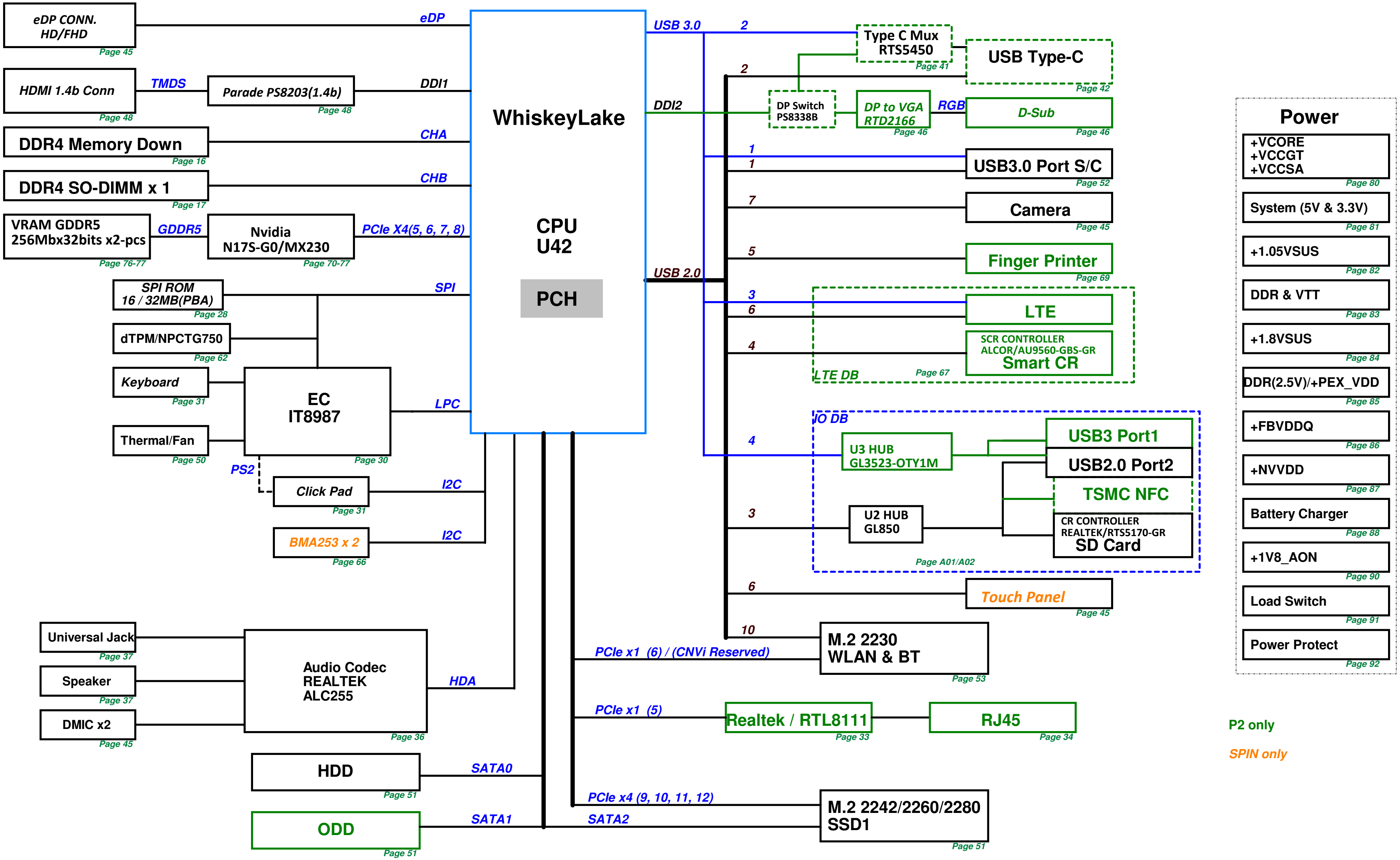
Dolly/DL4FA with Intel WHL/CML

Block Diagram



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : Block

BG1-HW3 RD

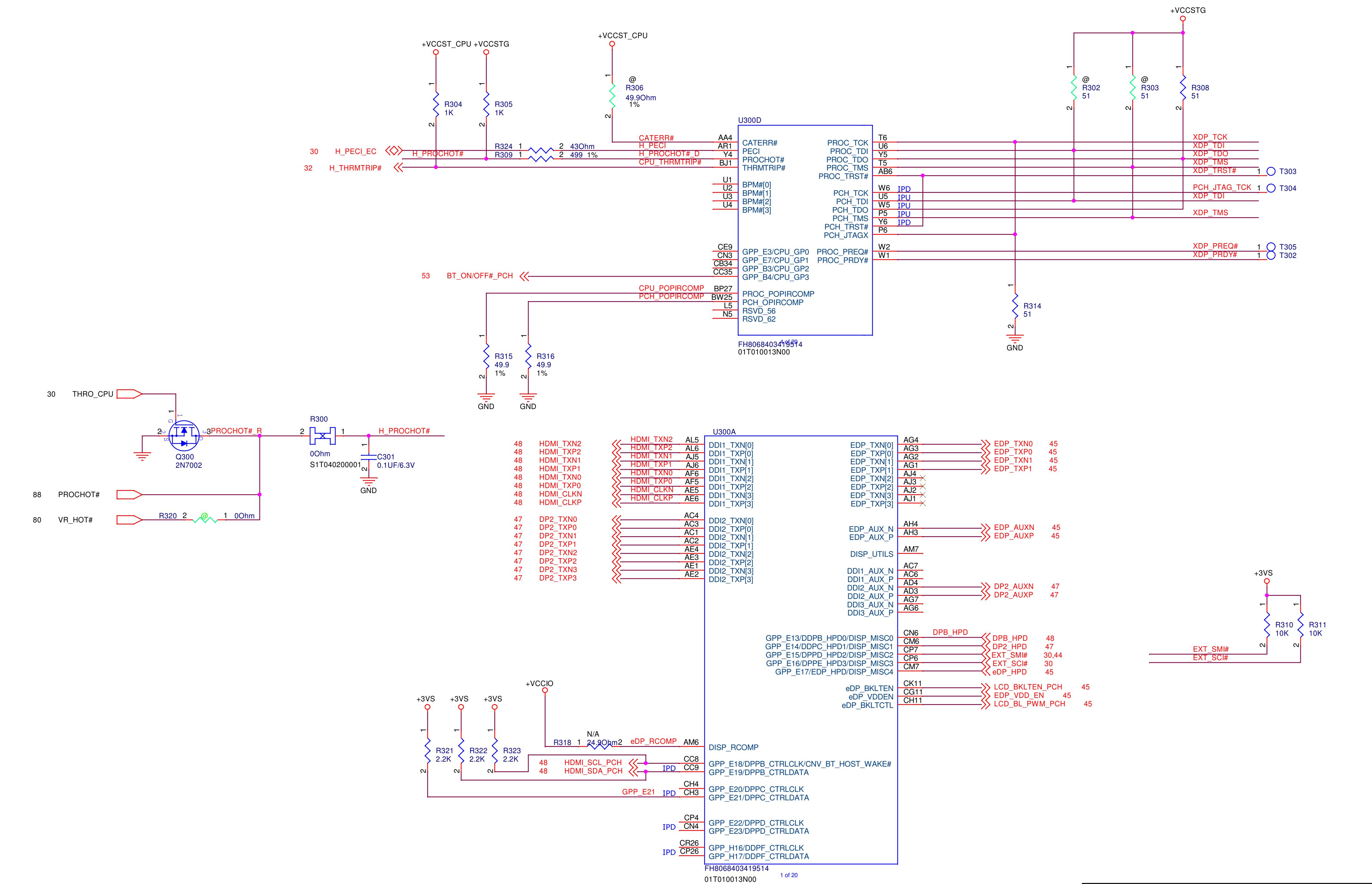
Engineer: Unknow desiner

Size	Project Name	Rev
C	P2 / Extensa	0.9

Date: Friday, April 12, 2019 Sheet 1 of 97

Option

Optional	Remark
@	Ummount
/Debug	Debug only
/EMI	Reserved EMI part
/UMA	Support UMA
/VGA	Support VGA
/U22	Support 2+2 CPU
/U42	Support 4+2 CPU
/TPM	Support dTPM function
/Non_TPM	Support fTPM function
/5450	DDI2 TO RTS5450 for reduce cost of RTS2166 and PS8338
/P2_SPIN	RTS5450 for Full funciton Type-C solution
@/Dead battery	No Support dead Battery
/Dead battery	Support dead Battery
/8338	DDI2 TO PS8338 DP SW for D-Sub
/CRT	RTS2166
/ODD	Support ODD function
PCB_ID0/1/2	PCB ID
MEM_ID0/1/2	MEM ID
/ALC233	Audio Codec : Realtek ALC233
/ALC255	Audio Codec : Realtek ALC255
/BASE_SKU	BASE SKU
/Premium_SKU	Premium_SKU



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

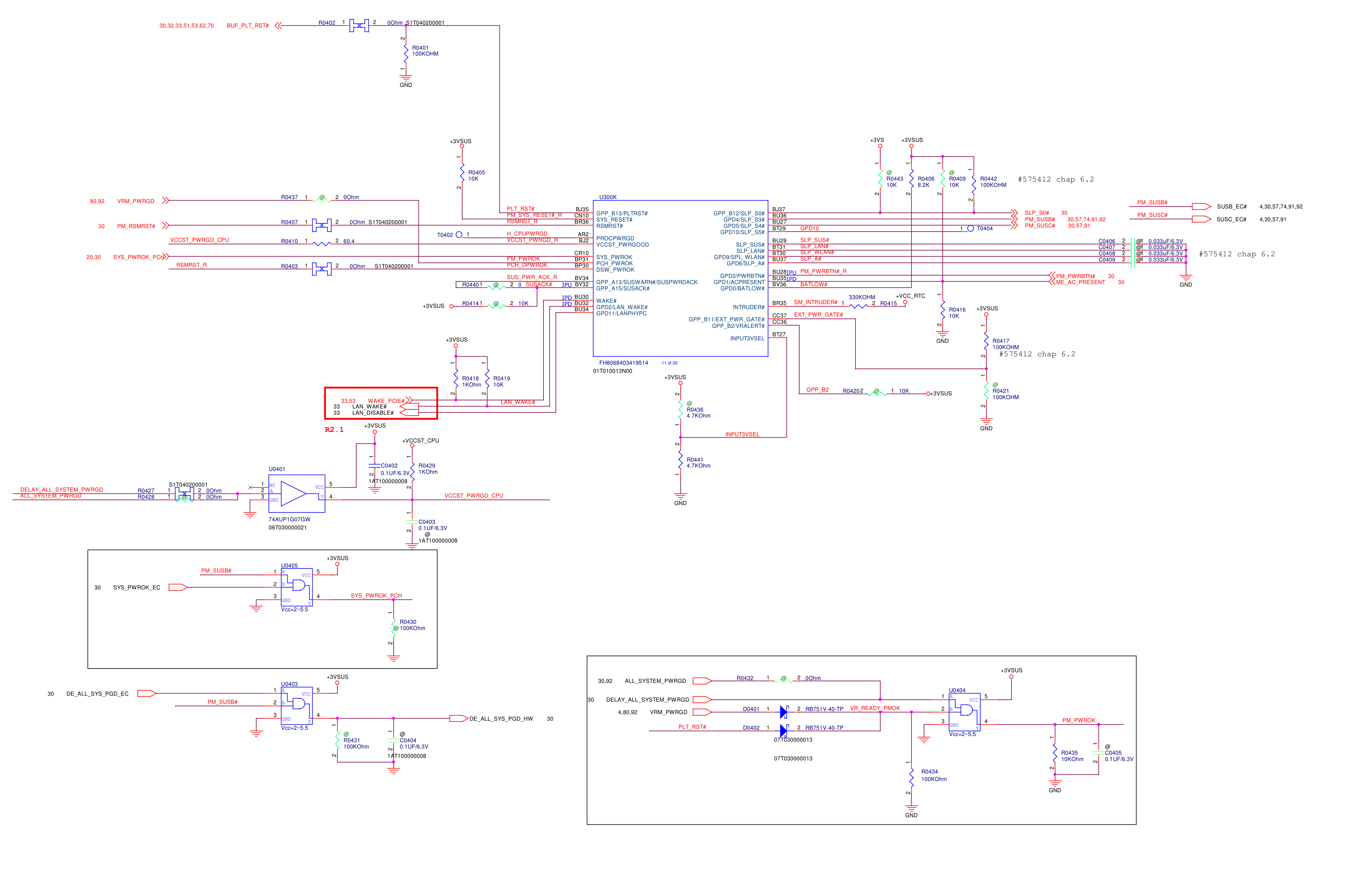
Title: MISC,JTAG,DDI,EDP

BG1-HW1 RD

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 3 of 104



PEGATRON

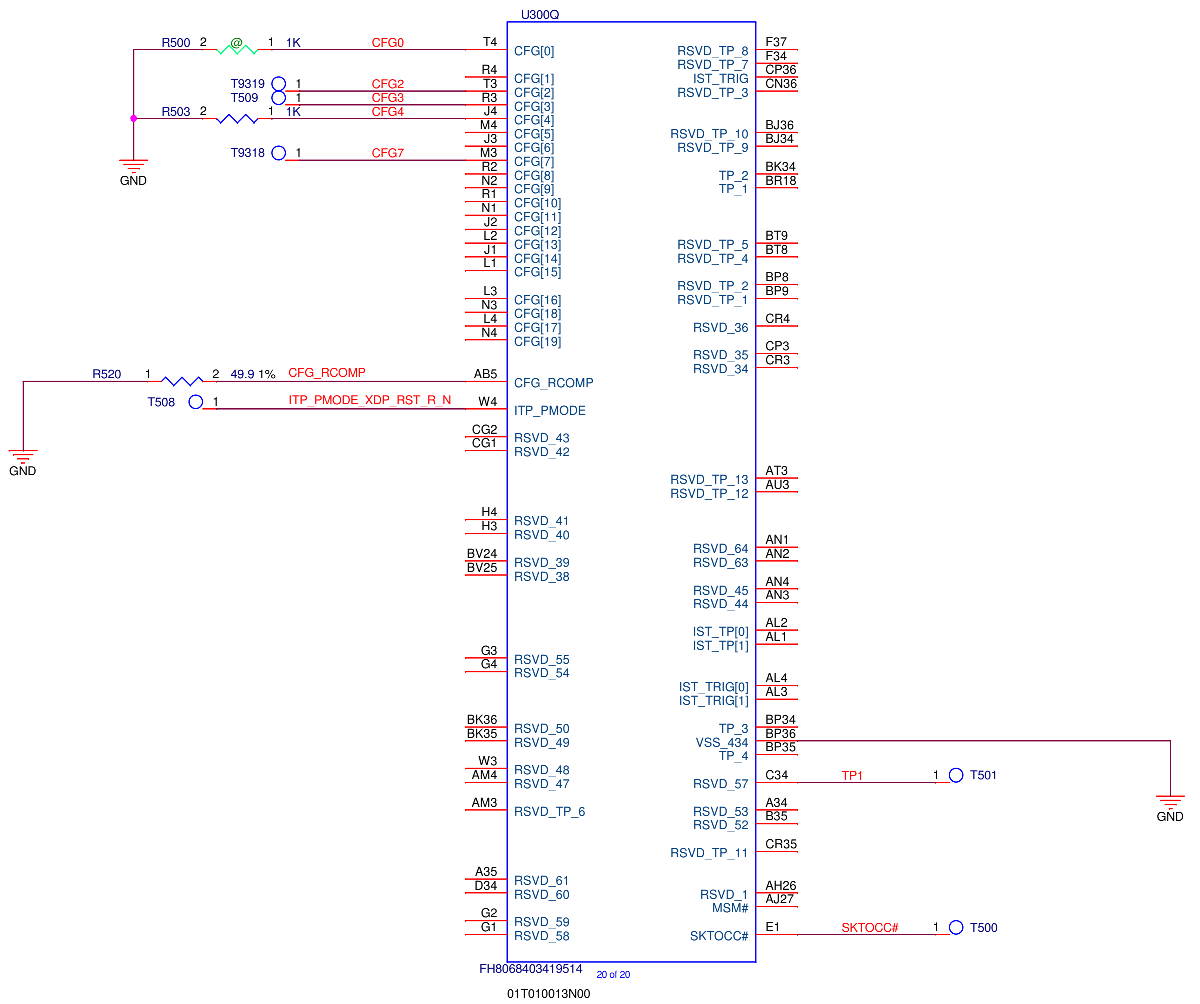
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title: CPU_SYS_POWER_MANAGER

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 4 of 104



PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

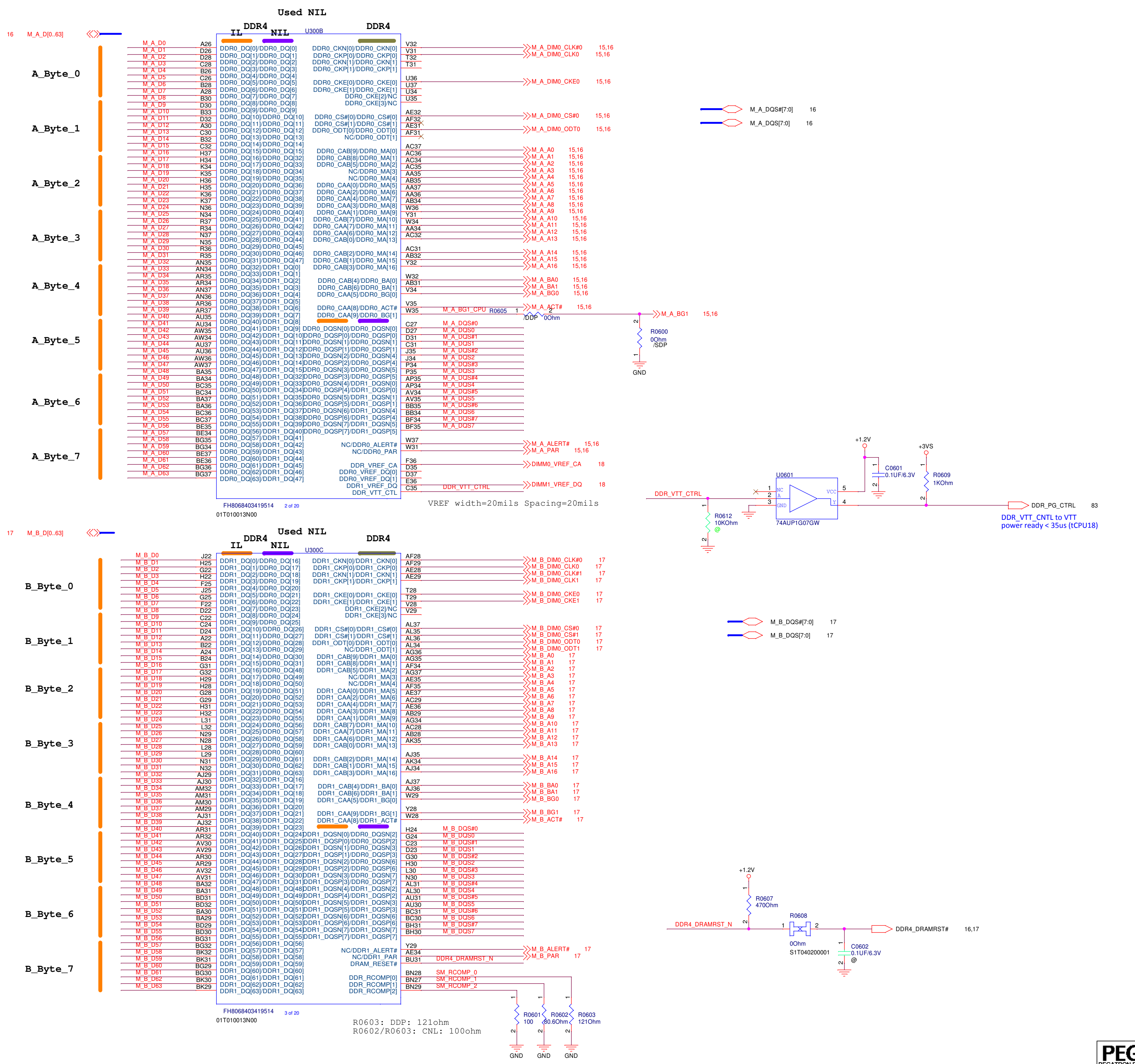
BG1-HW1 RD

Title : CPU_RESERVED

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 5 of 104



PEGATRON Title : CPU_DDR4

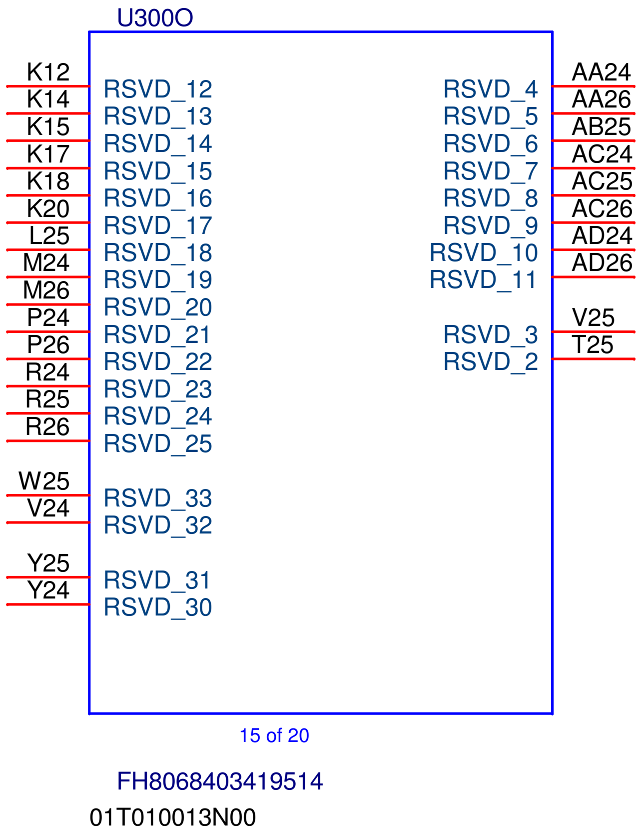
PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1-RD

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 6 of 104

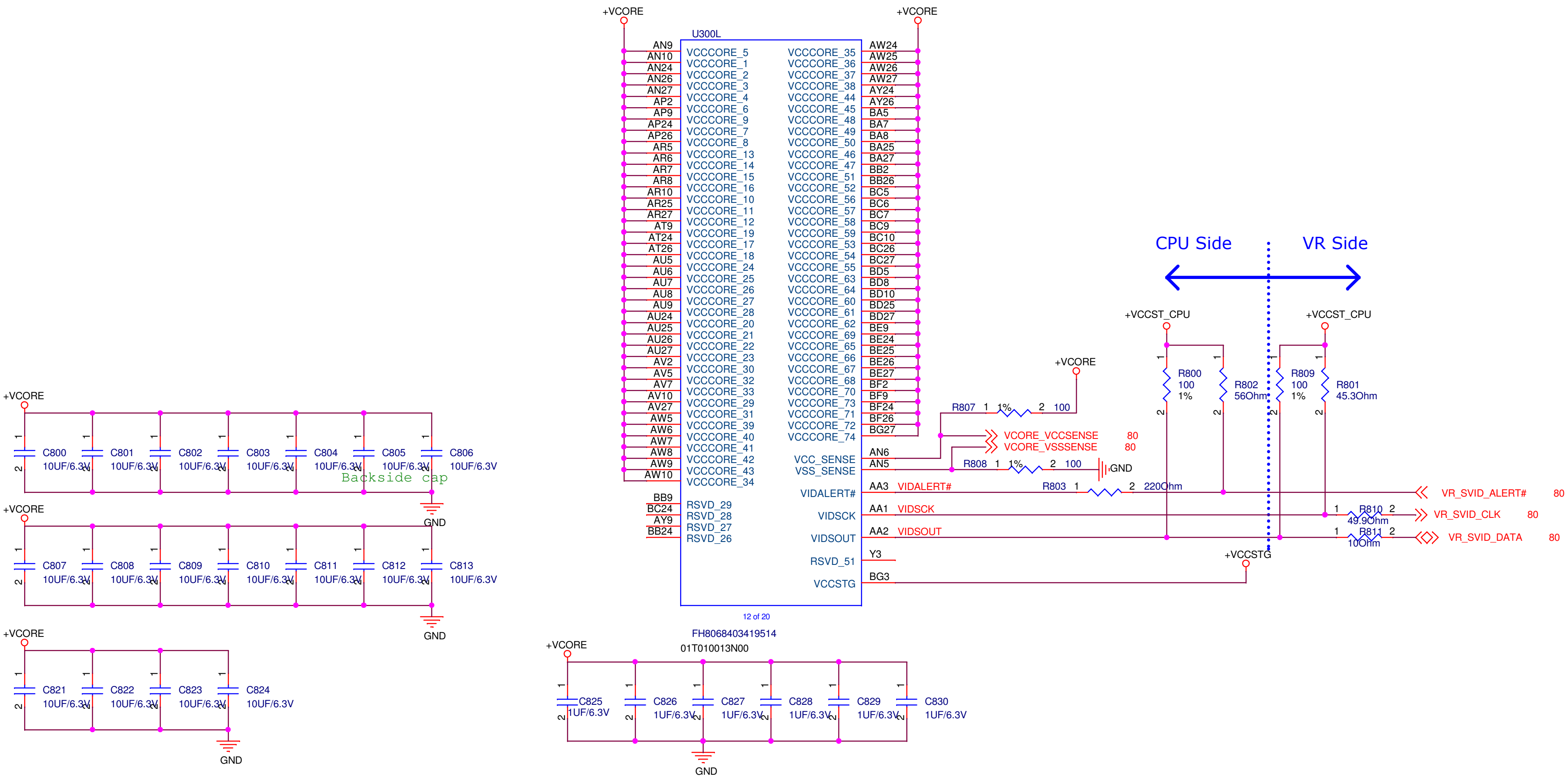


PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD

Title : CPU_RSVD		
Engineer: *Tina Lee*		
Size: Custom	Project Name: **DL4FA**	Rev: 1.1
Date: Friday, April 12, 2019	Sheet 7 of 104	



PEGATRON PROPRIETARY AND CONFIDENTIAL

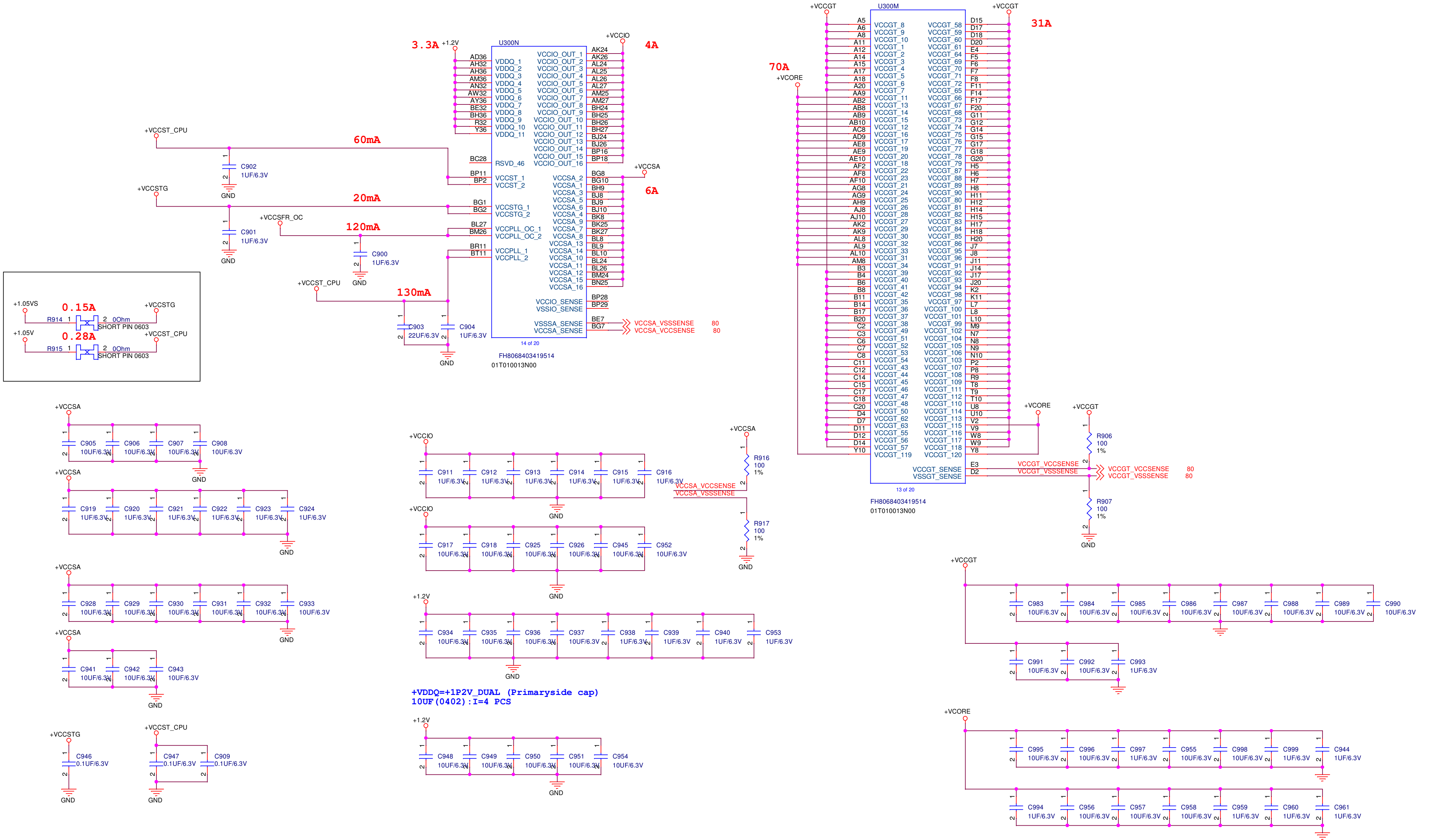
BG1-HW1 RD

Title: CPU_POWER_01

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 8 of 104



PEGATRON

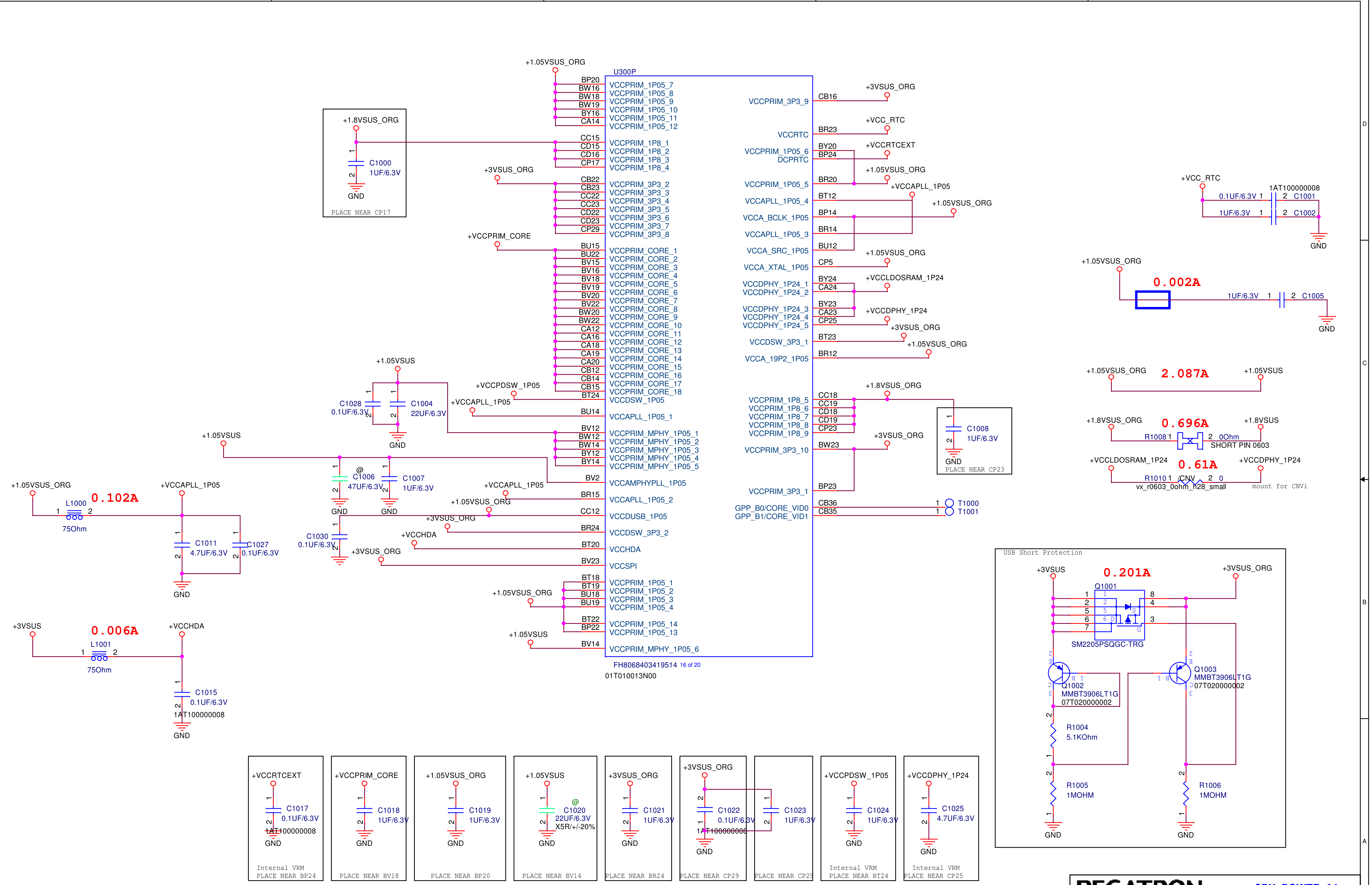
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title: GPU_POWER_02,03

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 — Sheet 9 of 104



PEGATRON Title: GPU_POWER_04

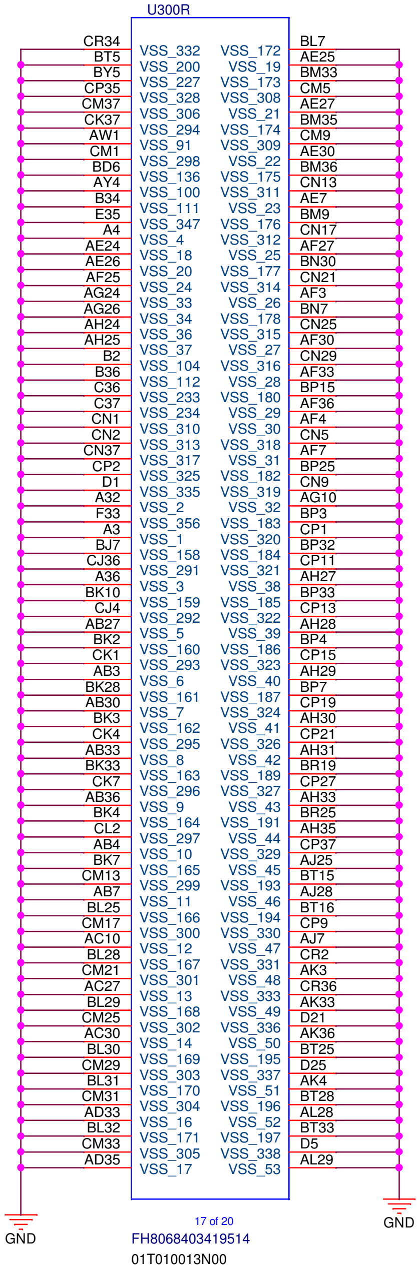
PEGATRON PROPRIETARY AND CONFIDENTIAL

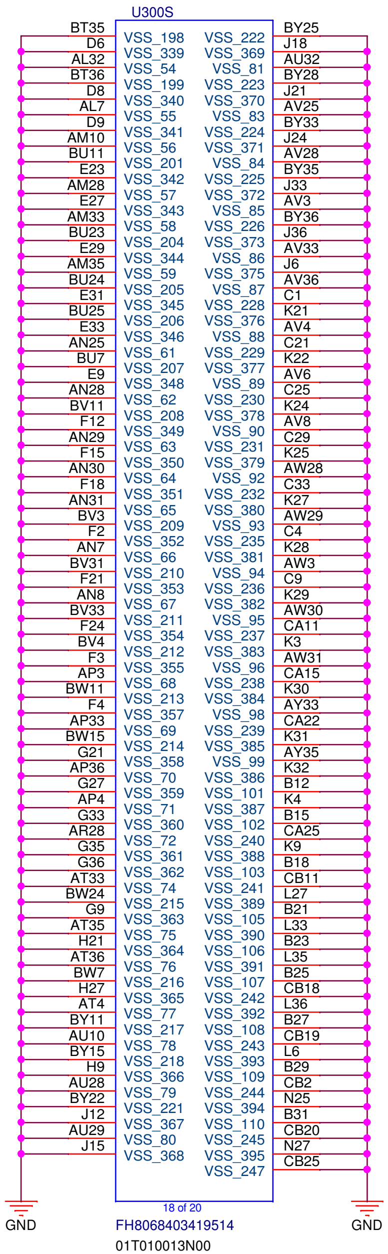
BG1-HW1 RD

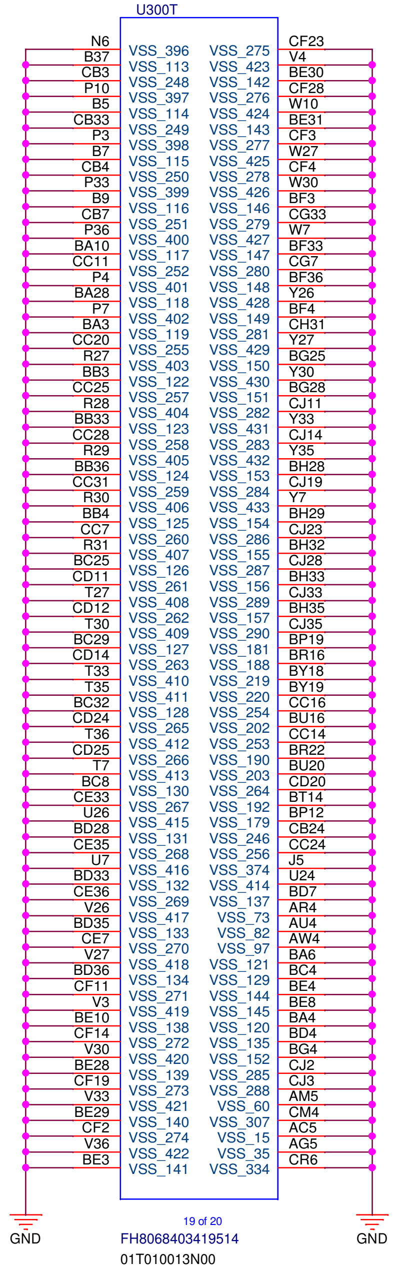
Engineer: Tina Lee

Size	Project Name		Rev
Custom		DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 10 of 104







PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL
BG1-HW1 RD

Title: CPU_GND

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 11 of 104

PEGATRON

Title : RSVD

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD

Engineer: *Tina Lee*

Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 12 of 104

5 4 3 2 1

D C B A

<Variant Name>

PEGATRON	Title : ******		
PEGATRON PROPRIETARY AND CONFIDENTIAL			
BG1-HW1 RD	Engineer: Tina Lee		
Size A	Project Name DL4FA		Rev 1.1
Date: Friday, April 12, 2019	Sheet 13 of 104		

PEGATRON

Title : RSVD

PEGATRON PROPRIETARY AND CONFIDENTIAL

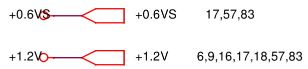
BG1-HW1 RD

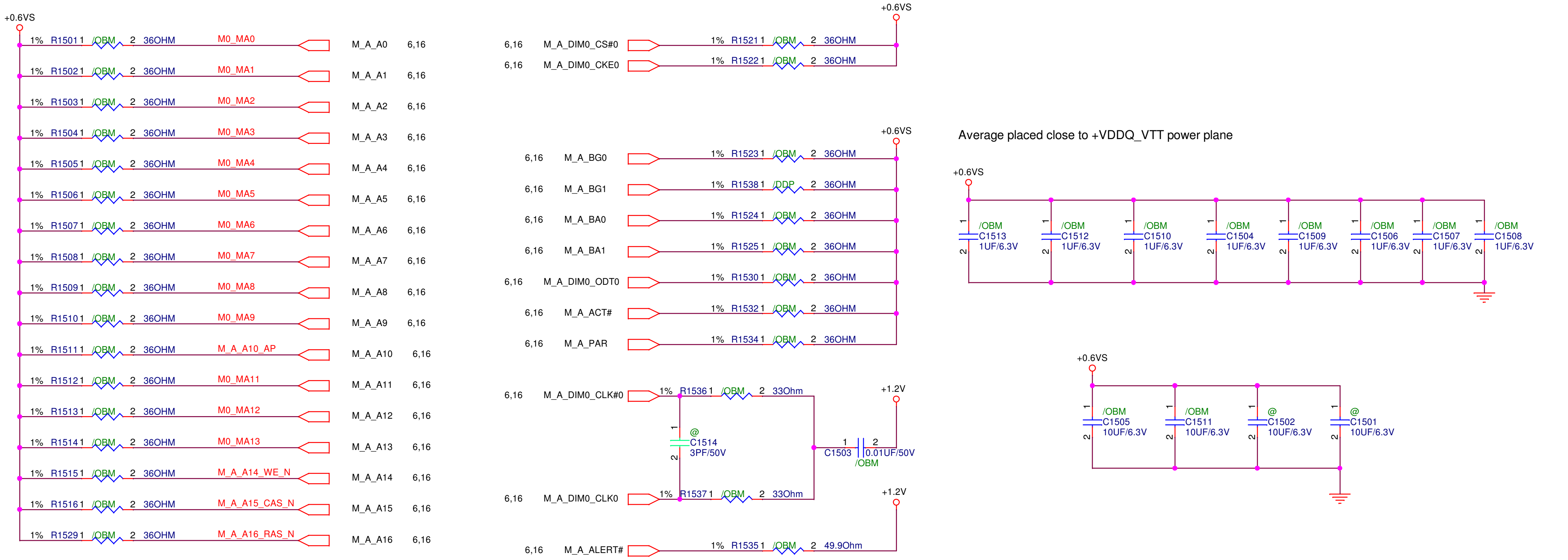
Engineer: Tina Lee

Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 14 of 104

DDR4(0)_Termination





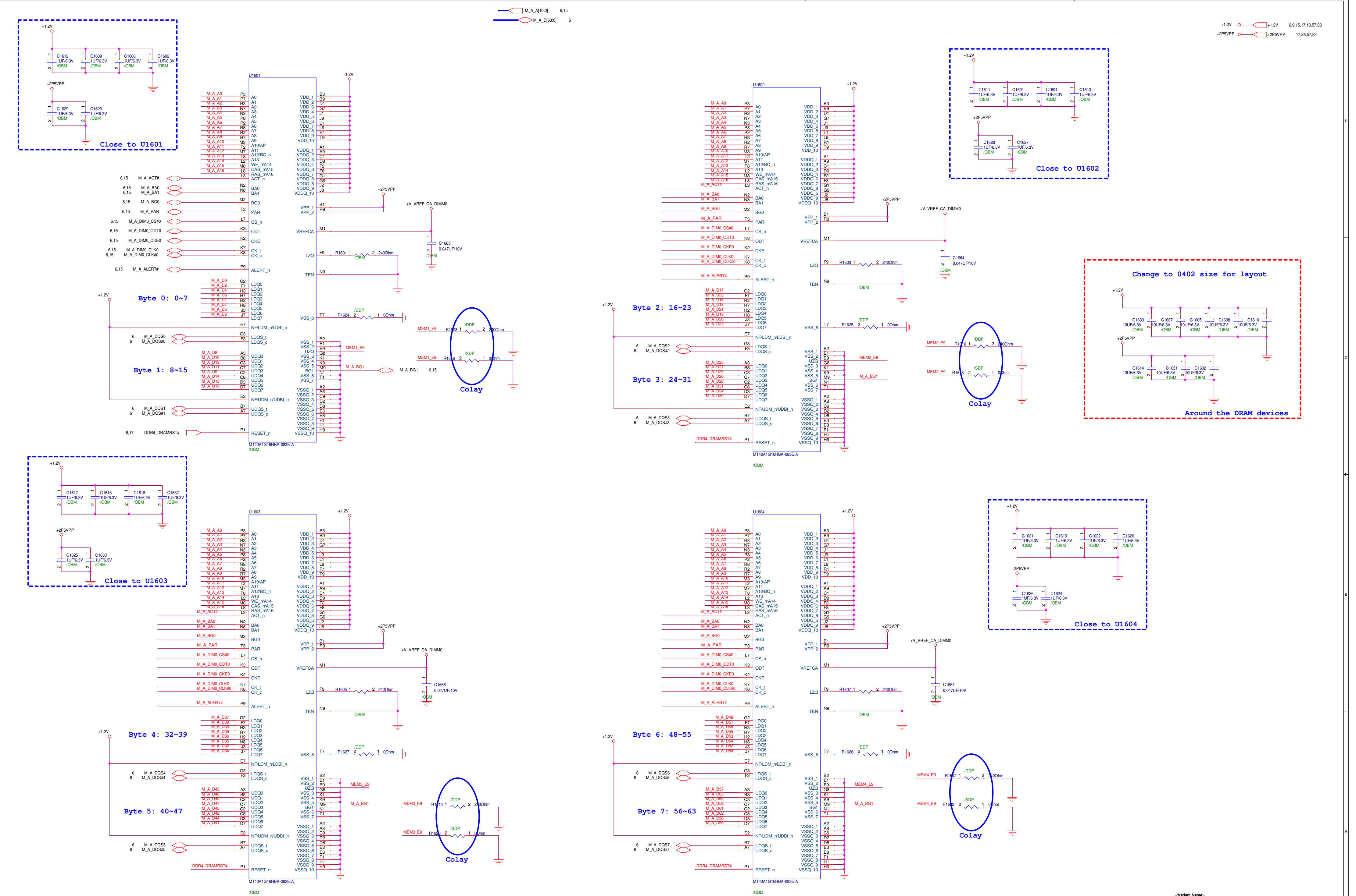
PEGATRON Title : DDR4(1)_Termination

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 15 of 104



<Variant Name>

PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

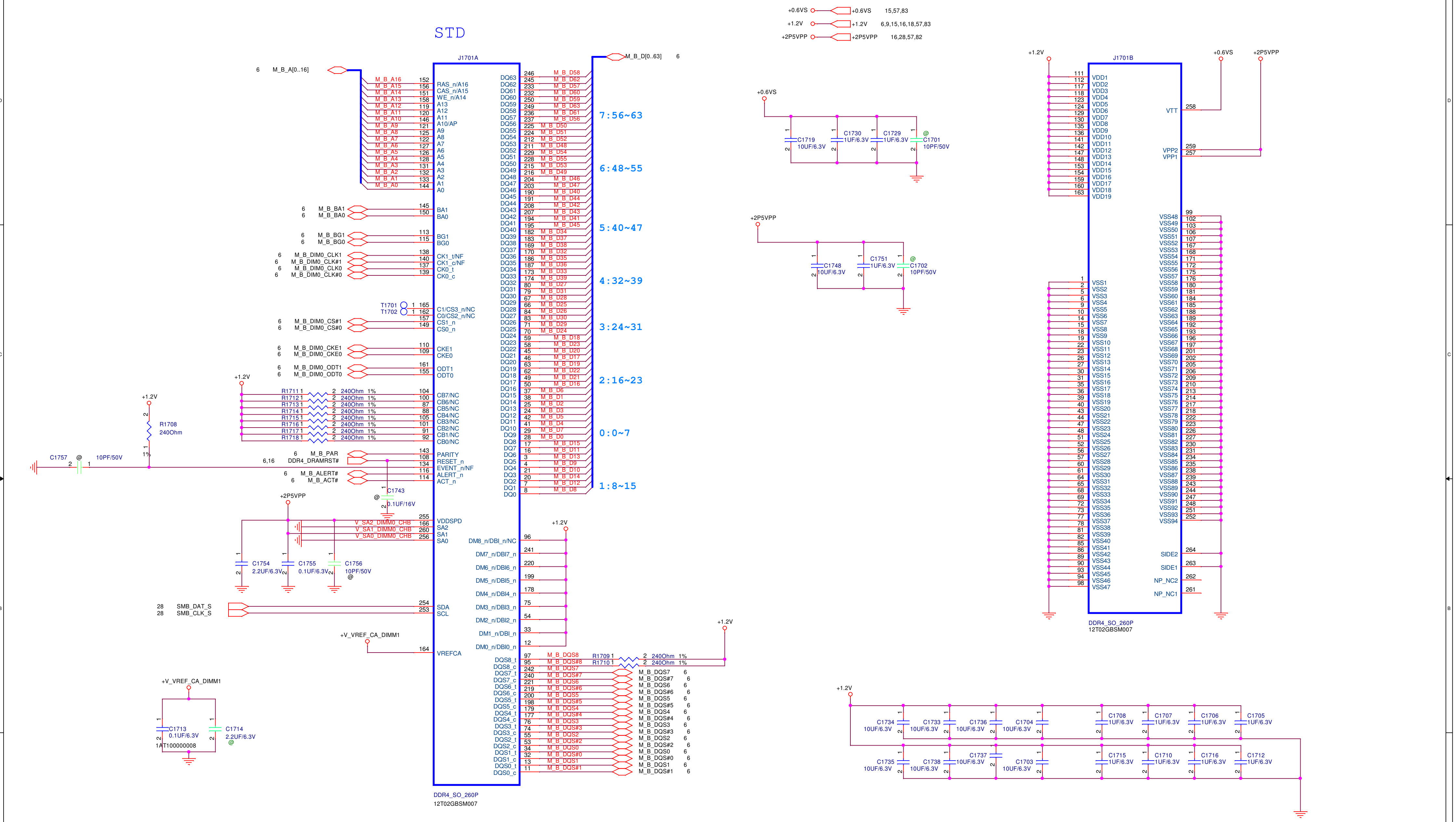
BG1-HW1 RD

Title : DDR4(1)_MEMORY DOWN

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 16 of 104



<Variant Name>

PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD

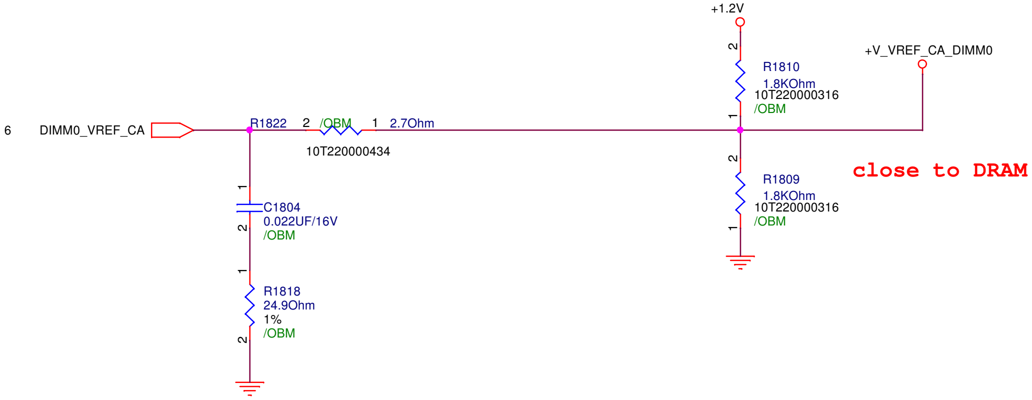
Title : DDR4(1)_SO-DIMM

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 17 of 104

+1.2V	+1.2V	6,9,15,16,17,57,83
+V_VREF_CA_DIMM0	+V_VREF_CA_DIMM0	16
+V_VREF_CA_DIMM1	+V_VREF_CA_DIMM1	17



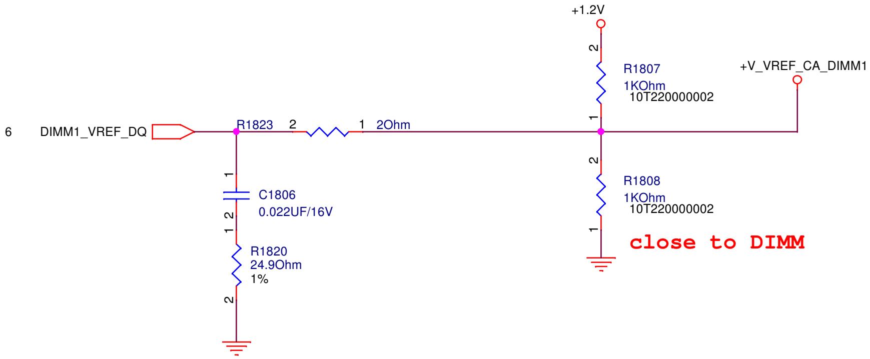


Figure 4-8. WHL U DDR4 x16 Devices Memory Down V_{REF-CA} Overview

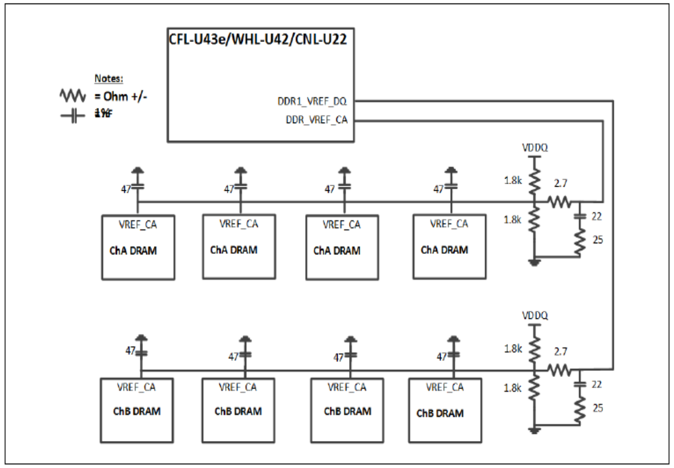
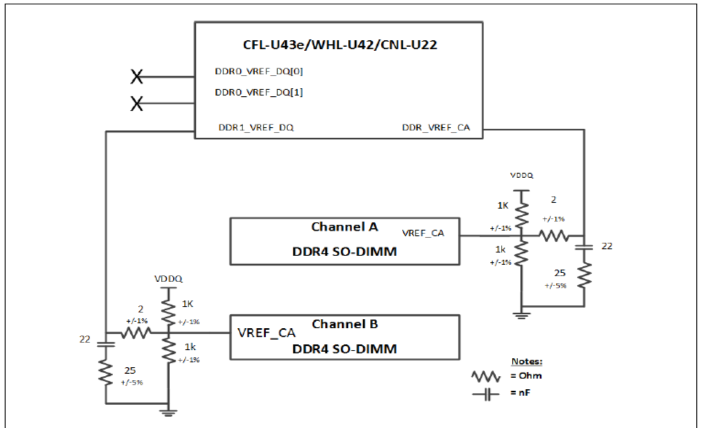


Figure 4-1. WHL U DDR4 SODIMM V_{REF-CA} Overview



Notes:
1. To enable easy route, At DDR4 systems, DDR1_VREF_DQ is used as VREF_CA for Channel B.

<Variant Name>

PEGATRON Title : DDR4(3)_CA/DQ Volta

Engineer: *Tina Lee*

BG1-HW1 RD

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 18 of 104

5 4 3 2 1

D C B A

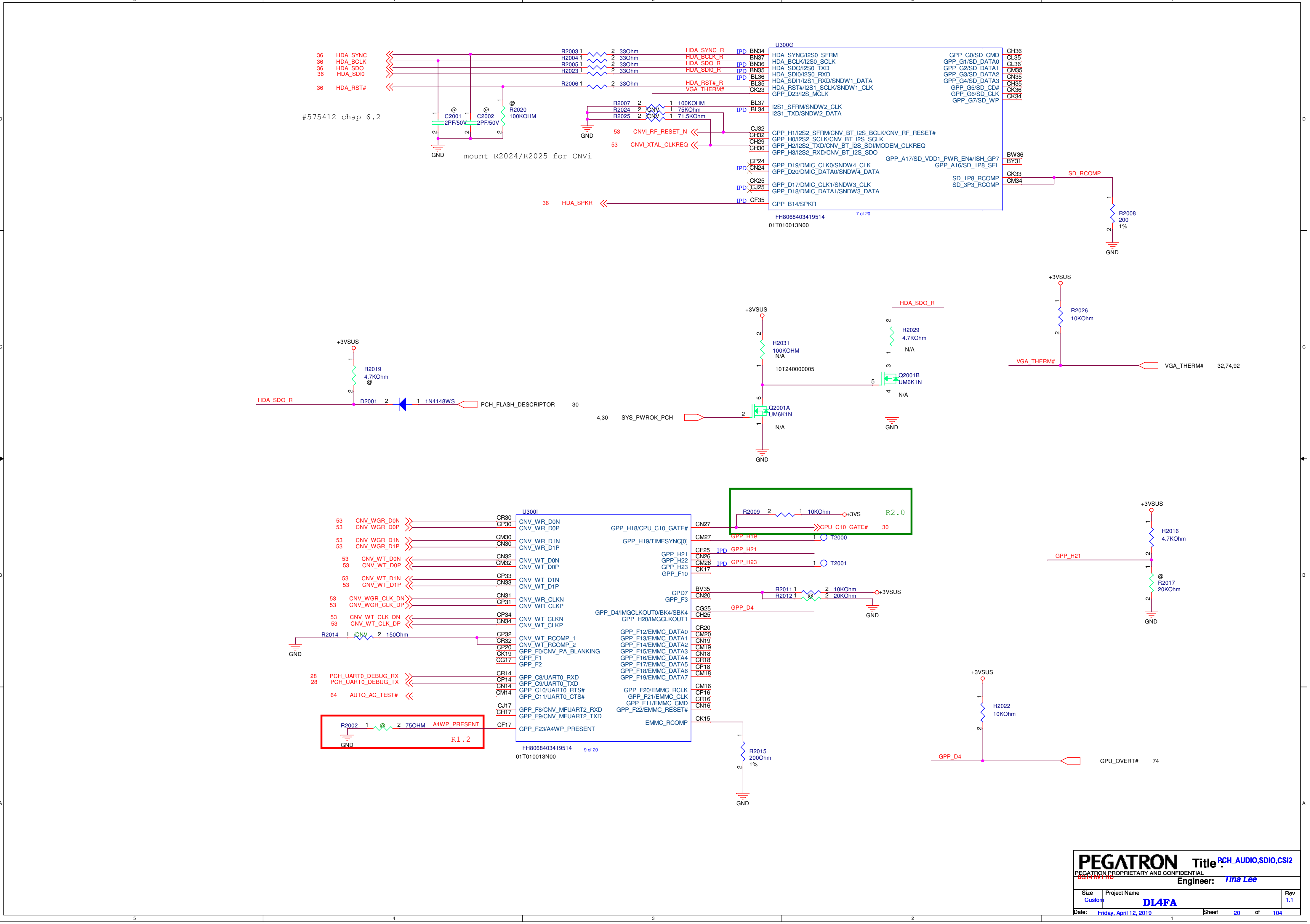
PEGATRON **Title :** DDR4(3)_CA/DQ Voltage

BG1-HW1 RD

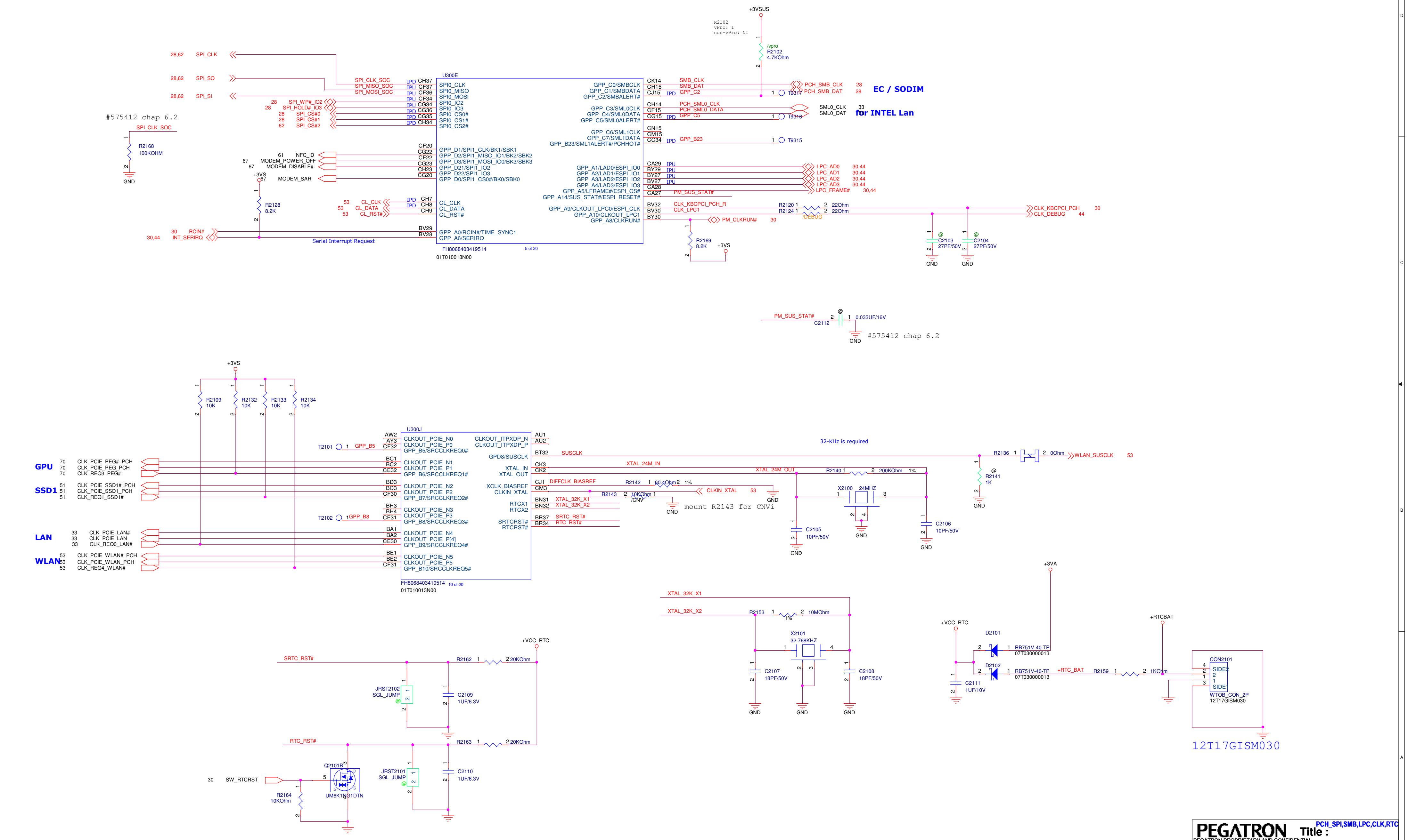
Engineer: *Tina Lee*

Size	Project Name	Rev
C	**DL4FA**	1.1

Date: Friday, April 12, 2019 Sheet 19 of 104



U300G
HDA_SYNC
HDA_BCLK
HDA_SDO
HDA_SDI0
HDA_RST#
R2003 33Ohm
R2004 33Ohm
R2005 33Ohm
R2023 33Ohm
R2006 33Ohm
HDA_SYNC_R
HDA_BCLK_R
HDA_SDO_R
HDA_SDI0_R
HDA_RST#_R
VGA_THERM#
HDA_SYNC/I2S0_SFRM
HDA_BCLK/I2S0_SCLK
HDA_SDO/I2S0_TXD
HDA_SDI0/I2S0_RXD
HDA_SDI1/I2S1_RXD/SNDW1_DATA
HDA_RST#/I2S1_SCLK/SNDW1_CLK
GPP_D23/I2S_MCLK
I2S1_SFRM/SNDW2_CLK
I2S1_TXD/SNDW2_DATA
GPP_H1/I2S2_SFRM/CNV_BT_I2S_BCLK/CNV_RF_RESET#
GPP_H0/I2S2_SCLK/CNV_BT_I2S_SCLK
GPP_H2/I2S2_TXD/CNV_BT_I2S_SDI/MODEM_CLKREQ
GPP_H3/I2S2_RXD/CNV_BT_I2S_SDO
GPP_D19/DMIC_CLK0/SNDW4_CLK
GPP_D20/DMIC_DATA0/SNDW4_DATA
GPP_D17/DMIC_CLK1/SNDW3_CLK
GPP_D18/DMIC_DATA1/SNDW3_DATA
GPP_B14/SPKR
GPP_G0/SD_CMD
GPP_G1/SD_DATA0
GPP_G2/SD_DATA1
GPP_G3/SD_DATA2
GPP_G4/SD_DATA3
GPP_G5/SD_CD#
GPP_G6/SD_CLK
GPP_G7/SD_WP
GPP_A17/SD_VDD1_PWR_EN#/ISH_GP7
GPP_A16/SD_1P8_SEL
SD_1P8_RCOMP
SD_3P3_RCOMP
SD_RCOMP
FH8068403419514
7 of 20
01T010013N00
#575412 chap 6.2
C2001 2PF/50V
C2002 2PF/50V
R2020 100KOHM
mount R2024/R2025 for CNVi
R2007 100KOHM
R2024 75KOhm
R2025 71.5KOhm
CNVI_RF_RESET_N
CNVI_XTAL_CLKREQ
HDA_SPKR
R2008 200 1%
GND
+3VSUS
R2019 4.7KOhm
HDA_SDO_R
D2001 1N4148WS
PCH_FLASH_DESCRIPTOR 30
R2031 100KOHM N/A
10T240000005
Q2001A UM6K1N
SYS_PWROK_PCH
R2029 4.7KOhm N/A
Q2001B UM6K1N
R2026 10KOhm
VGA_THERM# 32,74,92
U300I
CNV_WGR_D0N
CNV_WGR_D0P
CNV_WGR_D1N
CNV_WGR_D1P
CNV_WT_D0N
CNV_WT_D0P
CNV_WT_D1N
CNV_WT_D1P
CNV_WGR_CLK_DN
CNV_WGR_CLK_DP
CNV_WT_CLK_DN
CNV_WT_CLK_DP
CNV_WR_D0N
CNV_WR_D0P
CNV_WR_D1N
CNV_WR_D1P
CNV_WR_CLKN
CNV_WR_CLKP
CNV_WT_CLKN
CNV_WT_CLKP
CNV_WT_RCOMP_1
CNV_WT_RCOMP_2
GPP_F0/CNV_PA_BLANKING
GPP_F1
GPP_F2
GPP_C8/UART0_RXD
GPP_C9/UART0_TXD
GPP_C10/UART0_RTS#
GPP_C11/UART0_CTS#
GPP_F8/CNV_MFUART2_RXD
GPP_F9/CNV_MFUART2_TXD
GPP_F23/A4WP_PRESENT
R2014 150Ohm
PCH_UART0_DEBUG_RX
PCH_UART0_DEBUG_TX
AUTO_AC_TEST#
R2002 75OHM A4WP_PRESENT
R1.2
GPP_H18/CPU_C10_GATE#
GPP_H19/TIMESYNC[0]
GPP_H21
GPP_H22
GPP_H23
GPP_F10
GPD7
GPP_F3
GPP_D4/IMGCLKOUT0/BK4/SBK4
GPP_H20/IMGCLKOUT1
GPP_F12/EMMC_DATA0
GPP_F13/EMMC_DATA1
GPP_F14/EMMC_DATA2
GPP_F15/EMMC_DATA3
GPP_F16/EMMC_DATA4
GPP_F17/EMMC_DATA5
GPP_F18/EMMC_DATA6
GPP_F19/EMMC_DATA7
GPP_F20/EMMC_RCLK
GPP_F21/EMMC_CLK
GPP_F11/EMMC_CMD
GPP_F22/EMMC_RESET#
EMMC_RCOMP
FH8068403419514
9 of 20
01T010013N00
R2009 10KOhm +3VS
CPU_C10_GATE# 30
R2.0
T2000
T2001
R2011 10KOhm
R2012 20KOhm
GPP_D4
R2015 200Ohm 1%
R2016 4.7KOhm
R2017 20KOhm
R2022 10KOhm
GPU_OVERT# 74
PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL
Title: PCH_AUDIO,SDIO,CSI2
Engineer: Tina Lee
Size Custom
Project Name DL4FA
Rev 1.1
Date: Friday, April 12, 2019
Sheet 20 of 104



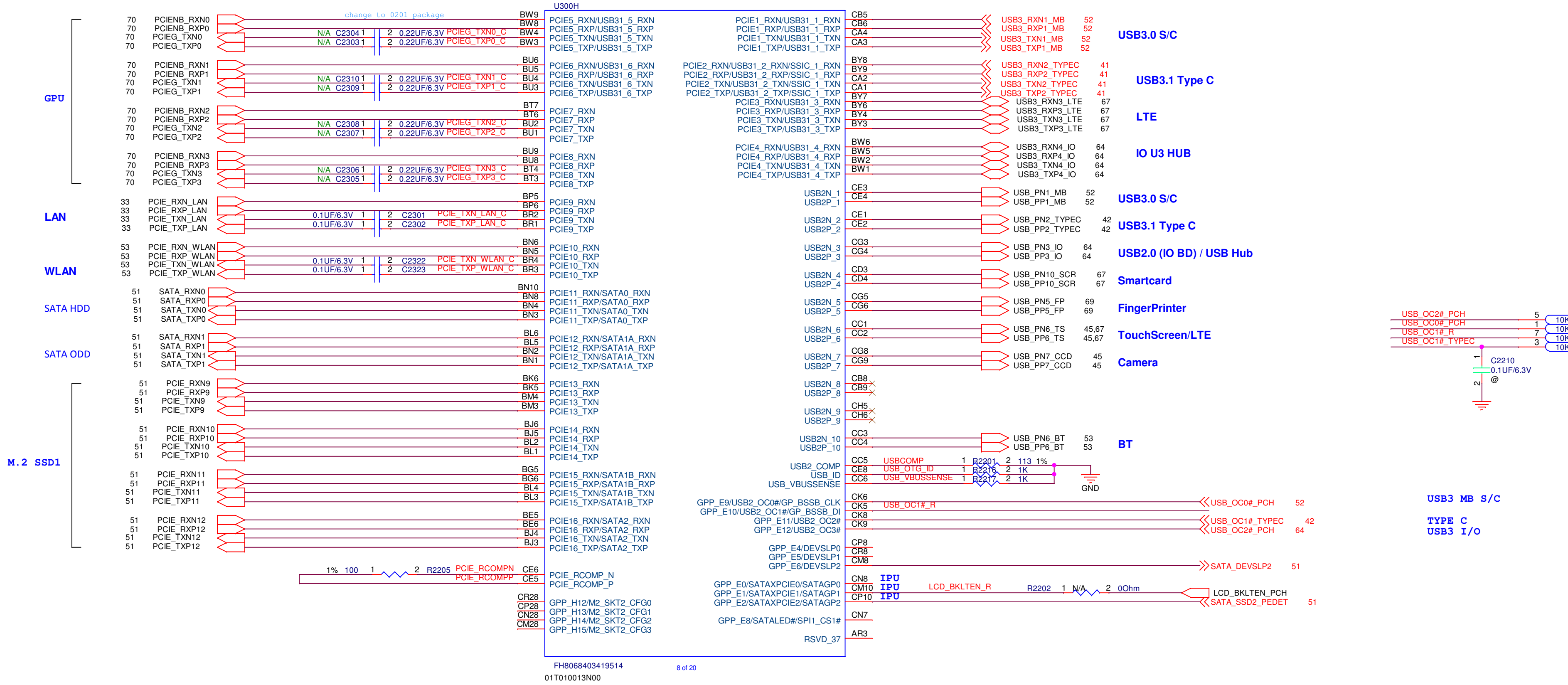
PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : PCH_SPI,SMB,LPC,CLK,RTC

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 21 of 104



PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

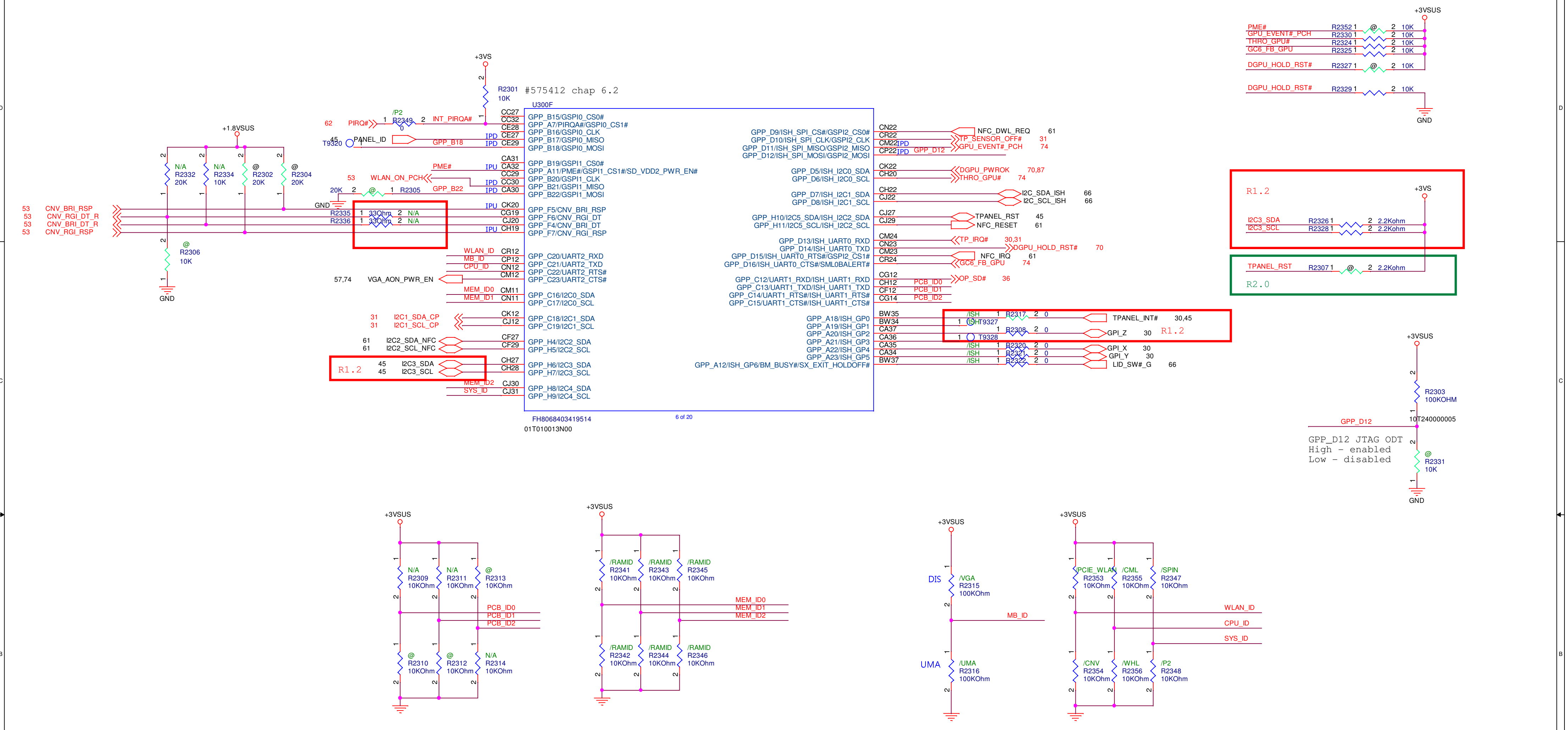
Title: PCH_PCIE,USB,SATA

BG1-HW1 RD

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 22 of 104



PEGATRON	Title: PCH_GPIO		
PEGATRON PROPRIETARY AND CONFIDENTIAL	Engineer: Tina Lee		
Size: Custom	Project Name: DL4FA		Rev: 1.1
Date: Friday, April 12, 2019	Sheet 23	of 104	

5 4 3 2 1

D D

C C

B B

A A

5 4 3 2 1

5 4 3 2 1

D D

C C

B B

A A

5 4 3 2 1

5 4 3 2 1

D D

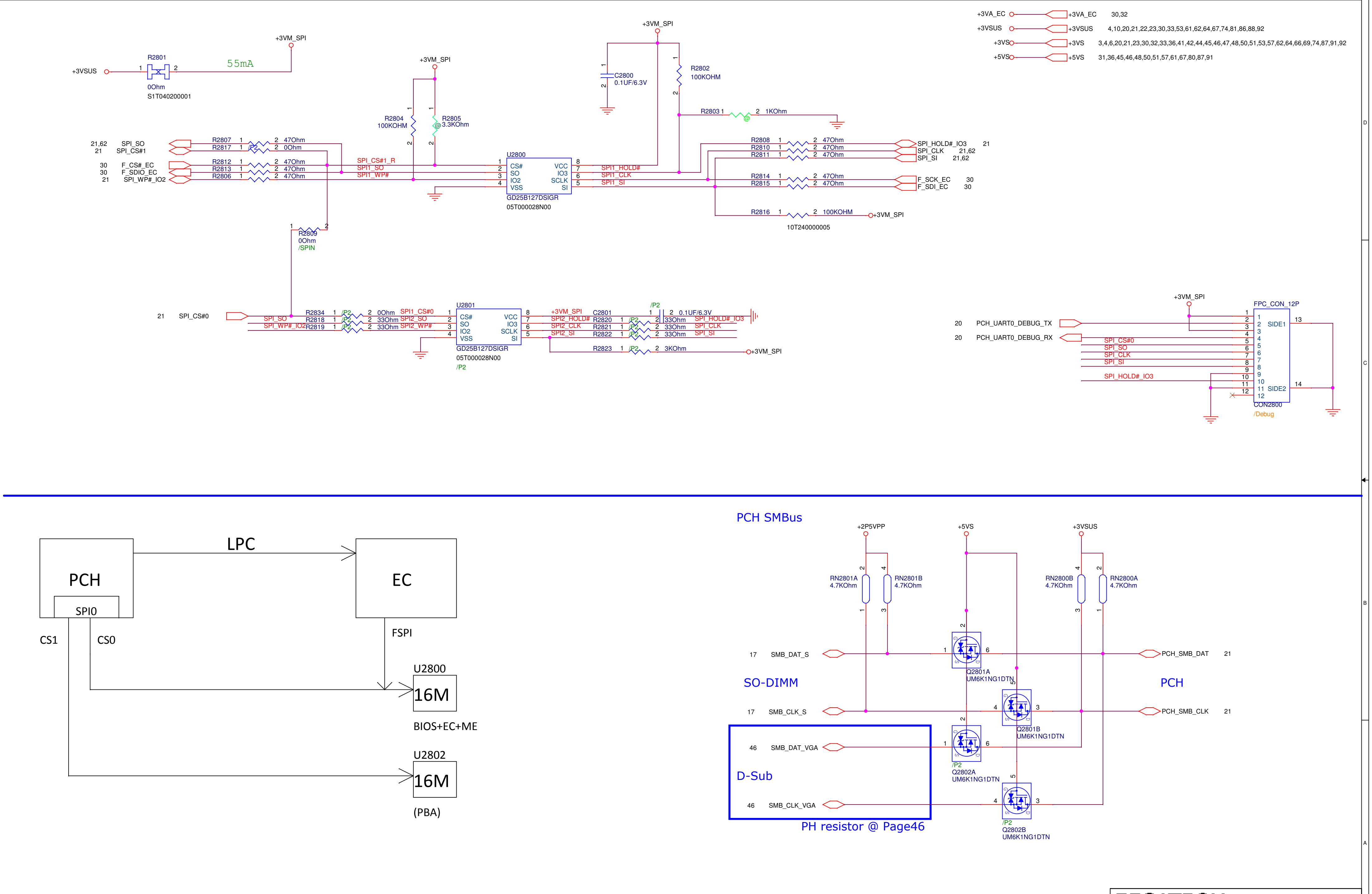
C C

B B

A A

5 4 3 2 1

PEGATRON PROPRIETARY AND CONFIDENTIAL		Title : RSVD	
BG1-HW1 RD		Engineer: Tina Lee	
Size: A	Project Name: DL4FA		Rev: 1.1
Date: Friday, April 12, 2019		Sheet 27 of 104	



BG1-HW1 RD

Title : PCH(9)_SPI_SMB

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

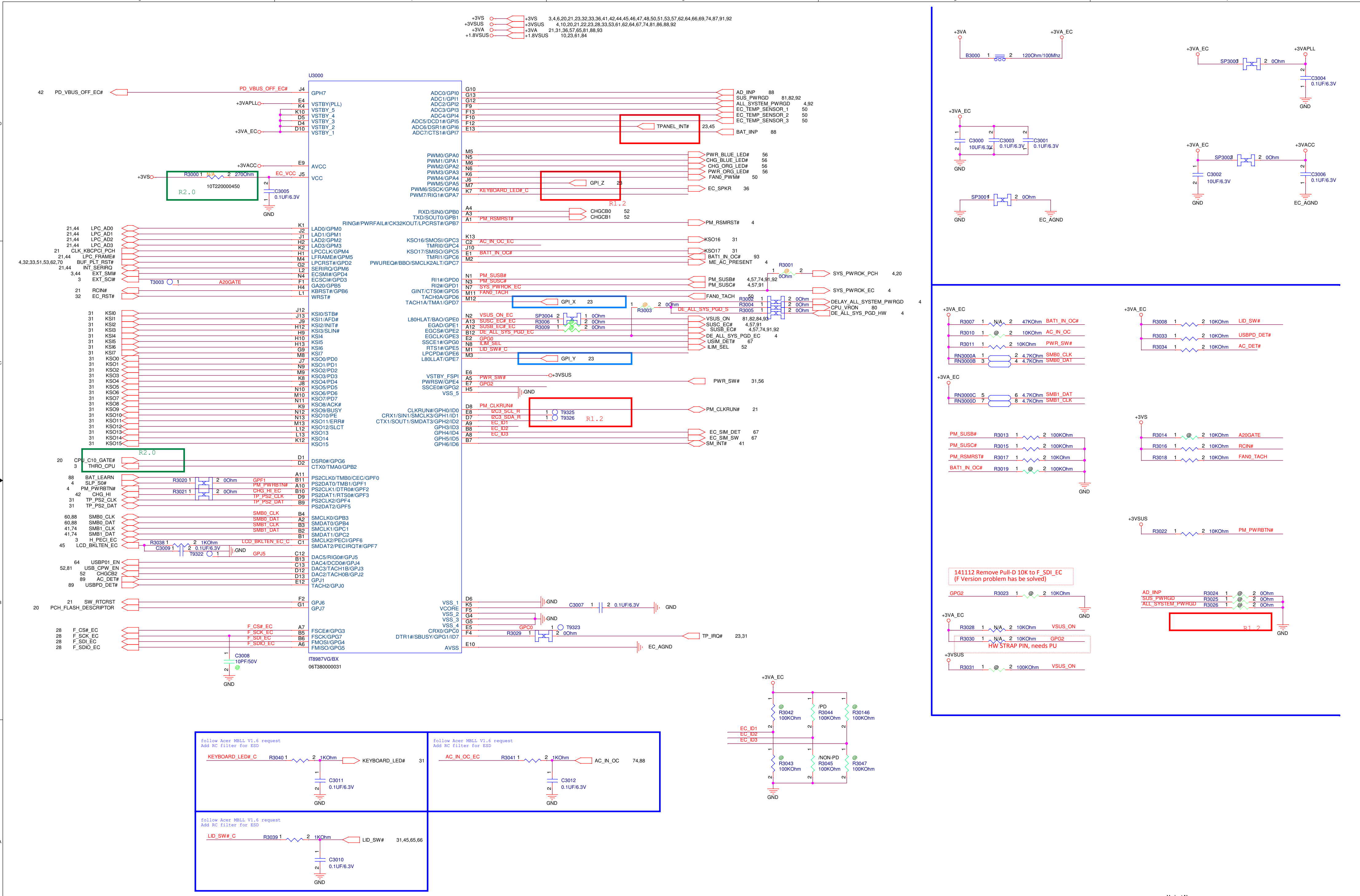
BG1-HW1 RD

Title : RSVD

Engineer: *Tina Lee*

Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 29 of 104



<Variant Name>

PEGATRON PEGATRON PROPRIETARY AND CONFIDENTIAL

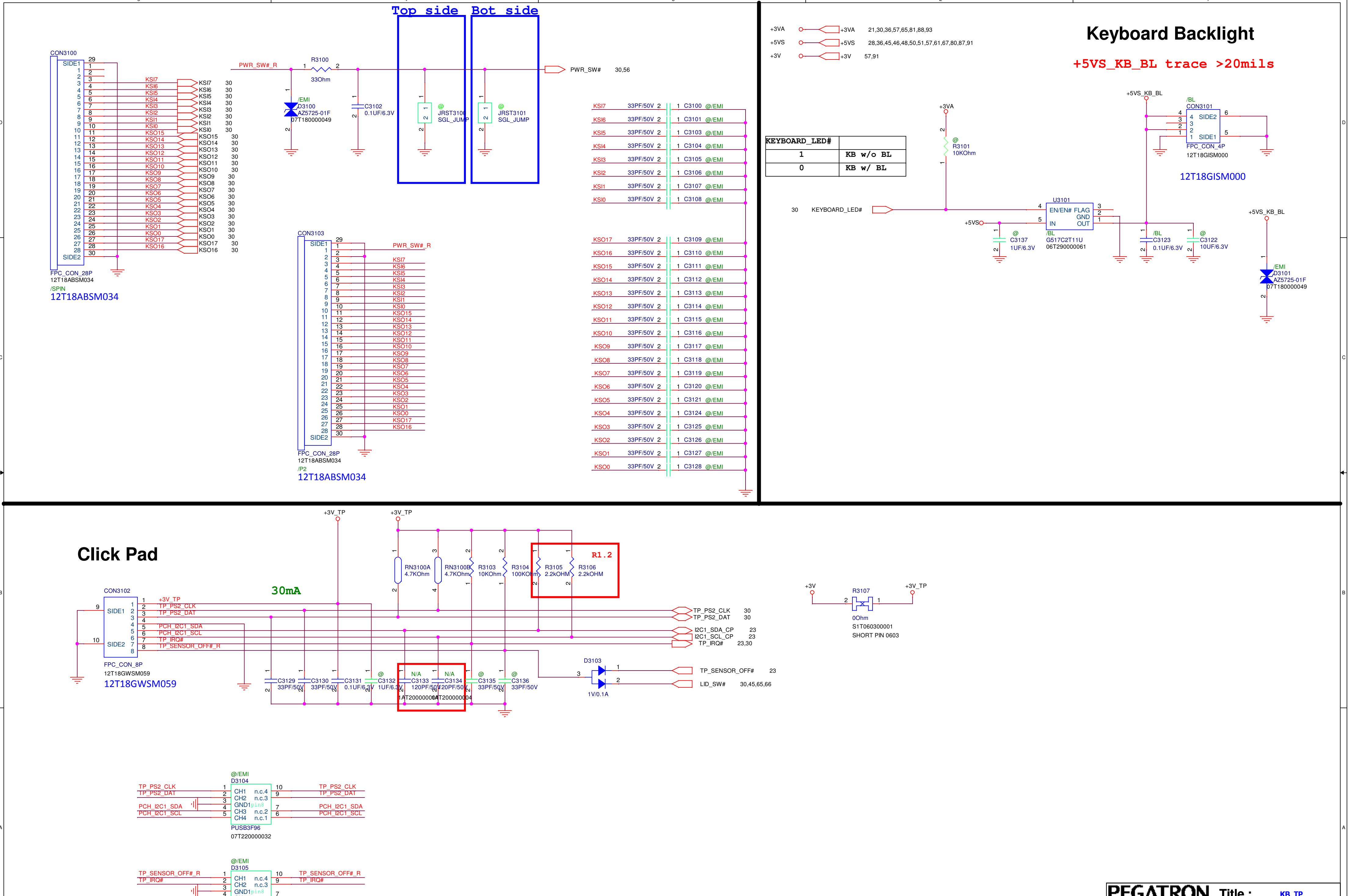
Title : EC_IT8587E/FX

BG1-HW1 RD

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 30 of 104



KEYBOARD_LED#	
1	KB w/o BL
0	KB w/ BL

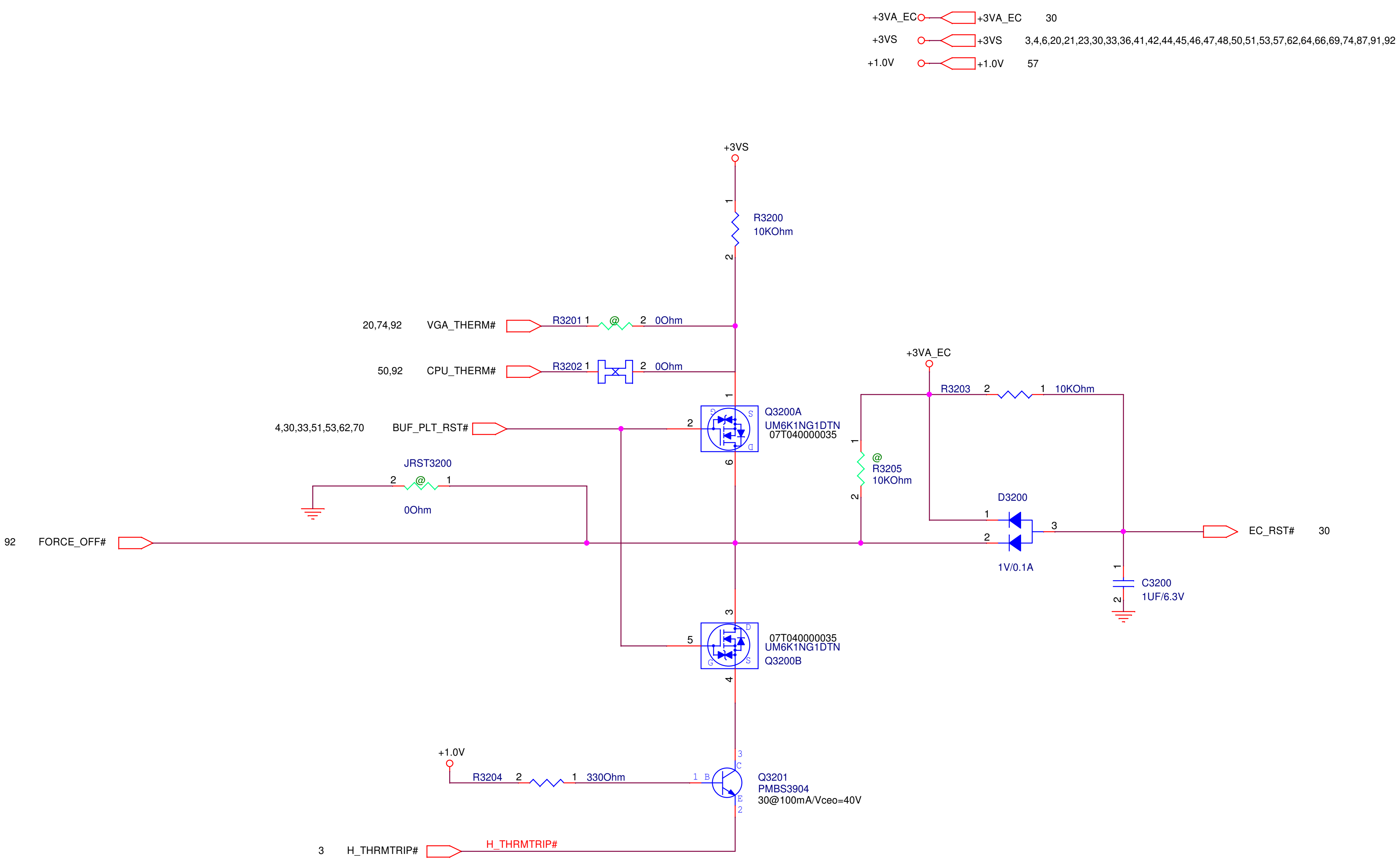
PEGATRON
BG1-HW1 RD

Title : KB_TP

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 31 of 104



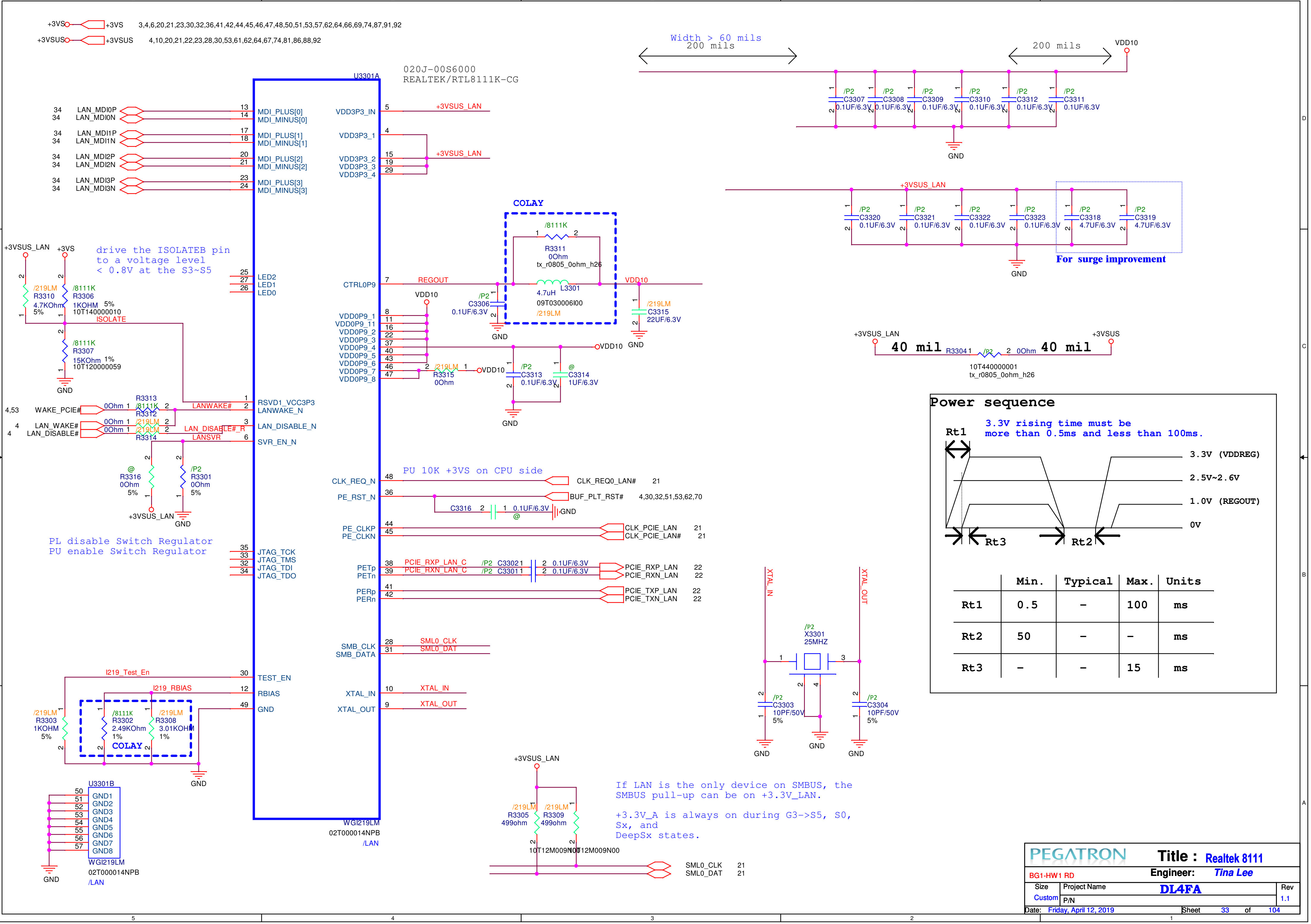
PEGATRON **Title :** RST_Reset Circuit

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD **Engineer:** *Tina Lee*

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 32 of 104



	Min.	Typical	Max.	Units
Rt1	0.5	-	100	ms
Rt2	50	-	-	ms
Rt3	-	-	15	ms

PEGATRON

BG1-HW1 RD

Title : Realtek 8111

Engineer: Tina Lee

Size: Custom

Project Name: DL4FA

P/N

Rev: 1.1

Date: Friday, April 12, 2019

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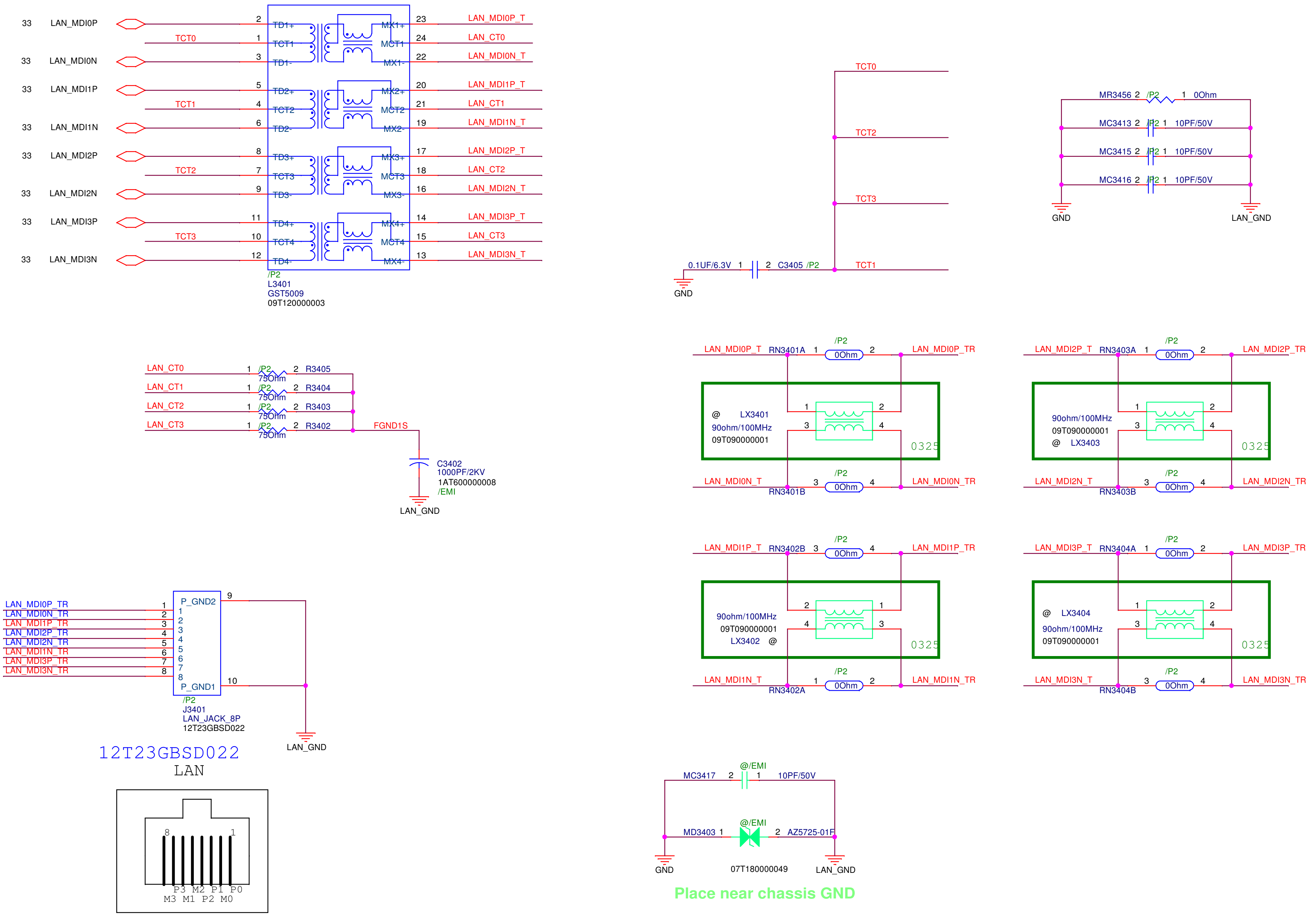


PEGATRON

Title : RJ45

BG1-HW1 RD

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1
	P/N	

Date: Friday, April 12, 2019 Sheet 34 of 104

PEGATRON

Title : RSVD

PEGATRON PROPRIETARY AND CONFIDENTIAL

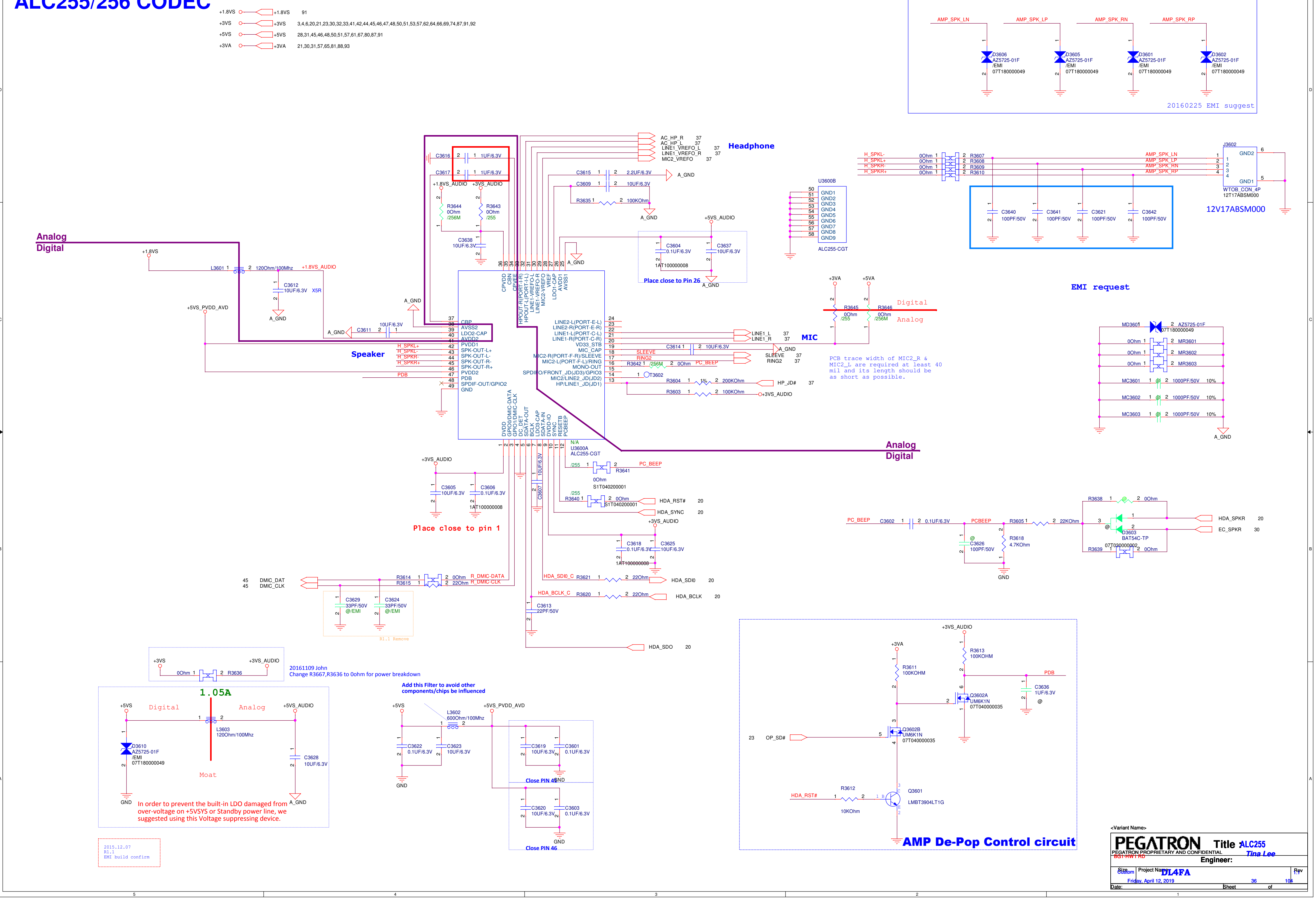
BG1-HW1 RD

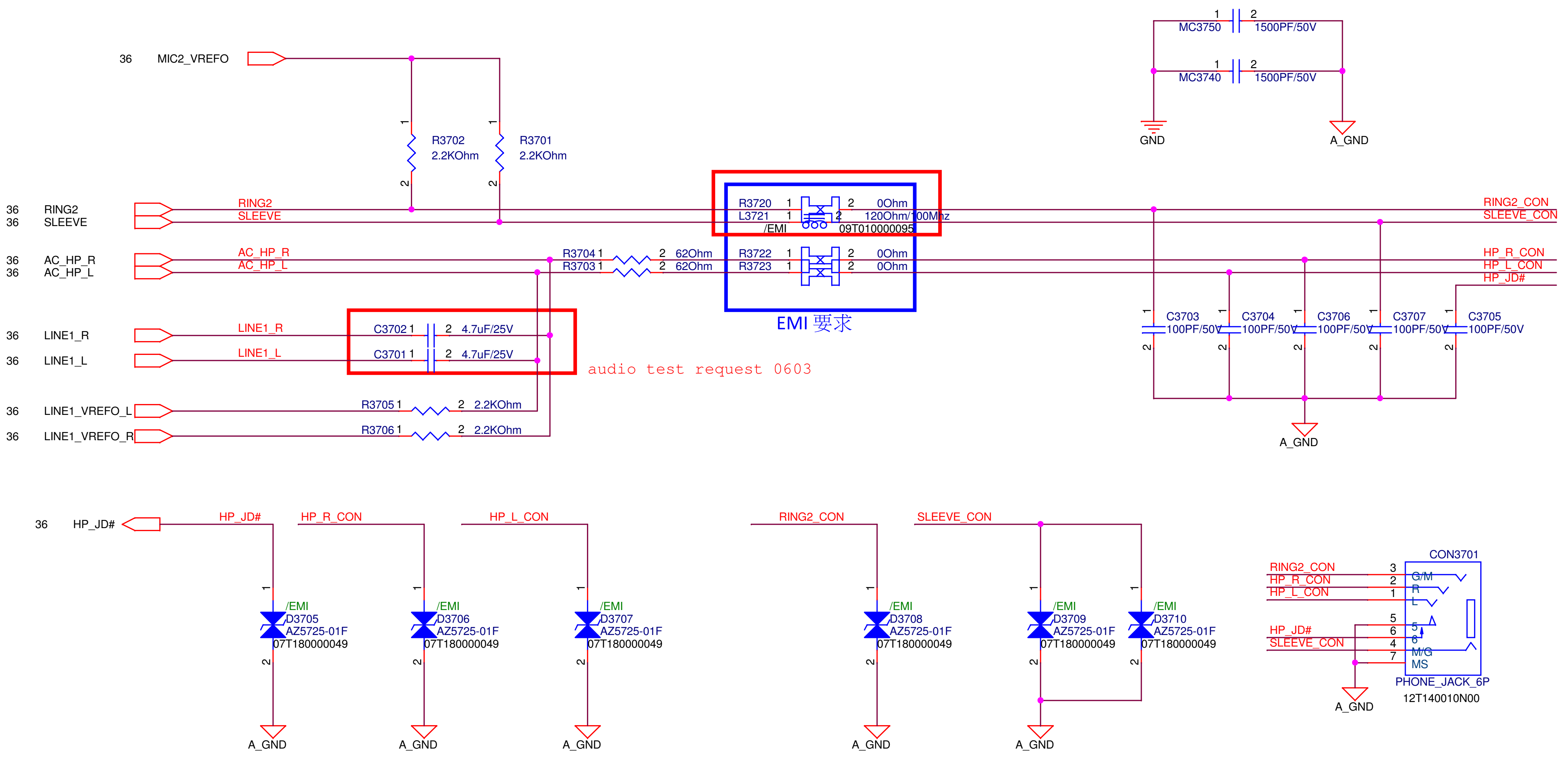
Engineer: *Tina Lee*

Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 35 of 104

ALC255/256 CODEC





PEGATRON	Title : AUD_HP/DMIC/SPK		
PEGATRON PROPRIETARY AND CONFIDENTIAL			
BG1-HW1 RD	Engineer: Tina Lee		
Size: Custom	Project Name: DL4FA		Rev: 1.1
Date: Friday, April 12, 2019	Sheet 37 of 104		

PEGATRON

Title : RSVD

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD

Engineer: *Tina Lee*

Size	Project Name	Rev
A	**DL4FA**	1.1

Date: Friday, April 12, 2019 Sheet 38 of 104

PEGATRON

Title : RSVD

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD

Engineer: Tina Lee

Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 39 of 104

5 4 3 2 1

D C B A

PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

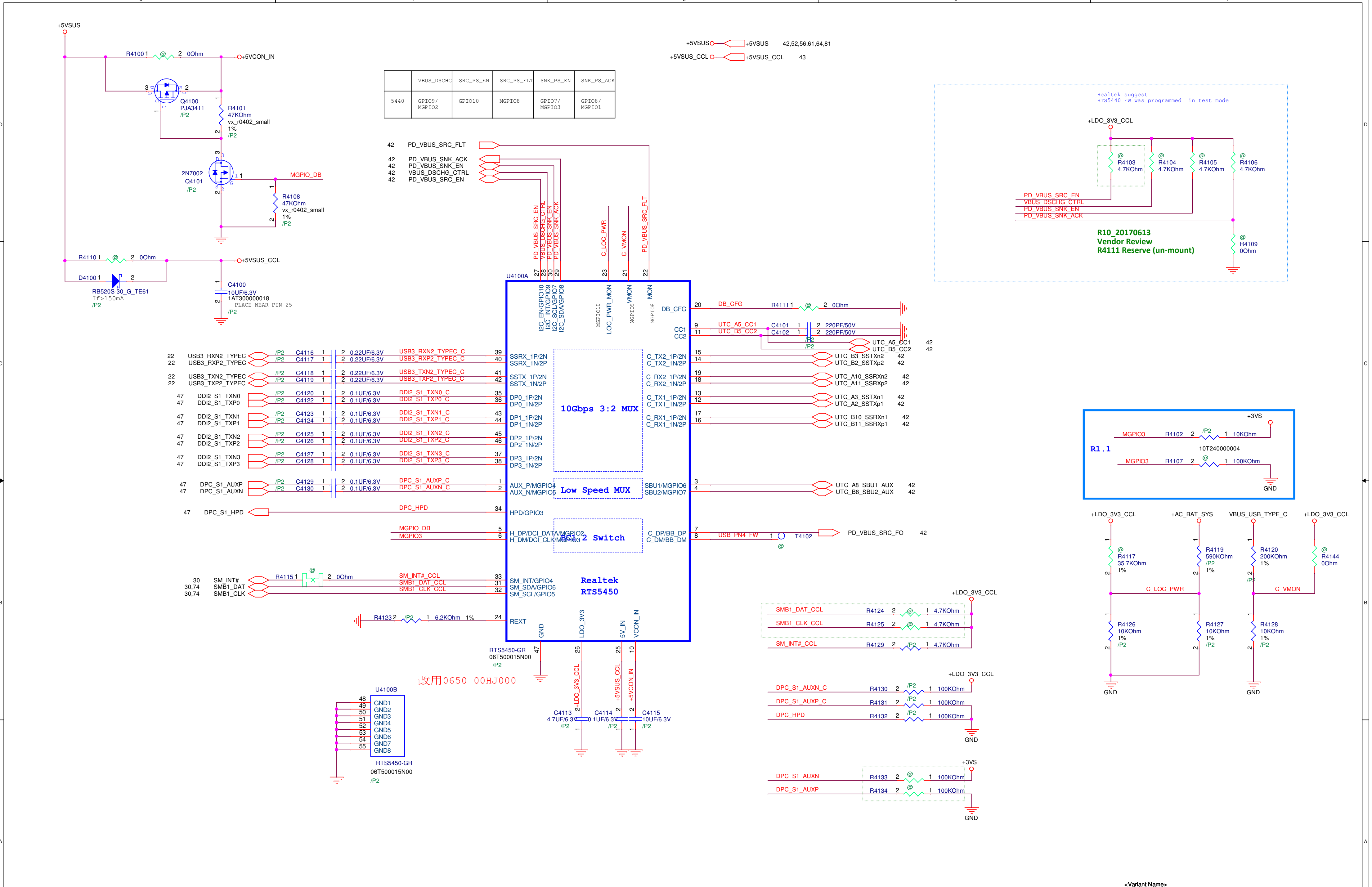
BG1-HW1 RD

Title : RSVD

Engineer: *Tina Lee*

Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 40 of 104



	VBUS_DSCHG	SRC_PS_EN	SRC_PS_FLT	SNK_PS_EN	SNK_PS_ACK
5440	GPIO9/ MGPIO2	GPIO10	MGPIO8	GPIO7/ MGPIO3	GPIO8/ MGPIO1

<Variant Name>

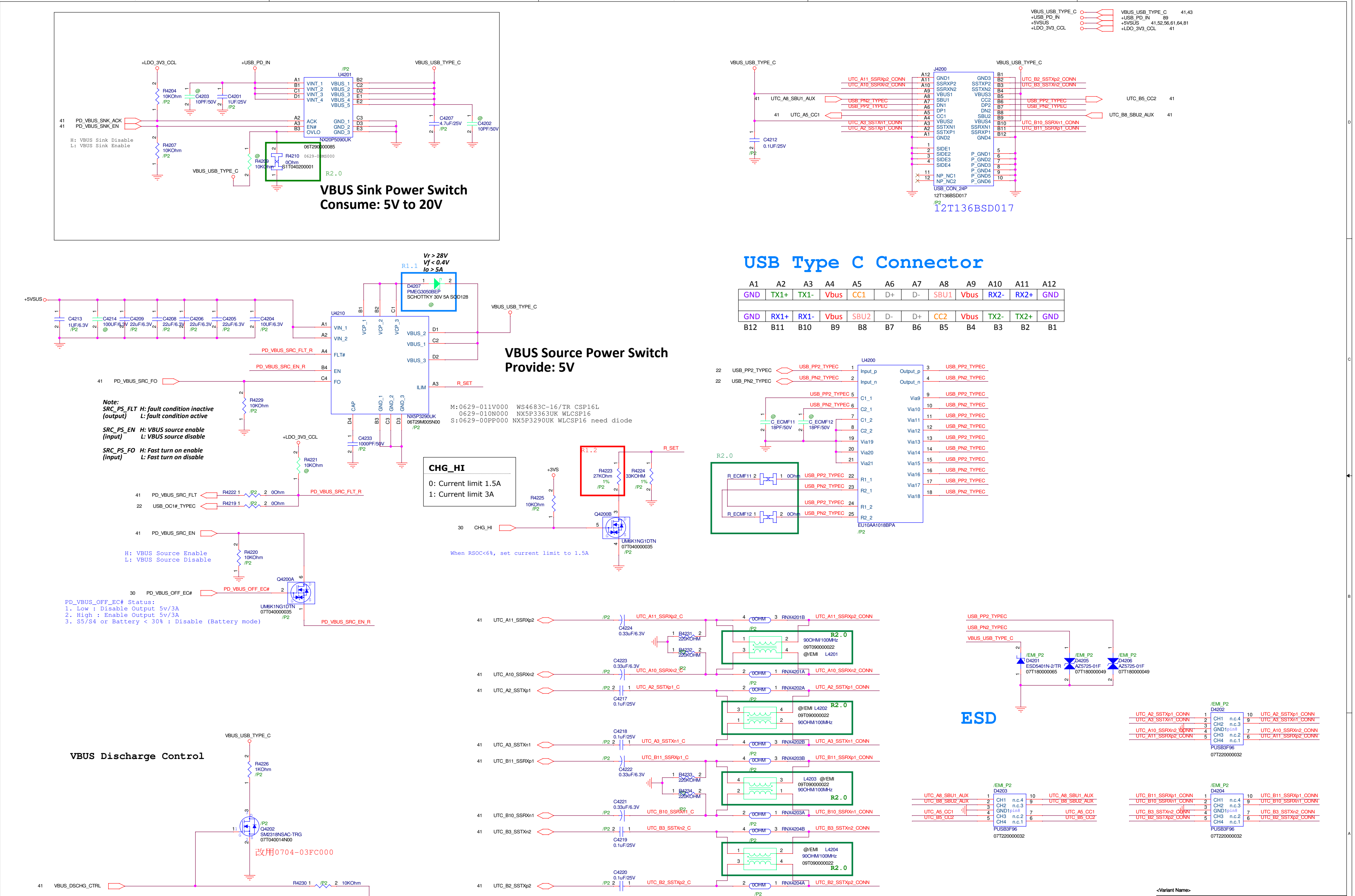
PEGATRON Title : USB3.1 Type-C

PEGATRON PROPRIETARY AND CONFIDENTIAL

Engineer: Tina

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 41 of 104



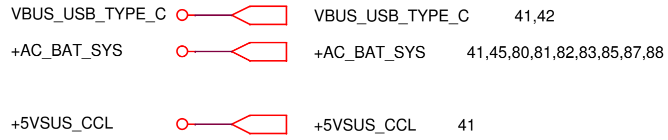
USB Type C Connector

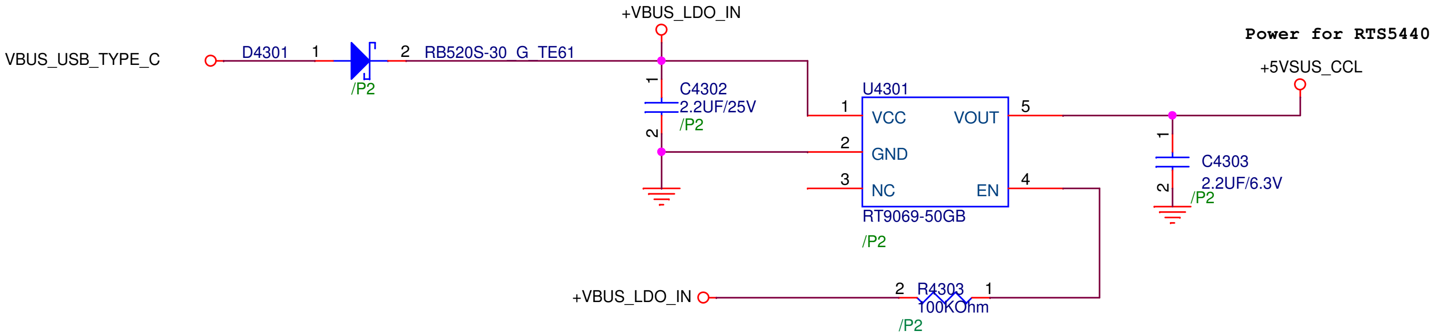
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
GND	TX1+	TX1-	Vbus	CC1	D+	D-	SBU1	Vbus	RX2-	RX2+	GND
GND	RX1+	RX1-	Vbus	SBU2	D-	D+	CC2	Vbus	TX2-	TX2+	GND
B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1

Title : USB Type-C Receptacle
Engineer: Tina
Size: Custom | Project Name: DL4FA | Rev 1.1
Date: Friday, April 12, 2019 | Sheet 42 of 104

Hardware Solution For Dead Battery

For notebook applications, if the battery charger needs higher voltage than 5V to operate correctly, execute the steps below in the order they are listed:





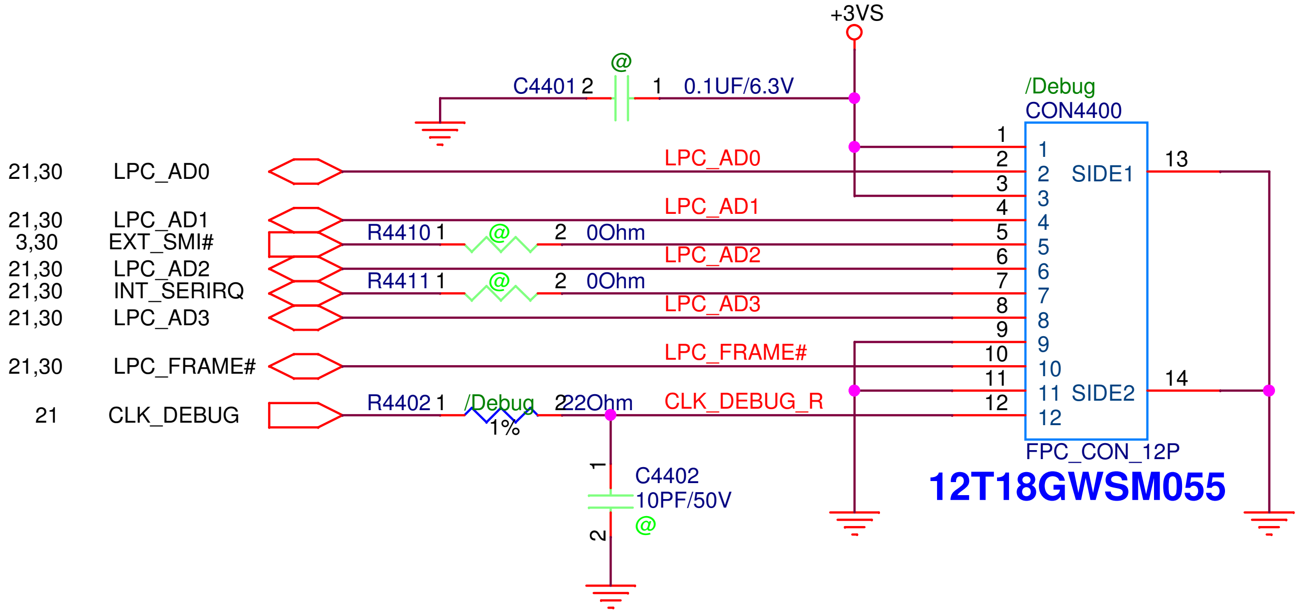
<Variant Name>

PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

Title :	Dead Battery	
Engineer:	Tina	
Size: Custom	Project Name: DL4FA	Rev: 1.1
Date: Friday, April 12, 2019	Sheet 43 of 104	

+3VS +3VS 3,4,6,20,21,23,30,32,33,36,41,42,45,46,47,48,50,51,53,57,62,64,66,69,74,87,91,92



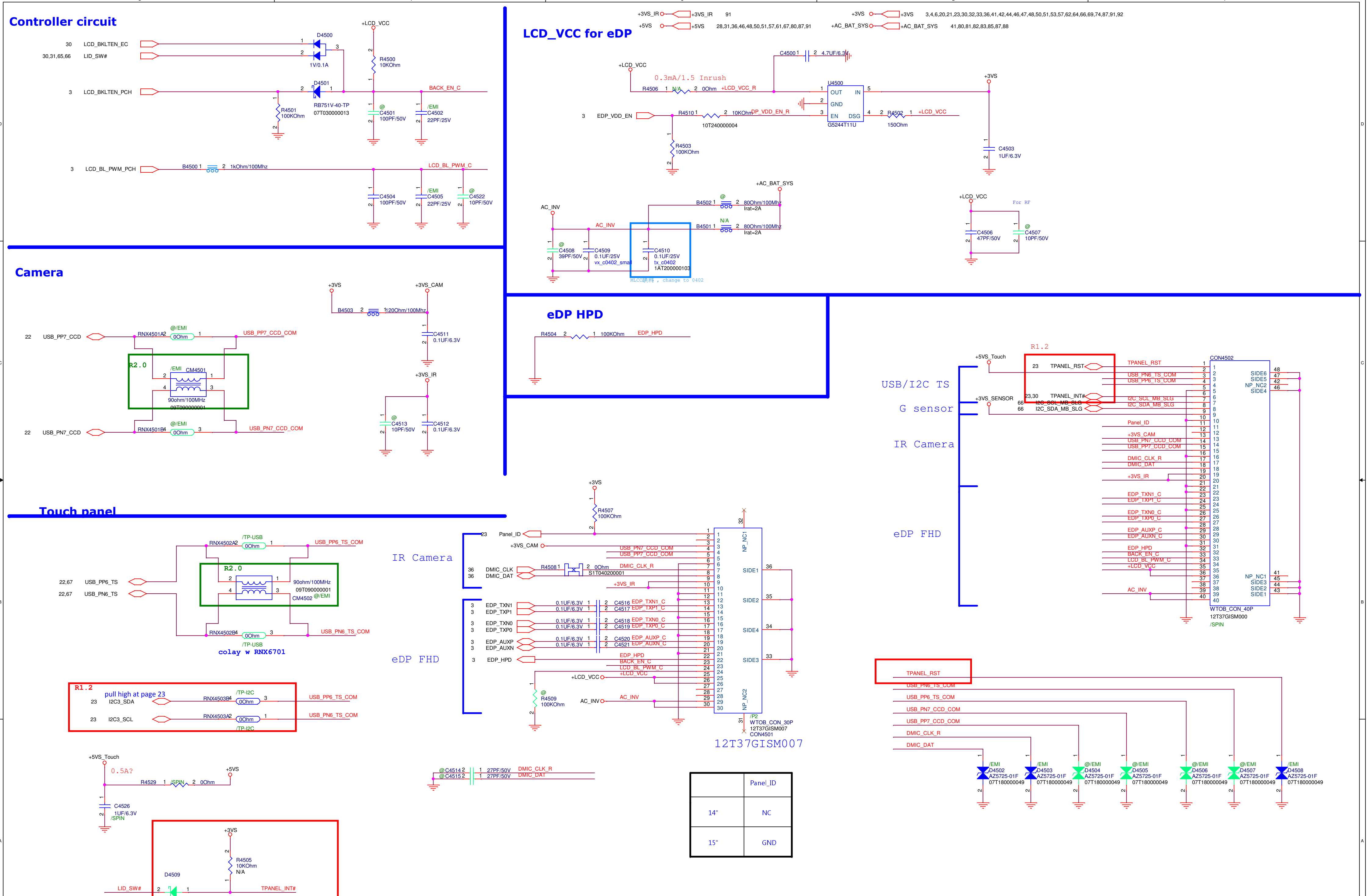
PEGATRON Title : DEBUG CONN.

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 44 of 104

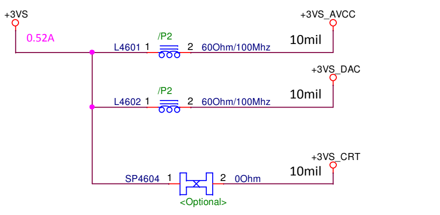


	Panel_ID
14"	NC
15"	GND

PEGATRON Title : eDP Out
PEGATRON PROPRIETARY AND CONFIDENTIAL
BG1-HW1 RD Engineer: Tina Lee
Size: Custom Project Name: DL4FA Rev: 1.1
Date: Friday, April 12, 2019 Sheet 45 of 104

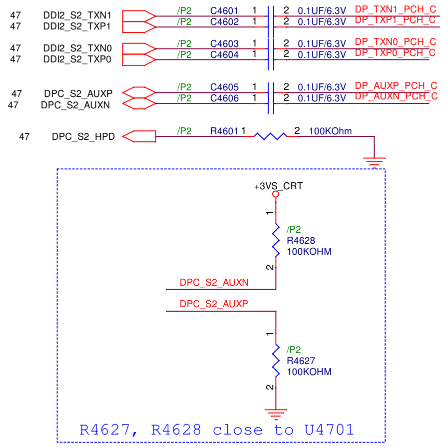
DP2VGA Realtek RTD2166

Power



CPU Interface

DP main link total length < 8 inch
VIA < 2



Rom / Flash Mode :

		POL1 (Pin10)	
		0	1
POL2 (Pin9)	0	No Use	No Use
	1	(V) Rom mode	Ext Flash mode

Embedded EDID setting :

EDID_SET (Pin11)	Mode
0 or NC	(V) Disable RTD2166 Embedded EDID
1	Enable RTD2166 Embedded EDID

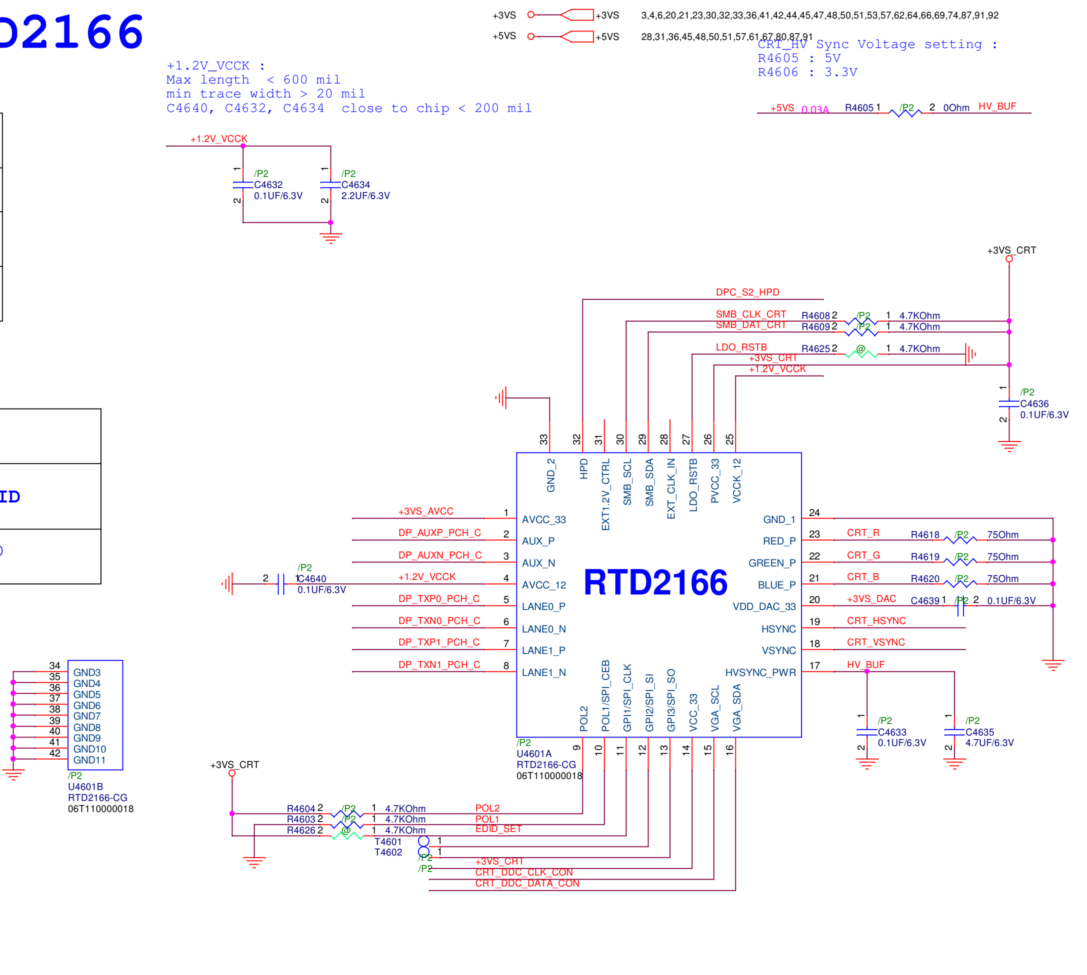
LDO Mode :

LDO_RSTB (Pin27)	Mode
1 or NC	(V) embedded LDO Mode
0	External 1.2V Mode

1: Pull High 0: Pull Down

+1.2V_VCCK :
Max length < 600 mil
min trace width > 20 mil
C4640, C4632, C4634 close to chip < 200 mil

CRT_HV Sync Voltage setting :
R4605 : 5V
R4606 : 3.3V

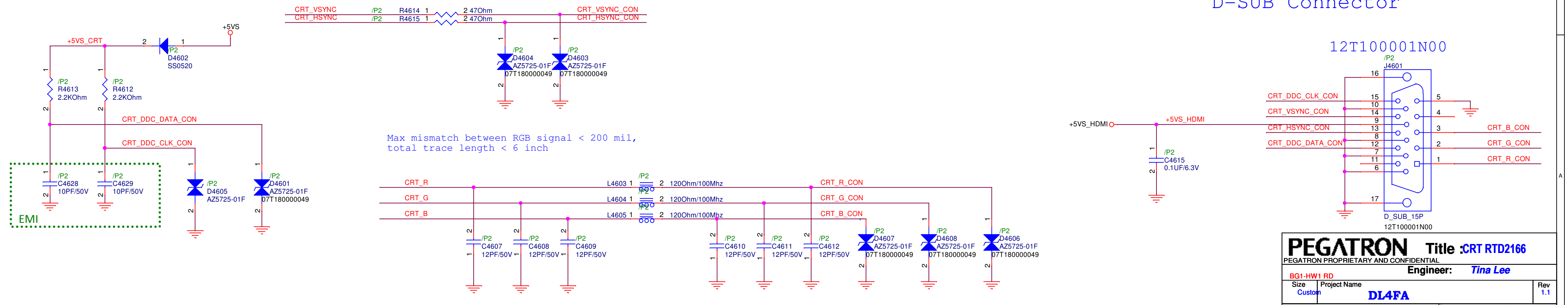


CRT_HV Sync total trace length < 6 inch

Max mismatch between RGB signal < 200 mil,
total trace length < 6 inch

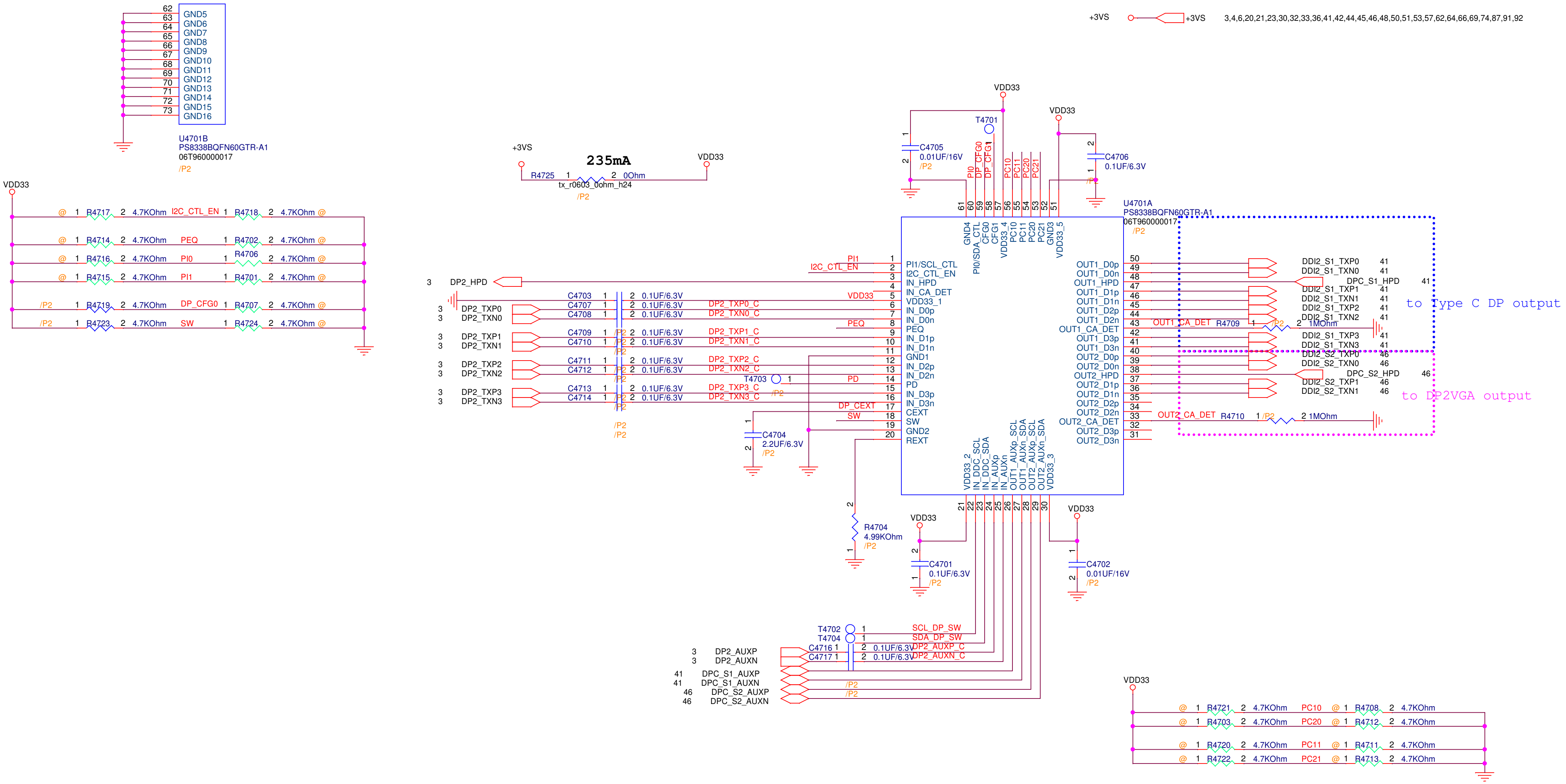
D-SUB Connector

12T100001N00



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title :	CRT RTD2166		
BG1-HW1 RD	Engineer:	Tina Lee	
Size: Custom	Project Name: DL4FA		Rev: 1.1
Date: Friday, April 12, 2019	Sheet 46	of 104	



PEGATRON **Title :** DP_SWITCH

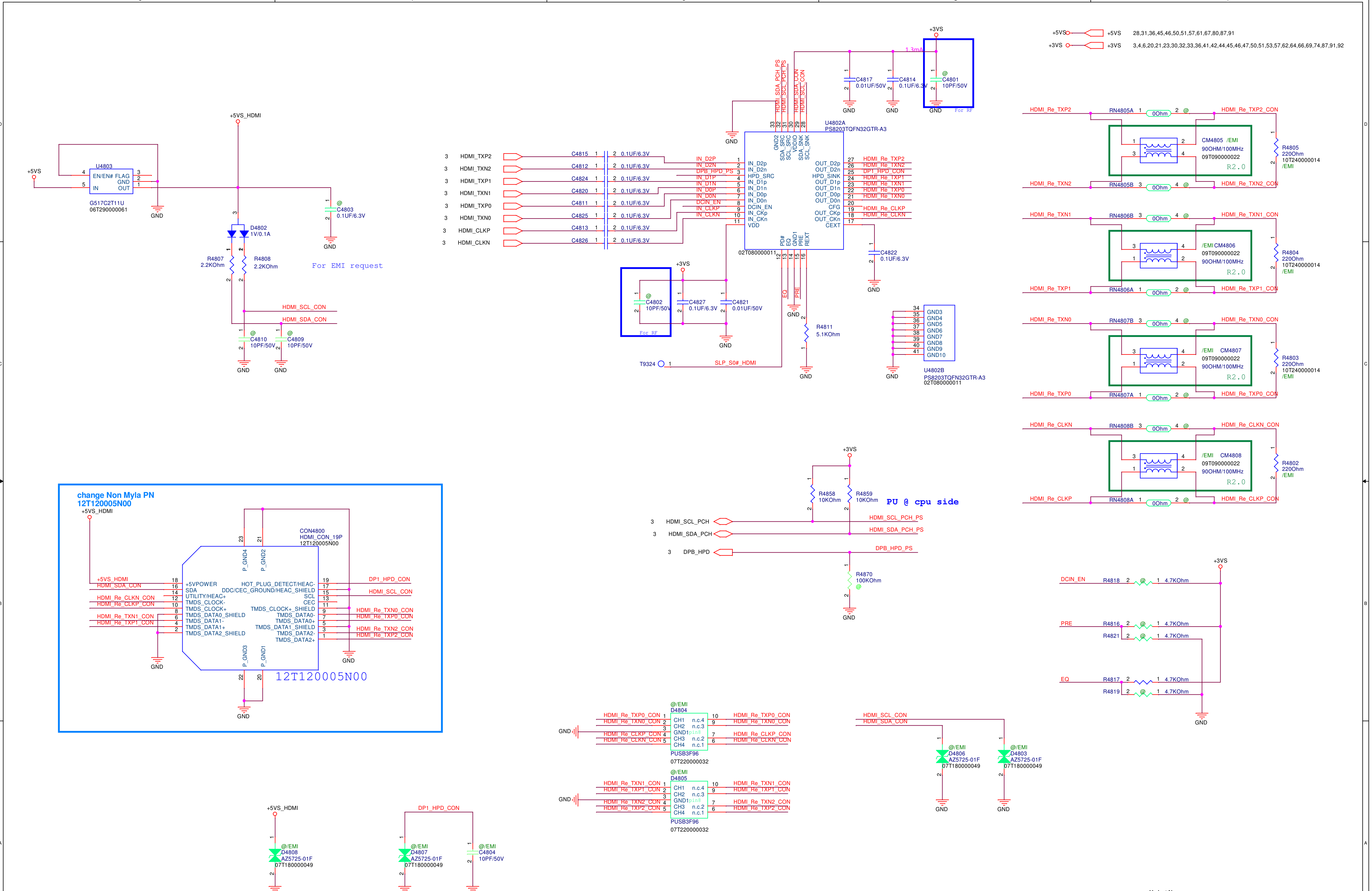
PEGATRON PROPRIETARY AND CONFIDENTIAL

Engineer: *Tina Lee*

BG1-HW1 RD

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 47 of 104



<Variant Name>

PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL
BG1-HW1 RD

Title : HDMI-4K2K

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 48 of 104

5 4 3 2 1

D

C

B

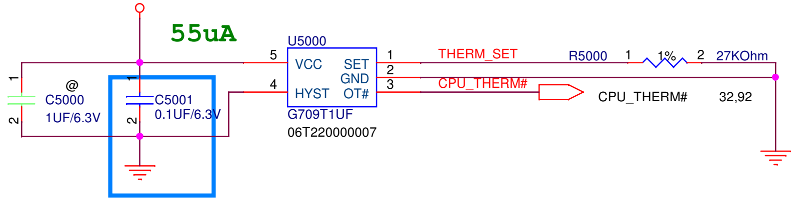
A

5 4 3 2 1

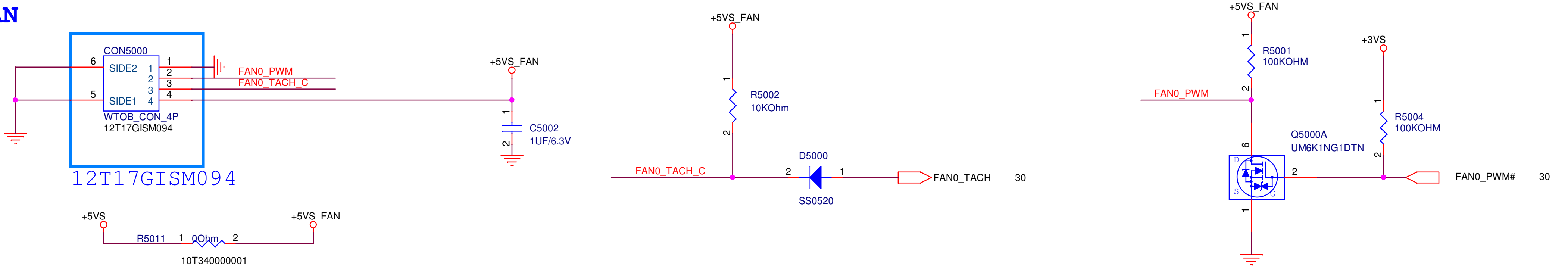
Thermal Sensor for package test

temp setting : 83 degree

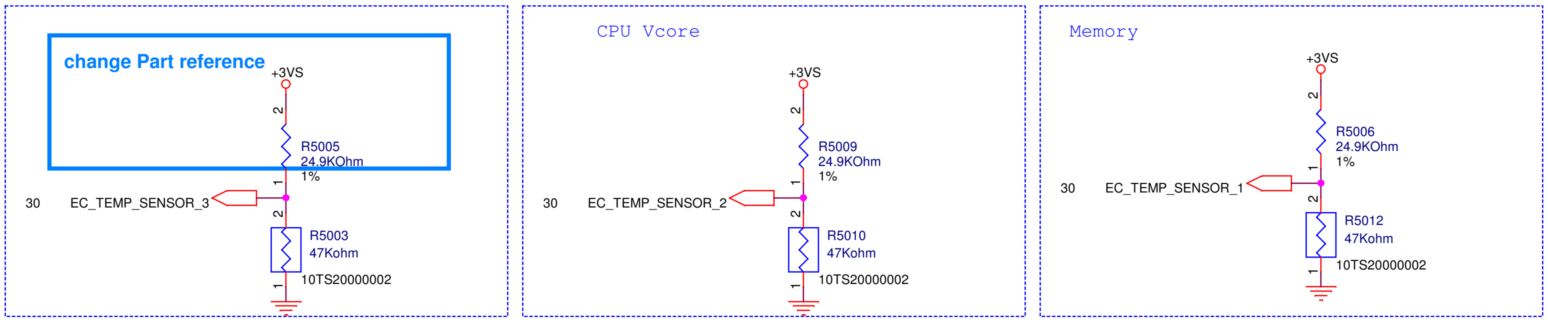
RSET(kΩ)= 0.0012T2 - 0.9308T + 96.147



FAN



DPTF



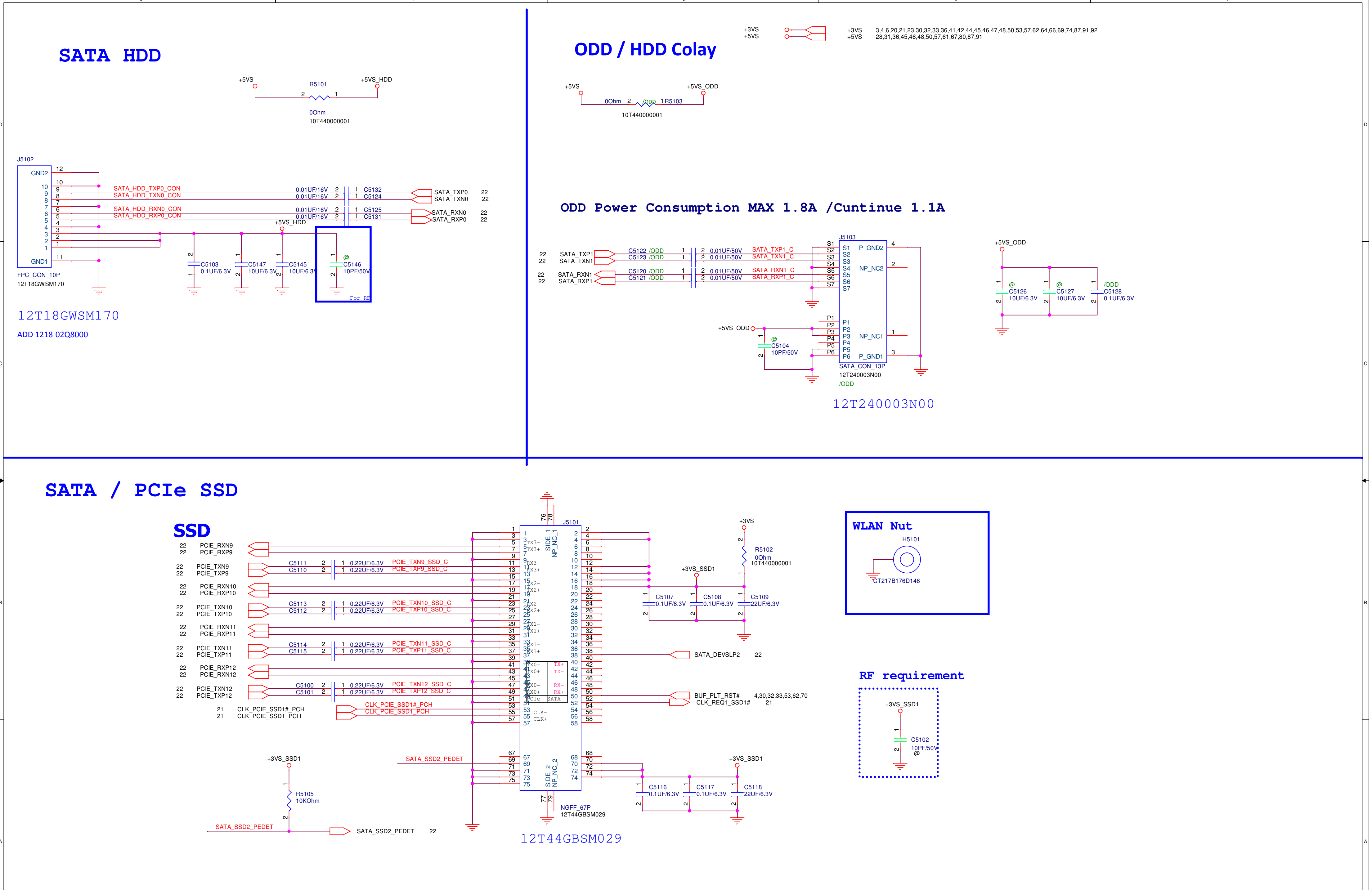
PEGATRON
BG1-HW1 RD

Title : Thermal_Fan

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 50 of 104



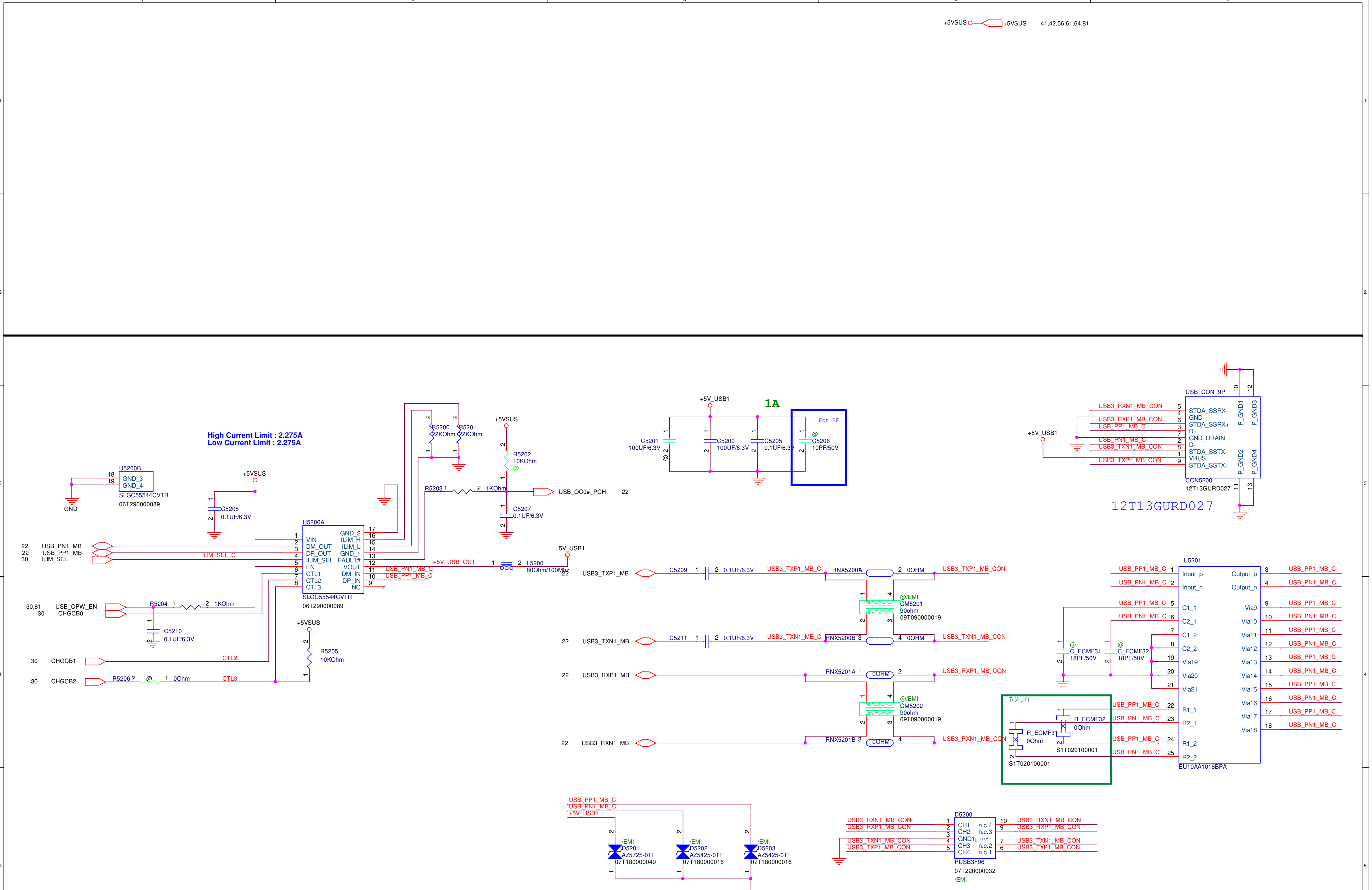
PEGATRON **Title :** SSD / HDD / ODD

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD **Engineer:** *Tina Lee*

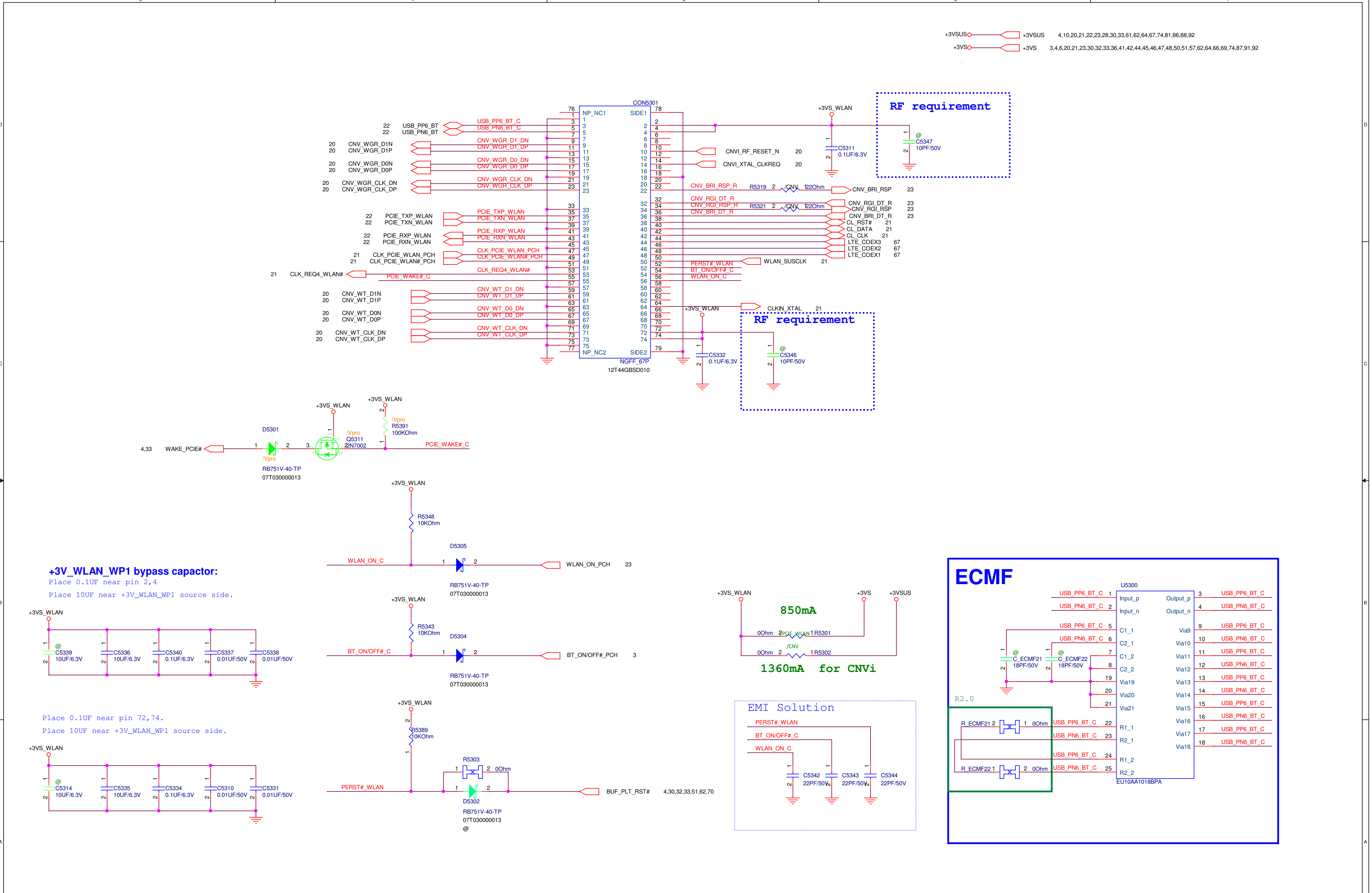
Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 51 of 104



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL
BG1-HW1 RD

Title:	USB3.0_Charge IC
Engineer:	Tina Lee
Size	Custom
Project Name	DL4FA
Rev	1.1
Date:	Friday, April 12, 2019
Sheet	52 of 104



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL
BG1-HW1 RD

Title :	PCIE_WLAN_BT	
Engineer:	Tina Lee	
Size: Custom	Project Name: DL4FA	Rev: 1.1
Date: Friday, April 12, 2019	Sheet 53 of 104	

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD

PEGATRON	Title : USB3 GEN2 redriver	
	Engineer: Tina Lee	
Size: C	Project Name: DL4FA	Rev: 1.1
Date: Friday, April 12, 2019	Sheet 54 of 104	

PEGATRON

Title : RSVD

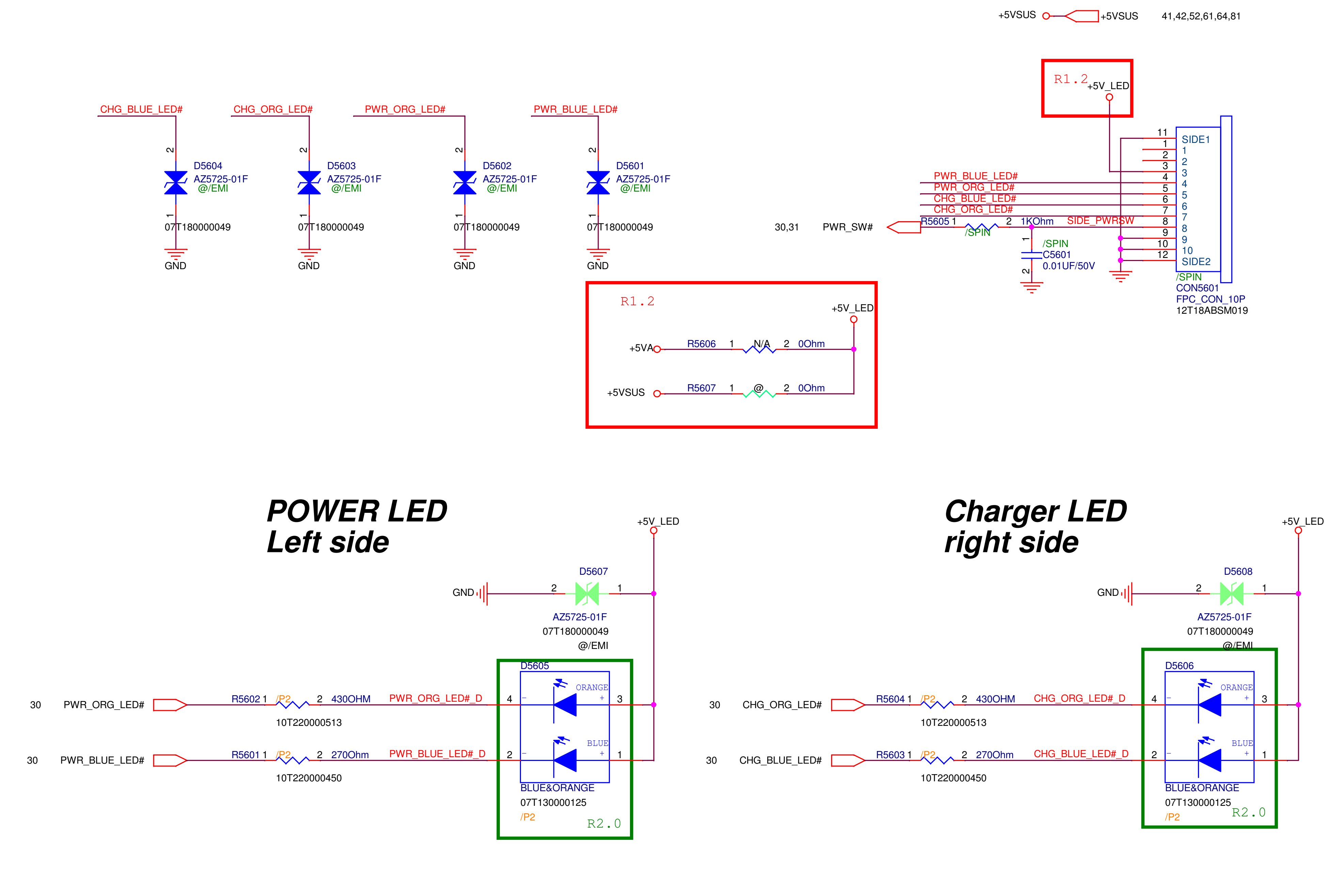
PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD

Engineer: *Tina Lee*

Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 55 of 104



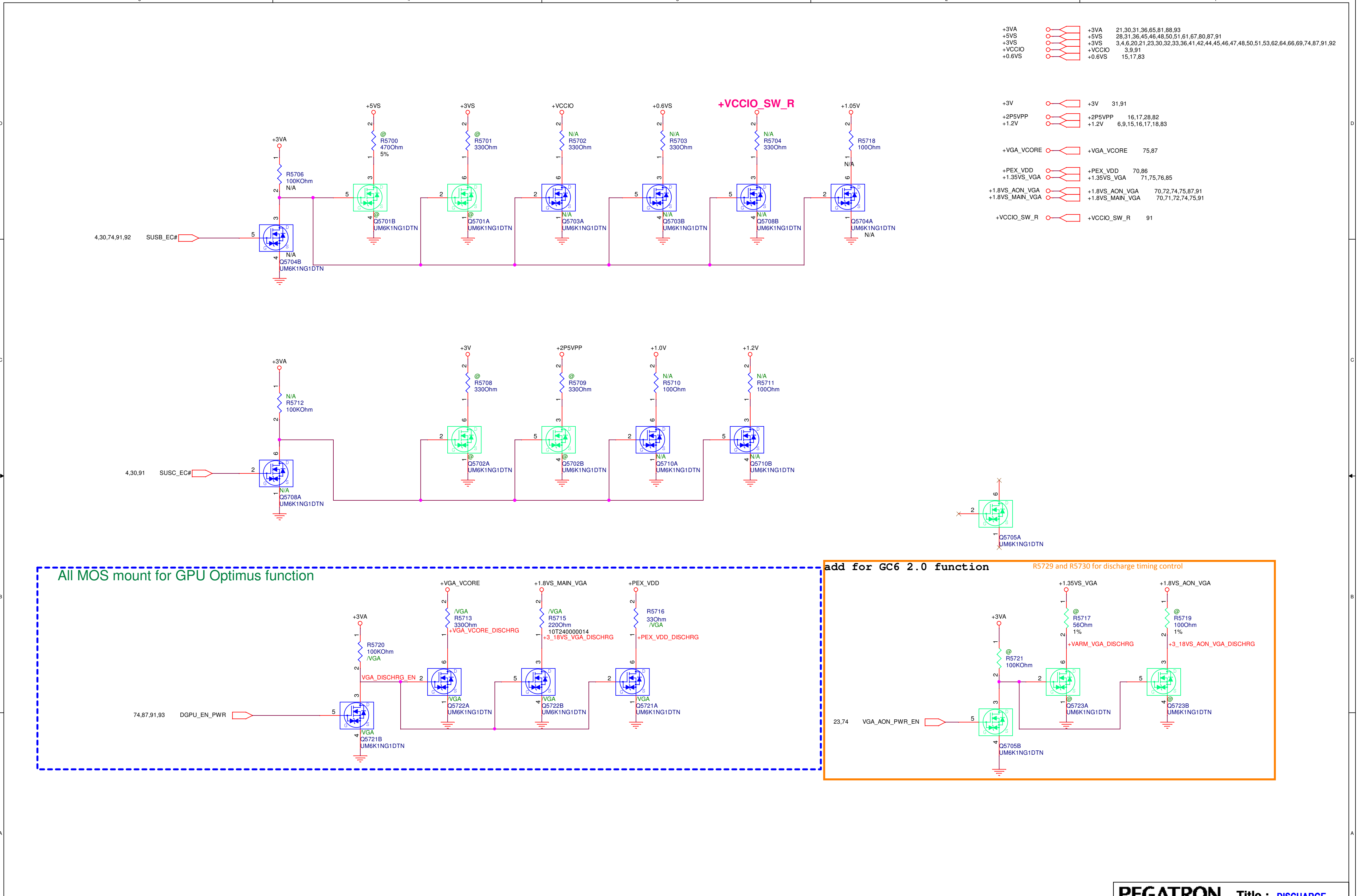
PEGATRON **Title : LED**

BG1-HW1 RD

Engineer: *Tina Lee*

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 56 of 104



PEGATRON Title : DISCHARGE

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 57 of 104

PEGATRON

Title : RSVD

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW1 RD

Engineer: *Tina Lee*

Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 58 of 104

PEGATRON Title : RSVD

PEGATRON PROPRIETARY AND CONFIDENTIAL

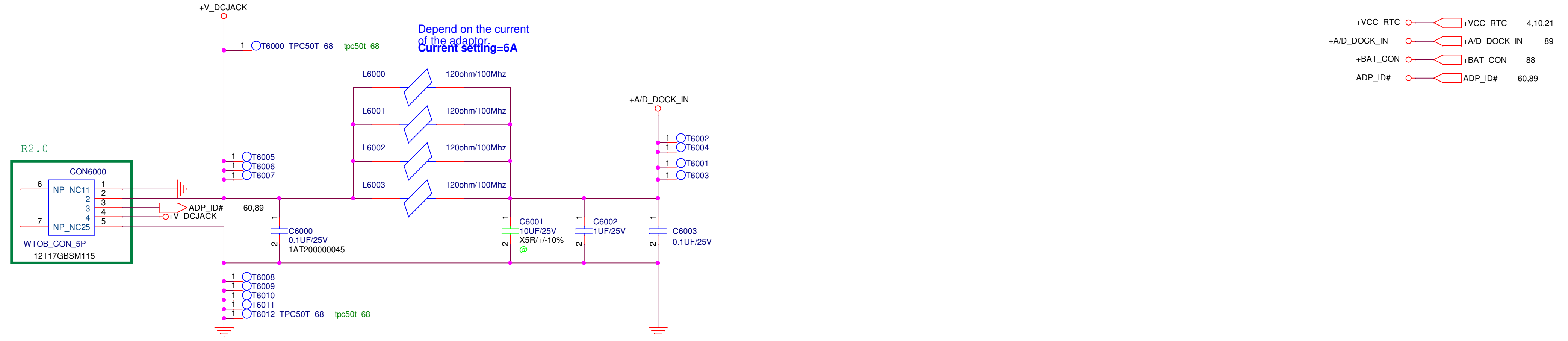
BG1-HW1 RD

Engineer: *Tina Lee*

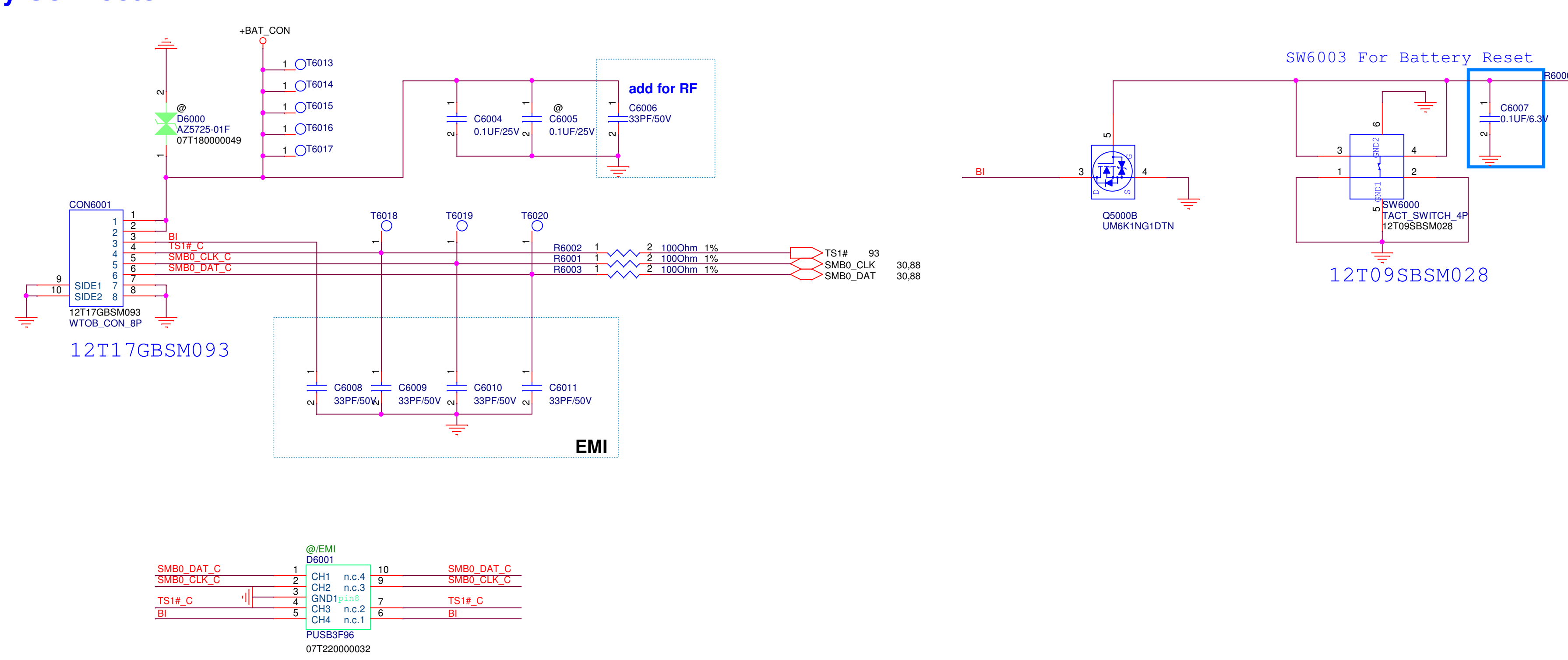
Size	Project Name	Rev
A	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 59 of 104

DC Jack WTB CONN



Battery Connector



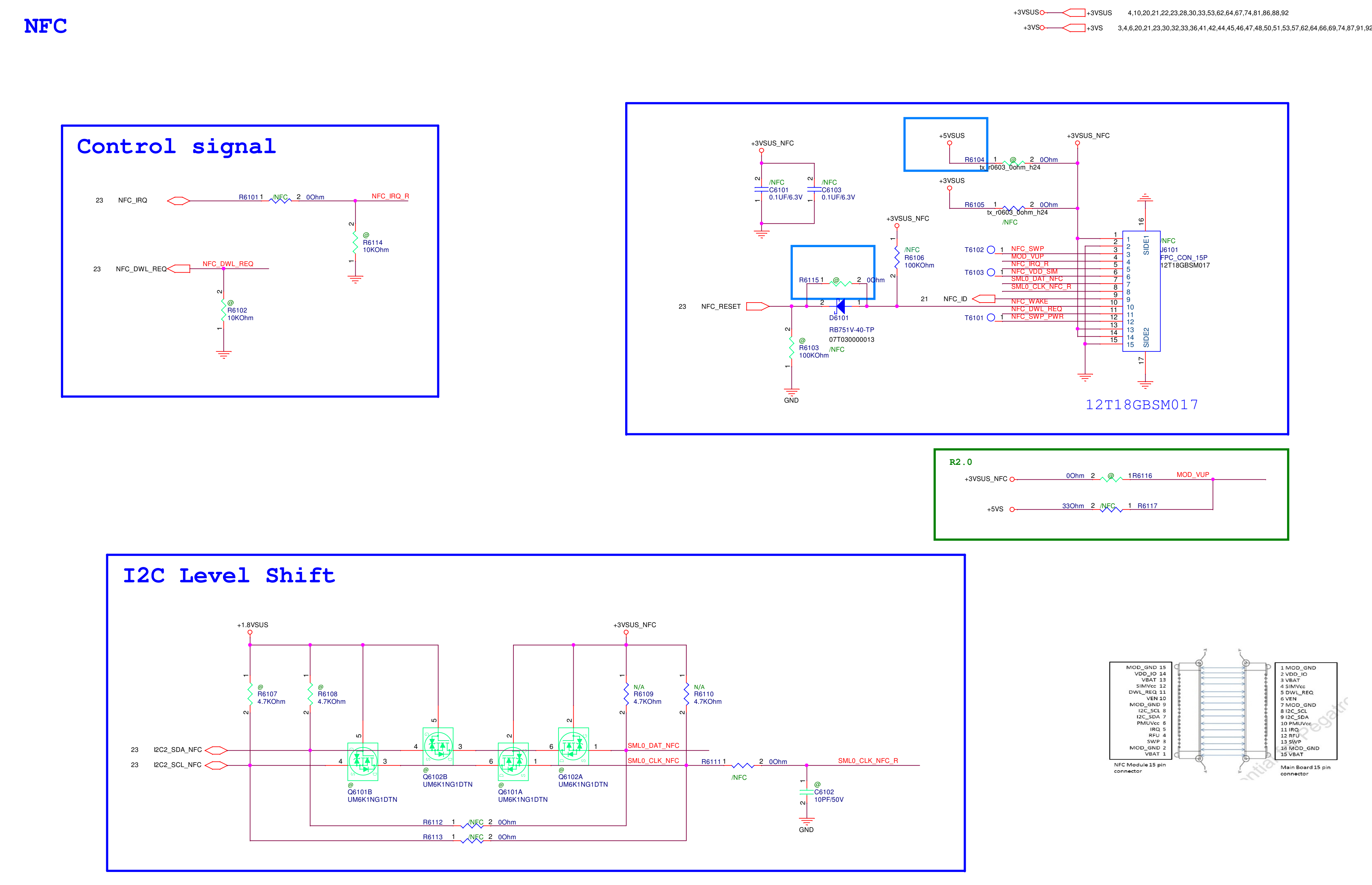
PEGATRON Title : DC_BAT_CONN

BG1-HW1 RD Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 60 of 104

NFC



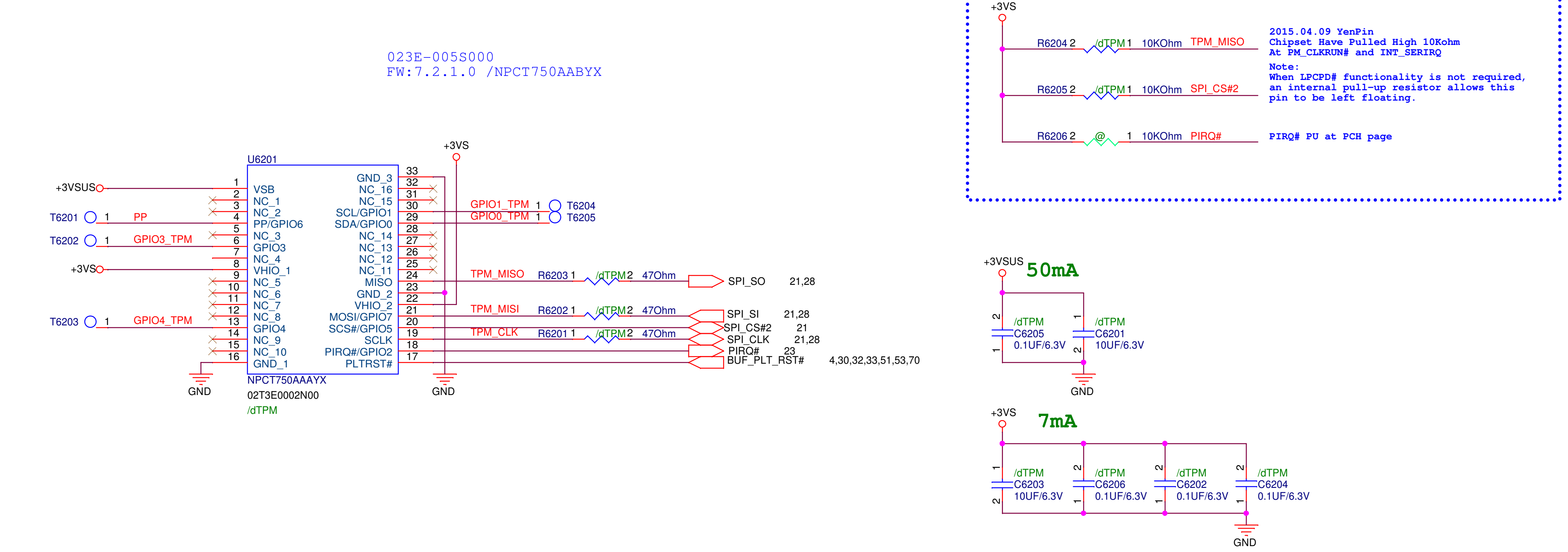
PEGATRON Title : NFC

BG1-HW1 RD Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 61 of 104

62 TPM NPCT750 - SPI



PEGATRON	Title :	TPM NPCT750
BG1-HW1 RD	Engineer:	Tina Lee
Size: Custom	Project Name: DL4FA	Rev: 1.1
Date: Friday, April 12, 2019	Sheet 62	of 104

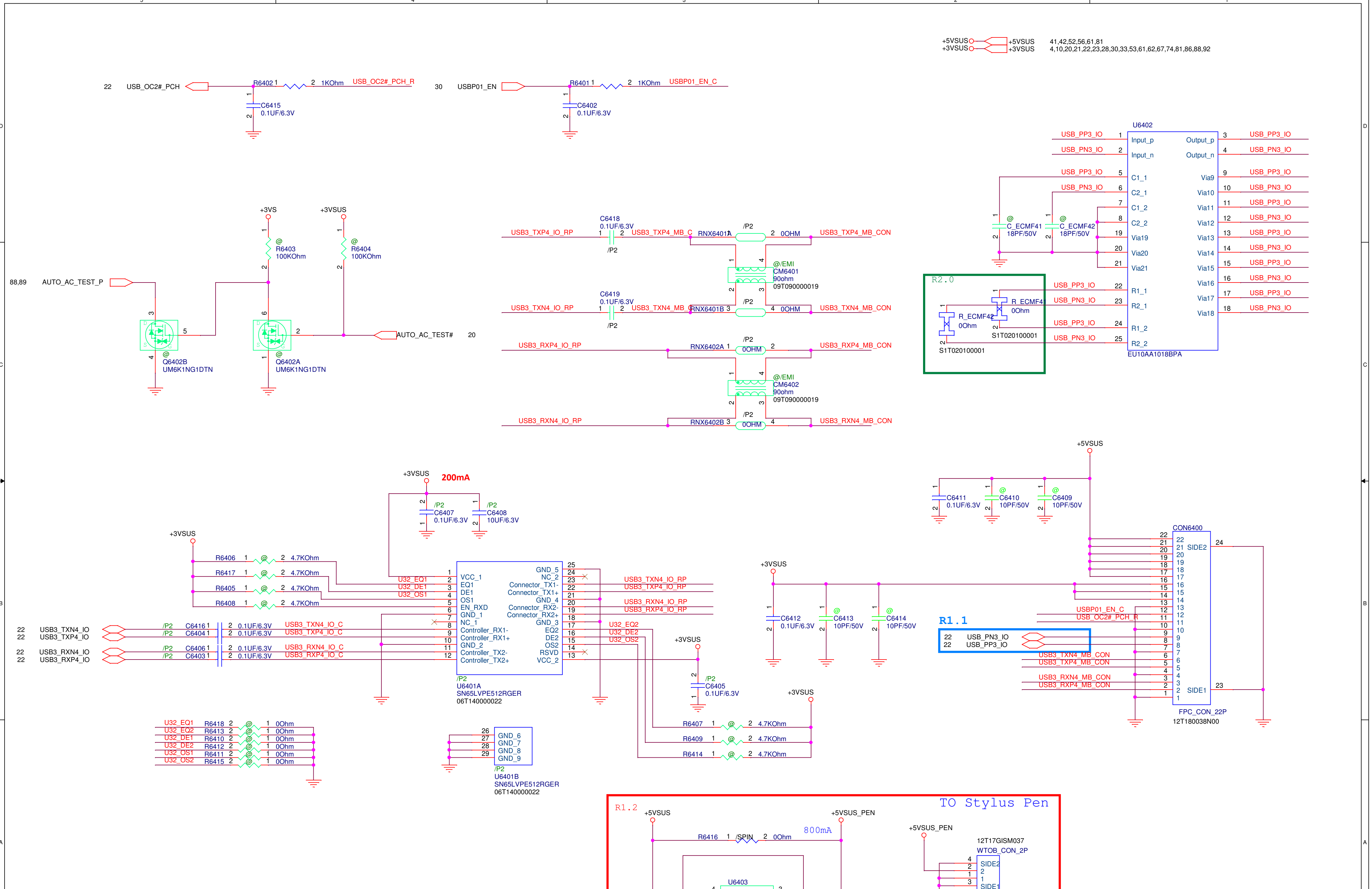
<Variant Name>

PEGATRON Title :***

Engineer: Tina Lee

Size	Project Name	Rev
B	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 63 of 104



PEGATRON

BG1-HW3 RD

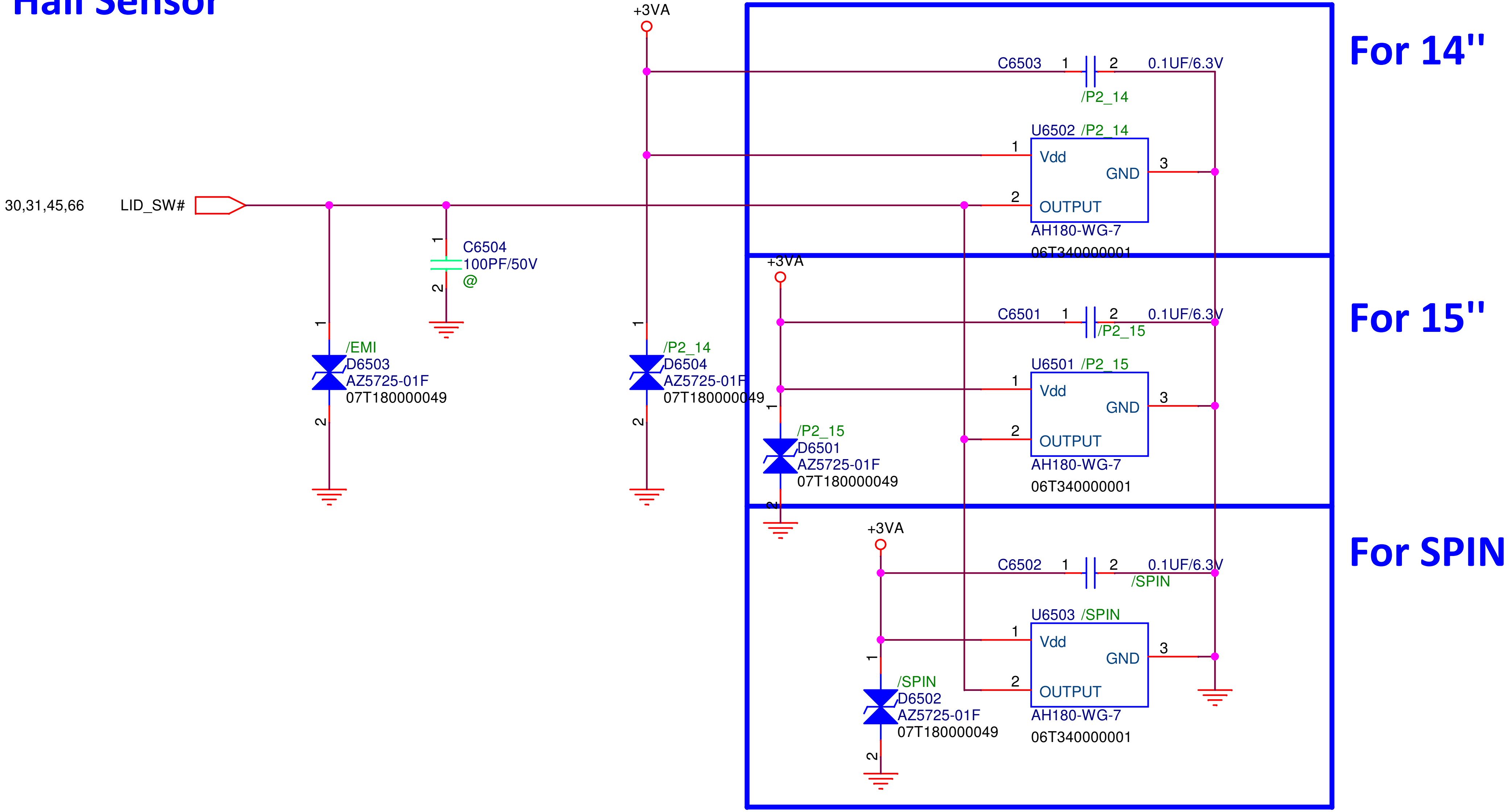
Title : IO Bd Connector

Engineer: Raly Hsieh

Size	Project Name	Rev
Custom	LE5EB	1.0

Date: Friday, April 12, 2019 Sheet 64 of 97

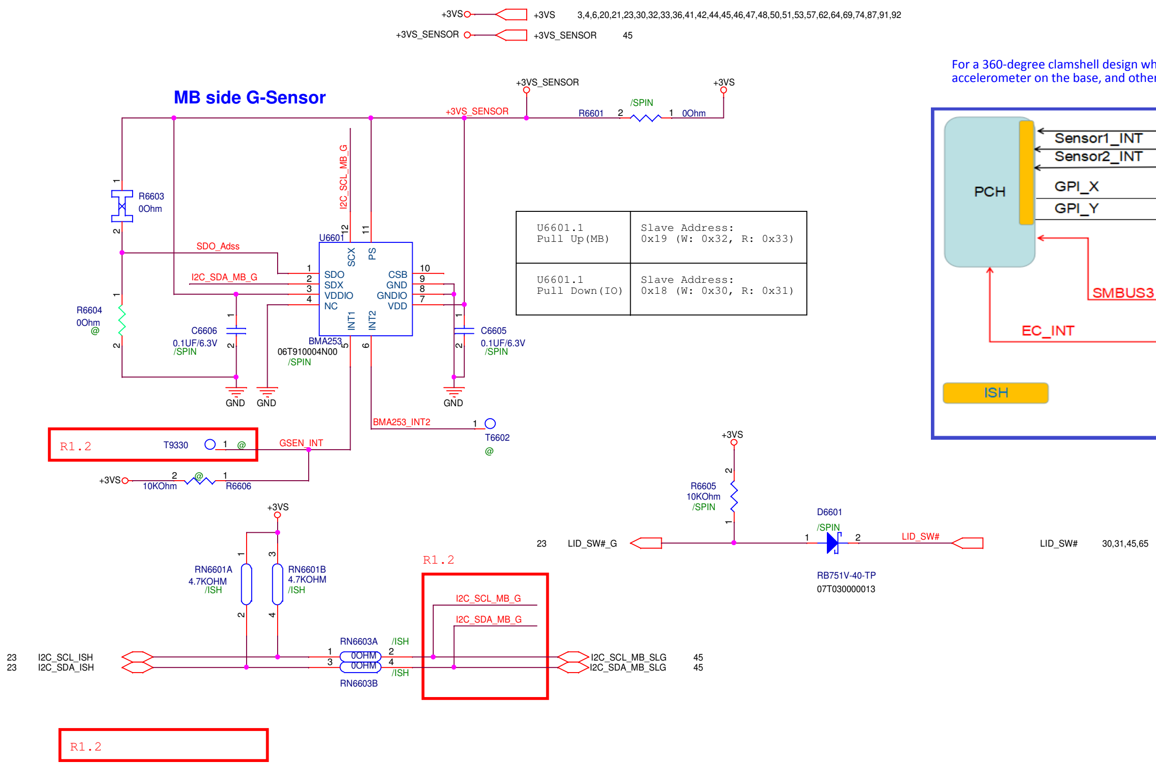
Hall Sensor



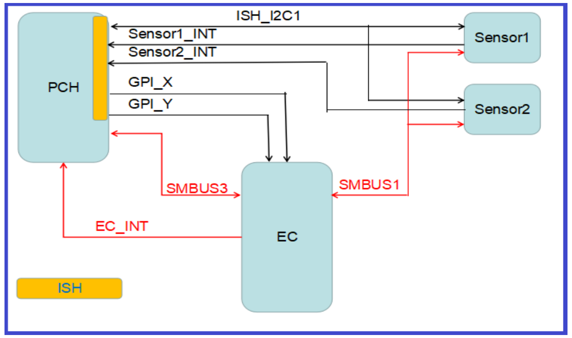
<Variant Name>

PEGATRON PEGATRON PROPRIETARY AND CONFIDENTIAL	Title :	G-Sensor	
	Engineer:	*Tina Lee*	
Size: Custom	Project Name	DL4FA	Rev: 1.1
Date: Friday, April 12, 2019	Sheet 65	of 104	

For a 360-degree clamshell design which needs a 2nd accelerometer on the base, and other sensors are on th lid.

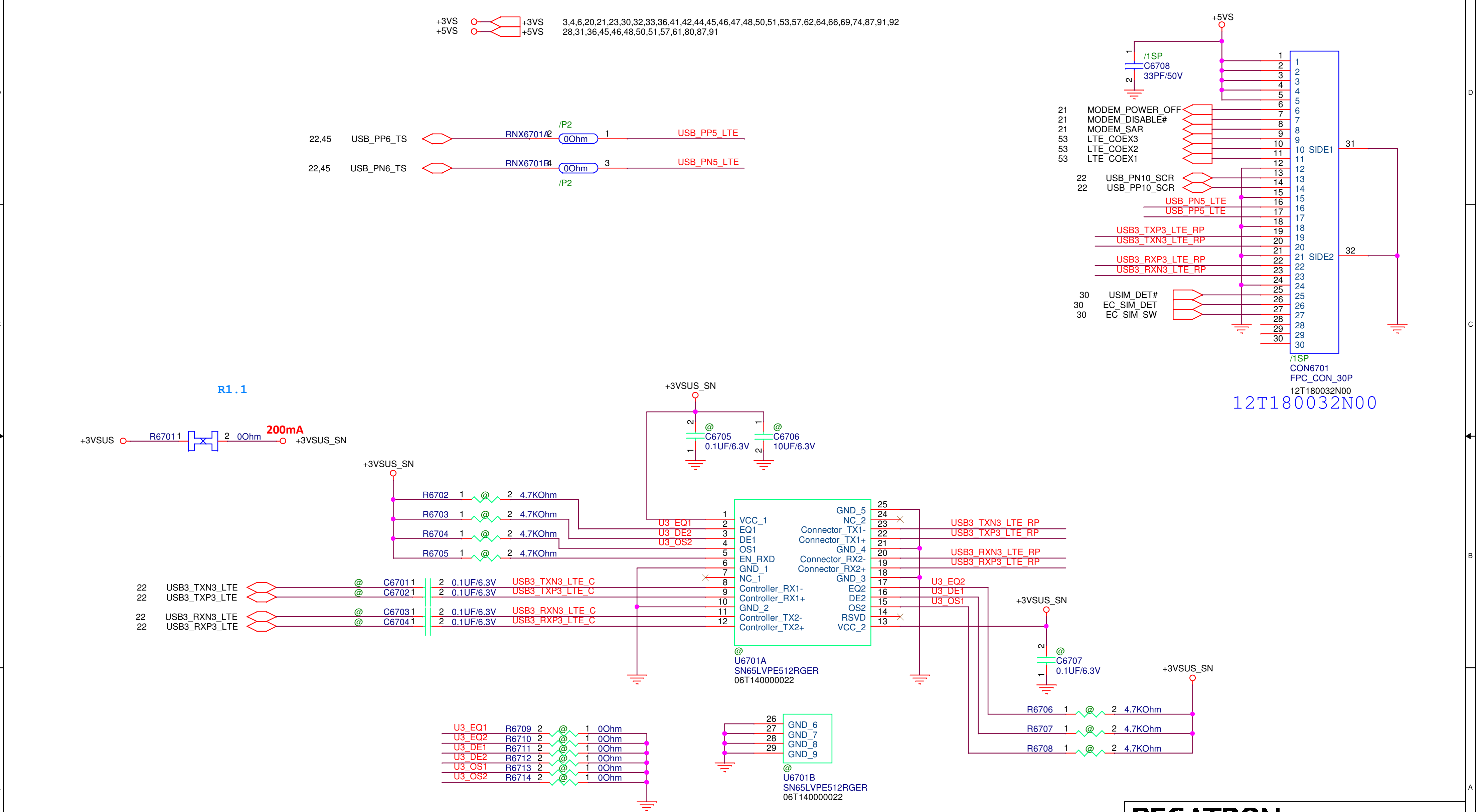


U6601.1 Pull Up(MB)	Slave Address: 0x19 (W: 0x32, R: 0x33)
U6601.1 Pull Down(IO)	Slave Address: 0x18 (W: 0x30, R: 0x31)



<Variant Name>

PEGATRON PEGATRON PROPRIETARY AND CONFIDENTIAL	Title : G-Sensor	
	Engineer: Tina Lee	
Size Custom	Project Name DL4FA	Rev 1.1
Date: Friday, April 12, 2019	Sheet 66 of 104	



PEGATRON Title : LTE

PEGATRON PROPRIETARY AND CONFIDENTIAL

BG1-HW3 RD Engineer: Raly Hsieh

Size	Project Name	Rev
B	LE5EB	2.0

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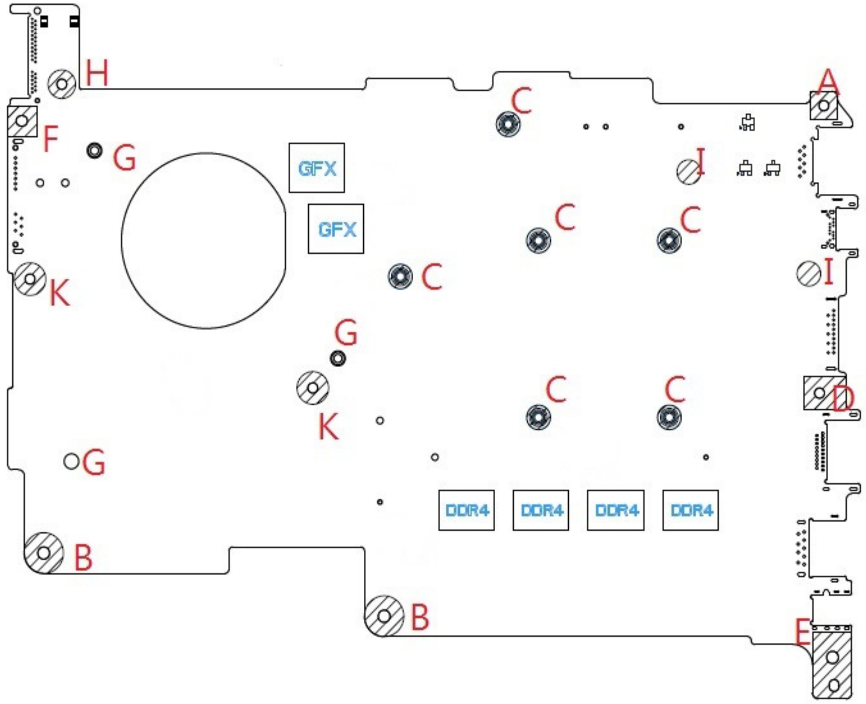
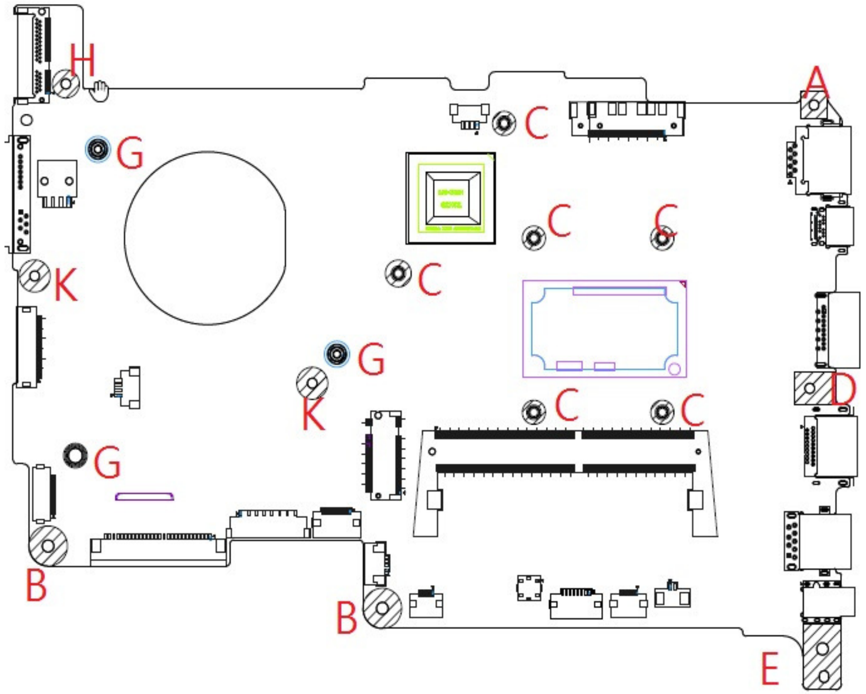
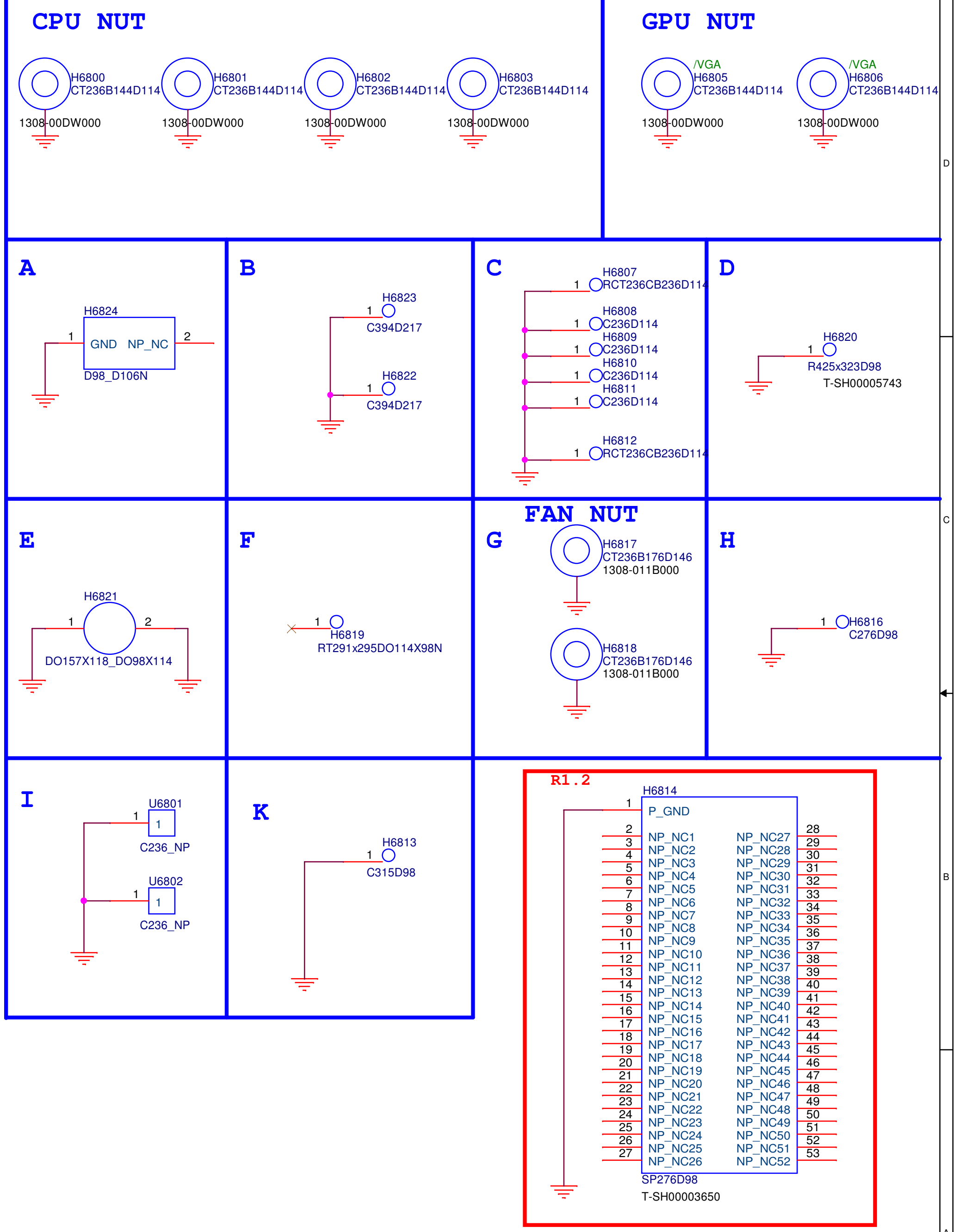
68 ME Hole







PEGATRON PEGATRON PROPRIETARY AND CONFIDENTIAL

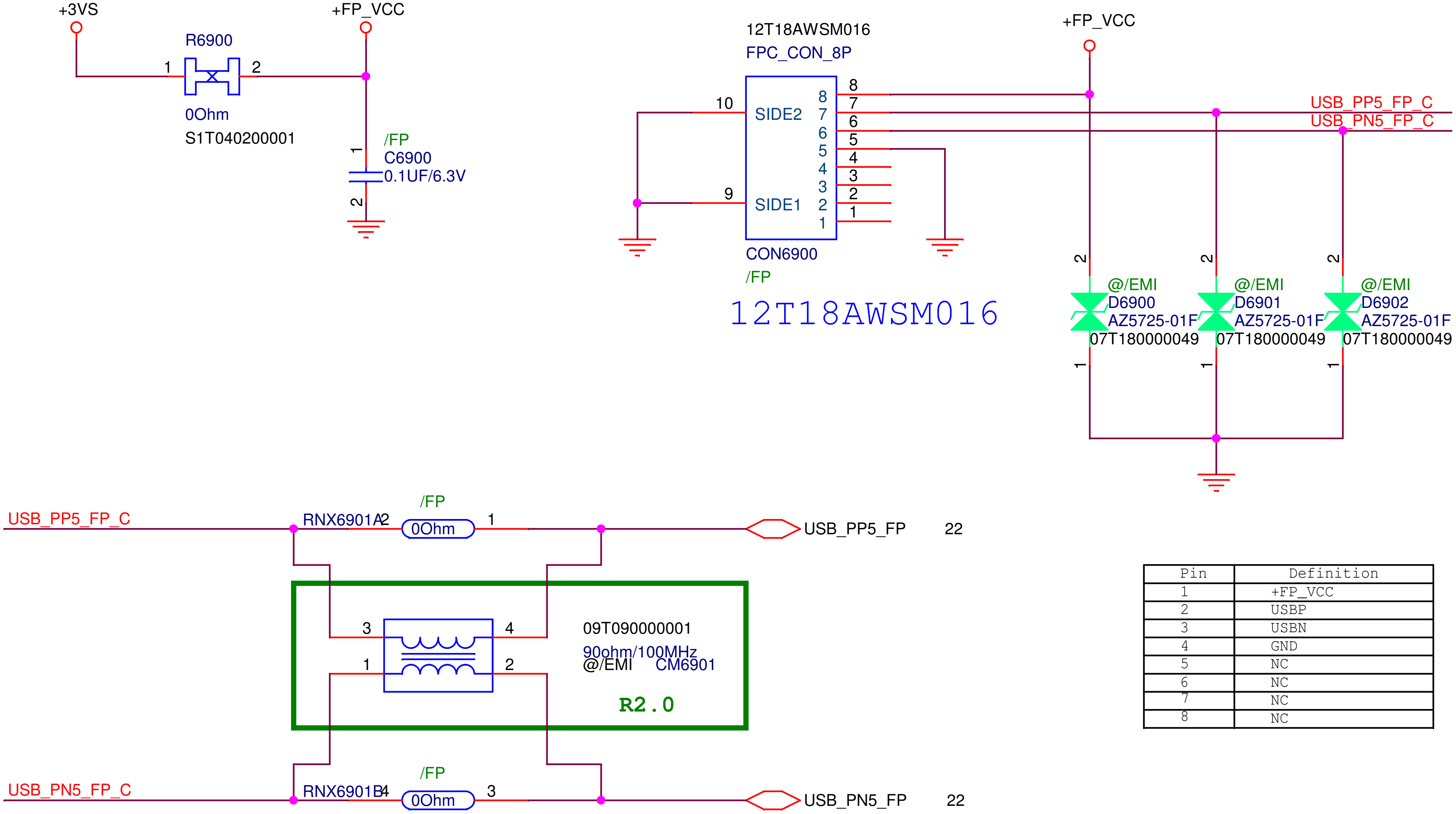
Title : ME Hole

BG1-HW1 RD

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 68 of 104



Pin	Definition
1	+FP_VCC
2	USBP
3	USBN
4	GND
5	NC
6	NC
7	NC
8	NC

PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : **Finger printer**

BG1-HW1 RD

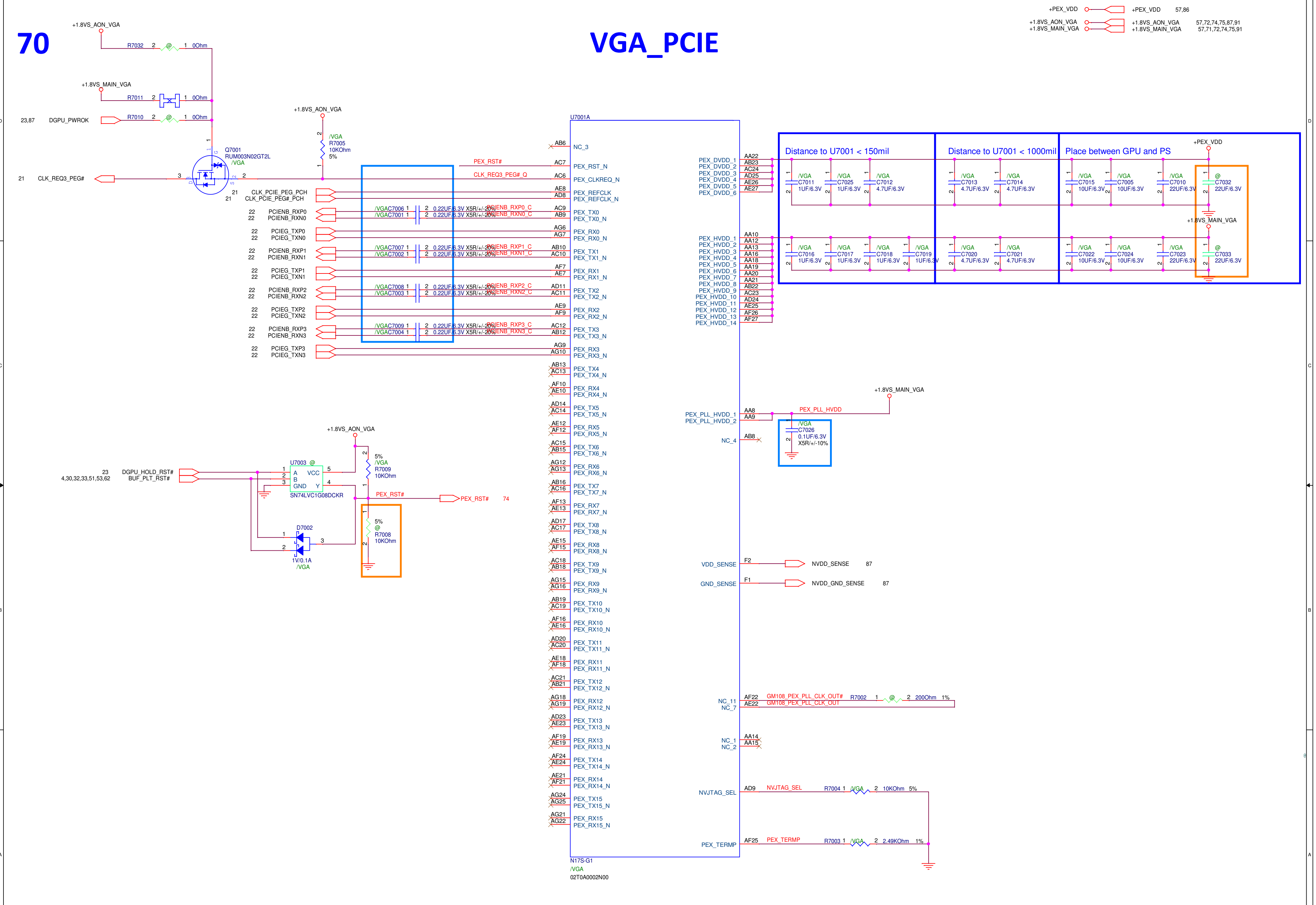
Engineer: *Tina Lee*

Size	Project Name	Rev
Custom	**DL4FA**	1.1

Date: Friday, April 12, 2019 Sheet 69 of 104

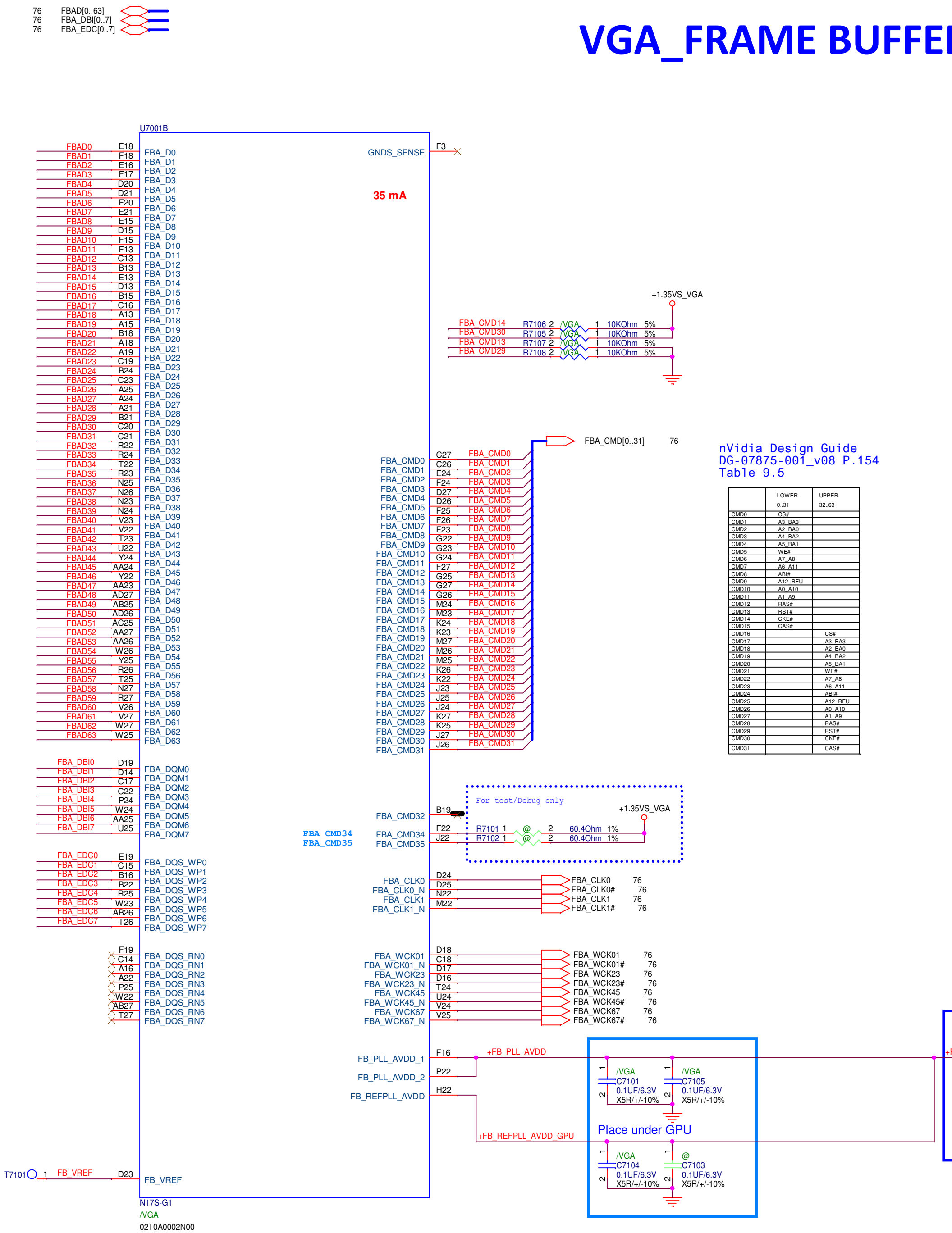
70

VGA_PCIE



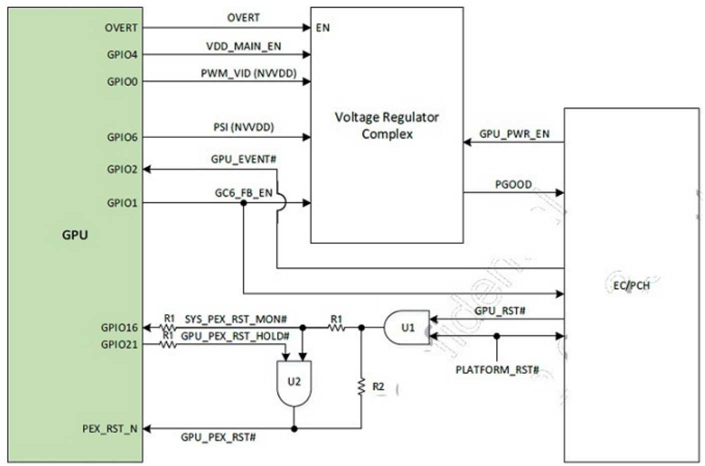
PEGATRON	Title : VGA_PCIE		
PEGATRON PROPRIETARY AND CONFIDENTIAL	Engineer: *Tina Lee*		
BG1-HW1 RD			
Size C	Project Name DL4FA		Rev 1.1
Date: Friday, April 12, 2019	Sheet 70 of 104		

VGA_FRAME BUFFER_GDDR5



nVidia Design Guide
DG-07875-001_v08 P.154
Table 9.5

	LOWER 0..31	UPPER 32..63
CMD0	CS#	
CMD1	A3_BA3	
CMD2	A2_BA0	
CMD3	A4_BA2	
CMD4	A5_BA1	
CMD5	WE#	
CMD6	A7_A8	
CMD7	A6_A11	
CMD8	ABI#	
CMD9	A12_RFU	
CMD10	A0_A10	
CMD11	A1_A9	
CMD12	RAS#	
CMD13	RST#	
CMD14	CKE#	
CMD15	CAS#	
CMD16		CS#
CMD17		A3_BA3
CMD18		A2_BA0
CMD19		A4_BA2
CMD20		A5_BA1
CMD21		WE#
CMD22		A7_A8
CMD23		A6_A11
CMD24		ABI#
CMD25		A12_RFU
CMD26		A0_A10
CMD27		A1_A9
CMD28		RAS#
CMD29		RST#
CMD30		CKE#
CMD31		CAS#



Title : VGA_FRAME BUFFER

BG1-HW1 RD

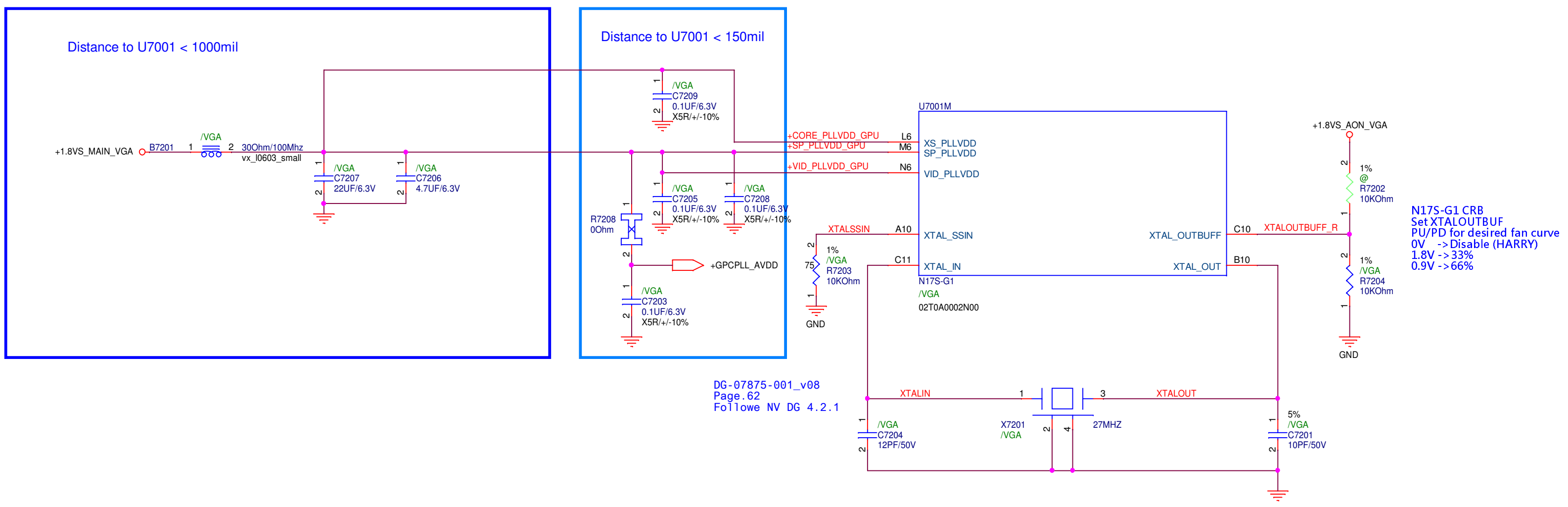
Engineer: Tina Lee

Size: C | Project Name: DL4FA | Rev: 1.1

Date: Friday, April 12, 2019 | Sheet 71 of 104

VGA_XTAL

+1.8VS_AON_VGA +1.8VS_AON_VGA 57,70,74,75,87,91
+1.8VS_MAIN_VGA +1.8VS_MAIN_VGA 57,70,71,74,75,91
+PEX_VDD +PEX_VDD 57,70,86



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : VGA_XTAL

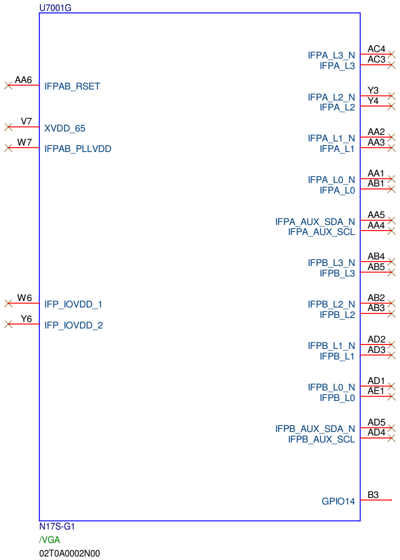
Engineer: Tina Lee

BG1-HW1 RD

Size	Project Name	Rev
C	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 72 of 104

VGA_DISPLAY



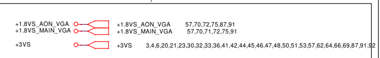
DG 10.2.1 Table 10.2
GB2C-64 no display support

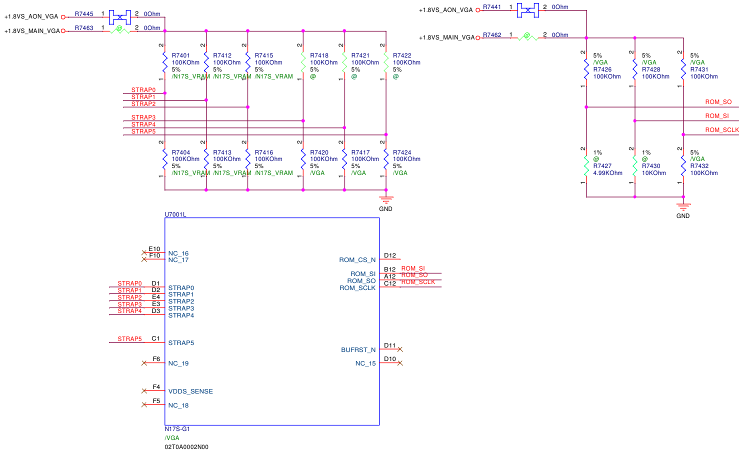
Table 10.2 GB2C-64 Standard Configurations

Link	Standard Display Configurations
Note: GPUs in GB2C-64 packages provide no display links and no display head support; they are operated in Optimus/MS-Hybrid mode. **Note:** GPUs in GB2C-64 packages do not support G-SYNC™.	

74 VBIOS ROM / Straping

VGA_GPIO_STRAP





From RVL-07916-001_v14 Table.4

	GB2C-64(N17S-LG)	Vendor	Strap	STRAP2	STRAP1	STRAP0
N17S-G0 TBD	MT51J256M32HF-80:B	Micron	0x9	L(R7416)	H(R7412)	L(R7404)
TBD	H5GC8H24AJR-R2C	Hynix	0xA		L(R7413)	H(R7401)
0315-01SB0PB	H5GC8H24MJR-R0C	Hynix	0x2	L(R7416)	H(R7412)	L(R7404)
	TBD	TBD	TBD			
0315-02GE0PB	MT51J256M32HF-70:B	Micron	0x4	H(R7415)	L(R7413)	L(R7404)
0315-02GG0PB	H5GC8H24AJR-R0C	Hynix	0x5	H(R7415)	L(R7413)	H(R7401)
N17S-G1	TBD	TBD	TBD			
	TBD	TBD	TBD			
	TBD	TBD	TBD			

Table 5.5 SORx_EXPOSED Strap Enablement for Down Designs

Row Index	Strap Pins see Note			Resulting SORx_EXPOSED Enablements			
	ROM_SO	ROM_SI	ROM_SCLK	SOR3_ EXPOSED	SOR2_ EXPOSED	SOR1_ EXPOSED	SOR0_ EXPOSED
0	H	H	M	disabled	disabled	disabled	disabled
	M	X	X	(Reserved; do not configure)			
	All other Strap Configurations			(Reserved)			

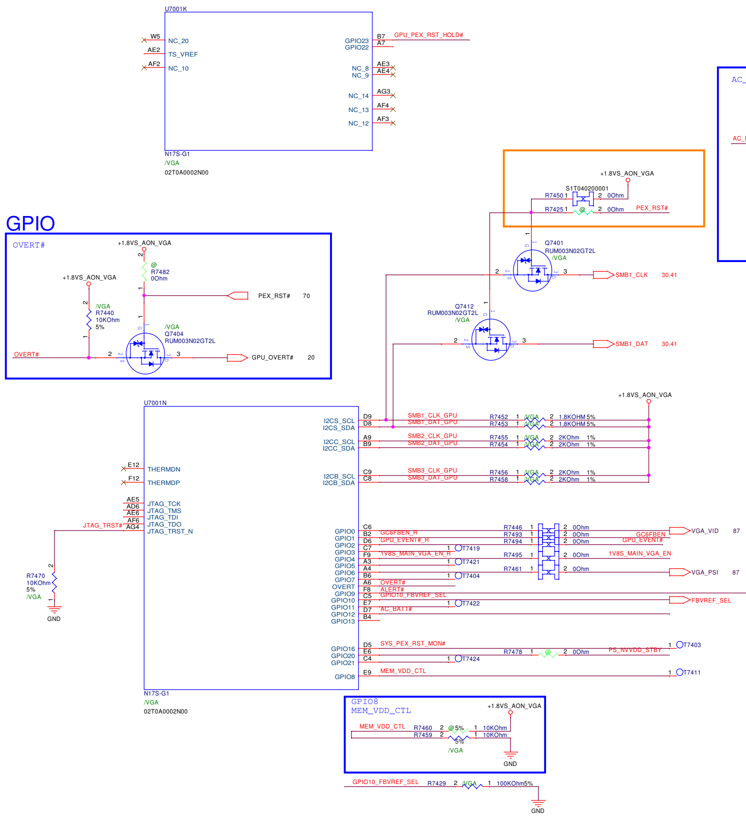
Table 5.6 SMB ALT_ADDR, DEVID_SEL, PCIE_CFG, VGA_DEVICE

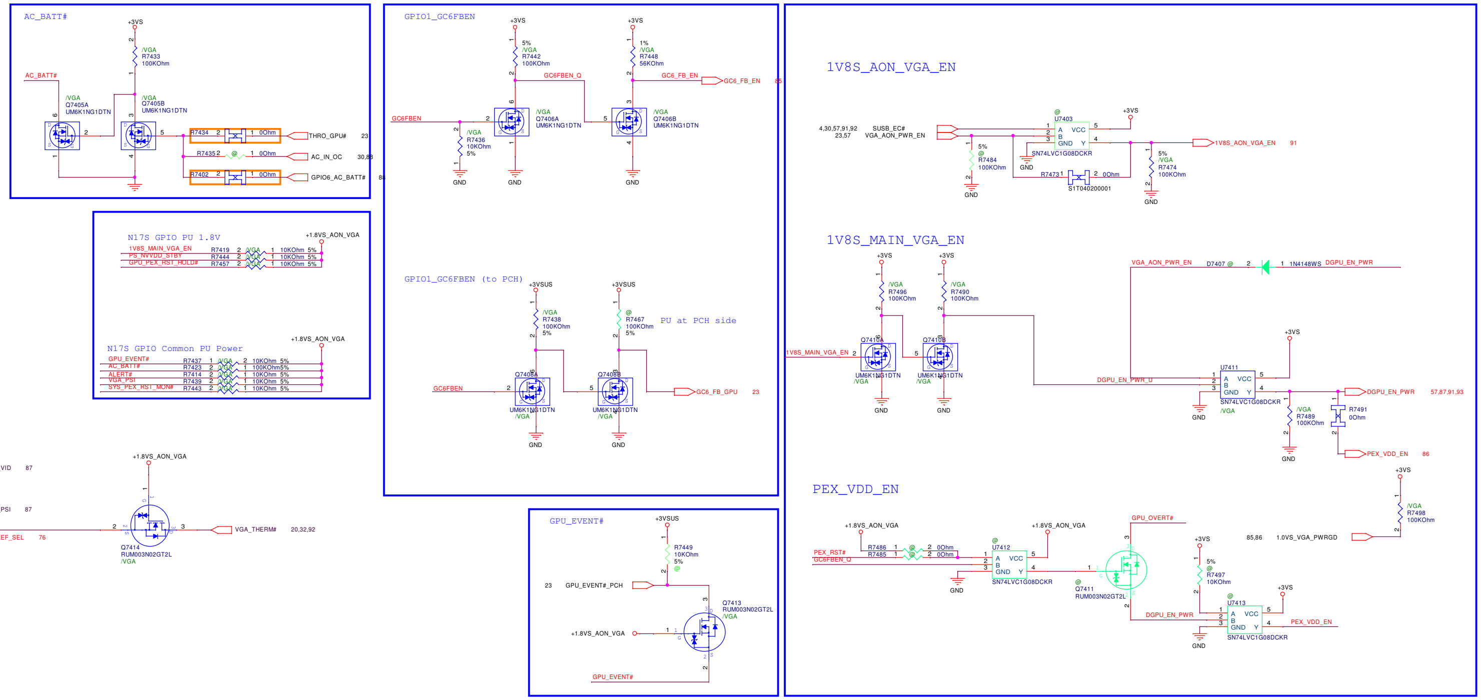
Strap Pins Note 1			Functions Selected by This Strapping			
STRAP5	STRAP4	STRAP3	SMB_ALT_ ADDR	DEVID_SEL	PCIE_CFG	VGA_DEVICE
L	L	L	0	0	0	0

Table 5.3 RAMCFG

Strap Pins see Note			RAMCFG Setting Number
STRAP2	STRAP1	STRAP0	(see Memory RVL for memory configs corresponding to these numbers)
L	L	L	0 (0x0000)
L	L	H	1 (0x0001)
L	H	L	2 (0x0002)
L	H	H	3 (0x0003)
H	L	L	4 (0x0004)
H	L	H	5 (0x0005)
H	H	L	6 (0x0006)
H	H	H	7 (0x0007)
L	L	M	8 (0x0008)
L	M	L	9 (0x0009)
L	M	H	10 (0x000A)
L	H	M	11 (0x000B)
M	L	L	12 (0x000C)
M	L	H	13 (0x000D)

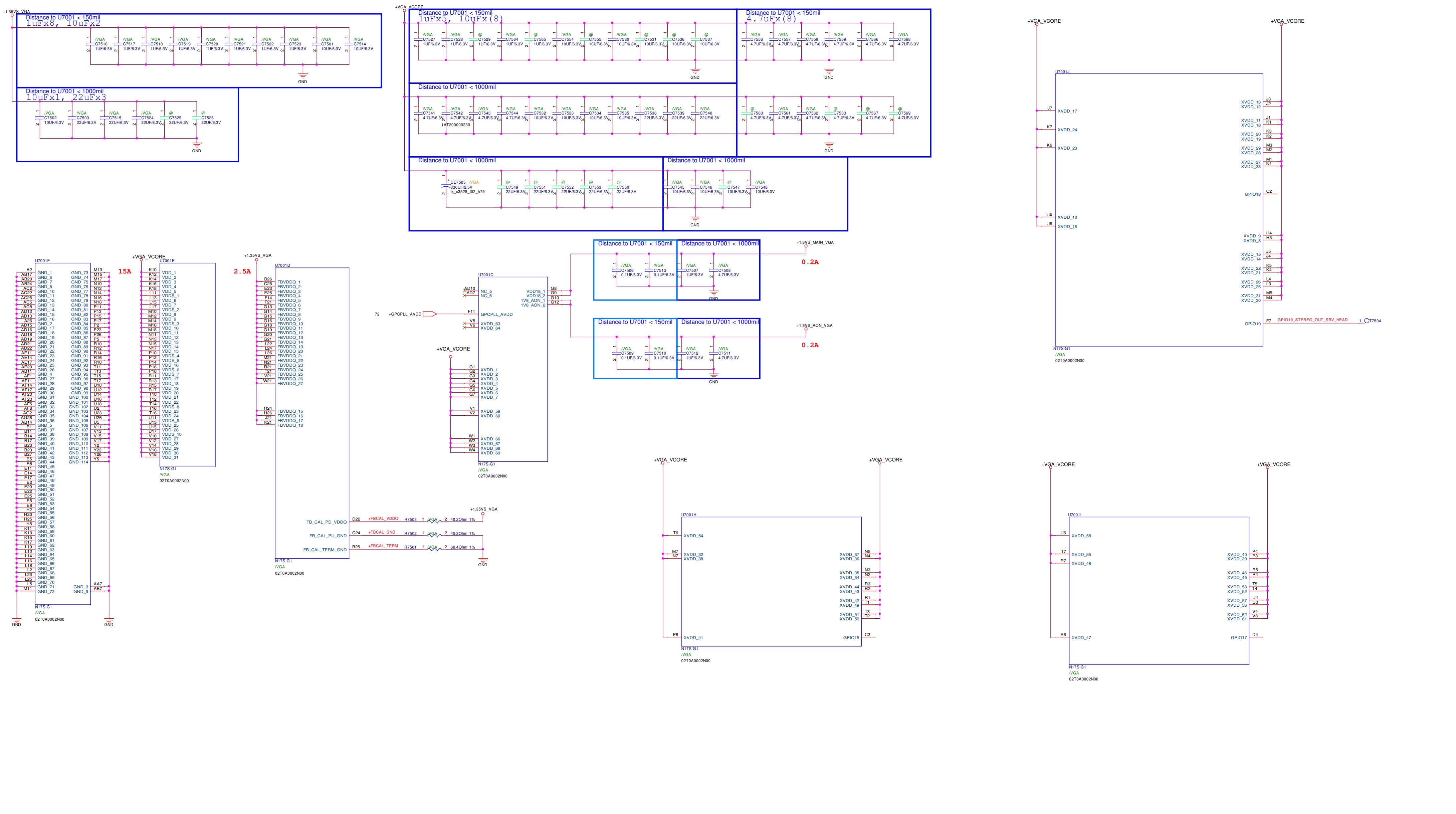
GPIO





PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL
Title : VGA_GPIO_STRAP
Engineer: Tina Lee
Size D
Project Name DL4FA
Rev 1.1
Date: Friday, April 12, 2019
Sheet 74 of 104

VGA_Power



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : VGA_Power

Engineer: Tina Lee

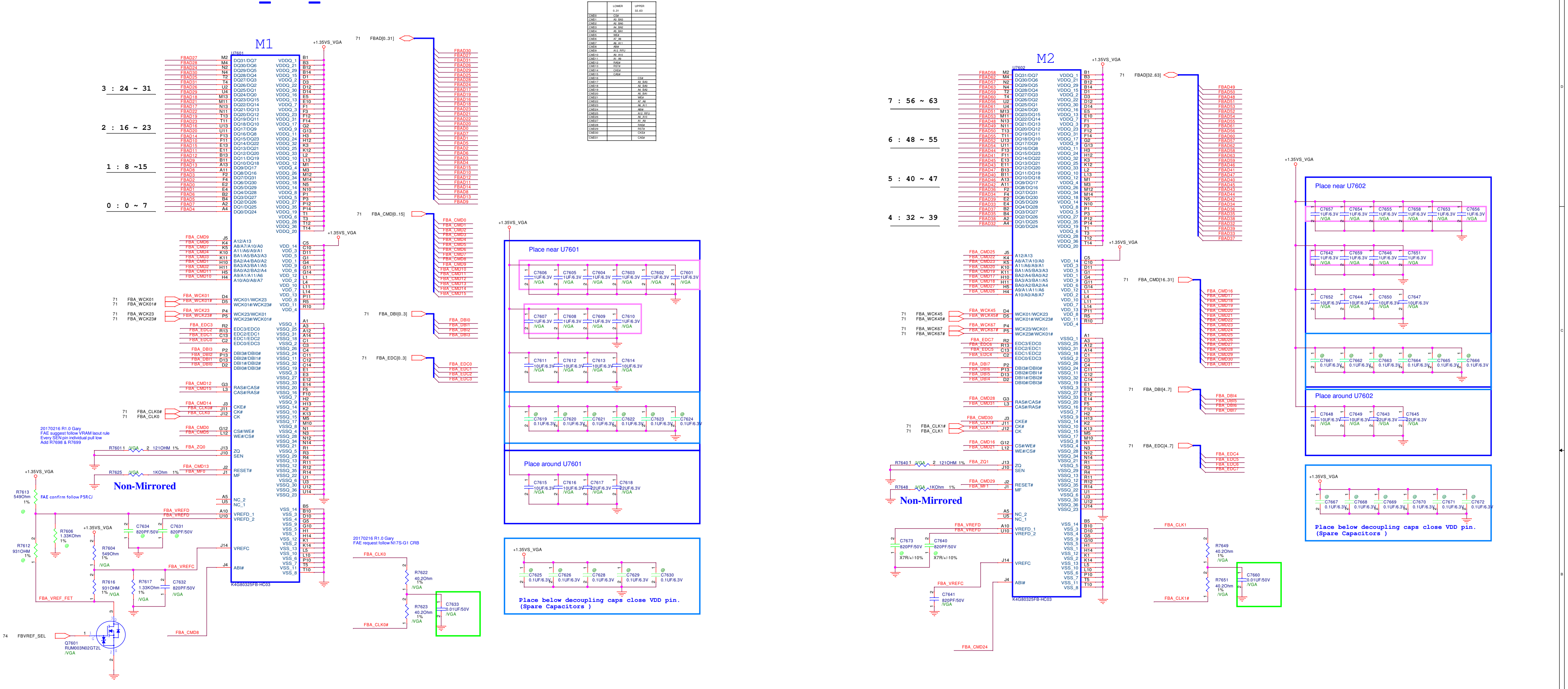
BG1-HW1 RD

Size	Project Name	Rev
D	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 75 of 104

VGA_FBA_GDDR5

nVidia Design Guide
DG-07875-001_v08 P.154
Table 9.5



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title :	VGA_FBA_GDDR5-1		
BG1-HW1 RD	Engineer: Tina Lee		
Size D	Project Name DL4FA		Rev 1.1
Date: Friday, April 12, 2019	Sheet 76	of 104	

D C B A

5 4 3 2 1

5 4 3 2 1

D C B A

PEGATRON PEGATRON PROPRIETARY AND CONFIDENTIAL <OrgName>	Title : RSVD		
	Engineer: Unknow desiner		
Size A	Project Name P2 / Extensa		Rev 0.9
Date: Friday, April 12, 2019	Sheet 78 of 104		

PEGATRON Title : RSVD

PEGATRON PROPRIETARY AND CONFIDENTIAL

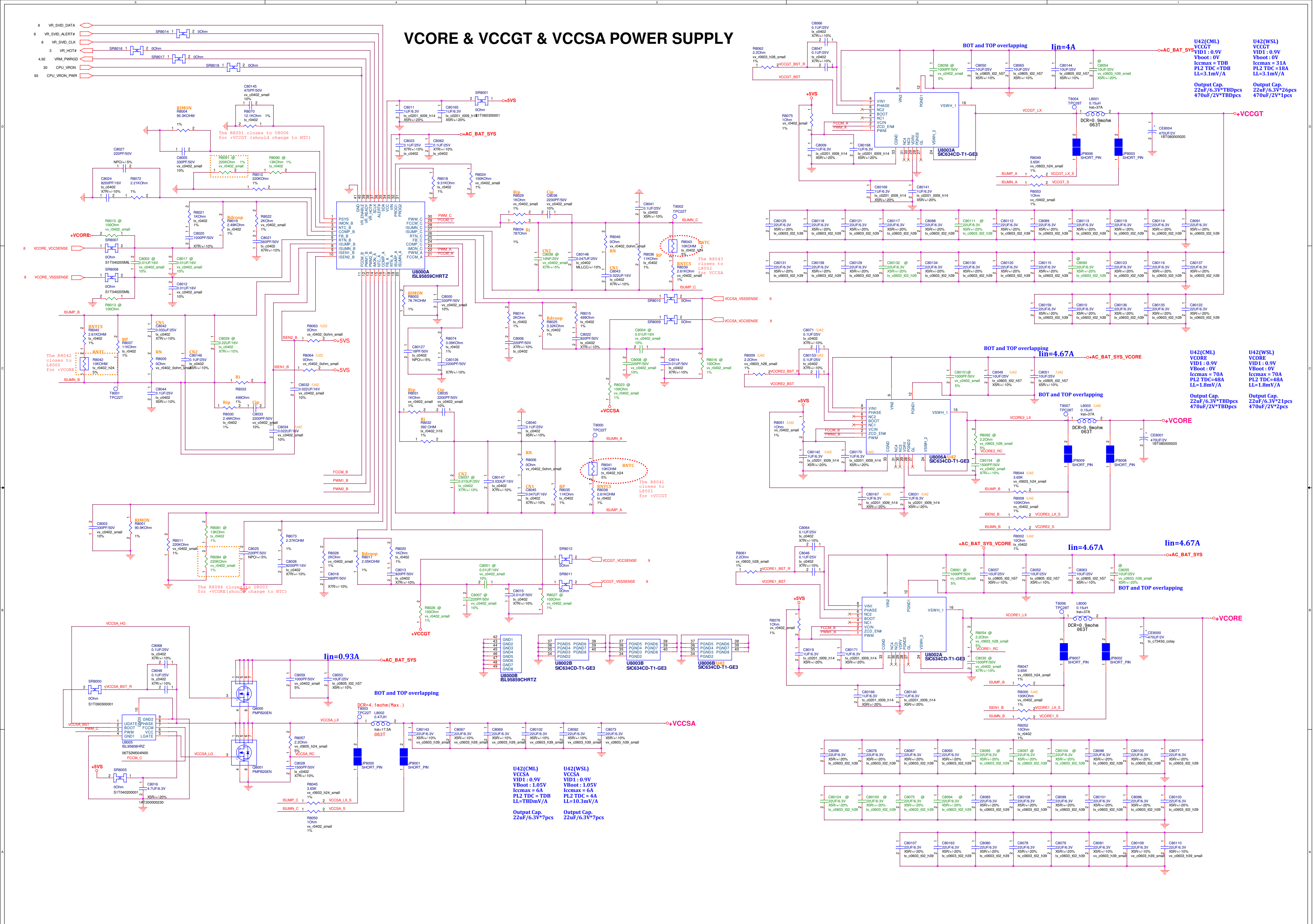
<OrgName>

Engineer: *Unknow desiner*

Size	Project Name	Rev
A	**P2 / Extensa**	0.9

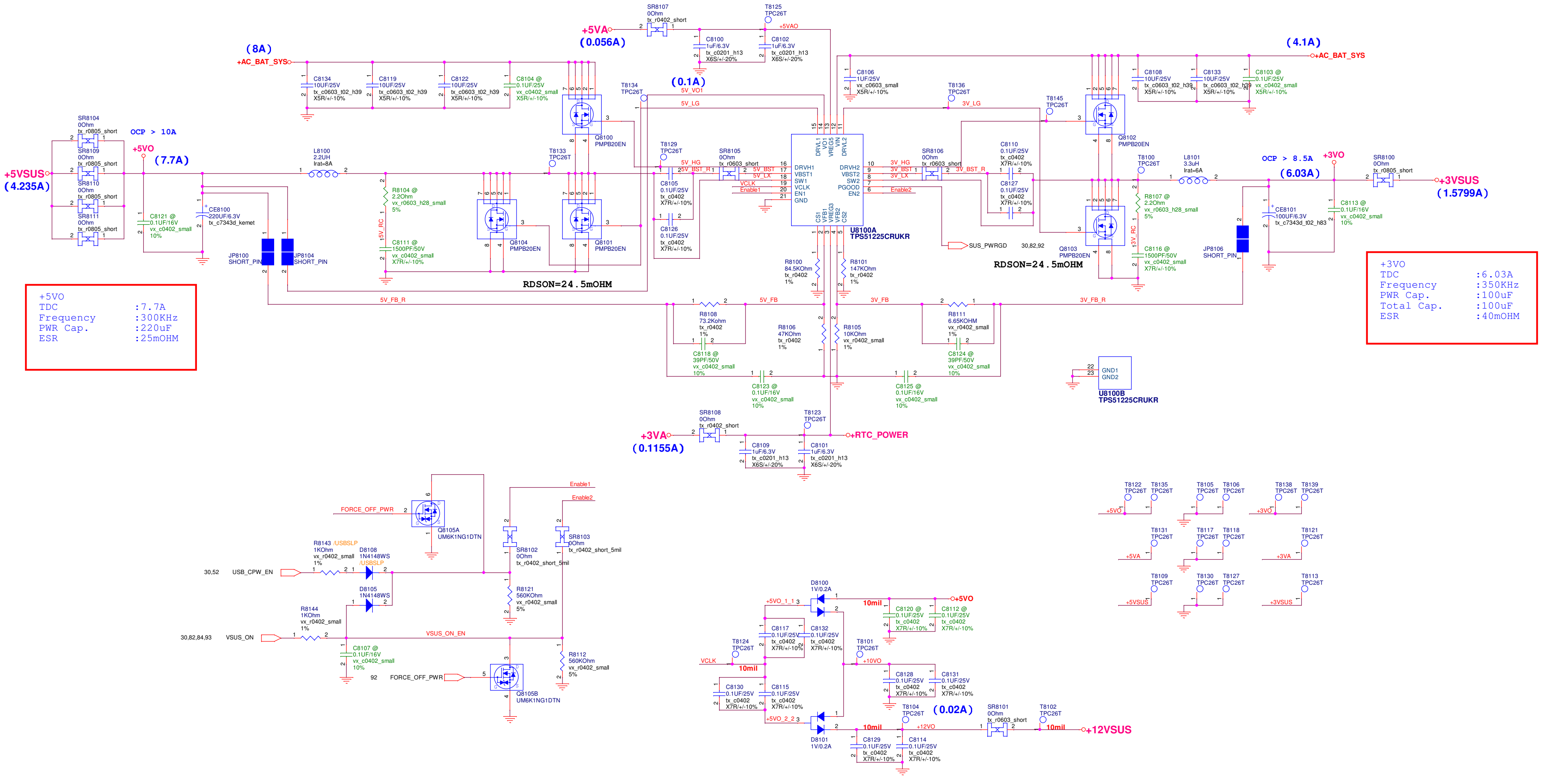
Date: Friday, April 12, 2019 Sheet 79 of 104

VCORE & VCCGT & VCCSA POWER SUPPLY



PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL
Title : POWER_Vcore
Engineer: Isaac Lin
BG1-POWER
Size: Custom
Project Name: DL4FA
Rev: 1.0
Date: Friday, April 12, 2019
Sheet 80 of 94

5VO & 3VO POWER SUPPLY

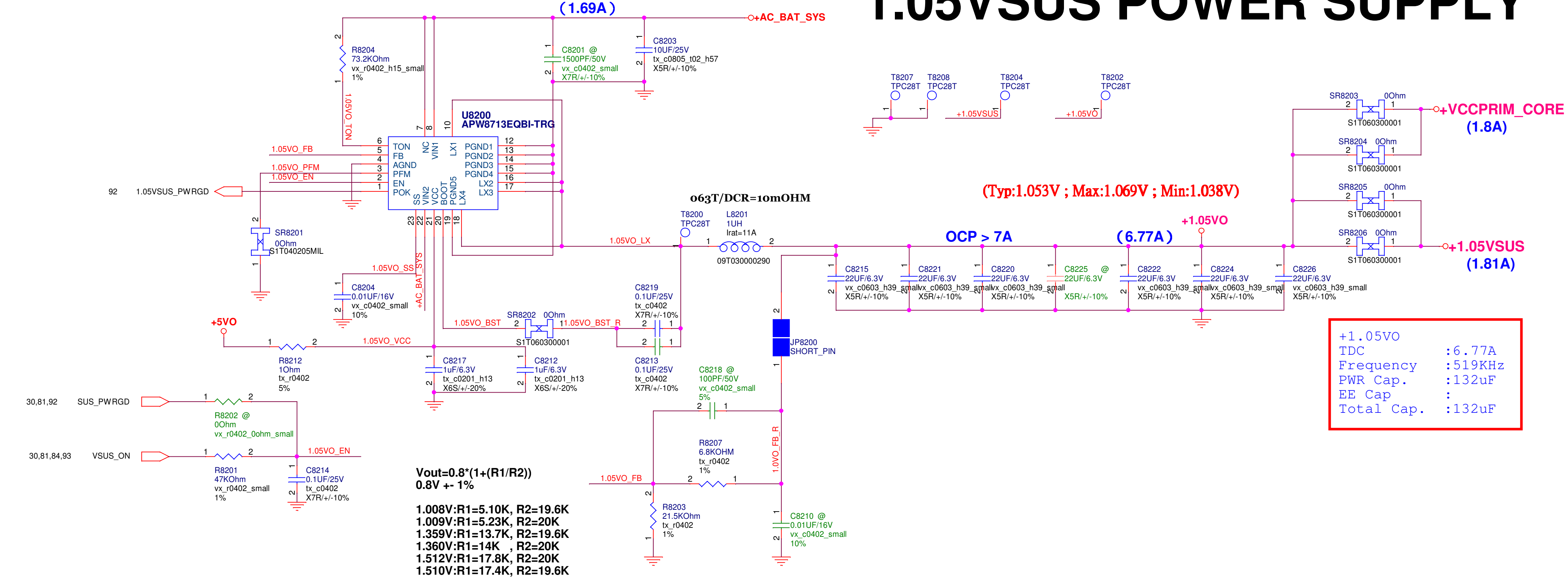


+5VO
TDC :7.7A
Frequency :300KHz
PWR Cap. :220uF
ESR :25mOHM

+3VO
TDC :6.03A
Frequency :350KHz
PWR Cap. :100uF
Total Cap. :100uF
ESR :40mOHM

PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL
Title : POWER_SYSTEM
Engineer: Isaac Lin
BG1-POWER
Size: Custom
Project Name: DL4FA
Rev: 1.0
Date: Friday, April 12, 2019
Sheet 81 of 97

1.05VSUS POWER SUPPLY



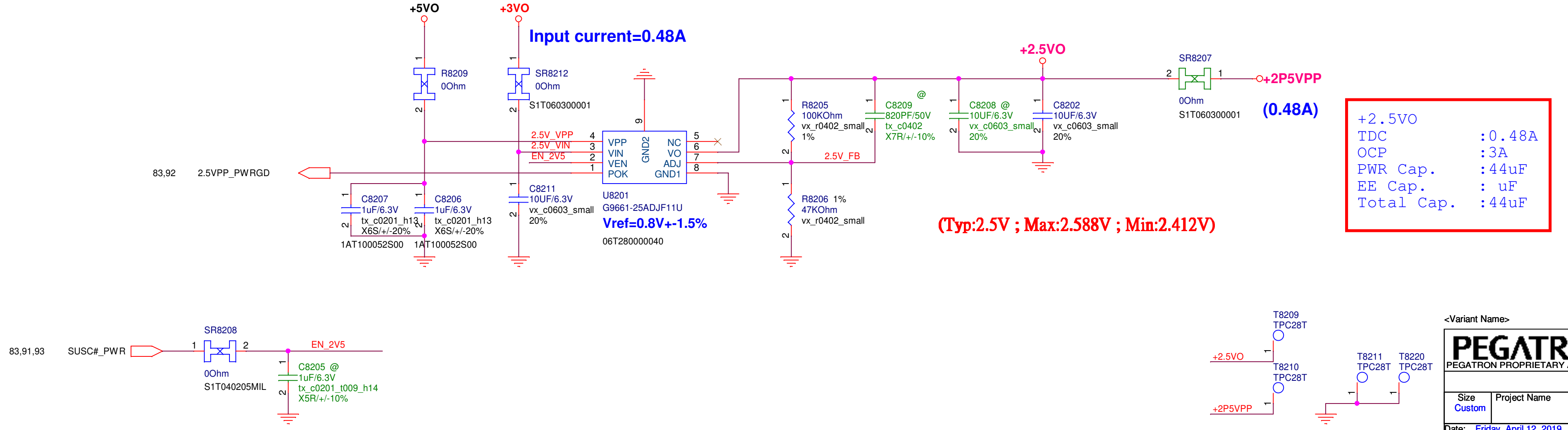
(Typ:1.053V ; Max:1.069V ; Min:1.038V)

Vout=0.8*(1+(R1/R2))
0.8V +- 1%

1.008V:R1=5.10K, R2=19.6K
1.009V:R1=5.23K, R2=20K
1.359V:R1=13.7K, R2=19.6K
1.360V:R1=14K , R2=20K
1.512V:R1=17.8K, R2=20K
1.510V:R1=17.4K, R2=19.6K

+1.05VO	
TDC	:6.77A
Frequency	:519KHz
PWR Cap.	:132uF
EE Cap	:
Total Cap.	:132uF

2.5V POWER SUPPLY



(Typ:2.5V ; Max:2.588V ; Min:2.412V)

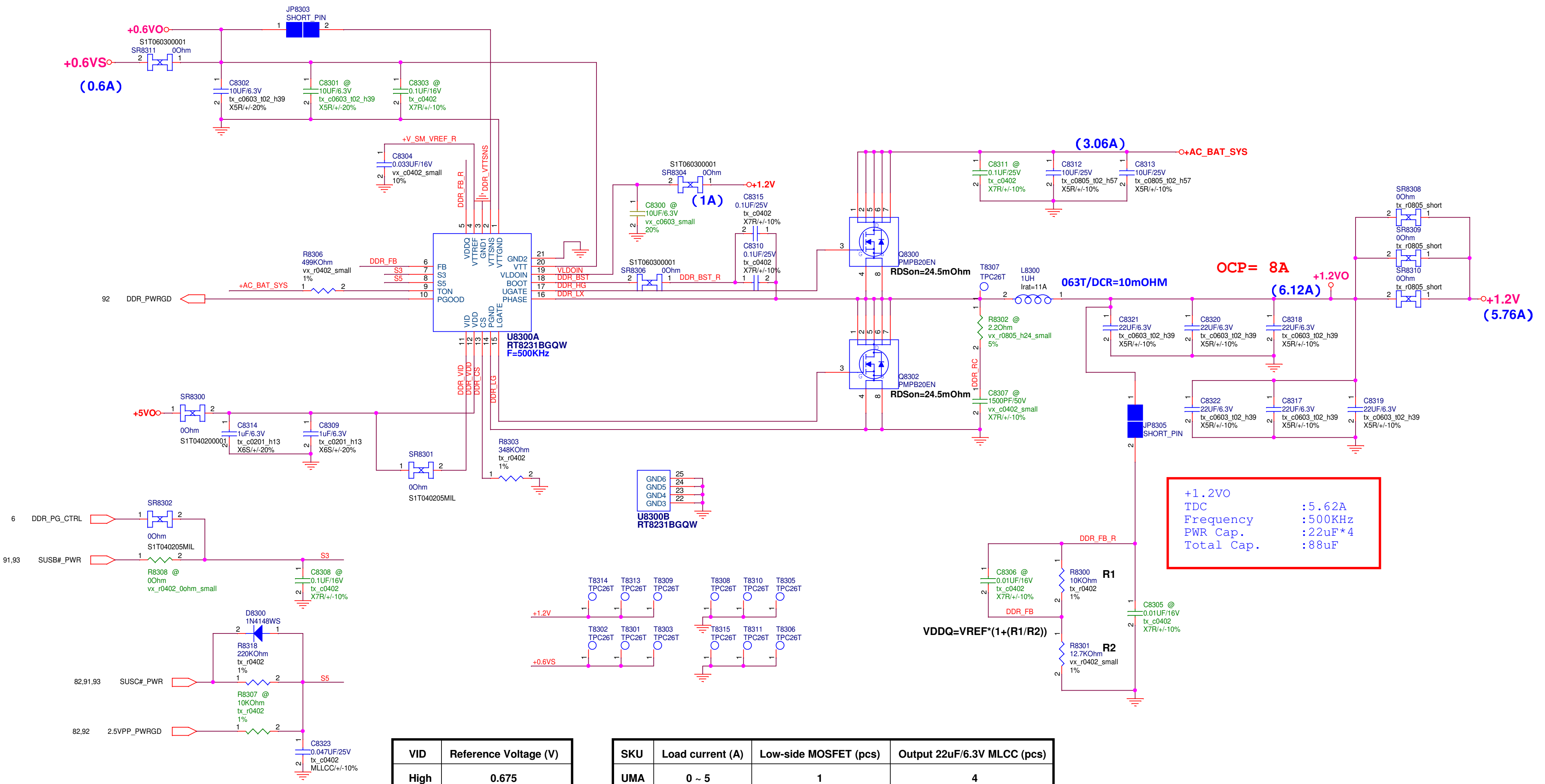
+2.5VO	
TDC	:0.48A
OCP	:3A
PWR Cap.	:44uF
EE Cap.	: uF
Total Cap.	:44uF

<Variant Name>

PEGATRON
Title : PWR_+1.0VSUS & +2.5V

Engineer: Isaac Lin
Size: Custom | Project Name: DL4FA | Rev: 1.0
Date: Friday, April 12, 2019

DDR & VTT POWER SUPPLY

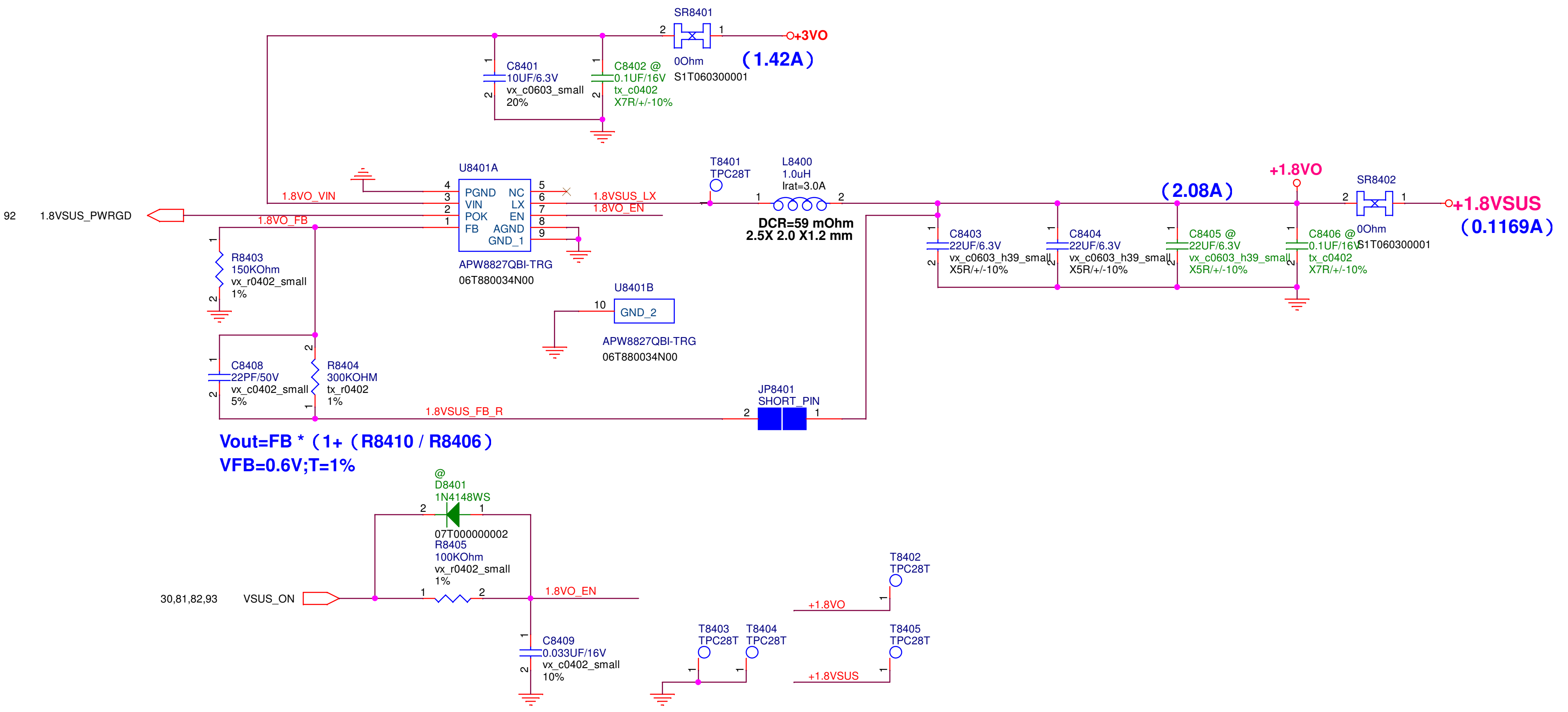


+1.2VO		
TDC		:5.62A
Frequency		:500KHz
PWR Cap.		:22uF*4
Total Cap.		:88uF

VID	Reference Voltage (V)
High	0.675
Low	0.75

SKU	Load current (A)	Low-side MOSFET (pcs)	Output 22uF/6.3V MLCC (pcs)
UMA	0 ~ 5	1	4
DSC	0 ~ 8	2	5

1.8VSUS POWER SUPPLY



<Variant Name>

PEGATRON Title : POWER_+1.8VSUS

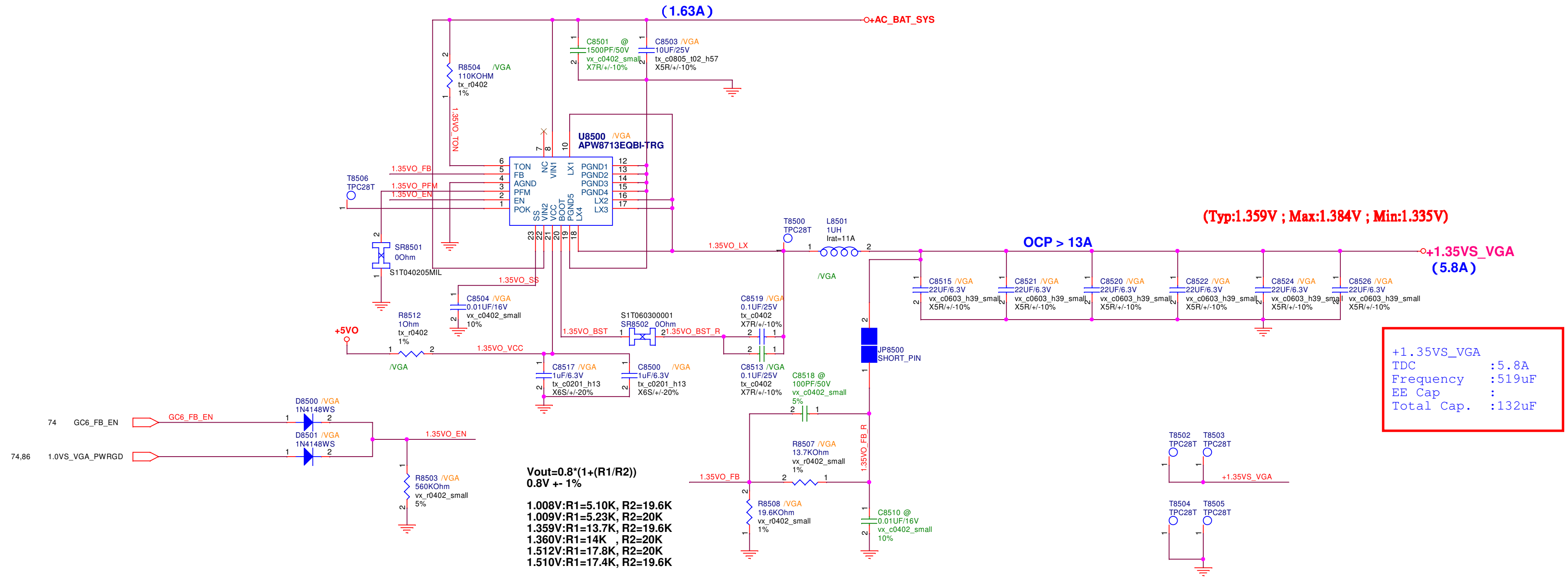
PEGATRON PROPRIETARY AND CONFIDENTIAL

Engineer: Isaac Lin

Size	Project Name	Rev
B	DL4FA	1.0

Date: Friday, April 12, 2019 Sheet 84 of 96

1.35VS_VGA POWER SUPPLY

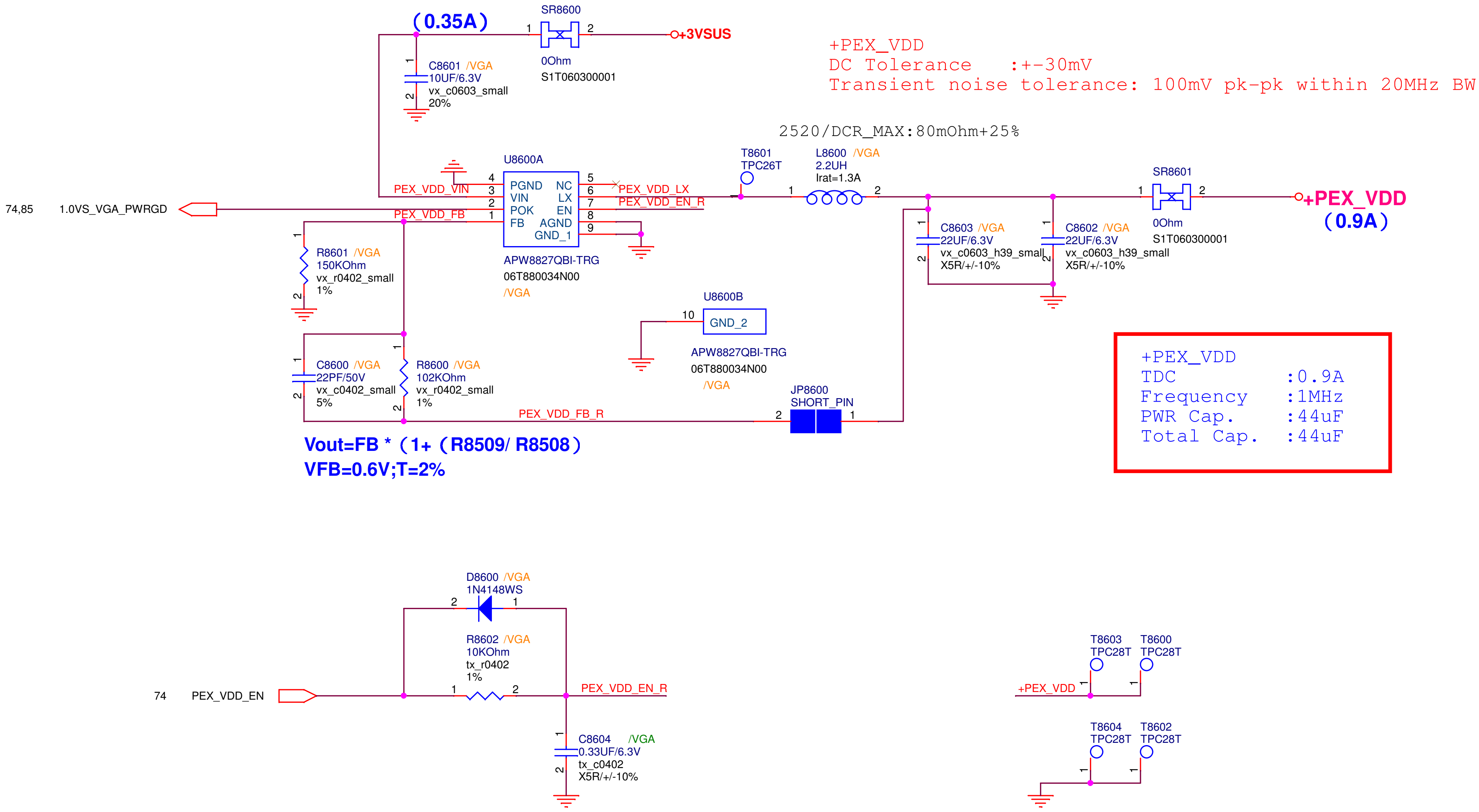


Vout=0.8*(1+(R1/R2))
0.8V +- 1%

1.008V:R1=5.10K, R2=19.6K
1.009V:R1=5.23K, R2=20K
1.359V:R1=13.7K, R2=19.6K
1.360V:R1=14K , R2=20K
1.512V:R1=17.8K, R2=20K
1.510V:R1=17.4K, R2=19.6K

```
+1.35VS_VGA
TDC          :5.8A
Frequency    :519uF
EE Cap       :
Total Cap.   :132uF
```

PEX_VDD POWER SUPPLY



<Variant Name>

PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : PWR_PEX_VDD

Engineer: Isaac Lin

Size	Project Name	Rev
Custom	DL4FA	1.0

Date: Friday, April 12, 2019 Sheet 86 of 96

VGA_CORE POWER SUPPLY

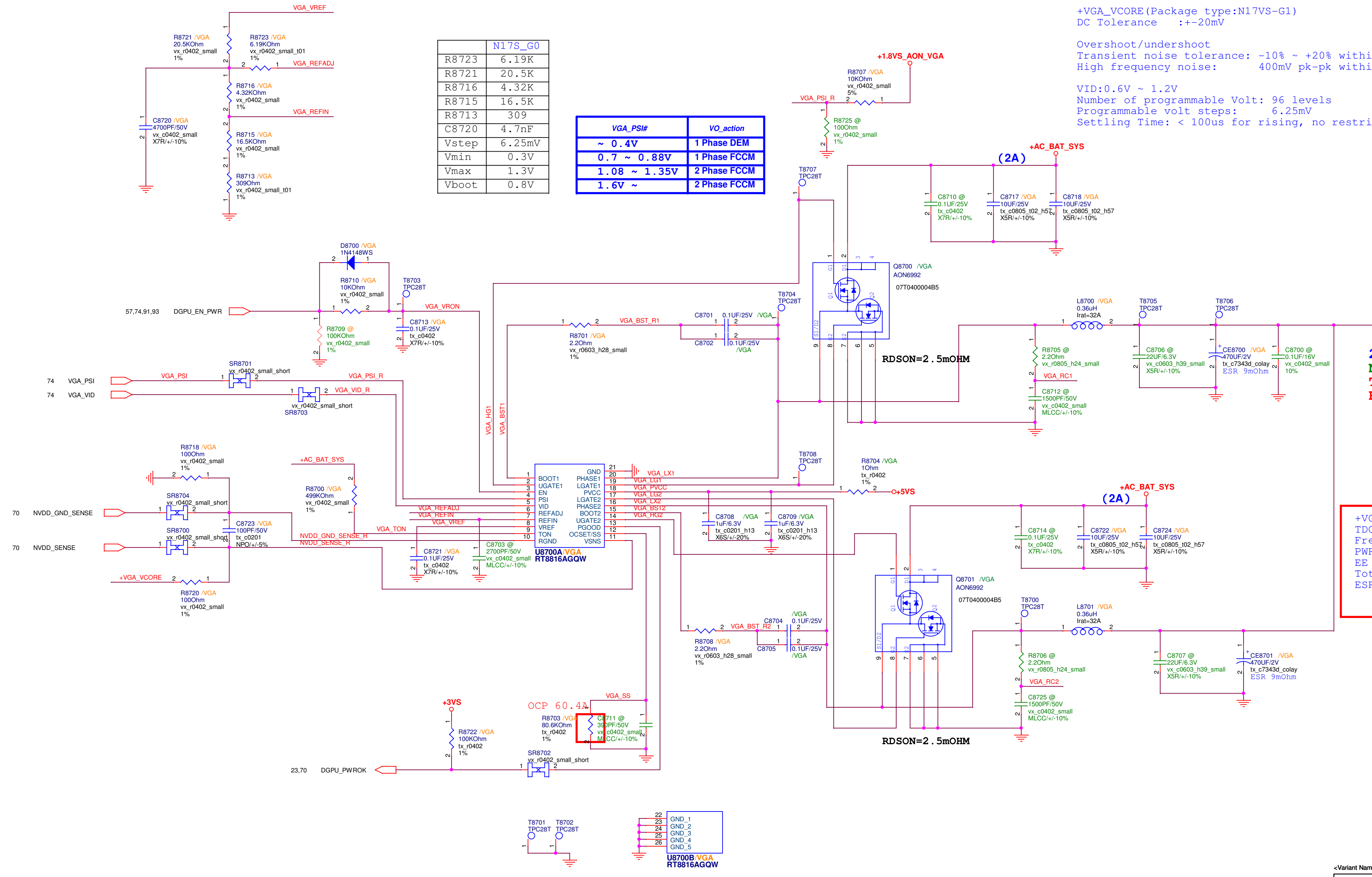
+VGA_VCORE(Package type:N17VS-G1)
DC Tolerance   :+-20mV

Overshoot/undershoot
Transient noise tolerance: -10% ~ +20% within 20MHz BW
High frequency noise: 400mV pk-pk within 1GHz BW

VID:0.6V ~ 1.2V
Number of programmable Volt: 96 levels
Programmable volt steps: 6.25mV
Settling Time: < 100us for rising, no restriction on falling

	N17S_G0
R8723	6.19K
R8721	20.5K
R8716	4.32K
R8715	16.5K
R8713	309
C8720	4.7nF
Vstep	6.25mV
Vmin	0.3V
Vmax	1.3V
Vboot	0.8V

VGA_PSI#	VO_action
~ 0.4V	1 Phase DEM
0.7 ~ 0.88V	1 Phase FCCM
1.08 ~ 1.35V	2 Phase FCCM
1.6V ~	2 Phase FCCM



2 PHASE 25W
N17S-G2
TDC=27.8A
EDP=42A

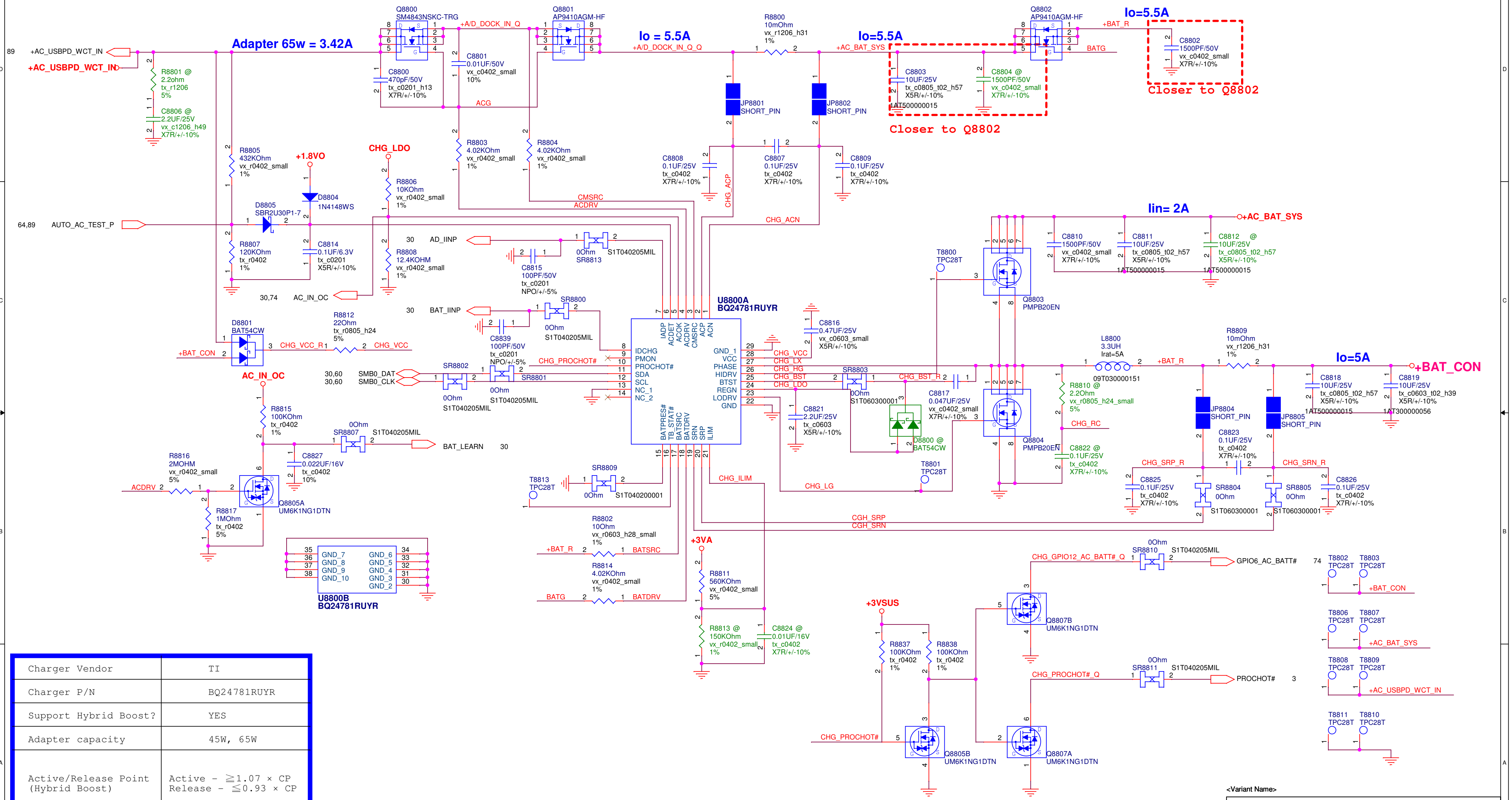
+VGA_VCORE (2 Phase)	
TDC	:27.8A
Frequency	:305KHz
PWR Cap.	:940uF
EE Cap.	:620uF
Total Cap.	:1560uF
ESR	:4.5mOHM

<Variant Name>

PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : VGA_VCORE
Engineer: Isaac Lin
Size: Custom | Project Name: DL4FA | Rev: 1.0
Date: Friday, April 12, 2019 | Sheet 87 of 96

BATTERY CHARGER



Charger Vendor	TI
Charger P/N	BQ24781RUYR
Support Hybrid Boost?	YES
Adapter capacity	45W, 65W
Active/Release Point (Hybrid Boost)	Active – ≧1.07 × CP Release – ≦0.93 × CP
Enable condition Disable condition	RSOC≧40% RSOC≦30%

<Variant Name>

PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : POWER_CHARGER

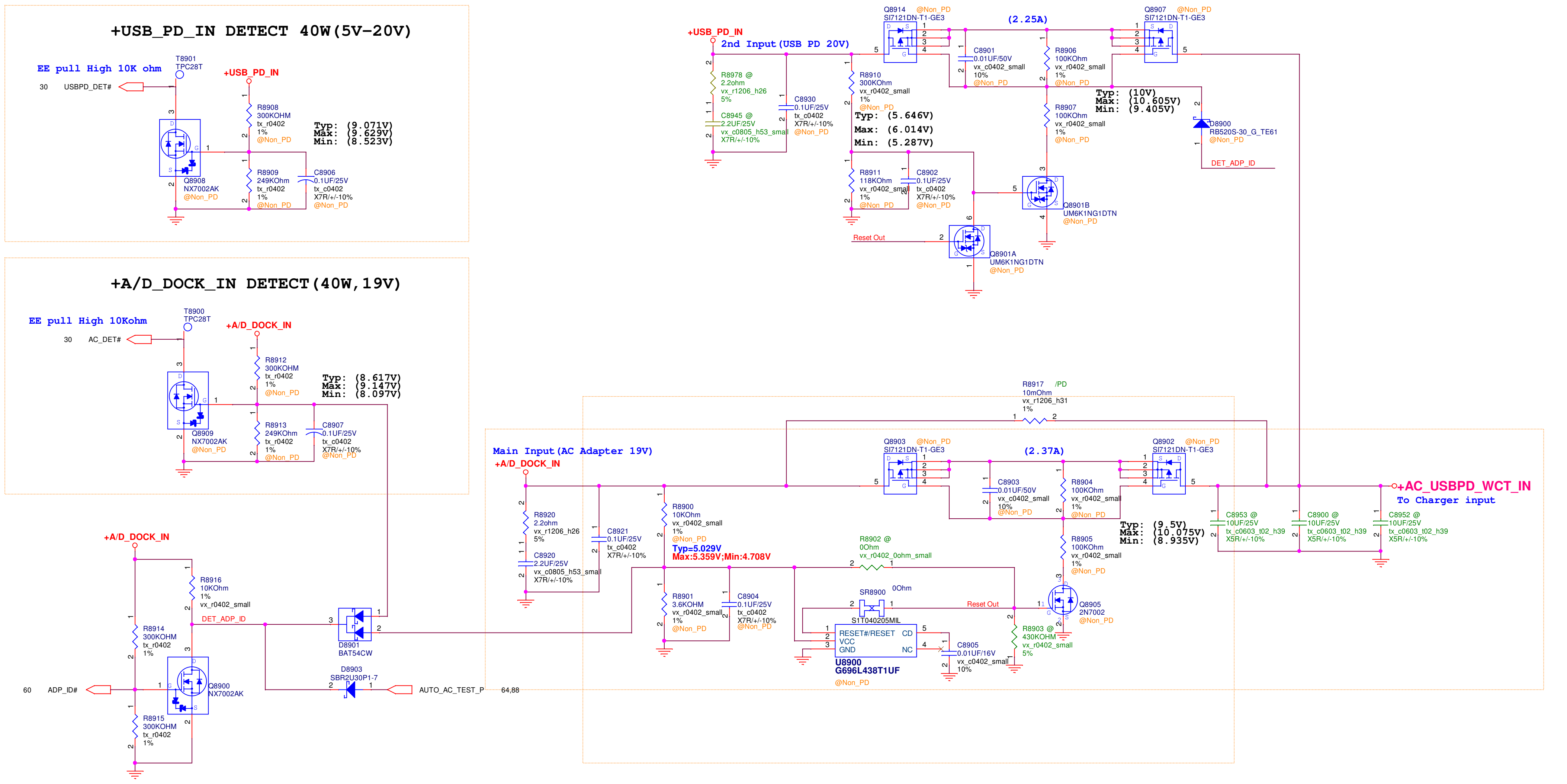
Engineer: Isaac Lin

Size: Custom | Project Name: DL4FA | Rev: 1.0

Date: Friday, April 12, 2019 | Sheet 88 of 96

AC & USB_PD Detect

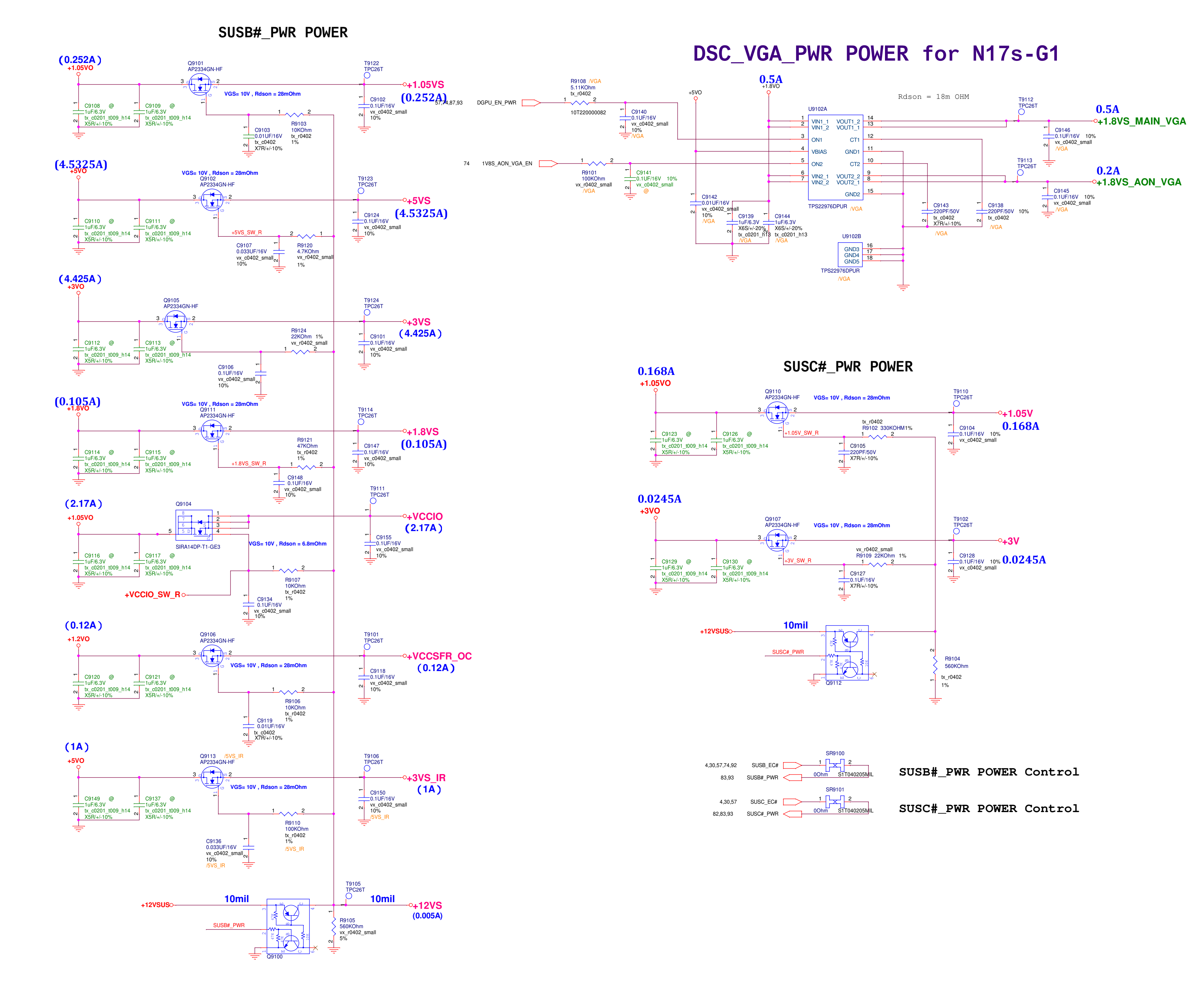
2 Input switch Circuit



PEGATRON	Title : AC&PD S.W.	
PEGATRON PROPRIETARY AND CONFIDENTIAL	Engineer: Isaac Lin	
Size: Custom	Project Name: DL4FA	Rev: 1.0
Date: Friday, April 12, 2019	Sheet 89 of 96	

<Variant Name>

PEGATRON PEGATRON PROPRIETARY AND CONFIDENTIAL	Title :	1V8_AON & DETECT
	Engineer:	Isaac Lin
Size Custom	Project Name DL4FA	Rev 1.0
Date: Friday, April 12, 2019	Sheet 90 of 96	



<Variant Name>

PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

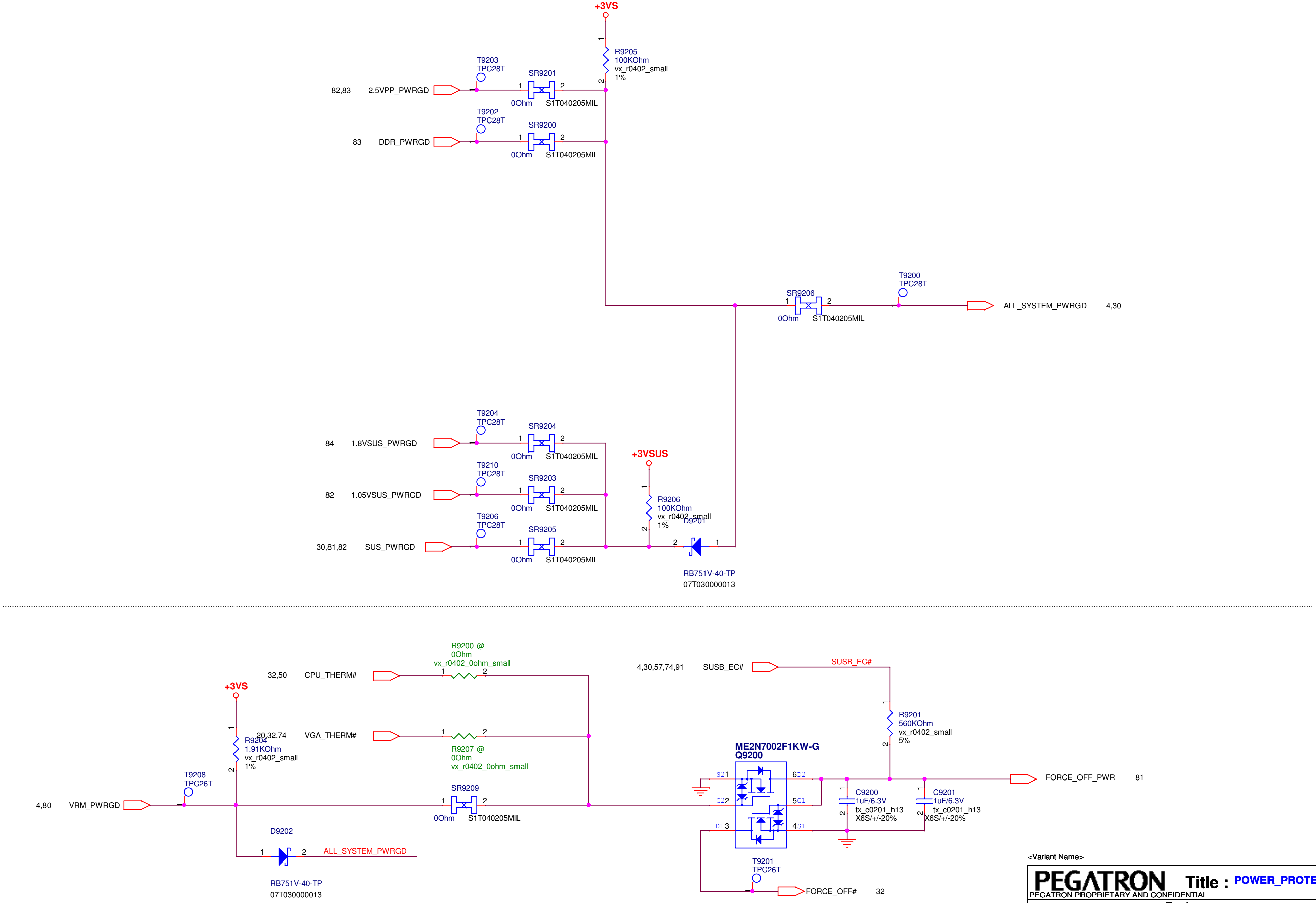
Title : POWER_LOAD SWITCH

Engineer: Isaac Lin

Size	Project Name	Rev
Custom	DL4FA	1.0

Date: Friday, April 12, 2019 Sheet 91 of 96

POWER GOOD DETECTER



<Variant Name>

PEGATRON Title : POWER_PROTECT

PEGATRON PROPRIETARY AND CONFIDENTIAL

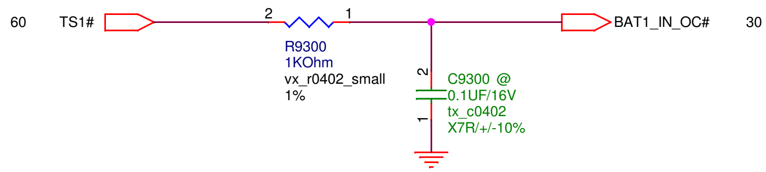
Engineer: Isaac Lin

Size	Project Name	Rev
Custom	DL4FA	1.0

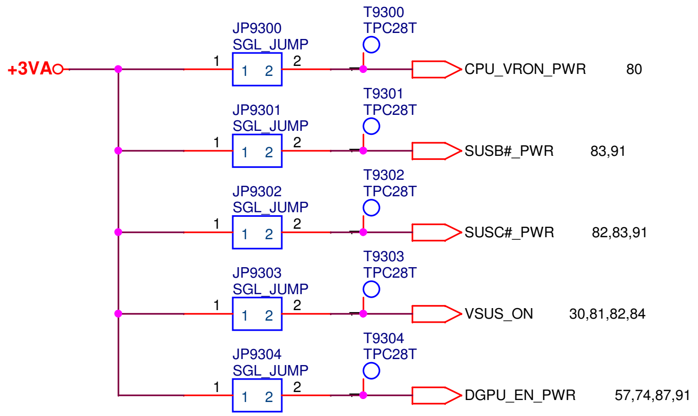
Date: Friday, April 12, 2019 Sheet 92 of 96

Net	Off-page connector	Sheets
+AC_USBPD_WCT_IN	+AC_USBPD_WCT_IN	88,89
+A/D_DOCK_IN	+A/D_DOCK_IN	60,89
+USB_PD_IN	+USB_PD_IN	42,89
+AC_BAT_SYS	+AC_BAT_SYS	41,45,80,81,82,83,85,87,88
+BAT_CON	+BAT_CON	60,88
+RTC_POWER	+RTC_POWER	81
+5VA	+5VA	36,56,81
+3VA	+3VA	21,30,31,36,57,65,81,88
+5VO	+5VO	81,82,83,85,91
+3VO	+3VO	81,82,84,91
+2.5VO	+2.5VO	82
+1.8VO	+1.8VO	84,88,91
+1.2VO	+1.2VO	83,91
+1.05VO	+1.05VO	82,91
+0.6VO	+0.6VO	83
+5VSUS	+5VSUS	41,42,52,56,61,64,81
+3VSUS	+3VSUS	4,10,20,21,22,23,28,30,33,53,61,62,64,67,74,81,86,88,92
+1.8VSUS	+1.8VSUS	10,23,61,84
+1.05VSUS	+1.05VSUS	10,82
+VCCPRIM_CORE	+VCCPRIM_CORE	10,82
+3V	+3V	31,57,91
+2P5VPP	+2P5VPP	16,17,28,57,82
+1.2V	+1.2V	6,9,15,16,17,18,57,83
+1.05V	+1.05V	9,57,91
+3VS_IR	+3VS_IR	45,91
+5VS	+5VS	28,31,36,45,46,48,50,51,57,61,67,80,87,91
+3VS	+3VS	3,4,6,20,21,23,30,32,33,36,41,42,44,45,46,47,48,50,51,53,57,62,64,66,69,74,87,91,92
+1.8VS	+1.8VS	36,91
+1.05VS	+1.05VS	9,91
+VCCIO	+VCCIO	3,9,57,91
+0.6VS	+0.6VS	15,17,57,83
+VCORE	+VCORE	8,9,80
+VCCGT	+VCCGT	9,80
+VCCSA	+VCCSA	9,80
+VGA_VCORE	+VGA_VCORE	57,75,87
+1.8VS_AON_VGA	+1.8VS_AON_VGA	57,70,72,74,75,87,91
+1.8VS_MAIN_VGA	+1.8VS_MAIN_VGA	57,70,71,72,74,75,91
+1.35VS_VGA	+1.35VS_VGA	57,71,75,76,85
+PEX_VDD	+PEX_VDD	57,70,86

BATTERY IN DETECT



FOR POWER TEST

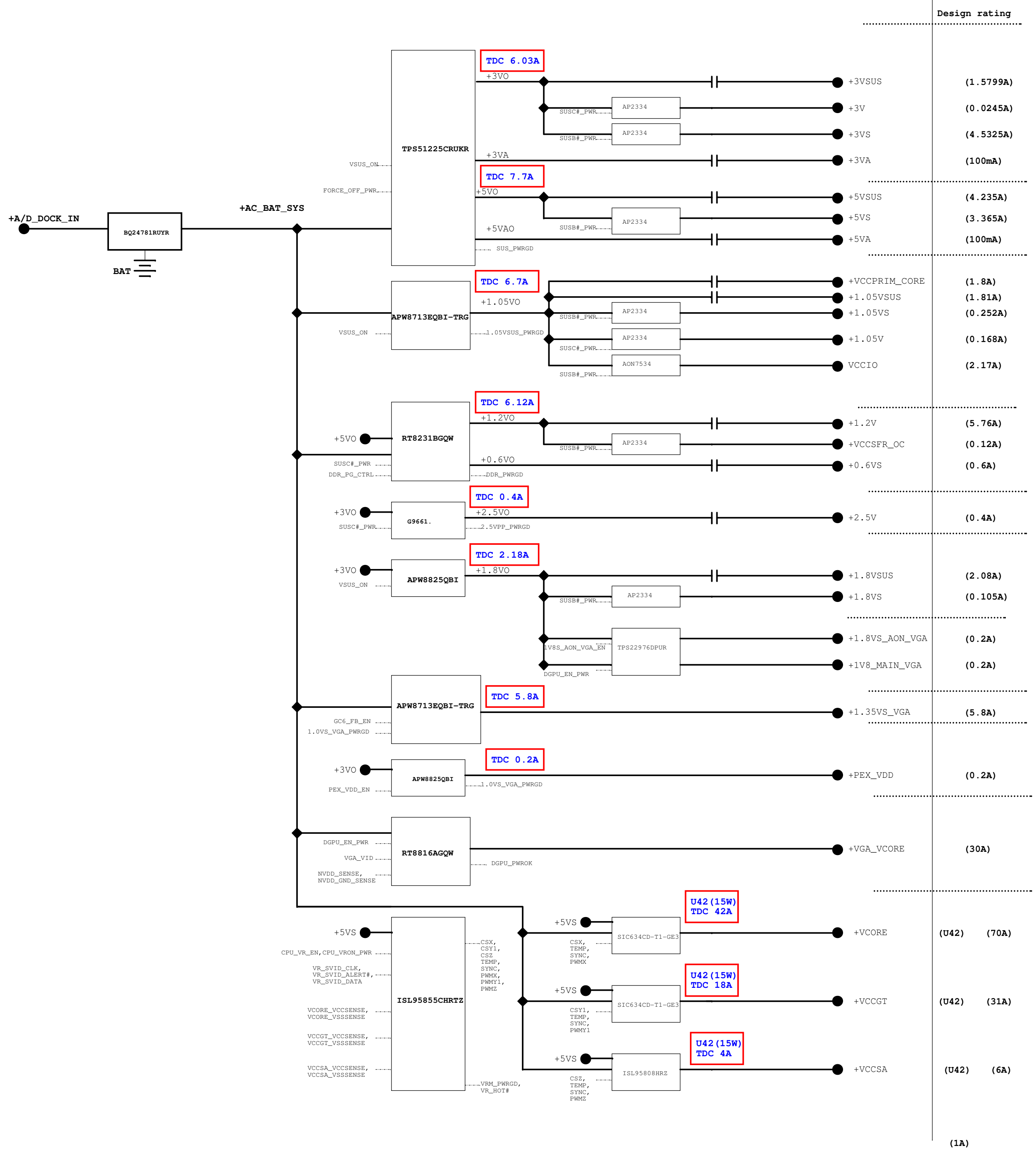


PEGATRON Title : PWR_SIGNAL & DETECT

BG1-POWER Engineer: Isaac Lin

Size	Project Name	Rev
Custom	DL4FA	1.0

Date: Friday, April 12, 2019 Sheet 93 of 96



<Variant Name>

PEGATRON
PEGATRON PROPRIETARY AND CONFIDENTIAL

Title : POWER_FLOWCHART

Engineer: Isaac Lin

Size	Project Name	Rev
Custom	DL4FA	1.0

Date: Friday, April 12, 2019 Sheet 94 of 96

<Variant Name>

PEGATRON **Title :** 1V8_AON & DETECT

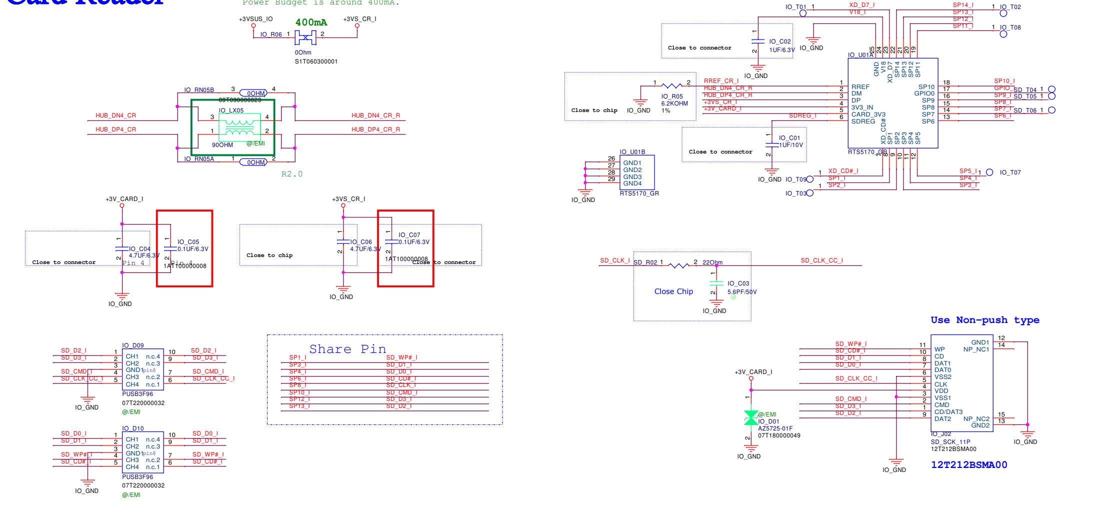
PEGATRON PROPRIETARY AND CONFIDENTIAL

Engineer: Isaac Lin

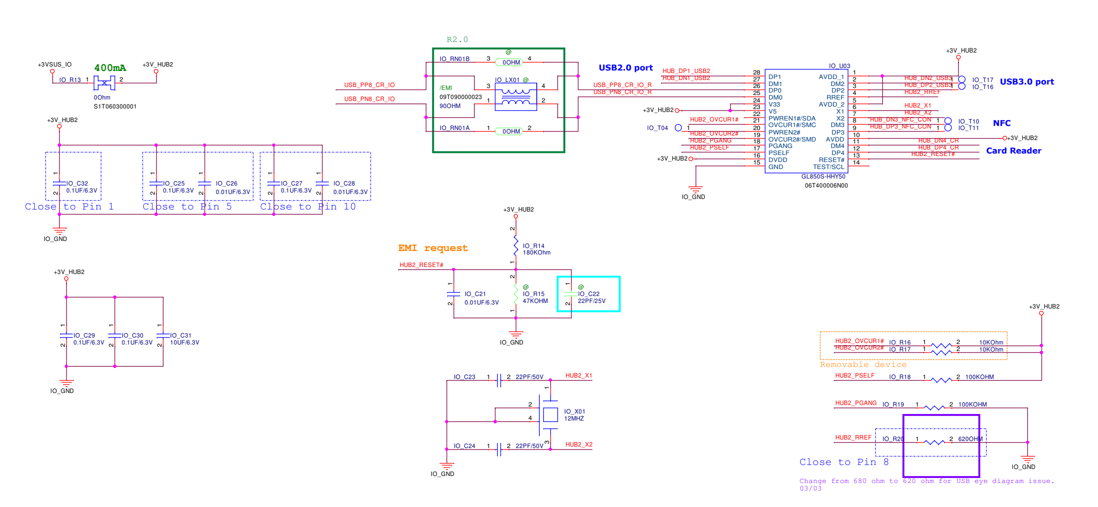
Size	Project Name	Rev
Custom	DL4FA	1.0

Date: Friday, April 12, 2019 Sheet 95 of 96

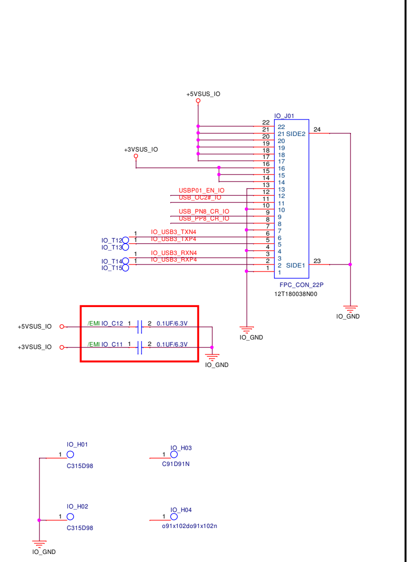
Card Reader



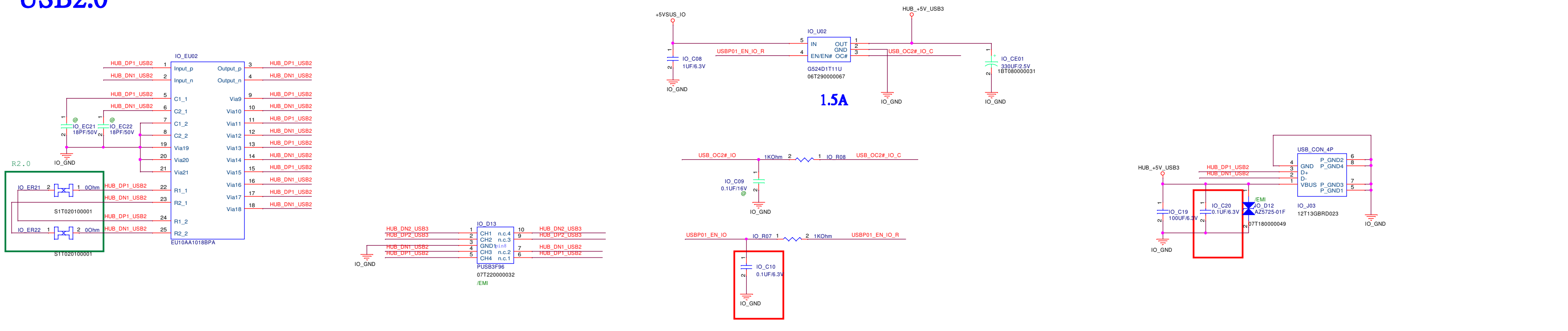
USB HUB



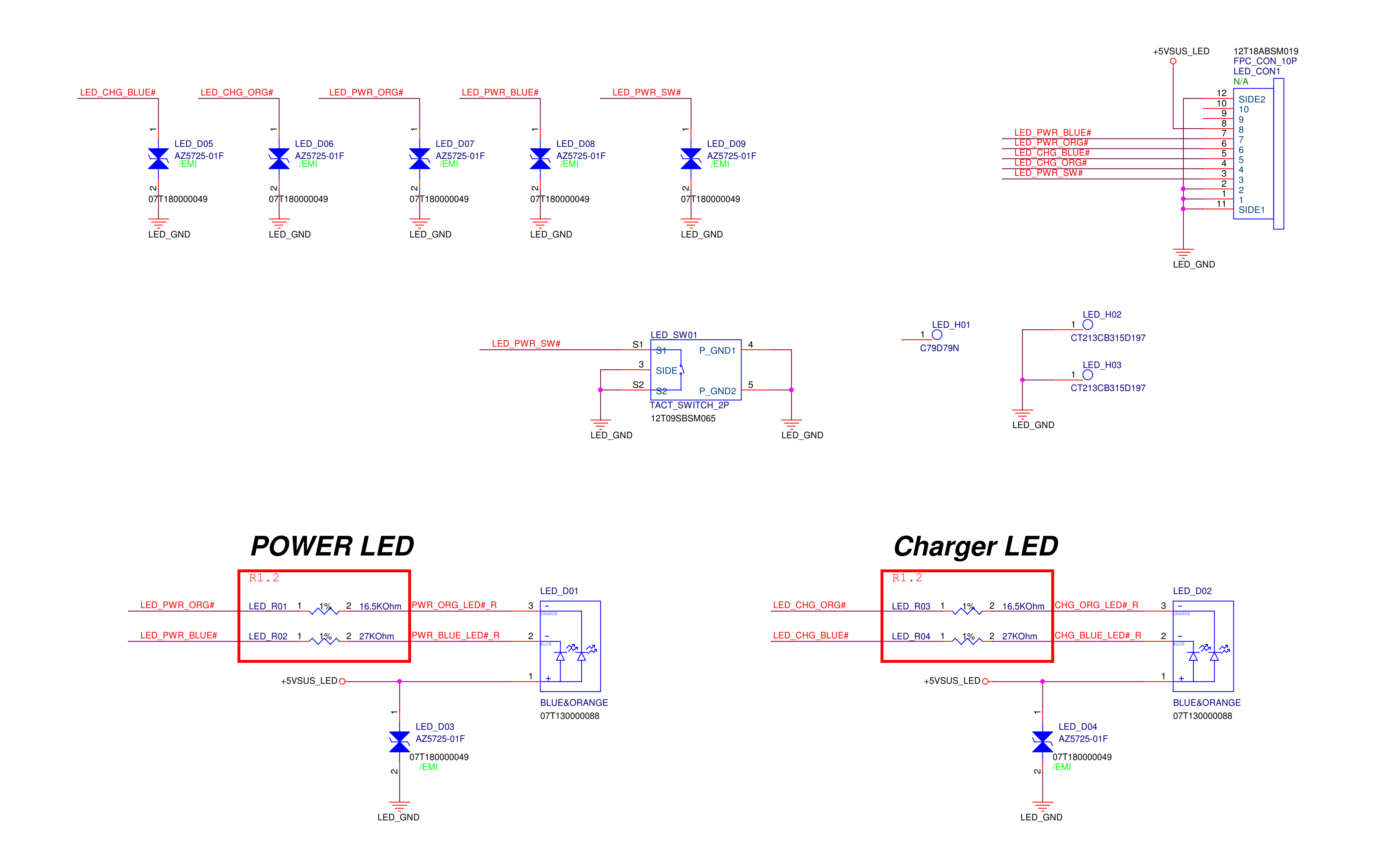
FFC connector



USB2.0



PEGATRON	Title : IO_USB		
BG1-HW1 RD	Engineer: Tina Lee		
Size: Custom	Project Name: DL4FA	P/N	Rev 1.1
Date: Friday, April 12, 2019	Sheet 101 of 104		



PEGATRON

PEGATRON PROPRIETARY AND CONFIDENTIAL

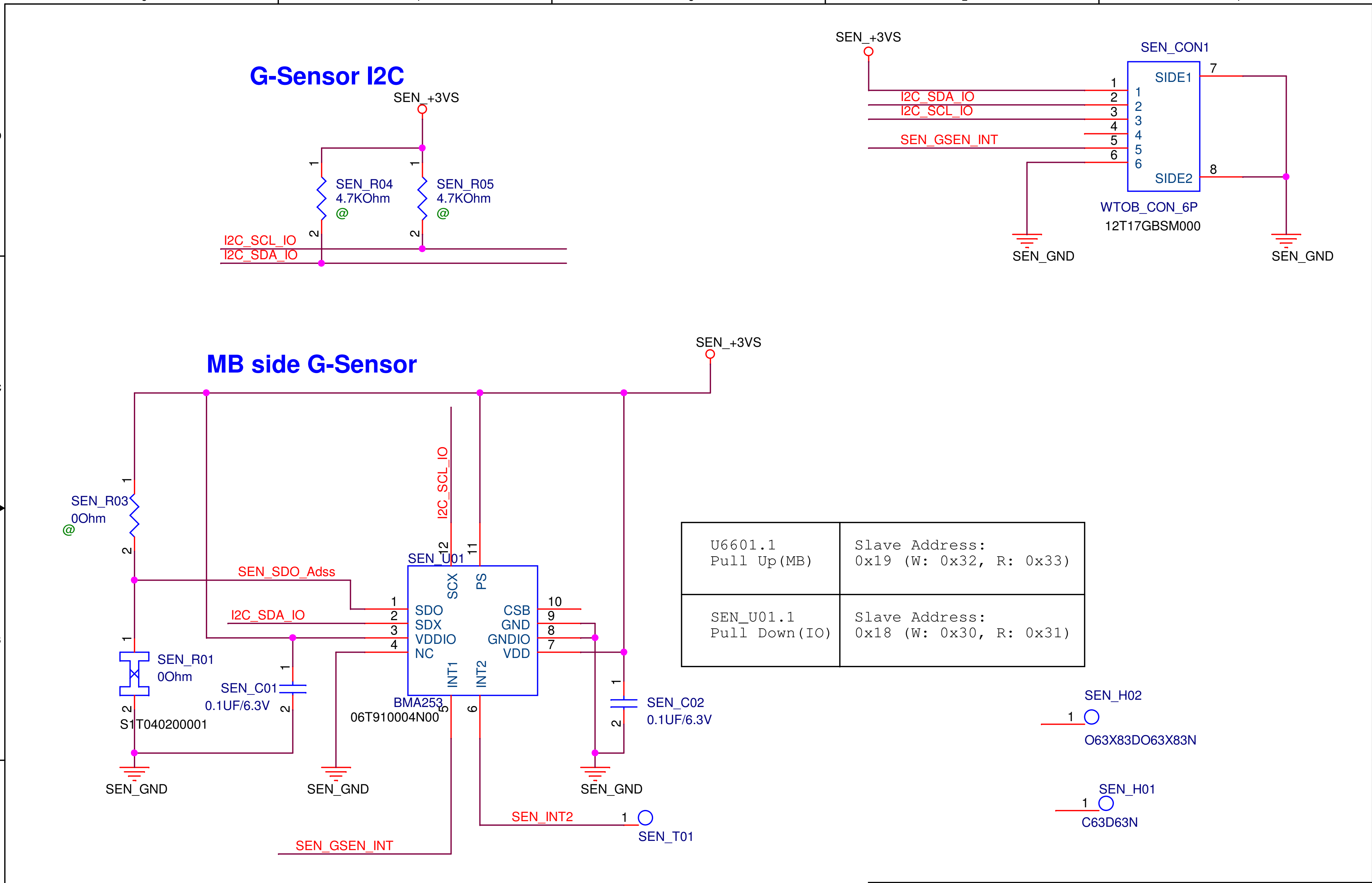
BG1-HW1 RD

Title : LED

Engineer: Tina Lee

Size	Project Name	Rev
Custom	DL4FA	1.1

Date: Friday, April 12, 2019 Sheet 103 of 104



U6601.1 Pull Up(MB)	Slave Address: 0x19 (W: 0x32, R: 0x33)
SEN_U01.1 Pull Down(IO)	Slave Address: 0x18 (W: 0x30, R: 0x31)

PEGATRON

Title : G-sensor

BG1-HW1 RD

Engineer: *Tina Lee*

Size	Project Name	Rev
A	DL4FA	1.1
	P/N	

Date: Friday, April 12, 2019 Sheet 104 of 104