

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.

CONTENTS

1. Caution.
2. Product Information.
3. Service Information.
4. Demounting and Service positions.
5. Service Software.
6. Electrical Drawings.
7. Diagnostics.
8. Mechanical drawing.
9. Partslist.

CLASS 1
LASER PRODUCT

3122 110 03400

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

Published by MW march 1993 Service & Support Interactive Media Systems Printed in The Netherlands ©Copyright reserved Subject to modification 4822 725 2465/



PHILIPS

PCS 68 28

CHAP. CONTENTS

1 CAUTION

2 PRODUCT INFORMATION

- 2.1 Technical specification
- 2.2 Connections and controls

3 SERVICE INFORMATION

- 3.1 Safety instructions
- 3.2 Servicing of SMDs (Surface Mounted Devices)
 - 3.2.1 General cautions on handling and storage
 - 3.2.2 Removal of SMDs
 - 3.2.2.1 Caution on removal
 - 3.2.3 Attachment of SMDs
 - 3.2.3.1 Caution on attachment
- 3.3 Handling ESD sensitive components
 - 3.3.1 Personal safety
 - 3.3.2 Storage and transport
 - 3.3.3 Testing or handling
- 3.3.4 Mounting ESD sensitive components
- 3.3.5 Soldering
- 3.3.6 Electrostatic charges
- 3.3.7 Transients (switch-on phenomena)
- 3.3.8 Working environment
- 3.3.9 Replacement of the Flat Pack ICs
- 3.4 Service tools
 - 3.4.1 Service PCB
 - 3.4.1.1 Circuit diagram
 - 3.4.1.2 Layout
 - 3.4.1.3 Parts list
- 3.4.2 Test discs
- 3.4.3 Extension connectors
- 3.4.4 Measurement equipment
- 3.4.5 Pointing device
- 3.4.6 Silicon-Gum
- 3.5 Circuit Description
- 3.6 THE CENTRAL REPAIR PROCEDURE

4 Demounting and Service positions

- 4.1 Servicing the MAIN board PM06
- 4.2 Servicing the CD-Lid
- 4.3 Servicing the LCD screen unit

5 SERVICE SOFTWARE

- 5.1 The low level MMC test
 - 5.1.1 Tools
 - 5.1.2 Test sequence
 - 5.1.3 Low level test implementation
 - 5.1.4 How to start up the low level test
 - 5.1.5 PCB low level test
 - 5.1.6 Terminal low level test
 - 5.1.7 Error codes
 - 5.1.8 Release number, position and checksum storage
 - 5.1.9 How is the checksum calculated ?
- 5.2 The service shell
 - 5.2.1 Starting the service shell
 - 5.2.2 Layout info
- 5.2.3 Subject dependent information

6 ELECTRICAL DRAWINGS

- 6.1 Wiring diagram
- 6.2 Alphabetical signal listing
- 6.3 Block diagram
- 6.4 MAIN Panel
 - 6.4.1 PCB Layout (Top side)
 - 6.4.2 Servo Schematic Diagram
 - 6.4.3 Audio Schematic Diagram (Part 1)
 - 6.4.4 Power/Audio Schematic Diagram (Part 2) & PP06
 - 6.4.5 Video Schematic Diagram (Part 1) & PB06
 - 6.4.6 Video Schematic Diagram (Part 2)
 - 6.4.7 MMC Schematic Diagram (Part 1)

- 6.4.8 MMC Schematic Diagram (Part 2)
- 6.4.9 MMC Schematic Diagram (Part 3)
- 6.4.10 PCB Layout (Bottom side)
- 6.5 Other Panel (PS06, PP06, Pl06, CD Lid, PB06)
- 6.6 Power Supply Unit
 - 6.6.1 PCB Layout
 - 6.6.2 Schematic Diagram

7 DIAGNOSTICS

- 7.1 Power Supply unit
- 7.2 Mainboard
 - 7.2.1 Power voltage
 - 7.2.2 Measurements Servo circuit
 - 7.2.2.1 Laser current
 - 7.2.2.2 Focus signal
 - 7.2.2.3 Starting signal
 - 7.2.2.4 Motor control signals
 - 7.2.2.5 Radial error circuit signals
 - 7.2.2.6 Clock signal IC88
 - 7.2.2.7 Decoder signals
 - 7.2.2.8 Video signals
 - 7.2.3 Measurements Audio circuit
 - 7.2.3.1 Slave processor data
 - 7.2.3.2 I2S signals
 - 7.2.3.3 Xin clock signal
 - 7.2.3.4 DEEMP signal
 - 7.2.3.5 FILTERN signal
 - 7.2.3.6 Kill signal
 - 7.2.3.7 Performance check
 - 7.2.4 Measurements & adjustment Video2 circuit
 - 7.2.4.1 Check of NTSC subcarrier
 - 7.2.4.2 Check of PAL subcarrier (& adjustment)
 - 7.2.4.3 Check of Phase Locked Loop
 - 7.2.4.4 Check of XT4 clocksignal
 - 7.2.4.5 Check of standard control signal SW
 - 7.2.4.6 Check of KILLM signal
 - 7.2.4.7 Check of HSYNC signal
 - 7.2.4.8 Check of RGB input signals
 - 7.2.5 Measurements MMC circuit
 - 7.2.5.1 Clock signals
 - 7.2.5.2 Reset circuitry
 - 7.2.5.3 Check of microprocessor 68070
 - 7.2.5.4 Low level test
- 7.3 LCD screen unit and PL50, PB06

8 MECHANICAL DRAWING

- 8.1 Exploded view

9 Parts List

- 9.1 Exploded view parts list
- 9.2 Electrical parts list

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

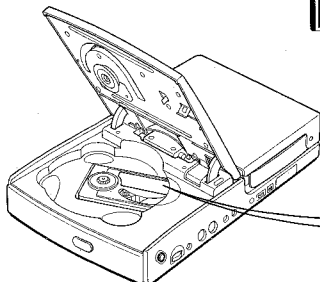
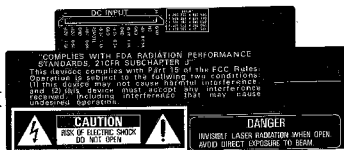
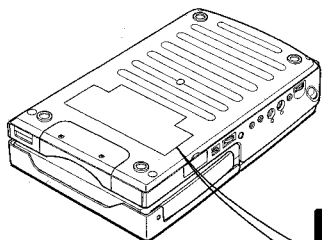
Wavelength: 760 - 800nm (30°C)

Laser Output: Continuous Wave Typ. 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

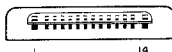
- characteristics

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

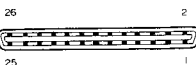
Power supply

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.)

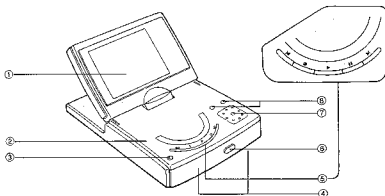


2.2 Connections and Controls

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

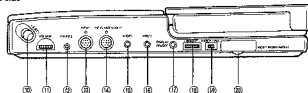
Front



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



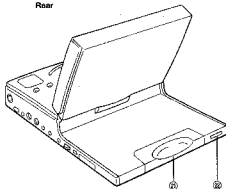
Rear view

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

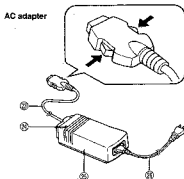
AC adapter

- 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

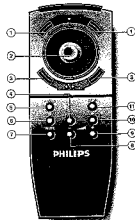
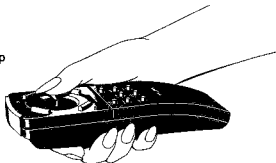


Note The rating plate is affixed to the bottom of the unit.

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

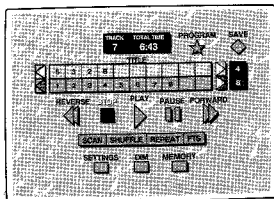


The control sits conveniently in the hand, and the thumbstick and action keys, which are by far most-used controls, are easily operated one-handed.

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.

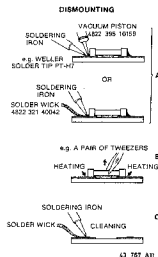


Fig. 1

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).

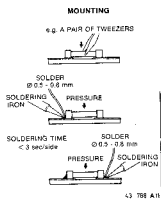


Fig. 2

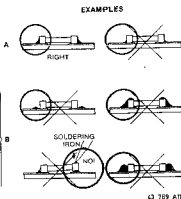
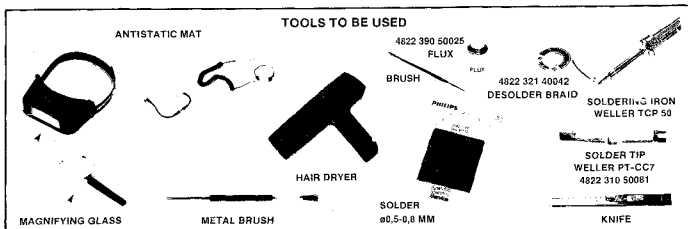


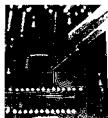
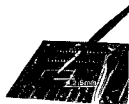
Fig. 3

3.2.3.1 Caution on attachment:

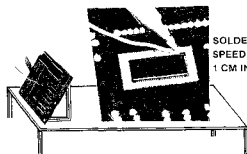
- When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering must be as quick as possible; care must be taken to avoid damage to the terminals and the body itself.
- Keep the SMD's body in contact with the printed board when soldering.
- The soldering iron to 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 DAMAGEDCLEANING
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

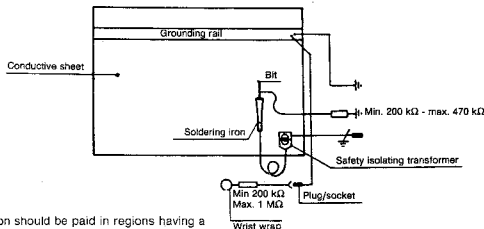
The work bench for the service technician should look like the one shown in the figure.

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.



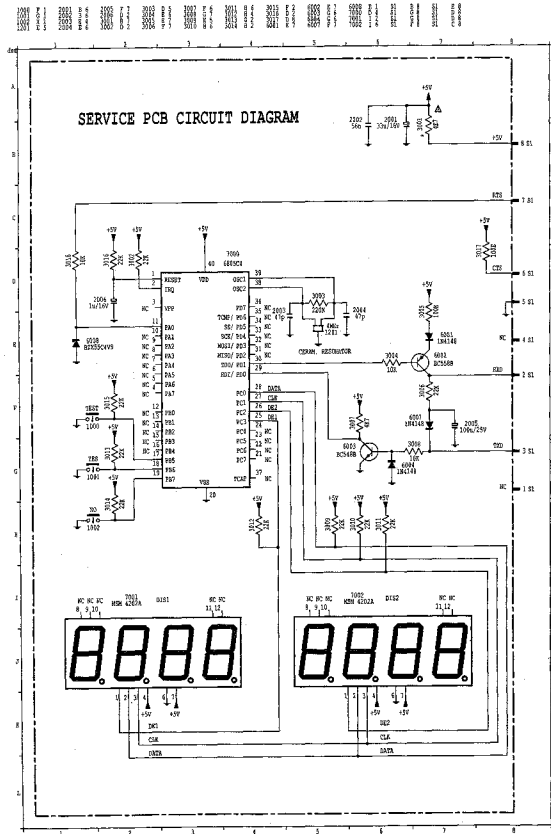
Special attention should be paid in regions having a dry atmosphere and when the floor is covered with a nylon carpet or such.

3.4 SERVICE TOOLS

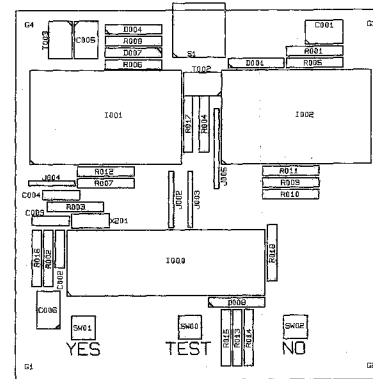
3.4.1 Service PCB (Low Level Test)

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	pF			
2003	47	pF	6001	1N4148	4822 130 30621
2004	2004	μF	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.

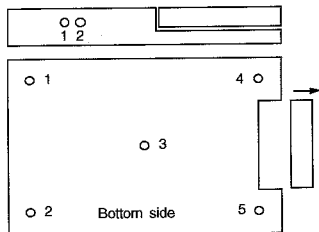


Fig 4.1

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.

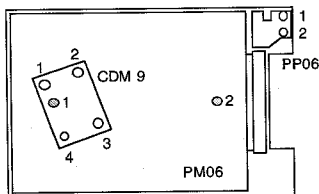


Fig 4.2

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.

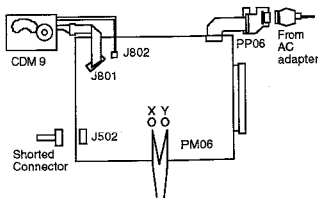


Fig 4.3

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.

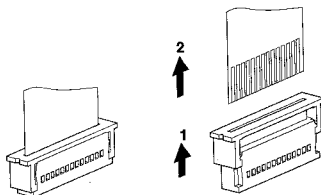


Fig 4.4

4.2 Servicing the CD-Lid

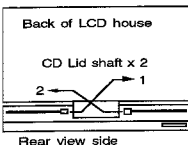
First Remove top cover 4.1.1

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.

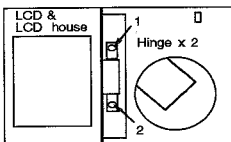
4.2.2

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.

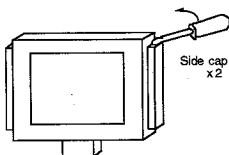
Remove two screws from the two Hinges.



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

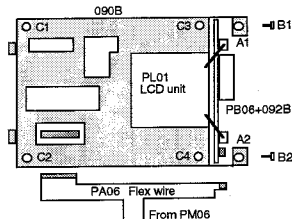
Remove 2 screws(A1-2) and then remove the bracket (090B) with PL01, etc. from the LCD housing.

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.



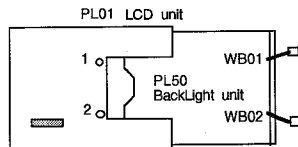
WARNING : If servicing the PB06, then coat the silicon-gum to the former coating point after soldering. (see "DIAGNOSTICS")

4.3.4 Remove the BackLight unit

The BackLight unit can be exchanged.

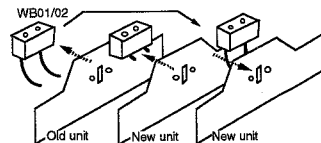
Remove 2 screws on the back of LCD unit.

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

2. Clear the RXD buffer.

3. Wait 5 ms.

4. Read the RXD buffer.

5. If the character received was an ACK (\$06) the start the pcb ltest

The UART is connected to I/O port 2

5.1.4 How to start up the low level test

With service pcb

To 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 DTAACK 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 DTAACK 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	VSC 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 kB.
- 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

FUNC

STEP

STEP

displa

ldioxr

In this

for a r

ldio sta

STEP

displa

In this

descri

check:

displa

STEP

The n

Adre

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:

- 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 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.

If error,

display: 7BrxEr14

STEP 8A : TEST DRAM BANK1

The following actions take place in this test:

1. fill the memory with the long word address as data.

display: 8Afx

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

display: 8Arx

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

If error,

display: 8ArxEr15

STEP 8B : TEST DRAM BANK1 WITH INVERTED DATA

The following actions take place in this test:

1. fill the memory with the inverted long word address as data.

display: 8Bfx

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

display: 8Brx

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

If error,

display: 8BrxEr16

STEP 9: CDIC

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

If error,

display: 9A Er17

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

display: 9B

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

If error,

display: 9A Er18

STEP 9C : CDIC REGISTER 2 TEST

display: 9C

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

If error,

display: 9C Er19

STEP 10 SLAVE processor (68HC05)

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

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

STEP 10A : WRITE REQUEST BYTE TO THE SLAVE

display: 10A

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

STEP 10B : READ ACKNOWLEDGE FROM THE SLAVE

display: 10B

In this step the following actions take place:

1. wait about 2 sec to give the slave the time to acknowledge.
2. read the acknowledge.
3. if the acknowledge is \$F0 then continue else give an error and stop testing.

If error,

display: 10B Er20

STEP 10C : READ AND DISPLAY SLAVE RELEASE NUMBER

display: 10C

In this step the following actions take place:

1. read the next byte from the slave
2. if the byte < \$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 test stopped and the err

This test has also so

w: writes continu the

r: reads continu the

d: displays the cont

The start address is

ESC stops these fun

Address range:

CDIC base address -

\$3C80.

STEP 10: SLAVE pro

This test for the sla

1 Write \$F0 to the

2 Read byte from s:

with \$F0.

3 If data is not \$F0

code else continu

4 Read the next byt

the slave process

bar. If the release

displayed.

5 Read the next byt

the CD processor

If the release num

played.

6 Read the next byt

Address range: Slav

See table of memor

STEP 11: CLOCK CAI

This step is not reall

be used to trim the r

within 1 minute acc

needed, this step sh

counter is needed to

test is entered accid

restart the l1test.

The clock calibration

frequency counter.

- Connect the prob

signals called CS

- Start the test with

counter set to mi

- The counter disp

to 512 Hz.

If not, the chck if

property.

range : \$1136724

- Press a key on the

Now fill in the me

l1test software wil

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 \$1FBBF = LSByte of the checksum of the ROM
 \$1FBFE = MSByte of the checksum of the ROM
 \$1FBFD = Release number of the ROM (BCD coded)
 \$1FBFC = 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 \$18000 to \$1FBFD + \$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.

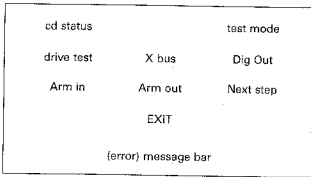


fig 3.2 CD test menu

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 : search index error
- xx = 34 : search time error
- xx = 37 : selection error

DUART TEST

This test is not relevant

APU/KEY TEST

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

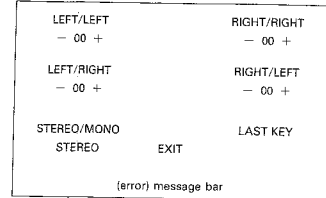


fig 3.4 APU test menu

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.

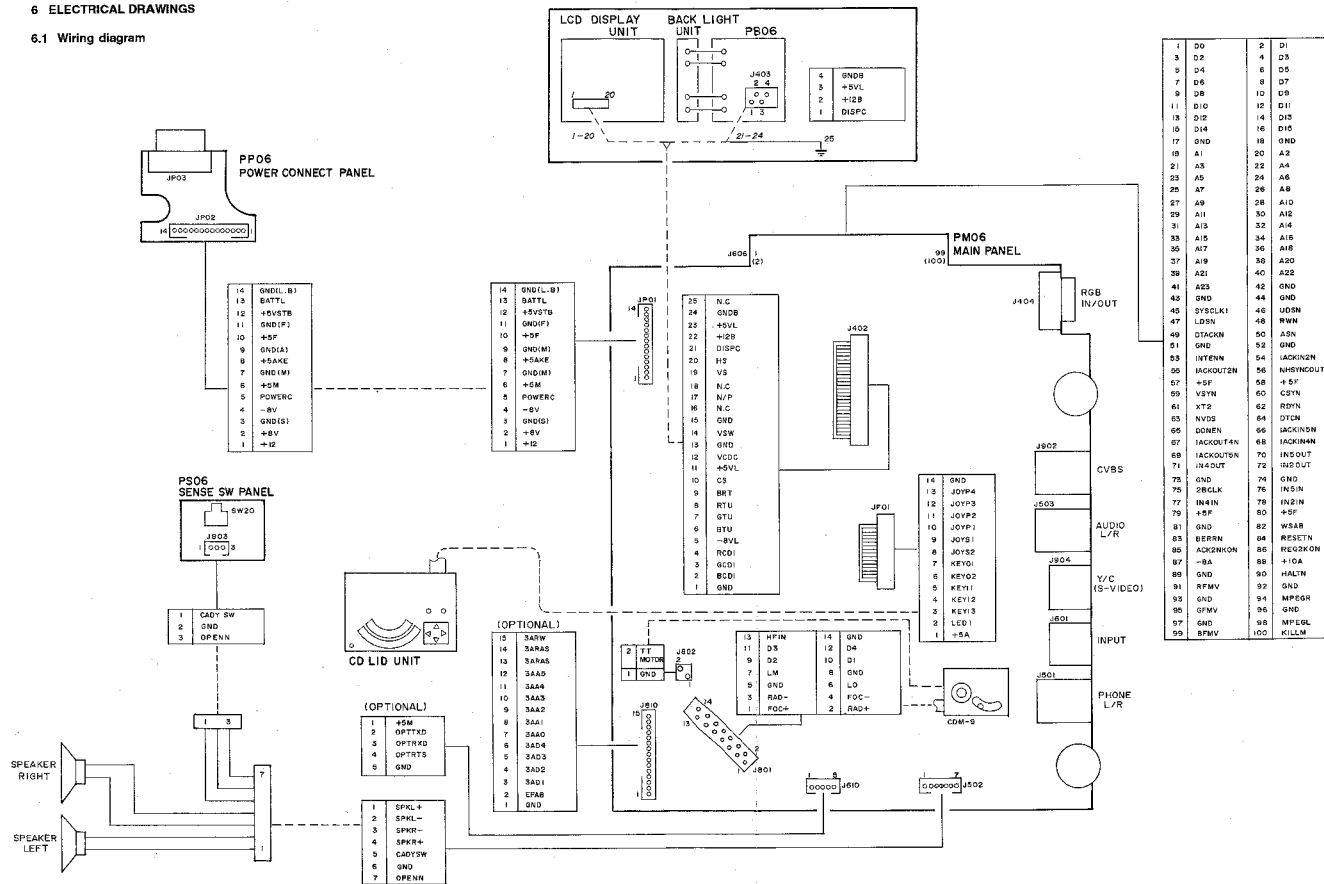
Service shell cannot be started with the testplug. Connections between port 1 and slave may be bad. Testplug could be wrong. Maybe the slave processor is defect. If the playershell cannot be started either, try the low level test first.

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 ELECTRICAL DRAWINGS

6.1 Wiring diagram



1	D0	2	D1
3	D2	4	D3
5	D4	6	D5
7	D6	8	D7
9	D8	10	D9
11	D10	12	D11
13	D12	14	D13
15	D14	16	D15
17	GND	18	GND
19	A1	20	A2
21	A3	22	A4
23	A5	24	A6
25	A7	26	A8
27	A9	28	A10
29	A11	30	A12
31	A13	32	A14
33	A15	34	A16
35	A17	36	A18
37	A19	38	A20
39	A21	40	A22
41	A23	42	GND
43	GND	44	GND
45	2V5CLK1	46	UDRN
47	LDN	48	RWN
49	DTACKN	50	ASN
51	GND	52	GND
53	INTEN	54	JACKIN2N
55	JACKOUT2N	56	NHEINOUT
57	+5F	58	+5F
59	V3TN	60	C3TN
61	XT2	62	RDYN
63	NVDS	64	DTCN
65	DOWN	66	JACKIN2N
67	JACKOUT4N	68	JACKIN4N
69	JACKOUTN	70	INSOUT
71	IN4OUT	72	INSOUT
73	GND	74	GND
75	2BCLK	76	INSIN
77	IN4IN	78	INSIN
79	+5F	80	+5F
81	GND	82	WSAB
83	BERRN	84	RESCKN
85	ACCKIN2N	86	RESCKN
87	-8A	88	+10A
89	GND	90	HALTN
91	RFMV	92	GND
93	GND	94	MPFGR
95	RFMV	96	GND
97	GND	98	MPFGR
99	RFMV	100	KILLN

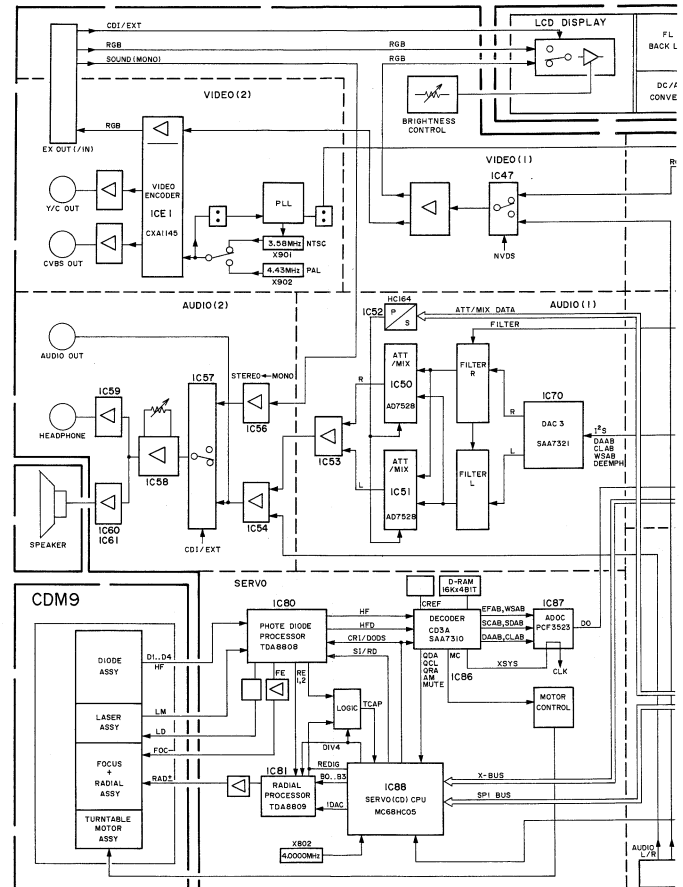
6.2 Alphabetical signal listing

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).
CSON	: (=CSONA) 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

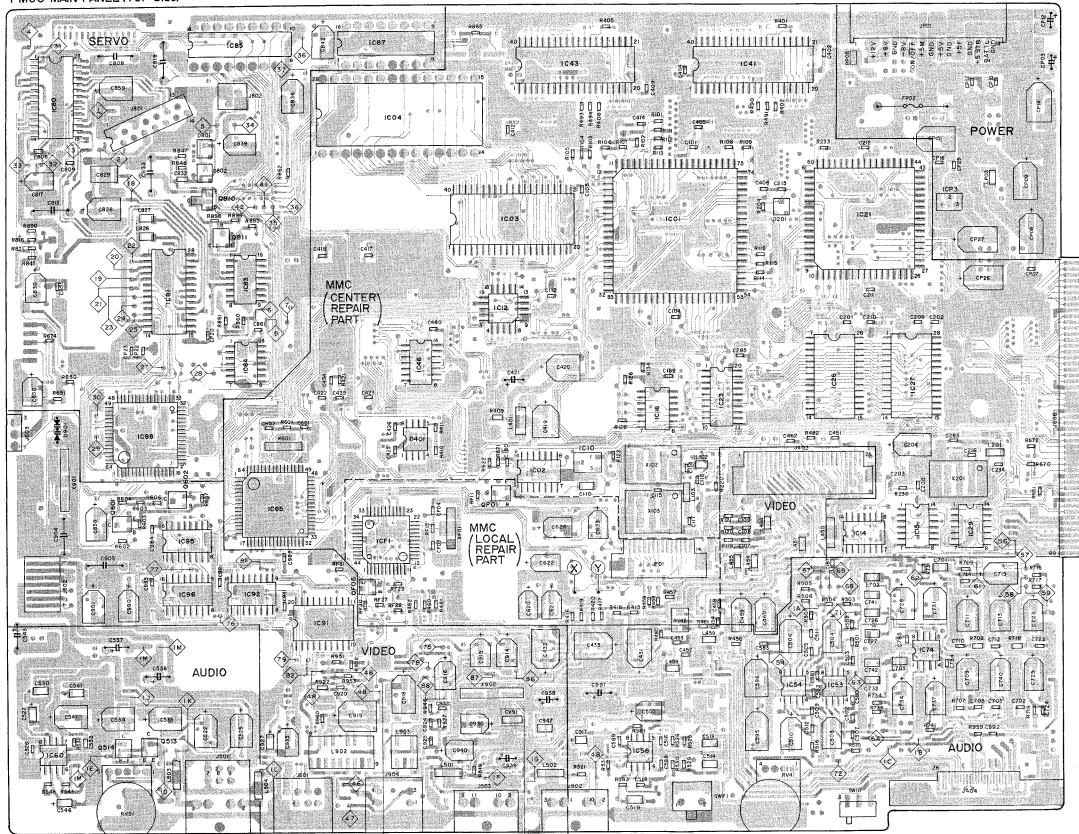
6.3 Block diagram



6.4 MAIN Panel

6.4.1 PCB Layout (Top side)

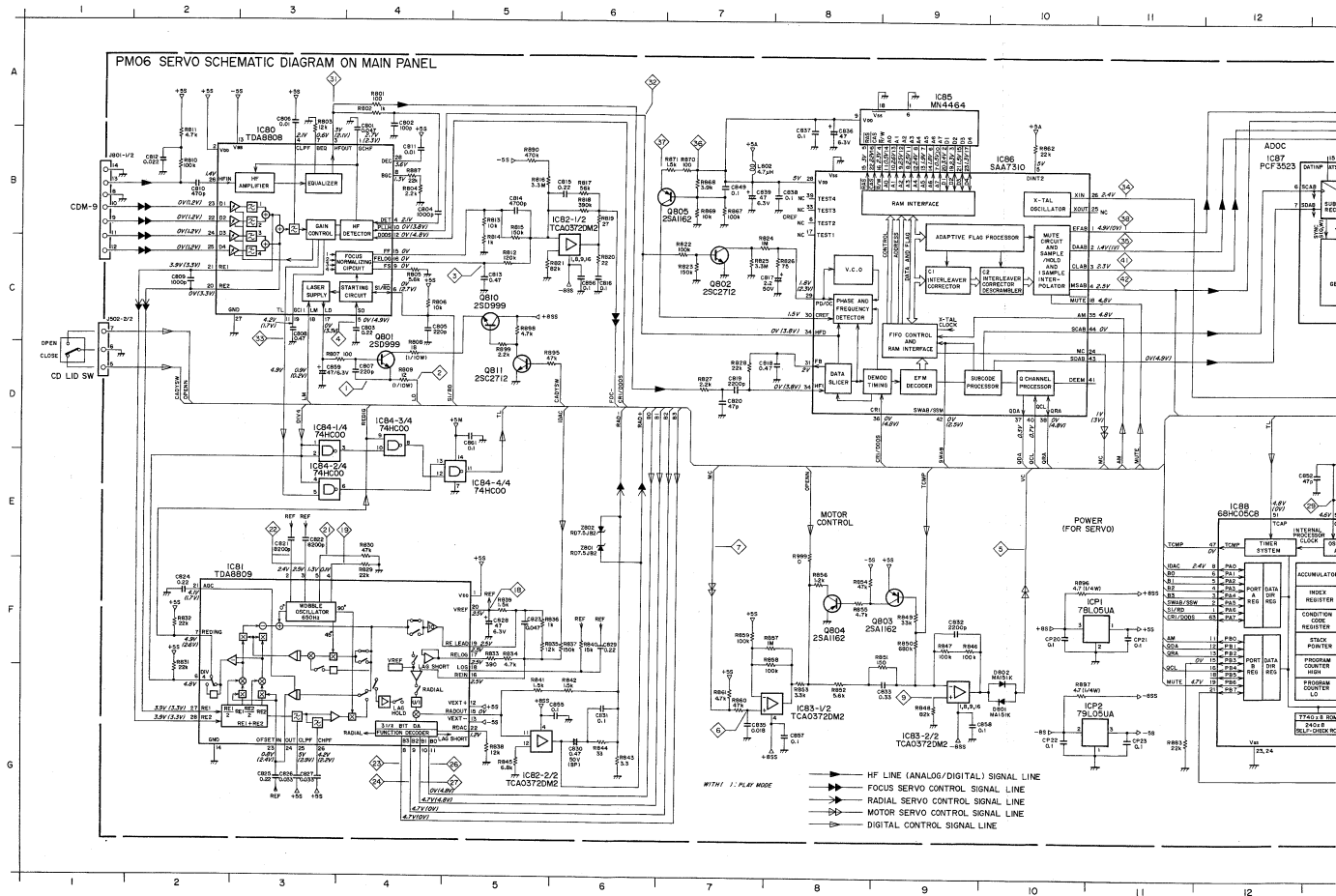
PM06 MAIN PANEL (TOP Side)



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
CP54	B54	CS51
CP55	B55	CS52
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



6.4.2 Servo Schematic Diagram

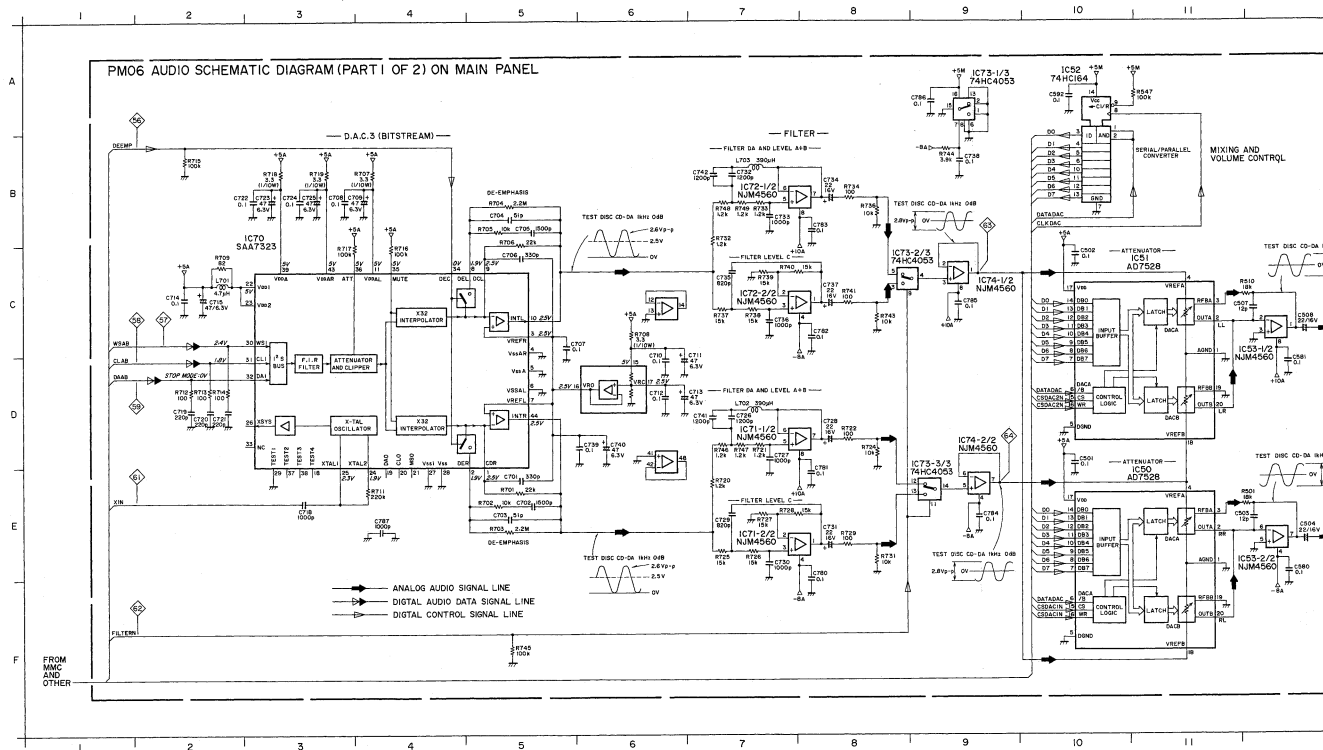




- | | |
|------------|------------|
| (C20) F10 | (R81)1F2 |
| (C20) F11 | (R81)2F1 |
| (C20) F12 | (R81)3F1 |
| (C20) F13 | (R81)3F2 |
| (C20) F14 | (R81)3F3 |
| (C20) F15 | (R81)3F4 |
| (C20) F16 | (R81)3F5 |
| (C20) F17 | (R81)3F6 |
| (C20) F18 | (R81)3F7 |
| (C20) F19 | (R81)3F8 |
| (C20) F20 | (R81)3F9 |
| (C20) F21 | (R81)3F10 |
| (C20) F22 | (R81)3F11 |
| (C20) F23 | (R81)3F12 |
| (C20) F24 | (R81)3F13 |
| (C20) F25 | (R81)3F14 |
| (C20) F26 | (R81)3F15 |
| (C20) F27 | (R81)3F16 |
| (C20) F28 | (R81)3F17 |
| (C20) F29 | (R81)3F18 |
| (C20) F30 | (R81)3F19 |
| (C20) F31 | (R81)3F20 |
| (C20) F32 | (R81)3F21 |
| (C20) F33 | (R81)3F22 |
| (C20) F34 | (R81)3F23 |
| (C20) F35 | (R81)3F24 |
| (C20) F36 | (R81)3F25 |
| (C20) F37 | (R81)3F26 |
| (C20) F38 | (R81)3F27 |
| (C20) F39 | (R81)3F28 |
| (C20) F40 | (R81)3F29 |
| (C20) F41 | (R81)3F30 |
| (C20) F42 | (R81)3F31 |
| (C20) F43 | (R81)3F32 |
| (C20) F44 | (R81)3F33 |
| (C20) F45 | (R81)3F34 |
| (C20) F46 | (R81)3F35 |
| (C20) F47 | (R81)3F36 |
| (C20) F48 | (R81)3F37 |
| (C20) F49 | (R81)3F38 |
| (C20) F50 | (R81)3F39 |
| (C20) F51 | (R81)3F40 |
| (C20) F52 | (R81)3F41 |
| (C20) F53 | (R81)3F42 |
| (C20) F54 | (R81)3F43 |
| (C20) F55 | (R81)3F44 |
| (C20) F56 | (R81)3F45 |
| (C20) F57 | (R81)3F46 |
| (C20) F58 | (R81)3F47 |
| (C20) F59 | (R81)3F48 |
| (C20) F60 | (R81)3F49 |
| (C20) F61 | (R81)3F50 |
| (C20) F62 | (R81)3F51 |
| (C20) F63 | (R81)3F52 |
| (C20) F64 | (R81)3F53 |
| (C20) F65 | (R81)3F54 |
| (C20) F66 | (R81)3F55 |
| (C20) F67 | (R81)3F56 |
| (C20) F68 | (R81)3F57 |
| (C20) F69 | (R81)3F58 |
| (C20) F70 | (R81)3F59 |
| (C20) F71 | (R81)3F60 |
| (C20) F72 | (R81)3F61 |
| (C20) F73 | (R81)3F62 |
| (C20) F74 | (R81)3F63 |
| (C20) F75 | (R81)3F64 |
| (C20) F76 | (R81)3F65 |
| (C20) F77 | (R81)3F66 |
| (C20) F78 | (R81)3F67 |
| (C20) F79 | (R81)3F68 |
| (C20) F80 | (R81)3F69 |
| (C20) F81 | (R81)3F70 |
| (C20) F82 | (R81)3F71 |
| (C20) F83 | (R81)3F72 |
| (C20) F84 | (R81)3F73 |
| (C20) F85 | (R81)3F74 |
| (C20) F86 | (R81)3F75 |
| (C20) F87 | (R81)3F76 |
| (C20) F88 | (R81)3F77 |
| (C20) F89 | (R81)3F78 |
| (C20) F90 | (R81)3F79 |
| (C20) F91 | (R81)3F80 |
| (C20) F92 | (R81)3F81 |
| (C20) F93 | (R81)3F82 |
| (C20) F94 | (R81)3F83 |
| (C20) F95 | (R81)3F84 |
| (C20) F96 | (R81)3F85 |
| (C20) F97 | (R81)3F86 |
| (C20) F98 | (R81)3F87 |
| (C20) F99 | (R81)3F88 |
| (C20) F100 | (R81)3F89 |
| (C20) F101 | (R81)3F90 |
| (C20) F102 | (R81)3F91 |
| (C20) F103 | (R81)3F92 |
| (C20) F104 | (R81)3F93 |
| (C20) F105 | (R81)3F94 |
| (C20) F106 | (R81)3F95 |
| (C20) F107 | (R81)3F96 |
| (C20) F108 | (R81)3F97 |
| (C20) F109 | (R81)3F98 |
| (C20) F110 | (R81)3F99 |
| (C20) F111 | (R81)3F100 |
| (C20) F112 | (R81)3F101 |
| (C20) F113 | (R81)3F102 |
| (C20) F114 | (R81)3F103 |
| (C20) F115 | (R81)3F104 |
| (C20) F116 | (R81)3F105 |
| (C20) F117 | (R81)3F106 |
| (C20) F118 | (R81)3F107 |
| (C20) F119 | (R81)3F108 |
| (C20) F120 | (R81)3F109 |
| (C20) F121 | (R81)3F110 |
| (C20) F122 | (R81)3F111 |
| (C20) F123 | (R81)3F112 |
| (C20) F124 | (R81)3F113 |
| (C20) F125 | (R81)3F114 |
| (C20) F126 | (R81)3F115 |
| (C20) F127 | (R81)3F116 |
| (C20) F128 | (R81)3F117 |
| (C20) F129 | (R81)3F118 |
| (C20) F130 | (R81)3F119 |
| (C20) F131 | (R81)3F120 |
| (C20) F132 | (R81)3F121 |
| (C20) F133 | (R81)3F122 |
| (C20) F134 | (R81)3F123 |
| (C20) F135 | (R81)3F124 |
| (C20) F136 | (R81)3F125 |
| (C20) F137 | (R81)3F126 |
| (C20) F138 | (R81)3F127 |
| (C20) F139 | (R81)3F128 |
| (C20) F140 | (R81)3F129 |
| (C20) F141 | (R81)3F130 |
| (C20) F142 | (R81)3F131 |
| (C20) F143 | (R81)3F132 |

To MMC 2
AND OTHER

6.4.3 Audio Schematic Diagram (Part 1)

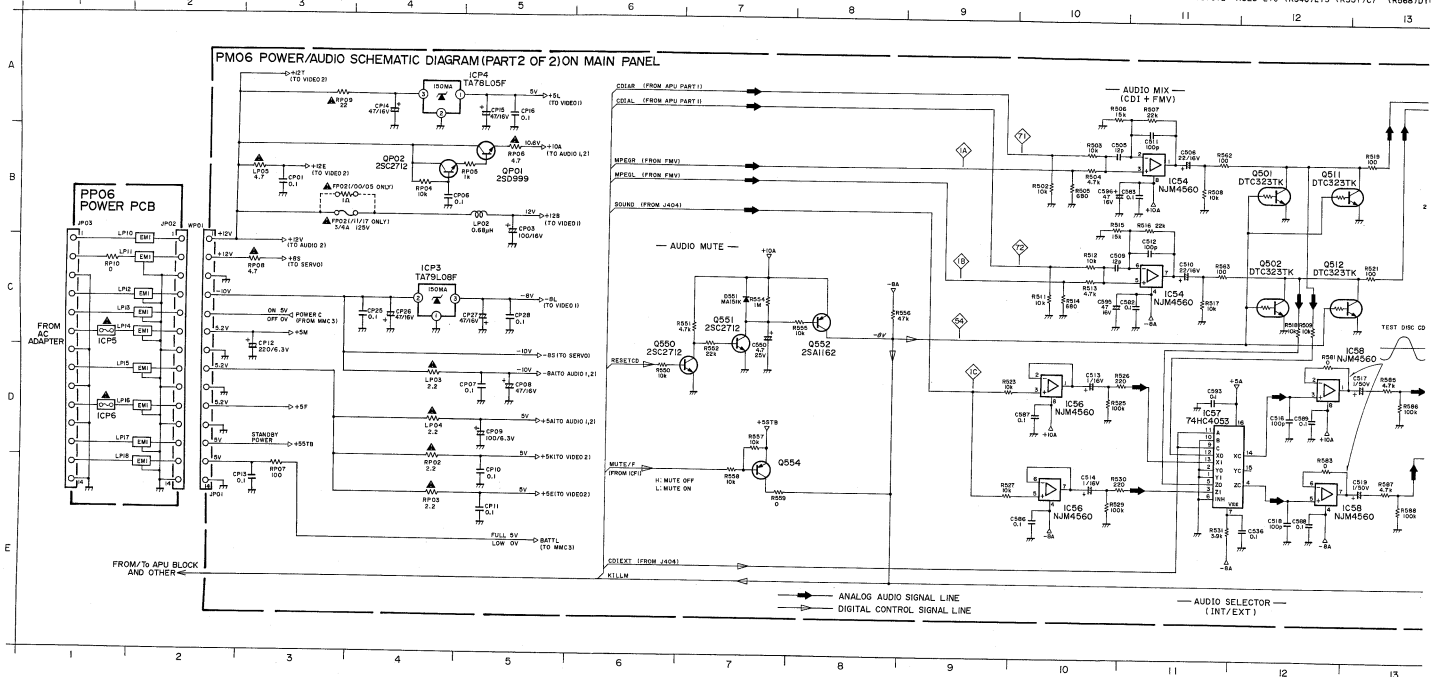


[illegible]

11

C50110B	(R724)10B
C50110C	(R724)11C
C50112	(R726)17
C50113	(R726)18
C50114	(R726)19
C50115	(R726)20
C50116	(R726)21
C50117	(R726)22
C50118	(R726)23
C50119	(R726)24
C50120	(R726)25
C50121	(R726)26
C50122	(R726)27
C50123	(R726)28
C50124	(R726)29
C50125	(R726)30
C50126	(R726)31
C50127	(R726)32
C50128	(R726)33
C50129	(R726)34
C50130	(R726)35
C50131	(R726)36
C50132	(R726)37
C50133	(R726)38
C50134	(R726)39
C50135	(R726)40
C50136	(R726)41
C50137	(R726)42
C50138	(R726)43
C50139	(R726)44
C50140	(R726)45
C50141	(R726)46
C50142	(R726)47
C50143	(R726)48
C50144	(R726)49
C50145	(R726)50
C50146	(R726)51
C50147	(R726)52
C50148	(R726)53
C50149	(R726)54
C50150	(R726)55
C50151	(R726)56
C50152	(R726)57
C50153	(R726)58
C50154	(R726)59
C50155	(R726)60
C50156	(R726)61
C50157	(R726)62
C50158	(R726)63
C50159	(R726)64
C50160	(R726)65
C50161	(R726)66
C50162	(R726)67
C50163	(R726)68
C50164	(R726)69
C50165	(R726)70
C50166	(R726)71
C50167	(R726)72
C50168	(R726)73
C50169	(R726)74
C50170	(R726)75
C50171	(R726)76
C50172	(R726)77
C50173	(R726)78
C50174	(R726)79
C50175	(R726)80
C50176	(R726)81
C50177	(R726)82
C50178	(R726)83
C50179	(R726)84
C50180	(R726)85
C50181	(R726)86
C50182	(R726)87
C50183	(R726)88
C50184	(R726)89
C50185	(R726)90
C50186	(R726)91
C50187	(R726)92
C50188	(R726)93
C50189	(R726)94
C50190	(R726)95
C50191	(R726)96
C50192	(R726)97
C50193	(R726)98
C50194	(R726)99
C50195	(R726)100
C50196	(R726)101
C50197	(R726)102
C50198	(R726)103
C50199	(R726)104
C50200	(R726)105
C50201	(R726)106
C50202	(R726)107
C50203	(R726)108
C50204	(R726)109
C50205	(R726)110
C50206	(R726)111
C50207	(R726)112
C50208	(R726)113
C50209	(R726)114
C50210	(R726)115
C50211	(R726)116
C50212	(R726)117
C50213	(R726)118
C50214	(R726)119
C50215	(R726)120
C50216	(R726)121
C50217	(R726)122
C50218	(R726)123
C50219	(R726)124
C50220	(R726)125
C50221	(R726)126
C50222	(R726)127
C50223	(R726)128
C50224	(R726)129
C50225	(R726)130
C50226	(R726)131
C50227	(R726)132
C50228	(R726)133
C50229	(R726)134
C50230	(R726)135
C50231	(R726)136
C50232	(R726)137
C50233	(R726)138
C50234	(R726)139
C50235	(R726)140
C50236	(R726)141
C50237	(R726)142
C50238	(R726)143
C50239	(R726)144
C50240	(R726)145
C50241	(R726)146
C50242	(R726)147
C50243	(R726)148
C50244	(R726)149
C50245	(R726)150
C50246	(R726)151
C50247	(R726)152
C50248	(R726)153
C50249	(R726)154
C50250	(R726)155
C50251	(R726)156
C50252	(R726)157
C50253	(R726)158
C50254	(R726)159
C50255	(R726)160
C50256	(R726)161
C50257	(R726)162
C50258	(R726)163

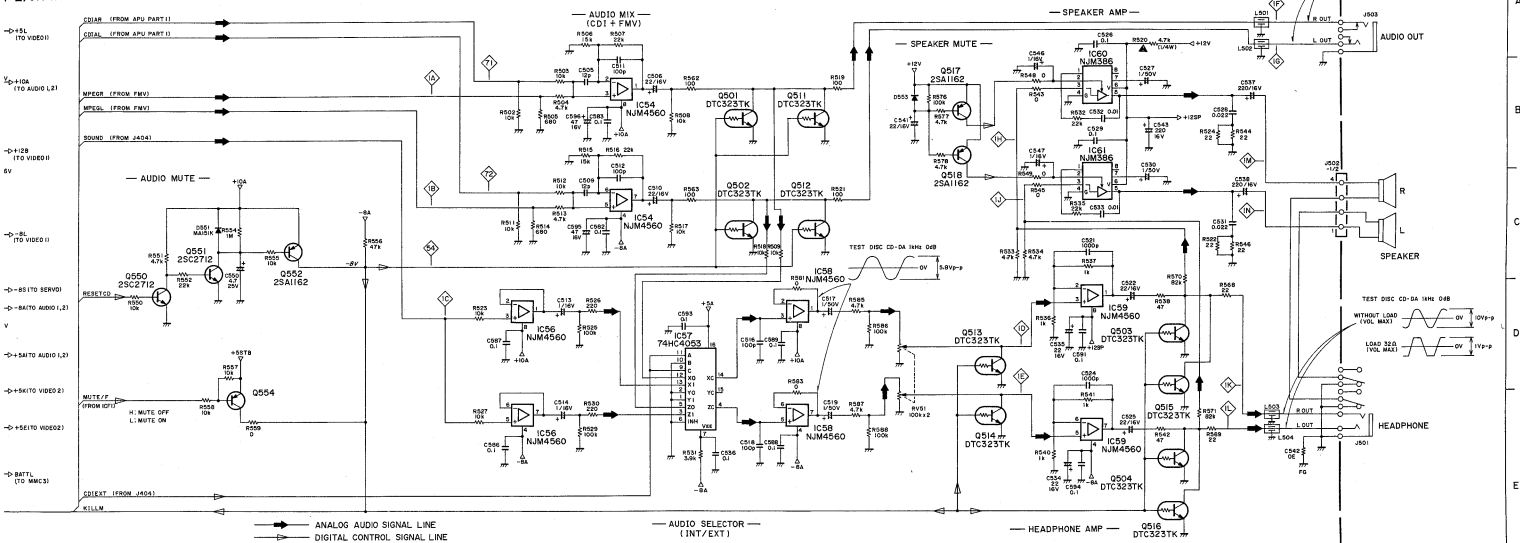
(): BOTTOM SIDE PARTS



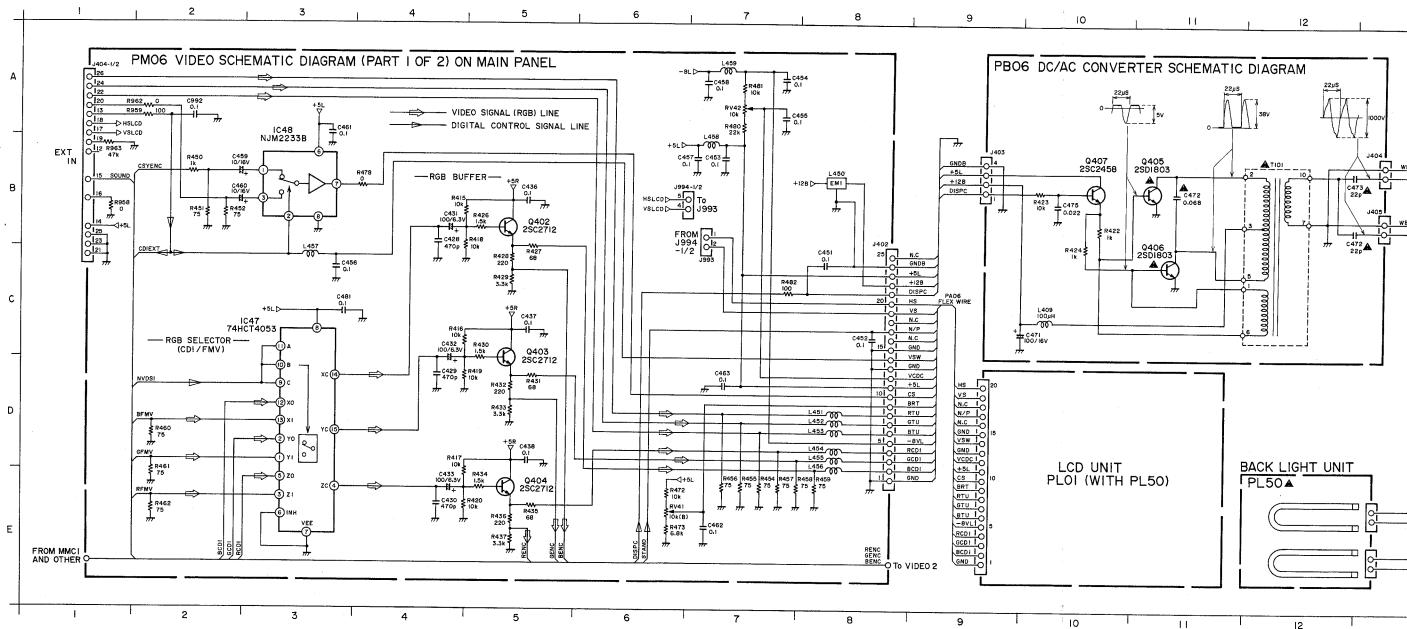
NOTE ON SAFETY :
Symbol ▲ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ▲ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

CS10 C11	CS62 D15	CS33 C15	CS47 B15	CS94E15	IC96 D1	IC60 B15	LP03 D4	LP17 D2	Q503D15	Q550IC6	RP08 C3	RS08D11	RS19 B13	RS30 E10	RS41E15	RS52IC7	RS60E16	RS87E13
CS11 B11	CS24D15	CS34 E15	CS90 C7	CS98 C10	IC54 B11	IC61B10	LP04D4	LP18 E2	Q504E15	Q521C7	RP09A3	RS09IC12	RS20A15	RS31 E11	RS42E16	RS52IC7	RS70C16	RS86E13
CS14 C10	CS27 A15	CS35 B15	CS92 E11	CS93B15	IC54 C11	IC61B10	LP05B3	LP19 B3	Q511B12	Q550IC6	RP10 C1	RS11C10	RS21 C15	RS32 C15	RS43 B14	RS54IC8	RS71D16	
CS15 C10	CS28 A10	CS36B12	CS93 B11	CS91IC7	IC56D10	IC62D10	LP02 B2	LP10 C2	Q512D12	Q554E17	RV1 E11	RS12C10	RS22C16	RS33C14	RS44B16	RS55IC8	RS76B14	
CS16 D12	CS29B16	CS38 C16	CS97D10	FP02 B3	IC57D11	IC63D11	JP01 E1	JP11 C2	Q503 E17	Q514 E17	LS04 E17	RS14C10	RS24B16	RS34D15	RS45B16	RS56E17	RS78B14	
CS17 D13	CS29B16	CS41 B13	CS98 B13	FP02 B3	IC58 D13	IC64D13	JP02 E17	JP13 C2	Q501B8	Q514E17	LS04 E17	RS15C10	RS25B16	RS35D15	RS46 B14	RS57E17	RS81B14	
CS18 E15	CS31C12	CS46 E15	CS99 D17	ICP3 C4	IC58 E15	IC64E15	LP02 A18	LP16 D2	Q501B8	Q514E17	LS04 E17	RS16C10	RS26B16	RS36D16	RS47B16	RS58E17	RS82B14	
CS19 E15	CS31C12	CS45 B16	CS99D1015	ICP4 A4	IC59D15	IC65D15	LP02B8	LP18 D2	Q501B8	Q514E17	LS04 E17	RS17B14	RS27B16	RS37D16	RS48B16	RS59E17	RS83B14	
CS21C15	CS32 B15	CS46 B14	CS99D11	ICP5 C1	IC59E15	IC65E15	LP02B8	LP18 D2	Q502C12	Q515C14	RP07E3	RS07 A11	RS18C12	RS28 E10	RS40E15	RS51C7	RS68D13	

F2)ON MAIN PANEL

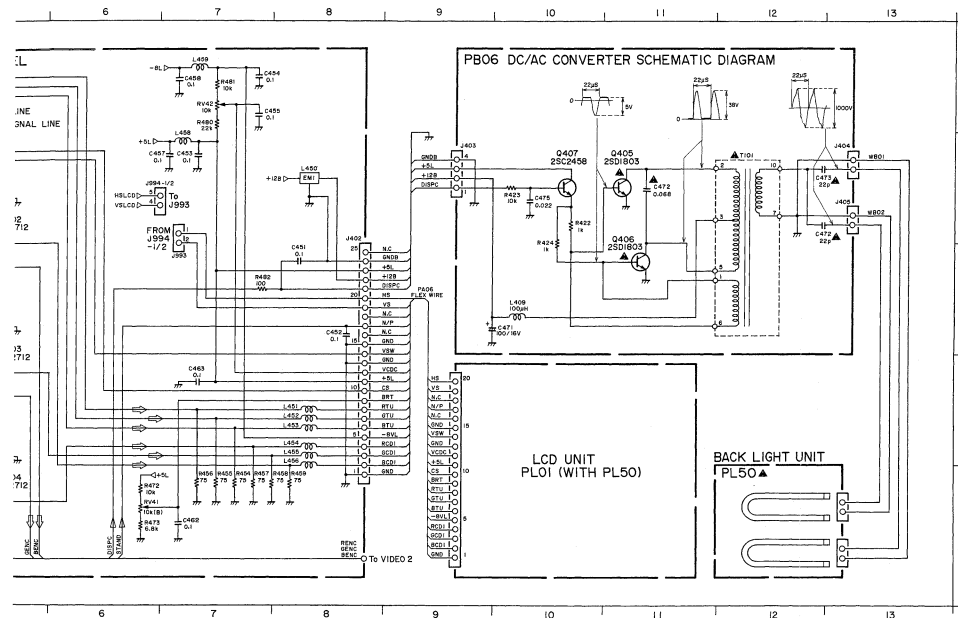


6.4.5 Video Schematic Diagram (Part 1) & PB06



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

(): BOTTOM SIDE PARTS



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) E8
(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) C3	(R489) A7
(C448) B3	(R490) A7
(C449) D4	(R491) A7
(C450) B1	(R492) A7
(C451) C3	(R493) A7
(C452) A7	(R494) A7
(C453) A7	(R495) A7
(C454) B2	(R496) A7
(C455) A7	(R497) A7
(C456) A7	(R498) A7
(C457) A7	(R499) A7
(C458) A7	(R500) A7
(C459) A7	(R501) A7
(C460) A7	(R502) A7
(C461) A7	(R503) A7
(C462) E2	(R504) A7
(C463) D7	(R505) A7
(C464) C10	(R506) A7
(C465) B1	(R507) A7
(C466) B1	(R508) A7
(C467) B1	(R509) A7
(C468) B1	(R510) A7
(C469) B1	(R511) A7
(C470) B1	(R512) A7
(C471) B1	(R513) A7
(C472) B1	(R514) A7
(C473) B1	(R515) A7
(C474) B1	(R516) A7
(C475) B1	(R517) A7
(C476) B1	(R518) A7
(C477) B1	(R519) A7
(C478) B1	(R520) A7
(C479) B1	(R521) A7
(C480) B1	(R522) A7
(C481) B1	(R523) A7
(C482) B1	(R524) A7
(C483) B1	(R525) A7
(C484) B1	(R526) A7
(C485) B1	(R527) A7
(C486) B1	(R528) A7
(C487) B1	(R529) A7
(C488) B1	(R530) A7
(C489) B1	(R531) A7
(C490) B1	(R532) A7
(C491) B1	(R533) A7
(C492) B1	(R534) A7
(C493) B1	(R535) A7
(C494) B1	(R536) A7
(C495) B1	(R537) A7
(C496) B1	(R538) A7
(C497) B1	(R539) A7
(C498) B1	(R540) A7
(C499) B1	(R541) A7
(C500) B1	(R542) A7

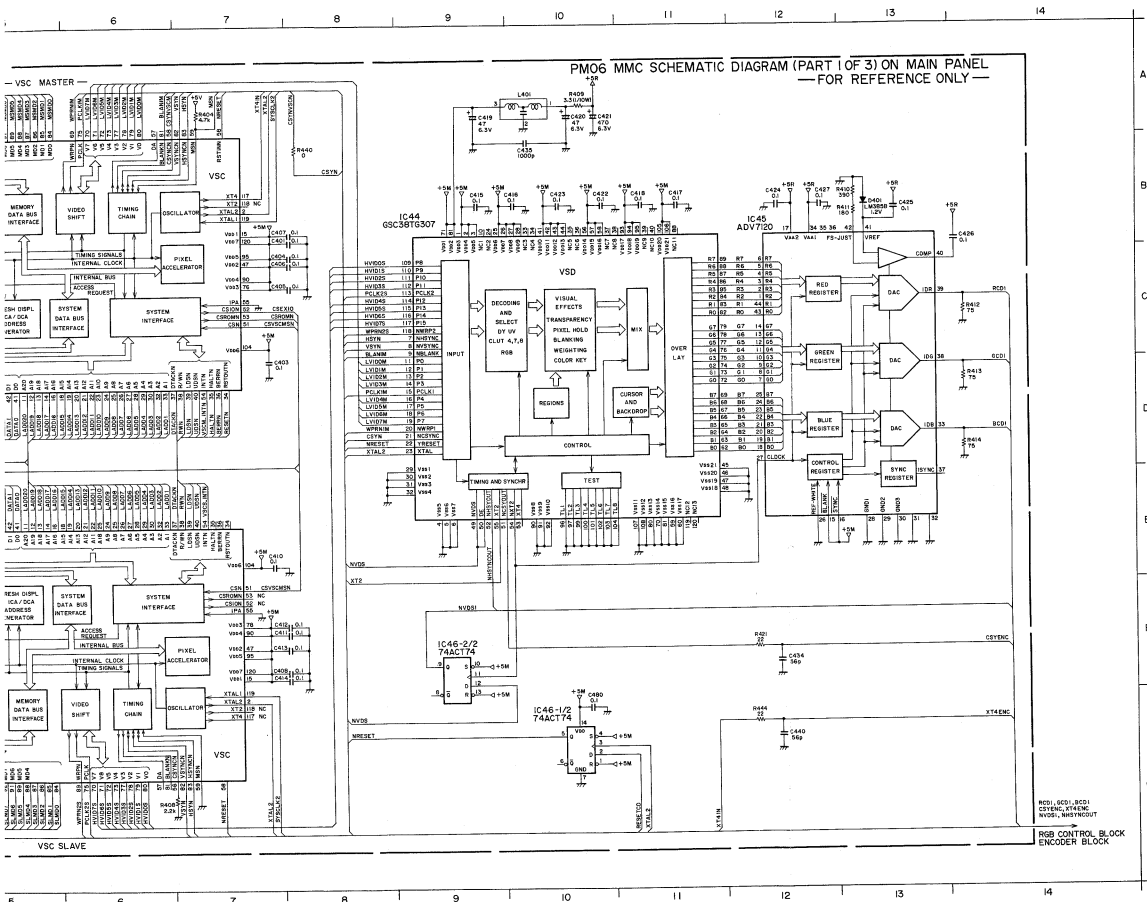
6.4.6 Video Schematic Diagram (Part 2)

(): BOTTOM SIDE PARTS

CV81 E4 (C910)D8 (C921)D10 (C931)E14 C947 C14 C991 B14 (C931)D7 (C939)E3 (L905)C15 (Q908)D14 (R906)B8 (R916)D9 (R926)F12 (R937)D14 (R947)F14 (R961)E13
 C901 C7 (C911)D9 (C922)D10 C932 E14 (C939)C2 C981 B10 (C946)B6 (C959)F4 (L907)E5 (R907)C9 (R917)E4 (R927)F13 (R938)D14 (R948)F14 (R962)B14
 C902 B8 (C912)E3 (C923)E12 C933 D11 C981 C5 (C912)C2 C96 E6 J404 A16 (L908)F15 (Q910)E14 (R908)C9 (R918)E4 (R928)F13 (R939)D14 (R949)F14 (R963)B14
 C903 B8 C914 C10 C924 E13 C934 C10 (C940)C2 C96 E7 J402 C16 (Q911)B9 (R909)C9 (R919)D10 (R929)F13 (R940)D14 (R950)B13 X901 B8
 C904 B8 C915 C10 C925 E13 C935 D14 (C941)C2 C96 E8 J403 A16 (L909)F15 (Q912)E14 (R910)B9 (R920)D10 (R930)D13 (R941)D14 (R951)B13 (R964)E13
 C905 B8 C916 C10 C926 E13 C936 D14 (C942)C2 C96 E9 J405 A16 (L910)F15 (Q913)E14 (R911)B9 (R921)D10 (R931)D13 (R942)D14 (R952)B13 X902 B8
 C906 B8 C917 C10 C927 E13 C937 D14 (C943)C2 C96 E10 J406 A16 (L911)F15 (Q914)E14 (R912)B9 (R922)C11 (R932)B14 (R943)D14 (R953)B13 X903 E4
 C907 B8 C918 C10 C928 E13 C938 D14 (C944)C2 C96 E11 J407 A16 (L912)F15 (Q915)E14 (R913)B9 (R923)C11 (R933)B14 (R944)D14 (R954)B13 X904 E4
 C908 B8 C919 C10 C929 E13 C939 D14 (C945)C2 C96 E12 J408 A16 (L913)F15 (Q916)E14 (R914)B9 (R924)C11 (R934)B14 (R945)D14 (R955)B13 X905 E4
 C909 B8 C920 C12 C930 D14 C940 C3 C982 E10 (C946)D10 (L901)D10 (R905)B8 (R915)D8 (R925)F12 (R936)C14 (R946)F14 (R960)E13
 C910 B8 C921 C12 C931 D14 C941 C3 C983 E10 (C947)D10 (L902)E15 (Q907)D14 (R907)B8 (R917)D8 (R927)F12 (R937)C14 (R947)F14 (R961)E13
 C911 B8 C922 C12 C932 D14 C942 C3 C984 E10 (C948)D10 (L903)E15 (Q908)D14 (R908)B8 (R918)D8 (R928)F12 (R938)C14 (R948)F14 (R962)B14
 C912 B8 C923 C12 C933 D14 C943 C3 C985 E10 (C949)D10 (L904)E15 (Q909)D14 (R909)B8 (R919)D8 (R929)F12 (R939)C14 (R949)F14 (R963)B14
 C913 B8 C924 C12 C934 D14 C944 C3 C986 E10 (C950)D10 (L905)E15 (Q910)D14 (R910)B9 (R930)C14 (R950)B13 X901 B8
 C914 B8 C925 C12 C935 D14 C945 C3 C987 E10 (C951)D10 (L906)E15 (Q911)D14 (R911)B9 (R931)C14 (R951)B13 X902 B8
 C915 B8 C926 C12 C936 D14 C946 C3 C988 E10 (C952)D10 (L907)E15 (Q912)D14 (R912)B9 (R932)C14 (R952)B13 X903 E4
 C916 B8 C927 C12 C937 D14 C947 C3 C989 E10 (C953)D10 (L908)E15 (Q913)D14 (R913)B9 (R933)C14 (R953)B13 X904 E4
 C917 B8 C928 C12 C938 D14 C948 C3 C990 E10 (C954)D10 (L909)E15 (Q914)D14 (R914)B9 (R934)C14 (R954)B13 X905 E4
 C918 B8 C929 C12 C939 D14 C949 C3 C991 E10 (C955)D10 (L910)E15 (Q915)D14 (R915)D8 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C919 B8 C930 C12 C940 D14 C950 C3 C992 E10 (C956)D10 (L911)E15 (Q916)D14 (R916)D8 (R926)F12 (R936)C14 (R946)F14 (R956)B13
 C920 B8 C931 C12 C941 D14 C951 C3 C993 E10 (C957)D10 (L912)E15 (Q917)D14 (R917)D8 (R927)F12 (R937)C14 (R947)F14 (R957)B13
 C921 B8 C932 C12 C942 D14 C952 C3 C994 E10 (C958)D10 (L913)E15 (Q918)D14 (R918)D8 (R928)F12 (R938)C14 (R948)F14 (R958)B13
 C922 B8 C933 C12 C943 D14 C953 C3 C995 E10 (C959)D10 (L914)E15 (Q919)D14 (R919)D8 (R929)F12 (R939)C14 (R949)F14 (R959)B13
 C923 B8 C934 C12 C944 D14 C954 C3 C996 E10 (C960)D10 (L915)E15 (Q920)D14 (R920)D8 (R930)C14 (R950)B13 X901 B8
 C924 B8 C935 C12 C945 D14 C955 C3 C997 E10 (C961)D10 (L916)E15 (Q921)D14 (R921)D8 (R931)C14 (R951)B13 X902 B8
 C925 B8 C936 C12 C946 D14 C956 C3 C998 E10 (C962)D10 (L917)E15 (Q922)D14 (R922)C11 (R932)B14 (R943)D14 (R953)B13 X903 E4
 C926 B8 C937 C12 C947 D14 C957 C3 C999 E10 (C963)D10 (L918)E15 (Q923)D14 (R923)C11 (R933)B14 (R944)D14 (R954)B13 X904 E4
 C927 B8 C938 C12 C948 D14 C958 C3 C1000 E10 (C964)D10 (L919)E15 (Q924)D14 (R924)C11 (R934)B14 (R945)D14 (R955)B13 X905 E4
 C928 B8 C939 C12 C949 D14 C959 C3 C1001 E10 (C965)D10 (L920)E15 (Q925)D14 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C929 B8 C940 C12 C950 D14 C960 C3 C1002 E10 (C966)D10 (L921)E15 (Q926)D14 (R926)F12 (R936)C14 (R946)F14 (R956)B13
 C930 B8 C941 C12 C951 D14 C961 C3 C1003 E10 (C967)D10 (L922)E15 (Q927)D14 (R927)F12 (R937)C14 (R947)F14 (R957)B13
 C931 B8 C942 C12 C952 D14 C962 C3 C1004 E10 (C968)D10 (L923)E15 (Q928)D14 (R928)F12 (R938)C14 (R948)F14 (R958)B13
 C932 B8 C943 C12 C953 D14 C963 C3 C1005 E10 (C969)D10 (L924)E15 (Q929)D14 (R929)F12 (R939)C14 (R949)F14 (R959)B13
 C933 B8 C944 C12 C954 D14 C964 C3 C1006 E10 (C970)D10 (L925)E15 (Q930)D14 (R930)C14 (R950)B13 X901 B8
 C934 B8 C945 C12 C955 D14 C965 C3 C1007 E10 (C971)D10 (L926)E15 (Q931)D14 (R931)C14 (R951)B13 X902 B8
 C935 B8 C946 C12 C956 D14 C966 C3 C1008 E10 (C972)D10 (L927)E15 (Q932)D14 (R932)C14 (R952)B13 X903 E4
 C936 B8 C947 C12 C957 D14 C967 C3 C1009 E10 (C973)D10 (L928)E15 (Q933)D14 (R933)C14 (R953)B13 X904 E4
 C937 B8 C948 C12 C958 D14 C968 C3 C1010 E10 (C974)D10 (L929)E15 (Q934)D14 (R934)C14 (R954)B13 X905 E4
 C938 B8 C949 C12 C959 D14 C969 C3 C1011 E10 (C975)D10 (L930)E15 (Q935)D14 (R935)F12 (R935)C14 (R945)F14 (R955)B13
 C939 B8 C950 C12 C960 D14 C970 C3 C1012 E10 (C976)D10 (L931)E15 (Q936)D14 (R936)C14 (R956)B13 X901 B8
 C940 B8 C951 C12 C961 D14 C971 C3 C1013 E10 (C977)D10 (L932)E15 (Q937)D14 (R937)C14 (R957)B13 X902 B8
 C941 B8 C952 C12 C962 D14 C972 C3 C1014 E10 (C978)D10 (L933)E15 (Q938)D14 (R938)C14 (R958)B13 X903 E4
 C942 B8 C953 C12 C963 D14 C973 C3 C1015 E10 (C979)D10 (L934)E15 (Q939)D14 (R939)C14 (R959)B13 X904 E4
 C943 B8 C954 C12 C964 D14 C974 C3 C1016 E10 (C980)D10 (L935)E15 (Q940)D14 (R940)C14 (R960)E13
 C944 B8 C955 C12 C965 D14 C975 C3 C1017 E10 (C981)D10 (L936)E15 (Q941)D14 (R941)D8 (R921)C11 (R931)B14 (R942)D14 (R952)B13 X901 B8
 C945 B8 C956 C12 C966 D14 C976 C3 C1018 E10 (C982)D10 (L937)E15 (Q942)D14 (R942)D8 (R922)C11 (R932)B14 (R943)D14 (R953)B13 X902 B8
 C946 B8 C957 C12 C967 D14 C977 C3 C1019 E10 (C983)D10 (L938)E15 (Q943)D14 (R943)D8 (R923)C11 (R933)B14 (R944)D14 (R954)B13 X903 E4
 C947 B8 C958 C12 C968 D14 C978 C3 C1020 E10 (C984)D10 (L939)E15 (Q944)D14 (R944)D8 (R924)C11 (R934)B14 (R945)D14 (R955)B13 X904 E4
 C948 B8 C959 C12 C969 D14 C979 C3 C1021 E10 (C985)D10 (L940)E15 (Q945)D14 (R945)D8 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C949 B8 C960 C12 C970 D14 C980 C3 C1022 E10 (C986)D10 (L941)E15 (Q946)D14 (R946)D8 (R926)F12 (R936)C14 (R946)F14 (R956)B13
 C950 B8 C961 C12 C971 D14 C981 C3 C1023 E10 (C987)D10 (L942)E15 (Q947)D14 (R947)D8 (R927)F12 (R937)C14 (R947)F14 (R957)B13
 C951 B8 C962 C12 C972 D14 C982 C3 C1024 E10 (C988)D10 (L943)E15 (Q948)D14 (R948)D8 (R928)F12 (R938)C14 (R948)F14 (R958)B13
 C952 B8 C963 C12 C973 D14 C983 C3 C1025 E10 (C989)D10 (L944)E15 (Q949)D14 (R949)D8 (R929)F12 (R939)C14 (R949)F14 (R959)B13
 C953 B8 C964 C12 C974 D14 C984 C3 C1026 E10 (C990)D10 (L945)E15 (Q950)D14 (R950)C14 (R950)B13 X901 B8
 C954 B8 C965 C12 C975 D14 C985 C3 C1027 E10 (C991)D10 (L946)E15 (Q951)D14 (R951)C14 (R951)B13 X902 B8
 C955 B8 C966 C12 C976 D14 C986 C3 C1028 E10 (C992)D10 (L947)E15 (Q952)D14 (R952)C14 (R952)B13 X903 E4
 C956 B8 C967 C12 C977 D14 C987 C3 C1029 E10 (C993)D10 (L948)E15 (Q953)D14 (R953)C14 (R953)B13 X904 E4
 C957 B8 C968 C12 C978 D14 C988 C3 C1030 E10 (C994)D10 (L949)E15 (Q954)D14 (R954)D8 (R924)C11 (R934)B14 (R945)D14 (R955)B13
 C958 B8 C969 C12 C979 D14 C989 C3 C1031 E10 (C995)D10 (L950)E15 (Q955)D14 (R955)D8 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C959 B8 C970 C12 C980 D14 C990 C3 C1032 E10 (C996)D10 (L951)E15 (Q956)D14 (R956)C14 (R956)B13 X901 B8
 C960 B8 C971 C12 C981 D14 C991 C3 C1033 E10 (C997)D10 (L952)E15 (Q957)D14 (R957)C14 (R957)B13 X902 B8
 C961 B8 C972 C12 C982 D14 C992 C3 C1034 E10 (C998)D10 (L953)E15 (Q958)D14 (R958)C14 (R958)B13 X903 E4
 C962 B8 C973 C12 C983 D14 C993 C3 C1035 E10 (C999)D10 (L954)E15 (Q959)D14 (R959)C14 (R959)B13 X904 E4
 C963 B8 C974 C12 C984 D14 C994 C3 C1036 E10 (C1000)D10 (L955)E15 (Q960)D14 (R960)D8 (R920)D10 (R930)D13 (R941)D14 (R951)B13 (R964)E13
 C964 B8 C975 C12 C985 D14 C995 C3 C1037 E10 (C1001)D10 (L956)E15 (Q961)D14 (R961)D8 (R921)C11 (R931)B14 (R942)D14 (R952)B13 X901 B8
 C965 B8 C976 C12 C986 D14 C996 C3 C1038 E10 (C1002)D10 (L957)E15 (Q962)D14 (R962)D8 (R922)C11 (R932)B14 (R943)D14 (R953)B13 X902 B8
 C966 B8 C977 C12 C987 D14 C997 C3 C1039 E10 (C1003)D10 (L958)E15 (Q963)D14 (R963)D8 (R923)C11 (R933)B14 (R944)D14 (R954)B13 X903 E4
 C967 B8 C978 C12 C988 D14 C998 C3 C1040 E10 (C1004)D10 (L959)E15 (Q964)D14 (R964)D8 (R924)C11 (R934)B14 (R945)D14 (R955)B13 X904 E4
 C968 B8 C979 C12 C989 D14 C999 C3 C1041 E10 (C1005)D10 (L960)E15 (Q965)D14 (R965)D8 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C969 B8 C980 C12 C990 D14 C1000 C3 C1042 E10 (C1006)D10 (L961)E15 (Q966)D14 (R966)D8 (R926)F12 (R936)C14 (R946)F14 (R956)B13
 C970 B8 C981 C12 C991 D14 C1001 C3 C1043 E10 (C1007)D10 (L962)E15 (Q967)D14 (R967)D8 (R927)F12 (R937)C14 (R947)F14 (R957)B13
 C971 B8 C982 C12 C992 D14 C1002 C3 C1044 E10 (C1008)D10 (L963)E15 (Q968)D14 (R968)D8 (R928)F12 (R938)C14 (R948)F14 (R958)B13
 C972 B8 C983 C12 C993 D14 C1003 C3 C1045 E10 (C1009)D10 (L964)E15 (Q969)D14 (R969)D8 (R929)F12 (R939)C14 (R949)F14 (R959)B13
 C973 B8 C984 C12 C994 D14 C1004 C3 C1046 E10 (C1010)D10 (L965)E15 (Q970)D14 (R970)D8 (R930)C14 (R950)B13 X901 B8
 C974 B8 C985 C12 C995 D14 C1005 C3 C1047 E10 (C1011)D10 (L966)E15 (Q971)D14 (R971)C14 (R951)B13 X902 B8
 C975 B8 C986 C12 C996 D14 C1006 C3 C1048 E10 (C1012)D10 (L967)E15 (Q972)D14 (R972)C14 (R952)B13 X903 E4
 C976 B8 C987 C12 C997 D14 C1007 C3 C1049 E10 (C1013)D10 (L968)E15 (Q973)D14 (R973)C14 (R953)B13 X904 E4
 C977 B8 C988 C12 C998 D14 C1008 C3 C1050 E10 (C1014)D10 (L969)E15 (Q974)D14 (R974)D8 (R924)C11 (R934)B14 (R945)D14 (R955)B13
 C978 B8 C989 C12 C999 D14 C1009 C3 C1051 E10 (C1015)D10 (L970)E15 (Q975)D14 (R975)D8 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C979 B8 C990 C12 C1000 D14 C1010 C3 C1052 E10 (C1016)D10 (L971)E15 (Q976)D14 (R976)D8 (R926)F12 (R936)C14 (R946)F14 (R956)B13
 C980 B8 C991 C12 C1001 D14 C1011 C3 C1053 E10 (C1017)D10 (L972)E15 (Q977)D14 (R977)D8 (R927)F12 (R937)C14 (R947)F14 (R957)B13
 C981 B8 C992 C12 C1002 D14 C1012 C3 C1054 E10 (C1018)D10 (L973)E15 (Q978)D14 (R978)D8 (R928)F12 (R938)C14 (R948)F14 (R958)B13
 C982 B8 C993 C12 C1003 D14 C1013 C3 C1055 E10 (C1019)D10 (L974)E15 (Q979)D14 (R979)D8 (R929)F12 (R939)C14 (R949)F14 (R959)B13
 C983 B8 C994 C12 C1004 D14 C1014 C3 C1056 E10 (C1020)D10 (L975)E15 (Q980)D14 (R980)D8 (R930)C14 (R950)B13 X901 B8
 C984 B8 C995 C12 C1005 D14 C1015 C3 C1057 E10 (C1021)D10 (L976)E15 (Q981)D14 (R981)C14 (R951)B13 X902 B8
 C985 B8 C996 C12 C1006 D14 C1016 C3 C1058 E10 (C1022)D10 (L977)E15 (Q982)D14 (R982)C14 (R952)B13 X903 E4
 C986 B8 C997 C12 C1007 D14 C1017 C3 C1059 E10 (C1023)D10 (L978)E15 (Q983)D14 (R983)C14 (R953)B13 X904 E4
 C987 B8 C998 C12 C1008 D14 C1018 C3 C1060 E10 (C1024)D10 (L979)E15 (Q984)D14 (R984)D8 (R924)C11 (R934)B14 (R945)D14 (R955)B13
 C988 B8 C999 C12 C1009 D14 C1019 C3 C1061 E10 (C1025)D10 (L980)E15 (Q985)D14 (R985)D8 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C989 B8 C1000 C12 C1010 D14 C1020 C3 C1062 E10 (C1026)D10 (L981)E15 (Q986)D14 (R986)D8 (R926)F12 (R936)C14 (R946)F14 (R956)B13
 C990 B8 C1001 C12 C1011 D14 C1021 C3 C1063 E10 (C1027)D10 (L982)E15 (Q987)D14 (R987)D8 (R927)F12 (R937)C14 (R947)F14 (R957)B13
 C991 B8 C1002 C12 C1012 D14 C1022 C3 C1064 E10 (C1028)D10 (L983)E15 (Q988)D14 (R988)D8 (R928)F12 (R938)C14 (R948)F14 (R958)B13
 C992 B8 C1003 C12 C1013 D14 C1023 C3 C1065 E10 (C1029)D10 (L984)E15 (Q989)D14 (R989)D8 (R929)F12 (R939)C14 (R949)F14 (R959)B13
 C993 B8 C1004 C12 C1014 D14 C1024 C3 C1066 E10 (C1030)D10 (L985)E15 (Q990)D14 (R990)D8 (R930)C14 (R950)B13 X901 B8
 C994 B8 C1005 C12 C1015 D14 C1025 C3 C1067 E10 (C1031)D10 (L986)E15 (Q991)D14 (R991)C14 (R951)B13 X902 B8
 C995 B8 C1006 C12 C1016 D14 C1026 C3 C1068 E10 (C1032)D10 (L987)E15 (Q992)D14 (R992)C14 (R952)B13 X903 E4
 C996 B8 C1007 C12 C1017 D14 C1027 C3 C1069 E10 (C1033)D10 (L988)E15 (Q993)D14 (R993)C14 (R953)B13 X904 E4
 C997 B8 C1008 C12 C1018 D14 C1028 C3 C1070 E10 (C1034)D10 (L989)E15 (Q994)D14 (R994)D8 (R924)C11 (R934)B14 (R945)D14 (R955)B13
 C998 B8 C1009 C12 C1019 D14 C1029 C3 C1071 E10 (C1035)D10 (L990)E15 (Q995)D14 (R995)D8 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C999 B8 C1010 C12 C1020 D14 C1030 C3 C1072 E10 (C1036)D10 (L991)E15 (Q996)D14 (R996)D8 (R926)F12 (R936)C14 (R946)F14 (R956)B13
 C1000 B8 C1011 C12 C1021 D14 C1031 C3 C1073 E10 (C1037)D10 (L992)E15 (Q997)D14 (R997)D8 (R927)F12 (R937)C14 (R947)F14 (R957)B13
 C1001 B8 C1012 C12 C1022 D14 C1032 C3 C1074 E10 (C1038)D10 (L993)E15 (Q998)D14 (R998)D8 (R928)F12 (R938)C14 (R948)F14 (R958)B13
 C1002 B8 C1013 C12 C1023 D14 C1033 C3 C1075 E10 (C1039)D10 (L994)E15 (Q999)D14 (R999)D8 (R929)F12 (R939)C14 (R949)F14 (R959)B13
 C1003 B8 C1014 C12 C1024 D14 C1034 C3 C1076 E10 (C1040)D10 (L995)E15 (Q1000)D14 (R1000)D8 (R930)C14 (R950)B13 X901 B8
 C1004 B8 C1015 C12 C1025 D14 C1035 C3 C1077 E10 (C1041)D10 (L996)E15 (Q1001)D14 (R1001)C14 (R951)B13 X902 B8
 C1005 B8 C1016 C12 C1026 D14 C1036 C3 C1078 E10 (C1042)D10 (L997)E15 (Q1002)D14 (R1002)C14 (R952)B13 X903 E4
 C1006 B8 C1017 C12 C1027 D14 C1037 C3 C1079 E10 (C1043)D10 (L998)E15 (Q1003)D14 (R1003)C14 (R953)B13 X904 E4
 C1007 B8 C1018 C12 C1028 D14 C1038 C3 C1080 E10 (C1044)D10 (L999)E15 (Q1004)D14 (R1004)D8 (R924)C11 (R934)B14 (R945)D14 (R955)B13
 C1008 B8 C1019 C12 C1029 D14 C1039 C3 C1081 E10 (C1045)D10 (L1000)E15 (Q1005)D14 (R1005)D8 (R925)F12 (R935)C14 (R945)F14 (R955)B13
 C1009 B8 C1020 C12 C1030 D14 C1040 C3 C1082 E10 (C1046)D10 (L1001)E15 (Q1006)D14 (R1006)D8 (R926)F12 (R936)C14 (R946)F14 (R956)B13
 C1010 B8 C1021 C12 C1031 D14 C1041 C3 C1083 E10 (C1047)D10 (L1002)E15 (Q1007)D14 (R1007)D8 (R927)F12 (R937)C14 (R947)F14 (R957)B13
 C1011 B8 C1022 C12 C1032 D14 C1042 C3 C1084 E10 (C1048)D10 (L1003)E15 (Q1008)D14 (R1008)D8 (R928)F12 (R938)C14 (R948)F14 (R958)B13
 C1012 B8 C1023 C12 C1033 D14 C1043 C3 C1085 E10 (C1049)D10 (L1004)E15 (Q1009)D14 (R1009)D8 (R929)F12 (R939)C14 (R949)F14 (R959)B13
 C1013 B8 C1024 C12 C1034 D14 C1044 C3 C1086 E10 (C1050)D10 (L1005)E15 (Q1010)D14 (R1010)D8 (R930)C14 (R950)B13 X901 B8
 C1014 B8 C1025 C12 C1035 D14 C1045 C3 C1087 E10 (C1051)D10 (L1006)E15 (Q1011)D14 (R1011)C14 (R951)B13 X902 B8
 C1015 B8 C1026 C12 C1036 D14 C1046 C3 C1088 E10 (C1052)D10 (L1007)E15 (Q1012)D14 (R1012)C14 (R952)B13 X903 E4
 C1016 B8 C1027 C

PM06 MMC SCHEMATIC DIAGRAM (PART 1 OF 3)
—FOR REF

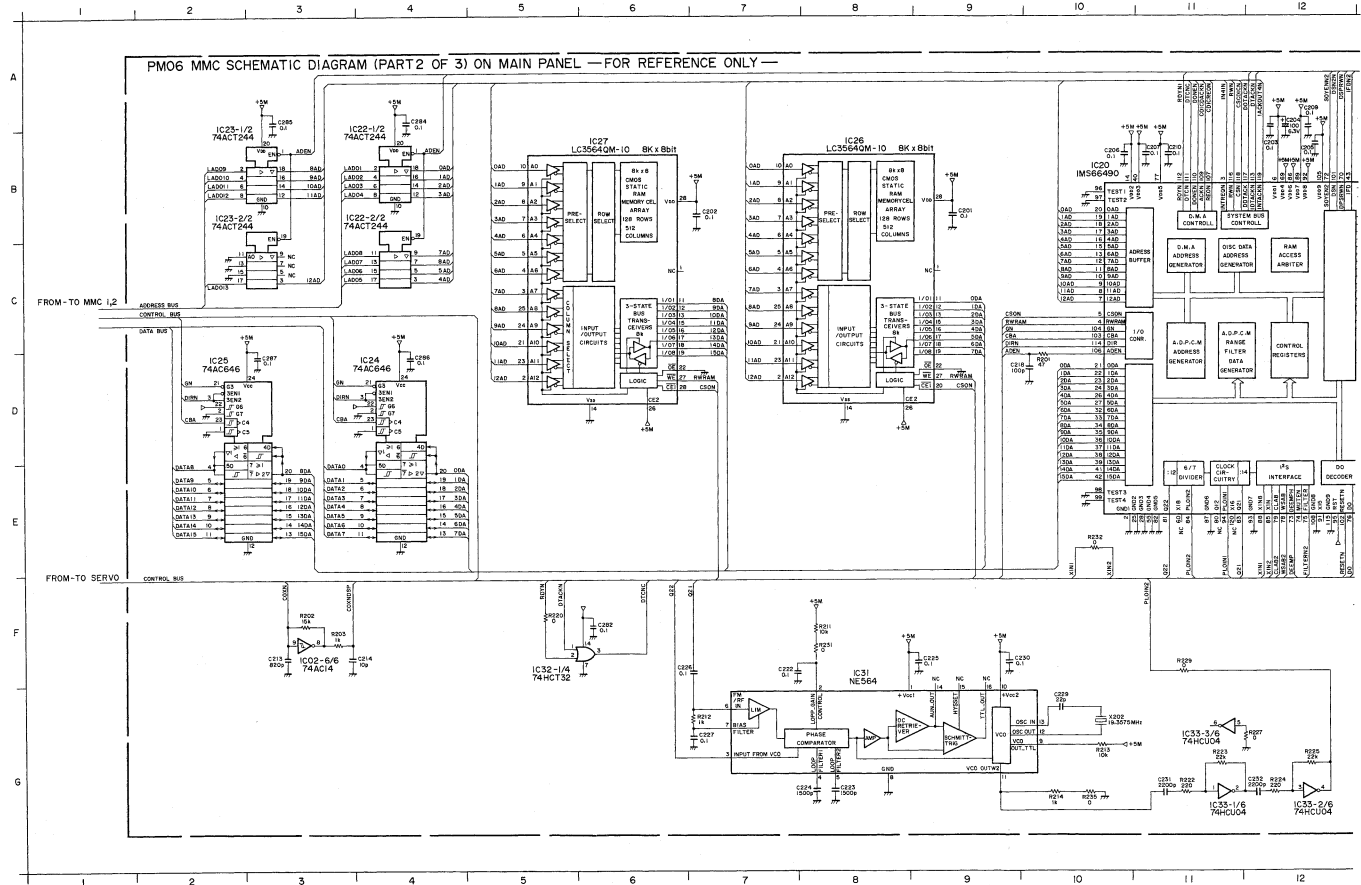




(): BOTTOM SIDE PARTS

(C401) B88
(C402) B8
(C403) C7
(C404) C8
(C405) C8
(C406) C8
(C407) B8
(C408) F8
(C409) E3
(C410) E7
(C411) F8
(C412) F8
(C413) F8
(C414) F8
(C415) B8
(C416) B1
(C417) B1
(C418) B1
(C419) A8
(C420) A10
(C421) A10
(C422) B10
(C423) B10
(C424) B12
(C425) B12
(C426) B12
(C427) B12
(C428) B14
(C429) B12
(C430) B12
(C431) B12
(C432) B10
(C433) B10
(C434) B10
(C435) B10
(C436) B10
(C437) B10
(C438) B10
(C439) B10
(C440) B12
(C441) B12
(C442) B12
(C443) B12
(C444) B12
(C445) B12
(C446) B12
(C447) B12
(C448) B12
(C449) B12
(C450) B12
(C451) B12
(C452) B12
(C453) B12
(C454) B12
(C455) B12
(C456) B12
(C457) B12
(C458) B12
(C459) B12
(C460) B12
(C461) B12
(C462) B12
(C463) B12
(C464) B12
(C465) B12
(C466) B12
(C467) B12
(C468) B12
(C469) B12
(C470) B12
(C471) B12
(C472) B12
(C473) B12
(C474) B12
(C475) B12
(C476) B12
(C477) B12
(C478) B12
(C479) B12
(C480) B12
(C481) B12
(C482) B12
(C483) B12
(C484) B12
(C485) B12
(C486) B12
(C487) B12
(C488) B12
(C489) B12
(C490) B12
(C491) B12
(C492) B12
(C493) B12
(C494) B12
(C495) B12
(C496) B12
(C497) B12
(C498) B12
(C499) B12
(C500) B12
(C501) B12
(C502) B12
(C503) B12
(C504) B12
(C505) B12
(C506) B12
(C507) B12
(C508) B12
(C509) B12
(C510) B12
(C511) B12
(C512) B12
(C513) B12
(C514) B12
(C515) B12
(C516) B12
(C517) B12
(C518) B12
(C519) B12
(C520) B12
(C521) B12
(C522) B12
(C523) B12
(C524) B12
(C525) B12
(C526) B12
(C527) B12
(C528) B12
(C529) B12
(C530) B12
(C531) B12
(C532) B12
(C533) B12
(C534) B12
(C535) B12
(C536) B12
(C537) B12
(C538) B12
(C539) B12
(C540) B12
(C541) B12
(C542) B12
(C543) B12
(C544) B12
(C545) B12
(C546) B12
(C547) B12
(C548) B12
(C549) B12
(C550) B12
(C551) B12
(C552) B12
(C553) B12
(C554) B12
(C555) B12
(C556) B12
(C557) B12
(C558) B12
(C559) B12
(C560) B12
(C561) B12
(C562) B12
(C563) B12
(C564) B12
(C565) B12
(C566) B12
(C567) B12
(C568) B12
(C569) B12
(C570) B12
(C571) B12
(C572) B12
(C573) B12
(C574) B12
(C575) B12
(C576) B12
(C577) B12
(C578) B12
(C579) B12
(C580) B12
(C581) B12
(C582) B12
(C583) B12
(C584) B12
(C585) B12
(C586) B12
(C587) B12
(C588) B12
(C589) B12
(C590) B12
(C591) B12
(C592) B12
(C593) B12
(C594) B12
(C595) B12
(C596) B12
(C597) B12
(C598) B12
(C599) B12
(C600) B12
(C601) B12
(C602) B12
(C603) B12
(C604) B12
(C605) B12
(C606) B12
(C607) B12
(C608) B12
(C609) B12
(C610) B12
(C611) B12
(C612) B12
(C613) B12
(C614) B12
(C615) B12
(C616) B12
(C617) B12
(C618) B12
(C619) B12
(C620) B12
(C621) B12
(C622) B12
(C623) B12
(C624) B12
(C625) B12
(C626) B12
(C627) B12
(C628) B12
(C629) B12
(C630) B12
(C631) B12
(C632) B12
(C633) B12
(C634) B12
(C635) B12
(C636) B12
(C637) B12
(C638) B12
(C639) B12
(C640) B12
(C641) B12
(C642) B12
(C643) B12
(C644) B12
(C645) B12
(C646) B12
(C647) B12
(C648) B12
(C649) B12
(C650) B12
(C651) B12
(C652) B12
(C653) B12
(C654) B12
(C655) B12
(C656) B12
(C657) B12
(C658) B12
(C659) B12
(C660) B12
(C661) B12
(C662) B12
(C663) B12
(C664) B12
(C665) B12
(C666) B12
(C667) B12
(C668) B12
(C669) B12
(C670) B12
(C671) B12
(C672) B12
(C673) B12
(C674) B12
(C675) B12
(C676) B12
(C677) B12
(C678) B12
(C679) B12
(C680) B12
(C681) B12
(C682) B12
(C683) B12
(C684) B12
(C685) B12
(C686) B12
(C687) B12
(C688) B12
(C689) B12
(C690) B12
(C691) B12
(C692) B12
(C693) B12
(C694) B12
(C695) B12
(C696) B12
(C697) B12
(C698) B12
(C699) B12
(C700) B12
(C701) B12
(C702) B12
(C703) B12
(C704) B12
(C705) B12
(C706) B12
(C707) B12
(C708) B12
(C709) B12
(C710) B12
(C711) B12
(C712) B12
(C713) B12
(C714) B12
(C715) B12
(C716) B12
(C717) B12
(C718) B12
(C719) B12
(C720) B12
(C721) B12
(C722) B12
(C723) B12
(C724) B12
(C725) B12
(C726) B12
(C727) B12
(C728) B12
(C729) B12
(C730) B12
(C731) B12
(C732) B12
(C733) B12
(C734) B12
(C735) B12
(C736) B12
(C737) B12
(C738) B12
(C739) B12
(C740) B12
(C741) B12
(C742) B12
(C743) B12
(C744) B12
(C745) B12
(C746) B12
(C747) B12
(C748) B12
(C749) B12
(C750) B12
(C751) B12
(C752) B12
(C753) B12
(C754) B12
(C755) B12
(C756) B12
(C757) B12
(C758) B12
(C759) B12
(C760) B12
(C761) B12
(C762) B12
(C763) B12
(C764) B12
(C765) B12
(C766) B12
(C767) B12
(C768) B12
(C769) B12
(C770) B12
(C771) B12
(C772) B12
(C773) B12
(C774) B12
(C775) B12
(C776) B12
(C777) B12
(C778) B12
(C779) B12
(C780) B12
(C781) B12
(C782) B12
(C783) B12
(C784) B12
(C785) B12
(C786) B12
(C787) B12
(C788) B12
(C789) B12
(C790) B12
(C791) B12
(C792) B12
(C793) B12
(C794) B12
(C795) B12
(C796) B12
(C797) B12
(C798) B12
(C799) B12
(C800) B12
(C801) B12
(C802) B12
(C803) B12
(C804) B12
(C805) B12
(C806) B12
(C807) B12
(C808) B12
(C809) B12
(C810) B12
(C811) B12
(C812) B12
(C813) B12
(C814) B12
(C815) B12
(C816) B12
(C817) B12
(C818) B12
(C819) B12
(C820) B12
(C821) B12
(C822) B12
(C823) B12
(C824) B12
(C825) B12
(C826) B12
(C827) B12
(C828) B12
(C829) B12
(C830) B12
(C831) B12
(C832) B12
(C833) B12
(C834) B12
(C835) B12
(C836) B12
(C837) B12
(C838) B12
(C839) B12
(C840) B12
(C841) B12
(C842) B12
(C843) B12
(C844) B12
(C845) B12
(C846) B12
(C847) B12
(C848) B12
(C849) B12
(C850) B12
(C851) B12
(C852) B12
(C853) B12
(C854) B12
(C855) B12
(C856) B12
(C857) B12
(C858) B12
(C859) B12
(C860) B12
(C861) B12
(C862) B12
(C863) B12
(C864) B12
(C865) B12
(C866) B12
(C867) B12
(C868) B12
(C869) B12
(C870) B12
(C871) B12
(C872) B12
(C873) B12
(C874) B12
(C875) B12
(C876) B12
(C877) B12
(C878) B12
(C879) B12
(C880) B12
(C881) B12
(C882) B12
(C883) B12
(C884) B12
(C885) B12
(C886) B12
(C887) B12
(C888) B12
(C889) B12
(C890) B12
(C891) B12
(C892) B12
(C893) B12
(C894) B12
(C895) B12
(C896) B12
(C897) B12
(C898) B12
(C899) B12
(C900) B12
(C901) B12
(C902) B12
(C903) B12
(C904) B12
(C905) B12
(C906) B12
(C907) B12
(C908) B12
(C909) B12
(C910) B12
(C911) B12
(C912) B12
(C913) B12
(C914) B12
(C915) B12
(C916) B12
(C917) B12
(C918) B12
(C919) B12
(C920) B12
(C921) B12
(C922) B12
(C923) B12
(C924) B12
(C925) B12
(C926) B12
(C927) B12
(C928) B12
(C929) B12
(C930) B12
(C931) B12
(C932) B12
(C933) B12
(C934) B12
(C935) B12
(C936) B12
(C937) B12
(C938) B12
(C939) B12
(C940) B12
(C941) B12
(C942) B12
(C943) B12
(C944) B12
(C945) B12
(C946) B12
(C947) B12
(C948) B12
(C949) B12
(C950) B12
(C951) B12
(C952) B12
(C953) B12
(C954) B12
(C955) B12
(C956) B12
(C957) B12
(C958) B12
(C959) B12
(C960) B12
(C961) B12
(C962) B12
(C963) B12
(C964) B12
(C965) B12
(C966) B12
(C967) B12
(C968) B12
(C969) B12
(C970) B12
(C971) B12
(C972) B12
(C973) B12
(C974) B12
(C975) B12
(C976) B12
(C977) B12
(C978) B12
(C979) B12
(C980) B12
(C981) B12
(C982) B12
(C983) B12
(C984) B12
(C985) B12
(C986) B12
(C987) B12
(C988) B12
(C989) B12
(C990) B12
(C991) B12
(C992) B12
(C993) B12
(C994) B12
(C995) B12
(C996) B12
(C997) B12
(C998) B12
(C999) B12
(C1000) B12

6.4.8 MMC Schematic Diagram (Part 2)



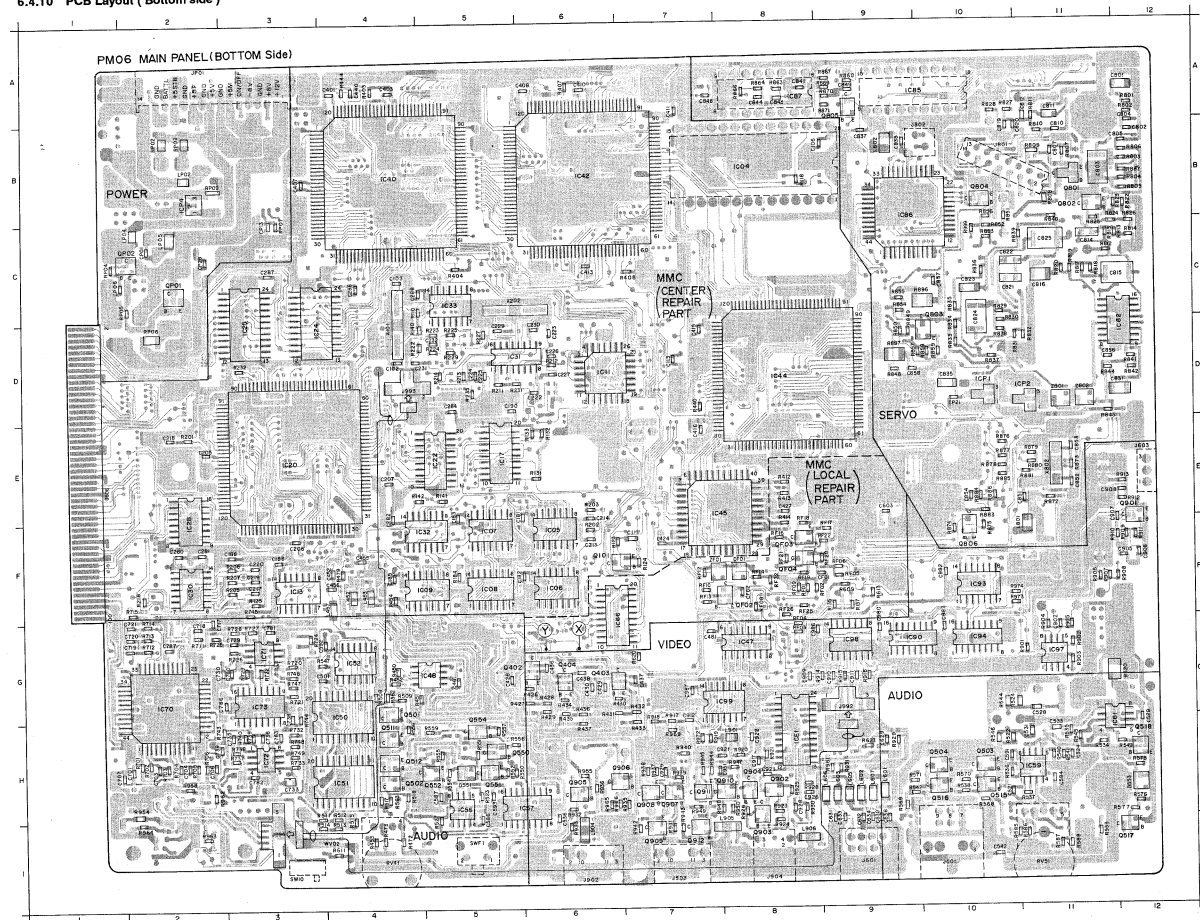
ON MAIN PANEL — FOR REFERENCE ONLY —

6.4.9 MMC Schematic Diagram (Part 3)

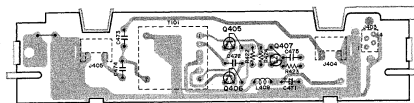
(): BOTTOM SIDE PARTS

(C601A4 C107 F13 C117 G11 C188 F17 C629JH4 IC01 B9 (IC06)H1 IC09 D14 IC16 016 J603 F1 QF01 D2 (RF03)B5 (RF41)D3 (RF25)C5 R101 E11 R111 B10 R192 E14 (R137)D8 R607 D8 R661 F18 X601 E7
 (C629D3 C108 J13 C181 F14 C601 E7 (C631)D2 IC02 B8 (IC07)H1 (C11)C16 IC17 B16 J606 A18 QF02 D3 (RF04)B4 RF10 D4 (RF26)C5 R102 E10 R112 B10 (R123)D4 (R140)E10 (R609)D8 R670 B17 (Z701)D2
 C603 D3 C109 G13 (C181)F14 C602 E7 (C631)D2 IC03 E4 (IC08)H1 (C12)C17 IC18 F16 J607 A19 QF03 D4 (RF05)A3 RF11 D5 (RF27)C6 R103 E12 R113 B11 (R124)D4 (R141)E11 (R610)D9 R671 B18
 C604 D4 C110 F14 (C182)D3 C603 E7 (C632)D2 IC04 B7 (IC09)H1 (C13)C18 IC19 F17 J608 A20 QF04 D5 (RF06)A4 RF12 D6 (RF28)C7 R104 E13 R114 B12 (R125)D4 (R142)E12 (R611)D9 R672 B19
 (C103)E10 C111 F14 (C183)D3 C604 E7 (C633)D2 IC05 D7 (IC10)H1 (C14)C19 IC20 F18 J609 A21 QF05 D6 (RF07)A5 RF13 D7 (RF29)C8 R105 E14 R115 B13 (R126)D4 (R143)E13 (R612)D9 R673 B20
 C105 D5 C112 F14 (C184)D3 C605 E7 (C634)D2 IC06 A7 (IC11)H1 (C15)C20 IC21 F19 J610 A22 QF06 D7 (RF08)A6 RF14 D8 (RF30)C9 R106 E15 R116 B14 (R127)D4 (R144)E14 (R613)D9 R674 B21
 C106 D6 C113 F14 (C185)D3 C606 E7 (C635)D2 IC07 A8 (IC12)H1 (C16)C21 IC22 F20 J611 A23 QF07 D8 (RF09)A7 RF15 D9 (RF31)C5 R107 E16 R117 B15 (R128)D4 (R145)E15 (R614)D9 R675 B22
 C107 D7 C114 F14 (C186)D3 C607 E7 (C636)D2 IC08 A9 (IC13)H1 (C17)C22 IC23 F21 J612 A24 QF08 D9 (RF10)A8 RF16 D10 (RF32)C6 R108 E17 R118 B16 (R129)D4 (R146)E16 (R615)D9 R676 B23
 C108 D8 C115 F14 (C187)D3 C608 E7 (C637)D2 IC09 B0 (IC14)H1 (C18)C23 IC24 F22 J613 A25 QF09 D10 (RF11)A9 RF17 D11 (RF33)C7 R109 E18 R119 B17 (R130)D4 (R147)E17 (R616)D9 R677 B24
 C109 D9 C116 F14 (C188)D3 C609 E7 (C638)D2 IC10 B1 (IC15)H1 (C19)C24 IC25 F23 J614 A26 QF10 D11 (RF12)A10 RF18 D12 (RF34)C8 R110 E19 R120 B18 (R131)D4 (R148)E18 (R617)D9 R678 B25
 C110 D10 C117 F14 (C189)D3 C610 E7 (C639)D2 IC11 B2 (IC16)H1 (C20)C25 IC26 F24 J615 A27 QF11 D12 (RF13)A11 RF19 D13 (RF35)C9 R111 E20 R121 B19 (R132)D4 (R149)E19 (R618)D9 R679 B26
 C111 D11 C118 F14 (C190)D3 C611 E7 (C640)D2 IC12 B3 (IC17)H1 (C21)C26 IC27 F25 J616 A28 QF12 D13 (RF14)A12 RF20 D14 (RF36)C5 R112 E21 R122 B20 (R133)D4 (R150)E20 (R619)D9 R680 B27
 C112 D12 C119 F14 (C191)D3 C612 E7 (C641)D2 IC13 B4 (IC18)H1 (C22)C27 IC28 F26 J617 A29 QF13 D14 (RF15)A13 RF21 D15 (RF37)C6 R113 E22 R123 B21 (R134)D4 (R151)E21 (R620)D9 R681 F1
 C113 D13 C120 F14 (C192)D3 C613 E7 (C642)D2 IC14 B5 (IC19)H1 (C23)C28 IC29 F27 J618 A30 QF14 D15 (RF16)A14 RF22 D16 (RF38)C7 R114 E23 R124 B22 (R135)D4 (R152)E22 (R621)D9 R682 F2
 C114 D14 C121 F14 (C193)D3 C614 E7 (C643)D2 IC15 B6 (IC20)H1 (C24)C29 IC30 F28 J619 A31 QF15 D16 (RF17)A15 RF23 D17 (RF39)C8 R115 E24 R125 B23 (R136)D4 (R153)E23 (R622)D9 R683 F3
 C115 D15 C122 F14 (C194)D3 C615 E7 (C644)D2 IC16 B7 (IC21)H1 (C25)C30 IC31 F29 J620 A32 QF16 D17 (RF18)A16 RF24 D18 (RF40)C9 R116 E25 R126 B24 (R137)D4 (R154)E24 (R623)D9 R684 F4
 C116 D16 C123 F14 (C195)D3 C616 E7 (C645)D2 IC17 B8 (IC22)H1 (C26)C31 IC32 F30 J621 A33 QF17 D18 (RF19)A17 RF25 D19 (RF41)C5 R117 E26 R127 B25 (R138)D4 (R155)E25 (R624)D9 R685 F5
 C117 D17 C124 F14 (C196)D3 C617 E7 (C646)D2 IC18 B9 (IC23)H1 (C27)C32 IC33 F31 J622 A34 QF18 D19 (RF20)A18 RF26 D20 (RF42)C6 R118 E27 R128 B26 (R139)D4 (R156)E26 (R625)D9 R686 F6
 C118 D18 C125 F14 (C197)D3 C618 E7 (C647)D2 IC19 B0 (IC24)H1 (C28)C33 IC34 F32 J623 A35 QF19 D20 (RF21)A19 RF27 D21 (RF43)C7 R119 E28 R129 B27 (R140)D4 (R157)E27 (R626)D9 R687 F7
 C119 D19 C126 F14 (C198)D3 C619 E7 (C648)D2 IC20 B1 (IC25)H1 (C29)C34 IC35 F33 J624 A36 QF20 D21 (RF22)A20 RF28 D22 (RF44)C8 R120 E29 R130 B28 (R141)D4 (R158)E28 (R627)D9 R688 F8
 C120 D20 C127 F14 (C199)D3 C620 E7 (C649)D2 IC21 B2 (IC26)H1 (C30)C35 IC36 F34 J625 A37 QF21 D22 (RF23)A21 RF29 D23 (RF45)C9 R121 E30 R131 B29 (R142)D4 (R159)E29 (R628)D9 R689 F9
 C121 D21 C128 F14 (C200)D3 C621 E7 (C650)D2 IC22 B3 (IC27)H1 (C31)C36 IC37 F35 J626 A38 QF22 D23 (RF24)A22 RF30 D24 (RF46)C5 R122 E31 R132 B30 (R143)D4 (R160)E30 (R629)D9 R690 F10
 C122 D22 C129 F14 (C201)D3 C622 E7 (C651)D2 IC23 B4 (IC28)H1 (C32)C37 IC38 F36 J627 A39 QF23 D24 (RF25)A23 RF31 D25 (RF47)C6 R123 E32 R133 B31 (R144)D4 (R161)E31 (R630)D9 R691 F11
 C123 D23 C130 F14 (C202)D3 C623 E7 (C652)D2 IC24 B5 (IC29)H1 (C33)C38 IC39 F37 J628 A40 QF24 D25 (RF26)A24 RF32 D26 (RF48)C7 R124 E33 R134 B32 (R145)D4 (R162)E32 (R631)D9 R692 F12
 C124 D24 C131 F14 (C203)D3 C624 E7 (C653)D2 IC25 B6 (IC30)H1 (C34)C39 IC40 F38 J629 A41 QF25 D26 (RF27)A25 RF33 D27 (RF49)C8 R125 E34 R135 B33 (R146)D4 (R163)E33 (R632)D9 R693 F13
 C125 D25 C132 F14 (C204)D3 C625 E7 (C654)D2 IC26 B7 (IC31)H1 (C35)C40 IC41 F39 J630 A42 QF26 D27 (RF28)A26 RF34 D28 (RF50)C9 R126 E35 R136 B34 (R147)D4 (R164)E34 (R633)D9 R694 F14
 C126 D26 C133 F14 (C205)D3 C626 E7 (C655)D2 IC27 B8 (IC32)H1 (C36)C41 IC42 F40 J631 A43 QF27 D28 (RF29)A27 RF35 D29 (RF51)C5 R127 E36 R137 B35 (R148)D4 (R165)E35 (R634)D9 R695 F15
 C127 D27 C134 F14 (C206)D3 C627 E7 (C656)D2 IC28 B9 (IC33)H1 (C37)C42 IC43 F41 J632 A44 QF28 D29 (RF30)A28 RF36 D30 (RF52)C6 R128 E37 R138 B36 (R149)D4 (R166)E36 (R635)D9 R696 F16
 C128 D28 C135 F14 (C207)D3 C628 E7 (C657)D2 IC29 B0 (IC34)H1 (C38)C43 IC44 F42 J633 A45 QF29 D30 (RF31)A29 RF37 D31 (RF53)C7 R129 E38 R139 B37 (R150)D4 (R167)E37 (R636)D9 R697 F17
 C129 D29 C136 F14 (C208)D3 C629 E7 (C658)D2 IC30 B1 (IC35)H1 (C39)C44 IC45 F43 J634 A46 QF30 D31 (RF32)A30 RF38 D32 (RF54)C8 R130 E39 R140 B38 (R151)D4 (R168)E38 (R637)D9 R698 F18
 C130 D30 C137 F14 (C209)D3 C630 E7 (C659)D2 IC31 B2 (IC36)H1 (C40)C45 IC46 F44 J635 A47 QF31 D32 (RF33)A31 RF39 D33 (RF55)C9 R131 E40 R141 B39 (R152)D4 (R169)E39 (R638)D9 R699 F19
 C131 D31 C138 F14 (C210)D3 C631 E7 (C660)D2 IC32 B3 (IC37)H1 (C41)C46 IC47 F45 J636 A48 QF32 D33 (RF34)A32 RF40 D34 (RF56)C5 R132 E41 R142 B40 (R153)D4 (R170)E40 (R639)D9 R700 F20
 C132 D32 C139 F14 (C211)D3 C632 E7 (C661)D2 IC33 B4 (IC38)H1 (C42)C47 IC48 F46 J637 A49 QF33 D34 (RF35)A33 RF41 D35 (RF57)C6 R133 E42 R143 B41 (R154)D4 (R171)E41 (R640)D9 R701 F21
 C133 D33 C140 F14 (C212)D3 C633 E7 (C662)D2 IC34 B5 (IC39)H1 (C43)C48 IC49 F47 J638 A50 QF34 D35 (RF36)A34 RF42 D36 (RF58)C7 R134 E43 R144 B42 (R155)D4 (R172)E42 (R641)D9 R702 F22
 C134 D34 C141 F14 (C213)D3 C634 E7 (C663)D2 IC35 B6 (IC40)H1 (C44)C49 IC50 F48 J639 A51 QF35 D36 (RF37)A35 RF43 D37 (RF59)C8 R135 E44 R145 B43 (R156)D4 (R173)E43 (R642)D9 R703 F23
 C135 D35 C142 F14 (C214)D3 C635 E7 (C664)D2 IC36 B7 (IC41)H1 (C45)C50 IC51 F49 J640 A52 QF36 D37 (RF38)A36 RF44 D38 (RF60)C9 R136 E45 R146 B44 (R157)D4 (R174)E44 (R643)D9 R704 F24
 C136 D36 C143 F14 (C215)D3 C636 E7 (C665)D2 IC37 B8 (IC42)H1 (C46)C51 IC52 F50 J641 A53 QF37 D38 (RF39)A37 RF45 D39 (RF61)C5 R137 E46 R147 B45 (R158)D4 (R175)E45 (R644)D9 R705 F25
 C137 D37 C144 F14 (C216)D3 C637 E7 (C666)D2 IC38 B9 (IC43)H1 (C47)C52 IC53 F51 J642 A54 QF38 D39 (RF40)A38 RF46 D40 (RF62)C6 R138 E47 R148 B46 (R159)D4 (R176)E46 (R645)D9 R706 F26
 C138 D38 C145 F14 (C217)D3 C638 E7 (C667)D2 IC39 B0 (IC44)H1 (C48)C53 IC54 F52 J643 A55 QF39 D40 (RF41)A39 RF47 D41 (RF63)C7 R139 E48 R149 B47 (R160)D4 (R177)E47 (R646)D9 R707 F27
 C139 D39 C146 F14 (C218)D3 C639 E7 (C668)D2 IC40 B1 (IC45)H1 (C49)C54 IC55 F53 J644 A56 QF40 D41 (RF42)A40 RF48 D42 (RF64)C8 R140 E49 R150 B48 (R161)D4 (R178)E48 (R647)D9 R708 F28
 C140 D40 C147 F14 (C219)D3 C640 E7 (C669)D2 IC41 B2 (IC46)H1 (C50)C55 IC56 F54 J645 A57 QF41 D42 (RF43)A41 RF49 D43 (RF65)C9 R141 E50 R151 B49 (R162)D4 (R179)E49 (R648)D9 R709 F29
 C141 D41 C148 F14 (C220)D3 C641 E7 (C670)D2 IC42 B3 (IC47)H1 (C51)C56 IC57 F55 J646 A58 QF42 D43 (RF44)A42 RF50 D44 (RF66)C5 R142 E51 R152 B50 (R163)D4 (R180)E50 (R649)D9 R710 F30
 C142 D42 C149 F14 (C221)D3 C642 E7 (C671)D2 IC43 B4 (IC48)H1 (C52)C57 IC58 F56 J647 A59 QF43 D44 (RF45)A43 RF51 D45 (RF67)C6 R143 E52 R153 B51 (R164)D4 (R181)E51 (R650)D9 R711 F31
 C143 D43 C150 F14 (C222)D3 C643 E7 (C672)D2 IC44 B5 (IC49)H1 (C53)C58 IC59 F57 J648 A60 QF44 D45 (RF46)A44 RF52 D46 (RF68)C7 R144 E53 R154 B52 (R165)D4 (R182)E52 (R651)D9 R712 F32
 C144 D44 C151 F14 (C223)D3 C644 E7 (C673)D2 IC45 B6 (IC50)H1 (C54)C59 IC60 F58 J649 A61 QF45 D46 (RF47)A45 RF53 D47 (RF69)C8 R145 E54 R155 B53 (R166)D4 (R183)E53 (R652)D9 R713 F33
 C145 D45 C152 F14 (C224)D3 C645 E7 (C674)D2 IC46 B7 (IC51)H1 (C55)C60 IC61 F59 J650 A62 QF46 D47 (RF48)A46 RF54 D48 (RF70)C9 R146 E55 R156 B54 (R167)D4 (R184)E54 (R653)D9 R714 F34
 C146 D46 C153 F14 (C225)D3 C646 E7 (C675)D2 IC47 B8 (IC52)H1 (C56)C61 IC62 F60 J651 A63 QF47 D48 (RF49)A47 RF55 D49 (RF71)C5 R147 E56 R157 B55 (R168)D4 (R185)E55 (R654)D9 R715 F35
 C147 D47 C154 F14 (C226)D3 C647 E7 (C676)D2 IC48 B9 (IC53)H1 (C57)C62 IC63 F61 J652 A64 QF48 D49 (RF50)A48 RF56 D50 (RF72)C6 R148 E57 R158 B56 (R169)D4 (R186)E56 (R655)D9 R716 F36
 C148 D48 C155 F14 (C227)D3 C648 E7 (C677)D2 IC49 B0 (IC54)H1 (C58)C63 IC64 F62 J653 A65 QF49 D50 (RF51)A49 RF57 D51 (RF73)C7 R149 E58 R159 B57 (R170)D4 (R187)E57 (R656)D9 R717 F37
 C149 D49 C156 F14 (C228)D3 C649 E7 (C678)D2 IC50 B1 (IC55)H1 (C59)C64 IC65 F63 J654 A66 QF50 D51 (RF52)A50 RF58 D52 (RF74)C8 R150 E59 R160 B58 (R171)D4 (R188)E58 (R657)D9 R718 F38
 C150 D50 C157 F14 (C229)D3 C650 E7 (C679)D2 IC51 B2 (IC56)H1 (C60)C65 IC66 F64 J655 A67 QF51 D52 (RF53)A51 RF59 D53 (RF75)C9 R151 E60 R161 B59 (R172)D4 (R189)E59 (R658)D9 R719 F39
 C151 D51 C158 F14 (C230)D3 C651 E7 (C680)D2 IC52 B3 (IC57)H1 (C61)C66 IC67 F65 J656 A68 QF52 D53 (RF54)A52 RF60 D54 (RF76)C5 R152 E61 R162 B60 (R173)D4 (R190)E60 (R659)D9 R720 F40
 C152 D52 C159 F14 (C231)D3 C652 E7 (C681)D2 IC53 B4 (IC58)H1 (C62)C67 IC68 F66 J657 A69 QF53 D54 (RF55)A53 RF61 D55 (RF77)C6 R153 E62 R163 B61 (R174)D4 (R191)E61 (R660)D9 R721 F41
 C153 D53 C160 F14 (C232)D3 C653 E7 (C682)D2 IC54 B5 (IC59)H1 (C63)C68 IC69 F67 J658 A70 QF54 D55 (RF56)A54 RF62 D56 (RF78)C7 R154 E63 R164 B62 (R175)D4 (R192)E62 (R661)D9 R722 F42
 C154 D54 C161 F14 (C233)D3 C654 E7 (C683)D2 IC55 B6 (IC60)H1 (C64)C69 IC70 F68 J659 A71 QF55 D56 (RF57)A55 RF63 D57 (RF79)C8 R155 E64 R165 B63 (R176)D4 (R193)E63 (R662)D9 R723 F43
 C155 D55 C162 F14 (C234)D3 C655 E7 (C684)D2 IC56 B7 (IC61)H1 (C65)C70 IC71 F69 J660 A72 QF56 D57 (RF58)A56 RF64 D58 (RF80)C9 R156 E65 R166 B64 (R177)D4 (R194)E64 (R663)D9 R724 F44
 C156 D56 C163 F14 (C235)D3 C656 E7 (C685)D2 IC57 B8 (IC62)H1 (C66)C71 IC72 F70 J661 A73 QF57 D58 (RF59)A57 RF65 D59 (RF81)C5 R157 E66 R167 B65 (R178)D4 (R195)E65 (R664)D9 R725 F45
 C157 D57 C164 F14 (C236)D3 C657 E7 (C686)D2 IC58 B9 (IC63)H1 (C67)C72 IC73 F71 J662 A74 QF58 D59 (RF60)A58 RF66 D60 (RF82)C6 R158 E67 R168 B66 (R179)D4 (R196)E66 (R665)D9 R726 F46
 C158 D58 C165 F14 (C237)D3 C658 E7 (C687)D2 IC59 B0 (IC64)H1 (C68)C73 IC74 F72 J663 A75 QF59 D60 (RF61)A59 RF67 D61 (RF83)C7 R159 E68 R169 B67 (R180)D4 (R197)E67 (R666)D9 R727 F47
 C159 D59 C166 F14 (C238)D3 C659 E7 (C688)D2 IC60 B1 (IC65)H1 (C69)C74 IC75 F73 J664 A76 QF60 D61 (RF62)A60 RF68 D62 (RF84)C8 R160 E69 R170 B68 (R181)D4 (R198)E68 (R667)D9 R728 F48
 C160 D60 C167 F14 (C239)D3 C660 E7 (C689)D2 IC61 B2 (IC66)H1 (C70)C75 IC76 F74 J665 A77 QF61 D62 (RF63)A61 RF69 D63 (RF85)C9 R161 E70 R171 B69 (R182)D4 (R199)E69 (R668)D9 R729 F49
 C161 D61 C168 F14 (C240)D3 C661 E7 (C690)D2 IC62 B3 (IC67)H1 (C71)C76 IC77 F75 J666 A78 QF62 D63 (RF64)A62 RF70 D64 (RF86)C5 R162 E71 R172 B70 (R183)D4 (R200)E70 (R669)D9 R730 F50
 C162 D62 C169 F14 (C241)D3 C662 E7 (C691)D2 IC63 B4 (IC68)H1 (C72)C77 IC78 F76 J667 A79 QF63 D64 (RF65)A63 RF71 D65 (RF87)C6 R163 E72 R173 B71 (R184)D4 (R201)E71 (R670)D9 R731 F51
 C163 D63 C170 F14 (C242)D3 C663 E7 (C692)D2 IC64 B5 (IC69)H1 (C73)C78 IC79 F77 J668 A80 QF64 D65 (RF66)A64 RF72 D66 (RF88)C7 R164 E73 R174 B72 (R185)D4 (R202)E72 (R671)D9 R732 F52
 C164 D64 C171 F14 (C243)D3 C664 E7 (C693)D2 IC65 B6 (IC70)H1 (C74)C79 IC80 F78 J669 A81 QF65 D66 (RF67)A65 RF73 D67 (RF89)C8 R165 E74 R175 B73 (R186)D4 (R203)E73 (R672)D9 R733 F53
 C165 D65 C172 F14 (C244)D3 C665 E7 (C694)D2 IC66 B7 (IC71)H1 (C75)C80 IC81 F79 J670 A82 QF66 D67 (RF68)A66 RF74 D68 (RF90)C9 R166 E75 R176 B74 (R187)D4 (R204)E74 (R673)D9 R734 F54
 C166 D66 C173 F14 (C245)D3 C666 E7 (C695)D2 IC67 B8 (IC72)H1 (C76)C81 IC82 F80 J671 A83 QF67 D68 (RF69)A67 RF75 D69 (RF91)C5 R167 E76 R177 B75 (R188)D4 (R205)E75 (R674)D9 R735 F55
 C167 D67 C174 F14 (C246)D3 C667 E7 (C696)D2 IC68 B9 (IC73)H1 (C77)C82 IC83 F81 J672 A84 QF68 D69 (RF70)A68 RF76 D70 (RF92)C6 R168 E77 R178 B76 (R189)D4 (R206)E76 (R675)D9 R736 F56
 C168 D68 C175 F14 (C247)D3 C668 E7 (C697)D2 IC69 B0 (IC74)H1 (C78)C83 IC84 F82 J673 A85 QF69 D70 (RF71)A69 RF77 D71 (RF93)C7 R169 E78 R179 B77 (R190)D4 (R207)E77 (R676)D9 R737 F57
 C169 D69 C176 F14 (C248)D3 C669 E7 (C698)D2 IC70 B1 (IC75)H1 (C79)C84 IC85 F83 J674 A86 QF70 D71 (RF72)A70 RF78 D72 (RF94)C8 R170 E79 R180 B78 (R191)D4 (R208)E78 (R677)D9 R738 F58
 C170 D70 C177 F14 (C249)D3 C670 E7 (C699)D2 IC71 B2 (IC76)H1 (C80)C85 IC86 F84 J675 A87 QF71 D72 (RF73)A71 RF79 D73 (RF95)C9 R171 E80 R181 B79 (R192)D4 (R209)E79 (R678)D9 R739 F59
 C171 D71 C178 F14 (C250)D3 C671 E7 (C700)D2 IC72 B3 (IC77)H1 (C81)C86 IC87 F85 J676 A88 QF72 D73 (RF74)A72 RF80 D74 (RF96)C5 R172 E81 R182 B80 (R193)D4 (R210)E80 (R679)D9 R740 F60
 C172 D72 C179 F14 (C251)D3 C672 E7 (C701)D2 IC73 B4 (IC78)H1 (C82)C87 IC88 F86 J677 A89 QF73 D74 (RF75)A73 RF81 D75 (RF97)C6 R173 E82 R183 B81 (R194)D4 (R211)E81 (R680)D9 R741 F61
 C173 D73 C180 F14 (C252)D3 C673 E7 (C702)D2 IC74 B5 (IC79)H1 (C83)C88 IC89 F87 J678 A90 QF74 D75 (RF76)A74 RF82 D76 (RF98)C7 R174 E83 R184 B82 (R195)D4 (R212)E82 (R681)D9 R742 F62
 C174 D74 C181 F14 (C253)D3 C674 E7 (C703)D2 IC75 B6 (IC80)H1 (C84)C89 IC90 F88 J679 A91 QF75 D76 (RF77)A75 RF83 D77 (RF99)C8 R175 E84 R185 B83 (R196)D4 (R213)E83 (R682)D9 R743 F63
 C175 D75 C182 F14 (C254)D3 C675 E7 (C704)D2 IC76 B7 (IC81)H1 (C85)C90 IC91 F89 J680 A92 QF76 D77 (RF78)A76 RF84 D78 (RF100)C9 R176 E85 R186 B84 (R197)D4 (R214)E84 (R683)D9 R744 F64
 C176 D76 C183 F14 (C255)D3 C676 E7 (C705)D2 IC77 B8 (IC82)H1 (C86)C91 IC92 F90 J681 A93 QF77 D78 (RF79)A77 RF85 D79 (RF101)C5 R177 E86 R187 B85 (R198)D4 (R215)E85 (R684)D9 R745 F65
 C177 D77 C184 F14 (C256)D3 C677 E7 (C706)D2 IC78 B9 (IC83)H1 (C87)C92 IC93 F91 J682 A94 QF78 D79 (RF80)A78 RF86 D80 (RF102)C6 R178 E87 R188 B86 (R199)D4 (R216)E86 (R685)D9 R746 F66
 C178 D78 C185 F14 (C257)D3 C678 E7 (C707)D2 IC79 B0 (IC84)H1 (C88)C93 IC94 F92 J683 A95 QF79 D80 (RF81)A79 RF87 D81 (RF103)C7 R179 E88 R189 B87 (R200)D4 (R217)E87 (R686)D9 R747 F67
 C179 D79 C186 F14 (C258)D3 C679 E7 (C708)D2 IC80 B1 (IC85)H1 (C89)C94 IC95 F93 J684 A96 QF80 D81 (RF82)A80 RF88 D82 (RF104)C8 R180 E89 R190 B88 (R201)D4 (R218)E88 (R687)D9 R748 F68
 C180 D80 C187 F14 (C259)D3 C680 E7 (C709)D2 IC81 B2 (IC86)H1 (C90)C95 IC96 F94 J685 A97 QF81 D82 (RF83)A81 RF89 D83 (RF105)C9 R181 E90 R191 B89 (R202)D4 (R219)E89 (R688)D9 R749 F69
 C181 D81 C188 F14 (C260)D3 C681 E7 (C710)D2 IC82 B3 (IC87)H1 (C91)C96 IC97 F95 J686 A98 QF82 D83 (RF84)A82 RF90 D84 (RF106)C5 R182 E91 R192 B90 (R203)D4 (R220)E90 (R689)D9 R750 F70
 C182 D82 C189 F14 (C261)D3 C682 E7 (C711)D2 IC83 B4 (IC88)H1 (C92)C97 IC98 F96 J687 A99 QF83 D84 (RF85)A83 RF91 D85 (RF107)C6 R183 E92 R193 B91 (R204)D4 (R221)E91 (R690)D9 R751 F71

6.4.10 PCB Layout (Bottom side)



Q405 Q406 Q407



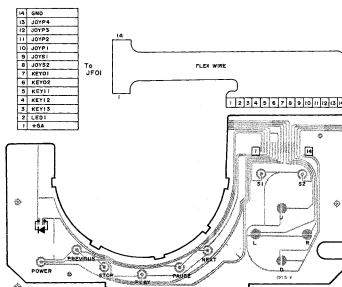
The diagram shows the internal wiring of the W500 control unit. It includes a switch labeled 'SW20' with positions 'OPEN' and 'CLOSE'. A 'RELAY' is connected to the switch. The unit has terminals for 'RIGHT' and 'W500'. A table on the right lists the wiring connections:

W500	Wiring
77	OPEN
6	END
45	CLAY BP
4	SPK R+
3	SPK R-
2	SPK L-
1	SPK L+

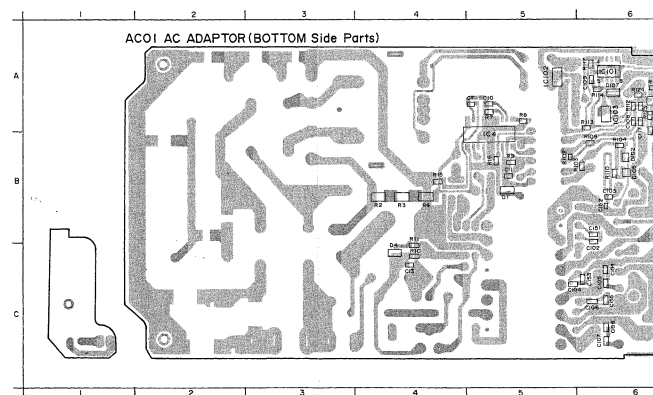
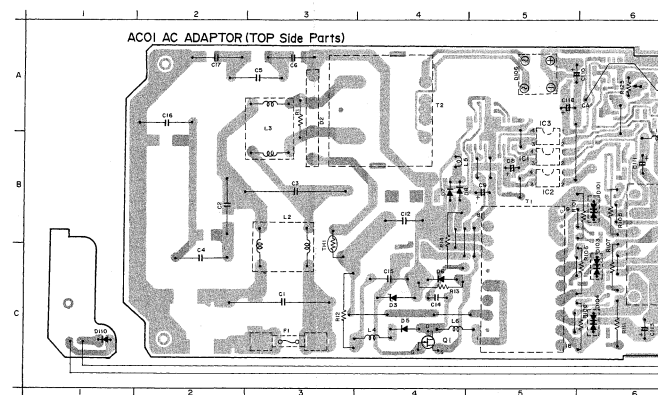
J005	
14	GND
13	BATT
12	+5VTR
11	GND
10	+5V
9	GND
8	+5VME
7	GND
6	+5M
5	POWER
4	+5V
3	GND
2	+5V
1	+12V

The diagram shows a connector labeled J603 with three pins. The 2003 module is connected to pin 1 (GND) and pin 2 (+5V). The 1603 module is connected to pin 3 (IR IN).

J603	
1	GND
2	+5V
3	IR IN

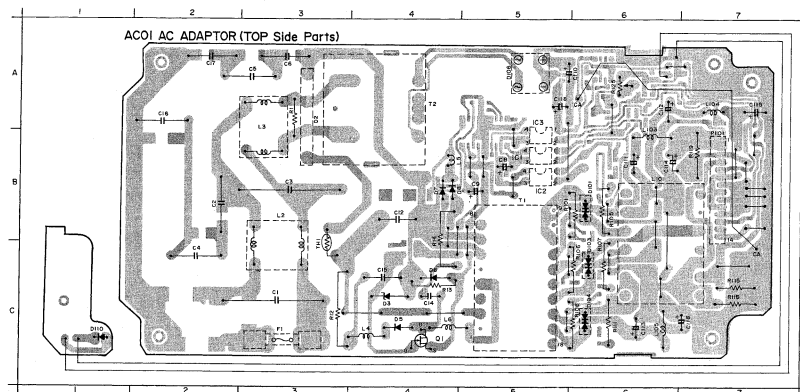


6.6.1 PCB Layout



6.6 Power Supply Unit

6.6.1 PCB Layout



C1	C3	C15	C4	C18	A5	D106	A5	L6	C4	R101	B6
C2	B2	C16	A2	D2	A3	D111	C1	L101	C4	R105	B6
C3	B3	C17	A2	D3	C4	F1	C3	L102	B6	R106	C6
C4	C5	C18	A5	D4	C4	I1	B5	L103	A7	R107	C6
C5	A5	C19	A6	D5	C4	I2	B5	L104	B6	R108	C6
C6	A5	C12	A6	D6	B4	I3	A5	P101	B7	R111	C6
C6	B5	C13	A6	D7	B4	L2	B5	Q1	C7	R115	C7
C7	B9	C14	B7	D8	B4	L3	A3	R12	C3	R116	C7
C8	B4	C15	A7	D9	C6	L4	C4	R13	C3	R119	B7
C14	C4	C16	C7	D10	C6	L5	B4	R14	B4	R125	A6
										T2	B5
										T4	C3
										TH1	C3

7 DIAGNOSTICS

7.1 Troubleshooting and repair

General Sequence:

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

2. Power Voltage

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

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

4. Service Shell (Operating is same as CD1205)

- How to activated of Service Shell for CD1360
- (1) Power OFF
- (2) Press two switches: Display ON/OFF and Action button 2
- (3) Power ON and release two switch if after Power ON

5. Measurement Each Circuit

7.1.1 Power supply unit

Preparation

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

1. Load Resistor

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

2. Power ON/OFF switch

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

CAUTION.

- Never turn on the power supply if no load resistor has been connected.
- Safety regulations require that the set under repair should be restored to its original state and that components identical to the ones specified should 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.

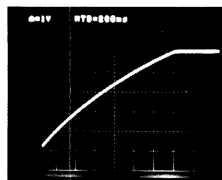
Play track 1 of testdisc 5, the voltage across measuring point 1 and point 2 should be : 0.7 V / DC +/-10 %.

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 :

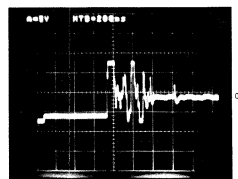


The signal is triggered by the S/VRD signal on IC80 pin6.

7.2.2.4 Motorcontrol signals.

Insert testdisc 5.

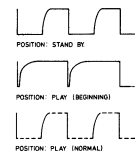
Measure across IC83 pin3 and GND, after pushing the play button the next picture should appear on the oscilloscope.



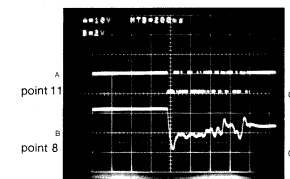
After a while, when playing track 1, the voltage should be : -1.7 V DC +/-10%

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%.

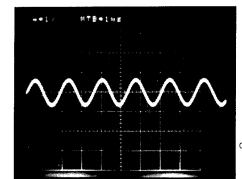
Voltage across measuring point 19 and GND :

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

Voltage across measuring point 21 and GND :

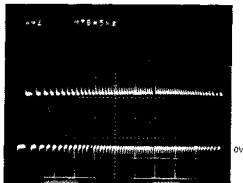
1.2 V / DC +/-10% in PLAY mode.

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 :



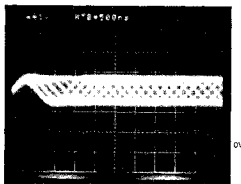
7.2.2.6 Clock signal IC88

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

7.2.2.7 Decoder signals

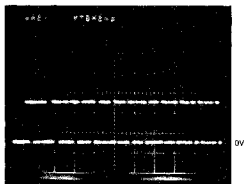
Play track 1 of testdisc 5.

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.

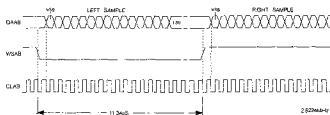
The signal across measuring point 32 should be :



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.

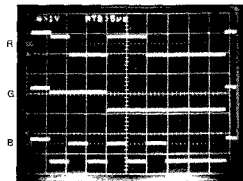
Measuring point 39,41 and 42 :



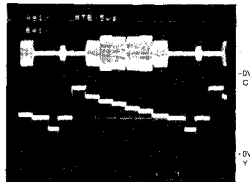
7.2.2.8 Video signals

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

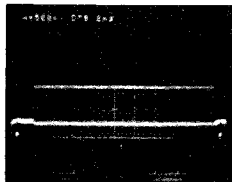
Measuring point 43 and 44 :



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)

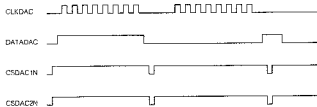
Use launch disc or arbitrary CD-I disc which contains audio levels A-B-C and/or CD-DA

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.

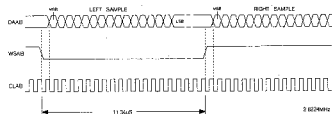
If there is any activity on one of the lines 66 % 69 one can suppose that the information of this signals are ok. This is also to be considered for the data lines D0 % D7.

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.

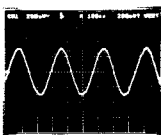
7.2.4 Measurements & adjustments Video 2 circuit (Video Encoder)

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



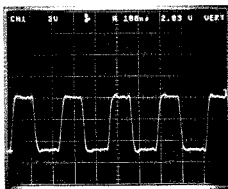
- Now check if the lock signal on testpoint 76, (pin 3 of IC94) meets 39335 Hz $\pm$ 8 Hz. and the divided VCO output signal on testpoint 77, (pin 14 of IC 94) meets also 39335 Hz $\pm$ 8 Hz.

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.

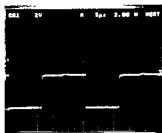
- Player switched off.
- Standard switch NTSC/PAL (SW10) in position 625, PAL.
- Connect frequency counter to testpoint 83 and turn on the player.
- Adjust with trimmer CV91, the frequency on testpoint 83 at 4 433 618 Hz. $\pm$ 50 Hz.



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.

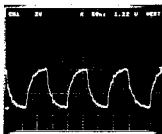
- Check if the divided VCO output signal on testpoint 77, (pin 14 of IC94) meets 39335 Hz $\pm$ 8 Hz.



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)

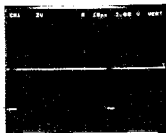
If this signal deviates check the IC65 26pin

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.

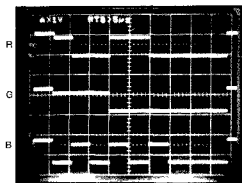
7.2.4.7 Check of HSYNC signal. (NTSC Only)

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

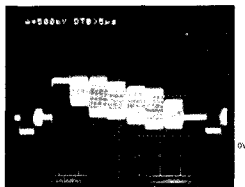


7.2.4.8 Check of RGB input signals

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

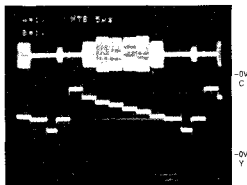


Check of Output signals for CVBS - Y / C.



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).

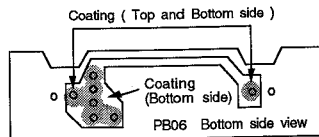
Settings of the terminal:

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

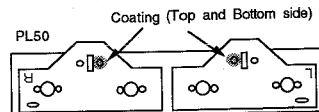
7.3 LCD screen unit and PL50,PB06

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

[PB06]

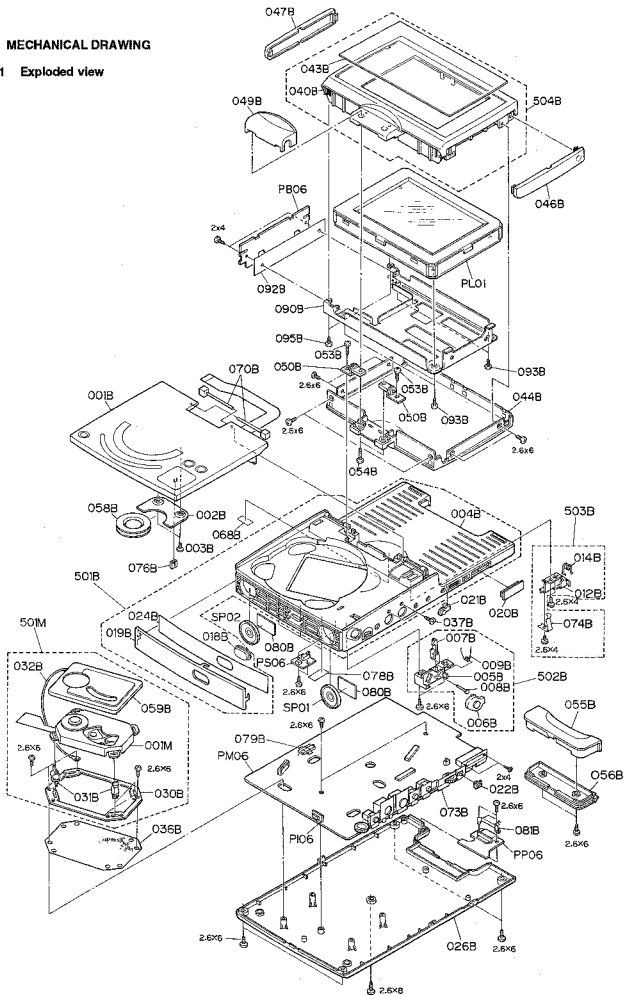


[PL50]



8 MECHANICAL DRAWING

8.1 Exploded view



9 PARTS LIST

9.1 Exploded view parts list

Position nbr.	Service code	Description
001B	4822 444 30461	CD COVER WITH KEYS
002B	4822 402 61464	CLAMPER BRACKET
003B	4822 502 13203	SCREW CLAMPER BRACKET
020B	4822 444 60883	RGB CONN. COVER
021B	4822 410 62344	LCD ON/OFF BUTTON
022B	4822 410 62343	PAL/NTSC BUTTON
026B	4822 444 50694	BOTTOM CASE ASSY
036B	4822 444 60884	COSMETIC CDM COVER
037B	4822 502 21335	P.H.M. SCREW 2.6x6
044B	4822 444 50709	LCD BOTTOM CASE
046B	4822 444 40611	R SIDE CAP LCD CASE
047B	4822 444 40612	L SIDE CAP LCD CASE
049B	4822 444 60879	LCD HINGE COVER
050B	4822 417 11179	LCD HINGE
053B	4822 502 21334	L.WASHER SCREW HINGE UNIT
054B	4822 502 30701	SCREW HINGE COVER
055B	4822 444 60881	FMV TOP COVER
056B	4822 444 50692	FMV BOTTOM COVER
058B	4822 532 21464	CLAMPER
070B	4822 535 93367	HOLDER ASSY
076B	4822 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
C550	4822 124 10773	4.7µF/25V
C580	4822 126 11687	GRM39F104Z16 0.1µF
C581	4822 126 11687	GRM39F104Z16 0.1µF
C582	4822 126 11687	GRM39F104Z16 0.1µF
C583	4822 126 11687	GRM39F104Z16 0.1µF
C586	4822 126 11687	GRM39F104Z16 0.1µF
C587	4822 126 11687	GRM39F104Z16 0.1µF
C588	4822 126 11687	GRM39F104Z16 0.1µF
C589	4822 126 11687	GRM39F104Z16 0.1µF
C591	4822 126 11687	GRM39F104Z16 0.1µF
C592	4822 126 11687	GRM39F104Z16 0.1µF
C593	4822 126 11687	GRM39F104Z16 0.1µF
C594	4822 126 11687	GRM39F104Z16 0.1µF
C595	4822 124 81484	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
C746	4822 126 11687	GRM39F104Z16 0.1µF
C747	4822 126 11681	1000pF/50V GR39
C596	4822 124 41842	47µF/16V
C726	4822 123 30365	1200pF J 16V
		ECWU1C
C727	4822 123 30364	1000pF J 16V
		ECWU1C
C729	4822 126 12502	820pF ±10% 50V
C732	4822 123 30365	1200pF J 16V
		ECWU1C
C733	4822 123 30364	1000pF J 16V
		ECWU1C
C735	4822 126 12502	820pF ±10% 50V
C741	4822 123 30365	1200pF J 16V
		ECWU1C
C742	4822 123 30365	1200pF J 16V
		ECWU1C
C747	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
R556	4822 051 30473	47kΩ ±5% 1/16W
R557	4822 051 30103	10kΩ ±5% 1/16W
R558	4822 051 30103	10kΩ ±5% 1/16W
R559	4822 116 82487	0Ω ±5% 1/16W
R562	4822 051 30101	100Ω ±5% 1/16W
R563	4822 051 30101	100Ω ±5% 1/16W
R568	4822 051 30229	22Ω ±5% 1/16W
R569	4822 051 30229	22Ω ±5% 1/16W
R570	4822 116 83222	82kΩ ±5% 1/16W
R571	4822 116 83222	82kΩ ±5% 1/16W
R576	4822 051 30104	100kΩ ±5% 1/16W
R577	4822 051 30472	4.7kΩ ±5% 1/16W
R578	4822 051 30472	4.7kΩ ±5% 1/16W
R581	4822 116 82487	0Ω ±5% 1/16W
R583	4822 116 82487	0Ω ±5% 1/16W
R585	4822 051 30472	4.7kΩ ±5% 1/16W
R586	4822 051 30104	100kΩ ±5% 1/16W
R587	4822 051 30472	4.7kΩ ±5% 1/16W
R588	4822 051 30104	100kΩ ±5% 1/16W
R701	4822 051 30223	22kΩ ±5% 1/16W
R702	4822 051 30103	10kΩ ±5% 1/16W
R703	4822 051 30225	2.2MΩ ±5% 1/20
R704	4822 051 30225	2.2MΩ ±5% 1/20
R705	4822 051 30103	10kΩ ±5% 1/16W
R706	4822 051 30223	22kΩ ±5% 1/16W
R709	4822 051 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 32672 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 42024	4FT 280NS DELAY LINE
L903	4822 153 70057	4FUS FOR MULTI STAND



D901	4822 150 31129	BB212 V-CAP DOUBLE D
------	----------------	----------------------



Q402	4822 130 43398	2SC2712 GR
Q403	4822 130 43398	2SC2712 GR
Q404	4822 130 43398	2SC2712 GR
Q405	4822 130 63003	2SD1803
Q406	4822 130 63003	2SD1803
Q407	4822 13042298	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 TC4811F
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	SSSS-12-12 SMT
		NTSC
XF01	5322 242 73734	CSAC4.00M/GC
		CERAMIC
X101	4822 242 81847	4.9152MHZ SMD-49
X102	4822 242 81351	30.209MHZ
		DSO49SJ C
X103	4822 242 81349	30.000MHZ
		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 81397	GP1-USBX 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
C191	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	820µF ±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)

-II-

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 1131	47µF/6.3V
C420	4822 124 1131	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	4.7kΩ ±5% 1/16W
RF19	4822 051 30473	47kΩ ±5% 1/16W
RF20	4822 051 30473	47kΩ ±5% 1/16W
RF21	4822 051 30472	4.7kΩ ±5% 1/16W
RF22	4822 051 30103	10kΩ ±5% 1/16W
RF25	4822 116 82487	0Ω ±5% 1/16W
RF26	4822 116 82487	0Ω ±5% 1/16W
RF27	4822 116 82487	0Ω ±5% 1/16W
RF28	4822 116 82487	0Ω ±5% 1/16W
RF29	4822 116 82487	0Ω ±5% 1/16W
RF30	4822 051 30103	10kΩ ±5% 1/16W
RF31	4822 051 30473	47kΩ ±5% 1/16W
RF32	4822 051 30103	10kΩ ±5% 1/16W
R101	4822 051 30472	4.7kΩ ±5% 1/16W
R102	4822 051 30102	1kΩ ±5% 1/16W
R103	4822 051 30102	1kΩ ±5% 1/16W
R104	4822 051 30472	4.7kΩ ±5% 1/16W
R105	4822 051 30472	4.7kΩ ±5% 1/16W
R106	4822 051 30102	1kΩ ±5% 1/16W
R107	4822 051 30102	1kΩ ±5% 1/16W
R108	4822 051 30472	4.7kΩ ±5% 1/16W
R109	4822 051 30472	4.7kΩ ±5% 1/16W
R110	4822 051 30105	1MΩ ±5% 1/16W
R111	4822 051 30102	1kΩ ±5% 1/16W
R112	4822 051 30102	1kΩ ±5% 1/16W
R113	4822 051 30102	1kΩ ±5% 1/16W
R114	4822 051 30102	1kΩ ±5% 1/16W
R115	4822 051 30102	1kΩ ±5% 1/16W
R116	4822 051 30102	1kΩ ±5% 1/16W
R118	4822 116 82487	0Ω ±5% 1/16W
R119	4822 051 30101	100Ω ±5% 1/16W
R120	4822 051 30101	100Ω ±5% 1/16W
R121	4822 051 30101	100Ω ±5% 1/16W
R122	4822 051 30104	100kΩ ±5% 1/16W
R123	4822 051 30104	100kΩ ±5% 1/16W
R124	4822 051 30104	100kΩ ±5% 1/16W
R125	4822 051 30102	1kΩ ±5% 1/16W
R126	4822 051 30102	1kΩ ±5% 1/16W
R128	4822 116 82487	0Ω ±5% 1/16W
R131	4822 051 30472	4.7kΩ ±5% 1/16W
R132	4822 051 30472	4.7kΩ ±5% 1/16W
R133	4822 051 30472	4.7kΩ ±5% 1/16W
R134	4822 051 30472	4.7kΩ ±5% 1/16W
R135	4822 051 30102	1kΩ ±5% 1/16W
R137	4822 116 82487	0Ω ±5% 1/16W
R140	4822 051 30222	2.2kΩ ±5% 1/16W
R141	4822 116 82487	0Ω ±5% 1/16W W
R142	4822 116 82487	0Ω ±5% 1/16W W
R201	4822 051 30479	47Ω ±5% 1/16W
R202	4822 051 30153	15kΩ ±5% 1/16W
R203	4822 051 30102	1kΩ ±5% 1/16W
R204	4822 051 30222	2.2kΩ ±5% 1/16W
R205	4822 051 30101	100Ω ±5% 1/16W
R206	4822 051 30101	100Ω ±5% 1/16W
R207	4822 051 30479	47Ω ±5% 1/16W

RVB0	4822 100 11780	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 30358	3.3Ω ±5% 1/16W
R844	4822 051 30359	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 26
J501	4822 265 31046	HSJ0924-01-1110 FOR
J502	4822 265 31049	CGP4707-0101 EP 7P L
J601	4822 265 31054	TCS7184-01-201
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
J502	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
------	----------------	------------------



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	ETS33K382V 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
------	----------------	--------



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+0062 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
------	----------------	-----------------



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.

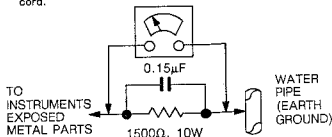
Fire and Shock Hazard (Continued)

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

Philips Consumer Service GmbH

Colonia-Allee 11, 51067 Köln

Tel.: 0221/96960-0, Fax: 0221/96960-809

**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.



PHILIPS



V13973

C.D.M.-1

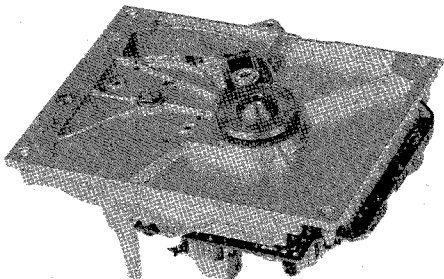
compact disc player

MECHANISM

Service
Service
Service

Service Manual

COMPACT
disc
DIGITAL AUDIO



35 367 A

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

CLASS 1
LASER PRODUCT

3/82 115 21430

Documentation Technique Service Documentazione di Servizio Huolto-Ohje Manual de Servicio Manual de Servicio

D 4822 725 20129

Printed in The Netherlands

CS 94 556 D

REPARATURHINWEISE

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

Das Objektiv lässt sich mit einem Blasepinsel reinigen.

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

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

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

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

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

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

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

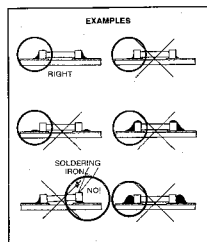
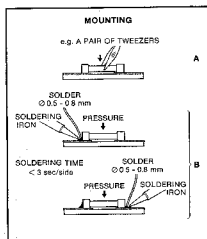
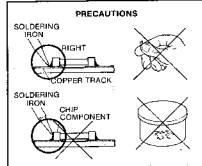
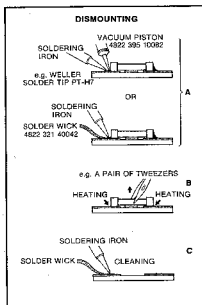
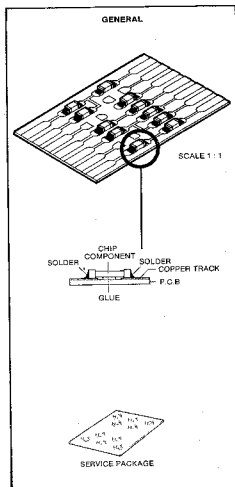
Achtung!

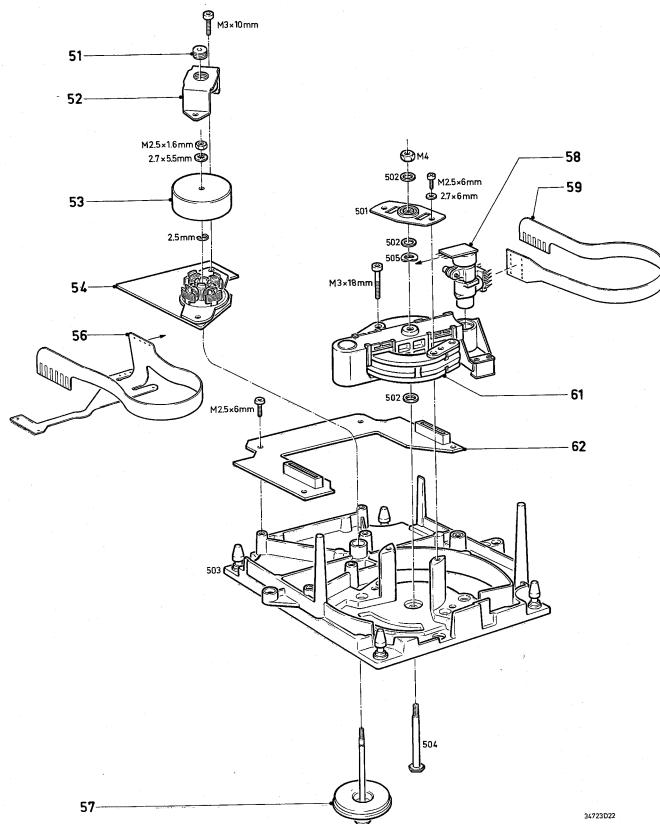
Um zu verhindern, dass sich Einstellungen ändern, dürfen KEINE ANDEREN SCHRAUBEN als im vorhergehenden genannt losgedreht werden.

**DIE OPTISCHE LESEVORRICHTUNG IST GEGENÜBER
STATISCHER LADUNG WEIT EMPFINDLICHER ALS
EIN MOS-IC.**

UNSORGFÄLTIGES VORGEHEN WÄHREND SERVICE-ARBEITEN KANN DIE LEBENSDAUER DRASTISCH KURZEN.

DAHER IST ZU VERANLASSEN, DASS WAEHREND DER SERVICE-ARBEITEN DIE HILFSMITTEL UND SIE SELBST DAS GLEICHE POTENTIAL WIE DER MECHANISMUS AUFWEISEN.



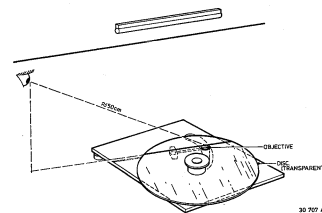


51	4822 502 11701
52	4822 520 10529
53	4822 362 20225
54	4822 214 50395
56	4822 322 40051
57	4822 528 10491
58+59	4822 691 30129
59	4822 322 40048
61	4822 691 30128
62	4822 214 50394

MECHANISCHE MESSUNGEN UND EINSTELLUNGEN

Höheneinstellung des Plattentellers (siehe service manual CD player)

Kontrolle der Winkeleinstellung

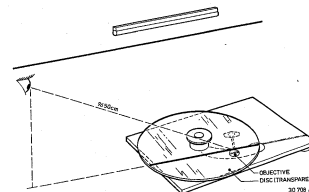


Spiegel 4822 395 90205 auf die Fokussiereinheit und Glasscheibe 4822 395 90204 (mit Andrücker 4822 532 60908) auf den Plattenteller legen. Gerät unter eine Lichtquelle, unter der sich eine gerade Linie befindet, stellen, (z.B. TL mit Gitter). Arm in Mittelstellung bringen. Gerät so drehen, dass der Arm parallel zu der Linie unter der Lichtquelle steht (siehe Bild).

In der Richtung und in der Fortsetzung der Linie die Reflexion auf Glasscheibe und Spiegel betrachten. Die Linien dürfen nicht mehr als 4 mm voneinander getrennt sein.

Das Gerät derart stellen, dass eine Linie über der Mitte des Spiegels läuft.

Wenn die andere Linie innerhalb der Oberfläche des Spiegels bleibt, ist der Abstand ≤ 4 mm.



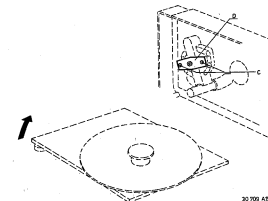
CD-Vorrichtung 90° gegenüber vorhergehende Stellung drehen. Der Arm soll in der Mittelstellung verbleiben (siehe Bild). Vorhergehende Messung wiederholen.

Winkeleinstellung

Beim fabrikmässigen Einstellen des durch Platte und Lichtweg gebildeten Winkels wurde ein Kompromiss zwischen Mindest-Winkelabweichung und Mindest-Armreibung angestrebt.

Wenn Messungen ergeben, dass der Winkel die gegebene Toleranz nicht einhält, muss der Winkel NICHT auf Mindestabweichung sondern gerade innerhalb der Toleranz eingestellt werden. Die neue Einstellung muss zwischen der alten und der günstigsten Einstellung liegen.

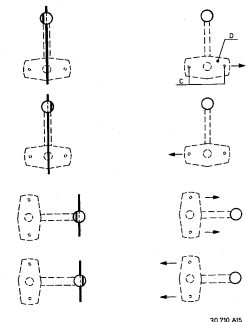
Nach der Einstellung muss die Armreibung geprüft werden. Die Prüfung der Armreibung wird mit Hilfe einer Federwaage vorgenommen, die an das Kontragewicht angelegt wird. Gemessen an dem Vollausschlag darf die Armreibung 30 mN nicht überschreiten. Wenn sich herausstellt, dass die Reibung zu hoch ist, muss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



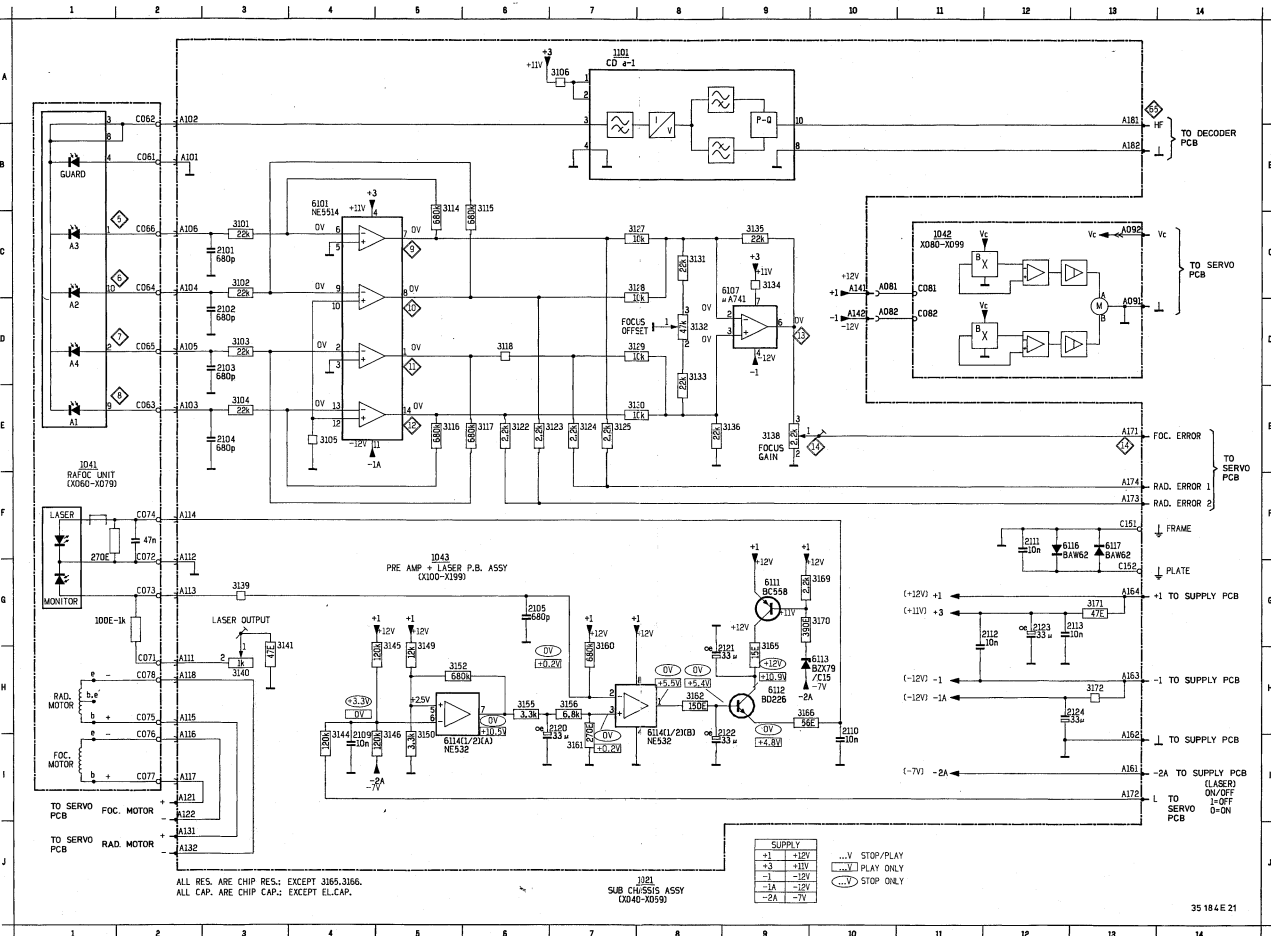
Der Winkel wird wie folgt eingestellt: Gerät auf die Servicestützen 4822 395 30202 stellen. Schrauben C (siehe Bild) soweit lösen, dass sich Lagerplatte D verschieben lässt. Winkeleinstellung korrigieren, indem die Lagerplatte in die im Bild gekennzeichnete Richtung verschoben wird. Schrauben C anziehen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

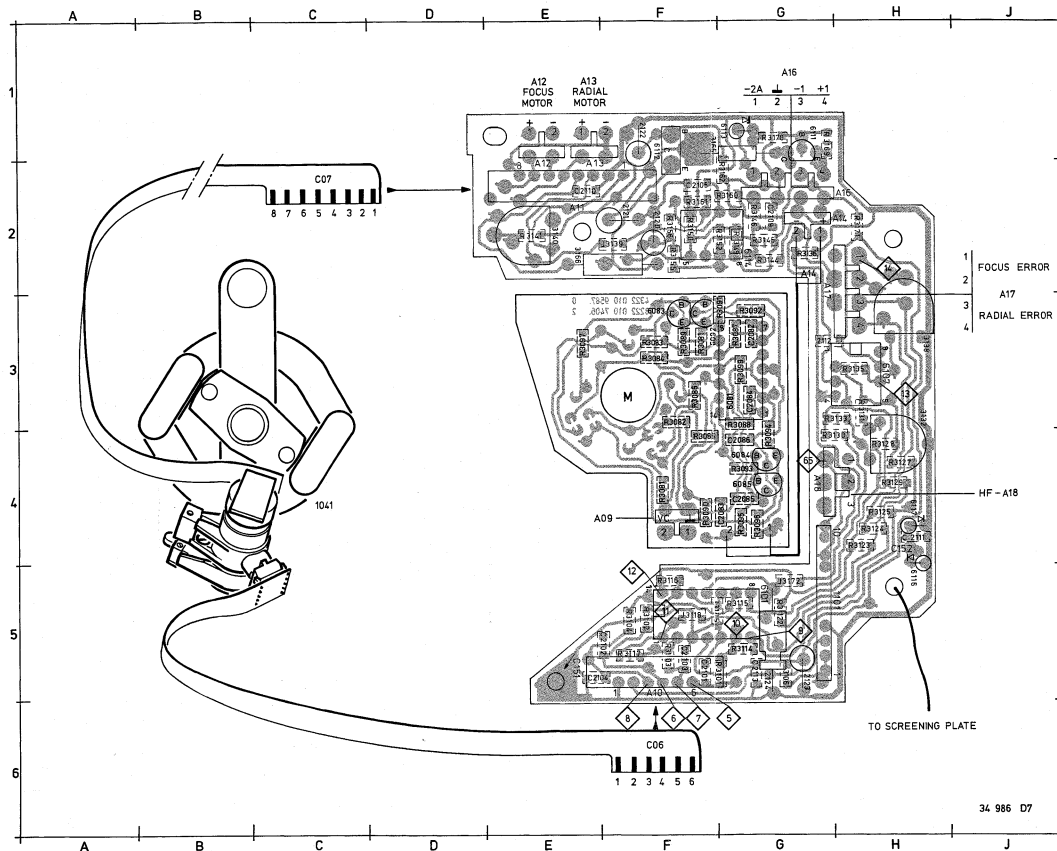
Achtung

Nach der Winkeleinstellung muss die Höheneinstellung des Plattentellers kontrolliert werden.



1101 R 7 2104 E 3 2111 F12 2121 H 9 3101 C 3 3105 E 4 3116 F 5 3123 E 7 3128 C 8 3132 D 8 3136 E 9 3141 G 3 3149 G 5 3156 H 7 3165 G 9 3171 G13 6111 G 9 6114H1 5
 2101 C 3 3105 E 4 2112 G12 2122 H 9 3102 D 3 3106 E 4 3117 F 5 3124 E 7 3129 D 8 3133 D 8 3138 E 9 3144 G 3 3150 I 5 3160 D 7 3166 H 9 3172 H13 6112 H 8 6116 F13
 2102 D 3 3109 E 4 2113 G13 2123 H 9 3103 D 3 3114 E 5 3118 D 6 3125 E 7 3130 D 8 3134 C 8 3139 D 3 3145 G 5 3152 H 5 3161 I 7 3169 D10 6103 G 4 6113 H10 6117 F13
 2103 D 3 2110 H10 2120 H 7 2124 H13 3104 E 3 3115 E 4 3122 E 7 3127 C 6 3131 C 6 3135 C 9 3143 H 3 3146 I 5 3155 H 6 3162 H 8 3170 D10 6107 C 9 6114H1 8



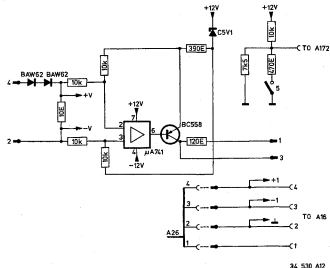


UNIT		
1101	Thick film unit HF	4822 218 10157
NE532N		4822 209 80818
NE5514N		4822 209 81451
μA714N		4822 209 80617
BC558		4822 130 40941
BD226		5322 130 44244
BZ79-C15		4822 130 34281
BAW62		4822 130 30613
3132	47k	4822 100 10583
3138	2k2	4822 100 20116
3140	1k	4822 100 20115
3165	15E MR30	5322 116 54914
3166	56E PR37	5322 116 54929
0E		4822 111 80163
47E		4822 111 90217
150E		5322 111 90098
270E		4822 111 90154
390E		5322 111 90138
2k2		4822 111 90249
3k3		4822 111 90157
6k8		5322 111 90117
10k		4822 111 90249
12k		5322 111 90097
22k		4822 111 90251
120k		4822 111 90149
680k		4822 111 90488
680 pF		4822 122 31809
10 nF		4822 122 31728

1101 005	2123 005	3102 005	3123 003	3169 001
2082 003	3081 004	3103 005	3135 003	3170 001
2083 004	3082 003	3104 006	3136 003	3171 002
2084 003	3083 003	3105 005	3138 003	3172 005
2085 004	3084 003	3106 005	3139 003	4081 005
2086 004	3085 004	3114 005	3140 003	4082 003
2101 005	3086 003	3115 005	3141 002	4084 004
2102 005	3087 003	3116 005	3144 002	4085 004
2103 005	3088 003	3117 005	3145 002	4086 003
2104 005	3089 003	3118 005	3146 002	4101 005
2105 002	3090 004	3122 005	3149 002	4107 003
2109 002	3091 003	3123 004	3150 002	4111 001
2110 002	3092 003	3124 004	3152 002	4112 002
2111 004	3093 004	3125 004	3153 002	4113 001
2112 003	3094 004	3127 004	3154 002	4114 005
2113 005	3095 004	3128 004	3160 002	4117 004
2120 002	3096 004	3129 004	3161 002	
2121 002	3097 003	3129 004	3162 002	
2122 001	3099 003	3131 003	3165 001	
2124 003	3101 005	3132 004	3166 002	

Laserversorgung

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



Kontrolle

Zu diesem Zweck muss die Lasersimulator-Printplatte nr. 3 (4822 395 30229) verwendet werden.
Flexible Leiterplatte dem Steckverbinder A11 entnehmen und den Simulatorprint mit dem Steckverbinder verbinden.

Stecker A16 herausziehen und in den Steckverbinder am Simulatorprint einstecken. Den Stecker mit vier Drähten mit dem Steckverbinder A16 verbinden.
Stecker A17 lösen und den Stecker mit einem Draht in den Steckverbinder A17 einstöpseln.

Kontrolle der Ruhestellung:

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

Kontrolle der Laserversorgungseinstellung:

Schalter am Simulatorprint in die "ON"-Stellung bringen und die Spannungen zwischen den Punkten +v und -v am Simulatorprint messen.

Widerstand 3140 rechtsherumdrehen (Höchst-Widerstand): $U + v - v = 225 \text{ mV} \pm 45 \text{ mV}$.

Widerstand 3140 linksherum-drehen (Mindest-Widerstand):

$$U + v - v = 750 \text{ mV} \pm 150 \text{ mV}$$

Widerstand 3140 in die Mitte stellen.

Es handelt sich um eine Voreinstellung. Nachdem der Simulatorprint fortgenommen ist, muss der Laserstrom eingestellt werden.
(siehe service manual CD player).

Regeln der Fokusbandbreite

(siehe service manual CD player).

Kontrolle der automatischen Verstärkungsregelung (AGC) und der Offsetschaltungen.

(siehe service manual CD player).

Kontrolle der Motorregelung (Hall).

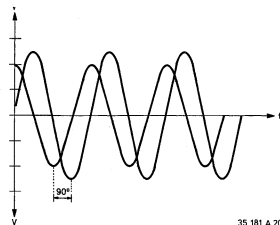
- 2 Steckter A09 vom Motorprint am CDM entfernen.
- 3 Kanal A eines Zweistrahloszilloskops an den Emittor der Transistoren 6082 und 6083 und Kanal B an den Emittor der Transistoren 6084 und 6085 anschließen.
Oszilloskopstellung: 2 V/Teilung — 10 ms/Teilung.
- 4 Anschluss 1 von Steckverbinder A09 am Motorprint mit der Masse des Gerätes verbinden.
- 5 Gerät einschalten.
- 6 Eine **negative** Spannung an Anschluss 2 von Steckverbinder A09 einspeisen.
Das Einspeisen **so! erst** erfolgen, nachdem die Schaltung an die Versorgungsspannung angeschlossen wurde! Es ist von 0 Volt auszugehen; diese Spannung **nach** auf +5 V bringen. Der Motor soll **nun** laufen.
Wenn der Motor läuft, kann die Spannung auf ca. —2,5 V gebracht werden.
Der Motor soll dann immer noch laufen.
- 7 Am Oszilloskop sollen nun sinusförmige Signale erkennbar sein (siehe Bild A).
Die Signale sollen nach etwa 2 Sekunden symmetrisch um Nulllinie liegen und um 90° zueinander verschoben sein. Die Amplituden dieser beiden Signale dürfen höchstens ein Verhältnis von 1 zu 2 aufweisen.
- 8 Die Amplitude wird durch die eingespiesene Spannung bedingt. Das Verhältnis U (in V- in)/U (aus V- out) soll zwischen 1:2 und 1:3 liegen.
- 9 Es ist zu ermitteln, bei welcher Eingangsspannung (V- in) der Motor 600 Umdrehungen in der Minute macht. Bei 600/min ist die Frequenz von V- out 30 Hz. V- in soll bei dieser Motordrehzahl zwischen —1,5 V und —3,7 V liegen.

Schlussfolgerung

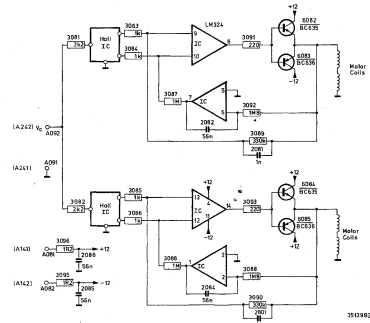
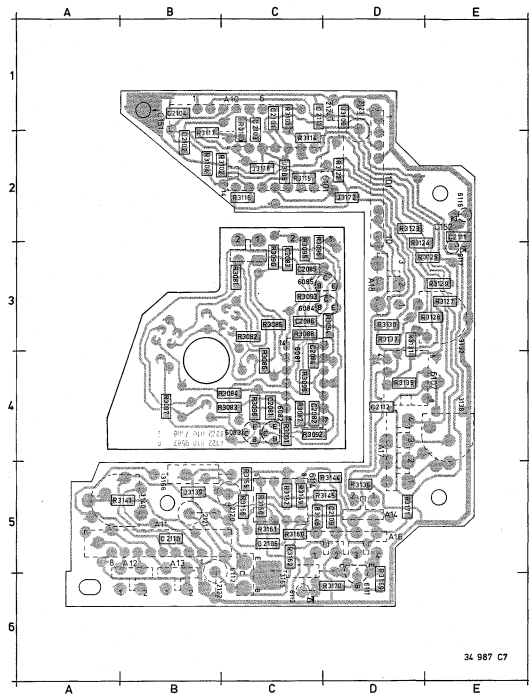
Wenn all diese Bedingungen erfüllt werden, lässt sich voraussetzen, dass der Motor und der Print in Ordnung sind.

Werden die Bedingungen in 5, 6 und 7 nicht erfüllt, dürfte allem Anschein nach der Fehler in der Elektronik gesucht werden.

Werden die Bedingungen in 5, 6 und 7 erfüllt und sollte zu 8 eine Spannung von beispielsweise $-4,5\text{ V}$ eingespielt werden müssen, damit eine Motordrehzahl von 600/min erreicht wird, dann wird allem Anschein nach in mechanischer Sicht einiges nicht in Ordnung sein, etwa eine zu hohe Lagerreibung.



35 181 A 20

[illegible]



SI

Wichtig für die Werkstatt!

Nr.: 24037

Sachgebiet: Compact Disc AC 24

Datum: 17.9.85

De/gs

Service Information

Betrifft: Compact Disc-Laufwerk
CDM 1

Verteiler: intern und extern

1. Abgleich Focus-Offset

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

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

Nach Abgleich soll der Schleifer des Einstellers in Mittelstellung ($\pm 10^\circ$) stehen.
- b.) in Play-Funktion des Spielers
 - Fehlerfreie Platte - z. B. Testplatte 5 (Best.-Nr. 4822 397 300 96) - abspielen.
 - Mit "Focus-Offset" das HF-Signal am MP 65 ("Augenmuster") auf einen Wert ≥ 500 mV einstellen (messen mit AC-Millivoltmeter).

2. Ergänzung zur Ersatzteil-Aufstellung

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

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

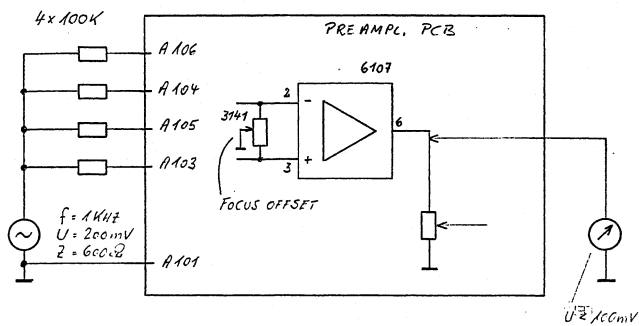


FIG. 1