

SERVICE MANUAL

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MODEL : M15

SERVICE MANUAL



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M15 C/AH
SURROUND
SOUND PREAMPLIFIER



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NAD ELECTRONICS INTERNATIONAL
TORONTO

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SECTION 1

SUMMARY

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PRODUCT SAFETY SERVICING GUIDELINES FOR AUDIO PRODUCTS

CAUTION : DO NOT ATTEMPT TO MODIFY THIS PRODUCT IN ANY WAY, NEVER PERFORM CUSTOMIZED INSTALLATIONS WITHOUT MANUFACTURER'S APPROVAL. UNAUTHORIZED MODIFICATIONS WILL NOT ONLY VOID THE WARRANTY, BUT MAY LEAD TO YOUR BEING LIABLE FOR ANY RESULTING PROPERTY DAMAGE OR USER INJURY.

SERVICE WORK SHOULD BE PERFORMED ONLY AFTER YOU ARE THOROUGHLY FAMILIAR WITH ALL OF THE FOLLOWING SAFETY CHECKS AND SERVICING GUIDELINES. TO DO OTHERWISE, INCREASES THE RISK OF POTENTIAL HAZARDS AND INJURY TO THE USER.

WHILE SERVICING, USE AN ISOLATION TRANSFORMER FOR PROTECTION FROM A.C. LINESHOCK.

SAFETY CHECKS

AFTER THE ORIGINAL SERVICE PROBLEM HAS BEEN CORRECTED, A CHECK SHOULD BE MADE OF THE FOLLOWING.

SUBJECT : FIRE & SHOCK HAZARD

1. BE SURE THAT ALL COMPONENTS ARE POSITIONED IN SUCH A WAY AS TO AVOID POSSIBILITY OF ADJACENT COMPONENT SHORTS. THIS IS ESPECIALLY IMPORTANT ON THOSE MODULES WHICH ARE TRANSPORTED TO AND FROM THE REPAIR SHOP.

2. NEVER RELEASE A REPAIR UNLESS ALL PROTECTIVE DEVICES SUCH AS INSULATORS, BARRIERS, COVERS, SHIELDS, STRAIN RELIEFS, POWER SUPPLY CORDS, AND OTHER HARDWARE HAVE BEEN REINSTALLED PER ORIGINAL DESIGN. BE SURE THAT THE SAFETY PURPOSE OF THE POLARIZED LINE PLUG HAS NOT BEEN DEFEATED.

3. SOLDERING MUST BE INSPECTED TO DISCOVER POSSIBLE COLD SOLDER JOINTS, SOLDER SPLASHES OR SHARP SOLDER POINTS. BE CERTAIN TO REMOVE ALL LOOSE FOREIGN PARTICLES.

4. CHECK FOR PHYSICAL EVIDENCE OF DAMAGE OR DETERIORATION TO PARTS AND COMPONENTS. FOR FRAYED LEADS, DAMAGED INSULATION (INCLUDING A.C. CORD). AND REPLACE IF NECESSARY.

SUBJECT: GRAPHIC SYMBOLS



THE LIGHTNING FLASH WITH APROWHEAD SYMBOL, WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.

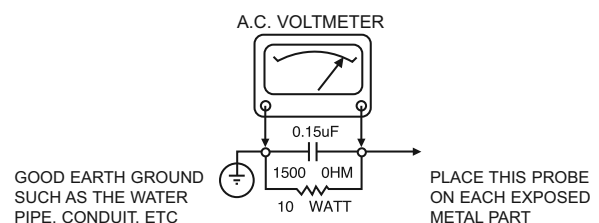


THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

5. NO LEAD OR COMPONENT SHOULD TOUCH A RECEIVING TUBE OR A RESISTOR RATED AT 1 WATT OR MORE. LEAD TENSION AROUND PROTRUDING METAL SURFACES MUST BE AVOIDED.

6. ALL CRITICAL COMPONENTS SUCH AS FUSES, FLAMEPROOF RESISTORS, CAPACITORS, ETC. MUST BE REPLACED WITH EXACT FACTORY TYPES, DO NOT USE REPLACEMENT COMPONENTS OTHER THAN THOSE SPECIFIED OR MAKE UNRECOMMENDED CIRCUIT MODIFICATIONS.

7. AFTER RE-ASSEMBLY OF THE SET ALWAYS PERFORM AN A.C. LEAKAGE TEST ON ALL EXPOSED METALLIC PARTS OF THE CABINET, (THE CHANNEL SELECTOR KNOB, ANTENNA TERMINALS. HANDLE AND SCREWS) TO BE SURE THE SET IS SAFE TO OPERATE WITHOUT DANGER OF ELECTRICAL SHOCK. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST USE AN A.C. VOLTMETER, HAVING 5000 OHMS PER VOLT OR MORE SENSITIVITY, IN THE FOLLOWING MANNER; CONNECT A 1500 OHM 10 WATT RESISTOR, PARALLELED BY A .15 MFD. 150.V A.C TYPE CAPACITOR BETWEEN A KNOWN GOOD EARTH GROUND (WATER PIPE, CONDUIT, ETC.) AND THE EXPOSED METALLIC PARTS, ONE AT A TIME. MEASURE THE A.C. VOLTAGE ACROSS THE COMBINATION OF 1500 OHM RESISTOR AND .15 MFD CAPACITOR. REVERSE THE A.C. PLUG AND REPEAT A.C. VOLTAGE MEASUREMENTS FOR EACH EXPOSED METALLIC PART. VOLTAGE MEASURED MUST NOT EXCEED 75 VOLTS R.M.S. THIS CORRESPONDS TO 0.5 MILLIAMPS A.C ANY VALUE EXCEEDING THIS LIMIT CONSTITUTES A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED IMMEDIATELY.



SERVICING PRECAUTIONS

CAUTION: Before servicing the Surround sound preamplifier covered by this service data and its supplements and addends, read and follow the SAFETY PRECAUTIONS. NOTE: if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publication, always follow the safety precautions. Remember Safety First:

General Servicing Precautions

1. Always unplug the Surround sound preamplifier AC power cord from the AC power source before:
 - (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
 - (2) Disconnecting or reconnecting any internal electrical plug or other electrical connection.
 - (3) Connecting a test substitute in parallel with an electrolytic capacitor.
- Caution: A wrong part substitute or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Do not spray chemicals on or near this Surround sound preamplifier or any of its assemblies.
 3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton tipped swab, or comparable soft applicator. Unless specified otherwise in this service data, lubrication of contacts is not required.
 4. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
 5. Do not apply AC power to this Surround sound preamplifier and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
 6. Always connect test instrument ground lead to the appropriate ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistances between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1 M-ohm.

Note 1: Accessible Conductive Parts including Metal panels, Input terminals, Earphone jacks, etc.

Electro statically Sensitive (ES) Devices

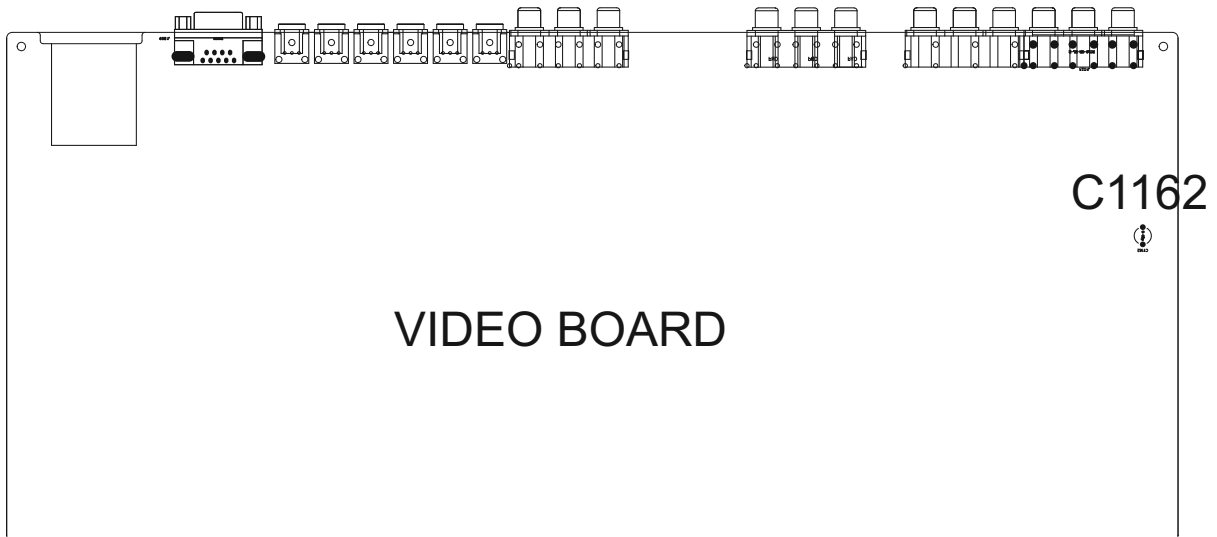
Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electro statically Sensitive (ES) Devices. Examples of typical Es devices are integrated circuits and some field effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reason prior to applying power to the unit under test.
 2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
 3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
 4. Use only an antistatic solder removal device. Some solder removal devices not classified a "anti-static" can generate electrical charges sufficient to damage ES devices.
 5. Do not use Freon propelled chemicals. These can generate electrical charge sufficient to damage ES devices.
 6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material).
 7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
- Caution: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Normally harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

ADJUSTMENT PROCEDURE

OSD VCO Oscillation Frequency (VIDEO BOARD)

Connect M15 CVBS monitor out to a TV set. Press “Enter” key on remote control to call OSD out. Then clockwise adjust C1162 and observe the OSD till the characters are just disappear, record the adjustment slot position A; then anticlockwise C1162 to make the OSD characters disappear and record the adjustment slot position B again. Adjust the adjustment slot position in the middle of A and B. Get in “DISPLAY SETUP” OSD Menu and switch the unit in both “NTSC” and PAL” mode, observe the OSD characters, they should be all stable displaying without any flicker.



SOFTWARE VERSION:

TO DISPLAY SOFTWARE VERSIONS, PRESS FRONT PANEL video & audio SIMULTANEOUSLY

SPECIFICATIONS

DECODING FORMATS

Dolby Digital, Dolby Digital EX, Dolby Pro Logic II, Dolby Pro Logic IIx, DTS, DTS ES, DTS Neo:6, DTS 96/24, THX Surround EX, THX Ultra 2

SAMPLING RATES 32kHz, 44.1kHz, 48kHz, 88.2k, 96kHz

MODES EARS, Enhanced stereo, Mono

VIDEO (input and output impedance) 75Ω

THD + NOISE 0.002%

PRE-AMP SECTION LINE LEVEL INPUTS

Input impedance(R + C) 56KΩ/180PF
Frequency response(20Hz to 20KHZ) 20Hz to 20kHz @ +/-0.3dB

LINE LEVEL OUTPUTS

Output impedance 470Ω
Tape Source Z + 2kΩ
Signal/noise ratio >102dB
Maximum Output Level 6Vrms
Multiroom Output (Zone 2) 470Ω

TONE CONTROLS

Bass ±10dB@20Hz
Treble ±10dB@20kHz
Center Dialog ±6dB@1kHz

+12VOLT TRIGGER OUT

Output Voltage +12V +/- 20%
Minimum Output Current >40ma
Maximum Short Circuit Current <60mA

PHYSICAL SPECIFICATIONS

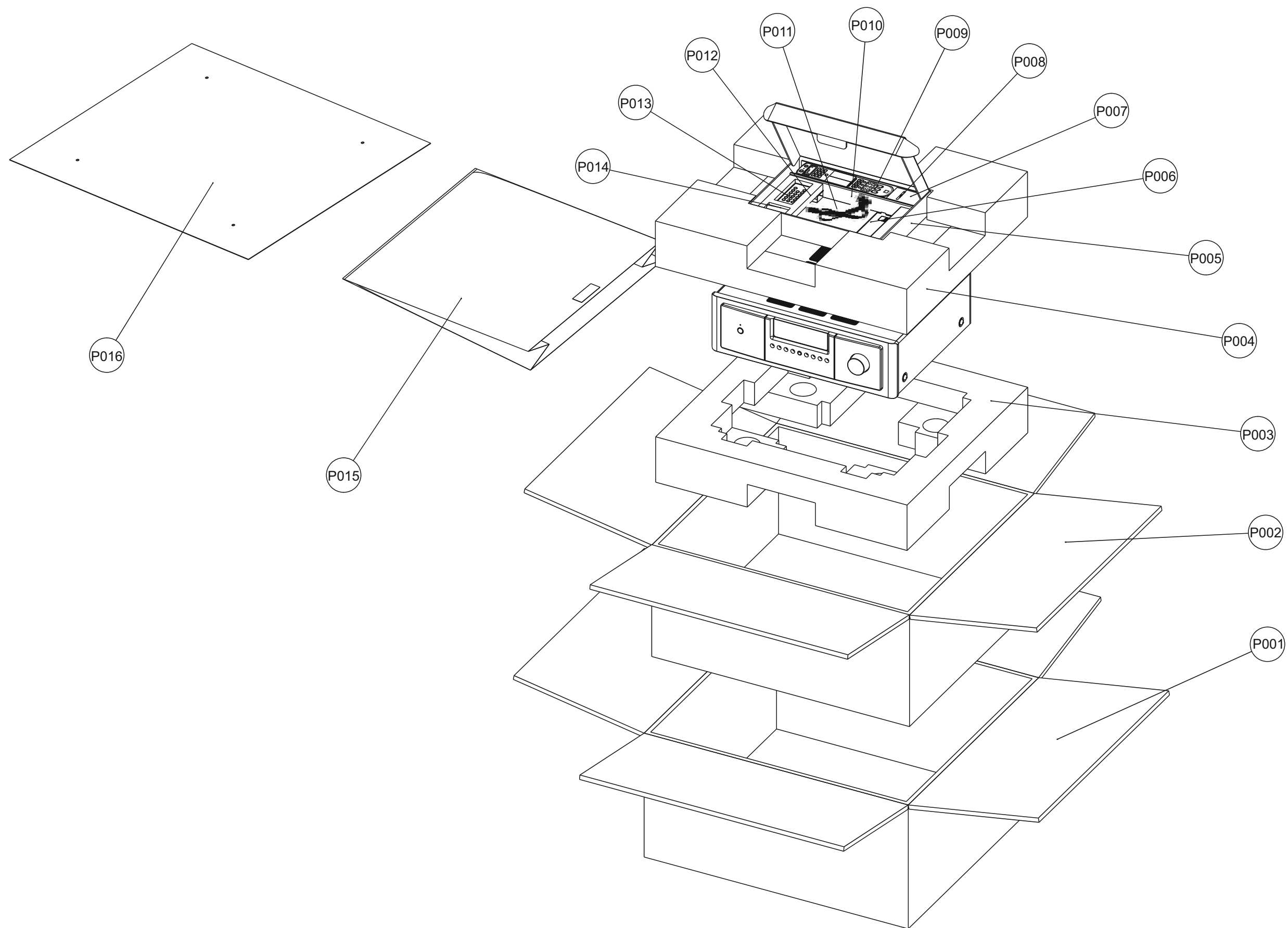
Operating temperature: 5 °C to 35 °C (41 °F to 95 °F)
Operating humidity: 5 % to 90 %
Dimensions (W x H x D) NET 17.13 x 5.24 x 13.98"(435 x 133 x 355mm)
Gross* 17.13 x 5.79 x 14.96"(435 x 147 x 380mm)
Net Weight 15 lbs
Shipping Weight 20 lbs

SECTION 2
CABINET & MAIN CHASSIS

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2.Packing accessory section



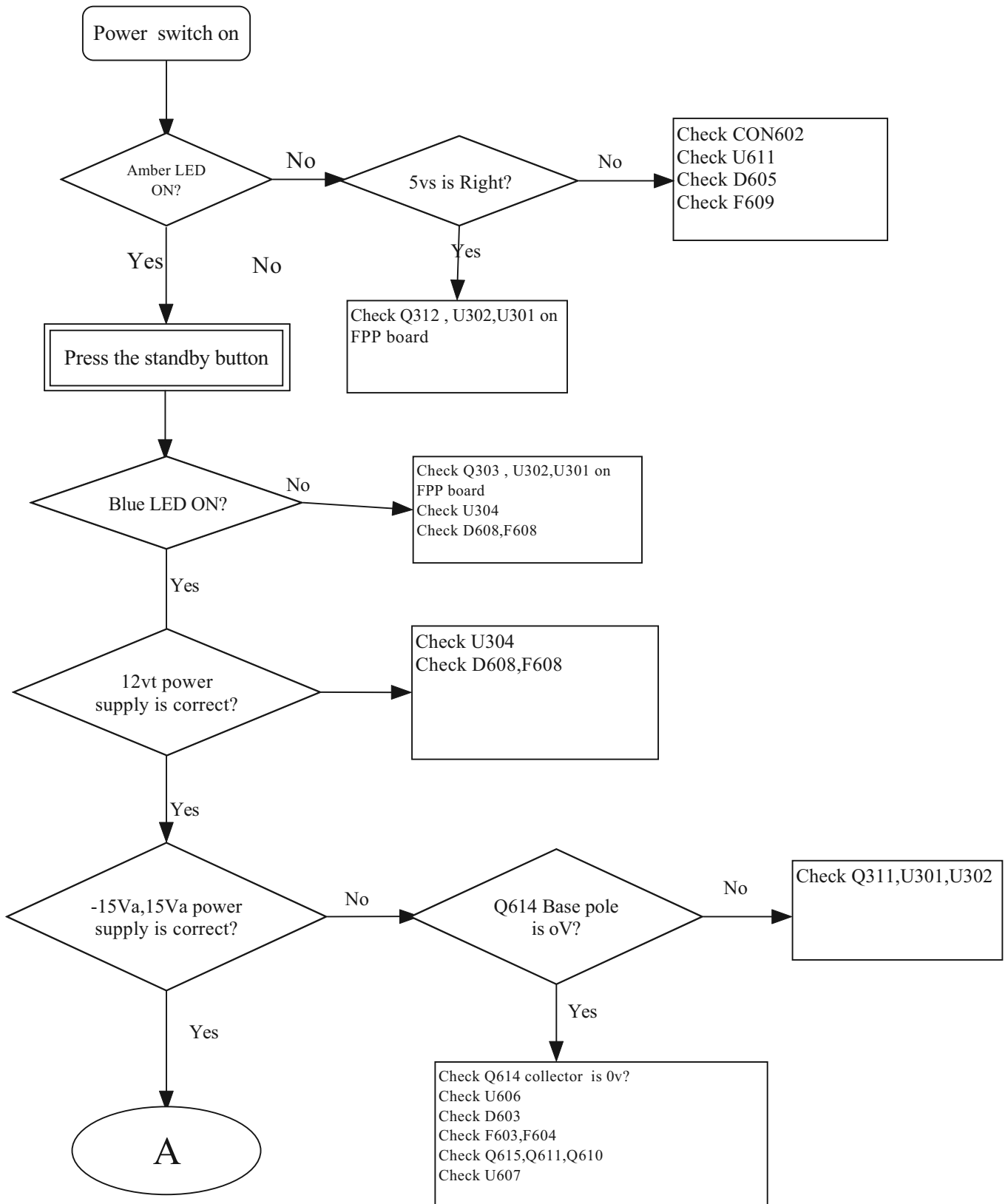
SECTION 3

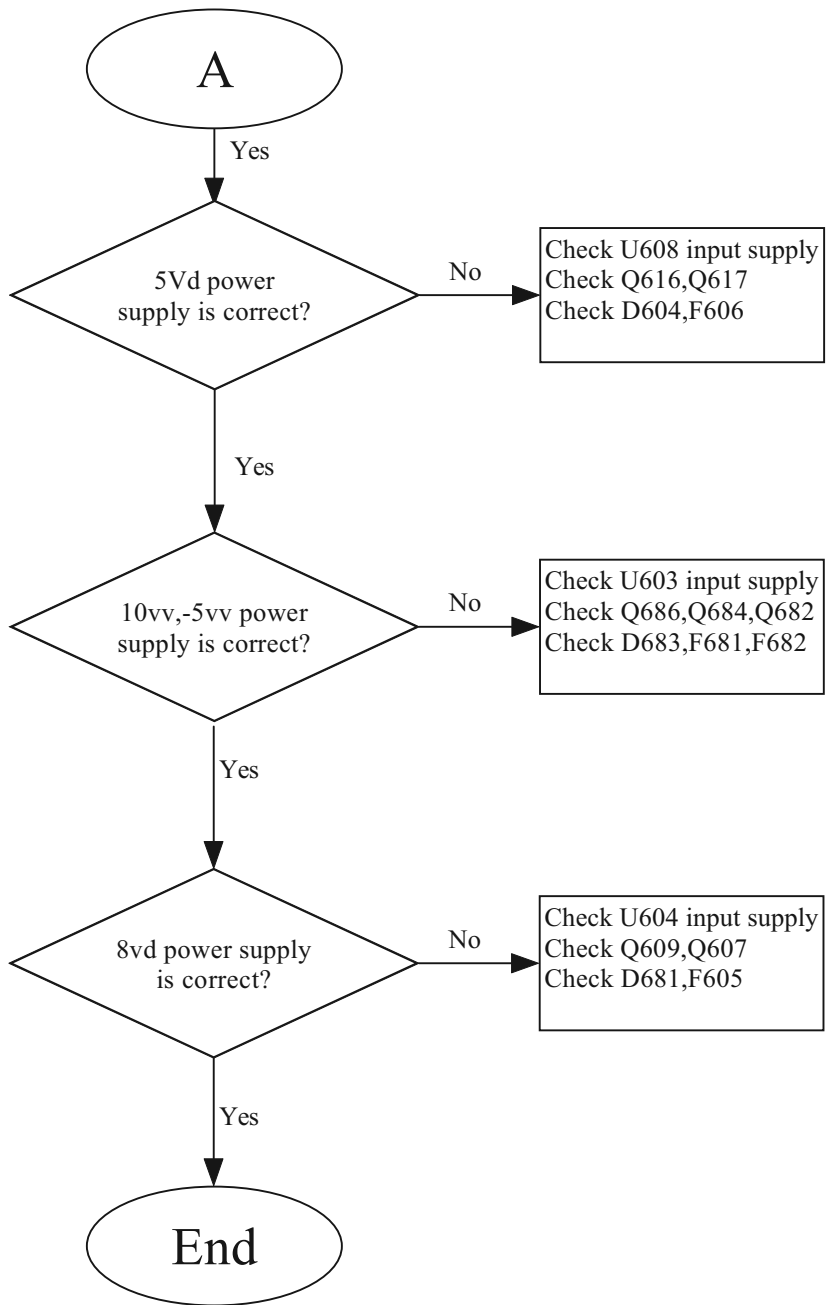
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ELECTRICAL TROUBLESHOOTING GUIDE

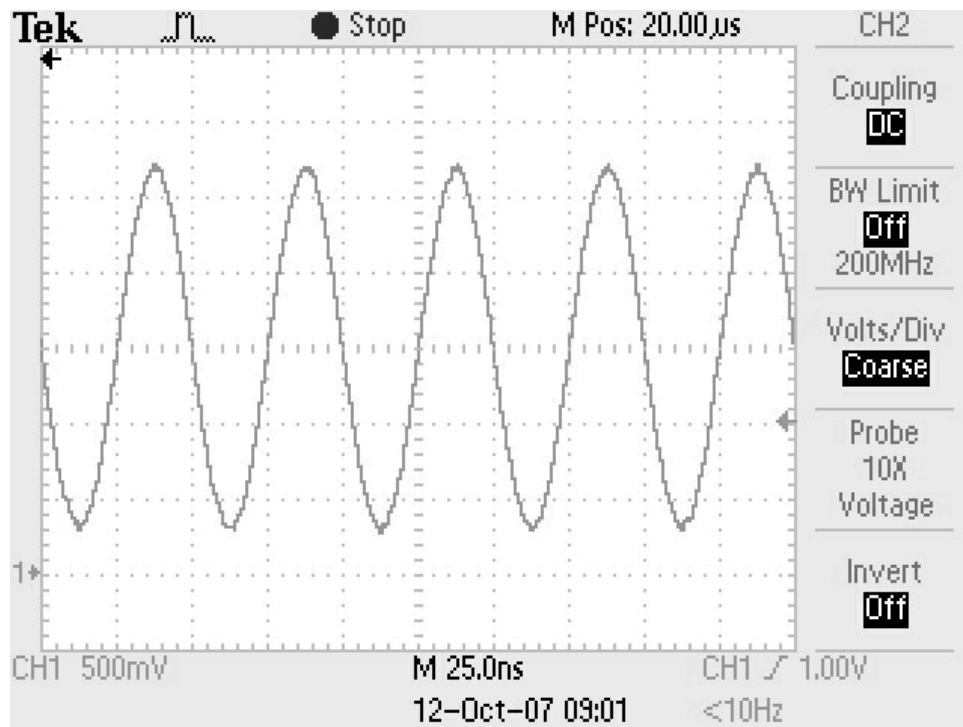
Power check flow



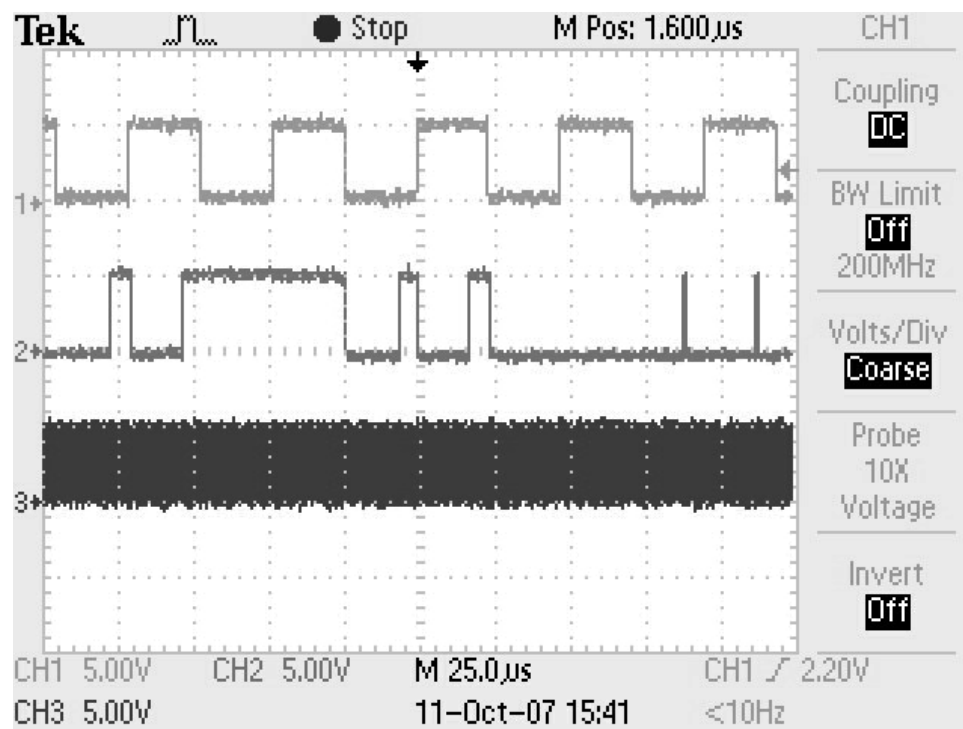


DETAILS AND WAVEFORMS ON SYSTEM TEST AND DEBUGGING

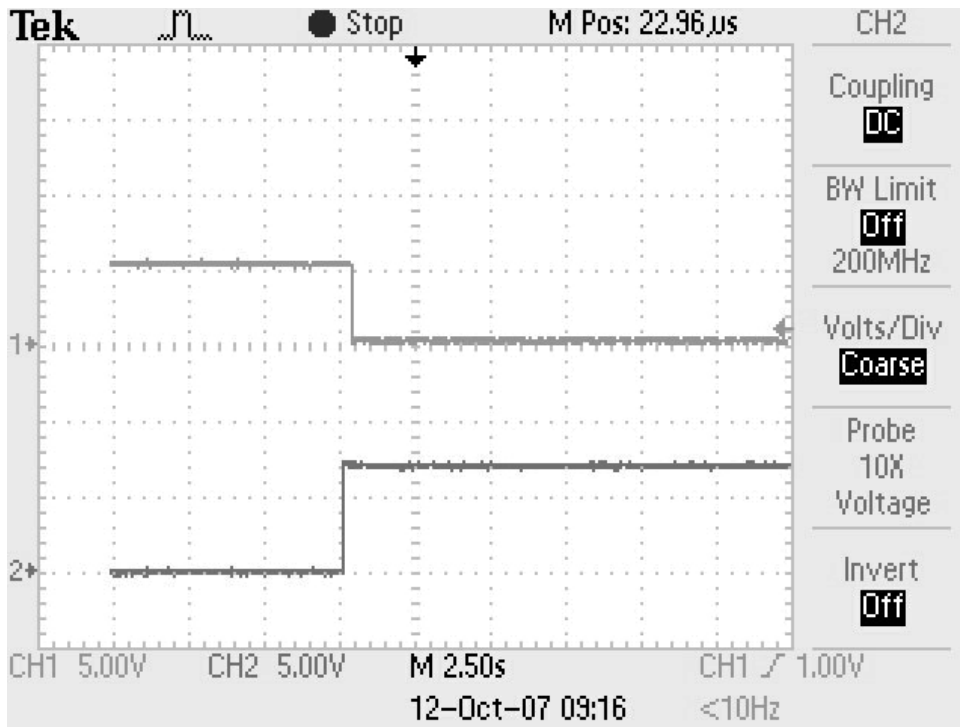
1.DSP clock 20MHz



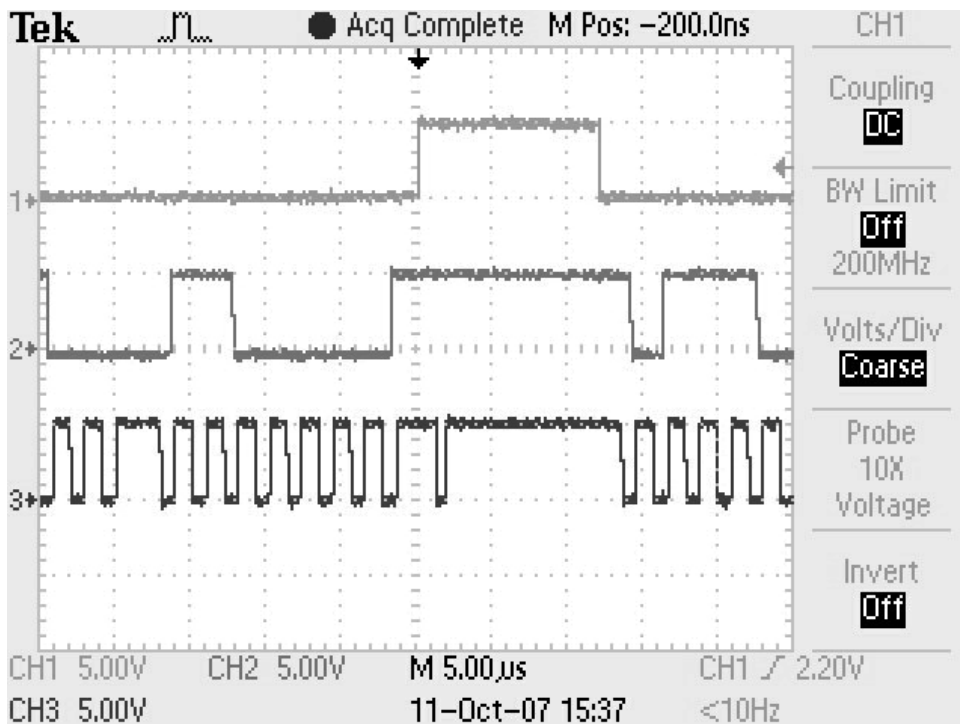
2.Volume control STB(CH1) , DATA(CH2) and CLOCK(CH3)



3. AT89C51 RESET IS HIGH ACTIVE, STB(CH1), +5V(CH2)

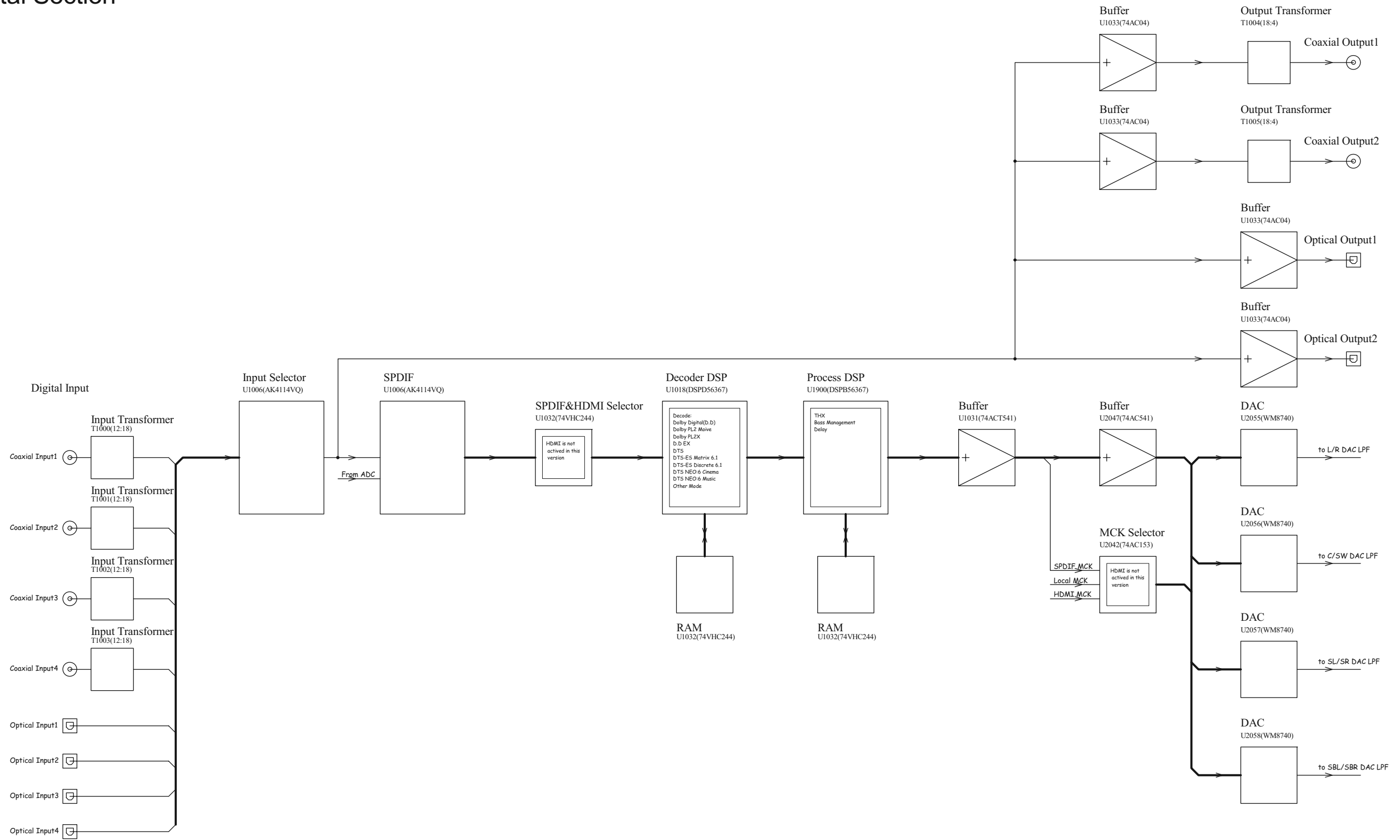


4. WM8740 DAC STB(CH1), DATA(CH2) AND CLOCK(CH3)

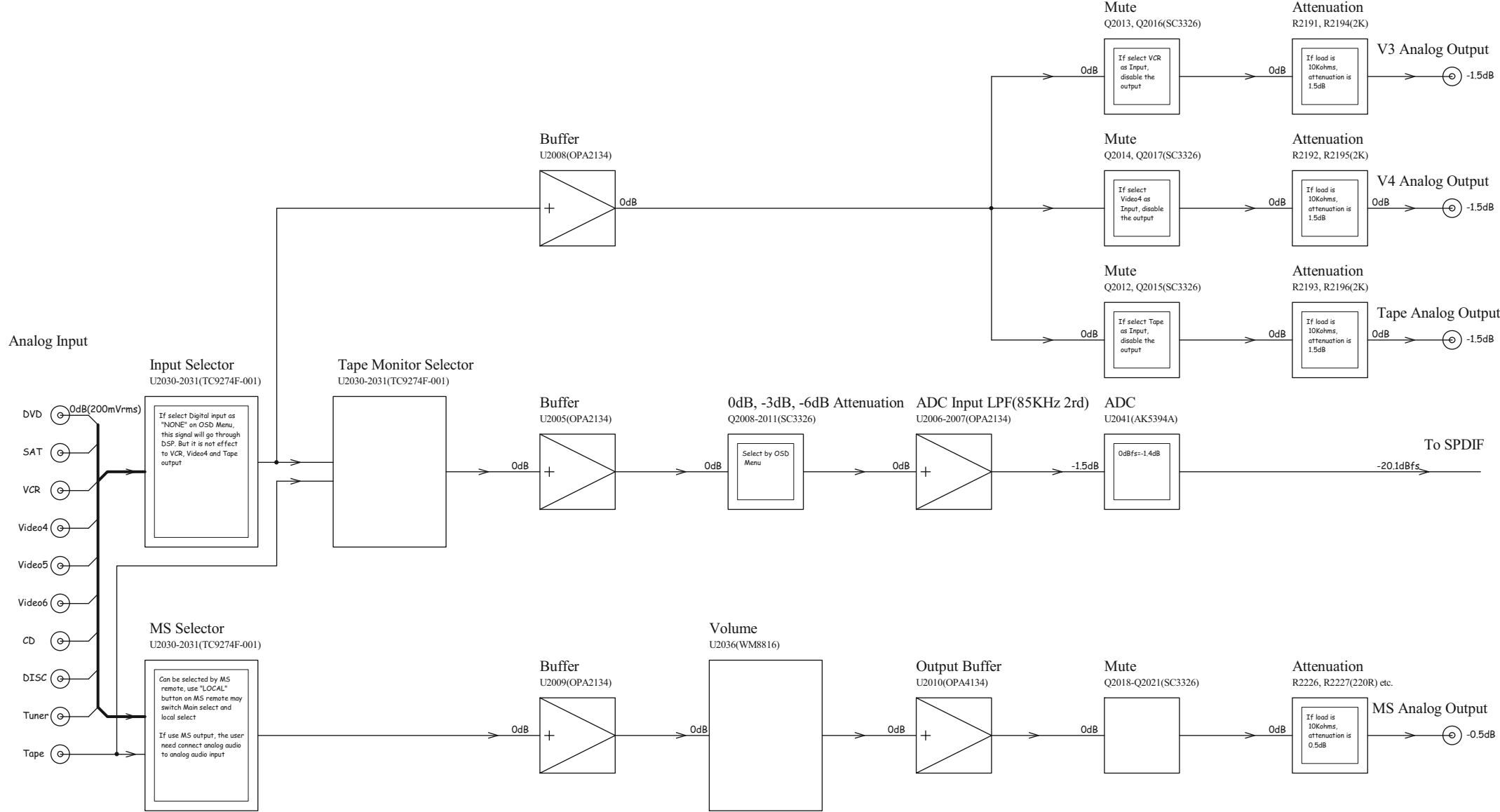


BLOCK DIAGRAM

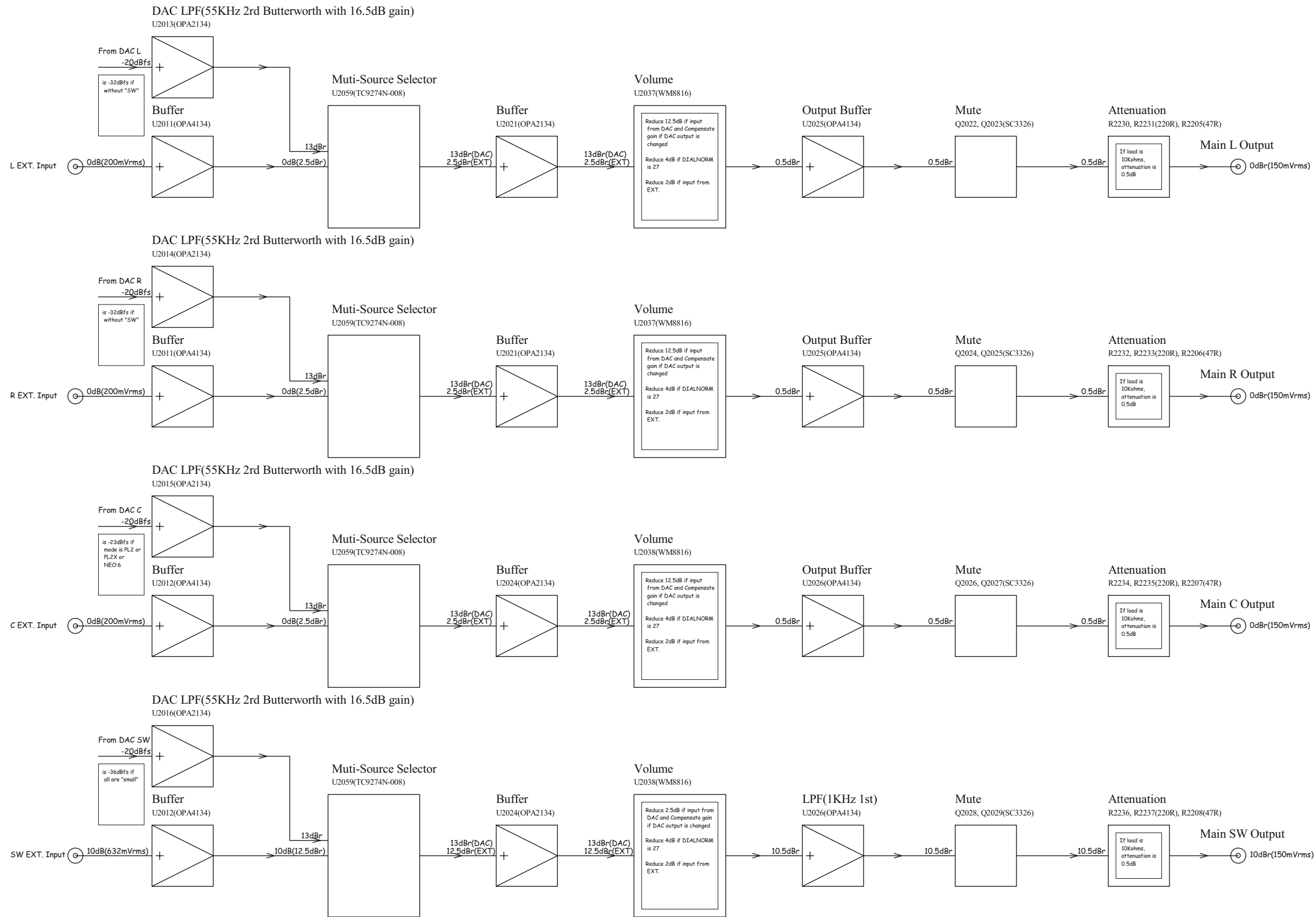
1. Digital Section



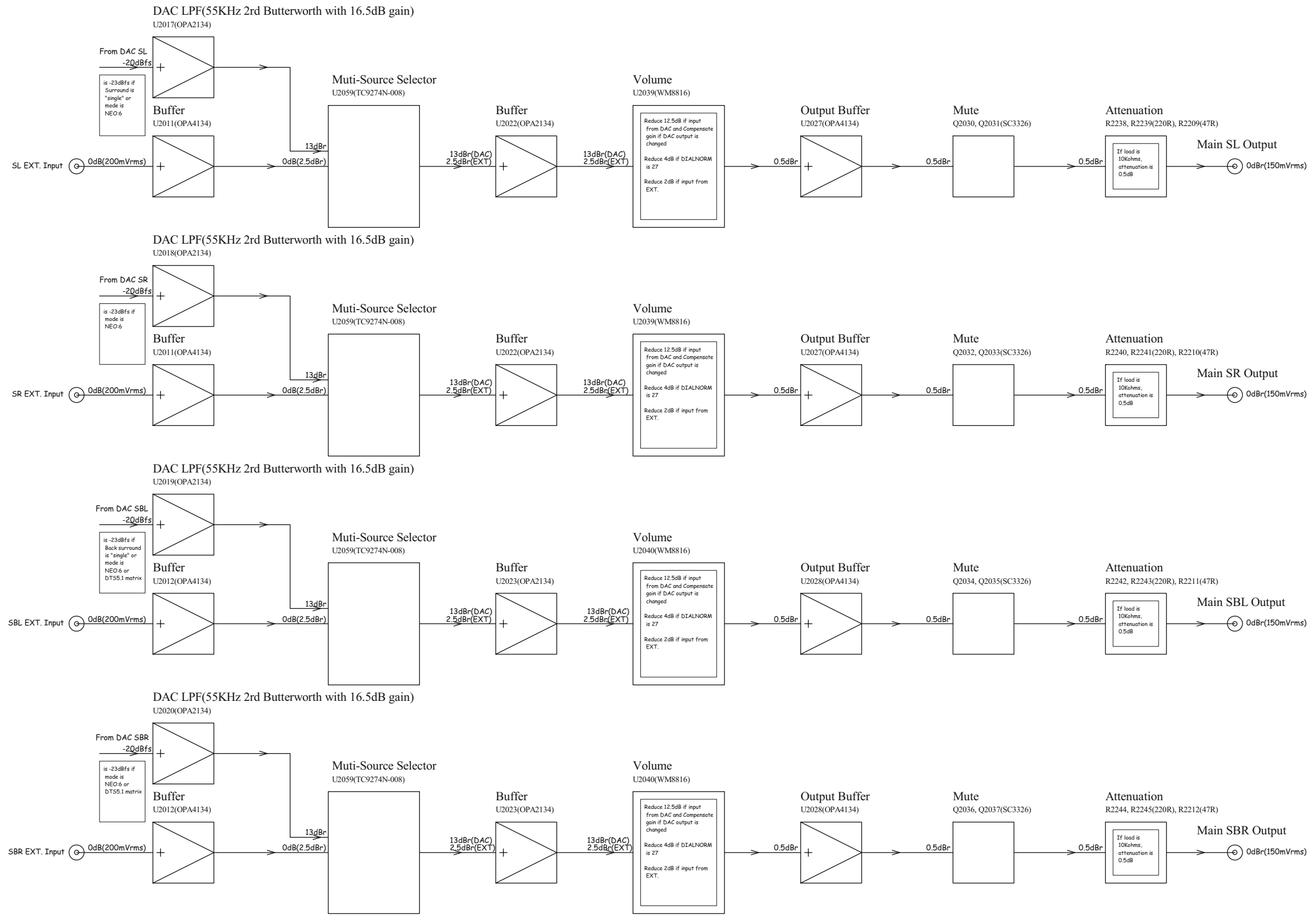
2. Analog Input Section



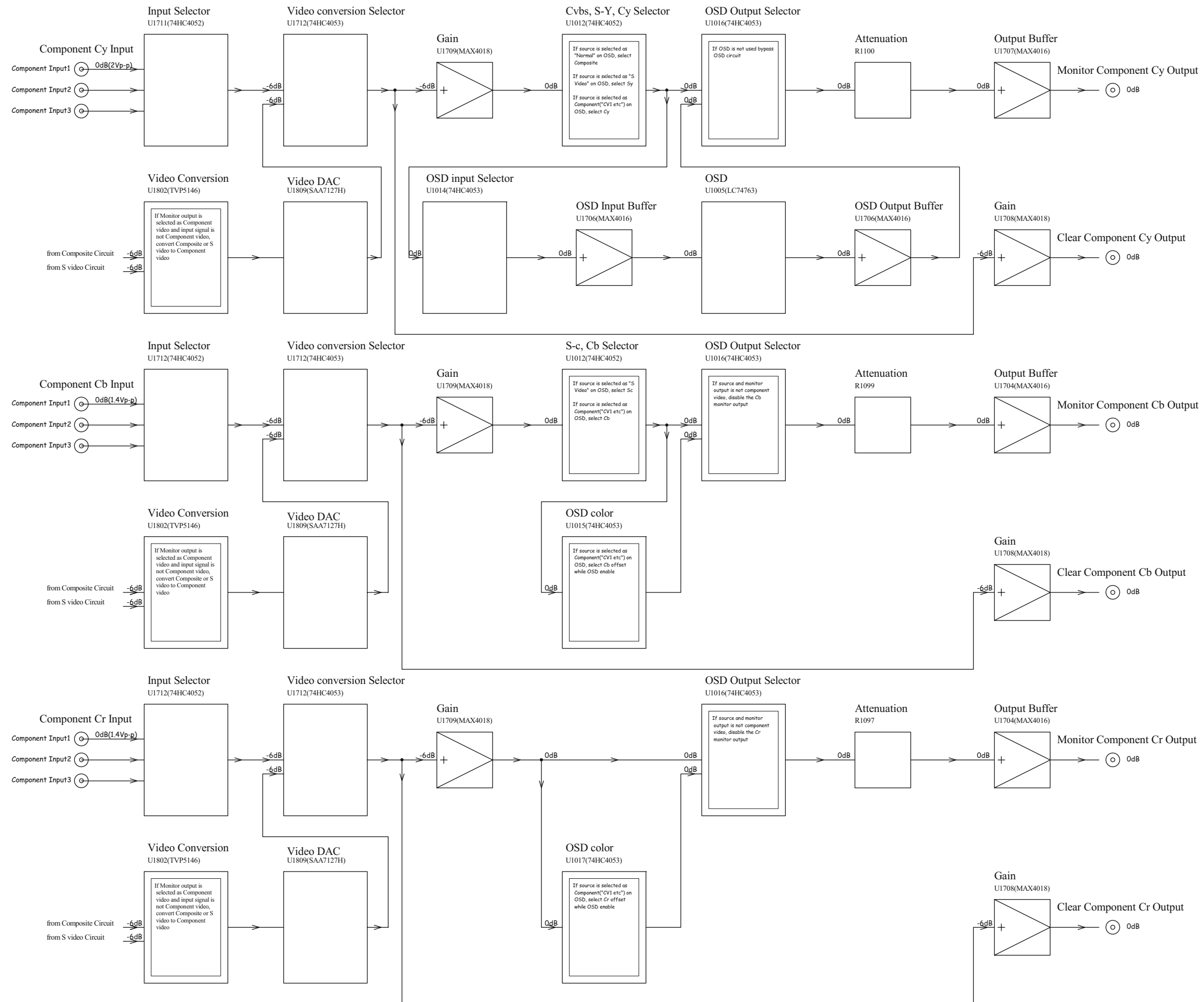
3. Volume and EXT. Section/L/R/C/SW



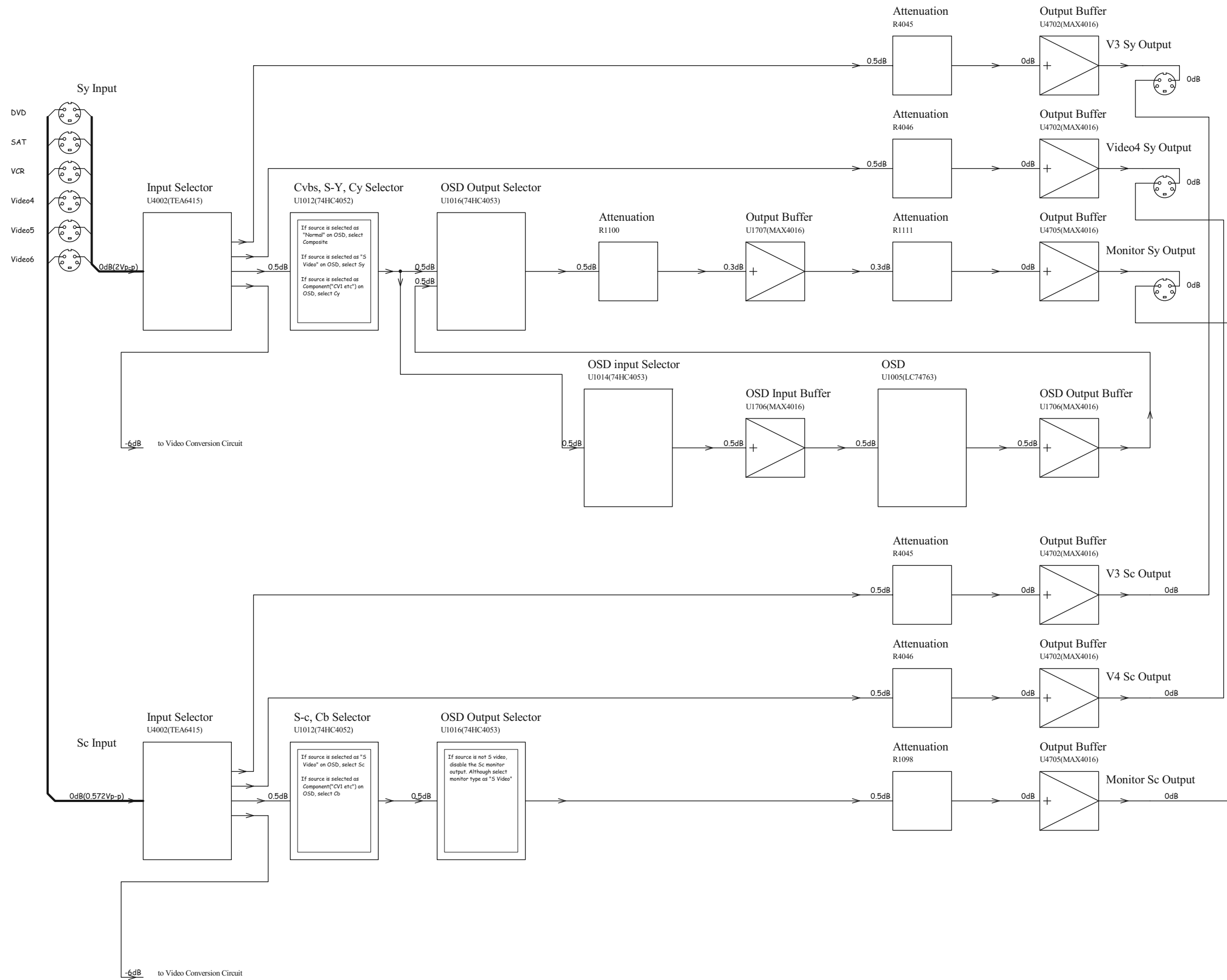
4. Volume and EXT. Section/SL/SR/SBL/SBR



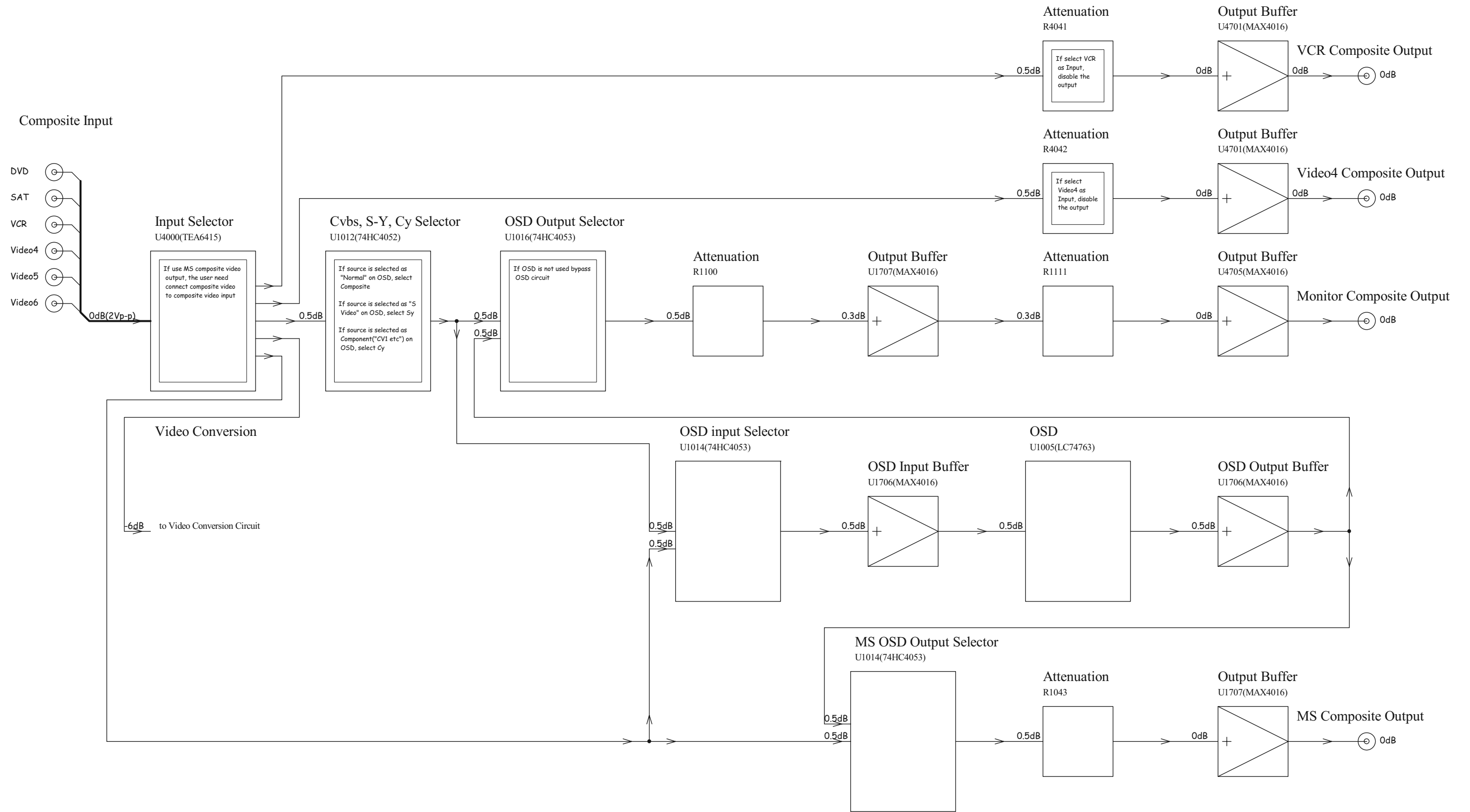
5.Component Video



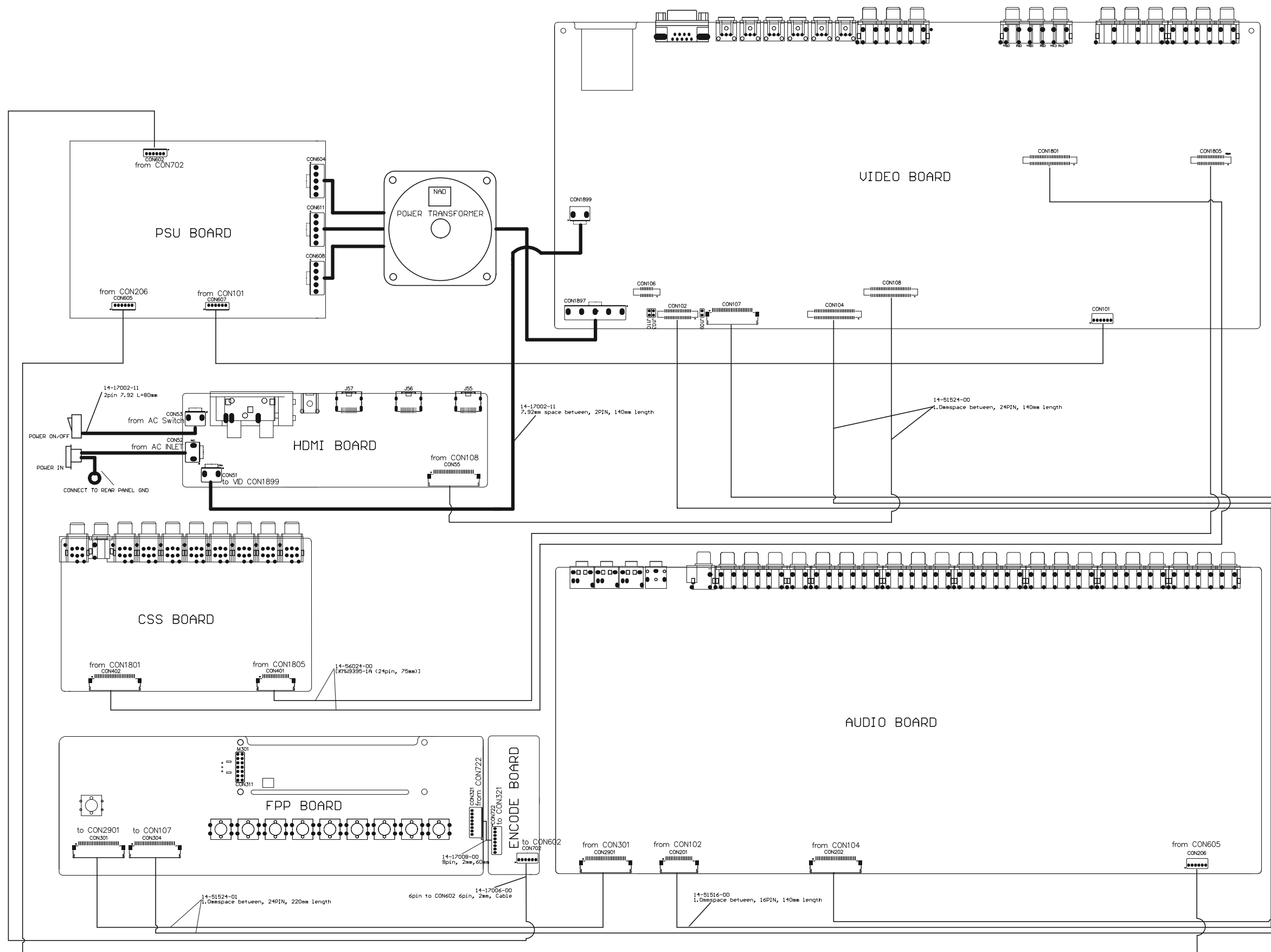
6 . S Video Section



7.Composite Video

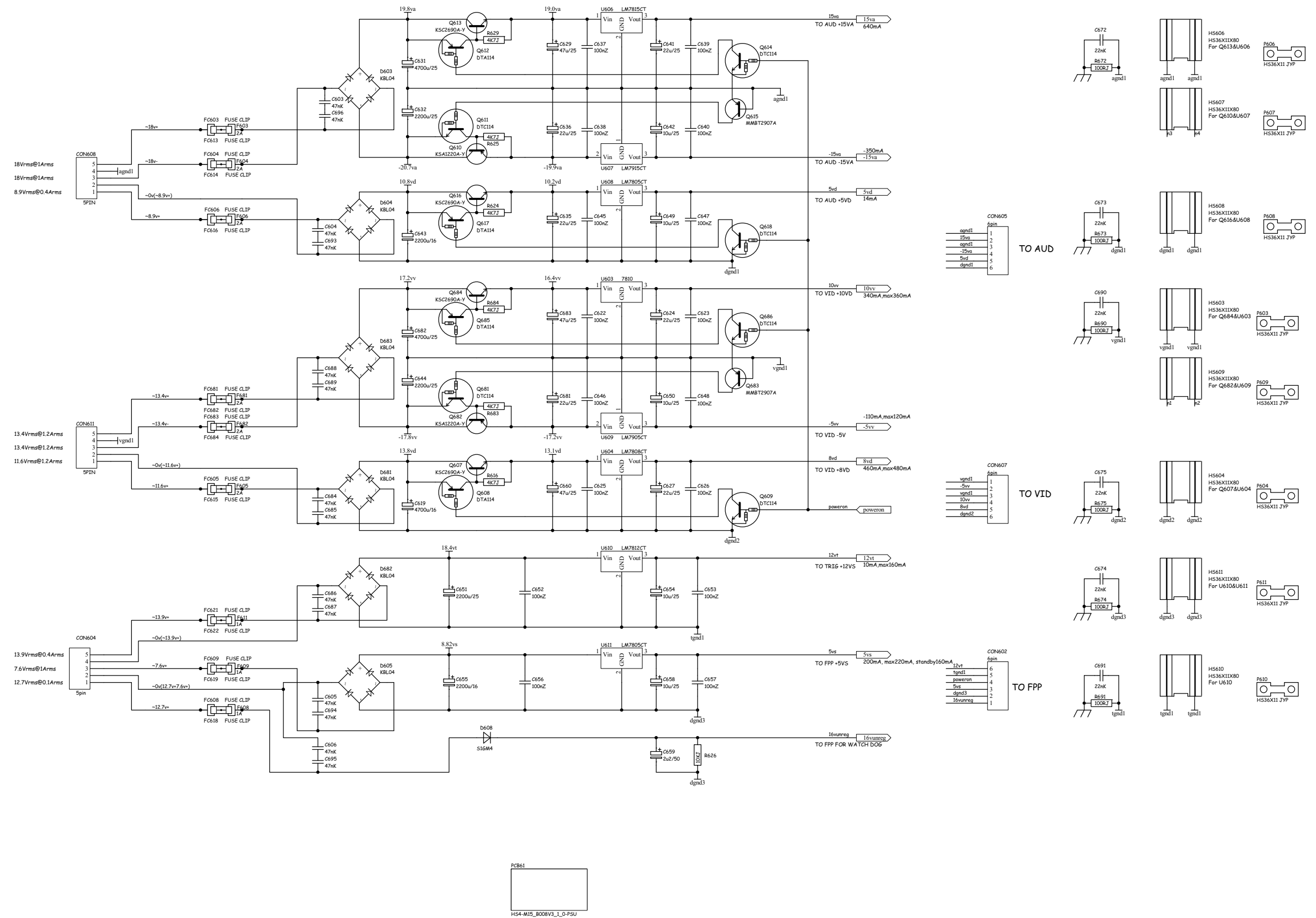


WIRING DIAGRAM

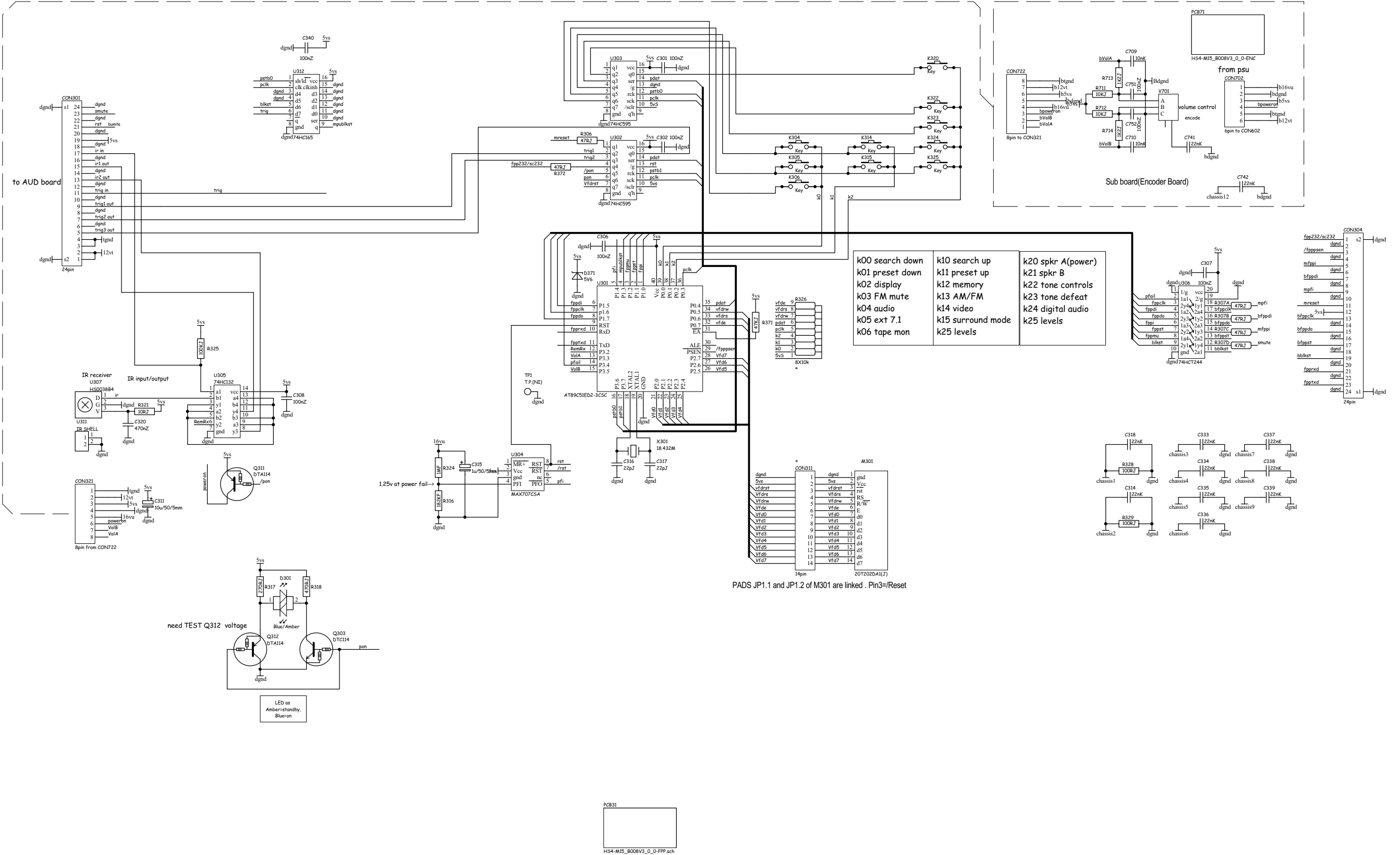


CIRCUIT DIAGRAMS

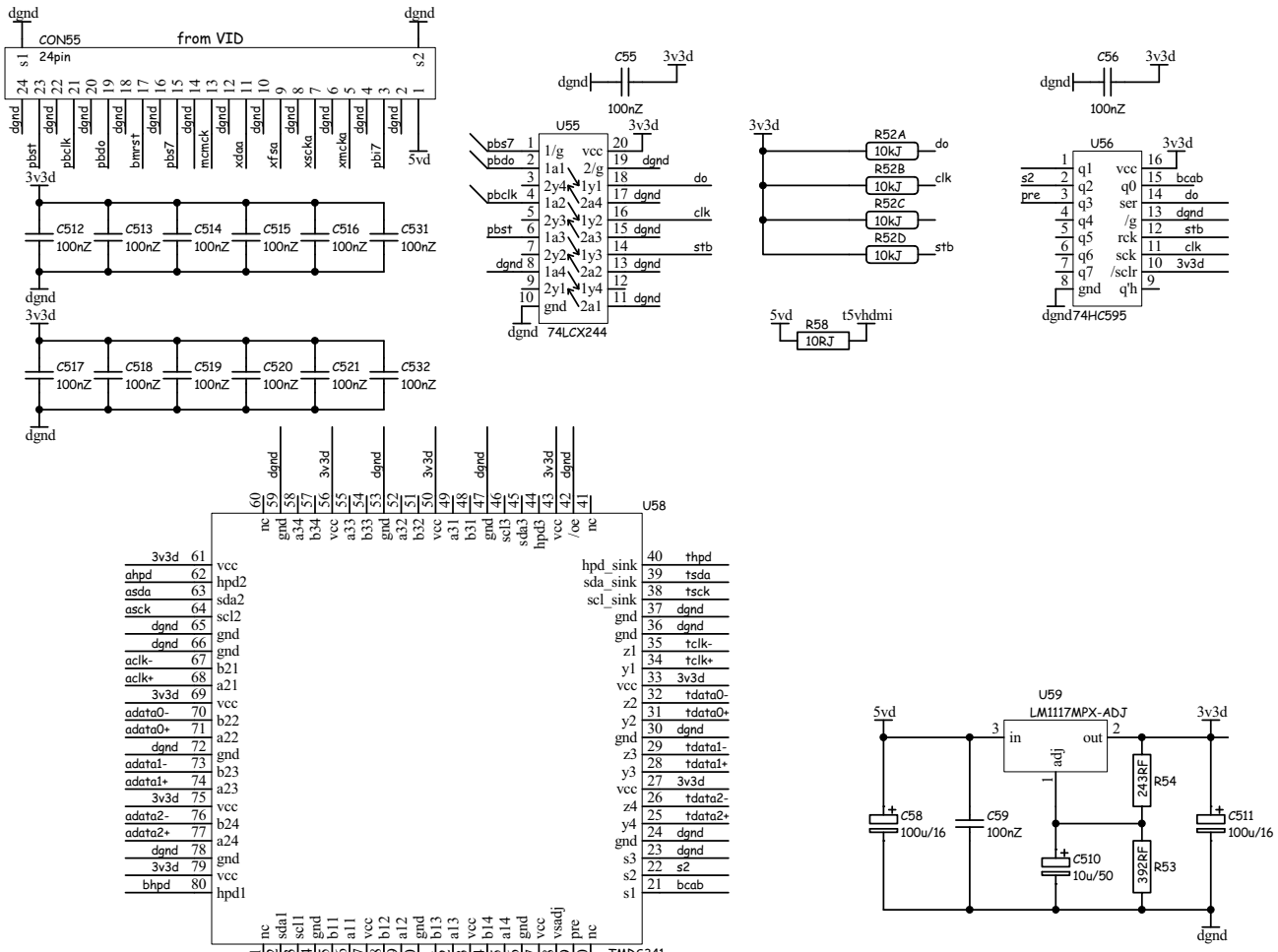
1. POWER SUPPLY CIRCUIT DIAGRAM



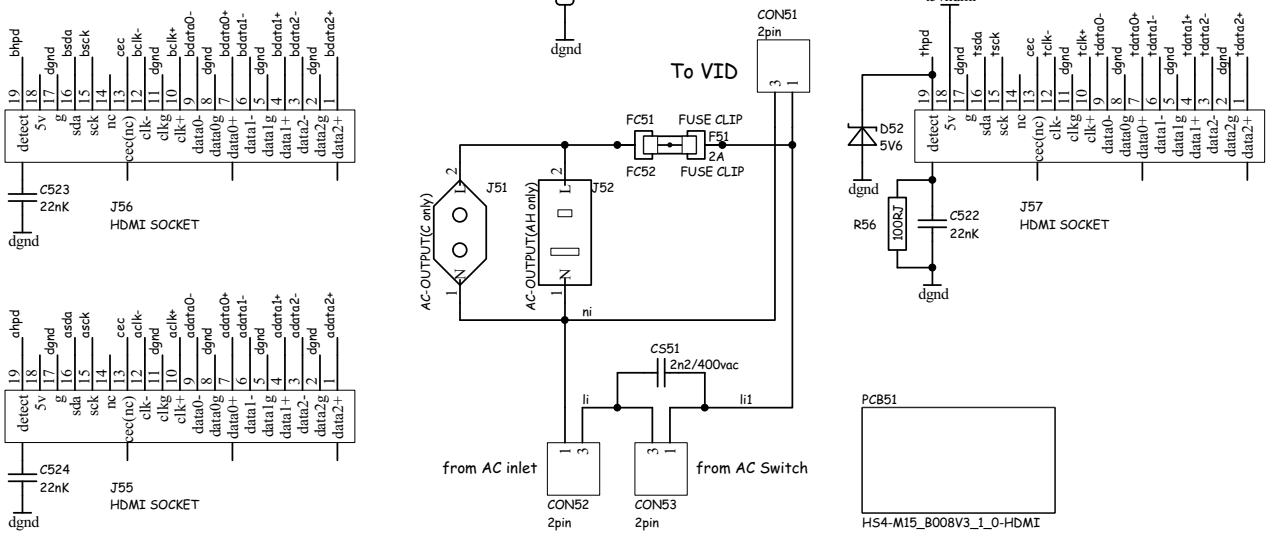
2.FRONT PANEL CIRCUIT DIAGRAM



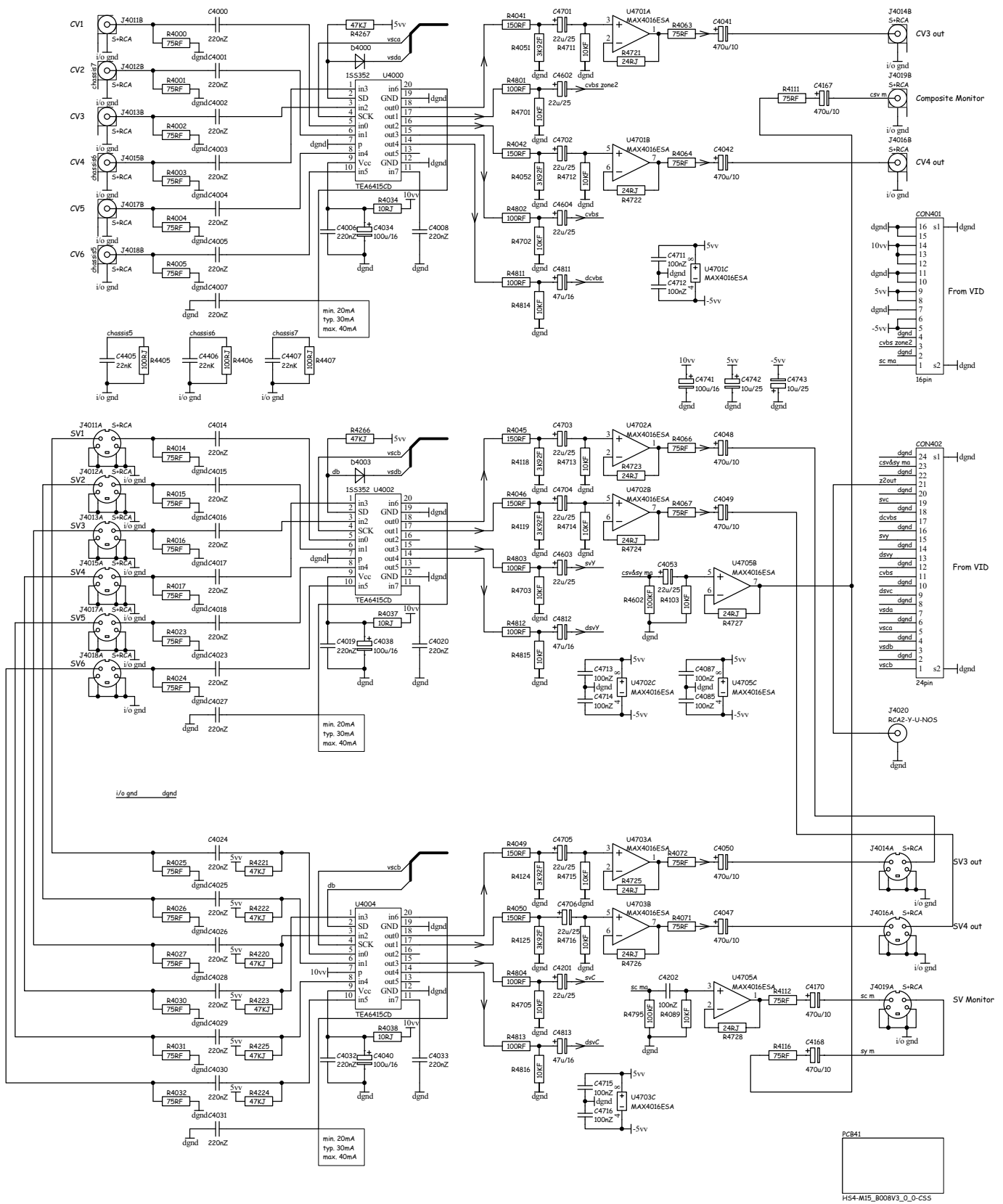
3.HDMI CIRCUIT DIAGRAM



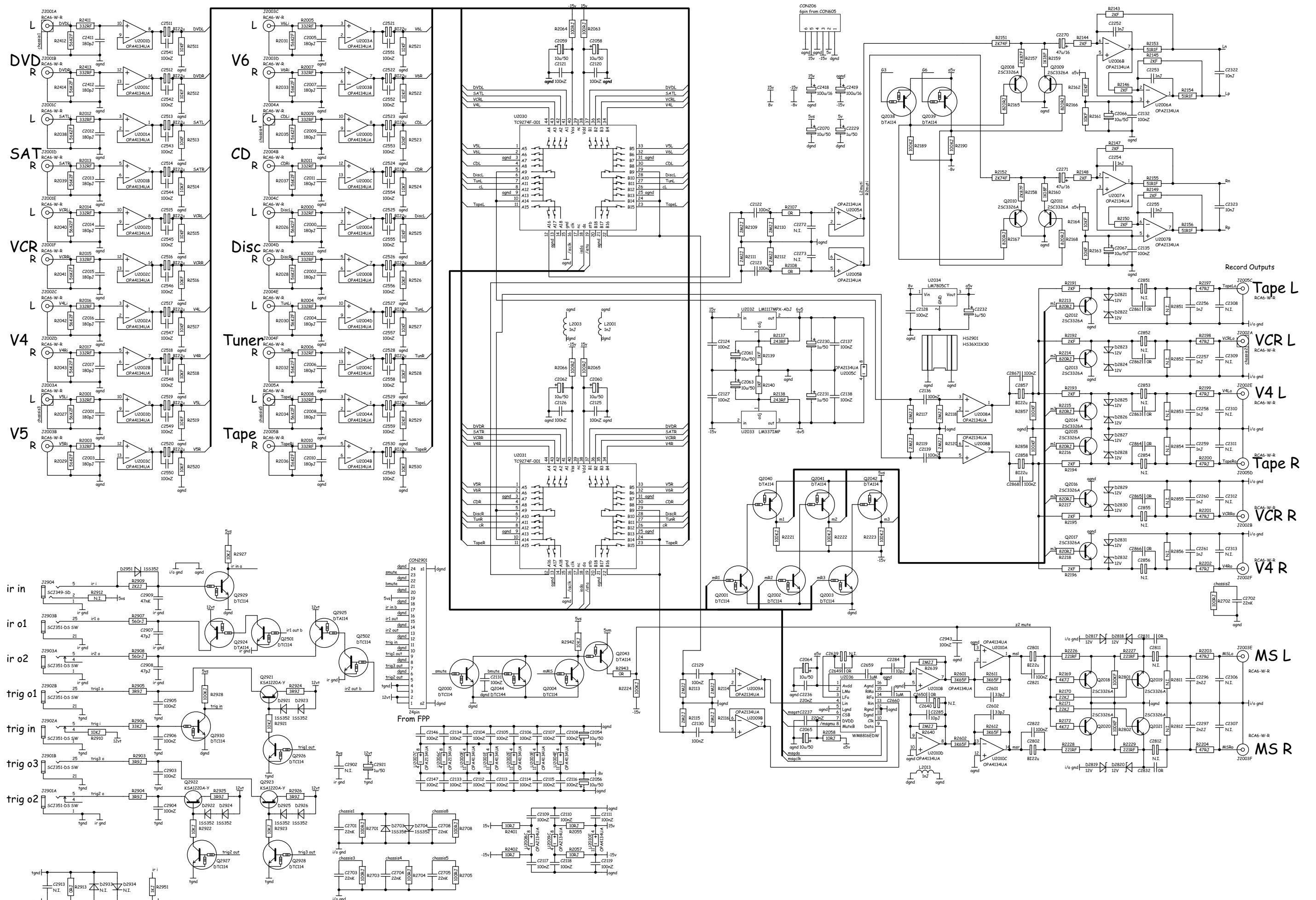
"pre" is output pre-emphasis adjustment, high=3dB



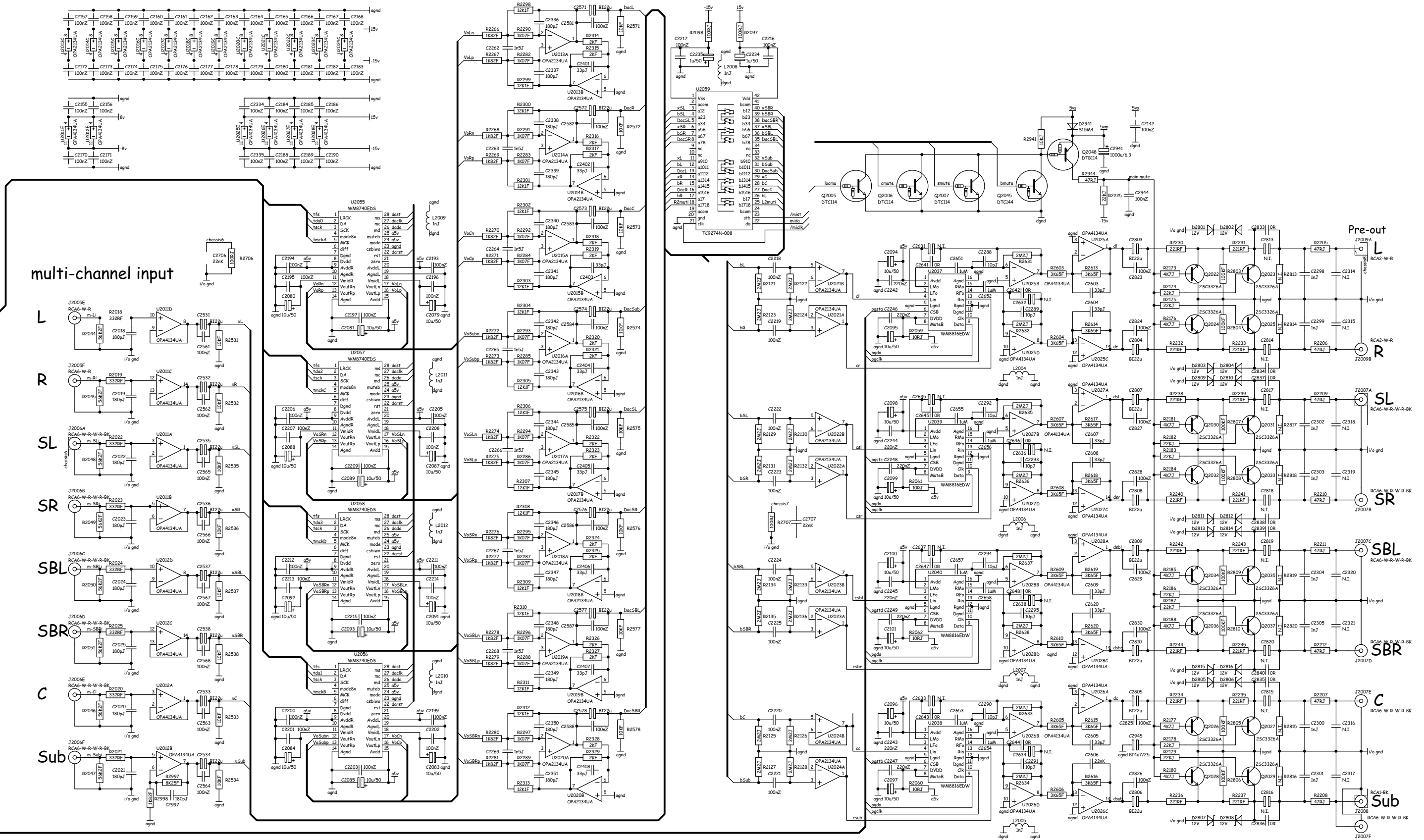
4.CSS CIRCUIT DIAGRAM



5.AUDIO CIRCUIT DIAGRAM-1



5.AUDIO CIRCUIT DIAGRAM-3

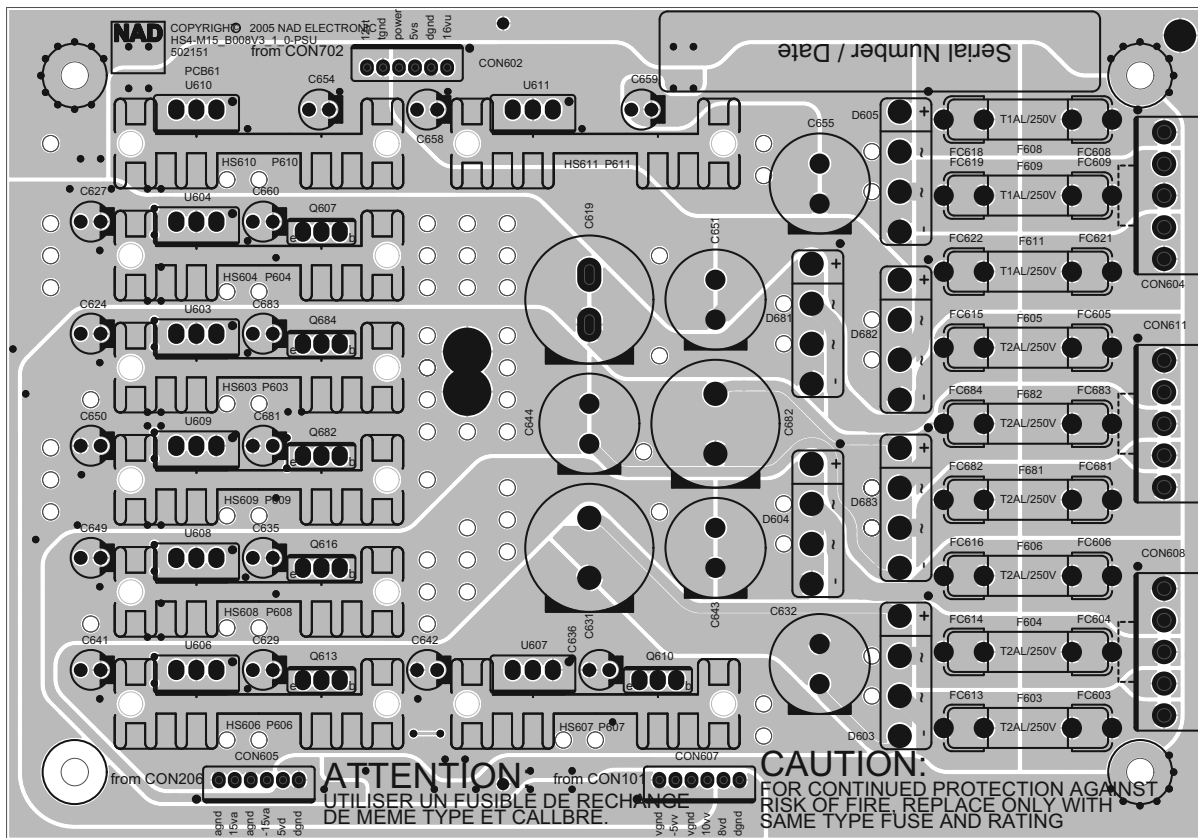


PCB21
H54-M15_8008V3_0_0-AUD

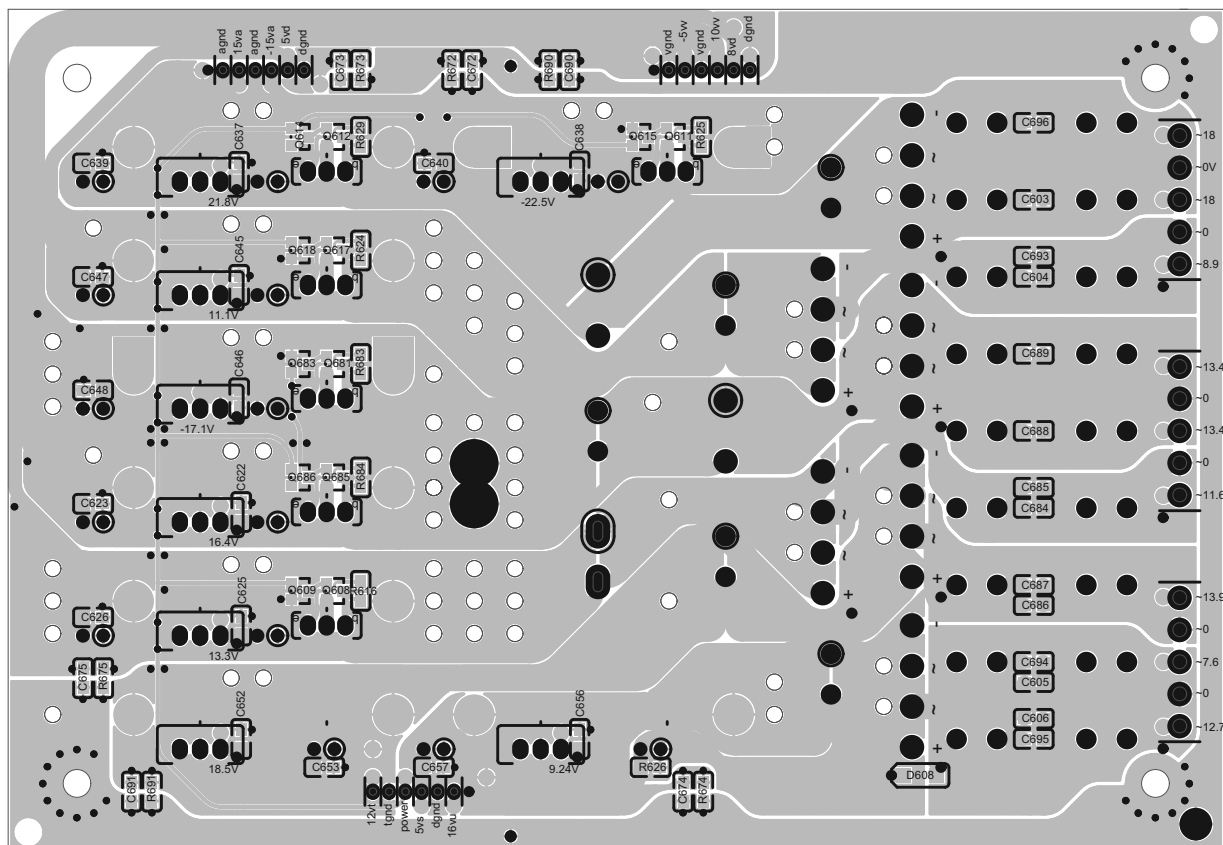
PRINTED CIRCUIT DIAGRAMS

1. POWER SUPPLY BOARD

PSU BOARD- COMPONENT SIDE

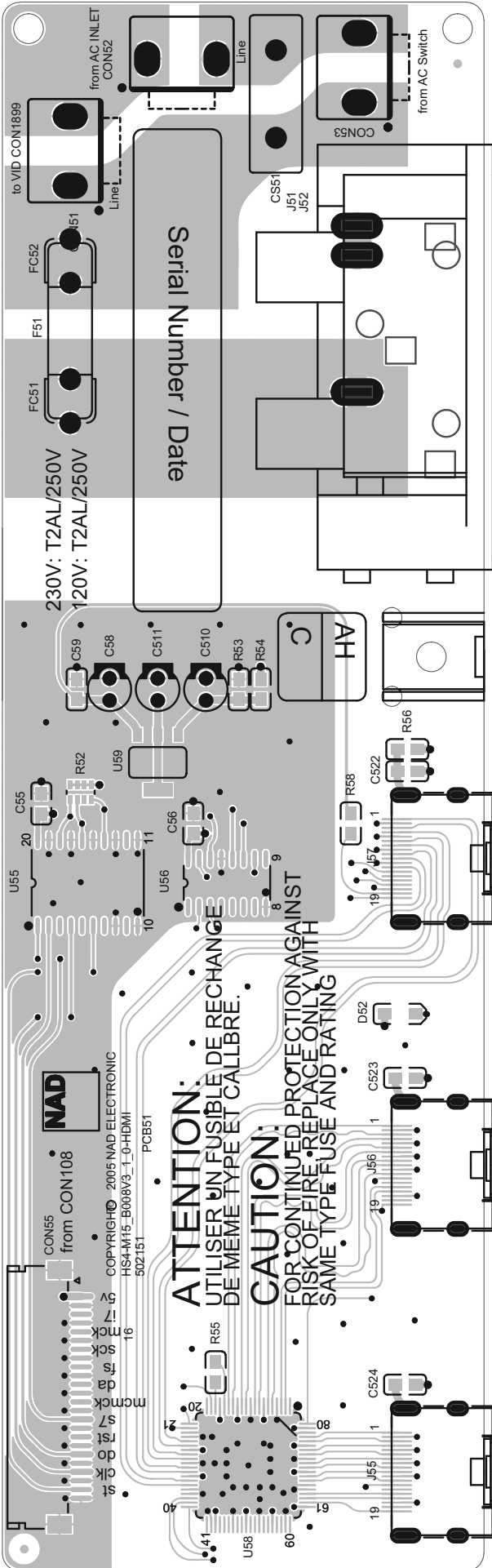


PSU BOARD- COPPER SIDE

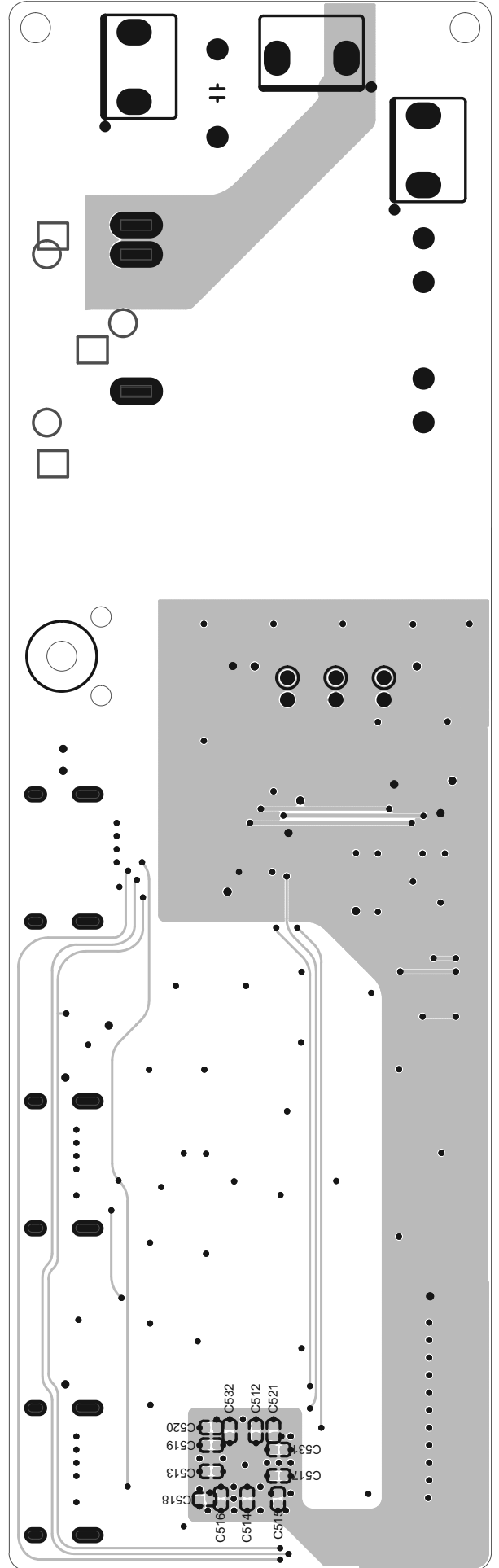


3.HDMI BOARD

HDMI BOARD- COMPONENT SIDE

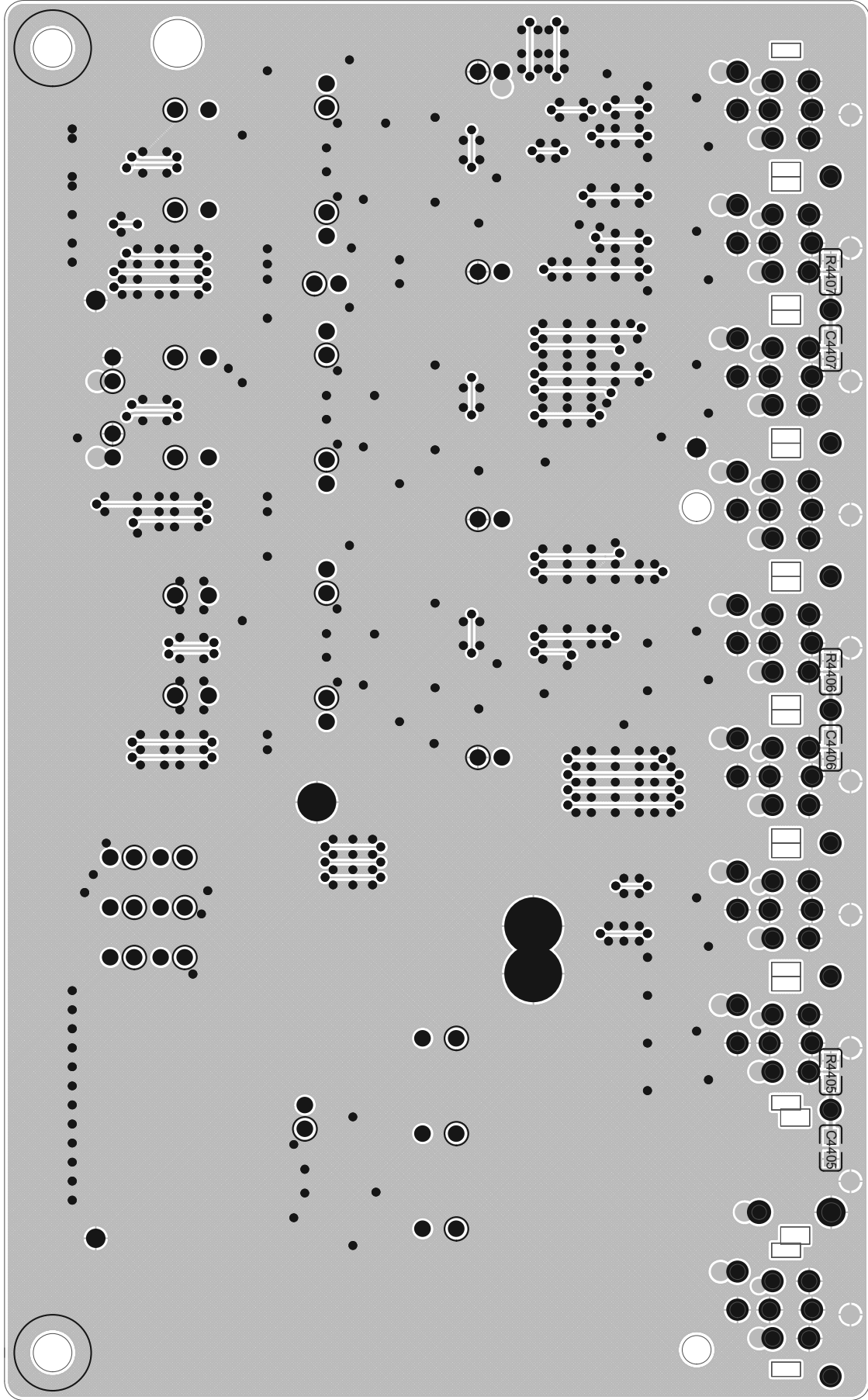


HDMI BOARD- COMPONENT SIDE

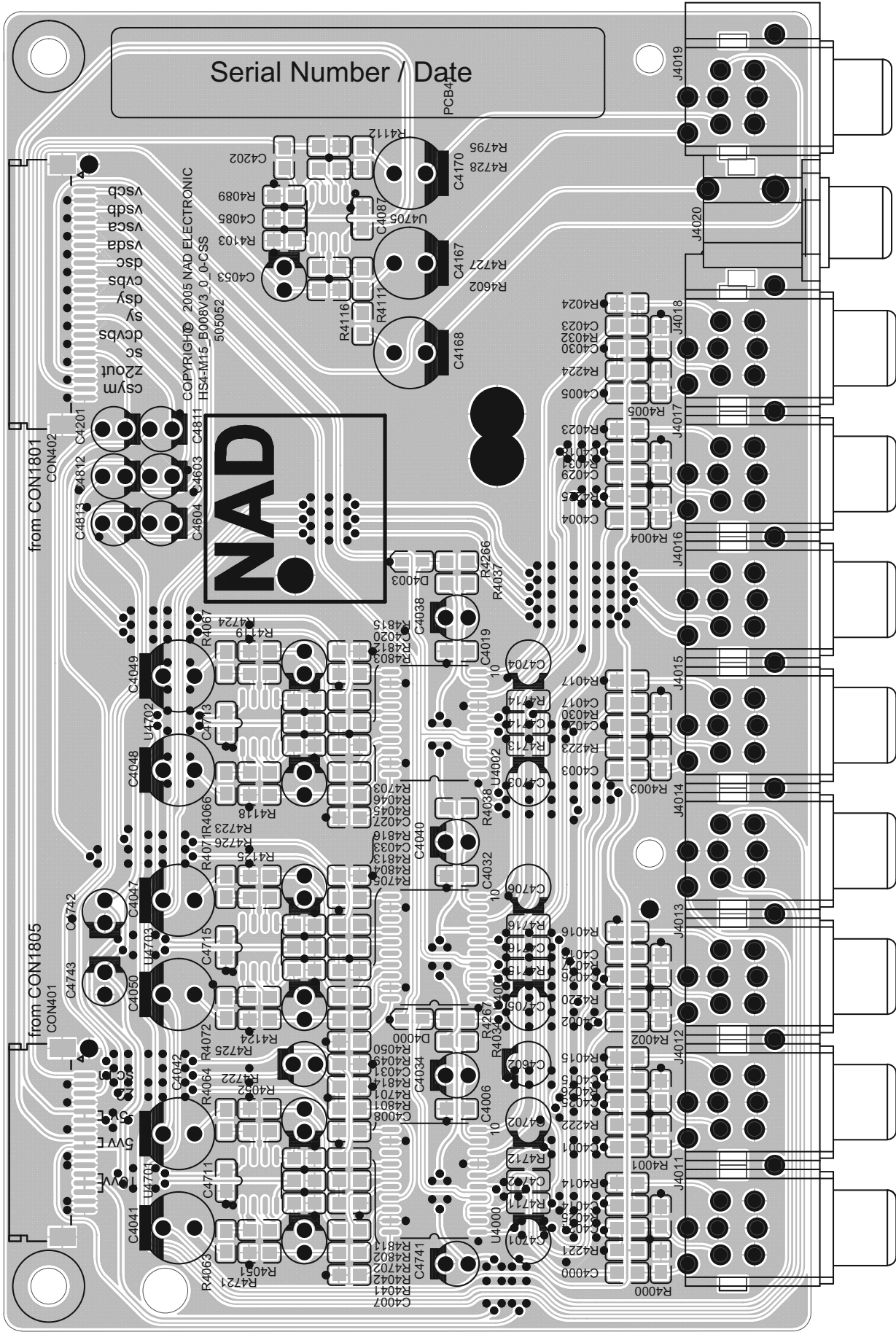


4.CSS BOARD

CSS BOARD-COPPER SIDE

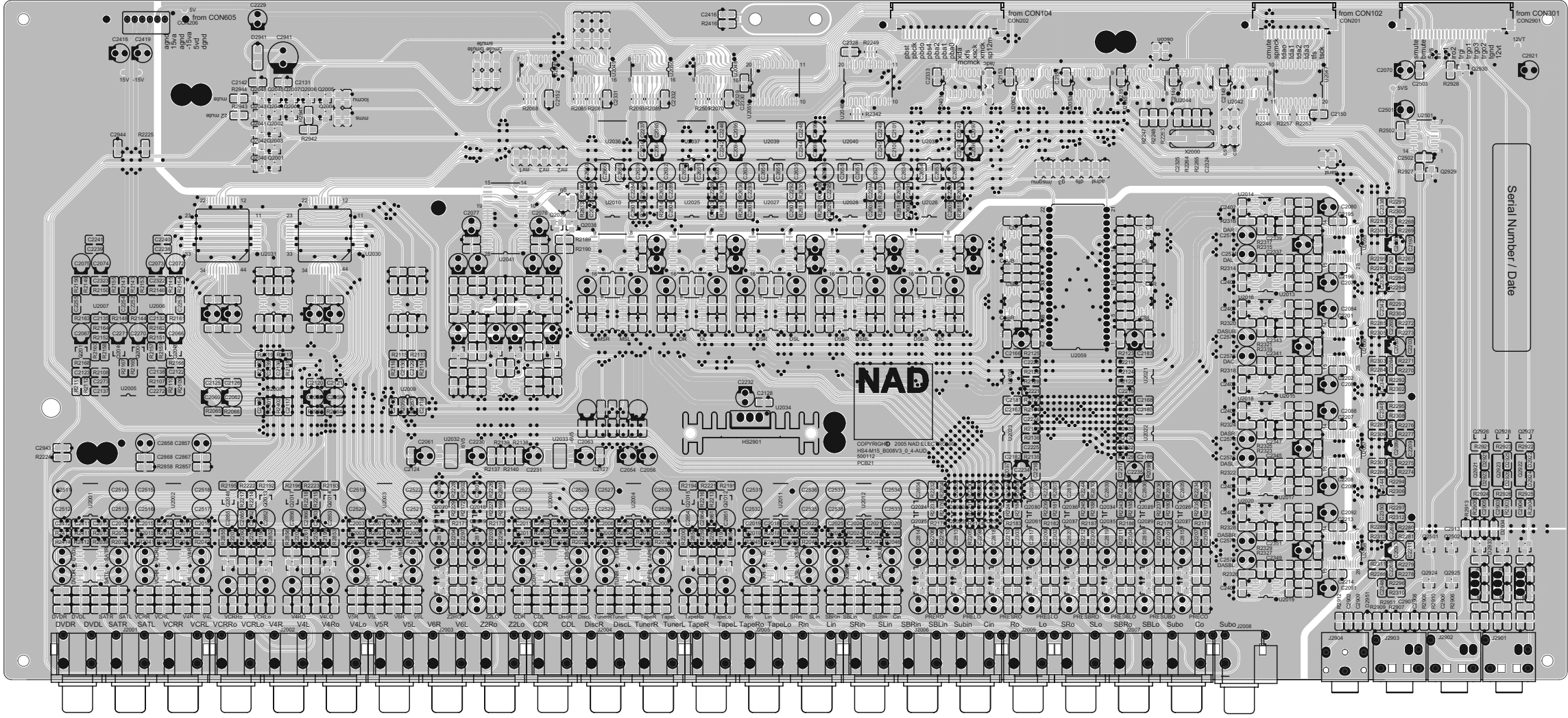


CSS BOARD-COMPONENT SIDE

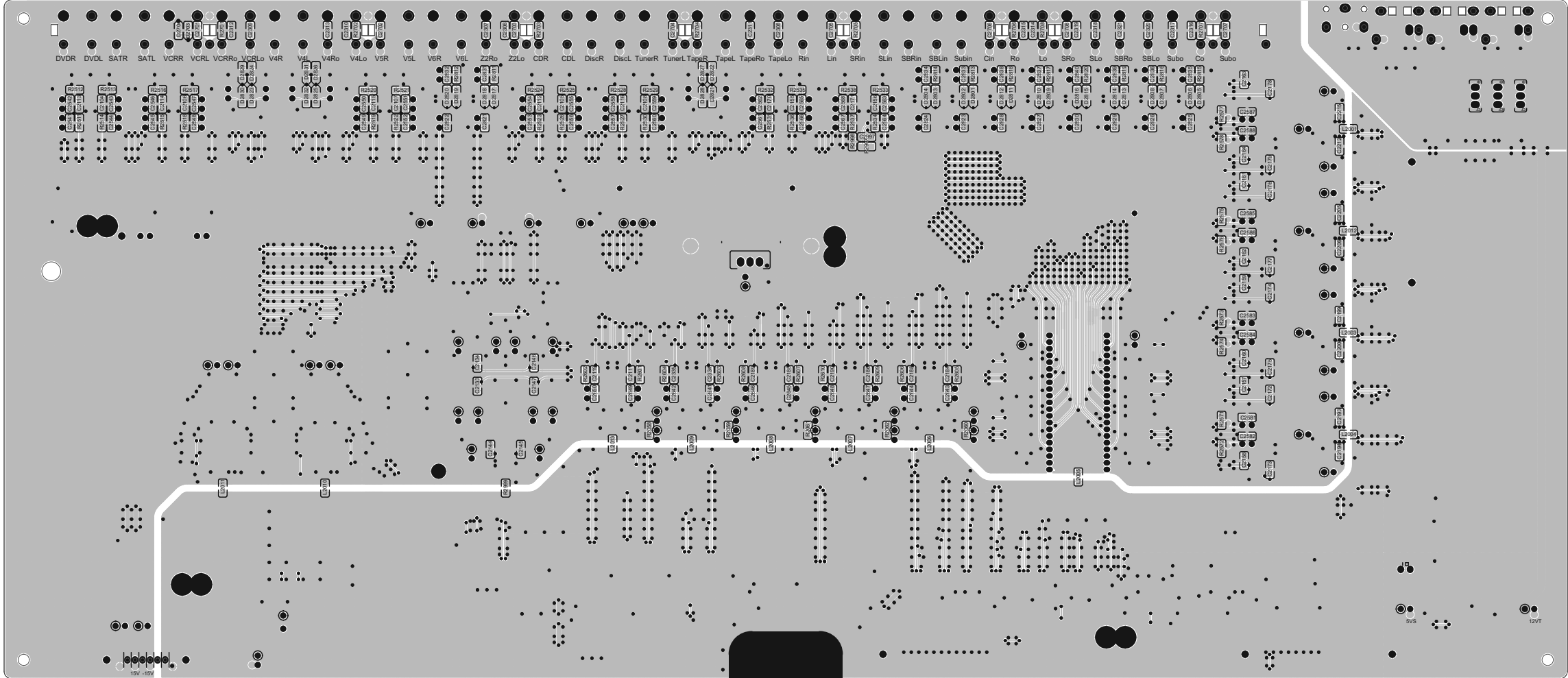


5.AUDIO BOARD

audio board component side

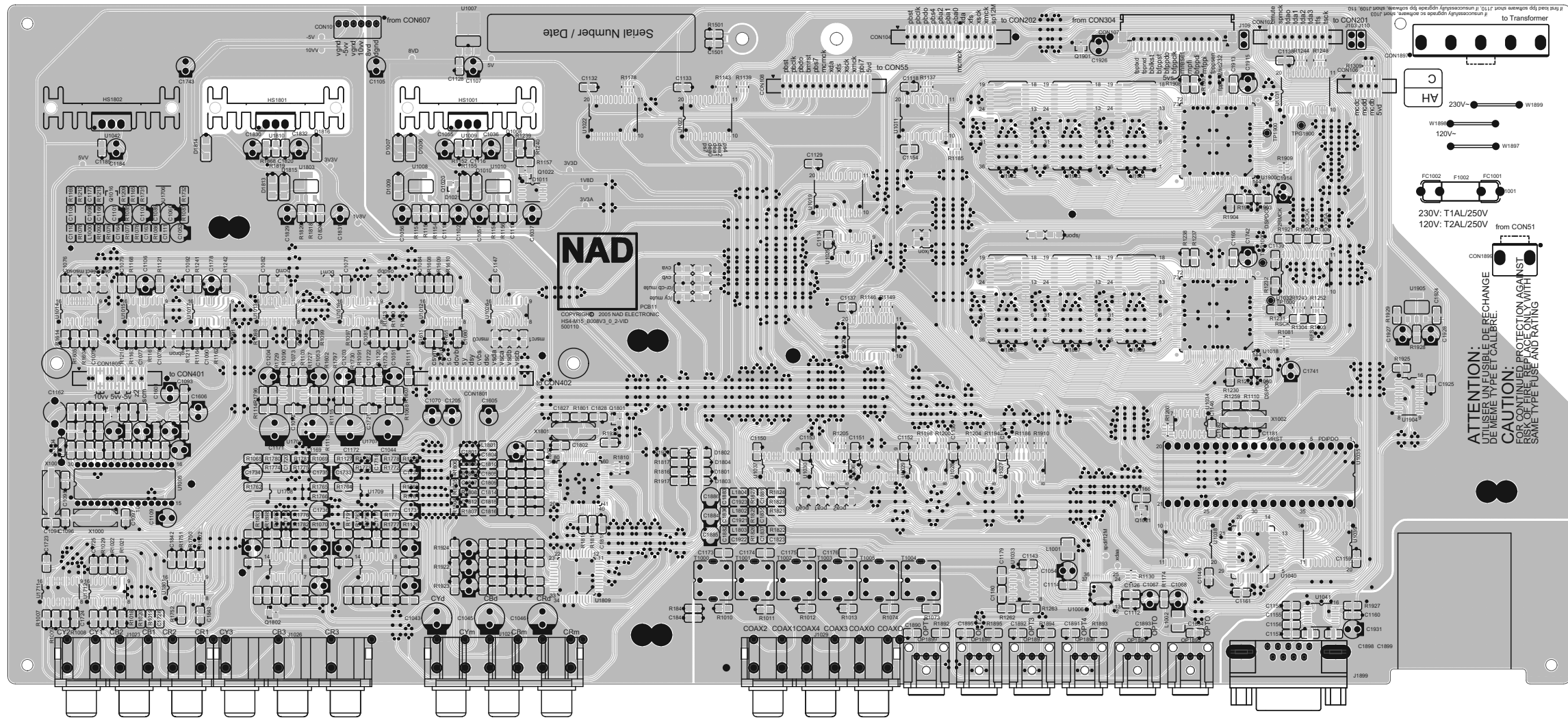


audio board copper side

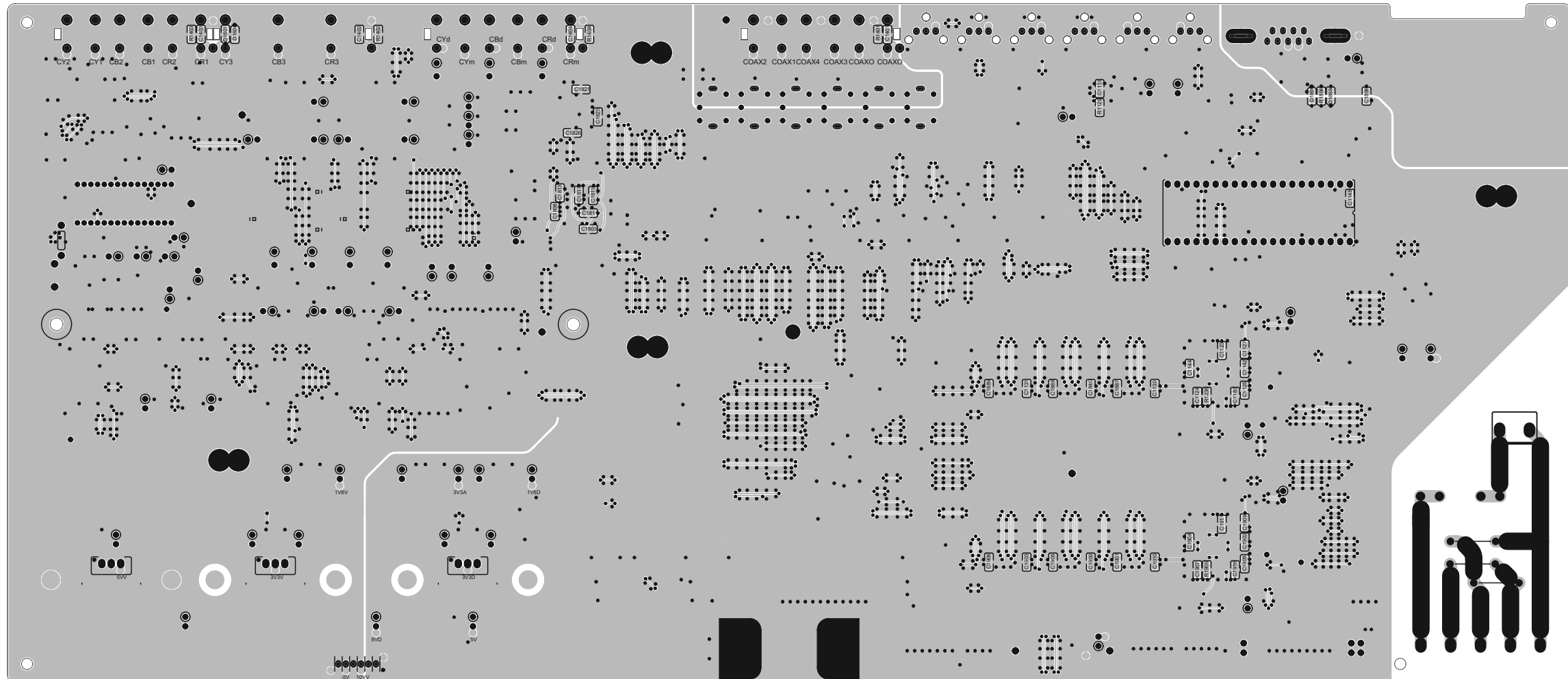


6.VIDEO BOARD

video board component side



video board copper side



SECTION 4 REPLACEMENT PARTS LIST

MODEL :M15 C/AH(NAD)
RUN DATE : HS4-M15_B013_VM1.9

NOTES: ▲ Warning Parts that are shaded are critical With respect to risk of fire or electrical shock.

| Reference No. | Part No. | Description |
|--|---------------|--|
| VID(video board) | | |
| DIODES | | |
| D1601 D1602 D1898 D1899 | 33-40352-01 | 1SS352 |
| D1803 D1804 | 33-12409-01 | 2V4, 0.5W, LL34, Tape |
| D1801 D1802 | 33-13309-01 | 3V3, 0.5W, LL34, Tape |
| D1006 D1007 D1008 D1009 D1010 D1814 D1815 D1816 | 33-20004-01 | S1GM4,SMA,Tape |
| D1021 D1813 | 33-20012-01 | SS12,SMA,Tape |
| TRANSISTORS | | |
| Q1020 | 31-03326-01 | 2SC3326A |
| Q1016 | 31-00033-01 | BCW33 |
| Q1021 Q1801 Q1802 Q1901 | 31-00114-05 | DTC114,SOT23,Tape |
| Q1022 | 31-02907-01 | MMBT2907A/MMBT2907AL/PMBT2907A, SOT23, Tape |
| Q1022 | or31-02907-02 | MMBT2907A/MMBT2907AL/PMBT2907A, SOT23, Tape |
| ICS | | |
| U1897 U1898 U1899 U1901 U1902 U1903 | 03-02568-01 | 61LV2568L-8K |
| U1033 | 03-00004-01 | 74AC04, SOIC0.15inch, Tube/Tape |
| U1031 | 03-00541-02 | 74ACT541, SOIC0.3inch, Tube/Tape |
| U1036 U1037 | 03-00151-01 | 74HC151, SOIC0.15inch, Tube/Tape |
| U1038 U1039 | 03-00573-02 | 74HC573, SOIC0.3inch, Tube/Tape |
| U1025 U1026 | 03-00595-01 | 74HC595, SOIC0.15inch, Tube/Tape |
| U1012 U1013 U1711 U1712 | 03-04052-02 | 74HC4052, SOIC0.15inch, Tube/Tape |
| U1014 U1015 U1016 U1017 U1801 | 03-04053-01 | 74HC4053, SOIC0.15inch, Tube/Tape |
| U1027 U1028 U1029 U1030 | 03-00138-01 | 74HCT138, SOIC0.15inch, Tube/Tape |
| U1022 U1023 | 03-00541-03 | 74HCT541, SOIC0.3inch, Tube/Tape |
| U1034 | 03-00004-02 | 74HCU04, SOIC0.15inch, Tube/Tape |
| U1011 | 03-00244-01 | 74LCX244, SOIC0.3inch, Tube/Tape |
| U1019 U1020 | 03-00541-04 | 74LCX541, SOIC0.3inch, Tube/Tape |
| U1032 | 03-00244-02 | 74VHC244, SOIC0.3inch, Tube/Tape |
| U1904 | 03-00157-01 | 74LCX157, SOIC0.15inch, Tube/Tape |
| U1006 | 03-04114-01 | AK4114VQ |
| U1040 | 03-29010-01 | AT29LV010A, 25nS, PLCC |
| U1900 | 03-56367-01 | DSPB56367PV150 |
| U1018 | 03-56367-02 | DSPD56367PV150 |
| OP1896 OP1897 OP1898 OP1899 | 03-00550-01 | GP1FA550RZ/GP1FA553RZ |
| OP1894 OP1895 | 03-00550-00 | GP1FA550TZ/GP1FA553TZ |
| D1011 | 03-00431-01 | KA431D/TL431CD, SOIC0.15inch,Tube |
| U1005 | 03-74763-00 | LC74763-9012, SDIP0.4inch,Tube |
| U1007 | 03-07805-01 | LM78M05CDT |
| U1009 U1810 | 03-00317-00 | LM317T |

| Reference No. | Part No. | Description |
|--|-------------|---|
| U1008 U1010 U1803 U1905 | 03-01117-02 | LM1117MPX-ADJ, SOT223, Tube |
| U1042 | 03-07805-00 | LM7805CT |
| U1041 | 03-03221-02 | MAX3221CAE, SSOP, Tube |
| U1704 U1706 U1707 | 03-04016-01 | MAX4016ESA, SOIC0.15inch, Tube |
| U1708 U1709 | 03-04018-01 | MAX4018ESD MAX4018ESD, SOIC0.15inch, Tube |
| U1809 | 03-07127-01 | SAA7127H, QFP, Tube |
| U1802 | 03-05146-01 | TVP5146PFP, QFP, Tube |
| U1035 | 03-08951-00 | AT89C51ED2-3CSIM,DIP0.6,Tube,3.3V |
| CRYSTALS | | |
| X1001 X1801 | 04-11432-00 | 14.31818MHz 49SMD, 14.31818MHz, FL=30PPM, CL=16pF, 300uW, Tape |
| X1000 | 04-11772-00 | 17.734475MHz 49SMD, 17.734475MHz, FL=30PPM, CL=16pF, 300uW, Tape |
| X1002 | 04-12002-01 | 20MHz 49SMD, 20MHz, FL=30PPM, CL=25pF, 300uW, Tape |
| CAPACITORS | | |
| C1163 C1173 C1174 C1175 C1176 | 26-10251-11 | 1nJ NPO 50V |
| C1164 | 26-68251-01 | 6n8K X7R 50V |
| C1165 C1166 C1401 C1402 C1403 C1404 C1501 C1841 C1896 C1913 | 26-22351-01 | 22nK X7R 50V |
| C1094 C1095 C1096 C1097 C1098 C1827 C1828 | 26-22051-01 | 22pJ NPO 50V |
| C1181 C1182 C1921 C1922 C1923 | 26-33051-01 | 33pJ NPO 50V |
| C1835 C1837 C1881 | | NI(47pJ NPO 50V) |
| C1071 C1072 C1073 C1074 C1075 C1076 C1077 C1078 C1079 C1080 C1081 C1082 C1084 C1089 C1090 C1091 C1092 C1093 C1110 C1111 C1112 C1113 C1114 C1115 C1116 C1117 C1118 C1123 C1124 C1125 | 26-10451-01 | 100nZ Y5V 50V |
| C1126 C1127 C1128 C1129 C1130 C1131 C1132 C1133 C1134 C1135 C1136 C1137 C1138 C1139 C1142 C1143 C1144 C1146 C1147 C1148 C1149 C1150 C1151 C1152 C1153 C1154 C1155 C1159 C1160 C1161 | 26-10451-01 | 100nZ Y5V 50V |
| C1177 C1179 C1180 C1185 C1717 C1718 C1719 C1720 C1721 C1722 C1723 C1724 C1725 C1726 C1802 C1803 C1804 C1805 C1806 C1807 C1808 C1809 C1810 C1811 C1812 C1813 C1814 C1815 C1816 C1817 | 26-10451-01 | 100nZ Y5V 50V |

| Reference No. | Part No. | Description |
|---|-------------|--|
| C1818 C1819 C1820 C1821 C1823 C1824 C1825 C1826 C1840 C1842 C1843 C1887 C1888 C1889 C1890 C1891 C1892 C1893 C1894 C1895 C1900 C1901 C1902 C1903 C1904 C1905 C1906 C1907 C1908 C1909 C1910 C1911 C1924 C1925 | 26-10451-01 | 100nZ Y5V 50V |
| C1836 C1882 C1883 | 26-12151-01 | 120pJ NPO 50V |
| C1108 | 26-33151-01 | 330pJ NPO 50V |
| C1156 C1157 C1158 C1183 C1916 | 26-47421-11 | 470nZ Y5V 25V |
| C1178 | | 1u(NI) CD110,1u,50V,20%, |
| C1100 | 06-10851-02 | CD110,0.1u,50V,20%,D=5,Pitch=2 |
| C1101 C1102 C1105 C1106 C1107 C1109 C1601 | 06-10951-02 | CD110,1u,50V,20%,D=5,Pitch=2 |
| C1801 | 06-22951-01 | CD110,2u2,50V,20%,D=5,Pitch=2 |
| C1052 C1054 C1055 C1056 C1057 C1060 C1067 C1068 C1070 C1184 C1743 C1203 C1204 C1205 C1829 C1830 C1926 C1927 C1928 | 06-10051-03 | CD110,10u,50V,20%,D=5,Pitch=2 |
| C1051 C1053 C1605 C1606 C1731 C1732 C1733 C1734 C1735 C1736 C1884 C1885 C1886 | 06-22021-00 | CD110,22u,25V,20%,D=5,Pitch=2, |
| C1036 C1037 C1741 C1742 C1831 C1832 C1914 C1915 C1931 | 06-10111-01 | CD110X,100u,16V,20%,D=5,Pitch=2,Pin Length=5 |
| C1043 C1044 C1045 C1046 C1169 C1171 C1172 | 06-47111-01 | CD110,470u,10V,20%,D=8,Pitch=3.5,Pin Length=5 |
| C1162 | 10-30012-01 | 3-30p 3-30p,100V,+50,-0% |
| C1898 C1899 | 26-10151-11 | EMI100p Low ESL Feed Through,0805,X5R,100p,50V,Tape |
| | | |
| RESISTORS | | |
| R1099 R1100 R1242 R1098 | 07-90000-01 | 0R Thick Film 0805,Tape |
| R1077 | 07-90152-01 | 1K5J Thick Film 0805,Tape |
| R1239 | 07-91001-01 | 1KF Thick Film 0805,Tape |
| R1092 | 07-90102-01 | 1KJ Thick Film 0805,Tape |
| R1259 | 07-90105-01 | 1MJ Thick Film 0805,Tape |
| R1240 | 07-92491-01 | 2K49F Thick Film 0805,Tape |
| R1121 | 07-92741-01 | 2K74F Thick Film 0805,Tape |
| R1916 R1917 R1930 | 07-90222-01 | 2k2J Thick Film 0805,Tape |
| R1213 | 07-93921-01 | 3K92F Thick Film 0805,Tape |
| R1802 R1803 | 07-90472-01 | 4k7J Thick Film 0805,Tape |
| R1163 R1164 | 07-95621-01 | 5K62F Thick Film 0805,Tape |
| R1085 | 07-90682-01 | 6K8J Thick Film 0805,Tape |
| R1153 | 07-90822-01 | 8K2J Thick Film 0805,Tape |
| R1212 | 07-98251-01 | 8K25F Thick Film 0805,Tape |

| Reference No. | Part No. | Description |
|---|-------------|----------------------------|
| R1927 | 07-90100-01 | 10RJ Thick Film 0805,Tape |
| R1087 R1090 R1091 R1103 R1120 R1761 R1762 R1763 R1764 R1765 R1766 | 07-91002-01 | 10KF Thick Film 0805,Tape |
| R1228 R1230 R1231 R1232 R1236 R1237 R1238 R1791 R1792 R1793 R1814 R1815 R1898 R1899 R1904 R1905 R1906 R1907 R1908 R1925 | 07-90103-01 | 10KJ Thick Film 0805,Tape |
| R1309 R1810 | 07-90103-10 | 10KJ |
| R1161 R1162 | 07-91502-01 | 15KF Thick Film 0805,Tape |
| R1129 | 07-91802-01 | 18KF Thick Film 0805,Tape |
| R1168 | 07-92002-01 | 20KF Thick Film 0805,Tape |
| R1727 R1729 R1730 R1731 R1732 R1733 | 07-90240-01 | 24RJ Thick Film 0805,Tape |
| R1157 | 07-90330-01 | 33RJ Thick Film 0805,Tape |
| R1260 | 07-90470-10 | 47RJ |
| R1816 R1817 | 07-90473-01 | 47kJ Thick Film 0805,Tape |
| R1076 | 07-90513-01 | 51KJ Thick Film 0805,Tape |
| R1097 | 07-94759-01 | 47R5F Thick Film 0805,Tape |
| R1007 R1008 R1009 R1010 R1011 R1012 R1013 R1018 R1019 R1020 R1021 R1022 R1029 R1065 R1068 R1069 R1070 R1073 R1074 R1113 R1114 R1115 | 07-97509-01 | 75RF Thick Film 0805,Tape |
| R1165 R1209 R1602 R1604 R1605 R1607 R1608 R1609 R1610 R1611 R1613 R1614 R1651 R1750 R1751 R1752 R1796 R1797 R1922 R1923 R1924 | 07-91003-01 | 100KF Thick Film 0805,Tape |
| R1166 R1801 | 07-90104-01 | 100KJ Thick Film 0805,Tape |
| R1126 R1127 R1128 | 07-94759-01 | 47R5F Thick Film 0805,Tape |
| R1158 R1210 R1211 R1820 | 07-91000-01 | 100RF Thick Film 0805,Tape |
| R1169 R1174 R1262 R1263 R1401 R1402 R1403 R1404 R1501 R1841 R1892 R1893 R1894 R1895 R1896 | 07-90101-01 | 100RJ Thick Film 0805,Tape |
| R1130 R1137 R1139 R1143 R1146 R1149 R1178 R1185 R1186 R1194 R1198 R1200 R1204 R1205 R1910 | 07-90101-10 | 100RJ |
| R1079 R1080 R1305 R1306 R1903 R1921 | 07-90121-01 | 120RJ Thick Film 0805,Tape |
| R1081 R1243 R1244 R1248 R1252 R1909 | 07-90121-10 | 120RJ |
| R1111 R1821 R1824 R1823 | 07-91870-01 | 187rF Thick Film 0805,Tape |
| R1086 | 07-92210-01 | 221RF Thick Film 0805,Tape |

| Reference No. | Part No. | Description |
|--|-------------|--|
| R1043 R1154 R1155 R1156 R1818 R1819 R1928 | 07-92430-01 | 243RF Thick Film 0805,Tape |
| R1152 R1868 R1929 | 07-93920-01 | 392RF Thick Film 0805,Tape |
| R1151 | 07-94320-01 | 432RF Thick Film 0805,Tape |
| R1078 | 07-90474-01 | 470KJ Thick Film 0805,Tape |
| R1110 | 07-90471-01 | 470RJ Thick Film 0805,Tape |
| R1777 R1778 R1779 R1780 R1781 R1782 | 07-94750-01 | 475RF Thick Film 0805,Tape |
| R1774 R1775 R1776 | 07-95110-01 | 511RF Thick Film 0805,Tape |
| R1771 R1772 R1773 | 07-95360-01 | 536RF Thick Film 0805,Tape |
| R1804 R1805 R1806 | 07-96190-01 | 619RF Thick Film 0805,Tape |
| R1807 R1808 R1809 | 07-98250-01 | 825RF Thick Film 0805,Tape |
| R1241 R1303 R1304 R1822 R1825 R1826 R1827 | | NI |
| RT1A RT1B RT1I RT1J RT1K RT1P RT1Q RT1R RT1S RT10 RT11 RT12 RT13 RT14 RT15 RT16 RT17 | | NI 2K2,5% |
| DT1A DT1B DT1I DT1J DT1K DT1P DT1Q DT1R DT1S DT10 DT11 DT12 DT13 DT14 DT15 DT16 DT17 | | NI |
| | | |
| INDUCTOR | | |
| L1801 | 08-04279-00 | 0805, 2u7H, 10%, Tape |
| L1802 L1803 L1804 | 08-04479-00 | 0805, 4u7H, 10%, Tape |
| L1000 | | NI 0805, 5u6H, 10%, Tape |
| L1001 L1002 | 08-04101-00 | 1210, 100uH, 10%, Tape |
| L1004 | 08-02569-00 | LGA0203-5R6K |
| | | |
| TRANS | | |
| T1004 T1005 | 22-22801-20 | PT-10(HKS-999-115) |
| T1000 T1001 T1002 T1003 | 22-22800-07 | PT-10(2280-T007) |
| | | |
| FUSES | | |
| F1001 ▲▲ | 20-12102-00 | 1A 5X20mm Delay, 1A, 250VAC |
| F1002 ▲▲ | 20-12202-00 | 2A 5X20mm Delay, 2A, 250VAC |
| FC1001, FC1002 ▲▲ | 20-20000-00 | HF-004/A |
| | | |
| CONNECTORS | | |
| J103 J109 J110 | 13-12502-00 | 2pin |
| CON1899 | 13-23903-01 | 2pin, 7.92mm, Socket VH3.96A-3Y1(remove pin2) |
| CON1897 | 13-23909-04 | 5pin 5pin, 7.92mm, Socket VH3.96A-9Y1(remove pin2,4,6,8) |
| CON101 | 14-17006-01 | 6pin to CON607 6pin, 2mm, Cable, H JG2.0A-6DW, L=100mm |

| Reference No. | Part No. | Description |
|---|--------------|--|
| CON106 | | NI |
| CON107 | 13-21024-01 | 24pin,1mm,Socket,H |
| CON102 CON1805 | 13-21016-03 | 16pin,1mm,Socket,V |
| CON104 CON108 CON1801 | 13-21024-02 | 24pin, 1mm, Socket, V |
| J1026 | 17-01003-01 | RCA3-GR-BL-R 3 heads,Green-Blue-Red,AV3-8.4-14 |
| J1021 J1023 | 17-01006-01 | RCA6-GR-BL-R 6 heads,Green-Blue-Red,AV6-8.4-13 |
| J1029 | 17-01006-02 | RCA6-O 6 heads,All Orange,AV6-8.4-13 |
| J1899 | 17-08009-00 | RS232 RS232/FS |
| TP1000 TP1900 TPG1000 TPG1900 | | T.P(NI) 1PIN |
| | | |
| LINKS | | |
| W1897 W1898 | 21-06121-00 | 12mm(AH) L=12, D=0.6 |
| W1899 | 21-06121-00 | 12mm(C) L=12, D=0.6 |
| | | |
| PCB | | |
| PCB11 | S16-51501-00 | HS4-M15_B008V3_0_0-VID |
| | | |
| | | |
| AUD(audio board) | | |
| DIODES | | |
| D2703 D2704 D2921 D2922 D2923 D2924 D2925 D2926 D2951 | 33-40352-01 | 1SS352 |
| D2927 D2928 D2929 | | 5V6, LL34, Tape(NI) |
| D2801 D2802 D2803 D2804 D2805 D2806 D2807 D2808 D2809 D2810 D2811 D2812 D2813 D2814 D2815 D2816 D2817 D2818 D2819 D2820 D2821 D2822 D2823 D2824 D2825 D2826 D2827 D2828 D2829 D2830 D2831 D2832 | 33-11200-11 | 12V, LL34, Tape |
| D2941 | 33-20004-01 | S1GM4,SMA,Tape |
| | | |
| TRANSISTORS | | |
| Q2008 Q2009 Q2010 Q2011 Q2012 Q2013 Q2014 Q2015 Q2016 Q2017 Q2018 Q2019 Q2020 Q2021 Q2022 Q2023 Q2024 Q2025 Q2026 Q2027 Q2028 Q2029 Q2030 Q2031 Q2032 Q2033 Q2034 Q2035 Q2036 Q2037 | 31-03326-01 | 2SC3326A |
| Q2038 Q2039 Q2040 Q2041 Q2042 Q2043 Q2924 Q2925 | 31-00114-01 | DTA114, SOT23, Tape |
| Q2048 | 31-00114-02 | DTB114, SOT23, Tape |

| Reference No. | Part No. | Description |
|--|-------------|--|
| Q2000 Q2001 Q2002 Q2003 Q2004 Q2005 Q2006 Q2007 Q2501 Q2502 Q2926 Q2927 Q2928 Q2929 Q2930 | 31-00114-05 | DTC114,SOT23,Tape |
| Q2044 Q2045 | 31-00144-01 | DTC144, SOT23, Tape |
| Q2921 Q2922 Q2923 | 31-01220-00 | KSA1220A-Y |
| ICS | | |
| U2044 | 03-00000-01 | 74AC00, SOIC0.15inch, Tube/Tape |
| U2045 | 03-00109-01 | 74AC109, SOIC0.15inch, Tube/Tape |
| U2042 | 03-00153-01 | 74AC153, SOIC0.15inch, Tube/Tape |
| U2047 | 03-00541-05 | 74AC541, SOIC0.3inch, Tube/Tape |
| U2046 | 03-00244-04 | 74ACT244, SOIC0.3inch, Tube/Tape |
| U2043 | 03-00004-03 | 74HC04, SOIC0.15inch, Tube/Tape |
| U2401 | 03-00137-01 | 74HC137, SOIC0.15inch, Tube/Tape |
| U2048 U2049 U2050 | 03-00138-02 | 74HC138, SOIC0.15inch, Tube/Tape |
| U2051 | 03-00541-06 | 74HC541, SOIC0.3inch, Tube/Tape |
| U2052 U2053 | 03-00595-01 | 74HC595, SOIC0.15inch, Tube/Tape |
| U2501 | 03-07486-02 | 74HC86, SOIC0.15inch, Tube/Tape |
| U2041 | 03-05394-01 | AK5394AVS |
| U2034 | 03-07805-00 | LM7805CT, TO220 |
| U2033 | 03-00337-01 | LM337IMP, SOT223, Tube/Tape |
| U2032 | 03-01117-02 | LM1117MPX-ADJ, SOT223, Tube/Tape |
| U2005 U2006 U2007 U2008 U2009 U2013 U2014 U2015 U2016 U2017 U2018 U2019 U2020 U2021 U2022 U2023 U2024 | 03-02134-00 | OPA2134UA, SOIC0.15inch, Tube/Tape |
| U2000 U2001 U2002 U2003 U2004 U2010 U2011 U2012 U2025 U2026 U2027 U2028 | 03-04134-00 | OPA4134UA, SOIC0.15inch, Tube/Tape |
| U2030 U2031 | 03-92740-01 | TC9274F-001, QFP, Tube/Tape |
| U2059 | 03-92740-08 | TC9274N-008, SDIP0.6inch, Tube |
| U2055 U2056 U2057 U2058 | 03-08740-01 | WM8740EDS, SSOP, Tube/Tape |
| U2036 U2037 U2038 U2039 U2040 | 03-08816-01 | WM8816EDW, SOIC0.3inch, Tube/Tape |
| CRYSTALS | | |
| X2000 | 04-12452-00 | 24.576MHz 49SMD,24.576MHz,FL=30PPM,CL=25pF, 300uW,Tape |
| CAPACITORS | | |

| Reference No. | Part No. | Description |
|--|-------------|---------------|
| C2252 C2253 C2254 C2255 C2256 C2257 C2258 C2259 C2260 C2261 C2298 C2299 C2300 C2301 C2302 C2303 C2304 C2305 L2001 L2003 L2004 L2005 L2006 L2007 L2008 L2009 L2010 L2011 L2012 L2013 | 26-10251-11 | 1nJ NPO 50V |
| C2262 C2263 C2264 C2265 C2266 C2267 C2268 C2269 | 26-15251-11 | 1n5J NPO 50V |
| C2296 C2297 | 26-22251-21 | 2n2J NPO 50V |
| C2322 C2323 | 26-10351-11 | 10nJ NPO 50V |
| C2284 C2285 C2288 C2289 C2290 C2291 C2292 C2293 C2294 C2295 | 26-10051-01 | 10pJ NPO 50V |
| C2503 | 26-10151-01 | 100pJ NPO 50V |
| C2416 C2606 C2701 C2702 C2703 C2704 C2705 C2706 C2707 C2708 | 26-22351-01 | 22nK X7R 50V |
| C2324 C2325 C2401 C2402 C2403 C2404 C2405 C2406 C2407 C2408 C2601 C2602 C2603 C2604 C2605 C2607 C2608 C2609 C2620 | 26-33051-01 | 33pJ NPO 50V |
| C2907 C2908 | 26-47051-01 | 47pJ NPO 50V |
| C2909 | 26-47351-01 | 47nK X7R 50V |
| C2104 C2105 C2106 C2107 C2108 C2109 C2110 C2111 C2112 C2113 C2114 C2115 C2116 C2117 C2118 C2119 C2120 C2121 C2122 C2123 C2124 C2125 C2126 C2127 C2128 C2129 C2130 C2131 C2132 C2133 | 26-10451-01 | 100nZ Y5V 50V |
| C2134 C2135 C2136 C2137 C2138 C2139 C2142 C2144 C2145 C2146 C2147 C2148 C2149 C2150 C2151 C2152 C2153 C2154 C2155 C2156 C2157 C2158 C2159 C2160 C2161 C2162 C2163 C2164 C2165 C2166 | 26-10451-01 | 100nZ Y5V 50V |
| C2167 C2168 C2170 C2171 C2172 C2173 C2174 C2175 C2176 C2177 C2178 C2179 C2180 C2181 C2182 C2183 C2184 C2185 C2186 C2188 C2189 C2190 C2193 C2194 C2195 C2196 C2197 C2199 C2200 C2201 | 26-10451-01 | 100nZ Y5V 50V |
| C2202 C2203 C2205 C2206 C2207 C2208 C2209 C2211 C2212 C2213 C2214 C2215 C2216 C2217 C2218 C2219 C2220 C2221 C2222 C2223 C2224 C2225 C2328 C2329 C2330 C2331 C2332 C2333 C2334 C2335 | 26-10451-01 | 100nZ Y5V 50V |

| Reference No. | Part No. | Description |
|---|-------------|---|
| C2502 C2541 C2542 C2543 C2544 C2545 C2546 C2547 C2548 C2549 C2550 C2551 C2552 C2553 C2554 C2555 C2556 C2557 C2558 C2559 C2560 C2561 C2562 C2563 C2564 C2565 C2566 C2567 C2568 C2581 | 26-10451-01 | 100nZ Y5V 50V |
| C2582 C2583 C2584 C2585 C2586 C2587 C2588 C2821 C2822 C2823 C2824 C2825 C2826 C2827 C2828 C2829 C2830 C2867 C2868 C2903 C2904 C2905 C2906 C2943 C2944 | 26-10451-01 | 100nZ Y5V 50V |
| C2000 C2001 C2002 C2003 C2004 C2005 C2006 C2007 C2008 C2009 C2010 C2011 C2012 C2013 C2014 C2015 C2016 C2017 C2018 C2019 C2020 C2021 C2022 C2023 C2024 C2025 C2336 C2337 C2338 C2339 C2340 C2341 C2342 C2343 C2344 C2345 C2346 C2347 C2348 C2349 C2350 C2351 C2411 C2412 C2997 | 26-18151-01 | 180pJ |
| | | |
| C2236 C2237 C2238 C2239 C2240 C2241 C2242 C2243 C2244 C2245 C2246 C2247 C2248 C2249 | 26-22451-01 | 220nZ Y5V 50V |
| C2651 C2652 C2653 C2654 C2655 C2656 C2657 C2658 C2659 C2660 | 26-10521-01 | 1uK X7R 25V |
| C2272 C2273 C2306 C2307 C2308 C2309 C2310 C2311 C2312 C2313 C2314 C2315 C2316 C2317 C2318 C2319 C2320 C2321 C2902 R2811 R2812 R2813 R2814 R2815 R2816 R2817 R2818 R2819 R2820 R2851 R2852 R2853 R2854 R2855 R2856 R2912 | | NI |
| C2811 C2812 C2813 C2814 C2815 C2816 C2817 C2818 C2819 C2820 C2851 C2852 C2853 C2854 C2855 C2856 | | NI CD71,22u,16V,20%,D=5mm,Pitch=2mm,Pin Length=5mm |
| C2229 C2230 C2231 C2232 C2234 C2235 C2921 | 06-10951-02 | CD110,1u,50V,20%,D=5,Pitch=2 |

| Reference No. | Part No. | Description |
|--|-------------|---|
| C2054 C2056 C2058 C2059 C2060 C2061 C2062 C2063 C2064 C2065 C2066 C2067 C2070 C2072 C2073 C2074 C2075 C2076 C2077 C2079 C2080 C2081 C2083 C2084 C2085 C2087 C2088 C2089 C2091 C2092 C2093 C2094 C2095 C2096 C2097 C2098 C2099 C2100 C2101 C2501 | 06-10051-03 | CD110,10u,50V,20%,D=5,Pitch=2 |
| C2511 C2512 C2513 C2514 C2515 C2516 C2517 C2518 C2519 C2520 C2521 C2522 C2523 C2524 C2525 C2526 C2527 C2528 C2529 C2530 C2531 C2532 C2533 C2534 C2535 C2536 C2537 C2538 C2571 C2572 C2573 C2574 C2575 C2576 C2577 C2578 C2801 C2802 C2803 C2804 C2805 C2806 C2807 C2808 C2809 C2810 C2857 C2858 | 06-22011-04 | CD71,22u,16V,20%,D=5mm,Pitch=2 |
| C2270 C2271 | 06-47011-04 | CD110,47u,16V,20%,D=5,Pitch=2, |
| C2631 C2632 C2633 C2634 C2635 C2636 C2637 C2638 C2639 C2640 | | NI(CD71,47u,16V,20%,D=5,Pitch=2) |
| C2418 C2419 | 06-10111-01 | CD110X,100u,16V,20%,D=5,Pitch=2,Pin Length=5 |
| C2941 | 06-10260-00 | CD110X, 1000u, 6V3, D=8mm, Pin Pitch=3.5mm |
| | | |
| RESISTORS | | |
| C2641 C2642 C2643 C2644 C2645 C2646 C2647 C2648 C2649 C2650 C2831 C2832 C2833 C2834 C2835 C2836 C2837 C2838 C2839 C2840 C2861 C2862 C2863 C2864 C2865 C2866 R2107 R2108 R2913 R2943 R2944 | 07-90000-01 | 0R Thick Film 0805,Tape |
| R2999 | 07-90100-01 | 10RJ Thick Film 0805,Tape |
| R2907 R2908 | 07-90561-01 | 560RJ Thick Film 0805,Tape |
| R2282 R2283 R2284 R2285 R2286 R2287 R2288 R2289 R2290 R2291 R2292 R2293 R2294 R2295 R2296 R2297 | 07-91071-01 | 1K07F Thick Film 0805,Tape |
| R2159 R2160 | 07-91181-01 | 1K18F Thick Film 0805,Tape |
| R2266 R2267 R2268 R2269 R2270 R2271 R2272 R2273 R2274 R2275 R2276 R2277 R2278 R2279 R2280 R2281 R2998 | 07-91821-01 | 1K82F Thick Film 0805,Tape |

| Reference No. | Part No. | Description |
|--|-------------|----------------------------|
| R2951 | 07-90102-01 | 1KJ Thick Film 0805,Tape |
| R2139 R2140 | 07-91001-01 | 1KF Thick Film 0805,Tape |
| R2909 | 07-90222-01 | 2K2J Thick Film 0805,Tape |
| R2264 | 07-90105-01 | 1MJ Thick Film 0805,Tape |
| R2151 R2152 | 07-92741-01 | 2K74F Thick Film 0805,Tape |
| R2157 R2158 | 07-92871-01 | 2K87F Thick Film 0805,Tape |
| R2143 R2144 R2145 R2146 R2147 R2148 R2149 R2150 R2191 R2192 R2193 R2194 R2195 R2196 R2314 R2315 R2316 R2317 R2318 R2319 R2320 R2321 R2322 R2323 R2324 R2325 R2326 R2327 R2328 R2329 | 07-92001-01 | 2KF Thick Film 0805,Tape |
| R2109 R2110 R2111 R2112 R2113 R2114 R2115 R2116 R2117 R2118 R2119 R2120 R2121 R2122 R2123 R2124 R2125 R2126 R2127 R2128 R2129 R2130 R2131 R2132 R2133 R2134 R2135 R2136 R2631 R2632 R2633 R2634 R2635 R2636 R2637 R2638 R2639 R2640 | 07-90225-01 | 2M2J Thick Film 0805,Tape |
| R2601 R2602 R2603 R2604 R2605 R2606 R2607 R2608 R2609 R2610 R2611 R2612 R2613 R2614 R2615 R2616 R2617 R2618 R2619 R2620 | 07-93651-01 | 3K65F Thick Film 0805,Tape |
| R2903 R2904 R2905 R2924 R2925 R2926 | 07-90399-01 | 3R9J Thick Film 0805,Tape |
| R2997 | 07-98251-01 | 8K25F Thick Film 0805,Tape |
| R2161 R2162 R2163 R2164 R2511 R2512 R2513 R2514 R2515 R2516 R2517 R2518 R2519 R2520 R2521 R2522 R2523 R2524 R2525 R2526 R2527 R2528 R2529 R2530 R2531 R2532 R2533 R2534 R2535 R2536 R2537 R2538 R2571 R2572 R2573 R2574 R2575 R2576 R2577 R2578 | 07-91002-01 | 10KF Thick Film 0805,Tape |
| R2910 R2921 R2922 R2923 R2941 R2942 R2927 | 07-90103-01 | 10KJ Thick Film 0805,Tape |
| R2055 R2057 R2058 R2059 R2060 R2061 R2062 R2401 R2402 | 07-90100-01 | 10RJ Thick Film 0805,Tape |
| R2298 R2299 R2300 R2301 R2302 R2303 R2304 R2305 R2306 R2307 R2308 R2309 R2310 R2311 R2312 R2313 | 07-91212-01 | 12K1F Thick Film 0805,Tape |
| R2502 | 07-90153-01 | 15KJ Thick Film 0805,Tape |


| Reference No. | Part No. | Description |
|--|-------------|----------------------------|
| R2170 R2171 R2174 R2175 R2178 R2179 R2182 R2183 R2186 R2187 | 07-90223-01 | 22kJ Thick Film 0805,Tape |
| R2906 | 07-90333-01 | 33KJ Thick Film 0805,Tape |
| R2197 R2198 R2199 R2200 R2201 R2202 R2203 R2204 R2205 R2206 R2207 R2208 R2209 R2210 R2211 R2212 | 07-90470-01 | 47RJ Thick Film 0805,Tape |
| R2169 R2172 R2173 R2176 R2177 R2180 R2181 R2184 R2185 R2188 | 07-90472-01 | 4K7J Thick Film 0805,Tape |
| R2153 R2154 R2155 R2156 | 07-95119-01 | 51R1F Thick Film 0805,Tape |
| R2026 R2027 R2028 R2029 R2030 R2031 R2032 R2033 R2034 R2035 R2036 R2037 R2038 R2039 R2040 R2041 R2042 R2043 R2044 R2045 R2046 R2047 R2048 R2049 R2050 R2051 R2412 R2414 | 07-95622-01 | 56K2F Thick Film 0805,Tape |
| R2801 R2802 R2803 R2804 R2805 R2806 R2807 R2808 R2809 R2810 R2857 R2858 | 07-91003-01 | 100KF Thick Film 0805,Tape |
| R2189 R2190 R2221 R2222 R2223 R2224 R2225 R2928 | 07-90104-01 | 100KJ Thick Film 0805,Tape |
| R2063 R2064 R2065 R2066 R2097 R2098 R2416 R2701 R2702 R2703 R2704 R2705 R2706 R2707 R2708 | 07-90101-01 | 100RJ Thick Film 0805,Tape |
| R2068 R2070 R2081 R2085 R2089 R2093 R2501 | 07-90101-10 | 100RJ |
| R2247 R2248 R2263 | 07-90121-01 | 120RJ Thick Film 0805,Tape |
| R2246 R2249 R2253 R2257 R2342 | 07-90121-10 | 120RJ |
| R2226 R2227 R2228 R2229 R2230 R2231 R2232 R2233 R2234 R2235 R2236 R2237 R2238 R2239 R2240 R2241 R2242 R2243 R2244 R2245 | 07-92210-01 | 221RF Thick Film 0805,Tape |
| R2137 R2138 | 07-92430-01 | 243RF Thick Film 0805,Tape |
| R2000 R2001 R2002 R2003 R2004 R2005 R2006 R2007 R2008 R2009 R2010 R2011 R2012 R2013 R2014 R2015 R2016 R2017 R2018 R2019 R2020 R2021 R2022 R2023 R2024 R2025 R2411 R2413 | 07-93320-01 | 332RF Thick Film 0805,Tape |
| R2265 | 07-90221-01 | 220RJ Thick Film 0805,Tape |
| R2165 R2166 R2167 R2168 R2213 R2214 R2215 R2216 R2217 R2218 | 07-90821-01 | 820RJ Thick Film 0805,Tape |

| Reference No. | Part No. | Description |
|--|-------------------|--|
| RT2A RT2B RT2C RT2D RT2E RT2F RT2G RT2H RT2I RT2J RT2K RT2L RT2M RT20 RT21 RT22 RT23 RT24 RT26 RT27 RT28 RT29 | | NI 2K2,5% |
| DT2A DT2B DT2C DT2D DT2E DT2F DT2G DT2H DT2I DT2J DT2K DT2L DT2M DT20 DT21 DT22 DT23 DT24 DT26 DT27 DT28 DT29 | | NI |
| CONNECTORS | | |
| CON206 | 14-17006-02 | 6pin from CON605 6pin, 2mm, Cable, H JG2.0A-6DW, L=120mm |
| CON201 | 13-21016-01 | 16pin, 1mm, Socket, H |
| CON202 CON2901 | 13-21024-01 | 24pin, 1mm, Socket, H |
| J2008 | 17-01001-07 | RCA1-BK 1 heads, Black, AV-8.4-14PB1 |
| J2009 | 17-01002-09 | RCA2-W-R 2 heads, Write-Red, AV2-8.4- 13PB2 |
| J2001 J2002 J2003 J2004 J2005 | 17-01006-05 | RCA6-W-R 6 heads, White-Red, AV6-8.4-13 |
| J2006 J2007 | 17-01006-04 | RCA6-W-R-W-R-BK 6 heads, White-Red- White-Red-Black-Black, AV6-8.4-13 |
| J2904 | 17-02001-03 | SCJ349-SD 3.5mm, Single Dual CH |
| J2904 | or17-02001- 04 | ST-323B-04/CKX-3.5-02-3P 3.5mm, Single Dual CH |
| J2901 J2902 J2903 | 17-02002-02 | SCJ351-DS SW 3.5mm, Double Single CH, SW |
| PCB | | |
| PCB21 | S16-51502-00 | HS4-M15_B008V3_0_0-AUD |
| FPP(front panel board) | | |
| DIODES | | |
| D371 | 33-15609-03 | 5V6, LL34, Tape |
| D301 | 33-50565-01 | Blue/Amber LED, D=5, High Light |
| TRANSISTORS | | |
| Q311 Q312 | 31-00114-01 | DTA114, SOT23, Tape |
| Q303 | 31-00114-05 | DTC114, SOT23, Tape |
| ICS | | |
| U305 | 03-00132-02 | 74HC132, SOIC0.15inch, Tube/Tape |
| U302 U303 | 03-00595-01 | 74HC595, SOIC0.15inch, Tube/Tape |
| U306 | 03-00244-05 | 74HCT244, SOIC0.3inch, Tube/Tape |
| U312 | 03-00165-01 | 74HC165, SOIC0.15inch, Tube/Tape |

| Reference No. | Part No. | Description |
|--|-------------|--|
| U301 | 03-08951-00 | AT89C51ED2-3CSIM,DIP0.6,Tube,3.3V |
| U307 | 03-01701-00 | HS0038B4 |
| U304 | 03-00707-01 | MAX707CSA/IMP707CSA, SOIC0.15inch |
| CRYSTALS | | |
| X301 | 04-11842-00 | 18.432MHz 49SMD,18.432MHz,FL=30PPM,CL=16pF, 300uW |
| CAPACITORS | | |
| C314 C318 C333 C334 C335 C336 C337 C338 C339 | 26-22351-01 | 22nK X7R 50V |
| C316 C317 | 26-22051-01 | 22pJ NPO 50V |
| C301 C302 C306 C307 C308 C340 | 26-10451-01 | 100nZ Y5V 50V |
| C320 | 26-47421-01 | 470nZ Y5V 25V |
| C315 | 06-10951-09 | CD50S,1u,50V,20%,D=5mm,Pitch=2mm,P in Length=5mm,Height=5mm |
| C311 | 06-10051-04 | CD50S,10u,50V,20%,D=5,Pitch=2,Pin Length=5,Height=5mm |
| RESISTORS | | |
| R324 | 07-91004-01 | 1MF Thick Film 0805,Tape |
| R326 | 07-01002-09 | 8X10K 8X10K, Patch=2.54mm, Pin Length=3mm |
| R321 | 07-90100-01 | 10RJ Thick Film 0805,Tape |
| R371 | 07-90473-01 | 47KJ Thick Film 0805,Tape |
| R306 R372 | 07-90470-01 | 47RJ Thick Film 0805,Tape |
| R307 | 07-90470-10 | 47RJ |
| R328 R329 | 07-90101-01 | 100RJ Thick Film 0805,Tape |
| R325 | 07-90104-01 | 100KJ Thick Film 0805,Tape |
| R316 | 07-91823-01 | 182KF Thick Film 0805,Tape |
| R317 | 07-90271-01 | 270RJ Thick Film 0805,Tape |
| R318 | 07-90471-01 | 470RJ Thick Film 0805,Tape |
| SWITCHES | | |
| K304 K305 K306 K314 K315 K320 K322 K323 K324 K325 | 11-04101-08 | IT-1103AA-1160 |
| CONNECTORS | | |
| CON321 | 13-22008-01 | 8pin, 2mm, 弯座, PH系列 |
| CON311 | 13-12514-03 | 14PIN 2.54MM,2 Row |
| CON301 CON304 | 13-21024-01 | 24pin, 1mm, Socket, H |
| TP2 TP3 | | T.P. 1PIN(NI) |
| TP1 | | T.P. TP(NI) |

| Reference No. | Part No. | Description |
|--|--------------|---------------------------------------|
| M301 | 23-30202-00 | 20T202DA1 (J) REVE 5X7 Dot VFD Module |
| PCB | | |
| PCB31 | S16-51503-00 | HS4-M15_B008V3_0_0-FPP |
| | S16-51530-00 | |
| ENC(encoder board) | | |
| CAPACITORS | | |
| C709 C710 | 26-10351-01 | 10nK X7R 50V |
| C751 C752 | 26-10451-01 | 100nZ Y5V 50V |
| C741 C742 | 26-22351-01 | 22nK X7R 50V |
| RESISTORS | | |
| R713 R714 | 07-90122-01 | 1K2J Thick Film 0805,Tape |
| R711 R712 | 07-90103-01 | 10KJ Thick Film 0805,Tape |
| V701 | 37-16243-00 | EC16B243040F(without detent) |
| CONNECTORS | | |
| CON722 | 14-17008-00 | 8pin, 2mm,60mm |
| CON702 | 14-17006-00 | 6pin to CON602 6pin, 2mm, Cable, H |
| PCB | | |
| PCB71 | S16-51507-00 | HS4-M15_B008V3_0_0-ENC |
| | S16-51530-00 | |
| CSS(composite & S video board) | | |
| DIODES | | |
| D4000 D4003 | 33-40352-01 | 1SS352 |
| ICS | | |
| U4000 U4002 U4004 | 03-06415-01 | TEA6415CD, SOIC0.3inch, Tube |
| U4701 U4702 U4703 U4705 | 03-04016-01 | MAX4016ESA, SOIC0.15inch, Tube |
| CAPACITORS | | |
| C4405 C4406 C4407 | 26-22351-01 | 22nK X7R 50V |
| C4085 C4087 C4202 C4711 C4712 C4713 C4714 C4715 C4716 | 26-10451-01 | 100nZ Y5V 50V |
| C4000 C4001 C4002 C4003 C4004 C4005 C4006 C4007 C4008 C4014 C4015 C4016 C4017 C4018 C4019 C4020 C4023 C4024 C4025 C4026 C4027 C4028 C4029 C4030 C4031 C4032 C4033 | 26-22451-01 | 220nZ Y5V 50V |

| Reference No. | Part No. | Description |
|--|--------------|---|
| C4742 C4743 | 06-10051-03 | CD110,10u,50V,20%,D=5,Pitch=2 |
| C4053 C4201 C4602 C4603 C4604 C4701 C4702 C4703 C4704 C4705 C4706 | 06-22021-00 | CD110,22u,25V,20%,D=5,Pitch=2, |
| C4811 C4812 C4813 | 06-47011-04 | CD110,47u,16V,20%,D=5,Pitch=2,Pin Length=5 |
| C4034 C4038 C4040 C4741 | 06-10111-01 | CD110X,100u,16V,20%,D=5,Pitch=2,Pin Length=5 |
| C4041 C4042 C4047 C4048 C4049 C4050 C4167 C4168 C4170 | 06-47111-01 | CD110,470u,10V,20%,D=8,Pitch=3.5,Pin Length=5 |
| RESISTORS | | |
| R4051 R4052 R4118 R4119 R4124 R4125 | 07-93921-01 | 3K92F Thick Film 0805,Tape |
| R4089 R4103 R4701 R4702 R4703 R4705 R4711 R4712 R4713 R4714 R4715 R4716 R4814 R4815 R4816 | 07-91002-01 | 10KF Thick Film 0805,Tape |
| R4034 R4037 R4038 | 07-90100-01 | 10RJ Thick Film 0805,Tape |
| R4721 R4722 R4723 R4724 R4725 R4726 R4727 R4728 | 07-90240-01 | 24RJ Thick Film 0805,Tape |
| R4220 R4221 R4222 R4223 R4224 R4225 R4266 R4267 | 07-90473-01 | 47kJ Thick Film 0805,Tape |
| R4000 R4001 R4002 R4003 R4004 R4005 R4014 R4015 R4016 R4017 R4023 R4024 R4025 R4026 R4027 R4030 R4031 R4032 R4063 R4064 R4066 R4067 R4071 R4072 R4111 R4112 R4116 | 07-97509-01 | 75RF Thick Film 0805,Tape |
| R4602 R4795 | 07-91003-01 | 100KF Thick Film 0805,Tape |
| R4801 R4802 R4803 R4804 R4811 R4812 R4813 | 07-91000-01 | 100RF Thick Film 0805,Tape |
| R4405 R4406 R4407 | 07-90101-01 | 100RJ Thick Film 0805,Tape |
| R4041 R4042 R4045 R4046 R4049 R4050 | 07-91500-01 | 150RF Thick Film 0805,Tape |
| CONNECTORS | | |
| CON401 | 13-21016-01 | 16pin,1mm,Socket,H |
| CON402 | 13-21024-01 | 24pin, 1mm, Socket, H |
| J4020 | 17-01002-06 | RCA2-Y-U-NOS 2 heads(delete one),Yellow, 镀厚金(4u) |
| J4011 J4012 J4013 J4014 J4015 J4016 J4017 J4018 J4019 | 17-01001-08 | S+RCA, RCA镀厚金(4u)(RCA无接地片) |
| PCB | | |
| PCB41 | S16-51504-00 | HS4-M15_B007V2_3_2-CSS.sch |

| Reference No. | Part No. | Description |
|--|--------------|---|
| | | |
| | | |
| HDMI(HDMI board) | | |
| DIODES | | |
| D52 | 33-15609-03 | 5V6, LL34, Tape |
| | | |
| ICS | | |
| U56 | 03-00595-01 | 74HC595, SOIC0.15inch, Tube/Tape |
| U55 | 03-00244-01 | 74LCX244, SOIC0.3inch, Tube/Tape |
| U59 | 03-01117-02 | LM1117MPX-ADJ, SOT223, Tube/Tape |
| U58 | 03-00341-01 | TMDS341, TQFP80, Tube/Tape |
| | | |
| CAPACITORS | | |
| C55 C56 C59 | 26-10451-01 | 100nZ Y5V 50V |
| C512 C513 C514 C515 C516 C517 C518 C519 C520 C521 C531 C532 | 26-10411-06 | 100nZ Y5V 16V |
| C58 C511 | 06-10111-00 | CD110X,100u,16V,20%,D=5,Pitch=5,Pin Length=5 |
| C510 | 06-10051-00 | CD110,10u,50V,20%,D=5,Pitch=5 |
| C522 C523 C524 | 26-22351-01 | 22nK X7R 50V |
| CS51  | 05-22242-00 | 2n2/400vac YA,2n2,400VAC,20%,Pitch=10mm,Pin Length=6-8mm |
| | 78-043002-0 | 851248-23 |
| | | |
| RESISTORS | | |
| R58 | 07-90100-01 | 10R Thick Film 0805,Tape |
| R55 | 07-94641-01 | 4K64F Thick Film 0805,Tape |
| R52 | 07-90103-10 | 10K×4 0603 |
| R56 | 07-90101-01 | 100RJ Thick Film 0805,Tape |
| R54 | 07-92430-01 | 243RF Thick Film 0805,Tape |
| R53 | 07-93920-01 | 392RF Thick Film 0805,Tape |
| | | |
| CONNECTORS | | |
| CON55 | 13-21024-01 | 24pin, 1mm, Socket, H |
| CON51 CON52 CON53 | 13-23903-01 | 2pin, 7.92mm, Socket |
| J55 J56 J57 | 17-08119-00 | HMR43-AK5200(WITHOUT POST) |
| J52 | 17-07002-12 | AC-OUTPUT(AH only) |
| J51 | 17-07002-20 | AC-OUTPUT(C only) |
| | | |
| PCB | | |
| PCB51 | S16-51505-00 | HS4-M15_B007V3_0_0-HDMI.sch |
| | | |
| | | |
| PSU(power supply board) | | |

| Reference No. | Part No. | Description |
|---|---------------|---|
| DIODES | | |
| D603 D604 D605 D681 D682 D683 | 33-30442-01 | KBL04 4A, 400V |
| D608 | 33-20004-01 | S1GM4,SMA,Tape |
| TRANSISTORS | | |
| Q608 Q612 Q617 Q685 | 31-00114-01 | DTA114, SOT23, Tape |
| Q609 Q611 Q614 Q618 Q681 Q686 | 31-00114-05 | DTC114, SOT23, Tape |
| Q610 Q682 | 31-01220-00 | KSA1220A-Y |
| Q607 Q613 Q616 Q684 | 31-02690-00 | KSC2690A-Y |
| Q615 Q683 | 31-02907-01 | MMBT2907A/MMBT2907AL/PMBT2907A, SOT23, Tape |
| Q615 Q683 | or31-02907-02 | MMBT2907A/MMBT2907AL/PMBT2907A, SOT23, Tape |
| ICS | | |
| U608 U611 | 03-07805-00 | LM7805CT, TO220 |
| U604 | 03-07808-00 | LM7808CT, TO220 |
| U603 | 03-07810-00 | 7810, TO220 |
| U610 | 03-07812-00 | LM7812CT, TO220 |
| U606 | 03-07815-00 | LM7815CT, TO220 |
| U609 | 03-07905-00 | LM7905CT, TO220 |
| U607 | 03-07915-00 | LM7915CT, TO220 |
| CAPACITORS | | |
| C672 C673 C674 C675 C690 C691 | 26-22351-01 | 22nK X7R 50V |
| C603 C604 C605 C606 C684 C685 C686 C687 C688 C689 C693 C694 C695 C696 | 26-47351-01 | 47nK X7R 50V |
| C622 C623 C625 C626 C637 C638 C639 C640 C645 C646 C647 C648 C652 C653 C656 C657 | 26-10451-01 | 100nZ Y5V 50V |
| C659 | 06-22951-03 | CD263,2u2,50V,20%,D=5mm,Pitch=2mm, Pin Length=5mm |
| C642 C649 C650 C654 C658 | 06-10021-03 | CD263,10u,25V,20%,D=5mm,Pitch=2mm, Pin Length=5mm |
| C624 C627 C635 C636 C641 C681 | 06-22021-03 | CD263,22u,25V,20%,D=5mm,Pitch=2mm, Pin Length=5mm |
| C629 C660 C683 | 06-47021-02 | CD263,47u,25V,20%,D=5,Pitch=2,Pin Length=5 |
| C643 C655 | 06-22211-02 | CD263,2200u,16V,20%,D=12.5mm,Pitch= 5mm,Pin Length=5mm |
| C632 C644 C651 | 06-22221-02 | CD263,2200u,25V,20%,D=12.5mm,Pitch= 5mm,Pin Length=5mm |
| C619 | 06-47211-00 | CD263,4700u,16V,20%,D=16,Pitch=7.5,Pi n Length=5 |

| Reference No. | Part No. | Description |
|--|--------------|---|
| C631 C682 | 06-47221-01 | CD263,4700u,25V,20%,D=18,Pitch=7.5,Pin Length=5 |
| RESISTORS | | |
| R616 R624 R625 R629 R683 R684 | 07-90472-01 | 4K7J Thick Film 0805,Tape |
| R626 | 07-90103-01 | 10KJ Thick Film 0805,Tape |
| R672 R673 R674 R675 R690 R691 | 07-90101-01 | 100RJ Thick Film 0805,Tape |
| FUSES | | |
| F609 F608 F611 ▲ | 20-12102-00 | 1A 5X20mm Delay, 1A, 250VAC |
| F603 F604 F605 F606 F681 F682 ▲ | 20-12202-00 | 2A 5X20mm Delay, 2A, 250VAC |
| FC603 FC604 FC605 FC606 FC608 FC609 FC613 FC614 FC615 FC616 FC618 FC619 FC621 FC622 FC681 FC682 FC683 FC684 ▲ | 20-20000-00 | HF-004/A |
| CONNECTORS | | |
| CON604 CON608 CON611 | 13-23905-00 | 5PIN P3.96/3X3X1.7 |
| CON602 CON605 CON607 | 13-22006-00 | 6pin, 2mm, Socket |
| PCB | | |
| PCB61 | S16-51506-00 | HS4-M15_B008V3_0_0-PSU |
| | | |
| | | |

SECTION 5

VERSION HISTORY

| SERIAL NUMBER | SOFTWARE VER. | PCB ASSEMBLY VERSION | PARTS CHANGE LIST |
|---|---------------|---|--|
| START FROM H62M1500419 | V1.07 | HS4-M15_B008V3_1_0-PSU HS4-M15_B008V3_1_0-HDMI HS4-M15_B008V3_0_0-CSS HS4-M15_B008V3_1_0-AUD HS4-M15_B008V3_0_2-VIDEO HS4-M15_B008V3_0_1-FPP | 1.D2941 change from S1GM4 to SS12R2944 2.R2944 change from 0R to 47R 3.R2225 change from 100K to 22K 4.ADD C2945 4.7uF |
| START FROM H65M15T00821 | V1.09 | HS4-M15_B008V3_1_0-PSU HS4-M15_B008V3_1_0-HDMI HS4-M15_B008V3_0_0-CSS HS4-M15_B008V3_1_0-AUD HS4-M15_B008V3_0_2-VIDEO HS4-M15_B008V3_0_1-FPP | 1.R4267 change from 47K to 10K 2.R4266 change from 47K to 4.7K |
| H65M15T00943~ H65M15T01020 | V1.09 | HS4-M15_B008V3_1_0-PSU HS4-M15_B008V3_1_0-HDMI HS4-M15_B008V3_0_0-CSS HS4-M15_B008V3_1_0-AUD HS4-M15_B008V3_3_2-VIDEO HS4-M15_B008V3_0_1-FPP | 1.U1035 change from AT89C51ED2-3CSIM to AT89C51ED2-SLSUM 2.U1809 change form SAA7127H to SAA7129AH 3.ADD U1911 MAX4018EDS 4.DELETE C1921,C1922,C1923 5.ADD C1961,C1962 100nZ Y5V 50V 0805 6.C1836 C1832 C1883 change from 120PJ NPO 50V 0805 to NI 7.ADD R1959,L1946~L1954 OR 0805 8.L1802,L1803,L1804 change from 4u7H 10% Tape to 0R 0805 9.ADD R1956 R1957 12R1F 0805 10.ADD R1958 1KF 0805 11.ADD R1944 R1945 R1946 24RJ 0805 12.R1825 R1826 R1827 change from NI to 75RF 0805 13.ADD R1953 R1954 R1955 75RF 0805 14.ADD R1950 R1951 R1952 100RF 0805 15.DELETE R1821 R1823 R1824 R1822 16.ADD,R1963~R1965;C1946~C1960;C1963~C1965;L1963~L1965 NI |
| H65M15T00943~ H65M15T01020 start from H65M15T01051 | V2.0 | HS4-M15_B008V3_1_0-PSU HS4-M15_B008V3_1_0-HDMI HS4-M15_B008V3_0_0-CSS HS4-M15_B008V3_1_0-AUD HS4-M15_B008V3_3_2-VIDEO HS4-M15_B008V3_0_1-FPP | software update |
| start from H6YM15T01211 | V2.0 | HS4-M15_B008V3_1_0-PSU HS4-M15_B008V3_1_0-HDMI HS4-M15_B008V3_0_0-CSS HS4-M15_B008V3_2_0-AUD HS4-M15_B008V3_3_2-VIDEO HS4-M15_B008V3_1_0-FPP | 1.C2252 C2254 change from 1nJ NPO 50V 0805 to 680PJ NPO 50V 2.ADD C2951 C2952 150PJ NPO 50V 3.C58,C511, C510,pitch change from 5mm to 2mm |