

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)

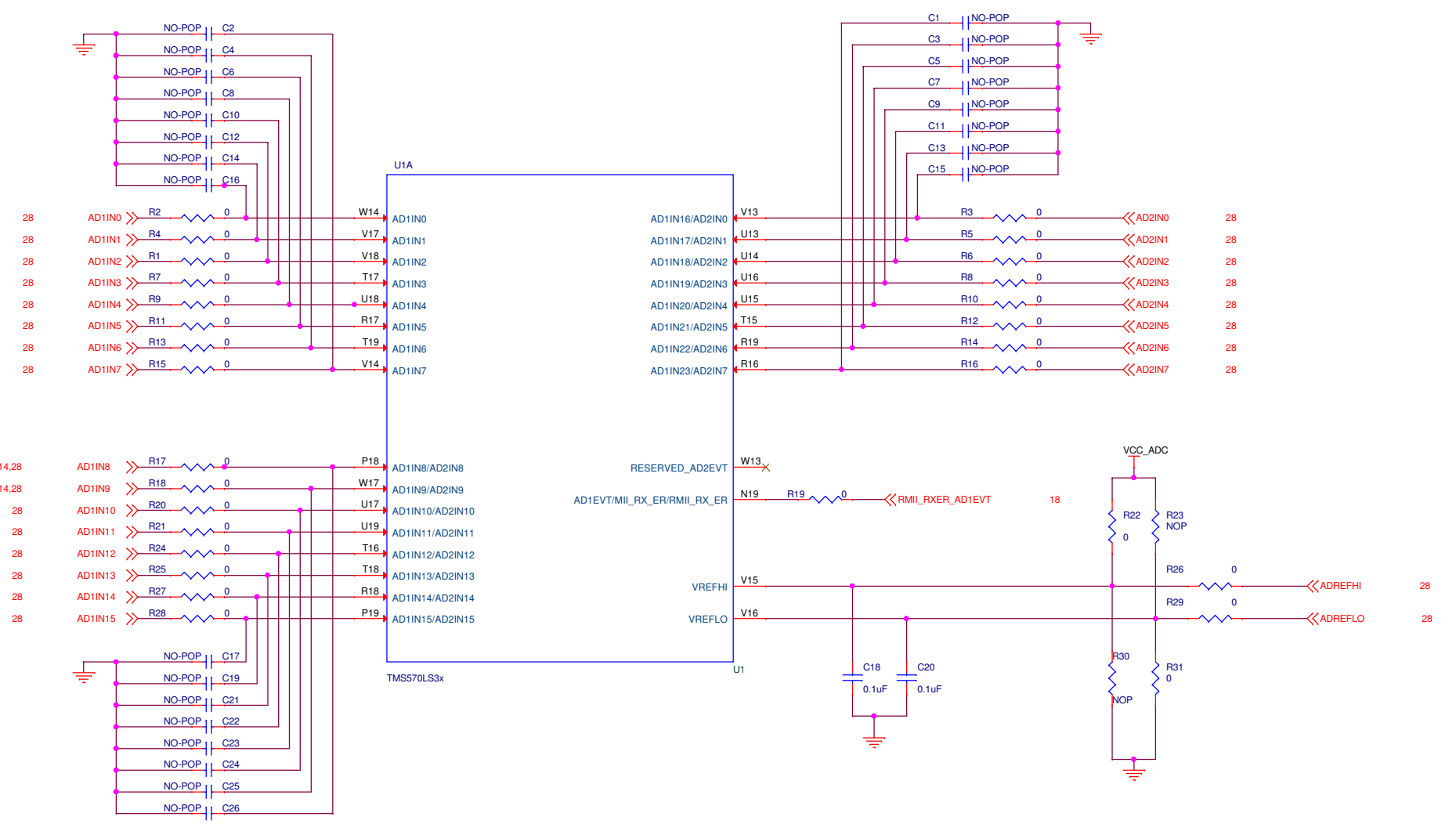
Changes on RevE:

- 1. Added n_channel FET and RC to JTAG nTRST (P07)
- 2. Replaced 2 color LEDs with 2 white LEDs

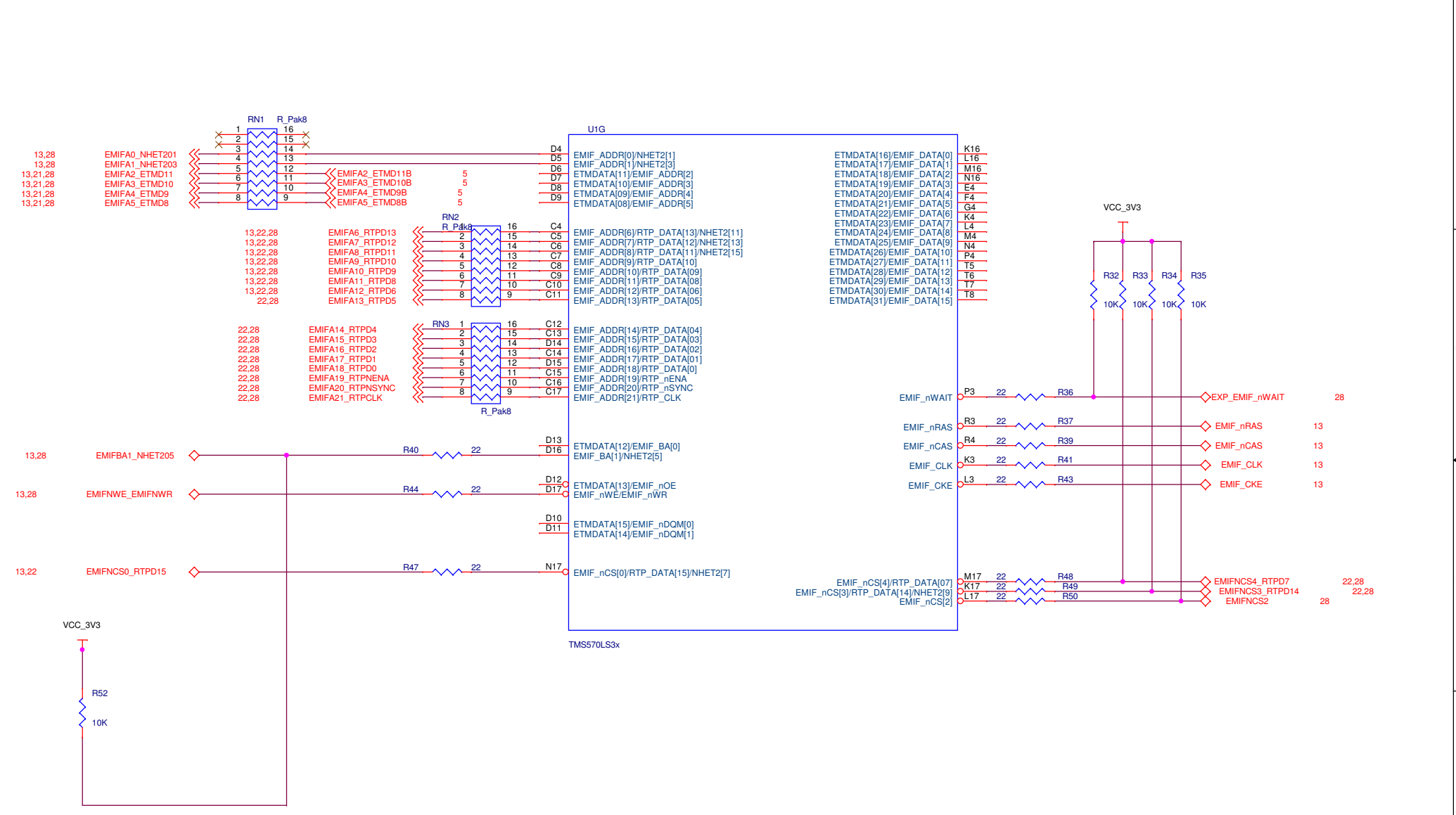
SCHEMATIC CONTENTS

- 01 TITLE SHEET
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- 03 MCU EMIF
- 04 MCU SPI
- 05 MCU ETM
- 06 MCU DCAN, FLEXRAY, and LIN
- 07 MCU JTAG and OSC
- 08 MCU NHET
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- 28 EXP P1 and EXP P2
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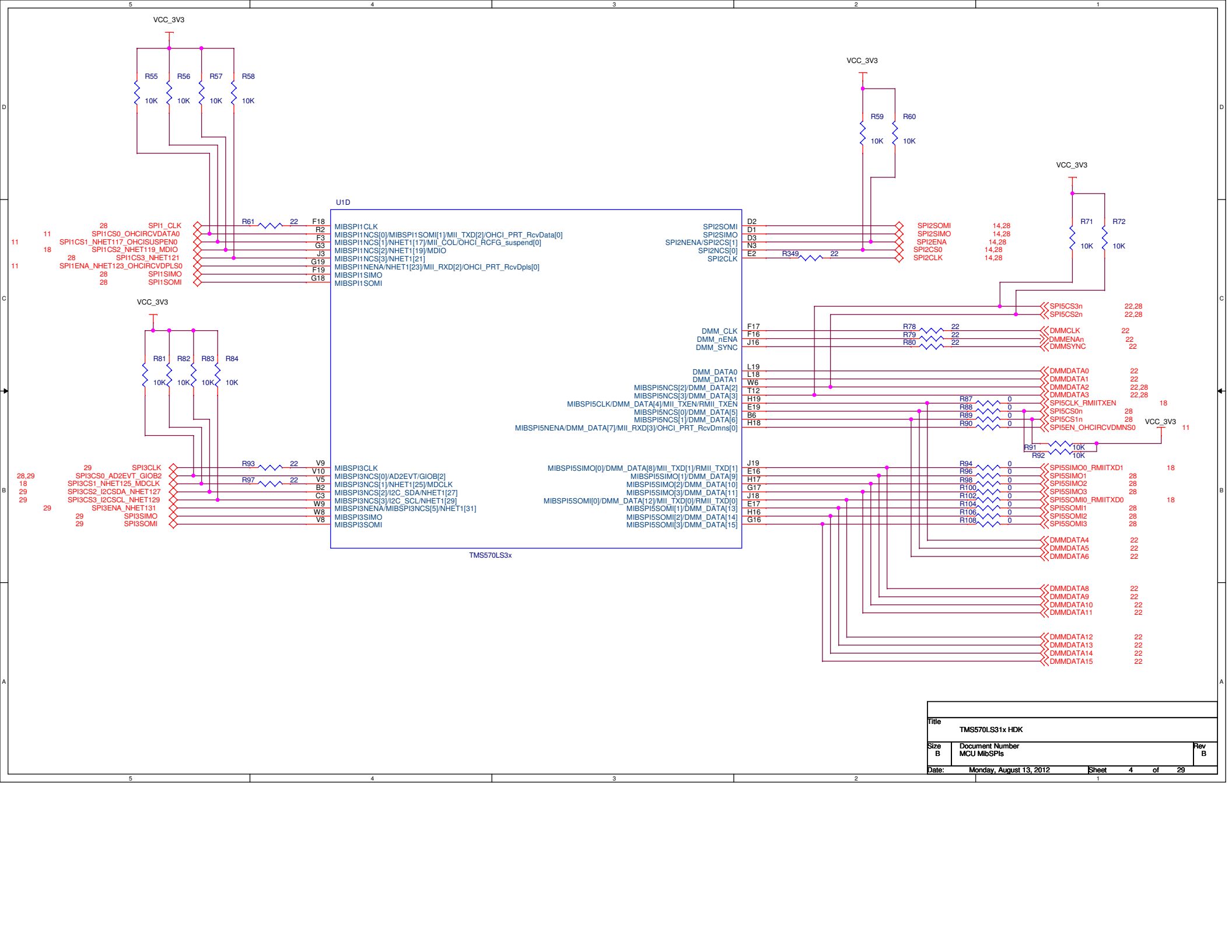
Texas Instruments Inc		
Title TMS570LS31x HDK		
Size A	Document Number TITLE	Rev B
Date:	Monday, July 29, 2013	Sheet 1 of 29



Title		
TMS570LS31x HDK		
Size B	Document Number	Rev B
	MCU ADC	
Date:	Monday, August 13, 2012	Sheet 2 of 29



Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	MCU EMIF	B
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U1D

TMS570LS3x

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
 MIBSPI5SOMI[0]/DMM_DATA[8]/MII_TXD[1]/RMII_TXD[1]
 MIBSPI5SOMI[1]/DMM_DATA[9]
 MIBSPI5SOMI[2]/DMM_DATA[10]
 MIBSPI5SOMI[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		
TMS570LS31x HDK		
Size B	Document Number	Rev B
	MCU MibSPis	
Date:	Monday, August 13, 2012	Sheet 4 of 29

TP1

21 ETMTRACECTL

21 ETMTRACECLKOUT

21 ETMDATA0

21 ETMDATA1

21 ETMDATA2

21 ETMDATA3

21 ETMDATA4

21 ETMDATA5

21 ETMDATA6

21 ETMDATA7

3 EMIFA5_ETMD8B

3 EMIFA4_ETMD9B

3 EMIFA3_ETMD10B

3 EMIFA2_ETMD11B

13,21,28 EMIFB0_ETMD12

21,28 EMIFN0E_ETMD13

13,21,28 EMIFNDQM1_ETMD14

13,21,28 EMIFNDQM0_ETMD15

13,21,28 EMIFD0_ETMD16

13,21,28 EMIFD1_ETMD17

13,21,28 EMIFD2_ETMD18

13,21,28 EMIFD3_ETMD19

13,21,28 EMIFD4_ETMD20

13,21,28 EMIFD5_ETMD21

13,21,28 EMIFD6_ETMD22

13,21,28 EMIFD7_ETMD23

13,21,28 EMIFD8_ETMD24

13,21,28 EMIFD9_ETMD25

13,21,28 EMIFD10_ETMD26

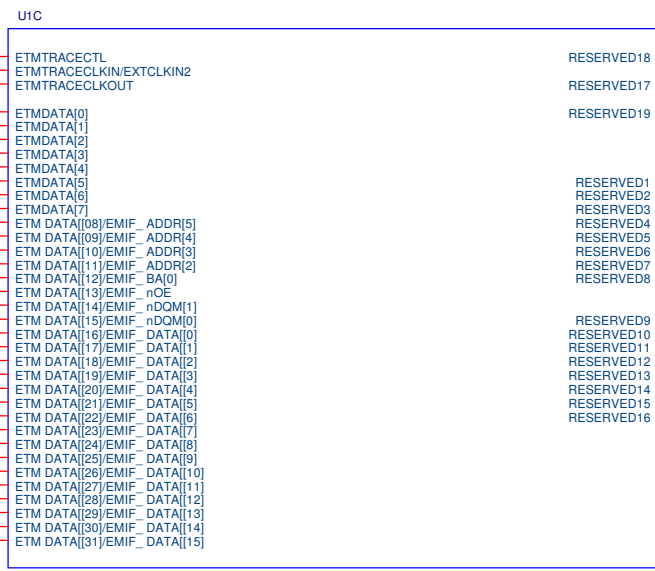
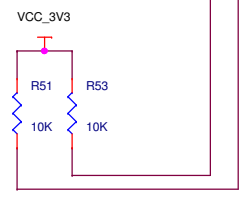
13,21,28 EMIFD11_ETMD27

13,21,28 EMIFD12_ETMD28

13,21,28 EMIFD13_ETMD29

13,21,28 EMIFD14_ETMD30

13,21,28 EMIFD15_ETMD31



TMS570LS3x

RESERVED18

RESERVED17

RESERVED19

RESERVED1

RESERVED2

RESERVED3

RESERVED4

RESERVED5

RESERVED6

RESERVED7

RESERVED8

RESERVED9

RESERVED10

RESERVED11

RESERVED12

RESERVED13

RESERVED14

RESERVED15

RESERVED16

W11

T11

U12

V11

U11

T10

U10

T9

U9

U8

U7

U6

U5

T4

V3

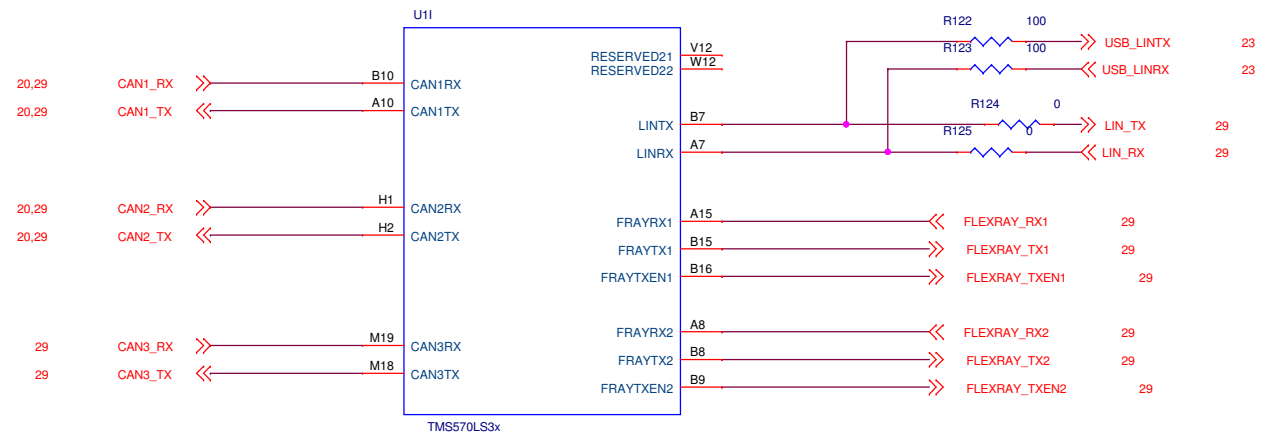
U3

T3

T2

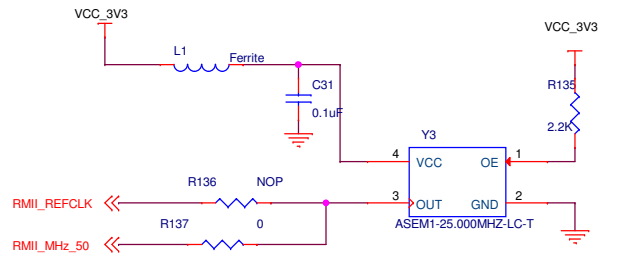
changed all the name to Gladiator only

Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	MCU ETM & Revved RTP	B
Date:	Monday, August 13, 2012	Sheet 5 of 29

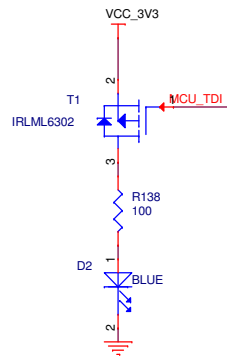


Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	MCU DCAN, FRAY, LIN	D
Date:	Monday, August 13, 2012	Sheet 6 of 29

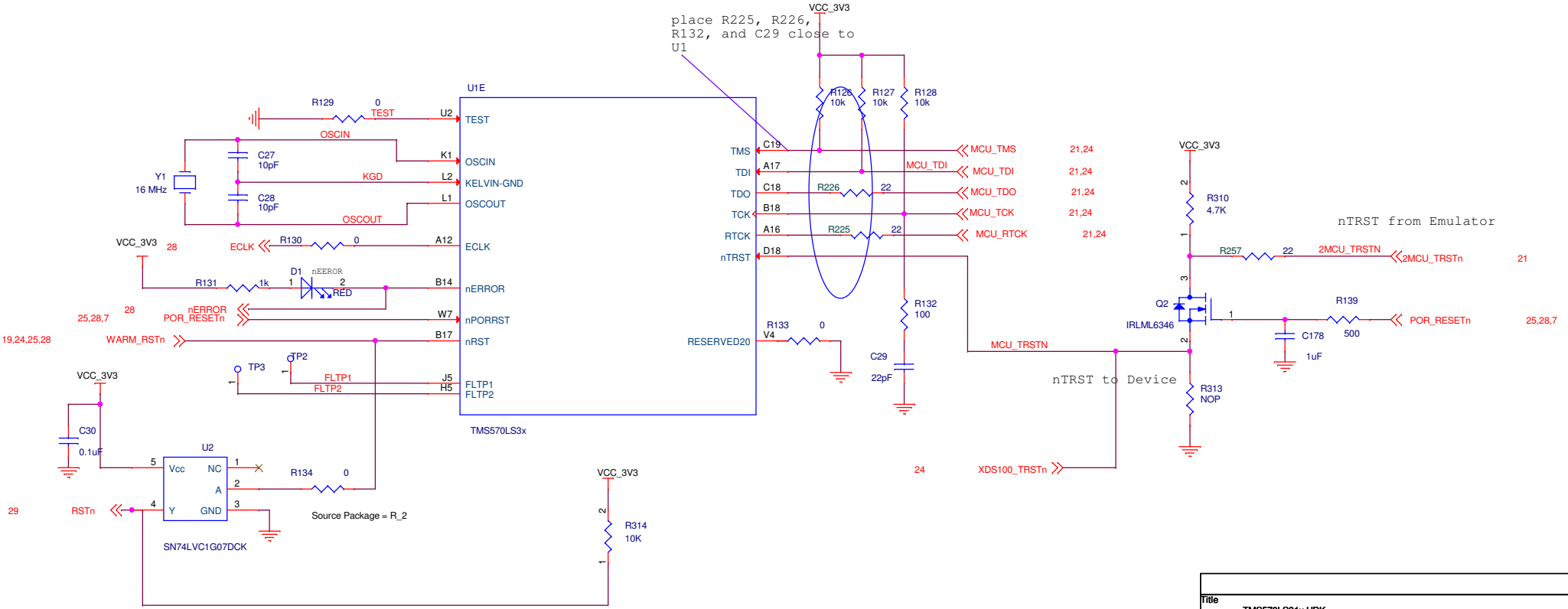
To MCU
18
19
TO PHY



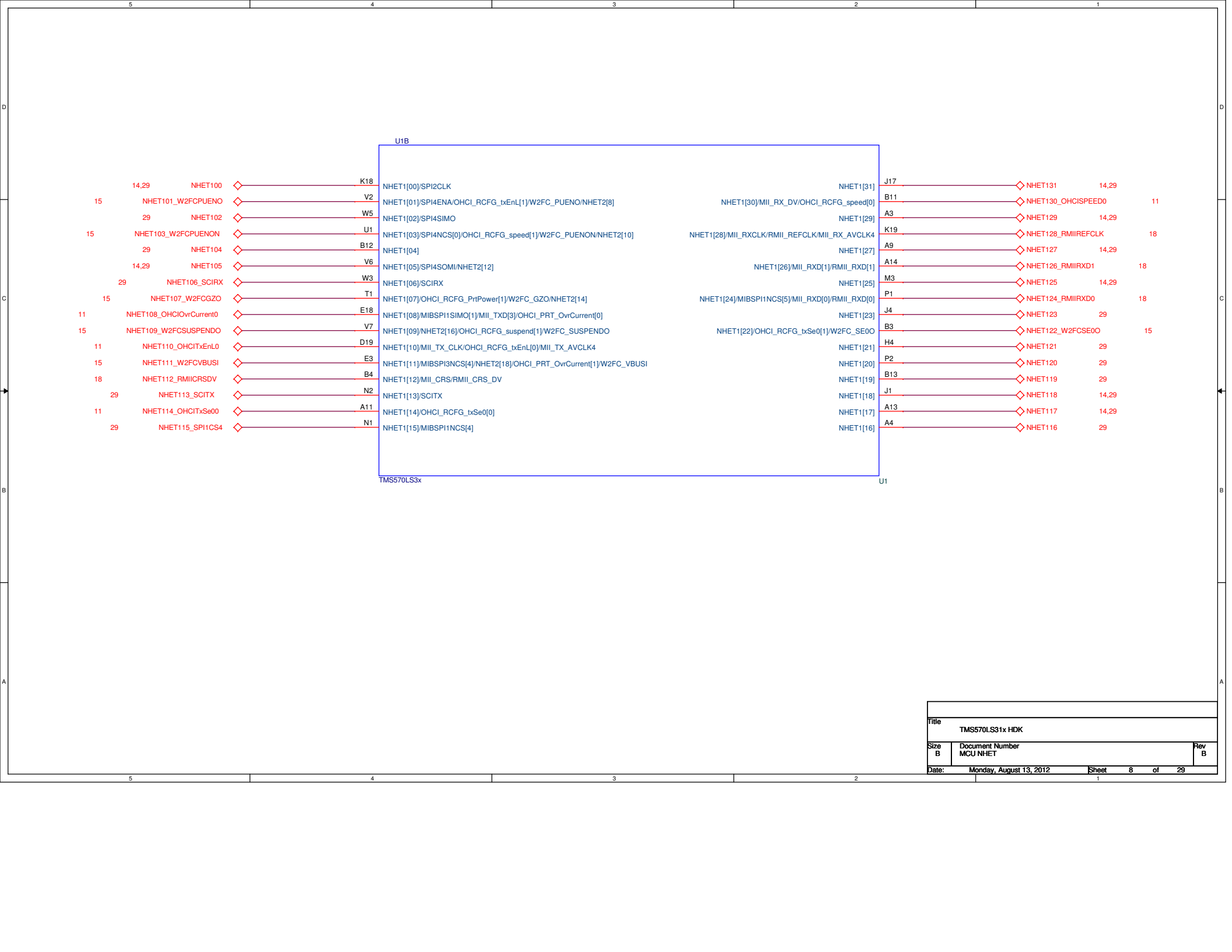
When using RMII, the OSC will be 50MHz



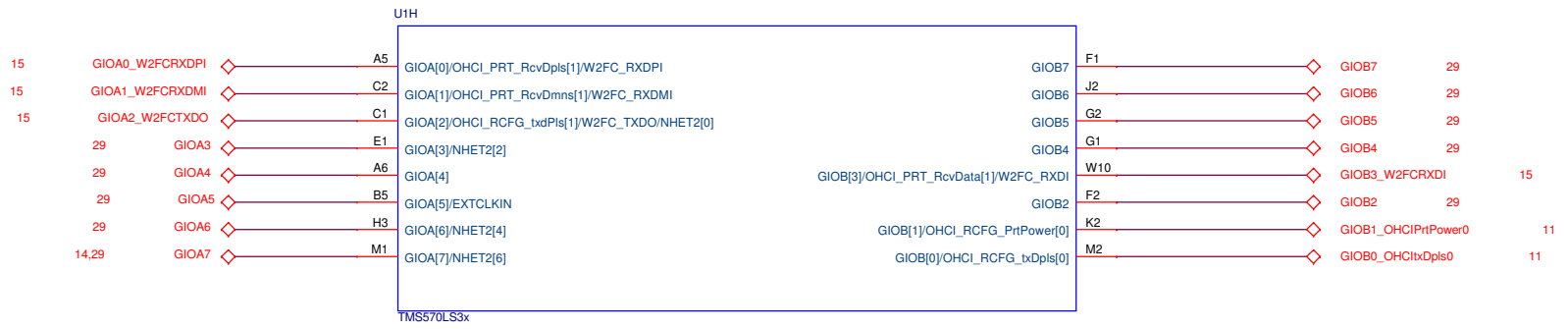
place R225, R226,
R132, and C29 close to
U1



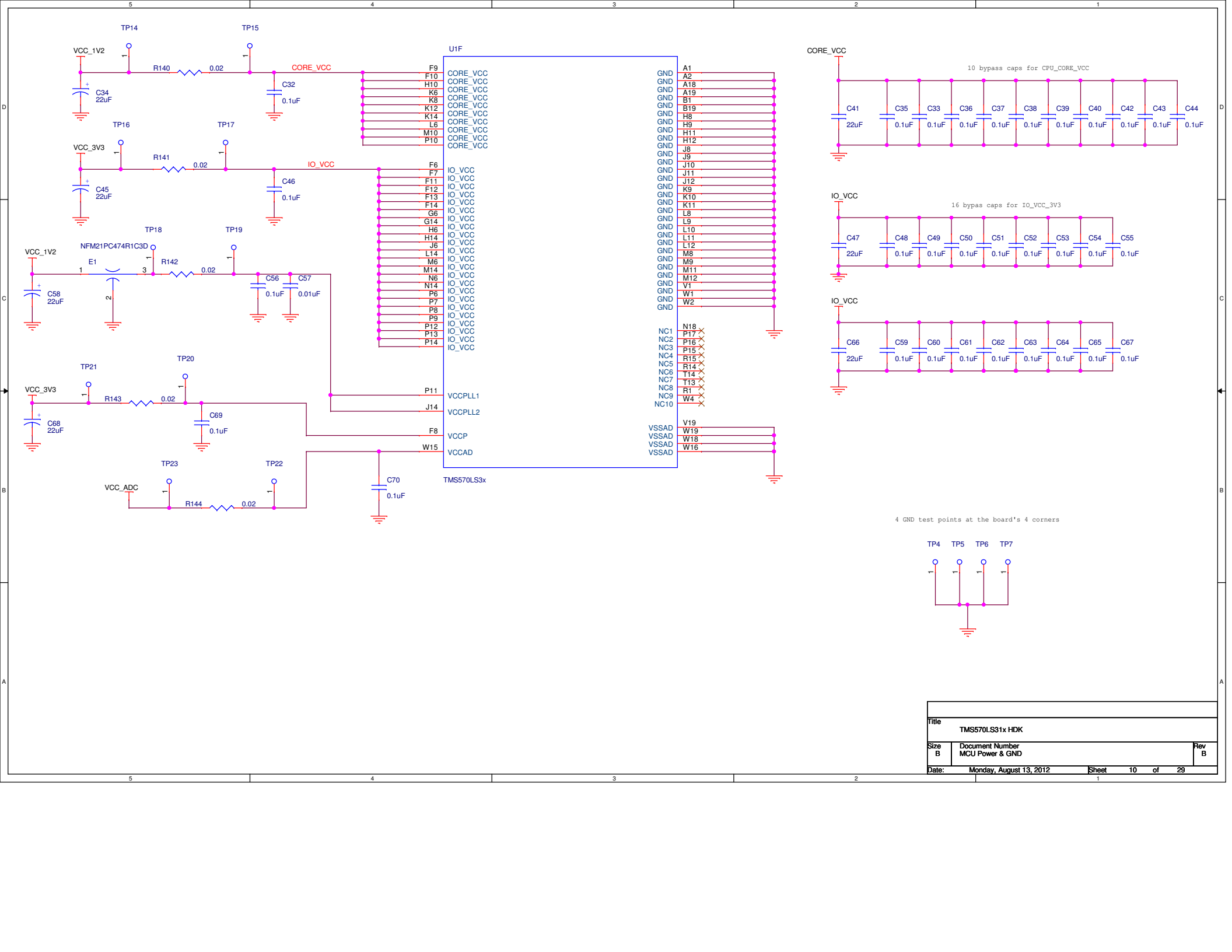
Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	MCU JTAG & OSC	D
Date:	Monday, August 13, 2012	Sheet 7 of 29



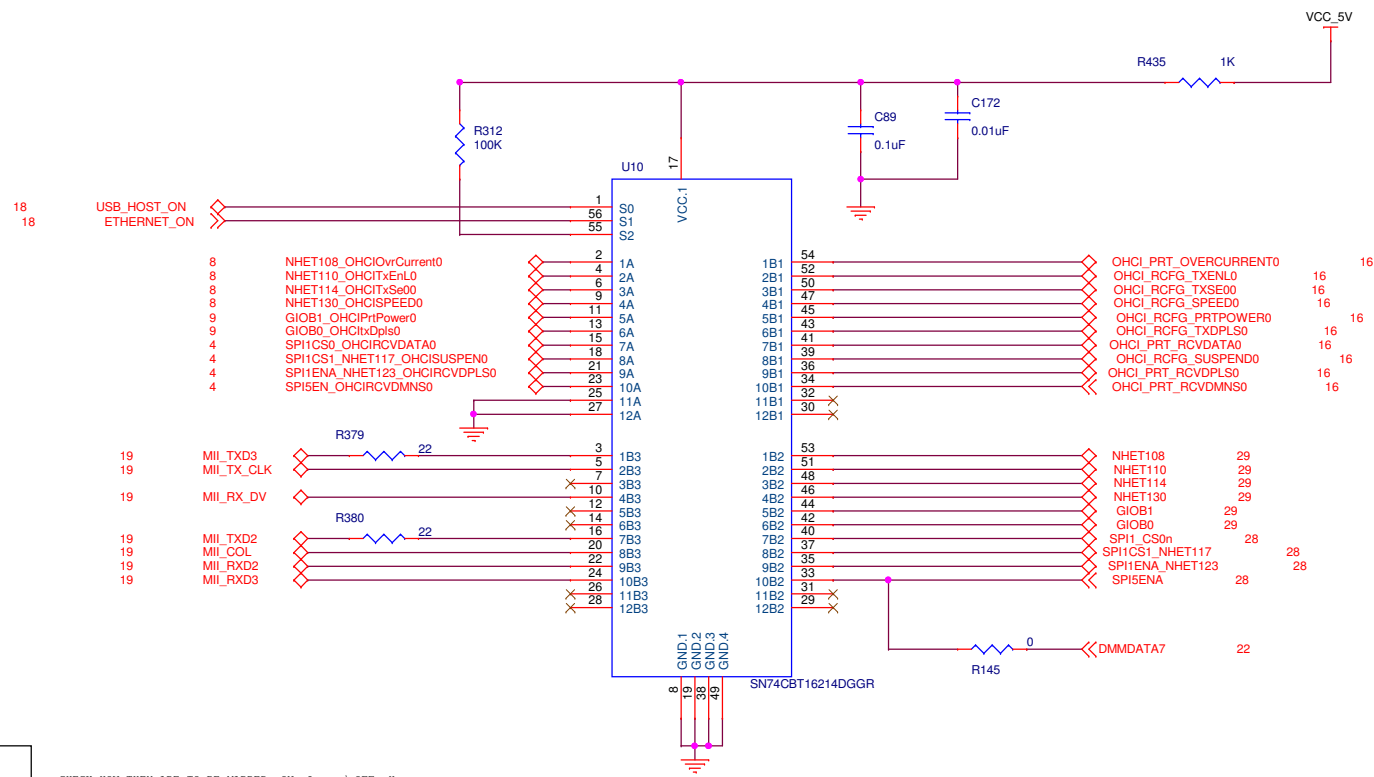
Title		
TMS570LS31x HDK		
Size B	Document Number	Rev B
	MCU NHET	
Date:	Monday, August 13, 2012	Sheet 8 of 29



Title		
TMS570LS31x HDK		
Size B	Document Number	Rev B
	MCU GPIO	
Date:	Monday, August 13, 2012	Sheet 9 of 29



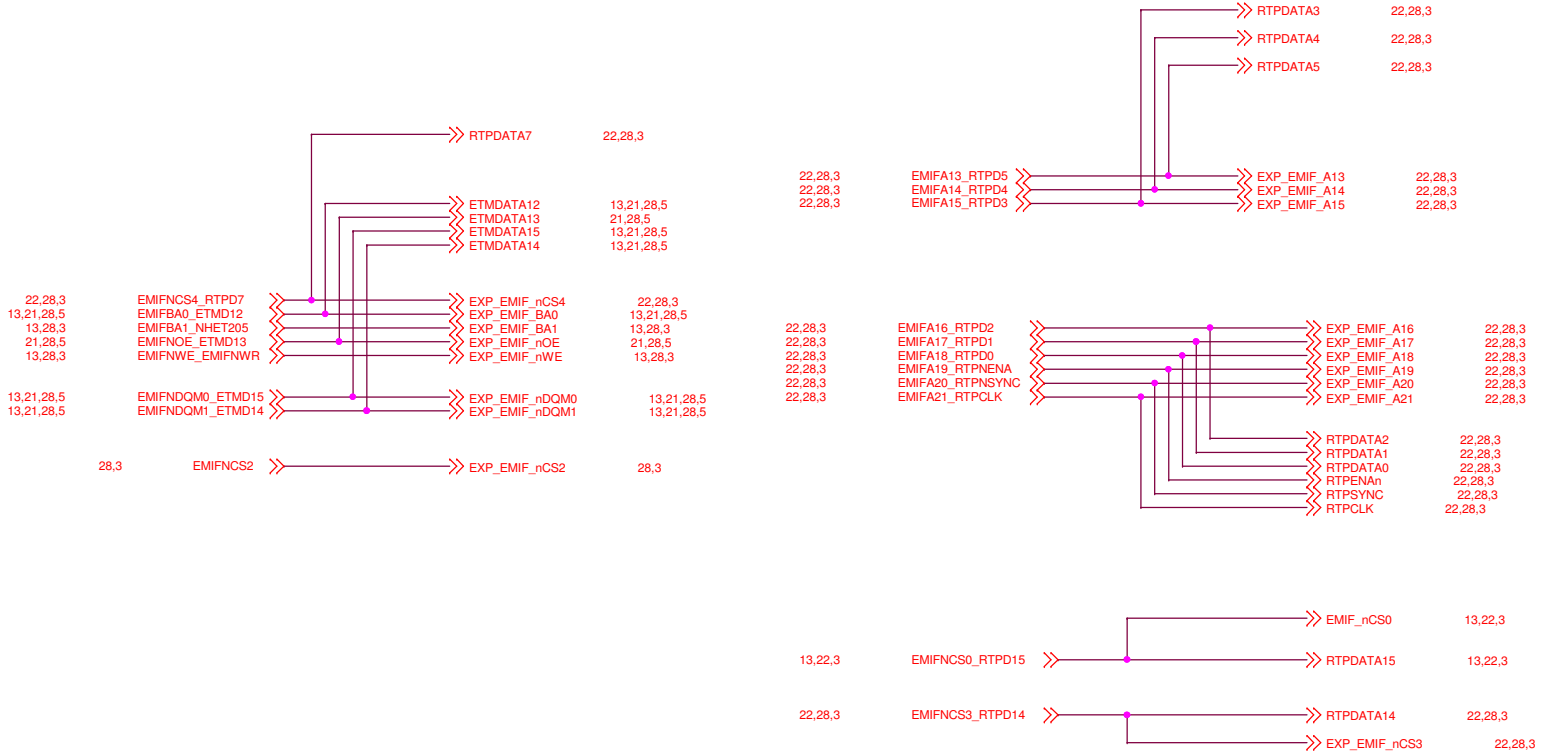
Title	
TMS570LS31x HDK	
Size	Document Number
B	MCU Power & GND
Date:	Monday, August 13, 2012
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Rev	B



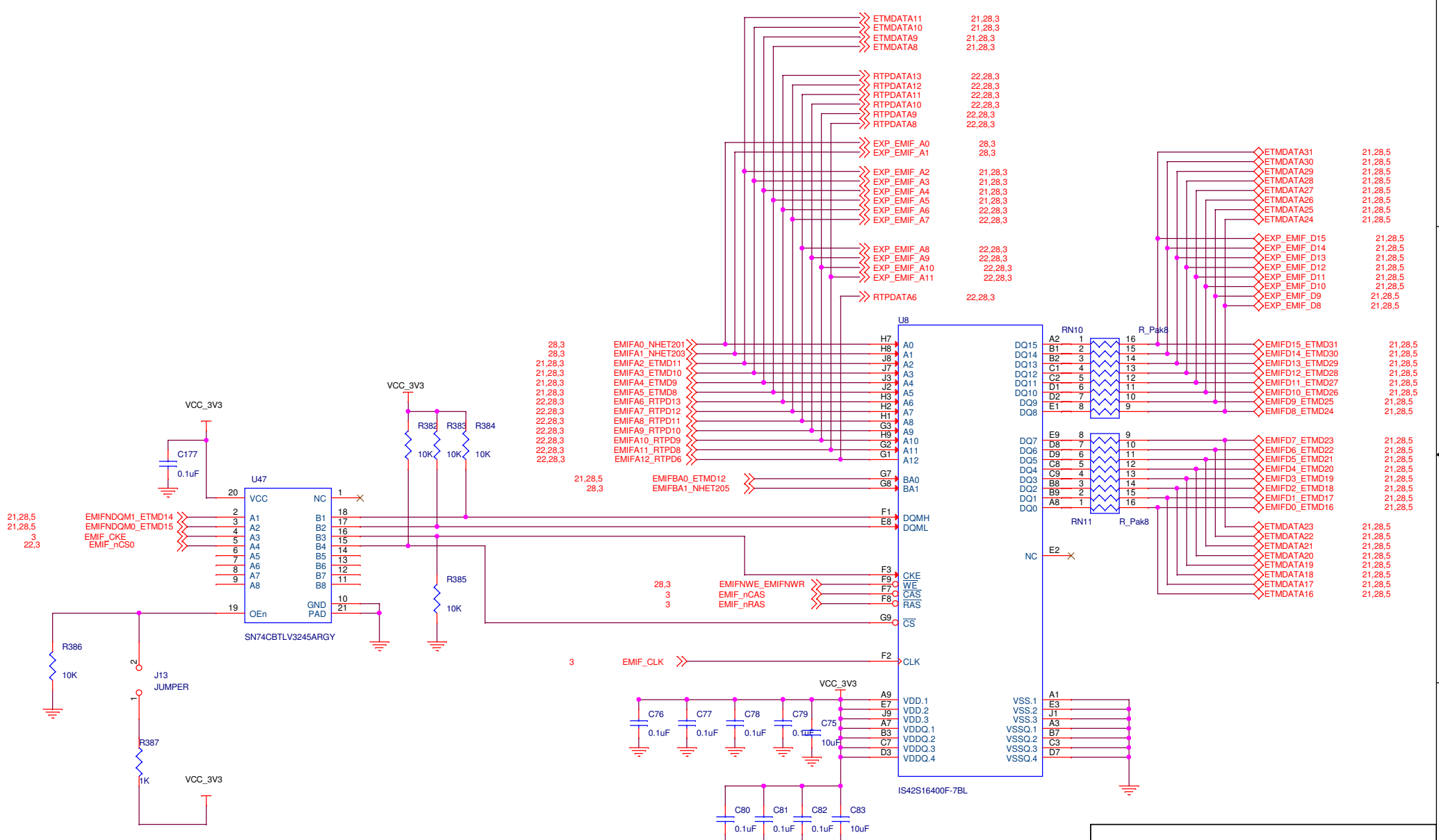
S2	S1	S0	A
1	0	0	Z
1	0	1	B3**
1	1	0	B1 **
1	1	1	B2 **

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

Title		
TMSS70LS31x HDK		
Size	Document Number	Rev
B	FET SWs FOR 1st USB HOST	B
Date:	Monday, August 13, 2012	Sheet 11 of 29



Title		
TMSS70LS31x HDK		
Size B	Document Number	Rev B
	EMIF DATA and ADDR BUSES	
Date:	Monday, August 13, 2012	Sheet 12 of 29



21,28.5
21,28.5
3
22,3

EMIFNDQM1_ETMD14
EMIFNDQM0_ETMD15
EMIF_CKE
EMIF_nCS0

VCC_3V3
C177
0.1uF

U47
SN74CBTLV3245ARGY

VCC_3V3
R382
10K
R383
10K
R384
10K

28,3
28,3
21,28,3
21,28,3
21,28,3
21,28,3
22,28,3
22,28,3
22,28,3
22,28,3
22,28,3
22,28,3
22,28,3

EMIFA0_NHET201
EMIFA1_NHET203
EMIFA2_ETMD11
EMIFA3_ETMD10
EMIFA4_ETMD9
EMIFA5_ETMD8
EMIFA6_RTPD13
EMIFA7_RTPD12
EMIFA8_RTPD11
EMIFA9_RTPD10
EMIFA10_RTPD9
EMIFA11_RTPD8
EMIFA12_RTPD6

21,28.5
28,3

EMIFBA0_ETMD12
EMIFBA1_NHET205

28,3
3
3

EMIFNWE_EMIFNWR
EMIF_nCAS
EMIF_nRAS

VCC_3V3
C76
0.1uF
C77
0.1uF
C78
0.1uF
C79
0.1uF
C75
10uF

A9
E7
J9
A7
B3
C7
D3

C80
0.1uF
C81
0.1uF
C82
0.1uF
C83
10uF

U8
IS42S16400F-7BL

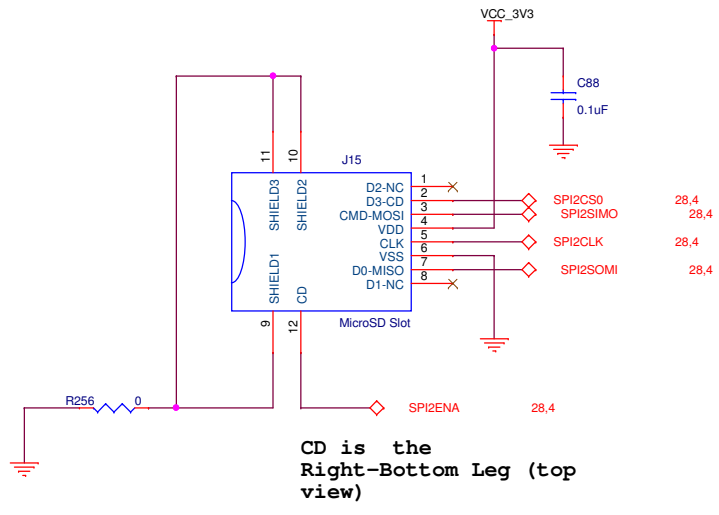
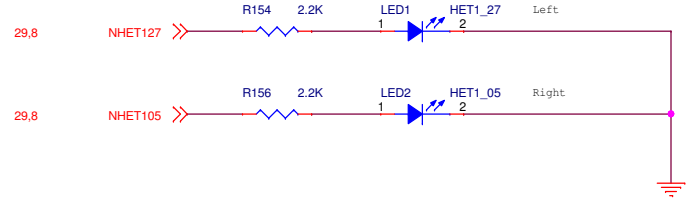
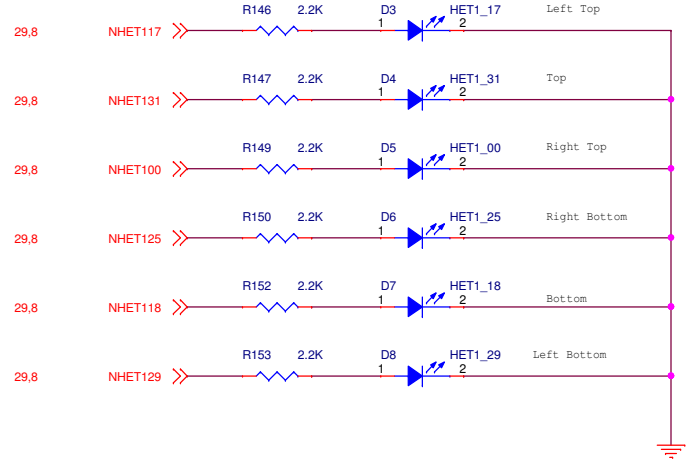
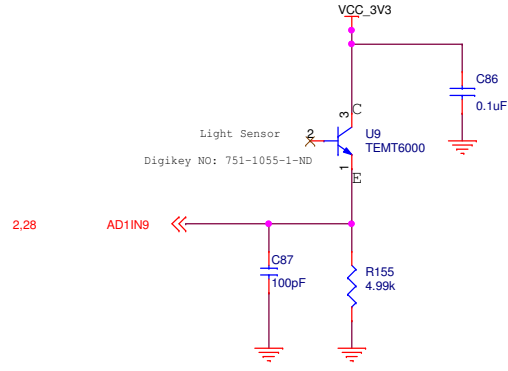
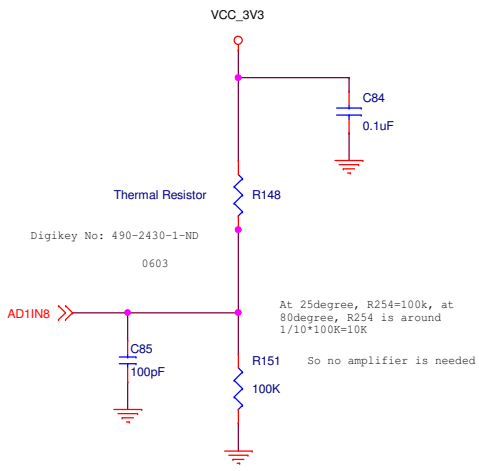
ETMDATA11 21,28,3
ETMDATA10 21,28,3
ETMDATA9 21,28,3
ETMDATA8 21,28,3
RTPDATA13 22,28,3
RTPDATA12 22,28,3
RTPDATA11 22,28,3
RTPDATA10 22,28,3
RTPDATA9 22,28,3
RTPDATA8 22,28,3
EXP_EMIF_A0 28,3
EXP_EMIF_A1 28,3
EXP_EMIF_A2 21,28,3
EXP_EMIF_A3 21,28,3
EXP_EMIF_A4 21,28,3
EXP_EMIF_A5 21,28,3
EXP_EMIF_A6 22,28,3
EXP_EMIF_A7 22,28,3
EXP_EMIF_A8 22,28,3
EXP_EMIF_A9 22,28,3
EXP_EMIF_A10 22,28,3
EXP_EMIF_A11 22,28,3
RTPDATA6 22,28,3

DQ15 A2 1
DQ14 B1 2
DQ13 B2 3
DQ12 C1 4
DQ11 D1 6
DQ10 D2 7
DQ9 E1 8
DQ8

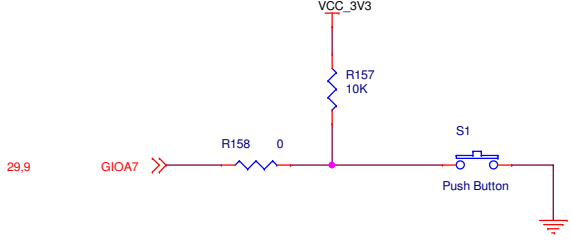
EMIFD15_ETMD31 21,28.5
EMIFD14_ETMD30 21,28.5
EMIFD13_ETMD29 21,28.5
EMIFD12_ETMD28 21,28.5
EMIFD11_ETMD27 21,28.5
EMIFD10_ETMD26 21,28.5
EMIFD9_ETMD25 21,28.5
EMIFD8_ETMD24 21,28.5
EMIFD7_ETMD23 21,28.5
EMIFD6_ETMD22 21,28.5
EMIFD5_ETMD21 21,28.5
EMIFD4_ETMD20 21,28.5
EMIFD3_ETMD19 21,28.5
EMIFD2_ETMD18 21,28.5
EMIFD1_ETMD17 21,28.5
EMIFD0_ETMD16 21,28.5

ETMDATA31 21,28.5
ETMDATA30 21,28.5
ETMDATA29 21,28.5
ETMDATA28 21,28.5
ETMDATA27 21,28.5
ETMDATA26 21,28.5
ETMDATA25 21,28.5
ETMDATA24 21,28.5
EXP_EMIF_D15 21,28.5
EXP_EMIF_D14 21,28.5
EXP_EMIF_D13 21,28.5
EXP_EMIF_D12 21,28.5
EXP_EMIF_D11 21,28.5
EXP_EMIF_D10 21,28.5
EXP_EMIF_D9 21,28.5
EXP_EMIF_D8 21,28.5

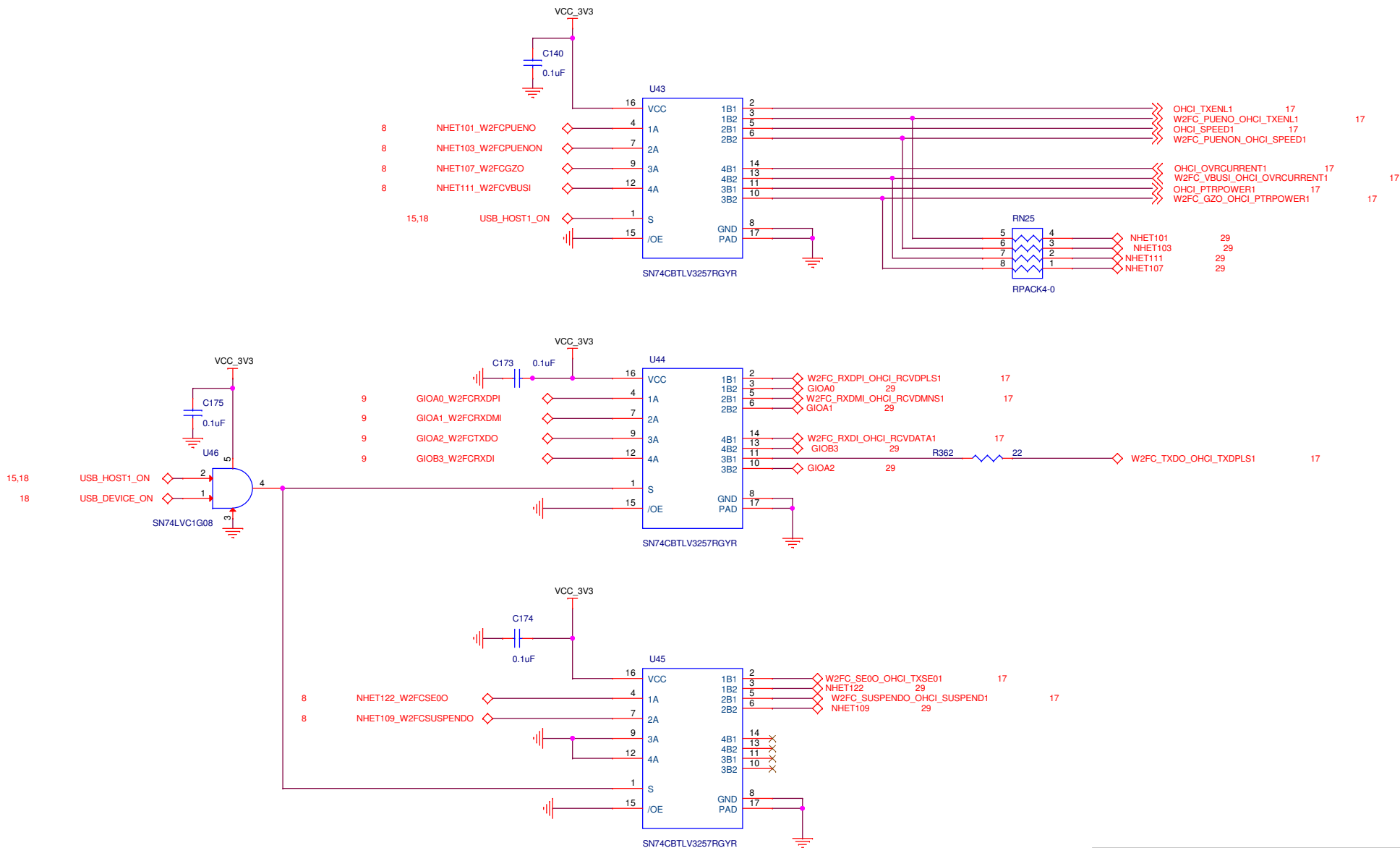
Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	SDRAM	B
Date:	Monday, August 13, 2012	Sheet 13 of 29



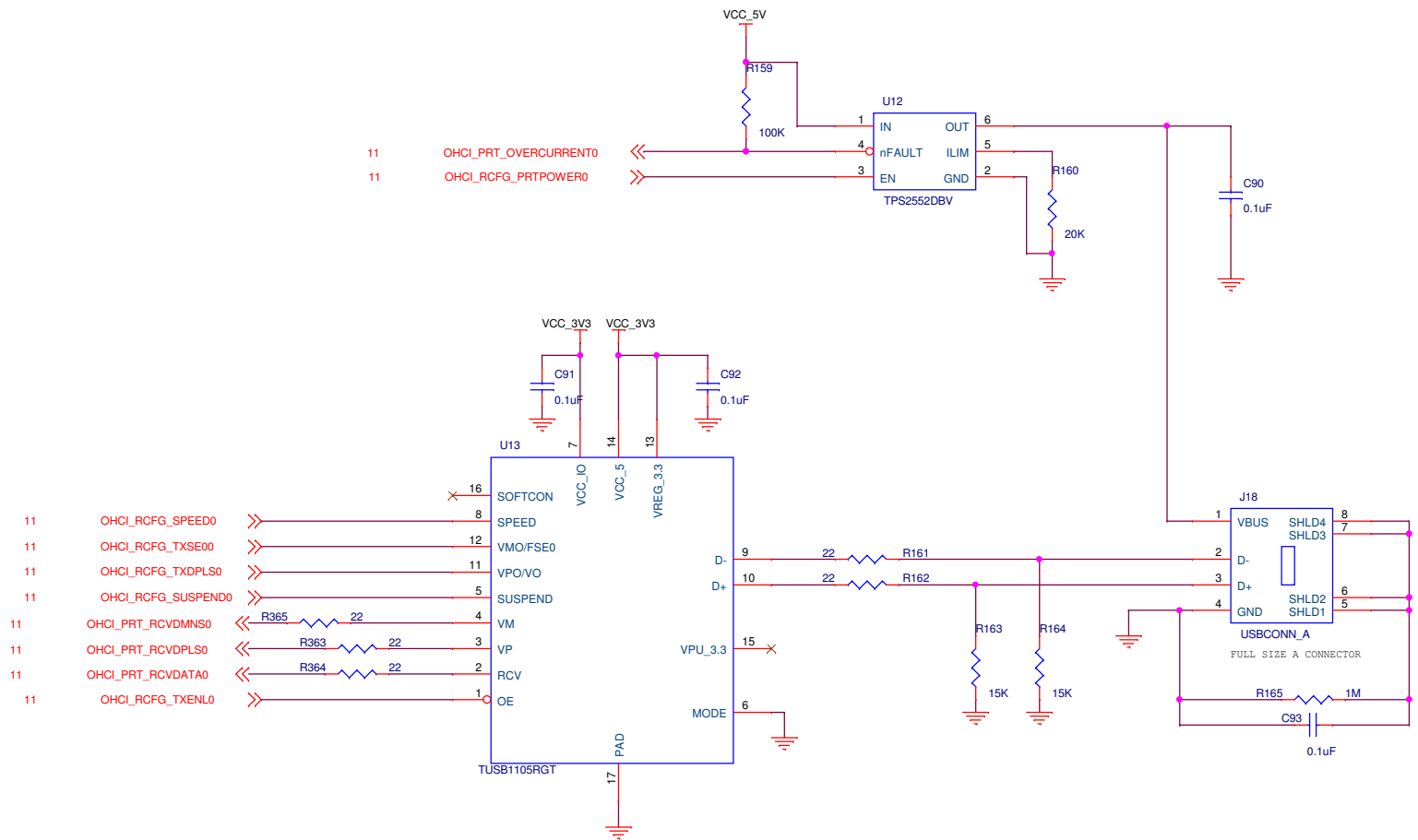
CD is the Right-Bottom Leg (top view)



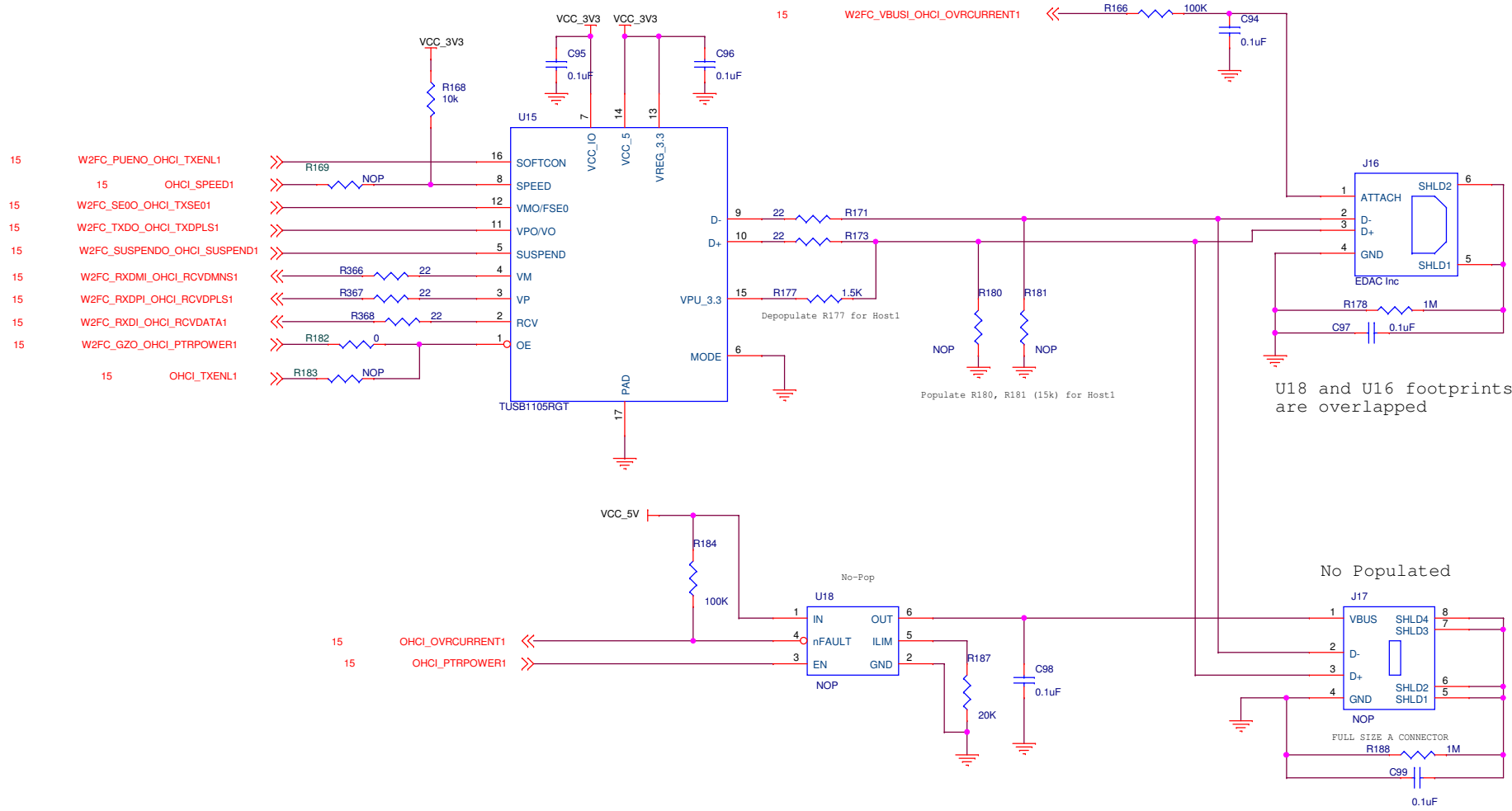
Title		
TMSS70LS31x HDK		
Size	Document Number	Rev
B	SENSOR, LED, PB	C
Date:	Monday, August 13, 2012	Sheet 14 of 29



Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	FET SWs FOR USB DEVICE & 2nd HOST	B
Date:	Monday, August 13, 2012	Sheet 15 of 29



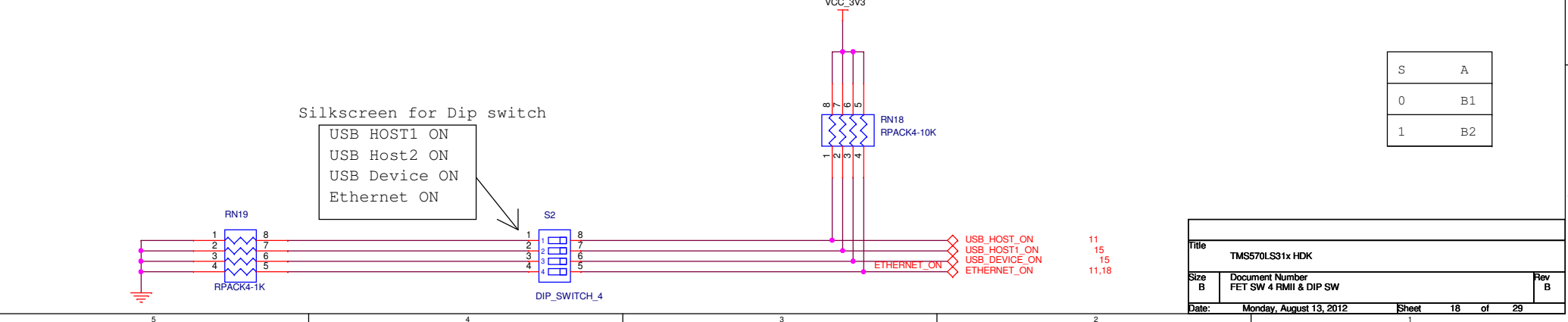
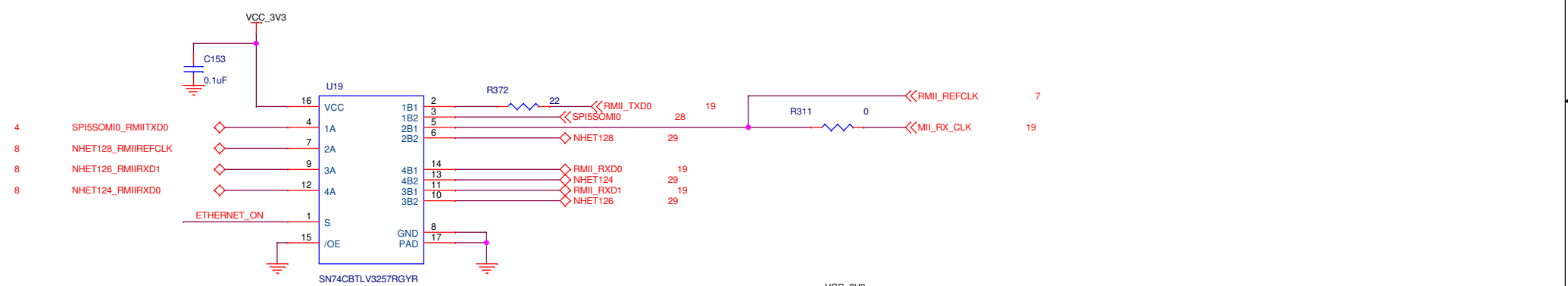
Title		
TMSS70LS31x HDK		
Size	Document Number	Rev
B	USB 1st OHCI Host	B
Date:	Monday, August 13, 2012	Sheet 16 of 29



U18 and U16 footprints are overlapped

No Populated

Title		
TMSS70LS31x HDK		
Size B	Document Number	Rev B
	USB Device & 2nd HOST	
Date:	Monday, August 13, 2012	Sheet 17 of 29

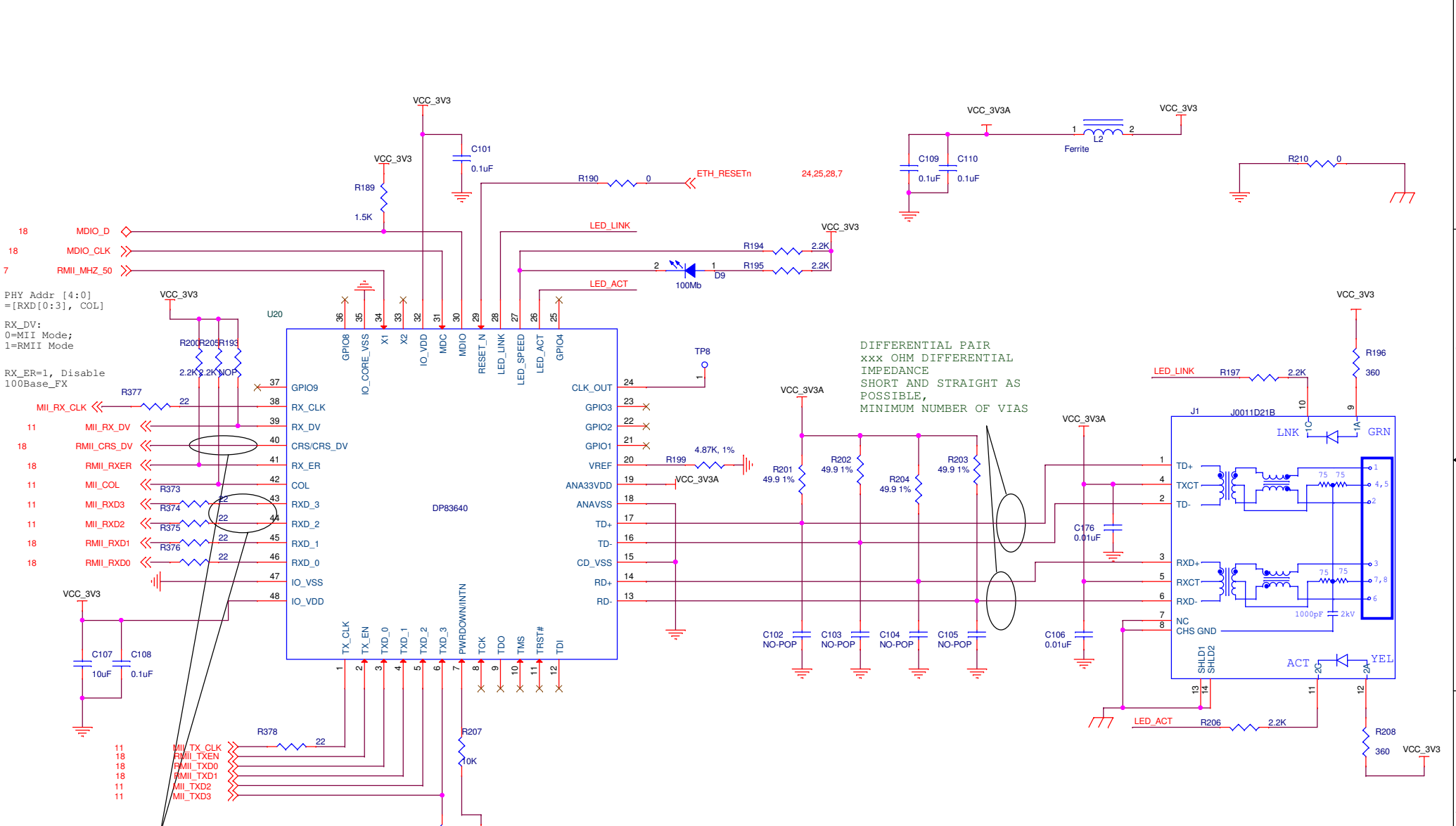


Silkscreen for Dip switch

USB HOST1 ON
 USB Host2 ON
 USB Device ON
 Ethernet ON

S	A
0	B1
1	B2

Title		
TMSS70LS31x HDK		
Size B	Document Number	Rev B
	FET SW 4 RMII & DIP SW	
Date:	Monday, August 13, 2012	Sheet 18 of 29

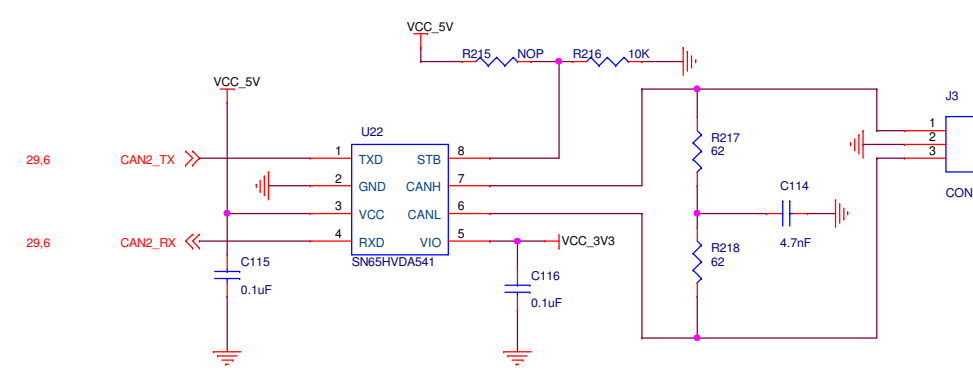
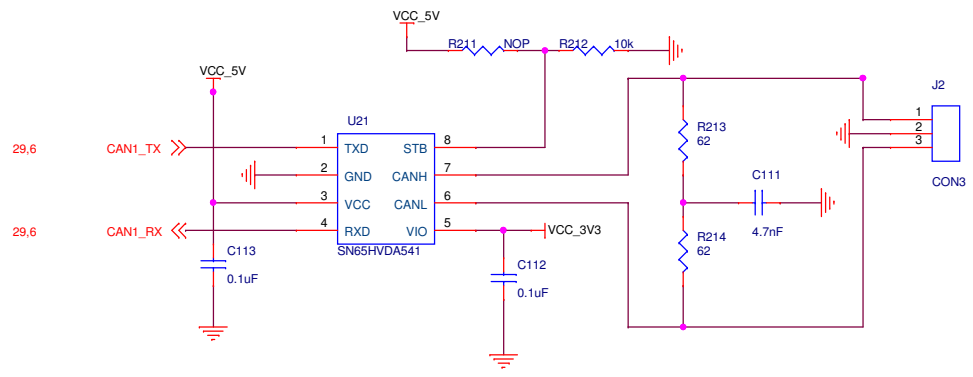


DIFFERENTIAL PAIR
 xxx OHM DIFFERENTIAL
 IMPEDANCE
 SHORT AND STRAIGHT AS
 POSSIBLE,
 MINIMUM NUMBER OF VIAS

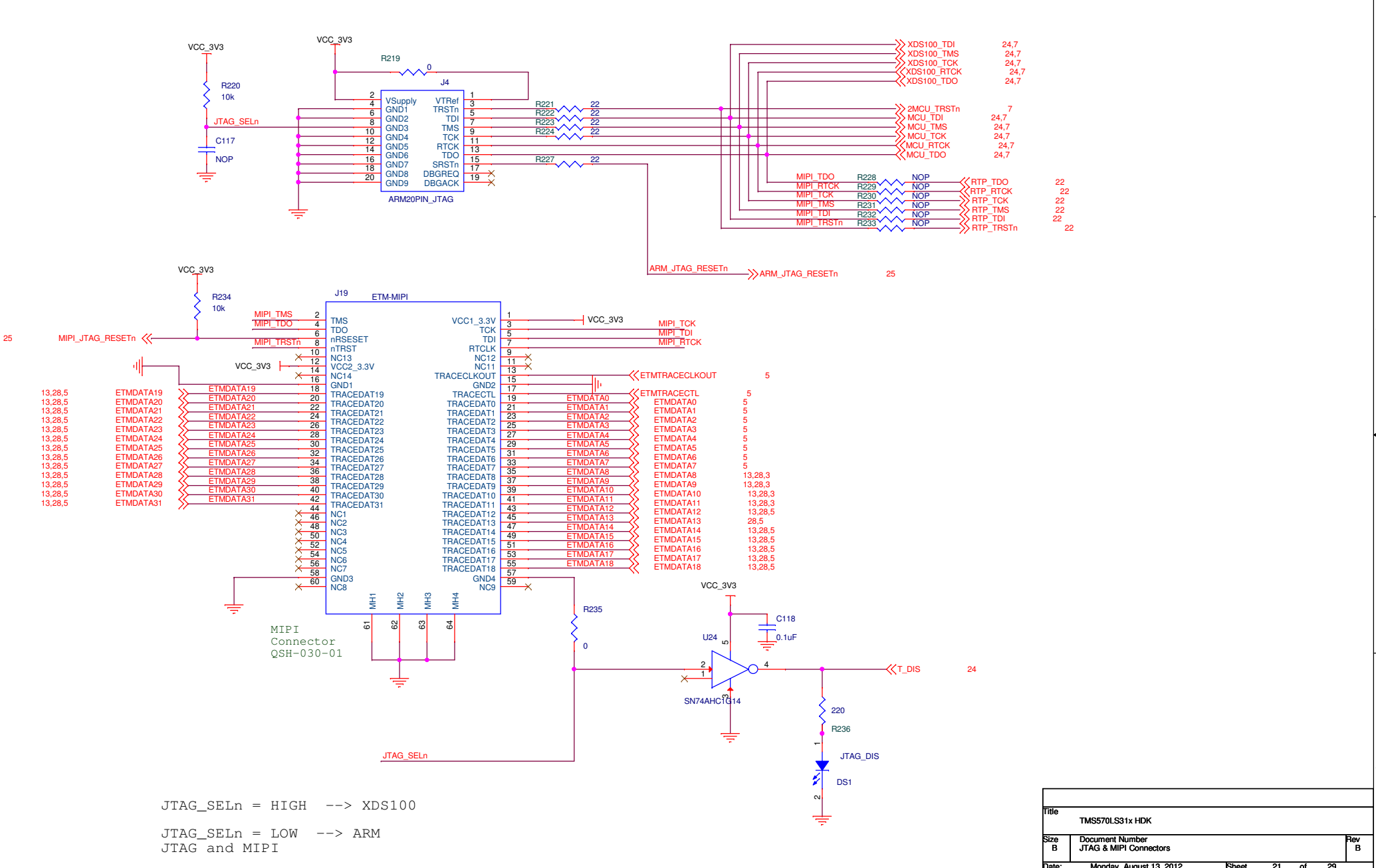
Strongly Recommend:
 1. Add a 2.2K ohms pull-down resistors to RXD_2 and RXD_3 signals.
 2. Add a 2.2K ohms pull-up resistor to CRS/CRS_DV signal

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

Title		
TMS570LS31x HDK		
Size B	Document Number	Rev B
Ethernet PHY & Conn		
Date:	Tuesday, March 05, 2013	Sheet 19 of 29

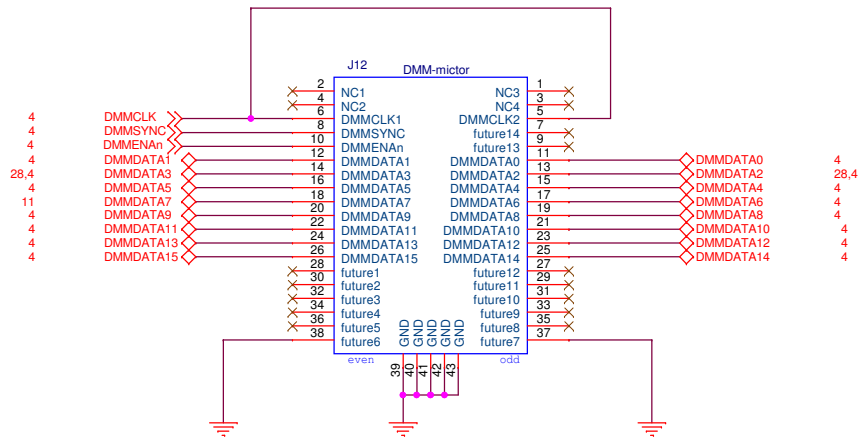


Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	DCAN Transceivers	B
Date:	Monday, August 13, 2012	Sheet 20 of 29
		1

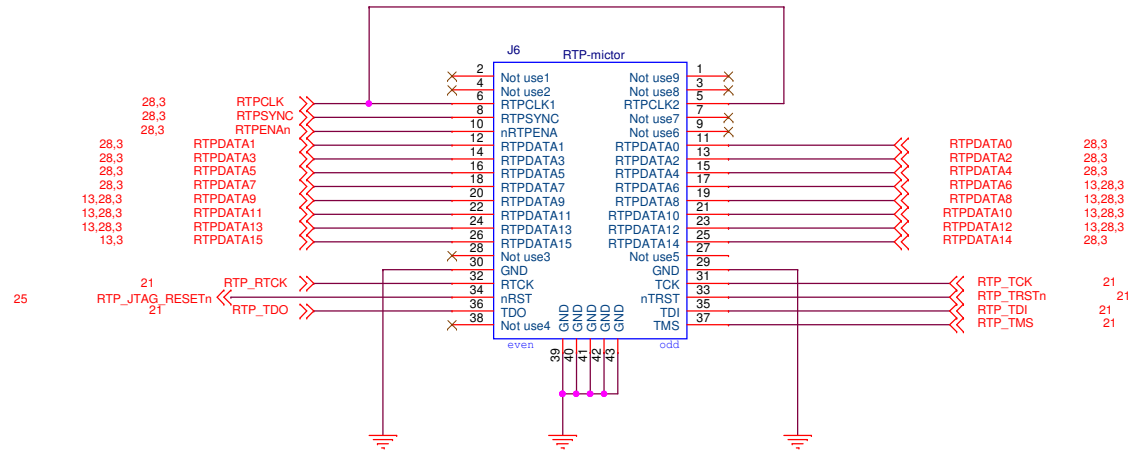


JTAG_SELn = HIGH --> XDS100
 JTAG_SELn = LOW --> ARM
 JTAG and MIPI

Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	JTAG & MIPI Connectors	B
Date:	Monday, August 13, 2012	Sheet 21 of 29

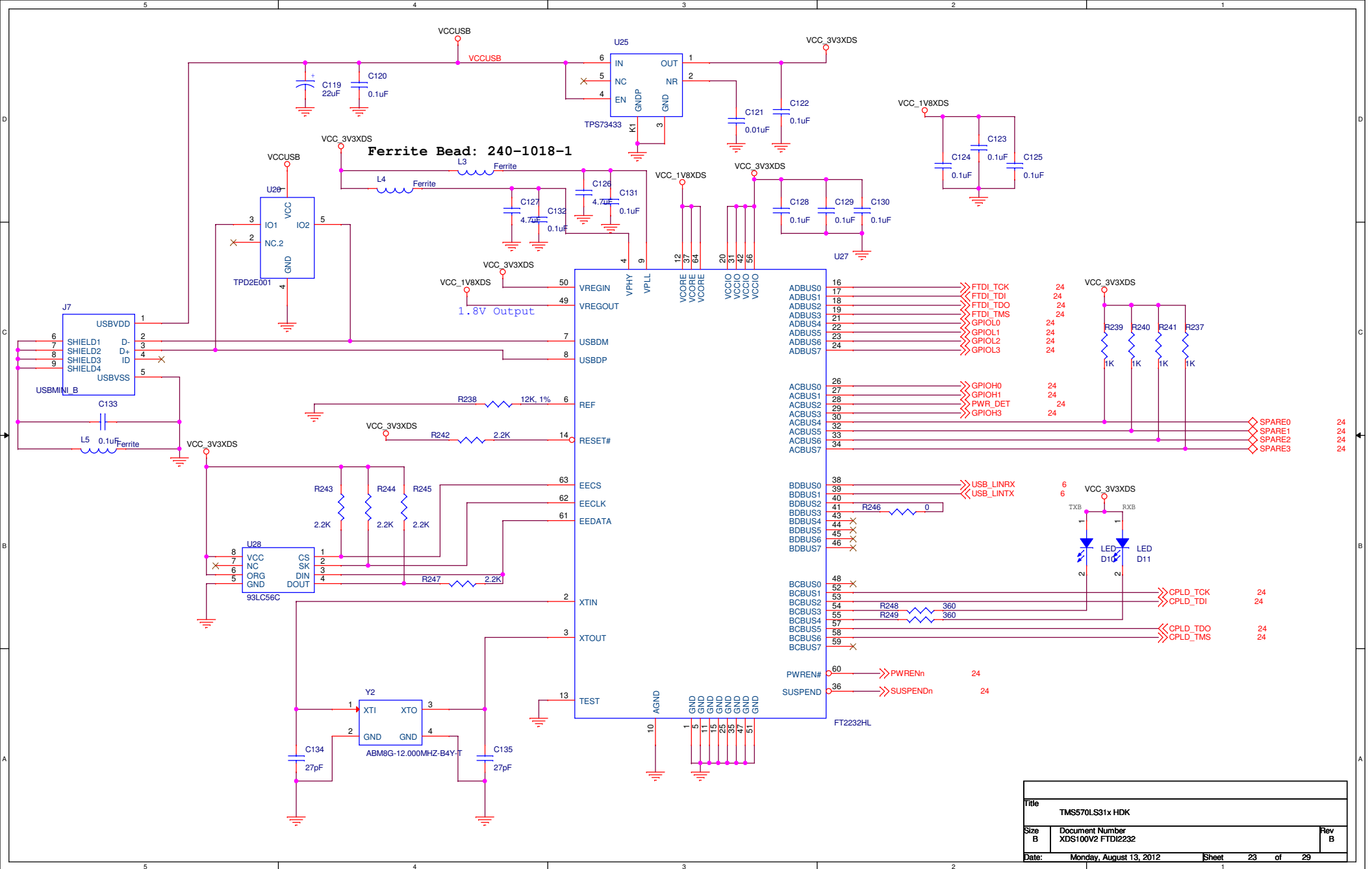


Foot Print Only
Pin39/40/41/42/43 are the central GND

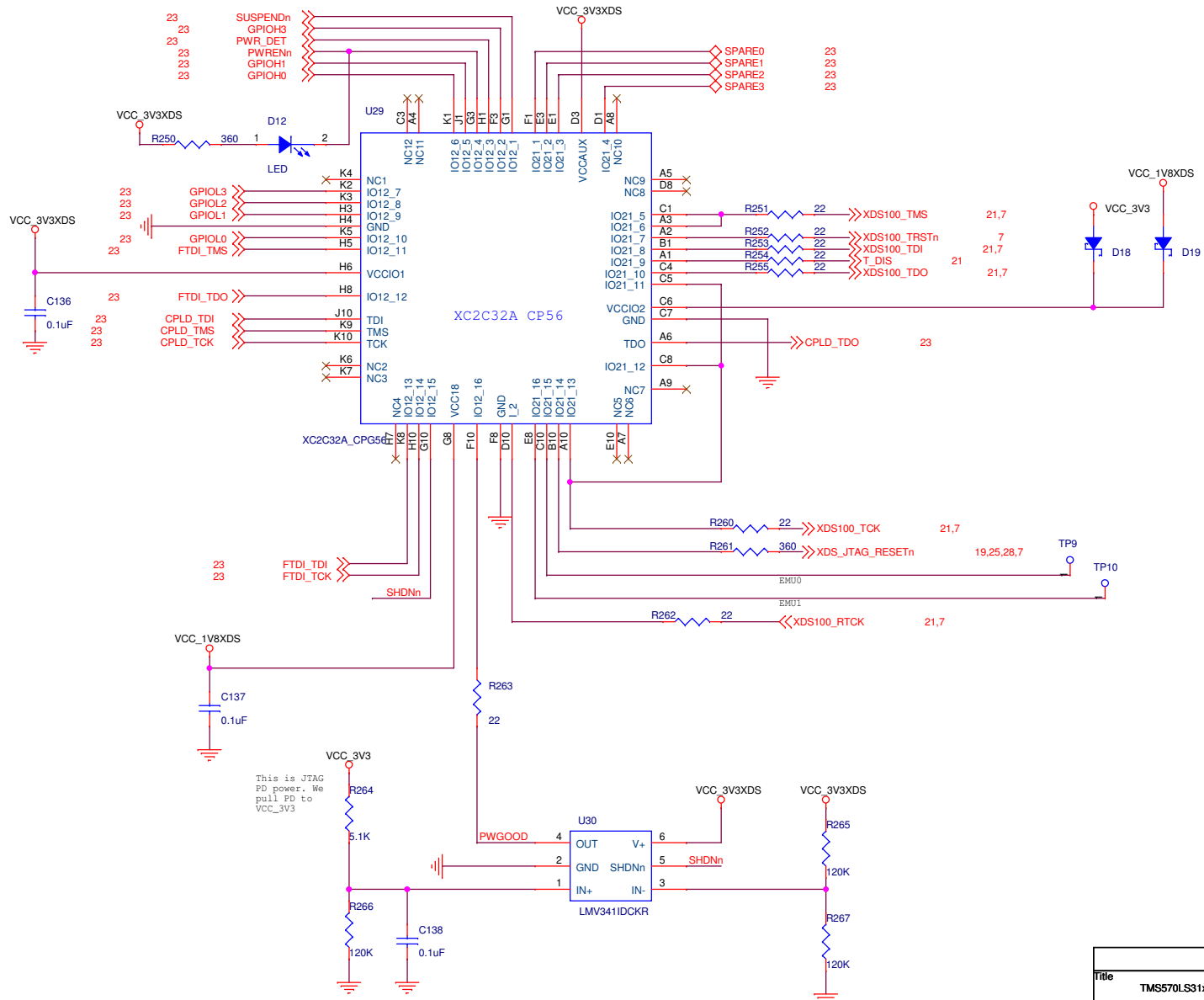


AMP 2-5767004-2
Receptacle, Center Strip Contacts
Foot Print Only

Title		
TMS570LS3x/RM5x CPU CARD		
Size	Document Number	Rev
B	DMM and RTP Connectors	B
Date:	Friday, May 18, 2012	Sheet 22 of 29



Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	XDS100V2 FTDI2232	B
Date:	Monday, August 13, 2012	Sheet 23 of 29



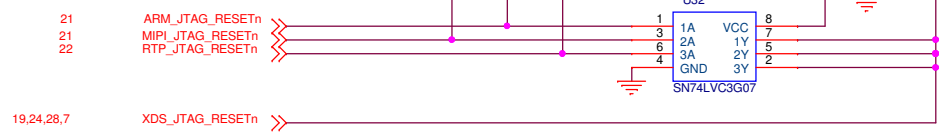
This is JTAG PD power. We pull PD to VCC_3V3

Title		
TMS570LS31x HDK		
Size	Document Number	Rev
B	XDS100V2 CPLD	B
Date:	Monday, August 13, 2012	Sheet 24 of 29

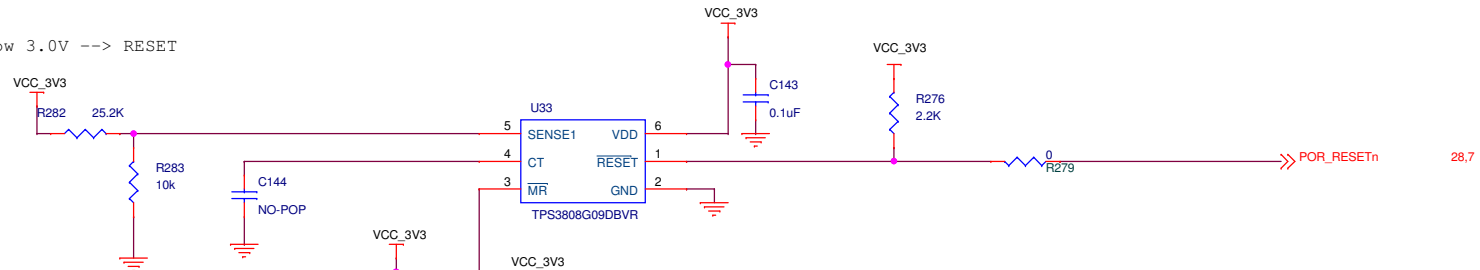


If VCC_3.3V below 3.0V --> RESET

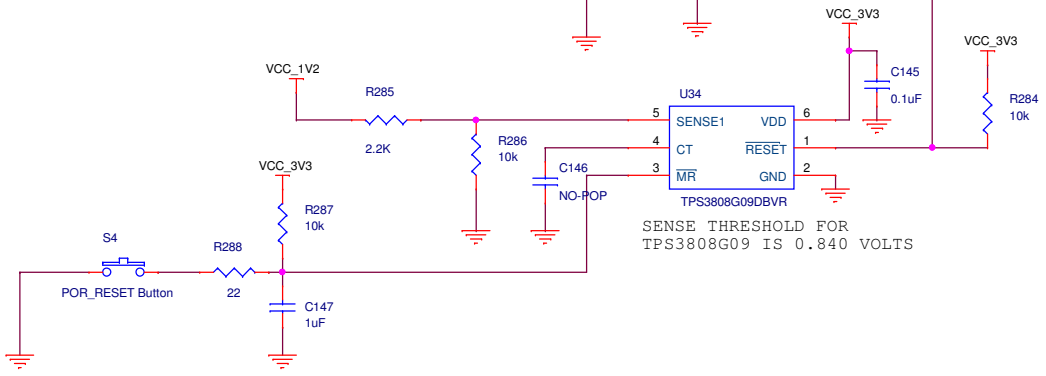
This is the RESET pin rather than TRST



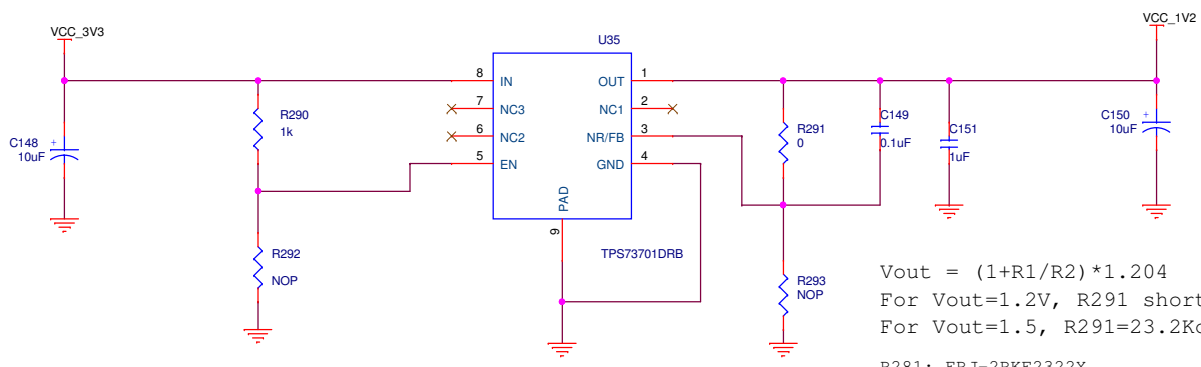
If VCC_3.3V below 3.0V --> RESET



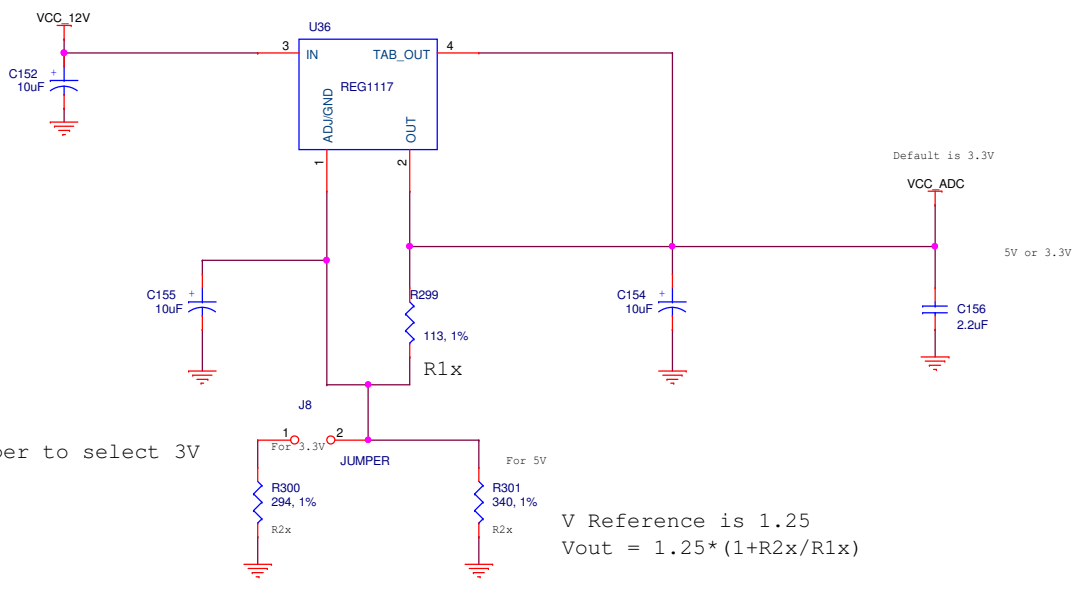
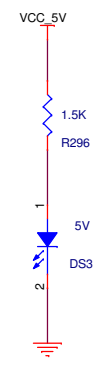
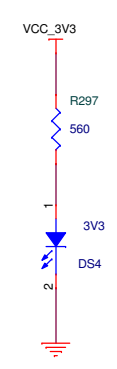
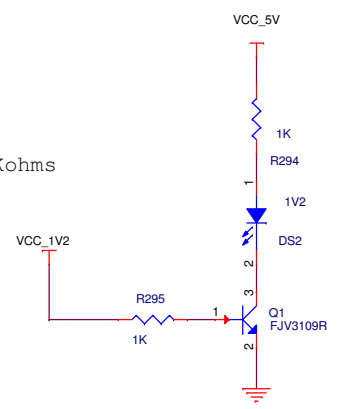
If VCC_1.5V below 1.35V --> RESET



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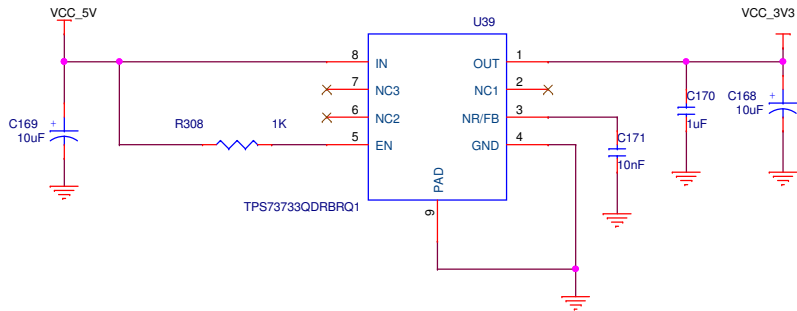
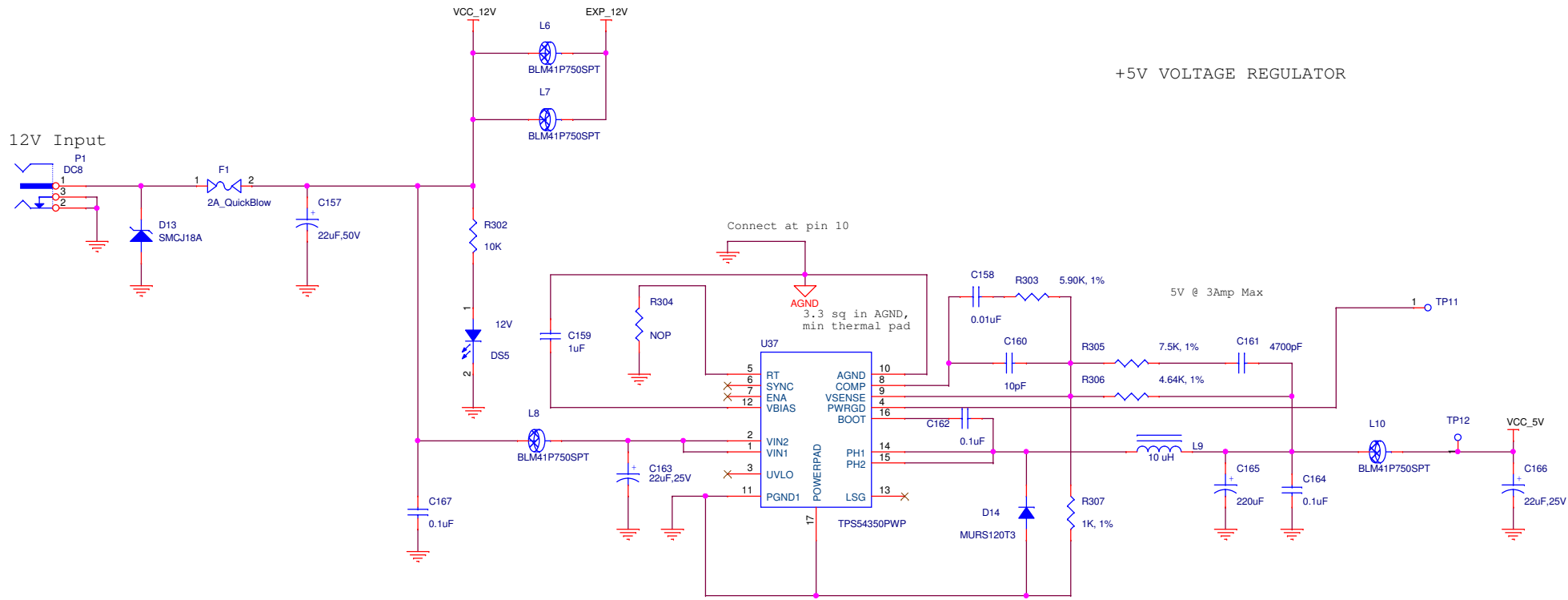
$V_{out} = (1 + R1/R2) * 1.204$
 For $V_{out} = 1.2V$, R291 shorted, and R293 Open
 For $V_{out} = 1.5V$, R291=23.2Kohms, and R293=95.3Kohms
 R281: ERJ-2RKF2322X



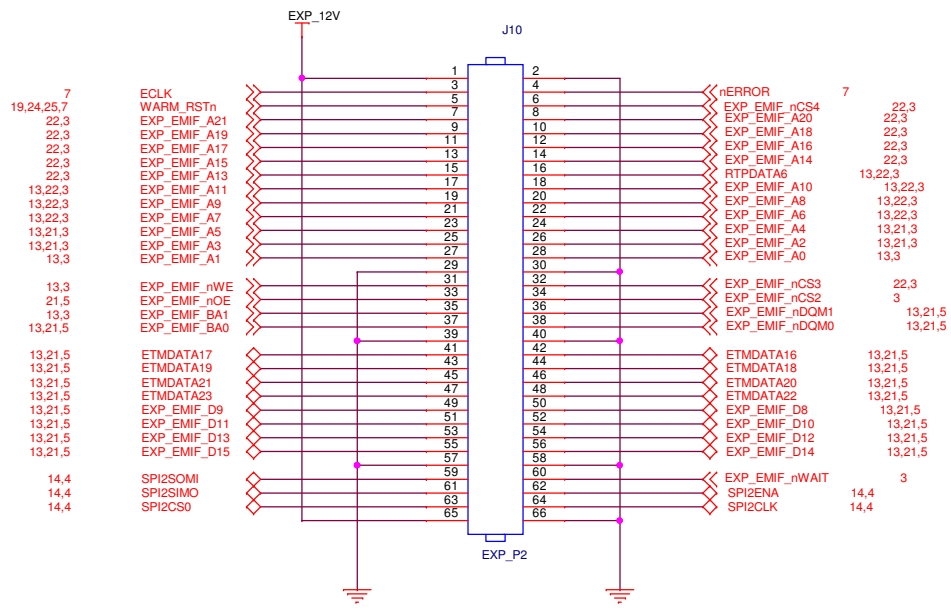
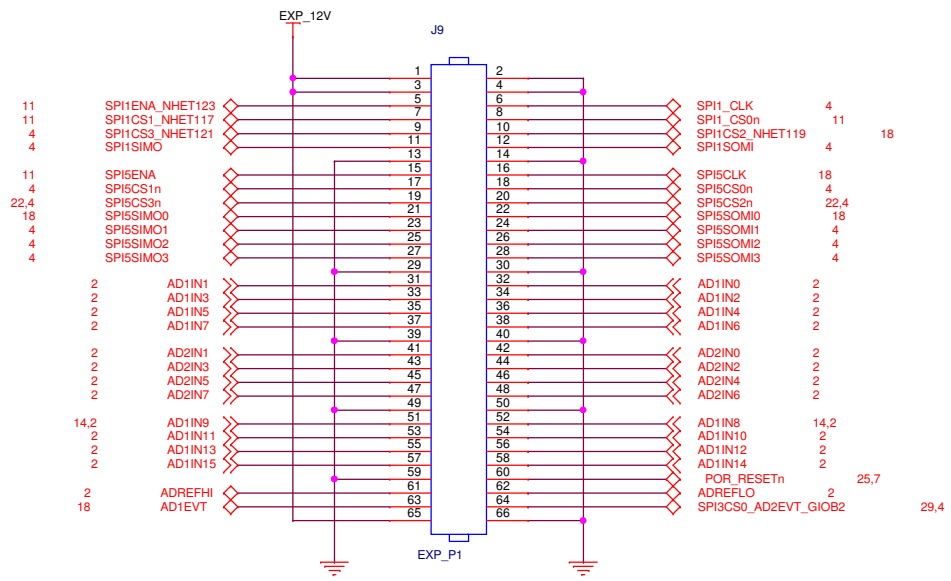
use jumper to select 3V

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

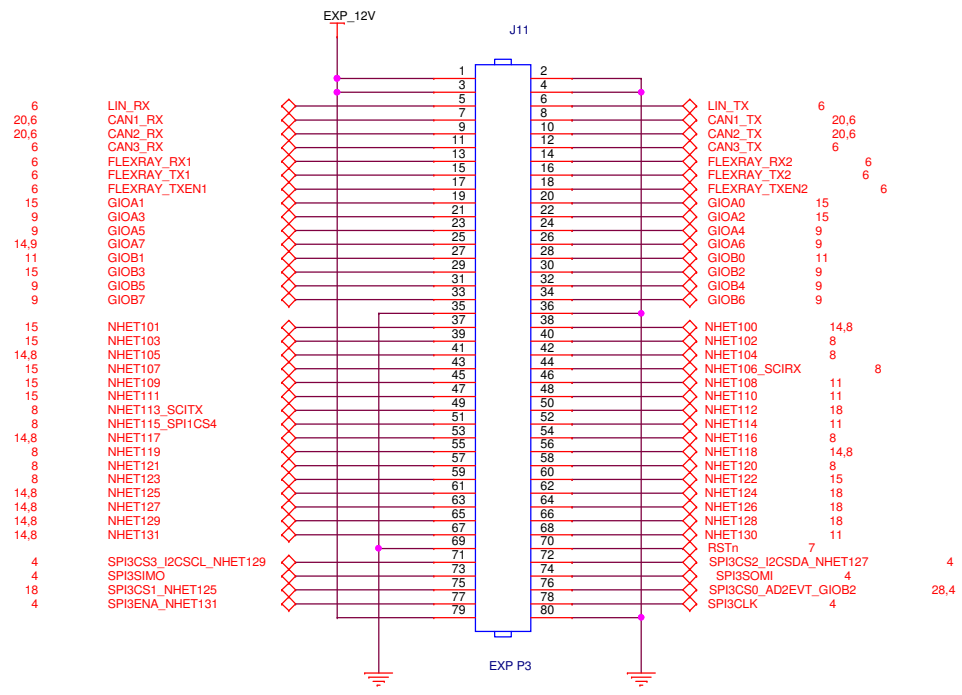
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