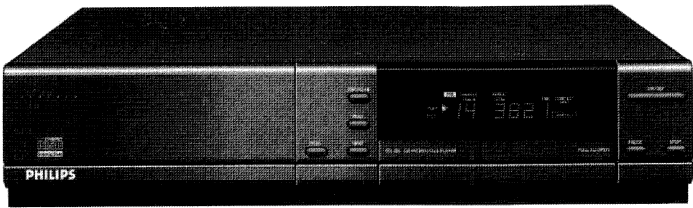


Service
Service
Service

Interactive
Media
Systems

CDI



Service Manual



SURVEY OF PLAYER VERSIONS

Version	Description
/41	Multivoltage PAL player
/40	PAL player without RF-modulator
/45	PAL player with RF-modulator for the UK-system
/57	NTSC player with RF-modulator for the USA-system

These players are equipped with a Compact Disc Mechanism type CDM9; service code 4822 691 30275.
This CDM is also used in CDI200 CDI205, CDI210 and CDI910.
Service information is included in this manual.

SURVEY OF MAINPANELS

Version	Codenummer
/20	4822 214 52065
/25	4822 214 52068
/37	4822 214 52056
/39	4822 214 52066
/40	4822 214 52163
/41	4822 214 52164
/45	4822 214 52165
/57	4822 214 52145

These mainpanels must be repaired via the central repair procedure. If the defective item is on the circuitry of the μ P section,digital audio (LEMM+DSP) section, GLUE logic section or digital video section. See chapter 3.6.
If the defective item is in the circuitry of the SERVO section, analog audio section or analog video section, then the panel can be repaired up to component level.
For partnumbers see chapter 8.4.

- SF** Varoitus!
Laite sisältää laserdiodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilyä.
- S** Varning!
Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad.
Betakta ej strålen.
- DK** Advarsel!
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion.
Undgå udsættelse for stråling.
- GB**
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.
Safety components are marked by the symbol ▲.



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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 utilisables • 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 USA: 120 V/60 Hz
UK: 240 V/50 Hz Japan: 100 V/50,60 Hz

Power consumption • Consommation • Consume de corriente
Opgenomen vermogen • Leistungsaufnahme • Consumo di corrente • Consomo de Corriente
35 W with, 22 W without extension (22ER9141)
35 W avec, 22 W sans extension (22ER9141)

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

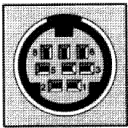
Relative humidity • Humidité relative • Humedad relative
Relatieve vochtigheid • Relative Feuchtigkeit • Umidità relativa • Humedad relativa
5% to 95% (no condensation)
5% à 95% (sans condensation)

Weight • Poids • Peso • Gewicht • Gewicht • Peso • Peso
5,2 kg

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.)
420 mm x 90 mm x 286 mm
16.55" x 3.55" x 11.25"

Input • Entrée • Entrada • Ingang • Eingang • Ingresso • Entradas
remote in 2 Vpp at 2.2 kOhm cinch socket
Prise cinch 2 Vc-c à 2,2 kOhm

input (2 ports) 8-pin mini-DIN
(2 entrées) mini DIN 8 broches



pin Broche	signal Signal	I/O E/S
1	nc	
2	rx	I / E
3	tx	O / S
4	nc	
5	ground / Masse	
6	cts	I / E
7	rts	O / S
8	+5V (200 mA maxi.)	

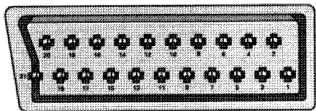
Output • Sortie • Salida • Uitgang • Ausgang • Uscita • Saídas • Salidas
video 1 Vpp (75 Ohm load, sync neg) RCA pin jack
1 Vc-c (charge 75 Ohm, sync. nég.) Prise cinch

S-video y-output 1 Vpp (75 Ohms)
c-output 300 mVpp (75 Ohms)
S-video 4-pin miniDIN
Sortie Y 1 Vc-c (75 Ohm)
Sortie C 300 mVc-c (75 Ohm)
mini DIN 4 broche S-video



pin Broche	signal Signal
1	ground y / Masse Y
2	ground c / Masse C
3	y / Y
4	c / C

AV/Euroconnector
Péritélévision AV

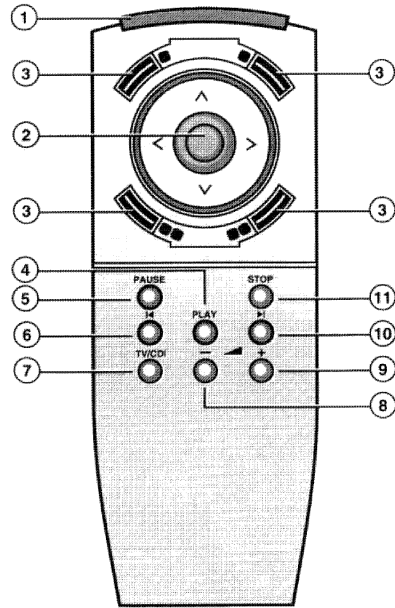
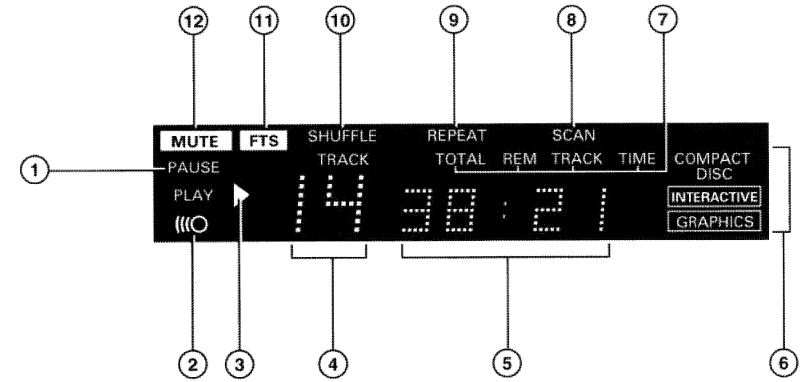
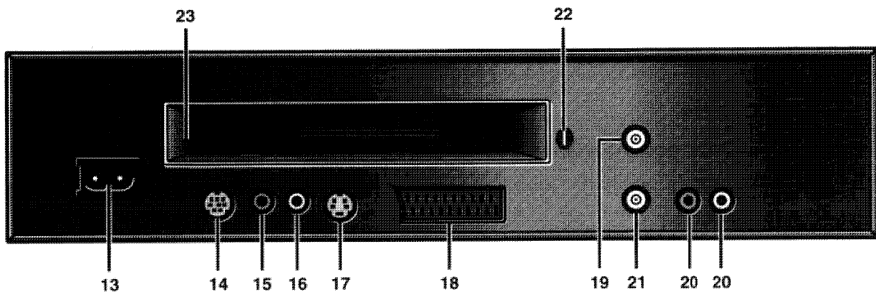
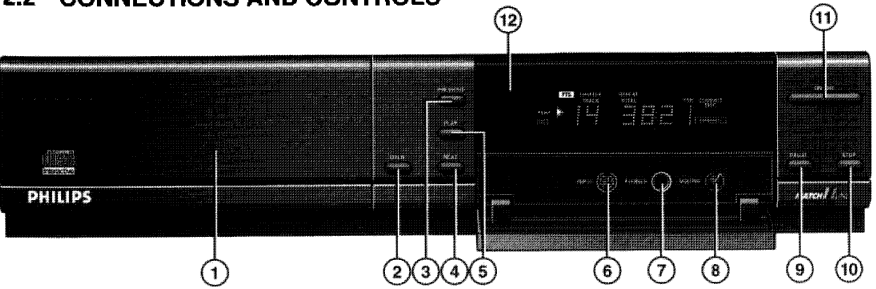


pin Broche	signal Signal
1	audio R / audio R (droite)
2	nc / non connecté
3	audio L / audio L (gauche)
4	audio ground / masse audio
5	blue ground / masse bleu
6	nc / non connecté
7	blue / bleu
8	slow switching (0=TV 1=AV/Euroconnector) commutation lente (0=TV 1=Péritélévision AV)
9	green ground / masse vert
10	nc / non connecté
11	green / vert
12	nc / non connecté
13	red ground / masse rouge
14	nc / non connecté
15	red / rouge
16	fast switching (RGB/CVBS) commutation rapide (RVB/CVBS)
17	CVBS ground / masse CVBS (PAL)
18	fast switching (ground) commutation rapide (masse)
19	CVBS/RGB sync / CVBS/RVB sync.
20	nc / non connecté
21	shield / blindage

Headphones
Prise Casque Input impedance 32 Ohm to 2 kOhm output power
30 mW at 1 kHz, 32 Ohm stereo socket 3.5 mm
impédance entrée 32 Ohm à 2 kOhm puissance sortie
30 mW à 1 kHz, 32 Ohm stéréo, prise Jack 3.5 mm

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

2.2 CONNECTIONS AND CONTROLS



DESCRIPTION OF CONTROLS AND CONNECTIONS

- FRONT**
- Disc loading tray
 - Open/close button
 - Previous track selection button
 - Next track selection button
 - Play button
 - Input port for CD-I pointing devices
 - Headphone jack
 - Headphone volume control
 - Pause button
 - Stop button
 - AC power on/off button
 - Soft tone multifunction display with infra-red remote control receiver

- REAR**
- Mains AC (alternating current) input jack
 - Input2 port for CD-I pointing devices, keyboard or RS232 connection
 - Remote control input
 - Video output (CVBS)
 - Y/C (S-video) output
 - AV Euroconnector*
 - RF OUT*
 - Audio output L
 - Audio output R
 - TV Antenna input*
 - Channel selector*
 - Extension socket (for 22ER9141)* Full motion video

- DISPLAY PANEL**
- CD pause active
 - Remote control active (flashing indicator)
 - Disc playing (stepping indicator)
 - Track number (CD-Audio)
 - Elapsed or remaining time (CD-Audio)
 - Type of disc indicator
 - Time indicators
 - CD scan active
 - CD repeat active
 - CD shuffle active
 - CD FTS active
 - Mute indicator

- REMOTE CONTROL**
- Infra red remote control
 - Thumbstick
 - Action buttons (for left or right handed operation)
 - Play button
 - CD pause button
 - CD previous track selection button
 - Audio mute button - CD-I/TV button*
 - Volume down button
 - Volume up button
 - CD next track selection button
 - CD stop button

*Available on some player versions only.

Note: Pointing device speed of 9600 baud is supported.
Remarque: Vitesse de transmission jusqu' à 9600 baud. • Nota: Se admite un dispositivo de puntero de 9600 baudios de velocidad. • Opmerking: Voor de aanwijsapparaten is een snelheid van 9600 baud mogelijk. • Hinweis: Die Geschwindigkeit der Zeigevorrichtung von 9600 baud wird unterstützt. • Nota: Tollera la velocità dell'accessorio di comando di 9600 baud. • Nota: Velocidad del dispositivo de apunta admitida: 9600 baudios.

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. • Änderungen von Ausführung und technische Daten vorbehalten. • I disegni e le specifiche tecniche sono soggette a modifiche senza preavviso. • As especificações descritas estão sujeitas a alteração sem aviso prévio. • El diseño y las especificaciones están sujetos a cambios sin previo aviso.

2.3 BEFORE USING YOUR CD-I PLAYER

PRECAUTIONS

To operate your CD-I player a pointing device is needed. For pointing devices other than the included one, please see the accessories page on the back of this manual.

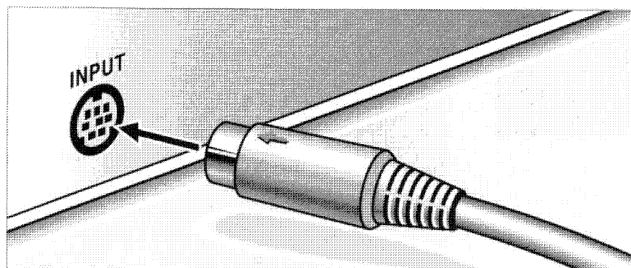
CAUTION

Never make or change connections with the power switched on.

Pointing devices are sensitive precision instruments. Handle them with care, keeping in mind the following precautions:

- Avoid dropping or knocking
- Do not use them in locations subject to extreme temperatures, humidity, dust or vibration.
- Never hold the pointing device by the cable.
- Never pull the cable to disconnect the pointing device from the player.

WIRED POINTING DEVICES (such as mouse, trackerball, roller controller or touchpad)



- Plug the pointing device connector into an input port for pointing devices on the CD-I player (input 7 at the front or input 15 at the rear).
- Insert the connector with the arrow at the top.
- Place the pointing device in front of the display screen, with the back (the cable end) pointed towards the screen.
- Now, as you roll the mouse, the trackerball or the roller controller, the cursor moves in the corresponding direction on the screen.

- When the cursor is positioned on the required function click on one of the action buttons.
- The function selected by this 'point-and-click' technique is highlighted to confirm the selection.

CAUTION

Never make or change connections with the power switched on.

Note

- A pointing device connected at the front panel can be used simultaneously with the supplied 'Thumbstick' remote control.
- Connecting a pointing device only at the rear panel immobilizes the supplied 'Thumbstick' remote control, except in certain programs for two persons.
- To 'point-and-click' on any screen shown in this manual, any one of the action buttons can be used. Within CD-I programs, you may find that the '■' buttons and the '■ ■' buttons have different functions.

INFRA RED REMOTE CONTROL

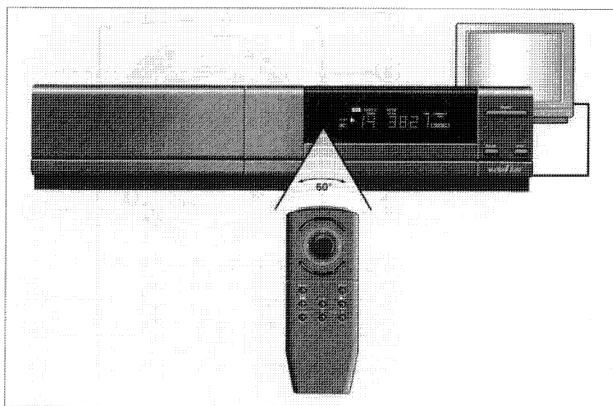
Remote control interactive operation

For normal interactive operation, use the 'Thumbstick' remote control to select functions displayed on the TV screen. Simply:

- Aim the remote control at the player.
- Move the Thumbstick to point the cursor arrow on the screen to the required function.
- The cursor arrow movement corresponds to the direction in which the stick is moved. The arrow moves faster if the stick is moved further.
- Click on one of the action buttons.
- The function selected by this 'point-and-click' technique is highlighted to confirm the selection.

Note

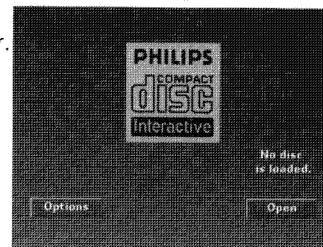
To 'point-and-click' on any screen shown in this manual, any one of the four action buttons can be used. Within CD-I programs, you may find that the '■' buttons and the '■ ■' buttons have different functions.



2.4 SETTING UP

SWITCHING ON AND OFF

- Press the ON/OFF button (11) to switch the player on.
- 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:



Open/Close:

To open or close the disc tray.

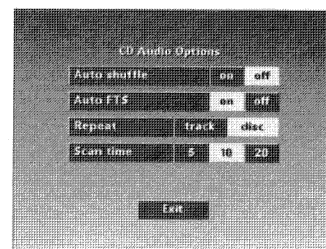
Options:

See: 'OPTIONS SCREEN'.

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.

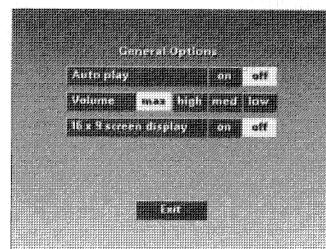
Scan time

Select the time you want the beginning of each audio track to play for 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.

16 : 9 screen display

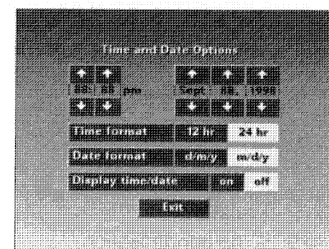
Selecting 16 : 9 screen display, when you have your player connected to a TV with a 16 : 9 screen.

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

- Press the ON/OFF button (11) to switch the player off.
- Switch off the TV (and HiFi system, if used).

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 ↑ and ↓ 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 dd/mm/yy to present the date in day-month-year sequence. Select dd/mm/yy to present the date in month-day-year sequence.

Display time/date

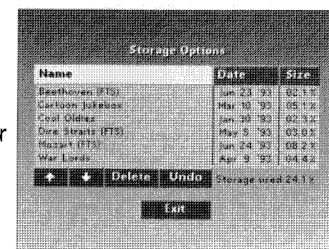
Select whether time and date will displayed on the TV screen or not.

- 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'.

2.5 DISC PLAY

GENERAL

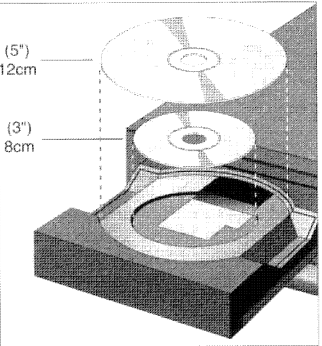
- Push button control:**
- For basic play control, or for playing discs through a stereo system without using the TV, you can use the buttons on the front panel or on the remote control.
 - The play, pause and stop buttons operate in the same way as the corresponding on-screen functions.
 - The next and previous buttons skip one track forward or backward respectively.

Note
The functioning of these buttons will depend completely on the application when playing a CD-I program.

- Changing over to TV:**
- Select the desired channel or input of your TV using the controls of your TV set.
 - When the player is switched on, its antenna signal is fed through to the TV and depending on the player-TV connection, TV reception might be interrupted automatically.

LOADING AND UNLOADING

- Loading:**
- Point and click on 'Open' (you may also press the OPEN button **(2)** on the player) to open the disc tray **(1)**.
 - Take the disc from its holder and place it on the tray with the label up.
 - Point and click on 'Close' (you may also press the OPEN button **(2)** on the player, or gently push the front of the tray) to close the tray.
 - The TV screen changes according to the type of disc.



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.

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 consists of more than one consecutive disc, a so-called 'multi-disc' title, follow the instructions for opening and closing of the tray as shown on the screen. When you use the open button **(2)** on the player the title is considered to be played wholly and any intermediate scores, settings or 'bookmarks' will not be updated. Any additional disc of the multi-disc title will not be recognised as part of it. The tray may also be closed by gently pressing the front of it.

- To change over to TV reception at any time in such case, press the TV/CDI button **(7)** on the remote control.
- To return to CD-I play, press the TV/CDI button **(7)** again.

- Sound level:**
- When playing any disc adjust the sound level as required, preferably on the TV or HiFi amplifier.
 - The volume up **(9)** /down **(8)** buttons on the remote control may also be used, but for each disc these controls always start at level set in the setting menu. A suitable level must therefore first be set on the TV or HiFi amplifier.

Note
Connecting headphones does not mute the loudspeaker sound. This must be done manually, on the TV or HiFi system, if required.

- Unloading:**
- Point and click on 'Open' (you may also press the OPEN button **(2)**) to open the disc loading tray.
 - The player start-up screen reappears on the TV.
 - Take the disc from the tray and replace it in its holder.
 - Point and click on 'Close' (you may also press the OPEN button **(2)** on the player, or gently press the front of the tray) to close the tray with or without a new disc.

- Note**
- You may unload the disc at any time by pressing the OPEN button **(2)**.
 - 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.

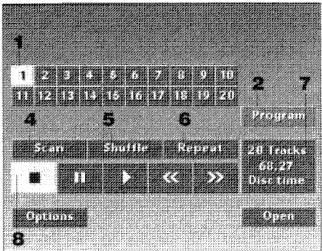
- After loading the disc, the CD-I start-up screen appears on the TV.
- To start the CD-I program, select the 'Play' icon on the screen; you may also press the PLAY button **(5)** on the player or remote control **(4)**.
- Using a PLAY button will also automatically close the tray when open.(*)
- The 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.

(*) The default Volume is than automatically set to the level selected in the 'General' screen.

DISC PLAY

PLAYING AN AUDIO CD

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



- 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 forward → and reverse ← 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 appear.

- 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.
 - 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 remote control. 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.

- | | |
|------------|--|
| 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. |

1. Using the audio screen

- Select a track** **track** number
if the disc contains more than 10 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** **forw(ard) >>**
searches forward through disc, first slowly, then fast.

- Reverse search** **rev(erse) <<**
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'.

DISC PLAY

PLAYING AN AUDIO CD

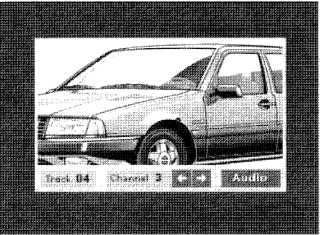
- After creating a Favorite Track Selection for a disc, you can compose a title of approx. 30 characters (depending on the character width) for the selection using the keyboard screen.
- The title then appears on the CD-Audio screen whenever the disc is loaded.
- At the CD-Audio screen, 'point-and-click'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



PLAYING AN AUDIO CD

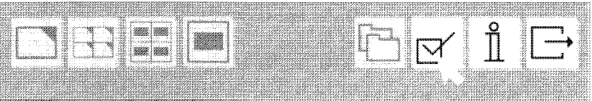
Available on some player versions only.

- When an audio CD with graphics 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.



PLAYING A PHOTO CD

- After loading the disc, the CD-I start-up screen appears on the TV.
- To start the Photo CD program, select the 'PLAY CD-I' icon on the screen; you may also press the PLAY button **(5)** on the player or remote control **(4)**.
- The opening screen of the Photo CD program now appears on the TV.
- At the bottom of this screen a menu bar with icons is shown.



- 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.

- 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.

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.

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



- Select the ⓘ 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.

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.

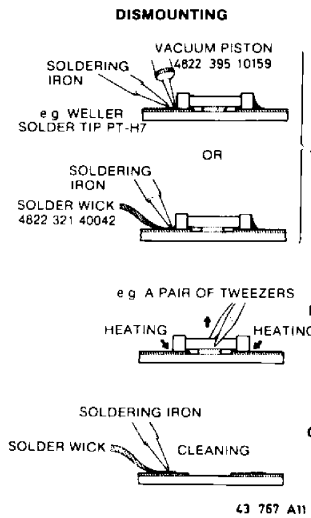


Fig. 1

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).

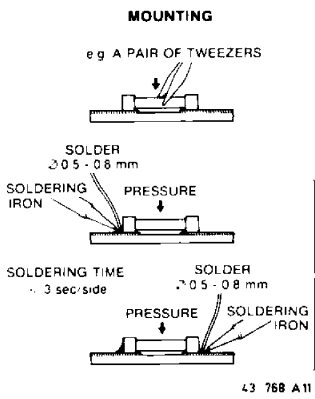


Fig. 2

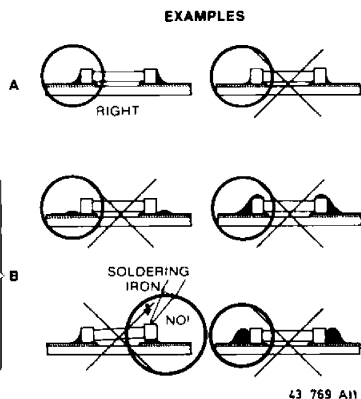


Fig. 3

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

3.3.2 Storage and transport

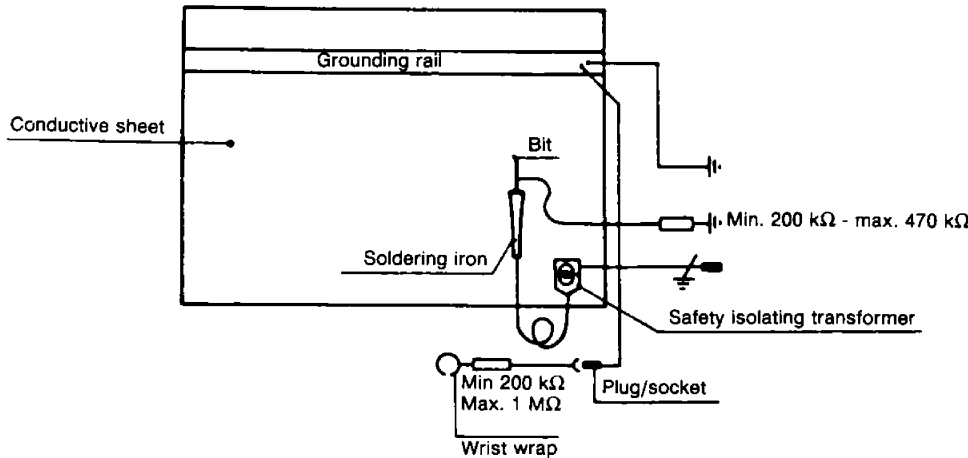
Transport and store the circuits and PCBs in their original packages. As an alternative to the original package one may use a conductive material or special IC package which short-circuits all the pins of the component with one another. Always discharge the package before opening it.

3.3.3 Testing or handling

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

3.3.4 Mounting ESD-sensitive components

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



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

3.3.8 Working environment

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

3.3.9 Replacement of the Flat Pack IC's

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

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. 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.

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.

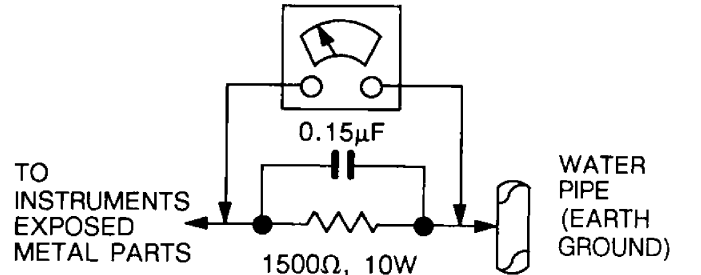
Fire and Shock Hazard (Continued)

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

* Broken line: 

Leakage Current Cold Check

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



Leakage Current Hot Check

1. Do not use an isolation transformer for this test. Plug the completely reassembled unit directly into the ac outlet.
2. Connect a 1.5k, 10W resistor paralleled by a 0.15µF capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohms/volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 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.

TOOLS TO BE USED

ANTISTATIC MAT



MAGNIFYING GLASS



METAL BRUSH



HAIR DRYER

4822 390 50025

FLUX

BRUSH



FLUX

4822 321 40042
DESOLDER BRAID



SOLDER
ø0,5-0,8 MM



SOLDERING IRON
WELLER TCP 50

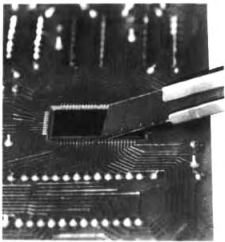


SOLDER TIP
WELLER PT-CC7
4822 310 50081

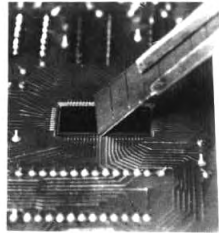


KNIFE

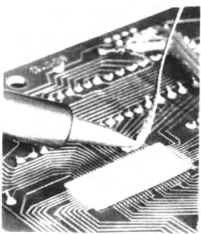
DISMOUNTING



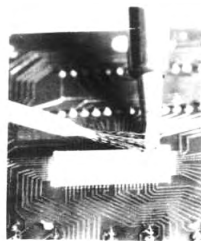
CUTTING
THE LEADS



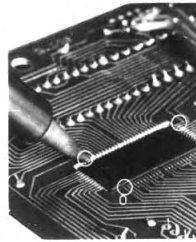
WRONG
TRACKS WILL
BE DAMAGED



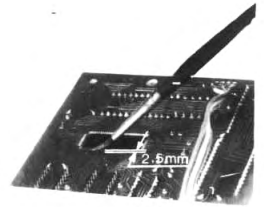
CLEANING
THE TRACKS



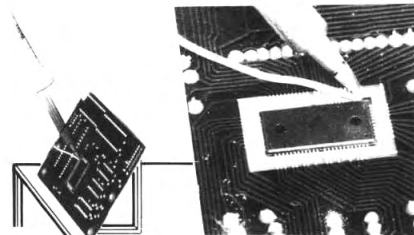
MOUNTING



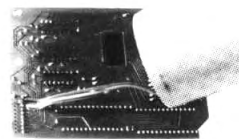
FIXING IC
AT THE CORNERS



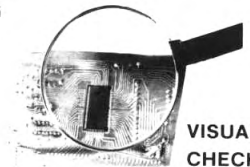
APPLYING FLUX



SOLDERING:
SPEED
1 CM IN 5 SEC.

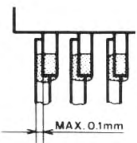


DRYING



VISUAL
CHECK

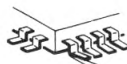
ALIGNING THE LEADS



RIGHT

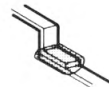


WRONG

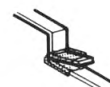


WRONG

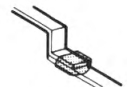
SOLDERING



RIGHT



WRONG

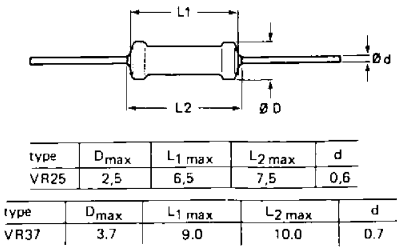


WRONG

3.4 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



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

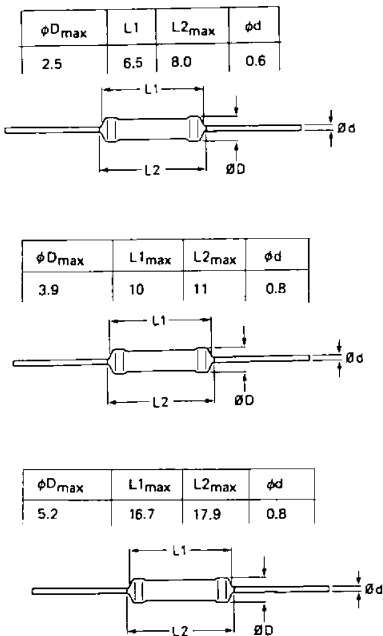
Composition of the service number for the VR25 and VR37
Main subgroup: 4822 053 20... and 4822 053 21...

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



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

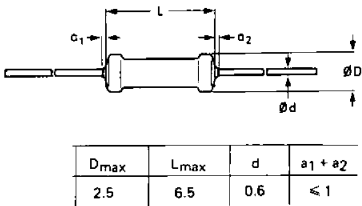
Composition of the service number for the PR01, PR02 and PR03
Main subgroup: 4822 053 10... ; 4822 053 11... and 4822 053 12...

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



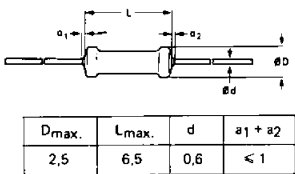
Composition of the service number for the NFR25
Main subgroup: 4822 052 10...

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



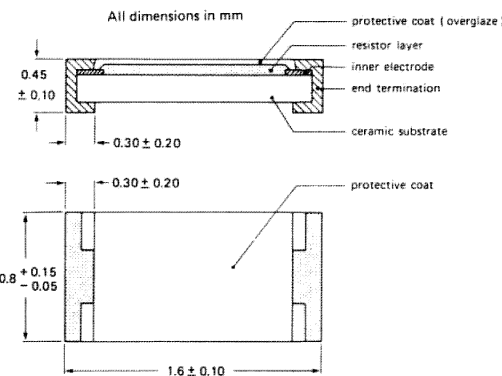
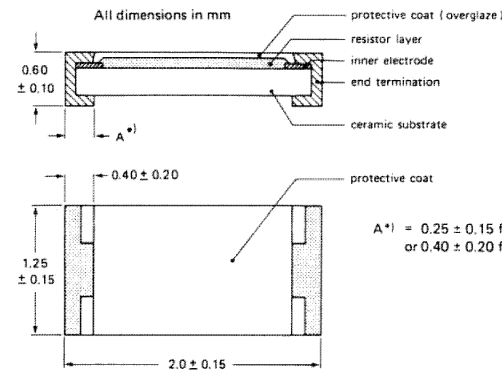
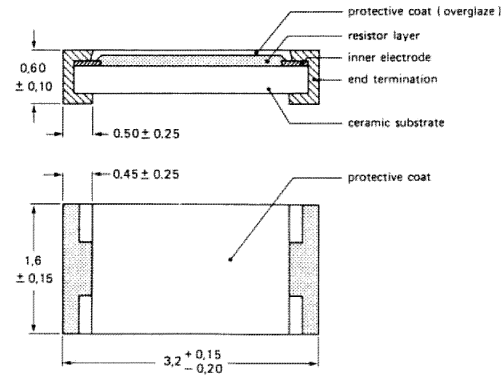
Composition of the service number for the NFR25H
Main subgroup: 4822 052 11...

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

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.

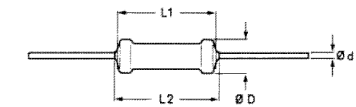
8 for R=	0 to 9.1 Ω
9 for R=	10 to 91 Ω
1 for R=	100 to 910 Ω
2 for R=	1 to 9.1 KΩ
3 for R=	10 to 91 KΩ
4 for R=	100 to 910 KΩ
5 for R=	1 to 9.1 MΩ
6 for R=	or > 10 MΩ

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



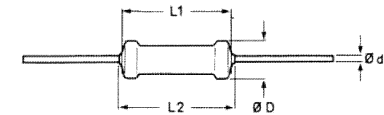
D	L	L2 max.	d
1,7 +0,2/-0,1	3,5 +0,2/-0,15	3,7	0,5 -0,04

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....

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 $K\Omega$
3 for R=	10	to 97,6 $K\Omega$
4 for R=	100	to 976 $K\Omega$
5 for R=	1	to 9,76 $M\Omega$
6 for R= or >	10	$M\Omega$

Example:

The service number of a resistor of 976 Ω is:

4822 050 29761

3.5 SERVICE TOOLS

3.5.1 List of accessories and service tools

Item	Codenummer	Description
1	4822 395 50145	TORX SCREW DRIVER SET
2	4822 214 52007	LOW-LEVEL- TEST PANEL ASSY
3	4822 321 61677	CABLE FOR TEST PANEL
4	4822 264 50263	PLUG FOR STARTUP OF SERVICESHELL ON PORT 2 (BU 2)
5	4822 397 30096	AUDIO TESTDISC SET
6	4822 397 30155	TESTDISC WITH CONTINUOUS 1KHz SIGNAL 70 MIN.
7	4822 397 30184	AUDIO SIGNALS DISC
8	4822 701 11922	SKEW DISC 0,6
9	4822 701 11923	EXCENTRICITY DISC 150 I
10	4822 691 30293	ROLLER CONTROLLER
11	4822 691 30298	TRACKER BALL
12	4822 691 30328	TOUCH PAD
13	4822 691 30297	MOUSE

3.5.2 Partslist for rollercontroller

Item	Codenummer	Description
1	4822 321 61841	CABLE ASSY
2	4822 413 90093	BALL
3	4822 276 13359	SWITCH
4	4822 410 62427	KEYTOP-LEFT
4	4822 410 62428	KEYTOP-RIGHT
5	4822 492 42645	SPRING

3.6 THE MONOBOARD CENTRAL REPAIR PROCEDURE

In case of a defect on the Multi Media Controller (see Block-diagram) part, the complete panel must be sent back to PCS for repair.

Below a brief description is given, a more detailed procedure is available at P.C.S Logistics Management, systems and Procedure Office.

CODENUMBER Monoboard:

Version	Codenummer
/40	4822 214 52163
/41	4822 214 52164
/45	4822 214 52165
/57	4822 214 52145

- NSO or Customer: send telex or on-line MSH system info to PCS customer relations officer with indicated number(s) and service 12NC for a repair reference number.
- PCS: send telex or MSH info with repair reference number and return invoice price. Also the same number(s) of new/repared items are sent with invoice.
- NSO or customer: send defective item(s) to PCS at SDM1 by standard address label with repair reference number and return invoice to PCS -price center.

- Remark: the difference between the invoice price and return invoice price gives the 'repair price' for the NSO

- PCS: send defective item to factory and stock.

- Experience has learned that the status of the particular products and packaging needs your local attention. Products will be returned in case of unacceptable conditions.

REPAIR PROCEDURE CONDITIONS :

- * HANDLE WITH CARE IN AN ESD PROTECTED ENVIRONMENT.

- * Defective items must be sent back to PHILIPS CONSUMER SERVICE for repair forwarded by Address sticker.

- * Put the address sticker properly on a free area of the box.

- * Boards must not be reworked or damaged.

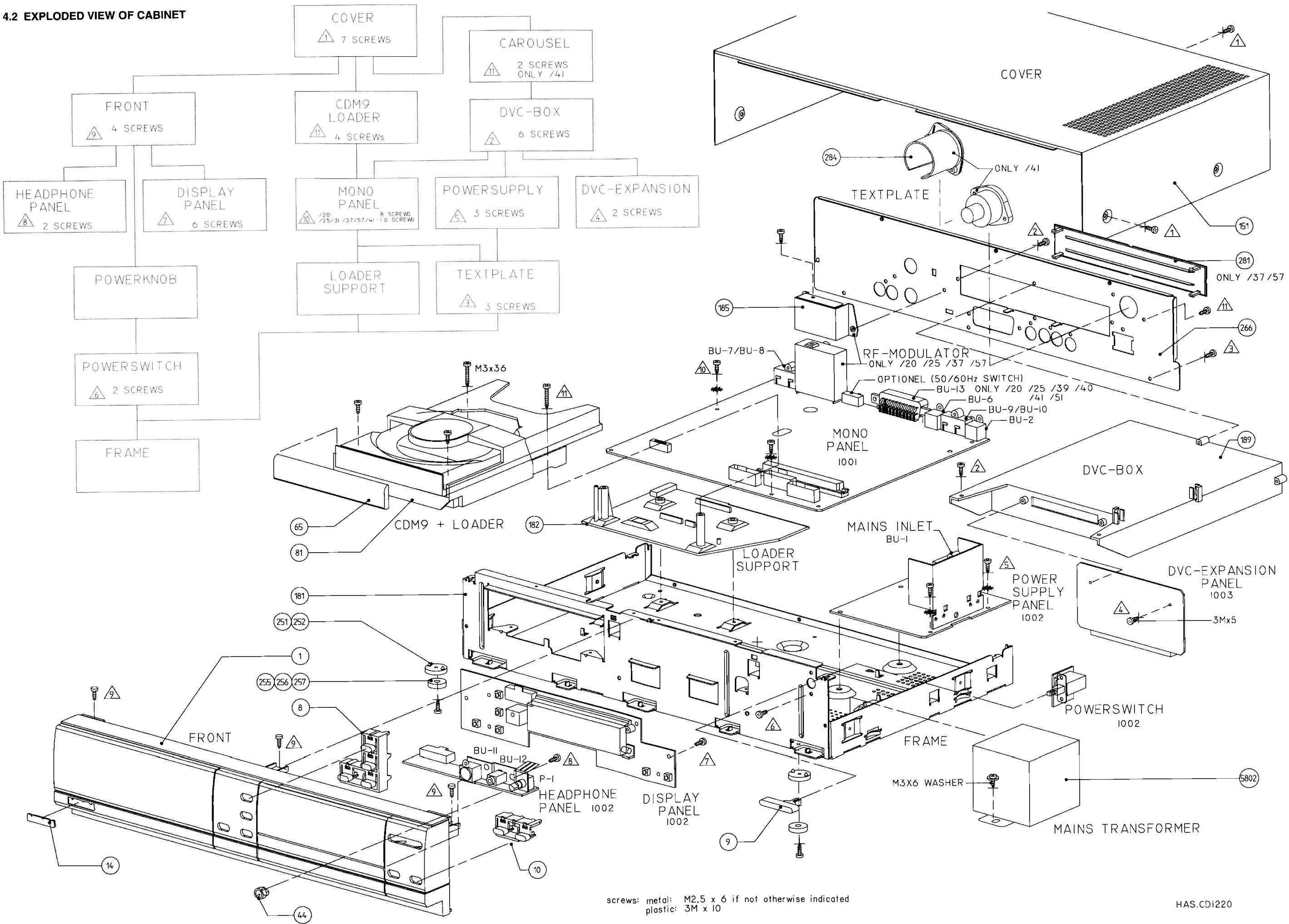
- * Re-use original package order new package in case of damages.

- * Remove additional stickers and labeling if re-using the original box. Service codenummer on sticker must be equal to codenummer on repairable item.

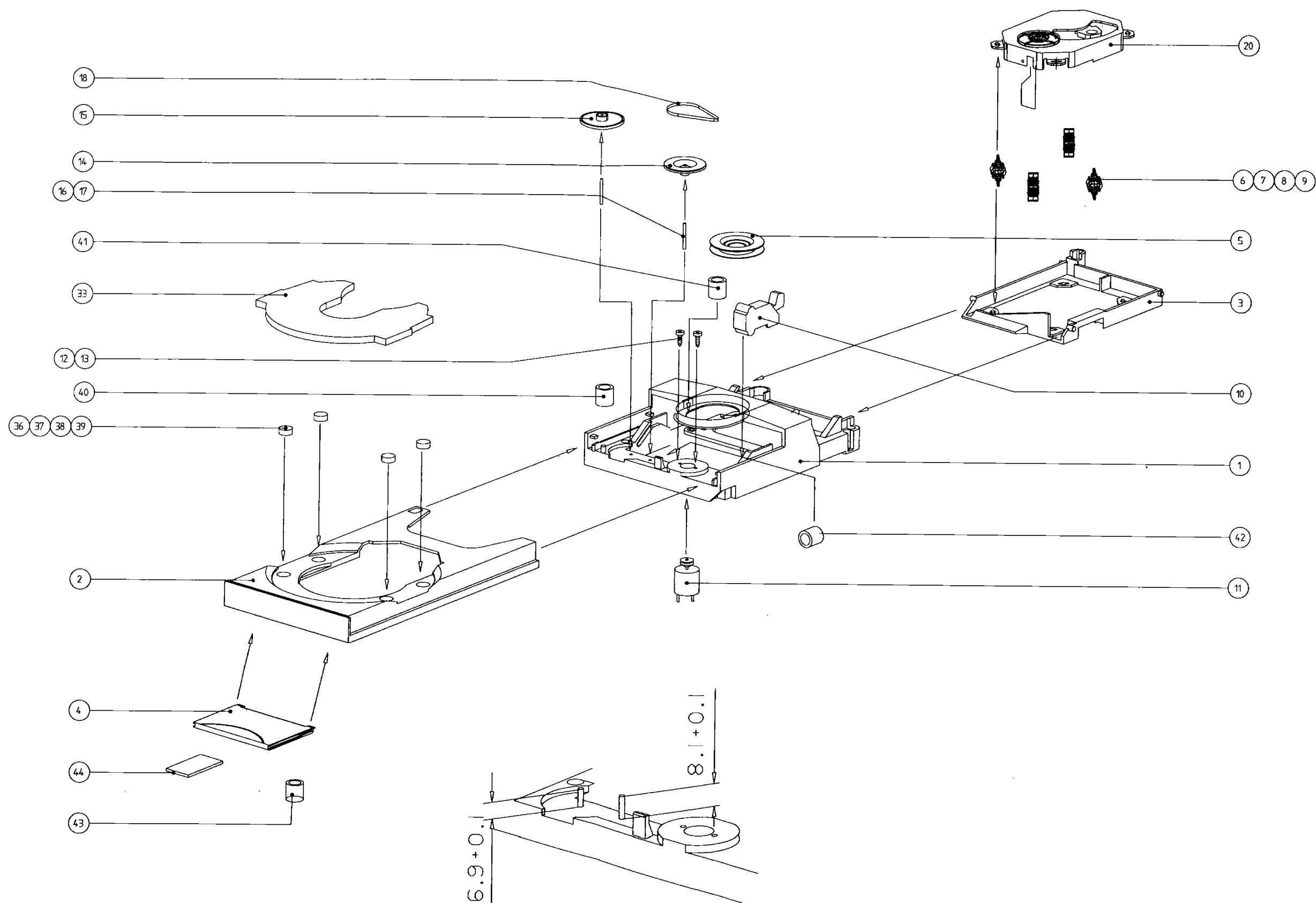
- !!! If the above conditions are not fulfilled, then boards are not accepted and the return price will not be credited !!!

- **Dealers have to contact the local PHILIPS Service-organization.**

4.2 EXPLODED VIEW OF CABINET



4.3 EXPLODED VIEW OF LOADER



5 SERVICE SOFTWARE

In the set there are 2 different testsoftware available:

- 1. Low Level test
- 2. Service Shell

5.1 THE LOW LEVEL MMC TEST

Scope

This test is standard implemented in the boot-software of CD-RTOS. It doesn't need a lot of hardware to run. When debugging or servicing an MMC panel this test is very useful. The Low Level test in Menu driven.
To run the low level test a terminal (or equivalent) must be connected to port 2 (= BU2). To start the test the space-bar on the terminal must be pushed at the same that the power is switched on at the CDI-player. To continue with the test, the instuctions on the screen of the terminal must be followed.

5.1.1 Testsequence

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

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
4	DRAM test
5	DSP test
6	Slave processor test
7	Chip Select test
8	VDSC test

Display ltest header and release number

In this step the VDSC is initialized in the same way as in the pcb ltest.

ITEM 0 : EXIT LOW LEVEL TEST

Selecting this item will end the ltest 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 addresses). Pressing 'ESC' stops the test.
If one tries to write to unused space in the memory map, the program will NOT generate an error message and the system will hang up.

ITEM 2 : ROM parity check

For the ROM the following information is displayed and checked:

- Display the identification code for this ROM (ROM ID)
- Display the release number of this ROM

- Display the checksum of this ROM. The upper word of the checksum displayed is always '0000'.
If the checksum is not ok then a specific error will be displayed. This error is the same as in the pcb low level test.

ITEM 3 : NVRAM test

For the NVRAM test three different tests can be selected:

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

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 continu the long address as data to the dram.
 - r : reads continu the dram (no display).
 - d : displays the contents of 421 succeeding ram locations. The start address is given by the user.
- ESC : stops these functions.

ITEM 5 : DSP

1. Write \$AA to the Interrupt Vector Register.
2. Read and compare IVR
3. Write \$55 to the IVR
4. Read and compare again

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

ITEM 6 : SLAVE processor

This ltest for the slave performs following actions:

1. Write \$F0 to the slave processor.
2. Read byte from same address, the slave should respond with \$F0.
3. If data is not \$F0 then stop testing and display error code else continue with next action.
4. Read the next byte: this byte is the release number of the slave processor firmware. Display the release number. If the release number is \$00 then an error will be displayed.
5. Read the next byte: this byte is the release number of the CD processor firmware. Display the release number. If the release number is \$00 then an error will be displayed.
6. Read the next byte: this is a dummy read.

ITEM 7 : 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, DSP, SLAVE, NVRAM and KILLME & DMAEN

ITEM 8 : VDSC test

1. Write continuously \$00 to the Display Decoder Registers of the master and slave.
2. Read continuously 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 testpattern
- CDM and servo circuitry

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

5.2.1 Starting the service shell

The service shell can be started by connecting the RXD and TXD lines of port 1 (pin2 and pin3) during start up (insert testplug before power on or reset).

5.2.2 Layout info

selectable/non selectable items

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

(error) messages on the screen

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

menu structure

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

5.3.3 Subject dependent information

Main menu

The main menu contains two test item boxes and the EXIT box. Selecting TEST IMAGE will give immediate action, the CD DRIVE will start the CD DRIVE test submenu.

CD drive test

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

MODE 0

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

MODE 1

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

MODE 2

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

MODE 3

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

MODE 4

In this mode the CDDA shell will appear like playing normally.
If something goes wrong, then the errors which will be sent by the CD processor will be displayed in a box on the screen. You cannot return to the service shell otherwise than by resetting the player.

MEANING OF ERROR MESSAGES DURING MODE 4

Format of the message on the screen : A5 xx0000

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

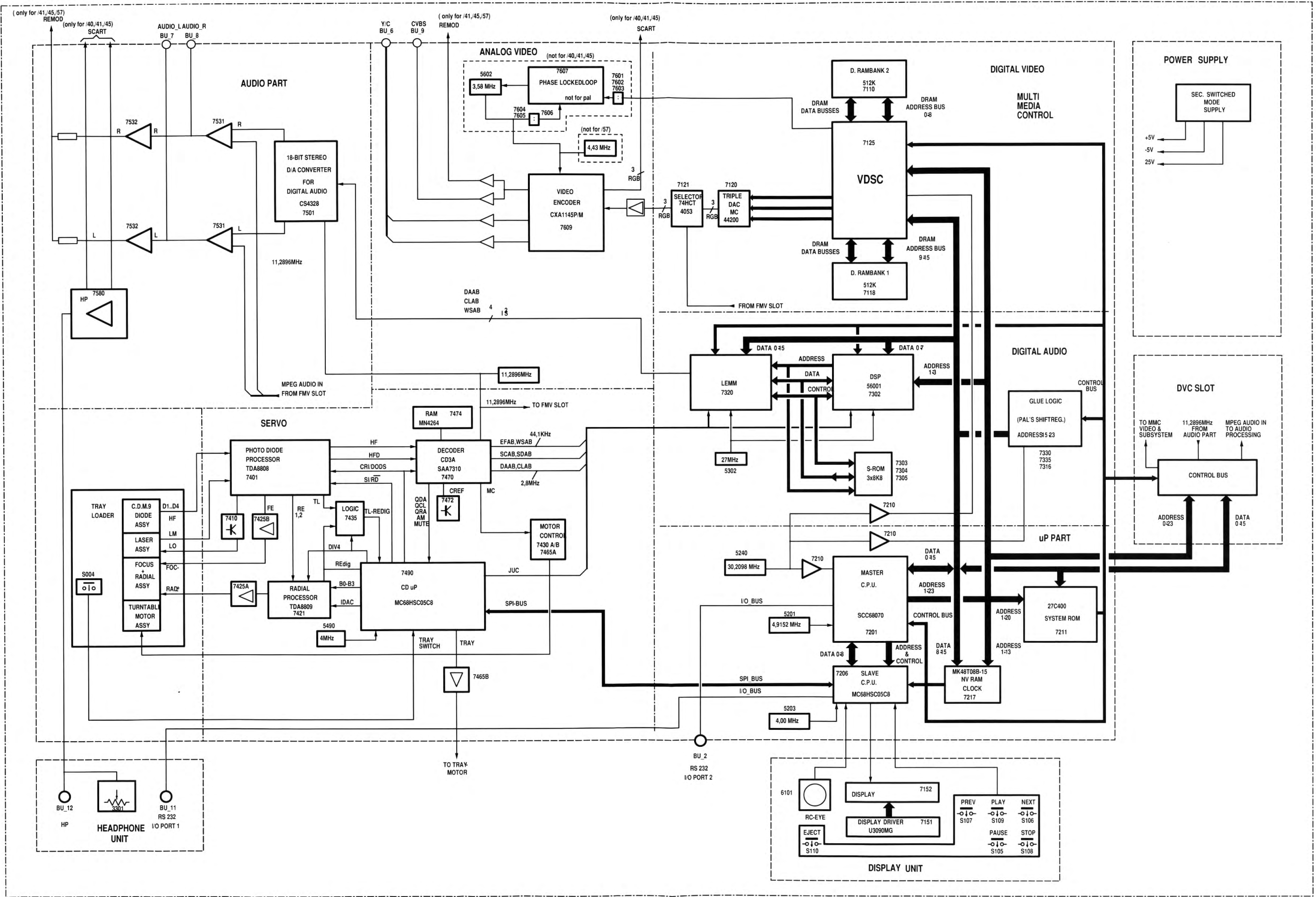
Video test image

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

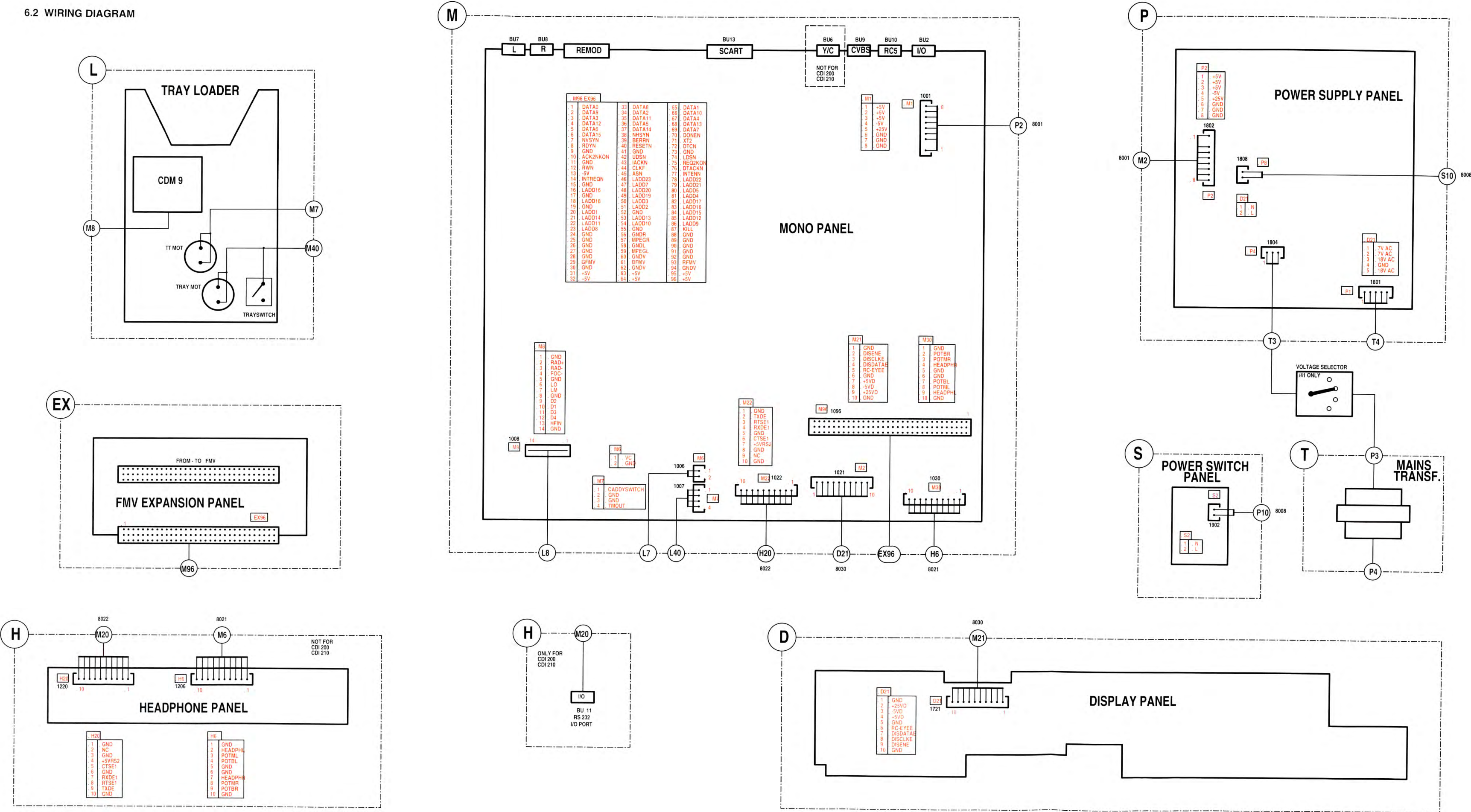
What could be wrong if...

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

6 ELECTRICAL DRAWINGS
6.1 BLOCK DIAGRAM



6.2 WIRING DIAGRAM



6.2.1 Alphabetical signal listing

A,B,C +	: >> control signals for brushless DC-motor	CLK=2BLCK	: CLOCK (11,2896 MHz)
A,B,C, -	: >>	CLKDAC	: CLOCK DAC, the clock used to send serial data to the volume adjustment
ACK2N	: DMA REQUEST ACKNOWLEDGE (active low)(of channel 2)	CLKF	: 2B-clock (11,2896 MHz) for the FMV-extension
ACM	: output AC-motor	CLK1	: the clock on which the DSP operates (7,5264 MHz)
ACK2NKON	: DMA REQUEST ACKNOWLEDGE (96-pins connector, channel 2 : FMV)	CLK11	: not used (connected to ground)
ADEN	: (=ADENA)ADDRESS ENABLE NOT. When low, the address ADENA coming from the bus (68070)	CLK3A	: 11.2896 MHz clock for the SAA7310 decoder
ADOCCLK	: output clock from the ADOC (11.2896 MHz)	CLOCK_27	: 27 MHz clock : used as system clock by the DSP and the LEMM
AM	: ADDITIONAL MUTE	CRI	: COUNTER RESET INHIBIT (low during a real trackloss or during execution of a jump command)
ASN	: ADDRESS STROBE (active low, tristate) indicates when an address is valid on the bus for the system	COC	: COMMAND COMPLETED signal
ASPRAT	: Aspect ratio switch signal (16:9 or 4:3)	COXN	: serial output clock for the X-bus
AUDGND	: Audio ground (SCART)	COXNDSP	: clock DSP, the clock used to send serial data on the X-bus
AUDL	: >> AUDIO LEFT	CSDMAKILL	: generates killme : Dot killer enable signal (active for NTSC) and functions as DMA enable for the FMV extension
AUDIOL	: >>	CSDSPN	: signal used by LEMM to generate the DSP chip select signal (KIP) (active low)
AUDIOLSC	: >> (scart)	CST	: combined chipselect signal for NVRAM/system ROM
AUDIOREM	: Audio signal to remodulator	CPUASN	: the address strobe of the 68070 microprocessor
AUDR	: >> AUDIO RIGHT	CPULDSN	: the lower data strobe of the 68070 microprocessor
AUDIOR	: >>	CPUUDSN	: the upper data strobe of the 68070 microprocessor
AUDIORSC	: >> (scart)	CRI-DODS	: counter reset inhibit of the 7310 chip
AVN	: AUTOVECTORED INTERRUPTS (active low), can be used by an extension	CS	: CHIP SELECT
A0..15	: Local addressbus of the audio DSP-processor	CSCDICN	: CHIP SELECT CDIC (active low) bus information is intended for or coming from CDIC
B0..7	: digital video (blue) from VDSC DRAM	CSKILL-MEMM	: chip select for kill and DMA circuit.
B0CD..B3CD	: input control bits for off-, catch-, play status and DAC output current for radial motor	CSKILL-MEMMS	: >> synchronized
B,G,R	: output colours of the VSD	CSDAC1N	: (= CSDAC2N) (if selected, low) it means that data will be adjusted on that channel
BERRN	: >> BUS ERROR (active low, open drain)	CSNVRAMN	: CHIP SELECT NVRAM (active low) bus information is intended for or coming from the NVRAM
BFMV	: blue color coming from the FMV-extension	CSROMN	: >>
BGND	: Blue color ground (SCART)	CSROM0N	: CHIP SELECT ROM (active low) bus information is coming from the ROM'S
BIN	: blue color input for the CXA1145 encoder	CSSLAVEN	: CHIP SELECT SLAVES (active low)
BLANI	: (= BLAN1M) BLANKING OUTPUT (active low, tristate) of the VSC	CSON	: CHIP SELECT (active low) for the 8kx8 SRAM'S
BSC	: blue color (scart)	CSVDSCN	: CHIP SELECT for the VDSC
BSW	: blue color coming from the switch CDI/external (FMV) video	CSYN	: COMPOSITE SYNCHRONIZATION input from the VSC'S (active low)
C	: Chrominance singnal (Y/C)	CTS1..4	: CLEAR TO SEND (active low) it indicates that the remote reciving device is ready
CADDYIN	: high when reading data	CTS#2	: >>
CADDYSWITCH	: control signal for position tray	CTSE1..2	: CLEAR TO SEND input
CAS1N	: column address strobe 1 (VDSC)	CTSI1..2	: >>
CAS2N	: column address strobe 2 (VDSC)	CVBS	: CVBS output
CBA	: 68070 bus transiever latch (rising edge)	CVBS-OUT	: >>
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)		
CLAB=CLAB2	: bitclock for the SAA 7220 chip		
CLABCD	: bitclock from the 7310 chip		

CVBS-GND	: CVBS ground (SCART)	FILTERN	: filter select when high: level C, when low: level A
CVBS-REM	: CVBS input signal for the remodulator	FOC-	: >> focus out to CDM
CVBS-SYNC	: composite sync input for the SCART connector	FOC+	: >>
D0..D23	: Local data bus of the audio DSP-processor	FSB	: Frame select line output of the LEMM → DSP : this line is asserted for every WSAB (pin 66 of the LEMM) transition
D8NVR	: data bit 8 (least significant bit) signal for the NVRAM	GFMV	: green color coming from from the FMV-extension
DAAB	: (DAAB2, DAABCD) serial data output of the X-bus I ² S standard	GGND	: Green color ground (SCART)
DATA0..15	: DATA LINES	GIN	: green color input for the CXA1145 encoder
DATADAC	: data which will be send to the DAC('S) for volume adjustment	GN	: when low: the outputs and inputs of the transceivers are enabled
DDTACKN	: DATA TRANSFER ACKNOWLEDGE (active low) from CDIC	GNDC	: Ground for the color signal (Y/C)
DEEMP	: DEEMPHASIS	GNDL	: Ground for MPEG audio left (96-pins connector)
DIG OUT	: DIGITAL OUTPUT	GNDR	: Ground for MPEG audio right (96-pins connector)
DIRN	: DIRECTION CONTROL. indicates the direction of data transfer through the transievers	GNDV	: Ground for MPEG video (96-pins connector)
DISCLK	: (DISCLKE) DISPLAY CLOCK >>	GNDY	: Ground for the luminance
DISDAT	: (DISDATAE) DISPLAY DATA >>	GSC	: green color (SCART)
DISEN	: (DISENE) DISPLAY ENABLE >>	GSW	: green color coming from the switch CDI/external (FMV) video
DISSEL	: software selection signal (CDI210/220)	G0..7	: digital video (green) from VDSC > DRAM
DIV4	: DIVIDE BY 4 signal	HALTN	: active low, open drain, bidirectional. if low together whit the resetn it causes the 68070 to enter the reset state.
DMAEN	: DMA enable for the FMV extension	HEADPHL	: (HPL)headphone audio left
DS	: Data memory select output of the DSP-processor (active low)	HEADPHR	: (HPR)headphone audio right
DSPACKN	: DMA acknowledge (Channel 1) : 68070 → LEMM (active low)	HFIN	: HF current input
DSPREQN	: DMA request (Channel 1) : LEMM → 68070 (active low)	HSYN	: (active low) horizontal synchronisation input from the VSC
DSP-INTN	: interrupt request DSP → 68070 (active low)	HSYNCOUT	: (active low) horizontal synchronisation output for monitor or tv
DTACKN	: data transfer acknowledge (68070) (active low)	HVID0..7S	: 8bit pixel bus for channel 1 VSD from VSC
DTCNC	: data transfer completed corrected (CDIC)	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
DTRAM	: DTACKN generation signal for NVRAM acces	IACKN	: interrupt acknowledge for the FMV-extension
DTROM	: DTACKN generation signal for system ROM acces	IACKIN2N	: >>
DTCN	: Data transfer completed (active low; 68070)	IACKIN4N	: >> decoded interrupt acknowledge (active low).
DO	: DIGITAL OUT	IACKIN5N	: >> asserted during an interrupt acknowledge
DODS	: DROP-OUT DETECTOR SUPPRESSION	IACKOUT2N	: >> sequence to indicate to a peripheral that
DONEN	: DONE (active low). open drain), operates in the DMA-mode	IACKOUT4N	: >> this interrupt request is being serviced
DOXN	: serial data output of the X-bus	IACKOUT5N	: >>
DPSRWN	: read (high) or write (low) from or to the DSP	IACKOUT2	: >>
DSN2N	: DATA STROBE (active low) of the DSP	IACKOUT4	: >>
DATAACK ROM	: DATA TRANSFER ACKNOWLEDGE of the ROM	IACKOUT5	: >>
DTACKSLAVEN	: DATA TRANSFER ACKNOWLEDGE of the SLAVE processor	IACKOUT22	: >>
DTCN	: DATA TRANSFER COMPLETE (active low, open drain) operates in the DMA-mode	IACKOUT23	: >>
DUARTCSN	: DUART CHIP SELECT, when low businfo is coming from or going to the DUART	IACKOUT42	: >>
EFAB	: ERROR FLAG	IACKOUT52	: >>
		IDAC	: 1/2 bit DAC

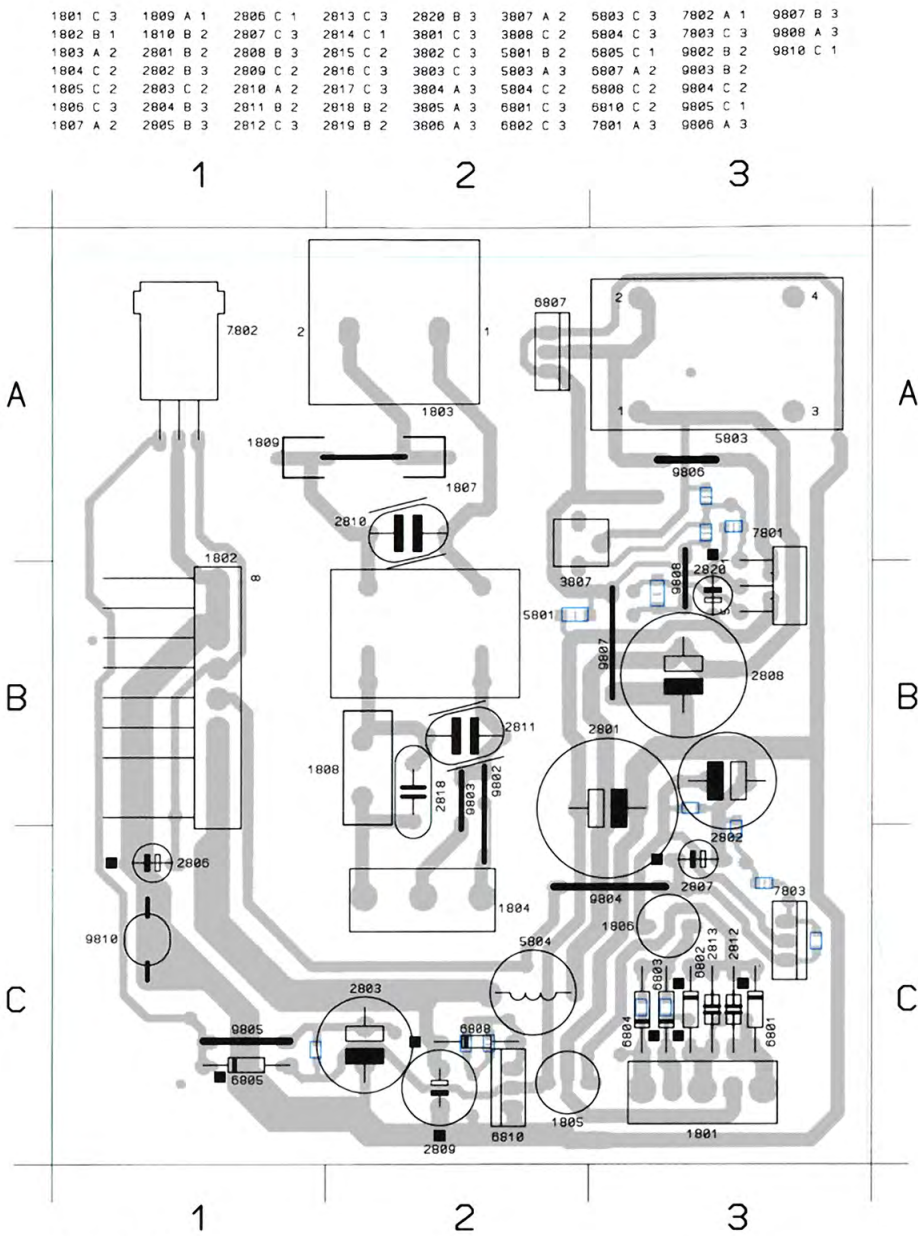
IFDN2	: main channel word-flag to the DSP	LVID0OUT..7OUT:	>>
IN2	: interrupt request from slave proc. → 68070 (active low)	LWN	: read/write enable (for the lower part of the data: MD0..7) for the DRAM (VDSC)
IN5	: interrupt request input 5 of the 68070 (not used)	LWRSN	: R/W lower memory data to DRAM from VSC slave
INTENN1	: interrupt enable for the FMV-extension	LWRMN	: R/W lower memory data to DRAM from VSC master
INTENN	: >> when low, no extensions use the interrupts, when high interrupt devices are daisy chained	MA0..8	: VDSC DRAM address bus
INTENN2	: >>	MC	: MOTOR CONTROL signal
INTENN3	: >>	MD0..15	: VDSC DRAM data bus
INTENN4	: >>	MISO	: MASTER IN SLAVE OUT
INTREQN	: interrupt request from the FMV-extension	MOSI	: MASTER OUT SLAVE IN
IN2IN	: (= IN2OUT) >>	MPEGL	: left audio signal color coming from the FMV-extension goes the adder CDI/FMV audio
IN4IN	: (= IN4OUT) >> decoder interrupt priority inputs	MPEGR	: right audio signal color coming from the FMV-extension goes the adder CDI/FMV AUDIO
IN5IN	: (= IN5OUT) >> (active low) IN2IN has the lower	MSM	: master slave selection input
IN2OUT	: >> and IN5IN has the higher priority	MSMA0..8	: ADDRESS-BUS between the DRAM'S of the VSC MASTER and the VSC MASTER
IN4OUT	: >> IN2IN = SLAVEPROCESSOR (6805), IN4IN =	MSMD0..15	: DATA-BUS between the DRAM'S of the VSC MASTER and the VSC MASTER
IN5OUT	: >> CDIC (IMS66490), IN5IN = DUART	NCSYNV	: composite sync for the VDSC
IN4OUT2	: >>	NHSYN	: active low horizontal sync input for the FMV-extension
IN5OUT2	: >>	NRESET	: when low the video synthesizer is in reset
IN2OUT3	: >>	NVDS	: digital output to control an external switch for TV overlays (active low)
IRQA	: interrupt request from LEMM → 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)	NVDSI	: >> synchronized with NXT2
IRQABN	: logical AND of the IRQA and the IRQB line (lemm output pin → DSP)	NVSYN	: (active low) vertical sync input for the FMV-extension
IRQB	: interrupt request from LEMM → DSP (active low) and mode B pin of the DSP (after the DSP reset, the DSP reads the level on this pin to define the mode of operation)	PCLK1IN	: PIXEL CLOCK for channel 1
JUC	: jump completed signal from servo proc. → LEMM	PCLK2IN	: PIXEL CLOCK for channel 2
KILL	: to mute audio outputs by power on and off	PLOIN1	: input clock for CDIC (22,5792 MHz)
KILLME	: (KILL-ME) dot killer enable signal (active for NTSC)	PLOIN2	: input clock for CDIC (19,3536 MHz)
KIP	: host enable input pin of the DSP-processor : this signal enables a transfer on the DSP host bus DATA0..7 (active low)	PLOIN	: clock signals for emulator panel
LA1	: >> control signals for brushless DC-motor	PLOINE	: >>
LB1	: >>	POTBL	: headphone left volume control
LC1	: >>	POTBR	: headphone right volume control
LADD1..23	: ADDRESS-BUS (active high, tristate) for direct addressing of 16 Mbyte of memory	POTML	: headphone left volume control
LBOT	: for HPL volume control	POTMR	: headphone right volume control
LDSN	: LOWER DATA STROBE of the bus	QCL	: Q-channel CLOCK
LM	: LASER MONITOR diode input	QDA	: Q-channel DATA
LO	: laser amplifier current OUTPUT	QRA	: Q-channel REQUEST INPUT/ACKNOWLEDGE OUTPUT
LRDN	: when low select, the ROM'S or NVRAM read the lower data byte	Q22	: output to PLL (22,5792 MHz) divided by 14
LTAP	: >> for HPL volume control	Q21	: output to PLL (19,3536 MHz) divided by 12
LTOP	: >>	Q_DATA	: I ² S data from LEMM → audio DAC
LVID0IN..7IN	: >> 8 bit pixel-bus for channel 2 (VSC-SLAVE)	Q_CLK	: I ² S bit clock from LEMM → audio DAC
		Q_WCLK	: I ² S word clock from LEMM → audio DAC
		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	SLMA0..8	: VSC-slave memory address bus to the DRAM'S
RCLED	: REMOTE CONTROL LED	SLMD0..15	: VSC-slave memory data bus to the DRAM'S
RD	: READ signal DSP : this signal is asserted to read external memory (three SRAM'S FCB61C65) on the data bus D0..23 (active low)	SOCKGND	: socket ground (SCART)
RDN	: READY signal, starting up procedure finished	SOXENN	: SERIAL OUTPUT ENABLE FOR THE X-BUS (enabled when low)
RDYN	: READY (active low) of the DMA channel	SOXRQN	: SERIAL OUTPUT REQUEST FOR THE X-BUS (when low)
REDIG	: RADIAL ERROR DIGITAL	SOYENN2	: SERIAL OUTPUT ENABLE FOR THE Y-BUS (when low)
REM	: power supply remodulator	SPICLK	: SERIAL PERIPHERAL INTERFACE CLOCK
RESETCD	: when low resetsequence starts	SPISS	: (SPISSN) SERIAL PERIPHERAL INTERFACE SLAVE SELECT
RESETINN	: when low VSC is in reset	SRD	: serial data from LEMM → DSP
RESETN	: this is the rest for all other ic's on MMC	STAND	: NTSC or PAL selection signal
RESESYS	: system reset (controlled by the slave-processor)	STANDARDOUT	: software choise between PAL and NTSC
REQ2N	: DMA-request of channel 2	STANDARDSW	: hardware choise between PAL and NTSC
REQ2NKON	: DMA-request (96-pins connector, channel 2 : FMV	STANDEM	: status from emulator,input for DUART
REQ2KON	: DMA-request of channel 2 via DMA 2 on/off circuit	STANDEMEN	: enable signal for switch signal on emulator
RFMV	: red color coming from the FMV-extension	STANDIN	: NTSC or PAL selection signal (input for slave)
RGBS_GND	: incoming video SCART (not used) ground	STATUS	: RF/external video selection signal
RGND	: red color ground (SCART)	STATUSF	: CVBS/RGB video selection signal
RIN	: red color input for the CXA1145 encoder	STD	: serial data from DSP → LEMM
RSC	: red color (scart)	SSM	: START STOP MOTOR
RSTOUT	: RESET OUT of the slave processor when high resetsequence starts	SWAB	: SUBCODING WORD CLOCK INPUT
RSW	: red color coming from the switch CDI/external (FMV) video	SWAB-SSM	: subcoding word clock output and start/stop input of the 7310
RTAP	: >> for HPR volume control	SWEM	: software dat to switch on the emulator
RTOP	: >>	SYSCLK	: >> SYSTEM CLOCK
RTSE1..2	: REQUEST TO SEND	SYSCLKA	: >>
RTSI1..2	: REQUEST TO SEND	SYSCLK1	: >>
RTSUART	: REQUEST TO SEND from the slave processor to the UART of the 68070 processor	SYSCLK2	: >>
RST1..4	: >> REQUEST TO SEND (active low)	TCAP	: input capture feature for the on-chip timer
RST#1..2	: >>	TCMP	: output for the output compare feature of the on chip timer
RWN	: READ - WRITE (low is write) signal	TL	: TRACK LOSS of the TDA8808 combined with the radial error signal of the TDA8809
RWN2	: READ - WRITE (low is write) signal from CDIC to the DSP	TMOUT	: TRAY MOTOR OUT
RWRAM	: READ - WRITE signal from the CDIC to the S RAM'S	TRAY	: tray open/close signal
RXDE1..2	: RECIEVE DATA	TXDE1..2	: transmit data
RXDI1..2	: RECIEVE DATA	TXDI1..2	: transmit data
R0..7	: digital video (red) from VDSC DRAM	TXD1..4	: >> TRANSMIT DATA TXD is data output
RXD1..4	: >> RECIEVE DATA RXD is data input	TXD#1..2	: >>
XD#1..2	: >>	UDSN	: UPPER DATA STROBE (active when low)
SCAB	: subcode data clock (2,8224 MHz) from the 7310	URDN	: READ UPPER DATA BYTE (active when low)
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	UWN	: read/write enable (for the upper part of the data: MD8..15) fir the DRAM (VDSC)
SDAB	: subcode data from the 7310	UWRSN	: read/write (write when low) UPPER MEMORY DATA FROM DRAM'S FROM VSC-SLAVE
SI	: on - off control for laser supply and focus circuit	VC	: output DC-motor (VOLTAGE CONTROL)
SI-RD	: on - off control for laser supply and focus circuit/ready signal, starting up procedure finished	VDSC-INTN	: interrupt request of the VDSC

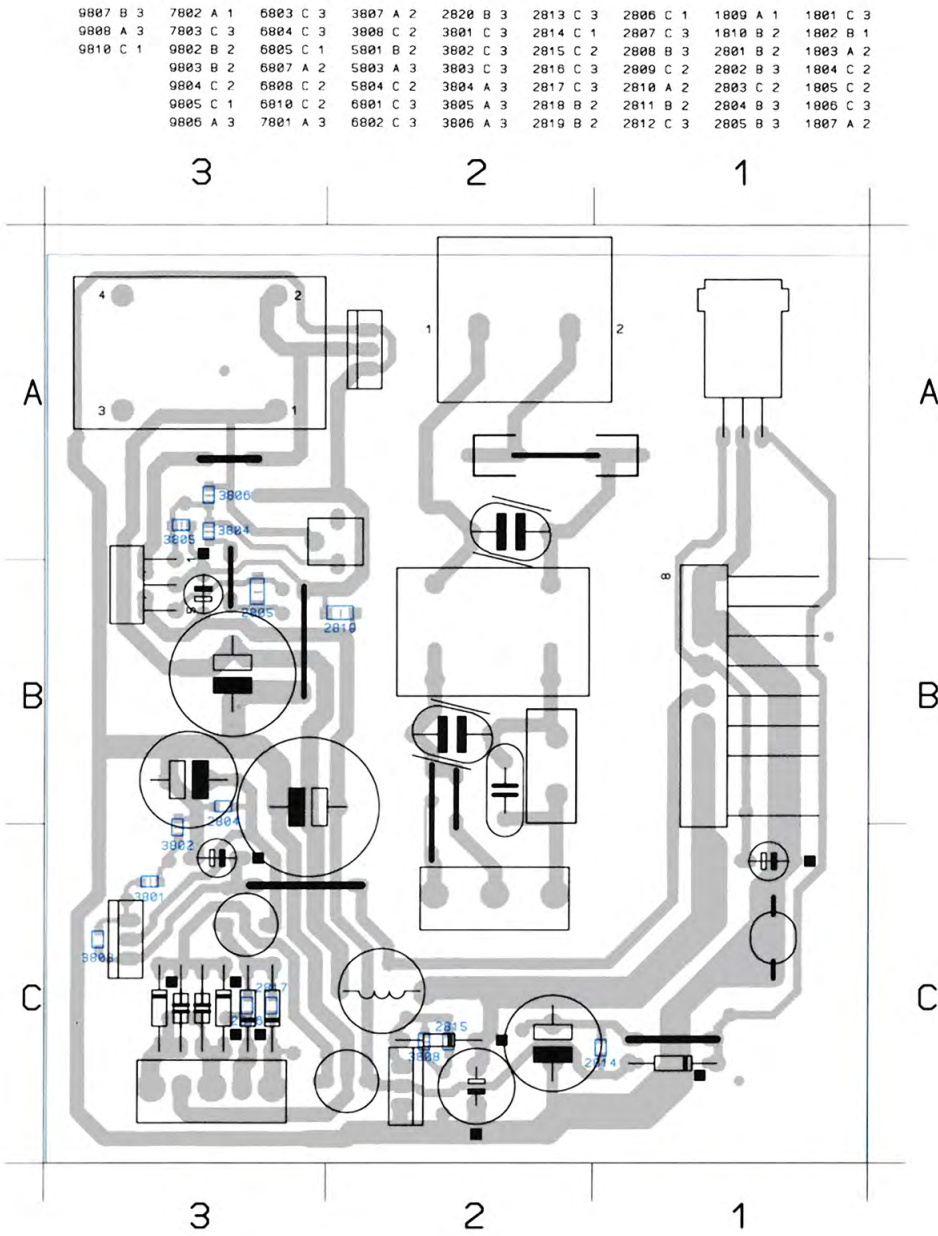
V-FLAG	: output to the DSP
VSCM-INTN	: when low,interrupt from VSC master to 68070 processor
VSCS-INTN	: when low,interrupt from VSC slave to 68070 processor
VSYN	: (active when low) VERTICAL SYNCHRONISATION INPUT from the VSC
WIREDRC	: see RC5
WR	: write enable output of the DSP : this signal is asserted 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 CHIP
WSAB2	: >>
WSABCD	: 11.2896 MHz bitclock (I ² S)
XINB	: delayed clock XIN from CDIC goes back to CDIC
XIN	: >> 11,2896/9,6768/4,8384 symmetrical clock
XIN2	: >>
X-TAL2	: the same as the system clock,coming out of the VSC'S
XT2	: (XT2N) the system clock devided by two
XT4	: >> the system clock devided by four
XT41N	: >>
XY	: this DSP output signal selects which external memory space (X or Y) is selected
Y	: luminance signal (Y/C)
0AD..12AD	: >> ADDRESS BUS, between CDIC-SRAM'S and SYSTEM ADDRESS BUS BUFFERS
10ADA..12ADA	: >>
0D..15D	: DATA BUS between CDIC and DSP
0DA..15DA	: DATA BUS between CDIC-SRAM'S and SYSTEM DATA BUS TRANCIEVERS
2BCLK	: CLOCK for the 2 B-chip
12A..15A	: ADDRESS BUS between CDIC and DSP

6.3 POWER SUPPLY PANEL

6.3.1 Power supply PCB
Component side view



Power supply PCB
Coppertrack side view



7801 MC34167

OSC

PWM

CURRENT LIMIT

THERMAL LIMIT

UVLO

SO

2

5803 250uH/4A

1

2808 4700u/6V3

5804 10uH

2809 1000u/6V3

+5V/3.5A

1802-1

1802-2

1802-3

6808 5V6

2

3

6810 2N6397

1

3808 1k

2815 22n

7802 78M24

1

2

3

2806 22u/40V

+25V/50mA

1802-5

7803 LM337

2

3

2807 22u/50V

-5V/400mA

1802-4

1802-6

1802-7

1802-8

	/20	/25	/31	/37	/39
9802 9803	X	X	X	X	X
1808	T315mA	T315mA	T800mA	T600mA	T315mA
1805	T2A	T2A	T2A	T2A	T2A
1806	T1A	T1A	T1A	T1A	T1A

FROM TRAFO

1801-5

1801-4

1801-3

2812 22n

6801

BYD14g

1805

10V DC

2801 3300u/35V

2819 470n

6802 22n

2813

BYD14g

6805 1N4002

2814 22n

29V3 DC

2803 1000u/35V

2805 100n

3804 68k

3805 220k

6807 MBR1545

3806 6k8

3807 47k

TO MONO BOARD

MAINS INLET

1803-2

1803-1

9801

1807 1808 1809

2810 1n5

5801 5H

2811 1n5

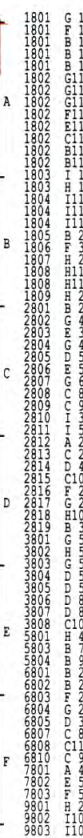
2818 3n3

9802 Y

9803 Z

FROM TO ON/OFF SWITCH

TO TRAFO



6.4 CONTROL & DISPLAY PANEL

6.4.1 Control & Display PCB

1703 A 1	1706 A 1	1721 A 2	2703 A 2	3702 A 2	3706 A 4	3713 A 2	3717 A 2	3720 A 1	3723 A 5	3726 A 1	3729 A 1	6701 A 2	6705 A 2	6708 A 1	7703 A 2	7706 A 4	7709 A 1	7712 A 1
1704 A 1	1707 A 6	2701 A 2	2705 A 1	3704 A 3	3707 A 3	3715 A 1	3718 A 1	3721 A 1	3724 A 5	3727 A 1	3730 A 1	6702 A 2	6706 A 6	6709 A 1	7704 A 5	7707 A 1	7710 A 1	
1705 A 6	1708 A 1	2702 A 2	3701 A 2	3705 A 2	3712 A 2	3716 A 2	3719 A 1	3722 A 1	3725 A 1	3728 A 1	3731 A 1	6704 A 2	6707 A 6	6710 A 5	7705 A 4	7708 A 1	7711 A 1	

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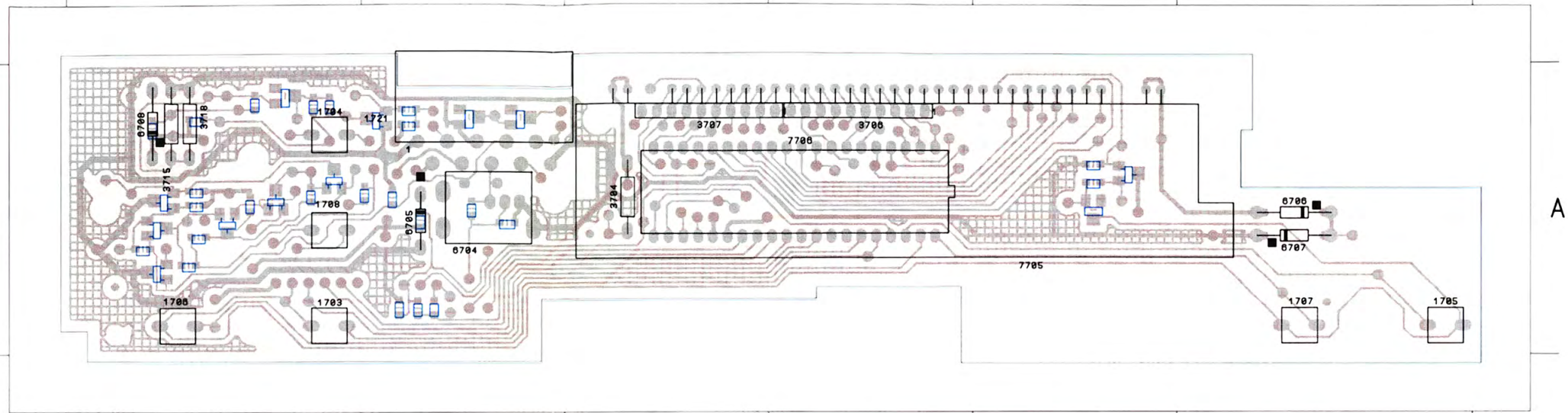
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6

7712 A 1	7709 A 1	7706 A 4	7703 A 2	6708 A 1	6705 A 2	6701 A 2	3729 A 1	3726 A 1	3723 A 5	3720 A 1	3717 A 2	3713 A 2	3706 A 4	3702 A 2	2703 A 2	1721 A 2	1706 A 1	1703 A 1
7710 A 1	7707 A 1	7704 A 5	6709 A 1	6706 A 6	6702 A 2	3730 A 1	3727 A 1	3724 A 5	3721 A 1	3718 A 1	3715 A 1	3707 A 3	3704 A 3	2705 A 1	2701 A 2	1707 A 6	1704 A 1	
7711 A 1	7708 A 1	7705 A 4	6710 A 5	6707 A 6	6704 A 2	3731 A 1	3728 A 1	3725 A 1	3722 A 1	3719 A 1	3716 A 2	3712 A 2	3705 A 2	3701 A 2	2702 A 2	1708 A 1	1705 A 6	

6

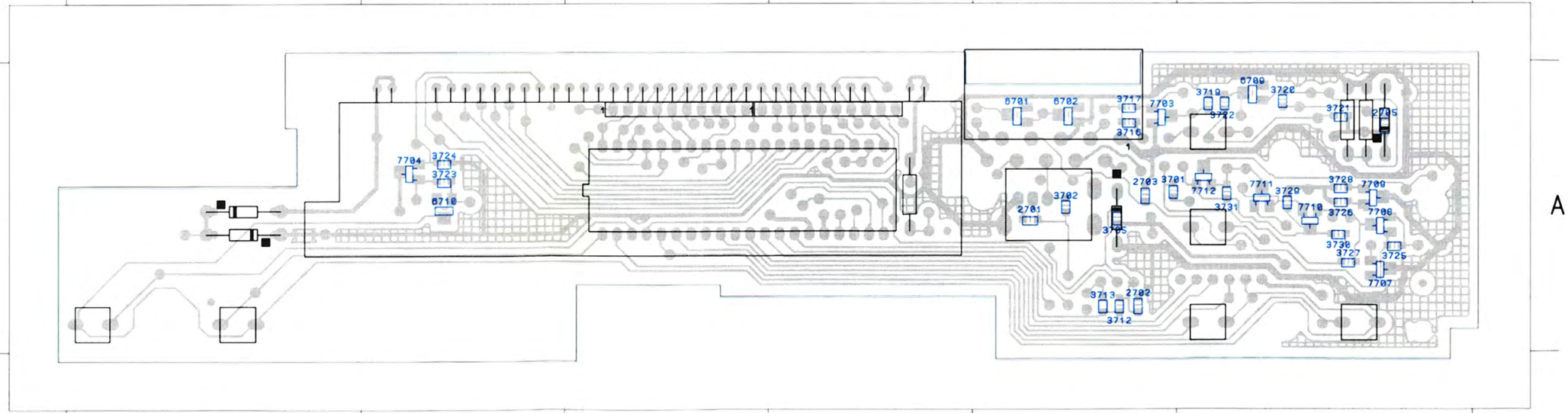
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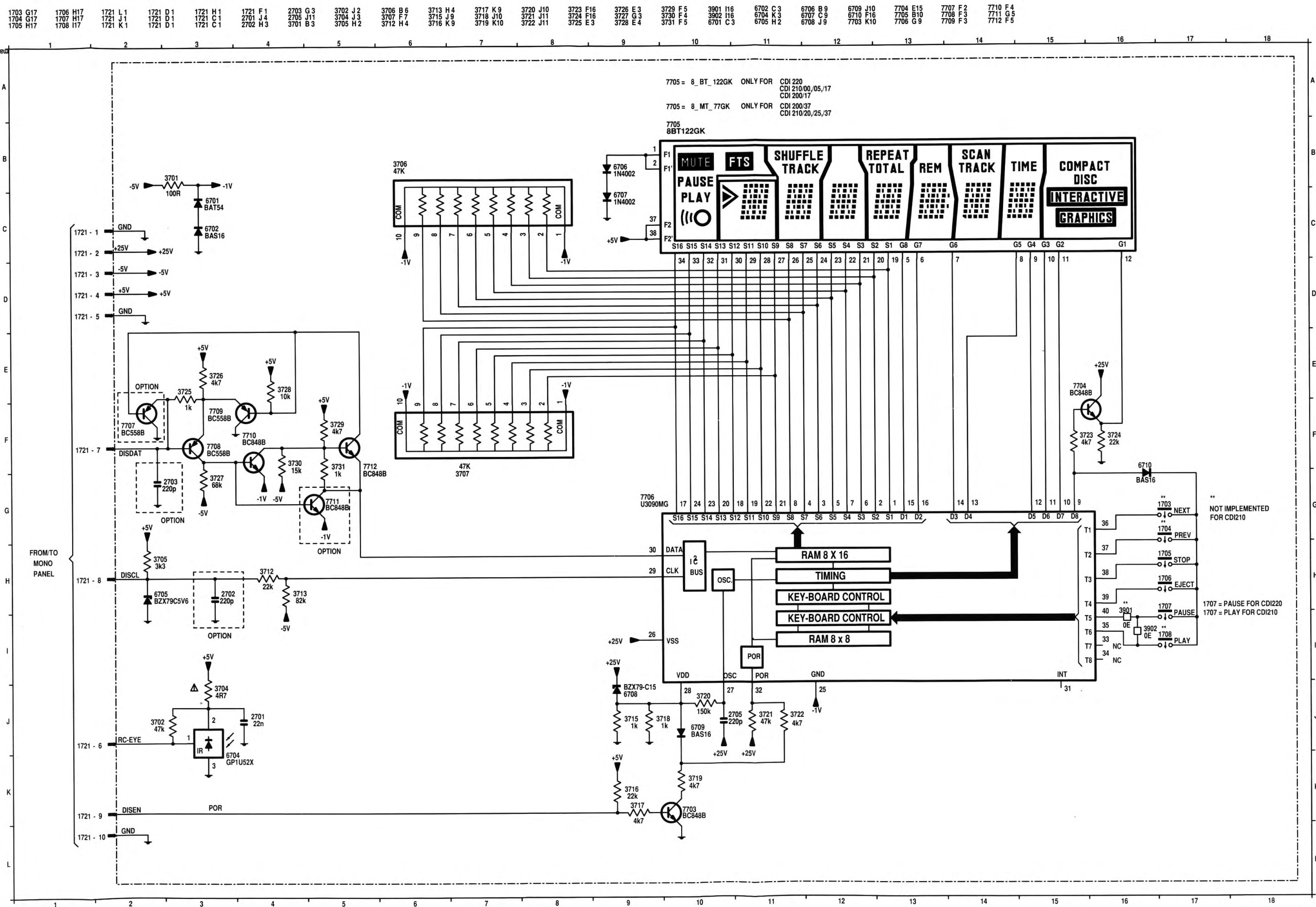
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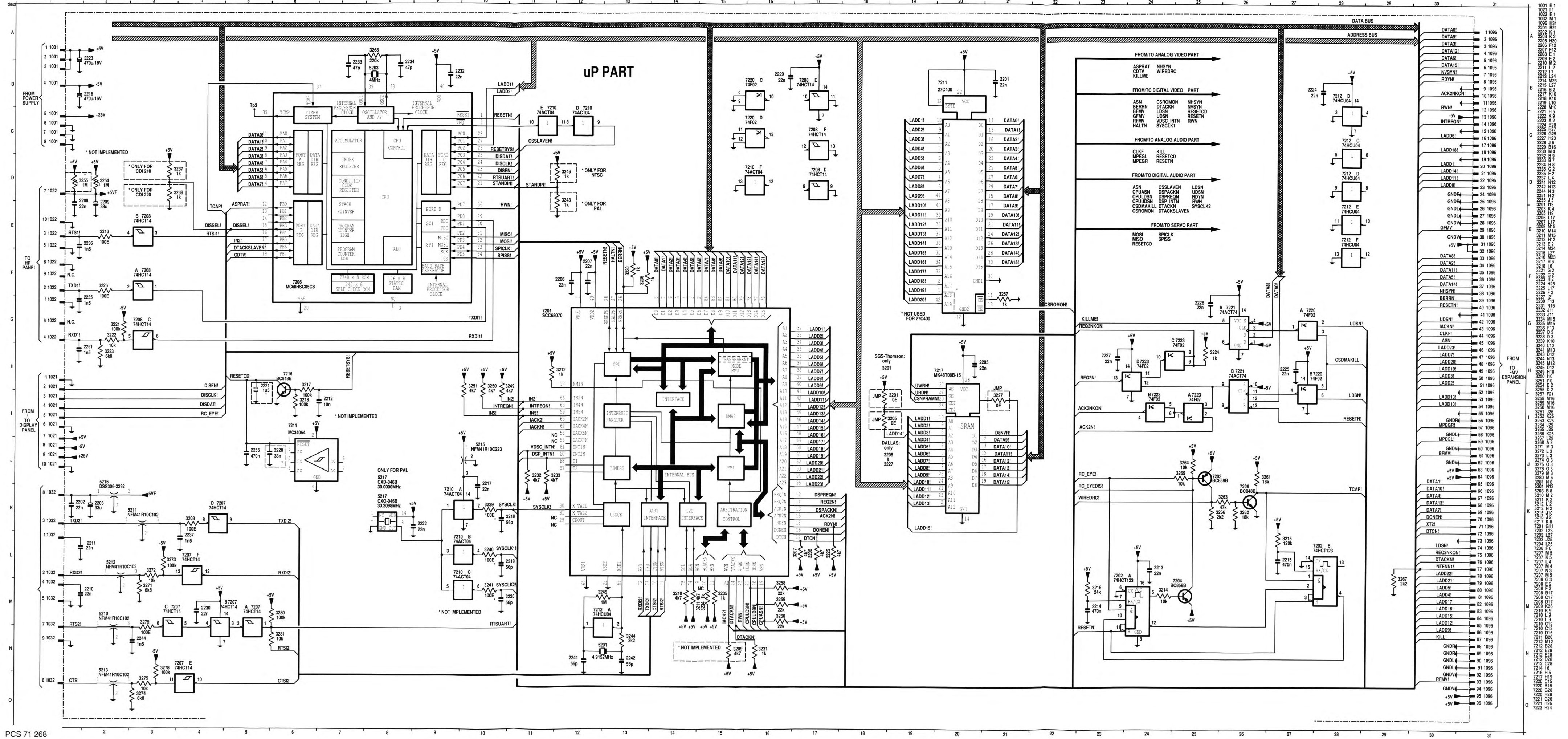
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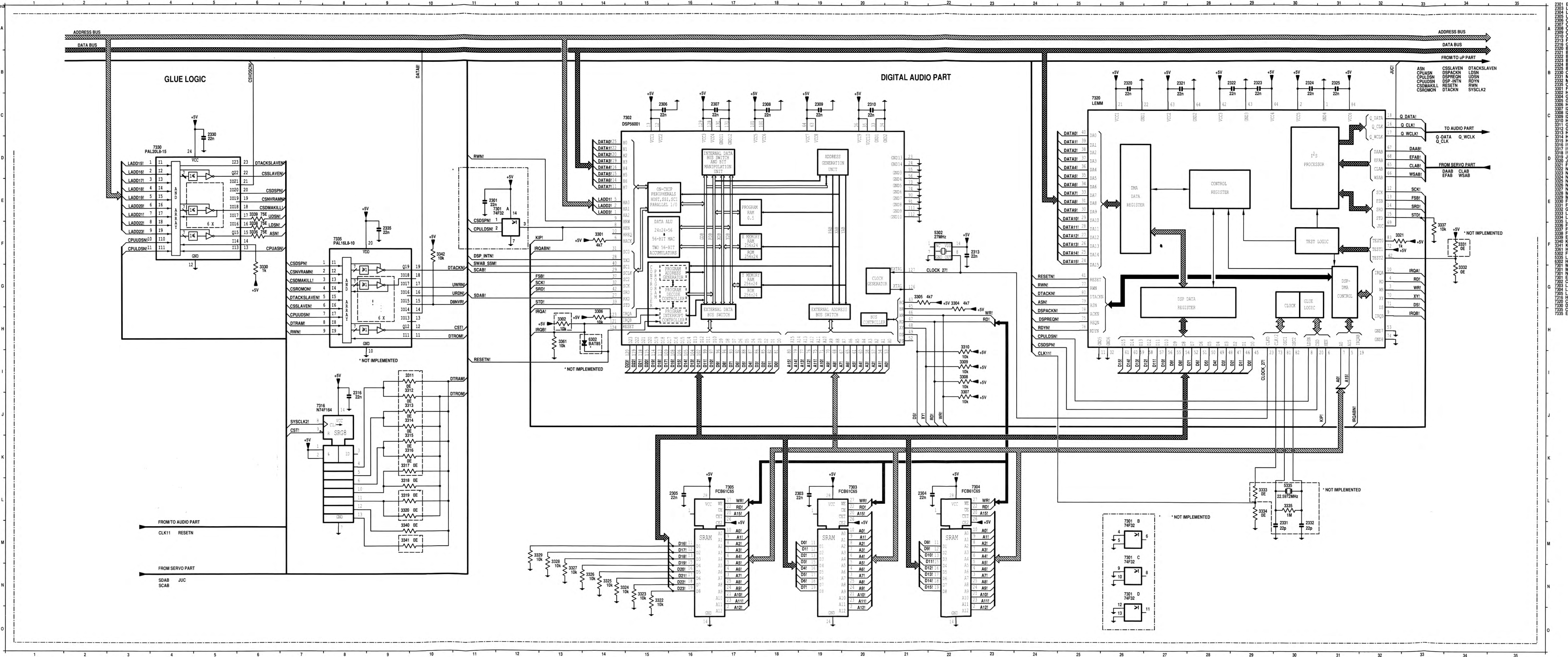
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6.4.2 Control & Display Circuit diagram

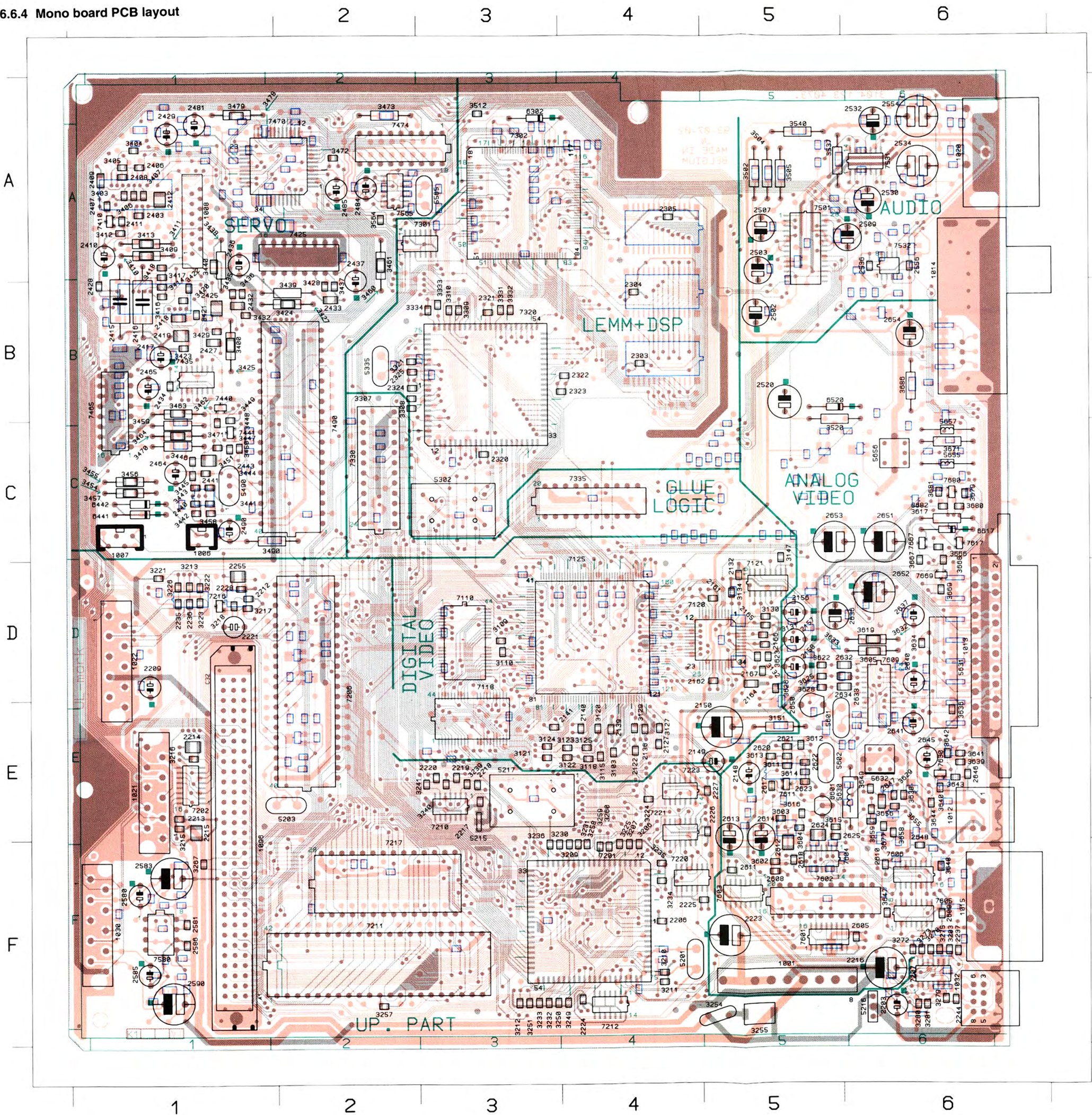




6.6.2 Glue logic, digital audio part circuit diagram

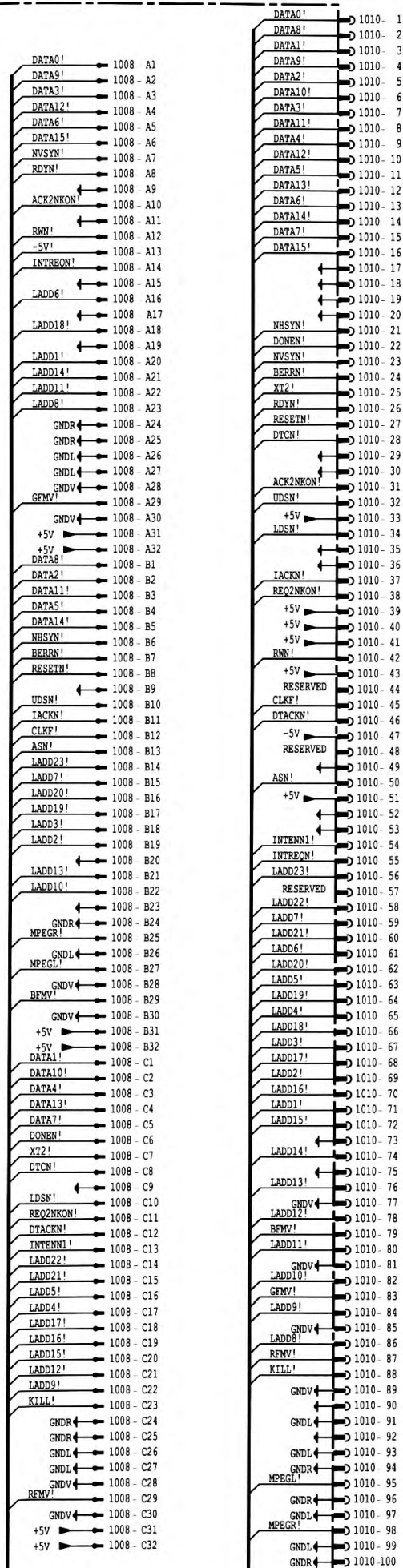
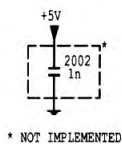


6.6.4 Mono board PCB layout

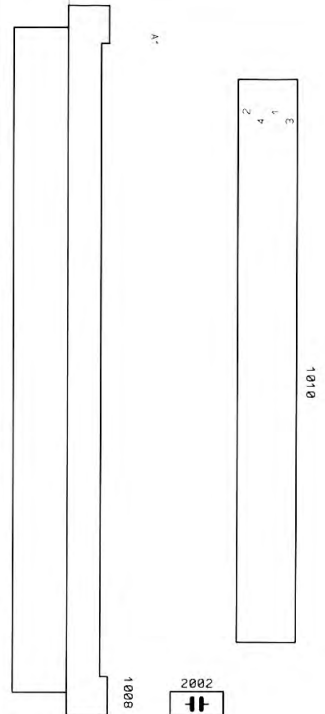


	1001 F 5	2324 B 2	2018 F 5	3249 F 4	3442 C 1	3566 A 2	5215 E 3	7031 E 6
	1006 C 1	2325 B 2	2020 E 5	3250 F 3	3443 C 1	3567 A 2	5216 F 6	7032 E 6
	1007 C 1	2330 C 2	2021 E 5	3251 F 3	3444 C 1	3568 A 2	5217 E 3	7033 F 6
	1008 A 1	2331 B 3	2022 E 5	3254 F 5	3445 C 1	3569 A 3	5302 C 3	7034 C 6
	1012 E 6	2332 B 3	2023 E 5	3255 F 5	3446 C 1	3570 A 6	5335 B 2	7038 E 6
	1013 D 6	2335 C 4	2024 E 5	3257 F 2	3447 C 1	3571 B 6	5400 C 1	7039 E 6
	1014 B 6	2400 A 1	2025 E 5	3258 F 4	3448 C 1	3572 A 6	5505 A 3	7043 D 6
	1015 F 6	2401 A 1	2030 E 6	3259 F 4	3449 B 1	3573 B 6	5601 E 5	7055 E 6
	1020 A 6	2402 A 1	2031 E 5	3260 F 4	3450 C 1	3574 B 6	5602 E 5	7056 F 6
	1021 E 1	2403 A 1	2032 D 6	3261 E 2	3451 C 1	3580 F 1	5603 F 5	7057 E 6
	1022 D 1	2404 A 1	2033 D 6	3262 E 2	3452 B 1	3581 F 1	5630 E 6	7067 C 6
	1030 F 1	2405 A 1	2034 D 6	3263 E 2	3453 B 1	3582 F 1	5631 D 6	7069 D 6
	1032 F 6	2406 A 1	2035 D 6	3264 D 2	3454 C 1	3583 F 1	5632 E 6	7070 B 6
	1006 E 1	2407 A 1	2036 D 5	3265 D 2	3455 C 1	3584 F 1	5633 B 6	7080 C 6
A	2110 D 3	2408 A 1	2037 D 6	3266 E 2	3456 C 1	3585 F 1	5640 D 6	Tr1 A 2
	2111 D 3	2409 A 1	2038 D 6	3267 F 1	3457 C 1	3586 F 1	5641 D 6	Tr2 A 1
	2112 D 3	2410 A 1	2039 E 6	3268 E 2	3458 C 1	3587 F 1	5642 D 6	Tr3 E 1
	2115 D 4	2411 A 1	2040 D 6	3271 F 6	3459 C 1	3588 F 1	5643 D 6	
	2117 E 3	2412 A 1	2041 E 6	3272 F 6	3460 A 2	3589 F 1	5644 D 6	
	2118 E 3	2413 A 1	2043 E 6	3273 F 6	3461 A 2	3601 E 5	5645 D 6	
	2119 E 3	2414 A 1	2045 E 6	3274 F 6	3462 B 1	3602 F 5	5646 E 6	
	2122 E 4	2415 B 1	2046 E 6	3275 F 6	3463 B 1	3603 E 5	5647 E 6	
	2127 E 4	2416 B 1	2047 E 6	3278 F 6	3464 C 1	3604 E 5	5648 B 6	
	2132 D 5	2417 B 1	2048 F 6	3279 F 6	3465 B 1	3605 D 6	5649 B 6	
	2133 D 4	2418 B 1	2049 E 6	3280 F 6	3466 B 1	3606 E 5	5653 F 6	
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	2135 D 4	2420 B 1	2051 C 6	3281 A 3	3468 B 1	3608 F 5	5656 C 6	
	2136 E 4	2421 B 1	2052 D 6	3282 A 3	3469 B 1	3609 F 5	5657 C 6	
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	2162 D 5	2450 A 1	3129 E 4	3328 A 4	3495 C 1	3635 E 6	5649 B 6	
	2163 D 5	2451 C 1	3130 D 5	3329 C 2	3496 C 1	3636 E 6	5650 B 6	
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	2184 F 3	2472 A 1	3150 C 5	3350 C 3	3517 B 5	3657 C 6	5671 C 6	
	2185 F 3	2473 A 1	3151 C 5	3351 C 3	3518 B 5	3658 C 6	5672 C 6	
	2186 F 3	2474 A 1	3152 C 5	3352 C 3	3519 B 5	3659 C 6	5673 C 6	
	2187 F 3	2475 A 1	3153 C 5	3353 C 3	3520 B 5	3660 F 6	5674 C 6	
	2188 F 3	2476 A 1	3154 C 5	3354 C 3	3521 B 5	3661 F 6	5675 C 6	
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	2193 F 3	2481 A 1	3159 C 5	3359 C 3	3526 B 5	3666 F 6	5680 C 6	
	2194 F 3	2482 A 1	3160 C 5	3360 C 3	3527 B 5	3667 F 6	5681 C 6	
	2195 F 3	2483 A 1	3161 C 5	3361 C 3	3528 B 5	3668 F 6	5682 C 6	
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	2197 F 3	2485 A 1	3163 C 5	3363 C 3	3530 B 5	3670 F 6	5684 C 6	
	2198 F 3	2486 A 1	3164 C 5	3364 C 3	3531 B 5	3671 F 6	5685 C 6	
	2199 F 3	2487 A 1	3165 C 5	3365 C 3	3532 B 5	3672 F 6	5686 C 6	
	2200 F 3	2488 A 1	3166 C 5	3366 C 3	3533 B 5	3673 F 6	5687 C 6	
	2201 F 3	2489 A 1	3167 C 5	3367 C 3	3534 B 5	3674 F 6	5688 C 6	
	2202 F 3	2490 A 1	3168 C 5	3368 C 3	3535 B 5	3675 F 6	5689 C 6	
	2203 F 3	2491 A 1	3169 C 5	3369 C 3	3536 B 5	3676 F 6	5690 C 6	
	2204 F 3	2492 A 1	3170 C 5	3370 C 3	3537 B 5	3677 F 6	5691 C 6	
	2205 F 3	2493 A 1	3171 C 5	3371 C 3	3538 B 5	3678 F 6	5692 C 6	
	2206 F 3	2494 A 1	3172 C 5	3372 C 3	3539 B 5	3679 F 6	5693 C 6	
	2207 F 3	2495 A 1	3173 C 5	3373 C 3	3540 B 5	3680 F 6	5694 C 6	
	2208 F 3	2496 A 1	3174 C 5	3374 C 3	3541 B 5	3681 F 6	5695 C 6	
	2209 F 3	2497 A 1	3175 C 5	3375 C 3	3542 B 5	3682 F 6	5696 C 6	
	2210 F 3	2498 A 1	3176 C 5	3376 C 3	3543 B 5	3683 F 6	5697 C 6	
	2211 F 3	2499 A 1	3177 C 5	3377 C 3	3544 B 5	3684 F 6	5698 C 6	
	2212 F 3	2500 A 1	3178 C 5	3378 C 3	3545 B 5	3685 F 6	5699 C 6	
	2213 F 3	2501 A 1	3179 C 5	3379 C 3	3546 B 5	3686 F 6	5700 C 6	
	2214 F 3	2502 A 1	3180 C 5	3380 C 3	3547 B 5	3687 F 6	5701 C 6	
	2215 F 3	2503 A 1	3181 C 5	3381 C 3	3548 B 5	3688 F 6	5702 C 6	
	2216 F 3	2504 A 1	3182 C 5	3382 C 3	3549 B 5	3689 F 6	5703 C 6	
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	2220 F 3	2508 A 1	3186 C 5	3386 C 3	3553 B 5	3693 F 6	5707 C 6	
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	2222 F 3	2510 A 1	3188 C 5	3388 C 3	3555 B 5	3695 F 6	5709 C 6	
	2223 F 3	2511 A 1	3189 C 5	3389 C 3	3556 B 5	3696 F 6	5710 C 6	
	2224 F 3	2512 A 1	3190 C 5	3390 C 3	3557 B 5	3697 F 6	5711 C 6	
	2225 F 3	2513 A 1	3191 C 5	3391 C 3	3558 B 5	3698 F 6	5712 C 6	
	2226 F 3	2514 A 1	3192 C 5	3392 C 3	3559 B 5	3699 F 6	5713 C 6	
	2227 F 3	2515 A 1	3193 C 5	3393 C 3	3560 B 5	3700 F 6	5714 C 6	
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	2234 F 3	2522 A 1	3200 C 5	3400 C 3	3567 B 5	3707 F 6	5721 C 6	
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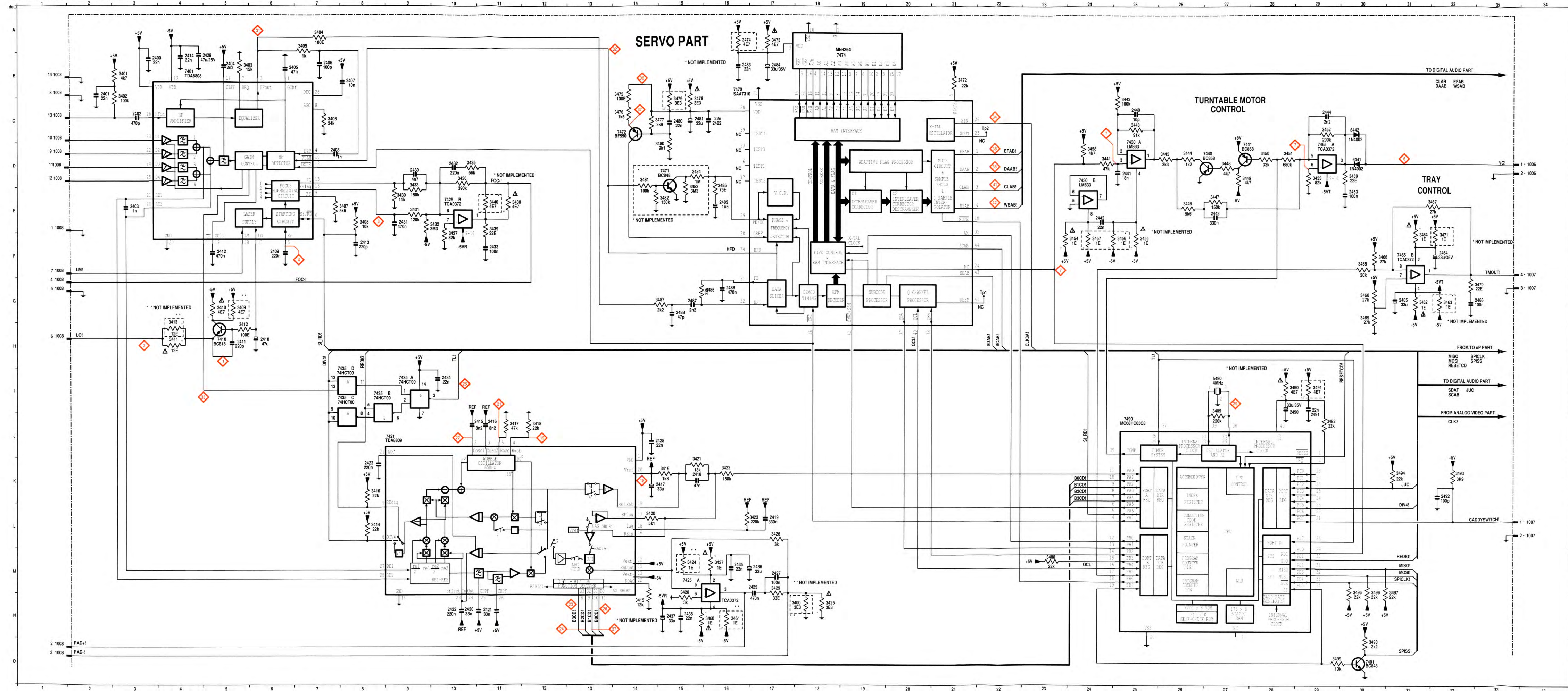
FMV CONNECTOR



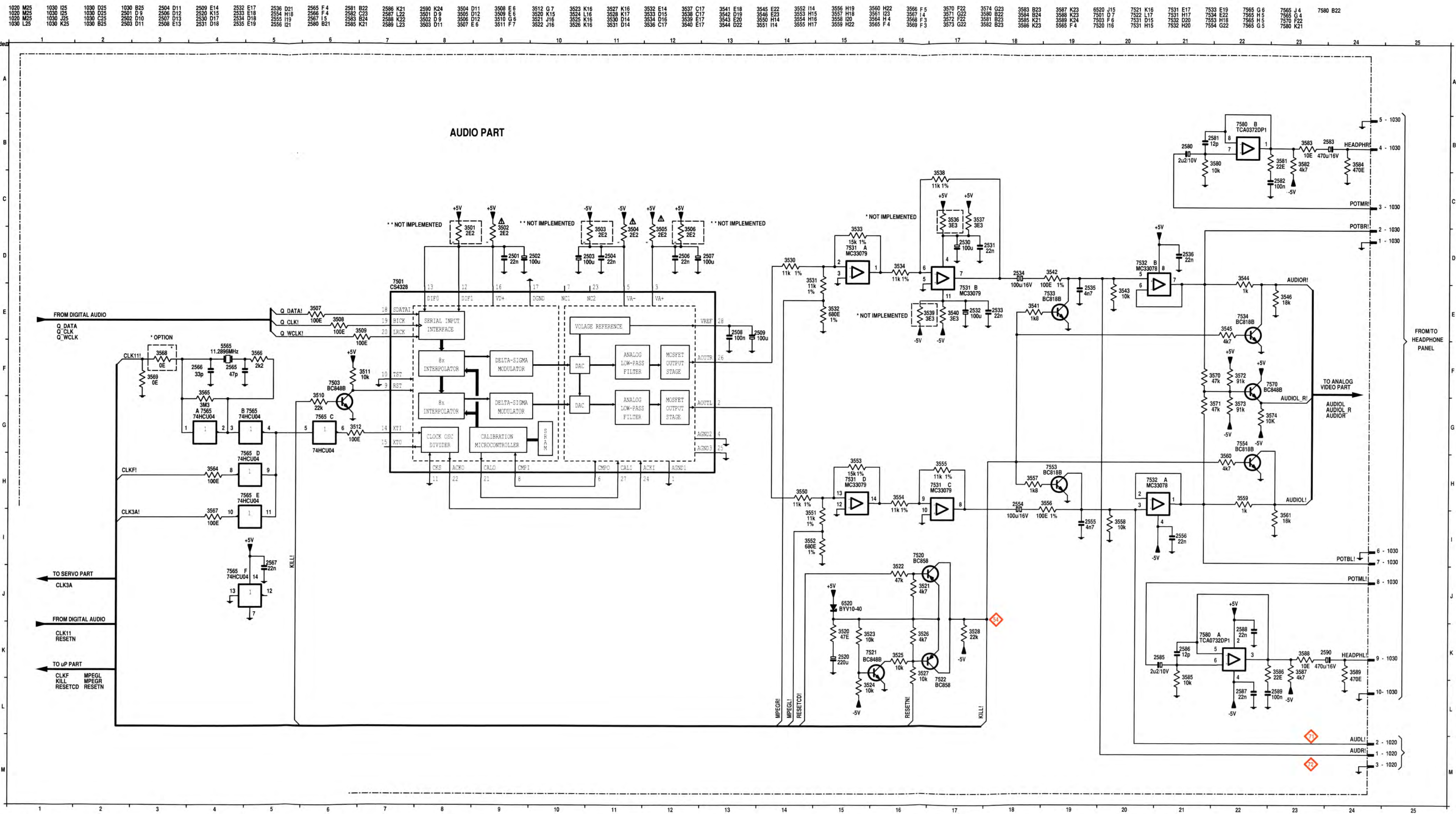
F.M.V. expansion

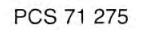


6.6.6 Servo part circuit digram



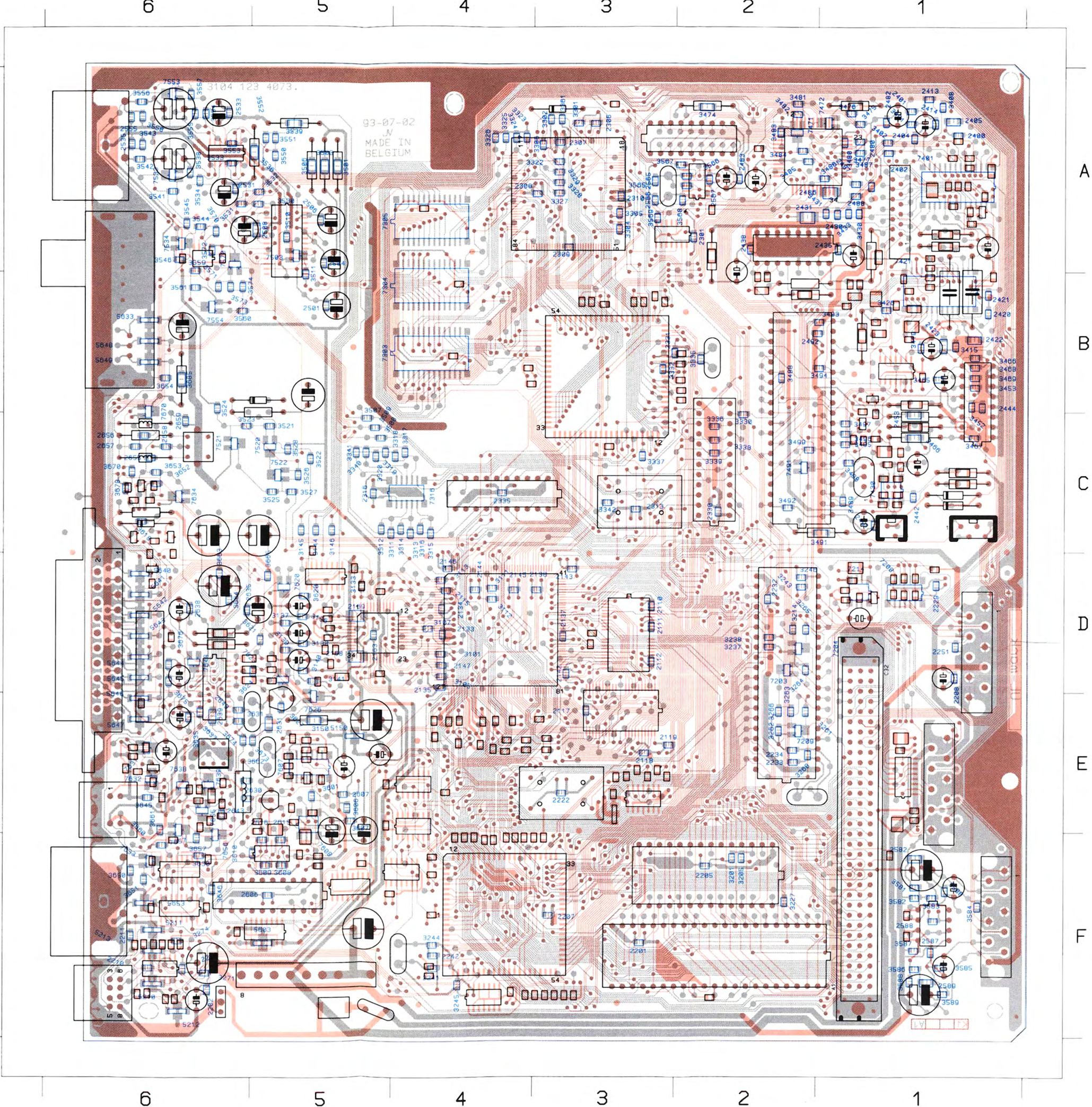
6.6.7 Analog audio part circuit diagram





6.6.9 Mono board PCB layout

7631 E 6	5215 E 3	3506 A 2	3442 C 1	3249 F 4	2618 F 5	2324 B 2	1001 F 5
7632 E 6	5216 F 6	3507 A 2	3443 C 1	3250 F 3	2620 E 5	2325 B 2	1006 C 1
7633 F 6	5217 E 3	3508 A 2	3444 C 1	3251 F 3	2621 E 5	2330 C 2	1007 C 1
7634 C 6	5302 C 3	3509 A 3	3445 C 1	3254 F 5	2622 E 5	2331 B 3	1008 A 1
7638 E 6	5335 B 2	3570 A 6	3446 C 1	3255 F 5	2623 E 5	2332 B 3	1012 E 6
7639 E 6	5400 C 1	3571 B 6	3447 C 1	3257 F 2	2624 E 5	2335 C 4	1013 D 6
7643 D 6	5505 A 3	3572 A 6	3448 C 1	3258 F 4	2625 E 5	2400 A 1	1014 B 6
7655 E 6	5601 E 5	3573 B 6	3449 B 1	3259 F 4	2630 E 6	2401 A 1	1015 F 6
7656 F 6	5602 E 5	3574 B 6	3450 C 1	3260 F 4	2631 E 5	2402 A 1	1020 A 1
7657 E 6	5603 F 5	3580 F 1	3451 C 1	3261 E 2	2632 D 6	2403 A 1	1021 E 1
7667 C 6	5630 E 6	3581 F 1	3452 B 1	3262 E 2	2633 D 6	2404 A 1	1022 D 1
7669 D 6	5631 D 6	3582 F 1	3453 B 1	3263 E 2	2634 D 6	2405 A 1	1030 F 1
7670 B 6	5632 E 6	3583 F 1	3454 C 1	3264 D 2	2635 D 6	2406 A 1	1032 F 6
7680 C 6	5633 B 6	3584 F 1	3455 C 1	3265 D 2	2636 D 6	2407 A 1	1006 E 1
7681 F 5	5640 D 6	3585 F 1	3456 C 1	3266 E 2	2637 D 6	2408 A 1	2110 D 3
7682 F 5	5641 D 6	3586 F 1	3457 C 1	3267 F 1	2638 D 6	2409 A 1	2111 D 3
7683 F 5	5642 D 6	3587 F 1	3458 C 1	3268 E 2	2639 E 6	2410 A 1	2112 D 3
7684 F 5	5643 D 6	3588 F 1	3459 C 1	3271 F 6	2640 D 6	2411 A 1	2115 D 4
7685 F 5	5644 D 6	3589 F 1	3460 A 2	3272 F 6	2641 E 6	2412 A 1	2117 E 3
7686 F 5	5645 D 6	3601 E 5	3461 A 2	3273 F 6	2643 E 6	2413 A 1	2118 E 3
7687 F 5	5646 E 6	3602 F 5	3462 B 1	3274 F 6	2645 E 6	2414 A 1	2119 E 3
7688 F 5	5647 E 6	3603 E 5	3463 B 1	3275 F 6	2646 E 6	2415 B 1	2122 E 4
7689 F 5	5648 E 6	3604 E 5	3464 C 1	3278 F 6	2647 E 6	2416 B 1	2127 E 4
7690 F 5	5649 E 6	3605 D 6	3465 B 1	3279 F 6	2648 F 6	2417 B 1	2132 D 5
7691 F 5	5653 F 6	3606 E 5	3466 B 1	3280 F 6	2649 E 6	2418 B 1	2133 D 4
7692 F 5	5655 C 6	3607 E 5	3467 C 1	3281 F 6	2650 E 5	2419 B 1	2134 D 4
7693 F 5	5656 C 6	3608 F 5	3468 B 1	3301 A 3	2651 C 6	2420 B 1	2135 D 4
7694 F 5	5657 C 6	3609 F 5	3469 B 1	3302 A 3	2652 D 6	2421 B 1	2136 E 4
7695 F 5	6302 A 3	3610 F 5	3470 C 1	3304 A 3	2653 C 5	2422 B 1	2137 D 3
7696 F 5	6441 C 1	3611 E 5	3471 C 1	3305 A 3	2654 B 6	2423 B 1	2138 D 3
7697 F 5	6442 C 1	3612 E 5	3472 A 2	3306 A 3	2655 C 6	2425 B 1	2139 E 4
7698 F 5	6520 B 5	3613 E 5	3473 A 2	3307 B 2	2656 C 6	2427 B 1	2140 E 4
7699 F 5	6601 E 5	3614 E 5	3474 A 2	3308 B 2	2657 C 6	2428 B 1	2141 E 3
7700 F 5	6617 C 6	3615 E 5	3475 A 1	3309 B 3	2658 C 6	2429 A 1	2142 D 3
7701 F 5	7110 D 3	3616 E 5	3476 A 1	3310 B 3	2659 C 6	2430 A 1	2143 D 3
7702 F 5	7118 E 3	3617 C 6	3477 A 1	3311 C 5	3101 D 4	2431 A 2	2144 D 4
7703 F 5	7120 D 5	3618 C 6	3478 A 1	3312 C 5	3103 A 4	2432 B 1	2145 D 4
7704 F 5	7121 D 5	3619 D 6	3479 A 1	3313 C 4	3105 D 4	2433 B 2	2146 D 4
7705 F 5	7125 D 4	3620 D 5	3480 A 1	3314 C 4	3107 D 4	2434 B 1	2147 D 4
7706 F 5	7201 F 4	3621 D 5	3481 A 2	3315 C 4	3109 D 3	2435 A 1	2148 E 5
7707 F 5	7202 E 1	3622 D 5	3482 A 2	3316 C 4	3110 D 3	2436 A 1	2149 E 5
7708 F 5	7203 D 2	3623 D 5	3483 A 2	3317 C 4	3111 D 4	2437 B 2	2150 E 5
7709 F 5	7204 D 2	3624 D 5	3484 A 2	3318 C 4	3112 D 4	2438 A 2	2156 D 5
7710 F 5	7205 D 2	3625 D 5	3485 A 2	3319 C 5	3113 D 4	2440 C 1	2157 D 5
7711 F 5	7207 F 6	3626 D 5	3486 A 1	3320 C 5	3115 E 4	2441 C 1	2158 D 5
7712 F 5	7208 D 1	3627 E 5	3487 A 1	3321 B 2	3118 E 4	2442 C 1	2161 D 5
7713 F 5	7209 E 2	3628 D 5	3488 B 2	3322 A 3	3120 E 4	2443 C 1	2162 D 5
7714 F 5	7210 E 3	3629 E 6	3489 C 1	3323 A 4	3121 E 3	2444 B 1	2163 D 5
7715 F 5	7211 F 2	3630 F 6	3490 C 1	3324 A 4	3122 E 4	2453 C 1	2164 D 5
7716 F 5	7212 F 4	3631 E 6	3491 C 1	3325 A 4	3123 A 4	2464 C 1	2165 D 5
7717 F 5	7214 D 1	3632 D 6	3492 C 2	3326 A 4	3124 E 3	2465 B 1	2166 D 5
7718 F 5	7216 D 1	3633 D 6	3493 B 1	3327 A 3	3125 E 4	2466 C 1	2167 D 5
7719 F 5	7217 F 2	3634 D 6	3494 B 1	3328 A 3	3127 E 4	2468 A 1	2168 D 5
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7721 F 5	7221 E 4	3636 E 6	3496 C 1	3330 C 2	3130 D 5	2482 A 1	2201 F 3
7722 F 5	7223 E 4	3637 E 6	3497 C 1	3331 B 3	3131 D 5	2483 A 2	2202 F 6
7723 F 5	7301 A 3	3638 E 6	3498 C 1	3332 B 3	3132 D 5	2484 A 2	2203 F 6
7724 F 5	7302 A 3	3639 E 6	3499 C 2	3333 B 3	3133 D 5	2485 A 2	2205 F 2
7725 F 5	7303 A 4	3640 E 6	3501 A 5	3334 B 3	3134 D 5	2486 A 1	2206 F 4
7726 F 5	7304 B 4	3641 E 6	3502 A 5	3335 B 2	3136 D 5	2487 A 1	2207 F 3
7727 F 5	7305 A 4	3642 E 6	3503 A 5	3336 C 2	3137 D 5	2488 A 1	2208 D 1
7728 F 5	7316 C 4	3643 E 6	3504 A 5	3337 C 3	3138 D 5	2490 C 1	2209 D 1
7729 F 5	7320 B 3	3644 E 6	3505 A 5	3338 C 2	3139 D 5	2491 C 1	2210 F 6
7730 F 5	7330 C 2	3645 E 6	3506 A 5	3339 C 2	3140 D 5	2492 B 1	2211 F 6
7731 F 5	7335 C 4	3646 F 6	3507 C 5	3340 C 5	3141 D 5	2501 B 5	2212 D 1
7732 F 5	7401 A 1	3647 F 6	3508 C 5	3341 C 5	3144 C 5	2502 B 5	2213 E 1
7733 F 5	7410 A 1	3648 F 6	3509 C 5	3342 C 5	3145 C 5	2503 A 5	2214 E 1
7734 F 5	7421 A 1	3649 E 6	3510 A 5	3361 A 3	3146 C 5	2504 A 5	2215 E 1
7735 F 5	7425 A 2	3650 F 6	3511 B 5	3400 B 1	3147 C 5	2506 A 5	2216 F 6
7736 F 5	7430 C 1	3651 F 6	3512 A 3	3401 A 1	3150 E 5	2507 A 5	2217 E 3
7737 F 5	7435 B 1	3652 C 6	3520 C 5	3402 A 1	3151 E 5	2508 A 5	2218 E 3
7738 F 5	7440 B 1	3653 C 6	3521 C 5	3403 A 1	3201 F 2	2509 A 6	2219 E 3
7739 F 5	7441 C 1	3654 B 6	3522 C 5	3404 A 1	3203 F 6	2520 B 5	2220 E 3
7740 F 5	7405 B 1	3655 E 6	3523 C 6	3405 A 1	3205 F 2	2530 A 6	2221 D 1
7741 F 5	7470 A 2	3656 E 6	3524 B 6	3406 A 1	3206 F 4	2531 A 6	2222 E 3
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7743 F 5	7472 A 1	3658 E 6	3526 C 5	3408 A 1	3209 F 4	2533 A 6	2224 F 4
7744 F 5	7474 A 2	3659 E 6	3527 C 5	3409 A 1	3210 F 4	2534 A 6	2225 F 5
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7750 F 5	7521 C 6	3665 D 6	3534 A 6	3415 B 1	3216 E 1	2565 A 3	2232 D 2
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7752 F 5	7531 A 6	3667 D 6	3537 A 5	3417 A 1	3218 D 1	2567 A 2	2234 E 2
7753 F 5	7532 A 6	3668 D 6	3538 A 6	3418 A 1	3221 D 1	2580 F 1	2235 D 1
7754 F 5	7533 A 6	3669 D 6	3539 A 5	3419 B 1	3222 D 1	2581 F 1	2236 D 1
7755 F 5	7534 A 6	3670 C 6	3540 A 5	3420 B 1	3223 D 1	2582 F 1	2237 F 6
7756 F 5	7553 A 6	3671 C 6	3541 A 6	3421 B 1	3224 E 4	2583 F 1	2241 F 4
7757 F 5	7554 B 6	3673 E 5	3542 A 6	3422 B 1	3225 F 4	2585 F 1	2242 F 4
7758 F 5	7565 A 2	3674 E 6	3543 A 6	3423 B 1	3226 D 1	2586 F 1	2244 F 6
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7773 F 5	7623 D 5	5211 F 6	3561 B 6	3439 B 2	3244 F 4	2615 F 5	2321 B 3
7774 F 5	7626 E 5	5212 F 6	3564 A 2	3440 A 2	3245 F 4	2616 F 5	2322 B 4
7775 F 5	7630 E 6	5213 F 6	3565 A 2	3441 C 1	3246 D 2	2617 E 5	2323 B 4



7 DIAGNOSTICS

7.1 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 troubleshooting 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 test the functioning of the MMC section. The Service Shell provides tests for the Analog Video, CD Servo, and Analog Audio circuits. Section 5.2 covers all the Service Shell test procedures.

The powersupply board assembly, the display board assembly, the analog video circuitry, the analog audio circuitry and the the CD servo circuitry can be serviced to the component level. Due to the complexity of the MMC circuit, replacement is recommended when defective.

The MMC circuitry consists of the uP part circuitry, digital video circuitry, LEMM + DSP circuitry and the GLUE Logic circuitry. The CDM-9 CD Mechanism is also replaced as an assembly. Disassembly instructions are provided on the exploded views.

Troubleshooting hints:

Symptom: Service Shell cannot be started with the test plug.

Possible fault: Connections between port 1 and Slave Microprocessor may be bad. Test plug could be wrong. Slave Microprocessor may be defective.

Hint: If the Player Shell cannot be started, perform the Low Level Test (LL TEST).

7.1.2 Troubleshooting and Service the MMC panel

The monoboard is replaced as a module when parts of the Multi Media Controller are defective. The technician must know the functions of the MMC parts 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 MMC test indicates a fault, replace the complete mainboard. If the test Cannot be initiated, check the power sources and main clock signals on the MMC section. If all supplies and clock signals are present, replace the Mainboard.

7.1.3 CD-servo part 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 analog audio 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.

When there is a symptom indicating a fault in the CD 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 CD servo schematic diagrams in the service manual). If the CDM does not start, check for Vdd, clock, and reset on the CD Drive Microprocessor. If these signals are present, perform the CD DRIVE test in the Service Shell or Low Level test. Also check for activity on the JUC-bus and SPI-bus. If there is a communication failure, proceed with the MMC 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 test modes. These modes are the standard CD servo test modes to test the Focusunit, turntable and swing arm electronics and mechanics. If there is a failure in the servo test modes, further checks with measurements on the CD panel (see section 7.2.2) should reveal the fault.

If the servo circuits are functioning, check the decoder circuits. Activity should be seen on the I²S (DAAB, CLAB, and WSAB) and subcode (SCAB and SDAB) lines from the SAA7310 Decoder IC. If there is no activity, check the supply (Vdd) and input signals (HF, XIN). When the servo and decoder circuits are functioning properly, there may be a problem in the Analog Audio circuit.

7.1.4 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, but video from the disc cannot be displayed. If this condition exists, the Digital Video section and video analog circuits are functioning. Since the player shell is displayed, the video synthesizer circuit is functioning. However, there must be a fault on the MMC section, since this is where the video decoding takes place. Thus the problem is isolated to the video decoding section on the MMC section.

Symptom 2: no video. 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. Hint, also check all the video outputs: S-video, RF, and CVBS. If video is not present from any output, check the RGB, composite sync, and power source inputs. If these signals are present, the Digital Video circuits are functional. Further checks of the Analog Video circuit can isolate the problem further. Check the Video Encoder IC. Also check Vcc1 and Vcc2 to the Video Encoder IC.

Symptom 3: no color. This symptom is most likely caused by a problem in the ENCODER circuit. Check the subcarrier oscillator at Pin 6 of the Video Encoder IC. If this signal is present (correct frequency), check the chroma output signal at Pin 15. If there is no chroma output, IC7609 may be the fault. Also check for short circuits between pins of the IC. If the chroma is present, check the chroma input at Pin 17. If the chroma is not present here, check the coupling components between Pins 15 and 17. If there is chroma at this point, check the composite output at Pin 20. If the chroma is missing, suspect the Video Encoder IC (IC7609).

7.2 MEASUREMENTS & ADJUSTMENTS

In the circuit diagrams and on the drawings of the panels measuring points are marked with :  Some times signals to be measured are pointed as for example : IC7181pin1.
All DC signals are measured with an universal electronic voltmeter.
All AC signals are measured with an oscilloscope

7.2.1 Powersupply section

The main signal in this section is the +5V, to be adjusted with potmeter 3807 up to 5,3V. All other voltages are stated in the circuit diagram.

7.2.2 Servo section

7.2.2.1 Lasercurrent.

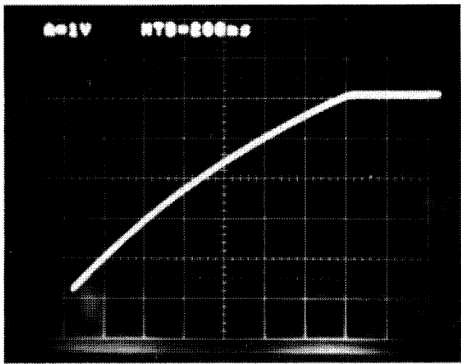
The lasercurrent is adjusted in the CDM9 and is a factory adjustment. After replacing a defective CDM the laser current does not need to be adjusted.
Play track 1 of testdisc 5, the voltage accross item 3411 (measuring point 1 and point 2) on the CD panel should be : 0,7 V / DC $\pm$ 10 %.

7.2.2.2 Focus signal.

Play track 1 of testdisc 5, the voltage accross item 2431 (measuring point 3 and GND) on the CD panel should be : + 400 mV / DC $\pm$ 10%.

7.2.2.3 Starting signal.

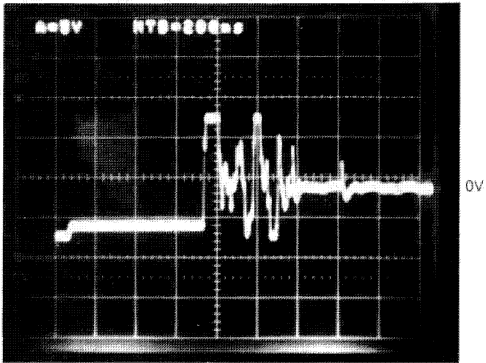
Insert a disc and measure accross item 2409 (measuring point 4 and GND).
After pushing the play button the next picture appears on the oscilloscope :



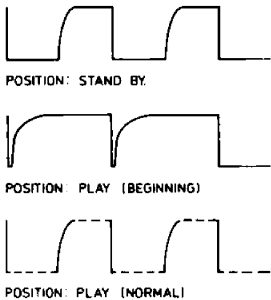
The signal is triggered by the Si/RD signal on IC7401pin 6.

7.2.2.4 Motorcontrol signals.

Insert testdisc 5.
Measure accross IC7465A pin3 and GND, after pushing the play button the next picture should appear on the oscilloscope.



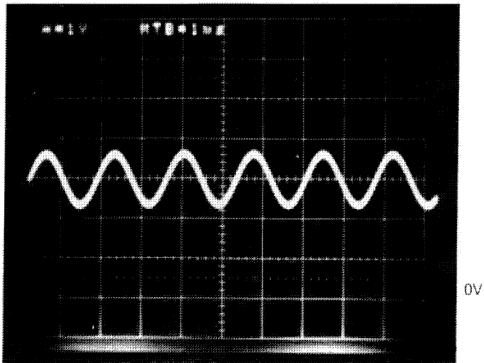
After a while, when playing track 1, the voltage should be : - 1.7 V DC $\pm$ 10%
Signal accross measuring point 7 and GND should be :



38 849 A12

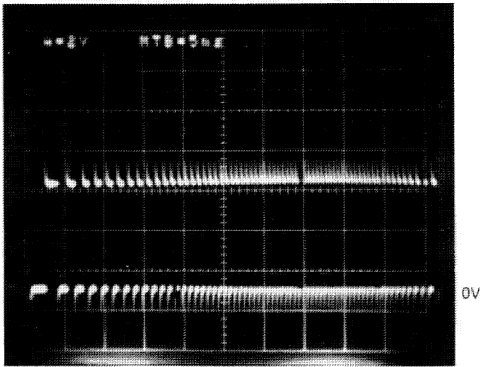
7.2.2.5 Radial error circuit signals.

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



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

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



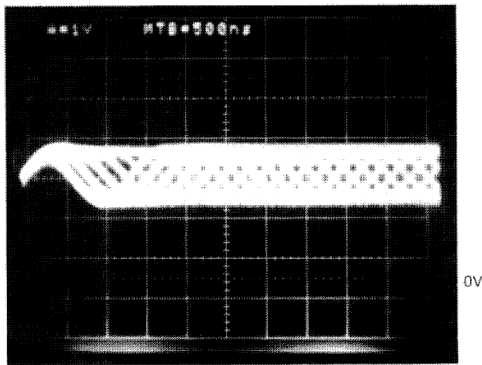
7.2.2.6 Clock signal μ P IC7490

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

7.2.2.7 Decoder signals

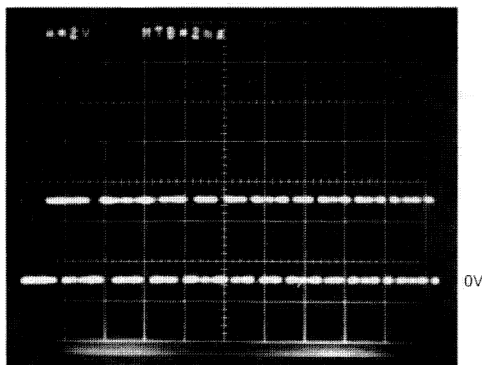
Play track 1 of testdisc 5.

The signal accross measuring point 31 and GND should be:



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

The signal accross measuring point 32 should be :



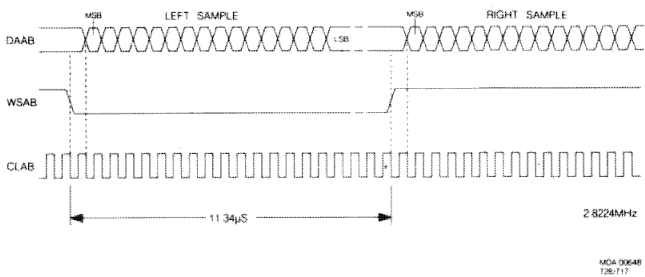
Measuring point 34 : clock signal $f = 11.289.600\text{ Hz}$.

Voltage accross measuring point 36 and 37 :

775 mV / DC $\pm 10\%$

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

Measuring point 39, 41 and 42 :

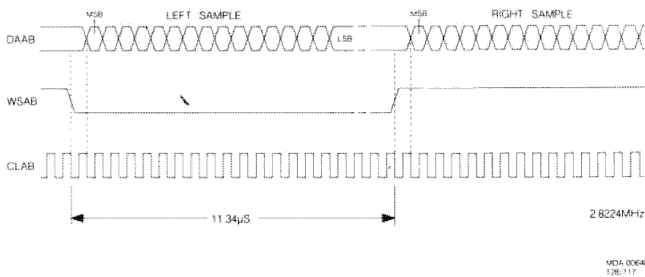


7.2.3 Audio section

7.2.3.1 I²S signals

Check whether the signals, given below, appear on the test points 35 - 41 - 42

Time base related only to CD-DA.



7.2.3.2 Xin clock signal

testpoint 34

Play a CD-DA track.

The frequency of the Xin signal must be:

11,2896 MHz (CD-DA.)

Play CD-I audio.

The frequency of the Xin signal must be:

9,767 MHz for CD-I level A and CD-I level B.

4,838 MHz for CD-I level C.

7.2.3.3 KILL signal

(testpoint 54)

This KILL signal must be +12V during reset.

In normal/play position this signal is - 8 V.

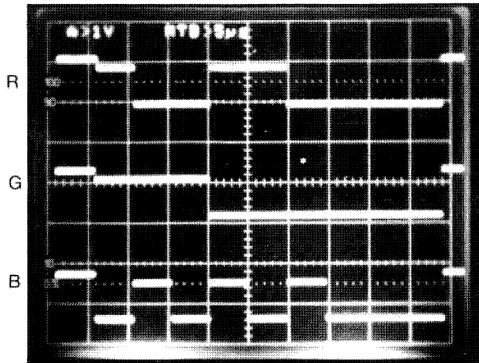
7.2.4 Video section

Required test equipment.

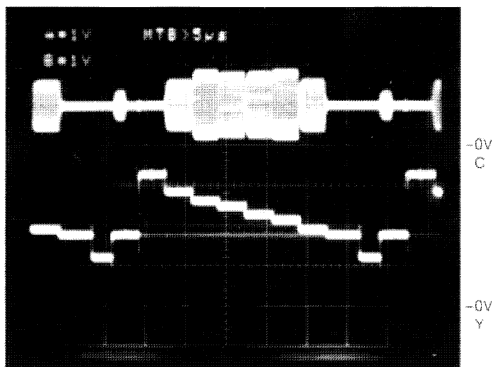
- Electronic voltmeter
- Oscilloscope
- Frequency counter

Put the player in the service shell on testimage (colorbar).
signals : BSW!, GSW!, RSW! At pos 7626, 7623 and 7620

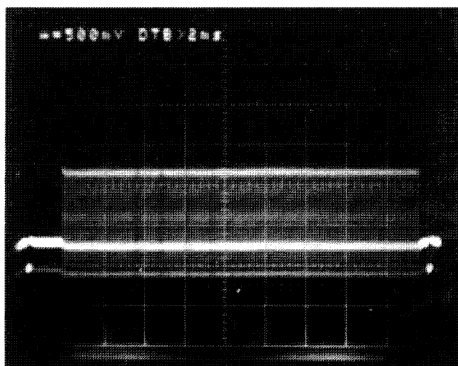
Measuring point 86, 87, 88 :



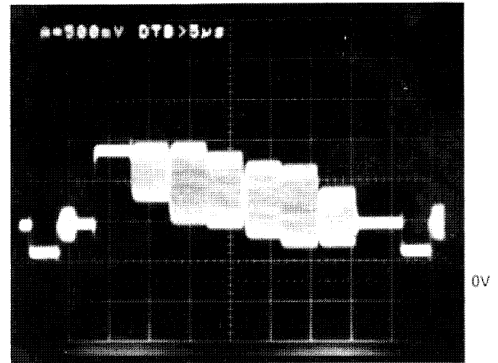
Measuring point 91 :



Measuring point 92 :



Measuring point 89 :



7.2.4.1 Check of subcarrier.

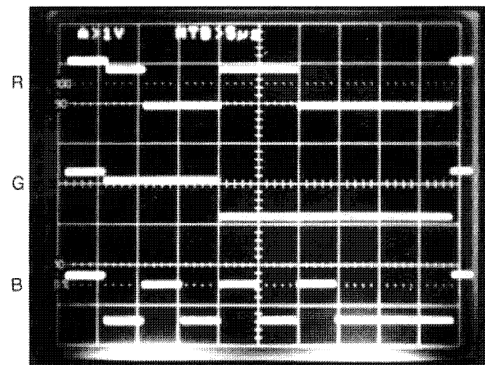
- Player switched off.
- Connect frequency counter to testpoint 83, (pin 6 IC 7609) and turn on the player.
- The frequency on testpoint 83 should be;
PAL = 4 433 618 Hz. $\pm$ 50 Hz.
NTSC = 3 579 545 Hz. $\pm$ 7 Hz.
- The amplitude on testpoint 83 should be in between;
400 mV and 1000 mV_{pp}
- If for PAL the frequency of this signal deviates, perform alignment of trimmer 2650.

7.2.4.2 Check of standard control signal SW

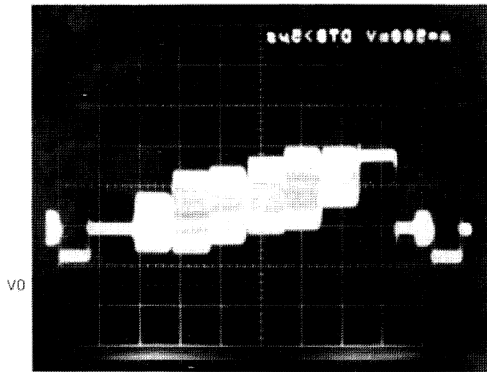
The control signal SW on testpoint 78, should be low (0 V) for PAL and high (5 V) for NTSC.

7.2.4.3 Check of RGB input signals

On the given photo below the signals are given for R - G - B.
On Testpoints 86, 87 and 88.

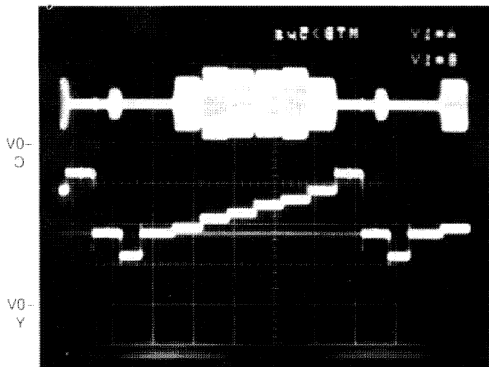


Check of Output signals for CVBS - Y / C.



CVBS signals Testpoint 89

Video signal	1000 mV _{pp}
White level	710 mV _{pp}
Sync	290 mV _{pp}
Burst	290 mV _{pp}



Y/C Sign. Testpoint 91/92

Video signal	1000 mV _{pp}
White level	710 mV _{pp}
Sync	290 mV _{pp}
Chroma	300 mV _{pp}

7.2.5 Multi Media Controller section

Required equipment:

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

7.2.5.1 Supply voltages

Check if the following voltages are present at connector 1001 :

pin 1,2,3	: + 5 V ± 5%
pin 4	: - 5 V ± 5%
pin 5	: + 25 V ± 5%
pin 6,7,8	: GROUND

7.2.5.2 Clock signals:

Carry out measurements just after hardware reset. This is done each time after pressing the OPEN/CLOSE button or after power-on.

System clock

30.0000 MHz ± 1500 Hz (PAL)

30.2098 MHz ± 600 Hz (NTSC)

This system clock must be present at the following points:

IC7201 pin 30

IC7125 pin 115

At IC 7201 pin 29 Clock divided by two must be present :

15.0000 MHz (= 30.000 : 2 for PAL)

15.1049 MHz (NTSC)

At IC7201 pin 69 the UART clock of 68070 must be present :

Frequency 4.9152 MHz ± 250 Hz

At IC7206 pin 39 clock of '68HC05' must be present.

Frequency 4.000 MHz ± 100 Hz

At pin 127 of IC 7302 the DSP clock must be present:

Frequency 27.00 MHz ± 100Hz

At pin 23 of IC 7320 the LEMM clock must be present:

Frequency 27.00 MHz ± 100Hz

7.2.5.3 I²S interface

FILTERN : 0V

DAAB : Blockwave signal

CLAB : frequency 2.8224 MHz (only for CD-DA)

WSAB : frequency 44.1 kHz (only for CD-DA)

DEEM : 0V (only for CD-DA and only if de-emphasis track is played)

7.2.5.4 Reset circuitry

Press the OPEN/CLOSE button at front panel and measure the 'RESETCD' time (low!). This 'low' time must be 140ms ± 20 ms. Also measure the RESETCD time (low!) if the button is released. The signal RESETCD must be low for 140ms ± 20ms.

IC7201 pin 28 RESETN; low time = 250 ms ± 20 ms

7.2.5.5 Check of microprocessor 68070.

Check after power on:

IC7201, pin 27 (= HALTN) = high (+ 5V)

IC7201, pin 28 (= RESETN) = high (+ 5V)

IC7201, pin 24 (= DTACKN) = changing high/low

IC7201, pin 26 (= BERRN) = high (+ 5V)

7.2.5.6 Low level test

Purpose is to test the hardware with software.

Connect a terminal to the UART of microprocessor 68070 via connector at rear side port 2 (= BU-2).

Settings of the terminal:

Baudrate : 9600

start bit : 1

data bists : 8

stop bits : 1

no parity/ no handshake

For the test sequence of the low level test see chapter 5.1.

8 PARTSLIST

8.1 Partslist of the cabinet

Item	Codenummer	Description	Item	Codenummer	Description
1	4822 444 40638	Front assy /57	256	4822 462 40409	Plate for foot
1	4822 444 40608	Front assy /40/41/45	257	4822 462 40409	Plate for foot
9	4822 410 62316	Powerknob assy	259	4822 502 12795	M2,5X5PAN<STZNBK
22	4822 502 30408	PL3X10PAN<STZNBK	260	4822 502 12795	M2,5X5PAN<STZNBK
23	4822 502 30408	PL3X10PAN<STZNBK	268	4822 502 12795	M2,5X5PAN<STZNBK
24	4822 502 30408	PL3X10PAN<STZNBK	269	4822 502 12795	M2,5X5PAN<STZNBK
25	4822 502 30408	PL3X10PAN<STZNBK	270	4822 502 12795	M2,5X5PAN<STZNBK
26	4822 502 30408	PL3X10PAN<STZNBK	271	4822 502 11667	M3X6PAN<STZNBK
27	4822 502 30408	PL3X10PAN<STZNBK	272	4822 502 11667	M3X6PAN<STZNBK
30	4822 502 30408	PL3X10PAN<STZNBK	273		M3X4PAN<STZNBK
31	4822 502 30408	PL3X10PAN<STZNBK	274	4822 502 11667	M3X6PAN<STZNBK
44	4822 413 51434	Volume knob	275	4822 502 11667	M3X6PAN<STZNBK
65	4822 444 40607	Tray front	278	4822 502 30408	PL3X10PAN<STZNBK
75	4822 502 12795	M2,5X5PAN<STZNBK	279	4822 502 30408	PL3X10PAN<STZNBK
76	4822 502 12795	M2,5X5PAN<STZNBK	281		Cap
77	4822 502 12795	M2,5X5PAN<STZNBK	284	4822 272 10361	Votage selector
78	4822 502 12795	M2,5X5PAN<STZNBK			
81	Tray loader	SEE SEPARATE LIST	301	4822 321 10249	Mainscord /40
151	4822 444 60898	Cover	301	4822 321 10886	Mainscord /45
171	4822 502 12795	M2,5X5PAN<STZNBK	301	4822 321 10249	Mainscord /41
172	4822 502 12795	M2,5X5PAN<STZNBK	301	4822 321 10788	Mainscord /57
173	4822 502 12795	M2,5X5PAN<STZNBK	302	4822 321 20308	Audio cord set
174	4822 502 12795	M2,5X5PAN<STZNBK	309	4822 736 21919	Dir. for use /57
175	4822 502 12795	M2,5X5PAN<STZNBK	309	4822 736 21936	Dir. for use /40/41/45
178	4822 502 12795	M2,5X5PAN<STZNBK	315	4822 321 61579	Video cord set
181		Frame assy	316	4822 321 61849	TPX 3500 cord
182		Trafo support	317	4822 320 11096	Antenna cable /57
183		Spacer locking	1001	4822 214 52145	Monopanel assy /57
184		Spacer locking	1001	4822 214 52163	Monopanel assy /40
185		Remod. bracket	1001	4822 214 52164	Monopanel assy /41
186	4822 402 61422	Spacer	1001	4822 214 52165	Monopanel assy /45
187	4822 402 61422	Spacer			These monoboards to be repaired via PCS-repair procedure !
188	4822 402 61422	Spacer	1001	See also separate partslist Monoboard	
189		DVC box			
200		Taptide M3X36	1002	See separate list	Display/powersupply panel.
201		Taptide M3X36	1003	4822 214 52048	FMV expansion panel
202	4822 502 12795	M2,5X5PAN<STZNBK			
203	4822 502 12795	M2,5X5PAN<STZNBK	1800	4822 253 30421	Fuse T600mA ../57
207		ZN 3X6 TORX	1800	4822 070 38001	Fuse T800mA ../51
208		ZN 3X6 TORX	1800	4822 070 33151	Fuse T315mA ../40/41/45
209	4822 502 12795	M2,5X5PAN<STZNBK			
210	4822 502 12795	M2,5X5PAN<STZNBK	5802	4822 146 31201	Transformer ../57
211	4822 502 30408	PL3X10PAN<STZNBK	5802	4822 146 31208	Transformer ../40/45
212	4822 502 30408	PL3X10PAN<STZNBK	5802	4822 146 31321	Transformer ../41
213	4822 502 30408	PL3X10PAN<STZNBK			
214	4822 502 30408	PL3X10PAN<STZNBK			
215	4822 530 80522	2,8X5,5			
216	4822 530 80522	2,8X5,5			
217	4822 502 12795	M2,5X5PAN<STZNBK			
218	4822 502 12795	M2,5X5PAN<STZNBK			
219	4822 502 12795	M2,5X5PAN<STZNBK			
220	4822 502 12795	M2,5X5PAN<STZNBK			
221	4822 530 80522	2,8X5,5			
222	4822 530 80522	2,8X5,5			
223	4822 502 30438	PL3X6PAN<STZNBK			
224	4822 502 30438	PL3X6PAN<STZNBK			
225		M3X4PAN<STZNBK			
226		M3X4PAN<STZNBK			
251	4822 462 41992	Foot			
252	4822 462 41992	Foot			
255	4822 462 40409	Plate for foot			

8.2 PARTS LIST OF THE TRAY LOADER

Item	Codenumber	Description
	4822 691 30294	COMPLETE LOADER WITHOUT CDM
1	4822 464 50934	CHASSIS
2	4822 444 30457	TRAY
3	4822 464 50908	SUB CHASSIS
4	4822 444 60861	COVER
5	4822 402 61412	CLAMPER ASSY
6	4822 466 93065	SUSPENSION
7	4822 466 93065	SUSPENSION
8	4822 466 93065	SUSPENSION
9	4822 466 93065	SUSPENSION
10	4822 271 30707	MICROSWITCH
11	4822 361 21492	MOTOR ASSY
12	4822 502 12001	M2X4 STZN
13	4822 502 12001	M2X4 STZN
14	4822 528 81465	PULLEY
15	4822 528 81464	DRIVE PINION
16	4822 535 93319	SPINDLE
17	4822 535 93319	SPINDLE
18	4822 358 31168	BELT
20	4822 691 30275	CDM9 UNIT
20	4822 691 30277	CDM9 UNIT + SUB CHASSIS + SUSPENSIONS !
33	4822 466 62109	TRANSPORT PROTECTION
40	4822 325 60379	DAMPING TULE
41	4822 325 60379	DAMPING TULE
42	4822 325 60379	DAMPING TULE
43	4822 325 60379	DAMPING TULE
44	4822 466 93163	DAMPING PLATE

8.3 PARTSLIST OF THE DISPLAY AND
POWERSUPPLY PANEL

Item	Codenumber	Description
2		Heat sink
4		Bracket for conn.
6		FTD-holder
7		Insulating plate
8		Factory plate
10		Shielding cap
101	4822 492 63076	Spring clip
103	4822 492 63076	Spring clip
107	4822 492 63076	Spring clip
201	4822 325 20188	Mica isulator
202	4822 325 20188	Mica isulator
1201	4822 267 31572	socket 3p hor. fem.
1202	4822 267 51216	minidin socket 8p FEM TCS
1206	4822 267 50994	Conn. 10p grey
1220	4822 267 50994	Conn. 10p grey
1221		Earth spring
1703	4822 276 13114	Switch tact H=4,3
1704	4822 276 13114	Switch tact H=4,3
1705	4822 276 13114	Switch tact H=4,3
1706	4822 276 13114	Switch tact H=4,3
1707	4822 276 13114	Switch tact H=4,3
1708	4822 276 13114	Switch tact H=4,3
1721		Conn. 10p hor male
1801		Conn. 5p ver male
1802		Conn. 8p ver male
1803	4822 265 31015	AC socket /40/41/45/51
1803	4822 265 31016	AC socket /57
1804		Conn. 3p top entry
1805	4822 253 10128	Fuse T2A Rad
1806	4822 253 10138	Fuse T1A Rad
1807	4822 256 30495	Fuseholder
1809	4822 256 30495	Fuseholder
1810	4822 265 40596	Conn. 2p male
1901	4822 276 11309	Powerswitch
1902	4822 265 40596	Conn. 2p male
2701	5322 122 32654	22nF 10% X7R 63V
2705	4822 122 33575	220pF 5% NPO 50V
2802	4822 124 80148	220µF 20% 16V
2803	4822 124 80047	1000µF 20% 35V
2804	5322 122 32654	22nF 10% X7R 63V
2805	4822 122 33496	100nF 10% X7R 63V
2806	4822 124 41596	22µF 20% 50V
2807	4822 124 41596	22µF 20% 50V
2808		4700µF 20% 6V3
2809		1000µF 20% 6V3
2810	4822 126 12522	1,5nF 20% 400V
2811	4822 126 12522	1,5nF 20% 400V
2812	4822 122 10289	22nF 100V
2813	4822 122 10289	22nF 100V
2814	5322 122 32654	22nF 10% X7R 63V
2815	5322 122 32654	22nF 10% X7R 63V
2816	5322 122 32654	22nF 10% X7R 63V
2817	5322 122 32654	22nF 10% X7R 63V
2818	4822 126 10454	3,3nF 20% 400V
2820	4822 124 41598	33µF 20% 35V

Item	Codenumber	Description
3201	4822 101 21199	2X10K POTM. CARBON
3701	4822 051 20101	100R00 5% 0,1W
3702	4822 051 20473	47K00 5% 0,1W
3704	4822 052 10478	4R70 5% 0,33W
3705	4822 051 20332	3K30 5% 0,1W
3706	4822 116 90857	4R7X8
3707	4822 116 90857	4R7X8
3712	4822 051 20223	22K00 5% 0,1W
3713	4822 051 20823	82K00 5% 0,1W
3715	4822 050 21002	1K00 1% 0,6W
3716	4822 051 20223	22K00 5% 0,1W
3717	4822 051 20472	4K70 5% 0,1W
3718	4822 050 21002	1K00 1% 0,6W
3719	4822 051 20472	4K70 5% 0,1W
3720	4822 051 20154	150K00 5% 0,1W
3721	4822 051 20473	47K00 5% 0,1W
3722	4822 051 20472	4K70 5% 0,1W
3723	4822 051 20472	4K70 5% 0,1W
3724	4822 051 20223	22K00 5% 0,1W
3725	4822 050 21002	1K00 1% 0,6W
3726	4822 051 20472	4K70 5% 0,1W
3727	4822 051 20683	68K00 5% 0,1W
3728	4822 051 20103	10K00 5% 0,1W
3729	4822 051 20472	4K70 5% 0,1W
3730	4822 051 20153	15K00 5% 0,1W
3731	4822 050 21002	1K00 1% 0,6W
3801	4822 051 20821	820R00 5% 0,1W
3802	4822 051 20008	0R00 5% 0,1W
3803	4822 051 20271	270R00 5% 0,1W
3804	4822 051 20683	68K00 5% 0,1W
3805	4822 116 83776	220K 1% 0,1W
3806	4822 051 20123	12K00 5% 0,1W
3807	4822 100 11633	47K TRIM CARBON
3808	4822 051 10102	1K00 2% 0,25W
5203		EMI FILTER 1nF 100V
5204		EMI FILTER 1nF 100V
5207		EMI FILTER 1nF 100V
5208		EMI FILTER 1nF 100V
5209		EMI FILTER 22nF 16V
5210		EMI FILTER 1nF 100V
5211		EMI FILTER 1nF 100V
5801	4822 338 33030	MAINS FILTER
5803		FXC INDUCTOR
5804	5322 157 52513	10µH 20%
6701	4822 130 80622	BAT54
6702	5322 130 31928	BAS16
6704	4822 214 52009	IR RECEIVER GP1U58XP
6705	4822 130 34173	BZX79-C5V6
6706	5322 130 30684	1N4002
6707	5322 130 30684	1N4002
6708	4822 130 34281	BZX79-C15
6709	5322 130 31928	BAS16
6801	4822 130 82985	BYD14G
6802	4822 130 82985	BYD14G
6803	5322 130 30684	1N4002
6804	5322 130 30684	1N4002
6805	5322 130 30684	1N4002
6807	4822 209 81758	MBR1545CT
6808	4822 130 34173	BZX79-C5V6
6810	4822 130 20279	2N6397PH

Item	Codenumber	Description
7703	5322 130 41982	BC848B
7704	5322 130 41982	BC848B
7705	4822 130 91194	FTD DISPLAY
7706	4822 209 72226	U3090M-40P
7708	5322 130 41983	BC858B
7709	5322 130 41983	BC858B
7710	5322 130 41982	BC848B
7712	5322 130 41982	BC848B

8.4 PARTS LIST MONOBOARD

Item	Codenumber	Description	Item	Codenumber	Description
1001		conn. 8p hor. male	2211	5322 122 32654	22nF 10% 63V
1006	4822 265 30525	conn. 2p vert. male	2212	4822 017 01031	10nF 20% 50V
1007	4822 265 40474	conn. 4p vert. male	2216	4822 124 41989	470µF 20% 16V
1008	4822 267 51152	conn. 14p zif straight	2217	5322 122 32654	22nF 10% 63V
1013	4822 267 60326	EUROCONN SCART BLUE	2222	5322 122 32654	22nF 10% 63V
1014	4822 214 52071	RF modulator /45	2223	4822 124 41989	470µF 20% 16V
1014	4822 214 52046	RF modulator/37 MCB8VU3428	2224	5322 122 32654	22nF 10% 63V
1015		socket 2p female YKC21-550	2225	5322 122 32654	22nF 10% 63V
1020		socket 2p female YKC21-528	2226	5322 122 32654	22nF 10% 63V
1021	4822 265 40442	conn. 10p vert. male	2227	5322 122 32654	22nF 10% 63V
1022	4822 265 40442	conn. 10p vert. male	2229	5322 122 32654	22nF 10% 63V
1032	4822 267 51216	minidin socket 8p FEM TCS	2230	5322 122 32654	22nF 10% 63V
1096	4822 267 70325	conn. 96p hor. female	2232	5322 122 32654	22nF 10% 63V
1206	4822 255 40129	IC socket 40p	2233	5322 122 32452	47pF 5% NPO 63V
1211	4822 255 40129	IC socket 40p	2234	5322 122 32452	47pF 5% NPO 63V
1490	4822 255 40129	IC socket 40p	2235	5322 122 31865	1,5nF 10% 63V
2110	5322 122 32654	22nF 10% 63V	2236	5322 122 31865	1,5nF 10% 63V
2111	5322 122 32654	22nF 10% 63V	2237	5322 122 31865	1,5nF 10% 63V
2112	5322 122 32654	22nF 10% 63V	2241	5322 122 32661	56pF 5% 50V
2117	5322 122 32654	22nF 10% 63V	2242	5322 122 32661	56pF 5% 50V
2118	5322 122 32654	22nF 10% 63V	2244	5322 122 31865	1,5nF 10% 63V
2119	5322 122 32654	22nF 10% 63V	2251	5322 122 31865	1,5nF 10% 63V
2132	5322 122 32654	22nF 10% 63V	2255	4822 126 12549	470nF 10% 25V
2133	5322 122 32654	22nF 10% 63V	2303	5322 122 32654	22nF 10% 63V
2134	5322 122 32654	22nF 10% 63V	2304	5322 122 32654	22nF 10% 63V
2135	5322 122 32654	22nF 10% 63V	2305	5322 122 32654	22nF 10% 63V
2136	5322 122 32654	22nF 10% 63V	2307	5322 122 32654	22nF 10% 63V
2137	5322 122 32654	22nF 10% 63V	2308	5322 122 32654	22nF 10% 63V
2138	5322 122 32654	22nF 10% 63V	2309	5322 122 32654	22nF 10% 63V
2139	5322 122 32654	22nF 10% 63V	2310	5322 122 32654	22nF 10% 63V
2140	5322 122 32654	22nF 10% 63V	2313	5322 122 32654	22nF 10% 63V
2141	5322 122 32654	22nF 10% 63V	2316	5322 122 32654	22nF 10% 63V
2142	5322 122 32654	22nF 10% 63V	2317	5322 122 32452	47pF 5% NPO 63V
2143	5322 122 32654	22nF 10% 63V	2320	5322 122 32654	22nF 10% 63V
2144	5322 122 32654	22nF 10% 63V	2321	5322 122 32654	22nF 10% 63V
2145	5322 122 32654	22nF 10% 63V	2322	5322 122 32654	22nF 10% 63V
2146	5322 122 32654	22nF 10% 63V	2323	5322 122 32654	22nF 10% 63V
2147	5322 122 32654	22nF 10% 63V	2324	5322 122 32654	22nF 10% 63V
2148	4822 124 41598	33µF 20% 35V	2325	5322 122 32654	22nF 10% 63V
2149	4822 124 41598	33µF 20% 35V	2330	5322 122 32654	22nF 10% 63V
2150	4822 124 41989	470µF 20% 16V	2335	5322 122 32654	22nF 10% 63V
2156	4822 124 41528	100µF 25V	2400	5322 122 32654	22nF 10% 63V
2157	4822 124 41528	100µF 25V	2401	5322 122 32654	22nF 10% 63V
2158	4822 124 41528	100µF 25V	2402	5322 122 32268	470pF 10% 50V
2161	5322 122 32654	22nF 10% 63V	2403	5322 122 34123	1nF 10% 50V
2162	5322 122 32654	22nF 10% 63V	2404	4822 122 33175	2,2nF 20% 50V
2163	5322 122 32654	22nF 10% 63V	2405	4822 122 32542	47nF 10% 63V
2164	4822 122 32542	47nF 10% 63V	2406	5322 122 32531	100pF 5% 50V
2165	5322 122 32654	22nF 10% 63V	2407	4822 122 33177	10nF 20% 50V
2166	5322 122 32654	22nF 10% 63V	2408	5322 122 34123	1nF 10% 50V
2167	5322 122 32654	22nF 10% 63V	2409	5322 122 31865	1,5nF 10% 63V
2168	4822 126 12549	470nF 10% 25V	2411	4822 122 32575	220pF 10% 500V
2169	4822 126 12549	470nF 10% 25V	2412	4822 126 12549	470nF 10%
2201	5322 122 32654	22nF 10% 63V	2413	4822 122 32575	220pF 10% 500V
2202	5322 122 32654	22nF 10% 63V	2414	5322 122 32654	22nF 10% 63V
2203	4822 124 41598	33µF 20% 35V	2415	4822 121 51321	8,2nF 1% 63V
2205	5322 122 32654	22nF 10% 63V	2416	4822 121 51321	8,2nF 1% 63V
2206	5322 122 32654	22nF 10% 63V	2417	4822 124 41598	33µF 20% 35V
2207	5322 122 32654	22nF 10% 63V	2418	4822 122 32542	47nF 10% 63V
2208	5322 122 32654	22nF 10% 63V	2419	5322 121 42661	330nF 5% 63V
2209	5322 122 32654	22nF 10% 63V	2420	4822 122 33342	33nF 10% 63V
2210	5322 122 32654	22nF 10% 63V	2421	4822 122 33342	33nF 10% 63V

Item	Codenumber	Description	Item	Codenumber	Description
2422	4822 121 42408	220nF 5% 63V	2639	4822 122 33496	100nF 10% 63V
2423	4822 121 42408	220nF 5% 63V	2640	4822 124 41579	10µF 20% 50V
2425	4822 121 51252	470nF 5% 63V	2641	4822 124 41579	10µF 20% 50V
2427	4822 122 33496	100nF 10% 63V	2643	5322 122 32448	10pF 5% 50V
2428	5322 122 32654	22nF 10% 63V	2647	4822 122 33496	100nF 10% 63V
2429	4822 124 41527	47µF 25V	2648	5322 122 32654	22nF 10% 63V
2430	5322 126 10223	4,7nF 10% 63V	2649	5322 122 32659	33pF 5% 50V
2431	4822 121 51252	470nF 5% 63V	2650		9,8pF-60pF 100V
2432	4822 122 32927	220nF Y5V 50V	2651	4822 124 41989	470µF 16V
2433	4822 122 33496	100nF 10% 63V	2652	4822 124 41989	470µF 16V
2434	5322 122 32654	22nF 10% 63V	2653	4822 124 41989	470µF 16V
2435	5322 122 32654	22nF 10% 63V	2654	4822 124 41528	100µF 25V
2436	4822 124 41598	33µF 20% 35V			
2437	4822 124 41598	33µF 20% 35V	3101	4822 051 20008	0R00 jumper
2438	5322 122 32654	22nF 10% 63V	3103	4822 051 20008	0R00 jumper
2440	5322 122 32448	10pF 5% 50V	3105	4822 051 20008	0R00 jumper
2441	4822 122 33893	18nF 10% 63V	3107	4822 051 20008	0R00 jumper
2442	5322 122 32654	22nF 10% 63V	3110	4822 051 20008	0R00 jumper
2443	4822 126 12719	330nF 10% 25V	3112	4822 051 20008	0R00 jumper
2444	4822 122 33175	2,2nF 20% 50V	3113	4822 051 20008	0R00 jumper
2453	4822 122 33496	100nF 10% 63V	3118	4822 051 10102	1K00 2% 0,25W
2464	4822 124 41598	33µF 20% 35V	3120	4822 051 20472	4K70 5% 0,1W
2465	4822 124 41598	33µF 20% 35V	3121		75R00 1%
2466	4822 122 33496	100nF 10% 63V	3122	4822 051 20223	22K00 5% 0,1W
2480	5322 122 32654	22nF 10% 63V	3123		75R00 1%
2481	4822 124 41598	33µF 20% 35V	3124		75R00 1%
2482	5322 122 32654	22nF 10% 63V	3125	4822 051 20223	22K00 5% 0,1W
2483	5322 122 32654	22nF 10% 63V	3127		75R00 1% 0,1W
2484	4822 124 41598	33µF 20% 35V	3129		75R00 1%
2485	4822 124 40243	1,5µF 20% 63V	3130		75R00 1% 0,1W
2486	4822 126 12549	470nF 10% 25V	3131		75R00 1% 0,1W
2487	4822 122 33175	2,2nF 20% 50V	3132		75R00 1% 0,1W
2488	5322 122 32452	47pF 5% 63V	3133	4822 051 20332	3K30 5% 0,1W
2490	4822 124 41598	33µF 20% 35V	3134		330R00 1%
2491	5322 122 32654	22nF 10% 63V	3136	4822 051 20103	10K00 5% 0,1W
2492	5322 122 32531	100pF 5% 50V	3137	4822 051 20103	10K00 5% 0,1W
2501	5322 122 32654	22nF 10% 63V	3138	4822 051 20103	10K00 5% 0,1W
2502	4822 124 41528	100µF 25V	3139	4822 051 20103	10K00 5% 0,1W
2503	4822 124 41528	100µF 25V	3140	4822 051 20103	10K00 5% 0,1W
2504	5322 122 32654	22nF 10% 63V	3141	4822 051 20103	10K00 5% 0,1W
2506	5322 122 32654	22nF 10% 63V	3144		150R00 1%
2507	4822 124 41528	100µF 25V	3145		150R00 1%
2508	4822 122 33496	100nF 10% 63V	3146		150R00 1%
2509	4822 124 41528	100µF 25V	3201	4822 051 20008	0R00 5% 0,1W
2520	4822 124 80144	220µF 20% 25V	3203	4822 051 20101	100R00 5% 0,1W
2530	4822 124 41528	100µF 25V	3206	4822 051 20472	4K70 5% 0,1W
2531	5322 122 32654	22nF 10% 63V	3207	4822 051 20472	4K70 5% 0,1W
2532	4822 124 41528	100µF 25V	3210	4822 051 20472	4K70 5% 0,1W
2533	5322 122 32654	22nF 10% 63V	3211	4822 051 20472	4K70 5% 0,1W
2535	5322 126 10223	4,7nF 10% 63V	3212	4822 050 21002	1K00 1% 0,1W
2536	5322 122 32654	22nF 10% 63V	3213	4822 051 20101	100R00 5% 0,1W
2554	4822 124 22339	100µF 16V	3218	4822 051 20472	4K70 5% 0,1W
2555	5322 126 10223	4,7nF 10% 63V	3221	4822 051 20104	100K00 5% 0,1W
2556	5322 122 32654	22nF 10% 63V	3222	4822 051 20103	10K00 5% 0,1W
2565	5322 122 32452	47pF 5% 63V	3223	4822 051 20682	6K80 5% 0,1W
2566	5322 122 32659	33pF 5% 50V	3224	4822 050 21002	1K00 1% 0,1W
2567	5322 122 32654	22nF 10% 63V	3225	4822 051 20472	4K70 5% 0,1W
2632	4822 122 33496	100nF 10% 63V	3226	4822 051 20101	100R00 5% 0,1W
2633	4822 122 33496	100nF 10% 63V	3230	4822 050 21002	1K00 1% 0,1W
2634	4822 122 33496	100nF 10% 63V	3231	4822 050 21002	1K00 1% 0,1W
2635	5322 122 32654	22nF 10% 63V	3232	4822 051 20472	4K70 5% 0,1W
2636	4822 124 41528	100µF 25V	3233	4822 051 20472	4K70 5% 0,1W
2637	4822 124 41579	10µF 20% 50V	3234	4822 050 21002	1K00 1% 0,1W
2638	5322 122 32654	22nF 10% 63V	3235	4822 050 21002	1K00 1% 0,1W

Item	Codenumber	Description	Item	Codenumber	Description
3236	4822 050 21002	1K00 1% 0,1W	3403	4822 116 83933	15K 1% 0,1W
3237	4822 051 10102	1K00 2% 0,25W	3404	4822 051 20101	100R00 5% 0,1W
3239	4822 051 20101	100R00 5% 0,1W	3405	4822 050 21002	1K00 1% 0,1W
3240	4822 051 20101	100R00 5% 0,1W	3406	4822 116 83705	24K 2% 0,2W
3241	4822 051 20101	100R00 5% 0,1W	3407	4822 051 20562	5K60 5% 0,1W
3243	4822 051 10102	1K00 2% 0,25W	3408	4822 051 20103	10K00 5% 0,1W
3244	4822 051 20222	2K20 5% 0,1W	3409	4822 052 10478	4R70 5% 0,33W
3245	4822 051 20105	1M00 5% 0,1W	3412	4822 051 20101	100R0 5% 0,1W
3249	4822 051 20472	4K70 5% 0,1W	3413		12R
3250	4822 051 20472	4K70 5% 0,1W	3414	4822 051 20223	22K00 5% 0,1W
3251	4822 051 20472	4K70 5% 0,1W	3415	4822 051 20123	12K00 5% 0,1W
3254	4822 051 20008	0R00 5% 0,1W	3416	4822 051 20223	22K00 5% 0,1W
3257	4822 050 21002	1K00 1% 0,1W	3417	4822 051 20473	47K00 5% 0,1W
3258	4822 051 20223	22K00 5% 0,1W	3418	4822 051 20223	22K00 5% 0,1W
3259	4822 051 20223	22K00 5% 0,1W	3419	4822 051 20182	1K80 5% 0,1W
3260	4822 051 20223	22K00 5% 0,1W	3420	4822 116 83706	5K1 2% 0,2W
3261	4822 051 20183	18K00 5% 0,1W	3421	4822 051 20183	18K00 5% 0,1W
3262	4822 051 20183	18K00 5% 0,1W	3422	4822 051 20154	150K00 5% 0,1W
3263	4822 051 20473	47K00 5% 0,1W	3423	4822 051 20224	220K00 5% 0,1W
3264	4822 051 20103	10K00 5% 0,1W	3424		1R
3265	4822 051 20103	10K00 5% 0,1W	3426	4822 051 20302	3K00 5% 0,1W
3266	4822 051 20222	2K20 5% 0,1W	3428	4822 051 20302	3K00 5% 0,1W
3267	4822 051 20222	2K20 5% 0,1W	3429	4822 051 20339	33R00 5% 0,1W
3268	4822 051 20224	220K00 5% 0,1W	3430	4822 051 20113	11K00 5% 0,1W
3271	4822 051 20682	6K80 5% 0,1W	3431	4822 051 20124	120K00 5% 0,1W
3272	4822 051 20103	10K00 5% 0,1W	3432		3M3 5% 0,1W
3273	4822 051 20104	100K00 5% 0,1W	3433	4822 051 20154	150K00 5% 0,1W
3274	4822 051 20682	6K80 5% 0,1W	3435	4822 051 20563	56K00 5% 0,1W
3275	4822 051 20103	10K00 5% 0,1W	3436	4822 051 20394	390K00 5% 0,1W
3278	4822 051 20104	100K00 5% 0,1W	3437	4822 051 20823	82K00 5% 0,1W
3279	4822 051 20101	100R00 5% 0,1W	3439	4822 116 52186	22E 5% 0,5W
3280	4822 051 20104	100K00 5% 0,1W	3440		4R7
3281	4822 051 20103	10K00 5% 0,1W	3441	4822 051 20473	47K00 5% 0,1W
3301	4822 051 20472	4K70 5% 0,1W	3442	4822 051 20104	100K00 5% 0,1W
3304	4822 051 20472	4K70 5% 0,1W	3443	4822 051 20913	91K00 5% 0,1W
3305	4822 051 20472	4K70 5% 0,1W	3444	4822 051 20122	1K20 5% 0,1W
3306	4822 051 20103	10K00 5% 0,1W	3445	4822 051 20332	3K30 5% 0,1W
3307	4822 051 20103	10K00 5% 0,1W	3446	4822 051 20562	5K60 5% 0,1W
3308	4822 051 20103	10K00 5% 0,1W	3447	4822 051 20154	150K00 5% 0,1W
3309	4822 051 20103	10K00 5% 0,1W	3448	4822 051 20472	4K70 5% 0,1W
3310	4822 051 20103	10K00 5% 0,1W	3449	4822 051 20472	4K70 5% 0,1W
3318	4822 051 20008	0R00 5% 0,1W	3450	4822 051 20333	33K00 5% 0,1W
3321	4822 050 21002	1K00 1% 0,1W	3451	4822 051 20684	680K00 5% 0,1W
3322	4822 051 20103	10K00 5% 0,1W	3452	4822 051 20204	200K00 5% 0,1W
3323	4822 051 20103	10K00 5% 0,1W	3453	4822 051 20823	82K00 5% 0,1W
3324	4822 051 20103	10K00 5% 0,1W	3456		1R00
3325	4822 051 20103	10K00 5% 0,1W	3457		1R00
3326	4822 051 20103	10K00 5% 0,1W	3458	4822 051 20472	4K70 5% 0,1W
3327	4822 051 20103	10K00 5% 0,1W	3459	4822 116 52186	22E 5% 0,5W
3328	4822 051 20103	10K00 5% 0,1W	3461		1R00
3329	4822 051 20103	10K00 5% 0,1W	3463		1R00
3330	4822 050 21002	1K00 1% 0,1W	3465	4822 051 20203	20K00 5% 0,1W
3332	4822 051 20008	0R00 5% 0,1W	3466	4822 116 83084	27K 2% 0,2W
3334	4822 051 20008	0R00 5% 0,1W	3467	4822 116 83084	27K 2% 0,2W
3336		75R00 1%	3468	4822 116 83084	27K 2% 0,2W
3337	4822 051 20103	10K00 5% 0,1W	3469	4822 116 83084	27K 2% 0,2W
3338		75R00 1%	3470	4822 116 52186	22E 5% 0,5W
3339		75R00 1%	3471		1R00
3340	4822 051 20008	0R00 5% 0,1W	3472	4822 051 20223	22K00 5% 0,1W
3342	4822 051 20103	10K00 5% 0,1W	3474		4R7
3361	4822 051 20103	10K00 5% 0,1W	3475	4822 051 20101	100R00 5% 0,1W
3400		3R3	3476	4822 051 20152	1K50 5% 0,1W
3401	4822 051 20472	4K70 5% 0,1W	3477	4822 051 20392	3K90 5% 0,1W
3402	4822 051 20104	100K00 5% 0,1W	3479		3R3

Item	Codenumber	Description			Item	Codenumber	Description		
3480	4822 051 20912	9K10	5%	0,1W	3617	4822 050 23301	330R00	1%	0,6W
3485		75R	1%		3618	4822 051 10102	1K00	2%	0,25W
3486	4822 051 20223	22K00	5%	0,1W	3619		3R3		
3487	4822 051 20222	2K20	5%	0,1W	3620	4822 051 10102	1K00	2%	0,25W
3488	4822 051 20223	22K00	5%	0,1W	3621	4822 051 20221	220R00	5%	0,1W
3489	4822 051 20224	220K00	5%	0,1W	3622	4822 051 20561	560R00	5%	0,1W
3491		4R7			3623	4822 051 10102	1K00	2%	0,25W
3492	4822 051 20223	22K00	5%	0,1W	3624	4822 051 20221	220R00	5%	0,1W
3493	4822 051 20392	3K90	5%	0,1W	3625	4822 051 20561	560R00	5%	0,1W
3494	4822 051 20223	22K00	5%	0,1W	3626	4822 051 10102	1K00	2%	0,25W
3495	4822 051 20223	22K00	5%	0,1W	3627	4822 051 20221	220R00	5%	0,1W
3496	4822 051 20223	22K00	5%	0,1W	3628	4822 051 20561	560R00	5%	0,1W
3497	4822 051 20223	22K00	5%	0,1W	3629	4822 051 20223	22K00	5%	0,1W
3498	4822 051 20222	2K20	5%	0,1W	3631	4822 116 83933	15K	1%	0,1W
3499	4822 051 20103	10K00	5%	0,1W	3634	4822 051 10102	1K00	2%	0,25W
3501		2R2			3635	4822 051 20273	27K00	5%	0,1W
3503		2R2			3636	4822 051 10102	1K00	2%	0,25W
3506		2R2			3637	4822 051 10102	1K00	2%	0,25W
3507	4822 051 20101	100R00	5%	0,1W	3638	4822 051 20223	22K00	5%	0,1W
3508	4822 051 20101	100R00	5%	0,1W	3649	4822 051 10102	1K00	2%	0,25W
3509	4822 051 20101	100R00	5%	0,1W	3650		75R00	1%	
3510	4822 051 20223	22K00	5%	0,1W	3651	4822 051 20151	150R00	5%	0,1W
3511	4822 051 20103	10K00	5%	0,1W	3652	4822 051 20151	150R00	5%	0,1W
3520	4822 052 10479	47R	5%	0,33W	3653		75R00	1%	
3521	4822 051 20472	4K7	5%	0,1W	3654		75R00	1%	
3522	4822 051 20473	47K00	5%	0,1W	3655	4822 051 54730	47K00	5%	0,1W
3523	4822 051 20103	10K00	5%	0,1W	3656	4822 051 20223	22K00	5%	0,1W
3524	4822 051 20103	10K00	5%	0,1W	3657	4822 051 20471	470R00	5%	0,1W
3525	4822 051 20103	10K00	5%	0,1W	3658	4822 051 20511	510R00	5%	0,1W
3526	4822 051 20472	4K70	5%	0,1W	3659	4822 051 20181	180R00	5%	0,1W
3527	4822 051 20103	10K00	5%	0,1W	3663		75R00	1%	
3528	4822 051 20223	22K00	5%	0,1W	3664		75R00	1%	
3530	4822 050 21103	11K00	1%	0,6W	3665		75R00	1%	
3531	4822 050 21103	11K00	1%	0,6W	3666	4822 051 20472	4K70	5%	0,1W
3532	4822 051 20681	680R00	5%	0,1W	3667	4822 117 10361	680R	1%	0,1W
3533	4822 050 21503	15K00	1%	0,6W	3668	4822 051 20472	4K70	5%	0,1W
3534	4822 050 21103	11K00	1%	0,6W	3669	4822 051 20101	100R00	5%	0,1W
3536		3R3			3670	4822 051 20472	4K70	5%	0,1W
3538	4822 050 21103	11K00	1%	0,6W	3674	4822 051 20008	0R00 JUMPER		
3539		3R3			3675		75R00	1%	
3541		1K80	1%	0,1W	3677	4822 051 20689	68R00	5%	0,1W
3542	4822 051 20101	100R00	5%	0,1W	3678	4822 051 20223	22K00	5%	0,1W
3543	4822 051 20103	10K00	5%	0,1W	3679	4822 051 20301	300R00	5%	0,1W
3544	4822 050 21002	1K00	1%	0,1W	3680	4822 051 20301	300R00	5%	0,1W
3545	4822 051 20472	4K70	5%	0,1W	3681	4822 051 20472	4K70	5%	0,1W
3546	4822 051 20183	18K00	5%	0,1W	3682	4822 051 20223	22K00	5%	0,1W
3550	4822 050 21103	11K00	1%	0,6W	3685		3R3		
3551	4822 050 21103	11K00	1%	0,6W					
3552	4822 051 20681	680R00	5%	0,1W	5150	4822 157 90252	EMI FILTER	22nF	100V
3553	4822 050 21503	15K00	1%	0,6W	5201	4822 242 81398	4.915 000 MC		
3554	4822 050 21103	11K00	1%	0,6W	5203	4822 242 81396	4.000 000 MC		
3555	4822 050 21103	11K00	1%	0,6W	5210		EMI FILTER	1nF	100V
3556	4822 051 20101	100R00	5%	0,1W	5211		EMI FILTER	1nF	100V
3557		1K80	1%	0,1W	5212		EMI FILTER	1nF	100V
3558	4822 051 20103	10K00	5%	0,1W	5213		EMI FILTER	1nF	100V
3559	4822 050 21002	1K00	1%	0,1W	5215	4822 157 90252	EMI FILTER	22nF	100V
3560	4822 051 20472	4K70	5%	0,1W	5216	4822 157 70378	EMI FILTER	22nF	16V
3561	4822 051 20183	18K00	5%	0,1W	5217	4822 242 81419	30 MC		
3570	4822 051 20473	47K00	5%	0,1W	5302		27 MC		
3571	4822 051 20473	47K00	5%	0,1W	5490	4822 242 72527	CST 4,00MGW-TF01		
3572	4822 051 20913	91K00	5%	0,1W	5631	4822 320 40247	DELAY LINE 275 nSEC		
3573	4822 051 20913	91K00	5%	0,1W	5632		FILTER 3M5814M43		
3574	4822 051 20103	10K00	5%	0,1W	5640		EMI FILTER	1nF	100V
3605		3R3			5641		EMI FILTER	1nF	100V

Item	Codenummer	Description	Item	Codenummer	Description
5642		EMI FILTER 220p 100V	7553	4822 130 42696	BC818-25
5643		EMI FILTER 1nF 100V	7554	4822 130 42696	BC818-25
5644		EMI FILTER 220pF 100V	7565	4822 209 30704	MC74HCU04D
5645		EMI FILTER 220pF 100V	7570	5322 130 41982	BC848B
5646		EMI FILTER 1nF 100V	7609	4822 209 31908	CXA1145M
5647		EMI FILTER 220pF 100V	7617	5322 130 41982	BC848B
5648		EMI FILTER 1nF 100V	7620	5322 130 41982	BC848B
5649		EMI FILTER 220pF 100V	7623	5322 130 41982	BC848B
5653		EMI FILTER 1nF 100V	7626	5322 130 41982	BC848B
			7633	5322 130 41982	BC848B
6441	5322 756 20683	1N4002	7634	5322 130 41982	BC848B
6442	5322 756 20683	1N4002	7638	5322 130 41982	BC848B
6520	5322 130 34885	1N5817	7639	5322 130 41982	BC848B
6617	4822 130 34197	BZX79-C12	7643	5322 130 41982	BC848B
			7655	5322 130 41982	BC848B
7110	4822 209 52465	HM514270ATT-7	7656	5322 130 41983	BC858B
7120	4822 209 31292	MC44200	7667	5322 130 41982	BC848B
7121	5322 209 60189	PC74HCT4053T	7669	5322 130 41982	BC848B
7125		GXCT38307CI15	7670	5322 130 41983	BC858B
7201		SCC68070CCA84	7680	4822 130 41982	BC848B
7203	5322 130 41983	BC858B			
7206	4822 209 52462	SLAVE PROC µP			
7207	5322 209 71568	PC74HCT14T			
7208	5322 209 71568	PC74HCT14T			
7209	5322 130 41982	BC848B			
7210	4822 209 30704	MC74HCU04D			
7211	4822 209 52461	SYSTEM E-PROM			
7212	4822 209 30704	MC74HCU04D			
7216	5322 130 41982	BC848B			
7217	4822 209 30554	MK48T08B15			
7220	5322 209 61434	N74F02D			
7221	4822 209 30696	MC74ACT74DR2			
7223	5322 209 61434	N74F02D			
7302		DSP56001FC27			
7303	4822 209 32036	FCB61C65L-70T			
7304	4822 209 32036	FCB61C65L-70T			
7305	4822 209 32036	FCB61C65L-70T			
7316	4822 209 52466	N74F164D			
7320		GSC38LG307P156			
7330		IC SELECT PAL			
7335		IC DTACK PAL			
7401	4822 209 73234	TDA8808T/C3			
7410	4822 130 42696	BC818-25			
7421	4822 209 31973	TDA8809T/C2/S1/13			
7425	4822 209 72587	TCA0372D2			
7430	4822 209 30095	LM833D			
7435	5322 209 60299	PC74HCT00T			
7440	5322 130 41983	BC858B			
7441	5322 130 41983	BC858B			
7465	4822 209 72587	TCA0372D2			
7470	4822 209 61759	SAA7310GP/H5			
7472	4822 130 42131	BF550			
7474	4822 209 70422	MN4264-15			
7490	4822 209 52463	IC SERVO-CD µP			
7491	5322 130 41982	BC848B			
7501	4822 209 32072	CS4328KS			
7503	4822 130 41982	BC848B			
7520	5322 130 41983	BC858B			
7521	5322 130 41982	BC848B			
7522	5322 130 41983	BC858B			
7531	4822 209 32071	MC33079D			
7532	4822 209 62312	MC33078P			
7533	4822 130 42696	BC818-25			
7534	4822 130 42696	BC818-25			

8.5 LIST OF ACCESSORIES AND SERVICE TOOLS

Item	Codenumber	Description
1	4822 395 50145	TORX SCREW DRIVER SET
2	4822 214 52007	LOW-LEVEL TEST PANEL ASSY
3	4822 321 61677	CABLE FOR TEST PANEL
4	4822 264 50263	PLUG FOR STARTUP OF SERVICESHELL ON PORT 2 (BU 2)
5	4822 397 30096	AUDIO TESTDISC SET
6	4822 397 30155	TESTDISC WITH CONTINOUS 1kHz SIGNAL 70 MIN.
7	4822 397 30184	AUDIOSIGNALSDISC
8	4822 701 11922	SKEW DISC 0,6
9	4822 701 11923	EXCENTRICITY DISC 150 I
10	4822 691 30293	ROLLER CONTROLLER
11	4822 691 30309	TRACKER BALL
12	4822 691 30328	TOUCH PAD
13	4822 691 30297	MOUSE

PARTSLIST FOR THE ROLLERCONTROLLER

Item	Codenumber	Description
1	4822 321 61841	CABLE ASSY
2	4822 413 90093	BALL
3	4822 276 13359	SWITCH
4	4822 410 62427	KEYTOP-LEFT
4	4822 410 62428	KEYTOP-RIGHT
5	4822 492 42645	SPRING

PARTSLIST FOR THE TOUCH PAD

Item	Codenumber	Description
1	4822 321 62311	CABLE ASSY
2	4822 498 91048	STICK