



WANDBOARD.ORG



WANDBOARD USER GUIDE

Revision B1

(20130620)



WANDBOARD DESIGN AND DISCLAIMER

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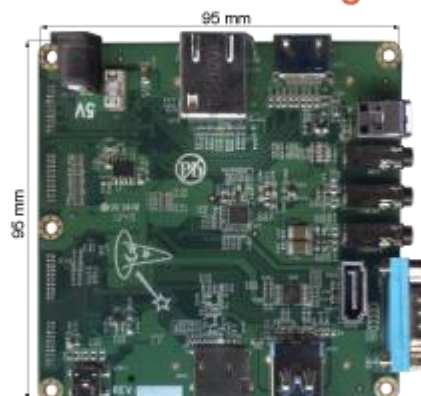
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Freescale i.MX6 Cortex-A9
Low cost open source community
Development Board

Dimensional drawing

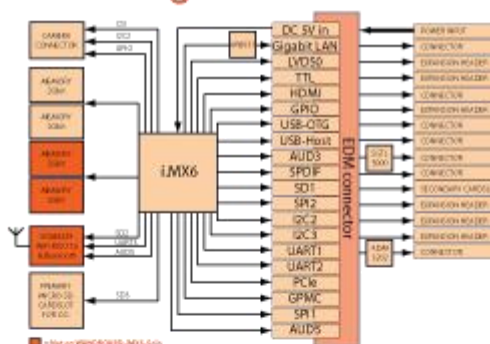


Specifications

	Wandboard Solo	Wandboard Dual	Wandboard Quad
Processor	i.MX6 Solo	i.MX6 DualLite	i.MX6 Quad
Cores	ARM Cortex-A9 Single core @ 1GHz	ARM Cortex-A9 Dual core @ 1GHz	ARM Cortex-A9 Quad core @ 1GHz
Memory	512 MB DDR3	1 GB DDR3	2 GB DDR3
Audio	✓	✓	✓
Optical S/PDIF	✓	✓	✓
HDMI	✓	✓	✓
Camera interface	✓	✓	✓
micro SD cardslot	2	2	2
Serial port	✓	✓	✓
Expansion Header	✓	✓	✓
USB	✓	✓	✓
USB OTG	✓	✓	✓
SATA connector	X	X	✓
Gigabit LAN	✓	✓	✓
WiFi (802.11n)	X	✓	✓
Bluetooth	X	✓	✓

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

Block diagram

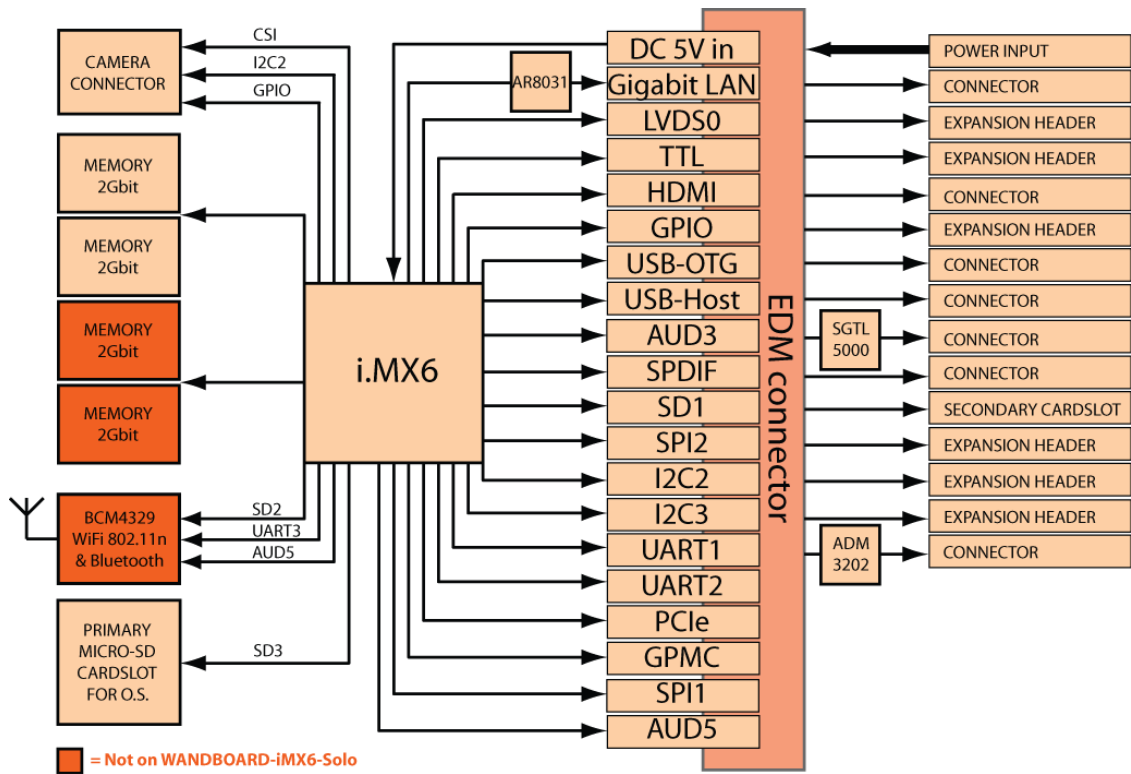


Order information

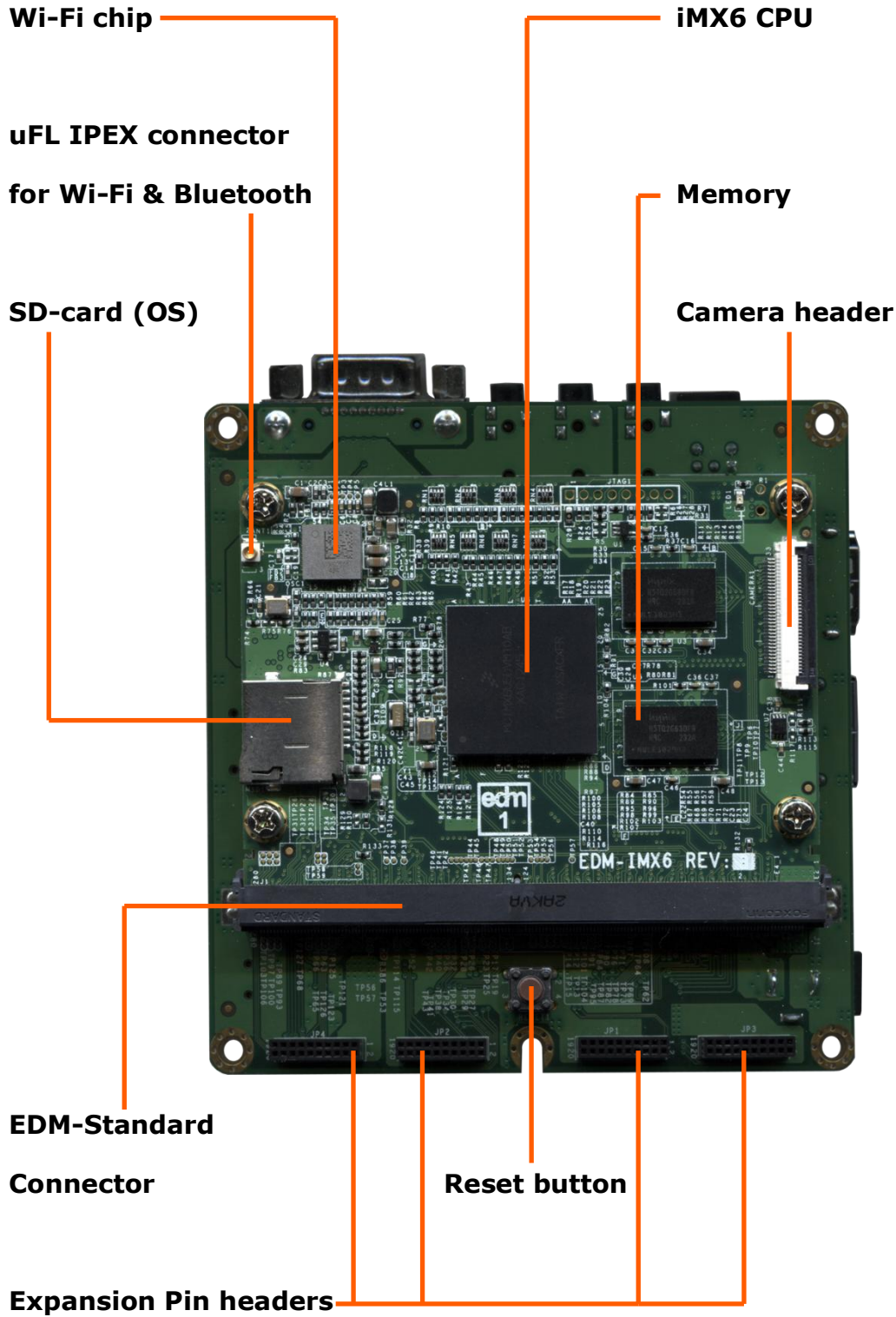
- wbsolo Wandboard i.MX6 Solo
- wbdual Wandboard i.MX6 DualLite
- wbquad Wandboard i.MX6 Quad
- wbenclosure Wandboard enclosure
- wbantennakit Wandboard antenna kit

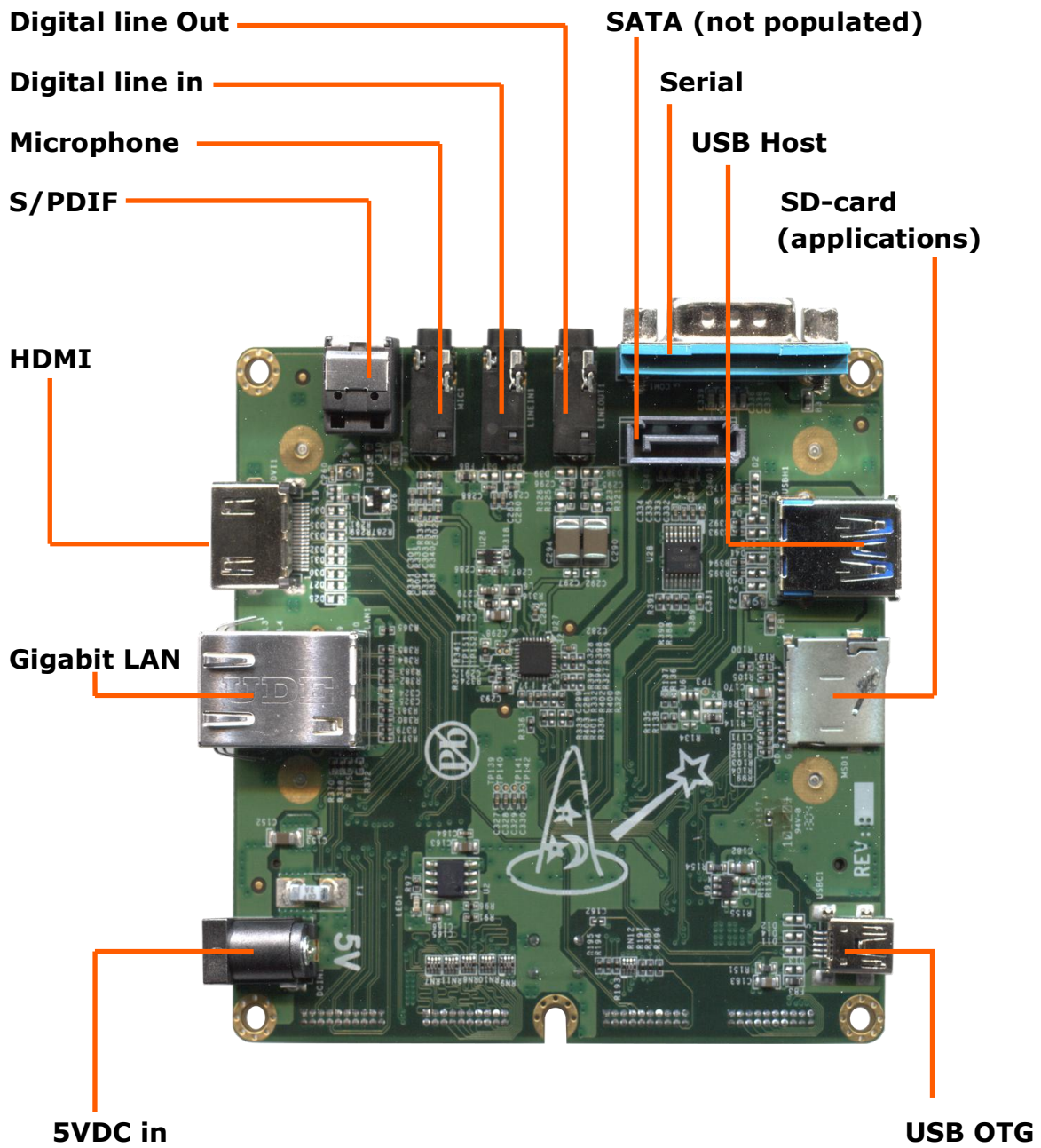


Block Diagram



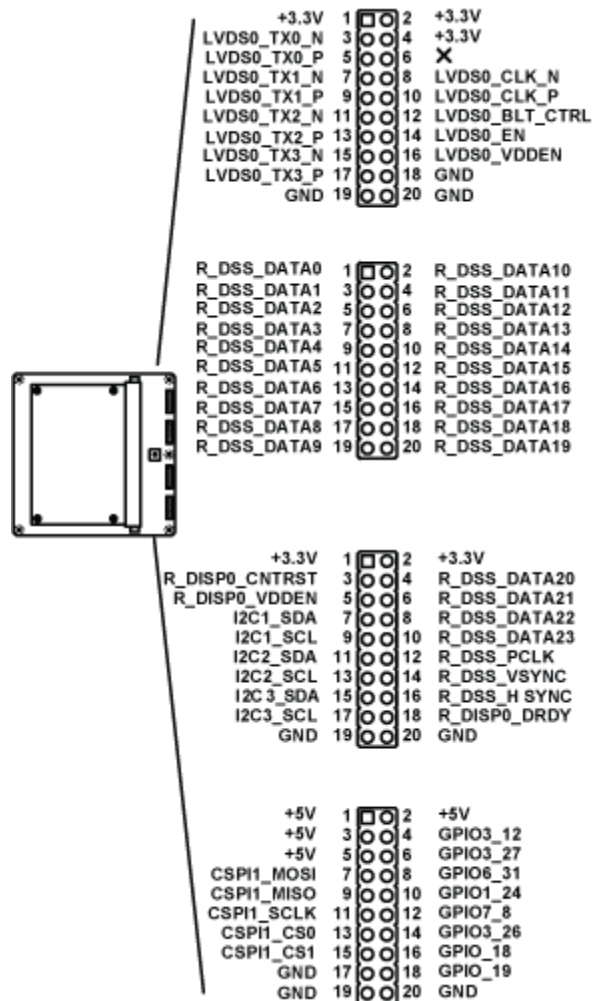
Overview



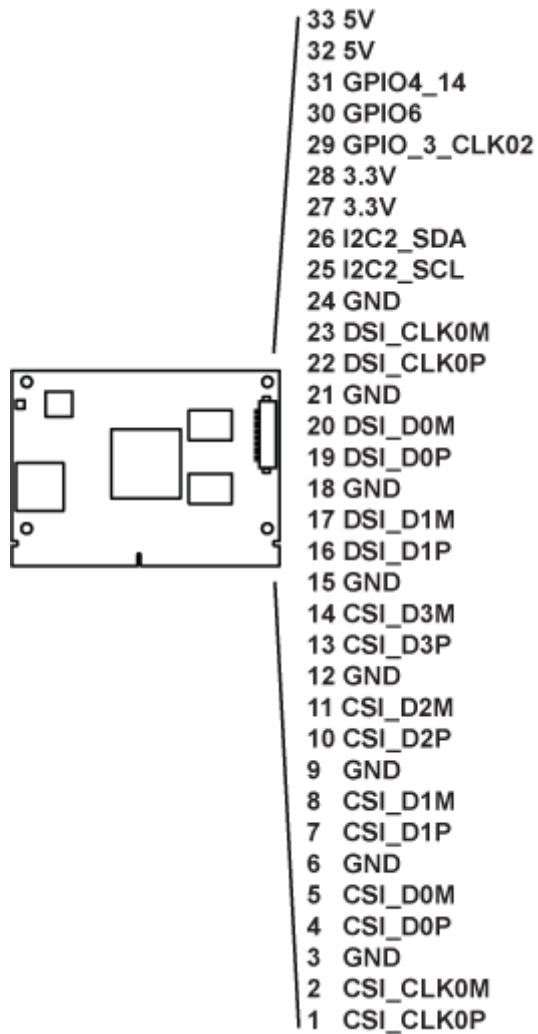




Expansion pin headers

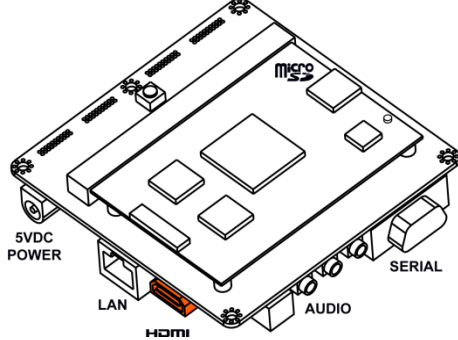


Camera header

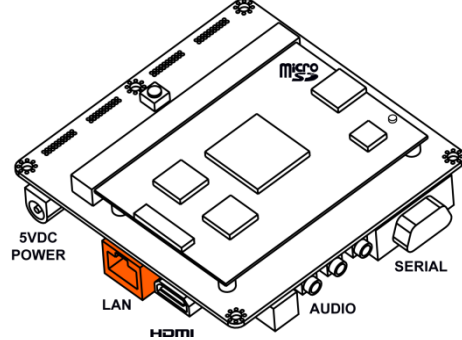


Quick Start Guide

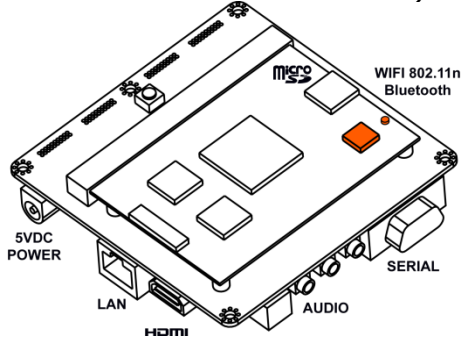
a) Connect display: use a quality HDMI cable to connect to your HDMI TV or Monitor.



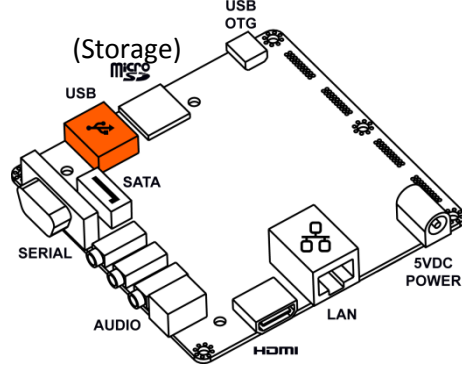
b) Connect network: use a standard RJ45 LAN cable to connect your wired network (optional)



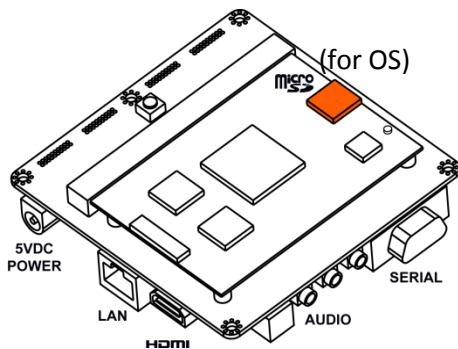
c) Connect wireless antenna (sold separately). This option is only available on Wandboard dual)



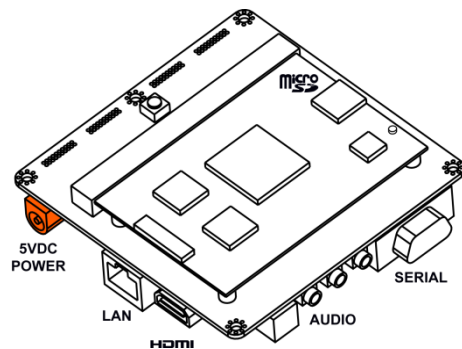
d) Connect a standard USB mouse or keyboard



e) Insert the microSD (orange microSD card slot)



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



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



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](http://www.wandboard.org) or can be downloaded according the instructions in paragraph 3.1.

3.1 Download the Win32DiskImager software

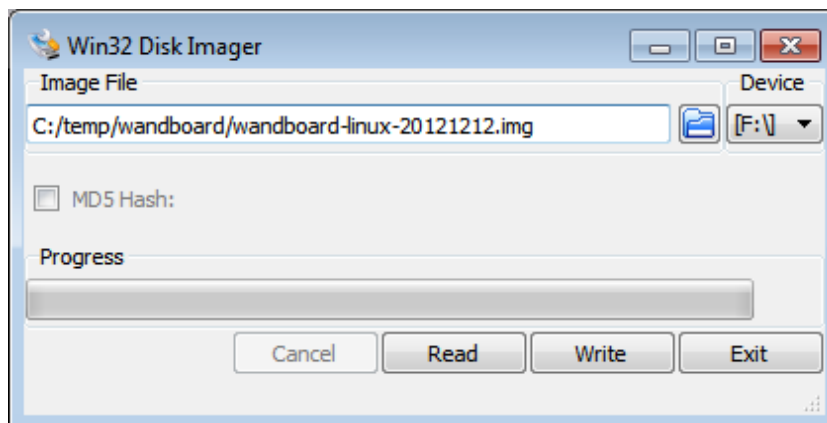
- a) Download *win32diskimager-binary.zip* from:
<http://sourceforge.net/projects/win32diskimager/>
- b) Right click on the file and choose "Extract all".
- c) This will create a new folder called *win32diskimager-binary*



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

3.2 Writing the image to the microSD card

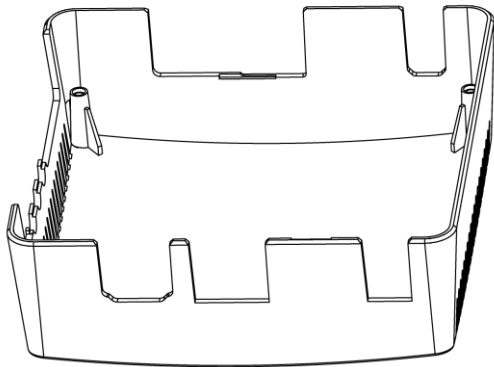
- a) Insert your microSD card into your PC (Check which drive is assigned to your device).
- b) In the folder you made in step 3.1(c), run the file named *Win32DiskImager.exe* (in Windows Vista, 7 and 8 we recommend that you right-click this file and choose "Run as administrator").
- c) If the SD card (*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



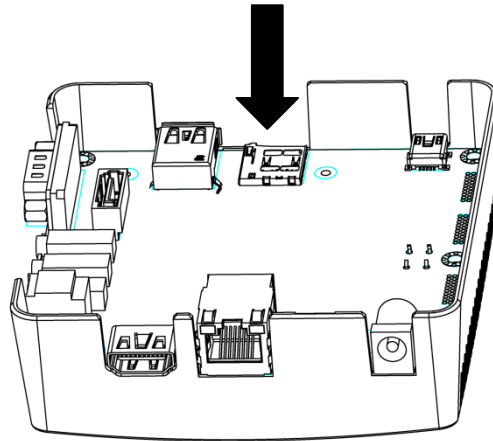
Warning: Make sure you write to the correct device. (check step 3.2a)

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

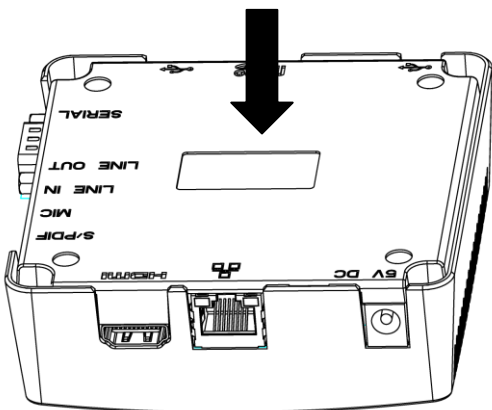
Assembly of the Wandboard Enclosure



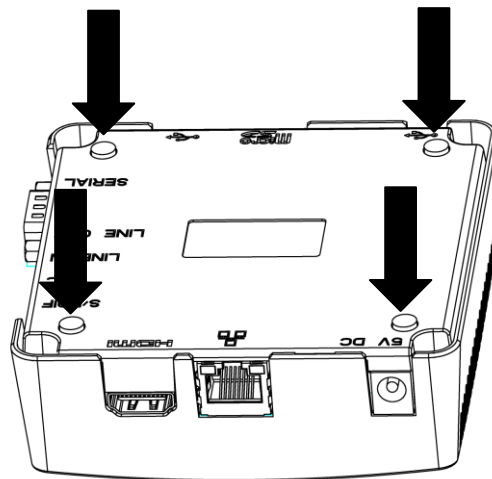
Step1 - Place the top-case on a soft surface



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 i.MX6 module and the Wandboard Interface Board.

Components marked with -x are not populated.

EDM-iMX6 REV:B1

PCB SN:101200480811

L=8, 82 x 60mm

PAGE TITLE

P01 Index

P02 IMX6_POWER

P03 IMX6_DDR3

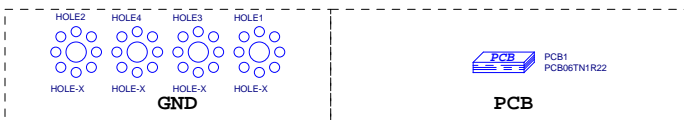
P04 IMX6_SOC

P05 IMX6_USB

P06 GiGa Ethernet

P07 WLAN & BT

P08 Expansion CONN.



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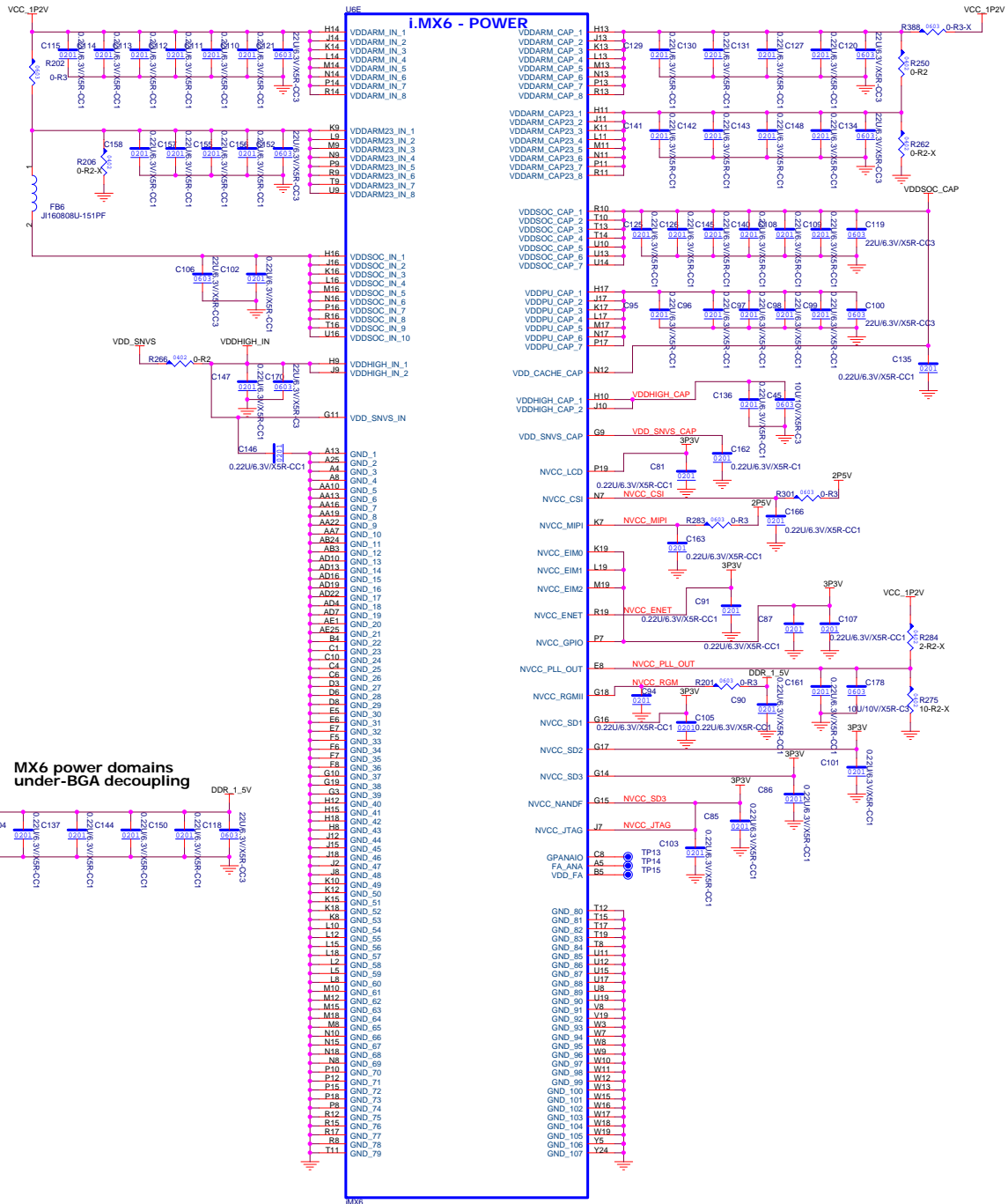
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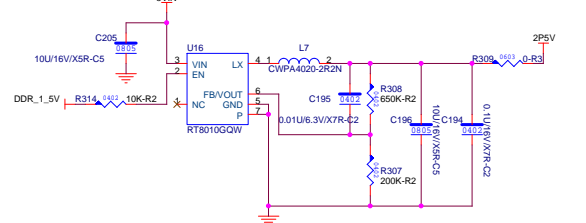
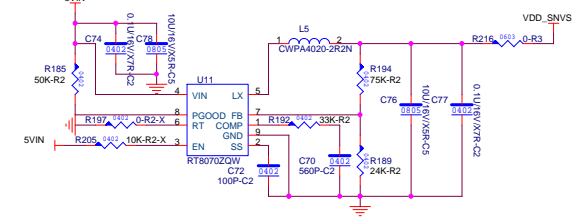
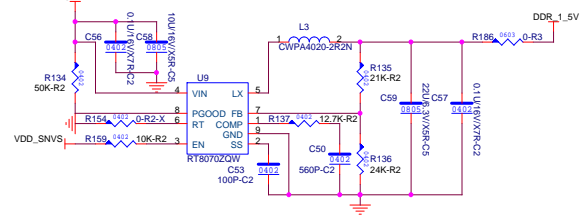
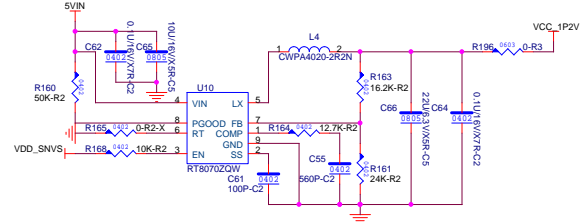
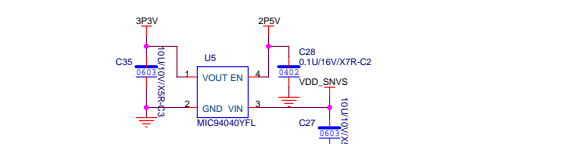
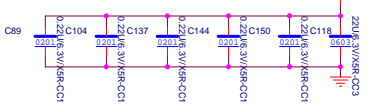
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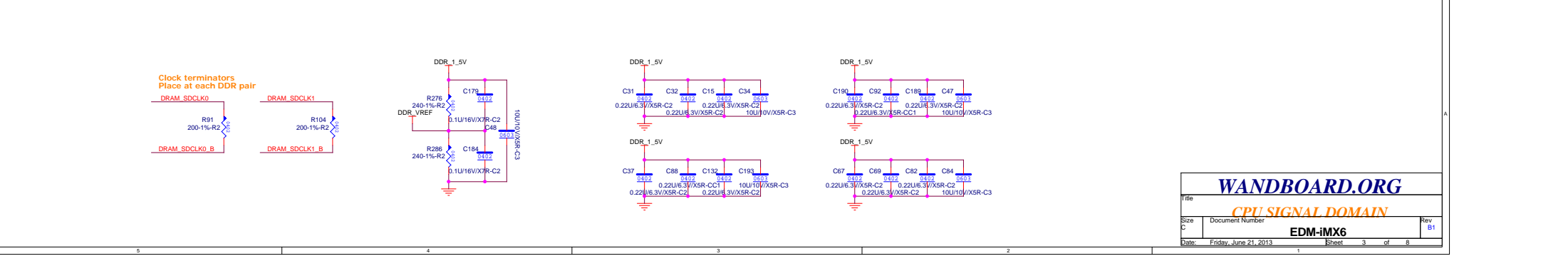
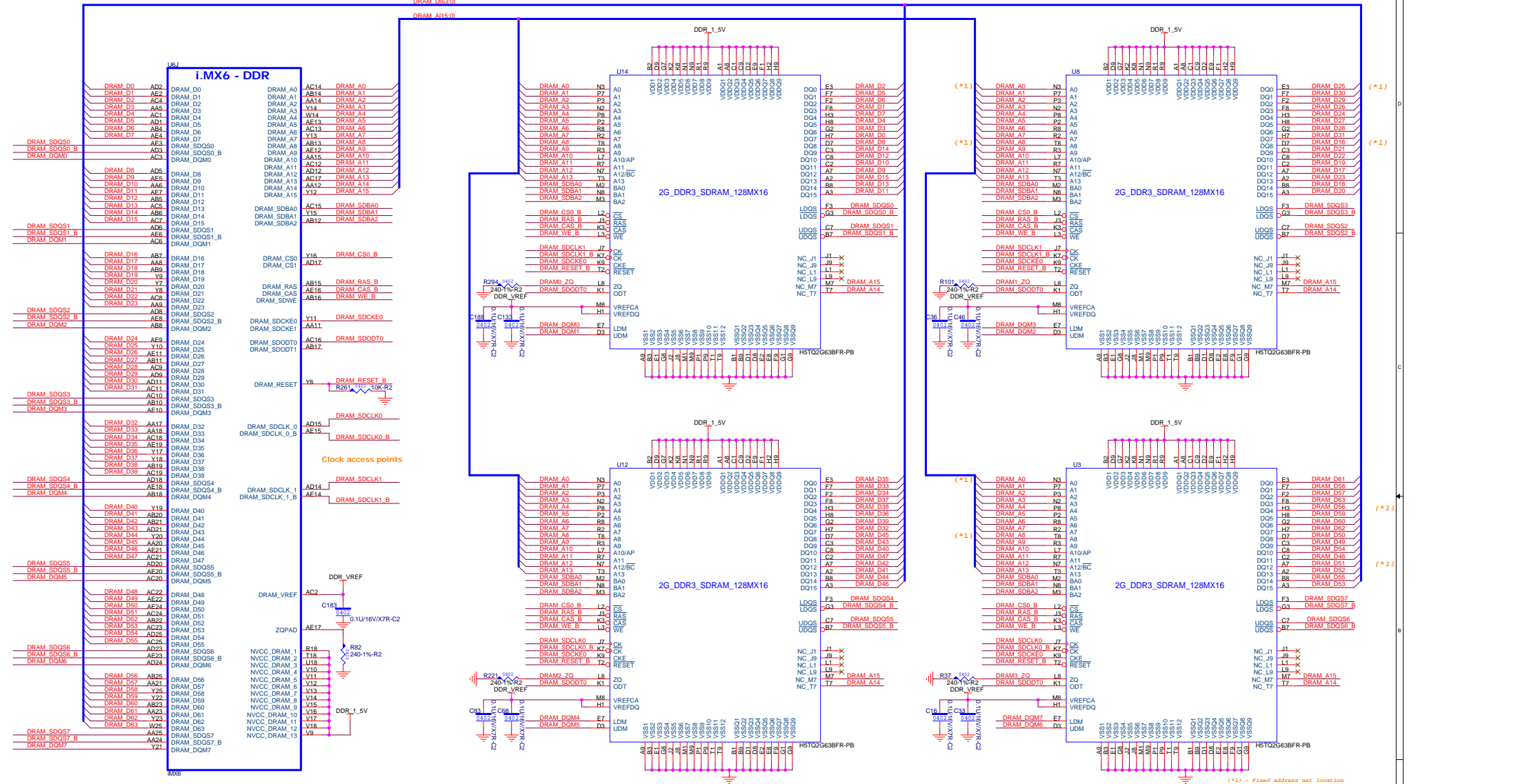
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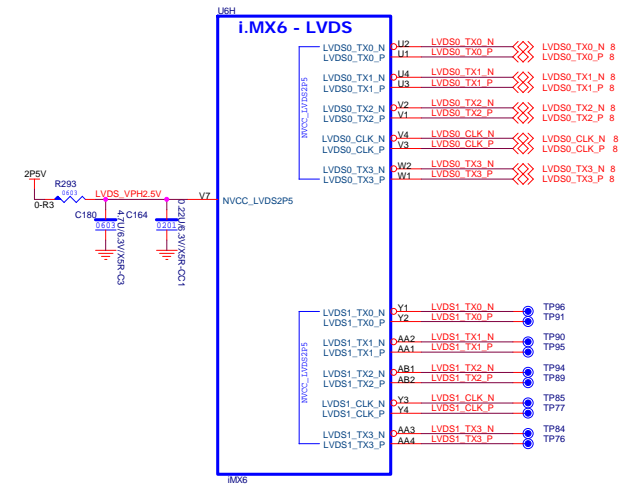
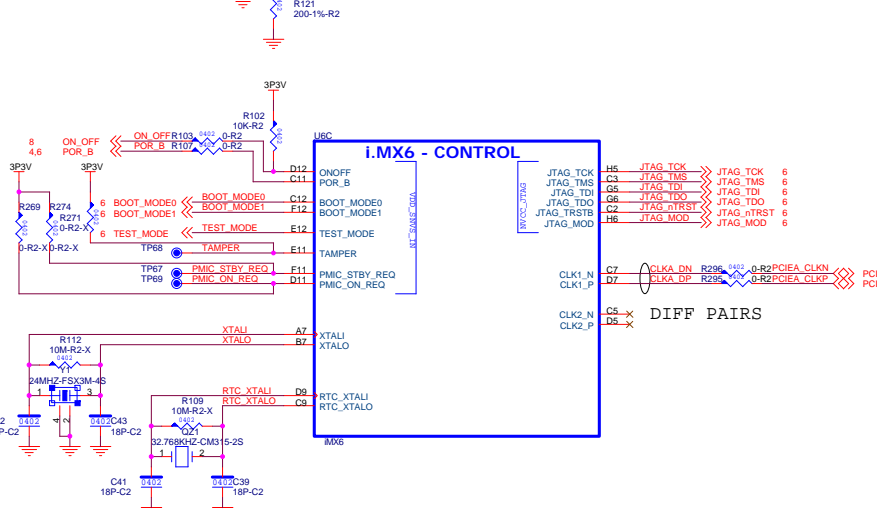
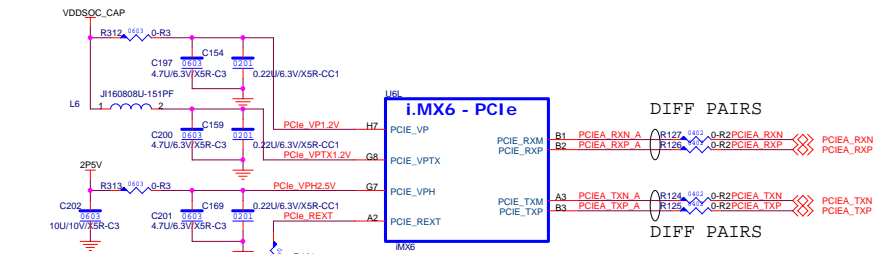
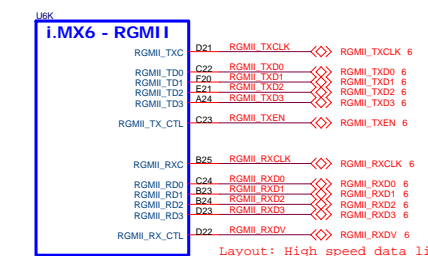
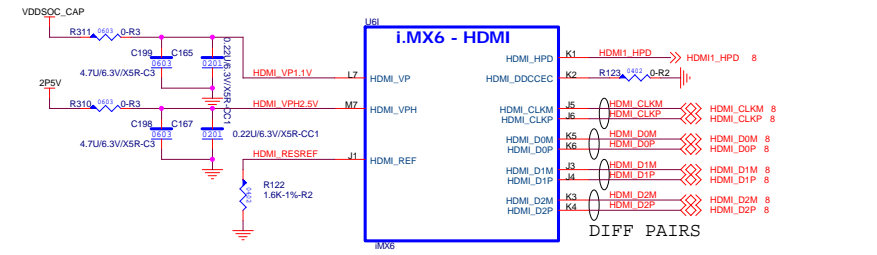
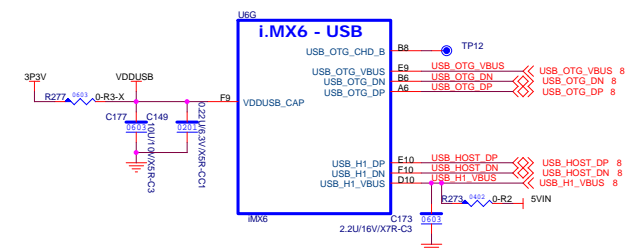
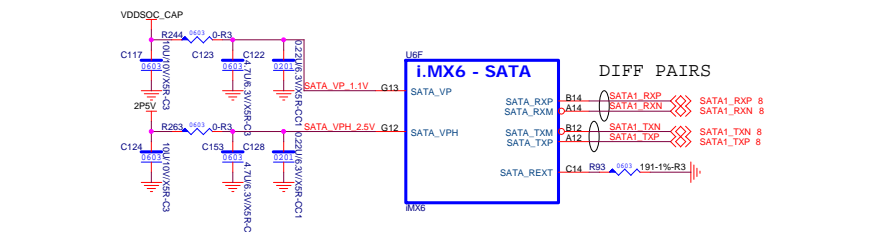
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Date	Friday, June 21, 2013	Sheet	1 of 8

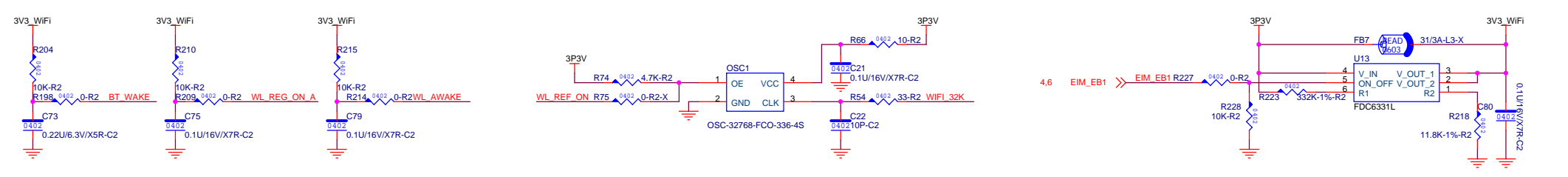
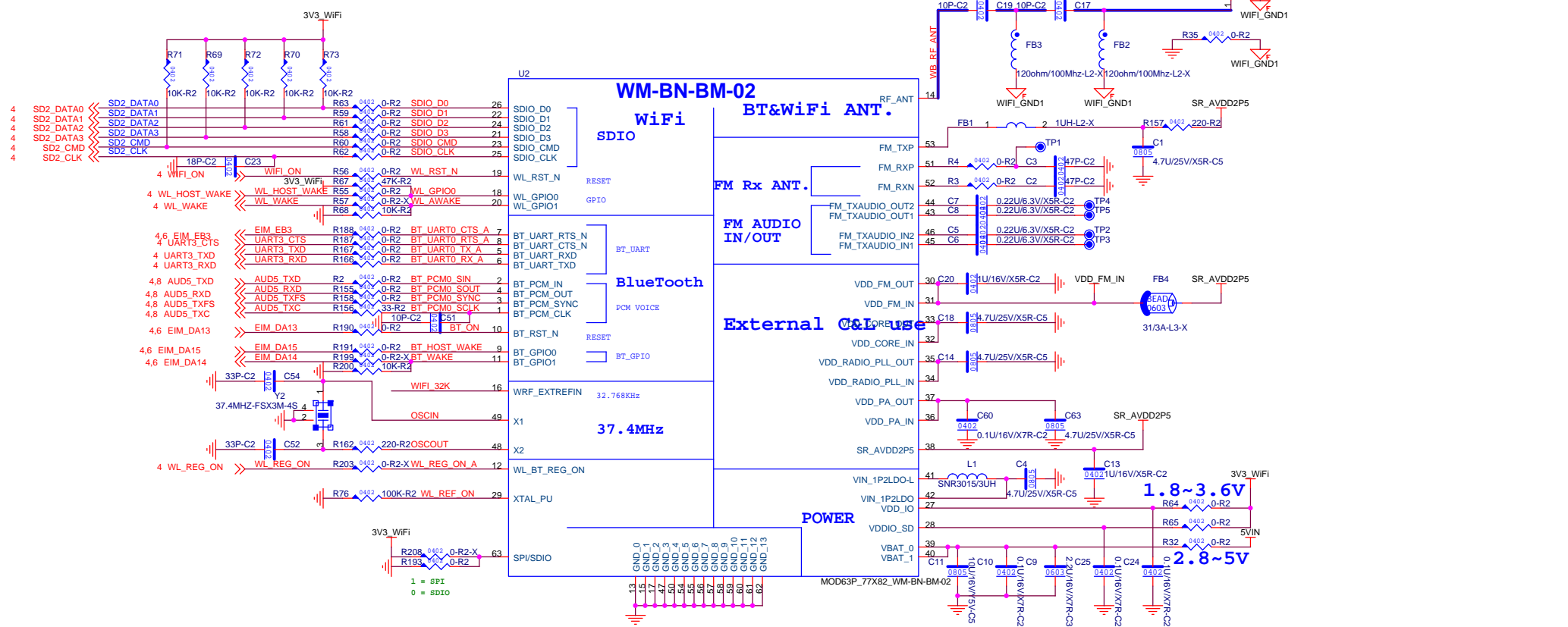


MX6 power domains under-BGA decoupling



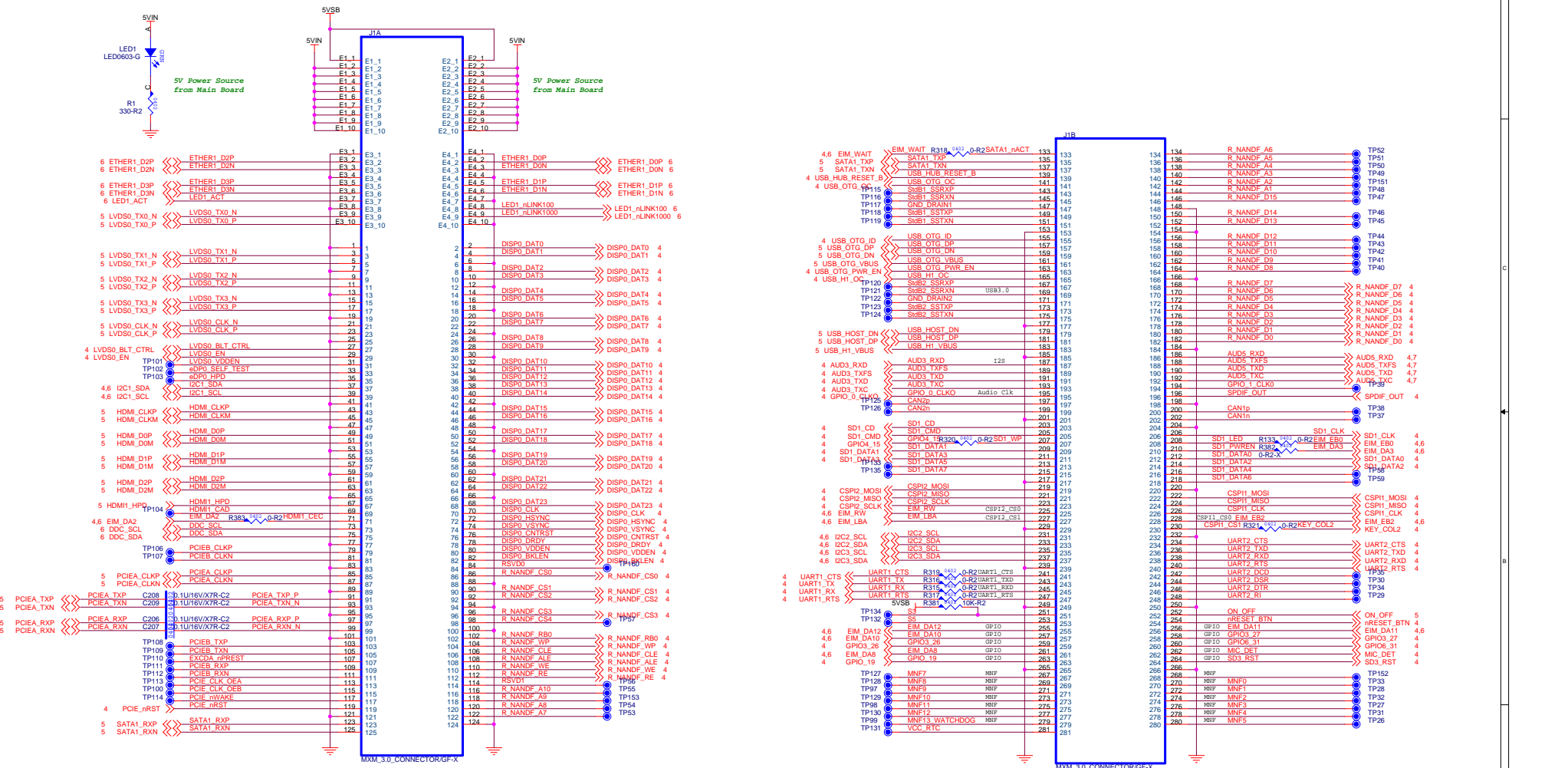






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Board to Board

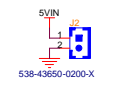


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BLOCK DIAGRAM

EDM-IMX6

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WAND REV:B1

PCB SN:100300490411

L=4, 95 x 95 mm

PAGE TITLE

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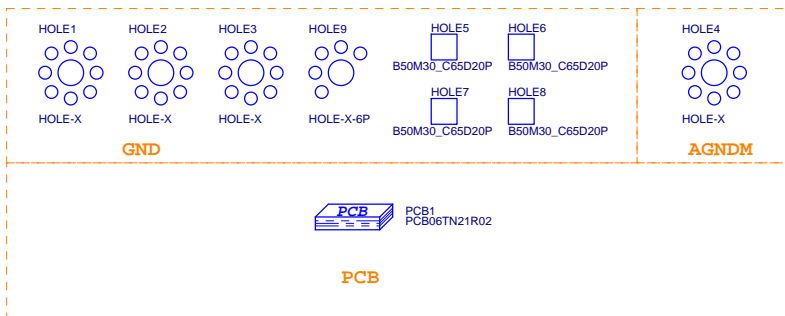
P02 Expansion CONN.

P03 DC-DC & M-SD

P04 HOST & Client

P05 Audio & RJ45

P06 LVDS & HDMI & SATA



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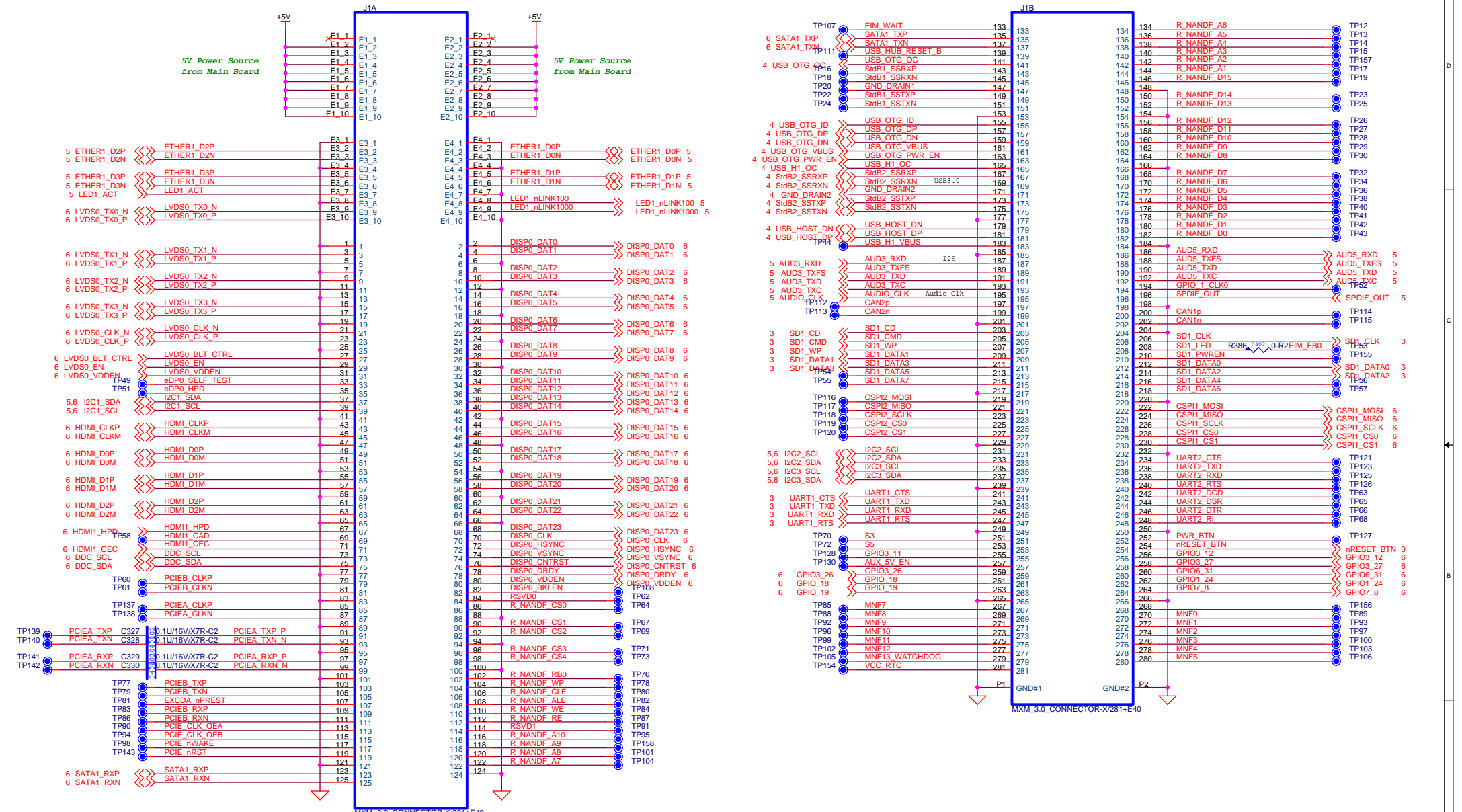
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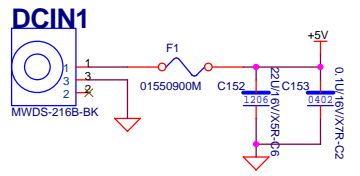
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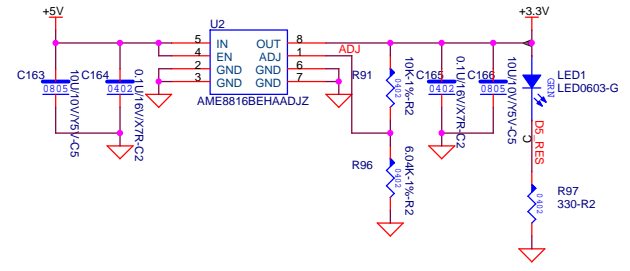
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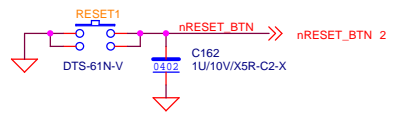
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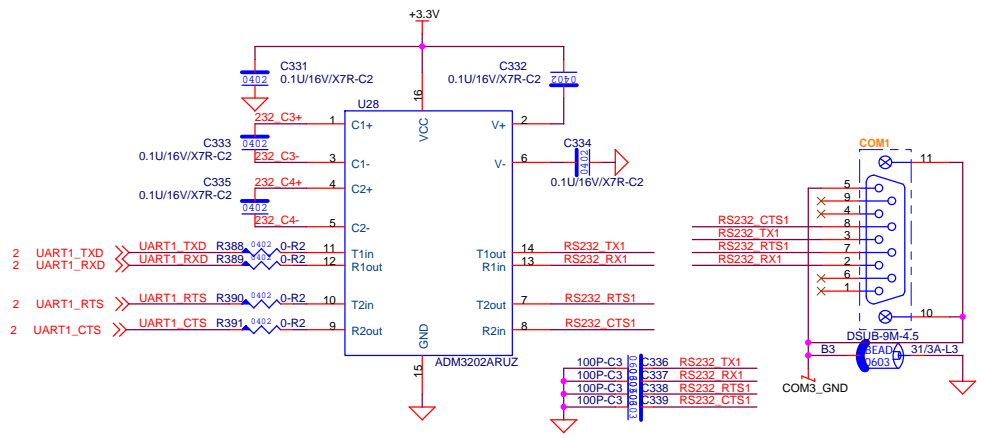
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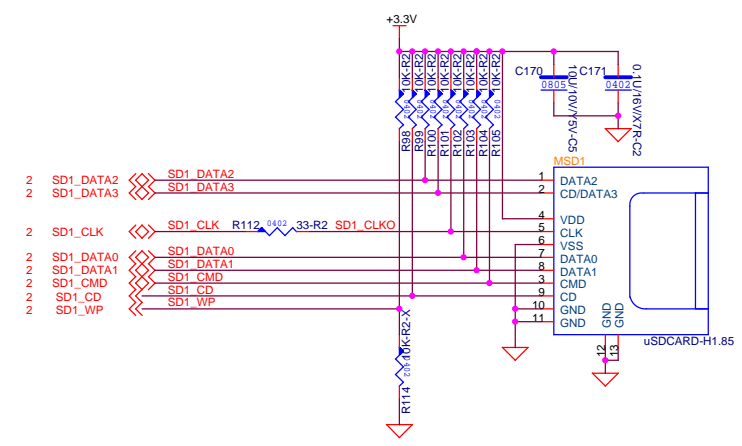
Button



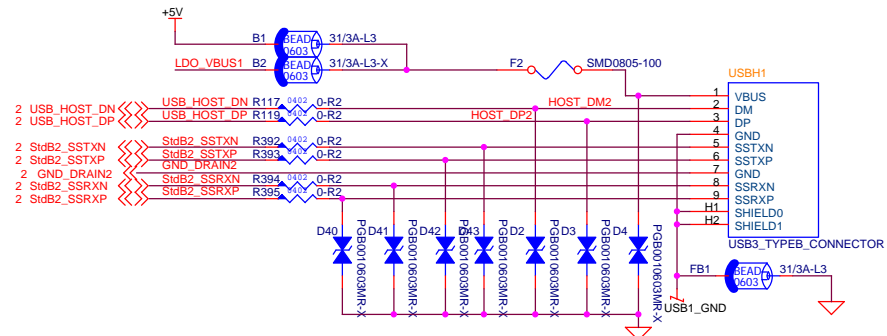
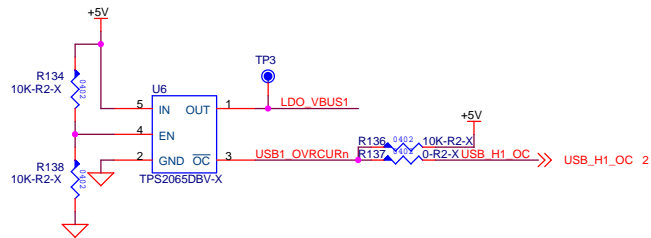
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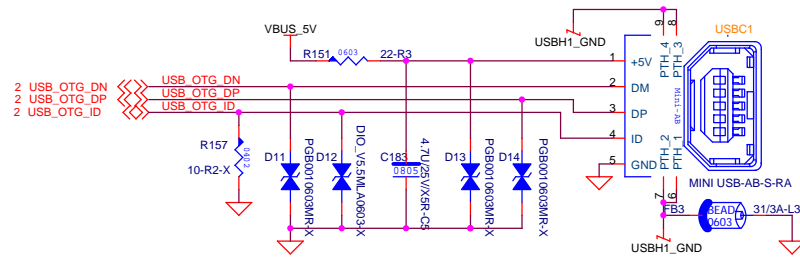
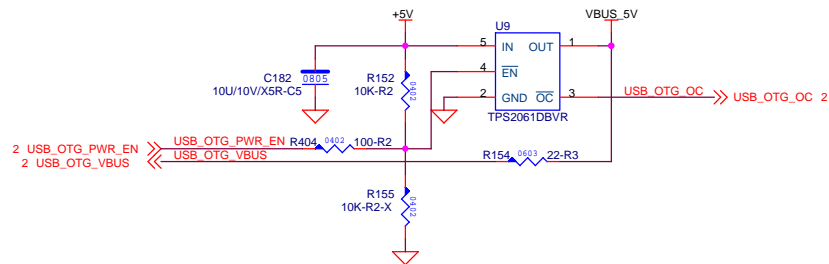
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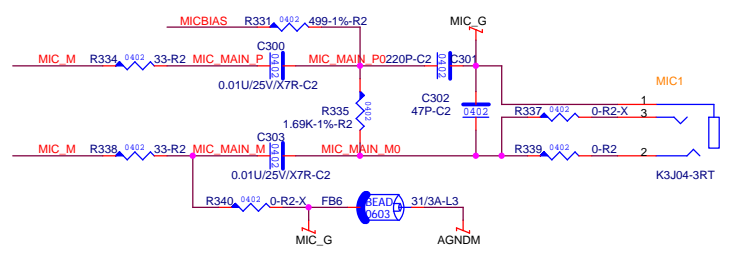
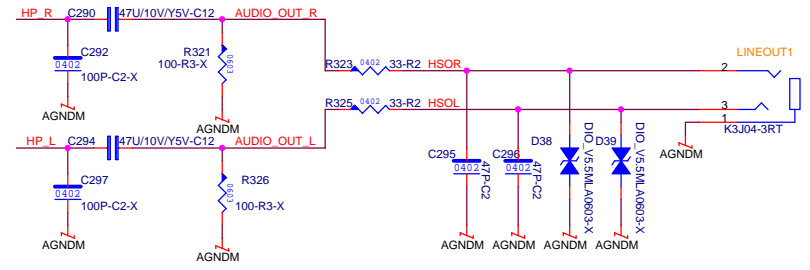
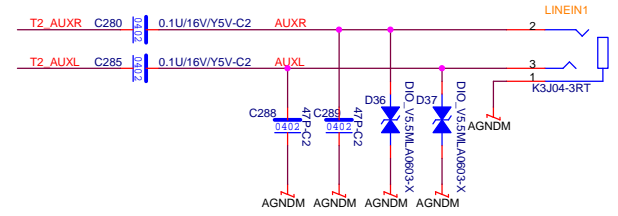
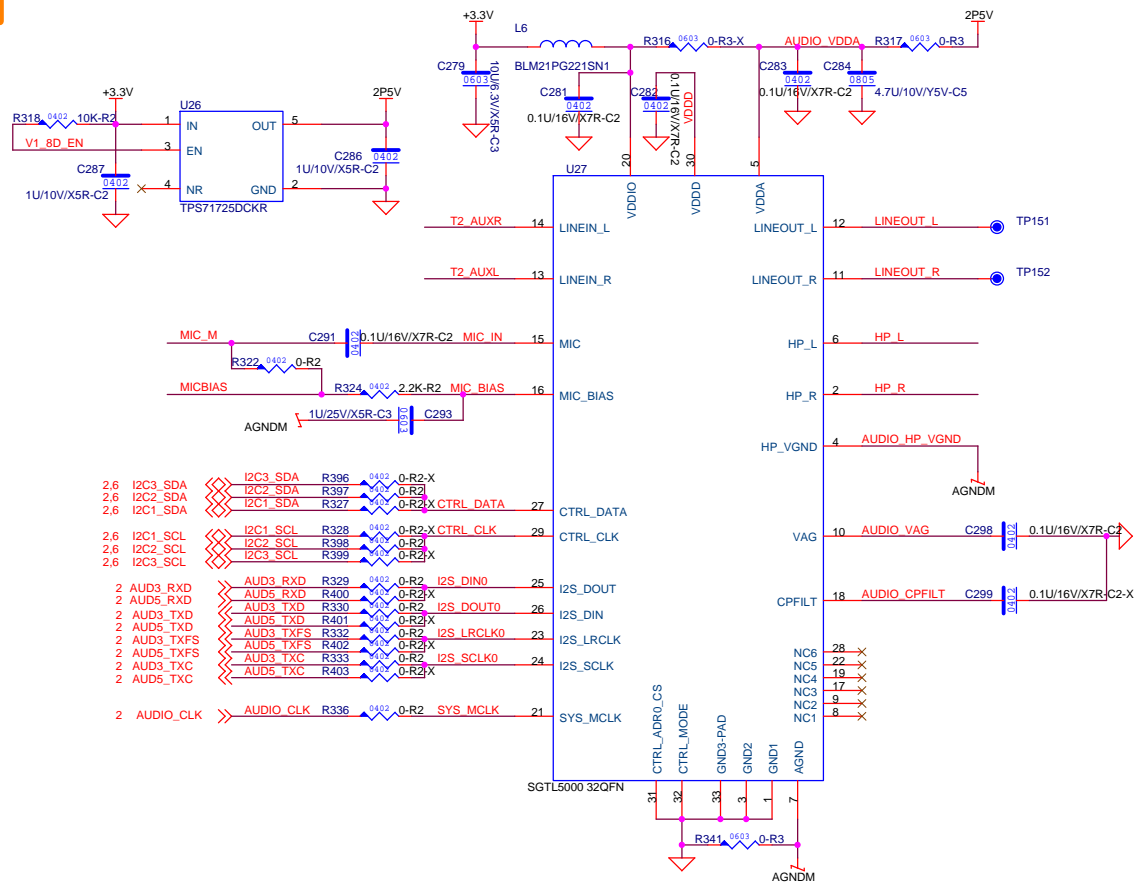
HOST USB



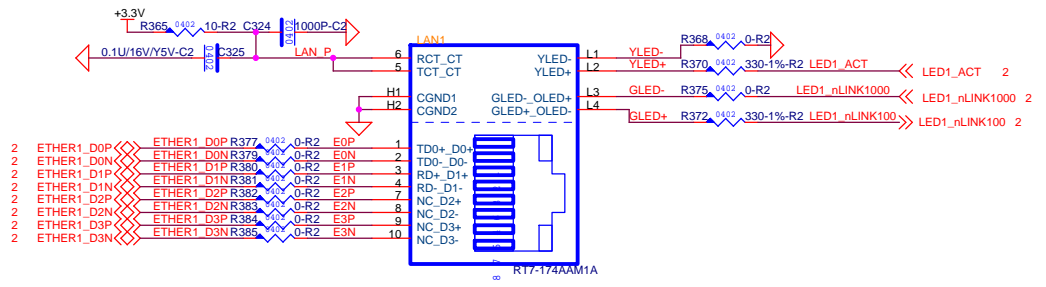
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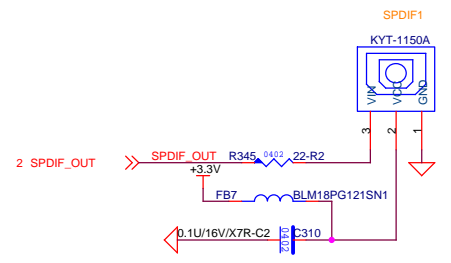
AUDIO



RJ45



SPDIF



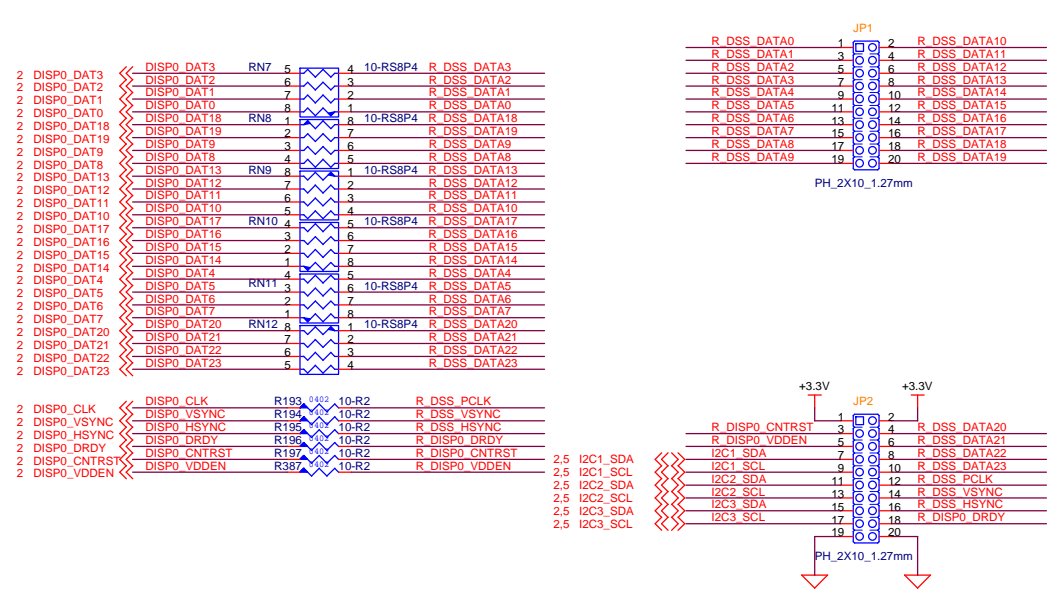
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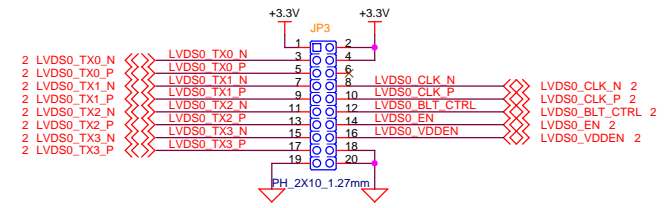
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Date: Friday, June 21, 2013 | Sheet: 5 of 6

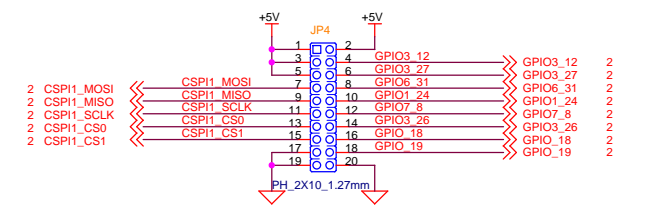
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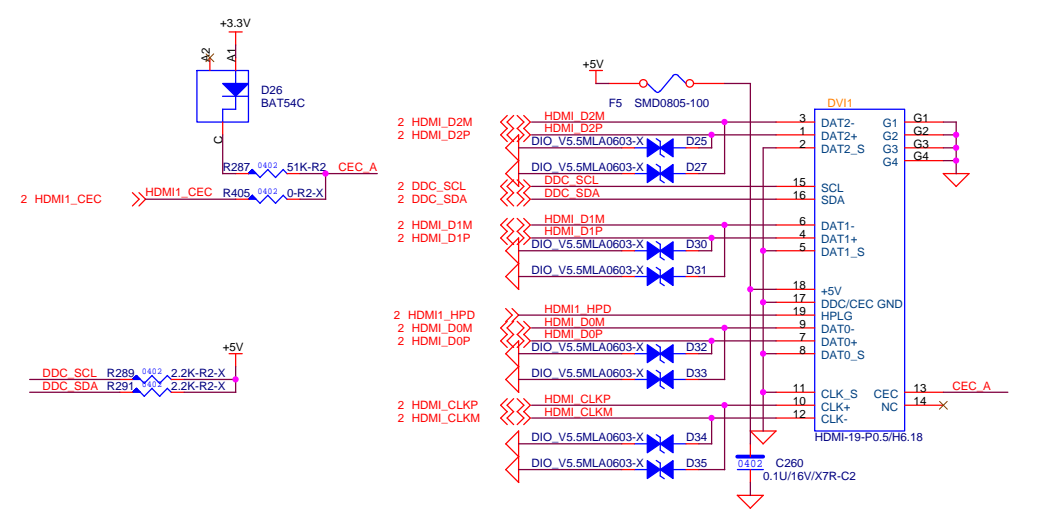
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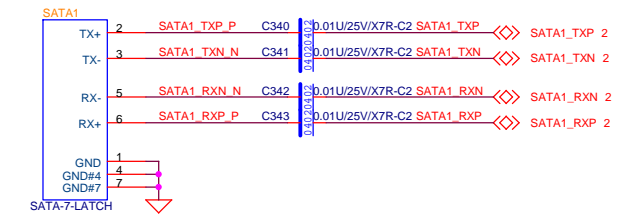
SPI



HDMI



SATA



Bill of Materials WandBoard-iMX6QUAD REV:B1 : Freescale System Module,6Q5EYM10AC

<i>Item</i>	<i>Q'TY</i>	<i>Location</i>	<i>Assortment</i>	<i>Description</i>
1	1	PCB1	PCB,WandBoard-iMX6,RevB1	8Layers,60x82mm,1.2mm
2	102	R2,R3,R4,R5,R6,R26,R28,R32,R35,R36,R55,R56,R58,R59,R60,R61,R62,R63,R64,R65,R77,R78,R79,R80,R81,R84,R85,R86,R89,R90,R92,R94,R95,R96,R100,R103,R107,R110,R118,R120,R123,R124,R125,R126,R127,R133,R142,R145,R155,R158,R166,R167,R170,R174,R187,R188,R190,R191,R193,R198,R209,R214,R220,R222,R224,R225,R226,R227,R230,R231,R232,R233,R234,R236,R237,R240,R241,R242,R243,R250,R253,R254,R255,R266,R267,R272,R273,R278,R289,R295,R296,R297,R305,R306,R315,R316,R317,R318,R319,R320,R321,R383	CHIP RESISTOR	0Ω,±5%,0402
3	5	R66,R113,R115,R128,R130	CHIP RESISTOR	10Ω,±5%,0402
4	2	R300,R299	CHIP RESISTOR	1KΩ,±5%,0402
5	44	R24,R25,R27,R30,R68,R69,R70,R71,R72,R73,R83,R87,R88,R97,R99,R102,R105,R108,R114,R116,R119,R159,R168,R200,R204,R210,R215,R228,R235,R238,R245,R247,R251,R256,R257,R258,R259,R261,R268,R287,R291,R304,R314,R381	CHIP RESISTOR	10KΩ,±5%,0402
6	2	R76,R290	CHIP RESISTOR	100KΩ,±5%,0402
7	1	R122	CHIP RESISTOR	1.6KΩ,±1%,0402
8	3	R91,R104,R121	CHIP RESISTOR	200Ω,±1%,0402
9	1	R307	CHIP RESISTOR	200KΩ,±5%,0402
10	1	R135	CHIP RESISTOR	21KΩ,±5%,0402
11	1	R219	CHIP RESISTOR	22Ω,±5%,0402
12	5	R132,R157,R162,R260,R264	CHIP RESISTOR	220Ω,±5%,0402
13	8	R117,R111,R211,R213,R279,R280,R281,R282	CHIP RESISTOR	2.2KΩ,±5%,0402
14	7	R37,R82,R101,R221,R276,R286,R294	CHIP RESISTOR	240Ω,±1%,0402
15	3	R136,R161,R189	CHIP RESISTOR	24KΩ,±5%,0402
16	3	R54,R106,R156	CHIP RESISTOR	33Ω,±5%,0402
17	1	R1	CHIP RESISTOR	330Ω,±5%,0402
18	1	R192	CHIP RESISTOR	33KΩ,±5%,0402
19	34	R8,R9,R10,R11,R12,R13,R14,R15,R16,R17,R18,R19,R20,R21,R22,R23,R38,R39,R40,R41,R42,R43,R44,R45,R46,R47,R48,R49,R50,R51,R52,R53,R74,R270	CHIP RESISTOR	4.7KΩ,±5%,0402
20	1	R67	CHIP RESISTOR	47KΩ,5%,0402
21	2	R195,R207	CHIP RESISTOR	6.8KΩ,±5%,0402
22	1	R285	CHIP RESISTOR	750Ω,±5%,0402
23	1	R194	CHIP RESISTOR	75KΩ,±5%,0402
24	1	R218	CHIP RESISTOR	11.8KΩ,±1%,0402
25	2	R137,R164	CHIP RESISTOR	12.7KΩ,±1%,0402
26	1	R163	CHIP RESISTOR	16.2KΩ,±1%,0402
27	1	R292	CHIP RESISTOR	2.37KΩ,±1%,0402
28	1	R223	CHIP RESISTOR	332KΩ,±1%,0402
29	3	R134,R160,R185	CHIP RESISTOR	49.9KΩ,±1%,0402
30	2	R288,R303	CHIP RESISTOR	6.04KΩ,±1%,0402
31	1	R308	CHIP RESISTOR	649KΩ,±1%,0402
32	19	R29,R186,R196,R201,R202,R212,R216,R217,R229,R244,R263,R283,R293,R301,R309,R310,R311,R312,R313	CHIP RESISTOR	0Ω,±5%,0603
33	1	R93	CHIP RESISTOR	191Ω,±1%,0603
34	8	RN1,RN2,RN3,RN4,RN5,RN6,RN7,RN8	CHIP RESISTOR ARRAY	10KΩ,±5%,0402,1/16W,8P4R
35	65	C81,C85,C86,C87,C88,C89,C90,C91,C92,C94,C95,C96,C97,C98,C99,C101,C102,C103,C104,C105,C107,C108,C109,C110,C111,C112,C113,C114,C115,C122,C125,C126,C127,C1	MULTI LAYER CERAMIC CAPACITOR	0.22uF,±10%,6.3V,X5R,0201

		28,C129,C130,C131,C135,C136,C137,C140,C141,C142,C143,C144,C145,C146,C147,C148,C149,C150,C154,C155,C156,C157,C158,C159,C161,C162,C163,C164,C165,C166,C167,C169		
36	4	C17,C19,C22,C51	MULTI LAYER CERAMIC CAPACITOR	10pF,±5%,50V,NP O,0402
37	3	C53,C61,C72	MULTI LAYER CERAMIC CAPACITOR	100pF,±5%,50V,NP O,0402
38	1	C195	MULTI LAYER CERAMIC CAPACITOR	0.01uF,±10%,25V,X7R,0402
39	48	C10,C12,C16,C21,C24,C25,C26,C28,C29,C30,C33,C36,C38,C40,C44,C46,C56,C57,C60,C62,C64,C68,C74,C75,C77,C79,C80,C83,C133,C138,C171,C172,C175,C176,C179,C181,C182,C183,C184,C185,C187,C188,C192,C194,C206,C207,C208,C209	MULTI LAYER CERAMIC CAPACITOR	0.1uF,±10%,16V,X7R,0402
40	1	C71	MULTI LAYER CERAMIC CAPACITOR	1uF,10V,±10%,X5R,0402
41	4	C13,C20,C186,C191	MULTI LAYER CERAMIC CAPACITOR	1uF,±10%,16V,X5R,0402
42	5	C23,C39,C41,C42,C43	MULTI LAYER CERAMIC CAPACITOR	18pF,±5%,50V,NP O,0402
43	2	C204,C203	MULTI LAYER CERAMIC CAPACITOR	22pF,±5%,50V,NP O,0402
44	15	C5,C6,C7,C8,C15,C31,C32,C37,C67,C69,C73,C82,C132,C189,C190	MULTI LAYER CERAMIC CAPACITOR	0.22uF,±10%,10V,X5R,0402
45	2	C54,C52	MULTI LAYER CERAMIC CAPACITOR	33pF,±5%,50V,NP O,0402
46	2	C2,C3	MULTI LAYER CERAMIC CAPACITOR	47pF,±5%,50V,NP O,0402
47	3	C50,C55,C70	MULTI LAYER CERAMIC CAPACITOR	560pF,±10%,50V,X7R,0402
48	15	C27,C34,C35,C45,C47,C48,C84,C93,C116,C117,C124,C177,C178,C193,C202	MULTI LAYER CERAMIC CAPACITOR	10uF,±20%,10V,X5R,0603
49	2	C9,C173	MULTI LAYER CERAMIC CAPACITOR	2.2uF,16V,X5R,±10%,0603
50	9	C100,C106,C118,C119,C120,C121,C134,C152,C170	MULTI LAYER CERAMIC CAPACITOR	22uF,±20%,6.3V,X5R,0603
51	8	C123,C153,C180,C197,C198,C199,C200,C201	MULTI LAYER CERAMIC CAPACITOR	4.7uF,6.3V,X5R,±10%,0603
52	10	C11,C49,C58,C65,C76,C78,C151,C174,C196,C205	MULTI LAYER CERAMIC CAPACITOR	10uF,±10%,16V,X5R,0805
53	2	C59,C66	MULTI LAYER CERAMIC	22uF,±20%,6.3V,X5R,0805

			CAPACITOR	
54	5	C1,C4,C14,C18,C63	MULTI LAYER CERAMIC CAPACITOR	4.7uF,25V,±10%,X5R,0805
56	4	L3,L4,L5,L7	PW CHOKE,FDSD04 20-H-2R2M	TOKO,2.2uH,±20%,4.1A,47mR,4.2X4.2mm
56	1	L1	PW CHOKE,SNR3015 F-3R3M-T-PF	SUNLEI,3.3uH,±20%,1.15A,88mR,3X3
57	1	L2	PW IND,CWPA3010-4R7N	CCS,4.7uH,±30%,Iset0.75A,225mR,3.0X3.0
58	4	FB5,L6,FB6,FB8	Multilayer Chip Bead	SUNLEI,JI160808 U-151-PF,150Ω,2A,0603
59	1	U7	IC,Voltage-Level Translator	TI,TXS0102DCUR,VSSOP8
60	1	U4	IC,Supervisor and Reset	TI,TPS3808G33DBVR,SOT23-6
61	1	U16	IC,Step-Down DC/DC Converter	RICHTEK,RT8010 GQW,WDFN-6L
62	1	U15	IC,10/100/1000 Ethernet Transceiver	ATHEROS,AR8031-AL1A,QFN48
63	3	U9,U10,U11	IC,Synchronous Step-Down Converter	RICHTEK,RT8070 ZQW,WDFN-8L
64	1	U5	IC,Single High Side Power Switch	MICREL,MIC9404 0YFL,MLF1.2X1.2mm
65	1	U1	BUFFER GATE	TI,SN74LVC1G12 5DCKR,SC-70
66	4	U3,U8,U12,U14	DDR3 SDRAM,H5TQ4G 63MFR-PBC	Hynix,256MX16,4Gb,1.5V,FBGA96
67	1	Y1	X'TAL,FSX3M,24 M12FAG,30PPM,12PF_W	FUJICOM,24MHz,SMD-4P,3.2X2.5mm
68	1	Y3	X'TAL,25.000MHz,30PPM,12PF	FUJICOM,FSX3M,25M12FAQ,SMD-4P,3.2X2.5mm
69	1	QZ1	X'TAL,32.768KHz,20PPM,12.5PF	CITIZEN,CM315,32.768KDZFTR,SMD-2P,3.2X1.5mm
70	1	Y2	X'TAL,37.4MHz,30PPM,20PF	FUJICOM,FSX3M,37.4M20FAQ,SMD-4P,3.2X2.5mm
71	1	OSC1	OSC,32.768KHz,50PPM,15PF,3.3V	FUJICOM,FCO336B,32.768KBA,SMD-4P,3.2*2.5mm
72	1	LED1	LED,EVERLIGHT,19-213SYGC-S313-TR8	SMD,0603,GREEN,570nm,57mcd
73	1	U13	Integrated Load Switch	Fairchild,FDC6331L,8V,2.8A,SSOT6
74	1	U6	CPU,ARM,Cortex-A9,Quad,non-lidded	MCIMX6Q5EYM10AC,FCBGA624

75	1	MSD1	Micro SD CARD READER	Most Well,MWCSD03S0 12R,H:1.85mm,SM D
76	1	ANT1	COAXIAL CONN.	I-PEX,MHF,20279- 001E- 01,3Pads,H=1.25 mm
77	1	CAMERA1	CONN,FPC,JSF5 3-233-9112- A,DOWN	JOIN TEK,33PIN,P=0.5, H=1.96,90,SMD
78	1	U2	Module,Wireless LAN+BT+FM	WM-BN-BM- 02,BCM4329
1	1	PCB1	PCB,WandBoard- iMX6,RevB1	8Layers,60x82mm, 1.2mm

Bill of Materials WAND,RevB1 : Carrier Board for Wandboard

Item	Q'TY	Location	Assortment	Description
1	1	PCB1	PCB,WAND, Carrier Board,RevB1	4Layers,95x95mm,1.6mm
2	30	R117,R119,R322,R329,R330,R332,R333,R336,R339,R368,R375,R377,R379,R380,R381,R382,R383,R384,R385,R386,R388,R389,R390,R391,R392,R393,R394,R395,R397,R398	CHIP RESISTOR	0Ω,±5%,0402
3	7	R193,R194,R195,R196,R197,R365,R387	CHIP RESISTOR	10Ω,±5%,0402
4	1	R91	CHIP RESISTOR	10KΩ,±1%,0402
5	10	R98,R99,R100,R101,R102,R103,R104,R105,R152,R318	CHIP RESISTOR	10KΩ,±5%,0402
6	1	R345	CHIP RESISTOR	22Ω,±5%,0402
7	1	R324	CHIP RESISTOR	2.2KΩ,±5%,0402
8	5	R112,R323,R325,R334,R338	CHIP RESISTOR	33Ω,±5%,0402
9	1	R97	CHIP RESISTOR	330Ω,±5%,0402
10	1	R287	CHIP RESISTOR	51KΩ,±5%,0402
11	1	R404	CHIP RESISTOR	100Ω,±5%,0402
12	1	R335	CHIP RESISTOR	1.69KΩ,±1%,0402
13	2	R372,R370	CHIP RESISTOR	330Ω,±1%,0402
14	1	R331	CHIP RESISTOR	499Ω,±1%,0402
15	1	R96	CHIP RESISTOR	6.04KΩ,±1%,0402
16	2	R341,R317	CHIP RESISTOR	0Ω,±5%,0603
17	2	R154,R151	CHIP RESISTOR	22Ω,±5%,0603
18	6	RN7,RN8,RN9,RN10,RN11,RN12	CHIP RESISTOR ARRAY	10Ω,±5%,0402,1/16W,8P4R
19	2	C294,C290	MULTI LAYER CERAMIC CAPACITOR	47uF,10V,±20%,X5R,1812
20	1	C324	MULTI LAYER CERAMIC CAPACITOR	1000pF,±10%,X7R,50V,0402
21	6	C300,C303,C340,C341,C342,C343	MULTI LAYER CERAMIC CAPACITOR	0.01uF,±10%,25V,X7R,0402
22	23	C153,C164,C165,C171,C260,C280,C281,C282,C283,C285,C291,C298,C310,C325,C327,C328,C329,C330,C331,C332,C333,C334,C335	MULTI LAYER CERAMIC CAPACITOR	0.1uF,±10%,16V,X7R,0402
23	2	C287,C286	MULTI LAYER CERAMIC CAPACITOR	1uF,10V,±10%,X5R,0402
24	1	C301	MULTI LAYER CERAMIC CAPACITOR	220pF,±5%,50V,NPO,0402
25	5	C288,C289,C295,C296,C302	MULTI LAYER CERAMIC CAPACITOR	47pF,±5%,50V,NPO,0402
26	4	C336,C337,C338,C339	MULTI LAYER CERAMIC CAPACITOR	100pF,50V,±5%,NPO,0603
27	1	C293	MULTI LAYER CERAMIC CAPACITOR	1uF,25V,X5R,10%,0603
28	1	C279	MULTI LAYER CERAMIC CAPACITOR	10uF,6.3V,X5R,±10%,0603
29	4	C163,C166,C170,C182	MULTI LAYER CERAMIC	10uF,10V,±10%,X5R,0805

			CAPACITOR	
30	2	C183,C284	MULTI LAYER CERAMIC CAPACITOR	4.7uF,25V,±10%,X5R,0805
31	1	C152	MULTI LAYER CERAMIC CAPACITOR	22uF,16V,X5R,10%,1206
32	1	FB7	Multilayer Chip Bead	SUNLEI,JI160808U-121-PHF,120Ω,3A,0603
33	1	L6	Multilayer Chip Bead	SUNLEI,JI160808U-221-PHF,220Ω,2A,0603
34	5	FB1,B1,FB3,B3,FB6	Multilayer Chip Bead	SUNLEI,JI160808U-310-PHF,31Ω,3A,0603
35	1	U9	IC,Power-Distribution Single Switch	TI,TPS2061DBV,1A,Active Low,SOT23-5PIN
36	1	U28	IC,RS232 D/R	ADI,ADM3202ARUZ,3.3V,TSSOP16
37	1	U27	IC,Stereo Audio CODEC_W	Freescall,SGTL5000XNAA3/R2,QFN32
38	1	U26	Regulator,LDO	TI,TPS71725DCKR,150mA,2.5V,SC70
39	1	D26	Schottky Barrier Diodes	BAT54C,30V,SOT-23
40	1	LED1	LED,EVERLIGHT,19-213SYGC-S313-TR8	SMD,0603,GREEN,570nm,57mcd
41	1	U2	Regulator,LDO,AME8816BEHAADJZ	AME,1.5A,ADJ,SO8
42	2	F5,F2	FUSE,POLY SWITCH,1.1A/6V	Sea&Land,SMD0805-100,0805
43	1	F1-1	Square Ceramic Fuse	CONQUER,SEF003,125V,3A,6.1X2.6
44	1	RESET1	TACT SWITCH,DTS-61N-V	DIPTRONICS,H=4.3,160g,DIP
45	1	J1	CONN,MXM3.0,314P,P=0.5,H=7.8	FOXCONN,AS0B821-S78B-7H,BLACK
46	1	MSD1	Micro SD CARD READER	Most Well,MWCSD03S012R,H:1.85mm,SMD
47	4	JP1,JP2,JP3,JP4	FEMALE HEADER	2X10PIN,1.27mm,H=4.3,180,DIP
48	1	F1	CONN,FUSE HOLDER	Little Fuse,01550900M,H=3.81,SMD
49	1	COM1	9Pin D-SUB Slim Type (4.5mm)	Qi-Speed,Male,Green,w/Screw,A02+0912-2522AS
50	1	USBC1	Mini USB AB Type	Qi-speed,HCO0556005-AB-001P-R,1 port,90D,SMD
51	1	USBH1	USBX1,A TYPE,3.0	Qi-Speed,KUSB-512-3.0,DIP
52	1	SATA1	CONN,SATA-7P,BLACK	Most Well,S6-09F107097S1B04,DIP
53	1	LAN1	RJ45X1 CONN.	UDE,RT7-174AAM1A,W/LED&TRANSFORMER,GIGA
54	3	MIC1,LINEOUT1,LINEIN1	AUDIO JACK,EPJ-	Most

			035-43A	Well,5PIN,3.5mm,H=5,DIP
55	1	DCIN1	DC POWER JACK,MWDS-216B-BK	Most Well,2.0mm,DIP
56	1	SPDIF1	OPTO JACK,KYT-1150A	KYOYAKU,5PIN,H=12,DIP
57	1	DVI1	CONN,HDMI,19PIN ,SHELL DIP TYPE	Most Well,HDMIFRM-80152-00,SMD
58	4	HOLE5,HOLE6,HOLE7,HOLE8	B50M30-501419D4BM	EMI,M3x5.0mm,DIP