

NOTES, UNLESS OTHERWISE SPECIFIED:

1. RESISTANCE VALUES IN OHMS.
2. CAPACITANCE VALUES IN MICROFARADS.
3. REFERENCE DESIGNATORS USED:
4. ALL 0.1 uF AND 0.01uF CAPACITORS ARE DECOUPLING CAPS UNLESS OTHERWISE NOTED. THEY ARE SHOWN ON THE PAGE WITH THE INTEGRATED CIRCUITS THEY SHOULD BE PLACED NEAR.
5. NHET1xx means NHET1_[xx].
6. OBSERVE THE LAYOUT NOTES IN SCHEMATIC.

Changes on RevC:

1. Changed SD card slot
2. R291 and R293 value for Gladiator 1.2V core power
3. Route EMIF D[8:15] to exp connector (missed on RevB)

Changes on RevD:

1. Added n_channel FET and RC to JTAG nTRST (P07)

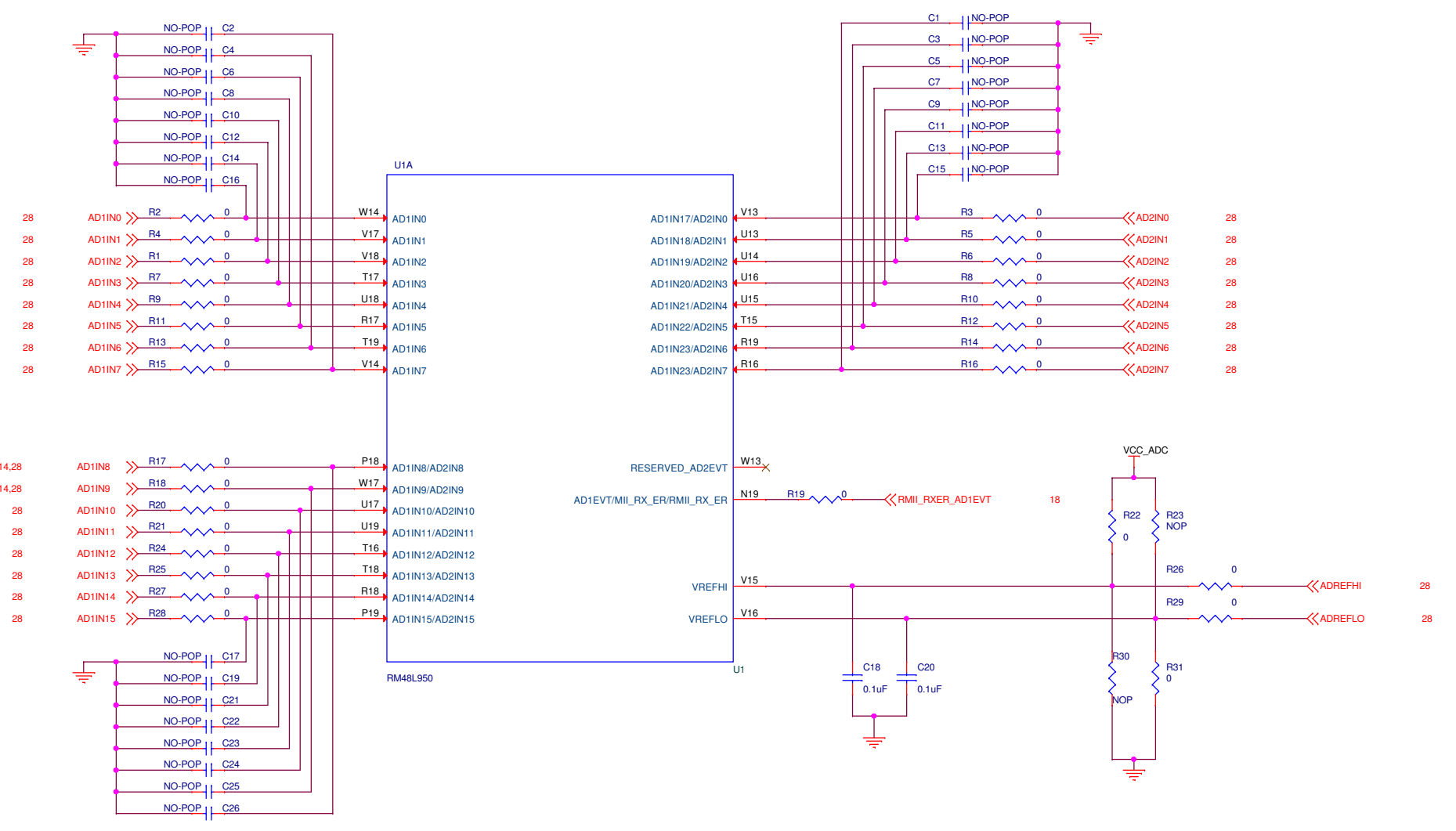
Changes on RevE:

1. Added n_channel FET and RC to JTAG nTRST (P07)

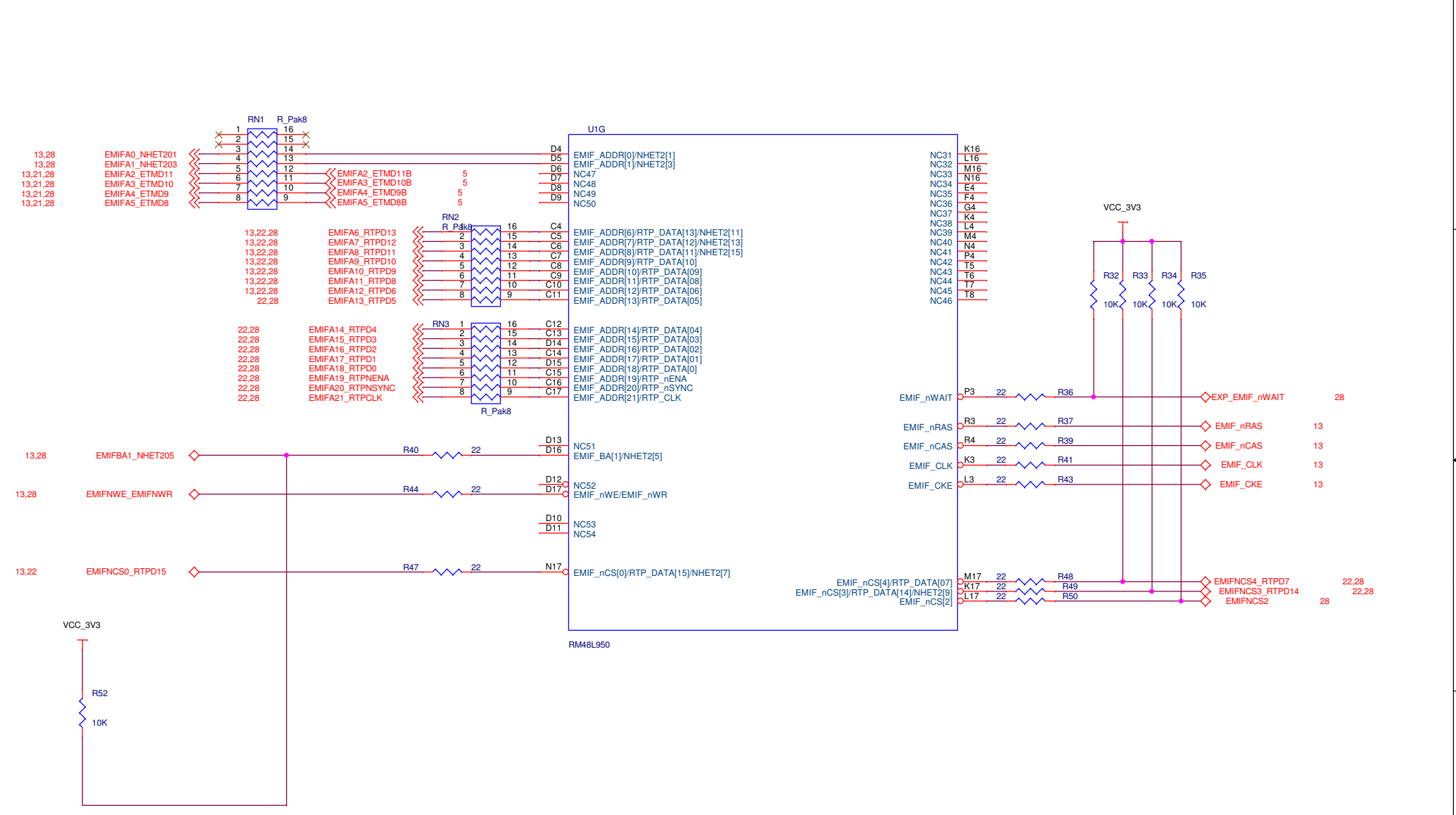
SCHEMATIC CONTENTS

- 01 TITLE SHEET
- 02 MCU ADC
- 03 MCU EMIF
- 04 MCU SPI
- 05 MCU ETM
- 06 MCU DCAN, FLEXRAY, and LIN
- 07 MCU JTAG and OSC
- 08 MCU NHET
- 09 MCU GPIO
- 10 MCU Power & GND
- 11 FETSwitches for 1st USB
- 12 EMIF Addr/ETM/RTP
- 13 SDRAM
- 14 Sensors, LEDs, and Pushbutton
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- 16 USB 1st OHCI Host
- 17 USB device and 2nd OHCI Host
- 18 FET Switch for RMII and DIP Switch
- 19 Ethernet PHY & Connector
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- 25 RESET
- 26 Power Supply
- 27 Power Inut
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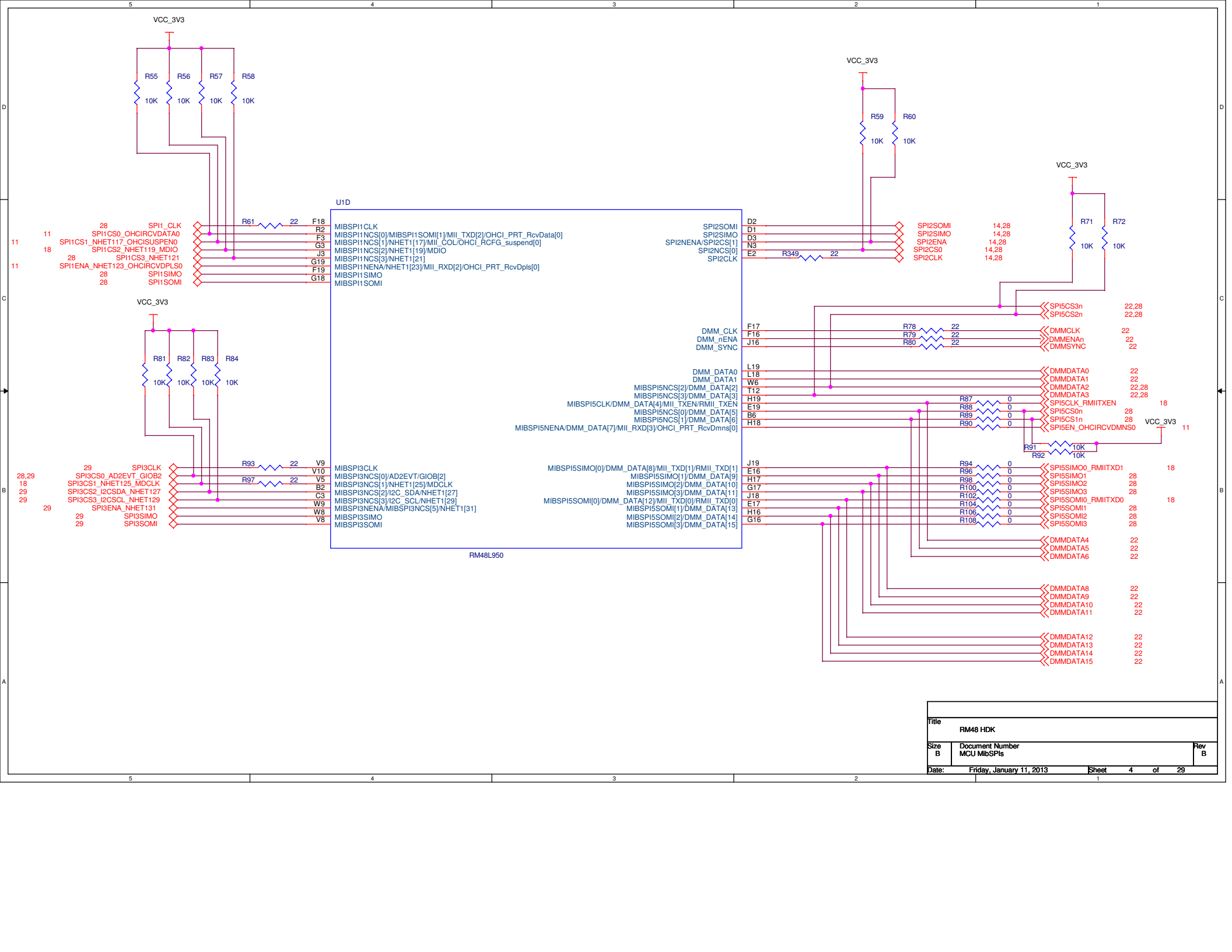
| | | |
|------------------------------|--------------------------|---------------|
| Texas Instruments Inc | | |
| Title | | |
| RM48 HDK | | |
| Size A | Document Number TITLE | Rev B |
| Date: | Wednesday, July 31, 2013 | Sheet 1 of 29 |



| | | |
|----------|--------------------------|---------------|
| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev B |
| | MCU ADC | |
| Date: | Friday, January 11, 2013 | Sheet 2 of 29 |



| | | | |
|-------|--------------------------|----------|---------|
| Title | | RM48 HDK | |
| Size | Document Number | Rev | |
| B | MCU EMIF | B | |
| Date: | Friday, January 11, 2013 | Sheet | 3 of 29 |



U1D

RM48L950

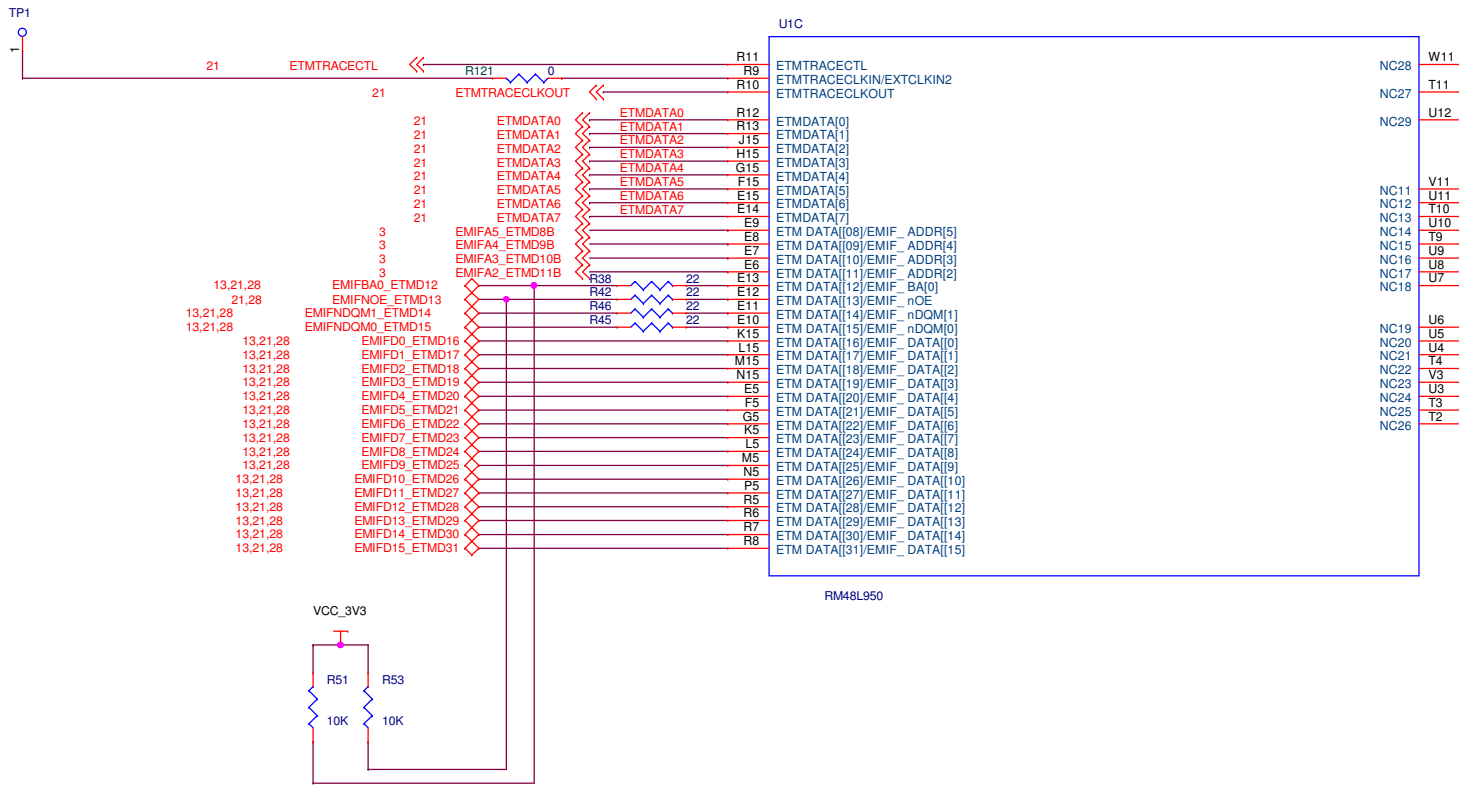
MIBSPI1CLK
 MIBSPI1NCS[0]/MIBSPI1SOMI[1]/MII_TXD[2]/OHCI_PRT_RcvData[0]
 MIBSPI1NCS[1]/NHET1[17]/MII_COL/OHCI_RCFG_suspend[0]
 MIBSPI1NCS[2]/NHET1[19]/MDIO
 MIBSPI1NCS[3]/NHET1[21]
 MIBSPI1NENA/NHET1[23]/MII_RXD[2]/OHCI_PRT_RcvDpls[0]
 MIBSPI1SIMO
 MIBSPI1SOMI

 MIBSPI3CLK
 MIBSPI3NCS[0]/AD2EVT/GIOB[2]
 MIBSPI3NCS[1]/NHET1[25]/MDCLK
 MIBSPI3NCS[2]/I2C_SDA/NHET1[27]
 MIBSPI3NCS[3]/I2C_SCL/NHET1[29]
 MIBSPI3NENA/MIBSPI3NCS[5]/NHET1[31]
 MIBSPI3SIMO
 MIBSPI3SOMI

 MIBSPI5CLK/DMM_DATA[4]/MII_TXEN/RMII_TXEN
 MIBSPI5NCS[0]/DMM_DATA[5]
 MIBSPI5NCS[1]/DMM_DATA[6]
 MIBSPI5NENA/DMM_DATA[7]/MII_RXD[3]/OHCI_PRT_RcvDmns[0]

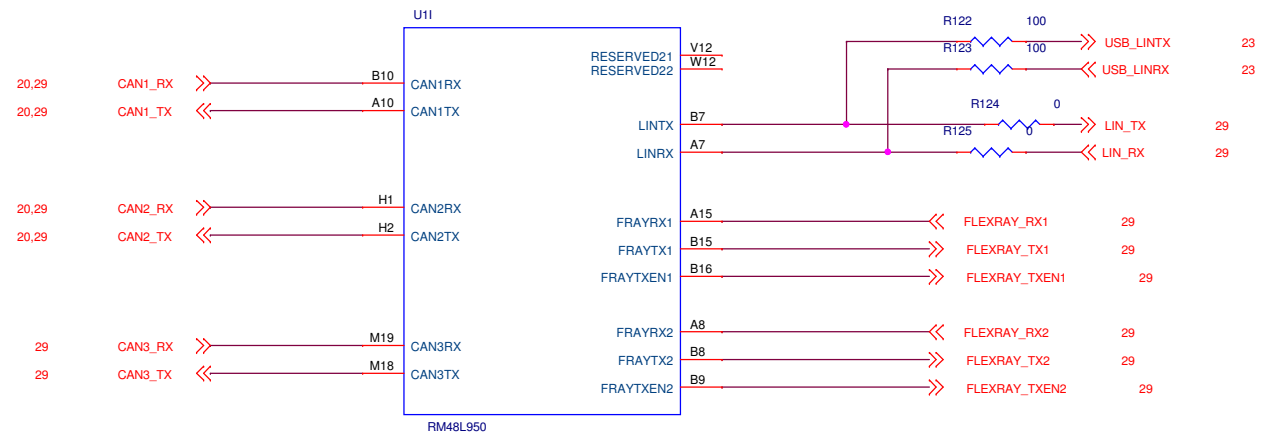
 MIBSPI5SIMO[0]/DMM_DATA[8]/MII_TXD[1]/RMII_TXD[1]
 MIBSPI5SIMO[1]/DMM_DATA[9]
 MIBSPI5SIMO[2]/DMM_DATA[10]
 MIBSPI5SIMO[3]/DMM_DATA[11]
 MIBSPI5SOMI[0]/DMM_DATA[12]/MII_TXD[0]/RMII_TXD[0]
 MIBSPI5SOMI[1]/DMM_DATA[13]
 MIBSPI5SOMI[2]/DMM_DATA[14]
 MIBSPI5SOMI[3]/DMM_DATA[15]

| | | |
|----------|--------------------------|---------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | MCU MibSPis | B |
| Date: | Friday, January 11, 2013 | Sheet 4 of 29 |

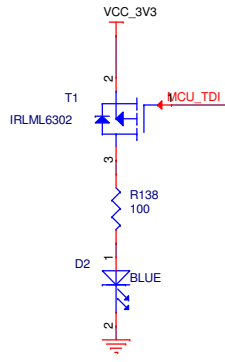
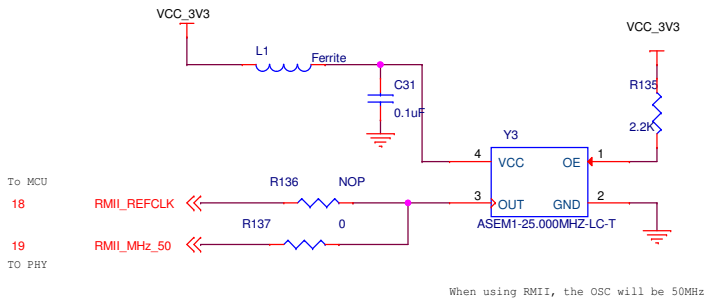


changed all the name to Gladiator only

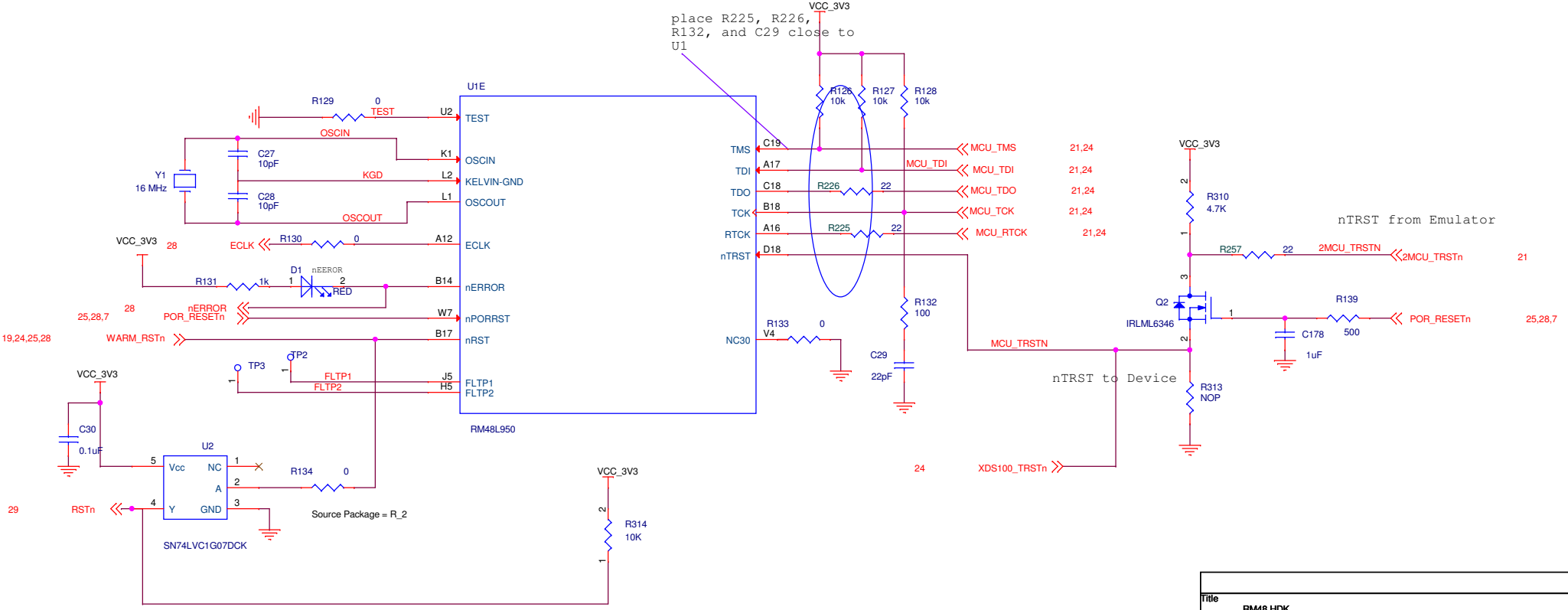
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|----------|--------------------------|---------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | MCU ETM & Rsvd RTP | B |
| Date: | Friday, January 11, 2013 | Sheet 5 of 29 |



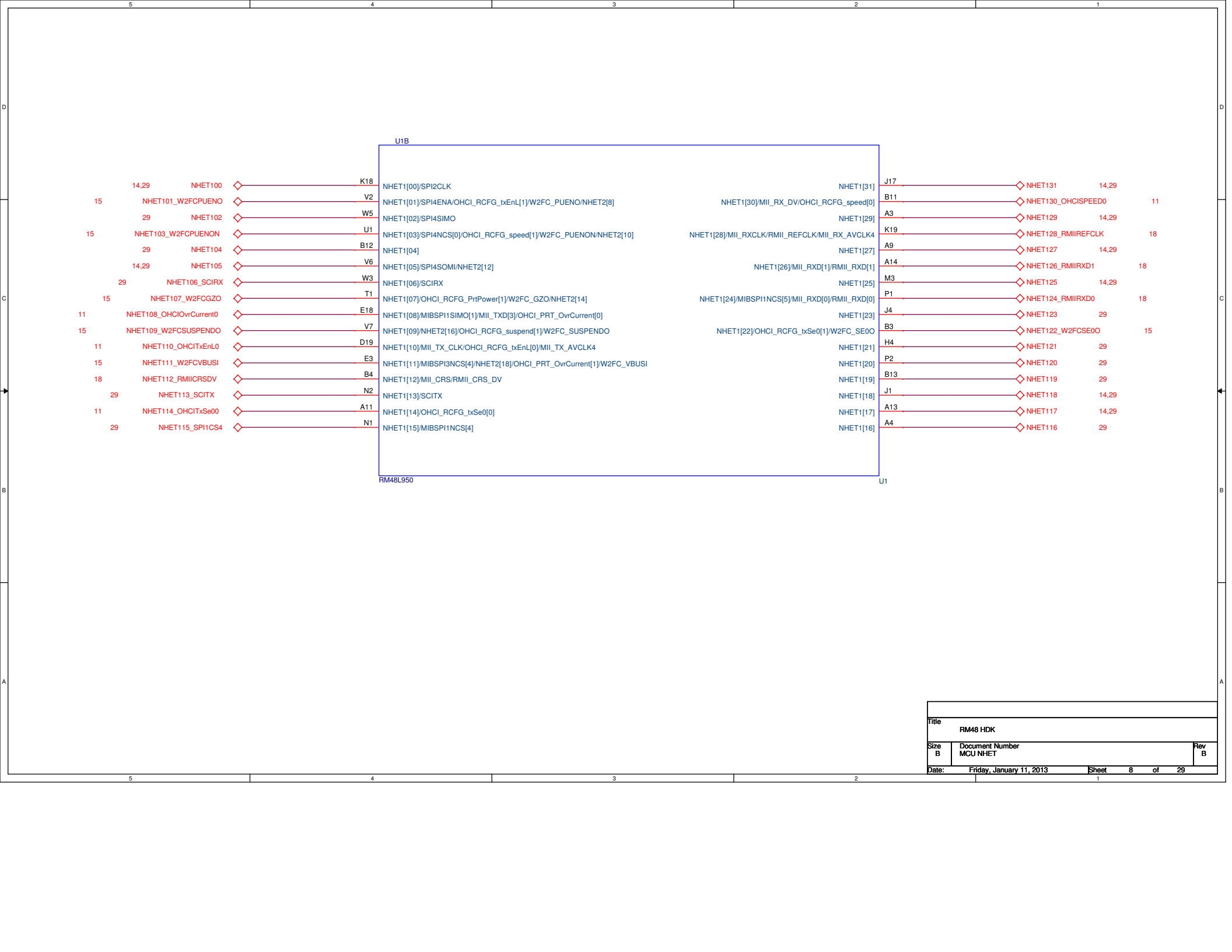
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|----------|--------------------------|---------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | MCU DCAN, FRAY, LIN | D |
| Date: | Friday, January 11, 2013 | Sheet 6 of 29 |



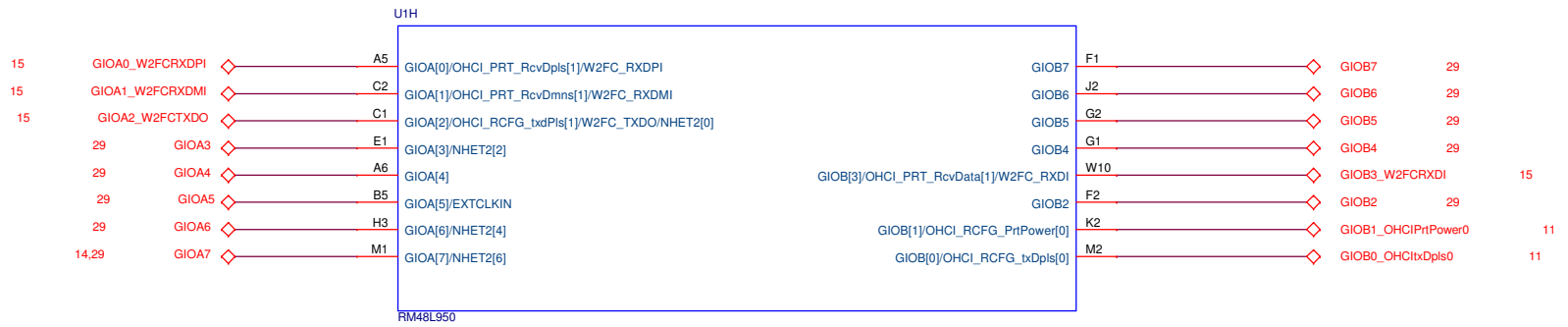
place R225, R226,
R132, and C29 close to
U1



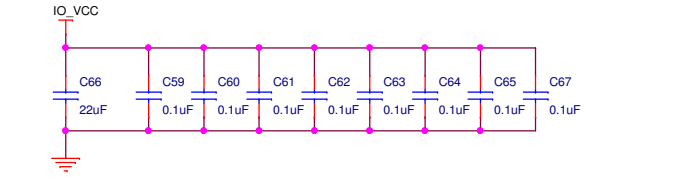
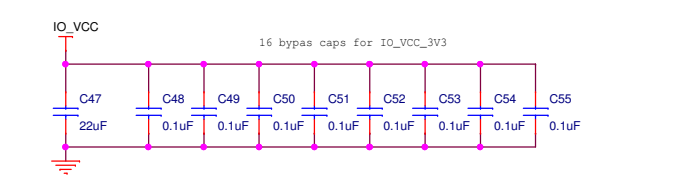
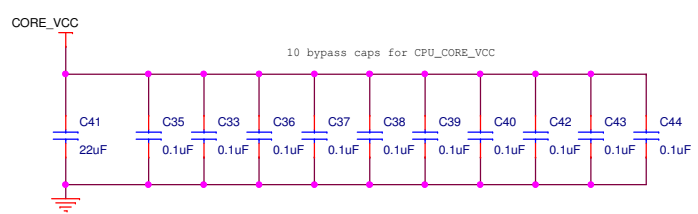
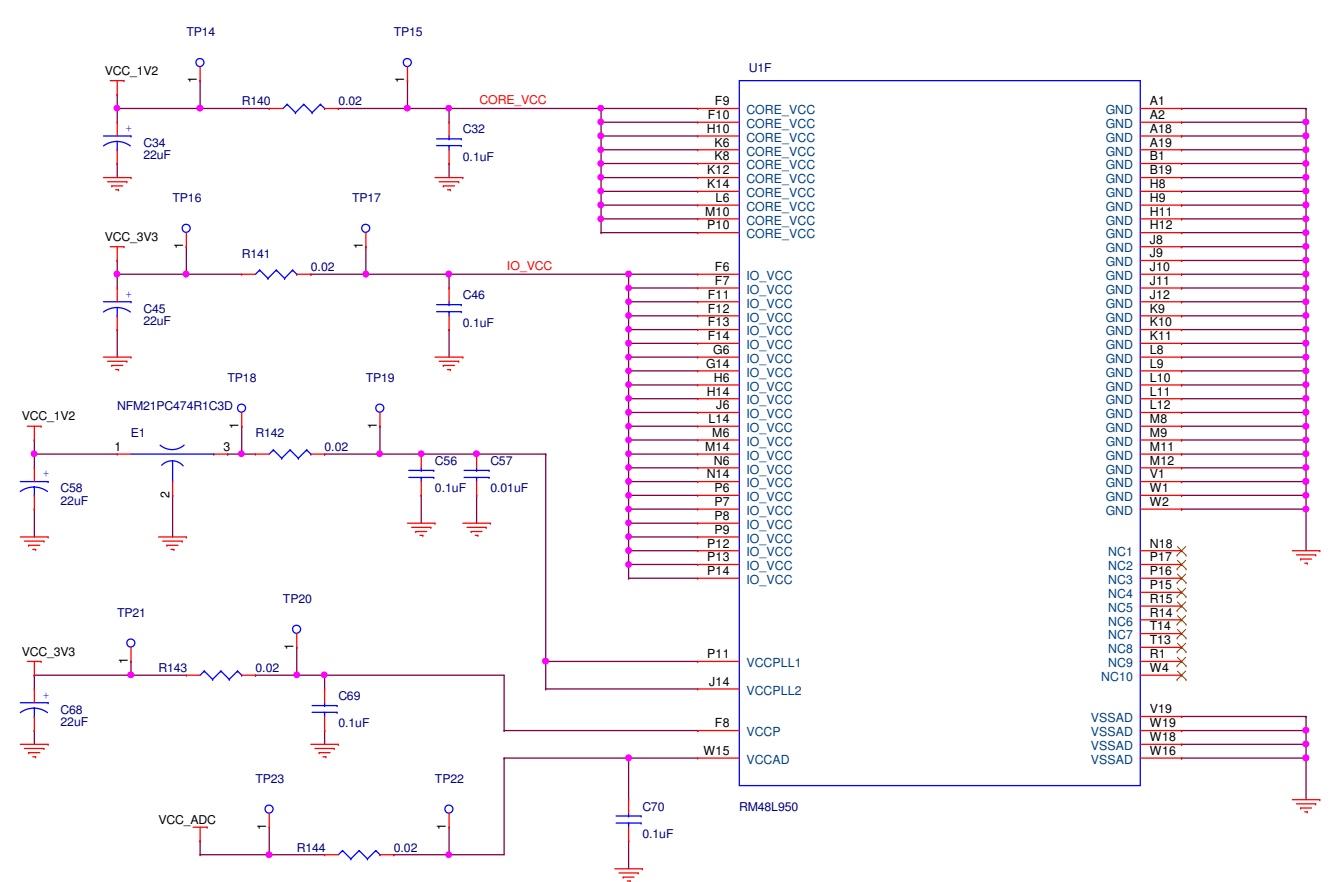
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|----------|------------------------|---------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | MCU JTAG & OSC | D |
| Date: | Tuesday, July 30, 2013 | Sheet 7 of 29 |



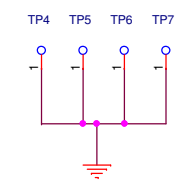
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|----------|--------------------------|---------------|
| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev B |
| | MCU NHET | |
| Date: | Friday, January 11, 2013 | Sheet 8 of 29 |



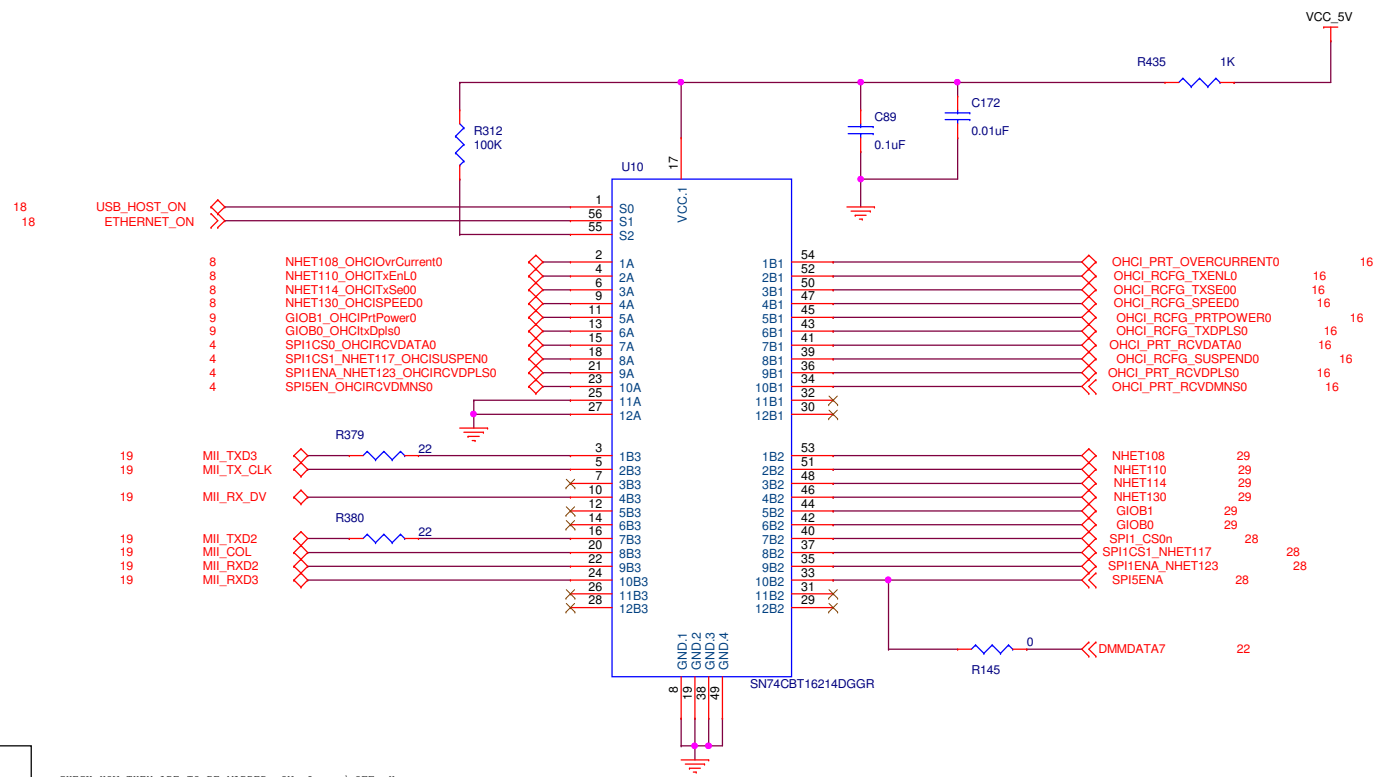
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|----------|--------------------------|---------------|
| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev B |
| | MCU GPIO | |
| Date: | Friday, January 11, 2013 | Sheet 9 of 29 |



4 GND test points at the board's 4 corners



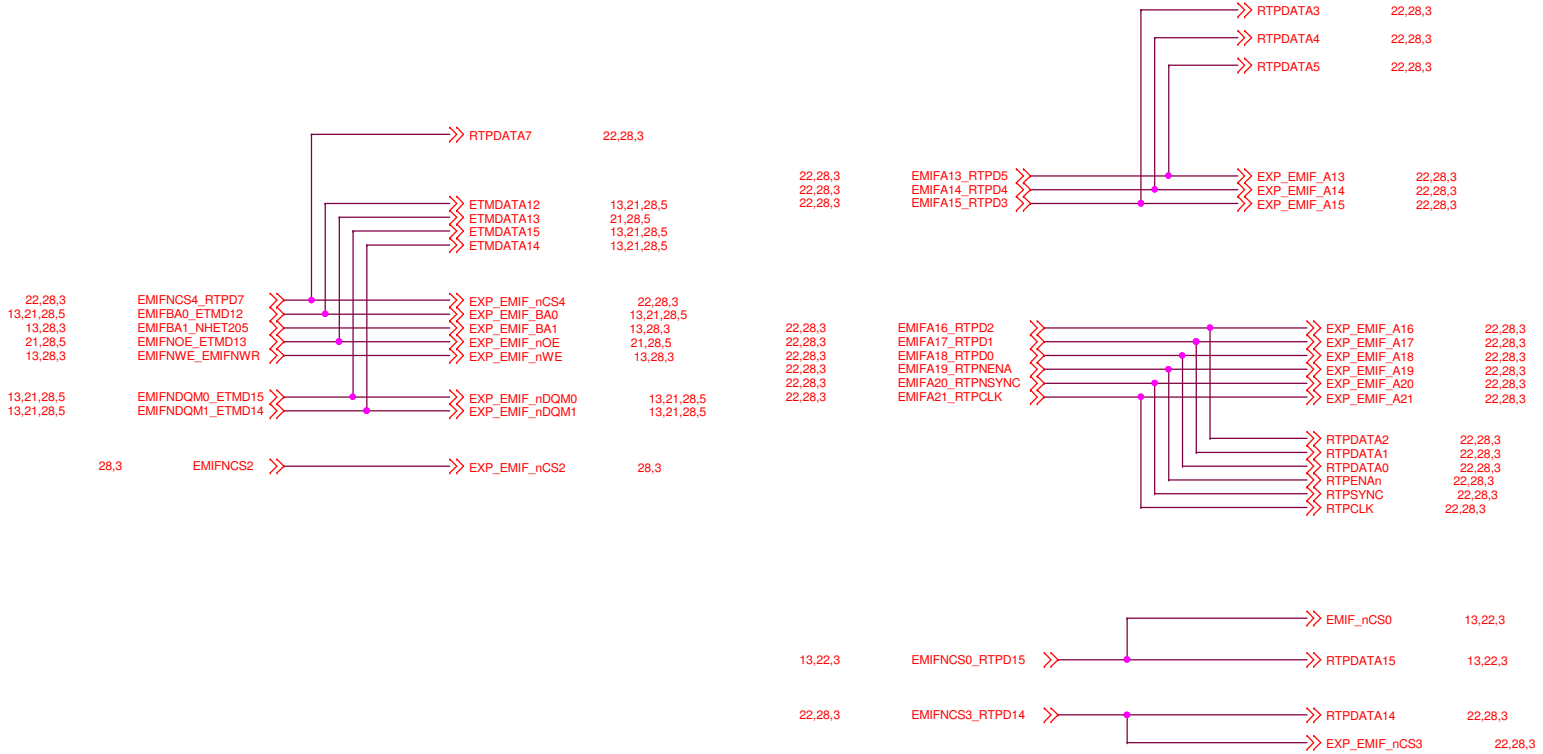
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|-------|--------------------------|-----------------|-----------------|
| Title | | RM48 HDK | |
| Size | B | Document Number | MCU Power & GND |
| Date: | Friday, January 11, 2013 | Sheet | 10 of 29 |
| | | | Rev B |



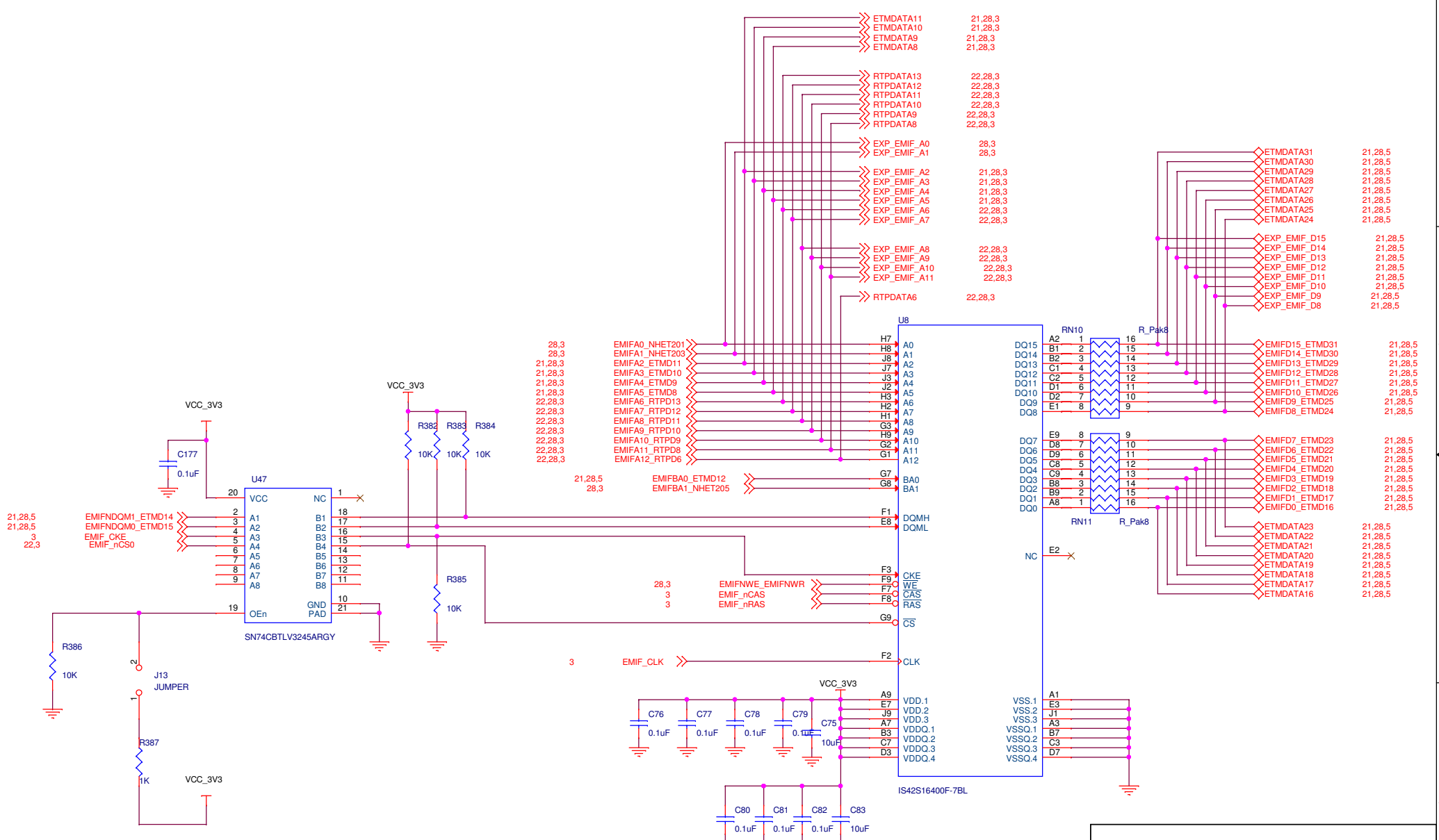
| S2 | S1 | S0 | A |
|----|----|----|-------|
| 1 | 0 | 0 | Z |
| 1 | 0 | 1 | B3** |
| 1 | 1 | 0 | B1 ** |
| 1 | 1 | 1 | B2 ** |

CHECK HOW THEY ARE TO BE MAPPED. ON--L, and OFF--H

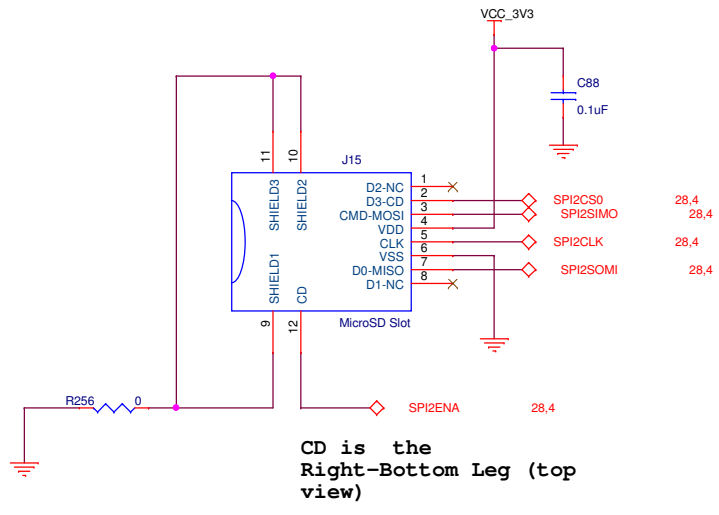
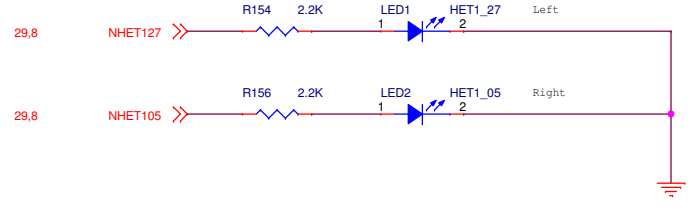
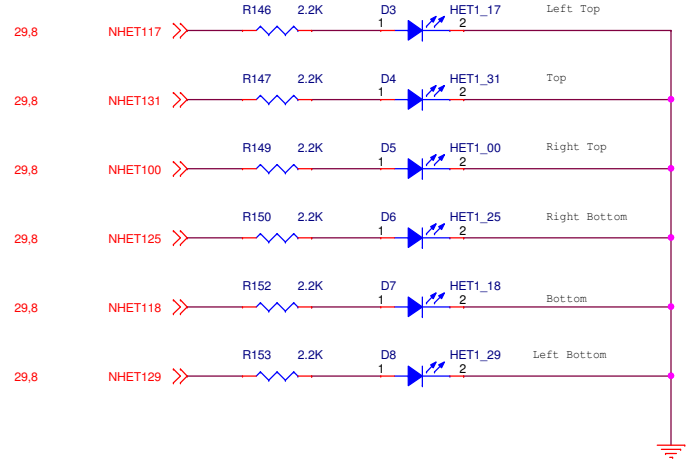
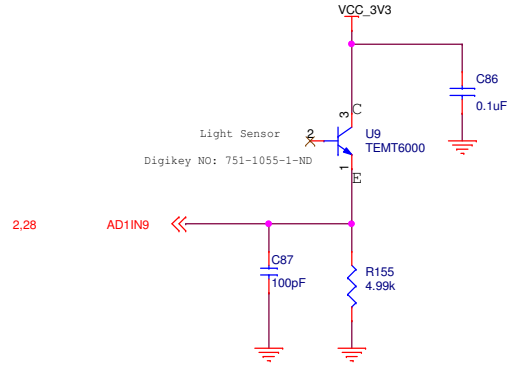
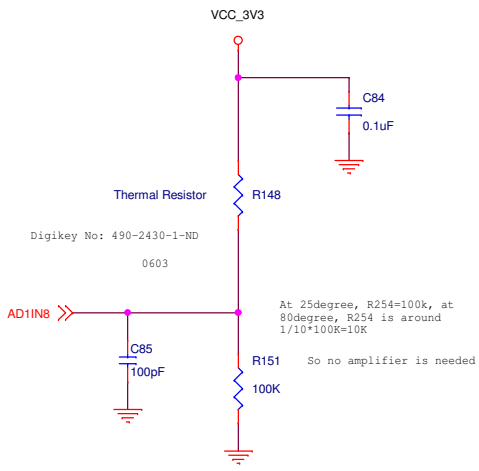
| | | |
|--------------------------|--------------------------|----------------|
| Title | | |
| TMS570LS3x/RM5x CPU CARD | | |
| Size | Document Number | Rev |
| B | FET SWs FOR 1st USB HOST | B |
| Date: | Friday, January 11, 2013 | Sheet 11 of 29 |



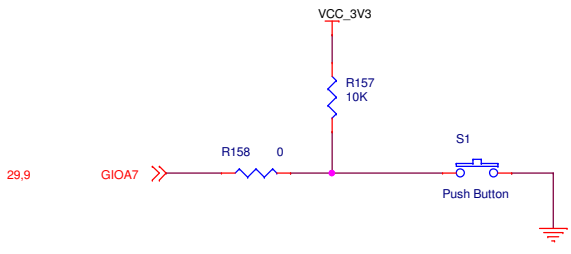
| | | |
|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev B |
| | EMIF DATA and ADDR BUSES | |
| Date: | Friday, January 11, 2013 | Sheet 12 of 29 |



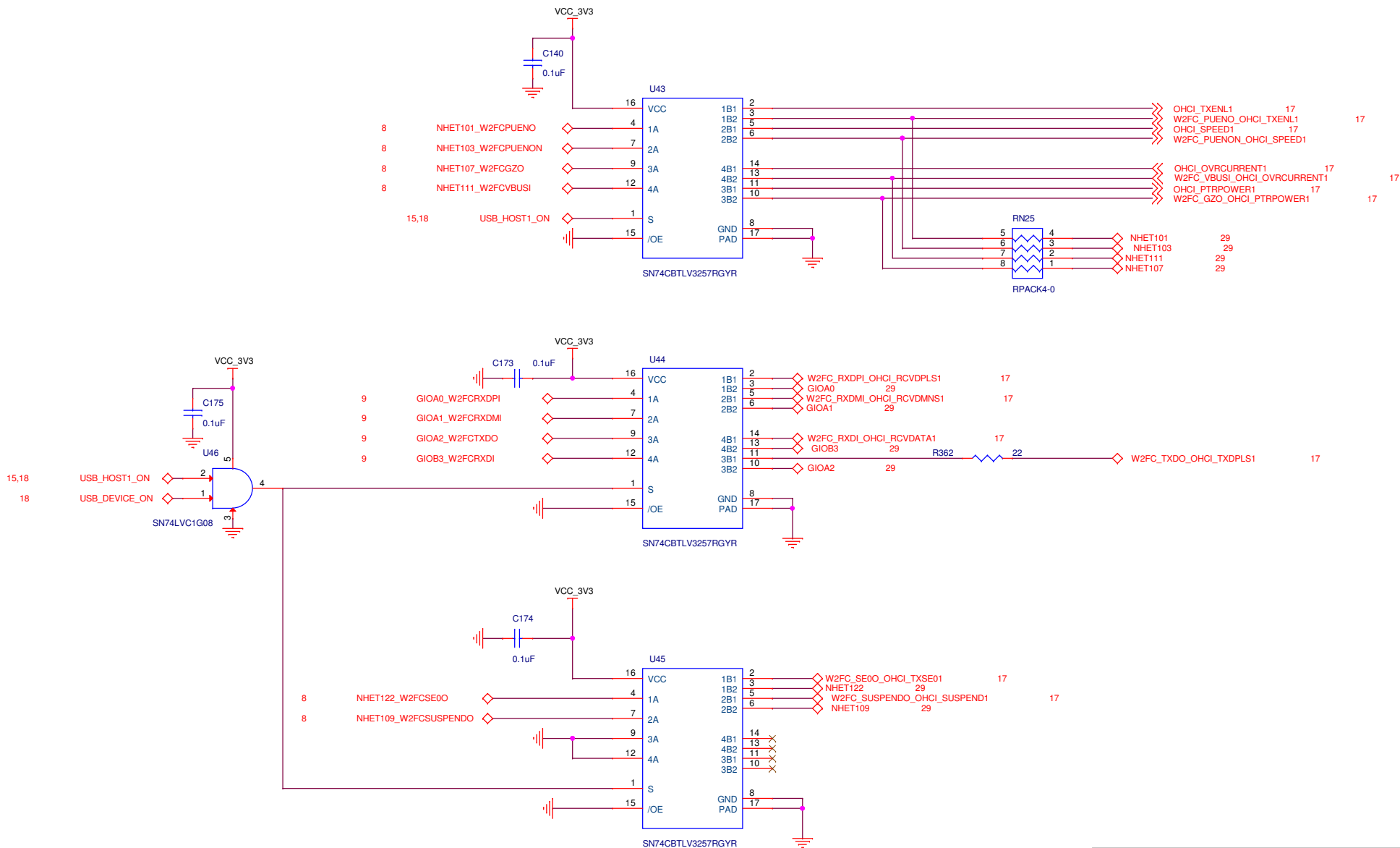
| | | |
|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | SDRAM | B |
| Date: | Friday, January 11, 2013 | Sheet 13 of 29 |



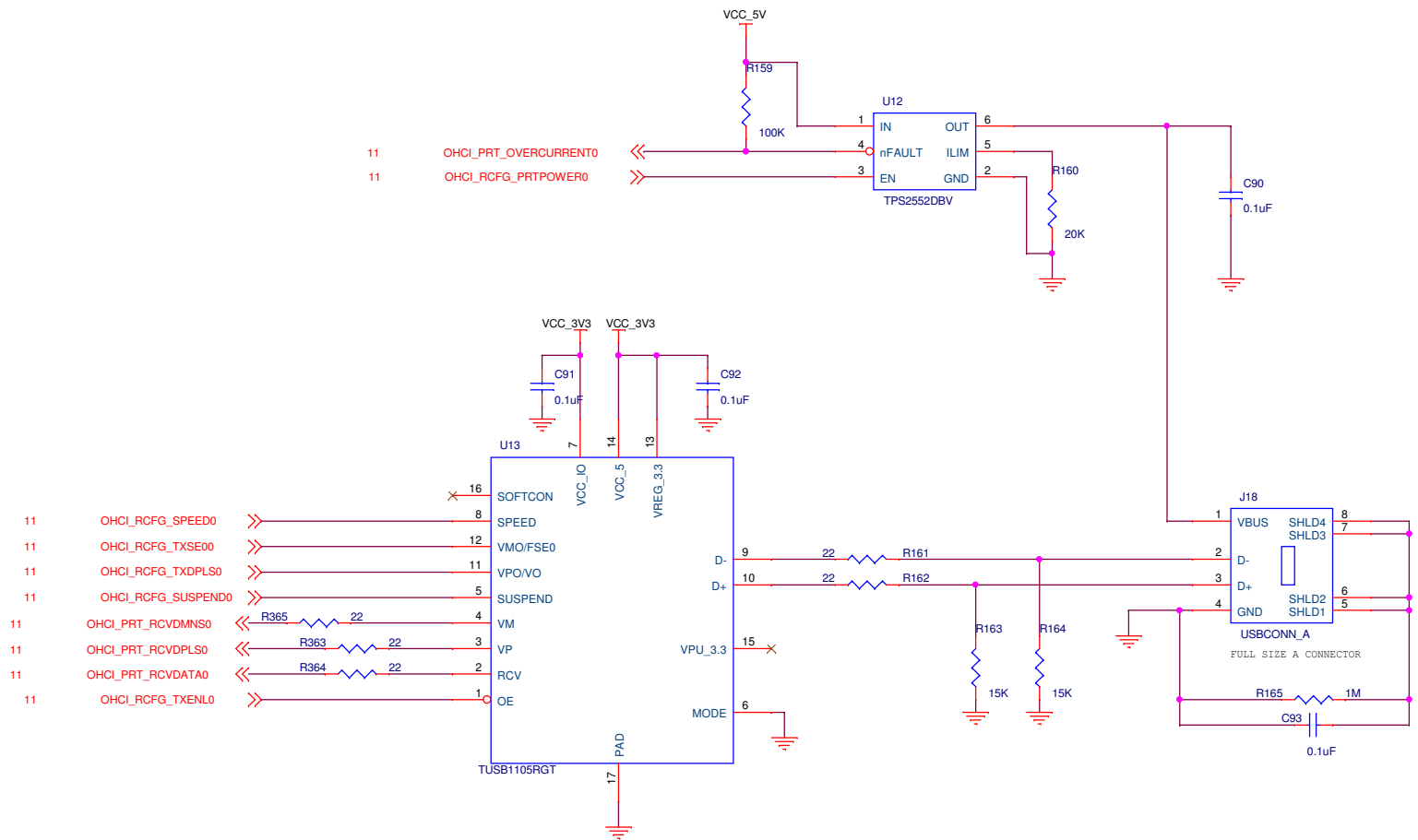
CD is the Right-Bottom Leg (top view)



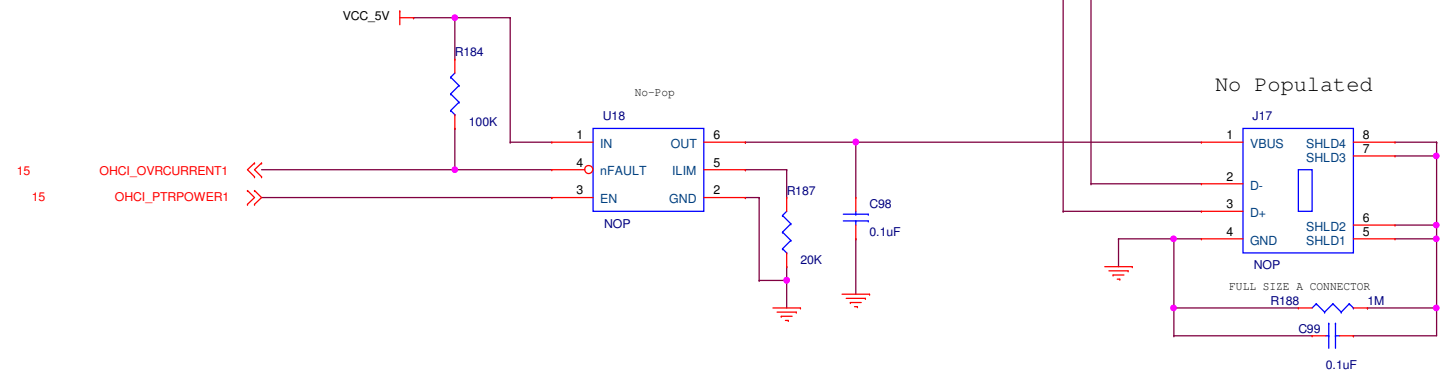
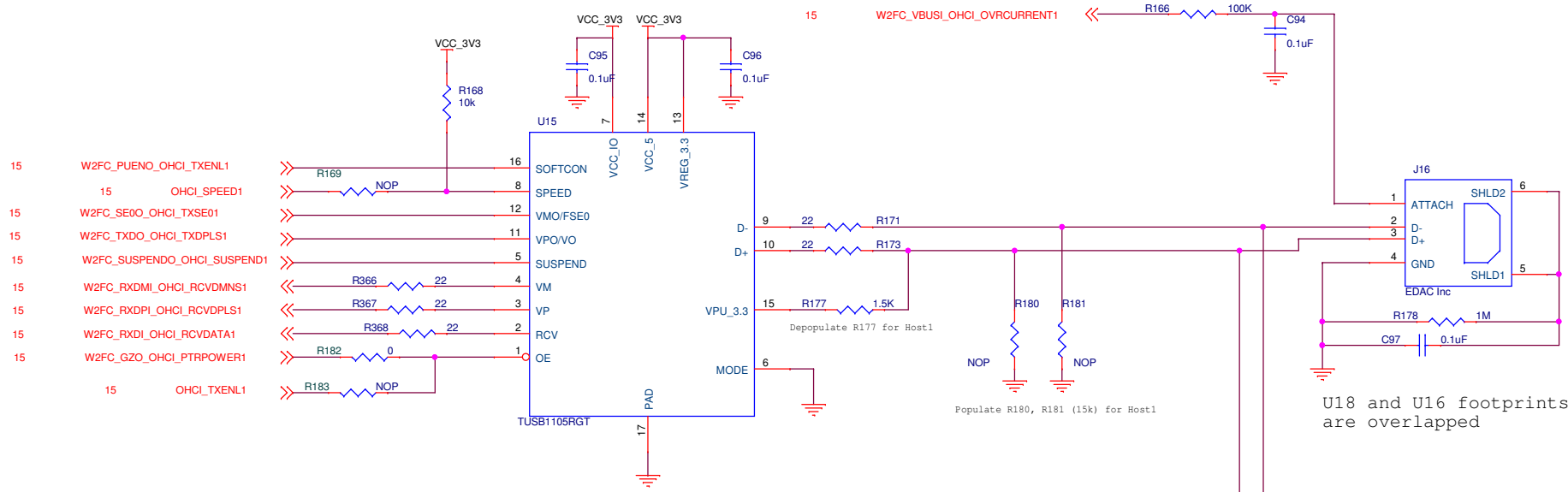
| | | |
|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | SENSOR, LED, PB | C |
| Date: | Friday, January 11, 2013 | Sheet 14 of 29 |



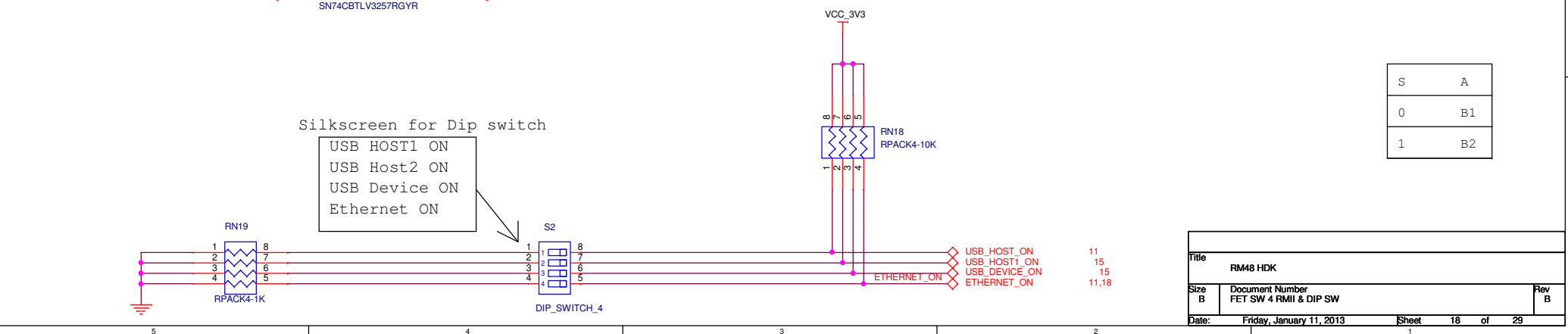
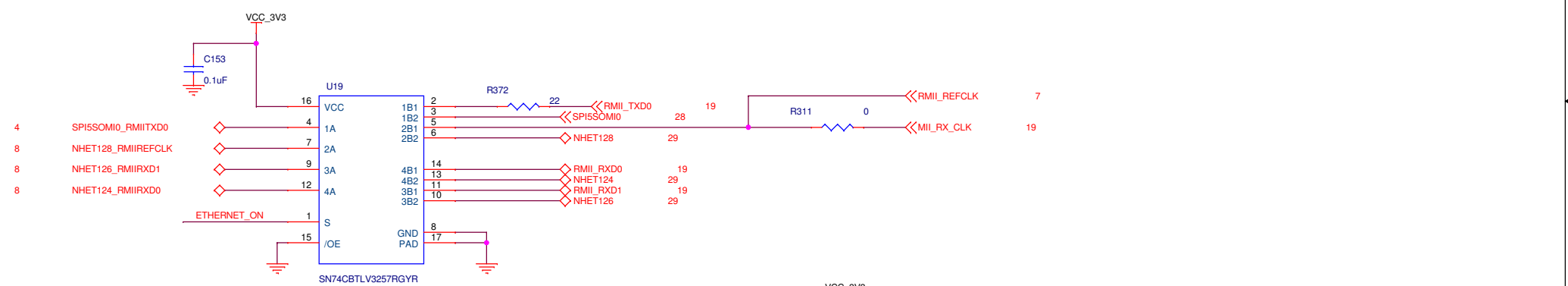
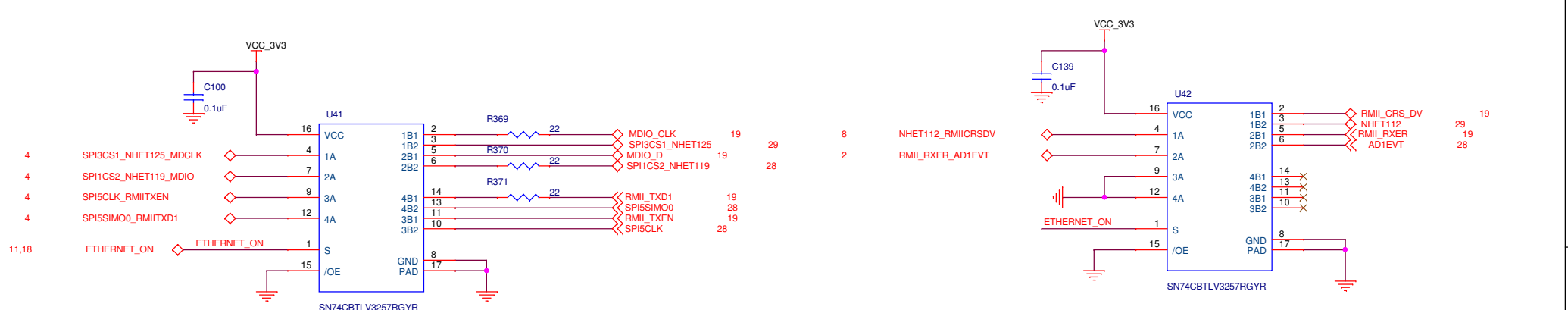
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|----------|-----------------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | FET SWs FOR USB DEVICE & 2nd HOST | B |
| Date: | Friday, January 11, 2013 | Sheet 15 of 29 |



| | | |
|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | USB 1st OHCI Host | B |
| Date: | Friday, January 11, 2013 | Sheet 16 of 29 |



| | | |
|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev B |
| | USB Device & 2nd HOST | |
| Date: | Friday, January 11, 2013 | Sheet 17 of 29 |



Silkscreen for Dip switch

USB HOST1 ON
 USB Host2 ON
 USB Device ON
 Ethernet ON

| | |
|---|----|
| S | A |
| 0 | B1 |
| 1 | B2 |

| | | | |
|-------|--------------------------|-----------------|----------|
| Title | | RM48 HDK | |
| Size | Document Number | Document Number | Rev |
| B | FET SW 4 RMII & DIP SW | | B |
| Date: | Friday, January 11, 2013 | Sheet | 18 of 29 |

PHY Addr [4:0]
 =[RXD[0:3], COL]
 RX_DV:
 0=MII Mode;
 1=RMI Mode

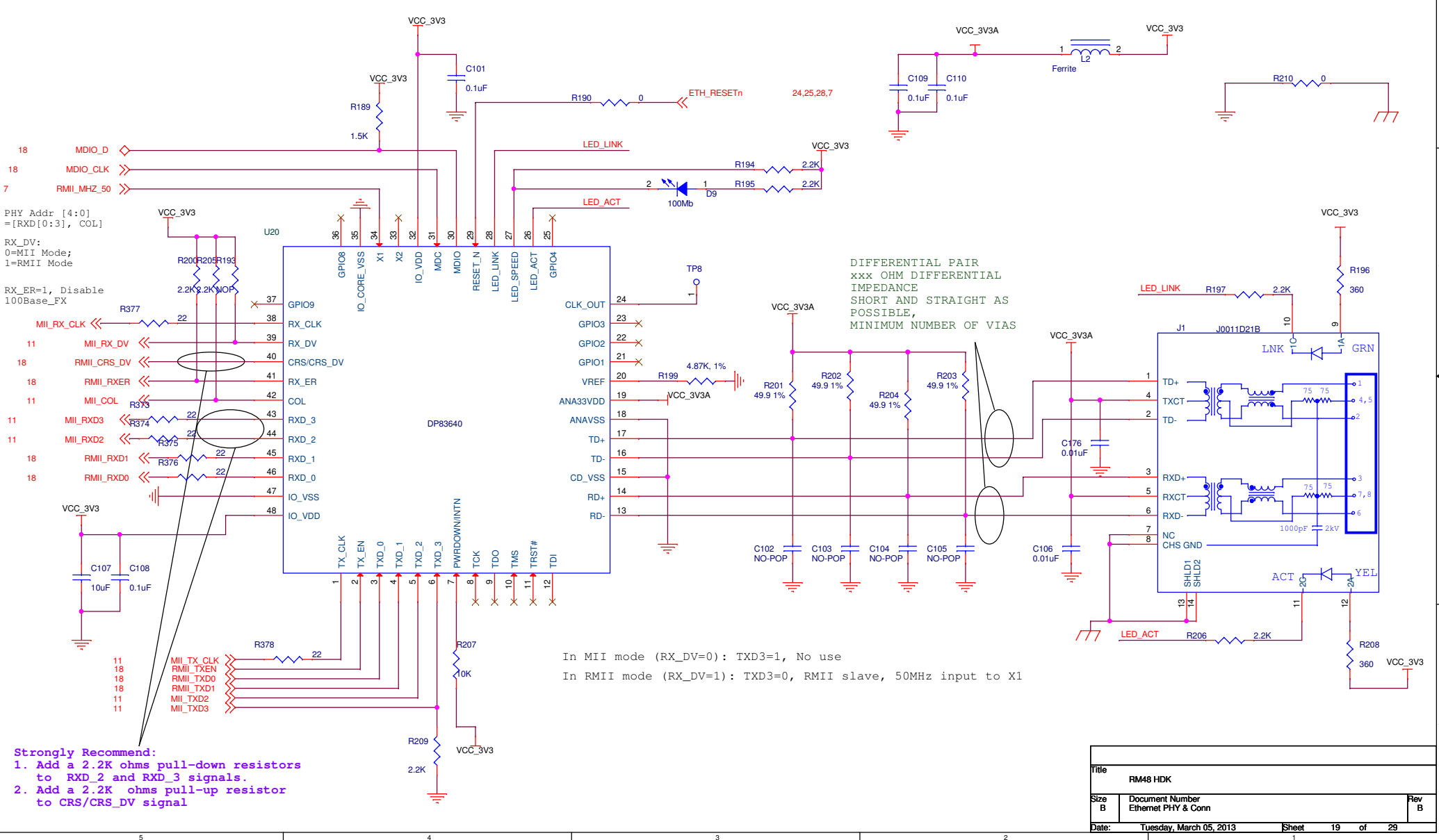
RX_ER=1, Disable
 100Base_FX

11 MII_TX_CLK
 18 RMII_TXEN
 18 RMII_TXD0
 18 RMII_TXD1
 11 MII_TXD2
 11 MII_TXD3

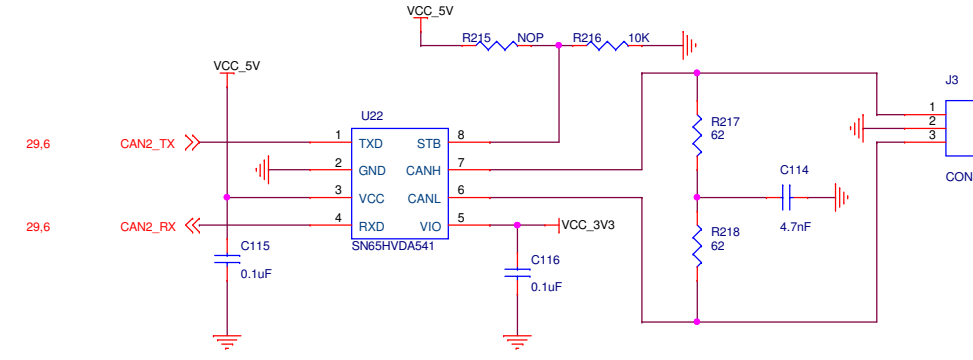
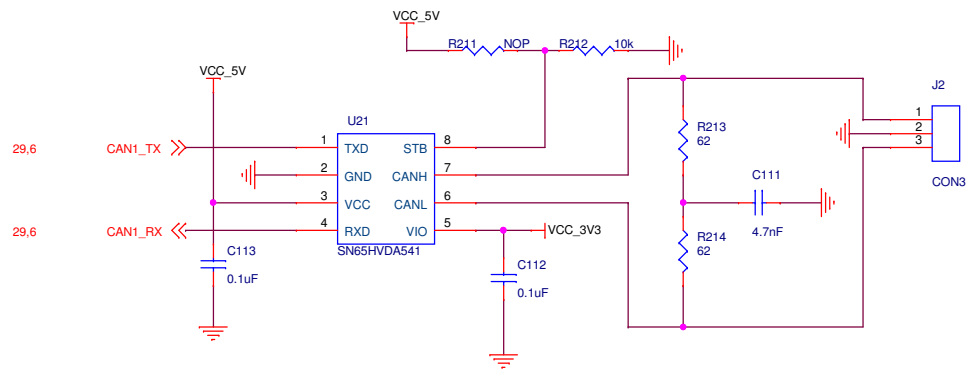
Strongly Recommend:
 1. Add a 2.2K ohms pull-down resistors to RXD_2 and RXD_3 signals.
 2. Add a 2.2K ohms pull-up resistor to CRS/CRS_DV signal

In MII mode (RX_DV=0): TXD3=1, No use
 In RMI mode (RX_DV=1): TXD3=0, RMI slave, 50MHz input to X1

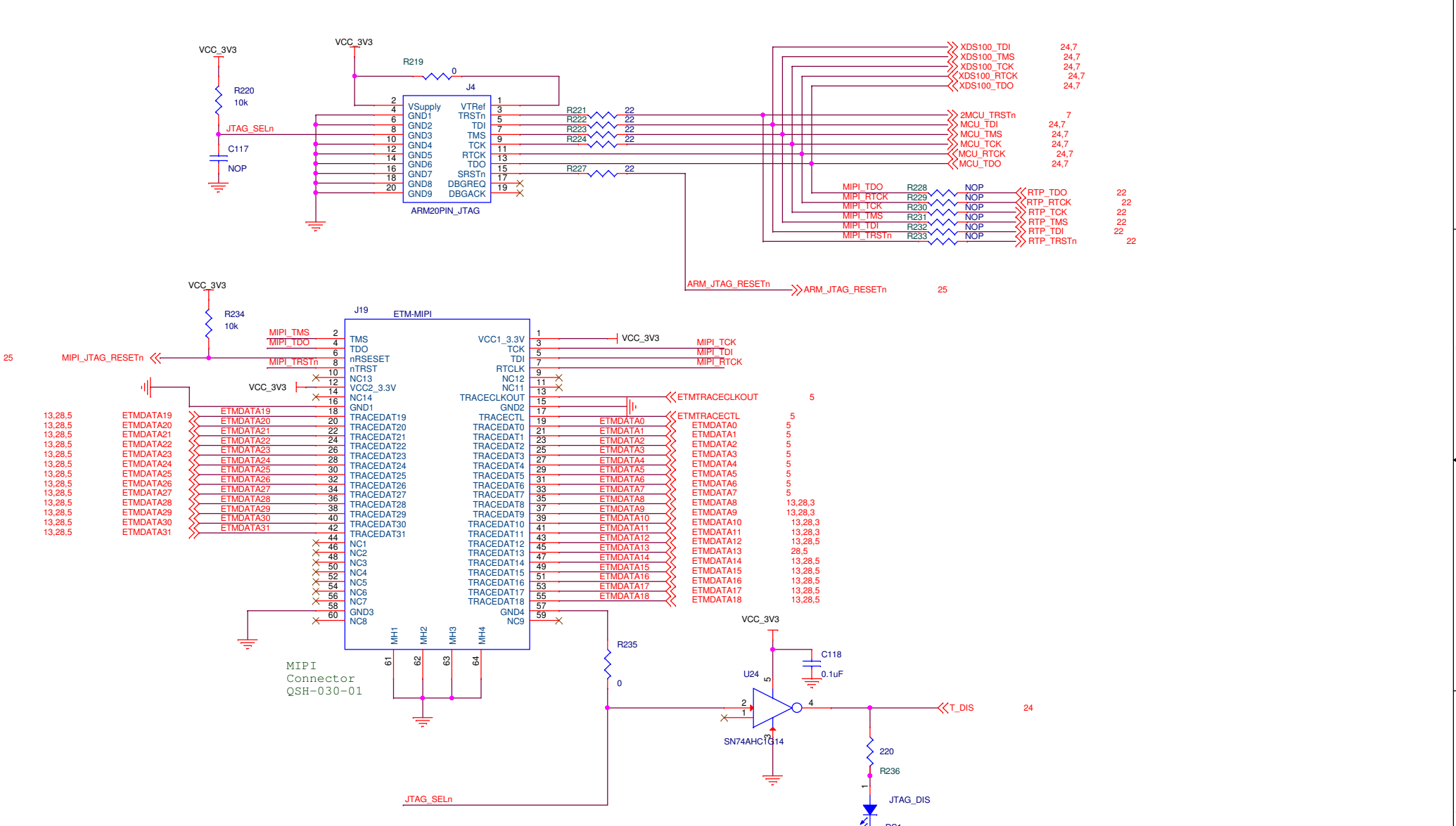
DIFFERENTIAL PAIR
 xxx OHM DIFFERENTIAL
 IMPEDANCE
 SHORT AND STRAIGHT AS
 POSSIBLE,
 MINIMUM NUMBER OF VIAS



| | | |
|----------|-------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | Ethernet PHY & Conn | B |
| Date: | Tuesday, March 05, 2013 | Sheet 19 of 29 |

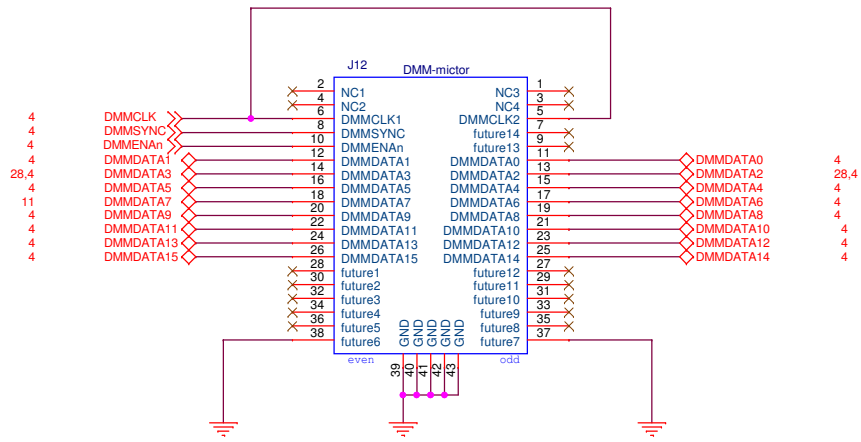


| | | |
|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | DCAN Transceivers | B |
| Date: | Friday, January 11, 2013 | Sheet 20 of 29 |

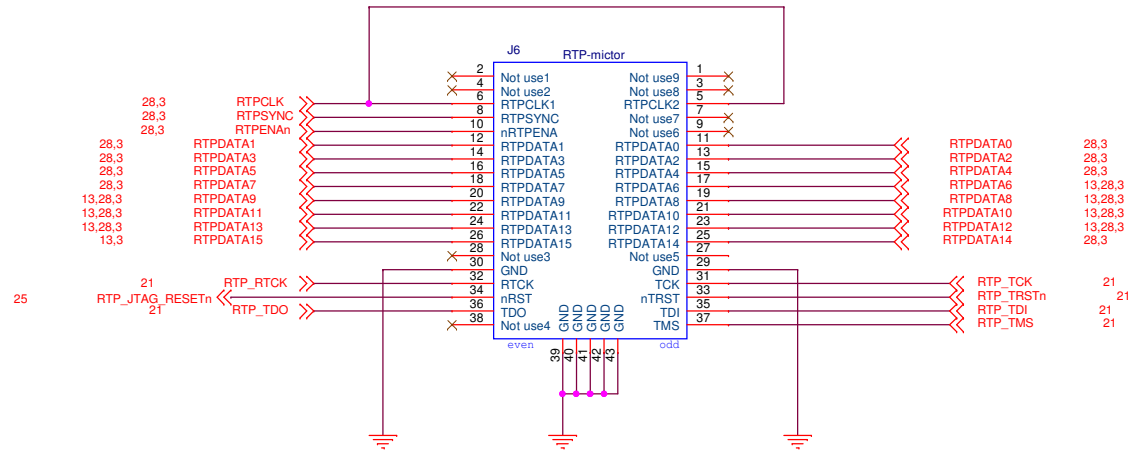


JTAG_SELn = HIGH --> XDS100
 JTAG_SELn = LOW --> ARM
 JTAG and MIPI

| | | |
|------------------------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev B |
| JTAG & MIPI Connectors | | |
| Date: | Friday, January 11, 2013 | Sheet 21 of 29 |

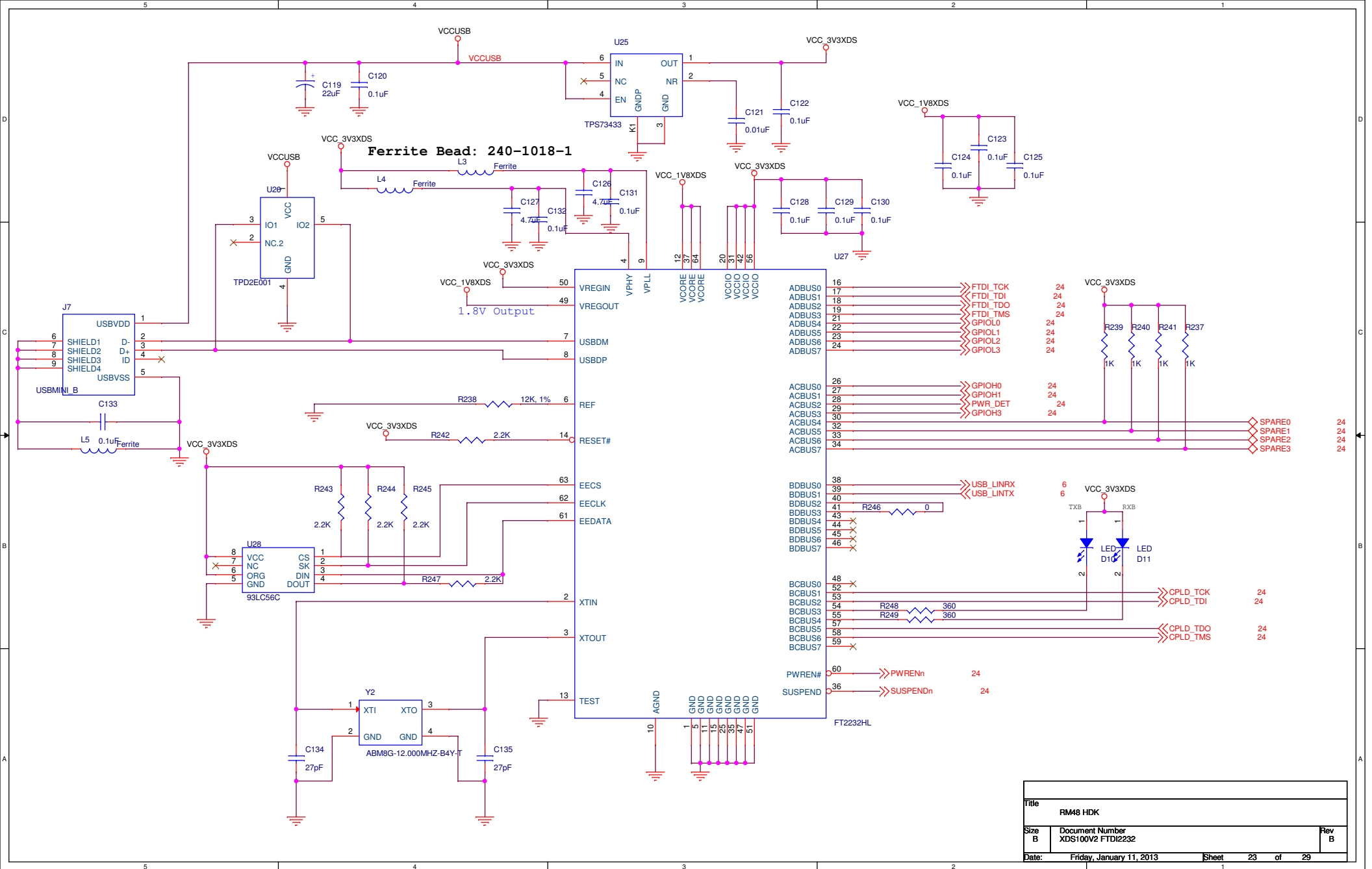


Foot Print Only
Pin39/40/41/42/43 are the central GND

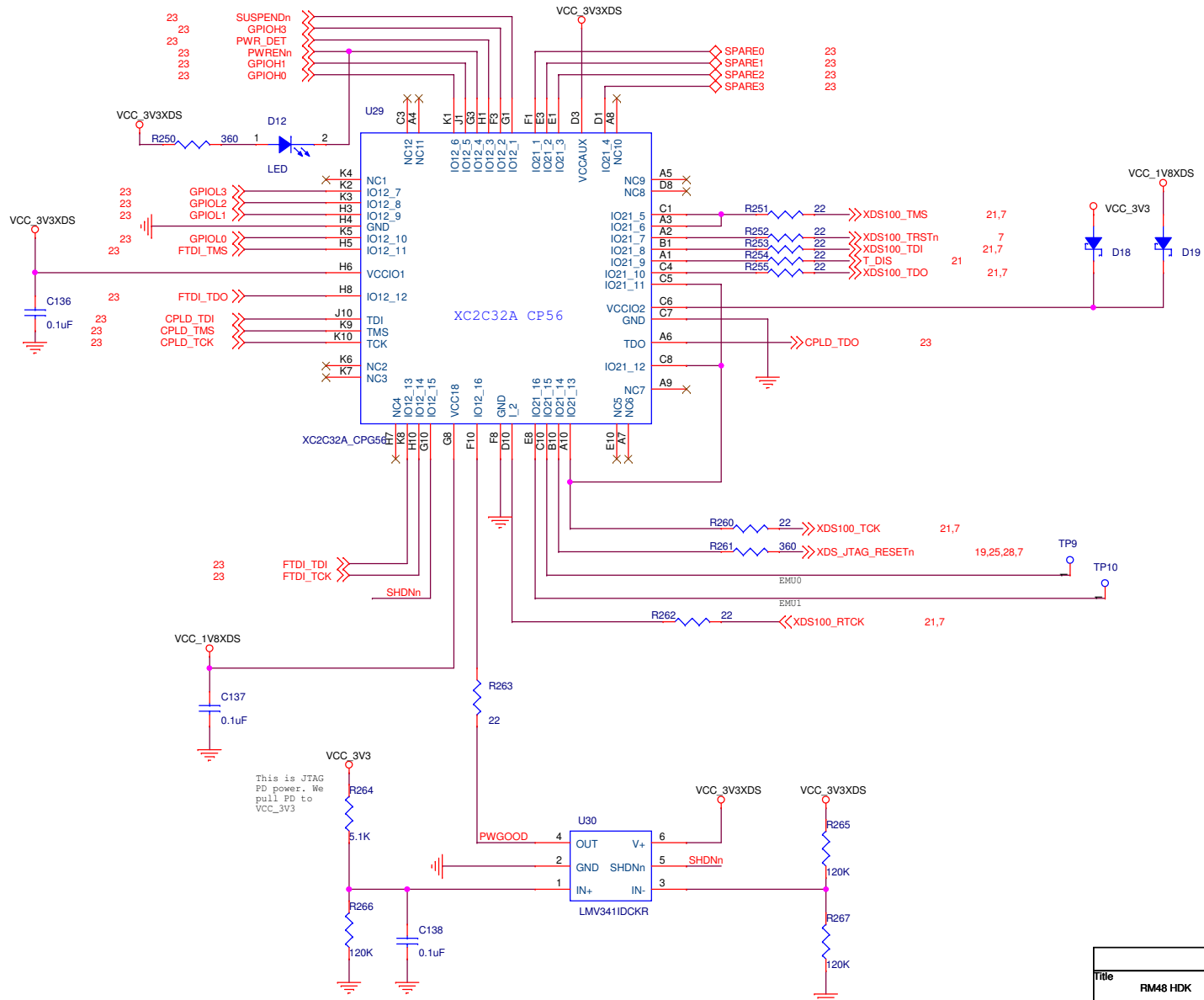


AMP 2-5767004-2
Receptacle, Center Strip Contacts
Foot Print Only

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|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | DMM and RTP Connectors | B |
| Date: | Friday, January 11, 2013 | Sheet 22 of 29 |



| | | |
|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | XDS100V2 FTDI2232 | B |
| Date: | Friday, January 11, 2013 | Sheet 23 of 29 |



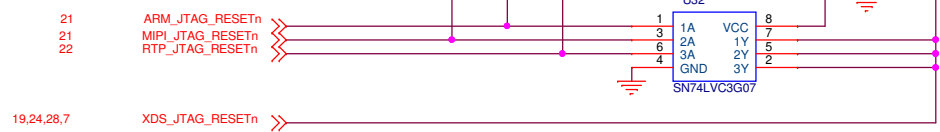
This is JTAG PD power. We pull PD to VCC_3V3

| | | |
|----------|--------------------------|----------------|
| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | XDS100V2 CPLD | B |
| Date: | Friday, January 11, 2013 | Sheet 24 of 29 |

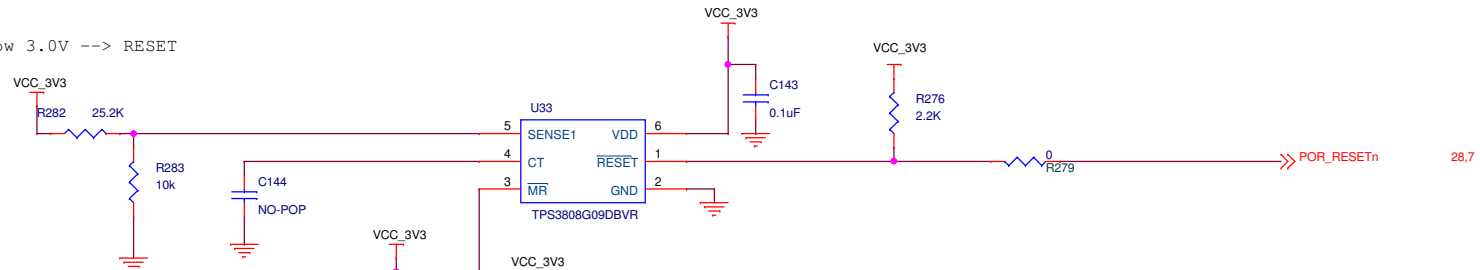


If VCC_3.3V below 3.0V --> RESET

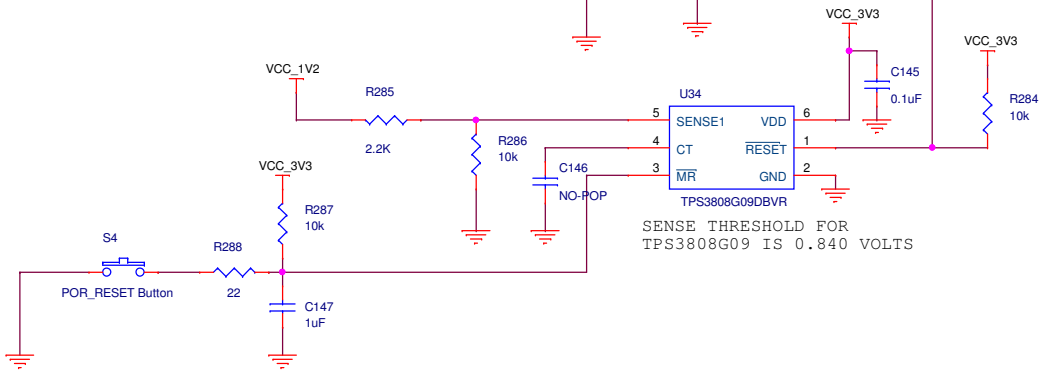
This is the RESET pin rather than TRST



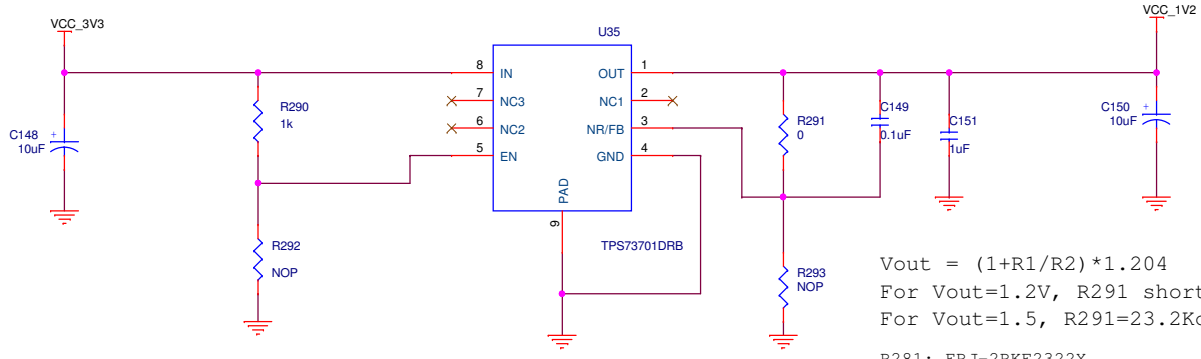
If VCC_3.3V below 3.0V --> RESET



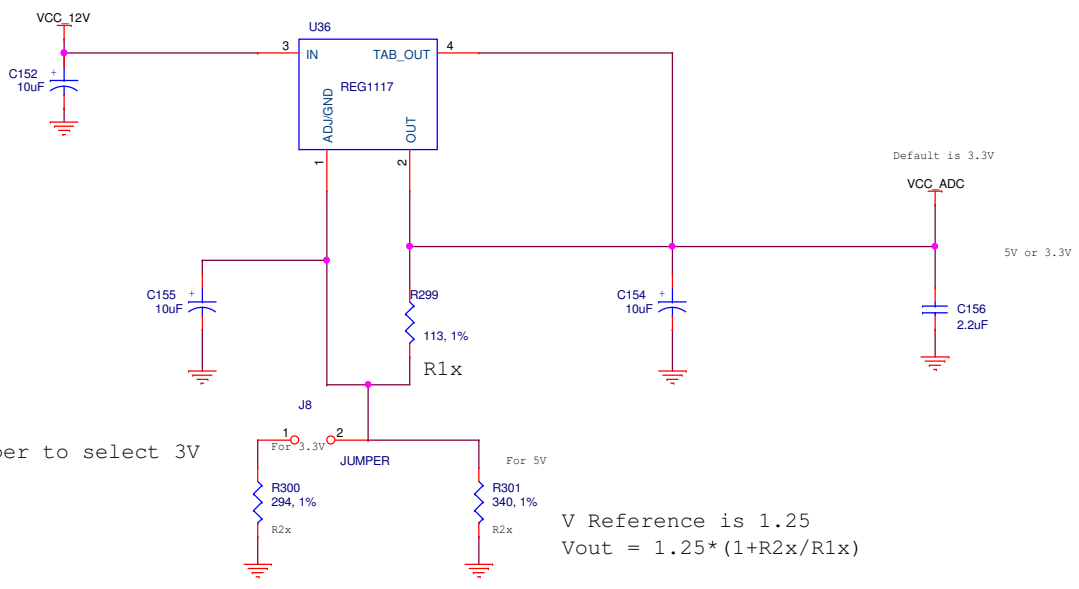
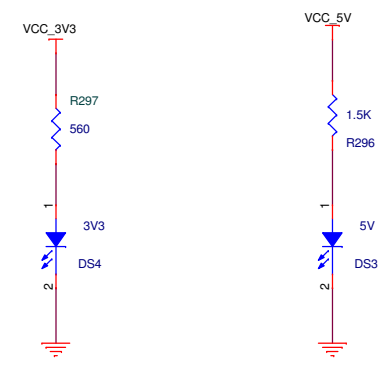
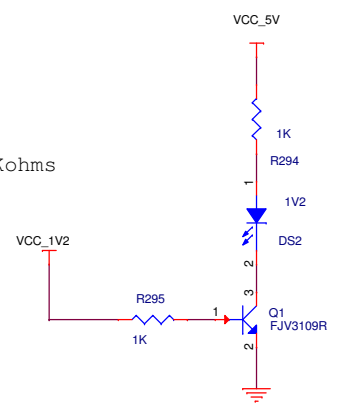
If VCC_1.5V below 1.35V --> RESET



| | | |
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| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev B |
| | RESET | |
| Date: | Friday, January 11, 2013 | Sheet 25 of 29 |



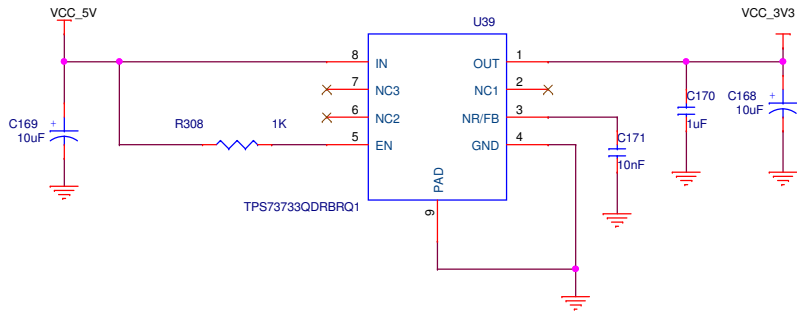
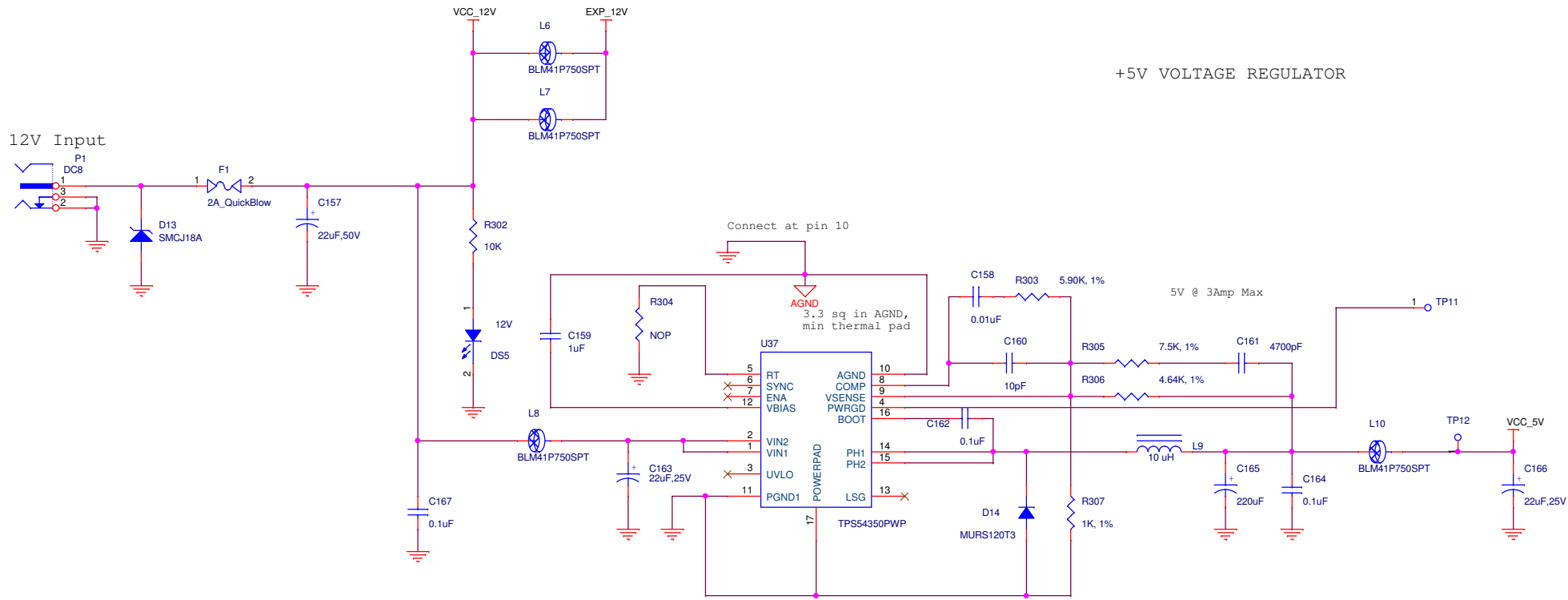
$V_{out} = (1+R1/R2) * 1.204$
 For $V_{out}=1.2V$, R291 shorted, and R293 Open
 For $V_{out}=1.5$, R291=23.2Kohms, and R293=95.3Kohms
 R281: ERJ-2RKF2322X



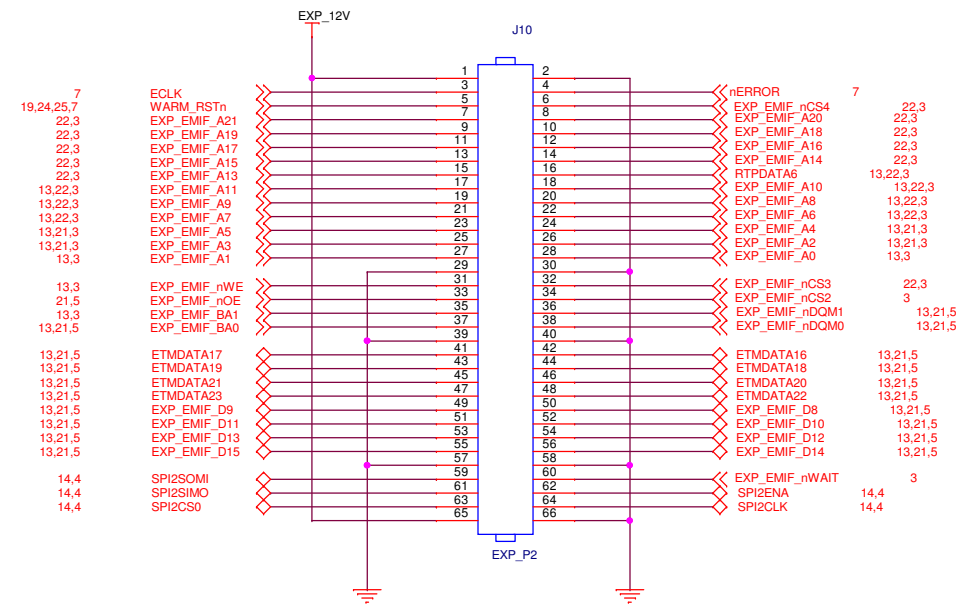
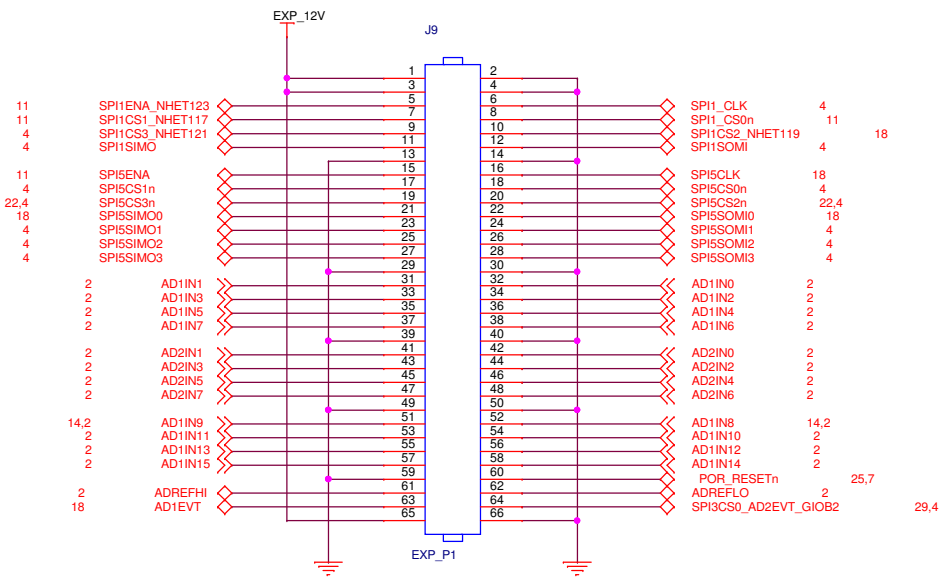
use jumper to select 3V

V Reference is 1.25
 $V_{out} = 1.25 * (1+R2x/R1x)$

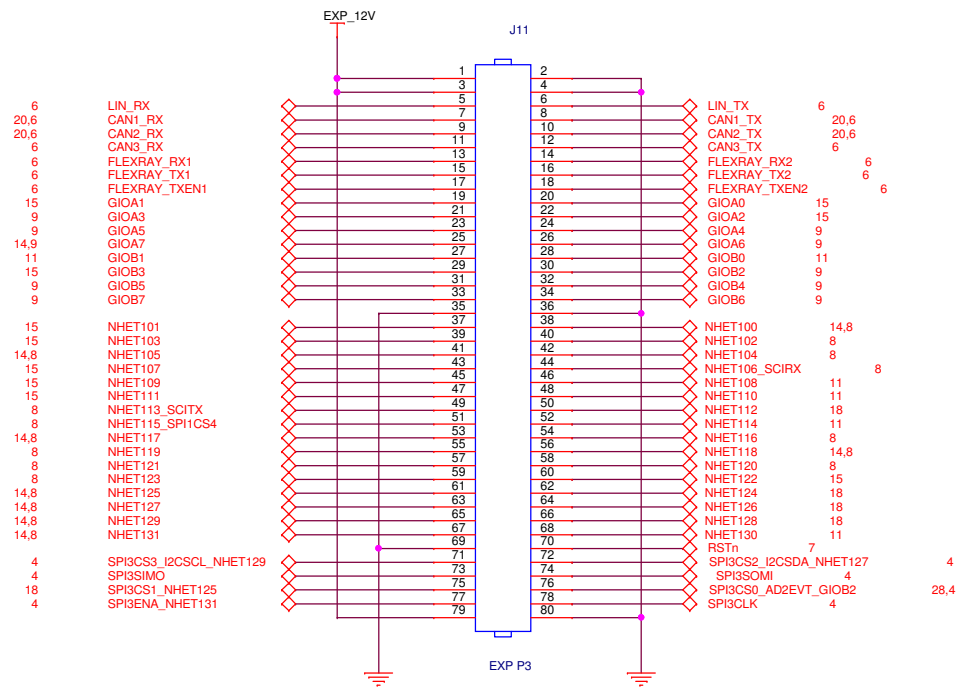
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| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev C |
| Power Supply | | |
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| Title | | |
| RM48 HDK | | |
| Size B | Document Number | Rev B |
| Power Input | | |
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| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | Expansion Connector 1 | B |
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| Title | | |
| RM48 HDK | | |
| Size | Document Number | Rev |
| B | Expansion Connector 2 | B |
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