

# HD 990/230

## CD Player



### CONTENTS

|                        |   |                                |       |
|------------------------|---|--------------------------------|-------|
| BASIC SPECIFICATIONS   | 2 | SEMICONDUCTOR PINOUTS          | 12    |
| TROUBLESHOOTING GUIDE  | 3 | PCB DRAWINGS                   | 30    |
| PACKAGE LIST AND PARTS | 4 | VERSION HISTORY                | 34    |
| EXPLODED VIEW          | 5 | SCHEMATIC DIAGRAMS             | 35-46 |
| PARTS LIST             | 6 | SERVICE BULLETIN, RATTLE NOISE | 47    |

Technical Specifications

Signal Format

|                    |                                                    |
|--------------------|----------------------------------------------------|
| Sampling Frequency | 32 kHz to 96 kHz                                   |
| D/A Conversion     | Multi-Level Delta-Sigma, Dual DAC configuration.   |
| Oversampling       | 24 Bits/384 kHz Asynchronous Sample Rate Convertor |

Discrete Analog Output Section

|                                 |                                              |
|---------------------------------|----------------------------------------------|
| Error Correction                | CIRC System                                  |
| Frequency Response              | 20 Hz – 20 kHz +0/-0.5dB                     |
| Total Harmonic Distortion (THD) | <0.0006% @1kHz                               |
| Dynamic Range                   | > 120 dB                                     |
| Signal-to-Noise Ratio           | 116 dB                                       |
| Channel Separation              | > 115 dB                                     |
| Line-Output Level               | 2.0 Vrms (Unbalanced)<br>4.0 Vrms (Balanced) |

General

|                   |                                      |
|-------------------|--------------------------------------|
| Power Requirement | 100-240 V 50/60 Hz                   |
| Power Consumption | <20 Watts (On)<br><2 Watts (Standby) |
| Dimensions        |                                      |
| Height            | 63mm                                 |
| Width             | 440mm                                |
| Depth             | 332mm                                |
| Weight            | 3.8 kg                               |

Depth measurement includes knobs, buttons and connection jacks.  
Height measurement includes feet and chassis.  
All features and specifications are subject to change without notice.

Harman Kardon is a registered trademark

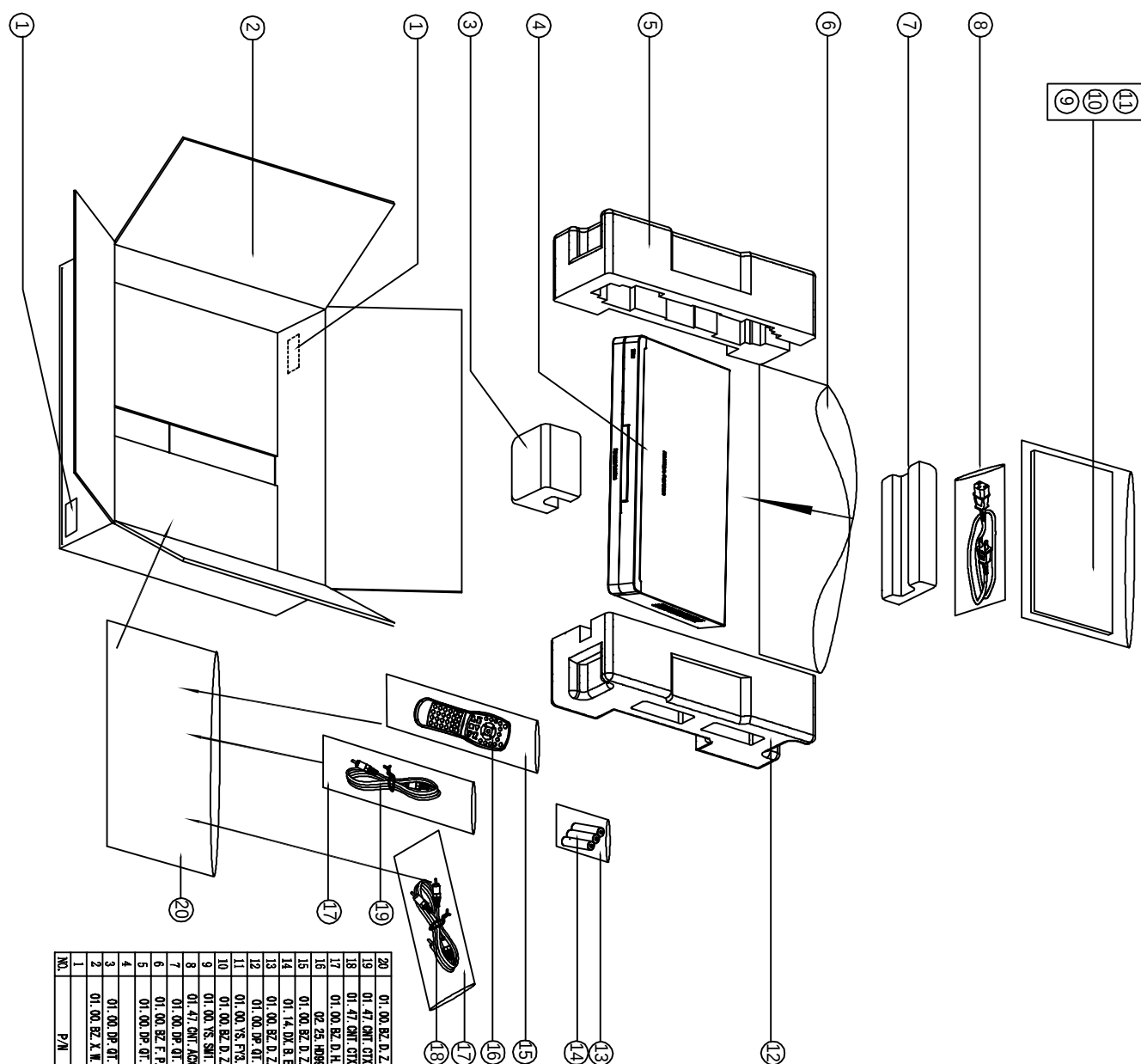


**H** A Harman International<sup>®</sup> Company  
250 Crossways Park Drive, Woodbury, New York 11797  
www.harmankardon.com  
Harman Consumer Group International:  
2, route de Tours, 72500 Château-du-Loir, France  
© 2008 Harman Kardon, Incorporated  
Part 01.00.YS.SM1.E1799

## Troubleshooting Guide

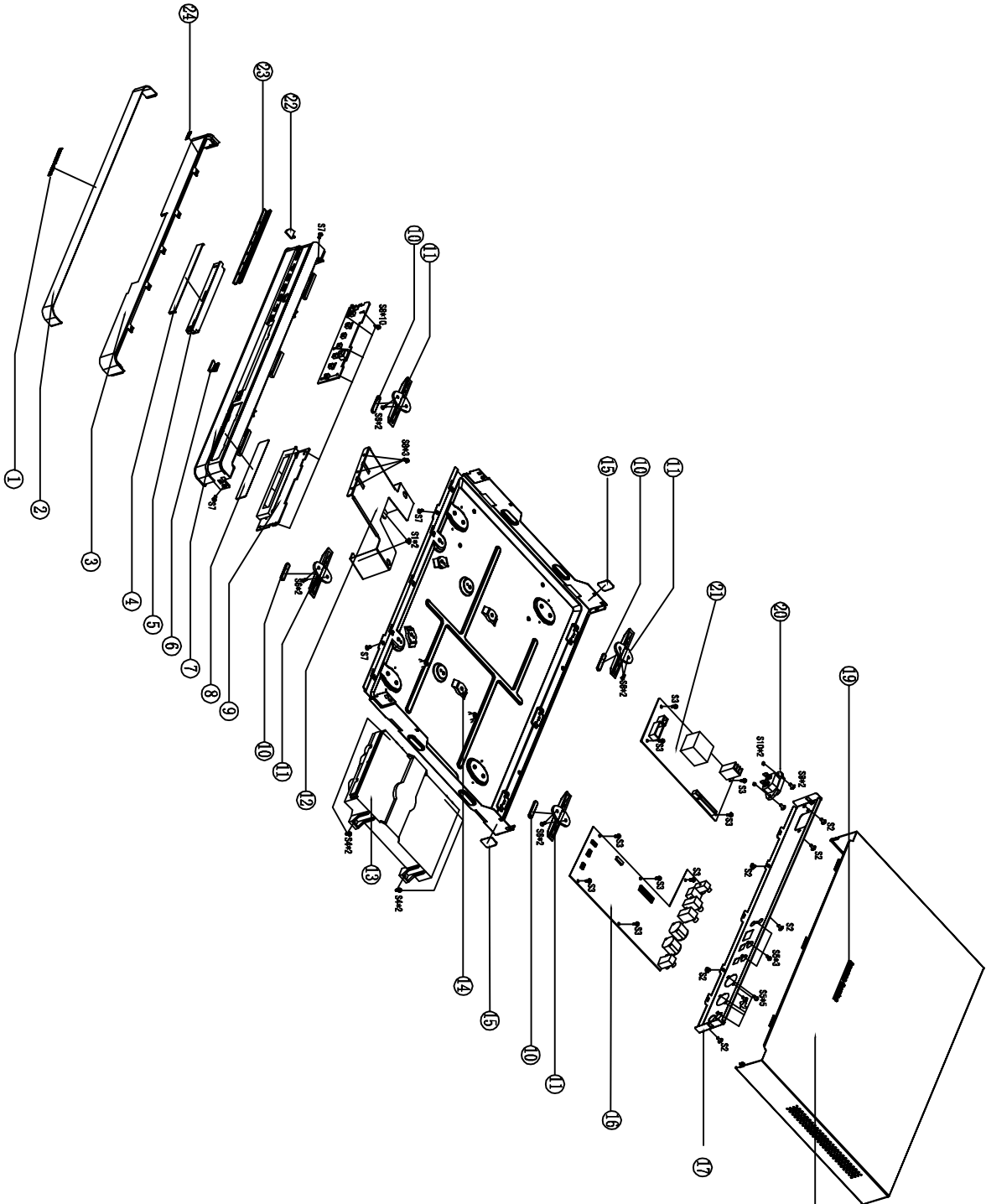
### TROUBLE SHOOTING GUIDE

| SYMPTOM                                            | CAUSE                                                                                                                     | SOLUTION                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No lights on Front Panel                           | <ul style="list-style-type: none"> <li>No AC power</li> </ul>                                                             | <ul style="list-style-type: none"> <li>Make certain AC power cord is plugged into a live outlet.</li> </ul>                                                                                                                                                                   |
| Remote does not appear to operate                  | <ul style="list-style-type: none"> <li>Power Switch turned off</li> <li>Weak batteries</li> <li>Blocked sensor</li> </ul> | <ul style="list-style-type: none"> <li>Turn on Power Switch.</li> <li>Install fresh batteries, observing polarity indications.</li> <li>Remove obstructions from the front panel sensor or connect a remote sensor to the <b>Remote In</b> jack on the rear panel.</li> </ul> |
| Front panel lights, but CD does not play           | <ul style="list-style-type: none"> <li>Disc upside down</li> </ul>                                                        | <ul style="list-style-type: none"> <li>Reload disc with label side facing up.</li> </ul>                                                                                                                                                                                      |
| Play indicator lights, but no sound is heard       | <ul style="list-style-type: none"> <li>Poor connections</li> <li>Wrong source connected</li> </ul>                        | <ul style="list-style-type: none"> <li>Make certain connections are secure and made to the correct (e.g., <b>CD</b>) input.</li> <li>Select CD source on receiver or preamp.</li> </ul>                                                                                       |
| Sound skips or stutters during play                | <ul style="list-style-type: none"> <li>Disc may be damaged</li> <li>Surface vibrations</li> </ul>                         | <ul style="list-style-type: none"> <li>Try another disc.</li> <li>Isolate the unit from vibration by placing it on a firm surface or move it further away from speakers.</li> </ul>                                                                                           |
| Sound is continually distorted                     | <ul style="list-style-type: none"> <li>Incorrect input</li> </ul>                                                         | <ul style="list-style-type: none"> <li>Make certain that the analog <b>Audio Outputs</b> ② of the CD player are connected to a line level audio input, NOT to a digital audio or phono input.</li> </ul>                                                                      |
| <b>ERROR</b> lights up continuously in the display | <ul style="list-style-type: none"> <li>Various</li> </ul>                                                                 | <ul style="list-style-type: none"> <li>Turn the unit off and on again. If the problem persists, turn the AC power to the CD player off and on.</li> </ul>                                                                                                                     |



| NO. | P/N                | DESCRIPTION                             | QTY. |
|-----|--------------------|-----------------------------------------|------|
| 20  | 01.00.BZ.D.Z.E018  | Plastic bag for accessory 16, 5924, 5cm | 1    |
| 19  | 01.47.CMT.CTX.E038 | AV line                                 | 1    |
| 18  | 01.47.CMT.CTX.E027 | Audio line                              | 1    |
| 17  | 01.00.BZ.D.H.E029  | Plastic bag for AV or audio line 6x23cm | 1    |
| 16  | 02.25.H0990        | Remote control                          | 2    |
| 15  | 01.00.BZ.D.Z.E019  | Plastic bag for RC 6, 4424cm            | 1    |
| 14  | 01.14.DX.B.E0015   | 5# battery                              | 3    |
| 13  | 01.00.BZ.D.Z.E035  | Plastic bag for battery 7, 598cm        | 1    |
| 12  | 01.00.DP-OT.E445   | Polyfoam - right                        | 1    |
| 11  | 01.00.YS.F13.E1781 | Safety and Warning instruction manual   | 1    |
| 10  | 01.00.BZ.D.Z.E020  | Plastic bag for manual 25x55cm          | 1    |
| 9   | 01.00.TS.SMT.E1788 | User manual                             | 1    |
| 8   | 01.47.CMT.AOX.E052 | AC Power Cord                           | 1    |
| 7   | 01.00.DP-OT.E446   | HD990-Accessorial                       | 1    |
| 6   | 01.00.BZ.F.P.E307  | Plastic bag for unit 59x90cm            | 1    |
| 5   | 01.00.DP-OT.E444   | Polyfoam - left                         | 1    |
| 4   | 01.00.DP-OT.E443   | Main unit                               | 1    |
| 3   | 01.00.DP-OT.E443   | Polyfoam - front                        | 1    |
| 2   | 01.00.BZ.X.W.E1699 | Carton box HD990 EU version             | 1    |
| 1   |                    | Barcode label                           | 2    |
|     |                    |                                         |      |
|     |                    |                                         |      |

HD 990 EU Explode view



|     |                              |                                                |      |
|-----|------------------------------|------------------------------------------------|------|
| NO. | P/N                          | DESCRIPTION                                    | QTY. |
| 1   | 01.00. M.J. JG. E119         | NUT M3                                         | 2    |
| 2   | 01.00. M.J. JG. E1083        | Screw 3x10PMH0                                 | 2    |
| 3   | 01.00. M.J. JG. E051         | Screw 2.5x8PMH1                                | 13   |
| 4   | 01.00. M.J. JG. E328         | Screw 3x6B8T10                                 | 4    |
| 5   | 01.00. M.J. JG. E309         | Screw 3x6B8T10                                 | 8    |
| 6   | 01.00. M.J. JG. E321         | Screw 3x6B8T10                                 | 8    |
| 7   | 01.00. M.J. JG. E285         | Screw 3x6B8T10                                 | 4    |
| 8   | 01.00. M.J. JG. E795         | Screw 3x6PMH1                                  | 9    |
| 9   | 01.00. M.J. JG. E403         | Screw 3x6B8T10                                 | 7    |
| 10  | 01.00. M.J. JG. E717         | Screw 3x4PMH1                                  | 2    |
| 11  | 01.00. S.B. E127             | Metal Logo 13.9x4.75mm (with single side glue) | 1    |
| 12  | 01.00. S.L. HD990. E004      | Button 1                                       | 1    |
| 13  | 01.00. S.L. HD990. E010      | Power Indicator lampshade                      | 1    |
| 14  | 02.19. HD00P1254C01          | SMPS Board                                     | 1    |
| 15  | 01.40. CON. DC2. E178        | Power Jack (MS-044-0)                          | 1    |
| 16  | 01.00. S.B. E129             | Metal logo 73.8x7.4mm (with single side glue)  | 1    |
| 17  | 01.00. M.J. T.J. HD990. E003 | Top cover                                      | 1    |
| 18  | 02.11. HD00H6504C01          | Rear panel                                     | 1    |
| 19  | 01.00. DP. X.L. E889         | Main board                                     | 1    |
| 20  | 01.00. M.J. T.J. HD990. E001 | Chassis                                        | 1    |
| 21  | 01.15. JX. EV34850           | DV34-850                                       | 1    |
| 22  | 01.00. S.L. HD990. E004      | Front panel bracket                            | 1    |
| 23  | 01.00. S.L. HD990. E008      | Pedestal under lay                             | 4    |
| 24  | 02.15. HD00K6576C01          | Sponge28.7x5.7x2.5mm (with single side glue)   | 4    |
| 25  | 01.00. S.L. HD990. E003      | VFD board                                      | 1    |
| 26  | 01.00. S.L. HD990. E005      | VFD filter                                     | 1    |
| 27  | 01.00. S.L. HD990. E009      | Front panel                                    | 1    |
| 28  | 01.00. M.J. T.J. HD990. E006 | Button 11                                      | 1    |
| 29  | 01.00. M.J. T.J. HD990. E007 | Disc tray door                                 | 1    |
| 30  | 01.00. M.J. T.J. HD990. E005 | Aluminum ally wrap for disc tray               | 1    |
| 31  | 01.00. M.J. T.J. HD990. E005 | Lens                                           | 1    |
| 32  | 01.00. M.J. T.J. HD990. E005 | Aluminum veneer                                | 1    |
| 33  | 01.00. S.B. E128             | Metal logo 52x5.2mm (with single side glue)    | 1    |

HD990  
Explodeview

| <b>HD990 Components List</b>                    |                                  |                                                      |            |                                                                                                      |                                                  |
|-------------------------------------------------|----------------------------------|------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Serial No.: WA0035-01001 to WA0035-01420</b> |                                  |                                                      |            |                                                                                                      |                                                  |
| <b>P/N</b>                                      | <b>Description</b>               | <b>Specification</b>                                 | <b>Qty</b> | <b>Location.No.</b>                                                                                  | <b>Note</b>                                      |
| 01.00.SJ.HD980E003                              | plastic part                     | HD980-Front panel                                    | 1          | HD980-RE01                                                                                           |                                                  |
| 01.00.SJ.HD980E004                              | plastic part                     | HD980-Button I                                       | 1          | HD980-RE02                                                                                           |                                                  |
| 01.00.SJ.HD980E005                              | plastic part                     | HD980-Button II                                      | 1          | HD980-RE03                                                                                           |                                                  |
| 01.00.SJ.HD980E006                              | plastic part                     | HD980-Pedestal underlay                              | 4          | HD980-RE04                                                                                           |                                                  |
| 01.00.SJ.HD980E007                              | plastic part                     | HD980-Lens                                           | 1          | HD980-RE05                                                                                           |                                                  |
| 01.00.SJ.HD980E008                              | VFD filter                       | HD980-VFD filter                                     | 1          | HD980-RE06                                                                                           |                                                  |
| 01.00.SJ.HD980E009                              | plastic part                     | HD980-Disc tray door                                 | 1          | HD980-RE07                                                                                           |                                                  |
| 01.00.SJ.HD980E010                              | plastic part                     | HD980-Power indicator lampshade                      | 1          | HD980-RE08                                                                                           |                                                  |
| 01.00.SJ.SK.E008                                | plastic part                     | 1000A-IR receiver support 5.5mm                      | 1          |                                                                                                      |                                                  |
| 01.00.FZ.QT.E409                                | PC piece                         | HD980-H05                                            | 1          | Between Lens and Front panel                                                                         |                                                  |
| 01.00WJTJHD990E001                              | Metals Part                      | HD990-Chassis                                        | 1          | HD990-PT01                                                                                           |                                                  |
| 01.00WJTJHD990E002                              | Metals Part                      | HD990-Rear panel                                     | 1          | HD990-PT02                                                                                           |                                                  |
| 01.00WJTJHD980E003                              | Metals Part                      | HD980-Top cover                                      | 1          | HD980-PT03                                                                                           |                                                  |
| 01.00WJTJHD980E004                              | Metals Part                      | HD980-Front panel bracket                            | 1          | HD980-PT04                                                                                           |                                                  |
| 01.00WJTJHD980E005                              | Metals Part                      | HD980-Aluminum veneer                                | 1          | HD980-PT05                                                                                           |                                                  |
| 01.00WJTJHD980E006                              | Metals Part                      | HD980-Aluminum ally wrap for disc tray               | 1          | HD980-PT06                                                                                           |                                                  |
| 01.00.WJ.JG.E717                                | Screw                            | M3*4PWBTTNI                                          | 2          | For Front panel bracket and Chassis (2)                                                              |                                                  |
| 01.00.WJ.JG.E403                                | Screw                            | M3*6PWBTTTO                                          | 7          | For Top cover and Chassis(2),Top cover and Rear panel(3),Rear panel and Chassis(2)                   |                                                  |
| 01.00.WJ.JG.E795                                | Screw                            | M3*6PWMHNI                                           | 9          | For Main board and Chassis(5),SMPS board and Chassis(4)                                              |                                                  |
| 01.00.WJ.JG.E235                                | Screw                            | M3*8PWBTTNI                                          | 4          | For Loader and Chassis(4)                                                                            |                                                  |
| 01.00.WJ.JG.E321                                | Screw                            | M3*8PAHO                                             | 8          | For the jacks on main board and Rear panel(8)                                                        |                                                  |
| 01.00.WJ.JG.E909                                | Screw                            | M3*6BBTTO                                            | 8          | For Pedestal underlay and Chassis(8)                                                                 |                                                  |
| 01.00.WJ.JG.E328                                | Screw                            | 3*6KBTTTO                                            | 4          | For Front panel and Chassis(4)                                                                       |                                                  |
| 01.00.WJ.JG.E051                                | Screw                            | M2.5*8PWAHNI                                         | 13         | For Key board and Front panel(6),VFD board and Front panel(6),Front panel bracket and Front panel(3) |                                                  |
| 01.00.WJ.JG.E1083                               | Screw                            | M3*10PMHO                                            | 2          | For the Power Jack(2)                                                                                |                                                  |
| 01.00.WJ.JG.E119                                | Nut                              | M3                                                   | 2          | For the Power Jack(2)                                                                                |                                                  |
| 01.00.FZ.TG.E025                                | Screw Jacket                     | Φ3*4mm                                               | 4          |                                                                                                      | For uncovered screws drilled through the chassis |
| 01.00.DP.XJ.E799                                | Sponge                           | 29.7*5.7*2.5mm (with single side glue)               | 4          | HD980-H01                                                                                            |                                                  |
| 01.00.DP.HM.E125                                | Sponge                           | 20*10*2mm (with double sides glue)                   | 3          | For VFD(2),Loader flat cable(1)                                                                      |                                                  |
| 01.00.DP.HM.E303                                | Sponge                           | 20*50*2mm (with single side glue)                    | 1          | For Loader flat cable and chassis(1)                                                                 |                                                  |
| 01.00.DP.HM.E124                                | Sponge                           | 20*10*3mm (with single side glue) Black              | 4          | Sticked on Front panel bracket                                                                       |                                                  |
| 01.00.DP.JY.E615                                | Insulated PVC                    | 176.5*84.4*0.5mm (with single side glue)             | 1          | Sticked under SMPS board                                                                             |                                                  |
| 01.00.DP.JY.E153                                | Insulated PVC                    | Φ6.6*Φ3.6*0.3mm (with single side glue) Black        | 1          | Sticked on Chassis under Loader                                                                      |                                                  |
| 01.00.DP.XJ.E889                                | Sponge                           | 15*15*2.7mm (with single side glue) Black            | 2          | HD980-H06, Sticked on the flank side of the Chassis                                                  |                                                  |
| 01.13.L.H.E020                                  | Magnetism annulus                | M248                                                 | 1          | For the Power Connect Cable                                                                          |                                                  |
| 01.00.FZ.QT.E122                                | Plastic fastener                 | 12cm                                                 | 4          | For Power cord (3),Loader connect cable(1)                                                           |                                                  |
| 01.00.WJ.TJ.E569                                | aluminium fastener               | Φ3.5*40                                              | 2          |                                                                                                      |                                                  |
| 01.47.CNT.LJX7E768                              | Connect cable                    | 2.54-3Y-3Y-220mm (Be different side)                 | 1          | Connect Key board and SMPS board                                                                     |                                                  |
| 01.47.CNTACXE052                                | AC Power Cord                    | WS-002E+WS-019 HO5VV-F 0.75*2C BK 2M                 | 1          |                                                                                                      | EU version                                       |
| 01.47.CNT.LJX3E037                              | Connect cable                    | 2.0-6Y-6Y-130mm (Be different side) (UL20080 28AWG)  | 1          | Connect Loader and Main board                                                                        |                                                  |
| 01.47.CNT.LJX3E036                              | Connect cable                    | 2.0-5Y-5Y-240mm (Be same side) (LG UL20080 28AWG)    | 1          | Connect Loader and Main board                                                                        |                                                  |
| 01.47.CNT.LJX7E612                              | Connect cable                    | 2.54-2.0-13Y-240mm(Be same side)                     | 1          | Connect SMPS board and Main board                                                                    |                                                  |
| 01.47.CNT.LJX5E333                              | Connect cable                    | 70mm(solder one end and grounding piece another end) | 1          | Connect Key board and SMPS board                                                                     |                                                  |
| 01.47.CNT.LJX5E334                              | Connect cable                    | 80mm(solder one end and grounding piece another end) | 1          | Connect VFD board and Main board                                                                     |                                                  |
| 01.47.CNT.LJX2E110                              | Connect cable                    | 1.25-6Y-6Y-180mm(Be same side)                       | 1          | Connect Key board and VFD board                                                                      |                                                  |
| 01.47.CNT.LJX7E819                              | Connect cable                    | VH-3Y-2Y-400mm(Be same side)                         | 1          | Connect SMPS board and Power Jack(solder one end)                                                    |                                                  |
| 01.48.BPX.1.E139                                | flat cable                       | 1.25*14P*80mmA                                       | 1          | Connect Main board and VFD board                                                                     |                                                  |
| 01.48.BPX.1.E045                                | flat cable                       | 0.5*24P*180mmA                                       | 1          | Connect Loader and Main board                                                                        |                                                  |
| 01.47.CNT.CTX.E027                              | Remot control transmission cable | Φ3.5+Φ3.5(single channel), black, 1.2m               | 1          |                                                                                                      |                                                  |
| 01.47.CNT.LJX5E337                              | HRS-Link Cable                   | HRS-Link Cable, Black, 1.5m                          | 1          |                                                                                                      |                                                  |
| 01.15.JX.EDV34850                               | Loader                           | DV34-850                                             | 1          | SF-HD850G+DVD-M06B                                                                                   |                                                  |
| 01.40.CON.DCZ.E178                              | Power Jack                       | WS-044-0                                             | 1          |                                                                                                      |                                                  |
| 01.00.SB.E162                                   | Metal logo                       | HD990 13.9*4.75mm (with single side glue)            | 1          | HD990-H01,stickd on Lens                                                                             |                                                  |

| P/N                | Description                          | Specification                      | Qty | Location.No.                        | Note |
|--------------------|--------------------------------------|------------------------------------|-----|-------------------------------------|------|
| 01.00.SB.E128      | Metal logo                           | 52*5.2mm (with single side glue)   | 1   | HD980-H03,stickd on Aluminum veneer |      |
| 01.00.SB.E129      | Metal logo                           | 73.6*7.4mm (with single side glue) | 1   | HD980-H04,stickd on Top cover       |      |
| 02.11HCD08M5604C01 | Main Board (semi-manufactured goods) | HCD08M-5604C01                     | 1   | 2-layers                            |      |
| 02.15HCD08K5575C01 | Key Board (semi-manufactured goods)  | HCD08K-5575C01                     | 1   | 2-layers                            |      |
| 02.15HCD08K5576C01 | VFD Board (semi-manufactured goods)  | HCD08K-5576C01                     | 1   | 2-layers                            |      |
| 02.19HCD06P1254C01 | SMPS Board (semi-manufactured goods) | HCD06P-1254C01                     | 1   | 1-layer                             |      |
| 02.25.HD990        | Remote Control(manufactured goods)   | HD990                              | 1   |                                     |      |

### HD990 Components List for Main Board (5604C01)

| P/N                | Description                         | Specification        | Qty | Location.No.                                                                                                                                                                                     | Note |
|--------------------|-------------------------------------|----------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 01.57.R.3.E000J    | Resistor, chip                      | 0805-0Ω ±5%          | 16  | R149 R154 R167 (R170) R175 (R191)<br>R194 R197 R201 R235 R236 R241 R253<br>R272<br>R273 R274                                                                                                     |      |
| 01.57.R.3.E1R0J    | Resistor, chip                      | 0805-1Ω±5%           | 4   | R204 R205 R206 R207                                                                                                                                                                              |      |
| 01.57.R.3.E220J    | Resistor, chip                      | 0805-22Ω±5%          | 3   | R148 R254 R256                                                                                                                                                                                   |      |
| 01.57.R.3.E330J    | Resistor, chip                      | 0805-33Ω±5%          | 5   | R98 R100 R101 R141 R247                                                                                                                                                                          |      |
| 01.57.R.3.E470J    | Resistor, chip                      | 0805-47Ω±5%          | 17  | R90 R91 R92 R95 R97 R102 R110 R125<br>R126 R127 R128 R130 R131 R136 R137<br>R268 R275                                                                                                            |      |
| 01.57.R.3.E750J    | Resistor, chip                      | 0805-75Ω±5%          | 1   | R85                                                                                                                                                                                              |      |
| 01.57.R.3.E101J    | Resistor, chip                      | 0805-100Ω±5%         | 14  | R88 R94 R96 R99 R150 R153 R162<br>R163 R164 R183 R184 R215 R216 R225                                                                                                                             |      |
| 01.57.R.3.E151J    | Resistor, chip                      | 0805-150Ω±5%         | 1   | R265                                                                                                                                                                                             |      |
| 01.57.R.3.E241J    | Resistor, chip                      | 0805-240Ω±5%         | 5   | R83 R165 R180 R181 R220                                                                                                                                                                          |      |
| 01.57.R.3.E271F    | Resistor, chip                      | 0805-270Ω±1%         | 1   | R109                                                                                                                                                                                             |      |
| 01.57.R.3.E391F    | Resistor, chip                      | 0805-390Ω±1%         | 3   | R117 R166 R214                                                                                                                                                                                   |      |
| 01.57.R.3.E511F    | Resistor, chip                      | 0805-510Ω±1%         | 2   | R219 (R224)                                                                                                                                                                                      |      |
| 01.57.R.3.E561J    | Resistor, chip                      | 0805-560Ω±5%         | 5   | R186 R187 R210 R259 R260                                                                                                                                                                         |      |
| 01.57.R.3.E102J    | Resistor, chip                      | 0805-1KΩ±5%          | 6   | R115 R138 R139 R140 R208 R239                                                                                                                                                                    |      |
| 01.57.R.3.E152J    | Resistor, chip                      | 0805-1.5KΩ±5%        | 2   | R178 R189                                                                                                                                                                                        |      |
| 01.57.R.3.E202J    | Resistor, chip                      | 0805-2KΩ±5%          | 2   | R246 R248                                                                                                                                                                                        |      |
| 01.57.R.3.E222J    | Resistor, chip                      | 0805-2.2KΩ±5%        | 4   | R157 R193 R195 R199                                                                                                                                                                              |      |
| 01.57.R.3.E272J    | Resistor, chip                      | 0805-2.7KΩ±5%        | 8   | R84 R211 R213 R226 R263 R264 R212<br>(R227)                                                                                                                                                      |      |
| 01.57.R.3.E332J    | Resistor, chip                      | 0805-3.3KΩ±5%        | 1   | R93                                                                                                                                                                                              |      |
| 01.57.R.3.E472J    | Resistor, chip                      | 0805-4.7KΩ±5%        | 8   | R112 R118 R142 R179 R190 R222<br>R244 R267                                                                                                                                                       |      |
| 01.57.R.3.E512J    | Resistor, chip                      | 0805-5.1KΩ±5%        | 1   | R202                                                                                                                                                                                             |      |
| 01.57.R.3.E622F    | Resistor, chip                      | 0805-6.2KΩ±1%        | 1   | R249                                                                                                                                                                                             |      |
| 01.57.R.3.E822F    | Resistor, chip                      | 0805-8.2KΩ±1%        | 3   | R200 R203 R266                                                                                                                                                                                   |      |
| 01.57.R.3.E103J    | Resistor, chip                      | 0805-10KΩ±5%         | 35  | (R86) R87 R89 R114 R120 R122 R123<br>R132 R133 (R134) R135 R143 R144<br>R145 R146 R147 R152 R155 R156<br>(R161) R168 R171 R173 R176 R185<br>R217 R218 R221 R223<br>R232 R238 R242 R243 R245 R276 |      |
| 01.57.R.3.E1182F   | Resistor, chip                      | 0805-11.8KΩ±1%       | 2   | R255 R257                                                                                                                                                                                        |      |
| 01.57.R.3.E223J    | Resistor, chip                      | 0805-22KΩ±5%         | 2   | R182 R192                                                                                                                                                                                        |      |
| 01.57.R.3.E333J    | Resistor, chip                      | 0805-33KΩ±5%         | 2   | R250 R251                                                                                                                                                                                        |      |
| 01.57.R.3.E473J    | Resistor, chip                      | 0805-47KΩ±5%         | 2   | R196 R198                                                                                                                                                                                        |      |
| 01.57.R.3.E104J    | Resistor, chip                      | 0805-100KΩ±5%        | 4   | R151 R169 R172 R174                                                                                                                                                                              |      |
| 01.57.R.3.E105J    | Resistor, chip                      | 0805-1MΩ±5%          | 2   | R177 R188                                                                                                                                                                                        |      |
| 01.57.R.4.E560J    | Resistor, chip                      | 1206-56Ω±5%          | 4   | R10 R31 R51 R72                                                                                                                                                                                  |      |
| 01.57.R.4.E101F    | Resistor, chip                      | 1206-100Ω±1%         | 4   | R9 R30 R50 R71                                                                                                                                                                                   |      |
| 01.57.R.4.E331F    | Resistor, chip                      | 1206-330Ω±1%         | 24  | R1 R2 R7 R13 R18 R19 R22 R23 R28<br>R34<br>R39 R40 R42 R43 R48 R54 R59 R60<br>R63                                                                                                                |      |
| 01.57.R.4.E511F    | Resistor, chip                      | 1206-510Ω±1%         | 4   | R12 R33 R53 R74                                                                                                                                                                                  |      |
| 01.57.R.4.E681F    | Resistor, chip                      | 1206-680Ω±1%         | 8   | R4 R16 R25 R37 R45 R57 R66 R78                                                                                                                                                                   |      |
| 01.57.R.4.E821F    | Resistor, chip                      | 1206-820Ω±1%         | 4   | R5 R26 R46 R67                                                                                                                                                                                   |      |
| 01.57.R.4.E222F    | Resistor, chip                      | 1206-2.2KΩ±1%        | 8   | R6 R15 R27 R36 R47 R56 R68 R77                                                                                                                                                                   |      |
| 01.57.R.4.E272F    | Resistor, chip                      | 1206-2.7KΩ±1%        | 10  | R8 R11 R21 R29 R32 R49 R52 R62 R70<br>R73                                                                                                                                                        |      |
| 01.57.R.4.E153F    | Resistor, chip                      | 1206-15KΩ±1%         | 7   | R3 R24 R44 R65 R158 R159 R160                                                                                                                                                                    |      |
| 01.57.R.4.E473F    | Resistor, chip                      | 1206-47KΩ±1%         | 12  | R14 R17 R20 R35 R38 R41 R55 R58<br>R61                                                                                                                                                           |      |
| 01.57.R.4.E475J    | Resistor, chip                      | 1206-4.7MΩ±5%        | 1   | R116                                                                                                                                                                                             |      |
| 01.57.R.8.EP3304   | Resistor, thick film chip network   | 0603-33Ω*4 ±5%       | 7   | RN2 RN3 RN4 RN5 RN6 RN7 RN8                                                                                                                                                                      |      |
| 01.54.CS.3E4P7N50V | Capacitor, multilayer ceramic, chip | 0805-4.7P NPO±5%/50V | 1   | C61                                                                                                                                                                                              |      |
| 01.54.CS.3E100N50V | Capacitor, multilayer ceramic, chip | 0805-10P NPO±5%/50V  | 6   | (C62) C63 (C75) (C76) (C77) (C79)                                                                                                                                                                |      |
| 01.54.CS.3E150N50V | Capacitor, multilayer ceramic, chip | 0805-15P NPO±5%/50V  | 2   | (C152) (C160)                                                                                                                                                                                    |      |
| 01.54.CS.3E470N50V | Capacitor, multilayer ceramic, chip | 0805-47P NPO±5%/50V  | 2   | C146 C187                                                                                                                                                                                        |      |
| 01.54.CS.3E101N50V | Capacitor, multilayer ceramic, chip | 0805-100P NPO±5%/50V | 5   | C94 C96 C121 C122 C126                                                                                                                                                                           |      |
| 01.54.CS.3E121N50V | Capacitor, multilayer ceramic, chip | 0805-120P NPO±5%/50V | 1   | C141                                                                                                                                                                                             |      |
| 01.54.CS.3E201N50V | Capacitor, multilayer ceramic, chip | 0805-200P NPO±5%/50V | 1   | C147                                                                                                                                                                                             |      |

## HD990 Components List for Main Board (5604C01)

| P/N                 | Description                         | Specification              | Qty | Location.No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Note                     |
|---------------------|-------------------------------------|----------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 01.54.CS.3E391N50V  | Capacitor, multilayer ceramic, chip | 0805-390P NPO±5%/50V       | 2   | C89 C90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |
| 01.54.CS.3E471N50V  | Capacitor, multilayer ceramic, chip | 0805-470P NPO±5%/50V       | 2   | C92 C93                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |
| 01.54.CS.3E681N50V  | Capacitor, multilayer ceramic, chip | 0805-680P NPO±5%/50V       | 1   | C98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |
| 01.54.CS.3E102X50V  | Capacitor, multilayer ceramic, chip | 0805-102 X7R ±10%/50V      | 3   | C56 C139 C149                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |
| 01.54.CS.3E332X50V  | Capacitor, multilayer ceramic, chip | 0805-332 X7R±10%/50V       | 3   | C142 C143 C150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |
| 01.54.CS.3E392X50V  | Capacitor, multilayer ceramic, chip | 0805-392 X7R±10%/50V       | 1   | C148                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |
| 01.54.CS.3E472X50V  | Capacitor, multilayer ceramic, chip | 0805-472 X7R±10%/50V       | 1   | (C157)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |
| 01.54.CS.3E103X50V  | Capacitor, multilayer ceramic, chip | 0805-103 X7R±10%/50V       | 5   | C70 C82 C100 C101 C140                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |
| 01.54.CS.3E223X50V  | Capacitor, multilayer ceramic, chip | 0805-223 X7R±10%/50V       | 1   | C57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |
| 01.54.CS.3E273Y50V  | Capacitor, multilayer ceramic, chip | 0805-273 Y5V-20+80%/50V    | 1   | C145                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |
| 01.54.CS.3E473X50V  | Capacitor, multilayer ceramic, chip | 0805-473 X7R±10%/50V       | 1   | C95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |
| 01.54.CS.3E104Y50V  | Capacitor, multilayer ceramic, chip | 0805-104 Y5V+80-20%/50V    | 103 | (C45) C46 C47 (C48) (C49) C50 C51 C52<br>(C53) C54 (C55) (C58) C59 C60 C68 (C72)<br>(C73) (C74) C81 (C83) (C84) (C85) C86 (C87) C88 (C91) C97 (C99) (C103) (C104) (C105) (C106) (C107) C108 (C109) (C110) (C111) (C112) (C113) (C114) (C115) (C116) (C117) (C118) (C119) (C120) C123 C124 C125 (C127) (C128) (C129) C130 (C131) (C132) (C133) (C134) (C135) (C136) (C137) C138<br>C144 C151 C153 C154 (C156) C161 C164 C165 C166 C188 C189 C65 C66 C67 C71<br>C190 C191 C192 C193 C194 C195 C196 C197 C198 C199 C200 C201 C202 C203 C204 C205 C206 C207 C208 C209 C210 C211 C212 C213 C214 C215 C216 |                          |
| 01.54.CS.3E105Y16V  | Capacitor, multilayer ceramic, chip | 0805-105 Y5V-20+80%/16V    | 6   | (C69) C80 C158 C159 C162 C163                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |
| 01.54.CS.3E475Y16V  | Capacitor, multilayer ceramic, chip | 0805-475 Y5V+80-20%/16V    | 1   | C155                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |
| 01.54.CS.4E104X50V  | Capacitor, multilayer ceramic, chip | 1206-104 X7R±10%/50V       | 24  | C1 C2 C6 C8 C9 C10 C11 C13 C14 C15 C16 C21 C23 C24 C28 C30 C31 C32 C33 C35<br>C36 C37 C38 C43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |
| 01.34.CL.DE10U16VC  | Capacitor, AL.electrolytic          | CD110-10UF/16V 5*11        | 1   | CE53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |
| 01.34.CL.D47U25VC1  | Capacitor, AL.electrolytic          | CD110-47UF/25V 5*11        | 20  | CE1 CE2 CE3 CE4 CE5 CE6 CE7 CE8 CE9 CE10 CE11 CE12 CE13 CE14 CE15 CE16 CE17 CE18 CE48 CE50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |
| 01.34.CLDE47U50VCD  | Capacitor, AL.electrolytic          | CD110-47UF/50V 6.3*12      | 11  | CE19 CE21 CE22 CE23 CE24 CE25 CE26 CE27 CE28 CE29 CE30 CE33 CE41 CE43 CE46 CE49 CE20 CE31 CE32 CE34 CE35 CE36 CE37 CE38 CE39 CE40 CE42 CE44 CE45 CE57 CE58 CE59 CE60 CE61 CE62 CE52                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |
| 01.34.CLDEH470U35VG | Capacitor, AL.electrolytic          | CD288H-470UF/35V 10*20     | 2   | CE47 CE51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | WB serie,samwha 105℃(M)  |
| 01.00.CDDLE33263V   | Metallized Polyester Film Capacitor | 332/63V                    | 4   | C183 C184 C185 C186                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Faratronic NO:C241J332J2 |
| 01.00.CD.DLE10463V  | Metallized Polyester Film Capacitor | 104/63V                    | 4   | C167 C173 C176 C181                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Faratronic NO:C241J104J2 |
| 01.00.CD.DLE68163V  | Metallized Polyester Film Capacitor | 681/63V                    | 8   | C168 C169 C171 C174 C178 C179 C180 C182                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Faratronic NO:C241J681K2 |
| 01.00.CD.DLE22250V  | Metallized Polyester Film Capacitor | 222/50V                    | 4   | C170 C172 C175 C177                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Faratronic NO:C241H222J2 |
| 01.13.L.L.S.E007    | Inductor, multilayer ceramic, chip  | 0805-10UH, SMD             | 2   | L5 L6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |
| 01.13.L.L.S.E362    | Inductor,Weifengda                  | WBR453232-220K-R, SMD1812  | 2   | L2 L1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |
| 01.13.L.L.D.E081    | Inductor, Coilcraft                 | WB1010-1, DIP6             | 4   | T1 T2 T3 T4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |
| 01.13.L.L.S.E382    | Inductor, TDK                       | 1812-47UH, SMD1812         | 2   | L4 L3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |
| 01.13.L.Z.ESC100    | Bead, chip,                         | 1206-100Q, SMD             | 14  | FB1 FB2 FB3 FB4 FB5 FB6 FB7 FB8 FB9 FB10 FB11 FB12 FB13 FB14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |
| 01.00.ZJ.BHQ.E008   | Relay, HongFa                       | HFD27/005-S(555), DIP      | 2   | K2 K1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |
| 01.41.D.PS.E5819    | Schottky Rectifier, Rohm            | 5819 1A SCHOTTKY, SS14     | 1   | D22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |
| 01.41.D.PS.ELL4148  | Diode                               | LL4148, DO-213AA           | 14  | D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |
| 01.41.D.PSE30BQ040  | Schottky Rectifier, IR              | 30BQ040 3A, SMC            | 4   | D14 D15 D16 D20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |
| 01.41.D.FS.E019     | LED, BRIGHTTEK                      | 1SA1206V31C0CAE1(Red), SMD | 3   | D17 D18 D19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |
| 01.41.D.WS.E6V2     | Zener diode                         | 6.2V 0.4W, SMD             | 1   | DZ1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |
| 01.42.Q.S.E123      | MOSFET, DIODES                      | BSS123, SOT-23             | 1   | MQ1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |
| 01.42.Q.S.E1035     | Transistor,Panasonic                | 2SA1035, SOT-23            | 17  | Q1 Q2 Q4 Q6 Q9 Q10 Q12 Q14 Q17 Q18 Q20 Q22 Q25 Q26 Q28 Q30 Q33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |
| 01.42.Q.S.E2406     | Transistor,Panasonic                | 2SC2406, SOT-23            | 16  | Q3 Q5 Q7 Q8 Q11 Q13 Q15 Q16 Q19 Q21 Q23 Q24 Q27 Q29 Q31 Q32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |
| 01.42.Q.S.E1132     | Transistor, ROHM                    | 2SB1132, MPT3              | 2   | Q43 Q44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |
| 01.42.Q.S.E1664T    | Transistor, ROHM                    | 2SD1664T100R, MPT3         | 2   | Q34 Q35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |
| 01.42.Q.S.E3018     | MOSFET,ROHM                         | 2SK3018T106, MPT3          | 2   | MQ2 MQ3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |
| 01.42.Q.D.E8050     | Transistor                          | KTC8050-C/P, TO-92         | 2   | Q38 Q39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |
| 01.42.Q.D.E8550     | Transistor                          | KTC8550-C/P, TO-92         | 2   | Q36 Q37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |
| 01.42.Q.S.EBCP5616  | Transistor, NXP                     | BCP56-16, SOT223           | 2   | Q40 Q41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |

**HD990 Components List for Main Board (5604C01)**

| P/N                | Description                                              | Specification                            | Qty | Location.No. | Note                                                                  |
|--------------------|----------------------------------------------------------|------------------------------------------|-----|--------------|-----------------------------------------------------------------------|
| 01.42.Q.S.EBCP5316 | Transistor, NXP                                          | BCP53-16, SOT223                         | 1   | Q42          |                                                                       |
| 01.00.JZ.E33868    | Quartz Crystal Unit                                      | 33.8688MHZ-49S-20P                       | 1   | Y2           |                                                                       |
| 01.00.JZ.E225792A  | Quartz Crystal Unit                                      | 22.5792MHz-49S-10PF ±10PPM DIP           | 1   | Y1           |                                                                       |
| 01.44.IC.S.EBF532S | IC, ADI, Blackin DSP                                     | ADSP-BF532SBSTZ400,LQFP176               | 1   | U22          |                                                                       |
| 01.46.IC.E7208G    | IC, Via, Servo chip                                      | VT7208, LQFP216                          | 1   | U36          |                                                                       |
| 01.46.ICEKH29LV040 | IC, KH,Flash Memory                                      | KH29LV040CQC-70G, PLCC32                 | 1   | U23          | firmware burn-in;<br>(Can be replaced by<br>ATEML<br>AT49BV040B-70JU) |
| 01.46.IC.E290011   | IC, AMIC, Flash memory                                   | AMIC A290011TL-70, PLCC32                | 1   | U37          | firmware burn-in                                                      |
| 0146ICHY57V641620E | IC, Hynix, SDRAM                                         | HY57V641620ETP-7,TSOP54                  | 1   | U24          |                                                                       |
| 0146ICEM11B416256A | IC, EliteMT, DRAM                                        | M11B416256A-25J,SOJ40                    | 1   | U38          |                                                                       |
| 01.44.IC.S.E5888   | IC, Rohm, Actuator driver                                | BA5888FP, HSOP-28                        | 1   | U28          |                                                                       |
| 01.44.IC.S.E1955   | IC,ADI, DAC                                              | AD1955, SSOP28                           | 2   | U11 U3       |                                                                       |
| 01.46.IC.E7414     | IC, Philips, Hex inverting Schmitt trigger               | 74HCT14D,SOIC14                          | 1   | U39          |                                                                       |
| 01.44.ICSE74LVC125 | IC, TI, quadruple Bus Buffer Gate                        | SN74LVC125ADR, SOIC14                    | 1   | U12          |                                                                       |
| 01.46ICESN74LV74DR | IC, TI, D-Type Trigger                                   | SN74LV74ADR, SOIC8                       | 1   | U40          |                                                                       |
| 01.46.IC.E74HCT245 | IC,TI,TTL input buffer                                   | SN74HCT245PWR,TSSOP20                    | 1   | U26          |                                                                       |
| 0146ICESN74LVC244A | IC, TI, Octal Buffers/Drives                             | SN74LVC244APWR, TSSOP20                  | 1   | U41          |                                                                       |
| 01.44.IC.D.EPC817C | IC, Sharp, Photoelectric Coupler                         | PC817,DIP4                               | 1   | U20          |                                                                       |
| 01.44.IC.S.E1117   | IC, AAC, LDO                                             | AZ1117H-ADJ, SOT-223                     | 2   | U30 U32      |                                                                       |
| 01.44.ICSEA11173V3 | IC, AAC, LDO                                             | AZ1117H-3.3, SOT-223                     | 1   | U29          |                                                                       |
| 01.44.IC.SELM393   | IC, ST, Comparator                                       | LM393, SOP8                              | 1   | U27          |                                                                       |
| 01.44.IC.SETL072CD | IC, TI, opamp                                            | TL072CD, SOIC8                           | 2   | U8 U4        |                                                                       |
| 0144ICSETPS73033DB | IC, TI, LDO                                              | TPS73033DBVR, DBV5                       | 1   | U17          |                                                                       |
| 01.44.IC.S.E9022   | IC, NS, Vacuum Fluorescent Display Filament Driver       | LM9022, SO8                              | 1   | U25          |                                                                       |
| 01.44.IC.S.E3522   | IC, AAT, Reset monitor                                   | AAT3522, SOT_23                          | 1   | U31          |                                                                       |
| 01.46.ICECS8416CZZ | IC, Cirrus Logic, Digital Audio Interface Receiver       | CS8416-CZZ, TSSOP28                      | 1   | U10          |                                                                       |
| 01.46.ICEAD8663ARZ | IC, ADI, opamp                                           | AD8663ARZ, SOIC8                         | 3   | U33 U34 U35  |                                                                       |
| 0146ICEICS83905AGT | IC, ICS, Crystal Interface-TO-LVCMOS/LVTTL Fanout Buffer | ICS83905AGT, TSSOP16                     | 1   | U14          |                                                                       |
| 01.44.IC.S.E2134   | IC, TI, opamp                                            | OPA2134UA, SOIC8                         | 2   | U2 U6        |                                                                       |
| 01.44.IC.S.E275    | IC, ADI, opamp                                           | OP275GS, SOIC8                           | 2   | U1 U5        |                                                                       |
| 0146ICESN65LVDS2DB | IC, TI, Differential Receiver                            | SN65LVDS2DBVR, DBV5                      | 1   | U15          |                                                                       |
| 01.40.CON.DCZ.E121 | Jack, IR in/out jack                                     | SCJ351P00XS0B00 (BLACK), In-line Package | 1   | JP7          |                                                                       |
| 01.40.CON.DCZ.E046 | Jack, Audio output jack                                  | AV2-8.4-1G                               | 1   | JP1          | Antiflaming,Down<br>red & up white, Gold-plated jack                  |
| 01.40.CON.DPH.E000 | Connector                                                | PH-2A                                    | 1   | CN7          | Antiflaming                                                           |
| 01.40.CON.DPH.E024 | Connector                                                | PH-5A                                    | 1   | CN3          | Antiflaming                                                           |
| 01.40.CON.DPH.E028 | Connector                                                | PH-6A                                    | 1   | CN4          | Antiflaming                                                           |
| 01.40.CON.DPH.E047 | Connector                                                | PH-13A                                   | 1   | CN5          | Antiflaming                                                           |
| 01.40.CON.S05.E007 | FPC connector                                            | FPC-0.5-24P with upward touch            | 1   | CN2          | SMD                                                                   |
| 0140CONS05FPC2E002 | FPC connector                                            | 1.25-14P                                 | 1   | CN1          | Vertical Type                                                         |
| 01.40.CON.DCZ.E808 | HRS-Link Jack                                            | PCB-109 DIP                              | 1   | JP6          |                                                                       |
| 01.40CONDDZEHDY9M4 | XLR Jack                                                 | HDY-9M-4 DIP                             | 2   | JP2 JP3      |                                                                       |
| 01.40.CON.DCZ.E799 | AV/Optical Reciver Jack                                  | TC58-655-52G DIP                         | 1   | JP4          |                                                                       |
| 01.40.CON.DCZ.E800 | AV/Optical Output Jack                                   | TC58-655-02G DIP                         | 1   | JP5          |                                                                       |
| 01.37.PCB.2.E5604C | 5604C                                                    | Main Board                               | 1   |              |                                                                       |

**HD990 Components List for Key Board (5575C01)**

| P/N                | Description                         | Specification            | Qty | Location.No.                            | Note             |
|--------------------|-------------------------------------|--------------------------|-----|-----------------------------------------|------------------|
| 01.57.R.3.E000J    | Resistor, chip                      | 0805-0Ω ±5%              | 1   | R414 R415                               |                  |
| 01.57.R.3.E241J    | Resistor, chip                      | 0805-240Ω±5%             | 1   | R412                                    |                  |
| 01.57.R.3.E471J    | Resistor, chip                      | 0805-470Ω±5%             | 1   | R404                                    |                  |
| 01.57.R.3.E821J    | Resistor, chip                      | 0805-820Ω±5%             | 1   | R413                                    |                  |
| 01.57.R.3.E472J    | Resistor, chip                      | 0805-4.7KΩ±5%            | 8   | R402 R403 R406 R407 R408 R409 R410 R411 |                  |
| 01.57.R.3.E153J    | Resistor, chip                      | 0805-15KΩ±5%             | 1   | R401                                    |                  |
| 01.54.CS.3E220N50V | Capacitor, multilayer ceramic, chip | 0805-22P NPO±5%/50V      | 2   | C402 C403                               |                  |
| 01.54.CS.3E104Y50V | Capacitor, multilayer ceramic, chip | 0805-104 Y5V+80-20%/50V  | 3   | C404 C405 C406                          |                  |
| 01.54.CS.3E225Y16V | Capacitor, multilayer ceramic, chip | 0805-225 Y5V-20+80%/16V  | 1   | C401                                    |                  |
| 01.34.CLDE100U10VA | Capacitor, AL.electrolytic          | CDV-100UF/10V 5*5        | 2   | CE401 CE402                             |                  |
| 01.41.D.PS.ELL4148 | Diode                               | LL4148 SMD               | 1   | D401                                    |                  |
| 01.41.DFDE1L0392A2 | LED, color is orange & white,DIP    | 1L0392A2W32CM002         | 1   | LED401                                  |                  |
| 01.42.Q.S.E8050    | Transistor                          | KTC8050 SMD              | 1   | Q402                                    | SOT-23           |
| 01.42.Q.S.EC8550   | Transistor                          | KTC8550 SMD              | 1   | Q401                                    | SOT-23           |
| 01.00.JZ.E04000    | Quartz Crystal Unit                 | 4.000MHZ-49S-22P         | 1   | Y401                                    |                  |
| 01.46.IC.E78P156   | IC, ELAN, MCU                       | EM78P156ELM,SOIC18       | 1   | U401                                    | firmware burn-in |
| 01.44.IC.D.E0038B  | IC, IR receiver                     | HS0038B                  | 1   | IR401                                   |                  |
| 01.39.SW.QC.ED665A | Touch switch                        | 6*6*5(80g)               | 7   | K401 K402 K403 K404 K405 K406 K407      | DIP              |
| 0140CONS13AY1E011  | Connector                           | 1.25-6A(Horizontal Type) | 1   | (CN403)                                 | DIP              |

**HD990 Components List for Key Board (5575C01)**

| P/N                | Description | Specification | Qty | Location.No. | Note        |
|--------------------|-------------|---------------|-----|--------------|-------------|
| 01.40.CON.DTJ.E024 | Connector   | TJC3-3A       | 1   | (CN404)      | Antiflaming |
| 01.37.PCB.2.E5575C | 5575C       | Key board     | 1   |              | 2-layers    |

**HD990 Components List for VFD Board (5576C01)**

| P/N                | Description                         | Specification                              | Qty | Location.No.   | Note     |
|--------------------|-------------------------------------|--------------------------------------------|-----|----------------|----------|
| 01.57.R.3.E103J    | Resistor, chip                      | 0805-10K $\Omega$ $\pm$ 5%                 | 1   | (R415)         |          |
| 01.57.R.3.E203J    | Resistor, chip                      | 0805-20K $\Omega$ $\pm$ 5%                 | 1   | (R414)         |          |
| 01.54.CS.3E300N50V | Capacitor, multilayer ceramic, chip | 0805-30P NPO $\pm$ 5%/50V                  | 1   | (C411)         |          |
| 01.54.CS.3E473X50V | Capacitor, multilayer ceramic, chip | 0805-473 X7R $\pm$ 10%/50V                 | 2   | (C407) ( C415) |          |
| 01.54.CS.3E104Y50V | Capacitor, multilayer ceramic, chip | 0805-104 Y5V+80-20%/50V                    | 2   | (C408 ) (C409) |          |
| 01.54.CS.3E225Y16V | Capacitor, multilayer ceramic, chip | 0805-225 Y5V-20+80%/16V                    | 1   | (C410)         |          |
| 01.34.CL.DE47U16VB | Capacitor, AL.electrolytic          | CD11X-47UF/16V 5*7                         | 1   | (CE403)        |          |
| 01.41.D.PS.ELL4148 | Diode                               | LL4148 SMD                                 | 1   | (D402)         |          |
| 01.44.IC.S.E75711  | IC, SANYO, VFD Driver               | LC75711NE,QFP64E                           | 1   | (U402)         |          |
| 01.16.E1302FA      | VFD                                 | VFD22-1302FA                               | 1   | VFD401         |          |
| 01.39.SW.QC.ED665A | Touch switch                        | 6*6*5(80g)                                 | 1   | K408           | DIP      |
| 01.40CONS13AY1E011 | Connector                           | 1.25-6A(Horizontal Type)                   | 1   | (CN403)        | DIP      |
| 0140CONS13FPC2E002 | FPC connector                       | 1.25-14P(Vertical Type and Single Contact) | 1   | (CN401)        |          |
| 01.37.PCB.2.E5576C | 5576C                               | VFD board                                  | 1   |                | 2-layers |

**HD990 Components List for SMPS Board (1254C01)**

| P/N                | Description                            | Specification                             | Qty | Location.No.            | Note                     |
|--------------------|----------------------------------------|-------------------------------------------|-----|-------------------------|--------------------------|
| 01.57.R.C.ED100    | FIXED CARBON FILM                      | RT1/4W-10 $\Omega$                        | 2   | R4,R6                   |                          |
| 01.57.R.C.ED470    | FIXED CARBON FILM                      | RT1/4W-47 $\Omega$                        | 1   | R21                     |                          |
| 01.57.R.C.ED101    | FIXED CARBON FILM                      | RT1/4W-100 $\Omega$                       | 1   | R16                     |                          |
| 01.57.R.C.ED221    | FIXED CARBON FILM                      | RT1/4W-220 $\Omega$                       | 3   | R13,R19,R20             |                          |
| 01.57.R.C.ED681    | FIXED CARBON FILM                      | RT1/4W-680 $\Omega$                       | 1   | R14                     |                          |
| 01.57.R.C.ED102    | FIXED CARBON FILM                      | RT1/4W-1K $\Omega$                        | 1   | R26                     |                          |
| 01.57.R.C.ED222    | FIXED CARBON FILM                      | RT1/4W-2.2K $\Omega$                      | 3   | R17,R18,R22             |                          |
| 01.57.R.C.ED512    | FIXED CARBON FILM                      | RT1/4W-5.1K $\Omega$                      | 3   | R23,R24,R25             |                          |
| 01.57.R.C.ED103    | FIXED CARBON FILM                      | RT1/4W-10K $\Omega$                       | 1   | R15                     |                          |
| 01.57.R.C.ED473    | FIXED CARBON FILM                      | RT1/4W-47K $\Omega$                       | 1   | R5                      |                          |
| 01.57.R.C.EF683    | FIXED CARBON FILM                      | RT1W-68K $\Omega$ 5%                      | 1   | R2                      |                          |
| 01.57.R.C.EF364    | FIXED CARBON FILM                      | RT1W-360K $\Omega$                        | 1   | R3                      |                          |
| 01.57.R.C.ED105    | FIXED CARBON FILM                      | RT1/4W-1M $\Omega$                        | 1   | R1                      |                          |
| 01.57.R.R.E5D9     | Thermistor                             | NTC-5D-9                                  | 1   | NTC                     |                          |
| 01.57.R.Y.E10K     | Varistor                               | 10K.471                                   | 1   | RV1                     |                          |
| 01.00.CDGYE104275V | High-voltage metallized polyester film | 104/275V X2(lead pitch: 15mm)             | 1   | CX1                     |                          |
| 01.00.CDGYE471400V | High-voltage metallized polyester film | 471/400V Y1(lead pitch:10mm)              | 2   | CY1,CY2                 |                          |
| 01.00.CDGYE102400V | High-voltage metallized polyester film | 102/400V Y1(lead pitch:10mm)              | 1   | CY3                     |                          |
| 01.00.CD.CPE1031KV | High-voltage metallized polyester film | 103/1KV(lead pitch:7.5mm)                 | 1   | C1                      |                          |
| 01.00.CDDSE473/50V | RADIAL LEADS MLCC                      | 473/50V X7R $\pm$ 10% (lead pitch:5.08mm) | 2   | C2,C13                  |                          |
| 01.00.CD.DS.E683   | RADIAL LEADS MLCC                      | 683/50V X7R $\pm$ 10% (lead pitch:5.08mm) | 1   | C3                      |                          |
| 01.00.CD.DSE10450V | RADIAL LEADS MLCC                      | 104/50V X7R $\pm$ 10% (lead pitch:5.08mm) | 6   | C10 C11 C12 C14 C15 C16 |                          |
| 01.34.CLDE4U7160VD | CAPACITOR,AL.ELECTROLYTIC              | CD288H-4.7UF/160V 8*12                    | 1   | EC3                     | CAPXON<br>KF4R7M160F115A |
| 01.34.CLDEH2U250VC | CAPACITOR,AL.ELECTROLYTIC              | CD288H-2.2UF/50V 5*11                     | 1   | EC22                    | CAPXON<br>GF2R2M050C110A |
| 01.34.CLDEH4U25VD  | CAPACITOR,AL.ELECTROLYTIC              | KM470M025C110AP                           | 2   | EC17,EC18               | CAPXON<br>GF470M025C110A |
| 01.34.CLDEH4U50VD  | CAPACITOR,AL.ELECTROLYTIC              | GF470M050E110A                            | 1   | EC2                     | CAPXON<br>GF470M050E110A |
| 01.34.CLDE47U400VG | CAPACITOR,AL.ELECTROLYTIC              | CD288H-47UF/400V 18*20                    | 1   | EC1                     | CAPXON<br>KM470M400K210A |
| 0134CLDE288100U25V | CAPACITOR,AL.ELECTROLYTIC              | GF101M025E110A                            | 2   | EC11,EC12               | CAPXON<br>GF101M025E110A |
| 0134CLDE288220U16V | CAPACITOR,AL.ELECTROLYTIC              | CD288H-220UF/16V 6.3*12                   | 4   | EC5,EC6,EC16,EC21       | CAPXON<br>GF221M016E110A |
| 0134CLDE288220U25V | CAPACITOR,AL.ELECTROLYTIC              | CD288H-220UF/25V 8*12                     | 4   | EC9,EC10,EC14,EC15      | CAPXON<br>GF221M025F115A |
| 01.34CLDEH470U16VD | CAPACITOR,AL.ELECTROLYTIC              | GF471M016F115A                            | 1   | EC4                     | CAPXON<br>GF471M016F115A |
| 01.34CLDE1000U16VG | CAPACITOR,AL.ELECTROLYTIC              | CD288H-1000UF/16V 10*20                   | 2   | EC19,EC20               | CAPXON<br>GF102M015G160A |
| 01.13.L.L.D.E090   | Pulse transformer,Coilcraft            | L520-10UH                                 | 1   | L7                      |                          |
| 01.13.L.L.D.E005   | Bead, leaded fixed                     | LH0810-20UH                               | 1   | L6                      |                          |
| 01.13.L.L.D.E051   | Bead, leaded fixed                     | LH0608-22UH                               | 4   | L3,L4,L5,L8             |                          |
| 01.13.L.L.D.E086   | Common Mode Choke                      | LCL- ET20-010(50MH)                       | 1   | LF1                     | FLY, FuZhou              |
| 01.41.D.PD.EIN4001 | Diode                                  | IN4001,SOD81                              | 1   | D17                     |                          |
| 01.41.D.PD.EIN4007 | Diode                                  | IN4007,SOD81                              | 4   | D1,D2,D3,D4             |                          |
| 01.41.D.PD.EFR104  | Diode                                  | FR104, In-line Package                    | 5   | D6,D8,D10,D11,D13       |                          |
| 01.41.D.PD.EFR107  | Diode                                  | FR107, In-line Package                    | 1   | D7                      |                          |
| 01.41.D.PD.EIN4148 | Diode                                  | IN4148,DO-35                              | 3   | D14,D16,D18             |                          |
| 01.41.D.PD.E21DQ10 | Diode                                  | 21DQ10, In-line Package                   | 1   | D12                     |                          |
| 01.41.D.PD.E31DQ06 | Diode                                  | 31DQ06, In-line Package                   | 1   | D15                     |                          |
| 01.41.D.PD.E1U08   | Diode                                  | 1U08, In-line Package                     | 1   | D5                      |                          |

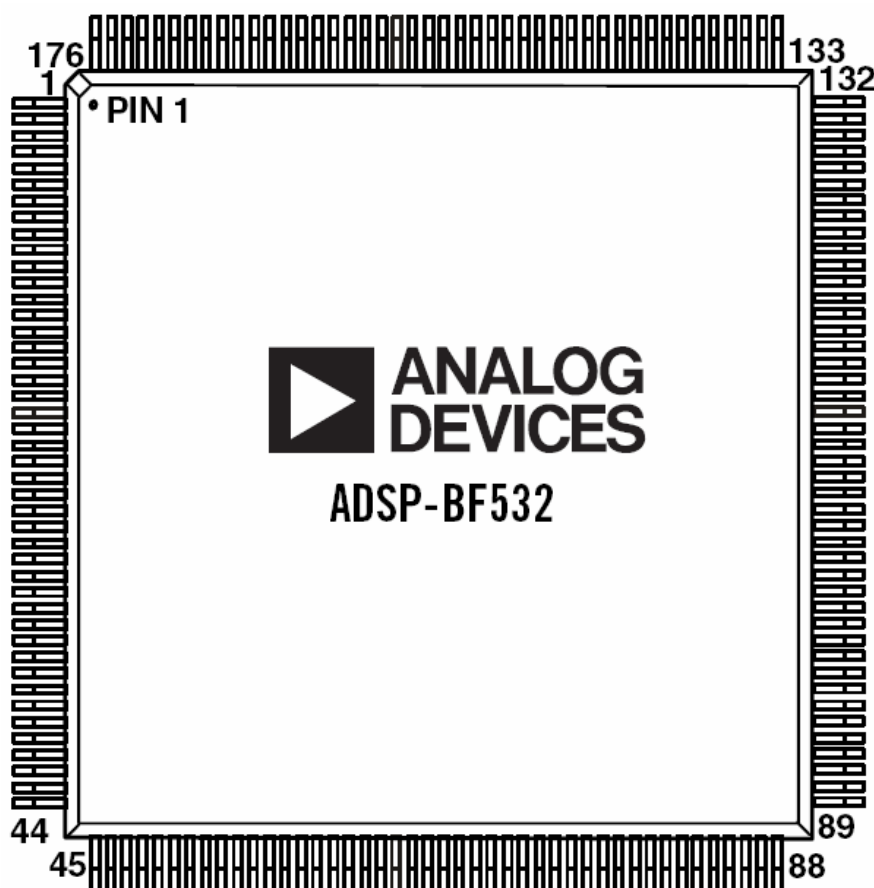
**HD990 Components List for SMPS Board (1254C01)**

| P/N                | Description                           | Specification                           | Qty | Location.No. | Note        |
|--------------------|---------------------------------------|-----------------------------------------|-----|--------------|-------------|
| 01.41.D.WD.E16V    | Zener Diode                           | 16V, In-line Package                    | 1   | ZD1          |             |
| 01.41.D.WD.E18V    | Zener Diode                           | 18V, In-line Package                    | 1   | ZD2          |             |
| 01.42.Q.D.E5551    | Transistor                            | 2N5551, TO-92                           | 1   | Q1           |             |
| 01.42.Q.D.E8550    | Transistor                            | KTC8550-C/P, TO-92                      | 1   | Q3           |             |
| 01.42.Q.D.E9014    | Transistor                            | C9014, TO-92                            | 1   | Q2           |             |
| 01.44.IC.D.EMCR100 | Silicon Controlled Rectifiers         | MCR100-6, TO-92                         | 1   | SC1          |             |
| 01.44.IC.D.E2659R  | IC, FAIRCHILD, FPS                    | KA5M02659R, DIP8                        | 1   | IC1          |             |
| 01.44.IC.DEAZ431AZ | IC, AAC, Adjustable Shunt Regulator   | AZ431AZ-AE1TR, TO-92                    | 1   | IC2          |             |
| 01.44.IC.D.EBA33   | IC, ROHM, Dropout Voltage Regulator   | BA33BCO, TO-220                         | 1   | IC6          |             |
| 01.44.IC.D.ELM317T | IC, NS, Positive Adjustable Regulator | LM317T, TO-220                          | 1   | IC5          |             |
| 01.44.IC.D.EL7805  | IC, ST, Voltage Regulator             | L7805, TO-220                           | 1   | IC3          |             |
| 01.44.IC.D.EPC817C | IC, Sharp, Photoelectric Coupler      | PC817, DIP4                             | 1   | PH1          |             |
| 01.40.CON.DCZ.E131 | Fuse Holder                           | BLX-2A                                  | 1   | FU1          | Antiflaming |
| 01.38.FUSEDE1A250V | Fuse                                  | T1A/250V                                | 1   | FU1          |             |
| 01.13.L.R.E059     | Switching Power Transformer           | BCK-EC2802                              | 1   | TR1          | FLY, FuZhou |
| 01.40.CON.DCZ.E129 | Connector                             | Vertical VH three holes two pins(white) | 2   | JP1          | Antiflaming |
| 01.40.CON.DTJ.E024 | Connector                             | TJC3-3A                                 | 1   | CN1          | Antiflaming |
| 01.40.CON.DTJ.E002 | Connector                             | TJC3-13A                                | 1   | CN2          | Antiflaming |
| 01.00.WJ.TJ.E496   | Radiator                              | 12*16*23mm                              | 1   | for IC3      | Antiflaming |
| 01.00.WJ.QT.E041   | 3pins grounding piece                 | M4                                      | 4   | G1,G2,G3,G4  |             |
| 01.00.FZ.ZZ.E009   | Jumper                                | 5mm                                     | 2   | JP3,JP5      |             |
| 01.00.FZ.ZZ.E002   | Jumper                                | 7.5mm                                   | 2   | JP7,JP8,JP2  |             |
| 01.00.FZ.ZZ.E003   | Jumper                                | 10mm                                    | 1   | JP4          |             |
| 01.00.FZ.ZZ.E010   | Jumper                                | 15mm                                    | 1   | JP6          |             |
| 01.37.PCB.1.E1254C | 1254C                                 | SMPS board                              | 1   |              | 1-layer     |

**HD990 Components List for Remote Control Include Circuits Board(1782C)**

| P/N                | Description                                | Specification                  | Qty | Location.No.                        | Note |
|--------------------|--------------------------------------------|--------------------------------|-----|-------------------------------------|------|
| 01.00.WJ.TH.E183   | Anode Spring                               |                                | 1   | same as DVD25                       |      |
| 01.00.WJ.TH.E184   | Cathode Spring                             |                                | 1   | same as DVD25                       |      |
| 01.00.WJ.TH.E185   | Double role spring                         |                                | 1   | same as DVD25                       |      |
| 01.00.SJ.HD990E001 | Remote Control Top Case                    |                                | 1   | HD990 (tooling same as HD970)       |      |
| 01.00.SJ.HD980E001 | Remote Control Bottom Case                 |                                | 1   | HD980 (tooling same as HD970)       |      |
| 01.00.SJ.HD980E002 | Cover for battery case                     |                                | 1   | HD980 (tooling same as HD970)       |      |
| 01.00.BP.QT.E1186  | RC indication plate (upper)                |                                | 1   | HD990                               |      |
| 01.00.BP.QT.E1075  | RC indication plate (nether)               |                                | 1   | HD980                               |      |
| 01.00.DD.QT.E012   | RC conductive rubber (upper)               |                                | 1   | same as HD970                       |      |
| 01.00.DD.QT.E117   | RC conductive rubber (nether)              |                                | 1   | same as HD970                       |      |
| 01.57.R.4.E010J    | Resistor, chip                             | 1206-1Ω±5%                     | 1   | R1                                  |      |
| 01.57.R.3.E221J    | Resistor, chip                             | 0805-220Ω±5%                   | 1   | R2                                  |      |
| 01.54.CS.3.E101N   | Capacitor, multilayer ceramic, chip        | 0805-100P NPO±5%/50V           | 2   | C3 C4                               |      |
| 01.54.CS.3.E104Y   | Capacitor, multilayer ceramic, chip        | 0805-104 Y5V+80-20%/50V        | 1   | C2                                  |      |
| 01.34.CLDE100U10VB | Capacitor,AL.electrolytic                  | CD11X-100UF/10V 5*7            | 1   | C1                                  | 5*7  |
| 01.44.IC.S.E970    | IC, Princeton Technology Corp., IR encoder | HD970, SMD                     | 1   | U1                                  |      |
| 01.41.D.PS.ELL4148 | Diode                                      | LL4148, DO213AA                | 8   | D1 D2 D3 D4 D5 D6 D7 D8             |      |
| 01.42.Q.S.E8050    | Transistor,CHIP                            | KTC8050, SOT-23                | 1   | Q1                                  |      |
| 01.41.D.FD.EHIR305 | Transmitting diode                         | HIR305CAP, 2P, In-line Package | 1   | LED                                 |      |
| 01.00.ZJ.TXQ.E009  | Ceramic Resonator                          | Z455E, 2P, In-line Package     | 1   | X1                                  |      |
| 02.25.HD9701782C   | 1782C                                      |                                | 1   | Remote control board(same as HD970) |      |

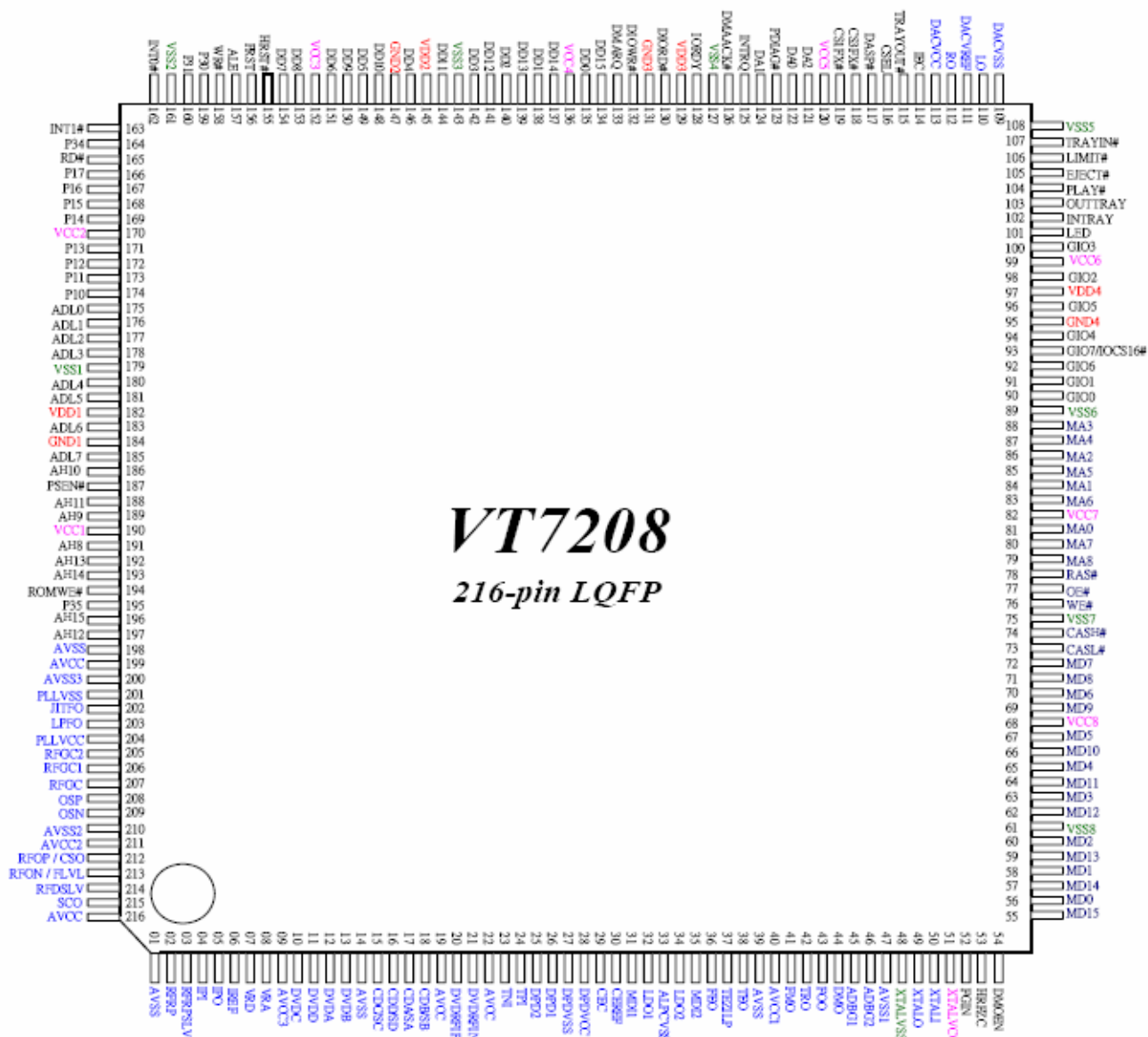
## ADSP-BF532SBSTZ400 LQFP176



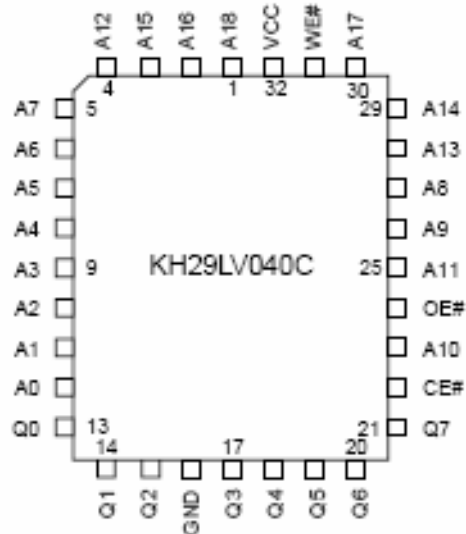
176-Lead LQFP Pin Assignment (Numerically by Lead Number)

| Lead No. | Signal  | Lead No. | Signal | Lead No. | Signal | Lead No. | Signal | Lead No. | Signal |
|----------|---------|----------|--------|----------|--------|----------|--------|----------|--------|
| 1        | GND     | 41       | GND    | 81       | TX     | 121      | ADDR19 | 161      | AMS0   |
| 2        | GND     | 42       | GND    | 82       | RX     | 122      | ADDR18 | 162      | ARDY   |
| 3        | GND     | 43       | GND    | 83       | EMU    | 123      | ADDR17 | 163      | BR     |
| 4        | VROUT1  | 44       | GND    | 84       | TRST   | 124      | ADDR16 | 164      | SA10   |
| 5        | VROUT0  | 45       | VDDEXT | 85       | TMS    | 125      | ADDR15 | 165      | SWE    |
| 6        | VDDEXT  | 46       | PFS    | 86       | TDI    | 126      | ADDR14 | 166      | SCAS   |
| 7        | GND     | 47       | PF4    | 87       | TDO    | 127      | ADDR13 | 167      | SRAS   |
| 8        | GND     | 48       | PF3    | 88       | GND    | 128      | GND    | 168      | VDDINT |
| 9        | GND     | 49       | PF2    | 89       | GND    | 129      | GND    | 169      | CLKOUT |
| 10       | CLKIN   | 50       | PF1    | 90       | GND    | 130      | GND    | 170      | GND    |
| 11       | XTAL    | 51       | PF0    | 91       | GND    | 131      | GND    | 171      | VDDEXT |
| 12       | VDDEXT  | 52       | VDDINT | 92       | GND    | 132      | GND    | 172      | SMS    |
| 13       | RESET   | 53       | SCK    | 93       | VDDEXT | 133      | GND    | 173      | SCKE   |
| 14       | NMI     | 54       | MISO   | 94       | TCK    | 134      | VDDEXT | 174      | GND    |
| 15       | GND     | 55       | MOSI   | 95       | BMODE1 | 135      | ADDR12 | 175      | GND    |
| 16       | RTX0    | 56       | GND    | 96       | BMODE0 | 136      | ADDR11 | 176      | GND    |
| 17       | RTX1    | 57       | VDDEXT | 97       | GND    | 137      | ADDR10 |          |        |
| 18       | VDDRTC  | 58       | DT1SEC | 98       | DATA15 | 138      | ADDR9  |          |        |
| 19       | GND     | 59       | DT1PRI | 99       | DATA14 | 139      | ADDR8  |          |        |
| 20       | VDDEXT  | 60       | TF51   | 100      | DATA13 | 140      | ADDR7  |          |        |
| 21       | PPL_CLK | 61       | TSCLK1 | 101      | DATA12 | 141      | ADDR6  |          |        |
| 22       | PP10    | 62       | DR1SEC | 102      | DATA11 | 142      | ADDR5  |          |        |
| 23       | PP11    | 63       | DR1PRI | 103      | DATA10 | 143      | VDDINT |          |        |
| 24       | PP12    | 64       | RFS1   | 104      | DATA9  | 144      | GND    |          |        |
| 25       | VDDINT  | 65       | RSCLK1 | 105      | DATA8  | 145      | VDDEXT |          |        |
| 26       | PP13    | 66       | VDDINT | 106      | GND    | 146      | ADDR4  |          |        |
| 27       | PF15    | 67       | DT0SEC | 107      | VDDEXT | 147      | ADDR3  |          |        |
| 28       | PF14    | 68       | DT0PRI | 108      | DATA7  | 148      | ADDR2  |          |        |
| 29       | PF13    | 69       | TF50   | 109      | DATA6  | 149      | ADDR1  |          |        |
| 30       | GND     | 70       | GND    | 110      | DATA5  | 150      | ABET   |          |        |
| 31       | VDDEXT  | 71       | VDDEXT | 111      | VDDINT | 151      | ABE0   |          |        |
| 32       | PF12    | 72       | TSCLK0 | 112      | DATA4  | 152      | ABE1   |          |        |
| 33       | PF11    | 73       | DR0SEC | 113      | DATA3  | 153      | ARE    |          |        |
| 34       | PF10    | 74       | DR0PRI | 114      | DATA2  | 154      | AOE    |          |        |
| 35       | PF9     | 75       | RFS0   | 115      | DATA1  | 155      | GND    |          |        |
| 36       | PF8     | 76       | RSCLK0 | 116      | DATA0  | 156      | VDDEXT |          |        |
| 37       | PF7     | 77       | TMR2   | 117      | GND    | 157      | VDDINT |          |        |
| 38       | PF6     | 78       | TMR1   | 118      | VDDEXT | 158      | AMS3   |          |        |
| 39       | GND     | 79       | TMR0   | 119      | BG     | 159      | AMS2   |          |        |
| 40       | GND     | 80       | VDDINT | 120      | BGH    | 160      | AMST   |          |        |

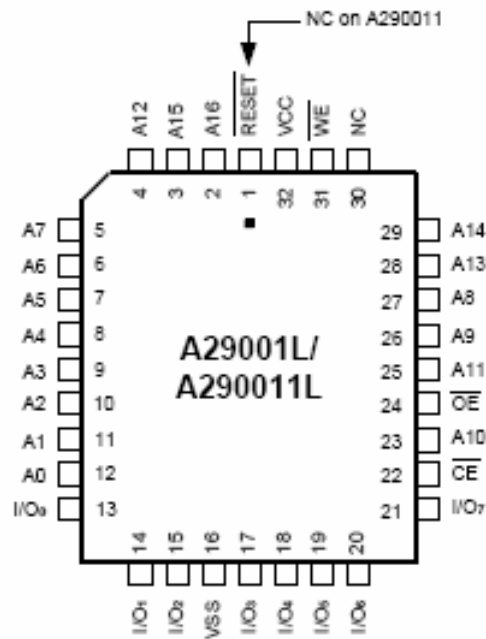
# VT7208 LQFP 216



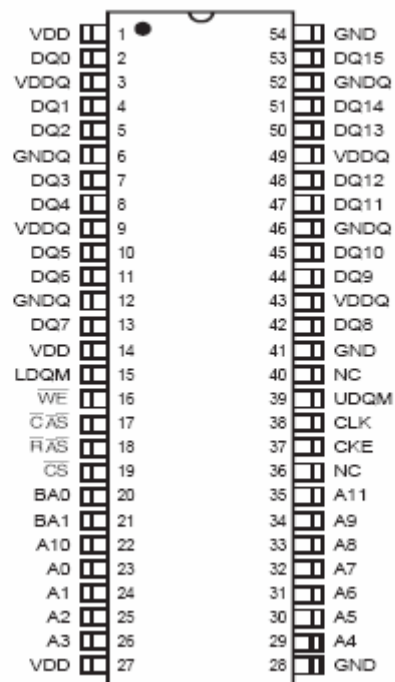
## KH29LV040CQC-70G PLCC-32



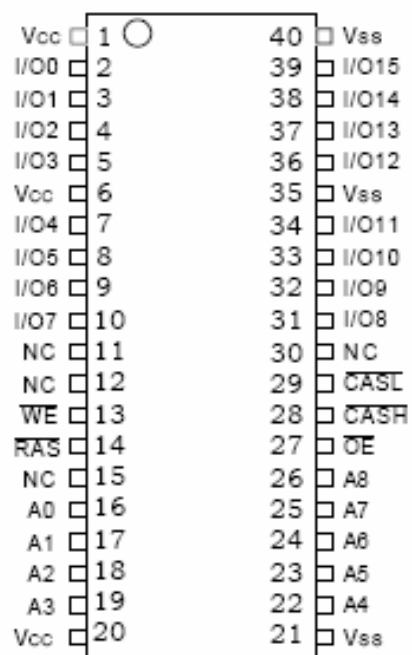
## A290011TL-70 PLCC-32



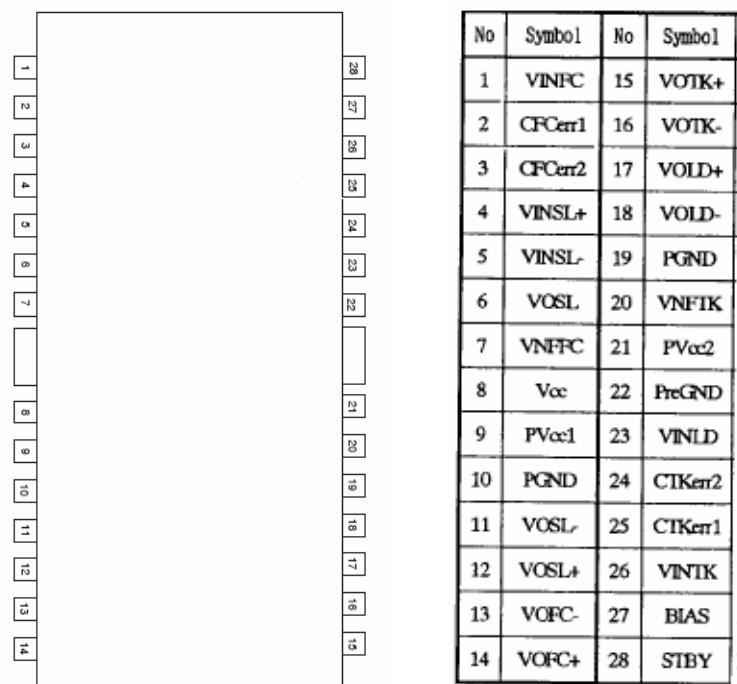
# HY57V641620ETP-7 TSSOP-54



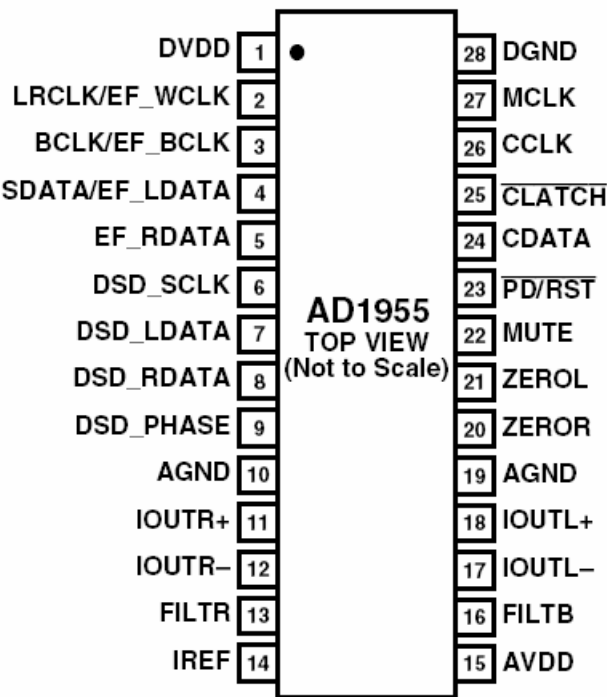
# M11B416256A SOJ-40



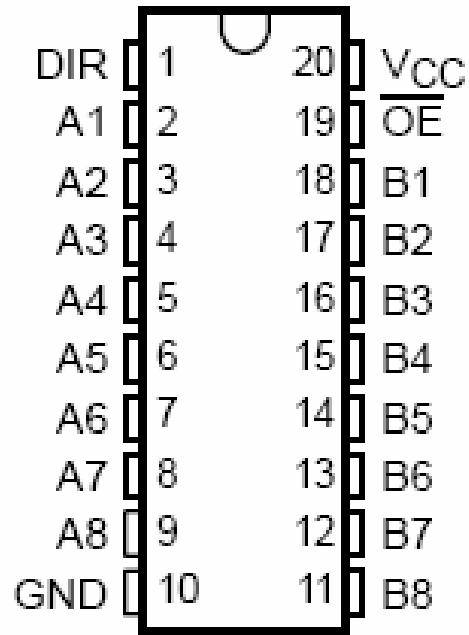
BA5888FP    HSOP-28



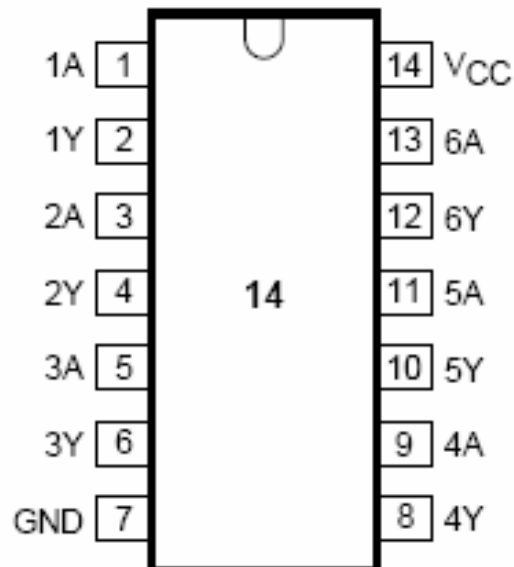
AD1955    SSOP-28



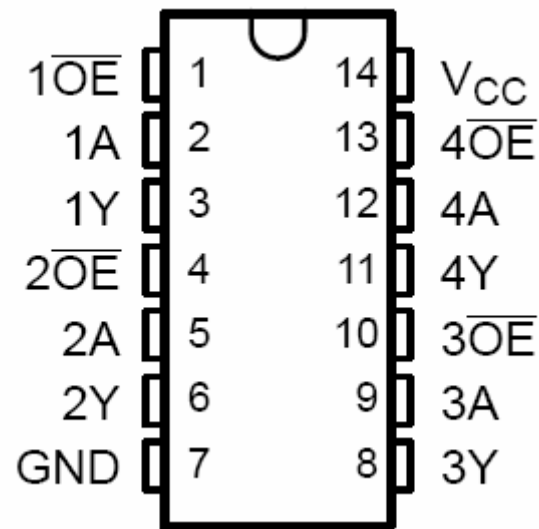
## SN74HCT245PWR TSSOP-20



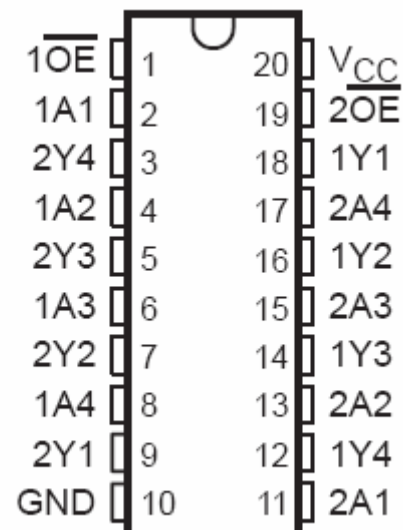
## 74HCT14D SOIC14



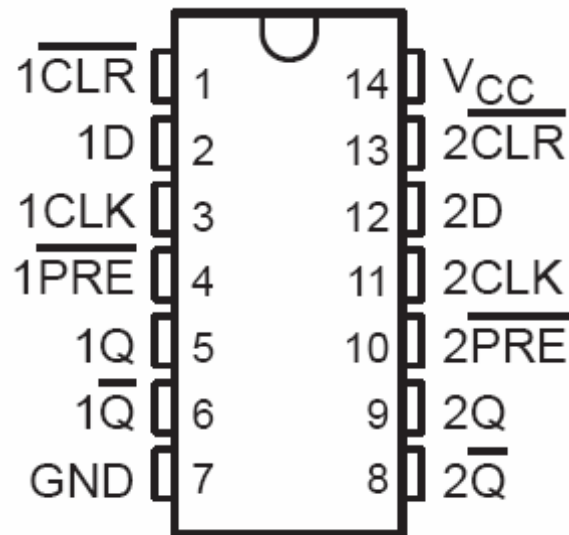
# SN74LVC125ADR SOIC8



# SN74LVC244APWR TSSOP20

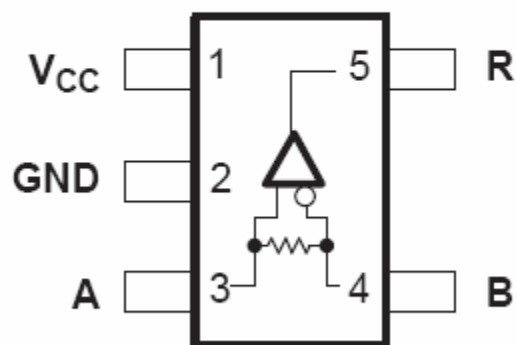


## SN74LV74ADR SOIC14



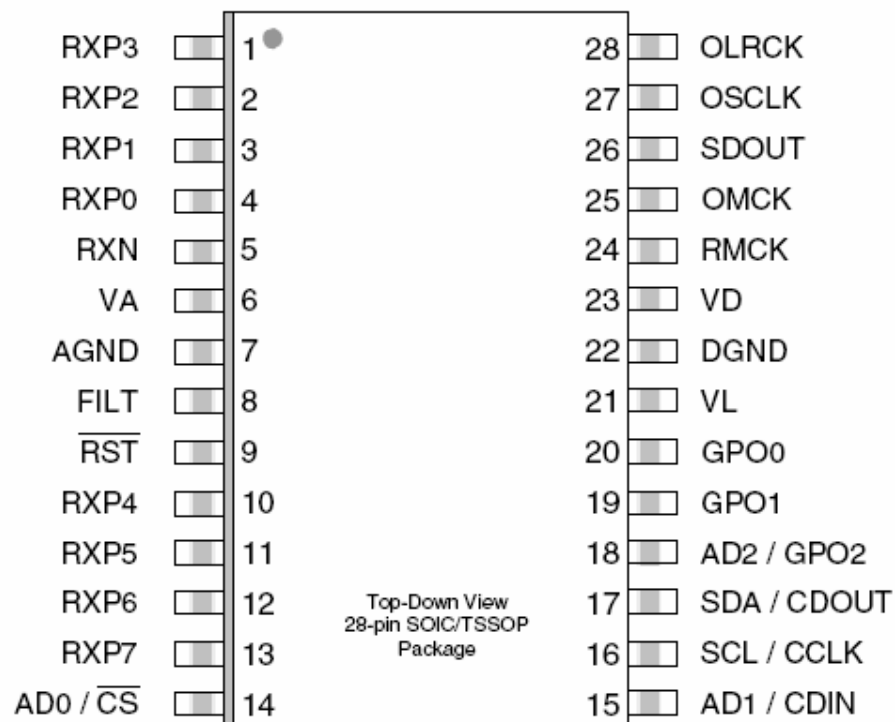
## SN65LVDS2DBVR DBV5

### SN65LVDS2 and SN65LVDT2 DBV Package (TOP VIEW)

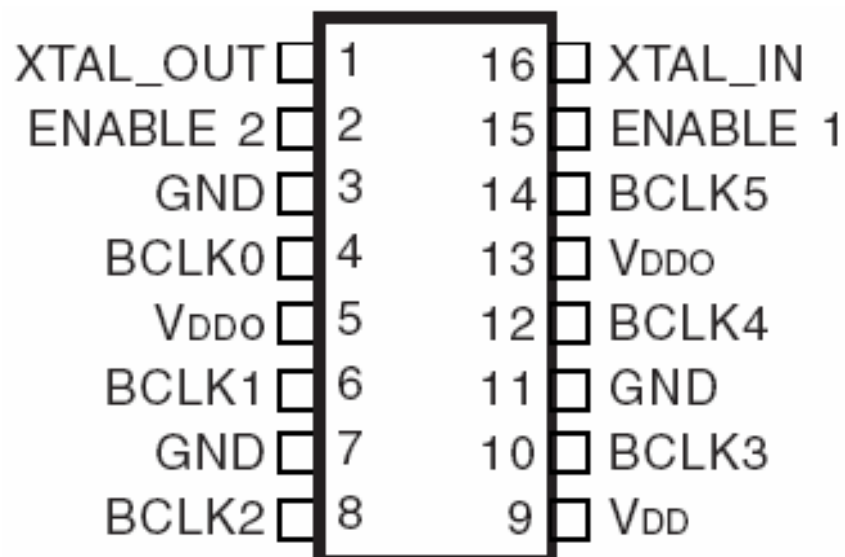


110- $\Omega$  Resistor for LVDT Only

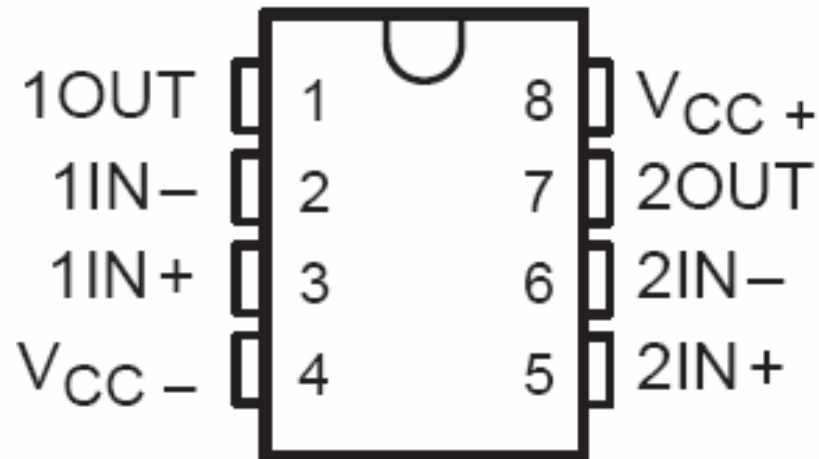
## CS8416-CZZ TSSOP28



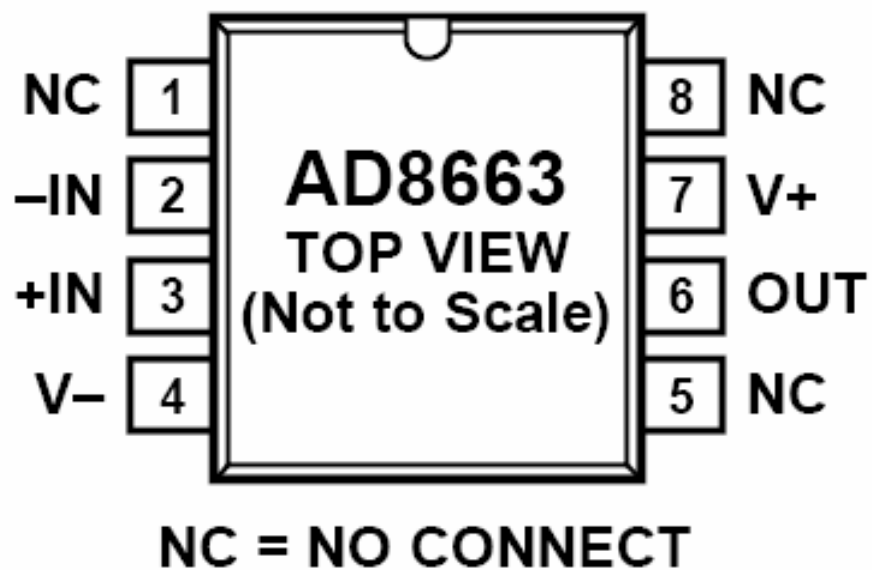
## ICS83905AGT TSSOP16



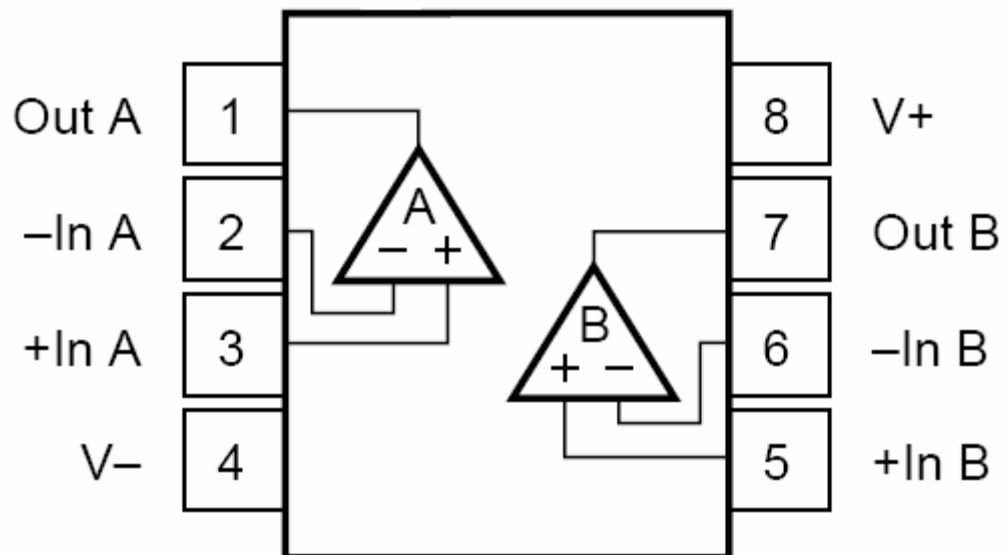
## TL072CD SO8



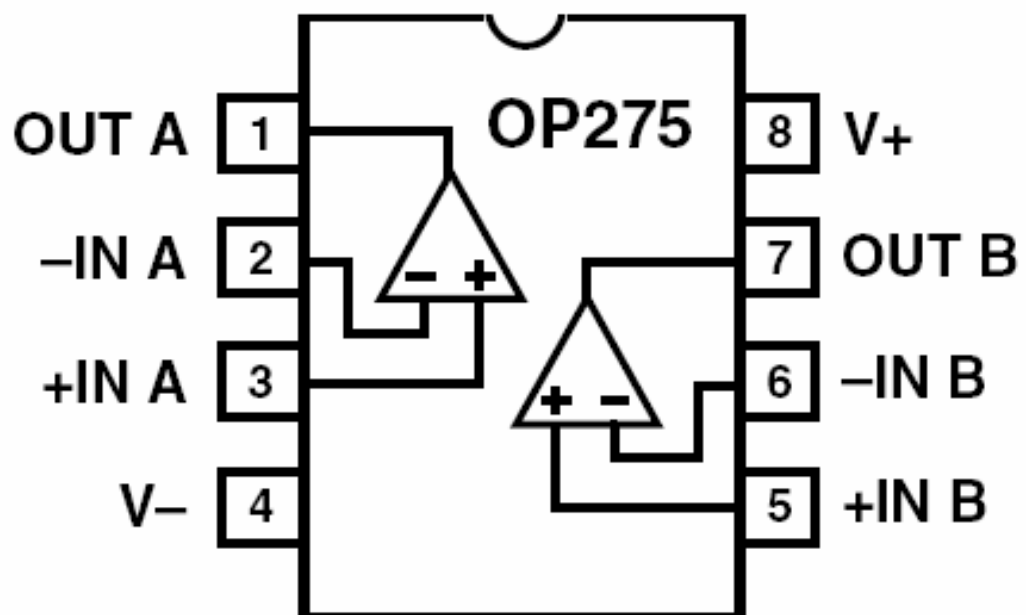
## AD8663ARZ SOIC8



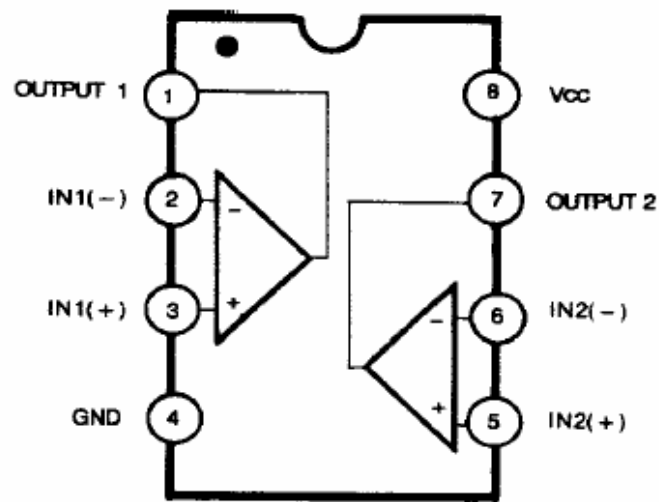
## OPA2134UA SOIC8



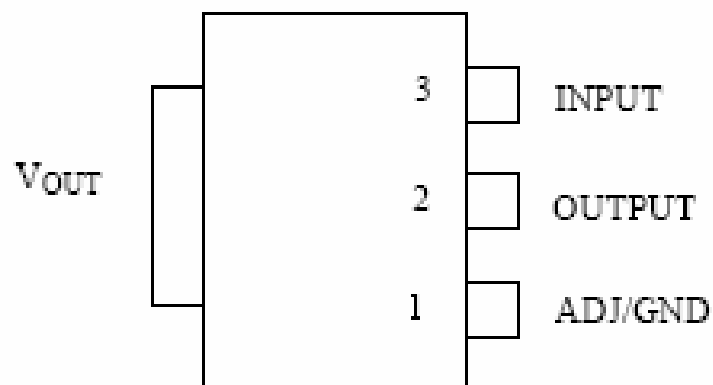
## OP275GS SO8



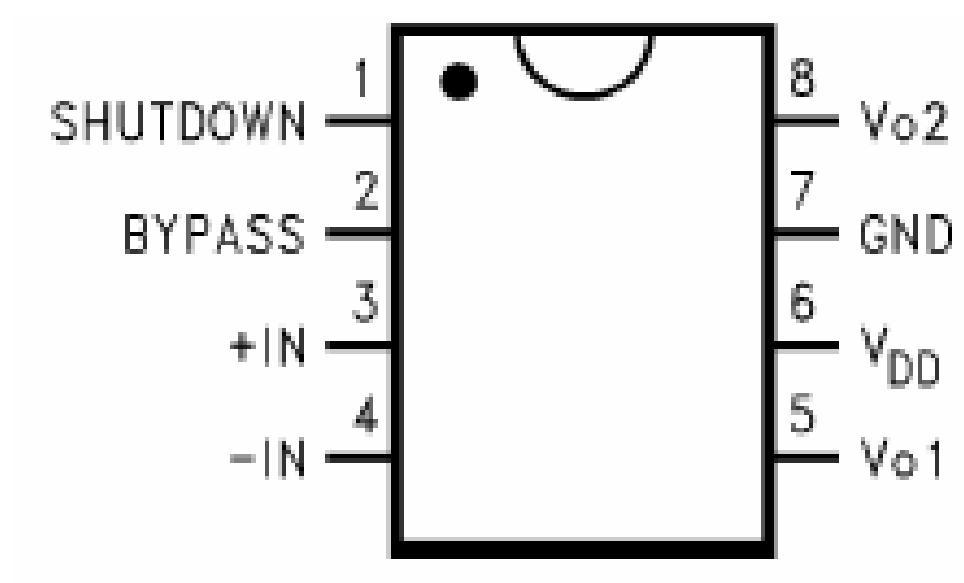
## LM393 SOP8



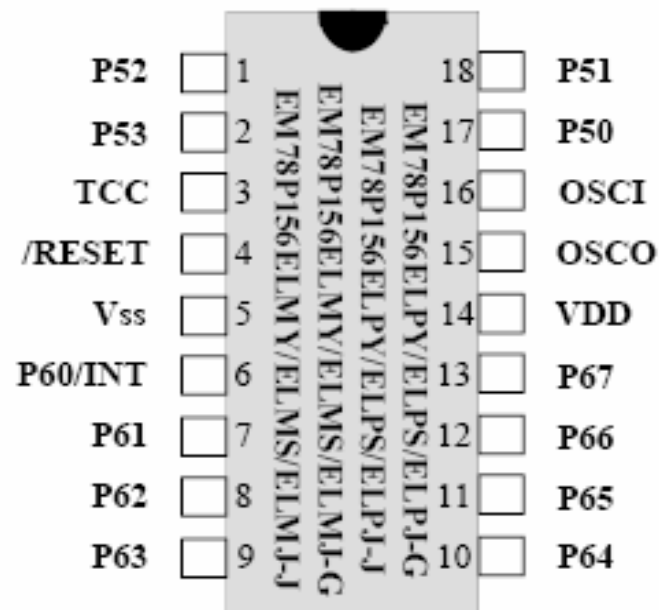
## AZ1117-ADJ/3.3V/5V SOT-223



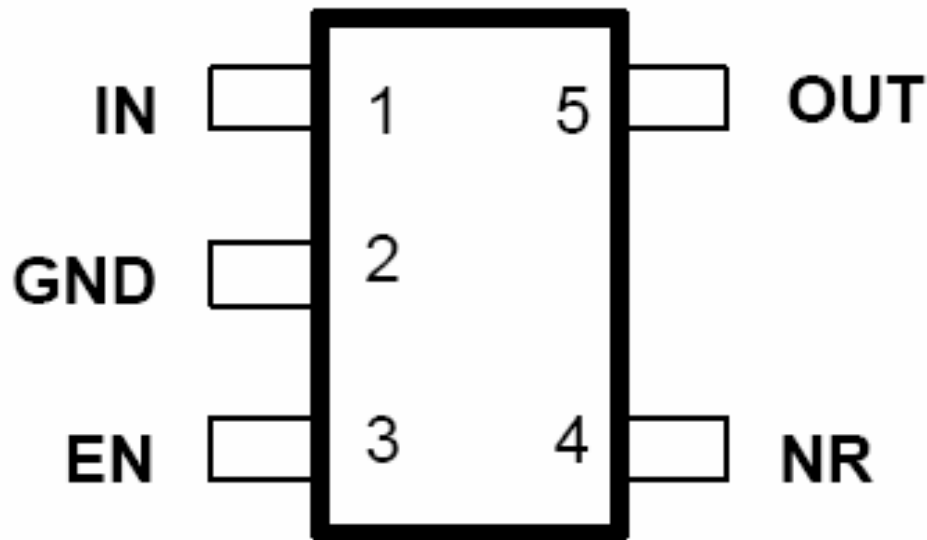
## LM9022 SOP8



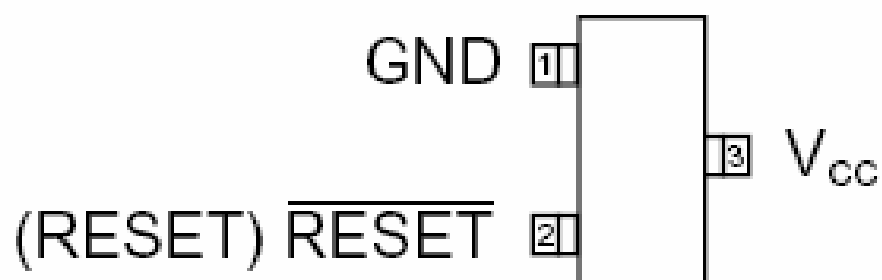
## EM78P156ELM-G SOIC18



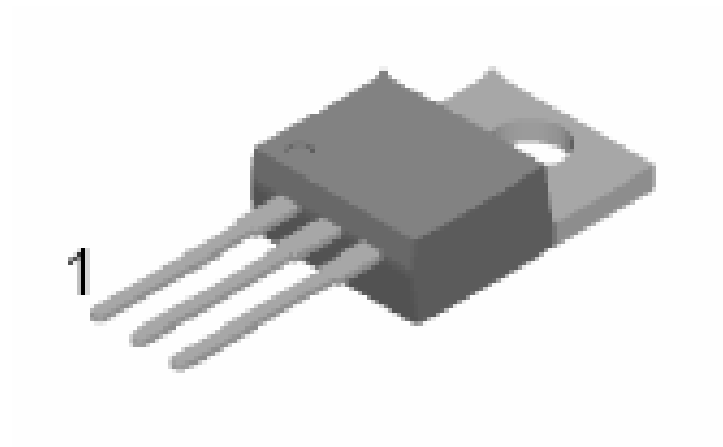
## TPS73033DBVR DVB5



## AAT3522 SOT-23

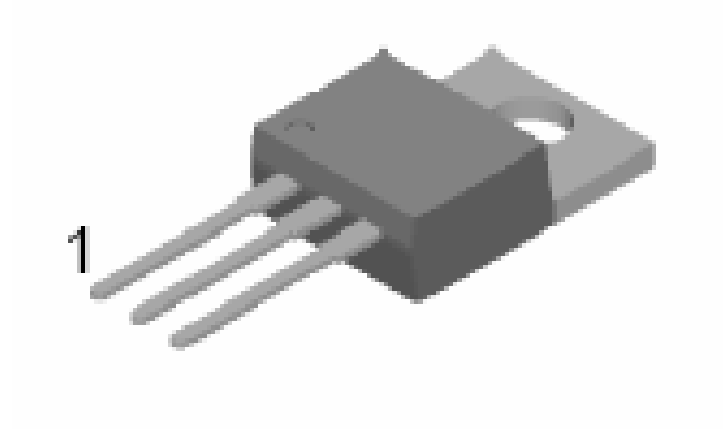


## L7805/L7812 TO-220



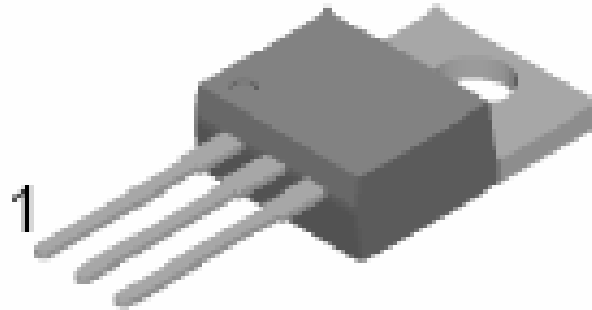
1. Input 2. GND 3. Output

## L7912 TO-220



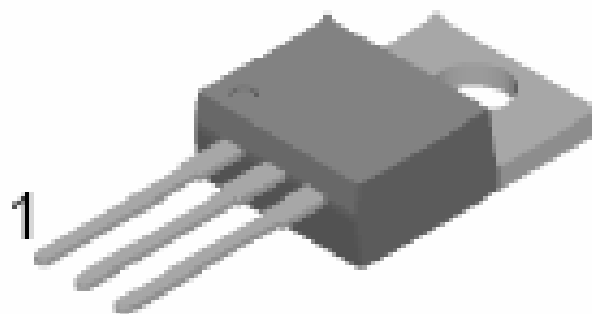
1. GND 2. Input 3. Output

## BA33BCO TO-220



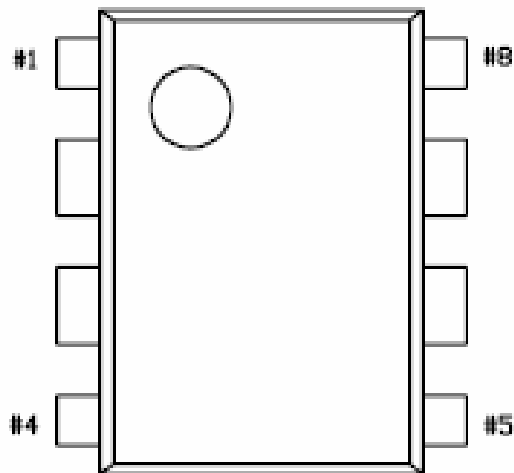
1. Vcc 2. GND 3. Output

## LM317T TO-220



1. Adj 2. Output 3. Input

## KA5M02659R DIP8



1.6.7.8. Drain

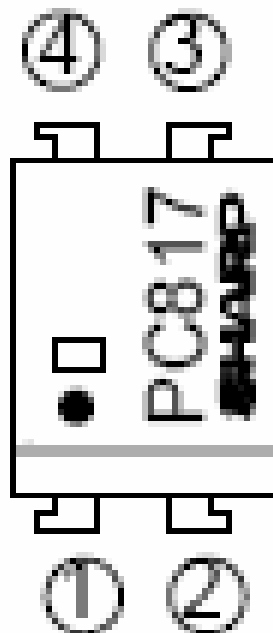
2. GND

3. Vcc

4. FB

5. NC

## PC817 DIP4



① Anode

② Cathode

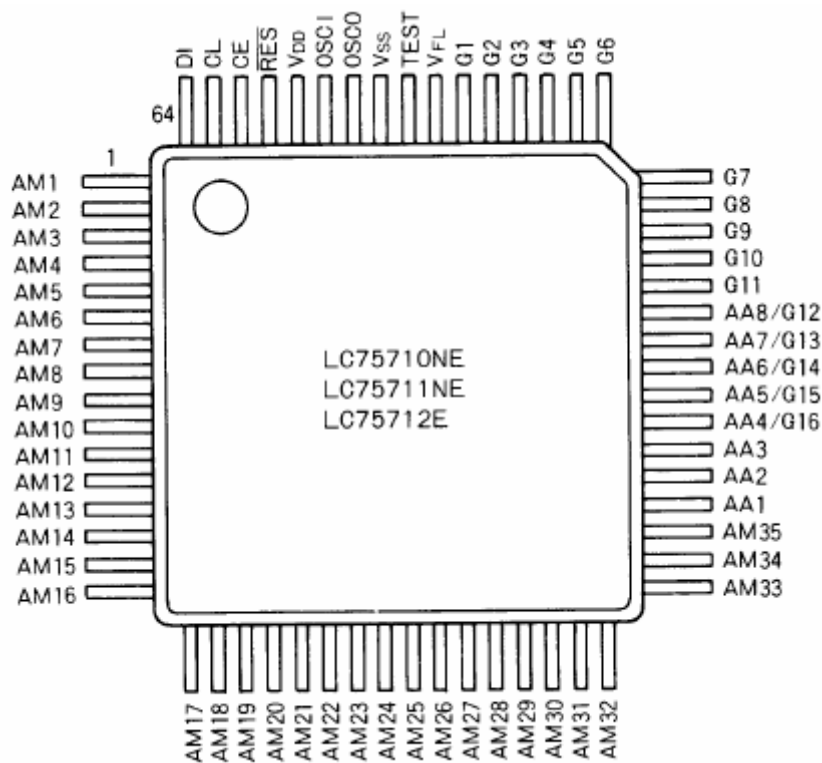
③ Emitter

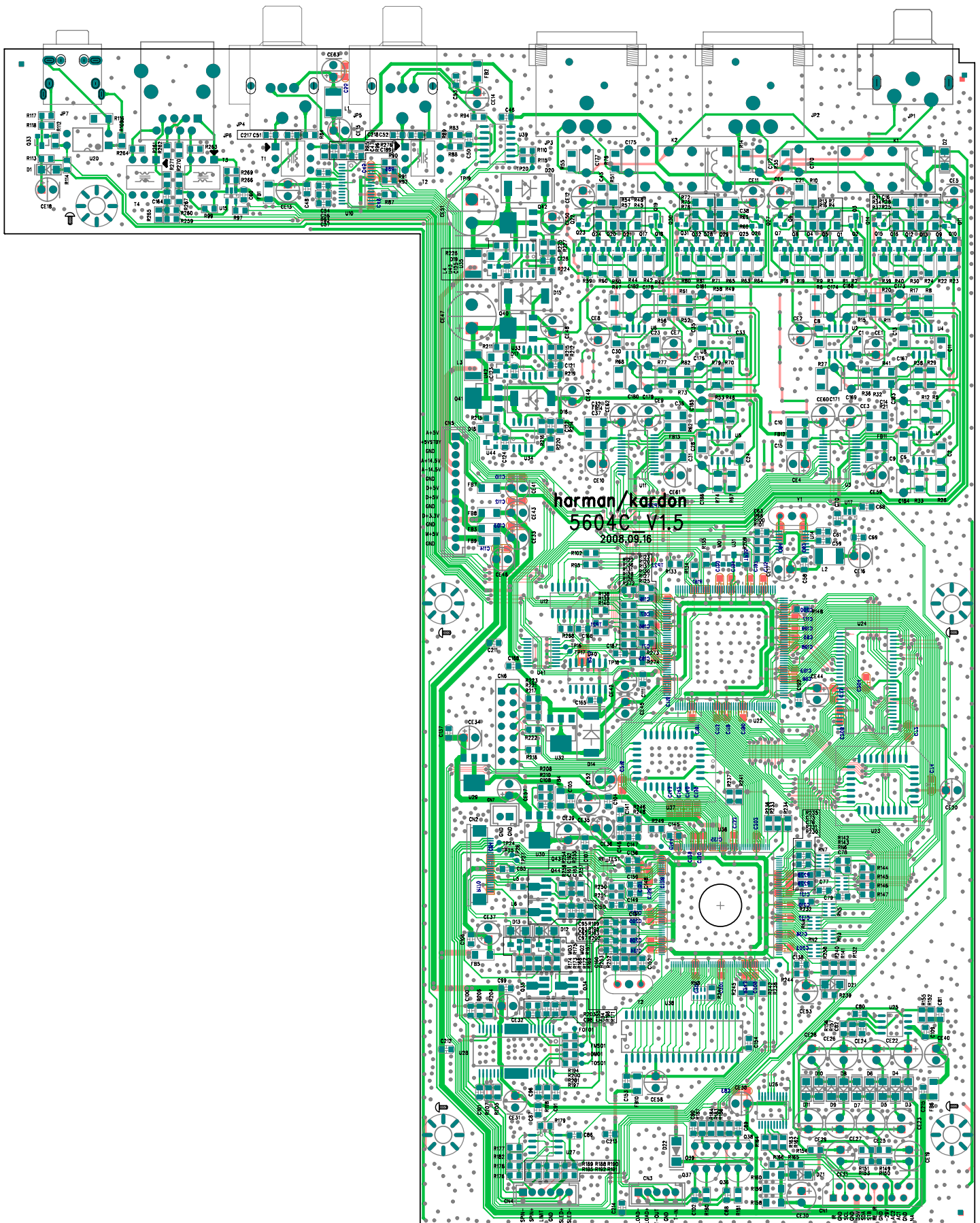
④ Collector

## AZ431AZ-ATRE1 TO-92

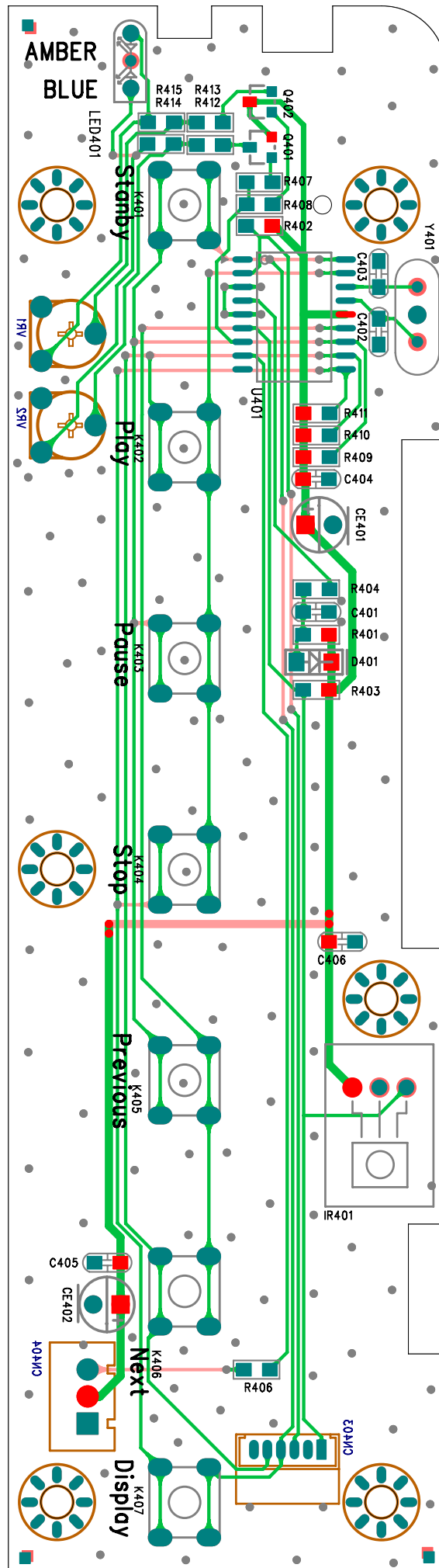


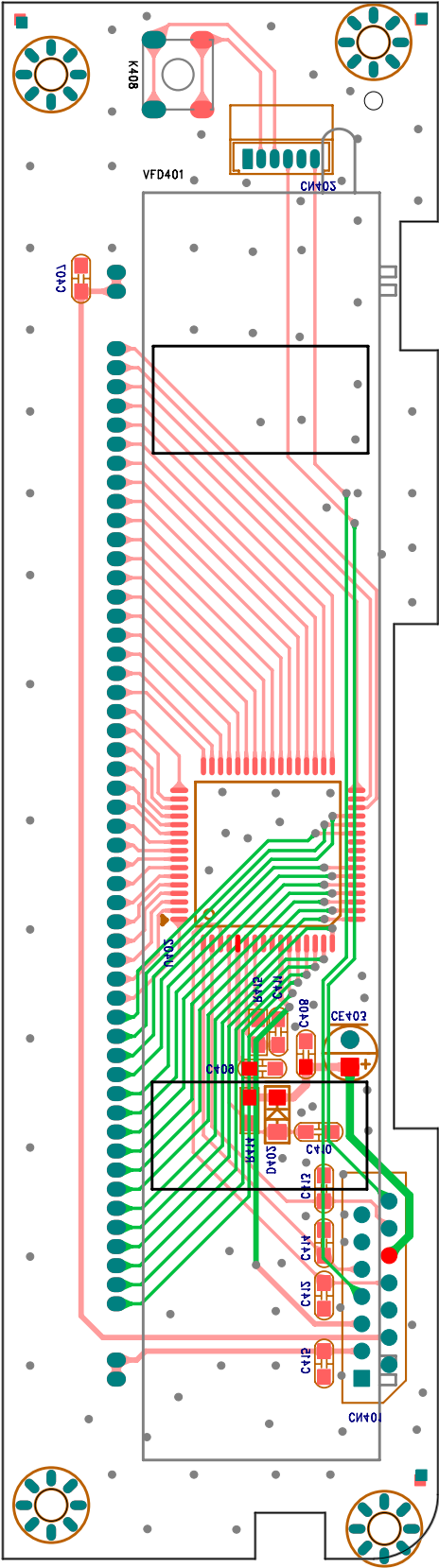
## LC75711NE QFP64E

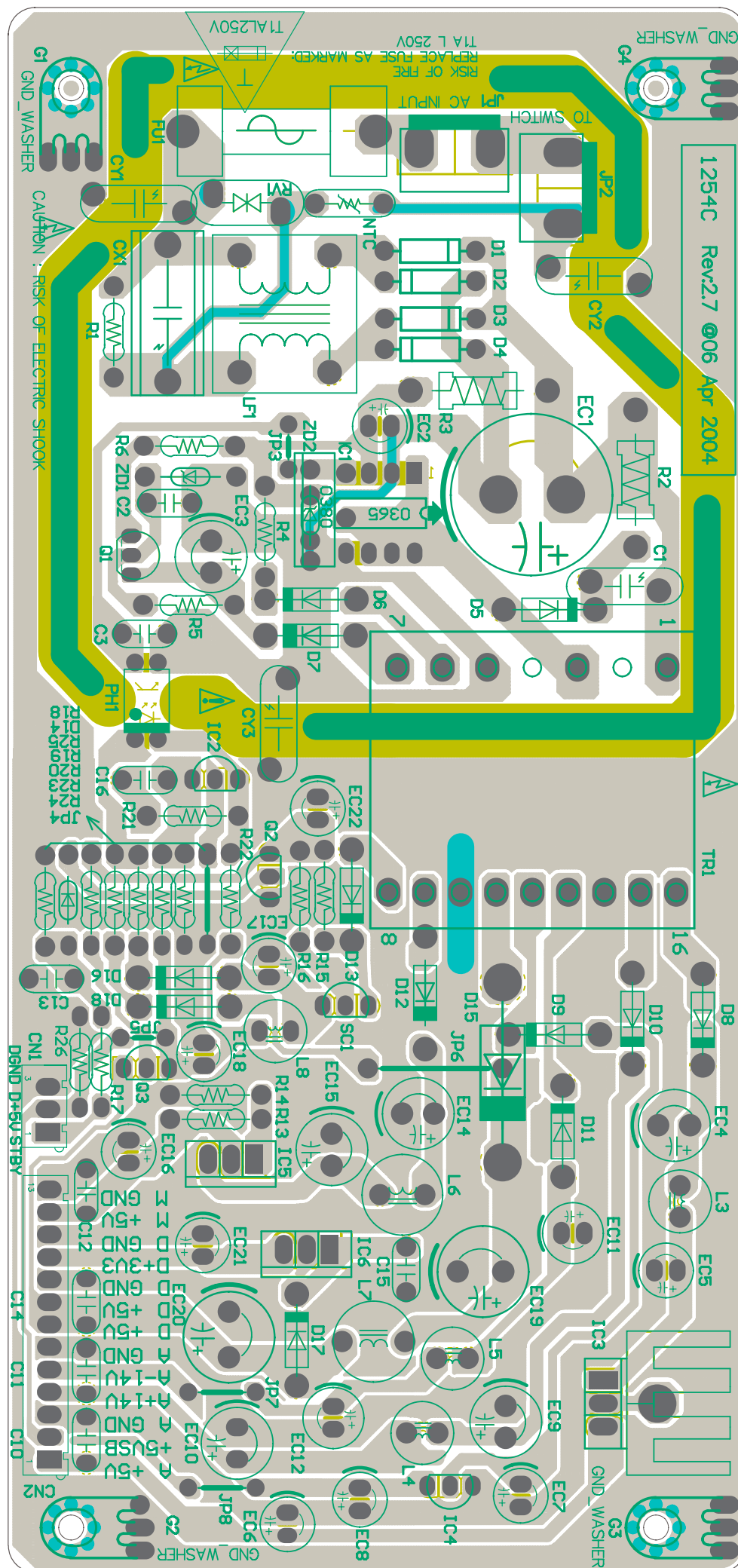




harman/kardon  
5604C V1.5  
2008.09.13







History

REV 1.0:

- 1.Make Pin1 of Y3 hang up.
- 2.Add R258 and C102, and both be valued "NA".
- 3.Add net name "ATA\_CS1#", "ATA\_CS0#", "ATA\_RDY", "ATA\_RST#", "VFD\_STB", "DATA/SDA", "CLOCK/SCL", "IR", "D[0..15]" and "A[1..19]".
- 4.Renamed net "CS\_75710" as "CS\_75711".
- 5.Renamed net "CS\_1955\_1#" in which Pin25 of U11 is connected as "CS\_1955\_2#".
- 6.Delete the Capacitors that connected Pin4,5,6 of JP5 and JP7.
- 7.Add FB11, FB12, FB13, FB14, CE20, CE42, CE51, CE52, CE54, CE55, CE56, CE57, CE58, CE59, CE60, CE61 and CE62.
- 8.Change the Y1's PCB Footprint into "DIP" Footprint.
- 9.Delete Y2, C83 and RN1 in the original schematics.

REV 1.1:

- 1.Add C165-C186, and all valued "NA";
- 2.Add U39, U40, T3, T4;
- 3.Add R259, R260, R265, R264, R261(NA), R262(NA), R263, R266, R267, R268, C164, C181, C182;
- 4.Delete U9, U16, U18, U19, U21;
- 5.Delete C65, C104, C61, C71, R105, R119, R124, R129, R107, R108, R110, R111;
- 6.Change R99 to 100R;
- 7.Replaced U21D with U12D;
- 8.Renamed net "DAC\_SDATA\_R1" as "DAC\_SDATA\_L"; and Renamed net "DAC\_SDATA\_R2" as "DAC\_SDATA\_R".

REV 1.2:

- 1.Change R5, R26, R46, R67 to 820R;
- 2.Add R272, R273, R274 valued 0R;
- 3.Add C187/0805-47pF and C188/0805-100nF;
- 4.Add U41/SN74LVC244;
- 5.Change R90, R91, R92 to 47R;
- 6.Change some connections between U40A and U12C
- 7.Add a 47R resistance between U40 PIN5 and U12C PIN12.
- 8.Change 3.3V supply of JP4 to 5V.

REV 1.3:

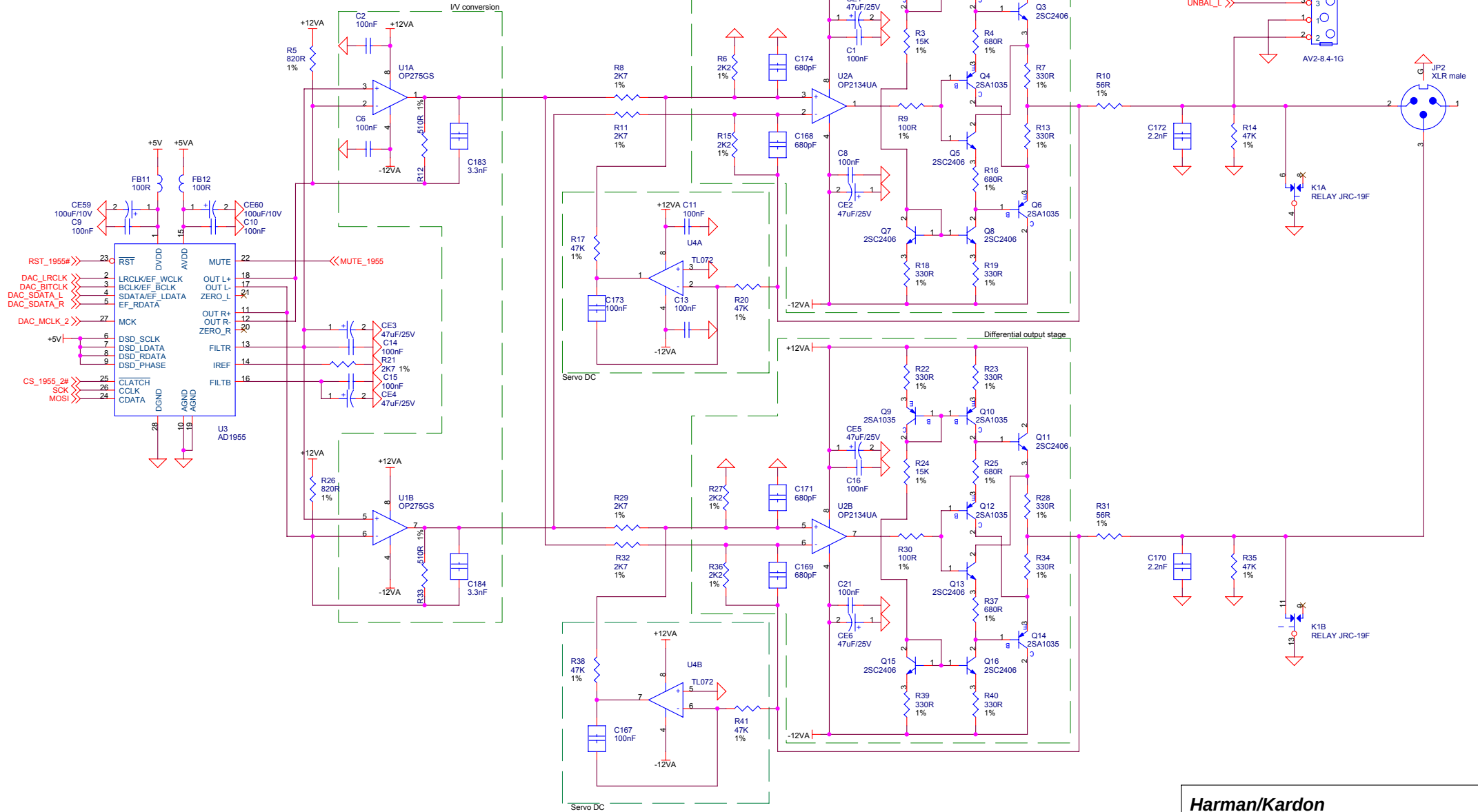
- 1.Add C198,R276.

REV 1.4:

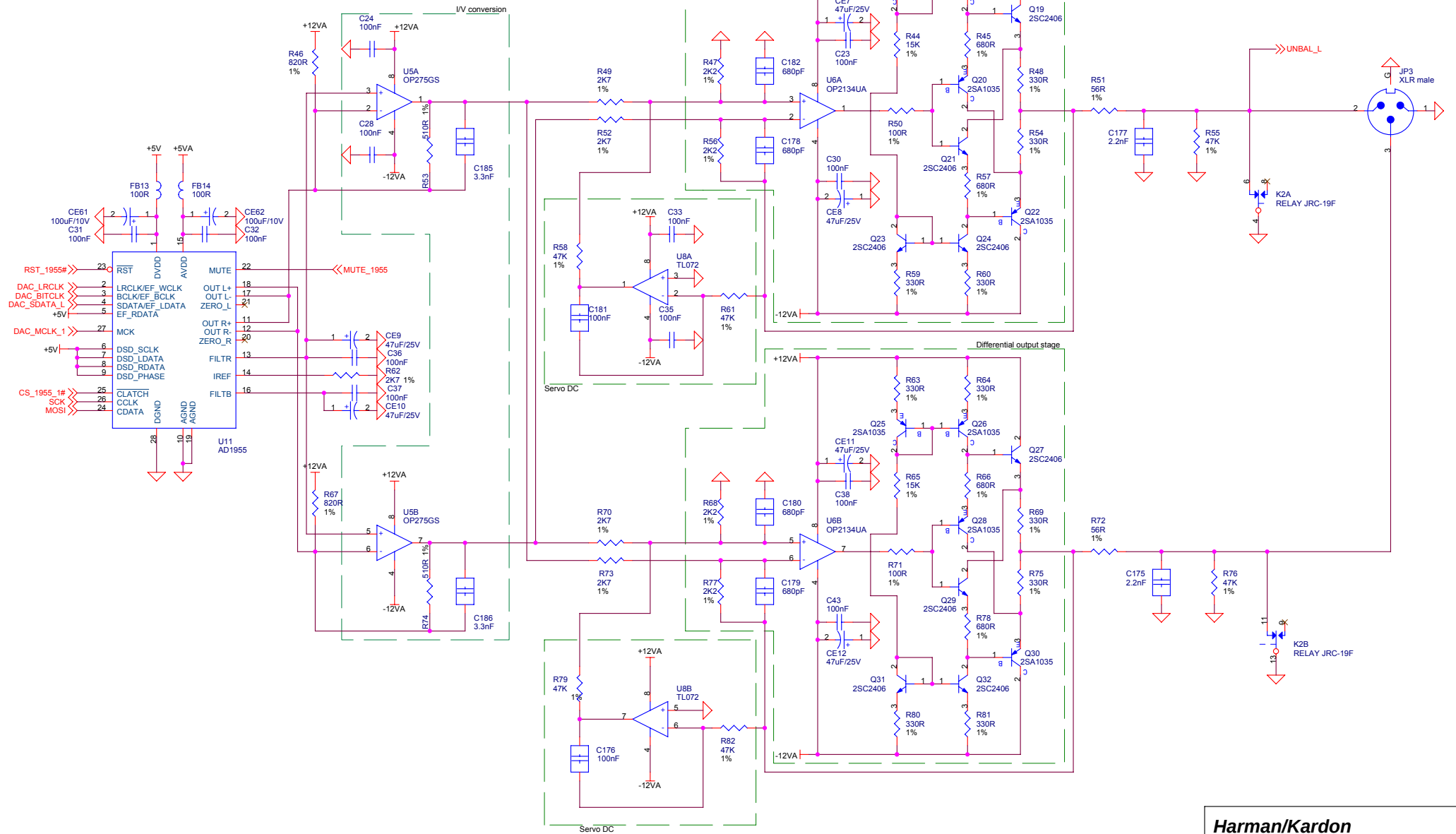
- 1.Exchange L/R channel.
- 2.change R12, R33, R53 and R74 to 510R 1%.
- 3.Add D22;
- 4.Change U2 and U6 from OP275GS to OPA2134UA;
- 5.Delete C3, C7, C17, C20, C25, C29, C39, C42, C12, C22, C34, C44, C4, C18, C26, C40, C5, C19, C27 & C41 and change them to C174, C168, C171, C169, C182, C178, C180, C179, C173, C167, C181, C176, C183, C184, C185, C186, C172, C170, C177 & C175 MKP type caps one to one.
- 6.Add C85, C86, C71, C67 & C190-C216.
- 7.Add C217 & C218 be valued NA.
- 8.Add CE52.

REV 1.5:

- 1.Add CON7; Add CE63; Add RF Test Point.



|                                 |                 |         |
|---------------------------------|-----------------|---------|
| <b>Harman/Kardon</b>            |                 |         |
| Title HD 990 Main board         |                 |         |
| Size Custom6604C                | Document Number | Rev 1.5 |
| Date: Tuesday, October 07, 2008 | Sheet 2         | 10      |

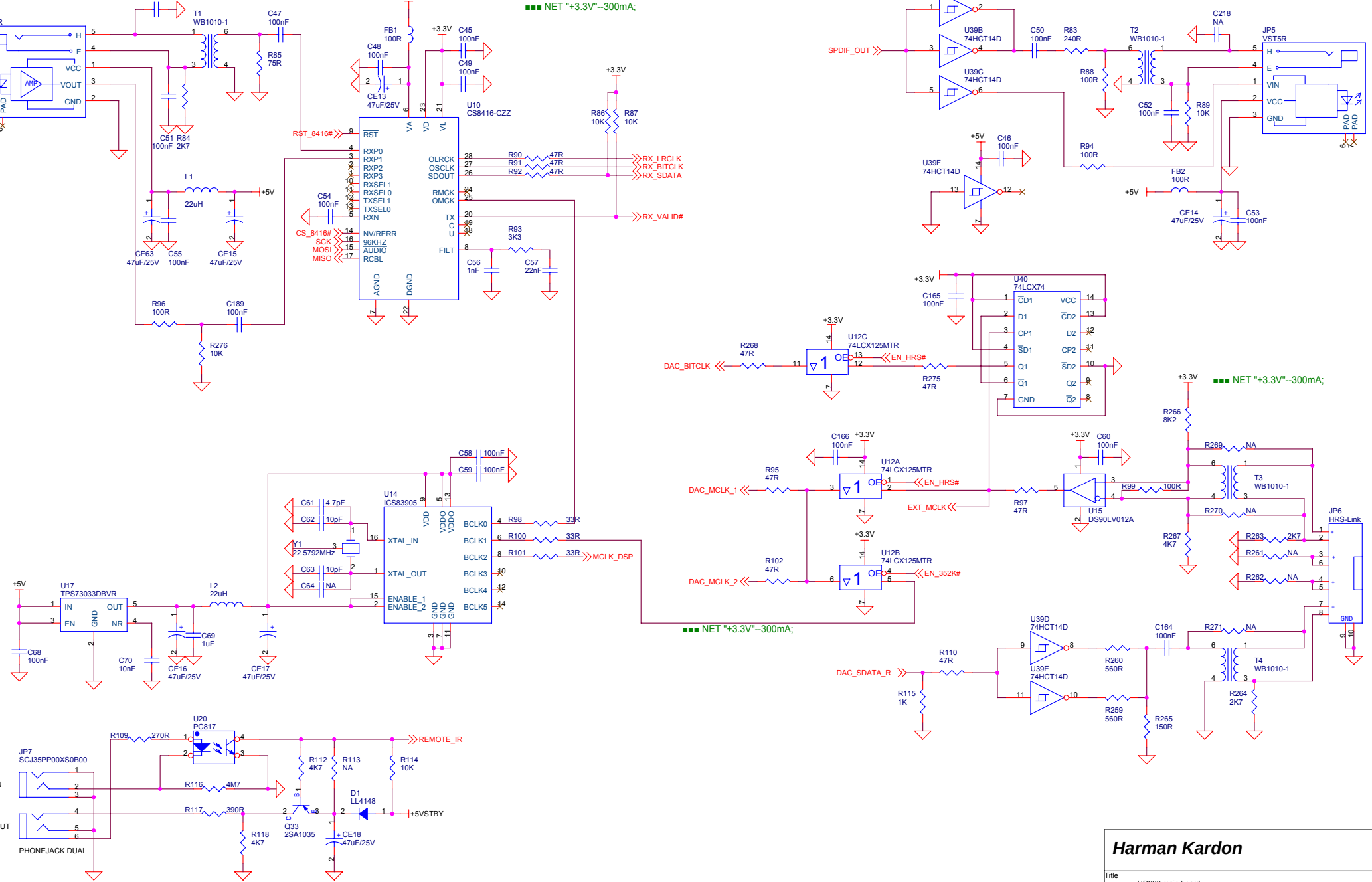


**Harman/Kardon**

|                   |                           |               |
|-------------------|---------------------------|---------------|
| Title             |                           |               |
| HD 990 Main board |                           |               |
| Size              | Document Number           | Rev           |
| Custom            | 6604C                     | 1.5           |
| Date:             | Tuesday, October 07, 2008 | Sheet 3 of 10 |

# harman/kardon

# HD 990/230 Service Manual

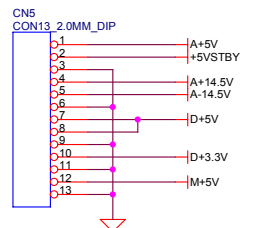


Harman Kardon

|       |                           |             |         |
|-------|---------------------------|-------------|---------|
| Title | HD990 main board          |             |         |
| Size  | Document Number           | Custom6604C | Rev 1.5 |
| Date: | Tuesday, October 07, 2008 | Sheet       | 4 10    |

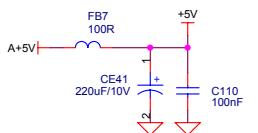


|        |                          |  |                  |         |     |
|--------|--------------------------|--|------------------|---------|-----|
| Title  |                          |  | HD990 main board |         |     |
| Size   | Document Number          |  |                  |         | Rev |
| Custom | 013_05_100 MAIN          |  |                  |         | 1.5 |
| Date   | Tuesday, October 07 2008 |  | Sheet            | 1 of 10 |     |

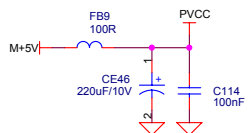


- NET "A+5V"--100mA;
- NET "+5VSTBY"--100mA;
- NET "A+14.5V"--100mA;
- NET "A-14.5V"--100mA;
- NET "D+5V"--1A;
- NET "M+5V"--1A;
- NET "D+3.3V"--200~300mA;

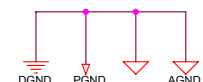
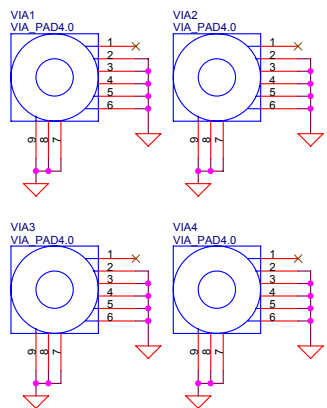
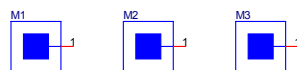
MASTER CLOCK & DAC



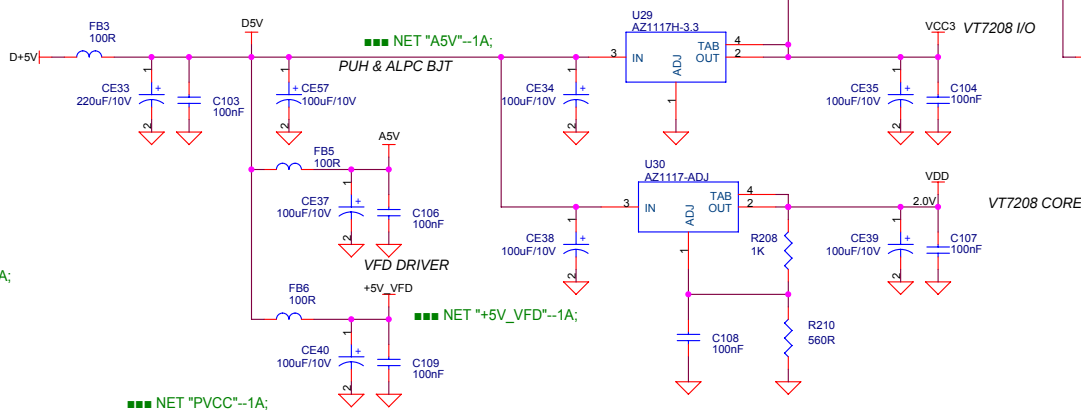
MOTOR CONTROL



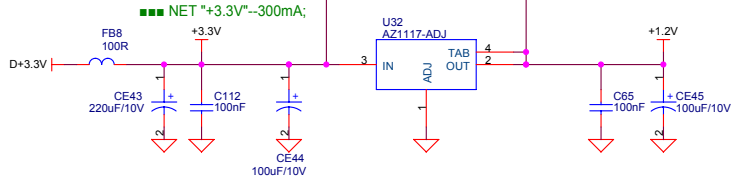
LOCATION-PAD  
for the board



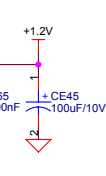
VT7208 RAM



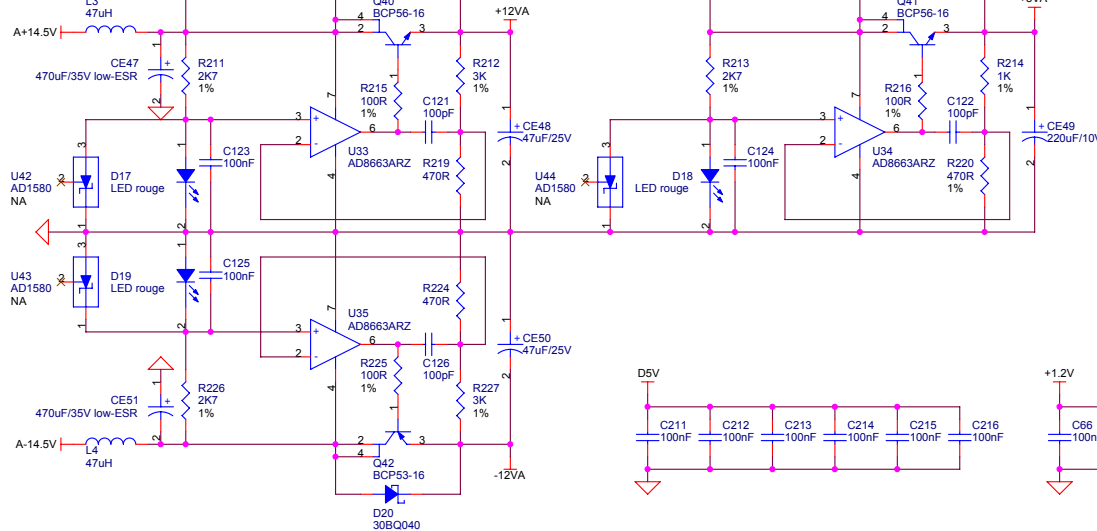
DSP & PERIPH.



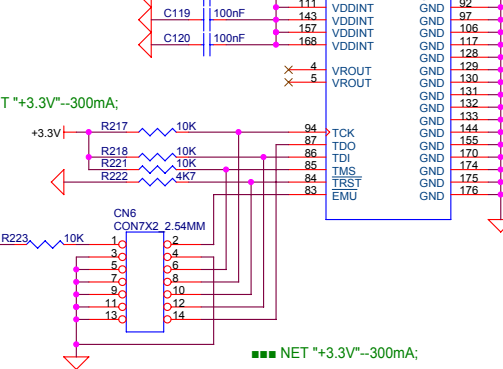
DSP CORE



OP-AMPS

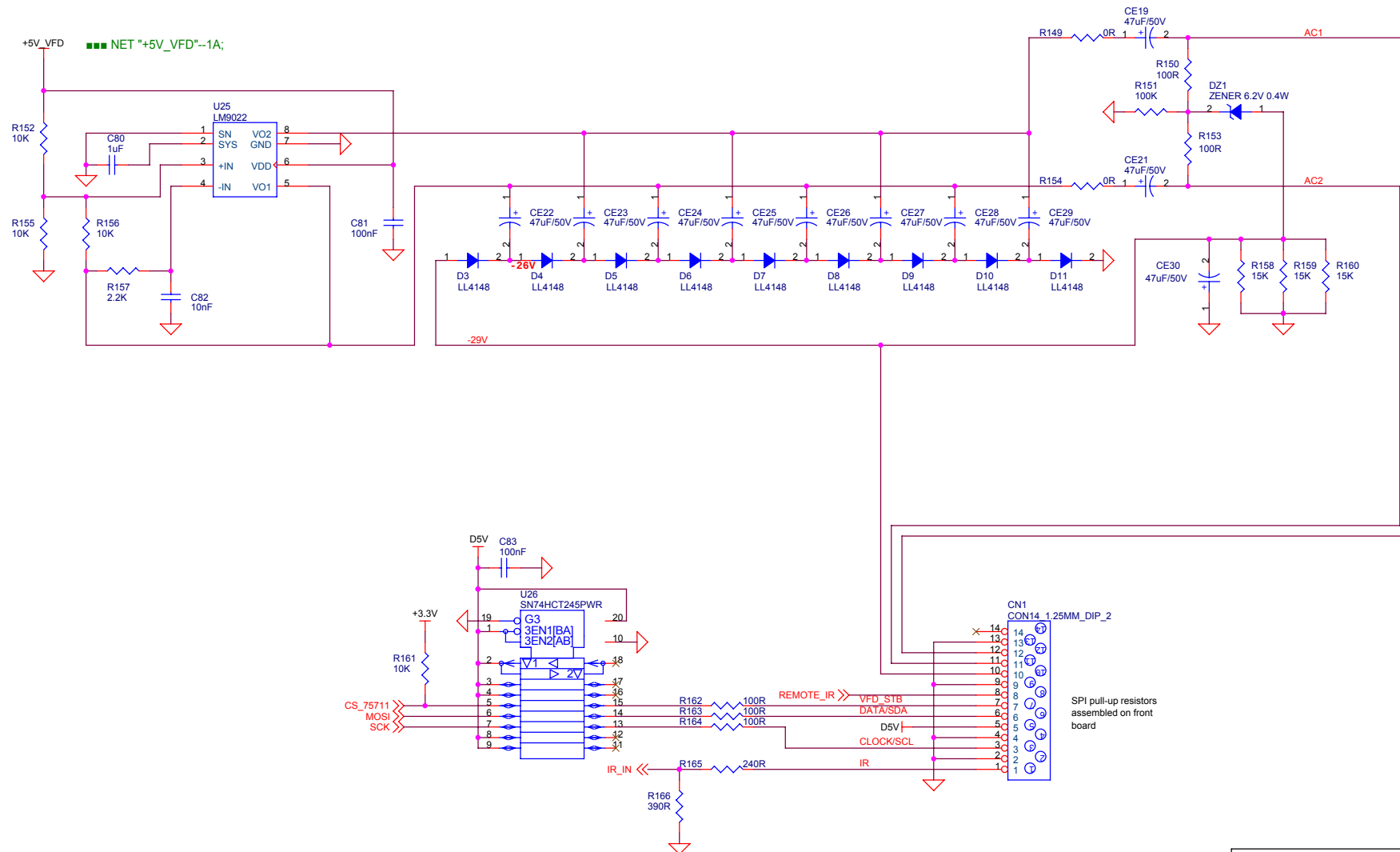


AD1955

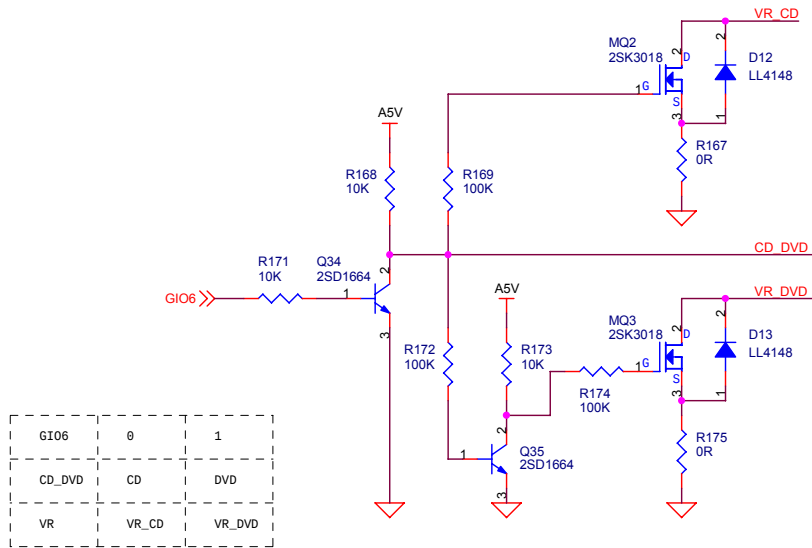


Harman Kardon

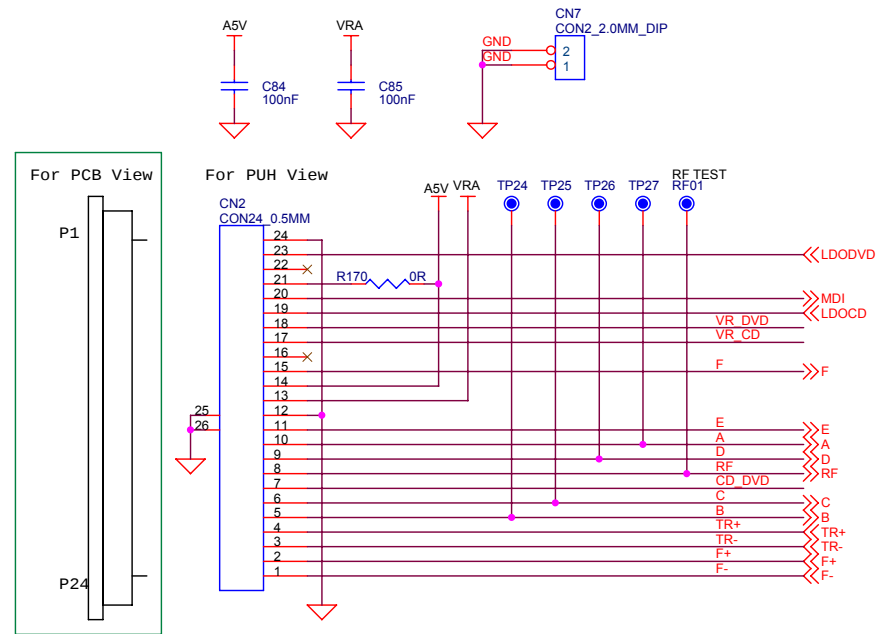
|        |                           |       |         |
|--------|---------------------------|-------|---------|
| Title  | HD990 main board          | Rev   | 1.5     |
| Size   | Document Number           |       |         |
| Custom | 013_05_100 MAIN           |       |         |
| Date:  | Tuesday, October 07, 2008 | Sheet | 1 of 10 |

**Harman Kardon**

|       |                           |       |                  |
|-------|---------------------------|-------|------------------|
| Title |                           |       | HD990 main board |
| Size  | Document Number           | Rev   |                  |
| A3    | 5604C                     | 1.5   |                  |
| Date: | Tuesday, October 07, 2008 | Sheet | 5 of 9           |

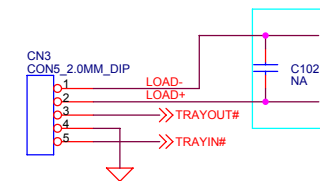
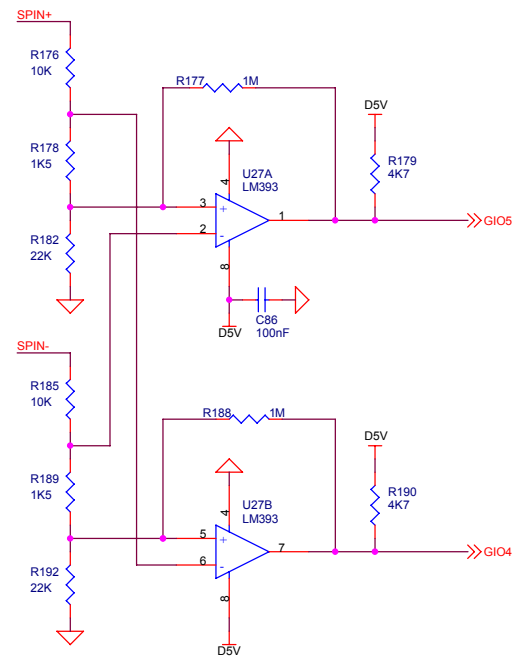
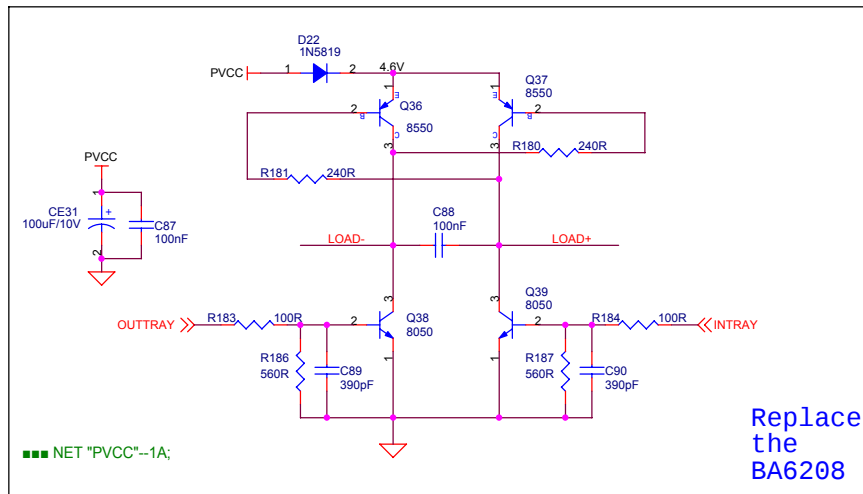


|        |       |        |
|--------|-------|--------|
| GI06   | 0     | 1      |
| CD_DVD | CD    | DVD    |
| VR     | VR_CD | VR_DVD |

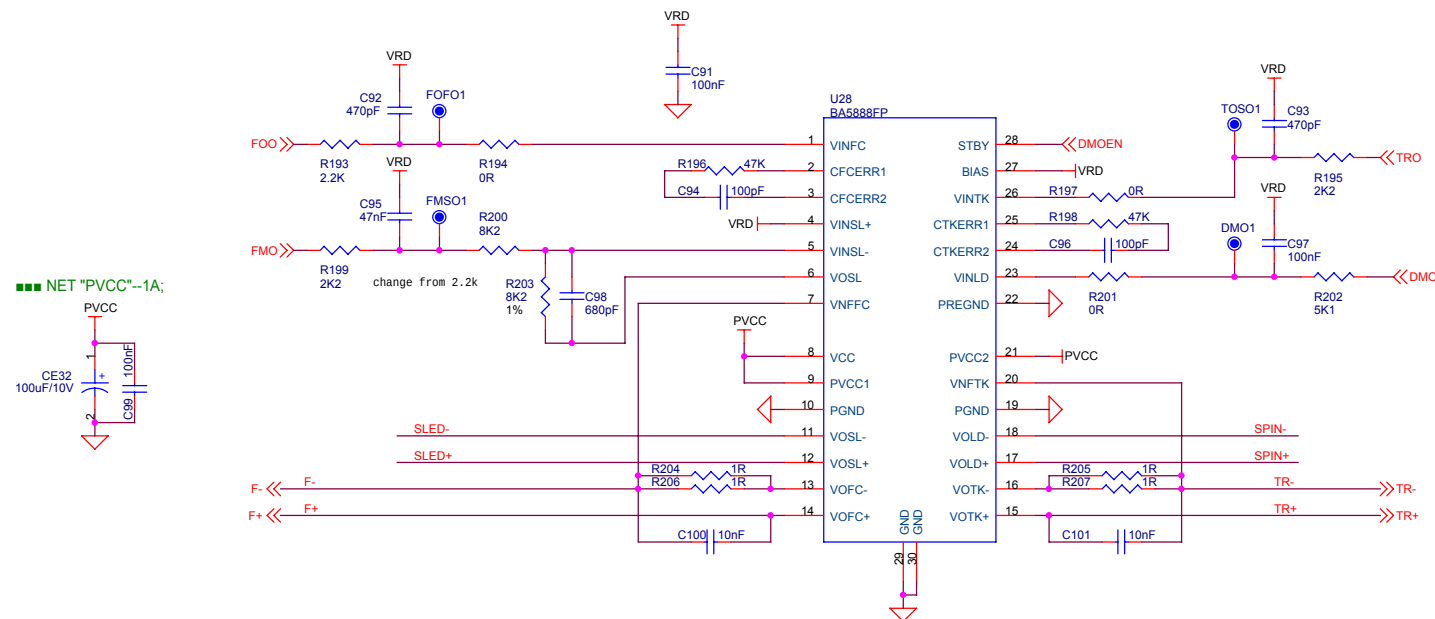
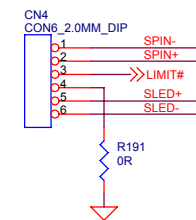


This connector support SF-HD850G

|                                    |                          |            |
|------------------------------------|--------------------------|------------|
| <b>Harman Kardon</b>               |                          |            |
| Title<br>HD990 main board          |                          |            |
| Size<br>B                          | Document Number<br>5604C | Rev<br>1.5 |
| Date:<br>Tuesday, October 07, 2008 | Sheet<br>6               | of<br>9    |

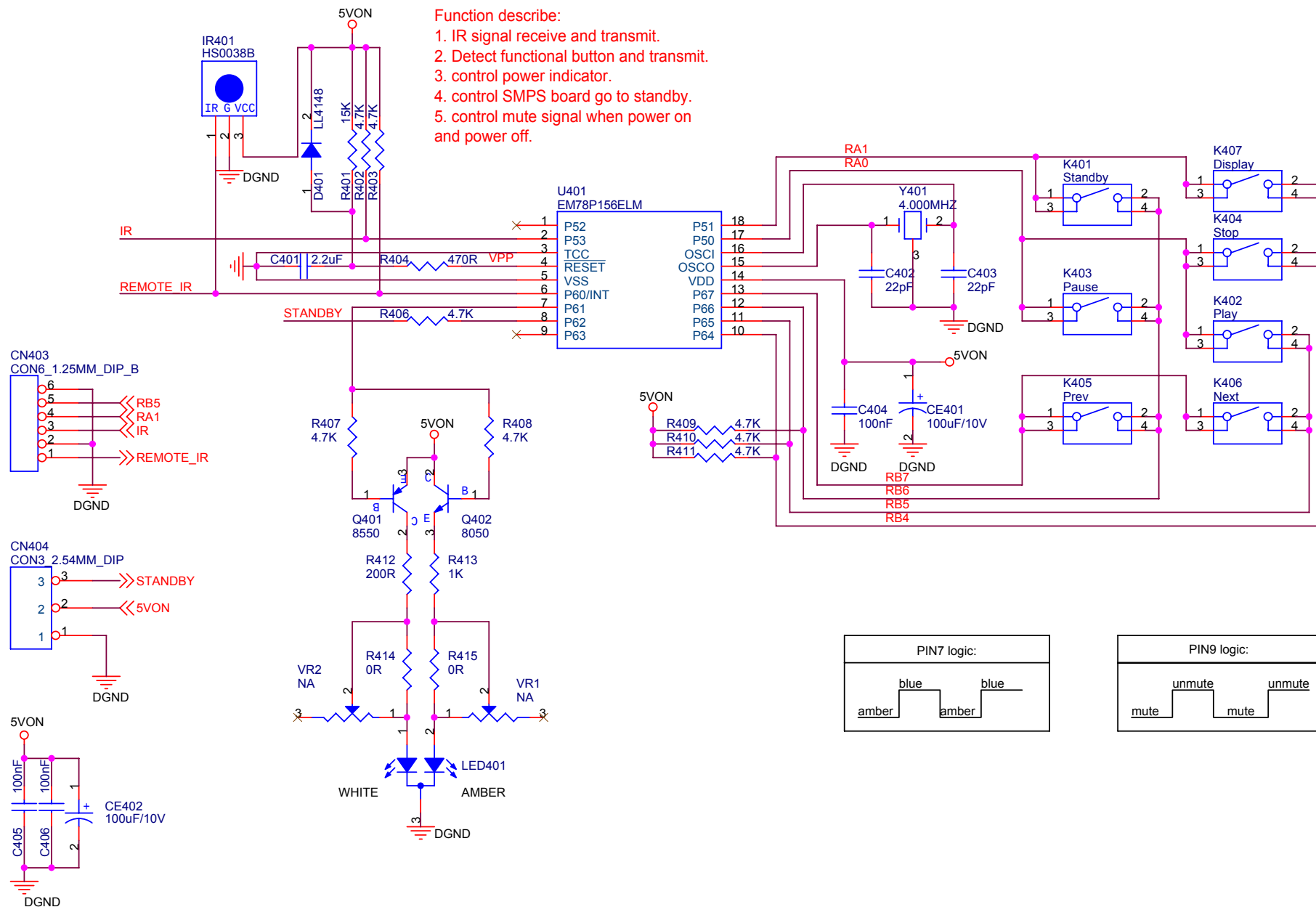


This connector support SF-HD850

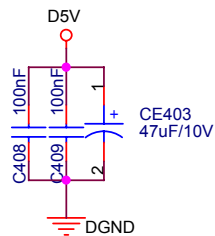
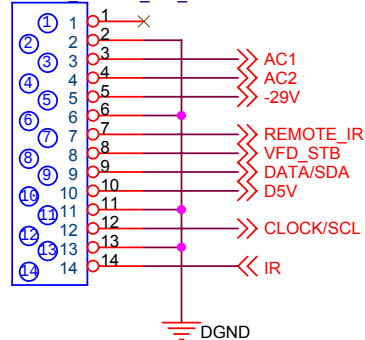


|                                 |                       |         |
|---------------------------------|-----------------------|---------|
| <b>Harman Kardon</b>            |                       |         |
| Title HD990 main board          |                       |         |
| Size A3                         | Document Number 5604C | Rev 1.5 |
| Date: Tuesday, October 07, 2008 | Sheet 7               | of 9    |

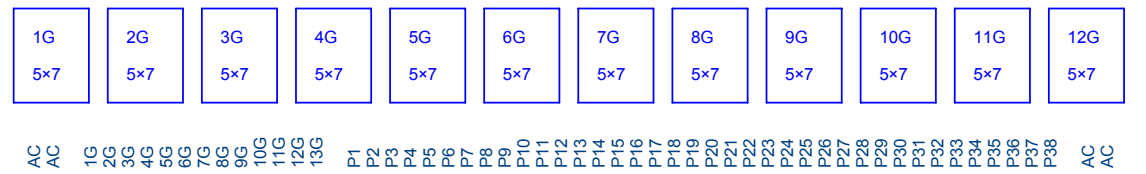
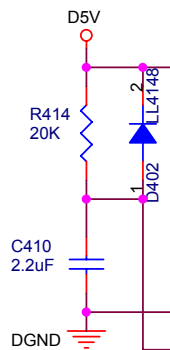
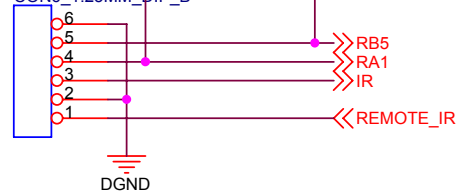
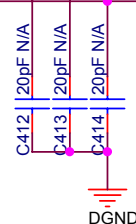




|                                 |                         |       |        |
|---------------------------------|-------------------------|-------|--------|
| Title                           |                         |       |        |
| HD980 FRONT PANEL: Button board |                         |       |        |
| Size                            | Document Number         | Rev   |        |
| A4                              | 5575C                   | 1.2   |        |
| Date:                           | Friday, August 01, 2008 | Sheet | 1 of 2 |

CN401  
CON14 1.25MM\_DIP\_2C407  
47nF  
AC2  
DGNDVFD401  
VFD22-1302FA

## VFD 12COLUMNS x 1LINE 5x7 DOT MATRIX

C415  
47nF  
AC1  
DGNDCN402  
CON6 1.25MM\_DIP\_BC410  
2.2uF  
DGNDVFD\_STB  
CLOCK/SCL  
DATA/SDAVFD\_STB  
CLOCK/SCL  
DATA/SDA

DGND

C411  
30pFR415  
10K

-29V

G1

G2

G3

G4

G5

G6

G7

G8

G9

G10

G11

G12

G13

AA8/G12

AA7/G13

AA6/G14

AA5/G15

AA4/G16

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

AA9

AA8

AA7

AA6

AA5

AA4

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

AA9

AA8

AA7

AA6

AA5

AA4

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

AA9

AA8

AA7

AA6

AA5

AA4

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

AA9

AA8

AA7

AA6

AA5

AA4

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

AA9

AA8

AA7

AA6

AA5

AA4

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

AA9

AA8

AA7

AA6

AA5

AA4

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

AA9

AA8

AA7

AA6

AA5

AA4

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

AA9

AA8

AA7

AA6

AA5

AA4

AA3

AA2

AA1

AA0

AA33

AA32

AA31

AA30

AA29

AA28

AA27

AA26

AA25

AA24

AA23

AA22

AA21

AA20

AA19

AA18

AA17

AA16

AA15

AA14

AA13

AA12

AA11

AA10

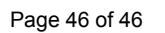
AA9

AA8

AA7

AA6

AA



HD 980/HD 990

May 2012

Service bulletin # HK2012-002

To: All Harman Kardon Service Centers

Models: HD 980/990

Subject: Rattle noise

---

In the event you receive a unit with the complaint “*Periodic mechanical noise from the CD player*”.

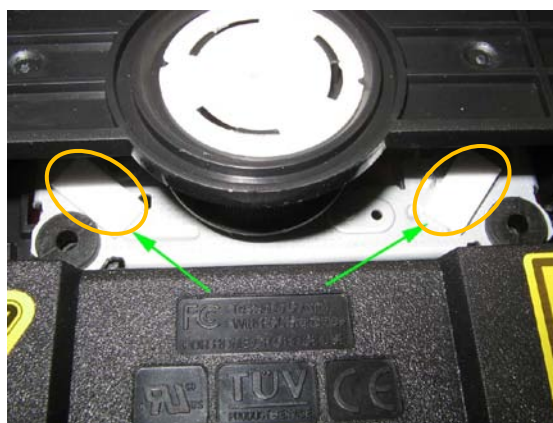
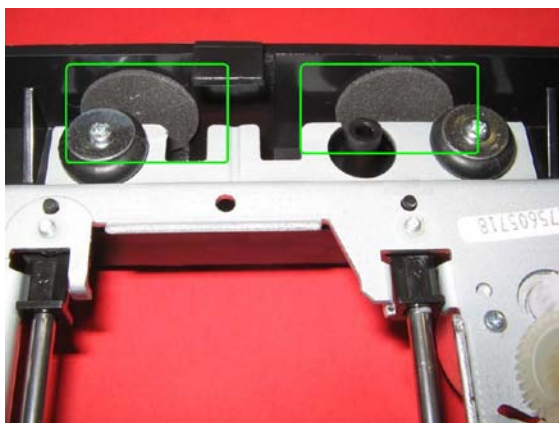
Perform the following repair: Add damping pads to prevent rattling.

Rattling noise is related to the spinning disc not being completely balanced or centric.

Parts: Pads – Part number: EDV3485ORATTLE (5 sets of 4 pads).

**Procedure:**

Please mount 2x2 damping-pads as shown in the pictures.



Note: There should be no marks in the surface or stickers on the disc, causing imbalance when the disc is spinning. Even original discs may not be fully centric.

| Model      | Serial number | Status       | Action           | PN used        |
|------------|---------------|--------------|------------------|----------------|
| HD 980/990 | All           | Rattle noise | Add damping pads | EDV3485ORATTLE |