Portable compact disc player

EXP320 EXP321 EXP322 EXP323 EXP325

all versions

Service
Service
Service

Service Manual

MP3-CD PLAYBACK MP3 | ReWritable CD COMPATIBLE | COMPACT disc DIGITAL AUDIO

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CLASS 1 LASER PRODUCT

Published by LX 0328 Service Audio Printed in The Netherlands Subject to modification

GB 3140 785 32600

PHILIPS

TECHNICAL SPECIFICATION

General

Dimensions (W x H x D) : 128 x 30x 137.5mm
Weight without batteries : 220g

Shock resistance

+X/-X direction : ≥2.5g
+Y/-Y direction : ≥2.5g
+Z/-Z direction : ≥2.0g

Power supply modes

SUPPLY MODE	Voltage range
	CD
DC-IN socket	2.5 - 6.5V
Primary batteries 2 x LR6	1.8 - 3.6V
Rechargable batteries	1.8 - 3.6V

Battery lifetime

BATTERY TYPE	CD MODE P.saving	CD MODE ESP ON	MP3 MODE P.saving	MP3 MODE ESP ON
Primary batteries 2 x LR6	≥ 8 h (11h typ.)	≥ 6 h (8h typ.)	≥ 16 h (18h typ.)	≥ 8 h (11h typ.)

Battery level detection

DETECTION LEVEL	Primary batteries
Power off	1.8V +100/-50mV
Difference btw.level 2 and power off	0.8V ± 100mV
Difference btw.level 1 and power off	0.5V ± 100mV

Current consumption

OPERATION MODE	DC-IN SUPPLY (4.5V)		BATT. SUPPLY (2.25V)	
	CD ESP ON	MP3 ESP ON	CD ESP ON	MP3 ESP ON
CD Play mode	260mA typ.	200mA typ.	330mA typ.	260mA typ.
CD Jump mode	440mA typ.	420mA typ.	500mA typ.	500mA typ.

Headphone out

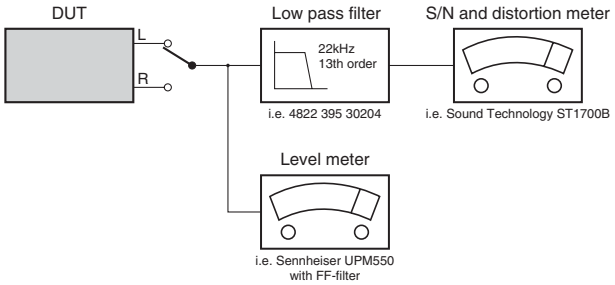
Output power (THD=10%)
  /17 version only : 8mW (+1/-3dB)
  all other versions : 4mW (+1/-3dB)
Frequency response (1mW) : 100Hz-20kHz within 6dB
S/N ratio CD (unwght) : ≥73dB (78dB typ.)
S/N ratio CD (A-wght) : ≥80dB (82dB typ.)
THD+N CD (1kHz, 1mW) : ≤2.0% (1.0% typ.)
Crosstalk (1kHz) : ≤-24dB (-44dB typ.)
Channel unbalance (-40dB) : ≤5dB
Volume attenuation (1kHz) : >60dB

Dynamic Bass Boost DBB

DBB STAGE	Frequency response		
	125 Hz	250 Hz	10kHz
DBB 1	+4dB ± 2dB	+1.5dB ± 2dB	0dB ± 2dB
DBB 2	+5dB ± 2dB	+4dB ± 2dB	+5dB ± 2dB

Measurement setup CD

Use Audio Signal disc SBC429 4822 397 30184



ACCESSORIES

ACCESSORIES FOR CD-PORTABLE -TARGET	EXP320			EXP321		EXP322		EXP323	EXP325	
	/00C	/07	/17	/00C	/05Z	/01	/10	/00C	/17	/00C
AY 3160/00 AC/DC Adaptor 3140 118 30742								x		
AY 3170/00 AC/DC Adaptor 3140 118 33601				x						
AY 3170/02 AC/DC Adaptor 3140 118 32020						x				
AY 3170/05 AC/DC Adaptor 3140 118 33610					x					
AY 3170/10 AC/DC Adaptor 3140 118 32182							x			
AY 3548/00 AC/DC Adaptor 3140 118 71901	x									x
AY 3548/17 AC/DC Adaptor 3140 118 71911									x	
SBC HE205/77 Stereo Headphone 9082 100 00615	x			x	x	x	x	x		x
SBC HL351/77 Stereo Headphone 9082 100 00639		x	x						x	
AY3501 Car cassette Adaptor 3140 118 71842									x	x
AY3363 Rechargeable battery 3103 308 84721								x		
Belt Clip 3103 304 70251	x	x	x	x	x	x	x	x	x	x

INSTRUCTION FOR UES

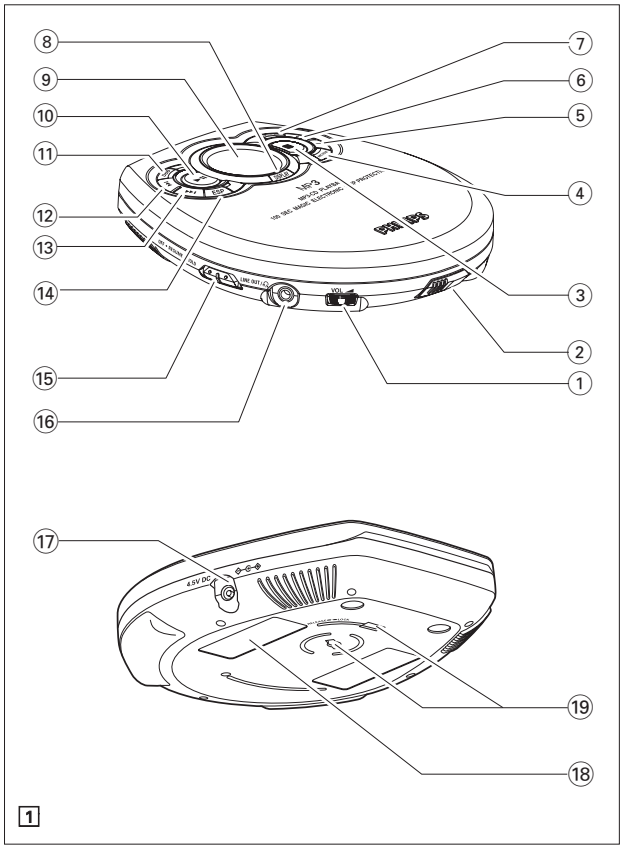
TROUBLESHOOTING

Troubleshooting

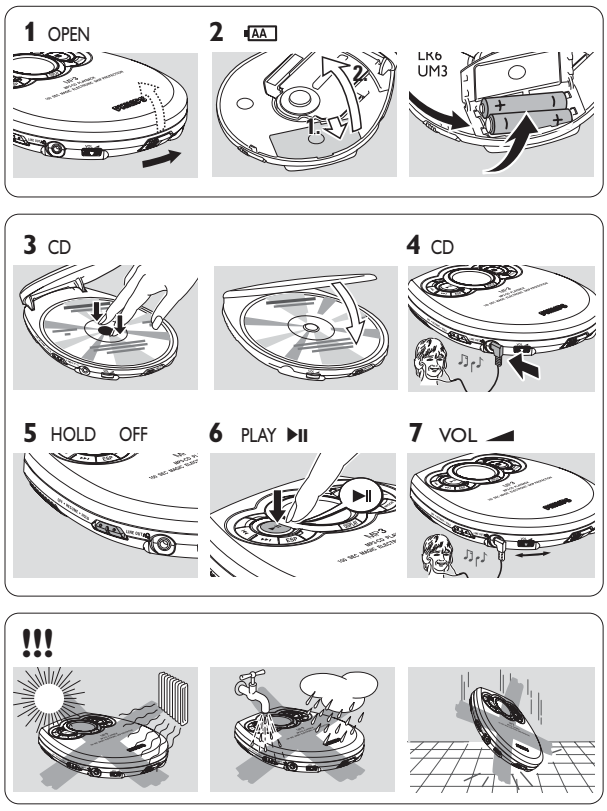
WARNING: *Under no circumstances should you try to repair the set yourself as this will invalidate the warranty. If a fault occurs, first check the points listed, before taking the unit for repair. If you are unable to solve a problem by following these hints, consult your dealer or service center.*

Problem	Solution
No power, playback does not start	– Insert the batteries correctly. – Replace the batteries. – Connect the mains adapter securely.
Hold indication and/or no reaction to controls	– Deactivate HOLD. – Disconnect the set from the power supply or take out the batteries for a few seconds.
No sound or bad sound quality	– Press ▶II to resume playback. – Adjust the volume. – Check and clean the connections. – Keep this set away from active mobile phones or strong magnetic fields.
Insert CD or No audio file indication	– Insert a disc, label upwards. – Clean or replace the disc. – Wait until the steamed up lens has cleared. – Make sure you have inserted an audio disc or an MP3-CD.

Problem	Solution
Disc error indication	– Make sure the inserted CDR or CDRW is recorded correctly .
Music file is not played	– Make sure that the file names of the MP3 files end with .mp3
Missing directories on MP3-CD	– Make sure the total number of files and albums on your MP3-CD does not exceed 400. – Only albums with MP3 files are shown.
The disc skips tracks	– Clean or replace the disc. – Make sure **repeat, repeat album, shuffle** or **prog** are not selected.
Music skips or popping sound when playing an MP3 file	– Play the music file on your com puter. If the problem persists, encode the audio track again and make a new CD-ROM.
Oops indication	– Switch ESP on. – Damaged disc.
In-car use: No power, playback does not start	– Clean the cigarette lighter jack – Switch on the ignition of your car.
In-car use: No sound or bad sound quality	– Insert the cassette adapter correctly. – Change the autoreverse direction of your car cassette player. – Let the set adjust to the temperature in the car.



QUICK START **MISE EN SERVICE RAPIDE**



INSTRUCTION FOR USE

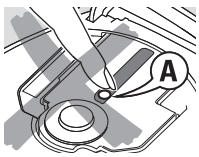
English CONTROLS / GENERAL INFORMATION

Controls (see figure 1)

① VOL ◢ .....adjusts the volume
② •••OPEN ▶ .....opens the CD lid
③ ■.....stops playback and switches the set off
④ MODE .....selects playback options such as **shuffle** and **repeat**
⑤ –.....MP3-CD only: select the previous album or fast track backward
⑥ +.....MP3-CD only: select the next album or fast track forward
⑦ PROG.....programs tracks and lets you review the program
⑧ DISPLAY.....selects the track and album information for MP3-CDs
⑨ .....display
⑩ ▶II.....switches the set on, starts playback and interrupts playback
⑪ DBB.....selects the bass adjustment: press and hold for 2 seconds or more for acoutic feedback on / off adjustment
⑫ ⏮.....skips forward and searches forward
⑬ ⏭.....skips backward and searches backward
⑭ ESP.....**E**LECTRONIC **S**KIP **P**ROTECTION prevents music interruptions caused by shocks
⑮ OFF.....switches RESUME and HOLD off
RESUME .....stores the last position played
HOLD.....locks all buttons
⑯ LINE OUT/🎧.....3.5 mm line out to connect
- the headphones
- this set to the audio input of your stereo equipment
⑰ 4.5V DC.....to connect the external power supply
⑱ .....typeplate
⑲ .....belt clip holder

Maintenance

- Do not touch the lens Ⓐ of the set.



- Do not expose the set, battery or discs to humidity, rain, sand or excessive heat (caused by heating equipment or direct sunlight).
- The lens may cloud over when the set is suddenly moved from cold to warm surroundings. Playing is not possible then. Leave the set in a warm environment until the moisture evaporates.
- Active mobile phones in the vicinity of this set may cause malfunctions.
- Avoid dropping the set as this may cause damage.
- Clean the set with a soft, lint-free cloth. Do not use any cleaning agents as they may have a corrosive effect.
- To clean a disc, wipe it in a straight line from the centre towards the edge using a soft, lint-free cloth. Cleaning agents may damage the disc.

GENERAL INFORMATION

Environmental information

- All redundant packing material has been omitted. We have done our utmost to make the packaging easily separable into three mono materials: cardboard (box), polystyrene foam (buffer) and polyethylene (bags, protective foam sheet).
- Your set consists of materials which can be recycled if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packing materials, exhausted battery and old equipment.

MP3 music files

The music compression technology MP3 (MPEG Audio Layer 3) reduce the size of digital data of an audio CD significantly while maintaining CD-like sound quality. With MP3 you can record up to 10 hours of CD-like music on a single CD-ROM.

How to get music files
Either download legal music files from the Internet to your computer hard disk or create them from your own audio CDs. For this, insert an audio CD into your computer´s CD-ROM drive and convert the music using an appropriate encoder software. To achieve a good sound quality, a bit rate of 128 kbps or higher is recommended for MP3 music files.

MP3 music files

How to organize music files
In order to easily handle the large number of music files on a CD-ROM, you can organize them in folders ("albums").

The tracks of an album will be played in alphabetical order. If you want to arrange them in a certain order, let the file names start with numbers.
For example:

001-ONEWORLD.MP3
002-FIRESTARTER.MP3
003-DEEP.MP3

The albums will be arranged in alphabetical order. If albums are located in an album, they will be played after this album. Albums without MP3 files will be skipped.

If there are MP3 files which you did not put into an album, you will find them in the album `Various` with album number `0`. `Various` is the first album that will be played.

How to make a CD-ROM with MP3
Use your computer´s CD burner to record ("burn") the music files from your hard disc on a CD-ROM. Use either ISO 9660 disc format or UDF. Some CD burner software like e. g. "DirectCD" support the UDF format.

Make sure that the file names of the MP3 files end with .mp3.

This set complies with the radio interference requirements of the European Community.

INSTRUCTION FOR USE

GENERAL INFORMATION / POWER SUPPLY

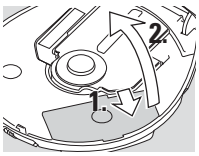
Supported formats

This set supports:
– Disc format: ISO 9660, Joliet, Multisession, UDF, Enhanced Music CD, Mixed Mode CD
– MP3 bit rate: 32–320 kbps and variable bit rate
–Total number of music files and albums : around 400

Batteries (supplied or optionally available)

Inserting batteries

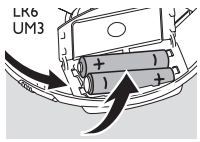
- Open the battery compartment and insert either 2 normal or alkaline batteries type **AA (LR6, UM3).**



Old and new or different types of batteries should not be combined.

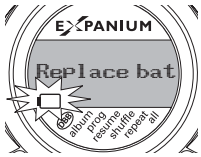
Indication of empty batteries

- Replace the battery or connect the mains adapter as soon as ▭ blinks and Replace batteries is scrolled.



Remove batteries if they are empty or if the unit will not be used for a long time.

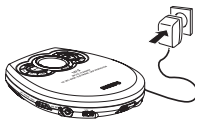
Batteries contain chemical substances, so they should be disposed of properly.



POWER SUPPLY / BASIC FUNCTIONS

Mains adapter (supplied or optionally available)

Only use the AY 3170 mains adapter (4.5 V/300 mA direct current, positive pole to the center pin). Any other product may damage the set.



1 Make sure the local voltage corresponds to the adapter´s voltage. If your mains adapter is equipped with a voltage selector, set this selector to the local mains voltage if necessary.

2 Connect the mains adapter to 4.5V DC on the set and to the wall outlet.

Note: Always disconnect the adapter if you are not using it.

Headphones (SBC HE205 or HL351)

- Connect the supplied headphones to LINE OUT/🎧.

Note: LINE OUT/🎧 *can also be used for connecting this set to your HiFi system. Adjust the volume and sound on both the CD player and your HiFi system.*

IMPORTANT!

- ***Hearing safety :***
  Do not play your headphones at a high volume. Hearing experts advise that continuous use at high volume can permanently damage your hearing.
- ***Traffic safety :***
  Do not use headphones while driving a vehicle. It may create a hazard and it is illegal in many countries. Even if your headphones are an open-air type designed to let you hear outside sounds, do not turn up the volume so high that you cannot hear what is going on around you.

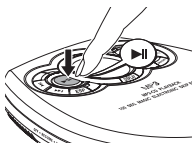
Playing a disc

With this set you can play
–all pre-recorded audio CDs
–all finalized audio CDRs and CDRWs
–MP3-CDs (CD-ROMs with MP3 files)

1 Push the ••••OPEN ▶ slider to open the CD lid.

2 Insert a disc, printed side up, by pressing gently on the disc´s centre so that it fits onto the hub. Close the lid by pressing it down.

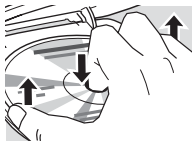
3 Press ▶II to start playback.
—▶EXpanium and Reading CD are displayed briefly. Playback starts.The current track number and the elapsed playing time are displayed. For a MP3 track, the album number is also displayed and the file-name is scrolled once.



4 Press ■ to stop playback.
—▶The total number of tracks the number of albums on an MP3-CD and the total playing time (of an audio disc only) are displayed.

5 To remove the disc, hold it by its edge and press the hub gently while lifting the disc.

6 Press ■ again to switch off the player.



Notes:
- After pressing ▶II it may take some time until the first MP3 track is played.
- The display clears automatically after 20 seconds if no controls are operated in the stop mode.

INSTRUCTION FOR USE

BASIC FUNCTIONS / FEATURES

Pause

1 Press ▶II to interrupt playback.
→ Elapsed playback time freezes and flashes.

2 To resume playback press ▶II again.

Display information (for MP3 tracks only)

1 Press DISPLAY repeatedly during playback to select the information to be displayed :
- **Filename**: the track's file name,
- **Album**: the album's folder name,
- **Artist**: the artist's name (if this ID3 tag information is available),
- **Title**: the track's title (if this ID3 tag information is available),
- the elapsed playing time.

2 The selected information is scrolled once. The album number and track number are displayed.

Notes:
The ID3 tag is part of an MP3 file and contains various track information such as the track's title or the artist's name. Complete the ID3 tag information with your MP3 encoder software before burning the MP3-CD.

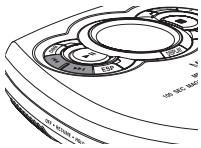
BASIC FUNCTIONS / FEATURES

Selecting and searching CD only

Selecting a track during playback

- Briefly press ⏮ or ⏭ once or several times to skip to the beginning of the current, previous or subsequent track.

→ Playback continues with the selected track .



Searching for a passage during playback

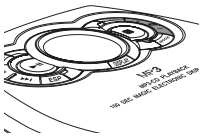
1 Keep ⏮ or ⏭ pressed to find a particular passage in a backward or forward direction.
→ Searching is started and playback continues at a low volume. For CD audio tracks the search speeds up .

2 Release the button at the desired passage.
→ Normal playback continues.

Selecting album and tracks on MP3-CDs

Selecting an album during playback

- Briefly press + or - once or several times to skip to the first track of the previous or subsequent album.
→ The first track of the selected album is played.



Selecting a track during playback

1 Keep + or - pressed to skip quickly to previous or subsequent MP3 tracks.
→ Skipping starts and speeds up .

2 Release the button at the desired track.
→ Playback continues with the selected track.

Note: To skip from track to track at low speed, use ⏮ or ⏭.

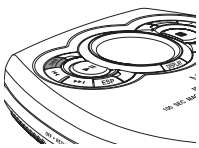
Volume and bass

Volume adjustment

- Adjust the volume by using VOL ◢◣.

Bass adjustment

1 Press DBB once or more to select the bass enhancement options:
→ ① moderate bass enhancement is activated.
→ ② strong bass enhancement is activated.

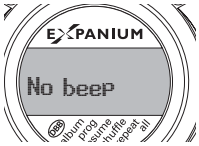


2 Press DBB again to switch off the bass enhancement options.
→ ① or ② disappears

Beep

A beep confirms that you have pressed a button or that the batteries are empty.

- During music mode only keep DBB pressed for 4 seconds to switch beep either on or off:
→ **Beep** is display. Beep is switched on.
→ **No beep** is display. Beep is switched off.

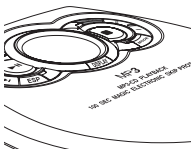


Programming track numbers

You can select up to 50 tracks to play in a program. A single track may be stored more than once in the program.

1 While playback is stopped, select a track with ⏮ or ⏭.

2 Press PROG to store the track.
→ The number of stored tracks are displayed.



3 Select and store all desired tracks in this way.

4 Press ▶II to start playback of your selected tracks.
→ ▼ appears above **prog**

- You can review the programme by pressing PROG for more than 3 seconds.
→ The display shows all the stored tracks in sequence.

Notes:
- If you press PROG and there is no track selected, Select track or Select file is displayed.
- If you try to review without first programming, No program is displayed
- If you try to store more than 50 tracks, Program full is displayed.

Clearing the programme

- While playback is stopped, press ■ to clear program.
→ **Program cleared** is displayed once, **program** goes off, and the program is cleared.

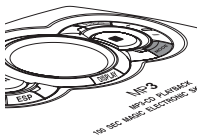
Notes: The programme will also be cleared if the power supply is interrupted, or if the CD-player lid is opened, or if the set switched off automatically.

INSTRUTION FOR USE

FEATURES

Playing tracks repeatedly or in random order-MODE

1 Press MODE repeatedly during playback to select either:
- **shuffle all :** All tracks of the disc are played in random order once.
- **shuffle repeat all :** All tracks of the disc are played repeatedly in random order.
- **repeat :** The current track is played repeatedly.
- **repeat all :** The entire disc is played repeatedly.
- **shuffle album** (with MP3-CDs only): All tracks of the current album are played in random order once.
- **shuffle repeat album** (with MP3-CDs only): All tracks of the current album are played repeatedly in random order.
- **repeat album** (with MP3-CDs only): All tracks of the current album are played repeatedly.



Your selected mode is marked by ▼ , ↓ , ▼▼ above the playmodes, **album, shuffle, repeat all.**

2 Playback starts in the selected mode after 2 seconds.

3 To return to normal playback, press MODE repeatedly until **repeat** and **shuffle** disappear.

Storing the last position played-RESUME

You can store the last position played. When restarting, playback wil continues from where you have stopped.

1 Switch the slider to RESUME during playback to activate **resume**.
→ ▼ appears above **resume**.

2 Press ■ whenever you want to stop playback.

3 Press ▶II to resume playback.
→ Playback continues from where you have stopped.

- To deactivate RESUME, switch the slider to OFF.
→ ▼ disappears from **resume**.

Locking all buttons-HOLD

You can lock all buttons of the set. When you press any key, no action will be executed then.

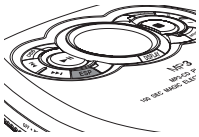
- Switch the slider to HOLD to activate **hold**.
→ ▼ appears above **resume** and **hold** is displayed. All buttons are locked. When pressing any key, **Hold** is displayed.

- To deactivate HOLD, switch the slider to OFF.
→ ▼ disappears from **resume** or **hold.**

FEATURES / ACCESSORIES

ESP and powersaving

With a conventional portable disc player the music may stop while you are jogging for example. The **E**LECTRONIC **S**KIP **P**ROTECTION protects this set against loss of sound caused by light vibrations or shocks. Continuous playback is ensured. **ESP does not protect the set against damage caused by dropping !**



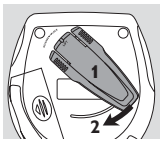
- Press ESP repeatedly during playback to select either:
→ ESP is shown and ESP is switched on.
→ ESP disappears. Powersaving is switched on.

Belt Clip

1 Align the belt clip as indicated in the illustration and press on the clip to insert its shaped pin into the hole in the set.

2 Turn the clip clockwise as indicated to lock the belt clip to the set.

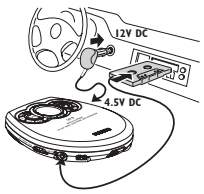
- To detach, gently lift the belt clip at the indicated end and turn it counter-clockwise.



In-car connections (supplied or optionally available)

Only use the AY 3545or AY 3548 car voltage converter (4.5 V DC, positive pole to the centre pin) and the AY 3501 car cassette adapter. Any other product may damage the set.

1 Put the set on a horizontal, vibration-free and stable surface. Make sure it is in a safe place, where the set is neither a danger nor an obstacle to the driver and the passengers.



2 Plug the voltage converter into the cigarette lighter socket ***(only for 12 V car battery, negative grounding)***, then connect the wired end with 4.5V DC input socket on the set.

3 If necessary, clean the cigarette lighter socket to obtain a good electrical contact.

4 Turn down the volume and connect the adapter cassette plug to LINE OUT/🎧 on the set.

5 Carefully insert the adapter cassette into the car radio's cassette compartment.

6 Make sure the cord does not hinder your driving.

7 Start playback on the set and adjust the sound with the car radio controls.

- ***Always remove the voltage converter from the cigarette lighter socket when the set is not in use.***

Note: If your car radio has a LINE IN socket, it is better to connect the set to this jack instead of using the cassette adapter. Connect LINE OUT /🎧 of the set with the LINE IN jack of your car radio with an appropriate cable.

SAFETY & WARNINGS

ESD

(GB) WARNING
All ICs and many other semiconductors 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 wristband with resistance. Keep components and tools at this potential.

(F) ATTENTION
Tous les IC et beaucoup d´autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti d´une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l´on utilise soient également à ce potentiel.

(D) WARNUNG
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(NL) WAARSCHUWING
Alle IC´s en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen vermindern. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) AVVERTIMENTO
Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB) AVAILABLE ESD PROTECTION EQUIPMENT :

anti-static table mat	large	1200x650x1.25mm	4822 466 10953
	small	600x650x1.25mm	4822 466 10958
anti-static wristband			4822 395 10223
connection box (3 press stud connections, 1MΩ)			4822 320 11307
extendible cable (2m, 2MΩ, to connect wristband to connection box)			4822 320 11305
connecting cable (3m, 2MΩ, to connect table mat to connection box)			4822 320 11306
earth cable (1MΩ, to connect any product to mat or to connection box)			4822 320 11308
KIT ESD3 (combining all 6 prior products - small table mat)			4822 310 10671
wristband tester			4822 344 13999

SAFETY

(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 ⚠

(F)
Les normes de sécurité exigent que l`appareil soit remis à l`état d`origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.
Les composants de sécurité sont marqués ⚠

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkeliijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

(I)
Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(GB) **DANGER**: Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.

CLASS 1
LASER PRODUCT

(S) Varning !
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

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

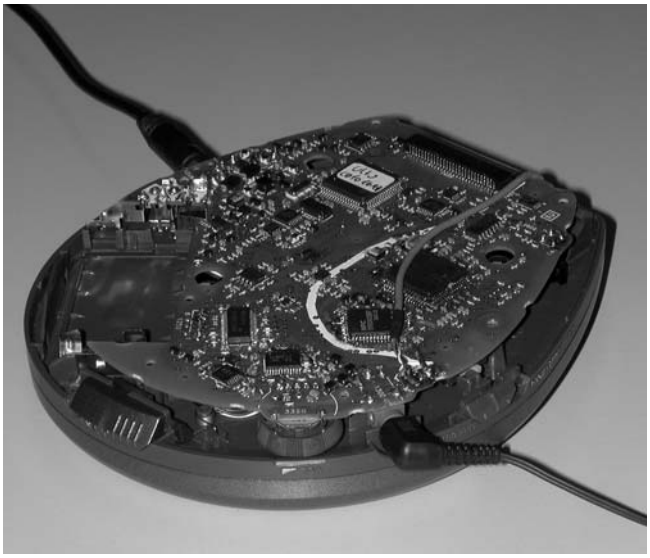
(FIN) Varoitus !
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

(GB)
After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.
The leakage current must not exceed 0.5mA.

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

SERVICE HINTS

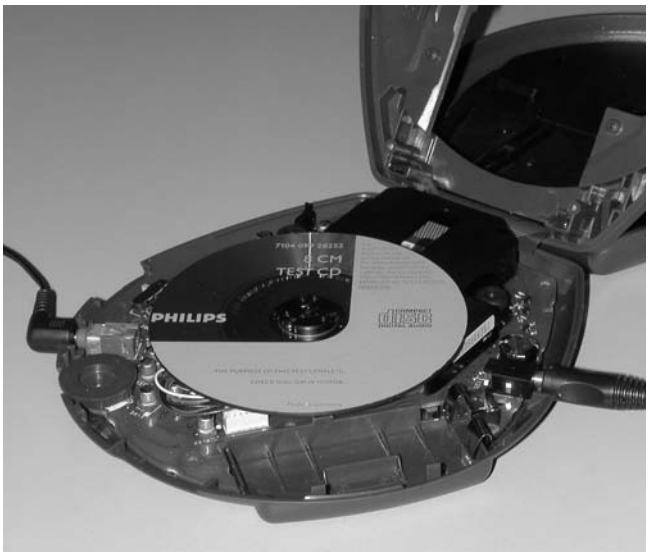
REPAIR POSITION COPPERSIDE



To get access to the copperside of the printed board assembly proceed as follows:

1.Remove bottom screws (6x)
2.Lift the bottom-assy-1
3.Supply the unit via external DC-socket
4.Take care that the door switch is closed during measurements

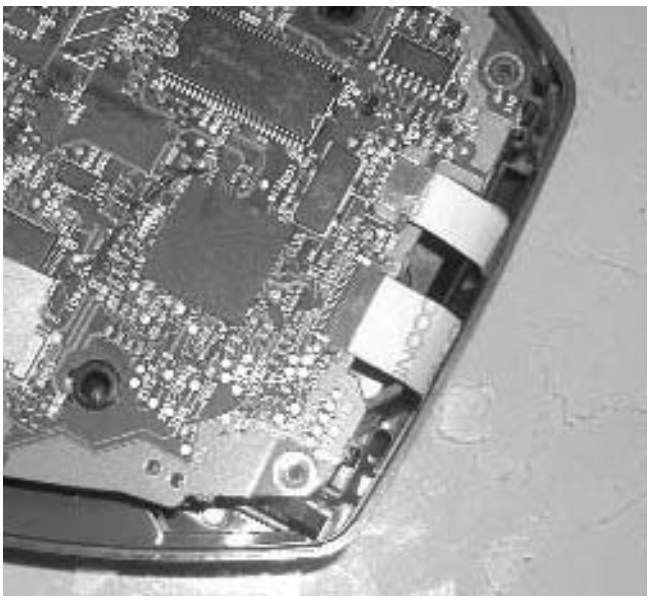
REPAIR POSITION COMPONENTSIDE



To get access to the compomentside of the printed board assembly proceed as follows:

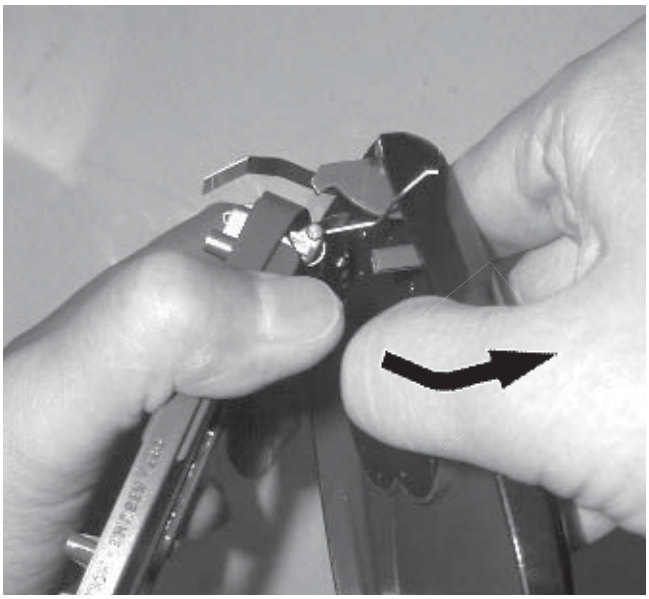
1.Remove the bottom screws(6x)
2.Open the CD-door
3.Lift the cabinet-assy-2 and put it backwards on the table
4.Supply the unit via the external DC-socket
5.Take care that the door switch is closed during measurements

DISMANTLING THE CD-DOOR



To dismantle the CD-door proceed as follows:

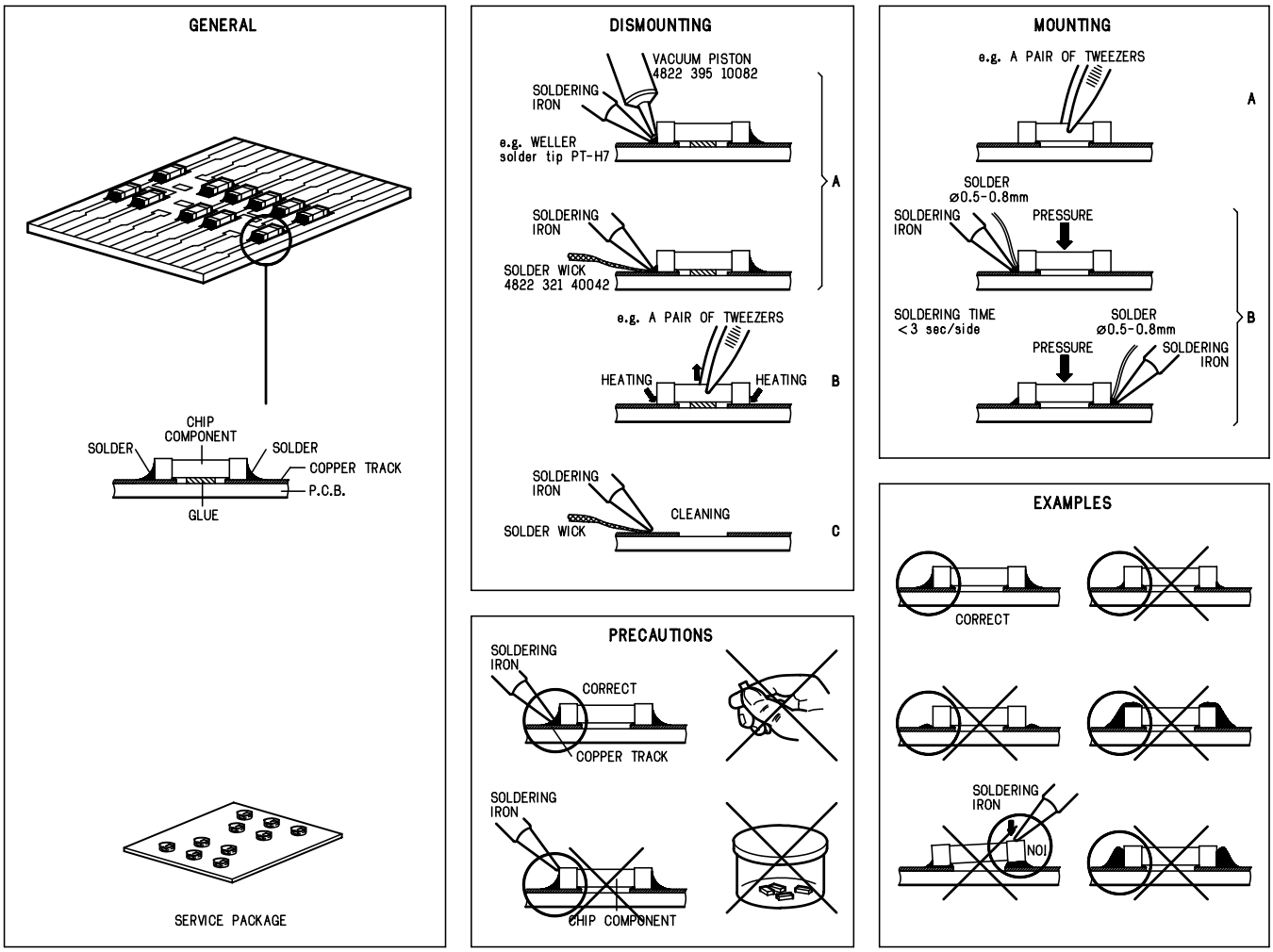
1.Dismantle bottom and printed board/drive assembly
2.Disconnect the sticker
(flex-foil connector on the membrance keyboard)
3.Disconnect membrance keyboard
(flex-foil connector on copperside of printed board)



4.Bend the CD-door rightwards downwards as indicated in the picture above

Remark:Do not use screwdrivers or tools.
Sharp edges could damage hinge or cabinet part.

HANDLING CHIP COMPONENTS



SERVICE TOOLS

Audio signal disc SBC429	4822 397 30184
Playability test disc SBC444	4822 397 30245
Test disc 5 (disc without errors) + **Test disc 5A**(disc with dropout errors black spots and fingerprints) **SBC426/ SBC426A**	4822 397 30096

ESD PROTECTION EQUIPMENT

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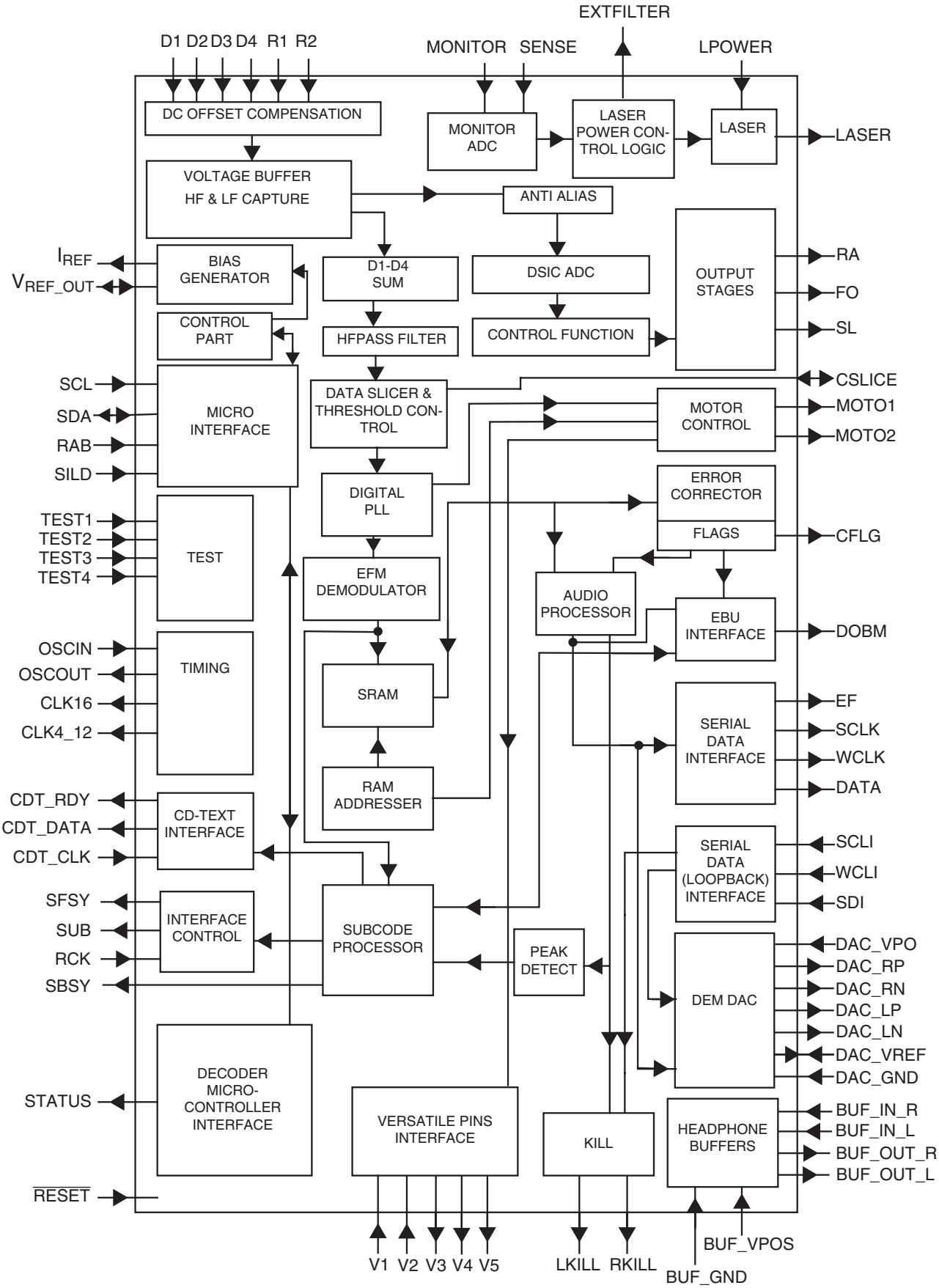
KIT ESD3(combining all 6 prior products - small table mat)	4822 310 10671
Wristband tester	4822 344 13999

BLOCK DIAGRAM OF IC SAA7824HL



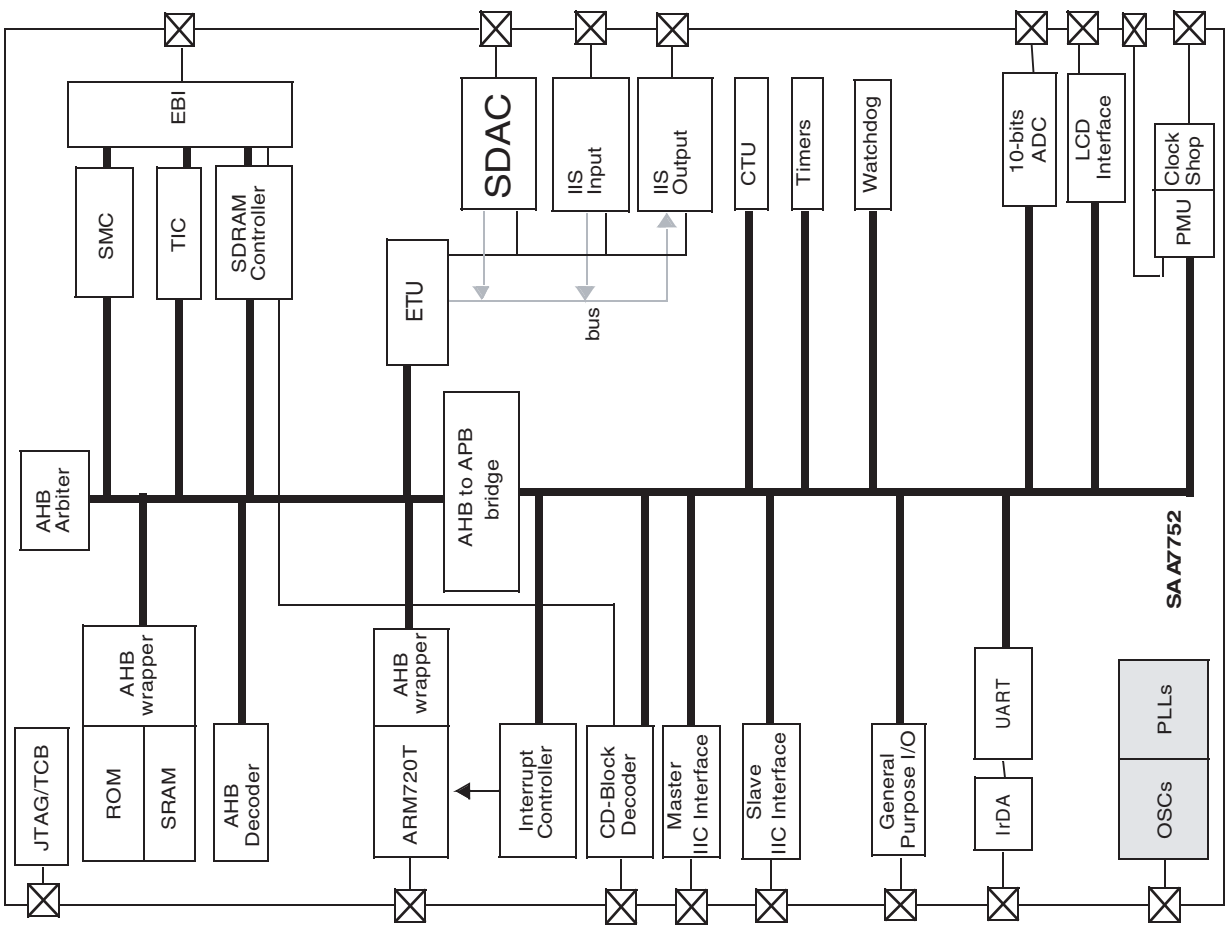
SYMBOL	PIN	DESCRIPTION
LPOWER	1	Laser power supply
EXTFILTER	2	10 nF capacitor for Laser start-up control
MONITOR	3	Laser monitor diode
SENSE	4	OPU ground reference point for MONITOR measurement
V_{SSA1}	5	Analogue ground 1
IREF	6	Reference current pin (24KΩ resister to analogue ground)
V_{DDA1}	7	Analogue supply voltage 1
VREF_OUT	8	Servo reference voltage
D1	9	Diode voltage/current input (central diode signal input)
D2	10	Diode voltage/current input (central diode signal input)
D3	11	Diode voltage/current input (central diode signal input)
D4	12	Diode voltage/current input (central diode signal input)
R1	13	Diode voltage/current input (satellite diode signal input)
R2	14	Diode voltage/current input (satellite diode signal input)
CSLICE	15	10nF capacitor for adaptive HF dataslicer
V_{DDA2}	16	Analogue supply voltage 2
V_{SSA2}	17	Analogue ground 2
OSCOUT	18	Crystal/resonator output
OSCIN	19	Crystal/resonator input
V_{SSA3}	20	Analogue ground 3
DAC_GND	21	Audio DAC ground
DAC_RP	22	Audio DAC right channel differential output (positive)
DAC_RN	23	Audio DAC right channel differential output (negative)
DAC_VREF	24	Audio DAC decoupling point (10uF//100nF to ground)
DAC_LN	25	Audio DAC left channel differential output (negative)
DAC_LP	26	Audio DAC left channel differential output (positive)
DAC_VPOS	27	Audio DAC positive supply
BUF_VPOS	28	Audio buffer positive supply
BUF_IN_R	29	Audio buffer right input
BUF_OUT_R	30	Audio buffer right output
BUF_OUT_L	31	Audio buffer left output
BUF_IN_L	32	Audio buffer left input
BUF_GND	33	Audio buffer ground
LKILL	34	Kill output for left channel (configurable as open drain)
RKILL	35	Kill output for right channel (configurable as open drain)
CDT_RDY	36	CD-Text to micro ready flag
CDT_DATA	37	CD-Text data to micro
CDT_CLK	38	CD-Text micro clock
CFLAG	39	Correction flag output (open drain)
V_{SSD1}	40	Digital ground 1
V_{DDD1}	41	Digital supply voltage 1
SDI	42	Serial data input (loopback)
WCLI	43	Word clock input (loopback)

SYMBOL	PIN	DESCRIPTION
SCLI	44	Serial bit clock (loopback)
EF	45	C2 error flag
DATA	46	Serial data output
WCLK	47	Word clock output
SCLK	48	Serial clock output
CLK16	49	16MHz clock
CLK4_12	50	Configurable 4MHz or 12MHz clock
$\overline{RESET}$	51	Power on reset (active low)
SDA	52	Micro interface data I/O line (open drain output)
SCL	53	Micro interface clock line
RAB	54	Micro interface R/W & load control line (4-wire)
SILD	55	Micro interface R/W & load control line (4-wire)
STATUS	56	Servo interrupt request line/decoder status register/DC offset value readback
RCK	57	Subcode clock
SUB	58	P to W subcode
SFSY	59	Subcode frame sync
SBSY	60	Subcode block sync
V_{SSD2}	61	Digital ground 2
DOBM	62	Bi-phase mark output (externally buffered)
V_{DDD2}	63	Digital supply voltage 2
RA	64	Radial actuator
FO	65	Focus actuator
SL	66	Sledge actuator
MOTO1	67	Motor output 1
MOTO2	68	Motor output 2
V_{SSD3}	69	Digital ground 3
V_{DDD3}	70	Digital supply voltage 3
V1	71	Versatile pin 1
V2	72	Versatile pin 2
V3	73	Versatile pin 3
V4	74	Versatile pin 4
V5	75	Versatile pin 5
TEST1	76	Test pin
TEST2	77	Test pin
TEST3	78	Test pin
TEST4	79	Test pin
LASER	80	Laser drive

PIN DESCRIPTIONS OF IC SAA7752

Table 1 Pin list SAA7752EL

SYMBOL[1]	LFBGA208 PIN	DIGITAL I/O LEVEL	APPL FUNC	PIN STATE AFTER RESET	DESCRIPTION
General Purpose Pins (fixed: 25 pins)					
GPIO<24>	A11	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<23>	B11	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<22>	A10	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<21>	B10	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<20>	A9	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<19>	B9	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<18>	A8	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<17>	B8	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<16>	A7	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<15>	F4	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<14>	G2	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<13>	F3	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<12>	G1	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<11>	F2	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<10>	F1	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<9>	D3	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<8>	E2	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<7>	D4	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<6>	E1	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<5>	D2	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<4>	D1	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<3>	C2	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<2>	C1	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<1>	B1	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
GPIO<0>	A1	0- 3.3VDC tolerant	I/O	0	General Purpose IO pin
8.4672MHz oscillator (fixed: 5 pins)					
XTAL1I	P4		A		6MHz clock input
XTAL1O	R3		A		6MHz clock output
CD_CLOCK	K1	0- 3.3VDC tolerant	O		CD clock output (gated)
VDDA1	R2				Analog supply Oscillator1
VSSA1	R1				Analog ground Oscillator 1
Voltage Supply PLLs(fixed: 2 pins)					
VDDA3	N2				Analog supply PLLs
VSSA3	N1				Analog ground PLLs
PLL (fixed 1pin)					
CLKO1	F15	0- 3.3VDC tolerant	O		256fs audio output clock
LCD Interface (fixed: 13 pins)					
LCD_WE	K3		O		Write Enable
LCD_RW_WR	A16		O		6800 read/write select 8080 active 'high' write enable



SYMBOL[1]	LFBGA 208 PIN	DIGITAL I/O LEVEL	APPL FUNC	PIN STATE AFTER RESET	DESCRIPTION
LCD_E_RD	B15		O		6800 active 'low' enable 8080 active 'high' write enable
LCD_DB<0>	D14	0- 3.3VDC tolerant	I/O		Data input 0/Data output 0
LCD_DB<1>	B17	0- 3.3VDC tolerant	I/O		Data input 1/Data output 1
LCD_DB<2>	C14	0- 3.3VDC tolerant	I/O		Data input 2/Data output 2
LCD_DB<3>	C16	0- 3.3VDC tolerant	I/O		Data input 3/Data output 3
LCD_DB<4>	D13	0- 3.3VDC tolerant	I/O		Data input 4/Data output 4
LCD_DB<5>	A17	0- 3.3VDC tolerant	I/O		Data input 5/Data output 5/serial clock
LCD_DB<6>	C13	0- 3.3VDC tolerant	I/O		Data input 6/Data output 6/Serial data input
LCD_DB<7>	B16	0- 3.3VDC tolerant	I/O		Data input 7/Data output 7/Serial data output
LCD_CSB	C12		O		Chip Select (active low)
LCD_RS	D12		O		'high' Data register select 'low' Instruction register select
10-bit ADC (fixed: 9 pins)					
GPA<4>	A5		A		Analog General Purpose pin 4
GPA<3>	B5		A		Analog General Purpose pin3
GPA<2>	J3		A		Analog General Purpose pin2
GPA<1>	M4	A			Analog General Purpose pin 1
GPA<0>	N3		A		Analog General Purpose pin 0
VREFP<1>	M3		A		10-bit ADC Reference voltage 1
VREFP<0>	L2		A		10-bit ADC Reference voltage 0
VDDA4	M2	A			nalog supply 10-bit ADC
VSSA4	M1				Analog ground 10-bit ADC
IIS input (fixed: 3 pins)					
BCKI1	J15	0- 3.3VDC tolerant	I		Bitclock input (external)
WSI1	H15	0- 3.3VDC tolerant	I		Wordselect input(external)
DATAI1	G15	0- 3.3VDC tolerant	I		Serial data input(external)
IIS output (fixed: 3 pins)					
BCKO1	M14		I/O	Tri-state	Bitclock output (external)
WSO1	F16		O	Tri-state	Wordselect output(external)
DATAO1	E16		O	Output/Low	Serial data output(external)
JTAG (fixed: 5 pins)					
JTAG_NTRST	K15	0- 3.3VDC tolerant	I		JTAG Reset Input
JTAG_TCK	U12	0- 3.3VDC tolerant	I		JTAG Clock Input
JTAG_TMS	K16	0- 3.3VDC tolerant	I		JTAG Mode Select Input
JTAG_TDI	T13	0- 3.3VDC tolerant	I		JTAG Data Input
JTAG_TDO	U13		O		JTAG Data Output
IIC slave Interface (fixed: 3 pins)					
SCL_SLAVE	P12	0- 3.3VDC tolerant	I/O		Serial clock IIC Slave
SDA_SLAVE	R12	0- 3.3VDC tolerant	I/O		Serial data IIC Slave
A0_SLAVE	T12	0- 3.3VDC tolerant	I		Address selection Slave
IIC master interface (fixed: 2 pins)					
SDA_MASTER	R13	0- 3.3VDC tolerant	I/O		IIC data I/O line (open drain output)/ UART Serial Data Input
SCL_MASTER	P13	0- 3.3VDC tolerant	I/O		IIC clock line output/ UART Serial Data Output
CDB lock Decoder (fixed: 10 pins)					
CDB_CRQ_NERDY	C5	0- 3.3VDC tolerant	I		Communication request line/CD engine is ready to receive the next frame
CDB_NCRST_NHRDY	D5		O		CD engine reset line/Host is ready to receive the next frame
CDB_CLAB	C9	0- 3.3VDC tolerant	I		IIS/EIAJ input bit clock
CDB_DAAB	C7	0- 3.3VDC tolerant	I		IIS/EIAJ serial data
CDB_WSAB	C8	0- 3.3VDC tolerant	I		IIS/EIAJ word clock
CDB_EFAB	D9	0- 3.3VDC tolerant	I		IIS/EIAJ error flags
CDB_V4_SUB	D8	0- 3.3VDC tolerant	I		Versatile pin 4:single wire subcode/EIAJ subcode data bits
CDB_CFLAG_SBSY	D6	0- 3.3VDC tolerant	I		Absolute time sync/EIAJ subcode block sync
CDB_SFSY	D7	0- 3.3VDC tolerant	I		EIAJ subcode frame sync
CDB_RCK	C6		O		EIAJ subcode clock output
Audio DAC (SDAC, fixed 5 pins)					
DAC_VREFP	R17				analog positive reference for SDAC
DAC_REFN	P16				analog negative reference for SDAC
VOUTL	P15		A		Analog left LINE output
VOUTR	R16		A		Analog right LINE output
DAC_VDD	N14		I		Supply digital part of the SDAC
EBI (fixed: 49 pins)					
EBI_NCS<2>	G16		O		Chip Selected 2
EBI_NCS<1>	T10		O		Chip Selected 1
EBI_NCS<0>	U10		O		Chip Selected 0
EBI_SDNCS<0>	H3		O		External SDRAM selection1 and SDRAM selection0
EBI_WEN	J2		O		Write enable not (for SDRAM only)
EBI_A<20>	J16		I/O		EBI address
EBI_A<19>	H16		I/O		EBI address
EBI_A<18>	F14		O		EBI address
EBI_A<17>	G14		O		EBI address
EBI_A<16>	H14		O		EBI address
EBI_A<15>	J14		O		EBI address
EBI_A<14>	R9	O			EBI address
EBI_A<13>	T9	O			EBI address
EBI_A<12>	U9	O			EBI address
EBI_A<11>	R8	O			EBI address
EBI_A<10>	T8	O			EBI address
EBI_A<9>	U8		O		EBI address
EBI_A<8>	P11		O		EBI address
EBI_A<7>	R7		O		EBI address
EBI_A<6>	P10		O		EBI address
EBI_A<5>	U7		O		EBI address
EBI_A<4>	P9		O		EBI address
EBI_A<3>	T7		O		EBI address
EBI_A<2>	P8		O		EBI address
EBI_A<1>	R6		O		EBI address
EBI_A<0>	U6		O		EBI address
EBI_D<15>	T6	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<14>	U5	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<13>	T5	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<12>	U4	0- 3.3VDC tolerant	I/O		EBI data

SYMBOL[1]	LFBGA 208 PIN	DIGITAL I/O LEVEL	APPL FUNC	PIN STATE AFTER RESET	DESCRIPTION
EBI_D<11>	T4	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<10>	U3	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<9>	T3	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<8>	P7	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<7>	U2	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<6>	P6	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<5>	U1	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<4>	R5	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<3>	T2	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<2>	P5	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<1>	T1	0- 3.3VDC tolerant	I/O		EBI data
EBI_D<0>	R4	0- 3.3VDC tolerant	I/O		EBI data
EBI_SDCLKOUT	J1		O		SDRAM clock
EBI_CKE<0>	H4		O		SDRAM clock enable
EBI_DQM<1>	T11		O		SDRAM data mask 1
EBI_DQM<0>	U11		O		SDRAM data mask 0
EBI_NRAS	R10		O		SDRAM: row address strobe SMC: byteWr0 (byte write enable for byte 0... active LOW)
EBI_NCAS	R11		O		SDRAM column address strobe SMC: byteWr1 (byte write enable for byte 1... active LOW)
EBI_NOE	H2		O		EBI output enable
UART (fixed: 3 pins)					
UART_DIR_TX	D10		O		
UART_REQ_RX	C10	0- 3.3VDC tolerant	I		
UART_CLK	D11	0- 3.3VDC tolerant	I/O		
Mode Selection pins SAA7752 (fixed: 3 pins)					
MODE<2>	L16	0- 3.3VDC tolerant	I		
MODE<1>	M15	0- 3.3VDC tolerant	I		
MODE<0>	M16	0- 3.3VDC tolerant	I		
Wake-up input pin SAA7752 (fixed: 1 pin)					
WAKE_UP	L1	0- 3.3VDC tolerant	I		Wake up input pin
Reset input pin SAA7752 (fixed: 1 pin)					
NRESET_IN	L15	0- 3.3VDC tolerant	I		System Reset Input
Reset output pin SAA7752 (fixed: 1 pin)					
RESET_OUT	N16		O		Reset output
Digital supplies SAA7752 (fixed: 6 pins)					
VDDI1	L4				Core supply SAA7752
VSSIS1	L3				Core ground and substrate SAA7752
VDDI2	G4				Core supply SAA7752
VSSI2	G3				Core ground SAA7752
VDDI3	E4				Core supply SAA7752
VSSI3	E3				Core ground SAA7752
Peripheral supplies SAA7752 (fixed: 4 pins)					
VDDE3V3	J4				Peripheral (I/O) supply SAA7752 (3.3V)
VSSE3V3	K4				Peripheral (I/O) ground SAA7752
VDDE_EBI	E17				Peripheral (I/O) supply SAA7752 for EBI pads
VDDE_EBI	K14				Peripheral (I/O) supply SAA7752 for EBI pads
VSSE_EBI	F17				Peripheral (I/O) ground SAA7752 for EBI pads
VSSE_EBI	L14				Peripheral (I/O) ground SAA7752 for EBI pads
Not connected pins (fixed: 2 pins)					
NC	D15				Not connected
NC	A4				Not connected
NC	B2				Not connected
NC	A2				Not connected
NC	D17				Not connected
NC	D16				Not connected
NC	C15				Not connected
NC	C17				Not connected
NC	N4				Not connected
NC	P3				Not connected
NC	P2				Not connected
NC	P1				Not connected
NC	A6				Not connected
NC	B6				Not connected
NC	K2				Not connected
NC	E15				Not connected
NC	B3				Not connected
NC	A3				Not connected
NC	B4				Not connected
NC	B14				Not connected
NC	A15				Not connected
NC	B13				Not connected
NC	A14				Not connected
NC	E14				Not connected
NC	T17				Not connected
NC	U17				Not connected
NC	T16				Not connected
NC	R15				Not connected
NC	U16				Not connected
NC	M17				Not connected
NC	K17				Not connected
NC	H17				Not connected
NC	G17				Not connected
NC	J17				Not connected
NC	L17				Not connected
NC	N17				Not connected
NC	P14				Not connected
NC	R14				Not connected
NC	U15				Not connected
NC	T15				Not connected
NC	T14				Not connected
NC	N15				Not connected
NC	U14				Not connected
NC	C4				Not connected

PIN DESCRIPTIONS OF IC SAA7752

SYMBOL[1]	LFBGA 208 PIN	DIGITAL I/O LEVEL	APPL FUNC	PIN STATE AFTER RESET	DESCRIPTION
NC	C3				Not connected
NC	H1				Not connected
NC	A13				Not connected
NC	A12				Not connected
NC	B12				Not connected

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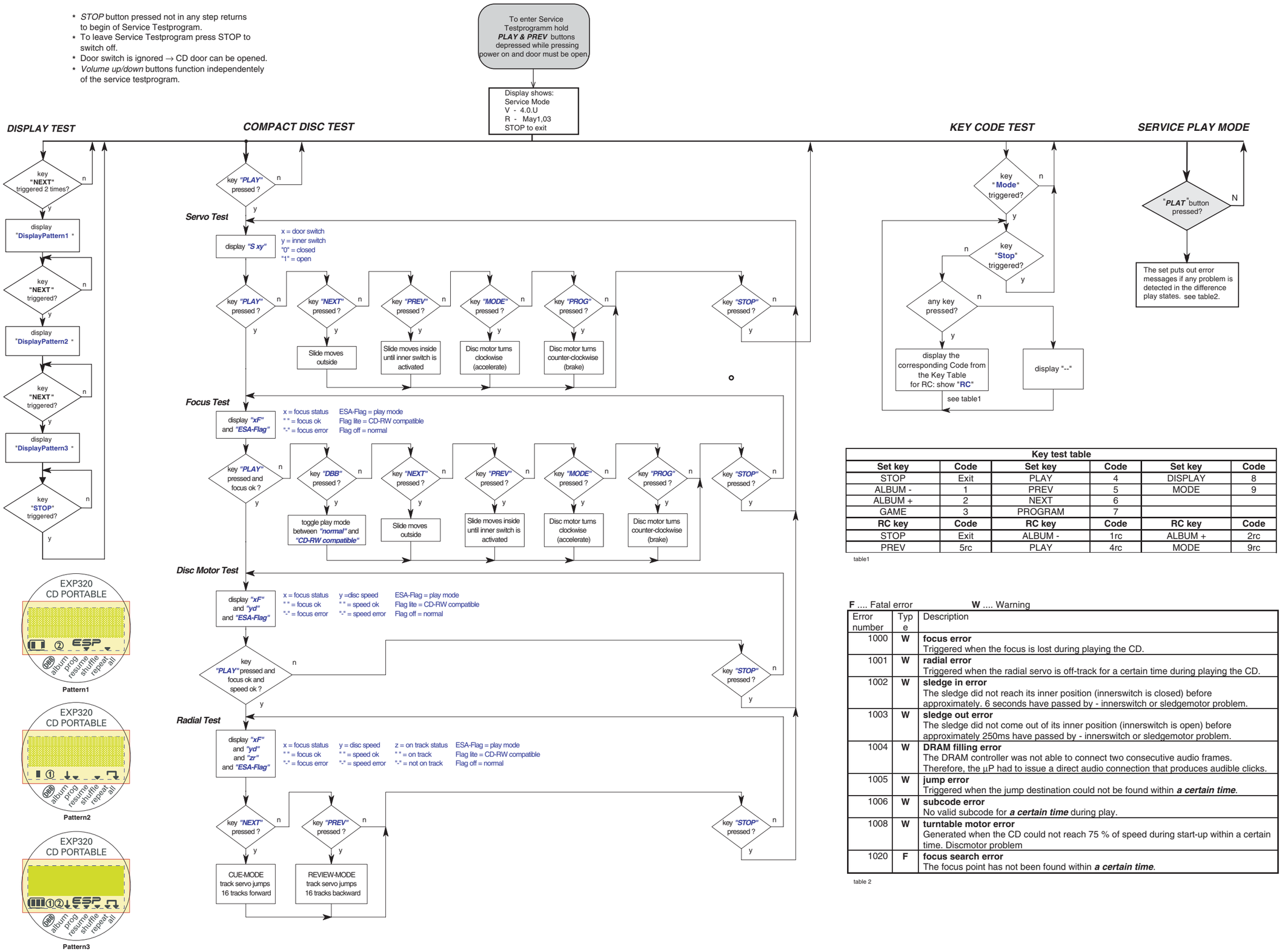
SERVICE TEST PROGRAM - FLOW CHART

* *STOP* button pressed not in any step returns to begin of Service Testprogram.
* To leave Service Testprogram press STOP to switch off.
* Door switch is ignored → CD door can be opened.
* *Volume up/down* buttons function independentely of the service testprogram.



Pattern1

Pattern2

Pattern3

Key test table

Set key	Code	Set key	Code	Set key	Code
STOP	Exit	PLAY	4	DISPLAY	8
ALBUM -	1	PREV	5	MODE	9
ALBUM +	2	NEXT	6		
GAME	3	PROGRAM	7		
RC key	**Code**	**RC key**	**Code**	**RC key**	**Code**
STOP	Exit	ALBUM -	1rc	ALBUM +	2rc
PREV	5rc	PLAY	4rc	MODE	9rc

table1

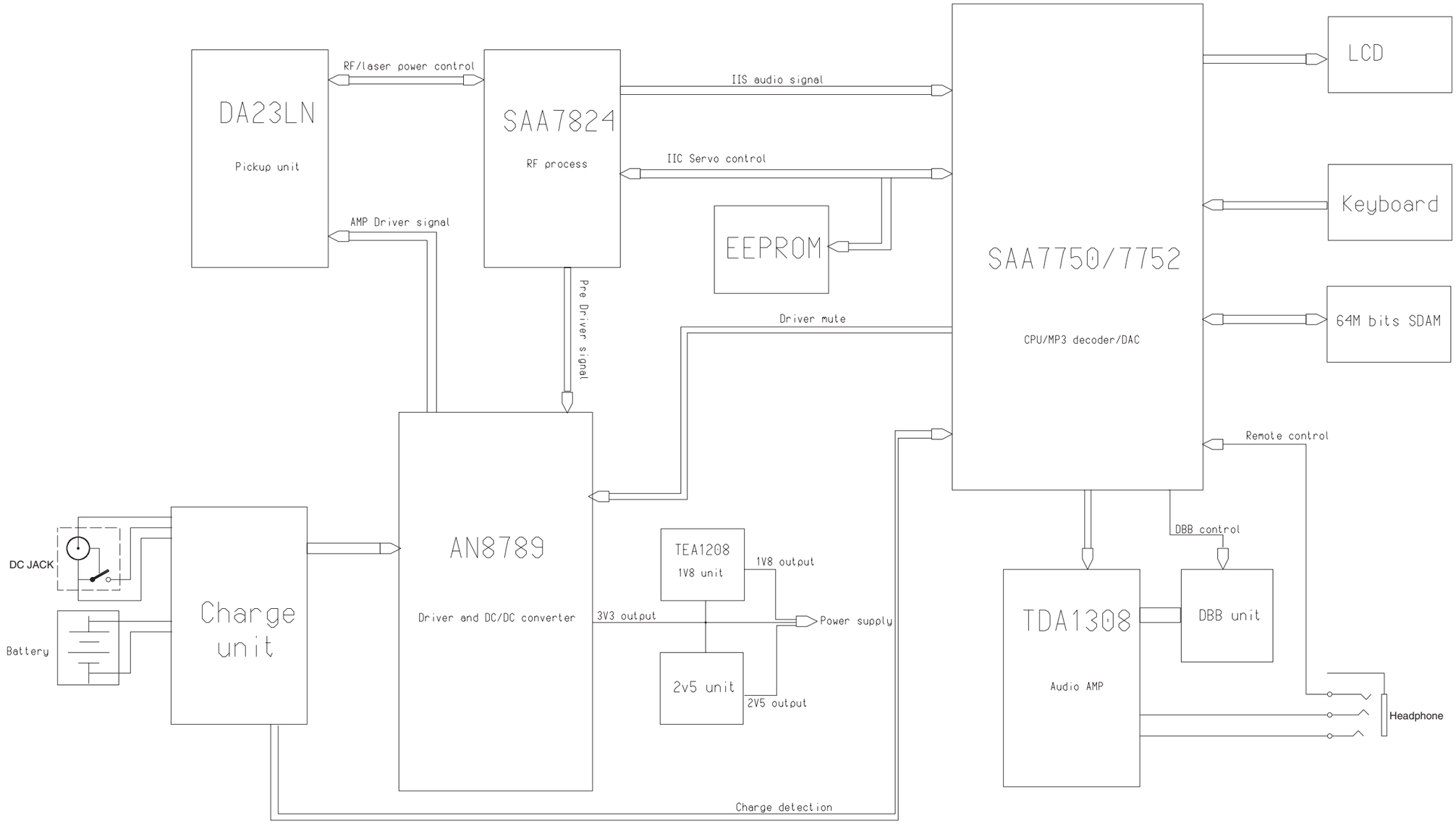
F .... Fatal error **W** .... Warning

Error number	Type	Description
1000	**W**	**focus error** Triggered when the focus is lost during playing the CD.
1001	**W**	**radial error** Triggered when the radial servo is off-track for a certain time during playing the CD.
1002	**W**	**sledge in error** The sledge did not reach its inner position (innerswitch is closed) before approximately. 6 seconds have passed by - innerswitch or sledgemotor problem.
1003	**W**	**sledge out error** The sledge did not come out of its inner position (innerswitch is open) before approximately 250ms have passed by - innerswitch or sledgemotor problem.
1004	**W**	**DRAM filling error** The DRAM controller was not able to connect two consecutive audio frames. Therefore, the µP had to issue a direct audio connection that produces audible clicks.
1005	**W**	**jump error** Triggered when the jump destination could not be found within ***a certain time***.
1006	**W**	**subcode error** No valid subcode for ***a certain time*** during play.
1008	**W**	**turntable motor error** Generated when the CD could not reach 75 % of speed during start-up within a certain time. Discmotor problem
1020	**F**	**focus search error** The focus point has not been found within ***a certain time***.

table 2

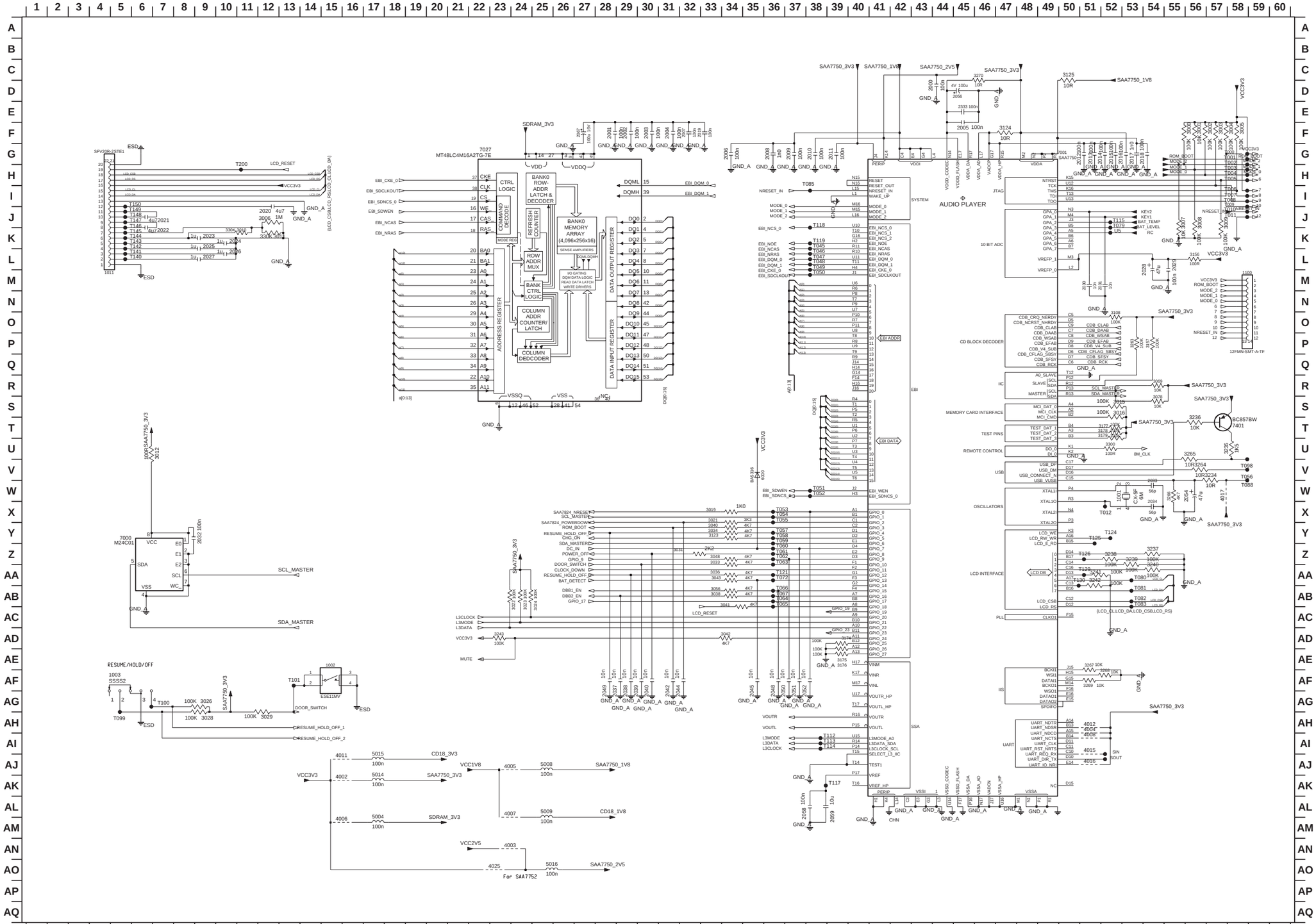
3 - 8

BLOCKDIAGRAM



4 -1

COMBI BOARD - CIRCUIT DIAGRAM
CONTROL/ESP PART



U5 K52	5016 AO25
SIN AI52	6000 V35
1001 W52	7000 Y5
1002 AE15	7001 G49
1003 AF4	7027 G23
1011 M4	7401 T58
1100 M58	SOUT AJ52
2000 D44	T000 G58
2001 F28	T001 G58
2002 F29	T002 G58
2003 F30	T003 H58
2004 F31	T004 H58
2005 F45	T005 H58
2006 G34	T006 I58
2007 F32	T007 I58
2008 G36	T008 I58
2009 G37	T009 I58
2010 G38	T010 J58
2011 G39	T011 J58
2012 G51	T012 X52
2013 G51	T045 K38
2014 G52	T046 L38
2015 G52	T047 L38
2016 G53	T048 L38
2017 G53	T049 L38
2018 G54	T050 M38
2019 F33	T051 W38
2020 J12	T052 W38
2021 J7	T053 X36
2022 K7	T054 X36
2023 K9	T055 X36
2024 K10	T056 V58
2025 K9	T057 Y36
2026 L10	T058 Y36
2027 L9	T059 Y36
2028 L54	T060 Z36
2029 L55	T061 Z36
2030 M51	T062 Z36
2031 M52	T063 Z36
2032 Y9	T064 AB36
2033 W54	T065 AB36
2034 X54	T066 AB36
2037 AF29	T067 AB36
2038 AF29	T072 AA36
2039 AF30	T079 J52
2040 AF30	T080 AA53
2042 AF31	T081 AB53
2044 AF32	T082 AB53
2045 AF35	T083 AB53
2048 AF36	T085 H38
2049 AF28	T088 W58
2050 AF37	T098 V58
2051 AF37	T099 AH5
2052 AF38	T100 AG7
2054 W56	T101 AF13
2056 D45	T112 AI39
2058 AL37	T113 AI39
2059 AL39	T114 AI39
2067 F27	T115 J52
2333 E45	T117 AK39
3000 F56	T118 J38
3001 F56	T119 K38
3002 F57	T121 AA36
3003 F57	T124 Y52
3004 F58	T125 Y51
3005 F58	T126 Z51
3006 J12	T129 AA51
3007 J55	T130 AA50
3008 J56	T140 L6
3009 J58	T141 L6
3010 K11	T142 K6
3011 K13	T143 K6
3012 U7	T144 K6
3015 S52	T145 K6
3016 S52	T146 J6
3019 X33	T147 J6
3021 X33	T148 J6
3022 AB24	T149 J6
3023 AB24	T150 I6
3024 AB25	T200 H11
3026 AG9	
3028 AH9	
3029 AH12	
3031 Z31	
3033 Z33	
3034 Y33	
3036 AA33	
3038 AB33	
3040 Y33	
3041 AB34	
3042 AD34	
3043 AA33	
3048 Z33	
3056 AB33	
3069 R54	
3078 S54	
3108 O52	
3123 Y33	
3124 F47	
3125 C50	
3156 L56	
3157 P54	
3174 AD39	
3175 AE39	
3176 AE39	
3177 T52	
3178 T52	
3179 T52	
3234 V57	
3235 U58	
3236 T56	
3237 Z54	
3238 Z52	
3239 Z53	
3240 AA54	
3241 AA51	
3242 AA51	
3243 AD23	
3263 P53	
3264 V56	
3265 U56	
3266 W55	
3267 AE51	
3268 AF52	
3269 AF51	
3270 C46	
3300 U52	
4002 AK15	
4003 AN23	
4004 AH51	
4005 AJ23	
4006 AM15	
4007 AL23	
4008 AI51	
4011 AJ15	
4012 AH51	
4015 AI51	
4016 AJ51	
4017 W57	
4025 AO23	
5004 AM17	
5008 AJ25	
5009 AL25	
5014 AK17	
5015 AJ17	

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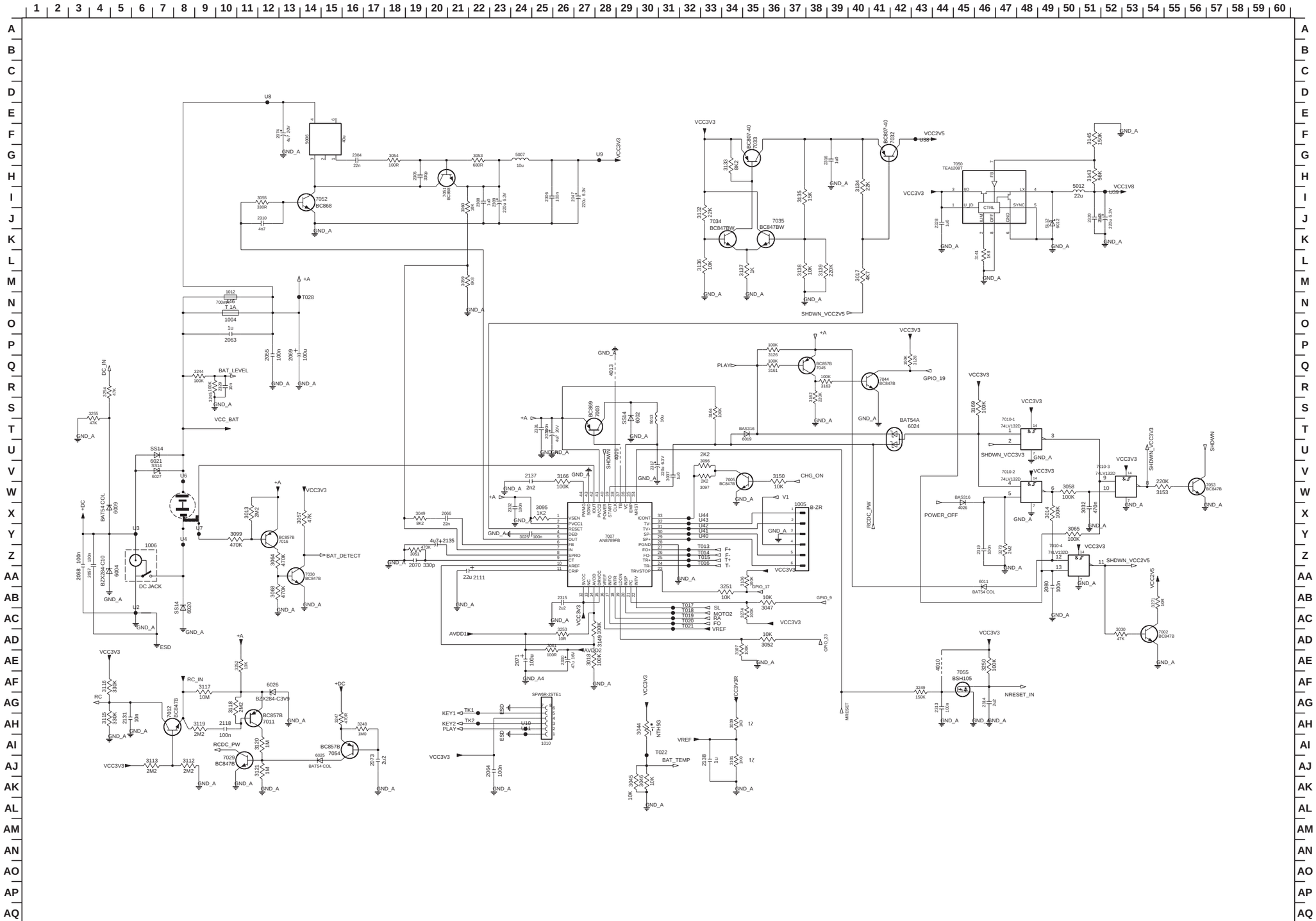
COMBI BOARD - CIRCUIT DIAGRAM
POWRE SUPPLY PART



U2 AC6	5006 F14	6002 S29
U3 Y6	5007 G24	6004 AA5
U4 Y8	5012 I50	6009 X5
U6 V8	5013 T30	6011 AA46
U7 Y9	6002 S29	6012 J49
U8 D12	6004 AA5	6019 T35
U9 G28	6009 X5	6020 AC8
TK1 AG22	6011 AA46	6021 U7
TK2 AH22	6012 J49	6024 T43
U10 AH24	6019 T35	6025 AJ14
U11 AH24	6020 AC8	6026 AF12
U38 F43	6021 U7	6027 V7
U39 I52	6024 T43	7002 AD54
U40 Y33	6025 AJ14	7003 S28
U41 Y33	6026 AF12	7005 V34
U42 Y33	6027 V7	7007 Y28
U43 X33	7002 AD54	7010-1 T47
U44 X33	7003 S28	7010-2 V47
1004 O10	7005 V34	7010-3 V52
1005 X37	7007 Y28	7010-4 Z50
1006 Z6	7010-1 T47	7011 AH12
1010 AI25	7010-2 V47	7012 AH7
1012 N10	7010-3 V52	7016 Y12
2047 I27	7010-4 Z50	7029 AJ10
2055 P12	7011 AH12	7030 AA14
2057 AA4	7012 AH7	7032 F42
2063 P10	7016 Y12	7033 G35
2064 AJ23	7029 AJ10	7034 J33
2066 X20	7030 AA14	7035 J36
2068 AA3	7032 F42	7044 R41
2069 P13	7033 G35	7045 Q38
2070 AA19	7034 J33	7050 G45
2071 AE24	7035 J36	7051 I20
2073 AJ17	7044 R41	7052 I14
2074 F13	7045 Q38	7053 W56
2075 T25	7050 G45	7054 AI15
2080 AA49	7051 I20	7055 AF45
2111 AA22	7052 I14	T013 Z33
2118 AH10	7053 W56	T014 Z33
2131 AH5	7054 AI15	T015 Z33
2135 Y21	7055 AF45	T016 Z33
2137 V24	T013 Z33	T017 AB32
2138 AJ33	T014 Z33	T018 AC32
2304 G16	T015 Z33	T019 AC32
2305 H19	T016 Z33	T020 AC32
2306 I25	T017 AB32	T021 AC32
2308 I22	T018 AC32	T022 AI31
2309 I23	T019 AC32	T028 NI4
2310 J12	T020 AC32	
2313 AG44	T021 AC32	
2314 AG46	T022 AI31	
2315 AB26	T028 NI4	
2316 G39		
2317 V30		
2318 J52		
2319 Z46		
2320 J51		
2328 J44		
2329 R10		
2330 AE26		
2331 T25		
2332 X24		
3013 X11		
3014 X49		
3017 M40		
3018 AE27		
3025 Y24		
3030 AD52		
3032 X51		
3037 V31		
3039 AH34		
3044 AH30		
3045 AK29		
3046 AK30		
3047 AB36		
3049 X19		
3051 Z19		
3052 AD36		
3053 G22		
3054 G18		
3055 I12		
3057 X14		
3058 W50		
3059 M21		
3060 I21		
3061 AD25		
3064 Z12		
3065 Y50		
3068 AB12		
3095 X25		
3096 V33		
3097 W33		
3099 Y10		
3101 AJ34		
3106 AA35		
3107 AD34		
3112 AJ8		
3113 AJ6		
3115 AH4		
3116 AF4		
3117 AF9		
3118 AG10		
3119 AH9		
3120 AI12		
3121 AJ12		
3126 P36		
3128 Q43		
3132 J33		
3133 G34		
3134 H40		
3135 I37		
3136 L33		
3137 L35		
3138 L37		
3139 L38		
3141 L46		
3143 H51		
3145 F51		
3149 AD28		
3150 V36		
3153 W54		
3161 Q36		
3162 R38		
3163 R38		
3164 S33		
3166 V26		
3169 S46		
3244 Q9		
3245 R9		
3247 AH15		
3248 AH16		
3249 AF43		
3250 AE46		
3251 AB34		
3252 AE11		
3253 AD26		
3254 R4		
3255 S4		
3271 AB54		
3273 Z47		
3274 AC35		
4009 U29		
4010 AE44		
4013 Q28		
4026 X45		

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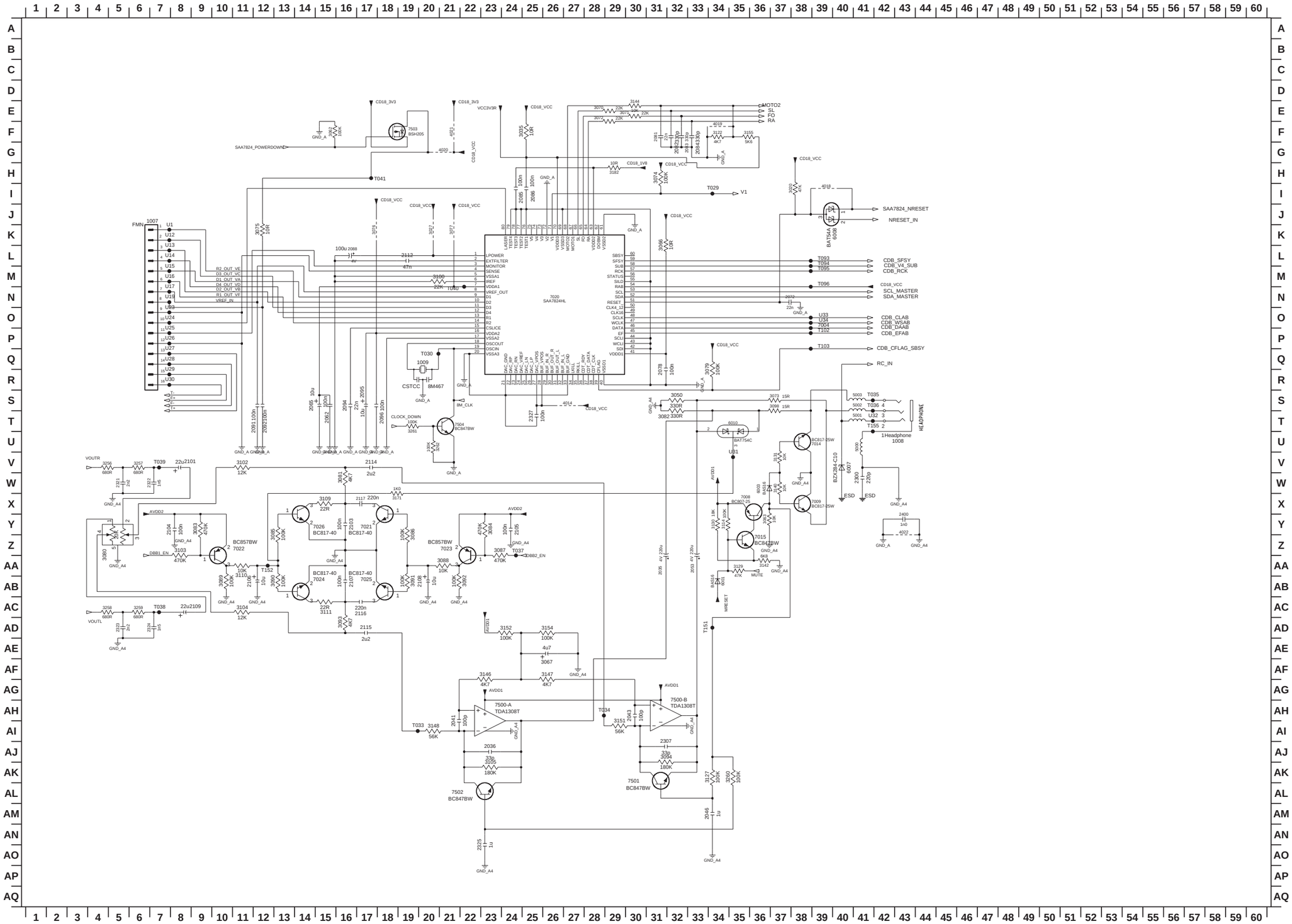
COMBI BOARD - CIRCUIT DIAGRAM
AUDIO/CD PART



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COMBI BOARD - LAYOUT DIAGRAM
COPPER SIDE VIEW

U1 I20
U2 K4
U3 J4
U4 M1
U5 K7
U6 L2
U7 L5
U8 P12
U9 S13
SIN F18
TK1 C9
TK2 C10
U10 B8
U11 A7
U12 J21
U13 J20
U14 J21
U15 J20
U16 J21
U17 K20
U19 K21
U20 M2
U21 L4
U22 L2
U23 K20
U24 K21
U25 K20
U26 L21
U27 L20
U28 L21
U29 L20
U30 L21
U31 T19
U32 Q20
U33 K15
U34 J15
U38 M10
U39 P10
U40 N15
U41 N15
U42 N15
U43 N15
U44 O15
1001 D11
1004 L6
1009 I19
1010 B10
1011 B14
1012 L6
1100 K10
2000 G15
2001 E8
2002 I8
2003 F8
2004 G8
2005 H13
2006 D14
2007 F11
2008 D15
2009 D15
2010 G14
2011 D14
2012 G12
2013 G14
2014 H14
2015 G14
2016 D13
2017 D13
2018 D13
2019 G11
2020 C12
2021 C12
2022 C13
2023 C15

2024 C15
2025 C15
2026 C16
2027 C16
2029 C13
2030 C13
2031 E12
2032 J15
2033 E11
2034 E12
2036 V14
2037 E17
2038 L22
2039 D19
2040 B16
2041 V14
2042 D16
2043 X13
2044 D16
2045 H4
2046 W15
2047 R14
2048 E17
2049 D17
2050 B16
2051 C17
2052 D15
2055 L5
2056 H12
2057 I4
2058 G11
2059 G12
2062 K18
2063 L5
2064 C9
2066 R16
2068 I5
2070 R17
2072 K15
2073 J8
2074 T12
2075 P12
2078 I15
2080 C8
2081 M18
2082 M18
2083 M18
2084 N18
2085 L16
2086 L17
2088 L19
2091 K19
2092 M13
2094 J19
2096 J19
2103 V17
2104 T18
2105 U16
2107 U20
2112 L19
2114 U17
2115 W16
2116 V19
2117 T17
2118 M6
2131 L7
2137 P14
2138 P19
2300 Q21
2304 S12
2305 S12
2306 R13
2307 X14
2308 Q11

2309 Q11
2310 S11
2313 N14
2314 N14
2315 P18
2316 M10
2317 P12
2318 O8
2319 C6
2320 O11
2321 T15
2322 T21
2323 V16
2324 V15
2325 W13
2327 I18
2328 O11
2329 I6
2331 P14
2332 R16
2333 G13
2400 S15
3000 J11
3001 J10
3002 J10
3003 J9
3004 J10
3005 J9
3006 C16
3007 J11
3008 J11
3009 J10
3010 B16
3011 C16
3012 I14
3013 G4
3014 B8
3015 E16
3016 E17
3017 L10
3018 Q18
3019 D15
3020 K15
3021 D15
3022 F17
3023 F17
3024 F17
3025 R16
3026 N22
3027 M14
3028 N22
3029 N22
3030 E6
3031 B17
3032 C8
3033 D19
3034 D16
3035 M17
3036 L22
3037 P14
3038 F17
3039 P19
3040 D15
3041 C12
3042 E18
3043 H4
3044 O7
3045 O7
3046 O8
3047 N17
3048 B16
3049 R16
3050 T20
3051 R17

3052 N17
3053 R13
3054 R13
3055 S11
3056 E18
3057 H4
3058 C8
3059 S11
3060 R12
3061 W15
3062 L13
3063 Q21
3064 H5
3065 D8
3066 I15
3068 H5
3069 K14
3070 M18
3071 M18
3072 N18
3073 S21
3074 M17
3075 L13
3076 H20
3077 M13
3078 K14
3079 I16
3081 T16
3082 Q21
3083 U18
3084 V15
3085 V19
3086 V17
3087 U15
3088 V16
3089 U19
3090 U19
3091 W17
3092 T16
3093 V20
3094 X14
3095 R16
3096 O13
3097 O13
3098 Q21
3099 G5
3100 K19
3101 P19
3102 U16
3103 T19
3104 T19
3105 U14
3106 M16
3107 N17
3108 F12
3109 U16
3110 V18
3111 U20
3112 K6
3113 L8
3114 R19
3115 L7
3116 L8
3117 K6
3118 N6
3119 M6
3120 J8
3121 J7
3122 N18
3123 D16
3124 H13
3125 D13
3126 F5
3127 V15

3128 F5
3129 S18
3130 S20
3131 Q20
3132 M8
3133 M9
3134 M9
3135 M8
3136 M8
3137 M8
3138 M10
3139 L9
3140 Q20
3141 N10
3142 S20
3143 O11
3144 M18
3145 N11
3146 V15
3147 W15
3148 V13
3149 P18
3150 M13
3151 X13
3152 V15
3153 D8
3154 W16
3155 O18
3156 C18
3157 F12
3161 E5
3162 F4
3163 F4
3164 P14
3166 Q14
3169 B7
3171 U19
3174 F16
3175 F16
3176 F16
3177 F16
3178 E17
3179 E16
3182 M15
3234 H15
3235 H15
3236 H15
3237 G17
3238 H16
3239 G17
3240 H16
3241 G17
3242 F16
3243 F18
3244 K6
3245 I6
3247 I6
3248 I7
3249 O14
3250 M14
3251 N16
3252 M7
3253 Q18
3254 I6
3255 J6
3256 T15
3257 T16
3258 V16
3259 V16
3260 V16
3261 H20
3262 H20
3263 F12
3264 H15

3265 H15
3266 H15
3267 I13
3268 I14
3269 I14
3270 H12
3271 E6
3273 D6
3274 N17
3300 H20
4002 H12
4003 I11
4004 G17
4005 C14
4006 E7
4007 M15
4008 G17
4009 O14
4010 N14
4011 M13
4012 G17
4013 P14
4014 I18
4015 F17
4016 F17
4017 H15
4018 K14
4019 N18
4020 L12
4021 M12
4022 T15
4025 I11
4026 C6
5000 R21
5001 P22
5002 S21
5003 P21
5004 E7
5007 R13
5008 C14
5009 M15
5014 H12
5015 M13
5016 H11
6000 C17
6001 S19
6002 O12
6003 S21
6004 I5
6007 P22
6008 L14
6009 J5
6010 S19
6011 B8
6012 O11
6019 F5
6020 J6
6021 J5
6024 E5
6025 J7
6026 J8
6027 K5
7000 J14
7001 F14
7002 D6
7003 O13
7004 J15
7005 N13
7007 P16
7008 R19
7009 P20
7010 C7
7011 K8
7012 L7

7014 P21
7015 S18
7016 C4
7020 K17
7021 T18
7022 U17
7023 U15
7024 T20
7025 V17
7026 U17
7027 G9
7029 K7
7030 H4
7032 M10
7033 M8
7034 M8
7035 M9
7044 F5
7045 E5
7050 O10
7051 R12
7052 R11
7053 D9
7054 J7
7055 O14
7401 H16
7500 W14
7501 W15
7502 V15
7503 L12
7504 H20
SOUT E18
T000 J11
T001 K11
T002 J10
T003 K10
T004 J10
T005 K10
T006 J10
T007 K9
T008 J9
T009 K9
T010 J9
T011 I3
T012 D10
T013 N15
T014 N16
T015 N16
T016 N16
T017 O18
T018 O18
T019 O18
T020 P18
T021 N7
T022 N7
T028 M6
T029 M7
T030 I18
T033 U14
T034 T17
T035 Q22
T036 R20
T037 U15
T038 W16
T039 T16
T040 K19
T041 M13
T045 H7
T046 H7
T047 G7
T048 G11
T049 H11
T050 H11
T051 G8

T052 H8
T053 D16
T054 J13
T055 D17
T056 H14
T057 D17
T058 D16
T059 J13
T060 D17
T061 B17
T062 B17
T063 C18
T064 F16
T065 F18
T066 F17
T067 E17
T072 H4
T079 H5
T080 B9
T081 B9
T082 C9
T083 C9
T085 K12
T088 H14
T093 L15
T094 L15
T095 L14
T096 L14
T098 H14
T099 M22
T100 O22
T102 J15
T103 I16
T112 F18
T114 F16
T115 N7
T117 G12
T118 E12
T119 D14
T121 L21
T124 G16
T125 H16
T126 H16
T129 G16
T130 F16
T140 C16
T141 C16
T142 A17
T143 A17
T144 B15
T145 B16
T146 A17
T147 A16
T148 A16
T149 B12
T150 B12
T152 V18
T155 R20
T200 B12

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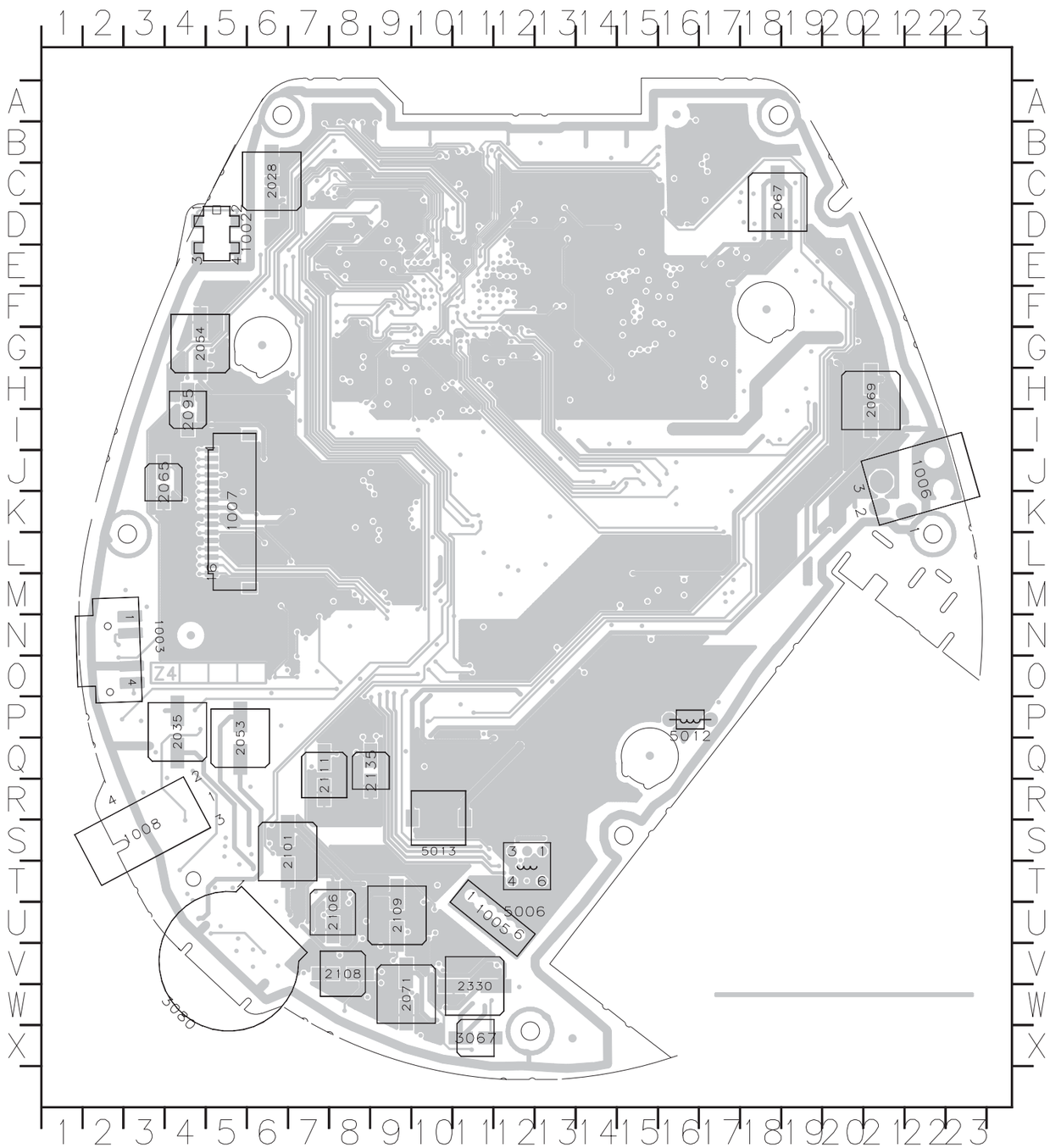
COMBI BOARD - LAYOUT DIAGRAM
COMPONENT SIDE VIEW



1002 D5
1003 N2
1005 U11
1006 J22
1007 K5
1008 S3
2028 C6
2035 P4
2053 Q5
2054 G4
2065 J3
2067 C18
2069 H21
2071 W9
2095 I4
2101 S6
2106 U8
2108 V8
2109 U9
2111 Q7
2135 Q9
2330 W11
3067 X11
3080 V5
5006 T12
5012 P16
5013 R10
cXXX 122

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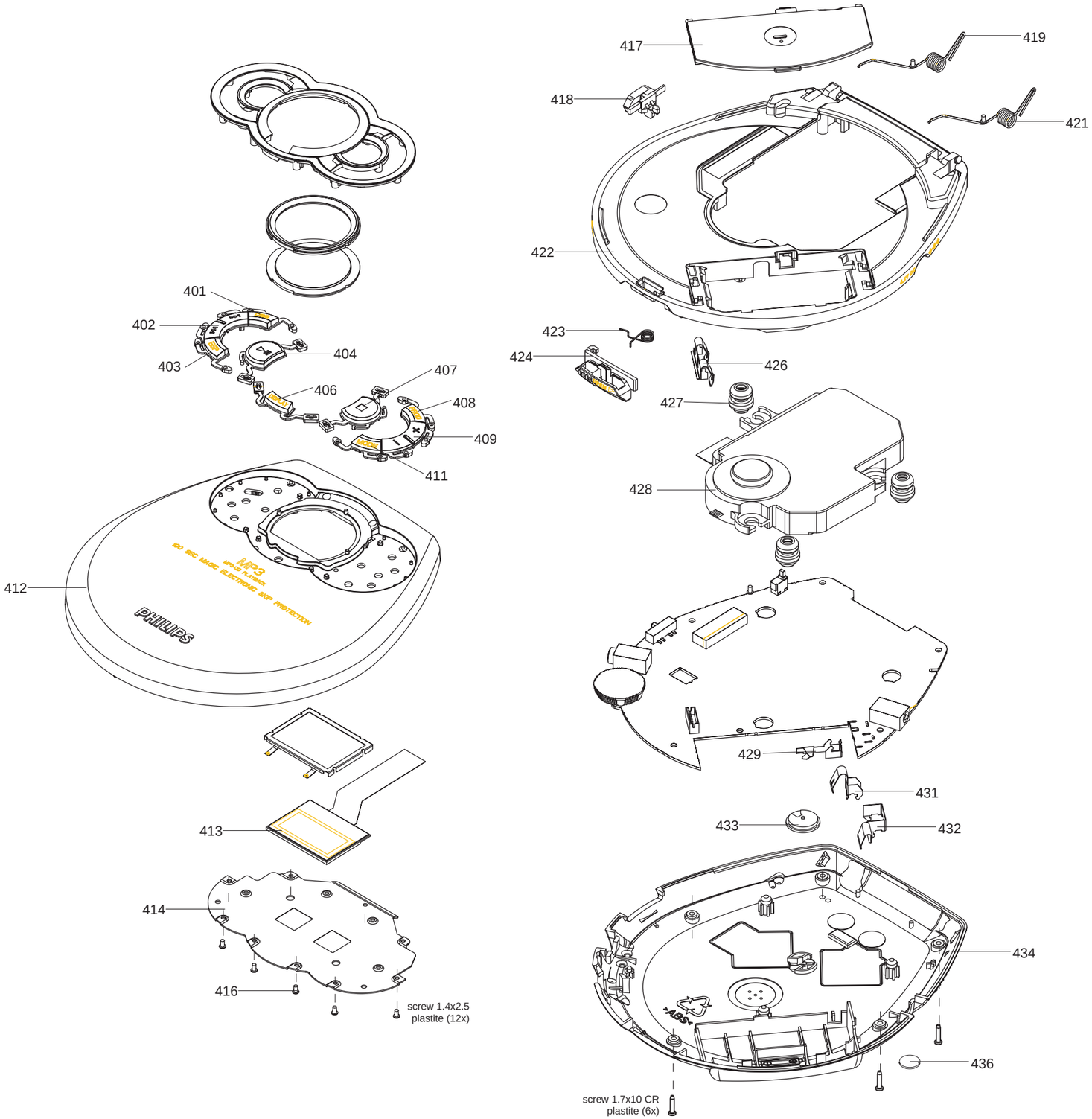
EXPLODED VIEW DIAGRAM



MECHANICAL PARTSLIST

401	3140 117 68721	BUTTON-DBB PNT-EXP321
402	3140 117 68711	BUTTON-SELECTION PNT-EXP321
403	3140 117 68751	BUTTON-ESP PNT-EXP321
404	3140 117 67671	BUTTON PLAY ASSY-EXP320
406	3140 117 68771	BUTTON-DISPLAY PNT-EXP321
407	3140 117 67681	BUTTON STOP ASSY-EXP320
408	3140 117 68731	BUTTON-PROGRAM PNT-EXP321
409	3140 117 68741	BUTTON-ALBUM "+-" PNT-EXP321
411	3140 117 68761	BUTTON-MODE PNT-EXP321
412	3140 117 67622	CD-DOOR ASSY-EXP321/00C
412	3140 117 64062	CD-DOOR ASSY-EXP325/00C
413	3140 110 51761	LCD PANEL 64+16 DOT MATRIX
414	3140 113 33101	MEMBRANE-KEYBOARD-EXP320
416	3103 300 41570	SCREW-P-1,4X2,5-CR
417	3103 304 70320	DOOR-BATTERY-2
418	3103 304 69570	SLIDER-RESUME
419	3140 111 01472	CD-DOOR-SPRING-LEFT
421	3140 111 01482	CD-DOOR-SPRING-RIGHT
422	3103 307 99711	CABINET - ASSY - 2
423	3103 301 06500	SPRING-SLIDER-OPEN-2
424	3103 304 69580	SLIDER-OPEN
426	3103 301 45180	SPRING-BATTERY-SHORT-2
427	3103 304 69590	SUSPENSION
428	3103 309 05480	CD DA23ZPH
429	3103 301 45430	SPRING-BATTERY-CHARGE
431	3103 301 45410	SPRING-BATTERY-MINUS
432	3103 301 45420	SPRING-BATTERY-PLUS
433	3103 304 69540	COVER-BOTTOM
434	3103 307 99620	BOTTOM-ASSY-1
436	4822 462 41819	RUBBER FOOT
	3103 304 69602	FOIL-ADHESIVE-FLEXFOIL

Note: Only these parts mentioned in the list are normal service parts.

ELECTRICAL PARTSLIST - COMBI BOARD

- MISCELLANEOUS -

1001	2422 543 01106	CRYSTAL
1002	2422 129 16818	SWITCH-PUSH
1003	4822 277 21705	SWITCH
1004	2422 086 11012	FUSE 0,7A 50V
1005	2422 025 12272	SOCKET FFC V 6P
1006	2422 026 05086	CONNECTOR BM H 1P
1007	4822 267 11027	CONNECTOR 16P
1008	2422 026 05204	SOCKET PHONE H 1P
1010	2422 025 11661	SOCKET FFC H 6P
1011	2422 025 18011	SOCKET FFC H 20P

- CAPACITORS -

2000	3198 035 71040	100nF Y5V 16V
2001	3198 035 71040	100nF Y5V 16V
2002	3198 035 71040	100nF Y5V 16V
2003	3198 035 71040	100nF Y5V 16V
2004	3198 035 71040	100nF Y5V 16V
2005	3198 035 71040	100nF Y5V 16V
2006	3198 035 71040	100nF Y5V 16V
2007	2238 586 59812	100nF +80-20% Y5V 50V
2008	2020 552 96618	1nF 10% X7R 50V
2009	3198 035 71040	100nF Y5V 16V
2010	3198 035 71040	100nF Y5V 16V
2011	3198 035 71040	100nF Y5V 16V
2012	3198 035 71040	100nF Y5V 16V
2013	3198 035 71040	100nF Y5V 16V
2014	3198 035 71040	100nF Y5V 16V
2015	3198 035 71040	100nF Y5V 16V
2016	3198 035 71040	100nF Y5V 16V
2017	3198 035 71040	100nF Y5V 16V
2018	3198 035 71040	100nF Y5V 16V
2019	2238 586 59812	100nF +80-20% Y5V 50V
2020	2222 240 59872	4,7µF +80-20% Y5V 10V
2021	2222 240 59872	4,7µF +80-20% Y5V 10V
2022	2222 240 59872	4,7µF +80-20% Y5V 10V
2023	3198 017 41050	1µF Y5V 10V
2024	3198 017 41050	1µF Y5V 10V
2025	3198 017 41050	1µF Y5V 10V
2026	3198 017 41050	1µF Y5V 10V
2027	3198 017 41050	1µF Y5V 10V
2028	4822 124 80151	47µF 16V
2029	2238 586 59812	100nF +80-20% Y5V 50V
2030	5322 126 11583	10nF 10% X7R 50V
2031	5322 126 11583	10nF 10% X7R 50V
2032	2238 586 59812	100nF +80-20% Y5V 50V
2033	4822 126 14225	56pF 5% NP0 50V
2034	4822 126 14225	56pF 5% NP0 50V

- CAPACITORS -

2035	4822 124 81059	220µF 20% 4V
2036	2222 867 15339	33pF 5% NP0 50V
2037	5322 126 11583	10nF 10% X7R 50V
2038	5322 126 11583	10nF 10% X7R 50V
2039	5322 126 11583	10nF 10% X7R 50V
2040	5322 126 11583	10nF 10% X7R 50V
2041	2020 552 94427	100pF 5% NP0 50V
2042	5322 126 11583	10nF 10% X7R 50V
2043	2020 552 94427	100pF 5% NP0 50V
2044	5322 126 11583	10nF 10% X7R 50V
2045	5322 126 11583	10nF 10% X7R 50V
2046	3198 017 41050	1µF Y5V 10V
2047	3198 032 28210	220µF 20% 6,3V
2048	5322 126 11583	10nF 10% X7R 50V
2049	5322 126 11583	10nF 10% X7R 50V
2050	5322 126 11583	10nF 10% X7R 50V
2051	5322 126 11583	10nF 10% X7R 50V
2052	5322 126 11583	10nF 10% X7R 50V
2053	4822 124 81059	220µF 20% 4V
2054	4822 124 80151	47µF 16V
2055	2238 586 59812	100nF +80-20% Y5V 50V
2056	3198 032 15190	100µF 20% 4V
2057	4822 126 14585	100nF 10% X7R 50V
2058	2238 586 59812	100nF +80-20% Y5V 50V
2059	2020 552 96637	10µF 10% X5R 6,3V
2062	3198 035 71040	100nF Y5V 16V
2063	3198 017 41050	1µF Y5V 10V
2064	2238 586 59812	100nF +80-20% Y5V 50V
2065	4822 124 23002	10µF 16V
2066	2238 916 15641	22nF 10% X7R 25V
2067	4822 124 12095	100µF 20% 16V
2068	2238 586 59812	100nF +80-20% Y5V 50V
2069	4822 124 12095	100µF 20% 16V
2070	5322 122 31863	330pF 5% NP0 63V
2071	4822 124 12095	100µF 20% 16V
2072	2238 916 15641	22nF 10% X7R 25V
2073	2238 586 59812	100nF +80-20% Y5V 50V
2073	4822 126 14491	2,2µF 10V
2074	3198 032 54110	4,7µF 20% 20V
2075	3198 032 54110	4,7µF 20% 20V
2078	2238 586 59812	100nF +80-20% Y5V 50V
2080	3198 016 31020	1nF NP0 25V
2081	4822 126 14238	2,2nF X7R 50V
2082	4822 126 14241	330pF NP0 50V
2083	4822 126 14241	330pF NP0 50V
2084	4822 126 14241	330pF NP0 50V
2085	2238 586 59812	100nF +80-20% Y5V 50V
2086	2238 586 59812	100nF +80-20% Y5V 50V
2088	3198 032 15190	100µF 20% 4V
2091	2238 586 59812	100nF +80-20% Y5V 50V

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ELECTRICAL PARTSLIST - COMBI BOARD

- CAPACITORS -

2092	2238 586 59812	100nF +80-20% Y5V 50V
2094	5322 126 11583	10nF 10% X7R 50V
2095	4822 124 23002	10µF 16V
2096	2238 586 59812	100nF +80-20% Y5V 50V
2101	3198 030 72290	22µF 20% 35V
2103	2238 586 59812	100nF +80-20% Y5V 50V
2104	2238 586 59812	100nF +80-20% Y5V 50V
2105	2238 586 59812	100nF +80-20% Y5V 50V
2106	2020 024 90166	10µF 20% 35V
2107	2238 586 59812	100nF +80-20% Y5V 50V
2108	2020 024 90166	10µF 20% 35V
2109	3198 030 72290	22µF 20% 35V
2111	5322 124 41945	22µF 20% 35V
2112	3198 024 44730	47nF Y5V 50V
2114	4822 126 14491	2,2µF 10V
2115	4822 126 14491	2,2µF 10V
2116	2238 586 59812	100nF +80-20% Y5V 50V
2117	2238 586 59812	100nF +80-20% Y5V 50V
2135	2020 021 91729	4,7µF 20% 35V
2137	4822 126 14238	2,2nF X7R 50V
2138	3198 017 41050	1µF Y5V 10V
2300	4822 126 13883	220pF 5% 50V
2304	2238 916 15641	22nF 10% X7R 25V
2305	4822 126 14241	330pF NP0 50V
2306	2238 586 59812	100nF +80-20% Y5V 50V
2307	2222 867 15339	33pF 5% NP0 50V
2308	3198 017 41050	1µF Y5V 10V
2309	3198 032 28210	220µF 20% 6,3V
2310	4822 126 13193	4,7nF 10% X7R 63V
2313	2238 586 59812	100nF +80-20% Y5V 50V
2314	4822 126 14491	2,2µF 10V
2315	4822 126 14491	2,2µF 10V
2316	3198 017 41050	1µF Y5V 10V
2317	3198 032 28210	220µF 20% 6,3V
2318	3198 032 28210	220µF 20% 6,3V
2319	2238 586 59812	100nF +80-20% Y5V 50V
2320	3198 017 41050	1µF Y5V 10V
2321	4822 126 14238	2,2nF X7R 50V
2322	4822 126 14247	1,5nF X7R 50V
2323	4822 126 14238	2,2nF X7R 50V
2324	4822 126 14247	1,5nF X7R 50V
2325	3198 017 41050	1µF Y5V 10V
2327	2238 586 59812	100nF +80-20% Y5V 50V
2328	3198 017 41050	1µF Y5V 10V
2329	5322 126 11583	10nF 10% X7R 50V
2330	4822 124 80151	47µF 16V
2331	2238 586 59812	100nF +80-20% Y5V 50V
2332	2238 586 59812	100nF +80-20% Y5V 50V
2333	3198 035 71040	100nF Y5V 16V
2400	5322 122 31647	1nF 10% X7R 63V

- CAPACITORS -

3025	2238 586 59812	100nF +80-20% Y5V 50V
3037	3198 017 41050	1µF Y5V 10V
3067	2020 021 91729	4,7µF 20% 35V

- RESISTORS -

3000	4822 117 13632	100K 1% 0,62W
3001	4822 051 30103	10K 5% 0,062W
3002	4822 117 13632	100K 1% 0,62W
3003	4822 117 13632	100K 1% 0,62W
3004	4822 117 13632	100K 1% 0,62W
3005	4822 117 13632	100K 1% 0,62W
3006	4822 051 30105	1M 5% 0,062W
3007	4822 051 30103	10K 5% 0,062W
3008	4822 117 13632	100K 1% 0,62W
3009	4822 117 13632	100K 1% 0,62W
3010	4822 051 30334	330K 5% 0,062W
3011	4822 051 30334	330K 5% 0,062W
3012	4822 117 13545	100R 5%
3013	3198 031 02250	2,2M 5%
3014	4822 117 13632	100K 1% 0,62W
3015	4822 117 13632	100K 1% 0,62W
3016	4822 117 13632	100K 1% 0,62W
3017	4822 051 30472	4,7K 5% 0,062W
3018	4822 117 13632	100K 1% 0,62W
3019	4822 051 30102	1K 5% 0,062W
3020	4822 117 12925	47K 1% 0,063W
3021	3198 031 03320	3,3K 5%
3022	4822 117 11297	100K 1/16W
3023	4822 117 13632	100K 1% 0,62W
3024	4822 117 11297	100K 1/16W
3026	4822 117 13632	100K 1% 0,62W
3027	4822 051 30008	0R JUMPER
3028	4822 117 13632	100K 1% 0,62W
3029	4822 117 13632	100K 1% 0,62W
3030	4822 117 12925	47K 1% 0,063W
3031	4822 051 30222	2,2K 5% 0,062W
3033	3198 031 04720	4,7K 5%
3034	3198 031 04720	4,7K 5%
3035	4822 051 30109	10R 5% 0,062W
3036	3198 031 04720	4,7K 5%
3038	3198 031 04720	4,7K 5%
3039	5322 117 13018	1K 1% 0,063W
3040	3198 031 04720	4,7K 5%
3041	3198 031 04720	4,7K 5%
3042	3198 031 04720	4,7K 5%
3043	3198 031 04720	4,7K 5%
3044	4822 116 30467	10K 5%
3046	4822 117 13606	10K 5% 0,0062W
3047	4822 117 12706	10K 1% 0,063W
3048	3198 031 04720	4,7K 5%

ELECTRICAL PARTSLIST - COMBI BOARD

- RESISTORS -

3049	4822 117 12902	8,2K 1% 0,063W
3050	4822 051 30331	330R 5% 0,062W
3051	4822 051 30474	470K 5% 0,062W
3052	4822 117 12706	10K 1% 0,063W
3053	4822 051 30681	680R 5% 0,062W
3054	4822 051 30101	100R 5% 0,062W
3055	4822 051 30331	330R 5% 0,062W
3056	3198 031 04720	4,7K 5%
3057	3198 031 04730	47K 5%
3058	4822 117 13632	100K 1% 0,62W
3059	4822 051 30682	6,8K 5% 0,062W
3060	4822 051 30103	10K 5% 0,062W
3061	4822 051 30101	100R 5% 0,062W
3062	4822 117 13632	100K 1% 0,62W
3063	4822 051 30103	10K 5% 0,062W
3064	4822 051 30474	470K 5% 0,062W
3066	4822 051 30109	10R 5% 0,062W
3068	4822 051 30474	470K 5% 0,062W
3069	4822 051 30103	10K 5% 0,062W
3070	4822 051 30223	22K 5% 0,062W
3071	4822 051 30223	22K 5% 0,062W
3072	4822 051 30223	22K 5% 0,062W
3073	4822 117 12971	15R 5% 0,62W
3074	4822 117 13632	100K 1% 0,62W
3075	4822 117 12917	1R 5% 0,062W
3076	4822 051 30008	0R JUMPER
3077	4822 051 30008	0R JUMPER
3078	4822 051 30103	10K 5% 0,062W
3079	4822 117 13632	100K 1% 0,62W
3080	2122 400 00001	10K X2 H F-1001G
3081	4822 051 30472	4,7K 5% 0,062W
3082	4822 051 30331	330R 5% 0,062W
3083	3198 031 04740	470K 5%
3084	3198 031 04740	470K 5%
3085	4822 117 13632	100K 1% 0,62W
3086	4822 117 13632	100K 1% 0,62W
3087	3198 031 04740	470K 5%
3088	4822 117 13606	10K 5% 0,0062W
3089	4822 117 13632	100K 1% 0,62W
3090	4822 117 13632	100K 1% 0,62W
3091	4822 117 13632	100K 1% 0,62W
3092	4822 117 13632	100K 1% 0,62W
3093	4822 051 30472	4,7K 5% 0,062W
3094	4822 051 30184	180K 5% 0,062W
3095	4822 117 11817	1,2K 1% 1/16W
3096	4822 051 30222	2,2K 5% 0,062W
3096	4822 051 30272	2,7K 5% 0,062W
3097	4822 051 30222	2,2K 5% 0,062W
3097	4822 051 30272	2,7K 5% 0,062W
3098	4822 117 12971	15R 5% 0,62W

- RESISTORS -

3099	4822 051 30474	470K 5% 0,062W
3100	4822 051 30223	22K 5% 0,062W
3101	5322 117 13018	1K 1% 0,063W
3102	4822 051 30123	12K 5% 0,062W
3103	4822 051 30474	470K 5% 0,062W
3104	4822 051 30123	12K 5% 0,062W
3105	4822 051 30184	180K 5% 0,062W
3106	4822 117 13632	100K 1% 0,62W
3107	4822 117 13632	100K 1% 0,62W
3108	4822 117 13632	100K 1% 0,62W
3109	4822 117 12139	22R 5% 0,062W
3110	4822 051 30103	10K 5% 0,062W
3111	4822 117 12139	22R 5% 0,062W
3114	4822 117 13632	100K 1% 0,62W
3121	4822 051 30105	1M 5% 0,062W
3123	3198 031 04720	4,7K 5%
3124	4822 051 30109	10R 5% 0,062W
3125	4822 051 30109	10R 5% 0,062W
3126	4822 117 13632	100K 1% 0,62W
3127	4822 117 13632	100K 1% 0,62W
3128	4822 117 13632	100K 1% 0,62W
3129	4822 117 12925	47K 1% 0,063W
3130	4822 051 30183	18K 5% 0,062W
3131	4822 051 30103	10K 5% 0,062W
3132	4822 051 30223	22K 5% 0,062W
3133	4822 117 12902	8,2K 1% 0,063W
3134	4822 051 30223	22K 5% 0,062W
3135	4822 051 30153	15K 5% 0,062W
3136	4822 051 30103	10K 5% 0,062W
3137	4822 051 30102	1K 5% 0,062W
3138	4822 051 30103	10K 5% 0,062W
3139	4822 117 12891	220K 1%
3140	4822 051 30103	10K 5% 0,062W
3141	4822 117 12903	1,8K 1% 0,063W
3142	4822 051 30682	6,8K 5% 0,062W
3143	2322 704 65603	56K 1%
3144	4822 051 30472	4,7K 5% 0,062W
3145	2322 704 61504	150K 1%
3146	4822 051 30472	4,7K 5% 0,062W
3147	4822 051 30472	4,7K 5% 0,062W
3148	4822 051 30563	56K 5% 0,062W
3149	4822 117 13632	100K 1% 0,62W
3150	4822 051 30103	10K 5% 0,062W
3151	4822 051 30563	56K 5% 0,062W
3152	4822 117 13632	100K 1% 0,62W
3153	4822 117 12891	220K 1%
3154	4822 117 13632	100K 1% 0,62W
3156	4822 051 30101	100R 5% 0,062W
3157	4822 117 13632	100K 1% 0,62W
3161	4822 117 13632	100K 1% 0,62W

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ELECTRICAL PARTSLIST - COMBI BOARD

- RESISTORS -

3162	4822 117 12891	220K 1%
3163	4822 117 13632	100K 1% 0,62W
3164	4822 117 13632	100K 1% 0,62W
3166	4822 117 13632	100K 1% 0,62W
3169	4822 117 13632	100K 1% 0,62W
3171	4822 051 30102	1K 5% 0,062W
3174	4822 117 11297	100K 1/16W
3175	4822 117 11297	100K 1/16W
3176	4822 117 11297	100K 1/16W
3177	4822 117 11297	100K 1/16W
3178	4822 117 11297	100K 1/16W
3179	4822 117 13632	100K 1% 0,62W
3182	4822 051 30109	10R 5% 0,062W
3234	4822 051 30109	10R 5% 0,062W
3235	4822 051 30152	1,5K 5% 0,062W
3236	4822 051 30103	10K 5% 0,062W
3237	4822 117 13632	100K 1% 0,62W
3238	4822 117 13632	100K 1% 0,62W
3239	4822 117 13632	100K 1% 0,62W
3240	4822 117 13632	100K 1% 0,62W
3241	4822 117 13632	100K 1% 0,62W
3242	4822 117 13632	100K 1% 0,62W
3243	4822 117 11297	100K 1/16W
3244	4822 117 13632	100K 1% 0,62W
3245	4822 117 13632	100K 1% 0,62W
3247	4822 051 30471	470R 5% 0,062W
3248	4822 051 30105	1M 5% 0,062W
3249	4822 051 30154	150K 5% 0,062W
3250	4822 117 13632	100K 1% 0,62W
3251	4822 051 30103	10K 5% 0,062W
3253	4822 051 30109	10R 5% 0,062W
3254	4822 117 12925	47K 1% 0,063W
3255	4822 117 12925	47K 1% 0,063W
3256	4822 051 30681	680R 5% 0,062W
3257	4822 051 30681	680R 5% 0,062W
3258	4822 051 30681	680R 5% 0,062W
3259	4822 051 30681	680R 5% 0,062W
3260	4822 117 13632	100K 1% 0,62W
3263	4822 117 13632	100K 1% 0,62W
3264	4822 051 30109	10R 5% 0,062W
3265	4822 051 30109	10R 5% 0,062W
3266	4822 051 30472	4,7K 5% 0,062W
3267	4822 051 30103	10K 5% 0,062W
3268	4822 051 30103	10K 5% 0,062W
3269	4822 051 30103	10K 5% 0,062W
3270	4822 051 30109	10R 5% 0,062W
3271	4822 051 30109	10R 5% 0,062W
3273	3198 021 32250	2,2M 5%
3274	4822 117 13632	100K 1% 0,62W
4002	4822 051 30008	0R JUMPER

- RESISTORS -

4003	4822 051 30008	0R JUMPER
4004	4822 051 30008	0R JUMPER
4005	4822 051 30008	0R JUMPER
4006	4822 051 30008	0R JUMPER
4007	4822 051 30008	0R JUMPER
4008	4822 051 30008	0R JUMPER
4009	4822 051 30008	0R JUMPER
4011	4822 051 30008	0R JUMPER
4012	4822 051 30008	0R JUMPER
4013	4822 051 30008	0R JUMPER
4014	4822 051 30008	0R JUMPER
4015	4822 051 30008	0R JUMPER
4016	4822 051 30008	0R JUMPER
4021	4822 051 30008	0R JUMPER
4022	4822 051 30008	0R JUMPER

- COILS & FILTERS -

1009	2422 540 98428	8M467 CSTCC8,46MG
4022	2422 549 42896	IND FXD EMI 100MHZ 120R
5000	2422 549 42896	IND FXD EMI 100MHZ 120R
5002	2422 549 42896	IND FXD EMI 100MHZ 120R
5003	2422 549 42896	IND FXD EMI 100MHZ 120R
5004	3198 018 51070	FXDIND SM 0,1µH 10%
5006	2422 536 00346	IND VAR 5MM 5HP 40µH
5007	4822 157 71593	10µH 10%
5008	3198 018 51070	FXDIND SM 0,1µH 10%
5009	3198 018 51070	FXDIND SM 0,1µH 10%
5012	4822 157 11235	22µH LANO2TB220J 5%
5013	2422 536 00419	IND FXD SM 10µH 20%
5014	3198 018 51070	FXDIND SM 0,1µH 10%
5015	3198 018 51070	FXDIND SM 0,1µH 10%
5016	3198 018 51070	FXDIND SM 0,1µH 10%

- DIODES -

4026	4822 130 11397	BAS316
6000	4822 130 11397	BAS316
6002	9322 128 70685	SS14
6003	4822 130 11397	BAS316
6004	4822 130 10794	BZX284-C10
6008	5322 130 10734	BAT54A
6009	4822 130 80622	BAT54
6010	9340 557 31215	BAT754C
6011	4822 130 80622	BAT54
6012	9322 189 14668	SL12

ELECTRICAL PARTSLIST - COMBI BOARD

- DIODES -

6019	4822 130 11397	BAS316
6020	9322 128 70685	SS14
6021	9322 128 70685	SS14
6024	5322 130 10734	BAT54A
6025	4822 130 80622	BAT54
6027	4822 130 11397	BAS316

- IC & TRANSISTORS -

7000	9322 143 49668	M24C01-RDW6
7001	9352 731 41557	SAA7752EL/N103
7002	5322 130 60159	BC846B
7003	4822 130 60142	BC869
7005	5322 130 60159	BC846B
7007	9322 186 71671	AN8789FB
7008	5322 130 60845	BC807-25
7009	9340 219 30115	BC817-25W
7010	9351 624 90118	74LV132D
7014	9340 219 30115	BC817-25W
7015	3198 010 42310	BC847BW
7016	4822 130 60373	BC856B
7020	9965 000 16922	SAA7824HL
7021	4822 130 42615	BC817-40
7022	3198 010 42320	BC857BW
7023	3198 010 42320	BC857BW
7024	4822 130 42615	BC817-40
7025	4822 130 42615	BC817-40
7026	4822 130 42615	BC817-40
7027	9322 166 67668	MT48LC4M16A2TG-7E
7029	5322 130 60159	BC846B
7030	5322 130 60159	BC846B
7032	5322 130 60123	BC807-40
7033	5322 130 60123	BC807-40
7034	3198 010 42310	BC847BW
7035	3198 010 42310	BC847BW
7044	5322 130 60159	BC846B
7045	4822 130 60373	BC856B
7050	9352 701 07118	TEA1208T/N1
7051	5322 130 61569	BC868
7052	5322 130 61569	BC868
7053	5322 130 60159	BC846B
7054	4822 130 60373	BC856B
7055	4822 130 11549	BSH105
7401	3198 010 42320	BC857BW
7500	4822 209 33165	TDA1308T/N1
7501	3198 010 42310	BC847BW
7502	3198 010 42310	BC847BW
7503	9340 547 21215	BSH205

Note: Only these parts mentioned in the list are normal service parts.