# ■Printed Circuit Board Diagram

● This circuit board diagram may be modified at any time with the development of new technology.

A SERVO P.C.B. (REP1650B-N)


(RF)
TJ701

(VREF)
TJ702

M702
(SPINDLE MOTOR)

M701

G MAIN P.C.B. (REP1841C-M ··· (E) / REP1841D-M ··· (GC))
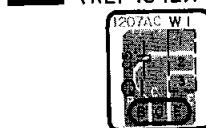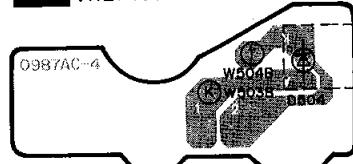
6   7   8   9   1
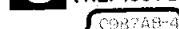
H REGULATOR TR. P.C.B. (REP1842A-2S)

I207AC W1

C PHOTO TR. P.C.B. (REP1557B-N)

O987AB-4

W501B

W502B

R503

B LED P.C.B. (REP1557B-N)

O987AC-4

W504B

W505B

Q504
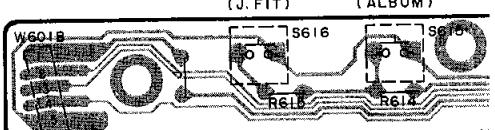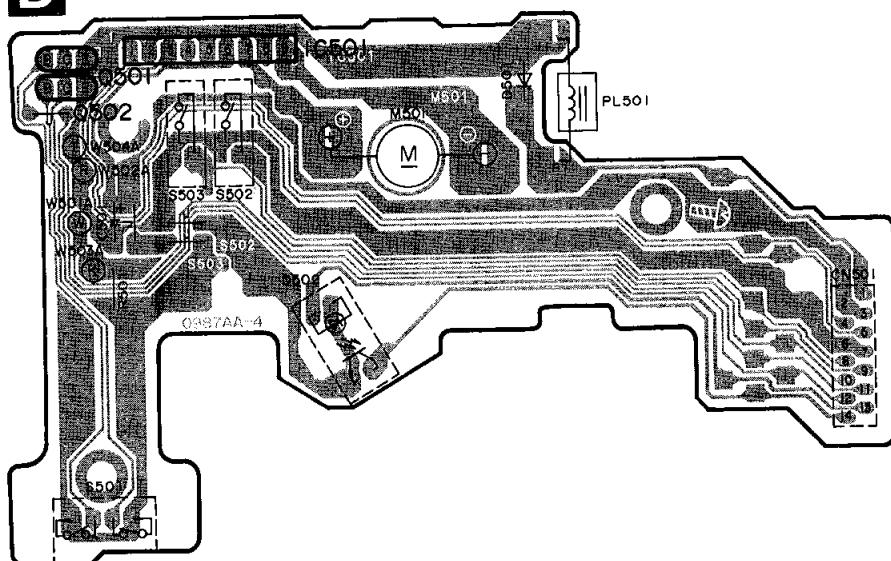
E OPERATION P.C.B. (REP1842A-IS)

AI EDIT

(J.FIT)   (ALBUM)

W601B   S616   S615

R615   R614

F FL P.C.B. (REP1842A-IS)

DISC 1   DISC 2   DISC 3

S609   R608   R607   S607

S608   R606

W601A

I207AA

D LOADING MOTOR P.C.B. (REP1557B-N)

Q501

Q502

W503B

W502A

W501B

S503   S502

S502

S503

Q503

O987AA-4

R501

M501

M

PL501

CN501

I CD

ST-CH505 or
ST-CH707/
RS-CH505

For (GC) area.

Q80

CP202   CP201   Q5

Q802

GND   AC   AC

POWER SUPPLY POINT

| 0 | 11 | 12 | 13 | 14 |

(L.FADE)

DISPLAY   RANDOM   REPEAT

S614
R613
1207A6
S612
S613
S611
R612
R6

□   00   ▷

S606   S604   S602
R805   R603
R804   R602
S605   S603
CP601
FL601

◄◄/◄◄   ►►/►►   ▲ OPEN/CLOSE
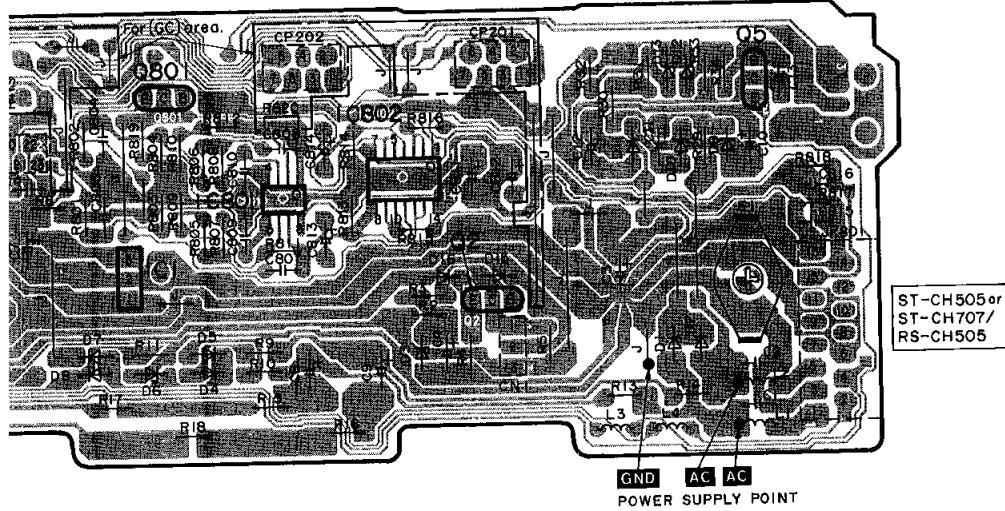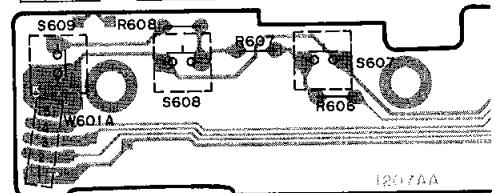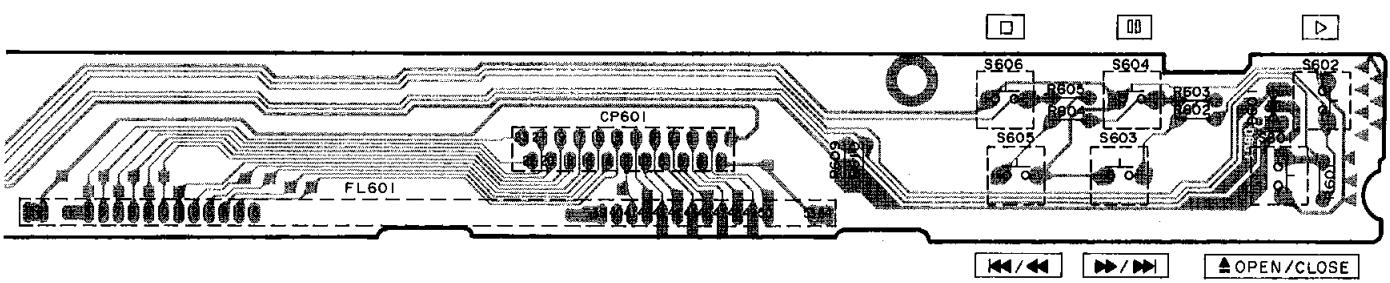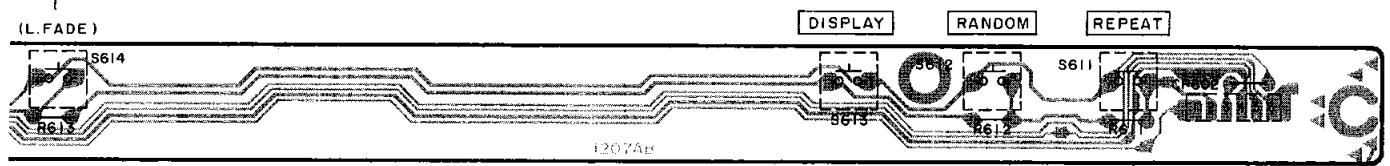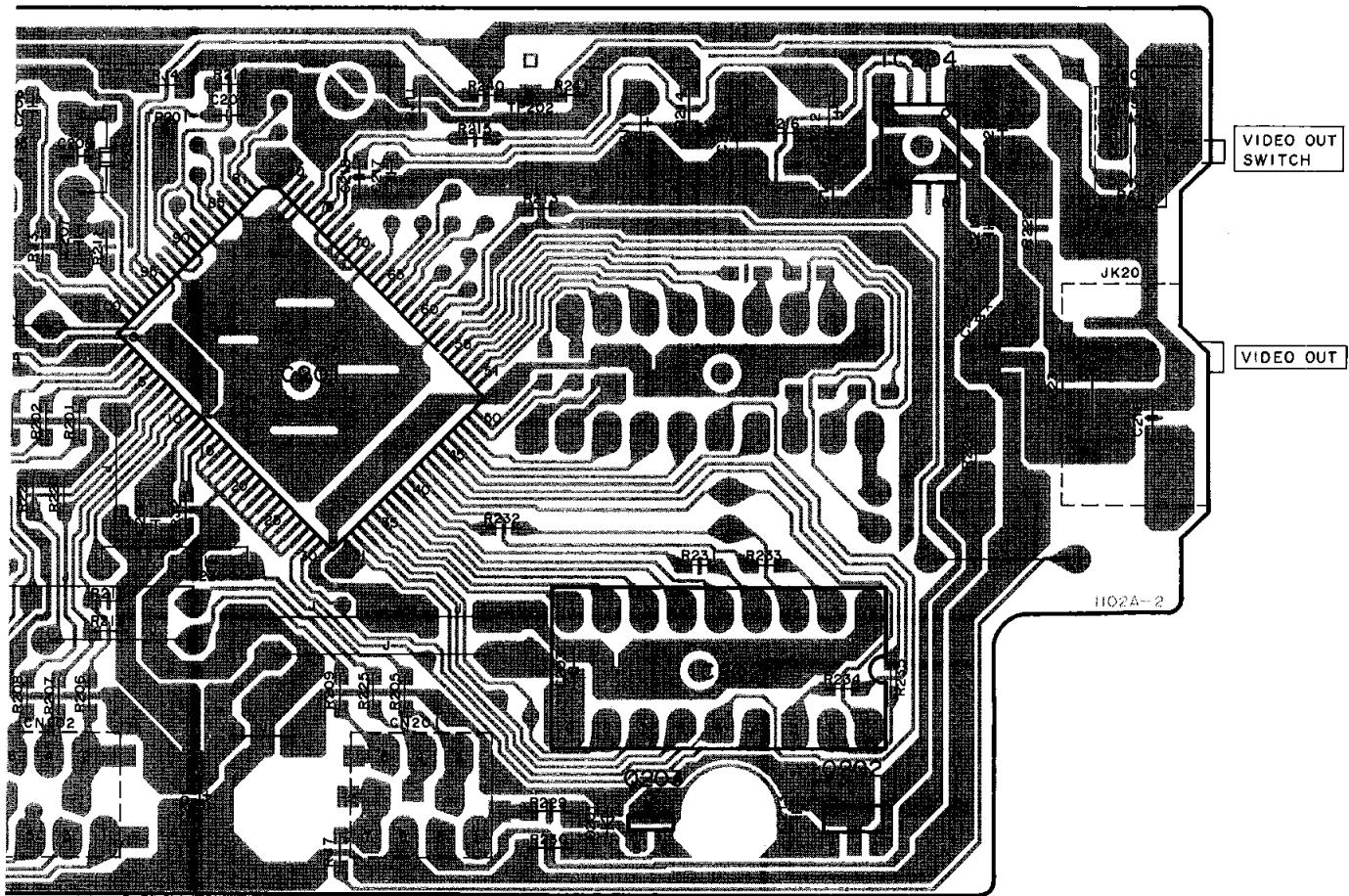
) GRAPHICS P.C.B. For (GC) area. (REP 1660A-T)

VIDEO OUT
SWITCH

JK20

VIDEO OUT

1102A-2

R232
R231   R233
R234

−33−

SL-CH515

●Terminal guide of IC's, transistors and diodes

XRA4558FT1	TC4066BFTP1	MC14576BFR2 — 8Pin / LA5608M-TE-L — 14Pin / AN8802SCE1V — 32Pin	MN66271RA	M38173M6270F
LC66306A4C13	LC7870NE	KM41C464P-8	BA6218	LM2940T5M / AN8389SE1
2SC3311AQSTA / UN4112TA / UN4212TA	2SB1238QRTV6	2SB1185EF	2SB621ARSTA	DTC143ESTP
2SB709STW / 2SC2414KPRTX	2SB766QRSTX	MA4270HTA	MA165TA / MA167TA / MA185TA / MA723TA / 1SR35200TB / 1SS291TA	MA4051MTA / MA4075MTA
MA110TX	GL380TB / PT381TB	RSQGP1S53V	SPR-305MDTF	

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■Wiring Connection Diagram

To RS-CH505 and ST-CH505 or ST-CH707

H REGULATOR TR. P.C.B.

W1 3

OPTICAL PICKUP

CP201 2 7 6 CN201

CN1 3 1

CP202 2 7 6 CN202

A SERVO P.C.B.

I CD GRAPHICS P.C.B.
For (GC) area.

CN702
23 22 ⋮ 2

2 ⋯ 16
1 ⋯ 15
CN701

CN401
23 ⋯ 22 ⋮ 2

M701 (TRAVERSE MOTOR)

M702 (SPINDLE MOTOR)

Red mark

NOTES:
BLK····Black
BRN····Brown
RED····Red
WHT····White

G MAIN P.C.B.

CN301
2 ⋯ 14
1 ⋯ 3

C PHOTO TR. P.C.B.

D LOADING MOTOR P.C.B.

W501B (W)
(R)
W502B

14 13
CN501
2 1

CN601
23 22 ⋮ 2

BLK —— (K) W503A
WHT —— (W) W501A
RED —— (R) W502A
BRN —— (T) W504A

W504B (T)
(K)
W503B

B LED P.C.B.

CN602
1 ⋯ 6

W601A

F FL P.C.B.

22 ⋯ 2
23 ⋯
CP601

W601B

E OPERATION P.C.B.

1 ⋯ 6
CP602

■ Measurements and Adjustments

This unit SL-CH515 is designed to operate on power supplied from the Amplifier SE-CH515A or SE-CH717 through the Tuner/Sound Processor ST-CH505 or ST-CH707.
When connecting the unit to other system components, do not connect to the Amplifier SE-CH515A or SE-CH717 directly. Be sure to connect this unit through the Tuner/Sound Processor ST-CH505 or ST-CH707.
When operating the unit SL-CH515 alone for testing and servicing, without having power supplied from the Amplifier SE-CH515A or SE-CH707 and the Tuner/Sound Processor ST-CH505 or ST-CH707, use the following method.

Power Supply to This Unit alone

Apply 11V AC power to the section between `AC11V` (`AC`) of the coil (L1) and the jumper J1 (`GND`) as well as the section between `AC11V` (`AC`) of the coil (L2) and the jumper J1 (`GND`). (10V AC power can be also applied when using power supply tool.) (Shown in Fig.1)

To Check Signals

Connect the oscilloscope or the speaker with built-in amplifier to the section between LINE OUT (Lch) of the resistor R815 and the GND point of the jumper J1 as well as the section between LINE OUT (Rch) of the resistor R816 and the GND point of the jumper J1 and check if the signals are outputting from this unit. **(Shown in Fig. 1)**
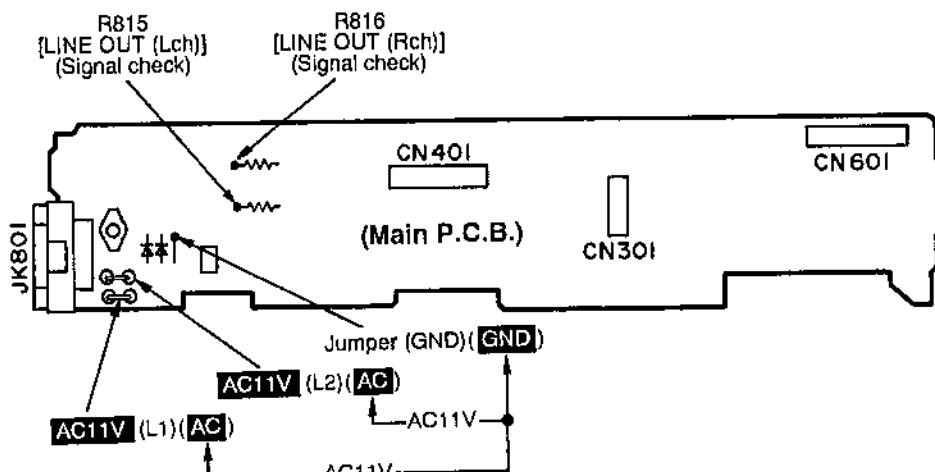

Fig. 1

Apply 10 V AC power when using power supply tool.
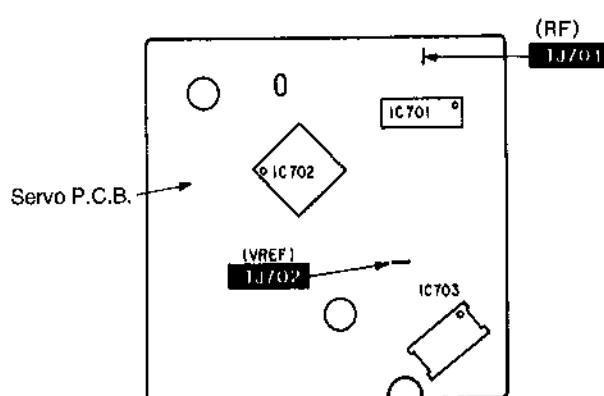
Fig. 2
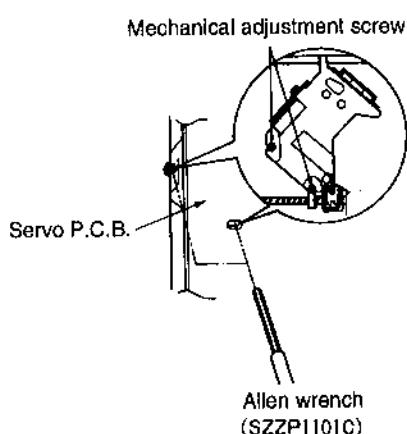
**Fig. 3**

●Preparation of Adjustment

1. Insert test disc into the unit as shown in "How to Check the Servo and Main P.C.B.". (Refer to page 15.)
2. Turn the power of this unit off and then turn it on. (The CD unit is adjusted automatically with it stood.)

Measuring Instruments and Special Tools

●Test disc
 1. Playability test disc (SZZP1054C)
 2. Uneven test disc (SZZP1056C)

●Allen wrench (M2.0) (SZZP1101C)
●Oscilloscope

(1) MECHANICAL ADJUSTMENT
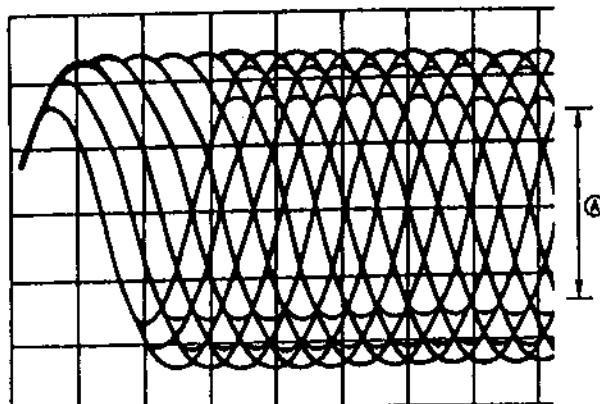
●When the traverse deck is replaced, making adjustments is not necessary. (The traverse deck ass'y is already adjusted.)

●Make adjustments to improve playability when the traverse deck has not been replaced. Make the electrical adjustments first.

1. Connect the oscilloscope's CH. 1 probe across TJ701 (+) and TJ702 (VREF) on the Servo P.C.B. (Shown in Fig. 2)
   Oscilloscope setting:
   VOLT .... 200 mV
   SWEEP .... 0.5 μsec
   Input coupling .... AC
2. Switch the player power ON, and play track 19 on the test disc (SZZP1056C).
3. Leave the player in Play mode and place it as shown in the figure on the right.
4. Alternately adjust the two mechanical adjusting screws with the 2.0 mm allen wrench (SZZP1101C) until the RF signal amplitude on the oscilloscope is maximize. (Shown in Fig. 3)
5. After completing the adjustment, lock the mechanical adjustments with lock paint (RZZ0L01).

Ⓐ Maximize the amplitude.

(2) CHECK OF PLAY OPERATION AFTER ADJUSTMENT

●Checking Skip Search
 1. Play an ordinary musical program disc.
 2. Press the skip button to check for normal skip search operation (in both the forward and reverse directions).

●Checking Manual Search
 1. Play an ordinary musical program disc.
 2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and reverse directions).

●Checking playability
 1. Play the 0.7 mm black dot and the 0.7 mm wedge on the test disc (SZZP1054C) and verify that no sound skip or noise occurs.
 2. Play the middle tracks of the uneven test disc and verify that no sound skip or noise occurs.

■About the self-diagnostic mode
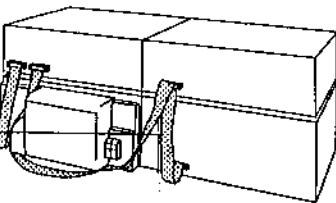
This unit is equipped with a self-diagnostic function which, in the event of a malfunction, automatically displays a code indicating the nature of the malfunction. Use this self-diagnostic function when servicing the unit.

SC-CH515 (SL-CH515, ST-CH505, SE-CH515A, RS-CH505, SB-CH515A)
SC-CH717 (SL-CH515, ST-CH707, SE-CH717, RS-CH505, SB-CH717)

Display method	Display location

To display the malfunction code

U-70: .... Automatically displays on the tuner/sound processor and the CD changer when a malfunction occurs.

F16~F25: .. Displays on the CD changer using the procedure described below.

F-61 .... Automatically displays on the tuner/sound processor when a malfunction occurs.

●**Display procedure**
1. Switch on the power to the unit (SL-CH515).
   Connect the system and press the POWER button on the amplifier (SE-CH515A or SE-CH717).
2. While pressing the STOP button for at least 2 seconds, press the F.SKIP button. The self-diagnostic mode will be activated.

If there is a malfunction, the above operation will cause the malfunction code (F16~F25) to be displayed.

Note: There may be more than one malfunction at the same time, so after correction the first malfunction displayed, repeat the procedure above [steps (1) and (2)] to confirm that no other malfunction is displayed.

If there is no other malfunction, "END" is displayed, the disc tray will half-eject, full-eject, and then close.

To return to the normal display

1. **For U-70:**
   ●Press an operation button (any button other than the OPEN/CLOSE button) on the unit (tuner/sound processor or CD changer) which displayed "U-70".
   ●To re-display the code, switch the power off (POWER STANDBY button), and then switch power back on again.
2. **For F16-F25:**
   ●Switch off the power (POWER STANDBY button).
   ●To re-display the code, switch the power on (POWER STANDBY button) and then repeat the procedure above (step 1 and 2).
3. **For F-61:**
   ●If "F-61" is displayed, the power will automatically be switched off and the standby indicator will light up.
   ●"F-61" will be displayed for 3 seconds, and then the clock will be displayed.
   ●To re-display the code, switch the power on. "F-61" will be re-displayed, and then after 3 seconds the clock will be displayed and the power will automatically switch off.

CD changer

Left speaker (SB-CH515A or SB-CH717)

F.SKIP button   Right speaker (SB-CH515A or SB-CH717)

Compact disc changer (SL-CH515)

Tuner/sound processor (ST-CH505 or ST-CH707)

Cassette deck (RS-CH505)

Amplifier (SE-CH515A or SE-CH717)

STOP button

POWER button

Tuner/sound processor

●Display contents

Display code	Problem or condition	Correction procedure
U-70 (displayed automatically)	A bus-line communications error has occurred as a result of the flat cables being inserted incorrectly, thus preventing the system from operating. 1. If "U-70" is displayed on the tuner/sound processor, the tape deck cannot be operated by remote control. 2. If "U-70" is displayed on the CD changer, the CD changer cannot be operated by remote control.	 Flat cable 1. To check for correct insertion of the flat cables ①Match each connector with the color (black/white) of the connection port and insert until you hear a click. ②Insert the flat cables at the back of the unit in the order indicated. Make sure the which side of the cable is on your right side. 2. Breakage of flat cable (Check and replace as necessary.) 3. If the problem is not corrected by items (1.) and (2.) above, this indicates a faulty IC. SL-CH515: IC301 (M38173M6270) IC302 (LA5608M-TE-L) Check these ICs and replace as necessary.
F16	Faulty traverse deck UP switch. Example: The rotary hits the traverse deck.	1. Check for faulty contact of the switch (S501), faulty soldering of switch terminals, and damaged foil. 2. Replace the switch, repair soldering or repair foil.
F17	Faulty traverse deck DOWN switch. Example: The tray opens.	1. Check for faulty contact of the switch (S501), faulty soldering of switch terminals, and damaged foil, etc. 2. Replace the switch, repair soldering or repair foil.
F18	Faulty rotary turret rotation detection. Example: The turret continues to turn at the initial position without stopping.	1. Check the optical sensor (D503) and replace if necessary.
F20	Faulty loading motor rotation detection. Example: The turret repeatedly rotates in forward or reverse direction, or tray repeatedly moves out and back in.	1. Check the optical sensor (D502) and replace if necessary.
F21	Loading motor rotates in reverse. Example: The turret repeatedly rotates in forward or reverse direction, or tray repeatedly moves out and back in.	1. Check the mounting direction of the motor (M501), and if the direction is reversed, re-mount it in the correct direction.
F22	Faulty loading motor and loading mechanism. Example: Nothing happens when the PLAY button is pressed. The loading operation is not performed when the OPEN/CLOSE button is pressed.	1. Check the motor (M501) and replace if necessary. Check the cams and other of the loading mechanism to confirm that none are damaged or missing, and that all are mounted in the correct positions.
F24	Faulty half-open switch. Example: When the tray is opened during play, it opens completely (full open).	1. Check for faulty switch contacts (S503), faulty soldering of switch terminals, and damaged foil. 2. Replace the switch, repair soldering or repair foil.
F25	Faulty full-open switch. Example: When the tray is opened, it closes after 3 or 4 seconds.	1. Check for faulty switch contacts (S502), faulty soldering of switch terminals, and damaged foil. 2. Replace the switch, repair soldering or repair foil.
F-61	When the power switch is switched on, it automatically switches back off, making it impossible to switch power on.	1. Faulty amplifier (SE-CH515A or SE-CH717) output IC (IC501). 2. Fan motor is burnt out, locked, or stopped. 3. Replace the output IC or fan motor as necessary.

■Display Function of Automatically-Adjusted Results

(Self-Check Function)

The SL-CH515 unit has a function that uses the FL display board to indicate the results from automatic adjustment of the servo-circuit (tracking, focus, offset, etc.) as error codes.

The error code display indicates the location of failures from automatic adjustment circuit.

The following procedure displays the error codes from the self-diagnostic function.

●Procedure for displaying automatic adjustment codes

1. Set the unit in the servo-board testing mode (refer to page 13).
2. Turn on the power to the unit (refer to page 3).
   Note:
   When the SL-CH515 unit is powered on, the error code "U-70" is displayed. Exit this mode using the STOP (□) key.
3. Check one of the disc trays in the rotary tray faces the front.
4. Hold down the STOP (□) key for more than two seconds and press the R.SKIP(◄◄/◄◄) key. This causes the unit to enter the automatic adjustment mode.
5. After automatic adjustment, the code display indicates the location of failure in the servo circuit.

●Troubleshooting using the automatic adjustment code

Notes:
1. If "E-00" is displayed as an error code, this means no error has been found.
2. Check the disc and laser-detector lens for damage, contamination or stains.
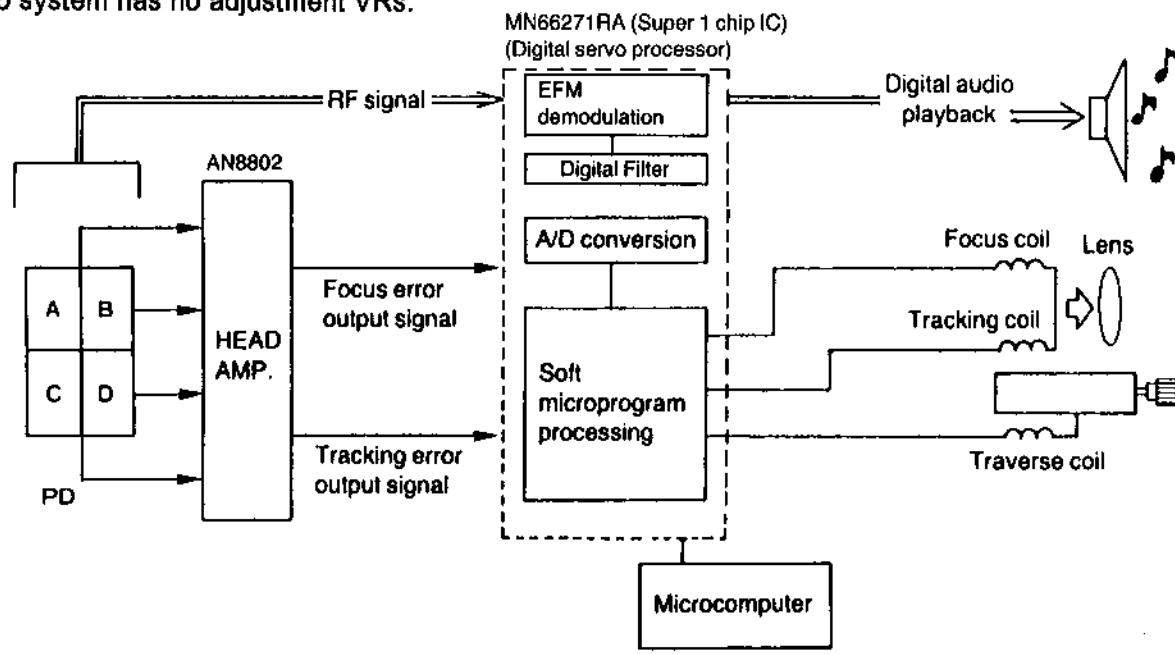
FL error code display	Symptom	Probable cause	Signal to check		Normal the values of voltage and waveform	
			Signal name	Location	PLAY	STOP
E-01	Focus and tracking offset adjustments did not complete in the specified time period.	① Clocks X1 and X2, power supply VDD, and reset/RST, all on IC702 ② MDATA, MCLK, MLD, and SENSE signals to/from the mechanism controller	MDATA	IC702 ⑥ pin	⎍⎍	4.8V
			MCLK	IC702 ⑦ pin	⎍⎍	4.8V
			MLD	IC702 ⑨ pin		
			SENSE	IC702 ⑩ pin	0V	0V
			/RST	IC702 ⑬ pin	4.9V	4.9V
			X1	IC702 ⑧ pin	∿∿	∿∿
			X2	IC702 ⑨ pin	∿∿	∿∿
E-03 E-05 E-07 E-09 E-0B E-0D E-0F	Disc play unstable	① Scratches or contaminants on disc surface ② Focus and tracking servo circuits (check waveforms, voltages, and part constangs.) ③ Spindle driver circuit ④ Optical pickup	FE	IC702 ㉒ pin	∿∿∿	2.4V
			TE	IC702 ㉓ pin	⊣⊢	2.4V
			FOD	IC702 ㉔ pin	2.4V	2.4V
			TRD	IC702 ㉗ pin	2.4V	2.4V
			KICK	IC702 ㉖ pin	2.4V	2.4V
			/FLOCK	IC702 ① pin	0V	4.9V
			/RF DET	IC702 ⑭ pin	0V	4.8V
			RF	TJ701	▨	3.4V
			STAT	IC702 ⑦ pin	4.9V	0V
E-4 E-6 E-C E-E	Best Eye (PD Balance) adjustment did not complete in the specified time period.	① Scratches or contaminants on disc surface. ② Focus and Tracking servo circuit (check waveforms, voltages, and constants.) ③ Optical pickup	FBAL	IC702 ㉚ pin	2.5V ± 1.25V	2.5V ± 1.25V
			RF	TJ701	▨	3.4V
			FE	IC702 ㉒ pin	∿∿∿	0V
			OFT	IC702 ㊶ pin	0V	0V
			/TLOCK	IC702 ⑬ pin	0V	0V
E-8 E-A	Focus or Tracking gain adjustment did not complete in the specified time period.	① Scratches or contaminants on disc surface. ② Focus and Tracking servo circuit (check waveforms, voltages, and part constants.) ③ Optical pickup	FE	IC702 ㉒ pin	∿∿∿	2.4V
			TE	IC702 ㉓ pin	⊣⊢	2.4V
			OFT	IC702 ㊶ pin	0V	0V
			/TLOCK	IC702 ⑬ pin	0V	0V

■Digital Servo System

DIGITAL SERVO SYSTEM

This servo system has no adjustment VRs.

MN66271RA (Super 1 chip IC)
(Digital servo processor)

RF signal

EFM demodulation

Digital Filter

A/D conversion

Digital audio playback

AN8802

A B
C D
PD

HEAD AMP.

Focus error output signal

Tracking error output signal

Soft microprogram processing

Focus coil   Lens

Tracking coil

Traverse coil

Microcomputer

The following flow chart shows the sequence of automatic adjustments.

● **Flow chart on automatic adjustment sequence**

Approx. 2 sec.

START

Focus search operation: ON

Focus offset adjustment

Tracking offset adjustment

Temporary adjustment of focus gain

Spindle motor starts rotation

Does focus pull in? — No

Yes

(A)

* Because the microcomputer precisely performs automatic adjustments as shown in the flow chart, it will take approx. 5 seconds to finish reading TOC data if a used disc is eccentric one or its surface is warped.

(A)

Focus servo operation: ON
Tracking servo operation: ON

Temporary adjustment of tracking gain

Tracking balance adjustment

Does tracking pull in? — No

Yes

Focus balance adjustment

Fine adjustment of focus gain

Fine adjustment tracking gain

END

■ Troubleshooting Guide

No CD playback

Does the test disc rotate? — NO → Remove the

YES

Check if TOC reading is performed. — NO

YES

Does "▷" appear on the display? — No access

Playing time appear on the display

Turn on open switch (

Does optic move

Does len vertical mov

Does lase come

Load test di

Check output pin ① ② ③ of IC702. — NG

① BCLK
② LRCK   OK
③ SRDATA

Check output pin ㉑ ㉓ of CN702. — OK "H" — Is pin ⑤ of CN702 at "HIGH" or "LOW"?

No signal — "L"

IC702 failure

Check the unit

IC702 failure

Below 700 mV or no output

TJ701 (ARF)

At about 1 Vp·p

Is pin ㊻ of IC702 at "HIGH" or "LOW"? (CLVS) — "L"

"H"

Is there an output at pin ㉖ of IC702? (KICK) — NG

OK

R726 failure

IC702 failure

Turn on o and close (S790)

Remains at "H" — Check pir IC70 (/RFDE

No waveform or upper and lower amplitudes are not equal.

Check pin ㉕ of IC701. (FE)

Upper and lower amplitudes of waveform are equal.

Remains at "H" — Check pi CN7((/FLO(

Optical pickup failure

IC701 failure

IC702 failure

IC703 f

test disc

and close
S790)

il pickup
?? — **NO**

Optical pickup moves toward
nner track once, and then toward
outer track slightly (2 or 3 mm).

s make
rements? — **NO**

ES

r diode
on? — **NO**

ES

the
sc

pen
switch

Measure voltage
across R701.

Above 0.4 V

Optical pickup
failure

Below 0.4 V

i ⑱ of
T)

Changes from
'H" or "L".

Above 0.6 V

n ⑩ of
)2
CK)

Changes from
'H" or "L".

ailure

Measure voltage
between ⑧ and ⑤
of Q701.

Below 0.6 V

Q701 or optical
pickup is
defective.

IC701 failure

Are there outputs
at pins ㉑ and ㉒ of
IC703? — **NG**

OK

Optical pickup
failure

Is there an output
at pin ㉑ of IC702?
(FOD)

NG

OK

IC702 failure

IC703 failure

Check the position
of optical pickup. — At outer or around middle track

At inner track

Is pin ① of CN702
at "HIGH" or "LOW"? — "H" "L" — Is pin ① of CN702 at
"HIGH" or "LOW"?

"L" (0 V)

Inner track limit
switch is defective
or disconnected

Inner track limit switch
is short-circulted.

Are there outputs
pins ⑮ and ⑯ of
IC703? — **NG**

OK

Traverse deck
failure

Is there an output
at pin ㉑ of IC702?
(TRV) — **NG**

OK

IC702 failure

IC703 failure

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■What is CD Graphics

CD-Graphics compact discs contain text and/or graphics information in reserved subcode channels that are separate from the main channels containing musical data.

There are eight subcode channels available on compact discs: i.e. P, Q, R, S, T, U, V, and W, of which only P and Q channels are currently in use. The remaining six 6-bit reserved channels, R through W, can be used to store text/graphics information. CD-Graphics CDs completely compatible with conventional CDs. Graphics information is read of the subcode channels (R through W), decoded by the CD graphics decoder, and shown on a video monitor.

Ninety eight (98) frames of subcode channels make up a single block.

Two of the 98 frames hold synchronization information that helps identify the first bit of each frame. Thus, 96 frame are actually available as subcode-channels.
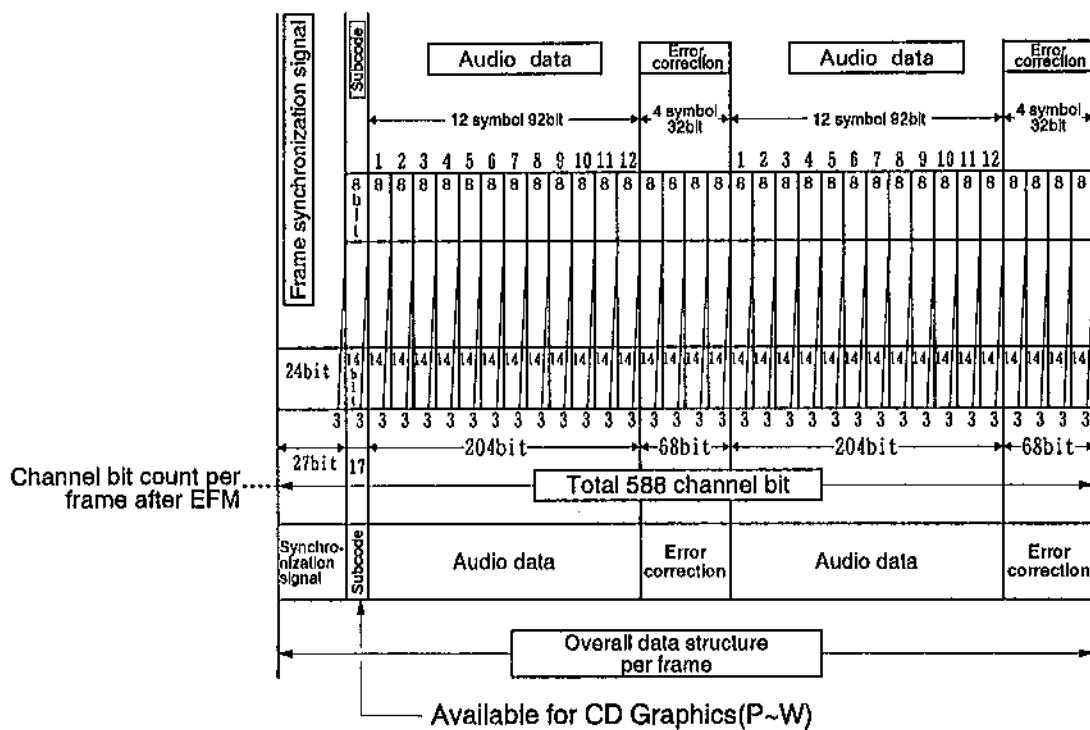
The total subcode bit count available in a single block is given by: 96 (frames) × 8 (bits) = 768 bits.

The total storage capacity provided by the six subcode channels (R~W) is thus:

$$6 \text{ bits} \times 96 \text{ frames} \times 75 \text{ times/sec.} \times 3600 \text{ sec.} = 155,520,000 \text{ bits.}$$

As 8 bit make up a single byte, this translates into 19,440,000 bytes or 19.44 Mbytes.
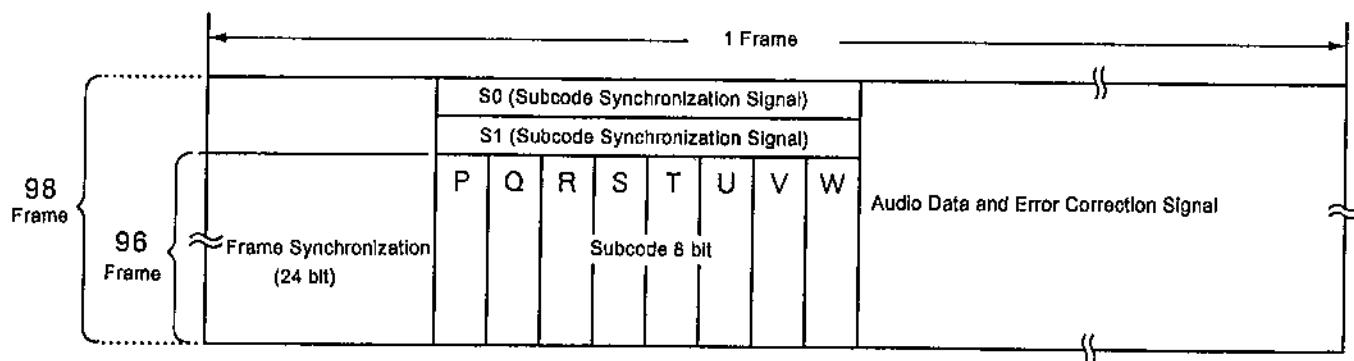
The six reserved subcode channels on a CD thus have a storage capacity close to 20 Mbytes, large enough to hold still graphics images or text data.
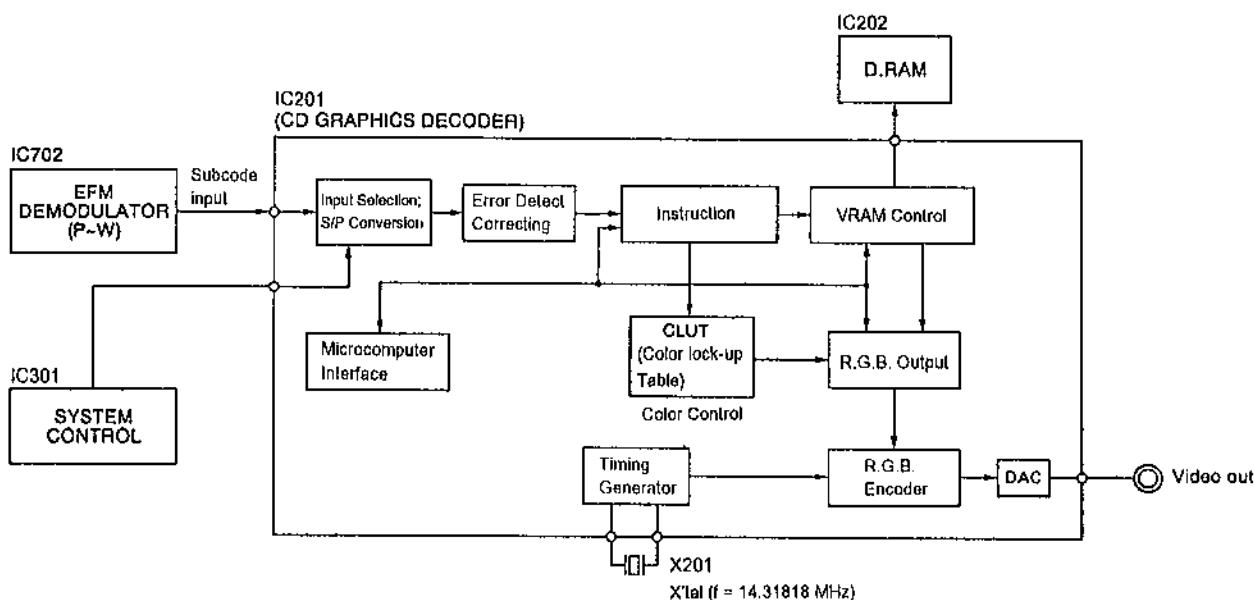
Frame data format used on CDs

●Contents of subcode channels
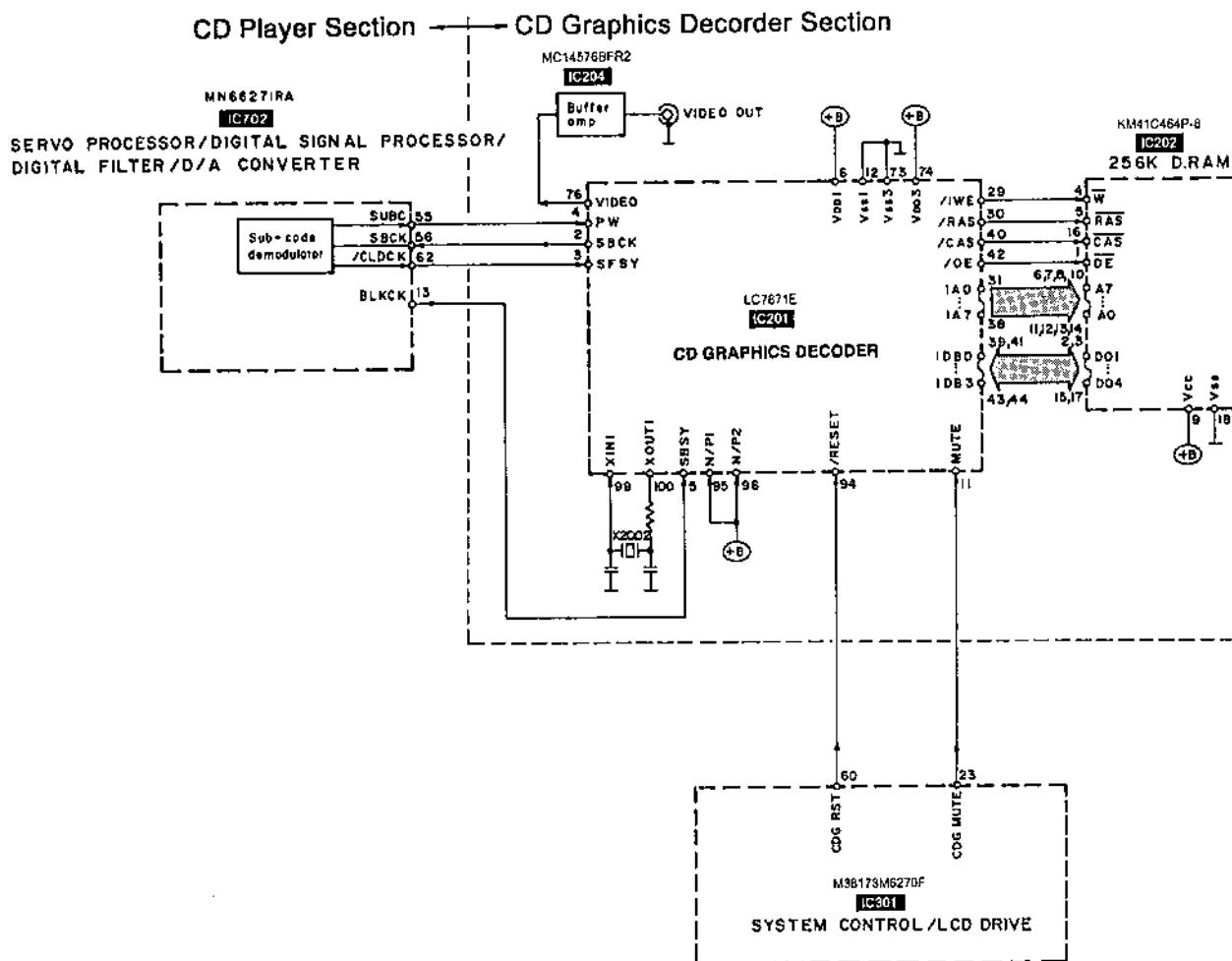
Number of Channels	Channel Name	Purpose	Channel bit Count
1	P	Presence of musical data (identifies inter-track spaces)	1 bit

2	Q	Control bits
		    Number of audio channels
		    Presence of pre-emphasis
		Address and contents of address
		    Track number
		    Index
		    Time in minutes, seconds
		    Frame number
		Cumulative time code (minutes seconds, frames)
		Serial disc number
			1 bit

3	R	Available for CD graphics	1 bit
4	S		1 bit
5	T		1 bit
6	U		1 bit
7	V		1 bit
8	W		1 bit

●IC201 (Subcode Decoder) Block Diagram

●Description of Operation

CD Player Section ——|—— CD Graphics Decorder Section

The clocks and subcode (P~W) demodulated by IC702 are accessed by IC201 through the following pins:

IC702		IC201		
Pin Number	Pin function	Pin Number	Pin function	
�55	SUBC	④	PW	Subcode Input
�56	SBCK	②	SBCK	Read Clock
㊸62	CLDCK	③	SFSY	Frame Clock
⑬	BLKCK	⑤	SBSY	Block Clock
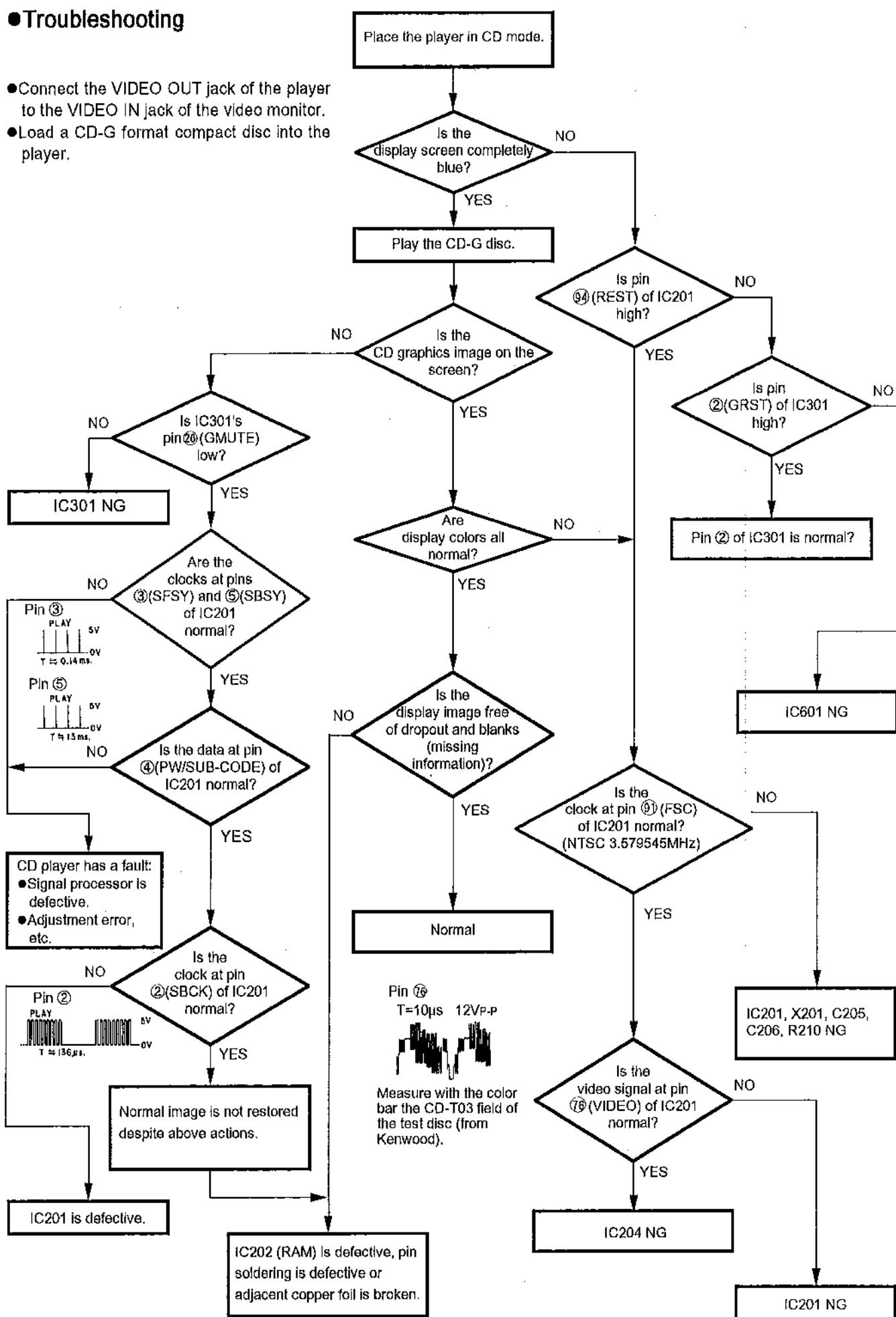
The subcode signal received at pin 4 of IC201 (CD Graphics Decoder) is processed into video data. The video data, appearing at pin 26 of IC201, feed IC204 (Video Amplifier), where it is amplified 6 dB. (For IC201's internal block diagram, see page 45.)

IC202 is a 256 kbit external DRAM.

Pins 94 (/RESET) and 11 (MUTE) of IC201 communicate with pins 2 and 26 of system microprocessor (IC601).

●Pin 2 is used to reset previous data and set the display screen to blue when the disc is replaced.

●Pin 26 is used to mute unwanted musical data when the SKIP key is pressed during playback.

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●Troubleshooting

●Connect the VIDEO OUT jack of the player to the VIDEO IN jack of the video monitor.
●Load a CD-G format compact disc into the player.

Place the player in CD mode.

Is the display screen completely blue? — NO

YES

Play the CD-G disc.

Is pin ㉔(REST) of IC201 high? — NO

YES

NO — Is the CD graphics image on the screen?

YES

Is IC301's pin㉖(GMUTE) low? — NO → IC301 NG

YES

Is pin ②(GRST) of IC301 high? — NO

YES

Pin ② of IC301 is normal?

Are the clocks at pins ③(SFSY) and ⑤(SBSY) of IC201 normal? — NO

Pin ③
PLAY
5V
0V
T = 0.14 ms.

Pin ⑤
PLAY
5V
0V
T = 15 ms.

YES

Is the data at pin ④(PW/SUB-CODE) of IC201 normal? — NO

YES

Are display colors all normal? — NO

YES

CD player has a fault:
●Signal processor is defective.
●Adjustment error, etc.

Is the display image free of dropout and blanks (missing information)? — NO

YES

Is the clock at pin ②(SBCK) of IC201 normal? — NO

Pin ②
PLAY
5V
0V
T = 136 µs.

YES

Normal image is not restored despite above actions.

IC201 is defective.

Normal

Pin ⑯
T=10µs 12VP-P

Measure with the color bar the CD-T03 field of the test disc (from Kenwood).

IC202 (RAM) is defective, pin soldering is defective or adjacent copper foil is broken.

IC601 NG

Is the clock at pin ⑨(FSC) of IC201 normal? (NTSC 3.579545MHz) — NO

YES

IC201, X201, C205, C206, R210 NG

Is the video signal at pin ⑯(VIDEO) of IC201 normal? — NO

YES

IC204 NG

IC201 NG

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■Function of IC Terminals
●IC301 (M38173M6270F)

Pin No.	Terminal Name	I/O	Function
1	BSDT0	O	Bus data output
2	BSCK0	O	Bus clock output
3	BSDT1	I	Bus data input
4	BSCK1	I	Bus clock input
5 ? 8	NU	—	
9	CS	O	IC401 serial communication starting signal output
10	CLK	O	IC401 clock output
11 12	D0 D1	O	IC401 data output
13	NU	—	
14	SOL	O	Solenoid drive signal output
15	PSTN	I	Photo sensor signal input
16	PHOUT	I	Photo sensor signal input (Speed detect)
17	/FWD	O	Motor control (FWD)
18	/REW	O	Motor control (REW)
19 20	NU	—	
21	DOWN	O	Traverse down detect signal input
22	FOPN	I	Tray full open detect signal input
23	HOPN	I	Tray half open detect signal input
24	UP	I	Traverse up detect signal input
25	REQ	O	IC401 request signal output
26	HALT	I	Power failure detect signal input
27	RST	I	Reset signal input
28	XC IN	—	GND
29	XC OUT	—	
30	X IN	I	Clock input

Pin No.	Terminal Name	I/O	Function
31	X OUT	O	Clock output
32	VSS		GND
33 ? 36	NU	—	
37	CD POWER	O	Reset control signal output
38	/CD	O	Muting control siganl output
39	GRST	O	Reset signal output
40	GMUTE	O	Video mute signal output
41 ? 51	G1 ? G11	O	FL grid drive signal output
52 ? 61	S10 ? S1	O	FL segment drive signal output
62 ? 69	S11 ? S18	O	FL segment drive signal output
70 71	LED1 LED0	O	LED control
72	NU	—	
73	VDD	I	+5V
74	VPP	I	-28V
75	AVSS	—	GND
76	VREF	O	Reference voltage output
77	NU	—	
78 79	KEY2, KEY1	I	Operation switch signal input
80	NU	—	

●IC401 (LC66306A4C13)

Pin No.	Terminal Name	I/O	Function
1	REST SW	I	Innermost track sense switch status
2	SERVO RST	I	Reset signal input
3	STAT	I	Status signal input
4	SUBQ	I	Subcode Q input
5	D MUTE	—	Muting signal output (No use)
6	NC	—	———
7	SQCK	O	External clock for subcode Q register
8	BLKCK	I	Subcode block clock input
9	ODL RX	I	———
10	ODL TX	—	———
11	NU	—	———
12	NU	—	Tied high
13	MLD	O	Microprocessor command load signal
14	M DATA	O	Microprocessor command data
15	TEST	—	GND
16	Vss		
17	OSC1	I	Clock input from X401 (4.23 MHz)
18	NC	—	GND
19	NC	—	GND
20	OSC2	O	Clock signal output to X401 (4.23 MHz)
21	/RST	O	Reset signal output
22	M CLK	O	Microprocessor command clock
23	NU	—	———
24	NU	—	———
25	———	—	———

Pin No.	Terminal Name	I/O	Function
26	CS	I	Input of Serial communication starting to IC601 for system control
27	REQ	I	Input of Request signal from IC601 for system control
28	DT	I/O	Data Signal input/output from IC601 for system control
29			
30	NU	—	GND
31	CLK	I	Clock for communication with IC601
32	NU	—	———
33	NU	—	GND
34			
35			
36			
37			
38			
39	VDD	I	Power supply
40	CLOSE SW	I	Disc tray "close" sense switch status
41	OPEN SW	I	Disc tray "open" sense switch status
42	NC	—	Connected to Vss
43			
44	/CLOSE	O	Close Disc Tray command output
45	/OPEN	O	Open Disc Tray command output
46	SENSE	I	Sense signal input
47	/FLOCK	I	Focus servo pull-in signal
48	/TLOCK	I	Tracking servo pull-in signal

●IC703 (AN8389SE1)

Pin No.	Terminal Name	I/O	Function
1	Vcc	I	Power supply
2	VREF	I	VREF input
3	IN4	I	Motor driver (4) input
4	IN3	I	Motor driver (3) input
5	GND	—	Ground connection
6	NC	—	Ground connection
7	NRESET	—	Reset input
8	GND	—	Ground connection
9	IN2	I	Motor driver (2) input
10	PC2	I	PC2 (power cut) input
11	IN1	I	Motor driver (1) input
12	PC1	I	PC1 (power cut) input (no use, open)

Pin No.	Terminal Name	I/O	Function
13	PVcc1	I	Power supply (1) for driver
14	PGND1	—	Ground connection (1) for driver
15	D1–	O	Motor driver (1) reverse-action output
16	D1+	O	Motor driver (1) forward-action output
17	D2–	O	Motor driver (2) reverse-action output
18	D2+	O	Motor driver (2) forward-action output
19	D3–	O	Motor driver (3) reverse-action output
20	D3+	O	Motor driver (3) forward-action output
21	D4–	O	Motor driver (4) reverse-action output
22	D4+	O	Motor driver (4) forward-action output
23	PGND2	—	Ground connection (2) for driver
24	PVcc2	I	Power supply (2) for driver

SL-CH515

● IC701 (AN8802SCE1V)

Pin No.	Terminal Name	I/O	Function
1	PDAD	I	PD A channel signal input with delay
2	PDA	I	PD A channel signal input without delay
3	LPD	I	Laser PD connection
4	LD	O	Power supply for LD driving
5	AMPI	I	RF amplifier Input
6	Vcc	I	Power supply connection
7	AMPO	O	RF amplifier output (no use, open)
8	CAGC	I	AGC loop filter connection
9	ARF	O	RF AGC output
10	CENV	I	Capacitor connection for RF detection
11	CEA	I	Capacitor connection for HPF amplifier
12	GND	—	Ground connection
13	LDON	I	ON/OFF input of LD APC ("H": ON, "L": OFF)
14	TES	I	Tracking error shunt signal input ("H": shunt)
15	PLAY	I	Play signal input ("H": PLAY)
16	WVEL	I	WVEL control
17	BDO	O	BDO output
18	/RFDET	O	NRFDET output
19	CROSS	O	CROSS output
20	OFTR	O	OFTR output
21	VDET	O	VDET output
22	ENV	O	ENV output
23	TEBPF	I	Vibration detection input
24	TE	O	Tracking error output
25	FE	O	Focus error output
26	PTO	O	Potentioamplifier output (no use, open)
27	PTI	I	Potentioamplifier inversion input (no use, open)
28	TBAL	I	Tracking balance input
29	FBAL	I	Focus balance input
30	VREF	O	VREF output
31	PDB	I	PD B channel signal input without delay
32	PDBD	I	PD B channel signal input with delay

● IC702 (MN66271RA)

Pin No	Terminal Name	I/O	Function
1	BCLK	—	Bit clock output for serial data (no used, open)
2	LRCK	—	L/R identification signal output (no use, open)
3	SRDATA	—	Serial data output (no used, open)
4	DVDD1	I	Power supply input (for digital circuit)
5	DVss1	—	GND (for digital circuit)
6	TX	O	Digital audio interface signal output
7	MCLK	I	Microprocessor command clock signal input (Latches data at first transition)
8	MDATA	I	Microprocessor command data signal input
9	MLD	I	Microprocessor command load signal input
10	SENSE	O	Sence signal output (OFT, FESL, MAGEND, NAJEND, POSAD, SFG)
11	/FLOCK	O	Focus servo feeding signal output ("L": Feed)
12	/TLOCK	O	Tracking servo feeding signal output ("L": Feed)
13	BLKCK	O	Sub-code block clock signal output (fBLKCK = 75 Hz during normal playback)
14	SQCK	I	External clock signal input for sub-code Q register
15	SUBQ	O	Sub-code Q code output
16	DMUTE	I	Muting input ("H": Mute)
17	STAT	O	Status signal output (CRC, CUE, CLVS, TTSTVP, FCLV, SQCK)
18	/RST	I	Reset input
19	SMCK	—	1/2-divided clock signal of crystal oscillating at MSEL = "H" (fSMCK = 8.4672 MHz) 1/4-divided clock signal of crystal oscillating at MSEL = "L" (fSMCK = 4.2336 MHz)
20	PMCK	—	1/192-divided clock signal of crystal oscillating (fPMCK = 88.2 KHz) (no use, open)
21	TRV	O	Traverse forced feed output
22	TVD	O	Traverse drive output
23	PC	O	Spindle motor ON signal output ("L": ON)
24	ECM	O	Spindle motor drive signal output (forced mode output)
25	ECS	O	Spindle motor drive signal output (servo error signal output)
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive output
28	FOD	O	Focus drive output

Pin No.	Terminal Name	I/O	Function
29	VREF	I	D/A (drive) output (TVO, ECS, TRD, FOD, FBAL, TBAL) Reference voltage input
30	FBAL	O	Focus balance adjustment output
31	TBAL	O	Tracking balance adjustment output
32	FE	I	Focus error signal input (analog input)
33	TE	I	Tracking error signal input (analog input)
34	RFENV	I	RF envelope signal input
35	VDET	I	Vibration detection signal input ("H": detection)
36	OFT	I	Off-track signal input ("H": off track)
37	TRCRS	I	Track cross signal input
38	/RFDET	I	RF detection signal input ("L": detection)
39	BDO	I	Dropout signal input ("H": Dropout)
40	LDON	O	Laser on signal output ("H": ON)
41	TES	O	Tracking error shunt signal output ("H": shunt)
42	PLAY	O	Play signal out ("H": PLAY)
43	WVEL	O	Double speed status signal output ("H": Double speed)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias (no use, open)
47	DSLF	I/O	DSL loop filter
48	PLLF	I/O	PLL loop filter
49	VCOF	—	VCO loop filter (no use, open)
50	AVDD2	I	Power supply input (for analog circuit)
51	AVss2	—	GND (for analog circuit)
52	EFM	—	EFM signal output (not use, open)
53	PCK	—	PLL extraction clock output (fPCK=4.321 MHz during normal playback) (no use, open)
54	PDO	—	Phase comparison signal of EFM and PCK signals (no use, open)
55	SUBC	O	Sub-code serial data output (no use, open)
56	SBCK	I	Clock input for sub-code serial data (no use, open)
57	Vss	—	GND
58	X1	I	Crystal oscillating circuit input (f=16.9344 MHz)
59	X2	O	Crystal oscillation circuit output (f=16.9344 MHz)
60	VDD	I	Power supply input (for oscillating circuit)
61	BYTCK	—	Byte clock output (no use, open)

Pin No.	Terminal Name	I/O	Function
62	/CLDCK	O	Sub-code frame clock signal output (fCLDCK=7.35 kHz during normal playback)
63	FCLK	—	Crystal frame clock signal output (fFCLK=7.35 kHz, double=14.7 kHz)
64	PFLAG	O	Interpolation flag output ("H": Interpolation) (no use, open)
65	FLAG	O	Flag output (no use, open)
66	CLVS	O	Spindle servo phase synchronizing signal output ("H": CLV, "L": rough servo) (no use, open)
67	CRC	O	Sub-code CRC checked output ("H": OK, "L": NG) (no use, open)
68	DEMPH	O	De-emphasis ON signal output ("H": ON) (no use, open)
69	RESY	—	Frame resynchronizing signal output (no use, open)
70	/RST2	I	Reset input through MASH circuit ("L": Reset)
71	/TEST	I	Test input
72	AVDD1	I	Power supply input (for analog circuit)
73	OUTL	O	Left channel audio signal output
74	AVss1	—	GND
75	OUTR	O	Right channel audio signal output
76	RSEL	I	RF signal polarity assignment input (at "H" level, RSEL="H"; at "L" level, RSEL=L)
77	CSEL	—	Crystal oscillating frequency designation input ("L": 16.9344 MHz, "H": 33.8688 MHz)
78	PSEL	—	Test input (normally, "L") (no use, open)
79	MSEL	—	Output frequency switching for SMCK terminal "H": SMCK=8.4672 MHz "L": SMCK=4.2336 MHz (no use, open)
80	SSEL	I	Output mode switching of SUBQ terminal ("H": Q code buffer mode)

●IC201 (LC7870NE) for (GC) area

Pin No.	Terminal Name	I/O	Function
1	S	I	CD display select signal input (Connected to Vᴅᴅ)
2	SBCK	O	Clock signal output for sub-code read
3	SFSY	I	Frame sync signal input for sub-code
4	PW	I	Data signal input for sub-code
5	SBSY	I	Block sync signal input for sub-code
6	Vᴅᴅ1	—	Power source terminal for digital signal
7	CE	I	Control signal input at the serial signal input/output
8	DO	O	Serial data signal output
9	DI	I	Serial data signal input
10	CL	I/O	Serial data clock signal input/output
11	MUTE	I	Video mute signal input
12	Vss1	—	GND terminal for digital signal
13 · 14	CH0 · CH1	I	Connected to Vᴅᴅ1
15 ≀ 28	CH2 ≀ CH15	—	Connected to GND
29	/1WE	O	Connected to D-RAM IC202 (KM41C464P-8), memory writing control signal output
30	/RAS	O	Connected to D-RAM IC202 (KM41C464P-8), memory reading control signal output
31 ≀ 38	1A0 ≀ 1A7	O	D-RAM address signal output
39	1DB0	I/O	D-RAM data signal input/output
40	/CAS	O	D-RAM control signal output
41	1DB1	I/O	D-RAM data signal input/output
42	/OE	O	D-RAM control signal output
43 · 44	1DB2 · 1DB3	I/O	D-RAM data signal input/output
45	/2WE	—	D-RAM control signal output (Not used)
46 ≀ 53	2A0 ≀ 2A7	—	D-RAM address signal output (Not used)

Pin No.	Terminal Name	I/O	Function
54 ≀ 57	2DB0 ≀ 2DB3	—	D-RAM data signal input/output (Not used)
58	TEST	—	Test signal input (Connected to GND)
59	CDGM	O	CD graphics detect signal output (CD graphics mode: "H", CD mode: "L")
60 ≀ 65	TRANS 0 ≀ TRANS 5	—	Not used
66	Vss2	—	GND terminal for analog signal (Not used)
67	Vᴅᴅ2	—	Power source terminal for analog signal (Not used)
68	BIAS1	—	Connected to a condenser for ripple elimination (Connected to GND)
69	TRANS	O	Signal output for define-transparency
70	R OUT	O	6-bit data output for video signal (R)
71	G OUT	O	6-bit data output for video signal (G)
72	B OUT	O	6-bit data output for video signal (B)
73	Vss3	—	GND terminal for analog signal
74	Vᴅᴅ3	—	Power source terminal for analog signal
75	BIAS2	—	Connected to a condenser for ripple elimination
76	VIDEO	O	Composite video signal output (8-bit DAC output)
77	TEST1	—	Test signal input (Connected to GND)
78	TEST2	—	
79	FSCIN	—	Clock signal input for sub-carrier (Connected to GND)
80	V SYNC	O	Vertical sync signal output (Not used)
81	2FSC	—	2FSC signal output (Not used)
82	YS	—	Superimpose control signal output (Not used)
83	/CSYNC	—	Complex sync signal output (Not used)
84	SON	—	Superimpose ON/OFF signal output (Connected to GND)
85	EFLG	—	Error mode monitoring signal output (Not used)

Pin No.	Terminal Name	I/O	Function
86	FSX	—	Error mode monitoring trigger signal output (Not used)
87	M1/M2	I	D-RAM IC select signal input (Connected to $V_{DD}1$)
88	DEN	—	Connected to GND
89	PALID	—	Not used
90	/H RESET	I	Connected to $V_{DD}1$
91	FSC	—	Clock signal output for sub-carrier (Connected to TP201)
92	/V REST	I	Connected to $V_{DD}1$
93	4FSC2	—	Connected to GND
94	/RESET	I	Reset signal input
95	N/P1	I	NTSC/PAL select signal input for RGB encoder (NTSC: "H", PAL: "L")
96	N/P2	I	NTSC/PAL select signal input for CD-EG decoder (NTSC: "H", PAL: "L")
97	XIN2	I	Connected to crystal oscillator X202 for PAL (17.734476 MHz input)
98	XOUT2	O	Connected to crystal oscillator X202 for PAL (17.734476 MHz output)
99	XIN1	I	Connected to crystal oscillator X201 for NTSC (14.31818 MHz input)
100	XOUT1	O	Connected to crystal oscillator X201 for NTSC (14.31818 MHz output)