

Service
Service
Service



Service Manual



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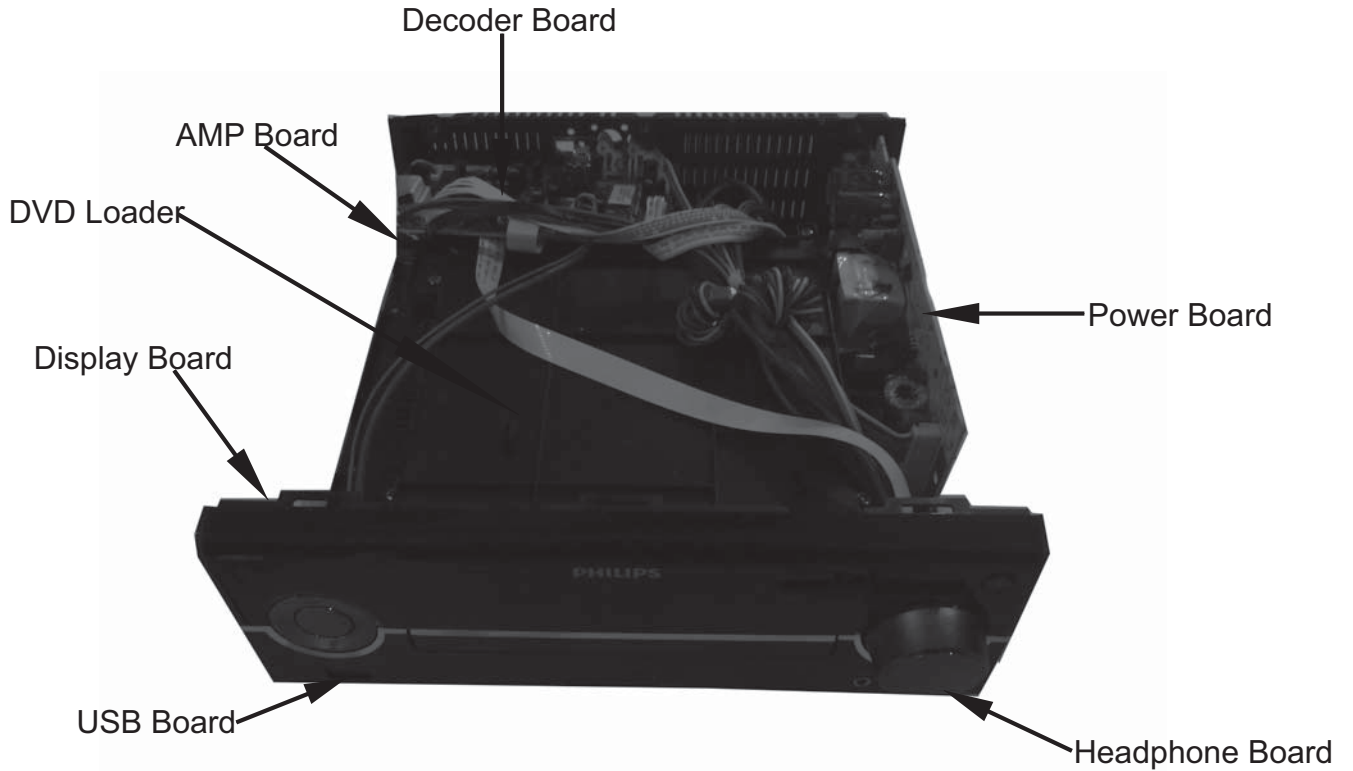
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Feature Different	/93
RDS	
Voltage Selector	✓
ECO Standby	✓
DTS	



Technical Specification and Connection Facilities

1. Location of PC Boards



Version Variations

Type /Versions:		MCD780											
Board in used:	Service policy	/05	/10	/12	/37	/51	/58	/61	/79	/93	/94	/96	/98
AMP Board										C			
Decoder Board										C			
Display Board										C			
Power Board										M			
USB Board										C			
Headphone Board										C			
Type /Versions		MCD780											
Features	Feature difference	/05	/10	/12	/37	/51	/58	/61	/79	/93	/94	/96	/98
RDS													
VOLTAGE SELECTOR										√			
ECO STANDBY - DARK										√			
DTS													
* TIPS : C -- Component Lever Repair. M -- Module Lever Repair √ -- Used													

2. General Information and Requirement

2.1 Product Family Features

2.1.1 Identity and Key Features

MCD780 is a Micro DVD Audio System support external iPod docking station, CD/DVD player with USB and Tuner FM. It is Philips Heritage Range Series AVM product.

Elements to include as generic requirements:

1. Detachable mains cord
2. Safety certification (CCC)

Following is a list of key features:

1. CD/DVD/MP3 disc player (MTK 1389G)
2. USB true source
 - a) MSC& MTP device
 - b) USB High Speed
3. Support Philips external iPod docking
4. MP3 Link (via headphones jack from PC or MP3 player)
5. Headphone Out (in front of the set)
6. Tuner FM(Silicon Lab Si4705)
7. Ture Digital Amplifier
8. Rated output power=2x30W @10%THD;

2.1.2 Styling, Forms and Functions

MCD780 can be placed on a tabletop which should have a form factor and footprint that can be easily be located in a 2nd room such as in the bedroom or small study room.

2.1.3 External I/O Connections

Model	MCD780			
Stroke Version	93			
Region	China			
iPod dock with Authentication chip	NA			
USB Port	√			
MP3 Link Port (3.5mm audio jack)	√			
Aux In Port (RCA cinch)	√			
Tuner Socket (for FM)	√			
HDMI output port	√			
SPDIF/Coaxial Port	√			
AV Port (R/L/CVBS) RCAx3	√			
Video Port (Y/U/V) RCAx3	NA			

Technical Specification and Connection Facilities

S-Video port	NA			
Headphone Port (3.5mm audio jack)	√			
M-Boy port(3.5mm headphone jact)	NA			

2.1.4 ACCESSORIES

Model	MCD780			
Stroke Version	/93			
Region	China			
Power Cord	1.8M			
AV cable(Y color)	1.5M			
Audio cable (3.5mm audio)	0.5M			
Tuner Antenna	1.5M pigtail			
Speaker cable	3M			
USB cable	NA			
Remote Control	40keys			
Battery	2xAAA			

2.1.5 Controls, Local Display and LED Indications

Control keys on the set are:

1. Standby-On
2. Eject
3. Play/Pause
4. Next
5. Pre
6. Source (Disc, USB, Dock, FM, Aux, MP3)
7. Stop
8. Volume Knob

There is local display VFD. 3 dim level. There are only LEDs for indications.
Standby LED colour: Red in Standby mode, and Two Blue LED for

2.2 Mechanical General Information

The product appearances and functions are defined in their respective MUS. Product management approves the MUS and it is a leading document where product appearance is applicable.

Please refer to Sh560 for mechanical information.

Technical Specification and Connection Facilities

2.3 Safety Standards

Where applicable:

For /12 (EU), /05 (UK), /51 (Russia)	EN/IEC 60065 7 th Edition
For /37 (US, Canada)	UL 60065
For /55 (LATAM), /78 (Brazil)	IEC 60065 7 th Edition
For /98 (AP), /69 (Singapore), /75 (Australia)	IEC 60065 7 th Edition
For /93 (China)	GB 8898 (IEC 60065 7 th Edition)
For /61 (Korea)	K 60065 6 th Edition
For /96 (Taiwan)	CNS 14408 (IEC 60065 7 th Edition)

2.4 EMC Requirements

Where applicable:

For /12 (EU), /05 (UK), /51 (Russia)	EN55013: 2001, EN55020: 2002
For /37 (US, Canada)	FCC15
For /55 (LATAM), /78 (Brazil)	CISPR13
For /98 (AP), /69 (Singapore), /75 (Australia)	CISPR13
For /61 (Korea)	CISPR13/20
For /93 (China)	GB 13837 (CISPR13)
For /96 (Taiwan)	CNS 13439 (CISPR13)

2.5 ESD Requirements

The product shall withstand electro static discharges on all user accessible parts of the product.

Reference: IEC61000-4-2.

For contact discharges:

Level	General (kV)	USA (kV)	Requirement
1	0-2	0-3	No deviations allowed.
2	>2-4	>3-4	Short perceptible deviations allowed.
3	8	8	Components damage not allowed.

For air discharge:

Level	General (kV)	USA (kV)	Requirement
1	0-4	0-6	No deviations allowed.
2	>4-8	>6-8	Short perceptible deviations allowed.
3	8	>15-18	Components damage not allowed.

General requirement:

1. 10 arcs for positive and negative polarity for unit “on” and “off” for 1kV incremental steps.
2. Component or mechanical damage is not allowed. No loss of fixed stored data (stored in EEPROMs).
3. Hang-ups and malfunctions are allowed, as long as the customer can “recover” from the hang-up by pressing the Standby or ON/OFF button of the set.
4. Failures that disappear only by unplugging the AC mains cord and/or power sources are not acceptable.

Technical Specification and Connection Facilities

2.6 Environmental Condition

The environmental condition requirements and test method is according to UAN-D1590.

Ambient temperature : max. 40 ° C - all climates
 Apparatus acc. to spec. : +5 to + 35 ° C

Vibration test (acc. IEC 60 068/2/6) : operational vibration test to be proceeded in operating position of the set.

2.7 Quality

PQR-class: class □ according to BLC A&MA PQR handbook V2.1 (2006-10-02)

Lifetime: 7 years

Tested According to: General Test Instruction UAN-D 1591
 Measured According to: UAN_L 1059 unless otherwise stated

3. Technical Specifications

3.1 Power Supply

3.1.1 Type and versions

Build-inSMPS will be used for all models and stroke versions.

All using figure '8' socket, will cater for all versions:

Versions	Region/Country	SMPS	Detachable mains cords
/93	China	1) 100 ~240Vac nom. (wide range from 90V~264Vac limit) used in all versions except India. Frequency: 47~63Hz.	China 2-pin

All requirements per defined for each country should be met with sufficient testing.

3.1.2 Surge Immunity (Lightning Test)

The product shall withstand mains interference's of:

Differential mode:

- 2kV/2 ohm criteria C for Europe.
- 6kV/12 ohm criteria C for NAFTA.

Parameters:

- Bi-wave
- Open circuit voltage: 2/50us
- Short circuit current: 8/20us
- From +/1kV to +/2kV (for Europe) or +/6kV (for Nafta) in steps of 1kV.
- 10 shots per combination.
- One shot per minute.
- Serial impedance: 2 Ohm for Europe, 12Ohm for Nafta.
- Polarity and phase: Positive (phase 90°) & Negative (phase 270°)

Common mode:

- 6kV/2 ohm criteria C for Europe.
- 6kV/12 ohm criteria C for Nafta.

Parameters:

- Ring-wave (100kHz)

Technical Specification and Connection Facilities

- From +/-3kV to +/-6kV in steps of 1 kV.
- 10 shots per combination.
- One shot per minute.
- Serial impedance: 2 Ohm for Europe, 12Ohm for Nafta
- Polarity and phase: Positive (phase 90°) & Negative (phase 270°)

Reference: IEC61000-4-5 and for USA: 3135 019 8029 Reliability evaluation.

Requirements:

- Apparatus should fulfil the leakage current requirements of IEC60065 point 9.1.1 (UAN-D1631)
- Defects or permanent deviations are not allowed.

3.1.3 Mains Drop-out Immunity

The product shall withstand mains failures of:

- Variation 0% (=100% dip) at T-event = 50 mSec. Performance criterion B
- Variation 40% (=60% dip) at T-event = 100 mSec. Performance criterion B
- Variation 0% (=100% dip) at T-event = 5 Sec. Performance criterion C

Additional for USA apparatus: See 3135 019 8029 Reliability evaluation.

- Variation 0% (=100% dip) at T-event = 100 mSec in standby mode. Performance criterion B

Requirement:

No misoperation and no interference of user in order to guarantee continuation of performed function.

Reference: IEC61000-4-11 For measuring method refer to UAN-D1724, as far as applicable.

Performance criterions according to IEC61000-4-4 Amendment 1

Performance Requirement

Criterion A - No any degradation of specification.

Criterion B - Temporary degradation / self recoverable.

Criterion C - No damage, resolvable hang-up.

Criterion D - Not recoverable loss of function.

3.1.4 Power Consumption

Power consumption at nominal AC input:

- | | | | | |
|--|---|---|-----------|---|
| 1. DVD play mode at 1/8 P-rated output power | : | ≤ | <u>40</u> | W |
| 2. Low Power Standby Mode | : | ≤ | _____ | W |

Technical Specification and Connection Facilities

3.2.2 Digital Audio Outputs

Type	Standard
CDDA / LPCM (including MPEG1)	IEC60958
MPEG2, Dolby Digital (AC-3)	IEC61937
DTS, 96kHz 24 bit	

3.2.2.1 Coaxial

Description	Specification
Output signal amplitude	0.5 Vpp ± 20%
Output impedance	75 Ω ± 20%
DC output voltage	< 0.05 V
Clock accuracy	< 100 ppm (typical) < 1000 ppm (maximum)
T _{rise} and T _{fall}	< 0.4 UI
Intrinsic jitter	< 0.05 UI

3.3 Video

3.3.1 Video Performance

3.3.1.1 CVBS

Description	Test Signal	Specification	
		NTSC	PAL
Amplitude output	100% White	1Vpp ± 10%	1Vpp ± 10%
White bar	100% White	714mV ± 10%	700mV ± 10%
Sync. Amplitude	100% White	286mV ± 10%	300mV ± 10%
Burst Amplitude	75% Color bar	286mV, +1dB / -4dB	300mV, +1dB / -4dB
Burst / chroma ratio	100% Color bar	± 5%	± 5%
S/N luminance	100% White	≥60 dB	≥60 dB
S/N chroma	100% Red	AM	≥57 dB
		PM	≥57 dB
Video Bandwidth	Multi-burst	0.5MHz – 4MHz	+1dB/-1dB
4.8MHz		-1.5dB	
5.8MHz		-5dB	
Chroma Subcarrier Frequency	75% Color bar	3.579545 MHz ± 25ppm	4.433618MHz± 30ppm
Chroma / luminance delay	2T pulse	≤20ns	≤20ns
Subcarrier locked/unlocked	75% Color bar	locked	locked
DC Level	0% Black	≤1V	≤1V

Technical Specification and Connection Facilities

3.3.1.2 Component Video (Y/Pb/Pr) (NA)

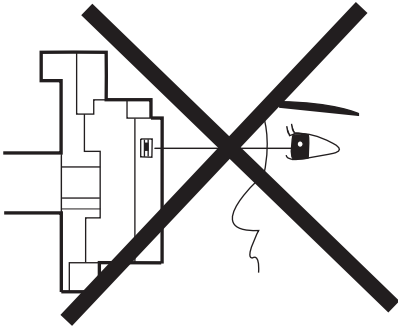
Description	Test Signal	Specification		
		Interlace/Progressive	NTSC	PAL
Amplitude output	100% White	1000mV ± 10%	1000mV ± 10%	
White bar	100% White	714mV ± 10%	700mV ± 10%	
PbPr peak to peak	75% Color bar	525mV ± 10%	535mV ± 10%	
PbPr Output unbalance	75% Color bar	≤3%	≤3%	
Sync. Amplitude	100% White	286mV ± 40mV	300mV ± 10%	
S/N on outputs	Y	≥60 dB	≥60 dB	
	Pb / Pr	75% Color bar		
Video Bandwidth	4.2MHz	Multi-burst	-1.5dB	-1.5dB
	5.8MHz		-5dB	-5dB
Video Bandwidth (Progressive)	8.4MHz	Multi-burst	-1.5dB	-1.5dB
	9.6MHz		-5dB	-5dB
DC Level	0% Black	≤1V	≤1V	

3.4 TUNER

FM use Silicon Lab tuner chipset Si4705(w/RDS)							
GENERAL PART							
WAVE RANGE		VERSION	TOLERANCE		TUNING GRID		
FM 87.5 – 108.00 MHz		/05/12	QUARTZ PRECISION		50kHz		
AERIAL							
FM : PIGTAIL TYPE ANT WIRE 75Ω							
ELECTRICAL DATA							
				FM	Nom	Limit	Unit
				- 3 dB Limiting Point	20	26	dBf
				Search Tuning Sensitivity(at stereo mode)	35	41	
				Search time digital tuning system.	-	60	S
				IF	10.7		MHz
				Stereo - 46 dB Quieting	48	51	dB
				Modulation Hum	50	45	
				S/N Ratio	50	45	
				Amplification Reverse	0	-4	dB
				Distortion (RF 1mV, Frq Dev.75 kHz)	2	3	%
				Overall Frequency Response: 63Hz – 12.5KHz	-	±3	dB
				Channel separation:400 / 1000 / 5000 Hz. RF input: 68 dBf	26/30 /20	20/26 /18	dB
Frequency (MHz)		Noise Limited Sensitivity 26 dB	Image Rejection	IF Rejection	Large Signal Handling	Selectivity S9/300 kHz	
FM	Nom.	18	30	64	1000	22	
88.0	Lim.	22	25	45	500	18 (*1)	
FM	Nom.	18	30	64	1000	22	
98.0	Lim.	22	25	45	500	18 (*1)	
FM	Nom.	18	30	60	116 dBf	45	
107.0	Lim.	22	25	65	108 dBf	25	
	Units	dBf	DB	dB	mV/m	dB	
Susceptibility to unwanted signals(CPU,SMPS,AMP,DSP ...):				Limited (dB)	Normal (dB)	Remark	
				-15dB	-20dB	Refer to selfpollution curve	

Laser Beam Safety Precautions

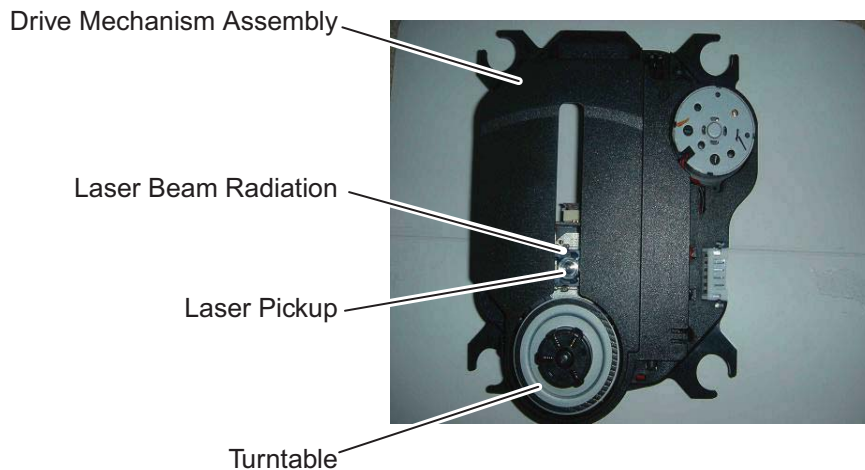
This Blu-Ray player uses a pickup that emits a laser beam.



Do not look directly at the laser beam coming from the pickup or allow it to strike against your skin.

The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 30 cm away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.

CAUTION: Use of controls and adjustments, or doing procedures other than those specified herein, may result in hazardous radiation exposure.



CAUTION-CLASS 2M LASER
RADIATION WHEN OPEN
DO NOT STARE INTO THE BEAM
OR VIEW DIRECTLY WITH
OPTICAL INSTRUMENTS



Location: Inside Top of Blu-Ray mechanism.

Important Safety Precautions

Caution: These servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

Important

Read and understand all instructions before you use your home theater. If damage is caused by failure to follow instructions, the warranty does not apply.

Safety

Risk of electric shock or fire!

- Never expose the product and accessories to rain or water. Never place liquid containers, such as vases, near the product. If liquids are spilt on or into the product, disconnect it from the power outlet immediately. Contact Philips Consumer Care to have the product checked before use.
- Never place the product and accessories near naked flames or other heat sources, including direct sunlight.
- Never insert objects into the ventilation slots or other openings on the product.
- Where the mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.
- Disconnect the product from the power outlet before lightning storms.
- When you disconnect the power cord, always pull the plug, never the cable.

Risk of short circuit or fire!

- Before you connect the product to the power outlet, ensure that the power voltage matches the value printed on the back or bottom of the product. Never connect the product to the power outlet if the voltage is different.

Risk of injury or damage to the home theater!

- For wall-mountable products, use only the supplied wall mount bracket. Secure the wall mount to a wall that can support the combined weight of the product and the wall mount. Koninklijke Philips Electronics N.V. bears no responsibility for improper wall mounting that results in accident, injury or damage.

- For speakers with stands, use only the supplied stands. Secure the stands to the speakers tightly. Place the assembled stands on flat, level surfaces that can support the combined weight of the speaker and stand.
- Never place the product or any objects on power cords or on other electrical equipment.
- If the product is transported in temperatures below 5°C, unpack the product and wait until its temperature matches room temperature before connecting it to the power outlet.
- Visible and invisible laser radiation when open. Avoid exposure to beam.
- Do not touch the disc optical lens inside the disc compartment.

Risk of overheating!

- Never install this product in a confined space. Always leave a space of at least four inches around the product for ventilation. Ensure curtains or other objects never cover the ventilation slots on the product.

Risk of contamination!

- Do not mix batteries (old and new or carbon and alkaline, etc.).
- Remove batteries if they are exhausted or if the remote control is not to be used for a long time.
- Batteries contain chemical substances, they should be disposed of properly.

Product care

- Do not insert any objects other than discs into the disc compartment.
- Do not insert warped or cracked discs into the disc compartment.
- Remove discs from the disc compartment if you are not using the product for an extended period of time.
- Only use microfiber cloth to clean the product.

Important Safety Precautions

Disposal of your old product and batteries



Your product is designed and manufactured with high quality materials and components, which can be recycled and reused.



When this crossed-out wheeled bin symbol is attached to a product it means that the product is covered by the European Directive 2002/96/EC. Please inform yourself about the local separate collection system for electrical and electronic products.

Please act according to your local rules and do not dispose of your old products with your normal household waste.

Correct disposal of your old product helps to prevent potential negative consequences for the environment and human health.



Your product contains batteries covered by the European Directive 2006/66/EC, which cannot be disposed with normal household waste.

Please inform yourself about the local rules on separate collection of batteries because correct disposal helps to prevent negative consequences for the environmental and human health.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts, and wires have been returned to their original positions. Afterwards, do the following tests and confirm the specified values to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1: Ratings for selected area

AC Line Voltage	Clearance Distance (d), (d')
110V~220V	≥ 3.2 mm (0.126 inches)

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

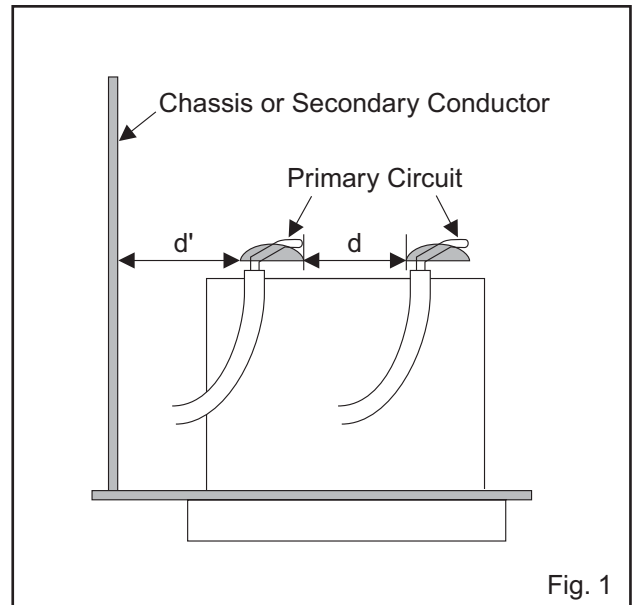


Fig. 1

2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

Measuring Method (Power ON):

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across the terminals of load Z. See Fig. 2 and the following table.

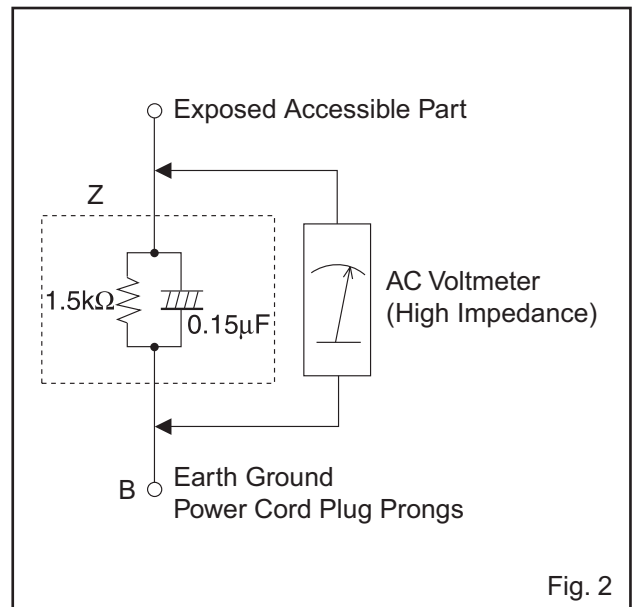


Fig. 2

Table 2: Leakage current ratings for selected areas


AC Line Voltage	Load Z	Leakage Current (i)	Earth Ground (B) to:
110V~220V	0.15 μ F CAP. & 1.5 k Ω RES. Connected in parallel	$i \leq 0.5$ mA Peak	Exposed accessible parts

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

Safety Information, General Notes & Lead Free Requirements

1 Safety Instructions

1.1 General Safety

- Safety regulations require that during a repair:
- Connect the unit to the mains via an isolation transformer.
 - Replace safety components, indicated by the symbol  , only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that after a repair, you must return the unit in its original condition. Pay, in particular, attention to the following points:

- Route the wires/cables correctly, and fix them with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the electrical DC resistance between the mains plug and the secondary side:
 1. Unplug the mains cord, and connect a wire between the two pins of the mains plug.
 2. Set the mains switch to the 'on' position (keep the mains cord unplugged!).
 3. Measure the resistance value between the mains plug and the front panel, controls, and chassis bottom.
 4. Repair or correct unit when the resistance measurement is less than 1 MΩ.
 5. Verify this, before you return the unit to the customer/user (ref. UL-standard no. 1492).
 6. Switch the unit 'off', and remove the wire between the two pins of the mains plug.

1.2 Laser Safety

This unit employs a laser. Only qualified service personnel may remove the cover, or attempt to service this device (due to possible eye injury).

Laser Device Unit

Type	: AlGaInN(BD) : AlGaInP(DVD) : AlGaInP(CD)
Wavelength	: 650 nm (DVD) : 780 nm (VCD/CD) : 405nm(BD)
Output Power	: 20 mW (DVD+RW writing) : 0.8 mW (DVD reading) : 0.3 mW (VCD/CD reading)
Beam divergence	: 60 degree

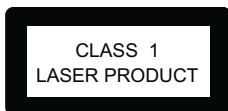



Figure 2-1

Note: Use of controls or adjustments or performance of procedure other than those specified herein, may result in hazardous radiation exposure. Avoid direct exposure to beam.

2 Warnings

2.1 General

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are at the same potential as the mass of the set by a wristband with resistance. Keep components and tools at this same potential. Available ESD protection equipment:
 - Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
 - Wristband tester 4822 344 13999.
- Be careful during measurements in the live voltage section. The primary side of the power supply, including the heatsink, carries live mains voltage when you connect the player to the mains (even when the player is 'off!'). It is possible to touch copper tracks and/or components in this unshielded primary area, when you service the player. Service personnel must take precautions to prevent touching this area or components in this area. A 'lightning stroke' and a stripe-marked printing on the printed wiring board, indicate the primary side of the power supply.
- Never replace modules, or components, while the unit is 'on'.

2.2 Laser

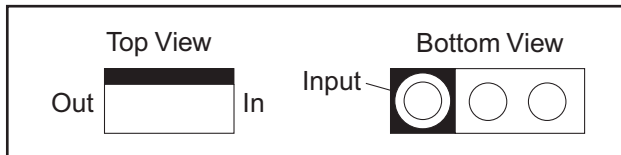
- The use of optical instruments with this product, will increase eye hazard.
- Only qualified service personnel may remove the cover or attempt to service this device, due to possible eye injury.
- Repair handling should take place as much as possible with a disc loaded inside the player.
- Text below is placed inside the unit, on the laser cover shield:

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
 ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
 ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
 VARNING SYNLIG OCH OSYNLIG LASERSTRÅLING NÅR DENNA DEL ÅR ÖPPNAD BETRÄKTA EJ STRÅLEN
 VAROJ AVATTAESSA OLET ALTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
 VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETZEN
 DANGER VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
 ATTENTION RAYONNEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE EXPOSITION DANGEREUSE AU FAISCEAU

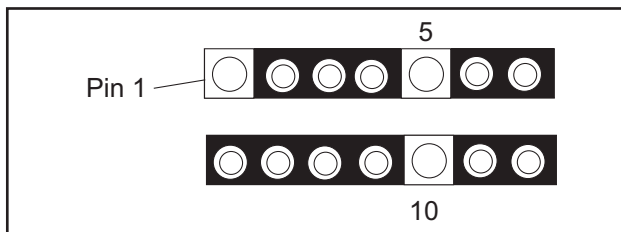
Figure 2-2

Circuit Board Indications

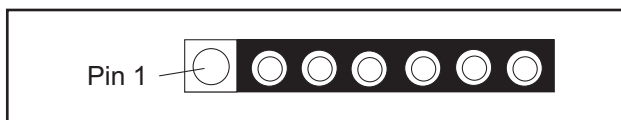
1. The output pin of the 3 pin Regulator ICs is indicated as shown.



2. For other ICs, pin 1 and every fifth pin are indicated as shown.

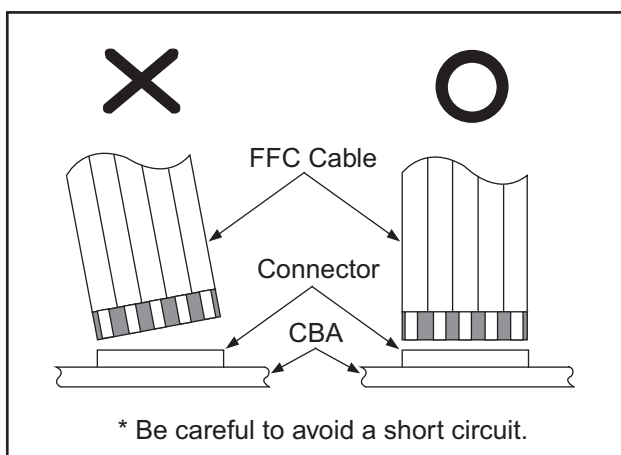


3. The 1st pin of every male connector is indicated as shown.



Instructions for Connectors

1. When you connect or disconnect the FFC (Flexible Foil Connector) cable, be sure to first disconnect the AC cord.
2. FFC (Flexible Foil Connector) cable should be inserted parallel into the connector, not at an angle.



Pb (Lead) Free Solder

When soldering, be sure to use the Pb free solder.

Information about lead-free soldering

Philips CE is producing lead-free sets from 1.1.2005 onwards.

IDENTIFICATION

Regardless of special logo (not always indicated)



One must treat all sets from **1 Jan 2005**

onwards, according to the next rule:

Serial Number gives a 14-digit. Digit 5&6 shows the YEAR, and digit 7&8 shows the WEEK.

So from **0501** onwards=from 1 Jan 2005 onwards

Important note : In fact also products of year 2004 must be treated in this way as long as you avoid mixing solder-alloys (leaded/ lead-free). So best to always use SAC305 and the higher temperatures belong to this.

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free solder alloy Philips SAC305 with order code 0622 149 00106. If lead-free solder-paste is required, please contact the manufacturer of your solder-equipment. In general use of solder-paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free solder alloy. The solder tool must be able
 - To reach at least a solder-temperature of 400°C,
 - To stabilize the adjusted temperature at the solder-tip
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around **360°C - 380°C** is reached and stabilized at the solder joint. Heating-time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips switch off un-used equipment, or reduce heat.
- Mix of lead-free solder alloy / parts with leaded solder alloy / parts is possible but PHILIPS recommends strongly to avoid mixed solder alloy types (leaded and lead-free).
If one cannot avoid or does not know whether product is lead-free, clean carefully the solder-joint from old solder alloy and re-solder with new solder alloy (SAC305).
- Use only original spare-parts listed in the Service-Manuals. Not listed standard-material (commodities) has to be purchased at external companies.

Standard Notes for Servicing, Lead Free Requirements & Handling Flat Pack IC

- Special information for BGA-ICs:

- always use the 12nc-recognizable soldering temperature profile of the specific BGA (for desoldering always use the lead-free temperature profile, in case of doubt)
- lead free BGA-ICs will be delivered in so-called 'dry-packaging' (sealed pack including a silica gel pack) to protect the IC against moisture. After opening, dependent of MSL-level seen on indicator-label in the bag, the BGA-IC possibly still has to be baked dry. (MSL=Moisture Sensitivity Level). This will be communicated via AYS-website. Do not re-use BGAs at all.

- For sets produced before 1.1.2005 (except products of 2004), containing leaded solder-alloy and components, all needed spare-parts will be available till the end of the service-period. For repair of such sets nothing changes.

- On our website www.atyourservice.ce.Philips.com you find more information to:

- BGA-de-/soldering (+ baking instructions)
- Heating-profiles of BGAs and other ICs used in Philips-sets

You will find this and more technical information within the "magazine", chapter "workshop news".

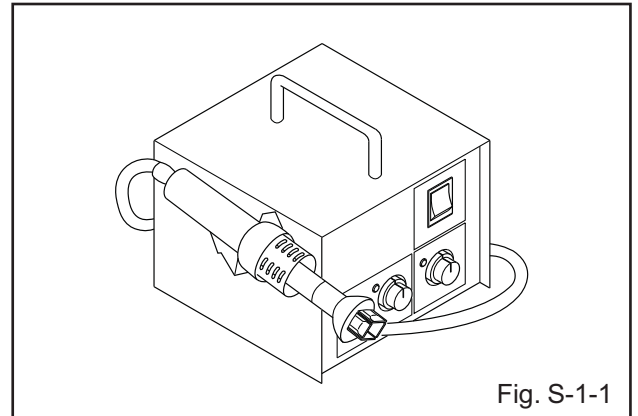
For additional questions please contact your local repair-helpdesk.

How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:

1. Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)



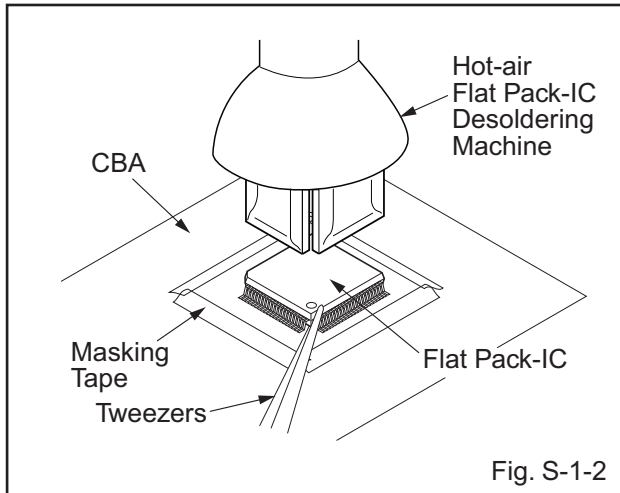
2. Remove the flat pack-IC with tweezers while applying the hot air.
3. Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
4. Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

CAUTION:

1. The Flat Pack-IC shape may differ by models. Use an appropriate hot-air flat pack-IC desoldering machine, whose shape matches that of the Flat Pack-IC.
2. Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)

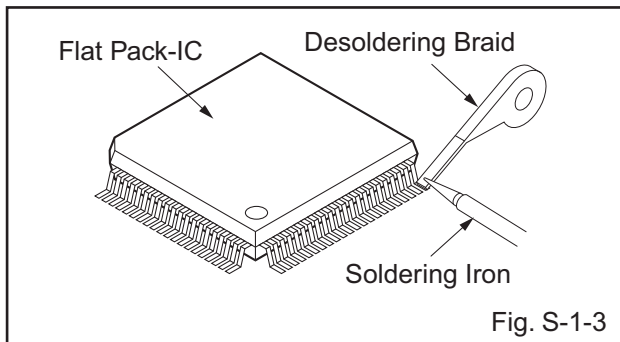
Standard Notes for Servicing, Lead Free Requirements & Handling Flat Pack IC

- The flat pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.

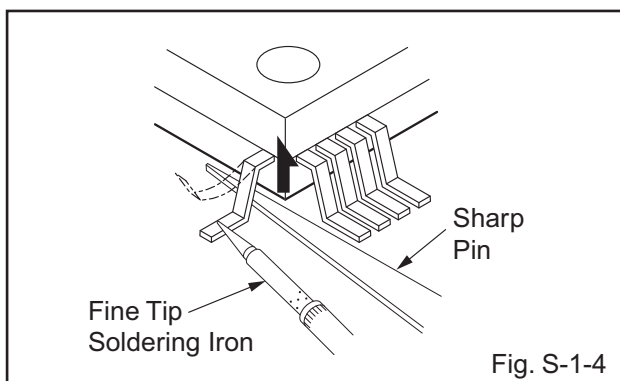


With Soldering Iron:

- Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)



- Lift each lead of the flat pack-IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air desoldering machine. (Fig. S-1-4)



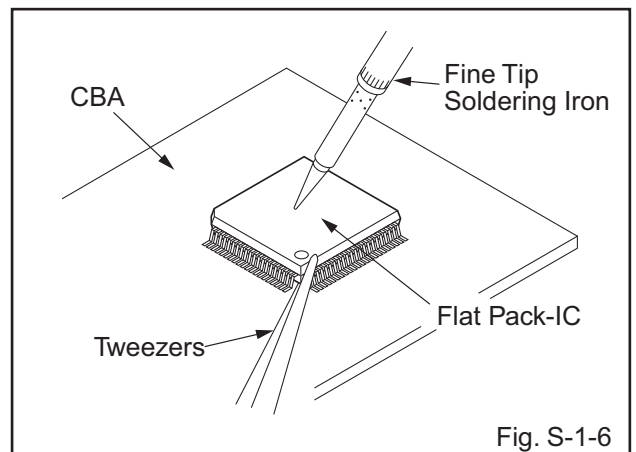
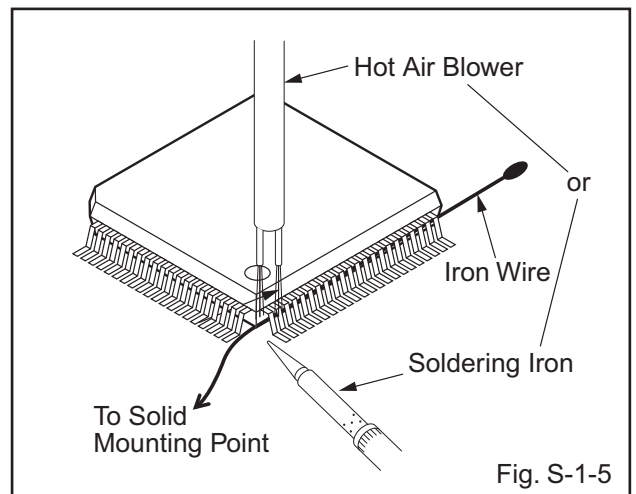
- Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

- Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

With Iron Wire:

- Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)
- Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.
- While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the CBA contact pads as shown in Fig. S-1-5.
- Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
- Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

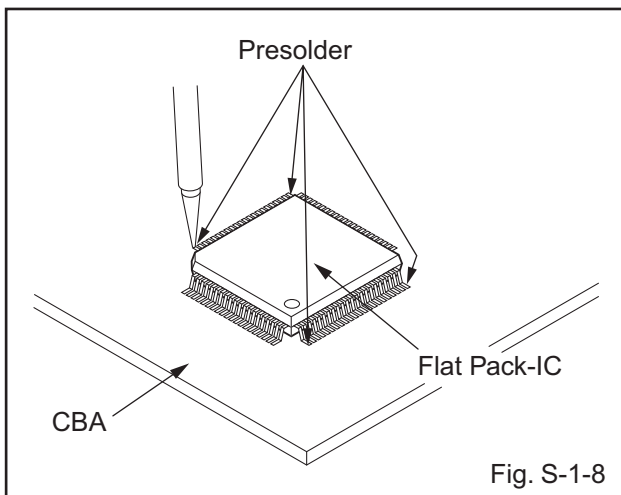
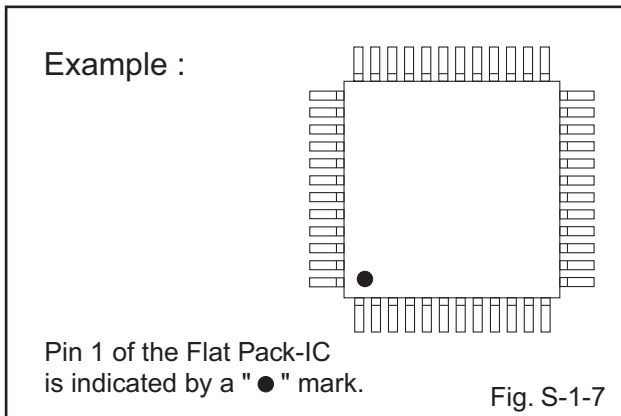
Note: When using a soldering iron, care must be taken to ensure that the flat pack-IC is not being held by glue. When the flat pack-IC is removed from the CBA, handle it gently because it may be damaged if force is applied.



Standard Notes for Servicing, Lead Free Requirements & Handling Flat Pack IC

2. Installation

1. Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA so you can install a replacement flat pack-IC more easily.
2. The "●" mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the 1 on the PCB when positioning for installation. Then presolder the four corners of the flat pack-IC. (See Fig. S-1-8.)
3. Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.



Instructions for Handling Semi-conductors

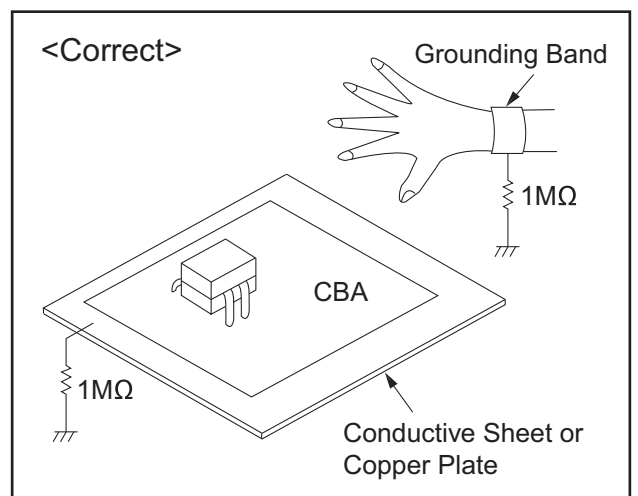
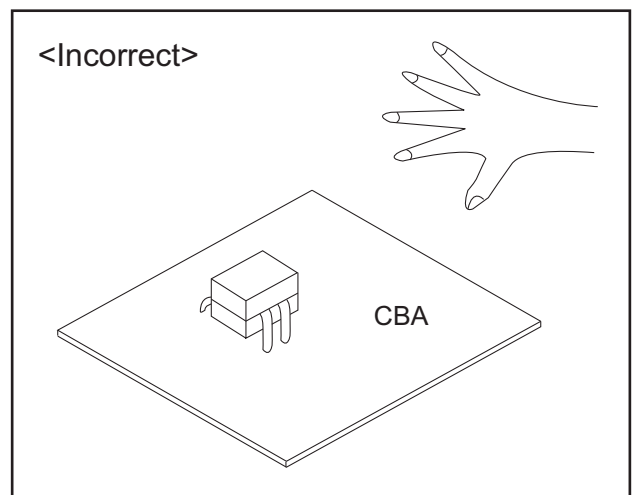
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

1. Ground for Human Body

Be sure to wear a grounding band (1 MΩ) that is properly grounded to remove any static electricity that may be charged on the body.

2. Ground for Workbench

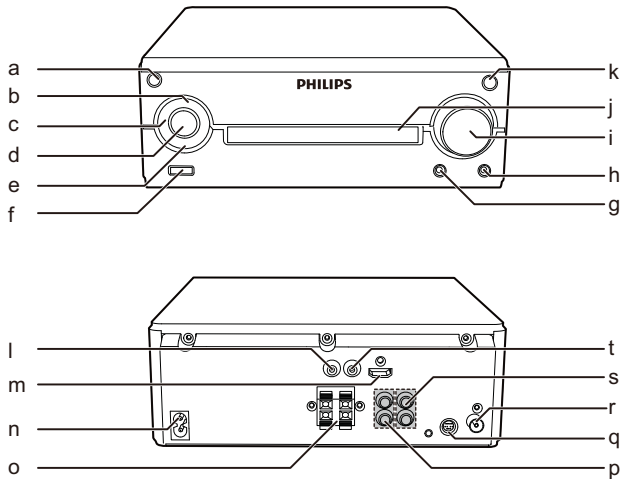
Be sure to place a conductive sheet or copper plate with proper grounding (1 MΩ) on the workbench or other surface, where the semi-conductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semi-conductors with your clothing.










Direction of Use

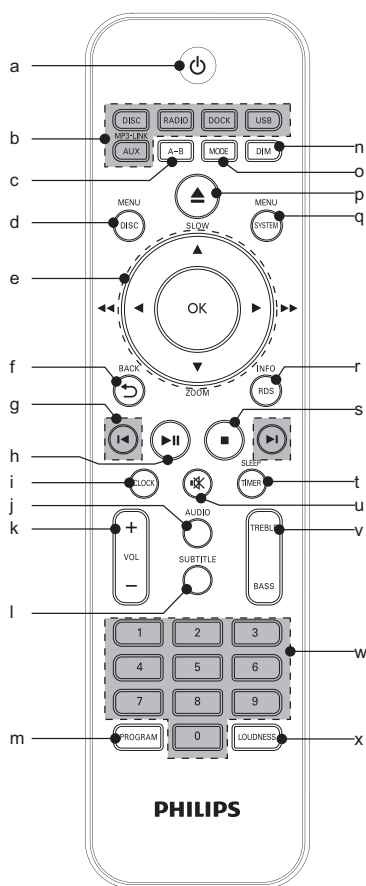
*The following excerpt of the DFU/QSG serves as an introduction to the set. The Complete Direction for Use can be download in different languages from the internet site of Philips Customer care Center : www.support.philips.com

Overview of the main unit



- a 
 - Turn on the device.
 - Switch to standby mode or Eco Power standby mode.
- b SRC
 - Select a source.
- c 
 - Skip to the previous/next track.
 - Search for radio stations.
 - Select programmed radio station.
 - Adjust time.
- d 
 - Start or pause play.
- e 
 - Stop play.
 - Erase a programmed radio station.
 - In standby mode, activate or deactivate demonstration mode.
- f 
 - USB socket.
- g MP3 LINK
 - Jack for an external audio device.
- h 
 - Headphone socket.
- i VOLUME
 - Adjust volume.
 - Adjust time.
- j Disc compartment
- k 
 - Open or close the disc compartment.
- l COAXIAL (DIGITAL OUT)
 - Digital out jack.
- m HDMI (DIGITAL AV OUT)
 - Connect an HDMI cable.
- n AC MAIN~
 - Power supply socket.
- o SPEAKER OUT
 - Connect speakers.
- p LINE OUT
 - Connect audio cables.
- q DOCKING
 - Connect docking device.
- r FM ANTENNA
 - Improve FM reception
- s AUX-IN
 - Connect an external audio device.
- t VIDEO (VIDEO OUT)
 - Video output jack.

Overview of remote control

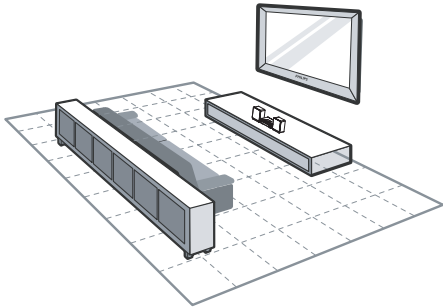


- a
 - Turn on the device.
 - Switch to standby mode or Eco Power standby mode.
- b DISC / RADIO / DOCK / USB / MP3-LINK/AUX
 - Select a source.
- c A-B
 - Repeat a specific section within a track/chapter.
- d DISC MENU
 - Access the main menu of the disc.
- e
 - Navigate through the menus.
 - Press / to slow backward/forward.
 - Press / to select programmed radio stations in tuner mode.
 - Press / / / to rotate a picture during slideshow.
 - Press / (/) to fast backward/forward.
 - Long press (ZOOM) to zoom in/out.
 - Press to confirm a selection or entry.

- f BACK
 - Return to previous display menu.
 - In dock mode, enter the menu list.
- g /
 - Skip to previous or next title, chapter, track, or file.
 - In tuner mode, select programmed radio stations.
- h
 - Start, pause, or resume play.
- i CLOCK
 - Set the clock.
- j AUDIO
 - Select an audio language or channel.
- k VOL +/-
 - Adjust the volume.
 - Adjust the time.
- l SUBTITLE
 - Select a subtitle language.
- m PROGRAM
 - Program radio stations.
- n DIM
 - Select different levels of brightness.
- o MODE
 - In DISC/USB mode, select repeat play or random play.
 - In DOCK mode, select repeat play only.
- p
 - Open or close the disc compartment.
- q SYSTEM MENU
 - Go to the system menu.
- r RDS/INFO
 - Show RDS information (not applicable for this model).
 - Show the disc information such as title, chapter, subtitle, time elapsed, total time, etc.
- s
 - Stop play.
 - Erase a programmed radio station.
 - Activate/deactivate the demonstration mode.
- t TIMER/SLEEP
 - Set alarm timer.
 - Set sleep timer.
- u
 - Mute or restore volume.
- v TREBLE/BASS
 - Increase/decrease the treble/bass level.
- w Numeric buttons
 - Select a title/chapter/track to play.
 - Select a preset number.
- x LOUDNESS
 - Turn on/off loudness control.

3 Connect

Place the unit



- 1 Place the DVD micro theater near TV.
- 2 Place the left and right speakers at equal distance from the TV and at an angle of approximately 45 degrees from the listening position.

Note

- To avoid magnetic interference or unwanted noise, never place this apparatus and speakers too close to any radiation devices.
- Place this unit on top of a table or mount it on the wall.
- Never place this unit in an enclosed cabinet.
- Install this unit near the AC outlet where the AC power plug can be easily reached.

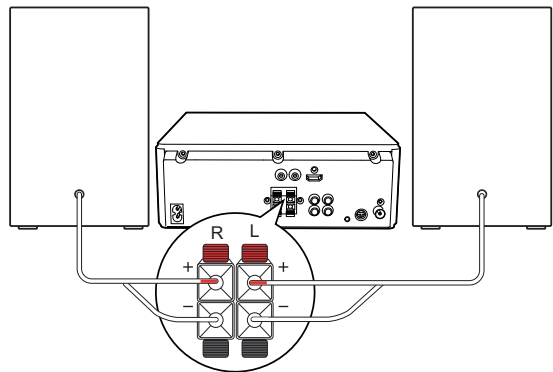
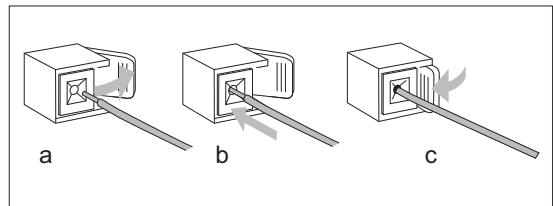
Connect speakers

Note

- Ensure that the colors of the speaker wires and terminals are matched.
- For optimal sound, use the supplied speakers only.
- Connect only speakers with impedance that is the same or higher than the supplied speakers. Refer to the Specifications section of this manual.

- 1 Hold down the socket flap.
- 2 Insert the stripped part of the wire completely.
 - Insert the right speaker wires to "R", left speaker wires to "L".
 - Insert the red wires to "+", white wires to "-".

- 3 Release the socket flap.

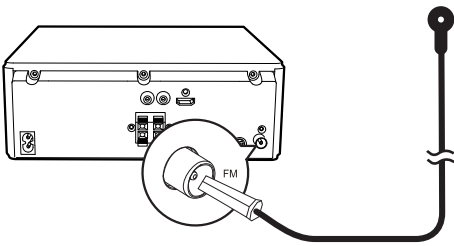


Connect FM antenna

Tip

- For optimal reception, fully extend and adjust the position of the antenna.
- For better FM stereo reception, connect an outdoor FM antenna to the FM ANTENNA jack.
- The unit does not support MW radio reception.

Connect the supplied FM antenna to the FM ANTENNA socket on the unit.



Connect video/audio cables

Select the best video connection that the TV can support.

- Option 1: Connect to the HDMI jack (for an HDMI, DVI or HDCP-compliant TV).
- Option 2: Connect to the composite video jack (for a standard TV).

Option 1: HDMI jack

Connect an HDMI cable (not supplied) to:

- the HDMI (DIGITAL AV OUT) jack on this product.
- the HDMI input jack on the TV.

Tip

- If the TV has a DVI connector only, connect via an HDMI/DVI adaptor. Connect an audio cable for sound output.
- If this product connects to a TV compatible with 1080p or 1080p/24Hz, Philips recommends HDMI category 2 cable, also known as High Speed HDMI cable, for optimal video and audio output.
- This type of connection provides the best picture quality.

Option 2: Composite video jack

Connect a composite video cable to:

- the VIDEO (VIDEO OUT) jack on this unit.
- the VIDEO input jack on the TV.

Tip

- The video input jack on the TV might be labeled as A/V IN, VIDEO IN, COMPOSITE or BASEBAND.

Route audio to other devices

You can route the audio from this product to other devices.

Connect an HDMI cable (not supplied) to:

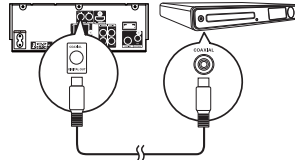
- the HDMI (DIGITAL AV OUT) jack on this unit.
- the HDMI jack input jack on the device.

Tip

- The HDMI connection provides the best audio quality.

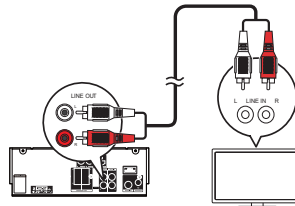
Connect a coaxial cable (not supplied) to:

- the COAXIAL (DIGITAL OUT) jack on this unit.
- the COAXIAL/DIGITAL input jack on the device.



Connect the audio cables to:

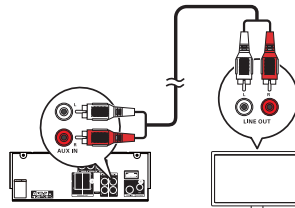
- the LINE OUT-L/R jacks on this unit, the AUDIO input jacks on the device.



Route audio from other devices

Route audio from TV or other devices. Use this product to play audio from the TV or other device such as a cable box.

Press MP3-LINK/AUX to select the audio output of your connection.



Connect an external device

You can listen to an audio player through this unit.

Connect the MP3 link cable to

- the MP3 LINK jack of this unit
- the audio output jack (usually headphone jack) of the external device.

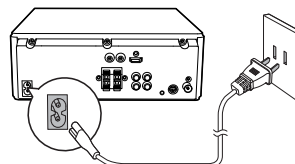
Connect power

Caution

- Risk of product damage! Ensure that the power supply voltage corresponds to the voltage printed on the back or the underside of the unit.
- Before connecting the AC power cord, ensure you have completed all other connections.

Connect the AC power cord to:

- the power socket on the back of the unit.
- the wall outlet.



Cabinet Disassembly Instructions

1. Disassembly Flowchart

This flowchart indicates the disassembly steps to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route, and dress the cables as they were originally.

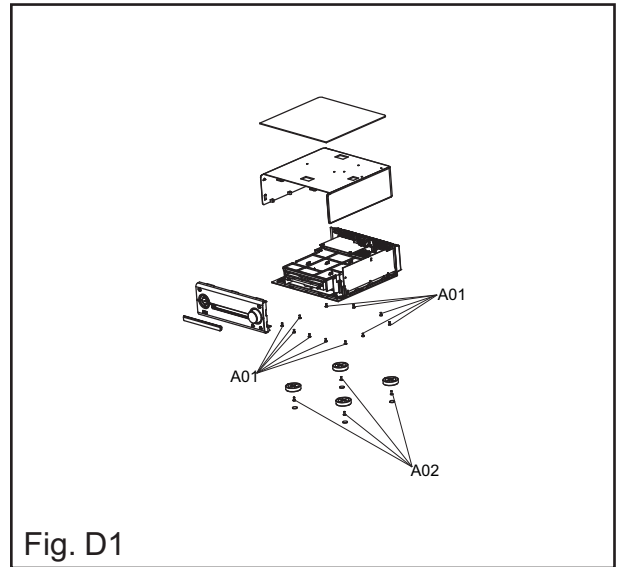
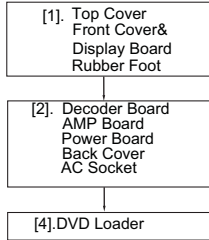


Fig. D1

2. Disassembly Method

ID/Loc. NO.	Part	Removal		
		Fig.NO.	Remove/Unhook /Unlock/Release/ Unplug/Desolder	Note
[1]	Top Cover Front Cover & Display Board Rubber Foot	D1	11(A01)D3 X 10 FA 4(A02)D3 X 10 BTH	
[2]	Decoder Board AMP Board Power Board Back Cover AC Socket	D2	4(A03)D3 X 8 PA 10(A04)D3 X 10 FA	
[3]	DVD Loader	D3	1(A05)D3 X 10 BTH 4(A06)D3 X 8 BA	

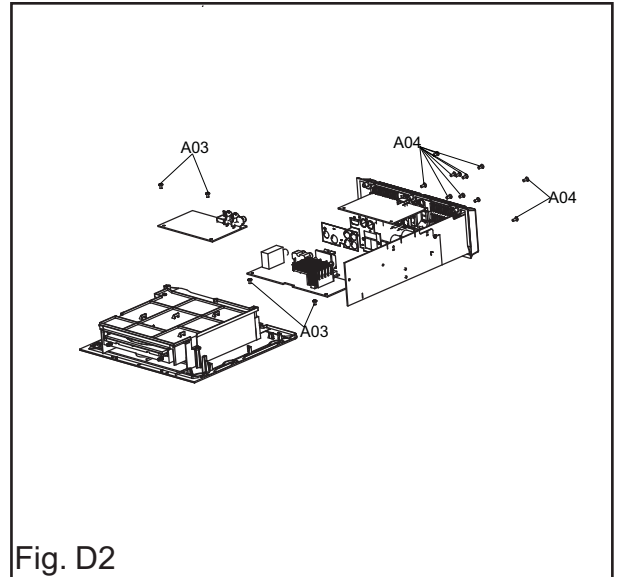


Fig. D2

Note:

- (1) Identification (location) No. of parts in the figures
- (2) Name of the part
- (3) Figure Number for reference
- (4) Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.

Axx = Screw, CNxx/Jxx/CONxx = Connector
D3.5X12BA is specification of screw.

* = Unhook, Unlock, Release, Unplug, or Desolder

e.g. 7(A01) = seven Screws

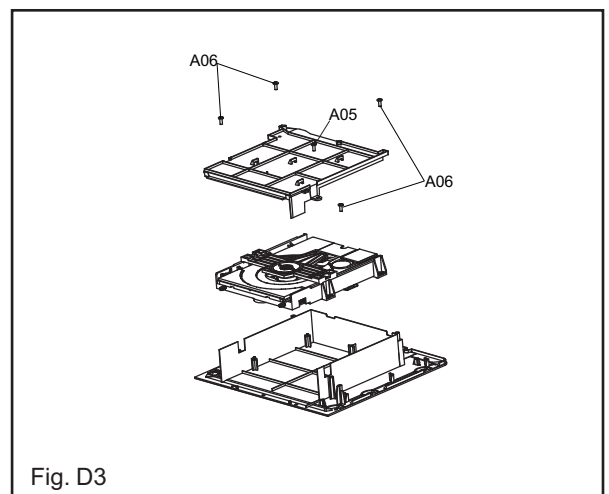
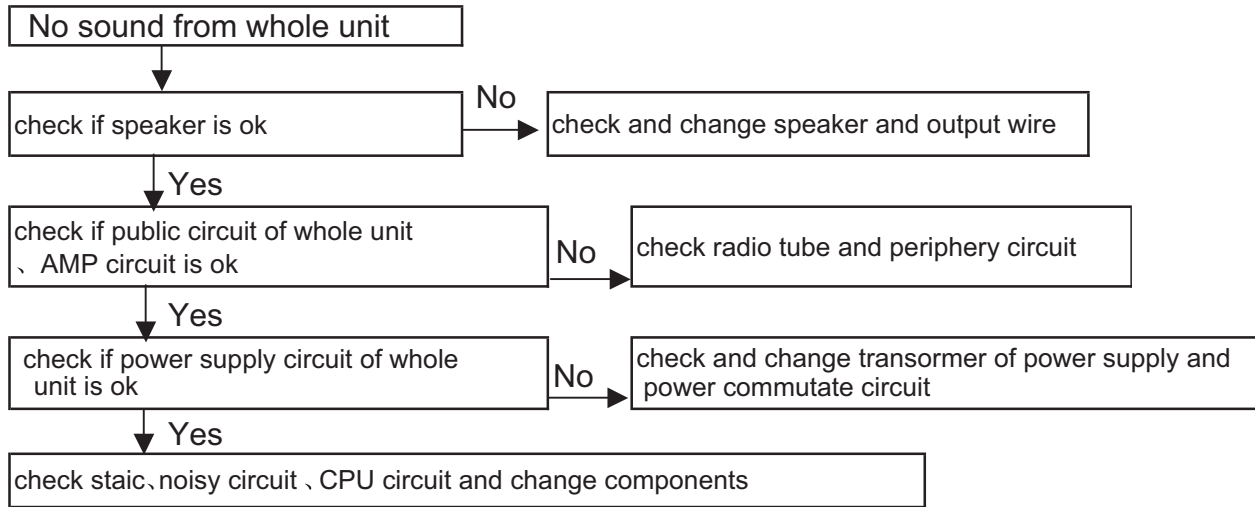


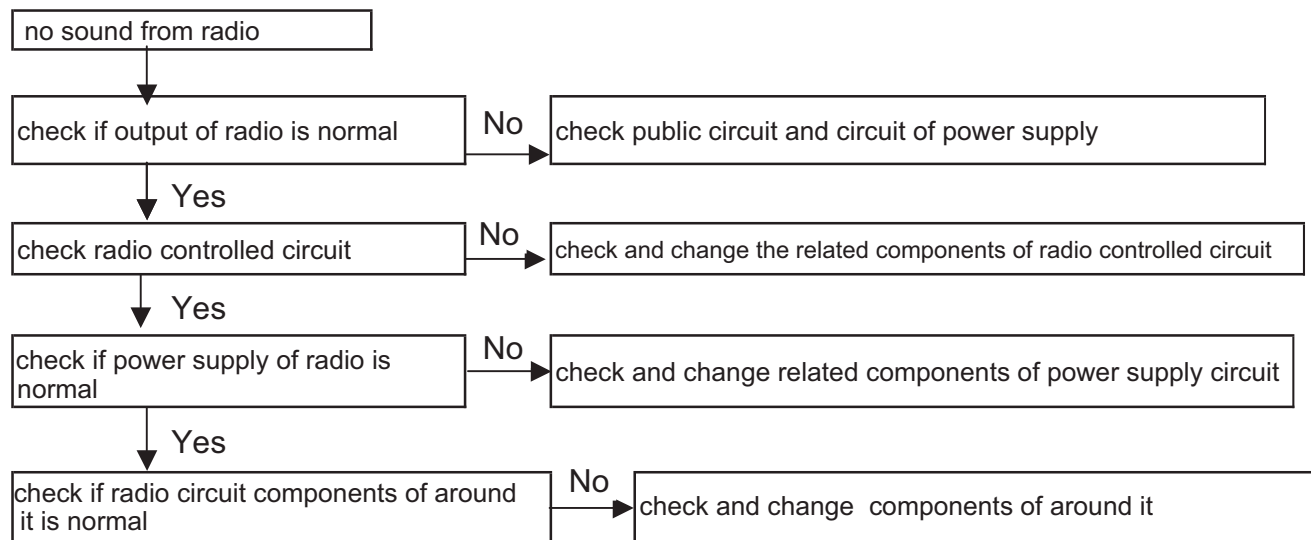
Fig. D3

Troubleshooting

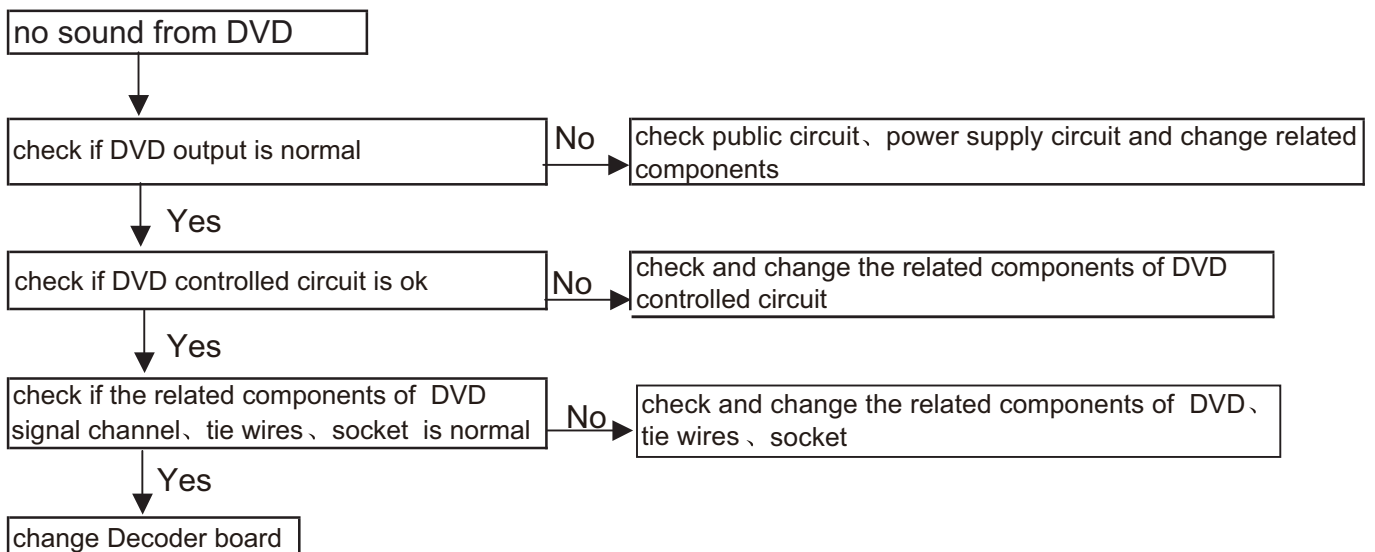
FLOW CHART NO.1



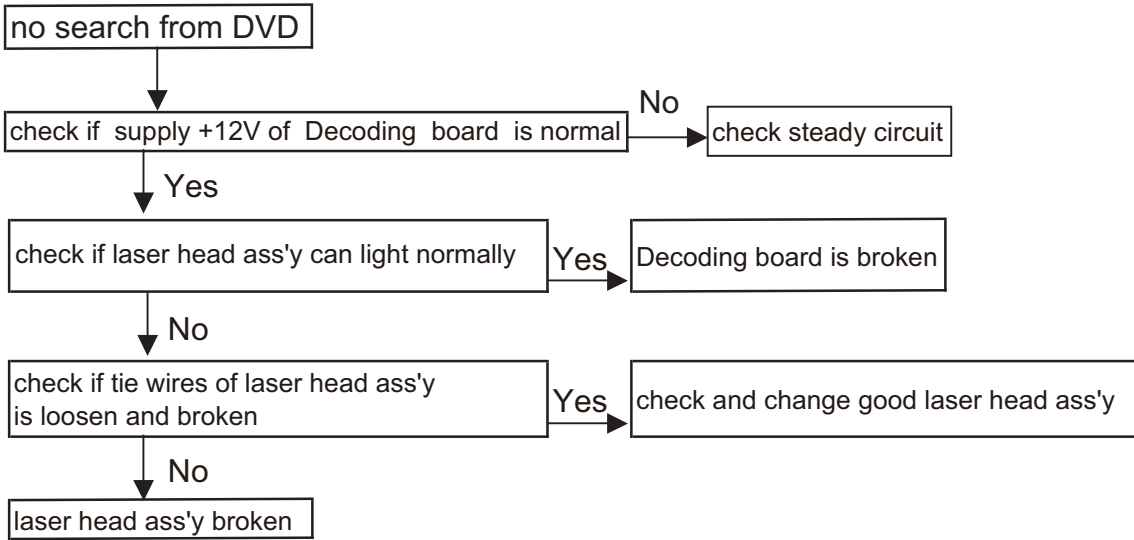
FLOW CHART NO.2



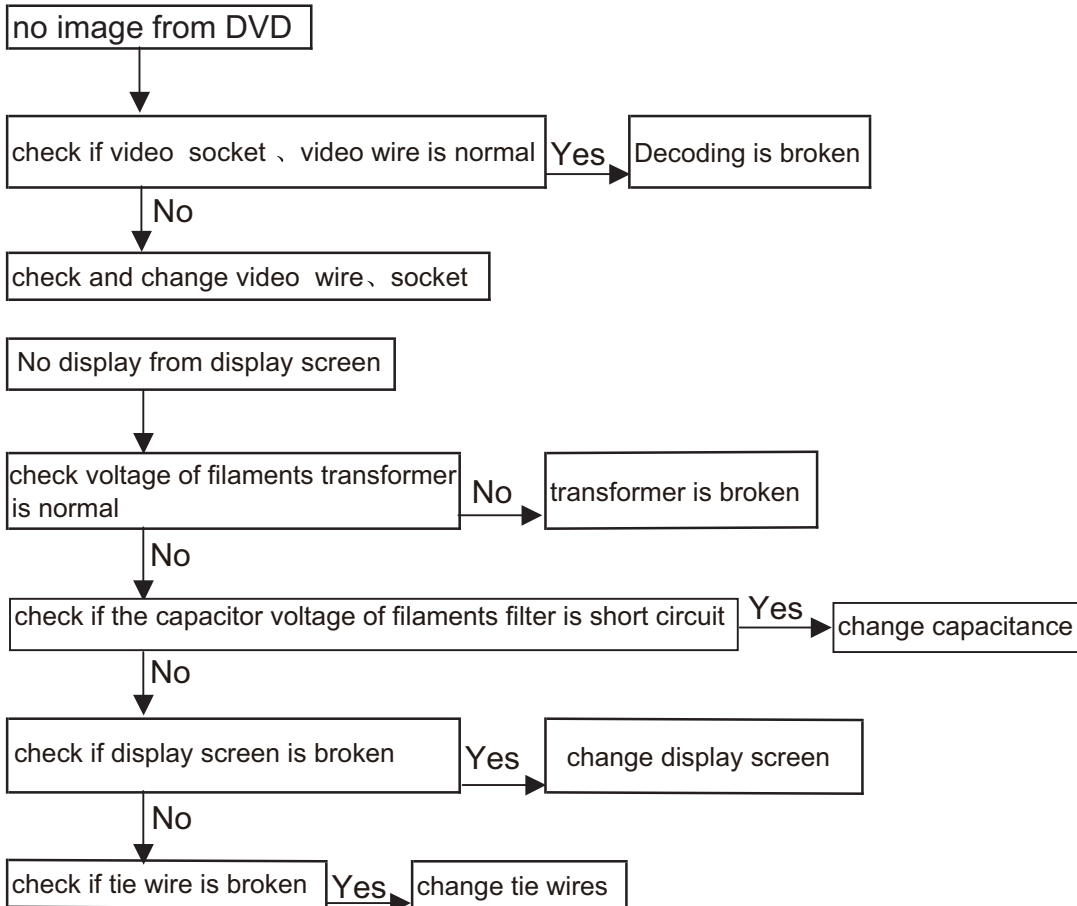
FLOW CHART NO.3



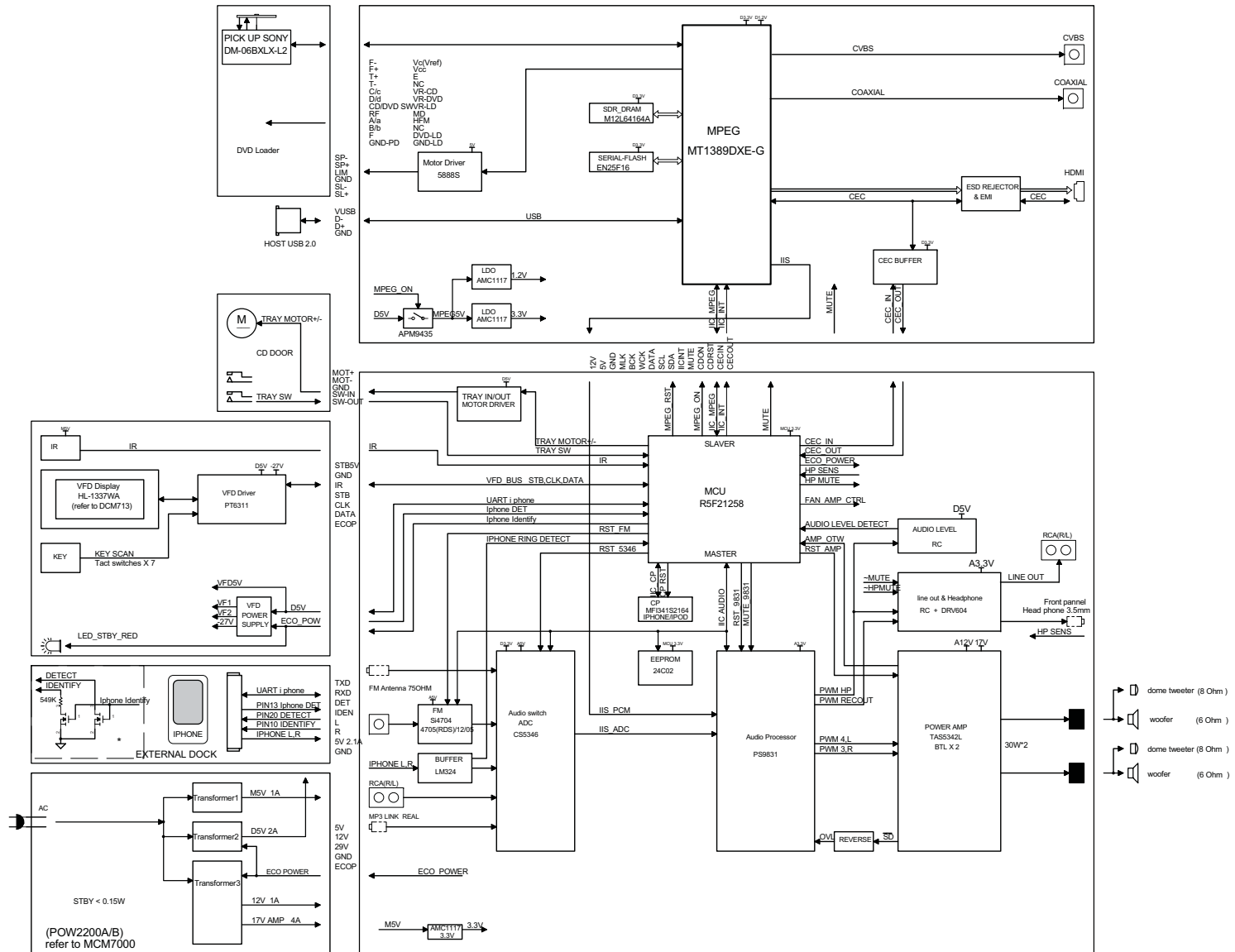
Troubleshooting



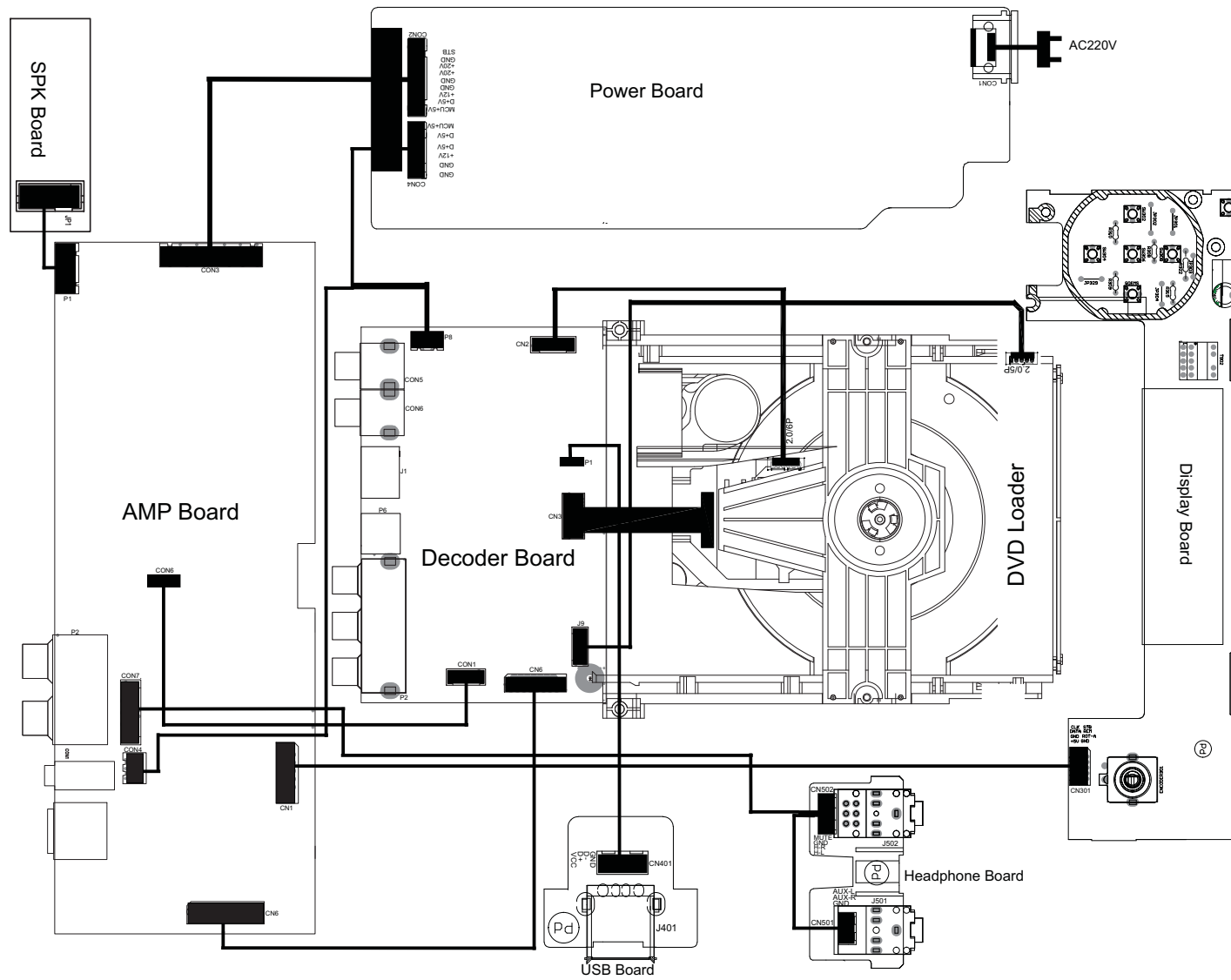
FLOW CHART NO.4



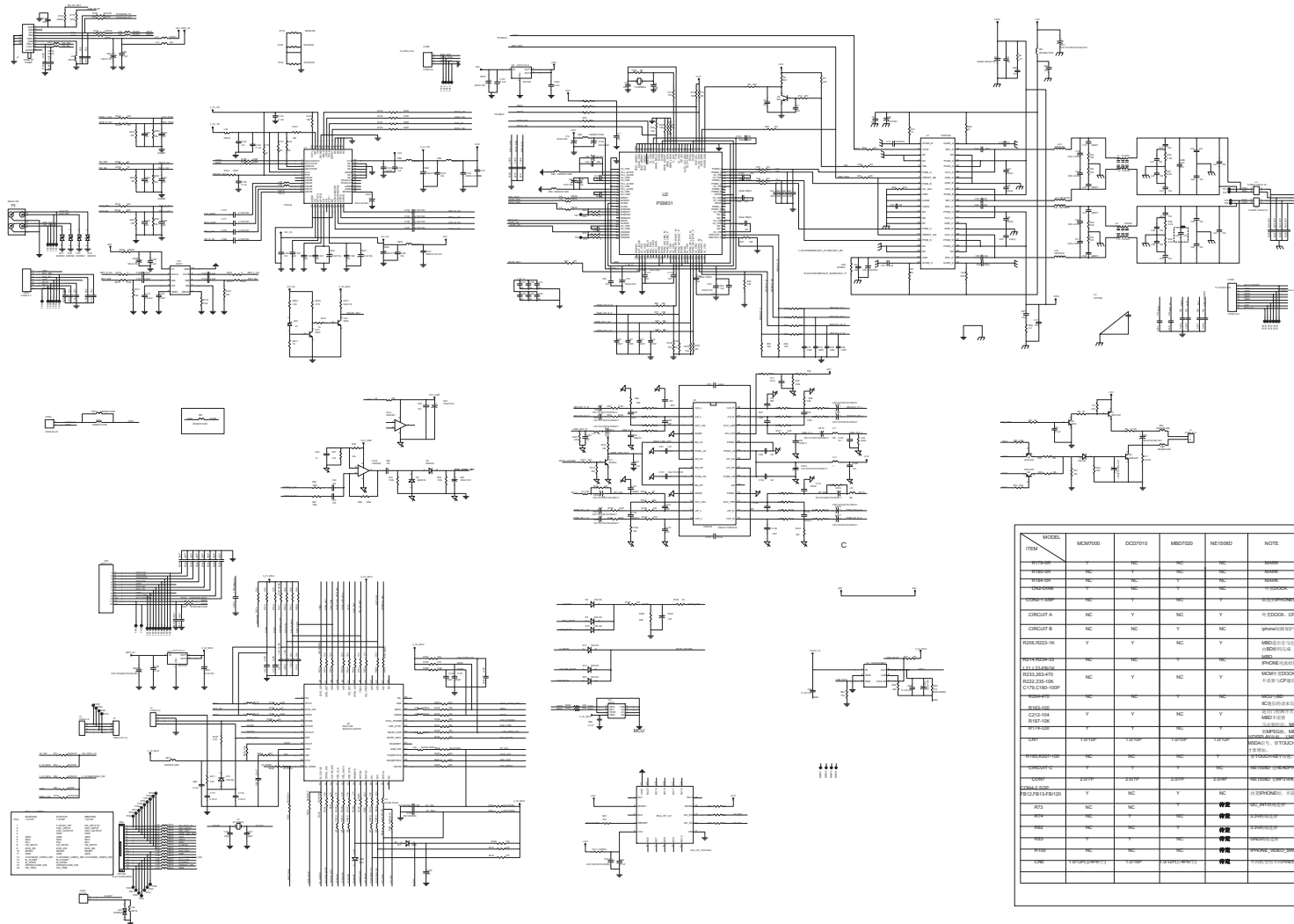
Block Diagram



Wiring Diagram



AMP Board -- Circuit Diagram



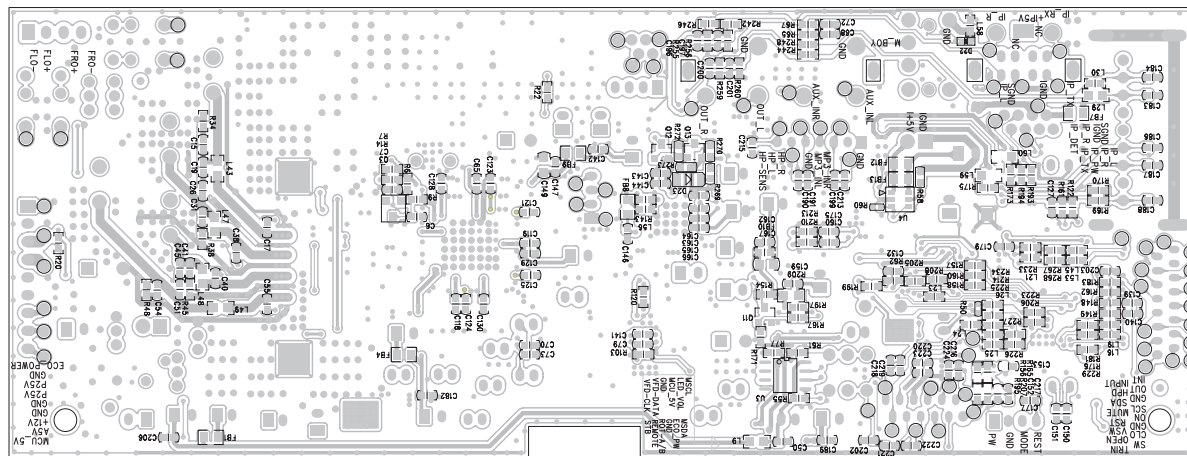
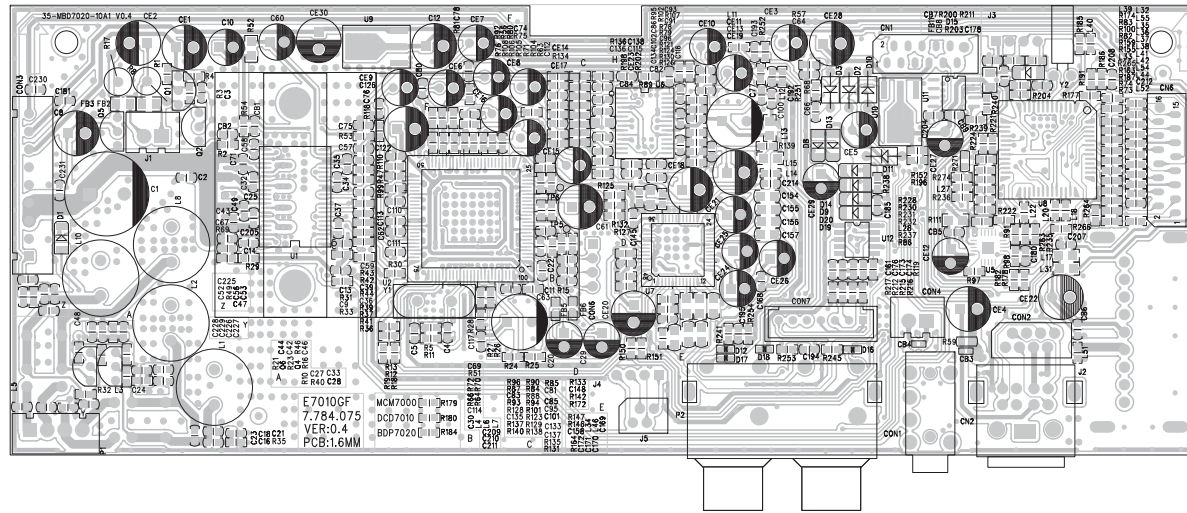
MODEL	MCM7000	DCD7010	MED7000	NE1500D	NOTE
ITEM					
RF/DB ON	Y	NC	NC	NC	MARK
RF/DB OFF	NC	Y	NC	NC	MARK
DC/DB ON	NC	NC	Y	NC	MARK
DC/DB OFF	Y	NC	NC	NC	MARK
MONO/STEREO	NC	Y	NC	Y	DISCONNECTOR
CIRCUIT A	NC	Y	NC	Y	4.5000K, CP 1.5 E.
CIRCUIT B	NC	NC	Y	NC	SHAWLUS 0.5/0.8
R206 R223 1K	Y	Y	Y	NC	MED 0.5/0.125 (0.05/0.125)
R206 R223 0.5	NC	NC	Y	NC	MARK
R206 R223 0.1	NC	Y	Y	NC	SHAWLUS 0.5/0.8 (0.05/0.125)
R223 235 10K	NC	Y	NC	Y	MARK 1000K, 0.15 (0.1/0.15)
C176 C180 100P	NC	NC	Y	NC	MARK 1000K, 0.15 (0.1/0.15)
R206 R223	Y	Y	Y	NC	MARK 1000K, 0.15 (0.1/0.15)
C210 10K	Y	Y	NC	Y	MARK 1000K, 0.15 (0.1/0.15)
R107 10K	Y	Y	NC	Y	MARK 1000K, 0.15 (0.1/0.15)
C181	10 10P	10 10P	10 10P	10 10P	MARK 1000K, 0.15 (0.1/0.15)
R106 R200 100	NC	NC	NC	Y	MARK 1000K, 0.15 (0.1/0.15)
CIRCUIT C	Y	Y	Y	NC	NE1500D (0.05/0.125)
C204 0.01	2.0 1P	2.0 1P	2.0 1P	2.0 1P	NE1500D (0.05/0.125)
R12 R13 R120	Y	NC	Y	NC	MARK 1000K, 0.15 (0.1/0.15)
R22	NC	NC	Y	NC	MARK 1000K, 0.15 (0.1/0.15)
R108	NC	Y	NC	NC	MARK 1000K, 0.15 (0.1/0.15)
R10	NC	NC	Y	NC	MARK 1000K, 0.15 (0.1/0.15)
R107	Y	Y	NC	NC	MARK 1000K, 0.15 (0.1/0.15)
R100	NC	NC	NC	NC	SPECIAL MARK 1000K, 0.15 (0.1/0.15)
C182	10 10P (0.05/0.125)	10 10P	10 10P (0.05/0.125)	10 10P	MARK 1000K, 0.15 (0.1/0.15)

ITEM	FUNCTION	FM	DAB	NOTE
RF/DB ON	Y	NC	NC	MARK
RF/DB OFF	NC	Y	NC	MARK
DC/DB ON	NC	NC	Y	MARK
DC/DB OFF	Y	NC	NC	MARK
LYT 1500D	Y	Y	Y	MARK 1000K, 0.15 (0.1/0.15)
LYT 1500E	NC	NC	NC	MARK 1000K, 0.15 (0.1/0.15)

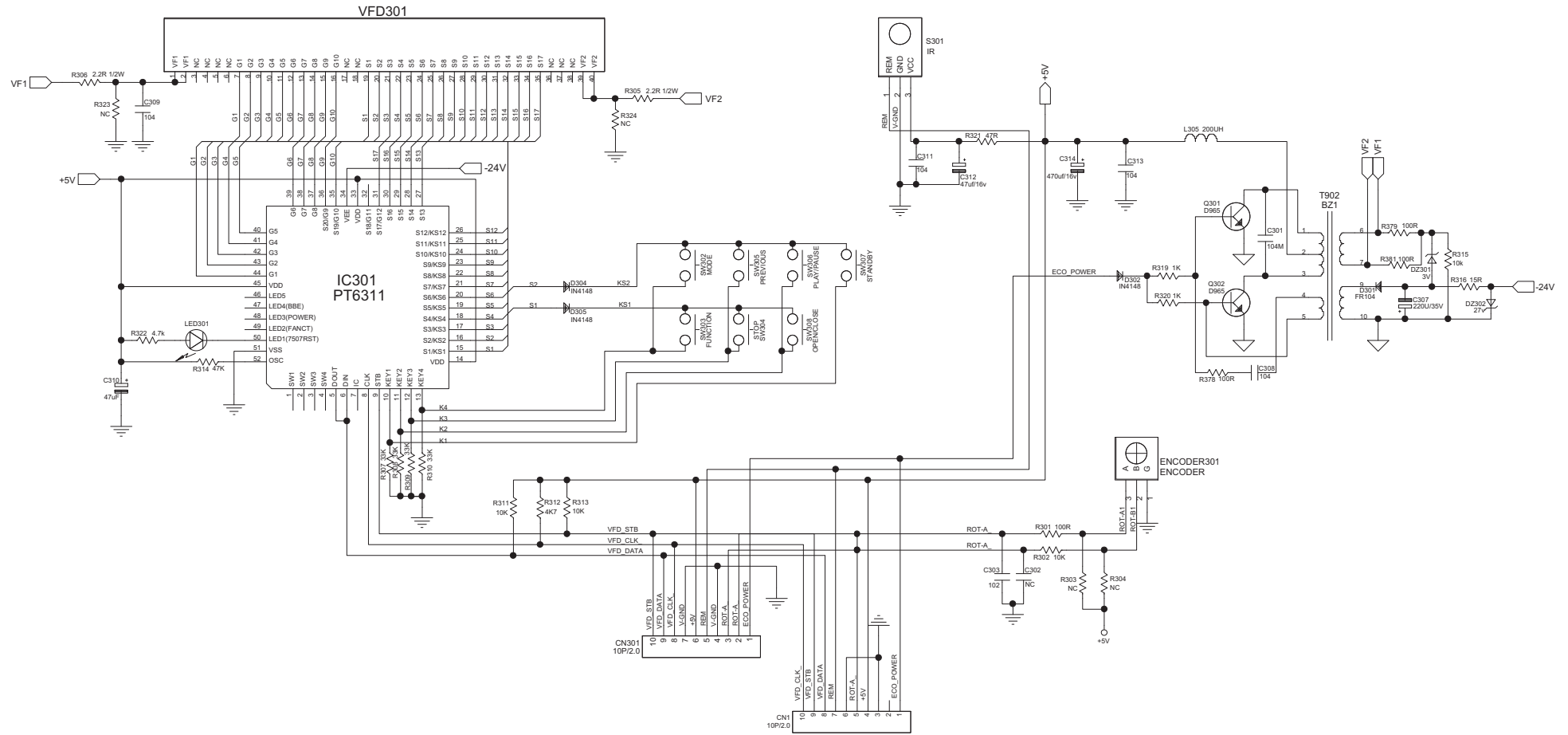
所有参数的先后顺序。
 按MCM7000, DCD7010, MED7000
 第一个电路功能, DCD7010和MED7000都有用, 那么就是
 NC/D/DR

NE1500D
 1. 功能按DCD7010,
 2. TOUCH KEY功能;
 3. 无HEADPHONE;
 4. 无MPS LINK.

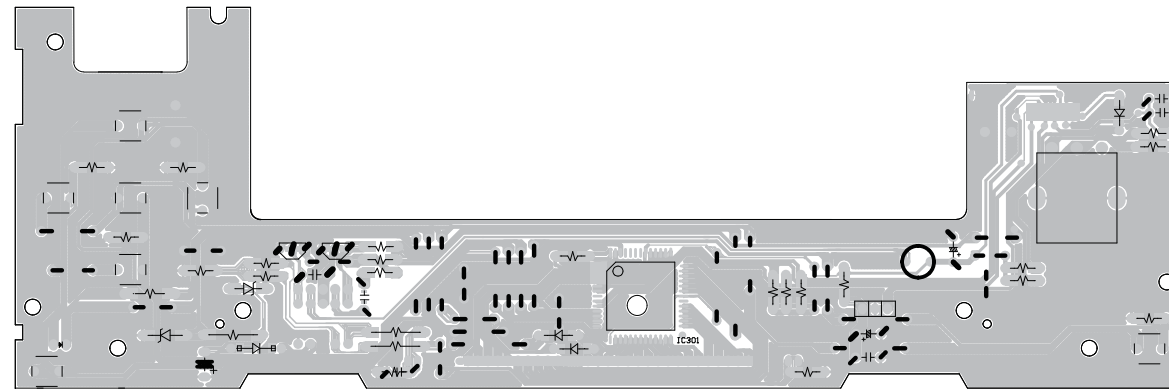
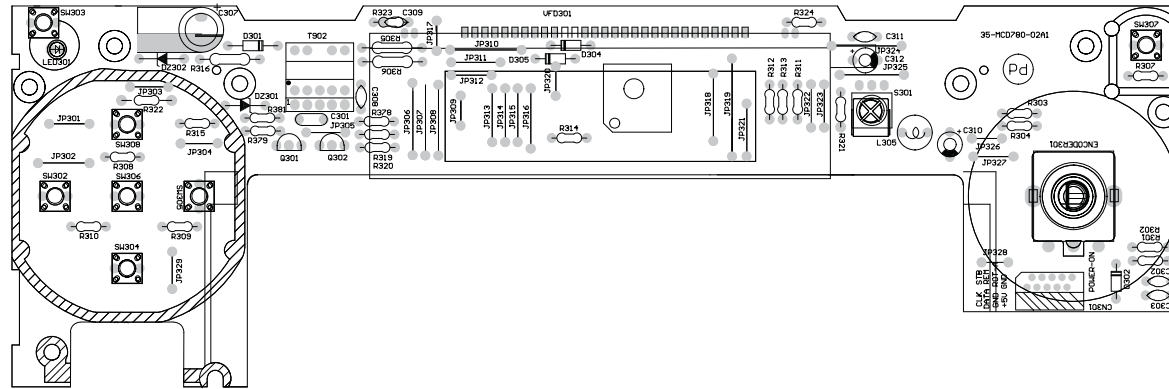
AMP Board -- Layout Diagram



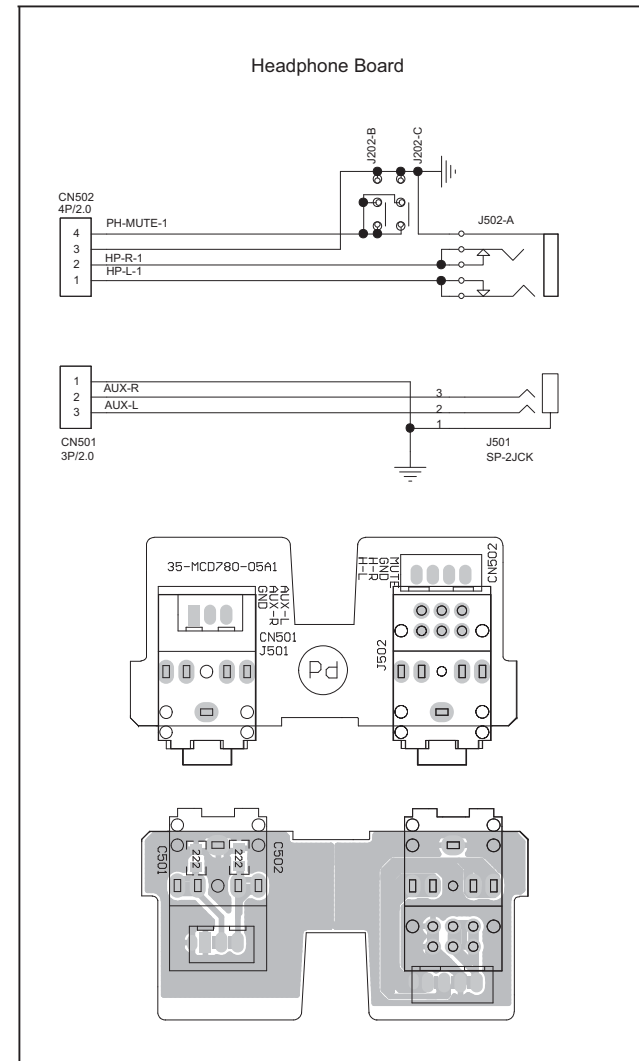
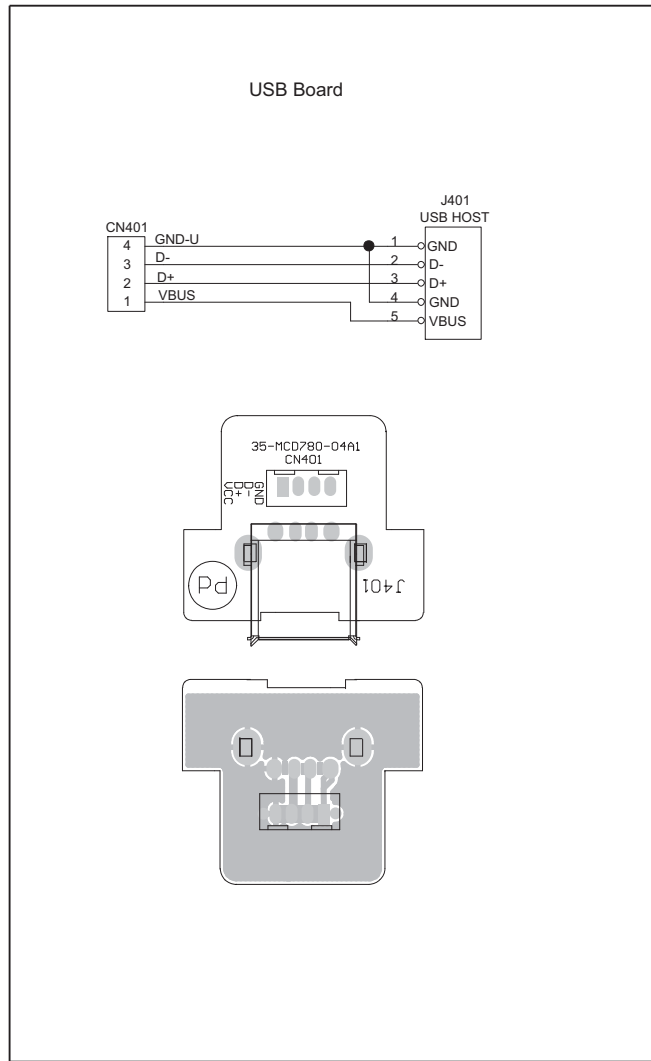
Display Board -- Circuit Diagram



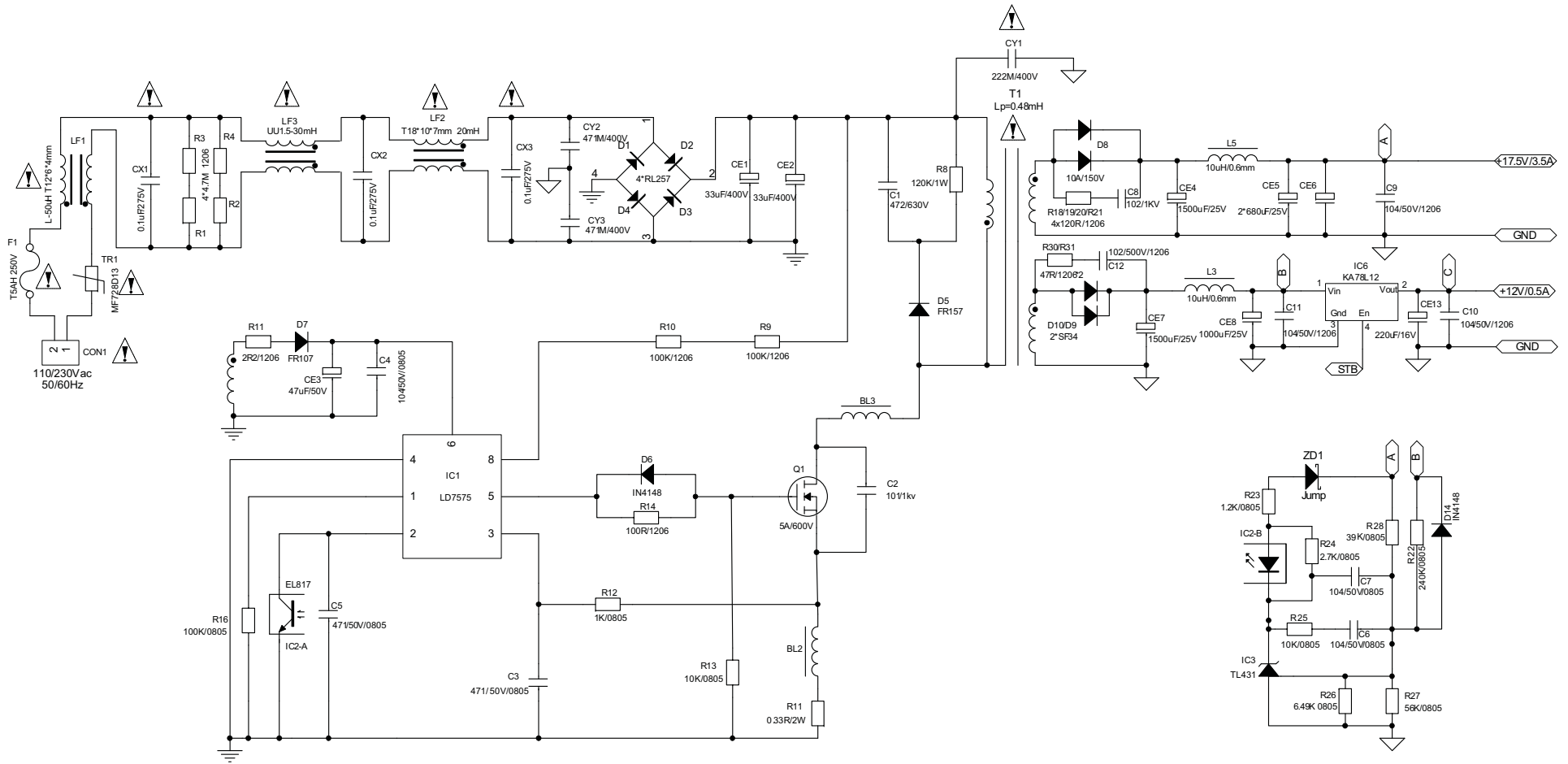
Display Board -- Layout Diagram

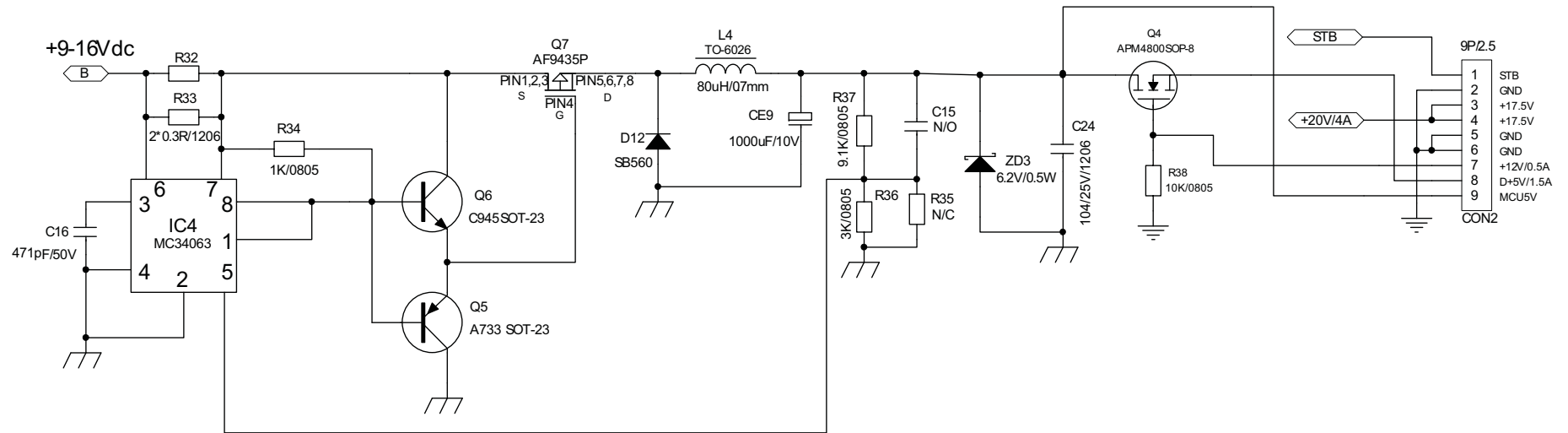


USB and Headphone Board -- Circuit and Layout Diagram

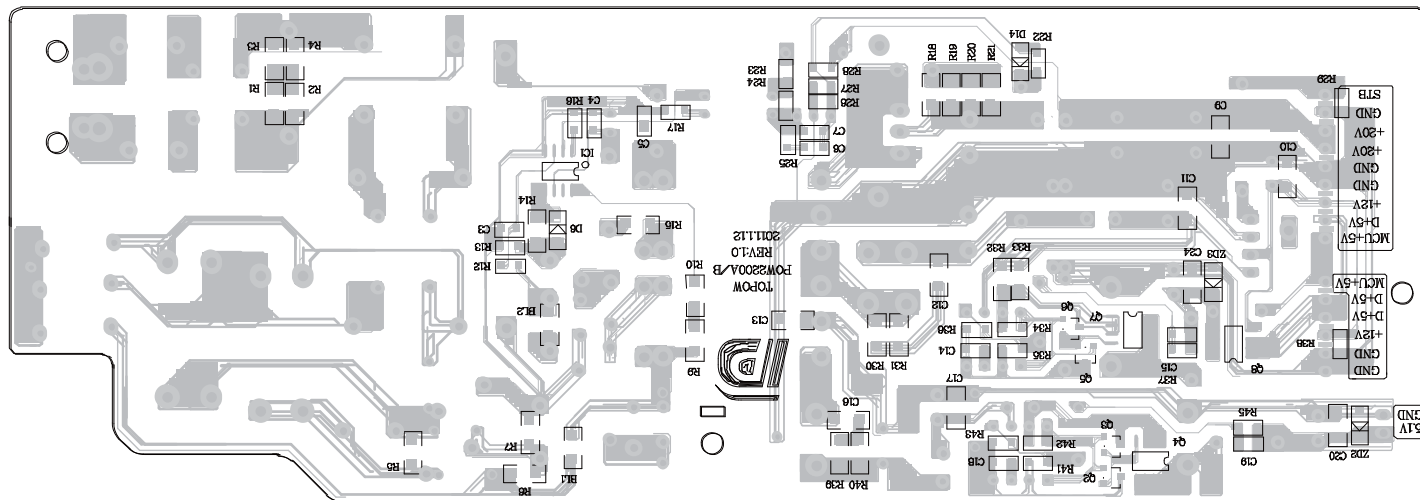
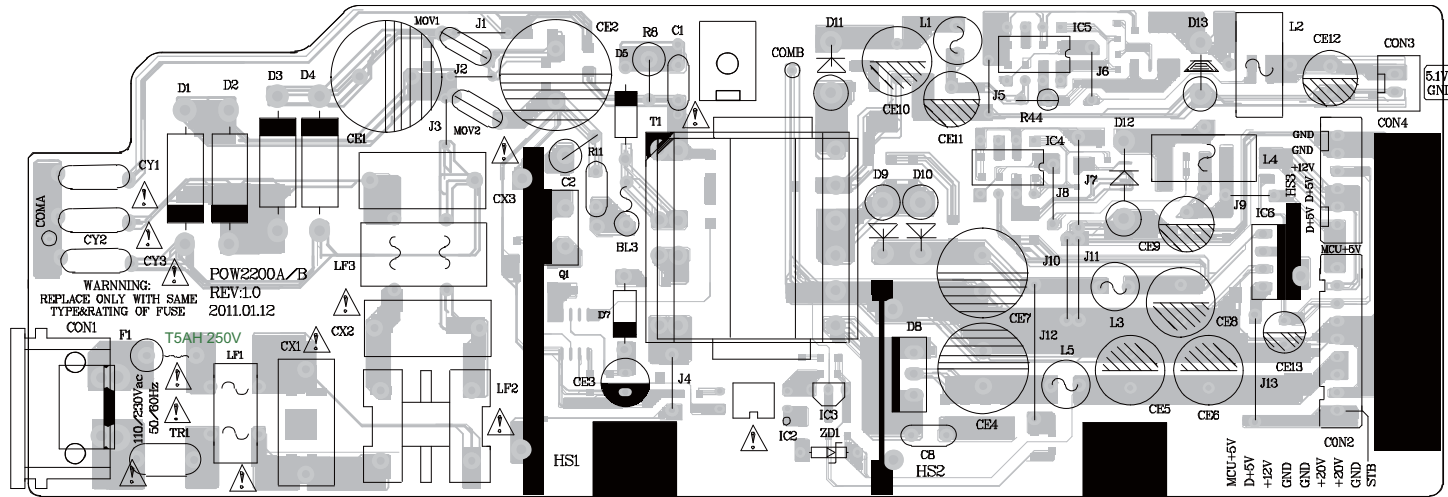


Power Board -- Circuit Diagram 1





Power Board -- Layout Diagram



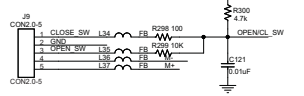
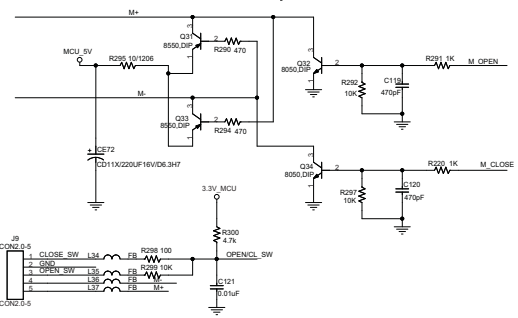
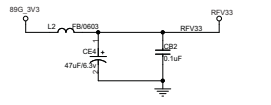
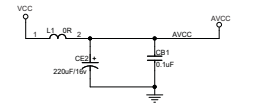
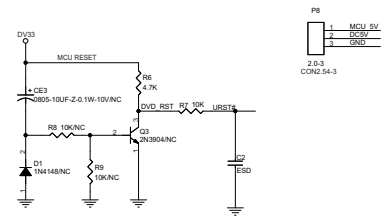
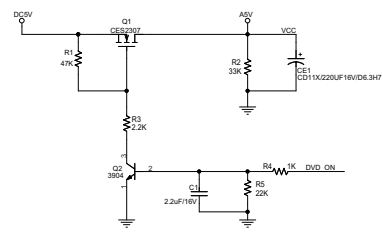
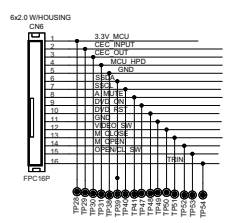
Decoder Board -- Circuit Diagram 1

COMMON1389G_HD65_AT5669_V1.1
 MT1389G (LQFP128) DVD Board w/ Sanyo HD6x Series PUHs

- 1 INDEX & POWER / RESET
- 2 MT1389G LQFP128
- 3 SDRAM & FLASH & MOTOR
- 4 AUDIO & MIC I/F
- 5 VIDEO I/F
- 6 MCR & USB I/F

5V 电流 standby40-60mA Play DVD5V开机570mA, 稳定电流800mA 瞬间1-1.25A
Play CD5V开机570mA, 稳定电流730mA 瞬间1-1.25A
3.3V 电流 standby20-23mA Play DVD3.3V开机290-300mA, 稳定电流360mA最大也是。 Play CD3.3V开机290-300mA, 稳定电流340mA最大也是。
1.2V 电流 standby20-23mA Play DVD&CD1.2V开机130-140mA, 稳定电流162.8mA最大也是。
12V 电流 standby2-3mA

TRIN	TRIN	2
SSDA	SSDA	2
SSCL	SSCL	2
A_MUTE	A_MUTE	2
MCU_HPD	MCU_HPD	2
CEC_INPUT	CEC_INPUT	2
VIDEO_SW	VIDEO_SW	2
SEC_OUT	SEC_OUT	2
3.3V MCU	MCU_V	2
MCU_BV	MCU_BV	2

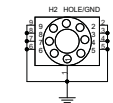
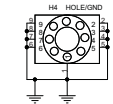
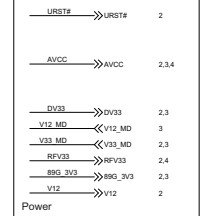


Rev	History	Prj	Date
V1	Original release		2008.09.25
V1.1	1).Modify CE31 from 47uF to 220uF for power noise improve; 2).Add 100 ohm resistance R160 and R161 to XI and XO nets for tune DPD performance; 3).Delete Q11 for costdown; 4).change L8 from 100uH to FB/200ohm.		2009.02.17

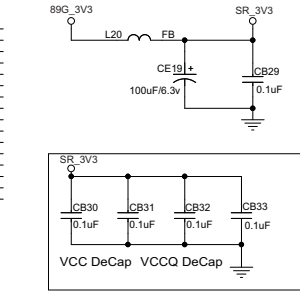
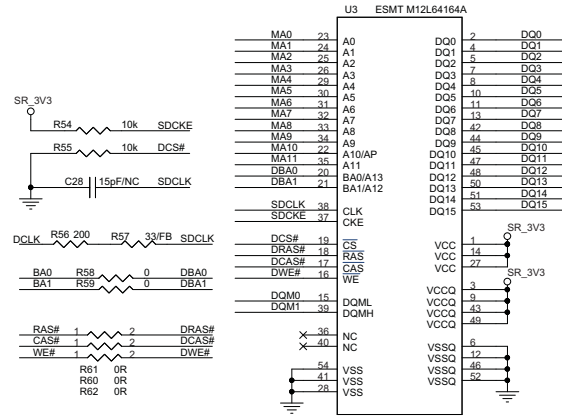
MT1389G 128 PIN GPIO LIST

NAME	PIN	FEATURES
TRAY_OPEN	14	VR_CD [STBY]
TRAY_CLOSE	15	VR_DVD [TROPEN; IOA]
FG / GPIO2	18	TRIN
UP1_6	28	HDMI_SCL
UP1_7	29	HDMI_SDA
GPIO3	34	
GPIO4	35	
GPIO5	7	TRCLOSE
GPIO6	31	
GPIO7	39	SD_CLK MS_CLK
GPIO8	38	SD_CMD MS_BS
GPIO9	37	SD_DATA MS_DATA
GPIO10	81	HPLG
GPIO11	30	SCART1 HSYNC# RxD
GPIO12	80	ASPDIF
GPIO13	36	VSTB
GPIO14	96	A_MUTE
GPIO19	103	SCART2 VSYNC#
GPIO20	104	AVCM
GPIO21	105	AKIN1
ARF	109	AUDIO_ARF
ARS	110	AUDIO_ARS
ALS	114	AUDIO_ALS
ALF	115	AUDIO_ALF
GPIO34	107	TROPEN IOA [Gxyz_D1#]
GPIO35	108	STBY [Gxyz_D2#]
RFIN / OPOUT	120	LIMIT TROUT

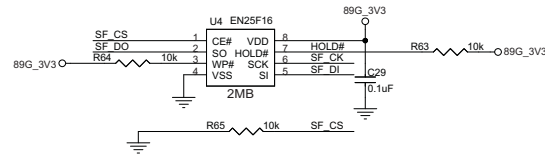
OFF-PAGE CONNECTION



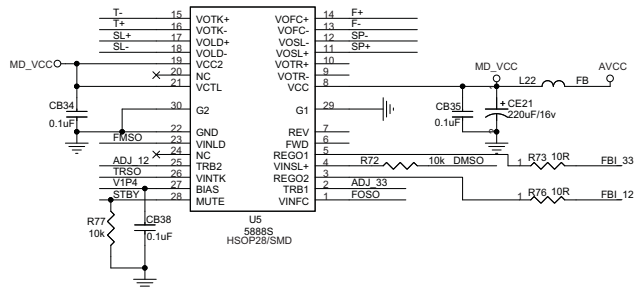
Decoder Board -- Circuit Diagram 3



SDR_DRAM (Dual Layout)

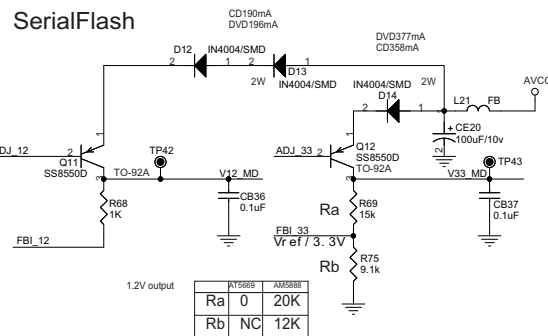


SerialFlash



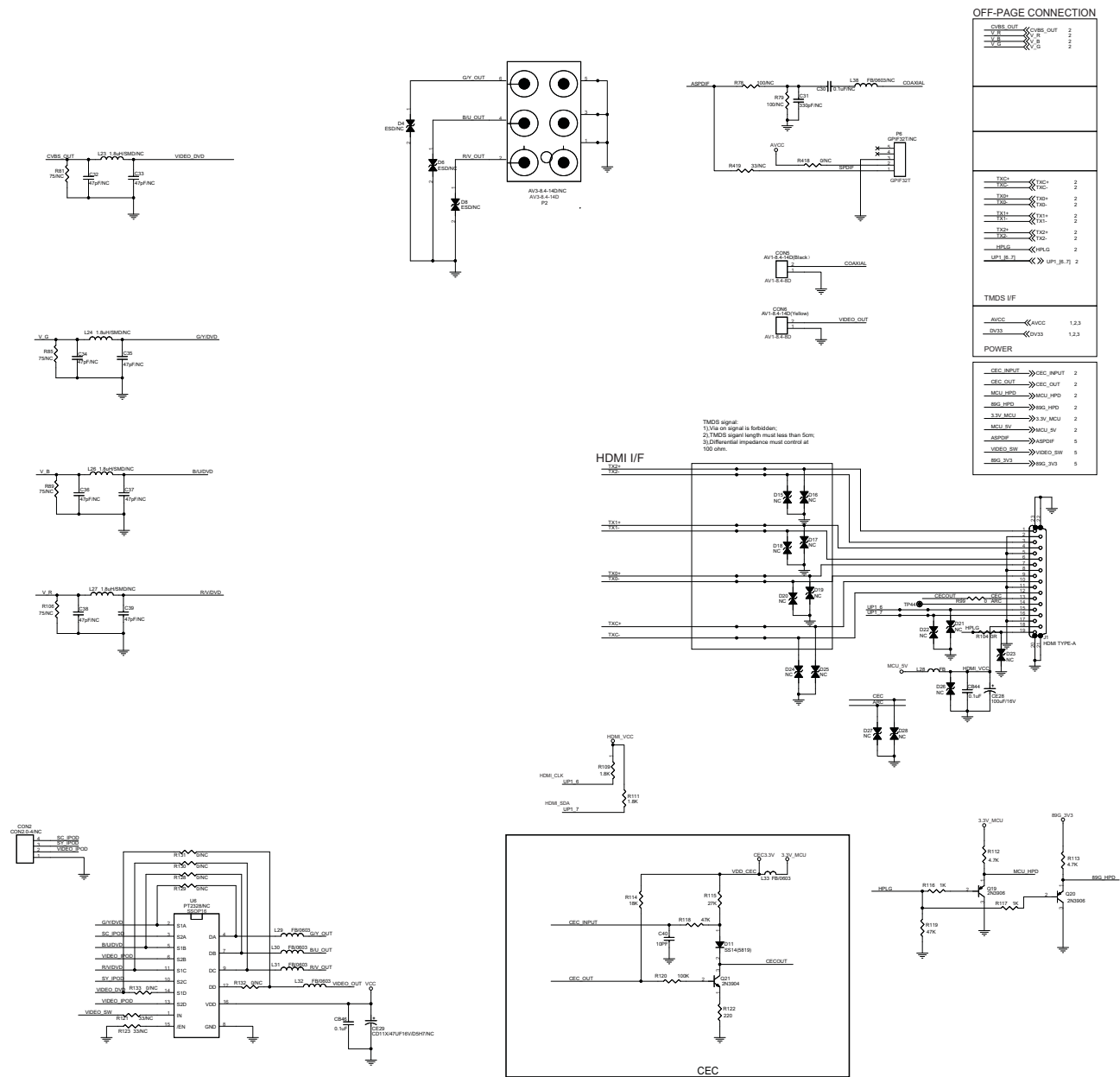
OFF-PAGE CONNECTION

DQ[0..15]	<<>	DQ[0..15]	2
MA[0..11]	<<>	MA[0..11]	2
DOM[0..1]	<<>	DOM[0..1]	2
BA[0..1]	<<>	BA[0..1]	2
DCLK	<<>	DCLK	2
RAS#	<<>	RAS#	2
CAS#	<<>	CAS#	2
WE#	<<>	WE#	2
DRAM I/F			
SF_CK	<<>	SF_CK	2
SF_CS	<<>	SF_CS	2
SF_DI	<<>	SF_DI	2
SF_DO	<<>	SF_DO	2
S-FLASH			
STBY	<<>	STBY	2
T-	<<>	T-	2
T+	<<>	T+	2
F-	<<>	F-	2
F+	<<>	F+	2
SL-	<<>	SL-	2
SL+	<<>	SL+	2
SP-	<<>	SP-	2
SP+	<<>	SP+	2
FOSO	<<>	FOSO	2
TRSO	<<>	TRSO	2
FMSO	<<>	FMSO	2
DMSO	<<>	DMSO	2
V1P4	<<>	V1P4	2
SERVO I/F			
DV33	<<>	DV33	1,2
V12_MD	<<>	V12_MD	1
V33_MD	<<>	V33_MD	1,2
Power			
URST#	<<>	URST#	1,2
Misc			
AVCC	<<>	AVCC	1,2,4
89G_3V3	<<>	89G_3V3	1,2

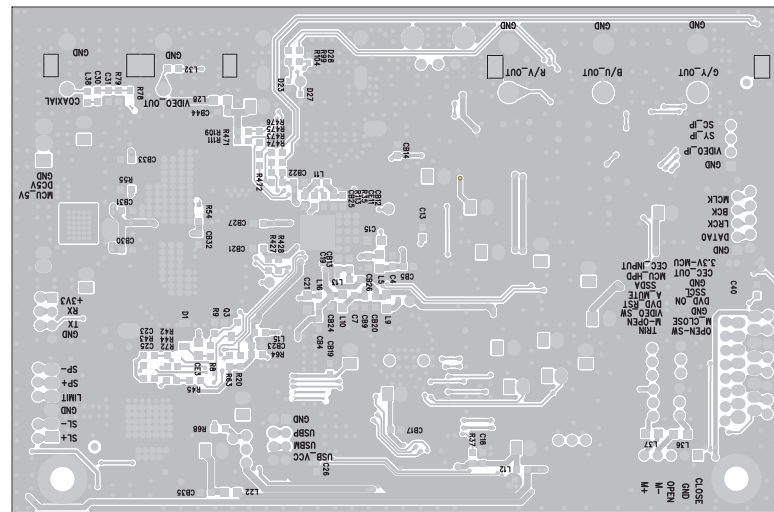
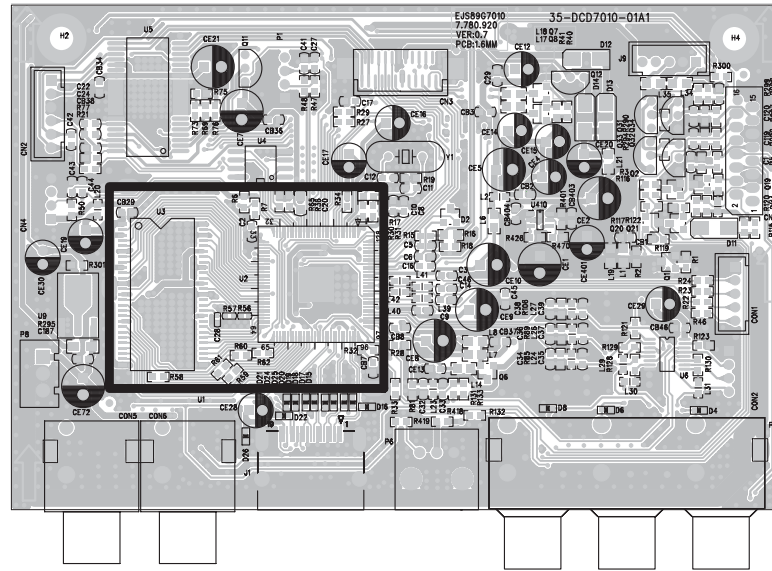


	R15889	AD2888
Ra	0	20K
Rb	NC	12K

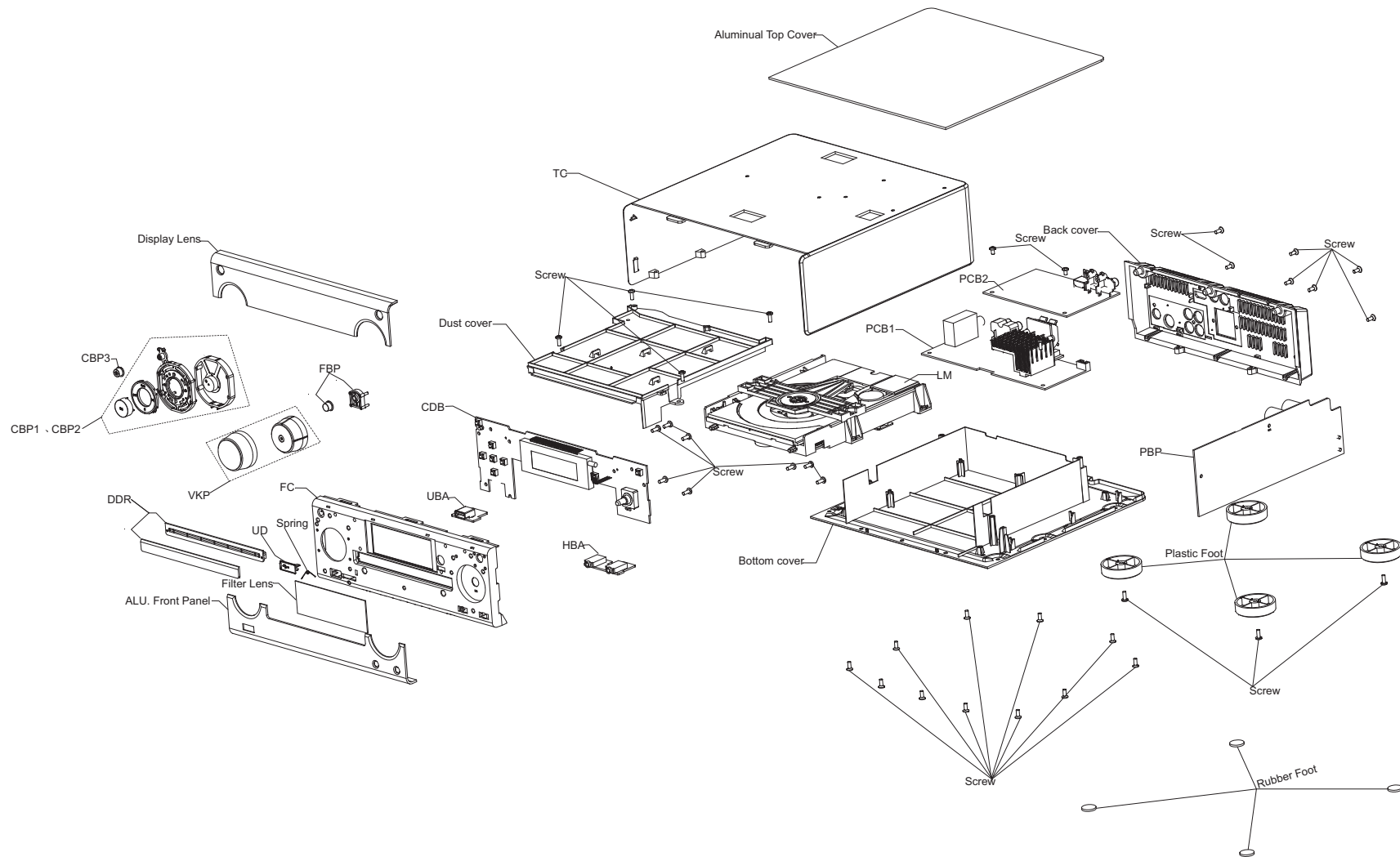
Decoder Board -- Circuit Diagram 4



Decoder Board -- Layout Diagram



Exploded View



Revision List

Revision List

Version 1.0
* Initial Release