

Service
Service
Service

Interactive
Media
Systems

CD-I



Service Manual

COMPACT
disc
Interactive



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 spårren 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.

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*Pour votre sécurité, ces documents
doivent être utilisés par des spécia-
listes agréés, seuls habilités à réparer
votre appareil en panne*.

CLASS 1
LASER PRODUCT

3122 110 0340

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PHILIPS

PCS 68 28

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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

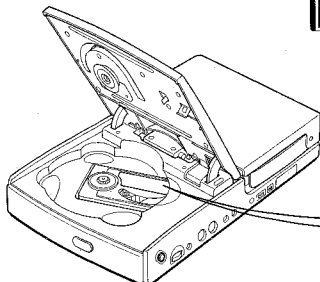
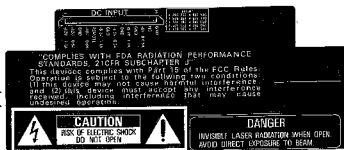
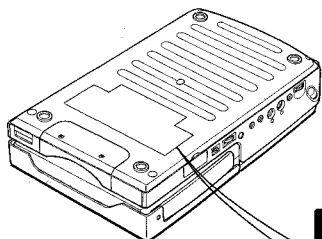
Wavelength: 760 - 800nm (30°C)

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 regulations!

Audio L+R:

-Connector : Mini Phone socket
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 : Mini Phone socket
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-interface	312 lines	262 lines
interface	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)
: 63.555 uS
- 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
: 4.5 MHz (-6dB)
- Video bandwidth : = 3.579545 MHz
- Chroma subc. freq. : 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
: 4.5 MHz (-6dB)
- Video bandwidth : = 4.433661 MHz
- Chroma subc. freq. : 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 output:

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

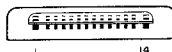
- characteristics

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

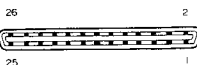
Power supply

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.)

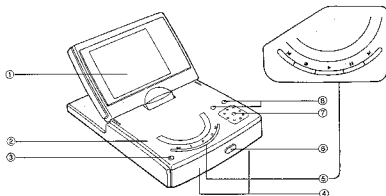


2.2 Connections and Controls

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

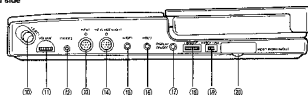
Front



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, except 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



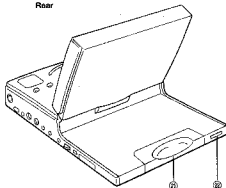
Rear view

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

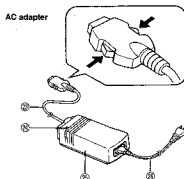
AC adapter

- 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



AC adapter

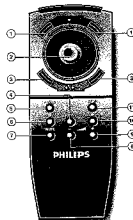
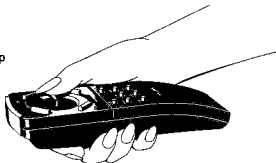


Note The rating plate is affixed to the bottom of the unit.

Remote controller (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

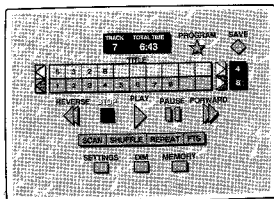


The control sits conveniently in the hand, and the thumbstick and action keys, which are by far most-used controls, are easily operated one-handed.

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" setting 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 (starts CD-I or Photo-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 preclude 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

- Oxidation on the SMDs terminals results in poor soldering. Do not handle SMDs with bare hand.
 - 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.
- 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. Similarly, do not slide the circuit board across any surface.

3.2.2 Removal of SMDs

- 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
- While holding the SMD with a pair of tweezers take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1b).
- 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:

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

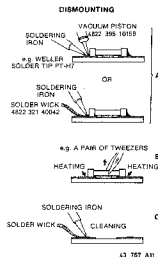


Fig. 1

3.2.3 Attachment of SMDs

- 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).
- Next complete the soldering of the terminals of the component (see Fig. 2b).

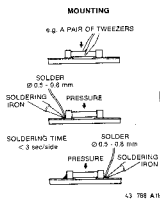


Fig. 2

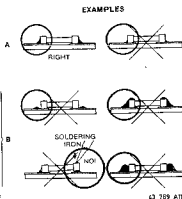
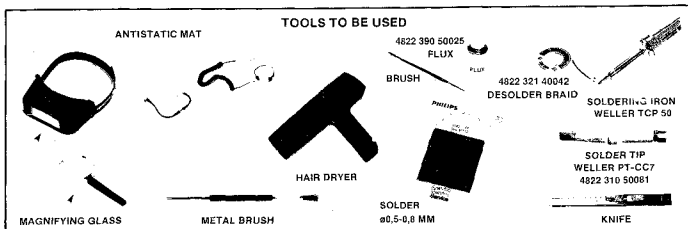


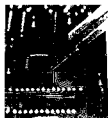
Fig. 3

3.2.3.1 Caution on attachment:

- 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.
- Keep the SMD's body in contact with the printed board when soldering.
- The soldering iron to be used (approx. 30 W) must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).
- Soldering should not be done outside the solder land.
- Soldering flux (of rosin) may be used but should not be acidic.
- After soldering, let the SMD cool down gradually at room temperature.
- 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).

**DISMOUNTING**

CUTTING THE LEADS



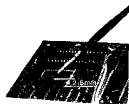
WRONG TRACKS WILL BE DAMAGED



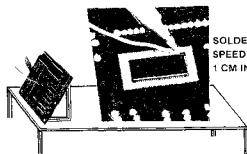
CLEANING THE TRACKS

**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-sensitive 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 peaks on the mains as a consequence of switching electric equipment, relay and DC lines on and off.

3.3.8 Working environment

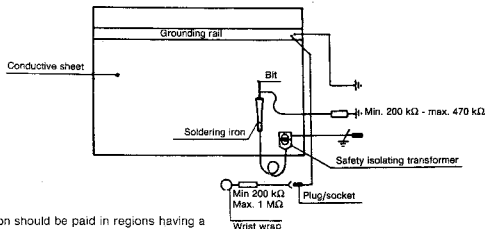
The work bench for the service technician should look like the one shown in the figure.

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.



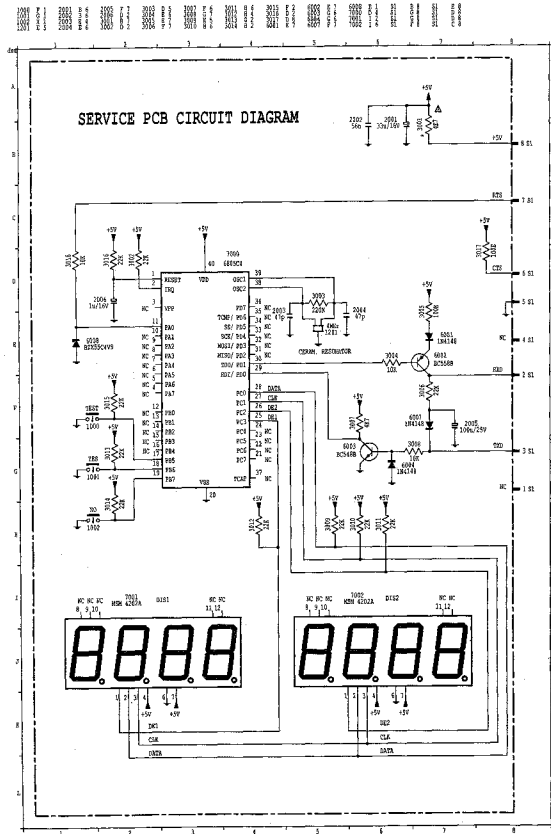
Special attention should be paid in regions having a dry atmosphere and when the floor is covered with a nylon carpet or such.

3.4 SERVICE TOOLS

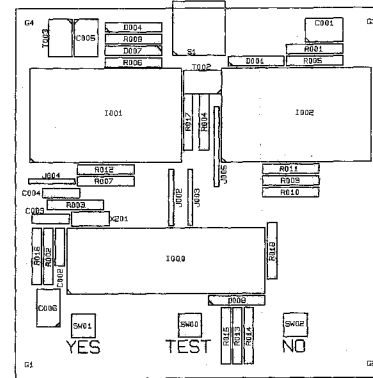
3.4.1 Service PCB (Low Level Test)

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	ITEM	DESCRIPTION	CODENUMBER
1000	Tact switch	4822 276 10974	3011	22	KΩ
1001	Tact switch	4822 276 10974	3012	22	KΩ
1002	Tact switch	4822 276 10974	3013	22	KΩ
			3014	22	KΩ
1201	Ceram.resonator	4822 242 72527	3015	22	KΩ
			3016	22	KΩ
2001	33	μF/16V	3017	100	Ω
2002	56	nF			
2003	47	pF	6001	1N4148	4822 130 30621
2004	2004	47	6002	BC558B	4822 130 44197
2005	100	μF/25V	6003	BC548B	4822 130 30621
2006	1	μF/63V	6005	BZX55 C4V7	4822 130 34174
			6006	BAT85	4822 130 31983
3001	4,7	Ω	6007	1N1448	4822 130 30621
3002	22	KΩ			
3003	220	KΩ	7000	MC68HC705C4	4822 900 10272
3004	10	KΩ	7001	MSM 4202A	4822 130 90474
3005	100	Ω	7002	MSM 4202A	4822 130 90474
3006	22	KΩ			
3007	4,7	KΩ			
3008	10	KΩ	S1	miniDIN 8pins	4822 267 31289
3009	22	KΩ			
3010	22	KΩ			

3.4.2 Test discs

Codenumber	Name/description	Application
4822 397 30086	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 continuous 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 40066	FLEX Cable	For CDM 9
4822 267 50676	FLEX Cable connector	extension
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 Controller	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 52087 /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/repaid 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 will be returned in case of unacceptable conditions.

3.6.3 Repair Procedure Conditions:

- HANDLE WITH CARE IN AN ESD PROTECTED ENVIRONMENT.
- 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 labelling 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, then 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.

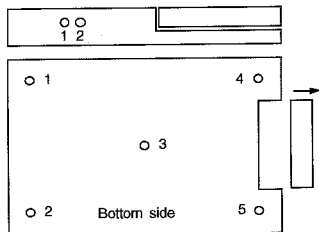


Fig 4.1

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 036B, then remove 2 screws on the mainboard and 2 screws on the power plug PP06. Then the main board PM06 can be removed.

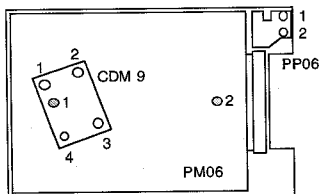


Fig 4.2

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 extension flex wire.

This extension wire can be made yourself by soldering a flex connector J801 on the extension 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.

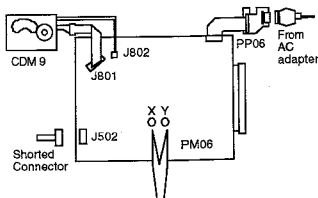


Fig 4.3

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 connector 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 clasper pos.058B on the disc.

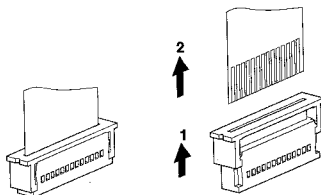


Fig 4.4

4.2 Servicing the CD-Lid

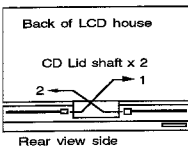
First Remove top cover 4.1.1

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.

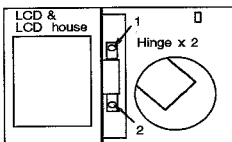
4.2.2

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

4.3 Servicing the LCD screen unit

4.3.1 Remove the LCD house.

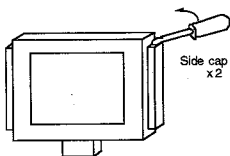
Remove two screws from the two Hinges.



Then remove the LCD house carefully. (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

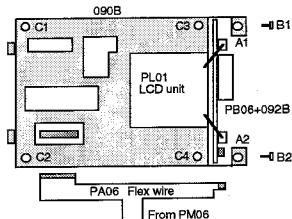
4.3.3 Remove the LCD-screen unit

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.



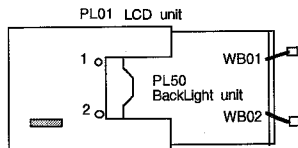
WARNING : If servicing the PB06, then coat the silicon-gum to the former coating point after soldering. (see "DIAGNOSTICS")

4.3.4 Remove the BackLight unit

The BackLight unit can be exchanged.

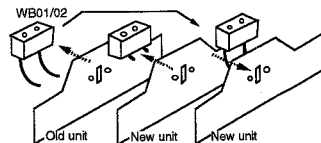
Remove 2 screws on the back of LCD unit.

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 silicon-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:

- Display header and release number.
- VSC
- ROM
- NVRAM
- DRAM
- CDIC
- 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 Testsequence

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 1

- Clear the RXD buffer.
- Wait 5 ms.
- Read the RXD buffer.
- 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 start up 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 RLX'.
- (with xx the release number)
- The pcb ltest is now ready to go.

With VT100 terminal

To start up 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 independent)
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 independent 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:

- Display release number of this ROM. (test A)
- 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 FBFF	1F FC01 - 1F FC1F	DUART (4)
16B*	UP&LO	1F FFC0 - 1F FFD0	1F FFC0 - 1F FFD0	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/DNAMEM
8kB-8	UP	3F 8000 - 3F FBFF	3F 8000 - 3F BFEE	NVRAM (2)
8B	UP	3F BF00 - 3F FBFF	3F BF00 - 3F BFEE	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

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

1. 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 accessible as a word.

- KB = kilobytes
- B = bytes
- B* = bytes, but some addresses are only accessible as words.
- kW = kilowords, only accessible as a word!

UPPEF
This c
cessib
UP

LO

UP&L

UNDE

MAPP

This c

descri

device

UNMA

Analo

occur

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STEP

STEP

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spec)

displa

The fc

1. rea

2. wri

3. rea

4. if b

err

If erro

displa

5. wri

6. rea

7. if b

err

If erro

displa

8. rep

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:

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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 BFFF	18 0000 - 1F BFFF	SYSTEM ROM
16B	LO	1F FC00 - 1F FBFB	1F FC01 - 1F FC1F	DUART (4)
16B*	UP&LO	1F FFC0 - 1F FFD	1F FFC0 - 1F FFD	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 FFE	CDI
910kB	UNDEF	31 0000 - 3E FFFF	31 0000 - 3E FFFF	FREE SPACE
2B	LO	3F 0000 - 3F 7FFF	3F 0001 - 3F 0003	KILLME/DMMEM
8kB-8	UP	3F 8000 - 3F FBFF	3F 8000 - 3F BFEE	NVRAM (2)
8B	UP	3F BFF0 - 3F BFFF	3F BFF0 - 3F BFEE	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 accessible 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. (DATA0-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.

UNDEF = (the device uses the complete databus. 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 yy)

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: 6Axx

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

display: 6AxxEr11

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: 6Bxx

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

display: 6BxxEr12

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: 7Axx

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

display: 7AxxEr13

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
6br	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 L1TEST 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 l1test 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 addresses). Pressing 'ESC' stops the test.

If one tries 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 l1test.

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 word 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 l1test.

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.

display: 7BxEr14

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.

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.

display: 8BxEr16

STEP 9: CDIC

This test only checks part of the CDIC ram, mainly because it is important 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.

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.

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.

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.

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 < \$00 then continue with step 3 else give an error and stop testing.

display: 10C Er21

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

If in one of these test stopped and the err

This test has also some hidden functions. Pressing: w: writes continu the address as data to the cd. r: reads continu the cd. d: displays the contents of 421 succeeding ram locations. The start address is ESC stops these fun

Address range: CDIC base address - \$3C80.

STEP 10: SLAVE pro

1. This l1test for the slave
2. Write \$F0 to the slave
3. Read byte from slave with \$F0.
4. If data is not \$F0 code else continu
5. Read the next byte from the slave process bar. If the release is displayed.
6. Read the next byte from the CD processor if the release number played.

Address range: Slave

See table of memory

STEP 11: CLOCK CAI

This step is not really used to trim the clock within 1 minute accuracy. This step should be needed to counter is needed to test is entered accidentally. The clock calibration frequency counter.

- Connect the probe signals called CS
- Start the test with counter set to min
- The counter display to 512 Hz.
- If not, the check if properly.
- range : \$1136724
- Press a key on the Now fill in the me itest software will filled into the call ic.
- The value of the f changed or influen
- 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: 7Bxx

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

display: 7BxxEr14

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: 8Axx

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

display: 8AxxEr15

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: 8Bxx

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

display: 8BxxEr16

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 work, 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 < \$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 continue the long address as data to the cdic.
 - r: reads continue 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 test 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 sec. 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 accidentally, 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 signals called CSCD1CN.
- 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 check if everything is set and connected properly.
(range : 511,96/24 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 right hand 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 left hand 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
 \$7BFE = MSByte of the checksum
 \$7BFD = Release number of this ROM (BCD coded)
 \$7BFC = 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.

- Video circuitry, by means of a colorbar testpattern
- CDM and servo circuitry
- Input / Output ports
- Audio circuitry

Testing the CDM, servo and audio circuitry 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 consists 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.

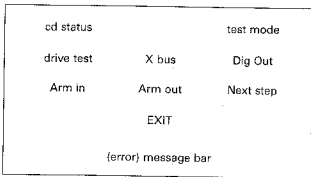


fig 3.2 CD test menu

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. Its purpose is to check whether 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 lens 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 lens 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 lens 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 : too many grooves to jump
- xx = 31 : search time out
- xx = 32 : bin. search error
- xx = 33 : ssearch 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 initialization.

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.

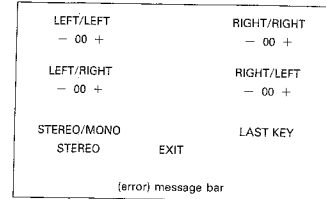


fig 3.4 APU test menu

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.

6.1 Wiring diagram



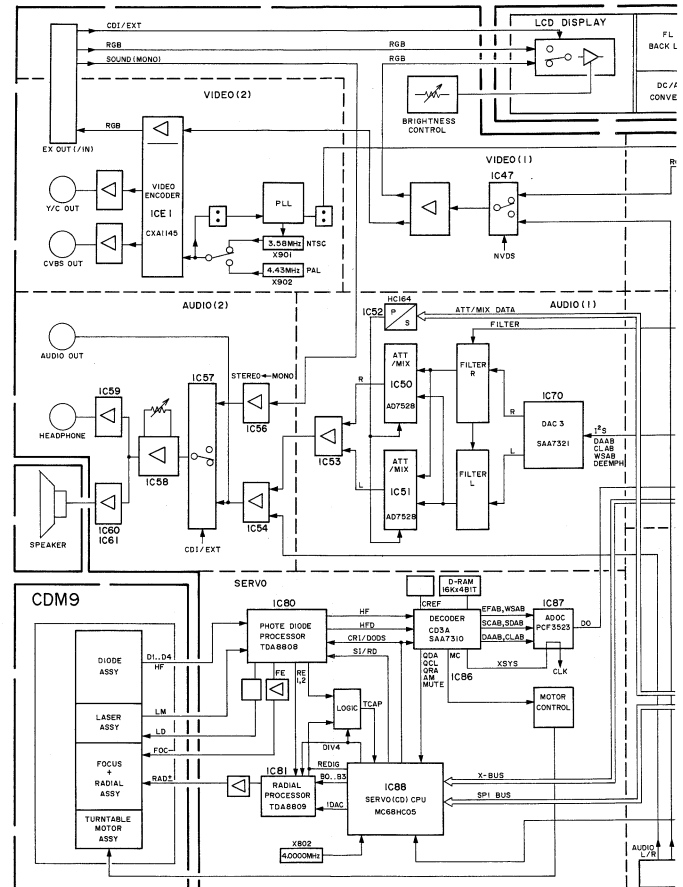
6.2 Alphabetical signal listing

ACK2N	: DMA REQUEST ACKNOWLEDGE (active low) (of channel 2)	DATA 0..15	: DATA LINES
ADEN	: (=ADENA) ADDRESS ENABLE NOT. When low, the address ADENA coming from the bus (68070) will be put through to CDIC	DATADAC	: Data which will be send to the DAC(S) for volume adjustment
AM	: ADDITIONAL MUTE	DDTACK	: DATA TRANSFER ACKNOWLEDGE to the 68070 bus
ASN	: ADDRESS STROBE (active low, tristate) indicates when an address is valid on the bus for the system	DEEMP	: DEEMPHASIS
AVN	: AUTOVECTORED INTERRUPTS (active low), can be used by an extension	DIRN	: DIRECTION CONTROL. Indicates the direction of data transfer through the transceivers
BO..3	: input control bits for off-catch-play status and DAC output current for radial motor	DISCLK	: DISPLAY CLOCK >>
BATTL	: Battery detect signal from Power in	DISDAT	: DISPLAY DATA >> only for CDI 2XX
BCDI	: Video signal from VSD (GCDI, RCDI)	DISPC	: LCD screen ON/OFF (ON=high)
BENC	: >> to encoder	DIV4	: DIVIDE BY 4 signal
BFMV	: >> from J606 (GENC, RENC)	DO	: DIGITAL OUT
BERRN	: >> BUS ERROR (active low, open drain)	DODS	: DROP-OUT DETECTOR SUPPRESSION
BERR	: >>	DONEN	: DONE (active low, open drain), operates in the DMA-mode
BLANI	: (=BLAN1M) BLANKING OUTPUT (active low, tristate) of the VSC	DOXN	: serial data output of the X-bus
BTU	: Video signal from J404 (GTU, RTU)	DSPRW	: Read (high) or write (low) from or to the Digital Signal Processor
CBA, CBAA	: 68070 bus transceiver latch (rising edge)	DSN2N	: DATA STROBE (active low) of the DSP
CDICDACKN	: (=ACK1N) DMA REQUEST ACKNOWLEDGE (active low)	DTACKN	: DATA TRANSFER ACKNOWLEDGE asserted by a peripheral
CDICREQN	: (=REQ1N) DMA REQUEST (active low)	DTACKSLAVEN	: DATA TRANSFER ACKNOWLEDGE of the SLAVE processor (68HC05)
CDIEXT	: Internal(CDI)/External exchange signal of Audio/Video (Low=internal)	DTCN	: DATA TRANSFER COMPLETE (active low, open drain) operates in the DMA-mode
CLAB	: (=CLAB2) bitclock for the SAA 7220 chip	EFAB	: ERROR FLAG
CLK	: CLOCK (11,2896 Mc)	FILTERN	: filter select when high: level C, when low: level A
CLKDAC	: CLOCK DAC, the clock used to send serial data to the volume adjustment	FOC	: >> focus out to CDM 9
CLK1	: the clock on which the DSP operates (7,5284 Mc)	FOC+	: >>
CRI	: COUNTER RESET INHIBIT (low during a real trackloss or during execution of a jump command)	GN	: >>
COC	: COMMAND COMPLETED signal	GNA	: >> When low: the outputs and inputs of the transceivers (646) are enabled
COXN	: serial output clock for the X-bus	GNB	: >>
CPUASN	: the address strobe of the 68070 microprocessor	HALTN	: active low, open drain, bidirectional. If low together with the reset it causes the 68070 to enter the reset state.
CPULDSN	: the lower data strobe of the 68070 microprocessor	HSLCD	: Hsync from LCD screen for external video
CPUUDSN	: the upper data strobe of the 68070 microprocessor	HSYN	: (active low) horizontal synchronisation input from the VSC
CS	: CHIP SELECT	HVID 0 IN	: >> 8 bit pixel bus for channel 1
CSCDICN	: CHIP SELECT CDIC (active low) bus information is intended for or coming from CDIC	...HVID 7 IN	
CSDAC1N	: (=CSDAC2N) (if selected, low) it means that data will be adjusted on that channel	HVID 0 OUT	: >> (VSC-master)
CSNVRAMN	: CHIP SELECT NVRAM (active low) bus information is intended for or coming from the NVRAM	...HVID 7 OUT	
CSROMN	: Chip select ROM (active low)	IACKIN2N	: >>
CSSLAVEN	: CHIP SELECT SLAVES (active low)	IACKIN4N	: >> Decoded interrupt acknowledge (active low).
CSO	: (=CSO1N) CHIP SELECT (active low) for the 8Kx8 SRAM'S	IACKIN5N	: >> Asserted during an interrupt acknowledge
CSVSCMSN	: CHIP SELECT VSC MASTER AND SLAVE. When low the coming information is intended for the VSC'S	IACKOUT2N	: >> sequence to indicate to a peripheral that
CSYN	: COMPOSITE SYNCHRONIZATION input from the VSC'S (active low)	IACKOUT4N	: >> this interrupt request is being serviced
CSYENC	: >> to encoder	IACKOUT5N	: >>
CTS2,M	: CLEAR TO SEND (active low) it indicates that the remote receiving device is ready	IACKOUT2	: >>
DAAB	: (DAAB2) serial data output of the X-bus 12S standard	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 interrupts, when high interrupt devices are daisy chained
		INTENN2	: >>
		INTENN3	: >>
		INTENN4	: >>
		IN2IN	: (=IN2OUT) >>
		IN4IN	: (=IN4UT) >> Decoder interrupt priority inputs

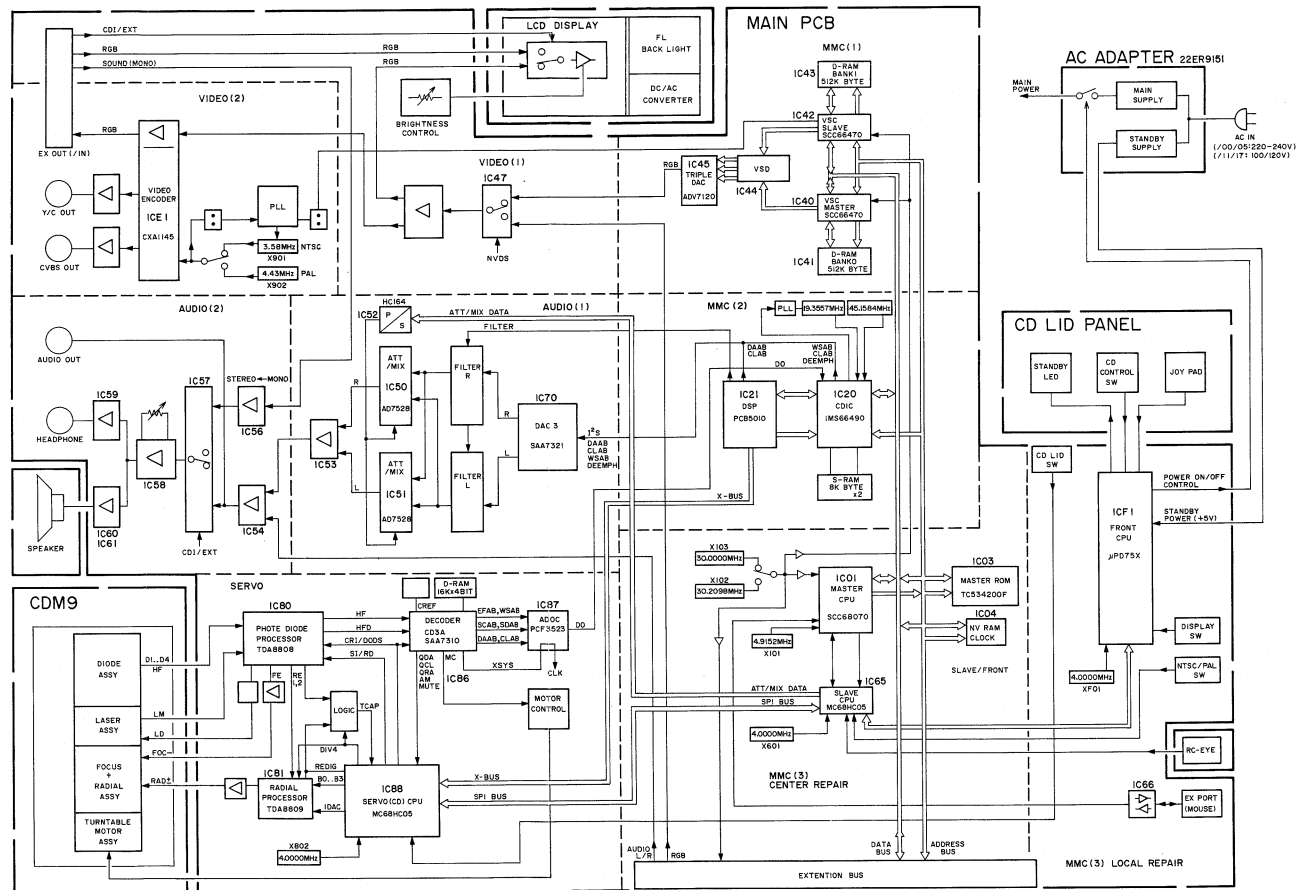
N5IN	: (=IN5OUT) >> (active low) IN2IN has the lower	RWN2	: READ - WRITE (low is write) signal from CDIC to the DSP
N2OUT	: >> and IN5IN has the higher priority	RWRAM	: READ - WRITE signal from the CDIC to the S-RAM'S
N4OUT	: >> IN2IN = SLAVEPROCESSOR (6805), IN4IN =	RXD2,M	: >> RECIEVE DATA RXD is data input
N5OUT	: >> CDIC (IMS66490), IN5IN = DUART (68681)	SI	: on - off control for laser supply and focus circuit
IOYP1..4	: Controller (Joy Pad) input	SLMA0..8	: VSC-slave memory address bus to the DRAM'S
JOYS1,2	: Action: sw input	SLMD0..15	: VSC-slave memory data bus to the DRAM'S SOXENN: SERIAL OUTPUT
KEY11..3	: Key scan for Front switch		ENABLE FOR THE X-BUS (enabled when low)
KEYO..3	: >>	SOXRQN	: SERIAL OUTPUT REQUEST FOR THE X-BUS (when low)
_CDCLK	: LCD screen control by I2C	SOYENN2	: SERIAL OUTPUT ENABLE FOR THE Y-BUS (when low)
_CDDAT	: >>	SPICLK	: SERIAL PERIPHERAL INTERFACE CLOCK
_ED1	: Power LED (red)	SPISS	: SERIAL PERIPHERAL INTERFACE SLAVE SELECT
KILLM	: to mute audio outputs by power on and off	STANDARD	: software choice between PAL and NTSC
_ADD1..23	: ADDRESS-BUS (active high, tristate) for direct addressing of 16 Mbyte of memory	STANDARD SW	: hardware choice between PAL and NTSC
_DSN	: LOWER DATA STROBE of the bus	SOUND	: Audio signal (mono) of external
_M	: LASER MONITOR diode input	SWAB	: SUBCODING WORD CLOCK INPUT
_O	: LASER amplifier current OUTPUT	SYSCCLK	: >> SYSTEM CLOCK
_RDN	: when low select, the ROM'S or NVRAM read the lower data byte	SYSCCLK1,2,A	: >>
_VIDOIN	: >> 8 bit pixel-bus for channel 2 (VSCSLAVE)	TCAP	: input capture feature for the on-chip timer
_LVID7IN	: >>	TCMP	: output for the output compare feature of the on chip timer
_LVIDOOUT	: >>	TMOUT	: TRAY MOTOR OUT
_LVID7OUT	: >>	TXD2,M	: >> TRANSMIT DATA TXD is data output
MC	: MOTOR CONTROL signal	UDSN	: UPPER DATA STROBE (active when low)
MISO	: MASTER IN SLAVE OUT	URDN	: READ UPPER DATA BYTE (active when low)
MOSI	: MASTER OUT SLAVE IN	UWRMN	: READ - WRITE (write when low) UPPER MEMORY DATA FROM DRAM'S FROM VSC-MASTER
MPEGLR	: Audio signal from J606	UWRN	: WRITE UPPER DATA BYTE (active when low)
MSMA0..8	: ADDRESS BUS between the DRAM'S of the VSC MASTER and the VSC MASTER	UWRN	: READ - WRITE (write when low) UPPER MEMORY DATA FROM DRAM'S FROM VSC-SLAVE
MSMD0..15	: DATA BUS between the DRAM'S of the VSC MASTER and the VSC MASTER	VC	: output DC-motor (VOLTAGE CONTROL)
NRESET	: when low the video synthesizer (VSR) is in reset	V-FLAG	: output to the DSP
NVDS	: digital output to control an external switch for TV overlays (active low)	VSCM-INTN	: when low, interrupt from VSC master to 68070 processor
PCLK1IN	: >> PIXEL CLOCK for channel 1	VSCS-INTN	: when low, interrupt from VSC slave to 68070 processor
PCLK1OUT	: >>	VSYN	: (active when low) VERTICAL SYNCHRONISATION INPUT from the VSC
PCLK2IN	: >> PIXEL CLOCK for channel 2	WRPN1IN..2	: >> control input for channel 1 or 2 (active low)
PCLK2OUT	: >>	WRPN1OUT..2	: >>
PLOIN1	: input clock for CDIC (22,5792 Mc)	WSAB	: >> WORD SELECT FOR AB CHIP
PLOIN2	: input clock for CDIC (19,3536 Mc)	WSAB2	: >>
POWERC	: Power ON/OFF control from ICF1 (ON=high)	XIN	: >> 11,2896/9,6768/4,8384 symmetrical clock
QCL	: Q-channel CLOCK	XIN2	: >>
QDA	: Q-channel DATA	X-TAL2	: the same as the system clock, coming out of the VSC'S
QRA	: Q-channel REQUEST	XT2	: the system clock divided by two
Q22	: INPUT/ACKNOWLEDGE OUTPUT	XT4	: >> the system clock divided by four
Q21	: output to PLL (22,5792 Mc) divided by 14	XT4IN	: >>
RAD+	: >> RADIAL OUT to CDM 9	0AD..12AD	: >> ADDRESS BUS, between CDIC-SRAM'S and SYSTEM ADDRESS BUS BUFFERS
RAD-	: >>	10ADA	: >>
RD	: READY signal, starting up procedure finished	...12ADA	: >>
RDYN	: READY (active low) of the DMA channel	0D..16D	: DATA BUS between CDIC and DSP
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		

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

6.3 Block diagram



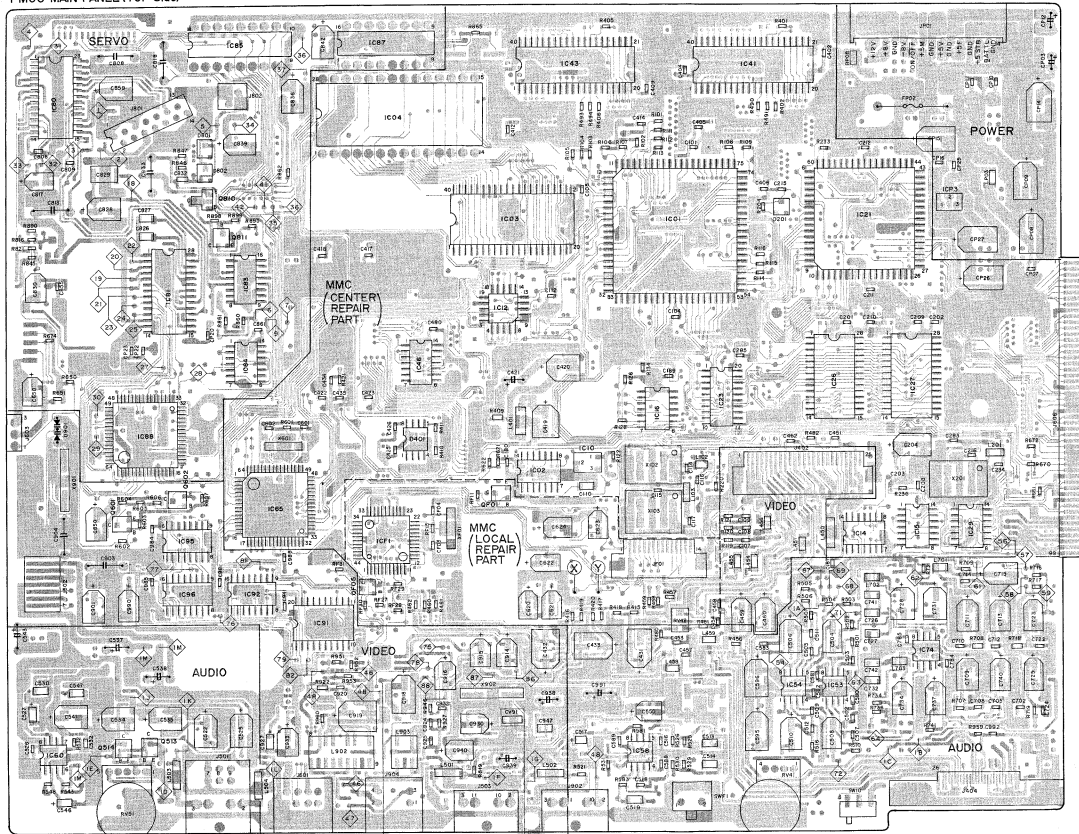
6.3 Block diagram



6.4 MAIN Panel

6.4.1 PCB Layout (Top side)

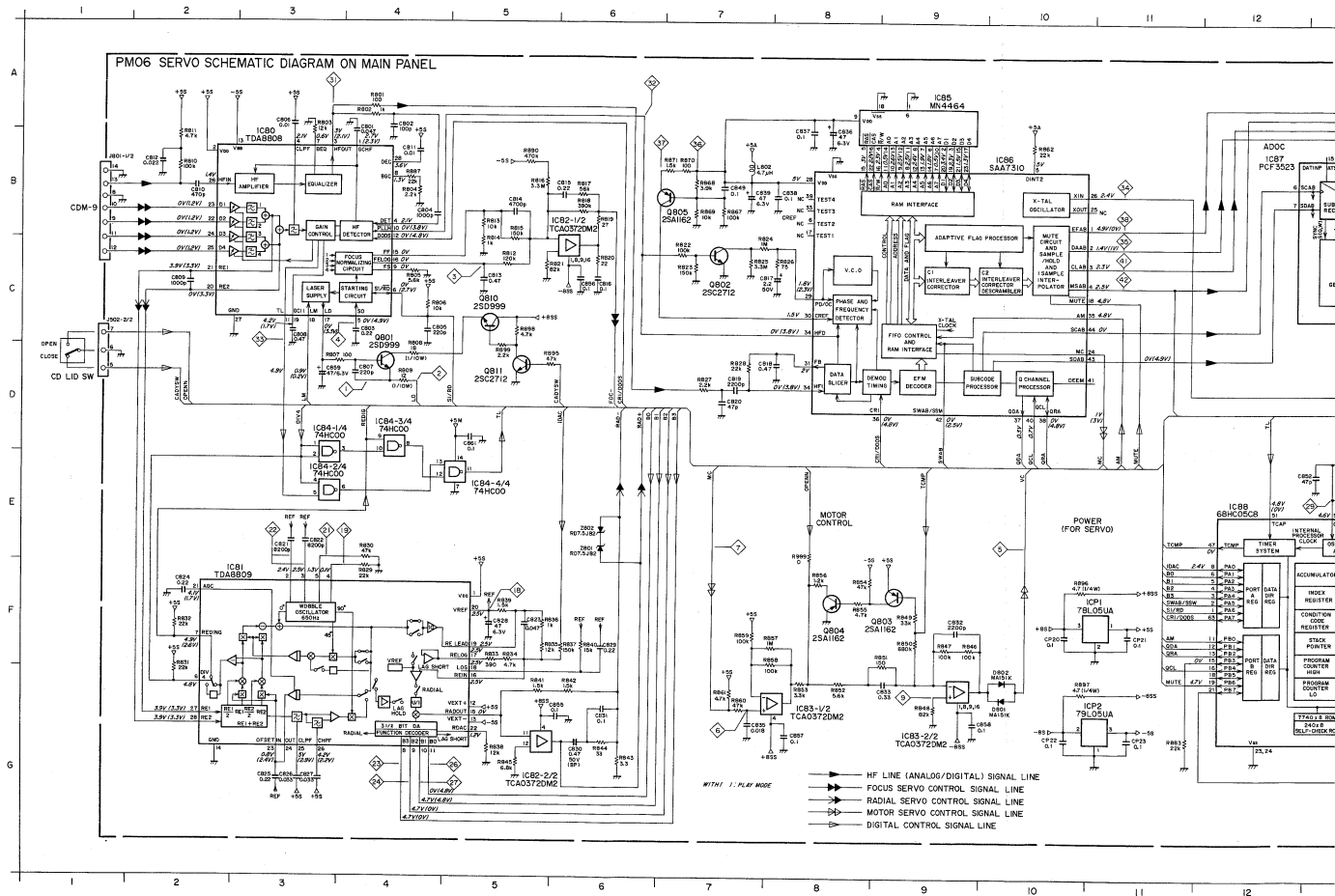
PM06 MAIN PANEL (TOP Side)

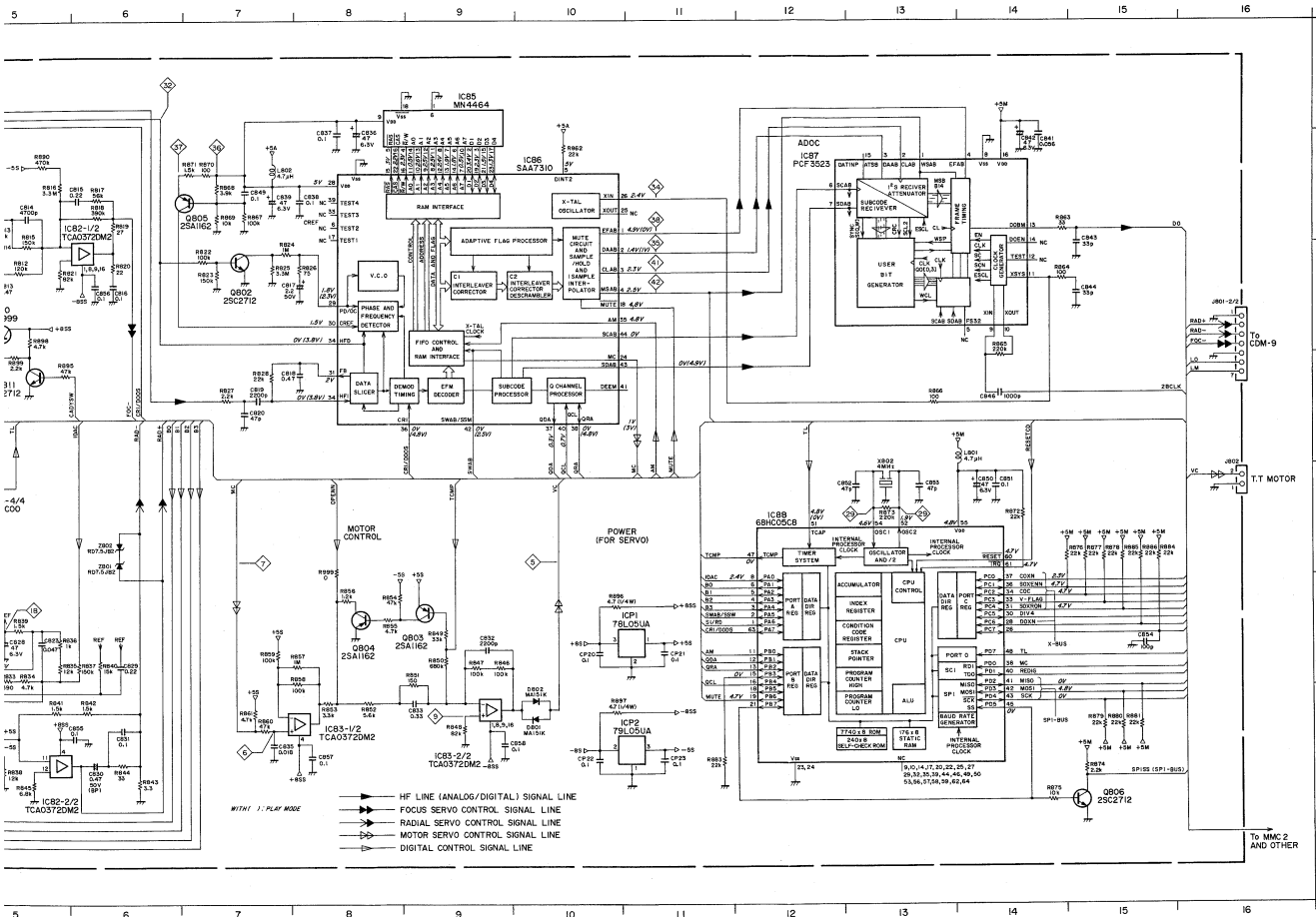


CP03	F2	CS1
CP04	F3	CS2
CP05	A11	CS3
CP07	D11	CS4
CP08	C11	CS5
CP09	B1	CS6
CP10	B10	CS7
CP11	B11	CS8
CP12	B12	CS9
CP13	B13	CS10
CP14	B14	CS11
CP15	B15	CS12
CP16	B16	CS13
CP17	B17	CS14
CP18	B18	CS15
CP19	B19	CS16
CP20	B20	CS17
CP21	B21	CS18
CP22	B22	CS19
CP23	B23	CS20
CP24	B24	CS21
CP25	B25	CS22
CP26	B26	CS23
CP27	B27	CS24
CP28	B28	CS25
CP29	B29	CS26
CP30	B30	CS27
CP31	B31	CS28
CP32	B32	CS29
CP33	B33	CS30
CP34	B34	CS31
CP35	B35	CS32
CP36	B36	CS33
CP37	B37	CS34
CP38	B38	CS35
CP39	B39	CS36
CP40	B40	CS37
CP41	B41	CS38
CP42	B42	CS39
CP43	B43	CS40
CP44	B44	CS41
CP45	B45	CS42
CP46	B46	CS43
CP47	B47	CS44
CP48	B48	CS45
CP49	B49	CS46
CP50	B50	CS47
CP51	B51	CS48
CP52	B52	CS49
CP53	B53	CS50
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CP56	B56	CS53
CP57	B57	CS54
CP58	B58	CS55
CP59	B59	CS56
CP60	B60	CS57
CP61	B61	CS58
CP62	B62	CS59
CP63	B63	CS60
CP64	B64	CS61
CP65	B65	CS62
CP66	B66	CS63
CP67	B67	CS64
CP68	B68	CS65
CP69	B69	CS66
CP70	B70	CS67
CP71	B71	CS68
CP72	B72	CS69
CP73	B73	CS70
CP74	B74	CS71
CP75	B75	CS72
CP76	B76	CS73
CP77	B77	CS74
CP78	B78	CS75
CP79	B79	CS76
CP80	B80	CS77
CP81	B81	CS78
CP82	B82	CS79
CP83	B83	CS80
CP84	B84	CS81
CP85	B85	CS82
CP86	B86	CS83
CP87	B87	CS84
CP88	B88	CS85
CP89	B89	CS86
CP90	B90	CS87
CP91	B91	CS88
CP92	B92	CS89
CP93	B93	CS90
CP94	B94	CS91
CP95	B95	CS92
CP96	B96	CS93
CP97	B97	CS94
CP98	B98	CS95
CP99	B99	CS96
CP100	B100	CS97
CP101	B101	CS98
CP102	B102	CS99
CP103	B103	CS100



6.4.2 Servo Schematic Diagram

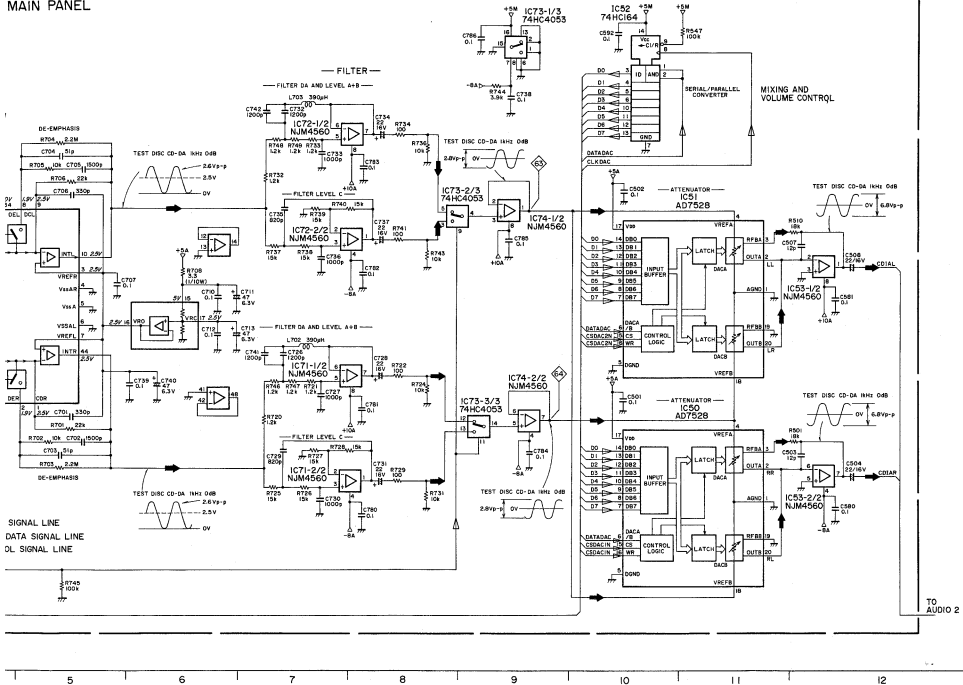




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(): BOTTOM SIDE PARTS

MAIN PANEL



A

B

C

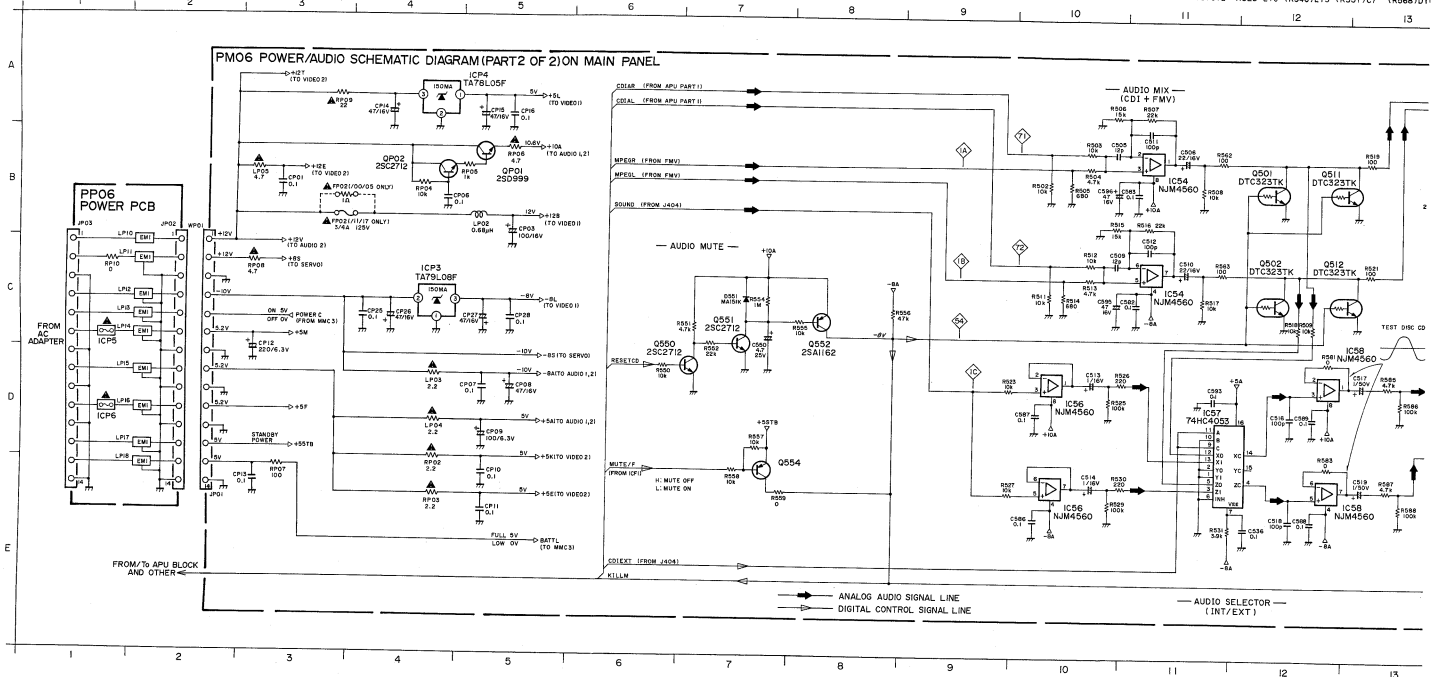
D

E

F

(C501)09	(R724)08
(C502)10	(R725)09
(C503)11	(R726)10
(C504)12	(R727)11
(C505)13	(R728)12
(C506)14	(R729)13
(C507)15	(R730)14
(C508)16	(R731)15
(C509)17	(R732)16
(C510)18	(R733)17
(C511)19	(R734)18
(C512)20	(R735)19
(C513)21	(R736)20
(C514)22	(R737)21
(C515)23	(R738)22
(C516)24	(R739)23
(C517)25	(R740)24
(C518)26	(R741)25
(C519)27	(R742)26
(C520)28	(R743)27
(C521)29	(R744)28
(C522)30	(R745)29
(C523)31	(R746)30
(C524)32	(R747)31
(C525)33	(R748)32
(C526)34	(R749)33
(C527)35	(R750)34
(C528)36	(R751)35
(C529)37	(R752)36
(C530)38	(R753)37
(C531)39	(R754)38
(C532)40	(R755)39
(C533)41	(R756)40
(C534)42	(R757)41
(C535)43	(R758)42
(C536)44	(R759)43
(C537)45	(R760)44
(C538)46	(R761)45
(C539)47	(R762)46
(C540)48	(R763)47
(C541)49	(R764)48
(C542)50	(R765)49
(C543)51	(R766)50
(C544)52	(R767)51
(C545)53	(R768)52
(C546)54	(R769)53
(C547)55	(R770)54
(C548)56	(R771)55
(C549)57	(R772)56
(C550)58	(R773)57
(C551)59	(R774)58
(C552)60	(R775)59
(C553)61	(R776)60
(C554)62	(R777)61
(C555)63	(R778)62
(C556)64	(R779)63
(C557)65	(R780)64
(C558)66	(R781)65
(C559)67	(R782)66
(C560)68	(R783)67
(C561)69	(R784)68
(C562)70	(R785)69
(C563)71	(R786)70
(C564)72	(R787)71
(C565)73	(R788)72
(C566)74	(R789)73
(C567)75	(R790)74
(C568)76	(R791)75
(C569)77	(R792)76
(C570)78	(R793)77
(C571)79	(R794)78
(C572)80	(R795)79
(C573)81	(R796)80
(C574)82	(R797)81
(C575)83	(R798)82
(C576)84	(R799)83
(C577)85	(R800)84
(C578)86	(R801)85
(C579)87	(R802)86
(C580)88	(R803)87
(C581)89	(R804)88
(C582)90	(R805)89
(C583)91	(R806)90
(C584)92	(R807)91
(C585)93	(R808)92
(C586)94	(R809)93
(C587)95	(R810)94
(C588)96	(R811)95
(C589)97	(R812)96
(C590)98	(R813)97
(C591)99	(R814)98
(C592)100	(R815)99
(C593)101	(R816)100
(C594)102	(R817)101
(C595)103	(R818)102
(C596)104	(R819)103
(C597)105	(R820)104
(C598)106	(R821)105
(C599)107	(R822)106

(): BOTTOM SIDE PARTS

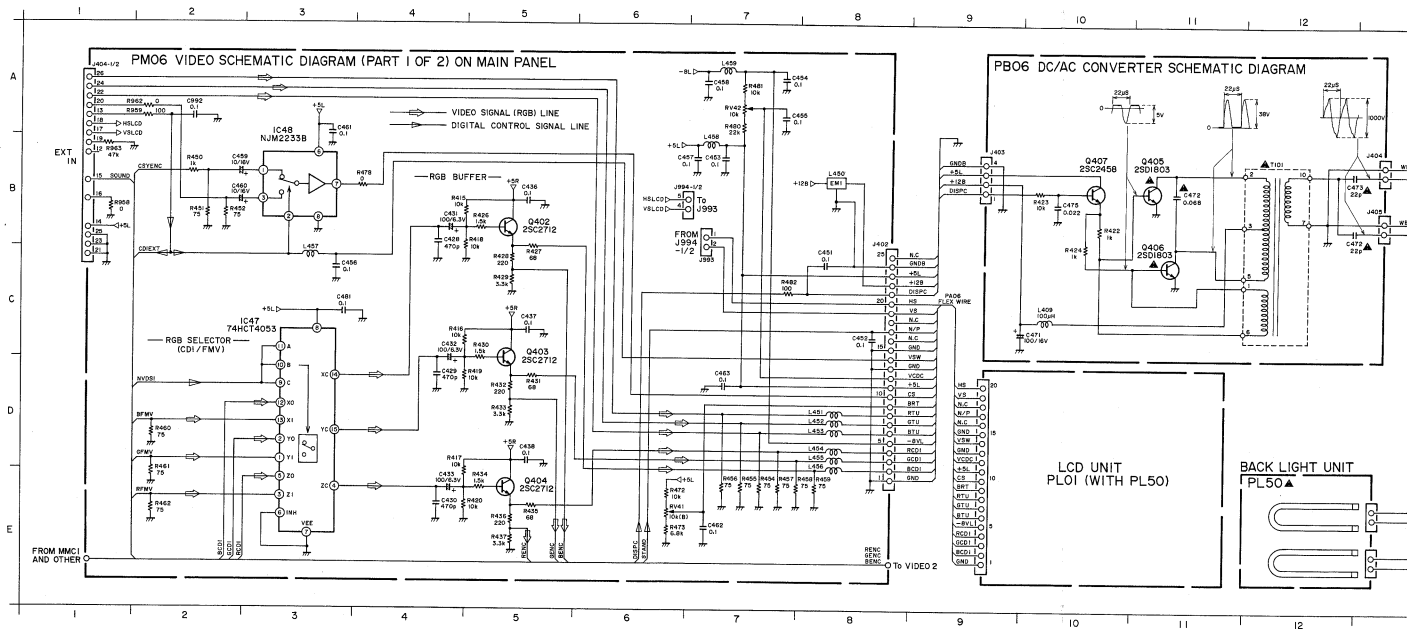


NOTE ON SAFETY :
Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

F 2) ON MAIN PANEL

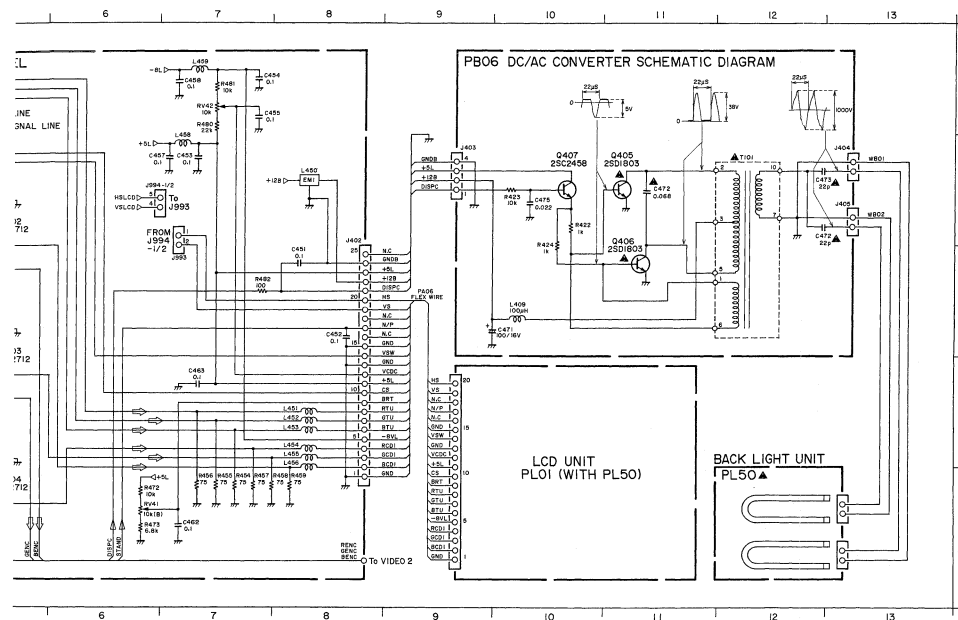


6.4.5 Video Schematic Diagram (Part 1) & PB06



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.

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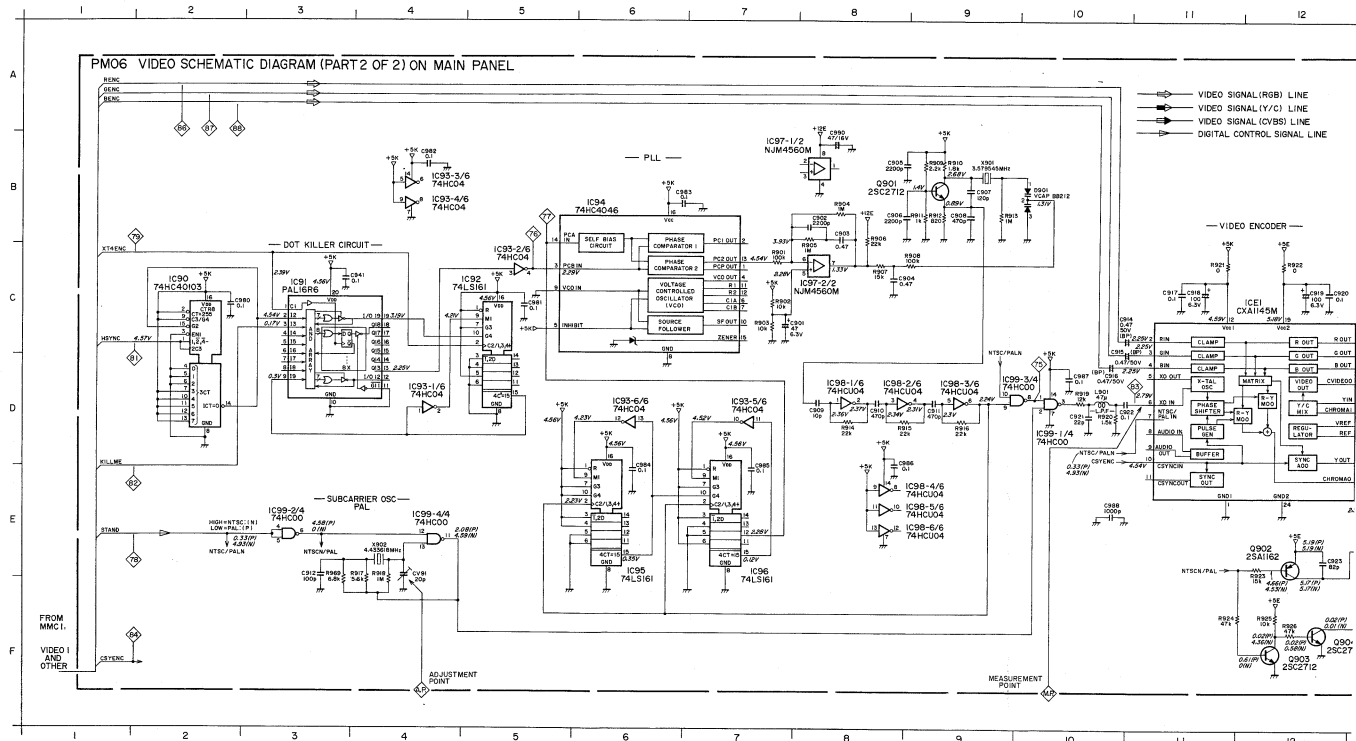
NOTE ON SAFETY :

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.

(C428) B4	(R495) E7
(C429) D4	(R496) E7
(C430) B4	(R497) E7
(C431) B4	(R498) E9
(C432) C4	(R499) E9
(C433) B4	(R500) D2
(C434) B5	(R481) E2
(C435) C5	(R482) E2
(C436) D5	(R472) E6
(C437) C5	(R473) E6
(C438) B3	(R476) B4
(C439) D4	(R481) A7
(C440) A7	(R482) C7
(C441) C3	(R483) B1
(C442) A7	(R484) A2
(C443) A7	(R485) B1
(C444) B2	(R486) A2
(C445) A3	(R487) B1
(C446) A7	(R488) A7
(C447) E2	
(C448) D7	
(C449) C10	
(C450) B1	
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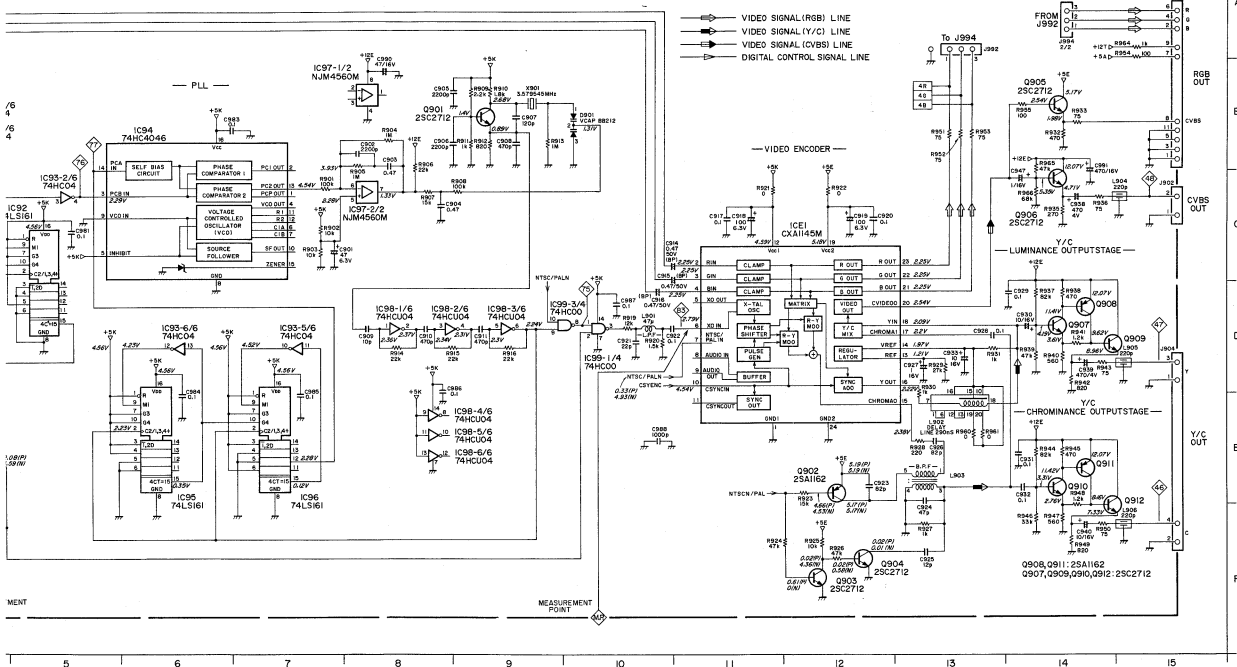
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C9V1 E4	C9I01D8	C9Q10I10	C9S31 E14	C9T47 C14	C9U91 B14	C9V03 I07	C9W10 C13	R0S1C15	R0S1D15	R0Q10D14	R0Q06 I08	R0I16 I09	R0Q26 F14	R0S3D14	R0R47 B14	R0S61 B14
C9V1 C7	C9I11D9	C9Q11D10	C9S32 E14	C9T48 C14	C9U92 B14	C9V04 I07	C9W11 C13	R0C19 C15	R0S1D15	R0Q10D14	R0Q07 I08	R0I17 I14	R0Q27 F15	R0S3D14	R0R48 F14	R0S64 A10
C9V2 B8	C9I12D9	C9Q12D10	C9S33 E14	C9T49 C14	C9U93 B14	C9V05 I07	C9W12 C13	R0C20 C15	R0S1D15	R0Q10D14	R0Q08 I08	R0I18 I14	R0Q28 F15	R0S3D14	R0R49 F14	R0S65 A10
C9V3 B8	C9I13D9	C9Q13D10	C9S34 E14	C9T50 C14	C9U94 B14	C9V06 I07	C9W13 C13	R0C21 C15	R0S1D15	R0Q10D14	R0Q09 I08	R0I19 I14	R0Q29 F15	R0S3D14	R0R50 F14	R0S66 A10
C9V4 B8	C9I14D9	C9Q14D10	C9S35 E14	C9T51 C14	C9U95 B14	C9V07 I07	C9W14 C13	R0C22 C15	R0S1D15	R0Q10D14	R0Q10 I08	R0I20 I14	R0Q30 F15	R0S3D14	R0R51 F14	R0S67 A10
C9V5 B8	C9I15D9	C9Q15D10	C9S36 E14	C9T52 C14	C9U96 B14	C9V08 I07	C9W15 C13	R0C23 C15	R0S1D15	R0Q10D14	R0Q11 I08	R0I21 I14	R0Q31 F15	R0S3D14	R0R52 F14	R0S68 A10
C9V6 B8	C9I16D9	C9Q16D10	C9S37 E14	C9T53 C14	C9U97 B14	C9V09 I07	C9W16 C13	R0C24 C15	R0S1D15	R0Q10D14	R0Q12 I08	R0I22 I14	R0Q32 F15	R0S3D14	R0R53 F14	R0S69 A10
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C9V8 B8	C9I18D9	C9Q18D10	C9S39 E14	C9T55 C14	C9U99 B14	C9V11 I07	C9W18 C13	R0C26 C15	R0S1D15	R0Q10D14	R0Q14 I08	R0I24 I14	R0Q34 F15	R0S3D14	R0R55 F14	R0S71 A10
C9V9 B8	C9I19D9	C9Q19D10	C9S40 E14	C9T56 C14	C9U100 B14	C9V12 I07	C9W19 C13	R0C27 C15	R0S1D15	R0Q10D14	R0Q15 I08	R0I25 I14	R0Q35 F15	R0S3D14	R0R56 F14	R0S72 A10
C9V01 B8	C9I20D9	C9Q20D10	C9S41 C3	C9T57 C14	C9U101 B14	C9V13 I07	C9W20 C13	R0C28 C15	R0S1D15	R0Q10D14	R0Q16 I08	R0I26 I14	R0Q36 F15	R0S3D14	R0R57 F14	R0S73 A10
C9V02 B8	C9I21D9	C9Q21D10	C9S42 E14	C9T58 C14	C9U102 B14	C9V14 I07	C9W21 C13	R0C29 C15	R0S1D15	R0Q10D14	R0Q17 I08	R0I27 I14	R0Q37 F15	R0S3D14	R0R58 F14	R0S74 A10
C9V03 B8	C9I22D9	C9Q22D10	C9S43 E14	C9T59 C14	C9U103 B14	C9V15 I07	C9W22 C13	R0C30 C15	R0S1D15	R0Q10D14	R0Q18 I08	R0I28 I14	R0Q38 F15	R0S3D14	R0R59 F14	R0S75 A10
C9V04 B8	C9I23D9	C9Q23D10	C9S44 E14	C9T60 C14	C9U104 B14	C9V16 I07	C9W23 C13	R0C31 C15	R0S1D15	R0Q10D14	R0Q19 I08	R0I29 I14	R0Q39 F15	R0S3D14	R0R60 F14	R0S76 A10
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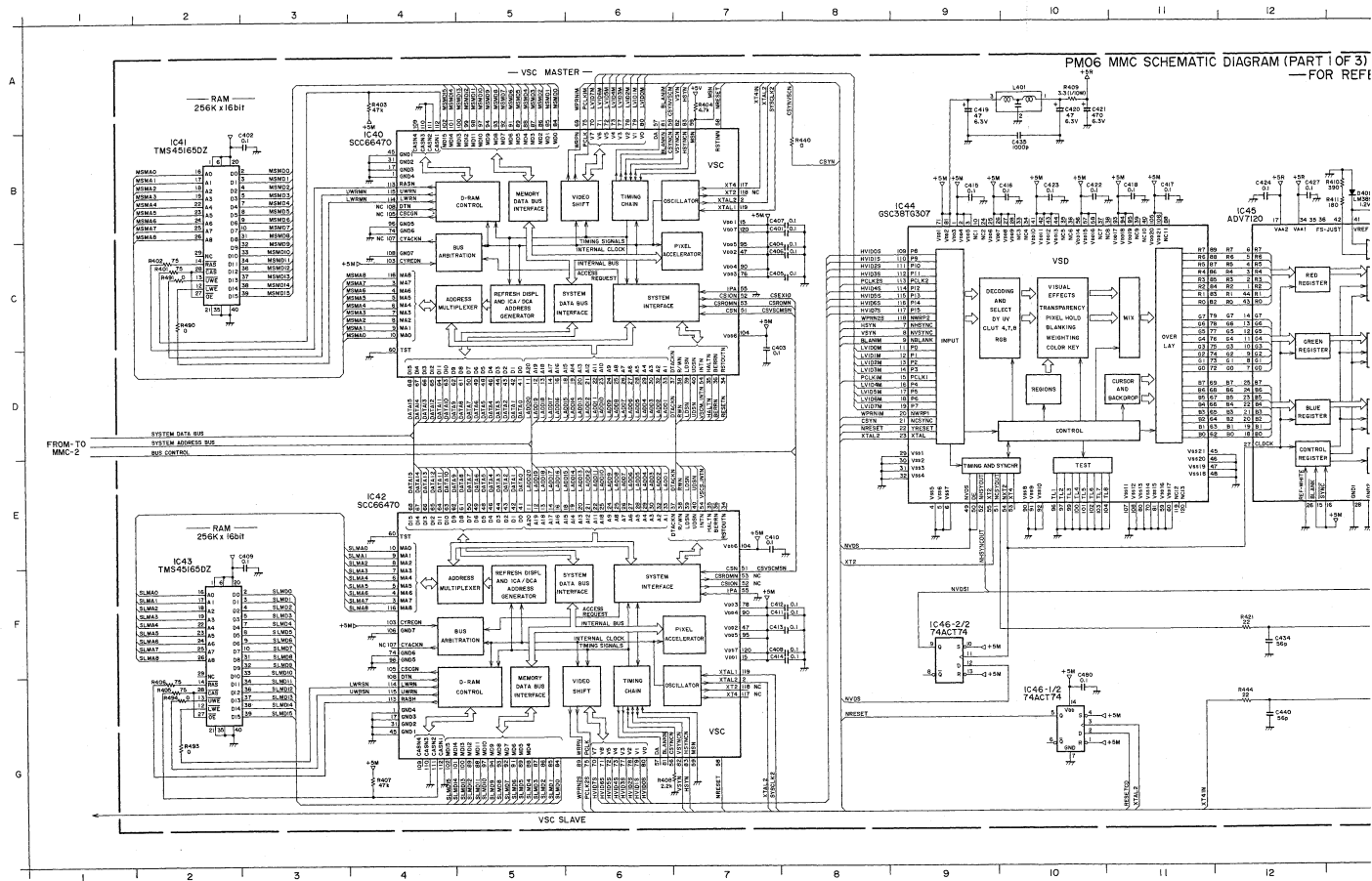


11 214 C947 C14 C991 B14 (IC991)D7 (IC991)E3 (LQ991)C15 (Q991)D14 (R991)B8 (R991)D9 (R991)F12 (R991)G14 (R947)F14 (R947)E13
 12 214 (C980)C2 (Q991)B10 (IC941)B6 (IC991)E4 (LQ991)D15 (Q991)D15 (R991)C8 (R917)E4 R927 F13 (R938)D14 (R948)E14 (R948)A1A15
 13 214 (C981)C3 (IC91)C12 (C991)E6 J904 A15 (Q991)D14 (R991)C9 (R991)E4 (R991)E13 (R991)D14 (R943)E14 (R943)B1A14
 16 214 (C982)B8 (IC901)C8 (C991)E7 J902 C15 (Q991)B8 (Q991)E14 (R991)B9 (R991)D10 (R991)D13 (R940)D14 (R950)F14 (R946)C14
 19 214 (C983)B6 (IC91)C3 (IC97)B7 J904 A15 (Q991)D12 (Q991)D12 (R991)B9 (R991)D10 (R991)D13 (R941)D14 (R951)A13 (R949)E3
 10 214 C984 D6 (C991)C6 (IC97)B8 J999A A15 (Q991)F12 (R991)C7 (R911)B9 (R921)C1 (R931)D13 (R942)D14 (R952)A13 X901 B9
 11 214 (C985)B4 (IC98)B8 J999A A15 (Q991)F12 (R991)C7 (R911)B9 (R921)C1 (R931)D13 (R942)D14 (R952)A13 X902 B4
 11 214 (C986)D7 (IC93)B4 (IC98)B8 J999A A15 (Q991)F12 (R991)C7 (R911)B9 (R921)C1 (R931)D13 (R942)D14 (R952)A13 X902 B4
 11 214 (C987)D10 (IC98)B8 J999A A15 (Q991)F12 (R991)C7 (R911)B9 (R921)C1 (R931)D13 (R942)D14 (R952)A13 X902 B4
 11 214 (C988)E10 (IC93)D4 (IC98)E9 R92 E11 (Q991)C14 (R941)B8 (R914)D8 (R924)F1 (R933)C14 (R945)E14 (R945)A14
 11 214 (C989)E10 (IC93)D4 (IC98)E9 R92 E11 (Q991)C14 (R941)B8 (R914)D8 (R924)F1 (R933)C14 (R945)E14 (R945)A14
 11 214 (C990)B6 (IC93)D6 (IC991)C10 L905 E13 (Q991)D14 (R991)B8 (R915)D8 (R925)F1 (R933)C14 (R946)F14 (R950)E13

PANEL



6.4.7 MMC Schematic Diagram (Part 1)





```
(C401)B8
C402 B8
(C403)C7
C404 C8
C405 C8
C406 C8
(C407)B8
(C408)F8
C409 E3
(C410)E7
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(C411) F8
C412 F8
(C413) F8
C414 F8
(C415) B9
(C416) B1
C417 B1
C418 B1
C419 A9
C420 A1
```

C421	A1
C422	B1
C423	B1
(C424)	B1
C425	B1
C426	B1
(C427)	B1
C434	F1
C435	B1
(C440)	G1

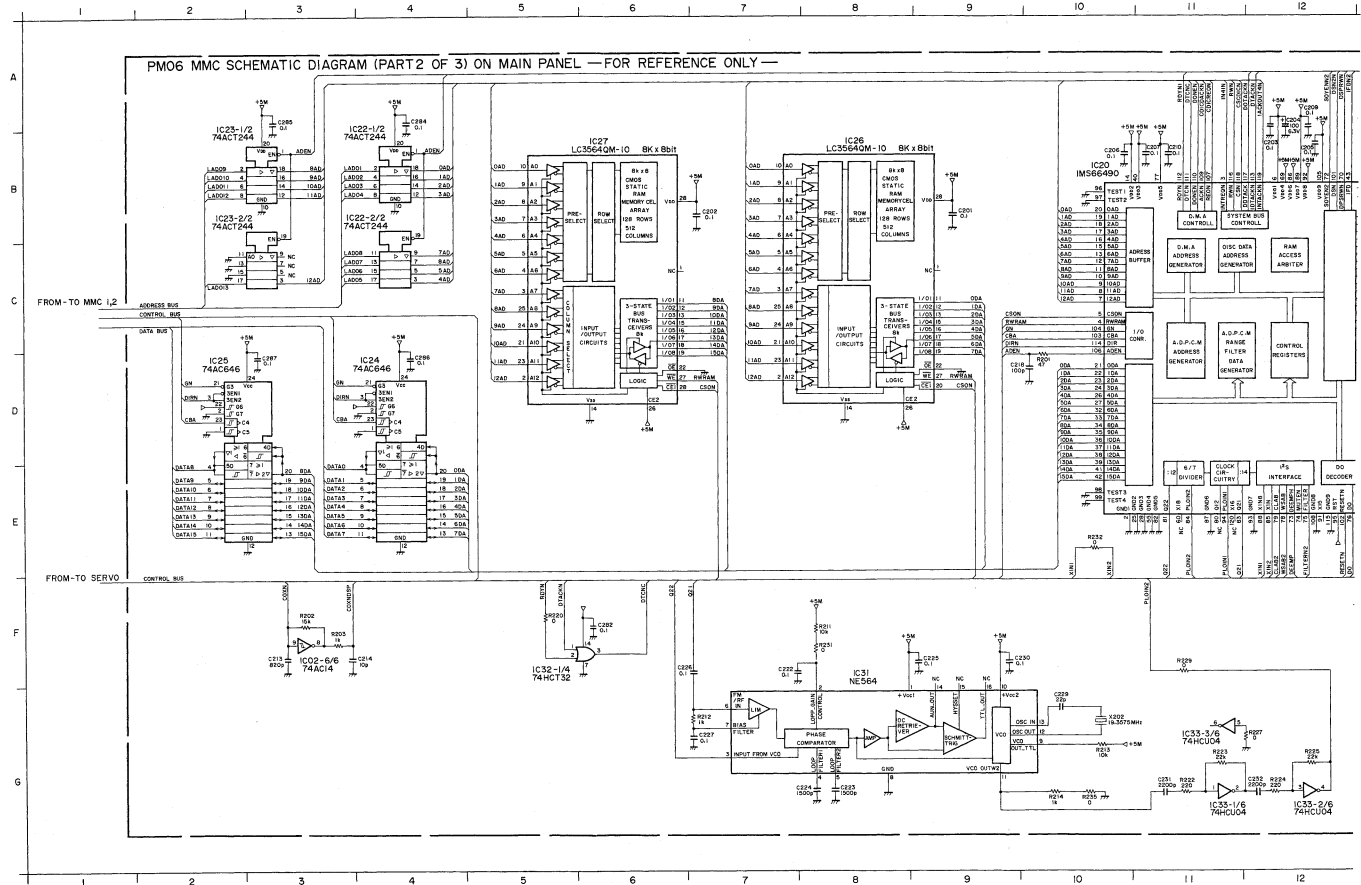
C480 G1
D401 B1
(IC40) B4
IC41 B2
(IC42) E4
IC43 F2
(IC44) B9
(IC45) B1
IC46 F9
IC46 G1

L401 A1
R401 C2
R402 C2
(R403) A4
(R404) A7
R405 G2
R406 G2
(R407) G4
(R408) G6
R409 A1

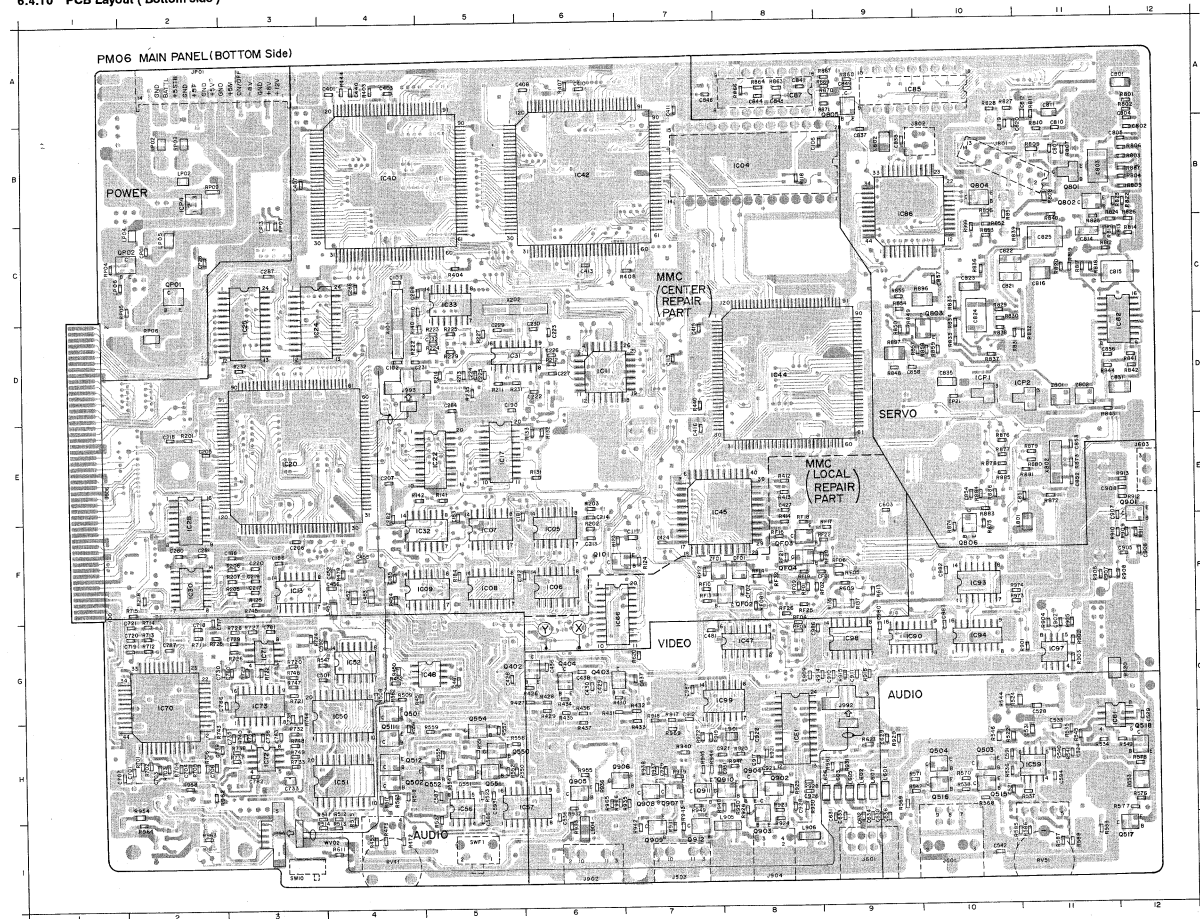
R410 B1
R411 B1
(R412) C1
(R413) D1
(R414) D1
R421 F1
(R440) B8
(R444) G1
R490 C2
R491 C2

R493 G2
R494 G2

6.4.8 MMC Schematic Diagram (Part 2)



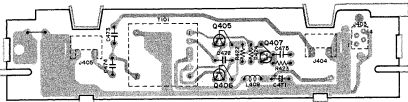
PM06 MAIN PANEL (BOTTOM Side)



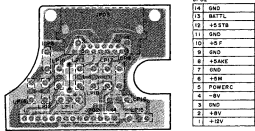
6.5 Other Panel (PS06,PP06,P106,PB06,CD Lid)

DC/AC CONVERTER PANEL(PB06)

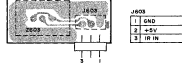
Q405 Q406 Q407



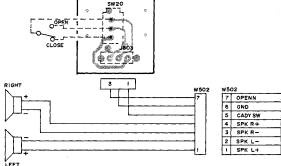
POWER CONNECT PANEL (PP06)



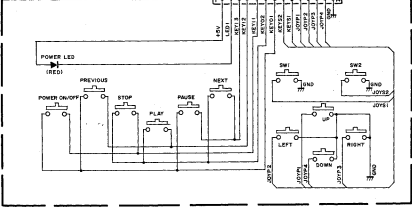
REMOTE IR PANEL (P106)



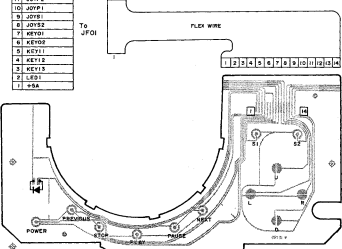
CD LID SW PANEL (PS06)



CD LID PANEL (FOR REFERENCE ONLY)

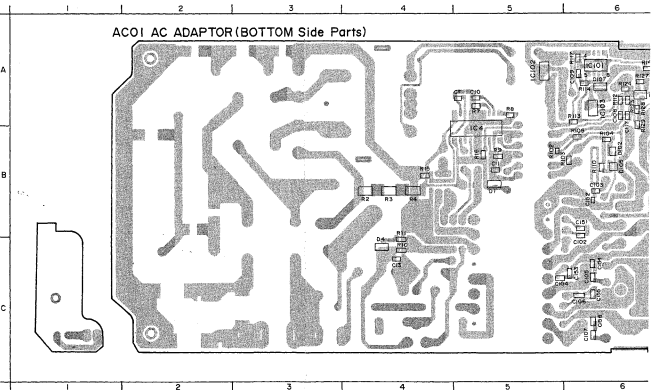
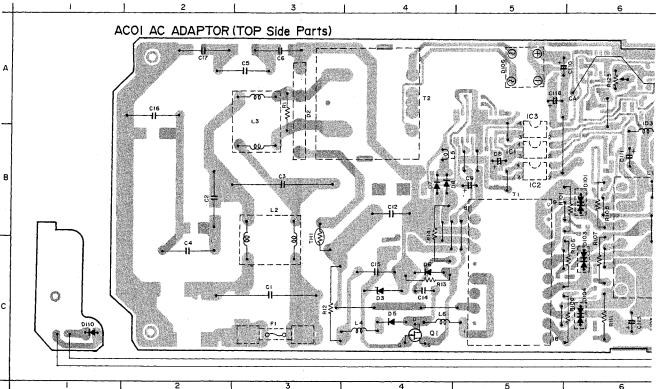


- 14) GND
- 13) +5V
- 12) +5V
- 11) +5V
- 10) +5V
- 9) +5V
- 8) +5V
- 7) +5V
- 6) +5V
- 5) +5V
- 4) +5V
- 3) +5V
- 2) +5V
- 1) +5V



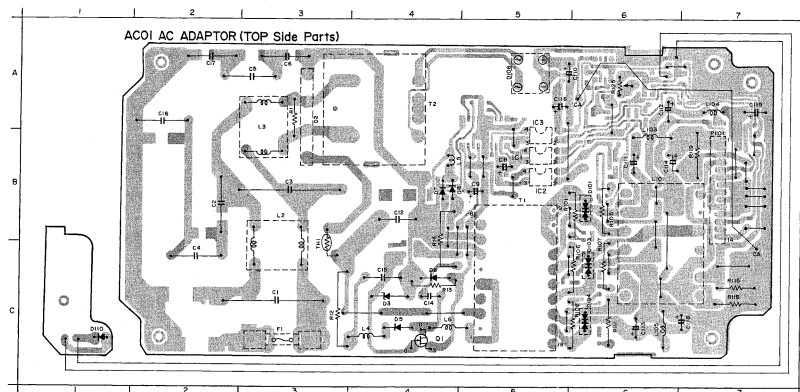
6.6 Power Supply Unit

6.6.1 PCB Layout



6.6 Power Supply Unit

6.6.1 PCB Layout



C1 C3 C5 C7 C9 C11 C13 C15 C17 C19 C21 C23 C25 C27 C29 C31 C33 C35 C37 C39 C41 C43 C45 C47 C49 C51 C53 C55 C57 C59 C61 C63 C65 C67 C69 C71 C73 C75 C77 C79 C81 C83 C85 C87 C89 C91 C93 C95 C97 C99 C101 C103 C105 C107 C109 C111 C113 C115 C117 C119 C121 C123 C125 C127 C129 C131 C133 C135 C137 C139 C141 C143 C145 C147 C149 C151 C153 C155 C157 C159 C161 C163 C165 C167 C169 C171 C173 C175 C177 C179 C181 C183 C185 C187 C189 C191 C193 C195 C197 C199 C201 C203 C205 C207 C209 C211 C213 C215 C217 C219 C221 C223 C225 C227 C229 C231 C233 C235 C237 C239 C241 C243 C245 C247 C249 C251 C253 C255 C257 C259 C261 C263 C265 C267 C269 C271 C273 C275 C277 C279 C281 C283 C285 C287 C289 C291 C293 C295 C297 C299 C301 C303 C305 C307 C309 C311 C313 C315 C317 C319 C321 C323 C325 C327 C329 C331 C333 C335 C337 C339 C341 C343 C345 C347 C349 C351 C353 C355 C357 C359 C361 C363 C365 C367 C369 C371 C373 C375 C377 C379 C381 C383 C385 C387 C389 C391 C393 C395 C397 C399 C401 C403 C405 C407 C409 C411 C413 C415 C417 C419 C421 C423 C425 C427 C429 C431 C433 C435 C437 C439 C441 C443 C445 C447 C449 C451 C453 C455 C457 C459 C461 C463 C465 C467 C469 C471 C473 C475 C477 C479 C481 C483 C485 C487 C489 C491 C493 C495 C497 C499 C501 C503 C505 C507 C509 C511 C513 C515 C517 C519 C521 C523 C525 C527 C529 C531 C533 C535 C537 C539 C541 C543 C545 C547 C549 C551 C553 C555 C557 C559 C561 C563 C565 C567 C569 C571 C573 C575 C577 C579 C581 C583 C585 C587 C589 C591 C593 C595 C597 C599 C601 C603 C605 C607 C609 C611 C613 C615 C617 C619 C621 C623 C625 C627 C629 C631 C633 C635 C637 C639 C641 C643 C645 C647 C649 C651 C653 C655 C657 C659 C661 C663 C665 C667 C669 C671 C673 C675 C677 C679 C681 C683 C685 C687 C689 C691 C693 C695 C697 C699 C701 C703 C705 C707 C709 C711 C713 C715 C717 C719 C721 C723 C725 C727 C729 C731 C733 C735 C737 C739 C741 C743 C745 C747 C749 C751 C753 C755 C757 C759 C761 C763 C765 C767 C769 C771 C773 C775 C777 C779 C781 C783 C785 C787 C789 C791 C793 C795 C797 C799 C801 C803 C805 C807 C809 C811 C813 C815 C817 C819 C821 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C1185 C1187 C1189 C1191 C1193 C1195 C1197 C1199 C1201 C1203 C1205 C1207 C1209 C1211 C1213 C1215 C1217 C1219 C1221 C1223 C1225 C1227 C1229 C1231 C1233 C1235 C1237 C1239 C1241 C1243 C1245 C1247 C1249 C1251 C1253 C1255 C1257 C1259 C1261 C1263 C1265 C1267 C1269 C1271 C1273 C1275 C1277 C1279 C1281 C1283 C1285 C1287 C1289 C1291 C1293 C1295 C1297 C1299 C1301 C1303 C1305 C1307 C1309 C1311 C1313 C1315 C1317 C1319 C1321 C1323 C1325 C1327 C1329 C1331 C1333 C1335 C1337 C1339 C1341 C1343 C1345 C1347 C1349 C1351 C1353 C1355 C1357 C1359 C1361 C1363 C1365 C1367 C1369 C1371 C1373 C1375 C1377 C1379 C1381 C1383 C1385 C1387 C1389 C1391 C1393 C1395 C1397 C1399 C1401 C1403 C1405 C1407 C1409 C1411 C1413 C1415 C1417 C1419 C1421 C1423 C1425 C1427 C1429 C1431 C1433 C1435 C1437 C1439 C1441 C1443 C1445 C1447 C1449 C1451 C1453 C1455 C1457 C1459 C1461 C1463 C1465 C1467 C1469 C1471 C1473 C1475 C1477 C1479 C1481 C1483 C1485 C1487 C1489 C1491 C1493 C1495 C1497 C1499 C1501 C1503 C1505 C1507 C1509 C1511 C1513 C1515 C1517 C1519 C1521 C1523 C1525 C1527 C1529 C1531 C1533 C1535 C1537 C1539 C1541 C1543 C1545 C1547 C1549 C1551 C1553 C1555 C1557 C1559 C1561 C1563 C1565 C1567 C1569 C1571 C1573 C1575 C1577 C1579 C1581 C1583 C1585 C1587 C1589 C1591 C1593 C1595 C1597 C1599 C1601 C1603 C1605 C1607 C1609 C1611 C1613 C1615 C1617 C1619 C1621 C1623 C1625 C1627 C1629 C1631 C1633 C1635 C1637 C1639 C1641 C1643 C1645 C1647 C1649 C1651 C1653 C1655 C1657 C1659 C1661 C1663 C1665 C1667 C1669 C1671 C1673 C1675 C1677 C1679 C1681 C1683 C1685 C1687 C1689 C1691 C1693 C1695 C1697 C1699 C1701 C1703 C1705 C1707 C1709 C1711 C1713 C1715 C1717 C1719 C1721 C1723 C1725 C1727 C1729 C1731 C1733 C1735 C1737 C1739 C1741 C1743 C1745 C1747 C1749 C1751 C1753 C1755 C1757 C1759 C1761 C1763 C1765 C1767 C1769 C1771 C1773 C1775 C1777 C1779 C1781 C1783 C1785 C1787 C1789 C1791 C1793 C1795 C1797 C1799 C1801 C1803 C1805 C1807 C1809 C1811 C1813 C1815 C1817 C1819 C1821 C1823 C1825 C1827 C1829 C1831 C1833 C1835 C1837 C1839 C1841 C1843 C1845 C1847 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C2181 C2183 C2185 C2187 C2189 C2191 C2193 C2195 C2197 C2199 C2201 C2203 C2205 C2207 C2209 C2211 C2213 C2215 C2217 C2219 C2221 C2223 C2225 C2227 C2229 C2231 C2233 C2235 C2237 C2239 C2241 C2243 C2245 C2247 C2249 C2251 C2253 C2255 C2257 C2259 C2261 C2263 C2265 C2267 C2269 C2271 C2273 C2275 C2277 C2279 C2281 C2283 C2285 C2287 C2289 C2291 C2293 C2295 C2297 C2299 C2301 C2303 C2305 C2307 C2309 C2311 C2313 C2315 C2317 C2319 C2321 C2323 C2325 C2327 C2329 C2331 C2333 C2335 C2337 C2339 C2341 C2343 C2345 C2347 C2349 C2351 C2353 C2355 C2357 C2359 C2361 C2363 C2365 C2367 C2369 C2371 C2373 C2375 C2377 C2379 C2381 C2383 C2385 C2387 C2389 C2391 C2393 C2395 C2397 C2399 C2401 C2403 C2405 C2407 C2409 C2411 C2413 C2415 C2417 C2419 C2421 C2423 C2425 C2427 C2429 C2431 C2433 C2435 C2437 C2439 C2441 C2443 C2445 C2447 C2449 C2451 C2453 C2455 C2457 C2459 C2461 C2463 C2465 C2467 C2469 C2471 C2473 C2475 C2477 C2479 C2481 C2483 C2485 C2487 C2489 C2491 C2493 C2495 C2497 C2499 C2501 C2503 C2505 C2507 C2509 C2511 C2513 C2515 C2517 C2519 C2521 C2523 C2525 C2527 C2529 C2531 C2533 C2535 C2537 C2539 C2541 C2543 C2545 C2547 C2549 C2551 C2553 C2555 C2557 C2559 C2561 C2563 C2565 C2567 C2569 C2571 C2573 C2575 C2577 C2579 C2581 C2583 C2585 C2587 C2589 C2591 C2593 C2595 C2597 C2599 C2601 C2603 C2605 C2607 C2609 C2611 C2613 C2615 C2617 C2619 C2621 C2623 C2625 C2627 C2629 C2631 C2633 C2635 C2637 C2639 C2641 C2643 C2645 C2647 C2649 C2651 C2653 C2655 C2657 C2659 C2661 C2663 C2665 C2667 C2669 C2671 C2673 C2675 C2677 C2679 C2681 C2683 C2685 C2687 C2689 C2691 C2693 C2695 C2697 C2699 C2701 C2703 C2705 C2707 C2709 C2711 C2713 C2715 C2717 C2719 C2721 C2723 C2725 C2727 C2729 C2731 C2733 C2735 C2737 C2739 C2741 C2743 C2745 C2747 C2749 C2751 C2753 C2755 C2757 C2759 C2761 C2763 C2765 C2767 C2769 C2771 C2773 C2775 C2777 C2779 C2781 C2783 C2785 C2787 C2789 C2791 C2793 C2795 C2797 C2799 C2801 C2803 C2805 C2807 C2809 C2811 C2813 C2815 C2817 C2819 C2821 C2823 C2825 C2827 C2829 C2831 C2833 C2835 C2837 C2839 C2841 C2843 C2845 C2847 C2849 C2851 C2853 C2855 C2857 C2859 C2861 C2863 C2865 C2867 C2869 C2871 C2873 C2875 C2877 C2879 C2881 C2883 C2885 C2887 C2889 C2891 C2893 C2895 C2897 C2899 C2901 C2903 C2905 C2907 C2909 C2911 C2913 C2915 C2917 C2919 C2921 C2923 C2925 C2927 C2929 C2931 C2933 C2935 C2937 C2939 C2941 C2943 C2945 C2947 C2949 C2951 C2953 C2955 C2957 C2959 C2961 C2963 C2965 C2967 C2969 C2971 C2973 C2975 C2977 C2979 C2981 C2983 C2985 C2987 C2989 C2991 C2993 C2995 C2997 C2999 C3001 C3003 C3005 C3007 C3009 C3011 C3013 C3015 C3017 C3019 C3021 C3023 C3025 C3027 C3029 C3031 C3033 C3035 C3037 C3039 C3041 C3043 C3045 C3047 C3049 C3051 C3053 C3055 C3057 C3059 C3061 C3063 C3065 C3067 C3069 C3071 C3073 C3075 C3077 C3079 C3081 C3083 C3085 C3087 C3089 C3091 C3093 C3095 C3097 C3099 C3101 C3103 C3105 C3107 C3109 C3111 C3113 C3115 C3117 C3119 C3121 C3123 C3125 C3127 C3129 C3131 C3133 C3135 C3137 C3139 C3141 C3143 C3145 C3147 C3149 C3151 C3153 C3155 C3157 C3159 C3161 C3163 C3165 C3167 C3169 C3171 C3173 C3175 C3177 C3179 C3181 C3183 C3185 C3187 C3189 C3191 C3193 C3195 C3197 C3199 C3201 C3203 C3205 C3207 C3209 C3211 C3213 C3215 C3217 C3219 C3221 C3223 C3225 C3227 C3229 C3231 C3233 C3235 C3237 C3239 C3241 C3243 C3245 C3247 C3249 C3251 C3253 C3255 C3257 C3259 C3261 C3263 C3265 C3267 C3269 C3271 C3273 C3275 C3277 C3279 C3281 C3283 C3285 C3287 C3289 C3291 C3293 C3295 C3297 C3299 C3301 C3303 C3305 C3307 C3309 C3311 C3313 C3315 C3317 C3319 C3321 C3323 C3325 C3327 C3329 C3331 C3333 C3335 C3337 C3339 C3341 C3343 C3345 C3347 C3349 C3351 C3353 C3355 C3357 C3359 C3361 C3363 C3365 C3367 C3369 C3371 C3373 C3375 C3377 C3379 C3381 C3383 C3385 C3387 C3389 C3391 C3393 C3395 C3397 C3399 C3401 C3403 C3405 C3407 C3409 C3411 C3413 C3415 C3417 C3419 C3421 C3423 C3425 C3427 C3429 C3431 C3433 C3435 C3437 C3439 C3441 C3443 C3445 C3447 C3449 C3451 C3453 C3455 C3457 C3459 C3461 C3463 C3465 C3467 C3469 C3471 C3473 C3475 C3477 C3479 C3481 C3483 C3485 C3487 C3489 C3491 C3493 C3495 C3497 C3499 C3501 C3503 C3505 C3507 C3509 C3511 C3513 C3515 C3517 C3519 C3521 C3523 C3525 C3527 C3529 C3531 C3533 C3535 C3537 C3539 C3541 C3543 C3545 C3547 C3549 C3551 C3553 C3555 C3557 C3559 C3561 C3563 C3565 C3567 C3569 C3571 C3573 C3575 C3577 C3579 C3581 C3583 C3585 C3587 C3589 C3591 C3593 C3595 C3597 C3599 C3601 C3603 C3605 C3607 C3609 C3611 C3613 C3615 C3617 C3619 C3621 C3623 C3625 C3627 C3629 C3631 C3633 C3635 C3637 C3639 C3641 C3643 C3645 C3647 C3649 C3651 C3653 C3655 C3657 C3659 C3661 C3663 C3665 C3667 C3669 C3671 C3673 C3675 C3677 C3679 C3681 C3683 C3685 C3687 C3689 C3691 C3693 C3695 C3697 C3699 C3701 C3703 C3705 C3707 C3709 C3711 C3713 C3715 C3717 C3719 C3721 C3723 C3725 C3727 C3729 C3731 C3733 C3735 C3737 C3739 C3741 C3743 C3745 C3747 C3749 C3751 C3753 C3755 C3757 C3759 C3761 C3763 C3765 C3767 C3769 C3771 C3773 C3775 C3777 C3779 C3781 C3783 C3785 C3787 C3789 C3791 C3793 C3795 C3797 C3799 C3801 C3803 C3805 C3807 C3809 C3811 C3813 C3815 C3817 C3819 C3821 C3823 C3825 C3827 C3829 C3831 C3833 C3835 C3837 C3839 C3841 C3843 C3845 C3847 C3849 C3851 C3853 C3855 C3857 C3859 C3861 C3863 C3865 C3867 C3869 C3871 C3873 C3875 C3877 C3879 C3881 C3883 C3885 C3887 C3889 C3891 C3893 C3895 C3897 C3899 C3901 C3903 C3905 C3907 C3909 C3911 C3913 C3915 C3917 C3919 C3921 C3923 C3925 C3927 C3929 C3931 C3933 C3935 C3937 C3939 C3941 C3943 C3945 C3947 C3949 C3951 C3953 C3955 C3957 C3959 C3961 C3963 C3965 C3967 C3969 C3971 C3973 C3975 C3977 C3979 C3981 C3983 C3985 C3987 C3989 C3991 C3993 C3995 C3997 C3999 C4001 C4003 C4005 C4007 C4009 C4011 C4013 C4015 C4017 C4019 C4021 C4023 C4025 C4027 C4029 C4031 C4033 C4035 C4037 C4039 C4041 C4043 C4045 C4047 C4049 C4051 C4053 C4055 C4057 C4059 C4061 C4063 C4065 C4067 C4069 C4071 C4073 C4075 C40

7 DIAGNOSTICS

7.1 Troubleshooting and repair

General Sequence:

- Power ON/OFF (controlled by Front CPU, ICF1)
 - ICF1 power voltage (+5STB; standby power)
 - ICF1 clock signal
 - ICF1 keyscan signal (during pressed switch)
 - ICF1 Power control signal (POWERC)
 - +5M voltage

2. Power Voltage

- ICF1 Power control signal (POWERC)
- +5M (for MMC)
- other voltage

3. Low Level Test (Operating is same as CD1205)

4. Service Shell (Operating is same as CD1205)

- How to activated of Service Shell for CD1360
- Power OFF
 - Press two switches: Display ON/OFF and Action button 2
 - 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
For service purposes you need 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 be 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
2	+12V	+12B,+12V(SP)
3	GND	+8S
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	BATTTL	(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 (for LCD backlight)
+12B	Video 1 (for speaker amp)
+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 Extension 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 oscilloscope

7.2.2.1 Lasercurrent.

The laser current is adjusted in the CDM9 and is a factory adjustment. After replacing a defective CDM the laser current does not need to be adjusted.

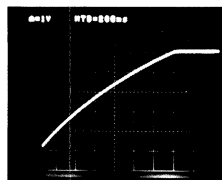
Play track 1 of testdisc 5, the voltage across measuring point 1 and point 2 should be : 0.7 V / DC +/-10 %.

7.2.2.2 Focus signal.

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

7.2.2.3 Starting signal.

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

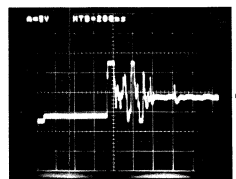


The signal is triggered by the S/VRD signal on IC80 pin6.

7.2.2.4 Motorcontrol signals.

Insert testdisc 5.

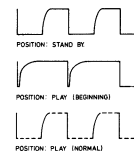
Measure across IC83 pin3 and GND, after pushing the play button the next picture should appear on the oscilloscope.



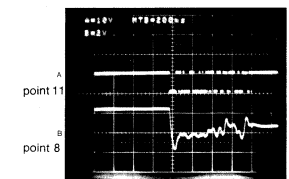
After a while, when playing track 1, the voltage should be : -1.7 V DC +/-10%

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

Signal across measuring point 7 and GND should be :



Insert test disc 5. Across 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 across measuring point 18 and GND :

2.5 V / DC +/-10%.

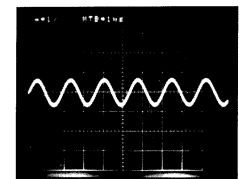
Voltage across measuring point 19 and GND :

110 mV / DC +/-10% in PLAY mode.

Voltage across measuring point 21 and GND :

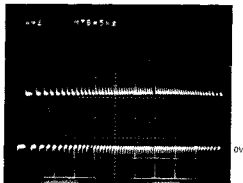
1.2 V / DC +/-10% in PLAY mode.

Voltage across measuring point 22 and GND :



Voltage across measuring points 23,24,26 and 27 depending 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 across point 28 and GND should be :



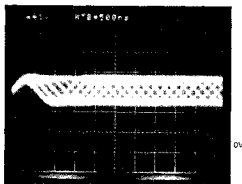
7.2.2.6 Clock signal IC88

Measuring point 29 : clock signal $f = 4\text{MHz}$.

7.2.2.7 Decoder signals

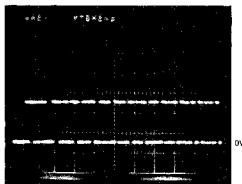
Play track 1 of testdisc 5.

The signal across measuring point 31 and GND should be:



Insert testdisc 5 and put the player in the service shell on CD drive test mode 2.

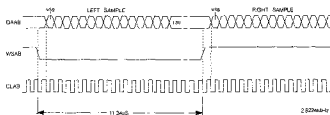
The signal across measuring point 32 should be :



Measuring point 34 : clock signal $f = 11.289.800\text{ Hz}$.
Voltage across 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.

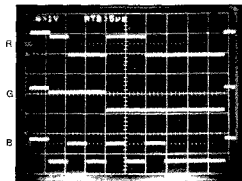
Measuring point 39,41 and 42 :



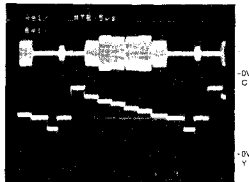
7.2.2.8 Video signals

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

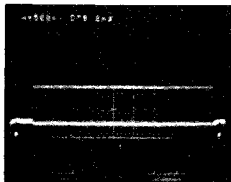
Measuring point 43 and 44 :



Measuring point 46 :



Measuring point 47 :



7.2.3 Measurements 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/stereo. This audio function can only be checked when an audio-disc is inserted. When any disturbances occur, the following checks/measurments 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)

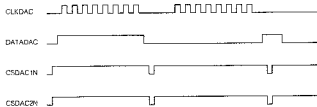
Use launch disc or arbitrary CD-I disc which contains audio levels A-B-C and/or CD-DA

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



These 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.

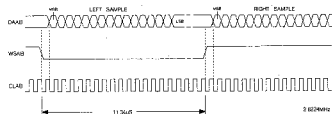
If there is any activity on one of the lines 66 % 69 one can suppose that the information of this signals are ok. This is also to be considered for the data lines D0 % D7.

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

7.2.3.2 I2S signals

Check 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 58)

Insert test disc 5 or 5A and during track 14 (recorded 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 first the 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.

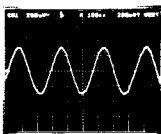
7.2.4 Measurements & adjustments Video 2 circuit (Video Encoder)

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. $\pm$ 50 Hz.
- The amplitude on testpoint 83 should be in between; 400 mV and 1000 mVpp



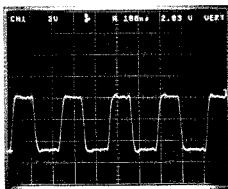
- Now check if the lock signal on testpoint 76, (pin 3 of IC94) meets 39335 Hz $\pm$ 8 Hz. and the divided VCO output signal on testpoint 77 , (pin 14 of IC 94) meets also 39335 Hz $\pm$ 8 Hz.

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. $\pm$ 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.

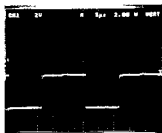
- Player switched off.
- Standard switch NTSC/PAL (SW10) in position 625, PAL .
- Connect frequency counter to testpoint 83 and turn on the player.
- Adjust with trimmer CV91, the frequency on testpoint 83 at 4 433 618 Hz. $\pm$ 50 Hz.



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 $\pm$ 8 Hz.
- If this frequency deviates check: XT4, HSYNC, and KILLM.

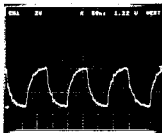
- Check if the divided VCO output signal on testpoint 77 , (pin 14 of IC94) meets 39335 Hz $\pm$ 8 Hz.



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 clock signal 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 should be low (0 V)

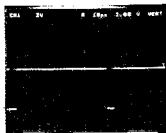
If this signal deviates check the IC65 26pin

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) in case of Non interlaced video.

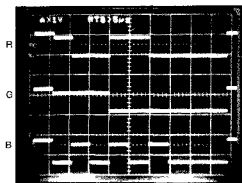
7.2.4.7 Check of HSYNC signal. (NTSC Only)

The horizontal synchronisation signal for NTSC standard is given on the photograph below. Testpoint 81, (pin 1 IC80)

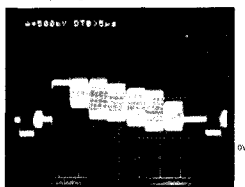


7.2.4.8 Check of RGB input signals

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

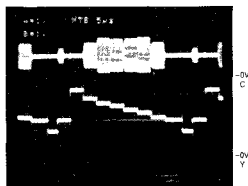


Check of Output signals for CVBS - Y / C.



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 mVpp
- White level	710 mVpp
- sync	290 mVpp
- Chroma	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 done 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 $\pm$ 600 Hz (NTSC)
30.0000 MHz $\pm$ 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 IC01 pin 29 Clock divided by two must be present for
NTSC 15.1049 MHz ($\approx$ 30.2098 : 2)
PAL 15.000 MHz ($\approx$ 30.000 : 2).

At IC01 pin 69 the UART clock of 68070 must be present.
Frequency 4.9152 MHz $\pm$ 250 Hz

At IC65 pin 54 clock of '68HC05' must be present.
Frequency 4.000 MHz $\pm$ 100 Hz

At IC20 pin94 the clock of the CDIC must me present.
Frequency 22.5792 MHz $\pm$ 1100 Hz.
At IC21 pin16 the DSP clock must be present.
Frequency 7.5264MHz $\pm$ 380 Hz

At IC87 pin9 the '2B-clock' must be present.
Frequency 11.2896 MHz $\pm$ 560 Hz

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

The frequency at IC88 pin37 'COXN' must be 75kHz $\pm$ 25kHz.

7.2.5.2 Reset circuitry:

Power ON and measure the 'RESETCD' time
This 'low' time must be 140ms $\pm$ 20 ms

Also measure the RESETCD time (low!) if the button is released. The signal RESETCD must be low for 140ms $\pm$ 20ms.

IC7201 pin 28 RESETN; low time = 250 ms $\pm$ 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).

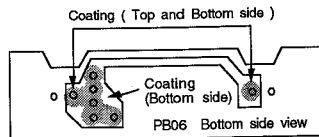
Settings of the terminal:

Baudrate : 9600
start bit : 1
data bits : 8
stop bits : 0
no parity
no handshake

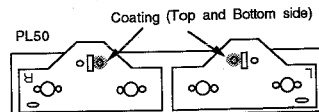
7.3 LCD screen unit and PL50,PB06

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

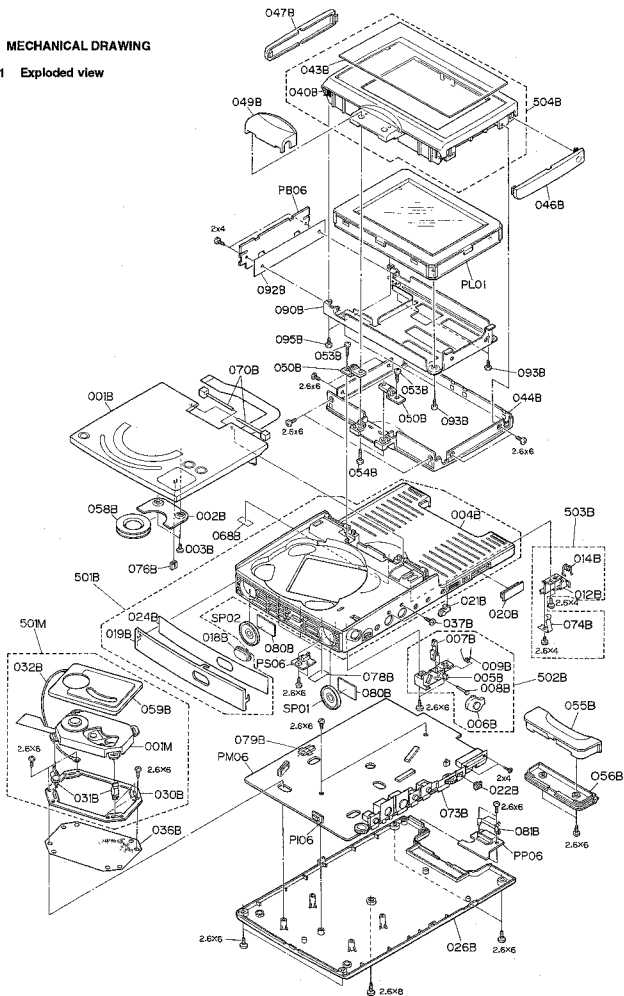
[PB06]



[PL50]



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 482 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 L06RA01
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 11683	12pF/50V
C504	4822 124 11075	22pF/16V
C505	4822 126 11663	12pF/50V
C506	4822 124 11075	22pF/16V
C507	4822 126 11663	12pF/50V
C508	4822 124 11075	22pF/16V
C509	4822 126 11663	12pF/50V
C510	4822 124 11075	22pF/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	100pF (GR39) 50V
C522	4822 124 11075	22pF/16V
C524	4822 126 11681	100pF (GR39) 50V
C525	4822 124 11075	22pF/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 32701	0.022µF/50V
C532	4822 122 32667	0.01µF Z 50V
C533	4822 122 32667	0.01µF Z 50V
C534	4822 124 11075	22pF/16V
C535	4822 124 11075	22pF/16V
C536	4822 126 11687	GRM39F104Z16 0.1µF
C537	4822 124 80412	220pF/16V
C538	4822 124 80412	220pF/16V
C541	4822 124 11075	22pF/16V
C542	4822 116 82487	0Ω ±5% 1/16W
C543	4822 124 80412	220pF/16V
C546	4822 122 32672	1µF/16V
C547	4822 122 32672	1µF/16V
C560	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	GRM39F104Z16 0.1µF
C593	4822 126 11687	GRM39F104Z16 0.1µF
C594	4822 126 11687	GRM39F104Z16 0.1µF
C595	4822 124 81482	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 11331	47µF/6.3V
C710	4822 126 11687	GRM39F104Z16 0.1µF
C711	4822 124 11331	47µF/6.3V
C712	4822 126 11687	GRM39F104Z16 0.1µF
C713	4822 124 11331	47µF/6.3V
C714	4822 126 11687	GRM39F104Z16 0.1µF
C715	4822 124 11331	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 11331	47µF/6.3V
C724	4822 126 11687	GRM39F104Z16 0.1µF
C725	4822 124 11331	47µF/6.3V
C726	4822 123 30379	1200pF/50V
C727	4822 123 30376	1000pF/50V
C728	4822 124 11075	22pF/16V
C730	4822 126 11681	1000pF (GR39) 50V
C731	4822 124 11075	22pF/16V
C732	4822 124 30379	1200pF/50V
C733	4822 124 30376	1000pF/50V
C734	4822 124 11075	22pF/16V
C736	4822 126 11681	1000pF (GR39) 50V
C737	4822 124 11075	22pF/16V 50V
C738	4822 126 11687	GRM39F104Z16 0.1µF
C739	4822 126 11687	GRM39F104Z16 0.1µF
C740	4822 124 11331	47µF/6.3V
C741	4822 123 30379	1200pF/50V
C742	4822 123 30379	1200pF/50V
C743	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
C727	4822 123 30364	1000pF J 16V
C728	4822 123 30364	ECWU1C
C729	4822 126 12502	820pF ±10% 50V
C732	4822 123 30365	1200pF J 16V
C733	4822 123 30364	ECWU1C
C734	4822 123 30364	1000pF J 16V
C735	4822 126 12502	820pF ±10% 50V
C741	4822 123 30365	1200pF J 16V
C742	4822 123 30365	ECWU1C
C743	4822 123 30365	1200pF J 16V
C744	4822 123 30365	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	10kΩ ±5% 1/16W
R521	4822 051 30101	10kΩ ±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	47kΩ ±5% 1/16W
R540	4822 051 30102	1kΩ ±5% 1/16W
R541	4822 051 30102	1kΩ ±5% 1/16W
R542	4822 051 30479	47kΩ ±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
R558	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 30829	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

VIDEO



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
 R749 4822 116 83207 1.2kΩ ±5% 1/16W
 RV51 4822 100 11944 RK10J12T T6 K2 M3 10

Safety resistors Δ

R620 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 63234 4.7μH
 L702 4822 157 70271 390μH J
 L703 4822 157 70271 390μH J



D651 4822 130 32635 MA-151K TAPE/ING
 D553 4822 130 32635 MA-151K TAPE/ING



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
 Q560 4822 130 43396 2SC2712 GR
 Q561 4822 130 43396 2SC2712 GR
 Q562 4822 130 42733 2SA1162 GR

Q564 4822 130 42733 2SA1162 GR



IC50 4822 209 31905 AD7528 MIX/ATTN
 IC51 4822 209 31905 AD7528 MIX/ATTN
 IC52 4822 209 62764 74HC164 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 81668 NJM386M FLAT PACK

IC61 4822 209 81666 NJM386M FLAT PACK

IC70 4822 209 83987 SAA7323GP DAC3



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 11687 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
 G901 4822 124 11131 47μF/6.3V
 G902 4822 126 11566 2200pF (GR39) 50V
 G903 4822 121 42668 0.47μF/J.50V
 G904 4822 121 42668 0.47μF/J.50V

G905 4822 126 11566 2200pF (GR39) 50V
 G906 4822 126 11566 2200pF (GR39) 50V
 G907 4822 122 33751 120pF (GR39) 50V
 G908 4822 126 11568 470pF (GR39) 50V
 G909 4822 122 33741 10pF (GR39) 50V

G910 4822 126 11568 470pF (GR39) 50V
 G911 4822 126 11568 470pF (GR39) 50V
 G914 4822 124 11333 B.P. 0.47μF/50V (MV)
 G915 4822 124 11333 B.P. 0.47μF/50V (MV)
 G916 4822 124 11333 B.P. 0.47μF/50V (MV)

G912 4822 122 33744 100pF (GR39) 50V
 G917 4822 126 11587 GRM39F104Z16 0.1μF
 G918 4822 124 10772 100μF/6.3V
 G919 4822 124 10772 100μF/6.3V
 G920 4822 126 11687 GRM39F104Z16 0.1μF

G921 4822 122 33761 22pF (GR39) 50V
 G922 4822 126 11687 GRM39F104Z16 0.1μF
 G923 4822 122 33788 82pF (GR39) 50V
 G924 4822 122 33777 47pF (GR39) 50V
 G925 4822 126 11663 12pF 50V

G926 4822 122 33798 82pF (GR39) 50V
 G927 4822 122 32675 1μF/16V
 G928 4822 126 11687 GRM39F104Z16 0.1μF
 G929 4822 126 11687 GRM39F104Z16 0.1μF
 G930 4822 124 11074 10μF/16V

G931 4822 126 11687 GRM39F104Z16 0.1μF
 G932 4822 126 11687 GRM39F104Z16 0.1μF
 G933 4822 124 11074 10μF/16V
 G936 4822 124 23561 470μF/4V
 G947 4822 122 32672 1μF/16V TANTAL

G939 4822 124 23561 470μF/4V O=B H=7



C940	4822 124 11074	10μF/16V
C941	4822 126 11687	GRM39F104Z16 0.1μF
C943	4822 116 82487	0Ω ±5% 1/16W
C946	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 11687	1000P/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	10kΩ ±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 83208	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 30581	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 051 30333	33kΩ ±5% 1/16W
R947	4822 051 30581	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 90693	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 051 30473	47kΩ ±5% 1/16W
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 82257	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 051 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 83208	12kΩ ±5% 1/16W
R448	4822 116 83208	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 RESISTOR 75Ω
R461	4822 051 30759	CHIP RESISTOR 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 051 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 21684	EP208 TRANS



L409	4822 157 53865	COIL TSL0707
L450	4822 157 70322	COIL 1000P
L451	4822 158 60636	FERRCEPTOR
L452	4822 158 60636	FERRCEPTOR
L453	4822 158 60636	FERRCEPTOR



L454	4822 158 60636	FERRCEPTOR
L455	4822 158 60636	FERRCEPTOR
L456	4822 158 60636	FERRCEPTOR
L457	4822 158 60636	FERRCEPTOR
L458	4822 158 60636	FERRCEPTOR
L459	4822 158 60636	FERRCEPTOR
L801	4822 157 70272	47UH 10%
L902	4822 320 40284	4FT 280NS DELAY LINE
L903	4822 153 70057	4FUS FOR MULTI STAND



D901	4822 150 31129	BB212 V-CAP DOUBLE D
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Q402	4822 130 43398	2SC2712 GR
Q403	4822 130 43398	2SC2712 GR
Q404	4822 130 43398	2SC2712 GR
Q405	4822 130 83003	2SD1803
Q406	4822 130 83003	2SD1803
Q407	4822 13042298	C36SP
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 TC4511F
IC48	4822 209 61783	NJM2233BM VID. SWITCH
ICE1	4822 209 31908	CXA1145M RGB ENCODER
IC60	4822 209 30142	PC74HC40103T JEDEC FL
IC91	4822 209 31911	TIBPAL16R5-25CDW
IC92	4822 209 60898	74LS161 EIAJ FLAT
IC93	5322 209 73187	74HC04 EIAJ FLAT
IC94	4822 209 31931	74HC0406 JEDEC
IC95	4822 209 60898	74LS161 EIAJ FLAT
IC96	4822 209 60898	74LS161 EIAJ FLAT
IC97	4822 209 89387	NJM4560M
IC98	4822 209 61534	74HCUB4 EIAJ FLAT
IC99	4822 209 31928	74HC00 EIAJ FLAT

MMC

Miscellaneous

DF01	4822 130 92635	MA-151K TAPING
SWF1	4822 276 13407	SWITCH
SW10	4822 277 21656	SSSSS-12-12 SMT
		NTSC
XF01	5322 242 73734	CSAC4.00M/GC
		CERAMIC
X101	4822 242 81847	4.9152MHZ SMD-49
X102	4822 242 81351	30.2098MHZ
		DSO49SJ C
X103	4822 242 81349	30.0000MHZ
		DSO49SJ C
X201	4822 242 81352	45.1584MHZ
		DSO49SJ C
X202	4822 242 81348	19.3575MHZ SMD-49
X801	5322 242 73734	CSAC4.00M/GC
		CERAMIC
X901	4822 242 81378	3.578545 MHZ XTAL
X902	4822 242 81379	4.433818 MHZ XTAL
Z603	4822 130 83197	GP1-UG8XP PHILIPS
ZF01	4822 130 83229	GCZ3.9X (TOSHIBA)

-II-

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/F16V
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
C200	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
C290	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 11685	4700pF (GR39)
C631	4822 126 11685	4700pF (GR39)
C632	4822 126 11685	4700pF (GR39)
C633	4822 126 11685	4700pF (GR39)
C634	4822 126 11685	4700pF (GR39)
C636	4822 126 11685	4700pF (GR39)
C650	4822 124 11074	10μF/16V

-II-

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	47kΩ ±5% 1/16W
RF19	4822 051 30473	47kΩ ±5% 1/16W
RF20	4822 051 30473	47kΩ ±5% 1/16W
RF21	4822 051 30472	47kΩ ±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	47kΩ ±5% 1/16W
R102	4822 051 30102	1kΩ ±5% 1/16W
R103	4822 051 30102	1kΩ ±5% 1/16W
R104	4822 051 30472	47kΩ ±5% 1/16W
R105	4822 051 30472	47kΩ ±5% 1/16W
R106	4822 051 30102	1kΩ ±5% 1/16W
R107	4822 051 30102	1kΩ ±5% 1/16W
R108	4822 051 30472	47kΩ ±5% 1/16W
R109	4822 051 30472	47kΩ ±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	47kΩ ±5% 1/16W
R132	4822 051 30472	47kΩ ±5% 1/16W
R133	4822 051 30472	47kΩ ±5% 1/16W
R134	4822 051 30472	47kΩ ±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	# 180 ±5% 1/10W
R809	4822 117 10151	# 120 ±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	30kΩ ±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	30kΩ ±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 83206	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 30338	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
R882	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
R888	4822 051 30473	47kΩ ±5% 1/16W
R889	4822 117 10146	# 4.7Q J 1/4W RF
R890	4822 117 10146	# 4.7Q J 1/4W RF
R891	4822 051 30472	4.7kΩ ±5% 1/16W
R892	4822 051 30222	2.2kΩ ±5% 1/16W
R893	4822 051 30474	470kΩ ±5% 1/16W
R894	4822 116 82487	0Ω ±5% 1/16W

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

D801	4822 130 52635	MA-151K TAPEING
D802	4822 130 52635	MA-151K TAPEING

Q801	4822 130 43954	2SD999
Q802	4822 130 43998	2SC2712 GR
Q803	4822 130 42733	2SA1162 GR
Q804	4822 130 42733	2SA1162 GR
Q805	4822 130 42733	2SA1162 GR
Q806	4822 130 43998	2SC2712 GR
Q810	4822 130 43954	2SD999
Q811	4822 130 43998	2SC2712 GR
Q812	4822 130 43954	2SD999
Q813	4822 130 43998	2SC2712 GR

IC80	4822 209 30436	TDA8808 HF AMP FLAT-
IC81	4822 209 30437	TDA8809 RADIAL SERVO
IC82	4822 209 31953	TCA0872DM2 SOP
IC83	4822 209 31953	TCA0872DM2 SOP
IC84	4822 209 31928	CMOS 74HC00 FLAT TAP
IC85	4822 209 73952	UPD41416C, M881416 SAA7310
IC86	4822 209 63453	DEMOMULATOR PCF3523P ADOC
IC87	4822 209 30439	MC68HC05C8 268K SERV
IC88	4822 209 31969	

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 5587-
J902	4822 267 31581	HSJ0922-01-1140 FOR
003B	4822 502 13203	SCREW:CLAMPER BRACKET
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/OAS 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
P106	4822 214 52039	IR-JOINT-PCB
X802	5322 242 73734	CSAC4-0.0MGC 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 H6
J501	4822 265 31046	HSJ0924-01-1110 FOR
J502	4822 265 31049	CGP4707-0101 EP 7P L
J601	4822 265 31054	TCS7184-01-201
J603	4822 267 31585	EMI-P 2.5MM PIN IMSA- 6035B
J606	4822 265 31053	FCN-228J100-G/0-01
J802	4822 267 31584	MKS8082-6-0-202 STOC
J804	4822 265 31055	TCS7144-01-201
J992	4822 265 31065	EMI-P 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 61485	CDM BRACKET
031B	4822 502 13877	DC PCB TAP SCREW
031B	4822 402 61486	SUSPENSION: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 82294	SPEAKER SHEET

MECHANICAL

Miscellaneous

501M	4822 693 91593	CDM 9 ASSY
502B	4822 256 92004	EJECT HOLDER ASSY
503B	4822 402 61487	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 REPLACE JIG SMALL
TOOL	4822 395 90612	CHIP IC REPLACE JIG
TOOL	4822 267 50676	CDM FLEX CONNECTOR FEMALE
J602	4822 267 31618	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 10814	# 14P DC CORD TPX15
AC03	4822 321 10815	AC MAINS CORD /06/11
AC03	4822 321 10939	AC MAINSCORD /17
AC03	4822 321 10932	AC MAINSCORD /00
JA31	4822 265 41293	LSJ/P0038 CONN.14P

Parts list for 22ER9151

-II-

CA02	4822 125 60192	ECKDN8332ME 3300P
CA04	4822 125 60192	ECKDN8332ME 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	470P/50
CA14	4822 125 60191	ECKD3A101KBN 100P/1K
CA15	4822 121 70274	ECQEB473KFWN 0.047U
CA17	4822 121 70275	ECQD2A103MY 0.01U
CA32	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 34099	ECUV1H109KBN 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

-II-

CA86	4822 125 60194	MCUV2D102KRN 1000P
RA07	4822 117 10207	ERJ6BNF1502V 15K
RA08	4822 117 10209	ERJ6BNF2702V 27K
RA09	4822 111 91076	ERJ6GEYJ332V 3.3K
RA10	4822 117 10218	ERJ4YJ01H 100Ω
RA11	4822 117 10219	ERJ4YJ220H 22Ω
RA12	4822 117 10214	ERG3SJ04H 100K
RA14	4822 117 10213	ERG2SJ270P 27Ω 2W
RA15	4822 111 90893	ERJ6GEYJ0101V 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 90898	ERJ6GEYJ0101V 100Ω
RA40	4822 111 91191	ERJ6GEYJ331V 330Ω
RA41	4822 117 10215	ERX1SJ2R2P 2.2Ω
RA42	4822 111 91191	ERJ6GEYJ331V 330Ω
RA43	4822 117 10208	ERJ6BNF2203V 220K SV
RA44	4822 117 10208	ERJ6BNF1002V 10K SV
RA45	4822 111 92141	BPR3F 0.01 0.01Ω
RA46	4822 111 92141	BPR3F 0.01 0.01Ω
RA47	4822 117 10205	ERJ6BNF1001V 1K
RA48	4822 117 10205	ERJ6BNF1001V 1K
RA49	4822 117 10212	ERJ1SJ471P 470Ω
RA50	4822 111 90894	ERJ6GEYJ102V 1K
RA51	4822 117 10212	ERJ1SJ471P 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	EVN39C007B13 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	VLP50005A/B/C COIL
LA05	4822 157 70394	VLP50005A/B/C COIL
LA06	4822 157 70393	VLP50005A/B/C COIL
LA31	4822 157 70392	ETS29K484V COIL
LA033	4822 157 70393	VLP50005A/B/C COIL
LA034	4822 157 70395	VLP50005A/B/C COIL
LA35	4822 157 70393	VLP50005A/B/C COIL
DA01	4822 130 42857	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	MA188 0.2A/200V
DA08	4822 130 83317	MA188 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
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ICA4	4822 209 62279	M51977FP SUPPLY IC
ICA5	4822 209 32136	AN6588S 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	ERT57FL100P 10Ω
TA01	4822 146 21717	ETS33K82V TRANS
TA02	4822 146 21716	ETP26Z335AF TRANS



CA01	4822 121 70276	ECQU2A47MV 0.47/250V
CA03	4822 121 70276	ECQU2A47MV 0.47/250V
CA05	4822 121 70275	ECQU2A103MY 0.01μ
CA12	4822 124 80451	MCE82DG121Q 120V/400
CA16	4822 125 60192	ECKDN8332ME 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	EGO1C



QA01	4822 130 63241	2SK998
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ICA1	4822 209 32138	ON3131 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	LSKM0068+0068 CASE
FA01	4822 253 30427	LS9F0015A40 4A/125V
JA32	4822 265 20625	LSJP0036 AC INLET
TA02	4822 146 21718	ETP26Z334AF TRANS
THA1	4822 111 92142	ERTD5ZFL8ROP 80Ω



CA01	4822 121 70278	EQU2A224MN 0.22μ
CA03	4822 121 70278	EQU2A224MN 0.22μ
CA05	4822 125 60195	VCKS0009 3300P
CA16	4822 125 60195	VCKS0009 3300P



RA01	4822 117 10226	ERD25FJ474 407K
RA02	4822 117 10227	ERJ12YJ273H 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	EGO1 0.7A/400V



QA01	4822 130 63245	2SK1819 5A/450V
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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 is also 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 service person 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 service 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 Δ 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 Δ 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 service person and the user. Extension cords which do not incorporate the polarizing feature should never be used.

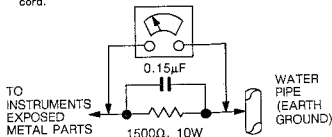
Fire and Shock Hazard (Continued)

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 0.15µF 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 milliamperes. 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. Service 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/Gedr:	AG-19	SI	Wichtig für die Werkstatt!	
Sachgebiet:	CDI		Nr.	4822-830-19004
Memo:	DE10BCD		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.

4822 830 19004



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 deaktiviert 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-Modus ist wieder mit den gleichen Bedienschritten A und B möglich.



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