Portable Compact Disc Player

ACT7585

all versions

Service
Service
Service

Service Manual

ESA
ESP

COMPACT disc DIGITAL AUDIO

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

**CLASS 1
LASER PRODUCT**

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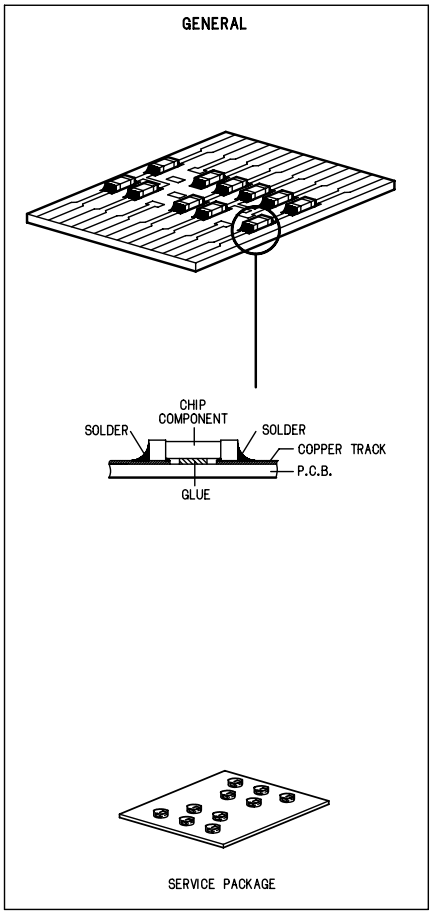
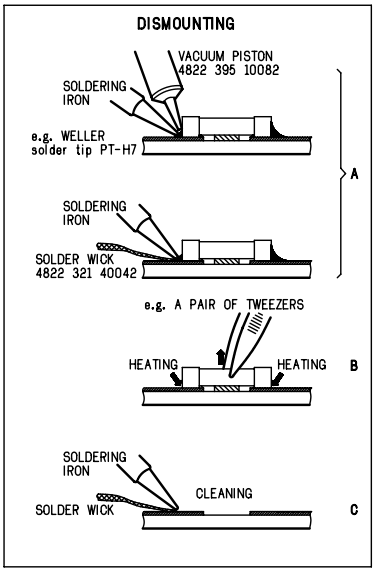
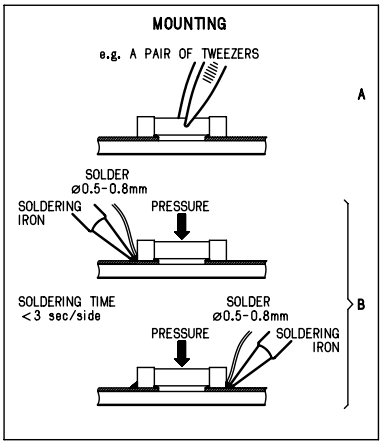
PCS 107 221

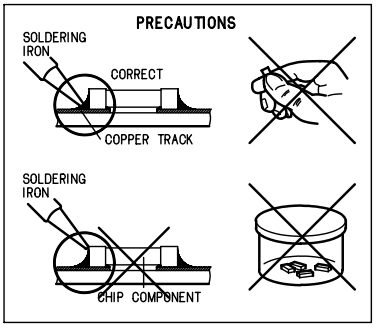
PHILIPS

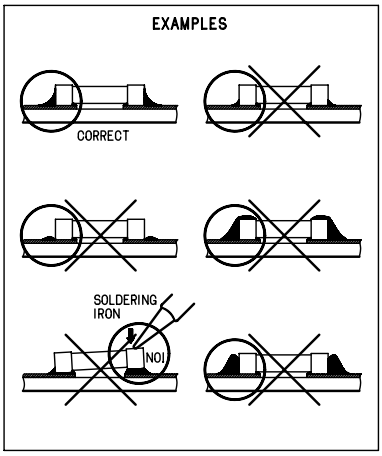
HANDLING CHIP COMPONENTS











© 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.

ESD

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.

ñ 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.

SAFETY

© 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.

ñ 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 ⚠

CLASS 1 LASER PRODUCT

© **DANGER**: Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.

s **Varning !**
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

∂ **Advarsel !**
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

ß **Varoitus !**
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

© 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".

TECHNICAL SPECIFICATIONS

General

Dimension (W x H x D)	:	133 x 32 x 148 mm
Weight	:	225 g

Power supply modes

DC in socket	:	4.5 – 5.5 V
Primary batteries	:	1.75 – 3.6 V
Rechargable batteries	:	1.75 – 3.6 V

Battery lifetime

Battery Type	ESP OFF	PSM ON	ESP ON
Primary batteries	20 hrs typ.	-	20 hrs typ.
Rech. batt. AY3362	9.5 hrs typ.	-	9.5 hrs typ.

Battery level detection

Battery level 3 &empty	:	0.7 V nom. ±100 mV
Battery level 2 &empty	:	0.5 V nom. ±100 mV
Battery level 1 &empty	:	0.3 V nom. ±100 mV
Battery empty	:	1.8 V nom +100/-50 mV

Charge section

Charge current	:	250 mA nom. ±10 %
Charge time for 80% AY3362	:	4.0 hrs nom.
Charge time for 100% AY3362	:	6.0 hrs nom.
Charge time limit	:	7.0 hrs nom.
Temperature protection	:	50 °C ± 5 °C

Current consumption DC–in supply (4.5 V)

Operation	ESP OFF	PSM ON	ESP ON
Play mode	100 mA typ.	-	100 mA typ.
Jump mode	220 mA typ.	-	220 mA typ.
Standby	30 mA typ.	-	30 mA typ.

Current consumption Battery supply (2.25 V)

Operation	ESA OFF	PSM ON	ESA ON
Play mode	120 mA typ.	-	120 mA typ.
Jump mode	400 mA typ.	-	400 mA typ.
Standby	0.05 mA typ.	-	0.05 mA typ.

Shock resistance (ESP off)

+X/-X direction	:	2.5 G
+Y/-Y direction	:	2.5 G
+Z/-Z direction	:	2 G

Shock resistance with car base (ESP off)

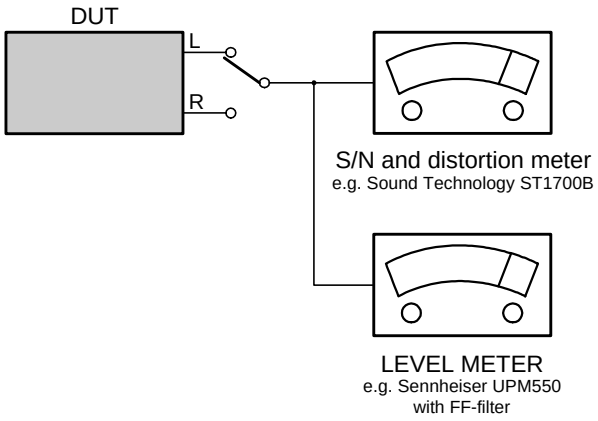
+X/-X direction	:	10 G
+Y/-Y direction	:	10 G
+Z/-Z direction	:	10 G

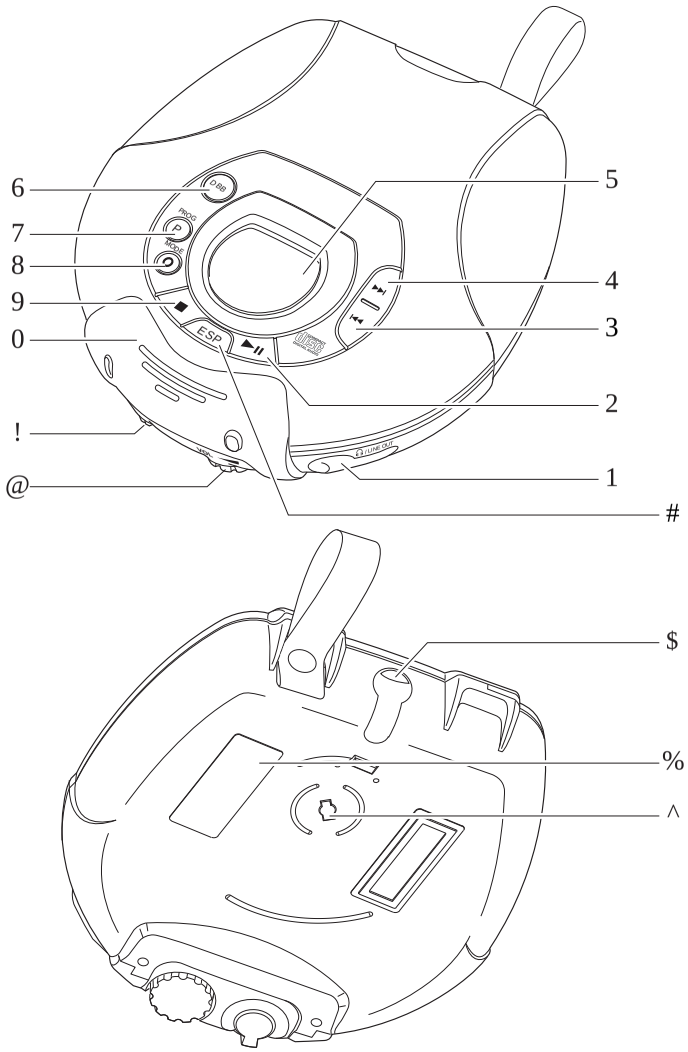
Headphone output (16 Ohm, ESP and DBB off)

Output power (10% THD)	:	6 mW (+1/-3 dB)
Output power (10% THD) -/17	:	12 mW (+1/-3 dB)
Frequency response (1mW)	:	100 Hz – 20kHz within 6 dB
S/N ratio (unw.)	:	80 dB (83 dB typ.)
S/N ratio (A-wght)	:	82 dB (85 dB typ.)
THD+N (1kHz, 1mW)	:	1 % (0.2 % typ.)
Crosstalk (1kHz, w/o load)	:	-24 dB (-44 dB typ.)
Channel unbalance (-40dB)	:	5 dB
Volume attenuation (1kHz)	:	> 60 dB

Measurement setup

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)





1 p /LINE OUT .3.5mm headphone socket

2 2 ; .....switches the set on, starts and interrupts CD play

3 ∞ .....skips and searches backward

4 § .....skips and searches forward

5 .....display

6 DBB.....DIGITAL **D**YNAMIC **B**ASS **B**OOST: switches the bass enhancement on and off This button also switches acoustic feedback (the beep) on/off when it is pressed for more than 2 seconds

7 PROG P.....programs tracks and reviews the program

8 MODE.....selects the different playing possibilities: **SHUFFLE**, **SHUFFLE REPEAT ALL**, **REPEAT**, **REPEAT ALL** and SCAN

9 9.....stops CD play, erases a program, activates charging and switches the set off

0 .....open the CD lid here

! RESUME.....stores the last position played
HOLD .....**locks all buttons**
OFF.....switches RESUME and HOLD off

@ VOL E .....adjusts the volume

ESP .....**E**LECTRONIC **S**KIP **P**ROTECTION ensures continuous CD playback regardless of vibrations and shocks

$ 4.5V DC.....socket for external power supply

% .....typeplate

^ .....belt clip holder

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

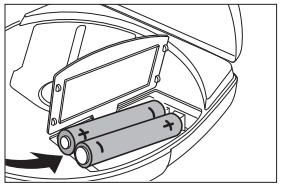
Batteries (supplied or optionally available)

You can use the following batteries with this CD-player:
- normal batteries type **LR6**, **UM3** or **AA** (preferably Philips), or
- alkaline batteries type **LR6**, **UM3** or **AA** (preferably Philips).

Note: – Old and new or different types of batteries should not be used in combination. Remove batteries if they are empty or if the player is not going to be used for a long time.

Inserting batteries

1 Unfasten the buckle.
2 Open the CD lid.
3 Open the battery compartment and insert either 2 alkaline batteries, or the rechargeable NiMH battery AY 3362 (if supplied).



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

Battery indication

The approximate power level of your batteries is shown in the display.

- Battery full
- Battery two-thirds full
- Battery one-third full
- Battery dead or empty. When the batteries are dead or empty, the symbol A flashes, bAtt is displayed, and the beep tone sounds repeatedly.

Average playing time of batteries under normal conditions

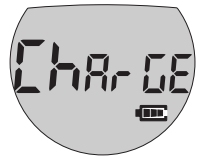
Battery type	ESP on	ESP off
Normal	7 hours	6 hours
Alkaline	22 hours	19 hours
Rechargeable ECO-PLUS NiMH battery	10 hours	9 hours

ECO-PLUS NiMH battery information (for versions supplied with the rechargeable ECO-PLUS NiMH battery AY 3362)

Recharging works only on players supplied with the rechargeable ECO-PLUS NiMH battery AY 3362.

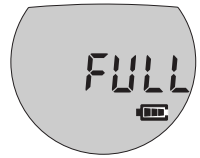
Recharging the ECO-PLUS NiMH battery on board

1 Insert the rechargeable ECO-PLUS NiMH battery AY 3362.
2 Connect the mains adapter to the 4.5V DC socket of the player and then to the wall socket.
   y A is shown and ChArGE is displayed for 5 seconds.



- Recharging stops after a maximum of 7 hours, or when you start playback.

3 When the battery is fully recharged, and FULL appear briefly in the display, before the display switches off.



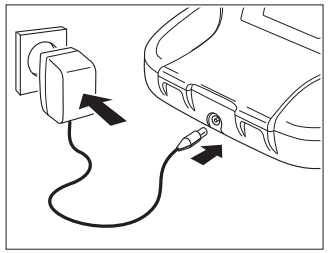
Notes: – It is normal for the batteries to become warm during recharging.
– If the batteries become too warm, recharging will be interrupted for approximately 30 minutes and Hot is displayed.
– To ensure proper recharging on board, take care that contacts are clean.
– Use only the ECO-PLUS NiMH battery AY 3362.

Handling instructions

- Recharging already charged or half-charged batteries will shorten their lifetime. We therefore recommend that you let the rechargeable ECO-PLUS NiMH battery run till it is completely empty before you recharge it.
- To avoid a short circuit, do not let the battery touch any metal object.
- If the battery becomes empty soon after recharging, then either its contacts are dirty or it has reached the end of its lifetime.

Mains adapter (supplied or optionally available)

Use only the AY 3170 adapter (4.5 V/300 mA direct current, positive pole to the centre pin). Any other product may damage the player.



1 Make sure that the adapter's voltage corresponds to the local voltage.

2 Connect the adapter to the 4.5V DC socket of the player and to the wall socket.

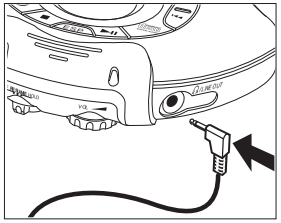
Note: Always disconnect the adapter when you are not using it.

Headphones AY 3678

- Connect the supplied headphones to the p/LINE OUT socket of the player.

ound you.

Note: p/LINE OUT can also be used for connecting the player to your HiFi system (with a signal lead) or to your car radio (with a cassette adapter or signal lead). In both cases, the volume of the player must be set to position 8.



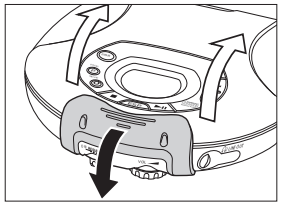
Use your head when using headphones

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 ar

Playing a CD

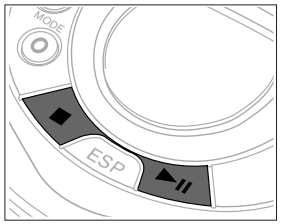
This CD-player can play all kinds of **Audio Discs** such as CD-Recordables and CD-Rewritables. Do not try to play a CD-ROM, CDi, VCD, DVD or computer CD.



1 Unfasten the buckle.

2 Open the CD lid.

3 Insert an audio CD, printed side up, by pressing the CD onto the hub.

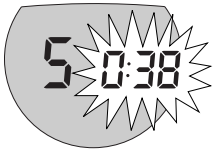


4 Close the lid by pressing it down on the left side.

5 Press 2 ; to switch the player on and start playback.

- The current track number and elapsed playing time are displayed.

- You can pause playback by pressing 2 ;.
  - The time at which playback was paused starts flashing.
- You can continue playback by pressing 2 ; again.

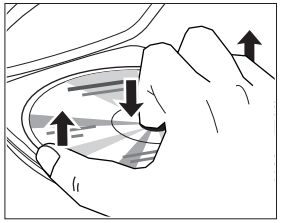


6 Press 9 to stop playback.

- The total number of tracks and the total playing time of the CD are displayed.

7 Press 9 again to switch the player off.

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



Note: If there is no activity, the set will automatically switch off after a while to save energy.

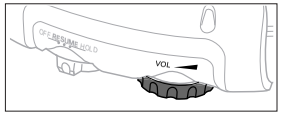
Playback information

- If a CD-Recordable (CD-R) or a CD-Rewritable (CD-RW) is not recorded properly, nF dISC is displayed, indicating that the CD has not been finalized. In that case, use FINALIZE on your CD recorder to complete the recording.
- When playing a CD-Rewritable (CD-RW), please note that it takes 3–15 seconds after pressing 2 ; for sound reproduction to start.
- Playback will stop if you open the CD lid.
- While the CD is read, 1 -:- flashes in the display.

Volume and bass

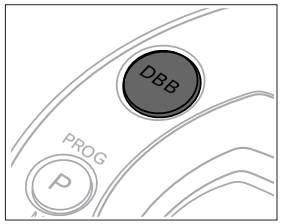
Volume adjustment

- Adjust the volume by using VOL E .



Bass adjustment

You can choose between the bass enhancement levels dbb1 and dbb2.



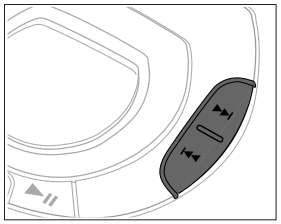
1 Press BASS once for dbb1 and twice for dbb2.
- y dbb1 or dbb2 is displayed and DBB is shown.

2 To switch dbb1 or dbb2 off, press BASS twice or once, respectively.
- y DBB goes off.

Selecting a track and searching

Selecting a track during playback

Briefly press ∞ or § once or several times to skip to the current, previous or next track.
- y Playback continues with the selected track, and the track's number is displayed.



Selecting a track when playback is stopped

1 Briefly press ∞ or § once or several times to select the desired track. The track number is displayed.

2 Press 2 ; to start CD play.
- y Playback starts with the selected track.

Searching for a passage during playback

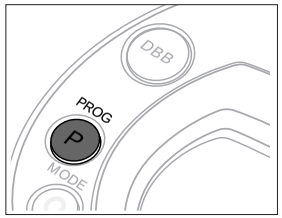
1 Keep ∞ or § pressed to find a particular passage in a backward or forward direction.
- y Searching starts while playback continues at low volume. After 2 seconds the search speeds up.

2 Release the button when you reach the desired passage.
- y Playback continues from this position.

Notes: – If the player is in SCAN mode (see MODE chapter), searching is not possible.
– In SHUFFLE, SHUFFLE REPEAT ALL or REPEAT mode (see MODE chapter), or while playing a program, searching is only possible within the particular track.

Programming track numbers

You can store up to 30 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 P to store the track.

- **PROGRAM** lights up; the track number programmed and P with the total number of stored tracks are displayed.

3 Select and store all desired tracks in this way.

4 Press 2 ; to start playback of your selected tracks.

- **PROGRAM** is shown and playback starts.

• You can review the program by pressing PROG P for more than 2 seconds.

- The display shows all the stored tracks in sequence.

Notes: – If you press PROG P and there is no track selected, SELECt is displayed.
– If you try to store more than 30 tracks, FULL is displayed.

Clearing the program

• While playback is stopped, press 9 to clear program.

- CLEAr is displayed once, **PROGRAM** goes off, and the program is cleared.

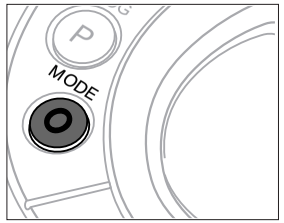
Note: The program will also be cleared if the power supply is interrupted, or if the CD-player lid is opened, or if the set switches off automatically.

Selecting different playing possibilities – MODE

It is possible to play tracks in random order, to repeat a single track or the entire CD, and to play the first few seconds of each track.

1 Press MODE during playback as often as required in order to activate one of the following 'modes'. The active mode is shown in the display.

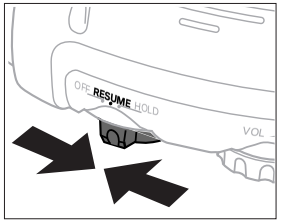
- **SHUFFLE**: All tracks of the CD are played in random order until all of them have been played once.
- **SHUFFLE REPEAT ALL**: All tracks of the CD are played repeatedly in random order.
- **REPEAT**: The current track is played repeatedly.
- **REPEAT ALL**: The entire CD is played repeatedly.
- SCAN: The first 10 seconds of each of the remaining tracks are played in sequence.



2 Playback starts in the chosen mode after 2 seconds.

• To return to normal playback, press MODE repeatedly until the display shows no active modes.

RESUME and HOLD



You can interrupt playback and continue (even after an extended period of time) from the position where playback stopped (RESUME) and you can lock all buttons of the set so that no action will be executed (HOLD). Use the RESUME–HOLD–OFF slider for these functions.

RESUME – continuing from where you have stopped

1 Switch the slider to RESUME during playback to activate RESUME.
- y **RESUME** is shown.

2 Press 9 whenever you want to stop playback.

3 Press 2 ; whenever you want to resume playback.
- y **RESUME** is shown and playback continues from where you have stopped.

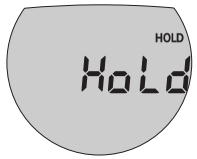
- To deactivate RESUME, switch the slider to OFF.
  - y **RESUME** goes off.

HOLD – locking all buttons

You can lock the buttons of the set by switching the slider to HOLD. Now, when a key is pressed, no action will be executed. This is of use, for example, when transporting the player in a bag. With HOLD activated, you can avoid accidental activation of other functions.

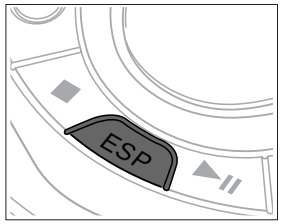
1 Switch the slider to HOLD to activate HOLD.
- y All buttons are locked. **HOLD** is shown when you press any button. If the set is switched off, **HOLD** will be shown only when 2 ; is pressed.

2 To deactivate HOLD, switch the slider to OFF.



Note: If you deactivate HOLD by switching the slider to RESUME, you will be activating the RESUME function.

ESP



Conventional portable CD-players subjected to a shock or vibration during playback often skip parts of the CD. The **E**LECTRONIC **S**KIP **P**ROTECTION (ESP) feature, with which your set is equipped, however, prevents such loss of continuity when your player is subjected to light vibrations. But ESP does not prevent playback interruptions caused by vigorous exercise. Nor does it protect against damage resulting from the player being dropped!

- Press ESP during playback to activate the skip protection.
  - y **ESP** is shown and the protection is activated.

- To deactivate the skip protection, press ESP again.
  - y **ESP** goes off and the protection is deactivated.

WARNING

Under no circumstances should you try to repair the set yourself as this will invalidate the guarantee.

If a fault occurs, first check the points listed, before taking the set for repair.

If you are unable to solve a problem by following these hints, consult your dealer or service centre.

Problem	Possible cause	Solution
No power, playback does not start	**Batteries** Batteries inserted incorrectly	Insert the batteries correctly.
	Batteries are empty.	Change the batteries.
	Contact pins are dirty.	Clean them with a cloth.
	Mains adapter Loose connection	Connect the adapter securely.
	In-car use Cigarette lighter is not powered when ignition is off.	Switch on ignition or insert batteries.
nF dISC indication	CD-RW (CD-R) is not recorded properly.	Use FINALIZE on the CD recorder to complete the recording.
no dISC indication	The CD is badly scratched or dirty.	Replace or clean the CD.
	CD is not or incorrectly inserted.	Insert a CD, label upwards.
	The laser lens is steamed up.	Wait until the lens has cleared.
HOLD indication and/or no reaction to controls	HOLD is activated.	Deactivate HOLD.
	Electrostatic discharge	Disconnect the set from power supply or take out the batteries for a few seconds.
The CD skips tracks.	The CD is damaged or dirty.	Replace or clean the CD.
	RESUME, **SHUFFLE** or **PROGRAM** is active.	Switch **RESUME**, **SHUFFLE** or **PROGRAM** off.
No sound or bad sound quality	PAUSE is activated.	Press 2 ; .
	Loose, wrong or dirty connections	Check and clean connections.
	Volume is not adjusted.	Adjust the volume.
	Malfunctions due to nearness of active mobile phones	Keep the player away from active mobile phones.
	Strong magnetic fields near the player	Change the player's position or connections.
	In-car use cassette adapter is inserted incorrectly.	Insert the cassette adapter correctly.
	Temperature inside the car is too high/low.	Let the player adjust to the temperature.
	Cigarette lighter socket is dirty.	Clean the cigarette lighter socket.
	Wrong playback direction of the car cassette player's autoreverse feature	Change the autoreverse direction.

CAUTION

Use of controls or adjustments or performance of procedures other than herein may result in hazardous radiation exposure or other unsafe operation.

ACCESSORIES

ACCESSORIES FOR CD-PORTABLE		ACT7585		
		/00	/01	/17
AY3170/00 AC/DC ADAPTOR	482221910617	X		
AY3160/02 AC/DC ADAPTOR	482221910449		X	
AY3170/17 AC/DC ADAPTOR	482221910616			X
AY3266 POUCH	314011310360	X	X	X
AY3362 BATTERY NIMH-R6	310330884120	X	X	X
AY3501/00 CAR ADAPTOR CASSETTE	482239710059	O	O	O
AY3545/00 CAR DC/DC CONVECTER	482221910033	O	O	O
AY3678V/00 HEADPHONE	482224211007	X	X	X
AY3860/00 ACTIVE SPEAKER BOX	482244510513	O	O	O
AY3464 HIFI CORD	482232011881	O	O	O

X - SUPPLY WITH THE SET
O - OPTIONAL AVAILABLE

FEATURES OVERVIEW

FEATURES OF CD-PORTABLE	ACT7585 all versions
ELECTRONIC SKIP PROTECTION (ESP)	43.2 sec.
CD REWRITABLE COMPATIBLE	X
POWER SAVE MODE (ESP)	-
HOLD / RESUME FUNCTION	X / X
DBB STAGES	2
ACOUSTIC FEEDBACK	X
PROGRAM MEMORY	30
RECHARGE FUNCTION NiCd / NiMH	- / X
EXTERNAL BATTERY BOX PREPARED	-
LCD ILLUMINATION	-
CORD REMOTE CONTROL PREPARED	-
LINE / DIGITAL OUTPUT	- / -

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

TRAINING MATERIAL

Portable CD 1994 – Principles of Electronic Shock Absorption System ESA, Key components 1994, Remote control system	4822 725 24941
Portable CD 1996 – Key components 1996, Battery charging, DC/DC-converter	4822 725 24986
Protable CD 1998 – Key components 1998, Power Save Mode PSM (available from April 1998 onwards)	4822 725 26017

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

SERVICE TEST PROGRAM

1. PRELIMINARY SETUP
- To enter the service test program disconnect the AC/DC adaptor and remove batteries, open the CD-door and hold the buttons “PLAY” & “PREV” depressed while turning power on (i.e. connecting the AC/DC adaptor).
- The display shows the software version of the built-in µP (i.e. “S - 2 6”). Versions are counted from “0 0” onwards; that means the higher the number the newer the software.
- The program is now in the main menu – various tests can be entered by pressing the corresponding buttons (see flow chart on next page or detailed description of available tests below).
- To exit the service test program press the “STOP“ button or disconnect the set from the power source.

2. DISPLAY TEST

Purpose: Check functionality of display and display driver.
- To enter the display test start the service test program and press the “NEXT” button.
- The display shows test pattern1. All segments are activated for finding open circuits (see flow chart on next page).
- To jump to the next pattern press the “NEXT” button.
- The display shows test pattern2. All alternate pins (2, 4, ...) are activated for finding short circuits (see flow chart on next page).
- To jump back to test pattern1 press the “NEXT” button, to exit the display test and return to the main menu press the “STOP” button.

3. KEY TEST

Purpose: Check operation of keys and cord remote control.
- To enter the key test start the service test program and press the “MODE” button.
- The display shows “- -”.
- Hold key depressed and check corresponding key code on the display. Key codes can be found in table1 (see flow chart on next page).
- To exit the key test and return to the main menu press the “STOP” button.

4. PLAYBACK TEST WITH ERROR ANALYSIS

Purpose: Analyze errors that occur during playback and search for intermittent failures.
- To enter the playback test start the service test program and press the “BASS” button.
- To start the error analysis press the “PLAY” button. Note that the playback test can only be entered if the CD-door is closed.
- The set will read the TOC and start playback.

As long as the playback is free of errors the display shows track and time information like in normal play-mode. In case of errors corresponding error codes will be displayed. The meaning of these error codes can be found in table2 (see flow chart on next page).

Note: Errors can either be *“fatal”* or *“non fatal”*. Fatal errors always stop the playback, non fatal errors only cause a short interruption of the music. Fatal errors are displayed as long as the set is connected to the power source, non fatal errors are displayed until a new error occurs or a button is pressed.

- To stop the playback test disconnect the set from the power source.

5. SERVO TEST

Purpose: Check door switch, inner switch of CD-drive, movement of slide and acceleration of discmotor.
- To enter the servo test start the service test program and press the “PLAY” button.
- The display shows “Cd *xy*”.
  “*x*” indicates state of door switch;
  “*y*” indicates state of inner switch.
  x,y = “0” means switch is closed; “1” means switch is open.
- To move slide outside hold the “NEXT” button depressed.
- To move slide inside hold the “PREV” button depressed.
- To accelerate the discmotor clockwise hold the “MODE” button depressed.
- To accelerate the discmotor counter-clockwise hold the “PROG” button depressed.
- To enter the focus test press the “PLAY” button, to exit the servo test and return to the main menu press the “STOP” button.

6. FOCUS TEST

Purpose: Check movement of lens and operation of focus servo for CDDA and CDRW discs.

> Since the CDRW reflects much less light than an ordinary CDDA, the gain of the HF-amplifier stage and the sensitivity of the ADC inside the Decoder&Digital Servo IC “CD10” must be adapted accordingly.
> The gain is switched via the CDRW input of the HF-preamplifier.
> The ADC-sensitivity is set via software parameters (sent from µP to “CD10”). In total, there are 4 sensitivity modes available: 1 for CDDA and 3 for CDRW. The modes are listed in table3 (see next page).
> In normal play-mode, the correct focus sensitivity is choosen automatically during start-up (see “Start-up procedure” on previous page).
> In the service test program, the sensitivity can be choosen manually in order to allow individual measurements in several modes.

- The focus servo loop is switched on and the set starts searching the focus (“focus ramping”). As soon as the focus has been found the focus servo loop is closed and the state of the focus is monitored continuously.
- If the focus is OK the display shows “ F *x*”, else “- F *x*”.
  “x” indicates the sensitivity mode. Details can be found in table3 (see flow chart on next page).
- To toggle between sensitivity modes press the “BASS” button.
- To move slide outside hold the “NEXT” button depressed.
- To move slide inside hold the “PREV” button depressed.
- To accelerate the discmotor clockwise hold the “MODE” button depressed.
- To accelerate the discmotor counter-clockwise hold the “PROG” button depressed.
- In case the focus is OK the discmotor test can be entered by pressing the “PLAY” button, to exit the focus test and return to the main menu press the “STOP” button.

7. DISCMOTOR TEST

Purpose: Check speed regulation of discmotor.
- The speed regulation is switched on and the discmotor starts rotating. If the speed reaches 75% of the nom. speed the display shows “ d”, else “- d”.
- In parallel also the state of the focus is monitored continuously (display “ F *x*” or “- F *x*”).
- In case the disc speed is OK and the focus is OK the radial test can be entered by pressing the “PLAY” button, to exit the discmotor test and return to the main menu press the “STOP” button.

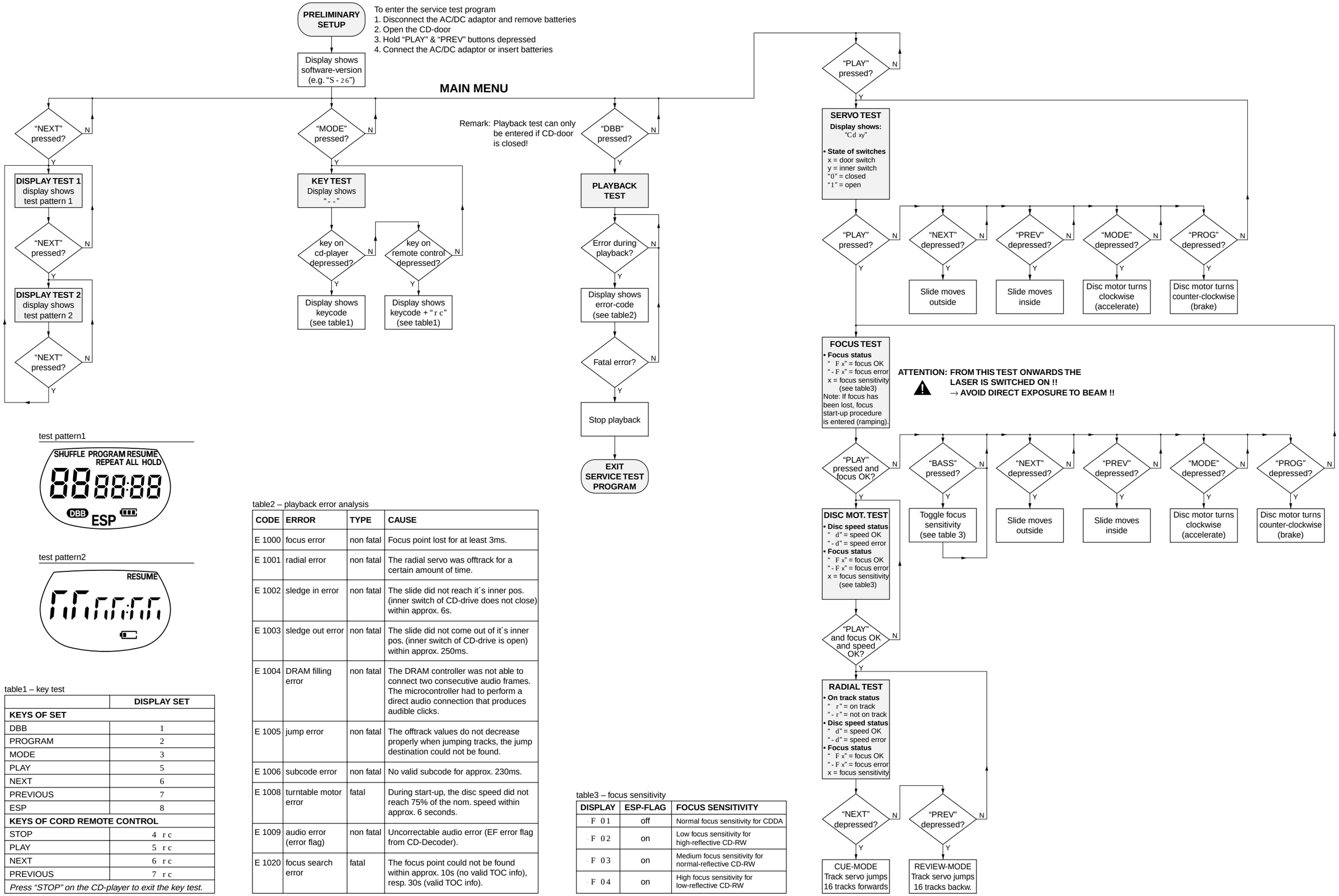
8. RADIAL TEST

Purpose: Check if radial loop locks and an audio signal is audible at the headphone output.
- The radial servo loop is switched on, mute is released and the audio signal is audible. If the system is on track the display shows “ r”, else “- r”.
- In parallel also the disc speed (display “ d” or “- d”) and the state of the focus (display “ F *x*” or “- F *x*”) are monitored continuously.
  Note: In case of radial errors the audio output is muted and muting is not released automatically when the systems recovers from the error. “- r” remains on the display.
  To open mute again press the “NEXT” or “PREV” button.
- To jump 16 tracks outside press the “NEXT” button.
- To jump 16 tracks inside press the “PREV” button.
- To exit the radial test and return to the main menu press the “STOP” button, to exit the service test program disconnect the set from the power source.

<u>Important remark:</u>

In radial test mode data to the DRAM is written at 1.2 times the nominal speed, and read from the DRAM at nominal speed. Because writing is done faster than reading the DRAM gets full after a certain time.
In normal play mode the system would now wait until the DRAM is partly emptied again, jump backwards and resume filling at the last written position. However, in radial test mode the jumps would disturb measurements on the radial servo loop.
Therefore this function has been disabled and filling restarts immediately from the current position of the pick-up unit. As a result “jumps” are audible during playback.

SERVICE TSET PROGRAM



test pattern1

test pattern2

table1 – key test

	DISPLAY SET
KEYS OF SET	
DBB	1
PROGRAM	2
MODE	3
PLAY	5
NEXT	6
PREVIOUS	7
ESP	8
KEYS OF CORD REMOTE CONTROL	
STOP	4 rc
PLAY	5 rc
NEXT	6 rc
PREVIOUS	7 rc
Press “STOP” on the CD-player to exit the key test.	

table2 – playback error analysis

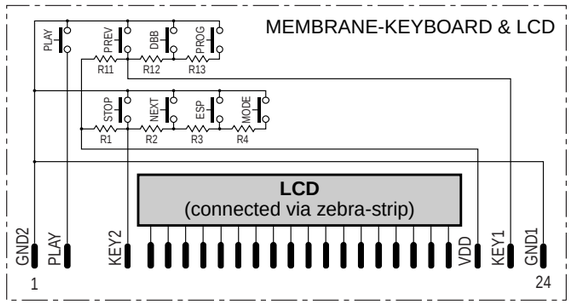
CODE	ERROR	TYPE	CAUSE
E 1000	focus error	non fatal	Focus point lost for at least 3ms.
E 1001	radial error	non fatal	The radial servo was offtrack for a certain amount of time.
E 1002	sledge in error	non fatal	The slide did not reach it´s inner pos. (inner switch of CD-drive does not close) within approx. 6s.
E 1003	sledge out error	non fatal	The slide did not come out of it´s inner pos. (inner switch of CD-drive is open) within approx. 250ms.
E 1004	DRAM filling error	non fatal	The DRAM controller was not able to connect two consecutive audio frames. The microcontroller had to perform a direct audio connection that produces audible clicks.
E 1005	jump error	non fatal	The offtrack values do not decrease properly when jumping tracks, the jump destination could not be found.
E 1006	subcode error	non fatal	No valid subcode for approx. 230ms.
E 1008	turntable motor error	fatal	During start-up, the disc speed did not reach 75% of the nom. speed within approx. 6 seconds.
E 1009	audio error (error flag)	non fatal	Uncorrectable audio error (EF error flag from CD-Decoder).
E 1020	focus search error	fatal	The focus point could not be found within approx. 10s (no valid TOC info), resp. 30s (valid TOC info).

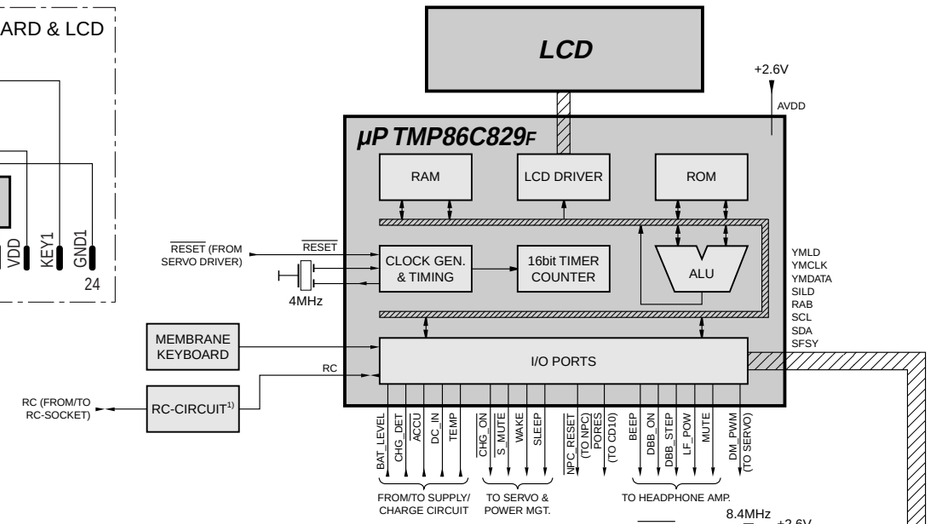
table3 – focus sensitivity

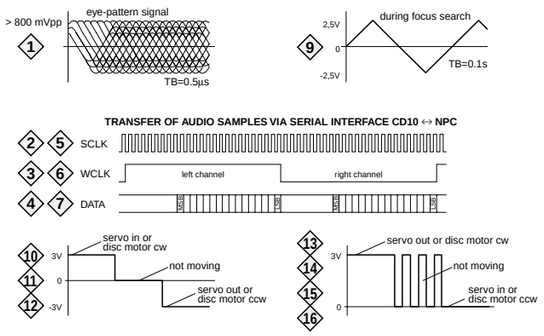
DISPLAY	ESP-FLAG	FOCUS SENSITIVITY
-F 01	off	Normal focus sensitivity for CDDA
-F 02	on	Low focus sensitivity for high-reflective CD-RW
-F 03	on	Medium focus sensitivity for normal-reflective CD-RW
-F 04	on	High focus sensitivity for low-reflective CD-RW

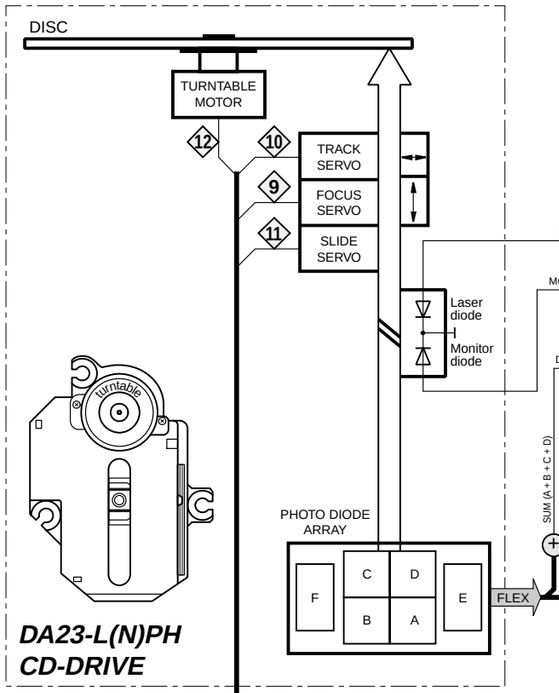
3-3

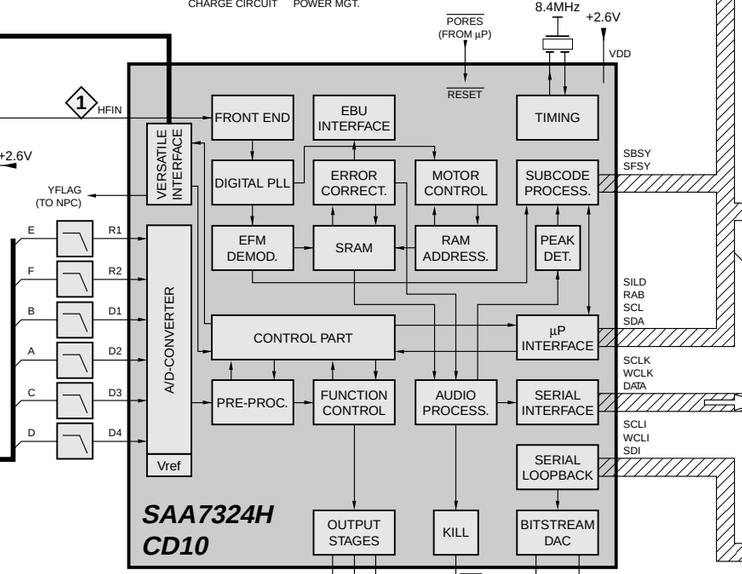
BLOCK DIAGRAM

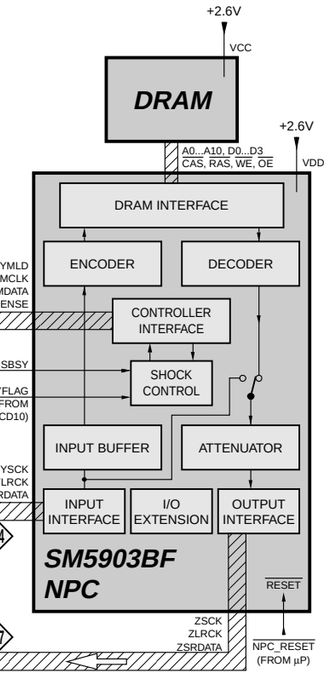


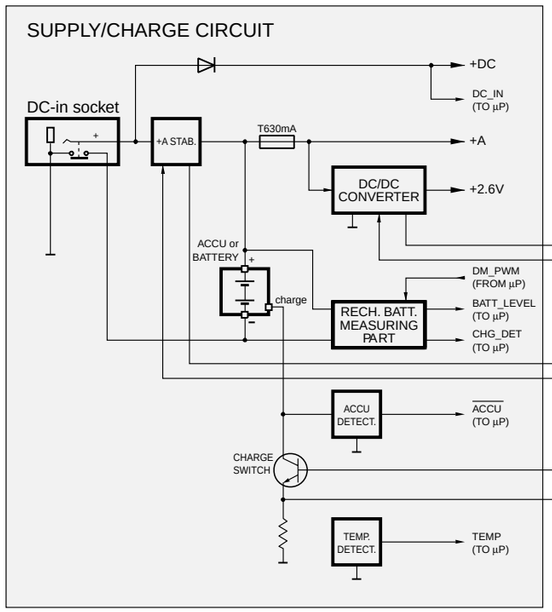


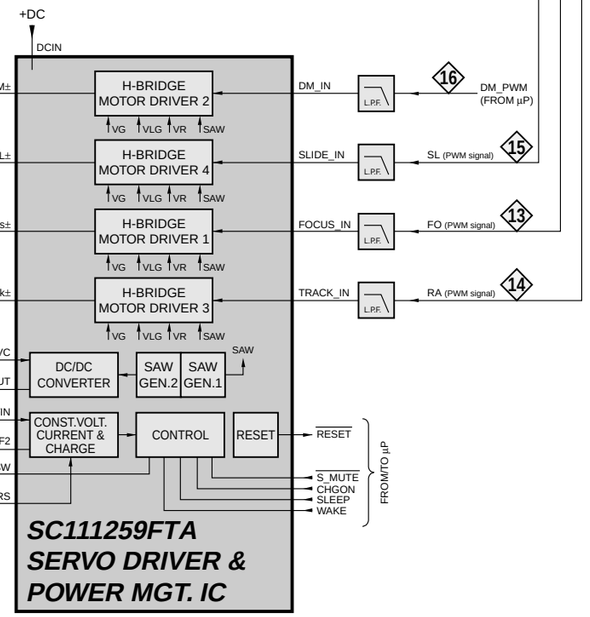


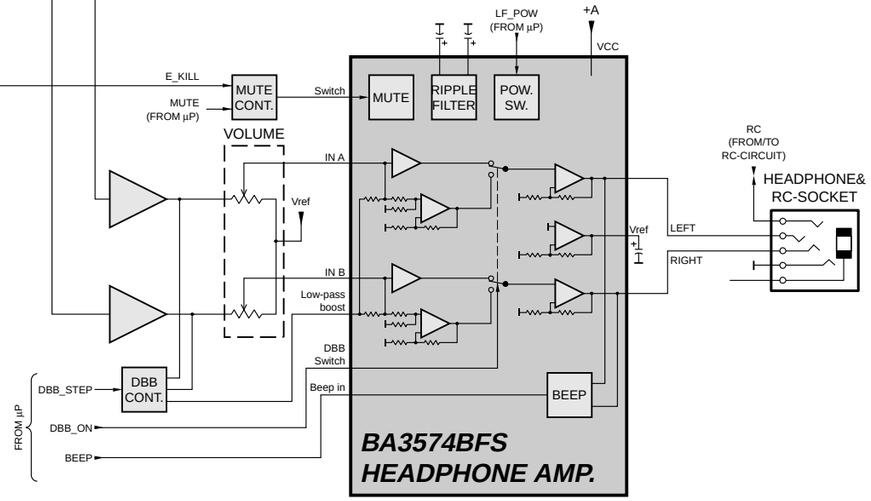






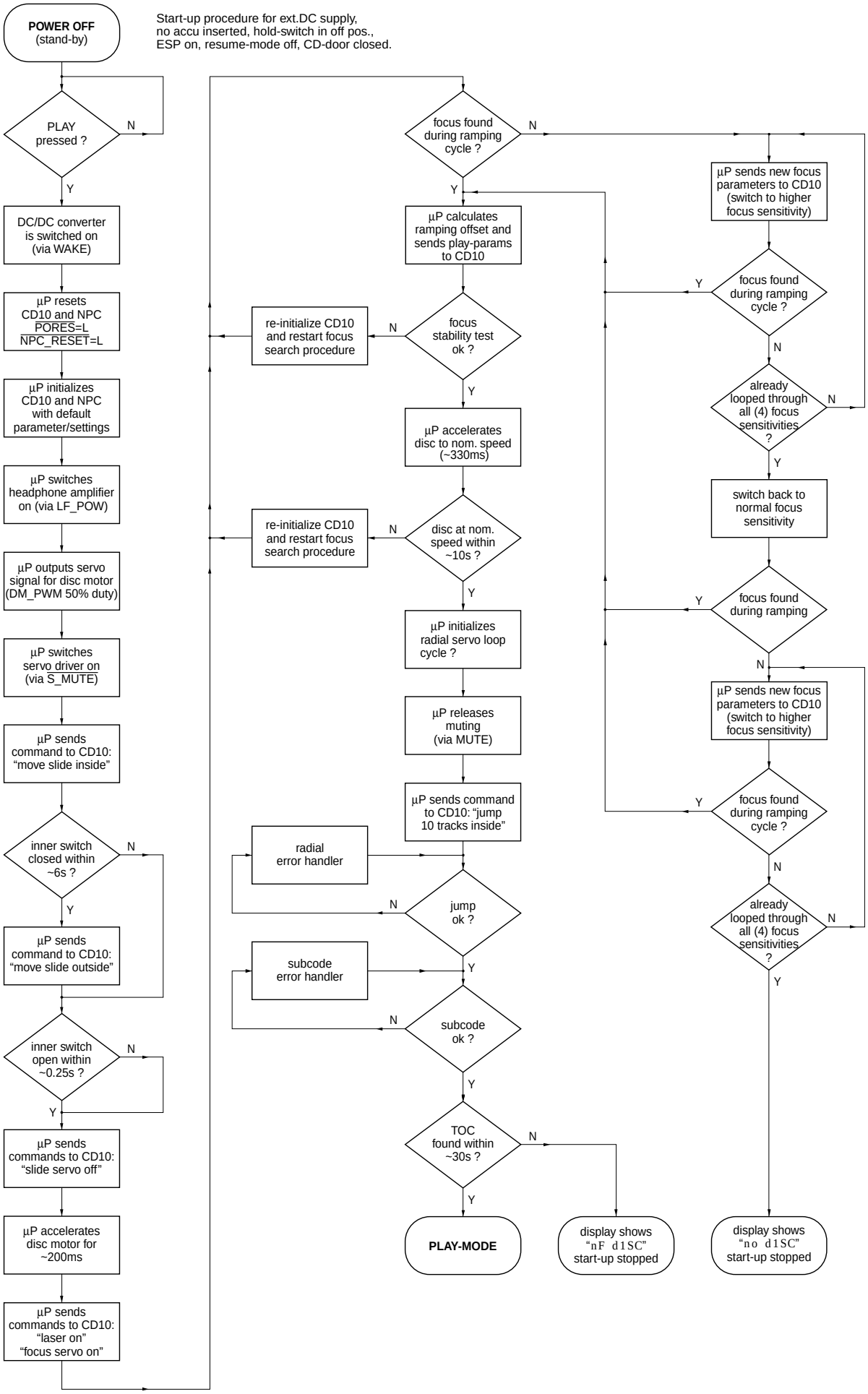






1) not on all versions

START-UP PROCEDURE



PIN DESCRIPTION OF INTEGRATED CIRCUITS

TZA1024 – HF-PREAMPLIFIER AND LASER SUPPLY CIRCUIT

Pin	*Name*	*Direction*	*Description*
1	LD	HF-preamp → CD-drive	current output to laser diode
2	VCCL	+2.6V	laser supply voltage
3	CFIL	→ HF-preamp	external filter capacitor
4	MON	CD-drive → HF-preamp	laser monitor diode input
5	DIN	CD-drive → HF-preamp	central diode input
6	GND	GND	ground
7	PWRON	CD10 → HF-preamp	power-on select input
8	CMFB	+2.6V / 2	common mode feedback voltage input
9	RFFB	→ HF-preamp	external RF feedback resistor
10	RFEQO	HF-preamp →	RF amplifier output
11	CDRW	CD10 → HF-preamp	gain select input for CDDA/CDRW
12	EQSEL	CD10 → HF-preamp	equalizer/speed select input
13	VCC2	+2.6V	supply voltage
14	RGADJ	GND	external laser supply gain adjust resistor

SC111259FTA – SERVO DRIVER & POWER MANAGEMENT IC

Pin	*Name*	*Direction*	*Description*
1	SLEEP	µP → servo driver	sleep input
2	WAKW	µP → servo driver	wake input
3	VR	+VR	reference voltage input (motor driver)
4	ERR4	CD10 → servo driver	control signal input (slide error signal)
5	CF4	→ servo driver	phase correction capacitor connect (CH4)
6	CF3	→ servo driver	phase correction capacitor connect (CH3)
7	ERR3	CD10 → servo driver	control signal input (radial error signal)
8	ERR2	CD10/µP → servo driver	control signal input (disc speed error signal)
9	CF2	→ servo driver	phase correction capacitor connect (CH2)
10	CF1	→ servo driver	phase correction capacitor connect (CH1)
11	ERR1	CD10 → servo driver	control signal input (focus error signal)
12	OUT1A	servo driver → CD-drive	positive drive output (CH1)
13	PGND1	GND	H-bridge driver ground
14	OUT1B	servo driver → CD-drive	negative drive output (CH1)
15	VIN12	+A	CH1 and CH2 H-bridge driver supply voltage
16	OUT2B	servo driver → CD-drive	negative drive output (CH2)
17	PGND2	GND	H-bridge driver ground
18	OUT2A	servo driver → CD-drive	positive drive output (CH2)
19	OUT3A	servo driver → CD-drive	positive drive output (CH3)
20	PGND2	GND	H-bridge driver ground
21	OUT3B	servo driver → CD-drive	negative drive output (CH3)
22	VIN34	+A	CH3 and CH4 H-bridge driver supply voltage
23	OUT4B	servo driver → CD-drive	negative drive output (CH4)
24	PGND4	GND	H-bridge driver ground
25	OUT4A	servo driver → CD-drive	positive drive output (CH4)
26	VG	+VG	charge pump output
27	C2H	→ servo driver	charge pump capacitor connect
28	C1H	→ servo driver	charge pump capacitor connect
29	C1L	→ servo driver	charge pump capacitor connect
30	C2L	→ servo driver	charge pump capacitor connect
31	VIN	battery → servo driver	battery supply voltage
32	RSTB	servo driver → µP	reset block output
33	CHGSW	servo driver → charge circuit	transistor drive output for battery charger
34	RS	charge circuit → servo driver	OpAmp non-inverting input for battery charger
35	INM2	+A stabilizer → servo driver	error amplifier inverting input
36	RF2	+A stabilizer → servo driver	error amplifier output
37	DCIN	+DC	DC power supply from AC/DC adaptor
38	VDET	servo driver →	DCIN over voltage and VIN low voltage detect output
39	VREF	servo driver →	Voltage reference circuit output
40	DTC	→ servo driver	max. duty control voltage input for power management
41	VOUT	servo driver → DC/DC converter	PWM output for power management
42	VC	→ servo driver	power management power supply
43	CGND	GND	internal ground
44	RF1	→	OpAmp output for power management
45	INM1	→ servo driver	OpAmp inverting input for power management
46	CLK	→ servo driver	clock input
47	OE	µP → servo driver	output enable for motor drivers
48	CHGON	µP → servo driver	charge enable for battery charger

SAA7324 – DECODER, DIGITAL SERVO IC AND D/A-CONVERTER CD10 (low voltage version)

Pin	*Name*	*Direction*		*Description*
1	HFREF	→ CD10		comparator common mode input
2	HFIN	→ CD10		comparator signal input
3	ISLICE	CD10 →		current feedback from data slicer
4	VSSA1	GND		analog ground 1
5	VDDA1	+2.6V		analog supply voltage 1
6	IREF	CD10 →		reference current output pin
7	VRIN	CD10 →		reference voltage for servo ADC's
8	D1	CD-drive → CD10		unipolar current input (central diode signal input)
9	D2	CD-drive → CD10		unipolar current input (central diode signal input)
10	D3	CD-drive → CD10		unipolar current input (central diode signal input)
11	D4	CD-drive → CD10		unipolar current input (central diode signal input)
12	R1	CD-drive → CD10		unipolar current input (satellite diode signal input)
13	R2	CD-drive → CD10		unipolar current input (satellite diode signal input)
14	VSSA2	GND		analog ground 2
15	CROUT	CD10 → X-TAL		crystal/resonator output
16	CRIN	X-TAL → CD10		crystal/resonator input
17	VDDA2	+2.6V		analog supply voltage 2
18	LN	CD10 →		DAC left channel differential output - negative
19	LP	CD10 →		DAC left channel differential output - positive
20	VNEG	GND		DAC negative reference input
21	VPOS	+2.6V		DAC positive reference input
22	RN	CD10 →		DAC right channel differential output - negative
23	RP	CD10 →		DAC right channel differential output - positive
24	SELPLL	CD10 →		selects whether internal clock multiplier PLL is used
25	TEST1	GND		test control input 1; this pin should be tied low
26	CL16	CD10 → NPC		16.9344 MHz system clock output
27	DATA	CD10 → NPC		serial data output (3-state)
28	WCLK	CD10 → NPC		word clock output (3-state)
29	SCLK	CD10 → NPC		serial bit clock output (3-state)
30	EF	CD10 → NPC		C2 error flag output (3-state)
31	TEST2	GND		test control input 2; this pin should be tied low
32	KILL	CD10 → Mute control		kill output (programmable; open-drain)
33	VSSD1	GND		digital ground 2
34	V2/V3	CD10 → NPC	CD10	versatile I/O: input versatile pin 2 or output versatile pin 3 (open-drain)
35	WCLI	NPC → CD10		word clock input (for data loopback to DAC)
36	SDI	NPC → CD10		serial data input (for data loopback to DAC)
37	SCLI	NPC → CD10		serial bit clock input (for data loopback to DAC)
38	RESETn	µP → CD10		power-on reset input (active low)
39	SDA	µP ↔ CD10		microcontroller interface data I/O line (open-drain output)
40	SCL	µP → CD10		microcontroller interface clock line input
41	RAB	µP → CD10		microcontroller interface R/W and load control line input (4-wire bus mode)
42	SILD	µP → CD10		microcontroller interface R/W and load control line input (4-wire bus mode)
43	STATUS	CD10 →		servo interrupt request line/decoder status register output (open-drain)
44	TEST3	GND		test control input 3; this pin should be tied low
45	RCK	→ CD10		subcode clock input
46	SUB	CD10 →		P-to-W subcode bits output (3-state)
47	SFSY	CD10 → µP		subcode frame sync output (3-state)
48	SBSY	CD10 → NPC		subcode block sync output (3-state)
49	CL11/4	CD10 →		11.2896 MHz or 4.2336 MHz (for microcontroller) clock output
50	VSSD2	GND		digital ground 3
51	DOBM	CD10 →		bi-phase mark output (externally buffered; 3-state)
52	VDDD1P	+2.6V		digital supply voltage 2 for periphery
53	CFLG	CD10 →		correction flag output (open-drain)
54	RA	CD10 → servo driver		radial actuator output
55	FO	CD10 → servo driver		focus actuator output
56	SL	CD10 → servo driver		slide control output
57	VDDD2C	+2.6V		digital supply voltage 3 for core
58	VSSD3	GND		digital ground 4
59	MOTO1	→ servo driver		motor output 1; versatile (3-state)
60	MOTO2	CD10 →		motor output 2; versatile (3-state)
61	V4	CD10 → HF-preamp		versatile output pin 4
62	V5	CD10 → HF-preamp		versatile output pin 5
63	V1	innerswitch → CD10		versatile input pin 1
64	LDON	CD10 → HF-preamp		laser drive on output (open-drain)

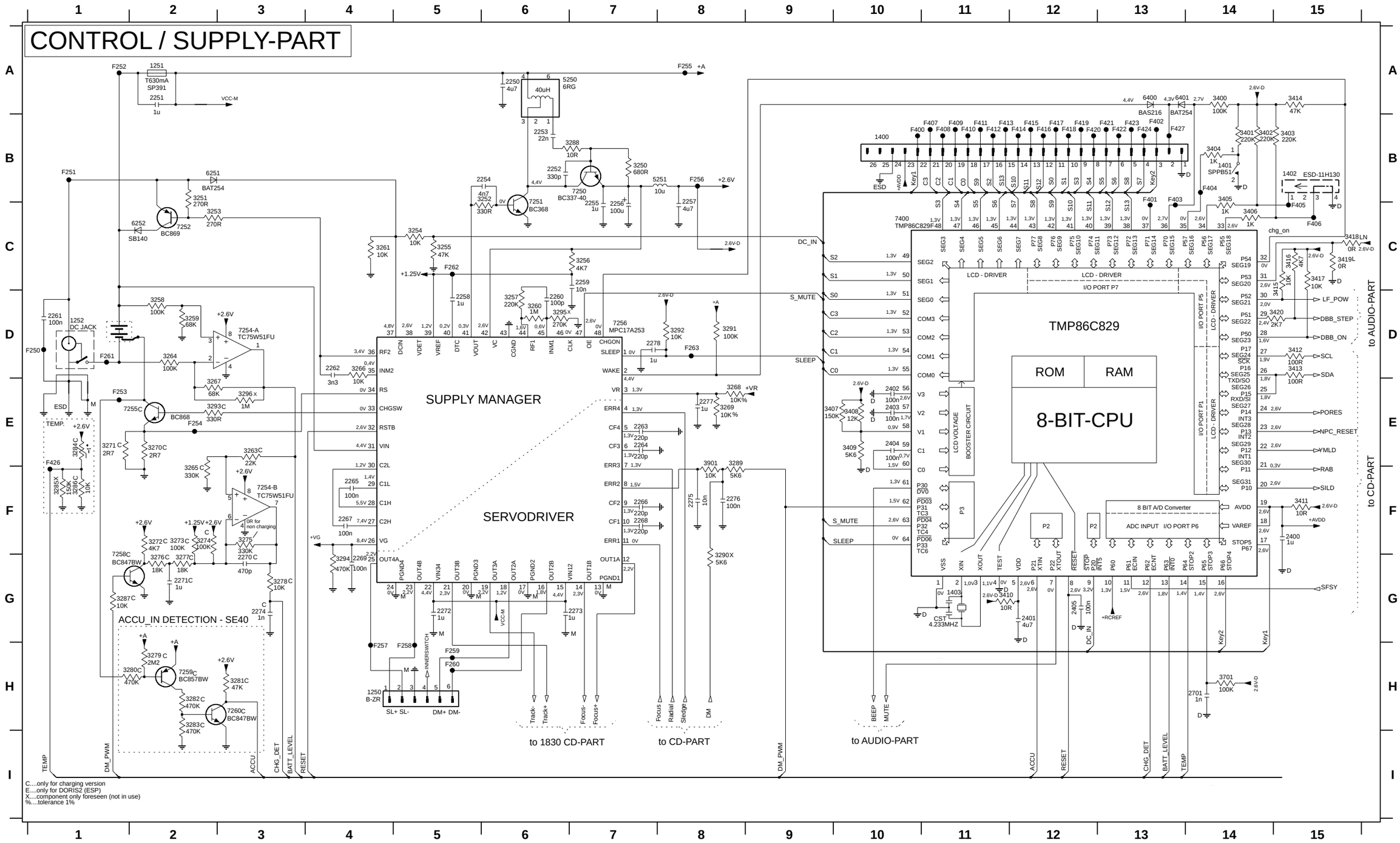
SM5903BF – COMPRESSION-TYPE ANTI-SHOCK MEMORY CONTROLLER NPC

Pin	*Name*	*Direction*	*Description*
1	VDD	+2.6V	supply voltage
2	UC1	NPC ↔	µP interface extension I/O line 1
3	UC2	NPC ↔	µP interface extension I/O line 2
4	UC3	NPC ↔	µP interface extension I/O line 3
5	UC4	NPC ↔	µP interface extension I/O line 4
6	UC5	NPC ↔	µP interface extension I/O line 5
7	TEST1/DIT	NPC →	digital audio interface output
8	TEST2	+2.6V	test pin
9	CLK	CD10 → NPC	16.9344MHz clock input
10	VSS	GND	ground
11	YSRDATA	CD10 → NPC	audio serial data input
12	YLRCK	CD10 → NPC	audio serial L/R clock input
13	YSCK	CD10 → NPC	audio serial bit clock input
14	ZSCK	NPC → CD10	audio serial bit clock output
15	ZLRCK	NPC → CD10	audio serial L/R clock output
16	ZSRDATA	NPC → CD10	audio serial data output
17	YFLAG	CD10 → NPC	signal processor IC RAM overflow flag
18	YFCLK	GND	crystal-controlled frame clock input
19	YBLKCK	CD10 → NPC	subcode block clock signal output
20	RESET	µP → NPC	system reset input (active low)
21	ZSENSE	NPC →	µP interface status output
22	VDD2	+2.6V	supply voltage
23		→ NPC	forced mute input
24	YMLD	µP → NPC	µP interface latch clock input
25	YMDATA	µP → NPC	µP interface serial data input
26	YMCLK	µP → NPC	µP interface shift clock input
27	OE	NPC → DRAM	DRAM OE control output (active low)
28	CAS	NPC → DRAM	DRAM CAS control output (active low)
29	D2	NPC ↔ DRAM	DRAM data input/output 2
30	D3	NPC ↔ DRAM	DRAM data input/output 3
31	D0	NPC ↔ DRAM	DRAM data input/output 0
32	D1	NPC ↔ DRAM	DRAM data input/output 1
33	WE	NPC → DRAM	DRAM WE control output (active low)
34	RAS	NPC → DRAM	DRAM RAS control output (active low)
35	A9	NPC → DRAM	DRAM address output 9
36	A8	NPC → DRAM	DRAM address output 8
37	A7	NPC → DRAM	DRAM address output 7
38	A6	NPC → DRAM	DRAM address output 6
39	A5	NPC → DRAM	DRAM address output 5
40	A4	NPC → DRAM	DRAM address output 4
41	A0	NPC → DRAM	DRAM address output 0
42	A1	NPC → DRAM	DRAM address output 1
43	A2	NPC → DRAM	DRAM address output 2
44	A3	NPC → DRAM	DRAM address output 3

YDMUTE

CONTROL / SUPPLY PART - CIRCUIT DIAGRAM

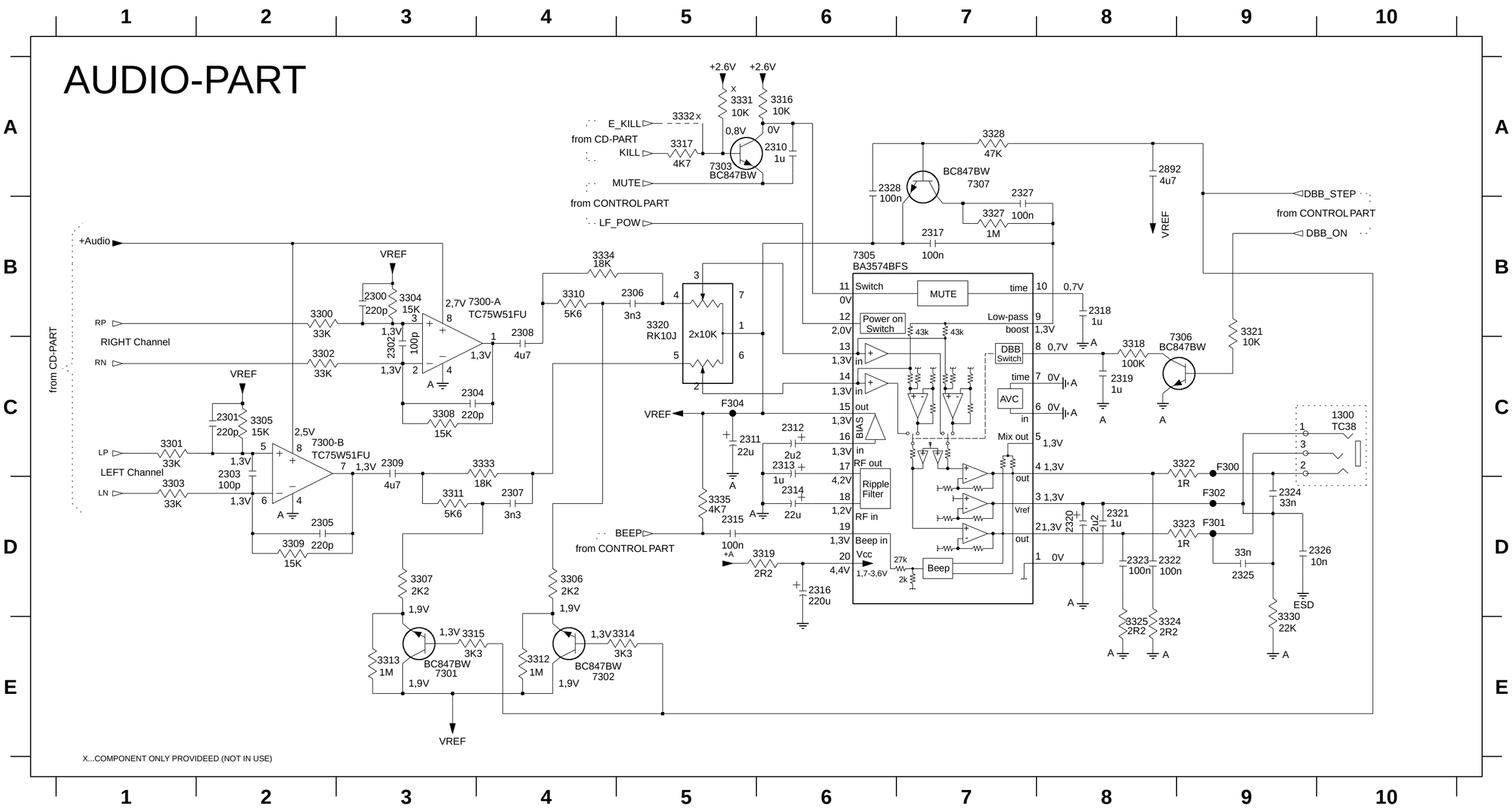
4-1



4-2

AUDIO PART - CIRCUIT DIAGRAM

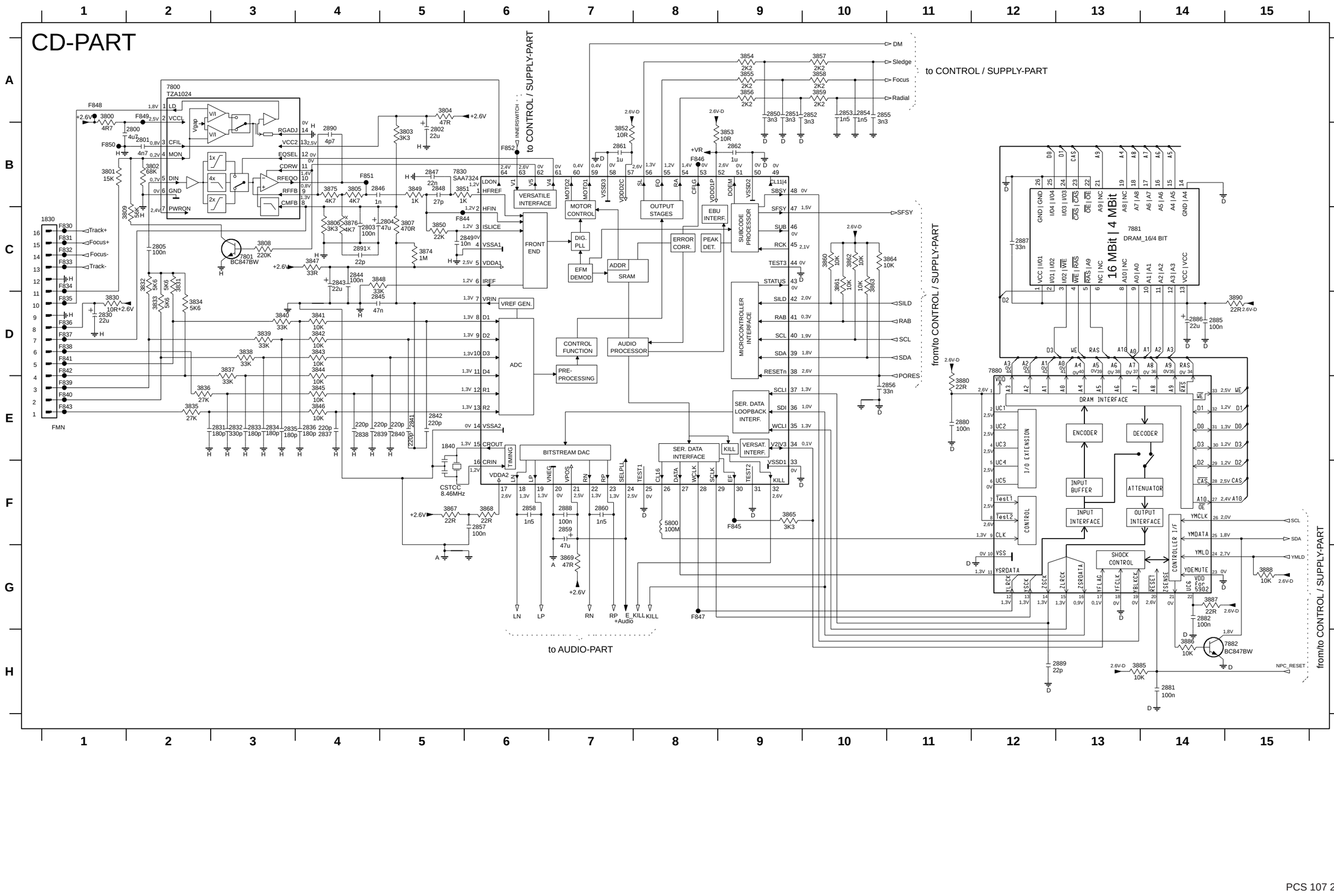
1300 C10	2304 C3	2309 C3	2314 D6	2319 C8	2324 D9	2892 A8	3304 B3	3309 D2	3314 E5	3319 D6	3324 E8	3331 A5	7300-A B3	7305 B6	F302 D9
2300 B3	2305 D2	2310 A6	2315 D5	2320 D8	2325 D9	3300 B2	3305 C2	3310 B4	3315 E3	3320 B5	3325 E8	3332 A5	7300-B C2	7306 C9	F304 C5
2301 C2	2306 B5	2311 C5	2316 D6	2321 D8	2326 D9	3301 C1	3306 D4	3311 D3	3316 A5	3321 B9	3327 B7	3333 C4	7301 E3	7307 A7	
2302 C3	2307 D4	2312 C6	2317 B7	2322 D8	2327 A7	3302 C2	3307 D3	3312 E4	3317 A5	3322 C9	3328 A7	3334 B4	7302 E4	F300 C9	
2303 D2	2308 B4	2313 C6	2318 B8	2323 D8	2328 A6	3303 D1	3308 C3	3313 E3	3318 C8	3323 D9	3330 D9	3335 D5	7303 A5	F301 D9	



4-3

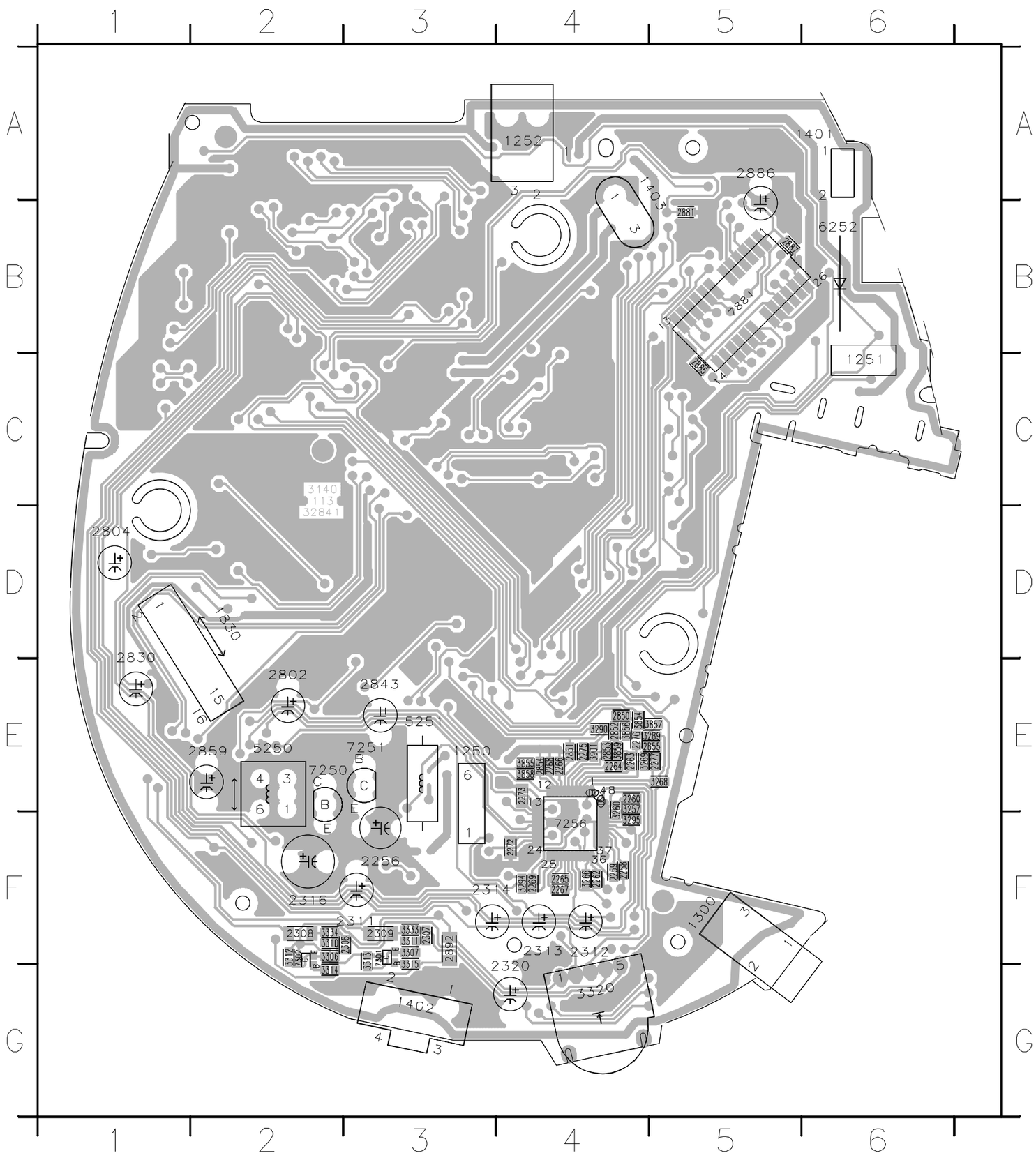
CD PARTD - CIRCUIT DIAGRAM

1830 C1 1840 E5 2800 B1 2801 B2 2802 B5 2803 C4 2804 C4 2805 C2 2830 D1 2831 E2 2832 E3 2833 E3 2834 E3 2835 E3 2836 E3 2837 E4 2838 E4 2839 E4 2840 E5 2841 E5 2842 E5 2843 C4 2844 C4 2845 D4 2846 B4 2847 B5 2848 B5 2849 C5 2850 A9 2851 A9 2852 A9 2853 A10 2854 A10 2855 A10 2856 E10 2857 F5 2858 F6 2859 F7 2860 F7 2861 B7 2862 B9 2880 E11 2881 H14 2882 G14 2885 D14 2886 D14 2887 C12 2888 F7 2889 H12 2890 B4 2891 C4 3800 A1 3801 B1 3802 B2 3803 C5 3804 A5 3805 B4 3806 C4 3807 C5 3808 C3 3809 C2 3830 D1 3831 C1 3832 C2 3833 C2 3834 C2 3835 E2 3836 E2 3837 D3 3838 D3 3839 D3 3840 D3 3841 D4 3842 D4 3843 D4 3844 D4 3845 E4 3846 E4 3847 C4 3848 C4 3849 B5 3850 C5 3851 B5 3852 B7 3853 B8 3854 A9 3855 A9 3856 A9 3857 A10 3858 A10 3859 A10 3860 C10 3861 C10 3862 C10 3863 C10 3864 C10 3865 F9 3867 F5 3868 F6 3869 G7 3874 C5 3875 B4 3876 C4 3880 E11 3885 H13 3886 H14 3887 G14 3888 G15 3890 D15 7800 A2 7801 C3 7830 B5 7880 D12 7881 C12 7882 H14 F830 C1 F831 C1 F832 C1 F833 C1 F834 C1 F835 D1 F836 D1 F837 D1 F838 D1 F839 E1 F840 E1 F841 E1 F842 D1 F843 E1 F844 C5 F845 F9 F846 B8 F847 G8 F848 B4 F849 A2 F850 B1 F851 B4 F852 B6



4-4

LAYOUT DIAGRAM - COMPONENT SIDE VIEW



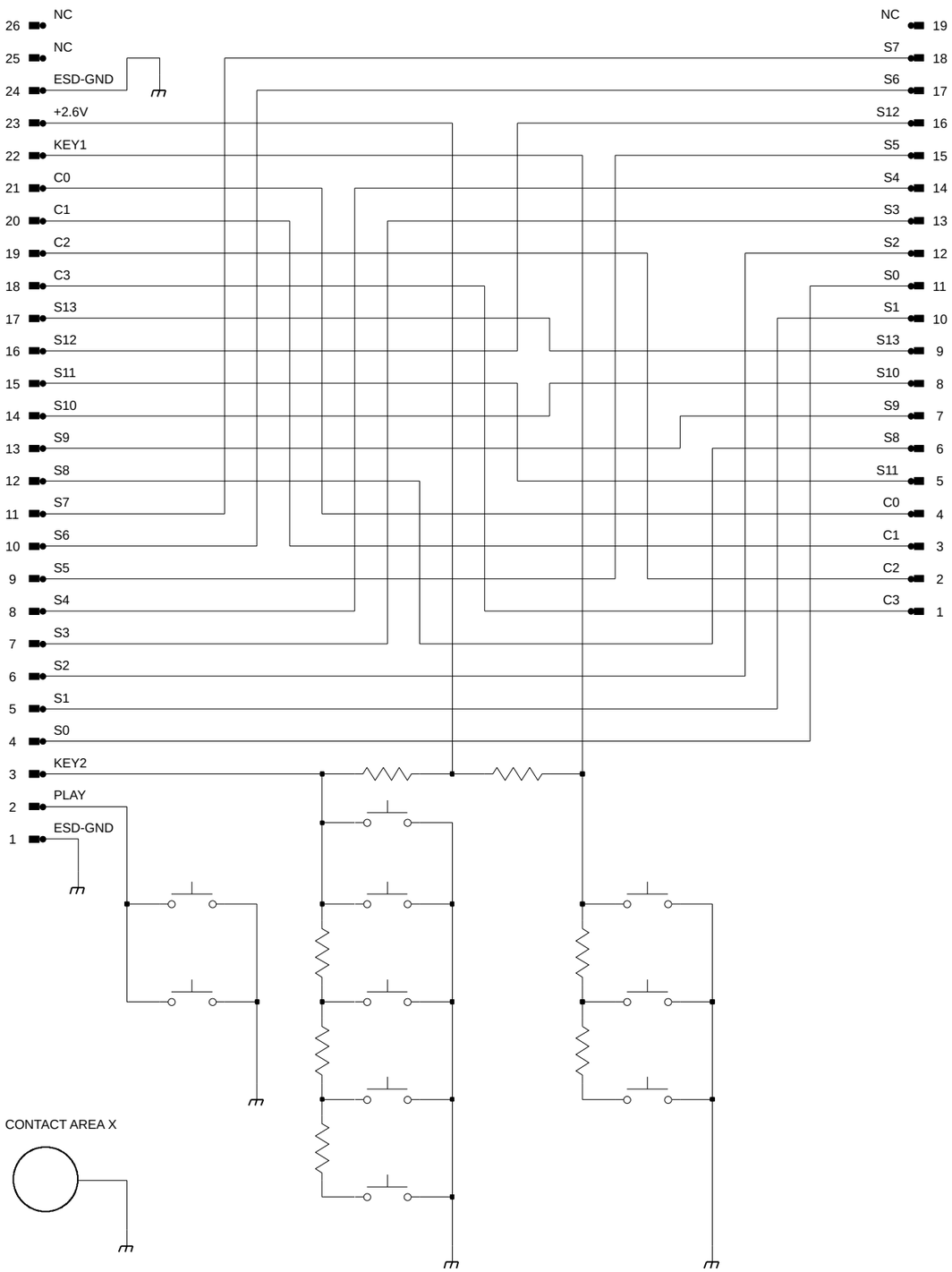
1250 F4	2802 E1	3313 H3
1251 C8	2804 E1	3314 H3
1252 A5	2830 F1	3315 H4
1300 H6	2843 F4	3320 I5
1401 B8	2850 F6	3322 H6
1402 H4	2851 F5	3323 H6
1403 A6	2852 F6	3324 H6
1830 F2	2853 F5	3325 H6
2256 G3	2854 G5	3333 H4
2258 G6	2855 F6	3334 H3
2259 G6	2859 F2	3704 A7
2260 G6	2881 B6	3708 A7
2262 H5	2885 C6	3854 F6
2263 F6	2886 A7	3855 G5
2264 F6	2887 B7	3856 F6
2265 H5	2892 H4	3857 F6
2266 G5	2893 A7	3858 G5
2267 H5	3257 G6	3859 F6
2268 G5	3260 G6	3901 F5
2269 H5	3265 C5	5250 F2
2270 C5	3266 H5	5251 F4
2272 G5	3268 F6	6252 B7
2273 G5	3269 G6	7250 F3
2274 C5	3272 C5	7251 F4
2275 F5	3273 C5	7256 G5
2276 F6	3274 C5	7300 G2
2277 G6	3275 C5	7301 H4
2278 H6	3276 C5	7302 H3
2300 G2	3277 C5	7701 A7
2301 G2	3278 D5	7881 B7
2302 G2	3289 A7	
2303 G2	3290 F5	
2304 G2	3294 H5	
2305 G2	3295 G6	
2306 H3	3300 G2	
2307 H4	3301 G2	
2308 H3	3302 G2	
2309 H3	3303 G2	
2311 H3	3304 G2	
2312 H5	3305 G2	
2313 H5	3306 H3	
2314 H4	3307 H4	
2316 G3	3308 G2	
2320 H5	3309 G2	
2322 H6	3310 H3	
2323 H6	3311 H4	
2702 A7	3312 H3	

4-5

LAYOUT DIAGRAM - COPPER SIDE VIEW

1400 A4	2846 C5	3318 F4	3837 B5	7306 E5
1840 C4	2847 C4	3319 E5	3838 B5	7307 E5
2250 D4	2848 C4	3321 E5	3839 B5	7400 A4
2251 A1	2849 C4	3327 E4	3840 C5	7800 C5
2252 D5	2856 D3	3328 E5	3841 C5	7801 D5
2253 D5	2857 B3	3331 B3	3842 B5	7830 C3
2254 E3	2858 C3	3332 C3	3843 B5	7880 A2
2255 E4	2860 C3	3335 E4	3844 B5	7882 A2
2257 D4	2861 D4	3400 A5	3845 B5	
2261 A3	2862 D4	3401 A5	3846 B5	
2271 A3	2880 B2	3402 A5	3847 D4	
2310 C2	2882 A2	3403 A5	3848 C4	
2315 E4	2888 C3	3404 A5	3849 C5	
2317 E4	2889 A2	3405 A5	3850 C4	
2318 F4	2890 D5	3406 A5	3851 C4	
2319 F4	2891 D4	3407 A4	3852 D4	
2321 F4	3250 D5	3408 A4	3853 D4	
2324 E2	3251 A2	3409 A4	3860 D3	
2325 E2	3252 E3	3410 A3	3861 D3	
2326 E2	3253 A1	3411 B5	3862 D3	
2327 E4	3254 A2	3412 B5	3863 D3	
2328 E5	3255 A2	3413 B5	3864 D3	
2400 B5	3256 E3	3414 A5	3865 C3	
2401 B4	3258 B3	3415 B5	3867 B3	
2402 A4	3259 B3	3416 B5	3868 C3	
2403 A4	3261 A2	3417 B5	3869 C3	
2404 A4	3263 B3	3418 A5	3874 C4	
2405 B4	3264 A3	3419 A5	3875 D5	
2701 B4	3267 B3	3420 B5	3876 D5	
2800 C5	3270 D3	3701 B4	3880 A2	
2801 C5	3271 D3	3800 C5	3885 A2	
2803 C5	3279 B2	3801 C5	3886 A2	
2805 B5	3280 B2	3802 C5	3887 A2	
2831 B5	3281 B3	3803 C5	3888 A2	
2832 B5	3282 B3	3804 D6	3890 A2	
2833 B5	3283 B3	3805 D5	5800 C3	
2834 B5	3284 C2	3806 C5	6251 A2	
2835 B5	3285 B4	3807 C5	6400 A6	
2836 C5	3286 B4	3808 D5	6401 A5	
2837 B5	3287 A3	3809 C5	7252 A2	
2838 B5	3288 D5	3830 D6	7254 B3	
2839 B5	3291 A1	3831 C5	7255 D3	
2840 B5	3292 B6	3832 C5	7258 A3	
2841 C4	3293 D3	3833 B5	7259 B3	
2842 C5	3296 B3	3834 B5	7260 B3	
2844 C4	3316 B3	3835 B5	7303 B3	
2845 C5	3317 D3	3836 B5	7305 E4	

MEMBRANE ASSEMBLY



MECHANICAL PARTSLIST

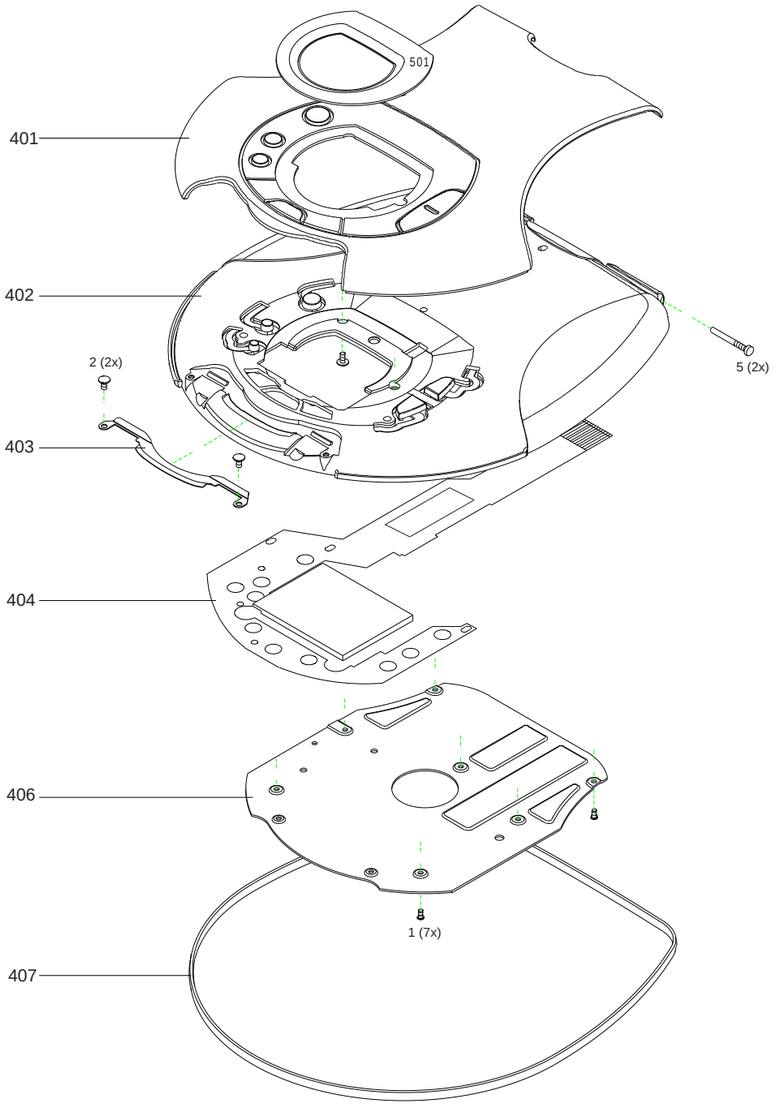
401	3140 114 37310	Decorative Cover
402	3140 114 37400	Door-ACT-DA23
403	4822 401 11793	Metal Clip Door
404	3140 117 60660	Menbrane LCD Assy
406	4822 466 12154	Plate Door
407	4822 532 13114	O Ring Door
408	3140 114 36610	Cabinet-DA23
409	3103 309 05340	CD DA23L Drive Assy
411	4822 463 11241	Slider Resume
412	3140 117 60640	Bottam-DA23 Assy (For -/00/01)
412	3140 117 60650	Bottam-DA23 Assy (For -/17)
413	4822 401 11794	Metal Clip
414	4822 401 11792	Clip
416	4822 417 11402	Hinge Assy
417	3140 114 36620	Door Battery
418	4822 492 11525	Spring Battery Short
419	3103 304 69590	Suspension
421	4822 492 11517	Spring Battery Minus
422	4822 492 11516	Spring Battery Plus
423	3103 301 45430	Spring Battery Charge
424	4822 402 11253	Bracket Clip
426	3140 114 37320	Belt Clip
	3140 115 28100	Instruction Manual (For -/00/01)
	3140 115 28110	Instruction Manual (For -/00)
	3140 115 28120	Instruction Manual (For -/17)

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

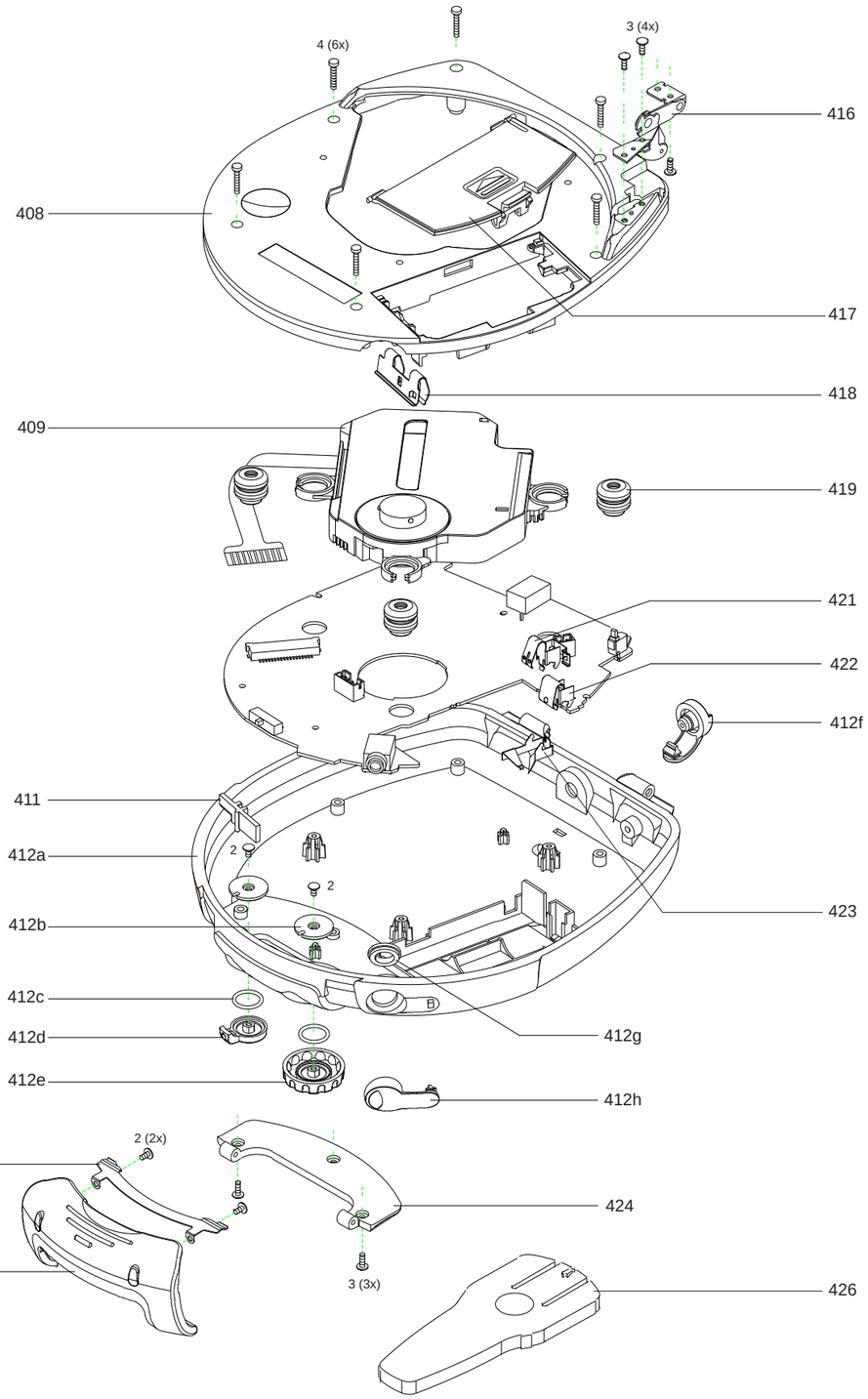
EXPLODED VIEW DIAGRAM

SCREWS LIST

1 C M1.3 x 2.5
2 C M1.5 x 3
3 C M1.5 x 4.5
4 C M1.6 x 9
5 C M1.6 x 15



5-1



ELECTRICAL PARTSLIST

- CAPACITORS -

2250	4822 126 14083	4µ7 10V
2251	4822 126 14472	1µF 10% X7R 10V
2252	4822 126 14241	330pF NPO 50V
2253	4822 126 14494	22nF 10% X7R 25V
2254	4822 126 13193	4,7nF 10% X7R 63V
2255	4822 126 14472	1µF 10% X7R 10V
2256	4822 124 12248	100µF 20% 4V
2257	4822 126 14083	4µ7 10V
2258	3198 017 41050	1µF Y5V 10V
2259	5322 126 11583	10nF 10% X7R 50V
2260	4822 122 31765	100pF 2% NP0 63V
2261	4822 126 14305	100nF 10% X7R 16V
2262	5322 126 11579	3,3nF10% X7R 63V
2263	4822 126 13883	220pF 5% 50V
2264	4822 126 13883	220pF 5% 50V
2265	4822 126 14305	100nF 10% X7R 16V
2266	4822 126 13883	220pF 5% 50V
2267	4822 126 14305	100nF 10% X7R 16V
2268	4822 126 13883	220pF 5% 50V
2269	4822 126 14305	100NF 10% X7R 16V
2270	4822 126 13881	470pF 5% 50V
2271	4822 126 14472	1µF 10% X7R 10V
2272	4822 126 14472	1µF 10% X7R 10V
2273	4822 126 14472	1µF 10% X7R 10V
2274	5322 126 11578	1nF 10% X7R 50V
2275	5322 126 11583	10nF 10% X7R 50V
2276	4822 126 14305	100nF 10% X7R 16V
2277	3198 017 41050	1µF Y5V 10V
2278	3198 017 41050	1µF Y5V 10V
2300	4822 126 13883	220pF 5% 50V
2301	4822 126 13883	220pF 5% 50V
2302	4822 122 31765	100pF 2% NP0 63V
2303	4822 122 31765	100pF 2% NP0 63V
2304	4822 126 13883	220pF 5% 50V
2305	4822 126 13883	220pF 5% 50V
2306	5322 126 11579	3,3nF 10% X7R 63V
2307	5322 126 11579	3,3nF 10% X7R 63V
2308	4822 126 14083	4µ7 10V
2309	4822 126 14083	4µ7 10V
2310	4822 126 14472	1µF 10% X7R 10V
2311	4822 124 40998	22µF 20% 6,3V
2312	4822 124 22652	2,2µF 20% 50V
2313	4822 124 22651	1,0µF 20% 50V
2314	4822 124 40998	22µF 20% 6,3V
2315	4822 126 14305	100nF 10% X7R 16V
2316	4822 124 12052	220µF 20% 6,3V
2317	4822 126 14305	100nF 10% X7R 16V
2318	4822 126 14472	1µF 10% X7R 10V
2319	3198 017 41050	1µF Y5V 10V
2320	4822 124 22652	2,2µF 20% 50V

- CAPACITORS -

2321	4822 126 14472	1µF 10% X7R 10V
2322	4822 126 14305	100nF 10% X7R 16V
2323	4822 126 14305	100nF 10% X7R 16V
2324	4822 126 14549	33nF 16V X7R
2325	4822 126 14549	33nF 16V X7R
2326	5322 126 11583	10nF 10% X7R 50V
2327	4822 126 14305	100nF 10% X7R 16V
2328	4822 126 14305	100nF 10% X7R 16V
2400	4822 126 14472	1µF 10% X7R 10V
2401	4822 126 14083	4µ7 10V
2402	4822 126 14305	100nF 10% X7R 16V
2403	4822 126 14305	100nF 10% X7R 16V
2404	4822 126 14305	100nF 10% X7R 16V
2405	4822 126 14305	100nF 10% X7R 16V
2701	5322 126 11578	1nF 10% X7R 50V
2702	5322 126 11583	10nF 10% X7R 50V
2800	4822 126 14083	4µ7 10V
2801	4822 126 13193	4,7nF 10% X7R 63V
2802	4822 124 40998	22µF 20% 6,3V
2803	4822 126 14305	100nF 10% X7R 16V
2804	4822 124 12362	47µF 20% 4V
2805	4822 126 14305	100nF 10% X7R 16V
2830	4822 124 40998	22µF 20% 6,3V
2831	4822 126 14508	180pF 5% 50V NP0
2832	4822 126 14241	330pF NPO 50V
2833	4822 126 14508	180pF 5% 50V NP0
2834	4822 126 14508	180pF 5% 50V NP0
2835	4822 126 14508	180pF 5% 50V NP0
2836	4822 126 14508	180pF 5% 50V NP0
2837	4822 126 13883	220pF 5% 50V
2838	4822 126 13883	220pF 5% 50V
2839	4822 126 13883	220pF 5% 50V
2840	4822 126 13883	220pF 5% 50V
2841	4822 126 13883	220pF 5% 50V
2842	4822 126 13883	220pF 5% 50V
2843	4822 124 40998	22µF 20% 6,3V
2844	4822 126 14305	100nF 10% X7R 16V
2845	3198 017 34730	47nF X7R 16V
2846	5322 126 11578	1nF 10% X7R 50V
2847	4822 126 14494	22nF 10% X7R 25V
2848	4822 126 11669	27pF
2849	5322 126 11583	10nF 10% X7R 50V
2850	5322 126 11579	3,3nF 10% X7R 63V
2851	5322 126 11579	3,3nF 10% X7R 63V
2852	5322 126 11579	3,3nF 10% X7R 63V
2853	4822 126 14247	1,5nF X7R 50V
2854	4822 126 14247	1,5nF X7R 50V
2855	5322 126 11579	3,3nF 10% X7R 63V
2856	4822 126 14549	33nF 16V X7R
2857	4822 126 14305	100nF 10% X7R 16V

6-1

ELECTRICAL PARTSLIST

- CAPACITORS -

2858	4822 126 13344	1,5nF 5% 63V
2859	4822 124 12362	47µF 20% 4V
2860	4822 126 13344	1,5nF 5% 63V
2861	3198 017 41050	1µF Y5V 10V
2862	3198 017 41050	1µF Y5V 10V
2880	4822 126 14305	100nF 10% X7R 16V
2881	4822 126 14305	100nF 10% X7R 16V
2882	4822 126 14305	100nF 10% X7R 16V
2885	4822 126 14305	100nF 10% X7R 16V
2886	4822 124 40998	22µF 20% 6,3V
2887	4822 126 14549	33nF 16V X7R
2888	5322 126 11583	10nF 10% X7R 50V
2889	4822 122 33761	22pF 5% NP0 50V
2892	4822 126 14083	4µ7 10V

- RESISTORS -

3250	4822 051 30681	680R 5% 0,062W
3251	4822 051 30271	270R 5% 0,062W
3252	4822 051 30331	330R 5% 0,062W
3253	4822 051 30271	270R 5% 0,062W
3254	4822 051 30103	10K 5% 0,062W
3255	4822 117 12925	47K 1% 0.063W
3256	4822 051 30272	2K7 5% 0,062W
3257	4822 117 12891	220K 1%
3258	5322 117 13019	100K 1% 0.063W
3259	5322 117 13035	68K 1% 0.063W
3260	4822 051 30105	1M 5% 0,062W
3261	4822 051 30103	10K 5% 0,062W
3263	4822 051 30223	22K 5% 0,062W
3264	5322 117 13019	100K 1% 0.063W
3265	4822 051 30334	330K 5% 0,062W
3266	4822 051 30103	10K 5% 0,062W
3267	5322 117 13035	68K 1% 0.063W
3268	4822 117 12706	10K 1% 0.063W
3269	4822 117 12706	10K 1% 0.063W
3270	2322 702 70278	2R7 5%
3271	2322 702 70278	2R7 5%
3272	4822 051 30472	4K7 5% 0,062W
3273	4822 117 13632	100K 1% 0.62W
3274	4822 117 13632	100K 1% 0.62W
3275	4822 051 30334	330K 5% 0,062W
3276	4822 051 30183	18K 5% 0,062W
3277	4822 051 30183	18K 5% 0,062W
3278	4822 051 30103	10K 5% 0,062W
3279	3198 021 32250	2M2 5%
3280	4822 051 30474	470K 5% 0,062W

- RESISTORS -

3281	4822 117 12925	47K 1% 0.063W
3282	4822 051 30474	470K 5% 0,062W
3283	4822 051 30474	470K 5% 0,062W
3284	4822 116 30467	10K 5%
3286	4822 051 30103	10K 5% 0,062W
3287	4822 051 30103	10K 5% 0,062W
3288	4822 051 30109	10R 5% 0,062W
3289	4822 051 30562	5K6 5% 0,063W
3291	4822 117 13632	100K 1% 0.62W
3292	4822 051 30103	10K 5% 0,062W
3293	4822 051 30331	330R 5% 0,062W
3294	4822 051 30474	470K 5% 0,062W
3295	4822 117 12889	270K 1% 0,063W
3300	4822 051 30333	33K 5% 0,062W
3301	4822 051 30333	33K 5% 0,062W
3302	4822 051 30333	33K 5% 0,062W
3303	4822 051 30333	33K 5% 0,062W
3304	4822 051 30153	15K 5% 0,062W
3305	4822 051 30153	15K 5% 0,062W
3306	4822 051 30222	2K2 5% 0,062W
3307	4822 051 30222	2K2 5% 0,062W
3308	4822 051 30153	15K 5% 0,062W
3309	4822 051 30153	15K 5% 0,062W
3310	4822 051 30562	5K6 5% 0,063W
3311	4822 051 30562	5K6 5% 0,063W
3312	4822 051 30105	1M 5% 0,062W
3313	4822 051 30105	1M 5% 0,062W
3314	4822 051 30332	3K3 5% 0,062W
3315	4822 051 30332	3K3 5% 0,062W
3316	4822 051 30103	10K 5% 0,062W
3317	4822 051 30472	4K7 5% 0,062W
3318	4822 117 13632	100K 1% 0.62W
3319	4822 117 13613	2R2 5%
3320	4822 101 11936	Var Resistor 10K
3321	4822 051 30103	10K 5% 0,062W
3322	2322 702 60688	6R8 5% 0.062W
3323	2322 702 60688	6R8 5% 0.062W
3324	4822 117 13613	2R2 5%
3325	4822 117 13613	2R2 5%
3327	4822 051 30105	1M 5% 0,062W
3328	4822 117 12925	47K 1% 0.063W
3333	4822 051 30183	18K 5% 0,062W
3334	4822 051 30183	18K 5% 0,062W
3335	4822 051 30472	4K7 5% 0,062W
3400	4822 117 13632	100K 1% 0.62W
3401	4822 117 12891	220K 1%
3402	4822 117 12891	220K 1%
3403	4822 117 12891	220K 1%
3404	4822 051 30102	1K 5% 0,062W
3405	4822 051 30102	1K 5% 0,062W

ELECTRICAL PARTSLIST

- RESISTORS -

3406	4822 051 30102	1K 5% 0,062W
3407	4822 051 30154	150K 5% 0,062W
3408	4822 051 30123	12K 5% 0,062W
3409	4822 051 30562	5K6 5% 0,063W
3410	4822 051 30109	10R 5% 0,062W
3411	4822 051 30109	10R 5% 0,062W
3412	4822 051 30101	100R 5% 0,062W
3413	4822 051 30101	100R 5% 0,062W
3414	4822 117 12925	47K 1% 0.063W
3415	4822 051 30103	10K 5% 0,062W
3416	4822 051 30472	4K7 5% 0,062W
3417	4822 051 30103	10K 5% 0,062W
3419	4822 051 30008	Jumper
3420	4822 051 30272	2K7 5% 0,062W
3701	4822 117 13632	100K 1% 0.62W
3704	4822 051 30105	1M 5% 0,062W
3708	4822 051 30103	10K 5% 0,062W
3800	4822 117 13608	4,7R 5% 0,0016W
3801	4822 051 30153	15K 5% 0,062W
3802	4822 051 30683	68K 5% 0,062W
3803	4822 051 30332	3K3 5% 0,062W
3804	4822 051 30479	47R 5% 0,062W
3805	4822 051 30472	4K7 5% 0,062W
3806	4822 051 30332	3K3 5% 0,062W
3807	4822 051 30471	470R 5% 0,062W
3808	4822 117 12891	220K 1%
3809	4822 051 30563	56K 5% 0,062W
3830	4822 051 30109	10R 5% 0,062W
3831	4822 051 30562	5K6 5% 0,063W
3832	4822 051 30562	5K6 5% 0,063W
3833	4822 051 30562	5K6 5% 0,063W
3834	4822 051 30562	5K6 5% 0,063W
3835	4822 051 30273	27K 5% 0,062W
3836	4822 051 30273	27K 5% 0,062W
3837	4822 051 30333	33K 5% 0,062W
3838	4822 051 30333	33K 5% 0,062W
3839	4822 051 30333	33K 5% 0,062W
3840	4822 051 30333	33K 5% 0,062W
3841	4822 051 30103	10K 5% 0,062W
3842	4822 051 30103	10K 5% 0,062W
3843	4822 051 30103	10K 5% 0,062W
3844	4822 051 30103	10K 5% 0,062W
3845	4822 051 30103	10K 5% 0,062W
3846	4822 051 30103	10K 5% 0,062W
3847	4822 051 30339	33R 5% 0,062W
3848	4822 051 30333	33K 5% 0,062W
3849	4822 051 30102	1K 5% 0,062W
3850	4822 051 30223	22K 5% 0,062W
3851	4822 051 30102	1K 5% 0,062W
3852	4822 051 30109	10R 5% 0,062W

- RESISTORS -

3853	4822 051 30109	10R 5% 0,062W
3854	4822 051 30222	2K2 5% 0,062W
3855	4822 051 30222	2K2 5% 0,062W
3856	4822 051 30222	2K2 5% 0,062W
3857	4822 051 30222	2K2 5% 0,062W
3858	4822 051 30222	2K2 5% 0,062W
3859	4822 051 30222	2K2 5% 0,062W
3860	4822 051 30103	10K 5% 0,062W
3861	4822 051 30103	10K 5% 0,062W
3862	4822 051 30103	10K 5% 0,062W
3863	4822 051 30103	10K 5% 0,062W
3864	4822 051 30103	10K 5% 0,062W
3865	4822 051 30332	3K3 5% 0,062W
3867	4822 117 12139	22R 5% 0,062W
3868	4822 117 12139	22R 5% 0,062W
3869	4822 051 30471	470R 5% 0,062W
3874	4822 051 30105	1M 5% 0,062W
3875	4822 051 30472	4K7 5% 0,062W
3880	4822 117 12139	22R 5% 0,062W
3885	4822 051 30103	10K 5% 0,062W
3886	4822 051 30103	10K 5% 0,062W
3887	4822 117 12139	22R 5% 0,062W
3888	4822 051 30103	10K 5% 0,062W
3890	4822 117 12139	22R 5% 0,062W
3901	4822 051 30103	10K 5% 0,062W
4201	4822 051 30008	Jumper

- COIL & FILTER -

5251	4822 157 51462	Coil 10µH 10%
5800	4822 157 11781	Filter BLM11A601SPT1

- DIODES -

6251	4822 130 10654	Diode BAT254
6252	5322 130 81917	Diode SB140
6400	4822 130 83757	Diode BAS216
6401	4822 130 10654	Diode BAT254

- IC & TRANSISTORS -

7250	9322 003 64676	Trans TBC337-40
7251	5322 130 44647	Trans BC368
7252	4822 130 60142	Trans BC869
7254	9322 142 72685	IC SM TC75W51FU
7255	5322 130 61569	Trans BC868
7256	9322 160 31669	IC SC111259FTA
7258	3198 010 42310	Trans BC847BW
7259	5322 130 42756	Trans BC857C
7260	3198 010 42310	Trans BC847BW
7300	9322 142 72685	IC SM TC75W51FU

ELECTRICAL PARTSLIST

- IC & TRANSISTORS -

7301	3198 010 42310	Trans BC847BW
7302	3198 010 42310	Trans BC847BW
7303	3198 010 42310	Trans BC847BW
7305	4822 209 16083	IC BA3574BFS
7306	3198 010 42310	Trans BC847BW
7307	3198 010 42310	Trans BC847BW
7400	8203 303 11110	IC SM TMP86C8296-UP
7701	3198 010 42310	Trans BC847BW
7800	4822 209 17286	IC TZA1024T/N1
7801	3198 010 42310	Trans BC847BW
7830	9352 641 80557	IC SAA7324H/M2B
7880	9322 142 87671	IC SM SM5903BF
7881	9322 138 26668	IC SM MSM51V17405D-60TS-K
7882	3198 010 42310	Trans BC847BW

-MISCELLANEOUS -

1250	2422 025 12272	Connector 6P
1251	2422 086 10946	Fuse Rad 630mA 65V
1252	2422 026 05086	DC Jack
1300	2422 026 05085	Headphone Jack
1400	2422 025 16707	Connector 26P
1401	4822 276 12889	Push Switch
1402	4822 277 21643	Slide Switch
1403	2422 540 98516	Filter 4MHz CSTS MG03
1830	4822 267 11028	Connector 16P
1840	4822 242 81546	Filter CSTCS8,46MT-TC
5250	2422 536 00141	Transformer 40µH

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