

# Riot board

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|             |               |                     |                             |  |               |
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| Review      | <review>      |                     |                             |  |               |
|             |               | TitleiMX6           |                             |  |               |
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|             |               | A3                  | 01.CONVER PAGE              |  | V1.           |
| Standardize | <standardize> | Date                | Saturday, December 07, 2013 |  | Sheet 1 of 20 |

Schematic History

2013-07-19

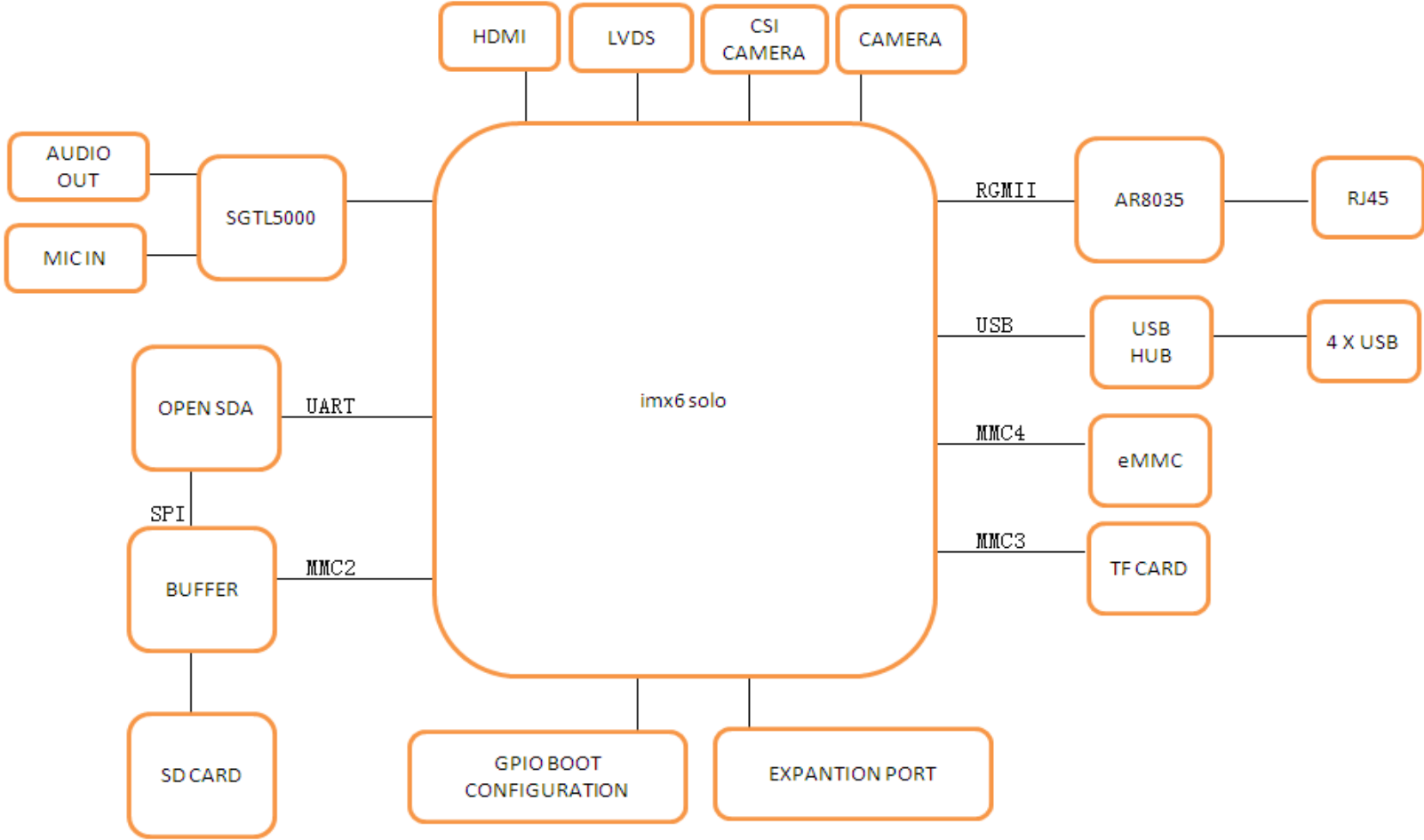
- 1.update all the parts reference to fix drc error
- 2.change bus SDA\_SD4\_\* to SDA\_SD2\_\* on PAGE(15)
- 3.add I2C2\_SCL/SDA connect to PMIC (PAGE05)
- 4.remove TPS3808G33DBVT (PAGE18),  
use PMIC internal reset for IMX6(PAGE05)

2013-08-01

- 1.Separate RJ45+Dual USB

|             |               |                     |                             |               |
|-------------|---------------|---------------------|-----------------------------|---------------|
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|             |               | Date                | Saturday, December 07, 2013 | Sheet 2 of 20 |

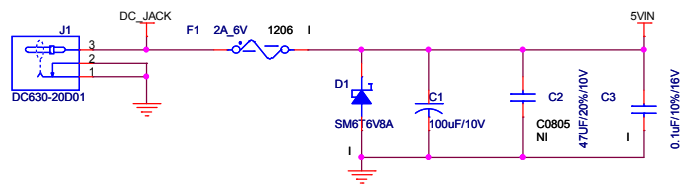
SYSTEM BLOCK



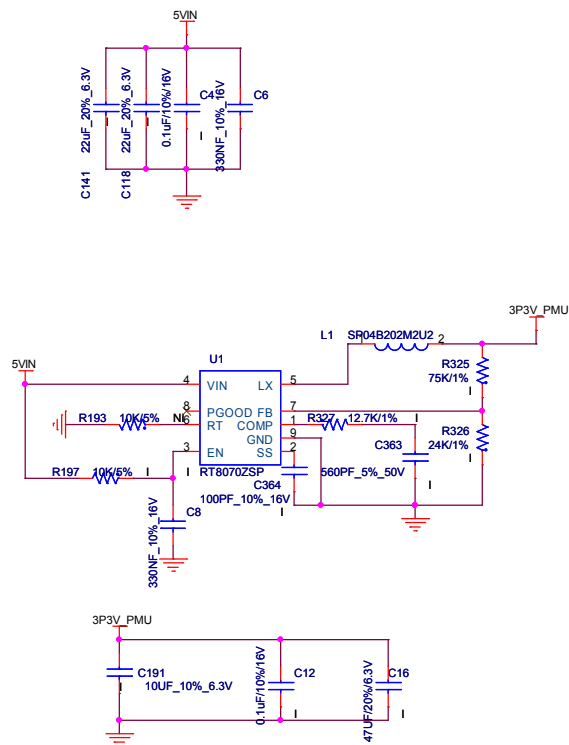
PCB1 PCB  
1001001000234

|             |               |                            |                             |               |
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|             |               | Date                       | Saturday, December 07, 2013 | Sheet 3 of 20 |

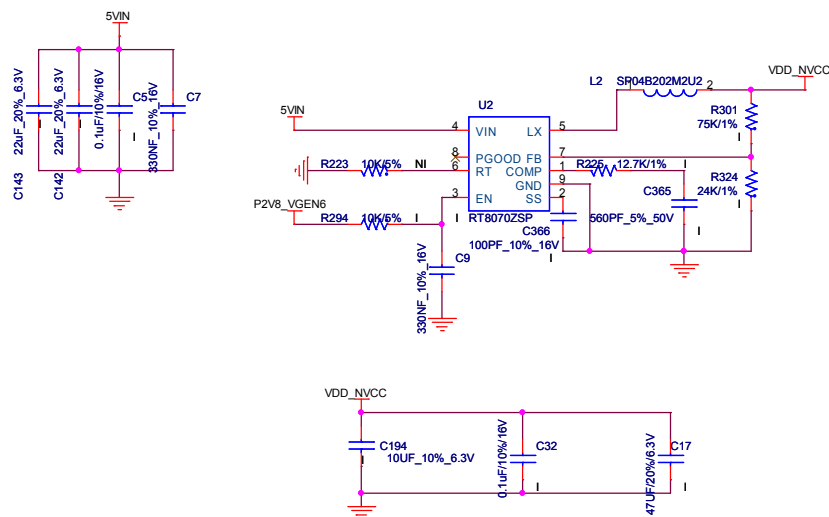
# Main Power



## PMIC Power Feed 3.5 A max



## Peripheral Power Supply 3.5 A max

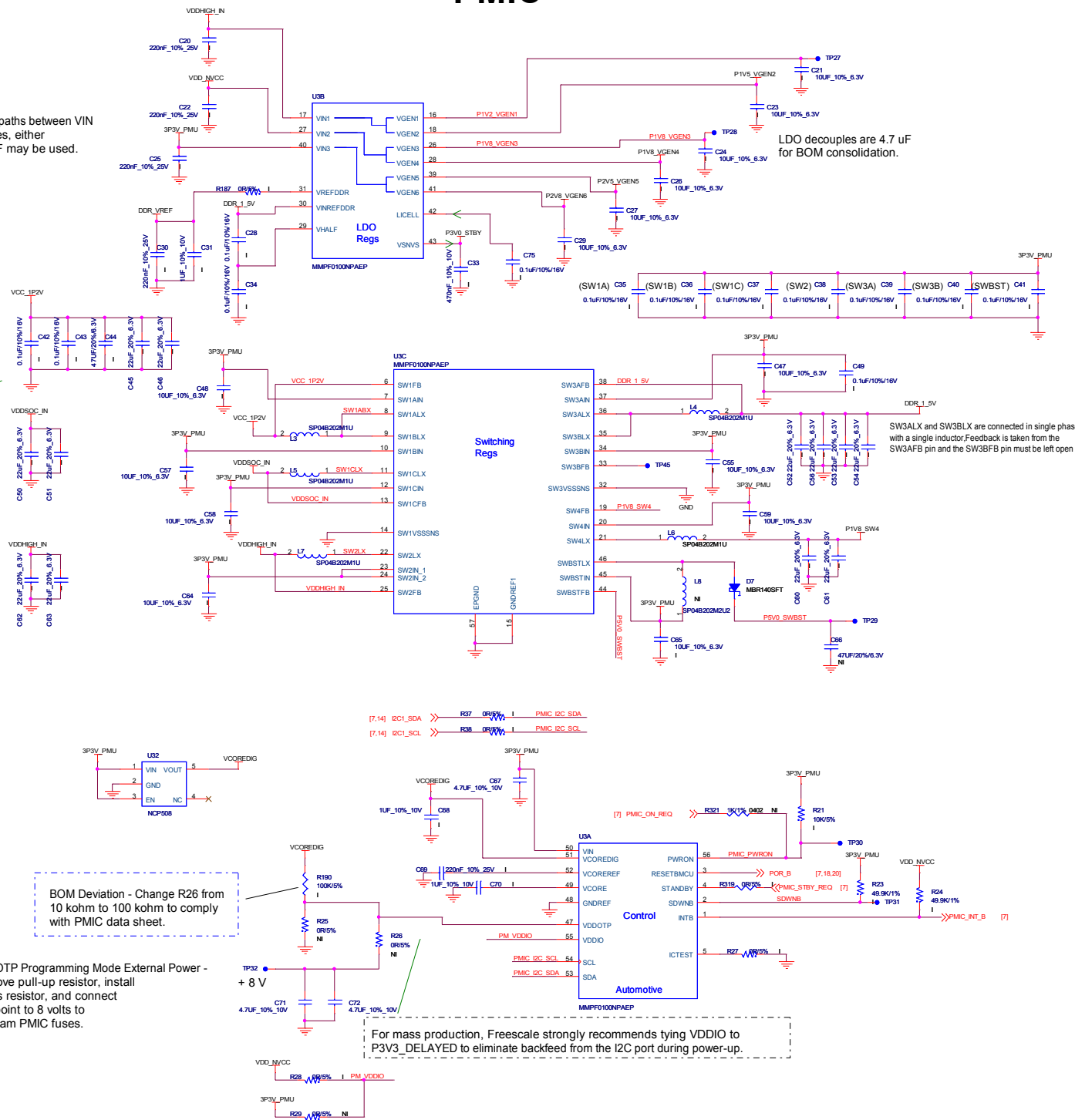


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|             |               | Date                       | Saturday, December 07, 2013 | Sheet 4 of 20 |

# PMIC

With low-inductive paths between VIN the voltage sources, either 0.22 uF or 0.47 uF may be used.

1.375 V Hardware Default for Boot



## Peripheral Power Rails

| Voltage (V) | Rail Name     | Block      | Power Source  | Generated By | Current Capability (A) |
|-------------|---------------|------------|---------------|--------------|------------------------|
| 12          | VBAT          | MLB        | Wall Supply   | MB           | 5.5                    |
| 5           | P5V0_DELAYED  | Para LCD   | Main Power    | MB or Jack   | 0.5                    |
|             |               | LVDS LCD   |               |              |                        |
|             |               | HDMI       |               |              |                        |
| 3.3         | P3V3_DELAYED  | MIPI       | switcher      | LT3680       | 3.5                    |
|             |               | USB        |               |              |                        |
| 3.0         | P3V0_VDD_USB  | NAND Flash | VDDUSB_CAP    | IMX          | -                      |
| 2.8         | P2V8_VGEN6    | SD Card    | VGEN6         | PMIC         | 0.2                    |
| 1.8         | P1V8_SW4      | NOR Flash  | SW4           | PMIC         | 1.0                    |
| 1.5         | P1V5_DDR_SW3  | HDMI       | VGEN4         | PMIC         | 0.35                   |
| 1.5         | P1V5_VGEN2    | LVDS LCD   | SW3A/B        | PMIC         | 2.5                    |
| 1.5         | ETH_VDDIO_REG | Ethernet   | VGEN2         | PMIC         | 0.25                   |
| 0.75        | POV75_REFDDR  | Mini PCIE  | PHY - on-chip | AR8031       | -                      |
| 0.75        | POV75_REFDDR  | DDR        | VREFDDR       | PMIC         | 0.01                   |

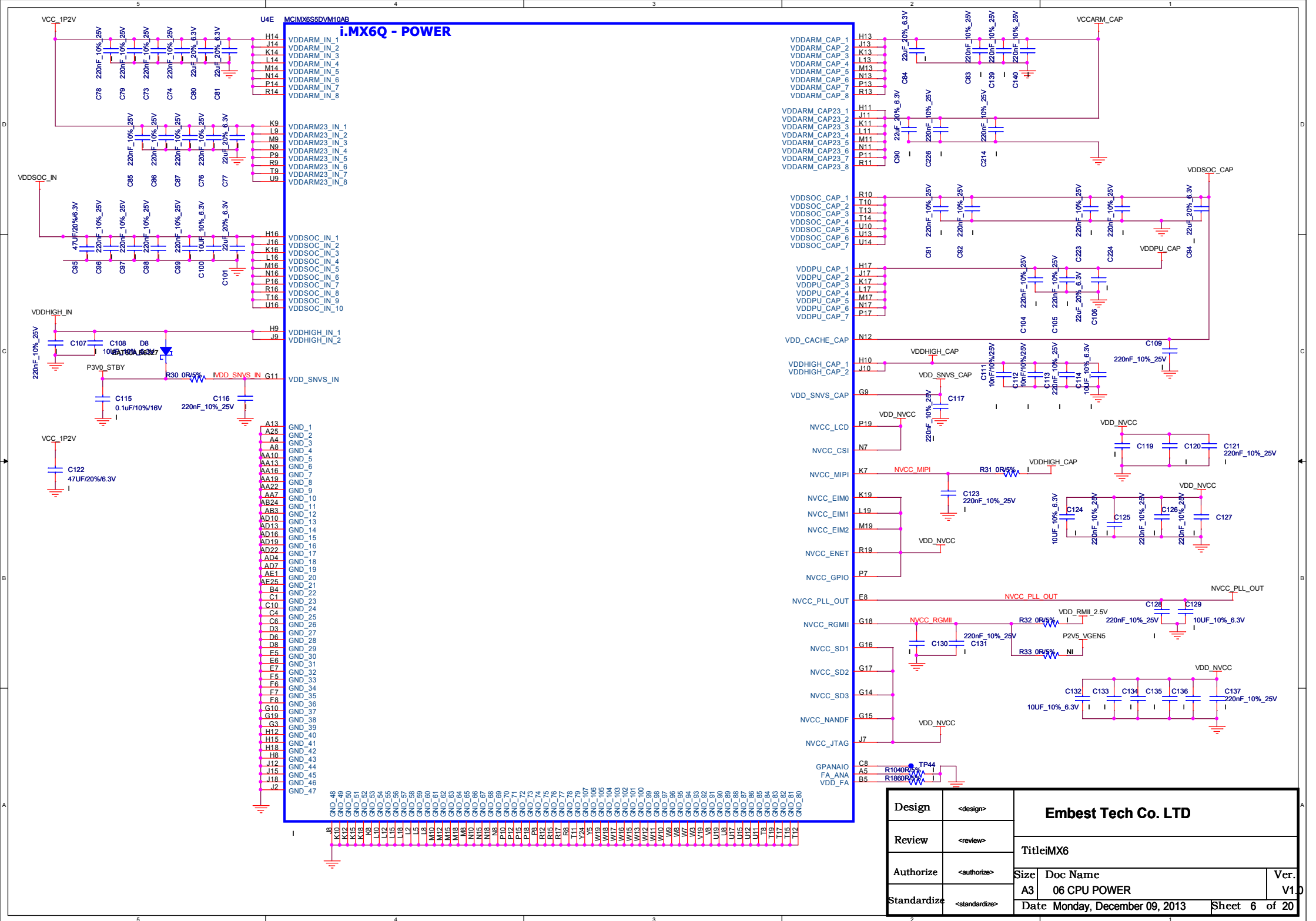
MB = Main board 26662

## PMIC Output Rails

| Regulator | Voltage (V) | Power-Up Sequence | Load                           |
|-----------|-------------|-------------------|--------------------------------|
| VSNVS     | 3           | 0                 | VDD_SNVS_IN                    |
| SW1A/B    | 1.375       | 1                 | VDDARM_IN                      |
| SW1C      | 1.375       | 1                 | VDDSOC_IN                      |
| SW2       | 3           | 2                 | VDDHIGH_IN                     |
| VGEN2     | 1.5         | 2                 | mini PCIE connector            |
| SW3A/B    | 1.5         | 3                 | NVCC_DRAM, NVCC_RGMII (option) |
| SW4       | 1.8         | 3                 | MIPI connector                 |
| VGEN4     | 1.8         | 3                 | NVCC_SD3                       |
| VGEN6     | 2.8         | 3                 | 3V3_DELAYED enable, MIPI conn  |
| VREFDDR   | 0.75        | 3                 | DRAM_VREF                      |
| VGEN5     | 2.5         | 3                 | Pwr LED & 5V0_DELAYED enable   |
| SWBST     | 0           | N/A               | Not used                       |
| VGEN1     | 0           | N/A               | Not used                       |
| VGEN3     | 0           | N/A               | Not used                       |

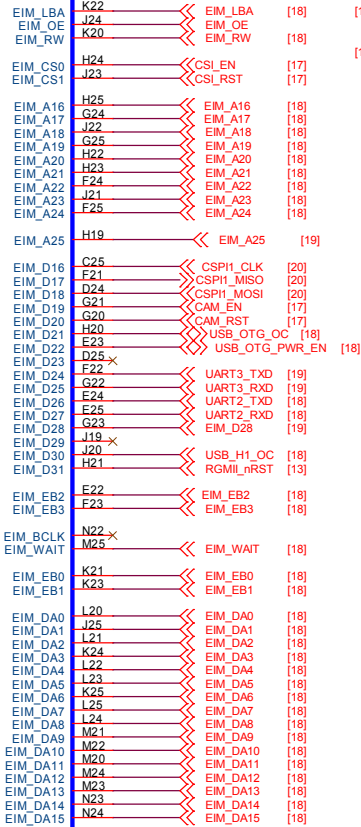
SW1A/B = 1.375 V for boot-up at ~800 MHz. Recommend that software increase SW1A/B to 1.425 V for 1 GHz operation.

| Design      | <design>      | Embest Info & Tech Co. LTD |                             |           |         |
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| Authorize   | <authorize>   | Size A2                    | Doc Name 05 PMIC            | Ver. V1.0 |         |
| Standardize | <standardize> | Date                       | Saturday, December 07, 2013 | Sheet     | 5 of 20 |

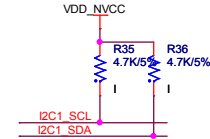
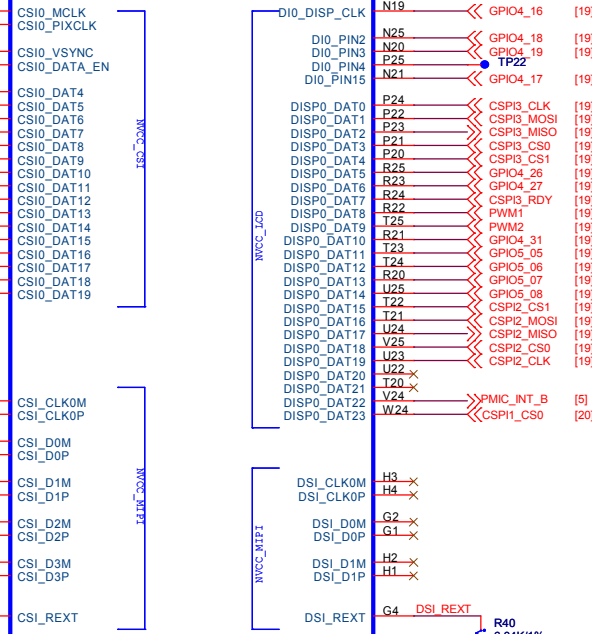


U4A  
MCIMX6S5DVM10AB

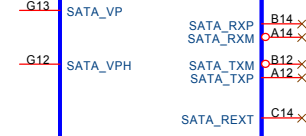
## i.MX6Q - EIM



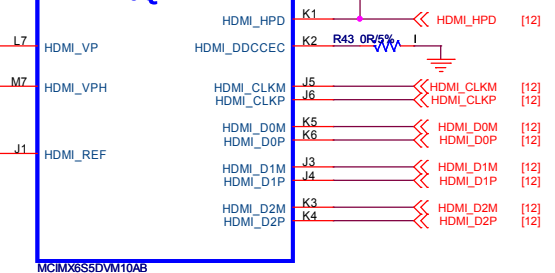
## i.MX6Q - DISP; CSI



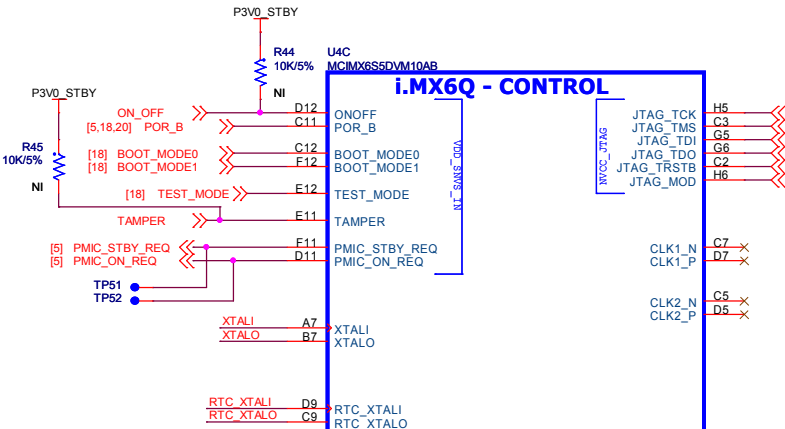
## i.MX6Q - SATA



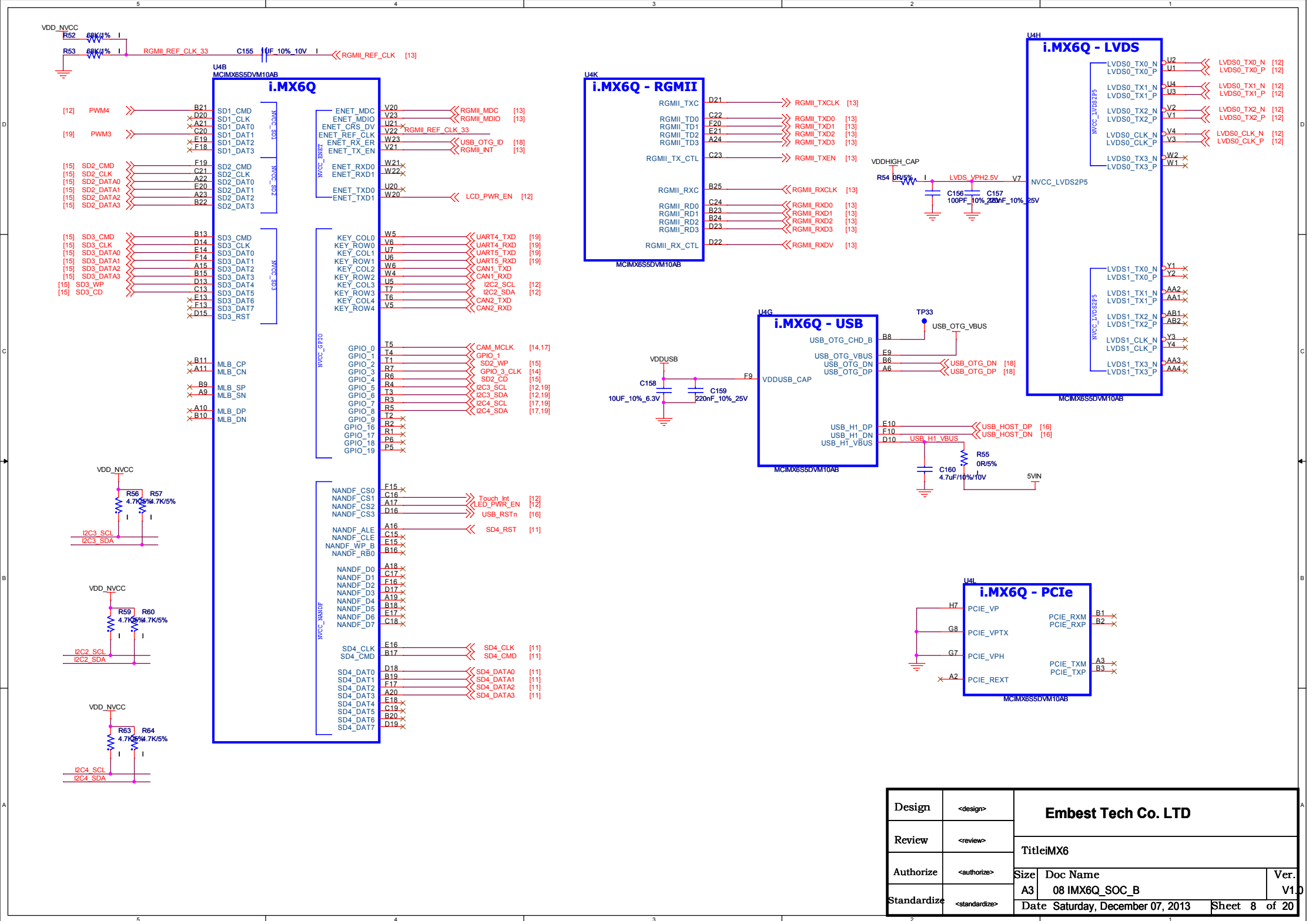
## i.MX6Q - HDMI

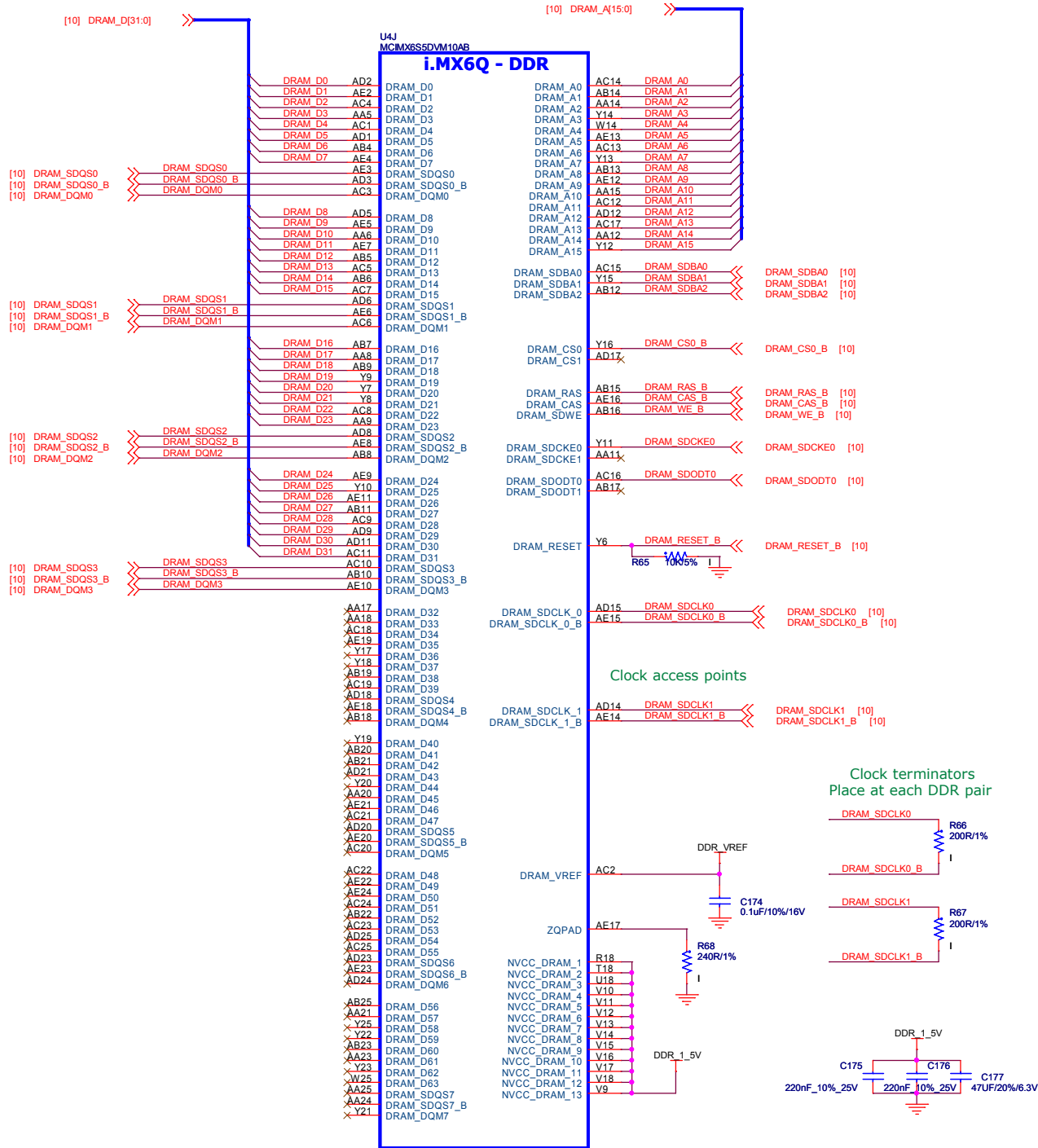


## i.MX6Q - CONTROL

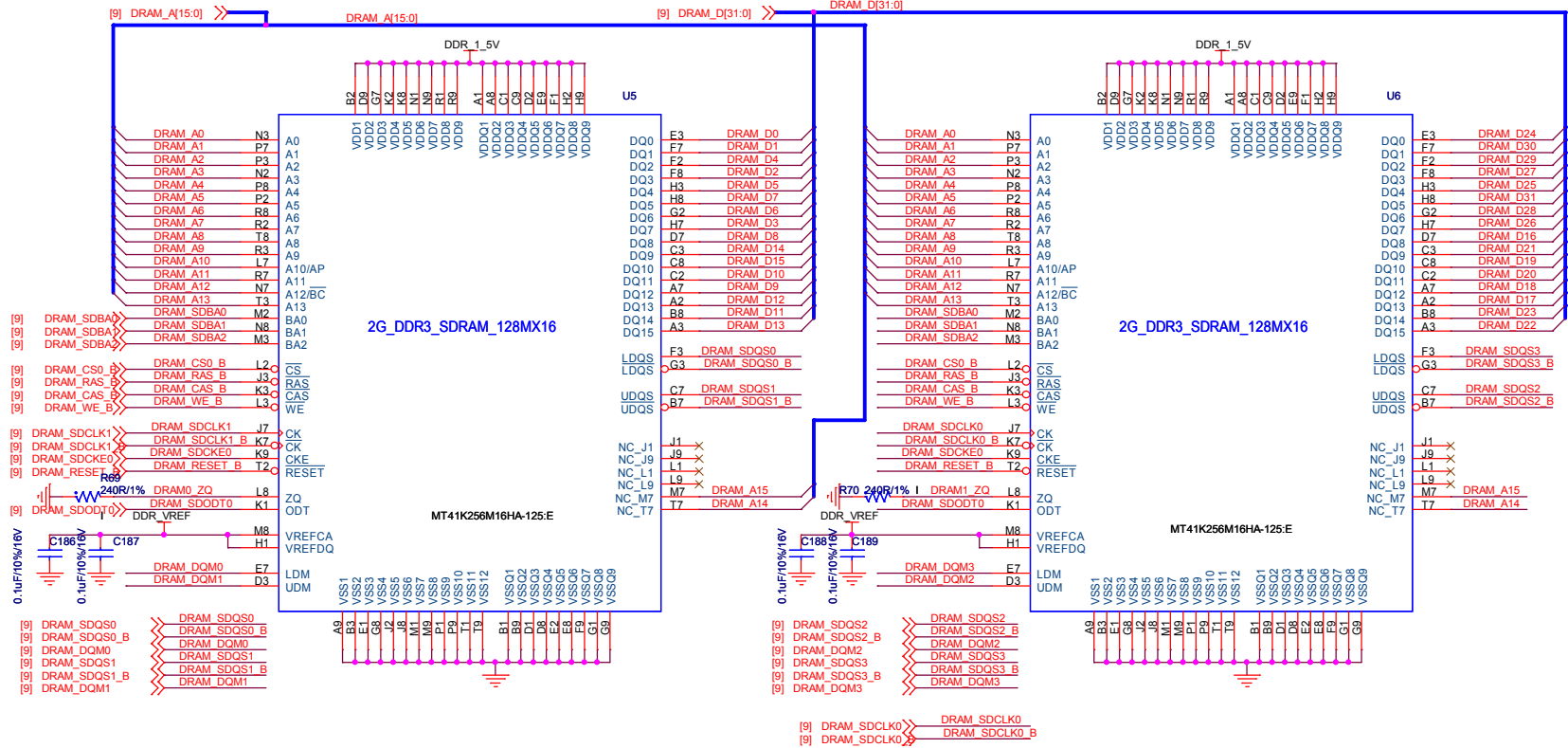


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|             |               | Date                | Tuesday, December 17, 2013 | Sheet 7 of 20 |

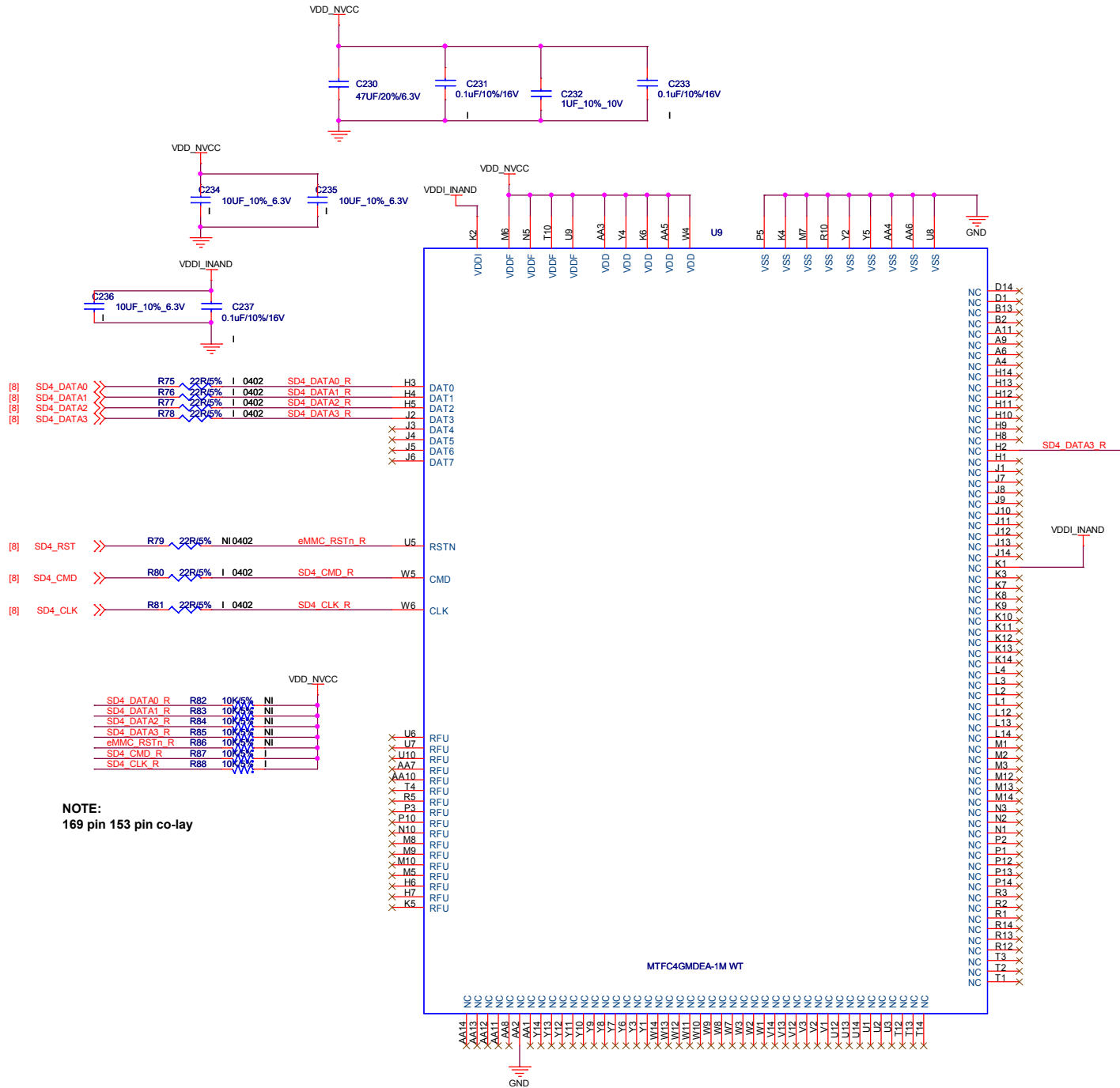




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|             |               | Date                | Monday, December 09, 2013 | Sheet 9 of 20 |



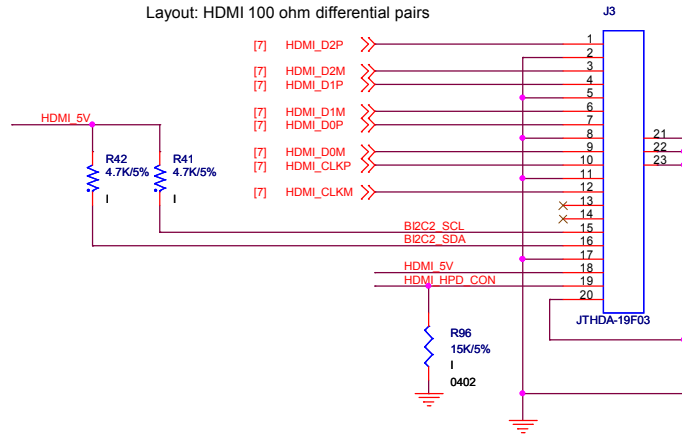
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|             |               | Date                | Saturday, December 07, 2013 | Sheet 10 of 20 |



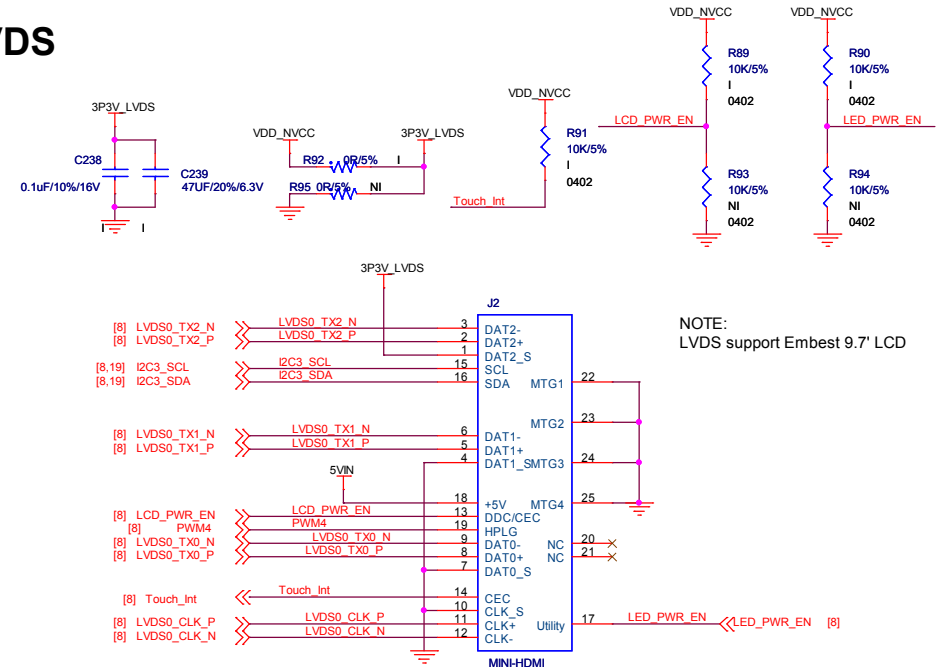
NOTE:  
169 pin 153 pin co-lay

# HDMI

Layout: HDMI 100 ohm differential pairs

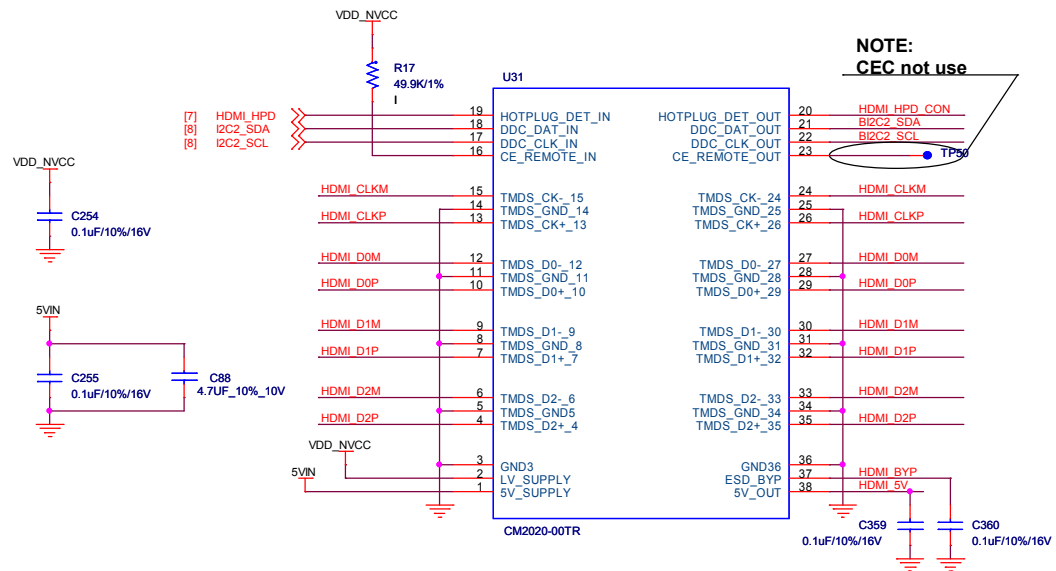


# LVDS



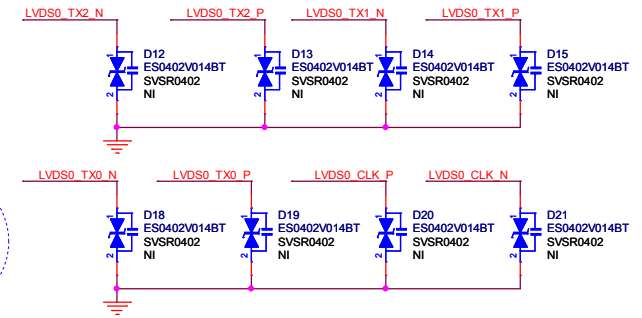
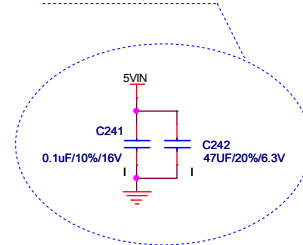
NOTE:  
LVDS support Embest 9.7" LCD

# HDMI ESD Protected



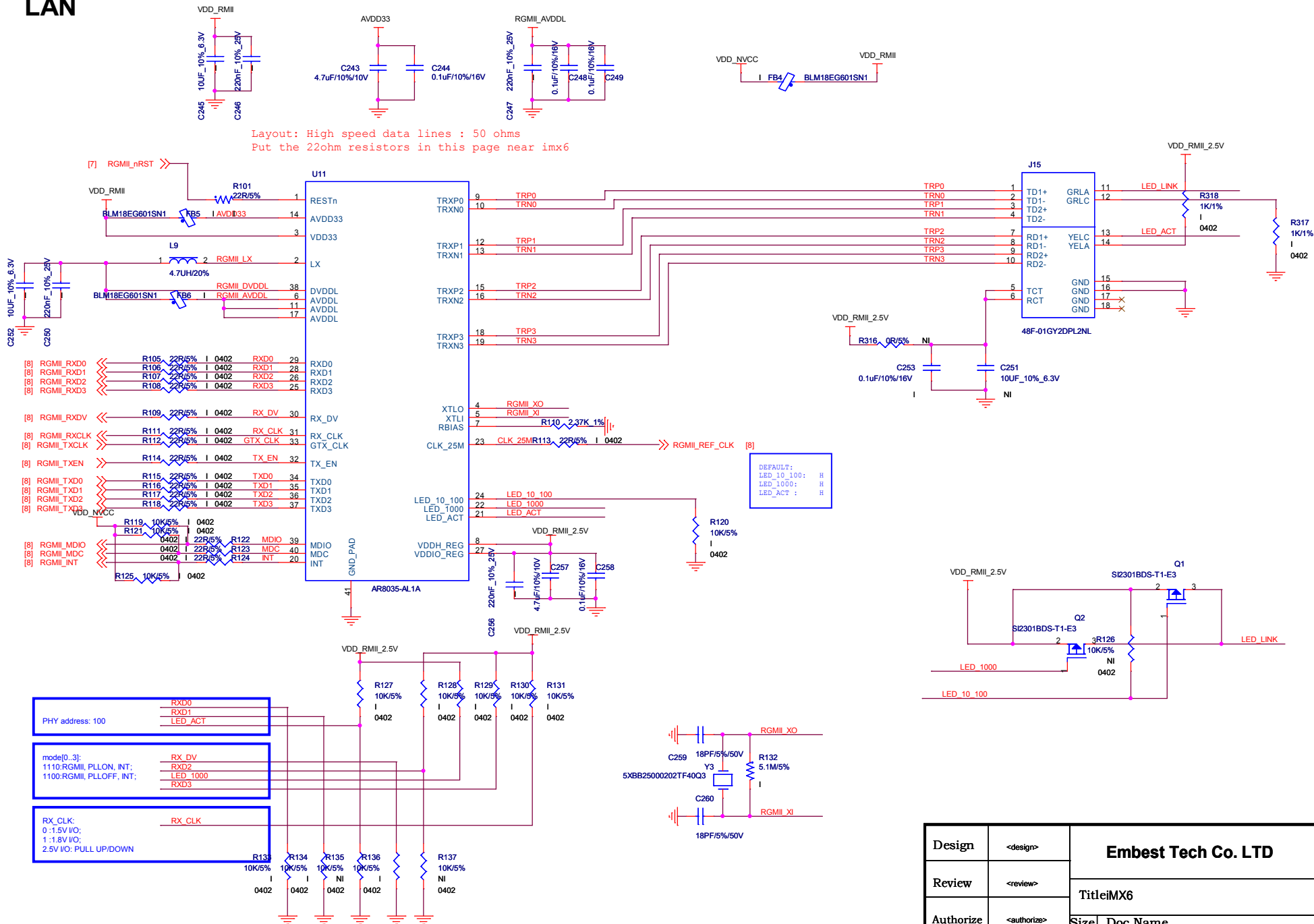
NOTE:  
CEC not use

NOTE:  
Close to J2 pin18



|             |               |                     |                             |                |
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|             |               | Date                | Saturday, December 07, 2013 | Sheet 12 of 20 |

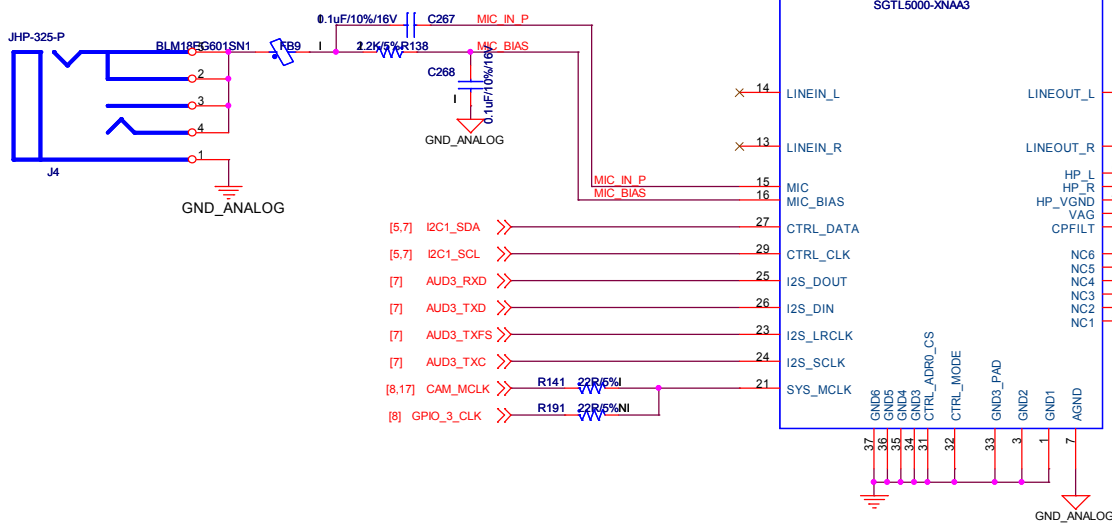
# LAN



|             |               |                     |                             |                |
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|             |               | Date                | Saturday, December 07, 2013 | Sheet 13 of 20 |

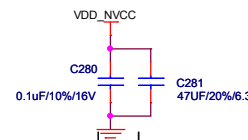
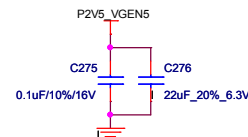
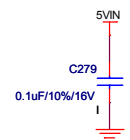
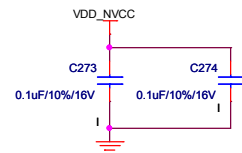
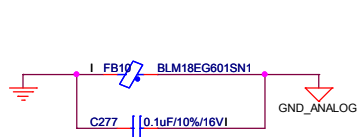
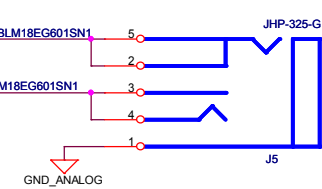
# AUDIO

## MIC IN



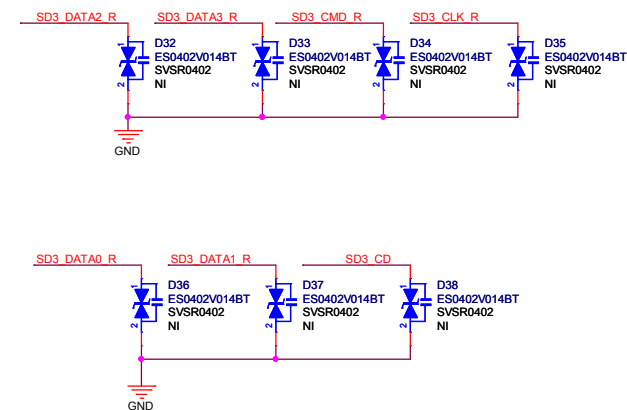
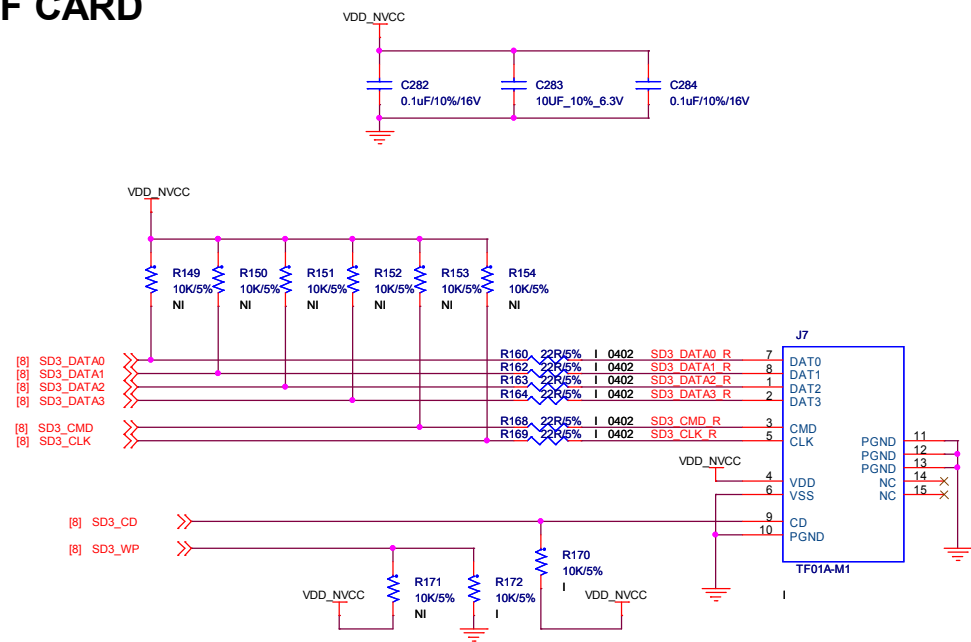
NOTE:  
Line out reserve  
NI in MP

## HP OUT

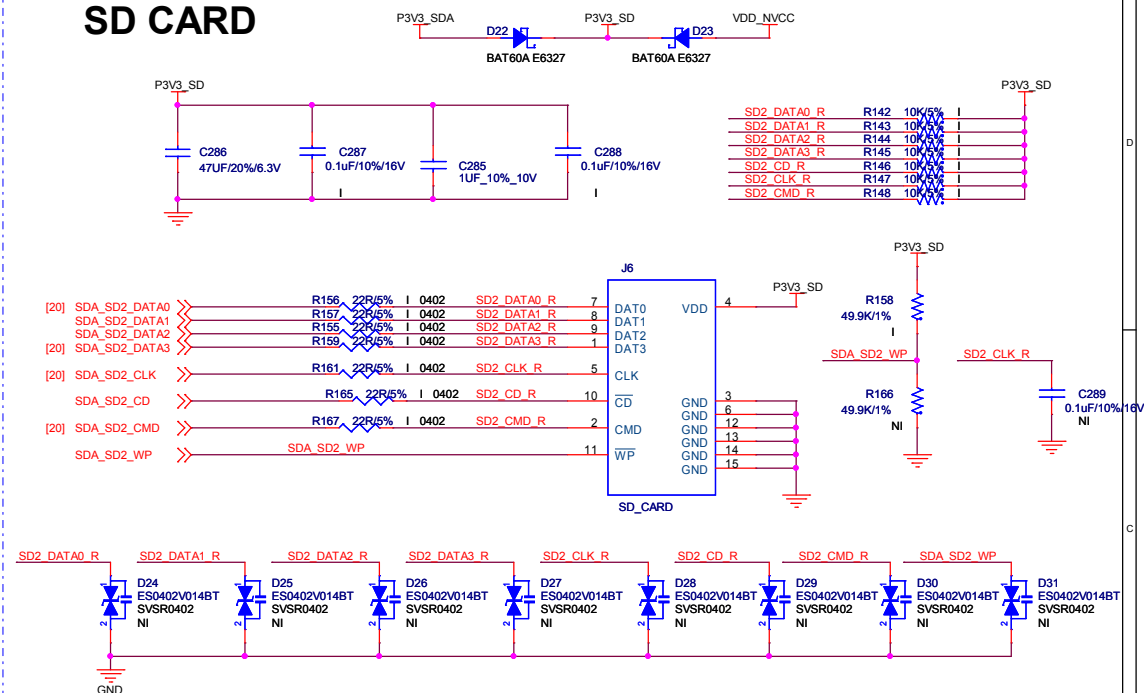


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|             |               | Date                | Saturday, December 07, 2013 | Sheet 14 of 20 |

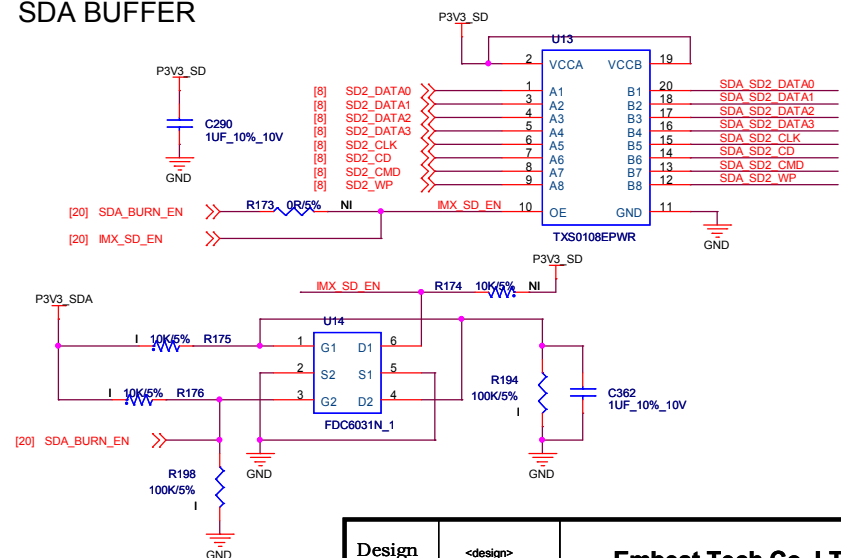
TF CARD



SD CARD

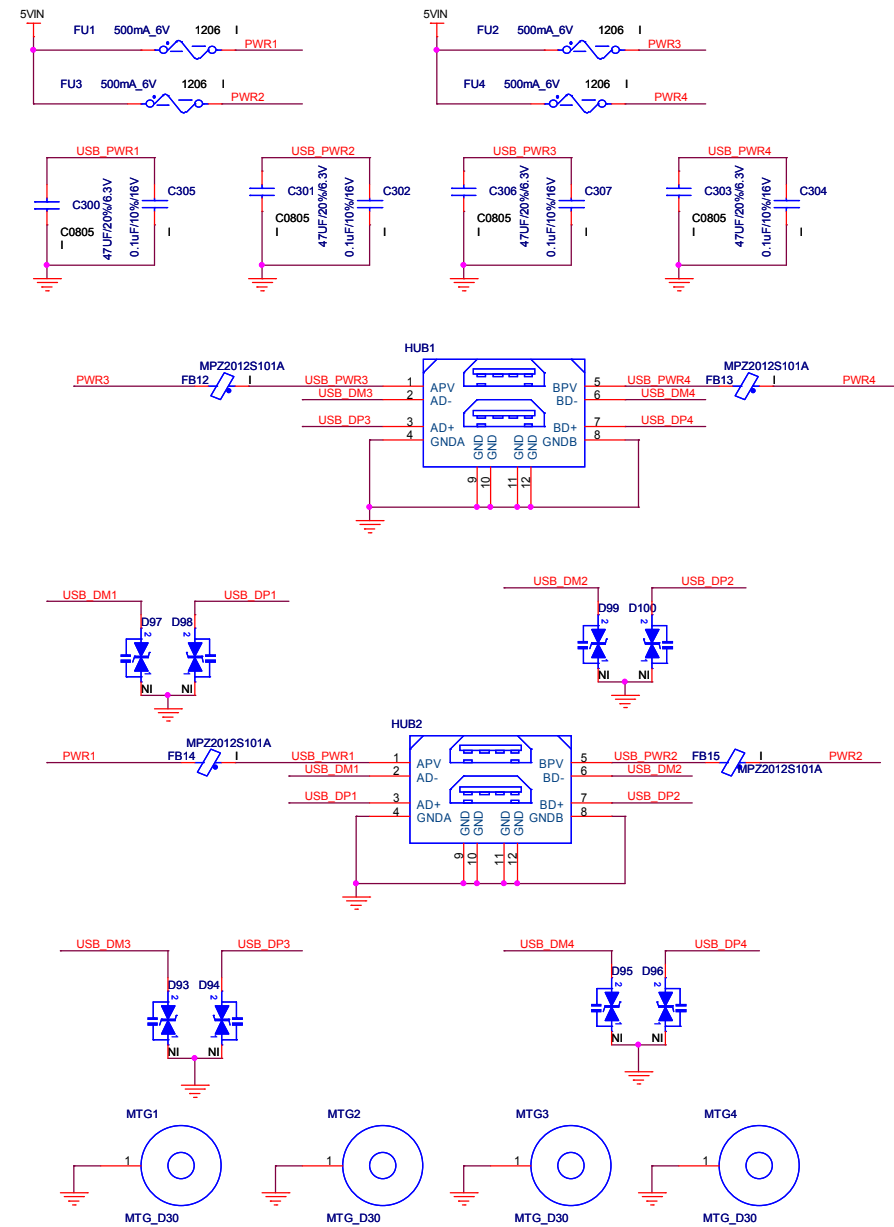
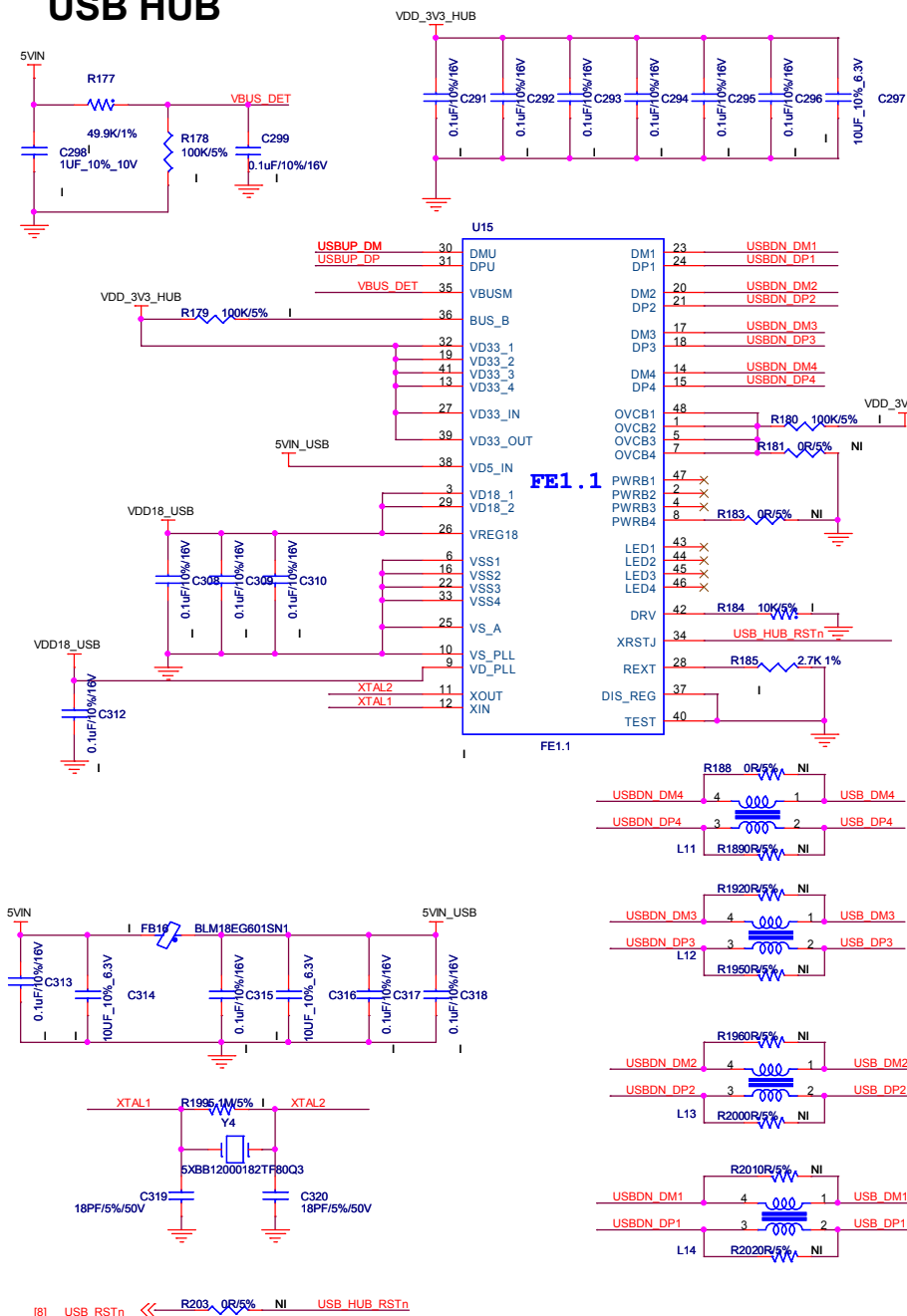


SDA BUFFER

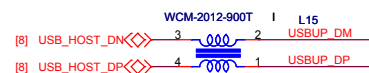


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|             |               | Date                | Monday, December 09, 2013 | Sheet 15 of 20 |

# USB HUB

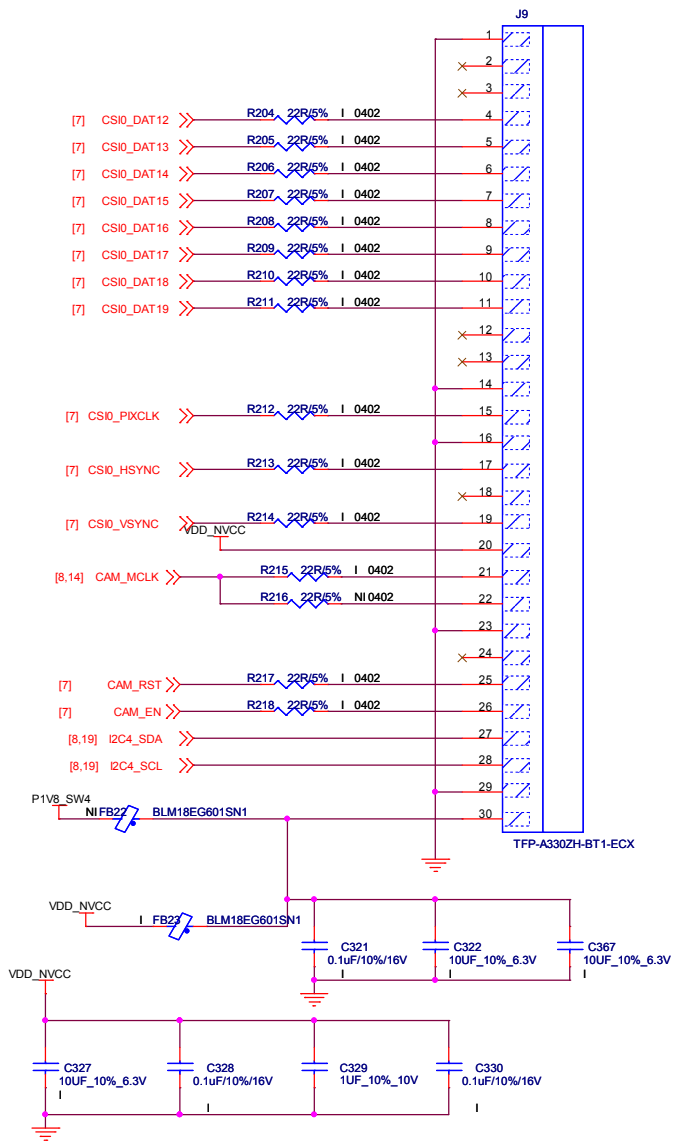


## USB Up Stream

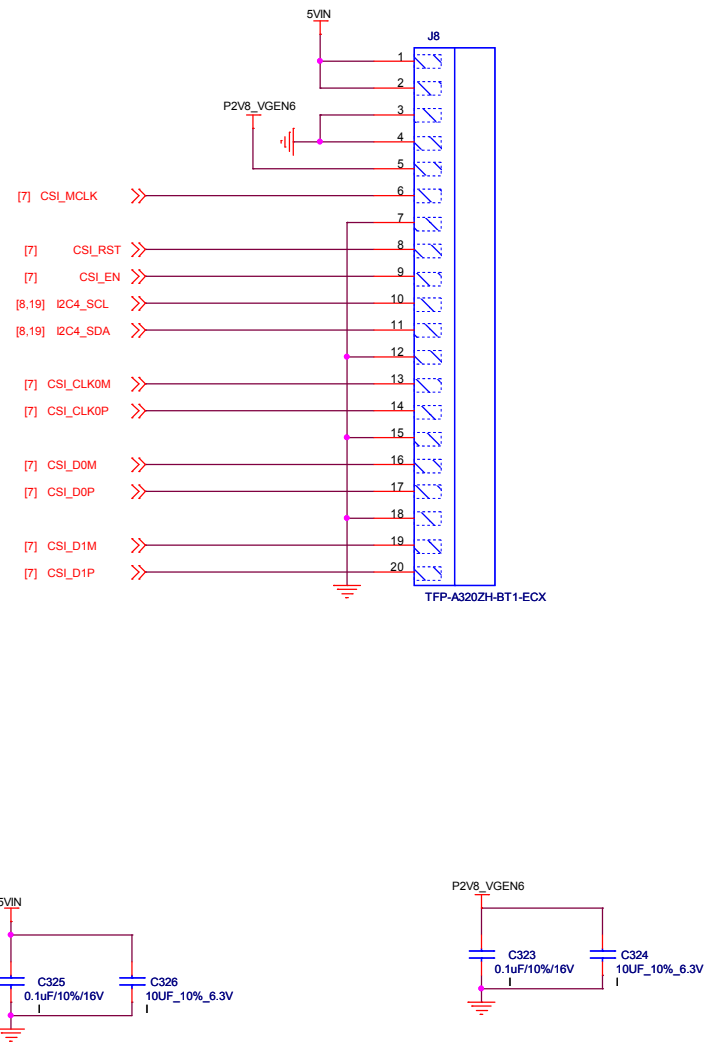


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|             |               | Date                | Saturday, December 07, 2013 | Sheet 16 of 20 |

Parallel

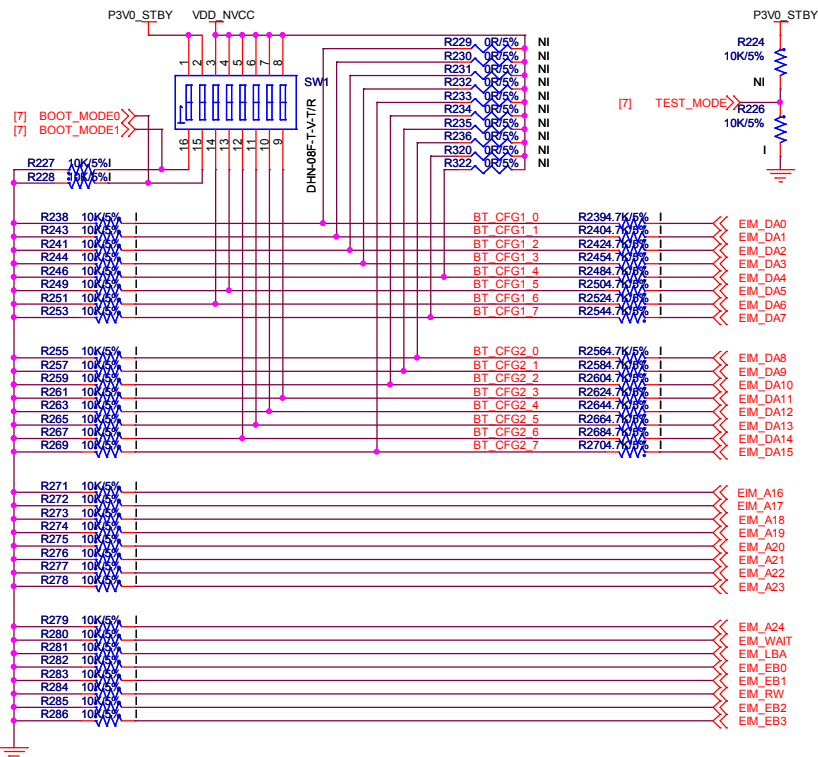


CSI



|             |               |                     |                             |                |
|-------------|---------------|---------------------|-----------------------------|----------------|
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|             |               | Date                | Saturday, December 07, 2013 | Sheet 17 of 20 |

BOOT DEV



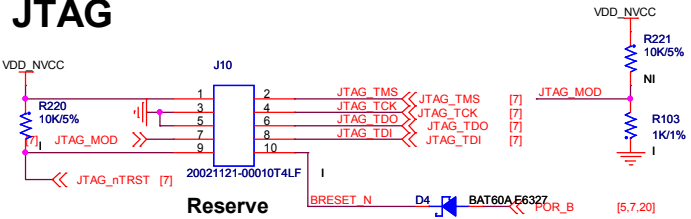
NOTE:  
Place series resistors so as to minimize EIM portion of trace length. Two layout possibiles include:  
1) As close to processor as possible.  
2) Close to other componets using EIM signals.  
iMX solo don't support SATA feature

Table 7-1. Boot MODE Pin Settings

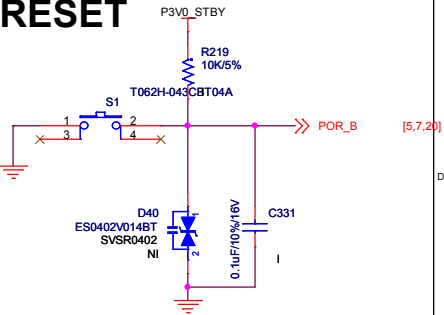
| BOOT_MODE[1:0] <sup>1</sup> | Boot Type                   |
|-----------------------------|-----------------------------|
| 00                          | Boot From Fuses             |
| 01                          | Serial Downloader           |
| 10                          | Internal Boot (Development) |
| 11                          | Reserved                    |

1. BOOT\_MODE[1:0] <- {BOOT\_MODE1,BOOT\_MODE0} (at rising edge of RESET\_B)

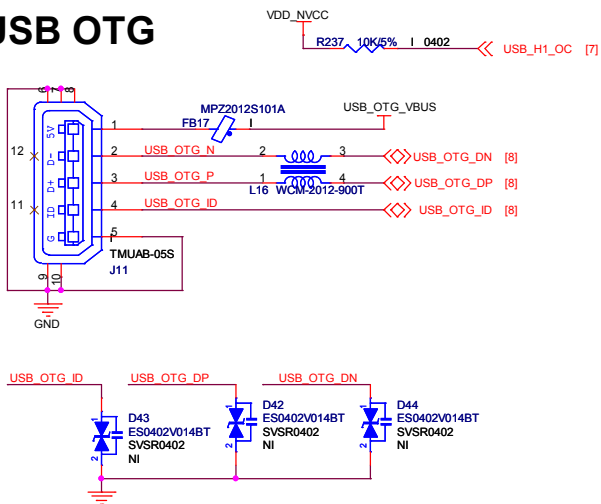
JTAG



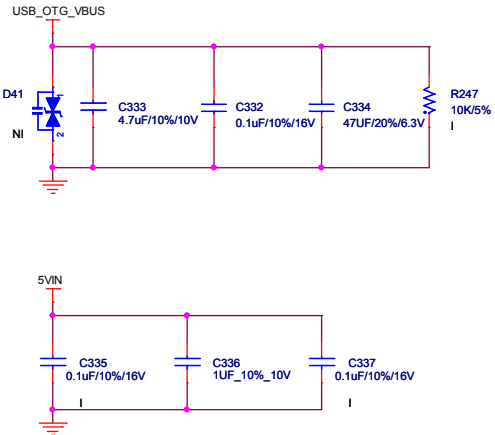
RESET



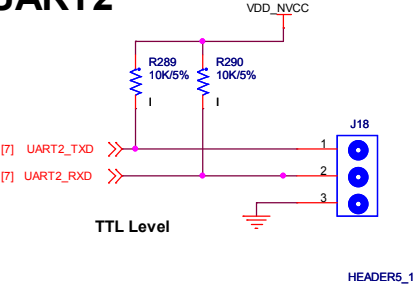
USB OTG



BOOT MODE



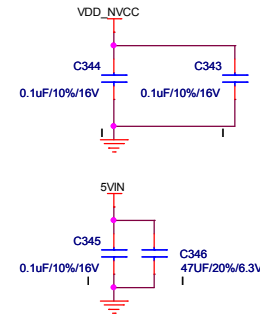
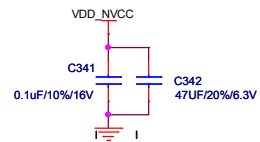
UART2



Note: Power\_EN active Low

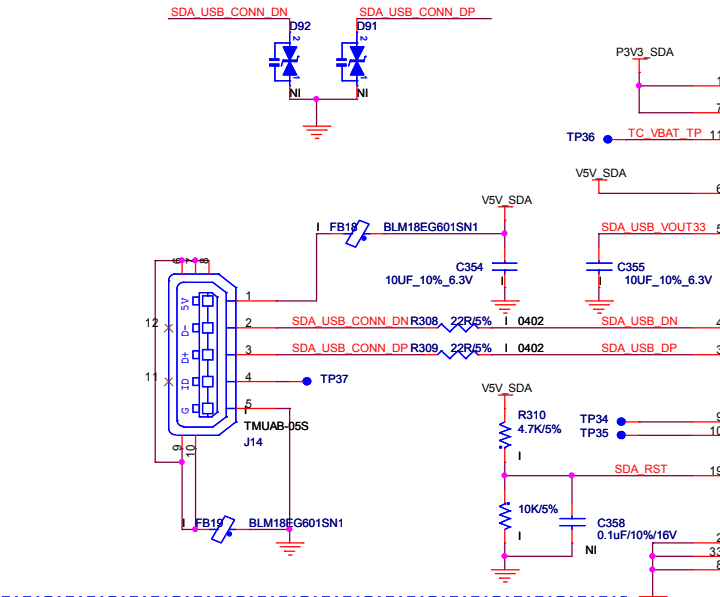
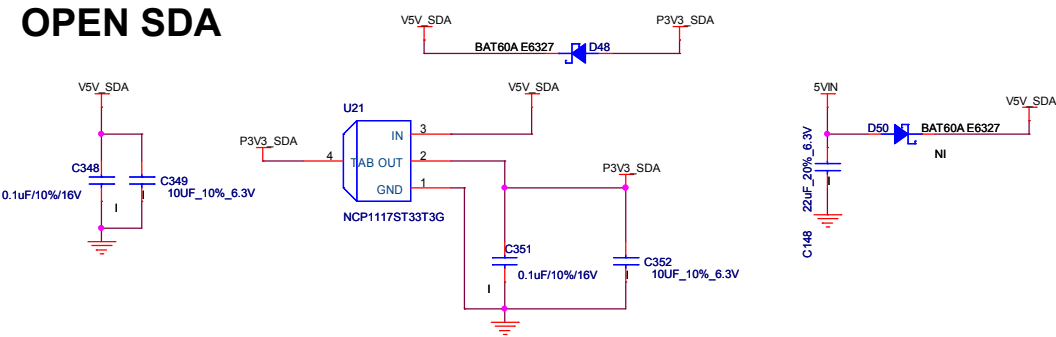
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| Authorize   | <authorize>   | Size                | Doc Name                    | Ver.           |
| Standardize | <standardize> | A3                  | 18 BOOT/UART2               | V1.0           |
|             |               | Date                | Wednesday, January 15, 2014 | Sheet 18 of 20 |

1. 20bits RGB
2. I2C x2
3. SPI x2
4. UART x3
5. PWM x3

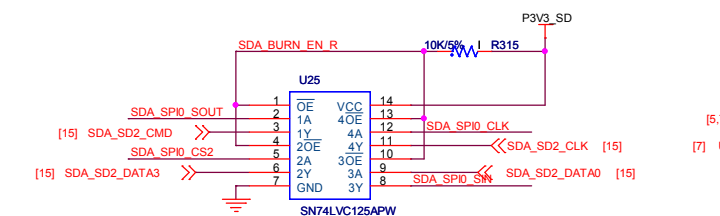


|             |               |                                                                  |                             |       |          |
|-------------|---------------|------------------------------------------------------------------|-----------------------------|-------|----------|
| Design      | <design>      | <div> <div>Embest Tech Co. LTD</div> <div>TitleIMX6</div> </div> |                             |       | A        |
| Review      | <review>      |                                                                  |                             |       |          |
| Authorize   | <authorize>   |                                                                  |                             |       |          |
| Standardize | <standardize> | Size                                                             | Doc Name                    | Ver.  | V1.0     |
|             |               | A3                                                               | 19 EXPANSION PORT           |       |          |
|             |               | Date                                                             | Saturday, December 07, 2013 | Sheet | 19 of 20 |

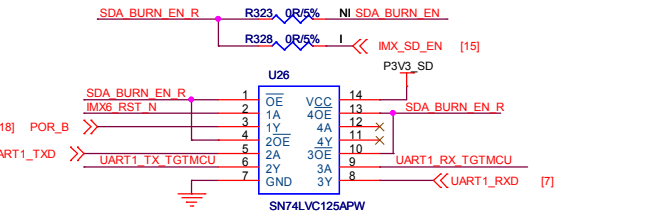
OPEN SDA



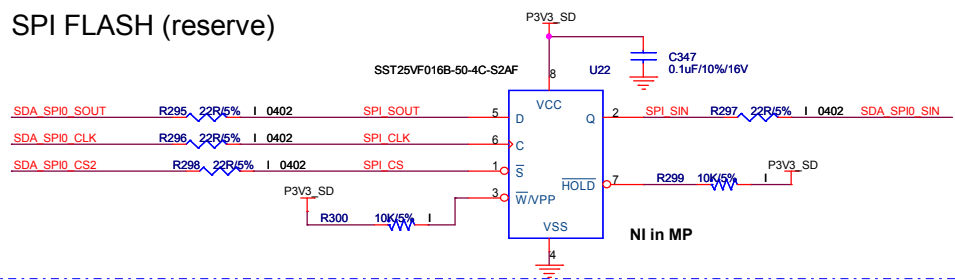
| Pin # | SD Mode              |                     |                                   | SPI Mode |                   |                        |
|-------|----------------------|---------------------|-----------------------------------|----------|-------------------|------------------------|
|       | Name                 | Type <sup>1</sup>   | Description                       | Name     | Type <sup>1</sup> | Description            |
| 1     | CD/DAT3 <sup>2</sup> | I/O/PP <sup>2</sup> | Card Detect/<br>Data Line [Bit 3] | CS       | I <sup>2</sup>    | Chip Select (neg true) |
| 2     | CMD                  | I/O/PP              | Command/Response                  | DI       | I                 | Data In                |
| 3     | VSS1                 | S                   | Supply voltage ground             | VSS      | S                 | Supply voltage ground  |
| 4     | VDD                  | S                   | Supply voltage                    | VDD      | S                 | Supply voltage         |
| 5     | CLK                  | I                   | Clock                             | SCLK     | I                 | Clock                  |
| 6     | VSS2                 | S                   | Supply voltage ground             | VSS2     | S                 | Supply voltage ground  |
| 7     | DAT0                 | I/O/PP              | Data Line [Bit 0]                 | DO       | O/PP              | Data Out               |
| 8     | DAT1 <sup>4</sup>    | I/O/PP              | Data Line [Bit 1]                 | RSV      |                   |                        |
| 9     | DAT2 <sup>2</sup>    | I/O/PP              | Data Line [Bit 2]                 | RSV      |                   |                        |



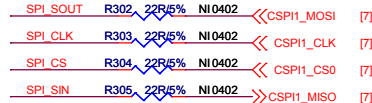
SDA\_MCU BUFFER



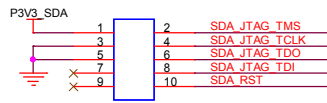
SPI FLASH (reserve)



Reserve for debug



Reserve



|             |               |                     |                             |                |
|-------------|---------------|---------------------|-----------------------------|----------------|
| Design      | <design>      | Embest Tech Co. LTD |                             |                |
| Review      | <review>      |                     |                             |                |
| Authorize   | <authorize>   | TitleIMX6           |                             |                |
| Standardize | <standardize> | Size                | Doc Name                    | Ver.           |
|             |               | A3                  | 20 OPEN SDA                 | V1.0           |
|             |               | Date                | Saturday, December 07, 2013 | Sheet 20 of 20 |