

Service
Service
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Service Manual

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1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

- 1.1 Technical Specifications
- 1.2 Connection Overview
- 1.3 Chassis Overview

Notes:

- Figures can deviate due to the different set executions.
- Specifications are indicative (subject to change).

1.1 Technical Specifications

1.1.1 Vision

Display type	: LCD
Screen size	: 32" (82 cm), 16:9 : 42" (107 cm), 16:9 : 47" (120 cm), 16:9 : 52" (132 cm), 16:9
Resolution (H × V pixels)	: 1366×768 (32") : 1366×768(42PFL34x) : 1920×1080 (rest)
Dyn. contrast ratio	: 26000:1 (32" and 42PFL34x) : 29000:1 (rest 42" & 47") : 33000:1 (52")
Min. light output (cd/m ²)	: 500
Typ. response time (ms)	: 2 ~ 8 (depending on model number)
Viewing angle (H × V degrees)	: 178 × 178 (rest) : 160 × 160 (52")
Tuning system	: PLL
Presets/channels	: 100 presets
Tuner bands	: VHF, UHF, S, H
TV Color systems	: ATSC : NTSC
Video playback	: NTSC
Cable	: Unscrambled digital cable - QAM
Supported computer formats (60Hz)	: 640 × 480 : 800 × 600 : 1024 × 768 : 1280 × 1024 : 1280 × 768 : 1360 × 768 : 1920 × 1080i : 1920 × 1080p (only for full HD sets)
Supported video formats (60Hz)	: 480i : 480p : 720p : 1080i : 1080p (only for full HD sets)

1.1.2 Sound

Sound systems	: Stereo : BBE® : Dolby Digital®
Maximum power (W _{RMS})	: 20 ~ 30 (depending on model number)

1.1.3 Miscellaneous

Power supply:

- Mains voltage (V _{AC})	: 90 - 240
- Mains frequency (Hz)	: 50 / 60

Ambient conditions:

- Temperature range (°C)	: +5 to +40
- Maximum humidity	: 90% R.H.

Power consumption (values are indicative)

- Normal operation (W)	: ≈ 240
- Stand-by (W)	: < 1

Dimensions (W × H × D inch)

- 32"	: 32.3 × 20.4 × 3.6
- 42"	: 40.7 × 26.2 × 3.5
- 47"	: 44.8 × 28.5 × 4.0
- 52"	: 51.2 × 31.4 × 4.7

Weight without stand (lb.)

- 32"	: 31.9
- 42"	: 45.1
- 47"	: 60.5
- 52"	: 83.8

1.2 Connection Overview

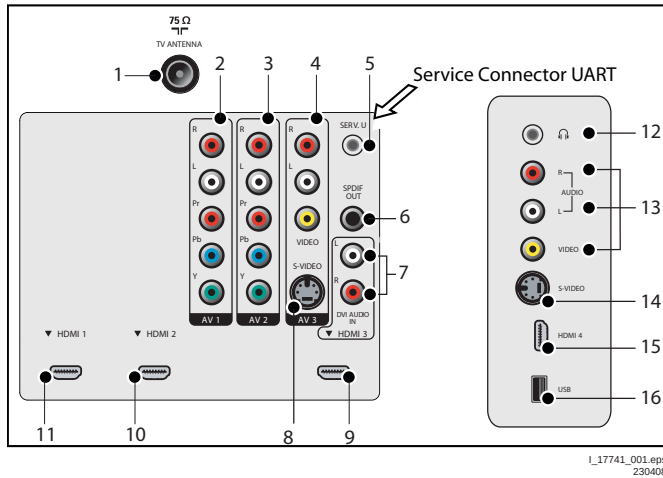


Figure 1-1 Side and rear I/O connections

Note: The following connector color abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, and Ye= Yellow.

1.2.1 Side Connections

Head phone - Out (12)

Bk - Head phone 32 - 600 ohm / 10 mW



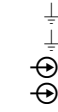
Cinch: Video CVBS - In, Audio - In (13)

Ye - Video CVBS 1 V_{PP} / 75 ohm
Wh - Audio L 0.5 V_{RMS} / 10 kohm
Rd - Audio R 0.5 V_{RMS} / 10 kohm



S-Video (Hosiden): Video Y/C - In (14)

1 - Ground Y Gnd
2 - Ground C Gnd
3 - Video Y 1 V_{PP} / 75 ohm
4 - Video C 0.3 V_{PP} / 75 ohm



HDMI4: Digital Video, Digital Audio - In (15)

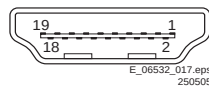
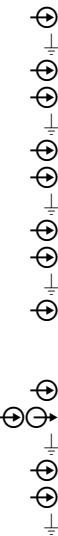


Figure 1-2 HDMI (type A) connector

1 - D2+ Data channel
2 - Shield Gnd
3 - D2- Data channel
4 - D1+ Data channel
5 - Shield Gnd
6 - D1- Data channel
7 - D0+ Data channel
8 - Shield Gnd
9 - D0- Data channel
10 - CLK+ Data channel
11 - Shield Gnd
12 - CLK- Data channel
13 - n.c.
14 - n.c.
15 - DDC_SCL DDC clock
16 - DDC_SDA DDC data
17 - Ground Gnd
18 - +5V
19 - HPD Hot Plug Detect
20 - Ground Gnd



USB2.0 (16)

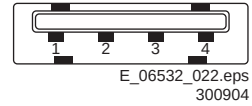
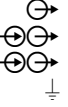


Figure 1-3 USB (type A)

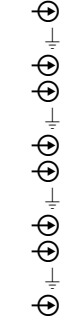
1 - +5V
2 - Data (-)
3 - Data (+)
4 - Ground Gnd



1.2.2 Rear Connections

HDMI1, 2 & 3: Digital Video, Digital Audio - In (9, 10, 11)

1 - D2+ Data channel
2 - Shield Gnd
3 - D2- Data channel
4 - D1+ Data channel
5 - Shield Gnd
6 - D1- Data channel
7 - D0+ Data channel
8 - Shield Gnd
9 - D0- Data channel
10 - CLK+ Data channel
11 - Shield Gnd
12 - CLK- Data channel
13 - n.c.
14 - n.c.
15 - DDC_SCL DDC clock
16 - DDC_SDA DDC data
17 - Ground Gnd
18 - +5V
19 - HPD Hot Plug Detect
20 - Ground Gnd



HDMI3: Cinch: DVI Audio - In (7)

Rd - Audio - R 0.5 V_{RMS} / 10 kohm
Wh - Audio - L 0.5 V_{RMS} / 10 kohm



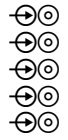
Aerial - In (1)

- - F-type (US) Coax, 75 ohm



AV1 & 2: Cinch: Video YPbPr - In, Audio - In (2, 3)

Gn - Video Y 1 V_{PP} / 75 ohm
Bu - Video Pb 0.7 V_{PP} / 75 ohm
Rd - Video Pr 0.7 V_{PP} / 75 ohm
Wh - Audio L 0.5 V_{RMS} / 10 kohm
Rd - Audio R 0.5 V_{RMS} / 10 kohm



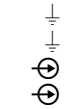
AV3: Cinch: Video CVBS - In, Audio - In (4)

Ye - Video CVBS 1 V_{PP} / 75 ohm
Wh - Audio L 0.5 V_{RMS} / 10 kohm
Rd - Audio R 0.5 V_{RMS} / 10 kohm



AV3: S-Video (Hosiden): Video Y/C - In (8)

1 - Ground Y Gnd
2 - Ground C Gnd
3 - Video Y 1 V_{PP} / 75 ohm
4 - Video C 0.3 V_{PP} / 75 ohm



Service Connector UART (5)

1 - UART_TX Transmit
2 - Ground Gnd
3 - UART_RX Receive



Cinch: S/PDIF - Out (6)

Bk - Coaxial 0.4 - 0.6V_{PP} / 75 ohm



1.3 Chassis Overview

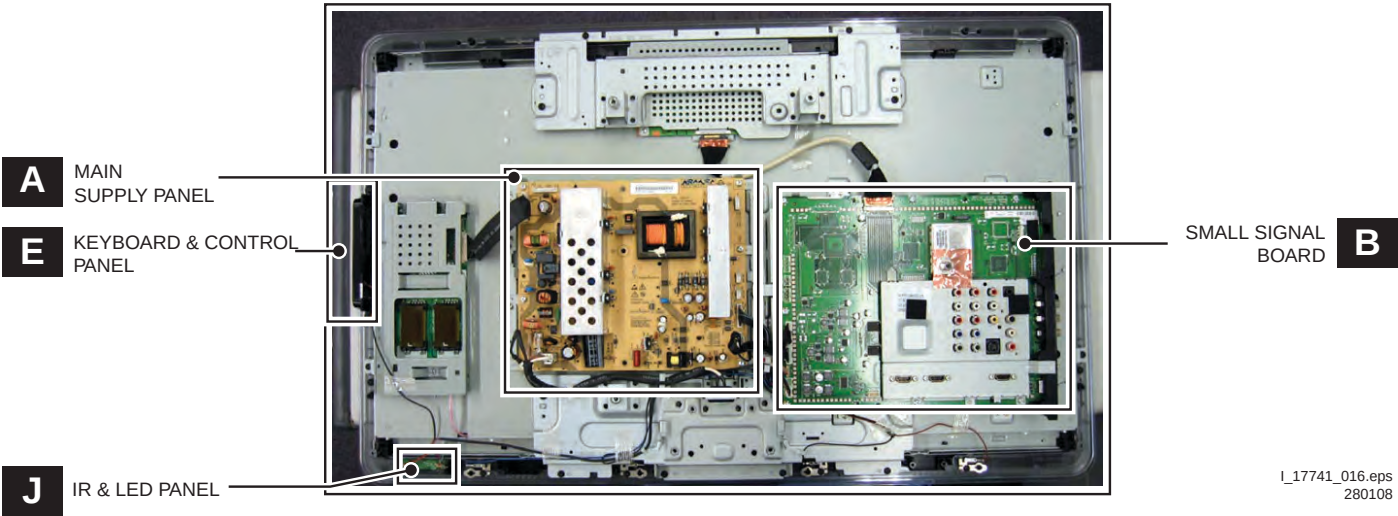


Figure 1-4 PWB/CBA locations 32" models

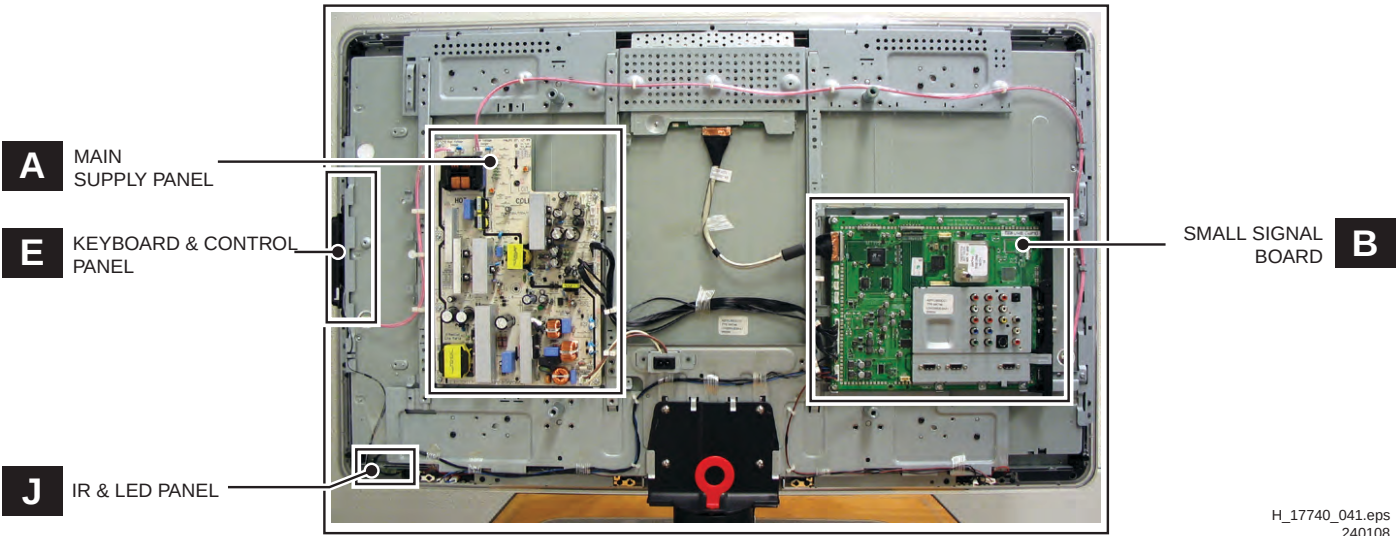


Figure 1-5 PWB/CBA locations 42" models

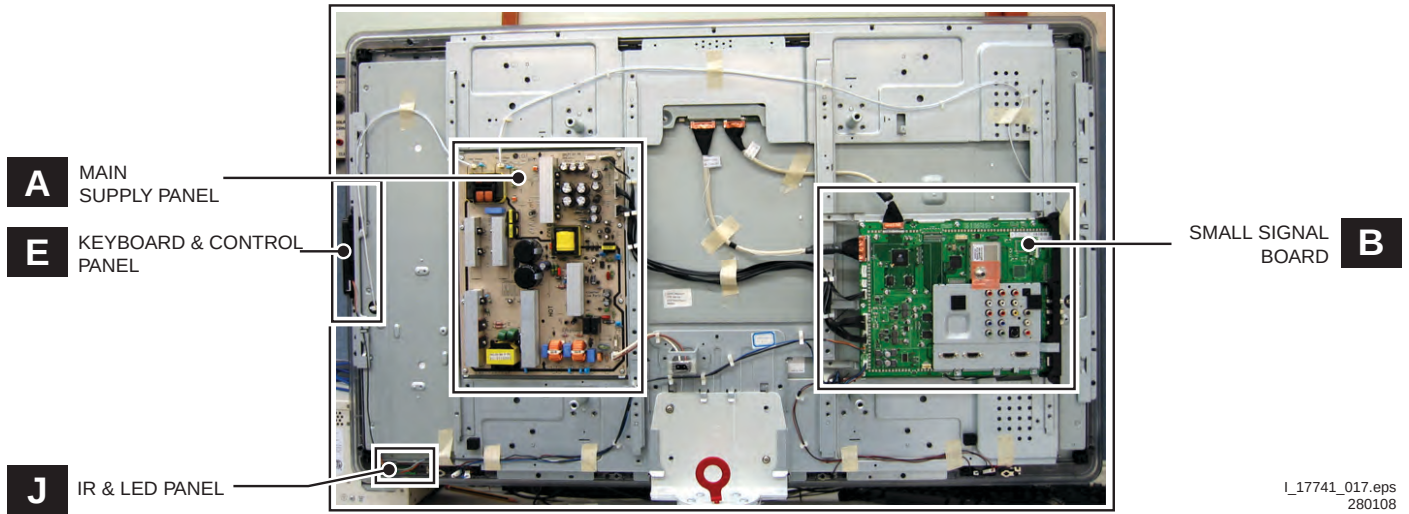


Figure 1-6 PWB/CBA locations 47" models

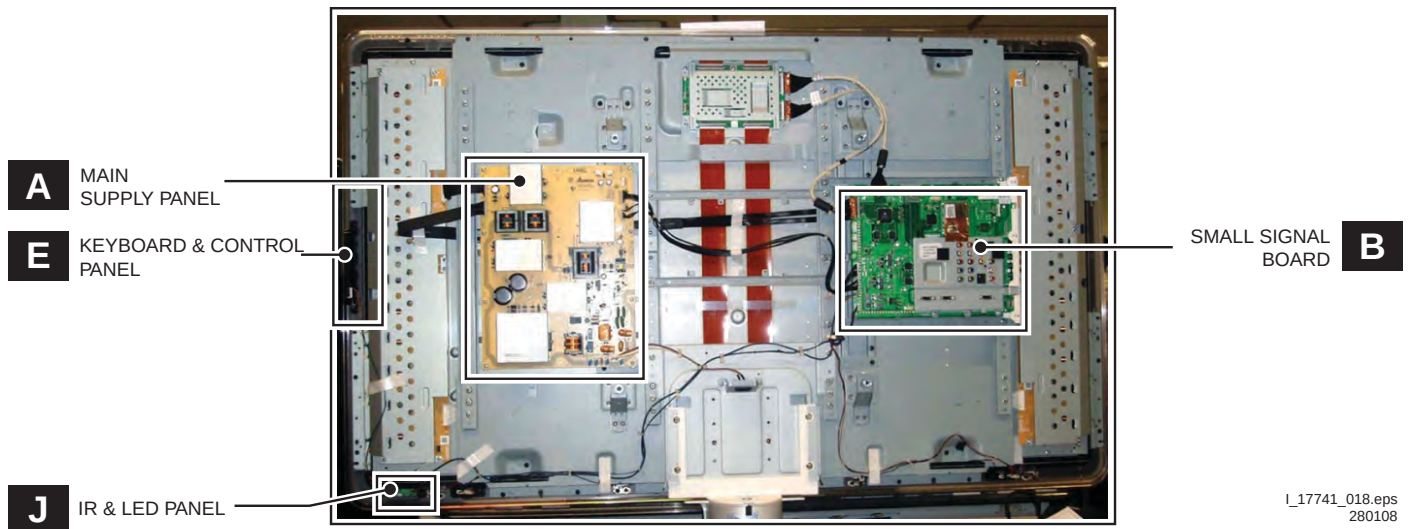


Figure 1-7 PWB/CBA locations 52" models

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

- 2.1 Safety Instructions
- 2.2 Warnings
- 2.3 Notes

2.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ▲, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
 1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
 2. Set the Mains/AC Power switch to the "on" position (keep the Mains/AC Power cord unplugged!).
 3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
 4. Switch "off" the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ▲). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

2.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⊥), or hot ground (↕), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a color bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).

- Where necessary, measure the waveforms and voltages with (⏏) and without (⏏) aerial signal. Measure the voltages in the power supply section both in normal operation (Ⓢ) and in stand-by (Ⓢ). These values are indicated by means of the appropriate symbols.
- Manufactured under license from Dolby Laboratories. "Dolby", "Pro Logic" and the "double-D symbol", are trademarks of Dolby Laboratories.

2.3.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Spare Parts List. Therefore, always check this list when there is any doubt.

2.3.3 BGA (Ball Grid Array) ICs

BGA Temperature Profiles

For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, contact your local Service organization.

2.3.4 Lead-free Soldering

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

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
 - To reach a solder-tip temperature of at least 400°C.
 - To stabilize the adjusted temperature at the solder-tip.
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch "off" unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly **to avoid** mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

2.3.5 Alternative BOM identification

The **third digit** in the serial number (example: AG2B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.

By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number "1" (example: AG1B0335000001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a "2" (example: AG2B0335000001), then the set has been produced according to B.O.M. no. 2. ***This is important for ordering the correct spare parts!***

For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26= 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production center (e.g. AG is Bruges), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2006 week 17). The 6 last digits contain the serial number.



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Figure 2-1 Serial number (example)

2.3.6 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.

If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

2.3.7 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages.** While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3. Directions for Use

You can download this information from the following websites:
<http://www.philips.com/support>
<http://www.p4c.philips.com>

4. Mechanical Instructions

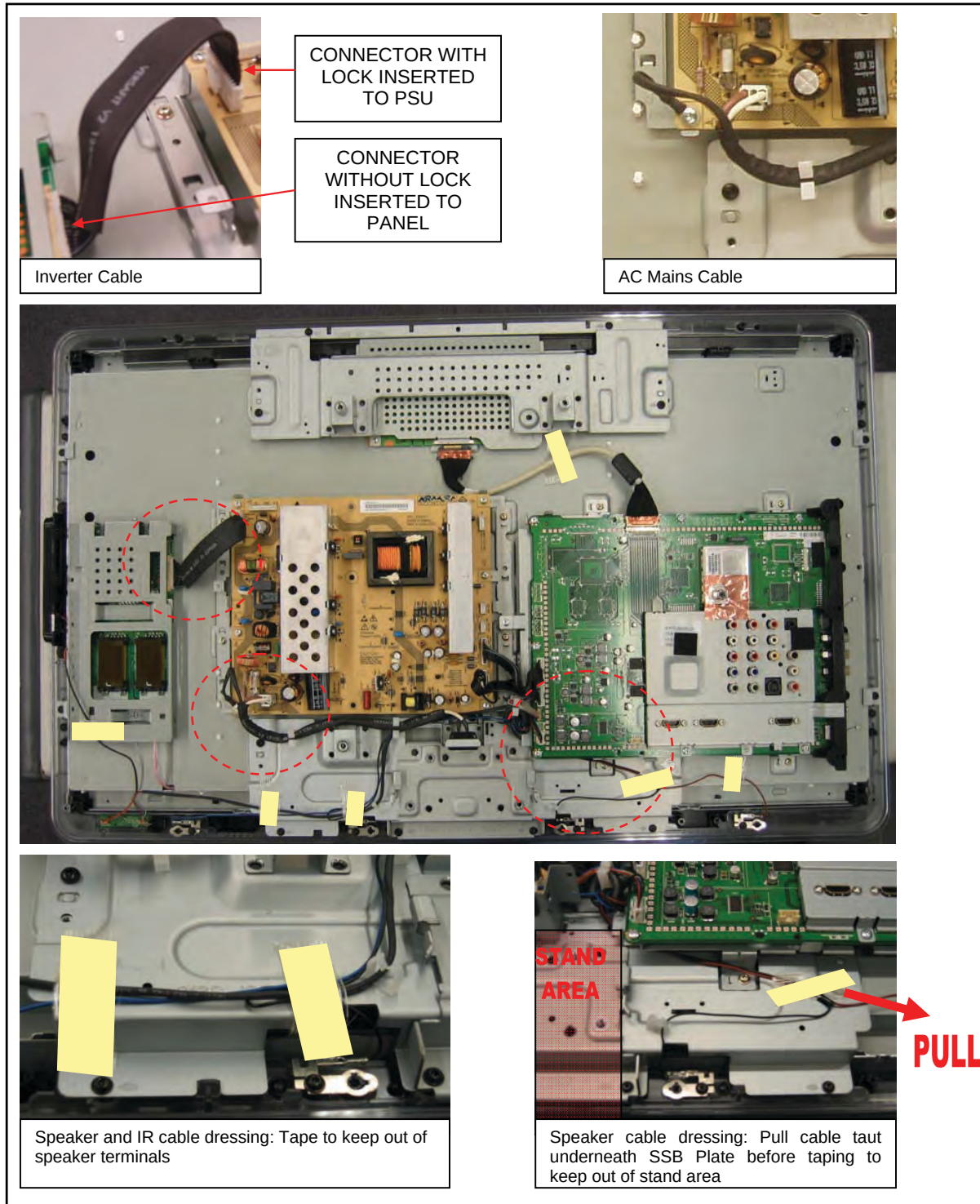
Index of this chapter:

- 4.1 Cable Dressing
- 4.2 Service Positions
- 4.3 Assy/Panel Removal ME8 Styling
- 4.4 Set Re-assembly

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.
- Follow the disassemble instructions in described order.
- Please pay special attention to the speaker wires when re-assembling the set. Place the cable tapes as shown in next figures.

4.1 Cable Dressing



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Figure 4-1 Cable dressing (32" models, ME8 styling)

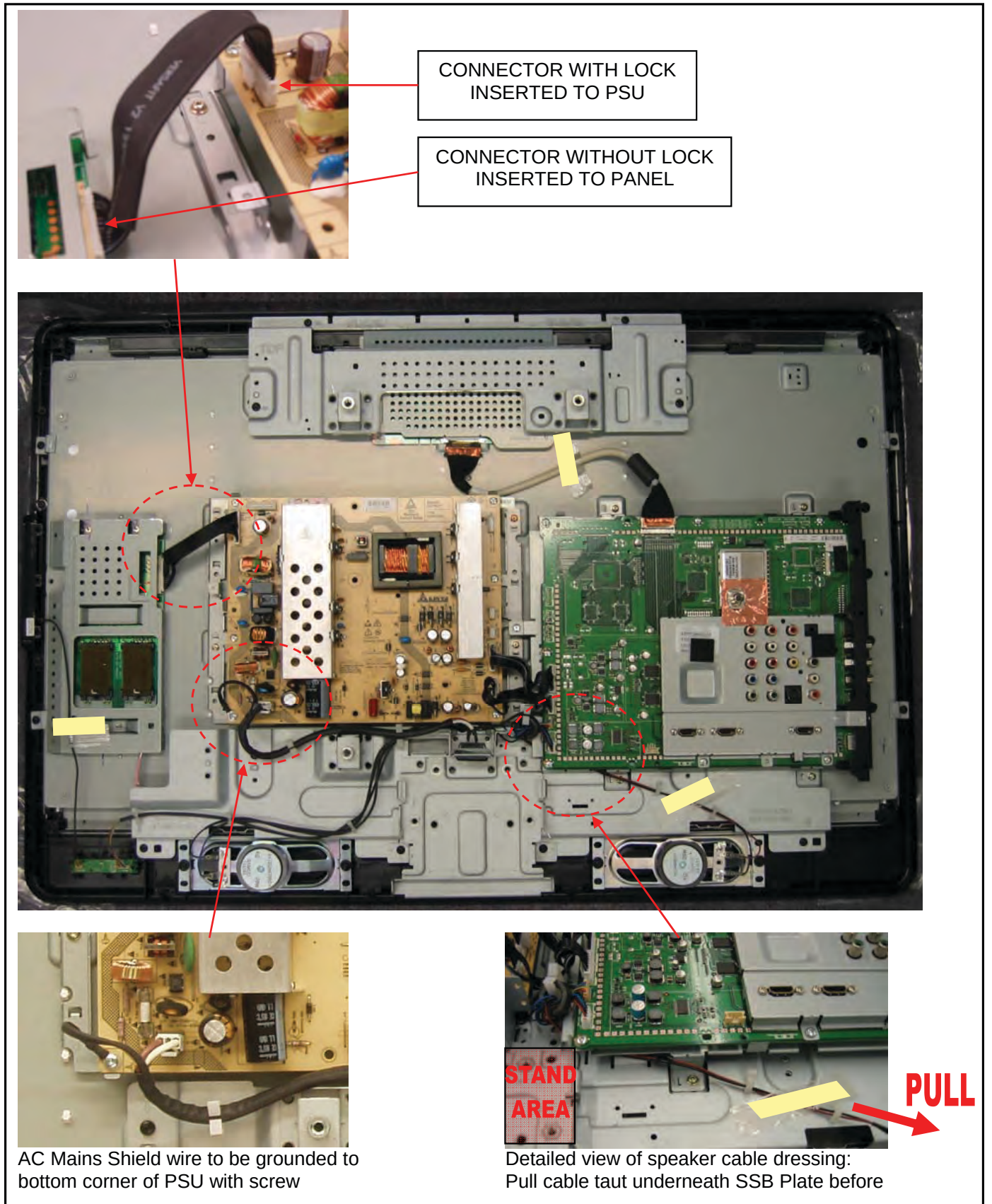
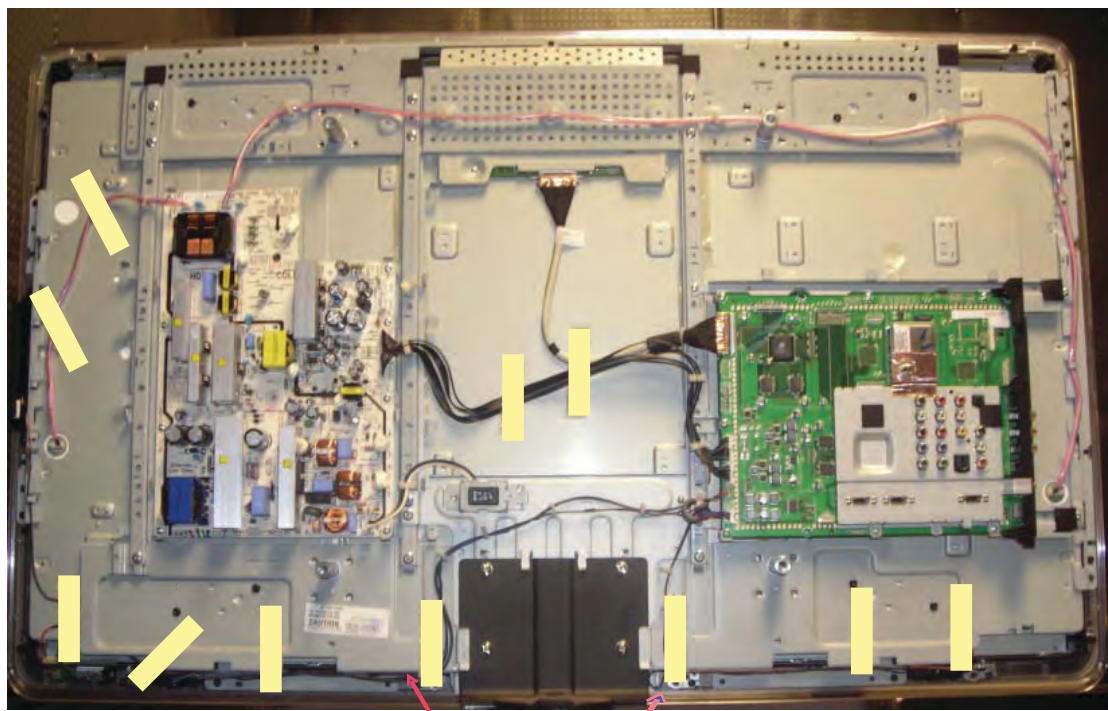
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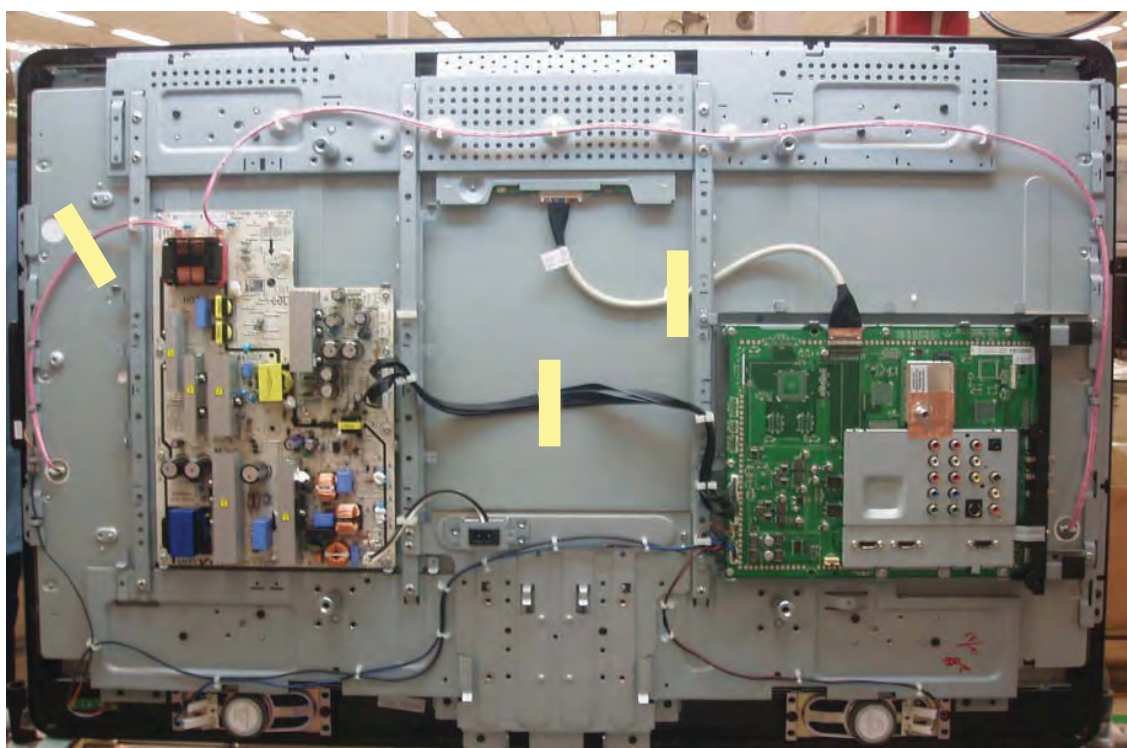
Figure 4-2 Cable dressing (32" models, MG8 styling)



Tape tweeter wire to metal frame (both ends)
to keep away from tweeter terminal

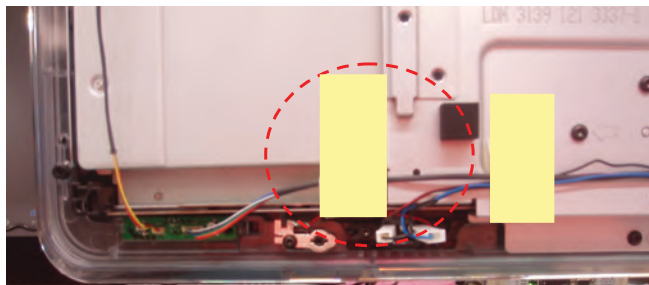
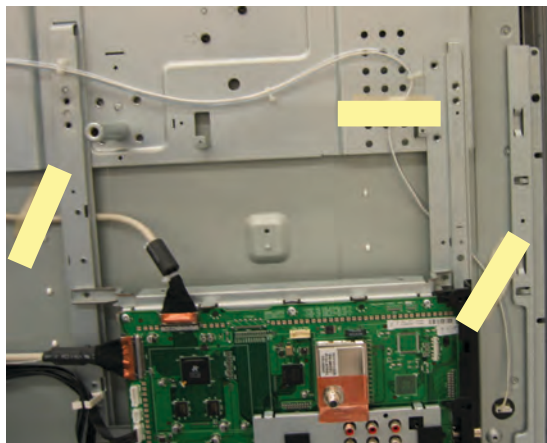
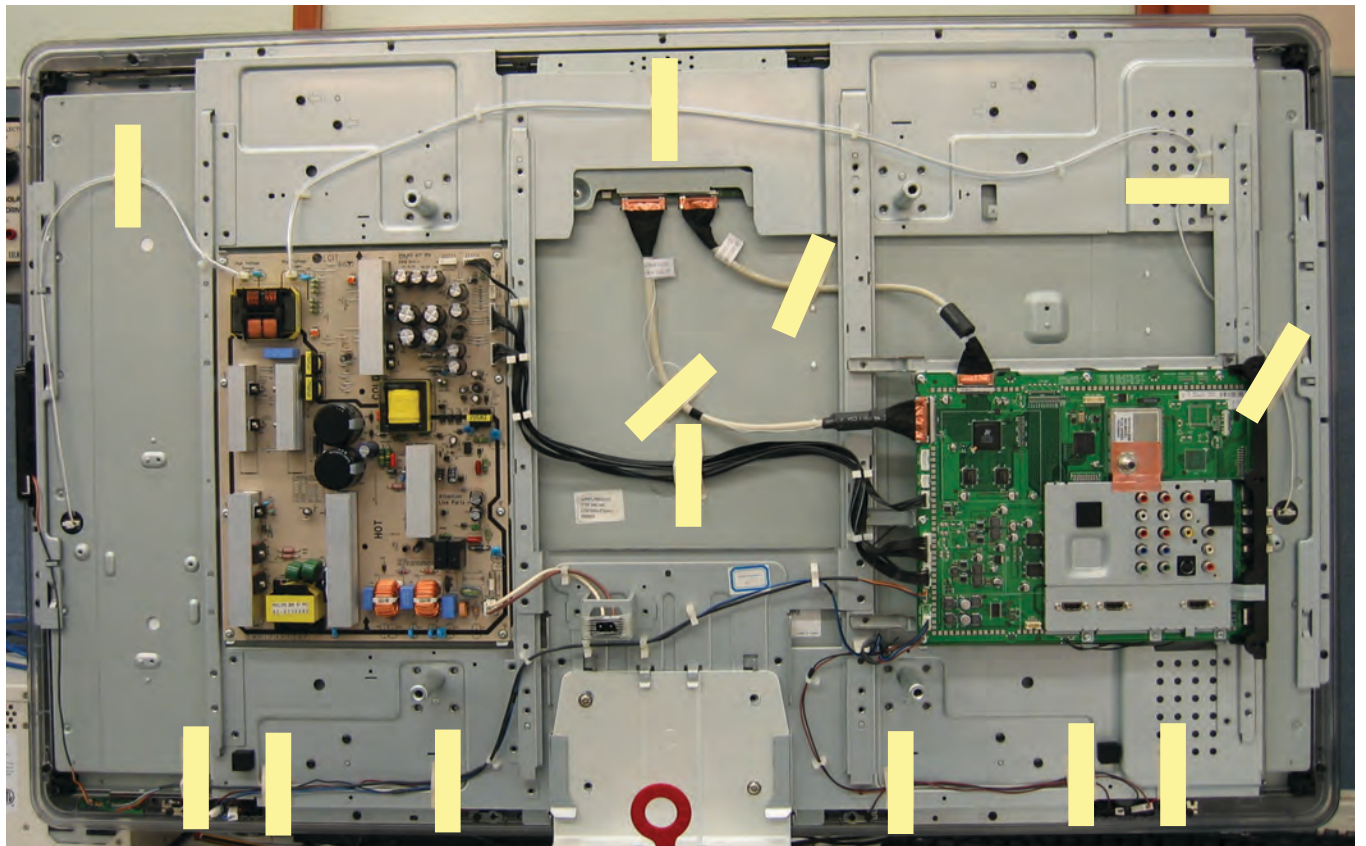
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Figure 4-3 Cable dressing (42" models, ME8 styling)



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Figure 4-4 Cable dressing (42" models, MG8 styling)



Tape the 8C02 cable (IR Board to SSB) and the short red tweeter wire together.

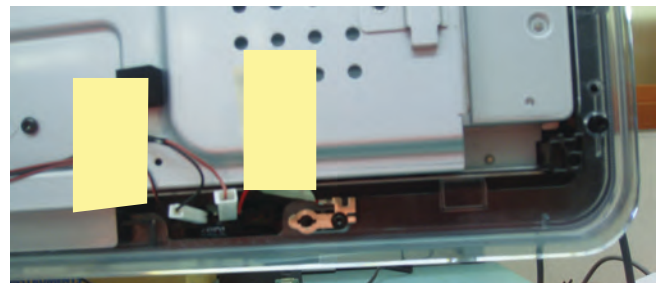
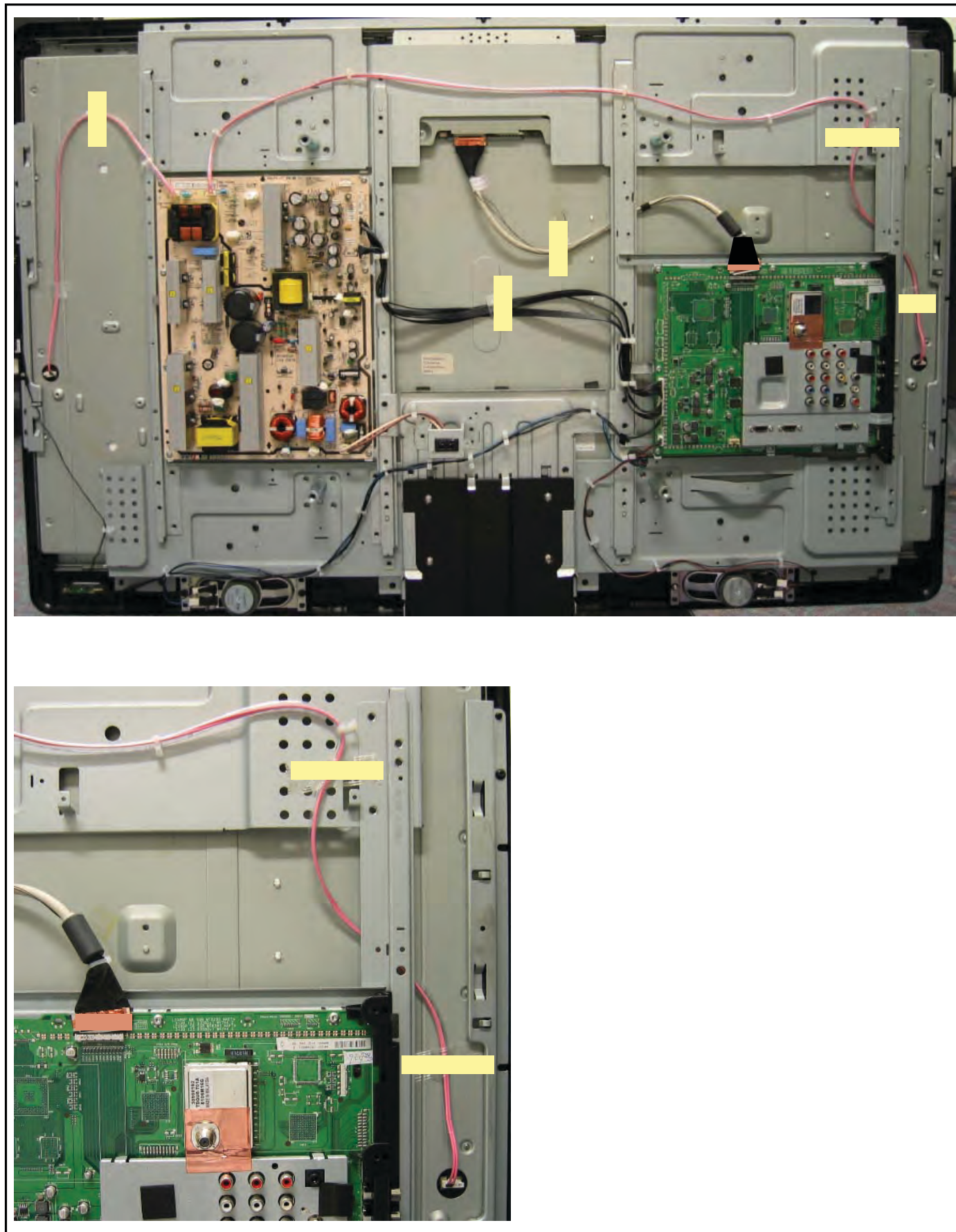
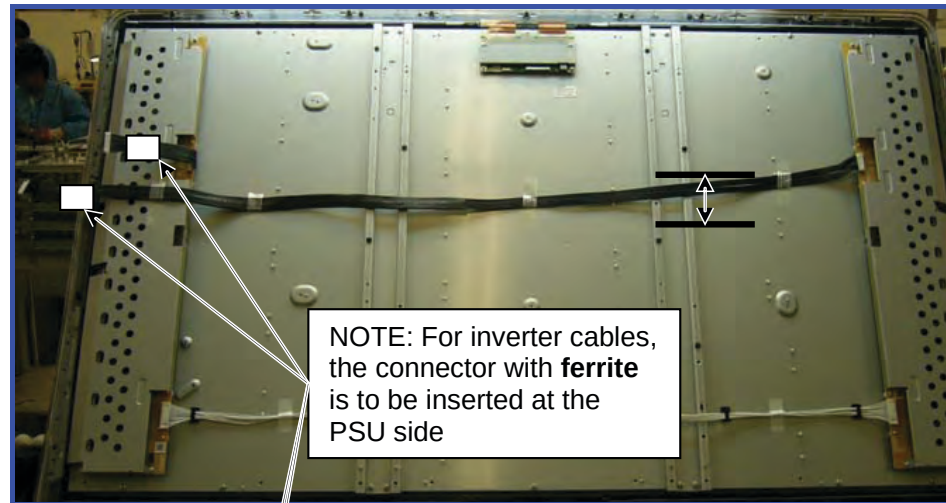


Figure 4-5 Cable dressing (47" models, ME8 styling)

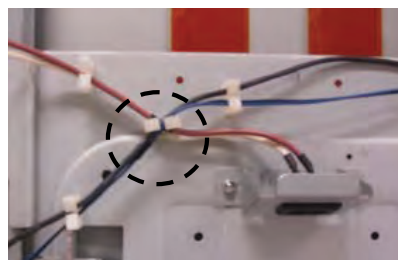
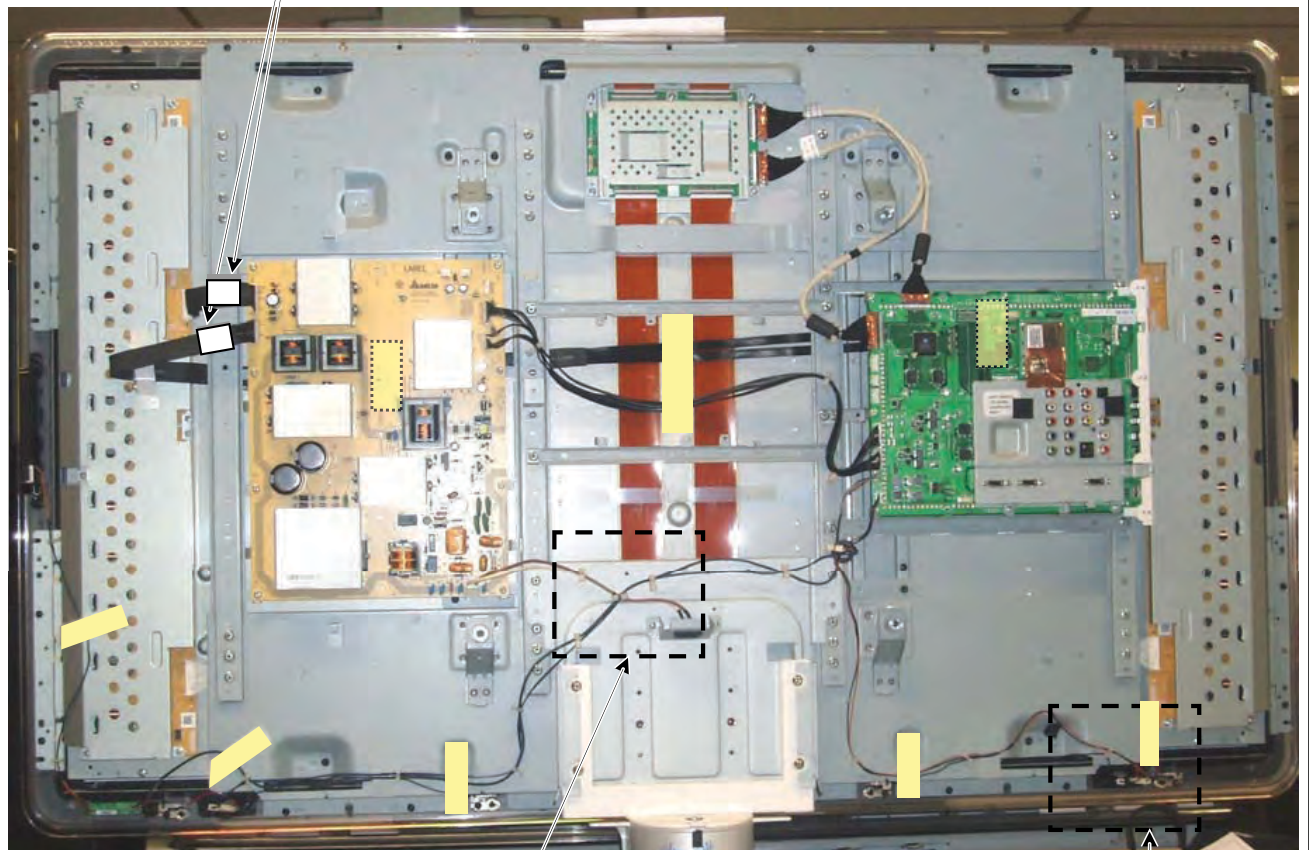


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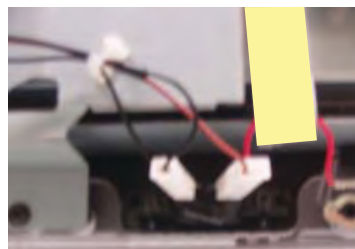
Figure 4-6 Cable dressing (47" models, MG8 styling)



Tape inverter cable so it stays in-between the LCD Panel lamp holders as shown to avoid EMC Foam on SSB Bars.

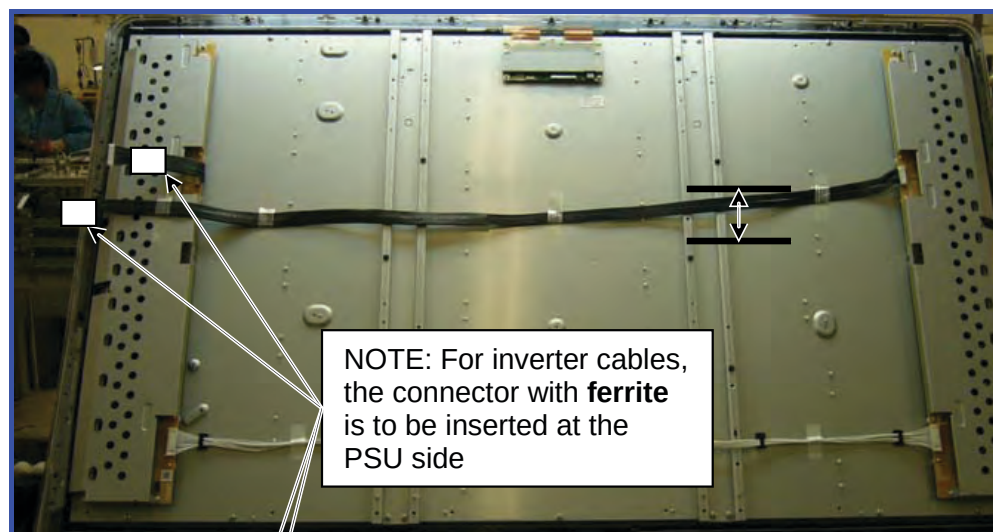


Note orientation of wire saddle – the IR and Speaker Cables must not be parallel with AC Mains cable



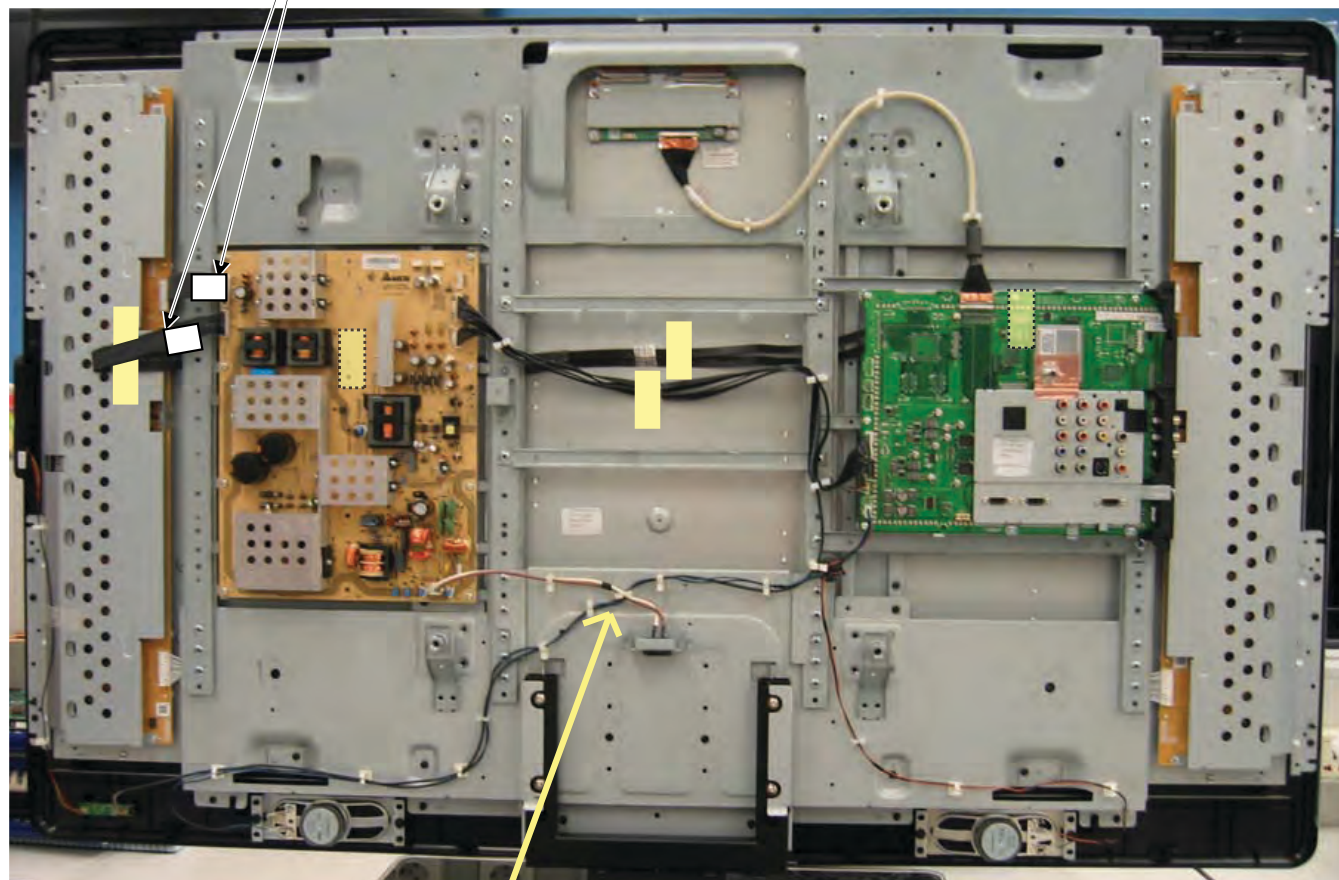
Tape speaker wires to prevent interference with speaker terminal

Figure 4-7 Cable dressing (52" models, ME8 styling)



Tape inverter cable so it stays in-between the LCD Panel lamp holders as shown to avoid EMC Foam on SSB Bars.

NOTE: For inverter cables, the connector with **ferrite** is to be inserted at the PSU side



Note horizontal orientation of wire saddle – the IR and Speaker Cables must cross the AC Mains Cable with “X” shape and not lay in parallel

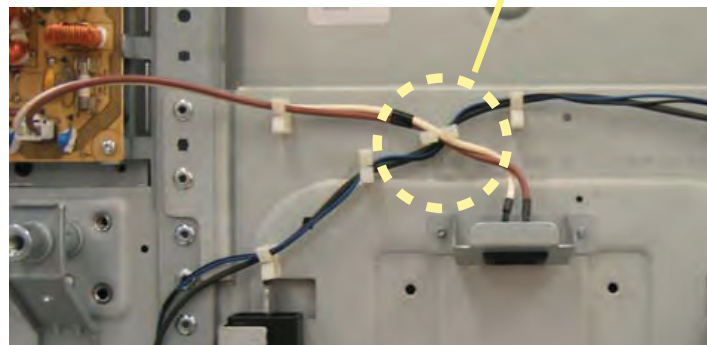


Figure 4-8 Cable dressing (52" models, MG8 styling)

4.2 Service Positions

For easy servicing of this set, there are a few possibilities created:

- The buffers from the packaging.
- Foam bars (created for Service).

4.2.1 Foam Bars

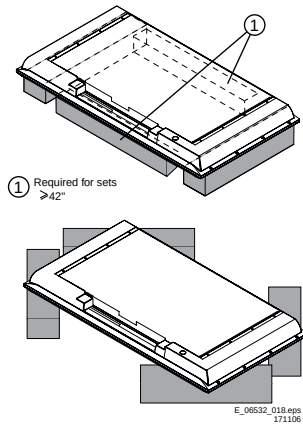


Figure 4-9 Foam bars

The foam bars (order code 3122 785 90580 for two pieces) can be used for all types and sizes of Flat TVs. See figure "Foam bars" for details.

Sets with a display of 42" and larger, require **four** foam bars [1]. Ensure that the foam bars are always supporting the cabinet and **never** only the display.

Caution: Failure to follow these guidelines can seriously damage the display!

By laying the TV face down on the (ESD protective) foam bars, a stable situation is created to perform measurements and alignments. By placing a mirror under the TV, you can monitor the screen.

4.2.2 Service Stands

The MkII aluminium Service Stands are **not** suitable for this chassis. Use the stands that come with the set instead.

4.3 Assy/Panel Removal ME8 Styling

4.3.1 Back Cover

Warning: Disconnect the mains power cord before you remove the back cover.

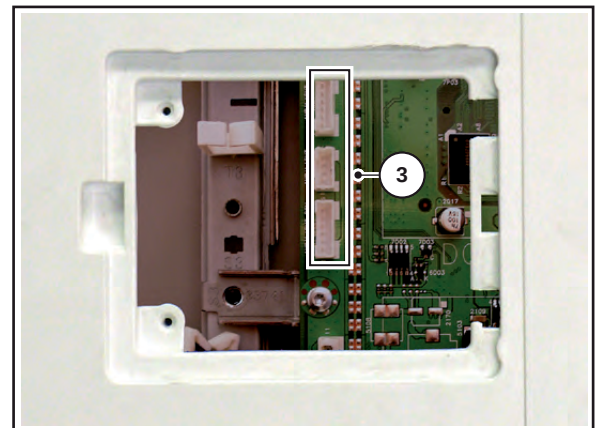
Note: it is **not** necessary to remove the stand while removing the back cover.

Warning: Most sets have an additional hatch located in the back cover. These are meant for disconnecting the flat cables to the AmbiLight units in the back cover, **before** the back cover is lifted from the set. The hatches are not always located at the same place for all sets, therefore the figures below are only meant as indication.

It is mandatory to locate these hatches first, open them, and unplug connector(s) behind. Lifting the back cover without having done so, could result in damaging the connectors inside!

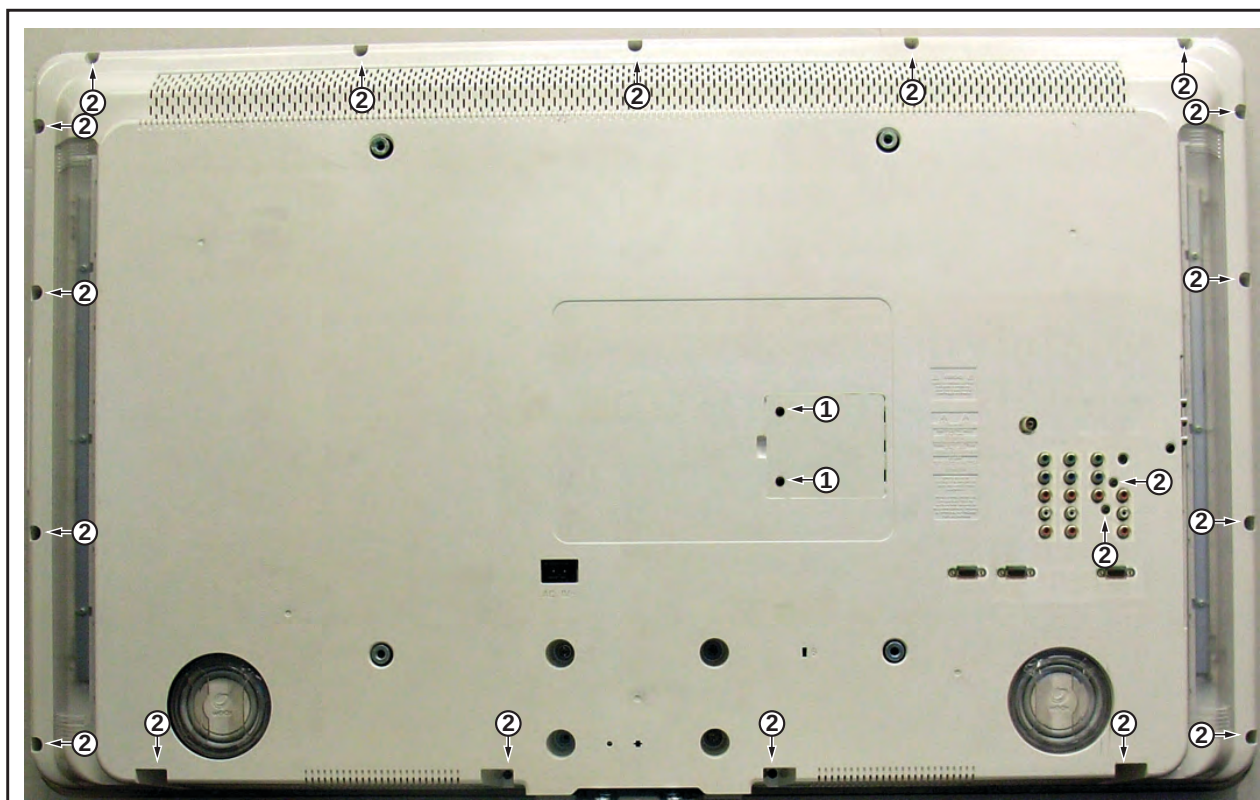
Refer to next figures for details.

1. First remove the screws [1] from the back cover hatch and remove the hatch.
2. Then unplug connector(s) [3].
3. Remove the screws [2], gently lift the back cover from the set. Make sure that wires and flat coils are not damaged while lifting the back cover from the set.



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Figure 4-10 Back Cover Removal [1/2]



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Figure 4-11 Back Cover Removal [2/2]

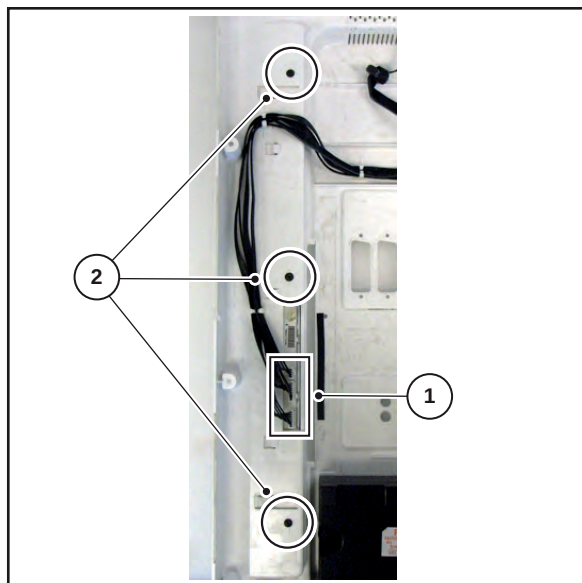
4.3.2 Ambilight (if present)

Refer to next figure for details.

1. Unplug the connectors [1].
 2. Remove the screws [2].
 3. Pull the unit sideways from the back cover.
- When defective, replace the whole unit.

4.3.3 Loudspeaker (MG8 styling only)

1. Unplug the connectors.
2. Remove the screws.
3. Remove the loudspeaker.



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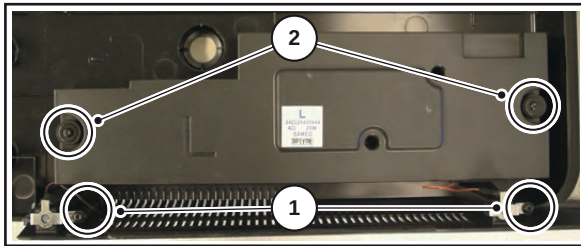
Figure 4-12 Ambilight Unit

4.3.4 Woofers (ME8 styling only)

Refer to next figure for details.

1. Remove the screws [1] and [2] and lift the whole unit from the back cover.

Take the speakers out together with their casing. When defective, replace the whole unit.



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Figure 4-13 Woofer

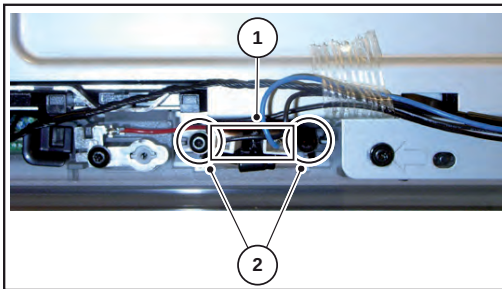
4.3.5 Tweeters (ME8 styling only)

Refer to next figure for details.

Warning: The speakers should never be connected or disconnected when the set is playing! This can damage the amplifiers on the SSB.

1. Unplug connector [1].
2. Remove screws [2] and remove unit.

Note: After repair, be sure to place the cable tapes (see also cable dressing figures for the exact location).



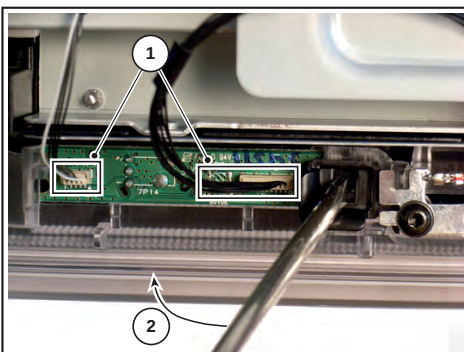
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Figure 4-14 Tweeter

4.3.6 IR & LED Board

Refer to next figure for details.

1. Unplug connectors [1].
 2. Use a flat screw driver to release the clip by pushing it in the indicated direction [2].
 3. Lift the board and take it out of the set.
- When defective, replace the whole unit.



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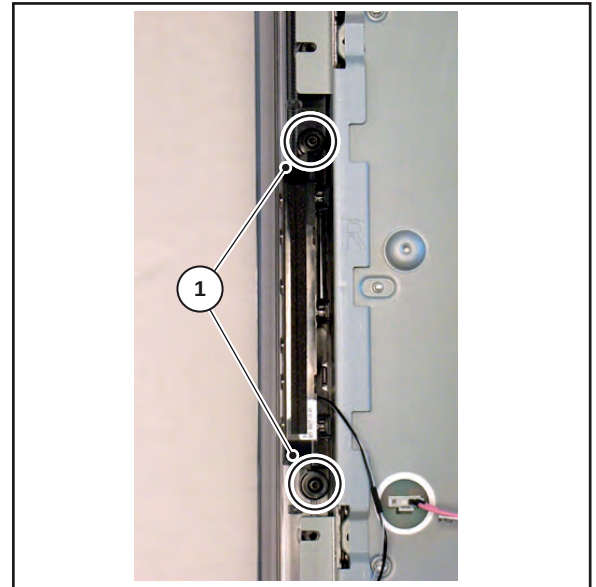
Figure 4-15 IR & LED Board

4.3.7 Key Board

Refer to next figure for details.

1. Unplug the key board connector from the IR & LED board.
2. Remove the screws [1].
3. Lift the unit and take it out of the set.

When defective, replace the whole unit.



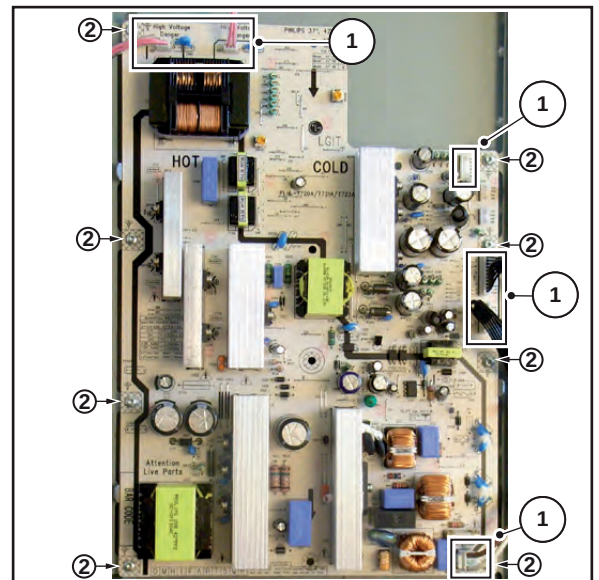
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Figure 4-16 Key Board

4.3.8 Display Supply Panel

Refer to next figure for details. **Note:** depending on the set execution, the used PSU can differ from figure below.

1. Unplug connectors [1].
2. Remove the fixation screws [2].
3. Take the board out.



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Figure 4-17 Display Supply Panel

4.3.9 Small Signal Board (SSB)

Refer to below figure for details.

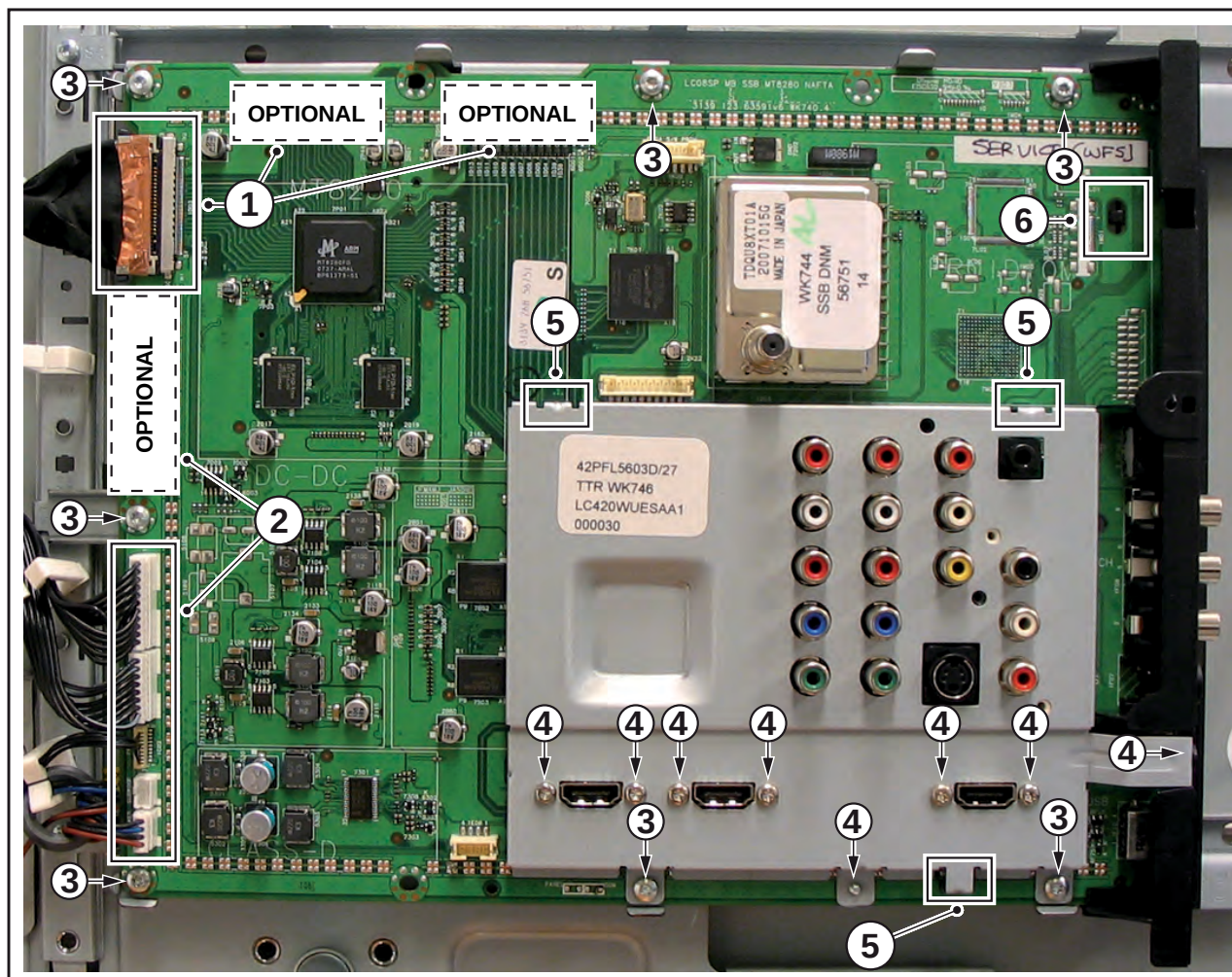
Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

Refer to next figures or details.

1. Unplug the LVDS connector(s) [1].

Caution: be careful, as this is a very fragile connector!

2. Unplug the connectors [2].
3. Remove the screws [3].
4. The SSB can now be taken out of the set, together with the front shield and the side cover.
5. To remove the shield, remove the screws [4] and lift it of while releasing clips [5].
6. Release clip [6] and slide the cover sideways from the SSB.



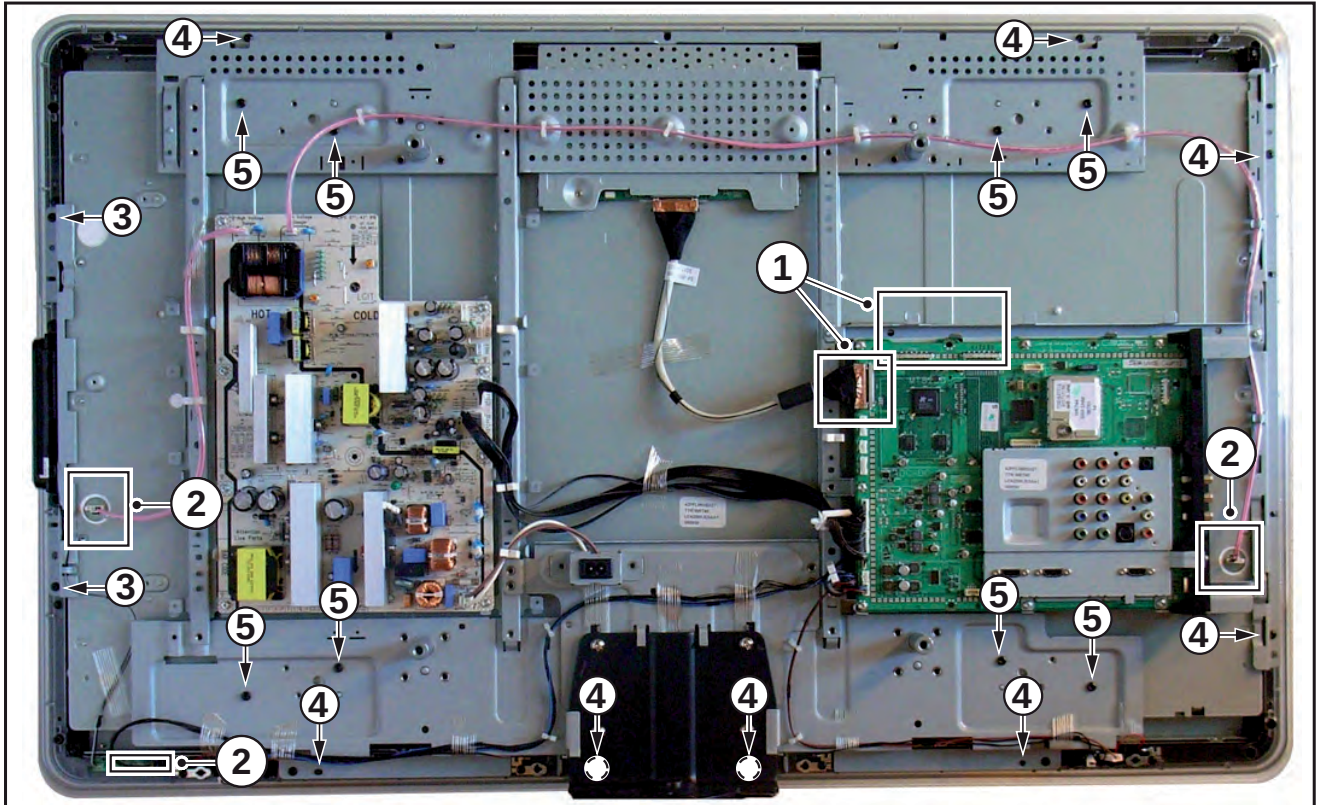
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Figure 4-18 Small Signal Board

4.3.10 LCD Panel

Refer to next figures for details. The figure used is from a 42-inch model, but the other screensizes have similar constructions.

1. Remove the stand.
2. Unplug the LVDS connector(s) [1].
Caution: be careful, as this is a very fragile connector!
3. Unplug the connectors [2].
4. Remove the fixation screws [3] from rim.
5. Take the rim from the set.
6. Remove the fixation screws [4] and [5].
7. Lift the subframe from the set.
8. The LCD panel can now be lifted from the front cabinet.



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Figure 4-19 LCD Panel (example from 42" model)

4.4 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- **Important:** While re-assembling, make sure that all cables and cable tapes are placed in their original position. See figure "Cable dressing".
- Pay special attention not to damage the EMC foams on the SSB shields. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

- 5.1 Test Points
- 5.2 Service Modes
- 5.3 Service Tools
- 5.4 Error Codes
- 5.5 The Blinking LED Procedure
- 5.6 Fault Finding and Repair Tips
- 5.7 Software Upgrading

5.1 Test Points

In the chassis schematics and layout overviews, the test points are mentioned. In the schematics, test points are indicated with "Fxxx" or "Ixxx", in the layout overviews with a "half-moon" sign. As most signals are digital, it will be difficult to measure waveforms with a standard oscilloscope. Several key ICs are capable of generating test patterns, which can be controlled via ComPair. In this way it is possible to determine which part is defective.

Perform measurements under the following conditions:

- Service Default Mode.
- Video: Color bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

The Service Mode feature is split into four parts:

- Service Default Mode (SDM).
- Service Alignment Mode (SAM).
- Customer Service Mode (CSM).
- Computer Aided Repair Mode (ComPair).

SDM and SAM offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:

- A pre-defined situation to ensure measurements can be made under uniform conditions (SDM).
- Activates the blinking LED procedure for error identification when no picture is available (SDM).
- The possibility to overrule software protections when SDM is entered via the Service pins.
- Make alignments (e.g. White Tone), (de)select options, enter options codes, reset the error buffer (SAM).
- Display information ("SDM" or "SAM" indication in upper right corner of screen, error buffer, software version, operating hours, options and option codes, sub menus).

The CSM is a Service Mode that can be enabled by the consumer. The CSM displays diagnosis information, which the customer can forward to the dealer or call centre. In CSM mode, "CSM", is displayed in the top right corner of the screen. The information provided in CSM and the purpose of CSM is to:

- Increase the home repair hit rate.
- Decrease the number of nuisance calls.
- Solved customers' problem without home visit.

ComPair Mode is used for communication between a computer and a TV on I2C /UART level and can be used by a Service engineer to quickly diagnose the TV set by reading out error codes, read and write in NVMs, communicate with ICs and the uP (PWM, registers, etc.), and by making use of a fault finding database. It will also be possible to up and download the software of the TV set via I2C with help of ComPair. To do this, ComPair has to be connected to the TV set via the ComPair connector, which will be accessible through the rear of the set (without removing the rear cover).

5.2.1 General

Some items are applicable to all Service Modes or are general. These are listed below.

Life Timer

During the life time cycle of the TV set, a timer is kept (called "Op. Hour"). It counts the normal operation hours (not the Stand-by hours). The actual value of the timer is displayed in SDM and SAM in a decimal value. Every two soft-resets increase the hour by +1. Standby hours are not counted.

Software Identification, Version, and Cluster

The software ID, version, and cluster will be shown in the main menu display of SDM, SAM, and CSM.

The screen will show: "AAAABCD X.YY", where:

- **AAAA** is the chassis name: LC81.
- **B** is the region indication: E= Europe, A= AP/China, U= NAFTA, L= LATAM.
- **C** is the display indication: L= LCD, P= Plasma.
- **D** is the language/feature indication: P= Philips, M= Magnavox.
- **X** is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 1 - 9 and A - Z.
 - If the main version number changes, the new version number is written in the NVM.
 - If the main version number changes, the default settings are loaded.
- **YY** is the sub version number: this is updated with a minor change (backwards compatible with the previous versions) Numbering will go from 00 - 99.
 - If the sub version number changes, the new version number is written in the NVM.
 - If the NVM is fresh, the software identification, version, and cluster will be written to NVM.

Display Option Code Selection

When after an SSB or display exchange, the display option code is not set properly, it will result in a TV with "no display". Therefore, **it is required** to set this display option code after such a repair.

To do so, press the following key sequence on a standard RC transmitter: "**062598**" directly followed by **MENU** and "**xxx**", where "xxx" is a 3 digit decimal value of the panel type: see column "Panel Code" in table "Option Codes OP1...OP7" (ch. 8), or see sticker on the side/bottom of the cabinet. When the value is accepted and stored in NVM, the set will switch to Stand-by, to indicate that the process has been completed.

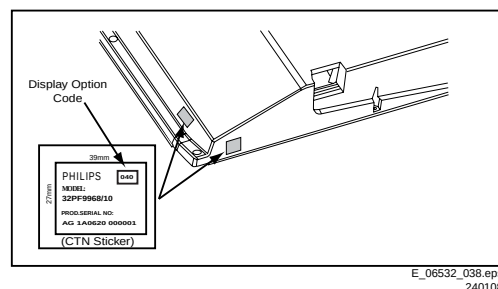


Figure 5-1 Location of Display Option Code sticker

During this algorithm, the NVM-content must be filtered, because several items in the NVM are TV-related and not SSB-related (e.g. Model and Prod. S/N). Therefore, "Model" and "Prod. S/N" data is changed into "See Type Plate".

In case a call centre or consumer reads "See Type Plate" in CSM mode, he needs to look to the side/bottom sticker to identify the set, for further actions.

5.2.2 Service Default Mode (SDM)

Purpose

Set the TV in SDM mode in order to be able to:

- Create a pre-defined setting for measurements to be made.
- Override software protections.
- Start the blinking LED procedure.
- Read the error buffer.
- Check the life timer.

Specifications

Table 5-1 SDM default settings

Region	Freq. (MHz)	Default syst.
Europe (except France), AP-PAL/-Multi	475.25	PAL B/G
France		SECAM L
NAFTA, AP-NTSC	61.25 (channel 3)	NTSC M
LATAM		PAL M

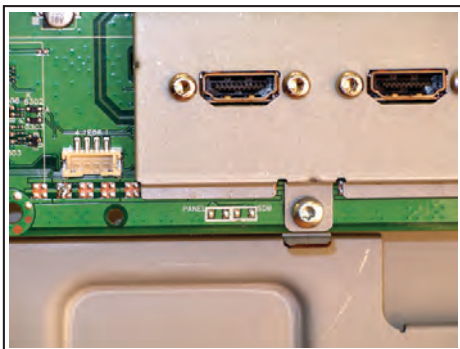
- Set linear video and audio settings to 50%, but volume to 25%. Stored user settings are not affected.
- All service-unfriendly modes (if present) are disabled, since they interfere with diagnosing/repairing a set. These service unfriendly modes are:
 - (Sleep) timer.
 - Blue mute/Wall paper.
 - Auto switch “off” (when there is no “ident” signal).
 - Hotel or hospital mode.
 - Child lock or parental lock (manual or via V-chip).
 - Skipping, blanking of “Not favorite”, “Skipped” or “Locked” presets/channels.
 - Automatic storing of Personal Preset or Last Status settings.
 - Automatic user menu time-out (menu switches back/OFF automatically).
 - Auto Volume levelling (AVL).

How to Activate

To activate SDM, use **one** of the following methods:

- Press the following key sequence on the remote control transmitter: “**062596**” directly followed by the **MENU** button (do not allow the display to time out between entries while keying the sequence).
- Short one of the “Service” jumpers on the TV board during cold start (see Figures “Service jumper”). Then press the mains button (remove the short after start-up).

Caution: Activating SDM by shorting “Service” jumpers will override the DC speaker protection (error 1), the General I2C error (error 4), and the Trident video processor error (error 5). When doing this, the service-technician must know exactly what he is doing, as it could damage the television set.

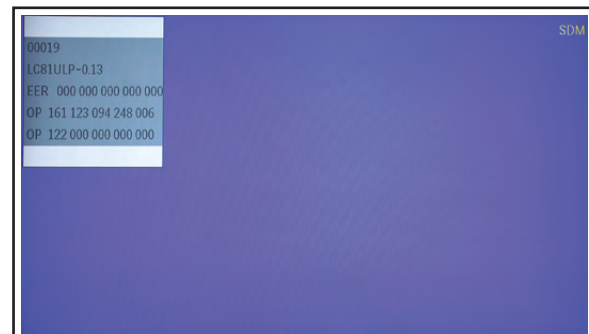


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Figure 5-2 Service jumper (SSB component side)

On Screen Menu

After activating SDM, the following screen is visible, with SDM in the upper right corner of the screen to indicate that the television is in Service Default Mode.



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Figure 5-3 SDM menu

Menu explanation:

- **HHHHH**: Are the operating hours (in decimal).
- **AAAABCD-X.YY**: See paragraph “Service Modes” -> “General” -> “Software Identification, Version, and Cluster” for the SW name definition.
- **EER**: Shows all errors detected since the last time the buffer was erased. Five errors possible.
- **OP**: Used to read-out the option bytes. See “Options” in the Alignments section for a detailed description. Ten codes (in two rows) are possible.

How to Navigate

As this mode is read only, there is not much to navigate. To switch to other modes, use one of the following methods:

- Command MENU from the user remote will enter the normal user menu (brightness, contrast, color, etc...) with “SDM” OSD remaining, and pressing MENU key again will return to the last status of SDM again.
- To prevent the OSD from interfering with measurements in SDM, command “OSD” or “i+” (“STATUS” or “INFO” for NAFTA and LATAM) from the user remote will toggle the OSD “on/off” with “SDM” OSD remaining always “on”.
- Press the following key sequence on the remote control transmitter: “**062596**” directly followed by the **OSD/STATUS/INFO/i+** button to switch to SAM (do not allow the display to time out between entries while keying the sequence).

How to Exit

Switch the set to STANDBY by pressing the mains button on the remote control transmitter or on the television set. If you switch the television set “off” by removing the mains (i.e., unplugging the television), the television set will remain in SDM when mains is re-applied, and the error buffer is not cleared. The error buffer will only be cleared when the “clear” command is used in the SAM menu.

Note:

- If the TV is switched “off” by a power interrupt while in SDM, the TV will show up in the last status of SDM menu as soon as the power is supplied again. The error buffer will not be cleared.
- In case the set is in Factory mode by accident (with “F” displayed on screen), by pressing and hold “VOL-” and “CH-” together should leave Factory mode.

5.2.3 Service Alignment Mode (SAM)

Purpose

- To change option settings.
- To display / clear the error code buffer.
- To perform alignments.

Specifications

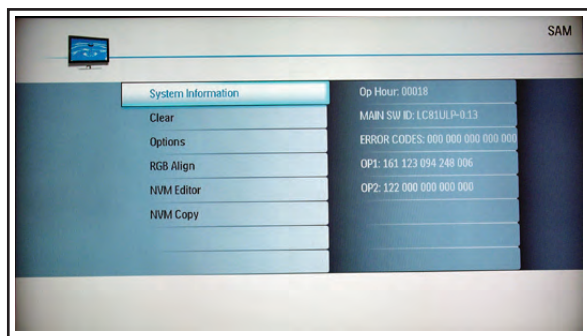
- Operation hours counter (maximum five digits displayed).
- Software version, error codes, and option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (White Tone).
- NVM Editor.
- Set screen mode to full screen (all content is visible).

How to Activate

To activate SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: **"062596"** directly followed by the **OSD/STATUS/INFO/i+** button (it depends on region which button is present on the RC). Do not allow the display to time out between entries while keying the sequence.
- Or via ComPair.

After entering SAM, the following screen is visible, with SAM in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.



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Figure 5-4 SAM menu

Menu explanation:

1. System Information:

- **Op. Hour.** This represents the life timer. The timer counts normal operation hours, but does not count Stand-by hours.
 - **MAIN SW ID.** See paragraph "Service Modes" -> "General" -> "Software Identification, Version, and Cluster" for the SW name definition.
 - **ERROR CODES.** Shows all errors detected since the last time the buffer was erased. Five errors possible.
 - **OP1 / OP2.** Used to read-out the option bytes. See "Options" in the Alignments section for a detailed description. Ten codes are possible.
2. **Clear.** Erases the contents of the error buffer. Select the CLEAR menu item and press the MENU RIGHT key. The content of the error buffer is cleared.
 3. **Options.** To set the option bits. See "Options" in the "Alignments" chapter for a detailed description.
 4. **RGB Align.** To align the White Tone. See "White Tone" in the "Alignments" chapter for a detailed description.
 5. **NVM Editor.** To change the NVM data in the television set. See also paragraph "Fault Finding and Repair Tips".
 6. **NVM Copy.** Gives the possibility to copy/load the NVM file to/from an USB stick.
Important: NVM data copied to a USB memory device is named **"TV2USB.bin"**. When copied back to a TV, the file first must be renamed to **"USB2TV.bin"**.

How to Navigate

- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the UP/DOWN keys to display the next / previous menu items.
- With the LEFT/RIGHT keys, it is possible to:
 - Activate the selected menu item.
 - Change the value of the selected menu item.
 - Activate the selected sub menu.
- When you press the MENU button twice while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background). To return to the SAM menu press the MENU button.
- The **"OSD/STATUS/INFO/i+"** key from the user remote will toggle the OSD "on/off" with "SAM" OSD remaining always "on".
- Press the following key sequence on the remote control transmitter: **"062596"** directly followed by the **MENU** button to switch to SDM (do not allow the display to time out between entries while keying the sequence).

How to Store SAM Settings

To store the settings changed in SAM mode (except the OPTIONS and RGB ALIGN settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set. The mentioned exceptions must be stored separately via the STORE button.

How to Exit

Switch the set to STANDBY by pressing the mains button on the remote control transmitter or the television set.

Note:

- When the TV is switched "off" by a power interrupt while in SAM, the TV will show up in "normal operation mode" as soon as the power is supplied again. The error buffer will not be cleared.
- In case the set is in Factory mode by accident (with "F" displayed on screen), by pressing and hold "VOL-" and "CH-" together should leave Factory mode.

5.2.4 Customer Service Mode (CSM)

Purpose

The Customer Service Mode shows error codes and information on the TV's operation settings. A call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps them to diagnose problems and failures in the TV before making a service call. The CSM is a read-only mode; therefore, modifications are not possible in this mode.

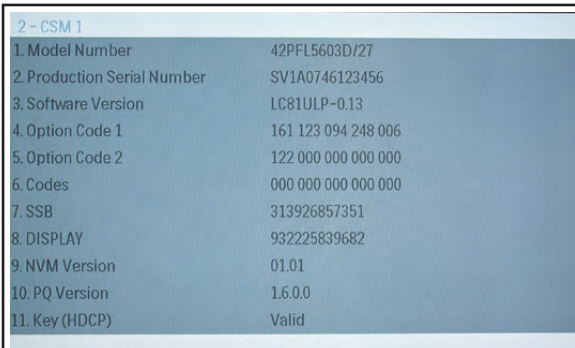
Specifications

- Ignore "Service unfriendly modes".
- Line number for every line (to make CSM language independent).
- Set the screen mode to full screen (all contents on screen is visible).
- After leaving the Customer Service Mode, the original settings are restored.
- Possibility to use "CH+" or "CH-" for channel surfing, or enter the specific channel number on the RC.

How to Activate

To activate CSM, press the following key sequence on a standard remote control transmitter: "**123654**" (do not allow the display to time out between entries while keying the sequence).

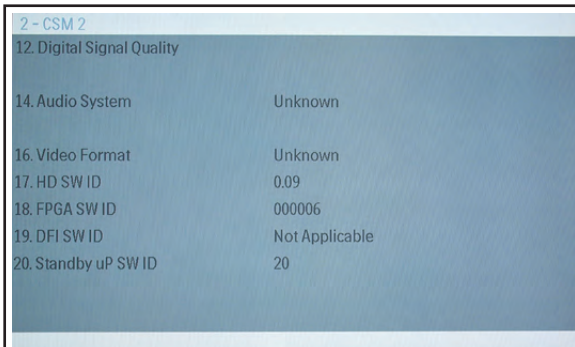
Upon entering the Customer Service Mode, the following screen will appear:



2 - CSM 1	
1. Model Number	42PFL5603D/27
2. Production Serial Number	SV1A0746123456
3. Software Version	LC81ULP-0.13
4. Option Code 1	161 123 094 248 006
5. Option Code 2	122 000 000 000 000
6. Codes	000 000 000 000 000
7. SSB	313926857351
8. DISPLAY	932225839682
9. NVM Version	01.01
10. PQ Version	1.6.0.0
11. Key (HDCP)	Valid

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Figure 5-5 CSM menu -1- (example)



2 - CSM 2	
12. Digital Signal Quality	
14. Audio System	Unknown
16. Video Format	Unknown
17. HD SW ID	0.09
18. FPGA SW ID	000006
19. DFI SW ID	Not Applicable
20. Standby uP SW ID	20

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Figure 5-6 CSM menu -2- (example)

Menu Explanation

1. **Model Number.** Type number, e.g. 42PFL5603D/27. (*)
2. **Production Serial Number.** Product serial no., e.g. SV1A0805123456 (*). SV= Production center, 1= BOM code, A= Service version change code, 08= Production year, 05= Production week, 123456= Serial number.
3. **Software Version.** Main software cluster and version is displayed.
4. **Option Code 1.** Option code information (group 1).
5. **Option Code 2.** Option code information (group 2).
6. **Codes.** Error buffer contents.
7. **SSB.** Indication of the SSB factory ID (= 12nc). (*)
8. **Display.** Indication of the display ID (=12 nc). (*)
9. **NVM Version.** The NVM software version no.
10. **PQ Version.** PQ (picture quality) data version. This is a subset of the main SW.
11. **Key (HDCP).** Indicates if the HDMI keys (or HDCP keys) are valid or not.
12. **Digital Signal Quality.** Tuner signal condition in percentage.
13. Blank.
14. **Audio System.** Gives information about the audio system of the selected transmitter (MONO/STEREO).
15. **HDAU.** HDMI audio stream detection. "YES" means audio stream detected. "NO" means no audio stream present. Only displayed when HDMI source is selected.
16. **Video Format.** Gives information about the video format of the selected transmitter (480p30/720p60/1080i50/1080i60, etc...). Is applicable to both HDMI and CVI sources.
17. **HD SW ID.** Shows the HD DNM software version.
18. **FPGA SW ID.** Shows the FPGA software version (if present).
19. **DFI SW ID.** Shows the DFI software version (if present).
20. **Standby uP SW ID.** Shows the Standby Processor software version.

(*) If an NVM IC is replaced or initialized, these items must be re-written to the NVM. ComPair will foresee in a possibility to do this.

How to Exit

To exit CSM, use one of the following methods:

- Press the MENU button twice on the remote control transmitter.
- Press the POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.3 Service Tools

5.3.1 ComPair

Introduction

ComPair (Computer Aided Repair) is a Service tool for Philips Consumer Electronics products. and offers the following:

1. ComPair helps you to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C or UART commands yourself, because ComPair takes care of this.
3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the uP is working) and all repair information is directly available.
4. ComPair features TV software up possibilities.

Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The (new) ComPair II interface box is connected **to the PC** via an USB cable. For the TV chassis, the ComPair interface box and the TV communicate via a bi-directional cable via the service connector(s).

How to Connect

This is described in the ComPair chassis fault finding database.

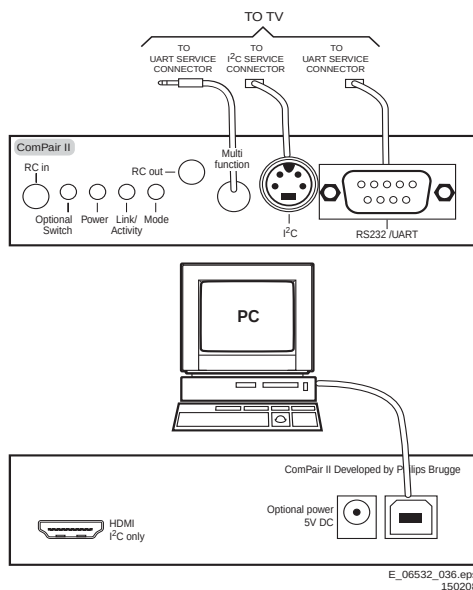


Figure 5-7 ComPair II interface connection

Caution: It is compulsory to connect the TV to the PC as shown in the picture above (with the ComPair interface in between), as the ComPair interface acts as a level shifter. If one connects the TV directly to the PC (via UART), ICs will be blown!

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- ComPair UART interface cable: 3138 188 75051.
- Program software can be downloaded from the Philips Service website.

Note: If you encounter any problems, contact your local support desk.

5.4 Error Codes

5.4.1 Introduction

Error codes are required to indicate failures in the TV set. In principle a unique error code is available for every:

- Activated protection.
- Failing I2C device.
- General I2C error.
- SDRAM failure.

The last five errors, stored in the NVM, are shown in the Service menu's. This is called the error buffer.

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

An error will be added to the buffer if this error differs from any error in the buffer. The last found error is displayed on the left.

An error with a designated error code may **never** lead to a deadlock situation. This means that it must always be diagnosable (e.g. error buffer via OSD or blinking LED procedure, ComPair to read from the NVM).

In case a failure identified by an error code automatically results in other error codes (cause and effect), only the error code of the MAIN failure is displayed.

Example: In case of a failure of the I2C bus (CAUSE), the error code for a "General I2C failure" and "Protection errors" is displayed. The error codes for the single devices (EFFECT) is not displayed. All error codes are stored in the same error buffer (TV's NVM) except when the NVM itself is defective.

5.4.2 How to Read the Error Buffer

You can read the error buffer in 3 ways:

- On screen via the SAM/SDM/CSM (if you have a picture).
Example:
 - **ERROR: 0 0 0 0 0** : No errors detected
 - **ERROR: 6 0 0 0 0** : Error code 6 is the last and only detected error
 - **ERROR: 9 6 0 0 0** : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See "The Blinking LED Procedure".
- Via ComPair.

5.3.2 LVDS Tool

Support of the LVDS Tool has been discontinued.

5.4.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error and not the actual cause of the problem (for example, a fault in the protection detection circuitry can also lead to a protection).

Code	Error Description	Detection via:	Type	Remarks
0	No Error	-- -- --	N/A	-- -- --
1	DC Protection	MT5382 (7A01)	Protection	DC_PROT = Low
2	+12V Failure	WT61P7 (7E23)	Protection	POWER_DOWN = Low
3	Stand-by Controller I2C	I2C0 Bus	Protection	Communication Error with WT61P7
4	General I2C	I2C0 Bus	Error Log	Communication Error on I2C0 Bus
5 #	MT8280 I2C	I2C0 Bus	Error Log	Communication Error with MT8280
6	System NVM I2C	I2C0 Bus	Protection	Communication Error with System NVM
7	Tuner	Tuner I2C Bus	Error Log	Communication Error with Tuner TDQU
8	IF/PLL Demodulator	Tuner I2C Bus	Error Log	Communication Error with TDA9886
9	Ambilight FPGA	I2C0 Bus	Error Log	Communication Error with EC2S
10	Reserved	-- -- --	N/A	-- -- --
11	Reserved	-- -- --	N/A	-- -- --
12	Reserved	-- -- --	N/A	-- -- --
13	HDMI Switch I2C	I2C0 Bus	Error Log	Communication Error with Si9185
14	MT8280 DRAM1	DRAM R/W (7B02/03)	Error Log	R/W Error with DRAM1 or DRAM2
15	Reserved	-- -- --	N/A	-- -- --
16	Reserved	-- -- --	N/A	-- -- --
17	Reserved	-- -- --	N/A	-- -- --
18 #	Channel Decoder I2C	I2C0 Bus	Error Log	Communication Error with MT5112 (reserved for BDS modules)
19 #	Pro Idiom I2C	I2C0 Bus	Error Log	Communication Error with Pro Idiom (reserved for BDS modules)
21 #	Bolt-On HDMI NVM I2C	I2C0 Bus	Error Log	Communication Error with BDS Bolt-On (reserved for BDS modules)
#	If IC/board available.			

5.4.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

- By using the CLEAR command in the SAM menu:
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

5.5 The Blinking LED Procedure

5.5.1 Introduction

The software is capable of identifying different kinds of errors. Because it is possible that more than one error can occur over time, an error buffer is available, which is capable of storing the last five errors that occurred. This is useful if the OSD is not working properly.

Errors can also be displayed by the blinking LED procedure. The method is to repeatedly let the front LED pulse with as many pulses as the error code number, followed by a period of 1.5 seconds in which the LED is "off". Then this sequence is repeated.

Example (1): error code 4 will result in four times the sequence LED "on" for 0.25 seconds / LED "off" for 0.25 seconds. After this sequence, the LED will be "off" for 1.5 seconds. Any RC5 command terminates the sequence. Error code LED blinking is in red color.

Example (2): the content of the error buffer is "12 9 6 0 0". After entering SDM, the following occurs:

- 1 long blink of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long blink of 1.5 seconds to finish the sequence,
- The sequence starts again with 12 short blinks.

5.5.2 Displaying the Entire Error Buffer

Additionally, the entire error buffer is displayed when Service Mode "SDM" is entered. In case the TV set is in protection or Stand-by: The blinking LED procedure sequence (as in SDM-mode in normal operation) must be triggered by the following RC sequence: "MUTE" "062500" "OK".

In order to avoid confusion with RC5 signal reception blinking, this blinking procedure is terminated when a RC5 command is received.

5.6 Fault Finding and Repair Tips

Notes:

- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before** any fault finding actions, check if the correct options are set.

5.6.1 Software Protections

Most of the protections and errors use either the stand-by or the micro processor as detection device. Since in these cases, checking of observers, polling of ADCs, and filtering of input values are all heavily software based, these protections are referred to as software protections.

There are several types of software related protections, solving a variety of fault conditions:

- Protections related to supplies:** check of the 12V.
- Protections related to breakdown of the safety check mechanism.** E.g. since the protection detections are done by means of software, failing of the software will have to initiate a protection mode since safety cannot be guaranteed any more.

Remark on the Supply Errors

The detection of a supply dip or supply loss during the normal playing of the set does not lead to a protection, but to a cold reboot of the set. If the supply is still missing after the reboot, the TV will go to protection.

Protections during Start-up

During TV start-up, some voltages and IC observers are actively monitored to be able to optimize the start-up speed, and to assure good operation of all components. If these monitors do not respond in a defined way, this indicates a malfunction of the system and leads to a protection.

5.6.2 Hardware Protections

The only real hardware protection in this chassis is (in case of an audio problem) the audio protection circuit that will trigger the uP to switch “off” the TV.

Repair Tip

- It is also possible that you have an audio DC protection because of an interruption in one or both speakers (the DC voltage that is still on the circuit cannot disappear through the speakers).
Caution: (dis)connecting the speaker wires during the ON state of the TV at high volume can damage the audio amplifier.

5.6.3 NVM Editor

In some cases, it can be convenient if one directly can change the NVM contents. This can be done with the “NVM Editor” in SAM mode. With this option, single bytes can be changed.

Caution:

- Do not change these, without understanding the function of each setting, because incorrect NVM settings may seriously hamper the correct functioning of the TV set!**
- Always write down the existing NVM settings, before changing the settings. This will enable you to return to the original settings, if the new settings turn out to be incorrect.

Table 5-2 NVM editor overview

	Hex	Dec	Description
Address	0x000A	10	Existing value
Value	0x0000	0	New value
Store	Store?		

5.6.4 Load Default NVM Values

It is possible to download default values automatically into the NVM in case a blank NVM is placed or when the NVM first 20 address contents are “FF”. After the default values are downloaded, it is possible to start-up and to start aligning the TV set. To initiate a forced default download the following action has to be performed:

- Switch “off” the TV set with the mains cord disconnected from the wall outlet (it does not matter if this is from “Stand-by” or “Off” situation).
- Short-circuit the SDM jumpers on the SSB (keep short circuited).
- Press “P+” or “CH+” on the local keyboard (and keep it pressed).
- Reconnect the mains supply to the wall outlet.
- Release the “P+” or “CH+” when the set is started up and has entered SDM.

When the downloading has completed successfully, the set should be into Stand-by, i.e. red LED on.

Alternative method:

It is also possible to upload the default values to the NVM with ComPair in case the SW is changed, the NVM is replaced with a new (empty) one, or when the NVM content is corrupted. After replacing an EEPROM (or with a defective/no EEPROM), default settings should be used to enable the set to start-up and allow the Service Default Mode and Service Alignment Mode to be accessed.

5.6.5 Display option code

Caution: In case you have replaced the SSB, always check the display option code in SAM, even if you have picture. With a wrong display option code it is possible that you have picture, but that in certain conditions you have unwanted side-effects.

5.6.6 Start-up/Shut-down Flowcharts

On the next pages you will find start-up and shut-down flowcharts, which might be helpful during fault finding.

POWER STATES

In this chassis, there are six possible power states as follows:

- Power OFF
- ON
- STANDBY
- SEMI-STANDBY
- Special Panel Mode
- PROTECTION

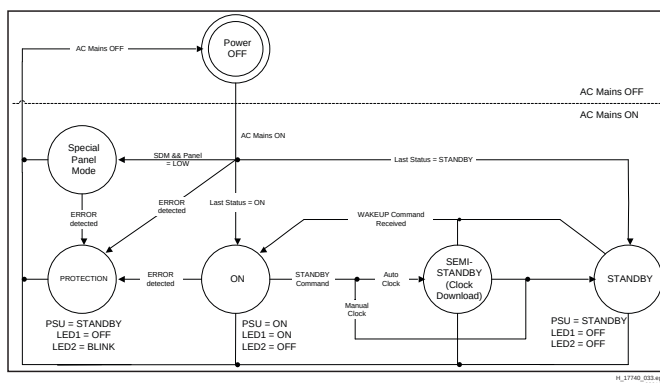


Figure 5-8 Power States

POWER OFF

In "Power OFF" mode, the system is completely switched "off" from AC mains. When AC power is applied, the system checks for last status. Depending on the last standby status stored in the system EEPROM, this mode can then transit to "ON" or "STANDBY" mode.

ON

This is the normal operating mode, indicated by the "on" LED. All the power supply lines are available and depending on the sub-mode, all the circuits in the system may be active. From this mode it shall be possible to transit to "STANDBY", "SEMI-STANDBY" and "PROTECTION" mode, or to "Power OFF" mode if AC mains are switched "off". The sub-modes are:

- Active Mode (Normal Consumer Mode)
- Service Modes
- Panel Modes
- Factory Modes

STANDBY

The total power consumption of the system in this mode shall be equal or less than 150 mW. This state is indicated by no LED when AC mains is switched "on". Only the standby controller WT61P7 is operational in this state, where only +3V3stby power supply is available. From this mode it shall be possible to transit to the "ACTIVE" or "Power OFF" mode if AC mains are switched "off".

SEMI-STANDBY

The semi-standby state is only accessed during transition from ACTIVE to STANDBY when the auto clock feature is switched "on". The clock information download is carried out in this state before proceeding to STANDBY.

SPECIAL PANEL MODE

The Special Panel Mode is **only** used during manufacturing process to program the system EEPROM. In this mode, the SDA0 and SCL0 ports of MT5382 are set to high impedance after SDM and PANEL pins are both detected as "low" during startup. This mode can be exited using a power recycle.

PROTECTION

This state is entered when an error has been detected at startup or in the "ACTIVE" mode. All switched power supply lines are turned "off" with only +3V3stby remaining "on"; similar to "STANDBY" mode. This state is indicated by the blinking red front LED with the blinking sequence denoting the type of error detected.

When the system enters the protection mode due to a critical error, it should be turned "off" and the failure cause needs to be resolved. The system will function normally again after performing a power recycling once all protection causing failures have been resolved.

START-UP SEQUENCE

There are two cases of start-up sequences, namely:

- AC On and
- Standby Wake-up

See also figure on next page.

AC ON

In the case of start-up from AC mains, all PSU voltages start to turn "on" as the hardware default of the active "low" STANDBY (controlled by Standby Controller WT61P7's STANDBY signal) signal to the PSU is pulled "low" with respect to ground.

The MT5382 starts running boot loader once the hardware reset circuit is released. The system will then check the last standby status from the system EEPROM to determine whether to complete the system start-up (load image, turn on the audio, display etc) or proceed to standby and wait for wake-up command from user. The Standby Controller then proceeds to verify the power status of the +12V and sends the system to protection in case of any failures. Special Panel, SDM, and PANEL modes are detected as well.

System recovery is always handled by Standby Controller. Watchdog for MT5382 and MT8280 (if present) will be only enabled during startup, and these components are able to differentiate the normal startup and watchdog reset to trigger system reset when applicable. The alive checking mechanism kicks in after system startup is completed.

STANDBY WAKEUP

When the system receives a command to wake-up from standby, the Standby Controller sets the STANDBY signal "low" to turn "on" the switched power, and similarly detects for the presence of +12V. The MT5382 waits for +3V3_SW to be available before loading its image. The significance of this voltage detection is due to the flash is also being powered by the same mentioned voltage.

The following figure shows the start-up flowchart for both "AC On" and "Standby Wake-up".

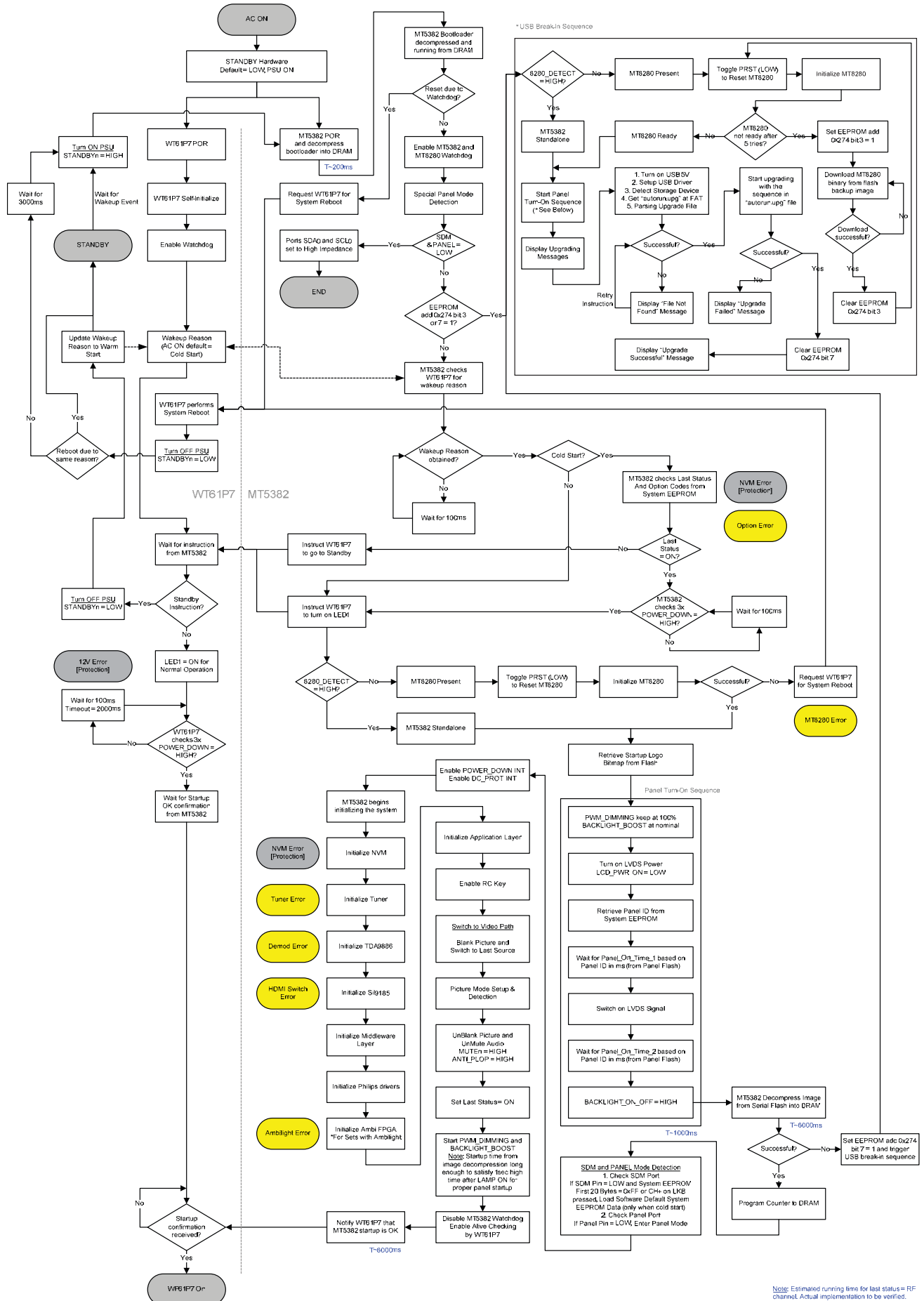
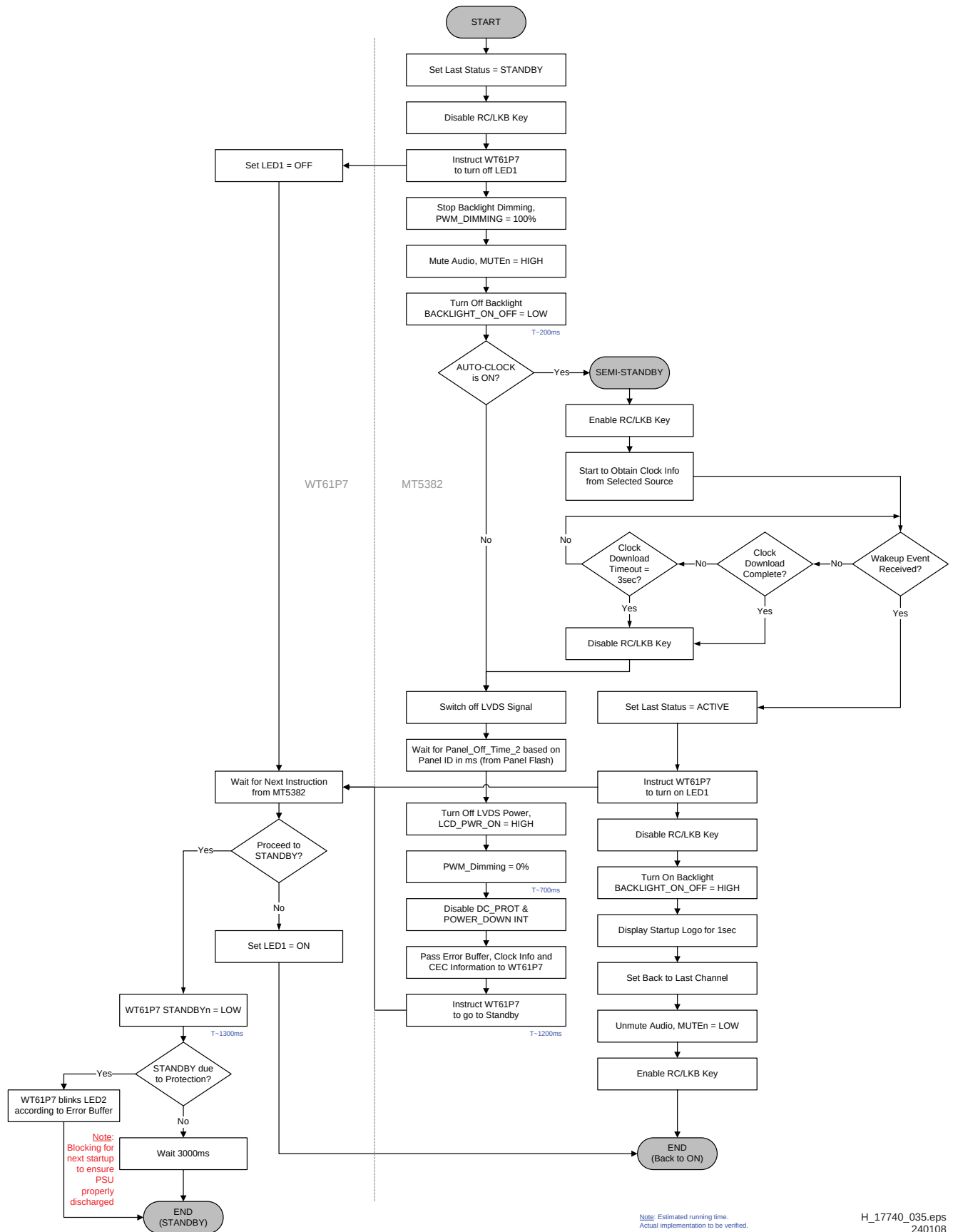


Figure 5-9 Start-up flowchart

STANDBY SEQUENCE

The following flowchart depicts the Standby (plus Semi-Standby condition) sequence:



Note: Estimated running time.
Actual implementation to be verified.

H_17740_035.eps
240108

Figure 5-10 Standby flowchart

POWERDOWN SEQUENCE

The following figure shows the power-down sequence flowchart:

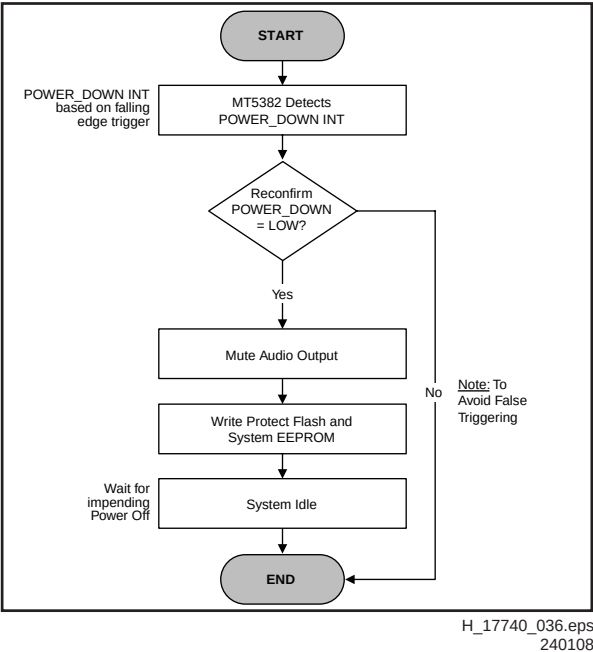


Figure 5-11 Power-down flowchart

The power-down condition is detected by the MT5382 POWER_DOWN signal which is an interrupt pin. A “low” level on this line signifies that power-down is detected. The two major activities that occur over this operation is the muting of audio output and write protecting the system flash and EEPROM.

DC PROTECTION

The following figure shows the DC_PROT interrupt flowchart:

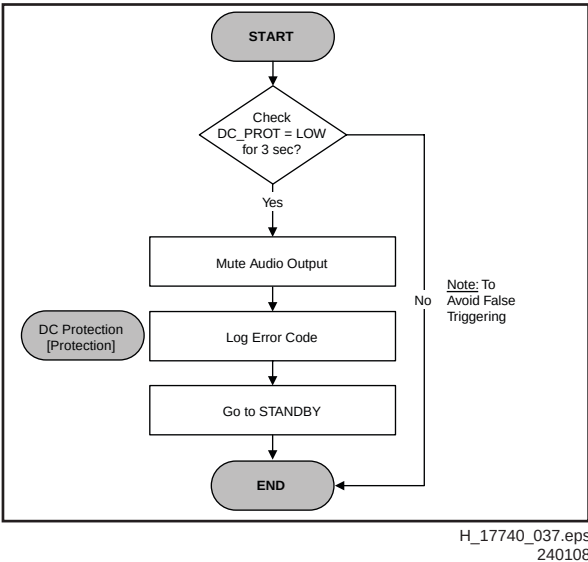


Figure 5-12 DC Protection flowchart

5.7 Software Upgrading

5.7.1 Introduction

It is possible **for the user** to upgrade the **main** software via the USB port. This allows replacement of a software image in a stand alone set, without the need of an E-JTAG debugger. A description on how to upgrade the main software can be found in the DFU or on the Philips website.

5.7.2 Main Software Upgrade

Automatic Software Upgrade

In "normal" conditions, so when there is no major problem with the TV, the main software and the default software upgrade

application can be upgraded with the "autorun.upg" (FUS part in the one-zip file). This can also be done by the consumers themselves, but they will have to get their software from the commercial Philips website or via the Software Update Assistant in the user menu (see DFU). The "autorun.upg" file must be placed in the root of your USB stick.

How to upgrade:

1. Copy "autorun.upg" to the root of your USB stick.
2. Insert USB stick in the side I/O while the set is in "On" mode. The set will restart and the upgrading will start automatically. As soon as the programming is finished, you will get the message that you can remove your USB stick and restart the set.

LC08SSp User software upgrade flow chart

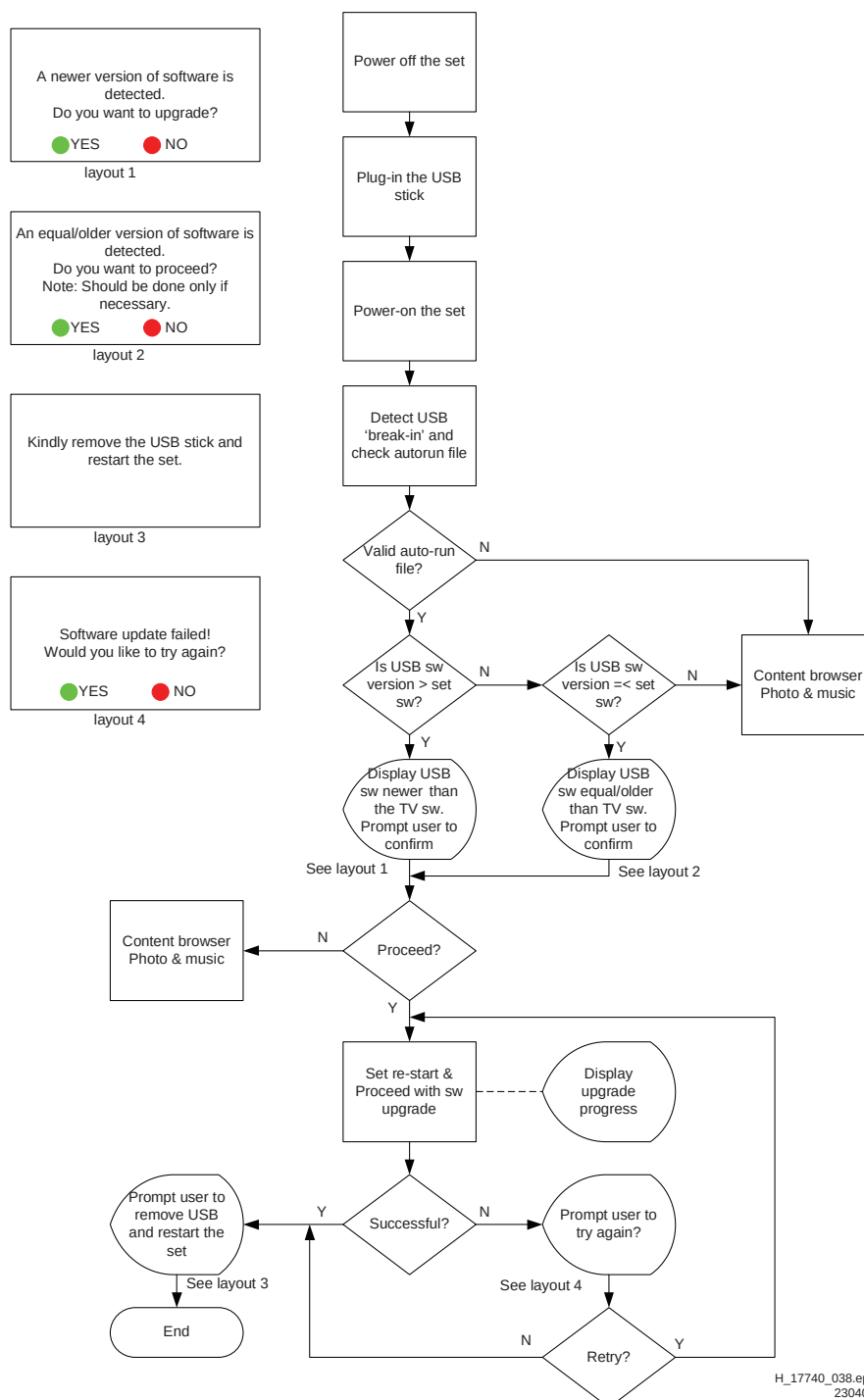


Figure 5-13 SW upgrade flowchart

5.7.3 Content and Usage of the One-Zip Software File

Below you find a content explanation of the One-Zip file, and instructions on how and when to use it.

- **Ambi_clustername_version.zip.** Not to be used by Service technicians.
- **Panel_clustername_version.zip.** Not to be used by Service technicians.
- **EDID_clustername_version.zip.** Contains the EDID content of the different EDID NVMs. See ComPair for further instructions.
- **FUS_clustername_version.zip.** Contains the "autorun.upg" which is needed to upgrade the TV main software and the software download application.
- **ProcessNVM_clustername_version.zip.** Default NVM content. Must be programmed via ComPair.

5.7.4 How to Copy NVM Data to/from USB

Write NVM data to USB

1. Insert the USB stick into the USB slot while in SAM mode.
2. Execute the command "Copy to USB", to copy the NVM data to the USB stick. The NVM filename on the USB stick will be named "**NVM2USB.bin**" (this takes a couple of seconds).

Write NVM data to TV

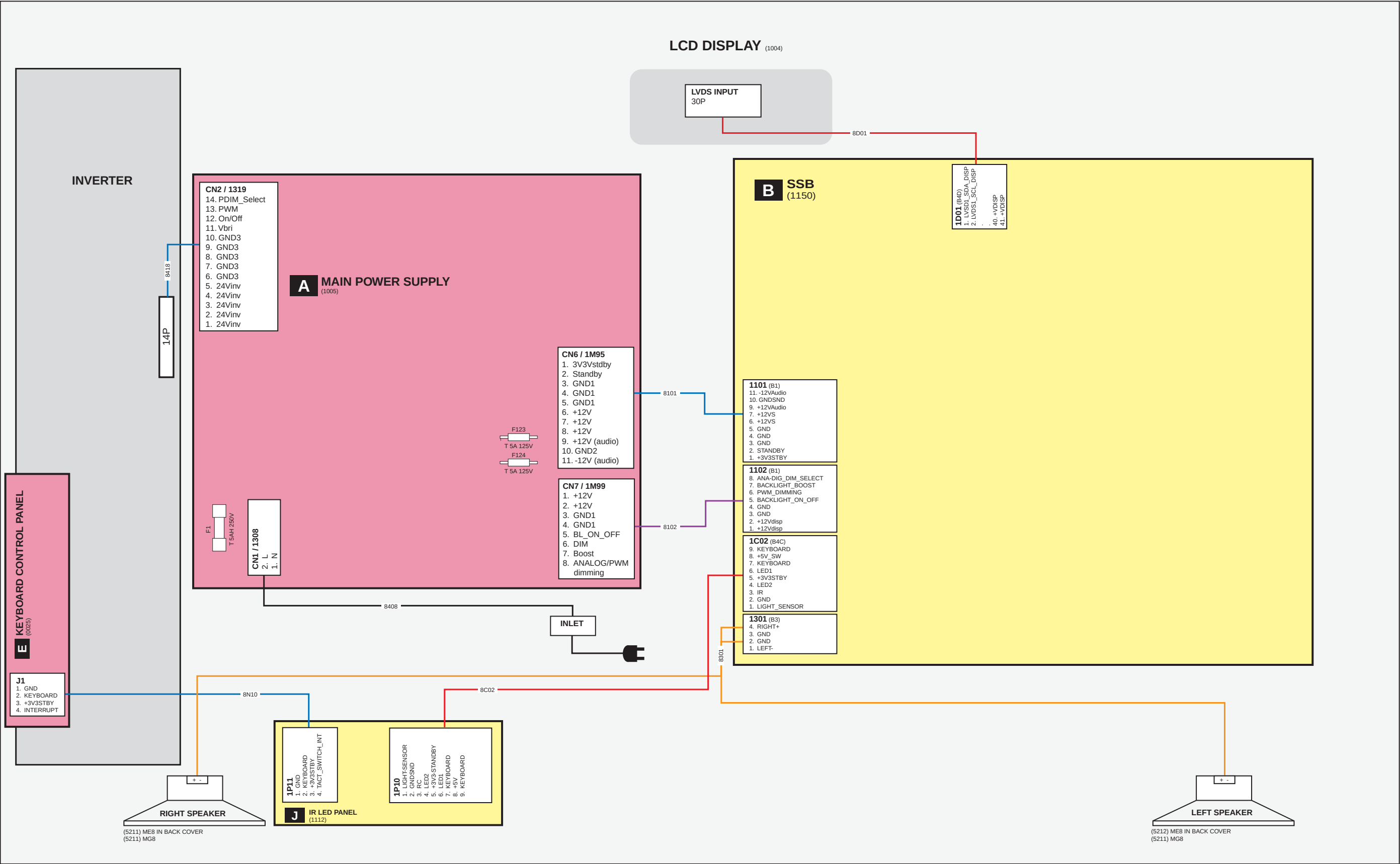
1. First, rename the filename (via a PC) on the USB stick to "**USB2NVM.bin**".
2. Insert the USB stick into the USB slot while in SAM mode.
3. Execute the command "Copy from USB" to copy the USB data to NVM (this takes about a minute to complete).

Important: The file must be located in the **root directory** of the USB stick.

6. Block Diagrams, Test Point Overview, and Waveforms

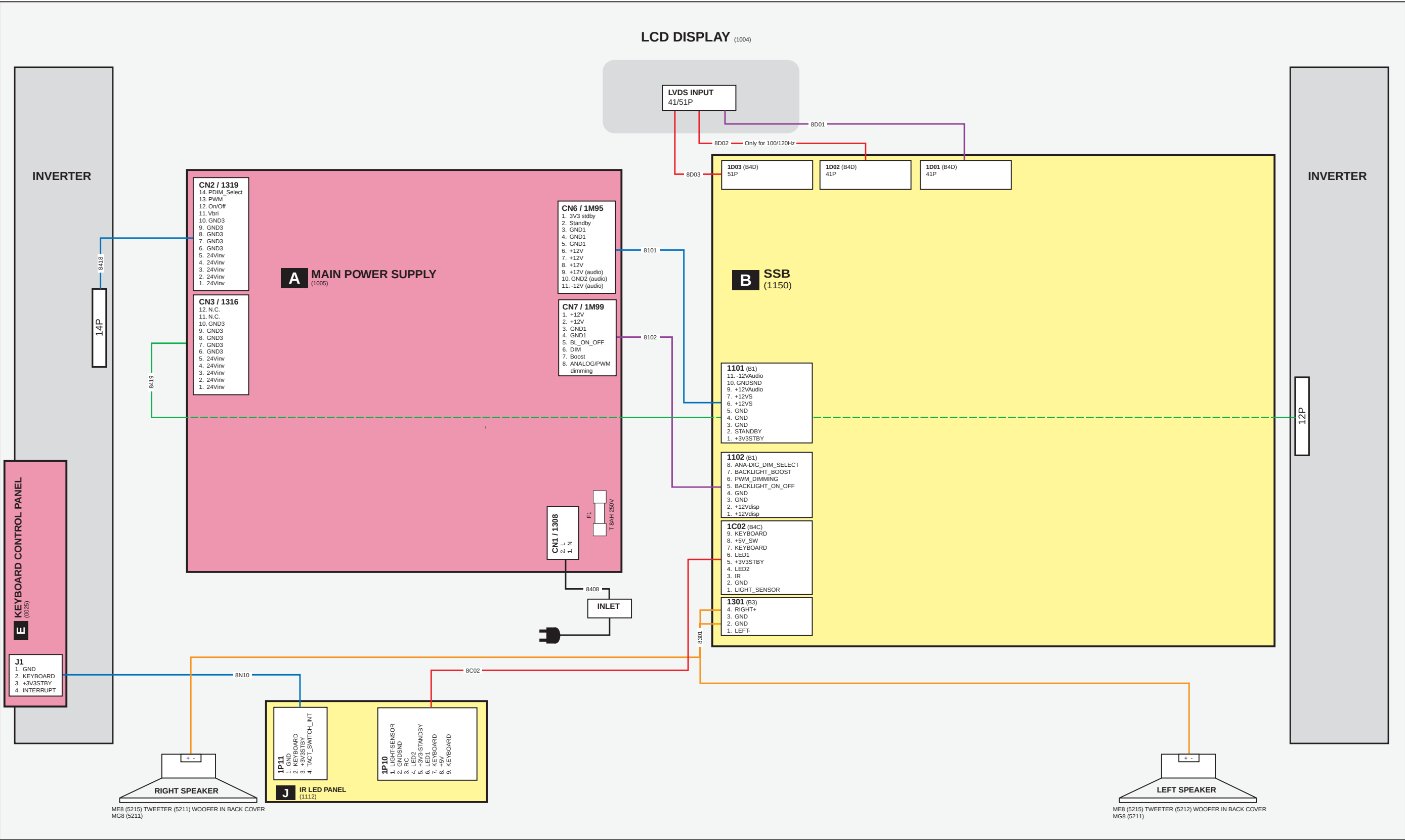
Wiring Diagram 32" (ME8/MG8)

WIRING 32" (STYLING ME8/MG8)



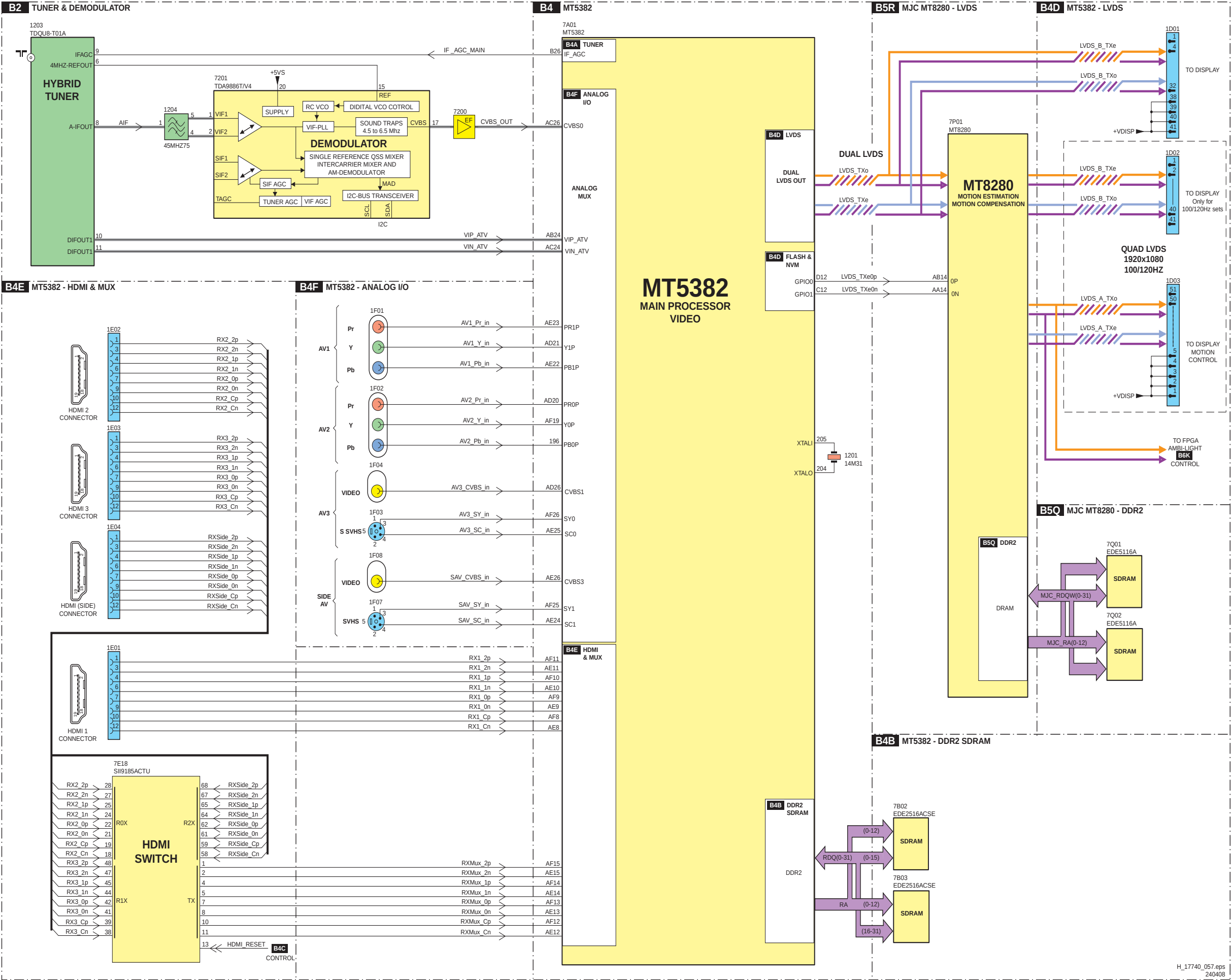
Wiring Diagram 52" (ME8/MG8)

WIRING 52" (STYLING ME8/MG8)

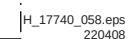


Block Diagram Video

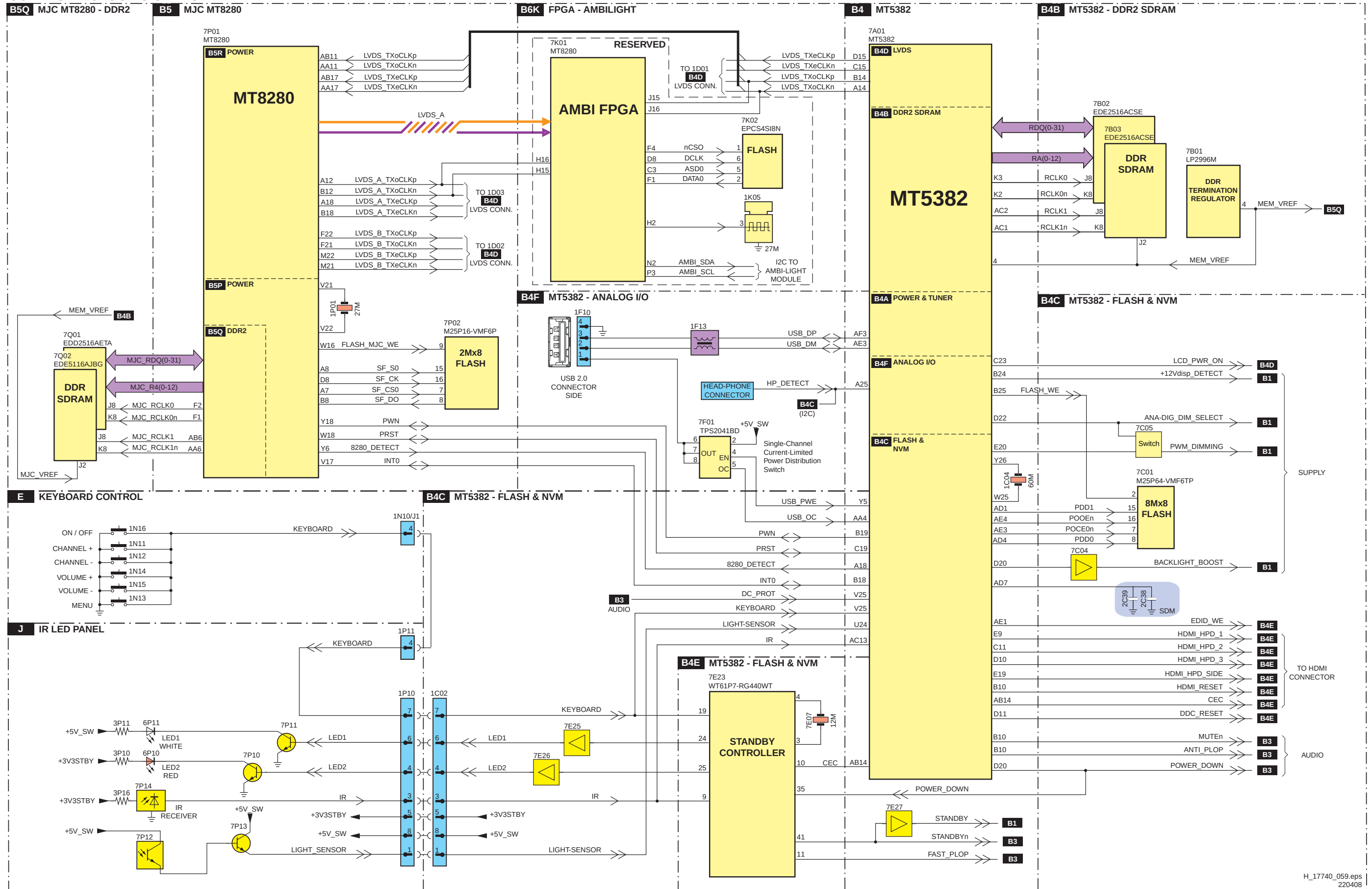
VIDEO



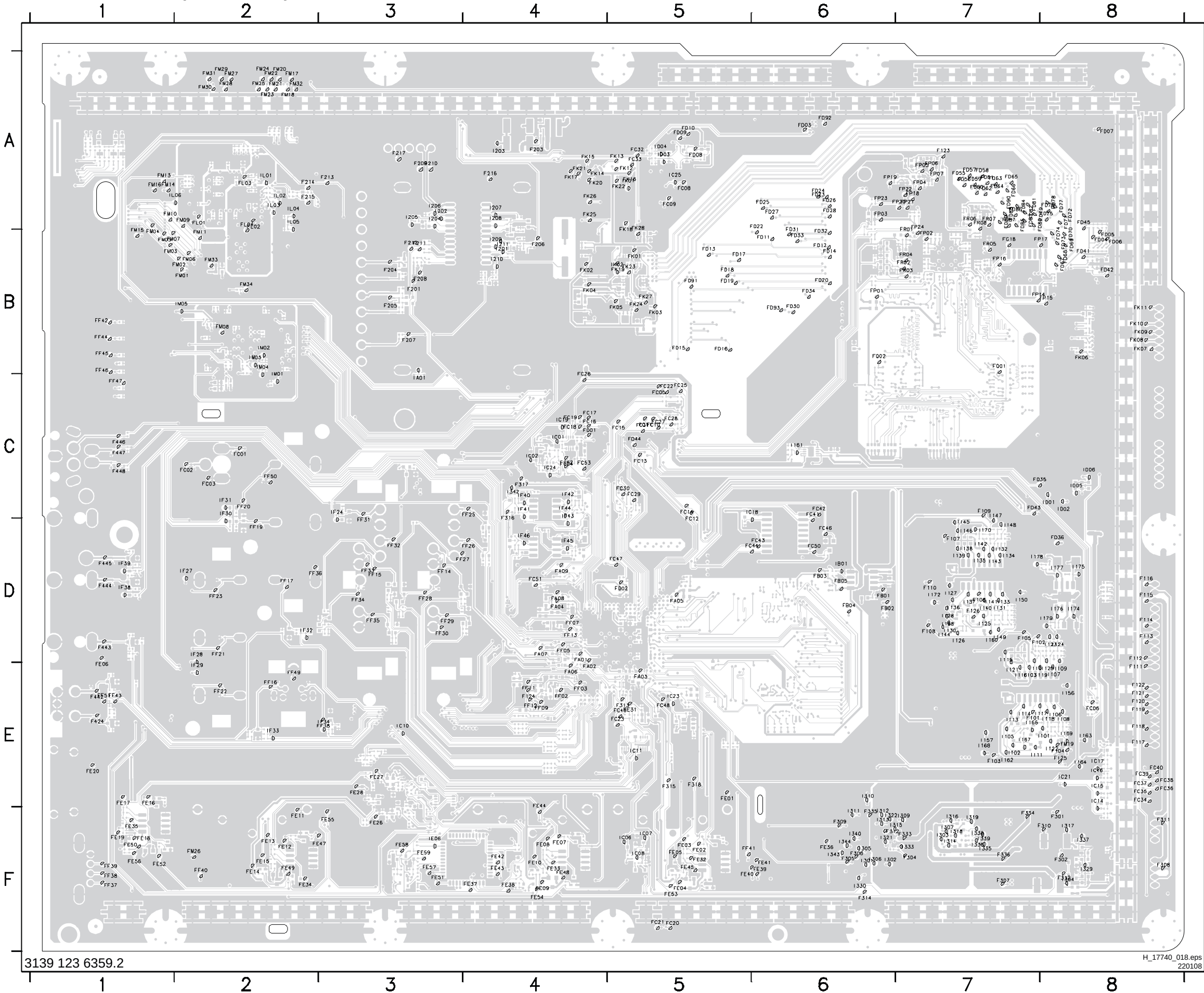
AUDIO



CONTROL + CLOCK SIGNALS

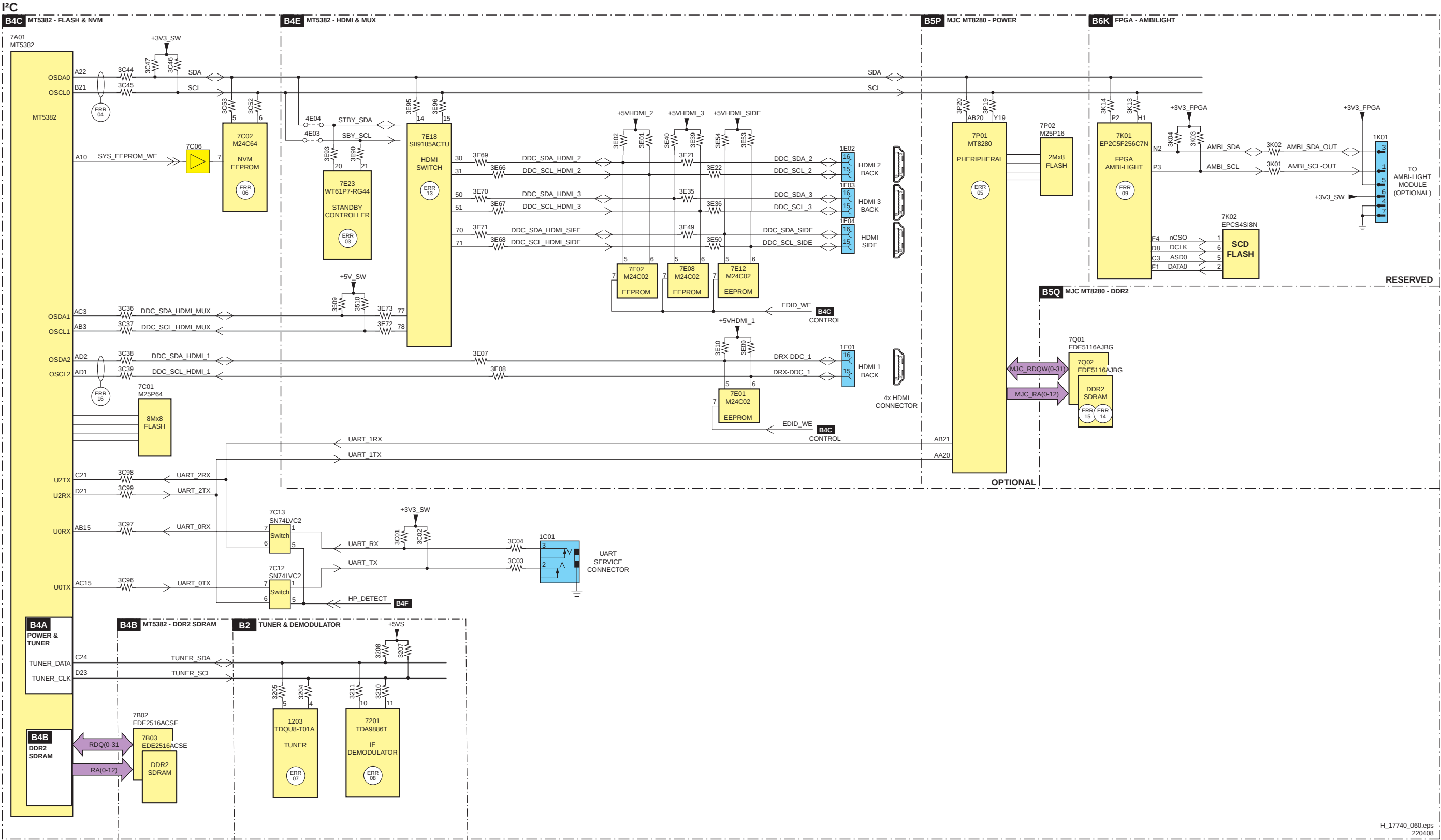


SSB: Test Points (Bottom Side)

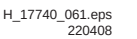


F101	E7	FC25	C5	FE03	F5	FK15	A4	I133	D7	IF27	D2
F102	D7	FC26	C4	FE04	F5	FK16	A5	I134	D7	IF28	D2
F103	E7	FC27	C5	FE05	F5	FK17	A4	I135	D7	IF29	E2
F104	E8	FC28	C5	FE06	D1	FK18	A5	I136	D7	IF30	D2
F105	D7	FC29	C5	FE07	F4	FK19	B5	I137	D7	IF31	C2
F106	D7	FC30	C5	FE08	F4	FK20	A4	I138	D7	IF32	D2
F107	D7	FC31	C5	FE09	F4	FK21	A4	I139	D7	IF33	E2
F108	D7	FC32	A5	FE10	F4	FK22	A5	I140	D7	IF34	E2
F109	C7	FC33	A5	FE11	F2	FK23	B5	I141	D7	IF38	D1
F110	D7	FC34	E8	FE12	F2	FK24	B5	I142	D7	IF39	D1
F111	E8	FC35	E8	FE13	F2	FK25	A4	I143	D7	IF40	C4
F112	D8	FC36	E8	FE14	F2	FK26	A4	I144	D7	IF41	C4
F113	D8	FC37	E8	FE15	F2	FK27	B5	I145	D7	IF42	C4
F114	D8	FC38	E8	FE16	E1	FK28	B5	I146	D7	IF43	D4
F115	D8	FC39	E8	FE17	E1	FK29	A2	I147	D7	IF44	C4
F116	D8	FC40	E8	FE18	F1	FK30	A2	I148	D7	IF45	D4
F117	E8	FC41	D6	FE19	F1	FK31	A2	I149	D7	IF46	D4
F118	E8	FC42	C6	FE20	E1	FK32	B2	I150	D7	IK01	A5
F119	E8	FC43	D6	FE21	F3	FK33	B2	I151	D7	IK02	B5
F120	E8	FC44	D6	FE22	E3	FK34	B2	I152	D7	IK01	A2
F121	E8	FC46	D6	FE28	E3	FK38	B1	I158	D7	IK02	A2
F122	E8	FC47	D5	FE31	E5	FK41	B1	I160	D7	IK03	A2
F123	A7	FC48	E5	FE32	F5	FK45	B1	I161	C6	IK04	A2
F124	E4	FC49	E5	FE33	F4	FK46	B2	I162	E7	IK05	B2
F125	E8	FC50	D6	FE34	F2	FK47	B1	I163	E8	IK06	A2
F126	D7	FC51	D4	FE35	F1	FK48	B2	I164	E8	IK01	C2
F201	B3	FC52	C4	FE36	F6	FK49	A2	I166	E7	IK02	E2
F203	A4	FC53	C4	FE37	F4	FK50	A1	I167	E7	IK03	B2
F204	B3	FC54	C4	FE38	F4	FK51	B2	I168	E7	IK04	C2
F205	B3	FC55	C4	FE39	F6	FK53	A1	I169	E8	IK05	B2
F206	B4	FC56	A6	FE40	F6	FK54	A1	I170	D7		
F207	B3	FC57	D8	FE41	F6	FK55	B1	I172	D7		
F208	B3	FC58	D8	FE42	F4	FK56	A1	I174	D8		
F209	A3	FC59	D8	FE43	F4	FK57	A2	I175	D8		
F210	A3	FC60	A8	FE44	F4	FK58	A2	I176	D8		
F211	B3	FC61	D8	FE45	F5	FK59	E8	I177	D8		
F212	B3	FC62	D8	FE46	F5	FK60	A2	I178	D7		
F213	A3	FC63	D10	FE48	F4	FK61	A2	I179	D8		
F214	A2	FC64	D11	FE49	F2	FK62	A2	I201	B4		
F215	A2	FC65	D12	FE50	F1	FK63	A2	I202	A4		
F216	A4	FC66	D13	FE51	F3	FK64	A2	I203	A4		
F217	A3	FC67	D14	FE52	F1	FK65	A2	I204	A3		
F301	F8	FC68	D15	FE53	F5	FK66	F2	I205	A3		
F302	F8	FC69	D16	FE54	F5	FK67	A2	I206	A3		
F303	F6	FC70	D17	FE55	F3	FK68	A2	I207	A4		
F305	F6	FC71	D18	FE56	F1	FK69	A2	I208	A4		
F306	F6	FC72	D19	FE57	F3	FK70	A2	I209	B4		
F307	F7	FC73	D20	FE58	F3	FK71	A2	I210	B4		
F308	F8	FC74	D22	FE59	F3	FK72	A2	I211	B4		
F309	F6	FC75	D23	FE60	E4	FK73	B2	I210	F6		
F310	F8	FC76	D24	FE61	E4	FK74	B2	I211	B4		
F311	F8	FC77	D25	FE62	A6	FK75	B3	I203	F7		
F312	F6	FC78	D26	FE63	A7	FK76	B2	I204	F8		
F313	E5	FC79	D27	FE64	F9	FK77	A6	I205	F6		
F314	F6	FC80	D28	FE65	E4	FK78	A7	I206	F6		
F315	E5	FC81	D30	FE66	E4	FK79	A7	I207	F7		
F316	C4	FC82	D31	FE67	A6	FK80	A7	I208	F7		
F317	C4	FC83	D32	FE68	A6	FK81	A7	I209	F7		
F318	E5	FC84	D33	FE69	A6	FK82	B1	I210	F7		
F322	F8	FC85	D34	FE70	E6	FK83	B1	I211	F8		
F333	F7	FC86	D35	FE71	D2	FK84	B1	I212	F7		
F334	F7	FC87	D36	FE72	E8	FK85	B1	I213	F8		
F335	F6	FC88	D41	FE73	E8	FK86	A7	I214	F7		
F336	F7	FC89	D42	FE74	E2	FK87	A6	I215	F6		
F424	E1	FC90	D43	FE75	D2	FK88	A7	I216	F7		
F442	E1	FC91	D44	FE76	E2	FK89	A7	I217	F8		
F443	D1	FC92	D45	FE77	D2	FK90	A2	I218	F7		
F444	D1	FC93	D46	FE78	C4	FK91	A6	I219	F6		
F445	D1	FC94	D47	FE79	C4	FK92	A7	I220	F6		
F446	C1	FC95	D48	FE80	C4	FK93	A7	I221	F8		
F447	C1	FC96	D49	FE81	C2	FK94	B2	I222	F6		
F448	C1	FC97	D50	FE82	C2	FK95	B1	I223	F7		
F401	D4	FC98	D60	FE83	C3	FK96	B2	I224	F7		
F402	D4	FC99	D61	FE84	C3	FK97	B2	I225	F7		
F403	E5	FC100	D62	FE85	C3	FK98	B2	I226	F7		
F404	D4	FC101	D63	FE86	C3	FK99	B2	I227	F7		
F405	D5	FC102	D64	FE87	C3	FK100	A7	I228	F7		
F406	E4	FC103	D65	FE88	C3	FK101	A7	I229	F7		
F407	D4	FC104	D66	FE89	C3	FK102	A7	I230	F7		
F408	D4	FC105	D67	FE90	F1	FK103	E8	I231	F6		
F409	D4	FC106	D68	FE91	F1	FK104	E7	I232	F6		
F401	D6	FC107	D69	FE92	F1	FK105	E7	I233	F6		
F402	D6	FC108	D70	FE93	F2	FK106	E7	I234	F6		
F403	D6	FC109	D71	FE94	F5	FK107	E8	I235	F6		
F404	D6	FC110	D72	FE95	B1	FK108	E8	I236	F6		
F405	D6	FC111	D73	FE96	B1	FK109	E8	I237	F6		
F401	C2	FC112	D74	FE97	B1	FK110	E8	I238	F6		
F402	C2	FC113	D75	FE98	B1	FK111	E7	I239	F6		
F403	C2	FC114	D76	FE99	B1	FK112	E7	I240	F6		
F404	C4	FC115	D77	FE100	B1	FK113	E7	I241	F6		
F405	C5	FC116	D78	FE101	E2	FK114	E7	I242	F6		
F406	E8	FC117	D79	FE102	C2	FK115	D7	I243	F6		
F407	E8	FC118	D80	FE103	E1	FK116	E7	I244	F6		
F409	A5	FC119	D81	FE104	F7	FK117	E8	I245	F6		
F410	C5	FC120	D82	FE105	B8	FK118	E8	I246	F6		
F411	C5	FC121	D83	FE106	B8	FK119	E8	I247	F6		
F412	C5	FC122	D84	FE107	B8	FK120	E8	I248	F6		
F413	C5	FC123	D85	FE108	B4	FK121	D7	I249	F6		
F414	C5	FC124	D86	FE109	B5	FK122	E8	I250	F6		
F415	C5	FC125	D87	FE110	B8	FK123	E8	I251	F6		
F416	C4	FC126	D88	FE111	B8	FK124	E8	I252	F6		
F417	C4	FC127	D89	FE112	B8	FK125	D7	I253	F6		
F418	C4	FC128	D90	FE113	B8	FK126	D7	I254	F6		
F419	C4	FC129	D91	FE114	B8	FK127	D7	I255	F6		
F420	F5	FC130	D92	FE115	B8	FK128	D7	I256	F6		
F421	F5	FC131	D93	FE116	A5	FK129	D7	I257	F6		
F422	C5	FC132	D94	FE117	A5	FK130	D7	I258	F6		
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I2C IC Overview

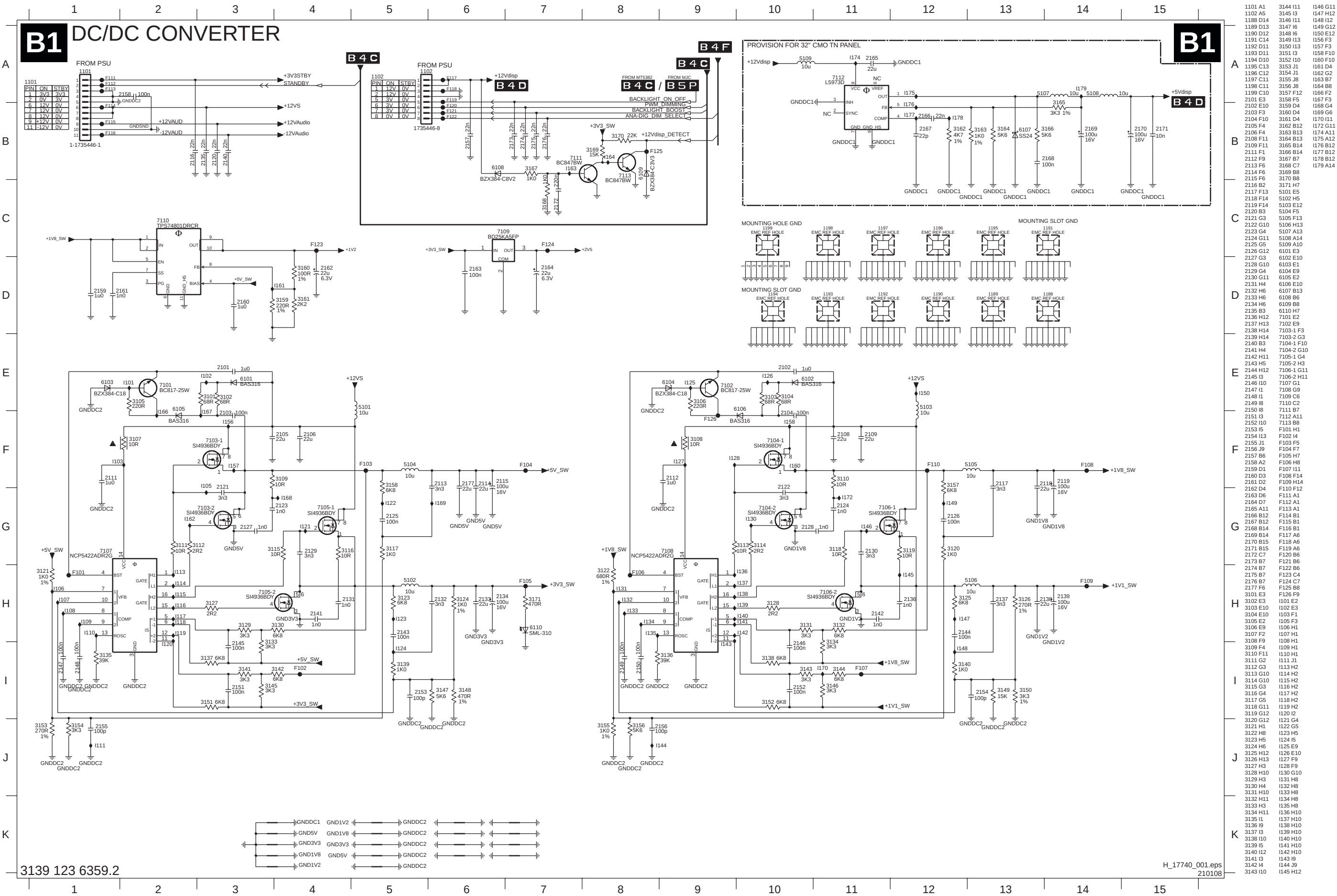


MAIN POWER SUPPLY



7. Circuit Diagrams and PWB Layouts

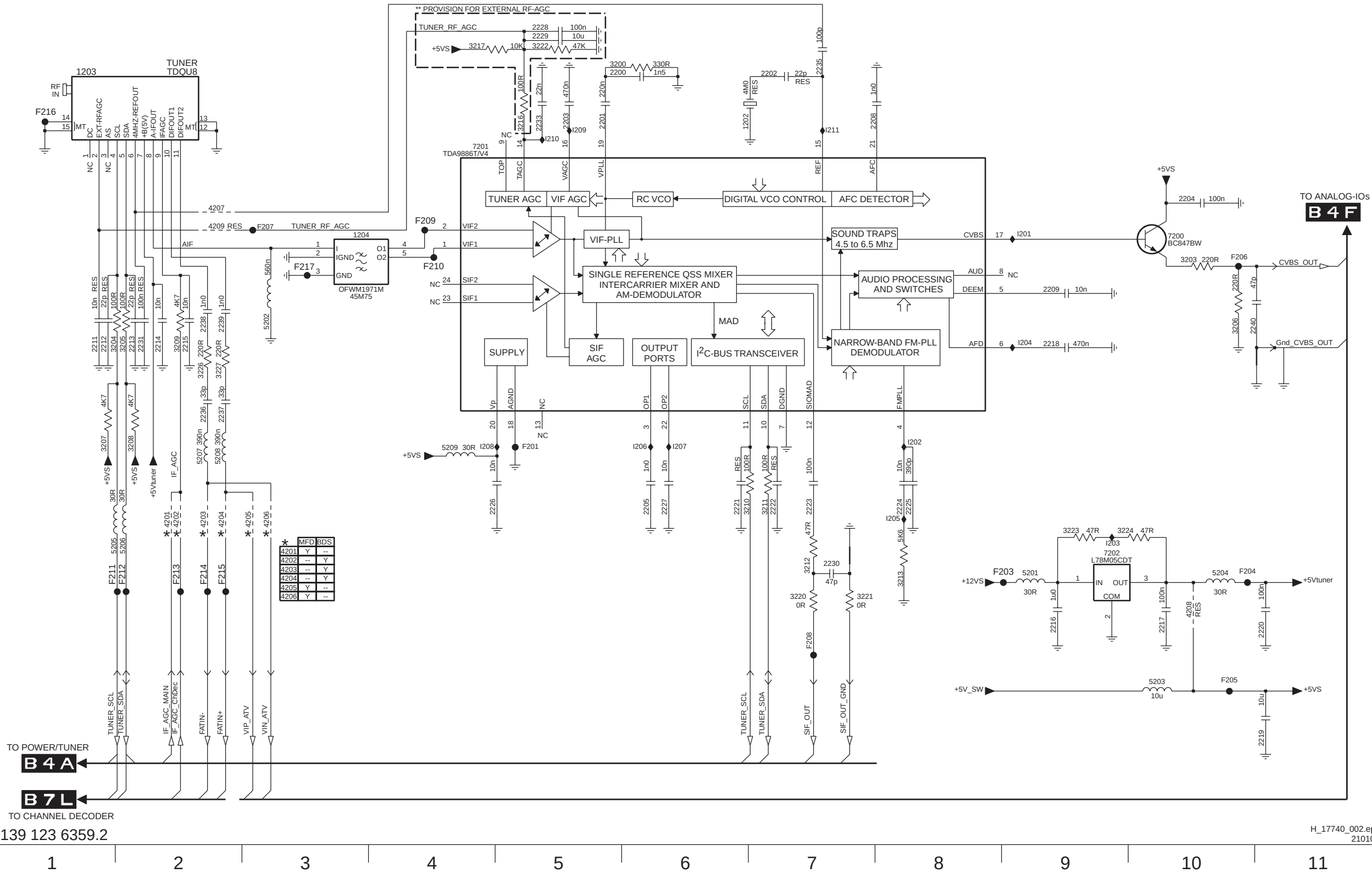
SSB: DC / DC Converter



SSB: Tuner & Demodulator

B2 TUNER & DEMODULATOR

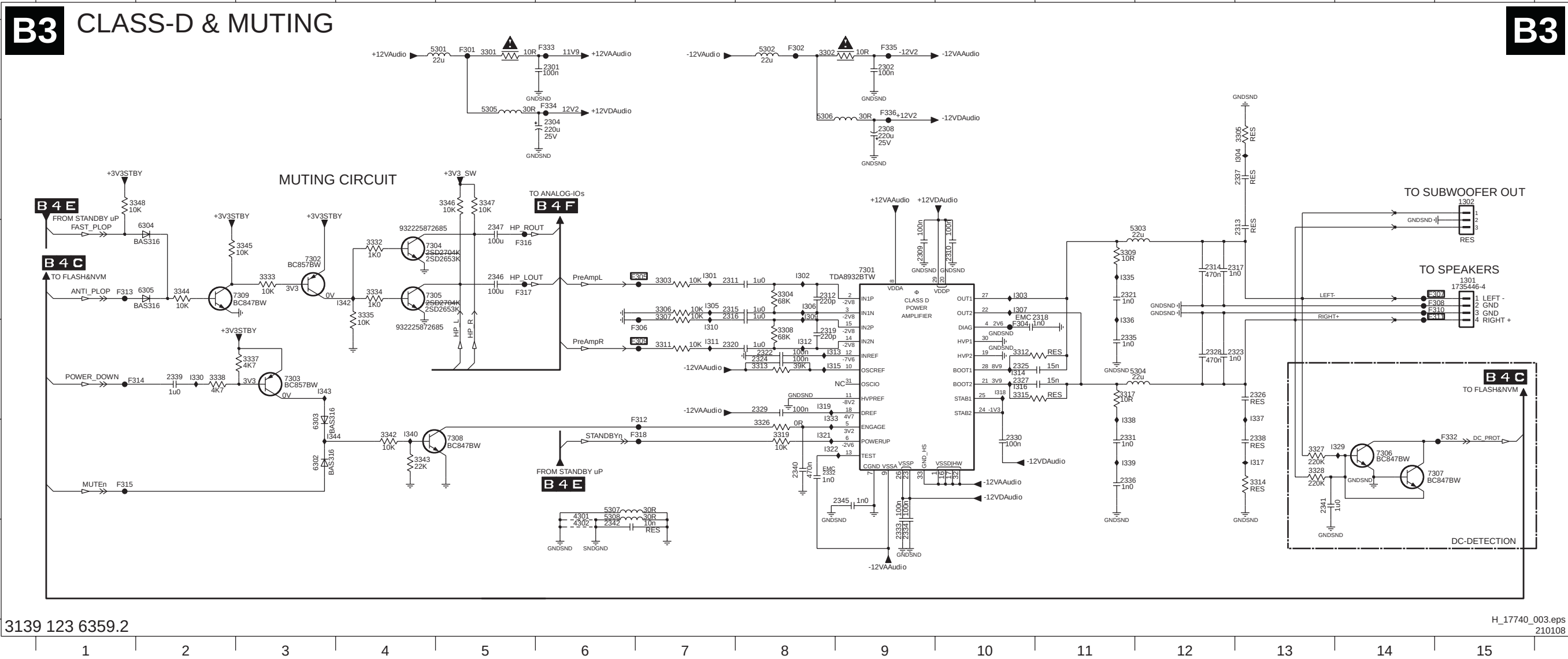
B2



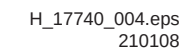
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- 2201 B5
- 2202 B7
- 2203 B5
- 2204 B10
- 2205 E6
- 2208 B8
- 2209 C9
- 2211 D1
- 2212 D1
- 2213 D2
- 2214 D2
- 2215 D2
- 2216 F9
- 2217 F10
- 2218 D9
- 2219 G11
- 2220 F11
- 2221 E6
- 2222 E7
- 2223 E7
- 2224 E8
- 2225 E8
- 2226 E4
- 2227 E6
- 2228 A5
- 2229 A5
- 2230 E7
- 2231 D2
- 2233 B5
- 2235 A7
- 2236 D2
- 2237 D2
- 2238 C2
- 2239 C2
- 2240 C11
- 3200 A5
- 3203 C10
- 3204 D2
- 3205 D2
- 3206 C10
- 3207 D1
- 3208 D2
- 3209 D2
- 3210 E7
- 3211 E7
- 3212 E7
- 3213 E8
- 3216 B5
- 3217 A4
- 3220 F7
- 3221 F7
- 3222 A5
- 3223 E9
- 3224 E9
- 3226 D2
- 3227 D2
- 4201 E2
- 4202 E2
- 4203 E2
- 4204 E2
- 4205 E3
- 4206 E3
- 4207 C2
- 4208 F10
- 4209 C2
- 5201 E9
- 5202 C3
- 5203 F10
- 5204 E10
- 5205 E2
- 5206 E2
- 5207 E2
- 5208 E2
- 5209 D4
- 7200 C10
- 7201 B4
- 7202 E9
- F201 D5
- F203 E9
- F204 E10
- F205 F10
- F206 C10
- F207 C3
- F208 F7
- F209 C4
- F210 C4
- F211 E1
- F212 E2
- F213 E2
- F214 E2
- F215 E2
- F216 B1
- F217 C3
- I201 C9
- I202 D8
- I203 E9
- I204 D9
- I205 E8
- I206 D6
- I207 D6
- I208 D4
- I209 B5
- I210 B5
- I211 B7

SSB: Class-D & Muting

1301 C15	2308 B9	2313 C13	2318 D11	2323 D13	2328 D12	2333 F9	2338 E13	2345 E9	3303 C7	3308 D8	3314 E13	3327 E13	3335 C4	3344 C2	4301 E6	5304 D12	6302 E3	7302 C3	7307 E14	F304 D10	F309 D7	F314 D2	F332 E15	I301 C7	I306 C8	I312 D8	I317 E13	I329 E14	I337 D13	I343 D3	
1302 B15	2309 C9	2314 C12	2319 D8	2324 D8	2329 D8	2334 F9	2339 D2	2346 C5	3304 C8	3309 C11	3315 D10	3328 E13	3337 D3	3345 C3	4302 F6	5305 A5	6303 E3	7303 D3	7308 E5	F305 C7	F310 C15	F311 C15	F315 E1	F333 A6	I302 C8	I307 C10	I313 D8	I318 D10	I330 D2	I338 E11	I344 E3
2301 A6	2310 C10	2315 C7	2320 D7	2325 D10	2330 E10	2335 D11	2340 E8	2347 C5	3305 B13	3311 D7	3317 D11	3332 C4	3338 D2	3346 B5	5301 A5	5306 A8	6304 C2	7304 C4	7309 C2	F306 D7	F311 C15	F316 C5	F334 A6	I303 C10	I309 C8	I314 D10	I319 D8	I333 D8	I339 E11		
2302 A9	2311 C7	2316 C7	2321 C11	2326 D13	2331 E11	2336 E11	2341 E13	2348 A5	3306 C7	3312 D10	3319 E8	3333 C3	3342 E4	3347 B5	5302 A8	5307 E6	6305 C2	7305 C4	F301 A5	F307 C15	F312 E7	F317 C5	F335 A9	I304 B13	I310 D7	I315 D8	I321 E8	I335 C11	I340 E4		
2304 A6	2312 C8	2317 C13	2322 D8	2327 D10	2332 E8	2337 B13	2342 F6	3302 A8	3307 C7	3313 D8	3326 E8	3334 C4	3343 E4	3348 B2	5303 C12	5308 E6	7301 C9	7306 E14	F302 A8	F308 C15	F313 C1	F318 E7	F336 A9	I305 C7	I311 D7	I316 D10	I322 E8	I336 D11	I342 C4		



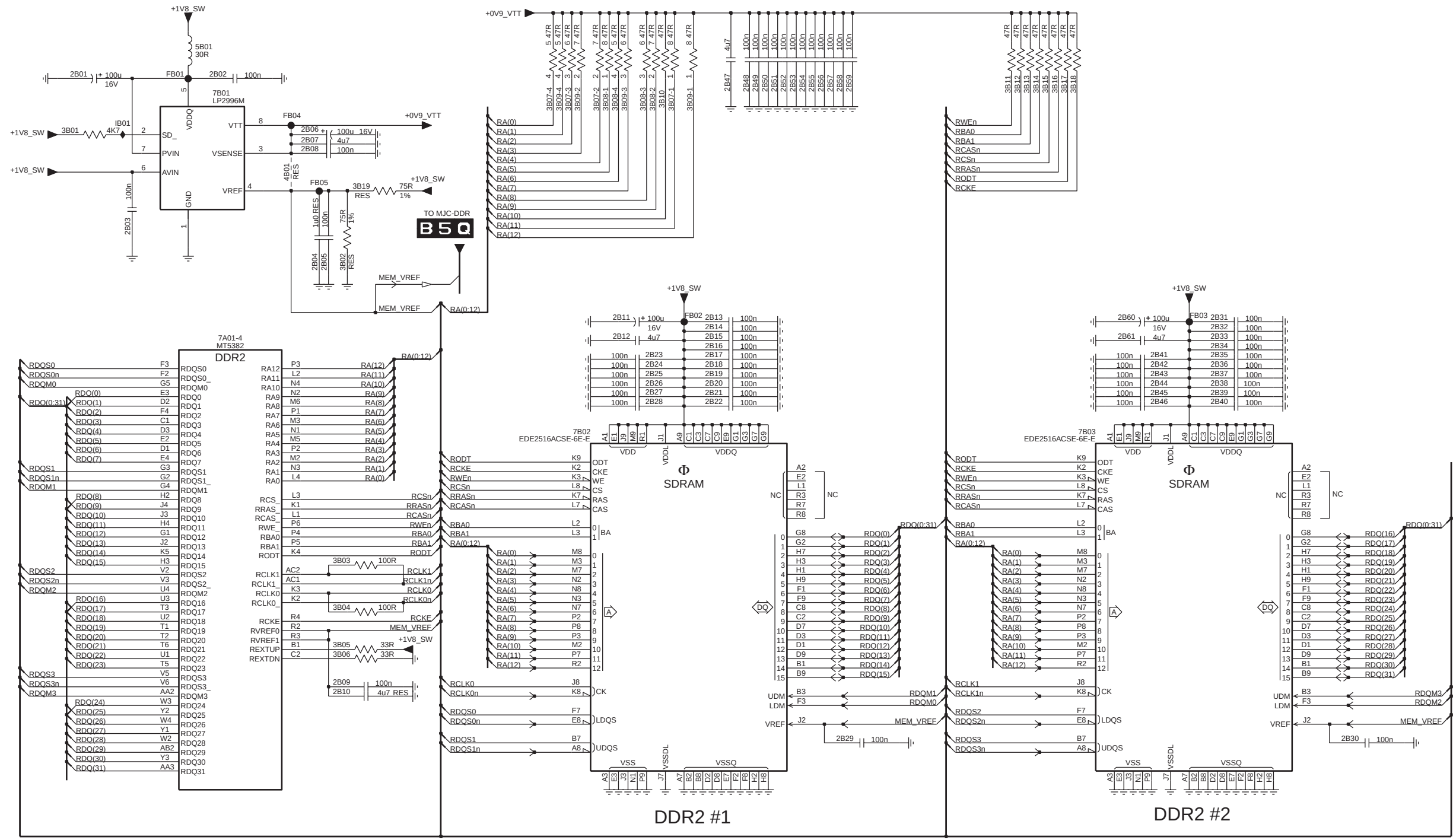
B4A



SSB: MT5382-DDR2 SDRAM

B4B MT5382 - DDR2 SDRAM

B4B



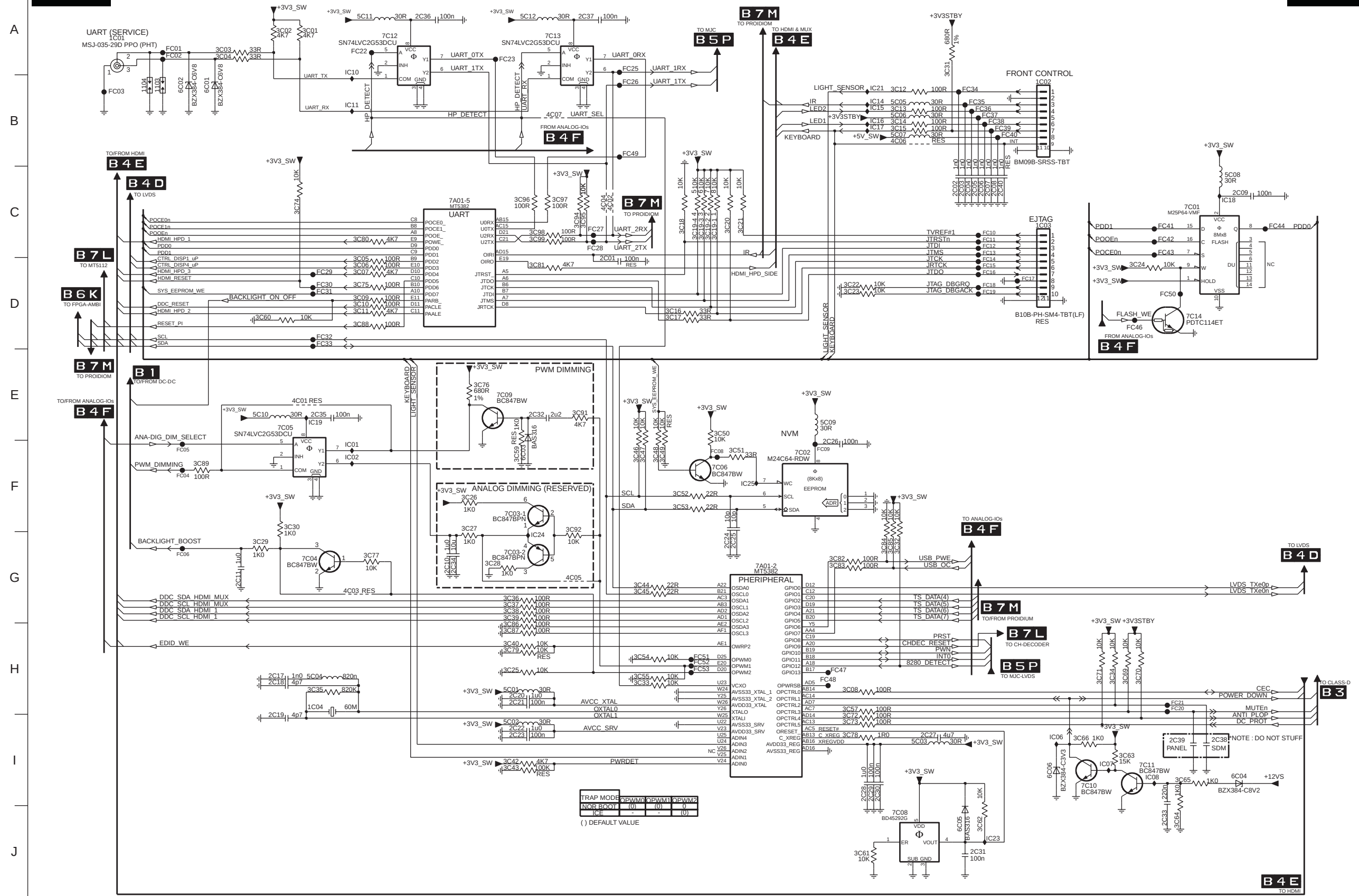
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- 2B10 F3
- 2B11 C5
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- 2B13 C6
- 2B14 D6
- 2B15 D6
- 2B16 D6
- 2B17 D6
- 2B18 D6
- 2B19 D6
- 2B20 D6
- 2B21 D6
- 2B22 D6
- 2B23 D5
- 2B24 D5
- 2B25 D5
- 2B26 D5
- 2B27 D5
- 2B28 D5
- 2B29 G7
- 2B30 G11
- 2B31 C10
- 2B32 D10
- 2B33 D10
- 2B34 D10
- 2B35 D10
- 2B36 D10
- 2B37 D10
- 2B38 D10
- 2B39 D10
- 2B40 D10
- 2B41 D9
- 2B42 D9
- 2B43 D9
- 2B44 D9
- 2B45 D9
- 2B46 D9
- 2B47 B6
- 2B48 B6
- 2B49 B6
- 2B50 B6
- 2B51 B6
- 2B52 B6
- 2B53 B6
- 2B54 B7
- 2B55 B7
- 2B56 B7
- 2B57 B7
- 2B58 B7
- 2B59 B7
- 2B60 C9
- 2B61 D9
- 3B01 B1
- 3B02 C3
- 3B03 E3
- 3B04 F3
- 3B05 F3
- 3B06 F3
- 3B07-1 B6
- 3B07-2 B5
- 3B07-3 B5
- 3B07-4 B5
- 3B08-1 B5
- 3B08-2 B5
- 3B08-3 B5
- 3B08-4 B5
- 3B09-1 B6
- 3B09-2 B5
- 3B09-3 B5
- 3B09-4 B5
- 3B10 B5
- 3B11 B8
- 3B12 B8
- 3B13 B8
- 3B14 B8
- 3B15 B8
- 3B16 B8
- 3B17 B9
- 3B18 B9
- 3B19 B3
- 4B01 B3
- 5B01 A2
- 7A01-4 D2
- 7B01 B2
- 7B02 D5
- 7B03 D9
- FB01 B2
- FB02 C6
- FB03 C10
- FB04 B3
- FB05 B3
- IB01 B1

SSB: MT5382-Flash & NVM

B4C

MT5382 - FLASH & NVM

B4C



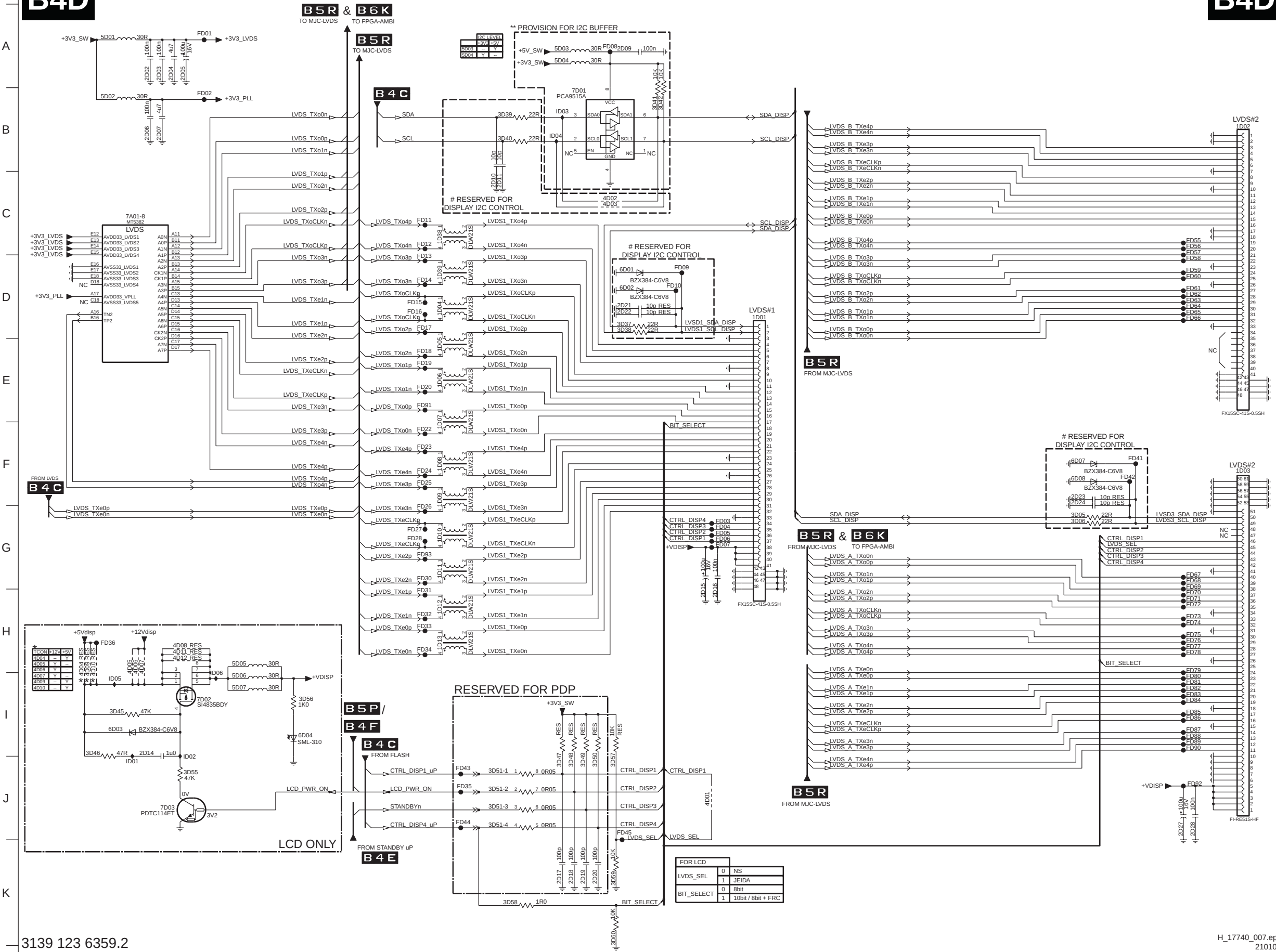
3139 123 6359.2

H_17740_006.eps
210108

SSB: MT5382-LVDS

B4D MT5382 - LVDS

B4D



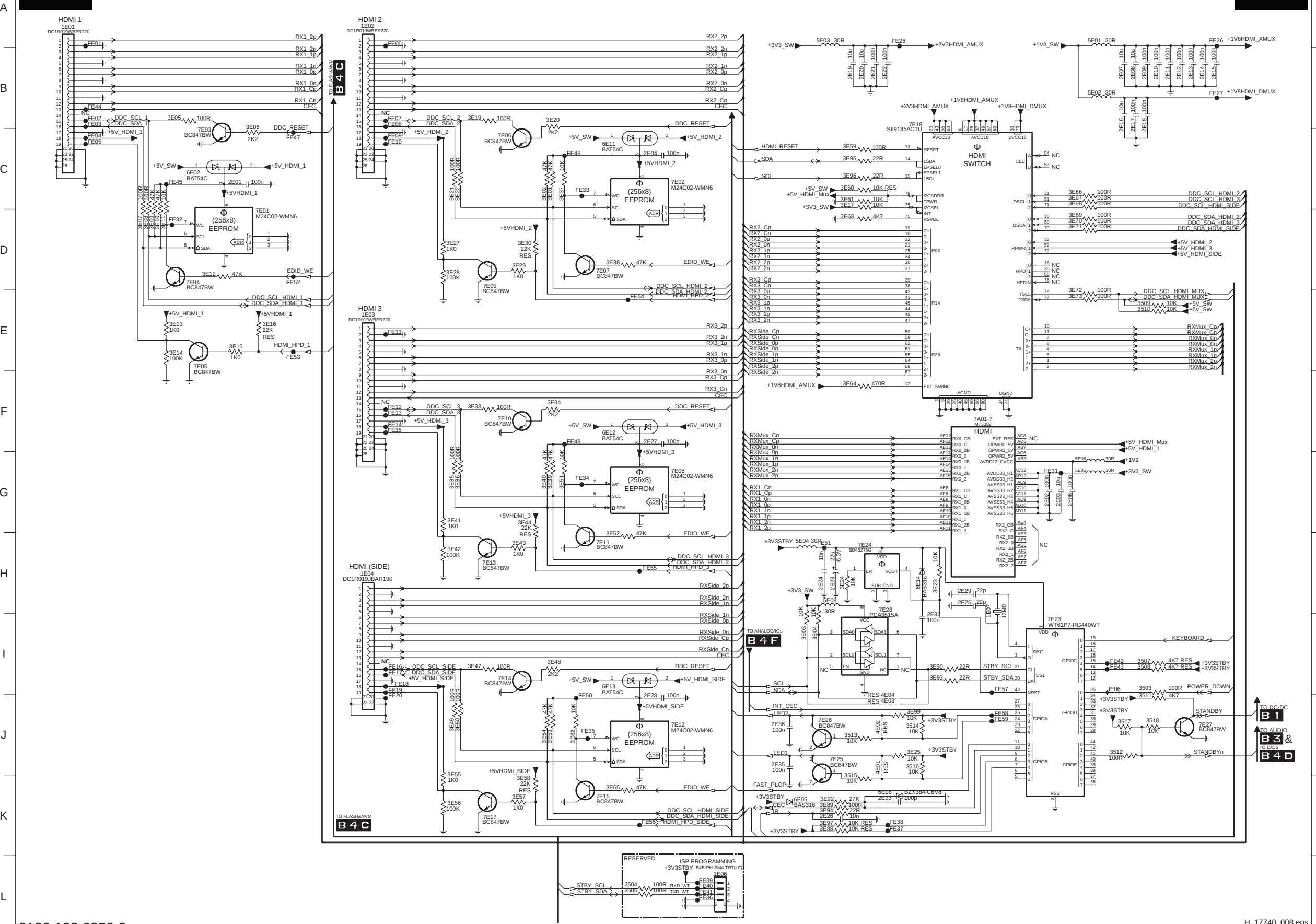
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1D10 G5
1D11 G5
1D12 H5
1D13 H5
1D38 C5
1D39 D5
2D02 A2
2D03 A2
2D04 A2
2D05 A2
2D06 B2
2D07 B2
2D09 A8
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2D11 C6
2D14 I2
2D15 H9
2D16 H9
2D17 K7
2D18 K7
2D19 K7
2D20 K7
2D22 D8
2D23 F13
2D24 F13
2D27 J14
2D28 J14
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3D06 G13
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3D42 B8
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3D49 J7
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3D51-2 J6
3D51-3 J6
3D51-4 J6
3D55 J2
3D56 I4
3D57 J8
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3D60 K8
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4D03 C8
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4D05 H2
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4D07 H2
4D08 H2
4D09 H1
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4D11 H2
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6D03 I2
6D04 I4
6D07 F13
6D08 F13
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7D06 G9
7D07 G9
7D08 A8
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7D10 D8
7D11 C5
7D12 C5
7D13 D5
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7D15 D5
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7D58 D14
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7D60 D14
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7D64 D14
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FD69 G14
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FD71 H14
FD72 H14
FD73 H14
FD74 H14
FD75 H14
FD76 H14
FD77 H14
FD78 H14
FD79 H14
FD80 I14
FD81 I14
FD82 I14
FD83 I14
FD84 I14
FD85 I14
FD86 I14
FD87 I14
FD88 I14
FD89 I14
FD90 I14
FD91 E5
FD92 J14
FD93 G5
ID01 J2
ID02 I2
ID03 B7
ID04 B7
ID05 I2
ID06 H3
- FX155C-41S-0.5SH
FX-RES15-HF

SSB: MT5382-HDMI & Mux

B4E

MT5382 - HDMI & MUX

B4E



1E01 A1	6E06 K11
1E02 A5	6E11 C8
1E03 E5	6E12 F8
1E04 H5	6E13 I8
1E06 L9	6E14 H12
1E07 H12	7A01-7 F12
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2E02 G13	7E02 C9
2E03 G13	7E03 C3
2E04 C8	7E04 D3
2E06 G14	7E05 E3
2E07 B14	7E06 C7
2E08 B14	7E07 D8
2E09 B14	7E08 G9
2E10 B15	7E09 D6
2E11 B15	7E10 F7
2E12 B15	7E11 H8
2E13 B15	7E12 J9
2E14 B15	7E13 H6
2E15 B15	7E14 I7
2E16 B14	7E15 K8
2E17 B14	7E17 K6
2E18 B14	7E18 B12
2E19 B11	7E23 I13
2E20 B11	7E24 H11
2E21 B11	7E25 J11
2E22 B11	7E26 J11
2E23 H11	7E27 J15
2E24 H10	7E28 H11
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2E27 F8	FE03 B1
2E28 J8	FE04 C1
2E29 H12	FE05 C1
2E32 I12	FE06 A5
2E33 K11	FE07 B5
2E35 J10	FE08 B5
2E36 J10	FE09 C5
3E03 I14	FE10 C5
3E04 L8	FE11 E5
3E05 L8	FE12 F5
3E07 I14	FE13 F5
3E08 I14	FE14 F5
3E09 E14	FE15 F5
3E10 E14	FE16 I5
3E11 J14	FE17 I5
3E12 J14	FE18 I5
3E13 J11	FE19 I5
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3E15 J11	FE26 A15
3E16 J12	FE27 B15
3E17 J14	FE28 A11
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3E03 I10	FE34 G7
3E04 I10	FE35 J8
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3E07 D2	FE38 K11
3E08 D2	FE39 L9
3E09 D2	FE40 L9
3E10 D2	FE41 L9
3E11 D2	FE42 I14
3E12 D3	FE43 I14
3E13 E2	FE44 B1
3E14 E2	FE45 C2
3E15 E3	FE47 C4
3E16 E4	FE48 C7
3E17 C11	FE49 F7
3E19 B6	FE50 J8
3E20 B7	FE51 H10
3E21 C6	FE52 D4
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3E24 H11	FE55 H8
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3E29 D7	FE59 J13
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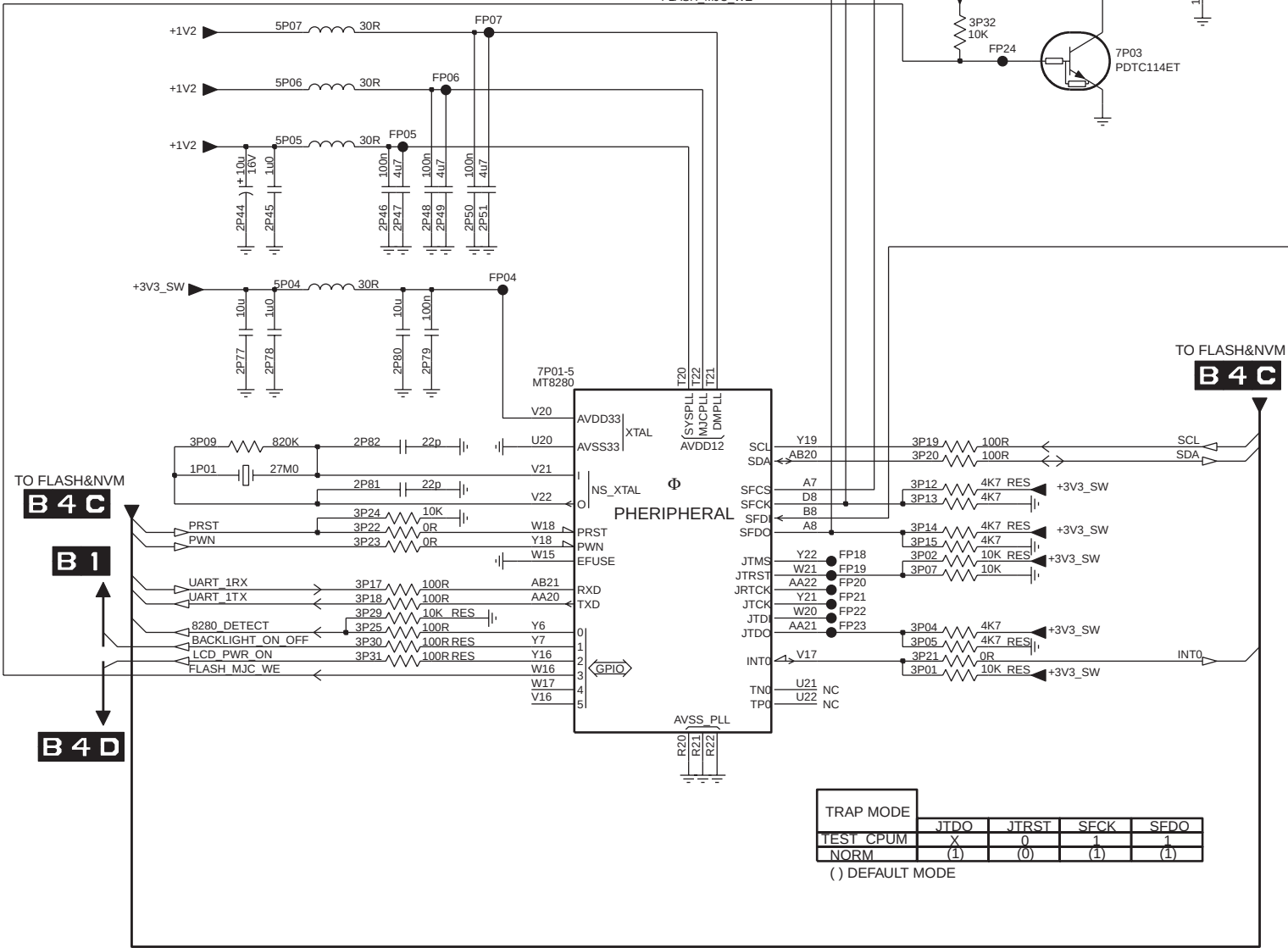
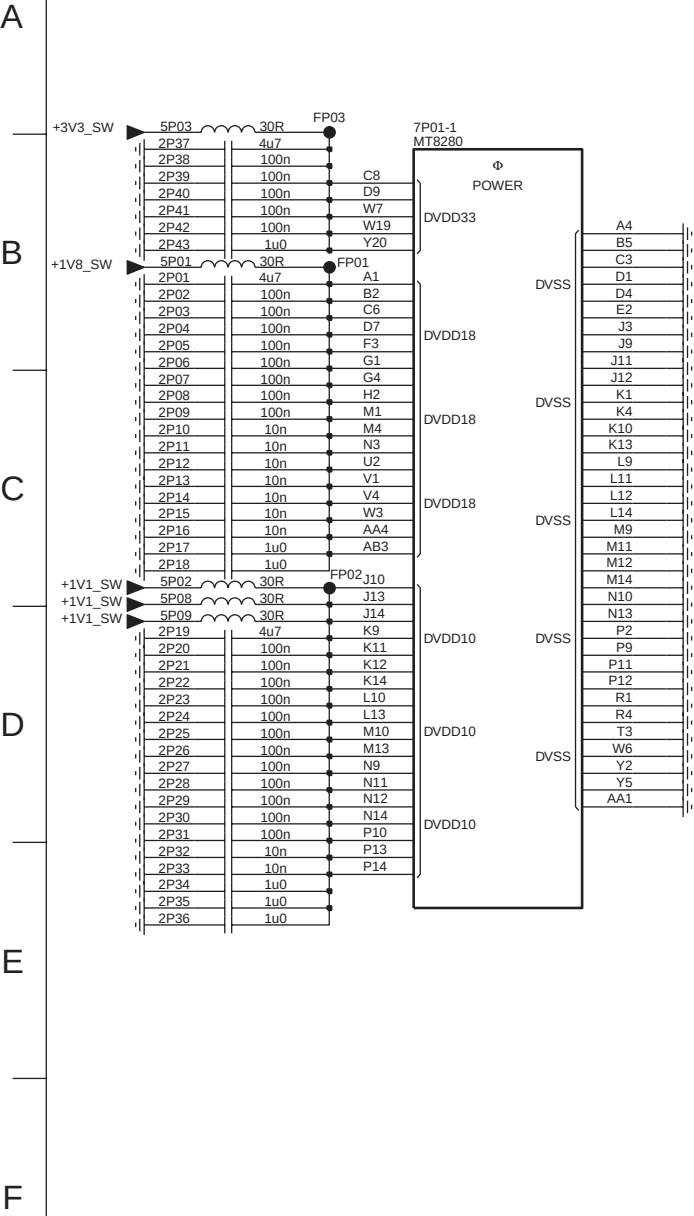
B4F MT5382 - ANALOG I/Os



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210108

SSB: MJC MT8280-Power

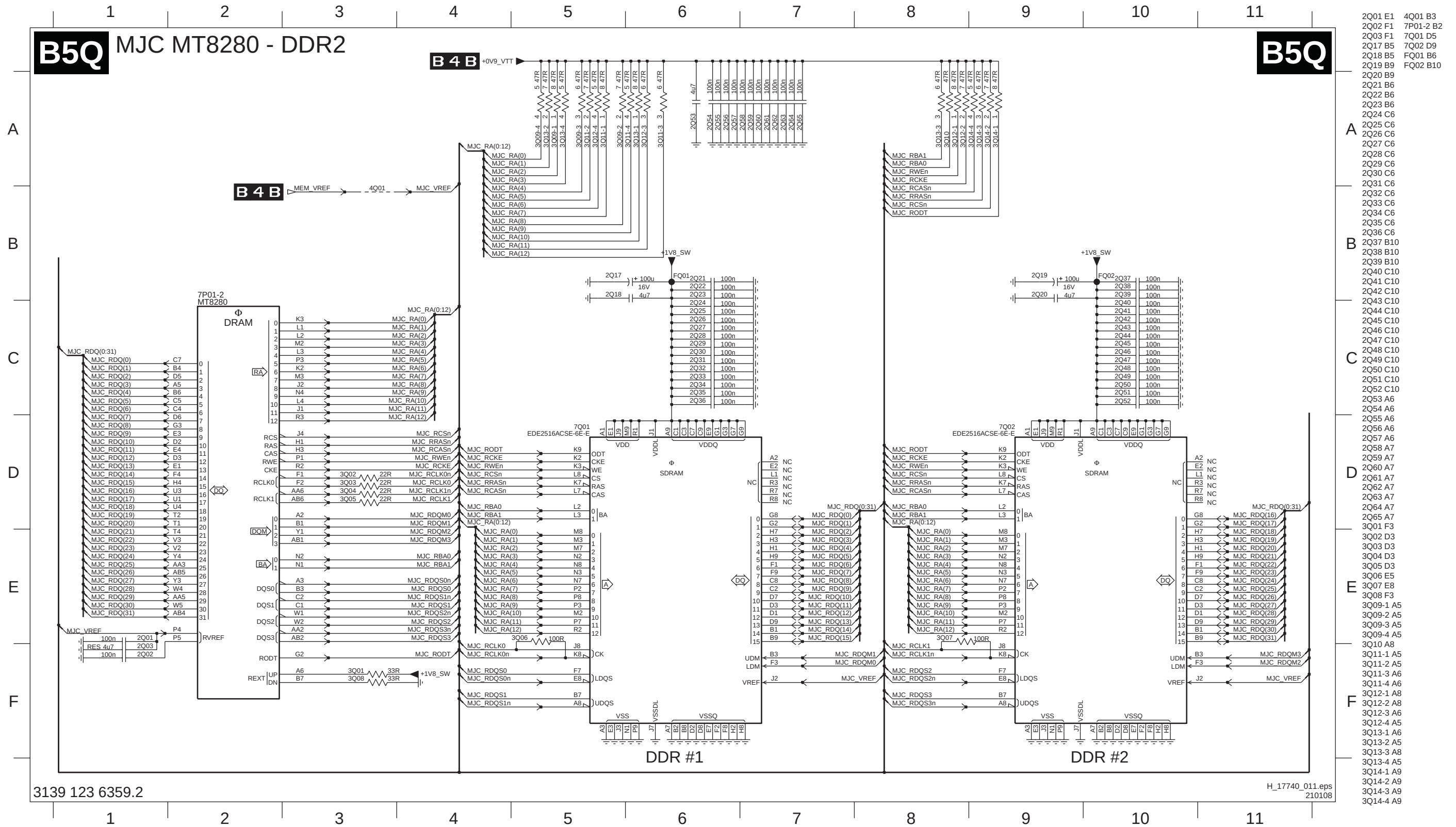
B5P MJC MT8280 - POWER



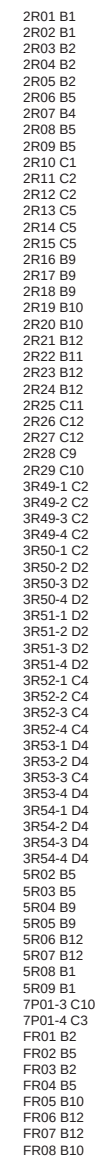
B5P

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- 2P07 C1
- 2P08 C1
- 2P09 C1
- 2P10 C1
- 2P11 C1
- 2P12 C1
- 2P13 C1
- 2P14 C1
- 2P15 C1
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- FP03 A1
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- FP05 C6
- FP06 B6
- FP07 B6
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- FP15 A9
- FP16 A9
- FP17 A10
- FP18 E8
- FP19 E8
- FP20 E8
- FP21 E8
- FP22 E8
- FP23 E8
- FP24 B9

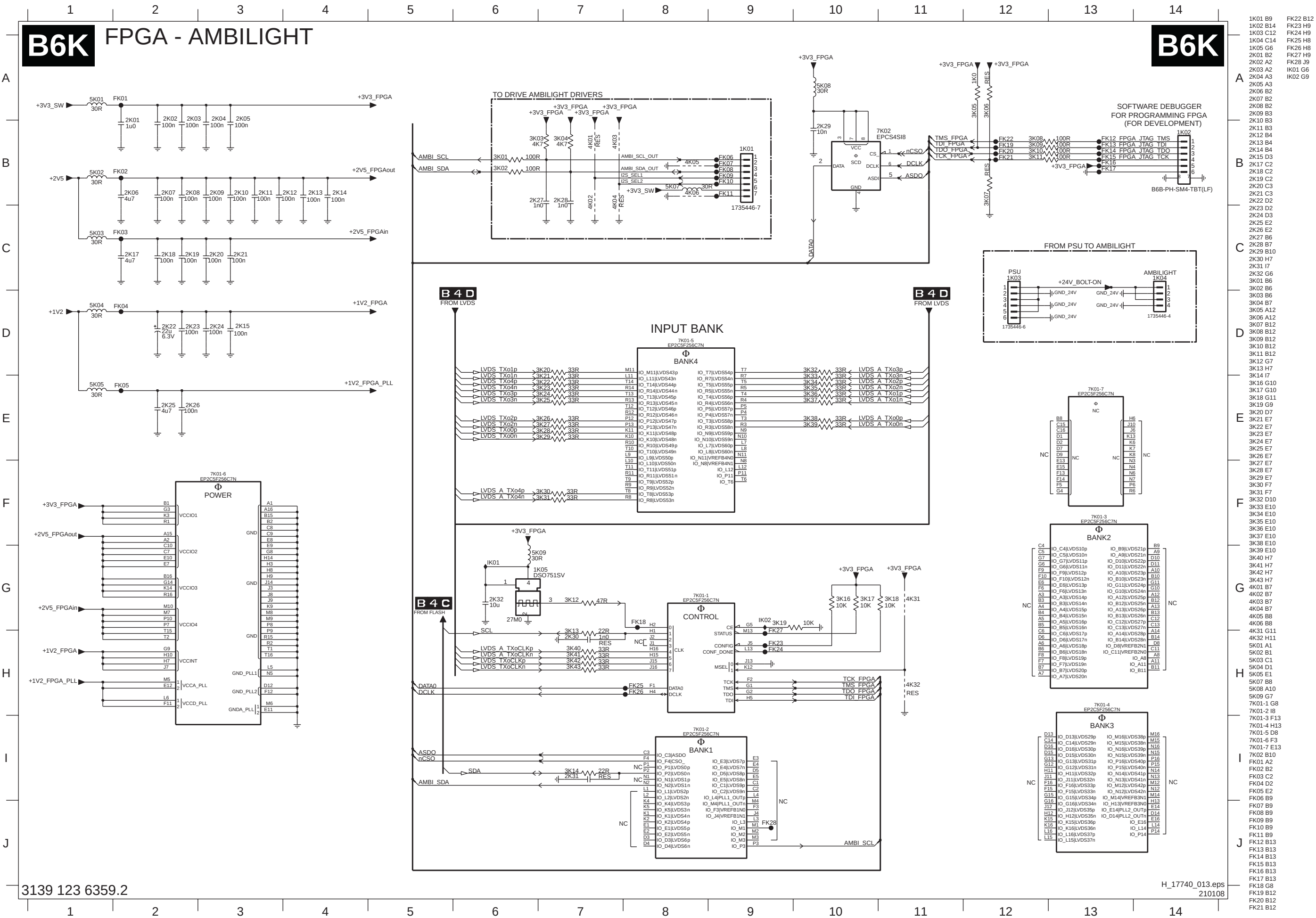
B5Q MJC MT8280 - DDR2



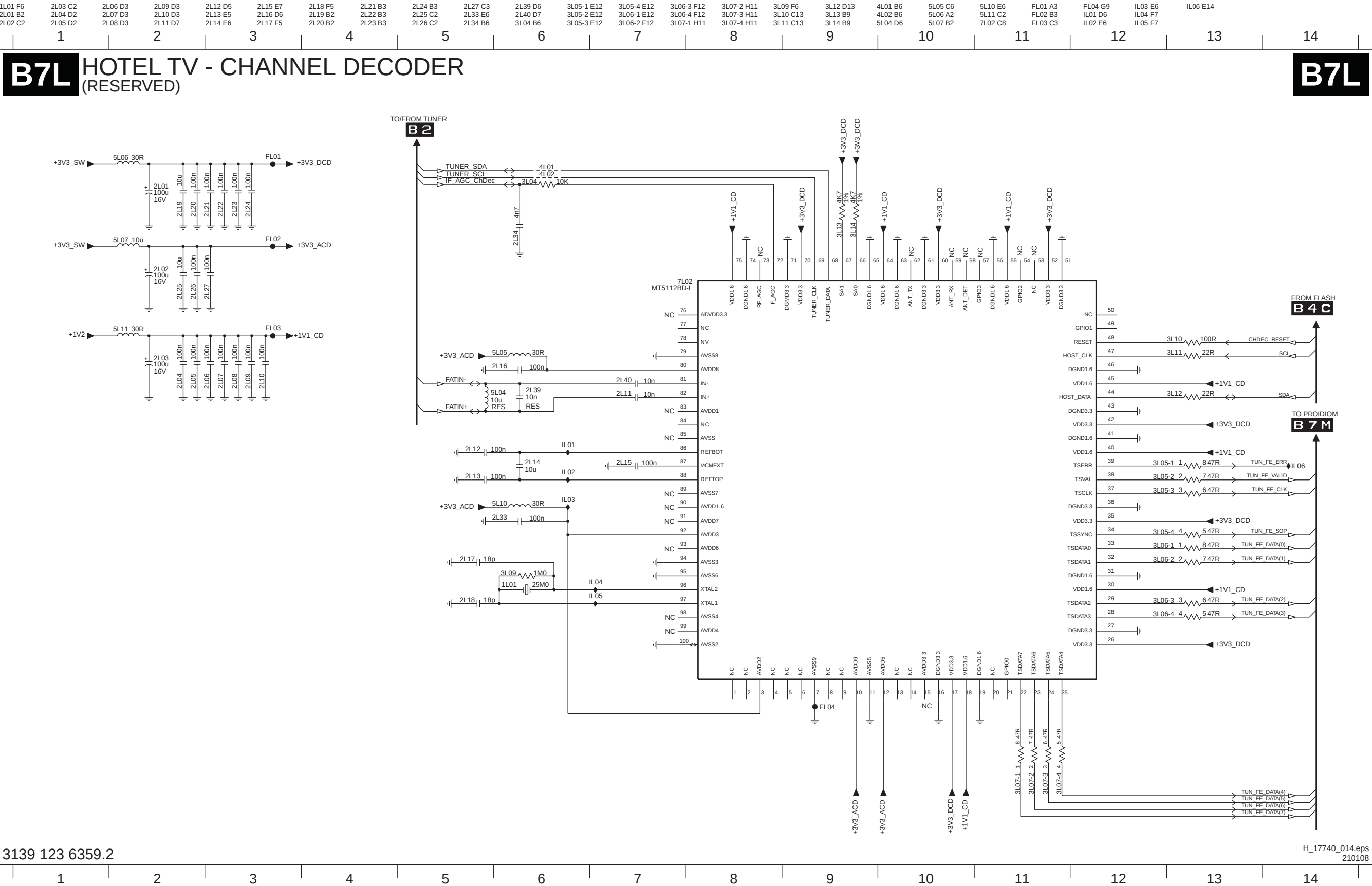
B5R MJC MT8280 - LVDS



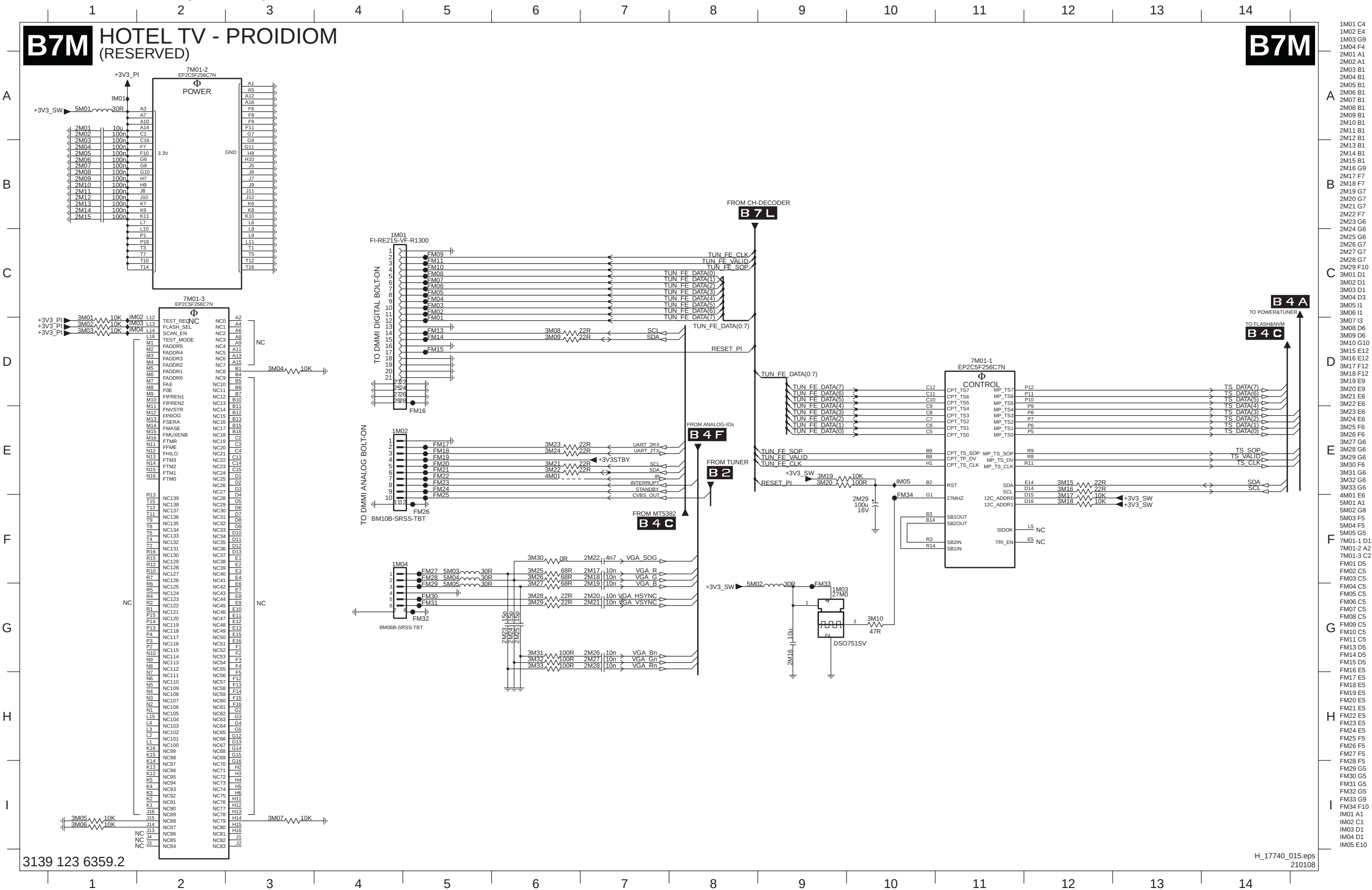
SSB: FPGA-AmbiLight



SSB: ITV-Channel Decoder (Reserved)



SSB: ITV-Pro:Idiom (Reserved)



SSB: SRP List Explanation

Example

Net Name	Diagram
+12-15V	AP1 (4x)
+12-15V	AP4 (4x)
+12-15V	AP5 (12x)
+12-15V	AP6 (4x)
+12-15V	AP7 (8x)
+12V	AP1 (4x)
+12V_NF	AP1 (2x)
+12VAL	AP1 (4x)
+25VLP	AP1 (4x)
+25VLP	AP2 (1x)
+3V3-STANDBY	AP5 (3x)
+400V-F	AP1 (2x)
+400V-F	AP2 (2x)
+400V-F	AP1 (2x)
+5V2	AP1 (6x)
+5V2	AP2 (1x)
+5V2-NF	AP1 (1x)
+5V2-NF	AP2 (1x)
+5V-SW	AP1 (6x)
+5V-SW	AP2 (1x)
+8V6	AP1 (3x)
+AUX	AP1 (2x)
+AUX	AP2 (1x)
+DC-F	AP1 (2x)
+DC-F	AP3 (2x)
+SUB-SPEAKER	AP1 (1x)
+SUB-SPEAKER	AP6 (2x)
-12-15V	AP1 (4x)
-12-15V	AP4 (6x)
-12-15V	AP5 (14x)
-12-15V	AP6 (6x)
-12-15V	AP7 (8x)
-AL-OFF	AP1 (2x)
AUDIO-L	AP4 (1x)
AUDIO-L	AP5 (1x)
AUDIO-PROT	AP5 (3x)
AUDIO-R	AP4 (1x)
AUDIO-R	AP5 (1x)
AUDIO-SW	AP4 (1x)
AUDIO-SW	AP7 (1x)
BOOST	AP1 (2x)
CPROT	AP4 (2x)
CPROT	AP5 (1x)
CPROT-SW	AP5 (1x)
CPROT-SW	AP6 (2x)
-DC-F	AP1 (2x)
-DC-F	AP3 (2x)
DC-PROT	AP1 (1x)
DC-PROT	AP5 (2x)
DIM-CONTROL	AP1 (2x)
FEEDBACK+SW	AP6 (2x)
FEEDBACK-L	AP4 (1x)
FEEDBACK-R	AP4 (2x)
FEEDBACK-R	AP6 (2x)
GND-AL	AP1 (2x)
GNDHA	AP1 (40x)
GNDHA	AP2 (20x)
GNDHA	AP3 (2x)
GNDHOT	AP3 (2x)
GND-L	AP1 (2x)
GND-L	AP4 (4x)
GND-L	AP5 (34x)
GND-LL	AP4 (7x)
GND-LL	AP5 (1x)
GND-LR	AP4 (7x)
GND-LR	AP5 (1x)
GND-LSW	AP5 (1x)
GND-LSW	AP6 (15x)
GND-S	AP1 (11x)
GND-SA	AP4 (8x)
GND-SA	AP5 (2x)
GND-SA	AP6 (8x)
GND-SA	AP7 (6x)
GNDScREW	AP3 (2x)
GNDScREW	AP5 (2x)
GND-SSB	AP5 (3x)
GND-SSP	AP1 (51x)
GND-SSP	AP2 (15x)
IN+SW	AP6 (2x)
IN-L	AP4 (2x)
IN-R	AP4 (2x)
IN-SW	AP6 (2x)
INV-MUTE	AP6 (1x)
INV-MUTE	AP4 (1x)
INV-MUTE	AP6 (1x)
LEFT-SPEAKER	AP4 (1x)
LEFT-SPEAKER	AP5 (1x)
MUTE	AP4 (2x)
MUTE	AP5 (1x)
MUTE	AP6 (2x)
ON-OFF	AP1 (3x)
OUT	AP6 (1x)
OUT	AP7 (2x)
OUTN	AP6 (1x)
OUTN	AP7 (1x)
POWER-GOOD	AP1 (2x)
POWER-OK-PLATFORM	AP1 (2x)
RIGHT-SPEAKER	AP4 (1x)
RIGHT-SPEAKER	AP5 (1x)
SOUND-ENABLE	AP5 (3x)
STANDBY	AP1 (5x)
STANDBY	AP2 (1x)
-SUB-SPEAKER	AP5 (1x)
-SUB-SPEAKER	AP6 (2x)
V-CLAMP	AP1 (1x)
V-CLAMP	AP3 (2x)

1.1. Introduction

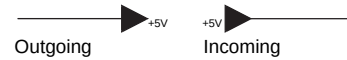
SRP (Service Reference Protocol) is a software tool that creates a list with all references to signal lines. The list contains references to the signals within all schematics of a PWB. It replaces the text references currently printed next to the signal names in the schematics. These printed references are created manually and are therefore not guaranteed to be 100% correct. In addition, in the current crowded schematics there is often none or very little place for these references. Some of the PWB schematics will use SRP while others will still use the manual references. Either there will be an SRP reference list for a schematic, or there will be printed references in the schematic.

1.2. Non-SRP Schematics

There are several different signals available in a schematic:

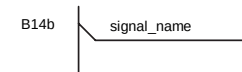
1.2.1. Power Supply Lines

All power supply lines are available in the supply line overview (see chapter 6). In the schematics (see chapter 7) is not indicated where supplies are coming from or going to.
It is however indicated if a supply is incoming (created elsewhere), or outgoing (created or adapted in the current schematic).



1.2.2. Normal Signals

For normal signals, a schematic reference (e.g. B14b) is placed next to the signals.

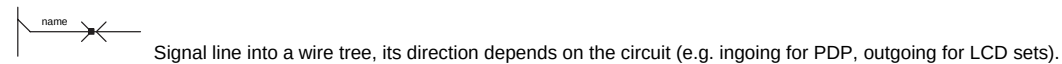
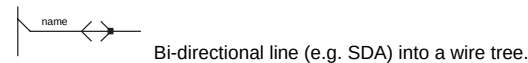
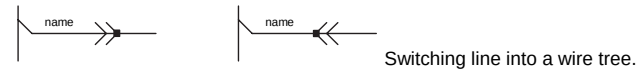
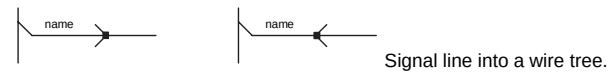
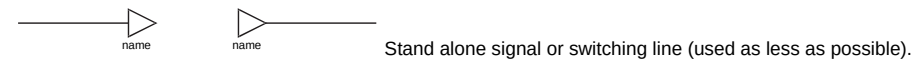


1.2.3. Grounds

For normal and special grounds (e.g. GNDHOT or GND3V3 etc.), nothing is indicated.

1.3. SRP Schematics

SRP is a tool, which automatically creates a list with signal references, indicating on which schematic the signals are used. A reference is created for all signals indicated with an SRP symbol, these symbols are:



Remarks:

- When there is a black dot on the "signal direction arrow" it is an SRP symbol, so there will be a reference to the signal name in the SRP list.
- All references to normal grounds (Ground symbols without additional text) are not listed in the reference list, this to keep it concise.
- Signals that are not used in multiple schematics, but only once or several times in the same schematic, are included in the SRP reference list, but only with one reference.

Additional Tip:

When using the PDF service manual file, you can very easily search for signal names and follow the signal over all the schematics. In Adobe PDF reader:

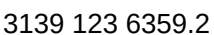
- Select the signal name you want to search for, with the "Select text" tool.
- Copy and paste the signal name in the "Search PDF" tool.
- Search for all occurrences of the signal name.
- Now you can quickly jump between the different occurrences and follow the signal over all schematics. It is advised to "zoom in" to e.g. 150% to see clearly, which text is selected. Then you can zoom out, to get an overview of the complete schematic.

PS. It is recommended to use at least Adobe PDF (reader) version 6.x, due to better search possibilities in this version. E_06532_031.eps

Personal Notes:

[illegible]

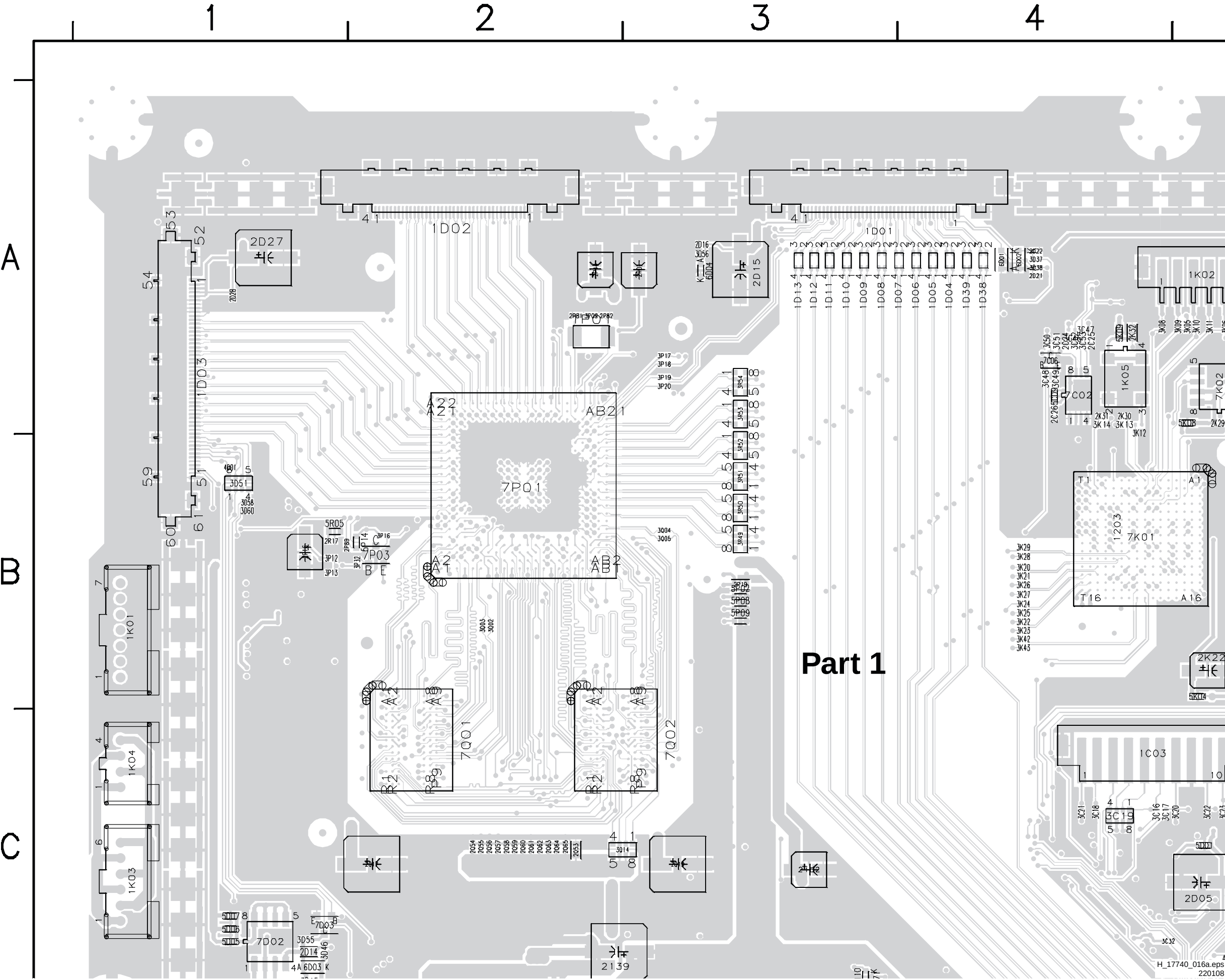
J1	D2	U16	D2	U26	E2	1191	D1	1197	A6	1302	F1	1D02	A2	1D08	A3	1D38	A4
J9	E2	U17	E2	1101	D1	1192	F1	1198	A8	1C01	C7	1D03	A1	1D09	A3	1D39	A4
U10	D2	U18	A8	1102	E1	1193	F3	1199	A8	1C02	E1	1D04	A4	1D10	A3	1E01	F4
J11	D2	U20	A3	1188	A4	1194	F4	1203	B6	1C03	C4	1D05	A4	1D11	A3	1E02	F5
U12	D2	U22	A1	1189	A3	1195	F8	1204	A6	1C04	E5	1D06	A4	1D12	A3	1E03	F7
U13	C2	U24	F7	1190	A1	1196	F6	1301	F1	1D01	A3	1D07	A4	1D13	A3	1E04	E8



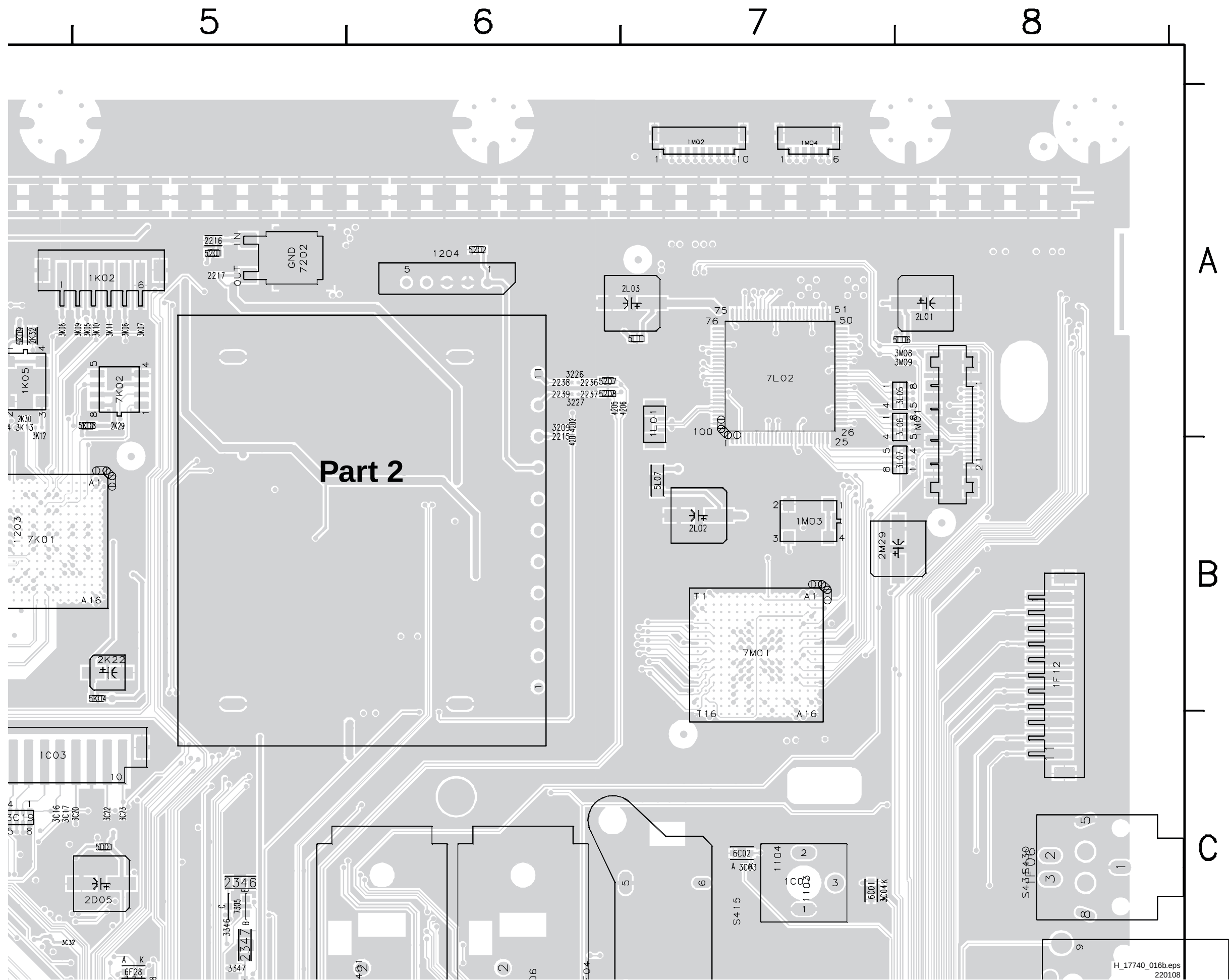
Part 4
H_17740_016d.eps

2801	D3	3311	F3	3K24	B4	6D01	A4
2806	D3	3313	F3	3K25	B4	6D02	A4
2811	D3	3319	F3	3K26	B4	6D03	C1
2847	E3	3326	F3	3K27	B4	6D04	A3
2848	D3	3332	D5	3K28	B4	6E14	F6
2849	D3	3333	D5	3K29	B4	6F16	D7
2850	D3	3334	D5	3K42	B4	6F17	E7
2851	D3	3335	D5	3K43	B4	6F25	F8
2852	D3	3337	F3	3L05	A8	6F26	F8
2853	D3	3338	F3	3L06	A8	6F27	F8
2854	D3	3342	F3	3L07	B8	6F28	C5
2855	D3	3343	F3	3M08	A8	7103	E2
2856	E3	3344	D5	3M09	A8	7104	D2
2857	E3	3345	D5	3P09	A2	7105	E2
2858	E3	3346	C5	3P12	B1	7106	D2
2859	D3	3347	C5	3P13	B1	7109	E2
2860	E3	3348	D5	3P16	B2	7111	E1
2C17	E5	3504	F3	3P17	A3	7113	E1
2C18	E5	3505	F3	3P18	A3	7202	A5
2C19	E5	3507	F5	3P19	A3	7301	F2
2C20	E5	3508	F5	3P20	A3	7302	D5
2C21	E5	3A01	E4	3P32	B2	7303	F3
2C22	E5	3A02	D5	3Q02	B2	7304	D5
2C23	E5	3B07	D3	3Q03	B2	7305	C5
2C24	A4	3B08	D3	3Q04	B3	7308	F3
2C25	A4	3B09	E3	3Q05	B3	7309	D5
2C26	A4	3B10	E3	3Q14	C2	7A01	D4
2C38	F4	3B11	E3	3R49	B3	7B02	D3
2C39	F4	3B12	E3	3R50	B3	7B03	E3
2D05	C5	3B13	E3	3R51	B3	7C02	A4
2D14	C1	3B14	E3	3R52	B3	7C06	A4
2D15	A3	3B15	E3	3R53	A3	7D02	C1
2D16	A3	3B16	E3	3R54	A3	7D03	C1
2D21	A4	3B17	E3	4201	B6	7E18	E6
2D22	A4	3B18	E3	4202	A6	7E24	F6
2D27	A1	3C03	C7	4205	A6	7F01	F7
2D28	A1	3C04	C7	4206	A7	7F05	D5
2E23	F6	3C05	D4	4A01	D5	7K01	A4
2E24	F6	3C16	C4	4A02	D5	7K02	A5
2E25	F6	3C17	C4	4A03	D5	7L02	A7
2E29	F5	3C18	C4	4C07	D5	7M01	B7
2E32	F6	3C19	C4	4D01	B1	7P01	B2
2F21	F7	3C20	C5	4D04	D1	7P03	B2
2F22	F7	3C21	C4	4D05	D1	7Q01	C2
2F27	E5	3C22	C5	4D06	D1	7Q02	C2
2F28	E5	3C23	C5	4D07	D1	S427	F8
2F33	E5	3C32	C4	4D09	D1	S428	F8
2F34	E5	3C33	D5	4D10	D1	S429	F8
2F38	C5	3C34	E4	5101	E1		
2F39	D5	3C35	E5	5102	E2		
2F79	E5	3C38	E4	5103	D2		
2F80	D5	3C39	E4	5104	E2		
2F81	D5	3C40	E4	5105	D2		
2F98	F8	3C42	D5	5106	D2		
2K22	B5	3C43	D5	5107	D1		
2K29	A5	3C44	D5	5108	D1		
2K30	A4	3C45	D5	5109	D1		
2K31	A4	3C46	A4	5201	A5		
2K32	A4	3C47	A4	5202	A6		
2L01	A8	3C48	A4	5207	A6		
2L02	B7	3C49	A4	5208	A6		
2L03	A7	3C50	A4	5301	F1		
2M29	B8	3C51	A4	5302	F1		
2P19	B3	3C52	A4	5303	F2		
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2P81	A2	3C79	E4	5305	F1		

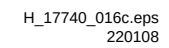
Layout Small Signal Board (Part 1 Top Side)



Layout Small Signal Board (Part 2 Top Side)



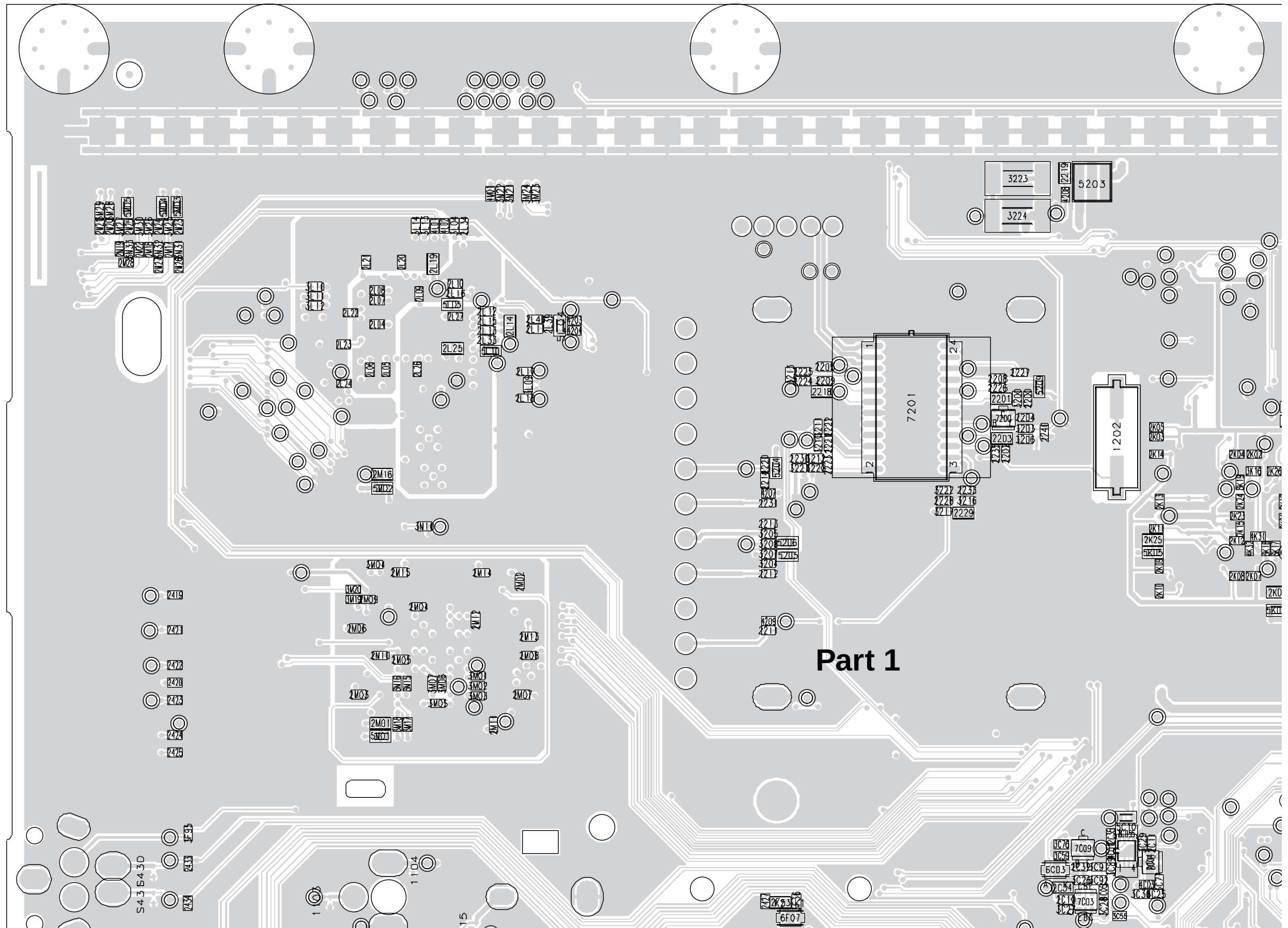
F



A	U12	B4	2423	B1	2C35	E5	2F95	D4	2P26	B7	3123	D8	3C28	C4	3E64	F5	3K39	A8	5A04	E5	7307	F8
	U15	B4	2424	B1	2C37	E5	2F96	E1	2P27	B7	3124	D8	3C29	C4	3E65	F1	3K40	A8	5A05	E5	7801	D6
	U19	A1	2425	C1	2C40	E8	2F97	D1	2P28	B7	3125	D7	3C30	C4	3E66	F3	3K41	A8	5A06	D4	7C01	D6
	U21	F6	2427	C3	2C02	E8	2F99	E1	2P29	B7	3126	D7	3C31	E8	3E67	F3	3K42	A4	5801	B6	7C03	C4
	U23	A8	2430	D2	2003	E6	2K01	B5	2P30	B7	3127	D7	3C32	E8	3E68	F3	3K42	A4	5C03	E4	7C04	C4
	U25	F2	2431	D1	2004	E6	2K02	B5	2P31	B7	3128	D7	3C33	E8	3E69	F3	3L10	A2	5C08	E8	7C05	C4
	U27	F2	2432	D1	2005	E6	2K03	B7	2P32	B7	3129	D7	3C34	E8	3E70	F3	3K10	A2	5C09	E8	7C06	C4
	U28	C4	2433	C1	2007	E6	2K04	B5	2P33	B7	3130	E8	3C58	C4	3E71	E3	3L12	A2	5C07	E8	7C09	C4
	1102	B4	2434	B1	2C09	A5	2K05	B4	2P34	B7	3131	D7	3C57	E2	3E72	E3	3L12	A2	5C08	E5	7C10	F5
	2101	E7	2435	C2	2D10	A5	2K06	B5	2P35	B7	3132	D7	3C59	C4	3E73	E3	3L14	A2	5C10	C4	7C11	F5
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2114	F6	2444	E4	2018	A8	2K09	B5	2P38	A7	3135	D7	3C62	E5	3E90	F4	3M03	B2	5C13	E5	7C14	D6	
2111	D7	2446	E4	2019	A18	2K10	B4	2P39	A7	3136	D7	3C63	E5	3E92	F4	3M04	B2	5C03	A5	7D01	A5	
2112	D7	2447	E4	2020	A8	2K11	B4	2P40	B7	3137	E8	3C64	F5	3E93	F4	3M05	B2	5C04	A5	7E01	F5	
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2148	E8	2A19	E6	2E17	E3	2L06	A2	2Q04	B7	3155	E8	3C85	E5	3F19	D3	3M29	A1	5F18	D4	7E26	F3	
2149	D7	2A20	E6	2E18	F3	2L07	A2	2Q20	B6	3156	D7	3C86	E5	3F20	D3	3M30	A1	5F20	D4	7E27	F3	
2150	D7	2A21	E18	2E19	E3	2L08	A2	2Q21	B7	3157	D7	3C89	C4	3F22	D3	3M31	A1	5F23	D3	7E28	E3	
2151	D8	2A22	E6	2E20	E3	2L09	A2	2Q22	B7	3158	E8	3C91	C4	3F23	E4	3M32	A1	5F25	D4	7F03	C4	
2152	D7	2A23	E6	2E21	F3	2L10	A2	2Q23	C7	3159	E8	3C92	C4	3F25	E4	3M33	A1	5X01	B5	7F04	D4	
2153	D8	2A24	E6	2E22	E3	2L11	A2	2Q24	B7	3160	E8	3C94	E5	3F26	E4	3M34	B6	5X02	B5	7F02	B7	
2154	D7	2A25	E6	2E26	F4	2L12	A2	2Q25	C7	3161	E8	3C95	C7	3F27	E4	3P01	A7	5X03	B5			
2155	D7	2A27	E6	2E27	F4	2L13	A2	2Q26	C7	3162	E8	3C96	C7	3F28	E4	3P02	A7	5X04	B5			
2156	D7	2A28	E5	2E28	F1	2L14	A2	2Q27	C7	3163	E8	3C97	C7	3F29	E4	3P05	A6	5X07	B8			
2158	D8	2A29	E5	2E33	F4	2L15	A2	2Q28	C7	3164	D8	3C98	E5	3F30	E4	3P07	A7	5L04	A2			
2159	C6	2A30	E5	2E35	F3	2L16	A2	2Q29	C7	3165	D8	3C99	E5	3F31	E4	3P14	B8	5L05	A2			
2160	C6	2A33	E4	2E36	F3	2L17	A2	2Q30	B7	3166	D8	3C05	B8	3F32	E4	3P15	B8	5L10	A2			
2161	C6	2A34	D4	2F04	E4	2L18	A2	2Q31	B7	3200	B4	3C08	B8	3F34	E4	3P21	B6	5M01	C2			
2165	D8	2A35	D4	2F05	E4	2L19	A2	2Q32	C7	3203	B4	3C09	A8	3F35	E4	3P22	B6	5M02	B2			
2167	D8	2B02	E6	2F07	E4	2L20	A2	2Q33	B7	3204	B3	3C10	A8	3F36	E4	3P23	B6	5M03	B2			
2167	D8	2B03	E6	2F08	E4	2L21	A2	2Q34	C7	3205	B3	3C41	A5	3F36	C3	3P24	A6	5M04	A1			
2168	D8	2B04	E6	2F09	D4	2L22	A2	2Q35	C7	3206	B4	3C02	A5	3F37	C3	3P25	B6	5M05	A1			
2173	E8	2B05	E6	2F10	E4	2L23	A2	2Q36	C7	3207	B3	3C47	B8	3F38	C3	3P29	B6	5P01	B6			
2174	E8	2B07	E6	2F11	E4	2L24	A2	2Q37	B7	3208	B3	3C48	B8	3F41	E4	3P30	B6	5P03	A6			
2175	E8	2B08	E6	2F12	D4	2L25	A2	2Q38	B7	3210	B3	3C49	B8	3F43	C3	3P31	A7	5P04	A7			
2176	E8	2B09	E5	2F13	D4	2L26	A2	2Q39	B7	3211	B3	3C49	B8	3F45	A7	3P32	A7	5P05	A7			
2177	E8	2B10	E5	2F14	D4	2L27	A2	2Q40	B7	3212	B3	3C49	B8	3F46	C3	3P33	A7	5P06	A7			
2201	B4	2B12	E6	2F15	D4	2L28	A2	2Q41	C7	3213	A3	3C59	A8	3F47	D4	3Q07	C6	5P07	A7			
2202	B4	2B13	E6	2F16	D4	2L34	A2	2Q42	B7	3216	B4	3E01	F4	3F48	D4	3Q08	B7	5P02	B6			
2203	B4	2B14	E6	2F17	D4	2L39	A2	2Q43	B7	3217	B4	3E02	F4	3F49	C4	3Q09	C6	5P03	B6			
2204	B4	2B15	E6	2F18	D4	2L40	A2	2Q44	B6	3220	B3	3E03	F3	3F50	C4	3Q10	C7	5P04	B7			
2205	A3	2B16	E6	2F19	D4	2M01	C2	2Q45	B6	3221	B3	3E04	F3	3F51	C4	3Q11	C7	5P06	A7			
2208	A3	2B17	E6	2F20	D4	2M02	C2	2Q46	B6	3222	B4	3E05	F3	3F52	C4	3Q12	C6	5P07	A7			
2210	A3	2B18	E6	2F21	D4	2M03	B6	2Q47	C0	3223	A4	3E06	F3	3F53	C4	3Q13	C6	5P08	A7			
2211	B3	2B19	E6	2F25	E4	2M04	B2	2Q48	C7	3224	A4	3E07	F5	3F54	C4	4203	A2	5P09	B7			
2212	B3	2B20	E6	2F26	C3	2M05	B2	2Q49	C6	3305	F8	3E08	F5	3F55	A4	4204	A2	6101	E7			
2213	B3	2B21	E6	2F30	E4	2M06	B2	2Q50	C7	3309	F7	3E09	F5	3F56	D4	4207	B3	6102	D7			
2214	B3	2B22	E6	2F31	E4	2M07	B2	2Q51	C6	3312	F7	3E10	F5	3F57	D4	4208	A4	6103	E8			
2218	A3	2B23	E6	2F36	D4	2M08	B2	2Q52	C6	3314	F8	3E11	F5	3F58	E2	4209	B3	6104	D7			
2219	A3	2B24	E6	2F37	D4	2M09	B2	2Q53	C7	3315	F7	3E12	F5	3F59	E2	4210	B3	6105	D7			
2220	B3	2B25	E6	2F41	D4	2M10	B2	2Q53	C7	3317	F7	3E13	F5	3F60	E2	4202	B8	6106	D7			
2221	B3	2B26	E6	2F42	D4	2M11	C2	2R04	B7	3327	F8	3E14	F5	3F61	E3	4801	B6	6107	D8			
2222	B3	2B27	E6	2F43	E1	2M12	B2	2R05	B7	3328	F8	3E15	F5	3F62	E2	4C01	C4	6C03	C4			
2223	B3	2B28	E6	2F44	D3	2M13	B2	2R06	B6	3401	E4	3E16	F5	3F63	D2	4C02	C5	6C04	F5			
2224	A3	2B29	E6	2F46	E3	2M14	B2	2R07	B7	3402	E4	3E17	F3	3F64	D2	4C03	C4	6C05	E5			
2225	A3	2B30	E5	2F47	D4	2M15	B2	2R08	B8	3408	C5	3E18	F4	3F65	C2	4C04	C4	6C06	F5			
2226	A3	2B31	E5	2F48	D4	2M16	B2	2R09	B8	3409	D4	3E19	F4	3F66	C2	4C05	C4	6C07	F5			
2227	A4	2B32	E6	2F50	D4	2M17	A1	2R10	B6	3412	D1	3E21	F4	3F71	E1							

4

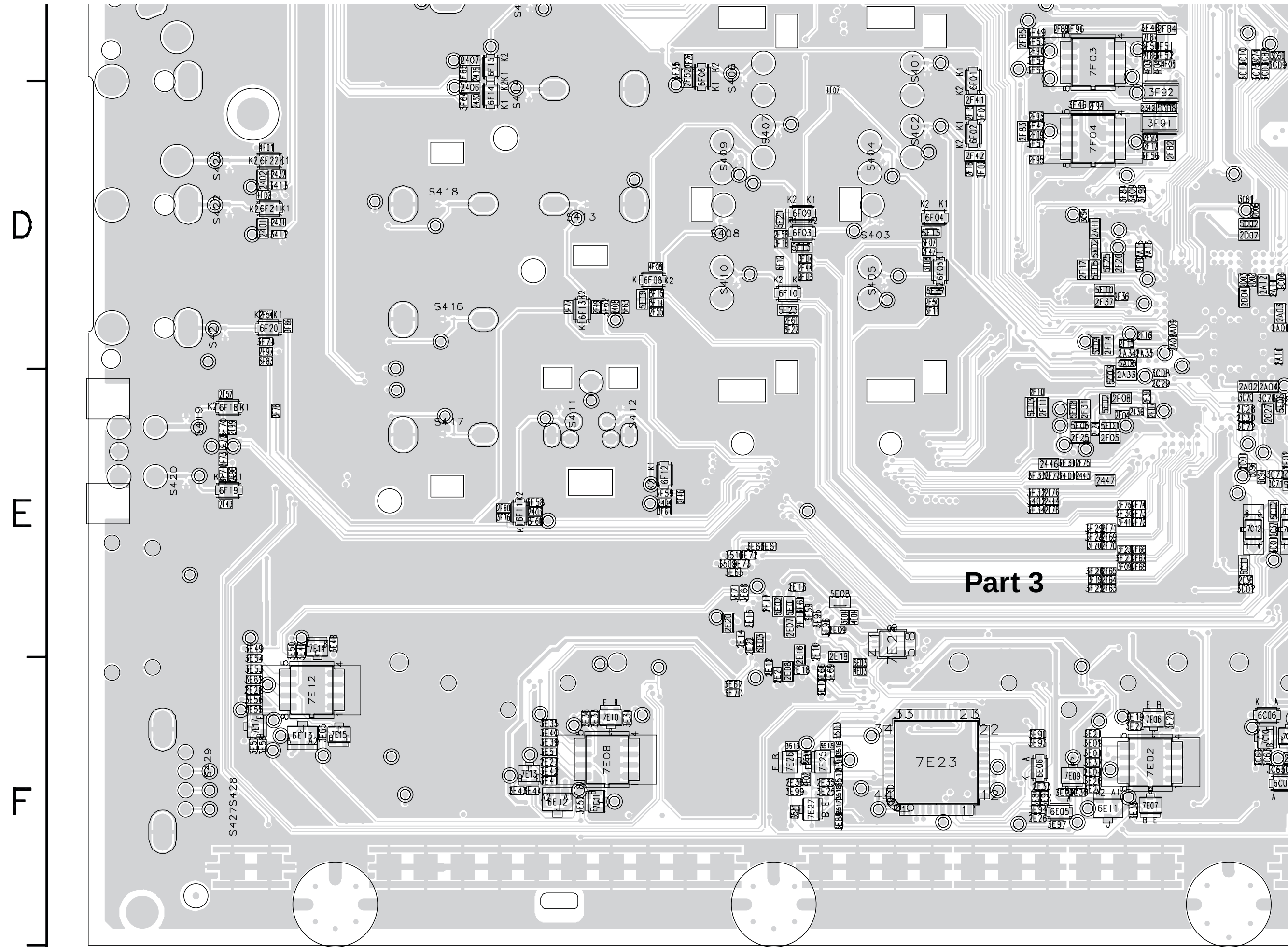
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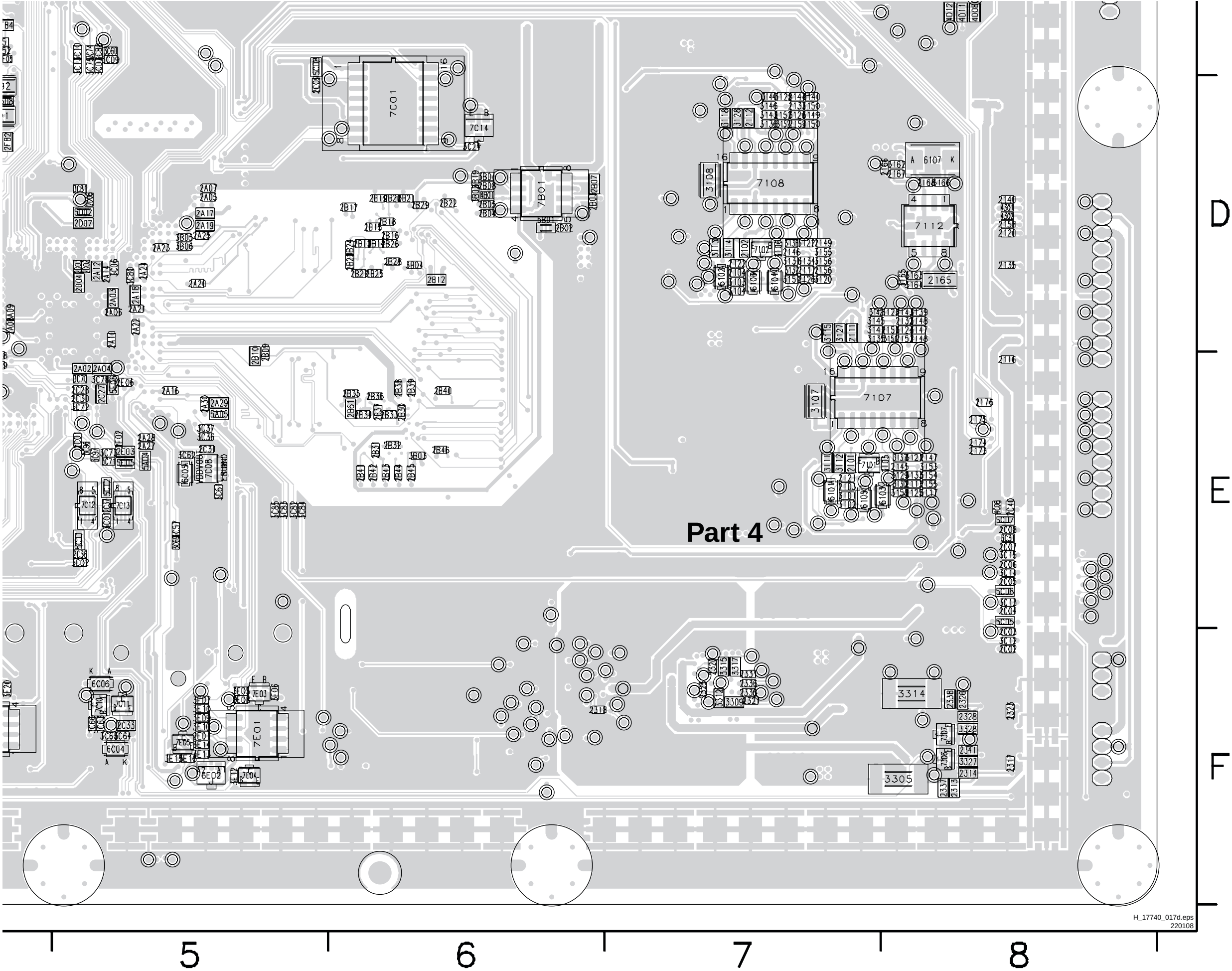
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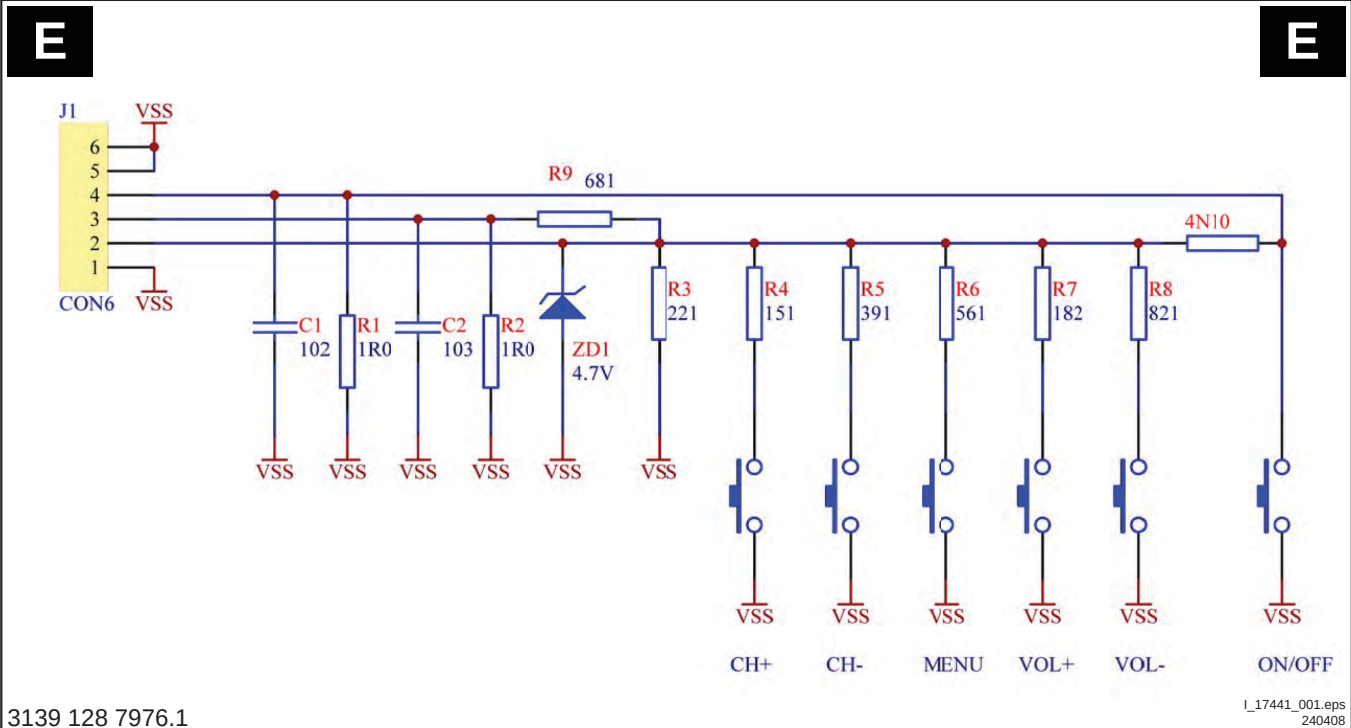
Layout Small Signal Board (Part 3 Bottom Side)



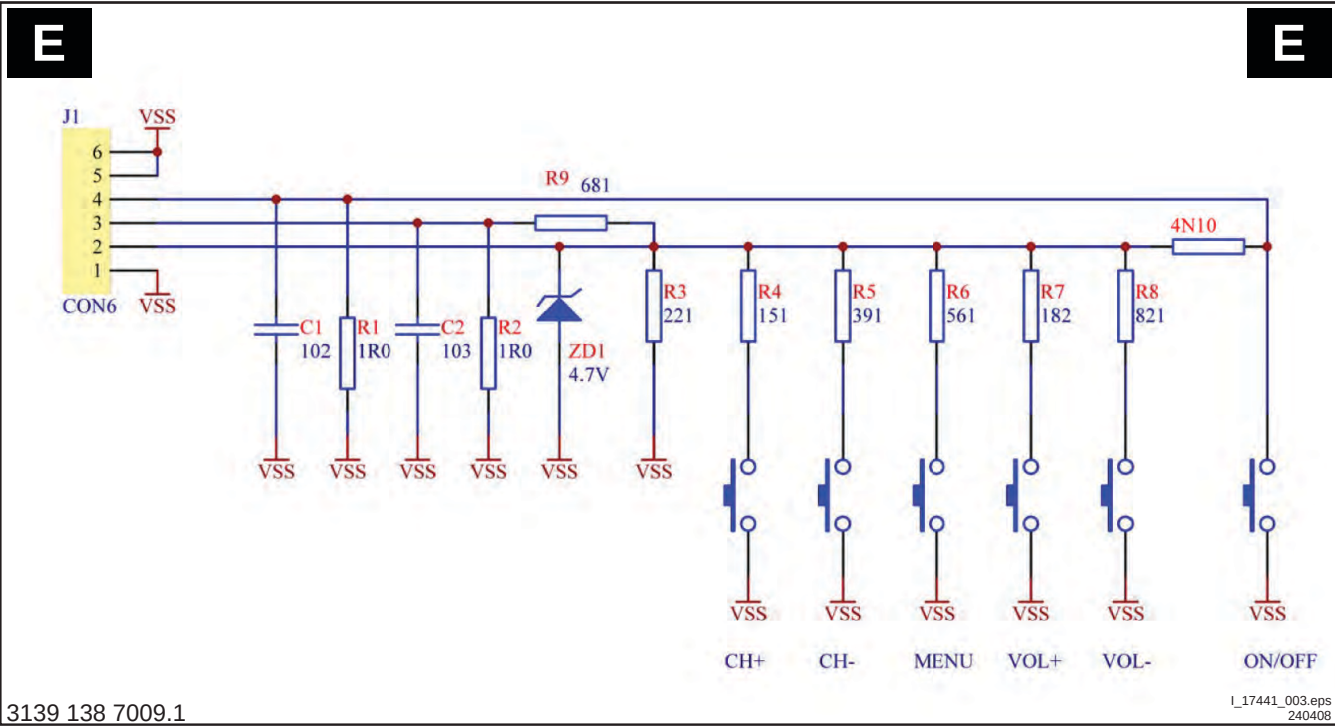
Layout Small Signal Board (Part 4 Bottom Side)



Keyboard Control Panel



Keyboard Control Panel



Layout Keyboard Control Panel



Obverse copper layer



Obverse character layer



Inverse copper layer



Inverse character layer

Layout Keyboard Control Panel



Obverse copper layer



Obverse character layer

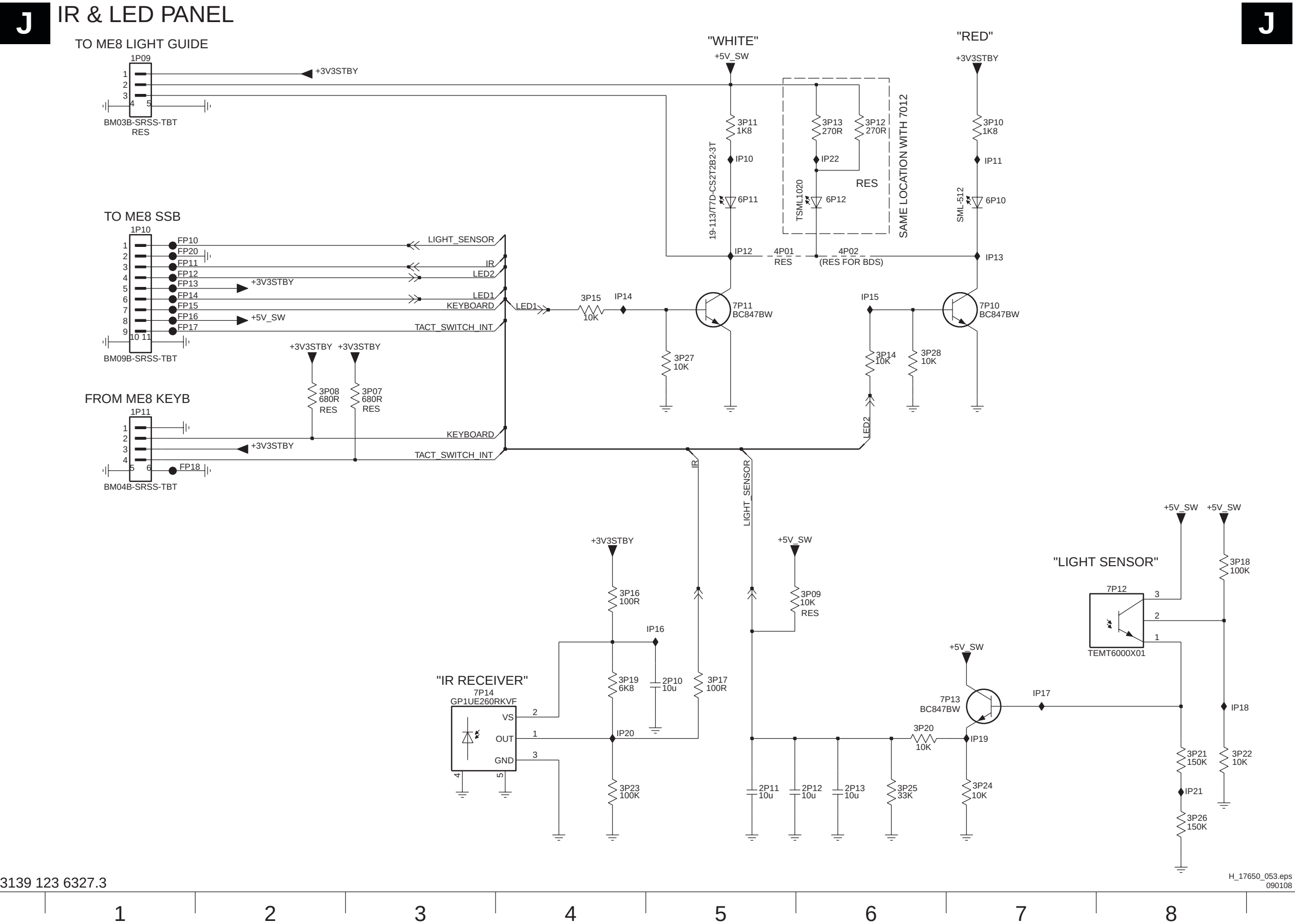


Inverse copper layer



Inverse character layer

IR & LED Panel



- 1P09 A1
- 1P10 B1
- 1P11 C1
- 2P10 E5
- 2P11 E5
- 2P12 E6
- 2P13 E6
- 3P07 C3
- 3P08 C2
- 3P09 D6
- 3P10 A7
- 3P11 A5
- 3P12 A6
- 3P13 A6
- 3P14 B6
- 3P15 B4
- 3P16 D4
- 3P17 E5
- 3P18 D8
- 3P19 E4
- 3P20 E6
- 3P21 E8
- 3P22 E8
- 3P23 E4
- 3P24 E7
- 3P25 E6
- 3P26 E8
- 3P27 B5
- 3P28 B6
- 4P01 B5
- 4P02 B6
- 6P10 A7
- 6P11 A5
- 6P12 A6
- 7P10 B7
- 7P11 B5
- 7P12 D8
- 7P13 E7
- 7P14 E3
- FP10 B1
- FP11 B1
- FP12 B1
- FP13 B1
- FP14 B1
- FP15 B1
- FP16 B1
- FP17 B1
- FP18 C1
- FP20 B1
- IP10 A5
- IP11 A7
- IP12 B5
- IP13 B7
- IP14 B4
- IP15 B6
- IP16 D5
- IP17 E7
- IP18 E8
- IP19 E7
- IP20 E4
- IP21 E8
- IP22 A6

[illegible]

8. Alignments

Index of this chapter:

- 8.1 General Alignment Conditions
- 8.2 Hardware Alignments
- 8.3 Software Alignments
- 8.4 Option Settings

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

General: The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5. Menu navigation is done with the CURSOR UP, DOWN, LEFT or RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage (depends on region):
 - AP-NTSC: 120 V_{AC} or 230 V_{AC} / 50 Hz (± 10%).
 - AP-PAL-multi: 120 - 230 V_{AC} / 50 Hz (± 10%).
 - EU: 230 V_{AC} / 50 Hz (± 10%).
 - LATAM-NTSC: 120 - 230 V_{AC} / 50 Hz (± 10%).
 - US: 120 V_{AC} / 60 Hz (± 10%).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND).

Caution: It is not allowed to use heatsinks as ground.
- Test probe: Ri > 10 Mohm, Ci < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

8.2 Hardware Alignments

There are no hardware alignments foreseen for this chassis.

8.3 Software Alignments

With the software alignments of the Service Alignment Mode (SAM), the RGB alignments can be performed:

- white tone (warm, normal, cool)
- black level offset

8.3.1 RGB Alignment

Before alignment, in customer menu, choose "Movie" as predefined picture and sound setting ("Auto Mode" button on RC). Also in customer menu "TV menu" > "TV settings" > "Picture", set

- "Active Control" to "Off"
- "Color Enhancement" to "Off"
- "Dynamic Contrast" to "Off"
- "DNR" to "Off".

White Tone Alignment:

- Activate SAM
- Select "RGB Align"
- Use a 75% white screen (Fluke 54200) or "Flat73" (Quantum Data 802BT) as input signal and set the following values:
 - All "R/G/B Gain" values initial to "128" (maximum).
 - All "R/G/B Offset" values (blacklevel) to "0".

In case you have a color analyzer:

- Measure with a calibrated (phosphor- independent) color analyzer (e.g. Minolta CA-210) in the centre of the screen. Consequently, the measurement needs to be done in a dark environment.
- Adjust the correct x,y coordinates (while holding one of the White point registers R, G or B on "128") by means of decreasing the value of one or two other white points to the correct x,y coordinates (see table "White D alignment values"). Tolerance: dx: ± 0.004, dy: ± 0.004.
- Repeat this step for the other color Temperatures that need to be aligned.
- Select "Store" in the "RGB Align" menu to store the aligned values to the NVM.

Table 8-1 White D alignment values

Value	Cool (11500 K)	Normal (9000 K)	Warm (6500 K)
x	0.276	0.289	0.314
y	0.277	0.291	0.319

If you do **not** have a color analyzer, you can use the default values. This is the next best solution. The default values are average values coming from production (statistics).

- Set the "R/G/B Gain" default values per temperature according to the values in the "Tint settings" table.
- Select "Store" in the "RGB Align" menu to store the aligned values to the NVM.

Table 8-2 Tint settings (default values)

Alignment	32"	42"	47"	52"
WARM_RED	127	127	127	127
WARM_GREEN	73	98	96	88
WARM_BLUE	61	96	86	59
NORMAL_RED	127	123	127	127
NORMAL_GREEN	81	117	105	96
NORMAL_BLUE	94	123	120	90
COOL_RED	127	99	115	126
COOL_GREEN	87	99	103	99
COOL_BLUE	115	127	127	110

Black Level Offset Alignment

- Activate SAM.
- Select "RGB Align" and choose a temperature.
- For each temperature, the "R/G/B Offset" value should be set to "0".
- Select "Store" in the "RGB Align" menu to store the aligned values to the NVM.

8.4 Option Settings

8.4.1 Introduction

The microprocessor communicates with a large number of I²C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence/absence of these specific ICs (or functions) is made known by the option codes.

Notes:

- After changing the option(s), save them with the “Store” command.
- The new option setting becomes active after the TV is switched "off" and "on" again with the mains switch (the NVM is then read again).

8.4.2 How To Set Option Codes

When the NVM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set all option numbers. You can find the correct option numbers in table “Option Codes OP1...OP10“ below.

How to Change Options Codes

An option code (or “option byte”) represents eight different options (bits). When you change these numbers directly, you can set all options very quickly. All options are controlled via ten option bytes (OP1... OPA).
Activate SAM and select “Options”. Now you can select the option byte (OP#1.. OP#A) with the CURSOR UP/ DOWN keys, and enter the new 3 digit (decimal) value. For the correct factory default settings, see the next table “Option code overview“. For more detailed information, see the next tables “Option codes at bit level“. If an option is set (value “1”), it represents a certain decimal value.
When all the correct options (bits) are set, the sum of the decimal values of each Option Byte (OP) will give the option code.

Table 8-3 Option code overview

CTN/Model nr.	Option Code	Display (Code)
32PFL3403D/85	065 123 094 248 006 106 000 000 000 004	LC320WXN (136)
32PFL5403D/27	065 123 094 248 006 106 000 000 000 004	LC320WXN (136)
32PFL5413D/85	065 123 094 248 006 106 000 000 000 004	LC320WXN (136)
42MF438B/27	064 091 086 248 006 002 000 000 000 002	LC420WUE (130)
42PFL3403D/27	065 123 094 248 006 106 000 000 000 002	LC420WXE (138)
42PFL3603D/27	065 123 094 248 006 106 000 000 000 002	LC420WUE (130)
42PFL5403D/85	065 123 094 248 006 106 000 000 000 000	LC420WXE (138)
42PFL5603D/27	195 123 094 248 006 106 000 000 000 000	LC420WUE (130)
42PFL7403D/27	201 123 094 248 006 106 000 000 000 001	LC420WUF (142)
42PFL7603D/27	233 123 094 248 006 122 000 000 000 001	LC420WUF (142)
42TA648BX/37	065 123 094 248 006 106 000 000 000 000	LC420WUE (130)
47MF438B/27	064 091 086 248 006 002 000 000 000 002	LC470WUE (135)
47PFL3603D/27	065 123 094 248 006 106 000 000 000 002	LC470WUE (135)
47PFL5603D/27	195 123 094 248 006 106 000 000 000 000	LC470WUE (135)
47PFL7403D/27	201 123 094 248 006 106 000 000 000 001	LC470WUF (137)
47PFL7603D/27	233 123 094 248 006 122 000 000 000 001	LC470WUF (137)
47TA648BX/37	065 123 094 248 006 106 000 000 000 000	LC470WUE (135)
52MF438B/27	064 091 086 248 006 002 000 000 000 002	LK520D3LZ83 (158)
52PFL3603D/27	065 123 094 248 006 106 000 000 000 002	LK520D3LZ83 (158)
52PFL5603D/27	195 123 094 248 006 106 000 000 000 000	LK520D3LZ83 (158)
52PFL7403D/27	201 123 094 248 006 106 000 000 000 001	LK520D3LZ93 (151)
52PFL7603D/27	233 123 094 248 006 122 000 000 000 001	LK520D3LZ93 (151)
52TA648BX/37	065 123 094 248 006 106 000 000 000 000	LK520D3LZ83 (158)

Option Bit Overview

Below find an overview of the Option Codes on **bit** level.

Table 8-4 Option codes at bit level (OP1-OP4)

Option Byte & Bit	Dec. Value	Option Name	Description
Byte OP1			
Bit 7 (MSB)	128	OPC_MT8280	ON = MT8280 is available OFF = MT8280 is not available, i.e. DFI is used in case 120Hz (MJC) is enabled
Bit 6	64	OPC_VIRGIN_MODE	ON = Virgin Mode (PNP) is available OFF = Virgin Mode (PNP) is not available
Bit 5	32	OPC_AMBILIGHT_2	0 = AmbiLight is not available
Bit 4	16	OPC_AMBILIGHT	1 = Mono AmbiLight is available 2 = Stereo AmbiLight is available 3 = Reserved
Bit 3	8	OPC_MJC_120HZ_2	0 = MJC (120Hz) is not available
Bit 2	4	OPC_MJC_120HZ	1 = MJC (120Hz) for 768p is available (OP11 must ON too) 2 = MJC (120Hz) for 1080p is available (OP11 must ON too) 3 = Reserved
Bit 1	2	OPC_MJC_60HZ	ON = MJC (60Hz) is available OFF = MJC (60Hz) is not available
Bit 0 (LSB)	1	OPC_PHILIPS	ON = Philips set OFF = Magnavox set
Byte OP2			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	OPC_SHOP_MODE	ON = Shop mode is available OFF = Shop mode is not available
Bit 5	32	OPC_LIGHT_SENSOR	ON = Light Sensor is available (ActiveControl= OFF, ON, ON w Light sensor) OFF = Light Sensor is not available (ActiveControl= OFF, ON)
Bit 4	16	OPC_BACKLIGHT_BOOST	ON = Backlight boosting is available OFF = Backlight boosting is not available
Bit 3	8	OPC_BACKLIGHT_DIMMING	ON = Backlight Dimming is available OFF = Backlight Dimming is not available
Bit 2	4	Reserved	Not Used (Reserved)
Bit 1	2	OPC_BBD	ON = Black Bar Detection is available OFF = Black Bar Detection is not available
Bit 0 (LSB)	1	OPC_WIDE_SCREEN	ON = TV is 16x9 set OFF = TV is 4x3 set (Provision)
Byte OP3			
Bit 7 (MSB)	128	OPC_HDMI_EASY	ON = HDMI Easy is available (Provision) OFF = HDMI Easy is not available (Provision)
Bit 6	64	OPC_CEC	ON = CEC is available OFF = CEC is not available
Bit 5	32	OPC_EPG	ON = EPG is available (Provision) OFF = EPG is not available (Provision)
Bit 4	16	OPC_VCHIP	ON = VChip is available (Provision) OFF = VChip is not available (Provision)
Bit 3	8	OPC_VIEW_FOR_YOU	ON = View for you feature is available OFF = View for you feature is not available
Bit 2	4	OPC_STEREO_DBX	ON = Stereo DBX detection is available (Provision) OFF = Stereo DBX detection is not available (Provision)
Bit 1	2	OPC_LIP_SYNC	ON = Lip Sync is available OFF = Lip Sync is not available
Bit 0 (LSB)	1	Reserved	Not Used (Reserved)
Byte OP4			
Bit 7 (MSB)	128	OPC_SideAV_SVHS	ON = SideAV SVHS is available OFF = SideAV SVHS is not available
Bit 6	64	OPC_SideAV_CVBS	ON = SideAV_CVBS is available OFF = SideAV_CVBS is not available
Bit 5	32	OPC_AV3_SVHS	ON = AV3_SVHS is available OFF = AV3_SVHS is not available
Bit 4	16	OPC_AV3_CVBS	ON = AV3_CVBS is available OFF = AV3_CVBS is not available
Bit 3	8	OPC_CVI2	ON = CVI2 is available OFF = CVI2 is not available
Bit 2	4	OPC_REGION_3	0 = NFATA
Bit 1	2	OPC_REGION_2	1 = EU, AP & LATAM
Bit 0 (LSB)	1	OPC_REGION	2 = Reserved 3 = Reserved 4 ~ 7 = Reserved

Table 8-5 Option codes at bit level (OP5-OPA)

Option Byte & Bit	Dec. Value	Option Name	Description
Byte OP5			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Reserved	Not Used (Reserved)
Bit 3	8	OPC_HDMI5	ON = HDMI5 is available OFF = HDMI5 is not available
Bit 2	4	OPC_HDMI4	ON = HDMI4 is available OFF = HDMI4 is not available
Bit 1	2	OPC_HDMI3	ON = HDMI3 is available OFF = HDMI3 is not available
Bit 0 (LSB)	1	OPC_VGA	ON = VGA is available OFF = VGA is not available
Byte OP6			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	OPC_MULTIMEDIA_PLAYER	ON = MultiMedia feature(i.e. Photo viewer & MP3 player) is available OFF = MultiMedia feature(i.e. Photo viewer & MP3 player) is not available
Bit 5	32	OPC_ECO_VIEW_MODE_DEMO	ON = Eco view mode demo is available OFF = Eco view mode demo is not available
Bit 4	16	OPC_AMBILIGHT_DEMO	ON = Ambilight demo is available OFF = Ambilight demo is not available
Bit 3	8	OPC_SS_DEMO	ON = Split Screen Demo is available OFF = Split Screen is not available
Bit 2	4	OPC_MP_ALIGN	ON = Using multi-point alignment for Gamma & White point (Provision) OFF = Using old way for Gamma (pre-defined) & White point alignment (Provision)
Bit 1	2	OPC_SYS_RECOVERY	ON = System Recovery is available OFF = System Recovery is not available
Bit 0 (LSB)	1	Reserved	Not Used (Reserved)
Byte OP7			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Reserved	Not Used (Reserved)
Bit 3	8	Reserved	Not Used (Reserved)
Bit 2	4	Reserved	Not Used (Reserved)
Bit 1	2	Reserved	Not Used (Reserved)
Bit 0 (LSB)	1	Reserved	Not Used (Reserved)
Byte OP8			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Reserved	Not Used (Reserved)
Bit 3	8	Reserved	Not Used (Reserved)
Bit 2	4	Reserved	Not Used (Reserved)
Bit 1	2	Reserved	Not Used (Reserved)
Bit 0 (LSB)	1	Reserved	Not Used (Reserved)
Byte OP9			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Reserved	Not Used (Reserved)
Bit 3	8	Tuner Profile_3	0 = US_ALPS TDQU
Bit 2	4	Tuner Profile_2	1 = Not Used (Reserved)
Bit 1	2	Tuner Profile_1	2 = Not Used (Reserved)
Bit 0 (LSB)	1	Tuner Profile_0	3 = Not Used (Reserved)
			4 = Not Used (Reserved)
			5 = Not Used (Reserved)
			6 = Not Used (Reserved)
			7 = Not Used (Reserved)
			8 = Not Used (Reserved)
			9 = Not Used (Reserved)
			10 = Not Used (Reserved)
Byte OPA			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Cabinet Profile_4	0 = Cabinet_Profile_0_42_ME8
Bit 3	8	Cabinet Profile_3	1 = Cabinet_Profile_1_47_MAG8
Bit 2	4	Cabinet Profile_2	2 = Cabinet_Profile_2_32_ME8
Bit 1	2	Cabinet Profile_1	3 = Cabinet_Profile_3_Supernova
Bit 0 (LSB)	1	Cabinet Profile_0	4 = Cabinet_Profile_4
			5 = Cabinet_Profile_5
			6 = Cabinet_Profile_6
			7 = Cabinet_Profile_7
			8 = Cabinet_Profile_8
			9 = Cabinet_Profile_9
			10

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

Index of this chapter:

- 9.1 Introduction
- 9.2 LCD Power Supply
- 9.3 DC/DC converters
- 9.4 Front-End
- 9.5 Video Processing
- 9.6 Audio Processing
- 9.7 HDMI
- 9.10 Abbreviation List
- 9.11 IC Data Sheets

Notes:

- Only **new** circuits (circuits that are not published recently) are described.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the Wiring, Block (chapter 6) and Circuit Diagrams (chapter 7). Where necessary, you will find a separate drawing for clarification.

Some key components are:

- Main processor (MT5382): audio/video processing.
- Motion estimation/compensation engine (MT8280) (in some sets).
- FPGA; I²C output to AmbiLight modules (in some sets).
- HDMI demultiplexer (SIL9185) for driving 4 HDMI connectors.
- Standby controller (WT61P7) for overall power management.
- Analog IF-PLL demodulator (TDA9886).
- Audio class-D amplifier (TDA8932).

9.1.1 Features

- Hybrid NTSC/ATSC tuner.
- 3+1 HDMI v1.3, supporting CEC.
- USB 2.0.
- Digital Natural Motion (DNM) (in some sets).
- Double Frame Rate (120 Hz) (in some sets).
- 2-sided AmbiLight (in some sets).
- PSU directly drives the backlight units (no inverters needed).

9.1 Introduction

The LC8.1U chassis (development name "LC08SP") is a newly developed platform using a "Mediatek" chipset. It covers screen sizes of 32" upto 52" with a new styling called "ME8" and "MG8". The MG8 is like the ME8 styling, however instead of a transparent flare, it has a in-mould color flare. Also the speakers are front firing as i.o. back-firing, and it comes w/o tweeters. The back cover construction is 95% same as ME8.

9.1.2 LC08SP Architecture Overview

For details of the chassis block diagrams refer to chapter "Block diagrams, Test Point Overview, and Waveforms". An overview of the LC08SP architecture can be found below.

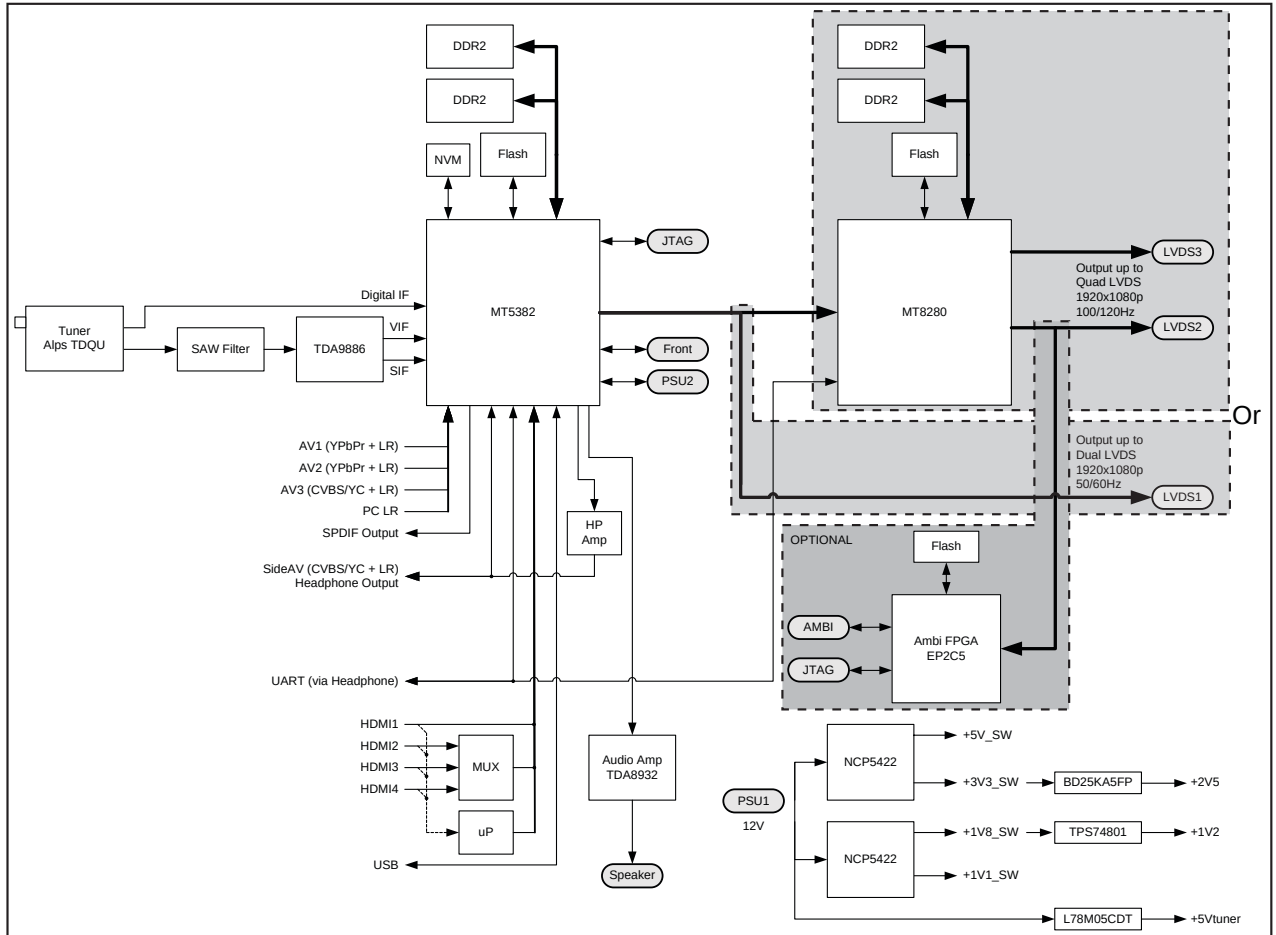


Figure 9-1 Architecture of LC08SP

9.1.3 SSB Cell Layout

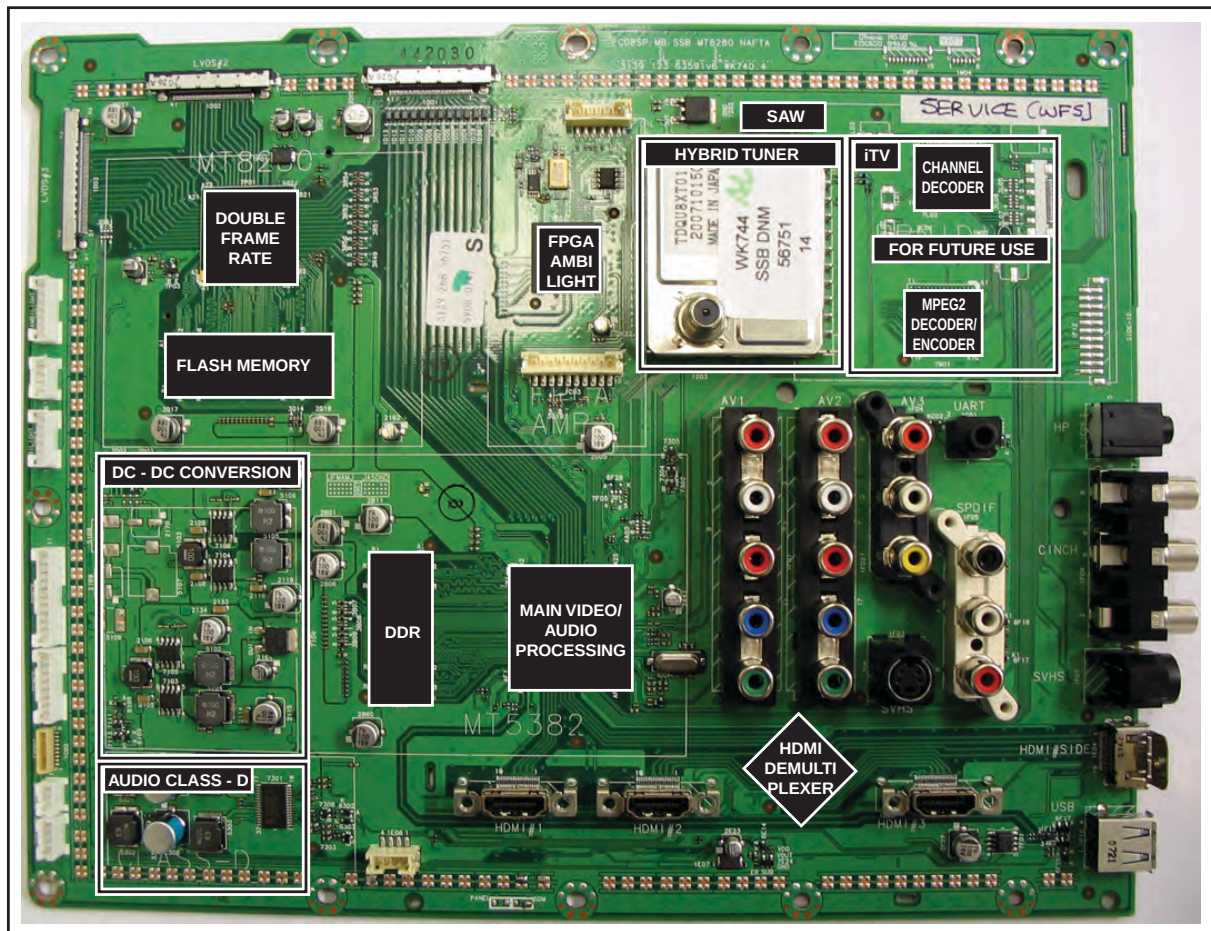
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Figure 9-2 SSB top view

9.2 LCD Power Supply

The Power Supply Unit (PSU) in this chassis is a buy-in and is a black-box for Service. When defective, a new panel must be ordered and the defective panel must be returned for repair, unless the main fuse of the unit is broken. Always replace the fuse with one with the correct specifications! This part is commonly available in the regular market.

Different PSUs are used in this chassis:

- 32" sets use a "Delta" PSU (DPS-182CP A)
- 42" sets use an "LG" PSU (LGIT PLHL-T721A or -T720A)
- 47" sets use an "LG" PSU (LGIT PLHL-T722A)
- 52" sets use a "Delta" PSU (DPS-411AP A).

Some Power Supply Units deliver also the high voltage to drive the backlight of the LCD panel (then called IPB= Integrated Power Board). These LCD panels come therefore without inverters. In addition, all PSU's deliver the following voltages to the chassis:

- High voltage to drive the backlight units (no inverters needed)
- +3V3_{STBY} to SSB
- +12 V_{display} to SSB
- +12 V_{audio} and -12 V_{audio} to SSB
- +12 V to DC-DC converters to SSB
- +12 V to Bolt-on Supply (where applicable) to SSB
- +24 V to Bolt-on Supply (where applicable) to SSB.

9.3 DC/DC converters

On-board DC-DC converters convert the +12 V coming from the PSU and deliver the following voltages:

- +5 V (+5V_{tuner})
- +5 V (+5V_{SW})
- +3.3 V (+3V3_{SW})
- +2.5 V (+2V5)
- +1.8 V (+1V8_{SW})
- +1.1 V (+1V1_{SW})
- +1.2 V (+1V2)

The power supply system consists on standby, switched, and regulated voltages. The Standby voltage, +3V3_{STBY}, will be available once AC supply is provided to the system. As for the other voltages, namely switched and regulated voltages, these are available once STANDBY signal is pulled "low" to allow other supplies from the PSU to turn "on". The switched supplies are generated from the main +12V supply, while the regulated supplies are derived from the switched supplies.

There are a number of detection circuits to detect the following supplies; +12V, +12V_{disp} and +3V3_{SW}. The +12V is the main supply voltage from the PSU that enables the switched voltages to be generated. The +12V_{disp} is the supply to the display timing controller, while the +3V3_{SW} is powering the microprocessor and its flash memory.

The following diagram shows the power supply architecture of the SSB:

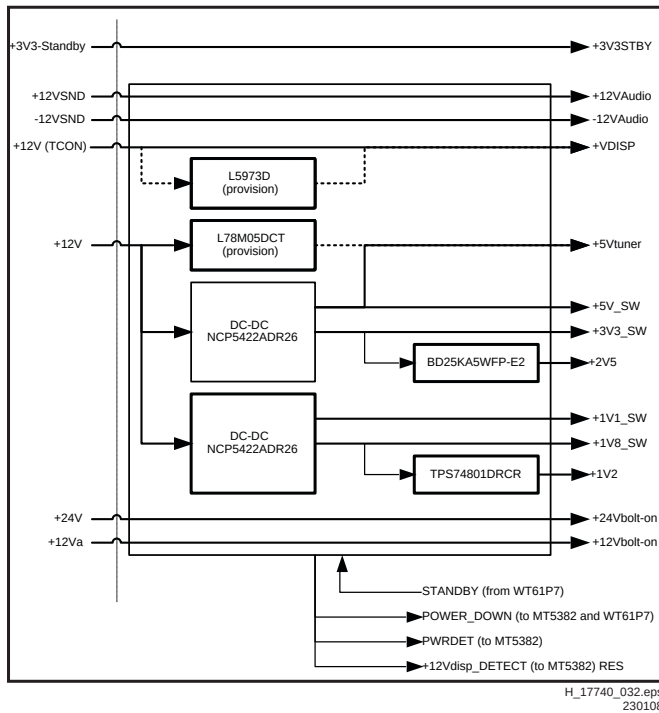


Figure 9-3 Power Supply Architecture

Control Signal Functions:

- **STANDBY**: Control of PSU to enable switched supplies, active "low", by Standby Controller WT61P7.
- **POWER_DOWN**: Signal to detect +12V presence, active "high".
- **PWRDET**: Signal to detect +3V3_SW presence for MT5382 operation, ADC operation.
- **+12Vdisp_DETECT**: Signal to detect +12Vdisp presence, active "high".

9.4 Front-End

All sets in this chassis use the "Alps TDQU" hybrid tuner. Refer to diagram B2 for details.

For analog reception, the signal from the tuner is processed by the MT5382 Main Processor via the M1971 SAW filter and TDA9886 Analog IF-PLL demodulator.

For digital reception, the signal from the tuner is processed directly by the MT5382 Main Processor.

In future ITV implementations, the MT5112 Channel Decoder and Prodiom MPEG2 decoder/encoder will be added (not implemented in this chassis).

Refer to figure "Front-end implementation" for details.

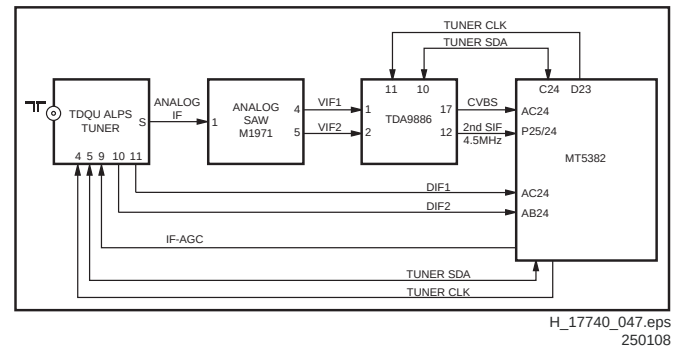
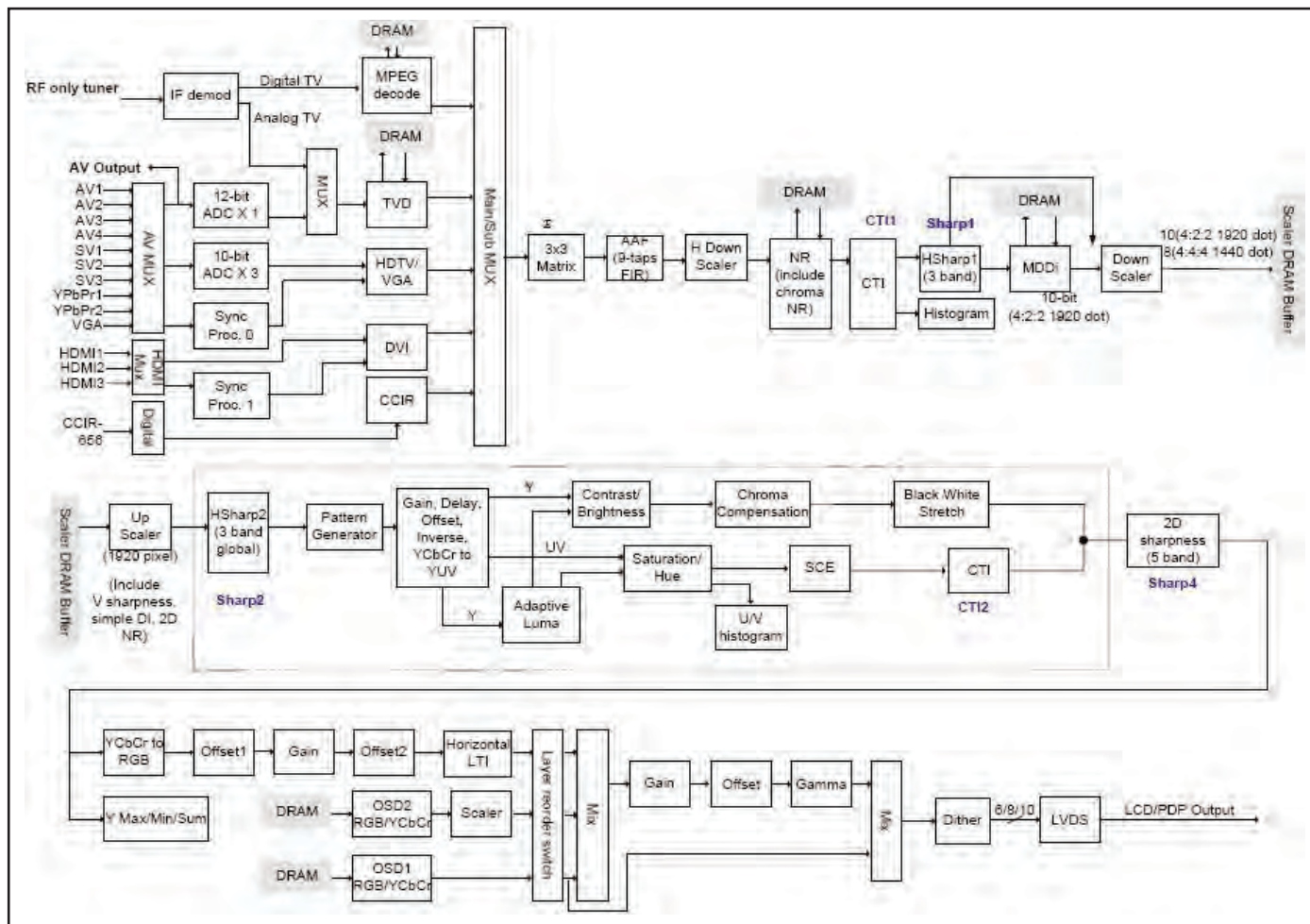


Figure 9-4 Front-end implementation

9.5 Video Processing

Both audio and video signals are processed by the MT5382 audio/video processor. Refer to diagram B4 for details.

In basic sets (sets without DNM/AmbiLight), the video signal is fed directly to the panel via an LVDS connector. Refer to figure "Video processing - basic sets" for details.

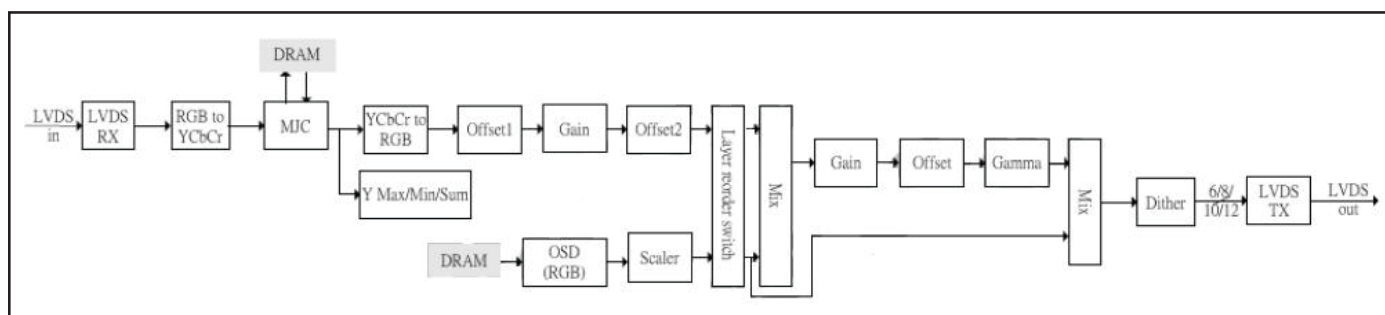


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Figure 9-5 Video processing - basic sets

In sets which support DNM/AmbiLight, the signal coming from the MT5382 audio/video processor is fed to the MT8280 motion engine with double frame rate output (120 Hz). Refer to

diagram B5R and figure "Video processing - DNM+AmbiLight using MT8280 Motion Engine)" for details.



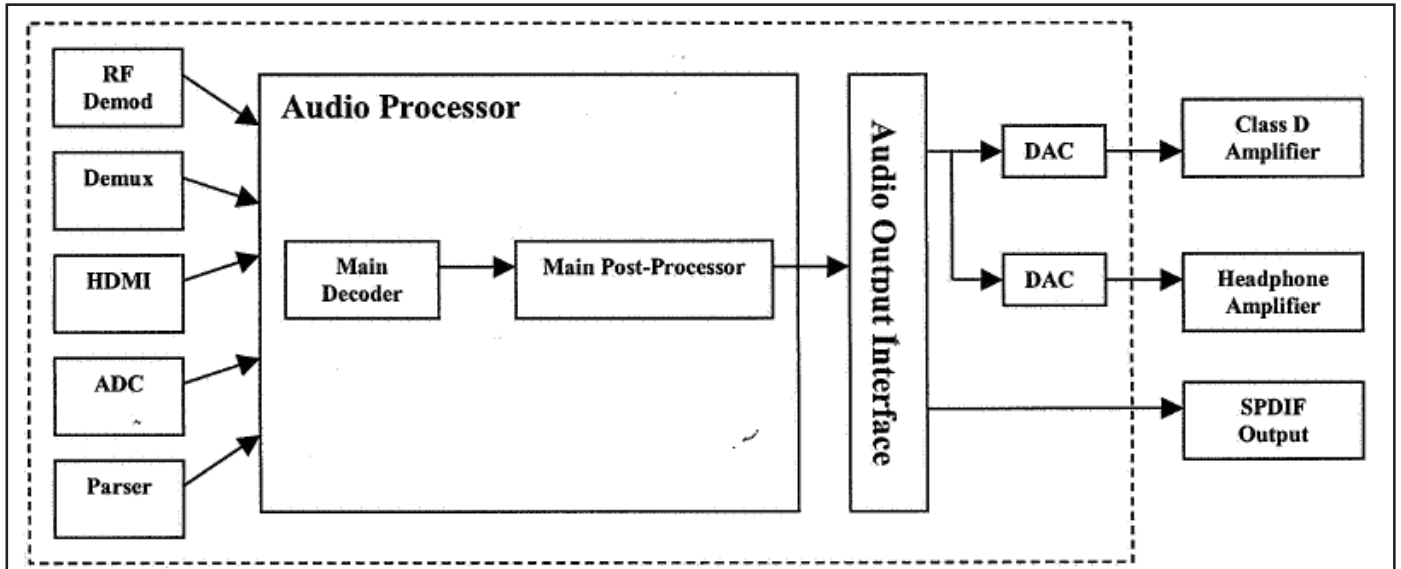
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Figure 9-6 Video processing - DNM+AmbiLight using MT8280 Motion Engine

9.6 Audio Processing

Both audio and video signals are processed by the MT5382 audio/video processor. Refer to diagram B4 for details.

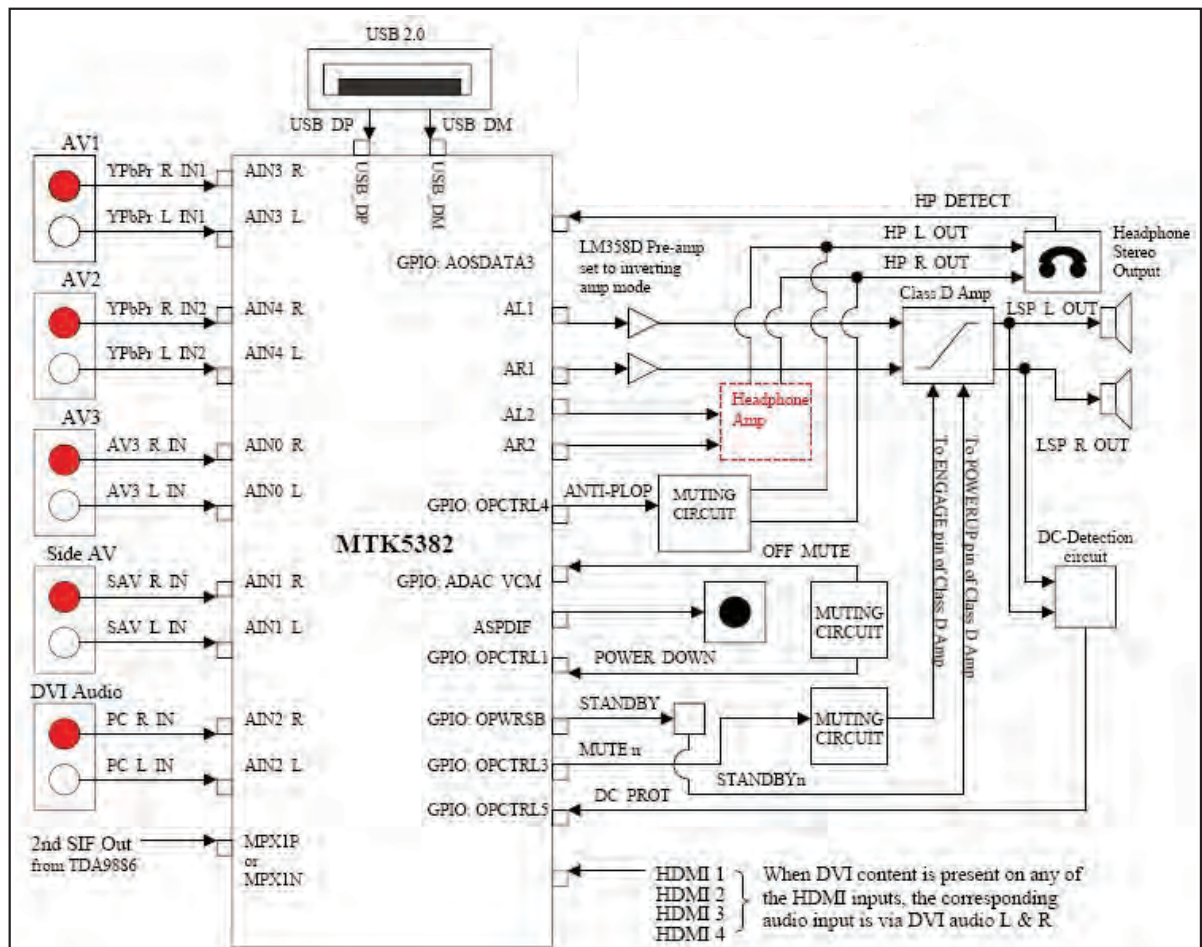
For the audio processing inside the audio/video processor, refer to figure "Functional blocks audio processing MT5382 audio/video processor" for details.



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Figure 9-7 Functional blocks audio processing MT5382 audio/video processing

For the implementation of the MT5382 audio/video processor for audio processing, refer to figure "Audio processing".



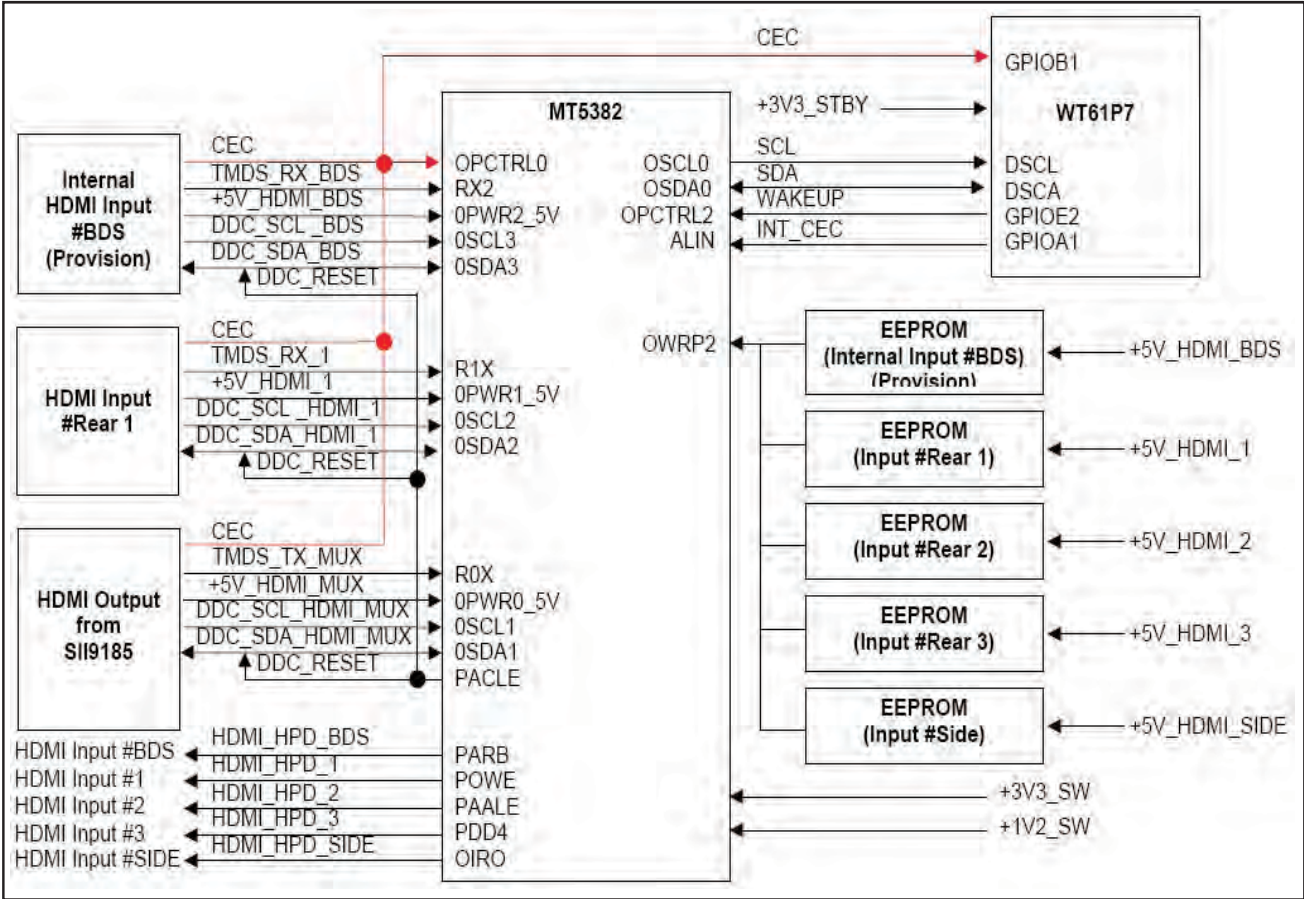
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Figure 9-8 Audio processing

9.7 HDMI

The MT5382 audio/video processor has three built-in HDMI receivers. An external HDMI switch (SII 9185) has been added to support a 4th HDMI connector.

The HDMI implementation supports CEC. The standby controller WT61P7 ensures CEC is also supported when set is in standby mode. Refer to figure “HDMI implementation” for details.



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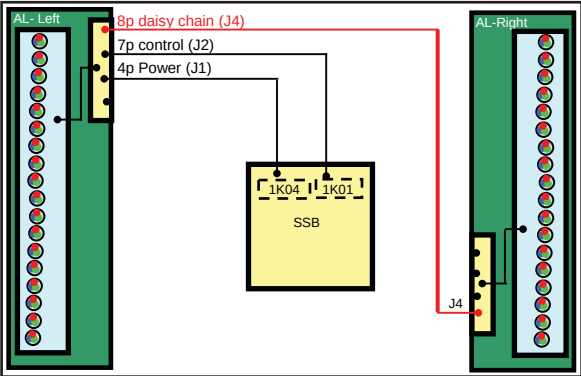
Figure 9-9 HDMI implementation

Note: if on one of the HDMI inputs a DVI signal is connected, the analog audio inputs near the HDMI3 connector are automatically selected as audio input source.

For the connector pin assignments, refer to the Wiring Diagram in chapter 6 “Block Diagrams, Test Points, and Waveforms”.

9.8 AmbiLight (when present)

The AmbiLight units are located in the back cover. Refer to figure “AmbiLight implementation” for details.

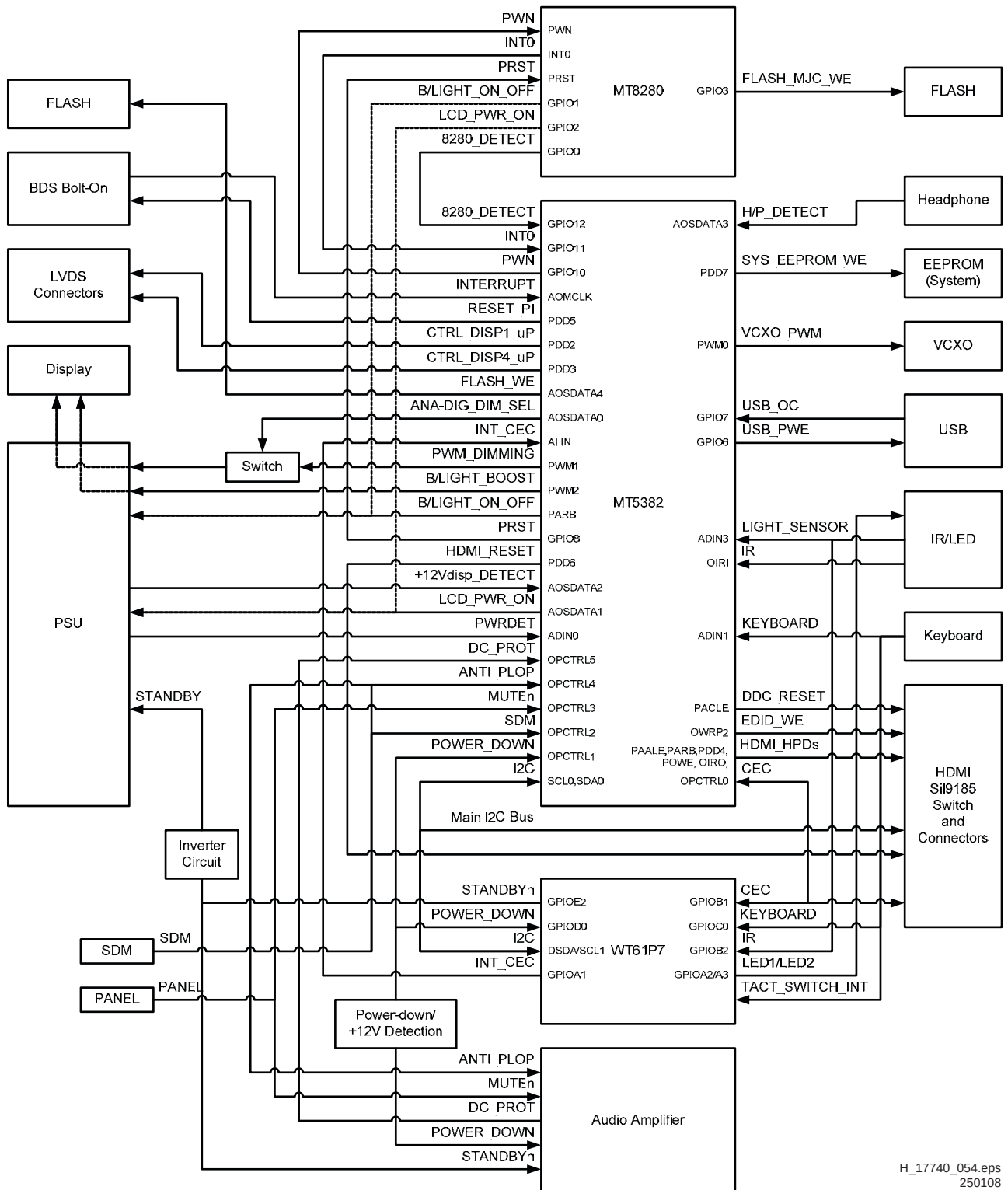


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Figure 9-10 AmbiLight implementation

9.9 Control Signal Description

The following diagram gives an overview of the control signal flow for the LC08SP platform.



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Figure 9-11 Control Signal flow diagram

The following GPIO table can be used for quick reference:

Table 9-1 GPIO Reference Table

Device	Pin	Symbol	Function	Reference	Type	Remarks
MT5382	C22	ALIN	INT_CEC	GPIO46	Input	Interrupt Port from Stby Controller
MT5382	A23	AOBCK	Reserved	GPIO49	N/A	Trap(0)
MT5382	B23	AOLRCK	Reserved	GPIO48	N/A	Trap(1)
MT5382	A24	AOMCLK	INTERRUPT	GPIO47	Input	Interrupt Port for BDS Bolt-On
MT5382	D22	AOSDATA0	ANA-DIG_DIM_SELECT	GPIO50	Output	Analog or Digital Dimming Selection
MT5382	C23	AOSDATA1	LCD_PWR_ON	GPIO51	Output	Vdisp On/Off Control Signal
MT5382	B24	AOSDATA2	+12VDISP_DETECT	GPIO52	Input	Display Power Detection
MT5382	A25	AOSDATA3	HEADPHONE_DETECT	GPIO53	Input	Headphone Detection Indicator
MT5382	B25	AOSDATA4	FLASH_WE	GPIO54	Output	Serial Flash Write Enable
MT5382	Y5	GPIO6	USB_PWE	GPIO6	Output	USB Power Enable
MT5382	AA4	GPIO7	USB_OC	GPIO7	Input	USB Over Current
MT5382	C19	GPIO8	PRST	GPIO8	Output	MT8280 Power On Reset
MT5382	A20	GPIO9	CHDEC_RESET	GPIO9	Output	Reset Signal for MT5112
MT5382	B19	GPIO10	PWN	GPIO10	Output	MT8280 Power Down Mode
MT5382	B18	GPIO11	INT0	GPIO11	Input	Interrupt from MT8280
MT5382	A18	GPIO12	8280_DETECT	GPIO12	Input	MT8280 Detection
MT5382	B17	GPIO13	ANA-DIG_AUD_SELECT	GPIO13	Output	Gain Selection to Pre-Amp (Reserved)
MT5382	AE1	OWRP2	EDID_WE	GPIO39	Output	WE for EDID EEPROMs
MT5382	U23	VCXO	UART_SELECT	GPIO67	Output	Service UART Selector (Reserved)
MT5382	C11	PAALE	HDMI_HPD_2	GPIO23	Output	HDMI Hotplug Detect for HDMI2
MT5382	D11	PACLE	DDC_RESET	GPIO24	Output	DDC Line Reset Signal
MT5382	E11	PARB	BACKLIGHT_ON_OFF	GPIO21	Output	LCD Backlight On/Off Control
MT5382	B9	PDD2	CTRL_DISP1_uP	GPIO25	Output	Display Control (Reserved)
MT5382	E10	PDD3	CTRL_DISP4_uP	GPIO26	Output	Display Control (Reserved)
MT5382	D10	PDD4	HDMI_HPD_3	GPIO27	Output	HDMI Hotplug Detect for HDMI3
MT5382	C10	PDD5	RESET_PI	GPIO28	Output	Reset Signal for Prolidom
MT5382	B10	PDD6	HDMI_RESET	GPIO29	Output	Reset Signal for SiI9185
MT5382	A10	PDD7	SYS_EEPROM_WE	GPIO30	Output	WE for System EEPROM
MT5382	E9	POWE	HDMI_HPD_1	GPIO22	Output	HDMI Hotplug Detect for HDMI1
MT5382	D25	PWM0	Reserved	GPIO40	N/A	Trap(0)
MT5382	E20	PWM1	PWM_DIMMING	GPIO41	Output	PWM for Backlight Dimming / Trap(0)
MT5382	D20	PWM2	BACKLIGHT_BOOST	GPIO42	Output	LCD Backlight Boosting / Trap(0)
MT5382	AB14	OPCTRL0	CEC	GPIO200	N/A	HDMI CEC Line
MT5382	AC14	OPCTRL1	POWER_DOWN	GPIO201	Input	Power-down Indicator
MT5382	AD7	OPCTRL2	SDM	GPIO202	Input	SDM Mode Detection (Startup Only)
MT5382	AC7	OPCTRL3	MUTEn	GPIO203	Output	Audio Output Muting
MT5382	AD14	OPCTRL4	ANTI_PLOP	GPIO204	Output	Audio Anti-Plop Control / Trap(1)
MT5382	AC13	OPCTRL5	DC_PROT	GPIO205	Input	Audio Output DC Protection / Trap(1)
MT5382	E19	ORIO	HDMI_HPD_Side	GPIO43	Output	HDMI Hotplug Detect for HDMI Side
WT61P7	pin 9	GPIOB2	IR	Pin 9	Input	From IR Receiver
WT61P7	pin 10	GPIOB1	CEC	Pin 10	N/A	HDMI CEC Line
WT61P7	pin 19	GPIOC0	KEYBOARD	Pin 19	Input	Key Control (Ladder Circuit) Input
WT61P7	pin 20	DSDA1	SDA	Pin 20	N/A	Data Line to SDA Bus
WT61P7	pin 21	DSCL1	SCL	Pin 21	N/A	Clock Line to SCL Bus
WT61P7	pin 24	GPIOA3	LED1	Pin 24	Output	Main LED (White) Control
WT61P7	pin 25	GPIOA2	LED2	Pin 25	Output	Standby LED (Red) Control
WT61P7	pin 26	GPIOA1	INT_CEC	Pin 26	Output	Interrupt Output to MT5382
WT61P7	pin 35	GIOD0	POWER_DOWN	Pin 35	Input	+12V Detection
WT61P7	pin 41	GPIOE2	STANDBYn	Pin 41	Output	Power Control Line (Inverted)

This section details the control signal descriptions. The control signals are classified by their respective functions as follows:

- System
- Audio
- Display
- HDMI
- USB.

9.9.1 System Control Signals

8280_DETECT

The 8280_DETECT signal is used to inform the MT5382 of the presence of MT8280.

FLASH_WE

The FLASH_WE signal is the write enable signal for the system flash IC. This signal is hardware-wise write enabled by default but is put to disabled after it is written with a valid software image file.

IR

The IR signal is an output from the remote control IR receiver. This signal is connected in parallel to both MT5382 and Standby Controller.

KEYBOARD

The KEYBOARD signal is a DC signal from the control board ladder circuit indicating which key has been pressed.

LED1

The LED1 control signal comes from the Standby Controller and its function is to control the ON mode LED. The ON mode LED is "White" in color and represents the status of the system, where it is "on" only in normal operation. A low signal turns on the LED, while a high signal turns off the LED.

LED2

The LED2 control signal controls the secondary LED, and is controlled by the Standby Controller. Similar, a low signal turns on the LED, while a high signal turns off the LED. The LED blinks in protection mode.

LIGHT_SENSOR

The LIGHT_SENSOR signal is an ADC input from the ambient light sensor. The converted digital value is used in video and picture quality improvement algorithms; refer to Video/PQ HSI for the details.

FLASH_MJC_WE

The MJC_FLASH_WE signal is the write enable signal for the MT8280 flash IC. This signal is hardware wise by default write enabled but is put to disabled after it is written with a valid software image file.

PANEL

The PANEL signal is used for service and is detected only at startup. When activated, the system will go into PANEL mode.

PWRDET

The PWRDET signal detects the power status of the +3V3 supply at startup. The usage of this signal is described in chapter 5 "Service Modes, Error Codes, and Fault Finding".

POWER_DOWN

The POWER_DOWN signal is an input from the power-down detection circuit. For the Standby Controller, this signal is used to detect the presence of +12V during the startup process.

SCL + SDA

I²C signals.

SDM

The SDM signal is used for service and is detected only at startup. When activated, the system will go into SDM mode.

STANDBYn

The STANDBYn signal is used to control the system power status, which is used to put the power supply unit to standby or normal operation. This signal is controlled by the Standby Controller.

SYS_EEPROM_WE

The SYS_EEPROM_WE signal is the write enable signal for the system EEPROM IC. The signal is connected to the active low Write Control pin of the EEPROM via a transistor inverter. This signal is only active when the system is conducting a write operation to the system EEPROM.

+12VDISP_DETECT (RESERVED)

The +12VDISP_DETECT signal is an input from the display timing controller power detection circuit. This signal is used to detect any power faults on the mentioned power line.

9.9.2 Audio Control Signals**ANTI_PLOP**

The ANTI_PLOP signal is used as an anti-plop control for the audio muting circuit.

DC_PROT

The DC_PROT signal is used to detect DC voltage level fault condition at the speaker output to send the system into protection in order to protect the audio amplifier and speakers.

HEADPHONE_DETECT

The HEADPHONE_DETECT signal is used to detect the presence of a headphone connection to the Side AV

headphone socket. When a headphone connection is detected, the speaker output should be muted.

MUTEn

The MUTEn signal is used as the mute control to the TDA8932BT class-D audio amplifier in an open drain application.

ANA-DIG_AUDIO_SELECT (RESERVED)

The ANA-DIG_AUDIO_SELECT signal is used as a gain selector for audio pre-amplifier. The purpose is to halve the gain in the case of digital inputs, which includes HDMI and digital TV inputs. The usage of this control signal is reserved, so it should be set as high impedance during normal operation.

9.9.3 Display Control Signals**ANA-DIG_DIM_SELECT (RESERVED)**

The ANA-DIG_DIM_SELECT control signal is used to select between digital PWM or analog DC backlight dimming method based on the display type (display option), by acting as a control signal to a 2:1 analog switch. By default, only digital PWM backlight dimming will be used. The analog DC backlight dimming is a provision for future displays which employs the latter methodology.

BACKLIGHT_BOOST

The BACKLIGHT_BOOST signal is a PWM output to the backlight boost circuit for display control.

BACKLIGHT_ON_OFF

The BACKLIGHT_ON_OFF signal is used to turn the display backlight on and off.

CTRL_DISP1_uP

The CTRL_DISP1_uP signal is reserved for use with SDI PDP display control. When other displays are used, this port should be tri-stated.

CTRL_DISP4_uP

The CTRL_DISP4_uP signal is reserved for use with FHP PDP display control. When other displays are used, this port should be tri-stated.

LCD_PWR_ON

The LCD_PWR_ON signal is used to turn the supply to the display timing controller board on and off.

PWM_DIMMING

The PWM_DIMMING signal is a PWM output to the backlight dimming circuit for display control.

9.9.4 HDMI Control Signals**HDMI_RESET**

The HDMI_RESET signal is used to reset the SiI9185 HDMI switch.

CEC

The CEC control signal is used as the system CEC control line. CEC is an AV systems control protocol derived from P50 adapted for HDMI control. This signal is connected to both MT5382 and the Standby Controller, with the latter handling the standby mode wake-up commands and the former handling all normal operation commands.

DDC_RESET

The DDC_RESET signal is used for HDMI DDC data reset purpose during HDMI signal detection.

EDID_WE

The EDID_WE signal is the WE signal for the HDMI EEPROM ICs. The signal is connected to the active low Write Control pin of the EEPROM via a transistor inverter. This signal is only used for the programming of EDID EEPROMs via MT5382. It is not used during normal operation mode.

HDMI_HPD_1

The HDMI_HPD_1 signal is used for resetting the HDMI source connected to HDMI1 during the hot plug process.

HDMI_HPD_2

The HDMI_HPD_2 signal is used for resetting the HDMI source connected to HDMI2 during the hot plug process.

HDMI_HPD_3

The HDMI_HPD_3 signal is used for resetting the HDMI source connected to HDMI3 during the hot plug process.

HDMI_HPD_SIDE

The HDMI_HPD_Side signal is used for resetting the HDMI source connected to Side HDMI during the hot plug process.

INT_CEC

The INT_CEC signal is the interrupt signal from WT61P7 to MT5382 for event notification. On the MT5382, an interrupt port is used to receive the notification.

9.9.5 USB Control Signals***USB_OC***

The USB_OC signal is an over-current indicator from the USB power switch.

USB_PWE

The USB_PWE signal is the enable signal for the USB power switch.

9.9.6 MT8280 Control Signals***PRST***

The PRST signal is the reset signal for MT8280.

PWN

The PWN signal is used to put the MT8280 into power down mode.

INT0

The INTERRUPT signal is reserved for interrupt signals from BDS bolt-on modules. For operational details, refer to BDS specifications.

9.10 Abbreviation List

1080i	1080 visible lines, interlaced	DVB(T)	Digital Video Broadcast; An MPEG2 based standard for transmitting digital audio and video. T= Terrestrial
1080p	1080 visible lines, progressive scan	DVD	Digital Versatile Disc
2CS	2 Carrier Sound	DVI	Digital Visual Interface
2DNR	Spatial (2D) Noise Reduction	DW	Double Window
3DNR	Temporal (3D) Noise Reduction	ED	Enhanced Definition: 480p, 576p
480i	480 visible lines, interlaced	EDID	Extended Display Identification Data (VESA standard)
480p	480 visible lines, progressive scan	EEPROM	Electrically Erasable and Programmable Read Only Memory
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeping up the original aspect ratio	EU	EUrope
AC	Alternating Current	EXT	EXTERNAL (source), entering the set by SCART or by cinches (jacks)
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page	FBL	Fast Blanking: DC signal accompanying RGB signals
ADC	analogue to Digital Converter	FBL-TXT	Fast Blanking Teletext
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency	FLASH	FLASH memory
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box	FM	Field Memory / Frequency Modulation
AM	Amplitude Modulation	FMR	FM Radio
AUO	Acer Unipack Optonics	FPGA	Field-Programmable Gate Array
AP	Asia Pacific	FRC	Frame Rate Converter
AR	Aspect Ratio: 4 by 3 or 16 by 9	FTV	Flat TeleVision
ASD	Automatic Standard Detection	H	H_sync to the module
AV	Audio Video	HD	High Definition: 720p, 1080i, 1080p
BDS	Broadcasting Data Services (used for EPG)	HDCP	High-bandwidth Digital Content Protection; A "key" encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a "snow vision" mode or changed to a low resolution. For normal content distribution, the source and the display device must be enabled for HDCP "software key" decoding
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz	HDMI	High Definition Multimedia Interface, digital audio and video interface
BTSC	Broadcast Television System Committee	HP	Head Phone
CAM	Conditional Access Module	I	Monochrome TV system. Sound carrier distance is 6.0 MHz
CBA	Circuit Board Assembly (or PWB)	I2C	Integrated IC bus
CEC	Consumer Electronics Control bus; remote control bus on HDMI connections	I2S	Integrated IC Sound bus
CI	Common Interface; E.g PCMCIA slot for a CAM in a set top box	IBO(Z)	Intelligent Bolt On module. Z= Zapper; module for DVB reception.
CL	Constant Level: audio output to connect with an external amplifier	IC	Integrated Circuit
CLUT	Color Look Up Table	IF	Intermediate Frequency
ComPair	Computer aided rePair	IPB	Integrated Power Board (PSU with integrated inverters to drive the LCD backlight)
COFDM	Coded Orthogonal Frequency Division Multiplexing; A multiplexing technique that distributes the data to be transmitted over many carriers	IR	Infra Red
CSM	Customer Service Mode	IRQ	Interrupt ReQuest
CVBS	Composite Video Blanking and Synchronization	Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customers wishes
CVBS-MON	CVBS monitor signal	LATAM	LATin America
CVBS-TER-OUT	CVBS terrestrial out	LC07	Philips chassis name for LCD TV 2007 project
CVI	Component Video Input	LCD	Liquid Crystal Display
DAC	Digital to analogue Converter	LED	Light Emitting Diode
DBE	Dynamic Bass Enhancement: extra low frequency amplification	L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
DC	Direct Current	LPL	LG Philips LCD
DDC	Display Data Channel; is a part of the "Plug and Play" feature	LS	Loud Speaker
DFU	Directions For Use: owner's manual	LVDS	Low Voltage Differential Signalling, data transmission system for high speed and low EMI communication.
DNR	Dynamic Noise Reduction	M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
DRAM	Dynamic RAM	MOSFET	Metal Oxide Semiconductor Field Effect Transistor
DSP	Digital Signal Processing		
DST	Dealer Service Tool: special (European) remote control designed for service technicians		
DTS	Digital Theatre Sound		

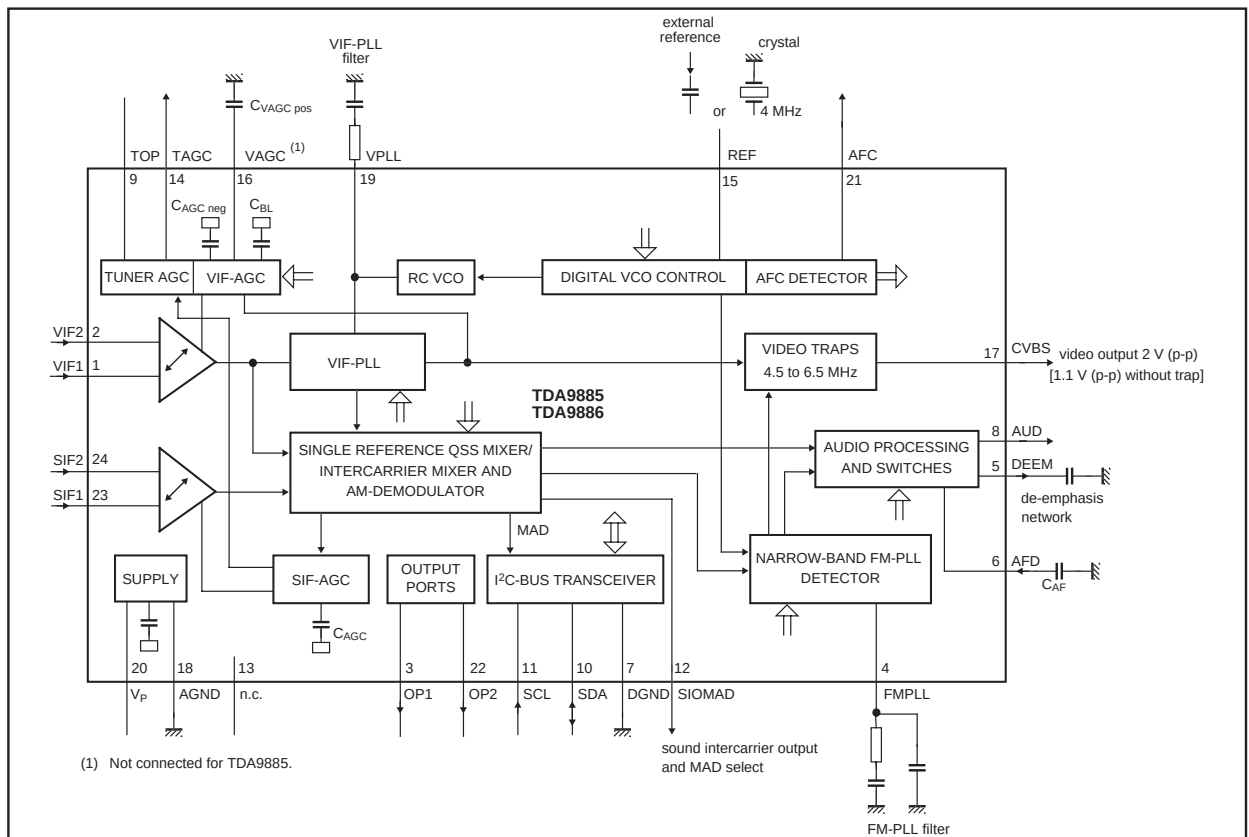
MPEG	Motion Pictures Experts Group	STBY	Stand-by
MSP	Multi-standard Sound Processor: ITT sound decoder	SVHS	Super Video Home System
MUTE	MUTE Line	SW	Sub Woofer / SoftWare / Switch
NAFTA	North American Free Trade Association: Trade agreement between Canada, USA and Mexico	THD	Total Harmonic Distortion
NC	Not Connected	TXT	Teletext
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, used mainly in Europe.	uP	Microprocessor
NTSC	National Television Standard Committee. Color system used mainly in North America and Japan. Color carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)	VL	Variable Level out: processed audio output toward external amplifier
NVM	Non Volatile Memory: IC containing TV related data (for example, options)	VCR	Video Cassette Recorder
O/C	Open Circuit	VGA	Video Graphics Array
ON/OFF LED	On/Off control signal for the LED	WD	Watch Dog
OAD	Over the Air Download	WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
OSD	On Screen Display	XTAL	Quartz crystal
PAL	Phase Alternating Line. Color system used mainly in Western Europe (color carrier = 4.433619 MHz) and South America (color carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)	YPbPr	Component video (Y= Luminance, Pb/Pr= Color difference signals B-Y and R-Y, other amplitudes w.r.t. to YUV)
PC	Personal Computer	Y/C	Video related signals: Y consists of luminance signal, blanking level and sync; C consists of color signal.
PCB	Printed Circuit Board (or PWB)	Y-OUT	Luminance-signal
PDP	Plasma Display Panel	YUV	Baseband component video (Y= Luminance, U/V= Color difference signals)
PIG	Picture In Graphic		
PIP	Picture In Picture		
PLL	Phase Locked Loop. Used, for example, in FST tuning systems. The customer can directly provide the desired frequency		
PSU	Power Supply Unit		
PWB	Printed Wiring Board (or PCB)		
RAM	Random Access Memory		
RC	Remote Control transmitter		
RC5 (6)	Remote Control system 5 (6), the signal from the remote control receiver		
RF	Radio Frequency		
RGB	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.		
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync		
ROM	Read Only Memory		
SAM	Service Alignment Mode		
SC	SandCastle: two-level pulse derived from sync signals		
SC1-OUT	SCART output of the MSP audio IC		
SC2-OUT	SCART output of the MSP audio IC		
S/C	Short Circuit		
SCL	Clock signal on I2C bus		
SD	Standard Definition: 480i, 576i		
SDA	Data signal on I2C bus		
SDI	Samsung Display Industry		
SDM	Service Default Mode		
SDRAM	Synchronous DRAM		
SECAM	SEquence Couleur Avec Memoire. Color system used mainly in France and Eastern Europe. Color carriers = 4.406250 MHz and 4.250000 MHz		
SIF	Sound Intermediate Frequency		
SMPS	Switch Mode Power Supply		
SND	SouND		
SOPS	Self Oscillating Power Supply		
S/PDIF	Sony Philips Digital InterFace		
SRAM	Static RAM		
SSB	Small Signal Board		

9.11 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.11.1 Diagram B2, Type TDA9886T (IC7201), Demodulator

Block Diagram



Pin Configuration

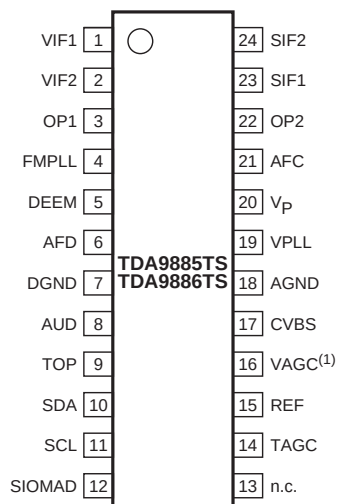
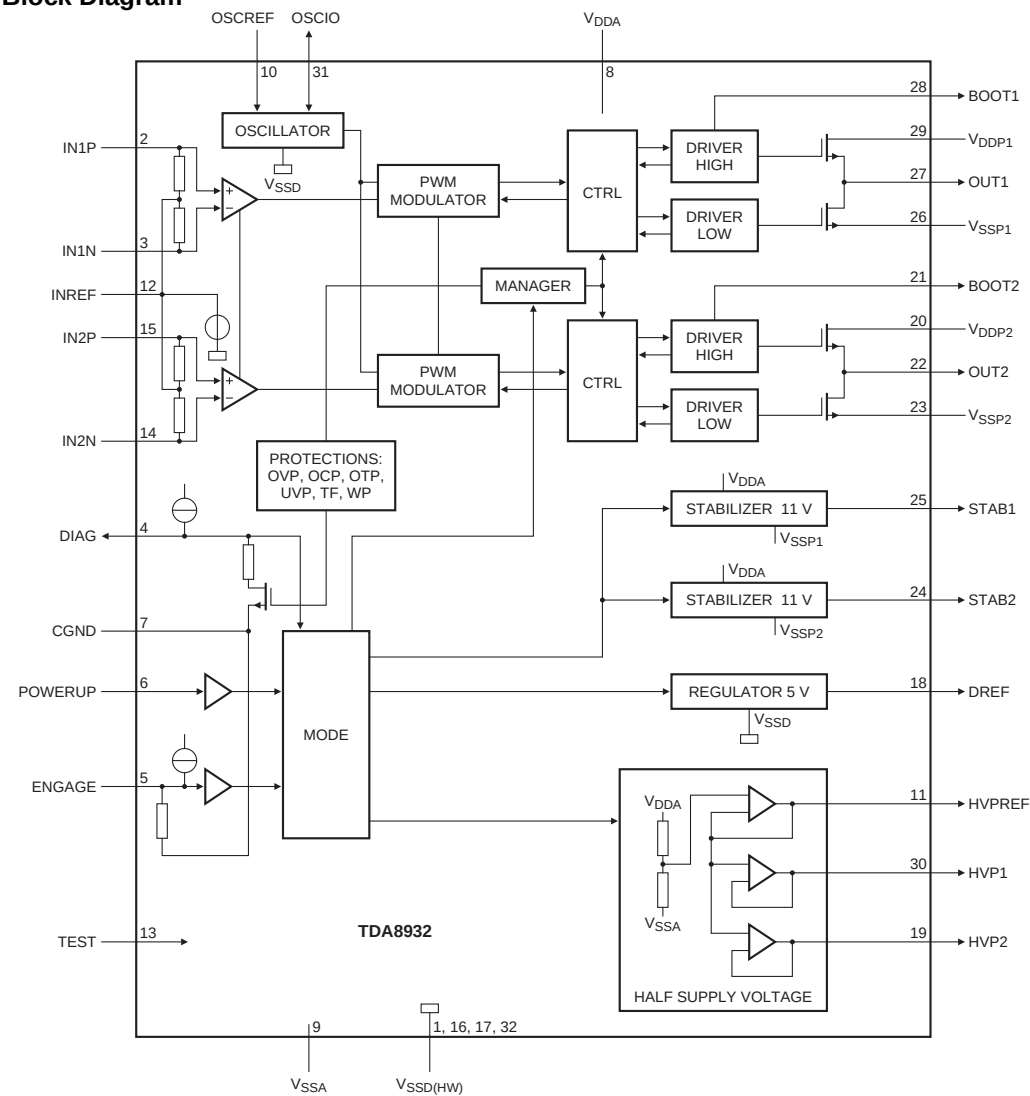


Figure 9-12 Internal block diagram and pin configuration

9.11.2 Diagram B3, Type TDA8932BT (IC7301), Class-D Audio Amplifier

Block Diagram



Pin Configuration

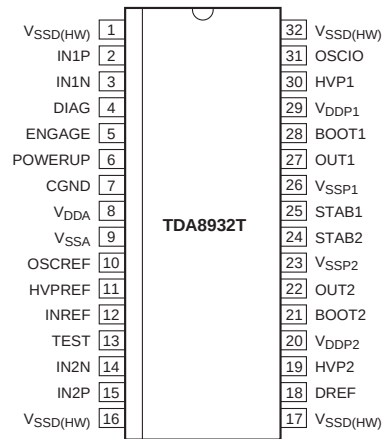
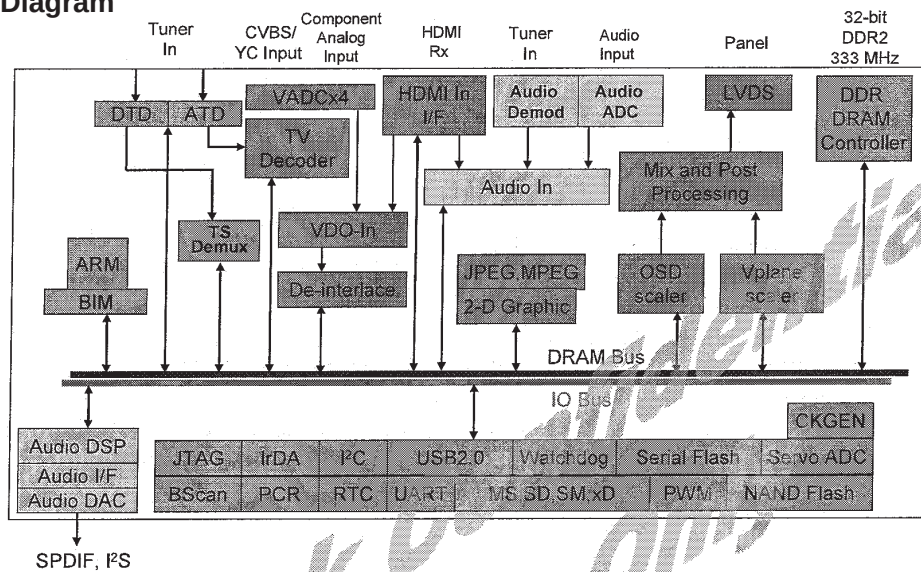


Figure 9-13 Internal block diagram and pin configuration

9.11.3 Diagram B4, Type MT5382 (IC7A01), Audio / Video Processor

Block Diagram



Pin Configuration

LT	1	2	3	4	5	6	7	8	9	10	11	12	13
A		VCC2IO	VCCK	VCCK	JTRST_	JTDO	JTMS	POOE_		PDD7	A0N	A1N	A2N
B	REXTUP	VCC2IO	VCC2IO	VCCK	VCCK	JTCK	JTDI	POCEL_	PDD2	PDD6	A0P	A1P	A2P
C	RDQ3	REXTDN	VCC2IO	VCC2IO	VCCK	VCCK	VCCK	POCE0_	PDD1	PDD5	PAALE	GPIO1	A4N
D	RDQ6	RDQ1	RDQ4	VCC2IO	VCC2IO	VCCK		JRTCK	PDD0	PDD4	PACLE	GPIO0	A4P
E	DVSS	RDQ5	RDQ0	RDQ7	VCC2IO	VCC2IO			POWE_	PDD3	PARB	AVDD33_L VDS	AVDD33_L VDS
F		RDQS0_	RDQS0	RDQ2	DVSS	VCC2IO				VCC3IO_3	VCC3IO_3		
G	RDQ12	RDQ51	RDQS1	RDQM1	RDQM0								
H	VCC2IO	RDQ8	RDQ15	RDQ11	VCC2IO	DVSS							
J		RDQ13	RDQ10	RDQ9	VCC2IO								
K	RRAS	RCLK0	RCLK0	RODT	RDQ14	DVSS							
L	RCAS	RA11	RCS	RA0	DVSS								
M		RA2	RA6	VCC2IO	RA4	RA8							
N	RA5	RA9	RA1	RA10	VCC2IO								
P	RA7	RA3	RA12	RBA0	RBA1	RWE							
R		RVREF	RVREF	RCKE	DVSS								
T	RDQ19	RDQ20	RDQ17	DVSS	RDQ21	RDQ21							
U	RDQ22	RDQ18	RDQ16	RDQ13	VCC2IO								
V		RDQ23	RDQ19	VCC2IO	RDQ24	RDQ25							
W	VCC2IO	RDQ28	RDQ26	RDQ27	DVSS								
Y	RDQ27	RDQ15	RDQ30	DVSS	GPIO6								
AA		RDQ14	RDQ41	GPIO7	VCC3IO_1								
AB	DVSS	OSCL1	VCC3IO_1	SE	AVDD33_L VDS	OPWR1_5V	AVDD12_C VCC						C_XREG
AC	PCER1	RCLK1	OSDA1	AVDD12_L VDS	ORSET	OPWR2_5V	OPCTRL3	EXT_RES	AVSS33_H DMI	AVSS33_H DMI	AVSS33_H DMI	AVDD33_H DMI	OPCTRL5
AD	OSCL2	OSDA2	AVSS33_L VDS	AVSS12_L VDS	OPWR5B	OPWR0_5V	OPCTRL2		AVSS33_H DMI	AVSS33_H DMI	AVSS33_H DMI	AVDD33_H DMI	
AE	OWRP2	OSDA3	USB_DM	RX2_CB	RX2_0B	RX2_1B	RX2_2B	RX1_CB	RX1_0B	RX1_1B	RX1_2B	RX0_CB	RX0_0B
AF	OSCL3	USB_VRT	USB_DP	RX2_C	RX2_0	RX2_1	RX2_2	RX1_C	RX1_0	RX1_1	RX1_2	RX0_C	RX0_0
LB	1	2	3	4	5	6	7	8	9	10	11	12	13

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Figure 9-14 Internal block diagram and pin configuration

9.11.4 Diagram B4E Type SIL9185 (IC7E18), HDMI Multiplexer

Block Diagram

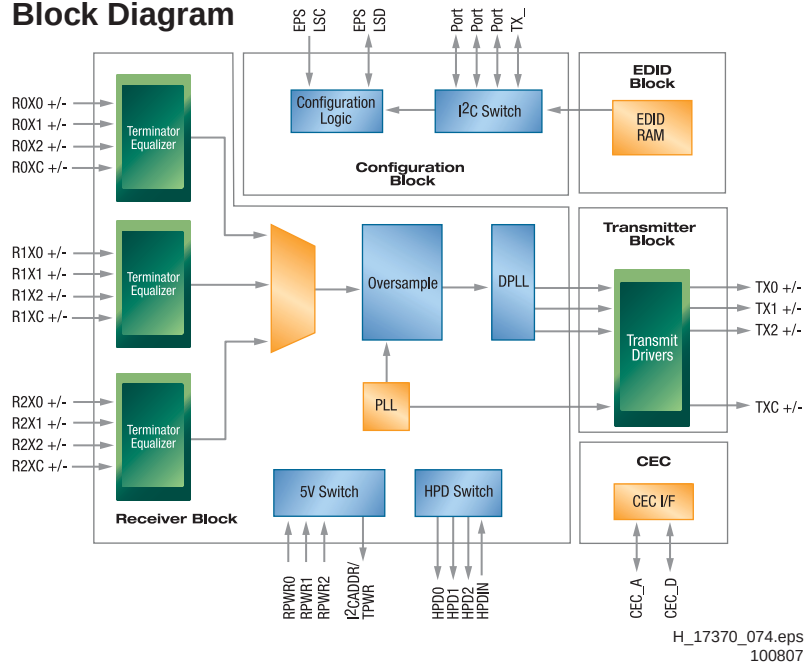


Figure 9-15 Internal block diagram

10. Spare Parts List

For the latest spare part overview, please consult the Philips Service website.

11. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- **All chapters:** Added 32PFL3403D/85, 32PFL5403D/27, 32PFL5413D/85, 42MF438B/27, 42PFL3403D/27, 42PFL3603D/27, 42PFL5403D/85, 42TA648BX/37, 47PFL3603D/27, 47TA648BX/37, 52MF438B/27, 52PFL3603D/27, 52PFL5603D/27
- **All chapters:** Some textual improvements.
- **Chapter 1:** Improved connection overview drawing.
- **Chapter 4:** Highlighted the importance of the cable tapes.
- **Chapter 5:** Info added on how to copy NVM data to and from USB stick.
- **Chapter 7:** Diagrams B7L and B7M indicated as "Reserved".
- **Chapter 8:** Tint settings table and Option code overview updated.

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