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Compact disc interactive player

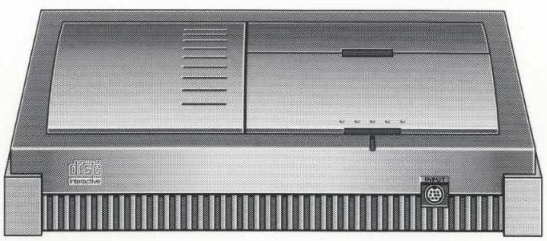
CDI 450/00/05/11/17

Service
Service
Service

Interactive
Media
Systems

CDI

Free service manuals
Gratis schema's
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NORTH-AMERICAN MODELS:
CDI450/17 = CDI450 BK
CDI550 = CDI550 DV
Service Manual: 5520.

Service Manual

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COMPACT disc Interactive

The CDI550 is a CDI450/17
with a built-in **D**igital **V**ideo **C**artridge.

For Service of the DVC see separate Service Manual
of the DVC model.
The modelnumber is on the DVC label: 22ER9956.

These sets are equiped with Compact Disc Mechanism
type CDM12: Service code 4822 691 30343.

CLASS 1
LASER PRODUCT
3122 110 03420

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

Published by P.S. 0694 Service & Support Interactive Media Systems Printed in The Netherlands © Copyright reserved Subject to modification 4822 725 24741

PCS 72 118

Published in Heiloo, Holland.

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2. PRODUCT INFORMATION
2.1 TECHNICAL SPECIFICATION

System • Système • Sistema • Systeem • System • Sistema • Sistema
CD-Interactive
CD-Interactif

Usable discs • Disques utiliables • Discos utilizables • Discos Utiliable • Te gebruiken discs • Verwendbare discs • Dischi usabili

CD-I	*CD-I*
CD-DA	*CD-Audio*
PHOTO-CD	*Photo CD*
CD-I READY	*CD-I READY*
CD BRIDGE	*CD-I BRIDGE*
CD+GRAPHICS	*CD+GRAPHICS*

Power requirement • Alimentation • Alimentacion • Alimentación • Voedingsspanning • Netzanschluß • Alimentazione
Europe: 220-230 V/50 Hz UK: 240 V/50 Hz
JAPAN: 100 V/50-60 Hz USA: 120 V/60 Hz

Power consumption • Consommation • Consume de corriente • Opgenomen vermogen • Leistungsaufname • Consumo di corrente • Consomo de Corriente
Europe: 30 W with, 23 W without Digital Video Cartridge (22ER9144)
Europe: 30 W avec, 23 W sans Digital Video Cartridge (22ER9144)
UK: 30 W with, 23 W without Digital Video Cartridge (22ER9144)
UK: 30 W avec, 23 W sans Digital Video Cartridge (22ER9144)

Operating temperature • Temperature de fonctionnement • Temperatura de operacion • Bedrijfstemperatuur • Betriebstemperatur • Temperatura di fonzionamento • Temperatura de funcionamiento
41°F(5°C) to 95°F(35°C)
5°C à 35°C

Relative humidity • Humidité relative • Humedad relative • Relatieve vochtigheid • Relative Feuchtigkeit • Umidità relativa • Humedad relativa
5% to 95% (no condensation)
5% à 95% (sans condensation)

Weight • Poids • Peso • Gewicht • Gewicht • Peso • Peso
Without extension: 1,210 Kg, 0,548 lbs.
Sans extension: 1,210 Kg, 0,548 lbs.

Dimensions (w x h x d) • Dimensions (l x h x p) • Dimensiones (a x a x p) • Afmetingen (b x h x d) • Abmessungen (B x H x T) • Dimensioni (l x h x p) • Dimensiones (anch. x alt. x prof.)

Cover closed:	Cover open
299 mm x 67 mm x 190 mm	299 mm x mm x 190 mm
11,75" x 2,64" x 7,5"	11,75" x " x 7,5"

Input • Entrée • Entrada • Ingang • Eingang • Ingresso • Entradas

input (1 ports) 8-pin mini-DIN
(1 entrées) mini DIN 8 broches
suitable for connection of max. 2 devices
(when splitter is used). e.g. 2 pointing devices.



pin Broche	signal Signal	I/O E/S
1	rxd1	
2	rxd2	I/E
3	txd1/tx2	O/S
4	rts1	
5	ground/Masse	
6	cts	I/E
7	rts2	O/S
8	+5V (150 mA max.)	

Output • Sortie • Salida • Uitgang • Ausgang • Uscita • Saídas • Salidas

video (PAL) 1 Vpp (75 Ohm load, sync neg) RCA pin jack
1 Vc-c (charge 75 Ohm, sync. nég.) Prise cinch

audio 2 Vrms
2 channel individual RCA pin cinch sockets
2 Veff
2 prises cinch (une par canal)

Audio/Power Cable:
RF Power + 5V, max. 50 mA
Audio Audio(mono); 1.55 Vrms

Note: Pointing device speed of 1200 baud is supported.
Remarque: Vitesse de transmission jusqu'à 1200 baud. • Nota: Se admite un dispositivo de puntero de 1200 baudios de velocidad. • Opmerking: Voor de aanwijsapparaten is snelheid van 1200 baud mogelijk. • Hinweis: Die Geschwindigkeit der Zeigevorrichtung von 1200 Baud wird unterstütz. • Nota: Tollera la velocità dell'accessorio di comando di 1200 baud. • Nota: Velocidad del dispositivo de apunta admitida: 1200 baudios.

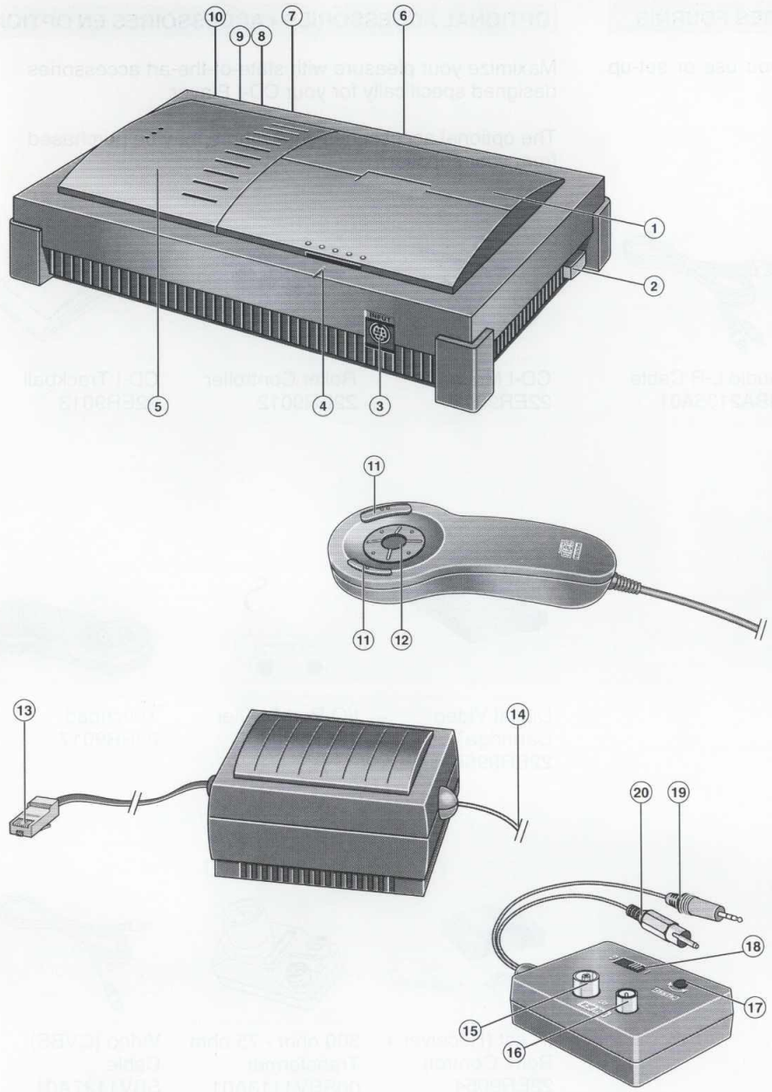
(SF) Varioitus!
Laite sisältaa laserdiodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilyä.

(S) Varning!
Osynlig laserstrålning när denna del är öppnad och spärren ar urkopplad. Betakta ej strålen.

(DK) Advarsel!
Usynlig laserstråling ved abning når sikkerhedsafbrydere er une af funktion. Undgå udsaettelse for stråling.

Designs and specifications are subject to change without notice. • *La conception et les spécifications de ce produit sont sujet à modifications sans avis préalable.* • *Los diseños y las especificaciones están sujetos a cambios sin previo aviso.* • *Concepten en specificaties kunnen gewijzigd worden zonder voorafgaande verwittigingen.* • *Änderungen von Ausführung und technische Daten vorbehalten.* • *I disegni e le specifiche tecniche sono soggette a modifiche senza preavviso.* • *As especificações descitas estão sujeitas a altreação sem aviso prévio.* • *El diseño y las especificaciones estás sujetos a cambios sin previo aviso.*

2.2 CONNECTION AND CONTROLS



DESCRIPTION OF CONTROLS AND CONNECTIONS

FRONT AND SIDE OF PLAYER
1. Disc cover.
2. ON/OFF button.
3. Input.
4. Power ON/READ IN indication.
5. Digital Video Cartridge cover.

REAR OF PLAYER
6 DC IN.
7 DC OUT (for external RF-modulator only).
8 Audio R (right).
9 Audio L (left).
10 Video (CVBS).

CD-I CONTROLLER
11 Action buttons.
12 Thumbpad.

CAUTION
NEVER MAKE OR CHANGE CONNECTIONS WITH THE POWER SWITCHED ON.

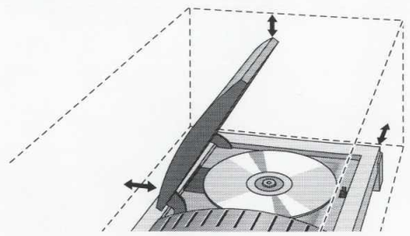
POWER SUPPLY
13 DC output
14 Mains AC input.

RF MODULATOR*
15 ANT IN.
16 ANT OUT.
17 Channel Selector.
18 TV System Selector.
19 Audio/Power Cable.
20 Video Cable.

(*) On some player versions only.

PLACEMENT

- Place the player on a firm, flat surface.
- Keep away from heat sources and direct sunlight.
- In a cabinet, allow 2-3 cm (appr. 1") of free space around the circumference of the player for adequate ventilation.



POWER CONNECTION

- Connect the DC output (13) of the power supply into the DC IN (6) of the player.
- Insert the plug of the cord (14) into an AC outlet.

NOTE
–The power supply automatically adjusts to the local mains voltage.
–This power supply is intended to be used only with this CD-I player.
–When the player is in the "OFF" position, it is still consuming some power. If you wish to disconnect your player completely from the mains, the mains-plug has to be disconnected.

Only use the prescribed Power Supply:
- For UK; use type 20PS301/05
- For Continental Europe; use type20PS301/00

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2.3 ACCESSORIES • ACCESSOIRES

SUPPLIED ACCESSORIES • ACCESSOIRES FOURNIS

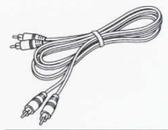
These accessories are provided to help you use or set-up your CD-I Player.



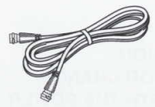
Power supply
22ER9156/17



RF Modulator*
22ER9071/17



Audio L-R Cable
SBA2135A01



Antenna Cable*
(RF coaxial cable)
SBV1130A01

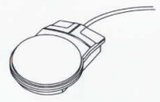


CD-I Controller
22ER9019

OPTIONAL ACCESSORIES • ACCESSOIRES EN OPTION

Maximize your pleasure with state-of-the-art accessories designed specifically for your CD-I Player.

The optional accessories shown here may be purchased from your supplier.



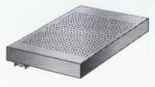
CD-I Mouse
22ER9011



Roller Controller
22ER9012



CD-I Trackball
22ER9013



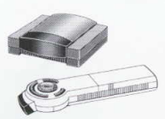
Digital Video
Cartridge**
22ER9956



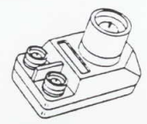
I/O Port Splitter
22ER9208



Touchpad
22ER9017



IR set (Receiver +
Rem. Control)
22ER9054



300 ohm - 75 ohm
Transformer
00SBV1113A01



Video (CVBS)
Cable
SBV1127A01



Connection kit
22ER9155/17



Audio Stereo
Splitter
22ER9209

* available on some player versions only.
** supplied with CDI550

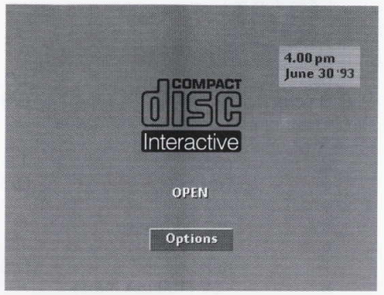
The products and services described herein are not necessarily available in all countries.

Due to continuous product improvements this document is subject to change without notice.

2.4 SETTING UP

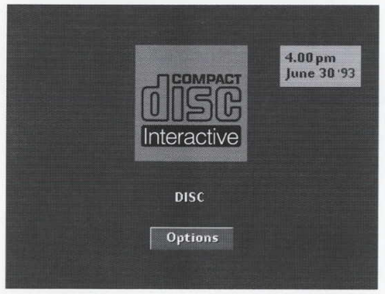
SETTINGS

•Press the ON/OFF button (2) to switch the player on.
•The green LED lights up.
•Switch on the TV (and HiFi system if used).
•Select the CD-I input on the TV (and HiFi system if used).
On the TV, the player start-up screen will appear.
This screen has the following system function icons to guide and assist you:



Options:
See: "OPTIONS SCREEN".

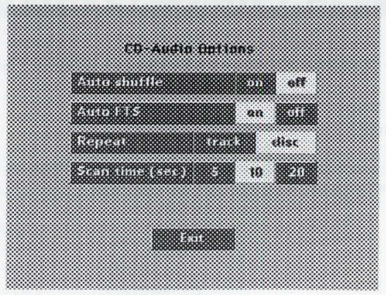
•Press the ON/OFF button (2) to switch the player off.
•Switch off the TV (and HiFi system, if used).



System information:
OPEN: Indicates that the disc cover is open (or not fully closed).
DISC: Means that there is no disc in the player or the disccan not be read due to damages or dirt (refer to p.13).

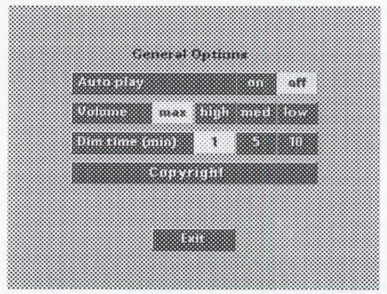
OPTIONS SCREEN

1. CD Audio
To preselect your preferred settings when playing audio CDs:
Auto shuffle
After switching the player on, the tracks on the CD will automatically be played in a random order.
Auto FTS
After switching the player on, the FTS program of the CD will be played automatically
Repeat
Select to repeat a complete audio disc or a single track when the repeat function is activated.
Scan time
Select the time you want the beginning of each audio track to play for (5, 10 or 20 seconds) when the scan function is activated.



• When finished, point-and-click on 'Exit'.

2. General
To change the player general settings.
Auto play
After switching the player on, playback will start automatically when a disc is loaded.
Volume
Selecting the player default volume setting
Dim Time (min)
On all screens shown in this manual except CD Graphics screen, dim occurs automatically after 1-5-10 minutes if the player is not used.
Dim greatly reduces the brightness of the displayed picture. The normal brightness is restored by any user action with the control device(s).



•When finished, point-and-click on 'Exit'.

3. Time and Date
To change the player time date settings
Time/Date set
If the time or date shown on the screen is wrong, select the appropriate 3 and 4 arrows to set hours, minutes, day, month and year in turn, as required.
Time format
Select 24 hour or 12 hour clock.
Date format
Select d/m/y to present the date in day-month-year sequence.
Select m/d/y to present the date in month-day-year sequence.
Display time/date
Select whether time and date will displayed on the TV screen or not.

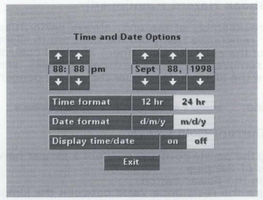
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2.5 DISC PLAY

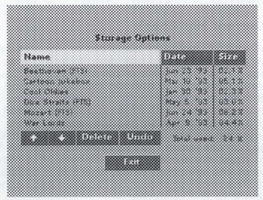
OPTIONS SCREEN — CONTINUATION



•When finished, point-and-click on 'Exit'.

4. Storage

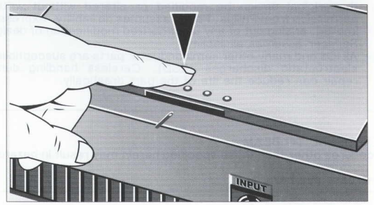
To refer to the intermediate results of CD-I titles and of programs created for your audio and Photo CDs.
The "Storage" screen shows the information held in memory: titles, dates and percentage of memory used.
Clicking on "Name", "Date" or "Size" sorts the information accordingly.
•Use the scroll arrows to move up and down the list.
•To delete an item, click on its title and then click on "Delete". If you change your mind after deleting, click on "Undo".

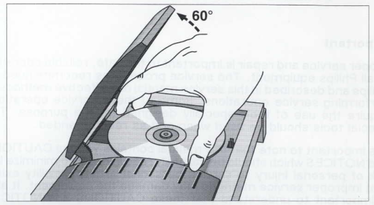


•When finished, point-and-click on 'Exit'.

LOADING

•Push on the disc cover (1) to open.
The disc cover unlatches.
•Open the cover gently until the opening position (60° approx.) where it latches.
•Take the disc and place it with the label up into the player.





•Push the disc cover (1) to close.
The LED flashes whilst the disc is starting up and lights stable when the disc is ready for play.
The TV screen changes according to the type of disc.

UNLOADING

•Push on the disc cover (1) to open.
The player start-up screen reappears on the TV.
•Take the disc from the player.
•Push the disc cover (1) to close.

NOTE

Unloading a CD-I disc while the CD-I program is running, will terminate the CD-I program abruptly. 'Bookmarks' or intermediate results, if used by the CD-I program, might not be updated to the latest situation.

CAUTION

NEVER PUT MORE THAN ONE DISC AT A TIME INTO THE CD-I PLAYER

PLAYING A CD-I DISC

NOTE

This procedure is equal for CD BRIDGE discs, CD-I READY discs and PHOTO CDs. And for Digital Video discs and Video CD's when a Digital Video Cartridge has been installed.

CAUTION

NEVER LEAVE A STILL PICTURE ON THE SCREEN FOR ANY LENGTH OF TIME. THIS CAN CAUSE BURNING-IN OF THE PICTURE TUBE. IN SUCH A CASE SWITCH OFF THE PLAYER OR REMOVE THE DISC.

When a title consist of more than one consecutive disc, a so called 'multi-disc' title, follow the instructions for opening and closing the disc cover as shown on this screen.

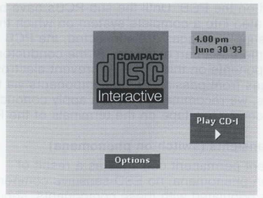
Playing a CD-I disc depends on de value of Autoplay (see settings). The factory setting is default "ON".

1.When autoplay is "ON":
After loading the disc, the CD-I program will start up automatically.

DISC PLAY

PLAYING A CD-I DISC — CONTINUATION

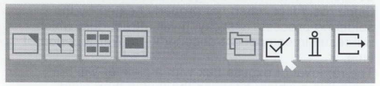
2.When autoplay is "OFF":
After loading the disc, the CD-I start-up screen appears on the TV.
To start the CD-I program, select the 'Play' icon on the screen and click on it.



The opening screen of the CD-I program now appears on the TV.
From this point, all interaction is between you and the program.
To stop at any time, select the STOP or EXIT function provided by the CD-I program.

PLAYING A PHOTO CD

•Select the ☑ icon.
The 'Options' screen will now appear.
•To select a language click on the box, the flag or the name of a country.
The previous setting will be replaced automatically.



•Select the ⮐ icon (Return) of this screen to go back to the Photo CD opening screen.



•Select the ℹ icon (Information) and the INFORMATION screen, explaining the control buttons of the menu bar in the selected language, appears.
•From this point, all interaction is between you and the program.

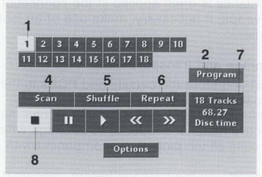
CAUTION

NEVER LEAVE A STILL PICTURE ON THE SCREEN FOR ANY LENGTH OF TIME. THIS CAN CAUSE BURNING-IN OF THE PICTURE TUBE. IN SUCH A CASE SWITCH OFF THE PLAYER OR REMOVE THE DISC. (SEE DIM OPTIONS).

PLAYING AN AUDIO CD — 1. Using the audio screen

NOTE: This procedure can also be used for audio sections on 5 inch (12 cm) laser discs.

After loading the disc, the CD- Audio screen appears on the TV.



1.Play track bar: shows the total number of tracks (up to 30). You can 'point-and-click' to select any track. For discs with more than 30 tracks, the right > and left < scroll arrows are used to move through the track list.

2.PROGRAM: allows you to program a list of special tracks called a Favorite Track Selection. When you select PROGRAM, the FTS track bar and the FTS icon will appears.

3.FTS: allows you to play Favorite Track Selections. This icon only appears if a Favorite Track Selection has been created for the disc that is loaded in the player.

4.SCAN: allows you to listen to the beginning of every track listed in the play track bar. You can set the scan time to 5, 10 or 20 seconds in the 'Options' screen.

5.SHUFFLE: allows you to play the tracks in the play track bar in a random order.

6.REPEAT: allows you to repeat either a track or the entire disc. You can change the repeat mode in the 'Options' screen.

7.TRACK/TIME window: after loading, and in STOP mode, this shows the total number of tracks and the total playing time. When you click at this window **(7)**, the track time of the selected track is displayed.
in PLAY and PAUSE modes, the window shows the track number and either the elapsed or the remaining track playing time. To change between elapsed and remaining time, 'point-and-click' at the time shown in the window.

8.All the disc play control functions are shown on the screen, and can be selected as desired by 'point-and-click' with your pointing device. The operation of the functions is briefly explained in the following table.

NOTE

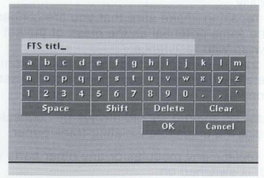
If auto SHUFFLE or auto FTS has been selected on the 'CD Audio' screen, this function will be activated automatically.

DISC PLAY

OPERATION	SELECT
Start play	**play** play starts at the beginning of track 1, or any other preselected track number. If a track is already playing, it is re-started. **NOTE:** When play starts, adjust the sound level as required.
Select a track	**track** number if the disc contains more than 30 tracks, use the left < and right > scroll arrows to move through the track numbers as required.
Pause	**pause** use to interrupt play.
Exit pause	**pause** or **play** play restarts at exactly the same point as pause was selected.
Forward search	**forward** searches forward through disc, first slowly, then fast.
Reverse search	**reverse** searches backwards through disc, first slowly, then fast.
Stop play	**stop** use to stop playing if play is re-started, it begins at the first track.
Scan the disc	**scan** plays the beginning of each track on the disc in turn.
Exit scan	**scan** normal play starts from this point.
Shuffle play	**shuffle** shuffle sequence appears in track bar.
Exit shuffle	**shuffle** normal play starts from this point.
Repeat	**repeat** repeats the entire disc (or FTS program), or the track being played, as selected on the "Options" screen.
Play FTS	**FTS** only available when an FTS program has already been created for the disc in the player.
Exit FTS	**FTS** normal play starts from this point.
Program FTS	**program** • Point to tracks as required on the play track bar, and in each case click on any action button to record the track in the FTS track bar. • To cancel an unwanted track, point to it in the FTS track bar and click on any action button. • To cancel the entire FTS program, point to the first track in the FTS track bar and click on any action button repeatedly until all the tracks disappear.
Store FTS	**save FTS** the keyboard screen replaces the CD-Audio screen. See 'CREATING FTS TITLES' p 12.

PLAYING AN AUDIO CD — 2. Creating FTS titles

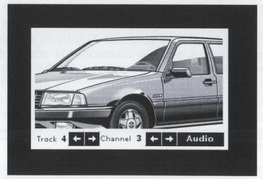
•After creating a Favorite Track Selection for a disc, you can compose a title of approx. 30 characters (depending on the character width) for the selection using the keyboard screen. The title then appears on the CD-Audio screen whenever the disc is loaded.
•At the CD-Audio screen, 'point-and-click' on the program button, then 'point-and-click' on the "Save FTS" button.



The CD-Audio screen will change to the keyboard screen.
•Select each character of the title in turn, using shift to change between upper and lower case characters and space to separate words.
Delete erases the last selected character.
Clear erases the complete (or partially complete) title.
Cancel returns to the CD-Audio screen without saving the title.
OK saves the title and returns to the CD-Audio screen.

PLAYING AN AUDIO CD — 3. CD graphics

When an audio CD withgraphics is played, the CD Graphics screen will appear automatically.



•To let the picture channel bar appear/disappear click on the action button anywhere outside the channel bar.
•You can select another track number by clicking on "Track" or either arrow next to it.
Depending on the disc other channel numbers might give you other information such as the lyrics in a different language.
•Refer to the instructions that come with the disc for their functions.
•To play audio only, click on the 'Audio' icon.

CAUTION

NEVER LEAVE A STILL PICTURE ON THE SCREEN FOR ANY LENGTH OF TIME. THIS CAN CAUSE BURNING-IN OF THE PICTURE TUBE. IN SUCH A CASE SWITCH OFF THE PLAYER OR REMOVE THE DISC. (SEE DIM OPTIONS).

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3.1 SAFETY INSTRUCTIONS

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

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

3.2 SERVICING OF SMDs (Surface Mounted Devices)

3.2.1 General cautions on handling and storage

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

3.2.2 Removal of SMDs

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

3.2.2.1 Caution on removal:

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

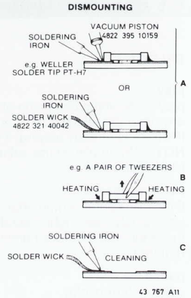


Fig. 1

3.2.3 Attachment of SMDs

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

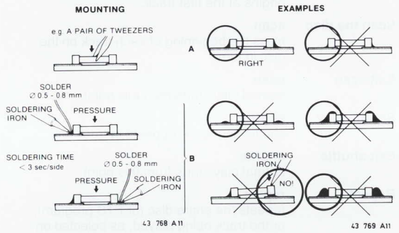


Fig. 2

Fig. 3

3.2.3.1 Caution on attachment:

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

3.3 HANDLING ESD-SENSITIVE COMPONENTS

3.3.1 Personal safety

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

3.3.2 Storage and transport

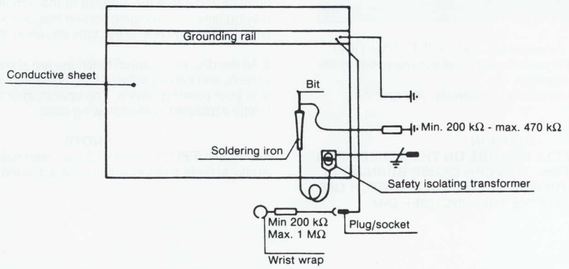
Transport and store the circuits and PCBs in their original packages.
As an alternative to the original package one may use a conductive material or special IC package which short-circuits all the pins of the component with one another.
Always discharge the package before opening it.

3.3.3 Testing or handling

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

3.3.4 Mounting ESD-sensitive components

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



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

3.3.5 Soldering

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

3.3.6 Electrostatic charges

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

3.3.7 Transients (switch-on phenomena)

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

3.3.8 Working environment

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

3.3.9 Replacement of the Flat Pack IC's

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

PHILIPS SAFETY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

Important

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

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

Safety Checks

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

Fire and Shock Hazard

1. Be sure all components are positioned in such a way as to avoid the possibility of adjacent component shorts. This is especially important on those units which are transported to and from the service shop.
2. Never release a repaired unit unless all protective devices such as insulators, barriers, covers, strain reliefs, and other hardware have been installed according to the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints, solder splashes, sharp solder points, frayed leads, pinched leads, or damaged insulation (including the ac cord). Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout, lead length, and dress.
5. No lead or component should touch a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with a ⚠ by the Ref. No. in the parts list and enclosed within a broken line* (where several critical components are grouped in one area) along with the safety symbol ⚠ on the schematic diagrams and/or exploded views.
   Replacement parts without the same safety characteristics may create shock, fire, or other hazards.
7. When servicing any unit, always use a separate isolation transformer for the chassis. Failure to use a separate isolation transformer may expose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many electronic products use a polarized ac line cord (one wide pin on the plug). Defeating this safety feature may create a potential hazard to the servicer and the user. Extension cords which do not incorporate the polarizing feature should never be used.

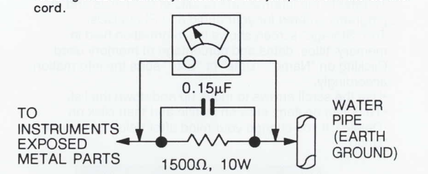
Fire and Shock Hazard (Continued)

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

* Broken line:

Leakage Current Cold Check

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



Leakage Current Hot Check

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

Parts Replacement

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

LASER NOTE:

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

Published in Heiloo, Holland.

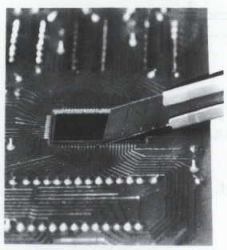
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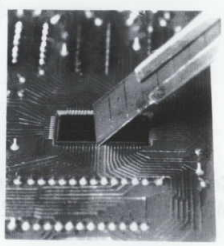
TOOLS TO BE USED



DISMOUNTING



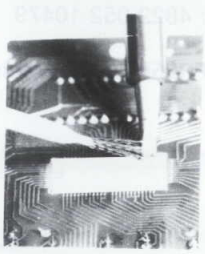
CUTTING
THE LEADS



WRONG
TRACKS WILL
BE DAMAGED



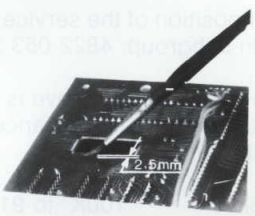
CLEANING
THE TRACKS



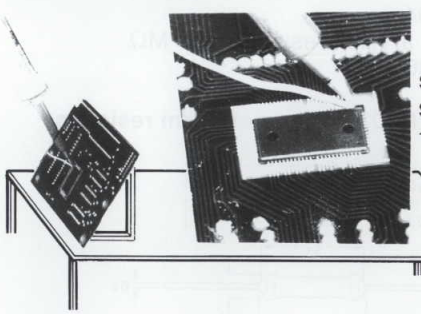
MOUNTING



FIXING IC
AT THE CORNERS

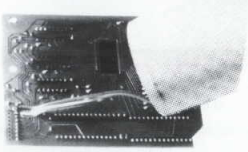


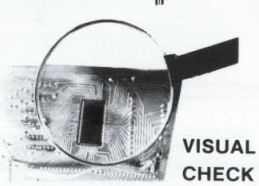
APPLYING FLUX



SOLDERING:
SPEED
1 CM IN 5 SEC.

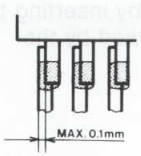
DRYING

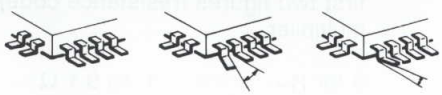




VISUAL
CHECK

ALIGNING THE LEADS





RIGHT WRONG WRONG

SOLDERING



RIGHT WRONG WRONG

Published in Heiloo, Holland.

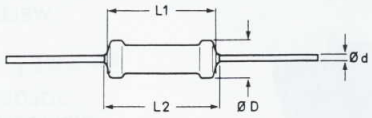
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3.4 CODENUMBERS FOR STANDARDIZED RESISTORS

Unless otherwise specified, all defective resistors in the circuits of the set can be replaced by standardizes types, mentioned in this chapter.

VR25, VR37 high-ohmic/high -voltage resistors



type	D_{max}	$L_{1\,max}$	$L_{2\,max}$	d
VR25	2,5	6,5	7,5	0,6

type	D_{max}	$L_{1\,max}$	$L_{2\,max}$	d
VR37	3.7	9.0	10.0	0.7

Range VR25 : 100 KΩ to 22 MΩ
Range VR37 : 100 KΩ to 33 MΩ

Composition of the service number for the VR25 and VR37
Main subgroup: 4822 053 20... and 4822 053 21...

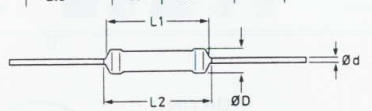
The codenumber above is completed by inserting the first two figures (resistance code) followed by the multiplier.

4 for R = 100K to 910 KΩ
5 for R = 1M to 9.1 MΩ
6 for R = or > 10M

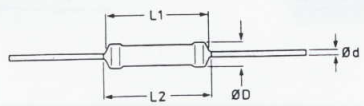
Example's:
The serv.nbr. for a VR25 resistor of 100 KΩ is 4822 053 20104
The serv.nbr. for a VR37 resistor of 33 MΩ is 4822 053 21336

PR01, PR02 and PR03 power metal film resistors

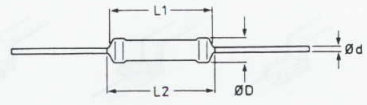
ϕD_{max}	L1	$L2_{max}$	ϕd
2.5	6.5	8.0	0.6



ϕD_{max}	$L1_{max}$	$L2_{max}$	ϕd
3.9	10	11	0.8



ϕD_{max}	$L1_{max}$	$L2_{max}$	ϕd
5.2	16.7	17.9	0.8



Rated dissipation at T(amb) = 70 degrees :
PR01 = 1 Watt, PR02 = 2 Watt, PR03 = 3Watt

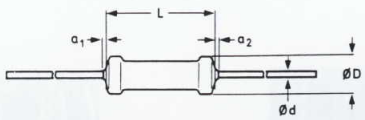
Composition of the service number for the PR01, PR02 and PR03
Main subgroup: 4822 053 10... ; 4822 053 11... and 4822 053 12...

The codenumber above is completed by inserting the first two figures (resistance code)followed by the multiplier.

8 for R= 1 to 9,1 Ω
9 for R= 10 to 91 Ω
1 for R= 100 to 910 Ω
2 for R= 1 to 9,1 KΩ
3 for R= 10 to 91 KΩ
4 for R= 100 to 910 KΩ
5 for R= or > 1 MΩ

Example:
The serv.nbr. of a PR01 resistor of 47 Ω is: 4822 053 10479
The serv.nbr. of a PR03 resistor of 1 MΩ is: 4822 053 12105

NFR25 fusible resistors ⚠



D_{max}	L_{max}	d	$a_1 + a_2$
2.5	6.5	0.6	⩽1

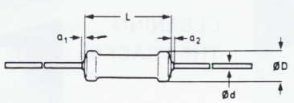
Composition of the service number for the NFR25
Main subgroup: 4822 052 10...

The codenumber above is completed by inserting the first two figures (resistance code)followed by the multiplier.

8 for R= 1 to 9,1 Ω
9 for R= 10 to 91 Ω
1 for R= 100 to 910 Ω
2 for R= 1 to 9,1 KΩ
3 for R= 10 to 91 KΩ

Example:
The service number of a resistor of 47 Ω is: 4822 052 10479

NFR25H fusible resistors ⚠



$D_{max.}$	$L_{max.}$	d	$a_1 + a_2$
2,5	6,5	0,6	⩽1

Composition of the service number for the NFR25H
Main subgroup: 4822 052 11...

The codenumber above is completed by inserting the first two figures (resistance code)followed by the multiplier.

8 for R= 1 to 9,1 Ω
9 for R= 10 to 91 Ω
1 for R= 100 to 910 Ω
2 for R= 1 to 9,1 KΩ
3 for R= 10 to 91 KΩ

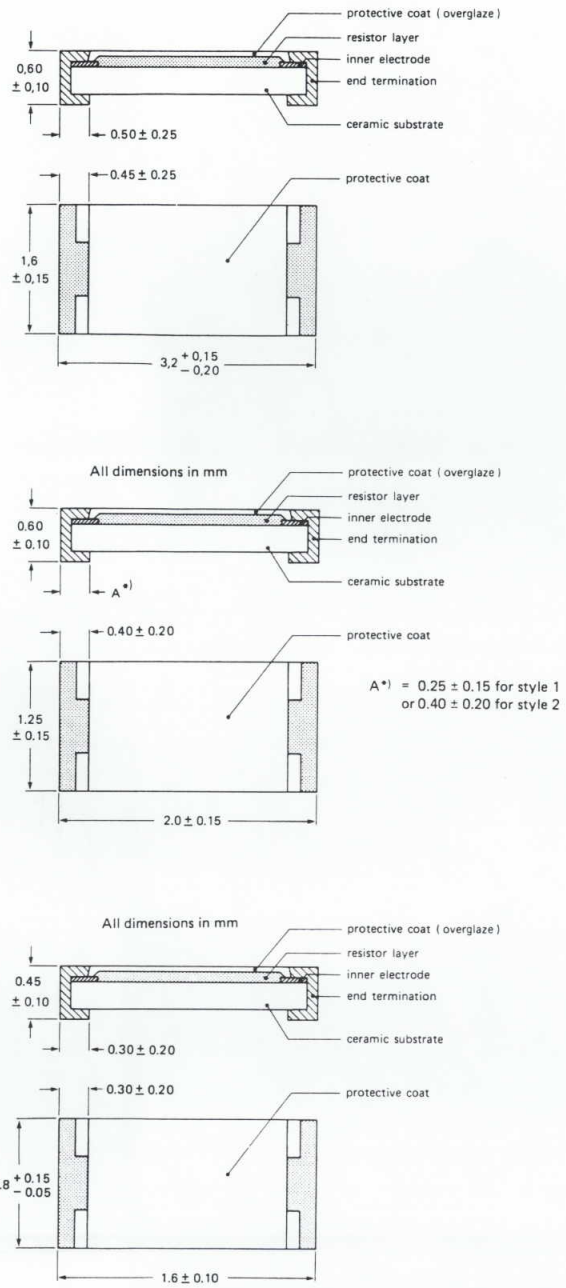
Example:
The service number of a resistor of 47 Ω is: 4822 052 11479

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RC-01, RC-11 AND RC-21 chip resistors



Absolute max. dissipation :
RC-01 : 0,25 W, RC-11 : 0,10 W, RC-21 :0,062 W.

Range: RC-01 0 Ω TO 10 MΩ
RC-11 0 Ω TO 10 MΩ
RC-21 0 Ω TO 6,8 MΩ

Composition of the service number for the RC-01,RC-11 and RC-21
Main subgroup: 4822 051 10... , 4822 051 20... and 4822 051 30...
The codenumber above is completed by inserting the first two figures (resistance code) followed by the multiplier.

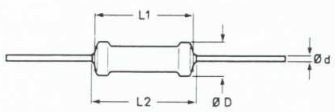
8 for R= 0 to 9.1 Ω
9 for R= 10 to 91 Ω
1 for R= 100 to 910 Ω
2 for R= 1 to 9.1 KΩ
3 for R= 10 to 91 KΩ
4 for R= 100 to 910 KΩ
5 for R= 1 to 9.1 MΩ
6 for R= or > 10 MΩ

Example's:
The serv.nbr. for a RC-01 resistor of

0 Ω is 4822 051 10008
The serv.nbr. for a RC-11 resistor of
0 Ω is 4822 051 20008
The serv.nbr. for a RC-21 resistor of
0 Ω is 4822 051 30008

The serv.nbr. for a RC-01 resistor of
10 Ω is 4822 051 10109
The serv.nbr. for a RC-11 resistor of
10 Ω is 4822 051 20109
The serv.nbr. for a RC-21 resistor of
10 Ω is 4822 051 30109

MRS16T metal film resistors with low-inductance



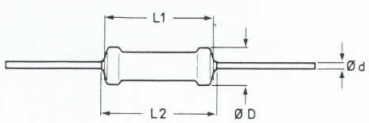
D	L	L2 max.	d
1,7 +0,2 −0,1	3,5 +0,2 −0,15	3,7	0,5 −0,04

Composition of the service number for the MRS16T
Main subgroup: 4822 050 1....
The codenumber above is completed by inserting the first three figures (resistance code)followed by the multiplier.

8 for R= 4,99 to 9,76 Ω
9 for R= 10 to 97,6 Ω
1 for R= 100 to 976 Ω
2 for R= 1 to 9,76 KΩ
3 for R= 10 to 97,6 KΩ
4 for R= 100 to 976 KΩ
5 for R= or > 1 MΩ

Example:
The service number of a resistor of 487 Ω is:
4822 050 14871

MRS25 metal film resistors (0,5%)



D	L1	L2 max	d
2,5	6,5	7,0	0,6 ± 0,03

Composition of the service number for the MRS25
Main subgroup: 4822 050 2....

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The codenumber above is completed by inserting the first three figures (resistance code)followed by the multiplier.

8 for R=	1	to 9,76 Ω
9 for R=	10	to 97,6 Ω
1 for R=	100	to 976 Ω
2 for R=	1	to 9,76 KΩ
3 for R=	10	to 97,6 KΩ
4 for R=	100	to 976 KΩ
5 for R=	1	to 9,76 MΩ

6 for R= or > 10 MΩ

Example:
The service number of a resistor of 976 Ω is:
4822 050 29761

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3.5 CENTRAL REPAIR PROCEDURE OF THE MAINBOARD

If the defective item is in the circuitry of the µP section, CIAP section or digital video section, then the complete main board must be replaced and sent back to a local central repairshop.
Relevant sections are displayed when using the diagnostic programme (chapter 5) and are marked by silkscreening in the layout of the board.
Dealers must contact the national Service Centers for this procedure. See further on in this chapter 3.6 for instructions and addresses.

If the defective item is in the circuitry of the SERVO section, analog audio or analog video section then the main panel can be repaired by the authorized dealer down to component level.
For partslist see chapter 8 .

Remark :
The defect on the board can be isolated and found by means of built-in diagnostics :
(See chapter **5 SERVICE SOFTWARE**)

1. Low Level test (in short LLtest)
2. Service Shell

3.6 REPAIR PROCEDURE OF THE MAINBOARD IN YOUR COUNTRY

3.6.1 Repair procedure for NORTH AMERICA Customers

- Return defective Main boards to the following address :

PHILIPS SERVICE COMPANY
907 SNAPP FERRY ROAD
GREENEVILLE, TN 37743

- Re-use original packaging to return the part to Philips.
- Use standard NARDA form to receive Warranty credit, Dud credit or Defective shelf stock credit. Form must be filled out completely.
  Describe the defect condition in detail.
- ALL RETURN ITEMS ARE SUBJECT TO INSPECTION FOR MISUSE OR ABUSE. PHILIPS RESERVES THE RIGHT TO REFUSE CREDIT ON SUCH ITEMS
- Damaged or cracked boards will be refused for credit.

3.6.2 Procedura di Riparazione ITALIA

Nel caso in cui il prodotto non funzioni correttamente o sia difettoso si prega di contattare il Centro Assistenza Tecnica Autorizzato di zona (consultare l'elenco telefonico provincia alla voce Philips Service).
Si raccomanda di leggere attentamente le istruzioni d'uso prima di interpellare il Centro Assistenza Autorizzato. Per ulteriori informazioni si consiglia di interpellare :

SERVIZIO CONSUMATORI PHILIPS
PIAZZA IV NOVEMBRE 3
20124 MILANO

FAX: 02 - 67 52 26 60
TEL.: 167 - 82 00 26 (Linea verde)

3.6.3 Reparatur Prozedur OSTERREICH

Bitte richten Sie alle weiteren Fragen an den PHILIPS SERVICE ZENTRALE:

Osterreichische Philips Industrie GmbH
Service Zentrale
Gutheil - Schodergasse 12
A-1100 WIEN

TEL.: (0222) 60 101-0
FAX: (0222) 60 101-5596

3.6.4 Reparatur Prozedur SCHWEIZ
Procedura di Riparazione SVIZZERA
Procédure de réparation SUISSE

Bitte richten Sie alle weiteren Fragen an Ihr "Philips info Center":
Per qualunque domanda in questione rivogetevi p.f. al vostro "Centro Philips d'Informazione":
Pour toustes autres questions, veuillez vous adresser à "Philips Info Center":

PHILIPS INFO CENTER
c/o SERLOG SERVICE + LOGISTIK AG
FEGISTRASSE 5
CH-8957 SPREITENBACH

TEL.NR. 056/70 72 70
FAX.NR. 056/70 75 75

3.6.5 Proceso de Reparación ESPAÑA

Para el proceso centralizado de reparaciónes de CD-i puede ud. Tomar contacto con el Sr. J.J. Morillas o Sr. Lluch. Dirección :

EUROSERVICE (SERVICE SPAIN)
BRUCH 147 - 149
08037 BARCELONA

TEL.NR. 34 3 2070100
FAX.NR. 34 3 4574894

3.6.6 Reparaturabwicklung DEUTSCHLAND

Das fehlerhafte Mainboard muss in ESD-sicherer Verpackung mit detaillierter Fehlerbeschreibung an die hierunter genannte Adresse gesandt werden.
Die Rücksendung des defekten Mainboards erfolgt an folgende Adresse:

PHILIPS CE GmbH
CONSUMER ELECTRONICS
SERVICE ORDERDESK
z.Hd. Frau Billert
ALEXANDERSTR. 1
20099 HAMBURG

3.6.7 Procédure de réparation FRANCE

- Commander le circuit principal
- ré-utiliser l'emballage initial pour retourner la pièce à SERVICE SA
- Retourner les principales pièces défectueuses à l'adresse suivante :

SERVICE SA
Service Retours / Pièces Détachées
Rue des Vieilles Vignes - BP 02
77311 - CROISSY BEAUBOURG

- Joindre le ticket de prélèvement de la pièce livrée
- Si la réparation est sous garanti, joignez une demande de remboursement

Remarque : Si le circuit défectueux n'est pas retourné dans les 8 jours qui suivent la livraison de la piéce de remplacement, une facture complémentaire sera établie.

3.6.8 Other countries

For the **not** above mentioned countries please contact your local PHILIPS organization via the usual channels to obtain instructions "how and where" to send the CDI450 mainboards.

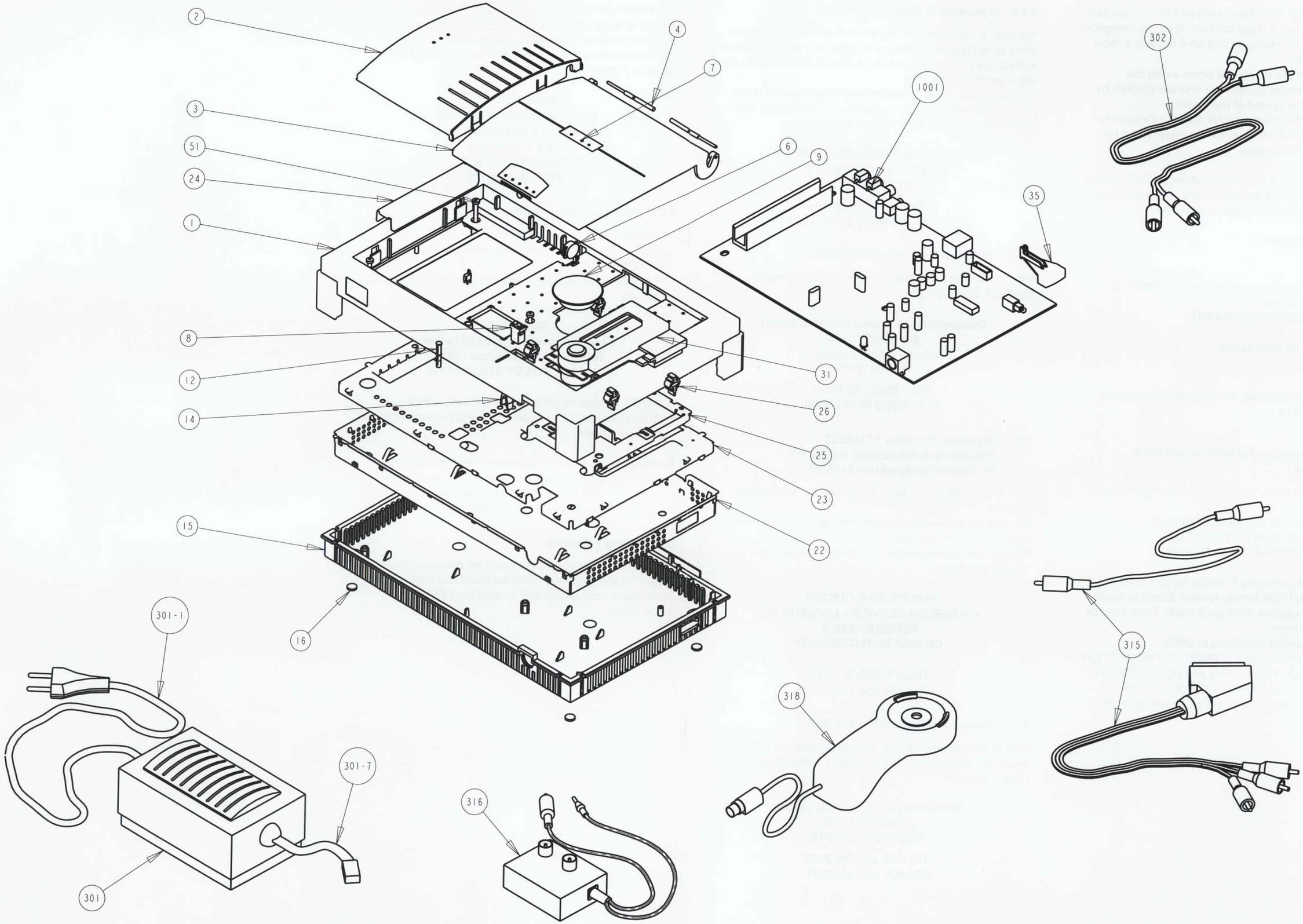
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4 MECHANICAL DRAWINGS

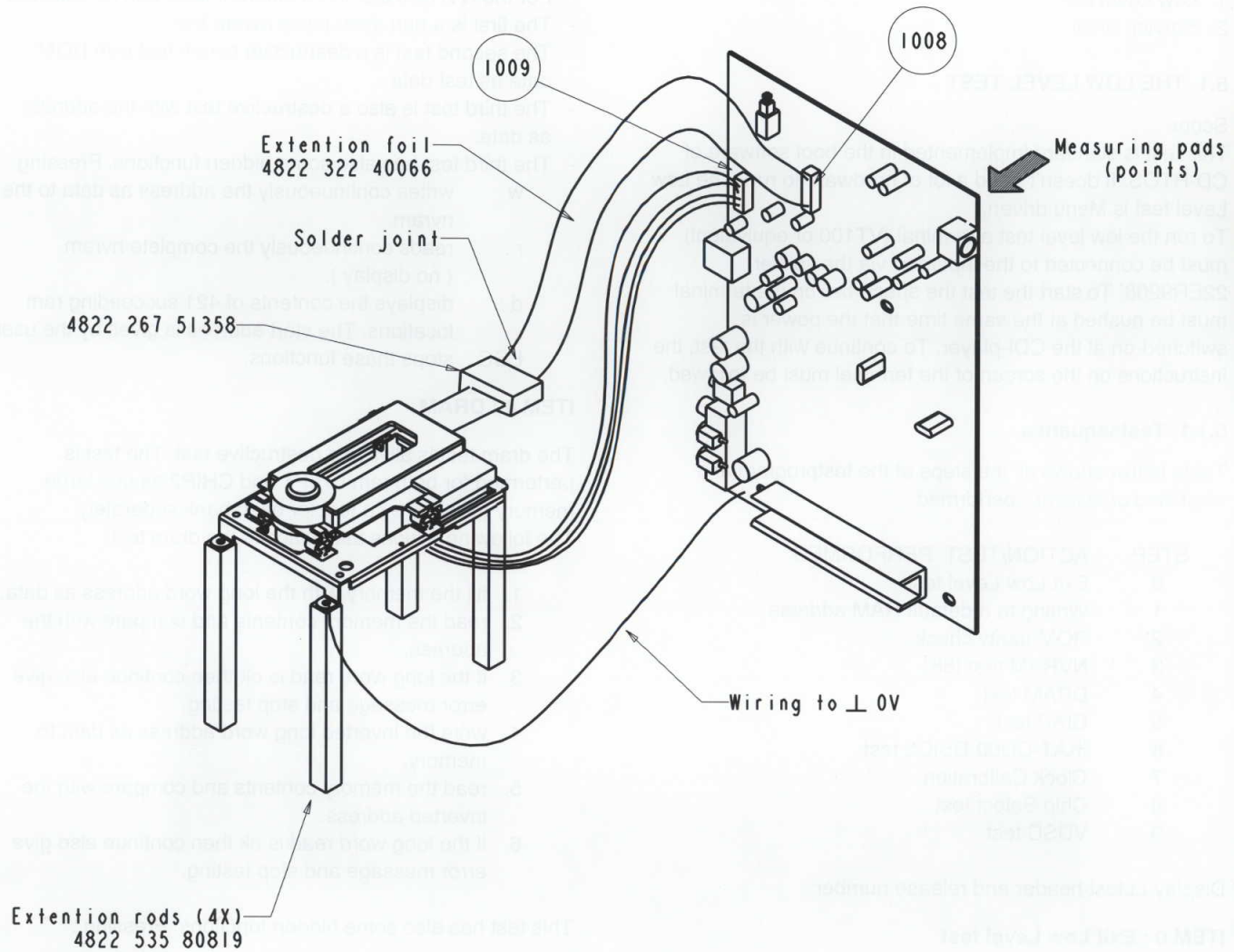
4.1 Exploded view of the cabinet



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4.2 Service position



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5 SERVICE SOFTWARE

In the set there are 2 different testsoftware available:

1. Low Level test
2. Service Shell

5.1 THE LOW LEVEL TEST

Scope
This test is standard implemented in the boot software of CD-RTOS. It doesn't need a lot of hardware to run. The Low Level test is Menu driven.
To run the low level test a terminal (VT100 or equivalent) must be connected to the inputport via the splitter 22ER9208. To start the test the space-bar on the terminal must be pushed at the same time that the power is switched-on at the CDI-player. To continue with the test, the instructions on the screen of the terminal must be followed.

5.1.1 Testsequence

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

STEP	ACTION/TEST PERFORMED
0	Exit Low Level test
1	Writing to a default RAM address
2	ROM parity check
3	NVRAM test (8K)
4	DRAM test
5	CIAP test
6	IKAT-CD60-DSIC2 test
7	Clock Calibration
8	Chip Select test
9	VDSC test

Display LLtest header and release number

ITEM 0 : Exit Low Level test

Selecting this item will end the lltest and continue with the boot. After the boot the player shell is started up.

ITEM 1 : Writing to a default RAM address

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

ITEM 2: ROM parity check (System 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.
  If the checksum is not ok then a specific error will be displayed.

ITEM 3 : NVRAM test

- For the NVRAM test three different tests can be selected:
- The first is a non destructive nvram 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 continueously the address as data to the nvram.
  - r : reads continueously 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.

ITEM 4 : DRAM

The dram test is always a destructive test. The test is performed for both ram CHIP1 and CHIP2 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 continueously the long address as data to the dram.
- r : reads continueously 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.

ITEM 5 : CIAP test

1. Read contents of Indentification Register (IDR) and diplay version : "CDxx"
   Example : CD01 is for CIAP1.0, CD02 IS for CIAP 1.5
2. Start Built-in Self-Test (BIST). Display BIST signature :

Device	Long BIST	Short BIST
CIAP 1.0		F286
CIAP1.5(ES2)	75B0	BBCD
CIAP1.5 - (MOT)	1F5C	1BF4

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

ITEM 6 : IKAT test

1. 8 data lines are tested. If one data line is defective then the errormessage will display the number(0..7) of the defective dataline.
2. Display the versionnumber of the IKAT software. (IKAT: 50 = VERSION 5.0)

ITEM 7 : CLOCK CALIBRATION

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

- Measure the frequency of the CS of the CIAP :pin 25 of IC7310, CSCIAPN!
- 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, then check if everything is set and connected properly.
  (range : 511,96724 to 512,03276 Hz)
- Press a key on the terminal to stop the measurement.
- Now fill in the measured value of the frequency. The lltest software will now calculate the proper value to be filled into the calibration register of the clock & calendar IC7241.
  The value of the frequency at pin 25 of IC7310 will not be changed or influenced.
- The calibration is done now.

ITEM 8 : Chip Select test

This step is only intended to be used with an oscilloscope. The software will generate a Chip Select pattern for All devices.It is not guaranteed that this test always runs. If one of the devices is defective (no DTACK) it will surely result in a hang-up of the testsoftware.
The devices are DRAM 1, DRAM 2, SYSTEM ROM, CIAP, IKAT and NVRAM.

ITEM 9 : VDSC test

1 Write continously $00 to the Display Decoder Registers of the master and slave.
2 Read continueously the contents of the Control Status Register (CSR).

5.2 THE SERVICE SHELL

Introduction.
For service purposes the CD-I set has built-in testsoftware modules. These modules can be activated via the service shell by menu.
The modules are for the testing of :
- Video circuitry, by means of a colorbar testpa tern
- CDM and servo circuitry. Testing the CDM and servo cicuitry in the service shell is only possible with a CD-DA disc.

5.2.1 Starting sequence of the service shell

1. Put the power off
2. Connect the RXD2 and TXD1 lines of the inputport at the front of the player (pin2 and pin3).
   Or insert testplug 4822 264 50263 into the inputport.
3. Put the power on and wait until the menu appears on the tv-screen.
4. Disconnect the shortcircuit of RXD2 and TXD1.
   Or remove the testplug.
5. Now connect a pointing device to the input port:
   Access of the menu can only be carried out by means of a "M"(ouse) pointing device like :

Tracker Ball	**4822 691 30298**
Mouse	**4822 691 30297**
Rollercontroller	**4822 691 30293**

selectable/non selectable items
Each menu of the service shell consist of a number of boxes and text strings. Some of these boxes can be selected by moving the screen cursor above the box and clicking on one of the pointing device 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 about errors in a box at the bottom of the screen. To remove such a message and continue a button must be clicked on the pointing device.

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.

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5.3.3 Subject dependent information

Main menu
The main menu contains three item boxes.

1. TEST IMAGE
2. CD DRIVE
3. EXIT

Selecting TEST IMAGE will give immediate action.
Selecting CD DRIVE will start the CD DRIVE test submenu.
Selecting EXIT will return to the normal usershell.

Test image
A video (75%)colorbar with 750 mV level white bar is generated and send to the video output.

CD drive test

1. First of all the communication with the CD part is checked then after clicking on one of the buttons the IKAT version is displayed.
2. After clicking on one of the buttons the CD drive test menu will appear. The CD drive test will perform the service loop as implemented in the Philips CD audio players. A CDDA disc is needed for this test. Results of this test will be displayed on the tv-screen.
3. When the cd drive test is selected, the next items can be selected:
   - ARM OUT. Clicking on this item will result in a movement of the sledge with laser and the optical pickup to the outside area of the disc if the sledge is at the centre area of the disc.
   - ARM IN. Selecting this item will return the sledge to the centre area of the disc if it is at the outside.
   - NEXT MODE. Selecting this item will put the servo circuit into some modes (or steps). The modes are displayed in the red box on the right at the top of the screen, while messages are displayed in the red box on the left. The drive test consist of the following steps:

MODE 0
In mode 0, the ARM IN and ARM OUT buttons can be selected to move the sledge with the optical unit inwards and outwards.
Selecting NEXT MODE will bring the player in mode 1.

MODE 1
In mode 1 the IKAT processor will try to focus. If it manages to do so (a disc must be present!), the message IN FOCUS will appear in the left box. Otherwise, the message NO FOCUS will appear after the processor has tried to focus 3 times. 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. The message MOTOR OK will appear. If an error occurs, the message MOTOR ERROR APEARS and the test will return to mode 0.
Selecting NEXT STEP in mode 2 will bring the player in mode 3.

MODE 3
The radialservo is now activated and the message RADIAL TEST OK appears. The optical pick up will follow the tracks now and the sound is muted.
If an error occurs, an error message will be displayed and the test will return to mode 0.
NEXT STEP in mode 3 will bring the player in normal playing mode, but if something goes wrong at the bottom of the screen an error code ("CD error x")will be displayed.
The meaning of the "x" is in the next list :

0 = no error
1 = focus found
2 = focus error
3 = radial error
4 = turntable motor error
5 = search time error
6 = subcode error
7 = TOC error
8 = fatal sledge error

To exit the SERVICE SHELL the power must be switched off.

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6 ELECTRICAL DRAWINGS

6.1 BLOCKDIAGRAM with FUNCTIONAL SURVEY

The circuitry is build up on one double sided 4-layer main board and consists of the following functional parts and blocks:

Processor part
- CPU (SCC68070)
- IKAT (MC68HC05I8)
- System ROM (27C400)
- NVRAM/CLOCK

CD Interface and Audio Processor part
- CIAP 1.5 (-)

Digital Video part
- VDSC (Video Decoder and System Controller)
- CALVIN(Video Encoder)
- 1MB DRAM with two banks of 512 KB
- CVBS video out

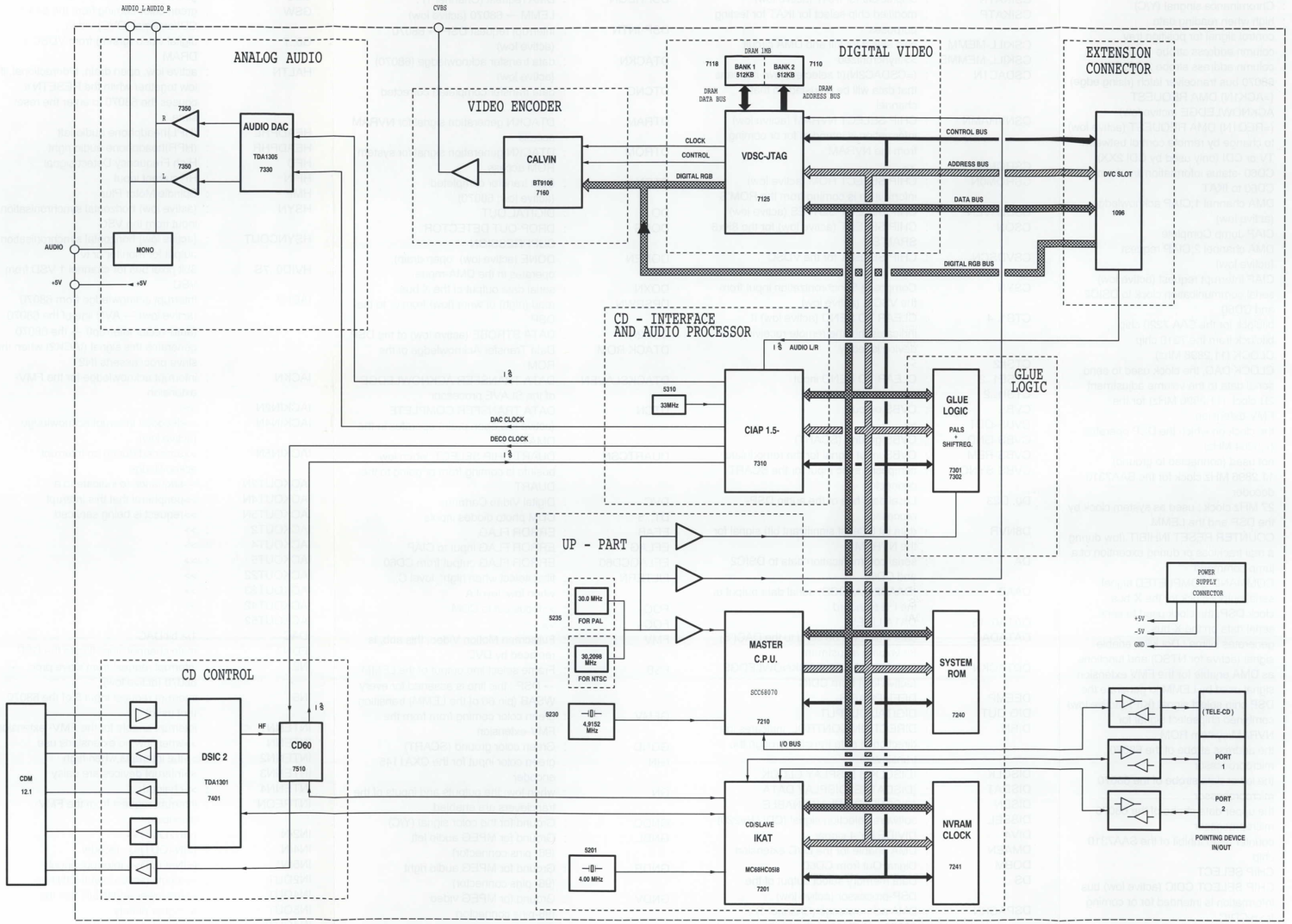
Chip Select and DTACKN generating glue logic
- PAL 16L8-10
- PAL 16R4-10

CD Control part
- CDM 12.1
- TDA 1301 (DSIC 2; Digital Servo IC for Controlling 2 stage 3 beam servo mechanisms)
- Additional discrete HF and defect detector circuits
- CD 60 (CD Decoder)

Audio part
- DAC (TDA 1305N2)
- Audio outputs L/R

External Power Supply
- +5V / -5V
- +5V Sense
- On/Off Sense

Interfaces
- CDM 12 interface (flex conn. pos.1008)
- Power supply inlet (pos.1001)
- Pointing device input/output (pos.1032)
- Extension connector (pos.1096)
- Audio outputs L/R (pos.1015)
- Video CVBS output (pos.1015)
- RF modulator power outlet (pos.1016)



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6.2 Alphabetical list of abbreviations

Remark: The list contains all abbreviations, which are ever used in CDI electrical circuitry

A,B,C +	:	>>control signals for brushless
A,B,C, -	:	>>DC-motor
ACK2N	:	DMA Request Acknowledge (active low)(of channel 2)
ACM	:	output AC-motor
ACK2NKON	:	DMA Request Acknowledge (96- pins connector, channel2 : FMV)
ADEN	:	(=ADENA)Address Enable Not. When low,the address ADENA coming from the bus (68070)
ADOCLK	:	output clock from the ADOC (11.2896 MHz)
AM	:	ADDITIONAL MUTE
ASN	:	ADDRESS STROBE (active low, tristate) indicates when an address is valid on the bus for the system
ASNP	:	ADDRESS STROBE from processor (active low)
ASPRAT	:	Aspect ratio switch signal (16:9 or 4:3)
AUDGND	:	Audio ground (SCART)
AUDL	:	>>AUDIO LEFT
AUDIOL	:	>>
AUDIOLSC	:	>> (scart)
AUDIOREM	:	Audio signal to remodulator
AUDR	:	>>AUDIO RIGHT
AUDIOR	:	>>
AUDIORSC	:	>> (scart)
AUDIO_CLK	:	16.93MHz clock (33.86MHz:2) from CIAP to CD60 and audio DAC
AVN	:	Auto Vectored Interups (active low), can be used by an extension
A0..15	:	Local addressbus of the audio DSP-processor
B0..7	:	digital video (blue) from VDSC > DRAM
B0CD..B3CD	:	input control bits for off-, catch-, play status and DAC output current for radial motor
B,G,R	:	output colours of the VSD
BERRN	:	>>BUS ERROR (active low, open drain)
BFMV	:	blue color coming from the DVC-extension
BGACKN	:	Bus Grant Acknowledge (active low)
BGN	:	Bus Grant (active low) access from the cartridge to the base system via bus mastership
BGND	:	Blue color ground (SCART)
BIN	:	blue color input for the encoder
BLANI	:	(=BLAN1M) Blanking Output (active low, tristate) of the VSC
BRN	:	Bus Request (active low) access from the cartridge to the basecase system via bus mastership
BSC	:	blue color (scart)
BSW	:	blue color coming from the switch CDI/external (FMV) video
BUGCD60	:	CD60 anti - hangup line
BUSYLED	:	signal to control green busy LED driver
C	:	Chrominance singnal (Y/C)
CADDYIN	:	high when reading data
CADDYSWITCH	:	control signal for position tray
CAS1N	:	column address strobe 1 (VDSC)
CAS2N	:	column address strobe 2 (VDSC)
CBA	:	68070 bus tranceiver latch (rising edge)
CDICDACKN	:	(=ACK1N) DMA REQUEST ACKNOWLEDGE (active low)
CDICREQN	:	(=REQ1N) DMA REQUEST (active low)
CDTV	:	to change by remote control between TV or CDI (only used by CDI 2XX)
CD60_V2	:	CD60 -status information line from CD60 to IKAT
CIAPACKN	:	DMA channel 1;CIAP acknowledge (active low)
CIAPJUC	:	CIAP Jump Complete
CIAPREQN	:	DMA channel 2;CIAP request (active low)
CIAP_INTN	:	CIAP interrupt request (active low)
CL	:	serial communication clock to DSIC2 and CD60
CLAB=CLAB2	:	bitclock for the SAA 7220 chip
CLABCD	:	bitclock from the 7310 chip
CLK=2BLCK	:	CLOCK (11,2896 Mhz)
CLKDAC	:	CLOCK DAC, the clock used to send serial data to the volume adjustment
CLKF	:	2B-clock (11,2896 MHz) for the FMV-extension
CLK1	:	the clock on which the DSP operates (7,5264 MHz)
CLK11	:	not used (connected to ground)
CLK3A	:	11.2896 MHz clock for the SAA7310 decoder
CLOCK_27	:	27 MHz clock : used as system clock by the DSP and the LEMM
CRI	:	COUNTER RESET INHIBIT (low during a real trackloss or during excention of a jump command
COC	:	COMMAND COMPLETED signal
COXN	:	serial output clock for the X-bus
COXNDSP	:	clock DSP, the clock used to send serial data on the X-bus
CSDMAKILL	:	generates killme : Dot killer enable signal (active for NTSC) and functions as DMA enable for the FMV extension
CSDSPN	:	signal used by LEMM to generate the DSP chip select signal (KIP) (active low)
CST	:	combined chipselect signal for NVRAM/system ROM
CPUASN	:	the address strobe of the 68070 microprocessor
CPULDSN	:	the lower data strobe of the 68070 microprocessor
CPUUDSN	:	the upper data strobe of the 68070 microprocessor
CRI-DODS	:	counter reset inhibit of the SAA7310 chip
CS	:	CHIP SELECT
CSCDICN	:	CHIP SELECT CDIC (active low) bus information is intended for or coming from CDIC
CSIKATN	:	chip selekt for IKAT (active low)
CSIKATP	:	modified chip select for IKAT for testing purposes
CSKILL-MEMM	:	chip select for kill and DMA circuit.
CSKILL-MEMMS	:	>> syncronized
CSDAC1N	:	(=CSDAC2N)(if selected, low) it means that data will be adjusted on that channel
CSNVRAMN	:	CHIP SELECT NVRAM (active low) information is intended for or coming from the NVRAM
CSROMN	:	>>
CSROM0N	:	CHIP SELECT ROM (active low) information is coming from the ROM'S
CSSLAVEN	:	CHIP SELECT SLAVES (active low)
CSON	:	CHIP SELECT (active low) for the 8Kx8 SRAM'S
CSVDSCN	:	CHIP SELECT for the VDSC (active low)
CSYN	:	Composite Synchronization input from the VSC'S (active low)
CTS1..4	:	CLEAR TO SEND (active low) it indicates that the remote receiving device is ready
CTS#2	:	>>
CTSE1..2	:	CLEAR TO SEND input
CTSI1..2	:	>>
CVBS	:	CVBS output
CVBS-OUT	:	>>
CVBS-GND	:	CVBS ground (SCART)
CVBS-REM	:	CVBS input signal for the remodulator
CVBS-SYNC	:	composite sync input for the SCART connector
D0..D23	:	Local data bus of the audio DSP-processor
D8NVR	:	data bit 8 (least significant bit) signal for the NVRAM
DA	:	serial communication data to DSIC2 and CD60
DAAB	:	(DAAB2,DAABCD) serial data output of the I^2S standard
DATA0..15	:	DATA LINES
DATADAC	:	data which will be send to the DAC('S) for volume adjustment
DDTACKN	:	DATA TRANSFER ACKNOWLEDGE (active low) from CDIC
DEEMP	:	DEEMPHASIS
DIG OUT	:	DIGITAL OUTPUT
DIRN	:	DIRECTION CONTROL. indicates the direction of data transfer through the transievers
DISCLK	:	(DISCLKE) DISPLAY CLOCK
DISDAT	:	(DISDATAE) DISPLAY DATA
DISEN	:	(DISENE) DISPLAY ENABLE
DISSEL	:	software selection signal (CDI210/220)
DIV4	:	DIVIDE BY 4 signal
DMAEN	:	DMA enable for the DVC extension
DOBM	:	Digital Out from CD60
DS	:	Data memory select output of the DSP-processor (active low)
DSPACKN	:	DMA acknowledge (Channel 1) : 68070 → LEMM (active low)
DSPREQN	:	DMA request (Channel 1) : LEMM → 68070 (active low)
DSP-INTN	:	interrupt request DSP → 68070 (active low)
DTACKN	:	data transfer acknowledge (68070) (active low)
DTCNC	:	data transfer completed corrected (CDIC)
DTRAM	:	DTACKN generation signal for NVRAM access
DTROM	:	DTACKN generation signal for system ROM access
DTCN	:	Data transfer completed (active low; 68070)
DO	:	DIGITAL OUT
DODS	:	DROP-OUT DETECTOR SUPPRESSION
DONEN	:	DONE (active low). open drain), operates in the DMA-mode
DOXN	:	serial data output of the X-bus
DPSRWN	:	read (high) or write (low) from or to the DSP
DSN2N	:	DATA STROBE (active low) of the DSP
DTACK ROM	:	Data Transfer Acknowledge of the ROM
DTACKSLAVEN	:	DATA TRANSFER ACKNOWLEDGE of the SLAVE processor
DTCN	:	DATA TRANSFER COMPLETE (active low,open drain) operates in the DMA mode
DUARTCSN	:	DUART CHIP SELECT, when low businfo is coming from or going to the DUART
DVC	:	Digital Video Cartridge
D1...5	:	CDM photo diodes inputs
EFAB	:	ERROR FLAG
EFLAG	:	ERROR FLAG input to CIAP
EFLAGCD60	:	ERROR FLAG output from CD60
FILTERN	:	filter select when high: level C, when low: level A
FOC–	:	>>focus out to CDM
FOC+	:	>>
FMV	:	Fullscreen Motion Video, this abb. is replaced by DVC
FSB	:	Frame select line output of the LEMM → DSP : this line is asserted for every WSAB (pin 66 of the LEMM) transition
GFMV	:	green color coming from from the FMV-extension
GGND	:	Green color ground (SCART)
GIN	:	green color input for the CXA1145 encoder
GN	:	when low: the outputs and inputs of the trancievers are enabled
GNDC	:	Ground for the color signal (Y/C)
GNDL	:	Ground for MPEG audio left (96- pins connector)
GNDR	:	Ground for MPEG audio right (96- pins connector)
GNDV	:	Ground for MPEG video (96-pins connector)
GNDY	:	Ground for the luminance
GSC	:	green color (SCART)
GSW	:	green color coming from the switch CDI/external (DVC) video
G0..7	:	digital video (green) from VDSC > DRAM
HALTN	:	active low, open drain, biderectional. if low together whith the RESETN it couses the 68070 to enter the reset state.
HEADPHL	:	(HPL)headphone audio left
HEADPHR	:	(HPR)headphone audio right
HFD	:	High Frequency Detect signal
HFIN	:	HF current input
HMP	:	Spindle Motor Plus
HSYN	:	(active low) horizontal synchronisation input from the VSC
HSYNCOUT	:	(active low) horizontal synchronisation output for monitor or tv
HVID0..7S	:	8bit pixel bus for channel 1 VSD from VSC
IACK2	:	Interrupt acknowledge from 68070 (active low) → AVN line of the 68070 (auto-vector interrupt) → the 68070 generates this signal (IACK2) when the slave proc. asserts IN2
IACKN	:	interrupt acknowledge for the FMV-extension
IACKIN2N	:	>>
IACKIN4N	:	>>decoded interrupt acknowledge (active low).
IACKIN5N	:	>>asserted during an interrupt acknowledge
IACKOUT2N	:	>>sequence to indicate to a
IACKOUT4N	:	>>peripheral that this interupt
IACKOUT5N	:	>>request is being serviced
IACKOUT2	:	>>
IACKOUT4	:	>>
IACKOUT5	:	>>
IACKOUT22	:	>>
IACKOUT23	:	>>
IACKOUT42	:	>>
IACKOUT52	:	>>
IDAC	:	1/2 bit DAC
IFDN2	:	main channel word-flag to the DSP
IN2	:	interrupt request from slave proc. → 68070 (active low)
IN5	:	interrupt request input 5 of the 68070 (not used)
INTENN1	:	interrupt enable for the FMV- extension
INTENN	:	>>when low,no extensions use
INTENN2	:	>>the interupts,when high
INTENN3	:	>>interupt devices are daisy
INTENN4	:	>>chained
INTREQN	:	interrupt request from the FMV-extension
IN2IN	:	(=IN2OUT)>>
IN4IN	:	(=IN4OUT)>> decoder
IN5IN	:	(=IN5OUT)>> interrupt priority
IN2OUT	:	>>inputs (active low) IN2IN has
IN4OUT	:	>>the lower and IN5IN has the
IN5OUT	:	>>higher priority
IN4OUT2	:	>>IN2IN =
IN5OUT2	:	>>Slaveprocessor
IN2OUT3	:	>>IN4IN=cidcIN5IN=duart
IRQA	:	interrupt request from LEMM to DSP (active low) and mode A pin of the DSP (after the DSP reset, the DSP reads the level on this pin to define the mode of operation)
IRQABN	:	logical AND of the IRQA and the IRQB line (lemm output pin → DSP)
IRQB	:	interrupt request from LEMM → DSP (active low) and mode B pin of the DSP (after the DSP reset, the DSP reads level on this pin to define the mode of operation)
JUC	:	jump completed signal from servo proc. → LEMM
KILL	:	to mute audio outputs by power on and off
KILLME	:	(KILL-ME)dot killer enable signal (active for NTSC)
KIP	:	host enable input pin of the DSP-processor : this signal enables a transfer on the DSP host bus DATA 0..7 (active low)
LA1	:	>>control signals for brushless DC motor
LB1	:	>>
LC1	:	>>
LADD1..23	:	ADDRESS-BUS (active high, tristate) for direct addressing of 16 Mbyte of memory
LBOT	:	for HPL volume control
LDSN	:	LOWER DATA STROBE of the bus
LIDSWITCH	:	Lid detection switch
LM	:	LASER MONITOR diode input
LO	:	laser amplifier current OUTPUT
LRDN	:	when low select,the ROM'S or NVRAM read the lower data byte
LTAP	:	>>for HPL volume control
LTOP	:	>>
LVID0IN..7IN	:	>>8 bit pixel-bus for channel 2
LVID0OUT..7OUT	:	>>(VSC SLAVE)
LWN	:	read/write enable (for the lower part of the data: MD0..7) for the DRAM (VDSC)
LWRSN	:	R/W lower memory data to DRAM from VSC slave
LWRMN	:	R/W lower memory data to DRAM from VSC master
MA0..8	:	VDSC DRAM address bus
MC	:	MOTOR CONTROL signal
MD0..15	:	VDSC DRAM data bus
MISO	:	MASTER IN SLAVE OUT
MOSI	:	MASTER OUT SLAVE IN
MPEGL	:	left audio signal color coming from the DVC-extension > goes the adder CDI/FMV audio
MPEGR	:	right audio signal color coming from the FMV-extension > goes the adder CDI/DVC AUDIO
MSM	:	master slave selection input

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MSMA0..8 : ADDRESS-BUS between the DRAM'S of the VSC'MASTER and the VSC MASTER
MSMD0..15 : DATA-BUS between the DRAM'S of the VSC'MASTER and the VSC MASTER
NCSYNV : composite sync for the VDSC
NHSYN : active low horizontal sync input for the FMV-extension
NPORE : Power on Reset for CD60 (active low)
NRESET : when low the video synthesizer is in reset
NVDS : digital output to control an external switch for TV overlays (active low)
NVDSI : >>synchronized with NXT2
NVDSN : Digital video switch - line (active low)
NVSYN : (active low) vertical sync input for the DVC
OTD : Off Track Detection from DSIC2
PCLK1IN : PIXEL CLOCK for channel 1
PCLK2IN : PIXEL CLOCK for channel 2
PLOIN1 : input clock for CDIC (22,5792 MHz)
PLOIN2 : input clock for CDIC (19,3536 MHz)
PLOIN : clock signals for emulator panel
PLOINE : >>
POTBL : headphone left volume control
POTBR : headphone right volume control
POTML : headphone left volume control
POTMR : headphone right volume control
PRTS11 : request to send from main processor
QCL : Q-channel CLOCK
QDA : Q-channel DATA
QRA : Q-channel REQUEST INPUT/ACKNOWLEDGE OUTPUT
Q22 : output to PLL (22,5792 MHz) devided by 14
Q21 : output to PLL (19,3536 MHz) devided by 12
Q_DATA : I^2S data from LEMM → audio DAC
Q_CLK : I^2S bit clock from LEMM → audio DAC
Q_WCLK : I^2S word clock from LEMM → audio DAC
RAB : hand shake protocol signal for CD60
RAD+ : >>RADIAL OUT to CDM
RAD– : >>
RASN : row address valid (active low) for the VDSC DRAM'S
RBOT : for HPR volume control
RC5 : wired RC input (cinch)
RC-EYEDIS : RC-EYE DISABLE signal (not used)
RCEYE : (RCEYEE)REMOTE CONTROL EYE
RCLED : REMOTE CONTROL LED
RD : READ signal DSP : this signal is asserted to read external memory (three SRAM'S FCB61C65) on the data bus D0..23 (active low)
RDN : READY signal, starting up procedure finished
RDYN : READY (active low) of the DMA channel
REDIG : RADIAL ERROR DIGITAL
REM : power supply remodulator
RESETCD : when low resetsequence starts
RESETINN : when low VSC is in reset
RESETN : this is the rest for all other ic's on keycomponents
RESETSYS : system reset (controlled by the slave-processor)
REQ2N : DMA-request of channel 2
REQ2NKON : DMA-request (96-pins connector, channel 2 : FMV
REQ2KON : DMA-request of channel 2 via DMA 2 on/off circuit
RFMV : red color coming from the DVC
RGBS_GND : incoming video SCART (not used) ground
RGND : red color ground (SCART)
RIN : red color input for the CXA1145 encoder
RSC : red color (scart)
RSTOUT : RESET OUT of the slave processor when high resetsequence starts
RSW : red color coming from the switch CDI/external (DVC) video
RTAP : >>for HPR volume control
RTOP : >>
RTS12 : REQUEST TO SEND 2 from IKAT
RTSE1..2 : REQUEST TO SEND
RTSI1..2 : REQUEST TO SEND
RTSUART : REQUEST TO SEND from the slave processor to the UART of the 68070 processor
RST1..4 : >>REQUEST TO SEND (active low)
RST#1..2 : >>
RWN : READ - WRITE (low is write) signal
RWN2 : READ - WRITE (low is write) signal from CDIC to the DSP
RWRAM : READ - WRITE signal from the CDIC to the S RAM'S
RXDE1..2 : RECIEVE DATA
RXDI1..2 : RECIEVE DATA
R0..7 : digital video (red) from VDSC > DRAM
RXD1..4 : >>RECIEVE DATA RXD is
XD#1..2 : >> data input
SCAB : subcode data clock (2,8224 MHz) from the SAA7310
SCK : serial clock output from the LEMM → DSP : the data and frame select for the DSP is clocked out on the rising edge of this clock
SCLK : I^2S clock out from CD60
SDAB : subcode data from the 7310
SDAT : I^2S data out from CD60
SERVORESETN : Reset for DSIC2 from IKAT
SI : on - off control for laser supply and focus circuit
SI-RD : on - off control for laser supply and focus circuit/ready signal, starting up procedure finished
SILD : Serial communication Load to DSIC2
SLEDGE : sledge motor control
SLEEPAUDN : Audio kill line (active low)
SLEEPVID : Video kill line (active low)
SLIDESW : SLIDE SWITCH ; detection of sledge - endposition
SLMA0..8 : VSC-slave memory address bus to the DRAM'S
SLMD0..15 : VSC-slave memory data bus to the DRAM'S
SOCKGND : socket ground (SCART)
SOXENN : SERIAL OUTPUT ENABLE FOR THE X-BUS (enabled when low)
SOXRQN : SERIAL OUTPUT REQUEST FOR THE X-BUS (when low)
SOYENN2 : SERIAL OUTPUT ENABLE FOR THE Y-BUS (when low)
SPICLK : SERIAL PERIPHERAL INTERFACE CLOCK
SPISS : (SPISSN) SERIAL PERIPHERAL INTERFACE SLAVE SELECT
SRD : serial data from LEMM → DSP
SRTS1 : request to send 1 from IKAT
STAND : NTSC or PAL selection signal
STANDARDOUT : software choise between PAL and NTSC
STANDARDSW : handware choise between PAL and NTSC
STANDEM : status from emulator, input for DUART
STANDEMEN : enable signal for switch signal on emulator
STANDIN : NTSC or PAL selection signal (input for slave)
STATUS : RF/external video selection signal
STATUSF : CVBS/RGB video selection signal
STD : serial data from DSP → LEMM
SSM : START STOP MOTOR
SWAB : SUBCODING WORD CLOCK INPUT
SWAB-SSM : subcoding word clock output and start/stop input of the SAA7310
SWCLK : I^2S Word Select Clock out from CD60
SWEM : software dat to switch on the emulator
SYSCLK : >>SYSTEM CLOCK
SYSCLKA : >>
SYSCLK1 : >>
SYSCLK2 : >>
SYSCLK3 : 33.86MHz system clock to CIAP
TCAP : input capture feature for the on-chip timer
TCMP : output for the output compare feature of the on chip timer
TDI : boundary scan input
TDOCIAP : boundary scan output of CIAP
TDOVDSC : boundary scan output of VDSC
TL : TRACK LOSS of the TDA8808 combined with the radial error signal of the TDA8809
TMOUT : TRAY MOTOR OUT
TMS : boundary scan control line
TRAY : tray open/close signal
TX2 : transmit data from IKAT
TXDE1..2 : transmit data
TXDI1..2 : transmit data
TXD1..4 : >>TRANSMIT DATA TXD is
TXD#1..2 : >>data output
UDSN : UPPER DATA STROBE (active when low)
URDN : READ UPPER DATA BYTE (active when low)
UWN : read/write enable (for the upper part of the data: MD8..15) for the DRAM (VDSC)
UWRN : Upper Write Read Not for NVRAM
UWRSN : read/write (write when low) Upper Memory Data from DRAM'S from VSC-SLAVE
VC : output DC-motor (Voltage Control)
VDSC-INTN : interrupt request of the VDSC
V-FLAG : output to the DSP
VREFA : Reference Voltage on audio DAC
VSCM-INTN : when low, interrupt from VSC master to 68070 processor
VSCS-INTN : when low,interrupt from VSC slave to 68070 processor
VSYN : (active when low) VERTICAL SYNCHRONISATION INPUT from the VSC
V1 : off track detection from DSIC2 to CD60
WIREDRC : see RC5
WR : write enable output of the DSP : this signal is asserted to write external memory (three SRAM'S FCB61C65) on the data bus D0..23 (active low)
WRMN : read/write (write when low) Upper Memory Data from DRAM'S from VSC-MASTER
WRN : WRITE UPPER DATA BYTE (active when low)
WRPN1M..S : control input for channel 1 or 2 (active low) of the VSD
WSAB : >>WORD SELECT from A to B
WSAB2 : >>CHIP
WSABCD : 11.2896 MHz bitclock (I^2S)
XINB : delayed clock XIN from CDIC > goes back to CDIC
XIN : >>11,2896/9,6768/4,8384
XIN2 : >>symmetrical clock
X-TAL2 : the same as the system clock,coming out of the VSC'S
XT2 : (XT2N) the system clock devided by two
XT4 : >>the system clock devided by
XT41N : >>four
XY : this DSP output signal selects which external memory space (X or Y) is selected
X_CLK : external audio I^2S -clock
X_DATA : external audio I^2S -data
X_WSIN : external audio I^2S -word select
Y : luminance signal (Y/C)
0AD..12AD : >>ADDRESS BUS, between
10ADA..12ADA : >>CDIC SRAM'S and SYSTEM ADDRESS BUS BUFFERS
0D..15D : DATA BUS between CDIC and DSP
0DA..15DA : DATA BUS between CDIC-SRAM'S and System Data bus trancievers
2BCLK : CLOCK for the 2 B-chip
12A..15A : ADDRESS BUS between CDIC and DSP

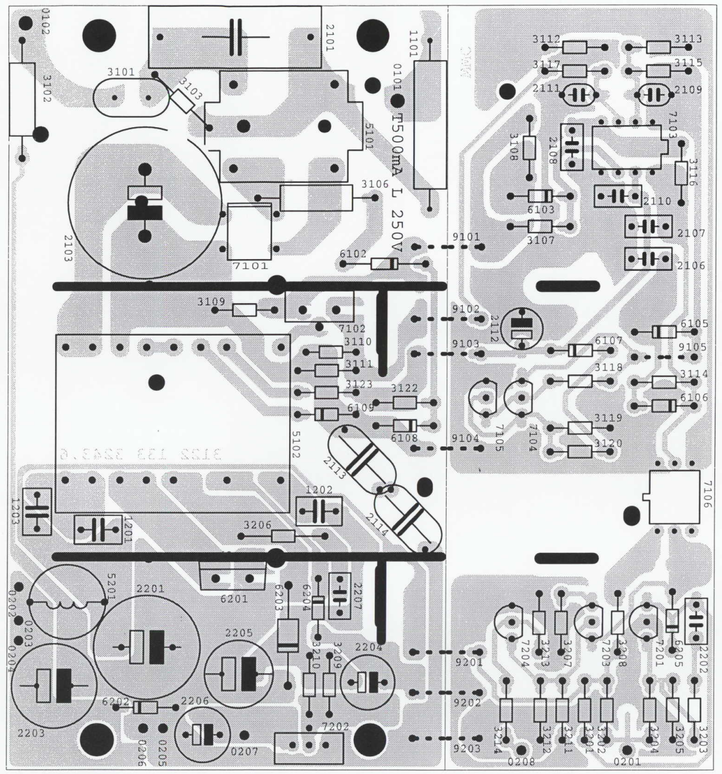
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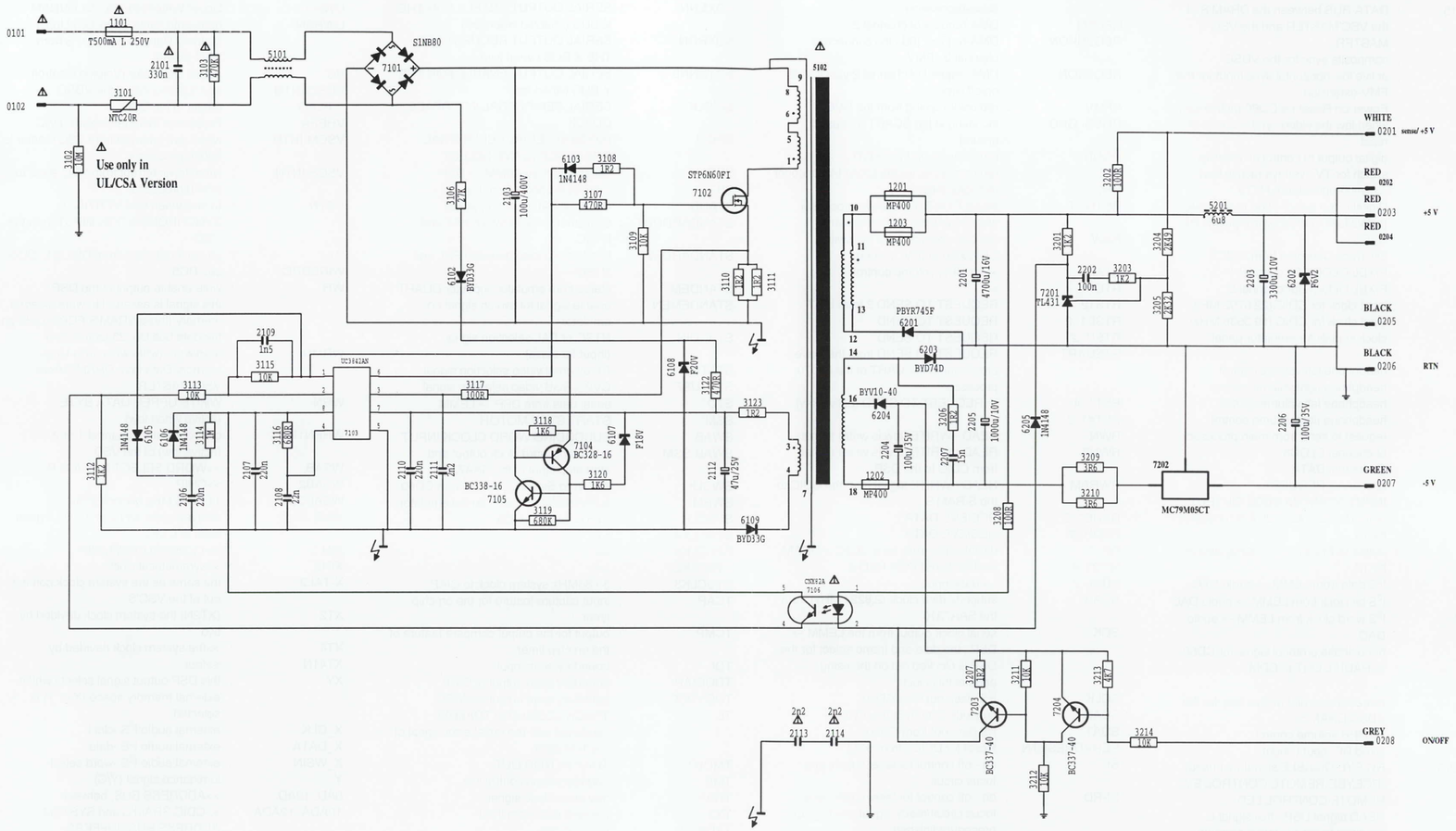
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6.3 POWER SUPPLY UNIT

6.3.1 Power supply PCB layout



6.3.2 Powersupply circuit diagram

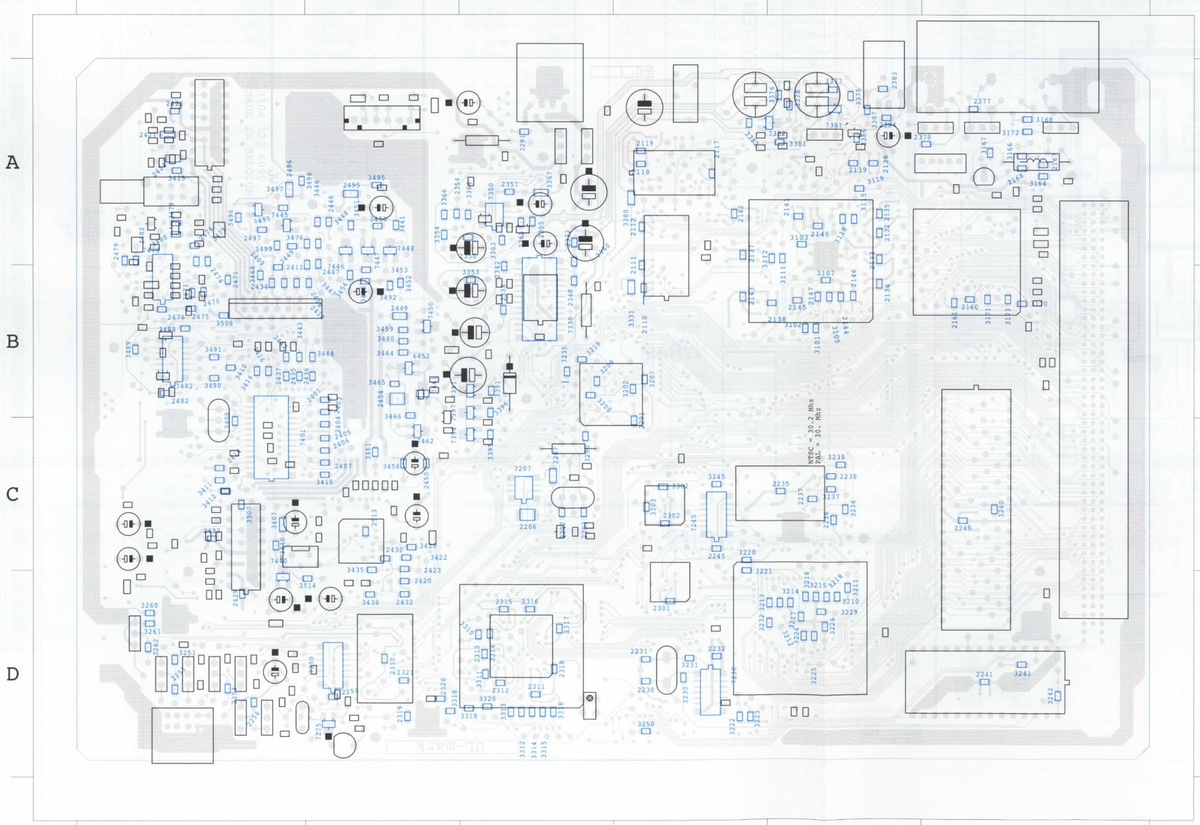


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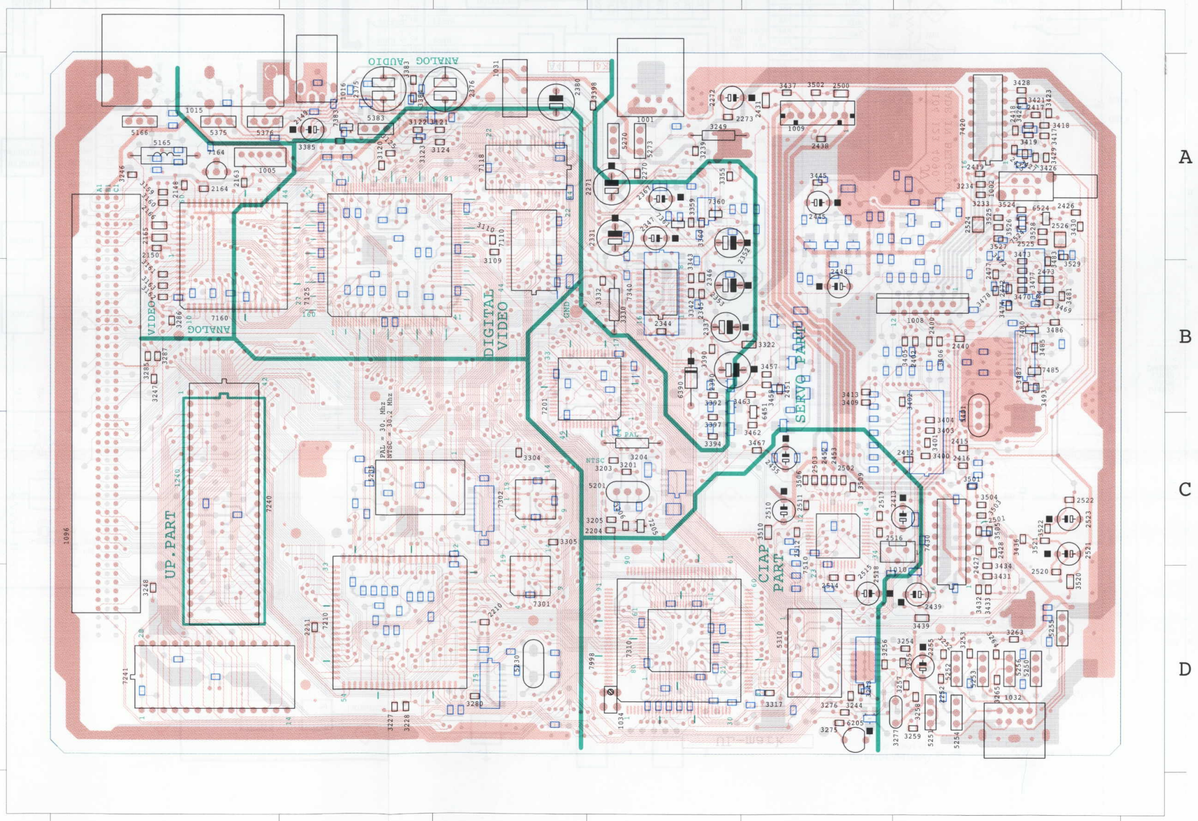
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6.4 MAINPANEL

6.4.1 Mainpanel PCB layout, Tracks side



6.4.2 Mainpanel PCB layout, Component side

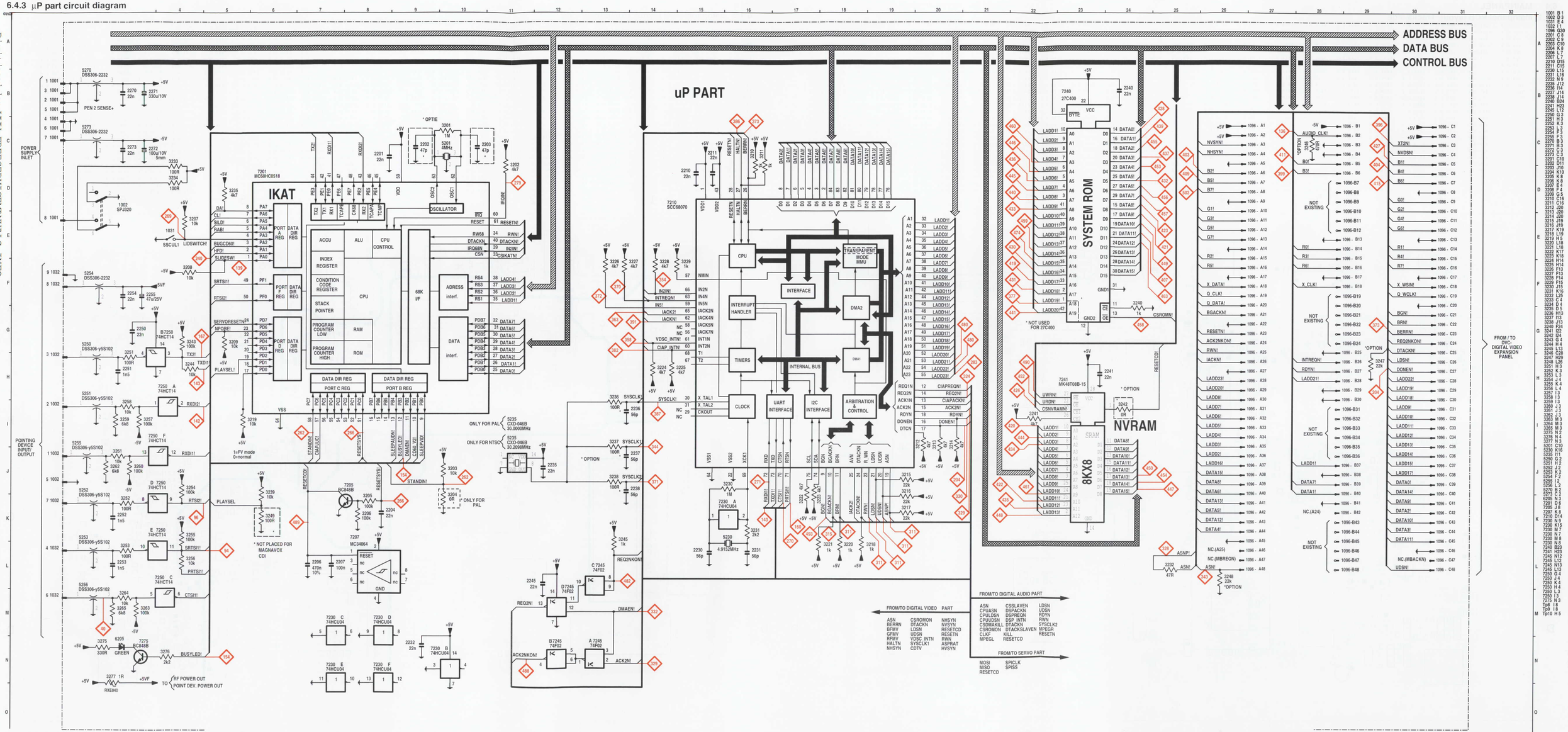


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6.4.3 µP part circuit diagram

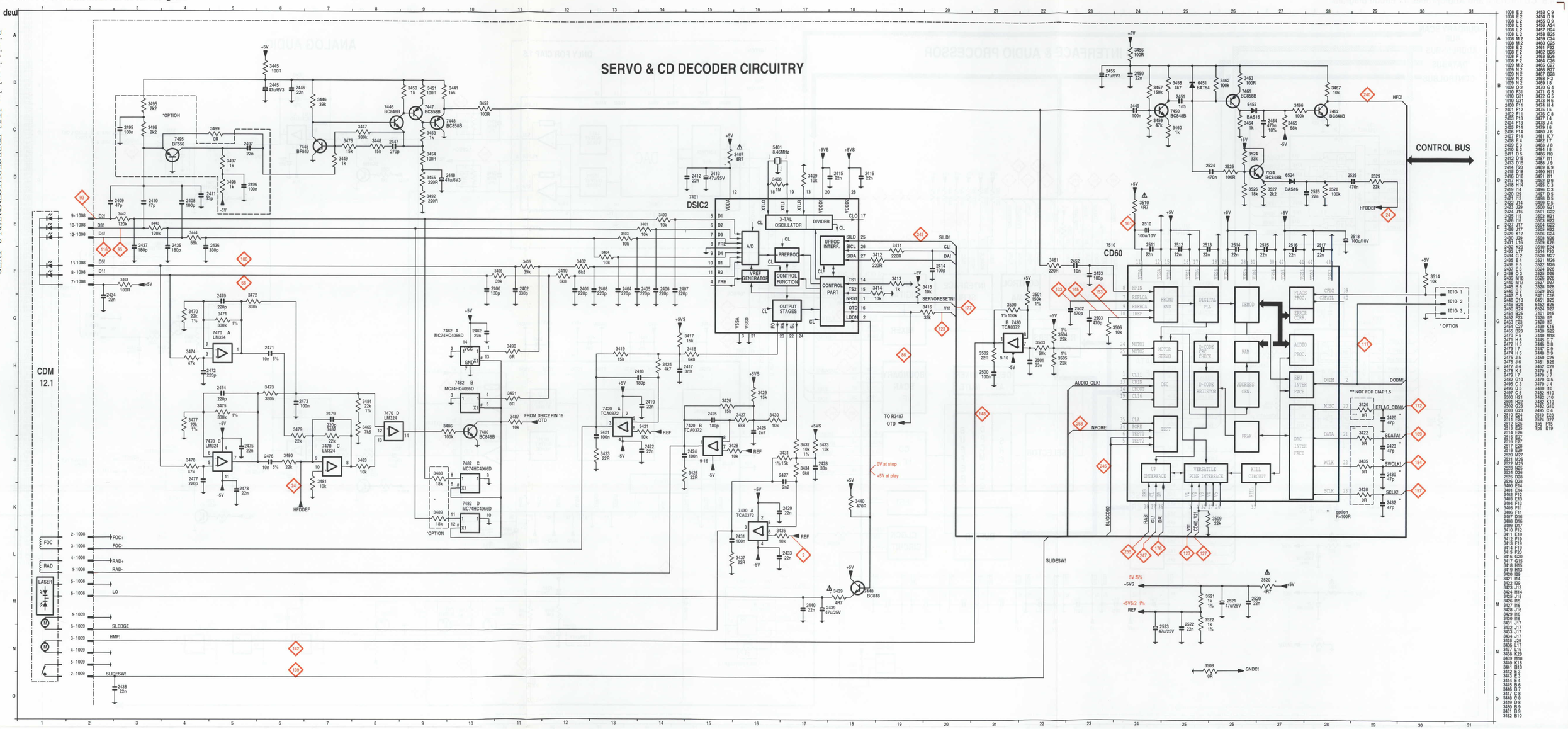


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6.4.4 Servo & CD Decoder circuit diagram

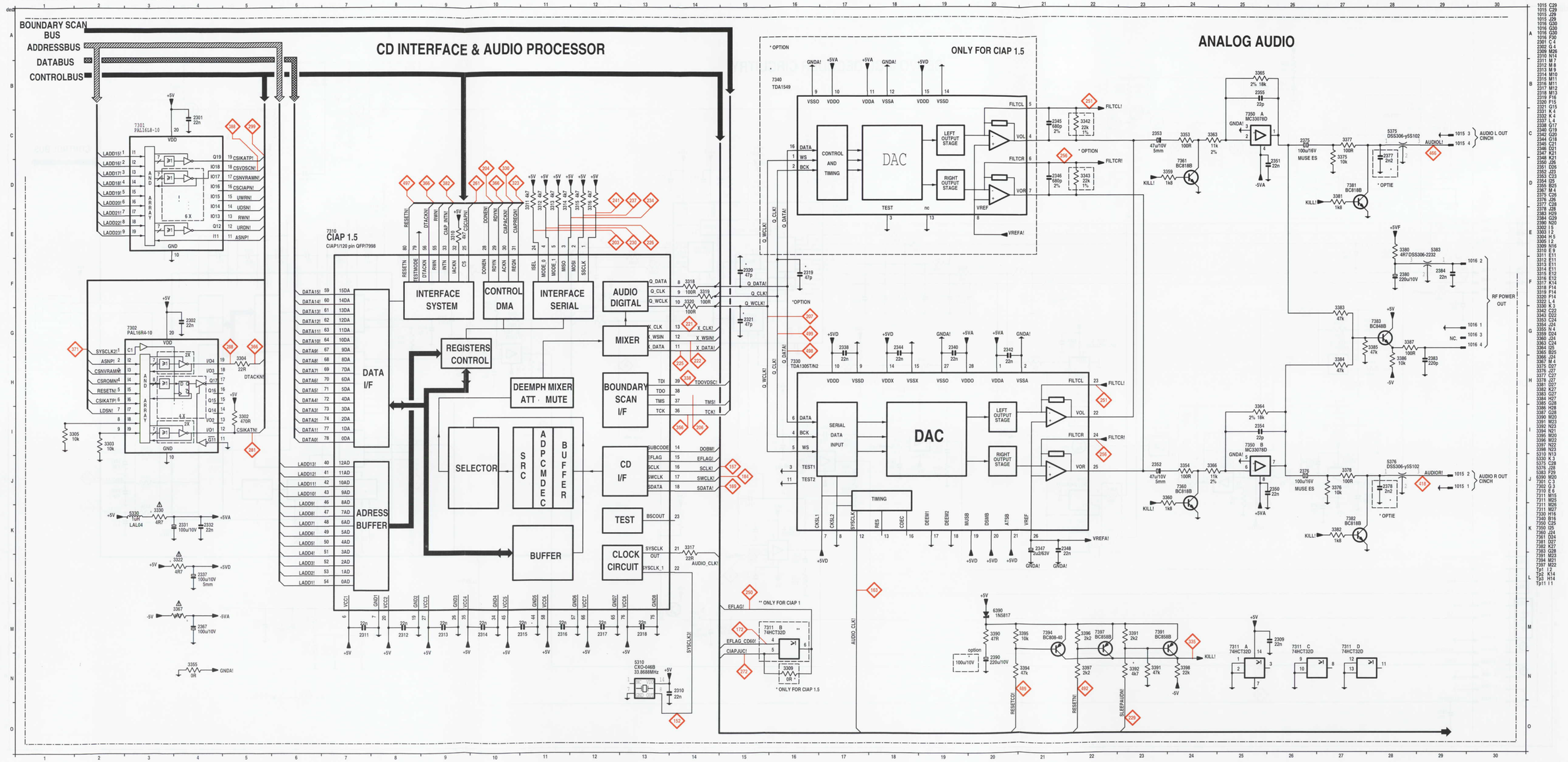


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6.4.5 CD interface and Audioprocessor circuit diagram

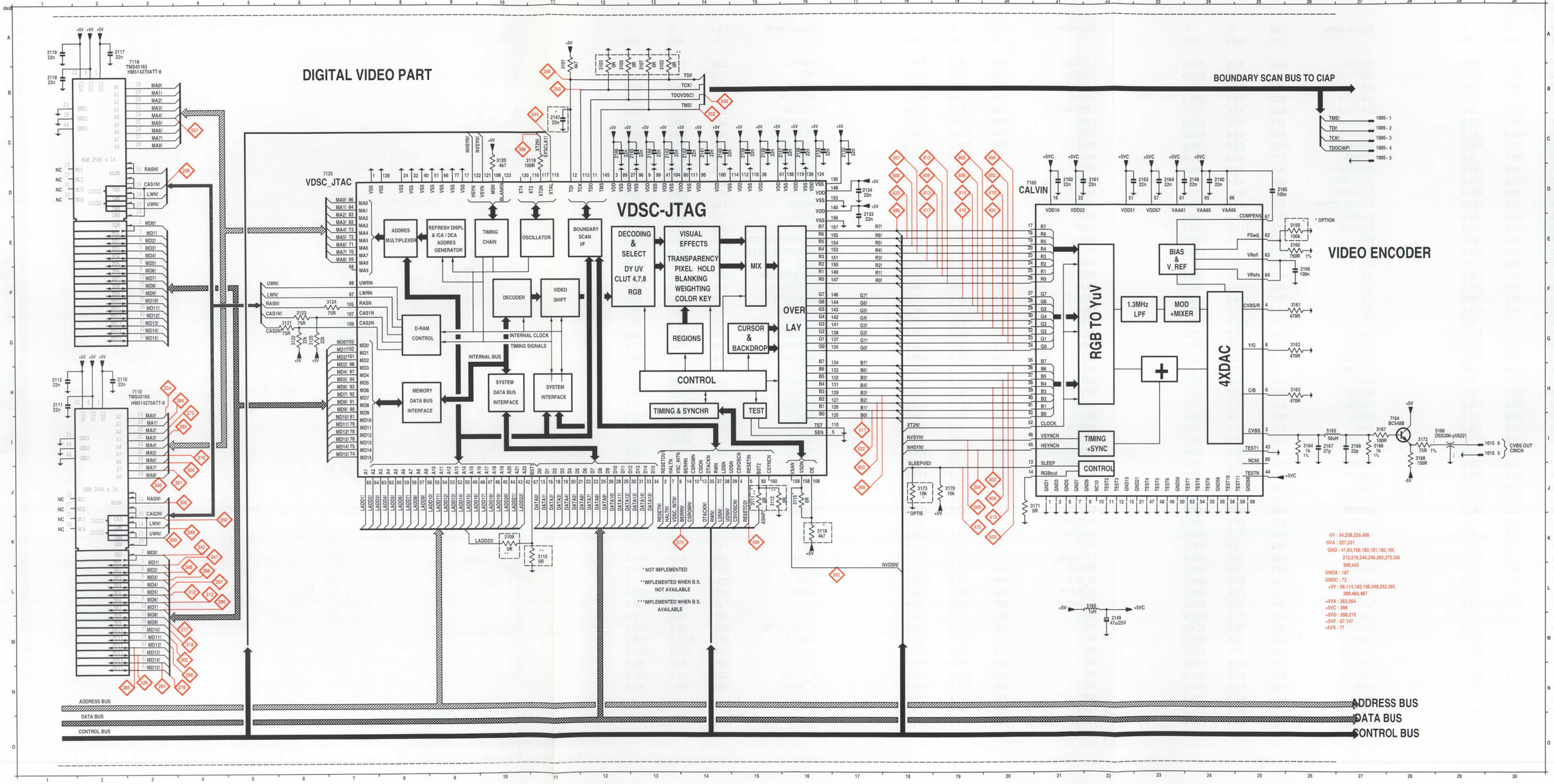


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6.4.6 Digital Video and Video Encoder circuit diagram



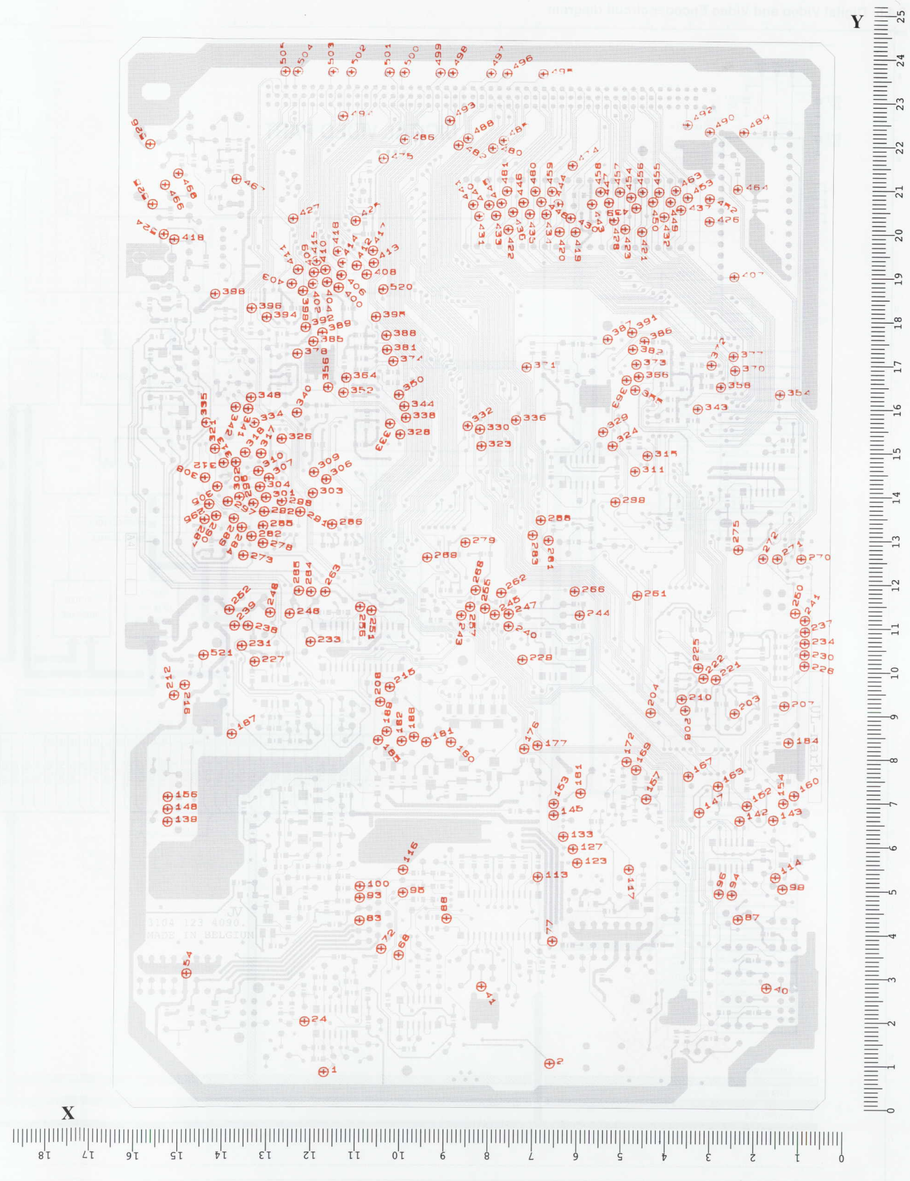
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6.4.7 Layout of Measuring pads

Signalname	Pad nr.	X-axis	Y-axis
ACK2N	329	55.4	154.6
ACK2NKON	488	86.4	221.2
ASN	343	34.0	160.0
ASNP	328	101.2	153.8
ASNP	333	103.6	156.2
AUDIOL	466	154.8	210.0
AUDIOR	418	152.6	197.6
AUDIO_CLK	303	120.8	140.2
AUDIO_CLK	163	28.4	74.0
B0	411	124.6	191.0
B1	427	125.8	202.6
B2	403	126.0	187.8
B3	399	123.4	186.2
B4	402	121.2	187.8
B5	409	121.0	190.4
B6	415	120.4	193.0
B7	503	117.0	236.0
BERRN	373	48.0	170.0
BGACKN	315	45.2	149.2
BGN	493	90.6	225.2
BRN	311	48.0	145.6
BUGCD60	245	79.4	112.8
BUSYLED	154	13.6	70.2
CAS1N	297	140.0	138.2
CAS1N	296	134.2	137.8
CAS2N	308	145.2	143.6
CAS2N	292	131.8	136.0
CD60_V2	127	61.2	59.6
CIAPACKN	330	83.2	155.0
CIAPJUC	272	18.8	126.0
CIAPREQN	323	82.8	151.2
CIAP_INTN	382	48.8	173.4
CL	247	76.2	113.0
CSCIAPN	261	47.2	117.4
CSIKATN	281	67.4	129.8
CSIKATP	299	52.4	138.6
CSNVRAMN	426	31.8	202.6
CSROMN	458	56.6	209.2
CSVDSCN	395	107.0	180.4
CSVDSCN	388	104.6	176.2
CSYNCN	520	105.4	186.6
CTS2	40	17.0	28.2
CTSI1	270	10.2	126.0
D1	68	100.4	35.2
D2	93	109.4	48.2
D3	95	99.6	49.4
D4	116	99.6	54.6
D5	100	109.4	50.8
DA	176	72.4	82.2
DATA0	428	53.4	202.8
DATA1	439	48.4	205.6
DATA2	455	43.2	209.2
DATA3	437	38.2	205.2
DATA4	453	36.8	208.0
DATA5	432	42.0	203.6
DATA6	456	47.0	209.2
DATA7	457	52.2	209.2
DATA8	423	50.8	200.8
DATA9	421	47.0	200.2
DATA10	449	40.6	207.0
DATA11	407	26.0	190.0
DATA12	463	39.4	209.6
DATA13	450	44.6	207.0
DATA14	454	49.6	208.0
DATA15	447	54.6	206.8
DMAEN	332	86.0	155.8
DOBM	117	48.4	55.0
DONEN	204	43.8	90.6
DTACKN	366	47.4	167.2
DTACKP	288	69.2	134.4
EFLAG_CD60	172	49.2	79.4
FILTCL	251	107.4	113.6
FILTCR	256	110.0	114.4
G0	494	114.8	226.0
G1	502	113.0	236.0
G2	410	118.4	191.0
G3	404	118.0	188.2
G4	400	115.4	187.0
G5	406	114.8	189.8
G6	414	114.6	192.6
G7	416	115.6	195.2
HALTN	386	46.2	175.2
HFD	240	76.2	110.2
HFDDEF	24	121.6	20.0
HFDDEF	1	117.2	8.4
HMP	148	153.0	68.0
IACK2	363	50.2	166.4
IACKN	391	49.0	177.2
IN2IN	354	15.4	163.4
1N5	372	31.0	170.0
INTREQN	370	25.6	168.8
IREF	153	65.6	69.8
IRQIN	279	86.2	129.2
ISELIN	203	24.8	90.6
KILL	335	145.0	156.2
LADD1	420	65.6	200.0
LADD2	444	66.0	206.4
LADD3	434	68.6	204.0
LADD4	460	71.2	209.2
LADD5	446	73.8	206.6
LADD6	436	76.2	204.4
LADD7	445	78.8	206.4
LADD8	440	81.6	206.0
LADD9	433	80.0	203.6
LADD10	461	77.6	209.2
LADD11	422	77.2	200.4
LADD12	435	72.4	204.0
LADD13	448	69.8	206.8
LADD14	459	67.4	209.2
LADD15	474	62.8	215.2
LADD16	430	63.2	203.2
LADD17	419	62.0	200.0
LADD18	431	83.8	203.4
LADD19	377	26.0	172.0
LADD20	441	85.2	206.0
LADD21	485	78.4	220.8
LADD22	480	80.8	219.0
LADD23	495	69.6	236.0
LADD23	283	71.0	131.0
LDSN	355	48.2	164.2
LIDSWITCH	269	94.8	125.8
LWN	289	138.6	134.4
MA0	334	134.2	156.2
MA1	284	136.8	132.4
MA2	273	136.4	126.0
MA3	282	134.6	130.4
MA4	307	130.8	143.6
MA5	310	133.2	145.2
MA6	304	132.8	141.6
MA7	301	131.4	139.2
MA8	340	124.6	158.6
MD0	342	138.4	159.8
MD1	341	135.6	159.4
MD2	348	135.0	162.0
MD3	286	116.4	133.2
MD4	287	145.2	134.2
MD5	312	141.0	147.0
MD6	313	138.2	147.2
MD7	290	142.6	135.0
MD8	317	132.6	149.2
MD9	318	136.2	149.4
MD10	302	137.4	139.2
MD11	298	127.8	138.4
MD12	285	132.0	132.8
MD13	326	128.0	152.6
MD14	291	123.6	136.0
MD15	278	132.0	128.8
MISOIN	234	9.2	106.8
MODE_0IN	230	9.2	104.2
MODE_1IN	226	9.2	101.6
MOSIIN	237	9.2	109.4
N.USED	250	11.4	113.6
NHSYN	504	125.0	236.0
NPORE	268	83.8	118.4
NVDSN	392	122.8	178.0
NVDSN	394	131.6	180.2
NVSYN	505	127.8	236.0
OTD	86	89.6	43.6
PLAYSEL	521	145.2	103.2
PRTSI1	160	11.2	72.0
Q_CLK	499	92.8	236.0
Q_DATA	498	90.0	236.0
Q_WCLK	207	13.6	92.4
R0	412	111.4	192.0
R1	408	109.2	190.0
R2	413	107.6	192.6
R3	417	107.8	195.4
R4	501	104.4	236.0
R5	500	101.0	236.0
R6	425	111.8	202.2
R7	486	100.8	220.8
RAB	255	81.6	114.2
RASN	305	142.4	141.6
RASN	321	143.0	150.2
RDYN	336	75.0	157.2
REF	2	66.0	10.6
REFHCA	145	65.6	67.2
REFLCA	133	63.4	62.4
REQ2N	324	53.2	151.4
REQ2NKON	482	88.6	219.6
RESETCD	489	24.2	223.0
RESETN	497	81.4	236.0
RESETSYS	266	61.4	118.2
RTSI2	96	28.0	49.6
RWN	496	77.8	236.0
RXDI1	271	15.6	126.0
RXDI2	142	23.4	66.2
SCLK	157	44.6	71.0
SDATA	169	47.0	77.6
SERVORESETN	177	69.4	83.0
SERVORESETN	113	69.0	53.2
SILD	243	87.0	112.6
SLEEPAUDN	229	73.0	102.6
SLEEPVID	475	105.6	216.4
SLIDESW	139	153.0	65.2
SLIDESW	257	85.0	114.6
SRTSI1	94	25.0	49.4
SSCLKIN	241	9.2	112.0
STANDIN	262	78.0	117.8
SWCLK	184	12.6	84.0
SYSCLK	387	54.6	175.6
SYSCLK1	344	100.4	160.2
SYSCLK2	371	72.8	169.2
SYSCLK3	152	21.8	69.6
TCK	378	124.6	172.0
TCK	356	117.6	164.4
TDI	374	103.0	170.4
TDI	350	101.6	162.8
TDOCIAP	206	36.0	91.2
TDOCIAP	210	36.8	93.8
TDOVDSC	338	100.0	157.6
TDOVDSC	381	104.4	173.0
TMS	352	114.2	163.2
TMS	364	113.6	166.6
TX2	167	35.2	76.2
TXDI1	143	15.8	66.4
UDSN	492	37.0	224.6
URDN	452	31.8	207.8
UWN	295	144.2	137.6
UWRN	490	32.0	223.0
V1	123	60.2	56.4
VDA	161	59.6	72.2
VDSC_INTN	358	28.8	165.0
VREFA	233	121.0	106.4
XT2N	396	135.0	182.2
X_CLK	221	29.2	98.4
X_DATA	225	33.2	101.0
X_WSIN	222	32.0	98.6



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7 DIAGNOSTICS AND SHORT DESCRIPTIONS

7.1 SHORT DESCRIPTION OF THE KEYCOMPNENTS

7.1.1 CPU SCC68070

- Microcontroller (UART, I/O-bus, I^2C-bus, 2 DMA-channels, memory management unit)
- 16 datalines (D0 .. D15) and 24 addresslines (A0 .. A23)
- 16 MByte addressrange:
  - 5 MByte for the monoboard
  - The rest for the extension
- Clockfrequency :
  30 MHz for PAL
  30.2 MHz for NTSC
  This **systemclock** is also a clock for the 'video chip' (VDSC) and PAL 7302 (16R4-10).
- The UART works on 4.9 MHz and provides in the communication between processor and terminal.

7.1.2 VDSC : Video Decoder and System Controller

System Interface

- Direct interface for 680X0 bus compatible devices
- 1 MByte ROM control
- 1 kByte I/O control
- Reset sequencer, including ROM shadowing
- Watchdog timer
- Generates chip selects for the systemrom

DRAM Interface

- On chip DRAM controller
- 4 MByte direct drive
  For CD-i 450 this is 1 MByte spread over 2 DRAM banks of 512 kByte.

Video Interface

- Up to 768 x 560 screen resolution
- Capability to display run-length coded files
- Mosaic effects
- 256 Color Look Up Table (CLUT)
- Two Delta YUV decoders
- Cursor shape, color and blink control
- Overlaying of four planes (cursorplane, plane A, plane B and backdrop plane)
- Special effects via weight control, priority control, etc.
- Dynamic programmable registers and CLUT reload in retrace period
- Digital RGB output (8 bit per component)
- Synchro generator for 50 and 60 Hz scan
- Synchronization with external video

General

- CMOS technology
- 160-pin QFP package

The DRAM banks are constantly being read by the VDSC to generate video. The VDSC has the highest priority but the DRAM is also a kind of system- memory (which is asynchronously read by the CPU).

7.1.3 SYSTEMROM 27C400

- 4 Mbit (EP)ROM
- Contains boot, operating system, hardware drivers and the player shell.

7.1.4 IKAT MC68HC05I8

- Integration of servo- and slave processor
  - Generates chip select for DSIC2 (servo controller) and CD60 (CD decoder)
  - Communication with and control of DSIC2
  - Control of the pointing device port and the player control keys.
- Works on 4 MHz.
- CMOS technology, 64 pin QFP

7.1.5 CIAP : CD-Interface and Audio Processor

- Establishes the link between the 'standard' CD- part and the CD-i part of the player.
- Decoding of the ADPCM-audio (base case audio).
- To perform audio mixing functions (as described in the Green Book).
- To be able to add external audio to the base case audio.
- At the CD-side the CIAP has to interface with the CD 60 for both main channel and subchan nel data.
- The CIAP does not control the servo but it can, via the Q-channel data, indicate which sector is currently read.
- it interfaces directly to the 68070.
- Works on 33 MHz; the devided by two clock is fed to the CD60 decoder and the audio DAC.

7.1.6 NVRAM + CLOCK

- 8Kx8 SRAM
- Time keeper
- Contains CSD-files (Configuration Status Description: info about system set-up) and FTS-files (files for the player shell and applications).

7.1.7 CALVIN

- Digital RGB to video encoder
- Four DAC's on chip
- Two NTSC/PAL Composite outputs
- Y/C outputs
- Analog RGB outputs
- Digital RGB inputs
- Automatic detection and support of PAL and NTSC modes
- Automatic detection and support of interlaced/noninterlaced modes
- Internal voltage reference available
- 68-pin PLCC

7.1.8 PAL's

- Glue logic
- Generates chip selects for IKAT, VDSC, NVRAM and CIAP. PAL 16L8-10]
- Generates DTACKN for the NVRAM and the SYSTEMROM [PAL 16R4-10].

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7.1.9 DSIC2 Digital Servo IC

Sophisticated digital servo controller which provides all servo functions needed in a two stage three spot CD-system.
[two stage means fine control by the actuator and coarse control by the sledge]
Provides in all servo functions except the spindle motor control (which is done by the CD60).
Special functions to improve the playability, to perform reliable access and to realize a high degree of shock insensitivity.
'Programmable' servo characteristics
a three wire microprocessor interface
Works on 8.46 MHz

7.1.10 CD60 CD-decoder

Complete CD decoder
HF is being transformed into a I^2S-format and digital out.
Errorcorrection
Spindle motor control with programmable motorloop bandwidths.
On chip AGC for the EFM input signal
- On chip front end 6 bits ADC
- Subcode data processing
- Audio data interpolation processing
- Digital audio interface (EBU)

7.2 TROUBLESHOOTING AND REPAIR

This section contains some guides to aid the technician in troubleshooting the CDI player. The CD servo section and Analog Audio section are similar to any CD player. Thus, the same techniques for troubles hooting a CD player may be used. Added features in servicing the CDI player is the Low Level Test and the Service Shell, see section 5." Service Software". The Low Level Test needs a VT100 terminal(or equivalent) to run and test the functioning of the µP section, CIAP section or digital video section.
The Service Shell provides tests for the Video and Servo and Decoder circuits. Section 5.3 covers all the Service Shell test procedures.
The analog video/audio and servo & CD decoder circuitry can be serviced to the component level, the CD Mechanism (CDM12) is also replaced as an assembly. Disassembly instructions are provided on the exploded views.
If the defective item is in the circuitry of the µP section, CIAP section or digital video section, then the complete main board must be replaced and sent back to a local central repairshop. See section 3.5 and 3.6.

Troubleshooting hints:

Symptom:
Service Shell cannot be started with the test plug.
Possible fault:
Connections between input port and IKAT may be bad. Test plug could be wrong. IKAT may be defective.
Hint:
If the Player Shell cannot be started, perform the Low Level Test (LL TEST).

7.2.2 Troubleshooting and Service the µP section, CIAP section or digital video section

The mainboard is replaced as a module when parts of the µP section, CIAP section or digital video section are defective. The technician must know the functioning of those sections to diagnose a CDI player. The CDI player contains some built-in diagnostics to aid in troubleshooting. One diagnostic tool is the Service Shell (see section 5.2) and the other is the Low Level Test or LL Test (see section 5.1). The LL Test should be performed if there is access to neither the Player Shell nor the Service Shell. If the Low Level test indicates a fault, replace the complete mainboard. If the test cannot be initiated, check the power sources and main clock signals on the µP section. If all supplies and clock signals are present, replace the mainpanel.

7.2.3 Servo & CD Decoder and Audio Section Troubleshooting

A problem in the CD-I player can be isolated to a particular circuit by carefully observing the symptoms. For example, if there is no audio, but a picture from a CD-I disc is displayed, it is obvious that the CD Servo and decoding circuits are functional. Therefore the fault can be isolated to the audio decoding circuits only. Or the symptom may be opposite, the audio circuits may be working, but not the video. Again, the servo circuits must be functioning. Troubleshooting of the video decoding should then be followed.
Also if a disc is inserted and the disc type is recognized it is obvious that the Servo and CD decoder circuit is functioning When there is a symptom indicating a fault in the Servo circuitry, troubleshooting techniques used in CD players can be followed since the CD Unit portion of the CD-I player is basically a CD player (refer to the Servo & CD decoder schematic diagrams). If the CDM does not start, check for Vdd, clock, and reset on the IKAT, DSIC2 and CD60.
If these signals are present, perform the CD drive test in the Service Shell or Low Level test. If there is a communication failure, proceed with the Low Level Test to determine if there is a failure in the system control circuitry. If the communication buses are functional, check the CD servo circuits using the Service Shell CD drive test modes. These modes are the standard CD servo test modes to test the Focus, radial and turntable control functions. If there is a failure in the servo test modes, further checks with measurements should reveal the fault If the servo circuits are functioning, check the decoder circuits. Activity should be seen on the (SDATA, SWCLK and SCLK) and DOBM. If there is no activity, check the supply (Vdd) and input signals (HF, AUDIO_CLK).
When the servo and decoder circuits are functioning properly, there may be a problem in the CD interface & Audio Processor circuitry (CIAP)

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7.2.4 Video Section Troubleshooting

The symptoms displayed can help the technician isolate the problem to a particular circuit. The following examples illustrate how a fault can be isolated.

Symptom 1:
the player shell is displayed, and the disc is recognized, but video from the disc cannot be displayed. If this condition exists, the Digital Video section, Servo and analog video circuits are functioning. Since the player shell is displayed, the video synthesizer circuit is functioning. However, there must be a fault on the CD interface section, because the video data from the disc comes via this section in the first place.

Symptom 2:
no video, while audio is functioning. This symptom may be caused by either the Digital Video part or by the Analog Video circuit. A few voltage and signal measurements can quickly isolate the problem.

Symptom 3:
no color. This symptom is most likely caused by a problem in the CALVIN ic. Check the CVBS output on pin 2 of IC7160

7.3 MEASUREMENTS

All signals, which are refered to a name and/or to a pin number of an IC can be measured at certain measuring pads on the board. Use these pads on the board, to prevent short circuiting caused by the metal point of measuring probes. See drawing 6.4.6 LAYOUT OF THE MEASURING PADS

7.3.1 A general check of the main panel

Test of the DC power supply voltages

Measurement method
Check if the voltages on the key-components listed below are within the tolerance range.

component pos. nr.	name	pin	voltage
7210	68070	1, 43	+5V ± 10%
7201	IKAT (MC68HC05I8)	59	+5V ± 10%
7240	SYSROM (27C400)	22	+5V ± 10%
7241	NVRAM	28	+5V ± 10%
7125	VDSC	3, 9, 27, 36, 41, 61, 80, 95, 100, 112, 119, 124, 130, 140, 148	+5V ± 10%
7160	CALVIN	16, 22, 51, 57, 61, 65, 66	+5V ± 10%
7310	CIAP	6, 20, 27, 35, 45, 58, 66, 76	+5V ± 10%
7401	DSIC2	12, 20, 28	+5V ± 5%
7510	CD60	11, 15, 17, 29, 31, 42, 44	+5V ± 5%

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7.3.2 Test of the clocksignals

Measurement method
These measurements have to be carried out just after hardware reset. This is done each time after opening the lid or after power-on.
Use a FET-probe to minimalise the oscillator-loads.

System clock

30.2098 MHz ± 20 ppm (NTSC)
30.0000 MHz ± 50 ppm (PAL)

This system clock must be present at the following points:

IC 7210 on pin 30
IC 7125 on pin 115
IC 7302 on pin 1

At IC 7210 pin 29 the Clock divided by two must be present:

15.0000 MHz ± 50 ppm (PAL)
15.1049 MHz ± 20 ppm (NTSC)

At IC 7210 pin 69 the UART-clock must be present:

4.9152 MHz ± 50 ppm

At IC 7201 the clock of the 68HC05I8 must be present:

4.000 MHz ± 55 ppm

At connector 1096 on pin C3 the XT2N-clock must be present:

15.1049 MHz ± 20 ppm (NTSC)
15.0000 MHz ± 50 ppm (PAL)

At IC 7310 on pin 22 the CIAP-clock must be present:

33.8688 MHz ± 50 ppm

At IC 7401 on pin 19 the DSIC2-clock must be present:

8.4672 MHz ± 50 ppm

At IC 7510 on pin 13 the AUDIO_CLK-clock must be present:

16.9344 MHz ± 50 ppm

7.3.3 Test of the I2S Interface

SDATA IC 7510, pin 21 : block wave signal
SWCLK IC 7510, pin 22 : 44.1 kHz (CDDA)
SCLK IC 7510, pin 23 : 2.8224 MHz (CDDA)

7.3.4 Test of the microcontroller 68070

Check after power on and RESET = +5V.
HALTN IC 7210, pin 27 : +5V
RESETN IC 7210, pin 28 : +5V
DTACKN IC 7210, pin 24 : changing +5V/0V
BERRN IC 7210, pin 26 : +5V

7.3.5 Test of the hardware with the Low Level Test

This test makes it possible to test the hardware with software.
Connect a terminal to the UART of the microcontroller 68070 via connector 1032.

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

To start the low level test, hit the space bar while putting the power on.
To test the PCB you only have to follow the instructions on the screen.

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8 PARTSLIST

8.1 Partslist of the cabinet

Item	Codenumber	Description
1	4822 444 60984	Coverassy. This assy includes items 1, 2, 3, 4, 6
2	4822 444 60984	DVC door
3	4822 444 60984	Door
4	4822 444 60984	Shaft
6	4822 529 10272	Damper assy
7	4822 459 10887	Wordmark /00/01/05/11
7	4822 459 11032	Wordmark /17
8	4822 276 13079	Latch switch
9+10	4822 402 10039	Disc holddown
12	4822 277 11454	Switch lever
14		Led indicator
15		Bottom
16		Rubber foot
17		Rubber foot
18		Rubber foot
19		Rubber foot
22		Shielding bottom
23		Shielding cover
24		Millishield
25		Support
26	4822 325 50215	Suspension
27	4822 325 50215	Suspension
28	4822 325 50215	Suspension
29	4822 325 50215	Suspension
31	4822 691 30343	CDM12.1T
32		Mini clamp
35	4822 410 63248	Knob
51		Torx scr 3x22
52		Torx scr 3x22
53		Torx scr 3x22
54		Torx scr 3x22
100		Sticker
301	4822 214 52166	Powersupply /00
301	4822 214 52167	Powersupply /05
301	4822 214 52168	Powersupply /11
301	4822 214 52169	Powersupply /17
309	4822 736 22052	Usermanual /17
318	4822 691 30331	Wired remote control
1001	**4835 214 57095**	**MAINPANEL /17**
1001	**(See chapter 3.5)**	**MAINPANEL /00/01/05**
1001	**(See chapter 3.5)**	**MAINPANEL /11**

8.2 Partslist of the mainboard

Item	Codenumber	Description		
	4835 214 57095	MAINPANEL /17		
	4822 214 -----	MAINPANEL /00/01/05		
1001	4822 267 51359	8p connector		
1002	4822 276 13387	Switch		
1008	4822 267 51358	12p connector		
1009		6p vert.connector		
1015		3p cinch connector		
1016	4822 267 31772	connector		
1031	4822 277 21474	Switch		
1032	4822 267 51361	Minidin 8p connector		
1240	5322 255 44217	40p IC socket		
2110	5322 122 32654	22n	63V	10%
2111	5322 122 32654	22n	63V	10%
2112	5322 122 32654	22n	63V	10%
2117	5322 122 32654	22n	63V	10%
2118	5322 122 32654	22n	63V	10%
2119	5322 122 32654	22n	63V	10%
2132	5322 122 32654	22n	63V	10%
2133	5322 122 32654	22n	63V	10%
2134	5322 122 32654	22n	63V	10%
2135	5322 122 32654	22n	63V	10%
2136	5322 122 32654	22n	63V	10%
2137	5322 122 32654	22n	63V	10%
2138	5322 122 32654	22n	63V	10%
2139	5322 122 32654	22n	63V	10%
2140	5322 122 32654	22n	63V	10%
2141	5322 122 32654	22n	63V	10%
2142	5322 122 32654	22n	63V	10%
2143	5322 122 32654	22n	63V	10%
2144	5322 122 32654	22n	63V	10%
2145	5322 122 32654	22n	63V	10%
2146	5322 122 32654	22n	63V	10%
2148	5322 122 32654	22n	63V	10%
2149	4822 124 80483	47µF	6,3V	
2150	5322 122 32654	22n	63V	10%
2160	5322 122 32654	22n	63V	10%
2161	5322 122 32654	22n	63V	10%
2163	5322 122 32654	22n	63V	10%
2164	5322 122 32654	22n	63V	10%
2165	4822 122 33496	100n	63V	10%
2166	4822 122 33496	100n	63V	10%
2167	5322 122 32481	15p	50V	5%
2168	5322 122 32658	22p	50V	5%
2201	5322 122 32654	22n	63V	10%
2204	5322 122 32654	22n	63V	10%
2206	4822 126 12549	470n	25V	10%
2207	4822 122 33496	100n	63V	10%
2210	5322 122 32654	22n	63V	10%
2211	5322 122 32654	22n	63V	10%
2230	5322 122 32661	56p	50V	5%
2231	5322 122 32661	56p	50V	5%
2232	5322 122 32654	22n	63V	10%
2235	5322 122 32654	22n	63V	10%
2240	5322 122 32654	22n	63V	10%
2241	5322 122 32654	22n	63V	10%
2245	5322 122 32654	22n	63V	10%
2250	5322 122 32654	22n	63V	10%
2251	5322 122 31865	1n5	63V	10%

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Item	Codenumber	Description		
2252	5322 122 31865	1n5	63V	10%
2253	5322 122 31865	1n5	63V	10%
2254	5322 122 32654	22n	63V	10%
2255	4822 124 40433	47µF	25V	
2270	5322 122 32654	22n	63V	10%
2271	4822 124 40849	330µF	16V	
2272		100µF	10V	
2273	5322 122 32654	22n	63V	10%
2301	5322 122 32654	22n	63V	10%
2302	5322 122 32654	22n	63V	10%
2309	5322 122 32654	22n	63V	10%
2310	5322 122 32654	22n	63V	10%
2311	5322 122 32654	22n	63V	10%
2312	5322 122 32654	22n	63V	10%
2313	5322 122 32654	22n	63V	10%
2314	5322 122 32654	22n	63V	10%
2315	5322 122 32654	22n	63V	10%
2316	5322 122 32654	22n	63V	10%
2317	5322 122 32654	22n	63V	10%
2318	5322 122 32654	22n	63V	10%
2331	4822 124 80602	1000µF	6,3V	
2332	5322 122 32654	22n	63V	10%
2337		100µF	10V	
2338	5322 122 32654	22n	63V	10%
2340	5322 122 32654	22n	63V	10%
2342	5322 122 32654	22n	63V	10%
2344	5322 122 32654	22n	63V	10%
2345		680p	63V	2%
2346		680p	63V	2%
2347	4822 124 40244	2,2µF	63V	
2348	5322 122 32654	22n	63V	10%
2350	5322 122 32654	22n	63V	10%
2351	5322 122 32654	22n	63V	10%
2352	4822 124 80483	47µF	6,3V	
2353	4822 124 80483	47µF	6,3V	
2354	5322 122 32658	22p	50V	5%
2355	5322 122 32658	22p	50V	5%
2367	4822 124 41584	100µF	10V	20%
2375	4822 124 22339	100µF	16V	
2376	4822 124 22339	100µF	16V	
2380	4822 124 41584	100µF	10V	20%
2383	4822 122 33575	220p	50V	5%
2384	5322 122 32654	22n	63V	10%
2390	4822 124 41584	100µF	10V	20%
2400	5322 122 33861	120p	50V	10%
2401	4822 122 33575	220p	50V	5%
2402	5322 122 31863	330p	50V	5%
2403	4822 122 33575	220p	50V	5%
2404	4822 122 33575	220p	50V	5%
2405	4822 122 33575	220p	50V	5%
2406	4822 122 33575	220p	50V	5%
2407	4822 122 33575	220p	50V	5%
2408	5322 122 32531	100p	50V	5%
2409	5322 122 32452	47p	63V	5%
2410	5322 122 32452	47p	63V	5%
2411	5322 122 32659	33p	50V	5%
2412	5322 122 32654	22n	63V	10%
2413	4822 124 40433	47µF	25V	20%
2414	5322 122 32531	100p	50V	5%
2415	5322 122 32654	22n	63V	10%
2416	5322 122 32654	22n	63V	10%

Item	Codenumber	Description		
2417	5322 126 10465	3n9	63V	10%
2418	4822 126 10326	180p	63V	5%
2419	5322 122 32654	22n	63V	10%
2421	4822 122 33496	100n	63V	10%
2422	5322 122 32654	22n	63V	10%
2423	5322 122 32452	47p	63V	5%
2424	4822 122 33496	100n	63V	10%
2425	4822 126 10326	180p	63V	5%
2426	4822 122 32627	2n7	50V	10%
2427	4822 122 33175	2n2	50V	20%
2428	4822 122 33342	33n	63V	10%
2429	5322 122 32654	22n	63V	10%
2430	5322 122 32452	47p	63V	5%
2431	4822 122 33496	100n	63V	10%
2432	5322 122 32452	47p	63V	5%
2433	5322 122 32654	22n	63V	10%
2434	5322 122 32654	22n	63V	10%
2435	4822 126 10326	180p	63V	5%
2436	5322 122 31863	330p	50V	5%
2437	4822 126 10326	180p	63V	5%
2438	5322 122 32654	22n	63V	10%
2440	5322 122 32654	22n	63V	10%
2445	4822 124 80483	47µF	6,3V	20%
2446	5322 122 32654	22n	63V	10%
2447	4822 122 33216	270p	50V	5%
2448	4822 124 80483	47µF	6,3V	20%
2449	4822 122 33496	100n	63V	10%
2450	5322 122 32654	22n	63V	10%
2451	5322 122 31865	1n5	63V	10%
2452	4822 122 33177	10n	50V	20%
2453	5322 122 32531	100p	50V	5%
2454	4822 126 12549	470n	25V	10%
2455	4822 124 80483	47µF	6,3V	20%
2470	4822 122 33575	220p	50V	5%
2471	5322 122 34098	10n	63V	10%
2472	4822 122 33575	220p	50V	5%
2473	4822 122 33496	100n	63V	10%
2474	4822 122 33575	220p	50V	5%
2475	5322 122 32654	22n	63V	10%
2476	4822 122 33575	220p	50V	5%
2478	5322 122 32654	22n	63V	10%
2479	4822 122 33575	220p	50V	5%
2482	5322 122 32654	22n	63V	10%
2500	4822 122 33496	100n	63V	10%
2501	4822 122 33342	33n	63V	10%
2502	5322 122 32268	470p	50V	10%
2503	5322 122 32268	470p	50V	10%
2510	4822 124 41584	100µF	10V	20%
2511	5322 122 32654	22n	63V	10%
2512	5322 122 32654	22n	63V	10%
2513	5322 122 32654	22n	63V	10%
2514	5322 122 32654	22n	63V	10%
2515	5322 122 32654	22n	63V	10%
2516	5322 122 32654	22n	63V	10%
2517	5322 122 32654	22n	63V	10%
2518	4822 124 41584	100µF	10V	20%
2520	5322 122 32654	22n	63V	10%
2521	4822 124 40433	47µF	25V	20%
2522	5322 122 32654	22n	63V	10%
2523	4822 124 40433	47µF	25V	20%
2524	4822 126 12549	470n	25V	10%

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Item	Codenumber	Description		
2525	5322 122 32654	22n	63V	10%
2526	4822 126 12549	470n	25V	10%
3101	4822 051 20472	4k7	0,1W	5%
3109	4822 051 20008	0R00	JUMPER	
3111	4822 051 20008	0R00	JUMPER	
3115	4822 051 20008	0R00	JUMPER	
3119	4822 051 20101	100R00	0,1W	5%
3120	4822 051 20472	4k7	0,1W	5%
3121	4822 051 20759	75R00	0,1W	5%
3122	4822 051 20223	22k00	0,1W	5%
3123	4822 051 20759	75R00	0,1W	5%
3124	4822 051 20759	75R00	0,1W	5%
3125	4822 051 20223	22k00	0,1W	5%
3159	4822 051 20272	2K70	0,1W	5%
3160		820R00		1%
3161	4822 051 20471	470R00	0,1W	5%
3162	4822 051 20471	470R00	0,1W	5%
3163	4822 051 20471	470R00	0,1W	5%
3164		820R00		1%
3166		820R00		1%
3167	4822 051 20101	100R00	0,1W	5%
3168	4822 051 20151	150R00	0,1W	5%
3170	4822 051 20103	10k00	0,1W	5%
3171	4822 051 10102	1k00	0,25W	2%
3172		75R00		1%
3201	4822 051 20105	1M00	0,1W	5%
3202	4822 051 20472	4k70	0,1W	5%
3203	4822 051 20103	10k00	0,1W	5%
3204	4822 050 21001	100R00	0,6W	1%
3205	4822 051 20104	100k00	0,1W	5%
3206	4822 051 20104	100k00	0,1W	5%
3207	4822 051 20103	10k00	0,1W	5%
3208	4822 051 20103	10k00	0,1W	5%
3209	4822 051 20103	10k00	0,1W	5%
3210	4822 051 10102	1k00	0,25W	2%
3211	4822 051 10102	1k00	0,25W	2%
3212	4822 051 20472	4k70	0,1W	5%
3213	4822 051 20472	4k70	0,1W	5%
3214	4822 051 20472	4k70	0,1W	5%
3215	4822 051 20223	22k00	0,1W	5%
3216	4822 051 20223	22k00	0,1W	5%
3217	4822 051 20223	22k00	0,1W	5%
3218	4822 051 51020	1k00	0,25W	2%
3219	4822 051 20103	10k00	0,1W	5%
3220	4822 051 51020	1k00	0,25W	2%
3221	4822 051 51020	1k00	0,25W	2%
3222	4822 051 20472	4k70	0,1W	5%
3223	4822 051 20472	4k70	0,1W	5%
3224	4822 051 20472	4k70	0,1W	5%
3225	4822 051 20472	4k70	0,1W	5%
3226	4822 051 20472	4k70	0,1W	5%
3227	4822 051 20472	4k70	0,1W	5%
3228	4822 051 20472	4k70	0,1W	5%
3229	4822 051 10102	1k00	0,25W	2%
3230	4822 051 20105	1M00	0,1W	5%
3231	4822 051 20222	2k00	0,1W	5%
3232	4822 051 54790	47R00	0,1W	5%
3233	4822 051 20101	100R00	0,1W	5%
3234	4822 051 20101	100R00	0,1W	5%
3235	4822 051 20472	4k70	0,1W	5%
3236	4822 051 20101	100R00	0,1W	5%
3237	4822 051 20101	100R00	0,1W	5%
3238	4822 051 20101	100R00	0,1W	5%
3239	4822 051 20103	10k00	0,1W	5%
3240	4822 051 51020	1k00	0,25W	2%
3241	4822 051 20472	4k70	0,1W	5%
3243	4822 051 20104	100k00	0,1W	5%
3244	4822 051 20103	10k00	0,1W	5%
3245	4822 051 51020	1k00	0,25W	2%
3246	4822 051 20471	470R00	0,1W	5%
3249	4822 050 21001	100R00	0,6W	1%
3251	4822 051 20101	100R00	0,1W	5%
3252	4822 051 20101	100R00	0,1W	5%
3253	4822 051 20101	100R00	0,1W	5%
3254	4822 051 20104	100k00	0,1W	5%
3255	4822 051 20104	100k00	0,1W	5%
3256	4822 051 20103	10k00	0,1W	5%
3257	4822 051 20104	100k00	0,1W	5%
3258	4822 051 20103	10k00	0,1W	5%
3259	4822 051 20682	6k80	0,1W	5%
3260	4822 051 20104	100k00	0,1W	5%
3261	4822 051 20103	10k00	0,1W	5%
3262	4822 051 20682	6k80	0,1W	5%
3263	4822 051 20104	100k00	0,1W	5%
3264	4822 051 20103	10k00	0,1W	5%
3265	4822 051 20682	6k80	0,1W	5%
3275	4822 051 20331	330R00	0,1W	5%
3276	4822 051 20222	2k20	0,1W	5%
3277	4822 116 40264	PTC 60V 0R80		
3280	4822 051 20008	0R00	JUMPER	
3285	4822 051 20223	22k00	0,1W	5%
3286	4822 051 20223	22k00	0,1W	5%
3287	4822 051 20223	22k00	0,1W	5%
3302	4822 051 20471	470R00	0,1W	5%
3303	4822 051 20103	10k00	0,1W	5%
3304	4822 051 20229	22R00	0,1W	5%
3305	4822 051 20103	10k00	0,1W	5%
3309	4822 051 20008	0R00	JUMPER	
3310	4822 051 20472	4k70	0,1W	5%
3311	4822 051 20472	4k70	0,1W	5%
3312	4822 051 20472	4k70	0,1W	5%
3313	4822 051 20472	4k70	0,1W	5%
3314	4822 051 20472	4k70	0,1W	5%
3315	4822 051 20472	4k70	0,1W	5%
3316	4822 051 20472	4k70	0,1W	5%
3317	4822 051 20229	22R00	0,1W	5%
3318	4822 051 20101	100R00	0,1W	5%
3319	4822 051 20101	100R00	0,1W	5%
3320	4822 051 20101	100R00	0,1W	5%
3322	4822 117 11152	4R7		5%
3331	4822 117 11152	4R7		5%
3353	4822 051 20101	100R00	0,1W	5%
3354	4822 051 20101	100R00	0,1W	5%
3355	4822 051 20008	0R00	JUMPER	
3359	4822 051 20182	1k80	0,1W	5%
3360	4822 051 20182	1k80	0,1W	5%
3363	4822 051 20113	11k00	0,1W	5%
3364	4822 051 20183	18k00	0,1W	5%
3365	4822 051 20183	18k00	0,1W	5%
3366	4822 051 20113	11k00	0,1W	5%
3367	4822 117 11152	4R7		5%
3375	4822 051 20103	10k00	0,1W	5%
3376	4822 051 20103	10k00	0,1W	5%
3377	4822 051 20101	100R00	0,1W	5%

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Item	Codenumber	Description		
3378	4822 051 20101	100R00	0,1W	5%
3380	4822 117 11151	1R		5%
3381	4822 051 20182	1k80	0,1W	5%
3382	4822 051 20182	1k80	0,1W	5%
3383	4822 051 20473	47k00	0,1W	5%
3384	4822 051 20473	47k00	0,1W	5%
3385	4822 051 20473	47k00	0,1W	5%
3386	4822 051 20103	10k00	0,1W	5%
3387	4822 051 20101	100R00	0,1W	5%
3390	4822 051 20479	47R00	0,1W	5%
3391	4822 051 20473	47k00	0,1W	5%
3392	4822 051 20222	2k20	0,1W	5%
3394	4822 051 20473	47k00	0,1W	5%
3395	4822 051 20103	10k00	0,1W	5%
3396	4822 051 20222	2k20	0,1W	5%
3397	4822 051 20222	2k20	0,1W	5%
3398	4822 051 20223	22k00	0,1W	5%
3400	4822 051 20103	10k00	0,1W	5%
3401	4822 051 20103	10k00	0,1W	5%
3402	4822 051 20682	6k80	0,1W	5%
3403	4822 051 20103	10k00	0,1W	5%
3404	4822 051 20103	10k00	0,1W	5%
3405	4822 051 20393	39k00	0,1W	5%
3406	4822 051 20383	39k00	0,1W	5%
3407	4822 117 11152	4R7		5%
3408	4822 051 20105	1M00	0,1W	5%
3409	4822 051 20103	10k00	0,1W	5%
3410	4822 051 20682	6k80	0,1W	5%
3411	4822 051 20221	220R00	0,1W	5%
3412	4822 051 20221	220R00	0,1W	5%
3413	4822 051 10102	1k00	0,25W	2%
3414	4822 051 20103	10k00	0,1W	5%
3415	4822 051 20103	10k00	0,1W	5%
3416	4822 051 10102	1k00	0,25W	5%
3417	4822 051 20153	15k00	0,1W	5%
3418	4822 051 20103	10k00	0,1W	5%
3419	4822 051 20153	15k00	0,1W	5%
3421	4822 051 20103	10k00	0,1W	5%
3422	4822 051 20008	0R00	JUMPER	
3423	4822 051 20229	22R00	0,1W	5%
3424	4822 051 20472	4k70	0,1W	5%
3425	4822 051 20229	22R00	0,1W	5%
3426	4822 051 20153	15k00	0,1W	5%
3427	4822 051 20682	6k80	0,1W	5%
3428	4822 051 20103	10k00	0,1W	5%
3429	4822 051 20153	15k00	0,1W	5%
3430	4822 051 20103	10k00	0,1W	5%
3431	4822 116 83933	15k00	0,1W	1%
3432	4822 117 10833	10k00	0,1W	1%
3433	4822 051 20153	15k00	0,1W	5%
3434	4822 051 20682	6k80	0,1W	5%
3435	4822 051 20008	0R00	JUMPER	
3436	4822 051 10833	10k00	0,1W	5%
3437	4822 051 20229	22R00	0,1W	5%
3438	4822 051 20008	0R00	JUMPER	
3439	4822 117 11151	1R00		5%
3440	4822 051 20471	470R00	0,1W	5%
3441	4822 051 20152	1k50	0,1W	5%
3442	4822 051 20124	120k00	0,1W	5%
3443	4822 051 20124	120k00	0,1W	5%
3444	4822 051 20563	56k00	0,1W	5%
3445	4822 051 20101	100R00	0,1W	5%

Item	Codenumber	Description		
3446	4822 051 20383	39k00	0,1W	5%
3447	4822 051 20334	330k00	0,1W	5%
3448	4822 051 20153	15k00	0,1W	5%
3449	4822 051 10102	1k00	0,1W	5%
3450	4822 051 10102	1k00	0,1W	5%
3451	4822 051 20101	100R00	0,1W	5%
3452	4822 051 20101	100R00	0,1W	5%
3453	4822 051 10102	1k00	0,1W	5%
3454	4822 051 20101	100R00	0,1W	5%
3455	4822 051 20221	220R00	0,1W	5%
3456	4822 051 20101	100R00	0,1W	5%
3457	4822 051 20154	150k00	0,1W	5%
3458	4822 051 20472	4k70	0,1W	5%
3459	4822 051 20473	47k00	0,1W	5%
3460	4822 051 10102	1k00	0,1W	5%
3461	4822 051 20221	220R00	0,1W	5%
3462	4822 051 20104	100k00	0,1W	5%
3463	4822 051 20101	100R00	0,1W	5%
3464	4822 051 10102	1k00	0,1W	5%
3465	4822 051 20683	68k00	0,1W	5%
3466	4822 051 20104	100k00	0,1W	5%
3467	4822 051 20103	10k00	0,1W	5%
3468	4822 051 20101	100R00	0,1W	5%
3469	4822 051 20682	6K80	0,1W	5%
3470	4822 051 20223	22k00	0,1W	5%
3471		330k00		1%
3472	4822 051 20334	330k00	0,1W	5%
3473	4822 051 20334	330k00	0,1W	5%
3474	4822 051 20473	47k00	0,1W	5%
3475		330k00		1%
3476	4822 051 20153	15k00	0,1W	5%
3477	4822 051 20223	22k00	0,1W	5%
3478	4822 051 20473	47k00	0,1W	5%
3479	4822 051 20223	22k00	0,1W	5%
3480	4822 051 20223	22k00	0,1W	5%
3481	4822 051 20103	10k00	0,1W	5%
3482	4822 051 20223	22k00	0,1W	5%
3483	4822 051 20103	10k00	0,1W	5%
3484	4822 117 10354	22k00	0,1W	1%
3485	4822 051 20272	22k00	0,1W	5%
3486	4822 051 20104	100k00	0,1W	5%
3487	4822 051 20272	22k00	0,1W	5%
3490	4822 051 20008	0R00	JUMPER	
3491	4822 051 20008	0R00	JUMPER	
3492	4822 051 20221	220R00	0,1W	5%
3493	4822 051 20103	10k00	0,1W	5%
3499	4822 051 20008	0R00	JUMPER	
3500		150k00		1%
3501		150k00		1%
3502	4822 051 20229	22R00	0,1W	5%
3503	4822 051 20683	68k00	0,1W	5%
3504	4822 117 10354	22k00	0,1W	1%
3505	4822 117 10354	22k00	0,1W	1%
3506	4822 051 20103	10k00	0,1W	5%
3508	4822 051 20008	0R00	JUMPER	
3509	4822 051 20223	22k00	0,1W	5%
3510	4822 117 11152	4R70		5%
3514	4822 051 20103	10k00	0,1W	5%
3520	4822 117 11152	4R70		5%
3521	4822 051 10102	1k00	0,25W	2%
3522	4822 051 10102	1k00	0,25W	2%
3524	4822 051 20333	33k00	0,1W	5%

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Item	Codenumber	Description		
3525	4822 051 20101	100R00	0,1W	5%
3526	4822 051 20183	18k00	0,1W	5%
3527	4822 051 20222	2k20	0,1W	5%
3528	4822 051 20104	100k00	0,1W	5%
3529	4822 051 20223	22k00	0,1W	5%
3999	4822 051 20104	100k00	0,1W	5%
5160	4822 157 51195	1 mH		
5165	4822 157 63316	56 mH		
5166		EMI FILTER 220p		
5201	4822 242 72527	CST4.00MWG-TF01		
5230	4822 242 81398	X-tal 4.915 000 MHz		
5235	4822 242 81419	X-tal 30.0000 MHz		
5250		EMI FILTER 1n		
5251		EMI FILTER 1n		
5252		EMI FILTER 1n		
5253		EMI FILTER 1n		
5254	4822 157 70378	EMI FILTER 22n		
5255		EMI FILTER 1n		
5256		EMI FILTER 1n		
5270	4822 157 70378	EMI FILTER 22n		
5273	4822 157 70378	EMI FILTER 22n		
5310	4822 242 81756	X-tal 33.8688 MHz		
5375		EMI FILTER 1n		
5376		EMI FILTER 1n		
5383	4822 157 70378	EMI FILTER 22n		
5401	4822 242 73557	CST8,46MTW-TF01		
6205	4822	LED TLHG6201BT		
6390	5322 130 34885	1N5817		
6451	4822 130 80622	BAT54		
6452	5322 130 31928	BAS16		
6524	5322 130 31928	BAS16		
7110	(See section 3.5)	HM514270ATT-7		
7118	(See section 3.5)	HM514270ATT-7		
7125	(See section 3.5)	VDSC JTAG		
7160	4822 209 52561	BT9106KPJ-		
7164	4822 130 40937	BC548B		
7201	4822 209 52558	IKAT		
7205	5322 130 41982	BC848B		
7207	4822 209 32977	MC34064D		
7210	(See section 3.5)	SCC68070CCA84		
7230	4822 209 30704	MC74HCU04D		
7240	(See section 3.5)	System rom		
7241	4822 209 30554	MK48T08B15		
7245	5322 209 61434	N74F02D		
7250	5322 209 71568	74HCT14D		
7275	5322 130 41982	BC848B		
7301	4822 209 33477	PAL 16L8-10		
7302	4822 209 33478	PAL 16L4-10		
7310	(See section 3.5)	CIAP1.5		
7330	4822 209 33403	TDA1305T/N2		
7350	4822 209 62312	MC33078D		
7360	4822 130 42696	BC818-25		
7361	4822 130 42696	BC818-25		
7381	4822 130 42696	BC818-25		
7382	4822 130 42696	BC818-25		
7383	5322 130 41982	BC848B		
7391	4822 130 42655	BC808-40		
7394	4822 130 42655	BC808-40		
7397	5322 130 41983	BC858B		
7401	4822 209 31064	TDA1301T/N1		

Item	Codenumber	Description
7420	4822 209 72587	TCA0372DP2
7430	4822 209 72587	TCA0372DP2
7440	4822 130 42696	BC818-25
7445	4822 130 60887	BF840
7446	5322 130 41982	BC848B
7447	5322 130 41983	BC858B
7448	5322 130 41983	BC858B
7450	5322 130 41982	BC848B
7461	5322 130 41983	BC858B
7462	5322 130 41982	BC848B
7470	4822 209 31615	LM324AD
7480	5322 130 41982	BC848B
7482	4822 209 33393	MC74HC4066D
7485	5322 130 41982	BC848B
7510	4822 209 33414	CD60
7524	5322 130 41982	BC848B

8.3 Partslist of the Powersuply unit

Item	Codenumber	Description		
	4822 214 52166	Powersupply /00		
	4822 214 52167	Powersupply /05		
	4822 214 52168	Powersupply /11		
	4822 214 52169	Powersupply /17		
0001	4822 321 11057	MAINSCORD /00		
0001	4822 321 11061	MAINSCORD /05		
0001	4822 321 11059	MAINSCORD /11		
0001	4822 321 11058	MAINSCORD /17		
0003		CASING		
0004		ST ZN BK 30X18		
0005		RUBBER PAD		
0006		TYPE PLATE		
0007	4822 321 62469	OUTPUT CABLE		
0010		PRINTED BOARD		
0011		HEATSINK		
0012	4822 492 70143	SPRING		
0013		HEATSINK		
0014	4822 492 70143	SPRING		
1101		FUSE PIG TAIL TYPE		
2101	5322 121 44222	330n	250V	20%
2103	4822 124 42191	100µF	400V	20%
2105	4822 121 42408	220n	63V	5%
2106	4822 121 42408	220n	63V	5%
2107	4822 121 42408	220n	63V	5%
2108	4822 121 41856	22n	250V	5%
2109		1n5	50V	10%
2110	4822 121 42408	220n	63V	5%
2111	5322 122 32818	2n2	100V	10%
2112		47µF	25V	20%
2113	4822 122 32576	2n2	400V	
2114	4822 122 32576	2n2	400V	
2201	4822 124 23183	4700µF	16V	20%
2202	5322 121 42386	100n	63V	5%
2203		3300µF	10V	20%
2204		100µF	35V	20%
2205		1000µF	10V	20%
2206		100µF	35V	20%
2207		15n	100V	20%

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Item	Codenumber	Description		
3101	4822 116 30464	NTC B57236 1W6S 20R		
3102		10M00		10%
3103	4822 053 20474	470k00	0,25W	5%
3106	4822 053 11273	27k00	2W	5%
3107	4822 116 83883	470R	0,5W	5%
3108		1R20		5%
3109	4822 116 52233	10k00	0,5W	5%
3110		1R20		5%
3111		1R20		5%
3112	4822 116 52207	1k20	0,5W	5%
3113	4822 116 52233	10k00	0,5W	5%
3114	4822 116 52235	1M00	0,5W	5%
3115	4822 116 52233	10k00	0,5W	5%
3116	4822 116 52228	680R00	0,5W	5%
3117	4822 116 52175	100R00	0,5W	5%
3118	4822 116 52233	10k00	0,5W	5%
3119	4822 116 52233	10k00	0,5W	5%
3120	4822 116 52233	10k00	0,5W	5%
3121	4822 116 52233	10k00	0,5W	5%
3122	4822 116 83883	470R00	0,5W	5%
3123		1R20		5%
3201		1R20		5%
3202	4822 116 52175	100R00	0,5W	5%
3203		1k20		5%
3204		2k49		1%
3205		2k32		1%
3206		1R20		5%
3207		1R20		5%
3208	4822 116 52175	100R00	0,5W	5%
3209		3R60		5%
3210		3R60		5%
3211	4822 116 52233	10k00	0,5W	5%
3212	4822 116 52233	10k00	0,5W	5%
3213	4822 116 52233	10k00	0,5W	5%
3214	4822 116 52233	10k00	0,5W	5%
5101		FIL.CHOKE ASSY		
5102		TRANSFORMER		
5201		6µ8		20%
6102	4822 130 42489	BYD33G		
6103	4822 130 30621	1N4148		
6105	4822 130 30621	1N4148		
6106	4822 130 30621	1N4148		
6107	4822 130 31024	BZX79C18		
6108	4822 130 31024	BZX79C18		
6109	4822 130 42489	BYD33G		
6201	4822 130 83073	PBYR745		
6202	4822 130 34167	BZX79C6V2		
6203	4822 130 82035	BYD74D		
6204	4822 130 32245	BYV10-40		
6205	4822 130 30621	1N4148		
7101	4822 130 83707	S1NB80		
7102	4822 130 63409	STP6N60FI		
7103	4822 209 83909	UC3842N		
7104	4822 130 41327	BC327-40		
7105	4822 130 41327	BC327-40		
7106	4822 130 10025	CNX82A		
7201	4822 209 33323	TL431CLPRM		
7202	4822 209 11079	MC79M05CT		
7203	4822 130 41344	BC337-40		
7204	4822 130 41344	BC337-40		

8.4 LIST OF ACCESSORIES AND SERVICE TOOLS

Item	Codenumber	Description
1	4822 395 50145	TORX SCREW DRIVER SET
2	4822 321 61677	CABLE FOR TERMINAL LLTEST
3	4822 264 50263	PLUG FOR STARTUP OF SERVICESHELL
4	4822 397 30096	AUDIO TESTDISC SET
5	4822 397 30155	TESTDISC WITH CONTINOUS 1KHz SIGNAL 70 MIN.
6	4822 397 30184	AUDIOSIGNALSDISC
7	4822 701 11922	SKEW DISC 0,6
8	4822 701 11923	EXCENTRICITY DISC 150 I
9	4822 691 30293	ROLLER CONTROLLER
10	4822 691 30298	TRACKER BALL
11	4822 691 30328	TOUCH PAD
12	4822 691 30297	MOUSE
13	4822 535 80819	EXTENTION RODS
14	4822 322 40066	EXTENTION FLEXFOIL

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