Evaluation Note

ADV7611 Evaluation Board

December 2013

Rev. A

Table of Contents

Table of Contents 3
1. Introduction 5
2. Evaluation Kit 5
3. Initial Hardware Configuration 6
4. Initial Hardware Configuration 7
4.1 XRC Installation 7
4.2 Loading/Unloading Boards 9
4.2.1 Loading a Board 9
4.2.2 Unloading a Board 10
4.3 Running Scripts 11
4.4 Other XRC Features 13
4.4.1 Register Control 13
5. The ADV7611 Evaluation Platform in Depth 14
5.1 Hardware Overview 14
5.1.1 Connectors 14
5.1.2 Jumpers 14
5.1.3 Switches & Buttons 15
5.1.4 Miscellaneous 15
5.2 Using the ADV7611 Evaluation Platform 17
5.2.1 Connecting an Input Video Source 17
5.2.2 Connecting to a Video Sink 17
5.2.3 Connecting an Input Audio Source 17
5.2.4 Connecting a headphone 17
5.2.5 Updating the Software Driver 18

5.2.6 Interfacing with the Software Driver 18

6. Appendix 1 – Schematics 21

7. Appendix 2 – Layout 31

8. Appendix 3 – Flash Magic 37

9. Appendix 4 – Downloading from FTP 38

10. Appendix 5 – Software Driver Controls 40

1. Introduction

This evaluation note is intended to provide application support for the ADV7611 evaluation board. It also provides details on the set up and manual configuration of the evaluation board. Software drivers are available for this evaluation board - a separate user guide is available for these software drivers.

This note applies to board revision B.

2. Evaluation Kit

The ADV7611 evaluation board kit should consist of the following:

1. ADV7611 Evaluation Board
2. 7.5V DC power supply module
3. USB cable

3. Initial Hardware Configuration

The ADV7611 evaluation board is a standalone evaluation platform used to demonstrate all features of the ADV7611 receiver. To assemble the platform, connect the female connector of the 7.5V DC power supply module supplied with the evaluation kit to the motherboard power connector, J8. To turn the evaluation platform on, flick the power switch (S5) to position “ON”. The green power LED (D8) should light.

Once the board is powered up, connect the USB cable supplied with the evaluation kit to USB connector, J1. The platform should now resemble Figure 1 and is ready to use.

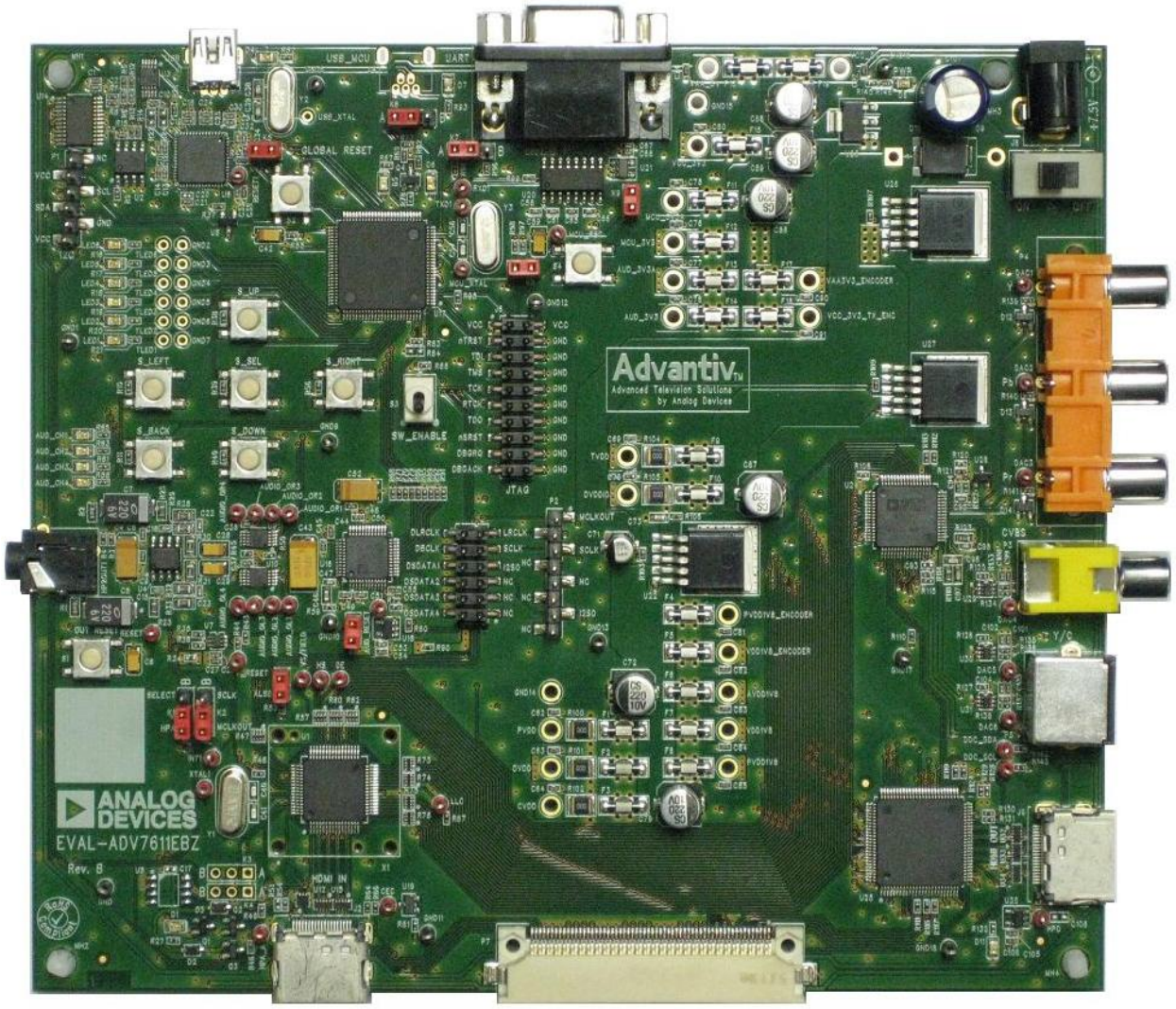


Figure 1 - ADV7611 Evaluation Platfor

4. Initial Hardware Configuration

4.1 XRC Installation

1. Run ADI_Install_XRC_x file (where x is the version number to be installed e.g. 1.5)
2. Review the license agreement and click “I Agree” if the terms of the agreement are acceptable
3. Select the desired access links – desktop shortcut and/or start menu shortcut (see Figure 2)

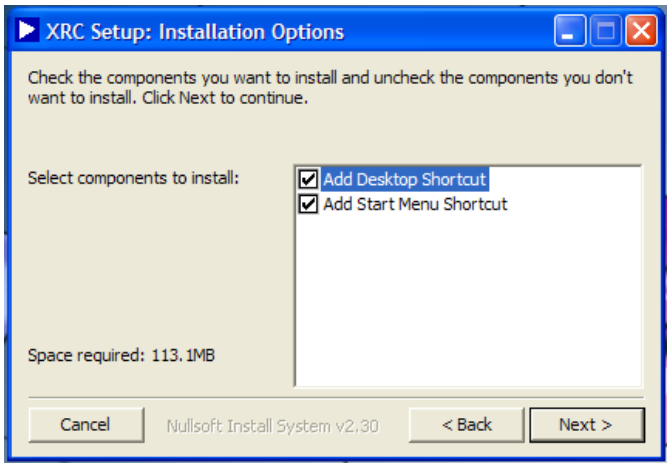


Figure 2 - Installation Options

4. Press “Next>”
5. Select the desired installation folder (see Figure 3)

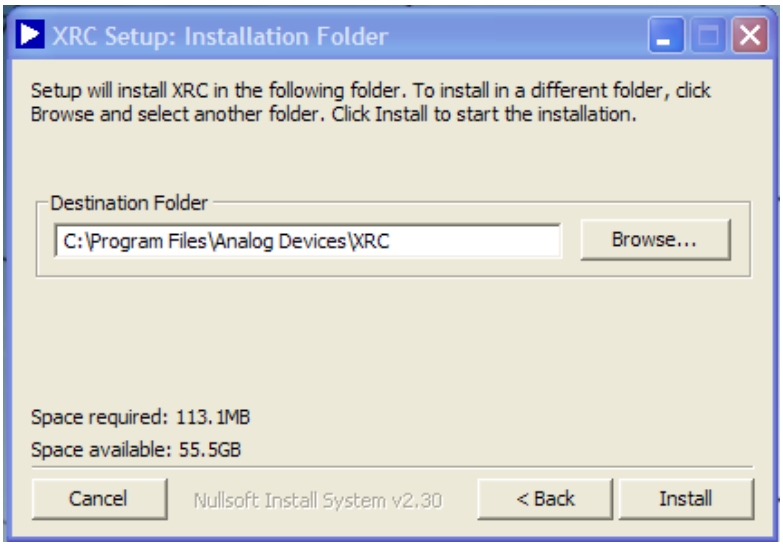


Figure 3 - Installation Folder

6. Press “Install”

7. When the install has completed, press “Close”

4.2 Loading/Unloading Boards

4.2.1 Loading a Board

The following steps must be performed to start a new XRC session by loading a new board.

1. Click “Choose Board…”
2. From the Board Selector window, select your attached system e.g. “ADV7611” as RX, “None” for MotherBoard and “ADV7511_ADV7341” for TX.
3. Click “Load”

Note: If the board is standalone, select the board in whichever window it is populated under (i.e. RX, Motherboard, TX) and leave the other windows at “None”.

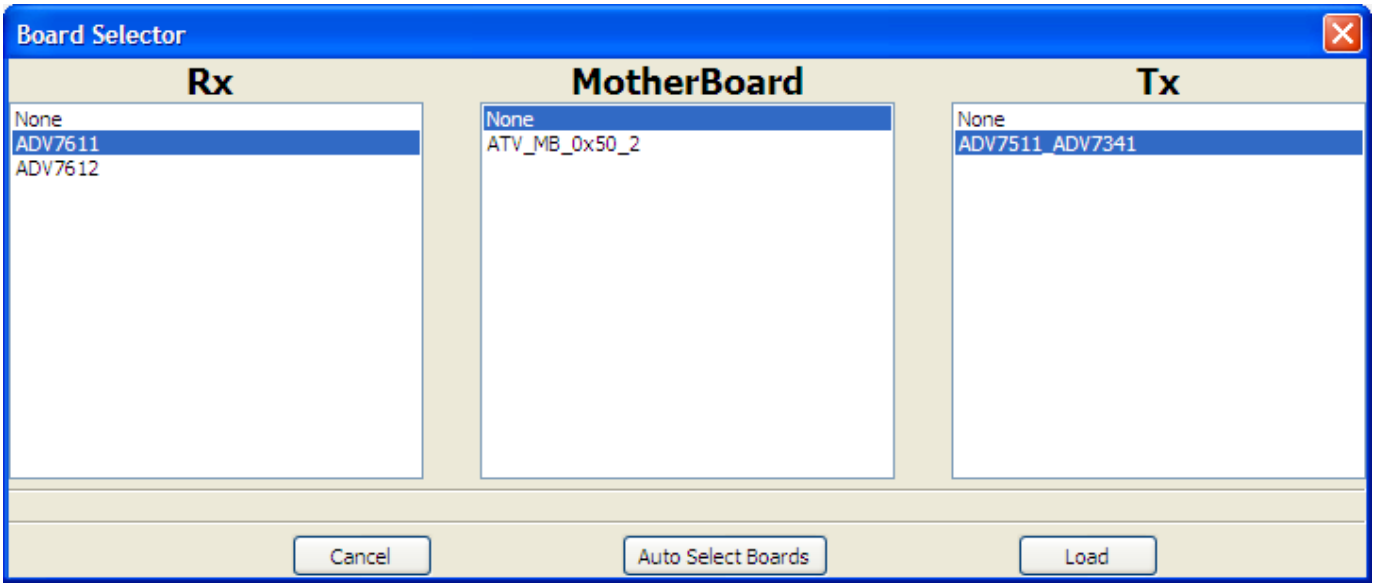


Figure 4 - Board Selector

4.2.2 Unloading a Board

The following steps must be performed to end an XRC session by unloading the selected board.

1. Select Files -> Unload Boards

4.3 Running Scripts

Scripts can be run by either of the following options:

1. Select Scripts -> Project Name e.g. ADV7611
2. Follow the script tree as outlined in the expanding menus (see Figure 5)

1. Select Scripts -> Run Script
2. Open the script folder of the desired project
3. Select the desired script and click “Open”

Please be patient as the script may take several seconds to run. Successful download of the script is notified by the green light at the bottom of the screen flashing twice.

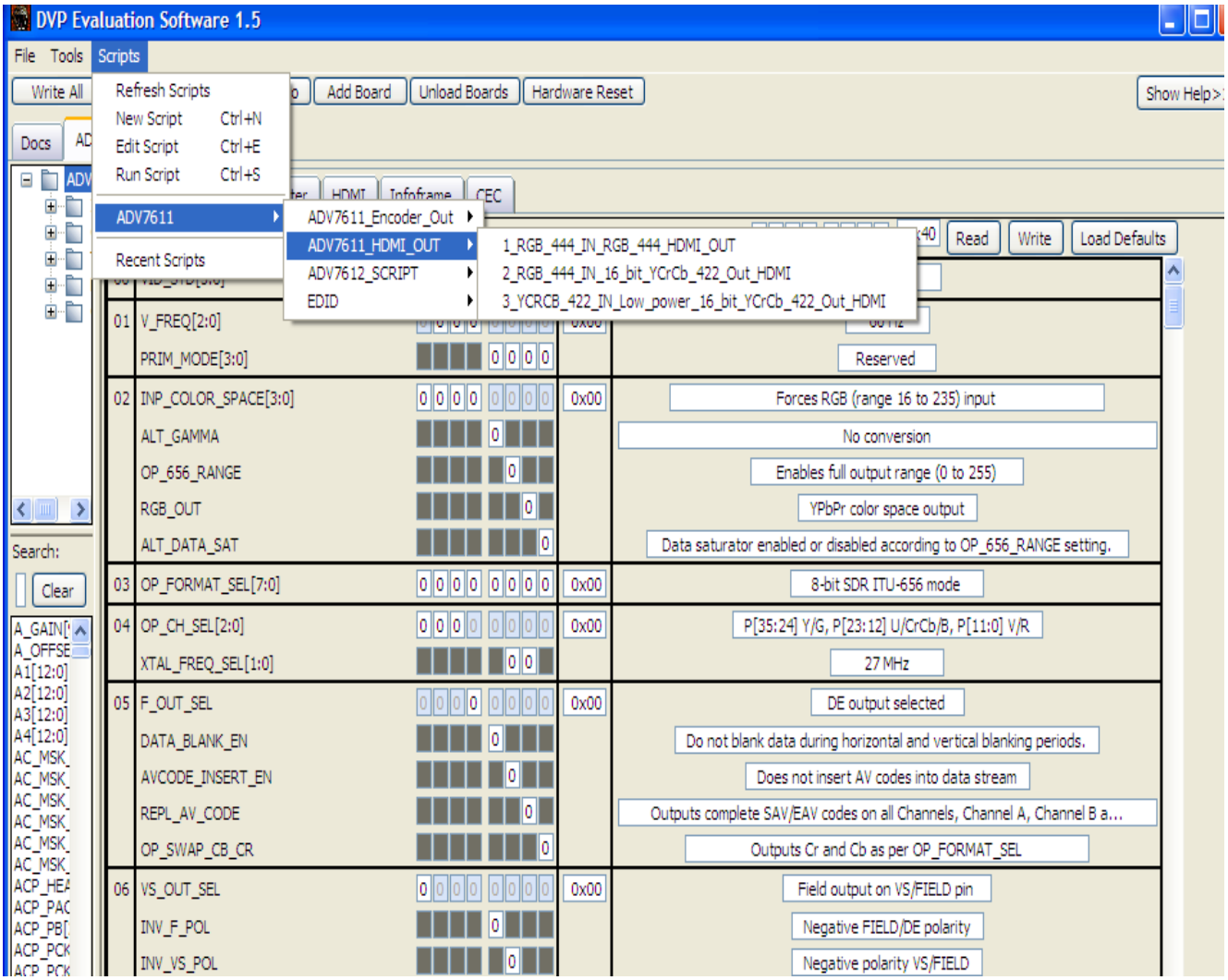


Figure 5 - XRC Script Tree

4.4 Other XRC Features

4.4.1 Register Control

The following steps must be performed to use XRC Register Control:

1. Select Tools -> Register Control
2. Enter the Device Address in HEX (see Figure 6)
3. Enter the desired register address in HEX
4. Press the “Write” button to write a value to the selected register
5. Press the “Read” button to read a value from the selected register

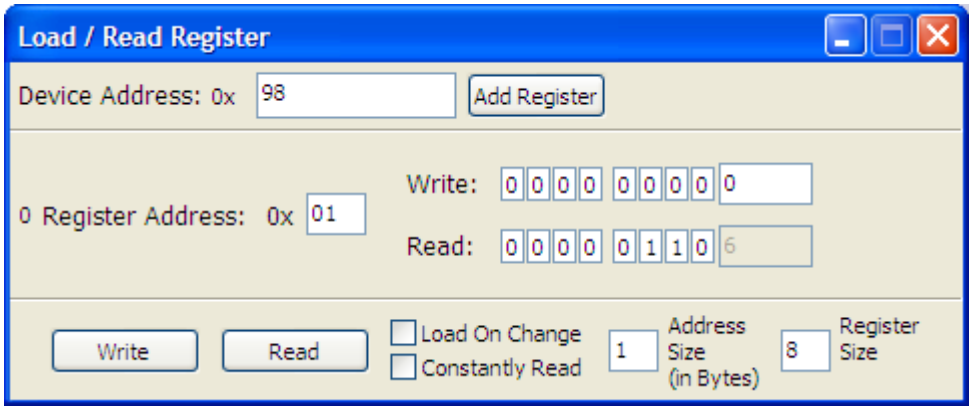


Figure 6 - register control window

5. The ADV7611 Evaluation Platform in Depth

5.1 Hardware Overview

The following features of the ADV7611 evaluation board should be noted

5.1.1 Connectors

1. 1 x HDMI inputs (J2)
2. 1 x HDMI output (J9)
3. 1 x UART connector (J7)
4. 1 x USB connector (J1)
5. 1 x audio output (U58)
6. 1 x S-video output (p5)
7. 1 x CVBS output (p3)
8. 1 x component (p4)
9. 1 x AV output connector (P7)

5.1.2 Jumpers

1. MCU boot ROM location (K7) – default position ‘B’
2. MCU reset (K8) – default position ‘not inserted’
3. USB MCU (K6) – default position ‘B’
4. I2C switch (K5) – default position ‘not inserted’
5. MCU I2C (SDA, SCL) – default position inserted
6. Audio reset (J3) – default position ‘open’
7. Microcontroller reset control (K9) – default position ‘not inserted’
8. INT 2 reset (K1, K2) – default position ‘not inserted’

5.1.3 Switches & Buttons

1. ON/OFF (S5)
2. Software enable/disable (S3)
3. DUT reset (S1)
4. MCU reset (S4)
5. global reset (S2)
6. Software driver buttons (S_UP, S_DOWN, S_LEFT, S_RIGHT, S_SELECT, S_BACK)

5.1.4 Miscellaneous

1. 1x 20 way connectors (J6)
2. 1 x 12 way connectors (J5)
3. Software driver LEDS (LED1, LED2, LED3, LED4, LED5, LED6)
4. Audio channel LEDS (AUD_CH1, AUD_CH2, AUD_CH3,AUD_CH4)
5. I2C header (P1)

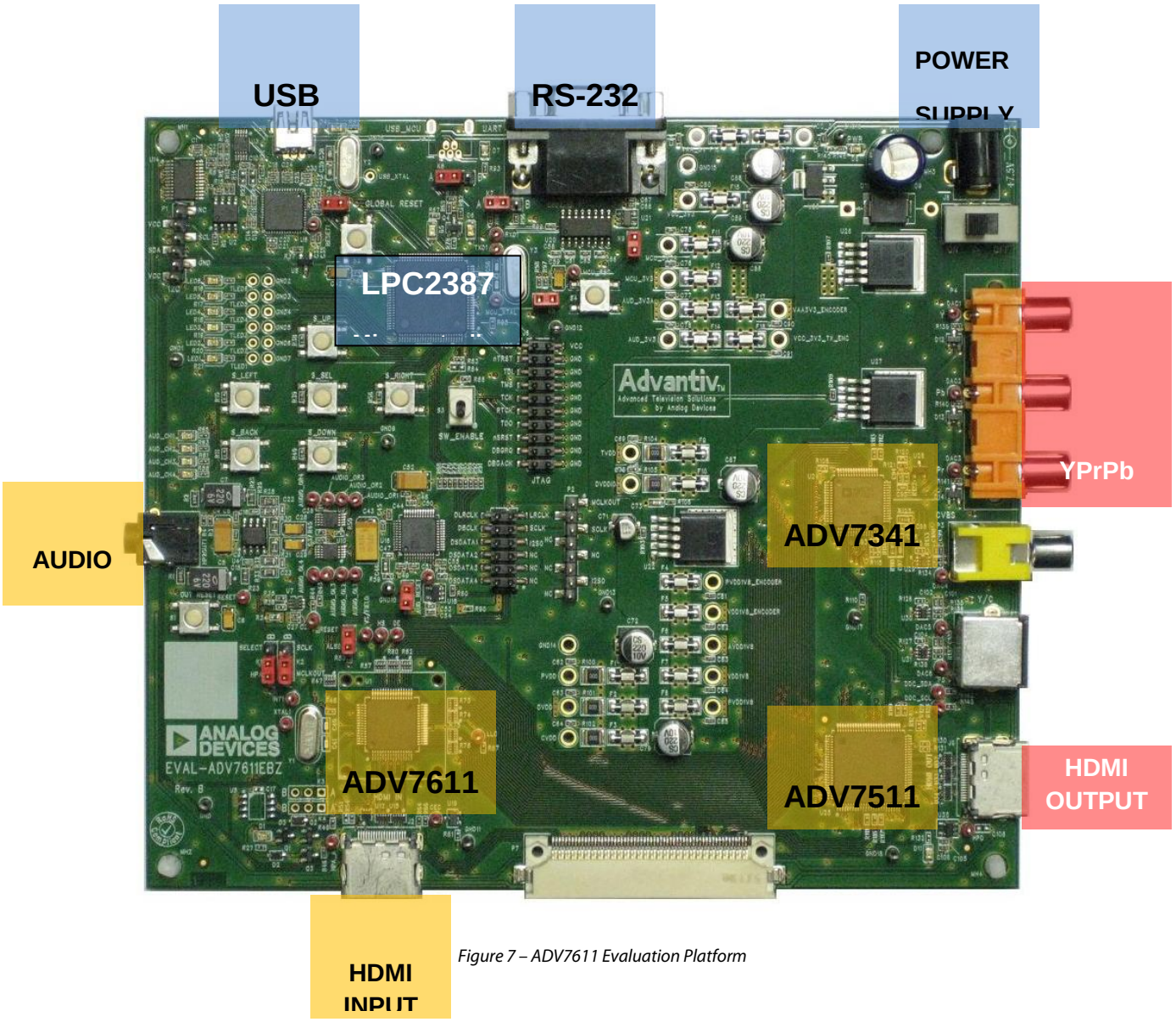


Figure 7 – ADV7611 Evaluation Platform

5.2 Using the ADV7611 Evaluation Platform

5.2.1 Connecting an Input Video Source

To connect an input video source to the ADV7611 evaluation board, use a HDMI cable and the input HDMI connector; J2. Do not use excessive force when connecting or disconnecting the cable as this may result in damage to the evaluation board.

5.2.2 Connecting to a Video Sink

To connect the ADV7611 evaluation board to a video sink, use a HDMI cable and the output HDMI connector; J9. Do not use excessive force when connecting or disconnecting the cable as this may result in damage to the evaluation board.

5.2.3 Connecting an Input Audio Source

To connect an input audio source to the ADV7611 evaluation board, use a TOSlink cable and the input audio connector; J2.

5.2.4 Connecting a headphone

To use a headphone, connect the headphone to connector HP2OUT1.

5.2.5 Updating the Software Driver

To download updated software driver code to the microcontroller used on the ADV7611 evaluation board, please perform the following steps

1. Power off the board
2. Insert jumper K9
3. Ensure jumper K7 is in position A
4. Ensure that jumper K8 (MCU RESET) is not inserted
5. Connect a serial cable between the computer to be used for the download and the UART connector (J7), on the ADV7611 evaluation board
6. Power on the board by moving the ON/OFF switch (S5) to position ON.
7. Start the Flashmagic download by pressing “Start”. For information on where to obtain and how to use the Flashmagic tool, please see Appendix 3 – Flash Magic.
8. When the download has completed, power off the board.
9. Remove jumper K9.
10. Ensure jumper K7 is in position B.
11. Power on the board by moving the ON/OFF switch (S5) to position ON.

If the Flashmagic tool gives a warning, please check the setup and jumper positions carefully.

5.2.6 Interfacing with the Software Driver

Jumper K8, when inserted, pulls the microcontroller reset low. To use the software driver, please ensure that K8 is removed.

Eval Note

To stop and start the software driver (e.g. to allow access to the I2C over XRC), toggle the SW_ENABLE switch on the evaluation board. When disabled, the driver will send the message “REP: Driver Disabled”. When enabled, the driver will send the message “REP: Driver Enabled” and any status updates will be displayed.

Please see the software driver documentation for the functions performed by software driver buttons (S_UP, S_DOWN, S_LEFT, S_RIGHT, S_SELECT, S_BACK) and LEDS (LED1, LED2, LED3, LED4, LED5, LED6). To enable the software driver, switch the software enable switch (S3) to SW_ENABLE and jumper K8 open. To disable the software driver, switch the software enable switch (S3) away from SW_ENABLE and insert K8 jumper.

Note: Depending on the version of software driver – it may act as HDMI repeater and content will be not output through video encoder (ADV7341). In this case to set encoder software driver should be turned off and XRC should be used with provided scripts.

For information on the latest software driver, please contact your local FAE or sales office.

Eval Note

6. Appendix 1 – Schematics

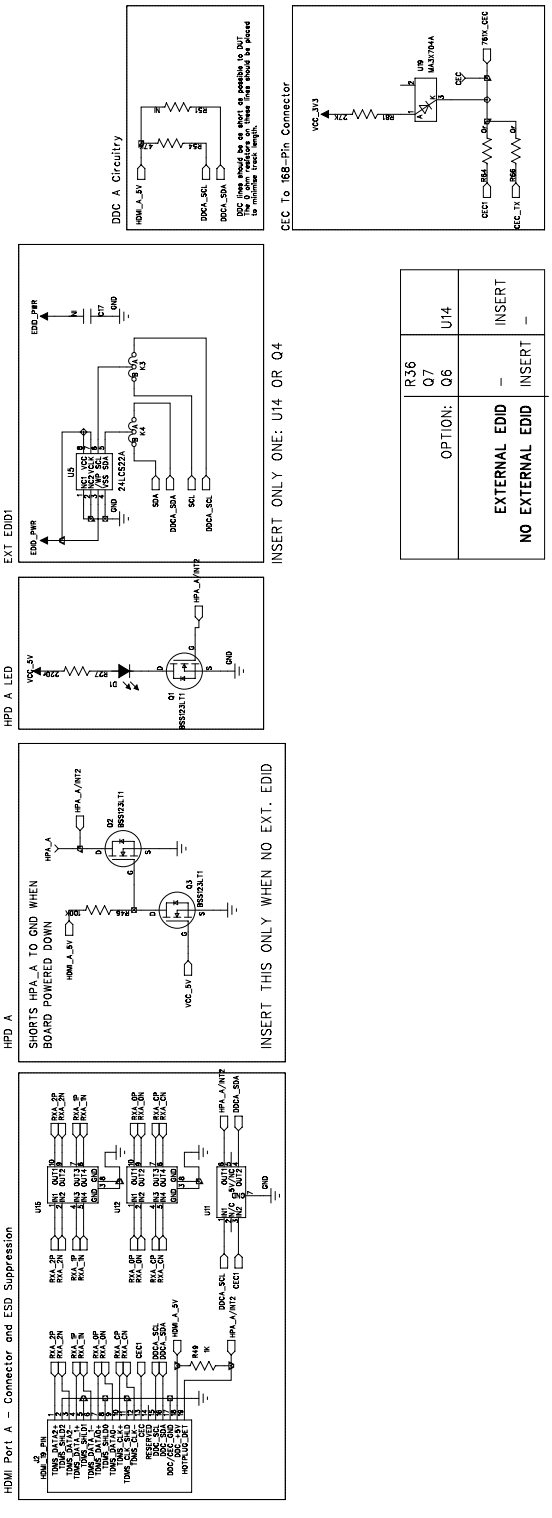


Figure 8 HDMI Inputs Schematics Page

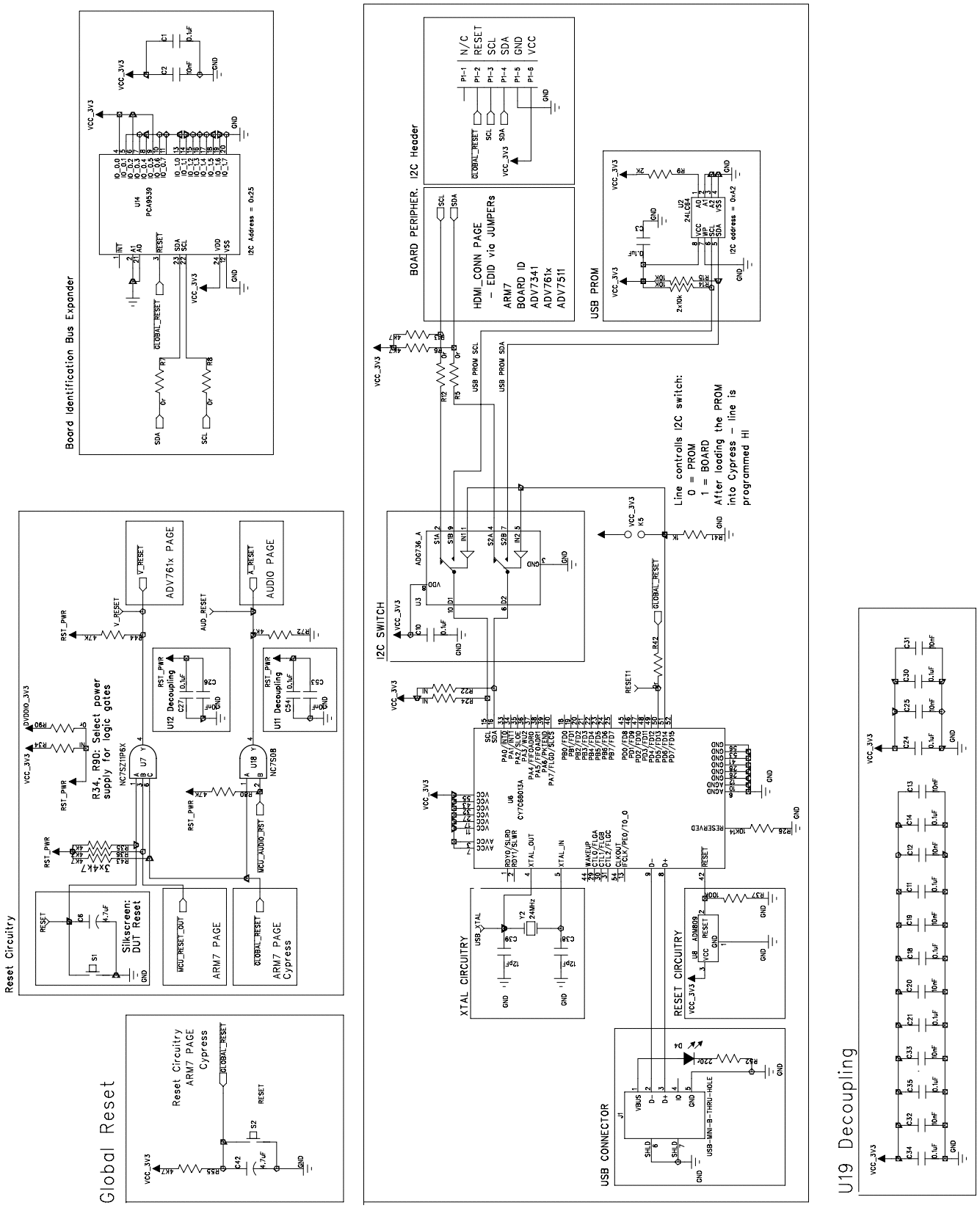


Figure 9: USB + Reset Circuitry Schematics Page

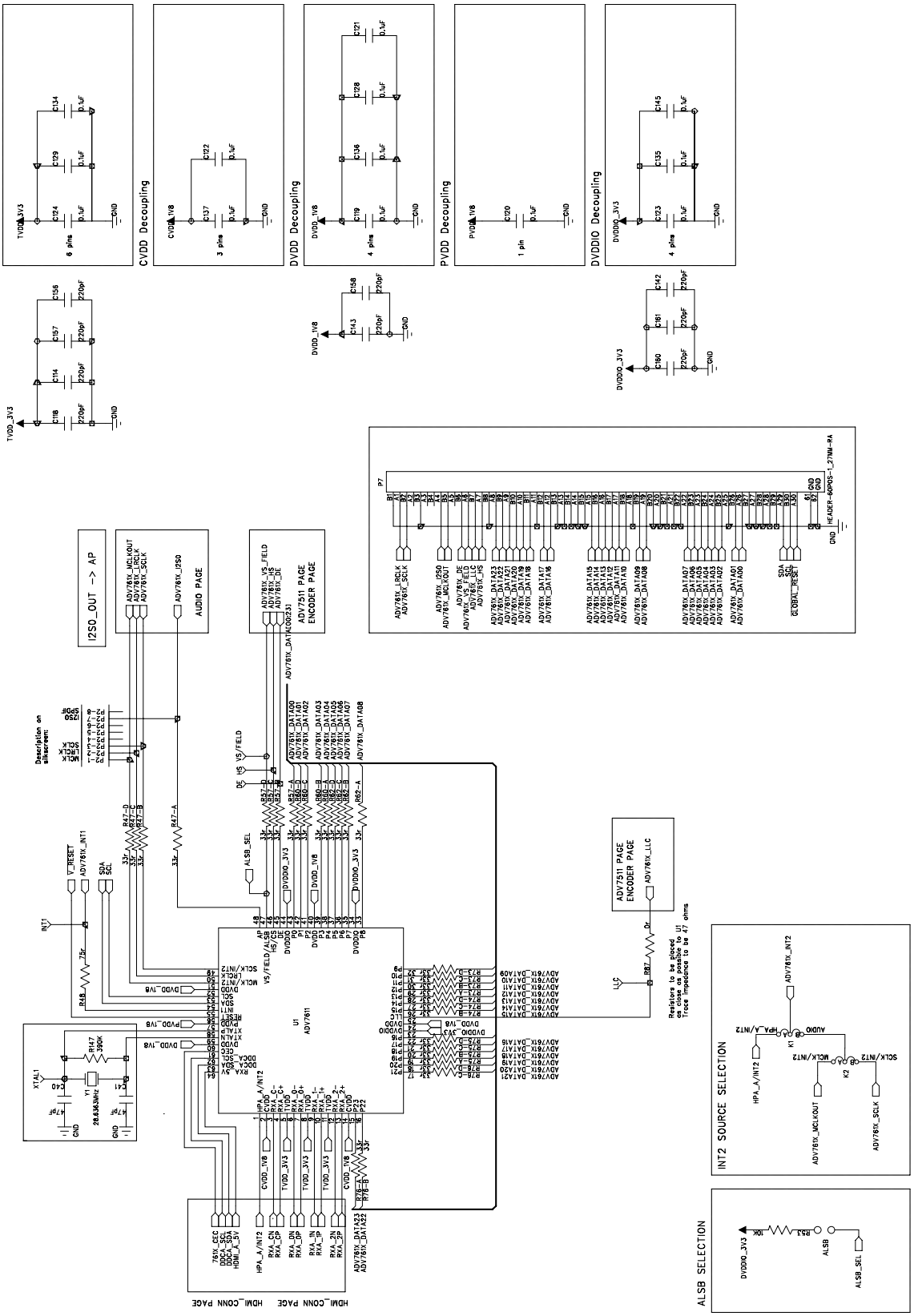
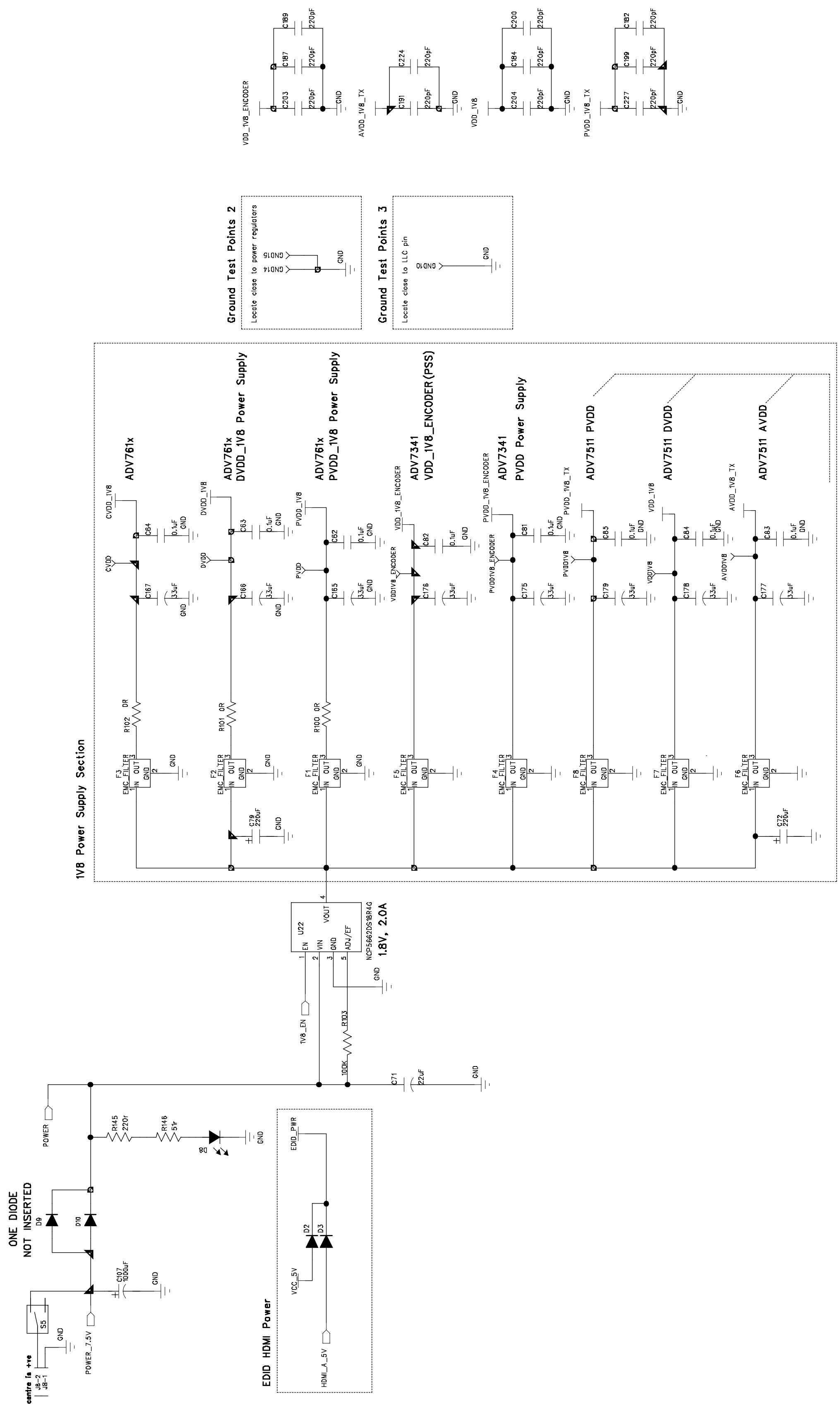


Figure 10: ADV7611 Schematics Page

Eval Note



1V8 Power Supply Section
ADV761x
ADV761x DVDD_1V8 Power Supply
ADV761x PVDD_1V8 Power Supply
ADV7341 VDD_1V8_ENCODER(PSS)
ADV7341 PVDD Power Supply
ADV7511 PVDD
ADV7511 DVDD
ADV7511 AVDD
Ground Test Points 2
Locate close to power regulators
Ground Test Points 3
Locate close to LLC pin
NCP5662DS18R4G
1.8V, 2.0A
ONE DIODE NOT INSERTED
EDID HDMI Power

Figure 11: Power Schematics Page 1 of 2

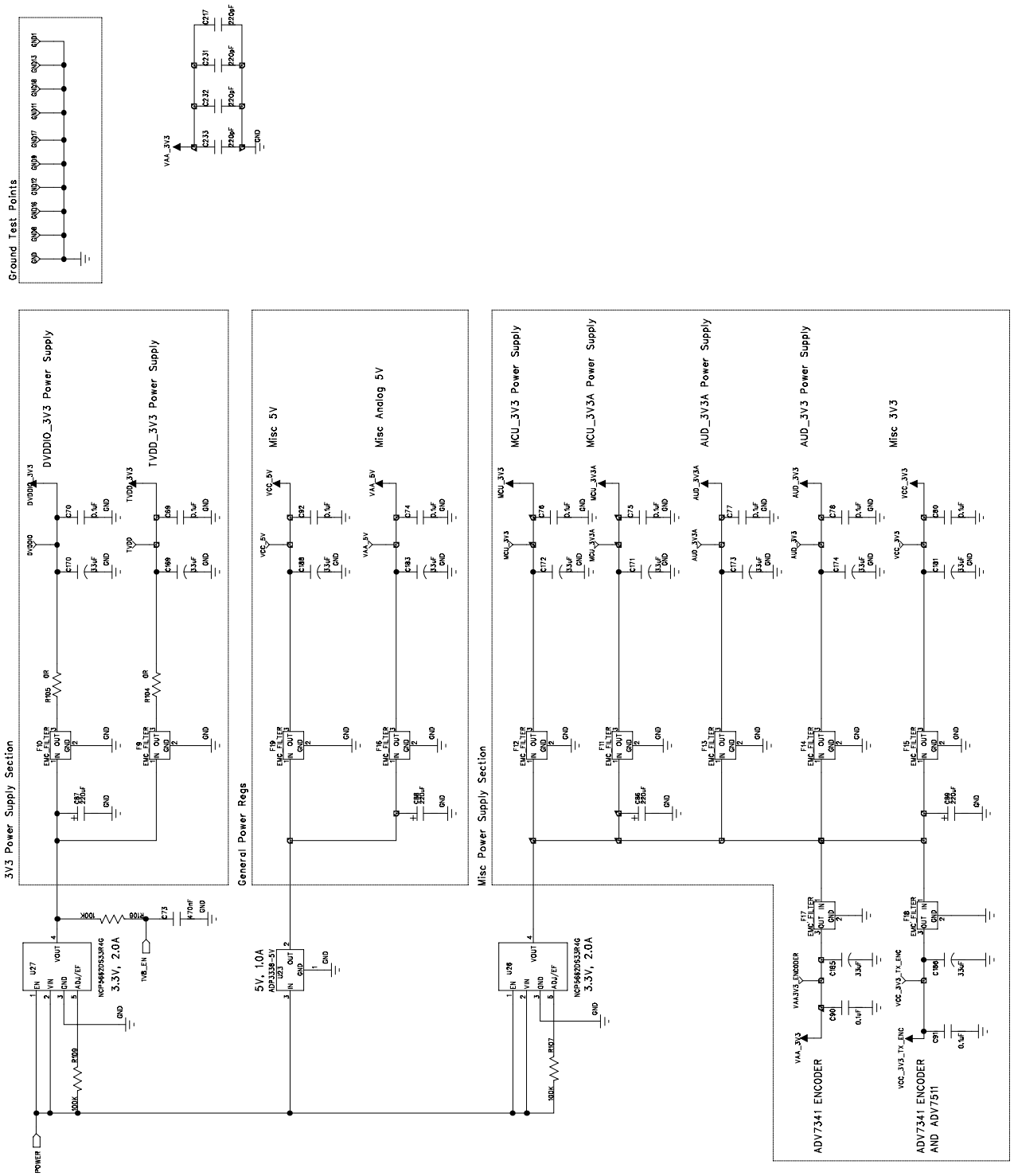


Figure 12: Power Schematics Page 2 of 2

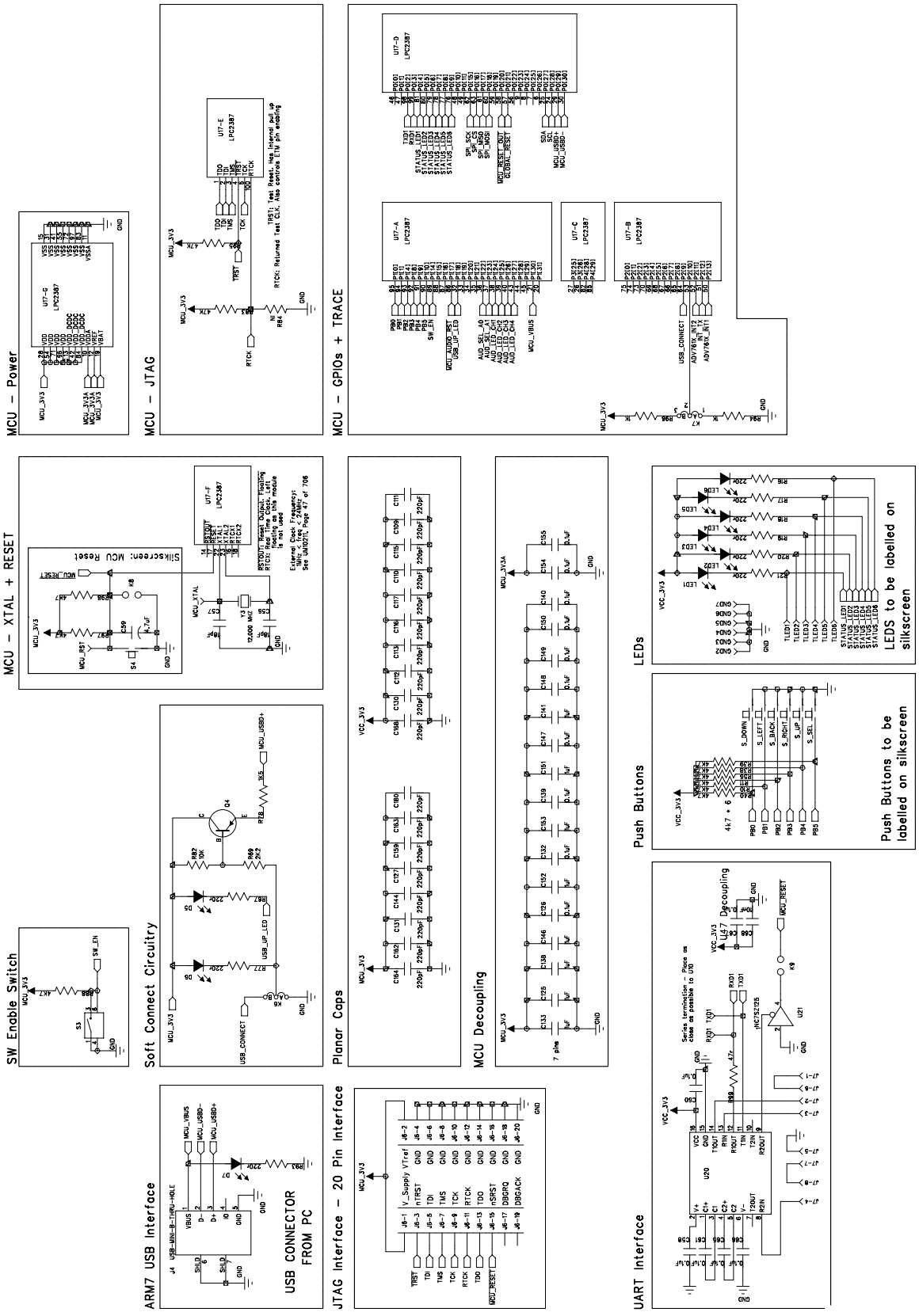


Figure 13: Microcontroller Schematics Page

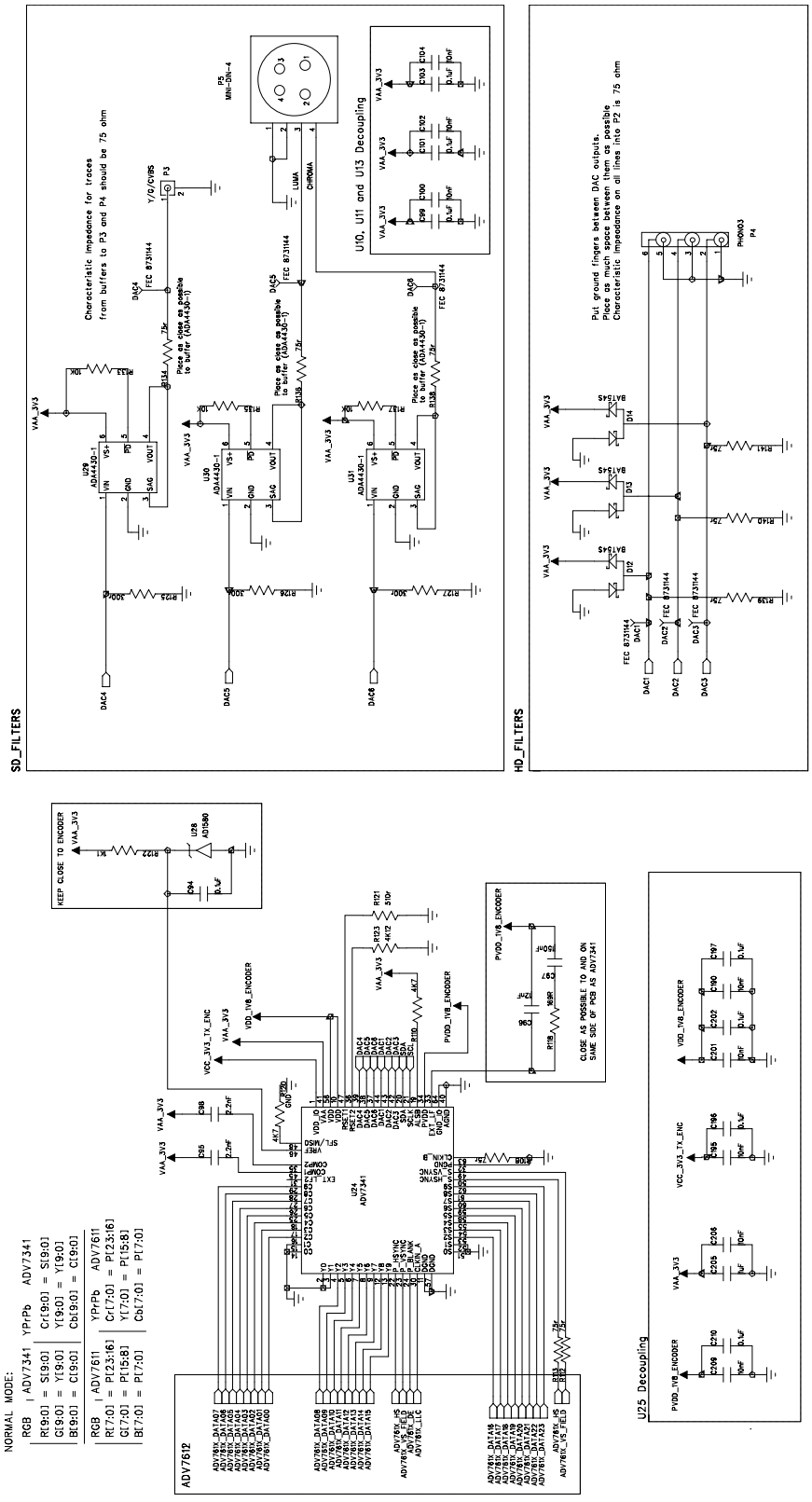


Figure 14: Encoder Schematics Page

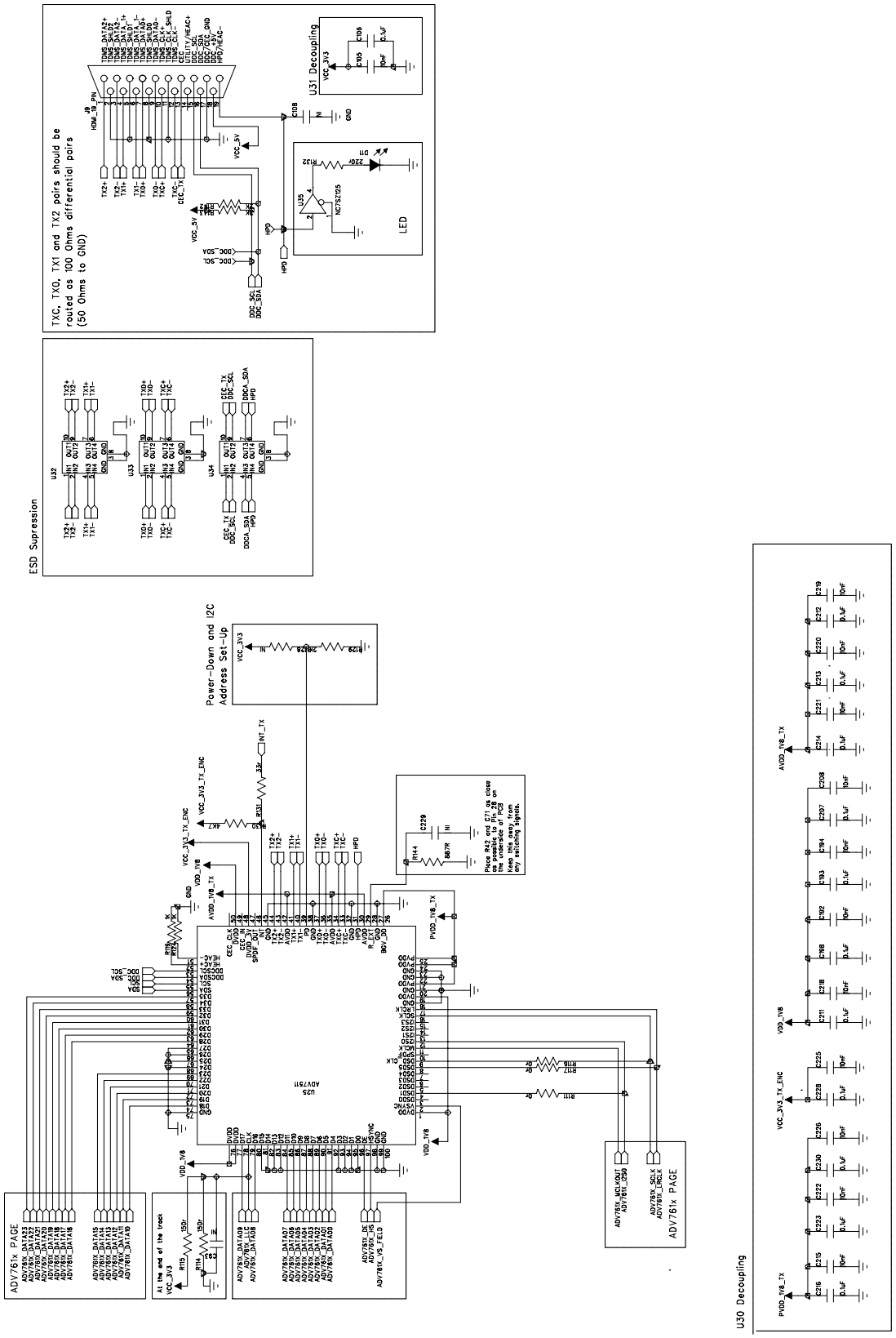


Figure 15: HDMI TX Schematics Page

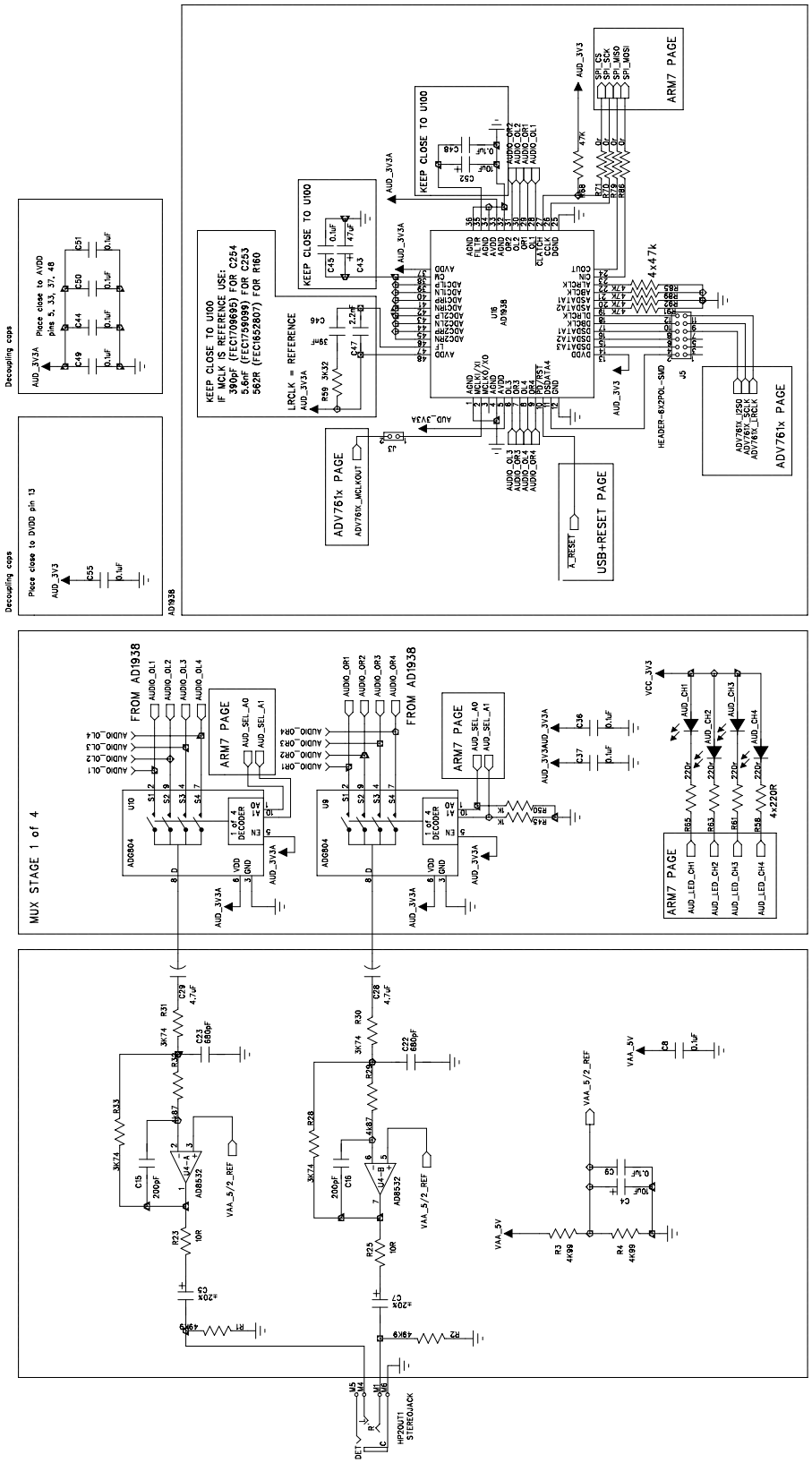


Figure 16: Audio Codec Schematics Page

7. Appendix 2 – Layout

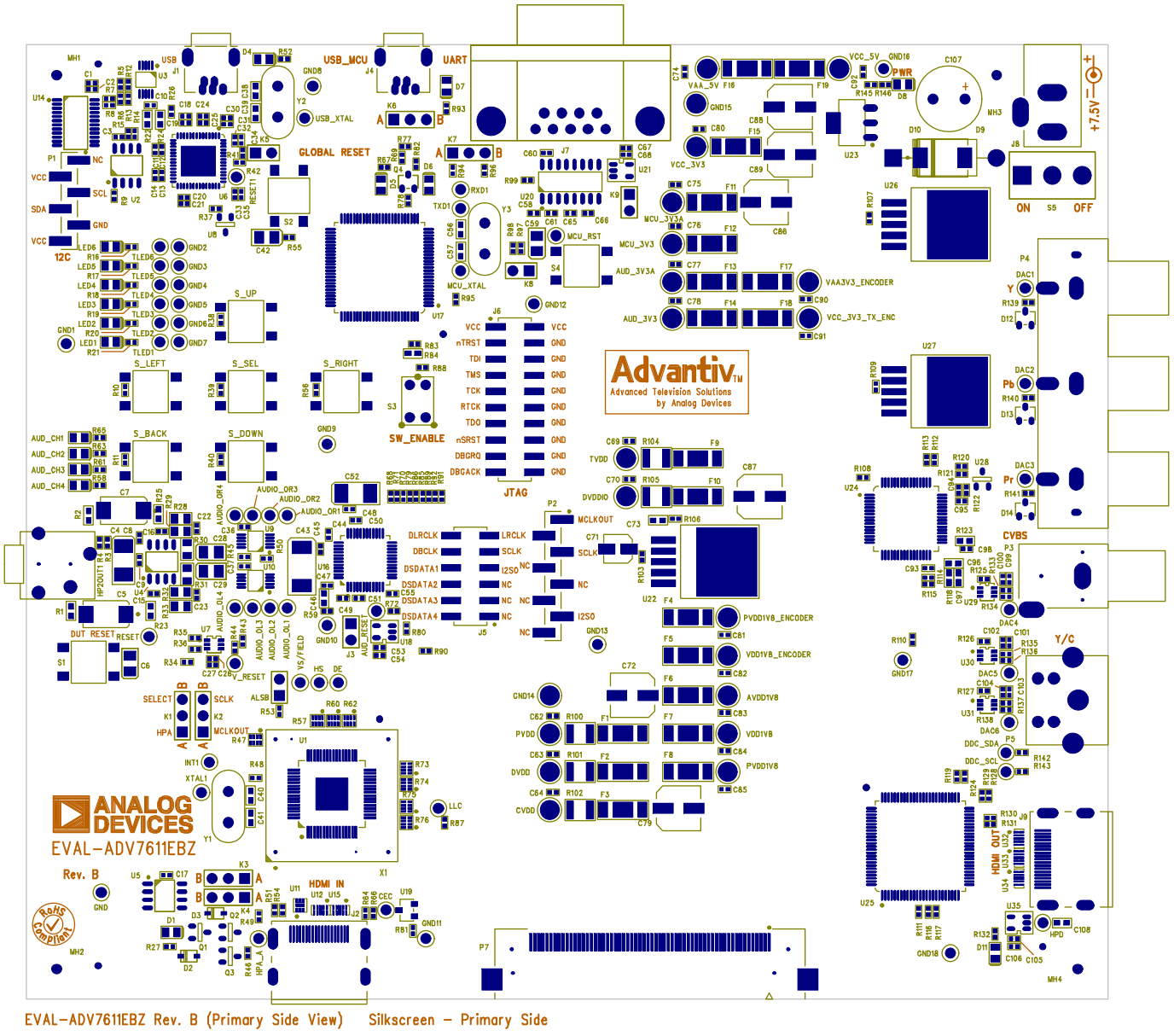


Figure 17: Layout Silkscreen (Top)

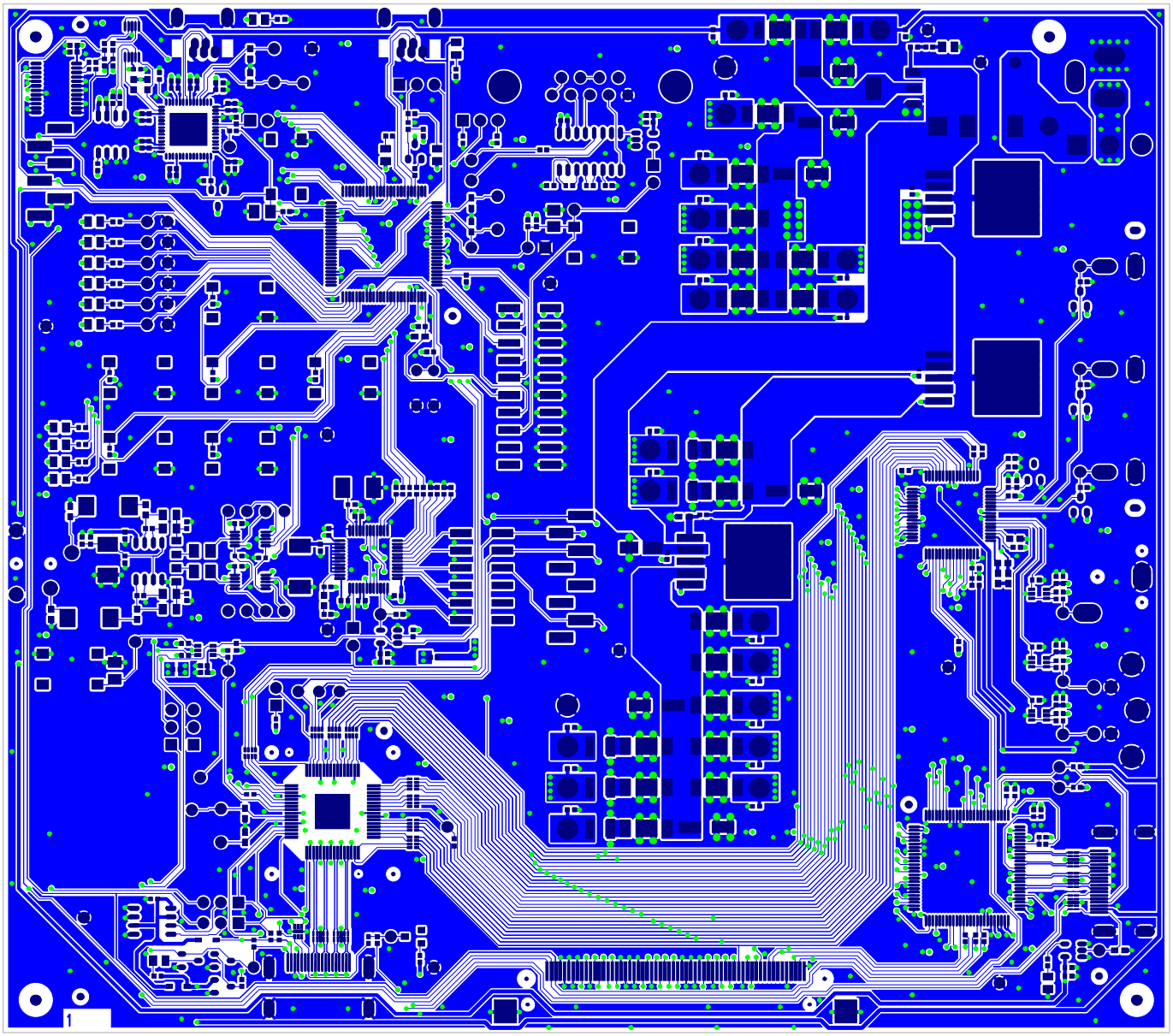


Figure 18: Layout Layer 1 (Top)

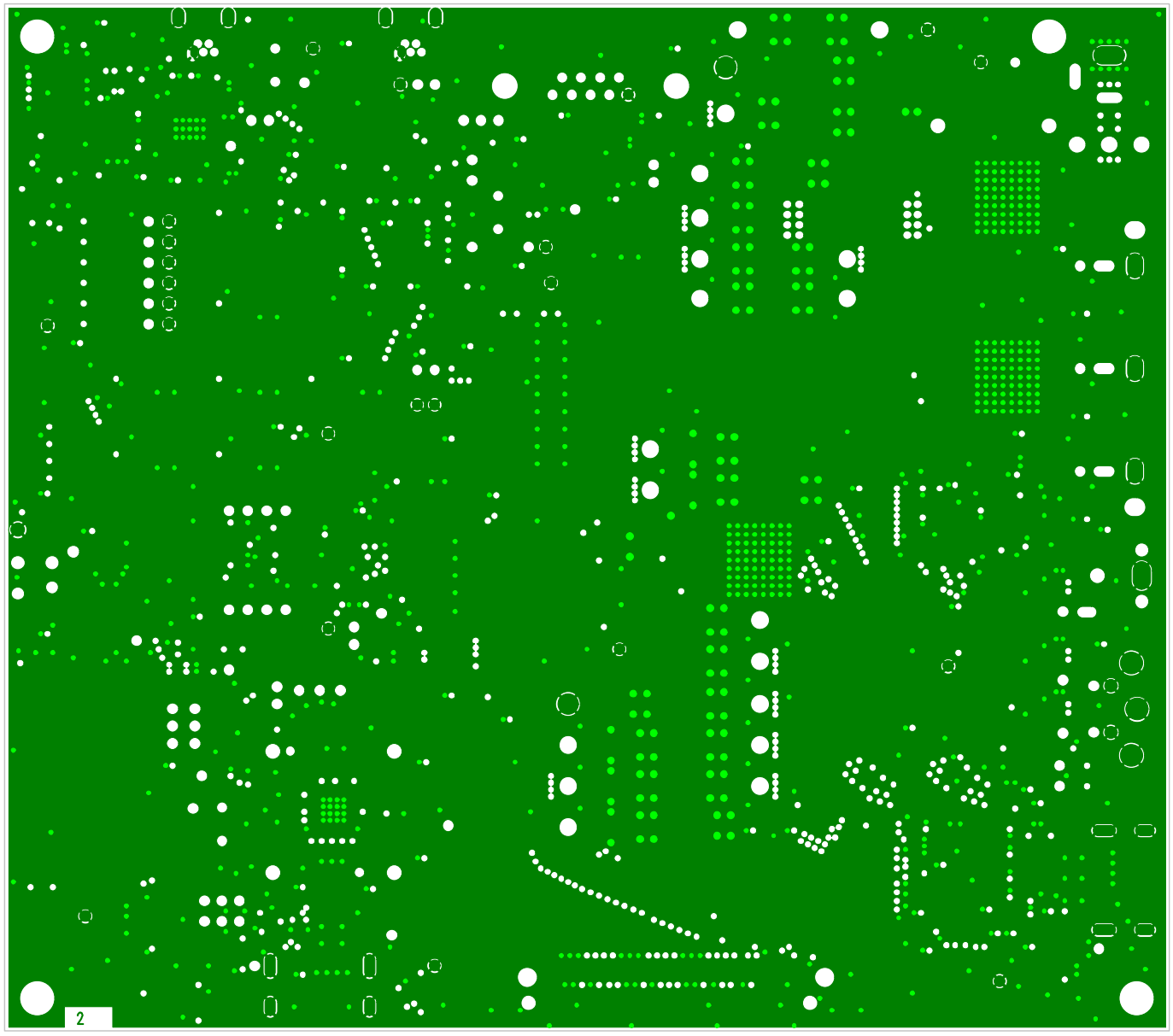


Figure 19: Layout Layer 2 (GND)

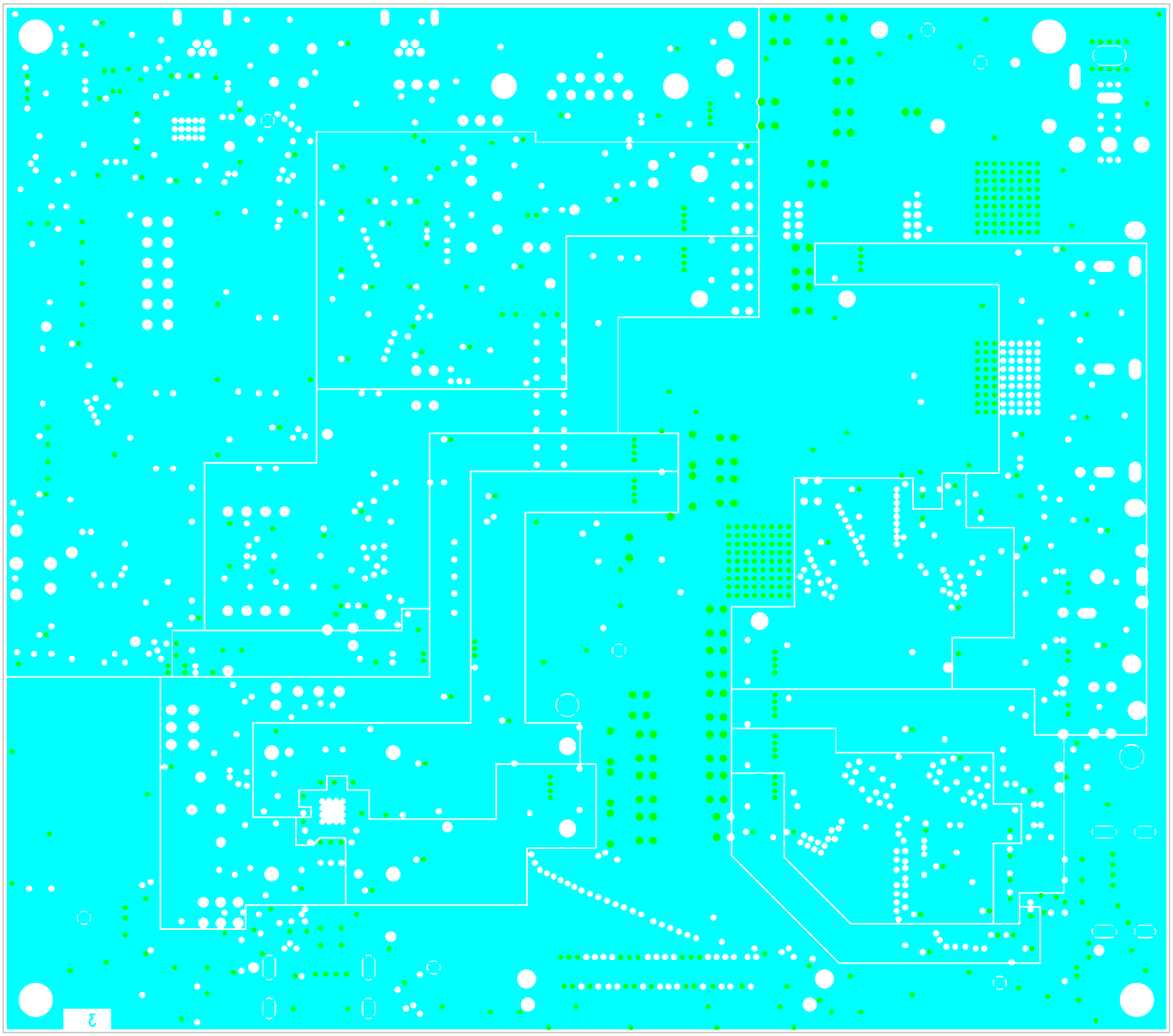


Figure 20: Layout Layer 3 (PWR)

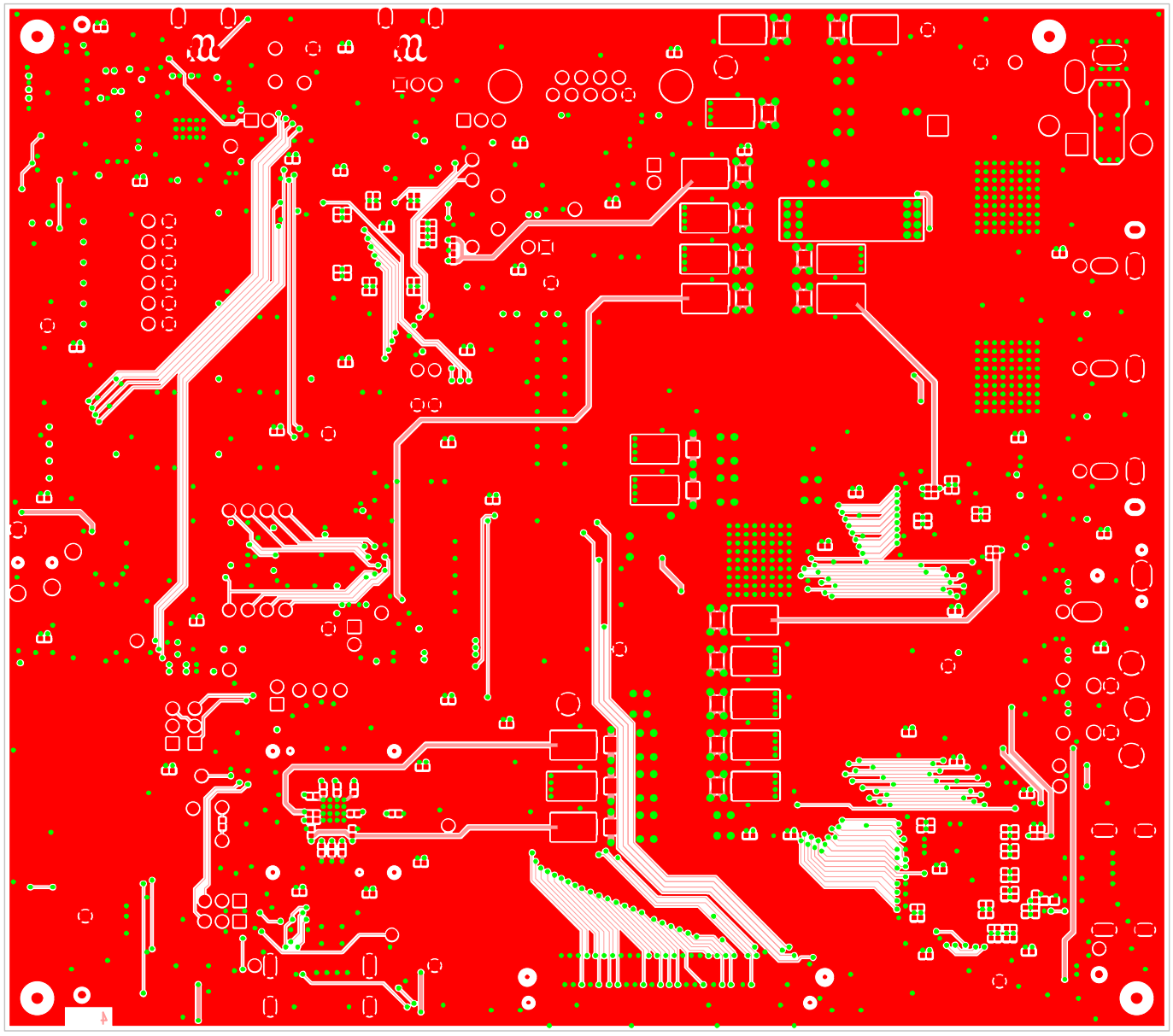
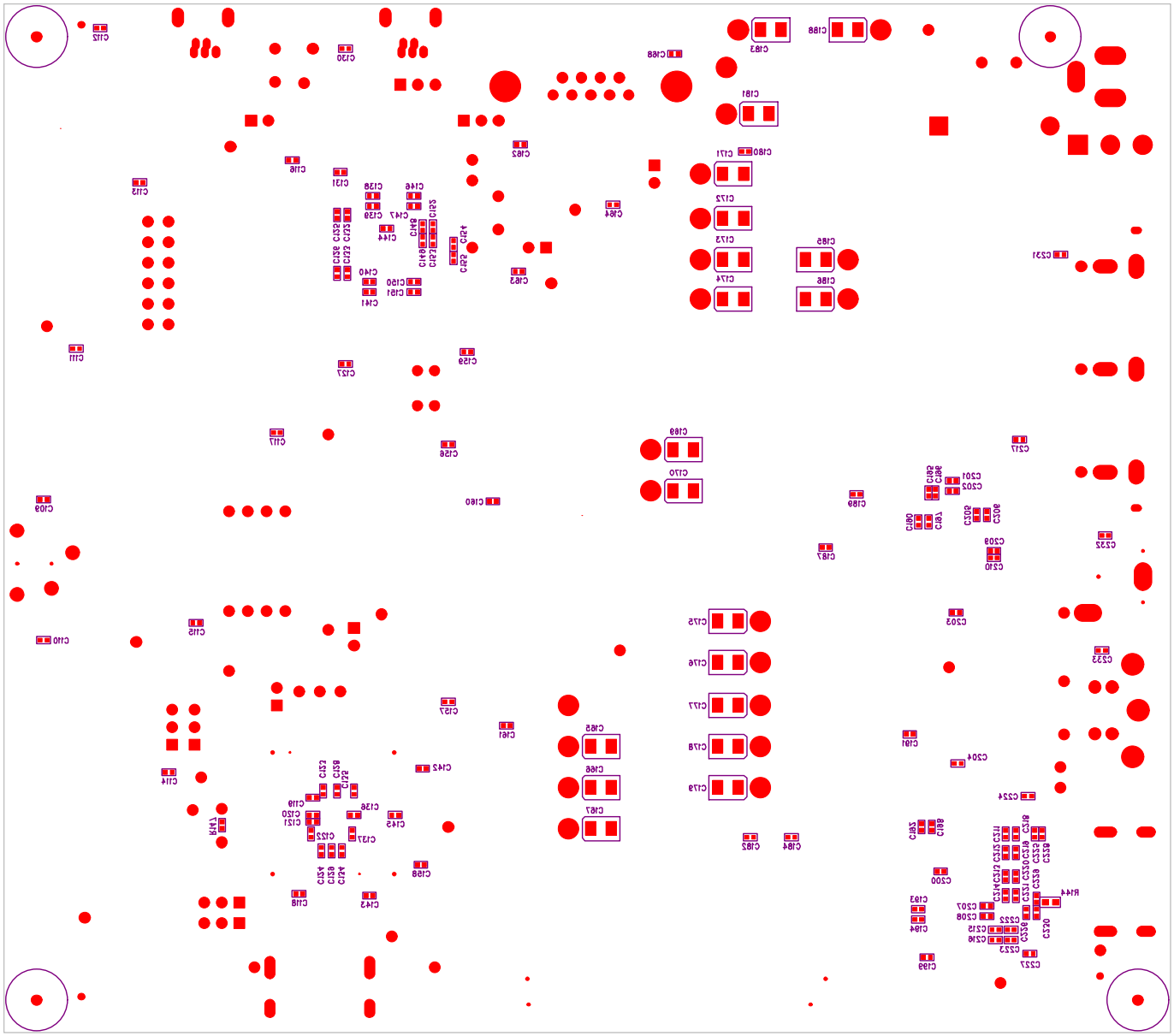


Figure 21: Layout Layer 4 (Bottom)



EVAL–ADV7611EBZ Rev. B (Primary Side View) Silkscreen – Secondary Side

Figure 22: Layout Silkscreen (Bottom)

8. Appendix 3 – Flash Magic

Software Setup: the Flashmagic tool can be downloaded from www.flashmagictool.com. Analog Devices does not take responsibility for the content of any external sites.

Note: Please ensure the tool settings are configured to “Use DTR and RTS to control RST and ISP pin”. The tool settings are accessed by navigating through Options -> Advanced Options -> Hardware Config.

All other main settings should be as follows:

- Device: LPC2387
- COM: As per user device
- Baud rate: 115200
- Interface: None (ISP)
- Oscillator: 12
- Ensure “Verify after programming” is enabled
- Ensure “Erase blocks used by Hex File” is enabled
- Specify filename to download

9. Appendix 4 – Downloading from FTP

Using an FTP client (e.g. Filezilla – http://filezilla-project.org/download.php?type=client - Analog Devices does not take responsibility for the content of any external sites), please log on to download the latest evaluation software.

Host: ftp.analog.com

Username: e.g. adv7611

Password: supplied from FAE/product line

Port: leave empty (FTP client will automatically populate this)

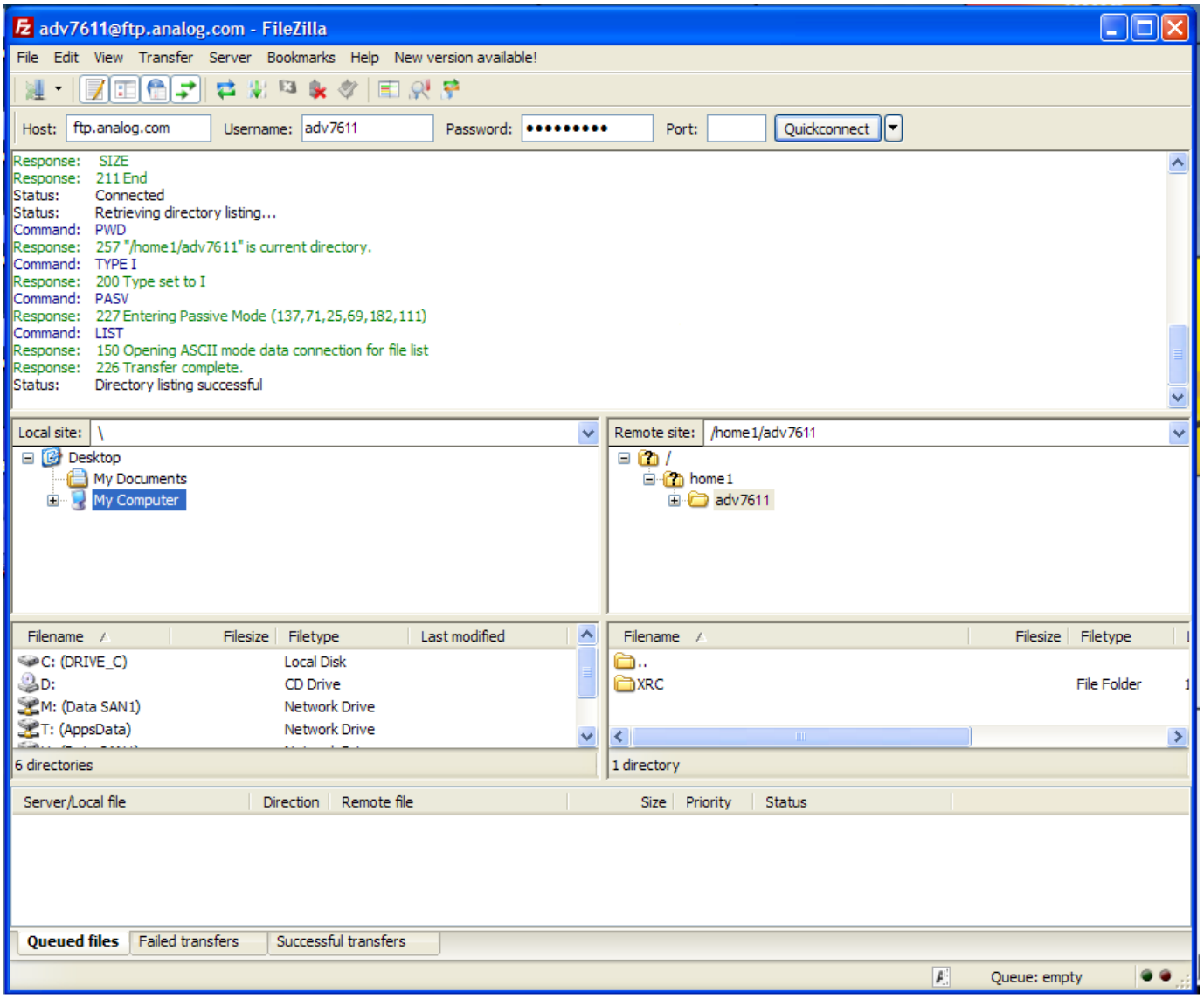


Figure 23 - Filezilla Settings

10. Appendix 5 – Software Driver Controls

When using the software driver, please connect a UART terminal e.g. Hyperterminal or TeraTerm for feedback on the status of the software driver.

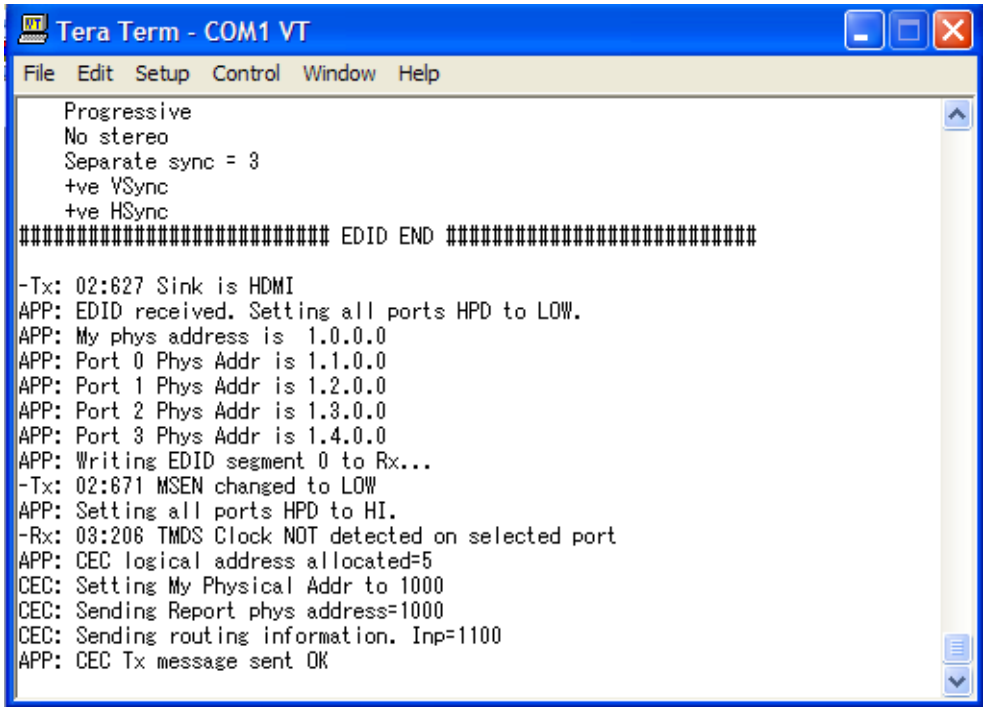


Figure 24 - Software Driver Feedback

Please use the following commands to interface with the software driver

```
?         Print help
help      Print help
amute     Mute audio output <on or off>
arctx     ARC TX mode <on or off>
avmute    Send AVMUTE <on or off>
cec       CEC support <on or off>
dbg       Select debug output [rx] [tx] [hdcp] [edid] [cec] [int] [none] [all]
```

```
dbg+       Same as dbg command with output addition
dbg-       Same as dbg command with output removal
enc        Output encryption <on, off or us(same as upstream)>
fs         Fast switching <on or off>
i2cr       i2c read <device> <register> <byte count>
i2cw       i2c write <device> <register> <value>
i2cand     i2c AND register with value <device> <register> <value>
i2cor      i2c OR  register with value <device> <register> <value>
i2cxor     i2c XOR register with value <device> <register> <value>
i2cdbg     i2c debug <device addr, dev addr, ...>
memr       Read memory <address(32-bit aligned)>  <byte count>
memw       Write memory <address(32-bit aligned)> <value>
mode       Set operating mode <rec, rep, xmt or auto>
mute       Set mute mode <man or auto>
mtime      Set mute times in ms <For TMDS, For Blackout>
out        Set TX output <hdmi, dvi, us or forced>
port       Select input port <a, b, c, d, e, f, g n(none) or t(auto)>
reset      Reset system
run        Resume software
stat       Print system status
stop       Stop software
vmute      Video output mute <on or off>
edidmod    Update RX EDID <on or off>
            EDID will be modified before being written to the RX internal EDID.
            Refer to REP_EVENT_TX_EDID_READY event processing in rep_notify.c
power      Power <on or off>, <mode 0 or 1>
cecaudio   send cec message about audio <opcode>, <directly addressed >,
           <parameters>
xmtmode    When no HDMI input connected (MXT mode), keep HDMI TX on or off
```

```
<on or off>
```

UART Terminal Settings

- Baud rate: 115200
- Data: 8-bit
- Parity: none
- Stop: 1-bit
- Flow control: none