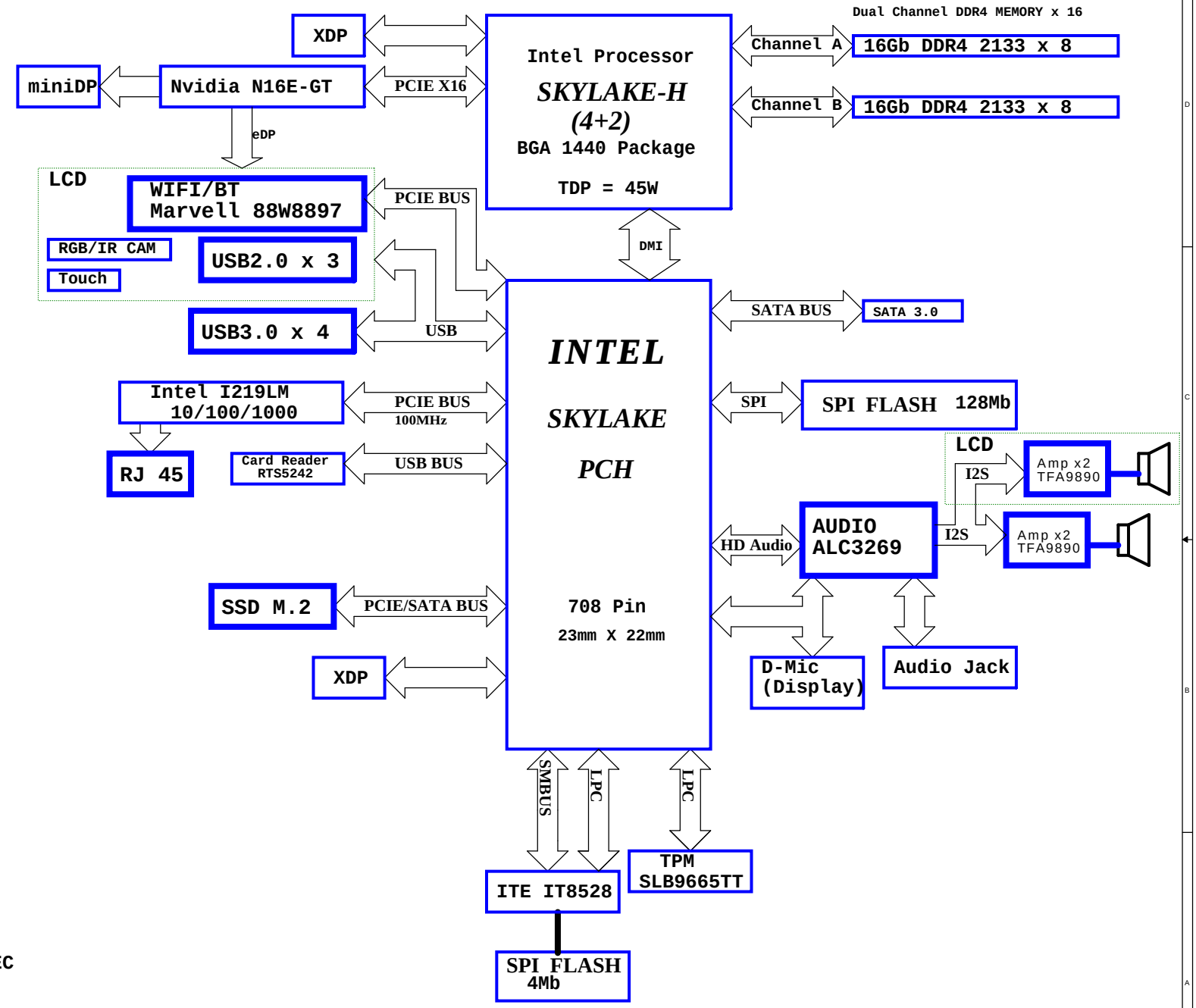
NHK MB

Revision:PV 3.1

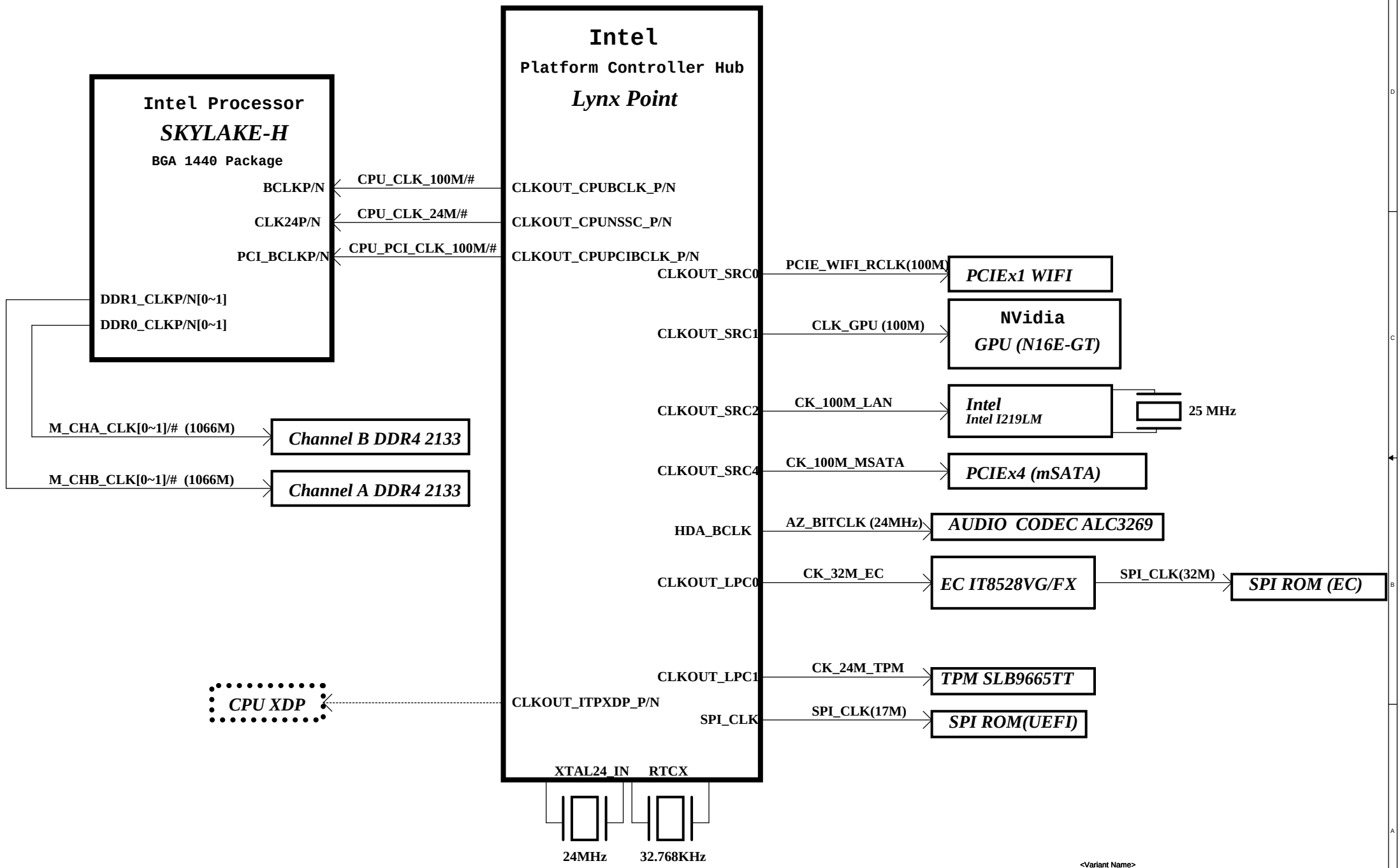
PAGE	TITLE
01	BLOCK DIAGRAM
02	CLOCKS DISTRIBUTION
03	SIGNAL & RESET MAP
04	CHANGE HISTORY
05	POWER FLOW
06	NA
07	POWER SEQUENCE
08~14	SKYLAKE-H BGA1440
15,16	DDR4 CHANNEL A&B
17	DDR4 DECOUPLE CAP.
18	PCH DMI/PCIE/USB
19	PCH SATA/PCIE/DISPLAY/GPIO
20	PCH RTC/CLOCK
21	PCH GPIO/MISC
22	PCH AUDIO/CLINK/GPIO
23	PCH GPIO
24,25	PCH POWER & GND
26	SPI
27	ME DISABLE
28	NGFF SSD
29	TEST POINT
30,31	INTEL LAN JACKSONVILLE
32,33	USB3.0 PORT
34	NA
35	HDD SATA
36	Audio CODEC ALC3269
37	AMP
38	NA
39	EC ITE IT8528
40	CARD READER BOARD
41	CARD READER CON
42	FAN CIRCUIT
43	SCREW HOLE
44	LPC DEBUG
45	TEMP Sensor
46	eDP Display
47	miniDP CONN
48	TPM
49	DC in
50~53	VCORE/VGTX CONTROLLER
54	VCORE/VGTX CAP.
55	VCCSA DRIVER & CAP
56	NA
57	IRMT & 12VA
58	+5V,+5V_LCD, 3P3V, 3P3VSB
59~61	+1VSB/+5VSB/+3P3VA/+VCCST,+3P3V_EC
62	+1P2V_DUAL & +VTT_DDR
63	+VCCIO, +2P5VPP
64	+AUD,+MSATA,+CARD
65	+1P05V_GPU, +3P3VA_GPU
66~80	GPU
81	PWRGD
82	NA

83	Power Monitor
84~85	CPU / PCH XDP DEBUG
86	SMBUS & I2C address table



<Variant Name>

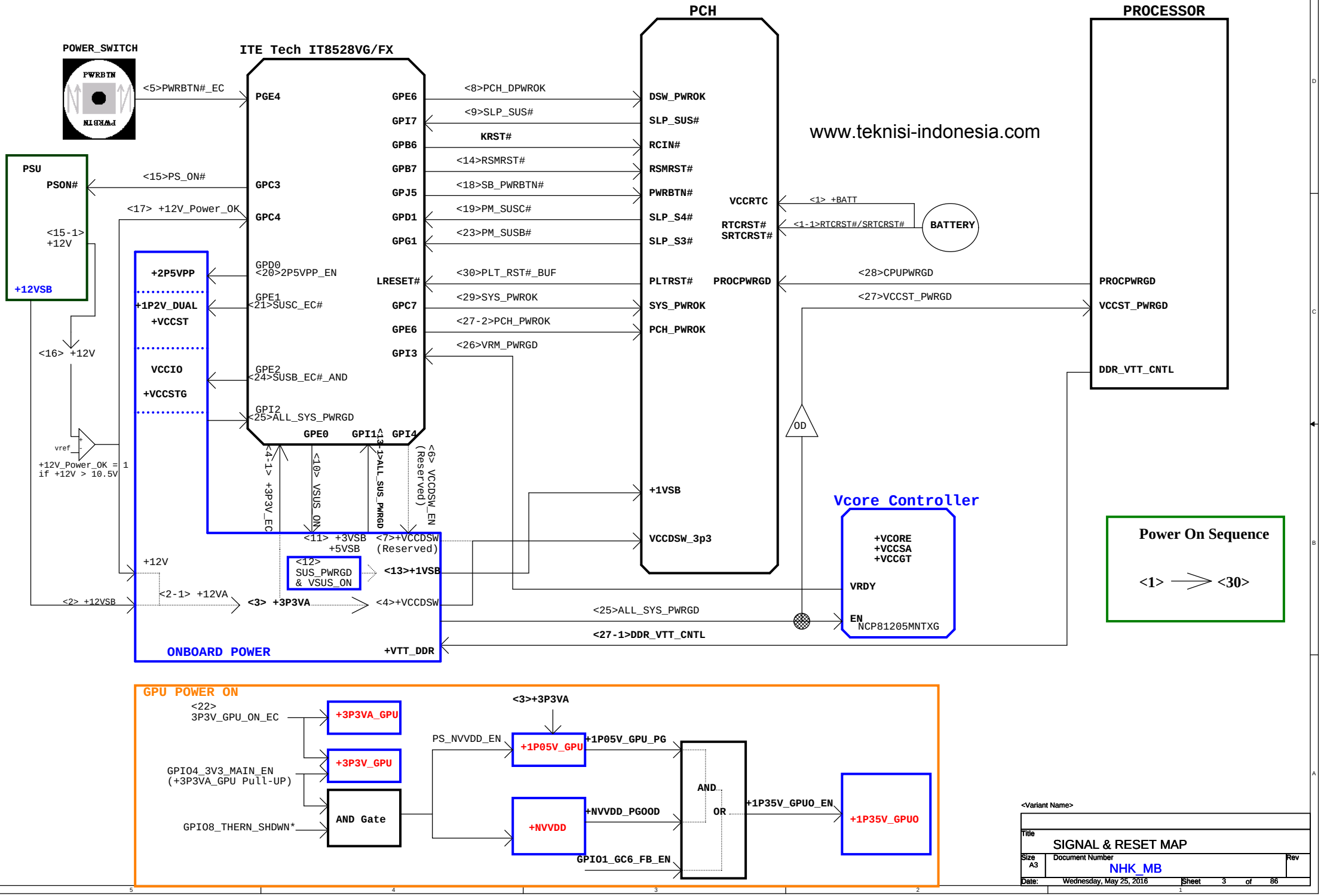
Title	BLOCK DIAGRAM
Size	A3
Document Number	NHK_MB
Rev	
Date:	Wednesday, May 25, 2016
Sheet	1 of 86



<Variant Name>

Title	CLOCK DISTRIBUTION	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 2 of 86	

Intel AMT 7.0 and DSW supported



<Variant Name>

Title	SIGNAL & RESET MAP	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 3 of 86	

Schematics Change History

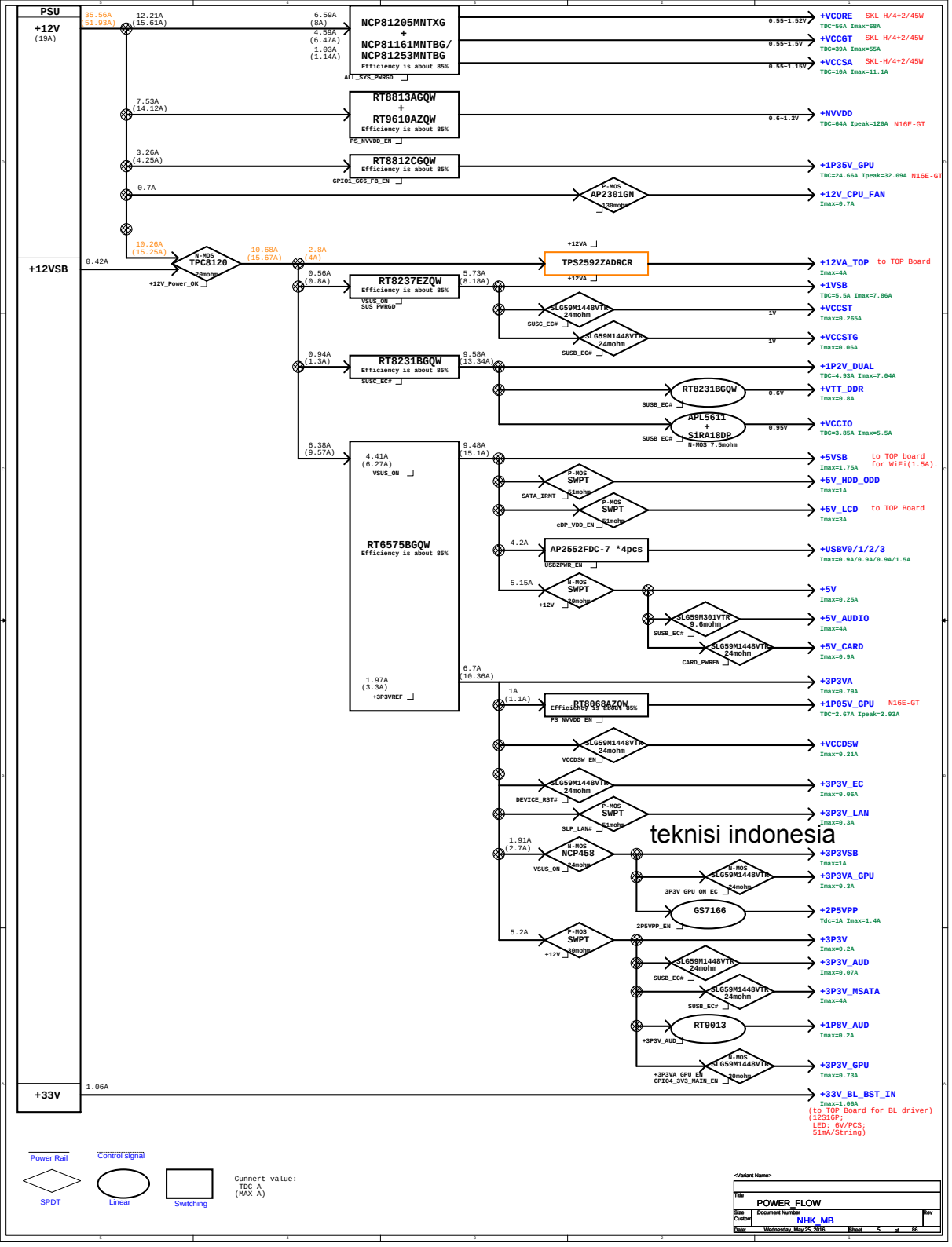
Version	Date	Comments

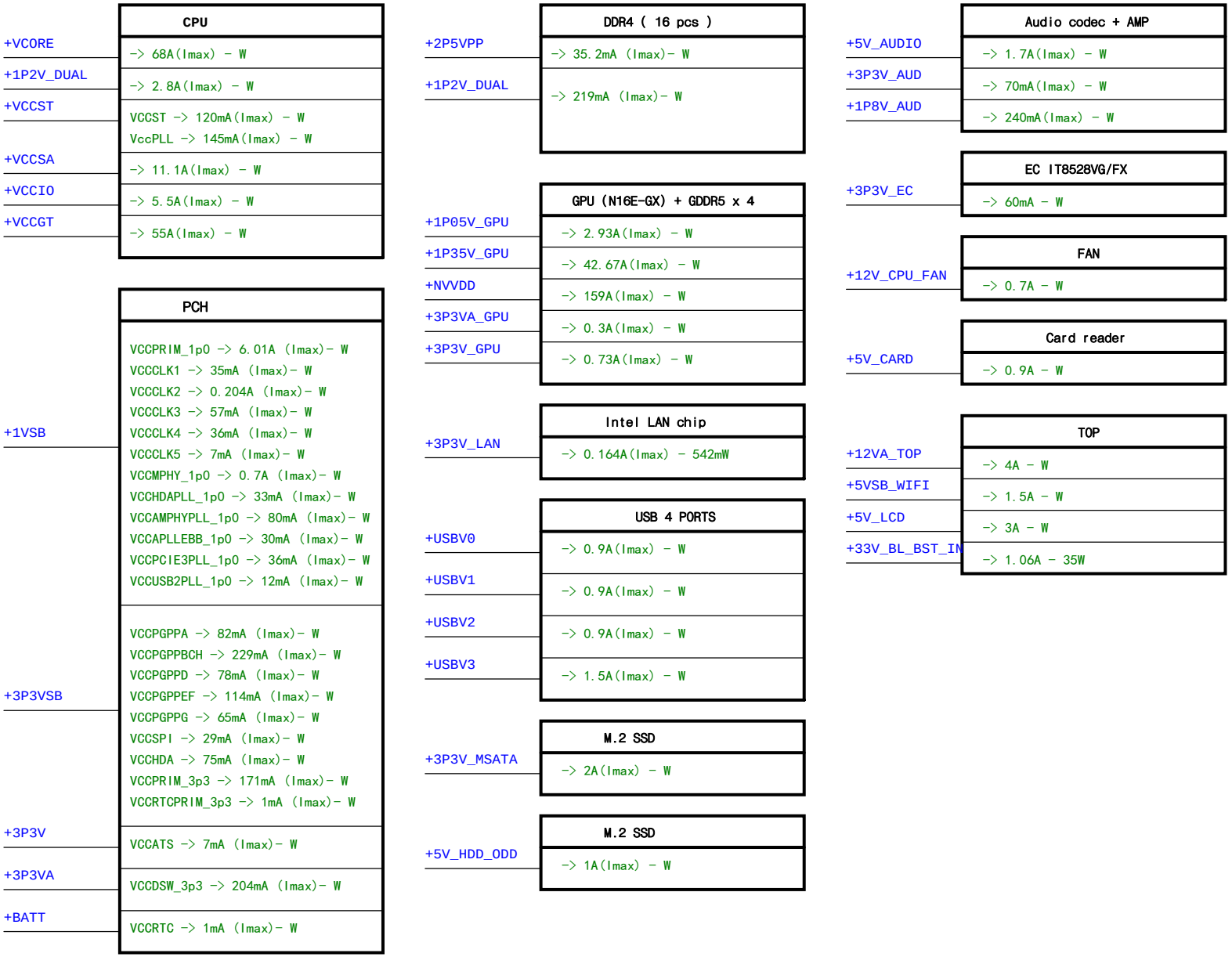
CAD Note:

Default component footprint is SMD 0402, Y5V, 5% type. Difference footprint show on schematics.
Property: BUILD-OPT
ALL = Installed Part. **GFX = Graphic option**
DNP = Not Installed Part. **S = Debug Part.**

<Variant Name>

Title: CHANGE HISTORY			
Size: A3	Document Number: NHK_MB		Rev:
Date: Wednesday, May 25, 2016	Sheet 4 of 86		


PSU
+12V
(19A)
35.56A
(51.93A)
12.21A
(15.61A)
6.59A
(8A)
NCP81205MNTXG
+
NCP81161MNTBG/
NCP81253MNTBG
Efficiency is about 85%
4.59A
(6.47A)
1.03A
(1.14A)
ALL_SYS_PWRGD
0.55~1.62V
+VCORE SKL-H/4+2/45W
TDC=56A Imax=68A
0.55~1.5V
+VCCGT SKL-H/4+2/45W
TDC=39A Imax=55A
0.55~1.15V
+VCCSA SKL-H/4+2/45W
TDC=10A Imax=11.1A
7.53A
(14.12A)
RT8813AGQW
+
RT9610AZQW
Efficiency is about 85%
PS_NVVDD_EN
0.6~1.2V
+NVVDD
TDC=64A Ipeak=120A N16E-GT
3.26A
(4.25A)
RT8812CGQW
Efficiency is about 85%
GPIO1_GC6_FB_EN
+1P35V_GPU
TDC=24.66A Ipeak=32.09A N16E-GT
0.7A
P-MOS
AP2301GN
130mohm
+12V_CPU_FAN
Imax=0.7A
+12VSB
0.42A
10.26A
(15.25A)
P-MOS
TPC8120
28mohm
+12V_Power_OK
10.68A
(15.67A)
2.8A
(4A)
+12VA
TPS2592ZADRCR
+12VA
+12VA_TOP to TOP Board
Imax=4A
0.56A
(0.8A)
RT8237EZQW
Efficiency is about 85%
VSUS_ON
SUS_PWRGD
5.73A
(8.18A)
+1VSB
TDC=5.5A Imax=7.86A
SLG59M1448VTR
24mohm
SUSC_EC#
1V
+VCCST
Imax=0.265A
SLG59M1448VTR
24mohm
SUSB_EC#
1V
+VCCSTG
Imax=0.06A
0.94A
(1.3A)
RT8231BGQW
Efficiency is about 85%
SUSC_EC#
9.58A
(13.34A)
+1P2V_DUAL
TDC=4.93A Imax=7.04A
RT8231BGQW
SUSB_EC#
0.6V
+VTT_DDR
Imax=0.8A
APL5611
+
SiRA18DP
N-MOS 7.5mohm
SUSB_EC#
0.95V
+VCCIO
TDC=3.85A Imax=5.5A
6.38A
(9.57A)
RT6575BGQW
Efficiency is about 85%
4.41A
(6.27A)
VSUS_ON
9.48A
(15.1A)
+5VSB to TOP board
for WiFi(1.5A).
Imax=1.75A
P-MOS
SWPT
61mohm
SATA_IRMT
+5V_HDD_ODD
Imax=1A
P-MOS
SWPT
61mohm
eDP_VDD_EN
+5V_LCD to TOP Board
Imax=3A
4.2A
AP2552FDC-7 *4pcs
USB2PWR_EN
+USBV0/1/2/3
Imax=0.9A/0.9A/0.9A/1.5A
5.15A
N-MOS
SWPT
20mohm
+12V
+5V
Imax=0.25A
SLG59M301VTR
9.6mohm
SUSB_EC#
+5V_AUDIO
Imax=4A
SLG59M1448VTR
24mohm
CARD_PWREN
+5V_CARD
Imax=0.9A
1.97A
(3.3A)
+3P3VREF
6.7A
(10.36A)
+3P3VA
Imax=0.79A
1A
(1.1A)
RT8068AZQW
Efficiency is about 85%
PS_NVVDD_EN
+1P05V_GPU N16E-GT
TDC=2.67A Ipeak=2.93A
SLG59M1448VTR
24mohm
VCCDSW_EN
+VCCDSW
Imax=0.21A
SLG59M1448VTR
24mohm
DEVICE_RST#
+3P3V_EC
Imax=0.06A
P-MOS
SWPT
61mohm
SLP_LAN#
+3P3V_LAN
Imax=0.3A
1.91A
(2.7A)
N-MOS
NCP458
24mohm
VSUS_ON
+3P3VSB
Imax=1A
N-MOS
SLG59M1448VTR
24mohm
3P3V_GPU_ON_EC
+3P3VA_GPU
Imax=0.3A
GS7166
2P5VPP_EN
+2P5VPP
Tdc=1A Imax=1.4A
5.2A
P-MOS
SWPT
20mohm
+12V
+3P3V
Imax=0.2A
SLG59M1448VTR
24mohm
SUSB_EC#
+3P3V_AUD
Imax=0.07A
SLG59M1448VTR
24mohm
SUSB_EC#
+3P3V_MSATA
Imax=4A
RT9013
+3P3V_AUD
+1P8V_AUD
Imax=0.2A
N-MOS
SLG59M1448VTR
30mohm
+3P3VA_GPU_EN
GPIO4_3V3_MAIN_EN
+3P3V_GPU
Imax=0.73A
+33V
1.06A
+33V_BL_BST_IN
Imax=1.06A
(to TOP Board for BL driver)
(12S16P;
LED: 6V/PCS;
51mA/String)
teknisi indonesia
Power Rail
Control signal
SPDT
Linear
Switching
Cunnert value:
IDC A
(MAX A)
<Variant Name>
Title
POWER_FLOW
Size
Custom
Document Number
NHK_MB
Rev
Date:
Wednesday, May 25, 2016
Sheet
5
of
86



<Variant Name>

Title: POWER DISTRIBUTION

Size: A3 | Document Number: NHK_MB | Rev:

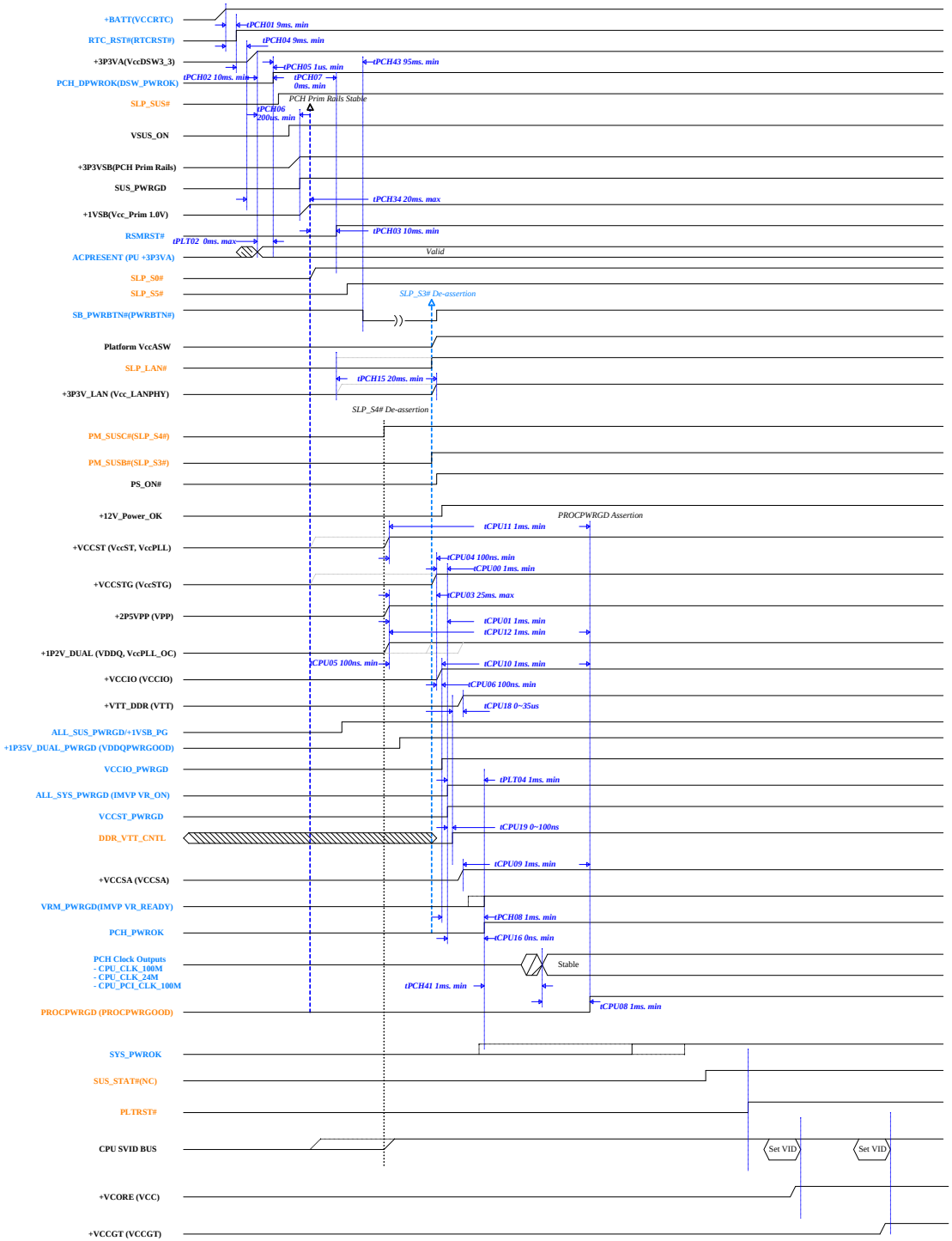
Date: Wednesday, May 25, 2016 | Sheet 6 of 86

Signal Names Timing of these signals is set by PCH or processor

Signal Names Timing of these signals should be met by the platform

Signal Names Voltage rails or chip-to-chip buses

G3 to S0 Power Sequence



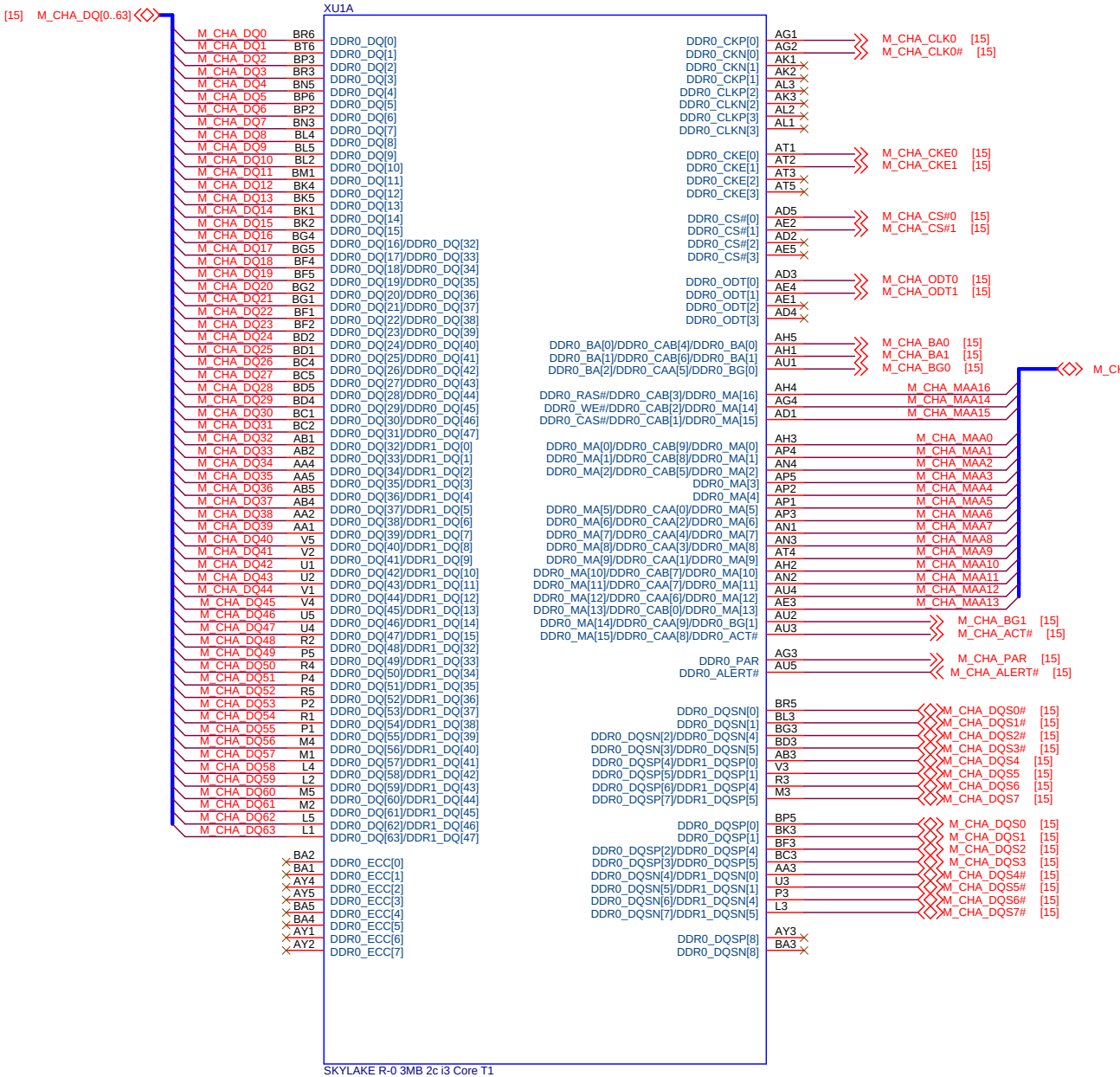
<Variant Name>

Title: POWER SEQUENCE

Size | Document Number | Rev

Custom | NHK_MB

Date: Wednesday, May 25, 2016 | Sheet 7 of 86

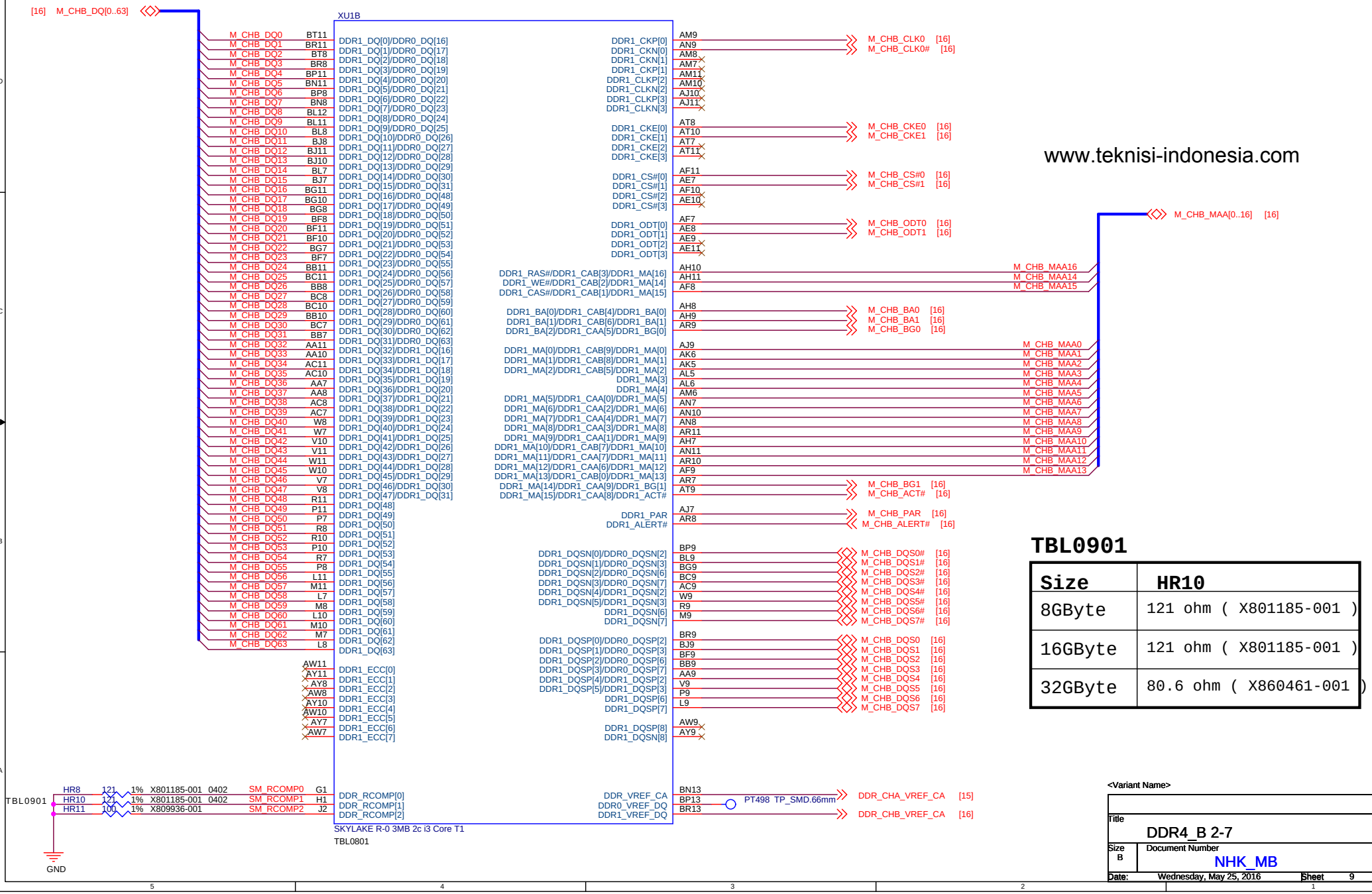


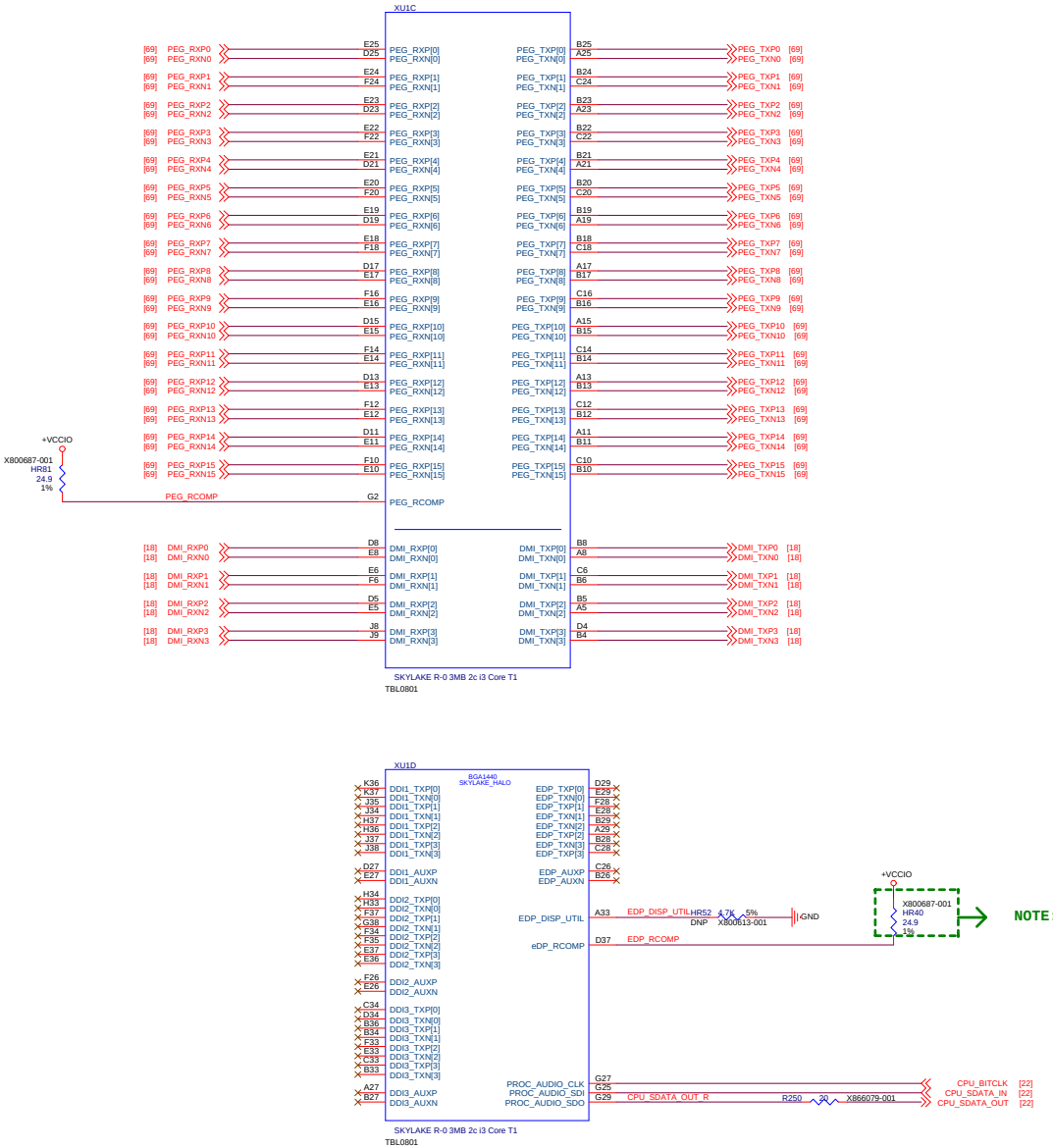
TBL0801

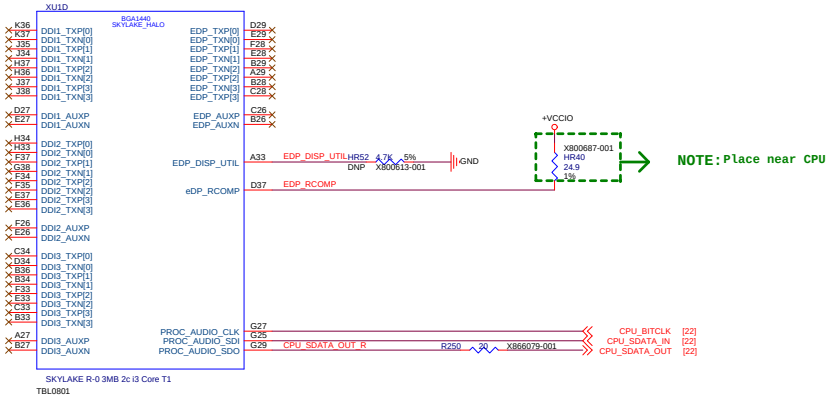
CPU	MSPN	Location
Skylake-H i3	X930503-001	XU1
Skylake-H i5	X937530-001	XU1
Skylake-H i7	X937531-001	XU1

<Variant Name>

Title	DDR4_A 1-7	
Size B	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 8 of 86	

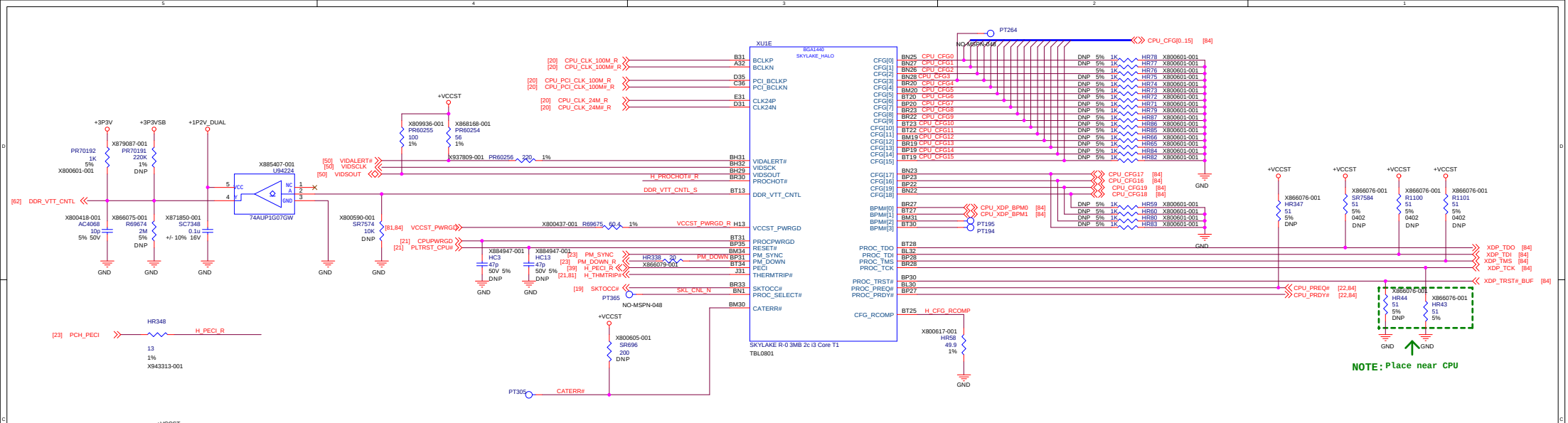

[16] M_CHB_DQ[0..63]
XU1B
M_CHB_DQ0 BT11
M_CHB_DQ1 BR11
M_CHB_DQ2 BT8
M_CHB_DQ3 BR8
M_CHB_DQ4 BP11
M_CHB_DQ5 BN11
M_CHB_DQ6 BP8
M_CHB_DQ7 BN8
M_CHB_DQ8 BL12
M_CHB_DQ9 BL11
M_CHB_DQ10 BL8
M_CHB_DQ11 BJ8
M_CHB_DQ12 BJ11
M_CHB_DQ13 BJ10
M_CHB_DQ14 BL7
M_CHB_DQ15 BJ7
M_CHB_DQ16 BG11
M_CHB_DQ17 BG10
M_CHB_DQ18 BG8
M_CHB_DQ19 BF8
M_CHB_DQ20 BF11
M_CHB_DQ21 BF10
M_CHB_DQ22 BG7
M_CHB_DQ23 BF7
M_CHB_DQ24 BB11
M_CHB_DQ25 BC11
M_CHB_DQ26 BB8
M_CHB_DQ27 BC8
M_CHB_DQ28 BC10
M_CHB_DQ29 BB10
M_CHB_DQ30 BC7
M_CHB_DQ31 BB7
M_CHB_DQ32 AA11
M_CHB_DQ33 AA10
M_CHB_DQ34 AC11
M_CHB_DQ35 AC10
M_CHB_DQ36 AA7
M_CHB_DQ37 AA8
M_CHB_DQ38 AC8
M_CHB_DQ39 AC7
M_CHB_DQ40 W8
M_CHB_DQ41 W7
M_CHB_DQ42 V10
M_CHB_DQ43 V11
M_CHB_DQ44 W11
M_CHB_DQ45 W10
M_CHB_DQ46 V7
M_CHB_DQ47 V8
M_CHB_DQ48 R11
M_CHB_DQ49 P11
M_CHB_DQ50 P7
M_CHB_DQ51 R8
M_CHB_DQ52 R10
M_CHB_DQ53 P10
M_CHB_DQ54 R7
M_CHB_DQ55 P8
M_CHB_DQ56 L11
M_CHB_DQ57 M11
M_CHB_DQ58 L7
M_CHB_DQ59 M8
M_CHB_DQ60 L10
M_CHB_DQ61 M10
M_CHB_DQ62 M7
M_CHB_DQ63 L8
DDR1_DQ[0]/DDR0_DQ[16]
DDR1_DQ[1]/DDR0_DQ[17]
DDR1_DQ[2]/DDR0_DQ[18]
DDR1_DQ[3]/DDR0_DQ[19]
DDR1_DQ[4]/DDR0_DQ[20]
DDR1_DQ[5]/DDR0_DQ[21]
DDR1_DQ[6]/DDR0_DQ[22]
DDR1_DQ[7]/DDR0_DQ[23]
DDR1_DQ[8]/DDR0_DQ[24]
DDR1_DQ[9]/DDR0_DQ[25]
DDR1_DQ[10]/DDR0_DQ[26]
DDR1_DQ[11]/DDR0_DQ[27]
DDR1_DQ[12]/DDR0_DQ[28]
DDR1_DQ[13]/DDR0_DQ[29]
DDR1_DQ[14]/DDR0_DQ[30]
DDR1_DQ[15]/DDR0_DQ[31]
DDR1_DQ[16]/DDR0_DQ[48]
DDR1_DQ[17]/DDR0_DQ[49]
DDR1_DQ[18]/DDR0_DQ[50]
DDR1_DQ[19]/DDR0_DQ[51]
DDR1_DQ[20]/DDR0_DQ[52]
DDR1_DQ[21]/DDR0_DQ[53]
DDR1_DQ[22]/DDR0_DQ[54]
DDR1_DQ[23]/DDR0_DQ[55]
DDR1_DQ[24]/DDR0_DQ[56]
DDR1_DQ[25]/DDR0_DQ[57]
DDR1_DQ[26]/DDR0_DQ[58]
DDR1_DQ[27]/DDR0_DQ[59]
DDR1_DQ[28]/DDR0_DQ[60]
DDR1_DQ[29]/DDR0_DQ[61]
DDR1_DQ[30]/DDR0_DQ[62]
DDR1_DQ[31]/DDR0_DQ[63]
DDR1_DQ[32]/DDR1_DQ[16]
DDR1_DQ[33]/DDR1_DQ[17]
DDR1_DQ[34]/DDR1_DQ[18]
DDR1_DQ[35]/DDR1_DQ[19]
DDR1_DQ[36]/DDR1_DQ[20]
DDR1_DQ[37]/DDR1_DQ[21]
DDR1_DQ[38]/DDR1_DQ[22]
DDR1_DQ[39]/DDR1_DQ[23]
DDR1_DQ[40]/DDR1_DQ[24]
DDR1_DQ[41]/DDR1_DQ[25]
DDR1_DQ[42]/DDR1_DQ[26]
DDR1_DQ[43]/DDR1_DQ[27]
DDR1_DQ[44]/DDR1_DQ[28]
DDR1_DQ[45]/DDR1_DQ[29]
DDR1_DQ[46]/DDR1_DQ[30]
DDR1_DQ[47]/DDR1_DQ[31]
DDR1_DQ[48]
DDR1_DQ[49]
DDR1_DQ[50]
DDR1_DQ[51]
DDR1_DQ[52]
DDR1_DQ[53]
DDR1_DQ[54]
DDR1_DQ[55]
DDR1_DQ[56]
DDR1_DQ[57]
DDR1_DQ[58]
DDR1_DQ[59]
DDR1_DQ[60]
DDR1_DQ[61]
DDR1_DQ[62]
DDR1_DQ[63]
AW11 DDR1_ECC[0]
AY11 DDR1_ECC[1]
AY8 DDR1_ECC[2]
AW8 DDR1_ECC[3]
AY10 DDR1_ECC[4]
AW10 DDR1_ECC[5]
AY7 DDR1_ECC[6]
AW7 DDR1_ECC[7]
DDR_RCOMP[0]
DDR_RCOMP[1]
DDR_RCOMP[2]
SKYLAKE R-0 3MB 2c i3 Core T1
TBL0801
DDR1_CKP[0] AM9
DDR1_CKN[0] AN9
DDR1_CKN[1] AM8
DDR1_CKP[1] AM7
DDR1_CLKP[2] AM11
DDR1_CLKN[2] AM10
DDR1_CLKP[3] AJ10
DDR1_CLKN[3] AJ11
DDR1_CKE[0] AT8
DDR1_CKE[1] AT10
DDR1_CKE[2] AT7
DDR1_CKE[3] AT11
DDR1_CS#[0] AF11
DDR1_CS#[1] AE7
DDR1_CS#[2] AF10
DDR1_CS#[3] AE10
DDR1_ODT[0] AF7
DDR1_ODT[1] AE8
DDR1_ODT[2] AE9
DDR1_ODT[3] AE11
DDR1_RAS#/DDR1_CAB[3]/DDR1_MA[16] AH10
DDR1_WE#/DDR1_CAB[2]/DDR1_MA[14] AH11
DDR1_CAS#/DDR1_CAB[1]/DDR1_MA[15] AF8
DDR1_BA[0]/DDR1_CAB[4]/DDR1_BA[0] AH8
DDR1_BA[1]/DDR1_CAB[6]/DDR1_BA[1] AH9
DDR1_BA[2]/DDR1_CAA[5]/DDR1_BG[0] AR9
DDR1_MA[0]/DDR1_CAB[9]/DDR1_MA[0] AJ9
DDR1_MA[1]/DDR1_CAB[8]/DDR1_MA[1] AK6
DDR1_MA[2]/DDR1_CAB[5]/DDR1_MA[2] AK5
DDR1_MA[3] AL5
DDR1_MA[4] AL6
DDR1_MA[5]/DDR1_CAA[0]/DDR1_MA[5] AM6
DDR1_MA[6]/DDR1_CAA[2]/DDR1_MA[6] AN7
DDR1_MA[7]/DDR1_CAA[4]/DDR1_MA[7] AN10
DDR1_MA[8]/DDR1_CAA[3]/DDR1_MA[8] AN8
DDR1_MA[9]/DDR1_CAA[1]/DDR1_MA[9] AR11
DDR1_MA[10]/DDR1_CAB[7]/DDR1_MA[10] AH7
DDR1_MA[11]/DDR1_CAA[7]/DDR1_MA[11] AN11
DDR1_MA[12]/DDR1_CAA[6]/DDR1_MA[12] AR10
DDR1_MA[13]/DDR1_CAB[0]/DDR1_MA[13] AF9
DDR1_MA[14]/DDR1_CAA[9]/DDR1_BG[1] AR7
DDR1_MA[15]/DDR1_CAA[8]/DDR1_ACT# AT9
DDR1_PAR AJ7
DDR1_ALERT# AR8
DDR1_DQSN[0]/DDR0_DQSN[2] BP9
DDR1_DQSN[1]/DDR0_DQSN[3] BL9
DDR1_DQSN[2]/DDR0_DQSN[6] BG9
DDR1_DQSN[3]/DDR0_DQSN[7] BC9
DDR1_DQSN[4]/DDR1_DQSN[2] AC9
DDR1_DQSN[5]/DDR1_DQSN[3] W9
DDR1_DQSN[6] R9
DDR1_DQSN[7] M9
DDR1_DQSP[0]/DDR0_DQSP[2] BR9
DDR1_DQSP[1]/DDR0_DQSP[3] BJ9
DDR1_DQSP[2]/DDR0_DQSP[6] BF9
DDR1_DQSP[3]/DDR0_DQSP[7] BB9
DDR1_DQSP[4]/DDR1_DQSP[2] AA9
DDR1_DQSP[5]/DDR1_DQSP[3] V9
DDR1_DQSP[6] P9
DDR1_DQSP[7] L9
DDR1_DQSP[8] AW9
DDR1_DQSN[8] AY9
DDR_VREF_CA BN13
DDR0_VREF_DQ BP13
DDR1_VREF_DQ BR13
M_CHB_CLK0 [16]
M_CHB_CLK0# [16]
M_CHB_CKE0 [16]
M_CHB_CKE1 [16]
M_CHB_CS#0 [16]
M_CHB_CS#1 [16]
M_CHB_ODT0 [16]
M_CHB_ODT1 [16]
M_CHB_MAA[0..16] [16]
M_CHB_MAA16
M_CHB_MAA14
M_CHB_MAA15
M_CHB_BA0 [16]
M_CHB_BA1 [16]
M_CHB_BG0 [16]
M_CHB_MAA0
M_CHB_MAA1
M_CHB_MAA2
M_CHB_MAA3
M_CHB_MAA4
M_CHB_MAA5
M_CHB_MAA6
M_CHB_MAA7
M_CHB_MAA8
M_CHB_MAA9
M_CHB_MAA10
M_CHB_MAA11
M_CHB_MAA12
M_CHB_MAA13
M_CHB_BG1 [16]
M_CHB_ACT# [16]
M_CHB_PAR [16]
M_CHB_ALERT# [16]
M_CHB_DQS0# [16]
M_CHB_DQS1# [16]
M_CHB_DQS2# [16]
M_CHB_DQS3# [16]
M_CHB_DQS4# [16]
M_CHB_DQS5# [16]
M_CHB_DQS6# [16]
M_CHB_DQS7# [16]
M_CHB_DQS0 [16]
M_CHB_DQS1 [16]
M_CHB_DQS2 [16]
M_CHB_DQS3 [16]
M_CHB_DQS4 [16]
M_CHB_DQS5 [16]
M_CHB_DQS6 [16]
M_CHB_DQS7 [16]
PT498 TP_SMD.66mm
DDR_CHA_VREF_CA [15]
DDR_CHB_VREF_CA [16]
TBL0901
HR8 121 1% X801185-001 0402 SM_RCOMP0 G1
HR10 121 1% X801185-001 0402 SM_RCOMP1 H1
HR11 100 1% X809936-001 SM_RCOMP2 J2
GND
www.teknisi-indonesia.com
TBL0901
Size HR10
8GByte 121 ohm (X801185-001)
16GByte 121 ohm (X801185-001)
32GByte 80.6 ohm (X860461-001)
<Variant Name>
Title
DDR4_B 2-7
Size B
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 9 of 86

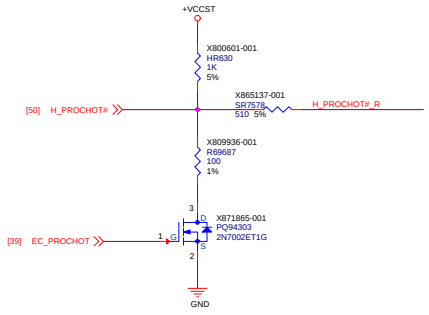


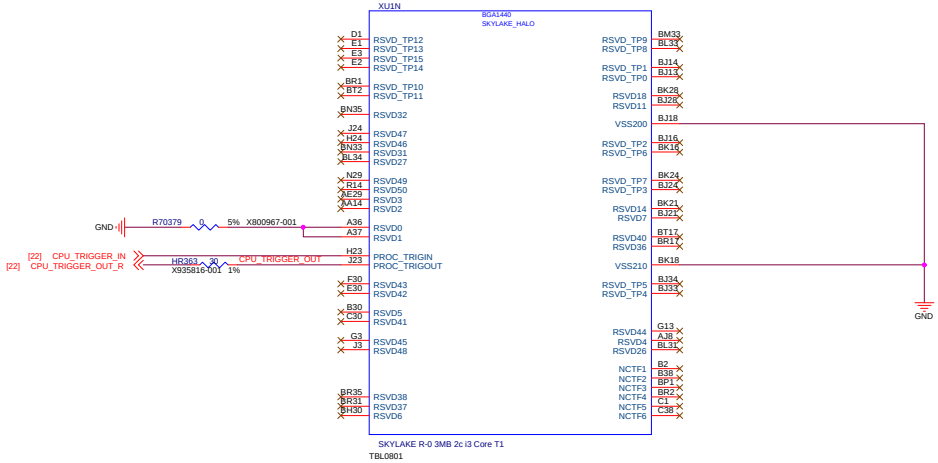


<variant_name>

Title	PCIE / DMI / DP 3-7	
Size A2	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 10 of 86	







2.2.1 PCI Express* Support

The processor's PCI Express* interface is a 16-lane (x16) port that can also be configured as multiple ports at narrower widths (see Table 2-18, Table 2-19).

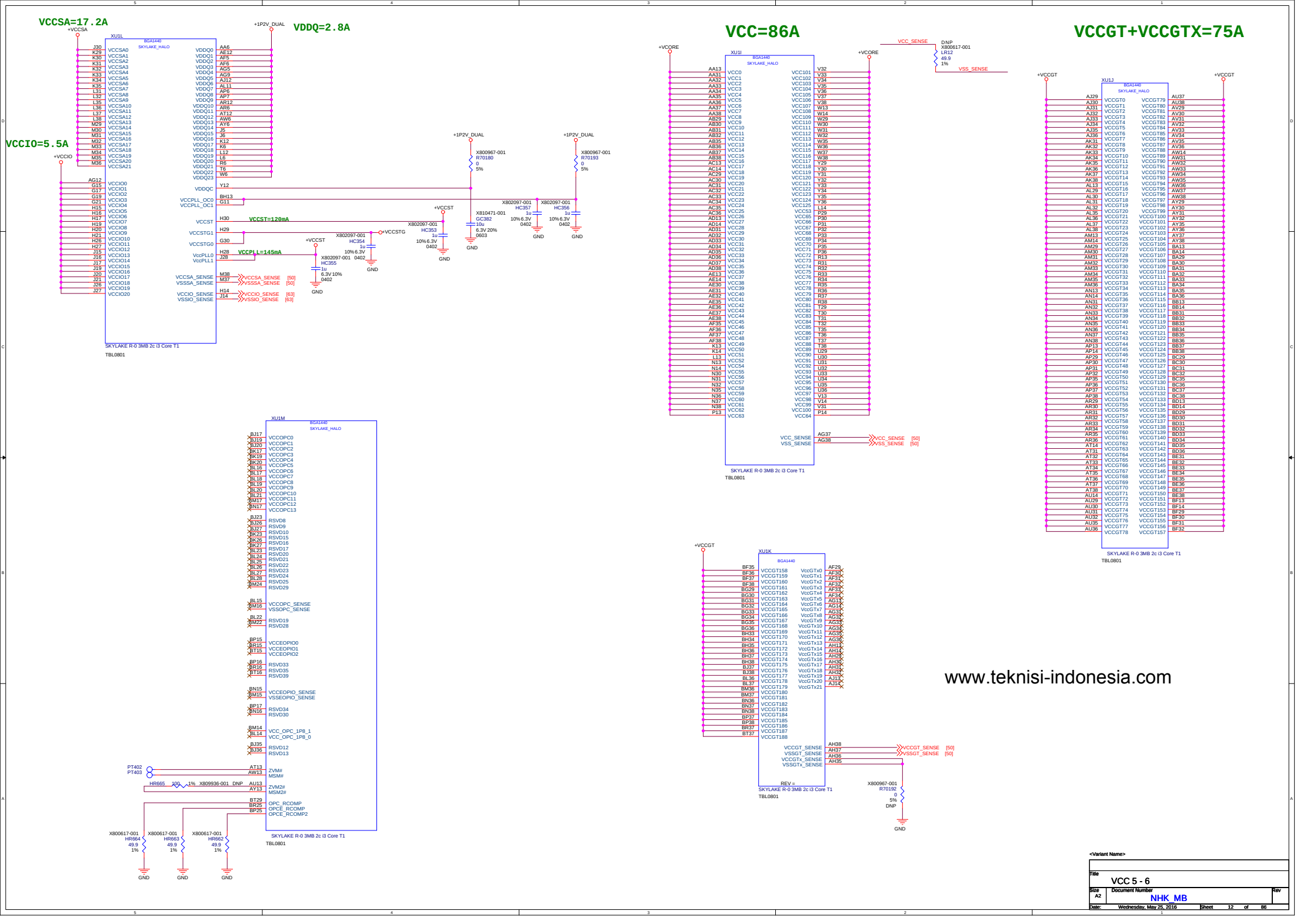
The processor supports the configurations shown in the following table.

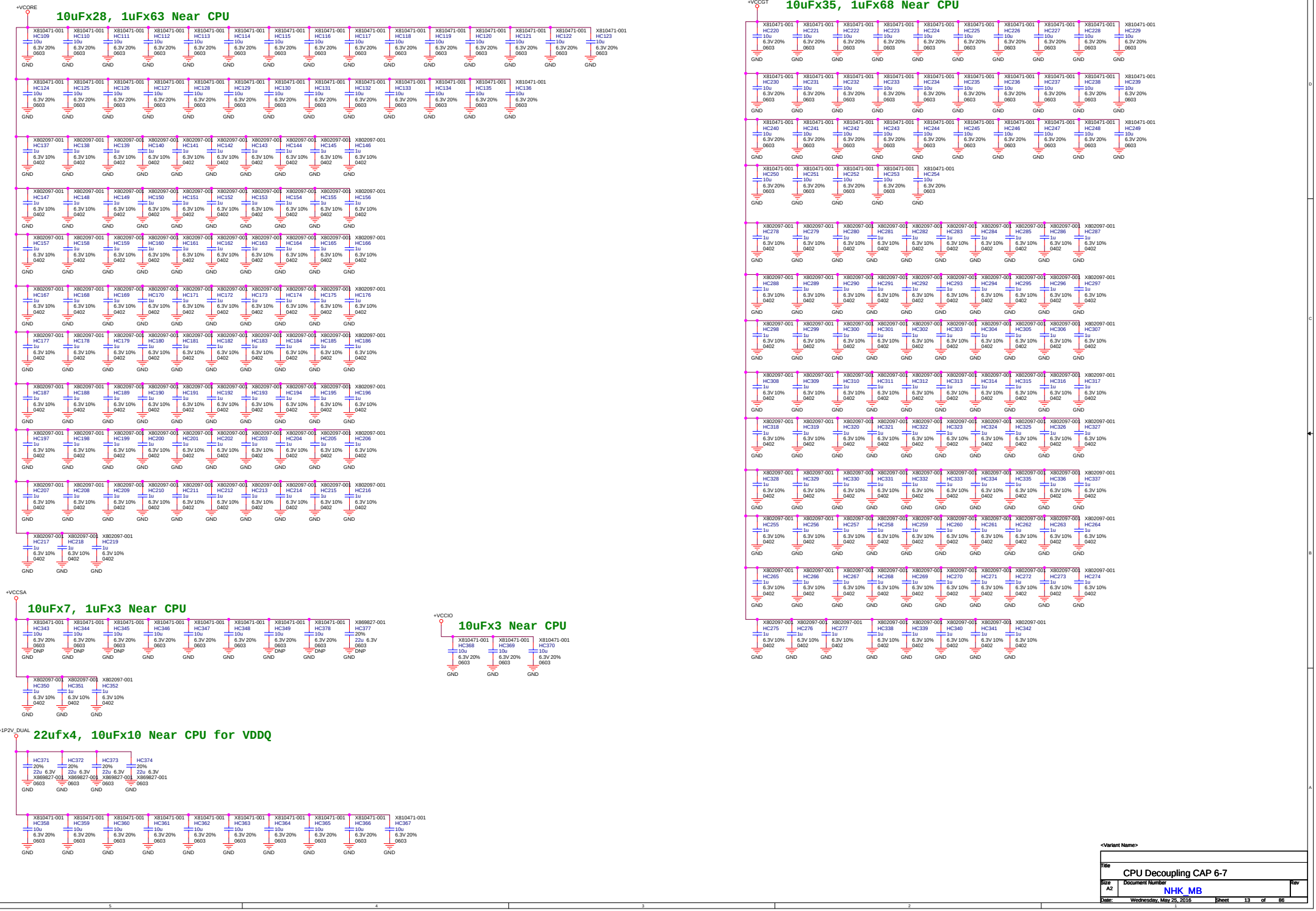
Table 2-18. PCI Express* Bifurcation and Lane Reversal Mapping

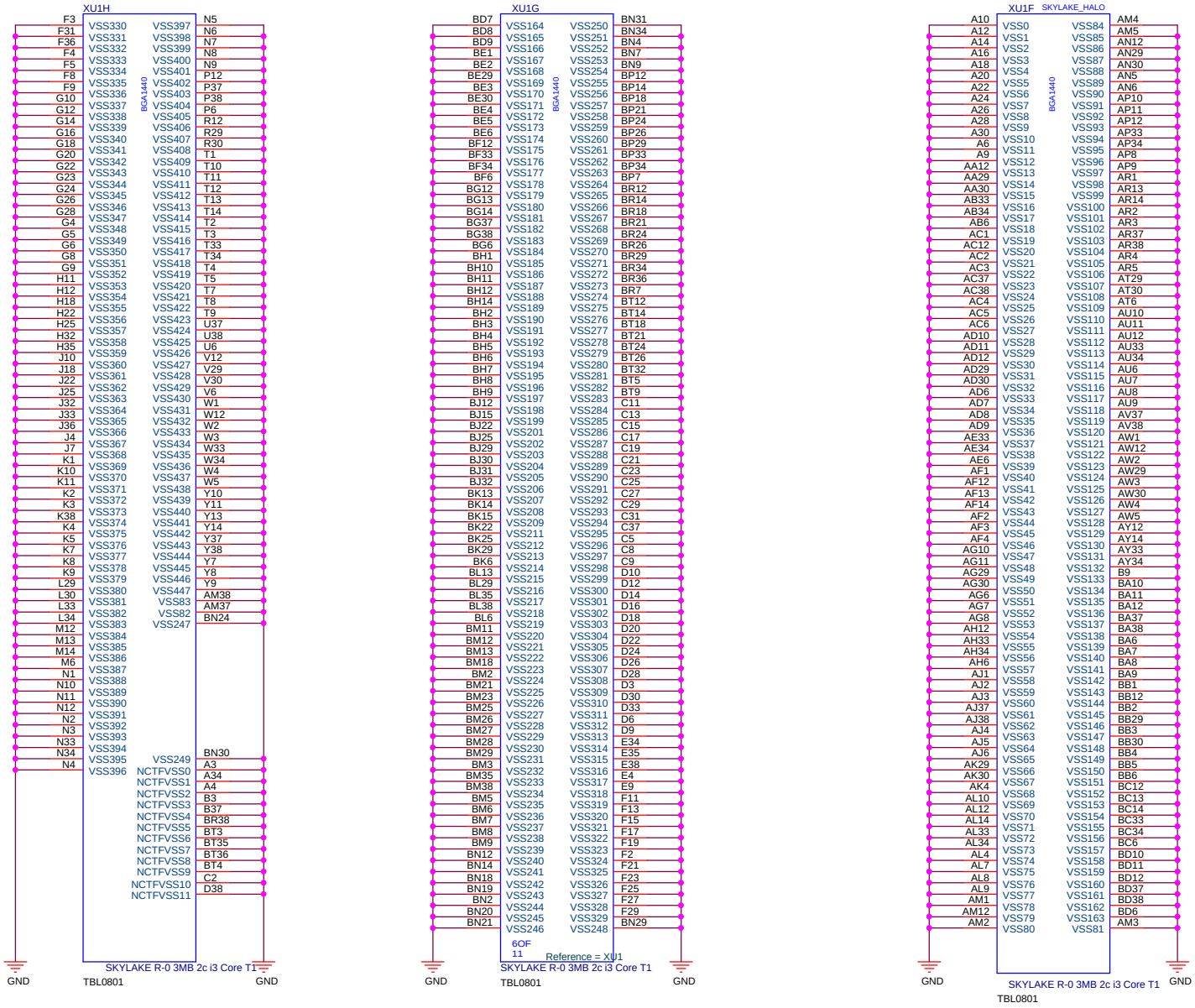
Bifurcation	Link Width			Config. Signals			Lanes													
	0:1:0	0:1:1	0:1:2	CFG [6]	CFG [5]	CFG [2]	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1x16	x16	N/A	N/A	1	1	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1x16 **Reversed**	x16	N/A	N/A	1	1	0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2x8	x8	x8	N/A	1	0	1	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
2x8 **Reversed**	x8	x8	N/A	1	0	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
1x8+2x4	x8	x4	x4	0	0	1	0	1	2	3	4	5	6	7	0	1	2	3	0	1	2	3
1x8+2x4 **Reversed**	x8	x4	x4	0	0	0	3	2	1	0	3	2	1	0	7	6	5	4	3	2	1	0

Notes:

1. For CFG bus further details, refer to Section 6.4.
2. Support is also provided for narrow width and use devices with lower number of lanes (that is, usage on x4 configuration), however further bifurcation is not supported.
3. In case that more than one device is connected, the device with the highest lane count, should always be connected to the lower lanes, as follows:
   - Connect lane 0 of 1st device to lane 0.
   - Connect lane 0 of 2nd device to lane 8.
   - Connect lane 0 of 3rd device to lane 12.


VCCSA=17.2A
VDDQ=2.8A
VCCIO=5.5A
VCC=86A
VCCGT+VCCGTX=75A
VCCST=120mA
VCCPLL=145mA
www.teknisi-indonesia.com
SKYLAKE R-0 3MB 2c i3 Core T1
TBL0801
Title
VCC 5 - 6
Size
A2
Document Number
NHK_MB
Rev
Date:
Wednesday, May 25, 2016
Sheet
12
of
86

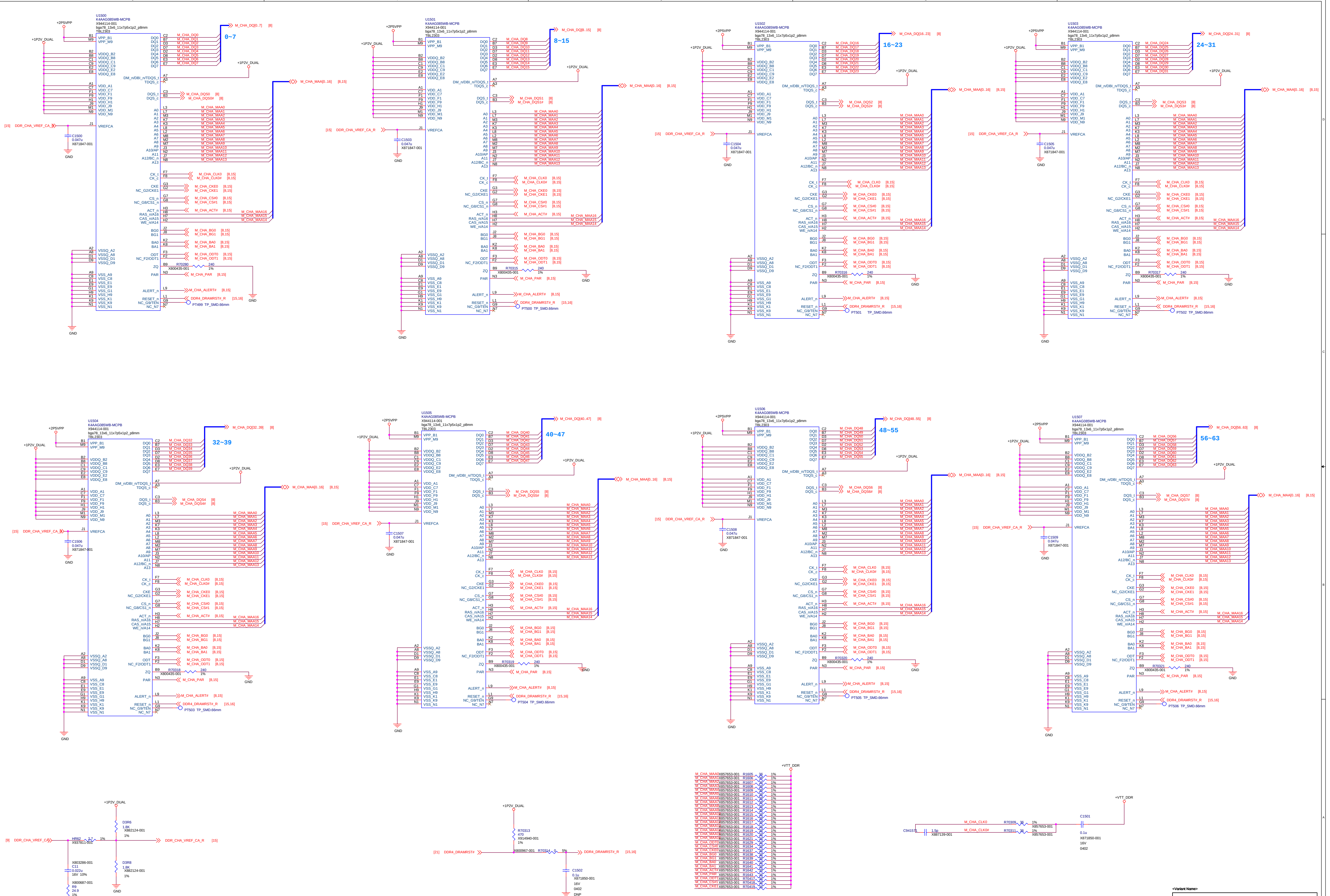

+VCORE
10uFx28, 1uFx63 Near CPU
+VCCGT
10uFx35, 1uFx68 Near CPU
+VCCSA
10uFx7, 1uFx3 Near CPU
+VCCIO
10uFx3 Near CPU
+1P2V_DUAL
22ufx4, 10uFx10 Near CPU for VDDQ
<Variant Name>
Title
CPU Decoupling CAP 6-7
Size A2
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 13 of 86



www.teknisi-indonesia.com

<Variant Name>

Title	VSS 7 - 7	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 14 of 86	

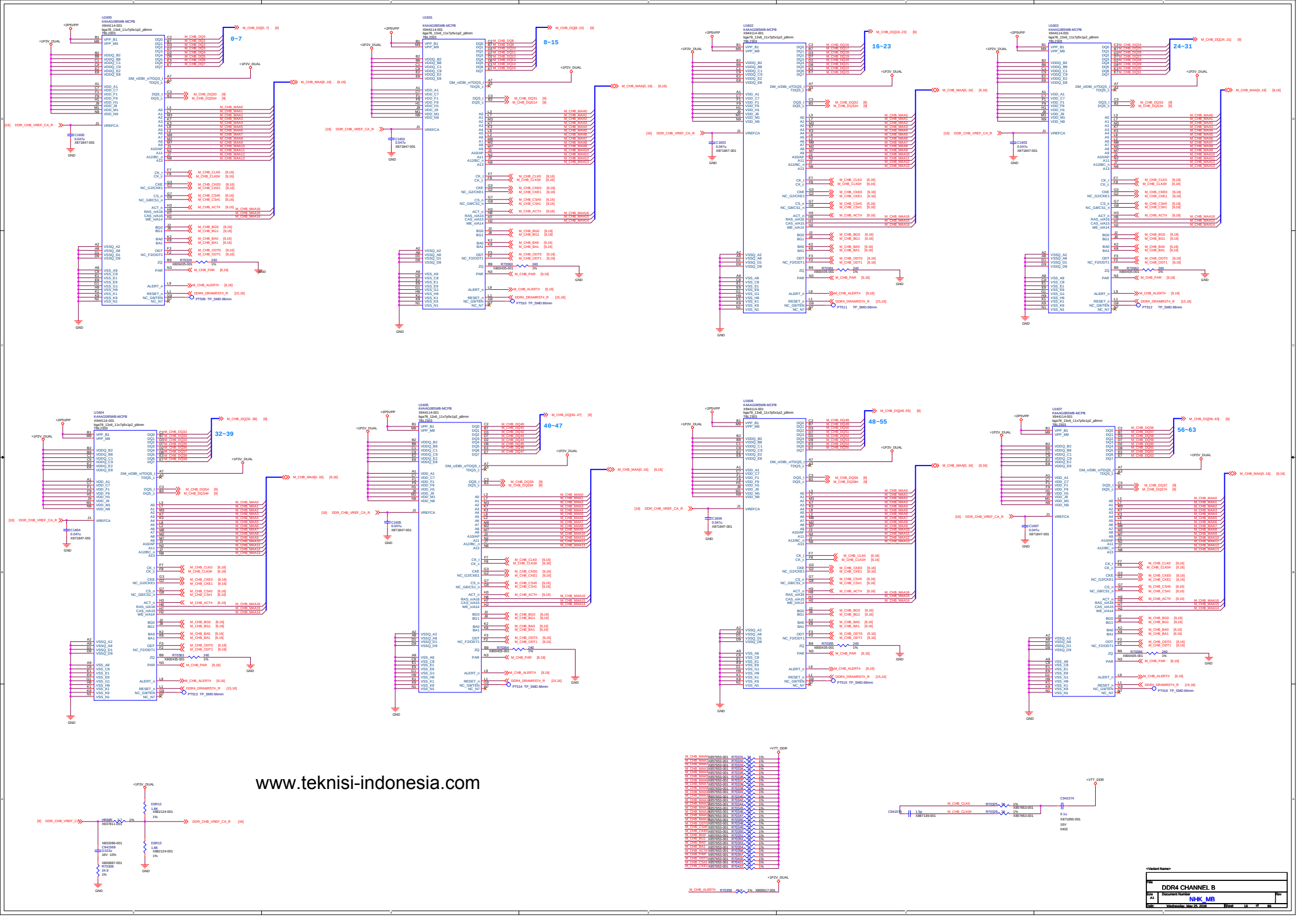


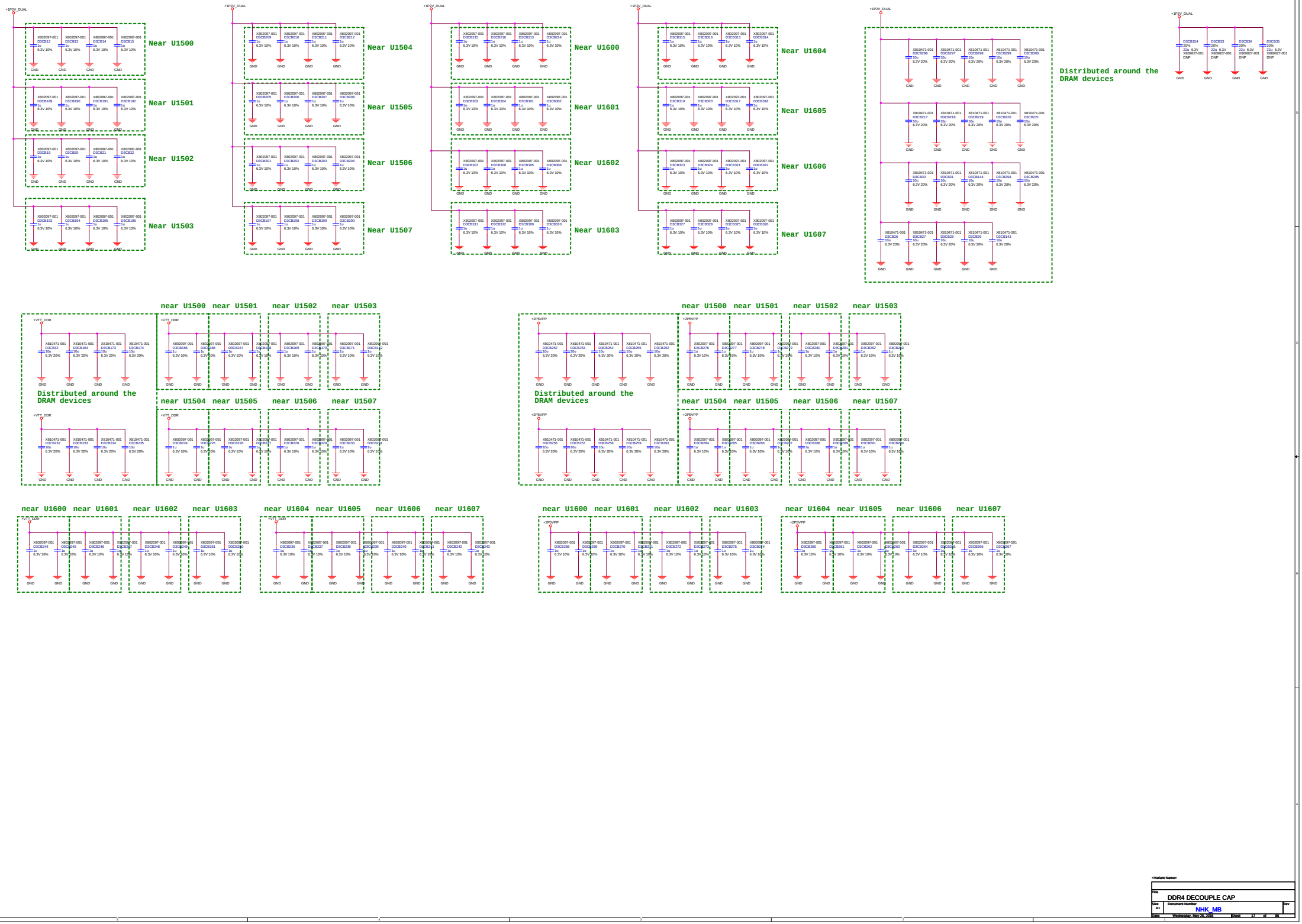
<Variant Name>

Title: DDR4 CHANNEL A

Size: A1 | Document Number: NHK_MB | Rev

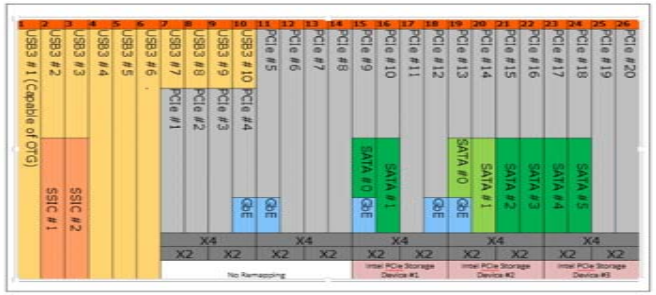
Date: Wednesday, May 25, 2016 | Sheet 15 of 86


U1600
K4AAG085WB-MCPB
X944114-001
bga78_13x6_11x7p5x1p2_pitch
TBL2303
0~7
M_CHB_DQ[0..7]
M_CHB_MAA[0..16]
DDR_CHB_VREF_CA_R
U1601
8~15
M_CHB_DQ[8..15]
U1602
16~23
M_CHB_DQ[16..23]
U1603
24~31
M_CHB_DQ[24..31]
U1604
32~39
M_CHB_DQ[32..39]
U1605
40~47
M_CHB_DQ[40..47]
U1606
48~55
M_CHB_DQ[48..55]
U1607
56~63
M_CHB_DQ[56..63]
+2P5VPP
+1P2V_DUAL
+VTT_DDR
GND
www.teknisi-indonesia.com
DDR4 CHANNEL B
NHK_MB
Wednesday, May 25, 2016



<variant_name>

Title	DDR4 DECOUPLE CAP		
Size A1	Document Number NHK_MB		Rev
Date: Wednesday, May 25, 2016	Sheet 17 of 88		



U39A

DMI

[10] DMI_TXP0 → N27 DMI_RXP0
[10] DMI_TXN0 → L27 DMI_RXN0
[10] DMI_RXP0 → B27 DMI_TXP0
[10] DMI_RXN0 → C27 DMI_TXN0

[10] DMI_TXP1 → G24 DMI_RXP1
[10] DMI_TXN1 → E24 DMI_RXN1
[10] DMI_RXP1 → A28 DMI_TXP1
[10] DMI_RXN1 → B28 DMI_TXN1

[10] DMI_TXP2 → E26 DMI_RXP2
[10] DMI_TXN2 → G27 DMI_RXN2
[10] DMI_RXP2 → C29 DMI_TXP2
[10] DMI_RXN2 → B29 DMI_TXN2

[10] DMI_TXP3 → K29 DMI_RXP3
[10] DMI_TXN3 → L29 DMI_RXN3
[10] DMI_RXP3 → A30 DMI_TXP3
[10] DMI_RXN3 → B30 DMI_TXN3

USB2.0

USB2P_1	AG7	USBP1 [32]
USB2N_1	AF5	USBN1 [32]
USB2P_2	AD7	USBP2 [32]
USB2N_2	AD5	USBN2 [32]
USB2P_3	AG10	USBP3 [33]
USB2N_3	AG8	USBN3 [33]
USB2P_4	AE2	USBP4 [33]
USB2N_4	AE1	USBN4 [33]
USB2P_5	AC3	USBP5 [29,46]
USB2N_5	AC2	USBN5 [29,46]
USB2P_6	AF3	USBP6 [41]
USB2N_6	AF2	USBN6 [41]
USB2P_7	AB2	USBP7 [46]
USB2N_7	AB3	USBN7 [46]
USB2P_8	AL7	USBP8 [46]
USB2N_8	AL8	USBN8 [46]
USB2P_9	AA2	
USB2N_9	AA1	
USB2P_10	AJ7	
USB2N_10	AJ8	
USB2P_11	W3	
USB2N_11	W2	
USB2P_12	AD2	
USB2N_12	AD3	
USB2P_13	V1	
USB2N_13	V2	
USB2P_14	AJ13	
USB2N_14	AJ11	

USB3.0 Port
TOP
CARD READER
TOP

PCIE/USB/SATA

B16 PCIE1_TXP/USB3_7_TXP
A16 PCIE1_TXN/USB3_7_TXN
G15 PCIE1_RXP/USB3_7_RXP
H15 PCIE1_RXN/USB3_7_RXN

C19 PCIE2_TXP/USB3_8_TXP
B19 PCIE2_TXN/USB3_8_TXN
G17 PCIE2_RXP/USB3_8_RXP
E17 PCIE2_RXN/USB3_8_RXN

C20 PCIE3_TXP/USB3_9_TXP
B20 PCIE3_TXN/USB3_9_TXN
K17 PCIE3_RXP/USB3_9_RXP
L17 PCIE3_RXN/USB3_9_RXN

A21 PCIE4_TXP/USB3_10_TXP
B21 PCIE4_TXN/USB3_10_TXN
G19 PCIE4_RXP/USB3_10_RXP
E20 PCIE4_RXN/USB3_10_RXN

Note: The IntelR i219LM/V Gigabit Ethernet LAN Connect Device can be connected to one of the following PCI Express ports 4, 5, 9, 12, 13. on PCH-H.

[30] LAN_PE1_TXP5_C → X871850-001 LC3 | 0.1u 16V +/- 10% → LAN_PE1_TXP5 → C22 PCIE5_TXP
[30] LAN_PE1_TXN5_C → X871850-001 LC4 | 0.1u 16V +/- 10% → LAN_PE1_TXN5 → D22 PCIE5_TXN
[30] LAN_PE1_RXP5 → L19 PCIE5_RXP
[30] LAN_PE1_RXN5 → K19 PCIE5_RXN

A23 PCIE6_TXP
B22 PCIE6_TXN
E22 PCIE6_RXP
G22 PCIE6_RXN

[46] WLAN_PE1_TXP7 → X871850-001 LC11 | 0.1u 16V +/- 10% → B23 PCIE7_TXP
[46] WLAN_PE1_TXN7 → X871850-001 LC12 | 0.1u 16V +/- 10% → C23 PCIE7_TXN
[46] WLAN_PE1_RXP7 → K22 PCIE7_RXP
[46] WLAN_PE1_RXN7 → L22 PCIE7_RXN

B24 PCIE8_TXP
C24 PCIE8_TXN
L24 PCIE8_RXP
K24 PCIE8_RXN

[35] SATA_TXP0 → B31 PCIE9_TXP/SATA0A_TXP
[35] SATA_TXN0 → C31 PCIE9_TXN/SATA0A_TXN
[35] SATA_RXP0 → H31 PCIE9_RXP/SATA0A_RXP
[35] SATA_RXN0 → G31 PCIE9_RXN/SATA0A_RXN

B32 PCIE10_TXP/SATA1A_TXP
C32 PCIE10_TXN/SATA1A_TXN
E29 PCIE10_RXP/SATA1A_RXP
G29 PCIE10_RXN/SATA1A_RXN

B33 PCIE11_TXP
C33 PCIE11_TXN
K31 PCIE11_RXP
L31 PCIE11_RXN

A35 PCIE12_TXP
B35 PCIE12_TXN
H33 PCIE12_RXP
G33 PCIE12_RXN

USB3.0

USB3_1_TXP	B11	USB3_TXP1 [32]
USB3_1_TXN	C11	USB3_TXN1 [32]
USB3_1_RXP	A7	USB3_RXP1 [32]
USB3_1_RXN	B7	USB3_RXN1 [32]
USB3_2_TXP/SSIC_1_TXP	A12	USB3_TXP2 [32]
USB3_2_TXN/SSIC_1_TXN	B12	USB3_TXN2 [32]
USB3_2_RXP/SSIC_1_RXP	B8	USB3_RXP2 [32]
USB3_2_RXN/SSIC_1_RXN	C8	USB3_RXN2 [32]
USB3_3_TXP/SSIC_2_TXP	D13	USB3_TXP3 [33]
USB3_3_TXN/SSIC_2_TXN	C13	USB3_TXN3 [33]
USB3_3_RXP/SSIC_2_RXP	A9	USB3_RXP3 [33]
USB3_3_RXN/SSIC_2_RXN	B10	USB3_RXN3 [33]
USB3_4_TXP	B13	USB3_TXP4 [33]
USB3_4_TXN	A14	USB3_TXN4 [33]
USB3_4_RXP	G11	USB3_RXP4 [33]
USB3_4_RXN	E11	USB3_RXN4 [33]
USB3_5_TXP	C14	USB3_TXP5 [46]
USB3_5_TXN	B14	USB3_TXN5 [46]
USB3_5_RXP	H13	USB3_RXP5 [46]
USB3_5_RXN	G13	USB3_RXN5 [46]
USB3_6_TXP	C15	USB3_TXP6 [41]
USB3_6_TXN	B15	USB3_TXN6 [41]
USB3_6_RXP	K13	USB3_RXP6 [29,41]
USB3_6_RXN	K15	USB3_RXN6 [29,41]

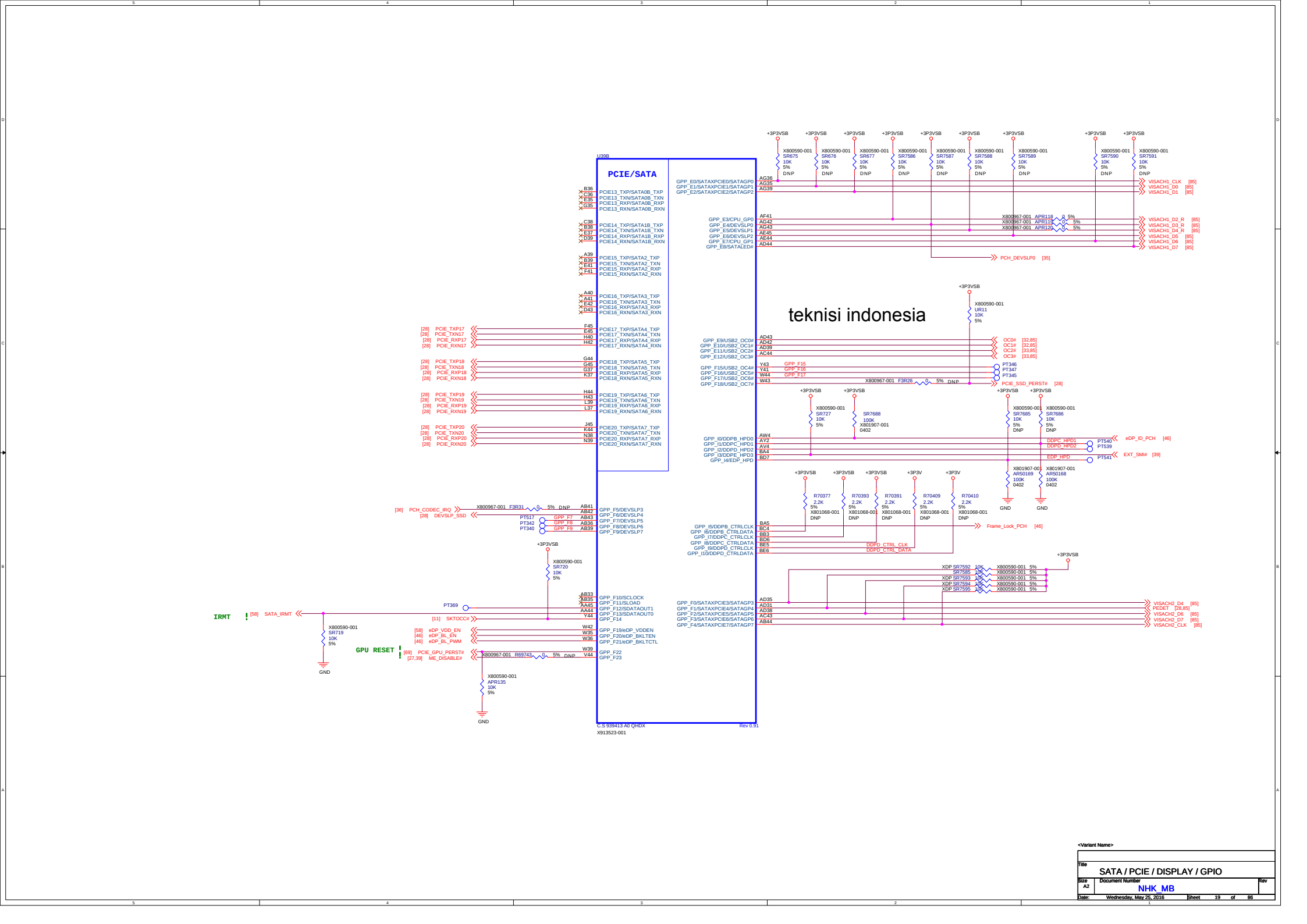
USB2_ID → AG2
USB2_VBUSSENSE → AD10 PD_USB2_VBUSSENSE

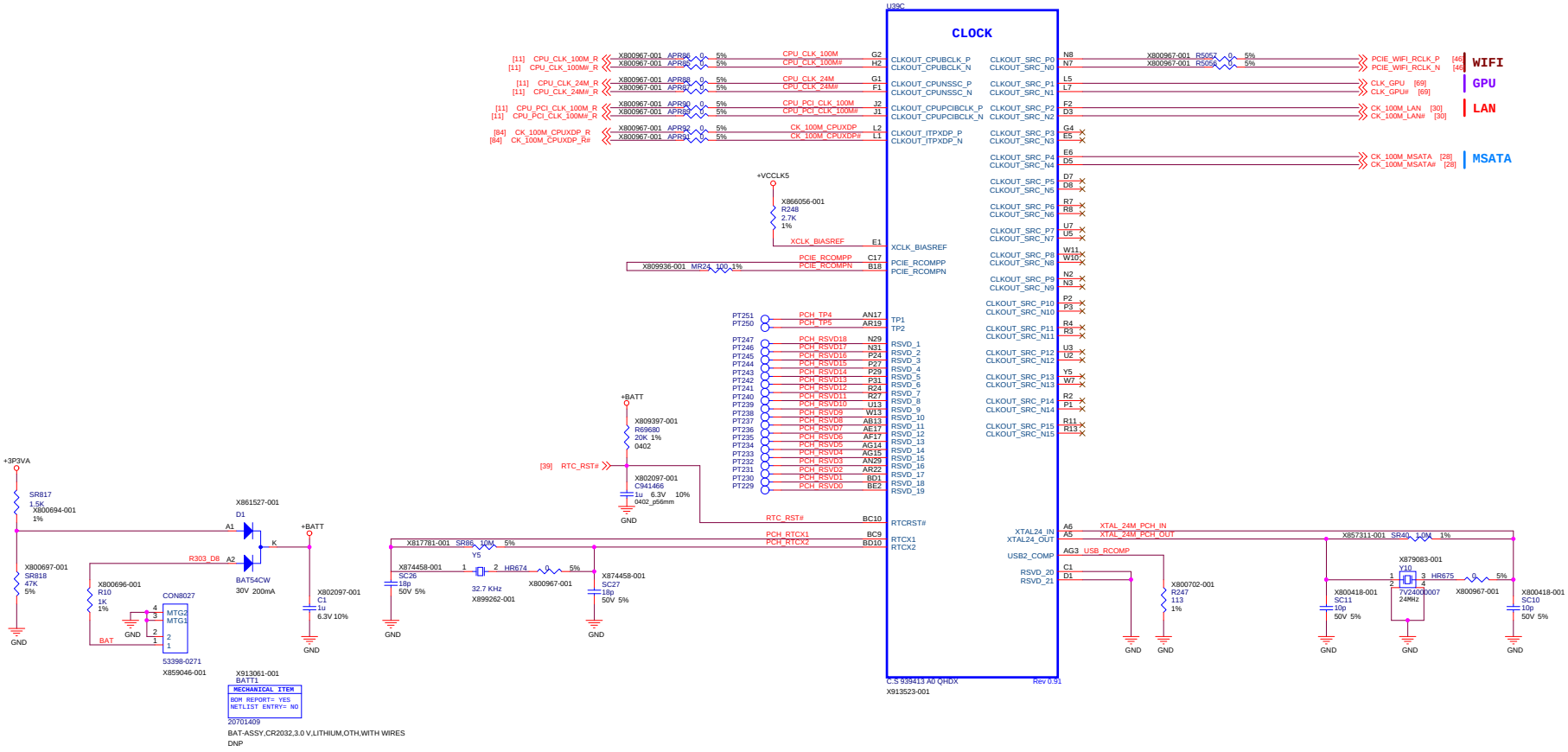
X800696-001
SR665 1K 1%
SR664 0 X800967-001 5%
NOTE: PLACE WITHIN 1 INCH
GND GND

C.S 939413 A0 QHDX
X913523-001
Rev 0.91

<Variant Name>

Title	PCH DMI/PCIE/USB	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 18 of 86	


U39B
PCIE/SATA
PCIE13_TXP/SATA0B_TXP
PCIE13_TXN/SATA0B_TXN
PCIE13_RXP/SATA0B_RXP
PCIE13_RXN/SATA0B_RXN
PCIE14_TXP/SATA1B_TXP
PCIE14_TXN/SATA1B_TXN
PCIE14_RXP/SATA1B_RXP
PCIE14_RXN/SATA1B_RXN
PCIE15_TXP/SATA2_TXP
PCIE15_TXN/SATA2_TXN
PCIE15_RXP/SATA2_RXP
PCIE15_RXN/SATA2_RXN
PCIE16_TXP/SATA3_TXP
PCIE16_TXN/SATA3_TXN
PCIE16_RXP/SATA3_RXP
PCIE16_RXN/SATA3_RXN
PCIE17_TXP/SATA4_TXP
PCIE17_TXN/SATA4_TXN
PCIE17_RXP/SATA4_RXP
PCIE17_RXN/SATA4_RXN
PCIE18_TXP/SATA5_TXP
PCIE18_TXN/SATA5_TXN
PCIE18_RXP/SATA5_RXP
PCIE18_RXN/SATA5_RXN
PCIE19_TXP/SATA6_TXP
PCIE19_TXN/SATA6_TXN
PCIE19_RXP/SATA6_RXP
PCIE19_RXN/SATA6_RXN
PCIE20_TXP/SATA7_TXP
PCIE20_TXN/SATA7_TXN
PCIE20_RXP/SATA7_RXP
PCIE20_RXN/SATA7_RXN
C.S 939413 A0 QHDX
X913523-001
Rev 0.91
teknisi indonesia
IRMT
GPU RESET
SATA_IRMT
PCH_CODEC_IRQ
DEVSLP_SSD
PCIE_GPU_PERST#
ME_DISABLE#
SKTOCC#
eDP_VDD_EN
eDP_BL_EN
eDP_BL_PWM
PCH_DEVSLP0
Frame_Lock_PCH
PCIE_SSD_PERST#
DDPD_CTRL_CLK
DDPD_CTRL_DATA
DDPC_HPD1
DDPD_HPD2
EDP_HPD
eDP_ID_PCH
EXT_SMI#
VISACH1_CLK
VISACH1_D0
VISACH1_D1
VISACH1_D2_R
VISACH1_D3_R
VISACH1_D4_R
VISACH1_D5
VISACH1_D6
VISACH1_D7
VISACH2_D4
VISACH2_D6
VISACH2_D7
VISACH2_CLK
OC0#
OC1#
OC2#
OC3#
PEDET
+3P3VSB
+3P3V
GND
<Variant Name>
Title
SATA / PCIE / DISPLAY / GPIO
Size
A2
Document Number
NHK_MB
Rev
Date:
Wednesday, May 25, 2016
Sheet
19
of
86



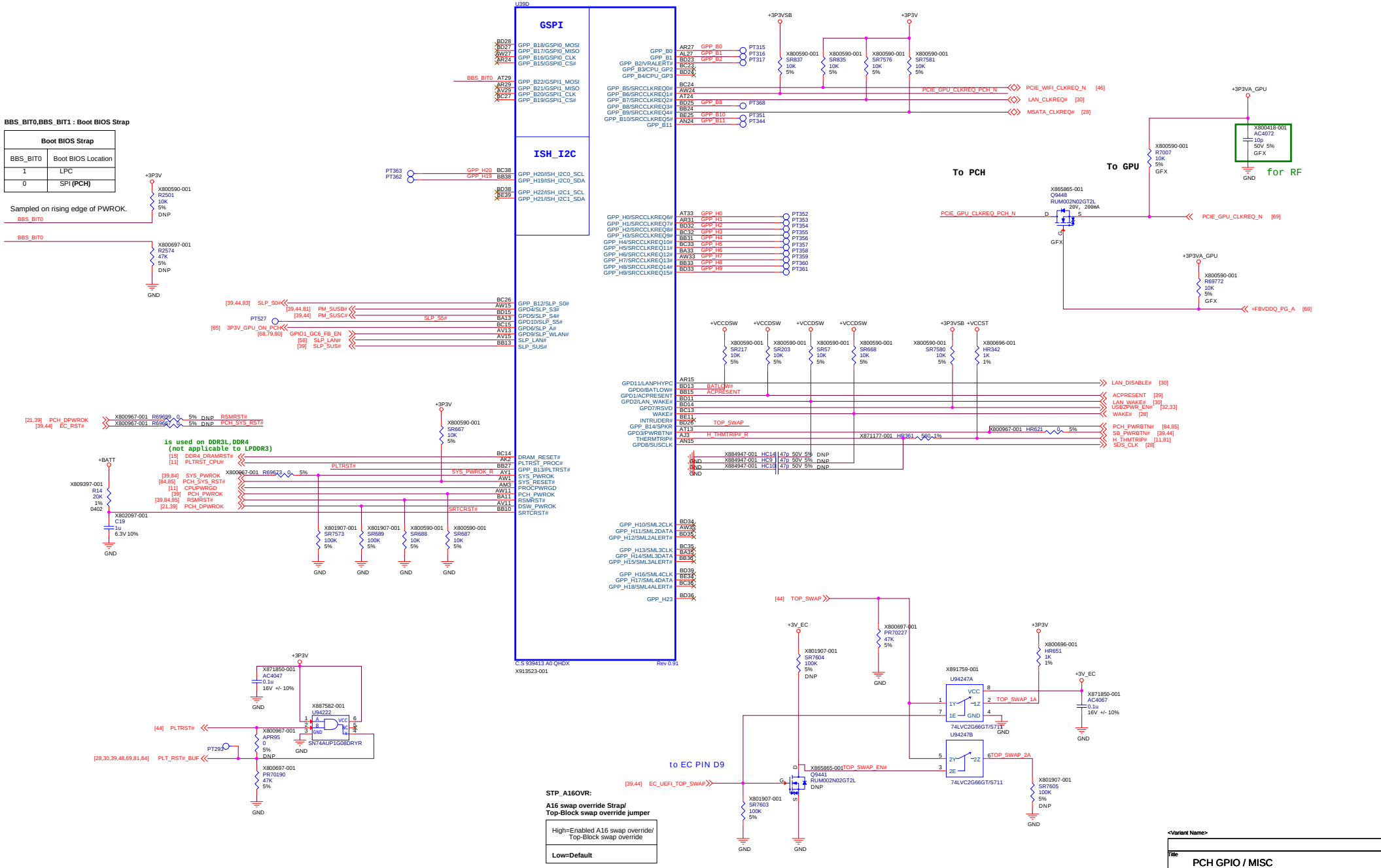
<Variant Name>

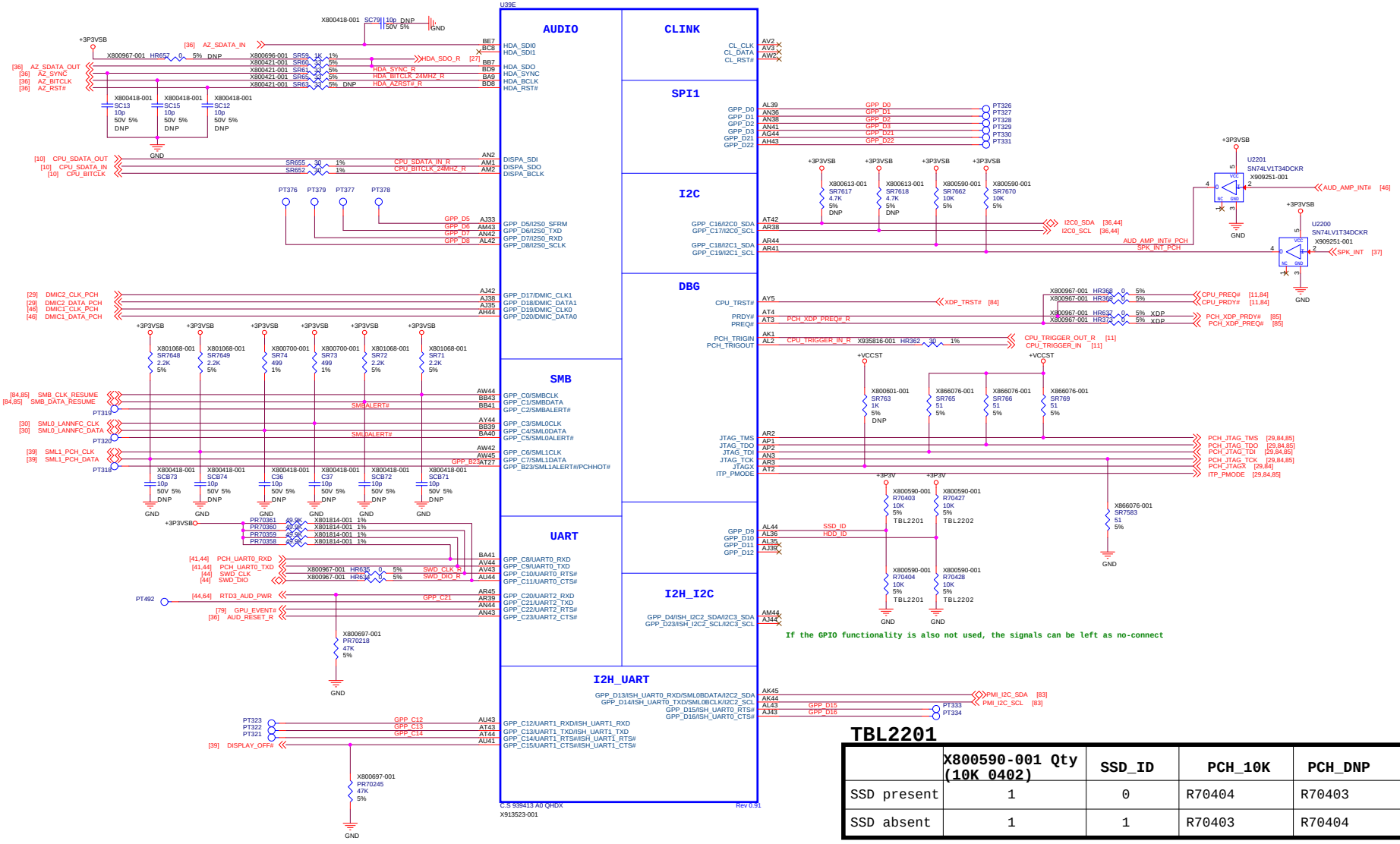
Title	PCH RTC / CLOCK	
Size A2	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 20 of 86	

BBS_BIT0,BBS_BIT1 : Boot BIOS Strap

Boot BIOS Strap	
BBS_BIT0	Boot BIOS Location
1	LPC
0	SPI **(PCH)**

Sampled on rising edge of PWROK.





TBL2201

	X800590-001 Qty (10K 0402)	SSD_ID	PCH_10K	PCH_DNP
SSD present	1	0	R70404	R70403
SSD absent	1	1	R70403	R70404

TBL2202

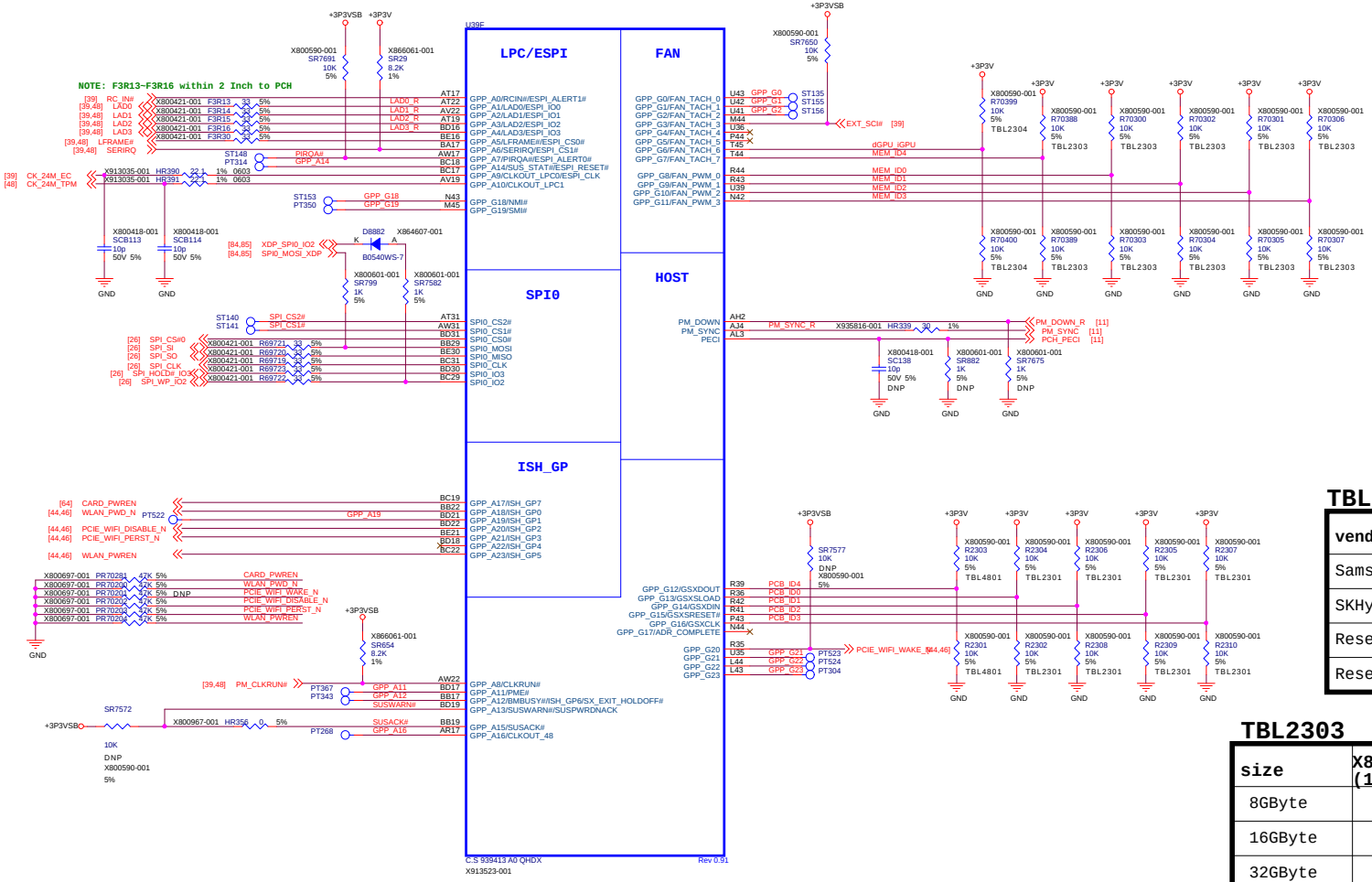
	X800590-001 Qty (10K 0402)	HDD_ID	PCH_10K	PCH_DNP
HDD present	1	0	R70428	R70427
HDD absent	1	1	R70427	R70428

<Variant Name>

Title: PCH AUDIO / CLINK / GPIO

Size: A2 | Document Number: NHK_MB | Rev:

Date: Wednesday, May 25, 2016 | Sheet 22 of 86



TBL2303

H4G	Hynix 4Gb	H5AN4G8NAFR-TFC
Mem	X936059-001	U1500~U1507, U1600~1607
S8G	Samsung 8Gb	K4A8G085WB-BCPB
Mem	X936060-001	U1500~U1507, U1600~1607
S4G	Samsung 4Gb	K4A4G085WE-BCPB
Mem	X944783-001	U1500~U1507, U1600~1607
S16G	Samsung 16Gb	K4AAG085WB-MCPB
Mem	X944114-001	U1500~U1507, U1600~1607

TBL2303

vendors	X800590-001 Qty (10K 0402)	MEM_ID1:0	PCH_10K	PCH_DNP
Samsung	2	00	R70304,R70303	R70302,R70300
SKHynix	2	01	R70304,R70300	R70302,R70303
Reserved	2	10	R70302,R70303	R70304,R70300
Reserved	2	11	R70302,R70300	R70304,R70303

TBL2303

size	X800590-001 Qty (10K 0402)	MEM_ID3:2	PCH_10K	PCH_DNP
8GByte	2	00	R70307,R70305	R70306,R70301
16GByte	2	01	R70307,R70301	R70306,R70305
32GByte	2	10	R70306,R70305	R70307,R70301
Reserved	2	11	R70306,R70301	R70307,R70305

TBL2303

speed	X800590-001 Qty (10K 0402)	MEM_ID4	PCH_10K	PCH_DNP
2133MHz	1	0	R70389	R70388
Reserved	1	1	R70388	R70389

TBL2304

speed	X800590-001 Qty (10K 0402)	dGPU_iGPU	PCH_10K	PCH_DNP
dGPU	1	0	R70400	R70399
iGPU	1	1	R70399	R70400

TBL2301

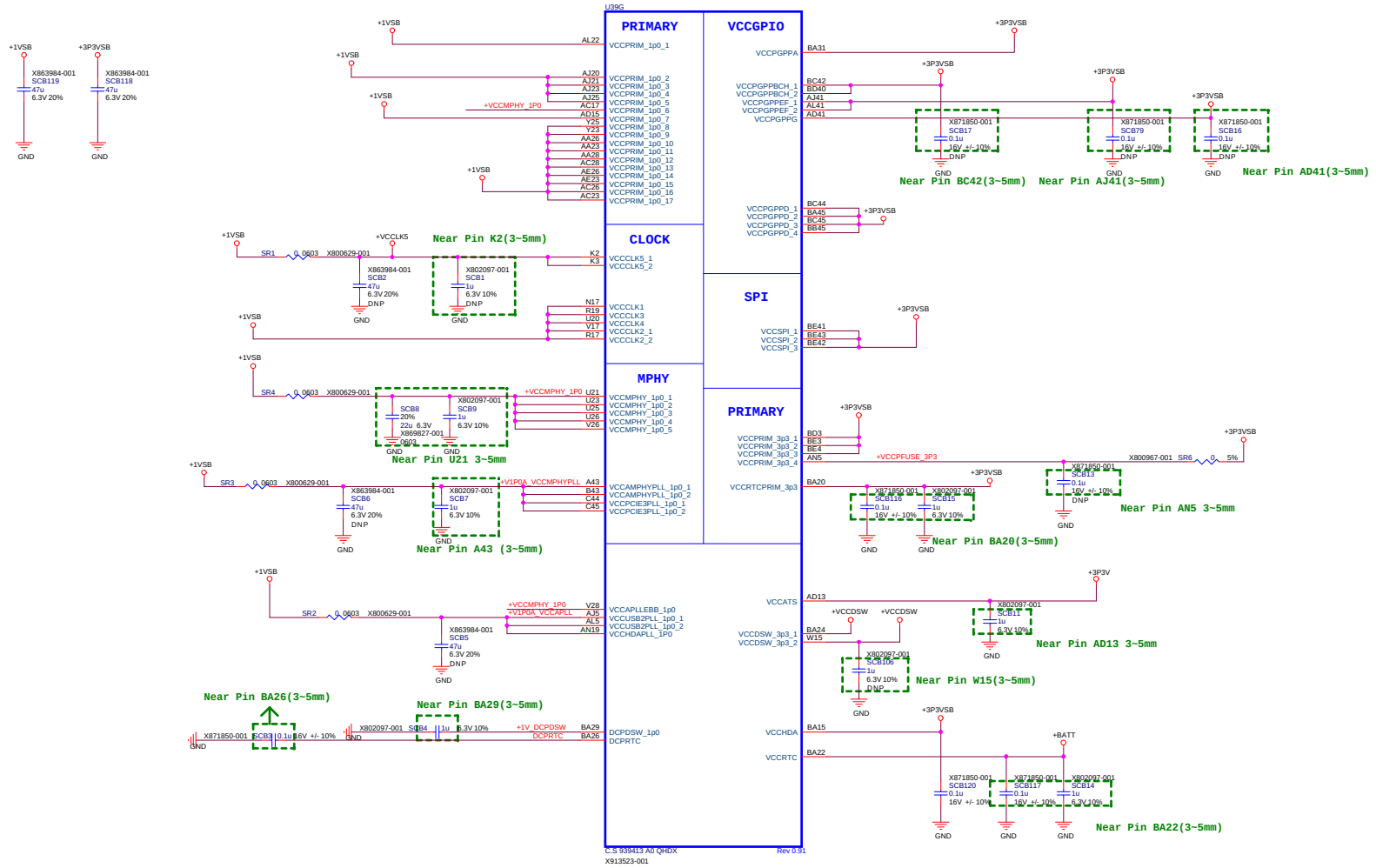
Build	X800590-001 Qty (10K 0402)	PCB_ID3:0	PCH_10K	PCH_DNP
POC	4	0000	R2310,R2309,R2308,R2302	R2307,R2305,R2306,R2304
EV1	4	0001	R2310,R2309,R2308,R2304	R2307,R2305,R2306,R2302
EV1.5	4	0010	R2310,R2309,R2306,R2302	R2307,R2305,R2308,R2304
EV2	4	0011	R2310,R2309,R2306,R2304	R2307,R2305,R2308,R2302
EV2.3	4	0100	R2310,R2305,R2308,R2302	R2307,R2309,R2306,R2304
EV2.5	4	0101	R2310,R2305,R2308,R2304	R2307,R2309,R2306,R2302
EV2.7	4	0110	R2310,R2305,R2306,R2302	R2307,R2309,R2308,R2304
DV	4	0111	R2310,R2305,R2306,R2304	R2307,R2309,R2308,R2302
PV_PM	4	1000	R2307,R2309,R2308,R2302	R2310,R2305,R2306,R2304
PV_NOPM	4	1001	R2307,R2309,R2308,R2304	R2310,R2305,R2306,R2302

<Variant Name>

Title: PCH GPIO

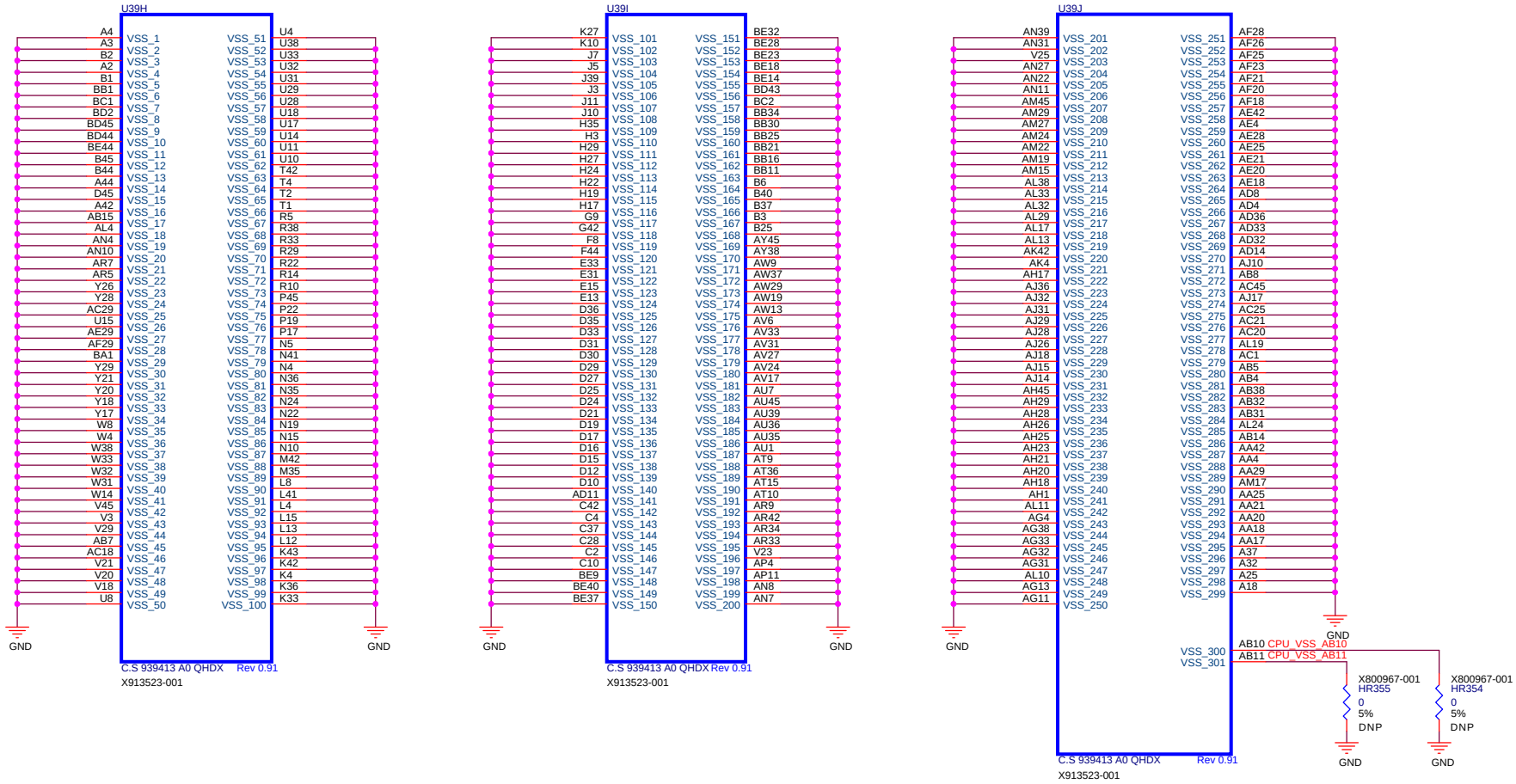
Size: A2 | Document Number: NHK_MB | Rev:

Date: Wednesday, May 25, 2016 | Sheet 23 of 86



<variant_name>

Title	PCH VCC 7-8	
Size A2	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 24 of 86	



<Variant Name>

Title
PCH VSS 8-8

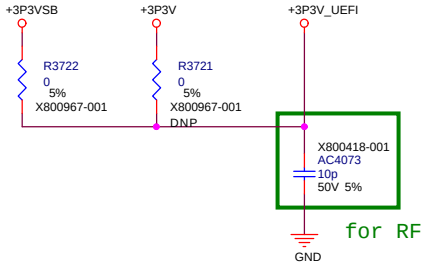
Size A3 | Document Number NHK_MB | Rev

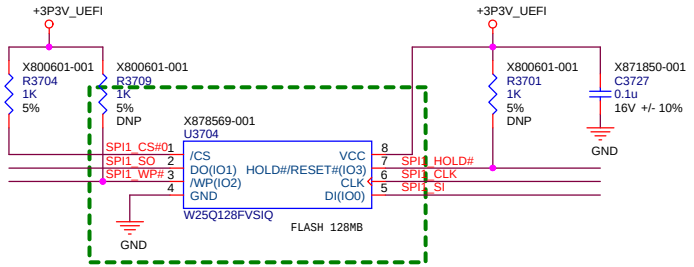
Date: Wednesday, May 25, 2016 | Sheet 25 of 86

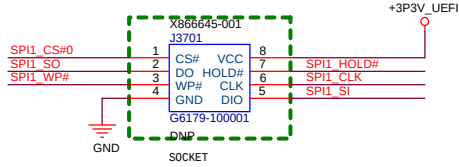
SPI ROM

Table 4. Function table[1]

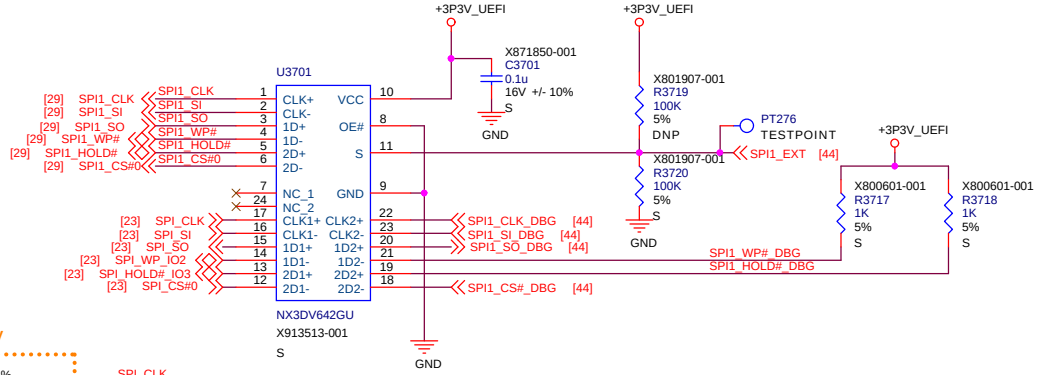
Input		Channel on
S	OE	
L	L	CLKn, 1Dn, 2Dn = CLK1n, 1D1n, 2D1n
H	L	CLKn, 1Dn, 2Dn = CLK2n, 1D2n, 2D2n
X	H	switch off

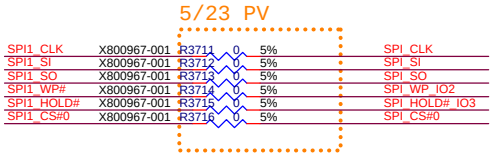






U3704 & J3701 co-lay

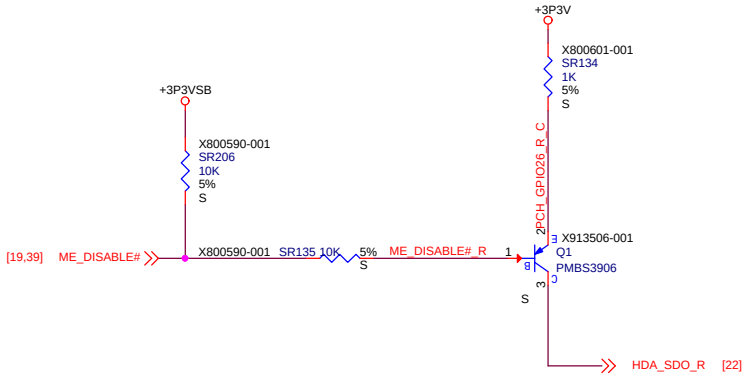




<variant_name>

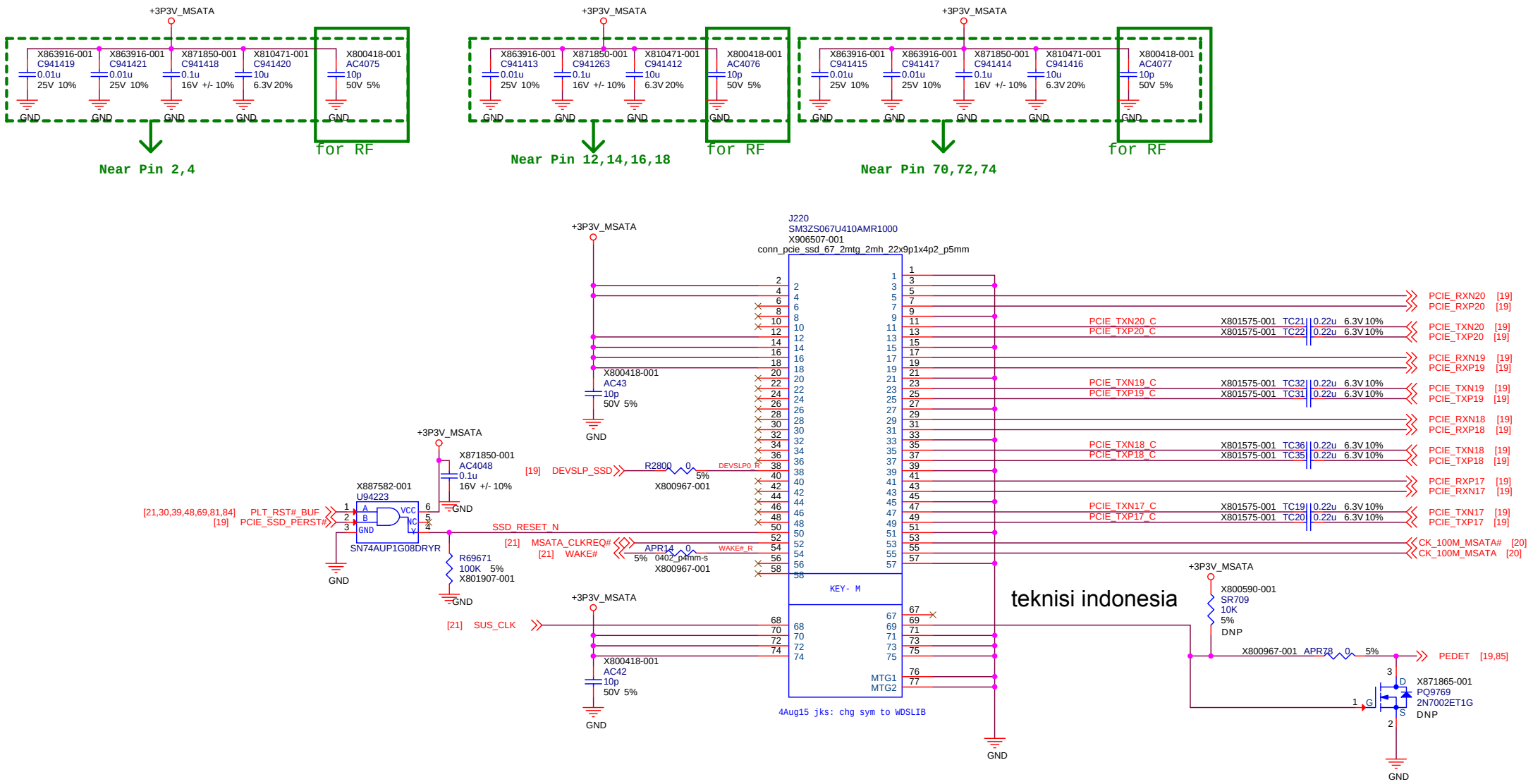
Title	SM BUS & SPI ROM	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 26 of 86	

ME Disable



<variant_name>

Title: ME DISABLE		
Size: A3	Document Number: NHK_MB	Rev:
Date: Wednesday, May 25, 2016	Sheet 27 of 86	



<Variant Name>

Title	NGFF KEY M (MSATA)	
Size B	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 28 of 86	

use J164 DIP pin

+12VADC_VIN: MTP160, MTP161, MTP162, MTP503, MTP504, MTP505
+12V: MTP420
+VCORE: MTP50
+VCCGT: MTP422
+VCCSA: MTP423
+NVVDD: MTP424
+1P35V_GPU: MTP425
+12VBDC_VIN: MTP99, MTP98, MTP97
+12VSB: MTP78
+12VA: MTP60
+1VSB: MTP146
+1P2V_DUAL: MTP36
+VTT_DDR: MTP82
+VCCIO: MTP428
+2P5VPP: MTP497
+VCCSTG: MTP535
+5VSB: MTP148
+5VSB_WIFI: MTP536
+5V_LCD: MTP430
+USBV0: MTP431
+USBV1: MTP432
+USBV2: MTP433
+USBV3: MTP434
+33VADC_VIN: MTP163, MTP164, MTP165
+5V: MTP48
+5V_AUDIO: MTP435
+5V_HDD_ODD: MTP506
MTP128, MTP129, MTP130, MTP131, MTP132, MTP149 → GND
+3P3VA: MTP437
+1P05V_GPU: MTP438
+3P3V_EC: MTP439
+VCCDSW: MTP541
+BATT: MTP532
+3P3VSB: MTP21
+3P3V: MTP72
+3P3V_AUD: MTP440
+3P3V_MSATA: MTP150
+1P8V_AUD: MTP88

MTP542 +5V_LCD_G_EN [58]
MTP537 PSU_FANPWM [39,49]
MTP538 PSU_TACH [39,49]
MTP539 SML3_EC_DATA [39,44,45,49,79]
MTP540 SML3_EC_CLK [39,44,45,49,79]
MTP513 PSU_PS_ON# [49]
MTP295 Volume Up [46]
MTP294 Volume Down [46]
MTP296 PWR_SW# [44,46,84]
MTP120 → GND

near CON8039
+5V_CARD: MTP436
MTP441 R_LP6+ [41]
MTP442 R_LP6- [41]
MTP443 R_USBH_TX6+ [41]
MTP444 R_USBH_TX6- [41]
MTP445 R_USBH_RX6+ [18,41]
MTP446 R_USBH_RX6- [18,41]
MTP114 → GND

near CON8031
+12VA_TOP: MTP454

near CON8032
MTP382 USBP5 [18,46]
MTP383 USBN5 [18,46]
MTP448 USB3_TXP5/USBN7 [46]
MTP449 USB3_TXN5/USBP7 [46]
MTP450 USB3_RXP5/USBN8 [46]
MTP451 USB3_RXN5/USBP8 [46]
MTP118 → GND

near CON8031
MTP458 DMIC1_DATA_R [46]
MTP459 DMIC1_CLK_R [46]
MTP416 DMIC2_DATA_PCH [22]
MTP417 DMIC2_CLK_PCH [22]
MTP418 DMIC2_DATA_CODEC [36]
MTP419 DMIC2_CLK_CODEC [36]
MTP117 → GND

near J3701
+3P3V_UEFI
MTP471
TP_SMD.66mm MTP270 SPI1_CLK [26]
TP_SMD.66mm MTP271 SPI1_SI [26]
TP_SMD.66mm MTP272 SPI1_SO [26]
TP_SMD.66mm MTP273 SPI1_WP# [26]
TP_SMD.66mm MTP274 SPI1_HOLD# [26]
TP_SMD.66mm MTP275 SPI1_CS#0 [26]
MTP113 → GND

near P70
+12V_CPU_FAN: MTP426
MTP470 CPUFAN_PWM_C [42]
MTP469 CPUFAN_TACH_C [42]
MTP472 → GND

near P70
MTP498 CPUFAN2_PWM_C [42]
MTP499 CPUFAN2_TACH_C [42]
MTP502 → GND

near J27
MTP460 A-MIC [36,41]
MTP461 HPOUT_R [36,41]
MTP462 HPOUT_L [36,41]
MTP463 HPOUT_JD [36,41]
MTP473 → AGND

near U9431
+3VA_SPI
TP_SMD.66mm MTP121 SCK_EC_DBG [39]
TP_SMD.66mm MTP412 SI_EC_DBG [39]
TP_SMD.66mm MTP413 SO_EC_DBG [39]
TP_SMD.66mm MTP414 SCE#_EC_DBG [39]
MTP415
MTP115 → GND

near U7501
+3P3VA_GPU
TP_SMD.66mm MTP421 GPU_JTAG_TCK [44,79]
TP_SMD.66mm MTP9 GPU_JTAG_TMS [44,79]
TP_SMD.66mm MTP10 GPU_JTAG_TDI [44,79]
TP_SMD.66mm MTP11 GPU_JTAG_TDO [44,79]
TP_SMD.66mm MTP12 GPU_JTAG_TRST_N [44,79]
MTP13
MTP119 → GND

near U4
+3P3V_LAN
MTP91
TP_SMD.66mm MTP1 GLAN_TDI [30]
TP_SMD.66mm MTP2 GLAN_TDO [30]
TP_SMD.66mm MTP4 GLAN_TMS [30]
TP_SMD.66mm MTP5 GLAN_TCK [30]
MTP122 → GND

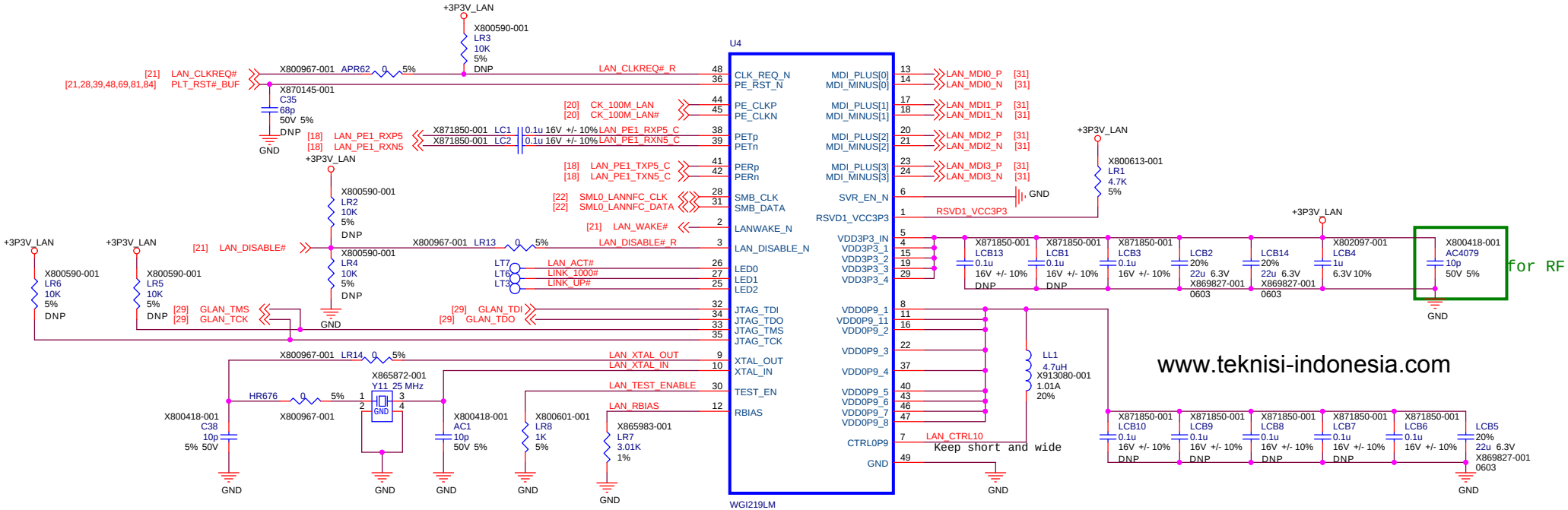
near CON95000
MTP464 SPK_OUT_R+_CN [37]
MTP465 SPK_OUT_R-_CN [37]
MTP466 SPK_OUT_L+_CN [37]
MTP467 SPK_OUT_L-_CN [37]

near U94217
+3P3V_GPU
MTP83
TP_SMD.66mm MTP480 xROM_CS# [79]
TP_SMD.66mm MTP481 xROM_SI [79]
TP_SMD.66mm MTP482 ROM_SO [79]
TP_SMD.66mm MTP483 xROM_SCLK [79]
MTP484 → GND

near U39
+VCCST
MTP427
TP_SMD.66mm MTP487 PCH_JTAG_TMS [22,84,85]
TP_SMD.66mm MTP485 PCH_JTAG_TDO [22,84,85]
TP_SMD.66mm MTP486 PCH_JTAG_TDI [22,84,85]
TP_SMD.66mm MTP488 PCH_JTAG_TCK [22,84,85]
TP_SMD.66mm MTP490 PCH_JTAGX [22,84]
MTP489 ITP_PMODE [22,84,85]
MTP491 → GND

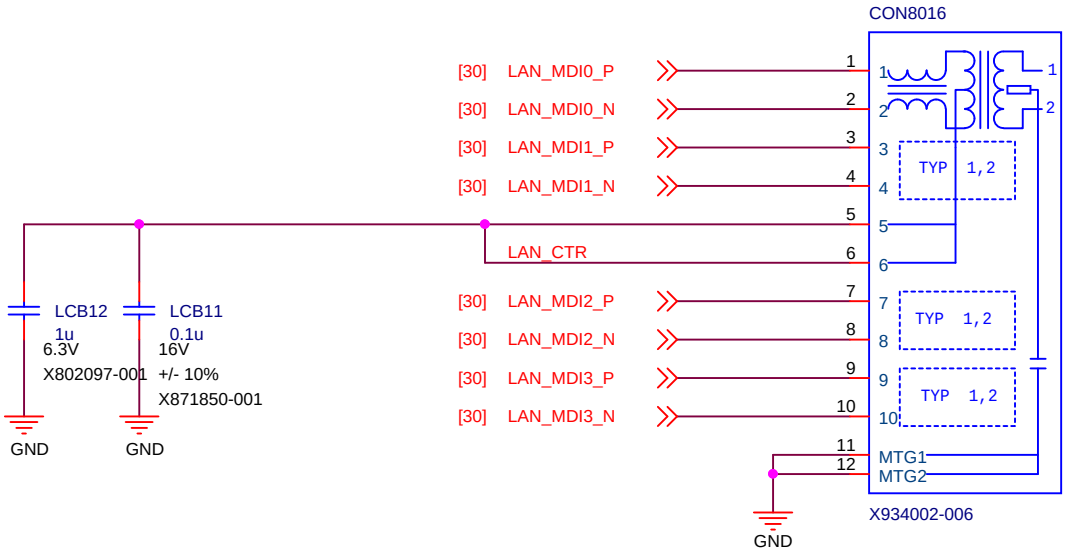
<Variant Name>

Title: VGA_DEBUG
Size: A3
Document Number: NHK_MB
Rev:
Date: Wednesday, May 25, 2016
Sheet 29 of 86



<Variant Name>

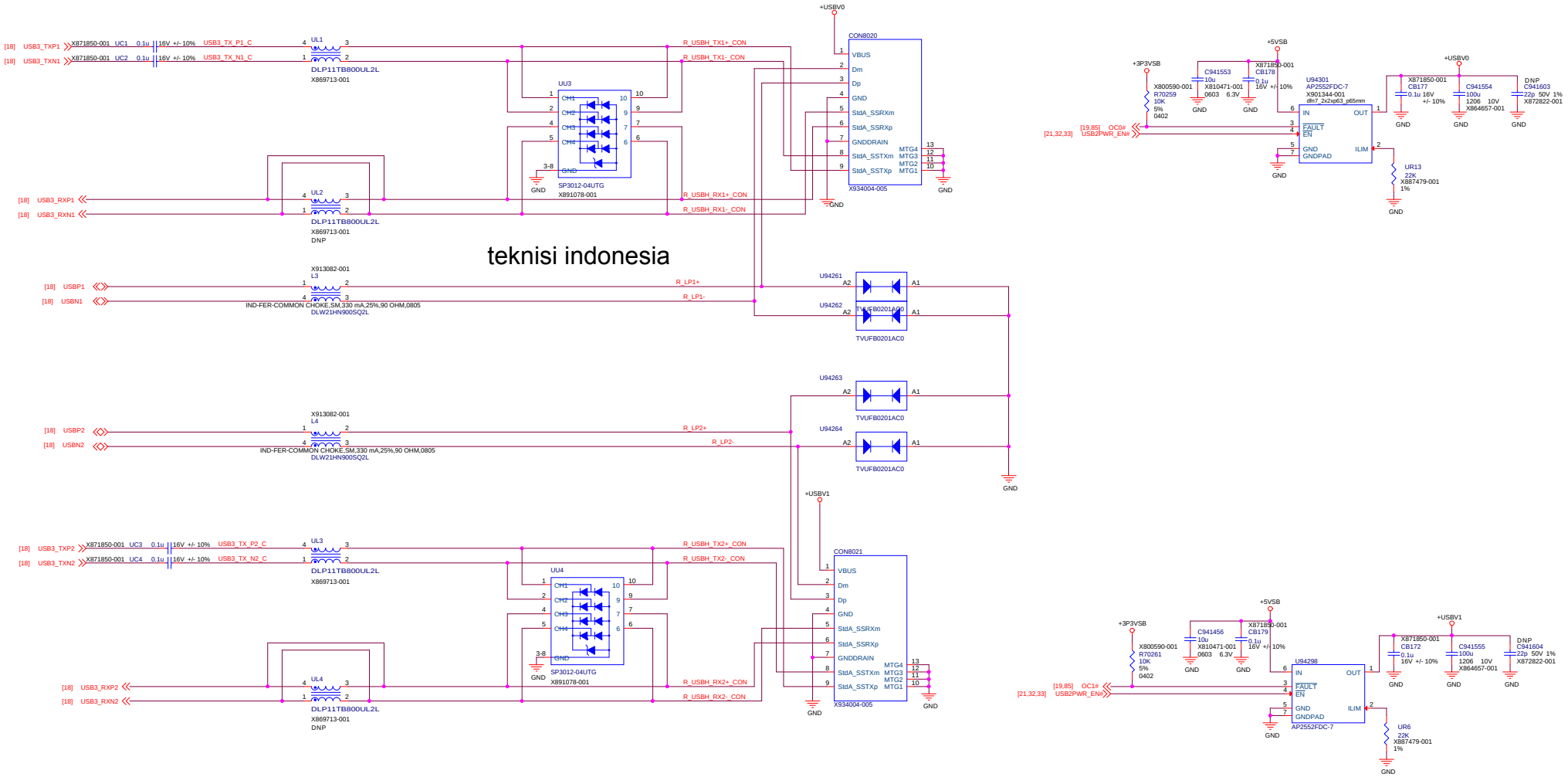
Title	INTEL JACKSONVILLE	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 30 of 86	



<Variant Name>

Title: LAN JACK		
Size: A4	Document Number: NHK_MB	Rev:
Date: Wednesday, May 25, 2016	Sheet 31 of 86	

$$I_{LIM(MAX)}(mA) = \frac{20.08}{R_{LIM}^{0.904}\ k\Omega} = 1.239A \quad I_{LIM(TYP)}(mA) = \frac{19.94}{R_{LIM}^{0.925}\ k\Omega} = 1.143A \quad I_{LIM(MIN)}(mA) = \frac{20.26}{R_{LIM}^{0.956}\ k\Omega} = 1.045A$$

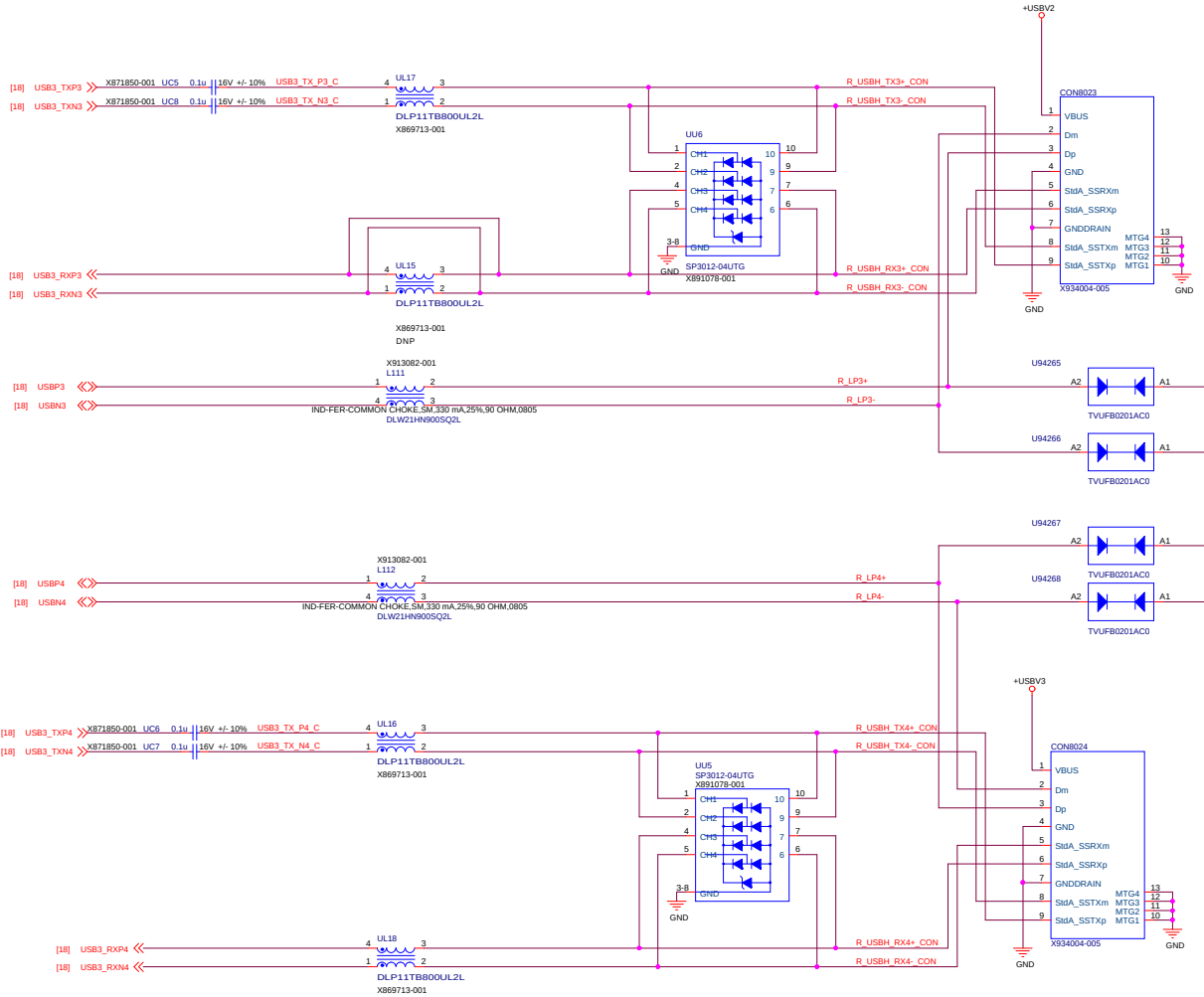


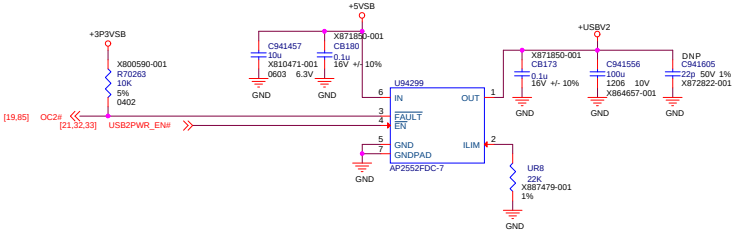
$$I_{LIM(MAX)}(mA) = \frac{20.08}{R_{LIM}^{0.904}\ k\Omega} = 1.239A \quad I_{LIM(TYP)}(mA) = \frac{19.94}{R_{LIM}^{0.925}\ k\Omega} = 1.143A \quad I_{LIM(MIN)}(mA) = \frac{20.26}{R_{LIM}^{0.956}\ k\Omega} = 1.045A$$

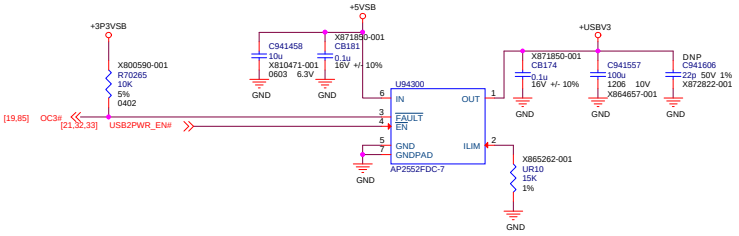
<Variant Name>

Title	USB3.0 PORT 1,2		
Size A2	Document Number NHK_MB		Rev
Date: Wednesday, May 25, 2016	Sheet 32 of 86		

$$I_{LIM(MAX)}(mA) = \frac{20.08}{R_{LIM}\ {}^{0.904}\ k\Omega} = 1.239A \quad I_{LIM(TYP)}(mA) = \frac{19.94}{R_{LIM}\ {}^{0.925}\ k\Omega} = 1.143A \quad I_{LIM(MIN)}(mA) = \frac{20.26}{R_{LIM}\ {}^{0.956}\ k\Omega} = 1.045A$$





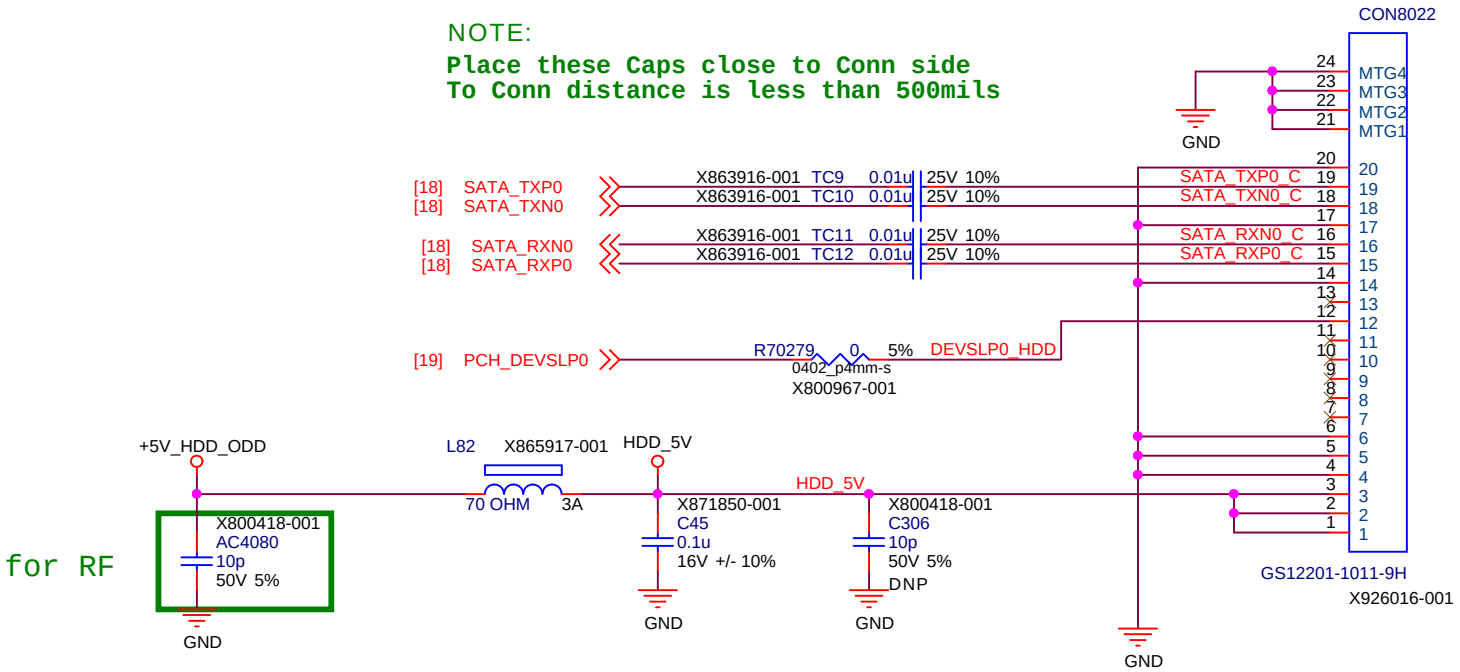


$$I_{LIM(MAX)}(mA) = \frac{20.08}{R_{LIM}\ {}^{0.904}\ k\Omega} = 1.752A \quad I_{LIM(TYP)}(mA) = \frac{19.94}{R_{LIM}\ {}^{0.925}\ k\Omega} = 1.629A \quad I_{LIM(MIN)}(mA) = \frac{20.26}{R_{LIM}\ {}^{0.956}\ k\Omega} = 1.507A$$

<Variant Name>

Title	USB3.0 PORT 3,4	
Size A2	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 33 of 86	

SATA HDD CONNECTOR



www.teknisi-indonesia.com

<Variant Name>

Title	SATA CONN	
Size A4	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 35 of 86	

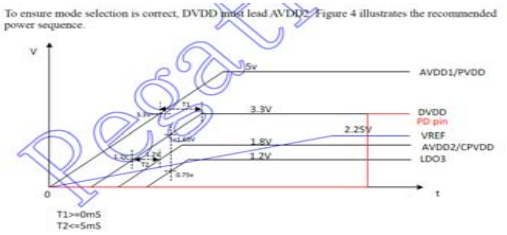


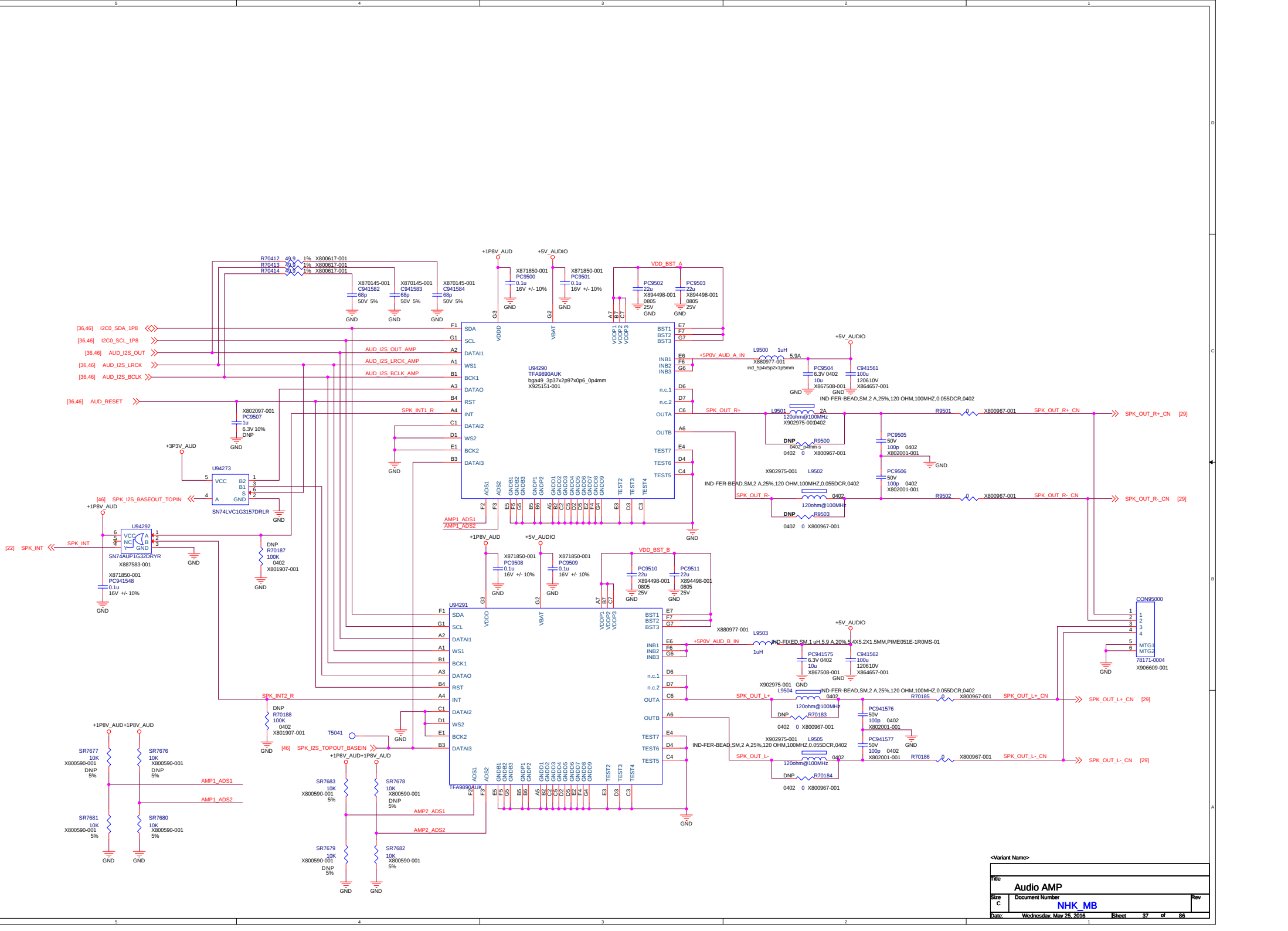
Figure 4. Power Sequence-2

SPK Trace width
Speaker 4 ohm = 40 mil
Speaker 8 ohm = 20 mil

U4009
ALC3269-CG
qfn57_7x7xp9_p4mm
X903977-001

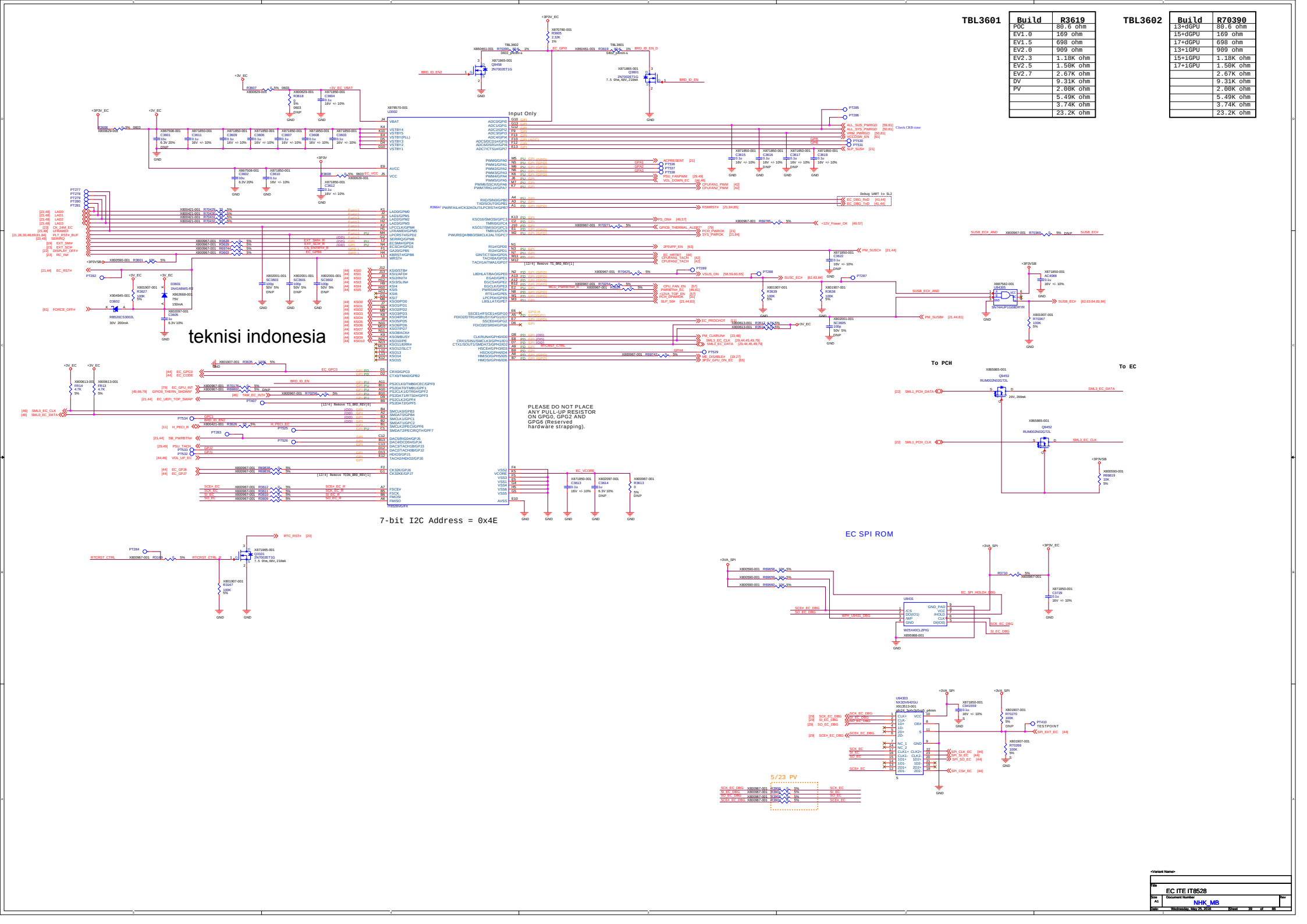
<variant_name>

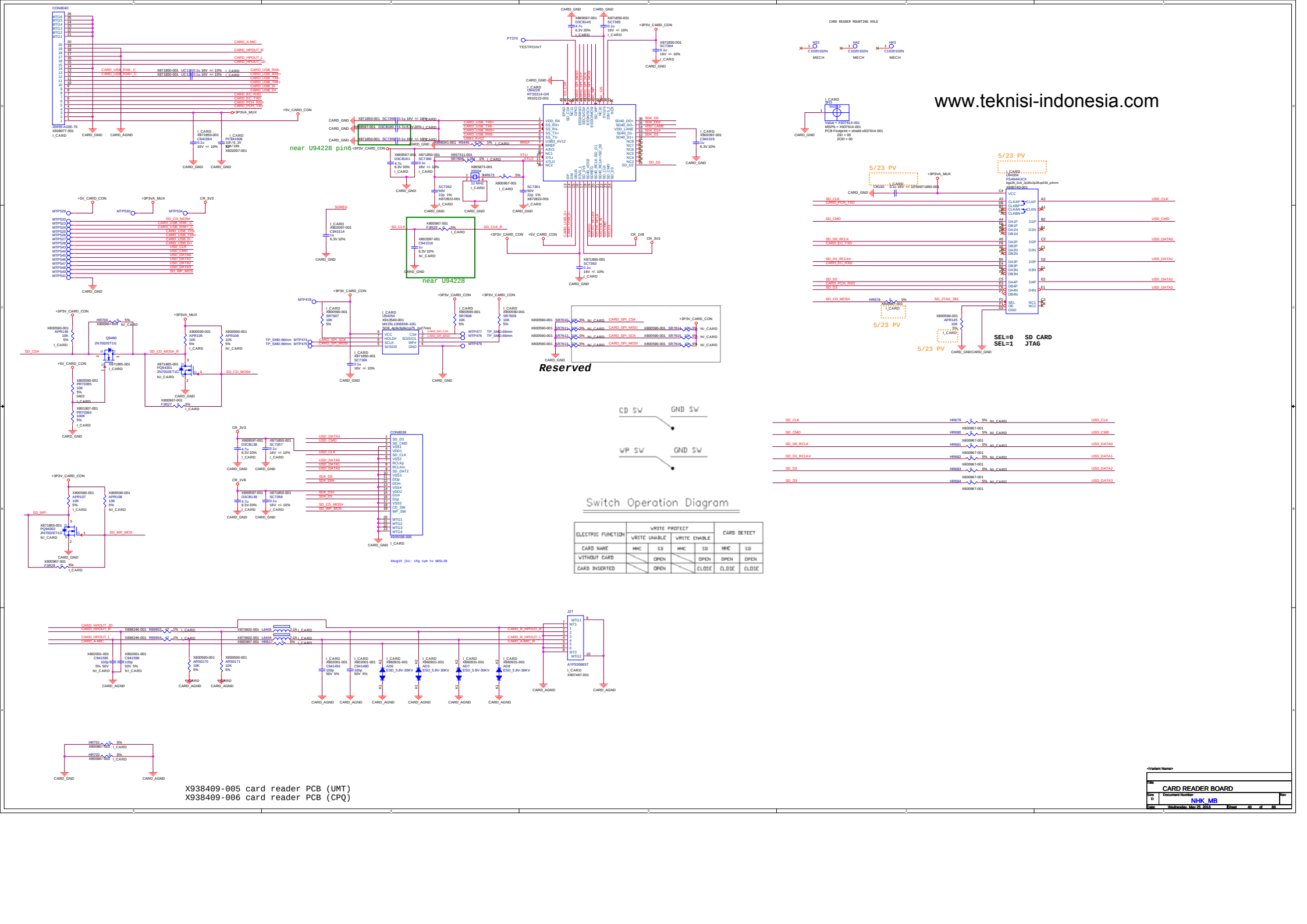
Title	AUDIO CODEC ALC3269		
Size A2	Document Number NHK_MB		Rev
Date: Wednesday, May 25, 2016	Sheet 36 of 86		


R70412 49.9 1% X800617-001
R70413 49.9 1% X800617-001
R70414 49.9 1% X800617-001
X870145-001 C941582 68p 50V 5%
X870145-001 C941583 68p 50V 5%
X870145-001 C941584 68p 50V 5%
+1P8V_AUD
+5V_AUDIO
X871850-001 PC9500 0.1u 16V +/- 10%
X871850-001 PC9501 0.1u 16V +/- 10%
VDD_BST_A
PC9502 22u X894498-001 0805 25V
PC9503 22u X894498-001 0805 25V
[36,46] I2C0_SDA_1P8
[36,46] I2C0_SCL_1P8
[36,46] AUD_I2S_OUT
[36,46] AUD_I2S_LRCK
[36,46] AUD_I2S_BCLK
[36,46] AUD_RESET
AUD_I2S_OUT_AMP
AUD_I2S_LRCK_AMP
AUD_I2S_BCLK_AMP
SPK_INT1_R
X802097-001 PC9507 1u 6.3V 10% DNP
U94290
TFA9890AUK
bga49_3p37x2p97x0p6_0p4mm
X925151-001
SDA
SCL
DATAI1
WS1
BCK1
DATAO
RST
INT
DATAI2
WS2
BCK2
DATAI3
VDDD
VBAT
VDDP1
VDDP2
VDDP3
BST1
BST2
BST3
INB1
INB2
INB3
n.c.1
n.c.2
OUTA
OUTB
TEST7
TEST6
TEST5
ADS1
ADS2
GND
+3P3V_AUD
U94273
SN74LVC1G3157DRLR
[46] SPK_I2S_BASEOUT_TOPIN
+1P8V_AUD
U94292
SN74AUP1G32DRYR
X887583-001
[22] SPK_INT
SPK_INT
X871850-001 PC941548 0.1u 16V +/- 10%
DNP R70187 100K 0402 X801907-001
AMP1_ADS1
AMP1_ADS2
+1P8V_AUD
+5V_AUDIO
X871850-001 PC9508 0.1u 16V +/- 10%
X871850-001 PC9509 0.1u 16V +/- 10%
VDD_BST_B
PC9510 22u X894498-001 0805 25V
PC9511 22u X894498-001 0805 25V
U94291
TFA9890AUK
SPK_INT2_R
DNP R70188 100K 0402 X801907-001
T5041
[46] SPK_I2S_TOPOUT_BASEIN
+1P8V_AUD+1P8V_AUD
SR7677 10K X800590-001 DNP 5%
SR7676 10K X800590-001 DNP 5%
SR7681 10K X800590-001 5%
SR7680 10K X800590-001 5%
SR7683 10K X800590-001 5%
SR7678 10K X800590-001 DNP 5%
SR7679 10K X800590-001 DNP 5%
SR7682 10K X800590-001 5%
AMP1_ADS1
AMP1_ADS2
AMP2_ADS1
AMP2_ADS2
+5P0V_AUD_A_IN
L9500 1uH 5.9A X880977-001 ind_5p4x5p2x1p5mm
PC9504 6.3V 0402 10u X867508-001
C941561 100u 120610V X864657-001
IND-FER-BEAD,SM,2 A,25%,120 OHM,100MHZ,0.055DCR,0402
SPK_OUT_R+
L9501 120ohm@100MHz 2A X902975-001 0402
R9501 0 X800967-001
SPK_OUT_R+_CN
SPK_OUT_R+_CN [29]
DNP R9500 0402_p4mm-s 0402 0 X800967-001
PC9505 50V 100p 0402 X802001-001
PC9506 50V 100p 0402 X802001-001
X902975-001 L9502
SPK_OUT_R-
120ohm@100MHz 0402
R9502 0 X800967-001
SPK_OUT_R-_CN
SPK_OUT_R-_CN [29]
DNP R9503 0402 0 X800967-001
+5P0V_AUD_B_IN
L9503 1uH X880977-001 IND-FIXED,SM,1 uH,5.9 A,20%,5.4X5.2X1.5MM,PIME051E-1R0MS-01
PC941575 6.3V 0402 10u X867508-001
C941562 100u 120610V X864657-001
X902975-001 L9504
SPK_OUT_L+
R70185 0 X800967-001
SPK_OUT_L+_CN
SPK_OUT_L+_CN [29]
DNP R70183 0402 0 X800967-001
PC941576 50V 100p 0402 X802001-001
PC941577 50V 100p 0402 X802001-001
X902975-001 L9505
SPK_OUT_L-
R70186 0 X800967-001
SPK_OUT_L-_CN
SPK_OUT_L-_CN [29]
DNP R70184 0402 0 X800967-001
CON95000
78171-0004
X906609-001
MTG1
MTG2
<Variant Name>
Title
Audio AMP
Size C
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 37 of 86

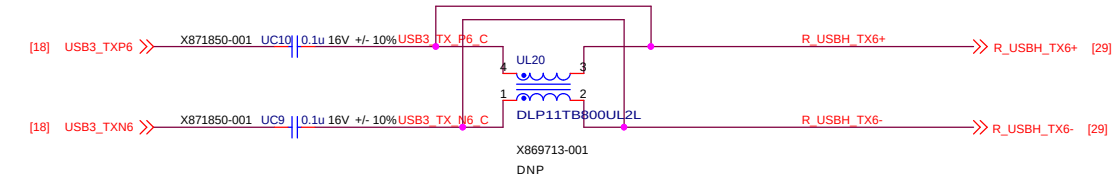
<variant_name><Variant Name></variant_name>

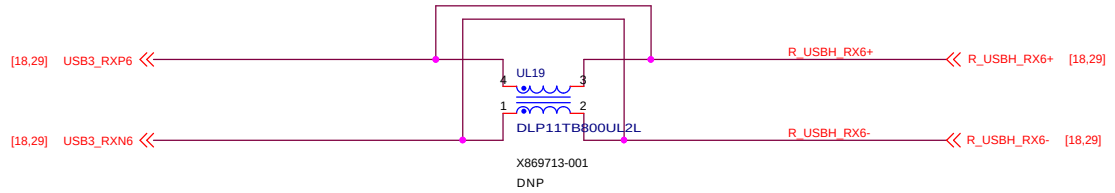
Title	NA	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 38 of 86	

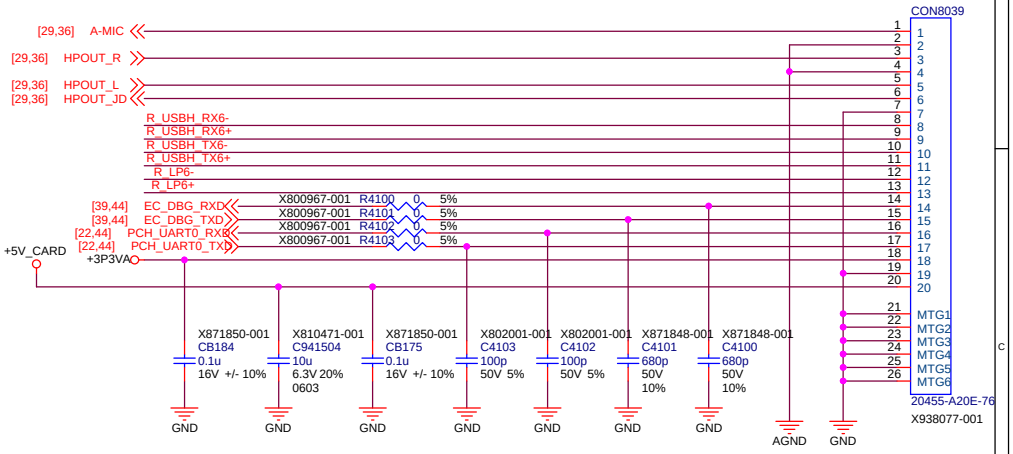

TBL3601
Build
R3619
POC
80.6 ohm
EV1.0
169 ohm
EV1.5
698 ohm
EV2.0
909 ohm
EV2.3
1.18K ohm
EV2.5
1.50K ohm
EV2.7
2.67K ohm
DV
9.31K ohm
PV
2.08K ohm
5.49K ohm
3.74K ohm
23.2K ohm
TBL3602
Build
R70390
13+dGPU
80.6 ohm
15+dGPU
169 ohm
17+dGPU
698 ohm
13+iGPU
909 ohm
15+iGPU
1.18K ohm
17+iGPU
1.50K ohm
2.67K ohm
9.31K ohm
2.08K ohm
5.49K ohm
3.74K ohm
23.2K ohm
Input Only
teknisi indonesia
7-bit I2C Address = 0x4E
PLEASE DO NOT PLACE ANY PULL-UP RESISTOR ON GPG0, GPG2 AND GPG6 (Reserved hardware strapping).
EC SPI ROM
To PCH
To EC
5/23 PV
EC ITE IT8528
NHK_MB

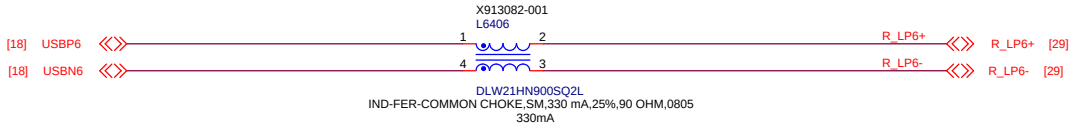


ELECTRIC FUNCTION	WRITE PROTECT				CARD DETECT	
	WRITE UNABLE		WRITE ENABLE			
CARD NAME	MMC	SD	MMC	SD	MMC	SD
WITHOUT CARD		OPEN		OPEN	OPEN	OPEN
CARD INSERTED		OPEN		CLOSE	CLOSE	CLOSE





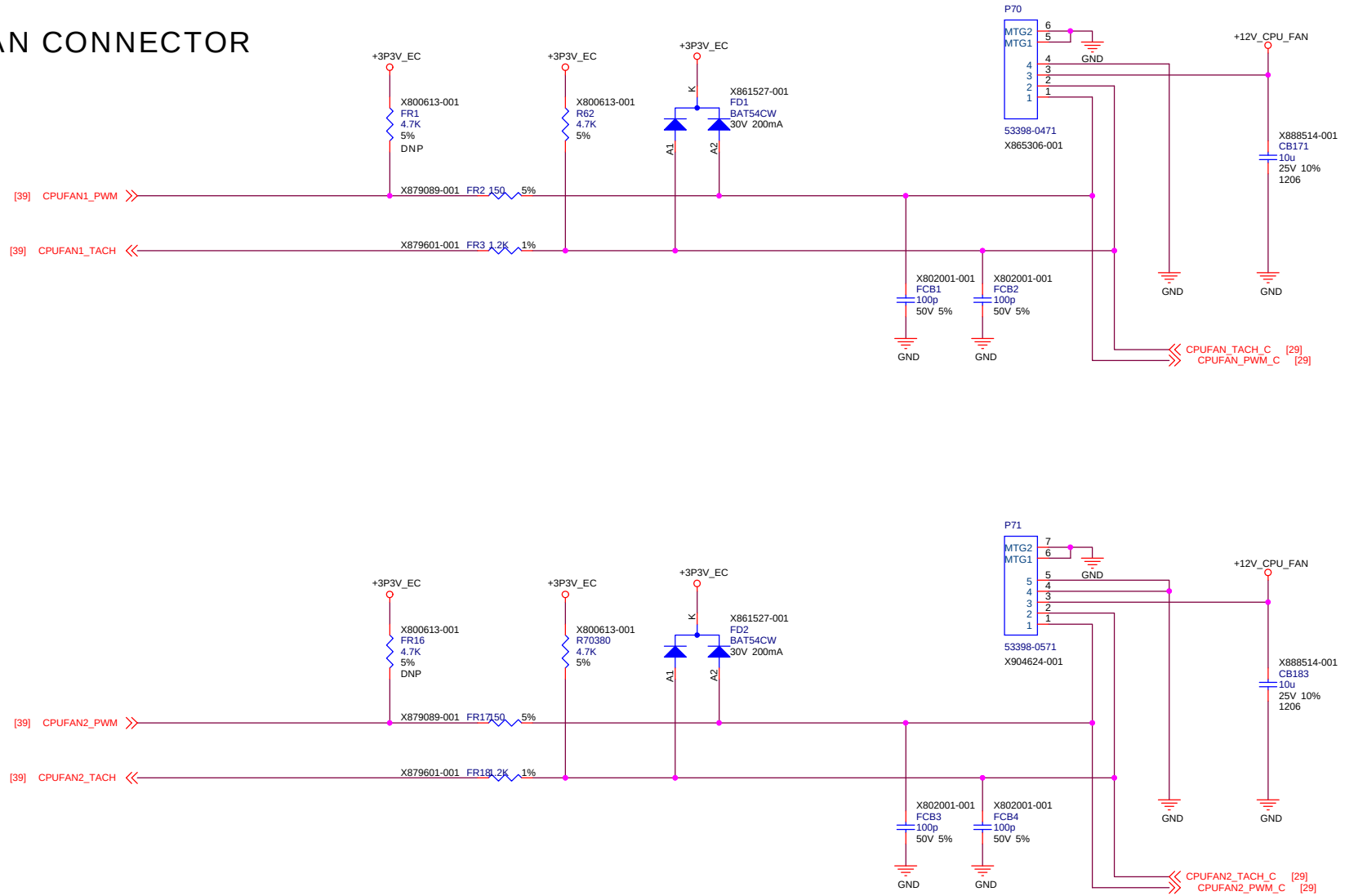




<variant_name>

Title	CARD READER CON	
Size A3	Document Number	Rev
Date: Wednesday, May 25, 2016	Sheet 41 of 86	

CPU FAN CONNECTOR



<Variant Name>

Title	FAN CIRCUIT	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 42 of 86	

H1
X938583-001
1
GND

for SSD nut

H28
1
C71D71N
MECH

H29
1
C71D71N
MECH

H30
1
C71D71N
MECH

MH mtg_pin_7p00x4p00d

H3
1
c158d158n
MECH

HDD

H37
1
C179D179N
MECH

GPU Screw hole

H35
X944363-002
1
GND

H34
X944363-002
1
GND

H36
X944363-002
1
GND

CPU Screw hole

H38
1
C179D179N
MECH

H39
X944363-002
1
GND

H40
1
C179D179N
MECH

H41
1
C179D179N
MECH

MH mtg_pin_8p00x4p50d

DDR4 Shielding fence

SH1
SHIELD
1
GND
X937616-004
ZID = 00
ZOD = 00

SH2
SHIELD
1
GND
X943223-002
ZID = 00
ZOD = 00

H24
1
C179D179N
MECH

H27
1
C179D179N
MECH

H26
1
C179D179N
MECH

H25
1
C179D179N
MECH

Speaker cable Clip

MP1
X944360-003
X944360-003
1
GND

MP2
X944360-003
X944360-003
1
GND

MP3
X944360-003
X944360-003
1
GND

MP4
1
YSMTBR-49002
X947991-001
DNP
GND

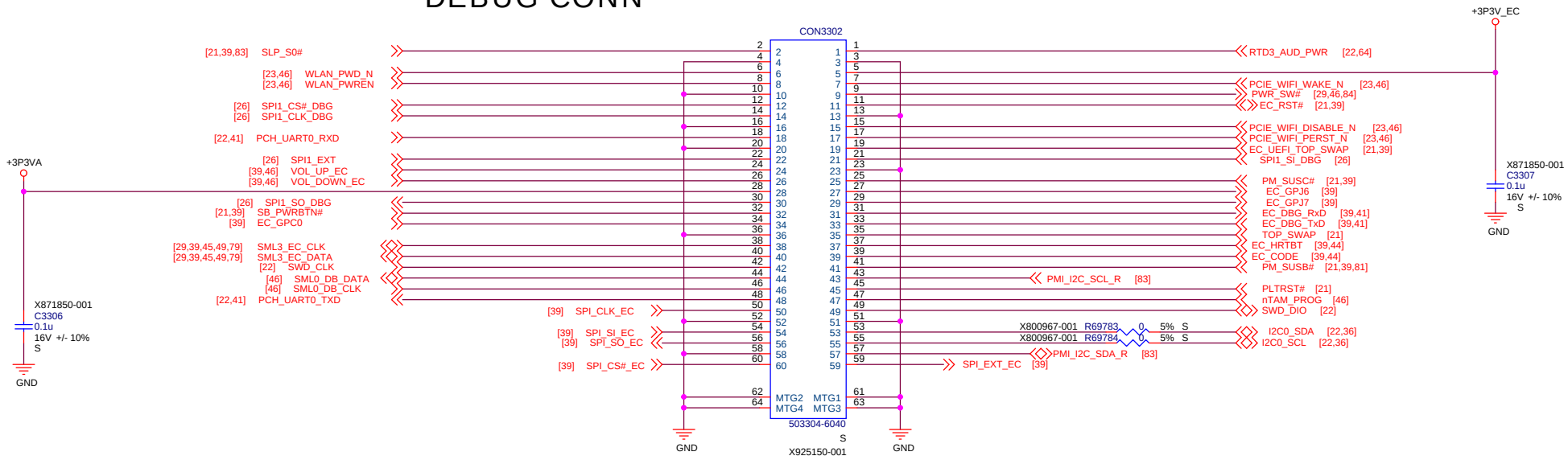
MP5
1
YSMTBR-49002
X947991-001
DNP
GND

X946948-005 PCB-RIGID,MAIN,BOTTOM,NIGHTHAWK,MP,10,FR4,CPQ
X946949-005 PCB-RIGID,MAIN,BOTTOM,NIGHTHAWK,MP,10,FR4,UMT

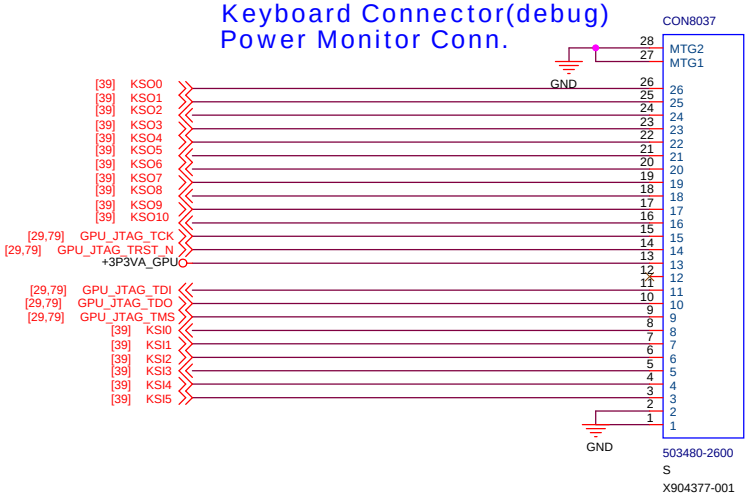
<Variant Name>

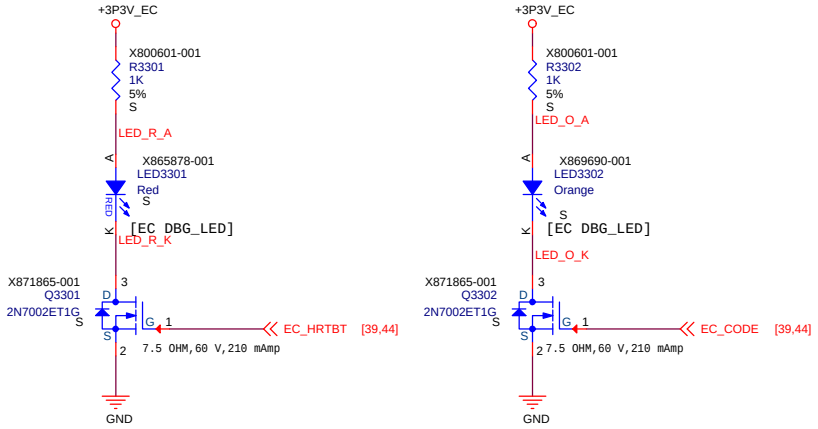
Title	SCREW HOLE	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 43 of 86	

DEBUG CONN



Keyboard Connector(debug)
Power Monitor Conn.

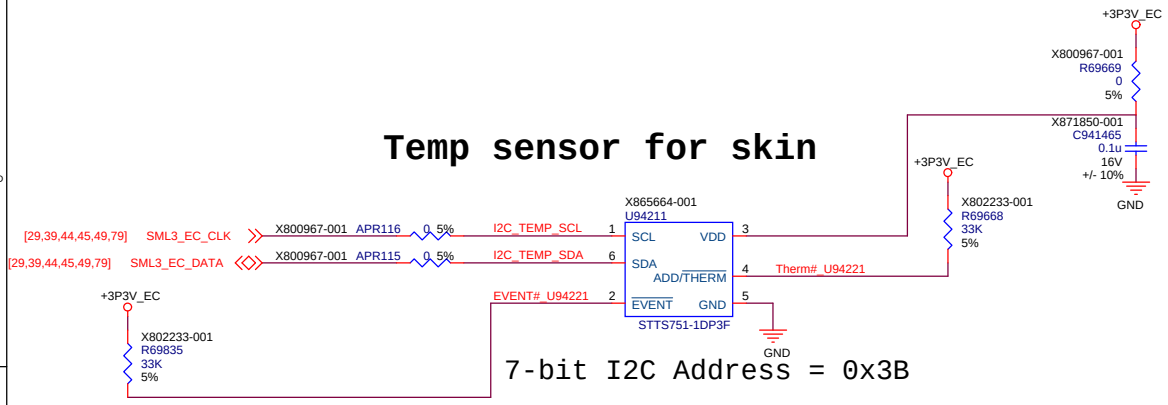




<Variant Name>

Title	LPC / DEBUG	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 44 of 86	

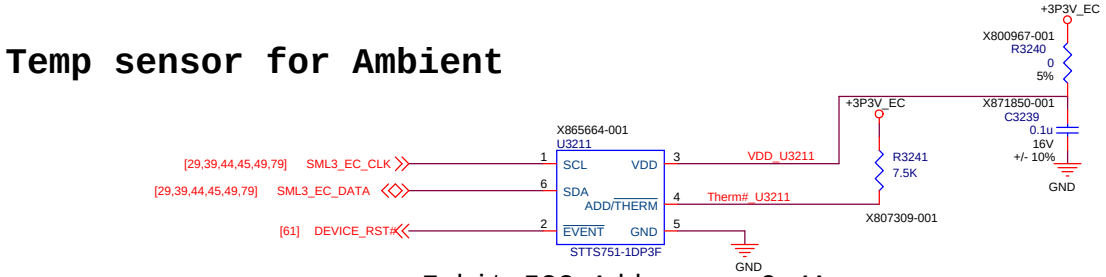
Temp sensor for skin



7-bit I2C Address = 0x3B

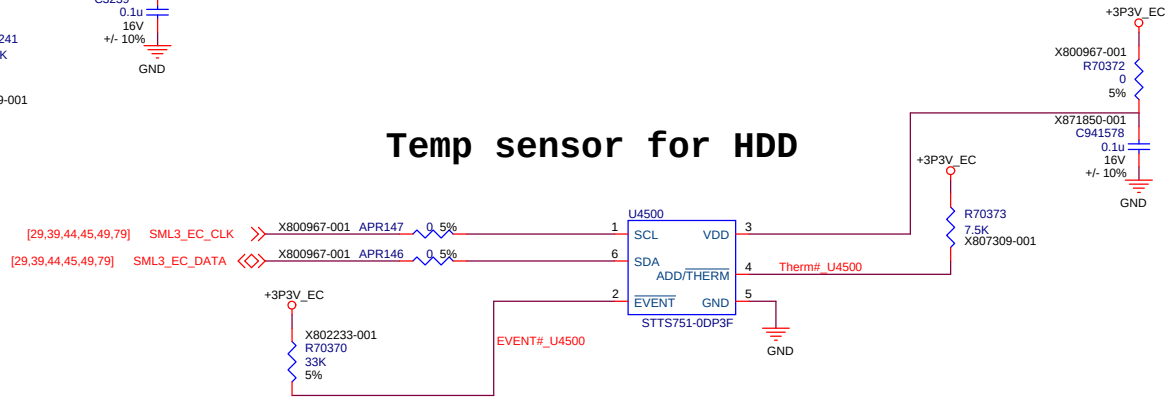
www.teknisi-indonesia.com

Temp sensor for Ambient



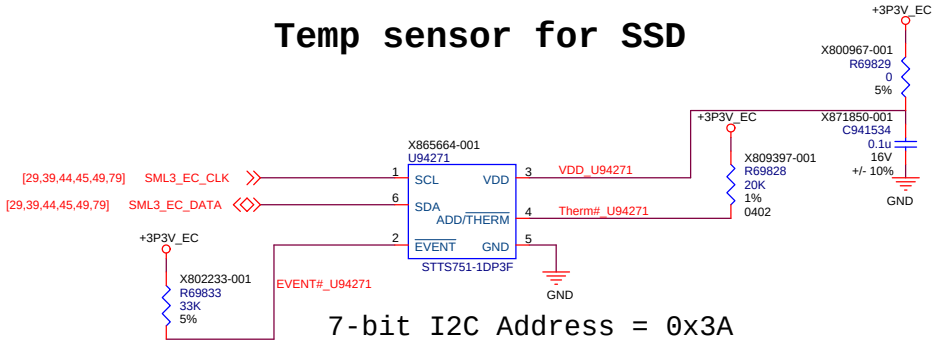
7-bit I2C Address = 0x4A

Temp sensor for HDD



7-bit I2C Address = 0x48

Temp sensor for SSD

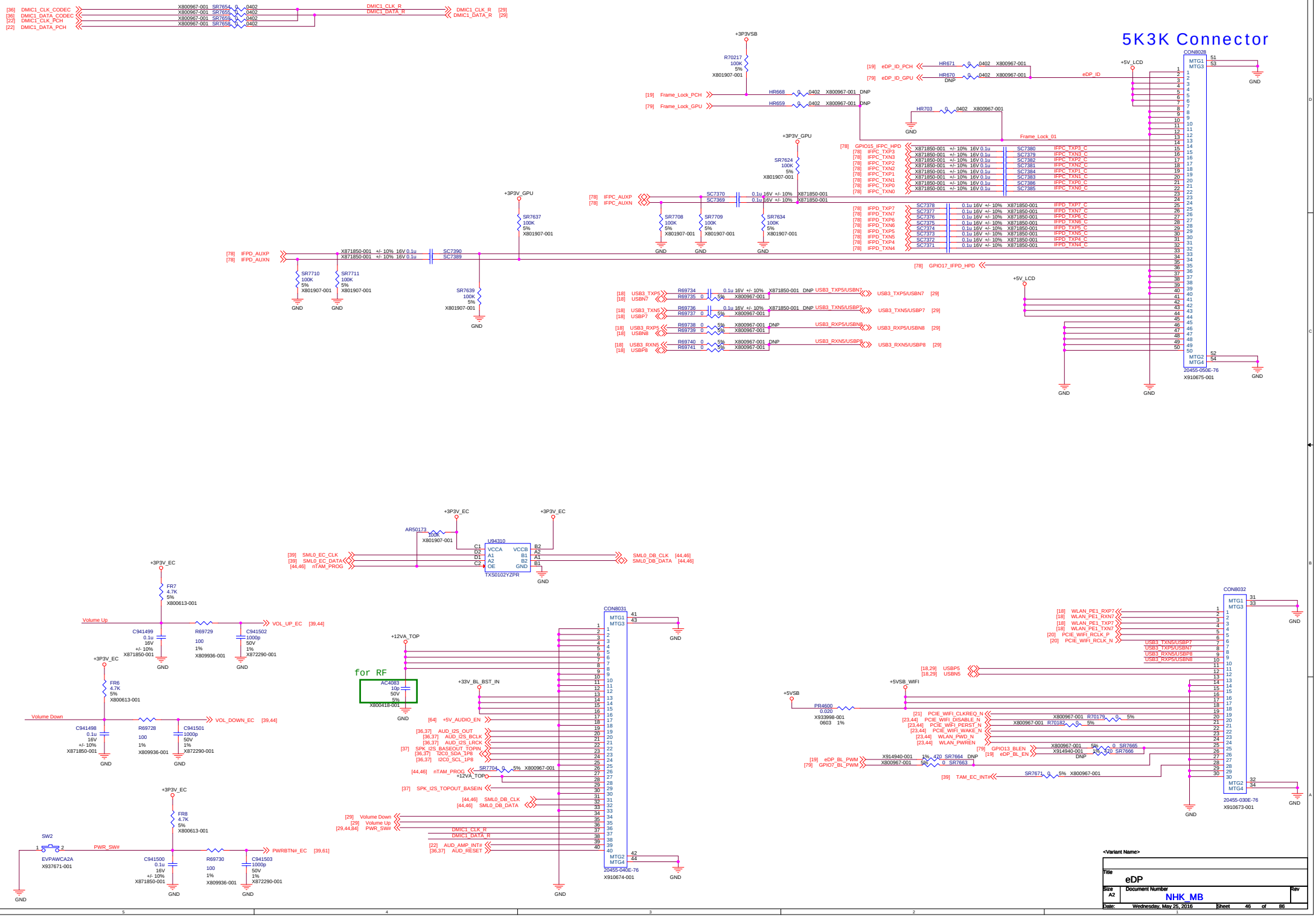


7-bit I2C Address = 0x3A

<Variant Name>

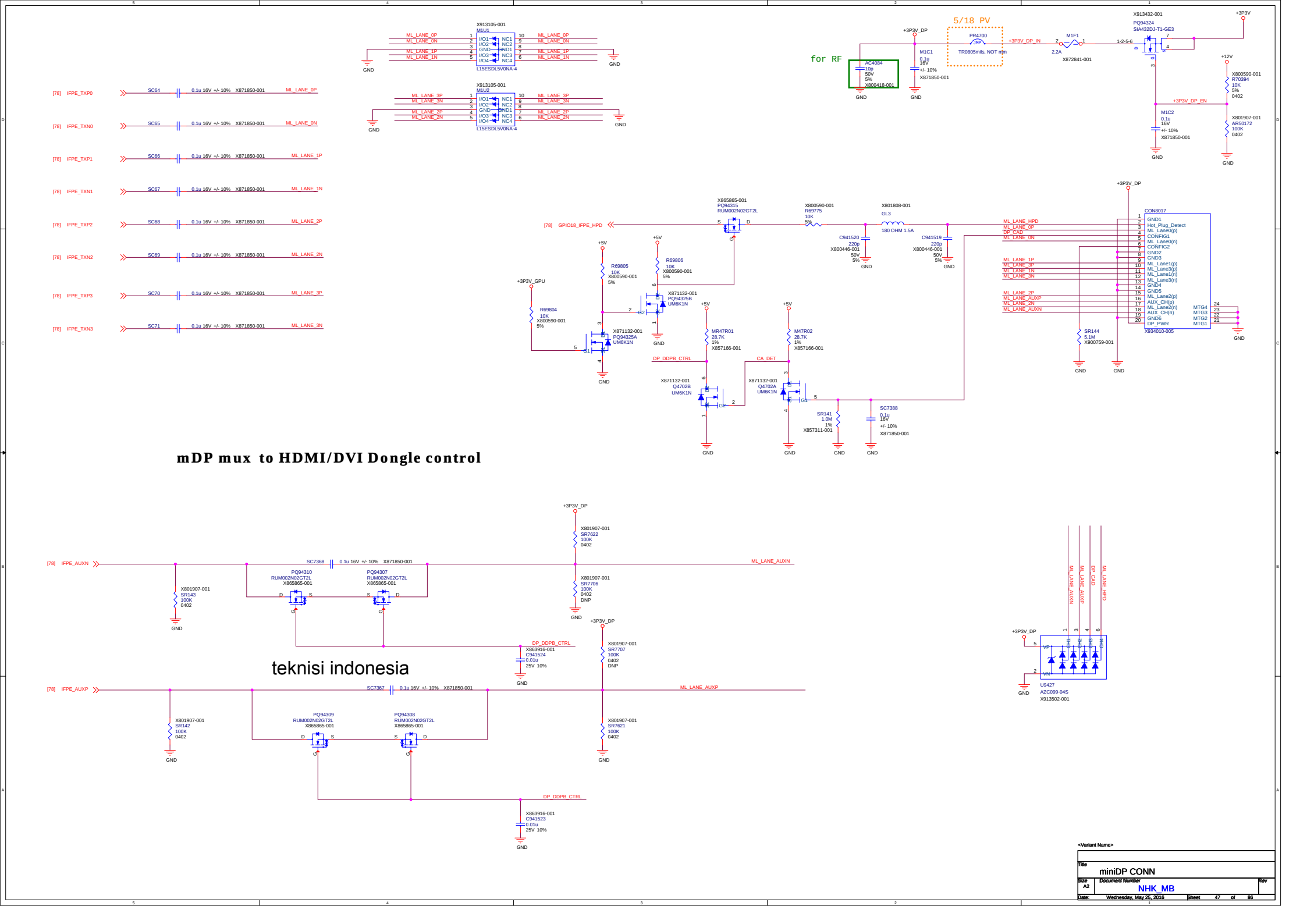
Title: Temp Sensor		
Size: A3	Document Number: NHK_MB	Rev:
Date: Wednesday, May 25, 2016	Sheet 45 of 86	

5K3K Connector

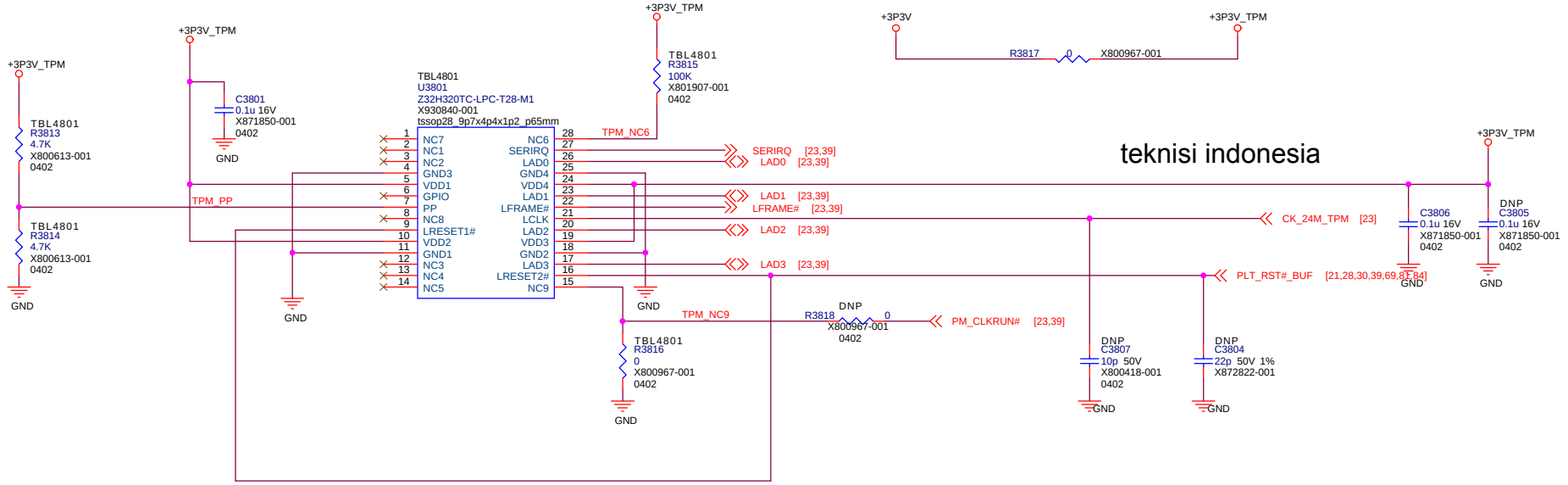


<variant_name>

Title	eDP		
Size A2	Document Number NHK_MB		Rev
Date: Wednesday, May 25, 2016	Sheet 46 of 86		


mDP mux to HDMI/DVI Dongle control
teknisi indonesia
5/18 PV
for RF
[78] IFPE_TXP0
[78] IFPE_TXN0
[78] IFPE_TXP1
[78] IFPE_TXN1
[78] IFPE_TXP2
[78] IFPE_TXN2
[78] IFPE_TXP3
[78] IFPE_TXN3
[78] IFPE_AUXN
[78] IFPE_AUXP
[78] GPIO18_IFPE_HPD
ML_LANE_0P
ML_LANE_0N
ML_LANE_1P
ML_LANE_1N
ML_LANE_2P
ML_LANE_2N
ML_LANE_3P
ML_LANE_3N
ML_LANE_AUXN
ML_LANE_AUXP
ML_LANE_HPD
DP_CAD
DP_DDPB_CTRL
CA_DET
+3P3V_DP
+3P3V_GPU
+5V
+12V
GND
CON8017
X934010-005
X913105-001
L15ESDL5V0NA-4
X865865-001
PQ94315
RUM002N02GT2L
X871132-001
PQ94325B
UM6K1N
PQ94325A
Q4702B
Q4702A
X913432-001
PQ94324
SIA432DJ-T1-GE3
X872841-001
X863916-001
C941524
C941523
X801907-001
SR7622
SR7706
SR7707
SR7621
SR143
SR142
SR144
SR141
X900759-001
X857311-001
X857166-001
X800590-001
X801808-001
GL3
180 OHM 1.5A
X800418-001
X871850-001
X800446-001
X801907-001
AR50172
R70394
U9427
AZC099-04S
X9913502-001
PQ94310
PQ94307
PQ94309
PQ94308
PR4700
TR0805mils, NOT mm
SC64
SC65
SC66
SC67
SC68
SC69
SC70
SC71
SC7368
SC7367
SC7388
0.1u 16V +/- 10% X871850-001
M1U1
M1U2
M1C1
M1C2
M1F1
2.2A
1-2-5-6
MR47R01
M47R02
R69804
R69805
R69806
R69775
C941520
C941519
MTG1
MTG2
MTG3
MTG4
<Variant Name>
Title
miniDP CONN
Size
A2
Document Number
NHK_MB
Rev
Date:
Wednesday, May 25, 2016
Sheet
47
of
86

Trusted Platform Module



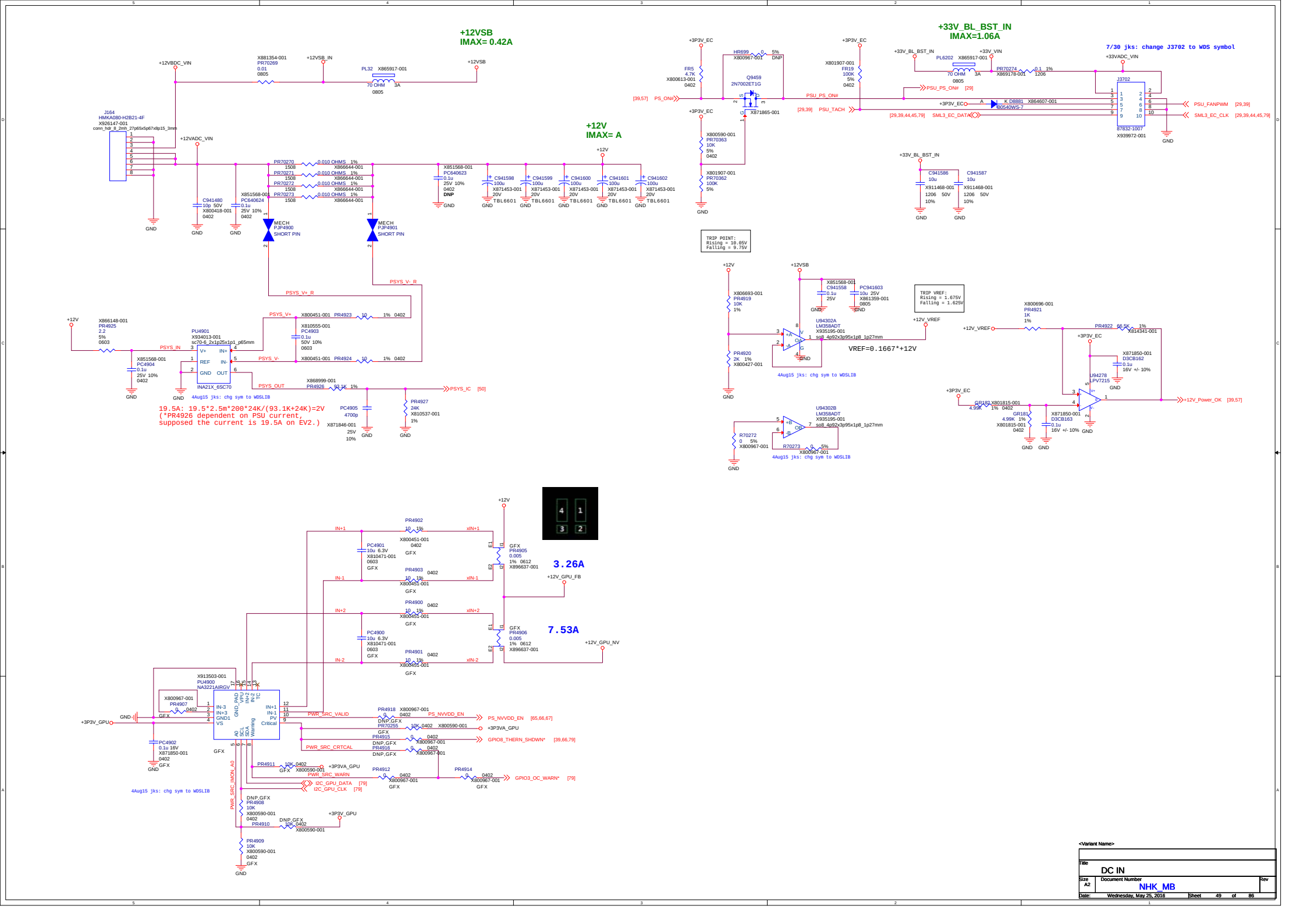
teknisi indonesia

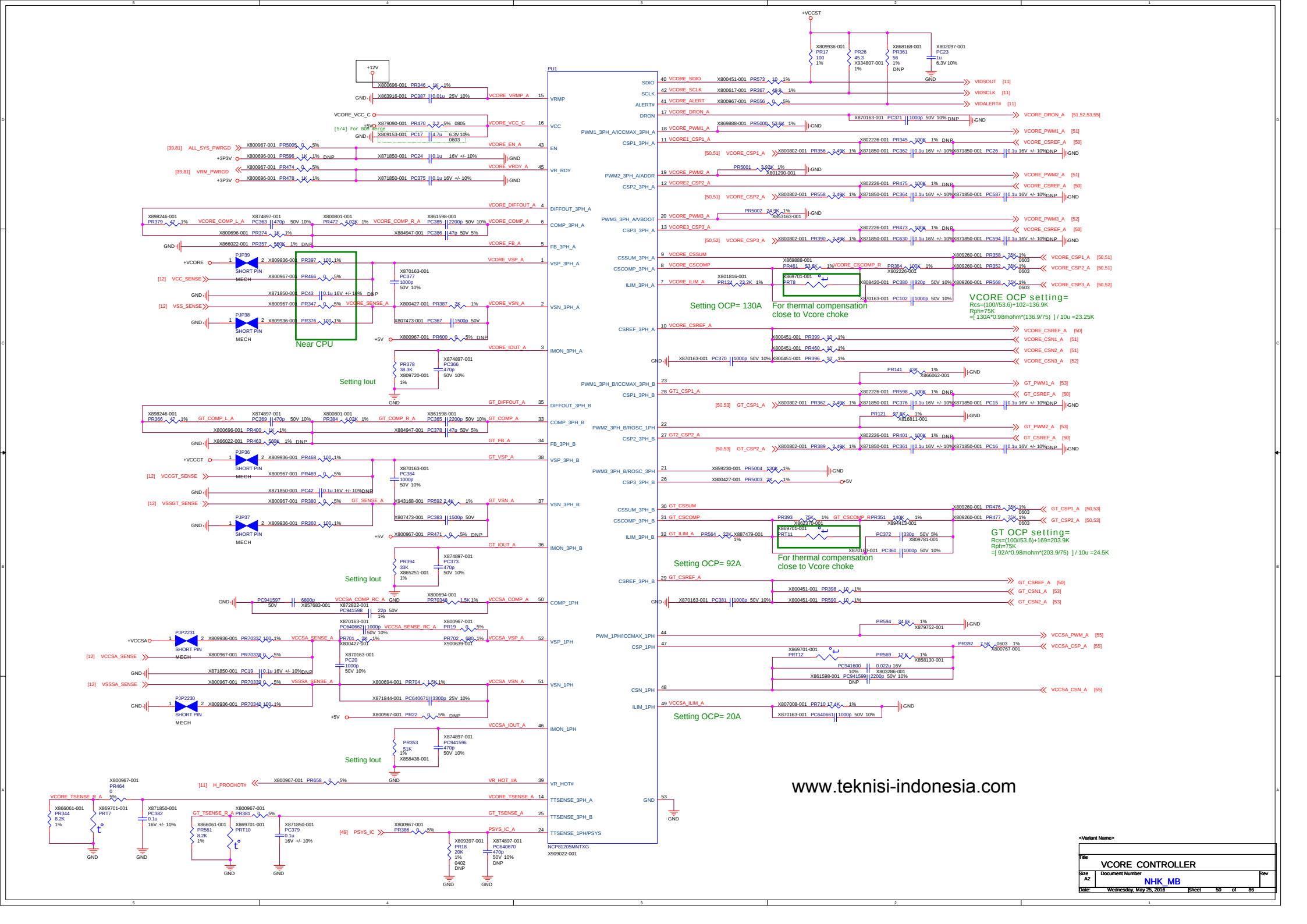
TBL4801

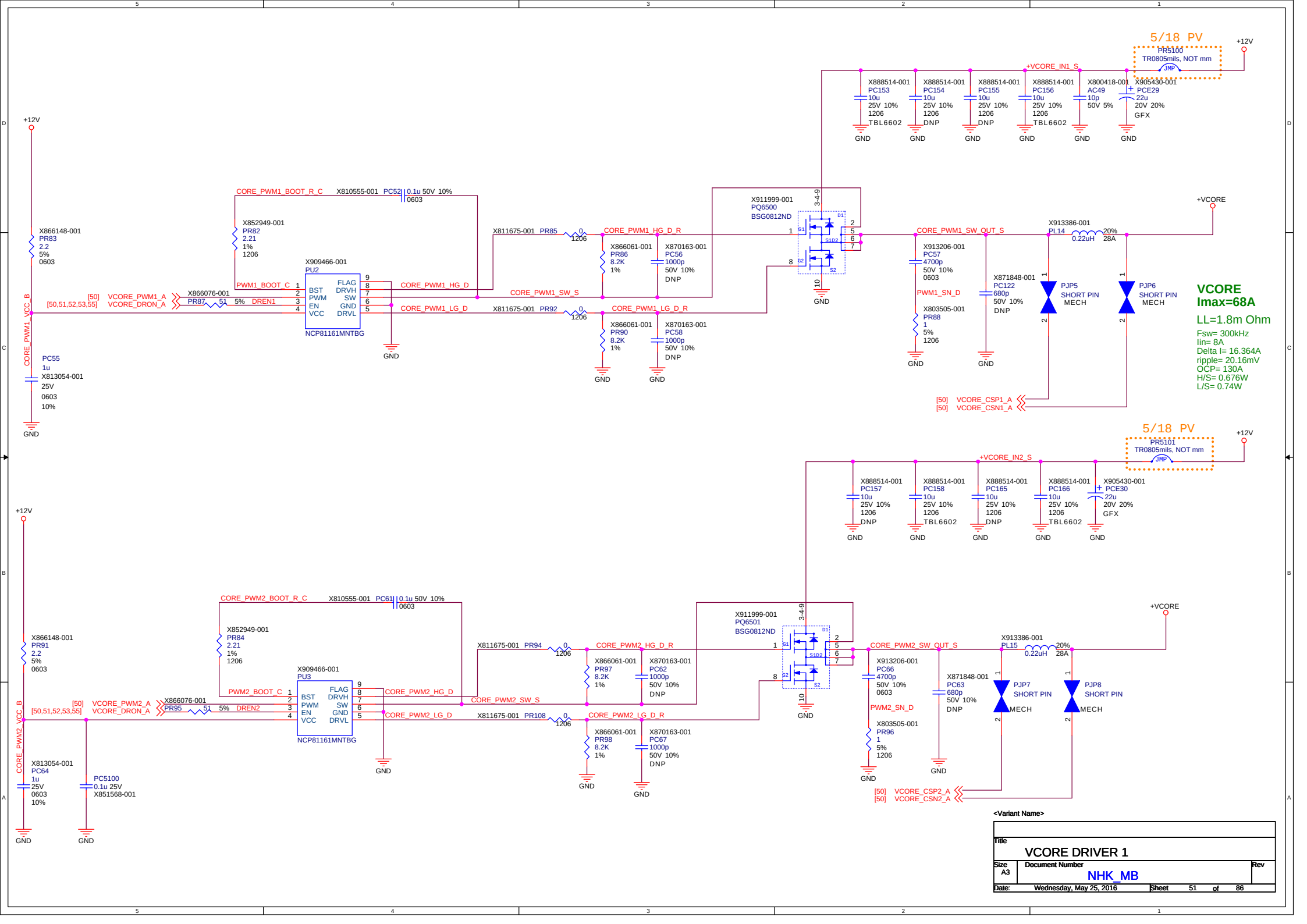
Ref	Infineon	NationZ
R2301	X800590-001	NO-STUFF
R2303	NO-STUFF	X800590-001
R3813	NO-STUFF	X800613-001
R3814	X800613-001	NO-STUFF
R3815	NO-STUFF	X801907-001
R3816	NO-STUFF	X800967-001
U3801	X912460-001	X930840-001

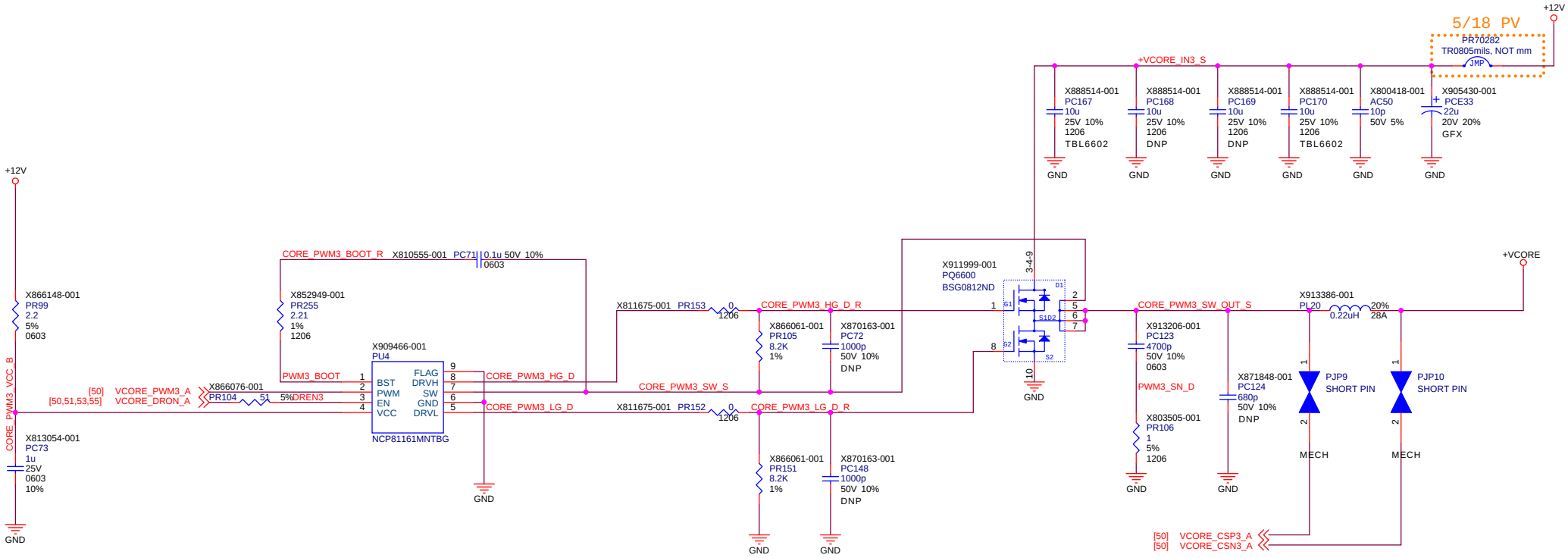
<Variant Name>

Title: TPM		
Size: A3	Document Number: NHK_MB	Rev:
Date: Wednesday, May 25, 2016	Sheet 48 of 86	


+12VSB
IMAX= 0.42A
+12V
IMAX= A
+33V_BL_BST_IN
IMAX=1.06A
7/30 jks: change J3702 to WDS symbol
+12VBDC_VIN
+12VSB_IN
+12VSB
+12VADC_VIN
+3P3V_EC
+33V_BL_BST_IN
+33V_VIN
+33VADC_VIN
PS_ON#
PSU_PS_ON#
PSU_TACH
PSU_FANPWM
SML3_EC_DATA
SML3_EC_CLK
PSYS_V+_R
PSYS_V-_R
PSYS_V+
PSYS_V-
PSYS_IN
PSYS_OUT
PSYS_IC
TRIP POINT:
Rising = 10.05V
Falling = 9.75V
TRIP VREF:
Rising = 1.675V
Falling = 1.625V
+12V_VREF
VREF=0.1667*+12V
+12V_Power_OK
19.5A: 19.5*2.5m*200*24K//(93.1K+24K)=2V
(*PR4926 dependent on PSU current,
supposed the current is 19.5A on EV2.)
3.26A
7.53A
+12V_GPU_FB
+12V_GPU_NV
+3P3V_GPU
PWR_SRC_VALID
PWR_SRC_CRTCAL
PWR_SRC_WARN
PWR_SRC_IMON_A0
PS_NVVDD_EN
GPIO8_THERN_SHDWN*
GPIO3_OC_WARN*
I2C_GPU_DATA
I2C_GPU_CLK
4Aug15 jks: chg sym to WDSLIB
DC IN
NHK_MB
Wednesday, May 25, 2016

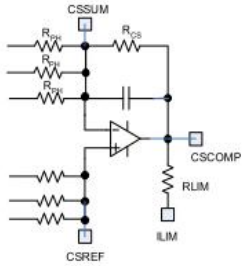

+VCCST
+12V
PU1
NCP81205MNTXG
X909022-001
SDIO
SCLK
ALERT#
DRON
PWM1_3PH_A/ICCMAX_3PH_A
CSP1_3PH_A
PWM2_3PH_A/ADDR
CSP2_3PH_A
PWM3_3PH_A/VBOOT
CSP3_3PH_A
CSSUM_3PH_A
CSCOMP_3PH_A
ILIM_3PH_A
CSREF_3PH_A
PWM1_3PH_B/ICCMAX_3PH_B
CSP1_3PH_B
PWM2_3PH_B/ROSC_1PH
CSP2_3PH_B
PWM3_3PH_B/ROSC_3PH
CSP3_3PH_B
CSSUM_3PH_B
CSCOMP_3PH_B
ILIM_3PH_B
CSREF_3PH_B
PWM_1PH/ICCMAX_1PH
CSP_1PH
CSN_1PH
ILIM_1PH
VRMP
VCC
EN
VR_RDY
DIFFOUT_3PH_A
COMP_3PH_A
FB_3PH_A
VSP_3PH_A
VSN_3PH_A
IMON_3PH_A
DIFFOUT_3PH_B
COMP_3PH_B
FB_3PH_B
VSP_3PH_B
VSN_3PH_B
IMON_3PH_B
COMP_1PH
VSP_1PH
VSN_1PH
IMON_1PH
VR_HOT#
TTSENSE_3PH_A
TTSENSE_3PH_B
TTSENSE_1PH/PSYS
VCORE_VRMP_A
VCORE_VCC_C
VCORE_EN_A
VCORE_VRDY_A
VCORE_DIFFOUT_A
VCORE_COMP_L_A
VCORE_COMP_R_A
VCORE_COMP_A
VCORE_FB_A
VCORE_VSP_A
VCORE_VSN_A
VCORE_IOUT_A
GT_DIFFOUT_A
GT_COMP_L_A
GT_COMP_R_A
GT_COMP_A
GT_FB_A
GT_VSP_A
GT_VSN_A
GT_IOUT_A
VCCSA_COMP_RC_A
VCCSA_COMP_A
VCCSA_SENSE_A
VCCSA_VSP_A
VCCSA_VSN_A
VCCSA_IOUT_A
VCCSA_SENSE_RC_A
VSSSA_SENSE_A
VR_HOT_#A
VCORE_TSENSE_R_A
VCORE_TSENSE_A
GT_TSENSE_R_A
GT_TSENSE_A
PSYS_IC_A
VCORE_SDIO
VCORE_SCLK
VCORE_ALERT
VCORE_DRON_A
VCORE_PWM1_A
VCORE1_CSP1_A
VCORE_PWM2_A
VCORE2_CSP2_A
VCORE_PWM3_A
VCORE3_CSP3_A
VCORE_CSSUM
VCORE_CSCOMP
VCORE_ILIM_A
VCORE_CSREF_A
GT1_CSP1_A
GT2_CSP2_A
GT_CSSUM
GT_CSCOMP
GT_ILIM_A
GT_CSREF_A
VCCSA_ILIM_A
VIDSOUT [11]
VIDSCLK [11]
VIDALERT# [11]
VCORE_DRON_A [51,52,53,55]
VCORE_PWM1_A [51]
VCORE_CSREF_A [50]
VCORE_PWM2_A [51]
VCORE_PWM3_A [52]
VCORE_CSP1_A [50,51]
VCORE_CSP2_A [50,51]
VCORE_CSP3_A [50,52]
GT_PWM1_A [53]
GT_PWM2_A [53]
GT_CSP1_A [50,53]
GT_CSP2_A [50,53]
VCCSA_PWM_A [55]
VCCSA_CSP_A [55]
VCCSA_CSN_A [55]
VCORE_CSN1_A [51]
VCORE_CSN2_A [51]
VCORE_CSN3_A [52]
GT_CSN1_A [53]
GT_CSN2_A [53]
Setting OCP= 130A
For thermal compensation close to Vcore choke
VCORE OCP setting=
Rcs=(100//53.6)+102=136.9K
Rph=75K
=[130A*0.98mohm*(136.9/75)] / 10u =23.25K
Setting OCP= 92A
For thermal compensation close to Vcore choke
GT OCP setting=
Rcs=(100//53.6)+169=203.9K
Rph=75K
=[92A*0.98mohm*(203.9/75)] / 10u =24.5K
Setting OCP= 20A
Near CPU
Setting Iout
Setting Iout
Setting Iout
www.teknisi-indonesia.com
<Variant Name>
Title
VCORE CONTROLLER
Size A2
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 50 of 86


5/18 PV
PR5100
TR0805mils, NOT mm
JMP
+12V
+VCORE_IN1_S
X888514-001 PC153 10u 25V 10% 1206 TBL6602
X888514-001 PC154 10u 25V 10% 1206 DNP
X888514-001 PC155 10u 25V 10% 1206 DNP
X888514-001 PC156 10u 25V 10% 1206 TBL6602
X800418-001 AC49 10p 50V 5%
X905430-001 PCE29 22u 20V 20% GFX
GND
CORE_PWM1_BOOT_R_C
X810555-001 PC52 0.1u 50V 10% 0603
X852949-001 PR82 2.21 1% 1206
X866148-001 PR83 2.2 5% 0603
X909466-001 PU2
BST PWM EN VCC FLAG DRVH SW GND DRVL
NCP81161MNTBG
PWM1_BOOT_C
[50] VCORE_PWM1_A
[50,51,52,53,55] VCORE_DRON_A
X866076-001 PR87 51 5% DREN1
CORE_PWM1_HG_D
CORE_PWM1_LG_D
CORE_PWM1_SW_S
X811675-001 PR85 0 1206
X811675-001 PR92 0 1206
CORE_PWM1_HG_D_R
CORE_PWM1_LG_D_R
X866061-001 PR86 8.2K 1%
X870163-001 PC56 1000p 50V 10% DNP
X866061-001 PR90 8.2K 1%
X870163-001 PC58 1000p 50V 10% DNP
X911999-001 PQ6500 BSG0812ND
CORE_PWM1_SW_OUT_S
X913206-001 PC57 4700p 50V 10% 0603
PWM1_SN_D
X803505-001 PR88 1 5% 1206
X871848-001 PC122 680p 50V 10% DNP
X913386-001 PL14 0.22uH 20% 28A
+VCORE
PJP5 SHORT PIN MECH
PJP6 SHORT PIN MECH
[50] VCORE_CSP1_A
[50] VCORE_CSN1_A
CORE_PWM1_VCC_B
PC55 1u X813054-001 25V 0603 10%
VCORE
Imax=68A
LL=1.8m Ohm
Fsw= 300kHz
Iin= 8A
Delta I= 16.364A
ripple= 20.16mV
OCP= 130A
H/S= 0.676W
L/S= 0.74W
5/18 PV
PR5101
TR0805mils, NOT mm
JMP
+VCORE_IN2_S
X888514-001 PC157 10u 25V 10% 1206 DNP
X888514-001 PC158 10u 25V 10% 1206 TBL6602
X888514-001 PC165 10u 25V 10% 1206 DNP
X888514-001 PC166 10u 25V 10% 1206 TBL6602
X905430-001 PCE30 22u 20V 20% GFX
CORE_PWM2_BOOT_R_C
X810555-001 PC61 0.1u 50V 10% 0603
X852949-001 PR84 2.21 1% 1206
X866148-001 PR91 2.2 5% 0603
X909466-001 PU3
PWM2_BOOT_C
[50] VCORE_PWM2_A
[50,51,52,53,55] VCORE_DRON_A
X866076-001 PR95 51 5% DREN2
CORE_PWM2_HG_D
CORE_PWM2_LG_D
CORE_PWM2_SW_S
X811675-001 PR94 0 1206
X811675-001 PR108 0 1206
CORE_PWM2_HG_D_R
CORE_PWM2_LG_D_R
X866061-001 PR97 8.2K 1%
X870163-001 PC62 1000p 50V 10% DNP
X866061-001 PR98 8.2K 1%
X870163-001 PC67 1000p 50V 10% DNP
X911999-001 PQ6501 BSG0812ND
CORE_PWM2_SW_OUT_S
X913206-001 PC66 4700p 50V 10% 0603
PWM2_SN_D
X803505-001 PR96 1 5% 1206
X871848-001 PC63 680p 50V 10% DNP
X913386-001 PL15 0.22uH 20% 28A
PJP7 SHORT PIN MECH
PJP8 SHORT PIN MECH
[50] VCORE_CSP2_A
[50] VCORE_CSN2_A
CORE_PWM2_VCC_B
X813054-001 PC64 1u 25V 0603 10%
PC5100 0.1u 25V X851568-001
<Variant Name>
Title
VCORE DRIVER 1
Size A3
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 51 of 86



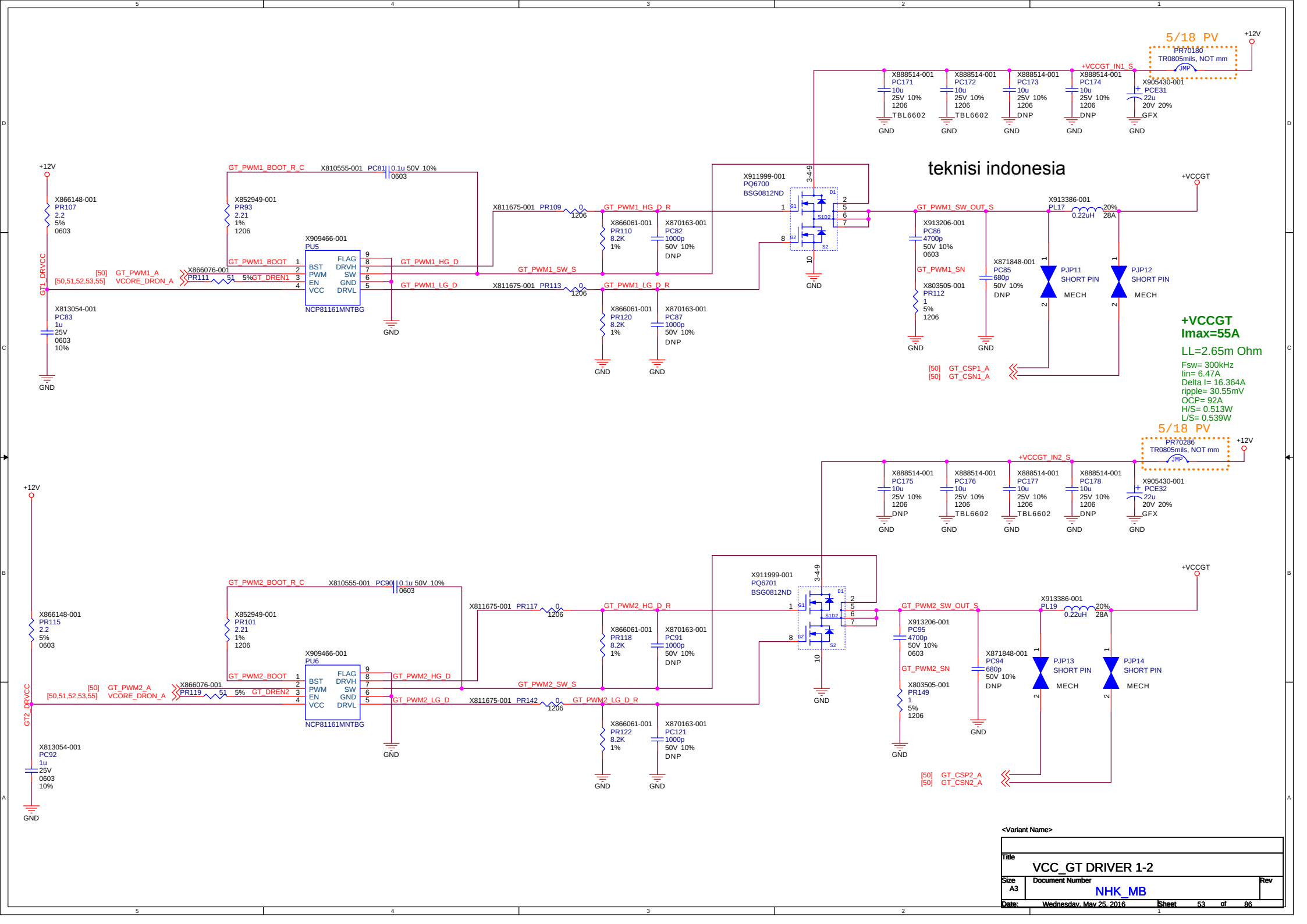
$$R_{ILIM} = \frac{I_{LIM} * DCR * R_{CS} / R_{PH}}{I_{CL}}$$

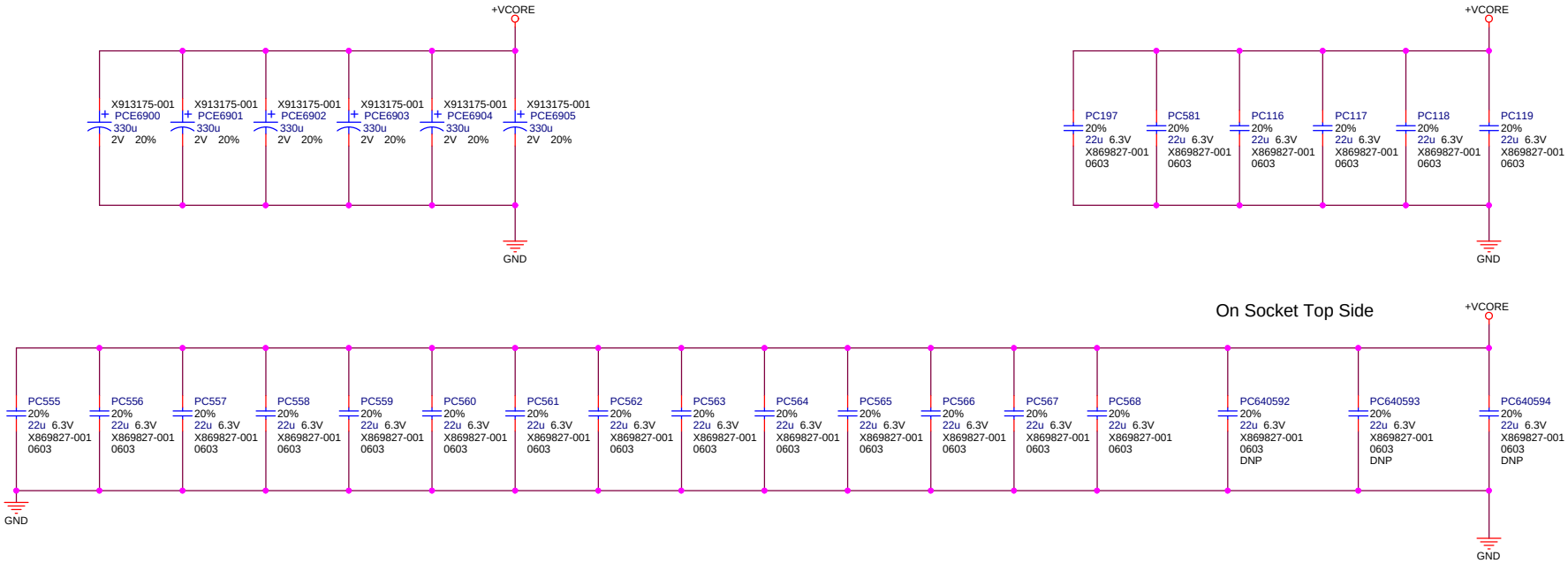
Where I_{CL} =10uA



<Variant Name>

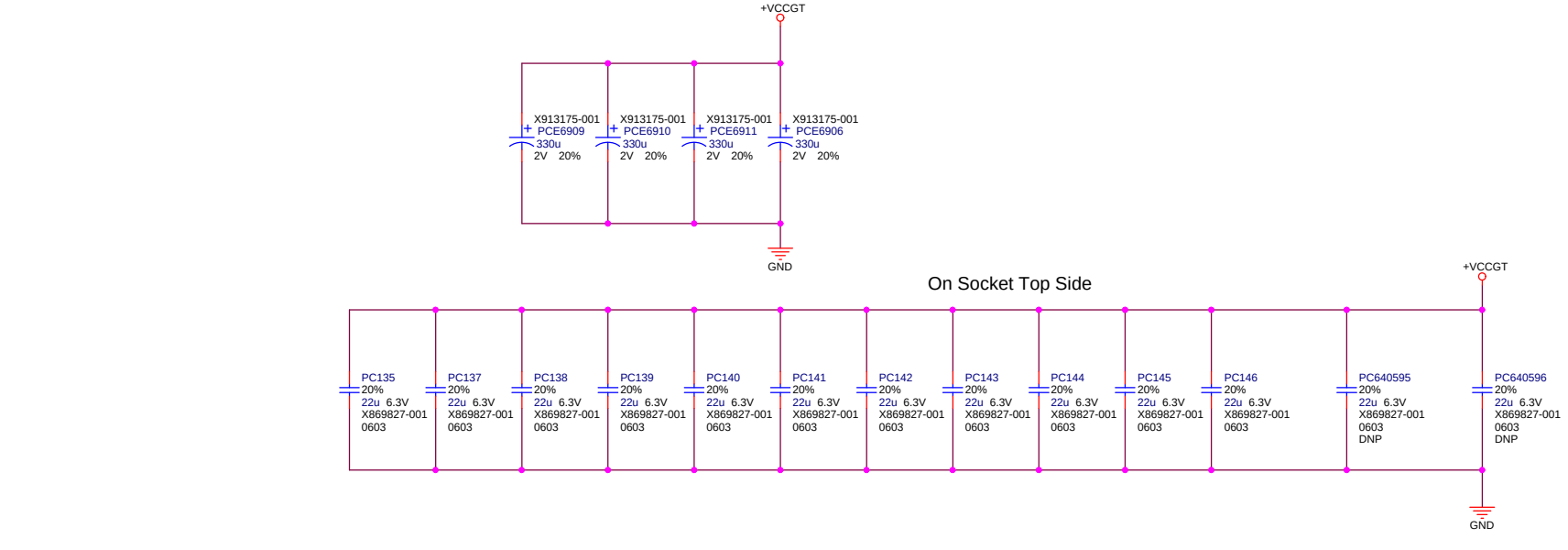
Title	VCORE DRIVER 2		
Size A3	Document Number NHK_MB		Rev
Date: Wednesday, May 25, 2016	Sheet 52 of 86		


5/18 PV
PR70180
TR0805mils, NOT mm
JMP
+12V
+VCCGT_IN1_S
X888514-001 PC171 10u 25V 10% 1206 TBL6602
X888514-001 PC172 10u 25V 10% 1206 TBL6602
X888514-001 PC173 10u 25V 10% 1206 DNP
X888514-001 PC174 10u 25V 10% 1206 DNP
X905430-001 PCE31 22u 20V 20% GFX
GND
teknisi indonesia
+VCCGT
GT_PWM1_BOOT_R_C
X810555-001 PC81 0.1u 50V 10% 0603
X852949-001 PR93 2.21 1% 1206
X866148-001 PR107 2.2 5% 0603
X909466-001 PU5
BST FLAG PWM DRVH EN SW VCC GND DRVL
NCP81161MNTBG
GT_PWM1_BOOT
GT_PWM1_HG_D
GT_PWM1_LG_D
GT_PWM1_A
VCORE_DRON_A
[50] [50,51,52,53,55]
X866076-001 PR111 51 5% GT_DREN1
GT1_DRVCC
X813054-001 PC83 1u 25V 0603 10%
X811675-001 PR109 0 1206
X811675-001 PR113 0 1206
GT_PWM1_HG_D_R
GT_PWM1_LG_D_R
GT_PWM1_SW_S
X866061-001 PR110 8.2K 1%
X870163-001 PC82 1000p 50V 10% DNP
X866061-001 PR120 8.2K 1%
X870163-001 PC87 1000p 50V 10% DNP
X911999-001 PQ6700 BSG0812ND
3-4-9
D1 G1 S1D2 G2 S2
GT_PWM1_SW_OUT_S
X913206-001 PC86 4700p 50V 10% 0603
GT_PWM1_SN
X803505-001 PR112 1 5% 1206
X871848-001 PC85 680p 50V 10% DNP
X913386-001 PL17 0.22uH 20% 28A
PJP11 SHORT PIN MECH
PJP12 SHORT PIN MECH
[50] GT_CSP1_A
[50] GT_CSN1_A
+VCCGT
Imax=55A
LL=2.65m Ohm
Fsw= 300kHz
Iin= 6.47A
Delta I= 16.364A
ripple= 30.55mV
OCP= 92A
H/S= 0.513W
L/S= 0.539W
5/18 PV
PR70286
TR0805mils, NOT mm
JMP
+12V
+VCCGT_IN2_S
X888514-001 PC175 10u 25V 10% 1206 DNP
X888514-001 PC176 10u 25V 10% 1206 TBL6602
X888514-001 PC177 10u 25V 10% 1206 TBL6602
X888514-001 PC178 10u 25V 10% 1206 DNP
X905430-001 PCE32 22u 20V 20% GFX
GND
GT_PWM2_BOOT_R_C
X810555-001 PC90 0.1u 50V 10% 0603
X852949-001 PR101 2.21 1% 1206
X866148-001 PR115 2.2 5% 0603
X909466-001 PU6
BST FLAG PWM DRVH EN SW VCC GND DRVL
NCP81161MNTBG
GT_PWM2_BOOT
GT_PWM2_HG_D
GT_PWM2_LG_D
GT_PWM2_A
VCORE_DRON_A
[50] [50,51,52,53,55]
X866076-001 PR119 51 5% GT_DREN2
GT2_DRVCC
X813054-001 PC92 1u 25V 0603 10%
X811675-001 PR117 0 1206
X811675-001 PR142 0 1206
GT_PWM2_HG_D_R
GT_PWM2_LG_D_R
GT_PWM2_SW_S
X866061-001 PR118 8.2K 1%
X870163-001 PC91 1000p 50V 10% DNP
X866061-001 PR122 8.2K 1%
X870163-001 PC121 1000p 50V 10% DNP
X911999-001 PQ6701 BSG0812ND
3-4-9
D1 G1 S1D2 G2 S2
GT_PWM2_SW_OUT_S
X913206-001 PC95 4700p 50V 10% 0603
GT_PWM2_SN
X803505-001 PR149 1 5% 1206
X871848-001 PC94 680p 50V 10% DNP
X913386-001 PL19 0.22uH 20% 28A
PJP13 SHORT PIN MECH
PJP14 SHORT PIN MECH
[50] GT_CSP2_A
[50] GT_CSN2_A
+VCCGT
<Variant Name>
Title
VCC_GT DRIVER 1-2
Size A3
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 53 of 86



Vcore Output CAP

330uF/2V * 6 pcs
22uF/6.3V * 20pcs

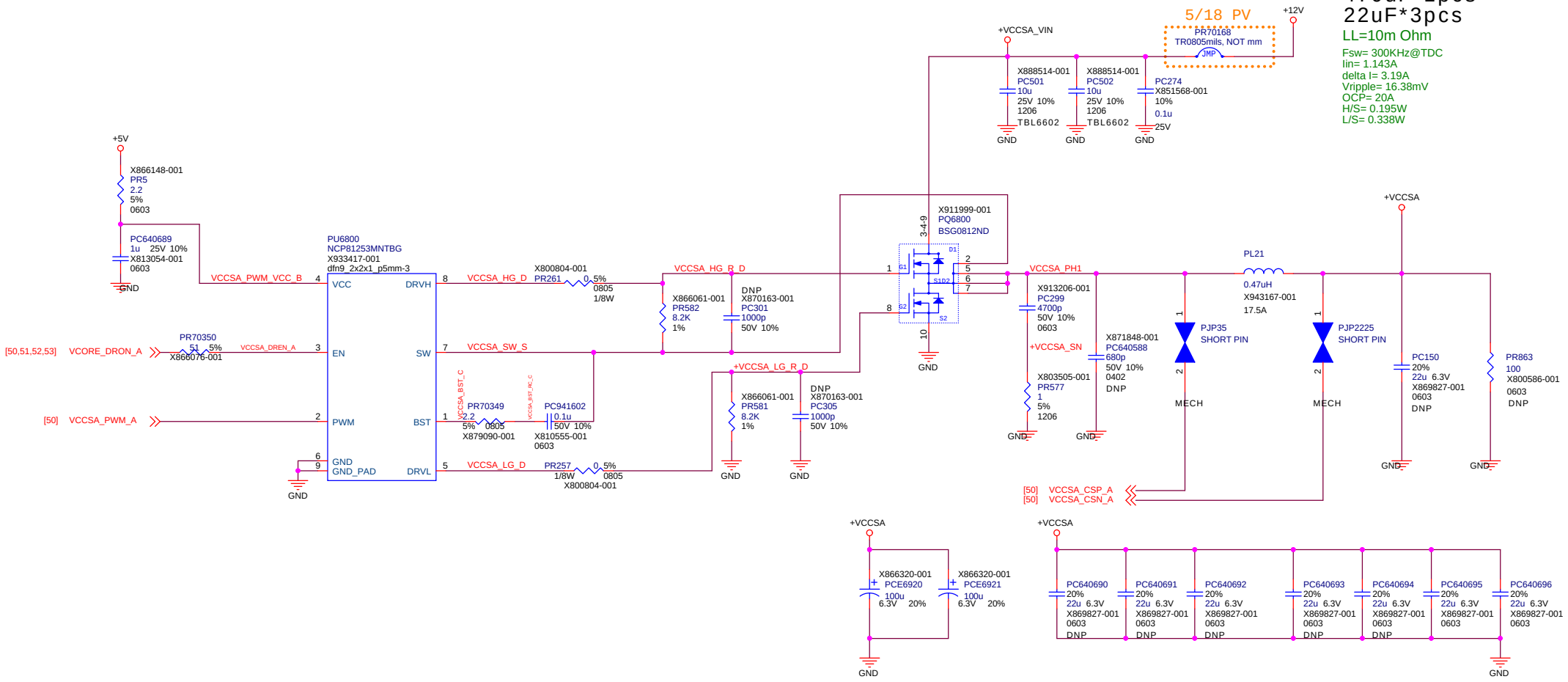


VCCGT Output CAP

300uF/2V * 4 pcs
22uF/6.3V * 11 pcs

<variant_name>

Title: VCORE & VCC_GT CAP		
Size: A3	Document Number: NHK_MB	Rev:
Date: Wednesday, May 25, 2016	Sheet 54 of 86	



<Variant Name>

Title	+VCCSA	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 55 of 86	

+12VA
Imax=14.67A
Icont=10A

CPU FAN POWER SWITCH

+12V_CPU_FAN
Imax=0.7A

GPIO default value=0

12VA TOP POWER SWITCH

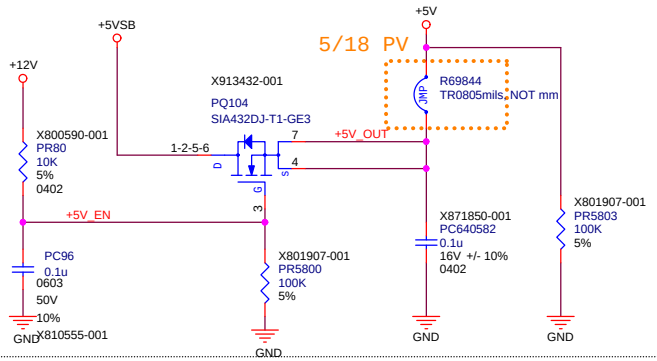
+12VA_TOP
Imax=4.69A

$$I_{OL} = \left(0.7 + 3 \times 10^{-5} \times R_{ILIM}\right)$$

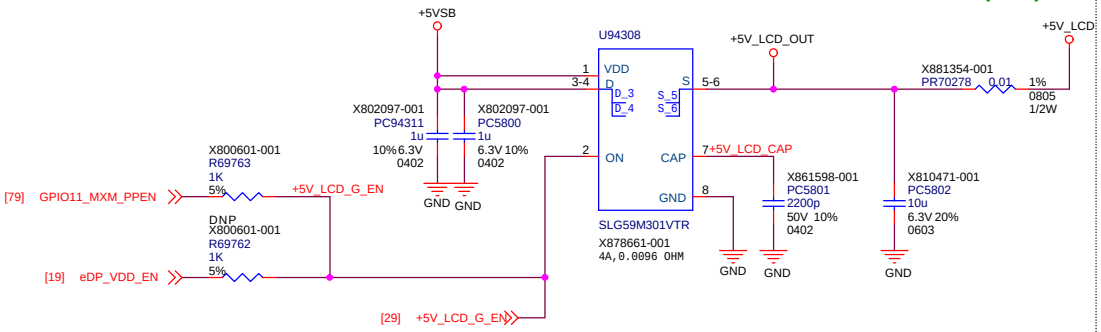
<Variant Name>

Title: IRMT & 12VA			
Size: A3	Document Number: NHK_MB		Rev:
Date: Wednesday, May 25, 2016	Sheet 57 of 86		

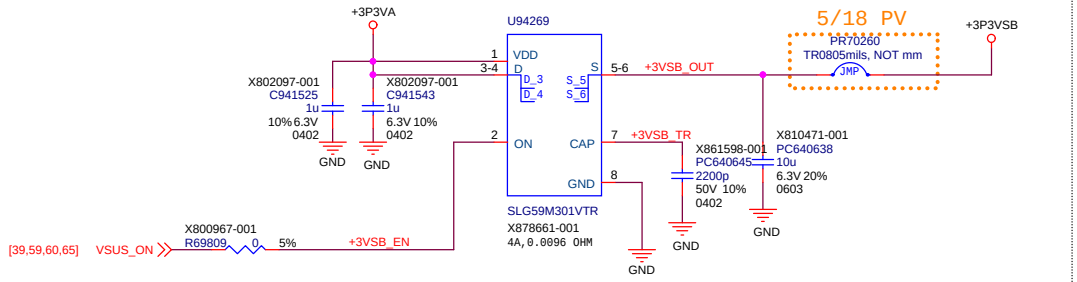
+5V/Imax:5.15A



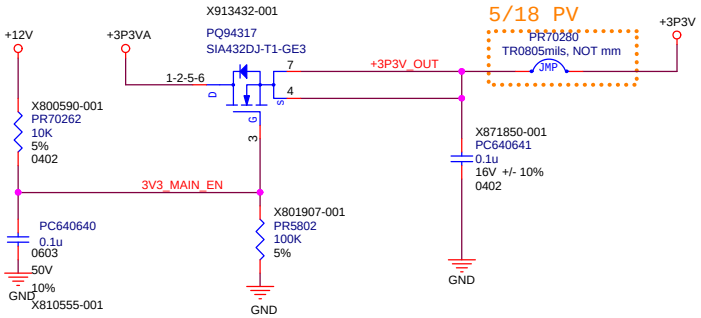
+5V_LCD
Imax=3A(15W)



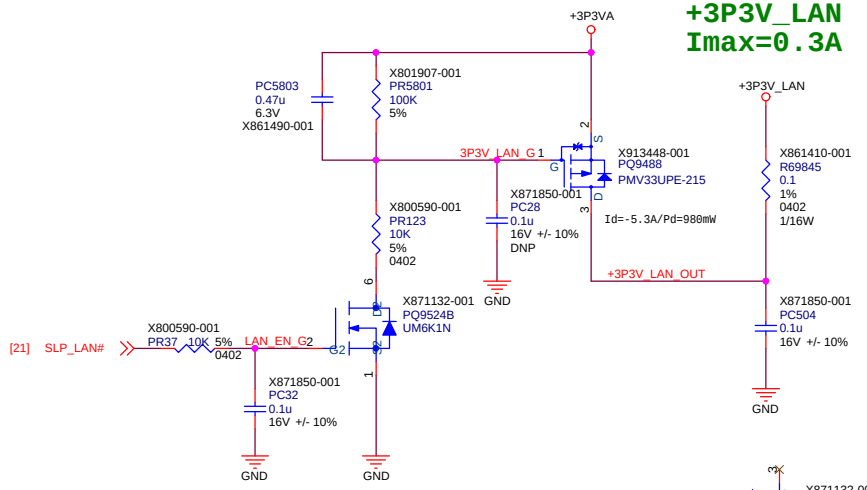
+3P3VSB /Imax:2.7A



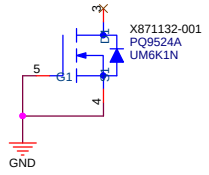
+3P3V /Imax:5.2A



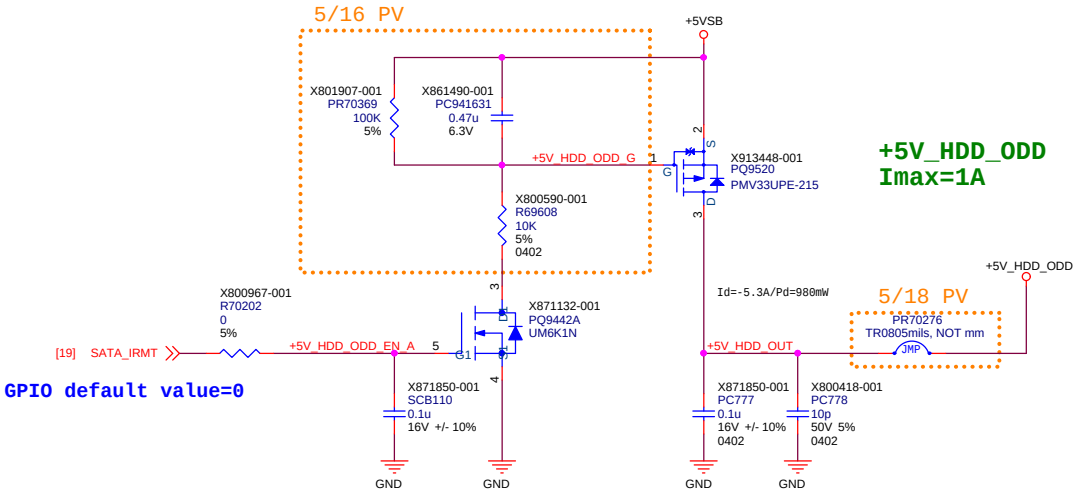
+3P3V_LAN
Imax=0.3A



WLAN 3V LDO removed



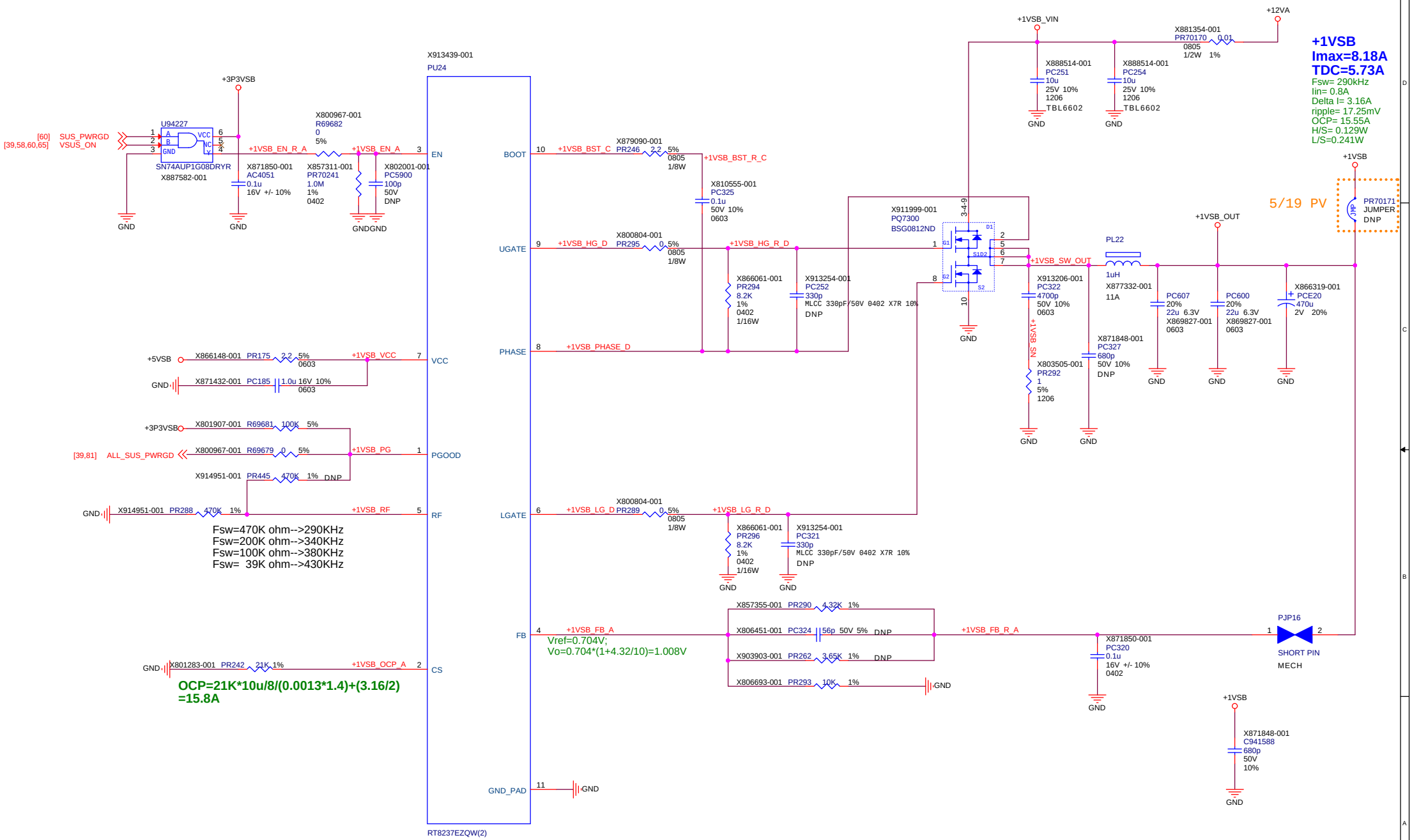
SATA HDD POWER SWITCH

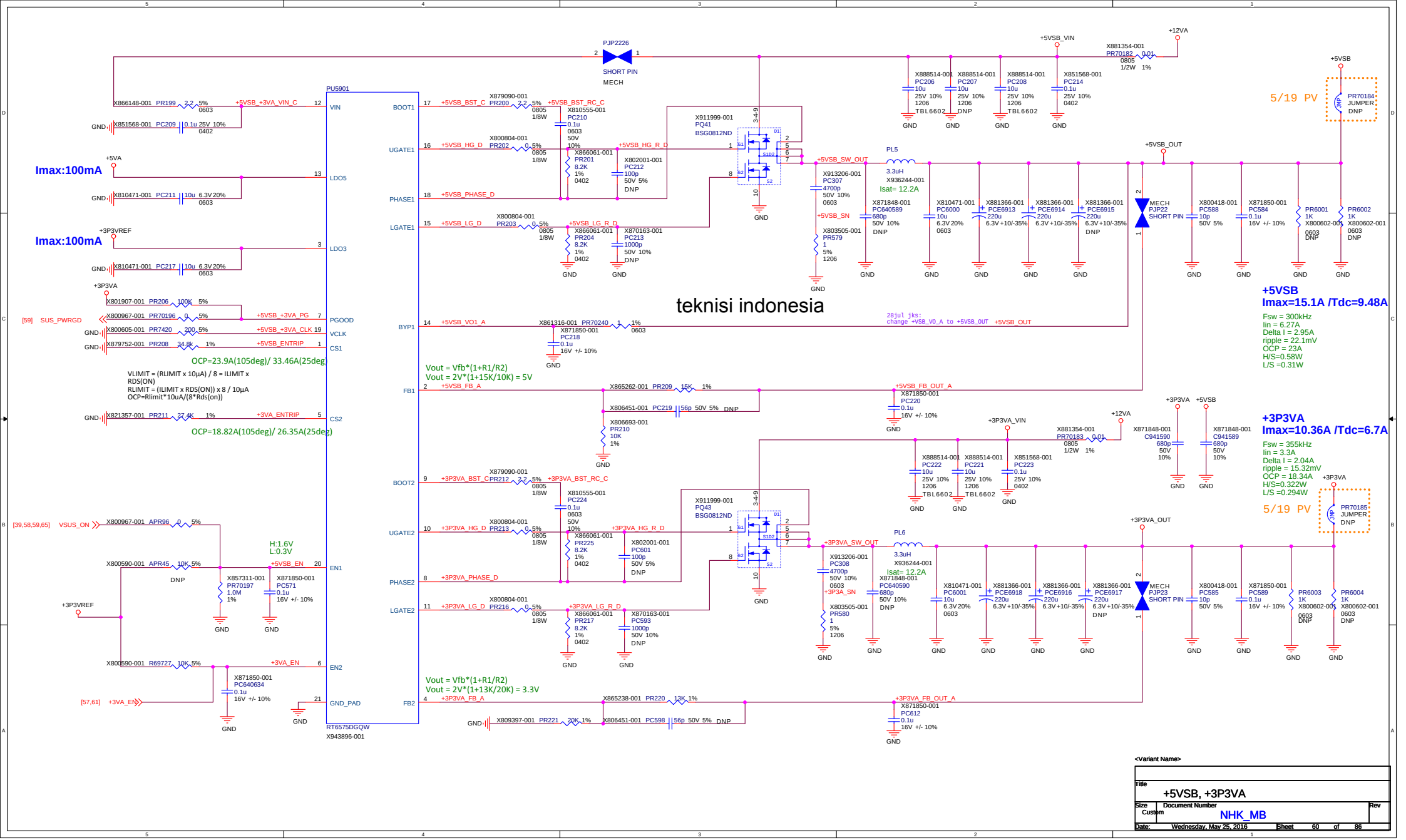


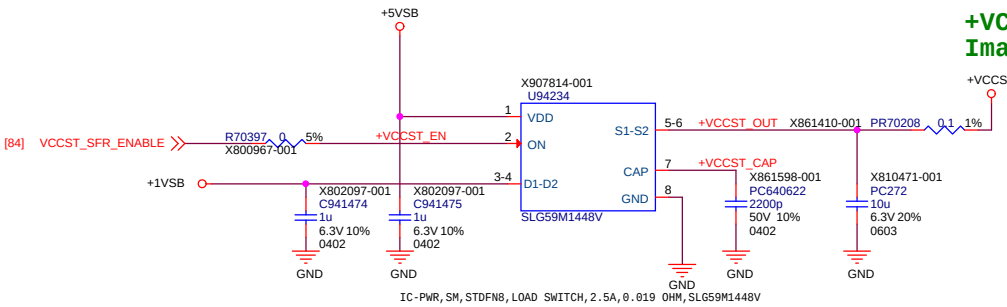
GPIO default value=0

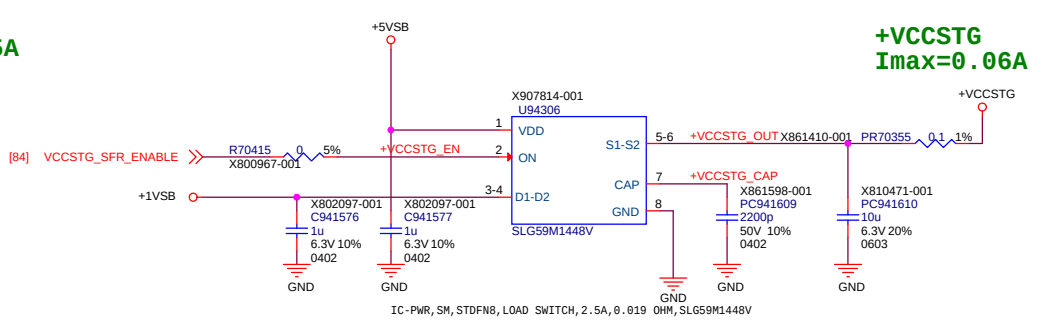
<Variant Name>

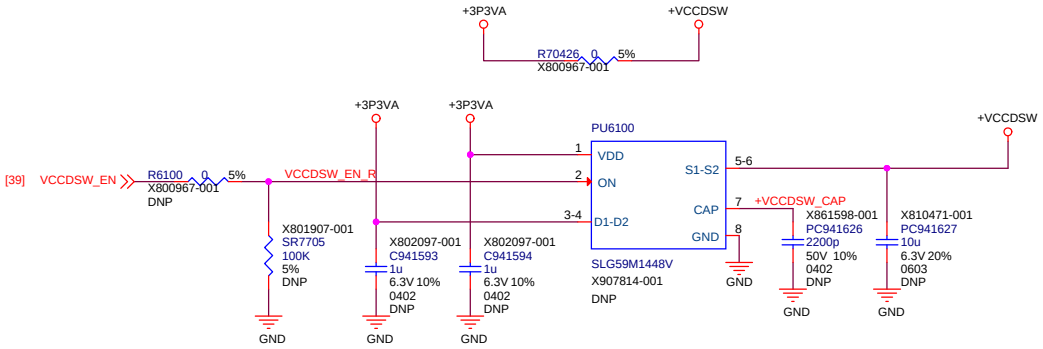
Title	+5V,+5VA,3P3V,3P3VSB	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 58 of 86	

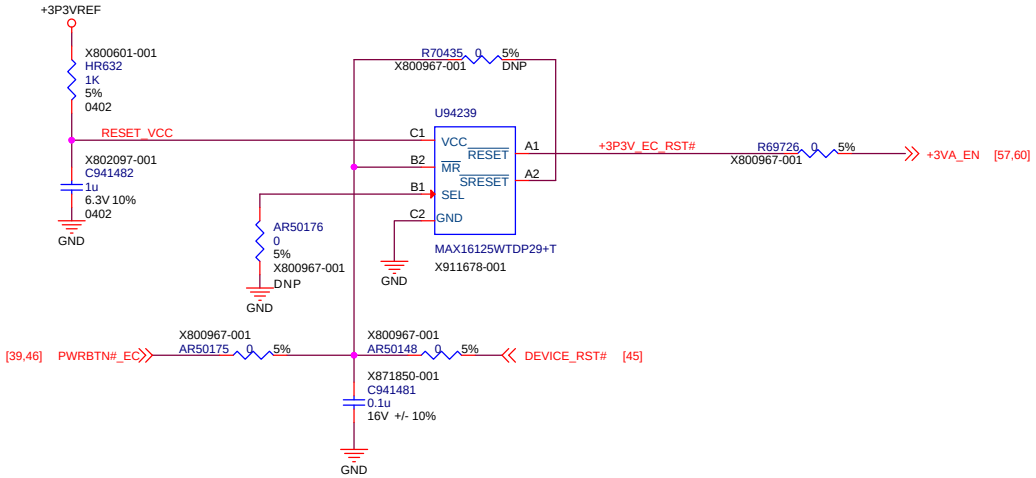

+1VSB
Imax=8.18A
TDC=5.73A
Fsw= 290kHz
Iin= 0.8A
Delta I= 3.16A
ripple= 17.25mV
OCP= 15.55A
H/S= 0.129W
L/S=0.241W
5/19 PV
X913439-001
PU24
RT8237EZQW(2)
Fsw=470K ohm-->290KHz
Fsw=200K ohm-->340KHz
Fsw=100K ohm-->380KHz
Fsw= 39K ohm-->430KHz
OCP=21K*10u/8/(0.0013*1.4)+(3.16/2)
=15.8A
Vref=0.704V;
Vo=0.704*(1+4.32/10)=1.008V
SN74AUP1G08DRYR
X887582-001
SHORT PIN
MECH
<Variant Name>
Title
+1VSB
Size A3
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 59 of 86

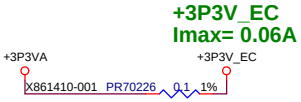

PU5901
RT6575DGQW
X943896-001
VIN
LDO5
LDO3
PGOOD
VCLK
CS1
CS2
EN1
EN2
GND_PAD
BOOT1
UGATE1
PHASE1
LGATE1
BYP1
FB1
BOOT2
UGATE2
PHASE2
LGATE2
FB2
PJP2226
SHORT PIN
MECH
+12VA
+5VSB_VIN
+5VSB
+5VSB_OUT
+5VSB_SW_OUT
+5VSB_SN
+5VSB_HG_R_D
+5VSB_LG_R_D
+5VSB_BST_C
+5VSB_BST_RC_C
+5VSB_PHASE_D
+5VSB_VO1_A
+5VSB_FB_A
+5VSB_FB_OUT_A
+5VA
+3P3VREF
+3P3VA
+3P3VA_VIN
+3P3VA_OUT
+3P3VA_SW_OUT
+3P3VA_HG_R_D
+3P3VA_LG_R_D
+3P3VA_BST_C
+3P3VA_BST_RC_C
+3P3VA_PHASE_D
+3P3VA_FB_A
+3P3VA_FB_OUT_A
PL5
3.3uH
X936244-001
Isat= 12.2A
PL6
3.3uH
X936244-001
Isat= 12.2A
PR70184
JUMPER
DNP
PR70185
JUMPER
DNP
5/19 PV
5/19 PV
Imax:100mA
Imax:100mA
OCP=23.9A(105deg)/ 33.46A(25deg)
OCP=18.82A(105deg)/ 26.35A(25deg)
VLIMIT = (RLIMIT x 10µA) / 8 = ILIMIT x RDS(ON)
RLIMIT = (ILIMIT x RDS(ON)) x 8 / 10µA
OCP=Rlimit*10uA/(8*Rds(on))
Vout = Vfb*(1+R1/R2)
Vout = 2V*(1+15K/10K) = 5V
Vout = Vfb*(1+R1/R2)
Vout = 2V*(1+13K/20K) = 3.3V
H:1.6V
L:0.3V
teknisi indonesia
+5VSB
Imax=15.1A /Tdc=9.48A
Fsw = 300kHz
Iin = 6.27A
Delta I = 2.95A
ripple = 22.1mV
OCP = 23A
H/S=0.58W
L/S =0.31W
+3P3VA
Imax=10.36A /Tdc=6.7A
Fsw = 355kHz
Iin = 3.3A
Delta I = 2.04A
ripple = 15.32mV
OCP = 18.34A
H/S=0.322W
L/S =0.294W
28jul jks:
change +VSB_VO_A to +5VSB_OUT +5VSB_OUT
[59] SUS_PWRGD
[39,58,59,65] VSUS_ON
[57,61] +3VA_EN
<Variant Name>
Title
+5VSB, +3P3VA
Size
Custom
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 60 of 86











<variant_name>

Title	+VCCST,+3P3V_EC	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 61 of 86	

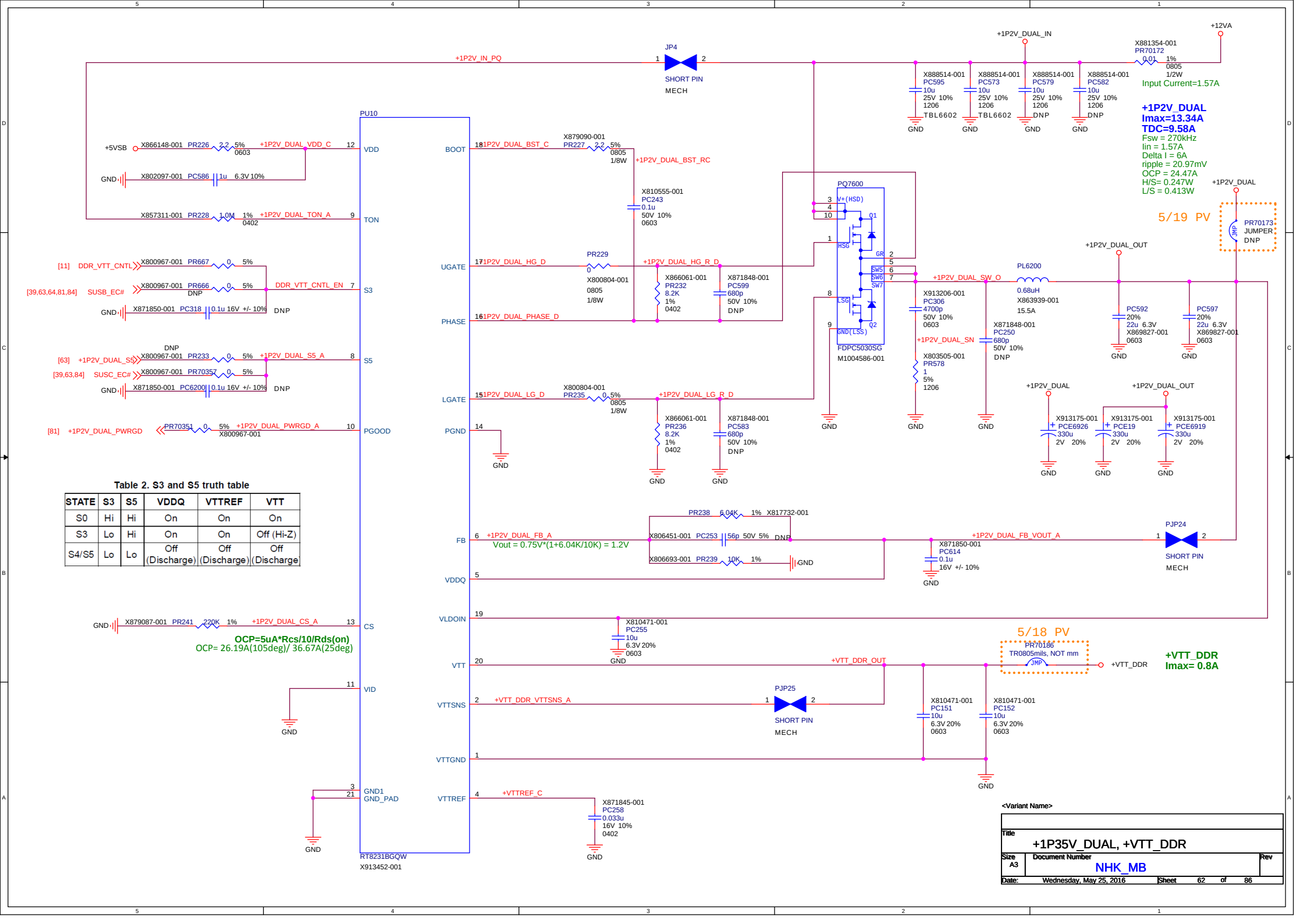


Table 2. S3 and S5 truth table

STATE	S3	S5	VDDQ	VTTREF	VTT
S0	Hi	Hi	On	On	On
S3	Lo	Hi	On	On	Off (Hi-Z)
S4/S5	Lo	Lo	Off (Discharge)	Off (Discharge)	Off (Discharge)

+0P95V_CPUIO

Iin=5.51A
Imax=5.51A
Vdroop=41.33mV
Pd=1.38W

teknisi indonesia

[39,62,64,81,84] SUSB_EC# PR328 10K 5% X800590-001 +VCCIO_EN_A

PU8500 APL5611CI-TRG (EN, GND, FB, VCC, DRV, SS) +CPUIO_DRV_D +CPUIO_SS_C

+12V

PC640683 1u X813054-001 25V 0603 10%

X802097-001 PC640678 1u 6.3V 10% 0402

X871845-001 PC640679 0.033u 16V 10% 0402

PC288 47p 50V X884947-001 0402

DNP PR128 10K 5% X800590-001 +CPUIO_RC1

X800613-001 PR595 4.7K 5% DNP +CPUIO_RC2

PC640680 50V 2700p 10% X801930-001 DNP

PC287 2200p 50V 10% X861598-001 DNP

+CPUIO_FB_A

PR127 100 1% X809936-001 +CPUIO_DRVR_D4

+1P2V_DUAL

X810471-001 PC300 10u 6.3V 20% 0603

X913418-001 PQ48 SiRA18DP-T1-GE3-G

PC640681 0.022u 16V 10% X803286-001

PR274 100 X809936-001 1%

+CPUIO_OUT

+CPUIO_FBR_A

PR253 3.6K X937154-001 1%

X812561-001 PC297 560p 50V 10%

VOUT=0.8*(1+3.6/19.1)=0.95V

PR273 19.1K X853427-001 1%

X800967-001 PR337 0 5% VCCIO_SENSE [12]

+VCCIO

5/18 PV

PR70275 TR0805mils, NOT mm

PC292 20% 22u 6.3V X869827-001 0603

PC304 20% 22u 6.3V X869827-001 0603

X913175-001 PCE17 330u 2V 20%

X800421-001 PR251 33 5% DNP

X885407-001 U94280 74AUP1G07GW (NC, A, GND, VCC, Y) VCCIO_PWRGD [81]

+1VSB

PR70318 10K 5% X800590-001

X871850-001 SC7391 0.1u 16V +/- 10% 0402

X800967-001 PR70294 0 5% VSSIO_SENSE_R

PJP2227 SHORT PIN MECH

VSSIO_SENSE [12]

For Top inside cavity

PC640674 20% 22u 6.3V X869827-001 0603

PC162 20% 22u 6.3V X869827-001 0603

PC163 20% 22u 6.3V X869827-001 0603

PC164 20% 22u 6.3V X869827-001 0603

GND

+2P5VPP

Imax =1.4A (TBD)
TDC=1A
Power Consumption=(3.3-2.5)*1.4=1.12W

+2P5VPP

5/18 PV

PR6301 TR0805mils, NOT mm

+5VSB

X866148-001 PR6302 2.2 0603 5%

X802097-001 PC6301 1u 6.3V 10% 0402

+3P3VSB

X810471-001 PC6302 10u 6.3V 20% 0603

PU6300 AOZ2023PI (VIN, VOUT, POK, VCNTL, EN, FB, GND, NC_5) X950136-001

+2P5VPP_VDD_A

+2P5VPP_VOUT

+2P5VPP_FB

X859830-001 PR6304 21.5K 1%

X802001-001 PC6307 100p 50V 5% DNP

X806693-001 PR6305 10K 1%

X810471-001 PC6303 10u 6.3V 20% 0603

X810471-001 PC6304 10u 6.3V 20% 0603

[39,62,63,84] SUSC_EC# X800967-001 DNP PR6300 0 5%

[39] 2P5VPP_EN X800967-001 PR70356 0 5%

+2P5VPP_EN_A

X872290-001 PC6306 1000p 50V 1% 0402

X801907-001 R70375 100K 5%

2P5VPP_PG_A

[39,62,63,84] SUSC_EC# 2P5VPP_PG_A

X887582-001 U94307 SN74AUP1G08DRYR (A, B, GND, VCC, NC, Y) DNP

X871850-001 AC4089 0.1u 16V +/- 10% DNP

+1P2V_DUAL_S5 [62]

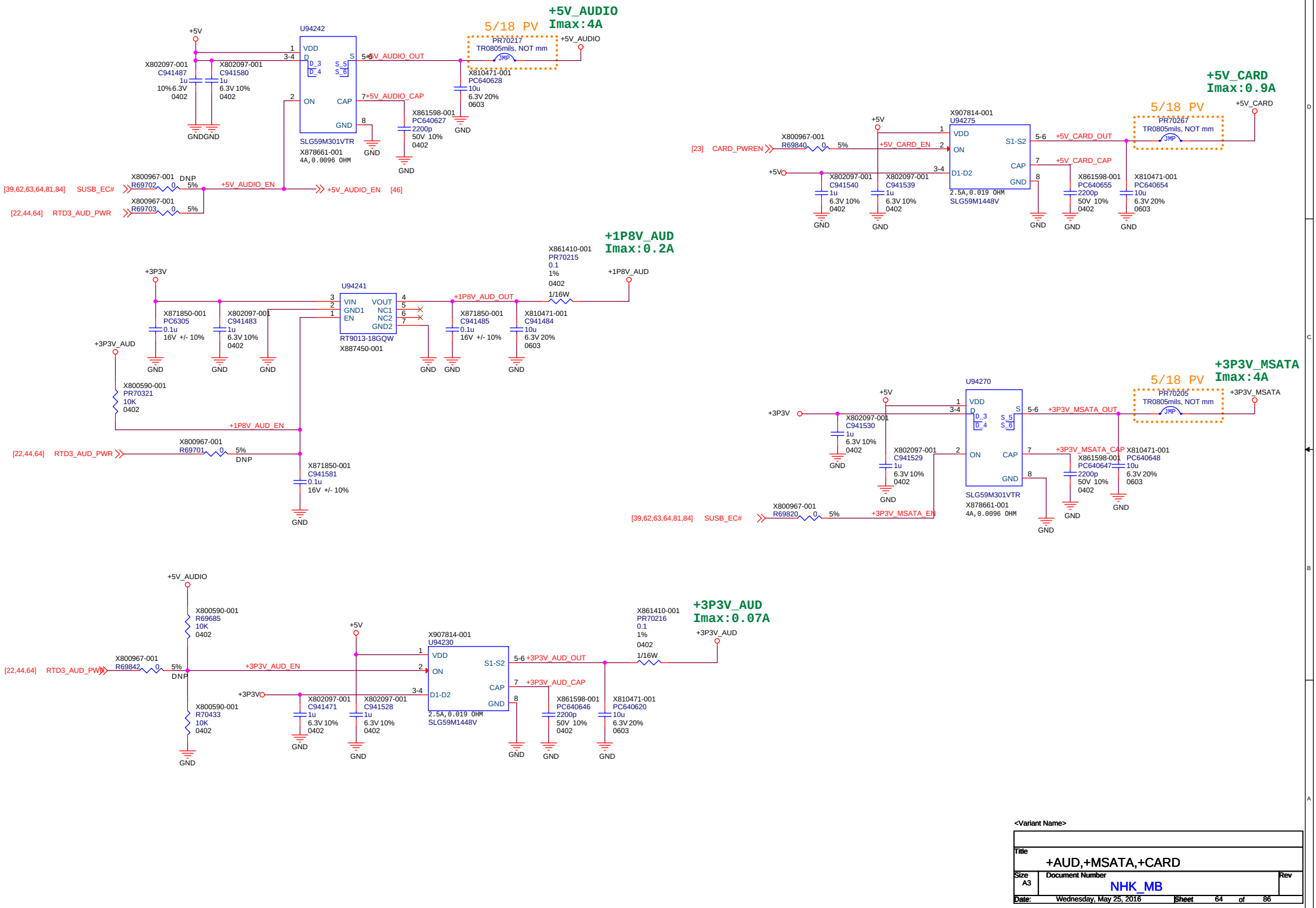
X801907-001 R70374 100K 5% DNP

X800590-001 PR6303 10K 5% DNP

VFb=0.8V
V=0.8*(1+21.5/10)=2.52V

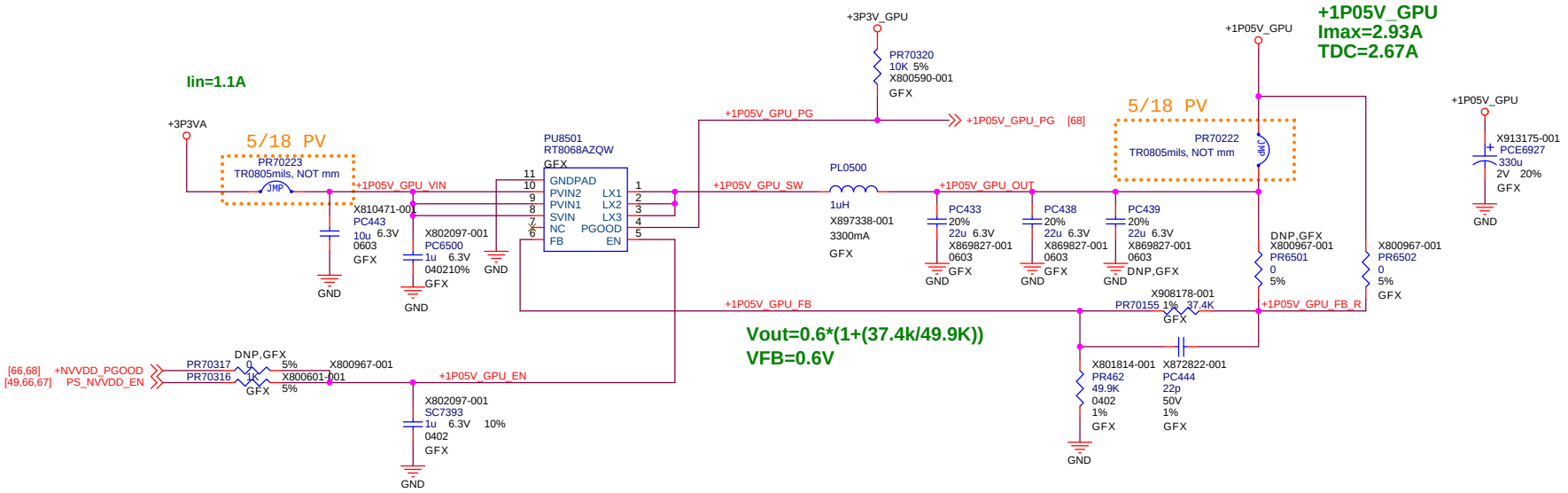
<Variant Name>

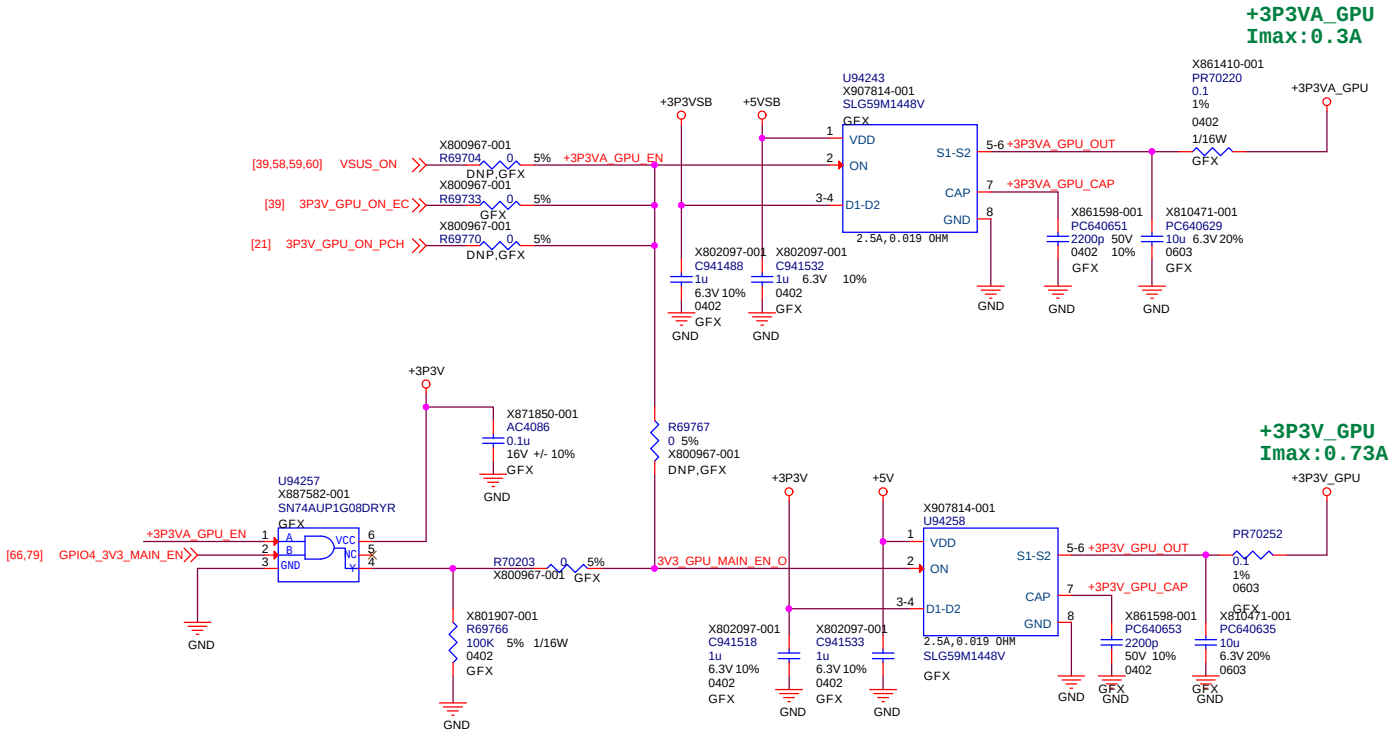
Title	+VCCIO, +2P5VPP	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 63 of 86	



<Variant Name>

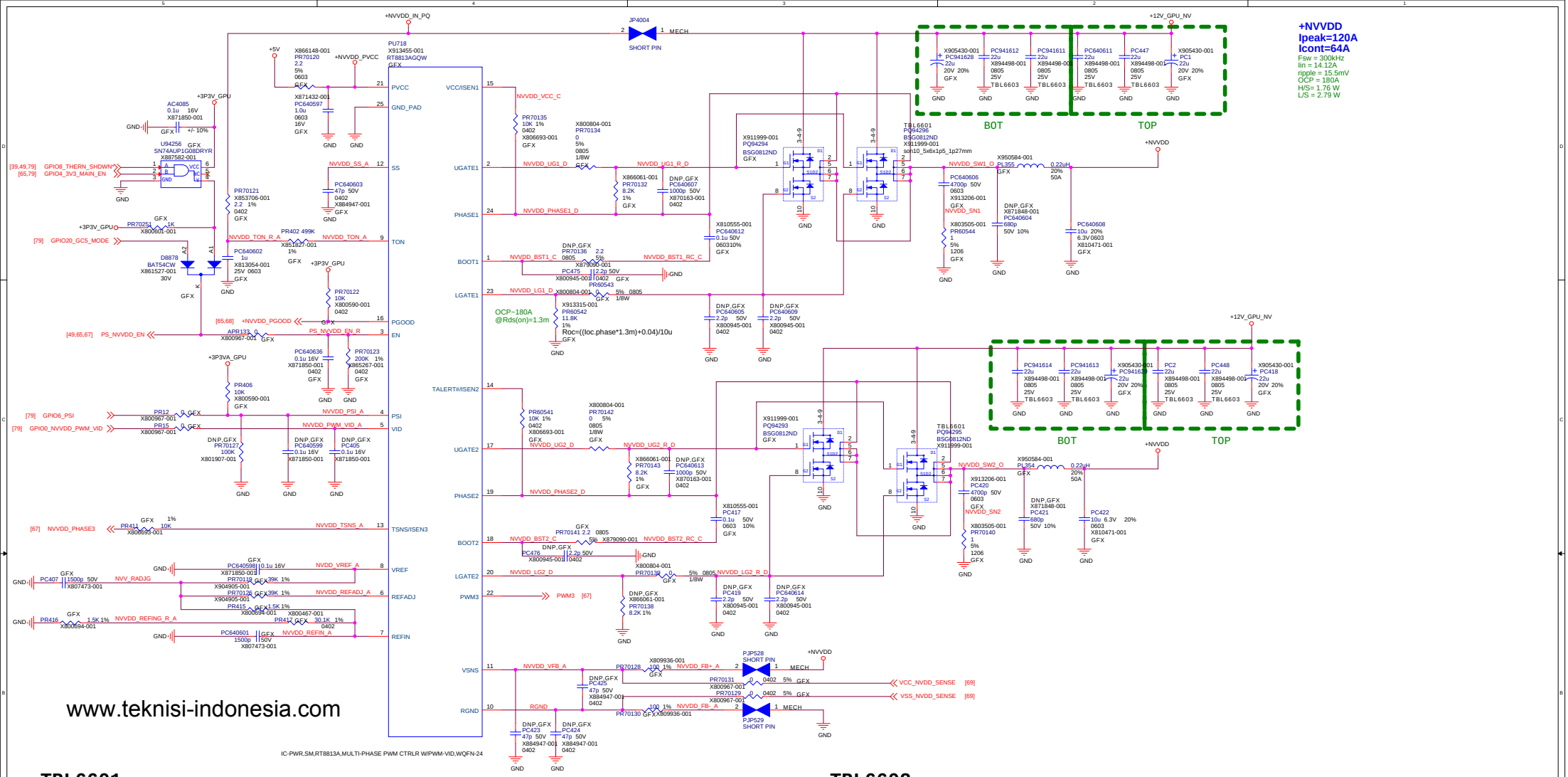
Title	+AUD,+MSATA,+CARD	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 64 of 86	





<variant_name>

Title	+1P05V_GPU, +3P3VA_GPU	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 65 of 86	



TBL6601

SKU	Install	DNP
GX	PQ94295,PQ94296,PQ94297,PCE78,PCE80, C941598,C941599,C941600,C941601,C941602	
GS / GT		PQ94295,PQ94296,PQ94297,PCE78,PCE80, C941598,C941599,C941600,C941601,C941602

TBL6602

SKU	Location : PC153,PC156,PC158,PC166,PC167,PC170,PC171,PC172, PC176,PC177,PC206,PC208,PC221,PC222,PC251,PC254, PC501,PC502,PC573,PC595
GX	X871163-001 (low noise cap)
GS / GT	X871452-001 (non low noise caps)

TBL6603

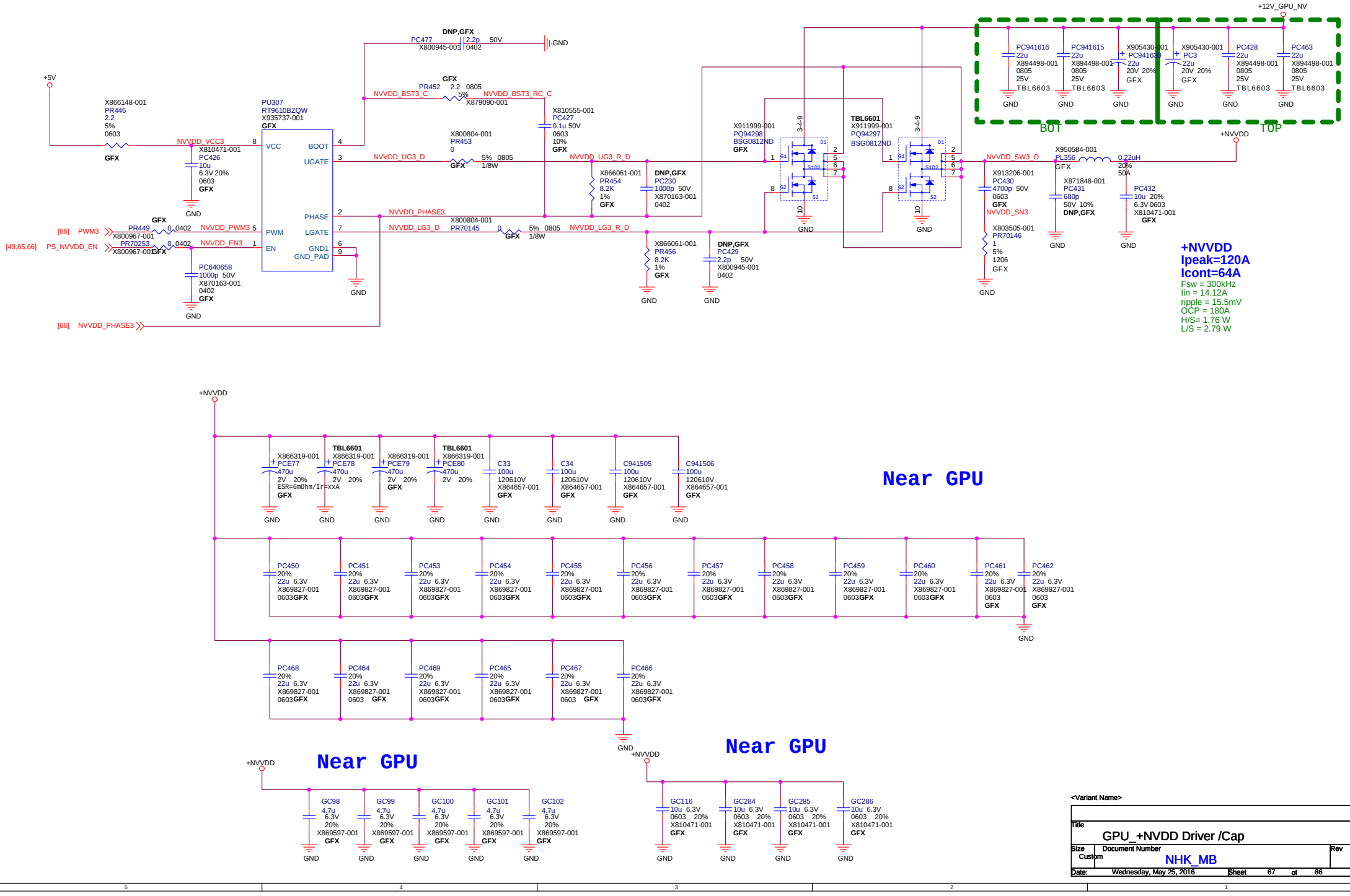
SKU	Location : PC2,PC941614,PC428,PC941615,PC447,PC941611, PC448,PC941613,PC463,PC941616,PC941612,PC640611
GX	X935230-001 (low noise cap)
GS / GT	X894498-001 (non low noise caps)

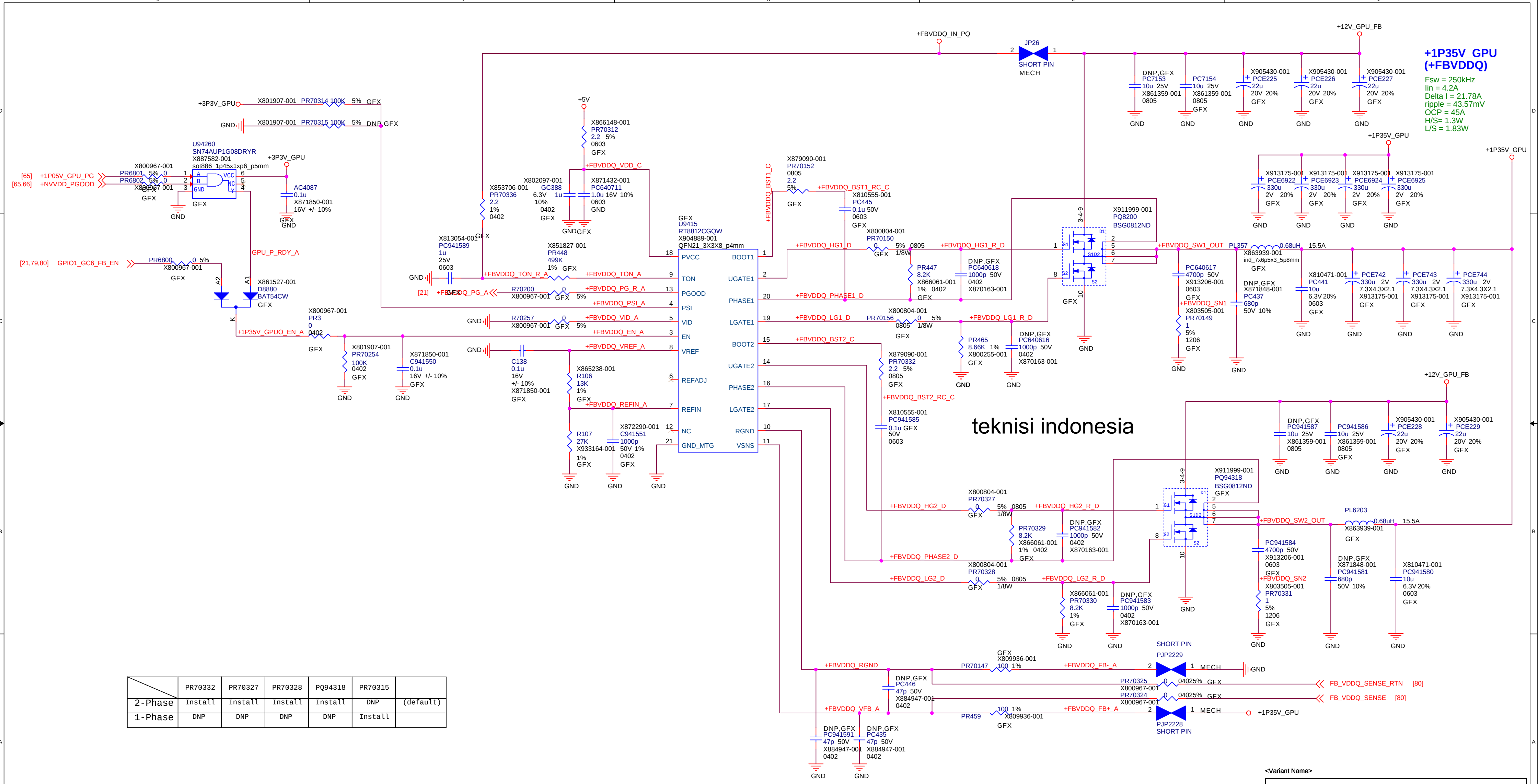
<Variant Name>

Title: GPU_+NVDD Controller

Size: A2 | Document Number: NHK_MB | Rev:

Date: Wednesday, May 25, 2016 | Sheet 66 of 86


+12V_GPU_NV
B0T
TOP
+5V
+NVVDD
PU307
RT9610BZQW
X935737-001
GFX
VCC
BOOT
UGATE
PHASE
LGATE
PWM
EN
GND1
GND_PAD
NVVDD_VCC3
NVVDD_BST3_C
NVVDD_BST3_RC_C
NVVDD_UG3_D
NVVDD_UG3_R_D
NVVDD_PHASE3
NVVDD_LG3_D
NVVDD_LG3_R_D
NVVDD_SW3_O
NVVDD_SN3
NVVDD_PWM3
NVVDD_EN3
[66] PWM3
[49,65,66] PS_NVVDD_EN
[66] NVVDD_PHASE3
TBL6601
X911999-001
PQ94298
BSG0812ND
PQ94297
S1D2
S2
G1
G2
D1
+NVVDD
Ipeak=120A
Icont=64A
Fsw = 300kHz
Iin = 14.12A
ripple = 15.5mV
OCP = 180A
H/S= 1.76 W
L/S = 2.79 W
Near GPU
Near GPU
Near GPU
<Variant Name>
Title
GPU_+NVDD Driver /Cap
Size
Custom
Document Number
NHK_MB
Rev
Date:
Wednesday, May 25, 2016
Sheet
67
of
86



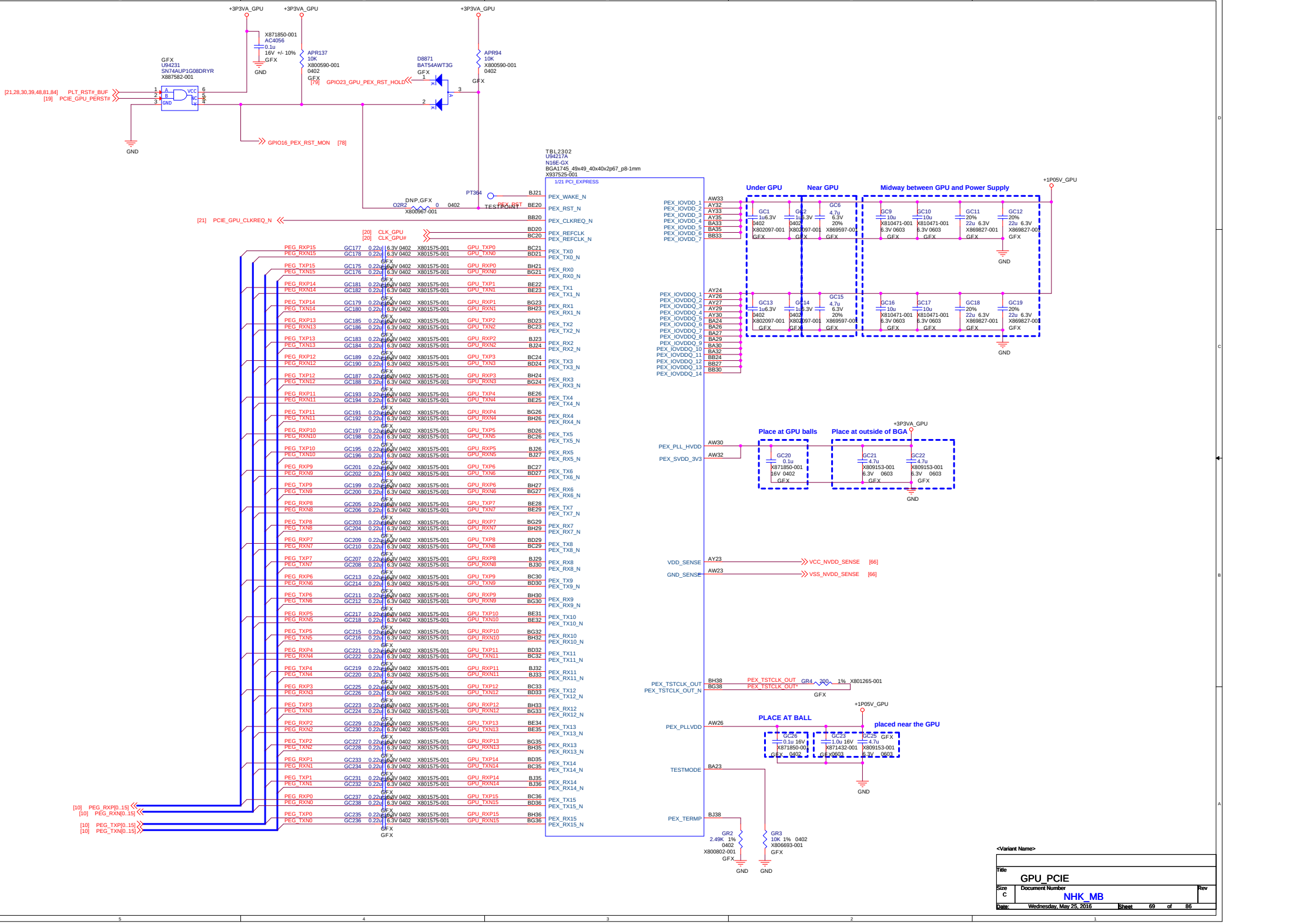
	PR70332	PR70327	PR70328	PQ94318	PR70315	
2-Phase	Install	Install	Install	Install	DNP	(default)
1-Phase	DNP	DNP	DNP	DNP	Install	

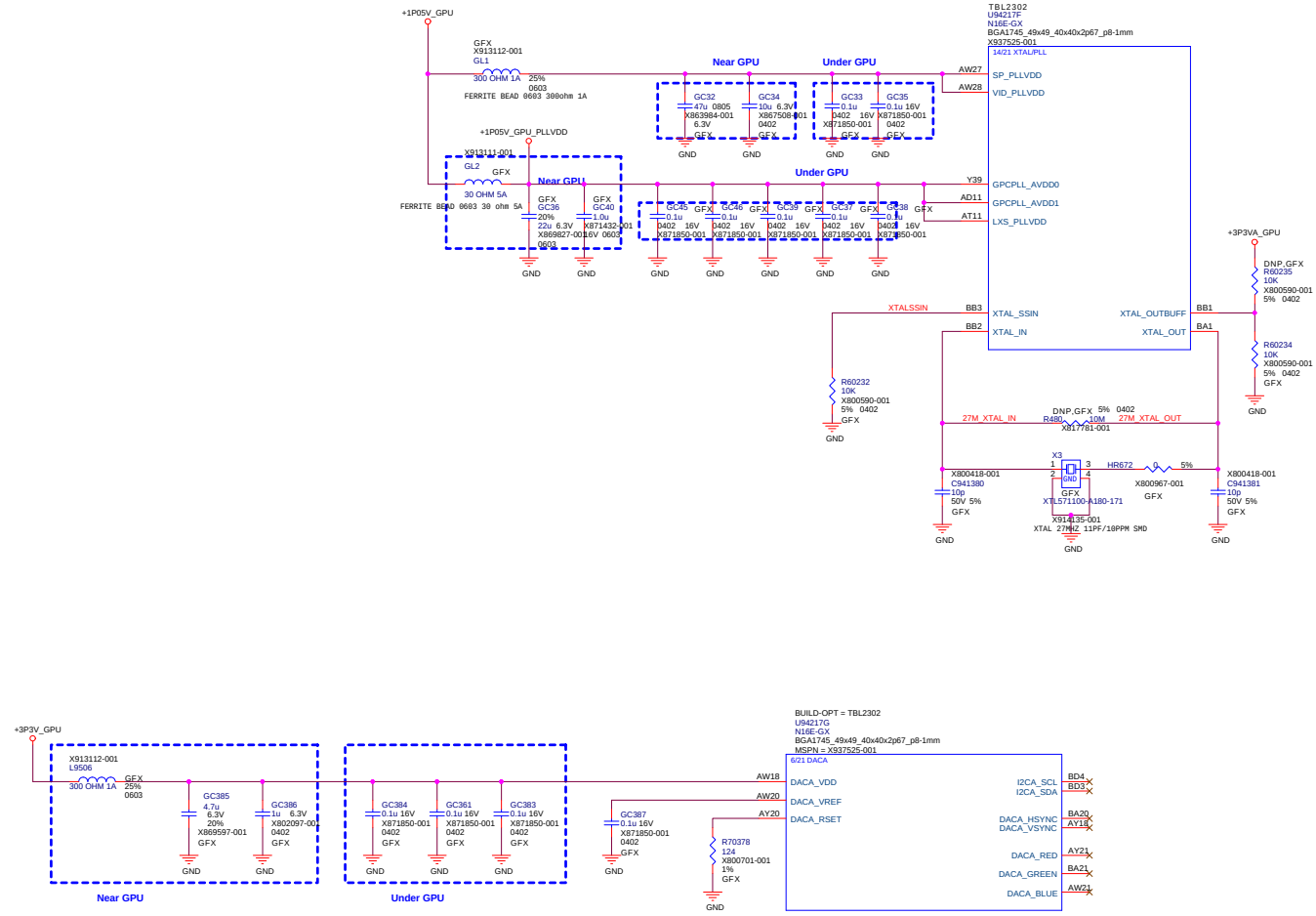
<Variant Name>

Title: GPU_+1.35_GPU,+1P05V_GPU

Size: Custom | Document Number: NHK_MB | Rev

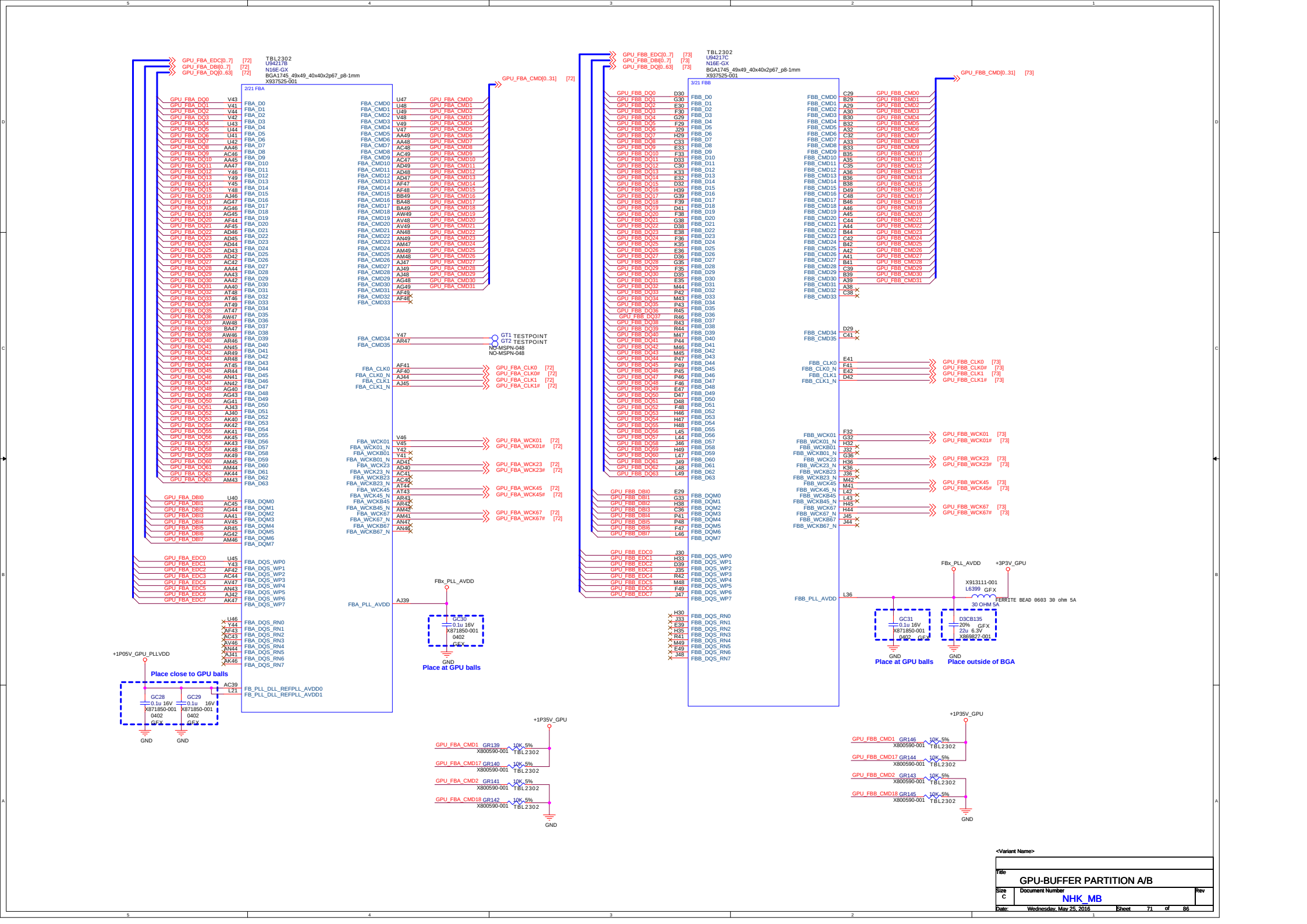
Date: Wednesday, May 25, 2016 | Sheet 68 of 86


+3P3VA_GPU
+3P3VA_GPU
+3P3VA_GPU
X871850-001
AC4056
0.1u
16V +/- 10%
GFX
GND
APR137
10K
X800590-001
0402
GFX
[78] GPIO23_GPU_PEX_RST_HOLD
D8871
BAT54AWT3G
GFX
APR94
10K
X800590-001
0402
GFX
GFX
U94231
SN74AUP1G08DRYR
X887582-001
[21,28,30,39,48,81,84] PLT_RST#_BUF
[19] PCIE_GPU_PERST#
GND
GPIO16_PEX_RST_MON [78]
TBL2302
U94217A
N16E-GX
BGA1745_49x49_40x40x2p67_p8-1mm
X937525-001
1/21 PCI_EXPRESS
PT364
TESTPOINT
DNP,GFX
O2R2 0 0402
X800967-001
PEX_RST
[21] PCIE_GPU_CLKREQ_N
[20] CLK_GPU
[20] CLK_GPU#
PEX_WAKE_N
PEX_RST_N
PEX_CLKREQ_N
PEX_REFCLK
PEX_REFCLK_N
PEX_TX0
PEX_TX0_N
PEX_RX0
PEX_RX0_N
PEX_TX1
PEX_TX1_N
PEX_RX1
PEX_RX1_N
PEX_TX2
PEX_TX2_N
PEX_RX2
PEX_RX2_N
PEX_TX3
PEX_TX3_N
PEX_RX3
PEX_RX3_N
PEX_TX4
PEX_TX4_N
PEX_RX4
PEX_RX4_N
PEX_TX5
PEX_TX5_N
PEX_RX5
PEX_RX5_N
PEX_TX6
PEX_TX6_N
PEX_RX6
PEX_RX6_N
PEX_TX7
PEX_TX7_N
PEX_RX7
PEX_RX7_N
PEX_TX8
PEX_TX8_N
PEX_RX8
PEX_RX8_N
PEX_TX9
PEX_TX9_N
PEX_RX9
PEX_RX9_N
PEX_TX10
PEX_TX10_N
PEX_RX10
PEX_RX10_N
PEX_TX11
PEX_TX11_N
PEX_RX11
PEX_RX11_N
PEX_TX12
PEX_TX12_N
PEX_RX12
PEX_RX12_N
PEX_TX13
PEX_TX13_N
PEX_RX13
PEX_RX13_N
PEX_TX14
PEX_TX14_N
PEX_RX14
PEX_RX14_N
PEX_TX15
PEX_TX15_N
PEX_RX15
PEX_RX15_N
PEG_RXP15 GC177 0.22u 6.3V 0402 X801575-001 GPU_TXP0 BC21
PEG_RXN15 GC178 0.22u 6.3V 0402 X801575-001 GPU_TXN0 BD21
PEG_TXP15 GC175 0.22u 6.3V 0402 X801575-001 GPU_RXP0 BH21
PEG_TXN15 GC176 0.22u 6.3V 0402 X801575-001 GPU_RXN0 BG21
PEG_RXP14 GC181 0.22u 6.3V 0402 X801575-001 GPU_TXP1 BE22
PEG_RXN14 GC182 0.22u 6.3V 0402 X801575-001 GPU_TXN1 BE23
PEG_TXP14 GC179 0.22u 6.3V 0402 X801575-001 GPU_RXP1 BG23
PEG_TXN14 GC180 0.22u 6.3V 0402 X801575-001 GPU_RXN1 BH23
PEG_RXP13 GC185 0.22u 6.3V 0402 X801575-001 GPU_TXP2 BD23
PEG_RXN13 GC186 0.22u 6.3V 0402 X801575-001 GPU_TXN2 BC23
PEG_TXP13 GC183 0.22u 6.3V 0402 X801575-001 GPU_RXP2 BJ23
PEG_TXN13 GC184 0.22u 6.3V 0402 X801575-001 GPU_RXN2 BJ24
PEG_RXP12 GC189 0.22u 6.3V 0402 X801575-001 GPU_TXP3 BC24
PEG_RXN12 GC190 0.22u 6.3V 0402 X801575-001 GPU_TXN3 BD24
PEG_TXP12 GC187 0.22u 6.3V 0402 X801575-001 GPU_RXP3 BH24
PEG_TXN12 GC188 0.22u 6.3V 0402 X801575-001 GPU_RXN3 BG24
PEG_RXP11 GC193 0.22u 6.3V 0402 X801575-001 GPU_TXP4 BE26
PEG_RXN11 GC194 0.22u 6.3V 0402 X801575-001 GPU_TXN4 BE25
PEG_TXP11 GC191 0.22u 6.3V 0402 X801575-001 GPU_RXP4 BG26
PEG_TXN11 GC192 0.22u 6.3V 0402 X801575-001 GPU_RXN4 BH26
PEG_RXP10 GC197 0.22u 6.3V 0402 X801575-001 GPU_TXP5 BD26
PEG_RXN10 GC198 0.22u 6.3V 0402 X801575-001 GPU_TXN5 BC26
PEG_TXP10 GC195 0.22u 6.3V 0402 X801575-001 GPU_RXP5 BJ26
PEG_TXN10 GC196 0.22u 6.3V 0402 X801575-001 GPU_RXN5 BJ27
PEG_RXP9 GC201 0.22u 6.3V 0402 X801575-001 GPU_TXP6 BC27
PEG_RXN9 GC202 0.22u 6.3V 0402 X801575-001 GPU_TXN6 BD27
PEG_TXP9 GC199 0.22u 6.3V 0402 X801575-001 GPU_RXP6 BH27
PEG_TXN9 GC200 0.22u 6.3V 0402 X801575-001 GPU_RXN6 BG27
PEG_RXP8 GC205 0.22u 6.3V 0402 X801575-001 GPU_TXP7 BE28
PEG_RXN8 GC206 0.22u 6.3V 0402 X801575-001 GPU_TXN7 BE29
PEG_TXP8 GC203 0.22u 6.3V 0402 X801575-001 GPU_RXP7 BG29
PEG_TXN8 GC204 0.22u 6.3V 0402 X801575-001 GPU_RXN7 BH29
PEG_RXP7 GC209 0.22u 6.3V 0402 X801575-001 GPU_TXP8 BD29
PEG_RXN7 GC210 0.22u 6.3V 0402 X801575-001 GPU_TXN8 BC29
PEG_TXP7 GC207 0.22u 6.3V 0402 X801575-001 GPU_RXP8 BJ29
PEG_TXN7 GC208 0.22u 6.3V 0402 X801575-001 GPU_RXN8 BJ30
PEG_RXP6 GC213 0.22u 6.3V 0402 X801575-001 GPU_TXP9 BC30
PEG_RXN6 GC214 0.22u 6.3V 0402 X801575-001 GPU_TXN9 BD30
PEG_TXP6 GC211 0.22u 6.3V 0402 X801575-001 GPU_RXP9 BH30
PEG_TXN6 GC212 0.22u 6.3V 0402 X801575-001 GPU_RXN9 BG30
PEG_RXP5 GC217 0.22u 6.3V 0402 X801575-001 GPU_TXP10 BE31
PEG_RXN5 GC218 0.22u 6.3V 0402 X801575-001 GPU_TXN10 BE32
PEG_TXP5 GC215 0.22u 6.3V 0402 X801575-001 GPU_RXP10 BG32
PEG_TXN5 GC216 0.22u 6.3V 0402 X801575-001 GPU_RXN10 BH32
PEG_RXP4 GC221 0.22u 6.3V 0402 X801575-001 GPU_TXP11 BD32
PEG_RXN4 GC222 0.22u 6.3V 0402 X801575-001 GPU_TXN11 BC32
PEG_TXP4 GC219 0.22u 6.3V 0402 X801575-001 GPU_RXP11 BJ32
PEG_TXN4 GC220 0.22u 6.3V 0402 X801575-001 GPU_RXN11 BJ33
PEG_RXP3 GC225 0.22u 6.3V 0402 X801575-001 GPU_TXP12 BC33
PEG_RXN3 GC226 0.22u 6.3V 0402 X801575-001 GPU_TXN12 BD33
PEG_TXP3 GC223 0.22u 6.3V 0402 X801575-001 GPU_RXP12 BH33
PEG_TXN3 GC224 0.22u 6.3V 0402 X801575-001 GPU_RXN12 BG33
PEG_RXP2 GC229 0.22u 6.3V 0402 X801575-001 GPU_TXP13 BE34
PEG_RXN2 GC230 0.22u 6.3V 0402 X801575-001 GPU_TXN13 BE35
PEG_TXP2 GC227 0.22u 6.3V 0402 X801575-001 GPU_RXP13 BG35
PEG_TXN2 GC228 0.22u 6.3V 0402 X801575-001 GPU_RXN13 BH35
PEG_RXP1 GC233 0.22u 6.3V 0402 X801575-001 GPU_TXP14 BD35
PEG_RXN1 GC234 0.22u 6.3V 0402 X801575-001 GPU_TXN14 BC35
PEG_TXP1 GC231 0.22u 6.3V 0402 X801575-001 GPU_RXP14 BJ35
PEG_TXN1 GC232 0.22u 6.3V 0402 X801575-001 GPU_RXN14 BJ36
PEG_RXP0 GC237 0.22u 6.3V 0402 X801575-001 GPU_TXP15 BC36
PEG_RXN0 GC238 0.22u 6.3V 0402 X801575-001 GPU_TXN15 BD36
PEG_TXP0 GC235 0.22u 6.3V 0402 X801575-001 GPU_RXP15 BH36
PEG_TXN0 GC236 0.22u 6.3V 0402 X801575-001 GPU_RXN15 BG36
[10] PEG_RXP[0..15]
[10] PEG_RXN[0..15]
[10] PEG_TXP[0..15]
[10] PEG_TXN[0..15]
PEX_IOVDD_1 AW33
PEX_IOVDD_2 AY32
PEX_IOVDD_3 AY33
PEX_IOVDD_4 AY35
PEX_IOVDD_5 BA33
PEX_IOVDD_6 BA35
PEX_IOVDD_7 BB33
Under GPU
Near GPU
Midway between GPU and Power Supply
+1P05V_GPU
GC1 1u 6.3V 0402 X802097-001 GFX
GC2 1u 6.3V 0402 X802097-001 GFX
GC6 4.7u 6.3V 20% X869597-001 GFX
GC9 10u X810471-001 6.3V 0603 GFX
GC10 10u X810471-001 6.3V 0603 GFX
GC11 20% 22u 6.3V X869827-001 GFX
GC12 20% 22u 6.3V X869827-001 GFX
GND
PEX_IOVDDQ_1 AY24
PEX_IOVDDQ_2 AY26
PEX_IOVDDQ_3 AY27
PEX_IOVDDQ_4 AY29
PEX_IOVDDQ_5 AY30
PEX_IOVDDQ_6 BA24
PEX_IOVDDQ_7 BA26
PEX_IOVDDQ_8 BA27
PEX_IOVDDQ_9 BA29
PEX_IOVDDQ_10 BA30
PEX_IOVDDQ_11 BA32
PEX_IOVDDQ_12 BB24
PEX_IOVDDQ_13 BB27
PEX_IOVDDQ_14 BB30
GC13 1u 6.3V 0402 X802097-001 GFX
GC14 1u 6.3V 0402 X802097-001 GFX
GC15 4.7u 6.3V 20% X869597-001 GFX
GC16 10u X810471-001 6.3V 0603 GFX
GC17 10u X810471-001 6.3V 0603 GFX
GC18 20% 22u 6.3V X869827-001 GFX
GC19 20% 22u 6.3V X869827-001 GFX
GND
PEX_PLL_HVDD AW30
PEX_SVDD_3V3 AW32
+3P3VA_GPU
Place at GPU balls
Place at outside of BGA
GC20 0.1u X871850-001 16V 0402 GFX
GC21 4.7u X809153-001 6.3V 0603 GFX
GC22 4.7u X809153-001 6.3V 0603 GFX
GND
VDD_SENSE AY23
GND_SENSE AW23
VCC_NVDD_SENSE [66]
VSS_NVDD_SENSE [66]
PEX_TSTCLK_OUT BH38
PEX_TSTCLK_OUT_N BG38
PEX_TSTCLK_OUT
PEX_TSTCLK_OUT*
GR4 200 1% X801265-001 GFX
PEX_PLLVDD AW26
+1P05V_GPU
PLACE AT BALL
placed near the GPU
GC26 0.1u 16V X871850-001 GFX 0402
GC23 1.0u 16V X871432-001 GFX 0603
GC25 4.7u X809153-001 6.3V 0603 GFX
GND
TESTMODE BA23
PEX_TERMP BJ38
GR2 2.49K 1% 0402 X800802-001 GFX
GR3 10K 1% 0402 X806693-001 GFX
GND
GND
<Variant Name>
Title
GPU_PCIE
Size C
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 69 of 86

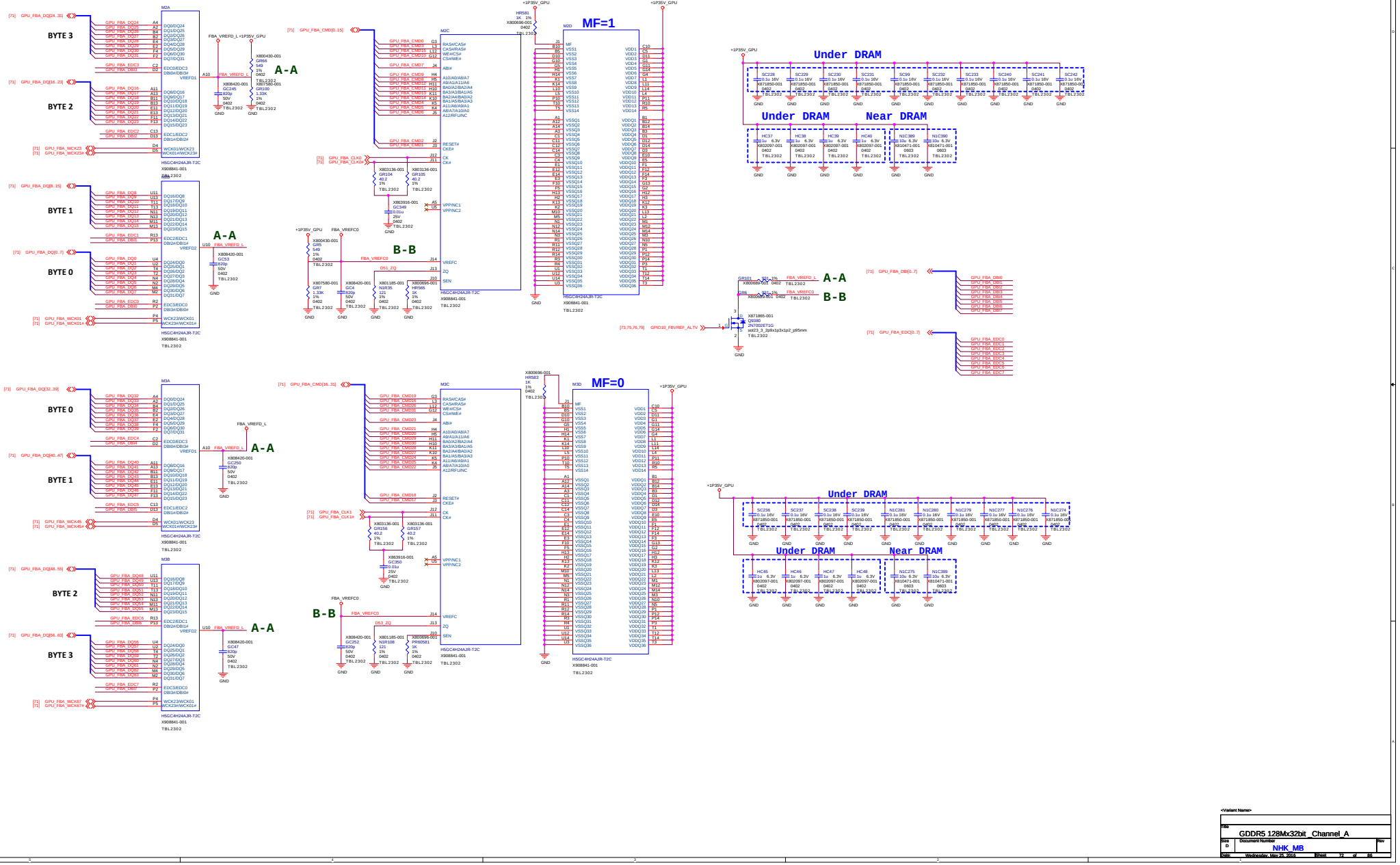


<variant_name>

Title	GPU-Xtal & DACA	
Size A2	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 70 of 86	


TBL2302
U94217B
N16E-GX
BGA1745_49x49_40x40x2p67_p8-1mm
X937525-001
2/21 FBA
GPU_FBA_EDC[0..7] [72]
GPU_FBA_DBI[0..7] [72]
GPU_FBA_DQ[0..63] [72]
GPU_FBA_CMD[0..31] [72]
TBL2302
U94217C
N16E-GX
BGA1745_49x49_40x40x2p67_p8-1mm
X937525-001
3/21 FBB
GPU_FBB_EDC[0..7] [73]
GPU_FBB_DBI[0..7] [73]
GPU_FBB_DQ[0..63] [73]
GPU_FBB_CMD[0..31] [73]
GT1 TESTPOINT
GT2 TESTPOINT
NO-MSPN-048
NO-MSPN-048
FBA_CLK0 [72]
FBA_CLK0_N [72]
FBA_CLK1 [72]
FBA_CLK1_N [72]
GPU_FBA_CLK0 [72]
GPU_FBA_CLK0# [72]
GPU_FBA_CLK1 [72]
GPU_FBA_CLK1# [72]
FBB_CLK0 [73]
FBB_CLK0_N [73]
FBB_CLK1 [73]
FBB_CLK1_N [73]
GPU_FBB_CLK0 [73]
GPU_FBB_CLK0# [73]
GPU_FBB_CLK1 [73]
GPU_FBB_CLK1# [73]
FBA_WCK01 [72]
FBA_WCK01_N [72]
FBA_WCKB01 [72]
FBA_WCKB01_N [72]
FBA_WCK23 [72]
FBA_WCK23_N [72]
FBA_WCKB23 [72]
FBA_WCKB23_N [72]
FBA_WCK45 [72]
FBA_WCK45_N [72]
FBA_WCKB45 [72]
FBA_WCKB45_N [72]
FBA_WCK67 [72]
FBA_WCK67_N [72]
FBA_WCKB67 [72]
FBA_WCKB67_N [72]
GPU_FBA_WCK01 [72]
GPU_FBA_WCK01# [72]
GPU_FBA_WCK23 [72]
GPU_FBA_WCK23# [72]
GPU_FBA_WCK45 [72]
GPU_FBA_WCK45# [72]
GPU_FBA_WCK67 [72]
GPU_FBA_WCK67# [72]
FBB_WCK01 [73]
FBB_WCK01_N [73]
FBB_WCKB01 [73]
FBB_WCKB01_N [73]
FBB_WCK23 [73]
FBB_WCK23_N [73]
FBB_WCKB23 [73]
FBB_WCKB23_N [73]
FBB_WCK45 [73]
FBB_WCK45_N [73]
FBB_WCKB45 [73]
FBB_WCKB45_N [73]
FBB_WCK67 [73]
FBB_WCK67_N [73]
FBB_WCKB67 [73]
FBB_WCKB67_N [73]
GPU_FBB_WCK01 [73]
GPU_FBB_WCK01# [73]
GPU_FBB_WCK23 [73]
GPU_FBB_WCK23# [73]
GPU_FBB_WCK45 [73]
GPU_FBB_WCK45# [73]
GPU_FBB_WCK67 [73]
GPU_FBB_WCK67# [73]
FBx_PLL_AVDD
+3P3V_GPU
X913111-001
L6399 GFX
FERRITE BEAD 0603 30 ohm 5A
30 OHM 5A
GC31 0.1u 16V X871850-001 0402 GFX
D3CB135 20% 22u 6.3V X869827-001 GFX
Place at GPU balls
Place outside of BGA
+1P05V_GPU_PLLVDD
Place close to GPU balls
GC28 0.1u 16V X871850-001 0402 GFX
GC29 0.1u 16V X871850-001 0402 GFX
GC30 0.1u 16V X871850-001 0402 GFX
Place at GPU balls
+1P35V_GPU
GPU_FBA_CMD1 GR139 10K 5% X800590-001 TBL2302
GPU_FBA_CMD17 GR140 10K 5% X800590-001 TBL2302
GPU_FBA_CMD2 GR141 10K 5% X800590-001 TBL2302
GPU_FBA_CMD18 GR142 10K 5% X800590-001 TBL2302
GPU_FBB_CMD1 GR146 10K 5% X800590-001 TBL2302
GPU_FBB_CMD17 GR144 10K 5% X800590-001 TBL2302
GPU_FBB_CMD2 GR143 10K 5% X800590-001 TBL2302
GPU_FBB_CMD18 GR145 10K 5% X800590-001 TBL2302
GND
<Variant Name>
Title
GPU-BUFFER PARTITION A/B
Size C
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 71 of 86

CELL1 TOP X32 MODE



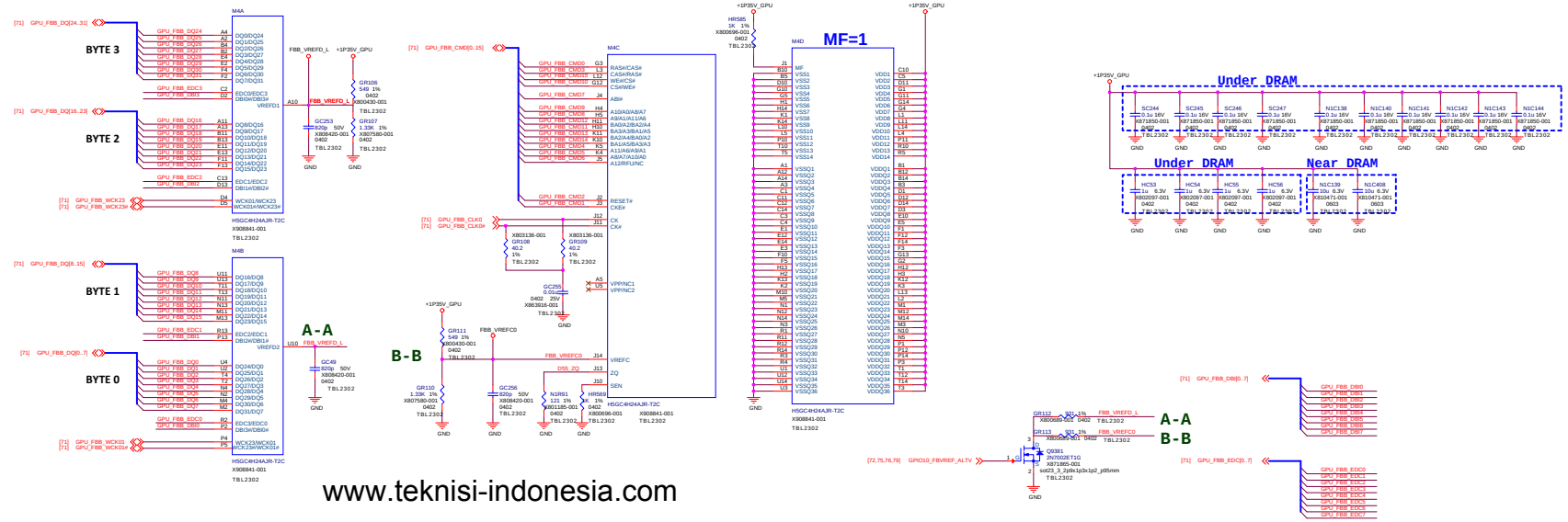
<Variant Name>

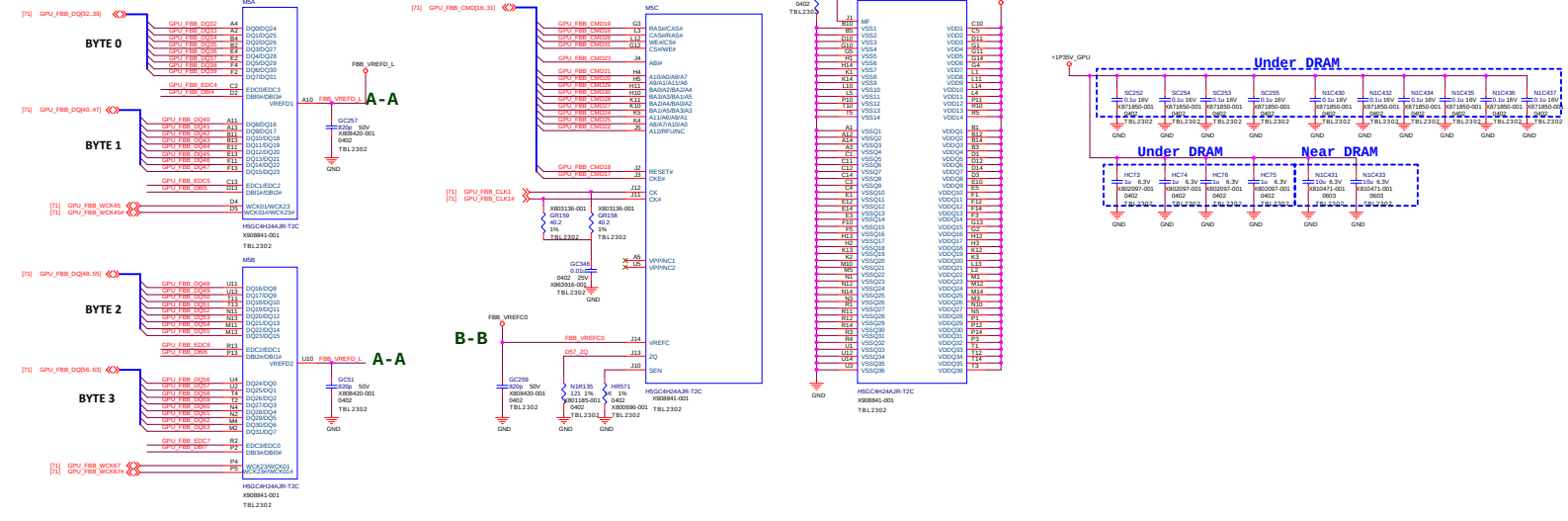
Title: GDDR5 128Mx32bit_Channel_A

Size: D | Document Number: NHK_MB | Rev:

Date: Wednesday, May 25, 2016 | Sheet 72 of 85

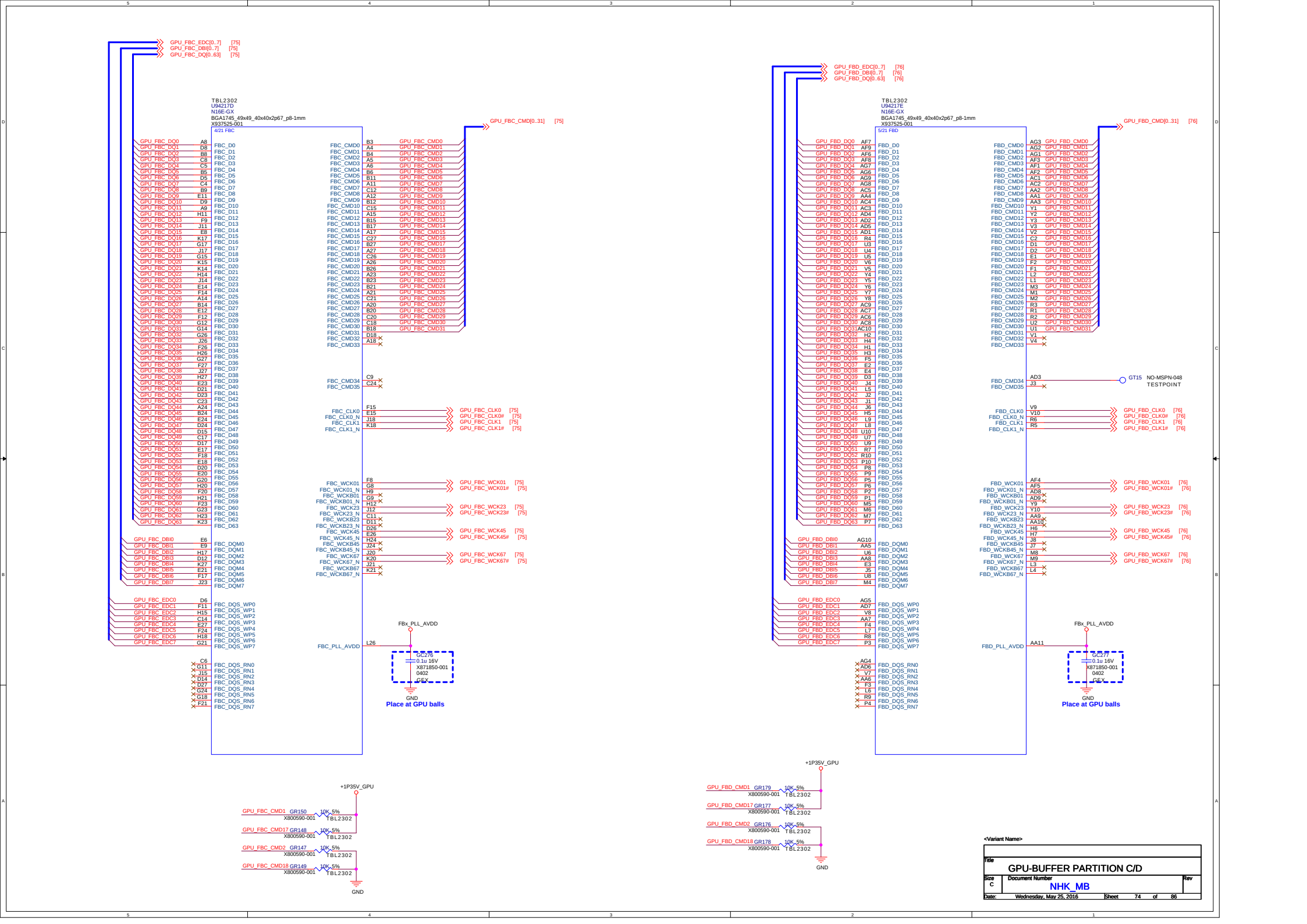
CELL2 TOP X32 MODE

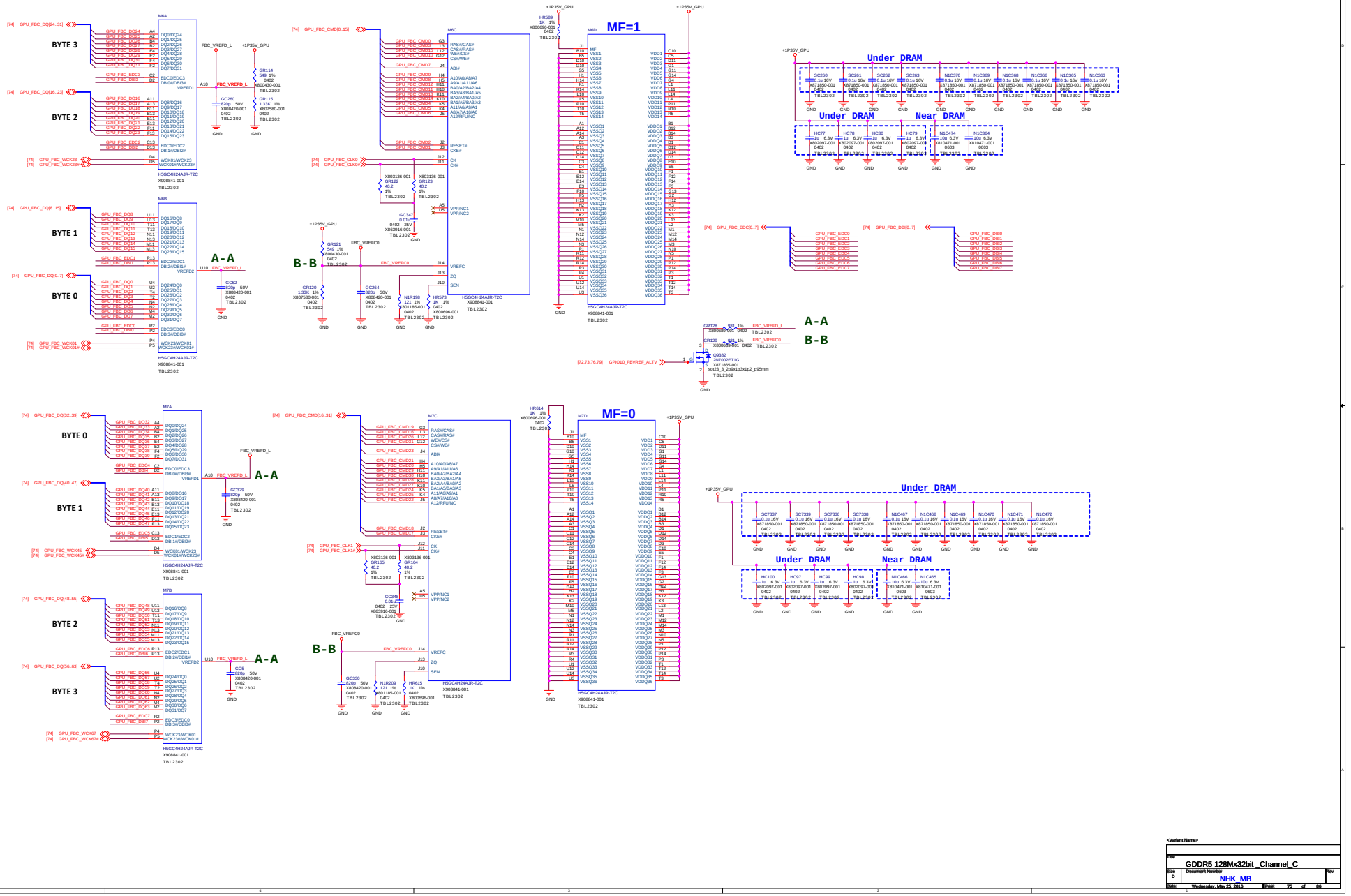


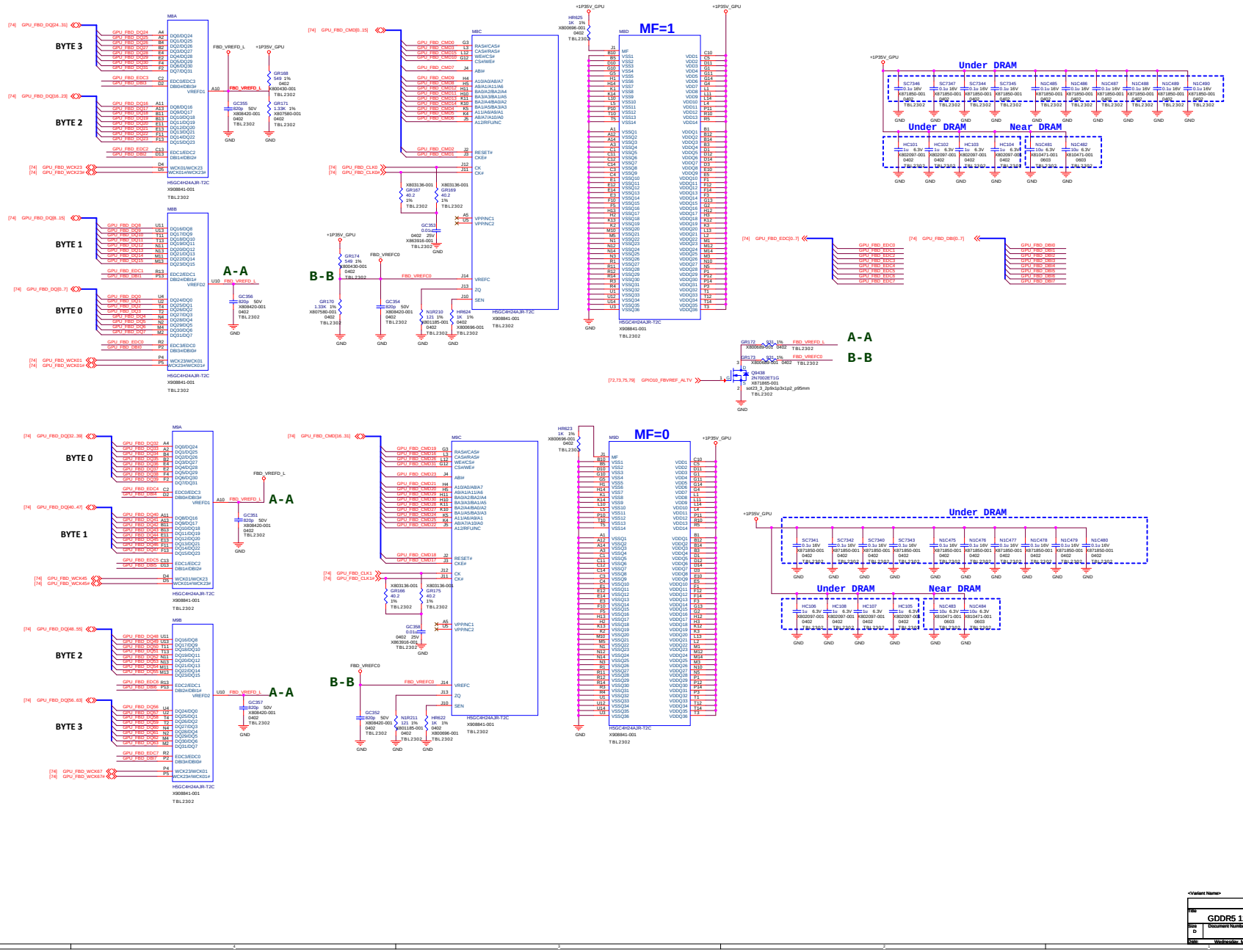


<variant_name>

Title	GDDR5 128Mx32bit_Channel_B	
Size: D	Document Number: NHK_MB	Rev:
Date: Wednesday, May 25, 2016	Sheet 73 of 86	


GPU_FBC_EDC[0..7] [75]
GPU_FBC_DBI[0..7] [75]
GPU_FBC_DQ[0..63] [75]
TBL2302
U94217D
N16E-GX
BGA1745_49x49_40x40x2p67_p8-1mm
X937525-001
4/21 FBC
GPU_FBC_CMD[0..31] [75]
GPU_FBC_CLK0 [75]
GPU_FBC_CLK0# [75]
GPU_FBC_CLK1 [75]
GPU_FBC_CLK1# [75]
GPU_FBC_WCK01 [75]
GPU_FBC_WCK01# [75]
GPU_FBC_WCK23 [75]
GPU_FBC_WCK23# [75]
GPU_FBC_WCK45 [75]
GPU_FBC_WCK45# [75]
GPU_FBC_WCK67 [75]
GPU_FBC_WCK67# [75]
FBx_PLL_AVDD
GC276
0.1u 16V
X8871850-001
0402
CEX
GND
Place at GPU balls
+1P35V_GPU
GPU_FBC_CMD1 GR150 10K 5%
GPU_FBC_CMD17 GR148 10K 5%
GPU_FBC_CMD2 GR147 10K 5%
GPU_FBC_CMD18 GR149 10K 5%
X800590-001
TBL2302
GND
GPU_FBD_EDC[0..7] [76]
GPU_FBD_DBI[0..7] [76]
GPU_FBD_DQ[0..63] [76]
TBL2302
U94217E
N16E-GX
BGA1745_49x49_40x40x2p67_p8-1mm
X937525-001
5/21 FBD
GPU_FBD_CMD[0..31] [76]
GT15 NO-MSPN-048
TESTPOINT
GPU_FBD_CLK0 [76]
GPU_FBD_CLK0# [76]
GPU_FBD_CLK1 [76]
GPU_FBD_CLK1# [76]
GPU_FBD_WCK01 [76]
GPU_FBD_WCK01# [76]
GPU_FBD_WCK23 [76]
GPU_FBD_WCK23# [76]
GPU_FBD_WCK45 [76]
GPU_FBD_WCK45# [76]
GPU_FBD_WCK67 [76]
GPU_FBD_WCK67# [76]
FBD_PLL_AVDD
GC277
0.1u 16V
X8871850-001
0402
CEX
GND
Place at GPU balls
+1P35V_GPU
GPU_FBD_CMD1 GR179 10K 5%
GPU_FBD_CMD17 GR177 10K 5%
GPU_FBD_CMD2 GR176 10K 5%
GPU_FBD_CMD18 GR178 10K 5%
X800590-001
TBL2302
GND
<Variant Name>
Title
GPU-BUFFER PARTITION C/D
Size C
Document Number
NHK_MB
Rev
Date: Wednesday, May 25, 2016
Sheet 74 of 86


MF=1
MF=0
A-A
B-B
BYTE 3
BYTE 2
BYTE 1
BYTE 0
Under DRAM
Near DRAM
M6A
M6B
M6C
M6D
M7A
M7B
M7C
M7D
HSGC4H24AJR-T2C
X908841-001
TBL2302


BYTE 3
BYTE 2
BYTE 1
BYTE 0
MF=1
MF=0
A-A
B-B
Under DRAM
Near DRAM
HSGC4H24AJR-T2C
X908841-001
TBL2302

TBL2302

GPU	MSPN	GDDR5 POPULATED	GDDR5 DNP	PASSIVE POPULATED	PASSIVE DNP
GS-KAB	X937527-001	M6,M7,M8,M9	M2,M3,M4,M5	GC52,GC260,GC347,GC264,SC260,SC261,SC262,SC263,N1C363,N1C365,N1C366,N1C368,N1C369,N1C370,HC77,HC78,HC79,HC80,N1C474,N1C364,GR114,GR115,GR122,GR123,GR120,GR121,N1R198,HR573,HR589,GC5,GC329,GC348,GC330,SC7336,SC7337,SC7338,SC7339,N1C467,N1C468,N1C469,N1C470,N1C471,N1C472,HC97,HC98,HC99,HC100,N1C465,N1C466,GR164,GR165,N1R209,HR615,HR614,Q9382,GR128,GR129,GC355,GC356,GC353,GC354,SC7344,SC7345,SC7346,SC7347,N1C485,N1C486,N1C487,N1C488,N1C489,N1C490,HC101,HC102,HC103,HC104,N1C481,N1C482,GR168,GR171,GR167,GR169,GR170,GR174,N1R210,HR624,HR625,GC351,GC357,GC358,GC352,SC7340,SC7341,SC7342,SC7343,N1C475,N1C476,N1C477,N1C478,N1C479,N1C480,HC105,HC106,HC107,HC108,N1C483,N1C484,GR166,GR175,N1R211,HR622,HR623,Q9438,GR172,GR173,GR147,GR148,GR149,GR150,GR176,GR177,GR178,GR179	GC245,GC53,GC349,GC4,SC228,SC229,SC230,SC231,SC99,SC232,SC233,SC240,SC241,SC242,HC37,HC38,HC39,HC40,N1C389,N1C390,GR66,GR100,GR104,GR105,GR5,GR7,N1R35,HR565,HR581,GC47,GC250,GC350,GC252,SC236,SC237,SC238,SC239,N1C274,N1C276,N1C277,N1C279,N1C280,N1C281,HC45,HC46,HC47,HC48,N1C275,N1C399,GR156,GR157,N1R108,PR60581,HR583,Q9380,GR6,GR101,GC49,GC253,GC255,GC256,SC244,SC245,SC246,SC247,N1C138,N1C140,N1C141,N1C142,N1C143,N1C144,HC53,HC54,HC55,HC56,N1C139,N1C408,GR106,GR107,GR108,GR109,GR110,GR111,N1R91,HR569,HR585,GC51,GC257,GC346,GC259,SC252,SC253,SC254,SC255,N1C430,N1C432,N1C434,N1C435,N1C436,N1C437,HC73,HC74,HC75,HC76,N1C431,N1C433,GR158,GR159,N1R135,HR571,HR593,Q9381,GR112,GR113,GR139,GR140,GR141,GR142,GR143,GR144,GR145,GR146
GX	X937525-001	M2,M3,M4,M5,M6,M7,M8,M9	NA	GC245,GC53,GC349,GC4,SC228,SC229,SC230,SC231,SC99,SC232,SC233,SC240,SC241,SC242,HC37,HC38,HC39,HC40,N1C389,N1C390,GR66,GR100,GR104,GR105,GR5,GR7,N1R35,HR565,HR581,GC47,GC250,GC350,GC252,SC236,SC237,SC238,SC239,N1C274,N1C276,N1C277,N1C279,N1C280,N1C281,HC45,HC46,HC47,HC48,N1C275,N1C399,GR156,GR157,N1R108,PR60581,HR583,Q9380,GR6,GR101,GC49,GC253,GC255,GC256,SC244,SC245,SC246,SC247,N1C138,N1C140,N1C141,N1C142,N1C143,N1C144,HC53,HC54,HC55,HC56,N1C139,N1C408,GR106,GR107,GR108,GR109,GR110,GR111,N1R91,HR569,HR585,GC51,GC257,GC346,GC259,SC252,SC253,SC254,SC255,N1C430,N1C432,N1C434,N1C435,N1C436,N1C437,HC73,HC74,HC75,HC76,N1C431,N1C433,GR158,GR159,N1R135,HR571,HR593,Q9381,GR112,GR113,GR139,GR140,GR141,GR142,GR143,GR144,GR145,GR146,GC52,GC260,GC347,GC264,SC260,SC261,SC262,SC263,N1C363,N1C365,N1C366,N1C368,N1C369,N1C370,HC77,HC78,HC79,HC80,N1C474,N1C364,GR114,GR115,GR122,GR123,GR120,GR121,N1R198,HR573,HR589,GC5,GC329,GC348,GC330,SC7336,SC7337,SC7338,SC7339,N1C467,N1C468,N1C469,N1C470,N1C471,N1C472,HC97,HC98,HC99,HC100,N1C465,N1C466,GR164,GR165,N1R209,HR615,HR614,Q9382,GR128,GR129,GC355,GC356,GC353,GC354,SC7344,SC7345,SC7346,SC7347,N1C485,N1C486,N1C487,N1C488,N1C489,N1C490,HC101,HC102,HC103,HC104,N1C481,N1C482,GR168,GR171,GR167,GR169,GR170,GR174,N1R210,HR624,HR625,GC351,GC357,GC358,GC352,SC7340,SC7341,SC7342,SC7343,N1C475,N1C476,N1C477,N1C478,N1C479,N1C480,HC105,HC106,HC107,HC108,N1C483,N1C484,GR166,GR175,N1R211,HR622,HR623,Q9438,GR172,GR173,GR147,GR148,GR149,GR150,GR176,GR177,GR178,GR179	NA
GT	X913515-001	M2,M3,M4,M5,M6,M7	M8,M9	GC245,GC53,GC349,GC4,SC228,SC229,SC230,SC231,SC99,SC232,SC233,SC240,SC241,SC242,HC37,HC38,HC39,HC40,N1C389,N1C390,GR66,GR100,GR104,GR105,GR5,GR7,N1R35,HR565,HR581,GC47,GC250,GC350,GC252,SC236,SC237,SC238,SC239,N1C274,N1C276,N1C277,N1C279,N1C280,N1C281,HC45,HC46,HC47,HC48,N1C275,N1C399,GR156,GR157,N1R108,PR60581,HR583,Q9380,GR6,GR101,GC49,GC253,GC255,GC256,SC244,SC245,SC246,SC247,N1C138,N1C140,N1C141,N1C142,N1C143,N1C144,HC53,HC54,HC55,HC56,N1C139,N1C408,GR106,GR107,GR108,GR109,GR110,GR111,N1R91,HR569,HR585,GC51,GC257,GC346,GC259,SC252,SC253,SC254,SC255,N1C430,N1C432,N1C434,N1C435,N1C436,N1C437,HC73,HC74,HC75,HC76,N1C431,N1C433,GR158,GR159,N1R135,HR571,HR593,Q9381,GR112,GR113,GR139,GR140,GR141,GR142,GR143,GR144,GR145,GR146,GC52,GC260,GC347,GC264,SC260,SC261,SC262,SC263,N1C363,N1C365,N1C366,N1C368,N1C369,N1C370,HC77,HC78,HC79,HC80,N1C474,N1C364,GR114,GR115,GR122,GR123,GR120,GR121,N1R198,HR573,HR589,GC5,GC329,GC348,GC330,SC7336,SC7337,SC7338,SC7339,N1C467,N1C468,N1C469,N1C470,N1C471,N1C472,HC97,HC98,HC99,HC100,N1C465,N1C466,GR164,GR165,N1R209,HR615,HR614,Q9382,GR128,GR129,GR147,GR148,GR149,GR150	GC355,GC356,GC353,GC354,SC7344,SC7345,SC7346,SC7347,N1C485,N1C486,N1C487,N1C488,N1C489,N1C490,HC101,HC102,HC103,HC104,N1C481,N1C482,GR168,GR171,GR167,GR169,GR170,GR174,N1R210,HR624,HR625,GC351,GC357,GC358,GC352,SC7340,SC7341,SC7342,SC7343,N1C475,N1C476,N1C477,N1C478,N1C479,N1C480,HC105,HC106,HC107,HC108,N1C483,N1C484,GR166,GR175,N1R211,HR622,HR623,Q9438,GR172,GR173,GR176,GR177,GR178,GR179
GS-KCD	X937526-001	M2,M3,M4,M5	M6,M7,M8,M9	GC245,GC53,GC349,GC4,SC228,SC229,SC230,SC231,SC99,SC232,SC233,SC240,SC241,SC242,HC37,HC38,HC39,HC40,N1C389,N1C390,GR66,GR100,GR104,GR105,GR5,GR7,N1R35,HR565,HR581,GC47,GC250,GC350,GC252,SC236,SC237,SC238,SC239,N1C274,N1C276,N1C277,N1C279,N1C280,N1C281,HC45,HC46,HC47,HC48,N1C275,N1C399,GR156,GR157,N1R108,PR60581,HR583,Q9380,GR6,GR101,GC49,GC253,GC255,GC256,SC244,SC245,SC246,SC247,N1C138,N1C140,N1C141,N1C142,N1C143,N1C144,HC53,HC54,HC55,HC56,N1C139,N1C408,GR106,GR107,GR108,GR109,GR110,GR111,N1R91,HR569,HR585,GC51,GC257,GC346,GC259,SC252,SC253,SC254,SC255,N1C430,N1C432,N1C434,N1C435,N1C436,N1C437,HC73,HC74,HC75,HC76,N1C431,N1C433,GR158,GR159,N1R135,HR571,HR593,Q9381,GR112,GR113,GR139,GR140,GR141,GR142,GR143,GR144,GR145,GR146	GC52,GC260,GC347,GC264,SC260,SC261,SC262,SC263,N1C363,N1C365,N1C366,N1C368,N1C369,N1C370,HC77,HC78,HC79,HC80,N1C474,N1C364,GR114,GR115,GR122,GR123,GR120,GR121,N1R198,HR573,HR589,GC5,GC329,GC348,GC330,SC7336,SC7337,SC7338,SC7339,N1C467,N1C468,N1C469,N1C470,N1C471,N1C472,HC97,HC98,HC99,HC100,N1C465,N1C466,GR164,GR165,N1R209,HR615,HR614,Q9382,GR128,GR129,GC355,GC356,GC353,GC354,SC7344,SC7345,SC7346,SC7347,N1C485,N1C486,N1C487,N1C488,N1C489,N1C490,HC101,HC102,HC103,HC104,N1C481,N1C482,GR168,GR171,GR167,GR169,GR170,GR174,N1R210,HR624,HR625,GC351,GC357,GC358,GC352,SC7340,SC7341,SC7342,SC7343,N1C475,N1C476,N1C477,N1C478,N1C479,N1C480,HC105,HC106,HC107,HC108,N1C483,N1C484,GR166,GR175,N1R211,HR622,HR623,Q9438,GR172,GR173,GR147,GR148,GR149,GR150,GR176,GR177,GR178,GR179

M2:
GC245,GC53,GC349,GC4,SC228,SC229,SC230,SC231,SC99,SC232,SC233,SC240,SC241,SC242,HC37,HC38,HC39,HC40,N1C389,N1C390
GR66,GR100,GR104,GR105,GR5,GR7,N1R35,HR565,HR581
M3:
GC47,GC250,GC350,GC252,SC236,SC237,SC238,SC239,N1C274,N1C276,N1C277,N1C279,N1C280,N1C281,HC45,HC46,HC47,HC48,N1C275,N1C399
GR156,GR157,N1R108,PR60581,HR583
M2&M3 related:
Q9380,GR6,GR101

M4:
GC49,GC253,GC255,GC256,SC244,SC245,SC246,SC247,N1C138,N1C140,N1C141,N1C142,N1C143,N1C144,HC53,HC54,HC55,HC56,N1C139,N1C408
GR106,GR107,GR108,GR109,GR110,GR111,N1R91,HR569,HR585
M5:
GC51,GC257,GC346,GC259,SC252,SC253,SC254,SC255,N1C430,N1C432,N1C434,N1C435,N1C436,N1C437,HC73,HC74,HC75,HC76,N1C431,N1C433
GR158,GR159,N1R135,HR571,HR593
M4&M5 related:
Q9381,GR112,GR113

M2&M3&M4&M5 related:
GR139,GR140,GR141,GR142,GR143,GR144,GR145,GR146

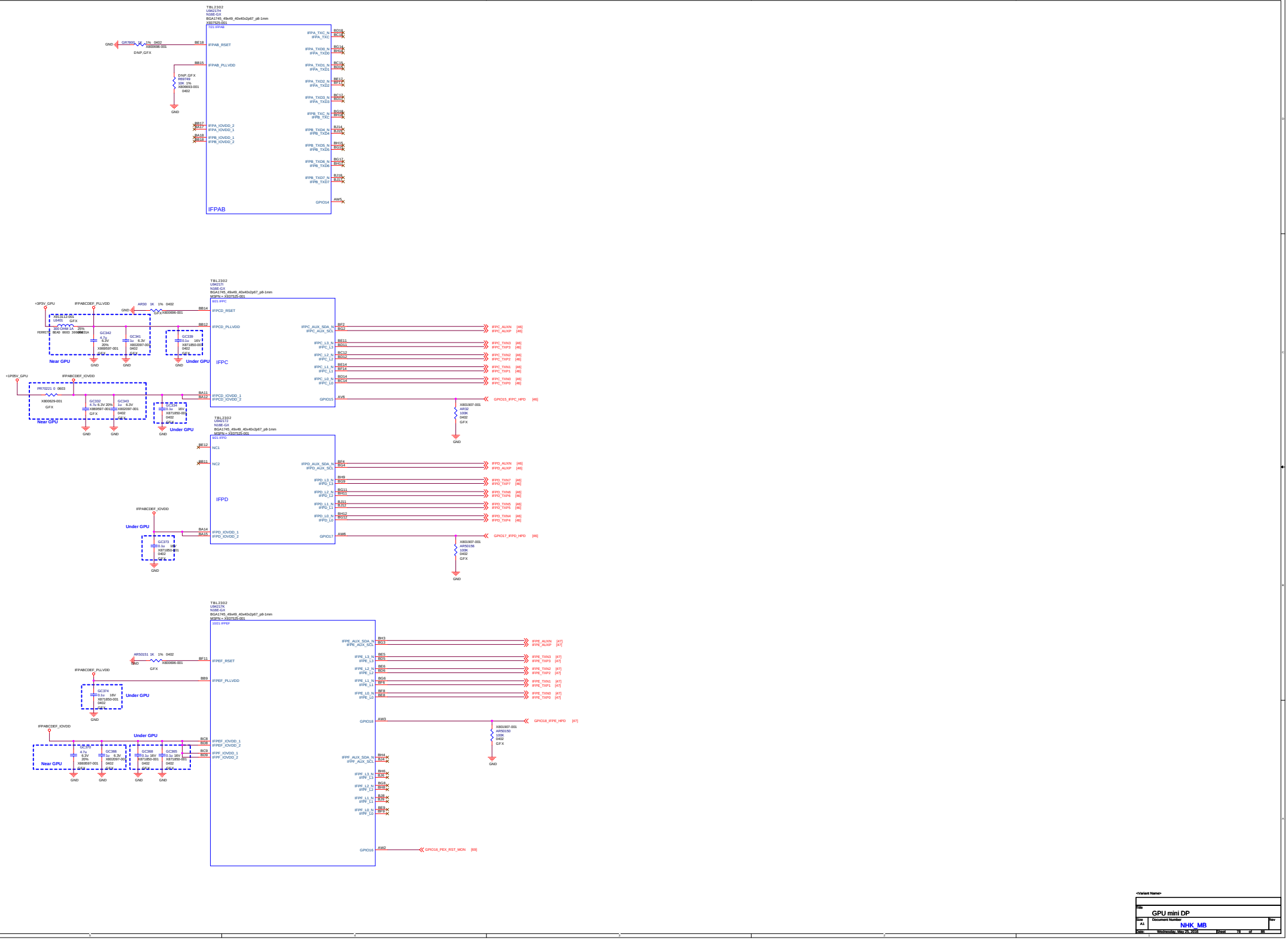
M6:
GC52,GC260,GC347,GC264,SC260,SC261,SC262,SC263,N1C363,N1C365,N1C366,N1C368,N1C369,N1C370,HC77,HC78,HC79,HC80,N1C474,N1C364
GR114,GR115,GR122,GR123,GR120,GR121,N1R198,HR573,HR589
M7:
GC5,GC329,GC348,GC330,SC7336,SC7337,SC7338,SC7339,N1C467,N1C468,N1C469,N1C470,N1C471,N1C472,HC97,HC98,HC99,HC100,N1C465,N1C466
GR164,GR165,N1R209,HR615,HR614
M6&M7 related:
Q9382,GR128,GR129
M8:
GC355,GC356,GC353,GC354,SC7344,SC7345,SC7346,SC7347,N1C485,N1C486,N1C487,N1C488,N1C489,N1C490,HC101,HC102,HC103,HC104,N1C481,N1C482
GR168,GR171,GR167,GR169,GR170,GR174,N1R210,HR624,HR625
M9:
GC351,GC357,GC358,GC352,SC7340,SC7341,SC7342,SC7343,N1C475,N1C476,N1C477,N1C478,N1C479,N1C480,HC105,HC106,HC107,HC108,N1C483,N1C484
GR166,GR175,N1R211,HR622,HR623
M8&M9 related:
Q9438,GR172,GR173
M6&M7&M8&M9 related:
GR147,GR148,GR149,GR150,GR176,GR177,GR178,GR179

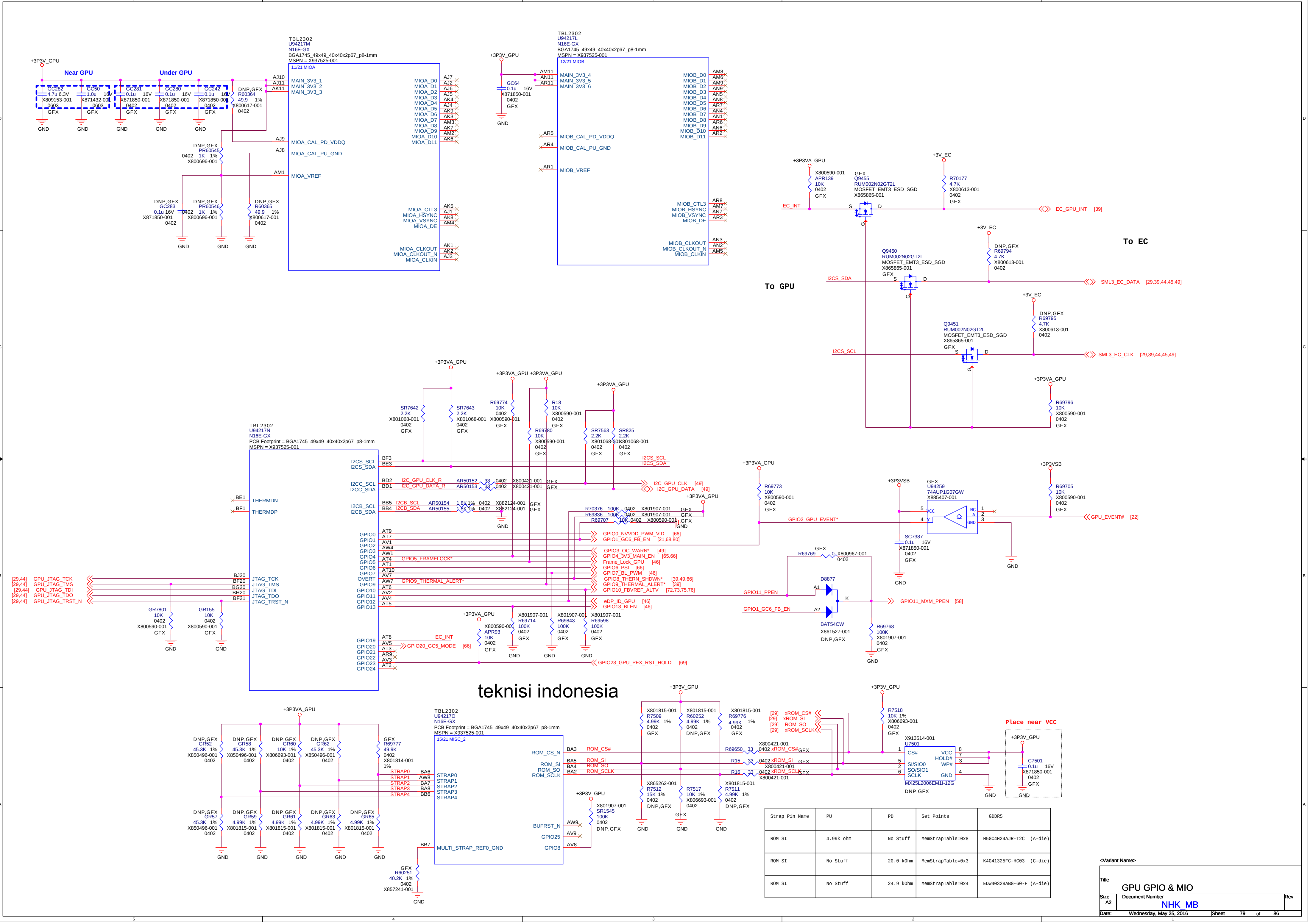
<Variant Name>

Title: GPU Load Options

Size: E | Document Number: NHK_MB | Rev:

Date: Wednesday, May 25, 2016 |


TBL2302
U9421TN
N16E-GX
BGA1745_49x49_40x40x2p67_p8-1mm
X937525-001
IFPAB
IFPA_TXC_N
IFPA_TXC
IFPA_TXD0_N
IFPA_TXD0
IFPA_TXD1_N
IFPA_TXD1
IFPA_TXD2_N
IFPA_TXD2
IFPA_TXD3_N
IFPA_TXD3
IFPB_TXC_N
IFPB_TXC
IFPB_TXD4_N
IFPB_TXD4
IFPB_TXD5_N
IFPB_TXD5
IFPB_TXD6_N
IFPB_TXD6
IFPB_TXD7_N
IFPB_TXD7
IFPA_IOVDD_2
IFPA_IOVDD_1
IFPB_IOVDD_1
IFPB_IOVDD_2
IFPAB_RSET
IFPAB_PLLVDD
GPIO14
IFPC
IFPC_AUX_SDA_N
IFPC_AUX_SCL
IFPC_L3_N
IFPC_L3
IFPC_L2_N
IFPC_L2
IFPC_L1_N
IFPC_L1
IFPC_L0_N
IFPC_L0
IFPCD_RSET
IFPCD_PLLVDD
IFPCD_IOVDD_1
IFPCD_IOVDD_2
GPIO15
IFPD
IFPD_AUX_SDA_N
IFPD_AUX_SCL
IFPD_L3_N
IFPD_L3
IFPD_L2_N
IFPD_L2
IFPD_L1_N
IFPD_L1
IFPD_L0_N
IFPD_L0
IFPD_RSET
IFPD_PLLVDD
IFPD_IOVDD_1
IFPD_IOVDD_2
GPIO17
IFPE
IFPE_AUX_SDA_N
IFPE_AUX_SCL
IFPE_L3_N
IFPE_L3
IFPE_L2_N
IFPE_L2
IFPE_L1_N
IFPE_L1
IFPE_L0_N
IFPE_L0
IFPEF_RSET
IFPEF_PLLVDD
IFPEF_IOVDD_1
IFPEF_IOVDD_2
IFPF_IOVDD_1
IFPF_IOVDD_2
IFPF_AUX_SDA_N
IFPF_AUX_SCL
IFPF_L3_N
IFPF_L3
IFPF_L2_N
IFPF_L2
IFPF_L1_N
IFPF_L1
IFPF_L0_N
IFPF_L0
GPIO16
Under GPU
Near GPU
GND
GFX
DNP,GFX
+3P3V_GPU
+1P05V_GPU
IFPABCDEF_PLLVDD
IFPABCDEF_IOVDD
IFPAB_PLLVDD
IFPC_AUXN
IFPC_AUXP
IFPC_TXN3
IFPC_TXP3
IFPC_TXN2
IFPC_TXP2
IFPC_TXN1
IFPC_TXP1
IFPC_TXN0
IFPC_TXP0
GPIO15_IFPC_HPD
IFPD_AUXN
IFPD_AUXP
IFPD_TXN7
IFPD_TXP7
IFPD_TXN6
IFPD_TXP6
IFPD_TXN5
IFPD_TXP5
IFPD_TXN4
IFPD_TXP4
GPIO17_IFPD_HPD
IFPE_AUXN
IFPE_AUXP
IFPE_TXN3
IFPE_TXP3
IFPE_TXN2
IFPE_TXP2
IFPE_TXN1
IFPE_TXP1
IFPE_TXN0
IFPE_TXP0
GPIO18_IFPE_HPD
GPIO16_PEX_RST_MCN
X801907-001
X801629-001
X801597-001
X802097-001
X871850-001
X800696-001
X801150
X801156



Near GPU
Under GPU
+3P3V_GPU
TBL2302
U94217M
N16E-GX
BGA1745_49x49_40x40x2p67_p8-1mm
MSPN = X937525-001
11/21 MIOA
MIOA_CAL_PD_VDDQ
MIOA_CAL_PU_GND
MIOA_VREF
MIOA_CTL3
MIOA_HSYNC
MIOA_VSYNC
MIOA_DE
MIOA_CLKOUT
MIOA_CLKOUT_N
MIOA_CLKIN
U94217L
12/21 MIOB
MIOB_CAL_PD_VDDQ
MIOB_CAL_PU_GND
MIOB_VREF
MIOB_CTL3
MIOB_HSYNC
MIOB_VSYNC
MIOB_DE
MIOB_CLKOUT
MIOB_CLKOUT_N
MIOB_CLKIN
To GPU
To EC
EC_INT
EC_GPU_INT [39]
I2CS_SDA
SML3_EC_DATA [29,39,44,45,49]
I2CS_SCL
SML3_EC_CLK [29,39,44,45,49]
U94217N
THERMDN
THERMDP
JTAG_TCK
JTAG_TMS
JTAG_TDI
JTAG_TDO
JTAG_TRST_N
I2C_GPU_CLK [49]
I2C_GPU_DATA [49]
GPIO0_NVVDD_PWM_VID [66]
GPIO1_GC6_FB_EN [21,68,80]
GPIO3_OC_WARN* [49]
GPIO4_3V3_MAIN_EN [65,66]
Frame_Lock_GPU [66]
GPIO6_PSI [66]
GPIO7_BL_PWM [46]
GPIO8_THERN_SHDWN* [39,49,66]
GPIO9_THERMAL_ALERT* [39]
GPIO10_FBVREF_ALTV [72,73,75,76]
eDP_ID_GPU [46]
GPIO13_BLEN [46]
GPIO20_GC5_MODE [66]
GPIO23_GPU_PEX_RST_HOLD [69]
GPU_EVENT# [22]
GPIO11_MXM_PPEN [58]
teknisi indonesia
U94217O
15/21 MISC_2
STRAP0
STRAP1
STRAP2
STRAP3
STRAP4
ROM_CS_N
ROM_SI
ROM_SO
ROM_SCLK
BUFRST_N
GPIO25
GPIO8
MULTI_STRAP_REF0_GND
U7501
MX25L2006EM1I-12G
Place near VCC

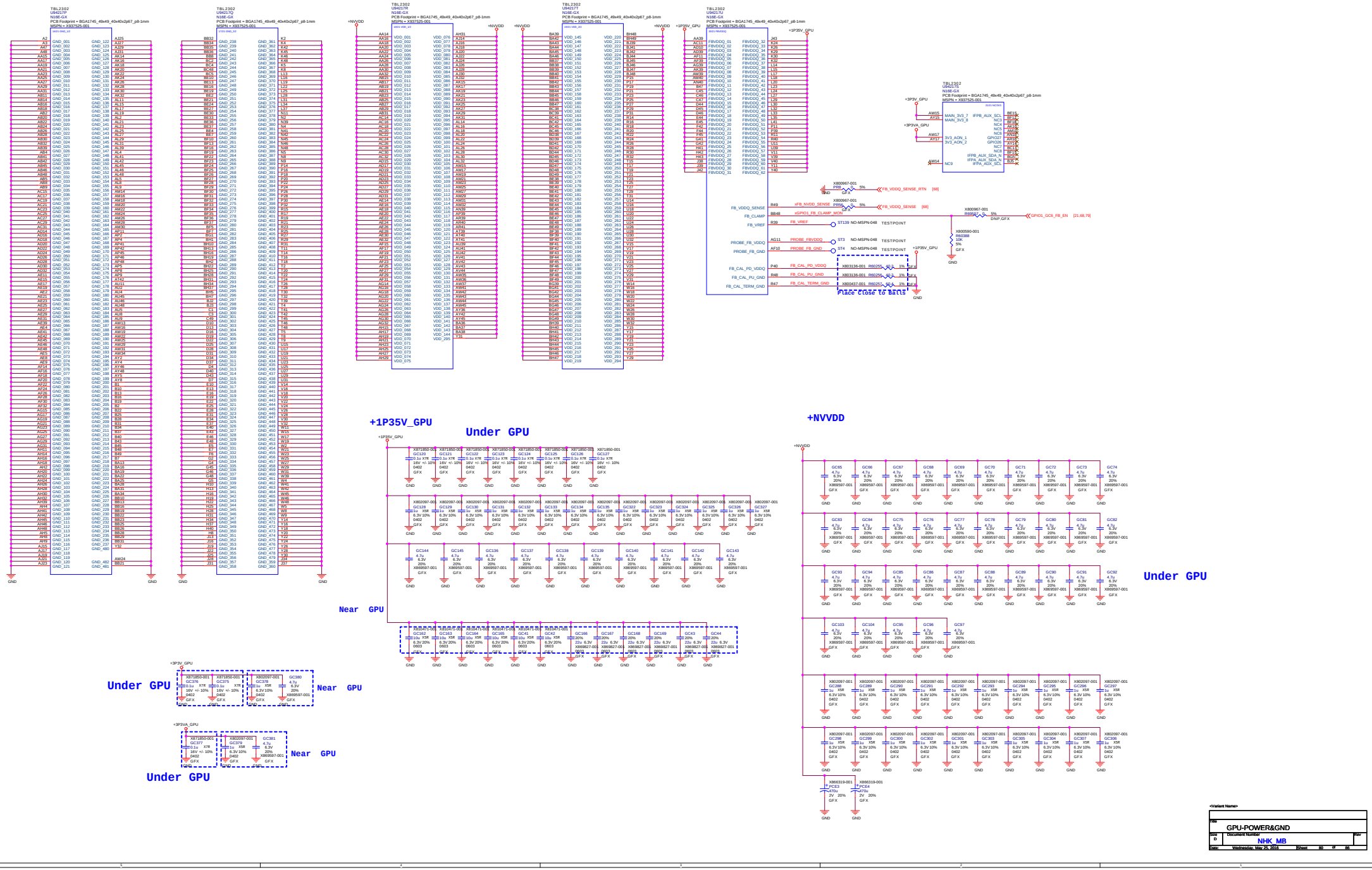
Strap Pin Name	PU	PD	Set Points	GDDR5
ROM SI	4.99k ohm	No Stuff	MemStrapTable=0x8	H5GC4H24AJR-T2C (A-die)
ROM SI	No Stuff	20.0 kOhm	MemStrapTable=0x3	K4G41325FC-HC03 (C-die)
ROM SI	No Stuff	24.9 kOhm	MemStrapTable=0x4	EDW4032BABG-60-F (A-die)

<Variant Name>

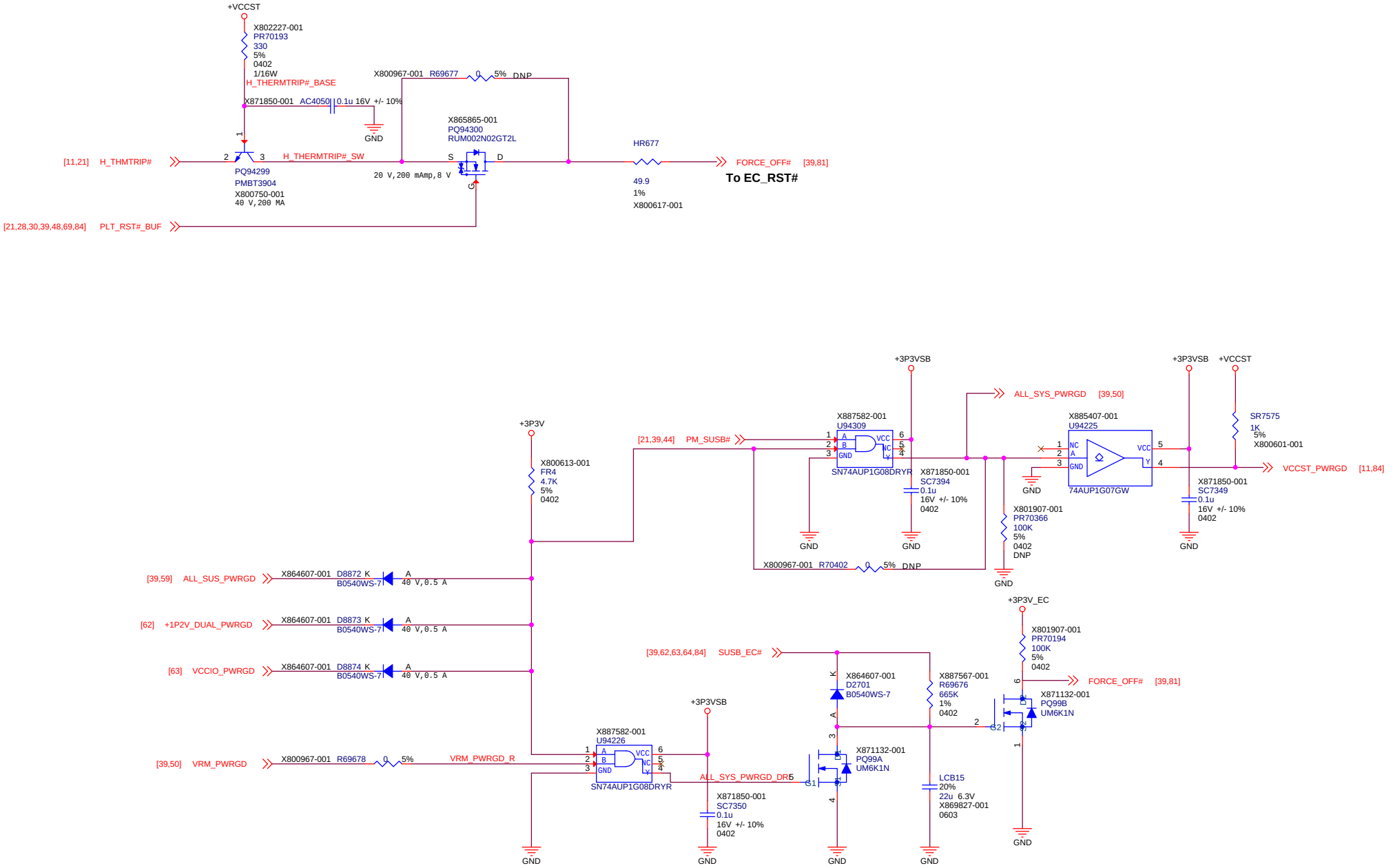
Title: GPU GPIO & MIO

Size: A2 | Document Number: NHK_MB | Rev

Date: Wednesday, May 25, 2016 | Sheet 79 of 86

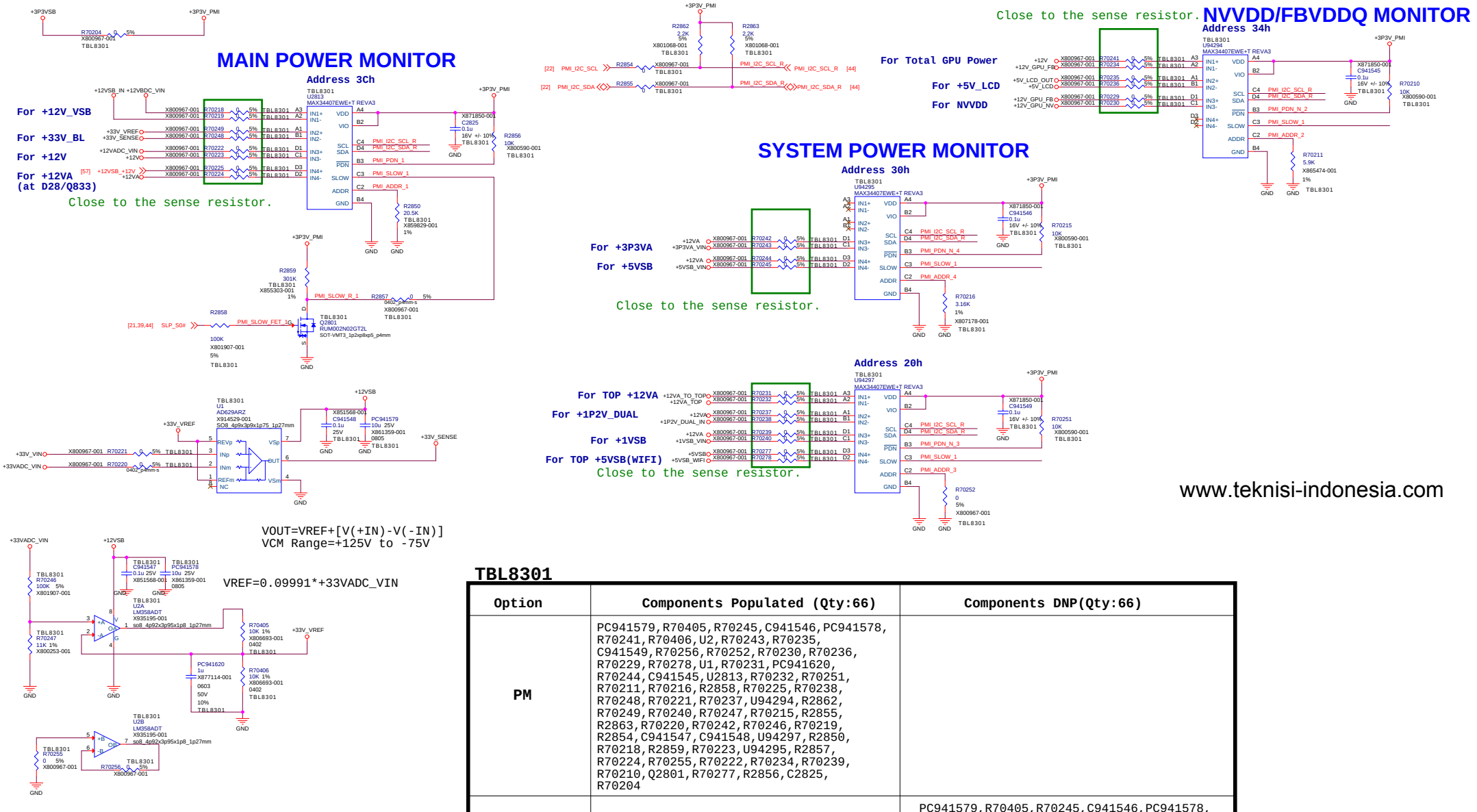


<Variant Name>	
Title	GPU-POWER&GND
Size: D	Document Number: NHK_MB Rev:
Date: Wednesday, May 29, 2013	Sheet 80 of 86



<Variant Name>

Title	PWRGD	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 81 of 86	



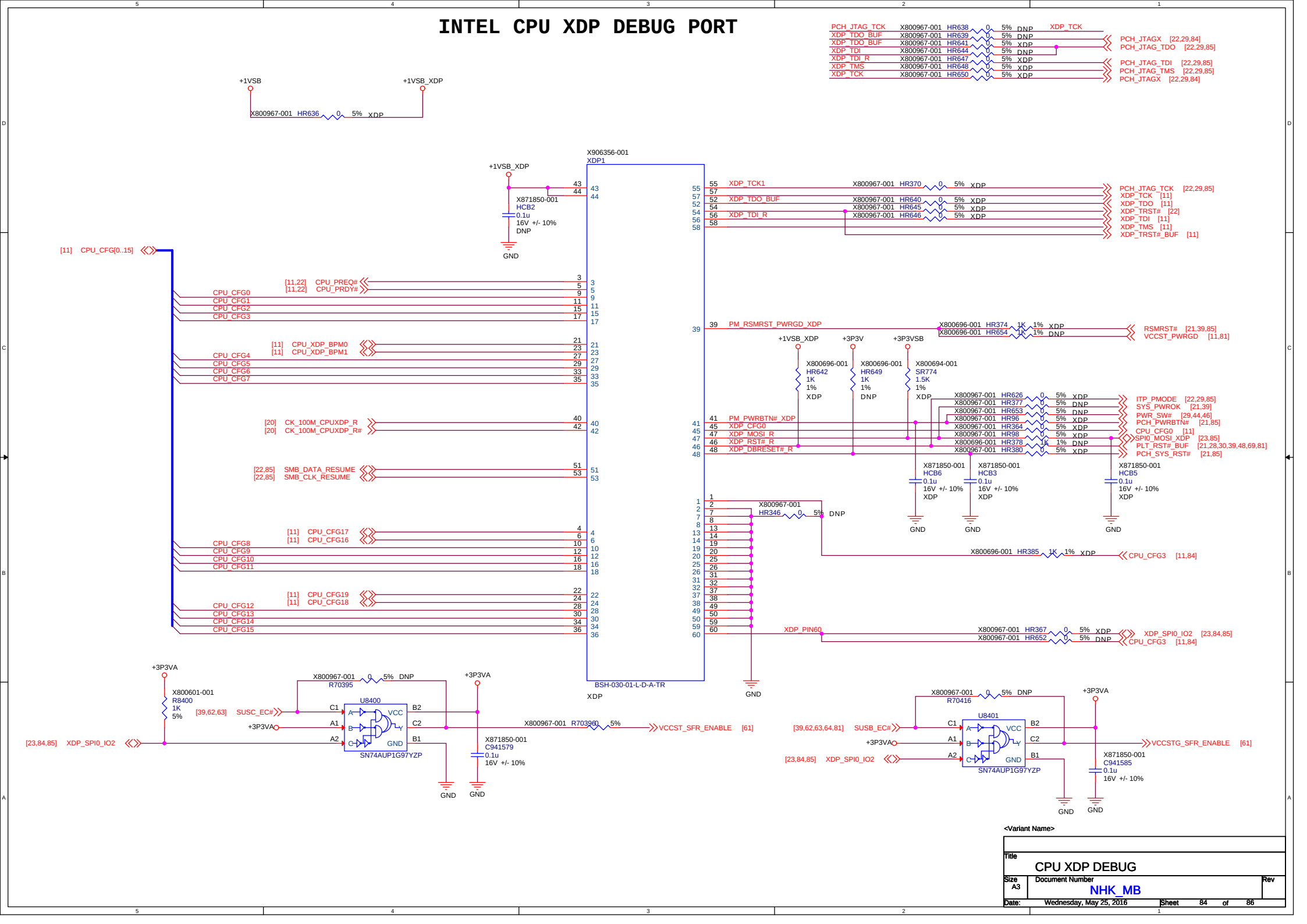
TBL8301

Option	Components Populated (Qty:66)	Components DNP(Qty:66)
PM	PC941579,R70405,R70245,C941546,PC941578, R70241,R70406,U2,R70243,R70235, C941549,R70256,R70252,R70230,R70236, R70229,R70278,U1,R70231,PC941620, R70244,C941545,U2813,R70232,R70251, R70211,R70216,R2858,R70225,R70238, R70248,R70221,R70237,U94294,R2862, R70249,R70240,R70247,R70215,R2855, R2863,R70220,R70242,R70246,R70219, R2854,C941547,C941548,U94297,R2850, R70218,R2859,R70223,U94295,R2857, R70224,R70255,R70222,R70234,R70239, R70210,Q2801,R70277,R2856,C2825, R70204	
No PM		PC941579,R70405,R70245,C941546,PC941578, R70241,R70406,U2,R70243,R70235, C941549,R70256,R70252,R70230,R70236, R70229,R70278,U1,R70231,PC941620, R70244,C941545,U2813,R70232,R70251, R70211,R70216,R2858,R70225,R70238, R70248,R70221,R70237,U94294,R2862, R70249,R70240,R70247,R70215,R2855, R2863,R70220,R70242,R70246,R70219, R2854,C941547,C941548,U94297,R2850, R70218,R2859,R70223,U94295,R2857, R70224,R70255,R70222,R70234,R70239, R70210,Q2801,R70277,R2856,C2825, R70204

<Variant Name>

Title	NA	
Size A2	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 83 of 86	

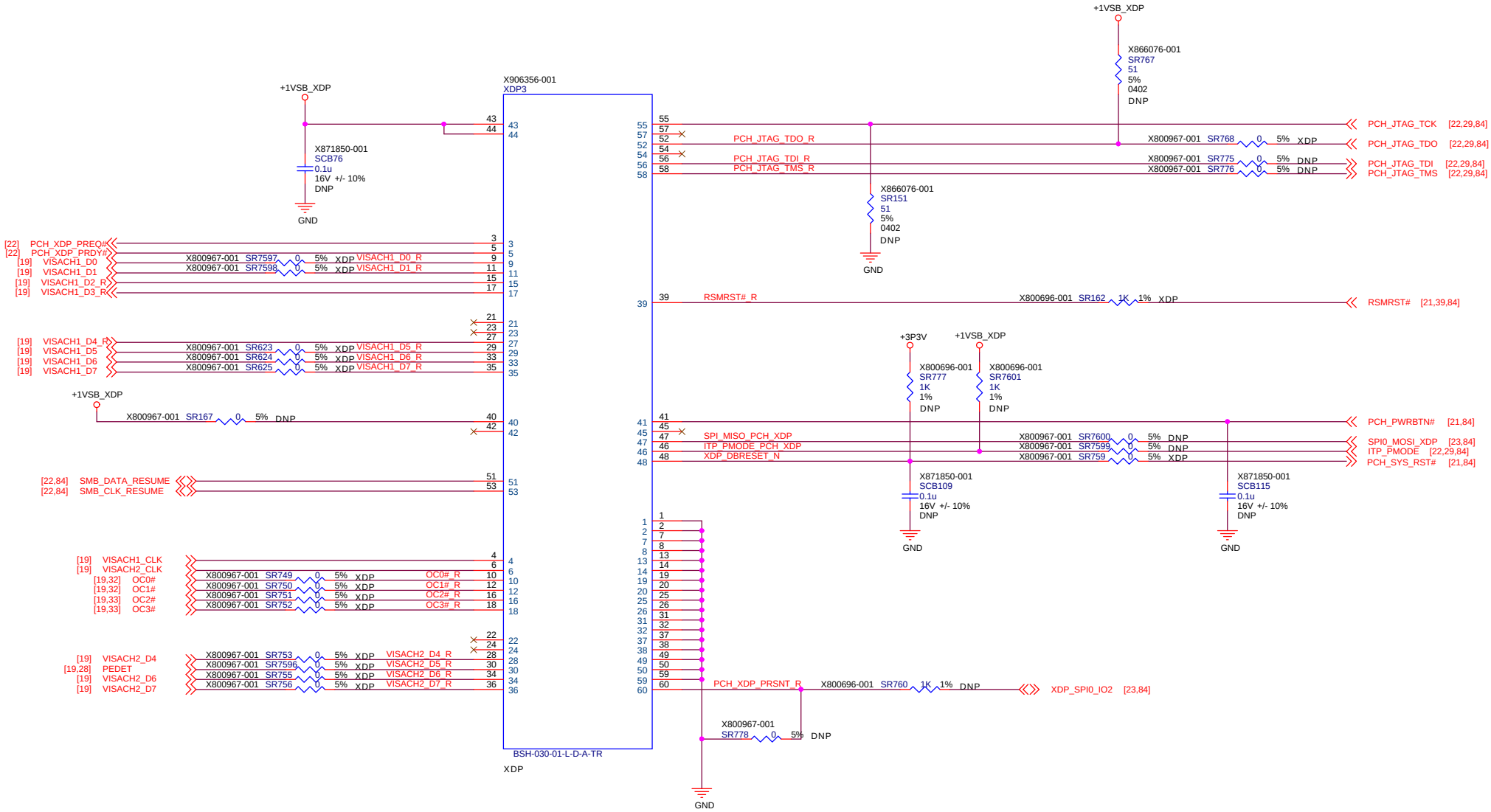
INTEL CPU XDP DEBUG PORT



<Variant Name>

Title	CPU XDP DEBUG	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 84 of 86	

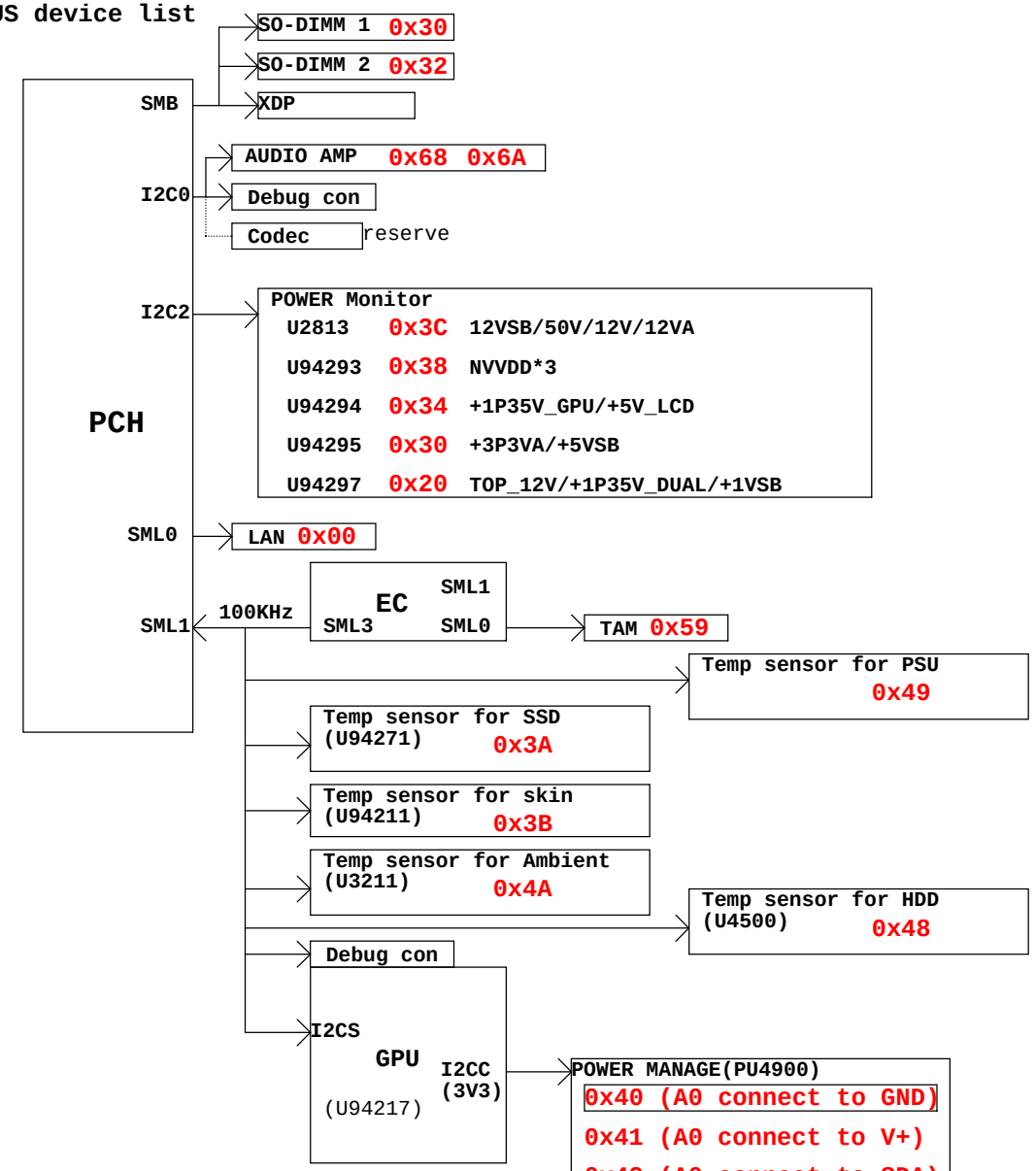
INTEL PCH XDP DEBUG PORT



<Variant Name>

Title	PCH XDP DEBUG	
Size A3	Document Number NHK_MB	Rev
Date: Wednesday, May 25, 2016	Sheet 85 of 86	

SMBUS device list



Device	Address
GPU	0X4B for NV internal testing 0X4F for internal thermal sensor (defult) 0X4E for internal thermal sensor (Multi)

<Variant Name>

Title: SMBUS & I2C address table		
Size: A3	Document Number: NHK_MB	Rev:
Date: Wednesday, May 25, 2016	Sheet 86 of 86	