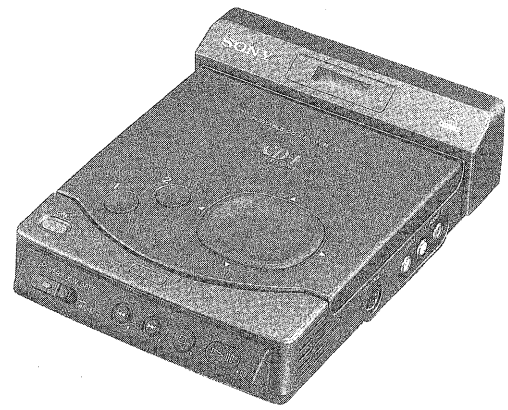
IVO-N7

SERVICE MANUAL

US Model
Japanese Model



The model IVO-N7 is equivalent to the previous model IVO-V11 (Japanese Model is V10), but the LCD block, terminal input function and built-in speaker are delete and the communication port RS232C (2 CH) is added in IVO-N7. Refer to Operation Manual (9-973-352-21) of IVO-11 for the description of major circuit.

Model Name Using Similar Mechanism	IVO-V11
OPTICAL Device Mechanism Name	KSM-311AAM

SPECIFICATIONS

System

Model	Compact Disc Digital Audio and Compact Disc Interactive System
D/A conversion	16-bit (44.1 kHz) linear, 8-bit (37.8 kHz)/4-bit (37.8 kHz/18.9 kHz) non-linear
Video signal	EIA standard NTSC color (initial display non-interlaced)

Input and output connectors

Video connector	Phono jack (1), 1 Vp-p, 75 ohms unbalanced, sync negative
Audio connector	Phono jacks (2: L, R) –1.6 dBs, impedance less than 10 kilohms
CONTROL R	8-pin mini DIN (1)
SERIAL PORT connector	D-sub 9-pin (1)
PHONES	Stereo minijack (ϕ3.5) (1)

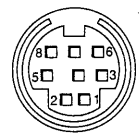
General

Power requirements	Battery mounting surface input: 6 V (battery pack), 7.5 V (AC power adaptor)
Power consumption	Approximately 6 W
Operating temperature	5°C to 35°C (41°F to 95°F)
Dimensions	144 x 54 x 201 mm (5 3/4 x 2 1/4 x 8 in.) (w/h/d)
Mass	Approximately 0.9 kg (2 lb)
Supplied accessories	See page 6

Interface

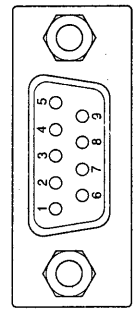
The player comes with two interface connectors for connection with external devices. The SERIAL PORT connector (D-sub 9-pin) can connect to serial communication devices such as a modem (in this case a CD-I software program, not supplied, is required). The CONTROL R connector allows you to attach a commercially available CD-I controller such as a mouse. For details, refer to the operating instructions that come with the devices. Below are the pin assignments of the two connectors.

CONTROL R connector



Pin	Signal	Pin	Signal
1	N.C.	5	GND
2	RXD	6	—
3	—	7	RTS
4	—	8	+5 V

SERIAL PORT connector



Pin	Signal	Pin	Signal
1	CD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	GND		

PORTABLE CD-I PLAYER

SONY®

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

Do not open the cabinet. Refer servicing to qualified personnel only.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

For the customers in the USA

CAUTION
You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Note
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

— Reorient or relocate the receiving antenna.
— Increase the separation between the equipment and receiver.
— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.

CAUTION
The use of optical instruments with this product will increase eye hazard.

As the laser beam used in this CD-I player is harmful to the eyes, do not attempt to disassemble the cabinet.
Refer servicing to qualified personnel only.

WARNING !!

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMISSION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 25 cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

CAUTION:

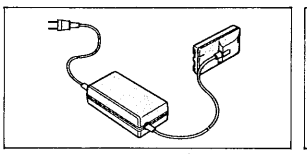
The use of optical instrument with this product will increase eye hazard.

CAUTION

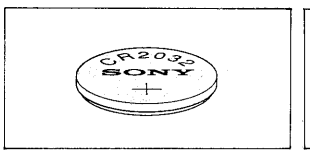
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Checking the Package Contents

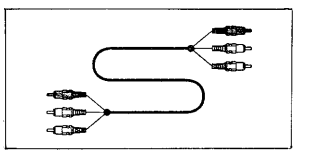
Make sure the following accessories are also included in the package. If any of them is missing, call your local Sony service facility.



AC-IV10 AC power adaptor (1 pc)



CR2032 Lithium battery (1 pc)



Audio/video connecting cord (1.5 m) (1 pc)

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer :

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.

2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.

3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.

4. Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recomment their replacement.

5. Check the B+ voltage to see it is at the values specified.

6. Flexible Circuit Board Repairing
   - Keep the temperature of the soldering iron around 270°C during repairing.
   - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

TABLE OF CONTENTS

- When removing the lithium battery (or when removing the bottom plate etc.), connect the AC power adptor to the AC power supply outlet.
  If the lithium battery is removed while power is not being supplied, the contents of the memory will be lost.

- Refer to the material to be published soon for how to back up the user data.

SERVICING NOTES

This is the check program for inspection.

This check program enables confirmation of unit's internal function during repair, check and maintenance of CD-I unit.
The commands to be used in DIAG mode are described here.

For operation of CD-I, see the "CD-I Programming Operation Manual" attached with the CD-I communication jig (U-BAX MK2).

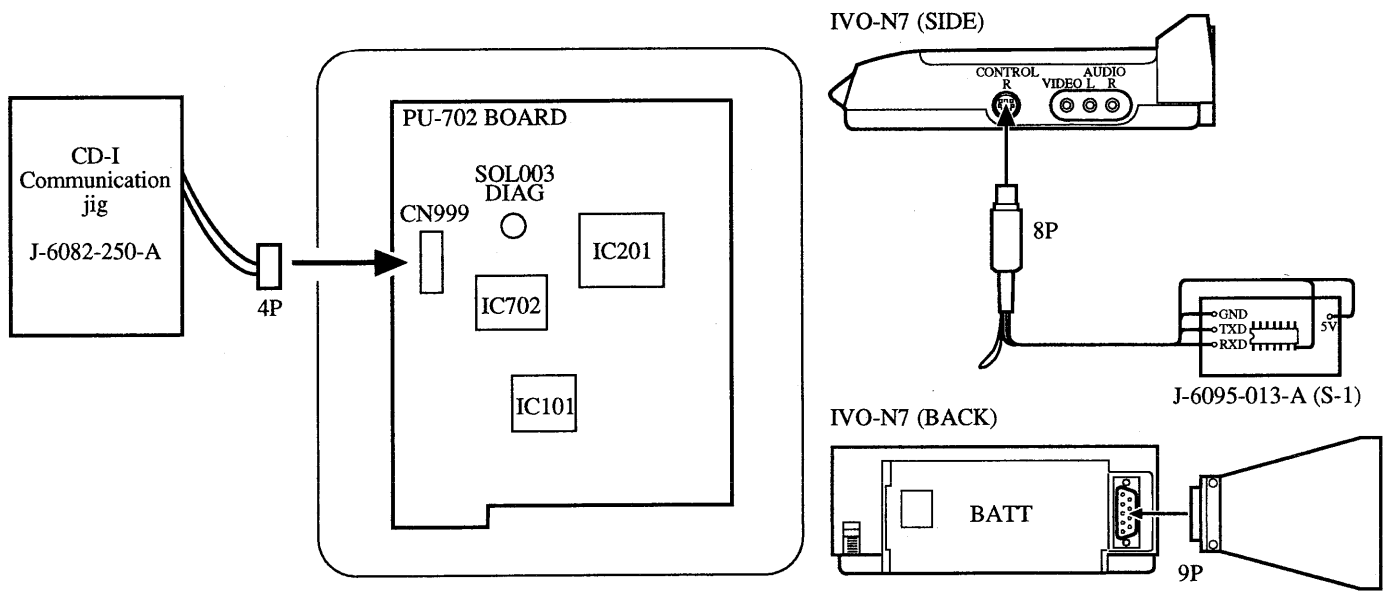
1) Jig

Name	Jig number
CD-I communication jig (U-BAX MK2)	J-6082-250-A
Serial port check jig S-1 : for DIN 8 Pin S-2 : for SERIAL PORT D-SUB 9 Pin	J-6095-013-A

2) DIAG mode

- When removing the lithium battery (or when removing the bottom plate etc.), connect the AC power adaptor to the AC power supply outlet.
  It the lithium battery is removed while power is not being supplied, the contents of the memory will be lost.

①Connect the lands of the printed wiring board SOL003 with soldering.
②Connect the jig to the input/output connector CN999.



Hardware Specifications

The hardware to be inspected has the following configuration.

MPU	= MC 68HC000 (15.1MHz)
ROM	= 1M bytes (0xC00000 ~ 0xCFFFFF)
RAM	= 1M bytes (0x000000 ~ 0x0FFFFF)
SRAM	= 8k bytes (odd addresses of 0xE00001 ~ 0xE03FFF are used.)
Timer	= 1 channel is used (in CXD8293Q)
Calendar	= RTC70 is used.(in CXD8293Q)
CDC/ADP	= CXD1197Q is used.
Input/output unit	= Terminal is used.
Serial interface	= 2 channels are used: for pointing device (μPD72001-RORT2) and for communication with terminal (in CXD8293Q)

Input/Output Specifications

Terminal is used as the input/output device.
Therefore, commands and parameters are received through serial interface and the results are output (displayed) through the serial interface.

Communication format with terminal should have the following format.

- Data format :
  1200bps, non-parity, 1 stop bit, and 7-bit data length.
- To output the result, the escape sequence is not used.
- To output the result, Xon (0x11) / Xoff (0x13) is used.

Opening

To begin execution, the following message is displayed.

When the Serial Initialization is completed, line is returned and "A" is displayed.

When the Set trap vector is completed, line is returned and "B" is displayed.

Opening message is then displayed.

The prompt '>' is displayed at the left end of screen prompting the command input.

```
A
B
                    Check Program Version **.**.**
>_(prompt is displayed, waiting for command input)
```

When an command is input now, the command is executed.

If faulty command or faulty parameter are input, the following display appears, prompting input of new command.

```
>3(if '3' is input as command)
bad command

>_(prompt is displayed, waiting for command input)

>all 10(if '10' is input as parameter)
invalid parameter
usage : all [e] or [n] {n : 1 - 9}

>_(prompt is displayed, waiting for command input)
```

Interrupt Exceptional Processing

If an exceptional processing (interrupt 2~255) occurs during execution of DIAG program, it is displayed.

- If bus error or address error occurs, the vector number and the address causing the interrupt, are displayed.

display) " The interrupt xxx has occurred. address = xxxxxx "

example) Bus error has occurred during DRAM check of all commands.

```
>all
 ROM Check Sum    = O. K.
 NVRAM Check      = O. K.
 DRAM Check       =      (When exceptional interrupt occurs, line is returned.)
 The interrupt 002 has occurred.  Address = 2000
                                          (After display, line is returned.)
 N. G.
```

- When other exceptional interrupt occurs, the vector number is displayed.

display) " The interrupt xxx has occurred. "

example) The exceptional interrupt 255 has occurred during execution of the t command.

```
>t
 The interrupt 255 has occurred.
```

Command Description

In the description of command and parameter, the parameter enclosed by '[', ']' is an option, indicating that it can be omitted.

The parameter enclosed by '<', '>' indicates that the data is hexadecimal data.

In the command input mode, back-space can be used.

The alphabetic letters do not discriminate between capital letters and small letters.

In hexadecimal data, '0' at the top of data is ignored that has no meaning.

F00, 0000F00, 0F00, and 0f00 are regarded to have the same meaning.

Command and parameter must be divided by inserting space. Also each parameters must be divided by inserting space.

```
>d  1001  30  s
```

List of DIAG command

On Line Manual for TIX-1, 2 DiAG SYSTEM Ver. 0.01 page 1/2

```
d <addr> [ <size> [s] ]                    - display data
f <add> <data (byte) > [ <size> [s]]       - fill
g <addr>                                   - go
k                                          - key status
s                                          - switch status
t                                          - tesrt CCD
a <n>            { n : 1}                  - soundmap play
at <n> <data>    { n : 1}                  - soundmap play with attenuator
time                                       - time
x                                          - cristal
r                                          - pointing device data
rt                                         - pointing device ID
l                                          - Disc label read
all [e] or [n]   {n : 1 - 9}               - auto check
```

On Line Manual for TIX-1, 2 DIAG SYSTEM Ver 0.01 page 2/2

```
put                                        - NVRAM down-load
get                                        - NVRAM up-load
bs                                         - SRAM backup set
setime yyyy/mm/dd hh:mm:ss                 - set time
va <n>           {n : 1 - 14}              - Plane-A video check
vb <n>           {n : 1 - 14}              - Plane-B video check
flt <n>          {n : 1 - 10}              - FL display check
sif [baud] [char] [stop] [parity]          - UART chip check
batt                                       - battery check
```

◎ d command (display data command)

SYNOPSIS : d < addr > [< size > [sw]]

< addr > = display start address (hex format)

< size > = number of pages to be displayed (hex format)

Default setting = 1 byte

sw = specifying access

's' = byte access and skip

'w' = word access

default setting = byte access and no skip

FUNCTION : When this command is entered, the data (content) from address < addr > to < size > is displayed in hexadecimal format.

The prompt is displayed, and the unit enters the mode waiting for command input.

When option parameter < size > is omitted, it is regarded that one byte size is specified.

When option parameter 's' is added, the data from < addr > is displayed every other byte.
(If the top address is even number, only even address data is displayed.
If the top address is odd number, only odd address data is displayed.)

When option parameter 'w' is added, the data (content) of < size > / 2 word from < addr > is displayed in hexadecimal format.
(When option parameter < size > is odd number, it is regarded that < size > + 1 is specified.
Also when the top address is odd number address, bus error will occur.)

RESULT DISPLAY : After command is received, line is returned.

Address and content of the data (within 16 bytes per line) is displayed in the next line.

```
>d <addr><size>
     address = <addr>: dd dd dd ····· dd
     address = <addr>+10: dd dd dd ····· dd
     ·····
>_
```

When option 's' is specified, and odd number or even address data only is going to be displayed, "xx" is displayed in the data area of the address which is not yet read.

example 1)
```
>d 300
 address = 0003000: F0
>_
```

example 2)
```
>d A00 20
 address = 000A00: 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f 10
 address = 000A10: 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f 20
>_
```

example 3)
```
>d 1001 30 s
 address = 001001: 81 xx 83 xx 85 xx 87 xx 89 xx 8b xx 8d xx 8f xx
 address = 001011: 91 xx 93 xx 95 xx 97 xx 99 xx 9b xx 9d xx 9f xx
 address = 001021: a1 xx a3 xx a5 xx a7 xx a9 xx ab xx ad xx af xx
>_
```

```
example 4>d A00 20 w
          address = 000A00: 0102 0304 0506 0708 090a 0b0c 0d0e 0f10
          address = 000A10: 1112 1314 1516 1718 191a 1b1c 1d1e 1f20
          >_
```

◎ f command (fill command)

SYNOPSIS : f < addr > < data > { < soze > {sw} }

```
<addr> = start address to write data (hex format)
<data> = one byte data to write (hex format)
<size> = number of data to be written (hex format)
          Default setting =1 byte
  sw = specifying access
          's' = byte access and skip
          'w' = word access
          default setting = byte access and no skip
```

FUNCTION : When this command is entered, the value of data from the address < addr > for the amount of < size > bytes is written.

The prompt is displayed, and the unit enters the mode waiting for command input.

When option parameter < size > is omitted, it is regarded that one byte size is specified.

When option parameter 's' is added, the data is written from < addr > every other byte.
(If the top address is even number, only even address data is written.
If the top address is odd number, only odd address data is written as much as specified.)

When option parameter 'w' is added, the value of data is written as much as < size > /2 words.
(When option parameter < size > is odd number, it is regarded that < size > + 1 is specified.
Also when the top address is odd number address, bus error will occur.)

RESULT DISPLAY : Nil
After command is received, line is returned.

example 1) > Write 0x65 data in the address 0x10000 for the amount of one byte.

```
>f 1000 65
>_
```

example 2) > Write 0x75 data in the address 0x20000 for the amount of 0x10 bytes.

```
>f 2000 75 10
>_
```

example 3) > Write 0xAA data in the address 0x30000 for the amount of 0x100 bytes with skip.

```
>f 3000 AA 100 s
>_
```

example 4) > Write 0x55AA data in the address 0x40000 for the amount of 0x100/2 words.

```
>f 3000 55AA 100 w
>_
```

◎ g command (go command)

SYNOPSIS : g < addr >

< addr > = Execution start address (hex format)

FUNCTION : When this command is entered, the program from the address < addr > is used for the sub – routine jump command and executed.

The prompt is displayed, and the unit enters the mode waiting for command input.

RESULT DISPLAY : Nil

After command is received, line is returned.

example) > Execute the program from the address 0x1000.

```
>g 1000
>_
```

◎ k command (key status command)

SYNOPSIS : k

FUNCTION : When this command is entered, the key status display mode is established.

The present key status is checked. If any change occurs, it is displayed.

By entering 'q' code, the unit exits from the key status display mode. The prompt is displayed, and the unit enters the mode waiting for command input.

In the key status display mode ;

When 1 key is pressed, "< 1. >" is displayed.

When 2 key is pressed, "< 2. >" is displayed.

When the upward pointing key is pressed, "< Up >" is displayed.

When the downward pointing key is pressed, "< Down >" is displayed.

When the rightward pointing key is pressed, "< Right >" is displayed.

When the leftward pointing key is pressed, "< Left >" is displayed.

When STOP key is pressed, "< Stop >" is displayed.

When PLAY/PAUSE key is pressed, "< Play >" is displayed.

When AMS next key is pressed, "< Next >" is displayed.

When AMS pre key is pressed, "< Pre. >" is displayed.

When any key is released, "[Rel.]" is displayed.

DISPLAY FORMAT : After command is received, line is returned, and the change status of key is displayed.

After 'q' code is received, line is returned.

example) >k
<1.> [Rel.] <2.> [Rel.] <Up> <Left> [Rel.] [Rel.] <Play> [Rel.]
<Next> [Rel.] <Pre.> [Rel.].....
('q' code input)
>_

◎ s command (switch status command)

SYNOPSIS : s

FUNCTION : When this command is entered, the status display mode is established.

The present statuses of default language of message LCD cover, CD cover, battery and external mouse are displayed.

If any change occurs, it is displayed.

By entering 'q' code, the unit exits from the key status display mode. The prompt is displayed, and the unit enters the mode waiting for command input.

In the status display mode, the followings are shown.

"Languag = English" or "Language = Japanese"

""CD Cover = Opened" or "CD = Closed"

"Battery = Full" or "Battery = Low" or "Battery = Empty"

"Ext. MOUSE = Attached" or "Ext. MOUSE = Removed"

CAUTION : In "Battery = Empty", the power is turned OFF so that no display is shown actually.

RESULT DISPLAY : After command is received, line is returned and the state is displayed.

After each states are displayed, line is returned.

example) >s
Language = English
CD Cover = Closed
Battery = Full
Ext. MOUSE = Attached
CD Cover = Opened
:
:
('q' code input)
>_

◎ t command (test cdd command)

SYNOPSIS : t

FUNCTION : When this command is entered, CDD enters the auto test state.

In the auto test state, the following keys to CD are valid.

- Play/Pause
- Stop
- AMS next
- AMS pre.

If Play key is pressed, and 1 button is pressed at the same time after CD lid is closed, CD starts playback.
(Both audio and data are played back.)

By entering 'q' code, the unit exits from the auto test state. The prompt is displayed, and the unit enters the mode waiting for command input.

After the processing is completed, prompt is displayed, and the unit enters the mode waiting for command input.

CAUTION : If 'q' code is entered to exit from the auto test state, press the Stop key to stop the CD.
If the CD is not stopped, the CDC/CDD related commands do not function.

RESULT DISPLAY : nil
After command is received, line is returned.

example) >t
('q' code input)
>_

◎ va command (Plane-A video check command)
◎ vb command (Plane-B video check command)

/* add the video off function./

SYNOPSIS : va <n>
vb <n>

<n> = type of display area (1, 2, 3, ... , 13)

FUNCTION : When the va command is entered, Plane-A test pattern is displayed on the monitor screen connected to the video output.

When the vb command is entered, Plane-B test pattern is displayed on the monitor screen connected to the video output.

The signal to display can be specified by the parameter <n>.

parameter <n> = 1 color bar 100%
= 2 color bar 75%
= 3 gray scale 16 steps
= 4 gray scale 5 steps
= 5 R scale 5 steps
= 6 G scale 5 steps
= 7 B scale 5 steps
= 8 100% white
= 9 50% white
= 10 0% black
= 11 100% red
= 12 15.4%G, 99.4%B and 99.7%R
= 13 rectangle
= 14 Video off

After command execution has completed, the prompt is displayed, and the unit enters the mode waiting for command input.

The display of this command confirms with CCIR recommendation.

RESULT DISPLAY : nil

After command is received, line is returned.

example 1) To display the 100% color bars on Plane-A.

```
>va 1
>_
```

example 2) To display the 100% white on Plane-B.

```
>vb 8
>_
```

◎ a command (soundmap play command)

SYNOPSIS : a <n>
<n> = 1

FUNCTION : When this command is entered, sound map data is played back.
The attenuation value is fixed. (LL : 00, LR : 80, RR : 00, RL : 80)

Type of playback data can be selected by the parameter <n>.
(There is only one type at present.)
<n> = 1 ---- A stereo (L=1.4 kHz, R=3 kHz).

Playback is repeated until 'q' code is entered.

By entering 'q' code, the soundmap playback is stopped. The prompt is displayed, and the unit enters the mode waiting for command input.

RESULT DISPLAY : After command is received, line is returned.

When error occurs, error message is displayed and line is returned.

example 1)
```
>a 1
('q' code input)
>_
```

example 2)
```
>a 1
 !!ERROR!!  ADP not ready
>_
```

◎ at command (soundmap play with attenuator command)

SYNOPSIS : at <n> <data> /* change data */
<n> = 1
<data> = attenuation value (8 digit hexadecimal data)

FUNCTION : When this command is entered, sound map data is played back with specified attenuation value.

Type of playback data can be selected by the parameter <n>.
(There is only one type at present.)
<n> = 1 ---- A stereo (L=1.4 kHz, R=3 kHz).

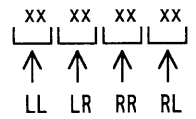
The attenuation value is specified by <data>.
If <data> is less than 8 digits of hexadecimal value, remaining digits are regarded as 0.
If it is more than 8 digits, the first 8 digits are valid.

Playback is repeated until 'q' code is entered.
By entering 'q' code, the soundmap playback is stopped. The prompt is displayed, and the unit enters the mode waiting for command input.

RESULT DISPLAY : After command is received, line is returned.

When error occurs, error message is displayed and line is returned.

example 1) >a 1
('q' code input)
>_
example 2) >a 1
!!ERROR!! ADP not ready
>_



◎ time command (time command)

SYNOPSIS : time

FUNCTION : When this command is entered, present data and time are read from the calendar IC (CXD8293Q) and are displayed.

After the command is executed, the prompt is displayed, and the unit enters the mode waiting for command input.

RESULT DISPLAY : After the command is received, line is returned, the date and time are displayed.

After date and time are displayed, line is returned.

example) >time
1991 08/23 20:20 30sec
>_

◎ setime command (set time command)

SYNOPSIS : setime yyyy/mm/dd hh : mm : ss

yyyy = year
mm = month
dd = day
hh = hour
mm = minute
ss = second

FUNCTION : When this command is entered, day and time are set in the calendar IC (CXD8293Q).

After the command is executed, the day and time that are set, are displayed. The prompt is displayed, and the unit enters the mode waiting for command input.

Each data are divided by either space, colon (:), semi-colon (;) or slash (/), and displayed.

The setting is in the unit of year anno Domini, and in 24 hours unit.

CAUTION : Sentence error is not checked.

If data are written only in the middle (i.e., year only, or year and month only), the data that have been entered so far, is set.

The range of data that can be entered ;
year = 1989~2087
month = 0~19
day = 0~39
hour = 0~39
minute = 0~79
second = 0~79.

The value for year exceeding this range cannot be received.
For the other values than year, the values smaller than these ranges are not received, but the previous values remain.
The values bigger than these ranges are received, but are returned to the allowable upper limits of these ranges.
For example, if 20 is entered as the value for month, it is returned to 0.

RESULT DISPLAY : After the command is received, line is returned, the date and time that are set, are displayed.

After date and time are displayed, line is returned.

example) >setime 1991/08/23 20:20:30
1991 08/23 20:20 30sec
>_

◎ x command (crystal command)

SYNOPSIS : x

FUNCTION : When this command is entered, CXD8293Q is set in the 16 kHz output test mode, waiting for entering 'q' code.

By entering 'q' code, the prompt is displayed, and CXD8293Q returns to the original state.

After the command is executed, the prompt is displayed, and the unit enters the mode waiting for command input.

RESULT DISPLAY : Nil
After command is received, line is returned and data is displayed.

example) >x
('q' code input)
>_

◎ r command (pointing device data command)

/* change the serial I/F Chip (uPD72001) */

SYNOPSIS : r

FUNCTION : When this command is entered, data of the external pointing device is displayed. It is continued until 'q' code is entered.

By entering 'q' code, the prompt is displayed, and the unit enters the mode waiting for command input.

When over-run error has occurred, "OE" is displayed.
When framing error has occurred, "FE" is displayed.

When external point device does not exist, 'not connected' is displayed.

RESULT DISPLAY : After command is received, line is returned and data is displayed.

Unto 18 data are displayed in one line, each of them are divided by a space.

After 'q' code is received, the line is returned.

example 1) >r
50 00 1F 50 00 10 50 00 10 50 00 11 50 00 03 70 09 01 70 13 00
60 15 00 60 13 00 60 11 00 . . . .
('q' code input)
>_

example 2) >r
not connected.
>_

◎ rt command (pointing device ID command)

SYNOPSIS : rt

FUNCTION : When this command is entered, ID of the external pointing device is checked and displayed.

After execution of the command is completed, prompt is displayed, and the unit enters the mode waiting for command input.

ID code is displayed as follows.
ID = xx (xx = 4D, 4A, 53, 54 or not connected)

```
4D = Relative coordinate  "M" : mouse
4A = Manoeuvering         "J" : pad
53 = Absolute screen      "S" : touch screen
54 = Absolute coordinate  "T" : tablet
```

If an external pointing device does not exist, 'not connected.' is displayed.

RESULT DISPLAY : After command is received, line is returned and ID is displayed.

Then the line is returned.

example 1)
```
>rt
 ID = 4A
>_
```

example 2)
```
>rt
 not connected.
>_
```

◎ I command (Disc Label Read command)

SYNOPSIS : I

FUNCTION : When this command is entered, the Disc Label (00 minu 02 second 16 block) is read to confirm that a group of letters "CD-I" start from the 2nd byte of data.

- When the group of letters "CD-I" is found correctly ;
  "CD-I Disc" is displayed.
- When CDC command cannot be sent ;
  "!!ERROR!! Command register is not ready" is displayed.
- When result of the command is not prepared ;
  "!!ERROR!! Not Ready Response" is displayed.
- When DMA error has occurred ;
  "!!ERROR!! DMA ERROR" is displayed.
- When type of disc is other than that of CD-I ;
  "!!ERROR!! Invalid Disc" is displayed.
- When disc does is not inserted, or CD lid has already been opened before ;
  "!!ERROR!! No Disc" is displayed.
- When CD lid is opened while disc label is being read ;
  "!!ERROR!! CD Open" is displayed.

RESULT DISPLAY : After command is received, result of command execution is displayed.

Then the line is returned.

example 1)
```
>I
 CD-I Disc
>_
```

◎ auto command (auto check command)

／＊ Sequence change, add uPD7200a check ＊／

SYNOPSIS : all [e]

[e] = Wait for inputting code after error is displayed.

FUNCTION : When this command is entered, eight items of peripheral devices are checked. Result is displayed.

When the option [e] is omitted, error existence or non-existence at each check is displayed and then proceeded to the next check automatically.

When the option [e] is specified, if error does not exist, the next check starts automatically. If error exists, select whether check of this item is continued or check of next item is started. Selection is done by inputting the selection code.

When code 'c' is entered, check of present item is continued.
When code 'n' is entered, check of present item is terminated and check of next item is started.

When codes other than the above are entered, they are ignored.

When all checks are completed, prompt is displayed, and the unit enters the mode waiting for command input.

CHECK CONTENT : The following checks will be done.

1. ROM check sum is inspected.
   - When all data of ROM are added, confirm that the lowest one byte is 0x00.

   When no error exists, the following is displayed ;

```
ROM Check Sum = O. K.
```

   When error occurs, and when [e] is not specified, the following is displayed ;

```
ROM Check Sum = 34,   N. G.
NVRAM Check =
 :
```

   When error occurs, and when [e] is specified ; the following is displayed.

```
ROM Check Sum = 34,  N. G.
press N key to next check. _
```

2. NVRAM is checked as follows ;
   - All areas are checked by first writing data (0x00) and then reading it.
   - All areas are checked by first writing data (0xFF) and then reading it.
   - All areas are checked by first writing data (lower bytes + middle bytes + higher bytes of address) and then reading it. The address = 0xE00001 is checked by the data 0x01 + 0x00 + 0xE0 = 0xE1.

   When no error exists, the following is displayed ;

```
NVRAM Check = O. K.
```

When error occurs, and when [e] is not specified, the following is displayed ;

```
NVRAM Check = N.G. address = aaaaaa, data = d1 -> d2
DRAM Check =
      :
```

When error occurs, and when [e] is specified ; the following is displayed.

```
NVRAM Check = N.G. address = aaaaaa, data = d1 -> d2
press N key to next check or C key to continue. _
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

3. DRAM is checked as follows.
   - All areas are checked by first writing data (0x00) and then reading it.
   - All areas are checked by first writing data (0xFF) and then reading it.
   - All areas are checked by first writing data (0x55AA) and then reading it.
   - For the 64k byte area starting from address = (0x100000 * n), the data of 64k byte area starting from address = (0xc10000 + (n * 3)) is written first, and then read.(n = 0 − F)

When no error exists, the following is displayed ;

```
DRAM Check = O.K.
```

When error occurs, and when [e] is not specified, the following is displayed ;

```
DRAM Check = N.G. address = aaaaaa, data = d1 -> d2
RTC70 Check =
      :
```

When error occurs, and when [e] is specified ; the following is displayed.

```
DRAM Check = N.G. address = aaaaaa, data = d1 -> d2
press N key to next check or C key to continue. _
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

4. CXD8293Q timer is checked as follows.

Checked whether the timer interrupt is generated.

When no error exists, the following is displayed ;
```
Timer Check = O. K.
```

When error occurs, and when [e] is not specified, the following is displayed ;
```
Timer Check = N. G.
8293Q Check =
        :
```

When error occurs, and when [e] is specified ; the following is displayed.
```
Timer Check = N. G.
press N key to next check. _
```

5. CXD8293Q is checked as follows.

This item checks whether calendar function works correctly.
(When the data in the "second" unit register is updated, the calendar function is working correctly.)

When no error exists, the following is displayed ;
```
CXD8293Q Check = O. K.
```

When error occurs, and when [e] is not specified, the following is displayed ;
```
CXD8293Q Check = N. G.
Timer Check =
      :
```

When error occurs, and when [e] is specified ; the following is displayed.
```
CXD8293Q Check = N. G.
press N key to next check. _
```

6. CXD8293Q is checked as follows.

- SCR register of the CXD8293Q is checked by first writing 0x00 – 0xFF data and then reading it.
- It is checked that the area (0x00000 – 0x7FFFF) can be switched between ROM and DRAM when MCR register of CXD8293Q is controlled.

When no error exists, the following is displayed ;
```
8293Q Check = O. K.
```

When error occurs, and when [e] is not specified, the following is displayed ;
```
8293Q Check = N. G. (MCR)
          or
8293Q Check = N. G. (SCR)
          or
8293Q Check = N. G. (MCR and SCR)

CXD1197 SRAM Check =

          :
```

When error occurs, and when [e] is specified ; the following is displayed.

```
8293Q Check = N.G. (MCR)
        or
8293Q Check = N.G. (SCR)
        or
8293Q Check = N.G. (MCR and SCR)

press N key to next check. _
```

7. SRAM of Sub-CPU is checked as follows.
   Result of diagnostics for Sub-CPU SRAM is checked and displayed.

   When no error exists, the following is displayed ;

```
Sub-CPU SRAM Check = O.K.
```

   When error occurs, and when [e] is not specified, the following is displayed ;

```
 Sub-CPU SRAM Check = N.G. address = aaaaaa, data = d1 -> d2
CXD1197Q SRAM Check =
        :
```

8. SRAM (32k bytes) of CXD1197Q is checked as follows.
   - All areas are checked by first writing data (0x00) and then reading it.
   - All areas are checked by first writing data (0xFF) and then reading it.
   - All areas are checked by first writing the data of 32k byte area starting from address = 0xC10000 and then reading it.
   - All areas are checked by first writing the data of 32k byte area starting from address = 0xC20000 and then reading it.

   When no error exists, the following is displayed ;

```
CXD1197Q SRAM Check = O.K.
```

   When error occurs, and when [e] is not specified, the following is displayed ;

```
CXD1197Q SRAM Check = N.G. address = aaaaaa, data = d1 -> d2
     or
CXD1197Q SRAM Check = N.G. DMA Error

Sub-CPU SRAM Check =
      :
```

   When error occurs, and when [e] is specified ; the following is displayed.

```
CXD1197Q SRAM Check = N.G. address = aaaaaa, data = d1 -> d2
press N key to next check or C key to continue. _
     or
CXD1197Q SRAM Check = N.G. DMA Error
press N key to next check. _
```

   aaaaaa specifies the address where error exists.

   d1 specifies the correct data that was written.

   d2 specifies the faulty data that was read.

When error occurs, and when [e] is specified ; the following is displayed.

```
Sub-CPU SRAM Check = N.G. address = aaaaaa, data = d1 -> d2
press N key to next check or C key to continue. _
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

9. UART (uPD72001) inspection.

```
>all 9
```

When no error exists, the following is displayed ;

```
 UART (uPD72001) Check = O.K.
>_
```

When error occurs, the following is displayed ;

```
 UART (uPD72001) Check =
 N.G. (Rx data ready Int.)  * PORT-1 Internal *
 Press Q key to next C key to continue. C
 N.G. (Control Signal Int.)  * PORT-1 External *
 Press Q key to next C key to continue. C
 N.G. (TX buffer empty Int.)  * PORT-1 External *
 Press Q key to next C key to continue. C
 N.G. (Framing Err)  * PORT-2 Internal *
 Press Q key to next C key to continue. Q
>_
```

Note : • Communication protocol (baud rate, char length, stop bit, parity) of UART (uPD72001) is set by the sif command or is set to the default setting activated by system reset.
• Use the J-6095-013-A jig for the all, all9 and SIF commands. Otherwise, an error occurs. Make sure to use the jig.

RESULT DISPLAY : When all checks shows O.K., the following is displayed.

example 1) When no error exists, the following is displayed ;

```
>all
 ROM Check Sum = O.K.
 NVRAM Check   = O.K.
 DRAM Check    = O.K.
 RTC7O Check   = O.K.
 Timer Check   = O.K.
 8293Q Check   = O.K.
 Sub-CPU SRAM Check = O.K.
 CXD1197Q SRAM Check = O.K.
 UART (uPD72001) Check = O.K.
>_
```

example 2) When error occurs, and when [e] is not specified, the following is displayed ;

```
>all
 ROM Check Sum = 34, N.G.
 NVRAM Check   = N.G. address = aaaaaa, data = d1 -> d2
 DRAM Check    = N.G. address = aaaaaa, data = d1 -> d2
 RTC7O Check   = N.G.
 Timer Check   = N.G.
```

```
82930 Check    = N.G. (MCR)
Sub-CPU SRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
CXD1197Q SRAM Check = N.G.  DMA Error
UART (uPD72001) Check =
>_(Prompt is displayed waiting for command input.)
N.G.  (Rx data ready Int.) * Port-1 Internal*
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

example 3) When error occurs, and when [e] is specified, the following is displayed ;

```
>all e
ROM Check Sum = 34,  N.G.
press N key to next check.  N
NVRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
press N key to next check or C key to continue.  C
NVRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
press N key to next check or C key to continue.  N
DRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
press N key to next check or C key to continue.  C
DRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
press N key to next check or C key to continue.  N
RTC70 Check = N.G.
press N key to next check.  N
Timer Check = N.G.
press N key to next check.  N
82930 Check = N.G. (SCR)
press N key to next check.  N
CXD1197Q SRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
press N key to next check or C key to continue.  C
CXD1197Q SRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
press N key to next check or C key to continue.  N
Sub-CPU SRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
press N key to next check or C key to continue.  N
UART (uPD72001) Check =
N.G.  (Rx data ready Int.)  * PORT-1 Internal *
Press N key to next c key to continue.  C
N.G.  (Control Signal Int.)  * PORT-1 External *
Press N key to next C key to continue.  C
N.G.  (Overrun Err)  * PORT-1 External *
Press N key to next C key to continue.  C
N.G.  (Rx data ready Int.)  * PORT-2 Internal *
Press N key to next C key to continue.  N
>_(Prompt is displayed waiting for command input.)
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

Note : Communication protocol (baud rate, char length, stop bit, parity) of UART (uPD72001) is set by the sif command or is set to the default setting activated by system reset.

◎ auto 2 command (single auto check command)

SYNOPSIS : all < n >

< n > = Items to be checked (1, 2, 3, ... , 8)

FUNCTION : When this command is entered, specified peripheral devices are checked. Result is displayed.

If error occurs, select whether check is continued or stopped. Selection is done by inputting the selection code.

When code 'c' is entered, check is continued.
When code 'q' is entered, check is terminated.
When codes other than the above are entered, they are ignored.

The items to be checked are specified by the parameter < n >.

parameter < n >. = 1 ROM Check Sum
= 2 NVRAM
= 3 DRAM
= 4 RTC70
= 5 Timer of CXD8293Q
= 6 CXD8293Q
= 7 CXD1197Q SRAM
= 8 Sub-CPU SRAM
= 9 UART (uPD72001)

CAUTION : Details for each item are same as those of 'auto' command

RESULT DISPLAY :

1. ROM check sum inspection.

```
>all 1
```

When no error exists, the following is displayed ;

```
 ROM Check Sum = O. K.
>_
```

When error occurs, the following is displayed ;

```
 ROM Check Sum = 34,  N. G.
>_
```

2. NVRAM inspection.

```
>all 2
```

When no error exists, the following is displayed ;

```
 NVRAM Check = O. K.
>_
```

When error occurs, the following is displayed ;

```
 NVRAM Check = N. G.  address = aaaaaa,  data = d1 -> d2
 press Q key to quit or C key to continue. _(wait for inputting code)
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

3. DRAM inspection.

```
>all 3
```

When no error exists, the following is displayed ;

```
 DRAM Check = O. K.
>_
```

When error occurs, the following is displayed ;

```
 DRAM Check = N. G.  address = aaaaaa,  data = d1 -> d2
 press Q key to quit or C key to continue._(wait for inputting code)
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

4. RTC70 inspection.

```
>all 4
```

When no error exists, the following is displayed ;

```
 RTC70 Check = O. K.
>_
```

When error occurs, the following is displayed ;

```
 RTC70 Check = N. G.
>_
```

5. CXD8293Q timer inspection.

```
>all 5
```

When no error exists, the following is displayed ;

```
 Timer Check = O. K.
>_
```

When error occurs, the following is displayed ;

```
 Timer Check = N. G.
>_
```

6. CXD8293Q inspection.

```
>all 6
```

When no error exists, the following is displayed ;

```
 8293Q Check = O. K.
>_
```

When error occurs, the following is displayed ;

```
 8293Q Check = N. G. (MCR)
       or
 8293Q Check = N. G. (SCR)
       or
 8293Q Check = N. G. (MCR and SCR)

>_
```

7. SRAM of Sub-CPU inspection.

```
>all 7
```

When no error exists, the following is displayed ;

```
Sub-CPU SRAM Check = O.K.
>_
```

When error occurs, the following is displayed ;

```
 Sub-CPU SRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
 press Q key to quit or C key to continue. _(wait for inputting code)
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

8. CXD1197Q SRAM (32k bytes) inspection.

```
>all 8
```

When no error exists, the following is displayed ;

```
 CXD1197Q SRAM Check = O.K.
>_
```

When error occurs, the following is displayed ;

```
 CXD1197Q SRAM Check = N.G.  address = aaaaaa,  data = d1 -> d2
 press Q key to quit or C key to continue. _(wait for inputting code)
       or
 CXD1197Q SRAM Check = N.G.  DMA Error
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

9. UART (uPD72001) inspection.

```
>all 9
```

When no error exists, the following is displayed ;

```
 UART (uPD72001) Check = O.K.
>_
```

When error occurs, the following is displayed ;

```
 UART (uPD72001) Check =
 N.G. (Rx data ready Int.)  * PORT-1 Internal *
 Press Q key to next C key to continue. C
 N.G. (Control Signal Int.)  * PORT-1 External *
 Press Q key to next C key to continue. C
 N.G. (TX buffer empty Int.)  * PORT-1 External *
 Press Q key to next C key to continue. C
 N.G. (Framing Err)  * PORT-2 Internal *
 Press Q key to next C key to continue. Q
>_
```

Note : • Communication protocol (baud rate, char length, stop bit, parity) of UART (uPD72001) is set by the sif command or is set to the default setting activated by system reset.
• Use the J-6095-013-A jig for the all, all9 and SIF commands. Otherwise, an error occurs. Make sure to use the jig.

◎ put command (NVRAM down-load command)

SYNOPSIS : put

FUNCTION : When this command is entered, all data in NVRAM are first converted to ASCII, then converted to Motorola S2 format and transmitted via serial port.

CAUTION : Communication protocol is 1200bps, 7-bits and Xon/off.
Data send does not start until Xon is first received.

If Xon (control + Q) does not arrive in one minute after command is received, it is recognized as the Time-out error.

It takes about 2 minutes 40 seconds to send all data.

RESULT DISPLAY : After command is received, line is returned and message is displayed. After message is displayed, Xon is waited and then data is transmitted.

After data is transmitted, line is returned and prompt is displayed.

When no error exists, the following is displayed ;

```
>put
sending..
>_
```

When error occurs, the following is displayed ;

```
>put
sending
!!ERROR!! Time out.
>_
```

◎ get command (NVRAM up-load command)

SYNOPSIS : get

FUNCTION : When this command is entered, data of Motorola S2 format is received from serial port, converted back to ASCII, and then written into NVRAM.

CAUTION : Communication protocol is 1200bps, 7-bits and Xon/off.

All the data before the Motorola S2 format data are ignored.

If data does not arrive in 1 minute after Xon is transmitted, it is recognized as the Time-out error.

After all data are received, they are written into NVRAM.

If error is found in data, error is displayed.

The data having error is not written into NVRAM.
It takes about 2 minutes 50 seconds to receive all data.

RESULT DISPLAY : After command is received, line is returned and message is displayed. After message is displayed, Xon is transmitted and then data is received.

After data is received, line is returned and prompt is displayed.

When no error exists, the following is displayed ;

```
>get
receiving...
>_
```

When error occurs, the following is displayed ;

```
get
receiving...

!!ERROR!!  Time out.

!!ERROR!!  Data Error.
Record Number = bbb.

!!ERROR!!  invalid record type.
Record Number = bbb.

!!ERROR!!  Not found start mark.
Record Number = bbb.

!!ERROR!!  data size not 88h.
Record Number = bbb.

!!ERROR!!  Check Sum = dddd1 -> dddd2.
Record Number = bbb.

!!ERROR!!  Not found end record.
Record Number = bbb.
```

```
!!ERROR!!  Not NVRAM address. address = aaaaaa
Record Number = bbb.

!!ERROR!!  not found stop character.
Record Number = bbb.

>_
```

bbb is the record number where error occurred.

dddd1 signifies the correct check sum. dddd2 signifies the actual check sum.

aaaaaa signifies the addresses that have exceeded NVRAM.

◎ bs command (SRAM backup set command)

SYNOPSIS : bs

FUNCTION : When this command is entered, test data is written into NVRAM and SRAM of Sub-CPU.

All areas of NVRAM are written by the data
(lower bytes + middle bytes + upper bytes of addresses).

For the address = 0xE00001,
data 0x01 + 0x00 + 0xE0 = 0xE1 is written.

Sub-CPU SRAM area 0x120C – 0x1A14 is written by the data
(lower bytes + upper bytes of addresses).

For the address = 0x07FF,
data 0x07 + 0xFF = 0x06 is written.

CAUTION : Be sure to use this command with bc command as a pair, because SRAM content is checked as follows. After test data is written, power is turned on and off, and then SRAM content is checked by the bc (SRAM backup check) command.

RESULT DISPLAY :
```
>bs
 NVRAM Write = O.K.
 SUB-SRAM Write = O.K.
>_
```

◎ bc command (SRAM backup check command)

SYNOPSIS : bc

FUNCTION : When this command is entered, the test data that was written in SRAM of Sub-CPU is checked by reading.

All areas of NVRAM are read and confirm that the data is (lower bytes + middle bytes + upper bytes of addresses).

For the address = 0xE00001,
confirm that the data is 0x01 + 0x00 + 0xE0 = 0xE1.

Sub-CPU SRAM area 0x120C – 0x1A14 is written by the data (lower bytes + upper bytes of addresses).

For the address = 0x07FF,
data 0x07 + 0xFF = 0x06 is written.

CAUTION : Be sure to use this command with bs command as a pair, because SRAM content is checked as follows. After test data is written, power is turned on and off, and then SRAM content is checked by the bs (SRAM backup set) command.

RESULT DISPLAY : When no error exists, the following is displayed ;

```
NVRAM Check = O. K.
SUB-SRAM Check = O. K.
>_
```

When error occurs, the following is displayed ;

```
NVRAM Check = N. G.  address = aaaaaa,  data = d1 -> d2
press N key to next check or C key to continue. _
Sub-CPU SRAM Check = N. G.  address = aaaaaa,  data = d1 -> d2
press Q key to quit C key to continue. _
>_
```

aaaaaa specifies the address where error exists.

d1 specifies the correct data that was written.

d2 specifies the faulty data that was read.

◎ flt command (Mini LCD test command)

SYNOPSIS : flt [n]

n ='1' – '10'

FUNCTION : When this command is entered, the Mini LCD is turned on and off.
The Mini LCD enters on/off mode by inputting the flt command, and exits by 'q' mode.
When < n > is omitted, it is regarded that all grids are selected.
When the flt command is entered, all elements of the Mini LCD.turns off.

RESULT DISPLAY :

example 1)
```
>flt
 0            -> All grids of FL tubes turn on.
 1            -> All grids of FL tubes turn off.
 ('q' code input)
>_
```

example 2)
```
> flt
 0            -> FL tube grid 5 turn on.
 1            -> FL tube grid 5 turn off.
 ('q' code input)
>_
```

Remarks : Grid assignment is shown below.

#1	#2	#3	#4	#5	#6	#7	#8
–	8	8	–	8	8	:8	8
remain repeat			1 all shuffle				
#10			#9				

◎ sif command (Serial Interface : RS-232C test command)

/* add */

SYNOPSIS : sif [baud] [char] [stop] [parity]
[baud] = 75, 150, 300, 600, 1200, 2400, 4800, 9600 (baud rate)
[char] = 7, 8 (Charactor length)
[stop] = 1, 2 (stop bit nelgth)
[parity] = n, o, e (parity : None, Odd, Even)

FUNCTION : When this command is entered, the following test for each of UART (uPD72001)'s PORT-1 (D-Sub) and PORT-2 (Mini DIN) /
- Internal Loop Back test
  1) Serial data check (TxD, RxD)
- External Loop Back test
  1) Control signal check (RTS, CTS, DCD, DTR, DSR, RI)

RESULT DISPLAY :
When no error exists, the following is displayed ;

```
>sif 9600 7 2 n
 Baud rate : 9600        +
 Char length : 7         +-> Setup data is displayed.
 Stop bit : 2            +
 Parity : n              +
 *** PORT-1 (D-Sub 9pin) ***         -> PORT-1 test is started.
 =Internal Loop back test=           -> Internal test is started.
   Serial Data Check :
     Input any string  !!  * PORT-1 Internal *    -> Waiting for input.
 akakakakakakak
 akakakakakakak
     Input any string  !!  * PORT-1 Internal *    -> Waiting for input
 (Interrupted by 'q' code input.)
 =External Loop back test=           -> External test is started.
   Control Signal Check : OK
   Serial Data Check :
     Input any strubg  !!  * PORT-1 External *    -> Waiting for input.
 jdslfjsdfjsdjf
 jdslfjsdfjsdjf
     Input any string  !!  * PORT-1 External *    -> Waiting for input.
 (Interrupted by 'q' code input.)
 *** PORT-2 (min DIN 8pin)***        -> PORT-2 test is started.
 =Internal Loop back test=           -> Internal test is started.
   Serial Data Check :
     Input any string  !!  * PORT-2 Internal *    -> Waiting for input.
 fdsflkjsdfjs
 fdsflkjsdfjs
     Input any string  !!  * PORT-2 Internal *    -> Waiting for input.
 (Interrupted by 'q' code input.)
 =External Loop back test=           -> External test is started.
 Control Signal Check : OK
 Serial Data Check :
     Input any string  !!  * PORT-2 External *    -> Waiting for input.
 kfodapkfdap
 kfodapkfdap
     Input any strubg  !!  * PORT-2 External *    -> Waiting for input.
 (Interrupted by 'q' code input.)
 O.K.
>_
```

When error occurs the following is displayed :

```
*** PORT-1 (D-Sub 9pin) ***        -> PORT-1 test is started.
=Internal Loop back test=          -> Internal test is started.
  Serial Data Check :
   Input any string  !!   * PORT-1 Internal * -> Waiting for input.
akakakakakakak
N.G. (Rx data aready Int.) * PORT-1 Internal *
Press Q key to next C key to continue. C
=External Loop back test=          -> External test is started.
  Control Signal Check :
N.G. (Control Signal Int.)  * PORT-1 External *
Press Q key to next C key to continue. Q
>_
```

Note : Sequence of input parameter cannot be changed.
Parameter can be omitted. (The followings or all.)

```
sif 9600 (as baud                                          -> Bad form
sif 9600 (as baud) 1 (as stop) -> char, parity omitted     -> Bad form
```

When omitted, current setup is maintained.
Default setting by system reset is as follows :

```
baud =      1200
char =      7
stop =      1
parity =    n(none)
```

Note :

- Communication protocol (baud rate, char length, stop bit, parity) of UART (uPD72001) is set by the sif command or is set to the default setting activated by system reset.
- Use the J-6095-013-A jig for the all, all9 and SIF commands. Otherwise, an error occurs. Make sure to use the jig.

◎ batt command (battery check command)

SYNOPSIS : batt

FUNCTION : When this command is given, the unit enters the battery condition display mode.

In this mode, present battery condition is displayed. If the battery condition changes, the new condition is displayed at the point of change.

By entering 'q' code, the unit exits from the battery condition display mode. The prompt is displayed, and the unit enters the mode waiting for command input.

The following messages are displayed ;

"Battery = Full"
"Battery = Low"
"Battery = Empty"

CAUTION : When battery voltage becomes the condition of "Empty", power of the unit is turned OFF, normally. However, during the battery condition display mode, this circuit is masked so that power of the unit is not turned OFF. When the unit exits the battery condition display mode, this mask is removed.

If 'q' code is entered in the condition of "Battery = Empty", the unit exits the battery condition display mode, and power of the unit is turned OFF.

DISPLAY FORMAT : After command is received, line is returned, and change of battery condition is displayed.

One condition is displayed in one line. After display, line is returned.

After 'q' code is received, line is returned.

example)
```
>batt
 Battery = Full
 Battery = Low
 Battery = Empty
         :
('q' code input)
>_
```

◎ h command (help command)

SYNOPSIS : h

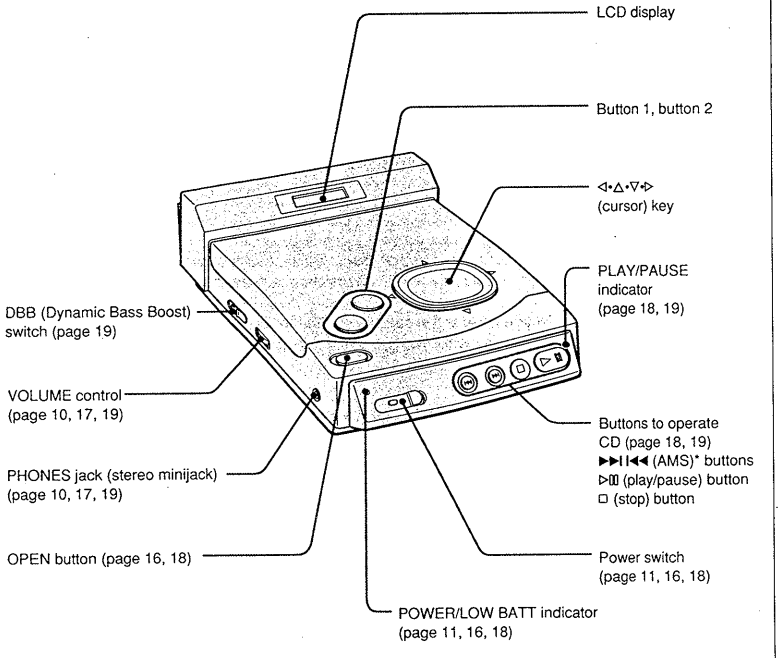
FUNCTION : When this command is entered, operating method of each command is simply displayed.

example) >h

```
d <addr> [ <size> [s] ]                    -display data
f <addr> <data (byte)> [ <size>[s] ]       - fill
g <addr>                                   - go
k                                          - key status
                        :
                        :
                        :
            Next Page - RETURN KEY
            Quit Help ='q' KEY
 ('q' code input)
>_
```

Identifying the Parts

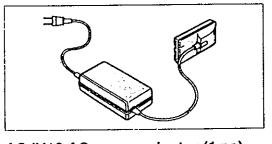
Numbers in parentheses indicate page numbers for detailed description.



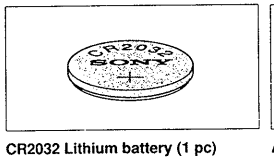
* AMS: Automatic Music Sensor, a function used for detecting the beginning of a selection.

Checking the Package Contents

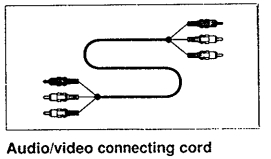
Make sure the following accessories are also included in the package. If any of them is missing, call your local Sony service facility.



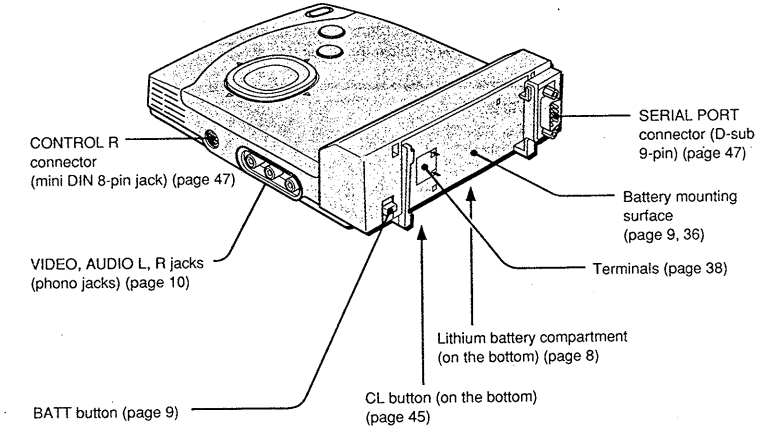
AC-IV10 AC power adaptor (1 pc)
(page 9)



CR2032 Lithium battery (1 pc)
(page 8)



Audio/video connecting cord (1.5 m) (1 pc)
(page 10)



CONTROL R connector
Use this connector to connect to CD-I controllers such as a CD-I mouse (not supplied). Always turn off the player before connecting the CD-I controller; otherwise a malfunction may occur. (For detailed connection information, refer to the operating instructions that come with your CD-I mouse.) When the mouse is connected, a pointer (e.g.↖) will appear on the TV.

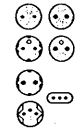
SERIAL PORT connector
Use this connector to connect to serial communication devices such as a modem. Always turn off the player before connecting or removing a serial communication device; otherwise a malfunction may occur. (For detailed connection information, refer to the operating instructions that come with your communication device.)

This section is extracted from instruction manual.

Using the CD-I Player Abroad

Each country has its own electricity and TV color systems. Before using your CD-I player abroad, check the following points.

You can use the CD-I player in any country with the supplied AC power adaptor within 100V to 240V AC, 50/60 Hz. If you cannot attach the power adaptor to an AC outlet, use a power cord plug adaptor (not supplied). The following is a list of the shape of AC outlets and the appropriate power cord plug adaptor required.

AC Outlet Type						
Required Plug Adaptor	Mainly in North America and South America No special plug adaptor is required.				 Mainly in Europe	 Mainly in Australia

The CD-I player is based on the NTSC color system. The TV must be based on the NTSC system or PAL-M system with NTSC/PAL-M transcoder. Check the following alphabetical list.

NTSC system countries

Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the USA, Venezuela, etc.

PAL system countries

Australia, Austria, Belgium, China, Denmark, Finland, Germany (former West Germany), Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

PAL M system country

Brazil

PAL N system countries

Argentina, Paraguay, Uruguay

SECAM system countries

Bulgaria, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, former Soviet Union, etc.

You can use the world time clock function abroad. For details, see page 26.

Features

The player must be connected to a TV equipped with video and audio input jacks. It offers the following features. Be sure to read the "Before You Begin" section (page 8) before you operate it.

CD-I Discs (page 16)
The player lets you enjoy on a TV both video and audio recorded on a CD-I disc.

Clock/Calendar/World Time Clock (page 22)
The player comes with clock, calendar and world time clock functions for display.

Compact Discs (page 18)
The player can play regular compact discs (CD).

Language Switching (page 11)
You can select English or Japanese as the language for use in the control panels (page 11) and messages (page 42).

What is CD-I?

CD-I (Compact Disc Interactive) is a type of multimedia technology. Each CD-I disc contains video, audio, and text data, as well as a program to manage them. Such design allows you to interact with the disc to determine how the program should proceed, thus making the process a lot of fun.

Playing a CD-I disc is simple: All you need is the cursor key, button 1, and button 2. The cursor key lets you move around within a CD-I program, while the two buttons trigger actions.

Discs the CD-I Player Can Play

The player can play three formats of discs. Before you insert a disc, make sure its logo is listed in the table below.

Disc Formats	CD-I	CD		CDV (Video cannot be displayed)
Disc Logo	COMPACT disc Interactive	CD SINGLE	COMPACT disc DIGITAL AUDIO	CD VIDEO CDV
Disc Type	CD-I discs	8-cm CD singles	CD	CDV
Size	8 or 12 cm	8 cm	12 cm	12 cm
See Page	16	18		

Some CD-I discs may also contain audio tracks (similar to those on regular compact discs).

A disc that is based on specifications of bridge format, such as Photo CD, can be played on this machine in the same way of playing CD-I discs.

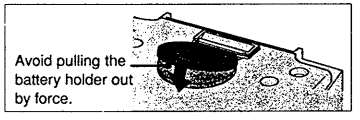
Before You Begin

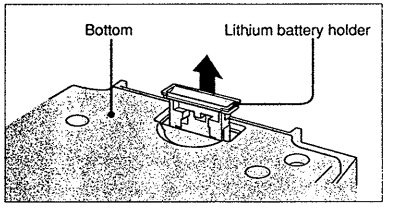
The following setups prepare the CD-I player for operation, so be sure to complete them before you start using the player.

Setup 1: Inserting the Lithium Battery

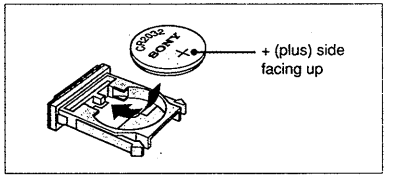
The supplied lithium battery keeps the internal clock running even when the player is not supplied with power from other sources. To insert the battery, follow the steps below.

1 Pull out the lithium battery holder.
If necessary, use a coin (or similar object) to pull out the battery holder as indicated.

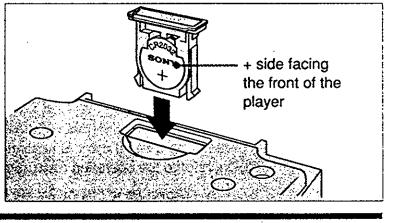




2 Insert the supplied lithium battery into the holder.



3 Put the battery holder back into the player.



Replacing the lithium battery
The lithium battery lasts for about 2 years. When it becomes dead, replace it as follows:
1 Connect the player to a power source (page 9).
2 Replace the used lithium battery with a new one.
If the player is not connected to a power source when you replace the lithium battery, the memory contents of the player will be lost, and you need to set the date and time again.

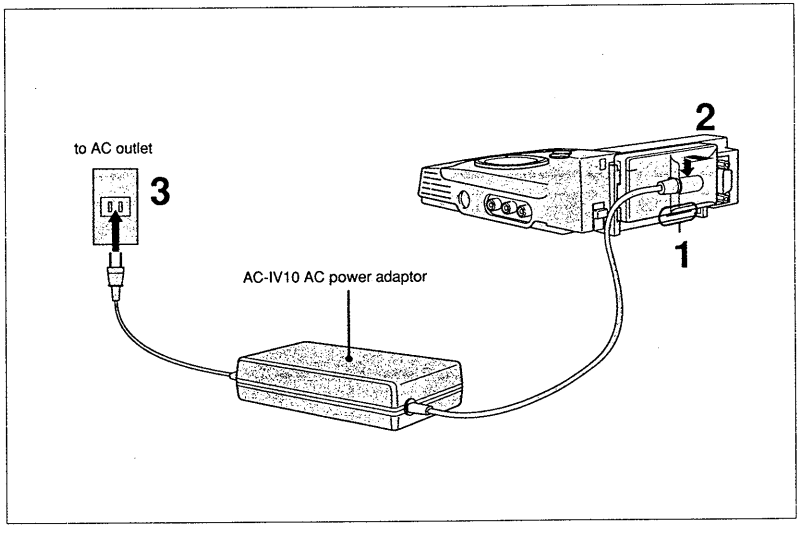
Replace the battery with a Sony CR2032 or Duracell DL-2032 lithium battery. Use of any other battery may present a risk of fire or explosion.

Lithium battery
- Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.
- Before use, wipe the battery with a dry cloth to ensure good contact.
- Insert the battery with the correct polarity.
- Do not hold the battery with metalic tweezers, otherwise a short-circuit may occur.

WARNING
Battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

Setup 2: Connecting to an AC Outlet

The player can work with AC power or a rechargeable battery pack (not supplied). The following describes how to connect the supplied AC-IV10 AC power adaptor. If you want to use the battery pack, see page 36 for details.

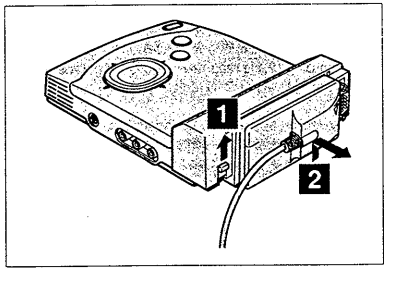


1 Align the bottom of the connecting plate with the line on the player.

2 While pressing the connecting plate, slide it as indicated.

3 Plug the AC power adaptor into an AC outlet.

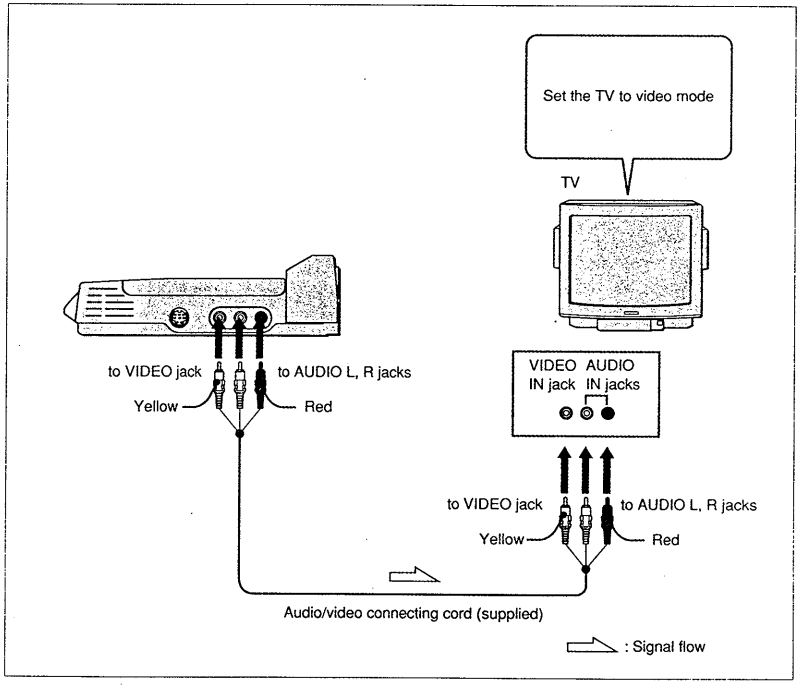
Removing the connecting plate
While pushing up the BATT button **1**, slide the connecting plate as indicated **2**.



Refer also to the operating manual that comes with the AC-IV10.

Setup 3: Connecting to a TV

Use the audio/video connecting cord (supplied) to connect the CD-I player to a TV equipped with audio and video input jacks. (For detailed connection information, refer to the operating instructions that come with the TV.) Then you can adjust the volume on the TV.



If the TV has only one AUDIO IN jack
This means the TV can only play monaural sound. The audio/video connecting cord VMC-915HG (pin plug (3) ↔ pin plug (2)) is recommended.Connect the black plug to the TV's AUDIO IN jack.

When using an audio/video connecting cord similar to the supplied one, use the white plug to connect to the AUDIO IN jack on the TV; do not use the red plug.

Using headphones
Plug a stereo mini plug-type headphones (e.g. those used for Walkman®) into the PHONES jack. Then use the VOLUME control to adjust the sound level. Try not to disturb people around you with the sound from your headphones.

Some CD-I discs or TVs may cause distortion to the picture on the TV.

Setup 4: Setting the Language, Date and Time

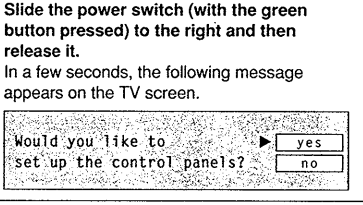
Some CD-I discs cannot function correctly if the date and time are not set correctly. Therefore, set the correct date and time before you operate the player.

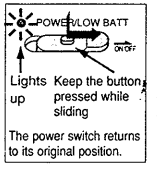
When setting the date and time, you must first specify the current time zone (page 14). If you later move to another location, you need to change the time zone and modify the time again. The valid range is from 1992 to 2041.

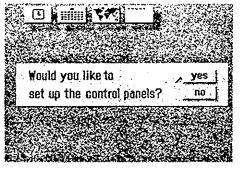
When shipped, the player has been set to use English as the display language. If necessary, you can change it to Japanese. This affects the control panel display (page 28) and messages (page 42).

Example: Setting to Paris, 3:30 pm, August 20, 1993

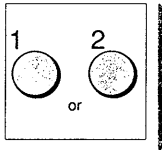
1 Slide the power switch (with the green button pressed) to the right and then release it.
In a few seconds, the following message appears on the TV screen.

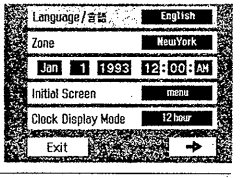




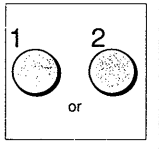


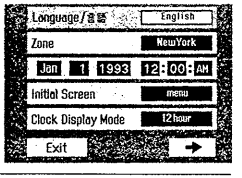
2 Make sure ▶ is pointing at [yes] (if necessary, press △ to move ▶), then press button 1 or button 2.
The control panel appears.





3 Press button 1 or button 2 again.
[English] is highlighted in black on white, indicating it is ready for change.

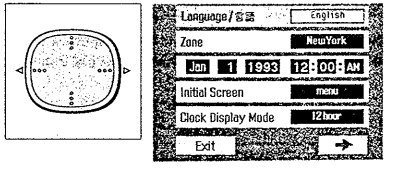




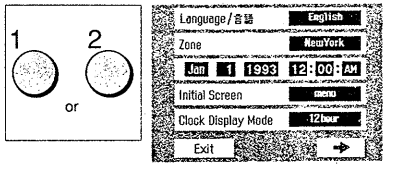
If [no] is selected in step 2
The initial screen appears. If this happens, turn off the player and try again, or do so when you operate the player again.

About the LCD display on the player
If you saw 00:00 flashing in step 1, this is because the date and time had not been set. The flashing will not occur after you have set the date and time.

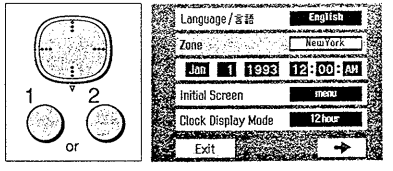
4 If necessary press ◁ or ▷ to select a new display language.



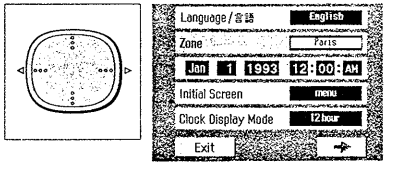
5 Press button 1 or button 2.
The display language is set.



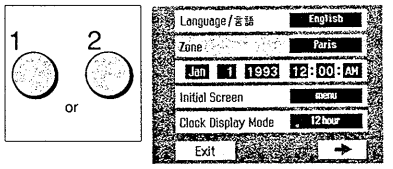
6 Press ▽, then press button 1 or button 2.
New York is highlighted in black on white, indicating that it is ready for change.



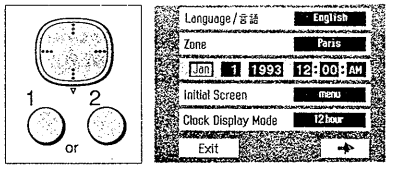
7 Press ◁ or ▷ until the desired zone appears (Paris in this example).
(See page 14 for the time zone chart.)



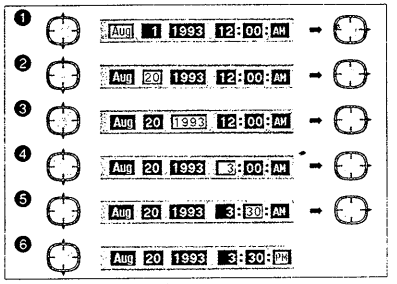
8 Press button 1 or button 2.
The time zone is set.



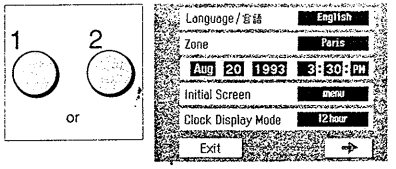
9 Press ▽, then press button 1 or button 2.
Jan is highlighted in black on white, indicating that it is ready for change.



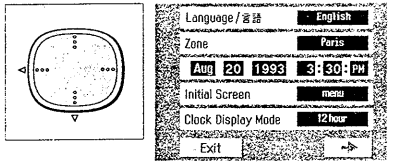
10 Set the date and time.
Press ▷ or ◁ to move to an item for change. Then press △ to increase or ▽ to decrease its value.
(Time is shown in 12-hour format.) The time set must be standard time. Otherwise, DS TIME will not be displayed correctly in the world time clock function (page 26).



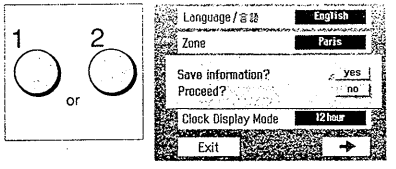
11 Using a local time-of-the-day service, press button 1 or button 2 to set the time.
The internal clock starts running. If you made a mistake, start from step 9 again.



12 Use ▽ and ◁ to highlight Exit .

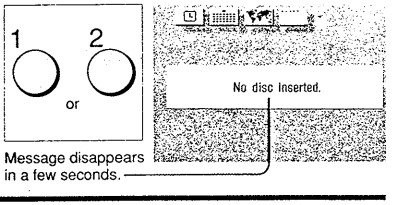


13 Press button 1 or button 2 to confirm.
The following message appears.



14 Make sure ▶ is pointing at yes (if necessary, press △ to move ▶). Then press button 1 or button 2.
The initial screen appears.

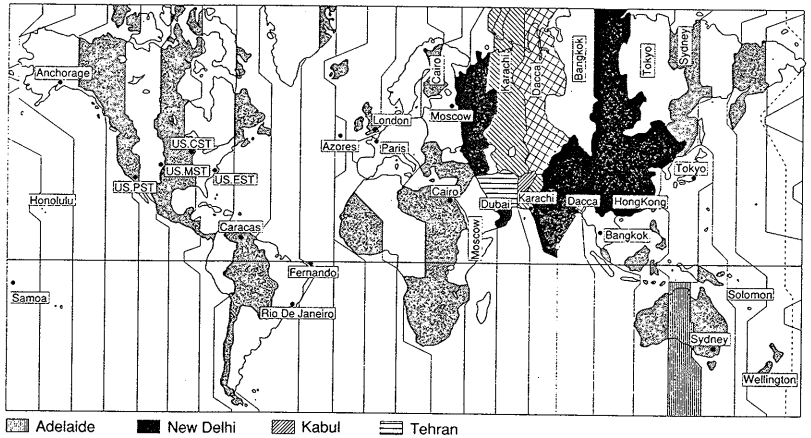
"no disc" appears on the LCD display, and disappers in a few seconds.



Correcting date and time
To correct, start from step 9. If you have already come to step 14, do the following:
1 Turn off the player (by sliding the power switch to the right and release it).
2 While holding button 1 and button 2 down, turn on the player. Do not release the buttons until the control panel appears.
3 Continue from step 9 on page 12 and make the correction.

Time Zone Chart

You can set the date and time for the desired country or area. For this reason, you need to set the time zone. The time zones are representative names of countries and areas.



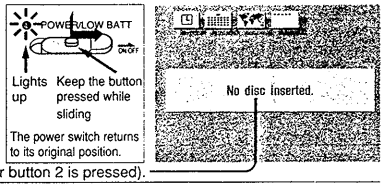
Zone name	Countries or areas
London	England, GMT (Greenwich Mean Time), Portugal
Paris	Austria, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland
Cairo	Egypt, Greece, Israel, Turkey
Moscow	Iraq, Kenya, Saudi Arabia, former USSR (west)
Tehran	Iran
Dubai	United Arab Emirates
Kabul	Afghanistan
Karachi	Moldives, Pakistan
New Delhi	India
Dacca	Bangladesh, India, Myanmar
Bangkok	Cambodia, Indonesia (Jakarta), Thailand, Vietnam
Hong Kong	Australia (west), China, Hong Kong, Indonesia (Bali, Borneo), Malaysia, Philippines, Singapore, Taiwan
Tokyo	Japan, Korea
Adelaide	Australia (central)
Sydney	Australia (east), Guam, Saipan
Solomon	New Caledonia
Wellington	Fiji, New Zealand
Samoa	Western Samoa
Honolulu	HST (Hawaii standard time), Tahiti
Anchorage	AST (Alaska standard time)
Los Angeles	PST (Pacific standard time)
Denver	MST (Mountain standard time)
Chicago	CST (Central standard time), Mexico
New York	EST (East standard time), Peru
Caracas	Chile, Venezuela
Rio de Janeiro	Argentina, Brazil
Fernando	Fernando de Noronha
Azores	Azores Islands

The countries and areas shown in the table are common names. They may be different from their formal names.

Playing a CD-I Disc

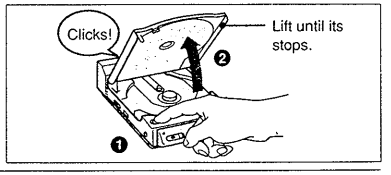
Playing a CD-I disc is simple: All you need is the cursor (◁ • △ • ▽ • ▷) key, button 1 and button 2. You must, however, have completed the steps described in the "Before You Begin" section (page 8-15).

1 Slide the power switch (with the green button pressed) to the right, then release it.
In a few seconds, the initial screen appears.

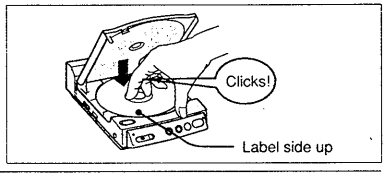


Message disappears in a few seconds (or when button 1 or button 2 is pressed).

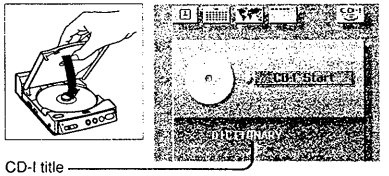
2 Press the OPEN button ❶ and open the disc cover ❷.



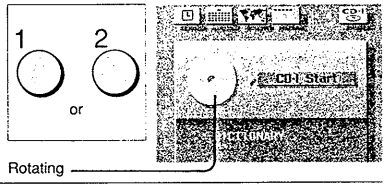
3 Put a CD-I disc into the disc compartment.
Push gently around the center of the disc until it clicks into place.



4 Close the disc cover.
[CD-I] appears on the initial screen.

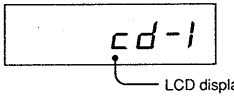


5 Press button 1 or button 2.
The CD-I disc starts playing.

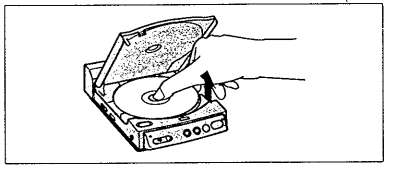


6 Adjust the speaker volume on the TV.

About the LCD display
When you insert a CD-I disc into the player, [cd-i] appears on the LCD display.
When you press button 1 or button 2 to play the CD-I disc, [cd-i] flashes and in a while changes from flashing to steady light.
As long as the disc is inserted in the player, the following message appears.



Removing a disc
Hold the disc as indicated, and remove it from the disc compartment. If it is hard to remove, try again 2 or 3 times, but do not remove it by force, otherwise the disc or the player may be damaged.



Turning off the player
Slide the power switch (with the green button pressed) to the right again, then release it.

Each CD-I disc may end its program differently, so be sure to refer to the disc instructions.

To play a multi-disc CD-I program
At the 2nd control panel, set to [Set Disc Handling : yes] (page 33).
The player will then keep the information about the last disc, when a new disc is inserted.

Some CD-I discs may take a longer time to start than others.
The TV screen appears in blue when a CD-I disc is starting up. This is not a malfunction.

When both [CD-I] and [CD] appear
This means the disc contains audio tracks (similar to those on regular compact disc) as well. [CD] will be selected and played. To play back the audio tracks, see page 18.

Using headphones
Plug a stereo mini plug-type headphones (e.g. those used for Walkman®) into the PHONE jack. Then use the VOLUME control to adjust the sound level. Try not to disturb people around you with the sound from your headphones.

When a CD-I disc is being played, the auto power-off feature (page 33) becomes inoperative.

Auto start (page 33)
At the 2nd control panel, if the CD-I auto start is set to [CD-I Auto Start : yes], the disc starts playing as soon as it is inserted into the player.

To play the CD-I disc when the clock, calendar, or world time clock is displayed (page 22)
1 Press the cursor key (◁ or ▷) until ▲ is pointing at [CD].
2 Press button 1 or button 2.
3 Make sure ▶ is pointing at [CD-I Start]. Press button 1 or button 2, and the CD-I disc starts playing.

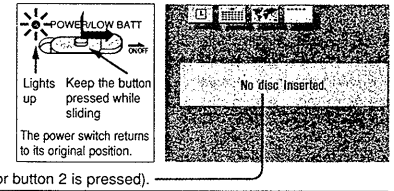
If you hear noise coming out from the player
This indicates the player is searching for information or the next scene. This is not a malfunction.

If ⛁ appears in front of a CD-I title
This indicates two or more CD-I discs are to be used. Multi-disc CD-I title handling can be modified at the 2nd control panel (page 33).

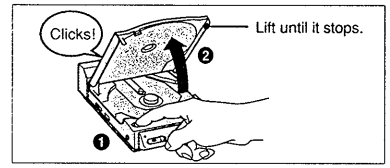
Playing a Compact Disc

The player can play regular compact discs (i.e. 8-cm CD singles). Before you start, make sure you have completed the steps described in the "Before You Bigin" section (page 8-15).

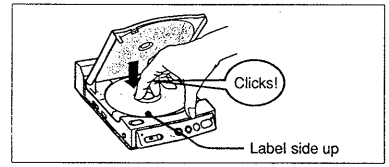
1 Slide the power switch (with the green button pressed) to the right, then release it.
In a few seconds, the initial screen appears.



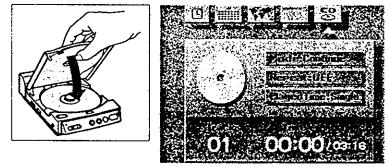
2 Press the OPEN button ❶ and open the disc cover ❷.



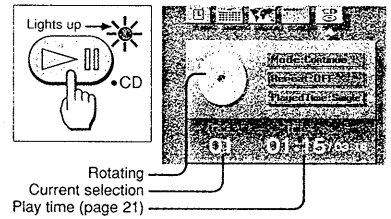
3 Put a compact disc into the disc compartment.
Push gently around the center of the disc until it clicks into place.



4 Close the disc cover.
CD appears, followed by the CD screen.

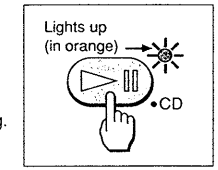


5 Press ▷II.
The compact disc starts playing.

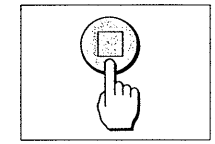


6 Adjust the speaker volume on the TV.

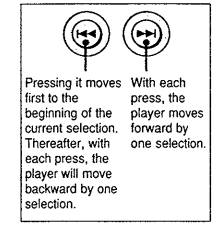
To pause
Press ▷II once. (The whole time display flashes during the pause.) Pressing it again resumes playing.



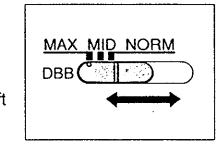
To stop
Press □.



To locate a desired selection



To listen to powerful bass sound
Slide the DBB switch (on the left side of the player) towards the left to increase the bass, and use the headphones (not supplied) to enjoy the effect. NORM is normal and MAX gives maximum bass. (The monitor speaker does not come with this function.)



To remove the CD disc
See "Removing a disc" section on page 17 for detailed description.

Sound tracks and time
When a compact disc is inserted, the total number of tracks (selections) and time will appear on both the LCD display and the TV screen in a few seconds.

Using headphones
Plug a stereo mini plug-type headphones (e.g. those used for Walkman®) into the PHONES jack. Then use the VOLUME control to adjust the sound level. Try not to disturb people around you with the sound from your headphones.

Displaying date and time functions
When the compact disc is being played, you can display the clock, calendar, or world time clock (page 22).

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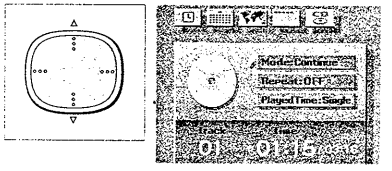
Selecting a Play Mode

For your music enjoyment, you can change and repeat the order of selections on the compact disc to be played. Up to six ways are listed on the next page for your choice.

Changing the order of selections

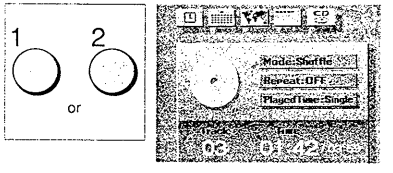
1 **Use △ or ▽ to move ▶ to [Mode].**



2 **Press button 1 or button 2.**
Each press changes the order as follows:

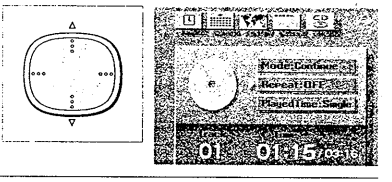
Shuffle → Single → Continue

See the table on page 21 for detailed description.

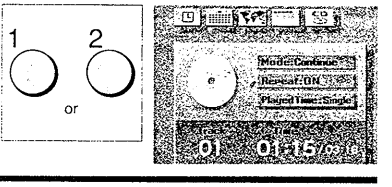


Repeating the order of selections

1 **Use ▽ or △ to move ▶ to [Repeat].**



2 **Press button 1 or button 2.**
Each press switches the repeat function ON or OFF. See the table on page 21 for detailed description.

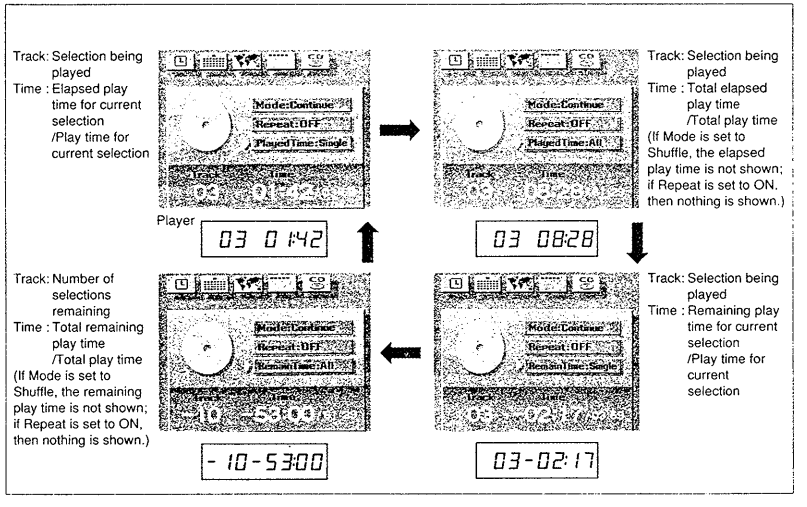


Compact disc play mode

Play mode	Set Mode to	Set Repeat to	TV Screen
Play all selections in natural order once.	Continue	OFF	Mode:Continue Repeat:OFF
Play all selections in natural order repeatedly.	Continue	ON	Mode:Continue Repeat:ON
Play all selections in random order once.	Shuffle	OFF	Mode:Shuffle Repeat:OFF
Play all selections in random order repeatedly.	Shuffle	ON	Mode:Shuffle Repeat:ON
Play a single selection once.	Single	OFF	Mode:Single Repeat:OFF
Play a single selection repeatedly.	Single	ON	Mode:Single Repeat:ON

Displaying the play time on the TV and the player

Use ▽ to move ▶ to [Played Time :] or [Remain Time :], and press button 1 or button 2. Each press changes the meanings of track and time as follows.

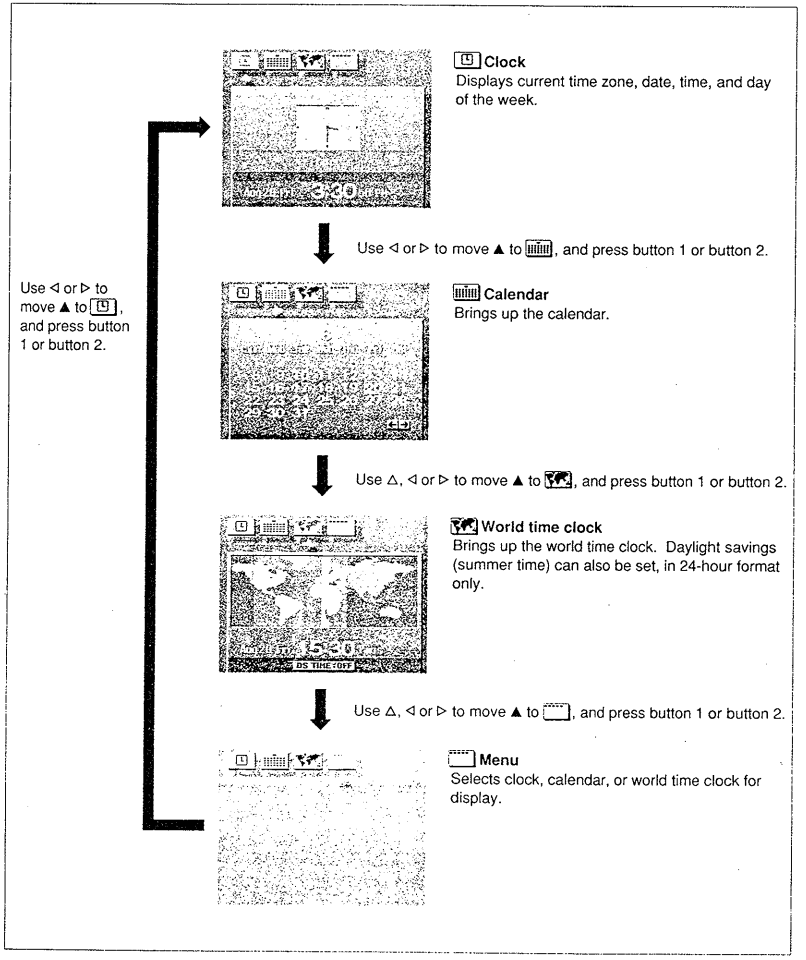


How to Select a Date and Time Function

Across the top of the initial screen are a number of icons (graphic symbols) each representing a function you can select. For example, the following illustration contains the clock, calendar, world time clock, and menu icons. If a CD-I disc or compact disc is inserted, its corresponding icon will also appear on the screen.

To display the time correctly, you must have completed the procedure described in the "Setup 4: Setting the Language, Date and Time" section (page 11).

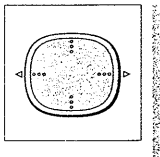
The following shows how to select a date and time function.

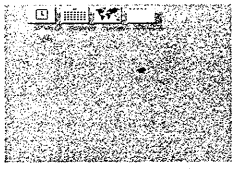


Using the Clock

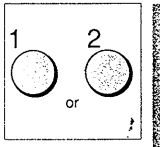
Selecting the [clock] icon displays the current time, date, and day of the week. This is also possible even when a compact disc is playing.

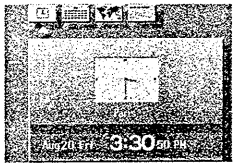
1 Use ◁ or ▷ to move ▲ to [clock].



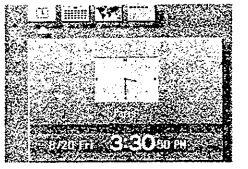


2 Press button 1 or button 2.
The clock appears.





If the selected language is Japanese, then the clock will appear as shown at the right.



Removing the clock display

1 Use ◁ or ▷ to move ▲ to [menu].
2 Press button 1 or button 2.

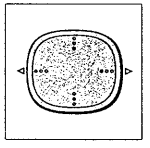
Time display format
The digital clock display can be set to either 12- or 24-hour format (page 28).

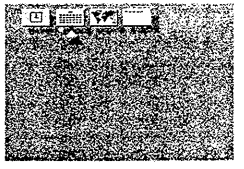
Selected time zone is displayed below the clock.

Using the Calendar

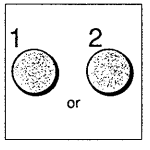
Selecting the icon brings up the calendar. This is also possible even when a compact disc is playing.

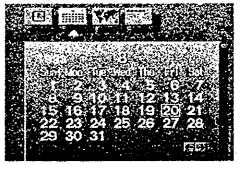
1 **Use ◁ or ▷ to move ▲ to .**





2 **Press button 1 or button 2.**
The calendar appears, showing the current month.





The display is the same when the selected language is Japanese.

Removing the calendar display

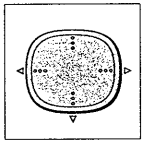
1 Use △, ◁ or ▷ to move ▲ to .
2 Press button 1 or button 2.

Calendar display format
The calendar display can be set to start from either Sunday or Monday (page 33).

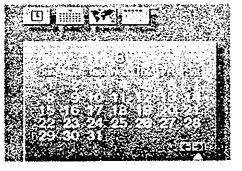
The clock is based on the standard time
Therefore, at midnights during the daylight savings period, the frame line (the square that marks the current day) will not move to the next day immediately; the movement will be delayed.

Displaying other months
When the current month appears, use the steps below to display other months.

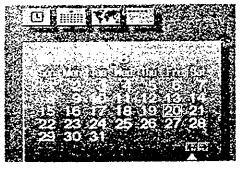
1 **Press ▽ once and ▲ will be pointing at or .**
displays the following month
displays the previous month
(If necessary, press ◁ or ▷ to move ▲.)



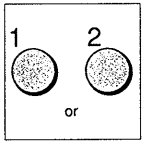
To display the following month



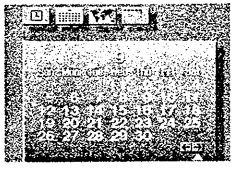
To display the previous month



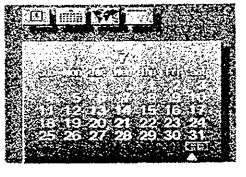
2 **Press button 1 or button 2.**
If ▲ is pointing at , each press moves the calendar to the following month.
If ▲ is pointing at , each press moves the calendar to the previous month.
To return ▲ to , press △.



To display the following month



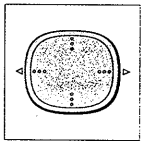
To display the previous month

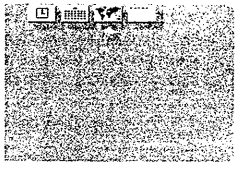


Using the World Time Clock

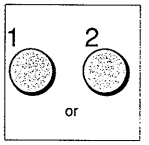
Selecting the 🗺 icon brings up the world time clock with the daylight savings (summer time) option. This is also possible even when a compact disc is playing.

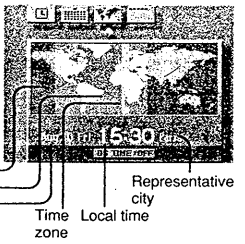
1 **Use ◁ or ▷ to move ▲ to 🗺.**



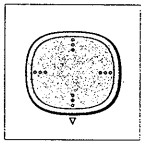


2 **Press button 1 or button 2.**
The world map appears, showing the date, local time, and representative city of the current time zone (highlighted in yellow).
The time is shown in 24-hour format.

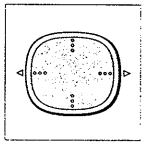


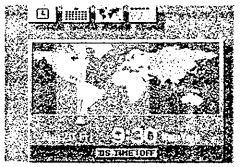


3 **To change the time zone, press ▽ to move ▲ to the bottom of the world map.**



4 **Use ◁ or ▷ to move ▲ to the desired time zone.**
The date, local time, and representative city of the desired time zone appear.





If the selected language is Japanese, then the clock will appear as shown at the right.

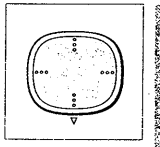
Removing the world time clock display

1 Use △, ◁ or ▷ to move ▲ to ⬜.
2 Press button 1 or button 2.

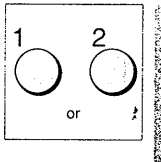
Effecting daylight savings time

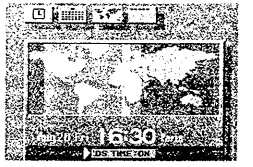
Set DS TIME (Daylight Savings Time) to ON.

1 **Use ▽ to move ▶ to DS TIME:OFF.**



2 **Press button 1 or button 2.**
The setting changes to DS TIME:ON and the daylight savings time is in effect. (In other words, the clock is moved forward by one hour.)
Pressing the button again returns to standard time.





✍ Setting the DS TIME affects only the world time clock, but not the clock.

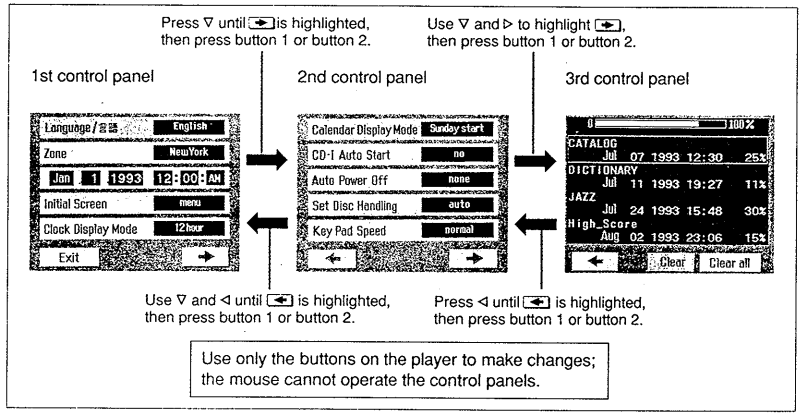
✍ Due to recent changes in the geography of Eastern Europe, the time zones in the player's world time clock are different from the actual ones.

Changing the CD-I Player Settings

The CD-I player has been configured at the factory to certain preset values (page 32, 33) so that you can enjoy CD-I programs as soon as possible. The only thing you must do when you operate the player the first time is set the language, date and time (page 11, 12, 13).

However, the CD-I player provides three control panels (as shown below) so that, if necessary, you can customize the player to your particular needs. (See page 32, 33 for a list of settings you can change.) When you want to do so, follow the procedure described below to make and save changes.

To move between the three control panels, use ▷ or ◁. ▷ advances to the next panel, while ◁ goes back to the previous one.



Use only the buttons on the player to make changes; the mouse cannot operate the control panels.

Making and Saving Changes

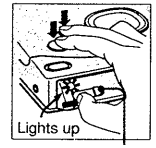
If the player is already on, turn it off.

See the above illustration for movement between the control panels, and see page 32, 33 for a list of settings that you can change.

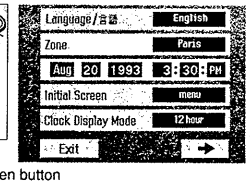
To restore to the factory preset values, see page 34; to cancel the changes, see page 35.

Example: Set the clock display mode to 24-hour format

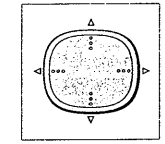
1 While holding both button 1 and button 2 down, turn on the player. Do not release the buttons until the 1st control panel appears.
The 1st control panel appears.

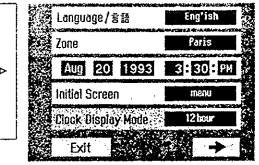


Slide the power switch (with the green button pressed) to the right, then release it.

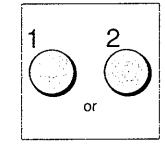


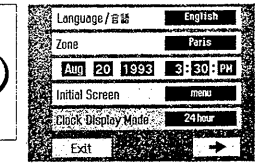
2 Press ◁, △, ▽, or ▷ to highlight the Clock Display Mode setting for change.





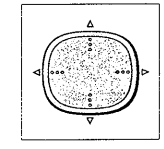
3 Press button 1 or button 2.
24-hour is selected.

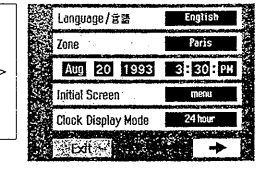




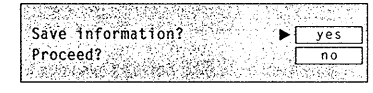
4 Repeat steps 2 and 3 to change other settings, if necessary.

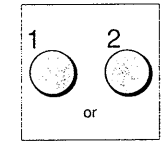
5 To end, use ◁, △, ▽, or ▷ to highlight Exit.

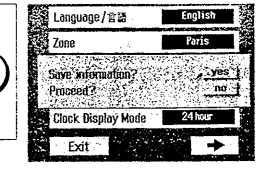




6 Press button 1 or button 2.
The following message appears.

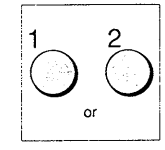


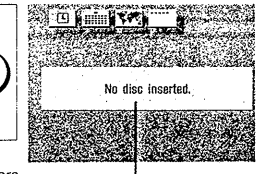




7 Make sure ▶ is pointing at yes, then press button 1 or button 2.
The changes are saved.
If ▶ is pointing at no, press △ to move ▶ to yes.

"no disc" appears on the LCD display, and disappears in a few seconds.





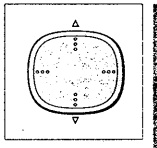
Message disappears in a few seconds.

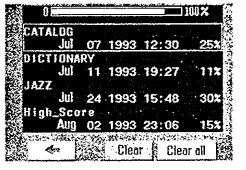
Clearing the Memory

The player contains memory which can store information — in the form of a file — about a disc played. Only some discs such as games can use this function. When the memory is full, you need to remove some or all of the files; otherwise an inserted disc cannot be played (page 16).

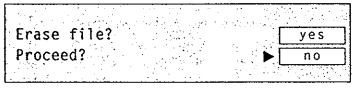
Removing one or more files

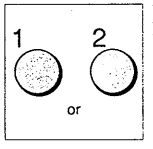
1 Bring up the 3rd control panel, then use △ or ▽ to move the frame line to the file for removal.

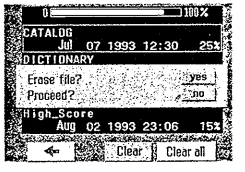




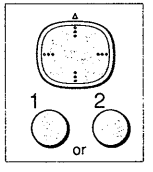
2 Press button 1 or button 2.
The following message appears.

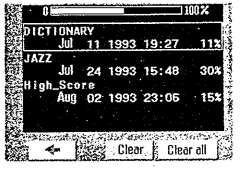






3 Press △until ▶ is pointing at [yes]. Then press button 1 or button 2.
The file is removed.
If you have selected [no] in step 2, then the file is not removed and the player returns to where it was in step 1.

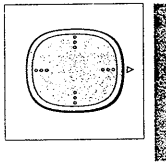


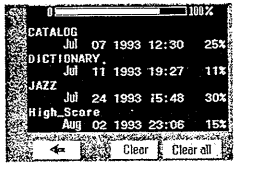


4 Repeat steps 1 to 3 to remove other files.

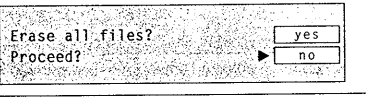
Removing all files

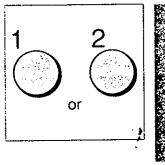
1 Press ▷ until [Clear all] is highlighted.

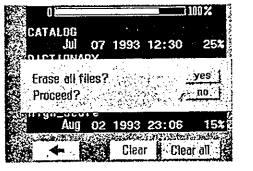




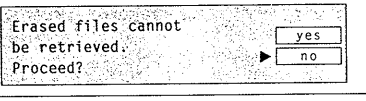
2 Press button 1 or button 2.
The following message appears.

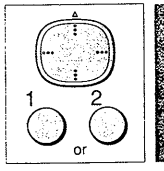


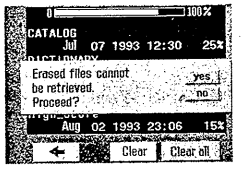




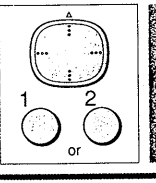
3 Press △until ▶ is pointing at [yes]. Then press button 1 or button 2.
The following message appears.
If you have selected [no], then the files are not removed and the player returns to where it was in step 1.

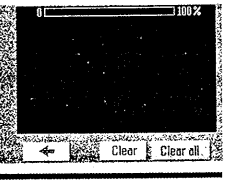






4 Press △until ▶ is pointing at [yes]. Then press button 1 or button 2.
All the files are removed.
If you have selected [no], then the files are not removed and the player returns to where it was in step 1.





Control panel settings

The following tables summarize the 1st, 2nd and 3rd control panel settings. Use the steps described in the "Making and Saving Changes" section (page 28) for changes. [E] means English and [J] means Japanese. When shipped, the player has been set to the English mode.

	Setting	Factory Preset Value	Description	When Button 1 or Button 2 is Pressed
1st Control Panel	[E] Language/ 言語	English	Set the display language (English or Japanese) for use in the control panels, messages, clock and world time clock.	[English] is displayed in cyan.
	[J] 言語/ Language	日本語		[日本語] is displayed in cyan.
	[E] Zone	New York	Set time zone (using representative city).	[New York] is displayed in cyan.
	[J] ゾーン	New York		[New York] is displayed in cyan.
	Date and time	[E] Jan 1 1993 12:00 AM	Set date and time for the selected time zone.	[Jan] is displayed in cyan.
		[J] 1993/1/1 12:00AM		[1993] is displayed in cyan.
	[E] Initial Screen	menu	Set initial screen to display when the player is turned on. If a CD-I or CD is inserted, the disc information will always be displayed instead.	menu → clock → calendar → world time clock
	[J] 初期画面	メニュー		メニュー→時計→カレンダー→世界時計
	[E] Clock Display Mode	12 hour	Set the digital clock display to the 12- or 24-hour format.	12 hour ↔ 24 hour
	[J] 時計表示	12時間		12時間↔24時間

	Setting	Factory Preset Value	Description	When Button 1 or Button 2 is Pressed
2nd Control Panel	[E] Calendar Display Mode	Sunday Start	Set the first day of the week to Sunday or Monday.	Sunday start ↔ Monday start
	[J] カレンダー表示	日曜始まり		日曜始まり↔月曜始まり
	[E] CD-I Auto Start	no	Enable auto start when a CD-I disc is inserted.	no ↔ yes
	[J] CD-Iオートスタート	しない		しない↔する
	[E] Auto Power Off	none	Automatically turn off the player at a preset time if no disc is played or if the date and time function is displayed.	none → 5 min → 10 min → 30 min
	[J] オートパワーオフ	なし		なし→5分→10分→30分
	[E] Set Disc Handling	auto	Handle multi-disc CD-I title (a program is recorded on multiple CD-I discs). If set to auto, the player will check for such feature; if set to yes, the player will always assume the disc is part of a multi-disc title. For details, see the manual that comes with the multi-disc CD-I title.	auto → yes → no
	[J] セットディスク対応	オート		オート→する→しない
	[E] Key Pad Speed	normal	Set how fast the markers or pointer should move when the cursor key is pressed during a CD-I disc operation.	normal → fast → slow
	[J] キー速度	普通		普通→速い→遅い
3rd Control Panel	[E] Clear	—	Remove some unnecessary files in the memory.	Messages appear.
	[J] クリア	—		
	[E] Clear all	—	Remove all the files in the memory.	Messages appear.
	[J] 全部クリア	—		

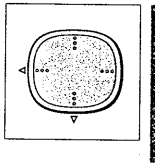
During the operation, the messages may be in English or Japanese depending on the selected language. For a list of the messages in English and Japanese, see page 42, 43.

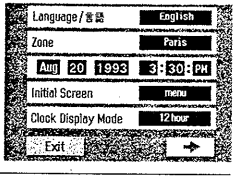
Restoring to the Factory Preset Values

You can use the 1st control panel (page 28) to restore all the settings to their factory preset values (page 32).

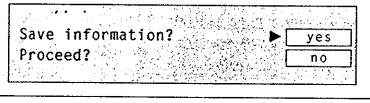
Note that this also changes the language, date and time. Therefore, when you operate the player again, you need to set them correctly (page 11).

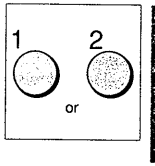
1 **Use ▽ and ◁ to highlight [Exit].**

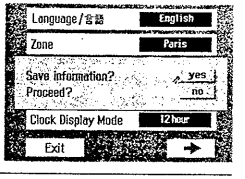




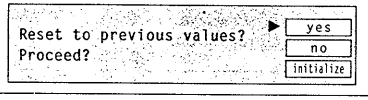
2 **Press button 1 or button 2.**
The following message appears.

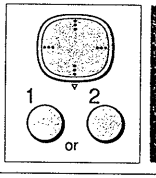


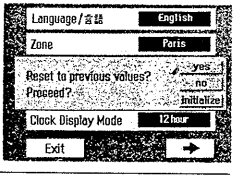




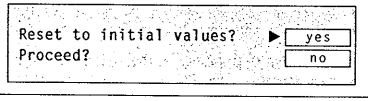
3 **Press ▽ until ▶ is pointing at [no]. Then press button 1 or button 2.**
The following message appears.

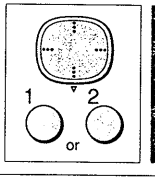


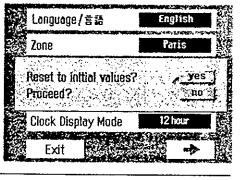




4 **Press ▽ until ▶ is pointing at [initialize]. Then press button 1 or button 2.**
The following message appears.

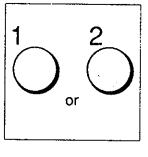


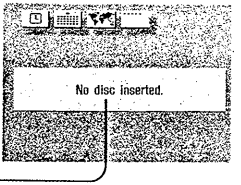




5 **Make sure ▶ is pointing at [yes], then press button 1 or button 2.**
All the control panel settings return to their factory preset values.
If ▶ is pointing at [no], press △ to move to [yes].

"no disc" appears on the LCD display, and disappears in a few seconds.



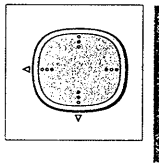


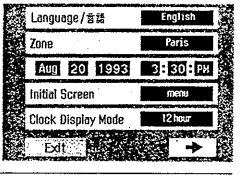
Message disappears in few seconds.

Canceling Changes

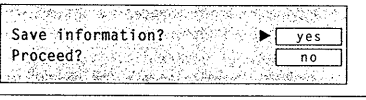
If you decide not to save changes made to the control panel settings, you can cancel them from the 1st control panel.

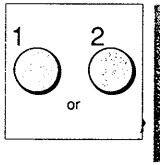
1 **Use ◁ and ▽ to highlight [Exit].**

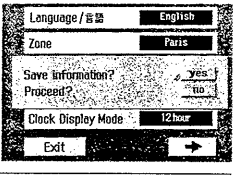




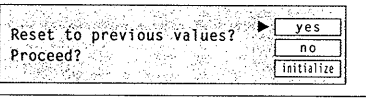
2 **Press button 1 or button 2.**
The following message appears.

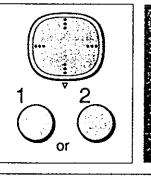


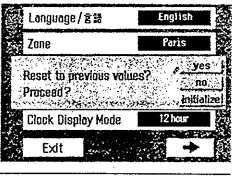




3 **Press ▽ until ▶ is pointing at [no]. Then press button 1 or button 2.**
The following message appears.

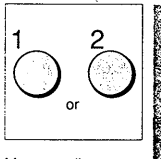


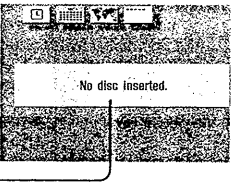




4 **Make sure ▶ is pointing at [yes], then press button 1 or button 2.**
All the control panel settings return to their previous values.
If ▶ is pointing at [no], press △ to move to [yes].

"no disc" appears on the LCD display, and disappears in a few seconds.





Message disappears in few seconds.

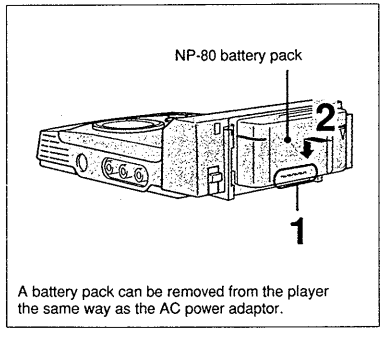
Choosing a Power Source

The player can also use a rechargeable battery pack besides AC power. (See the table at the bottom of this page.)

Battery Pack

A new battery pack must be charged. Also, if you use the BC-S10 battery charger or AC-S10 AC power adaptor, fully discharge the battery pack first, and then charge it completely.

The NP-80 battery pack is used here for explanation.



A battery pack can be removed from the player the same way as the AC power adaptor.

1 Align the bottom of the battery pack with the line on the player.

2 While pressing the battery pack, slide it as indicated.

Types of chargers

The CD-I player package does not include any charger; you need to provide one yourself. The chargers you can use are:

Type	Charger
Direct plug-in	BC-S10 battery charger
Via power cord	AC-S10 AC power adaptor (for one battery pack)* AC-V55 AC power adaptor (for two battery packs)*

* Always use them as chargers. Do not use them as adaptors, as they are not guaranteed to work.

Battery life

The table below lists the number of hours a fully charged battery pack can deliver for playing a compact disc continuously at room temperature. The respective battery life for playing CD-I discs may be shorter.

Battery Pack	Battery Life
NP-80/80D	About 3 hr 10 min
NP-77H/77HD	About 2 hr 50 min
NP-66H	About 2 hr
NP-60D	About 1 hr 30 min
NP-55H	About 1 hr 20 min

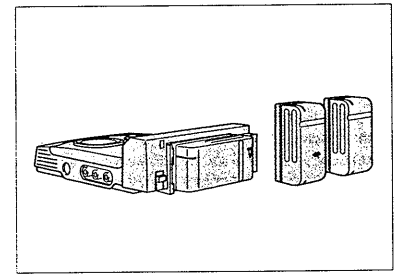
Using a Battery Pack Effectively

How to Prepare a Battery Pack

Have sufficient battery pack power to do 2 or 3 times the amount of playing that you plan to do.

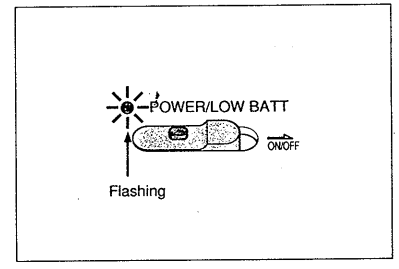
"Battery life" as described in the instruction manual or catalogue of the player is measured by the continuous use of the player, at room temperature, using a fully charged battery.

Battery life is shorter in a cold climate.
Cold climates reduce the efficiency of a battery and cause it to discharge more quickly.



When to Replace the Battery Pack

When the battery is low, the POWER/LOW BATT indicator becomes orange and starts flashing; this is the best time to replace the battery pack. Turn off the player and replace the battery pack with a fully charged one.



On Charging

Before using the battery pack, charge it completely. A brand-new battery pack is not charged.

Recharge the battery pack only when it is fully discharged.

If you use the BC-S10 battery charger or AC-S10 AC power adaptor, fully discharge the battery first, and then charge it completely. Repeated charging while some capacity remains will reduce the battery capacity.

However, the original battery capacity can be recovered if you fully discharge and charge the battery again.

Recharge the battery pack just before use.
If the battery pack is not used for a long time (about 1 year), it becomes discharged. Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Always Keep the Terminals Clean

If the terminals (metal parts on the battery pack) are soiled, the battery life will become shorter.

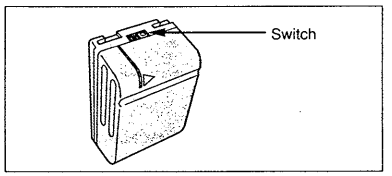
When the terminals are soiled, or when the battery pack has not been used for a long time, repeatedly attach and remove it several times. This will improve the contact of the battery pack and the player. Also, wipe the ⊕ and ⊖ terminals with a soft cloth or tissue.

How to care for battery pack

- Remove the battery pack from the player after use, and keep it in a cool place. When the battery pack is attached to the player, a small amount of current flows to the player even if the power switch is turned off. This causes overdischarge and, consequently, shortens battery life.
- The battery pack is always discharging even when it is not in use. Thus the battery should be charged before each use.
- When the battery pack is not in use, store it in a case. If the ⊕ and ⊖ terminals are short-circuited with a piece of metal, the battery heats up abnormally. This is very dangerous.

How to use the switch on the battery pack

Use this switch as a reminder of the charging condition. Set the switch to the "no mark" position when the charging is completed. Set the switch to the "red mark" position when the battery is fully discharged.



How many times can the battery pack be recharged

It can be fully charged and discharged about 500 times under normal temperatures. When the POWER/LOW BATT indicator turns orange and starts flashing with a fully charged battery pack, replace the battery pack with a brand new one.

Charging temperature

Lower temperatures require a longer charging time. Charging under a temperature ranging from 10°C to 30°C (50°F to 86°F) is recommended.

Why the battery pack heats up

While the battery pack is being charged or used, a chemical change occurs inside the battery pack which generates electric energy. Consequently, the battery pack becomes warm, but this is not dangerous.

Precautions

On Safety

- **Do not disassemble the player.**
  As the laser beam used in this player is harmful to the eyes, do not attempt to disassemble the casing.
- **Do not put any foreign objects into the player.**
  A safety device is built into the player so that when the disc cover is opened, the safety device will stop the laser beam from functioning. Any foreign objects (e.g. pin) inside the player will defeat the purpose of the safety device and the laser beam may come out when the cover is opened.
- **Do not wrap the player in a piece of cloth.**
  When the player is used with the AC power adaptor, do not wrap the unit in a cloth, blanket, etc. If you do so, the temperature inside and outside the player may rise considerably, resulting in malfunctioning of the player or serious accidents.
- **Do not subject the player to shock, or a malfunction may result.**
- **When the player is in use, its bottom will become hot.**
  So be careful if you place it on the carpet, etc.

On condensation

If the player is brought directly from a cold location to a warm one, or is placed in a very damp room, condensation may occur on the lens inside the player, causing it to work incorrectly. If this happens, remove the disc inside, and leave the player in a warm place for a few hours until the condensation evaporates. If the problem still continues, call your local Sony service facility for assistance.

About the lens

The lens on the disc table should be kept clean. Do not touch the lens or poke at it. If you do so, the lens may be damaged and the player will not operate properly. To keep the dust out, always keep the disc cover closed except for inserting discs.

About the temperature

The bottom of the player may get warm. This is not a malfunction. The AC power adaptor also gets warm. This is also not a malfunction. However, if the AC power adaptor gets excessively hot, disconnect it and have it checked by your local Sony service facility.

On installation

Do not place the player:

- Under direct sunlight or near heat sources such as radiators.
  Operate the player between 5°C to 35°C (41°F to 95°F)
- On the dashboard or inside your car parked under direct sunlight (particularly in the summer).
- Near magnet, speaker, or a TV where a magnetic field exists.
- In a very dusty place.
- In an inclined position.
- Subject to mechanical vibration or shock.
- Exposed to moisture or rain.

When listening to a CD-I or a compact disc

- Adjust the sound volume to a level comfortable to your ears.
- Try not to disturb people around you with the sound leaking from your headphones.

If any problem occurs

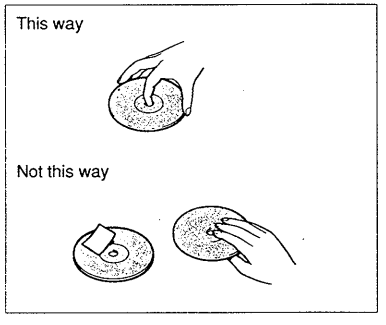
If any problem occurs, or if a foreign object falls into the player, turn off the player and call your local Sony service facility for assistance.

On the LCD display

- Do not push the display forcibly, otherwise player trouble may occur.
- Avoid operating the player at temperature below 5°C (41°F) or above 35°C (95°F).
- If the player is used in a cold place, the display will become lighter. This is not a malfunction of the unit.

Handling CD-I or compact discs

- Always hold a disc by its edge. Do not touch the surface (the side without a label).
- Do not stick paper or write anything on the surface of the disc.



Storing CD-I or compact discs

- Do not store the discs
  - subject to high temperature, e.g. direct sunlight.
  - in a very humid environment.
  - on the dashboard or inside your car parked under direct sunlight (particularly in the summer).
- When you are not going to play a disc for a long time, remove it from the player. Keep the disc in its case; otherwise the disc may warp. Do not stack it with other discs or stand it in an inclined position.

Maintenance

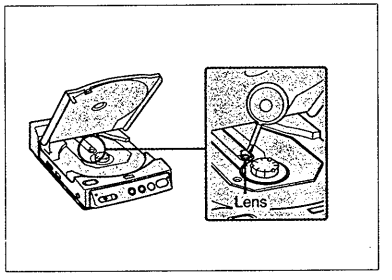
Player

Cleaning the casing

Clean the casing with a soft cloth. If the dirt is serious, slightly moisten the cloth with a mild detergent solution. Do not use solvents such as thinner, benzine, or alcohol, as they may damage the finish of the casing.

Cleaning the lens

If you accidentally touch the lens with dirty fingers or if dust on the lens prevents the player from operating properly, open the disc cover and clean the lens with a KK-9 lens cleaning kit (not supplied).



Cleaning the headphones plug

Keep the headphones plug clean to obtain optimum sound. Wipe the plug with a dry, soft cloth.

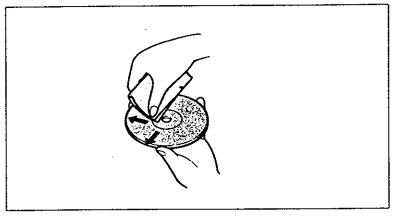
LCD Display

Use a soft cloth to wipe the display.

Discs

The CDM-1K/2K CD cleaning kit (not supplied) is recommended.

- If a disc becomes dirty, clean it with a cleaning kit.
- Do not use solvents such as benzine, thinner, commercially available cleaners or anti-static spray intended for use with records. They may damage the disc.
- Clean the disc from the center out, using a clean soft cloth.
- If the dirt is serious, slightly moisten the cloth with water and wipe it, followed by a dry cloth.



Messages

The messages that appear on the screen may be in English or Japanese, depending on the selected language selected. The following are lists of messages used in this player. [E] means English and [J] means Japanese.

Message	See Page
[E] Save information? Proceed? ▶ yes / no [J] 設定します よろしいですか ▶ はい / いいえ	13, 29, 34, 35
[E] Reset to previous values? Proceed? ▶ yes / no / initialize [J] もとの値に戻します よろしいですか ▶ はい / いいえ / 初期化	34, 35
[E] Reset to initial values? Proceed? ▶ yes / no [J] 初期値に設定します よろしいですか ▶ はい / いいえ	34
[E] Erase file? Proceed? yes / ▶ no [J] ファイルを消去します よろしいですか はい / ▶ いいえ	30
[E] Erase all files? Proceed? yes / ▶ no [J] すべてのファイルを消去します よろしいですか はい / ▶ いいえ	31
[E] Erased files cannot be retrieved. Proceed? yes / ▶ no [J] 消去すると もとに戻りません よろしいですか はい / ▶ いいえ	31
[E] No disc inserted. [J] ディスクがありません	13, 16, 18, 29, 34, 35

The following messages appear when the player is not functioning correctly.

Message	Try This	See Also Page
[E] This disc cannot be played on this machine. Please check the disc. [J] この装置では再生できません ディスクを確認してください	Remove the disc and check its format.	5
[E] Disc error found. Please check the disc. [J] ディスクに異常があります ディスクを確認してください	Remove the disc and look for dirt or damage. If necessary, clean the disc.	41
[E] System error found. Turn off the power immediately. [J] 異常が発生しました いったん電源を切ってください	Turn the player off, then back on again. If the problem still continues, call your local Sony service facility for assistance.	—
[E] Would you like to set up the control panels? ▶ yes / no [J] コントロールパネルの設定をします ▶ はい / いいえ	The player settings have returned to their factory preset values. Use the steps below to access the 1st control panel and set the correct date and time. If this is not done, the message will continue to appear every time the player is turned on. 1 With the player still connected to a power source, insert a new lithium battery. 2 Move ▶ to point at [yes], then press button 1 or button 2. 3 Set the correct date and time. If the problem still continues, call your local Sony service facility for assistance.	11
[E] The time and date are not properly set. Please set them again. ▶ reset [J] 日時の設定が正しくありません やり直してください ▶ やり直し	Set the correct date and time.	11
[E] Memory full. Please erase 10 % of the saved files. ▶ yes [J] 記憶容量がいっぱいです 合計10%分のファイルを消去してください ▶ はい	The memory is full, so you must erase some of the files. Press button 1 or button 2 to bring up the 3rd control panel (in this case the other two control panels cannot be accessed). Erase the unnecessary files to free up about 10% of memory. When this is done, the [Please wait a moment...] or [しばらくお待ちください] message appears for a few seconds, then the initial screen is displayed.	30

Troubleshooting

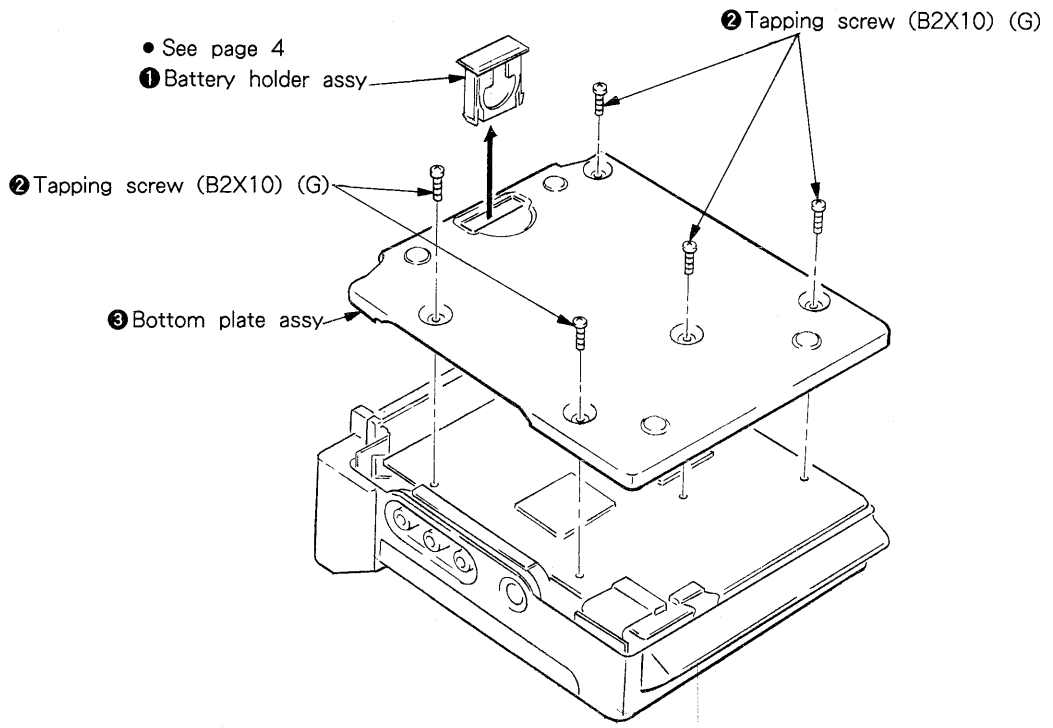
	Problem	Cause	Check	See Also Page
Operation	The CD-I disc screen does not appear when a CD-I disc is inserted.	• The disc is inserted upside down. • The disc or the lens is dirty.	• Insert the disc with the label side up. • Clean the disc or lens.	16, 18 41
	The compact disc screen does not appear when a compact disc is inserted.	• Condensation occurs.	• Take out the disc and leave the player for two or three hours until the condensation evaporates.	39
		• The disc cover is not closed properly.	• Close the cover properly.	16, 18
	The CD-I disc screen appears, but the inserted CD-I disc does not start playing.	• The memory is full.	• Remove some or all the unnecessary files.	30, 42
Sound & Picture	The sound skips, or picture does not appear.	• The CD-I, compact disc, or the lens is dirty. • The CD-I or compact disc is seriously damaged.	• Clean them. • Replace the disc.	41 —
		• The player is subject to strong vibration.	• Keep the player away from vibration.	39
	No sound comes from the headphones.	• The headphones are not connected correctly. • The VOLUME control is set to the minimum level.	• Plug the headphones properly into the PHONES jack. • Adjust the VOLUME control to a comfortable level.	19 17, 19
	No picture appears on the TV.	• The player is not properly connected to the TV. • The TV/video switch on the TV is set to TV.	• Connect them properly. • Set the switch to video.	10
	No sound comes from the TV.	• The player is not properly connected to the TV. • The sound volume on the TV is set to the minimum level.	• Connect them properly. • Adjust the volume.	10

	Problem	Cause	Check	See Also Page
Others	No power is supplied.	• The AC power adaptor is not connected. • The battery pack is almost or completely discharged, or is not installed yet. • The battery pack has expired.	• Connect the AC power adaptor properly. • Install a fully charged battery pack. • Replace with a new one.	9 36 37
	The power suddenly goes off.	• The auto power-off function is active.	• Turn on the player again. • Access the control panel and change auto power-off to Auto Power Off : none	— 33
	The battery pack is discharged very quickly.	• The player is being used in an extremely cold environment. • The battery pack is not fully charged. • The battery pack has expired.	— • After the battery pack is completely discharged, fully charge it. • Replace with a new one.	— 37 38
	None of the buttons work during operation.	• Strong interference from the external environment has caused the player's microprocessor to malfunction.	• Use a pointed device to press the CL button on the bottom of the player. This turns off the player.	7

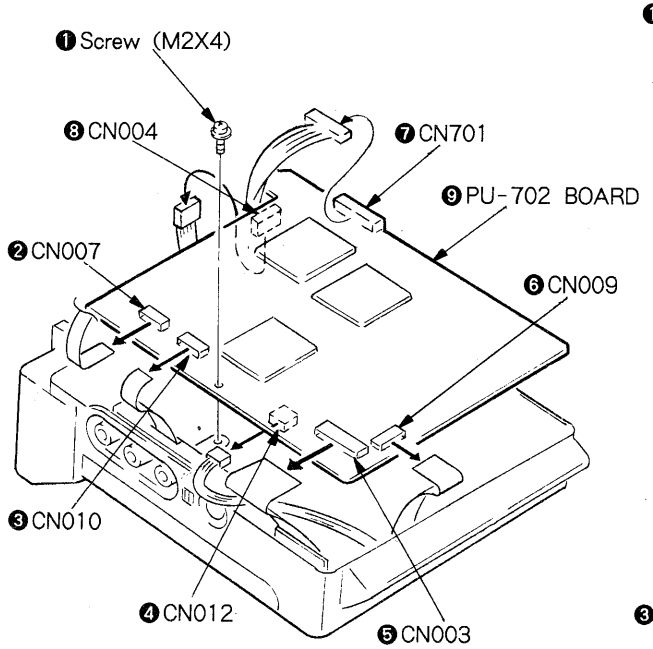
SECTION 2
DISASSEMBLY

NOTE : Follow the disassembly procedure in the numerical order given.

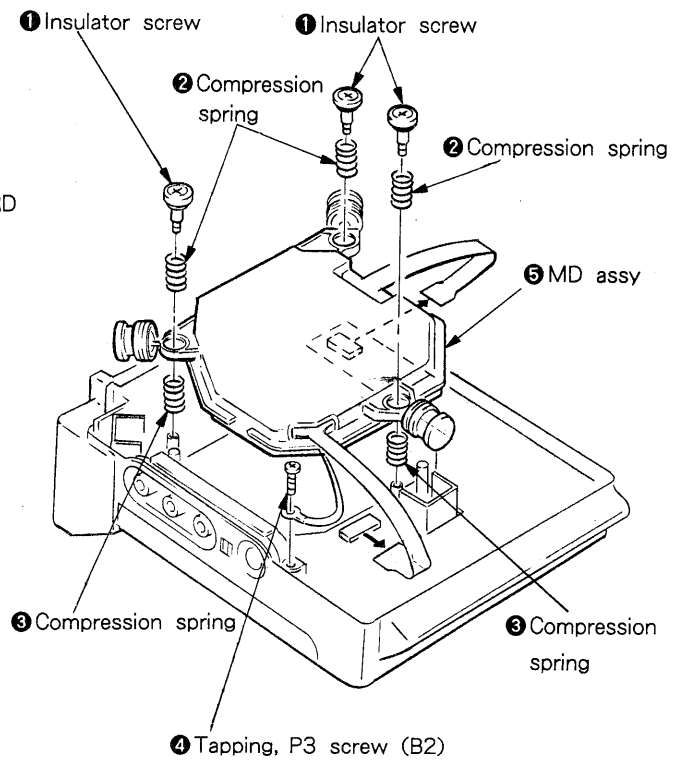
2-1. BATTERY HOLDER, BOTTOM PLATE ASSY



2-2. PU-702 BOARD



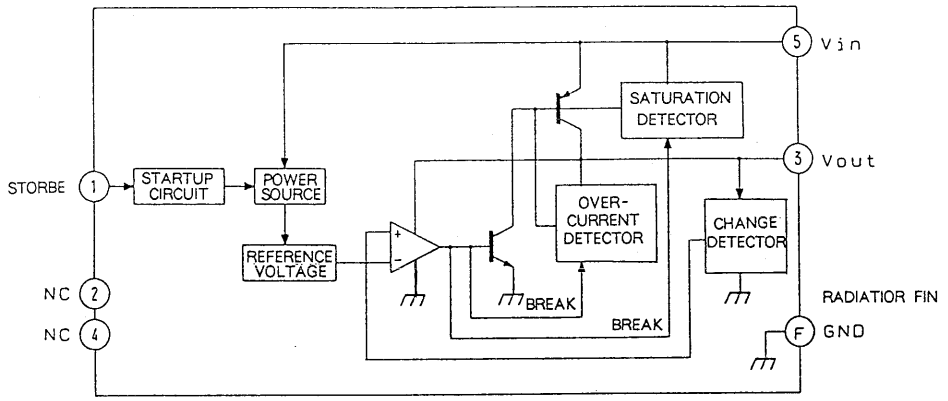
2-3. OPTICAL BLOCK, MD ASSY (KSM-311AAM)



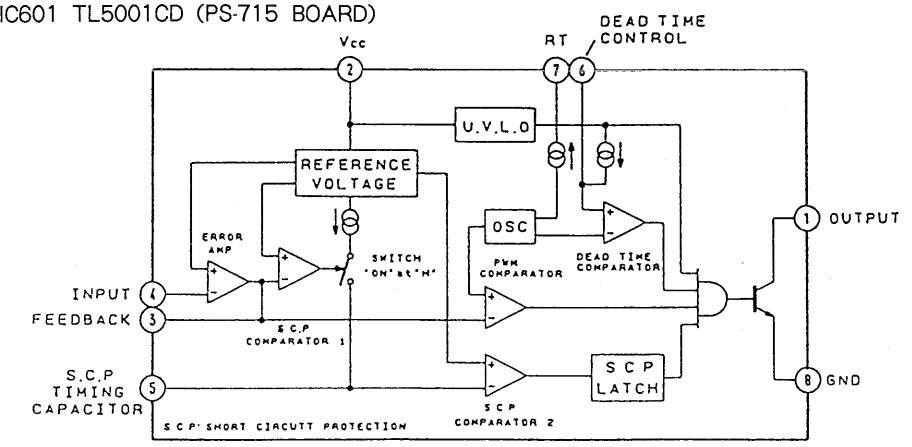
SECTION 3
DIAGRAMS

3-1. IC BLOCK DIAGRAMS

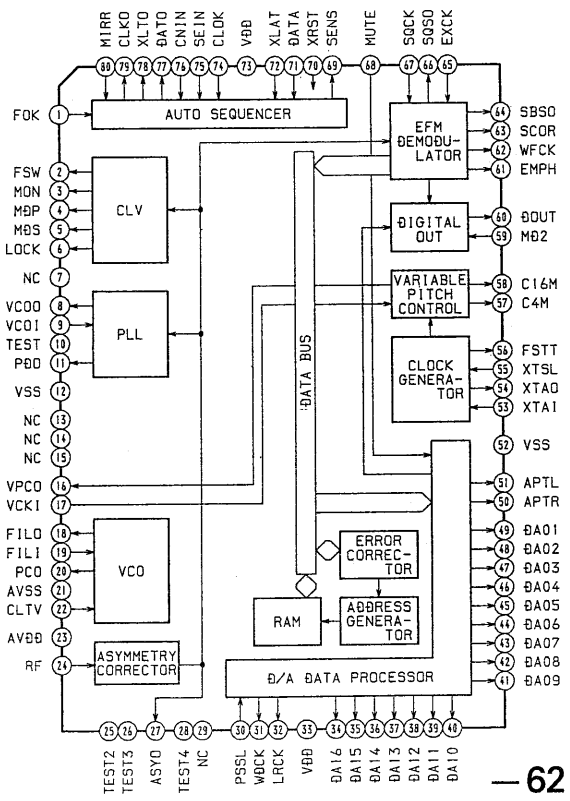
• IC506 AN6545SP (SV-703 BOARD) / IC503, 510 AN6545SP (PU-702 BOARD)



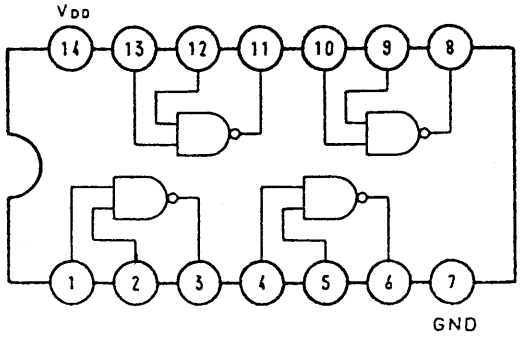
• IC601 TL5001CD (PS-715 BOARD)



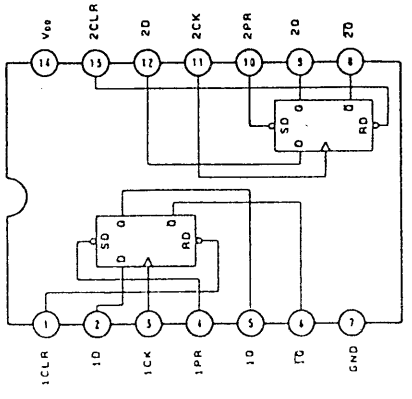
• IC003 CXD2500BQ (SV-703 BOARD)



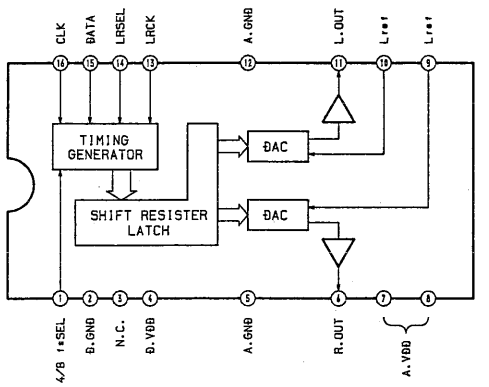
• IC005 SN74HC00ANS (PU-702 BOARD)



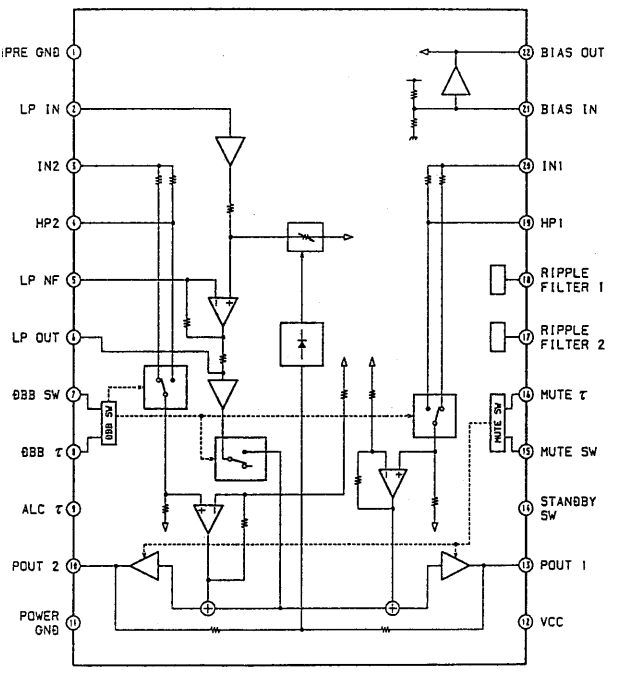
• IC508 SN74HC74ANS (PU-702 BOARD)



• IC511 UPD6376 (PU-702 BOARD)

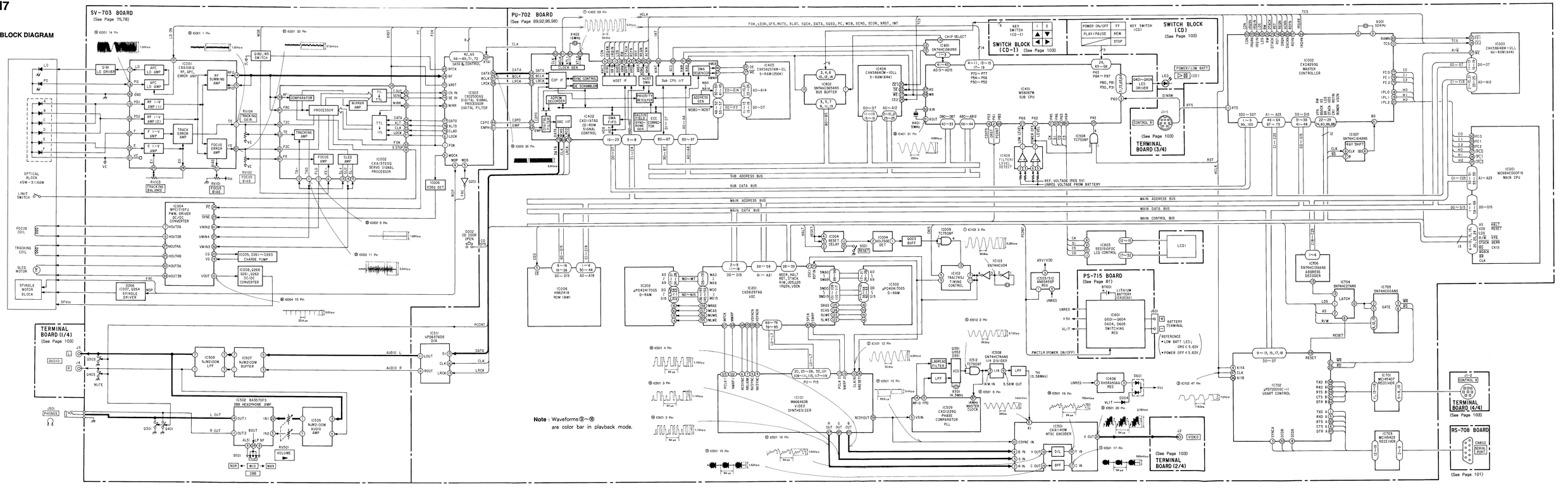


• IC502 BA3570FS (SV-703 BOARD)



IVO-N7

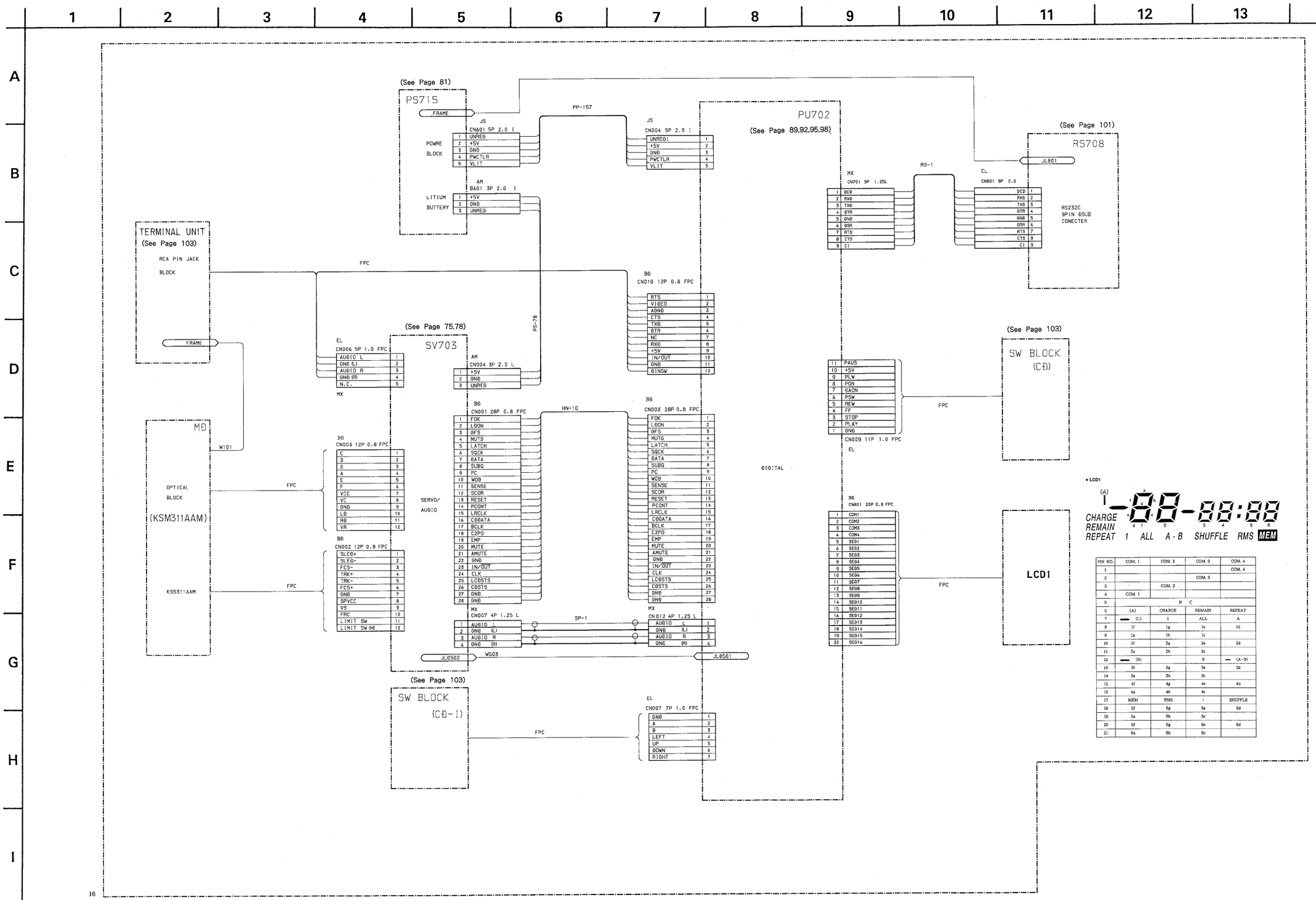
3-2. BLOCK DIAGRAM



SECTION 4

PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

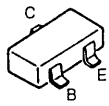
4-1. FRAME SCHEMATIC DIAGRAM



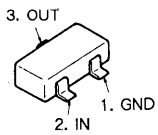
PIN NO.	COM. 1	COM. 2	COM. 3	COM. 4
1				COM. 4
2			COM. 3	
3		COM. 2		
4	COM. 1			
5		N C		
6	(A)	CHARGE	REMAIN	REPEAT
7	(L)	1	ALL	A
8	1f	1g	1e	1d
9	1a	1b	1c	
10	2f	2g	2e	2d
11	2a	2b	2c	
12	(R)		B	(A-B)
13	3f	3g	3e	3d
14	3a	3b	3c	
15	4f	4g	4e	4d
16	4a	4b	4c	
17	MEM	RMS	:	SHUFFLE
18	5f	5g	5e	5d
19	5a	5b	5c	
20	6f	6g	6e	6d
21	6a	6b	6c	

4-2. SEMICONDUCTOR READ LAYOUTS

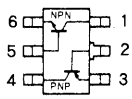
DTA143XU
UN5212
UN5213
2SA1162-G
2SA1677
2SB1197K-R
2SB624-BV345
2SC1623-L5L6
2SC2223-F13
2SD596DV345



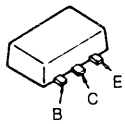
DTC114EU



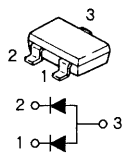
XN4601



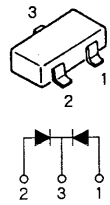
2SB1302-S
2SB798-DL
2SD999-CLCK



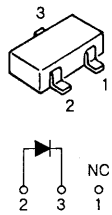
DAP202U



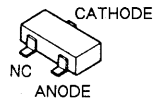
MA152WK
SB02W03C
STZ6.8T



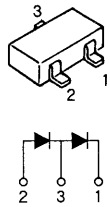
RD12M-B1
RD16M-B2
RD7.5M-B2
SB01-05CP
SB05-05CP



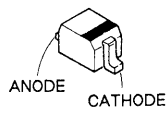
SB10-05PCP



1SS226



1T33C-01



4-3. SCHEMATIC DIAGRAM AND PRINTED WIRING BOARD

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

For printed wiring boards:

- o—— : indicated a lead wire mounted on the component side.
- ●and○: Through hole.
- ▒▒▒ : Pattern on the side which is seen.
  (Other pattern is not shown.)

For schematic diagram:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4 W unless otherwise noted.
  Chip resistors: 1/10 W unless otherwise noted.
  kΩ : 1000 Ω , MΩ : 1000kΩ .
- All capacitors are in μF unless otherwise noted. pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair. ★
- : B + Line. ★
- : B − Line. ★
- Voltage are dc between ground and measurement points. ★
- Readings are taken with a digital multimeter (DC10 MΩ). ★
- Voltage variations may be noted due to normal production tolerances. ★

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- ★ : indicated by color red.

SV-703 (SERVO/AUDIO) PRINTED WIRING BOARD

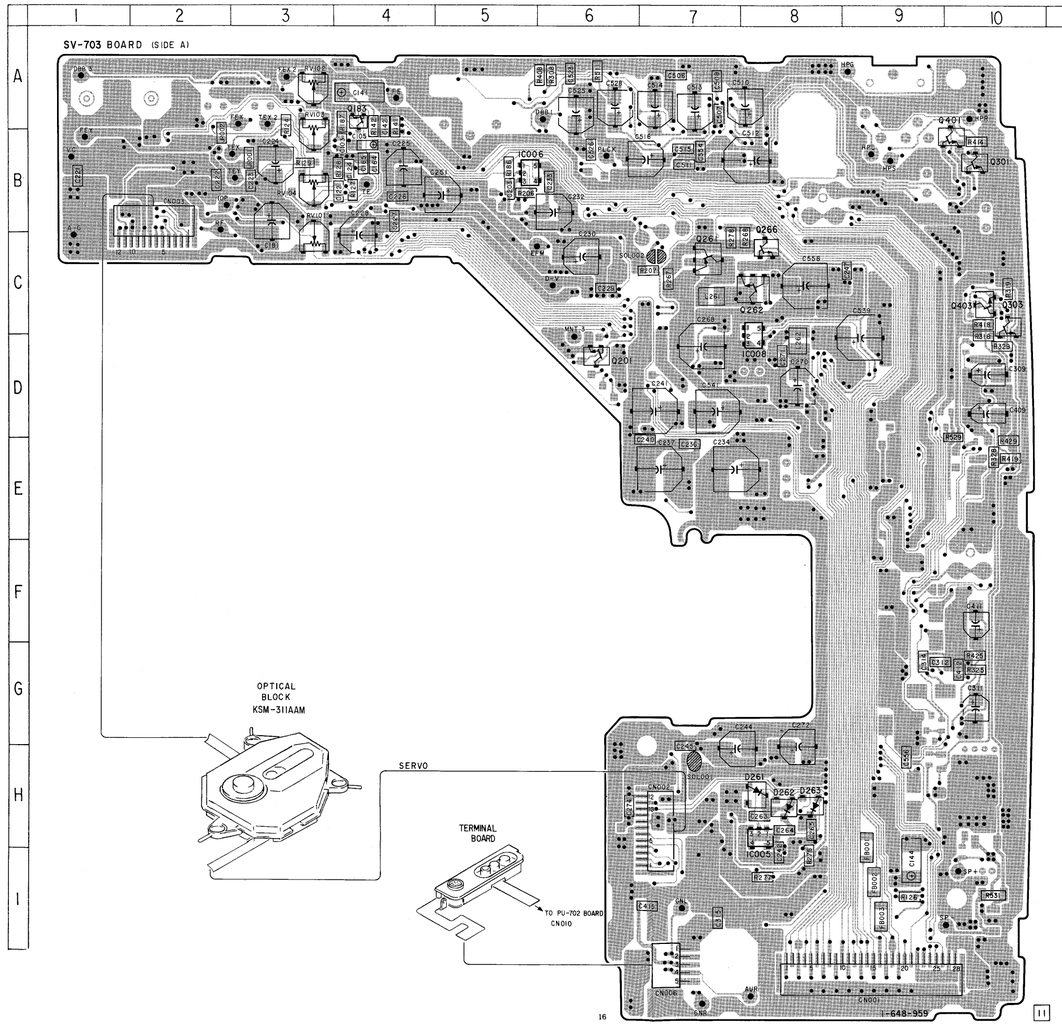
– Ref. No. SV-703 BOARD : 4,000 Series –

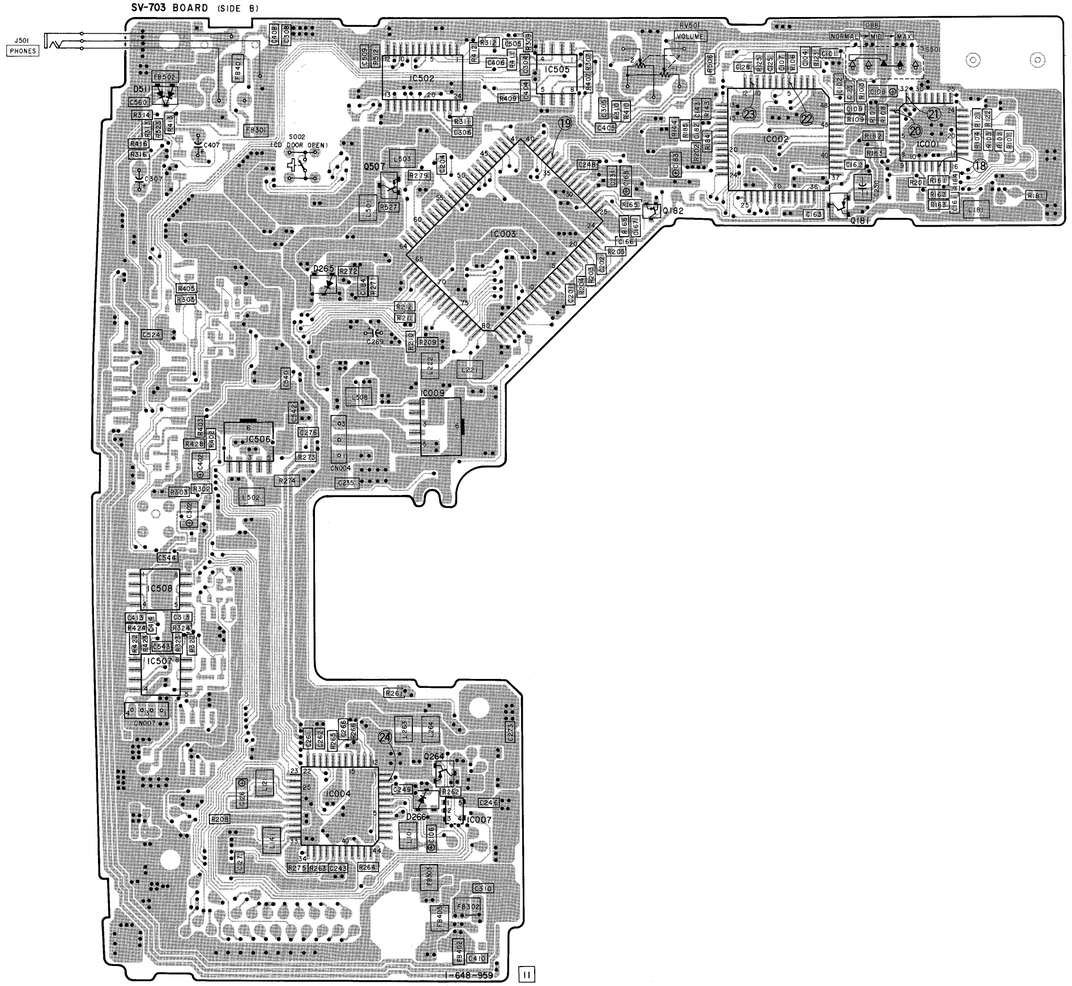
SV-703 BOARD

D261 H-8
D262 H-8
D263 H-8
D265 D-14
D266 I-15
D511 B-13

IC001 B-20
IC002 B-19
IC003 C-16
IC004 I-14
IC005 I-8
IC006 B-6
IC007 I-16
IC008 D-8
IC009 E-15
IC502 A-15
IC505 A-17
IC506 E-14
IC507 H-13
IC508 G-13

Q181 C-20
Q182 C-18
Q183 A-4
Q201 D-6
Q261 C-7
Q262 C-8
Q264 I-16
Q266 C-8
Q301 B-10
Q303 C-10
Q401 B-10
Q403 C-10
Q507 C-15



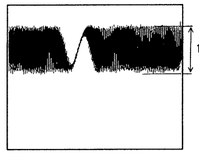


SV-703 (SERVO/AUDIO) (1/2) SCHEMATIC DIAGRAM

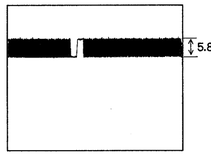
– Ref. No. SV-703 BOARD : 4,000 Series –

Waveform Diagram

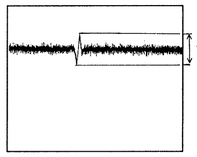
⑱ IC001 14 Pin



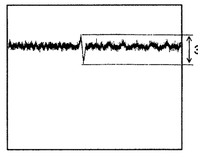
⑲ IC003 36 Pin



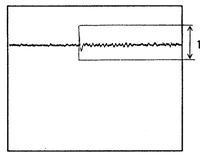
⑳ IC001 1 Pin



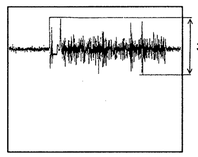
㉑ IC001 32 Pin



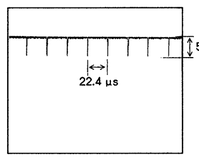
㉒ IC002 5 Pin



㉓ IC002 11 Pin



㉔ IC004 10 Pin



SV-703 BOARD (1/2)

IC001 CXA1981Q RF, APC, ERROR AMP.

IC002 CXA1972AQ SERVO SIGNAL PROCESSOR

IC003 CXD2500BQ DIGITAL SIGNAL PROCESSOR DIGITAL FILTER

IC004 PWM DRIVER DC-DC CONVERTER

IC005 CHARGE PUMP

IC006 EDGE DET.

IC007 SPINDLE DRIVER

IC008 INV.

IC009 REG.

Q261, Q262, Q266 SWITCHING/ DRIVER

TO OPTICAL BLOCK

TO PU-702 BOARD CN003 (See Page 95)

TO PS-715 BOARD B601 (See Page 83)

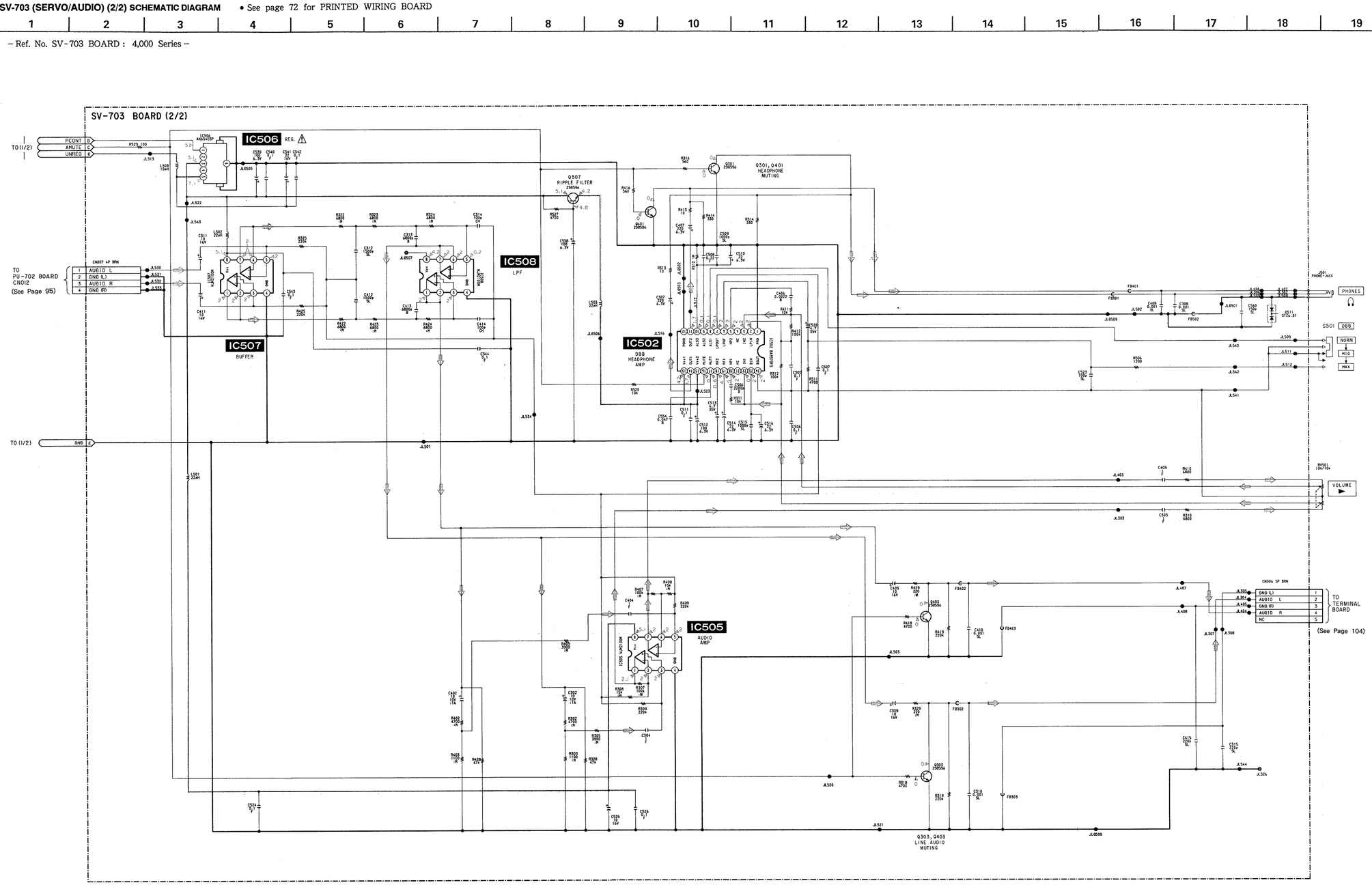
TO (2/2)

• Signal path.
⇨ : CD

SV-703 (SERVO/AUDIO) (2/2) SCHEMATIC DIAGRAM

• See page 72 for PRINTED WIRING BOARD

– Ref. No. SV-703 BOARD : 4,000 Series –

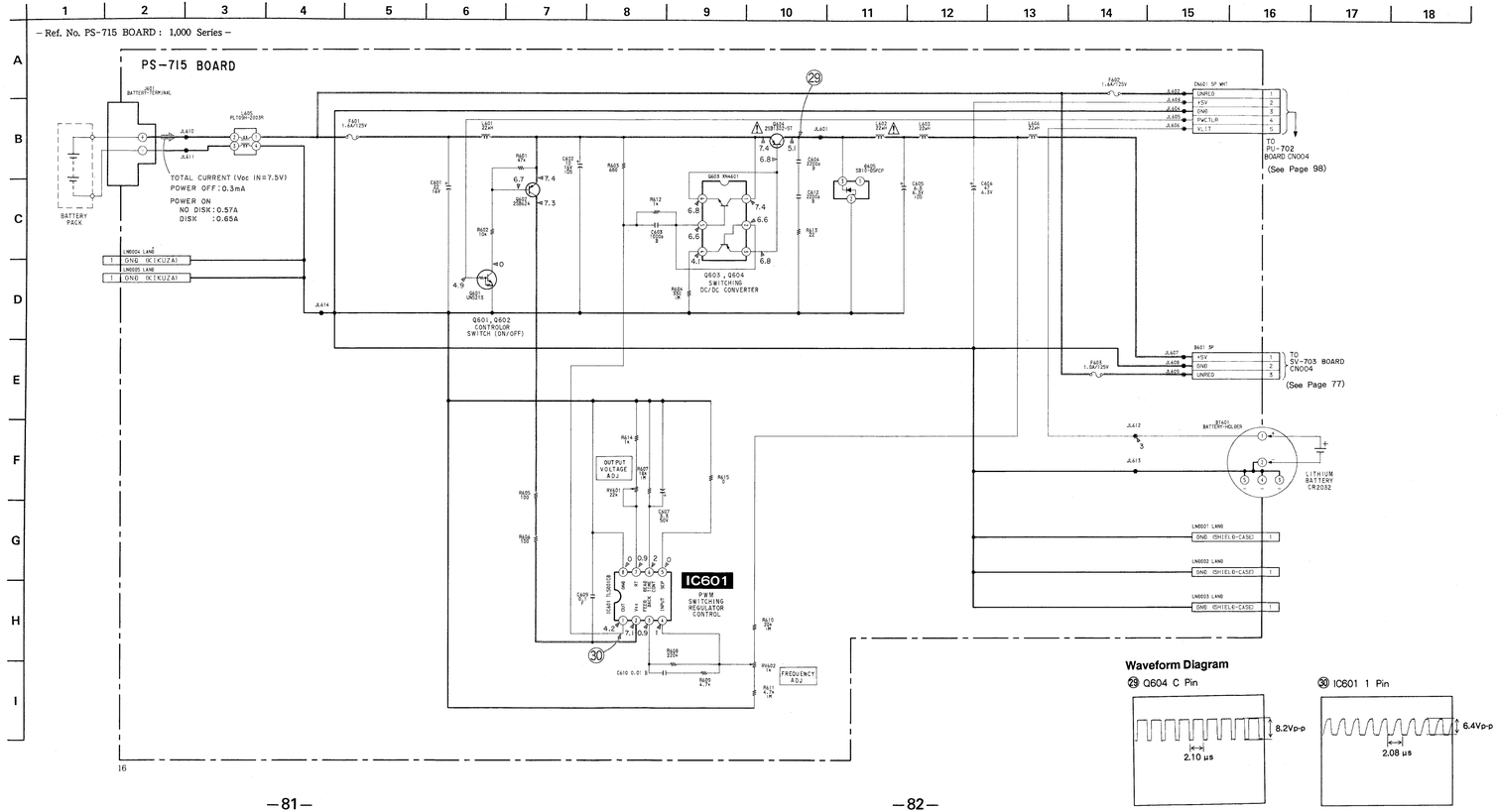


16

• **Signal path.**
⇨ : AUDIO

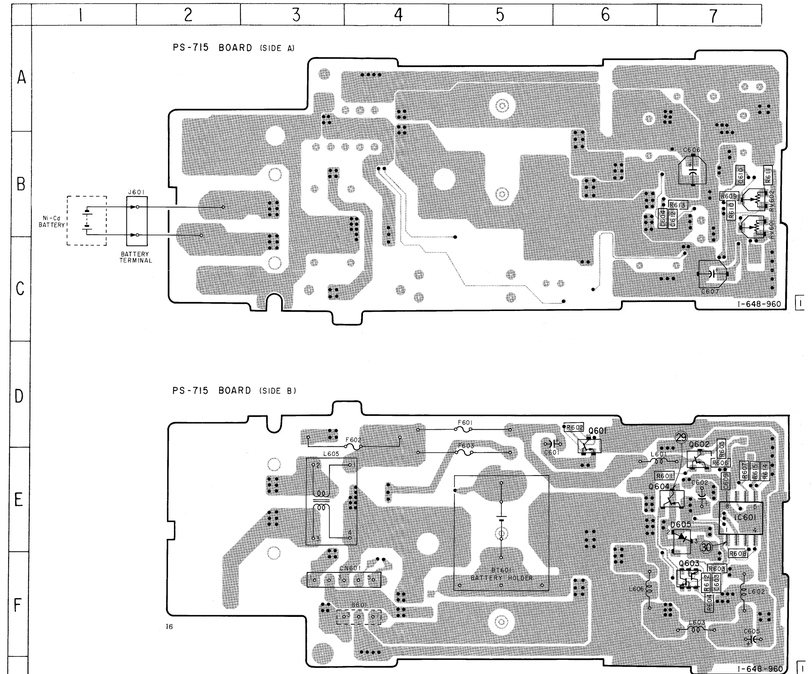
PS-715 (POWER) SCHEMATIC DIAGRAM

– Ref. No. PS-715 BOARD : 1,000 Series –



PS-715 (POWER) PRINTED WIRING BOARD

– Ref. No. PS-715 BOARD : 1,000 Series –



PS-715 BOARD

D605	F-7
IC601	E-7
Q601	E-6
Q602	E-7
Q603	F-7
Q604	E-7

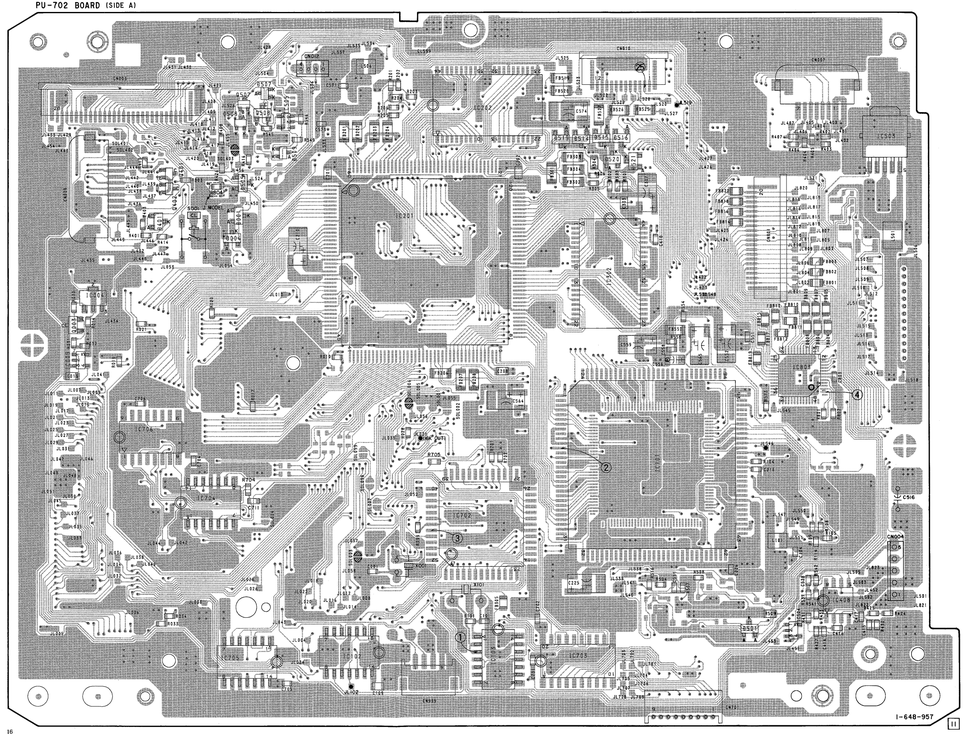
PU-702 (MAIN) PRINTED WIRING BOARD

– Ref. No. PU-702 BOARD : 2,000 Series –

PU-702 BOARD

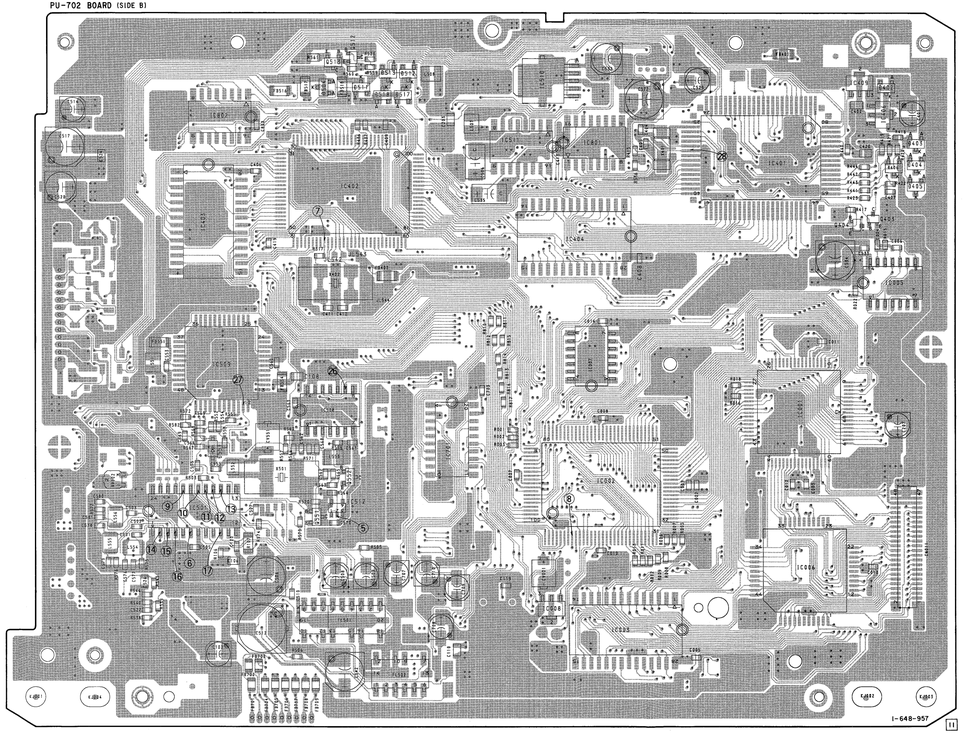
D001	C-3	IC302	D-8
D004	D-3	IC401	C-22
D401	C-3	IC402	C-17
D402	B-23	IC403	C-15
D403	B-23	IC404	D-19
D404	C-23	IC406	B-23
D405	C-23	IC408	H-11
D406	C-23	IC409	B-23
D501	H-10	IC501	G-15
D504	B-16	IC503	B-11
D505	C-4	IC504	H-10
D507	B-4	IC505	B-4
D508	B-4	IC508	F-17
D509	C-4	IC509	F-15
D511	B-17	IC510	B-19
D512	B-17	IC511	C-19
D513	B-17	IC512	G-16
D514	B-8	IC701	G-18
D515	B-8	IC702	G-6
D516	B-8	IC703	I-8
D517	B-17	IC704	G-3
D518	B-17	IC705	B-4
D519	C-7	IC706	F-3
D520	C-8	IC801	B-19
D521	C-8	IC802	B-15
D551	F-15	IC803	E-10
IC001	F-22	Q003	E-2
IC002	G-19	Q401	C-3
IC003	I-19	Q402	C-3
IC004	D-2	Q403	C-23
IC005	D-23	Q404	C-23
IC006	H-22	Q507	B-4
IC007	E-20	Q508	B-4
IC008	H-19	Q512	B-17
IC009	E-2	Q513	B-16
IC101	F-8	Q551	F-16
IC102	H-5	Q552	F-16
IC103	I-5		
IC201	D-6		
IC202	B-6		

PU-702 BOARD (SIDE A)



I-648-957

PU-702 BOARD (SIDE B)



I-648-957

MAIN

PU-702 (MAIN) (1/4) SCHEMATIC DIAGRAM

– Ref. No. PU-702 BOARD : 2,000 Series –

PU-702 BOARD (1/4)

IC201
CXD2502AQ
VIDEO SYSTEM CONTROLLER

IC202
D-RAM

IC302
D-RAM

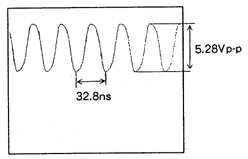
IC101
MN64440D
VIDEO SYNTHESIZER

IC102
RST TIMING CONTROL

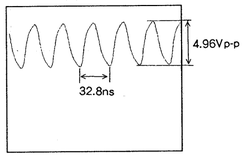
IC103
CLOCK OSC

Waveform Diagram

① IC103 3 Pin

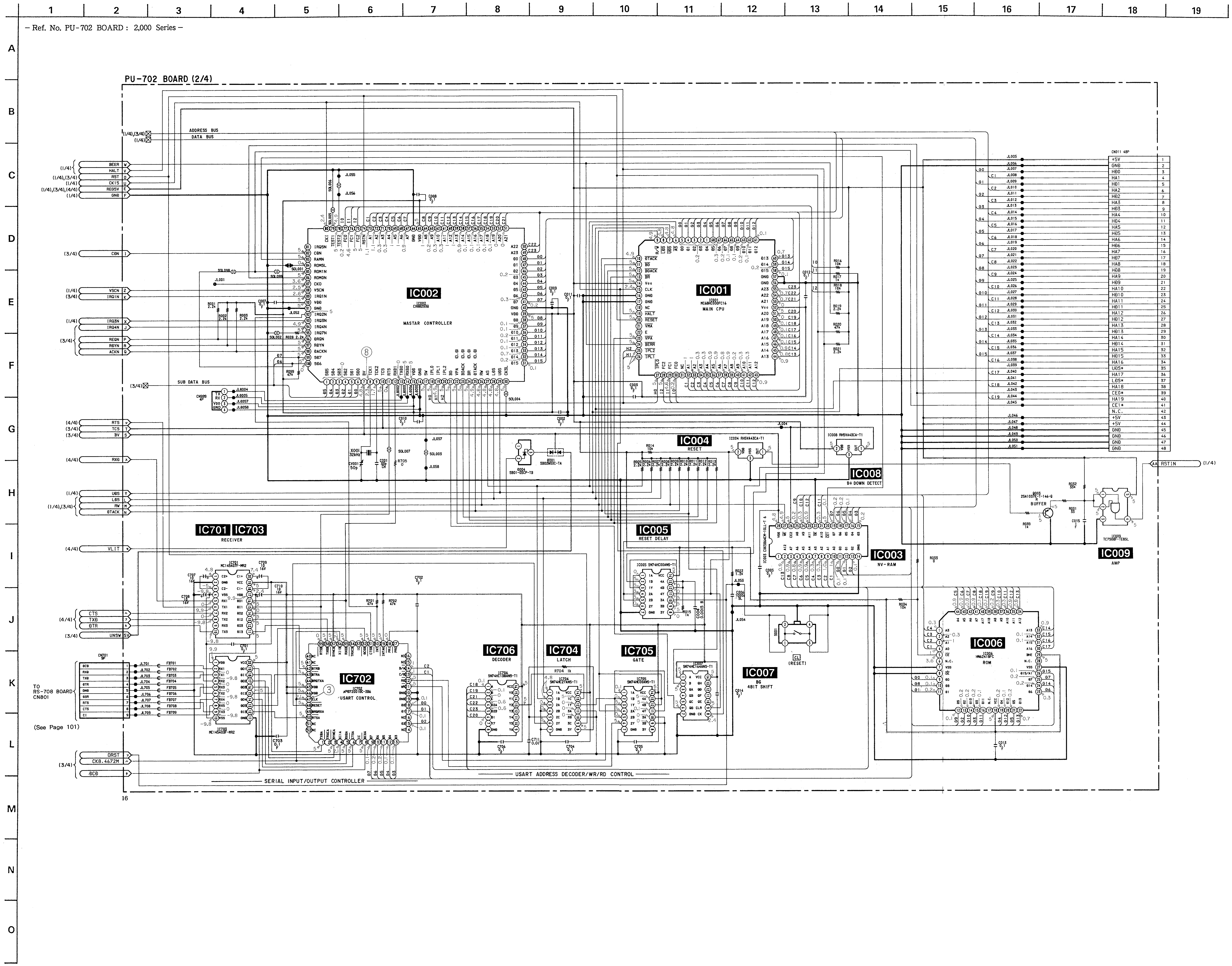


② IC101 12 Pin



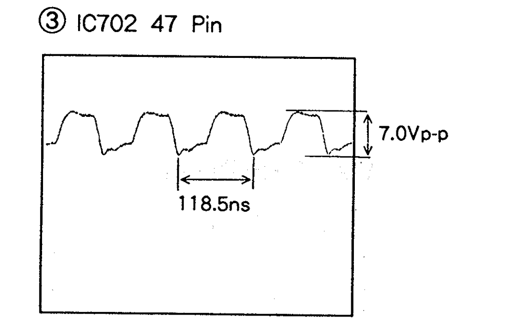
PU-702 (MAIN) (2/4) SCHEMATIC DIAGRAM • See page 85 for PRINTED DIAGRAM

– Ref. No. PU-702 BOARD : 2,000 Series –

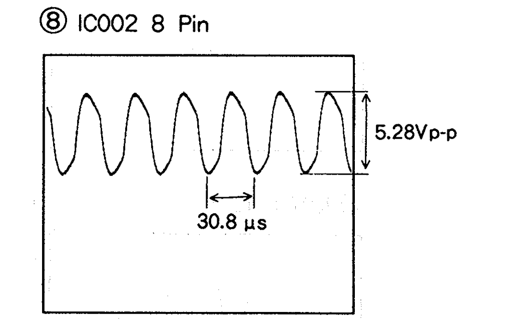

PU-702 BOARD (2/4)
IC002
MASTAR CONTROLLER
IC001
MAIN CPU
IC004
RESET
IC008
B+ DOWN DETECT
IC005
RESET DELAY
IC003
NV-RAM
IC009
AMP
IC701 IC703
RECEIVER
IC702
USART CONTROL
IC706
DECODER
IC704
LATCH
IC705
GATE
IC007
4BIT SHIFT
IC006
ROM
TO RS-708 BOARD CN801
(See Page 101)
SERIAL INPUT/OUTPUT CONTROLLER
USART ADDRESS DECODER/WR/RD CONTROL
ADDRESS BUS
DATA BUS
SUB DATA BUS

Waveform Diagram

③ IC702 47 Pin

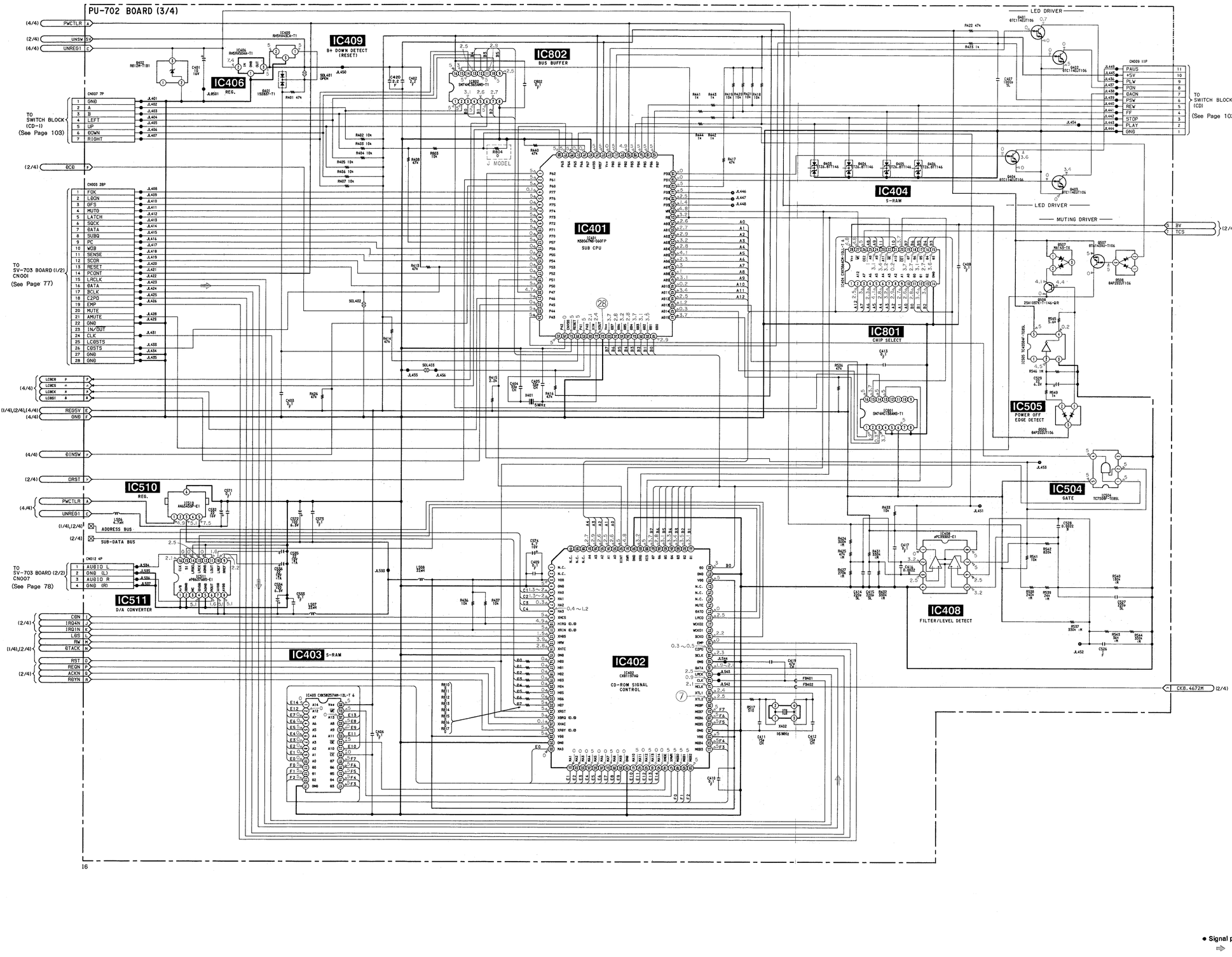


⑧ IC002 8 Pin



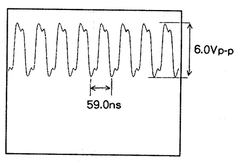
PU-702 (MAIN) (3/4) SCHEMATIC DIAGRAM • See page 85 for PRINTED DIAGRAM

– Ref. No. PU-702 BOARD : 2,000 Series –

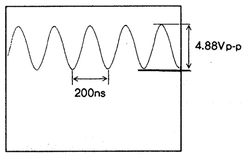


Waveform Diagram

⑦ IC402 59 Pin



㉘ IC401 31 Pin



• Signal path.
⇨ : CD

PU-702 (MAIN) (4/4) SCHEMATIC DIAGRAM • See page 85 for PRINTED DIAGRAM

– Ref. No. PU-702 BOARD : 2,000 Series –

PU-702 BOARD (4/4)

IC503 REG.

IC803 LCD CONTROL

IC508 1/4 DIVIDER

IC512 AMP

IC509 PHASE COMPARATOR PLL

IC501 NTSC ENCODER

TO LCD (See Page 70)

TO PS-715 BOARD CN601 (See Page 83)

TO TERMINAL BOARD (See Page 104)

Q512,513 BACKUP

BUFFER

Note : Waveforms ⑨~⑯, ㉕ are color bar in playback mode.

• **Signal path.**
⇨ : VIDEO

Waveform Diagram

④ IC803 1 Pin
1.92Vp-p, 56.0 µs

⑤ IC512 2 Pin
3.12Vp-p, 69.5ns

⑥ IC501 6 Pin
740mVp-p, 280ns

⑨ IC501 20 Pin
2.76Vp-p, 64 µs

⑩ IC501 18 Pin
760mVp-p, 64 µs

⑪ IC501 17 Pin
680mVp-p, 64 µs

⑫ IC501 16 Pin
1.64Vp-p, 64 µs

⑬ IC501 15 Pin
1.52Vp-p, 64 µs

⑭ IC501 2 Pin
1.16Vp-p, 64 µs

⑮ IC501 3 Pin
1.14Vp-p, 64 µs

⑯ IC501 4 Pin
1.16Vp-p, 64 µs

⑰ IC501 10 Pin
5.4Vp-p, 63.6 µs

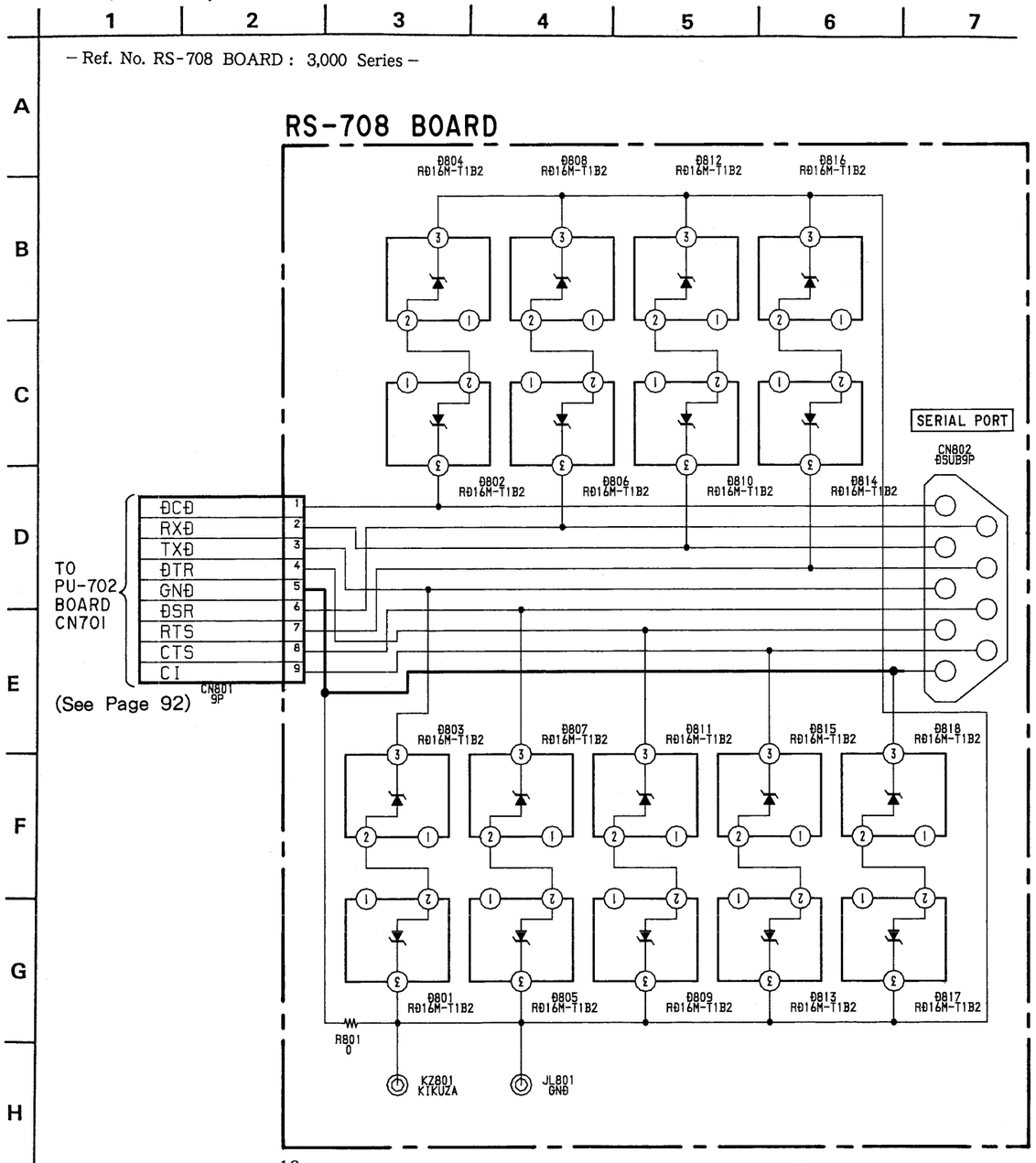
㉕ CN010 2 Pin
1.38Vp-p, 64 µs

㉖ IC508 9 Pin
100mVp-p, 280ns

㉗ IC509 11 Pin
102mVp-p, 70.5ns

RS-708 (SERIAL I/O) SCHEMATIC DIAGRAM

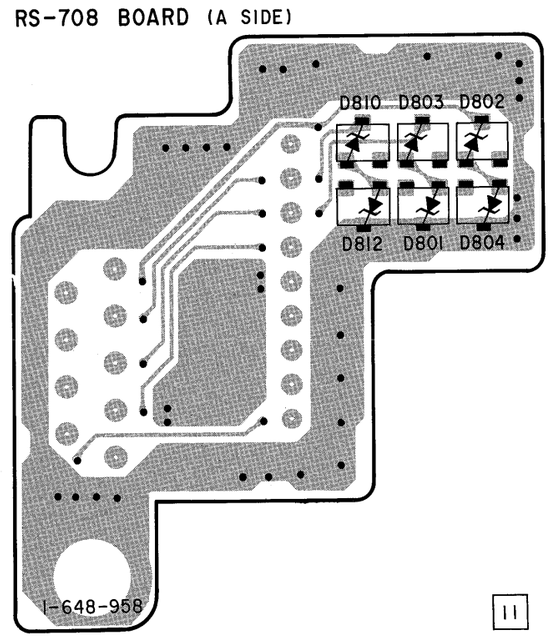
– Ref. No. RS-708 BOARD : 3,000 Series –

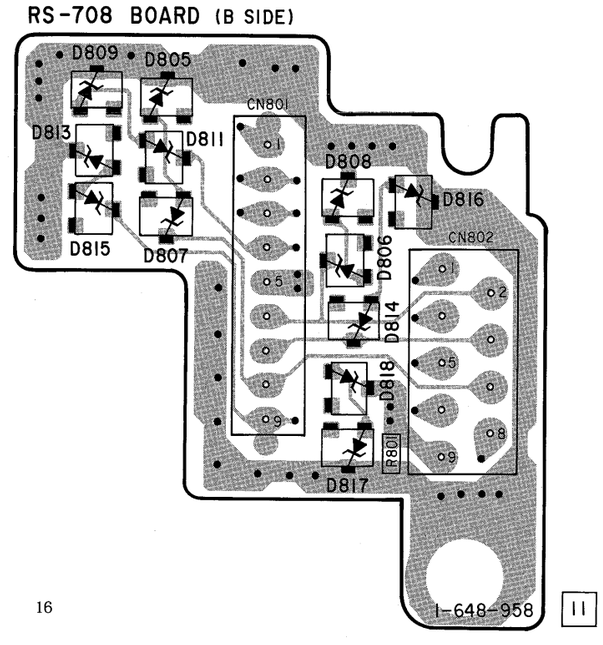


16

RS-708 (SERIAL I/O) PRINTED WIRING BOARD

– Ref. No. RS-708 BOARD : 3,000 Series –

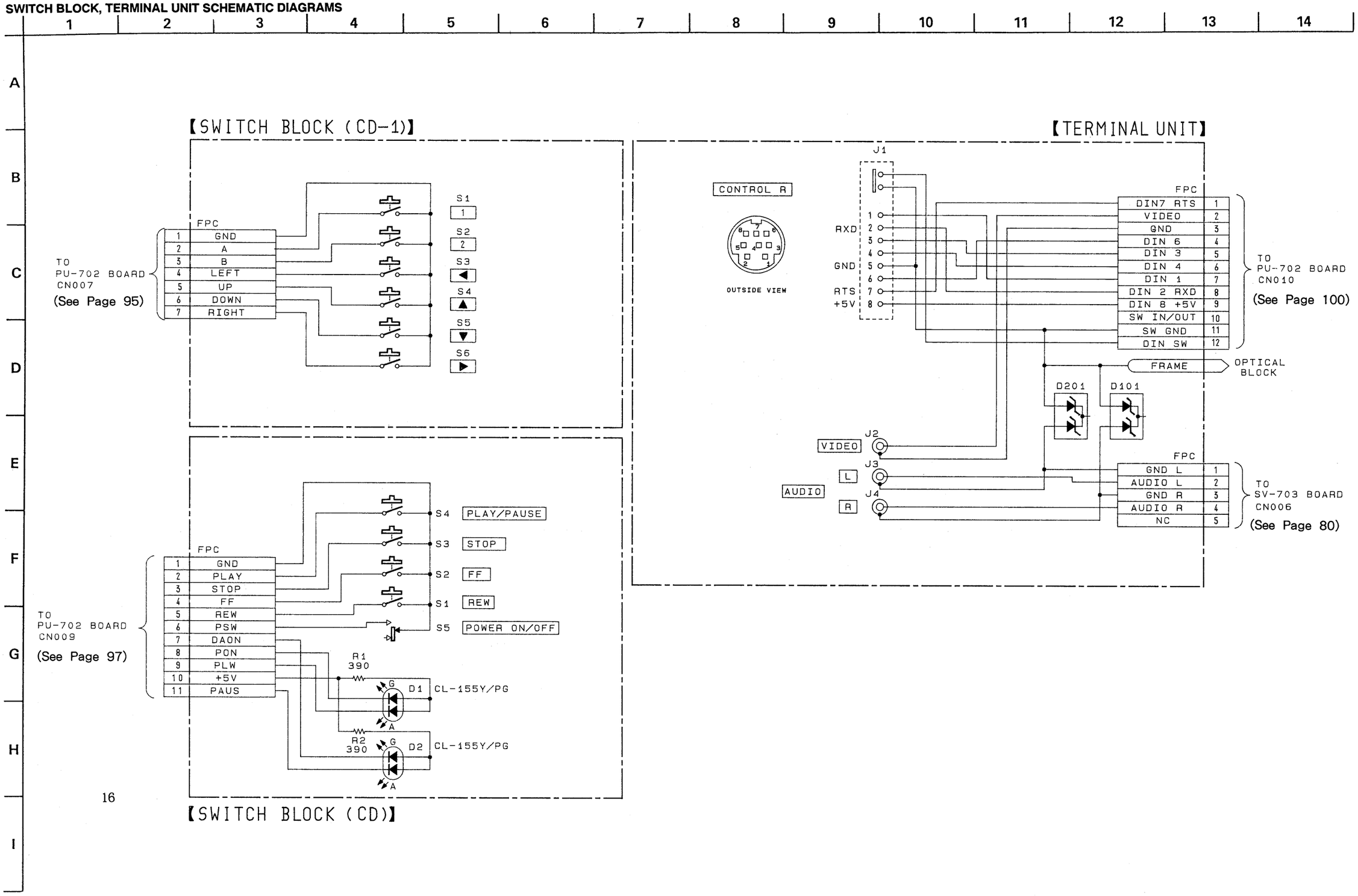




16

RS-708 BOARD	
D801	B-3
D802	B-3
D803	B-3
D804	B-3
D805	E-2
D806	F-3
D807	E-2
D808	E-3
D809	E-2
D810	B-3
D811	E-2
D812	B-3
D813	E-2
D814	F-3
D815	E-2
D816	E-4
D817	F-3
D818	F-3

SWITCH BLOCK, TERMINAL UNIT SCHEMATIC DIAGRAMS



• **IC002 MASTER CONTROLLER (CXD8293Q) (PU-702 BOARD)**

Pin No.	Pin Name	I/O	Description
1	SD5	I/O	Subdata bus
2	SD4	I/O	Subdata bus
3	SD3	I/O	Subdata bus
4	SD2	I/O	Subdata bus
5	SD1	I/O	Subdata bus
6	SD0	I/O	Subdata bus
7	BV	I	RTC power supply *1
8	TCK1	O	Connected to crystal *1
9	TCK2	I	Connected to crystal *1
10	TCS	I	RTC CS
11	RTS	O	P-device control
12	RXD1	I	P-device information receive (Pull-up)
13	TXD0	O	Serial interface transmission
14	RXD0	I	Serial interface receive (Pull-up)
15	VDD	–	Power supply
16	GND	–	GND
17	SW	I	(Pull-up)
18	IPL0	O	Interrupt priority
19	IPL1	O	Interrupt priority
20	IPL2	O	Interrupt priority
21	BG	I	Bus ground
22	VPA	O	Varied peripheral address (open drain)
23	BGACK	O	Bus ground acknowledge (open drain)
24	BR	O	Bus request
25	DTACK	I/O	Data transmission acknowledge
26	RW	I/O	Read and write
27	AS	I/O	Address strobe
28	LDS	I/O	Lower data strobe
29	UDS	I/O	Upper data strobe
30	CKSL	I	ROM delay select (Pull-up)
31	D15	I/O	Data bus
32	D14	I/O	Data bus
33	D13	I/O	Data bus
34	D12	I/O	Data bus
35	D11	I/O	Data bus
36	D10	I/O	Data bus
37	D9	I/O	Data bus
38	D8	I/O	Data bus
39	VDD	–	Power supply (+ 5V)
40	GND	–	GND
41	D7	I/O	Data bus
42	D6	I/O	Data bus
43	D5	I/O	Data bus
44	D4	I/O	Data bus
45	D3	I/O	Data bus
46	D2	I/O	Data bus
47	D1	I/O	Data bus
48	D0	I/O	Data bus
49	A23	I/O	Address bus
50	A22	I/O	Address bus
51	A21	I/O	Address bus
52	A20	I/O	Address bus
53	A19	I/O	Address bus
54	A18	I/O	Address bus
55	A17	I/O	Address bus
56	A16	I/O	Address bus
57	A15	I/O	Address bus
58	A14	I/O	Address bus
59	A13	I/O	Address bus
60	A12	I/O	Address bus
61	A11	I/O	Address bus
62	A10	I/O	Address bus
63	A9	I/O	Address bus
64	A8	I/O	Address bus
65	VDD	–	Power supply (+ 5V)
66	GND	–	GND
67	A7	I/O	Address bus
68	A6	I/O	Address bus
69	A5	I/O	Address bus
70	A4	I/O	Address bus
71	A3	I/O	Address bus
72	A2	I/O	Address bus
73	A1	I/O	Address bus
74	RSTN	I	Reset signal
75	FC2	I	Function code
76	FC1	I	Function code
77	FC0	I	Function code
78	TEST2	I	Test terminal (Pull-up)
79	TSET1	I	Test terminal (Pull-up)
80	CK1	I	Clock input (15 MHz)
81	IRQ5N	I	Open (Pull-up)
82	CDN	O	ACP and CDC chip select
83	RAMN	O	NVRAM chip select
84	ROMSL	I	4 or 8 Mbit ROM select (Pull-up)
85	ROM1N	O	ROM1 chip select
86	ROM0N	O	ROM0 chip select
87	CKO	O	Clock output (5 MHz)
88	VSCN	O	VSC chip select
89	IRQ1N	I	External interrupt signal (Pull-up)
90	VDD	–	Power supply (+ 5V)
91	GND	–	GND
92	IRQ2N	I	External interrupt signal (Pull-up)
93	IRQ3N	I	External interrupt signal (Pull-up)
94	IRQ4N	I	External interrupt signal (Pull-up)
95	IRQ7N	I	External interrupt signal (Pull-up)
96	DRQN	I	CDC and ADP DMA request
97	RDYN	I	CDC and ADP DMA controller
98	DACKN	O	
99	SD7	I/O	Subdata bus
100	SD6	I/O	Subdata bus

< Note > *1 : The I/O cells (TK1, TK2 and TK3) related to RTC and RTC are independent from VCC, and the power is supplied from the BV terminal.

• IC004 PWM DRIVER (MPC1715FU) (SV-703 BOARD)

1. Four-system PWM AMP circuit
2. REG circuit for microprocessors (2 V)
3. VREF (1.25 V) circuit
4. 5.8 V DC-CD converter control circuit
5. Charge pump circuit (12 V)
6. VD switch (VIN —o-o— VD)

IC004 is a CMOS motor driver which includes these devices.

Pin No.	Pin Name	I/O	Description
1	H IN 1	I	Thread PWM balanced input
2	H OUT1A	O	Thread motor drive output ⊕
3	FL IN 1	O	Thread PWM amplifier output (176 kHz rectangular wave)
4	V IN 12	–	PWM amplifier 1 and 2 + B
5	FL IN 2	O	Focus PWM amplifier output (176 kHz rectangular wave)
6	PWR GND	–	GND
7	H OUT 2A	O	Focus coil drive output ⊕
8	H IN 2	I	Focus PWM balanced input
9	H OUT 2B	O	Focus coil drive output ⊖
10	V OUT	O	5.8 V step-up circuit control output
11	DTC	I	Step-up circuit switching maximum duty limiter terminal
12	RF	O	Step-up circuit differential amplifier output
13	INM	I	Step-up circuit differential amplifier feedback input
14	INP	I	5.8 V step-up circuit control input
15	VB	–	Bias terminal for step-up circuit differential amplifier
16	VD	O	+ B output (OFF at stop)
17	SIG GND	–	GND
18	VREF	O	Reference output for 5.8 V REG circuit
19	VG	I	Motor drive FET drive (12 V) input
20	CG	O	Peripheral capacitor terminal for motor drive FET driver voltage generation (VG)
21	VCPU	O	Power supply output for microcomputer (IC801)
22	COSC	O	Sawtooth wave oscillator output (Period : approx. 6 μSec.)
23	$\overline{SYNC}$	I	System clock input
24	$\overline{PC}$	I	Power ON/OFF control input
25	H OUT 4B	O	Tracking coil drive output ⊖
26	H IN 4	I	Tracking PWM balanced input
27	H OUT 4A	O	Tracking coil drive output ⊕
28	PER GND	–	GND
29	FL IN 4	O	Tracking PWM amplifier output (176 kHz rectangular wave)
30	V IN 34	–	PWM amplifiers 3 and 4 + B
31	FL IN 3	O	Tracking coil PWM amplifier output (176 kHz rectangular wave)
32	H OUT 3A	O	Spindle motor drive output ⊕
33	H IN 3	I	Spindle PWM balanced input
34	H OUT 3B	O	Spindle motor drive output ⊖
35	LIM 24	I	PWM amplifiers 2 and 4 output limiter terminal
36	VM IN 3	I	Tracking servo error input
37	VM IN 4	I	Spindle servo error input
38	VLG	–	+ B
39	SIG GND	–	GND
40	VC	–	1/2 Vcc (1.8 V)
41	VM IN 2	I	Thread servo error input
42	VM IN 1	I	Focus servo error input
43	LIM 13	I	PWM amplifiers 1 and 3 output limiter terminal
44	H OUT 1B	O	Thread motor drive output ⊖

※ FL IN1 to 4 and VOUT signals are output synchronized with SYNC (176 kHz). If there is no SYNC, these signals are not output after the focus operation (UP/DOWN), because they are synchronized with the internal oscillator (approx. 200 kHz), and they do not match with the signal process system.

• IC401 SUB CPU (M38067M8-060FP) (PU-702 BOARD)

Pin No.	Pin Name	I/O	Description
1 to 3 and 76	P60 to P67	I/O	8-bit I/O port. This terminal is also used as an A-D converter input terminal.
4 to 11	P70 to P77	I/O	8-bit I/O port. Output type is N channel open drain. This terminal activates as a function terminal of serial I/O2 by selecting the function with the program.
12 to 19	P50 to P57	I/O	8-bit I/O port. This terminal activates as an I/O function terminal of timers X and Y, and an output terminal of the D-A converter by selecting the function with the program.
20 to 25, 28 and 29	P40 to P47	I/O	8-bit I/O port. This terminal activates as a function terminal of serial I/O1 by selecting the function with the program.
26	CNVss	–	GND
27	$\overline{RESET}$	I	When this terminal is "L" for more than 2 μs, a reset condition is set. However, add the appropriate period "L" level, if it takes a long time to stabilize the crystal oscillation.
30	XIN	I	I/O to the built-in clock generator circuit.
31	XOUT	O	
32	Vss	–	GND
33 to 40	DB0 to DB7	I/O	8-bit I/O port with the same functions port P0. It is used as a data bus.
41 to 48	AD8 to AD15	I/O	8-bit I/O port with the same functions as port P0. It outputs the higher part of the address information
49 to 56	AD0 to AD7	I/O	8-bit CMOS I/O port. It outputs the lower part of the address information.
58	WR	O	Pulse output terminal for writing data.
57	RD	O	Pulse output terminal for reading data.
59 to 64	P30 to P35	I/O	8-bit I/O port with the same functions as port P0. This terminal is used as a control bus.
65 to 72	P80 to P87	I/O	8-bit I/O port.
73	Vcc	–	Power supply terminal (+ 5 V)
74	VREF	I	Reference voltage input terminal for A-D and D-A converters
75	AVss	–	GND input terminal of the A-D and D-A converters. A potential equal to Vss is added.
78	P65	I/O	The character is switched to Japanese letters.

• **IC402 CD-ROM/ADPCM DECORDER (CXD1197AQ) (PU-702 BOARD)**

Pin No.	Pin Name	I/O	Description
1	NC	–	Open
2	NC	–	Open
3	VDD	–	Power supply (+ 5V)
4	GND	–	GND
5	HA0	I	Host address signal
6	HA1	I	Host address signal
7	HA2	I	Host address signal
8	HA3	I	Host address signal
9	XHCS	I	CXD1197Q select negative logic signal from the host
10	HIRQ	O	Negative logic signal of an interrupt request from the host. Open drain output
11	XRIN	O	Negative logic signal of an interrupt request from the host. Open drain output
12	XHDS	I	Negative logic signal of the host data strobe
13	HRW	I	Host read/write signal
14	XHTC	I/O	Negative logic signal of the host data acknowledge. Open drain output
15	GND	–	GND
16	HD0	I/O	Host data path
17	HD1	I/O	Host data path
18	HD2	I/O	Host data path
19	HD3	I/O	Host data path
20	HD4	I/O	Host data path
21	HD5	I/O	Host data path
22	HD6	I/O	Host data path
23	HD7	I/O	Host data path
24	XRST	I	Reset negative logic signal
25	XDRQ	O	Reset negative logic signal of the host DMA request. Open drain signal
26	XHAC	I	Negative logic signal of the host DMA acknowledge signal
27	XRDY	O	Negative logic signal of the host data ready. Open drain output.
28	VDD	–	Power supply (+5 V)
29	GND	–	GND
30	MA0	O	Buffer memory address (LSB)
31	MA1	O	Buffer memory address
32	MA2	O	Buffer memory address
33	MA3	O	Buffer memory address
34	MA4	O	Buffer memory address
35	MA5	O	Buffer memory address
36	MA6	O	Buffer memory address
37	MA7	O	Buffer memory address
38	MA8	O	Buffer memory address
39	MA9	O	Buffer memory address
40	GND	–	GND
41	MA10	O	Buffer memory address
42	MA11	O	Buffer memory address
43	MA12	O	Buffer memory address
44	MA13	O	Buffer memory address
45	MA14	O	Buffer memory addresss
46	XMOE	O	Buffer memory output enable negative logic signal
47	XMWR	O	Buffer memory write enable negative logic signal
48	MDB0	I/O	Buffer memory data bus
49	MDB1	I/O	Buffer memory data bus
50	MDB2	I/O	Buffer memory data bus
51	MDB3	I/O	Buffer memory data bus
52	MDB4	I/O	Buffer memory data bus
53	VDD	–	GND (+ 5 V)
54	GND	–	GND
55	MDB5	I/O	Buffer memory data bus
56	MDB6	I/O	Buffer memory data bus
57	MDB7	I/O	Buffer memory data bus
58	MDBP	I/O	Buffer memory data bus (error flag)
59	XTL2	O	Crystal oscillation output terminal
60	XTL1	I	Crystal oscillation circuit input terminal (16.9344 MHz)
61	HCLK	O	8.4672 MHz clock output terminal
62	CLK	O	16.9344 MHz clock output terminal
63	LRCK	I	LR clock signal from DSP for CD. (For distinguishing the R and L channels.)
64	DATA	I	Data signal from DSP for CD
65	GND	–	GND
66	BCLK	I	DATA terminal strobe clock signal. (Bit clock)
67	C2PO	I	Positive logic signal of error flag (C2 pointer) from DSP for CD
68	EMP	I	Positive logical signal of emphasis on from DSP for CD
69	BCKO	O	Bit clock signal to DAC (D/C converter)
70	WCO1	O	Word clock signal 1 to DAC
71	WCO2	O	Word clock signal 2 to DAC
72	LRCO	O	LR clock signal to DAC
73	DATO	O	Data signal to DAC
74	MUTE	O	Mute positive logic signal
75	NC	–	Open
76	NC	–	Open
77	NC	–	Open
78	VDD	–	Power supply (+ 5V)
79	GND	–	GND
80	D0	O	Sub CPU data bus
81	D1	O	Sub CPU data bus
82	D2	O	Sub CPU data bus
83	D3	O	Sub CPU data bus
84	D4	O	Sub CPU data bus
85	D5	O	Sub CPU data bus
86	D6	O	Sub CPU data bus
87	D7	O	CPU data bus
88	XCS	I	Negative logic signal of CXD1197Q from the sub CPU
89	XRD	I	Negative logic signal of CXD1197Q internal register read-out from the sub CPU
90	GND	–	GND
91	XWR	I	Negative logic signal of CXD1197Q internal register read-out from the sub CPU
92	XINT	O	Negative logic signal of an interrupt request to the sub CPU.
93	A0	I	Sub CPU address
94	A1	I	Sub CPU address
95	A2	I	Sub CPU address
96	A3	I	Sub CPU address
97	A4	I	Sub CPU address
98	NC	–	Open
99	NC	–	Open
100	NC	–	Open

• **IC509 SYNC. SEPARATION FOR DIGITAL VIDEO PROCESSING/AFC (CXD1229Q) (PU-702 BOARD)**

Outputs the sync. separation and 910 fH clock. Built-in AFC, OP AMP and VCO.

Pin No.	Pin Name	I/O	Description
1	FCS	I/O	Open
2	CPO	I/O	Open
3	SLI	AI	Slice level of the sync. clamp block.
4	STL	AI	Single chip level
5	VSIN	AI	Open
6	Vss	–	GND
7	CMPI	AI	Open
8	FCL	AI	Open
9	VCIN	AI	Open
10	PWM	AI	OP AMP input
11	PEO	AO	OP AMP output
12	Vss	–	GND
13	FPD	O	Phase comparator output from rising edge of sync. pulse and built-in H counter (Phase error output of the AFC sub loop)
14	RPD	O	Phase comparator output from the button of the sync. pulse and built-in H counter. (Phase error output of the AFC main loop)
15	MCKI	I	Inverter input for VCO
16	YO	O	Inverter output for VCO
17	MCKO	O	910 fH output. Logically same as YO.
18	Vss	–	GND
19	VDD	–	+5 V
20	XHLD	I	Normally "H". "H" : AFC error, active. "L" : AFC error, hold.
21	TC	I/O	This terminal is used to precisely adjust the AFC lock phase. The time constant connected to this terminal changes the pulse width of pin 13 (FPD), and makes pin 27 (AFH) lock phase adjustable.
22	MMT	I	Normally "H". (Built-in Mono-multi terminal)
23	BFP	O	Open
24	WIND	O	Open
25	HD	I/O	Open
26	VD	O	Open
27	AFH	O	Open
28	YHD	O	Open
29	CHD	O	Open
30	HLFH	O	Open
31	Vss	–	GND
32	WEVN	O	Odd and even detect output. "H" : First and third fields. (Connected to CXD1226 and CXD1228)
33	CLR	I	GND
34	TST2	I	GND
35	TST1	I	GND
36	TNT0	I	GND
37	YMCK	I	Master clock input. (This terminal is not internally connected to MCKO.)
38	TST3	I	GND
39	XXA	I/O	GND
40	IR1	I/O	Open
41	JOG	I	GND
42	Vss	–	GND
43	VDD	–	+5 V
44	POS	I	GND
45	XRES	O	Open
46	RFSW	I	GND
47	XVDT	I	Composite sync. input of V-Det system. Connected to "CSYN"
48	CSYN	I/O	Sync. separation output of the sync. clamp system

(Note) AI : Analog input
AO : Analog output

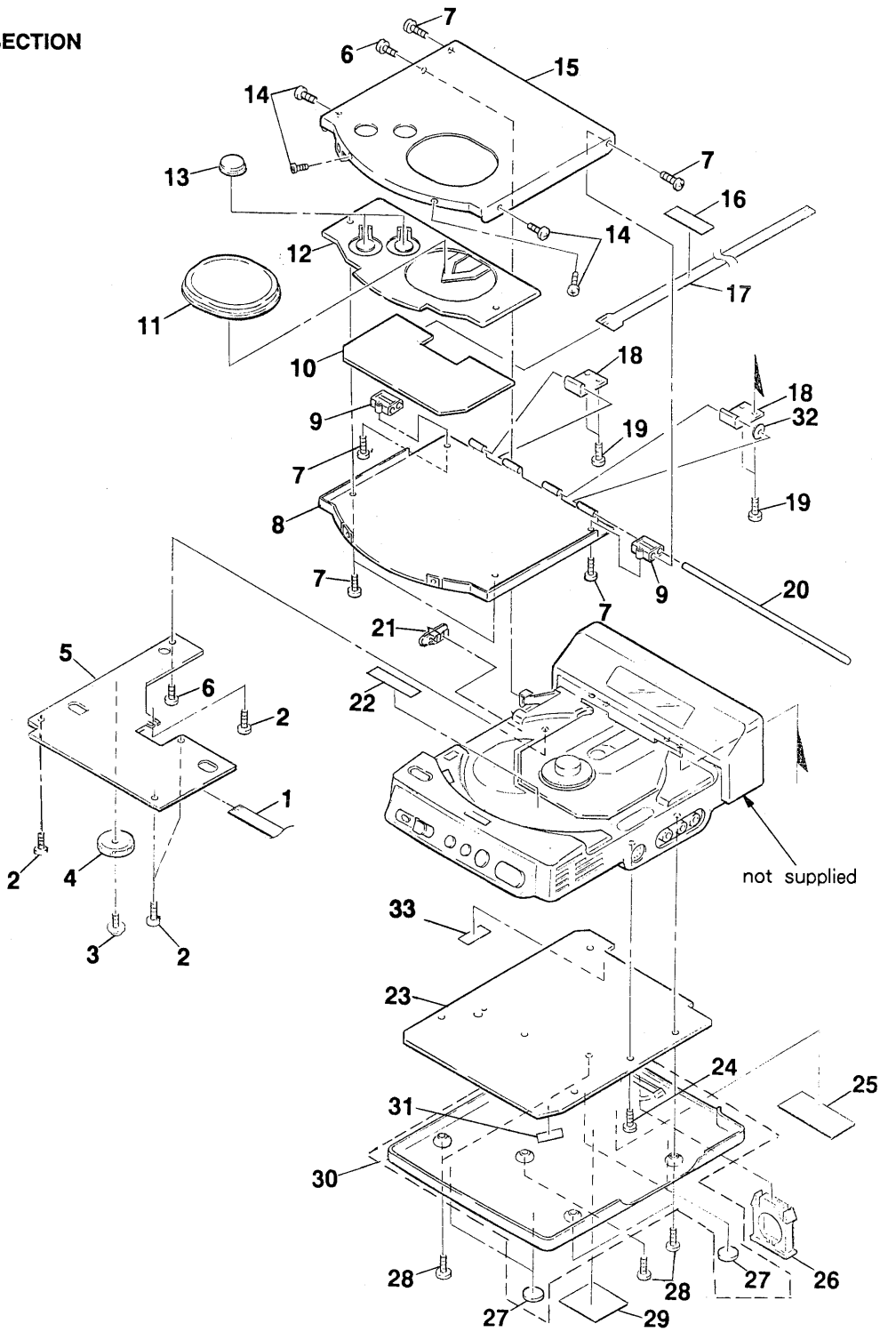
SECTION 5
EXPLODED VIEWS

NOTE:

- – XX, – X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts Example :
  KNOB, BALANCE (WHITE)...(RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1. CD LID SECTION

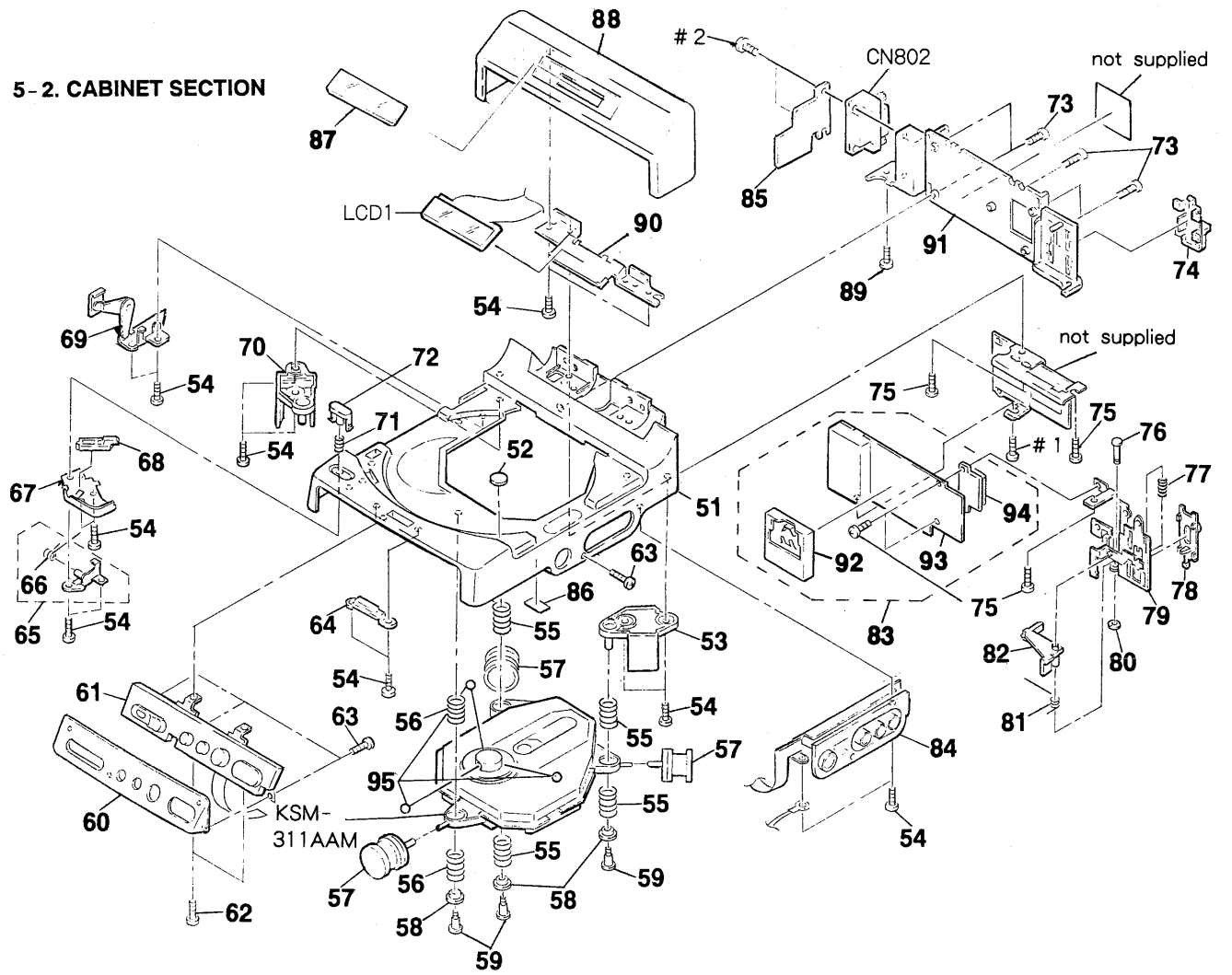


* Refer to next page for the parts list of this section.

Ref. No.	Part No.	Description	Remarks
1	1-641-818-11	PC BOARD, HN-10 FLEXIBLE	
2	3-719-408-01	SCREW (B2), TAPPING, P3	
3	3-345-648-01	SCREW (M1.4X3)	
4	4-932-763-11	KNOB, VOLUME	
* 5	A-4649-781-A	SV-703 BOARD, COMPLETE	
6	3-740-626-21	SCREW (M1.7X4)	
7	4-945-318-01	SCREW	
8	4-948-665-01	LID (LOWER), CD	
9	4-948-639-01	BEARING (CD LID)	
10	1-466-641-21	SWITCH BLOCK, CONTROL (CD-I)	
11	4-948-659-11	BUTTON (CA)	
12	4-948-671-01	HOLDER (CD LID)	
13	4-948-637-11	BUTTON (A)	
14	3-703-816-42	SCREW (M1.4X2.5), SPECIAL HEAD	
15	4-948-664-21	LID (UPPER), CD	
* 16	3-312-975-01	SPACER	
17	1-641-819-11	PC BOARD, HN-12 FLEXIBLE	

Ref. No.	Part No.	Description	Remarks
18	4-948-640-01	HINGE (CD LID)	
19	3-719-601-01	SCREW (B2X5), TAPPING	
20	4-948-618-01	SHAFT (CD HINGE)	
21	4-948-647-11	KNOB (DBB)	
22	4-908-711-11	LABEL, CAUTION, LENS	
* 23	A-4649-787-A	PU-702 BOARD, COMPLETE	
24	3-724-455-01	SCREW (M2X4)	
* 25	3-955-072-01	LABEL, MODEL NUMBER (U)	
26	X-4942-095-1	HOLDER ASSY, BATTERY	
27	4-912-641-11	FOOT, RUBBER	
28	3-336-395-01	SCREW (B2X10) (G), TAPPING	
29	3-704-256-01	LABEL, CAUTION (LITHIUM BATT)	
30	A-4604-979-A	PLATE ASSY, BOTTOM	
31	3-831-441-XX	SPACER, KNOB	
32	4-918-886-11	WASHER, THRUST	
33	3-884-241-01	SHEET (C), ADHESIVE	

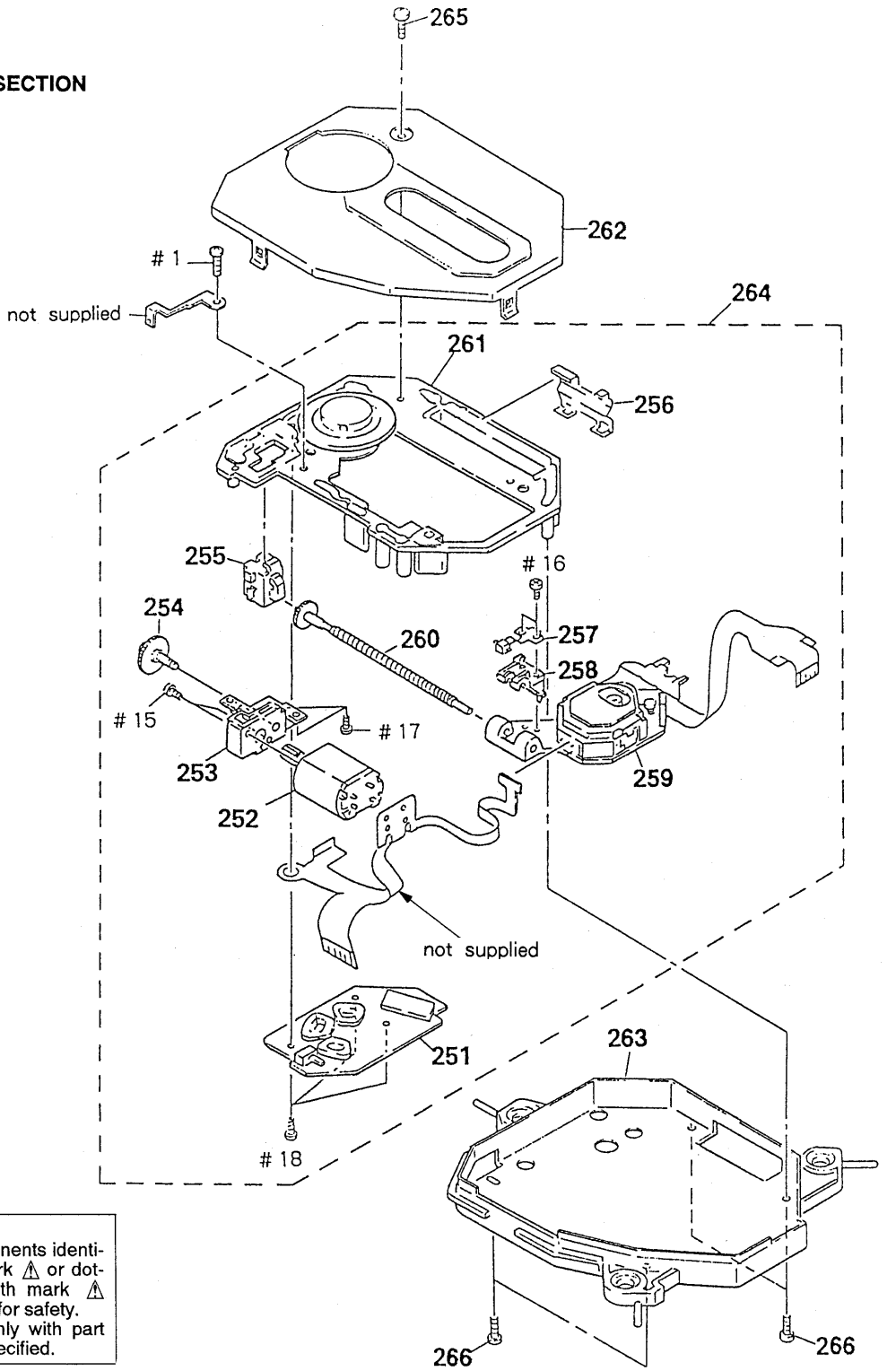
5-2. CABINET SECTION



Ref. No.	Part No.	Description	Remarks
51	4-948-662-21	CABINET	
* 52	3-551-305-21	CUSHION, PANEL	
53	4-948-651-01	HOLDER (R)	
54	3-719-408-01	SCREW (B2), TAPPING, P3	
55	4-951-816-01	SPRING (A), COMPRESSION	
56	4-951-817-01	SPRING (B), COMPRESSION	
57	3-330-929-11	DAMPER (S), HYPER	
58	4-948-634-01	RETAINER, SPRING	
59	4-924-718-01	SCREW, INSULATOR	
60	X-4943-201-3	ESCUTCHEON (CD) ASSY	
61	1-466-642-22	SWITCH BLOCK, CONTROL (CD)	
62	3-719-601-01	SCREW (B2X5), TAPPING	
63	4-945-318-01	SCREW	
64	3-955-071-01	COVER, LOCK	
65	X-4942-568-1	PLATE ASSY, POP	
66	4-951-262-01	SPRING, POP	
67	4-948-600-01	BRACKET (LOCK CLAW)	
68	4-948-658-01	CLAW (CD), LOCK	
69	X-4942-102-1	PLATE ASSY, SWITCHING	
70	4-948-650-01	HOLDER (L)	
71	4-951-335-01	SPRING, COMPRESSION	
72	4-948-614-11	BUTTON (OPEN)	
73	3-740-626-21	SCREW (M1.7X4)	
74	3-955-068-01	KNOB, BATTERY	

Ref. No.	Part No.	Description	Remarks
75	4-952-140-01	SCREW (M2X6)	
76	4-948-643-01	SHAFT (LOCK ARM)	
77	4-951-181-01	SPRING, PRESS COIL	
78	4-948-646-12	KNOB (LOCK RELEASE)	
79	X-4942-094-1	BRACKET (BATTERY LOCK) ASSY	
80	3-321-813-11	WASHER, COTTER POLYETHYLENE	
81	4-951-182-01	SPRING, TORSION	
82	4-951-189-01	CLAW, BATT	
* 83	A-4649-784-A	PS-715 BOARD, COMPLETE	
84	1-537-393-31	TERMINAL BOARD	
* 85	A-4649-778-A	RS-708 (A) BOARD, COMPLETE	
86	3-831-441-XX	SPACER, KNOB	
87	3-955-070-01	PLATE, TRANSPARENT	
88	3-955-066-01	CASE, ORNAMENTAL	
89	3-724-455-01	SCREW (M2X4)	
* 90	3-955-067-01	BRACKET, CASE	
91	3-955-069-01	BASE (3), BATTERY	
92	A-4604-973-A	GUIDE ASSY, BATTERY	
93	1-537-420-11	TERMINAL BOARD (BATTERY)	
94	4-951-265-01	SPACER (BATTERY TERMINAL)	
95	7-671-155-01	STEEL BALL 3.0	
CN802	1-695-206-21	CONNECTOR 9P (SERIAL PORT)	
LCD1	1-810-317-11	DISPLAY PANEL, LIQUID CRYSTAL	

5-3. MD SECTION



Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remarks
251	8-835-456-01	MOTOR, DC SSC-02E01S	
252	X-2625-210-1	GEAR ASSY, SLED MOTOR	
* 253	2-625-513-01	BASE, DRIVING	
254	2-625-818-01	GEAR (B)	
* 255	A-4910-348-B	RETAINER ASSY, THRUST	
* 256	2-625-514-01	COVER, FLEXIBLE	
257	2-625-516-01	SPRING (A), FEED	
258	2-625-515-01	RACK (AT)	

Ref. No.	Part No.	Description	Remarks
⚠259	8-848-245-11	DEVICE, OPTICAL KSS-311A	
260	X-2625-209-1	SCREW ASSY, SLED	
261	X-2625-309-2	CHASSIS ASSY, TURNTABLE	
262	4-948-652-01	COVER, MD	
* 263	4-948-667-01	HOLDER, MD	
⚠264	8-848-252-01	DEVICE, OPTICAL KSM-311AAM	
265	3-733-912-01	SCREW (M2X2.5), SPECIAL HEAD	
266	3-719-601-01	SCREW (B2X5), TAPPING	

SECTION 6
ELECTRICAL PARTS LIST

PS-715

NOTE:

When indicating parts by reference number, please include the board name.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- −XX, −X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS :
  uF : μF
- RESISTORS
  All resistors are in ohms.
  METAL : metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- COILS
  uH : μH
- SEMICONDUCTORS
  In each case, u : μ, for example :
  uA... : μA... , uPA... , μPA... ,
  uPB... , μPB... , uPC... , μPC... ,
  uPD..., μPD...

Ref. No.	Part No.	Description			Remarks
*	A-4649-784-A	PS-715 BOARD, COMPLETE			
		**********			
					(Ref. No 1,000 Series)
	1-537-420-11	TERMINAL BOARD (BATTERY)			
	4-951-265-01	SPACER (BATTERY TERMINAL)			
		< CAPACITOR >			
C601	1-124-234-00	ELECT	22uF	20%	16V
C602	1-127-512-00	ELECT(SOLID)	10uF	20%	16V
C603	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C604	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C605	1-127-481-00	ELECT(SOLID)	6.8uF	20%	6.3V
C606	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C607	1-126-602-11	ELECT CHIP	3.3uF	20%	50V
C609	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C610	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C612	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
		< CONNECTOR >			
* CN601	1-564-707-11	PIN, CONNECTOR (SMALL TYPE) 5P			
		< DIODE >			
D605	8-719-938-78	DIODE SB10-05PCP			
		< FUSE >			
⚠F601	1-532-778-21	FUSE, MICRO 1.6A 125V			
⚠F602	1-532-778-21	FUSE, MICRO 1.6A 125V			
⚠F603	1-532-776-21	FUSE, MICRO			
		< IC >			
IC601	8-759-521-35	IC TL5001CD			
		< JACK >			
J601	1-537-429-11	TERMINAL BOARD (BATTERY)			

Ref. No.	Part No.	Description			Remarks
		< COIL >			
L601	1-414-092-11	COIL, CHOKE 22uH			
L602	1-414-092-11	COIL, CHOKE 22uH			
L603	1-414-092-11	COIL, CHOKE 22uH			
L605	1-424-597-11	COIL, LINE FILTER			
L606	1-414-092-11	COIL, CHOKE 22uH			
		< TRANSISTOR >			
Q601	8-729-402-42	TRANSISTOR UN5213			
Q602	8-729-141-48	TRANSISTOR 2SB624-BV345			
Q603	8-729-402-84	TRANSISTOR XN4601			
Q604	8-729-822-60	TRANSISTOR 2SB1302-S			
		< RESISTOR >			
R601	1-216-841-11	METAL CHIP	47K	5%	1/16W
R602	1-216-833-11	METAL CHIP	10K	5%	1/16W
R603	1-216-819-11	METAL CHIP	680	5%	1/16W
R604	1-218-680-11	METAL CHIP	330	0.50%	1/16W
R605	1-216-809-11	METAL CHIP	100	5%	1/16W
R606	1-216-809-11	METAL CHIP	100	5%	1/16W
R607	1-218-722-11	METAL CHIP	18K	0.50%	1/16W
R608	1-216-849-11	METAL CHIP	220K	5%	1/16W
R609	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R610	1-218-723-11	METAL CHIP	20K	0.50%	1/16W
R611	1-218-708-11	METAL CHIP	4.7K	0.50%	1/16W
R612	1-216-821-11	METAL CHIP	1K	5%	1/16W
R613	1-216-801-11	METAL CHIP	22	5%	1/16W
R614	1-216-821-11	METAL CHIP	1K	5%	1/16W
R615	1-216-864-11	METAL CHIP	0	5%	1/16W
		< VARIABLE RESISTOR >			
RV601	1-241-396-11	RES, ADJ, METAL GLAZE 22K			
RV602	1-241-392-11	RES, ADJ, METAL GLAZE 1K			

****

PU-702

Ref. No.	Part No.	Description			Remarks
*	A-4649-787-A	PU-702 BOARD, COMPLETE			
		**********			
			(Ref. No 2,000 Series)		
		< CAPACITOR >			
C001	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C002	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C003	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C004	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C005	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C006	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C007	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C008	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C009	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C010	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C011	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C012	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C013	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C014	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C015	1-164-346-11	CERAMIC CHIP	1uF		16V
C101	1-162-917-11	CERAMIC CHIP	15PF	5%	50V
C103	1-124-779-00	ELECT CHIP	10uF	20%	16V
C104	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C106	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C108	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C109	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C110	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C119	1-162-917-11	CERAMIC CHIP	15PF	5%	50V
C120	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C201	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C202	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C203	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C207	1-124-779-00	ELECT CHIP	10uF	20%	16V
C208	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C210	1-128-024-11	ELECT CHIP	4.7uF	0	10V
C216	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C225	1-128-024-11	ELECT CHIP	4.7uF	0	10V
C226	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C303	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C307	1-128-024-11	ELECT CHIP	4.7uF	0	10V
C401	1-124-779-00	ELECT CHIP	10uF	20%	16V
C402	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C403	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C404	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C405	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C406	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C407	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C408	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C409	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C410	1-164-156-11	CERAMIC CHIP	0.1uF		25V

Ref. No.	Part No.	Description			Remarks
C411	1-162-917-11	CERAMIC CHIP	15PF	5%	50V
C412	1-162-917-11	CERAMIC CHIP	15PF	5%	50V
C413	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C414	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C415	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C416	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C417	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C419	1-162-923-11	CERAMIC CHIP	47PF	5%	50V
C420	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C501	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C502	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C503	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C505	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C506	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C507	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C508	1-124-779-00	ELECT CHIP	10uF	20%	16V
C509	1-124-779-00	ELECT CHIP	10uF	20%	16V
C510	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C511	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C512	1-128-391-11	ELECT	330uF	20%	6.3V
C514	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C516	1-126-245-11	ELECT	330uF	20%	6.3V
C517	1-126-204-11	ELECT CHIP	47uF	20%	16V
C520	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C524	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C526	1-164-346-11	CERAMIC CHIP	1uF		16V
C527	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C528	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C529	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C532	1-126-395-11	ELECT	22uF	20%	16V
C533	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C534	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C535	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C536	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C542	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C551	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C552	1-128-024-11	ELECT CHIP	4.7uF	0	10V
C553	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C554	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C555	1-162-926-11	CERAMIC CHIP	82PF	5%	50V
C556	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C558	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C559	1-128-024-11	ELECT CHIP	4.7uF	0	10V
C560	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C561	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C562	1-162-952-11	CERAMIC CHIP	82PF	5%	50V
C563	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C564	1-128-024-11	ELECT CHIP	4.7uF	0	10V
C565	1-128-028-11	ELECT CHIP	3.3uF	0	16V
C566	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V

Ref. No.	Part No.	Description			Remarks
C567	1-164-164-11	CERAMIC CHIP	33PF	5%	50V
C568	1-164-164-11	CERAMIC CHIP	33PF	5%	50V
C569	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C570	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C571	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C572	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C573	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C574	1-128-024-11	ELECT CHIP	4.7uF	0	10V
C575	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C576	1-164-378-11	CERAMIC CHIP	30PF	5%	50V
C577	1-164-218-11	CERAMIC CHIP	180PF	0.25PF	50V
C578	1-164-378-11	CERAMIC CHIP	30PF	5%	50V
C579	1-164-218-11	CERAMIC CHIP	180PF	0.25PF	50V
C580	1-164-378-11	CERAMIC CHIP	30PF	5%	50V
C581	1-164-218-11	CERAMIC CHIP	180PF	0.25PF	50V
C701	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C702	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C703	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C704	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C705	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C706	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C707	1-124-779-00	ELECT CHIP	10uF	20%	16V
C708	1-124-779-00	ELECT CHIP	10uF	20%	16V
C709	1-124-779-00	ELECT CHIP	10uF	20%	16V
C710	1-124-779-00	ELECT CHIP	10uF	20%	16V
C711	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C802	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C803	1-164-156-11	CERAMIC CHIP	0.1uF		25V

< CONNECTOR >

CN003	1-691-342-11	HOUSING, CONNECTOR 28P
* CN004	1-564-707-11	PIN, CONNECTOR (SMALL TYPE) 5P
CN007	1-566-523-11	CONNECTOR, FPC (ZIF) 7P
CN009	1-566-527-11	CONNECTOR, FPC (ZIF) 11P
CN010	1-569-528-11	HOUSING, CONNECTOR 12P
* CN012	1-565-151-11	PIN, CONNECTOR (ANGLE) 4P
* CN701	1-565-156-11	PIN, CONNECTOR (ANGLE) 9P
CN801	1-569-531-11	HOUSING, CONNECTOR 20P
CN999	1-580-057-11	PIN, CONNECTOR 4P

< VARIABLE CAPACITOR >

CV001	1-141-370-11	CAP, CHIP TRIMMER 50P
CV551	1-141-373-11	CAP, CHIP TRIMMER 50P

< DIODE >

⚠D001	8-719-991-65	DIODE	SB02W03C
⚠D004	8-719-938-72	DIODE	SB01-05CP
D401	8-719-400-18	DIODE	MA152WK
D402	8-719-106-70	DIODE	RD12M-B1
D403	8-719-016-73	DIODE	STZ6.8T
D404	8-719-016-73	DIODE	STZ6.8T
D405	8-719-016-73	DIODE	STZ6.8T
D406	8-719-016-73	DIODE	STZ6.8T
D501	8-719-016-73	DIODE	STZ6.8T
D504	8-719-016-73	DIODE	STZ6.8T
D505	8-719-016-73	DIODE	STZ6.8T
D507	8-719-800-76	DIODE	1SS226
D508	8-719-941-09	DIODE	DAP202U
D509	8-719-941-09	DIODE	DAP202U
D511	8-719-106-23	DIODE	RD7.5M-B2
D512	8-719-106-98	DIODE	RD16M-B2
D513	8-719-106-98	DIODE	RD16M-B2
D514	8-719-106-98	DIODE	RD16M-B2
D515	8-719-106-98	DIODE	RD16M-B2
D516	8-719-106-98	DIODE	RD16M-B2
D517	8-719-106-98	DIODE	RD16M-B2
D518	8-719-106-98	DIODE	RD16M-B2
D519	8-719-106-98	DIODE	RD16M-B2
D520	8-719-106-98	DIODE	RD16M-B2
D521	8-719-106-98	DIODE	RD16M-B2
D551	8-713-300-88	DIODE	1T33C-01

< FERRITE BEAD >

FB201	1-543-775-11	FILTER, EMI
FB202	1-543-775-11	FILTER, EMI
FB203	1-543-775-11	FILTER, EMI
FB204	1-543-775-11	FILTER, EMI
FB206	1-543-775-11	FILTER, EMI
FB207	1-543-775-11	FILTER, EMI
FB208	1-543-775-11	FILTER, EMI
FB301	1-543-775-11	FILTER, EMI
FB302	1-543-775-11	FILTER, EMI
FB303	1-543-775-11	FILTER, EMI
FB304	1-543-775-11	FILTER, EMI
FB305	1-412-390-21	INDUCTOR CHIP 0uH
FB401	1-543-775-11	FILTER, EMI
FB402	1-543-775-11	FILTER, EMI
FB516	1-543-775-11	FILTER, EMI
FB517	1-543-775-11	FILTER, EMI
FB518	1-543-775-11	FILTER, EMI
FB519	1-543-775-11	FILTER, EMI
FB520	1-543-775-11	FILTER, EMI
FB525	1-543-775-11	FILTER, EMI
FB526	1-543-775-11	FILTER, EMI
FB527	1-543-775-11	FILTER, EMI
FB551	1-543-775-11	FILTER, EMI
FB552	1-543-775-11	FILTER, EMI
FB554	1-543-775-11	FILTER, EMI

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

PU-702

Ref. No.	Part No.	Description	Remarks
FB701	1-412-390-21	INDUCTOR CHIP 0uH	
FB702	1-412-390-21	INDUCTOR CHIP 0uH	
FB703	1-412-390-21	INDUCTOR CHIP 0uH	
FB704	1-412-390-21	INDUCTOR CHIP 0uH	
FB705	1-412-390-21	INDUCTOR CHIP 0uH	
FB706	1-412-390-21	INDUCTOR CHIP 0uH	
FB707	1-412-390-21	INDUCTOR CHIP 0uH	
FB708	1-412-390-21	INDUCTOR CHIP 0uH	
FB709	1-412-390-21	INDUCTOR CHIP 0uH	
FB801	1-412-390-21	INDUCTOR CHIP 0uH	
FB802	1-412-390-21	INDUCTOR CHIP 0uH	
FB803	1-412-390-21	INDUCTOR CHIP 0uH	
FB804	1-412-390-21	INDUCTOR CHIP 0uH	
FB805	1-412-390-21	INDUCTOR CHIP 0uH	
FB806	1-412-390-21	INDUCTOR CHIP 0uH	
FB807	1-412-390-21	INDUCTOR CHIP 0uH	
FB808	1-412-390-21	INDUCTOR CHIP 0uH	
FB809	1-412-390-21	INDUCTOR CHIP 0uH	
FB810	1-412-390-21	INDUCTOR CHIP 0uH	
		< FILTER >	
FL501	1-415-891-11	DELAY LINE	
FL502	1-236-191-11	FILTER, BAND PASS	
		< IC >	
IC001	8-759-038-92	IC MC68HC000FC16	
IC002	8-759-521-53	IC CXD8293Q	
IC003	8-752-356-60	IC CXK5864CM-10LL	
IC004	8-759-043-25	IC RH5VA43CA	
IC005	8-759-927-46	IC SN74HC00ANS	
IC006	8-759-182-06	IC HN62418FPC	
IC007	8-759-926-24	IC SN74HC164ANS	
IC008	8-759-043-25	IC RH5VA43CA	
IC009	8-759-234-20	IC TC7S08F	
IC101	8-759-098-26	IC MN66460B	
IC102	8-759-985-26	IC 74AC74SJ	
IC103	8-759-927-29	IC SN74HCU04ANS	
IC201	8-759-180-95	IC CXD8297AQ	
IC202	8-759-182-05	IC uPD424170G5-70-7JF	
IC302	8-759-182-05	IC uPD424170G5-70-7JF	
IC401	8-759-182-07	IC M38067M8-060FP	
IC402	8-752-351-70	IC CXD1197AQ	
IC403	8-752-350-81	IC CXK58257AM-12L-T6	
IC404	8-752-356-60	IC CXK5864CM-10LL	
IC406	8-759-948-48	IC RH5RA50A	
IC408	8-759-100-93	IC uPC393G2	
IC409	8-759-043-25	IC RH5VA43CA	
IC501	8-752-033-07	IC CXA1145M	
IC503	8-759-062-32	IC AN6545SP	
IC504	8-759-234-20	IC TC7S08F	

Ref. No.	Part No.	Description	Remarks
IC505	8-759-245-04	IC TC4S584F	
IC508	8-759-925-90	IC SN74HC74ANS	
IC509	8-759-987-20	IC CXD1229Q	
IC510	8-759-062-32	IC AN6545SP	
IC511	8-759-148-30	IC uPD6376	
IC512	8-759-234-20	IC TC7S08F	
IC701	8-759-038-28	IC MC145407F	
IC702	8-759-190-79	IC uPD72001GC-11-3B6	
IC703	8-759-182-04	IC MC145403F-MR2	
IC704	8-759-925-83	IC SN74HC27ANS	
IC705	8-759-927-46	IC SN74HC00ANS	
IC706	8-759-926-11	IC SN74HC138ANS	
IC801	8-759-926-11	IC SN74HC138ANS	
IC802	8-759-926-62	IC SN74HC365ANS	
IC803	8-759-073-95	IC SED1510F0C	
		< COIL >	
L101	1-412-030-11	INDUCTOR CHIP 22uH	
L501	1-412-627-51	INDUCTOR 27uH	
L506	1-412-028-11	INDUCTOR CHIP 4.7uH	
L507	1-412-030-11	INDUCTOR CHIP 22uH	
L508	1-412-030-11	INDUCTOR CHIP 22uH	
L551	1-412-032-11	INDUCTOR CHIP 100uH	
L552	1-412-949-21	INDUCTOR 6.8uH	
L553	1-412-031-11	INDUCTOR CHIP 47uH	
L554	1-410-383-31	INDUCTOR CHIP 15uH	
L555	1-410-383-31	INDUCTOR CHIP 15uH	
L556	1-410-383-31	INDUCTOR CHIP 15uH	
		< TRANSISTOR >	
Q003	8-729-216-22	TRANSISTOR 2SA1162-G	
Q401	8-729-907-00	TRANSISTOR DTC114EU	
Q402	8-729-907-00	TRANSISTOR DTC114EU	
Q403	8-729-907-00	TRANSISTOR DTC114EU	
Q404	8-729-907-00	TRANSISTOR DTC114EU	
Q507	8-729-924-07	TRANSISTOR DTA143XU	
Q508	8-729-216-22	TRANSISTOR 2SA1162-G	
Q512	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q513	8-729-141-48	TRANSISTOR 2SB624-BV345	
Q551	8-729-102-07	TRANSISTOR 2SC2223-F13	
Q552	8-729-216-22	TRANSISTOR 2SA1162-G	
		< RESISTOR >	
R001	1-216-825-11	METAL CHIP 2.2K 5%	1/16W
R002	1-216-825-11	METAL CHIP 2.2K 5%	1/16W
R003	1-216-825-11	METAL CHIP 2.2K 5%	1/16W
R005	1-216-825-11	METAL CHIP 2.2K 5%	1/16W
R006	1-216-825-11	METAL CHIP 2.2K 5%	1/16W

Ref. No.	Part No.	Description			Remarks
R007	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R008	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R019	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R010	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R011	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R012	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R013	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R014	1-216-833-11	METAL CHIP	10K	5%	1/16W
R015	1-216-821-11	METAL CHIP	1K	5%	1/16W
R016	1-216-833-11	METAL CHIP	10K	5%	1/16W
R017	1-216-821-11	METAL CHIP	1K	5%	1/16W
R018	1-216-833-11	METAL CHIP	10K	5%	1/16W
R019	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R020	1-216-841-11	METAL CHIP	47K	5%	1/16W
R021	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R022	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R028	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R030	1-216-821-11	METAL CHIP	1K	5%	1/16W
R031	1-216-803-11	METAL CHIP	33	5%	1/16W
R032	1-216-839-11	METAL CHIP	33K	5%	1/16W
R033	1-216-864-11	METAL CHIP	0	5%	1/16W
R034	1-216-833-11	METAL CHIP	10K	5%	1/16W
R099	1-216-841-11	METAL CHIP	47K	5%	1/16W
R101	1-216-828-11	METAL CHIP	3.9K	5%	1/16W
R104	1-218-870-11	METAL CHIP	9.1K	0.50%	1/16W
R105	1-216-816-11	METAL CHIP	390	5%	1/16W
R106	1-216-841-11	METAL CHIP	47K	5%	1/16W
R107	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W
R108	1-216-816-11	METAL CHIP	390	5%	1/16W
R109	1-216-816-11	METAL CHIP	390	5%	1/16W
R114	1-216-864-11	METAL CHIP	0	5%	1/16W
R201	1-216-841-11	METAL CHIP	47K	5%	1/16W
R202	1-216-841-11	METAL CHIP	47K	5%	1/16W
R203	1-216-806-11	METAL GLAZE	56	5%	1/16W
R204	1-216-624-11	METAL CHIP	75	0.5%	1/10W
R205	1-216-803-11	METAL CHIP	33	5%	1/16W
R206	1-216-803-11	METAL CHIP	33	5%	1/16W
R301	1-216-841-11	METAL CHIP	47K	5%	1/16W
R302	1-216-841-11	METAL CHIP	47K	5%	1/16W
R303	1-216-806-11	METAL GLAZE	56	5%	1/16W
R304	1-216-624-11	METAL CHIP	75	0.5%	1/10W
R305	1-216-803-11	METAL CHIP	33	5%	1/16W
R306	1-216-803-11	METAL CHIP	33	5%	1/16W
R401	1-216-841-11	METAL CHIP	47K	5%	1/16W
R402	1-216-833-11	METAL CHIP	10K	5%	1/16W
R403	1-216-833-11	METAL CHIP	10K	5%	1/16W
R404	1-216-833-11	METAL CHIP	10K	5%	1/16W
R405	1-216-833-11	METAL CHIP	10K	5%	1/16W
R406	1-216-833-11	METAL CHIP	10K	5%	1/16W
R407	1-216-833-11	METAL CHIP	10K	5%	1/16W

Ref. No.	Part No.	Description			Remarks
R408	1-216-841-11	METAL CHIP	47K	5%	1/16W
R413	1-216-841-11	METAL CHIP	47K	5%	1/16W
R414	1-216-841-11	METAL CHIP	47K	5%	1/16W
R415	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R416	1-216-841-11	METAL CHIP	47K	5%	1/16W
R417	1-216-841-11	METAL CHIP	47K	5%	1/16W
R418	1-216-833-11	METAL CHIP	10K	5%	1/16W
R419	1-216-833-11	METAL CHIP	10K	5%	1/16W
R420	1-216-833-11	METAL CHIP	10K	5%	1/16W
R421	1-216-833-11	METAL CHIP	10K	5%	1/16W
R422	1-216-841-11	METAL CHIP	47K	5%	1/16W
R423	1-216-821-11	METAL CHIP	1K	5%	1/16W
R424	1-218-751-11	METAL CHIP	300K	0.50%	1/16W
R425	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R426	1-216-841-11	METAL CHIP	47K	5%	1/16W
R427	1-218-750-11	METAL CHIP	270K	0.50%	1/16W
R431	1-218-752-11	METAL CHIP	330K	0.50%	1/16W
R432	1-218-752-11	METAL CHIP	330K	0.50%	1/16W
R433	1-216-833-11	METAL CHIP	10K	5%	1/16W
R436	1-216-833-11	METAL CHIP	10K	5%	1/16W
R437	1-216-833-11	METAL CHIP	10K	5%	1/16W
R440	1-216-841-11	METAL CHIP	47K	5%	1/16W
R441	1-216-821-11	METAL CHIP	1K	5%	1/16W
R442	1-216-821-11	METAL CHIP	1K	5%	1/16W
R443	1-216-821-11	METAL CHIP	1K	5%	1/16W
R444	1-216-821-11	METAL CHIP	1K	5%	1/16W
R503	1-216-821-11	METAL CHIP	1K	5%	1/16W
R504	1-216-821-11	METAL CHIP	1K	5%	1/16W
R505	1-216-838-11	METAL CHIP	27K	5%	1/16W
R506	1-216-821-11	METAL CHIP	1K	5%	1/16W
R507	1-216-821-11	METAL CHIP	1K	5%	1/16W
R508	1-216-821-11	METAL CHIP	1K	5%	1/16W
R509	1-216-624-11	METAL CHIP	75	0.5%	1/10W
R516	1-216-841-11	METAL CHIP	47K	5%	1/16W
R517	1-218-289-11	METAL GLAZE	510	5%	1/16W
R523	1-216-821-11	METAL CHIP	1K	5%	1/16W
R536	1-216-841-11	METAL CHIP	47K	5%	1/16W
R537	1-218-752-11	METAL CHIP	330K	0.50%	1/16W
R538	1-218-749-11	METAL CHIP	240K	0.50%	1/16W
R539	1-218-725-11	METAL CHIP	24K	0.50%	1/16W
R540	1-218-746-11	METAL CHIP	180K	0.50%	1/16W
R541	1-216-833-11	METAL CHIP	10K	5%	1/16W
R542	1-216-856-11	METAL CHIP	820K	5%	1/16W
R543	1-218-729-11	METAL CHIP	36K	0.50%	1/16W
R544	1-218-751-11	METAL CHIP	300K	0.50%	1/16W
R545	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R546	1-216-857-11	METAL CHIP	1M	5%	1/16W
R549	1-216-821-11	METAL CHIP	1K	5%	1/16W
R552	1-216-845-11	METAL CHIP	100K	5%	1/16W
R553	1-216-839-11	METAL CHIP	33K	5%	1/16W

Ref. No.	Part No.	Description			Remarks
R554	1-216-809-11	METAL CHIP	100	5%	1/16W
R555	1-216-839-11	METAL CHIP	33K	5%	1/16W
R556	1-216-821-11	METAL CHIP	1K	5%	1/16W
R557	1-218-484-11	METAL CHIP	750	0.50%	1/16W
R558	1-216-811-11	METAL CHIP	150	5%	1/16W
R559	1-216-836-11	METAL CHIP	18K	5%	1/16W
R560	1-216-830-11	METAL CHIP	5.6K	5%	1/16W
R561	1-216-304-11	METAL CHIP	3.3	5%	1/10W
R562	1-216-814-11	METAL CHIP	270	5%	1/16W
R563	1-216-809-11	METAL CHIP	100	5%	1/16W
R564	1-216-821-11	METAL CHIP	1K	5%	1/16W
R565	1-216-803-11	METAL CHIP	33	5%	1/16W
R566	1-216-835-11	METAL CHIP	15K	5%	1/16W
R567	1-216-841-11	METAL CHIP	47K	5%	1/16W
R568	1-216-821-11	METAL CHIP	1K	5%	1/16W
R569	1-216-836-11	METAL CHIP	18K	5%	1/16W
R570	1-218-720-11	METAL CHIP	15K	0.50%	1/16W
R571	1-216-819-11	METAL CHIP	680	5%	1/16W
R572	1-216-821-11	METAL CHIP	1K	5%	1/16W
R573	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R574	1-216-864-11	METAL CHIP	0	5%	1/16W
R575	1-218-695-11	METAL CHIP	1.3K	0.50%	1/16W
R576	1-218-695-11	METAL CHIP	1.3K	0.50%	1/16W
R577	1-218-695-11	METAL CHIP	1.3K	0.50%	1/16W
R579	1-216-864-11	METAL CHIP	0	5%	1/16W
R582	1-216-864-11	METAL CHIP	0	5%	1/16W
R701	1-216-841-11	METAL CHIP	47K	5%	1/16W
R702	1-216-841-11	METAL CHIP	47K	5%	1/16W
R704	1-216-821-11	METAL CHIP	1K	5%	1/16W
R705	1-216-864-11	METAL CHIP	0	5%	1/16W
R801	1-216-855-11	METAL CHIP	680K	5%	1/16W
R802	1-216-821-11	METAL CHIP	1K	5%	1/16W
R803	1-216-833-11	METAL CHIP	10K	5%	1/16W
R804	1-216-864-11	METAL CHIP	0	5%	1/16W (J MODEL)
R810	1-216-864-11	METAL CHIP	0	5%	1/16W
R811	1-216-864-11	METAL CHIP	0	5%	1/16W
R812	1-216-864-11	METAL CHIP	0	5%	1/16W
R813	1-216-864-11	METAL CHIP	0	5%	1/16W
R814	1-216-864-11	METAL CHIP	0	5%	1/16W
R815	1-216-864-11	METAL CHIP	0	5%	1/16W
R816	1-216-864-11	METAL CHIP	0	5%	1/16W
R817	1-216-864-11	METAL CHIP	0	5%	1/16W
		< VARIABLE RESISTOR >			
RV102	1-241-396-11	RES, ADJ, METAL GLAZE 22K			
		< SWITCH >			
S001	1-572-725-11	SWITCH, TACTILE (CL)(RESET)			

Ref. No.	Part No.	Description			Remarks
		< VIBRATOR >			
X001	1-567-098-31	VIBRATOR, CRYSTAL 32KHz			
X101	1-579-512-11	VIBRATOR, CRYSTAL 30MHz			
X401	1-567-964-11	OSCILLATOR, CHIP CERAMIC 5MHz			
X402	1-577-274-11	VIBRATOR, CRYSTAL 16MHz			
X501	1-579-597-11	VIBRATOR, CRYSTAL 14.3MHz			
**********					
*	A-4649-778-A	RS-708 (A) BOARD, COMPLETE			
		**********			
					(Ref.No 3,000 Series)
		< CONNECTOR >			
CN802	1-695-206-21	CONNECTOR 9P (SERIAL PORT)			
		< DIODE >			
D801	8-719-106-98	DIODE			RD16M-B2
D802	8-719-106-98	DIODE			RD16M-B2
D803	8-719-106-98	DIODE			RD16M-B2
D804	8-719-106-98	DIODE			RD16M-B2
D805	8-719-106-98	DIODE			RD16M-B2
D806	8-719-106-98	DIODE			RD16M-B2
D807	8-719-106-98	DIODE			RD16M-B2
D808	8-719-106-98	DIODE			RD16M-B2
D809	8-719-106-98	DIODE			RD16M-B2
D810	8-719-106-98	DIODE			RD16M-B2
D811	8-719-106-98	DIODE			RD16M-B2
D812	8-719-106-98	DIODE			RD16M-B2
D813	8-719-106-98	DIODE			RD16M-B2
D814	8-719-106-98	DIODE			RD16M-B2
D815	8-719-106-98	DIODE			RD16M-B2
D816	8-719-106-98	DIODE			RD16M-B2
D817	8-719-106-98	DIODE			RD16M-B2
D818	8-719-106-98	DIODE			RD16M-B2
		< RESISTOR >			
R801	1-216-864-11	METAL CHIP	0	5%	1/16W
**********					
*	A-4649-781-A	SV-703 BOARD, COMPLETE			
		**********			
					(Ref.No 4,000 Series)
		< CAPACITOR >			
C101	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C102	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C103	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C104	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C105	1-135-210-11	TANTALUM CHIP	4.7uF	20%	10V

Ref. No.	Part No.	Description			Remarks
C106	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C107	1-164-386-11	CERAMIC CHIP	200PF	5%	50V
C108	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C109	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C122	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C123	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C124	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C125	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C126	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C127	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C128	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C141	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C142	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C143	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C144	1-135-159-21	TANTALUM CHIP	10uF	10%	20V
C161	1-162-921-11	CERAMIC CHIP	33PF	5%	50V
C162	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C163	1-164-373-11	CERAMIC CHIP	0.033uF		25V
C164	1-164-373-11	CERAMIC CHIP	0.033uF		25V
C165	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C166	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C167	1-164-386-11	CERAMIC CHIP	200PF	5%	50V
C168	1-135-145-11	TANTALUM CHIP	0.47uF	10%	35V
C181	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C182	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C183	1-135-210-11	TANTALUM CHIP	4.7uF	20%	10V
C184	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C201	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C202	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C203	1-164-386-11	CERAMIC CHIP	200PF	5%	50V
C204	1-164-361-11	CERAMIC CHIP	0.047uF		16V
C221	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C222	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C223	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C224	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C225	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C226	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C227	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C228	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C229	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C230	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C231	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C232	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C233	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C234	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C235	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C236	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C237	1-126-395-11	ELECT	22uF	20%	16V
C240	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C241	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C242	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C243	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C244	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C245	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C246	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C247	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C248	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C249	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C250	1-128-014-11	ELECT CHIP	10uF	0	4V
C251	1-124-779-00	ELECT CHIP	10uF	20%	16V
C261	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C262	1-164-346-11	CERAMIC CHIP	1uF		16V
C263	1-164-346-11	CERAMIC CHIP	1uF		16V
C264	1-164-346-11	CERAMIC CHIP	1uF		16V
C265	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C266	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C268	1-126-395-11	ELECT	22uF	20%	16V
C269	1-127-556-11	ELECT(SOLID)	6.8uF	20%	16V
C270	1-124-779-00	ELECT CHIP	10uF	20%	16V
C271	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C272	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C273	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C274	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C276	1-164-346-11	CERAMIC CHIP	1uF		16V
C302	1-135-216-11	TANTALUM CHIP	10uF	20%	10V
C304	1-164-346-11	CERAMIC CHIP	1uF		16V
C305	1-164-346-11	CERAMIC CHIP	1uF		16V
C306	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C307	1-126-369-11	ELECT	220uF	20%	6.3V
C308	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C309	1-124-779-00	ELECT CHIP	10uF	20%	16V
C310	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C311	1-124-779-00	ELECT CHIP	10uF	20%	16V
C312	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C313	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C314	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C315	1-162-957-11	CERAMIC CHIP	220PF	5%	50V
C402	1-135-216-11	TANTALUM CHIP	10uF	20%	10V
C404	1-164-346-11	CERAMIC CHIP	1uF		16V
C405	1-164-346-11	CERAMIC CHIP	1uF		16V
C406	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C407	1-126-369-11	ELECT	220uF	20%	6.3V
C408	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C409	1-124-779-00	ELECT CHIP	10uF	20%	16V
C410	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C411	1-124-779-00	ELECT CHIP	10uF	20%	16V
C412	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C413	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C414	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C415	1-162-957-11	CERAMIC CHIP	220PF	5%	50V

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Ref. No.	Part No.	Description			Remarks
C505	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C506	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C507	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C508	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C509	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C510	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C511	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C512	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C513	1-126-603-11	ELECT CHIP	4.7uF	20%	35V
C514	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C515	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C516	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C523	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C524	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C525	1-124-779-00	ELECT CHIP	10uF	20%	16V
C526	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C528	1-126-603-11	ELECT CHIP	4.7uF	20%	35V
C539	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C540	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C541	1-126-395-11	ELECT	22uF	20%	16V
C542	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C543	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C544	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C554	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C556	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C558	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C560	1-162-955-11	CERAMIC CHIP	150PF	5%	50V

< CONNECTOR >

CN001	1-691-342-11	HOUSING, CONNECTOR 28P	
CN002	1-569-528-11	HOUSING, CONNECTOR 12P	
CN003	1-569-528-11	HOUSING, CONNECTOR 12P	
* CN004	1-568-941-11	PIN, CONNECTOR 3P	
CN006	1-566-521-11	CONNECTOR, FPC (ZIF) 5P	
* CN007	1-565-151-11	PIN, CONNECTOR (ANGLE) 4P	

< DIODE >

D261	8-719-938-72	DIODE	SB01-05CP
D262	8-719-938-72	DIODE	SB01-05CP
D263	8-719-938-72	DIODE	SB01-05CP
D265	8-719-938-75	DIODE	SB05-05CP
D266	8-719-938-75	DIODE	SB05-05CP
D511	8-719-016-73	DIODE	STZ6.8T

< FERRITE BEAD >

FB001	1-543-775-11	FILTER, EMI	
FB002	1-543-775-11	FILTER, EMI	
FB003	1-543-775-11	FILTER, EMI	
FB301	1-543-775-11	FILTER, EMI	
FB302	1-543-775-11	FILTER, EMI	
FB303	1-543-775-11	FILTER, EMI	
FB401	1-543-775-11	FILTER, EMI	
FB402	1-543-775-11	FILTER, EMI	
FB403	1-543-775-11	FILTER, EMI	
FB502	1-543-775-11	FILTER, EMI	

< IC >

IC001	8-752-061-66	IC	CXA1081Q-T4
IC002	8-752-058-77	IC	CXA1372AQ
IC003	8-752-352-93	IC	CXD2500BQ
IC004	8-759-030-17	IC	MPC1715FU
IC005	8-759-031-84	IC	SC7S04F
IC006	8-759-234-13	IC	TC4S30F
IC007	8-759-209-57	IC	TC4S69F
IC008	8-759-031-84	IC	SC7S04F
IC009	8-759-062-32	IC	AN6545SP
IC502	8-759-510-56	IC	BA3570FS
IC505	8-759-710-55	IC	NJM2100M
IC506	8-759-062-32	IC	AN6545SP
IC507	8-759-710-55	IC	NJM2100M
IC508	8-759-710-55	IC	NJM2100M

< JACK >

J501	1-563-282-21	JACK, SMALL TYPE (PHONES)

< JUMPER RESISTOR >

JR001	1-216-295-00	METAL CHIP	0	5%	1/10W
JR002	1-216-295-00	METAL CHIP	0	5%	1/10W

< COIL >

L101	1-412-032-11	INDUCTOR CHIP 100uH
L121	1-412-032-11	INDUCTOR CHIP 100uH
L141	1-412-032-11	INDUCTOR CHIP 100uH
L181	1-412-029-11	INDUCTOR CHIP 10uH
L221	1-412-029-11	INDUCTOR CHIP 10uH
L222	1-412-029-11	INDUCTOR CHIP 10uH
L261	1-412-030-11	INDUCTOR CHIP 22uH
L262	1-412-031-11	INDUCTOR CHIP 47uH
L263	1-412-030-11	INDUCTOR CHIP 22uH
L264	1-412-030-11	INDUCTOR CHIP 22uH
L501	1-412-030-11	INDUCTOR CHIP 22uH
L502	1-412-030-11	INDUCTOR CHIP 22uH
L503	1-412-030-11	INDUCTOR CHIP 22uH
L508	1-412-029-11	INDUCTOR CHIP 10uH

Ref. No.	Part No.	Description			Remarks
		< TRANSISTOR >			
Q181	8-729-904-87	TRANSISTOR	2SB1197K-R		
Q182	8-729-810-13	TRANSISTOR	2SA1677		
Q183	8-729-402-45	TRANSISTOR	UN5212		
Q201	8-729-402-45	TRANSISTOR	UN5212		
Q261	8-729-101-07	TRANSISTOR	2SB798-DL		
Q262	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q264	8-729-904-87	TRANSISTOR	2SB1197K-R		
Q266	8-729-402-45	TRANSISTOR	UN5212		
Q301	8-729-141-75	TRANSISTOR	2SD596DV345		
Q303	8-729-141-75	TRANSISTOR	2SD596DV345		
Q401	8-729-141-75	TRANSISTOR	2SD596DV345		
Q403	8-729-141-75	TRANSISTOR	2SD596DV345		
Q507	8-729-141-75	TRANSISTOR	2SD596DV345		
		< RESISTOR >			
R101	1-218-736-11	METAL CHIP	68K	0.50% 1/16W	
R102	1-218-736-11	METAL CHIP	68K	0.50% 1/16W	
R103	1-218-736-11	METAL CHIP	68K	0.50% 1/16W	
R104	1-218-736-11	METAL CHIP	68K	0.50% 1/16W	
R105	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R106	1-216-845-11	METAL CHIP	100K	5% 1/16W	
R107	1-218-292-11	METAL GLAZE	20K	5% 1/16W	
R108	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R109	1-216-853-11	METAL CHIP	470K	5% 1/16W	
R121	1-218-738-11	METAL CHIP	82K	0.50% 1/16W	
R122	1-218-738-11	METAL CHIP	82K	0.50% 1/16W	
R123	1-218-716-11	METAL CHIP	10K	0.50% 1/16W	
R124	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R125	1-216-845-11	METAL CHIP	100K	5% 1/16W	
R126	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R127	1-216-853-11	METAL CHIP	470K	5% 1/16W	
R128	1-216-849-11	METAL CHIP	220K	5% 1/16W	
R129	1-216-821-11	METAL CHIP	1K	5% 1/16W	
R141	1-216-844-11	METAL CHIP	82K	5% 1/16W	
R142	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R143	1-216-846-11	METAL CHIP	120K	5% 1/16W	
R144	1-216-832-11	METAL CHIP	8.2K	5% 1/16W	
R161	1-216-839-11	METAL CHIP	33K	5% 1/16W	
R162	1-216-829-11	METAL CHIP	4.7K	5% 1/16W	
R163	1-216-832-11	METAL CHIP	8.2K	5% 1/16W	
R164	1-216-849-11	METAL CHIP	220K	5% 1/16W	
R165	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R166	1-216-857-11	METAL CHIP	1M	5% 1/16W	
R181	1-218-286-11	METAL CHIP	91	0.50% 1/16W	
R182	1-216-603-91	METAL CHIP	10	0.50% 1/10W	
R183	1-216-605-11	METAL CHIP	12	1% 1/10W	
R184	1-216-853-11	METAL CHIP	470K	5% 1/16W	
R185	1-218-273-11	METAL GLAZE	510K	5% 1/16W	

Ref. No.	Part No.	Description			Remarks
R186	1-216-845-11	METAL CHIP	100K	5% 1/16W	
R187	1-216-128-11	METAL GLAZE	2M	5% 1/10W	
R201	1-216-841-11	METAL CHIP	47K	5% 1/16W	
R202	1-216-845-11	METAL CHIP	100K	5% 1/16W	
R203	1-216-827-11	METAL CHIP	3.3K	5% 1/16W	
R204	1-216-827-11	METAL CHIP	3.3K	5% 1/16W	
R205	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R206	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R207	1-216-837-11	METAL CHIP	22K	5% 1/16W	
R208	1-216-841-11	METAL CHIP	47K	5% 1/16W	
R209	1-216-825-11	METAL CHIP	2.2K	5% 1/16W	
R210	1-216-825-11	METAL CHIP	2.2K	5% 1/16W	
R211	1-216-825-11	METAL CHIP	2.2K	5% 1/16W	
R212	1-216-825-11	METAL CHIP	2.2K	5% 1/16W	
R261	1-216-841-11	METAL CHIP	47K	5% 1/16W	
R262	1-216-819-11	METAL CHIP	680	5% 1/16W	
R263	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R264	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R265	1-216-829-11	METAL CHIP	4.7K	5% 1/16W	
R266	1-216-853-11	METAL CHIP	470K	5% 1/16W	
R267	1-216-817-11	METAL CHIP	470	5% 1/16W	
R268	1-216-198-91	METAL GLAZE	1K	5% 1/8W	
R271	1-216-817-11	METAL CHIP	470	5% 1/16W	
R272	1-216-821-11	METAL CHIP	1K	5% 1/16W	
R273	1-218-873-11	METAL CHIP	12K	0.50% 1/16W	
R274	1-216-821-11	METAL CHIP	1K	5% 1/16W	
R275	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R276	1-218-716-11	METAL CHIP	10K	0.50% 1/16W	
R277	1-218-732-11	METAL CHIP	47K	0.50% 1/16W	
R278	1-216-198-91	METAL GLAZE	1K	5% 1/8W	
R279	1-216-198-91	METAL GLAZE	1K	5% 1/8W	
R302	1-218-708-11	METAL CHIP	4.7K	0.50% 1/16W	
R303	1-218-270-11	METAL CHIP	1.1K	0.50% 1/16W	
R305	1-218-706-11	METAL CHIP	3.9K	0.50% 1/16W	
R307	1-218-740-11	METAL CHIP	100K	0.50% 1/16W	
R308	1-218-720-11	METAL CHIP	15K	0.50% 1/16W	
R309	1-216-849-11	METAL CHIP	220K	5% 1/16W	
R310	1-216-831-11	METAL CHIP	6.8K	5% 1/16W	
R311	1-216-833-11	METAL CHIP	10K	5% 1/16W	
R312	1-216-845-11	METAL CHIP	100K	5% 1/16W	
R313	1-216-797-11	METAL CHIP	10	5% 1/16W	
R314	1-216-815-11	METAL CHIP	330	5% 1/16W	
R316	1-216-818-11	METAL CHIP	560	5% 1/16W	
R318	1-216-829-11	METAL CHIP	4.7K	5% 1/16W	
R319	1-216-849-11	METAL CHIP	220K	5% 1/16W	
R322	1-218-867-11	METAL CHIP	6.8K	0.50% 1/16W	
R323	1-218-867-11	METAL CHIP	6.8K	0.50% 1/16W	
R324	1-218-867-11	METAL CHIP	6.8K	0.50% 1/16W	
R325	1-216-849-11	METAL CHIP	220K	5% 1/16W	

Ref. No.	Part No.	Description			Remarks
R328	1-216-841-11	METAL CHIP	47K	5%	1/16W
R329	1-218-676-11	METAL CHIP	220	0.50%	1/16W
R402	1-218-708-11	METAL CHIP	4.7K	0.50%	1/16W
R403	1-218-270-11	METAL CHIP	1.1K	0.50%	1/16W
R405	1-218-706-11	METAL CHIP	3.9K	0.50%	1/16W
R407	1-218-740-11	METAL CHIP	100K	0.50%	1/16W
R408	1-218-720-11	METAL CHIP	15K	0.50%	1/16W
R409	1-216-849-11	METAL CHIP	220K	5%	1/16W
R410	1-216-831-11	METAL CHIP	6.8K	5%	1/16W
R411	1-216-833-11	METAL CHIP	10K	5%	1/16W
R412	1-216-845-11	METAL CHIP	100K	5%	1/16W
R413	1-216-797-11	METAL CHIP	10	5%	1/16W
R414	1-216-815-11	METAL CHIP	330	5%	1/16W
R416	1-216-818-11	METAL CHIP	560	5%	1/16W
R418	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R419	1-216-849-11	METAL CHIP	220K	5%	1/16W
R422	1-218-867-11	METAL CHIP	6.8K	0.50%	1/16W
R425	1-216-849-11	METAL CHIP	220K	5%	1/16W
R428	1-216-841-11	METAL CHIP	47K	5%	1/16W
R429	1-218-676-11	METAL CHIP	220	0.50%	1/16W
R506	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R511	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R512	1-216-857-11	METAL CHIP	1M	5%	1/16W
R523	1-216-833-11	METAL CHIP	10K	5%	1/16W
R527	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R529	1-216-809-11	METAL CHIP	100	5%	1/16W
R531	1-216-158-00	METAL GLAZE	22	5%	1/8W
		< VARIABLE RESISTOR >			
RV101	1-230-873-11	RES, ADJ, METAL 47K			
RV102	1-230-871-11	RES, ADJ, METAL 22K			
RV103	1-230-871-11	RES, ADJ, METAL 22K			
RV104	1-230-871-11	RES, ADJ, METAL 22K			
RV501	1-230-485-11	RES, VAR, CARBON 10K/10K (VOLUME)			
		< SWITCH >			
S002	1-570-953-11	SWITCH, PUSH (1 KEY)(CD DOOR OPEN)			
S501	1-570-386-21	SWITCH, SLIDE (DBB)			

****

Ref. No.	Part No.	Description	Remarks
		MISCELLANEOUS	
		**********	
1	1-641-818-11	PC BOARD, HN-10 FLEXIBLE	
10	1-466-641-21	SWITCH BLOCK, CONTROL (CD-I)	
17	1-641-819-11	PC BOARD, HN-12 FLEXIBLE	
61	1-466-642-22	SWITCH BLOCK, CONTROL (CD)	
84	1-537-393-31	TERMINAL BOARD	
251	8-835-456-01	MOTOR, DC SSC-02E01S	
⚠259	8-848-245-11	DEVICE, OPTICAL KSS-311A	
⚠264	8-848-252-01	DEVICE, OPTICAL KSM-311AAM	
LCD1	1-810-317-11	DISPLAY PANEL, LIQUID CRYSTAL	

****

ACCESSORIES & PACKING MATERIALS
****

⚠	1-465-955-21	ADAPTOR, AC (US MODEL)	
⚠	1-465-955-12	ADAPTOR, AC (J MODEL)	
⚠	1-528-174-31	BATTERY, LITHIUM (CR2032 TYPE)	
	1-575-334-11	CORD (WITH CONNECTOR)	
	3-757-347-21	MANUAL, INSTRUCTION (ENGLISH) (US MODEL)	
	3-757-347-01	MANUAL, INSTRUCTION (JAPANESE) (J MODEL)	
*	3-955-073-01	INDIVIDUAL CARTON	
*	3-955-074-01	CUSHION (UPPER)	
*	3-956-618-01	CUSHION (LOWER)	

****

****
HARDWARE LIST
****

#1	7-627-553-17	PRECISION SCREW +P 2X2 TYPE 3
#2	7-685-647-79	SCREW +BVTP 3X10 TYPE2
#15	7-628-253-15	SCREW +PS 2X5
#16	7-627-852-17	+P 1.7X4
#17	7-627-553-37	PRECISION SCREW +P 2X3 TYPE 3
#18	7-685-102-19	SCREW +P 2X4 TYPE2 NON-SLIT

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

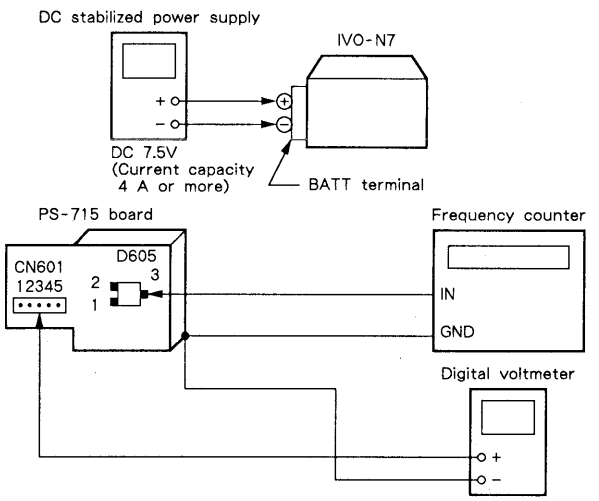
SECTION 7
ADJUSTMENTS

Notes on Adjustment

1. Adjust in the given order.
2. Use the service disk.
   YEDS-18
   Part code (3-702-101-01)
3. Power supply : DC7.5 V (Current capacity 4 A or more)
4. LINE IN/OUT switch : OUT
5. Set the PU-702 board to service mode.

7-1. Frequency and Voltage Adjustments

Adjustment Procedure:



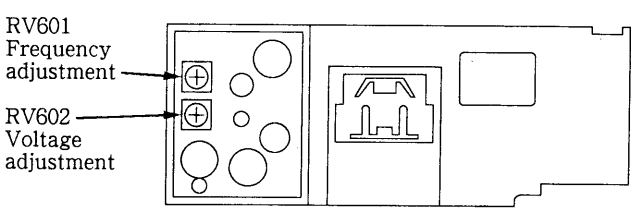
1. Frequency adjustment
   ①Connect a frequency counter to D605 (pin 3 : cathode).
   ②Adjust RV601 so that the frequency is 485 Hz ± 10 Hz.

2. Power Supply (Voltage) Adjustment
   ①Connect a digital voltmeter to CN601 (pin 2).
   ②Adjust RV602 so that the voltage is 4.95 V ± 0.02 V.

Adjustment Point: PS-715 board -Side A-

Adjustment Locations:

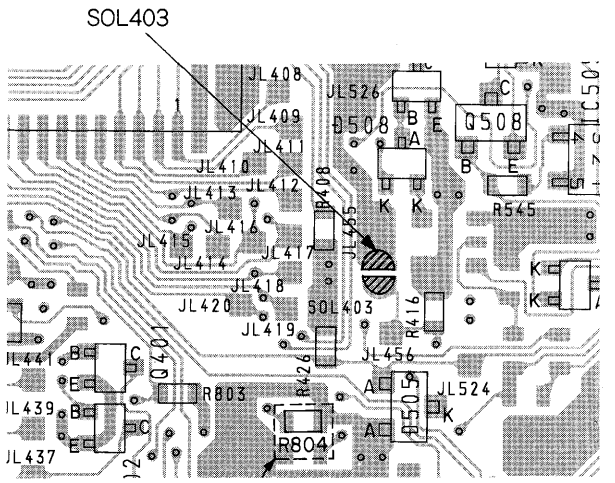
PS-715 BOARD (SIDE A)



• **Service Mode (Servo Adjustment) Setting Procedure**

1. Solder-bridge the SOL403 (S MODE) to side B of the PU-702 board.
2. Turn the power on. (The display remains blue.)
3. Service mode is setup.
4. After each adjustment is complete, turn the power off and remove the solder, then release service mode.

PU-702 BOARD (SIDE B)



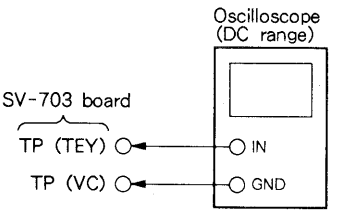
7-2. Tracking Balance Adjustment

• If the tracking balance is not adjusted correctly, the disk is played back out of track, and distorted or damaged disks are not played back correctly.

Conditions:

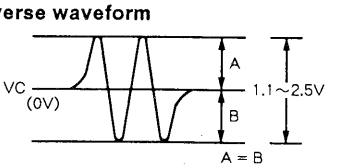
• Place the unit horizontally.

Adjustment Procedure:



1. Insert the test disk and press PLAY (⏯).
   (The focus servo and spindle servo are turned on.)
2. Adjust the center of the traverse waveform to 0 V with RV103.
3. Check that the peak value of the waveform is within the specification.

• **Traverse waveform**



Adjustment Point: SV-703 board (See page 124).

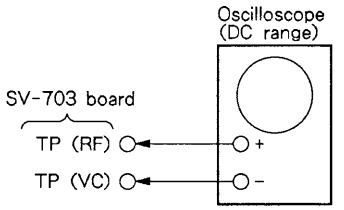
7-3. Focus Bias Adjustment

- To check whether the RF signal waveform is correct, is identical to checking whether the optical block is not affected by shock, etc.
  (If the RE signal waveform is disrupted, the block error rate increases and generates noise.)

Conditions:

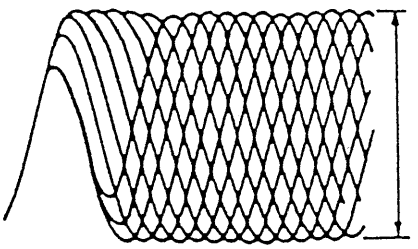
- Place the unit horizontally.

Adjustment Procedure:



1. Insert the test disk and press PLAY (⏯).
2. Press the AMS (⏭, ⏮) button to move the optical pick-up so that the eye pattern is easy to see.
3. Press button ① on the CD-I operation block.
   (The tracking servo and thread servo are turned on.)
4. Adjust RV101 so that the eye pattern (the diamond shape ◇ in the center of the waveform) can be distinguished clearly.
5. The RF level is within the specification.
6. Press the STOP button (■) to turn the servo off.

- RF Signal Waveform (eye pattern) VOLT/DIV : 200mV
  TIME/DIVE : 500ns



To look at the eye pattern, set the oscilloscope in the AC range and raise the vertical sensitivity.

Adjustment Point : SV-703 board

Reference

7-4. Focus/Tracking Gain Adjustment

A frequency response analyzer or CD jig is needed for precise adjustment.

> This gain has a built-in margin. Even if it is slightly off, there is no problem. Therefore, do not perform this adjustment.

Focus/tracking gain determines the pick-up follow-up (vertical and horizontal) relative to mechanical shock when a 2-axis device is operating.

- The higher the gain, the greater noise when operating a 2-axis device.
- The lower the gain, the more sensitive to mechanical shock, and the greater the tendency for the second to skip.

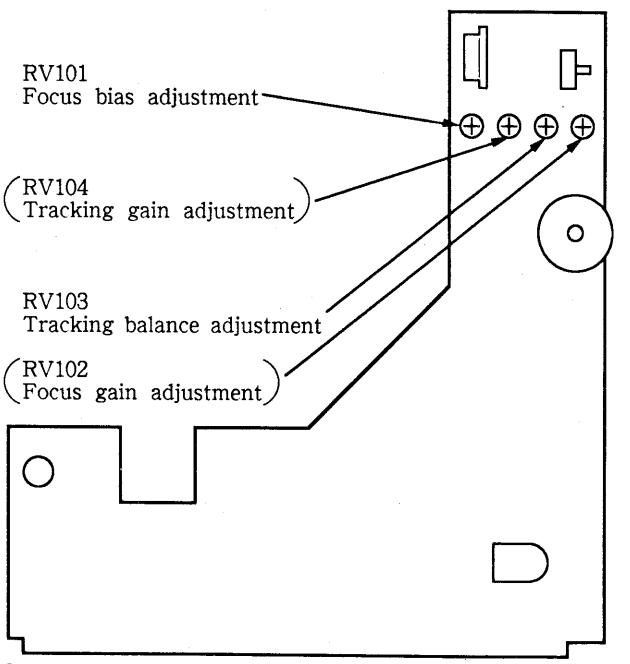
This adjustment is needed when the following are replaced:

- Optical pick-up block
- RV102 (focus gain volume)
- RV104 (Tracking gain volume)

Adjustment Point: SV-703 board (see the following figure.)

Adjustment locations

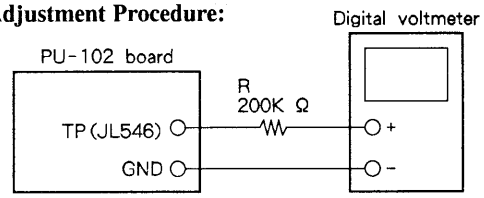
SV-703 BOARD (SIDE A)



7-5. 14 MHz Oscillation Frequency Adjustment

- If the 14MHz waveform is not adjusted correctly, the monitor may display a colorless picture or the dots are confused.

Adjustment Procedure:



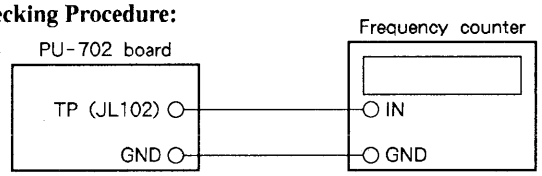
1. Connect a digital voltmeter to TP (JL546).
2. Adjust CV551 so that the voltage is between 2.5 V and 2.7 V.

Adjustment Point: PU-702 board

Checking 30 MHz Oscillation Frequency

- If the 30MHz waveform is shifted, the monitor may display a confused picture or not display a picture at all.

Checking Procedure:



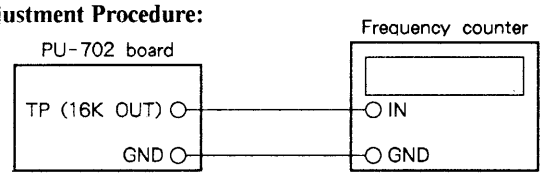
1. Check that the frequency is between 30.209368 MHz and 30.210212 MHz.

Adjustment Point: PU-702 board

7-6. 16 KHz Oscillation Frequency Adjustment

- If the 16kHz waveform is not adjusted correctly, the accuracy of the internal clock drops.

Adjustment Procedure:



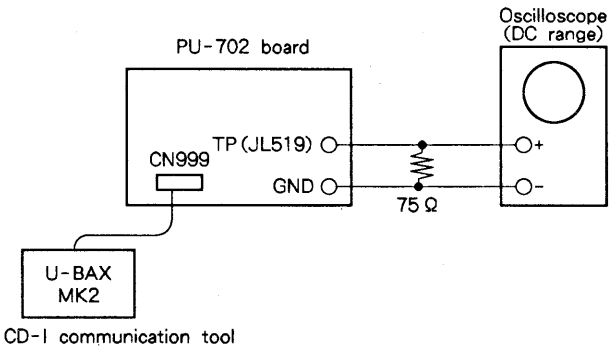
1. Short TP (SOL006).
2. Connect a frequency counter to TP (16KHz OUT).
3. Adjust CV001 so that the frequency is 16384.05 Hz ± 0.06 Hz.
4. After adjustment, open the TP (SOL006).

Adjustment Point: PU-702 board (See the following figure)

7-7. Video Output Level Adjustment

- If video output level is not correctly adjusted, picture on the monitor may be too bright, too dark or sometimes loses synchronization.

Adjustment method:

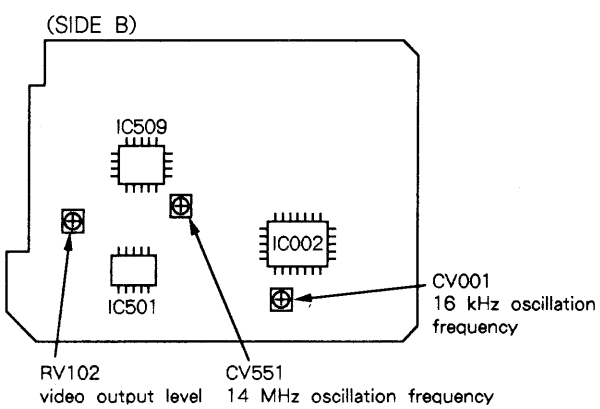


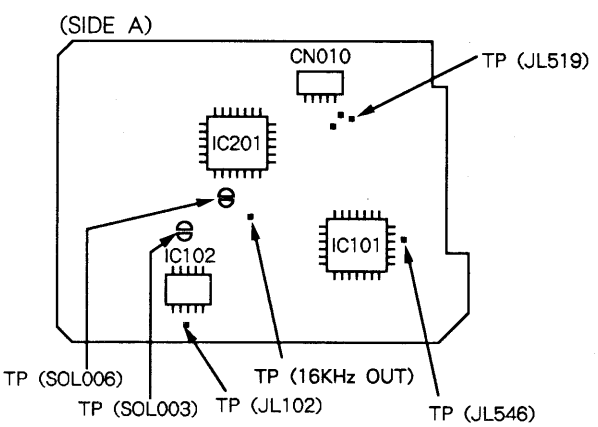
1. Short TP (SOL003, DIAG).
2. Connect oscilloscope to TP (JL519).
3. Generate 100 white signal with DIAG command VQ <8>.
4. Adjust RV102 to set output level (p-p) to 1V ± 0.05V.
5. After adjustment, unsolder TP (SOL003, DIAG) to open.

Adjustment point: PU-702 board (See the following figure)

Adjustment Locations:

PU-702 BOARD





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