Portable compact disc player

Service
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AZ7900
AZ7901
all versions

PRODUCT FAMILY DORIS1 – PB1

Service Manual

ReWritable CD COMPATIBLE
COMPACT disc DIGITAL AUDIO

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CLASS 1
LASER PRODUCT

Published by PW 9951 Service Audio Printed in The Netherlands Subject to modification

GB 3103 785 25000

CS 46 638

PHILIPS

TECHNICAL SPECIFICATION

General

Dimensions (WxHxD) : 128x28x139mm
Weight without batteries : 220g

Power supply modes

DC-in socket : 2.5-6.0V
Primary batteries (2xLR6) : 1.6-3.6V
Rechargable batteries (AY3362) : 1.6-3.6V

Battery lifetime

Primary batteries (2xLR6) : ≥11h (15h typ.)
Rechargable batteries (AY3362) : ≥6h (8h typ.)

Battery empty detection

Battery empty level : 1.8V nom. +100/-50mV

Current consumption at DC-in supply = 4.5V

PLAY mode : ≤150mA (100mA typ.)
JUMP mode : ≤300mA (220mA typ.)
Stand-by mode : ≤200µA (100µA typ.)

Current consumption at Battery supply = 2.25V

PLAY mode : ≤190mA (135mA typ.)
JUMP mode : ≤400mA (300mA typ.)
Stand-by mode : ≤200µA (100µA typ.)

Shock resistance

+X/-X direction : ≥4.0g
+Y/-Y direction : ≥4.0g
+Z/-Z direction : ≥3.0g

Headphone out (measured with 16Ω load, DBB off)

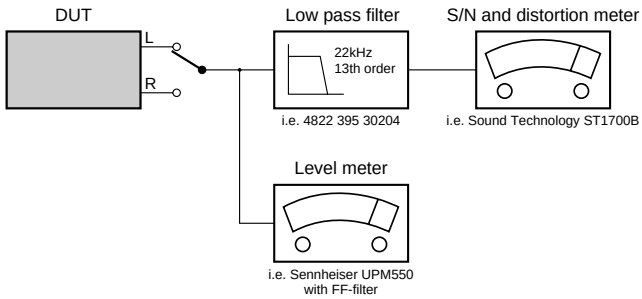
Output power (THD=10%)
/17 version only : 2x6mW (+1/-3dB)
all other versions : 2x3mW (+1/-3dB)
Frequency response (1mW) : 100Hz-20kHz within 6dB
S/N ratio (unwght) : ≥80dB (81dB typ.)
S/N ratio (A-wght) : ≥82dB (84dB typ.)
THD+N (1kHz, 1mW) : ≤1% (0.2% typ.)
Channel crosstalk (1kHz, no load) : ≤-24dB (-44dB typ.)
Channel unbalance (-40dB) : ≤5dB
Volume attenuation (1kHz) : ≥60dB

Laser

Output power : <5mW (3mW typ.)
Wavelength : 780nm

Measurement setup

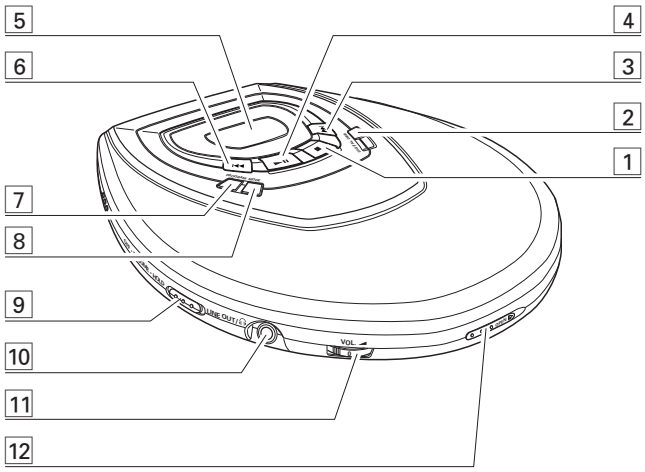
Use Audio Signal disc SBC429 4822 397 30184

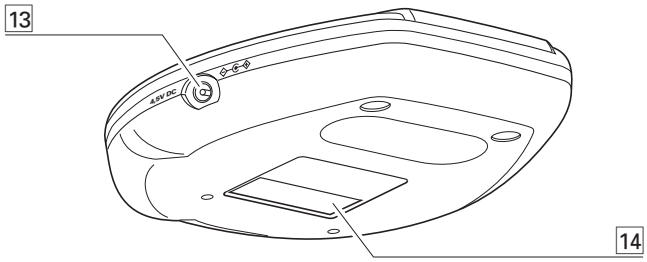


FEATURE OVERVIEW

FEATURES OF CD-PORTABLE PRODUCT FAMILY "DORIS1 – PB1"	AZ7900 (all versions)	AZ7901 (all versions)
CD-REWRITABLE COMPATIBILITY	●	●
HOLD / RESUME FUNCTION	● / ●	● / ●
DBB STAGES	1	1
ACOUSTIC FEEDBACK	●	●
PROGRAM MEMORY	15	15
RECHARGE FUNCTION NiCd / NiMH	– / –	– / –
CORD REMOTE CONTROL PREPARED	–	–
LINE / DIGITAL OUTPUT	– / –	– / –

CONNECTIONS AND CONTROLS





1 ■.....stops CD play, clears a program or switches the player off

2 DBB.....DIGITAL **D**YNAMIC **B**ASS **B**OOST switches the bass enhancement on and off

3 ⏭.....skips and searches CD tracks forwards

4 ▶II.....switches the player on, starts or pauses CD play

5 .....display

6 ⏮.....skips and searches CD tracks backwards

7 PROGRAM.....programs tracks and reviews the program

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

9 RESUME.....stores the last position of a CD track played
HOLD .....locks all buttons
OFF .....switches RESUME and HOLD off

10 LINE OUT/🎧 ....3.5mm headphone socket, socket to connect the player to another analogue audio input of an additional appliance

11 VOL ◢.....adjusts the volume

12 OPEN ▶.....opens the CD lid

13 4.5V DC.....socket for external power supply

14 .....typeplate

TROUBLESHOOTING (excerpt from the Instruction For Use)

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

Problem	Possible cause	Solution
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 ▶II
	Loose, wrong or dirty connections	Check and clean connections
	Volume is not adjusted	Adjust the volume
	Malfunctions due to vicinity 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

ACCESSORIES

ACCESSORIES FOR CD-PORTABLE PRODUCT FAMILY "DORIS1 – PB1"		AZ7900			AZ7901								
		/00	/00z	/17	/00	/00z	/01	/05	/11	/13	/16	/18	/19
AY3170/00 AC/DC Adaptor	4822 219 10617	X	X		X	X							
AY3170/02 AC/DC Adaptor	4822 219 10676						X				X		X
AY3170/05 AC/DC Adaptor	4822 219 10672							X					
AY3170/09 AC/DC Adaptor	4822 219 10679											X	
AY3170/12 AC/DC Adaptor	4822 219 10671								X				
AY3170/13 AC/DC Adaptor	local supplier									X			
AY3170/17 AC/DC Adaptor	4822 219 10616			X									
AY3501/00 Car Adaptor Cassette	4822 397 10059	O	O	O	O	O	O	O	O	O	O	O	O
AY3545/00 Car DC/DC Converter	4822 219 10033	O	O	O	O	O	O	O	O	O	O	O	O
AY3677/00 Earphone (L-plug)	4822 242 11004	X	X		X	X	X	X	X	X	X	X	X
AY3682/00 Headphone (L-plug)	4822 242 11003			X									
AY3464 HIFI CORD (3.5mm → cinch, L-plug)	4822 320 11881	O	O	O	O	O	O	O	O	O	O	O	O

X...supplied with the set, O...optional available

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.

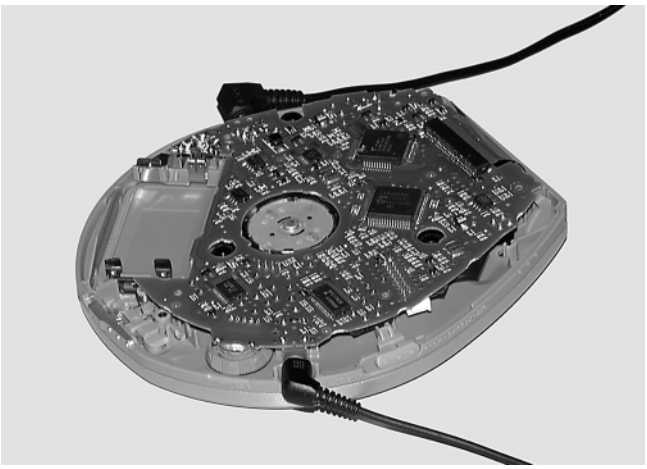
(FIN) Varoitus !
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

(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

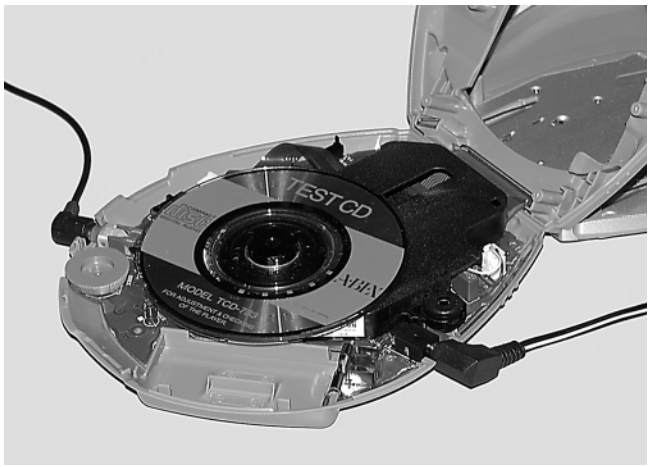
REPAIR POSITION COPPERSIDE



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

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

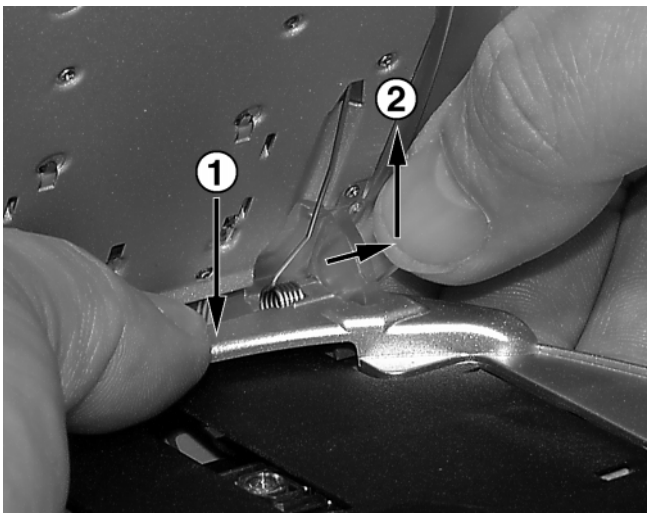
REPAIR POSITION COMPONENTSIDE

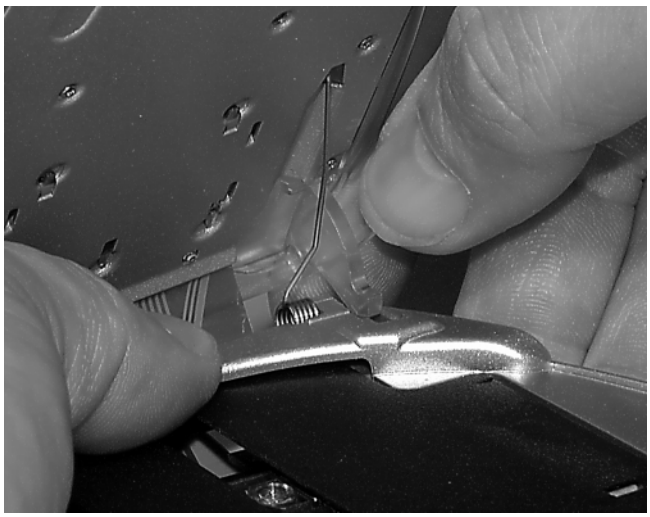


To get access to the componentside of the printed board assembly proceed as follows:

1. Remove the bottom screws (6x)
2. Open the CD-door
3. Lift the top-cabinet 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. Disconnect the membrane keyboard (flex-foil connector on copperside of printed board)
2. Smoothly bend the bridge of the cabinet downwards as shown in ①. Take care not to touch the lens
3. Smoothly pull out the right hinge of the CD-door as shown in ②.
4. Lift the CD-door

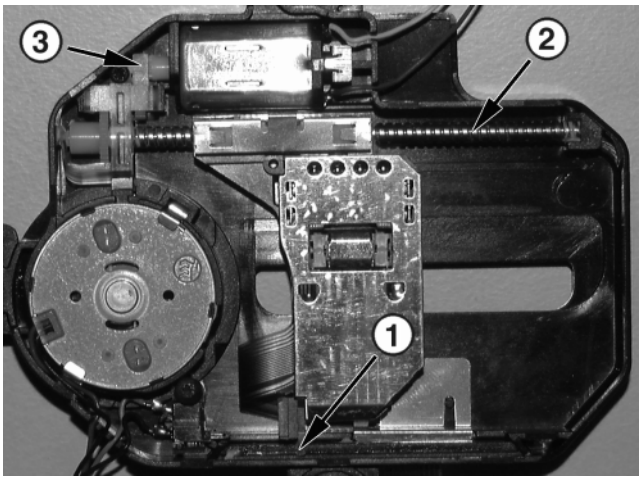
Remark: Do not use screwdrivers or tools like that. Sharp edges could damage hinge or cabinet part.

VAM2103 – DRIVE CLEANING & LUBRICATION

Lubrication of the CD-drive is only necessary in case of symptom “skipping tracks”.
The reason can be dirt which sticks to the grease or the grease is getting aged.

Use an acid-free synthetic grease – i.e. “Tribol 9890-2” or equivalent.

Before greasing the mechanism first remove the old grease from the mechanism. Use a cotton swab dipped in alcohol to clean the mechanism.



Cleaning the mechanism
1. Clean the lower and upper sledge guidance plane (optical pick-up).
2. Clean the spindle shaft.
3. Clean the area between the worm gear, idler wheel and clamping spring.

Lubricating the mechanism
1. Put one dot of grease onto the upper sledge guidance plane on each side of the sledge. Move the sledge to the inner and outer position to spread the grease.
   Put one dot of grease onto the lower sledge guidance plane on each side of the sledge. Move the sledge to the inner and outer position to spread the grease.
2. Put one dot of grease onto the spindle shaft on both sides of the sledge. Move the sledge to the inner and outer position to spread the grease.
3. Put one dot of grease between the worm gear and the clamping spring.

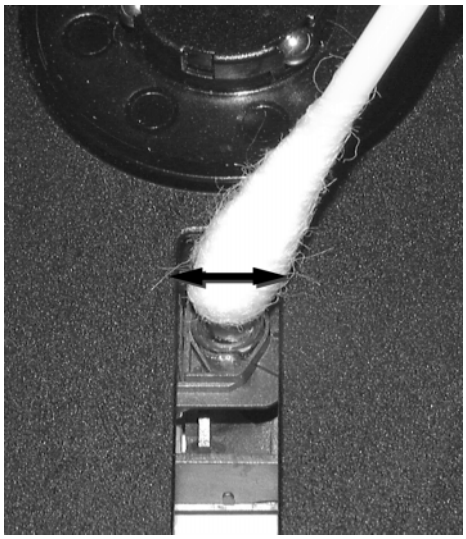
VAM2103 – LENS CLEANING

Before touching the lens it is advised to clean the surface of the lens by blowing clean air over it in order to avoid that little particles make scratches on the lens.

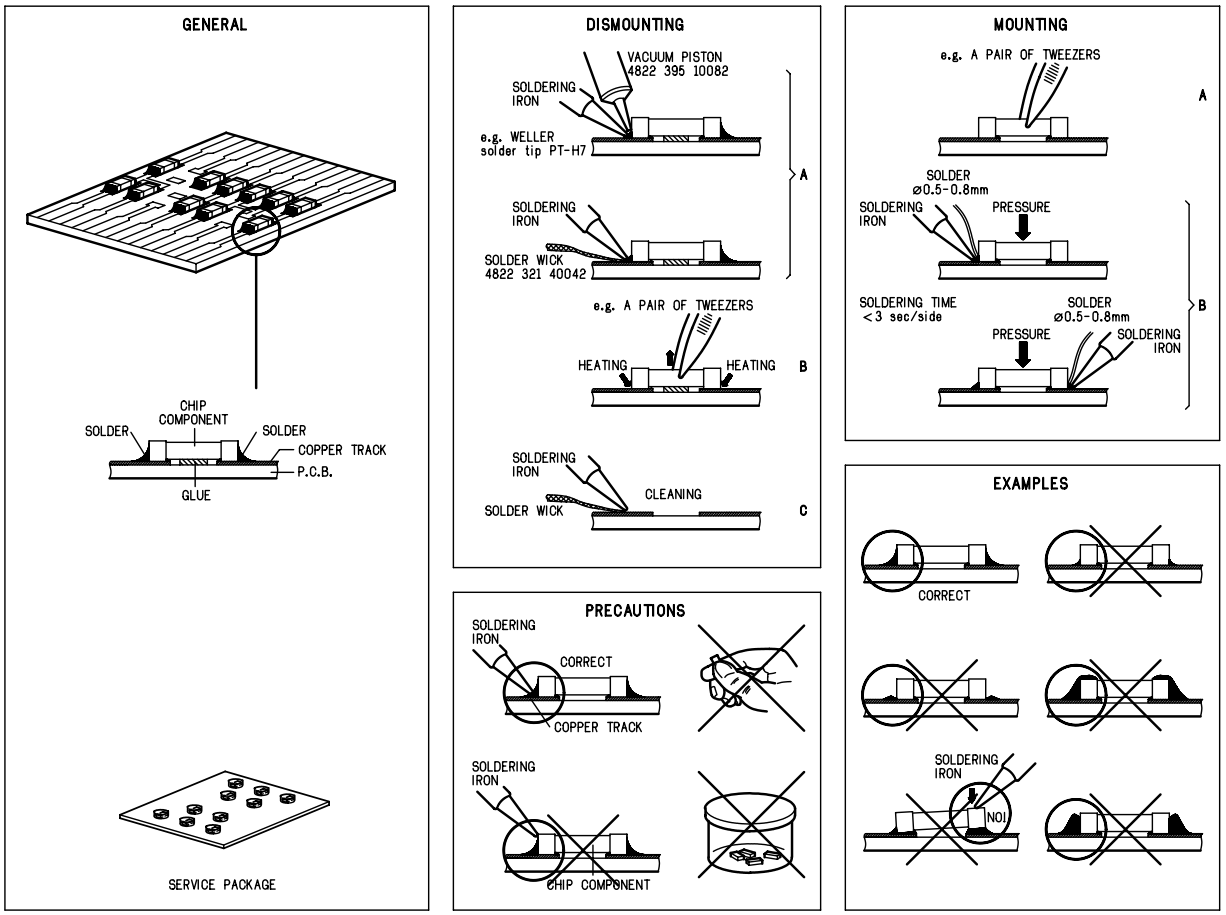
Because the material of the lens is synthetic and coated with a special anti-reflectivity layer, cleaning must be done with a non-aggressive cleaning fluid. It is advised to use “KODAK LENS CLEANER CAT 176 71 36”, available in normal photo shops.

The actuator is a very precise mechanical component and may not be damaged in order to guarantee its full function. It is advised to clean the lens gently (don’t press too hard) with a soft and clean cotton bud moistened with the special lens cleaner.

The direction of cleaning must be in the way as indicated in the picture below.



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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Wristband tester	4822 344 13999

PIN DESCRIPTION OF INTEGRATED CIRCUITS

TDA1300T – HF-PREAMPLIFIER AND LASER SUPPLY CIRCUIT (part of CD-drive VAM2103)

Pin	*Name*	*Direction*	*Description*
1	O4	HF-preamp → CD10	output of current amplifier 4
2	O6	HF-preamp → CD10	output of current amplifier 6
3	O3	HF-preamp → CD10	output of current amplifier 3
4	O1	HF-preamp → CD10	output of current amplifier 1
5	O5	HF-preamp → CD10	output of current amplifier 5
6	O2	HF-preamp → CD10	output of current amplifier 2
7	LDON	CD10 → HF-preamp	control pin for switching the laser on/off
8	VDDL	+3	laser supply voltage
9	VRFE	HF-preamp →	equalized output voltage of sum signal of amplifiers 1...4
10	VRF	not connected	unequalized output
11	HG	GND	control pin for gain switch
12	LS	+3	control pin for HF-equalization switch
13	C	external connection	external capacitor (bandwidth of ALPC)
14	ADJ	→ HF-preamp	reference input
15	GND	GND	0V supply, substrate connection
16	LO	HF-preamp → laser diode	current output to laser diode
17	MI	monitor diode → HF-preamp	laser monitor diode input
18	VDD	+3	positive supply voltage
19	I2	GND	photo detector input 2 (not used)
20	I5	diode array → HF-preamp	photo detector input 5 (satellite)
21	I1	diode array → HF-preamp	photo detector input 1 (central)
22	I3	diode array → HF-preamp	photo detector input 3 (central)
23	I6	diode array → HF-preamp	photo detector input 6 (satellite)
24	I4	diode array → HF-preamp	photo detector input 4 (central)

MPC17A50VM – 4-CHANNEL H-BRIDGE SERVODRIVER

Pin	*Name*	*Direction*	*Description*
1	CGND	GND	ground (control part)
2	VLG	+3	power supply input (control part)
3	ERR2	CD10 → servo driver	error level input (disc speed error signal)
4	NI2	→ servo driver	filter capacitor connection in ABS amp circuit section
5	OP2	→ servo driver	filter capacitor connection in ABS amp circuit section
6	ERR1	CD10 → servo driver	error level input (radial error signal)
7	NI1	→ servo driver	filter capacitor connection in ABS amp circuit section
8	OP1	→ servo driver	filter capacitor connection in ABS amp circuit section
9	LIM	→ servo driver	limit control level signal input
10	VR	→ servo driver	control reference voltage input (VR=VLG/2)
11	CLK	→ servo driver	clock signal input
12	OP3	→ servo driver	filter capacitor connection in ABS amp circuit section
13	NI3	→ servo driver	filter capacitor connection in ABS amp circuit section
14	ERR3	CD10 → servo driver	error level input (focus error signal)
15	OP4	→ servo driver	filter capacitor connection in ABS amp circuit section
16	NI4	→ servo driver	filter capacitor connection in ABS amp circuit section
17	ERR4	CD10 → servo driver	error level input (slide error signal)
18	PHSW	GND	CH4 mode setup (if PHSW=high, CH4 operates half-bridge)
19	POL	not connected	CH4 polarity monitor output
20	CFL4	→ servo driver	pin for connecting filter capacitor
21	CFL3	→ servo driver	pin for connecting filter capacitor
22	OUT4A	servo driver → slide motor	H-bridge output A
23	OUT4B	servo driver → slide motor	H-bridge output B
24	VIN34	+A	CH3 and CH4 output stage power supply
25	OUT3B	servo driver → focus actuator	H-bridge output B
26	PGND34	GND	CH3 and CH4 output stage ground
27	OUT3A	servo driver → focus actuator	H-bridge output A
28	OUT1A	servo driver → track actuator	H-bridge output A
29	PGND12	GND	CH1 and CH2 output stage ground
30	OUT1B	servo driver → track actuator	H-bridge output B
31	VIN12	+A	CH1 and CH2 output stage power supply
32	OUT2B	servo driver → disc motor	H-bridge output B
33	OUT2A	servo driver → disc motor	H-bridge output A
34	CFL1	→ servo driver	pin for connecting filter capacitor
35	CFL2	→ servo driver	pin for connecting filter capacitor
36	VG	VG	power supply input (predriver circuit)

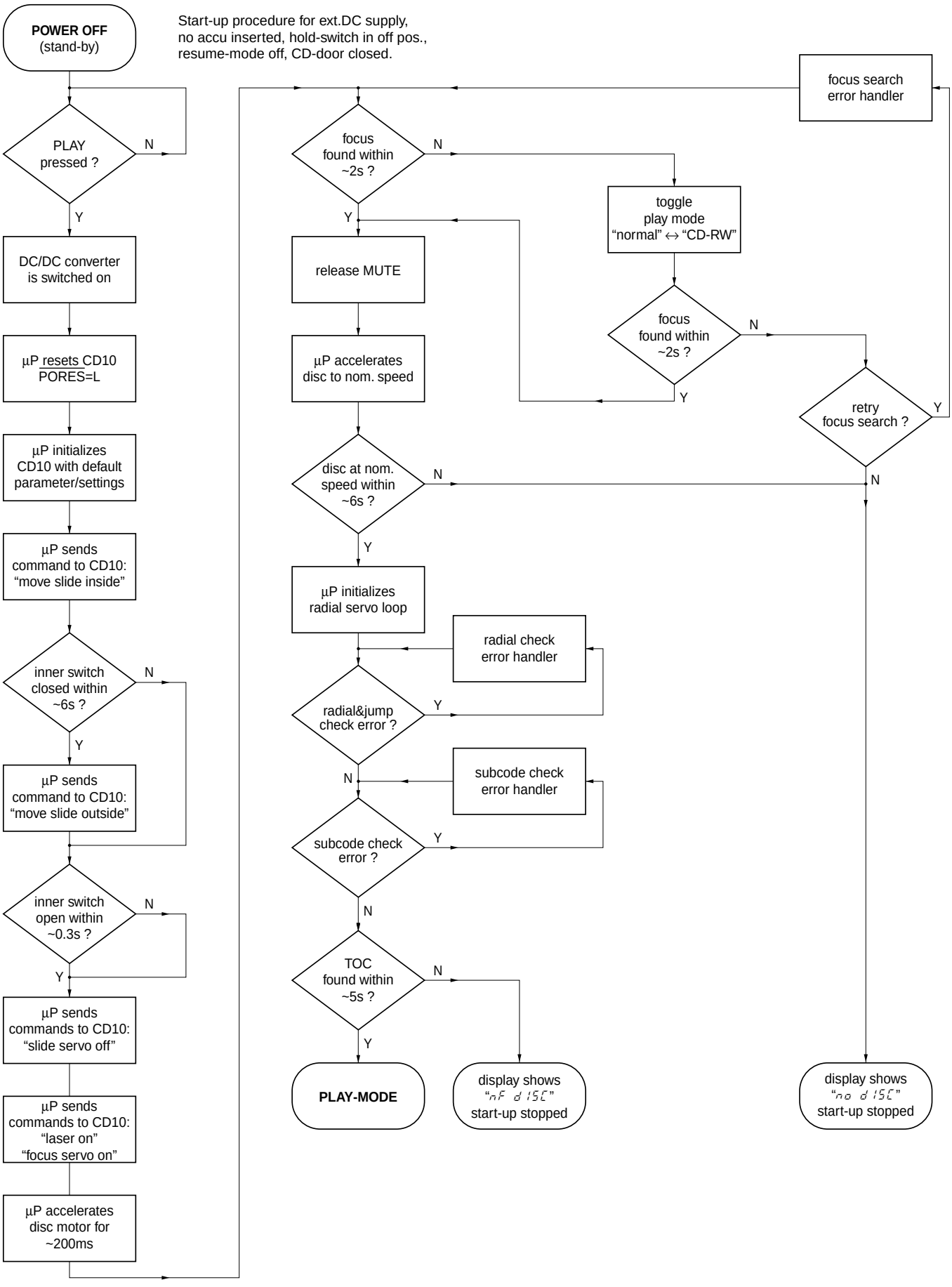
SAA7324 – DECODER, DIGITAL SERVO IC AND D/A-CONVERTER CD10 (low voltage version)

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	+3	analog supply voltage 1
6	IREF	CD10 →	reference current output pin
7	VRIN	CD10 →	reference voltage for servo ADC's
8	D1	HF-preamp → CD10	unipolar current input (central diode signal input)
9	D2	HF-preamp → CD10	unipolar current input (central diode signal input)
10	D3	HF-preamp → CD10	unipolar current input (central diode signal input)
11	D4	HF-preamp → CD10	unipolar current input (central diode signal input)
12	R1	HF-preamp → CD10	unipolar current input (satellite diode signal input)
13	R2	HF-preamp → 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	+3	analog supply voltage 2
18	LN	CD10 →	DAC left channel differential output - negative
19	LP	CD10 →	DAC left channel differential output - positive
20	VNEG	→ CD10	DAC negative reference input
21	VPOS	→ CD10	DAC positive reference input
22	RN	CD10 →	DAC right channel differential output - negative
23	RP	CD10 →	DAC right channel differential output - positive
24	SELPLL	+3	selects whether internal clock multiplier PLL is used
25	TEST1	GND	test control input 1; this pin should be tied low
26	CL16	CD10 →	16.9344 MHz system clock output
27	DATA	CD10 →	serial data output (3-state)
28	WCLK	CD10 →	word clock output (3-state)
29	SCLK	CD10 →	serial bit clock output (3-state)
30	EF	CD10 →	C2 error flag output (3-state)
31	TEST2	GND	test control input 2; this pin should be tied low
32	KILL	CD10 →	kill output (programmable; open-drain)
33	VSSD1	GND	digital ground 2
34	V2/V3	CD10 ↔	versatile I/O: input versatile pin 2 or output versatile pin 3 (open-drain)
35	WCLI	→ CD10	word clock input (for data loopback to DAC)
36	SDI	→ CD10	serial data input (for data loopback to DAC)
37	SCLI	→ 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	→ 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 →	subcode frame sync output (3-state)
48	SBSY	CD10 →	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	+3	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	+3	digital supply voltage 3 for core
58	VSSD3	GND	digital ground 4
59	MOTO1	CD10 → servo driver	motor output 1; versatile (3-state)
60	MOTO2	CD10 →	motor output 2; versatile (3-state)
61	V4	CD10 →	versatile output pin 4
62	V5	CD10 → HF-gain switch	versatile output pin 5
63	V1	inner switch → CD10	versatile input pin 1
64	LDON	CD10 → HF-preamp	laser drive on output (open-drain)

TA2120FN – Stereo Headphone Amplifier

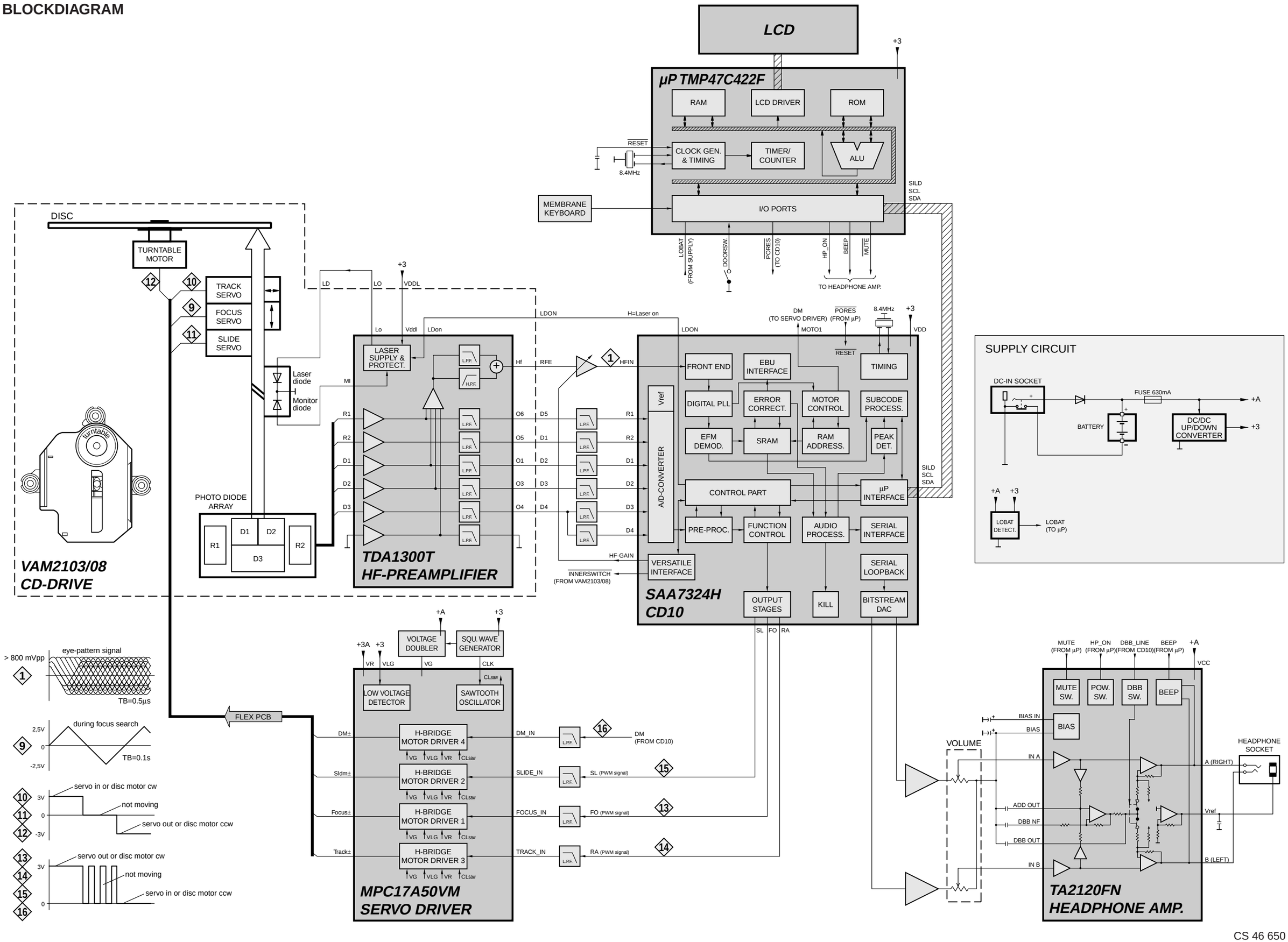
Pin	*Name*	*Direction*	*Description*
1	DBB NF	→ headphone-amp	NF of DBB amplifier
2	ADD OUT	headphone-amp →	output of ADD amplifier
3	RF IN	→ headphone-amp	terminal for ripple filter circuit
4	PWC	→ headphone-amp	center amplifier on/off switch (open = on)
5	VCC	→ headphone-amp	positive supply voltage
6	B	headphone-amp →	output of power amplifier
7	C	headphone-amp →	output of center amplifier
8	A	headphone-amp →	output of power amplifier
9	GND	GND	ground of power amplifier
10	MIX OUT	headphone-amp →	output of power amplifier (mixed)
11	ALC IN	→ headphone-amp	input terminal for ALC detector circuit
12	ALC DET	→ headphone-amp	smoothing for ALC detection (GND = ALC off, open = ALC ON)
13	ATT	→ headphone-amp	power amplifier gain switch (open/VCC = ATT off, GND = ATT on)
14	IN A	→ headphone-amp	input of power amplifier
15	IN B	→ headphone-amp	input of power amplifier
16	GND	GND	ground of input stage in power amplifier
17	BEEP IN	→ headphone-amp	input terminal for beep sound
18	MUTE TC	→ headphone-amp	terminal for mute smoothing
19	MUTE SW	→ headphone-amp	power mute switch (GND/open = mute off, VCC = mute on)
20	POWER	→ headphone-amp	power switch (VCC = power on, GND/open = power off)
21	BIAS	headphone-amp →	BIAS voltage
22	BIAS IN	→ headphone-amp	filter terminal for BIAS circuit
23	DBB SW	→ headphone-amp	DBB on/off switch (open/VCC = DBB on, GND = DBB off)
24	DBB OUT	headphone-amp →	Output of DBB amplifier (terminal for filter)

START-UP PROCEDURE – FLOW CHART



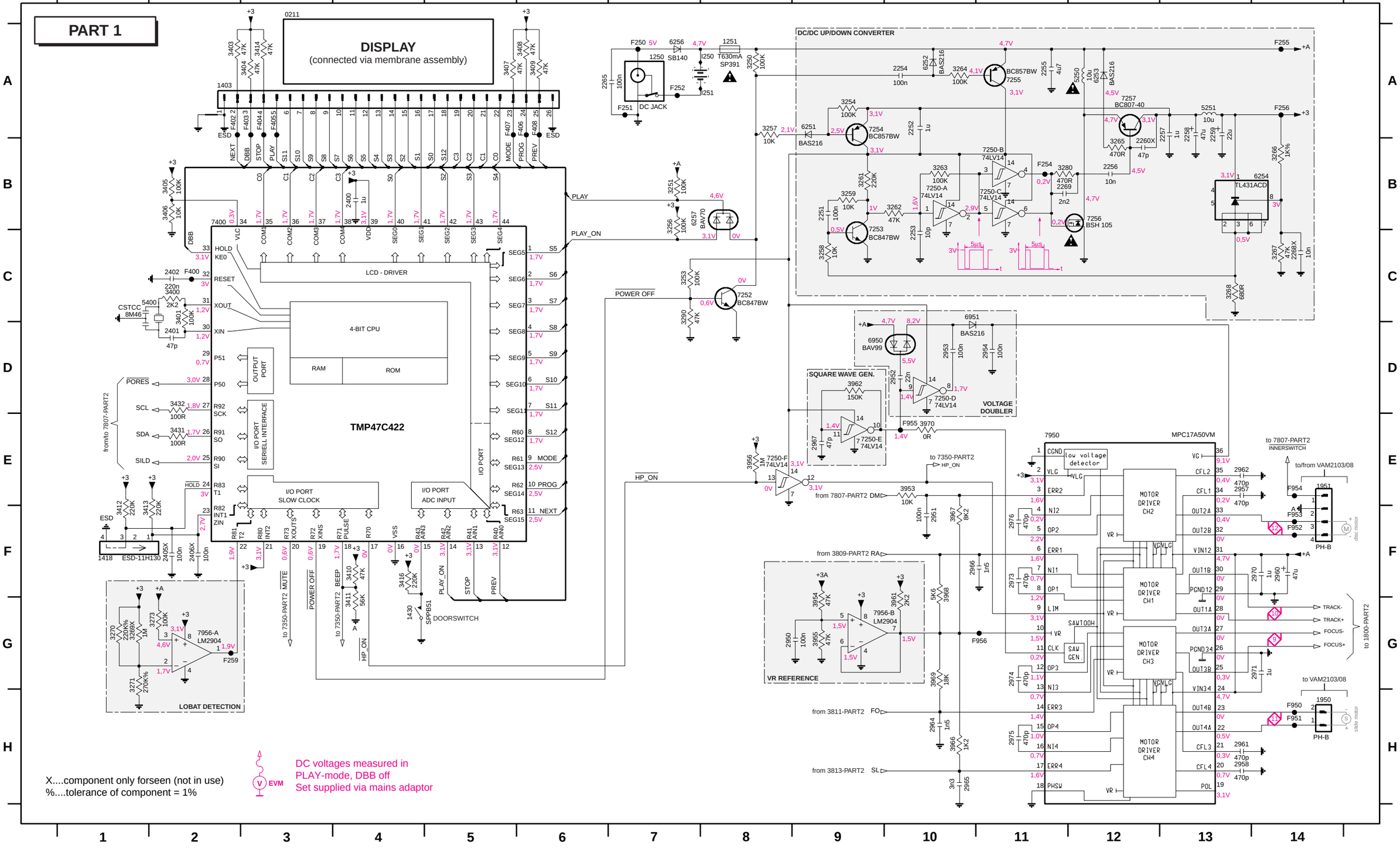
3-5

BLOCKDIAGRAM

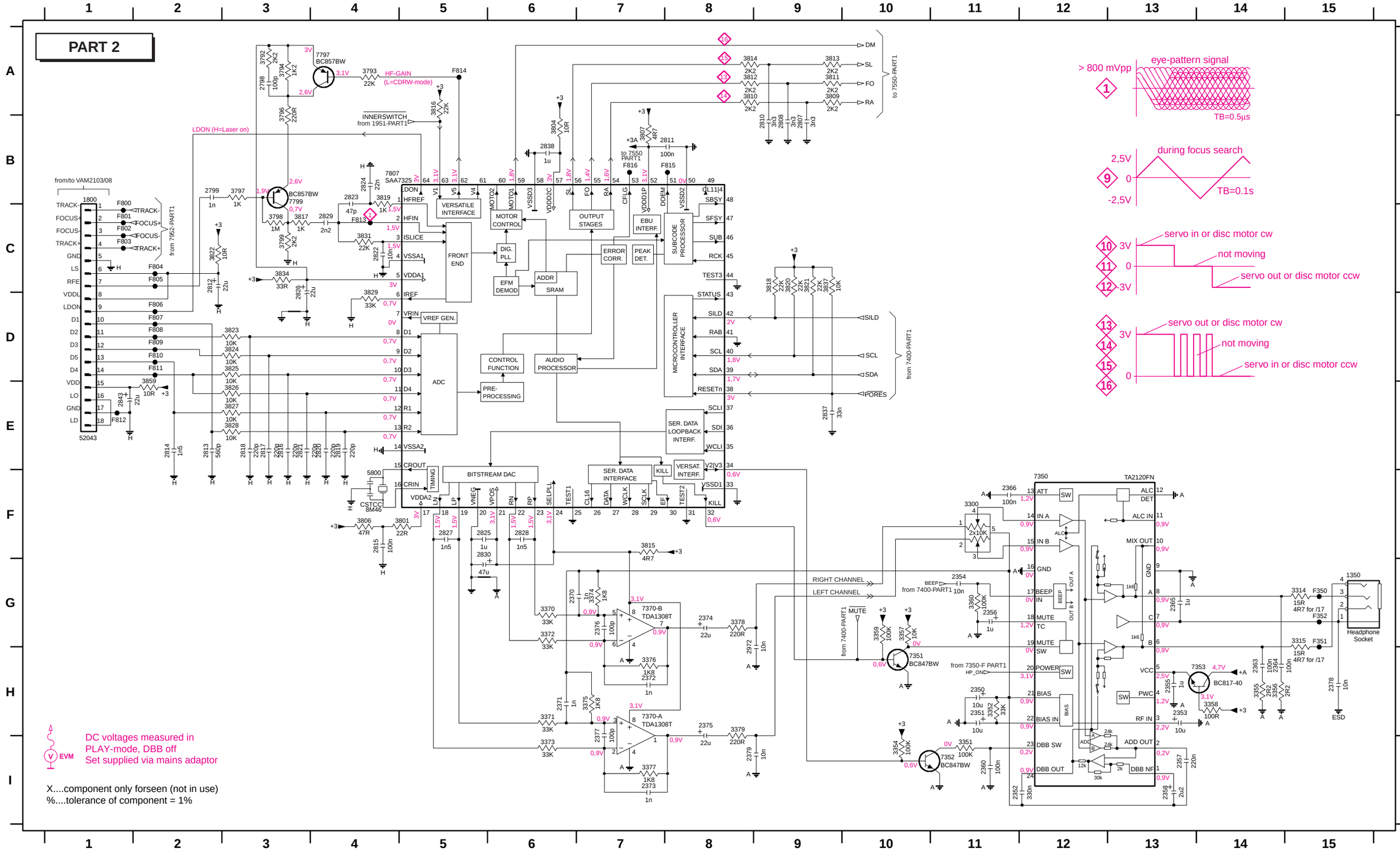


4-1

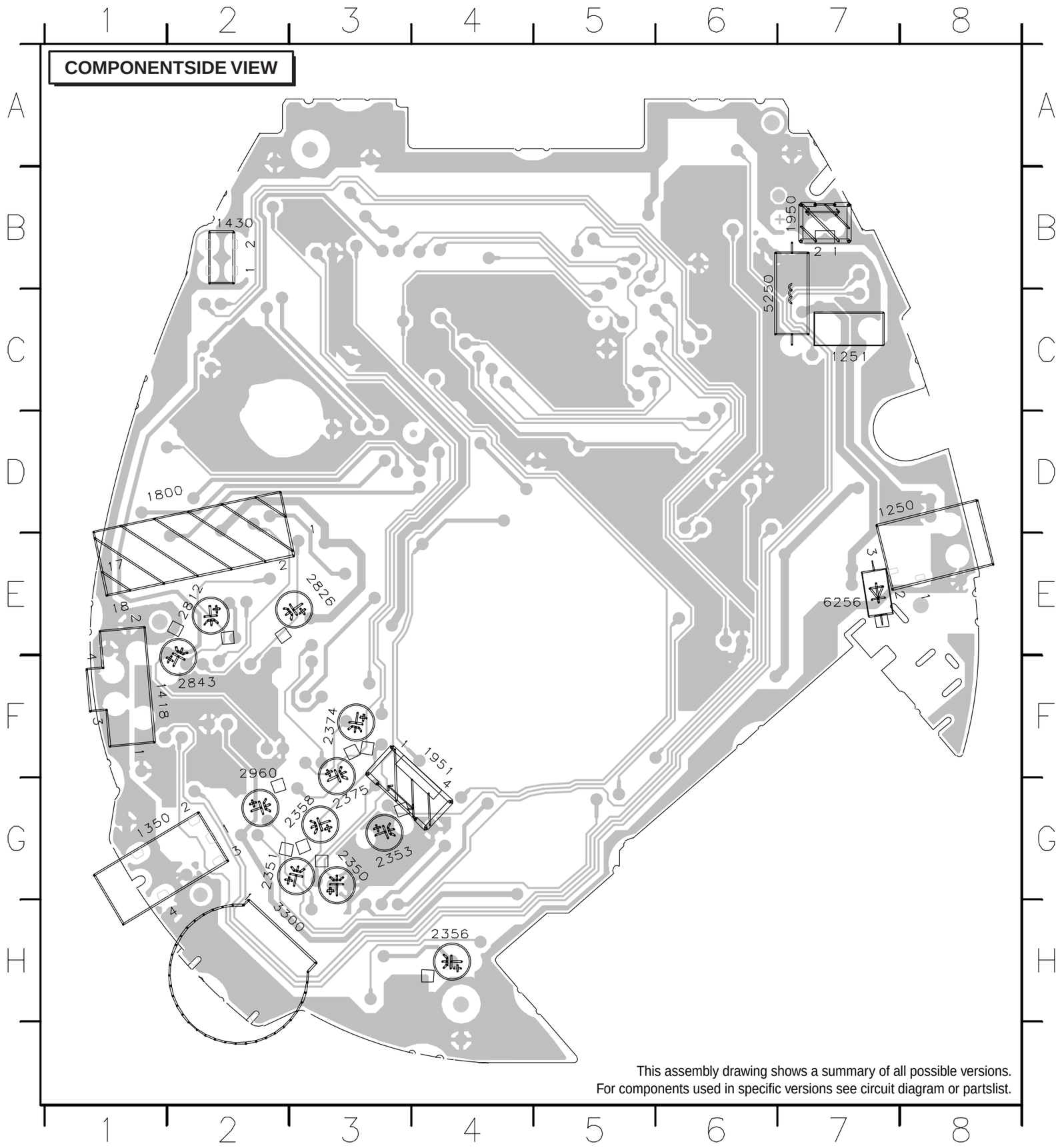
1250 A7	1951 E14	2256 B12	2268 C14	2406 F2	2957 E13	2965 H10	2974 G11	3254 A9	3262 B10	3268 C13	3290 C7	3406 B2	3412 F1	3953 E10	3966 H10	5251 A13	6256 A7	7250-C B11	7254 A9	7956-A G2	F255 A14	F404 A3	F951 H14	I250 A8
1251 A8	2251 B9	2257 A13	2269 B11	2950 G8	2958 H13	2966 F10	2975 H11	3256 B7	3263 B10	3269 G1	3400 C2	3407 A5	3413 F1	3954 G9	3967 F10	5400 C1	6257 B7	7250-D D10	7255 A11	7956-B G9	F256 A14	F405 A3	F952 F14	I251 A8
1403 A2	2252 A10	2258 A13	2400 B4	2951 F10	2960 F14	2967 E9	2976 F11	3257 A8	3264 A10	3270 G1	3401 D2	3408 A6	3414 A3	3955 G9	3968 F10	6251 A9	6950 D9	7250-E E9	7256 B12	F250 A7	F259 G2	F406 A6	F953 F14	
1418 F1	2253 C10	2259 A13	2401 D2	2952 D10	2961 H13	2970 F14	3250 A8	3258 C9	3265 B12	3271 G1	3403 A2	3409 A6	3416 F4	3956 E8	3969 G10	6252 A10	6951 C10	7250-F E8	7257 A12	F251 A7	F400 C2	F407 A5	F954 E14	
1430 G4	2254 A10	2260 B12	2402 C2	2953 D10	2962 E13	2971 G14	3251 B7	3259 B9	3266 B14	3273 G2	3404 A3	3410 F4	3431 E2	3961 G10	3970 E10	6253 A12	6952 A10	7252 C8	7400 B2	F252 A7	F402 A2	F408 A6	F955 E10	
1950 H14	2255 A11	2265 A6	2405 F2	2954 D11	2964 H10	2973 F11	3253 C7	3261 B9	3267 C14	3280 B11	3405 B2	3411 G4	3432 D2	3962 D9	5250 A12	6254 B14	7250-B B11	7253 C9	7950 E11	F254 B11	F403 A3	F950 H14	F956 G11	



4-2



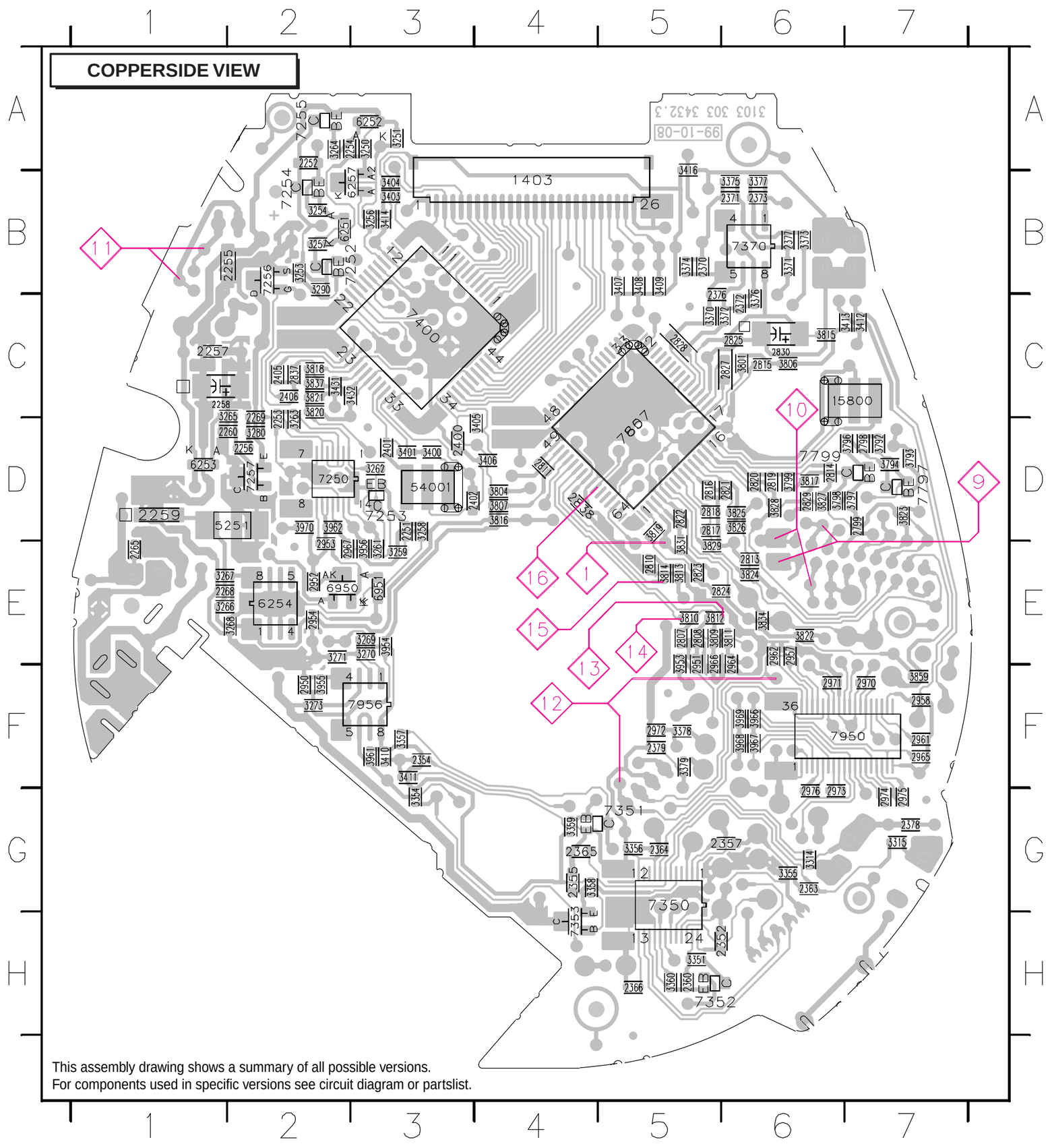
4-3



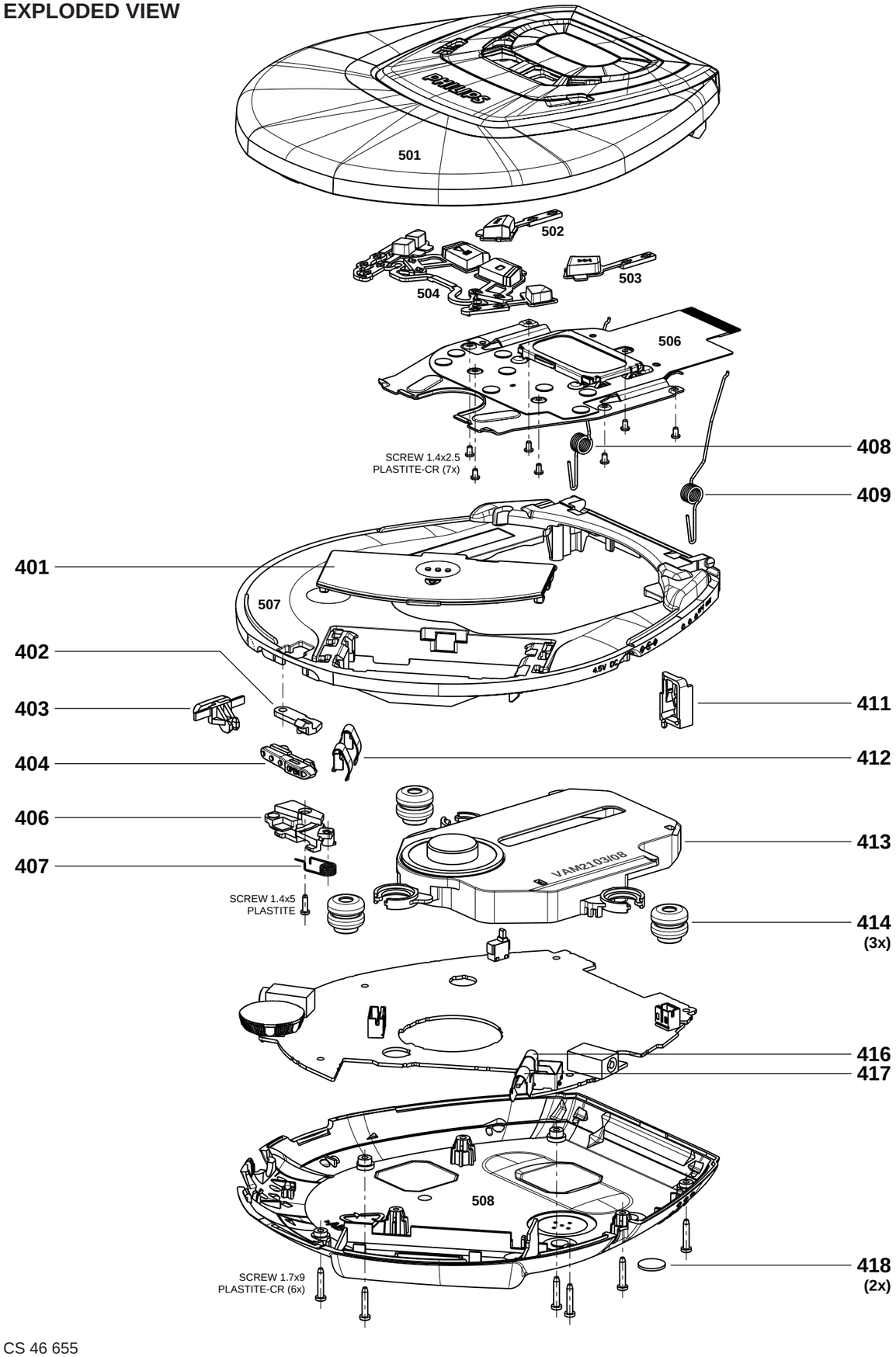
1250	D7
1251	C7
1350	G1
1418	F1
1430	C2
1800	E2
1950	B7
1951	F4
2350	G3
2351	G2
2353	G3
2356	H4
2358	G3
2374	F3
2375	F3
2812	E2
2826	E3
2843	F2
2960	G2
3300	H2
5250	C6
6256	E7

4-4

1403	B4	2825	C6	3356	G5	3820	C2
2251	D3	2827	C6	3357	F3	3821	C2
2252	A2	2828	C5	3358	G4	3822	E6
2253	D2	2829	D6	3359	G4	3823	D7
2254	A2	2830	C6	3360	H5	3824	E6
2255	B2	2837	C2	3370	C5	3825	D6
2256	D2	2838	D4	3371	B6	3826	D6
2257	C1	2950	F2	3372	C6	3827	D6
2258	C1	2951	E5	3373	B6	3828	D6
2259	D1	2952	E2	3374	B5	3829	E5
2260	D2	2953	E2	3375	B6	3831	E5
2265	E1	2954	E2	3376	C6	3834	E6
2268	E1	2957	E6	3377	B6	3837	C2
2269	C2	2958	F7	3378	F5	3859	F7
2352	H5	2961	F7	3379	F5	3953	E5
2354	F3	2962	E6	3400	D3	3954	E3
2355	G4	2964	E6	3401	D3	3955	F2
2357	G6	2965	F7	3403	B3	3956	E3
2360	H5	2966	E5	3404	B3	3961	F3
2363	G6	2967	E2	3405	D4	3962	D2
2364	G5	2970	F7	3406	D4	3966	F6
2365	G4	2971	F6	3407	B5	3967	F6
2366	H5	2972	F5	3408	B5	3968	F6
2370	B5	2973	G6	3409	B5	3969	F6
2371	B6	2974	G7	3410	F3	3970	D2
2372	C6	2975	G7	3411	F3	5251	D2
2373	B6	2976	G6	3412	C7	5400	D3
2376	C5	3250	A3	3413	C7	5800	C7
2377	B6	3251	A3	3414	B3	6251	B2
2378	G7	3253	B2	3416	A5	6252	A3
2379	F5	3254	B2	3431	C2	6253	D1
2400	D3	3256	B3	3432	C2	6254	E2
2401	D3	3257	B2	3792	D7	6257	B3
2402	D3	3258	D3	3793	D7	6950	E2
2405	C2	3259	E3	3794	D7	6951	E3
2406	C2	3261	E3	3796	D7	7250	D2
2798	D7	3262	D3	3797	D7	7252	B2
2799	D7	3263	D2	3798	D6	7253	D3
2807	E5	3264	A2	3799	D6	7254	B2
2808	E5	3265	C2	3801	C6	7255	A2
2810	E5	3266	E1	3804	D4	7256	B2
2811	D4	3267	E1	3806	C6	7257	D2
2813	E6	3268	E2	3807	D4	7350	G5
2814	D6	3269	E3	3809	E5	7351	G5
2815	C6	3270	E3	3810	E5	7352	H5
2816	D5	3271	E2	3811	E6	7353	H4
2817	D5	3273	F2	3812	E5	7370	B6
2818	D5	3280	D2	3813	E5	7400	C3
2819	D6	3290	B2	3814	E5	7797	D7
2820	D6	3314	G6	3815	C6	7799	D6
2821	D6	3315	G7	3816	D4	7807	D5
2822	D5	3351	H5	3817	D6	7950	F7
2823	E5	3354	G3	3818	C2	7956	F3
2824	E5	3355	G6	3819	D5		



EXPLODED VIEW



5-1

MECHANICAL PARTSLIST

401	3103 304 68080	DOOR-BATTERY-2
402	3103 304 68060	LEVER-OPEN-2
403	3103 304 68110	SLIDER-RESUME-2
404	3103 307 97940	SLIDER-OPEN-2-LAC
406	3103 304 68070	HOLDER-OPEN-2
407	3103 301 06500	SPRING-SLIDER-OPEN-2
408	3103 301 06520	SPRING-OPEN-LONG-L-2C45
409	3103 301 06510	SPRING-OPEN-LONG-R-2C45
411	3103 304 68090	BRAKE-2
412	3103 301 45180	SPRING-BATTERY-SHORT-2
413	9305 022 13208	CD-DRIVE VAM2103/08
414	4822 402 10897	DAMPER-CD DRIVE
416	3103 301 45200	SPRING-BATTERY-MINUS-2
417	3103 301 45190	SPRING-BATTERY-PLUS-2
418	4822 462 41819	RUBBER FOOT
	4822 502 13872	SCREW 1.4x5 PLASTITE
	3103 300 41570	SCREW 1.4x2.5 PLASTITE-CR
	3103 300 41580	SCREW 1.7x9 PLASTITE-CR

ELECTRICAL PARTSLIST

MISCELLANEOUS

0211	9360 282 30112	LCD PANEL LPH6406-1
1250	2422 026 05086	EXT. DC-JACK
1251	2422 086 10946	FUSE T630mA 65V ⚠
1350	4822 265 11247	SOCKET, HEADPHONE HSJ1537
1403	2422 025 16707	CONNECTOR, FLEX-FOIL 26P
1418	4822 277 21643	SWITCH-SLIDE, RESUME/HOLD
1430	4822 276 12889	SWITCH, CD-DOOR
1800	4822 265 11576	CONNECTOR, FLEX-FOIL 18P

CAPACITORS

2251 ©	4822 126 14305	100nF	10%	16V
2252 ©	4822 126 14043	1µF	20%	16V
2253 ©	4822 122 33741	10pF	10%	50V
2254 ©	4822 126 14305	100nF	10%	16V
2255 ©	4822 126 14083	4,7µF	20%	10V
2256 ©	5322 126 11583	10nF	10%	63V
2257 ©	4822 126 14472	1µF	10%	10V
2258 ©	4822 124 12111	47µF	20%	4V
2259 ©	4822 124 12107	22µF	20%	4V
2265 ©	4822 126 14305	100nF	10%	16V
2269 ©	4822 126 14238	2,2nF	10%	50V
2350	4822 124 11947	10µF	20%	16V
2351	4822 124 11947	10µF	20%	16V
2352 ©	2222 780 15656	330nF	10%	16V
2353	4822 124 11947	10µF	20%	16V
2354 ©	5322 126 11583	10nF	10%	63V
2355 ©	4822 126 14472	1µF	10%	10V
2356	4822 124 22651	1µF	20%	50V
2357 ©	2238 780 15654	220nF	10%	16V
2358	4822 124 22652	2,2µF	20%	50V
2360 ©	4822 126 14305	100nF	10%	16V
2363 ©	4822 126 14305	100nF	10%	16V
2364 ©	4822 126 14305	100nF	10%	16V
2365 ©	4822 126 14472	1µF	10%	10V
2366 ©	4822 126 14305	100nF	10%	16V
2370 ©	5322 126 11578	1nF	10%	63V
2371 ©	5322 126 11578	1nF	10%	63V
2372 ©	5322 126 11578	1nF	10%	63V
2373 ©	5322 126 11578	1nF	10%	63V
2374	4822 124 40998	22µF	20%	6,3V
2375	4822 124 40998	22µF	20%	6,3V
2376 ©	4822 122 31765	100pF	5%	50V
2377 ©	4822 122 31765	100pF	5%	50V
2378 ©	5322 126 11583	10nF	10%	63V
2379 ©	5322 126 11583	10nF	10%	63V
2400 ©	4822 126 14472	1µF	10%	10V
2401 ©	4822 122 33777	47pF	5%	63V
2402 ©	2238 780 15654	220nF	10%	16V
2798 ©	4822 122 31765	100pF	5%	50V
2799 ©	5322 126 11578	1nF	10%	63V
2807 ©	5322 126 11579	3,3nF	10%	63V
2808 ©	5322 126 11579	3,3nF	10%	63V
2810 ©	5322 126 11579	3,3nF	10%	63V
2811 ©	4822 126 14305	100nF	10%	16V
2812	4822 124 40998	22µF	20%	6,3V
2813 ©	4822 126 14249	560pF	10%	50V
2814 ©	4822 126 14247	1,5nF	10%	50V
2815 ©	4822 126 14305	100nF	10%	16V
2816 ©	4822 126 13883	220pF	5%	50V
2817 ©	4822 126 13883	220pF	5%	50V
2818 ©	4822 126 13883	220pF	5%	50V

CAPACITORS

2819 ©	4822 126 13883	220pF	5%	50V
2820 ©	4822 126 13883	220pF	5%	50V
2821 ©	4822 126 13883	220pF	5%	50V
2822 ©	5322 126 11583	10nF	10%	63V
2823 ©	4822 122 33777	47pF	5%	63V
2824 ©	4822 126 14494	22nF	10%	25V
2825 ©	3198 017 41050	1µF	20%	10V
2826	4822 124 40998	22µF	20%	6,3V
2827 ©	4822 126 13344	1,5nF	5%	63V
2828 ©	4822 126 13344	1,5nF	5%	63V
2829 ©	4822 126 14238	2,2nF	10%	50V
2830 ©	4822 124 12111	47µF	20%	4V
2837 ©	4822 126 14549	33nF	10%	16V
2838 ©	4822 126 14472	1µF	10%	10V
2843	4822 124 40998	22µF	20%	6,3V
2950 ©	4822 126 14305	100nF	10%	16V
2951 ©	4822 126 14305	100nF	10%	16V
2952 ©	4822 126 14494	22nF	10%	25V
2953 ©	4822 126 14305	100nF	10%	16V
2954 ©	4822 126 14305	100nF	10%	16V
2957 ©	4822 126 13881	470pF	5%	50V
2958 ©	4822 126 13881	470pF	5%	50V
2960	4822 124 80483	47µF	20%	6,3V
2961 ©	4822 126 13881	470pF	5%	50V
2962 ©	4822 126 13881	470pF	5%	50V
2964 ©	4822 126 14247	1,5nF	10%	50V
2965 ©	5322 126 11579	3,3nF	10%	63V
2966 ©	4822 126 14247	1,5nF	10%	50V
2967 ©	4822 122 33777	47pF	5%	63V
2970 ©	3198 017 41050	1µF	20%	10V
2971 ©	3198 017 41050	1µF	20%	10V
2972 ©	5322 126 11583	10nF	10%	63V
2973 ©	4822 126 13881	470pF	5%	50V
2974 ©	4822 126 13881	470pF	5%	50V
2975 ©	4822 126 13881	470pF	5%	50V
2976 ©	4822 126 13881	470pF	5%	50V

RESISTORS

3250 ©	4822 117 13632	100kΩ	1%	0,06W	
3251 ©	4822 117 13632	100kΩ	1%	0,06W	
3253 ©	4822 117 13632	100kΩ	1%	0,06W	
3254 ©	4822 117 13632	100kΩ	1%	0,06W	
3256 ©	4822 117 13632	100kΩ	1%	0,06W	
3257 ©	4822 051 30103	10kΩ	5%	0,06W	
3258 ©	4822 051 30103	10kΩ	5%	0,06W	
3259 ©	4822 051 30103	10kΩ	5%	0,06W	
3261 ©	4822 117 12891	220kΩ	1%	0,06W	
3262 ©	4822 117 12925	47kΩ	1%	0,06W	
3263 ©	4822 117 13632	100kΩ	1%	0,06W	
3264 ©	4822 117 13632	100kΩ	1%	0,06W	
3265 ©	4822 051 30471	470Ω	5%	0,06W	
3266 ©	5322 117 13018	1kΩ	1%	0.0625W	
3267 ©	4822 117 12925	47kΩ	1%	0,06W	
3268 ©	4822 051 30681	680Ω	5%	0,06W	
3270 ©	4822 117 12891	220kΩ	1%	0,06W	
3271 ©	4822 117 12889	270kΩ	1%	0,06W	
3273 ©	4822 117 13632	100kΩ	1%	0,06W	
3280 ©	4822 051 30471	470Ω	5%	0,06W	
3290 ©	4822 117 12925	47kΩ	1%	0,06W	
3300 ©	3103 308 52850	POTMETER ALPS 2x10kΩ CX2			
3314 ©	4822 117 13608	4,7Ω	5%	0,06W	only for /17
3314 ©	4822 117 12971	15Ω	5%	0,06W	not for /17
3315 ©	4822 117 13608	4,7Ω	5%	0,06W	only for /17

RESISTORS

3315 ©	4822 117 12971	15Ω	5%	0,06W	not for /17
3351 ©	4822 117 13632	100kΩ	1%	0,06W	
3352 ©	4822 051 30333	33kΩ	5%	0,06W	
3354 ©	4822 117 13632	100kΩ	1%	0,06W	
3355 ©	4822 117 13613	2,2Ω	5%	0,06W	
3356 ©	4822 117 13613	2,2Ω	5%	0,06W	
3357 ©	4822 051 30103	10kΩ	5%	0,06W	
3358 ©	4822 051 30101	100Ω	5%	0,06W	
3359 ©	4822 117 13632	100kΩ	1%	0,06W	
3360 ©	4822 117 13632	100kΩ	1%	0,06W	
3370 ©	4822 051 30333	33kΩ	5%	0,06W	
3371 ©	4822 051 30333	33kΩ	5%	0,06W	
3372 ©	4822 051 30333	33kΩ	5%	0,06W	
3373 ©	4822 051 30333	33kΩ	5%	0,06W	
3374 ©	4822 117 12903	1,8kΩ	1%	0,06W	
3375 ©	4822 117 12903	1,8kΩ	1%	0,06W	
3376 ©	4822 117 12903	1,8kΩ	1%	0,06W	
3377 ©	4822 117 12903	1,8kΩ	1%	0,06W	
3378 ©	4822 051 30221	220Ω	5%	0,06W	
3379 ©	4822 051 30221	220Ω	5%	0,06W	
3400 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3401 ©	4822 117 13632	100kΩ	1%	0,06W	
3403 ©	4822 117 12925	47kΩ	1%	0,06W	
3404 ©	4822 117 12925	47kΩ	1%	0,06W	
3405 ©	4822 117 13632	100kΩ	1%	0,06W	
3406 ©	4822 051 30103	10kΩ	5%	0,06W	
3407 ©	4822 117 12925	47kΩ	1%	0,06W	
3408 ©	4822 117 12925	47kΩ	1%	0,06W	
3409 ©	4822 117 12925	47kΩ	1%	0,06W	
3410 ©	4822 117 12925	47kΩ	1%	0,06W	
3411 ©	4822 051 30563	56kΩ	5%	0,06W	
3412 ©	4822 117 12891	220kΩ	1%	0,06W	
3413 ©	4822 117 12891	220kΩ	1%	0,06W	
3414 ©	4822 117 12925	47kΩ	1%	0,06W	
3416 ©	4822 117 12891	220kΩ	1%	0,06W	
3431 ©	4822 051 30101	100Ω	5%	0,06W	
3432 ©	4822 051 30101	100Ω	5%	0,06W	
3792 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3793 ©	4822 051 30223	22kΩ	5%	0,06W	
3794 ©	4822 117 11817	1,2kΩ	1%	0,06W	
3796 ©	4822 051 30221	220Ω	5%	0,06W	
3797 ©	4822 051 30102	1kΩ	5%	0,06W	
3798 ©	4822 051 30105	1MΩ	5%	0,06W	
3799 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3801 ©	4822 117 12139	22Ω	5%	0,06W	
3804 ©	4822 051 30109	10Ω	5%	0,06W	
3806 ©	4822 051 30479	47Ω	5%	0,06W	
3807 ©	4822 117 13608	4,7Ω	5%	0,06W	
3809 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3810 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3811 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3812 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3813 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3814 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3815 ©	4822 117 13608	4,7Ω	5%	0,06W	
3816 ©	4822 051 30223	22kΩ	5%	0,06W	
3817 ©	4822 051 30102	1kΩ	5%	0,06W	
3818 ©	4822 051 30223	22kΩ	5%	0,06W	
3819 ©	4822 051 30102	1kΩ	5%	0,06W	
3820 ©	4822 051 30223	22kΩ	5%	0,06W	
3821 ©	4822 051 30223	22kΩ	5%	0,06W	
3822 ©	4822 051 30109	10Ω	5%	0,06W	
3823 ©	4822 051 30103	10kΩ	5%	0,06W	
3824 ©	4822 051 30103	10kΩ	5%	0,06W	

RESISTORS

3825 ©	4822 051 30103	10kΩ	5%	0,06W
3826 ©	4822 051 30103	10kΩ	5%	0,06W
3827 ©	4822 051 30103	10kΩ	5%	0,06W
3828 ©	4822 051 30103	10kΩ	5%	0,06W
3829 ©	4822 051 30333	33kΩ	5%	0,06W
3831 ©	4822 051 30223	22kΩ	5%	0,06W
3834 ©	4822 051 30339	33Ω	5%	0,06W
3837 ©	4822 051 30103	10kΩ	5%	0,06W
3859 ©	4822 051 30109	10Ω	5%	0,06W
3953 ©	4822 051 30103	10kΩ	5%	0,06W
3954 ©	4822 117 12925	47kΩ	1%	0,06W
3955 ©	4822 117 12925	47kΩ	1%	0,06W
3956 ©	4822 051 30105	1MΩ	5%	0,06W
3961 ©	4822 051 30222	2,2kΩ	5%	0,06W
3962 ©	4822 051 30154	150kΩ	5%	0,06W
3966 ©	4822 117 11817	1,2kΩ	1%	0,06W
3967 ©	4822 117 12902	8,2kΩ	1%	0,06W
3968 ©	4822 051 30562	5,6kΩ	5%	0,06W
3969 ©	4822 051 30183	18kΩ	5%	0,06W
3970 ©	3198 021 90030	CHIP JUMPER 0603		

COILS

5250	4822 157 51462	10µH 10% ⚠
5251 ©	4822 157 11705	10µH 10%
5400 ©	4822 242 81546	CER. RES. 8,4672MHz
5800 ©	4822 242 81546	CER. RES. 8,4672MHz

DIODES

6251 ©	4822 130 83757	BAS216
6252 ©	4822 130 83757	BAS216
6253 ©	4822 130 83757	BAS216
6256	5322 130 81917	SB140
6257 ©	5322 130 34331	BAV70
6950 ©	5322 130 34337	BAV99
6951 ©	4822 130 83757	BAS216

TRANSISTORS

7252 ©	9340 217 70115	BC847BW
7253 ©	9340 217 70115	BC847BW
7254 ©	9340 218 50115	BC857BW
7255 ©	9340 218 50115	BC857BW
7256 ©	4822 130 11549	BSH105 ⚠
7257 ©	5322 130 60123	BC807-40
7351 ©	9340 217 70115	BC847BW
7352 ©	9340 217 70115	BC847BW
7353 ©	4822 130 42615	BC817-40
7797 ©	9340 218 50115	BC857BW
7799 ©	9340 218 50115	BC857BW

INTEGRATED CIRCUITS

6254 ©	4822 209 16406	TL431ACD
7250 ©	4822 209 17289	74LV14PW
7350 ©	9322 142 97668	TA2120FN HEADPHONE AMPLIFIER
7370 ©	4822 209 33165	TDA1308T/N1
7400 ©	4822 209 17323	TMP47C422F/83920
7807 ©	9352 642 17557	SAA7325H/M2B CD10/M2
7950 ©	4822 209 16085	MPC17A50VM SERVO DRIVER
7956 ©	5322 209 12343	LM2904D