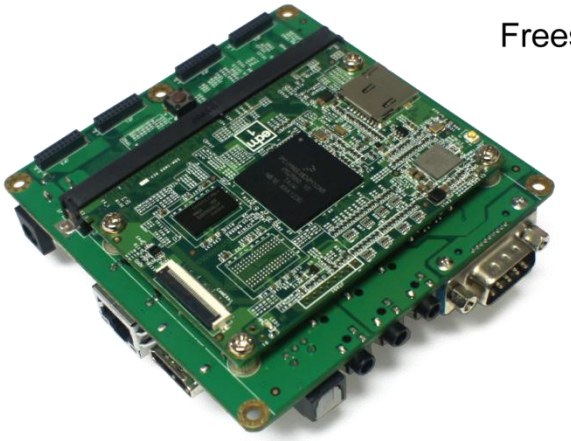
WANDBOARD.ORG

WANDBOARD USER GUIDE

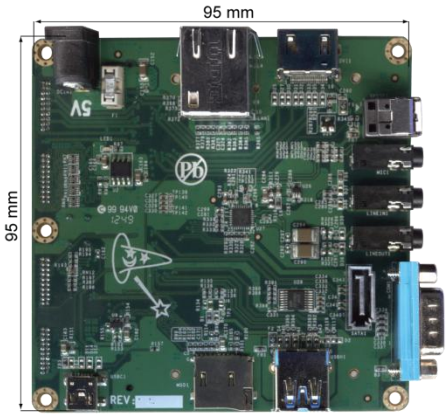
(20130208)

WANDBOARD.ORG



Freescale i.MX6 Cortex-A9
Low cost open source community
Development Board

Dimensional drawing

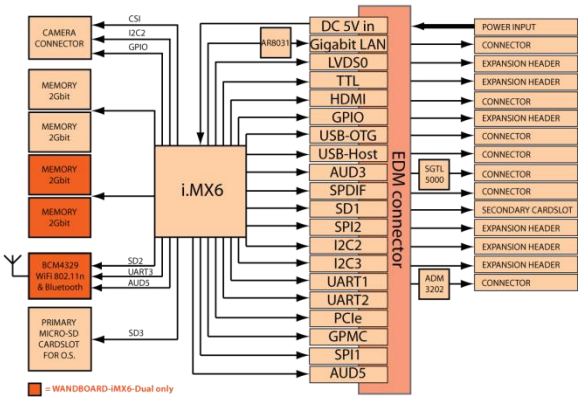


Specifications

	Wandboard Solo	Wandboard Dual
Processor	i.MX6 Solo	i.MX6 DualLite
Cores	ARM Cortex-A9	ARM Cortex-A9
	Single core @ 1GHz	Dual core @ 1GHz
Memory	512 MB DDR3	1 GB DDR3
Audio	✓	✓
Optical S/PDIF	✓	✓
HDMI	✓	✓
Camera interface	✓	✓
micro SD cardslot	2	2
Serial port	✓	✓
Expansion Header	✓	✓
USB	✓	✓
USB OTG	✓	✓
SATA connector	Not populated	Not populated
Gigabit LAN	✓	✓
WIFI (802.11n)	X	✓
Bluetooth	X	✓

Complete Schematics, Source Code and Documentation can be found on www.wandboard.org

Block diagram



Order information

Wandboard Solo
Wandboard Dual
Accessory

i.MX6 Solo
i.MX6 DualLite
Enclosure

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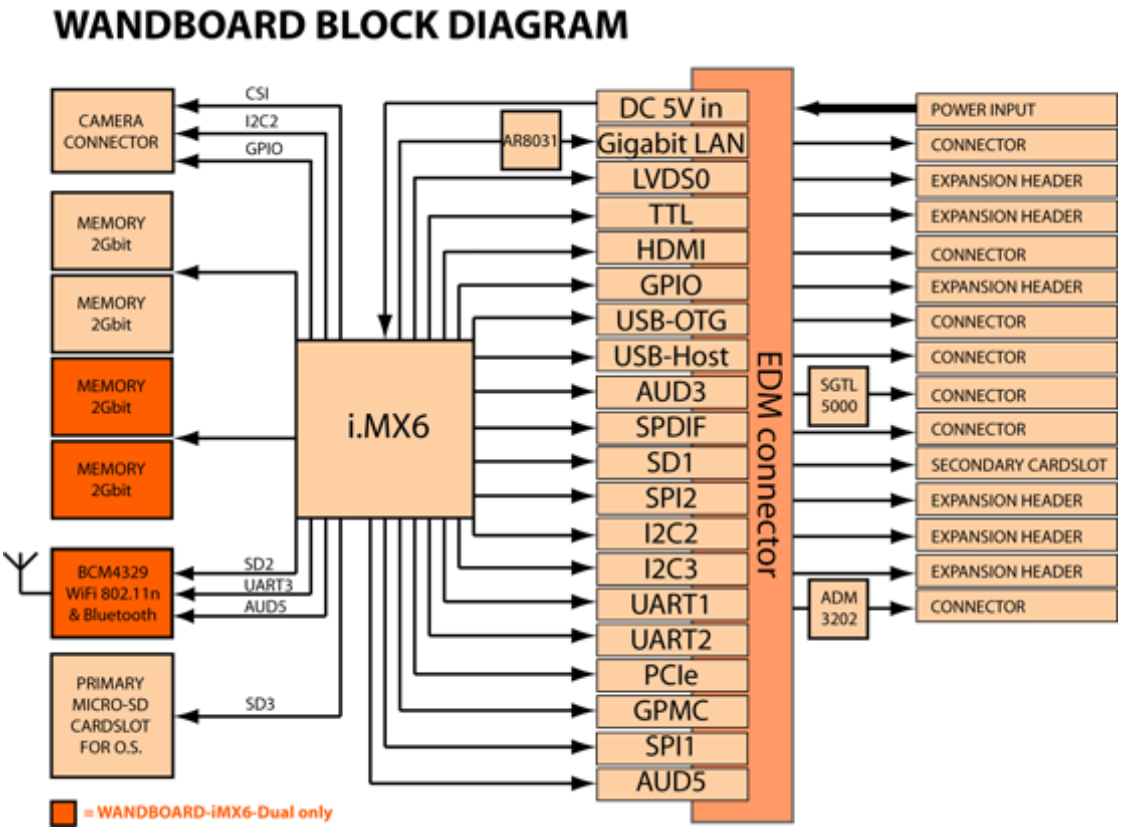
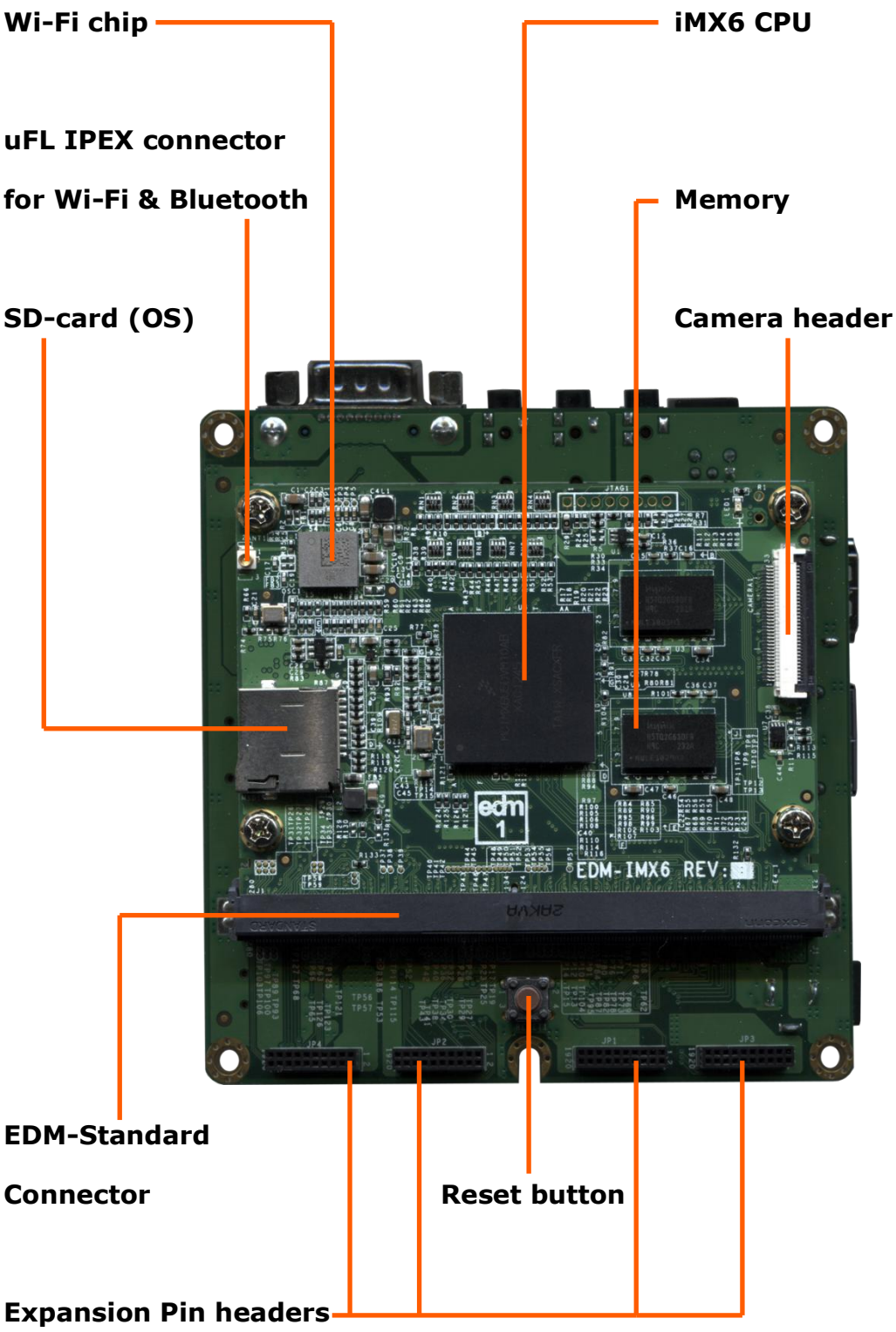
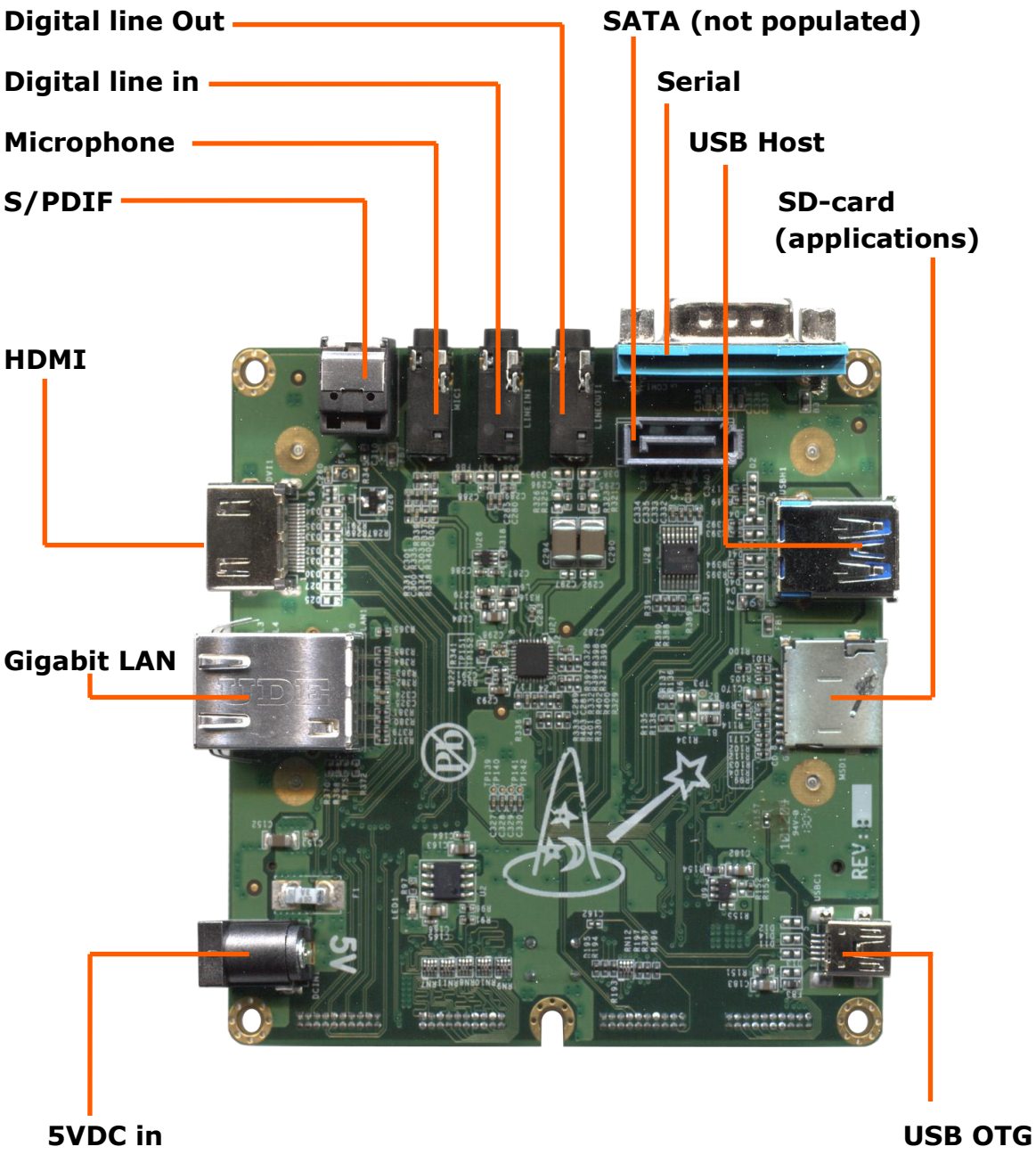
Block Diagram



Overview


Wi-Fi chip
iMX6 CPU
uFL IPEX connector
for Wi-Fi & Bluetooth
Memory
SD-card (OS)
Camera header
EDM-Standard
Connector
Reset button
Expansion Pin headers
EDM-IMX6 REV:


Digital line Out
Digital line in
Microphone
S/PDIF
HDMI
Gigabit LAN
5VDC in
SATA (not populated)
Serial
USB Host
SD-card
(applications)
USB OTG

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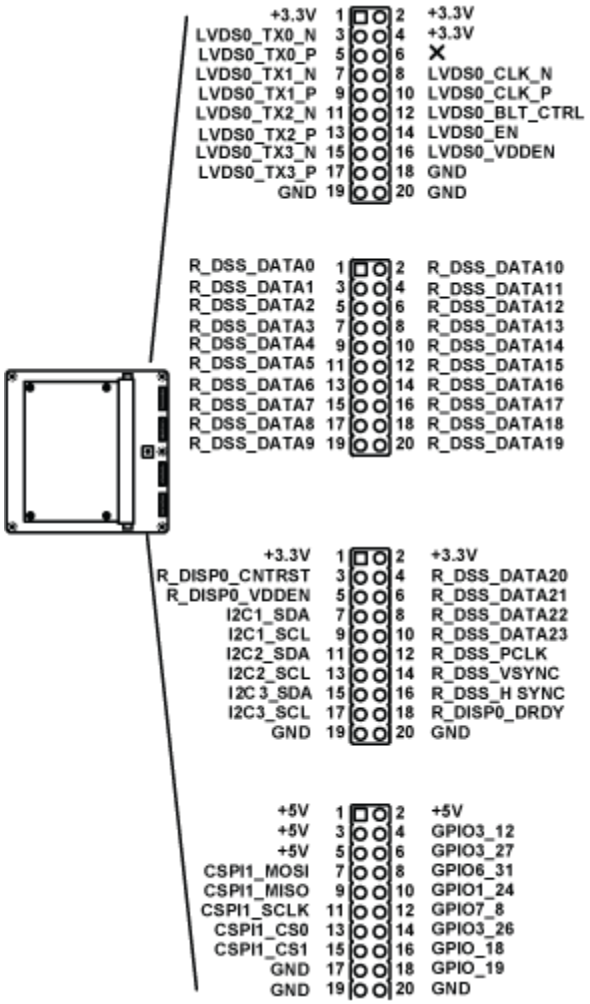
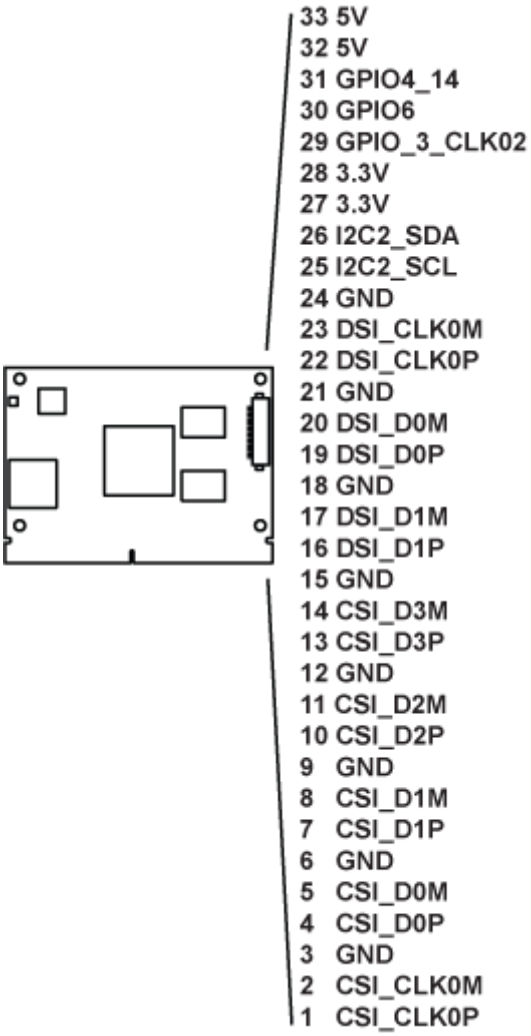
Expansion pin headers



Camera header



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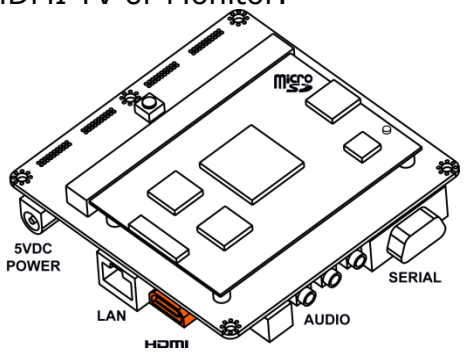
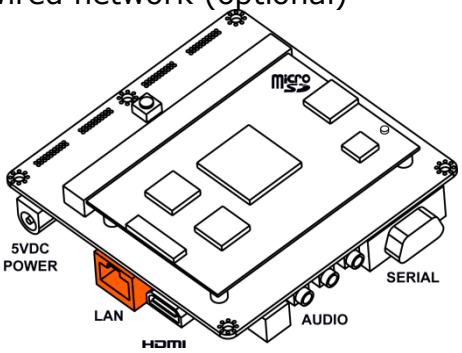
Quick Start Guide

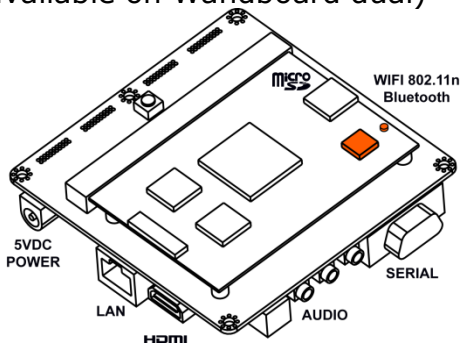
a) Connect display: use a quality HDMI cable to connect to your HDMI TV or Monitor.



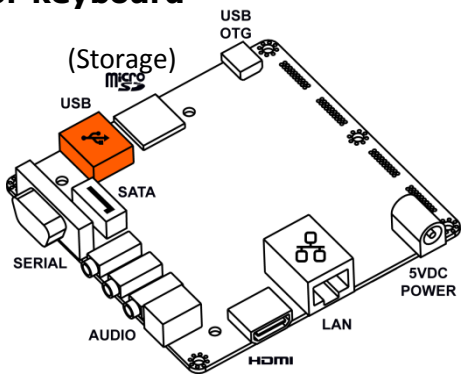
b) Connect network: use a standard RJ45 LAN cable to connect your wired network (optional)



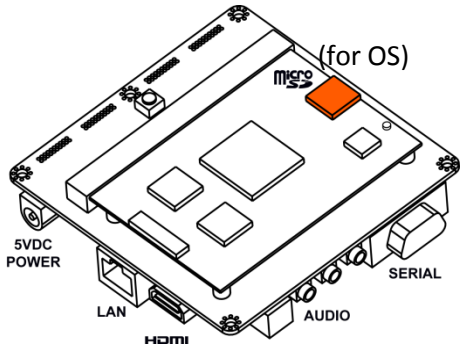
c) Connect wireless antenna (sold separately). This option is only available on Wandboard dual)



d) Connect a standard USB mouse or keyboard

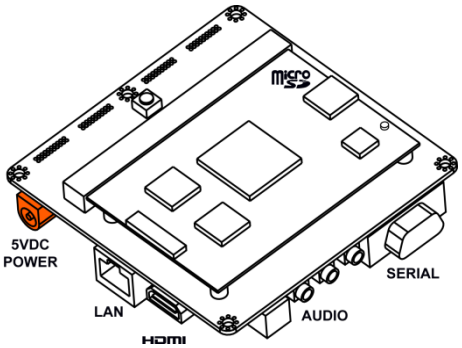


e) Insert the microSD (orange microSD card slot)



Read the last 2 pages of this document to create a microSD card containing the Operating System.

f) Power up: Plug in a power supply (**5 VDC at 2A** is recommended)



Preparing the bootable microSD card for your Wandboard

The microSD card that is created below will contain the Wandboard operating system. A large number of demo runtime images are available.

1. Procedures to get you started

a) Download your preferred Wandboard runtime image
http://www.wandboard.org/index.php/downloads
b) Extract the file that you just downloaded
- Right click on the file and choose "Extract all".
- The extracted files will contain a file ending in *.img*

2. Instructions for Linux users

This paragraph explains how to create a SD card using Linux desktop or notebook. The SD card can be made using a standard terminal.

```
# dd if=*.img of=/dev/sdd bs=1M
```

replace *.img with the full name of the SD card image and replace /dev/sdd with your SD card device".

3. Instructions for Windows users

This paragraph explains how to create a SD card using Windows desktop or notebook.

Note: the *.img* file can only be written to your microSD card by special disk imaging software. This disk imaging software is included in the downloads at wandboard.org or can be downloaded according the instructions in paragraph 3.1.

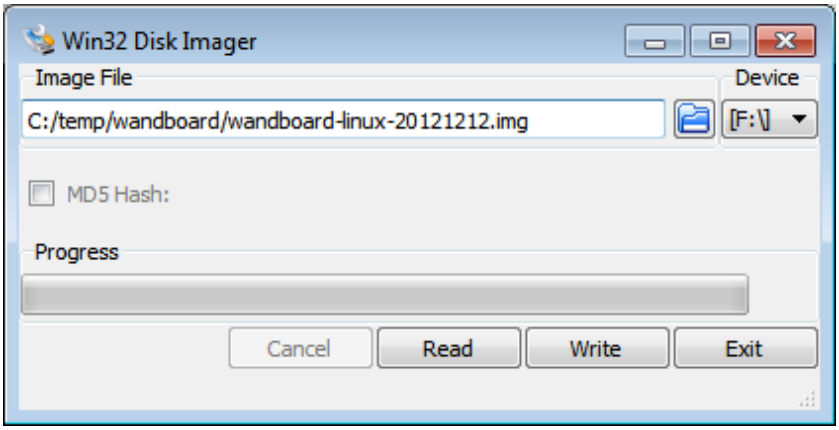
3.1 Download the Win32DiskImager software

a) Download *win32diskimager-binary.zip* from:
http://sourceforge.net/projects/win32diskimager/
b) Right click on the file and choose "Extract all".
c) This will create a new folder called *win32diskimager-binary*

You are now ready to write the Wandboard runtime image to your microSD card.

3.2 Writing the image to the microSD card

a) Insert your microSD card into your PC (Check which drive is assigned to your device).
b) In the folder you made in step 3.1(c), run the file named *Win32DiskImager.exe* (in Windows Vista, 7 and 8 we recommend that you right-click this file and choose "Run as administrator").
c) If the SD card (*Device*) you are using isn't found automatically. Click on the drop down box and select it
d) In the *Image File* box, choose the *.img* file that you download previously



Warning: Make sure you write to the correct device. (check step 3.2a)

e) Click *Write*
f) After a few minutes you receive a notification that your microSD has been created successfully.

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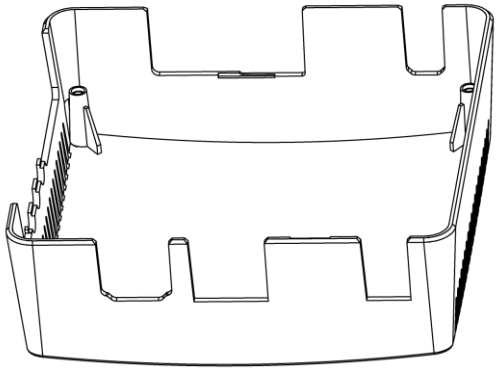
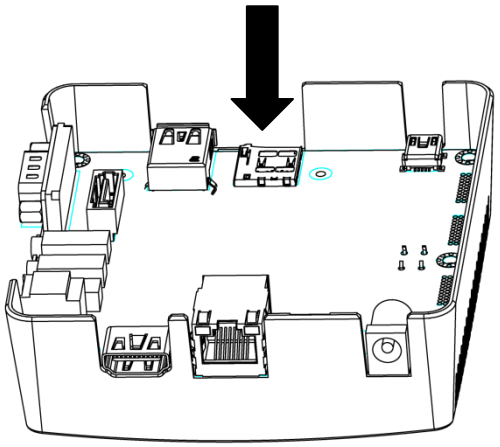
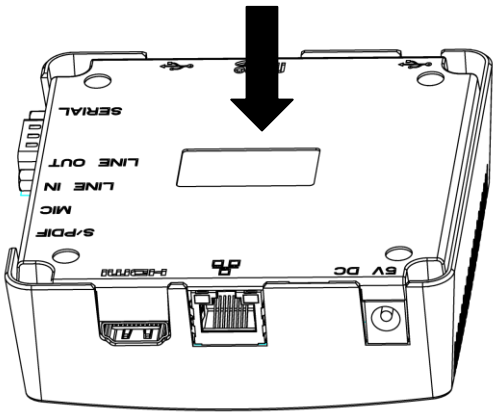
Assembly of the Wandboard Enclosure



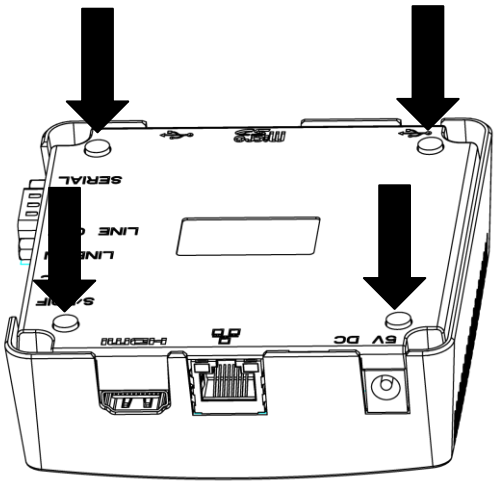
Step1 - Place the top-case on a soft surface



Step2 - Insert your Wandboard



Step3 - Insert bottom part



Step4 - Fasten the screws and the rubber feet

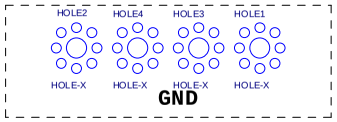
Schematics

On the following pages you will find the schematics of the Freescale iMX6 module and the Wandboard Interface Board.

Components marked with -x are not populated.

EDM-iMX6 REV:A

PAGE	TITLE
P01	Index
P02	iMX6_POWER
P03	iMX6_DDR3
P04	iMX6_SOC
P05	iMX6_USB
P06	GiGa Ethernet
P07	WLAN & BT
P08	Expansion CONN.



RoHS compliant

WANDBOARD.ORG		
Title: Index		
Size: C	Document Number: EDM-iMX6	Rev: A
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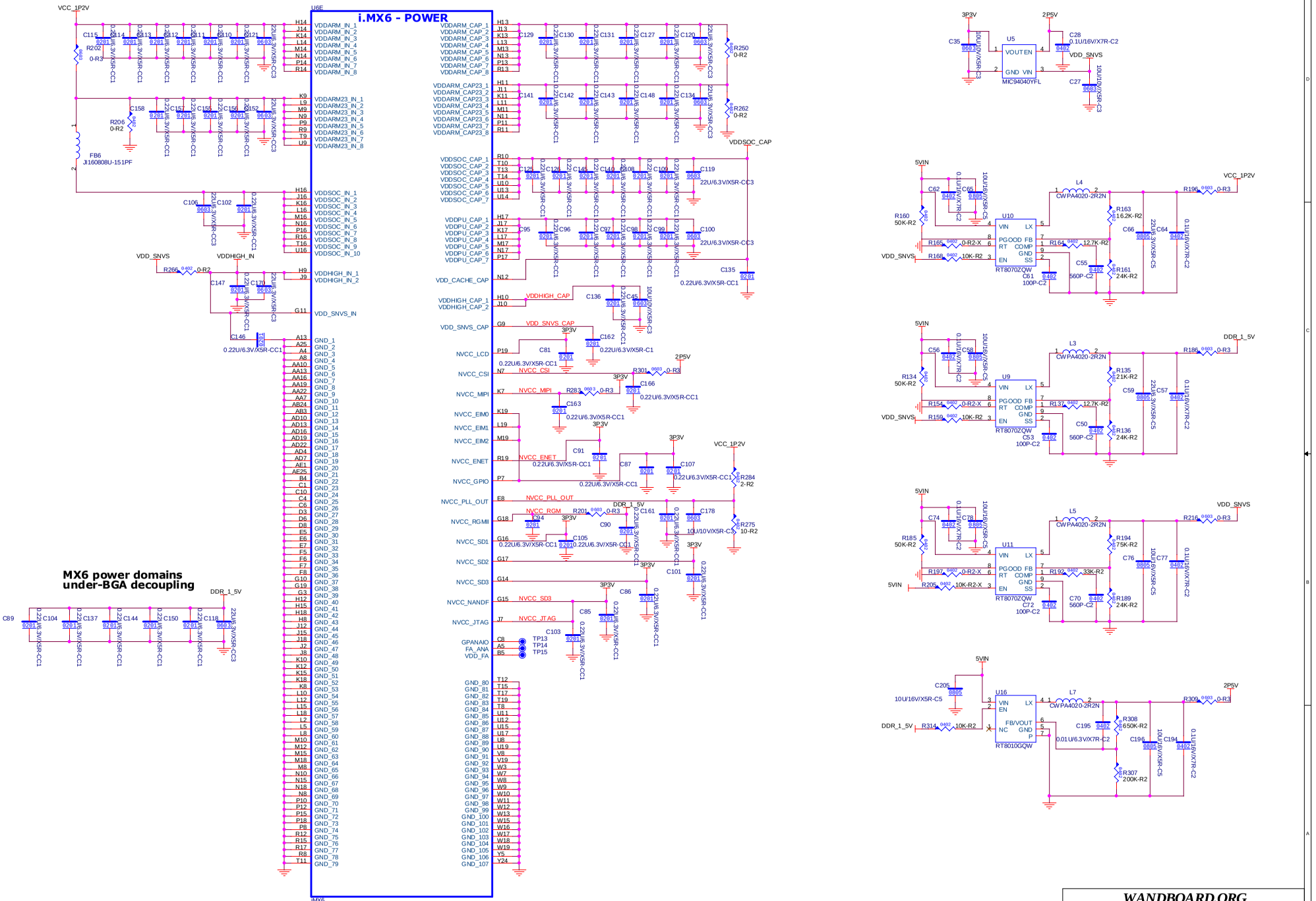
i.MX6 - POWER
MX6 power domains
under-BGA decoupling
VCC_1P2V
VDDSOC_CAP
VDD_SNVS
VDDHIGH_IN
DDR_1_5V
5VIN
3P3V
2P5V
VCC_1P2V
VDD_SNVS
DDR_1_5V
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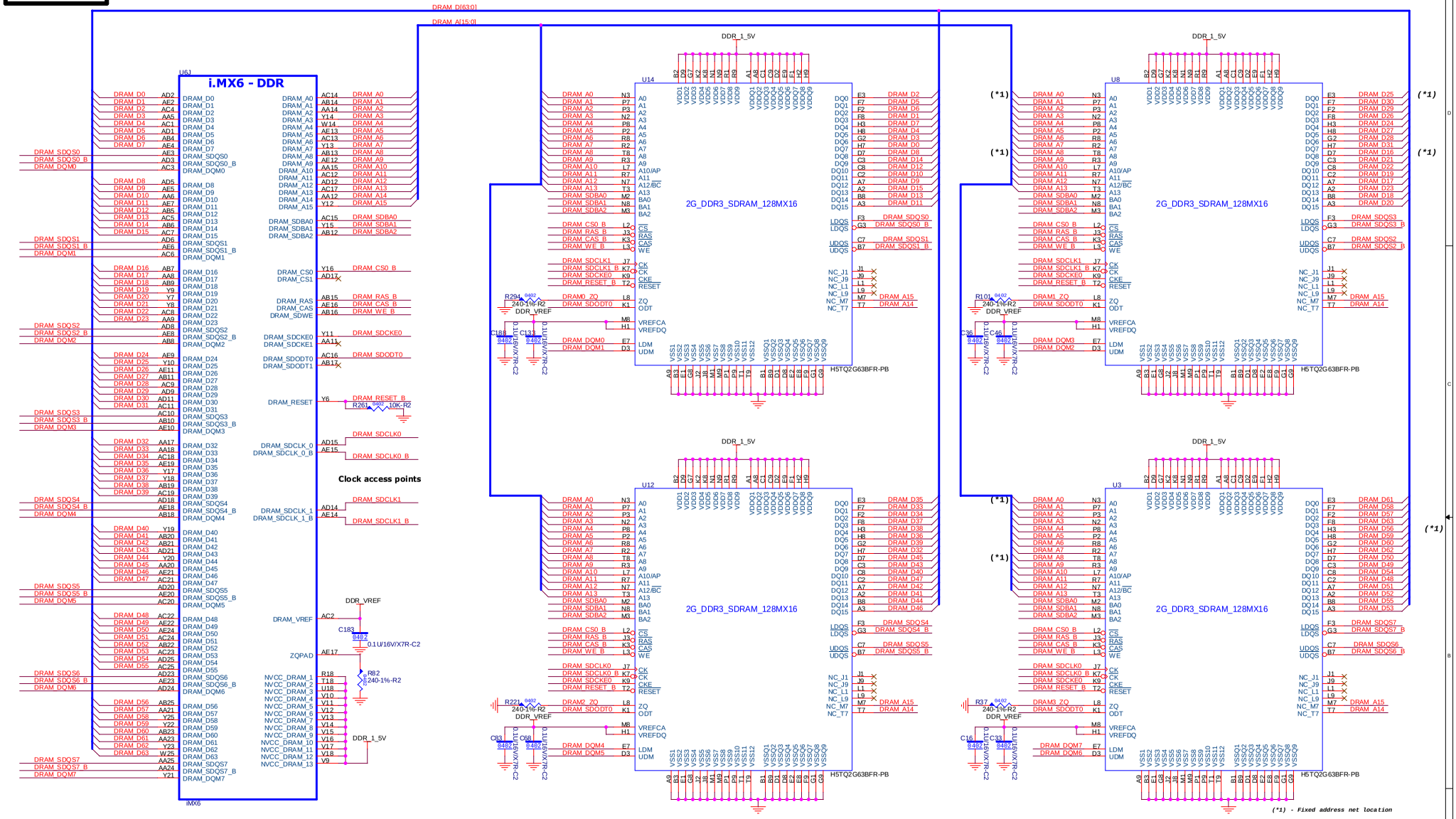
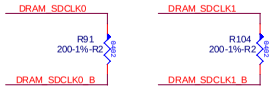
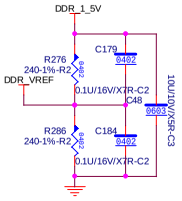
COU POWER DOMAIN
EDM-iMX6
Thursday, February 07, 2013

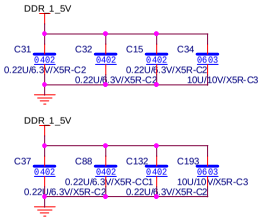
DDR3 2GB

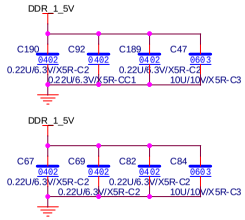


Clock terminators
Place at each DDR pair









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Size: C	Document Number: EDM-iMX6	Rev: A
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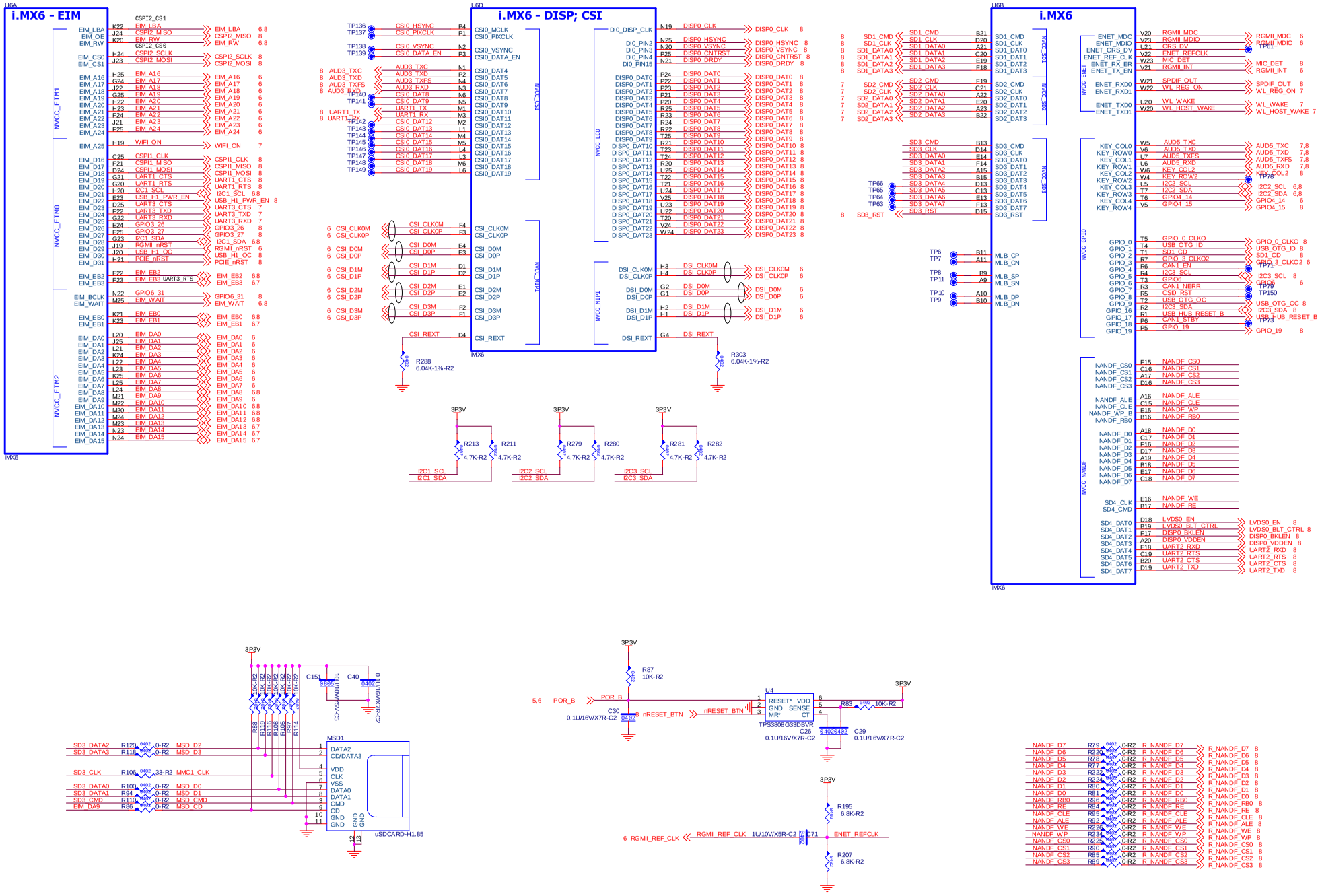
U6A
i.MX6 - EIM
NVCC_EIM1
NVCC_EIM0
NVCC_EIM2
iMX6
U6D
i.MX6 - DISP; CSI
NVCC_CSI
NVCC_LCD
NVCC_MIPI
iMX6
U6B
i.MX6
NVCC_ENET
NVCC_SD1
NVCC_SD2
NVCC_SD3
NVCC_GPIO
NVCC_NANDF
iMX6
3P3V
R288
6.04K-1%-R2
R303
6.04K-1%-R2
R213
R211
R279
R280
R281
R282
4.7K-R2
I2C1_SCL
I2C1_SDA
I2C2_SCL
I2C2_SDA
I2C3_SCL
I2C3_SDA
MSD1
uSDCARD-H1.85
R87
10K-R2
POR_B
U4
TPS3808G33DBVR
nRESET_BTN
C30
0.1U/16V/X7R-C2
C26
0.1U/16V/X7R-C2
C29
0.1U/16V/X7R-C2
R83
10K-R2
R195
6.8K-R2
R207
6.8K-R2
RGMII_REF_CLK
1U/10V/X5R-C2
C71
ENET_REFCLK
WANDBOARD.ORG
CPU SIGNAL DOMAIN
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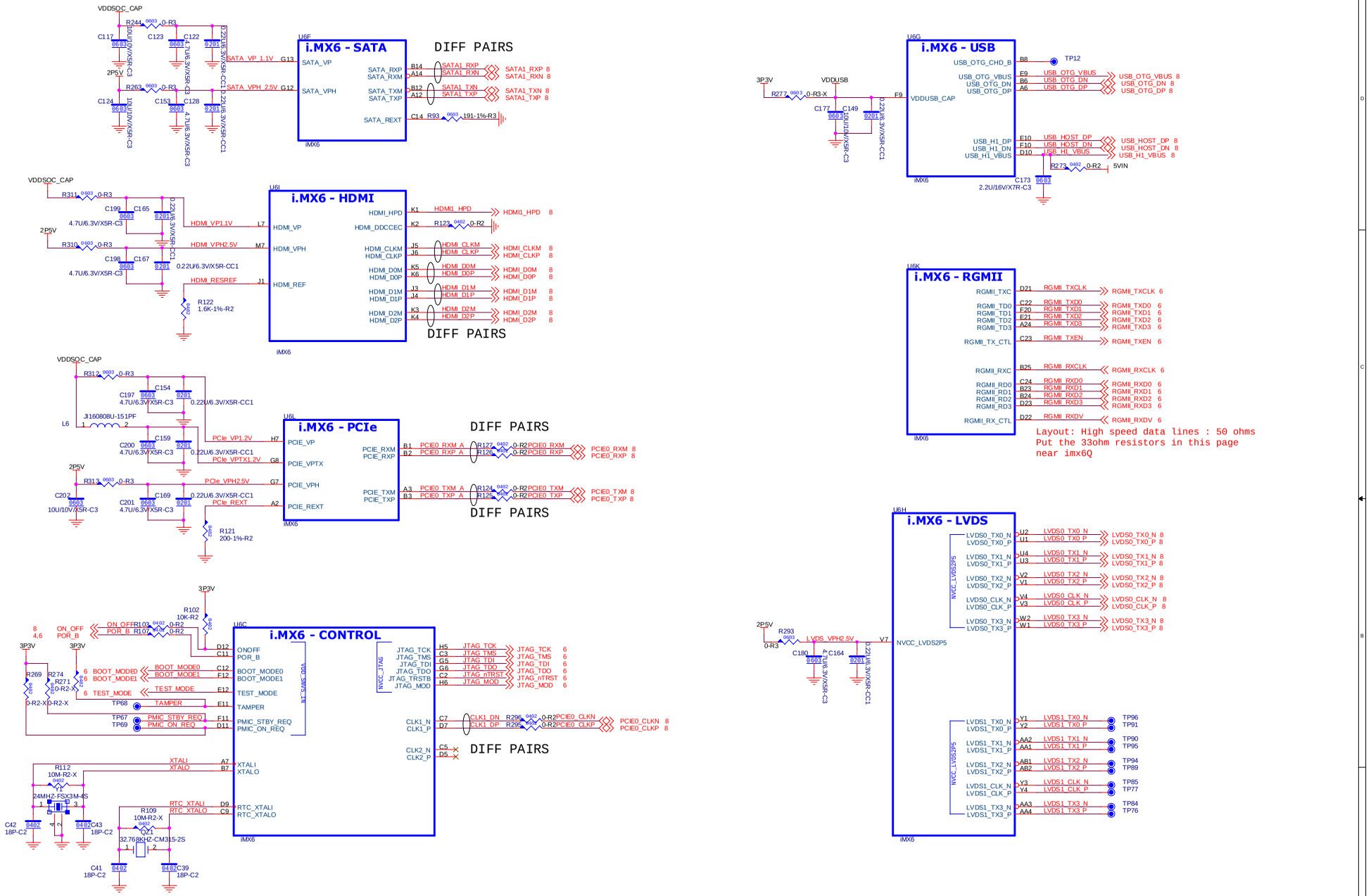
i.MX6 - SATA
DIFF PAIRS
SATA_VP
SATA_VPH
SATA_RXP
SATA_RXM
SATA_TXM
SATA_TXP
SATA_REXT
SATA_VP_1.1V
SATA_VPH_2.5V
SATA1_RXP
SATA1_RXN
SATA1_TXN
SATA1_TXP
i.MX6 - HDMI
HDMI_VP
HDMI_VPH
HDMI_REF
HDMI_HPD
HDMI_DDCCEC
HDMI_CLKM
HDMI_CLKP
HDMI_D0M
HDMI_D0P
HDMI_D1M
HDMI_D1P
HDMI_D2M
HDMI_D2P
HDMI_VP1_1V
HDMI_VPH2.5V
HDMI_RESREF
HDMI1_HPD
HDMI_CLKM
HDMI_CLKP
HDMI_D0M
HDMI_D0P
HDMI_D1M
HDMI_D1P
HDMI_D2M
HDMI_D2P
i.MX6 - PCIe
PCIE_VP
PCIE_VPTX
PCIE_VPH
PCIE_REXT
PCIE_RXM
PCIE_RXP
PCIE_TXM
PCIE_TXP
PCIe_VP1_2V
PCIe_VPTX1_2V
PCIe_VPH2.5V
PCIe_REXT
PCIE0_RXM_A
PCIE0_RXP_A
PCIE0_TXM_A
PCIE0_TXP_A
PCIE0_RXM
PCIE0_RXP
PCIE0_TXM
PCIE0_TXP
i.MX6 - CONTROL
ONOFF
POR_B
BOOT_MODE0
BOOT_MODE1
TEST_MODE
TAMPER
PMIC_STBY_REQ
PMIC_ON_REQ
XTALI
XTALO
RTC_XTALI
RTC_XTALO
JTAG_TCK
JTAG_TMS
JTAG_TDI
JTAG_TDO
JTAG_TRSTB
JTAG_MOD
CLK1_N
CLK1_P
CLK2_N
CLK2_P
NVCC_JTAG
VDD_SNVS_CAP
i.MX6 - USB
USB_OTG_CHD_B
USB_OTG_VBUS
USB_OTG_DN
USB_OTG_DP
USB_H1_DP
USB_H1_DN
USB_H1_VBUS
VDDUSB_CAP
USB_HOST_DP
USB_HOST_DN
USB_H1_VBUS
i.MX6 - RGMII
RGMII_TXC
RGMII_TD0
RGMII_TD1
RGMII_TD2
RGMII_TD3
RGMII_TX_CTL
RGMII_RXC
RGMII_RD0
RGMII_RD1
RGMII_RD2
RGMII_RD3
RGMII_RX_CTL
RGMII_TXCLK
RGMII_TXD0
RGMII_TXD1
RGMII_TXD2
RGMII_TXD3
RGMII_TXEN
RGMII_RXCLK
RGMII_RXD0
RGMII_RXD1
RGMII_RXD2
RGMII_RXD3
RGMII_RXDV
Layout: High speed data lines : 50 ohms
Put the 33ohm resistors in this page
near imx6Q
i.MX6 - LVDS
NVCC_LVDS2P5
LVDS0_TX0_N
LVDS0_TX0_P
LVDS0_TX1_N
LVDS0_TX1_P
LVDS0_TX2_N
LVDS0_TX2_P
LVDS0_CLK_N
LVDS0_CLK_P
LVDS0_TX3_N
LVDS0_TX3_P
LVDS1_TX0_N
LVDS1_TX0_P
LVDS1_TX1_N
LVDS1_TX1_P
LVDS1_TX2_N
LVDS1_TX2_P
LVDS1_CLK_N
LVDS1_CLK_P
LVDS1_TX3_N
LVDS1_TX3_P
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IMX6Q_LVDS/USB
EDM-iMX6
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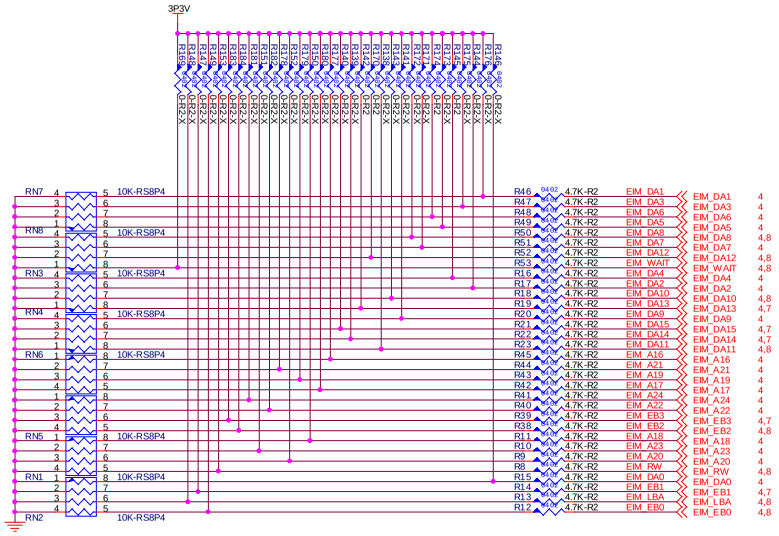
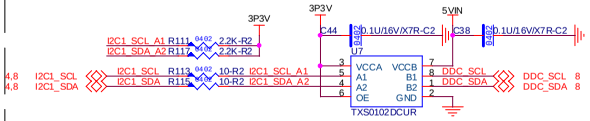
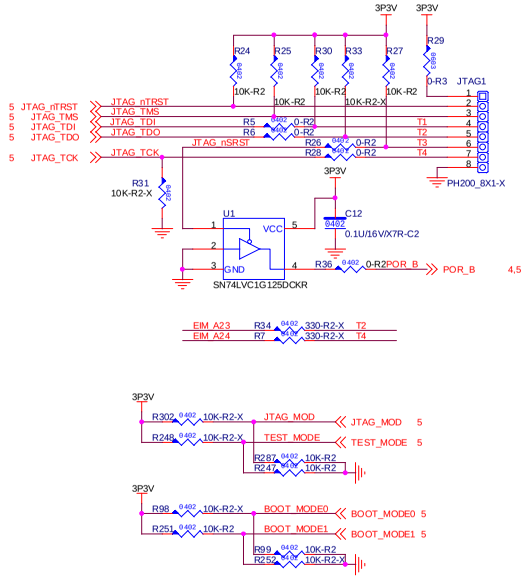
Boot Config Select



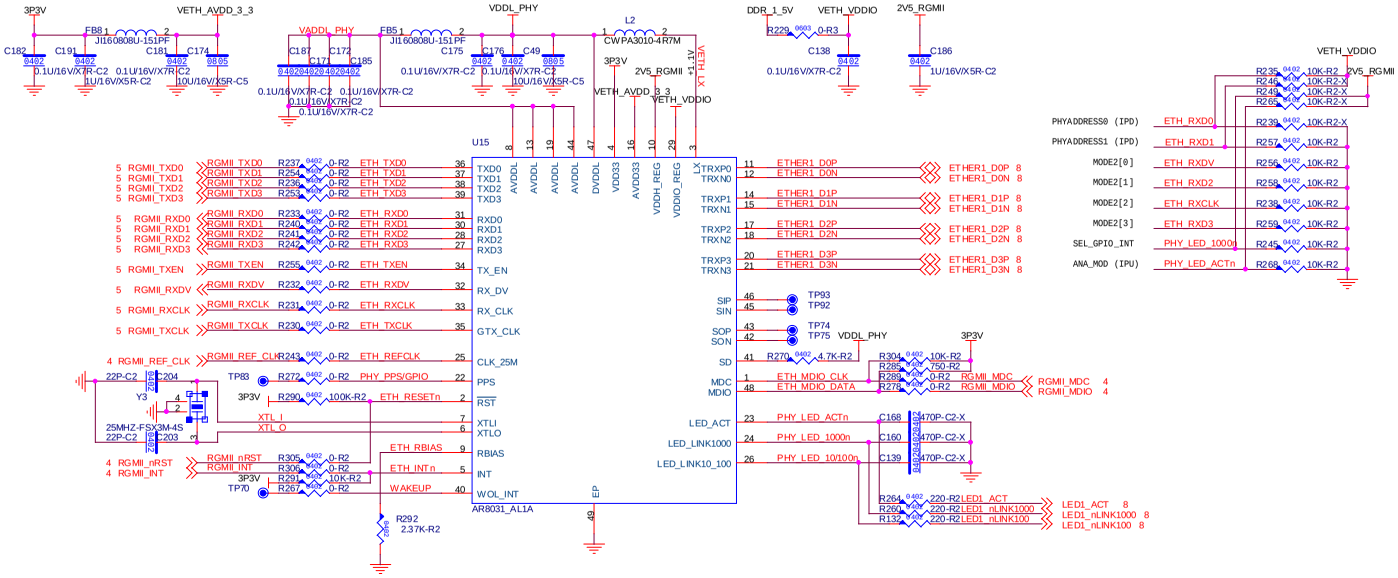
JTAG



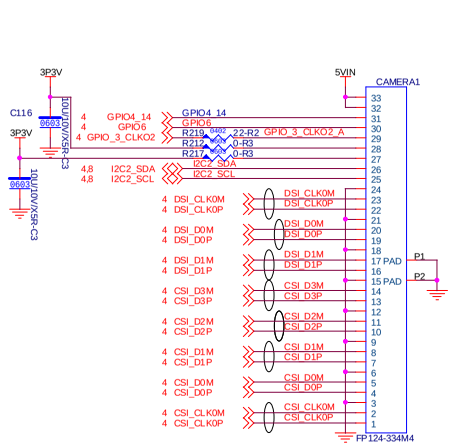
JTAG



Ethernet



CAMERA



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Size: C	Document Number: EDM-iMX6	Rev: A
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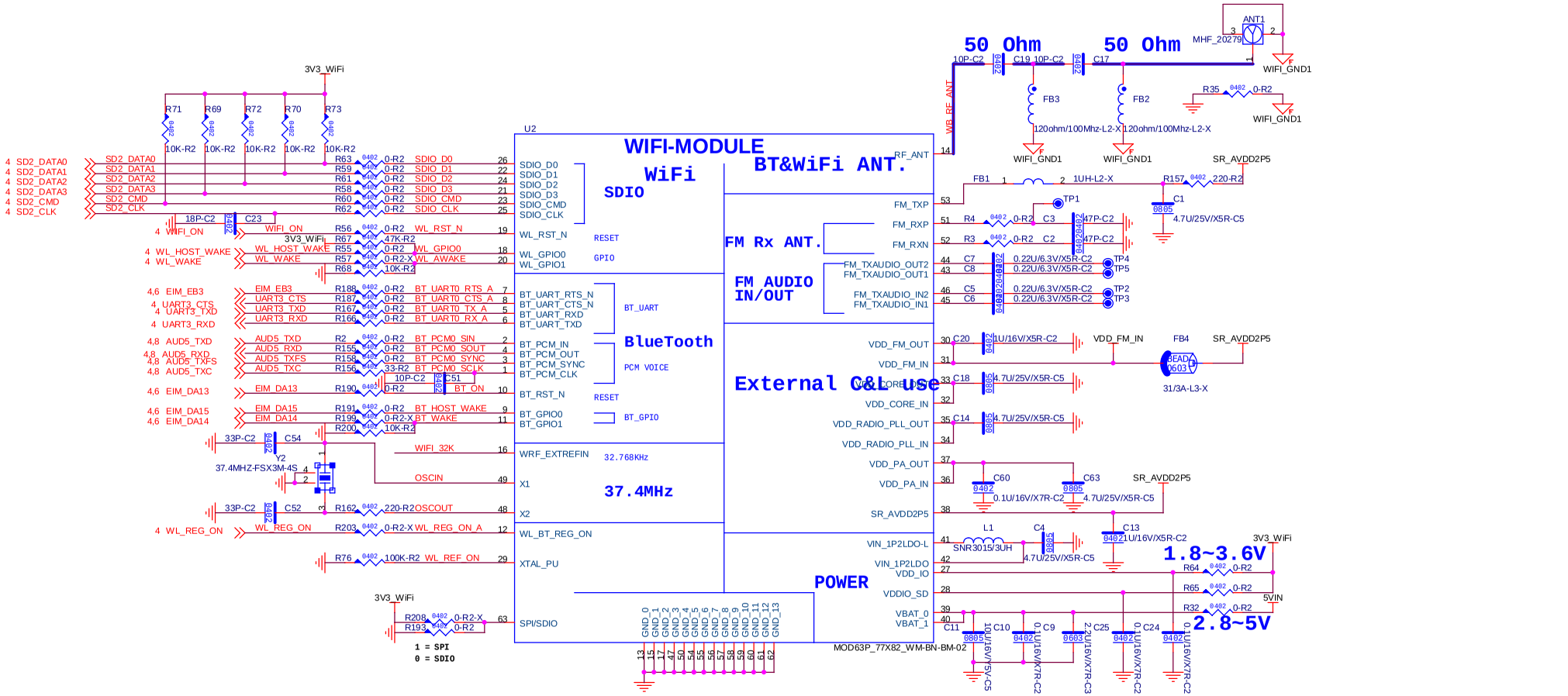
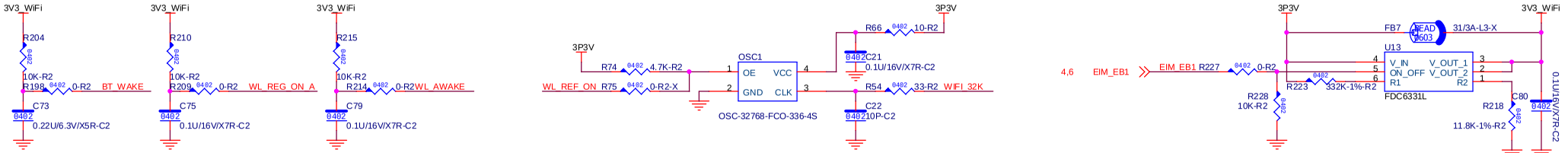
WIFI+BT





WANDBOARD.ORG	
Title	WIFI-MODULE
Size: Custom	Document Number: EDM-iMX6
Rev	A
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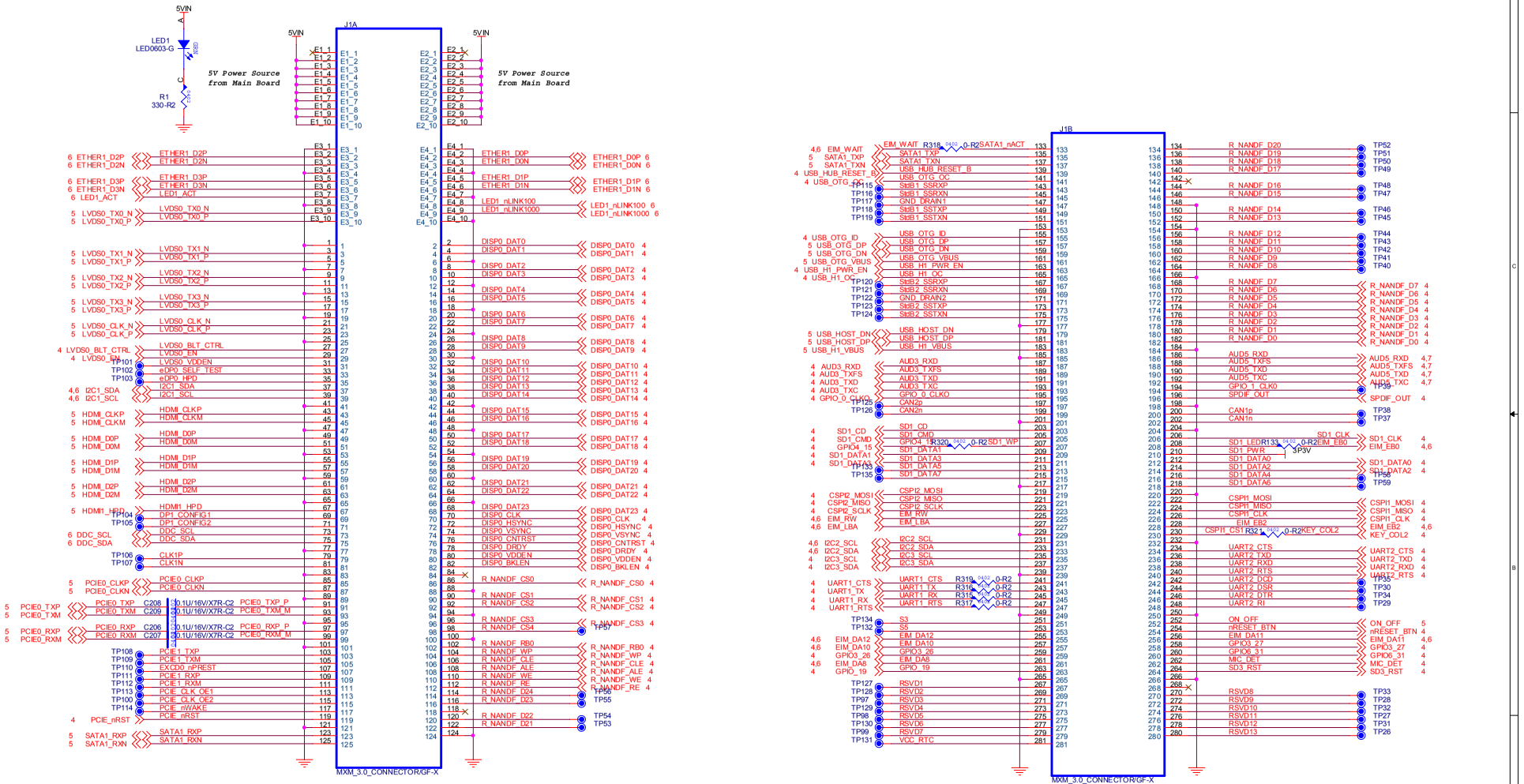
Board to Board



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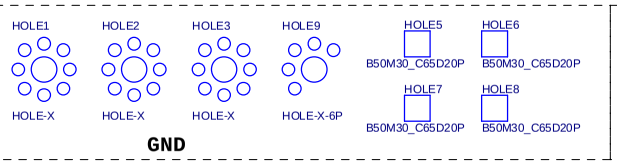
P03	DC-DC & M-SD
P04	HOST & Client
P05	Audio & RJ45
P06	LVDS & HDMI & SATA



RoHS compliant

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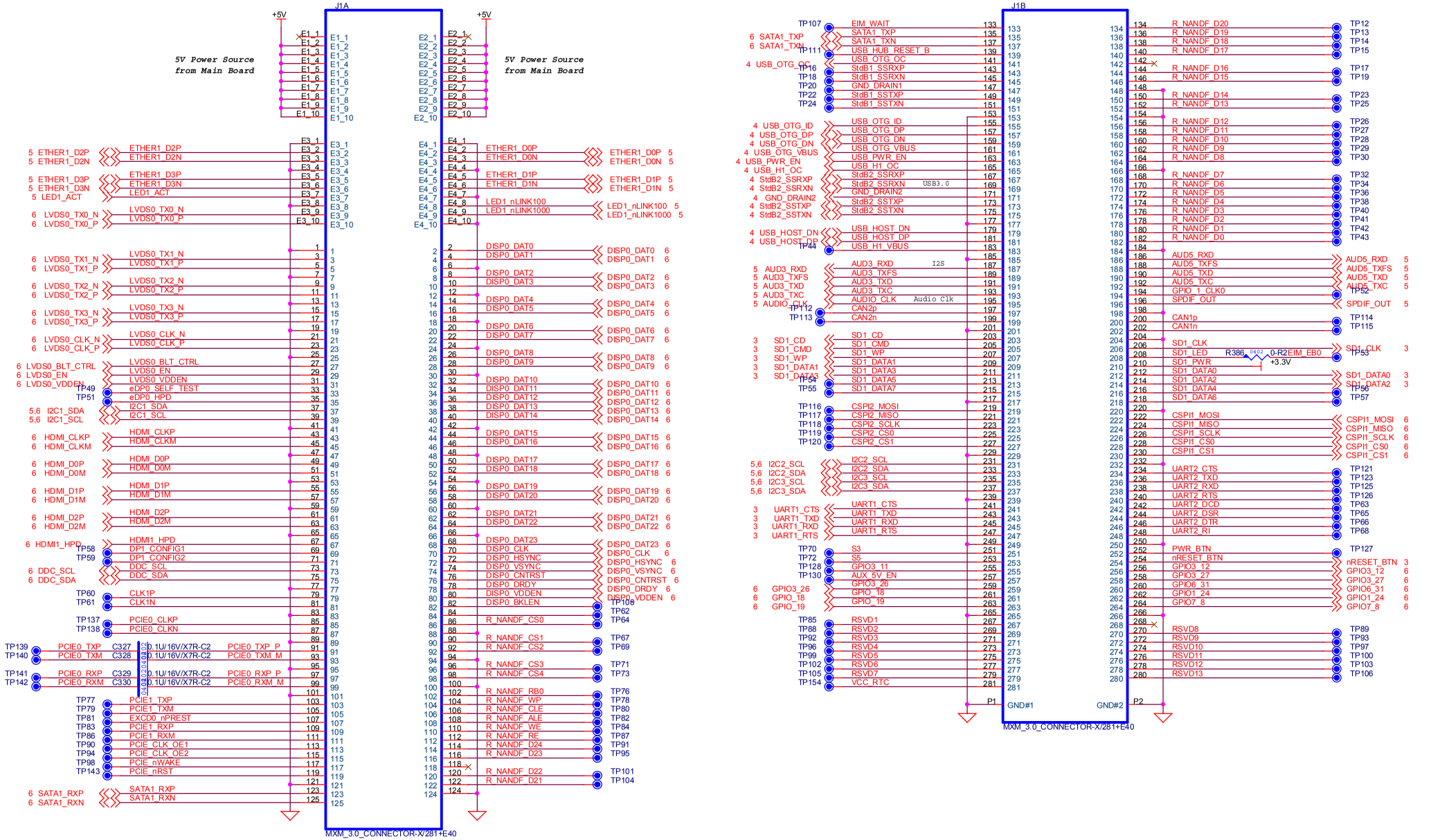

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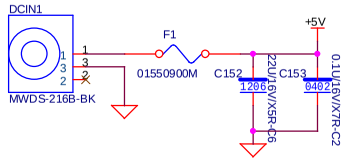
DC JACK



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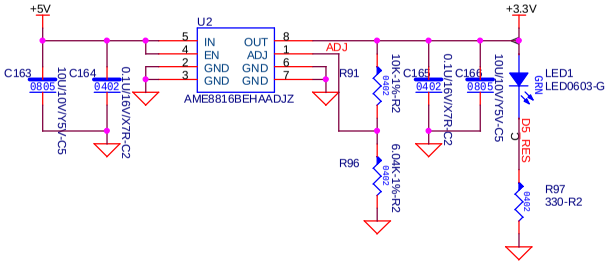
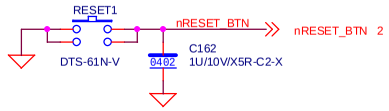
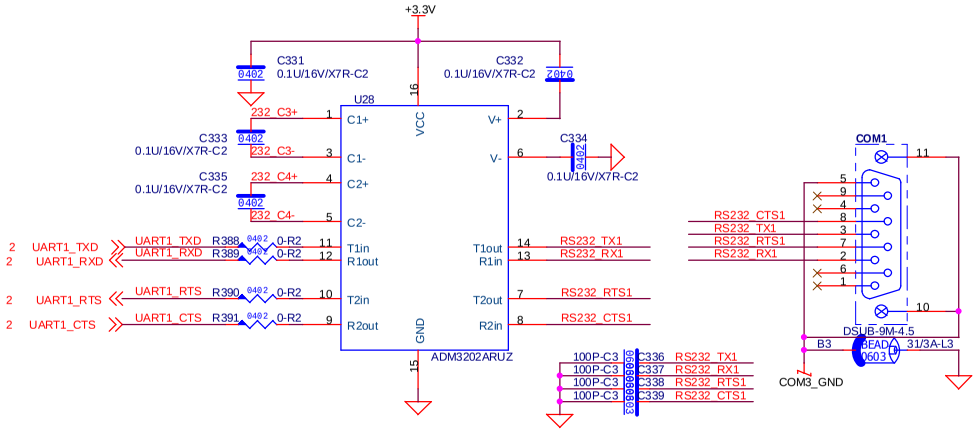


Button



UART



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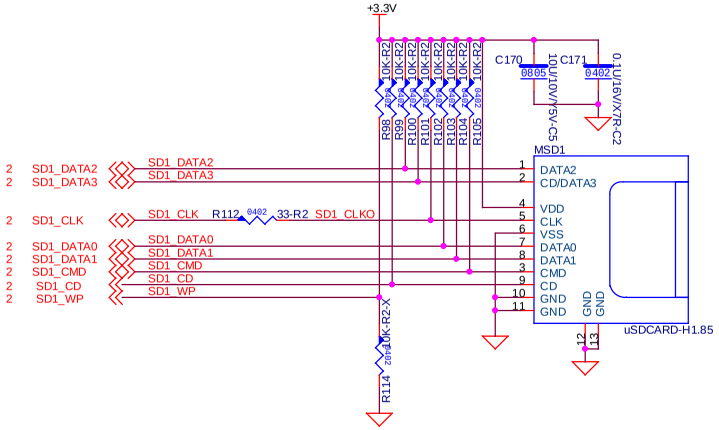

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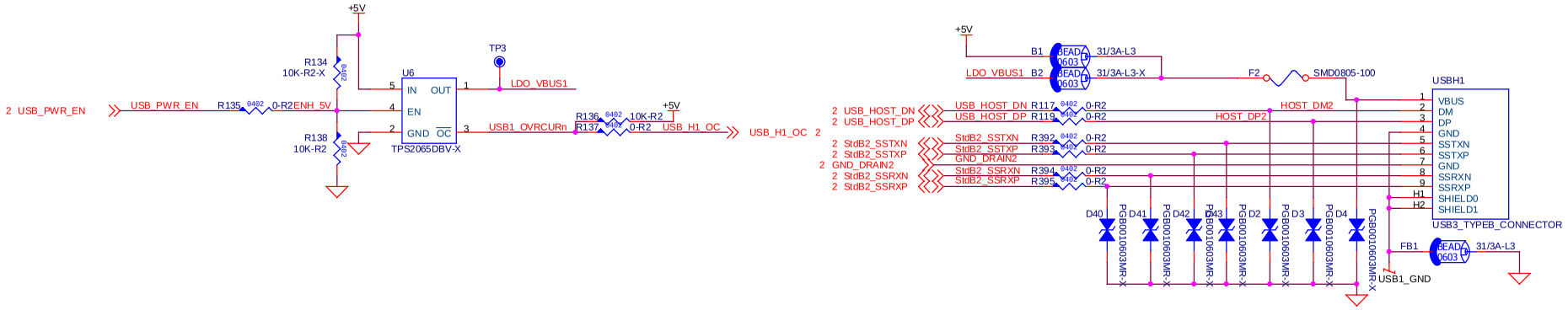
HOST USB



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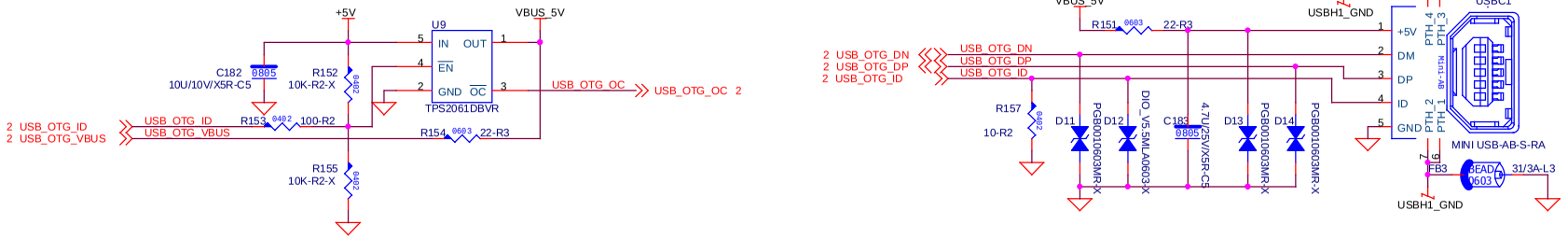

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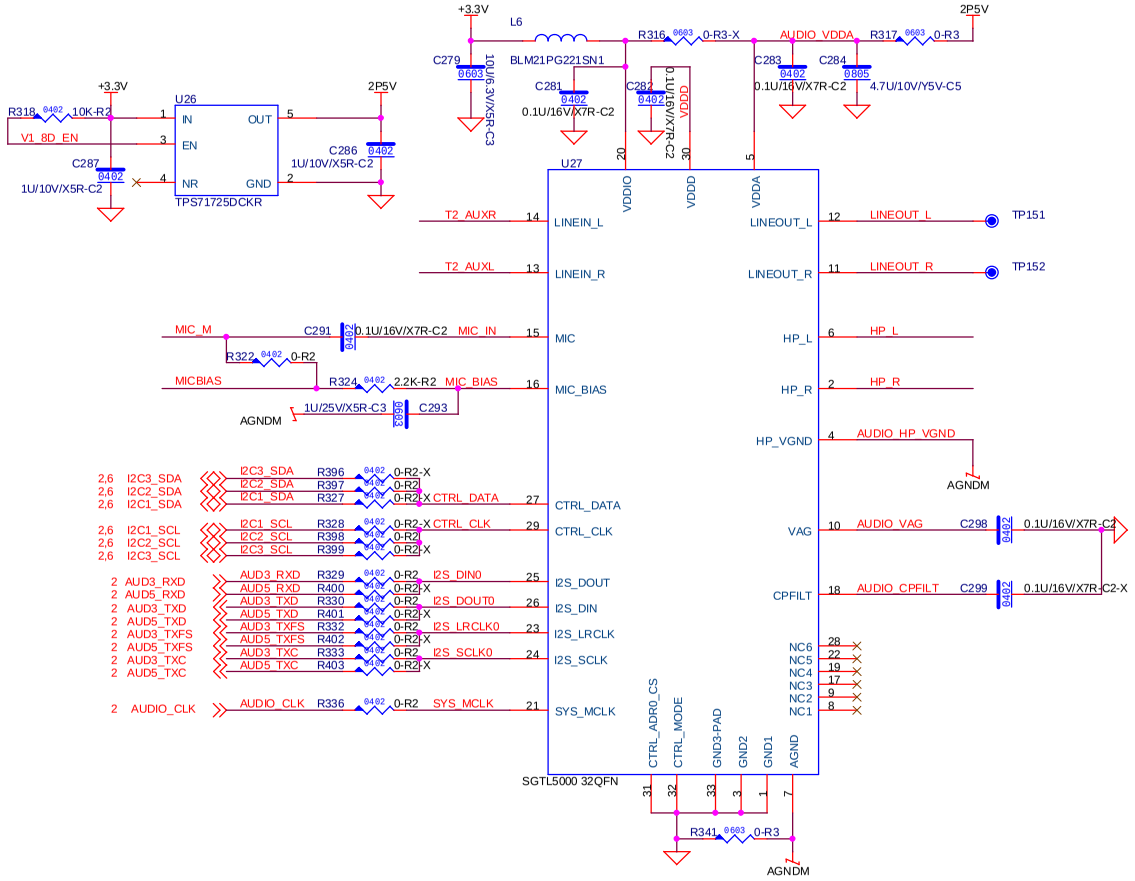
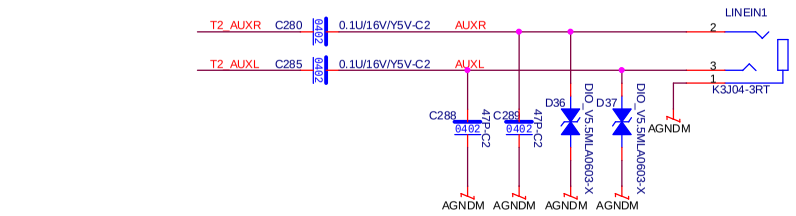
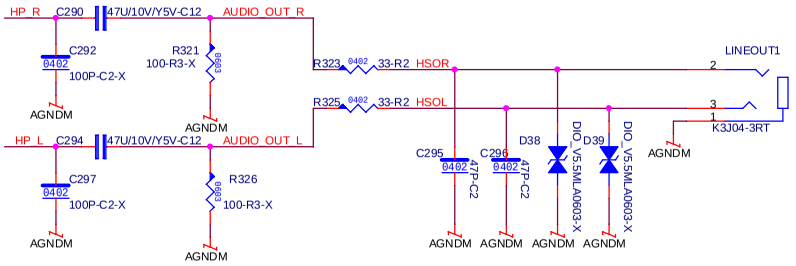
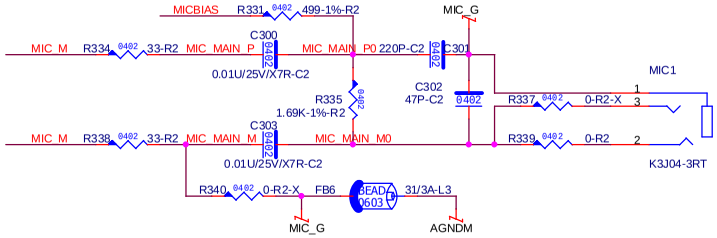
AUDIO









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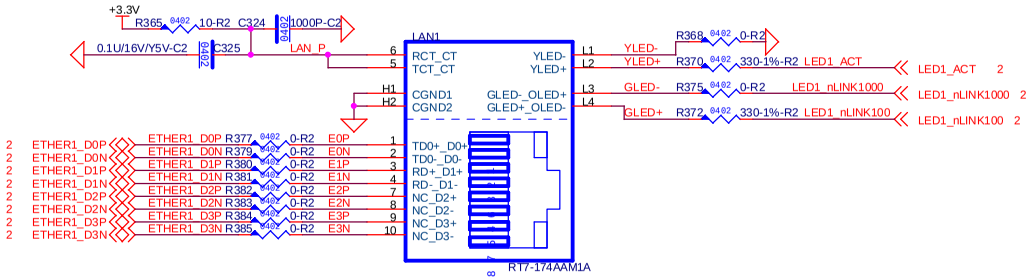

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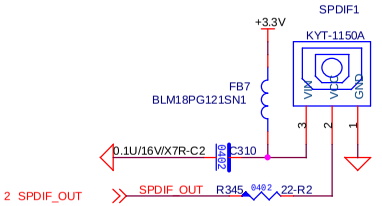

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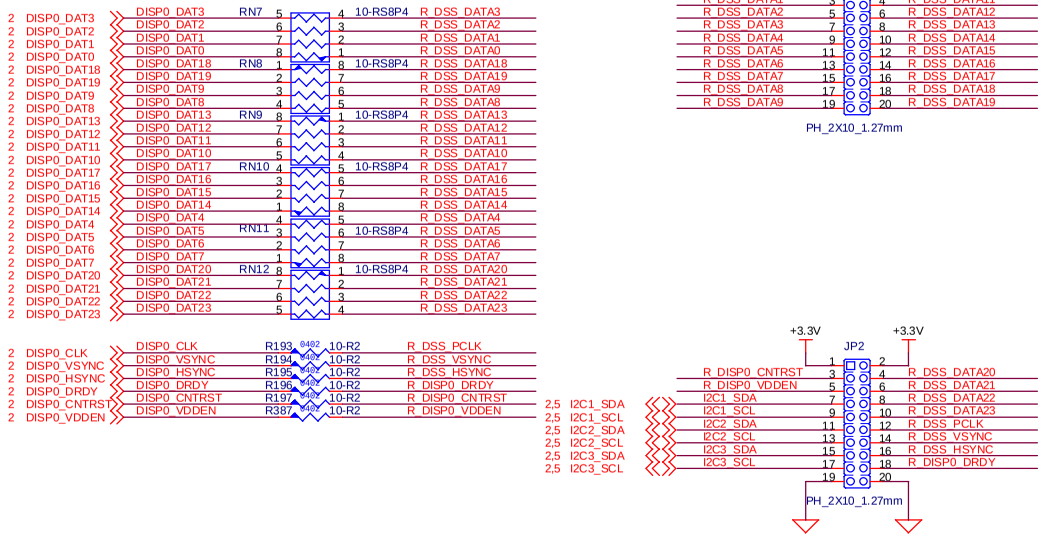
TTL



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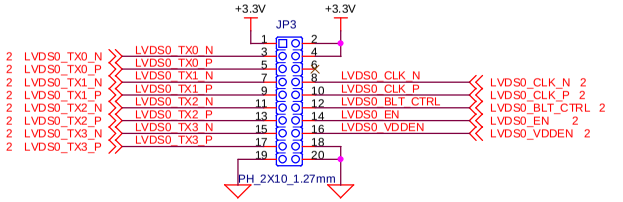

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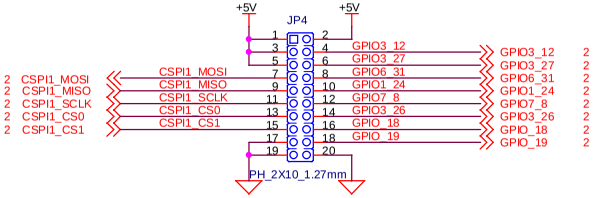

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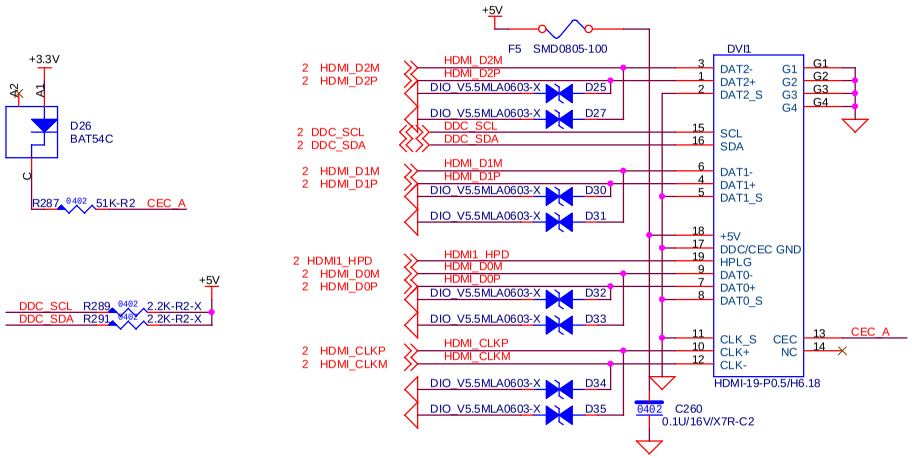
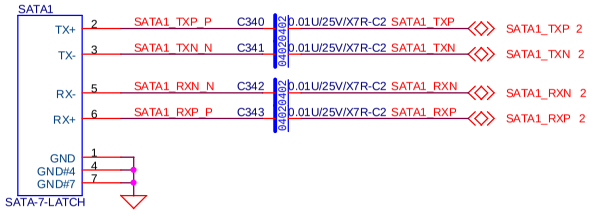


SATA



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