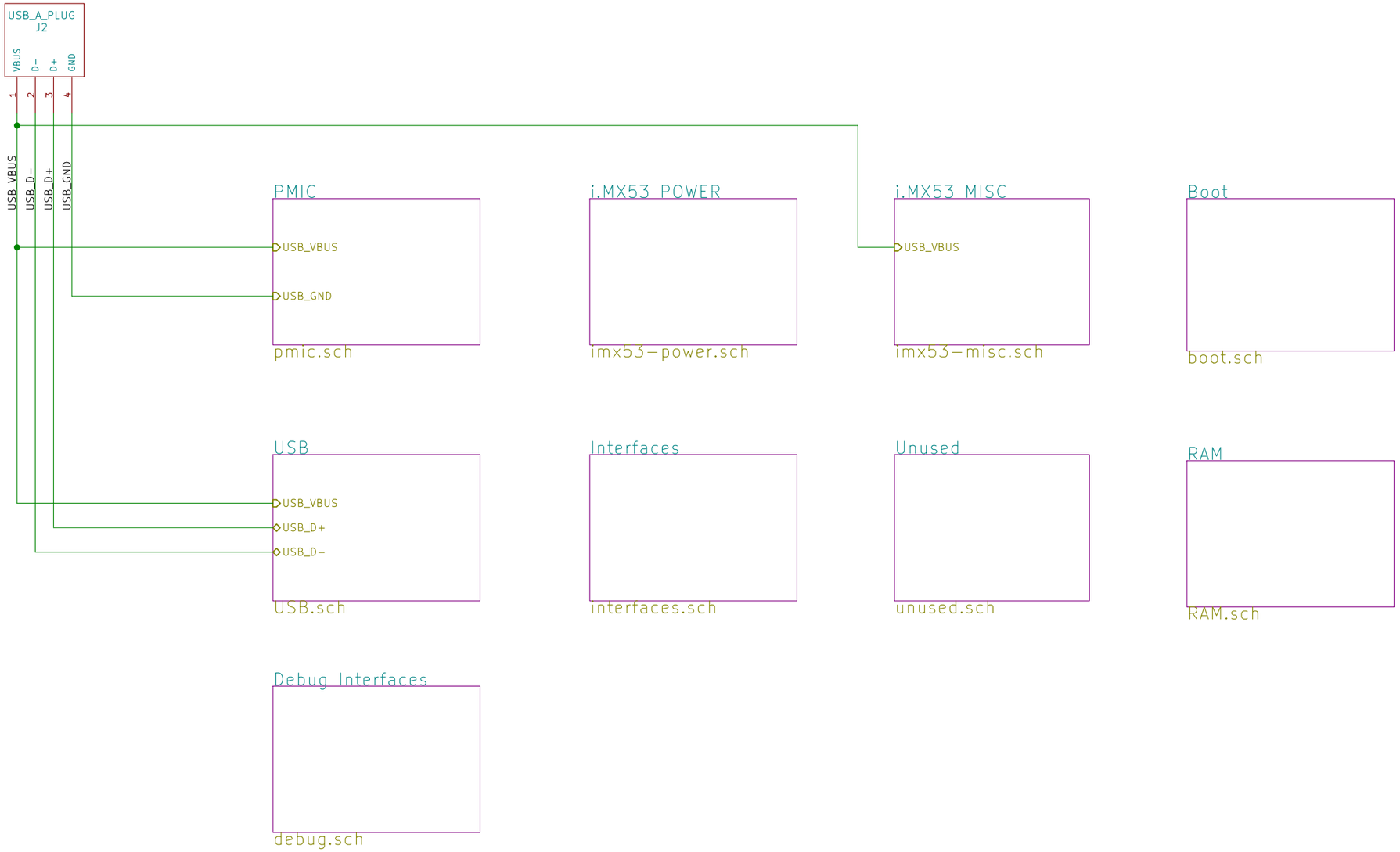

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Sheet: /
File: armory.sch

Title: USB armory test board

Size: A3	Date: 20 Aug 2014	**Rev: ALPHA**
KiCad E.D.A. eeschema (2014-jan-25)-product		Id: 1/10

USB_VBUS
USB_GND
5V_MAIN
PMIC_LDO1_STDBY
PMIC_LDO1_STDBY
C2 1uF
R3 100k
0.8 V
R4 158k
P7 ST
PMIC_LDO2_1V5
C1 2.2uF
R1 191k
Not used in current revision.
C3 1uF
PMIC_LDO2
0.675 V
PMIC_LDO2_FB
R2 158k
C4 10uF
PMIC_LDO3_2V8
C5 2.2uF
5V_MAIN
PMIC_LDO4_3V2
C109 2.2uF
R23 4.7k
R13 47k
WAKE
TST_PMIC_PWR_ON
Standby function disabled.
Power on as soon as connected in the USB plug.
IMX53_LDO_1V8
WAKE
SW2_VCC
DDR_1V5
ENABLE_DDR_1V5
C6 10uF
37
VIN
36 LDO1_STDBY
35 LDO1_FB
1 VIN_LDO2
2 LDO2
38 LDO2_FB
5 VIN_LDO34
3 LDO3
4 LDO4
8 RST0
17 RQ
22 PBSTAT
23 WAKE
29 PGOOD
21 ON
28 VSTB
20 PWR_ON
10 EN1
11 EN2
13 EN3
14 EN4
9 EN_LDO2
18 EN_LDO3
GND
41
U1
LTC3589
PVIN1 6
SW1 7
BUCK1_FB 39
PVIN2 24
SW2 25
BUCK2_FB 33
PVIN3 27
SW3 26
BUCK3_FB 34
PVIN4 15
BB_OUT 16
SW4AB 12
SW4CD 19
BB_FB 40
DVDD 32
SCL 30
SDA 31
C7 10uF
C8 10uF
C9 10uF
C10 10uF
L1 2.7uH
C110 0.1uF
PMIC_I2C_SCL
PMIC_I2C_SDA
I2C1_SCL
I2C1_SDA
1.0uH L3
C13 22uF
C15 22uF
C18 10pF
R9 100k
SW1_VDDGP
PMIC_SW1_VDDGP
0.675 V
R10 158k
PMIC_SW1
PMIC_BUCK1_FB
2.2uH L4
C17 22uF
C19 10pF
R11 180k
SW2_VCC
PMIC_SW2_VCC
PMIC_SW2
PMIC_BUCK2_FB
0.675 V
R12 191k
2.2uH L2
C12 22uF
C14 10pF
R5 270k
SW3_2V5
PMIC_SW3_2V5
PMIC_SW3
PMIC_BUCK3_FB
0.675 V
R6 100k
C11 22uF
C16 10pF
R7 511k
SW4_3V3
PMIC_SW4_3V3
PMIC_BUCK4_FB
0.8 V
R8 158k
PWR_FLAG
5V_MAIN
C78 10uF
ENABLE_DDR_1V5
R20 4.53k
C83 0.56uF
U3
LT3481
VIN 4
BD 1
RUN/SS 5
VC 9
RT 10
PG 6
BOOST 2
SW 3
BIAS 7
FB 8
GND 11
1V5RUN_SS
1V5VC
1V5RT
C77 330pF
R16 15.4k
R17 100k
C79 0.47uF
1V5SW
3.3uH L6
DDR_1V5
PMIC_DDR_1V5
1V5FB
R19 3.9k
R18 21k
C80 47uF
D1 DFLS240L

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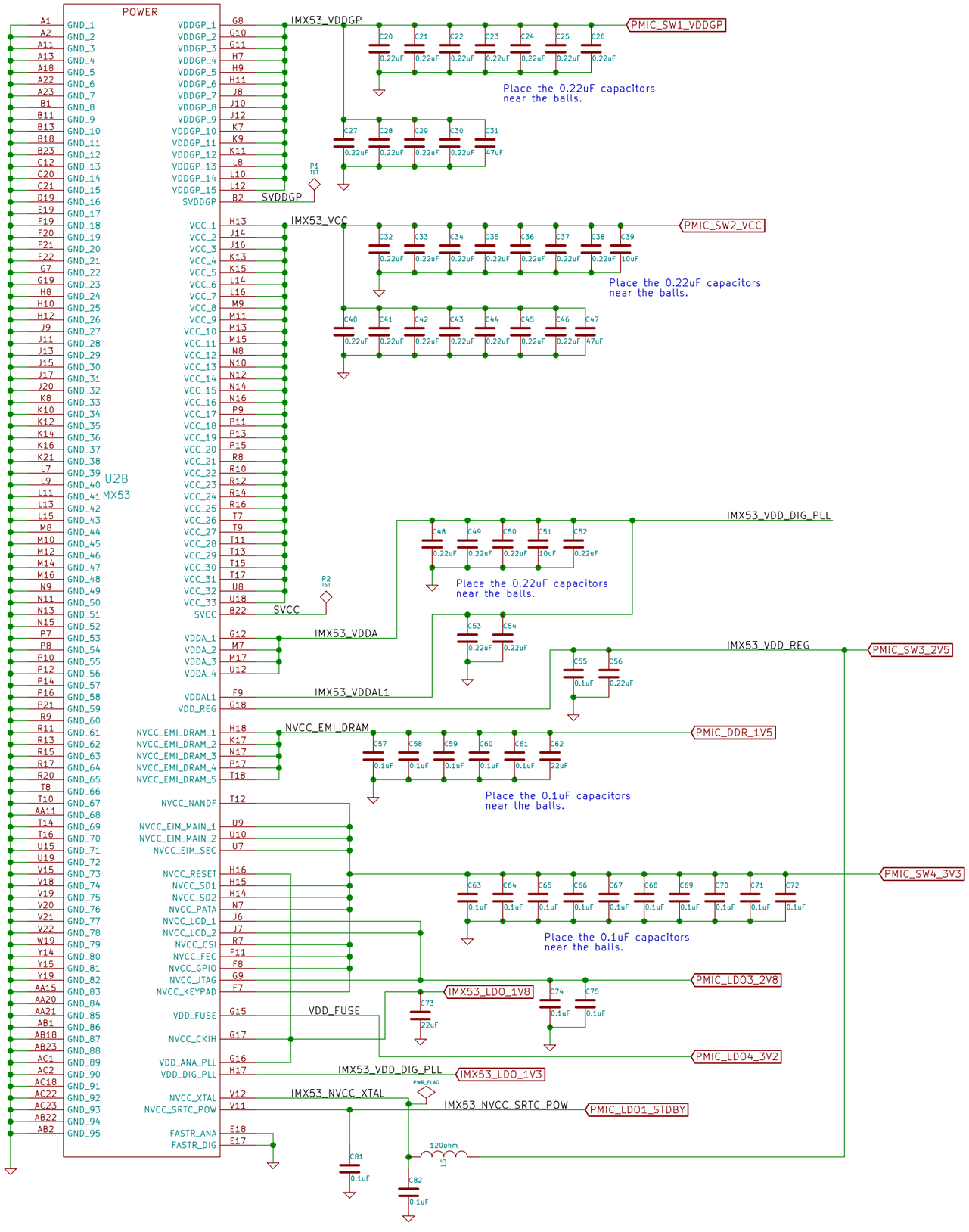
Sheet: /PMIC/
File: pmic.sch

Title: USB armory test board

Size: A3	Date: 20 Aug 2014	**Rev: ALPHA**
KiCad E.D.A. eeschema (2014-jan-25)-product		Id: 2/10


POWER
U2B
MX53
IMX53_VDDGP
PMIC_SW1_VDDGP
Place the 0.22uF capacitors near the balls.
SVDDGP
IMX53_VCC
PMIC_SW2_VCC
Place the 0.22uF capacitors near the balls.
SVCC
IMX53_VDD_DIG_PLL
Place the 0.22uF capacitors near the balls.
IMX53_VDDA
IMX53_VDDAL1
IMX53_VDD_REG
PMIC_SW3_2V5
NVCC_EMI_DRAM
PMIC_DDR_1V5
Place the 0.1uF capacitors near the balls.
PMIC_SW4_3V3
Place the 0.1uF capacitors near the balls.
PMIC_LDO3_2V8
IMX53_LDO_1V8
VDD_FUSE
PMIC_LDO4_3V2
IMX53_VDD_DIG_PLL
IMX53_LDO_1V3
IMX53_NVCC_XTAL
IMX53_NVCC_SRTC_POW
PMIC_LDO1_STDBY
120ohm
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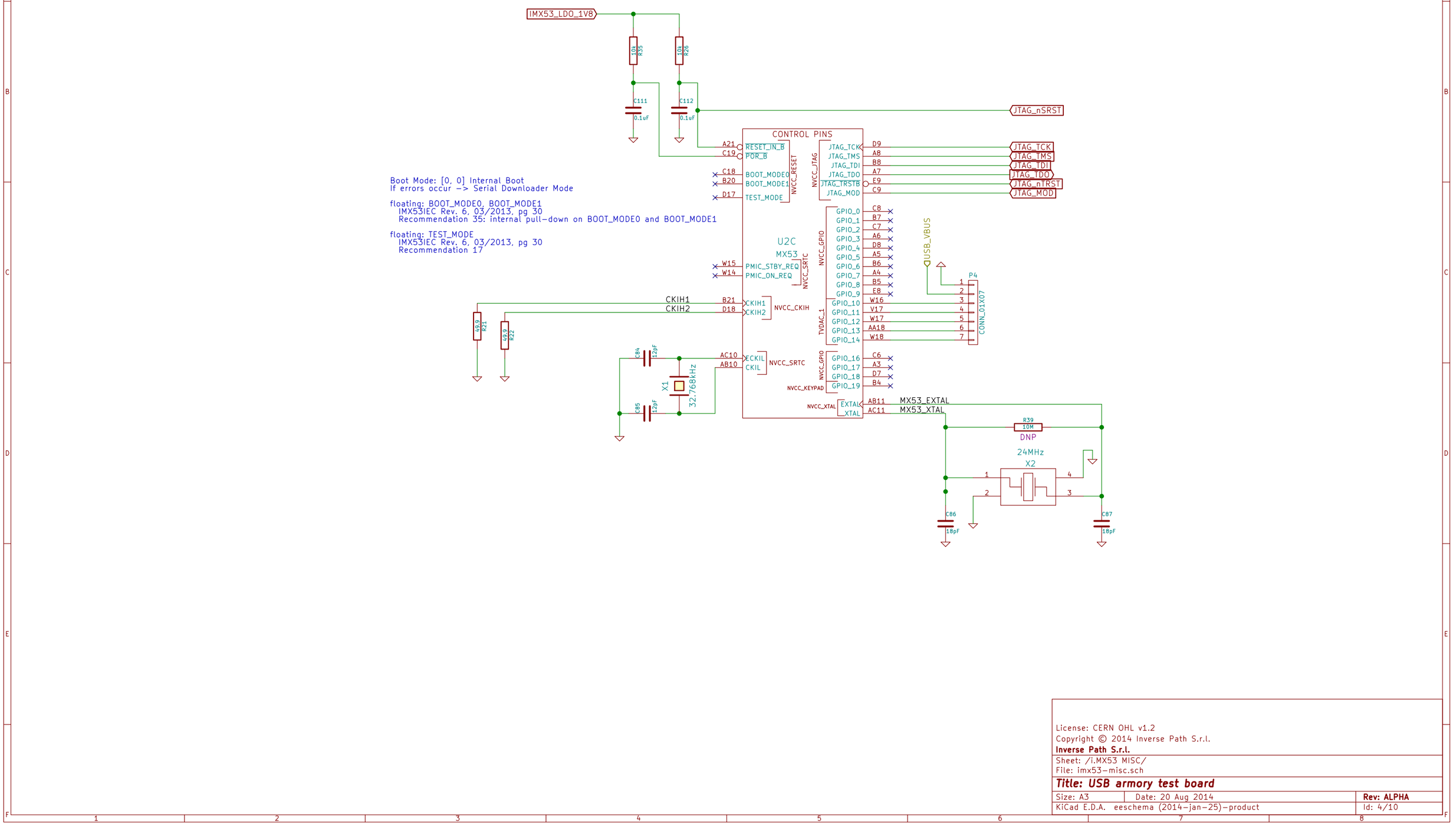
Sheet: /i.MX53 POWER/
File: imx53-power.sch
Title: USB armory test board
Size: A3
Date: 20 Aug 2014
Rev: ALPHA
KiCad E.D.A. eeschema (2014-jan-25)-product
Id: 3/10



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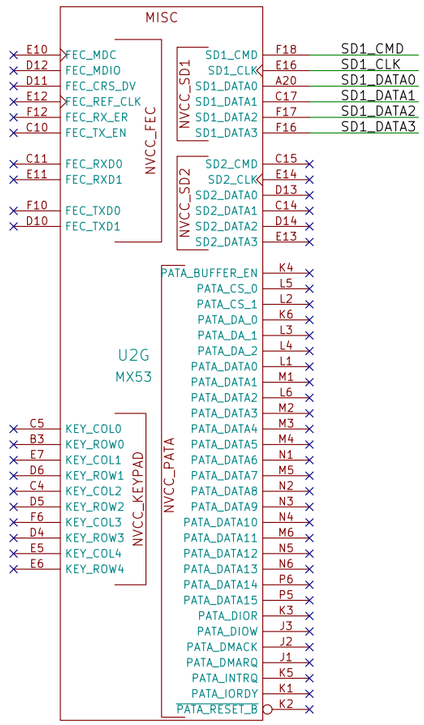
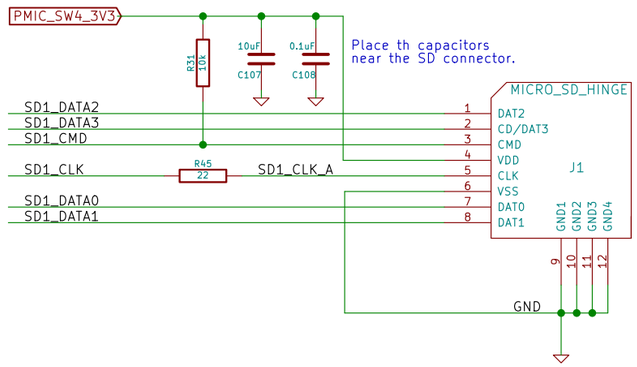
Sheet: /i.MX53 MISC/
File: imx53-misc.sch

Title: USB armory test board

Size: A3	Date: 20 Aug 2014	**Rev: ALPHA**
KiCad E.D.A.	eeschema (2014-jan-25)-product	Id: 4/10





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Sheet: /Interfaces/
File: interfaces.sch

Title: USB armory test board

Size: A3	Date: 20 Aug 2014	**Rev: ALPHA**
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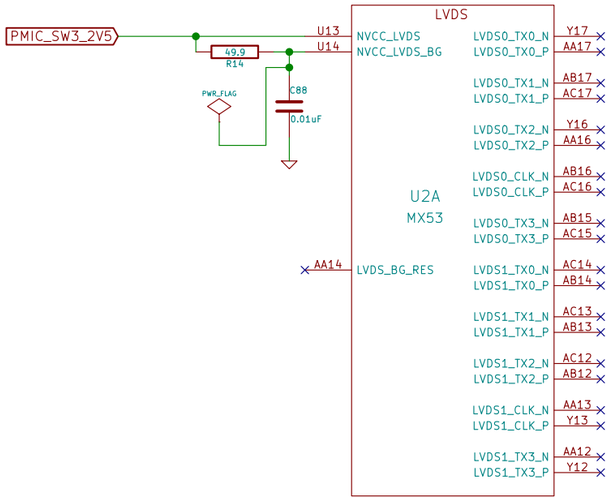


powered: NVCC_LVDS, NVCC_LVDS_BG
  https://community.freescale.com/thread/309316

floating: LVDS0_*, LVDS1_*
  Freescale QSB and SABRE reference schematics

floating: LVDS_BG_RES
  MX53UG Rev. 1, 3/2011, pg 30
  Design checklist, Recommendation 21

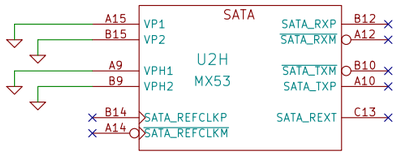
LVDS0_* and LVDS1_* pads are muxed.
NVCC_LVDS, NVCC_LVDS_BG, LVDS_BG_RES are not.

floating: SATA_REFCLKP, SATA_REFCLKM, SATA_RXP, SATA_RXM, SATA_TXM, SATA_TXP, SATA_REXT
  IMX53IEC Rev. 6, 03/2013, pg 117
  4.7.13.4 SATA Connectivity when not in use

grounded: VP1, VP2, VPH1, VPH2
  IMX53IEC Rev. 6, 03/2013, pg 117
  4.7.13.4 SATA Connectivity when not in use

All the SATA pads are not muxed.

Warning: The temperature sensor is disabled when SATA module is not powered.



floating: TVDAC_VREF
  https://community.freescale.com/thread/309316

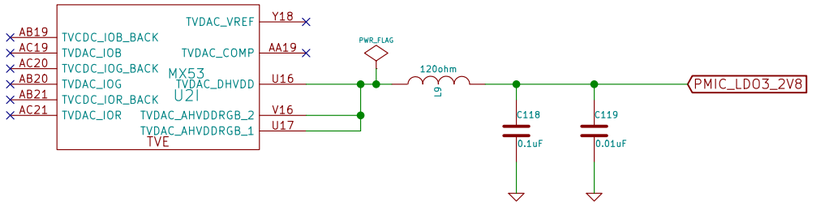
floating: TVDAC_COMP
  MX53UG Rev. 1, 3/2011, pg 29
  Design checklist, Recommendation 14

floating: TVDAC_IO*, TVCDC_IO*
  MX53UG Rev. 1, 3/2011, pg 29
  Design checklist, Recommendation 15

floating: TVDAC_DHVDD, TVDAC_AHVDDRGB
  IMX53IEC Rev. 6, 03/2013, pg 26
  4.2.3 Power Supplies Usage

TVE module not used, but we use the GPIO powered by this TVE power rail.
Next revision: consider using alternate GPIOs.

All the TVE pads are not muxed.



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Sheet: /Unused/
File: unused.sch

Title: USB armory test board

Size: A3	Date: 20 Aug 2014	**Rev: ALPHA**
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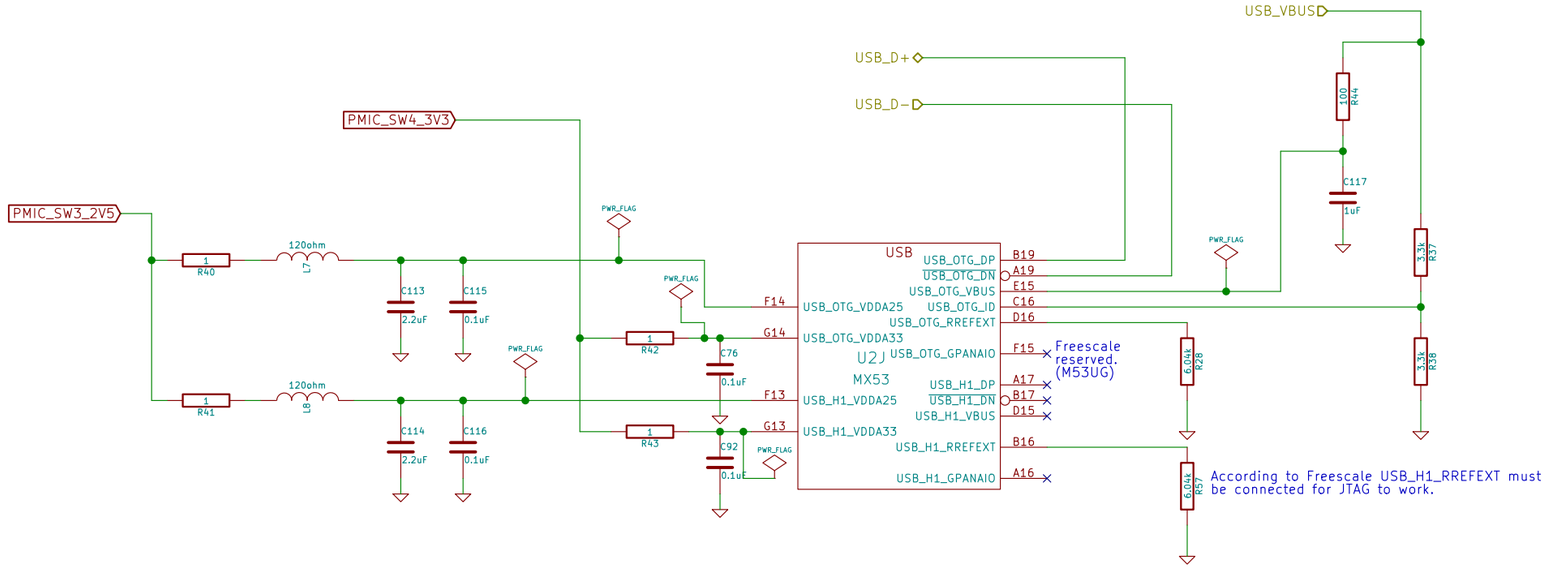

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Sheet: /USB/
File: USB.sch

Title: USB armory test board

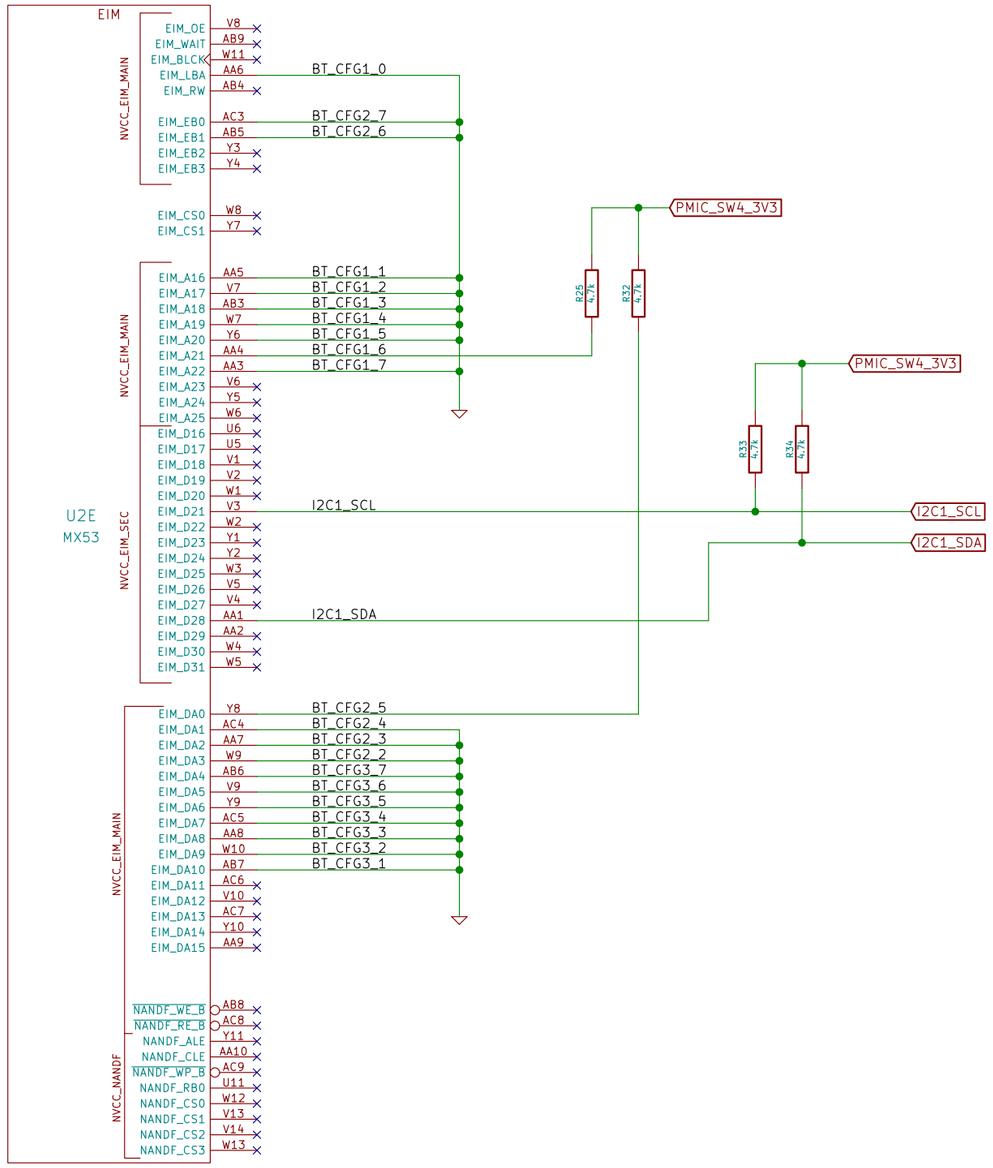
Size: A3	Date: 20 Aug 2014	**Rev: ALPHA**
KiCad E.D.A. eeschema (2014-jan-25)-product		Id: 7/10

References:
– i.MX53 Multimedia Applications Processor Reference Manual, Rev. 2.1, 6/2012, pg 479
– i.MX53 Applications Processors for Industrial Products, Rev. 6, pg 142

BOOT_CFG1[7:6] = 01 – Boot from ESDHC interfaces
BOOT_CFG1[5] = 0 – SD/eSD
BOOT_CFG1[4] = 0 – Fast Boot Support: Normal Boot
BOOT_CFG1[3] = 0 – Normal Speed Mode
BOOT_CFG1[2] = x – ignored in SD/eSD boot mode
BOOT_CFG1[1]/BT_FREQ = 0 – ARM Frequency 800 MHz
BOOT_CFG1[0]/BT_MMU_ENABLE = 0 – MMU/Cache is disabled during the boot

BOOT_CFG2[7:5] = xx1 – Bus Width: 4 bit
BOOT_CFG2[4]/AXI-DDR Freq = 0 – 200 MHz AXI, 400MHz DDR
BOOT_CFG2[3]/OSC_FREQ_SEL = 0 – auto detection

BOOT_CFG3[5:4] = 00 – Port ESDHCV2-1
BOOT_CFG3[3] = 0 – Boot ROM default
BOOT_CFG3[2] = 0 – Boot Acknowledge Enabled



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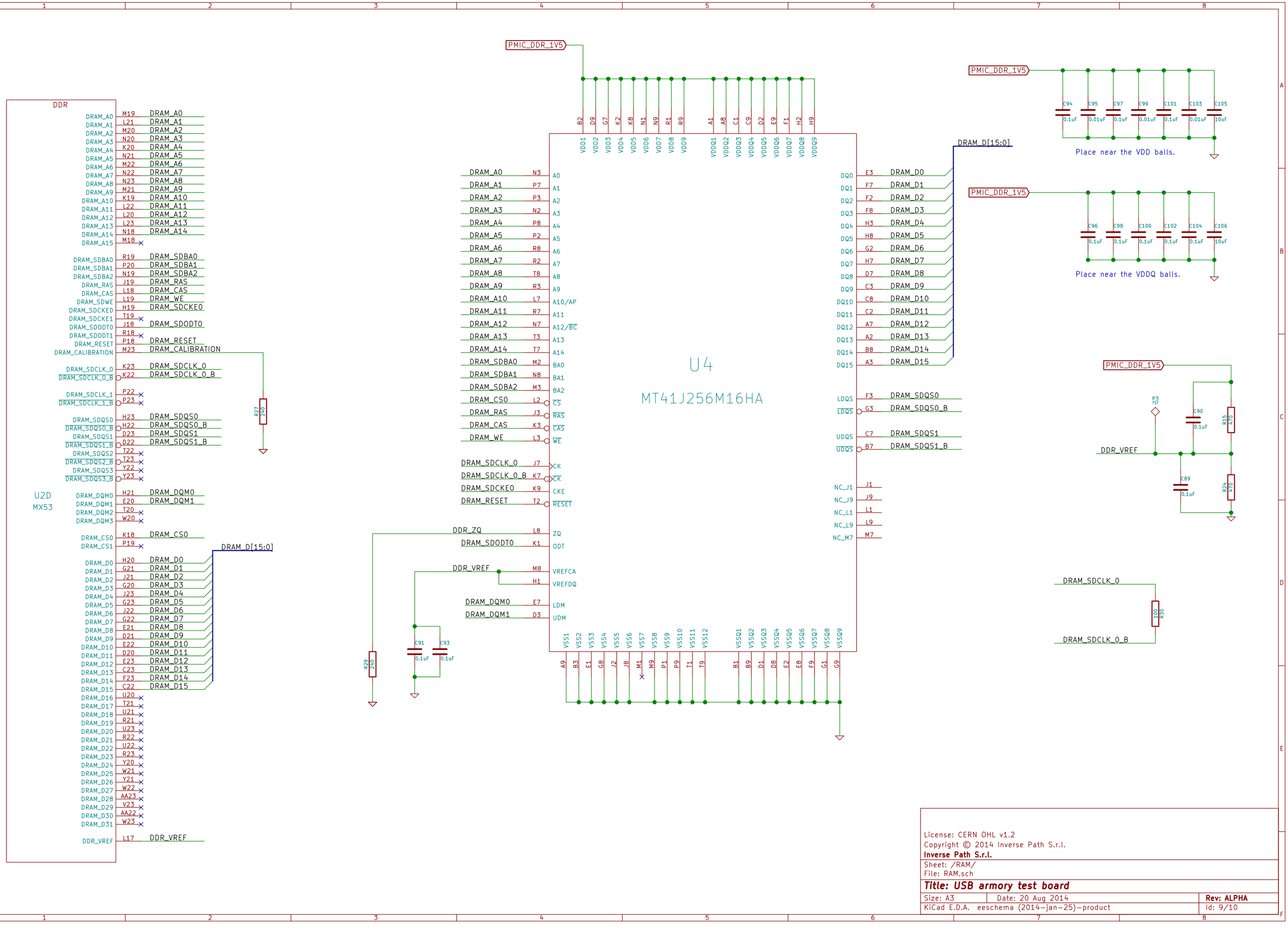
Sheet: /Boot/
File: boot.sch

Title: USB armory test board

Size: A3	Date: 20 Aug 2014	**Rev: ALPHA**
KiCad E.D.A.	eeschema (2014-jan-25)-product	Id: 8/10


DDR
U2D
MX53
DRAM_A0 M19 DRAM_A0
DRAM_A1 L21 DRAM_A1
DRAM_A2 M20 DRAM_A2
DRAM_A3 N20 DRAM_A3
DRAM_A4 K20 DRAM_A4
DRAM_A5 N21 DRAM_A5
DRAM_A6 M22 DRAM_A6
DRAM_A7 N22 DRAM_A7
DRAM_A8 N23 DRAM_A8
DRAM_A9 M21 DRAM_A9
DRAM_A10 K19 DRAM_A10
DRAM_A11 L22 DRAM_A11
DRAM_A12 L20 DRAM_A12
DRAM_A13 L23 DRAM_A13
DRAM_A14 N18 DRAM_A14
DRAM_A15 M18
DRAM_SDBA0 R19 DRAM_SDBA0
DRAM_SDBA1 P20 DRAM_SDBA1
DRAM_SDBA2 N19 DRAM_SDBA2
DRAM_RAS J19 DRAM_RAS
DRAM_CAS L18 DRAM_CAS
DRAM_SDWE L19 DRAM_WE
DRAM_SDCKE0 H19 DRAM_SDCKE0
DRAM_SDCKE1 T19
DRAM_SDODT0 J18 DRAM_SDODT0
DRAM_SDODT1 R18
DRAM_RESET P18 DRAM_RESET
DRAM_CALIBRATION M23 DRAM_CALIBRATION
R27 240
DRAM_SDCLK_0 K23 DRAM_SDCLK_0
DRAM_SDCLK_0_B K22 DRAM_SDCLK_0_B
DRAM_SDCLK_1 P22
DRAM_SDCLK_1_B P23
DRAM_SDQS0 H23 DRAM_SDQS0
DRAM_SDQS0_B H22 DRAM_SDQS0_B
DRAM_SDQS1 D23 DRAM_SDQS1
DRAM_SDQS1_B D22 DRAM_SDQS1_B
DRAM_SDQS2 T22
DRAM_SDQS2_B T23
DRAM_SDQS3 Y22
DRAM_SDQS3_B Y23
DRAM_DQM0 H21 DRAM_DQM0
DRAM_DQM1 E20 DRAM_DQM1
DRAM_DQM2 T20
DRAM_DQM3 W20
DRAM_CS0 K18 DRAM_CS0
DRAM_CS1 P19
DRAM_D[15:0]
DRAM_D0 H20 DRAM_D0
DRAM_D1 G21 DRAM_D1
DRAM_D2 J21 DRAM_D2
DRAM_D3 G20 DRAM_D3
DRAM_D4 J23 DRAM_D4
DRAM_D5 G23 DRAM_D5
DRAM_D6 J22 DRAM_D6
DRAM_D7 G22 DRAM_D7
DRAM_D8 E21 DRAM_D8
DRAM_D9 D21 DRAM_D9
DRAM_D10 E22 DRAM_D10
DRAM_D11 D20 DRAM_D11
DRAM_D12 E23 DRAM_D12
DRAM_D13 C23 DRAM_D13
DRAM_D14 F23 DRAM_D14
DRAM_D15 C22 DRAM_D15
DRAM_D16 U20
DRAM_D17 T21
DRAM_D18 U21
DRAM_D19 R21
DRAM_D20 U23
DRAM_D21 R22
DRAM_D22 U22
DRAM_D23 R23
DRAM_D24 Y20
DRAM_D25 W21
DRAM_D26 Y21
DRAM_D27 W22
DRAM_D28 AA23
DRAM_D29 V23
DRAM_D30 AA22
DRAM_D31 W23
DDR_VREF L17 DDR_VREF
PMIC_DDR_1V5
B2 D9 G7 K2 K8 N1 N9 R1 R9
VDD1 VDD2 VDD3 VDD4 VDD5 VDD6 VDD7 VDD8 VDD9
A1 A8 C1 C9 D2 E9 F1 H2 H9
VDDQ1 VDDQ2 VDDQ3 VDDQ4 VDDQ5 VDDQ6 VDDQ7 VDDQ8 VDDQ9
U4
MT41J256M16HA
DRAM_A0 N3 A0
DRAM_A1 P7 A1
DRAM_A2 P3 A2
DRAM_A3 N2 A3
DRAM_A4 P8 A4
DRAM_A5 P2 A5
DRAM_A6 R8 A6
DRAM_A7 R2 A7
DRAM_A8 T8 A8
DRAM_A9 R3 A9
DRAM_A10 L7 A10/AP
DRAM_A11 R7 A11
DRAM_A12 N7 A12/BC
DRAM_A13 T3 A13
DRAM_A14 T7 A14
DRAM_SDBA0 M2 BA0
DRAM_SDBA1 N8 BA1
DRAM_SDBA2 M3 BA2
DRAM_CS0 L2 CS
DRAM_RAS J3 RAS
DRAM_CAS K3 CAS
DRAM_WE L3 WE
DRAM_SDCLK_0 J7 CK
DRAM_SDCLK_0_B K7 CK
DRAM_SDCKE0 K9 CKE
DRAM_RESET T2 RESET
DDR_ZQ L8 ZQ
DRAM_SDODT0 K1 ODT
DDR_VREF M8 VREFCA
H1 VREFDQ
DRAM_DQM0 E7 LDM
DRAM_DQM1 D3 UDM
R29 240
C91 0.1uF
C93 0.1uF
VSS1 VSS2 VSS3 VSS4 VSS5 VSS6 VSS7 VSS8 VSS9 VSS10 VSS11 VSS12
A9 B3 E1 G8 J2 J8 M1 M9 P1 P9 T1 T9
VSSQ1 VSSQ2 VSSQ3 VSSQ4 VSSQ5 VSSQ6 VSSQ7 VSSQ8 VSSQ9
B1 B9 D1 D8 E2 E8 F9 G1 G9
DRAM_D[15:0]
DQ0 E3 DRAM_D0
DQ1 F7 DRAM_D1
DQ2 F2 DRAM_D2
DQ3 F8 DRAM_D3
DQ4 H3 DRAM_D4
DQ5 H8 DRAM_D5
DQ6 G2 DRAM_D6
DQ7 H7 DRAM_D7
DQ8 D7 DRAM_D8
DQ9 C3 DRAM_D9
DQ10 C8 DRAM_D10
DQ11 C2 DRAM_D11
DQ12 A7 DRAM_D12
DQ13 A2 DRAM_D13
DQ14 B8 DRAM_D14
DQ15 A3 DRAM_D15
LDQS F3 DRAM_SDQS0
LDQS G3 DRAM_SDQS0_B
UDQS C7 DRAM_SDQS1
UDQS B7 DRAM_SDQS1_B
NC_J1 J1
NC_J9 J9
NC_L1 L1
NC_L9 L9
NC_M7 M7
PMIC_DDR_1V5
C94 0.1uF
C95 0.01uF
C97 0.1uF
C99 0.01uF
C101 0.1uF
C103 0.01uF
C105 10uF
Place near the VDD balls.
PMIC_DDR_1V5
C96 0.1uF
C98 0.1uF
C100 0.1uF
C102 0.1uF
C104 0.1uF
C106 10uF
Place near the VDDQ balls.
PMIC_DDR_1V5
P3 1ST
C90 0.1uF
R45 470
DDR_VREF
C89 0.1uF
R24 470
DRAM_SDCLK_0
R30 100
DRAM_SDCLK_0_B
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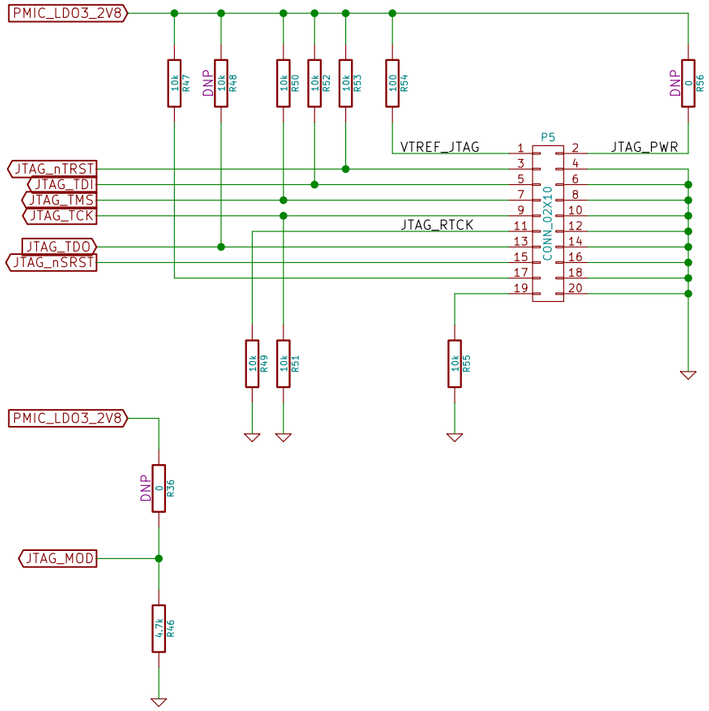
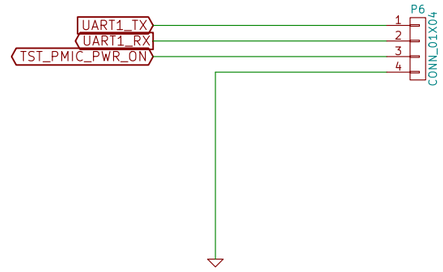
Sheet: /RAM/
File: RAM.sch
Title: USB armory test board
Size: A3
Date: 20 Aug 2014
Rev: ALPHA
KiCad E.D.A. eeschema (2014-jan-25)-product
Id: 9/10





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Sheet: /Debug Interfaces/
File: debug.sch

Title: USB armory test board

Size: A3	Date: 20 Aug 2014	**Rev: ALPHA**
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