Portable compact disc interactive player CDI 350/00/05/11/17

Service
Service
Service

Interactive
Media
Systems

CD-I

Service Manual

COMPACT disc Interactive

PhotoCD

The Philips Portable CD-I system

- Combination CD-I player, 6" color LCD screen, and pointing device for home, institutional or professional purposes.
- Ideal stand-alone system for individual, person-to-person and small-groups applications.
- Connectable to any PAL or NTSC TV set or Monitor to form a high-performance CD-I system, ideal for presentations.
- Comprehensive interfaces to remote controller, pointing devices and HiFi stereo systems.
- Plays all CD-I discs, CD-digital audio, Photo CD and CD-Bridge discs.
- Easy operation using on-screen program display.
- Runs on the AC-power adapter 22ER9151.

The optical pick-up assy, Code Number 4822 693 91593, contains the CDM-9.
Optional Remote Control 22ER9051/11 Code Number 4822 218 10438.

(SF)

Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen.

(S)

Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Betakta ej strålen.

(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

CONTENTS

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

CLASS 1
LASER PRODUCT
9122 190 03420

Published by MW march 1993 Service & Support Interactive Media Systems Printed in The Netherlands 4822 725 24651

PHILIPS

CHAP. CONTENTS

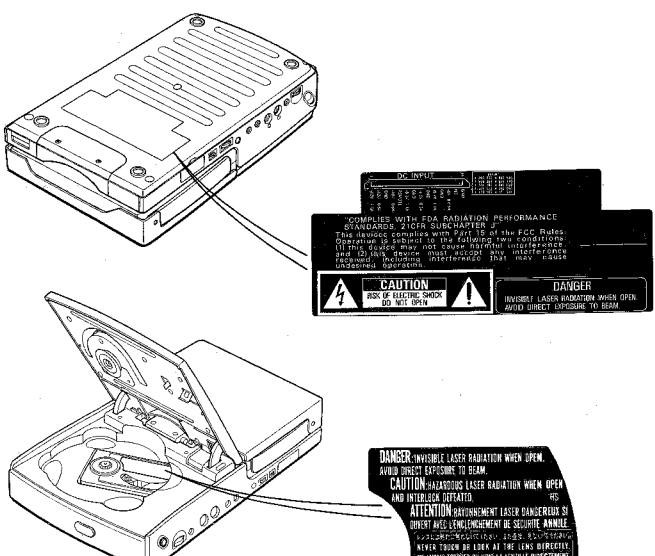
1 CAUTION

LASER NOTE:
DANGER - Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.
CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may in result hazardous radiation exposure.
CAUTION - The use of optical instruments with this product will increase eye hazard.

THE CD-I PLAYER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT PROPERLY QUALIFIED SERVICE PERSONNEL.

LASER BEAM RADIATION SPOT
Laser Diode Properties
Material: Ga-Al-As
Wavelength: 760 - 800nm (30°C)
Laser Output: Continuous Wave Tpy. 0.4mW Max. 0.6mW

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 30cm from the surface of the objective lens on the light pen assembly.



2 PRODUCT INFORMATION
2.1 TECHNICAL SPECIFICATION

Physical
- Dimensions (w x d x h)
292 x 190 x 53 mm
(11.5 x 7.5 x 2.1 inch)

- Weight (approx.)
2.0 kg
(4.4 lbs)

Power consumption
Approx. 20.6 W (without extensions)

Approvals
FCC,UL
Conforms with VDE, FTZ, CSA, Nordic,US and German laser safety regulationsl

Audio L+R:
-Connector
Type : Mini Phone socket
- Output quality in case of CD-DA
Output level : 2Vrms +/- 3 dB
Channel unbalance : 80 dB 1kHz
Frequency range : 20 HZ to 20 kHz
Phase non- linearity : +0.2 dB/ -0.2 dB
Cross talk (1kHz) : - 86 dB
Harmonic dist.
+ noise at 1kHz : -70 dB 1kHz
S/N ratio : 84 dB (typ >90)
Dynamic range : 80 dB 1kHz

Headphone output:
-Connector
Type : Mini Phone socket
-Output quality in case of CD-DA
Load impedance range : 8 Ohm - 2 kOhm
Output power : 10 mW at 1kHz, 32 Ohm
Distortion : 50dB 1kHz 32 ohm

Speaker output
Output power : 200mW x 2

Video specifications
625 lines : RGB (PAL, SECAM)
525 lines : RGB, Y/C, CVBS (NTSC)

Video interface

General information	PAL	NTSC
Resolution normal	Enviroment	Enviroment
H*V	384*280	384*240
	384*560	384*480
Line period	64.00 us	63.555 us
Active line period	51.20 us	58.84 us
VSC clock	30.0000 MHz	30.2098 MHz
Display format		
non-interlace	312 lines	262 lines
interlace	625 lines	525 lines
(2 different frames)		
interleaved	625 lines	525 lines
(2 identical frames)		

RGB output:
A/ NTSC
- Amplitude : 714mVpp +/- 10%
(max. white level)
- Line time : 63.555 uS
- CVBS. output : 1Vpp +15%/- 10%
- S/N on RGB output : > 50 dB (40 Hz - 5 MHz)
- S/N on RGB output : > 45 dB (40 Hz - 10 MHz)
- Bandwidth on RGB out : - 3 dB at 7.5 MHz

B/ PAL
- Amplitude : 700mVpp +/- 10%
(max. white level)
- Line time : 64. uS
- CVBS. output : 1Vpp +15%/-10%
- S/N on RGB output : > 50 dB (40 Hz - 5 MHz)
- S/N on RGB output : > 45 dB (40 Hz - 10 MHz)
- Bandwidth on RGB out : - 3 dB at 7.5 MHz

CVBS output:
A/ NTSC
- Amplitude : 1Vpp +15% / -10%
- White bar : 714 mVpp +110 mV / -70 mV
- Sync amplitude : 286 mVpp +/- 40 mV
- Burst amplitude : 290 mV +/- 30 mV
- S/N lum. (40Hz-10MHz) fsc notch >45dB
- S/N chrom. in red : AM (*)> 37 dB
PM (**) > 48 dB
- Video bandwidth : 4.5 MHz (-6dB)
- Chroma subc. freq. : = 3.579545 MHz
locked to sync. +/-70Hz

B/ PAL
- Amplitude : 1Vpp +15%/-10%
- White bar : 700 mVpp +110 mV/-70 mV
- Sync amplitude : 300 mVpp +/-40 mV
- Burs amplitude : 300 mV +/-30 mV
- S/N lum. (40Hz-10MHz) fsc notch >45dB
- S/N chrom. in red : AM (*)> 37 dB
PM (**) > 43 dB
- Video bandwidth : 4.5 MHz (-6dB)
- Chroma subc. freq. : = 4,433661 MHz
X-tal locked +/-50Hz

* AM noise: output of measured value in dB referred to the average amplitude of the colour subcarrier burst applied
** PM noise: output of measured value in dB referred to the constant phase of a reference oscillator

Y/C ouput:
A/ NTSC
- amplitude : Y= 1Vpp +/-10% into 75 Ohm
- amplitude : C= 286 mVpp +/- 10% (burst)
- bandwidth Y : = 4.5 MHz (-3dB)
- bandwidth C : = 1 MHz
- S/N on Y output : 45dB (unweight)
- S/N on C output : 42dB (unweight)

B/ PAL
- amplitude : Y= 1Vpp +15%/-10% into 75 Ohm
- amplitude : C= 300 mVpp +/- 10% (burst)
- bandwidth Y : = 5 MHz (-3dB)
- bandwidth C : = 1.6 MHz
- S/N on Y output : 45dB (unweight)
- S/N on C output : 42dB (unweight)

Laser Detector Grating Unit (LDGU)

Laser type	: semi conductor AlGaAs
Wave length	: 780 nm
Output power	: 3.3 mW typical

RS232-2 (port 2) communication: (INPUT)

Connector type	: 8 pins miniDIN (female)
Internal device	: on chip UART (SCC68070)
Baudrates	: 75, 150, 300, 1200, 2400, 4800, 9600 and 19200
Dataformat	: character length: 7 or 8 bits
stopbit length	: 1 or 2 bits
parity	: odd, even or no
Handshake	: hardware: 2 control lines; RTS and CTS.
software	: XON/XOFF.

All signal levels and current ratings, except +5V and DTR are according EIA RS-232-C standard.

RATINGS	: +5V +/-10% max. 200mA
DTR	: +12V +/-10% max. 10mA (Ri = 1k ohm)

IR interface:
The IR (infra red) receiver for use with the CD-I remote control.
Specification according UAW-0422

- characteristics

Data format	: RC-5 extended format and RC-6 format
-infrared transmission data.	
Distance	: 20 - 800 cm.
Sampling time	: =< 50 ms
Receive angle	: 45 degree out of the centre line

Power supply

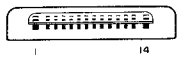
22ER9151/00 ..... Europe(/00 model)
220V-240V (198V to 264V) 50-60Hz 0.55A

Output +12V	1.6A
-10V	0.7A
+5.2V	2.7A
+5V	0.015A

22ER9151/11,/17 ..... JAPAN,USA(/11,/17 model)
100V/120V (90V to 132V) 50/60Hz 56W

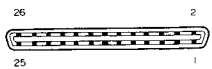
Output +12V	1.6A
-10V	0.7A
+5.2V	2.7A
+5V	0.015A

DC Power Input



Pin	Signal	Pin	Signal
1	+12v	2	+12v
3	GND	4	-10V
5	Power ON/OFF	6	+5.2V
7	GND	8	+5.2V
9	GND	10	+5.2V
11	GND	12	+5V (Standby)
13	Voltage detect	14	GND

Video (RGB) IN/OUT



Pin	Signal	Pin	Signal
1	Blue GND	2	Blue
3	Green GND	4	Green
5	Red GND	6	Red
7	SW (RGB/CVBS)	8	CVBS/RGB sync
9	SW	10	n.c
11	GND	12	n.c
13	External SW	14	+12V out (300mA max.)
15	Audio in	16	GND
17	V.sync out	18	H.sync out
19	LCD SW	20	Sync in
21	Red in GND	22	Red in
23	Green in GND	24	Green in
25	Blue in GND	26	Blue in

S-Video (Y/C) connector

Pin	Signal
1	GND Y
2	GND C
3	Y
4	C

RS232C (INPUT) connector

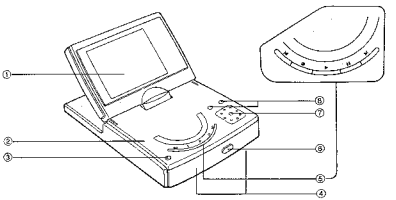
Pin	Signal
1	n.c
2	Txd
3	Rxd
4	DTR
5	GND
6	CTS
7	RTS
8	+5V (160mA max.)

2.2 Connections and Controls

Front view

1 LCD screen
2 Disc inspection window
3 Power button and indicator
4 Stereo speakers
5 Basic audio CD control
6 Sensor for remote control
7 Touchpad controller
8 Action buttons

Front

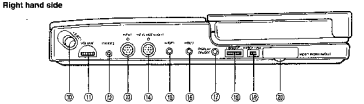


Right hand side view

10 Disc compartment eject button
11 Volume control (Headphone & Speakers)
12 Headphone socket
13 Input connector
- note that connecting an external pointing device disables the touchpad controller/ remote control, expect in certain programs for two persons.

14 Y/C (S-Video) output connector
15 Stereo audio output jack
16 Video (CVBS) output jack
17 Display on/off button
18 Screen brightness control
19 PAL/NTSC selector
20 Video (RGB) IN/OUT

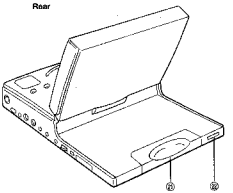
Right hand side



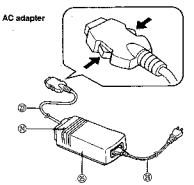
Rear view

21 Cover protecting extension socket
22 Power supply connector (low voltage DC)

Rear



AC adapter



AC adapter
- 22ER9151/00 220-240V
- 22ER9151/11, /17 100-120V

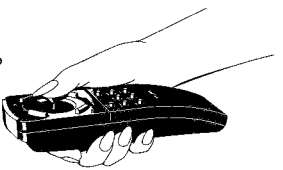
23 DC output cable
Squeeze sides to disconnect.
24 Power indicator
25 Adapter
26 AC power cord

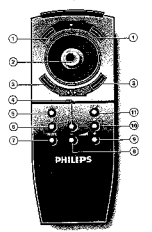
Note The rating plate is affixed to the bottom of the unit.

Remote controler (Option)
- 22ER9051

001/3 Action keys
2 Thumbstick
4 "Play" key
5 "Pause" key
6 "Previous" key for instant track skip
7 Mute or TV/CDI selector key*
8 Volume control down key
9 Volume control up key
10 "Next" key for instant track skip
11 "stop" key
*depending on version

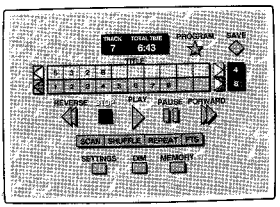
The control sits conviniently in the hand, and the thumbstick and action keys, which are by far most-used controls, are easily operated one-handed.





22ER9051 Infra red remote control

The user shell
With just the one "point and click" operation, player functions can be controlled so easily that the actions become intuitive. This is because of the player's specially designed "user shell" program, which presents a series of screen displays that not only allow you a complete choice of play functions, but also guide you in selecting them.



When the player is switched on, the first "user shell" screen invites you to load a disc. Playing a CD-I disc is a simple matter of loading the disc and selecting "Start" on the "CD-I start" screen which then automatically appears. The CD-I program starts to run, and you select options from the screen according to choice.

For CD-Digital Audio discs, the "user shell" presents a play control screen. This offers more than just the functions fitted as standard on CD players (and also provided on the front panel and remote control). It offers all the features found only on top-of-the-range players. These include Program, Favorite Track Selection, Title, Shuffle, Repeat, Play and Scan.

Another "user shell" screen offers "Personal Preference" settings. These include data and time display, Scan time, Auto Shuffle, and Repeat. When "Personal Preference" settings have been made, the player automatically adopts them when starting up.

Further "user shell" screens provide information, CD-DA programming (FTS) facilities, a list of stored programs and other information, and control for CD-Graphics.

User Shell Functions
General screens:
> "Personal preference " seting screen:
Auto Shuffle, Auto FTS, Display Time/Date, Scan Time, Repeat (Disc or Track).
> Memory screen (manages CD-I stored data, as well as FTS programs and titles).
> Dim Screen (LCD display ON/OFF and adjust screen brightness for external TV.)

CD-I start-up screen:
> Start CD-I (stats CD-I or Phote-CD applications).

CD-Digital Audio screen:
> While Playing: Play, Stop and Pause.
> Play Modes: Scan, Shuffle, Repeat and FTS.
> Control: Fast Forward, Fast Rewind, Next Track (directly selectable), Previous Track (directly selectable), Program (programming of selected tracks in any order), Save (stores your favorite track program and allows manual input of titles related to discs or FTS programs).

3 SERVICE INFORMATION

3.1 SAFETY INSTRUCTIONS

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.
  Safety components are marked by the symbol ⚠.
- **ESD**

  All IC's and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
  When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
  Keep components and tools also at this potential.
  For detailed information see "Handling ESD-sensitive components".
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to prelude short-circuit or to prevent a specific circuit form being rendered unstable.

3.2 SERVICING OF SMDs (Surface Mounted Devices)

3.2.1 General cautions on handling and storage

a. Oxidation on the SMDs terminals results in poor soldering. Do not handle SMDs with bare hand.
b. Avoid for storage places that are sensitive to oxidation such as places with sulfur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity.
   As a result the capacitance or resistance value of the SMDs may be affected.
c. Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similary, do not slide the circuit board across any surface.

3.2.2 Removal of SMDs

a. Heat the solder (for 2-3 seconds) at each terminal of the chip. Small components can, by means of litz wire and a limited horizontal force, be removed with the soldering iron. They can also be removed with a solder sucker (see Fig. 1a) or
b. While holding the SMD with a pair of tweezers take it off gently using th soldering iron's heat applied to each terminal (see Fig. 1b).
c. Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1c).

3.2.2.1 Caution on removal:

a. When handling the soldering iron, use suitable pressure and be careful.
b. When removing the chip, do not use undue force with the pair of tweezers.
c. The soldering iron to be used (approx. 30 W), must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).
d The chip, once removed, must **never** be used again.

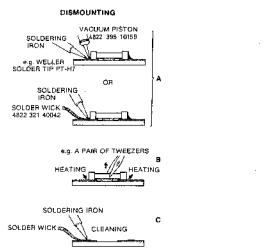


Fig. 1

3.2.3 Attachment of SMDs

a. Locate the SMD on the solder lands by means of tweezers and solder the component at one side. Ensure that the component is positioned well on the solder lands (see Fig. 2a).
b. Next complete te soldering of the terminals of the component (see Fig. 2b).

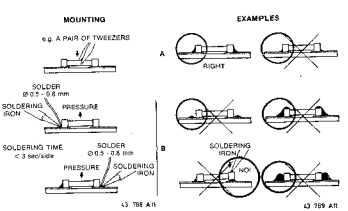


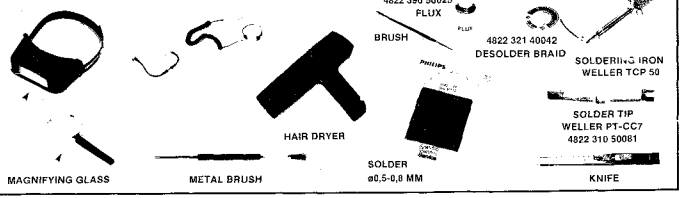
Fig. 2

Fig. 3

3.2.3.1 Caution on attachment:

a. When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering must be as quick as possible; care must be taken to avoid damage to the terminals and the body itself.
b. Keep the SMD's body in contact with the printed board when soldering.
c. The soldering iron to be used (approx. 30 W) must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).
d. Soldering should not be done outside the solder land.
e. Soldering flux (of rosin) may be used but should not be acidic.
f. After soldering, let the SMD cool down gradually at room temperature.
g. The quantity of solder must be proportional with the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the printed board (see Fig. 3).

TOOLS TO BE USED



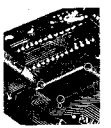
DISMOUNTING

CUTTING
THE LEADS

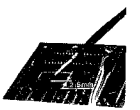
WRONG
TRACKS WILL
BE DAMAGED

CLEANING
THE TRACKS

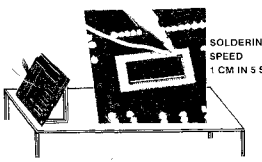
MOUNTING



FIXING IC
AT THE CORNERS

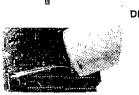


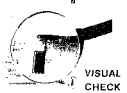
APPLYING FLUX



SOLDERING:
SPEED
1 CM IN 5 SEC.

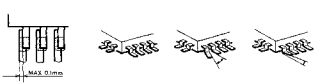
DRYING





VISUAL
CHECK

ALIGNING THE LEADS



RIGHT WRONG WRONG

SOLDERING

RIGHT WRONG WRONG

3.3 HANDLING ESD-SENSITIVE COMPONENTS

3.3.1 Personal safety

The testing, handling and replacing of ESD-sensitve components requires special attention for personal safety. A person dealing with ESD-sensitive components should, normally speaking, be connected via a resistance to the same potential as the chassis of the set to protect him against direct contact with the supply voltage.
This resistance is often applied in the connection lead of wrist wraps. If necessary, make use of an isolating transformer.

3.3.2 Storage and transport

Transport and store the circuits and PCBs in their original packages.
As an alternative to the original package one may use a conductive material or special IC package which short-circuits all the pins of the component with one another.
Always discharge the package before opening it.

3.3.3 Testing or handling

Work on a conductive surface when testing loose circuits and components or when transferring components and circuits from one package to another.
Use a conductive wrist wrap with lead to make an electrical connection between the conductive surface and yourself via a resistance in the connection lead of the wrist wrap.
Connect equipment and tools also with this conductive surface.
Do not connect any signals to inputs as long as the power supply of the set to be tested is off.
All the inputs that are not used should be connected either to ground or to the supply voltage. When testing, do not use any freon sprays for under-cooling of sensitive components.

3.3.4 Mounting ESD-sensitive components

Mount ESD-sensitive components only after all other components have been mounted.
Make sure that the components themselves, the metal parts of the PCB, mounting equipment and mounting operator are at the same potential level as the chassis of the set.
If it is impossible to ground the PCB, the mounting operator should pick the PCB up before bringing it into contact with the components to be replaced.

3.3.5 Soldering

Soldering iron tips, also those of low-voltage soldering stations, should be kept at the same potential as the components and the PCB.
It is better to use solder-removing braid than solder suckers.

3.3.6 Electrostatic charges

One should stick to the precautionary measures also after the ESD-sensitive components have been mounted on the PCB. Until the sub-PCBs have been incorporated into a complete system on which the correct supply voltages are connected, the PCB is nothing more than an extension of the conductors of the components on this PCB. To prevent electrostatic discharges from passing to the components via the terminals, we recommend that you apply conductive clips or conductive tape on the terminals of the PCB.

3.3.7 Transients (switch-on phenomena)

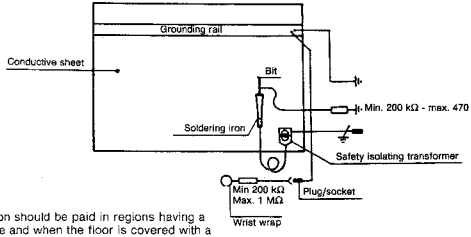
To prevent permanent damages as a result of switch-on phenomena, no ESD-sensitive components, or PCBs populated with these components, should be inserted in or removed from test-sockets or systems with the supply voltage on.
Prevent switching peeks on the mains as a consequence of switching electric equipment, relay and DC lines on and off.

3.3.8 Working environment

The work bench for the service technician should look like the one shown in the figure.

3.3.9 Replacement of the Flat Pack IC's

For replacing a component see Fig. 6 Dismounting and Mounting. Also a number of precautions and examples is given.
When replacing a flat pack, rosin flux applied to the device leads will ensure a good soldered joint.
Since rosin flux, when not properly heated by the soldering process, is sticky, it will attract dust which will result in component degeneration over a period of time.
The removal of excess flux with a cleaner will not solve this problem because the flux is then even spread over a greater area by the cleaner. Drying of the flux can be accomplished by blowing the area with a common hair dryer for 1 or 2 minutes at a distance of approx. 10 centimeters.



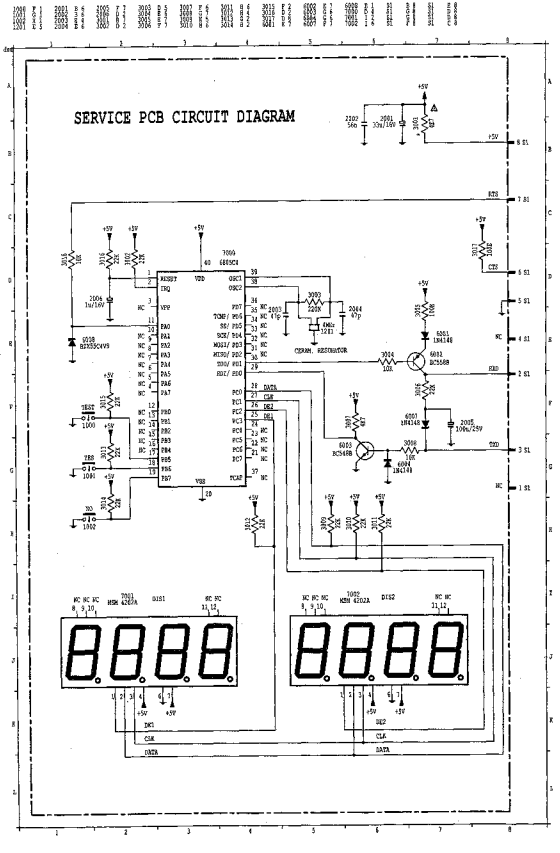
Special attention should be paid in regions having a dry atmosphere and when the floor is covered with a nylon carpet or such.

3.4 SERVICE TOOLS

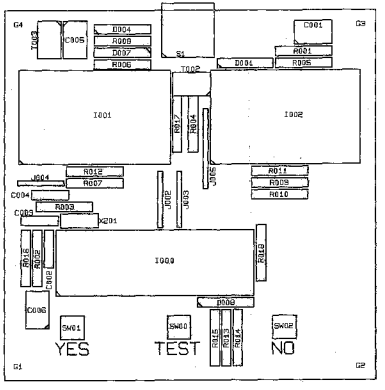
3.4.1 Service PCB (Low Level Test)

Code number	Name/Description	Application
4822 214 52007	Service PCB	Low Level Test
4822 321 61677	Cable	Connect Low Level PCB to Mainboard

3.4.1.1 Circuit diagram



3.4.1.2 Layout



3.4.1.3 Parts list

ITEM	DESCRIPTION		CODENUMBER
1000	Tact switch		4822 276 10974
1001	Tact switch		4822 276 10974
1002	Tact switch		4822 276 10974
1201	Ceram.resonator		4822 242 72527
2001	33	µF/16V	4822 124 20688
2002	56	nF	4822 121 41154
2003	47	pF	4822 122 31072
2004	47	pF	4822 122 31072
2005	100	µF/25V	4822 124 20701
2006	1	µF/63V	4822 124 20722
3001	4,7	Ω	See standardized list
3002	22	KΩ	
3003	220	KΩ	
3004	10	KΩ	
3005	100	Ω	
3006	22	KΩ	
3007	4,7	KΩ	
3008	10	KΩ	
3009	22	KΩ	
3010	22	KΩ	

ITEM	DESCRIPTION		CODENUMBER
3011	22	KΩ	
3012	22	KΩ	
3013	22	KΩ	
3014	22	KΩ	
3015	22	KΩ	
3016	22	KΩ	
3017	100	Ω	
6001	1N4148		4822 130 30621
6002	BC558B		4822 130 44197
6003	BC548B		4822 130 30621
6005	BZX55 C4V7		4822 130 34174
6006	BAT85		4822 130 31983
6007	1N1448		4822 130 30621
7000	MC68HC705C4		4822 900 10272
7001	MSM 4202A		4822 130 90474
7002	MSM 4202A		4822 130 90474
S1	miniDiN 8pins		4822 267 31289

3.4.2 Test discs

Codenumber	Name/description	Application
4822 397 30096	Testdisc 5 (music) Testdisc 5A (music + dropouts and fingerprints)	Reference disc for playability and adjustments of CDM
4822 397 30155	test disc with 1 KHz continous signal, 70 minutes.	life test in case of intermittent faults
4822 397 30184	Audio signals	Measure specs.
4822 701 11922	Skew disc 0,6	Reference disc for playability
4822 701 11923	Excentricity disc 150	Reference disc for playability
Launch disc	CD-I demo disc	

3.4.3 Extension cable

Codenumber	Name/description	Application
4822 322 40068	FLEX Cable	For CDM 9
4822 267 50676	FLEX Cable connector	extention
4822 267 31618	Female connector for J502	

3.4.4 Measurement equipment

Electronic Digital Multimeter
Display terminal type Digital VT220 or VT100
Digital oscilloscope
Analog oscilloscope
Timer/counter

3.4.5 Pointing devices

4822 218 10401	Remote Control	22ER9051
4822 691 30297	Mouse (Black)	22ER9011
4822 691 30298	Trackball	22ER9013
4822 691 30293	Roller Controler	22ER9012

3.4.6 Silicon-Gum (for the isolation)

RTV gum KE3490

3.5 Circuit Description

For circuit description, See CDI 205 circuit description. This is available under code number 4822 725 24107.

3.6 THE CENTRAL REPAIR PROCEDURE

3.6.1 Mainboard

The mainboard contains functions like MMC as well as peripheral functions. like Servo, Audio and Video processing. In case of a defect of the MMC function the complete board must be sent for repair to PCS. In case of a defect in the peripheral functions this must be repaired locally. The different functions are indicated on the PCB by means of marked lines.
Below a brief description is given, a more detailed procedure is available at P.C.S Logistics Management, systems and Procedure Office.

Code Number of Main Board:

4822 214 52095 /17
4822 214 52097 /00/05/11

3.6.2 General procedure

- NSO or Customer: send telex or on-line MSH system info to PCS customer relations officer with indicated number(s) and service 12NC for a repair reference number.
- PCS: send telex or MSH info with repair reference number and return invoice price. Also the same number(s) of new/repaied items are sent with invoice.
- NSO or customer: send defective item(s) to PCS at SDM1 by standard address label with repair reference number and return invoice to PCS -price center.
- Remark: the difference between the invoice price and return invoice price gives the 'repair price' for the NSO.
- PCS: send defective item to factory and stock.
- Experience has learned that the status of the particular products and packaging needs your local attention. Products wil be returned in case of unacceptable conditions.

3.6.3 Repair Procedure Conditions:

- HANDLE WITH CARE IN AN ESD PROTECTED ENVIROMENT.
- Defective items must be sent back to PHILIPS CONSUMER SERVICE for repair forwarded by Address sticker.
- Put the address sticker properly on a free area of the box.
- Damaged boards are refused for repair.
- Re-use original package order new package in case of damages.
- Remove additional stickers and labeling if re-using the original box.
  Service codenumber on sticker must be equal to codenumber on repairable item.

!!! If the above conditions are not fulfilled, hen boards are not accepted and the return price will not be credited !!!

4 DEMOUNTING AND SERVICE POSITIONS

4.1 Servicing the MAIN board PM06

4.1.1

Remove the FMV connector cover 055B/056B. Remove the 5 screws on the bottom-side of the player then remove 2 screws on the right hand side of the player.
Screw 3 is a Longer type.

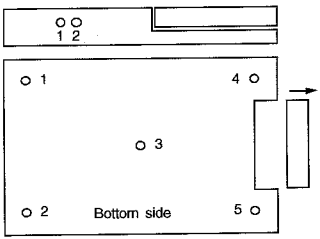


Fig 4.1

Lift the top cover from the bottom-side. Then place the top cover on the right hand side and dismount the flex wire from connector J402 and connector JF01.
Also disconnect the connector J502 then the top cover can be taken off.

4.1.2 Remove CDM

Remove 4 screws of the CDM.
Disconnect flex wire J801 and disconnect J802.
Remove sheet 056B, then remove 2 screws on the mainboard and 2screws on the power plug PP06.
Then the main board PM06 can be removed.

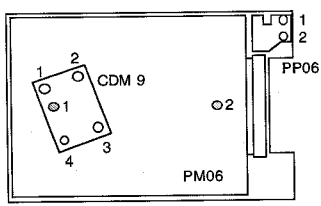


Fig 4.2

Caution : Demounting of Flex Foil CDM 9
- Remove the "flex foil" from the connector(s) on the PCB by lifting the upper part of the connector and taking the flex foil out. (see Fig 4.4)
- After disconnection of the "flex foil" short-circuit the by means of a paperclip or conductive clip.

Note:
Since laser, monitor diode and photodiodes are very sensitive to electrostatic discharges, careless handling during servicing may reduce life expectancy drastically.For this reason care should be taken that during servicing the potentials of the aids and yourself are equal to that of the screening of the set.

4.1.3 Connect the CDM with an extention frex wire.

This extention wire can be made yourself by soldering a frex connector J801 on the extention flex wire. This wire can be ordered with service code number 4822 322 40066.

Connect the motor wire to J802 and position the CDM next to the front side of the mainboard.

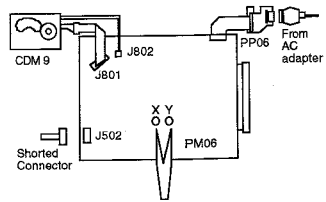


Fig 4.3

Both side of the mainboard can be reached by turn over the mainboard.
Mounting must be done in the reversed way.

4.1.4 Operate without top cover

When the CD Lid is removed the player can still be operated with the remote control.
First interconnect pin 5 and pin 6 of connector J502. This can be done by connecting a female onnector to J502 with pin 5 and pin 6 short circuited. Connect the AC adapter to the PP06 PCB. Second interconnect point X and Y on the mainboard for switching on the player. (near the JF01)

4.1.5 Playing

For player a disc in this service position place a disc on the turntable and place a magnetic clamper pos.058B on the disc.

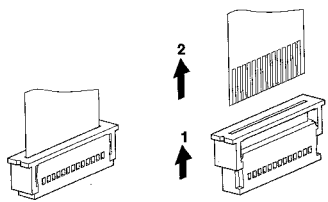
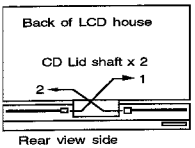


Fig 4.4

4.2 Servicing the CD-Lid
First Remove top cover 4.1.1

4.2.1 Remove the CD-Lid
Put the LCD unit in the vertical position.
Now the shafts can be reached from behind.
Remove the shafts by means of a pair of tweezers.



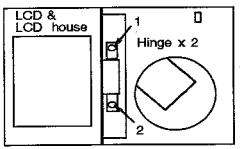
Then the CD-Lid can be removed carefully.

Be **Careful** with Flex wire of CD Lid when inserting the CD Lid shaft 1.

4.2.2
The CD-Lid is a complete service part only the clamper pos.058B and the clamper bracket pos. 002B are also service parts.

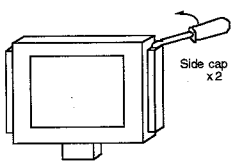
4.3 Servicing the LCD screen unit

4.3.1 Remove the LCD house.
Remove two screws from the two Hinges.



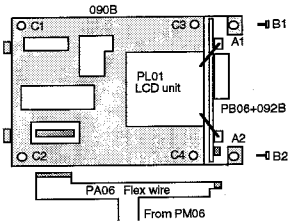
Then remove the LCD house cafully. (Flex wire)

4.3.2 Open the LCD house
Remove side caps pos.046B(R) and pos.047B(L) by means of a screw-driver.



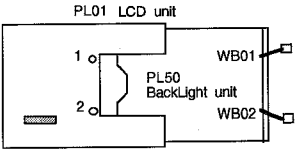
Then remove 2 screws on each side of the LCD house.
Then remove two screws holding the Hinges from behind.
The LCD house can be opened now

4.3.3 Remove the LCD-screen unit
Remove 2 screws(A1-2) and then remove the bracket (090B) with PL01,etc. from the LCD housing.
Remove 2 screws(B1-2) on the PCB(PB06) and then remove the PCB and 092B.
Remove 4 screws(C1-4) on the bracket (090B).
Then the LCD-screen unit can be taken out.

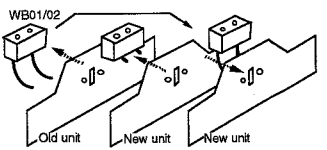


WARNING : If servicing the PB06, then coat the silcon-gum to the former coating point after soldering. (see "DIAGNOSTICS")

4.3.4 Remove the BackLight unit
The BackLight unit can be exchanged.
Remove 2 screws on the back of LCD unit.
Then remove the BackLight unit carefully.



When the New BackLight unit is put on the LCD unit, demount the two wire(WB01,02) from Old unit and demount the connector from New unit and then mount the two wire (WB01,02) on New unit.
Careful : Don't remove this PCB and Lamp from PL50.



WARNING : Coat the silcon-gum to the former coating point after soldering. (see "DIAGNOSTICS")

Mounting the LCD-screen unit must be done in the opposite way.

5 SERVICE SOFTWARE

5.1 THE LOW LEVEL MMC TEST

Scope
This test is standard implemented in the boot software of CD-RTOS. It doesn't need a lot of hardware to run. When debugging or servicing an MMC panel this test is very useful.

General
This test is developed for service and low level hardware debugging purposes only. It is meant to be used with the service pcb as described in TOOLS (please refer to section 3.5 SERVICE TOOLS). The test executed with the service pcb is called the **"pcb low level test"**.
The test executed with the VT100 terminal is called the **"terminal low level test"**. Since this service pcb display has just 8 digits, only the most important information will be displayed to the user. For the VT100 terminal this is never a problem.
This test consists out of the following items:

a. Display header and release number.
b. VSC
c. ROM
d. NVRAM
e. DRAM
f. CDIC
g. SLAVE processor (68HC05)

5.1.1 Tools
In this test the service pcb acts as some kind of a 'micro terminal'. This means that the service pcb is able to display some alphabetical and numerical characters. Some characters because it uses 7-segment displays

The three keys available are:
TEST ; test all display leds.
Yes ; Send an ASCII 'Y'.
No ; Send an ASCII 'N'.

The communication parameters are fixed at: 9600 baud
8 data bits
1 stopbit
no parity

The microcontroller is programmed with software available at IMS CDI software group.
The circuit diagram is on section 3.5.1.1

5.1.2 Testsquence
Table 1 below shows all the steps of the testprogram and what kind of tests are performed.

STEP	ACTION/TEST PERFORMED
00	VSC master/slave init
01	ROM
05	NVRAM
06	DRAM BANK0 & BANK1
07	DRAM BANK0
08	DRAM BANK1
09	CDIC
10	SLAVE
11	CLOCK CALIBRATION

Table 1: teststeps low level test

5.1.3 Low level test implementation
The low level test (short: ltest) is implemented in the boot part of the CD-RTOS software. The whole test occupies about 10k of ROM memory and is written in assembler.
The test runs without the use of any external RAM. It only uses internal CPU registers. As communication channel the 68070's UART is used. Before starting the normal player boot the following sequence is executed:
1. Initialize the 68070's UART : 9600 baud
   1 startbit
   8 databits
   1 stopbit
   no parity
   no handshake !
2. Clear the RXD buffer.
3. Wait 5 ms.
4. Read the RXD buffer.
5. if the character received was an ACK ($06) the start the pcb ltest

The UART is connected to I/O port 2

5.1.4 How to start up the low level test

With service pcb
To startup **the pcb low level testsoftware** the next sequence should be followed:
- Switch off the player.
- Connect service pcb to INPUT at the right hand side.
- Switch on the player.
- The service pcb display should now show 'CDI RLxx'. (with xx the release number)
- The pcb ltest is now ready to go.

With VT100 terminal
To startup **the terminal low level testsoftware** one should follow the next sequence:
- Switch off the player.
- Connect the terminal to the 68070's UART of the player.
- Switch on the player while pressing the SPACE-bar of the terminal.
- The terminal should now show the title of the terminal ltest.

5.1.5 PCB low level test
If the service pcb is connected to port 2 the pcb low level test is executed after power on. In table 1 a survey is given for all tests executed.

Display ltest release number:
When this ltest is entered, first the release number of the pcb ltest will be displayed.

Example: CDI RLxx

(RL stands for RELEASE, xx stands for release x.x).
The ltest is now waiting for an action from the user. The user should now press either the'Y' or 'N' button to continue the test.

STEP 0: VSC

STEP 0A: VSC MASTER

display: 0A

In this step some registers of the VSC MASTER are initialized. These registers are :

DCR2 register(set to independant
DCR register (disable display)
CSR register (set DTACK delay and DRAM type)

STEP 0B: VSC SLAVE

display: 0B

In this step some registers of the VSC SLAVE are initialized. These registers are:

DCR2 register(set to independant DCA)
DCR register (disable display)
CSR register (set DTACK delay and DRAM type)

STEP 1: ROM

In this step the contents of the ROM is checked.
Following tests are done on the ROM:
1. Display release number of this ROM. (test A)
3. Check if the parity of the ROM is OK. (test C)

Address range:
- The ROM chips used for this memory map are :
  1 X 4Mbit.
  On the MINI MMC the clock and calendar chip used is the SGS-Thomson MK48T08B. It is visible in the memory map.

Nr.of Bytes Words	UPPER — — — LOWER	MAPPED ADDRESS SPACE	UNMAPPED ADDRESS SPACE	FUNCTION
512kB	UP&LO	00 0000 - 07 FFFF	00 0000 - 07 FFFF	DRAM BANK1
512kB	UP&LO	08 0000 - 0F FFFF	08 0000 - 0F FFFF	DRAM BANK2
512kB	UNDEF	10 0000 - 17 FFFF	10 0000 - 17 FFFF	RESERVED
512kB	UP&LO	18 0000 - 1F FBFF	18 0000 - 1F FBFF	SYSTEM ROM
16B	LO	1F FC00 - 1F FFBF	1F FC01 - 1F FC1F	DUART (4)
16B*	UP&LO	1F FFC0 - 1F FFDF	1F FFC0 - 1F FFDF	VCS REGS SLAVE
16B*	UP&LO	1F FFE0 - 1F FFFF	1F FFE0 - 1F FFFF	VSC REGS MASTER
4B	LO	20 0000 - 20 7FFF	20 0001 - 20 0007	SLAVE
500kB	UNDEF	20 8000 - 27 FFFF	20 8000 - 27 FFFF	FREE SPACE
64kB	LO	28 0000 - 28 FFFF	28 0001 - 28 FFFF	FLOPPY (4)
460kB	UNDEF	28 0000 - 2F FFFF	28 0000 - 2F FFFF	FREE SPACE
8kW	UP&LO	30 0000 - 30 FFFF	30 0000 - 30 3FFE	CDI
910kB	UNDEF	31 0000 - 3E FFFF	31 0000 - 3E FFFF	FREE SPACE
2B	LO	3F 0000 - 3F 7FFF	3F 0001 - 3F 0003	KILLME/DMAMEM
8kB-8	UP	3F 8000 - 3F FBFF	3F 8000 - 3F BFEE	NVRAM (2)
8B	UP	3F BFF0 - 3F FBFF	3F BFF0 - 3F BFFE	CLOCK&CAL REGS
1kB	UNDEF	3F FC00 - 3F FFFF	3F FC00 - 3F FFFF	DO NOT ACCESS(3)
13MB	UNDEF	40 0000 - FF FFFF	40 0000 - FF FFFF	EXTENSION SPACE

Table of the memory map

(1) The effective memory space for SYSTEM ROM is 512kB-1k.
(2) The maximum available NVRAM space in this configuration is 31 kByte.
(3) This part of the memory map should not be accessed. The VSC registers are mapped here.
(4) When used.

I.. Explanation of items in tables
Nbr. of Bytes/Words :
The total available bytes or words. Words in this case means the part of the memory map is only accessable as a word.
kB = kilobytes
B = bytes
B* = bytes, but some addresses are only accessible as words.
kW = kiiowords, only accessible as a word!

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RAM type)

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Nr.of Bytes Words	UPPER — — — LOWER	MAPPED ADDRESS SPACE	UNMAPPED ADDRESS SPACE	FUNCTION
512kB	UP&LO	00 0000 - 07 FFFF	00 0000 - 07 FFFF	DRAM BANK1
512kB	UP&LO	08 0000 - 0F FFFF	08 0000 - 0F FFFF	DRAM BANK2
512kB	UNDEF	10 0000 - 17 FFFF	10 0000 - 17 FFFF	RESERVED
512kB	UP&LO	18 0000 - 1F FBFF	18 0000 - 1F FBFF	SYSTEM ROM
16B	LO	1F FC00 - 1F FFBF	1F FC01 - 1F FC1F	DUART (4)
16B*	UP&LO	1F FFC0 - 1F FFDF	1F FFC0 - 1F FFDF	VCS REGS SLAVE
16B*	UP&LO	1F FFE0 - 1F FFFF	1F FFE0 - 1F FFFF	VSC REGS MASTER
4B	LO	20 0000 - 20 7FFF	20 0001 - 20 0007	SLAVE
500kB	UNDEF	20 8000 - 27 FFFF	20 8000 - 27 FFFF	FREE SPACE
64kB	LO	28 0000 - 28 FFFF	28 0001 - 28 FFFF	FLOPPY (4)
460kB	UNDEF	28 0000 - 2F FFFF	28 0000 - 2F FFFF	FREE SPACE
8kW	UP&LO	30 0000 - 30 FFFF	30 0000 - 30 3FFE	CDI
910kB	UNDEF	31 0000 - 3E FFFF	31 0000 - 3E FFFF	FREE SPACE
2B	LO	3F 0000 - 3F 7FFF	3F 0001 - 3F 0003	KILLME/DMAMEM
8kB-8	UP	3F 8000 - 3F FBFF	3F 8000 - 3F BFEE	NVRAM (2)
8B	UP	3F BFF0 - 3F FBFF	3F BFF0 - 3F BFFE	CLOCK&CAL REGS
1kB	UNDEF	3F FC00 - 3F FFFF	3F FC00 - 3F FFFF	DO NOT ACCESS(3)
13MB	UNDEF	40 0000 - FF FFFF	40 0000 - FF FFFF	EXTENSION SPACE

Table of the memory map

(1) The effective memory space for SYSTEM ROM is 512kB-1k.
(2) The maximum available NVRAM space in this configuration is 31 kByte.
(3) This part of the memory map should not be accessed. The VSC registers are mapped here.
(4) When used.

I.. Explanation of items in tables
Nbr. of Bytes/Words :
The total available bytes or words. Words in this case means the part of the memory map is only accessable as a word.
kB = kilobytes
B = bytes
B* = bytes, but some addresses are only accessible as words.
kW = kilowords, only accessible as a word!

UPPER - LOWER:
This column gives an indication of how the device is accessible.
UP = only accessible as byte via the UPPER byte of the databus.
(DATA8-DATA15)
LO = only accessible as byte via the LOWER byte of the databus.
(DATA0-DATA7)
UP&LO = accessible via LOWER as well as UPPER byte of the databus.
(the device uses the complete databus.
UNDEF = not defined.

MAPPED ADDRESS SPACE:
This column gives the total address range where the device described in FUNCTION is accessible. In this range the device can occur several times.

UNMAPPED ADDRESS SPACE:
Analogous as mapped address space, only the device can occur only ONE time.

FUNCTION: This column describes the device or register

STEP 1: ROM 10

STEP 1A: ID AND RELEASE NUMBER DISPLAY

display: 1A
IDxxRLyy

In this step the release number of this ROM is displayed for a moment.
(ID stands for IDentification, xx is the id number.
RL stands for RELEASE, yy stands for y.y)

STEP 1C: CHECKSUM

display: 1C

In this step the checksum of this ROM is calculated as described in " how is the checksum calculated ". If the checksum is not ok an error will be displayed.

display: 1C Er05

STEP 5: NVRAM
The nvram test is a non destructive test. This means that the original nvram contents is restored again.
Address range: Full nvram address range (see product spec)

display: 5

The following actions take place in the nvram test:
1. read byte from nvram and save it in a register
2. write a pattern (from ROM) to nvram
3. read byte from nvram and compare with pattern
4. if byte read is ok then continue with action 5 else give error message and stop testing

If error,

display: 5 Er09

5. write inverted pattern to nvram
6. read byte from nvram and compare with pattern
7. if byte read is ok then restore original byte else give error message and stop testing

If error,

display: 5 Er10

8. repeat this for every possible nvram address

STEP 6-8 :DRAM
The dram test is always a destructive test. The test is performed for both ram bank0 and bank1 as one large memory followed by a test for each bank separately.
On the displays following, the 'x' is a memory counter. The counter is incremented every 128k. So for the full range it counts from 1 to 8.

Address range: full address range (see table)
Bank0 = lower RAM bank
Bank1 = upper RAM bank

STEP 6A : TEST THE FULL DRAM MEMORY
The following actions take place in this test:
1. fill the memory with the long word address as data.

display: 6Afx

2. read the memory contents and compare with the address.

display: 6Arx

3. if the long word read is ok then continue else give error message and stop testing.
If error,

display: 6ArxEr11

STEP 6B : TEST THE FULL DRAM MEMORY WITH INVERTED DATA
The following actions take place in this test:
1. fill the memory with the inverted long word address as data.

display: 6Bfx

2. read the memory contents and compare with the inverted address.

display: 6Brx

3. if the long word read is ok then continue else give error message and stop testing.
If error,

display: 6BrxEr12

STEP 7A : TEST DRAM BANK0
The following actions take place in this test:
1. fill the memory with the long word address as data.

display: 7Afx

2. read the memory contents and compare with the address.

display: 7Arx

3. if the long word read is ok then continue else give error message and stop testing.
If error,

display: 7ArxEr13

STEP 10D : READ AND DISPLAY CD RELEASE NUMBER

display: 10D

In this step the following actions take place:
1. read the next byte from the slave
2. If the byte < > $00 then continue with step 3 else give an error and stop testing
   If error,

   display: 10D Er22

3. wait until a key is pressed.
4. read the next byte: this is a dummy read.

STEP	DESCRIPTION
0a	VSC master initialization
0b	VSC slave initialization
1a	ROM10 release number
1c	ROM10 checksum check
5	NVRAM test with rom data as data
6af	DRAM fill bank0&bank1 with address as data
6ar	DRAM read and compare data
6bf	DRAM fill bank0&bank1 with inverted add. as data
6br	DRAM read and compare data
7af	DRAM fill bank0 with address as data
7ar	DRAM read and compare
7bf	DRAM fill bank0 with inverted address as data
7br	DRAM read and compare data
8af	DRAM fill bank1 with address as data
8ar	DRAM read and compare
8bf	DRAM fill bank1 with inverted address as data
8br	DRAM read and compare data
9a	CDIC RAM test with address as data
9b	CDIC RAM test with inverted address as data
9c	CDIC register test
10a	SLAVE test: write request to slave
10b	SLAVE test: read echo from slave
10c	SLAVE test: read SLAVE release number from slave
10d	SLAVE test: read CD release number from slave

Table 1: PCB LLTEST steps overview

5.1.6 Terminal low level test

If a VT100 or compatible terminal is connected to the 68070's UART of the CDI player one is able to execute the terminal low level test. Due to the fact that almost every test is self explanatory only the major steps are described below. In this test it is possible to skip every major step.

Display lltest header and release number

STEP 0: VSC
Both master and slave vsc are low level initialized sequentially. This is done the same as in the pcb low level test.

STEP 0: Writing to a user definable ram address
This test writes the powers of 2 to a (word) address. The result is read again and will be displayed. The address can be selected by the user (only word adresses). Pressing 'ESC' stops the test.
If one trys to write to unused space in the memory map, the program will NOT generate an error message.

STEP 01: ROM
For the ROM the following information is displayed and checked:
- Display the identification code for this ROM (ROM ID)
- Display the release number of this ROM
- Display the checksum of this ROM. The upper word of the checksum displayed is always '0000'.
  If the checksum is not ok then a specific error will be displayed. This error is the same as in the pcb low level test.

STEP 05: NVRAM
For the NVRAM test three different tests can be selected:
- The first is a non destructive nvram test as in the pcb low level test.
- The second test is a destructive nvram test with ROM data as test data.
- The third test is also a destructive test with the address as data.
- The third test has also some hidden functions. Pressing:
  w: writes continu the address as data to the nvram.
  r: reads continu the complete nvram (no display).
  d: displays the contents of 421 succeeding ram locations. The start address is given by the user.
  ESC stops these functions.

Remark: The error message is different from the pcb lltest.

See error table for more information.

Address range: Full nvram address range (see table of memory map)

STEP 06-08: DRAM
The dram test is always a destructive test. The test is performed for both ram bank0 and bank1 as one large memory followed by a test for each bank separately.
The following actions take place in the dram test:
1. fill the memory with the long word address as data.
2. read the memory contents and compare with the address.
3. if the long word read is ok then continue else give error message and stop testing.
4. write the inverted long word address as data to memory.
5. read the memory contents and compare with the inverted address.
6. if the long word read is ok then continue else give error message and stop testing.

This test has also some hidden functions. Pressing:
w: writes continu the long address as data to the dram.
r: reads continu the dram (no display).
d: displays the contents of 421 succeeding ram locations. The start address is given by the user.
ESC stops these functions.

Remark: the error message is different from the pcb lltest.

See error table for more information.

Address range: full address range (see product spec)
Bank0 = lower RAM bank
Bank1 = upper RAM bank

STEP 09: CDIC
cdic register2:
CDIC base address + $3FFA ; register2 contents after reset: $D7FE

See table of memory map for base address.

The cdic test consists out of three main parts:
1 test cdic ram with long word address as pattern
2 test cdic ram with inverted long word address as pattern
3 display cdic register and compare

STEP 7B : TEST DRAM BANK0 WITH INVERTED DATA
The following actions take place in this test:
1. fill the memory with the inverted long word address as data.

   display: 7Bfx

2. read the memory contents and compare with the inverted address.

   display: 7Brx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 7BrxEr14

STEP 8A : TEST DRAM BANK1
The following actions take place in this test:
1. fill the memory with the long word address as data.

   display: 8Afx

2. read the memory contents and compare with the address.

   display: 8Arx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 8ArxEr15

STEP 8B : TEST DRAM BANK1 WITH INVERTED DATA
The following actions take place in this test:
1. fill the memory with the inverted long word address as data.

   display: 8Bfx

2. read the memory contents and compare with the inverted address.

   display: 8Brx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 8BrxEr16

STEP 9: CDIC
This test only checks part of the CDIC ram, mainly because it is possible that during the test the CDIC destroys part of the ram contents.
address range: CDIC base address + $1400 to CDIC base address + $3C7F.
cdic register2: CDIC base address + $3FFA
register2 contents after reset: $C7FE

See table for base address.

STEP 9A :CDIC RAM TEST WITH ADDRESS AS DATA

display: 9A

The following actions take place in the CDIC RAM test:
1. Fill the memory with long word address as data.
2. Read and compare the data with the address.
3. If the long word read is ok then continue else give an error and stop testing.
   If error,

   display: 9A Er17

STEP 9B :CDIC RAM TEST WITH INVERTED ADDRESS AS DATA

display: 9B

The following actions take place in the CDIC RAM test:
1. Fill the memory with inverted long word address as data.
2. Read and compare the data with the inverted address.
3. If the long word read is ok then continue else give an error and stop testing.
   If error,

   display: 9A Er18

STEP 9C :CDIC REGISTER 2 TEST

display: 9C

The following actions take place in the CDIC REGISTER test:
1. Read register 2 and compare with fixed pattern. (Register 2 has a defined pattern after reset.)
2. If the register is ok then continue with next step else give an error and stop testing.
   If error,

   display: 9C Er19

STEP 10 SLAVE processor (68HC05)
This test checks the communication with the slave processor.
Additionally it displays the slave and cd processor release numbers. If the communication with the cd processor via SPI does not function, the cd release number will give a 0.0.

Address range: Slave base address + 6 (See table).

STEP 10A : WRITE REQUEST BYTE TO THE SLAVE

display: 10A

In this step a $F0 (request) is written to the slave.

STEP 10B : READ ACKNOWLEDGE FROM THE SLAVE

display: 10B

In this step the following actions take place:
1. wait about 2 sec to give the slave the time to acknowledge.
2. read the acknowledge.
3. if the acknowledge is $F0 then continue else give an error and stop testing.
   If error,

   display: 10B Er20

STEP 10C : READ AND DISPLAY SLAVE RELEASE NUMBER

display: 10C

In this step the following actions take place:
1. read the next byte from the slave
2. if the byte <gd> $00 then continue with step 3 else give an error and stop testing.
   If error,

   display: 10C Er21

3. wait until a key is pressed.
4. continue with next step

If in one of these tes
stopped and the err

This test has also so
w: writes continu the
r: reads continu the
d: displays the cont
The start address is
ESC stops these fun

Address range:
CDIC base address -
$3C80.

STEP 10: SLAVE pro
This lltest for the sla
1 Write $F0 to the s
2 Read byte from s
  with $F0.
3 If data is not $F0
  code else continu
4 Read the next byt
  the slave process
  ber. If the release
  displayed.
5 Read the next byt
  the CD processor
  If the release nurr
  played.
6 Read the next byt

Address range: Slav

See table of memor

STEP 11: CLOCK CAI
This step is not reall
be used to trim the
within 1 minute acc.
needed, this step sh
counter is needed tc
test is entered accid
restart the lltest.
The clock calibration
frequency counter.

- Connect the probe
  signalis called CS
- Start the test with
  counter set to mi
- The counter displ
  to 512 Hz.
  If not, the chek if
  properly.
  (range : 511,96724
- Press a key on the
- Now fill in the me
  lltest software wil
  filled into the calil
  IC.
  The value of the f
  changed or influer
- The calibration is

STEP 7B : TEST DRAM BANK0 WITH INVERTED DATA
The following actions take place in this test:
1. fill the memory with the inverted long word address as data.

   display: 7Bfx

2. read the memory contents and compare with the inverted address.

   display: 7Brx

3. If the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 7BrxEr14

STEP 8A : TEST DRAM BANK1
The following actions take place in this test:
1. fill the memory with the long word address as data.

   display: 8Afx

2. read the memory contents and compare with the address.

   display: 8Arx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 8ArxEr15

STEP 8B : TEST DRAM BANK1 WITH INVERTED DATA
The following actions take place in this test:
1. fill the memory with the inverted long word address as data.

   display: 8Bfx

2. read the memory contents and compare with the inverted address.

   display: 8Brx

3. if the long word read is ok then continue else give error message and stop testing.
   If error,

   display: 8BrxEr16

STEP 9: CDIC
This test only checks part of the CDIC ram, mainly because it is possible that during the test the CDIC destroys part of the ram contents.
address range: CDIC base address + $1400 to CDIC base address + $3C7F.
cdic register2: CDIC base address + $3FFA
register2 contents after reset: $C7FE

See table for base address.

STEP 9A :CDIC RAM TEST WITH ADDRESS AS DATA

display: 9A

The following actions take place in the CDIC RAM test:
1. Fill the memory with long word address as data.
2. Read and compare the data with the address.
3. If the long word read is ok then continue else give an error and stop testing.
   If error,

   display: 9A Er17

STEP 9B :CDIC RAM TEST WITH INVERTED ADDRESS AS DATA

display: 9B

The following actions take place in the CDIC RAM test:
1. Fill the memory with inverted long word address as data.
2. Read and compare the data with the inverted address.
3. If the long word read is ok then continue else give an error and stop testing.
   If error,

   display: 9A Er18

STEP 9C :CDIC REGISTER 2 TEST

display: 9C

The following actions take place in the CDIC REGISTER test:
1. Read register 2 and compare with fixed pattern.
   (Register 2 has a defined pattern after reset.)
2. If the register is ok then continue with next step else give an error and stop testing.
   If error,

   display: 9C Er19

STEP 10 SLAVE processor (68HC05)
This test checks the communication with the slave processor.
Additionally it displays the slave and cd processor release numbers. If the communication with the cd processor via SPI does not function, the cd release number will give a 0.0.

Address range: Slave base address + 6 (See table).

STEP 10A : WRITE REQUEST BYTE TO THE SLAVE

display: 10A

In this step a $F0 (request) is written to the slave.

STEP 10B : READ ACKNOWLEDGE FROM THE SLAVE

display: 10B

In this step the following actions take place:
1. wait about 2 sec to give the slave the time to acknowledge.
2. read the acknowledge.
3. If the acknowledge is $F0 then continue else give an error and stop testing.
   If error,

   display: 10B Er20

STEP 10C : READ AND DISPLAY SLAVE RELEASE NUMBER

display: 10C

In this step the following actions take place:
1. read the next byte from the slave
2. if the byte <gd> $00 then continue with step 3 else give an error and stop testing.
   If error,

   display: 10C Er21

3. wait until a key is pressed.
4. continue with next step

If in one of these tests an error occurs the test will be stopped and the error displayed.

This test has also some hidden functions. Pressing:
w: writes continu the long address as data to the cdic.
r: reads continu the complete cdic (no display).
d: displays the contents of 421 succeeding ram locations.
The start address is given by the user.
ESC stops these functions.

Address range:
CDIC base address + $1400 to CDIC base address + $3C80.

STEP 10: SLAVE processor (68HC05)
This iltest for the slave performs following actions:
1 Write $F0 to the slave processor.
2 Read byte from same address, the slave should respond with $F0.
3 If data is not $F0 then stop testing and display error code else continue with next action.
4 Read the next byte: this byte is the release number of the slave processor firmware. Display the release number. If the release number is $00 then an error will be displayed.
5 Read the next byte: this byte is the release number of the CD processor firmware. Display the release number. If the release number is $00 then an error will be displayed.
6 Read the next byte: this is a dummy read.

Address range: Slave base address + what is read in 6.

See table of memory map for base address.

STEP 11: CLOCK CALIBRATION
This step is not really a test. it is a software tool that can be used to trim the clock&calendar chip so that it runs within 1 minute acc. per month. If calibration is not needed, this step should be executed since a frequency counter is needed to complete this test successfully. If this test is entered accidently, just switch off the power and restart the iltest.
The clock calibration should be performed with an external frequency counter.

- Connect the probe of the counter to pin21 of IC7205 the signalis called CSCDICN.
- Start the test with the gate time of the frequency counter set to minimum 5 sec.
- The counter display should now show a frequency near to 512 Hz.
  If not, the chek if everything is set and connected properly.
  (range : 511,96724 to 512,03276)
- Press a key on the terminal to stop the measurement.
- Now fill in the measured value of the frequency. The iltest software will now calculate the proper value to be filled into the calibration register of the clock&calendar IC.
  The value of the frequency at pin21 of IC7205 will not be changed or influenced.
- The calibration is done now.

5.1.7 Error codes

When during a test an error occurs the user should be aware of following conventions:
- For the pcb low level test the error is displayed on the outermost righthand side of the display.

  Example: 1 Er11

  An survey for all error codes is given in table 2.

- For the terminal low level test the error is displayed on the outermost lefthand side of the terminal. In some cases (memory tests) the error code is replaced by a more meaningful error output.

  Example: ADDRESS DATA READ EXPECTED
  ERROR:00080000 F0080000 00080000 RETURN to continue,ESC to STOP

  Meaning: (assuming long word data is used); On address
  $80000 the data was $F0080000 and not $80000 as it should be. If the RETURN button is pressed, the next address will be read and checked. With this output it will be easier to debug the MMC board

- When an error has occurred the program will wait for a user intervention with following question:
  RESTART the test Yes or No?
  If the answer was 'Y' then the iltest software is executed again from the beginning.
  If the answer was 'N' then the next test is executed as if nothing happened.

ERROR	DESCRIPTION	DISPLAY
05	ROM checksum error	Er05
09	NVRAM error	Er09
10	NVRAM error (for inverted data)	Er10
11	DRAM error (bank0 & bank1)	Er11
12	DRAM error (bank0 & bank1, inverted data)	Er12
13	DRAM bank0 error	Er13
14	DRAM bank0 error (inverted data)	Er14
15	DRAM bank1 error	Er15
16	DRAM bank1 error (inverted data)	Er16
17	CDIC RAM error	Er17
18	CDIC RAM error (inverted data)	Er18
19	CDIC register error	Er19
20	SLAVE error (wrong echo from slave)	Er20
21	Invalid release number from slave	Er21
22	Invalid release number from cd proc	Er22

Table 2. Error codes overview

5.1.8 Release number, position and checksum storage

The release number,ID and checksum are always stored in the CDI ROM. Step 1 of the pcb iltest as well as the terminal iltest uses all this information to check if the ROM is ok.

Where are these bytes stored in the ROM's, where in the memory?
(ROM address range for the 4Mb: $00000-$7FBFF)
(MMC address range for the 1Mb: $180000-$1FFBFF)

ROM address $7FBFF = LSByte of the checksum
$7FBFE = MSByte of the checksum
$7FBFD = Release number of this ROM (BCD coded)
$7FBFC = Player ID (BCD coded)
MMC address $1FFBFF = LSByte of the checksum of the ROM
$1FFBFE = MSByte of the checksum of the ROM
$1FFBFD = Release number of the ROM (BCD coded)
$1FFBFC = Player ID (BCD coded)

Remark: The total ROM space is 512k minus 1k. This 1k can never be accessed in the MMC address space. It is used for the VSC's registers and chip selects.

5.1.9 How is the checksum calculated?
The checksum is calculated for every ROM separately. The checksum is the algebraic sum of all bytes in that ROM except the 2 bytes where the checksum is written. Only the LSWord of the sum is used. To calculate the real checksum of the ROM just add these 2 bytes to the LSWord of the sum.
The last 1024 bytes are always assumed to be all $FF.

ROM checksum = sum of all bytes of the address range $180000 to $1FFBFD + $FC00
ROM checksum displayed in STEP 1=
ROM checksum + (LSB + MSB) of this checksum.
This is also equal to the checksum of the complete ROM.

5.2 THE SERVICE SHELL

Introduction.
For service purposes the CD-I set has built-in software modules. These modules can be activated via the service shell by menu.
The modules are for the testing of :
- Video circuitry, by means of a colorbar testpatern
- CDM and servo circuitry
- Input / Output ports
- Audio circuitry

Testing the CDM, servo and audio cicuitry in the service shell is only possible with a CD-DA disc.

5.2.1 Starting the service shell
(1) Power OFF (2) Press two switches: ' Display ON/OFF ' and ' Action button 2 (Right side) ' (3) Power ON and release two switch if after Power ON

5.2.2 Layout info

SELECTABLE/NON SELECTABLE ITEMS
Each menu of the service shell consist of a number of boxes and text strings. Some of these boxes can be selected by moving the screen cursor above the box and clicking on one of the joystick buttons. Only the colored boxes can be selected. Clicking on one of the other boxes will have no effect.

(ERROR) MESSAGES ON THE SCREEN
The service shell will provide information and errors in a box at the top of the screen. To remove such a message and continue with the test a button must be clicked on the remote control joystick.

MENU STRUCTURE
When the service shell is started, the main menu appears with a number of boxes on it. Selecting some boxes will result in a submenu being displayed, other boxes may result in immediate action. Selecting the EXIT box will stop the service shell and restart the player. Selecting EXIT in a submenu will return you to the previous menu.

5.2.3 Subject dependent information

MAIN MENU
The main menu contains four test item boxes and the EXIT box. Selecting TEST IMAGE will give immediate action, the other three test items will display a submenu.

CD TEST
This menu has two information boxes at the top of the screen. Below it are three test items for the CD player and below these are three buttons that can be selected only during the CD drive test. When the menu is first entered only the three test item boxes can be selected. Subjects of the CD test are the cd drive itself, the X bus and a test on Digital Out.
When this menu is selected in the main menu, the communication channel with the CD processor will be checked first. A message will be displayed giving the result of this check (either O.K. or No response). After pressing one of the buttons (to remove the message) the cd menu will be displayed.

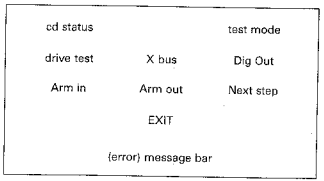


fig 3.2 CD test menu

The X bus test will result in immediate action. It checks the communication channel between the CDIC and CD processor that is normally used to send commands (seek, read etc) to the CD processor. The result is either O.K or No response.
The Dig. Out test will also give immediate action. It's purpose is to check wether the CDIC receives a Digital Out signal or not. The result of this test is O.K. or No Digital Out.
The CD drive test uses a different menu and will therefore be described in a separate paragraph.

CD DRIVE TEST
The CD drive test will perform the service loop as implemented in the Philips CD audio players. A disc is needed for this test. Results of this test will be displayed on the screen instead of a display. When the cd drive test is selected, the same screen will appear, but with other buttons highlighted. You cannot select the X bus and Dig Out test anymore. Selecting the EXIT button will return you to the cd menu. (X bus and Dig Out button highlighted again). The drive test consist of the following steps:

Mode 0
Software release number of the CD micro processor is displayed in the button at the left top of the screen (cd status button).Mode 0 is displayed in the button at the right top of the screen (mode button). During the cd drive test this button will display the current mode.
In mode 0, the ARM IN and ARM OUT buttons can be selected to move the cd lense inwards and outwards. Selecting NEXT STEP will bring the player in mode 1.

Mode 1
In mode 1 the cd driveprocessor will try to focus. If it manages to do so (a disc must be present!), the message IN FOCUS will appear in the status button. Otherwise, the message NO FOCUS will appear in the status button after the cd driveprocessor has tried to focus 16 times (this may take a while). In that case (no focus found) the test will return to mode 0.
Selecting NEXT STEP will bring the player in mode 2.

Mode 2
The turntablemotor is rotating and controlled by the rough HF, moving the cd lense outside (by hand) will slow the disc down.
If an error occurs, the test will return to mode 0.
Selecting NEXT STEP in mode 2 will bring the player in mode 3.

Mode 3
You can select ARM IN and ARM OUT to make the cd lense jump inside or outside (small jumps). The laser will keep jumping while a button is pressed on the remote control.
If an error occurs, the test will return to mode 0.
NEXT STEP in mode 3 will bring the player in normal playing mode.

Normal playing mode
The player shell will be started and errors sent by the cd processor will be displayed in a box on the screen. You cannot return to the service shell otherwise than by resetting the player.

ERROR MESSAGES

display: A5 xx0000
.
.
xx = 2 : focus error
xx = 3 : radial error
xx = 5 : off error (TL stays low for 50 msec.)
xx = 6 : jump error
xx = 7 : subcode error, no valid subcode in 3 sec.
xx = 8 : TOC error: out of lead-in area while reading the TOC
xx = 30 : to many grooves to jump
xx = 31 : search time out
xx = 32 : bin. search error
xx = 33 : search index error
xx = 34 : search time error
xx = 37 : selection error

DUART TEST
This test is not relevant

APU/KEY TEST
This is a combined menu, the attenuation can be changed via this menu and the keys on remote control and player can be tested with it. There are three buttons for every attenuation path on the screen. Two of them can be selected (to increment/decrement) and one is used to display the current attenuation value for the path. There is also a MONO/STEREO button on the screen. In STEREO, two attenuation paths are disabled (left to right and right to left), in MONO all attenuation paths are enabled. Maximum attenuation is reached at the value 47 (no sound). A CD audio disc is needed for the attenuation test. The test routine will start playing the disc at initializiation.
When a key is pressed, a text will appear on the key button on the right side of the screen describing the button pressed. The text will disappear when the key is released.

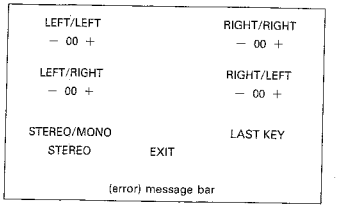


fig 3.4 APU test menu

VIDEO TEST IMAGE
A colorbar will be displayed on the screen. Pressing a button after the screen has been filled completely will return you to the main menu. There are no error messages for this test.

What could be wrong if...
This paragraph will describe the meaning of the error messages given by the service shell and contains suggestions about possible errors. This paragraph must be updated with new information from testing and debugging players.

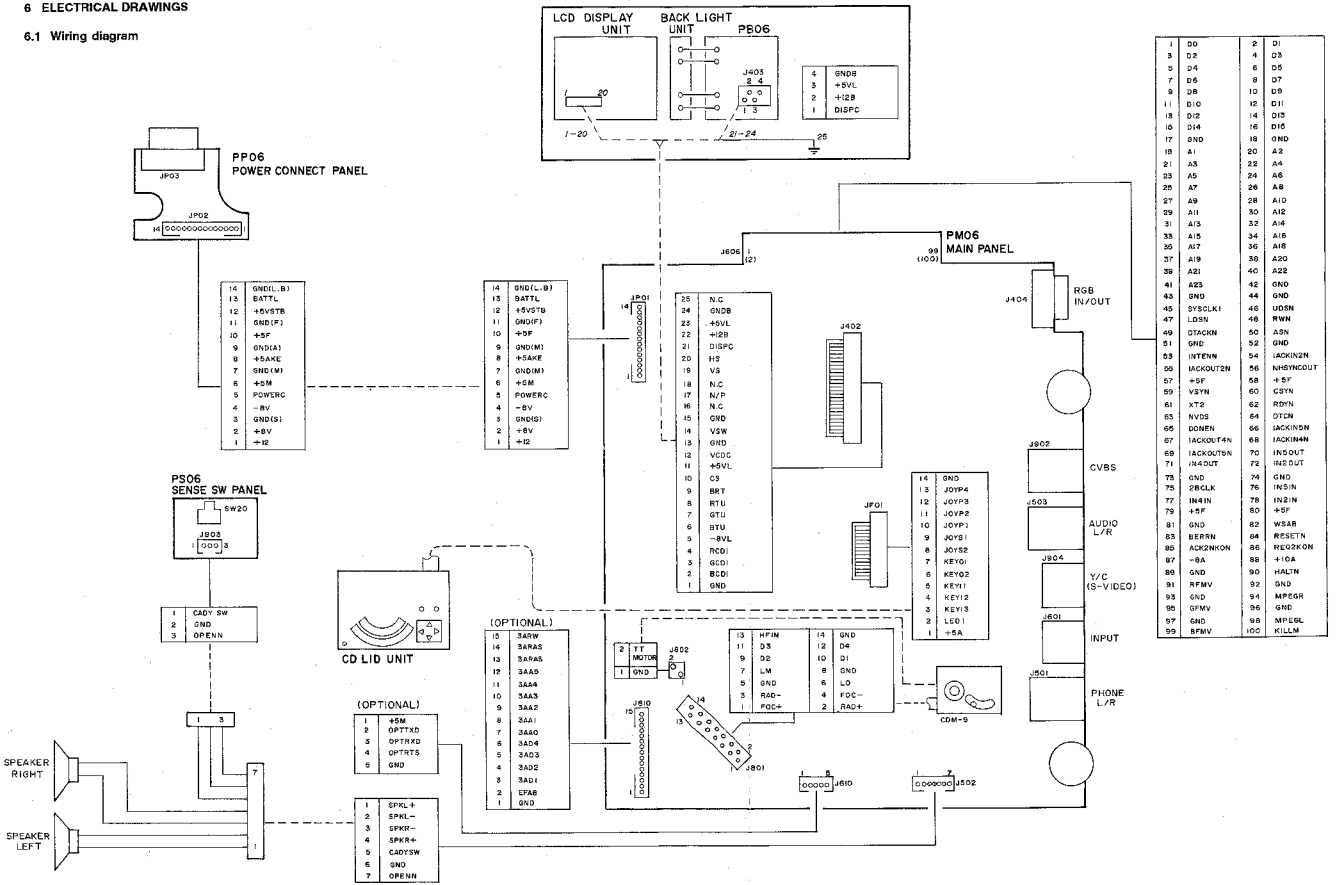
Service shell cannot be started with the testplug. Connections between port 1 and slave may be bad. Testplug could be wrong. Maybe the slave processor is defect. If the playershell cannot be started either, try the low level test first.

The key test will display the text ERROR if an unknown key code is received.

Disconnecting the clock from MMC to CD processor will make the CD player turn as fast as it can.

6 ELECTRICAL DRAWINGS

6.1 Wiring diagram



6.2 Alphabetical signal listing

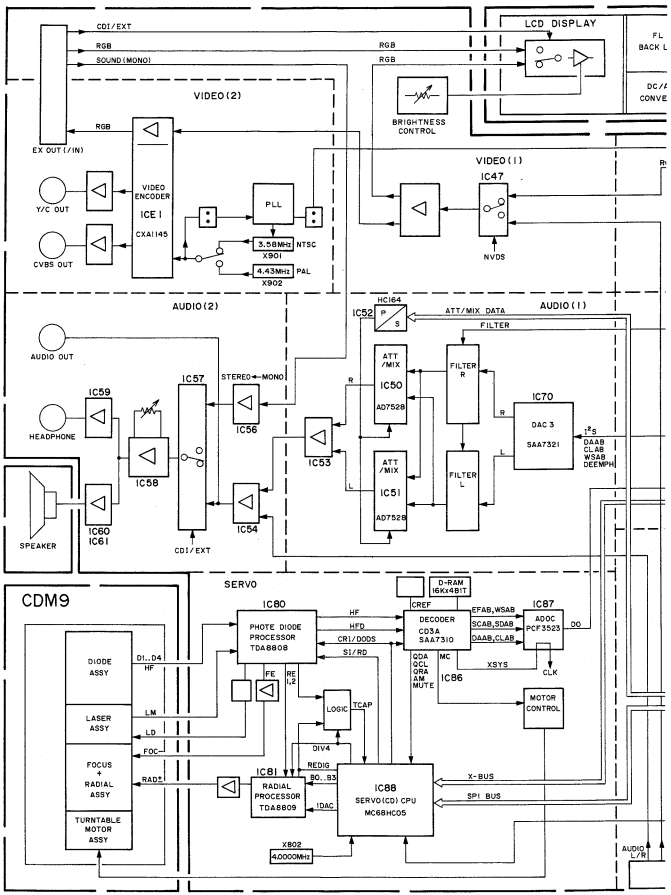
ACK2N : DMA REQUEST ACKNOWLEDGE (active low) (of channel 2)
ADEN : (=ADENA) ADDRESS ENABLE NOT. When low,the address ADENA coming from the bus (68070) will be put through to CDIC
AM : ADDITIONAL MUTE
ASN : ADDRESS STROBE (active low,tristate) indicates when an address is valid on the bus for the system
AVN : AUTOVECTORED INTERRUPTS (active low),can be used by an extension
B0..3 : input control bits for off-,catch-,play status and DAC output current for radial motor
BATTL : Battery detect signal from Power in
BCDI : Video signal from VSD (GCDI,RCDI)
BENC : >> to encoder
BFMV : >> from J606 (GENC,RENC)
BERRN : >> BUS ERROR (active low,open drain)
BERR : >>
BLANI : (=BLAN1M) BLANKING OUTPUT (active low,tristate)of the VSC
BTU : Video signal from J404 (GTU,RTU)
CBA,CBAA : 68070 bus transiever latch (rising edge)
CDICDACKN : (=ACK1N) DMA REQUEST ACKNOWLEDGE (active low)
CDICREQN : (=REQ1N) DMA REQUEST (active low)
CDIEXT : Interna(CDI)\/Extanal exchange signal of Audio/Video(Low=intanal)
CLAB : (=CLAB2) bitclock for the SAA 7220 chip
CLK : CLOCK (11,2896 Mc)
CLKDAC : CLOCK DAC,the clock used to send seria data to the volume adjustment
CLK1 : the clock on which the DSP operates (7,5264 Mc)
CRI : COUNTER RESET INHIBIT (low during a real trackloss or during excention of a jump command
COC : COMMAND COMPLETED signal
COXN : serial output clock for the X-bus
CPUASN : the address strobe of the 68070 microprocessor
CPULDSN : the lower data strobe of the 68070 microprocessor
CPUUDSN : the upper data strobe of the 68070 microprocessor
CS : CHIP SELECT
CSCDICN : CHIP SELECT CDIC (active low) bus information is intended for or coming from CDIC
CSDAC1N : (=CSDAC2N) (if selected,low) it means that data will be adjusted on that channel
CSNVRAMN : CHIP SELECT NVRAM (active low) bus information is intended for or coming from the NVRAM
CSROMN : Chip delect ROM (active low)
CSSLAVEN : CHIP SELECT SLAVES (active low)
CSON : (=CSONA) CHIP SELECT (active low) for the 8Kx8 SRAM'S
CSVSCMSN : CHIP SELECT VSC MASTER AND SLAVE. When low the coming information is intended for the VSC'S
CSYN : COMPOSITE SYNCHRONIZATION input from the VSC's (active low)
CSYENC : >> to encoder
CTS2,M : CLEAR TO SEND (active low) it indicates that the remote recieving device is ready
DAAB : (DAAB2) serial data output of the X-bus I2S standard
DATA 0..15 : DATA LINES
DATADAC : Data which will be send to the DAC('S) for volume adjustment
DDTACK : DATA TRANSFER ACKNOWLEDGE to the 68070 bus
DEEMP : DEEMPHASIS
DIRN : DIRECTION CONTROL. Indecates the direction of data transfer through the transcievers
DISCLK : DISPLAY CLOCK>>
DISDAT : DISPLAY DATA >>only for CDI 2XX
DISPC : LCD screen ON/OFF (ON=high)
DIV4 : DIVIDE BY 4 signal
DO : DIGITAL OUT
DODS : DROP-OUT DETECTOR SUPPRESSION
DONEN : DONE (active low,open drain),operates in the DMA-mode
DOXN : serial data output of the X-bus
DSPRWN : Read (high) or write (low) from or to the Digital Signal Processor
DSN2N : DATA STROBE (active low) of the DSP
DTACKN : DATA TRANSFER ACKNOWLEDGE asserted by a peripheral
DTACKSLAVEN : DATA TRANSFER ACKNOWLEDGE of the SLAVE processor (68HC05)
DTCN : DATA TRANSFER COMPLETE (active low,open drain) operates in the DMA-mode
EFAB : ERROR FLAG
FILTERN : filter select when high:level C,when low:level A
FOC- : >> focus out to CDM 9
FOC+ : >>
GN : >>
GNA : >> When low:the outputs and inputs of the trancievers (646) are enabled
GNB : >>
HALTN : active low,open drain,bidirectional. If low together whith the resetn it couses the 68070 to enter the reset state.
HSLCD : Hsync from LCD screen for external video
HSYN : (active low) horizontal synchronisation input from the VSC
HVID 0 IN ....HVID 7 IN : >> 8 bit pixel bus for channel 1
HVID 0 OUT ...HVID 7 OUT : >> (VSC-master)
IACKIN2N : >>
IACKIN4N : >> Decoded interupt acknowledge (active low).
IACKIN5N : >> Asserted during an interupt acknowledge
IACKOUT2N : >> sequence to indicate to a peripheral that
IACKOUT4N : >> this interupt request is bein serviced
IACKOUT5N : >>
IACKOUT2 : >>
IACKOUT4 : >>
IACKOUT5 : >>
IDAC : 1/2 bit DAC
IDTACKN : data transfer acknowledge from 68070
IFDN2 : main channel word-flag to the DSP
INTENN : >> when low,no extensions use the interupts,when high interrupt devices are daisy chained
INTENN2 : >>
INTENN3 : >>
INTENN4 : >>
IN2IN : (=IN2OUT) >>
IN4IN : (=IN4UT) >> Decoder interrupt priority inputs

N5IN : (=IN5OUT) >> (active low) IN2IN has the lower
N2OUT : >> and IN5IN has the higher priority
N4OUT : >> IN2IN = SLAVEPROCESSOR (6805),IN4IN =
N5OUT : >> CDIC (IMS66490),IN5IN = DUART (68681)
IOYP1..4 : Controler (Joy Pad) input
IOYS1,2 : Action sw input
CEYI1..3 : Key scan for Front switch
CEYO..3 :>>
_CDCLK : LCD screen control by I2C
_CDDAT :>>
_ED1 : Power LED (red)
CILLM : to mute audio outputs by power on and off
_ADD1..23 : ADDRESS-BUS (active high,tristate) for direct addressing of 16 Mbyte of memory
_DSN : LOWER DATA STROBE of the bus
_M : LASER MONITOR diode input
_O : LASER amplifier current OUTPUT
_RDN : when low select,the ROM'S or NVRAM read the lower data byte
_VIDOIN : >> 8 bit pixel-bus for channel 2
...LVID7IN (VSCSLAVE)
LVIDOOUT : >>
...LVID7OUT
MC : MOTOR CONTROL signal
MISO : MASTER IN SLAVE OUT
MOSI : MASTER OUT SLAVE IN
MPEGL,R : Audio signal from J606
MSMA0..8 : ADDRESS BUS between the DRAM'S of the VSC' MASTER and the VSC MASTER
MSMD0..15 : DATA BUS between the DRAM'S of the VSC' MASTER and the VSC MASTER
NRESET : when low the video synthesizer (VSR) is in reset
NVDS : digital output to control an external switch for TV overlays (active low)
PCLK1IN : >> PIXEL CLOCK for channel 1
PCLK1OUT : >>
PCLK2IN : >> PIXEL CLOCK for channel 2
PCLK2OUT : >>
PLOIN1 : input clock for CDIC (22,5792 Mc)
PLOIN2 : input clock for CDIC (19,3536 Mc)
POWERC : Power ON/OFF control from ICF1(ON=high)
QCL : Q-channel CLOCK
QDA : Q-channel DATA
QRA : Q-channel REQUEST INPUT/ACKNOWLEDGE OUTPUT
Q22 : output to PLL (22,5792 Mc) devided by 14
Q21 : output to PLL (19,3536 Mc) devided by 12
RAD+ : >> RADIAL OUT to CDM 9
RAD- : >>
RD : READY signal,starting up procedure finished
RDYN : READY (active low) of the DMA channel
REDIG : RADIAL ERROR DIGITAL
RESETCD : when low resetsequence starts
RESETINN : when low VSC is in reset
RESETN : this is the reset for all other ic's
REQ2N : DMA-request of the second channel
RSTOUT : RESET OUT of the slave processor when high resetsequence starts
RTSUART : REQUEST TO SEND from the slave processor to the UART of the 68070 processor
RTS2,M : >> REQUEST TO SEND (active low)
RWN : READ - WRITE (low is write) signal

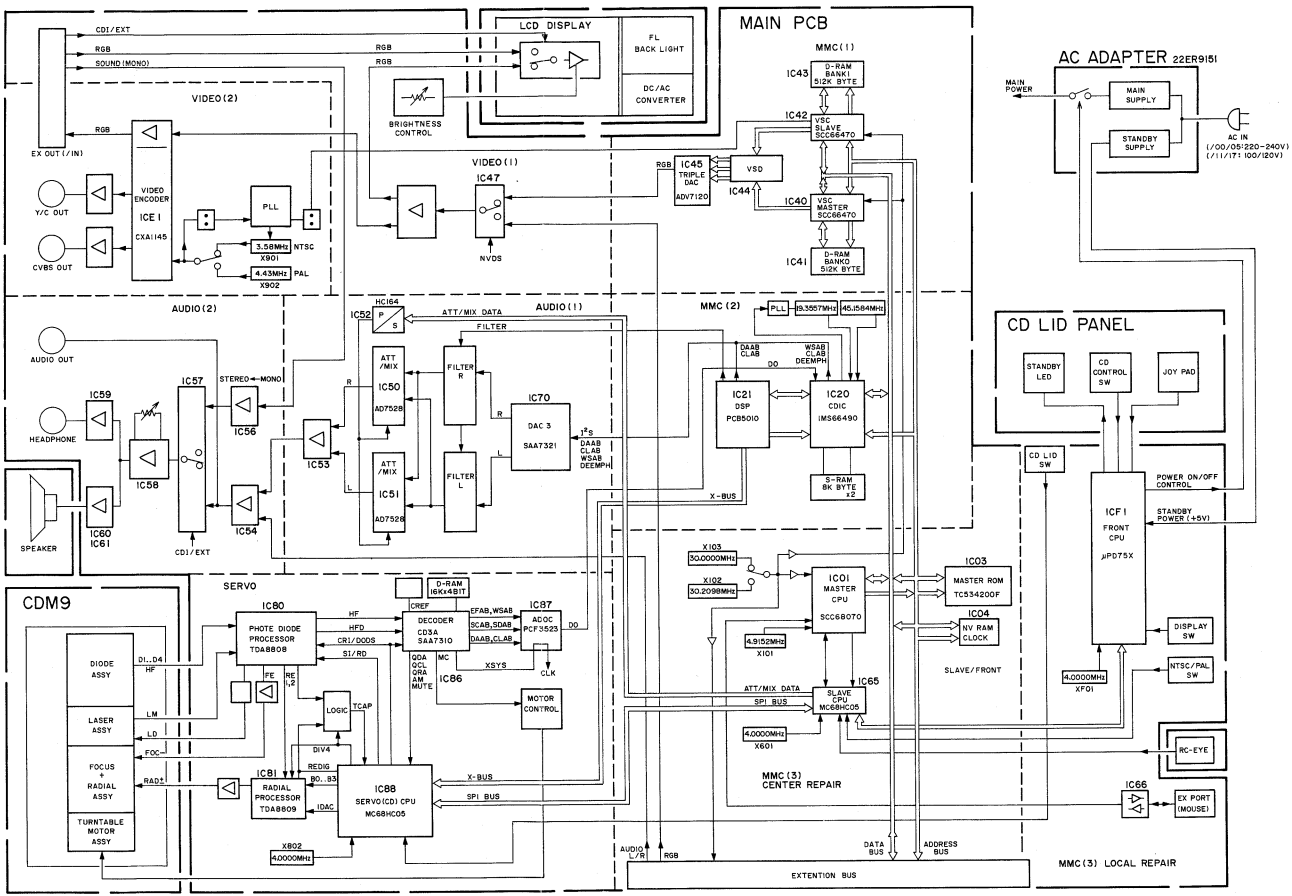
RWN2 : READ - WRITE (low is write) signal from CDIC to the DSP
RWRAM : READ - WRITE signal from the CDIC to the S-RAM'S
RXD2,M : >> RECIEVE DATA RXD is data input
SI : on - off control for laser supply and focus circuit
SLMA0..8 : VSC-slave memory address bus to the DRAM'S
SLMD0..15 : VSC-slave memory data bus to the DRAM'S SOXENN: SERIAL OUTPUT ENABLE FOR THE X-BUS (enabled when low)
SOXRQN : SERIAL OUTPUT REQUEST FOR THE X-BUS (when low)
SOYENN2 : SERIAL OUTPUT ENABLE FOR THE Y-BUS (when low)
SPICLK : SERIAL PERIPHERAL INTERFACE CLOCK
SPISS : SERIAL PERIPHERAL INTERFACE SLAVE SELECT
STANDARD : software choise between PAL and NTSC
STANDARDSW : handware choise between PAL and NTSC
SOUND : Audio signal (mono) of external
SWAB : SUBCODING WORD CLOCK INPUT
SYSCLK : >> SYSTEM CLOCK
SYSCLK1,2,A : >>
TCAP : input capture feature for the on-chip timer
TCMP : output for the output compare feature of the on chip timer
TMOUT : TRAY MOTOR OUT
TXD2,M : >> TRANSMIT DATA TXD is data output
UDSN : UPPER DATA STROBE (active when low)
URDN : READ UPPER DATA BYTE (active when low)
UWRMN : READ - WRITE (write when low) UPPER MEMORY DATA FROM DRAM'S FROM VSC-MASTER
UWRN : WRITE UPPER DATA BYTE (active when low)
UWRSN : READ - WRITE (write when low) UPPER MEMORY DATA FROM DRAM'S FROM VSC-SLAVE
VC : output DC-motor (VOLTAGE CONTROL)
V-FLAG : output to the DSP
VSCM-INTN : when low,interrupt from VSC master to 68070 processor
VSCS-INTN : when low,interrupt from VSC slave to 68070 processor
VSYN : (active when low) VERTICAL SYNCHRONISATION INPUT from the VSC
WRPN1IN..2 : >> control input for channel 1 or 2 (active low)
WRPN1OUT.2 : >>
WSAB : >> WORD SELECT FOR AB CHIP
WSAB2 : >>
XIN : >> 11,2896/9,6768/4,8384 symmetrical clock
XIN2 : >>
X-TAL2 : the same as the system clock,coming out of the VSC'S
XT2 : the system clock devided by two
XT4 : >> the system clock devided by four
XT4IN : >>
0AD..12AD : >> ADDRESS BUS,between CDIC-SRAM'S and SYSTEM ADDRESS BUS BUFFERS
10ADA : >>
....12ADA
0D..15D : DATA BUS between CDIC and DSP

0DA..15DA : DATA BUS between CDIC-SRAM'S and SYSTEM DATA BUS TRANCIEVERS
2BCLK : CLOCK for the 2B-chip
12A..15A : ADDRESS BUS between CDIC and DSP

6.3 Block diagram



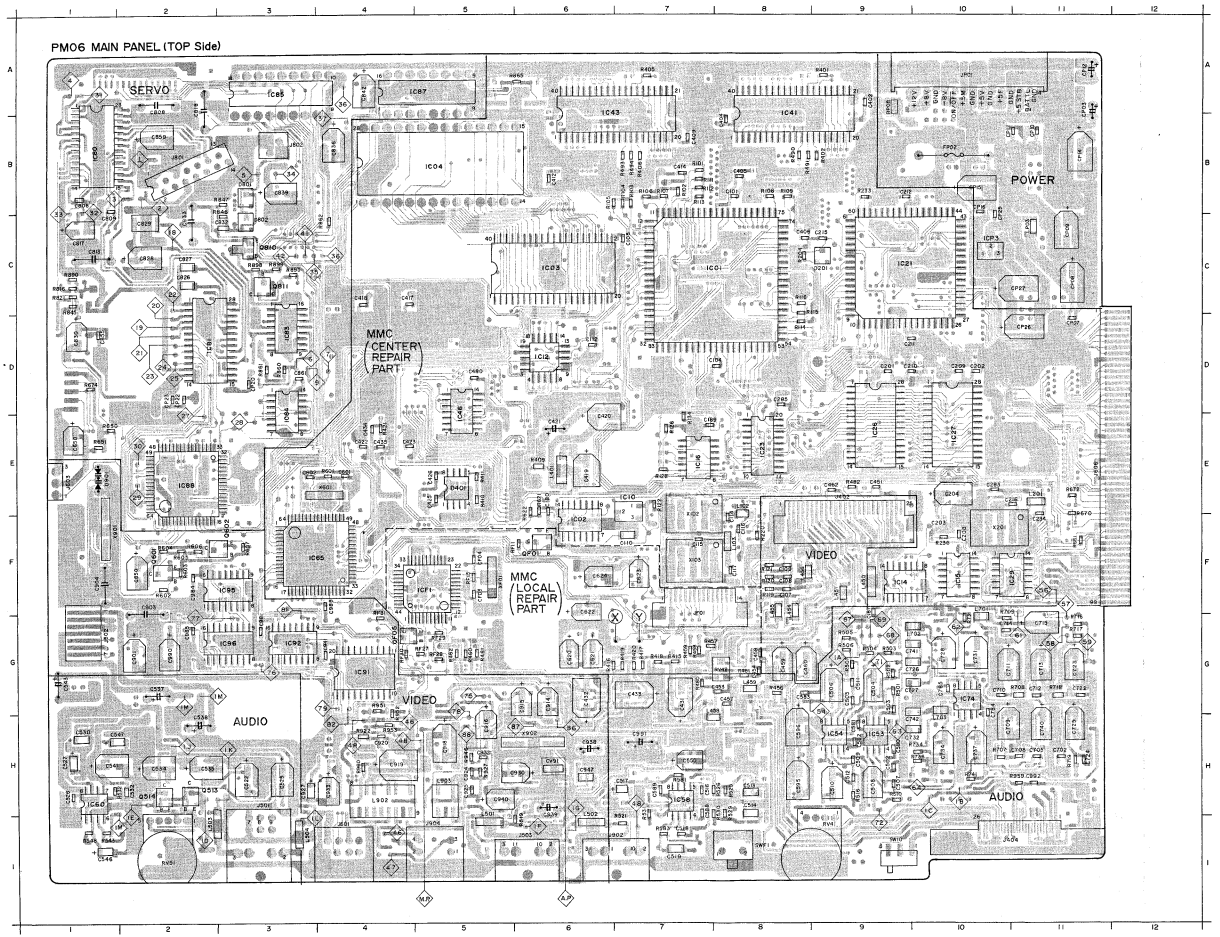
6.3 Block diagram

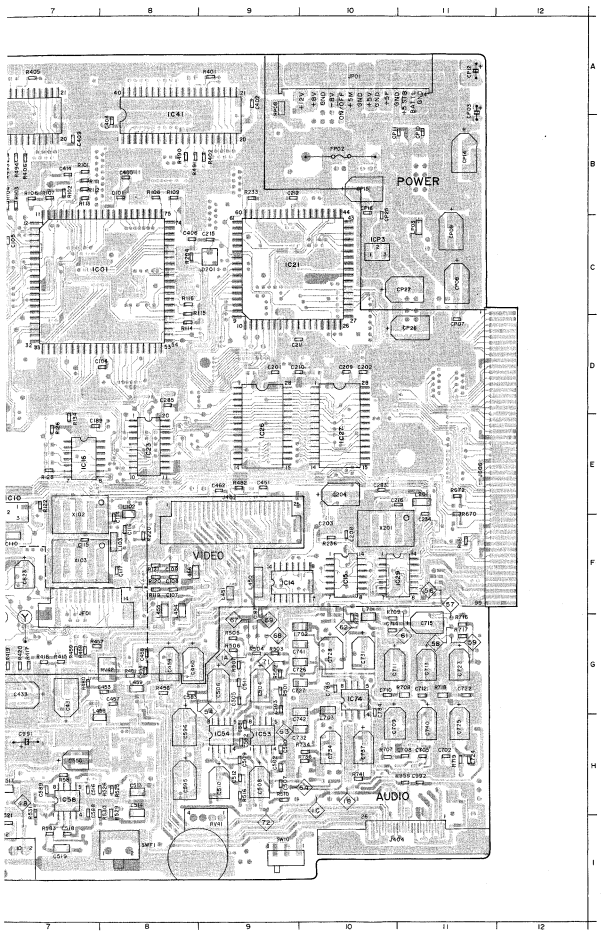


6.4 MAIN Panel

6.4.1 PCB Layout (Top side)

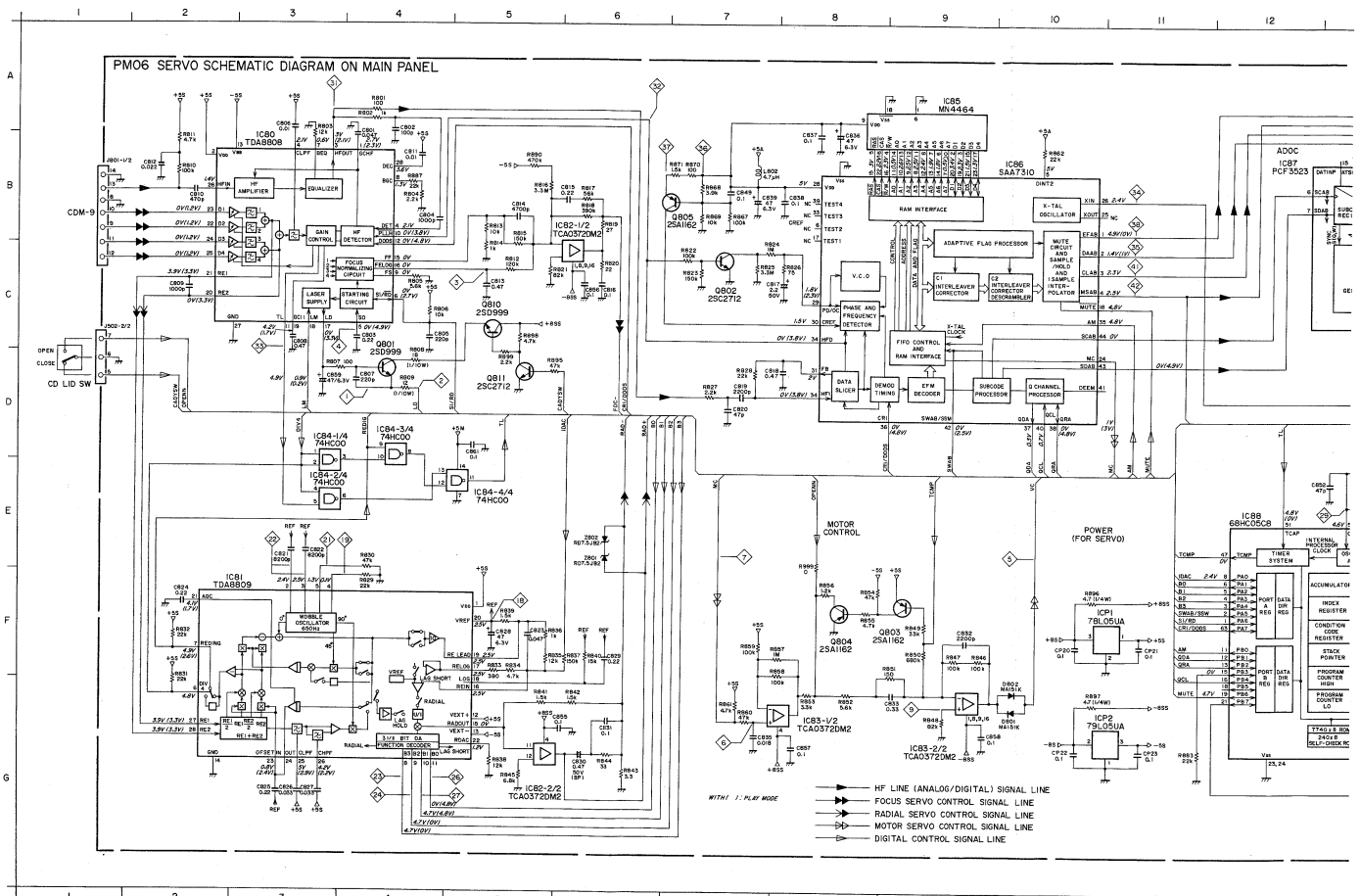
PM06 MAIN PANEL (TOP Side)

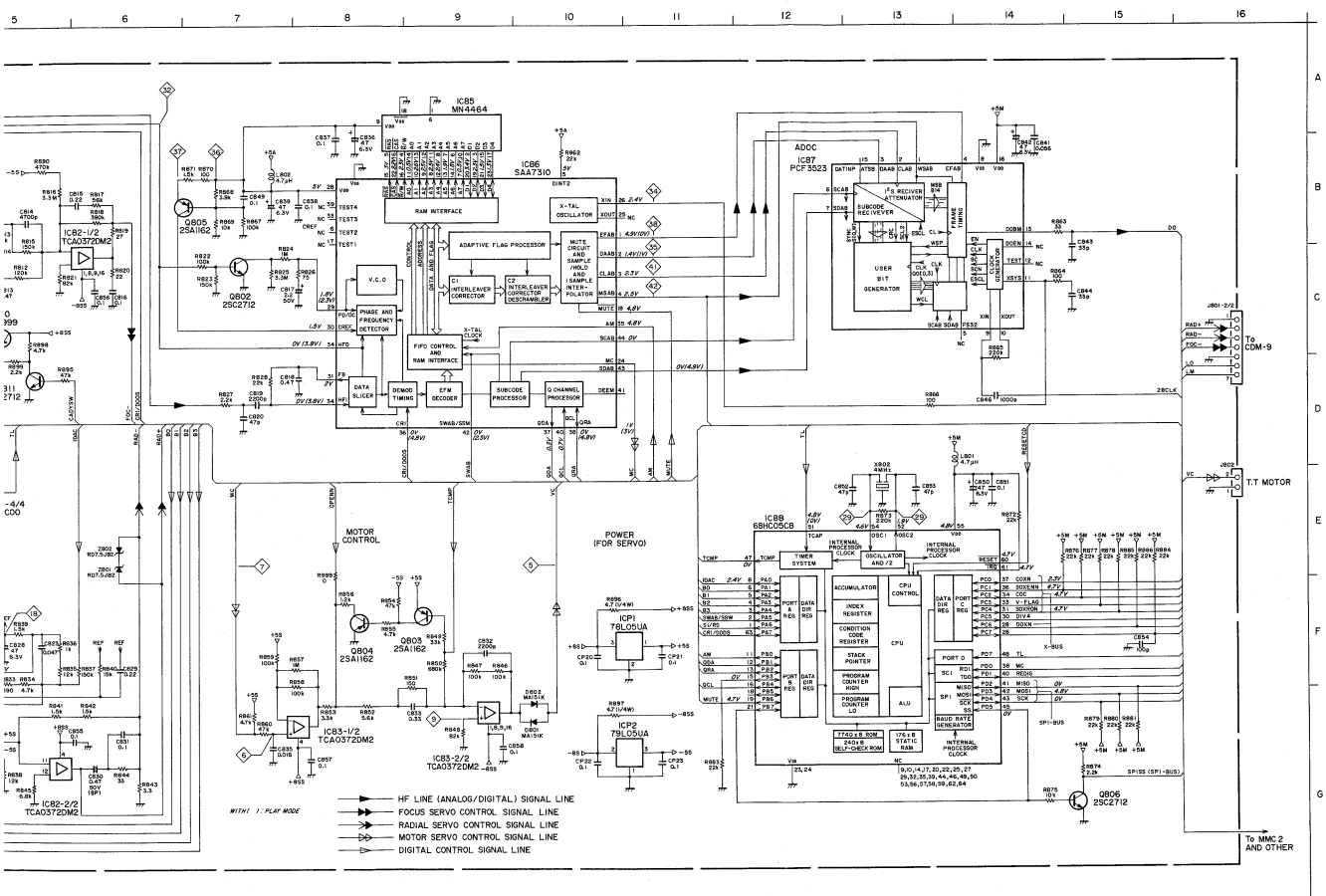




CF03	F5	C611	G9	C842	A4	J606	E11
CF04	F5	C612	H9	C850	F2	J801	B2
CP03	A11	C615	H8	C855	D1	J802	B3
CP07	D11	C614	H8	C859	B2	J902	I7
CP08	C11	C616	H7	C861	D3	J904	I5
CP09	C11	C617	H7	C901	B2	LP03	C1
CP10	B11	C618	I7	C903	F2	L102	E8
CP11	B10	C619	I7	C904	F1	L103	F8
CP12	A11	C622	H3	C914	G8	L201	E11
CP14	B1	C625	H3	C915	G6	L401	E6
CP15	B10	C626	H1	C916	H5	L501	I5
CP16	B10	C627	H1	C918	H5	L502	I6
CP20	D3	C630	H1	C919	H4	L503	I2
CP21	D2	C632	H2	C920	H4	L504	I3
CP23	D2	C634	H2	C924	H5	L701	G10
CP25	B10	C635	H2	C925	H5	L702	G10
CP26	D11	C637	G2	C927	H3	L703	H10
CP27	C11	C638	H2	C930	H6	L902	H4
CV91	H6	C641	H1	C932	H5	L903	H5
CY01	B8	C643	G1	C933	H4	QF01	F6
C104	D8	C646	I1	C938	H6	Q513	H2
C105	C7	C647	H1	C939	H6	Q514	H2
C107	F8	C650	H7	C940	H5	Q601	F2
C108	F8	C680	H9	C941	G4	Q602	F3
C109	F8	C681	H9	C981	G3	Q810	C3
C110	F7	C682	H9	C984	F2	Q811	C3
C112	D6	C683	H9	C985	G2	RF11	F6
C114	F8	C688	H7	C988	F4	RF15	F6
C115	F7	C689	H7	C990	G2	RF27	G5
C116	F8	C695	H8	C991	H7	RF28	G5
C117	F8	C696	H8	C992	H11	RF29	G5
C180	E6	C801	E4	D201	C9	RF30	G4
C189	E7	C802	E3	D401	E5	RV41	I9
C201	D9	C820	G6	D801	B3	RV51	I2
C202	D10	C821	G6	D802	C3	R101	B7
C203	F10	C822	F6	D901	E1	R102	B7
C204	E10	C823	F7	FP02	B10	R103	B7
C206	F10	C824	E1	ICF1	F5	R104	B7
C209	D10	C850	H11	ICP3	C10	R105	B6
C210	D10	C702	H11	IC01	C8	R106	B7
C211	D10	C705	H11	IC02	F6	R107	B7
C212	B9	C708	H11	IC03	C6	R108	B8
C215	D10	C709	H10	IC04	B5	R109	B8
C216	E11	C710	G10	IC10	E7	R111	B7
C234	E11	C711	G10	IC12	D6	R112	B7
C283	E10	C712	G11	IC14	F9	R113	B7
C285	D8	C713	G11	IC15	E10	R114	D8
C402	A9	C714	G10	IC16	E7	R115	C8
C405	B8	C715	G11	IC21	C9	R116	C8
C406	C8	C722	G11	IC23	C8	R119	F8
C409	B7	C723	G11	IC26	E9	R120	F8
C412	B6	C724	H11	IC27	E10	R121	F8
C414	B7	C725	H11	IC29	F11	R122	E7
C417	C4	C726	G10	IC41	A8	R126	E7
C418	C4	C727	G10	IC43	A6	R128	E7
C419	E6	C728	G10	IC46	D9	R154	E7
C420	E6	C731	G10	IC53	H9	R204	C8
C421	E6	C732	G10	IC54	H9	R232	F8
C422	E4	C734	H10	IC56	H7	R253	B9
C425	E4	C737	H10	IC60	H1	R401	A9
C426	E8	C740	H11	IC65	F4	R402	B9
C428	E5	C741	H10	IC80	B1	R403	A9
C431	G6	C742	G10	IC81	D2	R236	E10
C432	G6	C744	G10	IC82	D3	R405	B7
C434	E4	C745	G10	IC84	A3	R409	E6
C435	E4	C808	B1	IC86	A3	R410	E5
C451	G8	C809	B1	IC87	A5	R411	E5
C452	G8	C813	C1	IC91	G5	R415	G6
C454	E8	C817	C1	IC92	G5	R416	G6
C455	E8	C818	A2	IC95	F3	R418	G7
C460	D5	C819	A2	IC96	F3	R419	G7
C502	H9	C827	C2	JP01	A10	R420	E7
C503	G9	C828	C2	J402	E9	R421	E4
C504	G9	C829	C2	J404	I11	R460	G5
C505	G9	C830	D1	J501	I3	R461	G5
C506	H9	C832	C2	J502	I1	R462	E9
C507	H9	C835	B2	J503	I6	R485	E9
C508	H9	C836	B4	J601	I4	R490	B8
C510	H9	C839	B3	J603	E1	R491	B8
						R493	B7
						R494	B7
						R501	G9
						R502	G9
						R503	G9
						R504	G9
						R505	G9
						R506	G9
						R507	G9
						R510	H9
						R516	H9
						R519	I6
						R521	I7
						R525	H8
						R526	H8
						R529	H8
						R530	H8
						R531	H7
						R532	I1
						R543	I1
						R548	I1
						R581	H7
						R583	I7
						R601	E4
						R602	F2
						R603	F2
						R604	F2
						R605	F2
						R606	F3
						R607	F3
						R621	E6
						R622	E6
						R650	E1
						R651	E1
						R661	F11
						R670	E11
						R672	E11
						R674	D1
						R707	H10
						R708	G11
						R709	G10
						R716	G11
						R717	G11
						R718	G11
						R719	H11
						R731	G10
						R734	H10
						R736	H10
						R741	H10
						R816	C1
						R821	C1
						R845	C1
						R846	B3
						R847	B3
						R860	D3
						R861	D3
						R862	C4
						R880	A6
						R890	C1
						R895	C3
						R898	C3
						R899	C3
						R926	H4
						R927	H5
						R946	H5
						R951	G4
						R952	G4
						R953	H4
						R959	H11
						SW11	I8
						SW10	I8

6.4.2 Servo Schematic Diagram





( ): BOTTOM SIDE PARTS

CP20 F10 (R831)F2
(CP21)F11 (R832)F2
CP22 G10 (R833)F5
CP23 G11 (R834)F5
(C801)A4 (R835)F5
(C802)A4 (R836)F5
(C803)C4 (R837)F6
(C804)J4 (R838)G5
(C805)C4 (R839)F5
C806 A3 (R840)F6

(CA077)D4 (R841)G5
C808 C3 (R842)G6
C809 C2 (R843)G6
(C810)B2 (R844)G6
(C811)B4 R845 G5
(C812)B2 R846 F9
C813 C5 R847 F9
(C814)B5 (R848)G9
(C815)B6 (R849)F9
(C816)C6 (R850)F9

C817 C8 (R851)F9
C818 D8 (R852)G8
(C819)D7 (R853)G8
(C820)D7 (R854)F8
(C821)E3 (R855)F8
(C822)E3 (R856)F8
(C823)F3 (R857)F8
(C824)F1 (R858)F8
(C825)G3 (R859)F7
C826 G3 R860 G7

C827 G3 R861 G7
C828 F5 R862 A10
C829 F6 (R863)B14
C830 G6 (R864)C14
(C831)G6 R865 C14
C832 F9 (R866)D13
C833 G9 (R867)B7
(C835)G7 (R868)B7
C836 B8 (R869)B7
(C837)B8 (R870)B7

(C838)B8 (R871)B7
C839 B7 (R872)E14
(C841)B14 (R873)E13
C842 B14 (R874)G15
(C843)C15 (R875)G14
(C844)C15 (R876)E9
(C846)D14 (R877)E15
(C849)B7 (R878)G15
C850 E14 (R879)G15
(C851)E14 (R880)G15

(C852)E13 (R881)G15
(C853)E13 (R883)G11
(C854)F15 (R884)E15
C855 G6 (R885)E15
(C856)C6 (R886)E15
(C857)G8 (R887)B4
(C858)G9 R890 B5
C859 D3 R895 D6
C861 D5 (R896)F10
D801 G10 (R897)G10

D802 G10 R898 C5
(CP1)F11 R899 D6
(CP2)G11 (R999)E8
CB0 B3 (X802)E13
CB1 F3 (Z801)E6
(CB2)G5 (Z802)E6
CB3 G8
CB3 G9
CB4 D3
CB4 D4

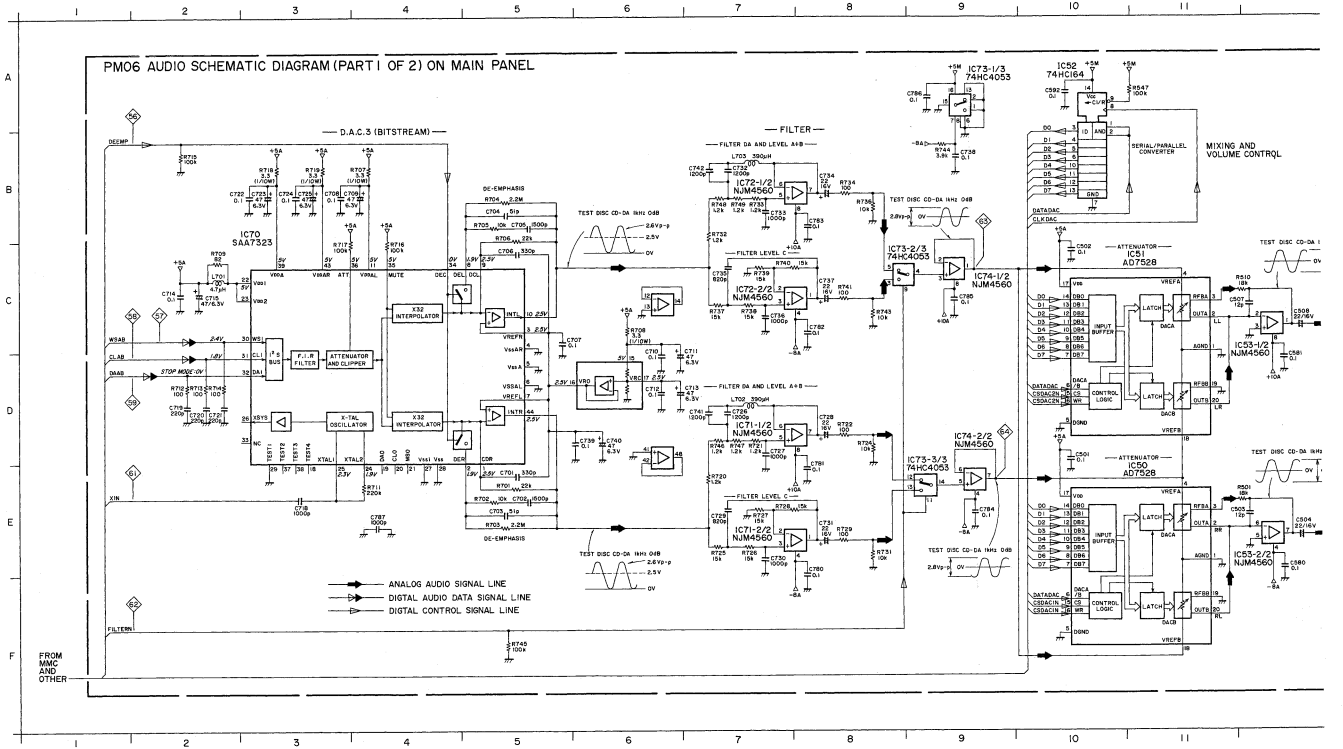
CB4 E5
CB4 D5
CB5 A8
(CB6)B10
CB7 B12
CB8 E12
J502 C1
J801 B1
J801 C16
J802 E16

(L801)F14
(L802)B7
(R001)C4
(R002)C4
(R003)C4
(R004)C4
(R005)C4
(R006)C4
(R007)D3
(R008)D4
(R009)D4
(R010)B2

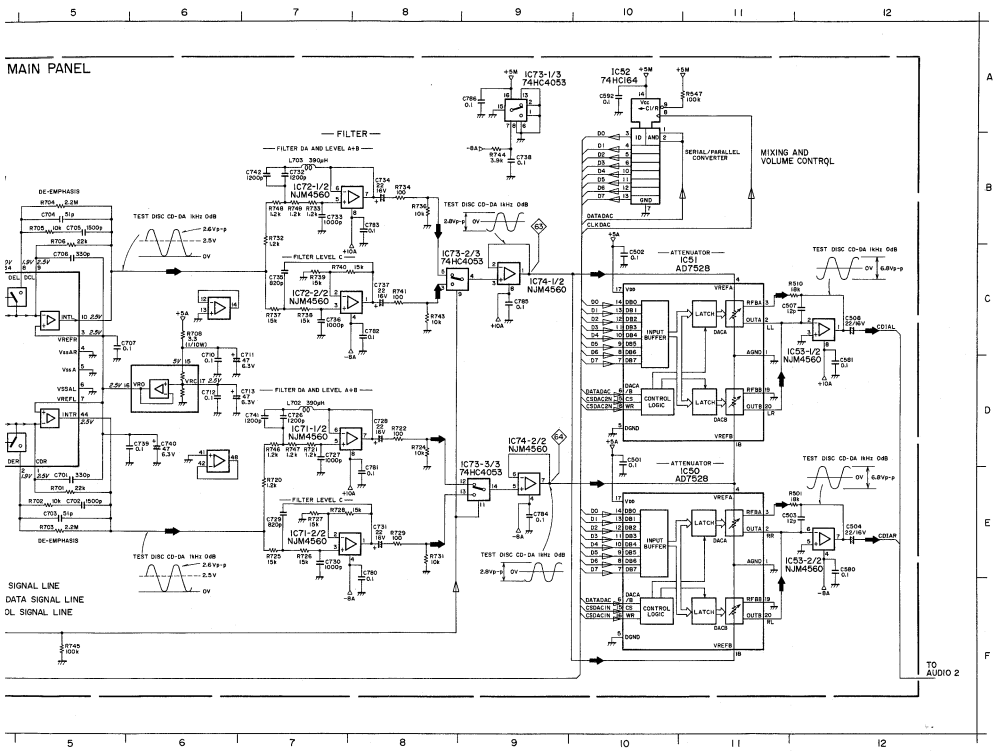
(R011)B2
(R012)C5
(R013)B5
(R014)C5
(R015)B5
R016 B5
(R017)B6
(R018)B6
(R019)B6
(R020)C6

R021 C5
(R022)C7
(R023)C7
(R024)C7
(R025)C7
(R026)C8
(R027)D7
(R028)D7
(R029)F4
(R030)E4

6.4.3 Audio Schematic Diagram (Part 1)



( ): BOTTOM SIDE PARTS



(C501) D9
C502 C10
C503 E12
C504 E12
C507 C12
C508 C12
C580 E12
C581 D12
(C592) A10
(C701) E5

C705 E5
(C703) E5
(C704) B5
C709 B5
(C706) C5
(C707) C5
C708 B3
C709 B4
C710 D6
C711 D7

C712 D6
C713 D7
C714 C2
C715 C2

(C716) E3
(C819) D2
(C720) D2
(C721) D2
C722 B3

C723 B3
C724 B3
C725 B3
C726 D7
C727 D7
C728 D8
(C729) E7
(C730) E7
C731 E8
C732 B7

(C733) B7
C734 B8
(C735) C7
(C736) C7
C737 C8
(C738) B9
(C739) D6
C740 D6
C741 D7
C742 B7

(C780) E8
(C781) E8
(C782) E8
(C783) E8
C785 C9
(C786) A9
(C787) E4
(C501) E11
(C511) C11

(IC52) A10
IC53 C12
IC55 E12
(IC70) C3
(C71) D7
(C71) E7
(C72) B7
(C72) C7
(C75) A9
(C75) C8

(C73) E9
IC74 C9
IC74 D9
L701 C2
L702 D7
L703 B7
R501 E12
R510 C12
(R547) A11
(R701) E5

(R702) E5
(R703) E5
(R704) B5
(R705) B5
(R706) B5
R707 B4
R708 C6
R709 C2
(R711) E4
(R712) D2

(R713) D2
(R714) D2
(R715) B2
R716 C4
R717 C3
R718 B3
R719 B3
(R720) E7
(R721) D7
(R722) D8

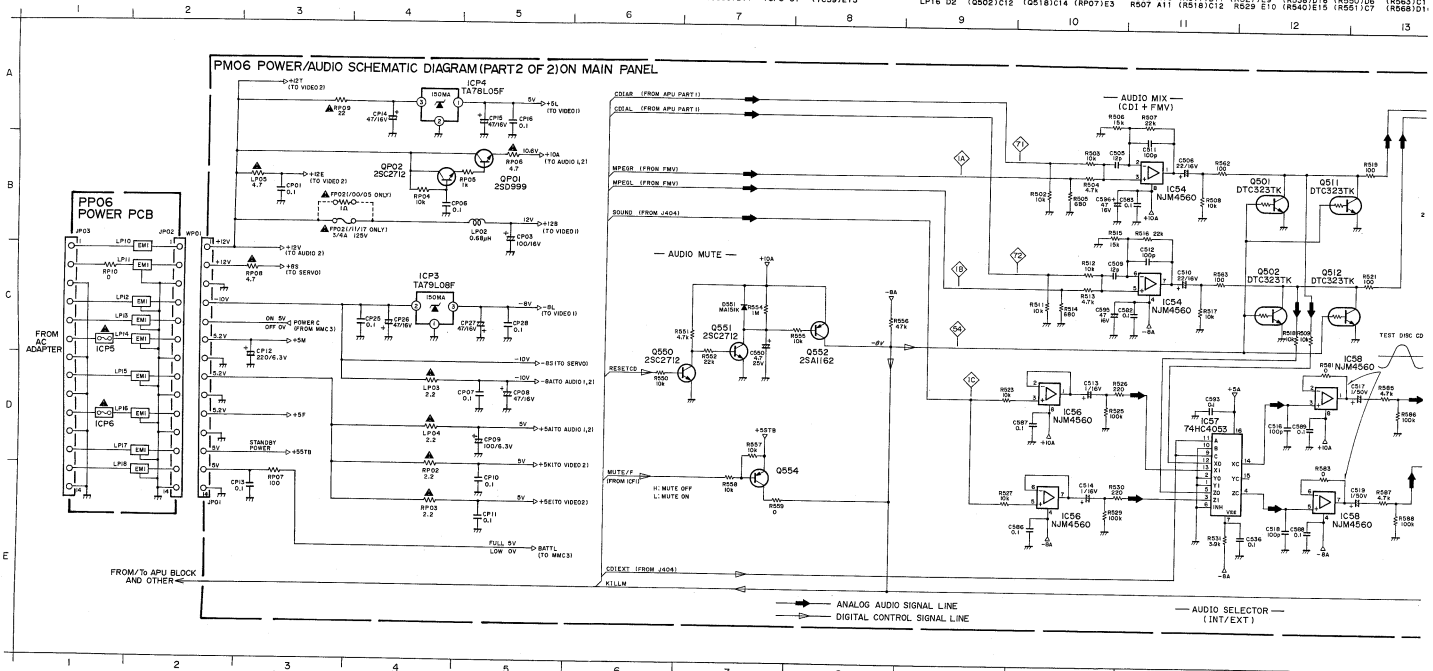
(R724) D8
(R725) E7
(R726) E7
(R727) E7
(R728) E7
(R729) E8
R731 E8
(R732) B7
(R733) B7
R734 B8

R736 B8
(R737) C7
(R738) C7
(R739) C7
(R740) C7
R741 C8
(R743) C8
(R744) B9
(R745) F5
(R746) D7

(R747) D7
(R748) B7
(R749) B7

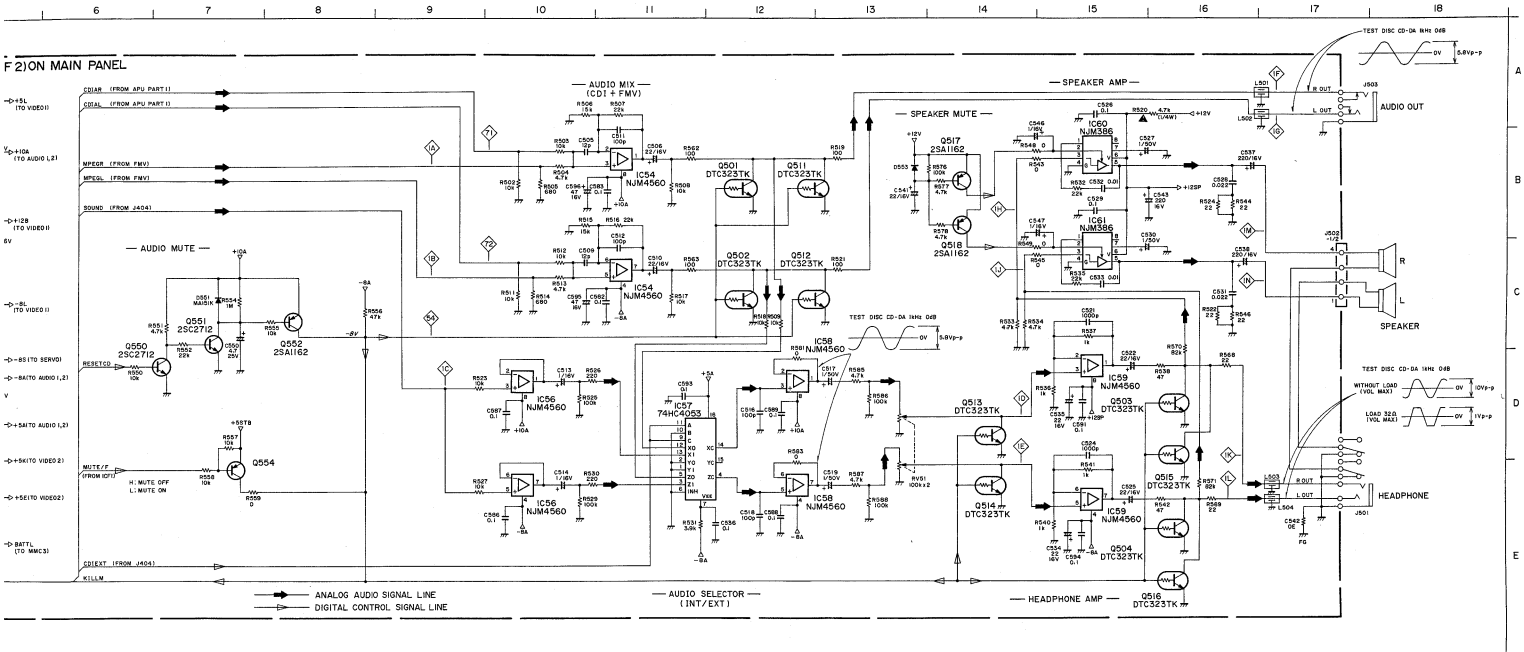
6.4.4 Power/Audio Schematic Diagram (Part 2)& PP06

( ): BOTTOM SIDE PARTS

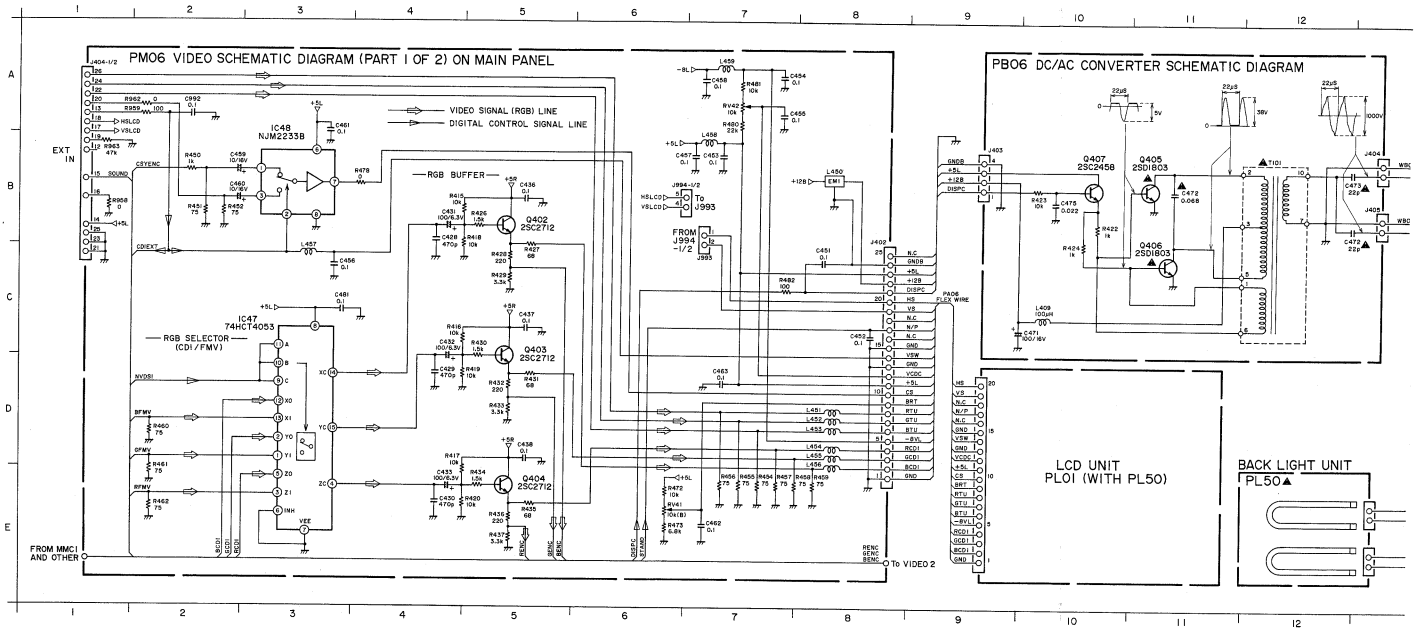


NOTE ON SAFETY :
Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

F 2)ON MAIN PANEL

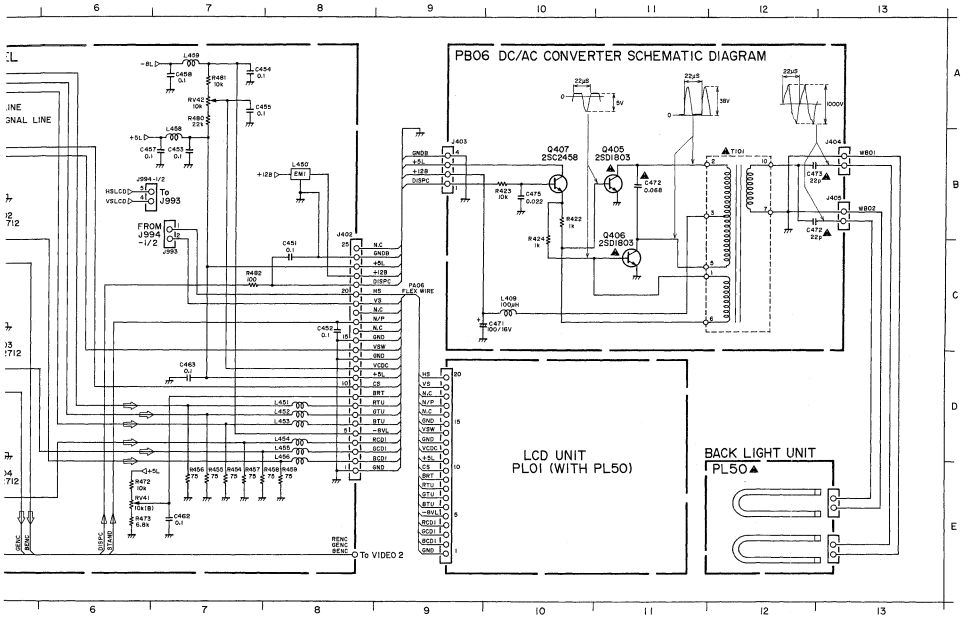


6.4.5 Video Schematic Diagram (Part 1)& PB06



NOTE ON SAFETY :
Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

( ): BOTTOM SIDE PARTS



(C428) B4
(C429) D4
(C430) E4
C431 B4
C432 C4
C433 E4
(C436) B5
(C437) C5
(C438) D5
C451 D8

(C452) C8
C453 B7
C454 A7
(C455) A7
(C456) C3
C457 B7
C458 A7
C459 B2
C460 B2
(C461) A5
C462 E2
C463 D7
C471 C10
C472 B11
C473 B13
C475 B13
C475 B10
(C481) C5
C993 A5
(C47 C5

(C48 B3
J402 C8
J403 B9
J404 B13
J404 A13
J405 B13
(J994) B6
(J993) C7
L409 C10
L450 B8

L451 D8
(L452) D8
(L453) D8
L454 D8
L455 D8
L456 D8
(L457) C3
L458 B7
L459 A7
(Q402) B5

(Q403) C5
(Q404) E5
Q405 B11
Q406 C11
Q407 B10
R415 B4
R416 C4
R417 D4
R418 B5
R419 D5

R420 E5
R422 B10
R423 B10
R424 B10
(R426) B5
(R427) C5
(R428) C5
(R429) C5
(R430) C5
(R431) D5

(R432) D5
(R433) D5
(R434) E5
(R435) E5
(R436) E5
(R437) E5
(R450) B2
(R451) B2
(R452) B2
(R454) E7
(R455) E7
R456 E7
R457 E7
R458 E8
R459 E9
R460 D2
R461 E2
R462 E2
(R472) E6
(R473) E6

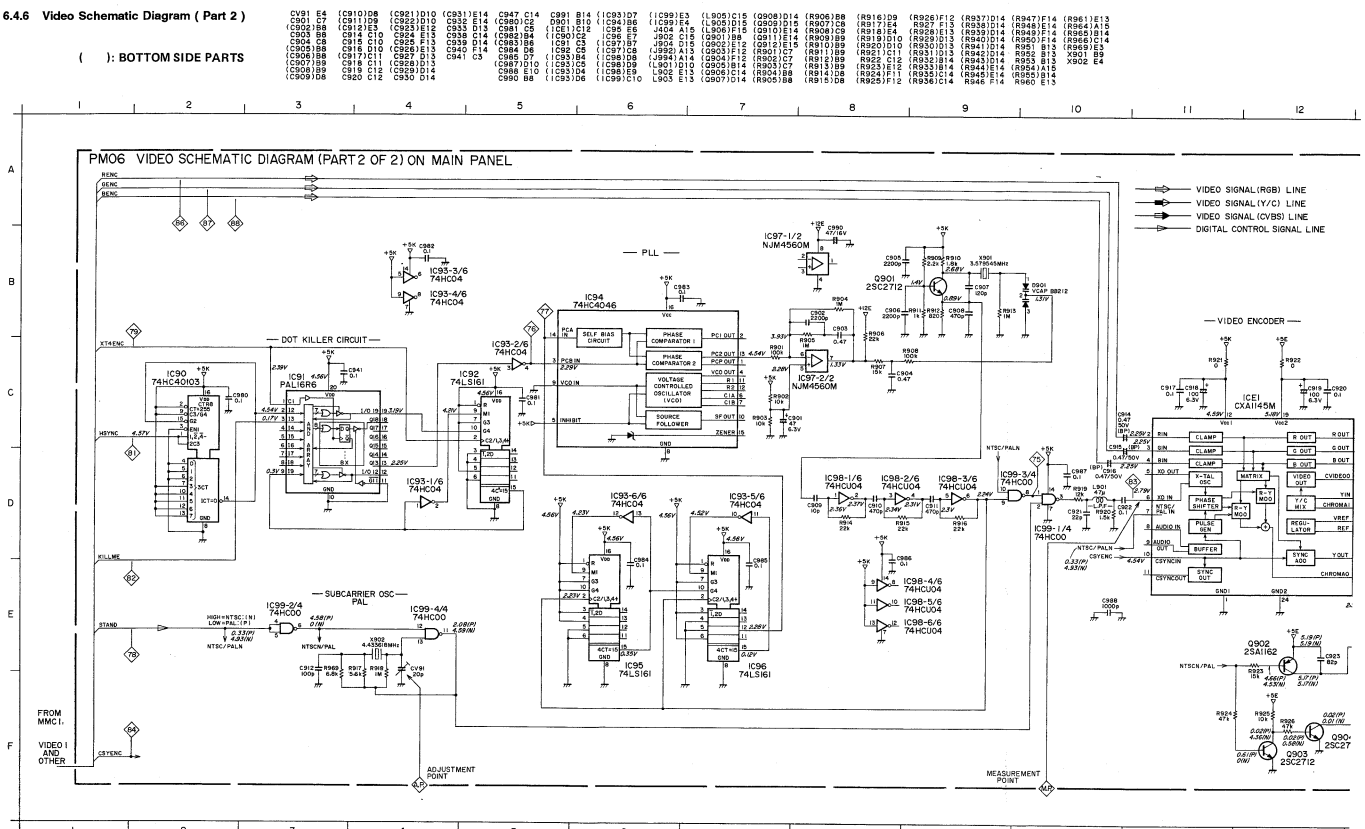
(R478) B4
R480 A7
R481 A7
R482 C7
R958 B1
R959 A2
R962 A2
R963 B1
RV41 E6
RV42 A7

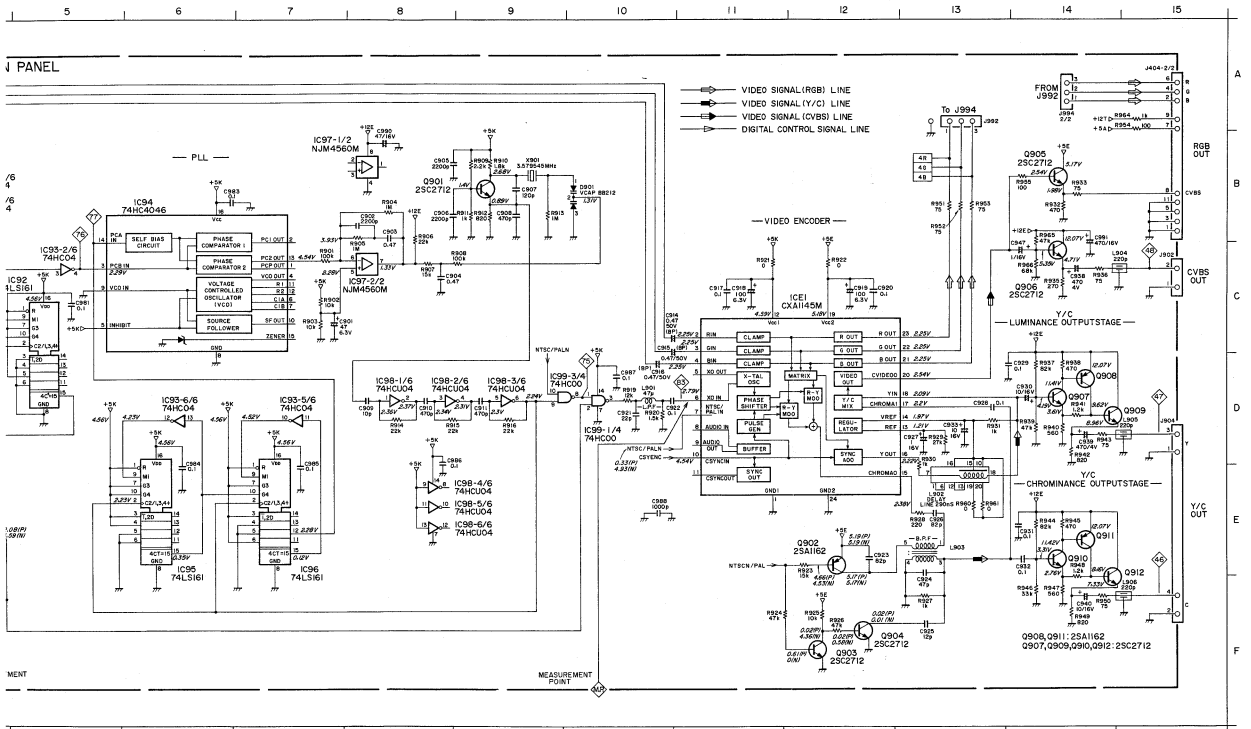
T101 B12

NOTE ON SAFETY :
Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

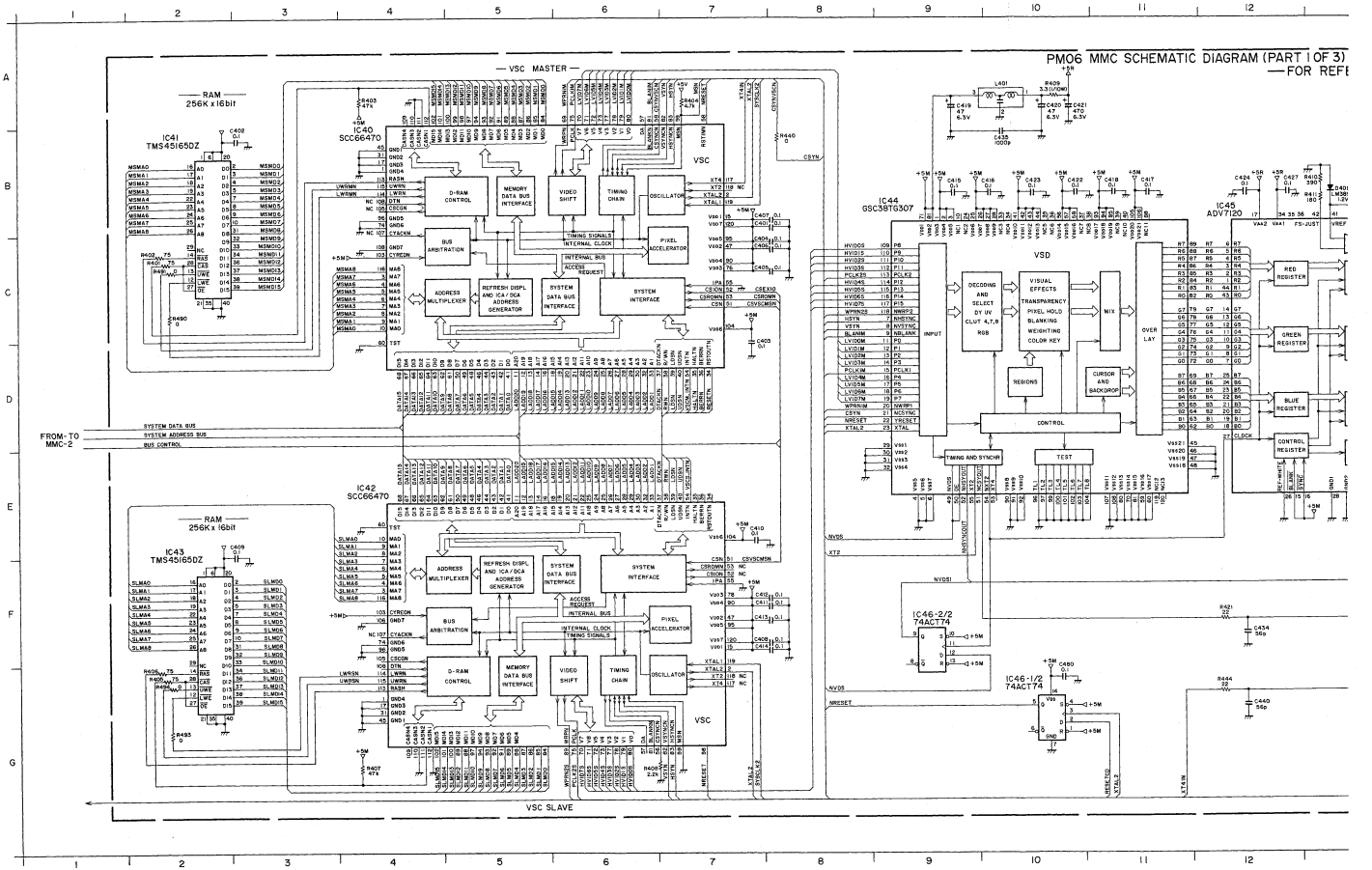
6.4.6 Video Schematic Diagram (Part 2)

( ): BOTTOM SIDE PARTS





6.4.7 MMC Schematic Diagram (Part 1)



( ): BOTTOM SIDE PARTS

(C401) B8
C402 B8
(C403) C7
C404 C8
C405 C8
C406 C8
(C407) B8
(C408) F8
C409 E3
(C410) E7

(C411) F8
C412 F8
(C413) F8
C414 F8
(C415) B9
(C416) B10
C417 B11
C418 B11
C419 A9
C420 A10

C421 A10
C422 B10
C423 B10
(C424) B12
C425 B12
C426 B14
(C427) B12
C434 F12
C435 B10
(C440) G12

C480 G10
D401 B13
(1C40) B4
1C41 B2
(1C42) E4
1C43 F2
(1C44) B9
(1C45) B12
1C46 F9
1C46 G10

L401 A10
R401 C2
R402 C2
(R403) A4
(R404) A7
R405 G2
R406 G2
(R407) G4
(R408) G6
R409 A10

R410 B13
R411 B13
(R412) C14
(R413) D14
(R414) D14
R421 F12
(R440) B8
(R444) G12
R490 C2
R491 C2

R493 G2
R494 G2

PM06 MMC SCHEMATIC DIAGRAM (PART 1 OF 3) ON MAIN PANEL
—FOR REFERENCE ONLY—

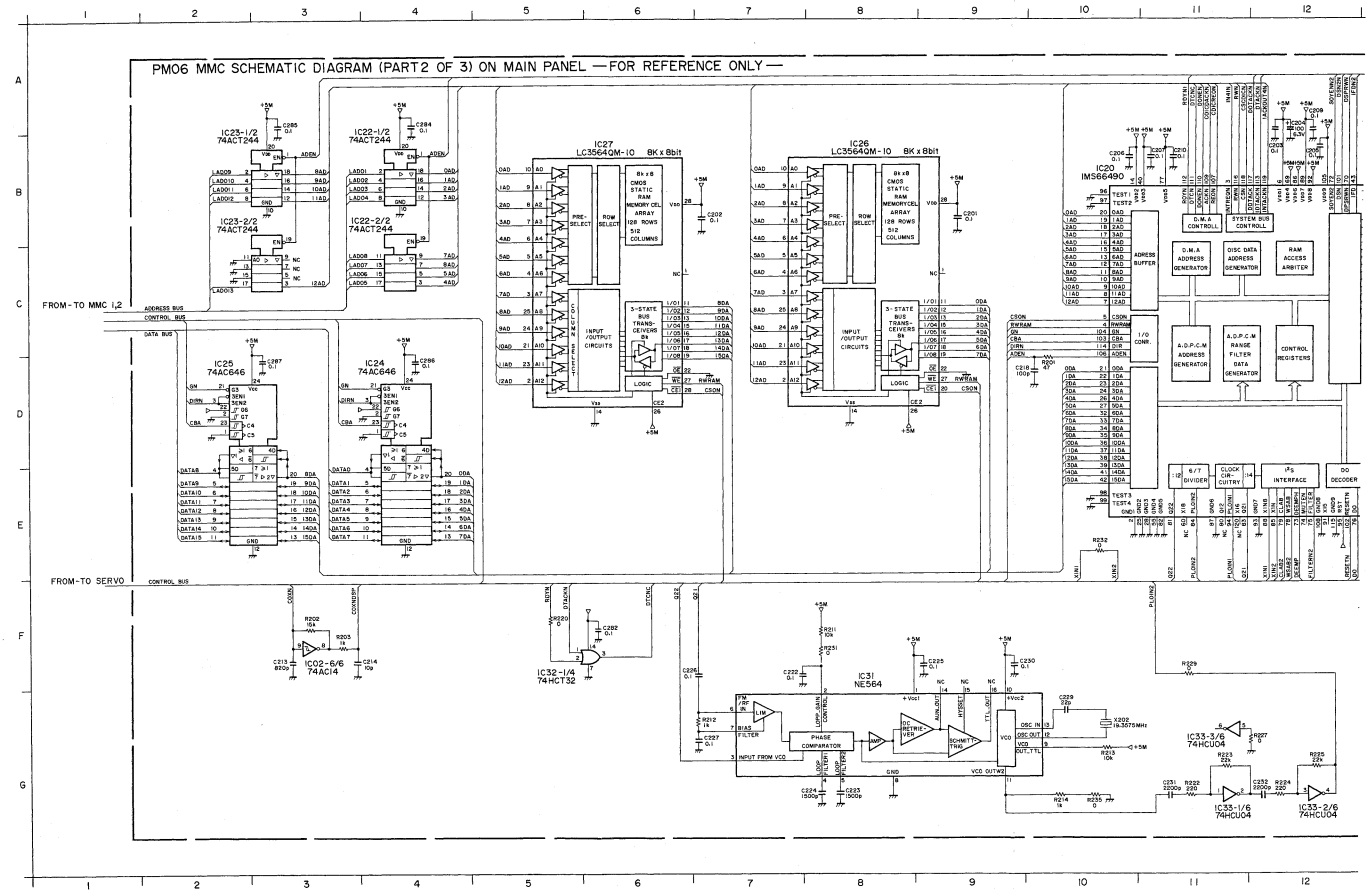
VSC MASTER

VSC SLAVE

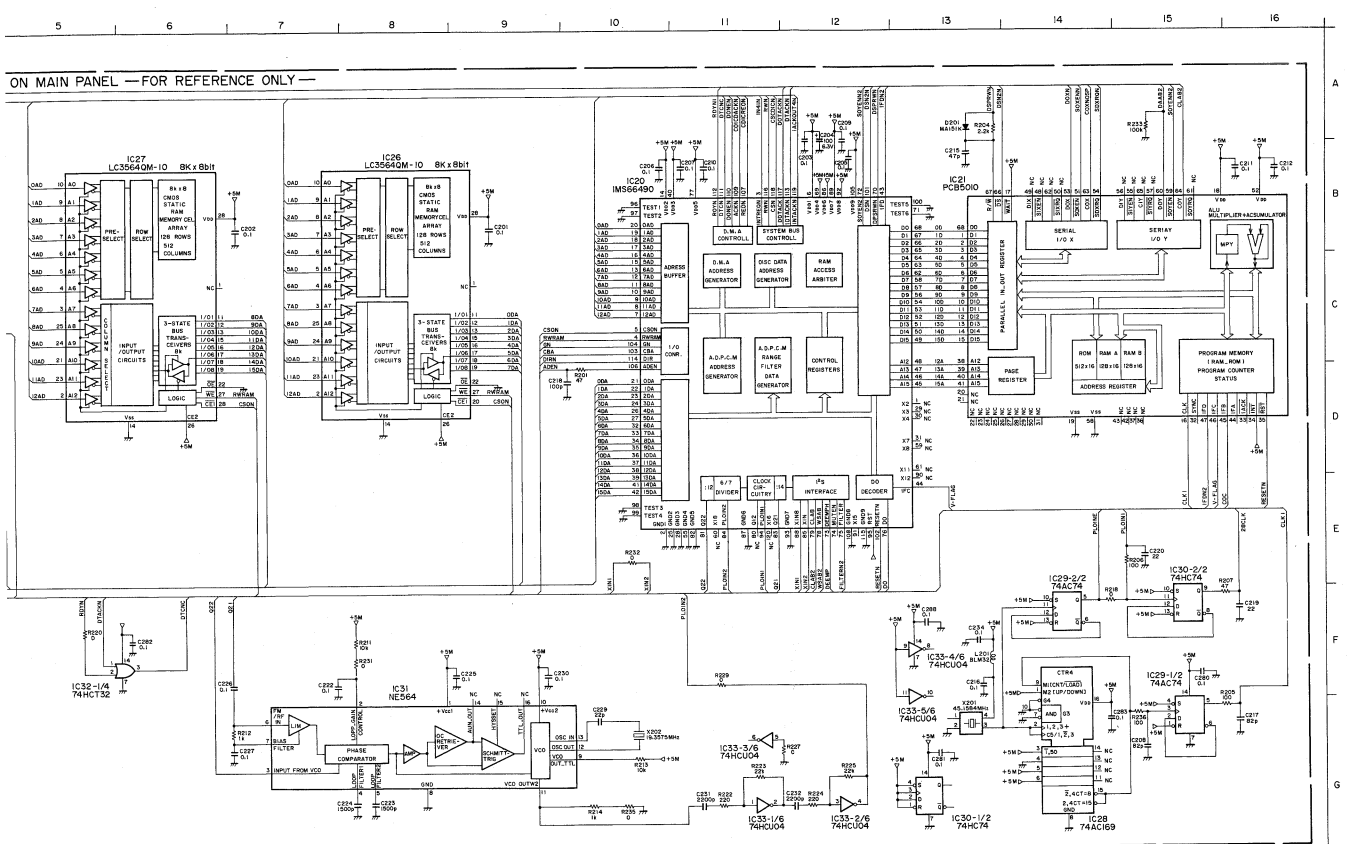
RGB CONTROL BLOCK
ENCODER BLOCK

RCD1, GCD1, BCD1
CSYENC, XT4ENC
NVDS1, NHSYNCOUT

6.4.8 MMC Schematic Diagram (Part 2)

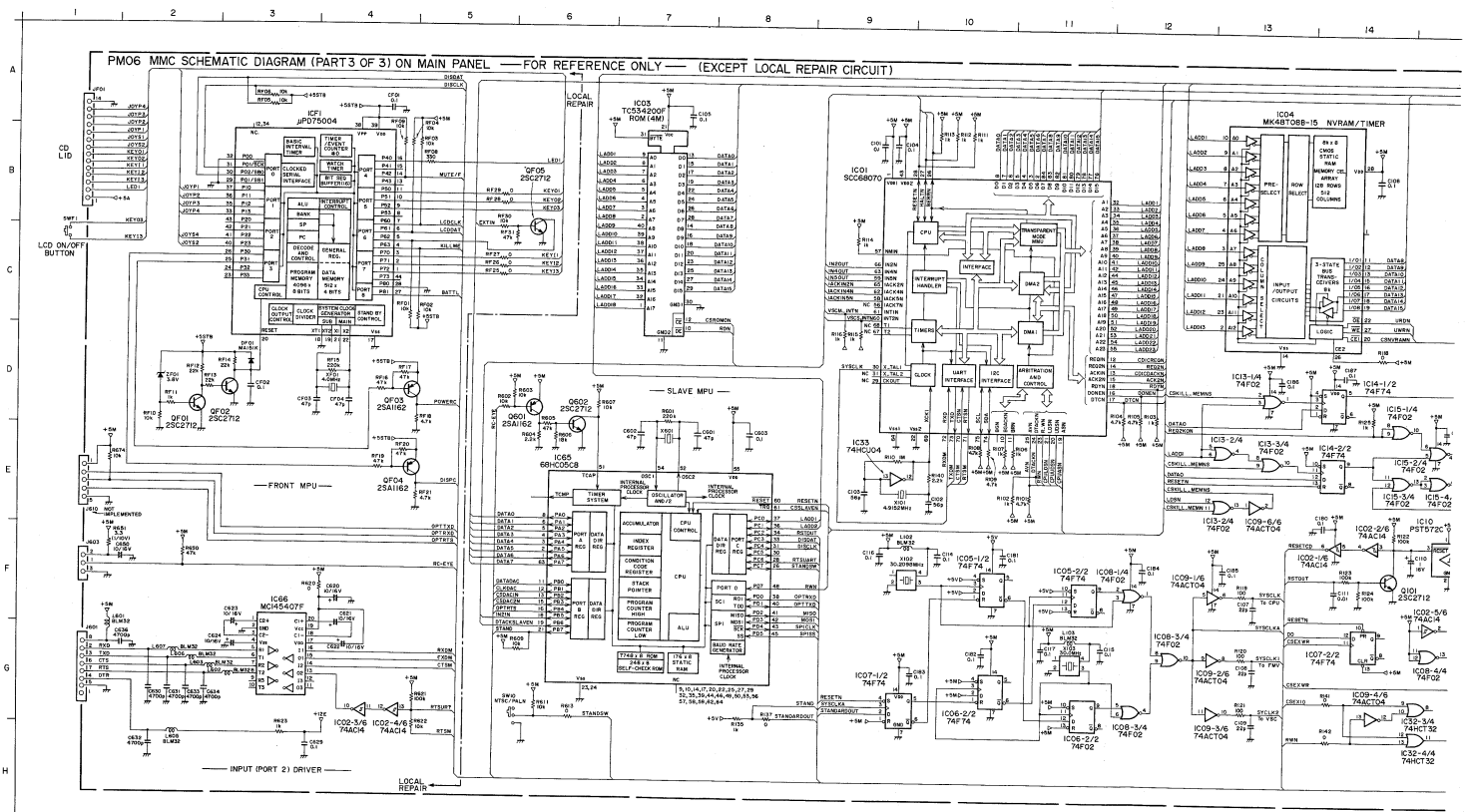


( ): BOTTOM SIDE PARTS

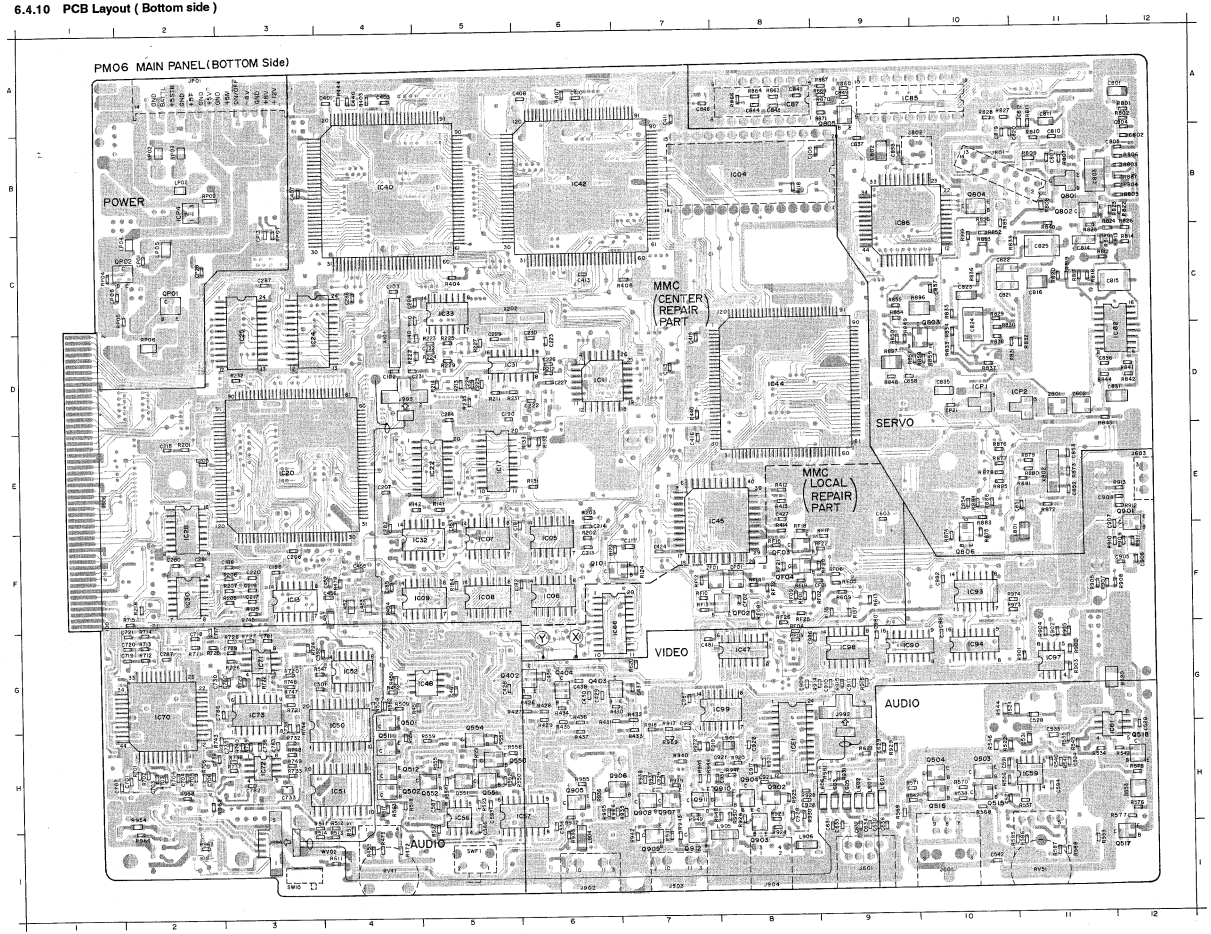


6.4.9 MMC Schematic Diagram (Part 3)

( ): BOTTOM SIDE PARTS

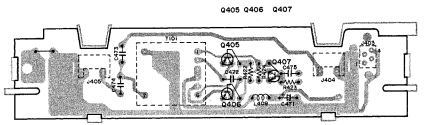


6.4.10 PCB Layout (Bottom side)

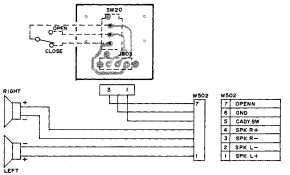


6.5 Other Panel (PS06,PP06,PI06,PB06,CD Lid)

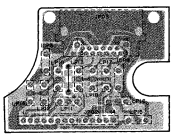
DC/AC CONVERTER PANEL(PB06)



CD LID SW PANEL(PS06)



POWER CONNECT PANEL(PP06)

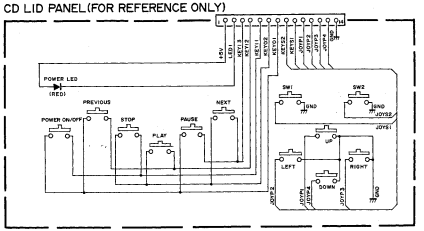


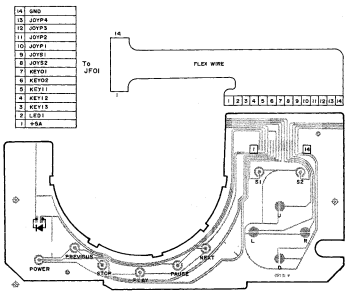
JP02	
14	GND
13	BATTL
12	+5STB
11	GND
10	+5.7
9	GND
8	+SAKE
7	GND
6	+9M
5	POWERC
4	-9V
3	GND
2	+9V
1	+12V

REMOTE IR PANEL(PI06)

J603	
3	GND
2	+5V
1	IR IN

CD LID PANEL(FOR REFERENCE ONLY)

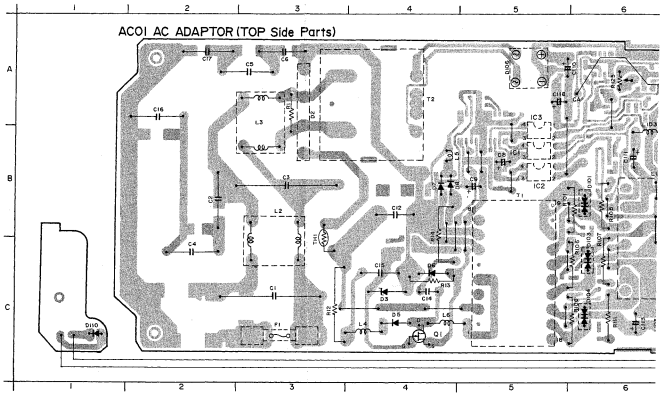




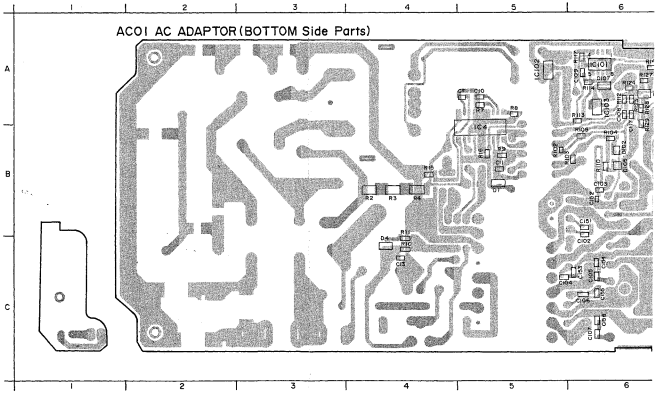
6.6 Power Supply Unit

6.6.1 PCB Layout

ACO1 AC ADAPTOR(TOP Side Parts)



ACO1 AC ADAPTOR(BOTTOM Side Parts)

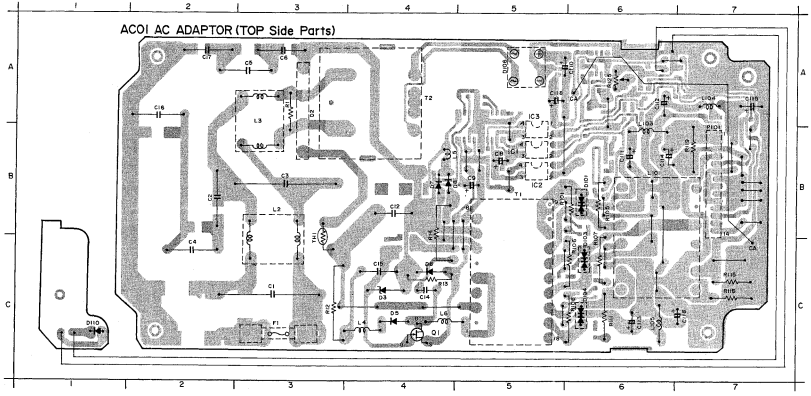


6.6 Power Supply Unit

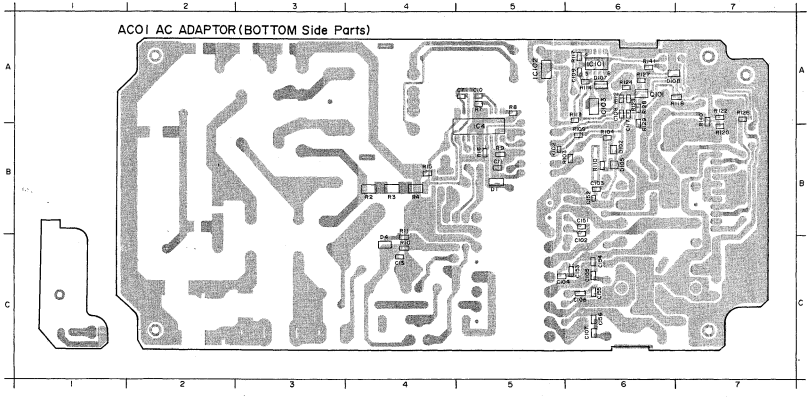
6.6.1 PCB Layout

W502

7	OPENIN
6	GND
5	CADYSW
4	SPK R+
3	SPK R−
2	SPK L−
1	SPK L+

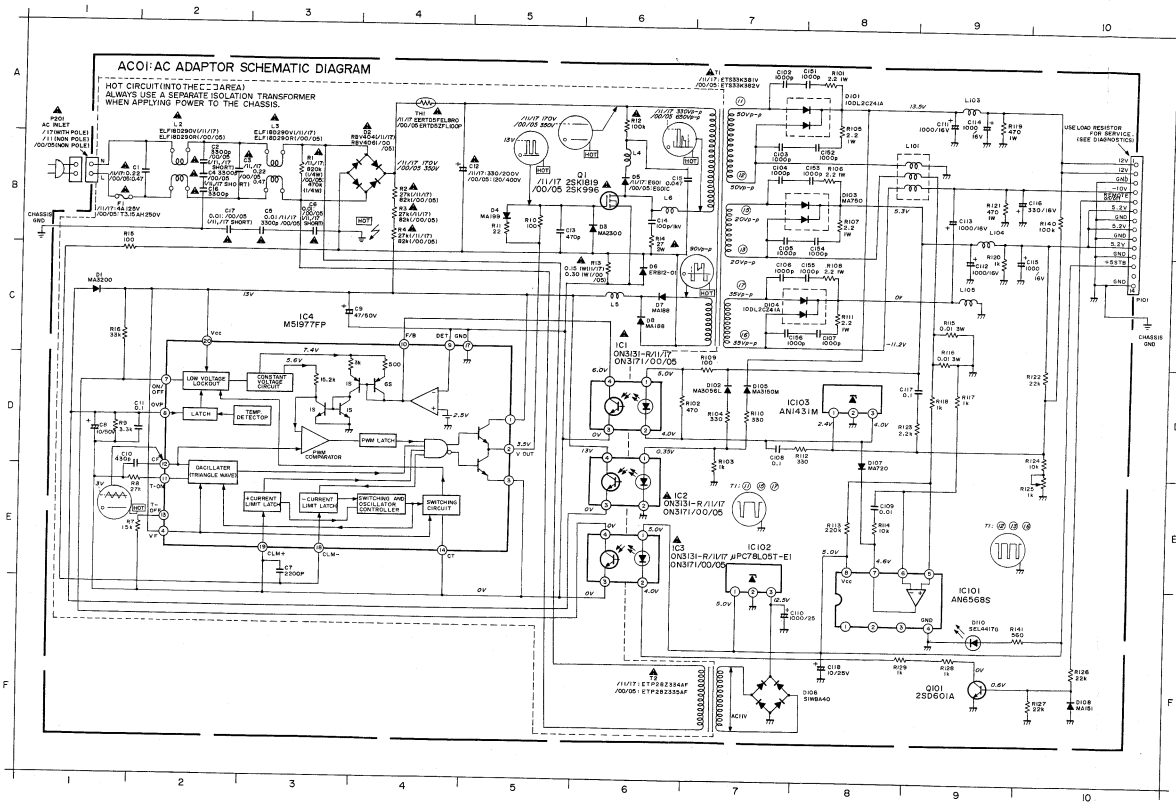


C1	C3	C16	C4	C118	A5	D106	A5	L6	C4	R101	B6
C2	B2	C18	A2	D2	A3	D111	C1	L101	B6	R105	B6
C3	B2	C17	A2	D3	C4	F1	C3	L103	B6	R106	C6
C4	C2	C110	A5	D5	C4	IC1	B5	L104	A7	R107	C6
C5	A3	C111	B6	D6	C4	IC2	B5	L105	C6	R108	C6
C6	A3	C112	A6	D7	B4	IC3	A5	P101	B7	R111	C5
C8	B3	C113	C6	D8	B4	L2	B3	Q1	C4	R115	C7
C9	B3	C114	B6	D101	B6	L3	A3	R1	A3	R116	C7
C12	B4	C115	A7	D103	C6	L4	C4	R12	C3	R119	B7
C14	C4	C116	C7	D104	C6	L5	B4	R13	C4	R125	A6
								R14	B4	T1	B5
										T2	A4
										TH1	C3



C7	A5	C108	A6	D4	C4	R2	B4	R104	B6	R123	A6
C10	A5	C109	A6	D102	B6	R3	B4	R109	B6	R124	A6
C11	B5	C117	A6	D105	B6	R4	B4	R110	B6	R126	A7
C13	C4	C151	B6	D107	A6	R7	A5	R113	A6	R127	A6
C102	C6	C152	C6	D108	A6	R8	A5	R113	A6	R128	A6
C103	B6	C153	C6	IC4	B5	R9	B5	R114	A6	R129	B6
C104	C6	C154	C6	IC101	A6	R10	C4	R117	A6	R140	A7
C105	C6	C155	C6	IC102	A5	R11	B4	R118	A7	R141	A6
C106	C6	C156	C6	IC103	A6	R15	B4	R120	B7		
C107	C6	D1	B5	Q101	A6	R16	B5	R122	A7		
						R102	B5				
						R103	B6				

6.6.2 Schematic Diagram



( ): BOTTOM SIDE PARTS

C1	B2	R119	A9
C2	B2	(R120)	C9
C3	B2	R121	B9
C4	B2	(R122)	D10
C5	B3	(R123)	D9
C6	B3	(R124)	D10
C7	C3	R125	E10
C8	D1	(R126)	F10
C9	C3	(R127)	F10
(C10)	E2	(R128)	F9
(C11)	D2	(R129)	F8
C12	B4	(R140)	B10
(C13)	B5	(R141)	F10
C14	B6	T1	A7
C15	B6	T2	F7
C16	B6	TH1	A4
(C101)	A7		
(C102)	A7		
(C103)	B7		
(C104)	B7		
(C105)	B7		
(C106)	C7		
(C107)	C8		
(C108)	D7		
(C109)	E8		
C110	F7		
C111	A9		
C112	C9		
C113	B9		
C114	A9		
C115	C9		
C116	B9		
(C117)	D9		
C118	F8		
C151	A8		
C152	B8		
C153	B8		
C154	B8		
C155	D8		
(C156)	C7		
(D1)	C1		
D2	B4		
D3	B5		
D4	B5		
D5	B6		
D6	C6		
D7	C6		
D8	C6		
(D101)	A8		
(D102)	D7		
D103	B8		
D104	C8		
(D105)	D7		
D106	F7		
(D107)	D8		
(D108)	F10		
D110	F9		
F1	B1		
IC1	C6		
IC2	E6		
IC3	E6		
(IC4)	C3		
(IC101)	F9		
(IC102)	E7		
IC103	D8		
L2	B2		
L3	B3		
L4	B6		
L5	C6		
L6	B6		
L101	B8		
L103	A9		
L104	B9		
L105	C9		
P101	C10		
P201	A1		
Q1	B6		
(Q101)	F9		
R1	B3		
(R2)	B4		
(R3)	B4		
(R4)	B4		
(R7)	E2		
(R8)	E2		
R9	D1		
(R10)	B5		
(R11)	B5		
R12	A6		
R13	D6		
R14	B6		
(R15)	C1		
(R16)	C1		
R101	A8		
(R102)	D6		
R103	D7		
(R104)	D7		
R105	A8		
R106	B8		
R107	B8		
R108	C8		
(R109)	D7		
(R110)	D7		
R111	C8		
(R112)	D8		
(R113)	E8		
(R114)	E8		
R115	C9		
R116	C9		
(R117)	D9		
(R118)	D9		

/11/17 Model

CAUTION: FOR CONTIUED PROTECTION AGAINST FIRE HAZARD. REPLACE ONLY WITH THE SAME TYPE 4A 125V FUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES AISQUES D'INCEIE N'UTILJSER QUE DES FUSIBLE DE MÉME TYPE 4A 125V

4A 125V

/00/05 Model

CAUTION: FOR CONTIUED PROTECTION AGAINST FIRE HAZARD. REPLACE ONLY WITH THE SAME TYPE T3.15AH 250VFUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES AISQUES D'INCEIE N'UTILJSER QUE DES FUSIBLE DE MÉME TYPE T3.15AH 250V

NOTE ON SAFETY :
Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

7 DIAGNOSTICS

7.1 Troubleshooting and repair

General Sequence:

1. Power ON/OFF (controled by Front CPU, ICF1)
   (1) ICF1 power voltage (+5STB; standby power)
   (2) ICF1 clock signal
   (3) ICF1 keyscan signal (during pressed switch)
   (4) ICF1 Power control signal (POWERC)
   (5) +5M voltage

2. Power Voltage
   (1) ICF1 Power control signal (POWERC)
   (2) +5M (for MMC)
   (3) other voltage

3. Low Level Test (Operating is same as CDI205)

4. Service Shell (Operating is same as CDI205)
   How to activated of Service Shell for CDI360
   (1) Power OFF
   (2) Press two switches: Display ON/OFF and Action button 2
   (3) Power ON
   and release two switch if after Power ON

5. Measurement Each Circuit

7.1.1 Power supply unit

Preparation

- Load Resistor and Power ON/OFF switch
Switching power supply is needed load resistor when servicing. And this power supply is needed Power ON/OFF switch for standby circuit.

1. Load Resistor
For service purposes you only have to connect the two load resistance to the +5M and +5F (+5V).
Use two 5.1 ohm, 10W resistor, code number 4822 053 34518.

2. Power ON/OFF switch
For service purposes you only have to connect a switch between +5STB and Power ON/OFF.

CAUTION.
- Never turn on the power supply if no load resistor has been connected.
- Safety regulations require that the set under repair should be restored to its original state and that components identical to the ones specified should used.
- For reasons of safety, components. For code number refer to the parts list of electrical components.

7.2 Mainboard

7.2.1 Power voltage

JP01 (after Power ON)

Pin	Name/Voltage	Power lines of separated
1	+12V	+12T,+5L,+10A,+12E +12B,+12V(SP)
2	+12V	+8S
3	GND	
4	-10V	-8L,-8S,-8A
5	Power ON/OFF	(ON:5V,OFF:0V)
6	+5.2V	+5M
7	GND	
8	+5.2V	+5A,+5K,+5E
9	GND	
10	+5.2V	+5F
11	GND	
12	+5V(Standby)	+5STB
13	BATTL	(Full:5V,Low:0V)
14	GND	

Power lines

+12T	Video 2
+5L	Video 1 (for LCD panel)
+10A	Audio 1 and 2
+12E	Video 2
+12B	Video 1 (for LCD backlight)
+12V(SP)	Audio 2 (for speaker amp)
+8S (+5S)	Servo
-8L	Video 1
-8S (-5S)	Servo
-8A	Audio 1 and 2
+5M	MMC,etc. (for digital circuit)
+5A	Audio 1 and 2
+5K	Video 2 (for digital circuit)
+5E	Video 2 (for Analog circuit)
+5F	MMC (for Extention socket)
+5STB	MMC (for ICF1,Front uCOM)

7.2.2 Measurements Servo circuit

In the circuit diagrams and on the drawings of the panels measuring points are marked with : .
Some times signals to be measured are pointed as for example : IC80 pin1.
All DC signals are measured with an universal electronic voltmeter.
All AC signals are measured with an oscilloscoop

7.2.2.1 Lasercurrent.

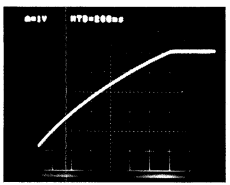
The lasercurrent is adjusted in the CDM9 and is a factory adjustment. After replacing a defective CDM the laser current does not need to be adjusted.
Play track 1 of testdisc 5, the voltage accross measuring point 1 and point 2
should be : 0.7 V / DC +/-10 %.

7.2.2.2 Focus signal.

Play track 1 of testdisc 5, the voltage accross measuring point 3 and GND
should be : + 400 mV / DC +/-10%.

7.2.2.3 Starting signal.

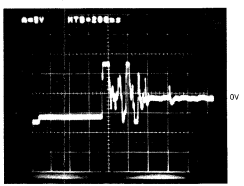
Insert a disc and measure accross measuring point 4 and GND. After pushing the play button the next picture appears on the oscilloscoop :



The signal is triggered by the SI/RD signal on IC80 pin6.

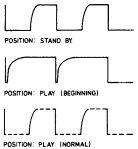
7.2.2.4 Motorcontrol signals.

Insert testdisc 5.
Measure accross IC83 pin3 and GND, after pushing the play button the next picture should appear on the oscilloscope.

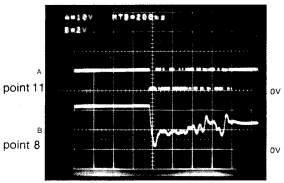


After a while, when playing track 1, the voltage should be:
- 1.7 V DC +/-10%
Play track 1 of testdisc 5, the voltage across measuring point 6 and ground should be: 3.2V DC +/-10%

Signal accross measuring point 7 and GND should be :

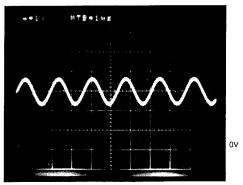


Insert test disc 5. Accross measuring point 8 and GND the next picture should appear on the oscilloscope after pushing the play button



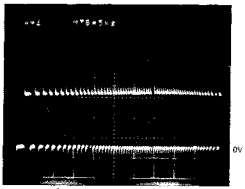
7.2.2.5 Radial error circuit signals.

Voltage accross measuring point 18 and GND :
2,6 V / DC +/- 10%.
Voltage accross measuring point 19 and GND :
110 mV / DC +/- 10% in PLAY mode.
Voltage accross measuring point 21 and GND :
1,2 V / DC +/- 10% in PLAY mode.
Voltage accross measuring point 22 and GND :



Voltage accross measuring points 23,24,26 and 27 denpending on playing mode, 0 V if LOW or 5V if HIGH

For measuring point 28 and 33 put the player in the service shell on CD drive test mode 2. The voltage accross point 28 and GND should be :

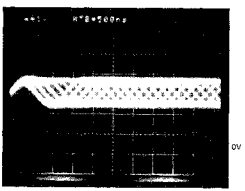


7.2.2.6 Clock signal IC88

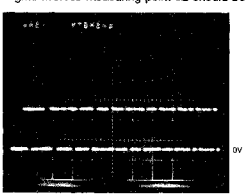
Measuring point 29 : clock signal f = 4MHz.

7.2.2.7 Decoder signals

Play track 1 of testdisc 5.
The signal accross measuring point 31 and GND should be:



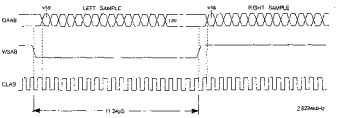
Insert testdisc 5 and put the player in the service shell on CD drive test mode 2.
The signal accross measuring point 32 should be :



Measuring point 34 : clock signal f = 11.289.600 Hz.
Voltage accross measuring point 37 and 37 :
775 mV /DC +/- 10%

Measuring points 38 : LOW. If the blackdot track of testdisc 5A is played then pulses activity should be measured on this point.

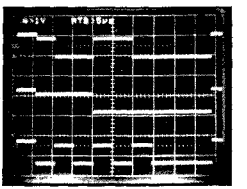
Measuring point 39,41 and 42 :



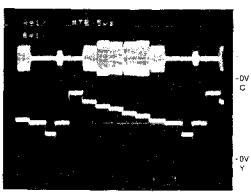
7.2.2.8 Video signals

Put the player in the service shell on testimage (colorbar).

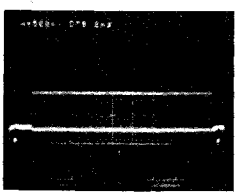
Measuring point 43 and 44 :



Measuring point 46 :



Measuring point 47 :



7.2.3 Measurments Audio circuit

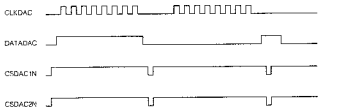
Select the submenu "MMC slave" of the Service Shell, see section 5.2. With this menu we can check besides the remote control functions also the audio functions L-R and mono/streo. This audio function can only be checked when an audio-disc is inserted. When any disturbances occur, the following checks/measuerments can be performed (2 % 8).

Required test discs:
Use an arbitrary Digital Audio disc in the service shell, submenu MMC slave.
Test disc no.5-5A (4822 397 30096 - SBC 426)
Use launch disc or arbitrary CD-I disc which contains audio levels A-B-C and/or CD-DA
Audio signals disc (4822 397 30184 - SBC 429)

7.2.3.1 Slave processor data

Check whether the signals appear on test/measurments points 66 % 69 from the slave processor.

66 - CLKDAC
67 - DATADAC
68 - CSDAC1N
69 - CSDAC2N

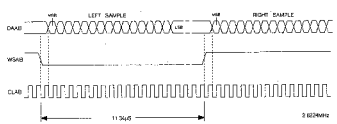


There signals are very hard to recognize on an oscilloscope during the normal application. Only in the service shell and controlling the attenuators you can observe activity.
If there is any activity on one of the lines 66 % 69 one can suppose that the information of this signals are oke. This is also to be considered for the data lines D0 % D7.

If no disturbances, check the data outputs D0 % D7 of IC52.

7.2.3.2 I2S signals

Ckeck whether the signals, given below, appear on the testpoints 57 - 58 - 59.
Time base related only to CD-DA.



7.2.3.3 Xin clock signal

(testpoint 61)

Play a CD-DA track.
The frequency of the Xin signal must be :
11.2896 MHz (CD-DA)

Play CD-I audio.
9.767 MHz for CD-I level A and CD-I level B.
4.838 MHz for CD-I level C.

7.2.3.4 DEEMP signal

(testpoint 56)
Insert test disc 5 or 5A and during track 14 (recorderd without pre-emphasis) the signal DEEMP should be low. (0V)
During track 15 (recorded with pre-emphasis) this signal DEEMP should be high (+5V).

7.2.3.5 FILTERN signal

(testpoint 62)
Insert CD-I disc which contains audio levels A-B-C and/or Digital audio.
This signal FILTERN should be high (+5V). In case a track is played back with audio level C (speech).
The signal FILTERN should be low (0V), in case of level A or B or DA.

7.2.3.6 KILL signal

(test point 54)
This KILL signal must be +5V during reset. In normal/play position this signal is -8V.

7.2.3.7 Performance check APU

Position digital audio
- Insert Audio signals test disc 1, SBC 429.
- Play track no.1. (1kHz sinus signal L + R 0dB)
- The level on testpoint 63 and 64 should be: 0.9Vrms +/- 2dB

If this level deviates check firstthe signals

FILTERN	62	step 6
KILL	54	step 7
Xin	61	step 4

- The level on testpoint 71 and 72 should be: 2 Vrms +/- 3dB.

Position audio level C
- Insert CD-I disc
- Play track with audio .level C, 1kHz L + R, 0dB.
- The level on testpoint 63 and 64 should be: 0.9V rms +/- 3dB

If this level deviates check first the signals

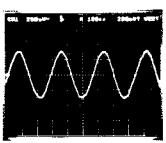
FILTERN	62	step 6
KILLM	54	step 7

- The level on test point 71 and 72 should be: 2Vrms +/-3dB.

7.2.4 Measurements & adjustments Video 2 circuit
(Video Encoder)

Required test equipment.
- Electronic voltmeter
- Oscilloscope
- Frequency counter

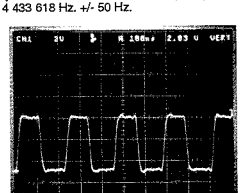
7.2.4.1 Check of NTSC subcarrier .
- Player switched off.
- Standard switch NTSC/PAL (SW10) in position 525, NTSC.
- Connect frequency counter to testpoint 83 , (Pin 6 ICE1) and turn on the player.
- The frequency on testpoint 83 should be; 3 579 545 Hz. +/- 50 Hz.
- The amplitude on testpoint 83 should be in between; 400 mV and 1000 mVpp



- Now check if the lock signal on testpoint 76, (pin 3 of IC94) meets 39335 Hz +/- 8 Hz. and the divided VCO output signal on testpoint 77 . (pin 14 of IC 94) meets also meets 39335 Hz +/- 8 Hz.

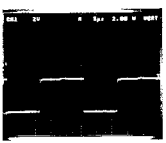
7.2.4.2 Check of PAL subcarrier .
- Player switched off.
- Standard switch NTSC/PAL (SW10) in position 625, PAL.
- Connect frequency counter to testpoint 83 ,(Pin 6 IC ICE1) and turn on the player.
- The frequency on testpoint 83 should be; 4 433 618 Hz. +/- 50 Hz.
- The amplitude on testpoint 83 should be in between; 400 mV and 1000 mVpp
- If the frequency of this signal deviates, perform alignment of trimmer CV91.

Adjustment PAL sub carrier oscillator.
- Player switched off.
- Standard switch NTSC/PAL (SW10) in position 625, PAL .
- Connect frequency counter to testpoint 83 and turn on the player.
- Adjust with trimmer CV91, the frequency on testpoint 83 at 4 433 618 Hz. +/- 50 Hz.

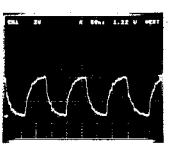


7.2.4.3 Check of Phase Locked Loop. (NTSC Only)
- Check if the lock signal for NTSC on testpoint 76 , (pin 3 of IC94) meets 39335 Hz +/- 8 Hz.
If this frequency deviates check: XT4, HSYNC, and KILLM.

- Check if the divided VCO outputsignal on testpoint 77 , (pin 14 of IC94) meets 39335 Hz +/- 8 Hz.



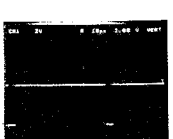
7.2.4.4 Check of XT4, System clock divided by 4 (NTSC Only)
The divided by 4 system clock frequency on testpoint 79 , should be: 7 552 450 Hz .
If this clocksignal deviates check the IC40 pin117.



7.2.4.5 Check of standard control signal SW
In case of NTSC (525) the control signal SW on testpoint 78, should be high (+ 5 V).
In case of PAL (625) this signal sould be low (0 V)
If this signal deviates check the IC65 26pin

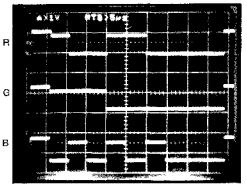
7.2.4.6 Check of KILLM signal. (NTSC Only)
This KILLM signal (active Low) on testpoint 82, (pin 3 of IC91) should be low (0 V) incase of Non interlaced video.

7.2.4.7 Check of HSYNC signal. (NTSC Only)
The horizontal synchronisation signal for NTSC standard is given on the photograph below. Testpoint 81, (pin 1 IC90)

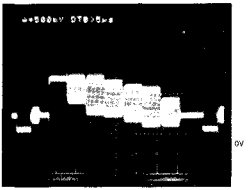


7.2.4.8 Check of RGB input signals

On the given photo below the signals are given for R - G - B in case of NTSC. On Testpoints 86 87 88.

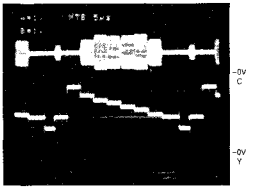


Check of Output signals for CVBS - Y / C.



CVBS signals
Testpoint 89

	PAL-CVBS	NTSC-CVBS
- Video signal	1000 mVpp	1000 mVpp
- White level	710 mVpp	710 mVpp
- sync	290 mVpp	290 mVpp
- Burst	290 mVpp	290 mVpp



Y/C signals
Testpoint 91/92

	NTSC- Y/C Sign.	Testpoint 91/92
- Video signal	1000 mVppl	1000 mVpp
- White level	710 mVpp	710 mVpp
- sync	290 mVpp	290 mVpp
- Chroma	300 mVpp	300 mVpp

7.2.5 Measurements MMC circuit

Required equipment:
Multimeter
Display terminal type Digital VT220 or VT100
Digital oscilloscope
Analog oscilloscope
Timer/counter

7.2.5.1 Clock signals:
Carry out measurements just after hardware reset. This is dine each time after pressing Power ON/OFF switch, or interconnect point X and Y without CD Lid. (see the section 4.1.4)

System clock = 30.2098 MHz +/- 600 Hz (NTSC)
30.0000 MHz +/- 1500 Hz (PAL)

- Changed by PAL/NTSC switch

This system clock must be present at the following points:
IC01 pin 30
IC40 pin 119
IC42 pin 119

At IC01pin 29 Clock divided by two must be present for
NTSC 15.1049 MHz (=30.2098 : 2)
PAL 15.000 MHz (=30.000 : 2).

At IC01 pin 69 the UART clock of 68070 must be present.
Frequency 4.9152 MHz +/- 250 Hz

At IC65 pin 54 clock of '68HC05' must be present.
Frequency 4.000 MHz +/- 100 Hz

At IC20 pin94 the clock of the CDIC must me present.
Frequency 22.5792 MHz +/- 1100 Hz.
At IC21 pin16 the DSP clock must be present.
Frequency 7.5264MHz +/- 380 Hz

At IC87 pin9 the '2B-clock' must be present.
Frequency 11.2896 MHz +/- 560 Hz

Carry out measurements at IC40 pin117. Clock of 'XT4' must be present. For
Frequency 7.55245 +/- 150 Hz for NTSC
7.5000 +/- 380 Hz for PAL

The frequency at IC88 pin37 'COXN' must be 75kHz +/- 25kHz.

7.2.5.2 Reset circuitry:
Power ON and measure the 'RESETCD' time
This 'low' time must be 140ms +/- 20 ms

Also measure the RESETCD time (low!) if the button is released. The signal
RESETCD must be low for 140ms +/- 20ms.

IC7201 pin 28 RESETN; low time = 250 ms +/- 20 ms

7.2.5.3 Check of microprocessor 68070.
Check after power on:
IC01, pin 27 (= HALTN) = high (+5V)
IC01, pin 28 (= RESETN) = high (+5V)
IC01, pin 24 (=DTACKN) = changing high/low
IC01, pin 26 (=BERRN) = high (+5V)

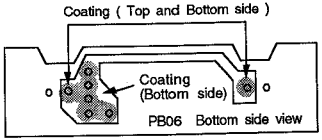
7.2.5.4 Low level test
Purpose is to test the hardware with software.
Connect a terminal, or test PCB to the UART of microprocessor 68070 via connector at INPUT (port2).

Settings of the terminal:
Baudrate : 9600
start bit : 1
data bists : 8
stop bits : 0
no parity
no handshake

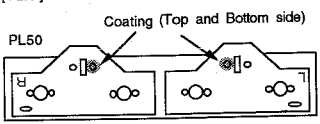
7.3 LCD screen unit and PL50,PB06

Coating pointe : The soldering point of the FL lamp must be coated the silicon-gum for the isolation.

[PB06]

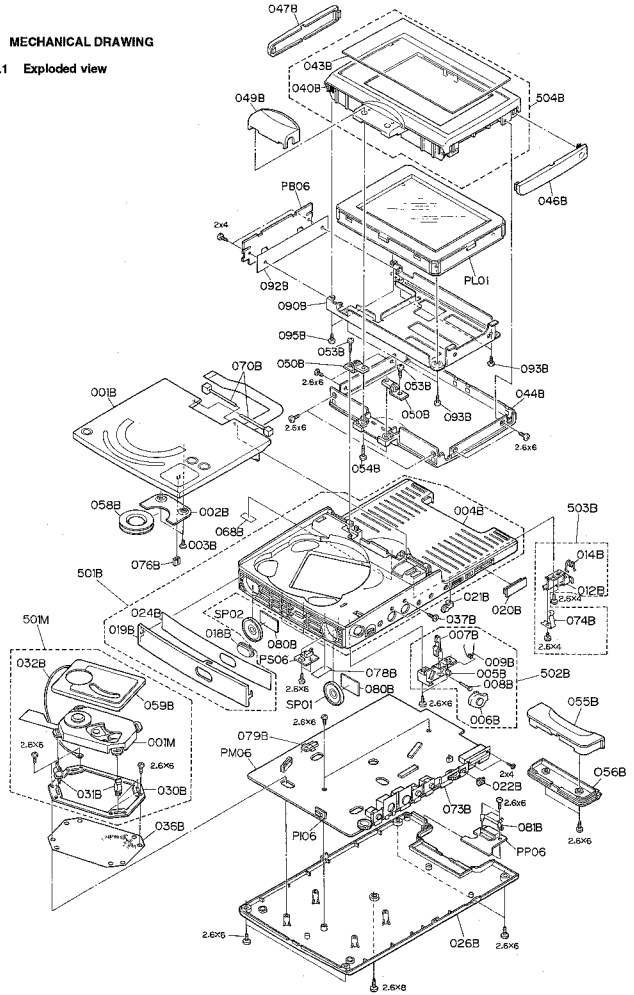


[PL50]



8 MECHANICAL DRAWING

8.1 Exploded view



9 PARTS LIST

9.1 Exploded view parts list

Position nbr.	Service code	Description
001B	4822 444 30461	CD COVER WITH KEYS
002B	4822 402 61464	CLAMPER BRACKET
003B	4822 502 13203	SCREW CLAMPER BRACKET
020B	4822 444 60883	RGB CONN. COVER
021B	4822 410 62344	LCD ON/OFF BUTTON
022B	4822 410 62343	PAL/NTSC BUTTON
026B	4822 444 50694	BOTTOM CASE ASSY
036B	4822 444 60884	COSMETIC CDM COVER
037B	4822 502 21335	P.H.M. SCREW 2.6x6
044B	4822 444 50709	LCD BOTTOM CASE
046B	4822 444 40611	R SIDE CAP LCD CASE
047B	4822 444 40612	L SIDE CAP LCD CASE
049B	4822 444 60879	LCD HINGE COVER
050B	4822 417 11179	LCD HINGE
053B	4822 502 21334	L.WASHER SCREW HINGE UNIT
054B	4822 502 30701	SCREW HINGE COVER
055B	4822 444 60881	FMV TOP COVER
056B	4822 444 50692	FMV BOTTOM COVER
058B	4822 532 21464	CLAMPER
070B	4822 535 93367	HOLDER ASSY
076B	4822 462 71896	LID CAP
501B	4822 444 60886	MAIN CASE ASSY
502B	4822 256 92004	EJECT HOLDER ASSY
503B	4822 402 61467	OPEN BRACKET ASSY
504B	4822 444 50711	LCD TOP CASE ASSY
501M	4822 693 91593	CDM9 ASSY
PL01	4822 130 91096	LCD SCREEN UNIT LQ6RA01
PP06	4822 214 52034	POWER CONNECT PCB
PS06	4822 214 52035	LID SWITCH PCB
PB06	4822 214 52096	BACKLIGHT DC-AC PCB
SP01	4822 240 30598	SPEAKER
SP02	4822 240 30598	SPEAKER
093B		P.H.M SCREW LCD+BRACKET 3x8
095B		P.H.M SCREW BRACKET+LCD CASE 2x6

9.2 Electrical parts list

AUDIO

C501	4822 126 11687	GRM39F104Z16 0.1µF
C502	4822 126 11687	GRM39F104Z16 0.1µF
C503	4822 126 11663	12pF/50V
C504	4822 124 11075	22µF/16V
C505	4822 126 11663	12pF/50V
C506	4822 124 11075	22µF/16V
C507	4822 126 11663	12pF/50V
C508	4822 124 11075	22µF/16V
C509	4822 126 11663	12pF/50V
C510	4822 124 11075	22µF/16V
C511	4822 122 33744	100pF (GR39) 50V
C512	4822 122 33744	100pF (GR39) 50V
C513	4822 122 32672	1µF/16V TANTAL
C514	4822 122 32672	1µF/16V TANTAL
C515	4822 116 82487	0Ω ±5% 1/16W
C516	4822 122 33744	100pF (GR39) 50V
C517	4822 122 32672	1µF/16V TANTAL
C518	4822 122 33744	100pF (GR39) 50V
C519	4822 122 32672	1µF/16V TANTAL
C521	4822 126 11681	1000pF (GR39) 50V
C522	4822 124 11075	22µF/16V
C524	4822 126 11681	1000pF (GR39) 50V
C525	4822 124 11075	22µF/16V
C526	4822 126 11687	GRM39F104Z16 0.1µF
C527	4822 122 32672	1µF/16V TANTAL
C528	4822 122 33701	0.022µF/50V
C529	4822 126 11687	GRM39F104Z16 0.1µF
C530	4822 122 32672	1µF/16V
C531	4822 122 33701	0.022µF/50V
C532	4822 122 32667	0.01µF Z 50V
C533	4822 122 32667	0.01µF Z 50V
C534	4822 124 11075	22µF/16V
C535	4822 124 11075	22µF/16V
C536	4822 126 11687	GRM39F104Z16 0.1µF
C537	4822 124 80412	220µF/16V
C538	4822 124 80412	220µF/16V
C541	4822 124 11075	22µF/16V
C542	4822 116 82487	0Ω ±5% 1/16W
C543	4822 124 80412	220µF/16V
C546	4822 122 32672	1µF/16V
C547	4822 122 32672	1µF/16V
C550	4822 124 10773	4.7µF/25V
C580	4822 126 11687	GRM39F104Z16 0.1µF
C581	4822 126 11687	GRM39F104Z16 0.1µF
C582	4822 126 11687	GRM39F104Z16 0.1µF
C583	4822 126 11687	GRM39F104Z16 0.1µF
C586	4822 126 11687	GRM39F104Z16 0.1µF
C587	4822 126 11687	GRM39F104Z16 0.1µF
C588	4822 126 11687	GRM39F104Z16 0.1µF
C589	4822 126 11687	GRM39F104Z16 0.1µF
C591	4822 126 11687	GRM39F104Z16 0.1µF
C592	4822 126 11687	GRM39F194Z16 0.1µF
C593	4822 126 11687	GRM39F104Z16 0.1µF
C594	4822 126 11687	GRM39F104Z16 0.1µF
C595	4822 124 41842	47µF/16V EL CAP
C701	4822 126 11695	GR39 330pF
C702	4822 126 12495	GR39 1500pF/50V
C703	4822 126 12701	GR39 51pF/50V
C704	4822 126 12494	GR39 51pF CH 50VDC
C705	4822 126 12495	1500pF (GR39) 50V
C706	4822 126 12493	330pF ±5% J CG
C707	4822 126 11687	GRM39F104Z16 0.1µF
C708	4822 126 11687	GRM39F104Z16 0.1µF
C709	4822 124 11131	47µF/6.3V
C710	4822 126 11687	GRM39F104Z16 0.1µF
C711	4822 124 11131	47µF/6.3V
C712	4822 126 11687	GRM39F104Z16 0.1µF
C713	4822 124 11131	47µF/6.3V
C714	4822 126 11687	GRM39F104Z16 0.1µF
C715	4822 124 11131	47µF/6.3V
C718	4822 126 11681	1000pF (GR39) 50V
C719	4822 126 11682	220pF (GR39) 50V
C720	4822 126 11682	220pF (GR39) 50V
C721	4822 126 11682	220pF (GR39) 50V
C722	4822 126 11687	GRM39F104Z16 0.1µF
C723	4822 124 11131	47µF/6.3V
C724	4822 126 11687	GRM39F104Z16 0.1µF
C725	4822 124 11131	47µF/6.3V
C726	4822 123 30379	1200pF/50V
C727	4822 123 30376	1000pF/50V
C728	4822 124 11075	22µF/16V
C730	4822 126 11681	1000pF (GR39) 50V
C731	4822 124 11075	22µF/16V
C732	4822 124 30379	1200pF/50V
C733	4822 124 30376	1000pF/50V
C734	4822 124 11075	22µF/16V
C736	4822 126 11681	1000pF (GR39) 50V
C737	4822 124 11075	22µF/16V 50V
C738	4822 126 11687	GRM39F104Z16 0.1µF
C739	4822 126 11687	GRM39F104Z16 0.1µF
C740	4822 124 11131	47µF/6.3V
C741	4822 123 30379	1200pF/50V
C742	4822 123 30379	1200pF/50V
C780	4822 126 11687	GRM39F104Z16 0.1µF
C781	4822 126 11687	GRM39F104Z16 0.1µF
C782	4822 126 11687	GRM39F104Z16 0.1µF
C783	4822 126 11687	GRM39F104Z16 0.1µF
C784	4822 126 11687	GRM39F104Z16 0.1µF
C785	4822 126 11687	GRM39F104Z16 0.1µF
C786	4822 126 11687	GRM39F104Z16 0.1µF
C787	4822 126 11681	1000pF/50V GR39
C596	4822 124 41842	47µF/16V
C726	4822 123 30365	1200pF J 16V ECWU1C
C727	4822 123 30364	1000pF J 16V ECWU1C
C729	4822 126 12502	820pF ±10% 50V
C732	4822 123 30365	1200pF J 16V ECWU1C
C733	4822 123 30364	1000pF J 16V ECWU1C
C735	4822 126 12502	820pF ±10% 50V
C741	4822 123 30365	1200pF J 16V ECWU1C
C742	4822 123 30365	1200pF J 16V ECWU1C
C787	4822 126 11681	1000pF/50V GR39
R501	4822 116 83212	18kΩ ±5% 1/16W
R502	4822 051 30103	10kΩ ±5% 1/16W
R503	4822 051 30103	10kΩ ±5% 1/16W
R504	4822 051 30472	4.7kΩ ±5% 1/16W
R505	4822 051 30684	680Ω ±5% 1/16W
R506	4822 051 30153	15kΩ ±5% 1/16W
R507	4822 051 30223	22kΩ ±5% 1/16W
R508	4822 051 30103	10kΩ ±5% 1/16W
R509	4822 051 30103	10kΩ ±5% 1/16W
R510	4822 116 83212	18kΩ ±5% 1/16W
R511	4822 051 30103	10kΩ ±5% 1/16W
R512	4822 051 30103	10kΩ ±5% 1/16W
R513	4822 051 30472	4.7kΩ ±5% 1/16W
R514	4822 051 30684	680Ω ±5% 1/16W
R515	4822 051 30153	15kΩ ±5% 1/16W
R516	4822 051 30223	22kΩ ±5% 1/16W
R517	4822 051 30103	10kΩ ±5% 1/16W
R518	4822 051 30103	10kΩ ±5% 1/16W
R519	4822 051 30101	100Ω ±5% 1/16W
R521	4822 051 30101	100Ω ±5% 1/16W
R522	4822 111 91459	22Ω ±5% 1/10W
R523	4822 051 30103	10kΩ ±5% 1/16W
R524	4822 111 91459	22Ω ±5% 1/10W
R525	4822 051 30104	100kΩ ±5% 1/16W
R526	4822 051 30221	220Ω ±5% 1/16W
R527	4822 051 30103	10kΩ ±5% 1/16W
R529	4822 051 30104	100kΩ ±5% 1/16W
R530	4822 051 30221	220Ω ±5% 1/16W
R531	4822 051 30392	3.9kΩ ±5% 1/16W
R532	4822 051 30223	22kΩ ±5% 1/16W
R533	4822 051 30472	4.7kΩ ±5% 1/16W
R534	4822 051 30472	4.7kΩ ±5% 1/16W
R535	4822 051 30223	22kΩ ±5% 1/16W
R536	4822 051 30102	1kΩ ±5% 1/16W
R537	4822 051 30102	1kΩ ±5% 1/16W
R538	4822 051 30479	47Ω ±5% 1/16W
R540	4822 051 30102	1kΩ ±5% 1/16W
R541	4822 051 30102	1kΩ ±5% 1/16W
R542	4822 051 30479	47Ω ±5% 1/16W
R543	4822 116 82487	0Ω 1/16W
R544	4822 111 91459	22Ω ±5% 1/10
R545	4822 116 82487	0Ω 1/16W
R546	4822 111 91459	22Ω ±5% 1/10W
R547	4822 051 30104	100kΩ ±5% 1/16W
R548	4822 116 82487	0Ω 1/16W
R549	4822 116 82487	0Ω 1/16W
R550	4822 051 30103	10kΩ ±5% 1/16W
R551	4822 051 30472	4.7kΩ ±5% 1/16W
R552	4822 051 30223	22kΩ ±5% 1/16W
R554	4822 051 30105	1MΩ ±5% 1/16W
R555	4822 051 30103	10kΩ ±5% 1/16W
R556	4822 051 30473	47kΩ ±5% 1/16W
R557	4822 051 30103	10kΩ ±5% 1/16W
R558	4822 051 30103	10kΩ ±5% 1/16W
R559	4822 116 82487	0Ω ±5% 1/16W
R562	4822 051 30101	100Ω ±5% 1/16W
R563	4822 051 30101	100Ω ±5% 1/16W
R568	4822 051 30229	22Ω ±5% 1/16W
R569	4822 051 30229	22Ω ±5% 1/16W
R570	4822 116 83222	82kΩ ±5% 1/16W
R571	4822 116 83222	82kΩ ±5% 1/16W
R576	4822 051 30104	100kΩ ±5% 1/16W
R577	4822 051 30472	4.7kΩ ±5% 1/16W
R578	4822 051 30472	4.7kΩ ±5% 1/16W
R581	4822 116 82487	0Ω ±5% 1/16W
R583	4822 116 82487	0Ω ±5% 1/16W
R585	4822 051 30472	4.7kΩ ±5% 1/16W
R586	4822 051 30104	100kΩ ±5% 1/16W
R587	4822 051 30472	4.7kΩ ±5% 1/16W
R588	4822 051 30104	100kΩ ±5% 1/16W
R701	4822 051 30223	22kΩ ±5% 1/16W
R702	4822 051 30103	10kΩ ±5% 1/16W
R703	4822 051 30225	2.2MΩ ±5% 1/20
R704	4822 051 30225	2.2MΩ ±5% 1/20
R705	4822 051 30103	10kΩ ±5% 1/16W
R706	4822 051 30223	22kΩ ±5% 1/16W
R709	4822 051 30229	82Ω ±5% 1/16W
R711	4822 051 30224	220kΩ ±5% 1/16W
R712	4822 051 30101	100Ω ±5% 1/16W
R713	4822 051 30101	100Ω ±5% 1/16W
R714	4822 051 30101	100Ω ±5% 1/16W
R715	4822 051 30104	100kΩ ±5% 1/16W
R716	4822 051 30104	100kΩ ±5% 1/16W
R717	4822 051 30104	100kΩ ±5% 1/16W
R720	4822 116 83207	1.2kΩ ±5% 1/16W
R721	4822 116 83207	1.2kΩ ±5% 1/16W
R722	4822 051 30101	100Ω ±5% 1/16W
R724	4822 051 30103	10kΩ ±5% 1/16W
R725	4822 051 30153	15kΩ ±5% 1/16W
R726	4822 051 30153	15kΩ ±5% 1/16W
R727	4822 051 30153	15kΩ ±5% 1/16W

R728	4822 051 30153	15kΩ ±5% 1/16W
R729	4822 051 30101	100Ω ±5% 1/16W
R731	4822 051 30103	10kΩ ±5% 1/16W
R732	4822 116 83207	1.2kΩ ±5% 1/16W
R733	4822 116 83207	1.2kΩ ±5% 1/16W
R734	4822 051 30101	100Ω ±5% 1/16W
R736	4822 051 30103	10kΩ ±5% 1/16W
R737	4822 051 30153	15kΩ ±5% 1/16W
R738	4822 051 30153	15kΩ ±5% 1/16W
R739	4822 051 30153	15kΩ ±5% 1/16W
R740	4822 051 30153	15kΩ ±5% 1/16W
R741	4822 051 30101	100Ω ±5% 1/16W
R743	4822 051 30103	10kΩ ±5% 1/16W
R744	4822 051 30392	3.9kΩ ±5% 1/16W
R745	4822 051 30104	100kΩ ±5% 1/16W
R746	4822 116 83207	1.2kΩ ±5% 1/16W
R747	4822 116 83207	1.2kΩ ±5% 1/16W
R748	4822 116 83207	1.2kΩ ±5% 1/16W
R748	4822 116 83207	1.2kΩ ±5% 1/16W
RV51	4822 100 11944	RK10J12T T6 K2 M3 10

Safety resistors ▲

R520	4822 117 10146	# 4.7Ω J 1/4W RF
R707	4822 117 10145	# 3.3Ω ±5% 1/10W
R708	4822 117 10145	# 3.3Ω ±5% 1/10W
R718	4822 117 10145	# 3.3Ω ±5% 1/10W
R719	4822 117 10145	# 3.3Ω ±5% 1/10W

L701	4822 157 60234	4.7µH
L702	4822 157 70271	390µH J
L703	4822 157 70271	390µH J

D551	4822 130 32635	MA-151K TAPEING
D553	4822 130 32635	MA-151K TAPEING

Q501	4822 130 63187	DTC323TK
Q502	4822 130 63187	DTC323TK
Q503	4822 130 63187	DTC323TK
Q504	4822 130 63187	DTC323TK
Q511	4822 130 63187	DTC323TK
Q512	4822 130 63187	DTC323TK
Q513	4822 130 63187	DTC323TK
Q514	4822 130 63187	DTC323TK
Q515	4822 130 63187	DTC323TK
Q516	4822 130 63187	DTC323TK
Q517	4822 130 42733	2SA1162 GR
Q518	4822 130 42733	2SA1162 GR
Q550	4822 130 43398	2SC2712 GR
Q551	4822 130 43398	2SC2712 GR
Q552	4822 130 42733	2SA1162 GR
Q554	4822 130 42733	2SA1162 GR

IC50	4822 209 31905	AD7528 MIX/ATTN
IC51	4822 209 31905	AD7528 MIX/ATTN
IC52	4822 209 62764	74HC164F TAPING
IC71	4822 209 83357	NJM4560M
IC72	4822 209 83357	NJM4560M
IC73	4822 209 62503	74HC4053
IC74	4822 209 83357	NJM4560M
IC53	4822 209 83357	NJM4560M
IC54	4822 209 83357	NJM4560M
IC56	4822 209 83357	NJM4560M
IC57	4822 209 62503	74HC4053
IC58	4822 209 83357	NJM4560M

IC59	4822 209 83357	NJM4560M
IC60	4822 209 61668	NJM386M FLAT PACK
IC61	4822 209 61668	NJM386M FLAT PACK
IC70	4822 209 63997	SAA7323GP DAC3

VIDEO

C428	4822 126 11568	470pF (GR39) 50V
C429	4822 126 11568	470pF (GR39) 50V
C430	4822 126 11568	470pF (GR39) 50V
C431	4822 124 10772	100µF/6.3V
C432	4822 124 10772	100µF/6.3V
C433	4822 124 10772	100µF/6.3V
C435	4822 126 12516	1000pF/50V
C436	4822 126 11687	GRM39F104Z16 0.1µF
C437	4822 126 11687	GRM39F104Z16 0.1µF
C438	4822 126 11687	GRM39F104Z16 0.1µF
C450	4822 126 11687	GRM39F104Z16 0.1µF
C458	4822 126 11668	220pF (GR39) 50V
C459	4822 126 11668	220pF (GR39) 50V
C464	5322 122 34098	0.01µF/50V
C467	4822 126 11687	GRM39F104Z16 0.1µF
C481	4822 126 11687	GRM39F104Z16 0.1µF
C482	4822 126 11687	GRM39F104Z16 0.1µF
C483	4822 126 11687	GRM39F104Z16 0.1µF
C484	4822 126 11687	GRM39F104Z16 0.1µF
C485	4822 122 32672	1µF/16V
C451	4822 124 11687	0.1µF/25V
C452	4822 124 11687	0.1µF/25V
C453	4822 124 11687	0.1µF/25V
C454	4822 124 11687	0.1µF/25V
C455	4822 124 11687	0.1µF/25V
C456	4822 124 11687	0.1µF/25V
C459	4822 124 11074	10µF/16V
C460	4822 124 11074	10µF/16V
C461	4822 126 11687	0.1µF/25V
C462	4822 126 11687	0.1µF/25V
C471	4822 124 22728	100µF/16V
C472	4822 121 20256	0.068µF
C473	4822 125 60184	22pF DC5.0KV
C474	4822 125 60184	22pF DC5.0KV
C475	4822 122 40588	0.022µF
CV91	4822 125 60188	TZC03P200A110 20pF
C901	4822 124 11131	47µF/6.3V
C902	4822 126 11566	2200pF (GR39) 50V
C903	4822 121 42668	0.47µF,J,50V
C904	4822 121 42668	0.47µF,J,50V
C905	4822 126 11566	2200pF (GR39) 50V
C906	4822 126 11566	2200pF (GR39) 50V
C907	4822 122 33751	120pF (GR39) 50V
C908	4822 126 11568	470pF (GR39) 50V
C909	4822 122 33741	10pF (GR39) 50V
C910	4822 126 11568	470pF (GR39) 50V
C911	4822 126 11568	470pF (GR39) 50V
C914	4822 124 11333	B.P 0.47µF/50V (MV)
C915	4822 124 11333	B.P 0.47µF/50V (MV)
C916	4822 124 11333	B.P 0.47µF/50V (MV)
C912	4822 122 33744	100pF (GR39) 50V
C917	4822 126 11687	GRM39F104Z16 0.1µF
C918	4822 124 10772	100µF/6.3V
C919	4822 124 10772	100µF/6.3V
C920	4822 126 11687	GRM39F104Z16 0.1µF
C921	4822 122 33761	22pF (GR39) 50V
C922	4822 126 11687	GRM39F104Z16 0.1µF
C923	4822 122 33788	82pF (GR39) 50V
C924	4822 122 33777	47pF (GR39) 50V
C925	4822 126 11663	12pF 50V
C926	4822 122 33788	82pF (GR39) 50V
C927	4822 122 32672	1µF/16V
C928	4822 126 11687	GRM39F104Z16 0.1µF
C929	4822 126 11687	GRM39F104Z16 0.1µF
C930	4822 124 11074	10µF/16V
C931	4822 126 11687	GRM39F104Z16 0.1µF
C932	4822 126 11687	GRM39F104Z16 0.1µF
C933	4822 124 11074	10µF/16V
C938	4822 124 23561	470µF/4V
C947	4822 122 32672	1µF/16V TANTAL
C939	4822 124 23561	470µF/4V O=8 H=7

C940	4822 124 11074	10µF/16V
C941	4822 126 11687	GRM39F104Z16 0.1µF
C943	4822 116 82487	0Ω ±5% 1/16W
C948	4822 116 82487	0Ω ±5% 1/16W
C980	4822 126 11687	GRM39F104Z16 0.1µF
C981	4822 126 11687	GRM39F104Z16 0.1µF
C982	4822 126 11687	GRM39F104Z16 0.1µF
C983	4822 126 11687	GRM39F104Z16 0.1µF
C984	4822 126 11687	GRM39F104Z16 0.1µF
C985	4822 126 11687	GRM39F104Z16 0.1µF
C986	4822 126 11687	GRM39F104Z16 0.1µF
C987	4822 126 11687	GRM39F104Z16 0.1µF
C988	4822 126 11681	1000pF/50V GR39
C990	4822 124 41842	47µF/16V
C991	4822 124 21852	470µF/16V
C992	4822 126 11687	GRM39F104Z16 0.1µF

R901	4822 051 30104	100kΩ ±5% 1/16W
R902	4822 051 30103	10kΩ ±5% 1/16W
R903	4822 051 30103	10kΩ ±5% 1/16W
R904	4822 051 30105	1MΩ ±5% 1/16W
R905	4822 051 30105	1MΩ ±5% 1/16W
R906	4822 051 30223	22kΩ ±5% 1/16W
R907	4822 051 30153	15kΩ ±5% 1/16W
R908	4822 051 30104	100kΩ ±5% 1/16W
R909	4822 051 30222	2.2kΩ ±5% 1/16W
R910	4822 116 83211	1.8kΩ ±5% 1/16W
R911	4822 051 30102	1kΩ ±5% 1/16W
R912	4822 116 83219	820Ω ±5% 1/16W
R913	4822 051 30105	1MΩ ±5% 1/16W
R914	4822 051 30223	22kΩ ±5% 1/16W
R915	4822 051 30223	22kΩ ±5% 1/16W
R916	4822 051 30223	22kΩ ±5% 1/16W
R917	4822 116 83215	5.6kΩ ±5% 1/16W
R918	4822 051 30105	1MΩ ±5% 1/16W
R919	4822 116 83206	12kΩ ±5% 1/16W
R920	4822 051 30152	1.5kΩ ±5% 1/16W
R921	4822 116 82487	0Ω ±5% 1/16W
R922	4822 116 82487	0Ω ±5% 1/16W
R923	4822 051 30153	15kΩ ±5% 1/16W
R924	4822 051 30473	47kΩ ±5% 1/16W
R925	4822 051 30103	10kΩ ±5% 1/16W
R926	4822 051 30473	47kΩ ±5% 1/16W
R927	4822 051 30102	1kΩ ±5% 1/16W
R928	4822 051 30221	220Ω ±5% 1/16W
R929	4822 051 30273	27kΩ ±5% 1/16W
R930	4822 051 30102	1kΩ ±5% 1/16W
R931	4822 051 30102	1kΩ ±5% 1/16W
R932	4822 051 30471	470Ω ±5% 1/16W
R933	4822 051 30759	75Ω ±5% 1/16W
R935	4822 116 83213	270Ω ±5% 1/16W
R936	4822 051 30759	75Ω ±5% 1/16W
R937	4822 116 83222	82kΩ ±5% 1/16W
R938	4822 051 30471	470Ω ±5% 1/16W
R939	4822 051 30473	47kΩ ±5% 1/16W
R940	4822 051 30561	560Ω ±5% 1/16W
R941	4822 116 83207	1.2kΩ ±5% 1/16W
R942	4822 116 83219	820Ω ±5% 1/16W
R943	4822 051 30759	75Ω ±5% 1/16W
R944	4822 116 83222	82kΩ ±5% 1/16W
R945	4822 051 30471	470Ω ±5% 1/16W
R946	4822 061 30333	33kΩ ±5% 1/16W
R947	4822 051 30561	560Ω ±5% 1/16W
R948	4822 116 83207	1.2kΩ ±5% 1/16W
R949	4822 116 83219	820Ω ±5% 1/16W
R950	4822 051 30759	75Ω ±5% 1/16W
R951	4822 051 30759	75Ω ±5% 1/16W
R952	4822 051 30759	75Ω ±5% 1/16W
R953	4822 051 30759	75Ω ±5% 1/16W
R954	4822 111 90893	100Ω ±5% 1/10W

R955	4822 051 30101	100Ω ±5% 1/16W
R958	4822 116 82487	0Ω ±5% 1/16W
R959	4822 051 30101	100Ω ±5% 1/16W
R960	4822 116 82487	0Ω ±5% 1/16W
R961	4822 116 82487	0Ω ±5% 1/16W
R962	4822 116 82487	0Ω ±5% 1/16W
R963	4822 051 30473	47kΩ ±5% 1/16W
R964	4822 051 30102	1kΩ ±5% 1/16W
R965	4822 061 30473	47kΩ ±5% 1/16W6
R966	4822 051 30683	68kΩ ±5% 1/16W
R969	4822 051 30682	6.8kΩ ±5% 1/16W
R415	4822 051 30103	10kΩ ±5% 1/16W
R416	4822 051 30103	10kΩ ±5% 1/16W
R417	4822 051 30103	10kΩ ±5% 1/16W
R418	4822 051 30103	10kΩ ±5% 1/16W
R419	4822 051 30103	10kΩ ±5% 1/16W
R420	4822 051 30103	10kΩ ±5% 1/16W
R422	4822 050 11002	1K
R423	4822 116 52257	22K
R424	4822 050 11002	1K
R426	4822 051 30152	1.5kΩ ±5% 1/16W
R427	4822 116 83218	68Ω ±5% 1/16W
R428	4822 051 30221	220Ω ±5% 1/16W
R429	4822 051 30332	3.3kΩ ±5% 1/16W
R430	4822 051 30152	1.5kΩ ±5% 1/16W
R431	4822 116 83218	68Ω ±5% 1/16W
R432	4822 061 30221	220Ω ±5% 1/16W
R433	4822 051 30332	3.3kΩ ±5% 1/16W
R434	4822 051 30152	1.5kΩ ±5% 1/16W
R435	4822 116 83218	68Ω ±5% 1/16W
R436	4822 051 30221	220Ω ±5% 1/16W
R437	4822 051 30332	3.3kΩ ±5% 1/16W
R447	4822 116 83206	12kΩ ±5% 1/16W
R448	4822 116 83206	12kΩ ±5% 1/16W
R449	4822 051 30104	100kΩ ±5% 1/16W
R450	4822 051 30473	47kΩ ±5% 1/16W
R451	4822 051 30473	47kΩ ±5% 1/16W
R452	4822 051 30103	10kΩ ±5% 1/16W
R453	4822 116 82487	0Ω ±5% 1/16W
R454	4822 051 30759	75Ω ±5% 1/16W
R455	4822 051 30759	75Ω ±5% 1/16W
R456	4822 051 30759	75Ω ±5% 1/16W
R457	4822 051 30759	75Ω ±5% 1/16W
R458	4822 051 30759	75Ω ±5% 1/16W
R459	4822 051 30759	75Ω ±5% 1/16W
R460	4822 051 30759	CHIP RESISTER 75Ω
R461	4822 051 30759	CHIP RESISTER 75Ω
R462	4822 051 30759	75Ω ±5% 1/16W
R463	4822 051 30221	220Ω ±5% 1/16W
R464	4822 051 30221	220Ω ±5% 1/16W
R465	4822 061 30221	220Ω ±5% 1/16W
R466	4822 116 82487	0Ω ±5% 1/16W
R472	4822 051 30103	10kΩ ±5% 1/16W
R473	4822 051 30103	10kΩ ±5% 1/16W
R478	4822 116 82487	0Ω ±5% 1/16W
R479	4822 051 30759	75Ω ±5% 1/16W
R480	4822 051 30103	10kΩ ±5% 1/16W
R481	4822 051 30103	10kΩ ±5% 1/16W
R482	4822 051 30101	100Ω
R483	4822 051 30103	10kΩ ±5% 1/16W
R484	4822 051 30103	10kΩ ±5% 1/16W
RV41	4822 100 12009	10K POTM
RV42	4822 100 11801	10K POTM
T101	4822 148 21664	EP208 TRANS

L409	4822 157 53865	COIL TSL0707
L450	4822 157 70322	COIL 100OpF
L451	4822 158 60636	FERROCEPTOR
L452	4822 158 60636	FERROCEPTOR
L453	4822 158 60636	FERROCEPTOR

L454	4822 158 60636	FERROCEPTOR
L455	4822 158 60636	FERROCEPTOR
L456	4822 158 60636	FERROCEPTOR
L457	4822 158 60636	FERROCEPTOR
L458	4822 158 60636	FERROCEPTOR
L459	4822 158 60636	FERROCEPTOR
L901	4822 157 70272	47UH 10%
L902	4822 320 40294	4FT 290NS DELAY LINE
L903	4822 153 70057	4FUS FOR MULTI STAND

D901	4822 130 31129	BB212 V-CAP DOUBLE D

Q402	4822 130 43398	2SC2712 GR
Q403	4822 130 43398	2SC2712 GR
Q404	4822 130 43398	2SC2712 GR
Q405	4822 130 63003	2SD1803
Q406	4822 130 63003	2SD1803
Q407	4822 13042298	C536SP
Q410	4822 130 43398	2SC2712 GR
Q411	4822 130 43398	2SC2712 GR
Q901	4822 130 43398	2SC2712 GR
Q902	4822 130 42733	2SA1162 GR
Q903	4822 130 43398	2SC2712 GR
Q904	4822 130 43398	2SC2712 GR
Q905	4822 130 43398	2SC2712 GR
Q906	4822 130 43398	2SC2712 GR
Q907	4822 130 43398	2SC2712 GR
Q908	4822 130 42733	2SA1162 GR
Q909	4822 130 43398	2SC2712 GR
Q910	4822 130 43398	2SC2712 GR
Q911	4822 130 42733	2SA1162 GR
Q912	4822 130 43398	2SC2712 GR

IC35	4822 209 31902	74HC4538 FLAT PACK
IC36	4822 209 31901	CHIP LOGIC TC4S11F
IC48	4822 209 61783	NJM2233BM VID. SWITCH
IC61	4822 209 31908	CXA1145M RGB ENCODER
IC90	4822 209 30142	PC74HC40103T JEDEC F
IC91	4822 209 31911	TIBPAL16R6-25CDW
IC92	4822 209 60898	74LS161 EIAJ FLAT
IC93	5322 209 73187	74HC04 EIAJ FLAT
IC94	4822 209 31931	74HC4046 JEDEC
IC95	4822 209 60898	74LS161 EIAJ FLAT
IC96	4822 209 60898	74LS161 EIAJ FLAT
IC97	4822 209 83357	NJM4560M
IC98	4822 209 61534	74HCU04 EIAJ FLAT
IC99	4822 209 31928	74HC00 EIAJ FLAT

MMC

Miscellaneous

DF01	4822 130 32835	MA-151K TAPEING
SWF1	4822 276 13407	SWITCH
SW10	4822 277 21656	SSSSZ-12-12 SMT NTSC
XF01	5322 242 73734	CSAC4.00MGC CERAMIC
X101	4822 242 81347	4.9152MHZ SMD-49
X102	4822 242 81351	30.2098MHZ DSO48SJ C
X103	4822 242 81349	30.0000MHZ DSO48SJ C
X201	4822 242 81352	45.1584MHZ DSO48SJ C
X202	4822 242 81348	19.3575MHZ SMD-49
X601	5322 242 73734	CSAC4.00MGC CERAMIC
X901	4822 242 81378	3.579545 MHZ XTAL
X902	4822 242 81379	4.433818 MHZ XTAL
Z603	4822 130 83197	GP1US8XP PHILIPS
ZF01	4822 130 83229	02CZ3.9X (TOSHIBA)

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CF01	4822 126 11687	GRM39F104Z16 0.1µF
CF02	4822 126 11687	GRM39F104Z16 0.1µF
CF03	4822 122 33777	47pF (GR39) 50V
CF04	4822 122 33777	47pF (GR39) 50V
C101	4822 126 11687	GRM39F104Z16 0.1µF
C102	4822 122 33782	56pF (GR39) 50V
C103	4822 122 33782	56pF (GR39) 50V
C104	4822 126 11687	GRM39F104Z16 0.1µF
C105	4822 126 11687	GRM39F104Z16 0.1µF
C106	4822 126 11687	GRM39F104Z16 0.1µF
C107	4822 122 33761	22pF (GR39) 50V
C108	4822 122 33761	22pF (GR39) 50V
C109	4822 122 33761	22pF (GR39) 50V
C110	4822 122 32672	1µF/16V
C111	5322 122 34098	0.01µF 50V
C112	4822 126 11687	GRM39F104Z16 0.1µF
C113	4822 126 11687	GRM39F104Z16 0.1µF
C114	4822 126 11687	GRM39F104Z16 0.1µF
C115	4822 126 11687	GRM39F104Z16 0.1µF
C116	4822 126 11687	0.1µF/25V
C117	4822 126 11687	0.1µF/25V
C180	4822 126 11687	GRM39F104Z16 0.1µF
C181	4822 126 11687	GRM39F104Z16 0.1µF
C182	4822 126 11687	GRM39F104Z16 0.1µF
C183	4822 126 11687	GRM39F104Z16 0.1µF
C184	4822 126 11687	GRM39F104Z16 0.1µF
C185	4822 126 11687	GRM39F104Z16 0.1µF
C186	4822 126 11687	GRM39F104Z16 0.1µF
C187	4822 126 11687	GRM39F104Z16 0.1µF
C188	4822 126 11687	GRM39F104Z16 0.1µF
C189	4822 126 11687	GRM39F104Z16 0.1µF
C190	4822 126 11687	GRM39F104Z16 0.1µF
C201	4822 126 11687	GRM39F104Z16 0.1µF
C202	4822 126 11687	GRM39F104Z16 0.1µF
C203	4822 126 11687	GRM39F104Z16 0.1µF
C204	4822 124 10772	100µF/6.3V
C205	4822 126 11687	GRM39F104Z16 0.1µF
C206	4822 126 11687	GRM39F104Z16 0.1µF
C207	4822 126 11687	GRM39F104Z16 0.1µF
C208	4822 122 33788	82pF (GR39) 50V
C209	4822 126 11687	GRM39F104Z16 0.1µF
C210	4822 126 11687	GRM39F104Z16 0.1µF
C211	4822 126 11687	GRM39F104Z16 0.1µF
C213	4822 126 12502	820pF ±10%
C212	4822 126 11687	GRM39F104Z16 0.1µF
C214	4822 122 33741	10pF (GR39)
C215	4822 122 33777	47pF (GR39)
C216	4822 126 11687	GRM39F104Z16 0.1µF
C217	4822 122 33788	82pF (GR39)
C218	4822 122 33744	100pF (GR39)

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C219	4822 122 33761	22pF (GR39)
C220	4822 122 33761	22pF (GR39)
C222	4822 126 11687	GRM39F104Z16 0.1µF
C223	4822 126 12495	1500pF (GR39)
C224	4822 126 12495	1500pF (GR39)
C225	4822 126 11687	GRM39F104Z16 0.1µF
C226	4822 126 11687	GRM39F104Z16 0.1µF
C227	4822 126 11687	GRM39F104Z16 0.1µF
C229	4822 122 33761	22pF (GR39)
C230	4822 126 11687	GRM39F104Z16 0.1µF
C231	4822 126 11566	2200pF (GR39)
C232	4822 126 11566	2200pF (GR39)
C234	4822 126 11687	0.1µF/25V CHIP CAP
C280	4822 126 11687	GRM39F104Z16 0.1µF
C281	4822 126 11687	GRM39F104Z16 0.1µF
C282	4822 126 11687	GRM39F104Z16 0.1µF
C283	4822 126 11687	GRM39F104Z16 0.1µF
C284	4822 126 11687	GRM39F104Z16 0.1µF
C285	4822 126 11687	GRM39F104Z16 0.1µF
C286	4822 126 11687	GRM39F104Z16 0.1µF
C287	4822 126 11687	GRM39F104Z16 0.1µF
C288	4822 126 11687	GRM39F104Z16 0.1µF
C401	4822 126 11687	GRM39F104Z16 0.1µF
C402	4822 126 11687	GRM39F104Z16 0.1µF
C403	4822 126 11687	GRM39F104Z16 0.1µF
C404	4822 126 11687	GRM39F104Z16 0.1µF
C405	4822 126 11687	GRM39F104Z16 0.1µF
C406	4822 126 11687	GRM39F104Z16 0.1µF
C407	4822 126 11687	GRM39F104Z16 0.1µF
C408	4822 126 11687	GRM39F104Z16 0.1µF
C409	4822 126 11687	GRM39F104Z16 0.1µF
C410	4822 126 11687	GRM39F104Z16 0.1µF
C411	4822 126 11687	GRM39F104Z16 0.1µF
C412	4822 126 11687	GRM39F104Z16 0.1µF
C413	4822 126 11687	GRM39F104Z16 0.1µF
C414	4822 126 11687	GRM39F104Z16 0.1µF
C415	4822 126 11687	GRM39F104Z16 0.1µF
C416	4822 126 11687	GRM39F104Z16 0.1µF
C417	4822 126 11687	GRM39F104Z16 0.1µF
C418	4822 126 11687	GRM39F104Z16 0.1µF
C419	4822 124 11131	47µF/6.3V
C420	4822 124 11131	47µF/6.3V
C421	5322 124 21349	470µF/6.3V
C422	4822 126 11687	GRM39F104Z16 0.1µF
C423	4822 126 11687	GRM39F104Z16 0.1µF
C424	4822 126 11687	GRM39F104Z16 0.1µF
C425	4822 126 11687	GRM39F104Z16 0.1µF
C426	4822 126 11687	GRM39F104Z16 0.1µF
C427	4822 126 11687	GRM39F104Z16 0.1µF
C434	4822 122 33782	56pF (GR39)
C440	4822 122 33782	56pF (GR39)
C480	4822 126 11687	GRM39F104Z16 0.1µF
C601	4822 122 33777	47pF (GR39)
C602	4822 122 33777	47pF (GR39)
C603	4822 126 11687	GRM39F104Z16 0.1µF
C620	4822 124 11074	10µF/16V
C621	4822 124 11074	10µF/16V
C622	4822 124 11074	10µF/16V
C623	4822 124 11074	10µF/16V
C624	4822 124 11074	10µF/16V
C629	4822 126 11687	GRM39F104Z16 0.1µF
C630	4822 126 11695	4700pF (GR39)
C631	4822 126 11695	4700pF (GR39)
C632	4822 126 11695	4700pF (GR39)
C633	4822 126 11695	4700pF (GR39)
C634	4822 126 11695	4700pF (GR39)
C636	4822 126 11695	4700pF (GR39)
C650	4822 124 11074	10µF/16V

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RF01	4822 051 30103	10kΩ ±5% 1/16W
RF02	4822 051 30103	10kΩ ±5% 1/16W
RF03	4822 051 30103	10kΩ ±5% 1/16W
RF04	4822 051 30103	10kΩ ±5% 1/16W
RF05	4822 051 30103	10kΩ ±5% 1/16W
RF06	4822 051 30103	10kΩ ±5% 1/16W
RF08	4822 051 30331	330Ω ±5% 1/16W
RF09	4822 051 30103	10kΩ ±5% 1/16W
RF10	4822 051 30103	10kΩ ±5% 1/16W
RF11	4822 051 30102	1kΩ ±5% 1/16W
RF12	4822 051 30223	22kΩ ±5% 1/16W
RF13	4822 051 30223	22kΩ ±5% 1/16W
RF14	4822 051 30223	22kΩ ±5% 1/16W
RF15	4822 051 30224	220kΩ ±5% 1/16W
RF16	4822 051 30473	47kΩ ±5% 1/16W
RF17	4822 051 30473	47kΩ ±5% 1/16W
RF18	4822 051 30472	4.7kΩ ±5% 1/16W
RF19	4822 051 30473	47kΩ ±5% 1/16W
RF20	4822 051 30473	47kΩ ±5% 1/16W
RF21	4822 051 30472	4.7kΩ ±5% 1/16W
RF22	4822 051 30103	10kΩ ±5% 1/16W
RF25	4822 116 82487	0Ω ±5% 1/16W
RF26	4822 116 82487	0Ω ±5% 1/16W
RF27	4822 116 82487	0Ω ±5% 1/16W
RF28	4822 116 82487	0Ω ±5% 1/16W
RF29	4822 116 82487	0Ω ±5% 1/16W
RF30	4822 051 30103	10kΩ+/-5% 1/16W
RF31	4822 051 30473	47kΩ +/-5% 1/16W
RF32	4822 051 30103	10kΩ +/-5% 1/16W
R101	4822 051 30472	4.7kΩ ±5% 1/16W
R102	4822 051 30102	1kΩ ±5% 1/16W
R103	4822 051 30102	1kΩ ±5% 1/16W
R104	4822 051 30472	4.7kΩ ±5% 1/16W
R105	4822 051 30472	4.7kΩ ±5% 1/16W
R106	4822 051 30102	1kΩ ±5% 1/16W
R107	4822 051 30102	1kΩ ±5% 1/16W
R108	4822 051 30472	4.7kΩ ±5% 1/16W
R109	4822 051 30472	4.7kΩ ±5% 1/16W
R110	4822 051 30105	1MΩ ±5% 1/16W
R111	4822 051 30102	1kΩ ±5% 1/16W
R112	4822 051 30102	1kΩ ±5% 1/16W
R113	4822 051 30102	1kΩ ±5% 1/16W
R114	4822 051 30102	1kΩ ±5% 1/16W
R115	4822 051 30102	1kΩ ±5% 1/16W
R116	4822 051 30102	1kΩ ±5% 1/16W
R118	4822 116 82487	0Ω ±5% 1/16W
R119	4822 051 30101	100Ω ±5% 1/16W
R120	4822 051 30101	100Ω ±5% 1/16W
R121	4822 051 30101	100Ω ±5% 1/16W
R122	4822 051 30104	100kΩ ±5% 1/16W
R123	4822 051 30104	100kΩ ±5% 1/16W
R124	4822 051 30104	100kΩ ±5% 1/16W
R125	4822 051 30102	1kΩ ±5% 1/16W
R126	4822 051 30102	1kΩ ±5% 1/16W
R128	4822 116 82487	0Ω ±5% 1/16W
R131	4822 051 30472	4.7kΩ ±5% 1/16W
R132	4822 051 30472	4.7kΩ ±5% 1/16W
R133	4822 051 30472	4.7kΩ ±5% 1/16W
R134	4822 051 30472	4.7kΩ ±5% 1/16W
R135	4822 051 30102	1kΩ ±5% 1/16W
R137	4822 116 82487	0Ω ±5% 1/16W
R140	4822 051 30222	2.2kΩ ±5% 1/16W
R141	4822 116 82487	0Ω ±5% 1/16W W
R142	4822 116 82487	0Ω ±5% 1/16W W
R201	4822 051 30479	47Ω ±5% 1/16W
R202	4822 051 30153	15kΩ ±5% 1/16W
R203	4822 051 30102	1kΩ ±5% 1/16W
R204	4822 051 30222	2.2kΩ ±5% 1/16W
R205	4822 051 30101	100Ω ±5% 1/16W
R206	4822 051 30101	100Ω ±5% 1/16W
R207	4822 051 30479	47Ω+/-5% 1/16W

RV80	4822 100 11789	20kΩ EVM1S,TMC3K
R801	4822 051 30101	100Ω ±5% 1/16W
R802	4822 051 30102	1kΩ ±5% 1/16W
R803	4822 116 83208	12kΩ ±5% 1/16W
R804	4822 051 30222	2.2kΩ ±5% 1/16W
R805	4822 116 83215	5.6kΩ ±5% 1/16W
R806	4822 051 30103	10kΩ ±5% 1/16W
R807	4822 051 30101	100Ω ±5% 1/16W
R808	4822 117 10152	# 18Ω ±5% 1/10W
R809	4822 117 10151	# 12Ω ±5% 1/10W
R810	4822 051 30104	100kΩ ±5% 1/16W
R811	4822 051 30472	4.7kΩ ±5% 1/16W
R812	4822 116 83209	120kΩ ±5% 1/16W
R813	4822 051 30103	10kΩ ±5% 1/16W
R814	4822 051 30102	1kΩ ±5% 1/16W
R815	4822 051 30154	150kΩ ±5% 1/16W
R816	4822 051 30335	3.3MΩ ±5% 1/16W
R817	4822 116 83216	56kΩ ±5% 1/16W
R818	4822 051 30394	390kΩ ±5% 1/16W
R819	4822 051 30279	27Ω ±5% 1/16W
R820	4822 051 30229	22Ω ±5% 1/16W
R821	4822 116 83222	82kΩ ±5% 1/16W
R822	4822 051 30104	100kΩ ±5% 1/16W
R823	4822 051 30154	150kΩ ±5% 1/16W
R824	4822 051 30105	1MΩ ±5% 1/16W
R825	4822 051 30335	3.3MΩ ±5% 1/16W
R826	4822 051 30759	75Ω J 1/16W
R827	4822 051 30222	2.2kΩ ±5% 1/16W
R828	4822 051 30223	22kΩ ±5% 1/16W
R829	4822 051 30223	22kΩ ±5% 1/16W
R830	4822 051 30473	47kΩ ±5% 1/16W
R831	4822 051 30223	22kΩ ±5% 1/16W
R832	4822 051 30223	22kΩ ±5% 1/16W
R833	4822 051 30391	390Ω ±5% 1/16W
R834	4822 051 30472	4.7kΩ ±5% 1/16W
R835	4822 116 83208	12kΩ ±5% 1/16W
R836	4822 051 30102	1kΩ ±5% 1/16W
R837	4822 051 30154	150kΩ ±5% 1/16W
R838	4822 116 83208	12kΩ ±5% 1/16W
R839	4822 051 30152	1.5kΩ ±5% 1/16W
R840	4822 051 30153	15kΩ ±5% 1/16W
R841	4822 051 30152	1.5kΩ ±5% 1/16W
R842	4822 051 30152	1.5kΩ ±5% 1/16W
R843	4822 051 30338	3.3Ω ±5% 1/16W
R844	4822 051 30339	33Ω ±5% 1/16W
R845	4822 051 30682	6.8kΩ ±5% 1/16W
R846	4822 051 30104	100kΩ ±5% 1/16W
R847	4822 051 30104	100kΩ ±5% 1/16W
R848	4822 116 83222	82kΩ ±5% 1/16W
R849	4822 051 30333	33kΩ ±5% 1/16W
R850	4822 051 30684	680kΩ ±5% 1/16W
R851	4822 051 30154	150kΩ ±5% 1/16W
R852	4822 116 83215	5.6kΩ ±5% 1/16W
R853	4822 051 30332	3.3kΩ ±5% 1/16W
R854	4822 051 30473	47kΩ ±5% 1/16W
R855	4822 051 30472	4.7kΩ ±5% 1/16W
R856	4822 116 83207	1.2kΩ ±5% 1/16W
R857	4822 051 30105	1MΩ ±5% 1/16W
R858	4822 051 30104	100kΩ ±5% 1/16W
R859	4822 051 30104	100kΩ ±5% 1/16W
R860	4822 051 30473	47kΩ ±5% 1/16W
R861	4822 051 30472	4.7kΩ ±5% 1/16W
R862	4822 051 30223	22kΩ ±5% 1/16W
R863	4822 051 30339	33Ω ±5% 1/16W
R864	4822 051 30101	100Ω ±5% 1/16W
R865	4822 051 30224	220kΩ ±5% 1/16W
R866	4822 051 30101	100Ω ±5% 1/16W
R867	4822 051 30104	100kΩ ±5% 1/16W
R868	4822 051 30392	3.9kΩ ±5% 1/16W
R869	4822 051 30103	10kΩ ±5% 1/16W
R870	4822 051 30101	100Ω ±5% 1/16W

R871	4822 051 30152	1.5kΩ ±5% 1/16W
R872	4822 051 30223	22kΩ ±5% 1/16W
R873	4822 051 30224	220kΩ ±5% 1/16W
R874	4822 051 30222	2.2kΩ ±5% 1/16W
R875	4822 051 30103	10kΩ ±5% 1/16W
R876	4822 051 30223	22kΩ ±5% 1/16W
R877	4822 051 30223	22kΩ ±5% 1/16W
R878	4822 051 30223	22kΩ ±5% 1/16W
R879	4822 051 30223	22kΩ ±5% 1/16W
R880	4822 051 30223	22kΩ ±5% 1/16W
R881	4822 051 30223	22kΩ ±5% 1/16W
R883	4822 051 30223	22kΩ ±5% 1/16W
R884	4822 051 30223	22kΩ ±5% 1/16W
R885	4822 051 30223	22kΩ ±5% 1/16W
R886	4822 051 30223	22kΩ ±5% 1/16W
R887	4822 051 30223	22kΩ ±5% 1/16W
R895	4822 051 30473	47kΩ ±5% 1/16W
R896▲	4822 117 10146	# 4.7Ω J 1/4W RF
R897▲	4822 117 10146	# 4.7Ω J 1/4W RF
R898	4822 051 30472	4.7kΩ ±5% 1/16W
R899	4822 051 30222	2.2kΩ ±5% 1/16W
R890	4822 051 30474	470kΩ ±5% 1/16W
R999	4822 116 82487	0Ω ±5% 1/16W

L801	4822 157 83234	NL322522-4R7M 4.7UH
L802	4822 157 63234	NL322522-4R7M 4.7UH

D801	4822 130 32635	MA-151K TAPEING
D802	4822 130 32635	MA-151K TAPEING

Q801	4822 130 43954	2SD999
Q802	4822 130 43398	2SC2712 GR
Q803	4822 130 42733	2SA1162 GR
Q804	4822 130 42733	2SA1162 GR
Q805	4822 130 42733	2SA1162 GR
Q806	4822 130 43398	2SC2712 GR
Q810	4822 130 43954	2SD999
Q811	4822 130 43398	2SC2712 GR
QP01	4822 130 43954	2SD999
QP02	4822 130 43398	2SC2712 GR

IC80	4822 209 30436	TDA8808 HF AMP FLAT-
IC81	4822 209 30437	TDA8809 RADIAL SERVO
IC82	4822 209 31953	TCA0372DM2 SOP
IC83	4822 209 31953	TCA0372DM2 SOP
IC84	4822 209 31928	CMOS 74HC00 FLAT TAP
IC85	4822 209 73952	UPD41416C,MB81416
IC86	4822 209 63453	SAA7310 DEMODULATOR
IC87	4822 209 30439	PCF3523P ADOC
IC88	4822 209 31969	MC68HC05C8 268K SERV

Miscellaneous

S801	4822 271 30787	SIF-012H R66 4759 1-
J503	4822 267 31581	HSJ0922-01-1140 FOR
J801	4822 267 50676	14P JACK MOLEX 5597-
J902	4822 267 31581	HSJ0922-01-1140 FOR
003B	4822 502 13203	SCREW:CLAMPER BRACKE
010B	4822 502 13877	SCREW:EJECT HOLDER
011B	4822 502 13877	SCREW:O/C PCB
016B	4822 502 13314	SCREW:OPEN BRACKET
017B	4822 502 13314	SCREW:LEAF SPRING
033B	4822 502 13877	SCREW:CDM BRACKET
034B	4822 502 13314	SCREW:DC PCB
035B	4822 502 13877	SCREW:MMC PCB
037B	4822 502 13877	I/O&S OUT
045B	4822 502 13877	SCREW:LCD CASE
048B	4822 502 13877	SCREW:CASE DOWN &UP
051B	4822 502 13103	SCREW:CASE DOWN &UP
053B	4822 502 30699	HINGE UNIT
068B	4822 502 13877	FOR FMV CASE
PI08	4822 214 52039	IR-JOINT-PCB
X802	5322 242 73734	CSACB 20MGC CERAMIC
JF01	4822 265 31051	006200-147-032800 14
JP01	4822 265 31048	S14B-PH-K-S
J402	4822 265 31052	006200-257-032800 FF
J404	4822 265 31047	TX20A-26RD2G1-A1L 26
J501	4822 265 31046	HSJ0924-01-1110 FOR
J502	4822 265 31049	CGP4707-0101 EP 7P L
J601	4822 265 31054	TCS7184-01-201 EMI-P
J603	4822 267 31585	2.5MM PIN IMSA-6035B
J606	4822 265 31053	FCN-228J100-G/0-01
J802	4822 267 31584	MKS8082-6-0-202 STOC
J904	4822 265 31055	TCS7144-01-201 EMI-P
J992	4822 265 31065	JACK1.25MM 3PIN CHIP
J993	4822 265 31064	JACK1.25MM 2PIN CHIP
W401	4822 321 61813	25PIN 330MM FLAT CAB
WP01	4822 321 61808	PHR14-SAN14 80MM
WV02	4822 321 61845	5P TO 3P SHIELD WIRE
W502	4822 321 61812	CGP1207(7P)-EHR (3P)
030B	4822 402 61465	CDM BRACKET
	4822 502 13877	DC PCB TAP SCREW
031B	4822 402 61466	SUSPENTION:CDM-9
059B	4822 462 71892	ORNAMENTAL COVER
SP01	4822 240 30598	SPEAKER 16Ω
SP02	4822 240 30598	SPEAKER 16Ω
078B	4822 462 71897	SPEAK WIRE BUFFER
079B	4822 462 71897	CDM WIRE BUFFER
080B	4822 466 62294	SPEAKER SHEET

MECHANICAL

Miscellaneous

501M	4822 693 91593	CDM 9 ASSY
502B	4822 256 92004	EJECT HOLDER ASSY
503B	4822 402 61467	OPEN BRACKET ASSY
504B	4822 444 50711	LCD CASE UP
001T	4822 736 21734	USER MANUAL/00/05
001T	4822 736 2	USER MANUAL/11/17
PL01	4822 130 91096	5.7" LCD
PP06	4822 214 52034	POWER CONNECT PCB
PS06	4822 214 52035	LID SWITCH PCB
PM06	4822 214 52097	MAIN PCB /00/05/11
PM06	4822 214 52095	MAIN PCB/17

Service tools

TOOL	4822 395 50365	CHIP REPLACE JIG BIG
TOOL	4822 395 50366	CHIP REPLACEJIG SMAL
TOOL	4822 395 90612	CHIP IC REPLACE JIG
TOOL	4822 267 50676	CDM FLEX CONNECTOR
J502	4822 267 31618	FEMALE CONNECTOR
TOOL	4822 214 52007	LL TEST PCB
TOOL	4822 321 61677	LL TEST CABLE

AC ADAPTER

Miscellaneous

AC01	4822 272 10326	180-265V 22ER9151 /00
AC01	4822 272 10329	85-135V 22ER9151 /17
AC02 ▲	4822 321 10914	# 14P DC CORD TPX13
AC03	4822 321 10915	AC MAINS CORD /05/11
AC03	4822 321 10939	AC MAINSCORD /17
AC03	4822 321 10932	AC MAINSCORD /00
JA31	4822 265 41293	LSJP0036 CONN.14P

Parts list for 22ER9151

CA02	4822 125 60192	ECKDNS332ME 3300P
CA04	4822 125 60192	ECKDNS332ME 3300P
CA06	4822 121 70275	ECQU2A103MY 0.01U
CA07	4822 122 33127	ECUV1H222KBN 2200P
CA08	4822 124 80448	ECEA1HGE100 10U/50V
CA09	4822 124 80449	ECEA1HGE470 47U/50V
CA10	4822 125 60193	ECUV1H431JCN 430P
CA11	4822 126 12061	ECUV1E104KBN 0.1U
CA13	5322 122 34099	ECUV1H471KBN 470P/50
CA14	4822 125 60191	ECKD3A101KBN 100P/1K
CA15	4822 121 70274	ECQE6473KFWN 0.047U
CA17	4822 121 70275	ECQU2A103MY 0.01U
CA32	4822 125 60194	MCUV2D102KRN 1000P
CA33	4822 125 60194	MCUV2D102KRN 1000P
CA34	4822 125 60194	MCUV2D102KRN 1000P
CA35	4822 125 60194	MCUV2D102KRN 1000P
CA36	4822 125 60194	MCUV2D102KRN 1000P
CA37	4822 125 60194	MCUV2D102KRN 1000P
CA38	4822 126 12061	ECUV1E104KBN 0.1U
CA39	5322 122 34098	ECUV1H103KBN 0.01
CA40	4822 124 80447	ECEA1EGE102 1000U
CA41	4822 124 80444	ECEA1CGE102 1000U
CA42	4822 124 80444	ECEA1CGE102 1000U
CA43	4822 124 80444	ECEA1CGE102 1000U
CA44	4822 124 80444	ECEA1CGE102 1000U
CA45	4822 124 80444	ECEA1CGE102 1000U
CA46	4822 124 80445	ECEA1CGE331 330/16
CA47	4822 126 12061	ECUV1E104KBN 0.1/25V
CA48	4822 124 80446	ECEA1EGE100 10/25V
CA81	4822 125 60194	MCUV2D102KRN 1000P
CA82	4822 125 60194	MCUV2D102KRN 1000P
CA83	4822 125 60194	MCUV2D102KRN 1000P
CA84	4822 125 60194	MCUV2D102KRN 1000P
CA85	4822 125 60194	MCUV2D102KRN 1000P
CA86	4822 125 60194	MCUV2D102KRN 1000P
RA07	4822 117 10207	ERJ6ENF1502V 15K
RA08	4822 117 10209	ERJ6ENF2702V 27K
RA09	4822 111 91076	ERJ6GEYJ332V 3.3K
RA10	4822 117 10218	ERJ14YJ01H 100Ω
RA11	4822 117 10219	ERJ14YJ220H 22Ω
RA12	4822 117 10214	ERG3SJ104H 100K
RA14	4822 117 10213	ERG2SJ270P 27Ω 2W
RA15	4822 111 90893	ERJ6GEYJ101V 100Ω
RA16	4822 111 90913	ERJ6GEYJ333V 33K
RA31	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA32	4822 111 91192	ERJ6GEYJ471V 470Ω
RA33	4822 111 90894	ERJ6GEYJ102V 1K
RA34	4822 111 91191	ERJ6GEYJ331V 330Ω
RA35	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA36	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA37	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA38	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA39	4822 111 90893	ERJ6GEYJ101V 100Ω
RA40	4822 111 91191	ERJ6GEYJ331V 330Ω
RA41	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA42	4822 111 91191	ERJ6GEYJ331V 330Ω
RA43	4822 117 10208	ERJ6ENF2209V 220K 5V
RA44	4822 117 10208	ERJ6ENF1002V 10K 5V
RA45	4822 111 92141	BPR3F 0.01 0.01Ω
RA46	4822 111 92141	BPR3F 0.01 0.01Ω
RA47	4822 117 10205	ERJ6ENF1001V 1K
RA48	4822 117 10205	ERJ6ENF1001V 1K
RA49	4822 117 10212	ERG1SJ471P 470Ω
RA50	4822 111 90894	ERJ6GEYJ102V 1K
RA51	4822 117 10212	ERG1SJ471P 470Ω 1W
RA52	4822 111 90907	ERJ6GEYJ223V 22K
RA53	4822 111 90906	ERJ6GEYJ222V 2.2K
RA54	4822 111 90895	ERJ6GEYJ103V 10K
RA55	4822 100 11983	EVN39C00YB13 1K
RA56	4822 111 90907	ERJ6GEYJ223V 22K
RA57	4822 111 90907	ERJ6GEYJ223V 22K
RA58	4822 111 90894	ERJ6GEYJ102V
RA59	4822 111 90894	ERJ6GEYJ102V
RA70	4822 111 90896	ERJ6GEYJ104V 100K
RA71	4822 116 83352	ERJ6GEYJ561V 560Ω
LA04	4822 157 70393	VLPS0005A/B/C COIL
LA05	4822 157 70394	VLQS7H392J COIL
LA06	4822 157 70393	VLPS0005A/B/C COIL
LA31	4822 157 70392	ETS29K484V COIL
LA033	4822 157 70393	VLPS0005A/B/C COIL
LA034	4822 157 70395	VLQS9A9ROM COIL
LA35	4822 157 70393	VLPS0005A/B/C COIL
DA01	4822 130 42657	MA3200 0.1A/20V
DA03	4822 130 83318	MA2300 0.4A/30V
DA04	4822 130 83321	MA199 0.2A/200V
DA06	4822 130 33617	ERB12-01 1A/100V
DA07	4822 130 83317	MA198 0.2A/200V
DA08	4822 130 83317	MA198 0.2A/200V
DA31	4822 130 83323	10DL2CZ41A 10A /200V
DA32	4822 130 83327	MA3056 0.1A/5.6V
DA33	4822 130 83324	MA750 10A/40V
DA34	4822 130 83323	10DL2CZ41A 10A /200V

DA35	4822 130 83328	MA3150 0.1A/15V
DA36	4822 130 83325	SIWBA40 1A/400V
DA37	4822 130 82452	MA720 0.5A/40V
DA38	4822 130 32635	MA151K 0.1A/40V
DA40	4822 130 83326	SEL4417G LED
QA31	4822 130 42671	2SD601A 0.1A/50V
ICA4	4822 209 62279	M51977FP SUPPLY IC
ICA5	4822 209 32136	AN6568S OP-AMP
ICA6	4822 209 32137	UPC78L05T POWER IC
ICA7	4822 209 32135	AN143M POWER REG IC

Only for 22EA9151/00

Miscellaneous

001V	4822 444 40646	LSKM0067+0068 CASE
FA01	4822 253 30426	FUSE 3.15A/250V
JA32	4822 265 20624	LSJP0037 AC INLET
THA1	4822 111 92137	ERT5ZFL100P 10Ω
TA01	4822 146 21717	ETS33K382V TRANS
TA02	4822 146 21716	ETP28Z335AF TRANS
CA01	4822 121 70276	ECQU2A47MV 0.47/250V
CA03	4822 121 70276	ECQU2A47MV 0.47/250V
CA05	4822 121 70275	ECQU2A103MY 0.01U
CA12	4822 124 80451	MCES2DG121Q 120U/400
CA16	4822 125 60192	ECKDNS332ME 3300P
RA01	4822 117 10211	ERD25FJ474 470K
RA02	4822 117 10217	ERJ12YJ823H 82K
RA03	4822 117 10217	ERJ12YJ823H 82K
RA04	4822 117 10217	ERJ12YJ823H 82K
RA13	4822 117 10216	ERX1SJR30P 0.30Ω
LA02	4822 157 70391	ELF18D290R COIL
LA03	4822 157 70391	ELF18D290R COIL
DA02	4822 130 83319	RBV-406 4A/600V
DA05	4822 130 83316	EG01C
QA01	4822 130 63241	2SK998
ICA1	4822 209 32138	ON3731 PHOTO COUPLER
ICA2	4822 209 32138	ON3171 PHOTO COUPLER
ICA3	4822 209 32138	ON3171 PHOTO COUPLER

Only for 22EA9151/17

Miscellaneous

001V	4822 444 40647	LSKM0063+0062 CASE
FA01	4822 253 30427	LSSF0015A40 4A/125V
JA32	4822 265 20625	LSJP0036 AC INLET
TA02	4822 146 21718	ETP28Z334AF TRANS
THA1	4822 111 92142	ERTD5ZFL8ROP 80Ω
CA01	4822 121 70278	EQU2A224MN 0.22U
CA03	4822 121 70278	EQU2A224MN 0.22U
CA05	4822 125 60195	VCKS0009 3300P
CA16	4822 125 60195	VCKS0009 3300P
RA01	4822 117 10226	ERD25FJ474 407K
RA02	4822 117 10227	ERJ12Y273H 27K
RA03	4822 117 10227	ERJ12YJ273H 27K
RA04	4822 117 10227	ERJ12YJ273H 27K
LA02	4822 157 70401	ELF18D290V COIL
LA03	4822 157 70401	ELF18D290V COIL
DA02	4822 130 83319	RBV-406 4A/400V
DA05	4822 130 83329	EG01 0.7A/400V
QA01	4822 130 63245	2SK1819 5A/450V
ICA1	4822 209 32156	ON3131 PHOTO COUPLER
ICA2	4822 209 32156	ON3131 PHOTO COUPLER
ICA3	4822 209 32156	ON3131 PHOTO COUPLER

PHILIPS SAFETY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

Important

Proper service and repair is important to the safe, reliable operation of all Philips equipment. The service procedures recommended by Philips and described in this service manual are effective methods of performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Philips could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Philips has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Philips must first satisfy himself thoroughly that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

Safety Checks

After the original service problem has been corrected, a complete safety check should be made. Be sure to check over the entire set, not just the areas where you have worked. Some previous servicer may have left an unsafe condition, which could be unknowingly passed on to your customer. Be sure to check all of the following:

Fire and Shock Hazard

1. Be sure all components are positioned in such a way as to avoid the possibility of adjacent component shorts. This is especially important on those units which are transported to and from the service shop.
2. Never release a repaired unit unless all protective devices such as insulators, barriers, covers, strain reliefs, and other hardware have been installed according to the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints, solder splashes, sharp solder points, frayed leads, pinched leads, or damaged insulation (including the ac cord). Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout, lead length, and dress.
5. No lead or component should touch a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with a ⚠ by the Ref. No. in the parts list and enclosed within a broken line* (where several critical components are grouped in one area) along with the safety symbol ⚠ on the schematic diagrams and/or exploded views.

   Replacement parts without the same safety characteristics may create shock, fire, or other hazards.
7. When servicing any unit, always use a separate isolation transformer for the chassis. Failure to use a separate isolation transformer may expose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many electronic products use a polarized ac line cord (one wide pin on the plug). Defeating this safety feature may create a potential hazard to the servicer and the user. Extension cords which do not incorporate the polarizing feature should never be used.

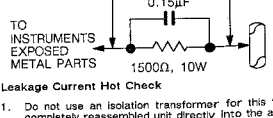
Fire and Shock Hazard (Continued)

9. After reassembly of the unit, always perform an ac leakage test or resistance test from the line cord to all exposed metal parts of the cabinet. Also, check all metal control shafts (with knobs removed), antenna terminals, handles, screws, etc. to be sure the unit is safe to operate without danger of electrical shock.

* Broken line: ——— • ——— • ———

Leakage Current Cold Check

1. Unplug the ac line cord and connect a jumper between the two prongs of the plug.
2. Turn on the power switch.
3. Measure the resistance value between the jumpered ac plug and all exposed cabinet parts of the receiver, such as screw heads, antennas, and control shafts. When the exposed metallic part has a return path to the chassis, the reading should be between 1 megohm and 5.2 megohms. When the exposed metal does not have a return path to the chassis, the reading must be infinity. Remove the jumper from the ac line cord.



Leakage Current Hot Check

1. Do not use an isolation transformer for this test. Plug the completely reassembled unit directly into the ac outlet.
2. Connect a 1.5k, 10W resistor paralleled by a 0.15uF. capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohms/volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 milliamps. If a measurement is outside of the specified limits, there is a possibility of shock hazard. The receiver should be repaired and rechecked before returning it to the customer.
5. Repeat the above procedure with the ac plug reversed. (Note: An ac adapter is necessary when a polarized plug is used. Do not defeat the polarizing feature of the plug.)

Parts Replacement

1. Many electrical and mechanical parts in Philips equipment have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The use of a substitute part which does not have the same safety characteristics as the Philips recommended replacement part shown in this service manual may create shock, fire, or other hazards. Under no circumstances should the original design be modified or altered without written permission from Philips. Philips assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.
2. All ICs and many other semiconductor parts are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce the life of the part drastically.

LASER NOTE:

DANGER – Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.
CAUTION – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
CAUTION – The use of optical instruments with this product will increase eye hazard.

V 14454

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PHILIPS

Art Code:	AC439	SI	Wichtig für die Werkstatt
Stichwort:	CDI		Nummer: 4822 830 19004
Memo:	DE10BICD		Datum: 13.05.1996

Service Information

Betrifft: Vorführ- Mode

Verteiler: F1, S4

Alle CDi- Player mit Schublade.

Diese CDI- Player sind mit einem Vorführ- Mode ausgestattet. Kunden können diesen Mode unbewußt mit gleichzeitigem halten der STOP- Taste beim Einschalten aktivieren. Hiernach ist ein öffnen der Schublade zum entfernen der CD- Platte nicht mehr möglich. Durch erneutes Einschalten mit gedrückter STOP- Taste wird dieser Mode wieder deaktiviert.

Bei entsprechender Beanstandung den Kunden bitte mit beiliegendem Hinweis informieren.

CD-i

Werter Kunde !

Ihr CD-i Player war in den Verkaufs-Vorführ-Mode geschaltet. In dieser Vorführstellung kann die CD-Lade nicht geöffnet werden, damit bei Demonstrationen, z.B. bei Ausstellungen, in Geschäften und bei Händlern, die CD von Kunden nicht entnommen werden kann.

Wenn sich die CD-Lade bei Ihrem Gerät zu Hause nicht öffnen läßt und im Bildschirm-Menü das 'OPEN-ICON' Feld fehlt, ist der Vorführ-Mode aktiviert.

Beachten Sie bitte folgenden Bedienhinweis:

Um den CD-i Player wieder in die normale OPEN/CLOSE-Funktion zu schalten, muß der Verkaufs-Vorführ-Mode durch nachfolgende Bedienungsschritte de-aktiviert werden:

A.) **Schalten Sie den CD-i Player mit der ON/OFF-Taste aus.**

B.) **Halten Sie beim Einschalten die STOP-Taste gedrückt.**

Ob der Vorführ-Mode erfolgreich ausgeschaltet wurde, erkennen Sie im Bildschirm-Menü durch das Erscheinen des 'OPEN-ICON' Feldes.

Die Aktivierung des Vorführ-Modes ist wieder mit den gleichen Bedienschritten A und B möglich.

PHILIPS

V13973

C.D.M.-1

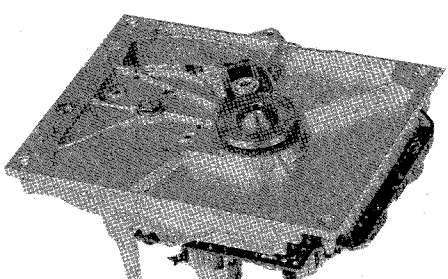
compact disc player

MECHANISM

Service
Service
Service

Service Manual

COMPACT disc DIGITAL AUDIO



35 367 A

CLASS 1
LASER PRODUCT

3122 115 01400

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

DocumentationTechnique Service Dokumentation Documentazione di Servizio Huolte-Ohje Manual de Servicio Manual de Serviçic
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Printed in The Netherlands

CS 94 556 D

REPARATURHINWEISE

Zur Verhütung dass lose Metallteile in den CD-Mechanismus gelangen, ist zu veranlassen, dass die Stellen an der repariert wird, sauber ist.

Das Objektiv lässt sich mit einem Blasepinsel reinigen.

Der CD-Mechanismus ist mit selbstschmierenden Lagern versehen und darf daher NICHT geschmiert werden.

Es ist dafür zu sorgen, dass bei Reparaturen und Messungen auf der Unterseite des Gerätes das Gerät nicht auf der Achse des Plattentellermotors ruht.

Serviceleistungen an der RAFOC-Einheit (=Radial- und Fokussiereinheit pos. 61)

Die von Service gelieferte RAFOC-Einheit (Radial-und Fokussiereinheit) ist die gleiche wie in CDM-0. Die Bodenplatte dieser RAFOC-Einheit ist in dem CDM-1 durch Rahmen Pos. 503 ersetzt worden. Beim Auswechseln der RAFOC-Einheit müssen **vorsichtig** und präzise folgende Handlungen verrichtet werden.

- Die beiden Flexprints den Steckverbindern am Vorverstärkerprint entnehmen.
- *Schadhafte* RAFOC-Einheit ausbauen, dadurch dass die vier Schrauben M3x18 mm gelöst und Achse Pos. 504 beseitigt werden.
- Bei der *neuen* RAFOC-Einheit die Achse Pos. 504 beseitigen. Es sind die drei Unterlegscheiben Pos. 502 und die Federscheibe Pos. 505 zu beachten; sie sollen beim Einbau an die gleiche Stelle gelangen.

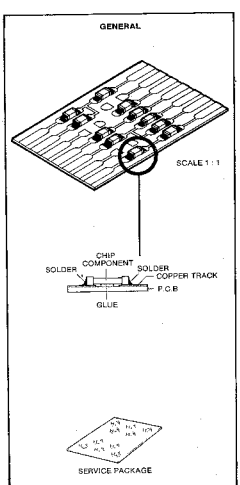
Die vier Schrauben M3x18 mm so weit lösen, dass sich die Bodenplatte abnehmen lässt. Die Schrauben M3x18 mm nicht beseitigen (sie halten die neue RAFOC-Einheit zusammen).

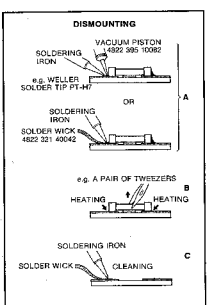
- Die neue RAFOC-Einheit auf den Rahmen 503 einbauen. Es ist dann zu beachten, dass die 3 Unterlegscheiben 502 und die Federscheibe 505 sich an der richtigen Stelle befinden, bevor Asche Pos. 504 fixiert wird.
- Kontrollieren, ob der Arm freiläuft, sowie die Winkeleinstellung prüfen (siehe Kontrolle und ggf. Regeln der Winkeleinstellung).

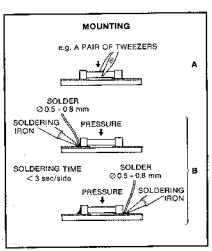
Achtung!

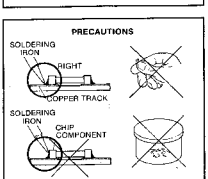
Um zu verhindern, dass sich Einstellungen ändern, dürfen KEINE ANDEREN SCHRAUBEN als im vorhergehenden genannt losgedreht werden.

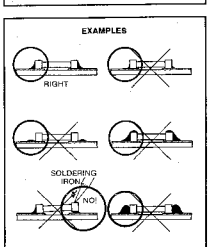
DIE OPTISCHE LESEVORRICHTUNG IST GEGENÜBER STATISCHER LADUNG WEIT EMPFINDLICHER ALS EIN MOS-IC.
UNSORGFÄLTIGES VORGEHEN WÄHREND SERVICE-ARBEITEN KANN DIE LEBENSDAUER DRASTISCH KURZEN.
DAHER IST ZU VERANLASSEN, DASS WAEHREND DER SERVICE-ARBEITEN DIE HILFSMITTEL UND SIE SELBST DAS GLEICHE POTENTIAL WIE DER MECHANISMUS AUFWEISEN.



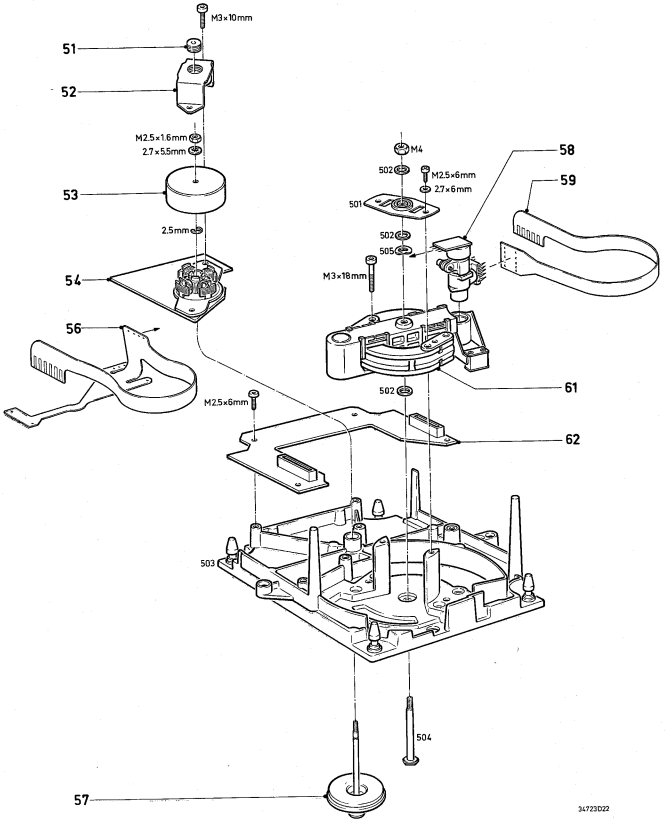








27 012C12

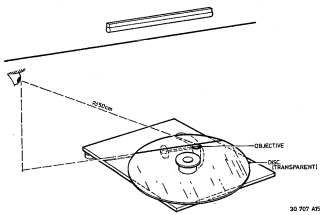


51	4822 502 11701
52	4822 520 10529
53	4822 362 20225
54	4822 214 50395
56	4822 322 40051
57	4822 528 10491
58+59	4822 691 30129
59	4822 322 40048
61	4822 691 30128
62	4822 214 50394

MECHANISCHE MESSUNGEN UND EINSTELLUNGEN

Höheneinstellung des Plattentellers (siehe service manual CD player)

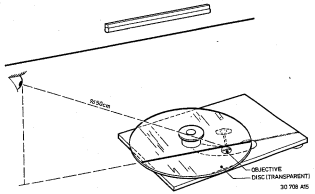
Kontrolle der Winkeleinstellung



Spiegel 4822 395 90205 auf die Fokussiereinheit und Glasscheibe 4822 395 90204 (mit Andrücker 4822 532 60906) auf den Plattenteller legen.
Gerät unter eine Lichtquelle, unter der sich eine gerade Linie befindet, stellen, (z.B. TL mit Gitter).
Arm in Mittelstellung bringen. Gerät so drehen, dass der Arm parallel zu der Linie unter der Lichtquelle steht (siehe Bild).
In der Richtung und in der Fortsetzung der Linie die Reflexion auf Glasscheibe und Spiegel betrachten.

Die Linien dürfen nicht mehr als 4 mm voneinander getrennt sein.

Das Gerät derart stellen, dass eine Linie über der Mitte des Spiegels läuft.
Wenn die andere Linie innerhalb der Oberfläche des Spiegels bleibt, ist der Abstand ⩽ 4 mm.

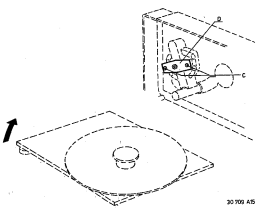


CD-Vorrichtung 90° gegenüber vorhergehende Stellung drehen.
Der Arm soll in der Mittelstellung verbleiben (siehe Bild).
Vorhergehende Messung wiederholen.

Winkeleinstellung

Beim fabrikmässigen Einstellen des durch Platte und Lichtweg gebildeten Winkels wurde ein Kompromiss zwischen Mindest-Winkelabweichung und Mindest-Armreibung angestrebt.
Wenn Messungen ergeben, dass der Winkel die gegebene Toleranz nicht einhält, muss der Winkel NICHT auf Mindestabweichung sondern gerade innerhalb der Toleranz eingestellt werden. Die neue Einstellung muss zwischen der alten und der günstigsten Einstellung liegen.

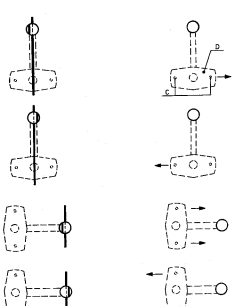
Nach der Einstellung muss die Armreibung geprüft werden. Die Prüfung der Armreibung wird mit Hilfe einer Federwaage vorgenommen, die an das Kontragewicht angelegt wird. Gemessen an dem Vollausschlag darf die Armreibung 30 mN nicht überschreiten. Wenn sich herausstellt, dass die Reibung zu hoch ist, muss die Einstellung auf den alten Wert zurückgebracht werden. Der Arm ist dann auszuwechseln und der Winkel ist erneut zu kontrollieren.



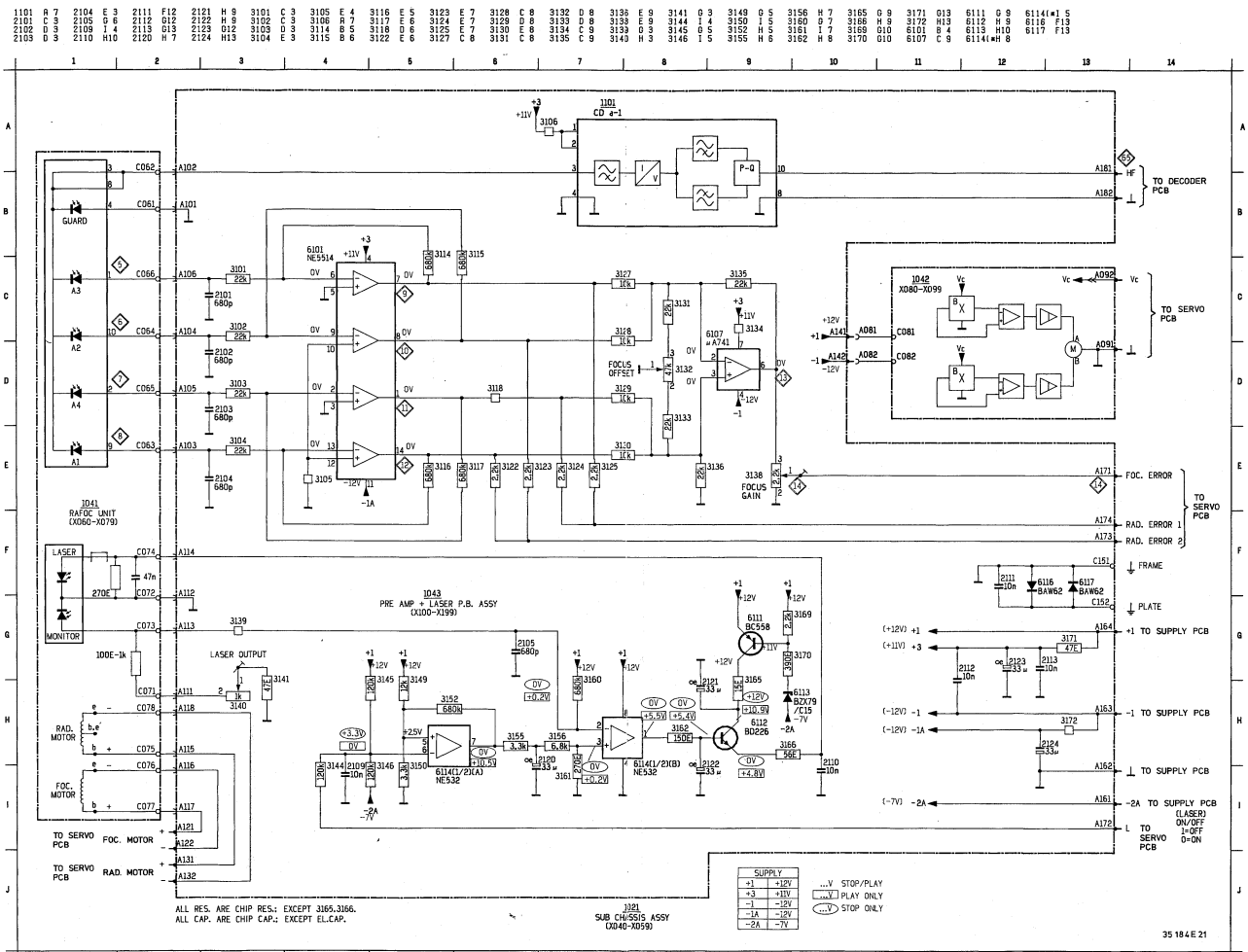
Der Winkel wird wie folgt eingestellt:
Gerät auf die Servicestützen 4822 395 30202 stellen.
Schrauben C (siehe Bild) soweit lösen, dass sich Lagerplatte D verschieben lässt.
Winkeleinstellung korrigieren, indem die Lagerplatte in die im Bild gekennzeichnete Richtung verschoben wird.
Schrauben C anziehen und beachten, dass sich die Einstellung nicht ändert.
Anschliessend nochmals die Winkeleinstellung in zwei Richtungen kontrollieren.

Achtung

Nach der Winkeleinstellung muss die Höheneinstellung des Plattentellers kontrolliert werden.

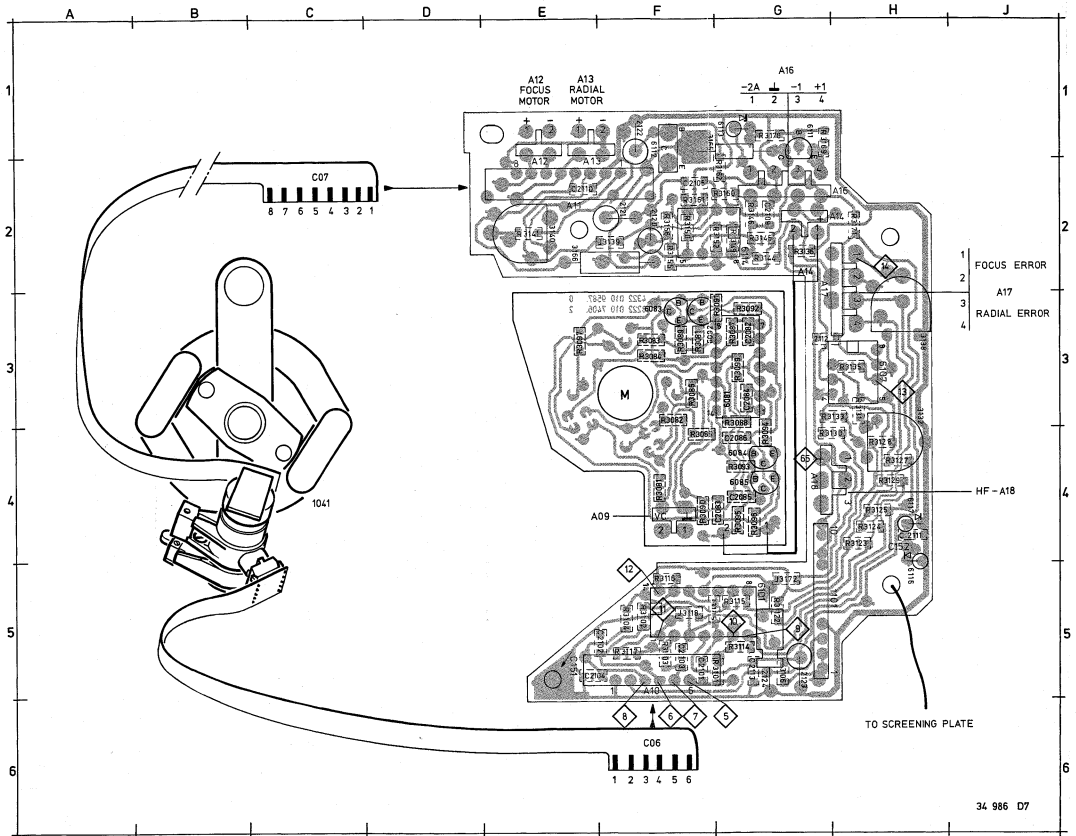


CS 94 569



CS 94 559 D

V13973 / Druck 2



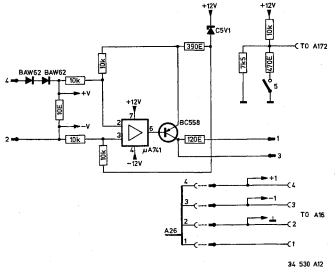
UNIT		
1101	Thick film unit HF	4822 218 10157
NE532N		4822 209 80818
NE5514N		4822 209 81451
µA714N		4822 209 80617
BC558		4822 130 40941
BD226		5322 130 44244
BZX79-C15		4822 130 34281
BAW62		4822 130 30613
3132	47k	4822 100 10583
3138	2k2	4822 100 20116
3140	1k	4822 100 20115
3165	15E MR30	5322 116 54914
3166	56E PR37	5322 116 54929
0E		4822 111 90163
47E		4822 111 90217
150E		5322 111 90098
270E		4822 111 90154
390E		5322 111 90138
2k2		4822 111 90249
3k3		4822 111 90157
6k8		5322 111 90117
10k		4822 111 90249
12k		5322 111 90097
22k		4822 111 90251
120k		4822 111 90149
680k		4822 111 90488
680 pF		4822 122 31809
10 nF		4822 122 31728

1101	G05	2133	G03	3102	F05	3133	H03	3169	G01		
2082	G03	3081	F04	3103	F05	3135	H03	3170	G01		
2083	F04	3082	F03	3104	F05	3136	G02	3171	H02		
2084	G03	3083	F03	3105	F05	3138	H03	3172	G05		
2085	G04	3084	F03	3106	G05	3139	F02	6081	G03		
2086	G04	3085	F04	3114	G05	3140	H02	6083	F03		
2101	F05	3086	F03	3115	G05	3141	H02	6084	G04		
2102	F05	3087	G03	3116	F05	3144	G02	6085	G04		
2103	F05	3088	G03	3117	F05	3145	G02	6092	F03		
2104	H05	3089	F03	3118	F05	3146	G02	6101	G05		
2105	F02	3090	F04	3122	G05	3149	G02	6107	H03		
2109	G02	3091	F03	3123	H04	3150	F02	6111	G01		
2110	H02	3092	G03	3124	H04	3152	G02	6112	F01		
2111	H04	3093	G04	3125	H04	3155	F02	6113	G01		
2112	G03	3094	G04	3127	H04	3156	F02	6116	H05		
2113	G05	3095	G04	3128	H04	3160	G02	6117	H04		
2120	F02	3096	G04	3129	H04	3161	F02				
2121	F02	3097	E03	3130	H04	3162	G02				
2122	F01	3099	G03	3131	H03	3165	G01				
2124	G05	3101	F05	3132	H04	3166	F02				

CS 94 560

Laserversorgung

Da die Abtastoptik gegenüber statischen Ladungen äusserst empfindlich ist, müssen während der Messung und Einstellung der Laserversorgung die Hilfsmittel und Sie selbst das gleiche Potential wie der CD-Mechanismus haben.



Kontrolle

Zu diesem Zweck muss die Lasersimulator-Printplatte nr. 3 (4822 395 30229) verwendet werden.
Flexible Leiterplatte dem Steckverbinder A11 entnehmen und den Simulatorprint mit dem Steckverbinder verbinden.
Stecker A16 herausziehen und in den Steckverbinder am Simulatorprint einstecken. Den Stecker mit vier Drähten mit dem Steckverbinder A16 verbinden.
Stecker A17 lösen und den Stecker mit einem Draht in den Steckverbinder A17 einstöpseln.

Kontrolle der Ruhestellung:

Schalter am Simulatorprint in die "OFF"-Stellung und Netzschalter in die "ON"-Stellung bringen.
Einstellwiderstand 3140 rechtsherumdrehen (Höchst-Widerstand) und die Spannung zwischen den Punkten +v und —v am Simulatorprint messen. Die Spannung soll ⩽ 15 mV sein.

Kontrolle der Laserversorgungseinstellung:

Schalter am Simulatorprint in die "ON"-Stellung bringen und die Spannungen zwischen den Punkten +v und —v am Simulatorprint messen.
Widerstand 3140 rechtsherumdrehen (Höchst-Widerstand): U +v —v = 225 mV± 45 mV.

Widerstand 3140 linksherum-drehen (Mindest-Widerstand):
U +v —v = 750 mV ± 150 mV.
Widerstand 3140 in die Mitte stellen.
Es handelt sich um eine Voreinstellung. Nachdem der Simulatorprint fortgenommen ist, muss der Laserstrom eingestellt werden.
(siehe service manual CD player).

Regeln der Fokusbandbreite

(siehe service manual CD player).

Kontrolle der automatischen Verstärkungsregelung (AGC) und der Offsetschaltungen.

(siehe service manual CD player).

Kontrolle der Motorregelung (Hall).

1 Stecker A09 vom Motorprint am CDM entfernen.

2 Kanal A eines Zweistrahloszilloskopen an den Emitter der Transistoren 6082 und 6083 und Kanal B an den Emitter der Transistoren 6084 und 6085 schalten.
Oszilloskopstellung: 2 V/Teilung — 10 ms/Teilung.

3 Anschluss 1 von Steckverbinder A09 am Motorprint mit der Masse des Gerätes verbinden.

4 Gerät einschalten.

5 Eine **negative** Spannung an Anschluss 2 von Steckverbinder A09 einspeisen.
Das Einspeisen **soll erst** erfolgen, nachdem die Schaltung an die Versorgungsspannung angeschlossen worden ist. Es ist von 0 Volt auszugehen; diese Spannung nach und nach auf —5 V bringen. Der Motor soll nun laufen.
Wenn der Motor läuft, kann die Spannung auf ca. —2,5 V gebracht werden.
Der Motor soll dann immer noch laufen.

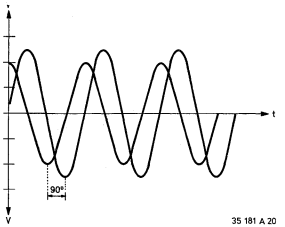
6 Am Oszilloskop sollen nun sinusförmige Signale erkennbar sein (siehe Bild A).
Die Signale sollen nach etwa 2 Sekunden symmetrisch um die Nullachse liegen und um 90° zueinander verschoben sein. Die Amplituden dieser beiden Signale dürfen zuhöchst ein Verhältnis von 1 zu 2 aufweisen.

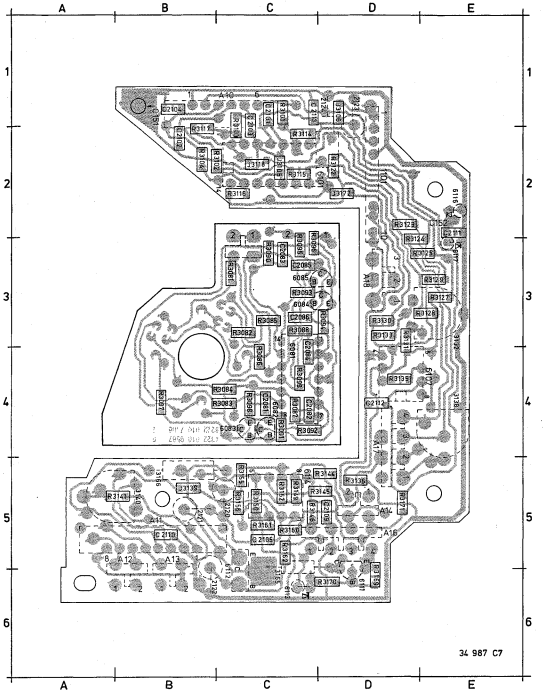
7 Die Amplitude wird durch die eingespeiste Spannung bedingt. Das Verhältnis U ein (V-in)/U aus ss (V-out pp) soll zwischen 1:2 und 1:3 liegen.

8 Es ist zu ermitten, bei welcher Eingangsspannung (V-in) der Motor 600 Umdrehungen in der Minute macht. Bei 600/min ist die Frequenz von V-out 30 Hz. V in soll bei dieser Motordrehzahl zwischen —1,5 V und —3,7 V liegen.

Schlussfolgerung

Wenn all diese Bedingungen erfüllt werden, lässt sich voraussetzen, dass der Motor und der Print in Ordnung sind.
Werden die Bedingungen in 5, 6 und 7 nicht erfüllt, dürfte allem Anschein nach der Fehler in der Elektronik gesucht werden.
Werden die Bedingungen in 5, 6 und 7 erfüllt und sollte zu 8 eine Spannung von beispielsweise —4,5 V eingespiest werden müssen, damit eine Motordrehzahl von 600/min erreicht wird, dann wird allem Anschein nach in mechanischer Sicht einiges nicht in Ordnung sein, etwa eine zu hohe Lagerreibung.





1101 B02
2081 C04
2082 C04
2083 C03
2084 C04

2085 C03
2086 C03
2101 C01
2102 B02
2103 C01

2104 B01
2105 C05
2109 B05
2110 B05
2111 B02

2112 B04
2113 C01
2120 C05
2121 B05
2123 D01

3124 D02
3081 C03
3082 C03
3083 C04
3084 C04

3085 C03
3086 C04
3087 C04
3088 C03
3090 C03

3091 C04
3092 C04
3093 C03
3095 C03
3096 C05

3097 B04
3098 C04
3099 C04
3101 C01
3102 C02

3103 C01
3104 B02
3105 C02
3106 B01
3114 C02

3115 C02
3116 C02
3117 B02
3118 C02
3122 B02

3123 D02
3124 D02
3127 E03
3128 E03
3129 E03

3130 E03
3131 E03
3132 E03
3133 E03
3135 D04

3136 D05
3138 E04
3139 B05
3140 B05
3141 B05

3144 D05
3145 D05
3146 C05
3149 C05
3150 C05

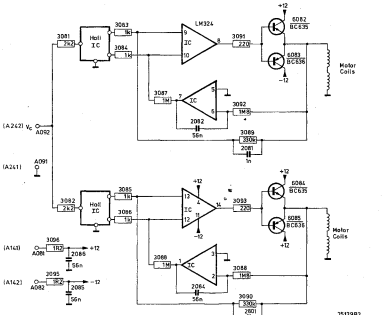
3152 C05
3155 C05
3156 C05
3160 C05
3161 C05

3162 C05
3165 C05
3166 B05
3169 D06
3170 D06

3171 D05
3172 D02
6081 C04
6082 C04
6083 C04

6084 C03
6085 C03
6101 C02
6107 D04
6111 D06

6112 C06
6113 C06
6116 E02
6117 E03



PHILIPS

SI Wichtig für die Werkstatt!

Nr.: 24037

Sachgebiet: Compact Disc AC 24 Datum: 17.9.85 De/gs

Service Information

Betrifft: Compact Disc-Laufwerk CDM 1

Verteiler: intern und extern

1. Abgleich Focus-Offset

Der Abgleich des Einstellers "Focus-Offset" auf dem Vorverstärker- und Laser-Print kann - falls erforderlich - wahlweise nach 2 verschiedenen Methoden durchgeführt werden:

a.) mit Zuführung eines Meßsignals
- Anschlüsse nach Fig. 1 herstellen.
- Mit "Focus-Offset" Spannungen an Pin 6/IC 6107 auf Minimum ($\leq$ 100 mV) einstellen.

Nach Abgleich soll der Schleifer des Einstellers in Mittelstellung ($\pm$ 10°) stehen.

b.) in Play-Funktion des Spielers
- Fehlerfreie Platte - z. B. Testplatte 5 (Best.-Nr. 4822 397 300 96) - abspielen.
- Mit "Focus-Offset" das HF-Signal am MP 65 ("Augenmuster") auf einen Wert $\geq$ 500 mV einstellen (messen mit AC-Millivoltmeter).

2. Ergänzung zur Ersatzteil-Aufstellung

Die Fassungen A 10 und A 11 auf dem Vorverstärker- und Laser-Print (Konnektoren für die Flexprints vom Lightpen) werden als Ersatzteile geführt:

A 10, 6polig	4822 267 504 12
A 11, 8polig	4822 267 504 13

Form 80.148

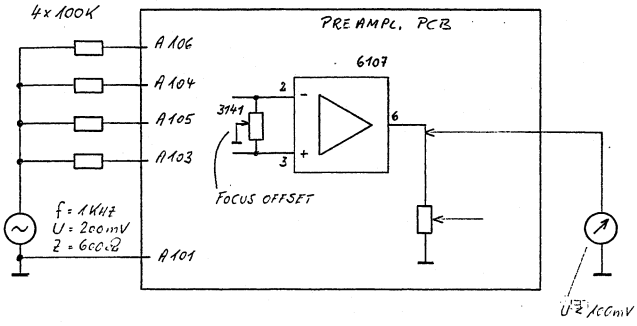

4x100K
PREAMPL. PCB
A106
A104
A105
A103
A101
6107
2
3
6
3941
FOCUS OFFSET
f = 1KHz
U = 200mV
Z = 600Ω
U/Z/100mV

FIG. 1