

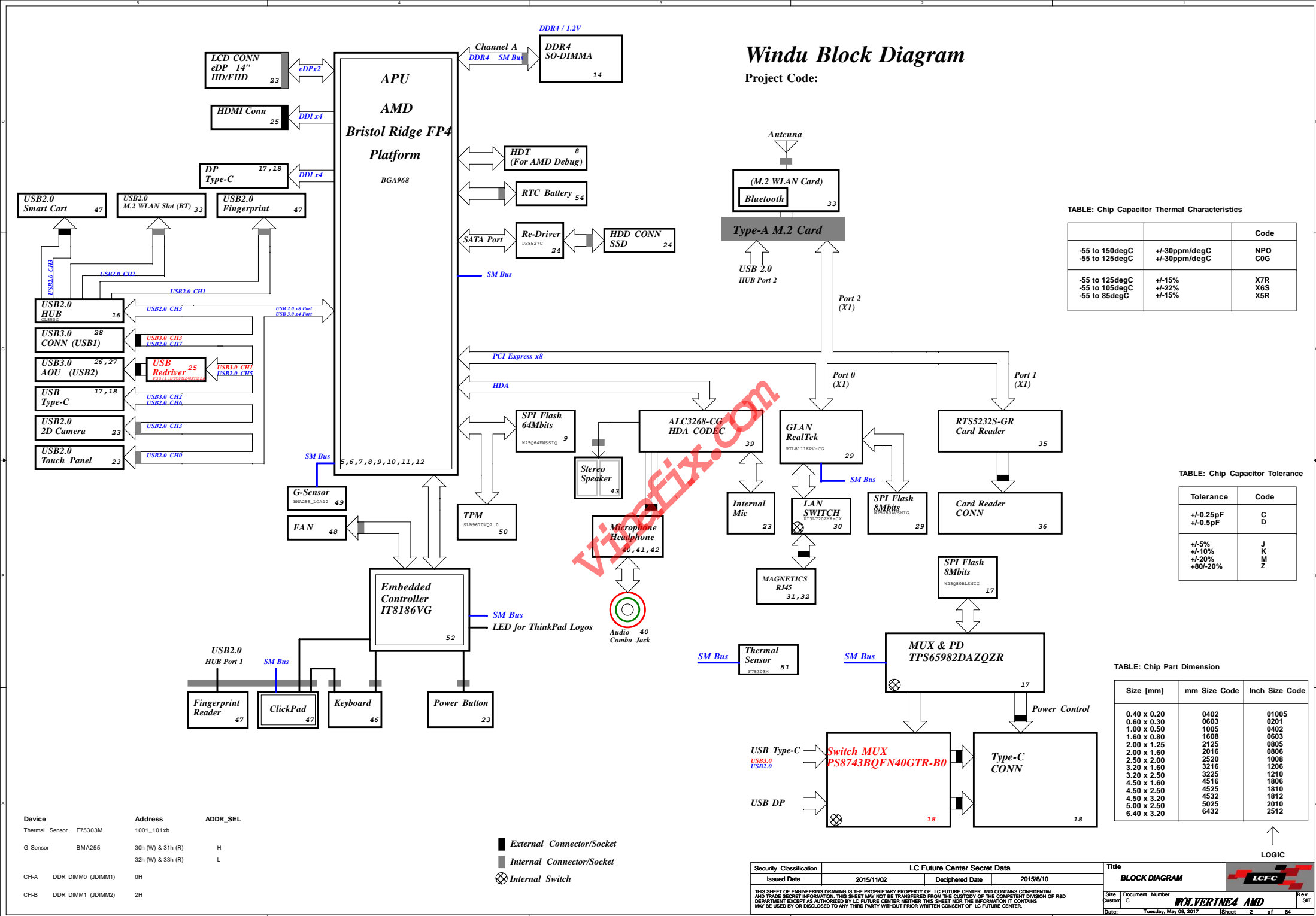
WV4 AMD Schematic

P01_TITLE PAGE
P02_BLOCK DIAGRAM
P03_BLANK
P04_SMBus Block
P05_APU PEG/PCIe
P06_APU DDRA/1
P07_APU DDRB/2
P08_APU DISPLAY/CLK/MISC 2
P09_APU SATA/USB/LPC/SPI
P10_APU GPIO/AZ/I2C/UARTS/ACPI
P11_APU Power
P12_APU GND
P13_Switch
P14_DDR4 CH-A PRIMARY
P15_BLANK
P16_USB 2.0 HUB GL850G
P17_BLANK
P18_BLANK
P19_LCD/LID/MIC/CAMERA/PWR SW
P20_PCIE SATA SWITCH
P21_HDMI Bypass
P22_HDMI CONNECTOR
P23_SATA REDRIVER
P24_SATA EXPRESS CONNECTOR
P25_USB3.0 REDRIVER
P26_USB AOU POWER/CONNECTOR
P27_PCIE RE-DRIVER
P28_USB POWER/CONNECTOR
P29_GLAN-RTL8111EPV
P30_BLANK
P31_GBE MAGNETICS
P32_RJ45 CONNECTOR
P33_TYPE C PD Controller
P34_TYPE-C_MUX
P35_M.2 SOCKET 1 WLAN

P36_M.2 SOCKET 2 WWAN
P37_CARD READER RTS5232S-GR
P38_Card Reader Connector
P39_AUDIO ALC3268
P40_AUDIO CONNECTOR
P41_AUDIO JACK SENSE
P42_AUDIO EXT MIC I/F
P43_AUDIO SPEAKER
P44_AUDIO BEEP
P45_BLANK
P46_KEYBOARD/TRACK POINT
P47_TOUCH PAD/FPR/Smart Card
P48_FAN CONNECTOR
P49_G-SENSOR
P50_TPM
P51_DEVICE_DETECT# TABLE
P52_EC_IT8186E/FX
P53_PTH FOR SCREW HOLES
P54_THERMAL SENSOR
P55_3VS/5VS/VDDP/1.8VS
P56_VDDCR_FCH_ALW/RTC/0.775VA
P57_+1.5VS
P69_OTP
P70_DC-IN
P71_TYP-C
P72_BATTERY INPUT
P73_BATTERY CHARGER(BQ25700)
P74_CHARGER SELECTOR
P75_DC/DC VCC5M/VCC3M(NB679/680)
P76_DC/DC VCC1R2A(NB685A)
P77_VDD/VDDNB (ISL62771)
P78_VDD_GFX(ISL62771)
P79_SDLE DECOUPLING
P80_VDDCORE DECOUPLING
P81_+1.05VALW(NB693)


P82_+2.5V(RT8068A)
P83_+1.8VALW(RT8068A)
P84_RTC BATTERY

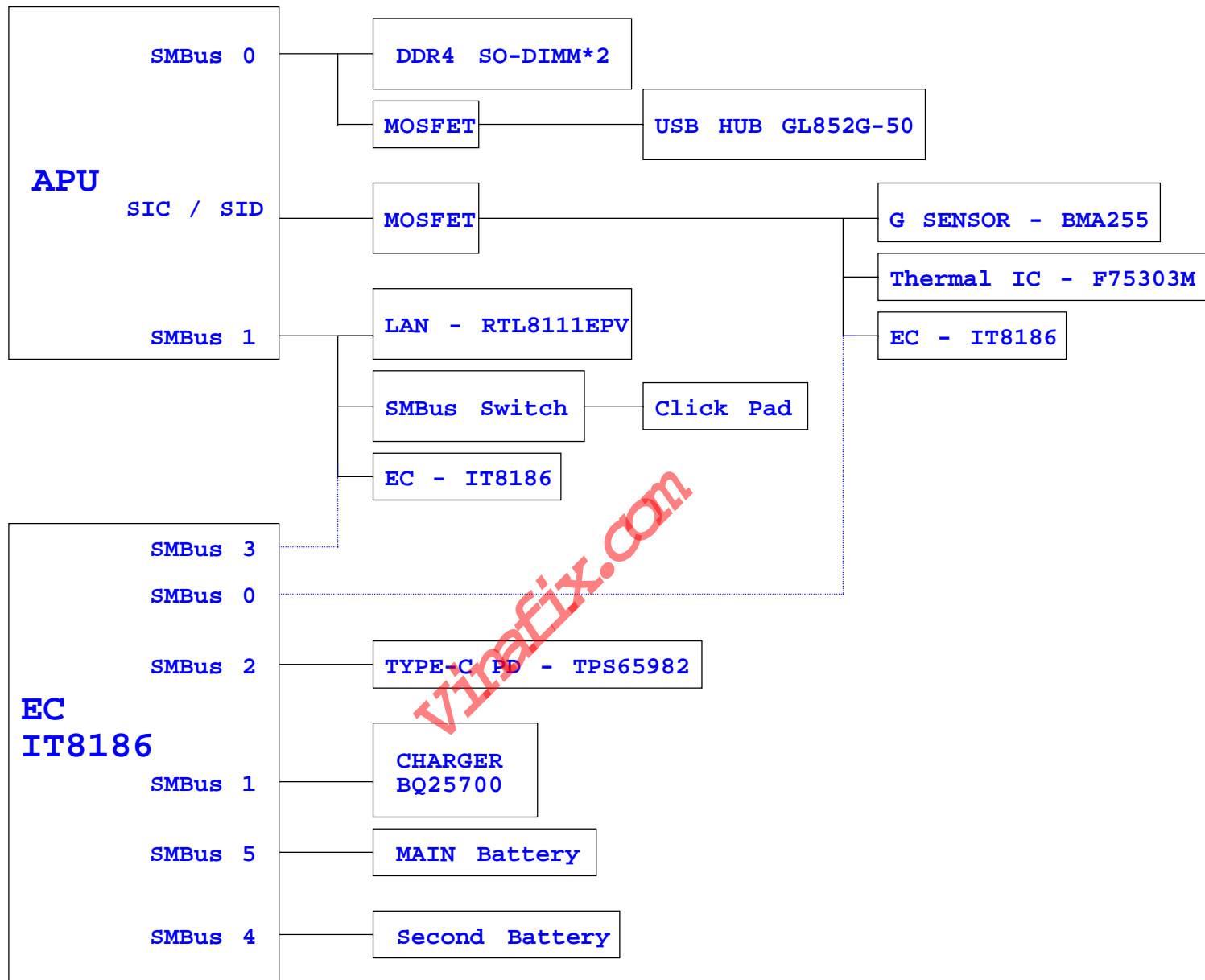
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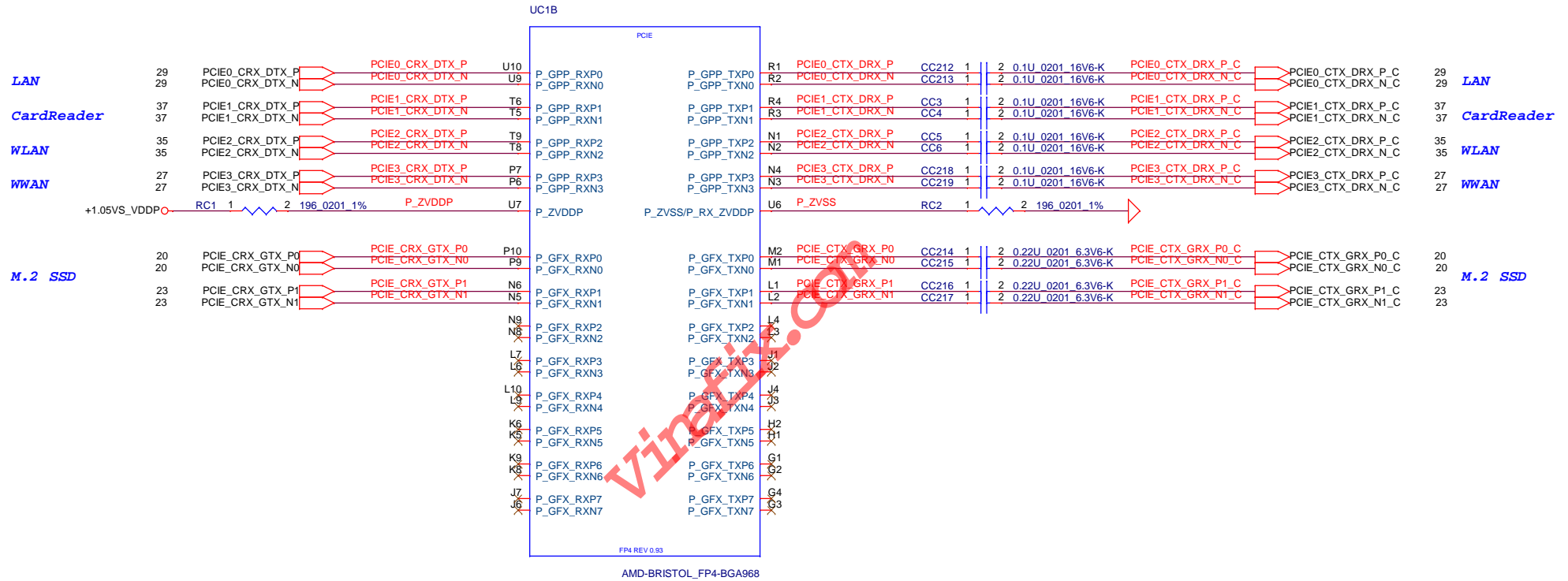


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WOLVERINE4 AMD

PCIe Port Assignment

- 0 GbE PHY
- 1 Card Reader
- 2 M.2 WLAN Slot
- 3 M.2 WWAN Slot



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UC11

MEMORY B			
AG31	MB_ADD0	MB_DATA0	A25
AC30	MB_ADD1	MB_DATA1	A25
AC31	MB_ADD2	MB_DATA2	A27
AB32	MB_ADD3	MB_DATA3	A27
AA32	MB_ADD4	MB_DATA4	B24
AA33	MB_ADD5	MB_DATA5	B25
AA31	MB_ADD6	MB_DATA6	B27
Y33	MB_ADD7	MB_DATA7	A27
AA30	MB_ADD8		
W32	MB_ADD9	MB_DATA8	A29
AG32	MB_ADD10	MB_DATA9	C29
Y32	MB_ADD11	MB_DATA10	B32
W33	MB_ADD12	MB_DATA11	D32
AL31	MB_ADD13	MB_DATA12	B28
W30	MB_ADD14/MB_BG1	MB_DATA13	B29
V32	MB_ADD15/MB_ACT_L	MB_DATA14	A31
		MB_DATA15	A31
			E30
AH32		MB_DATA16	E31
AG33	MB_BANK0	MB_DATA17	G33
W31	MB_BANK1	MB_DATA18	G32
	MB_BANK2/MB_BG0	MB_DATA19	C33
		MB_DATA20	D33
D25	MB_DM0	MB_DATA21	G30
D26	MB_DM1	MB_DATA22	A31
E30	MB_DM2	MB_DATA23	A
J33	MB_DM3		
AR30	MB_DM4	MB_DATA24	J30
AW30	MB_DM5	MB_DATA25	A31
BC30	MB_DM6	MB_DATA26	C33
BC26	MB_DM7	MB_DATA27	C32
N33	MB_DM8	MB_DATA28	C33
		MB_DATA29	C30
B28	MB_DQS_H0	MB_DATA30	A31
A26	MB_DQS_L0	MB_DATA31	A31
B31	MB_DQS_H1		
A30	MB_DQS_L1	MB_DATA32	AN31
F32	MB_DQS_H2	MB_DATA33	AP32
E32	MB_DQS_L2	MB_DATA34	AT32
J32	MB_DQS_H3	MB_DATA35	AJ32
AR32	MB_DQS_L3	MB_DATA36	AN33
AR33	MB_DQS_H4	MB_DATA37	AG32
AW32	MB_DQS_L4	MB_DATA38	AR31
AW33	MB_DQS_H5	MB_DATA39	AT33
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BA25	MB_DQS_L6	MB_DATA41	AV32
AY25	MB_DQS_H7	MB_DATA42	BA33
P32	MB_DQS_L7	MB_DATA43	AY32
N32	MB_DQS_H8	MB_DATA44	AJ33
	MB_DQS_L8	MB_DATA45	AU31
		MB_DATA46	AW31
AE33	MB_CLK_H0	MB_DATA47	AY33
AE32	MB_CLK_L0		
AE30	MB_CLK_H1	MB_DATA48	BC31
AD32	MB_CLK_L1	MB_DATA49	BB30
AD33	MB_CLK_H2	MB_DATA50	BB38
AC33	MB_CLK_L2	MB_DATA51	AY29
AC32	MB_CLK_H3	MB_DATA52	BB32
	MB_CLK_L3	MB_DATA53	BA31
		MB_DATA54	CC29
T33	MB_RESET_L	MB_DATA55	BB29
AG30	MB_EVENT_L		
		MB_DATA56	BB27
U32		MB_DATA57	BB26
U33	MB_CKE0	MB_DATA58	BB24
	MB_CKE1	MB_DATA59	AY23
		MB_DATA60	BA27
AL30	MB0_ODT0	MB_DATA61	BC27
AM32	MB0_ODT1	MB_DATA62	CC25
AJ32	MB1_ODT0	MB_DATA63	BB25
AM33	MB1_ODT1		
		MB_CHECK0	N30
AJ33		MB_CHECK1	N31
AL32	MB0_CS_L0	MB_CHECK2	R33
AJ30	MB0_CS_L1	MB_CHECK3	R32
AL33	MB1_CS_L0	MB_CHECK4	R32
	MB1_CS_L1	MB_CHECK5	R33
		MB_CHECK6	R30
		MB_CHECK7	R31
AH33	MB_RAS_L/MB_RAS_L_ADD16		
AK32	MB_CAS_L/MB_CAS_L_ADD15		
AJ31	MB_WE_L/MB_WE_L_ADD14		
A19	MB_VREFDQ	MB_ZVDDIO_MEM_S	AF32

FP4 REV 0.03

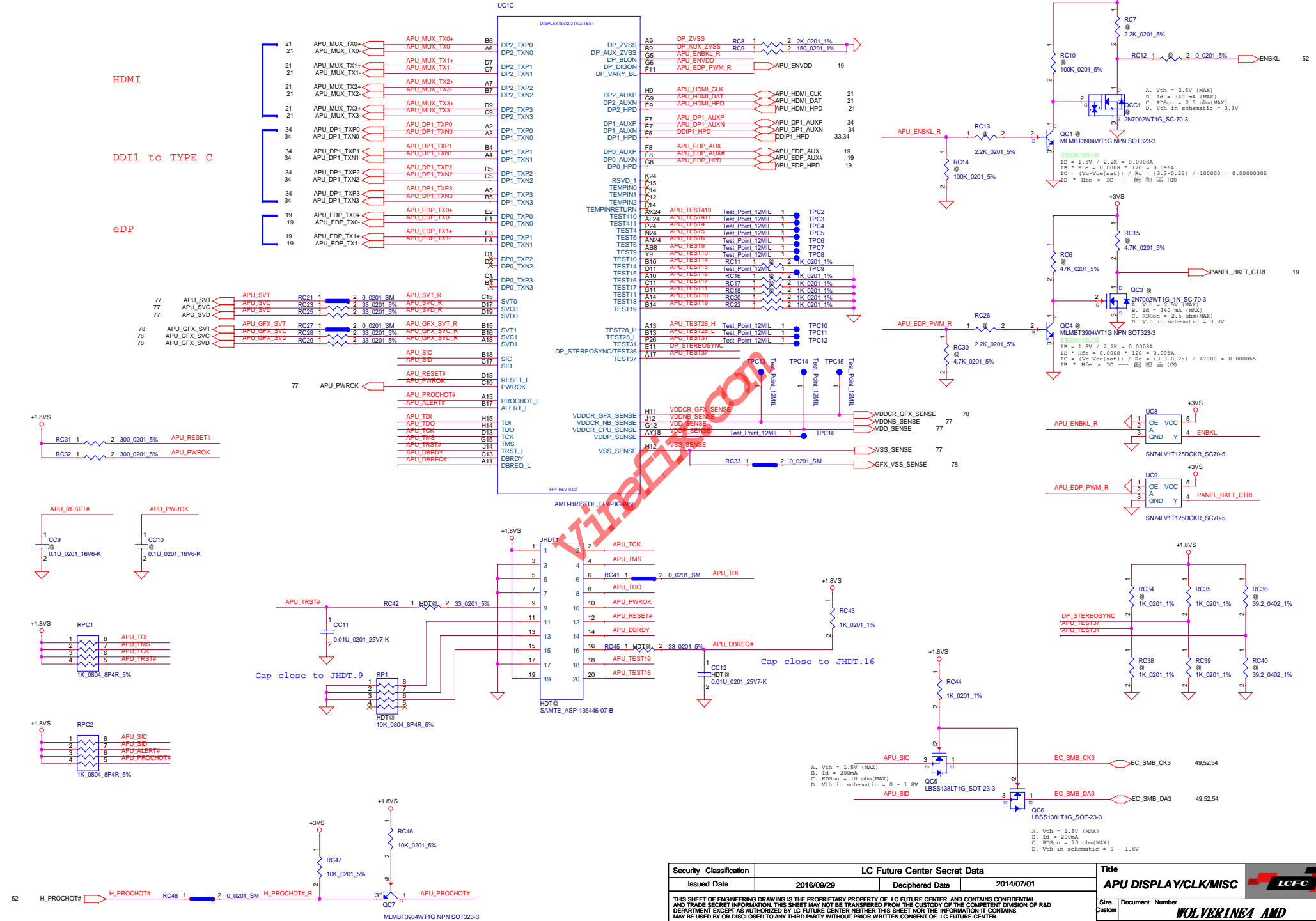
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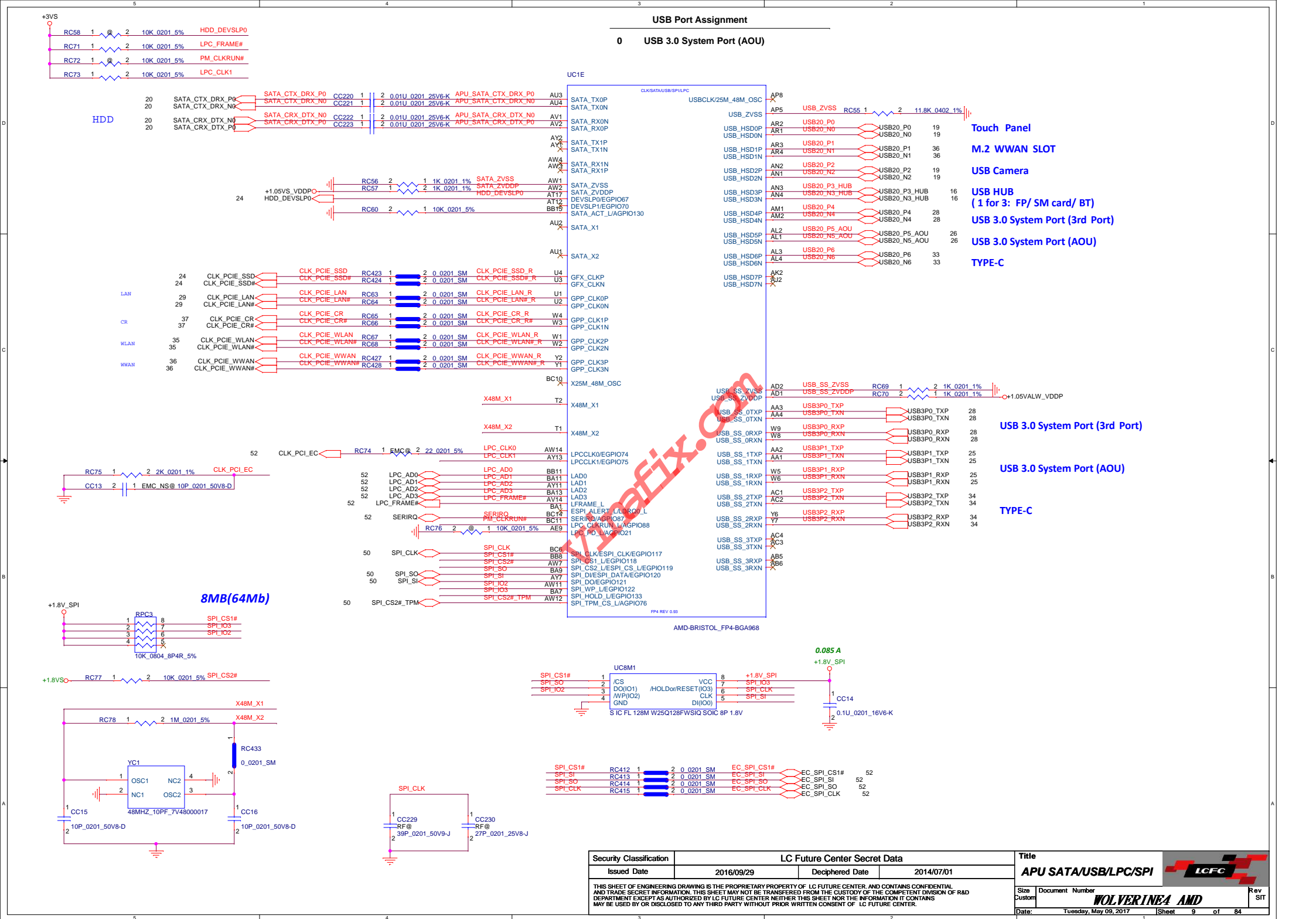
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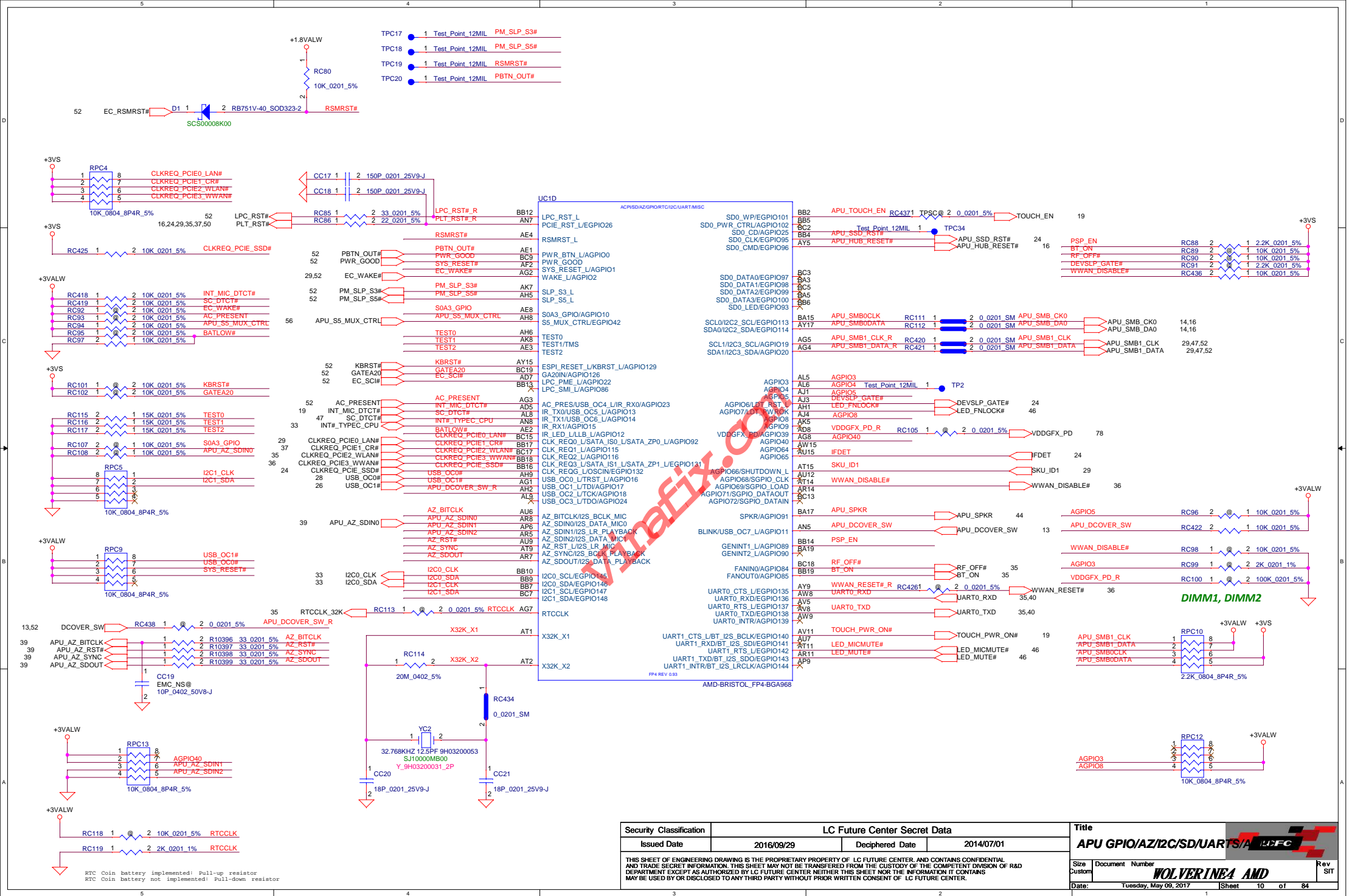
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DDI1 to TYPE C

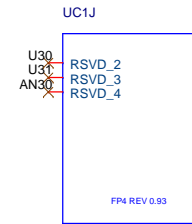
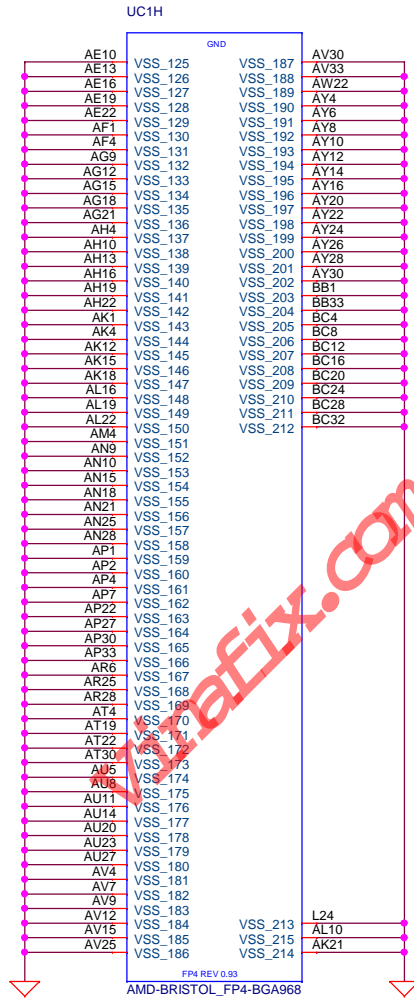
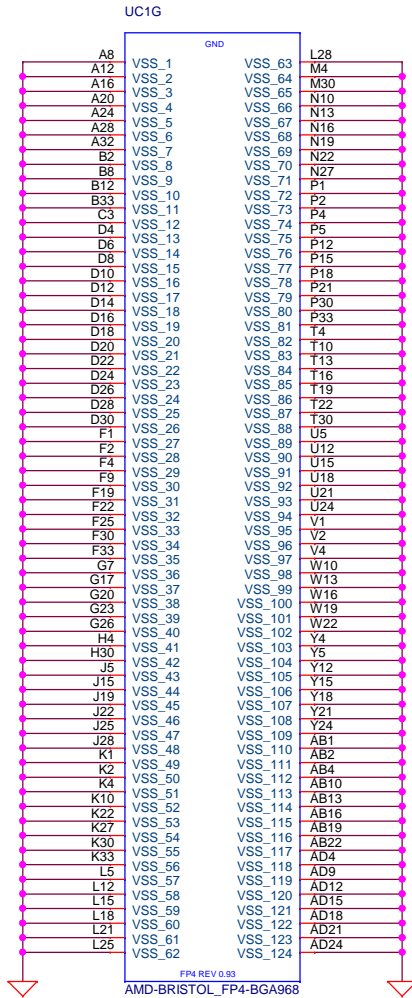
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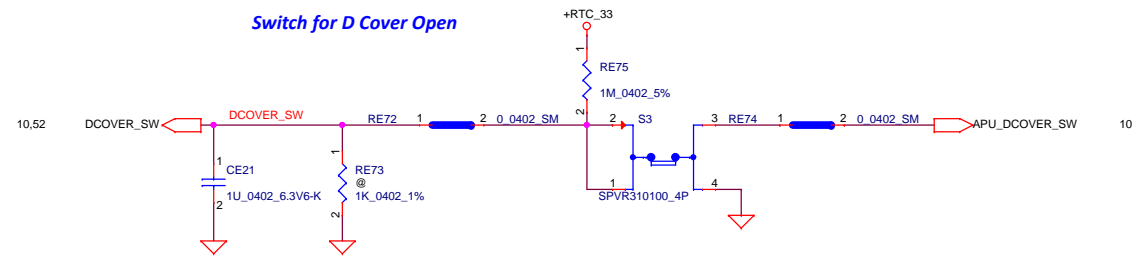
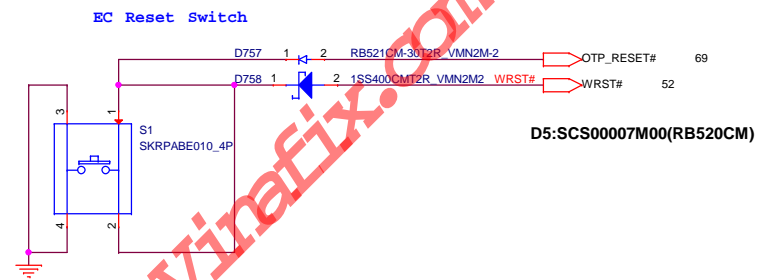
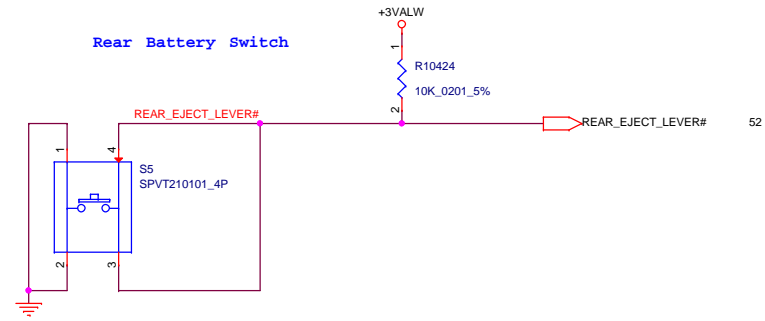



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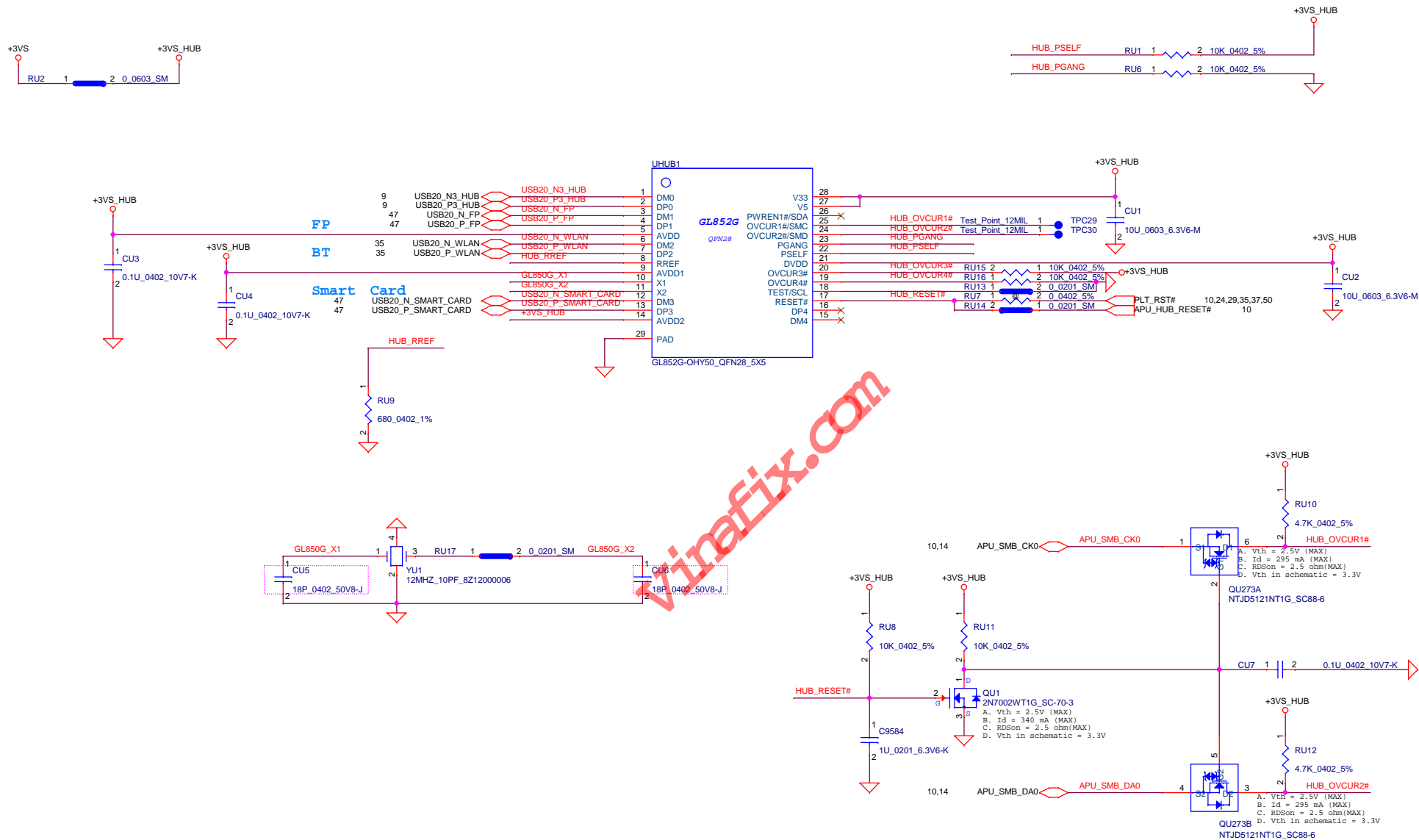
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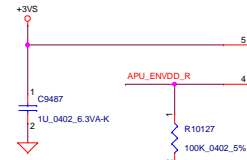
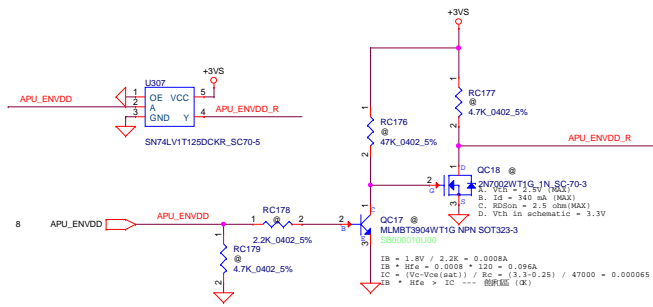
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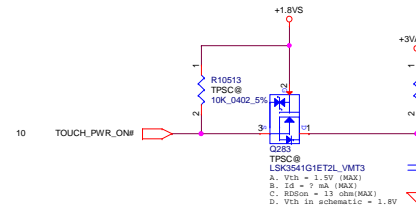
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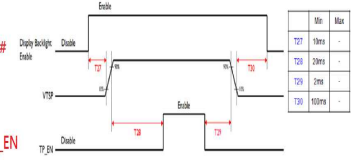
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Touch Power Control



TP power on/off Sequence:

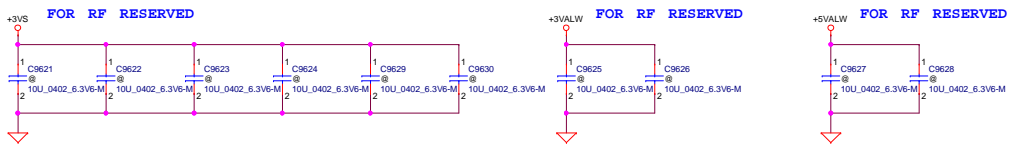
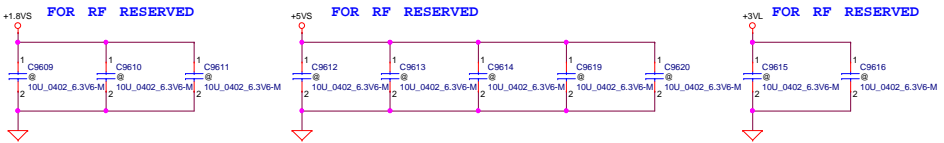
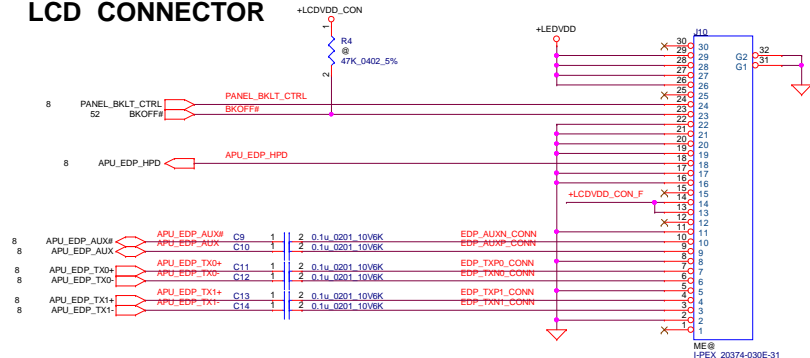


Touch consumption 214mW

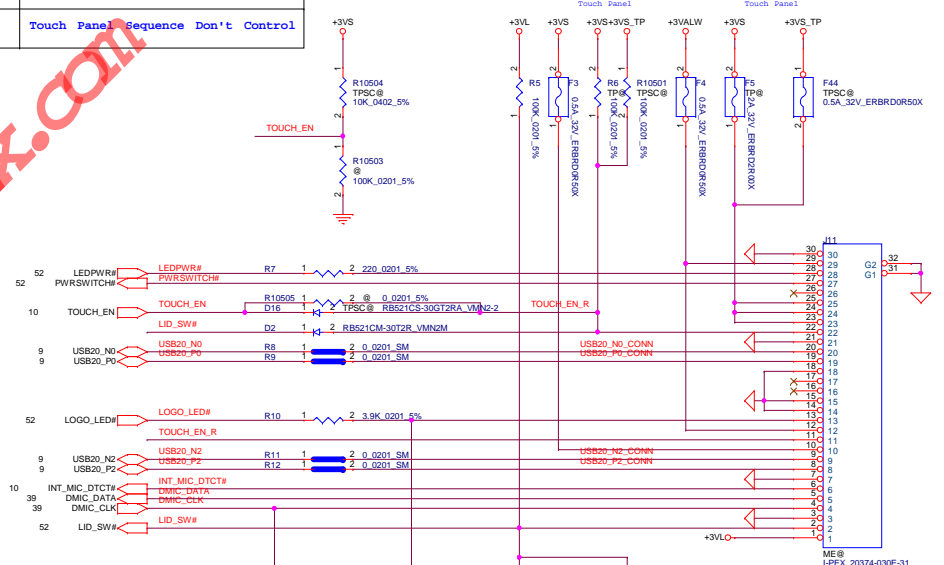
I/O N1254 R2

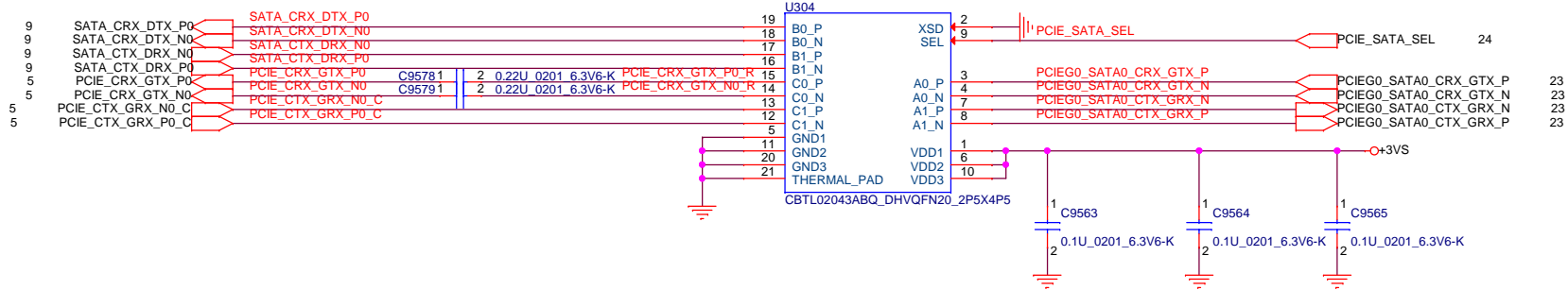
A. Vch = -1V (MAX)
B. Id = 1mA (MAX)
C. RDS(on) = 130m ohm (MAX)
D. Vch in schematic = -1V

LCD CONNECTOR




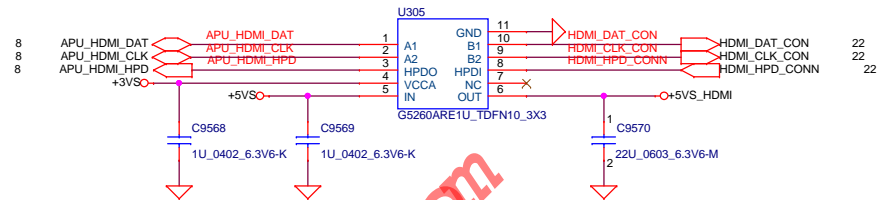
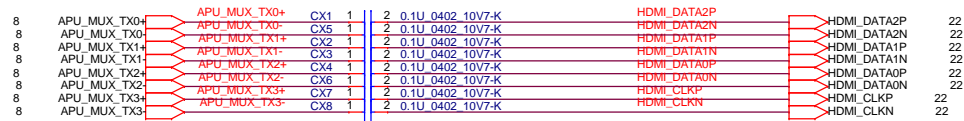
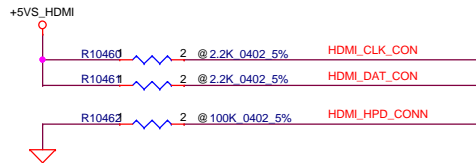
TPSC@	Touch Panel Sequence Control
TP@	Touch Panel Sequence Don't Control



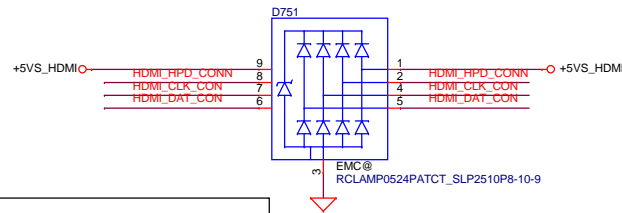
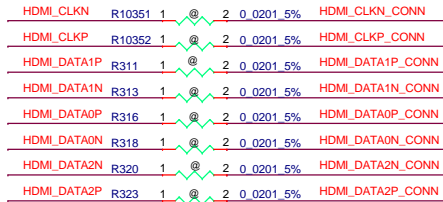
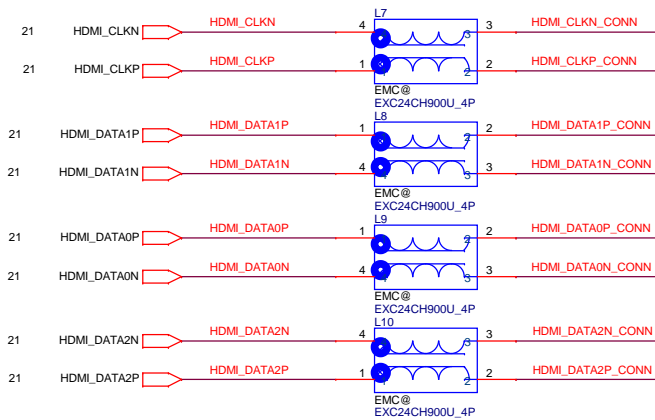
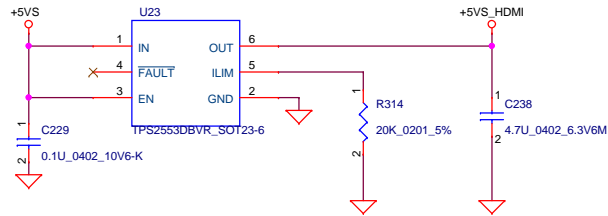


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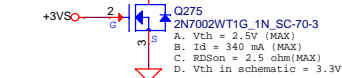
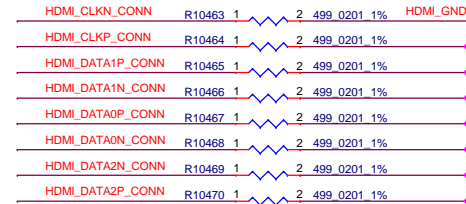
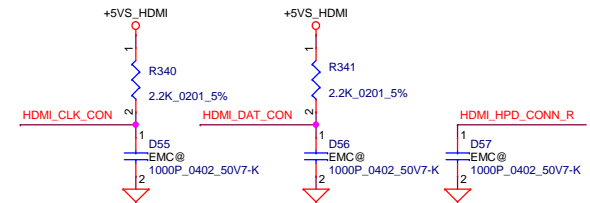
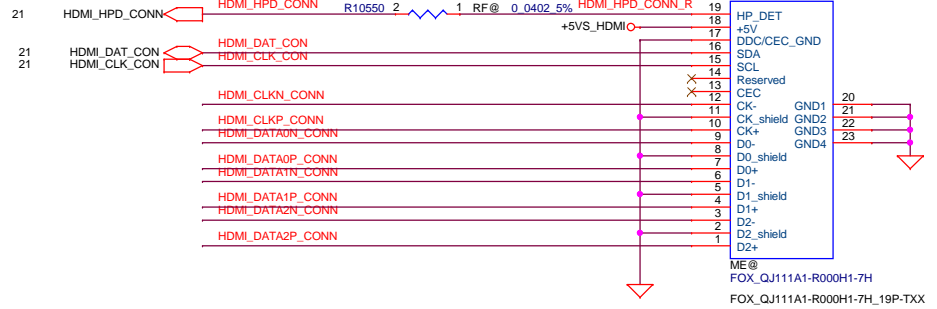
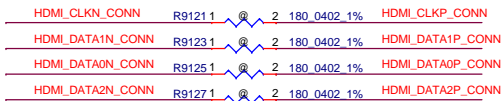
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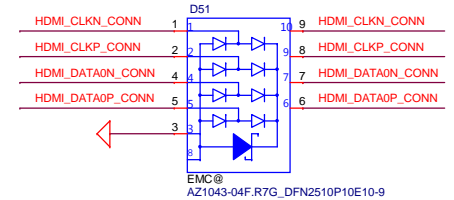
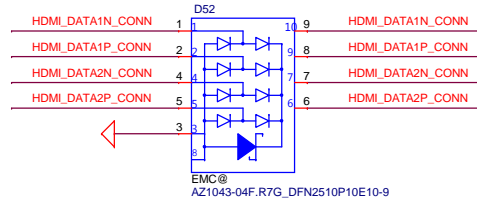
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For PARADE Debug use.



For EMC



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Issued Date		2016/09/29		Deciphered Date		2013/08/05				
						HDMI CONNECTOR				
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						Date:	Tuesday, May 09, 2017	Sheet	22	of 84

HOST TX
RX

RX Device
TX

1. Keep 0 ohm.
2. Change to R-short in SVT.

1. Keep 0 ohm.
2. Change to R-short in SVT.

MODE	
0	SATA
1	PCIe

2017/03/22 Change PCIe Redriver solution
from Limited to linear

HOST TX
RX

RX Device
TX

EN#	
0	Normal
1	Disable

2017/03/22 Change PCIe Redriver solution
from Limited to linear

TABLE: PI3EQX12902BZLE Input Equalization Setting (EQ_A & EQ_B)

	@3GHz	@4GHz
GND	6.3 dB	8.7 dB
Open	4.7 dB (Default)	6.7 dB (Default)
VDD	8.2 dB	10.8 dB

TABLE: PI3EQX862 Output De-emphasis Setting (DE_A & DE_B)

GND	-2.5 dB
Open	0 dB (Default)
VDD	-4 dB

TABLE: Mode Configuration Table

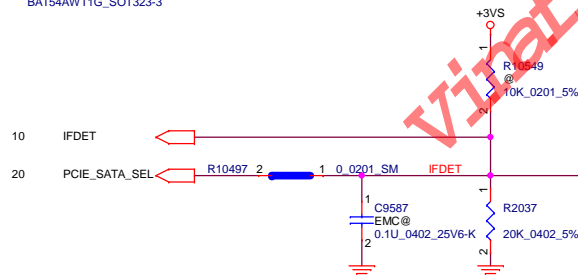
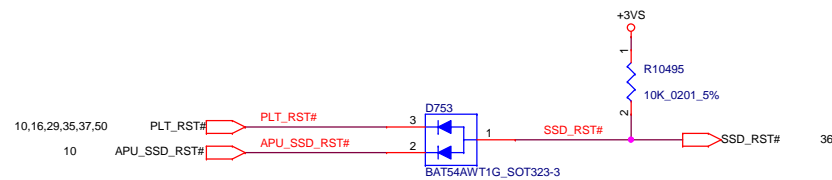
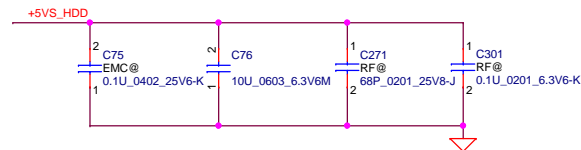
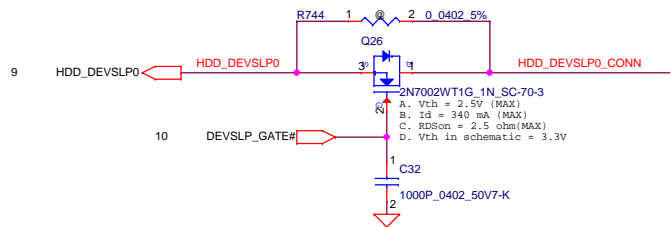
EN#	MODE	Mode
Low	Low	SATA Application
Low	High	PCIe Application
High	X	Disable

Security Classification	LC Future Center Secret Data	
Issued Date	2015/11/02	Deciphered Date 2015/08/10

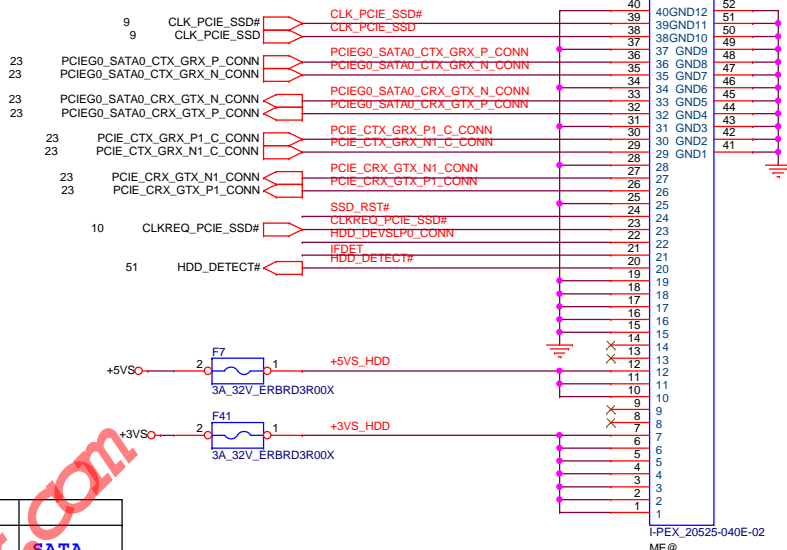
Title	STORAGE I/F REDRIVER
-------	----------------------

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Date:	Tuesday, May 26, 2017	15:58:23 of 84





IFDET	REDR_EN#	REDR_PE_EN#	REDR_MODE
0	1	1	0
1	0	0	1

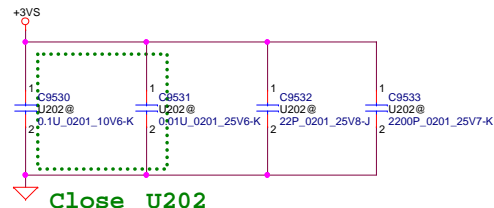


EN#	
0	Normal
1	Disable

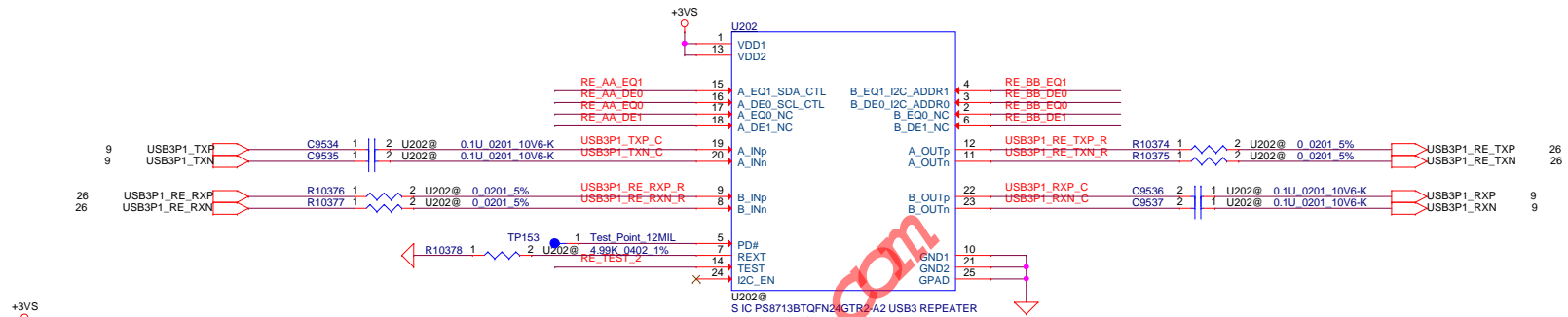
MODE	
0	SATA
1	PCIE

2017/03/22 Change PCIE Redriver solution from Limited to linear

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Issued Date	2016/09/29	Deciphered Date	2015/08/10	SATA HDD CONNECTOR		
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USB3.0 Repeater Port 1



Normal LFPS mode Internal PD

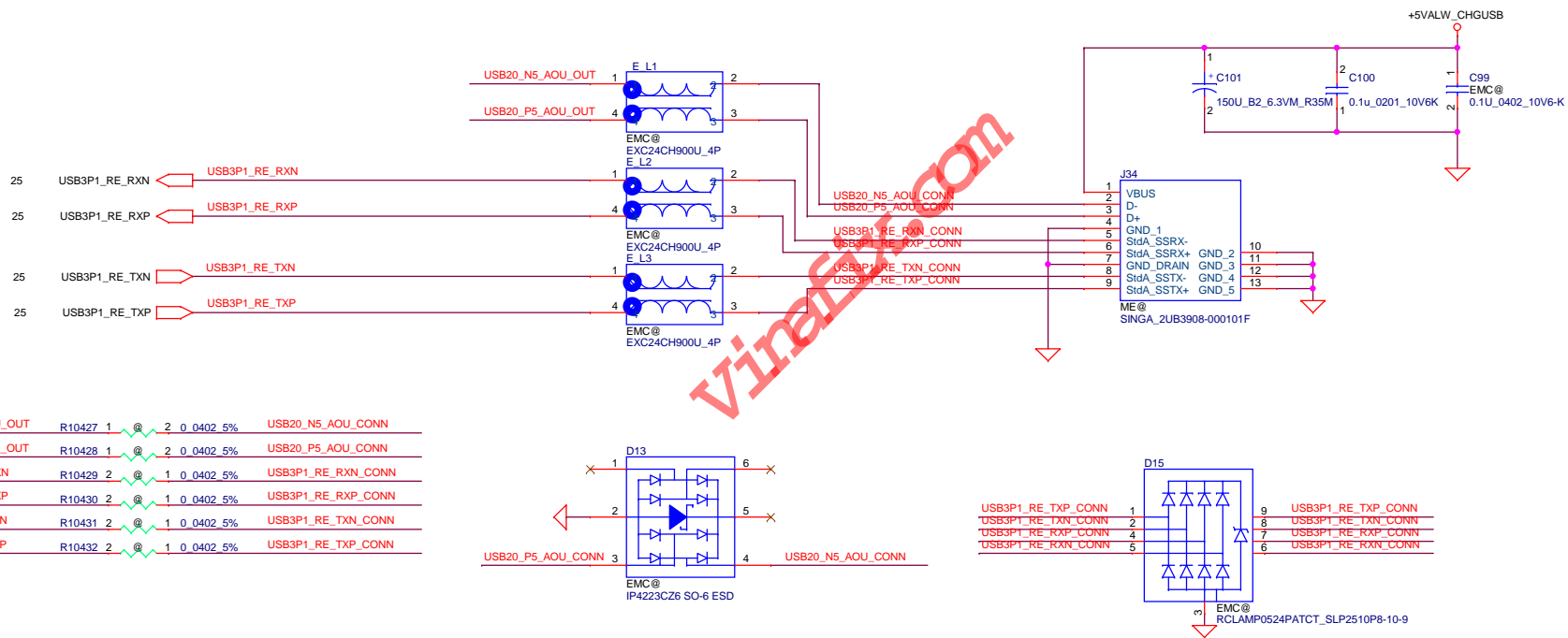
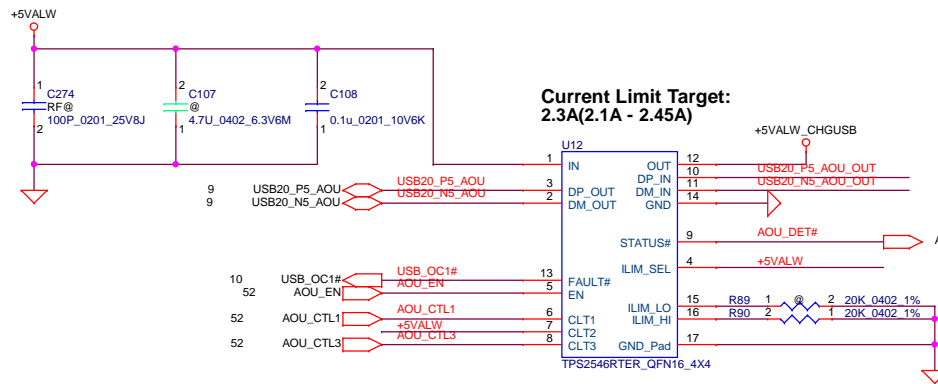


EQ Default 9.5dB Internal PD

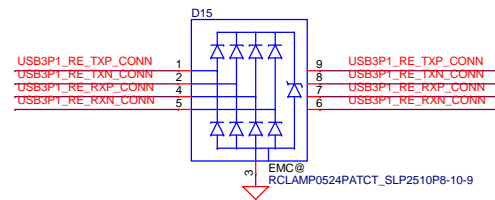
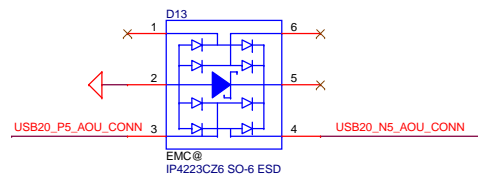



de-emphasis Default 3.5dB Internal PD

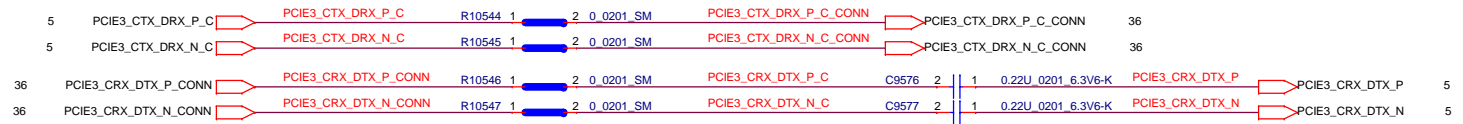
Security Classification		LC Future Center Secret Data		Title	
Issued Date	2016/09/29	Deciphered Date	2015/08/10	USB3.0 Repeater	
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USB20_N5_AOU_OUT	R10427	1	@	2	0.0402	5%	USB20_N5_AOU_CONN
USB20_P5_AOU_OUT	R10428	1	@	2	0.0402	5%	USB20_P5_AOU_CONN
USB3P1_RE_RXN	R10429	2	@	1	0.0402	5%	USB3P1_RE_RXN_CONN
USB3P1_RE_RXP	R10430	2	@	1	0.0402	5%	USB3P1_RE_RXP_CONN
USB3P1_RE_TXN	R10431	2	@	1	0.0402	5%	USB3P1_RE_TXN_CONN
USB3P1_RE_TXP	R10432	2	@	1	0.0402	5%	USB3P1_RE_TXP_CONN



Security Classification		LC Future Center Secret Data		Title			
Issued Date		2016/09/29		Deciphered Date			
						USB POWER/CONNECTOR	
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Security Classification		LC Future Center Secret Data		Title			
Issued Date		2016/09/29	Deciphered Date		2015/08/10		PCIE RE-DRIVER
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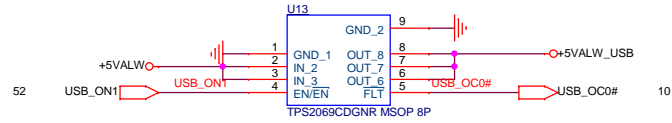
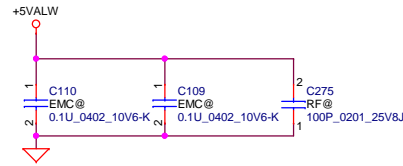
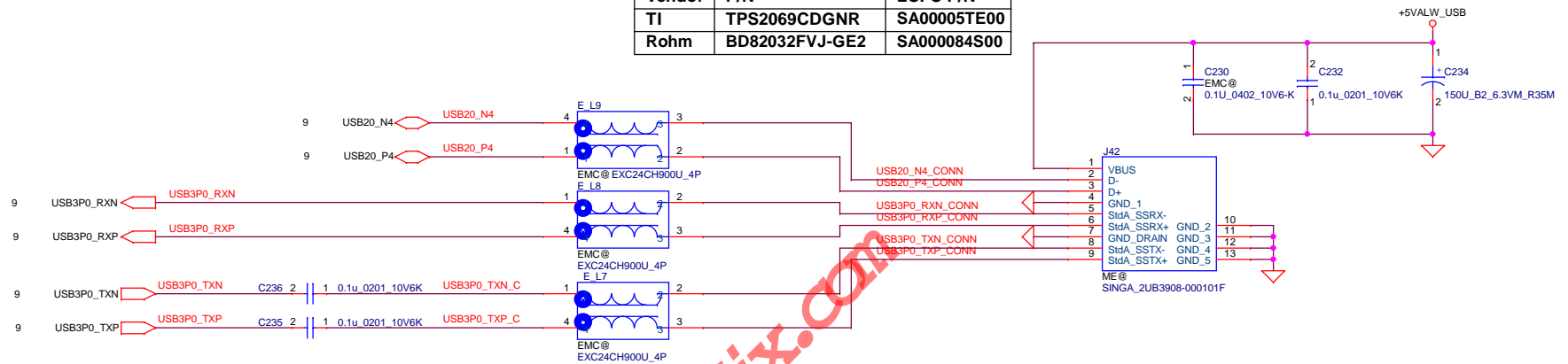
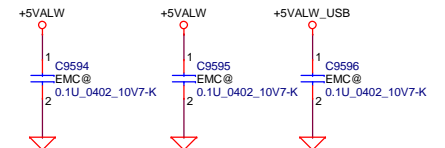
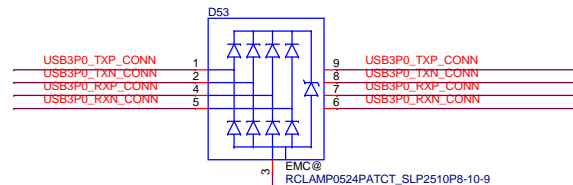
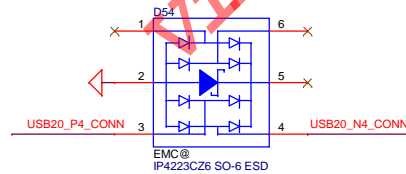


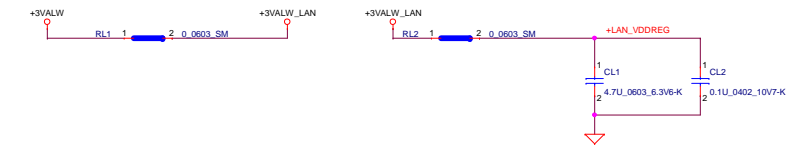
TABLE of USB3.0 Single (U13)		
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TI	TPS2069CDG NR	SA00005TE00
Rohm	BD82032FVJ-GE2	SA000084S00



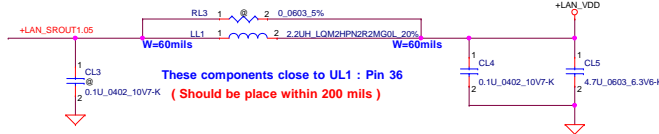
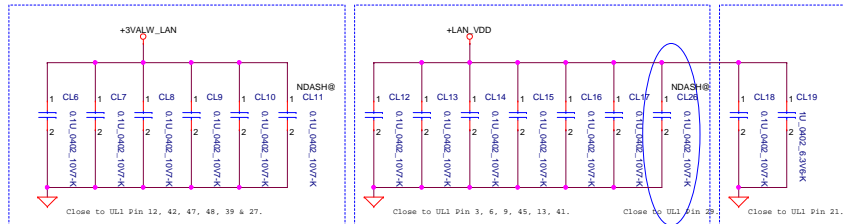
USB20_N4	R10433	1	@	2	0.0402 5%	USB20_N4_CONN
USB20_P4	R10434	1	@	2	0.0402 5%	USB20_P4_CONN
USB3P0_RXN	R10435	2	@	1	0.0402 5%	USB3P0_RXN_CONN
USB3P0_RXP	R10436	2	@	1	0.0402 5%	USB3P0_RXP_CONN
USB3P0_TXN_C	R10437	2	@	1	0.0402 5%	USB3P0_TXN_CONN
USB3P0_TXP_C	R10438	2	@	1	0.0402 5%	USB3P0_TXP_CONN

PLACE NEAR USB CONNECTOR
WIDE PATTERN(MIN 500mA)

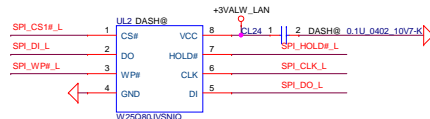
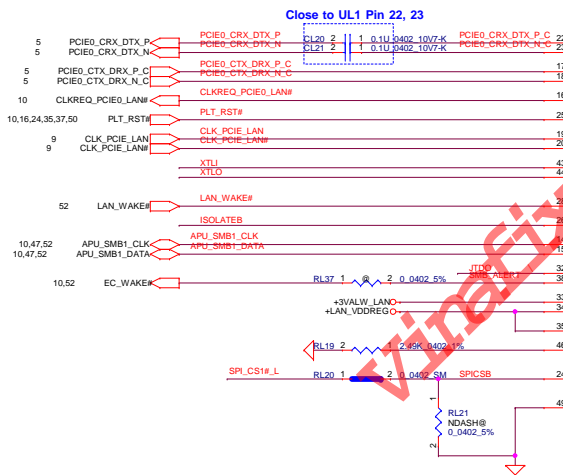
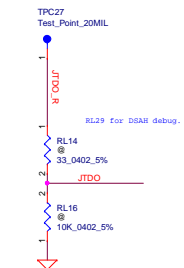
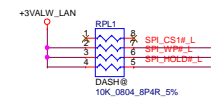
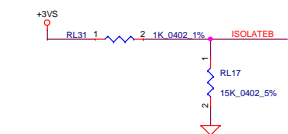
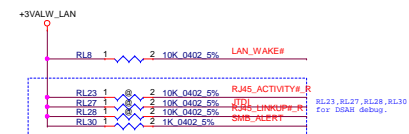
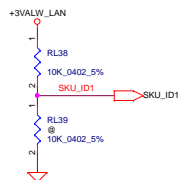




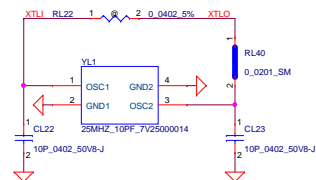
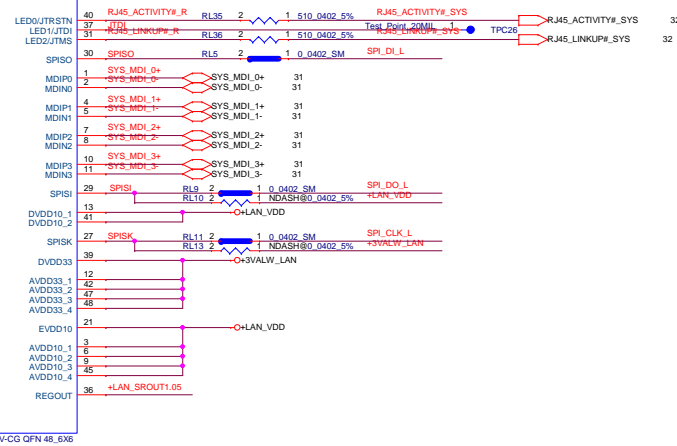
+3VALW_LAN Rising time (10%-90%) >0.5mS and <100mS.




SKU_ID1	DASH	Non-DASH
RL38	V	X
RL39	X	V



SA000078S00



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THE WIDTH OF THESE TRACE SHOULD BE WIDER THAN 35MIL TO PREVENT VOLTAGE DROP.

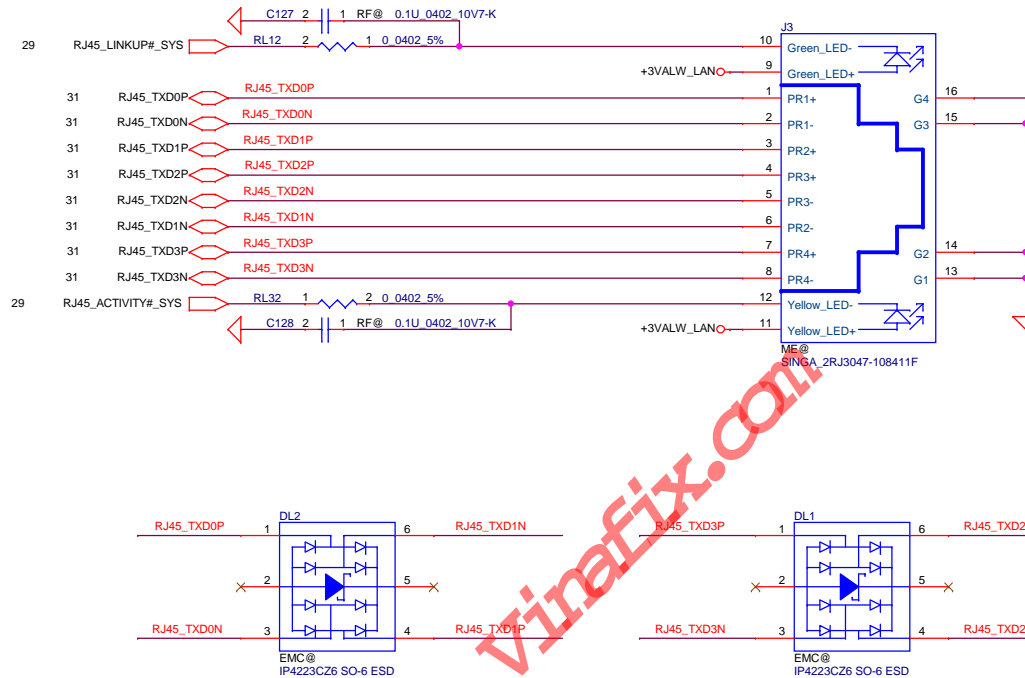
C303 SHOULD BE PLACED AS CLOSE TO MAGNETICS AS POSSIBLE.


ESD REASON

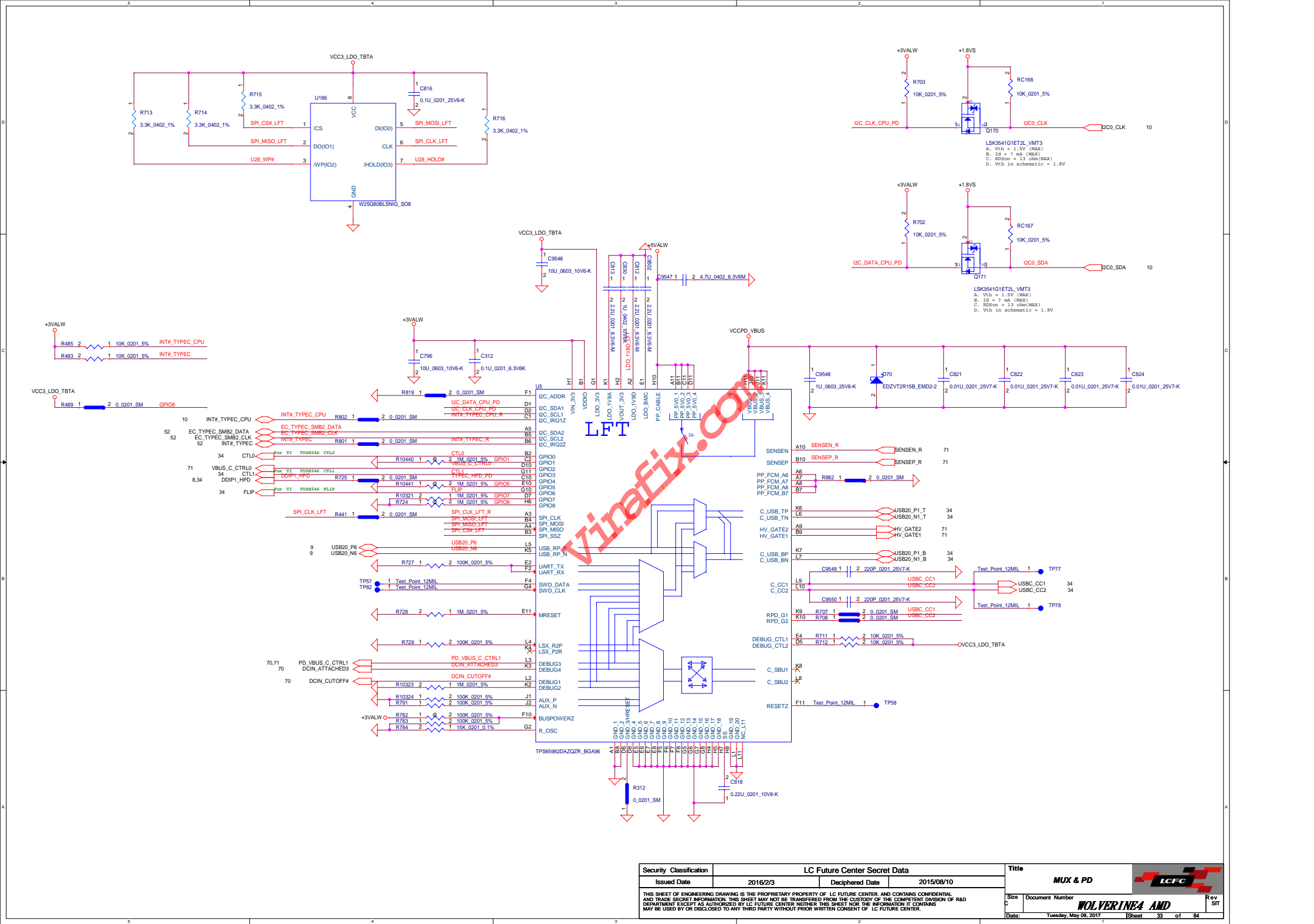
Vendor	P/N
TDK	TLA-7T231HF-T
Timag	IH-115-F
Bothand	NA69LF

Security Classification	LC Future Center Secret Data		
Issued Date	2016/09/29	Deciphered Date	2015/08/10
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GBE MAGNETICS		WOLVERINE4 AND	
Size	Document Number	Date	Rev
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Security Classification		LC Future Center Secret Data		Title		
Issued Date	2016/09/29	Deciphered Date	2015/08/10	RJ45 CONNECTOR		
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				Custom	WOLVERINE4 AND	SIT
				Date:	Tuesday, May 09, 2017	Sheet 32 of 84



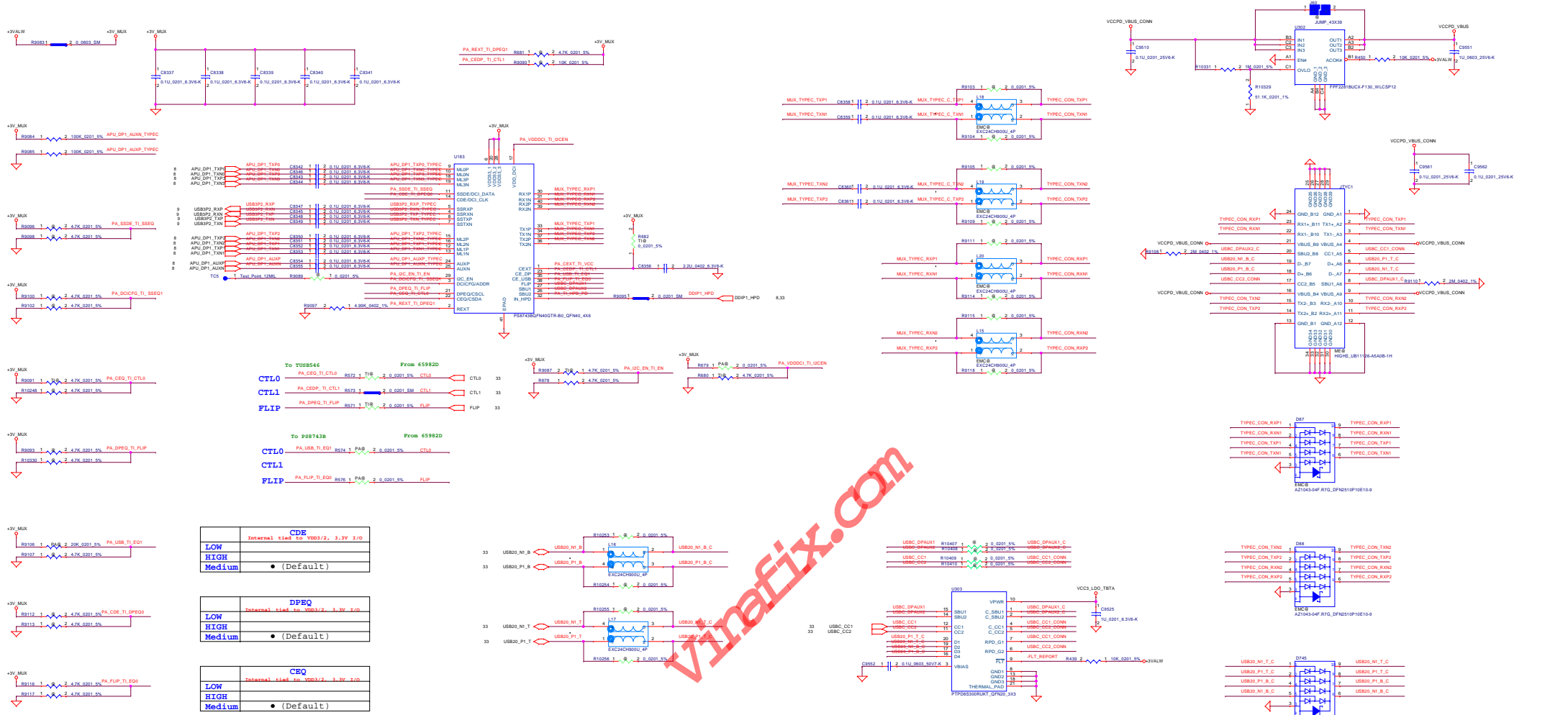


TABLE:

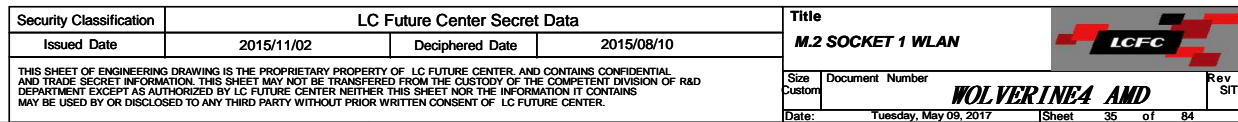
Module Configuration for USB546 Mode Selection				
State #	MUX_CSDP	MUX_CSDA	MUX_CSCL	MODE
0	H	H	H	1-port USB on SS2 2-lane DP. DP ML0 is on SSRX1(Flipped)
1	H	H	L	1-port USB on SS1 2-lane DP. DP ML0 is on SSRX2(Un-flipped)
2	H	L	H	4-lane DP. DP ML0 is on SSRX1(Flipped)
3	H	L	L	4-lane DP. DP ML0 is on SSRX2(Un-flipped)
4	L	H	H	1-port USB only on SS2 channels (Flipped)
5	L	H	L	1-port USB only on SS1 channels (Un-flipped)
6	L	L	H	Chip power down
7	L	L	L	Chip power down

TABLE:

Module Configuration for P58743 Mode Selection				
State #	CE_DP	CE_USB	FLIP	MODE
0	H	H	H	1-port USB on SS2 2-lane DP. DP ML0 is on SSRX1(Flipped)
1	H	H	L	1-port USB on SS1 2-lane DP. DP ML0 is on SSRX2(Un-flipped)
2	H	L	H	4-lane DP. DP ML0 is on SSRX1(Flipped)
3	H	L	L	4-lane DP. DP ML0 is on SSRX2(Un-flipped)
4	L	H	H	1-port USB only on SS2 channels (Flipped)
5	L	H	L	1-port USB only on SS1 channels (Un-flipped)
6	L	L	H	Chip power down
7	L	L	L	Chip power down

As for MP schedule, we are working with worldwide to pull in the schedule to beginning of November but not yet confirmed.

3.2H CONNECTOR



TYPE-B NGFF CARD FOR WWAN

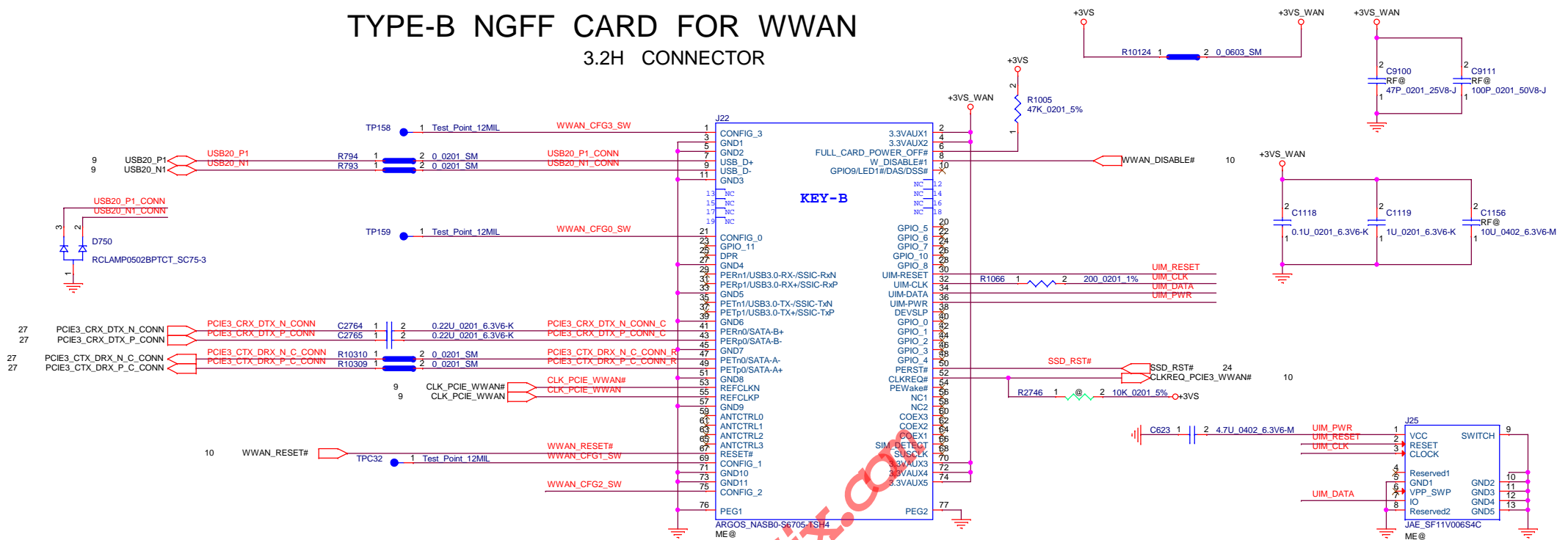
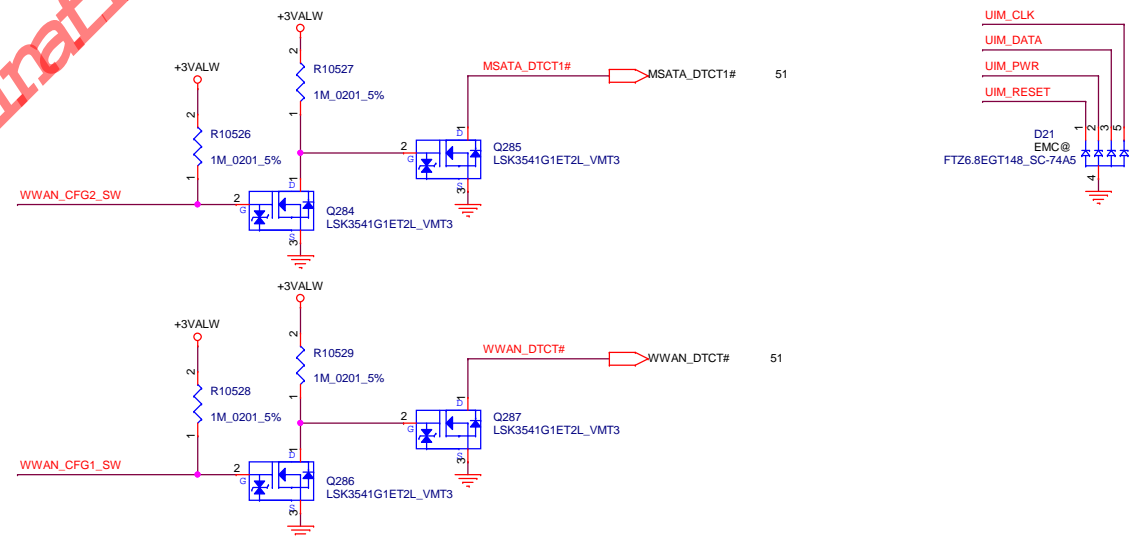

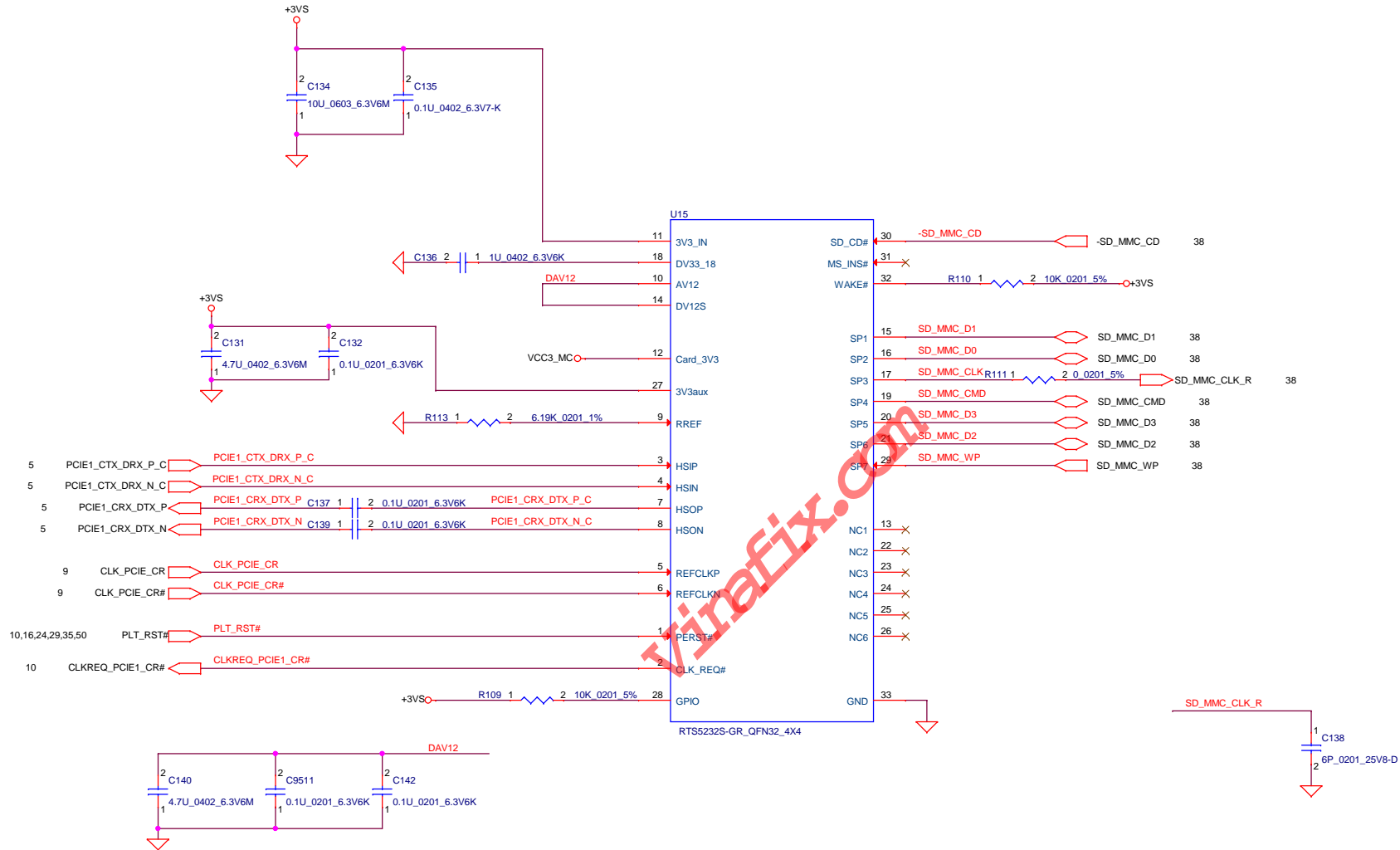


TABLE:

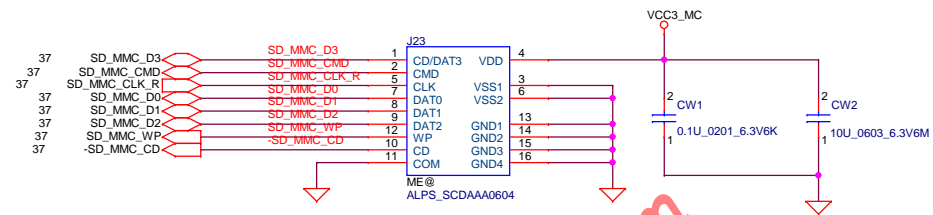
State #	Module Configuration Decodes				Module Type and Main Host Interface	Port Configuration
	CONFIG_0 (Pin 21)	CONFIG_3 (Pin 1)	CONFIG_2 (Pin 75)	CONFIG_1 (Pin 69)		
0	GND	GND	GND	GND	SSD - SATA	N/A
1	GND	GND	GND	NC	SSD - PCIe	N/A
2	GND	GND	NC	GND	WWAN - PCIe	0
3	GND	GND	NC	NC	WWAN - PCIe	1
4	GND	NC	GND	GND	WWAN - USB 3.0	0
5	GND	NC	GND	NC	WWAN - USB 3.0	1
6	GND	NC	NC	GND	WWAN - USB 3.0	2
7	GND	NC	NC	NC	WWAN - USB 3.0	3
8	NC	GND	GND	GND	WWAN - SSIC	0
9	NC	GND	GND	NC	WWAN - SSIC	1
10	NC	GND	NC	GND	WWAN - SSIC	2
11	NC	GND	NC	NC	WWAN - SSIC	3
12	NC	NC	GND	GND	WWAN - PCIe	2
13	NC	NC	GND	NC	WWAN - PCIe	3
14	NC	NC	NC	GND	RFU	N/A
15	NC	NC	NC	NC	No Module Present	N/A



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Security Classification		LC Future Center Secret Data		Title	
Issued Date	2016/09/29	Deciphered Date	2015/08/10	MEDIA CARD CONTROLLER	
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				WOLVERINE4 AMD	
				Date: Tuesday, May 09, 2017	Rev SIT
				Sheet 37 of 84	

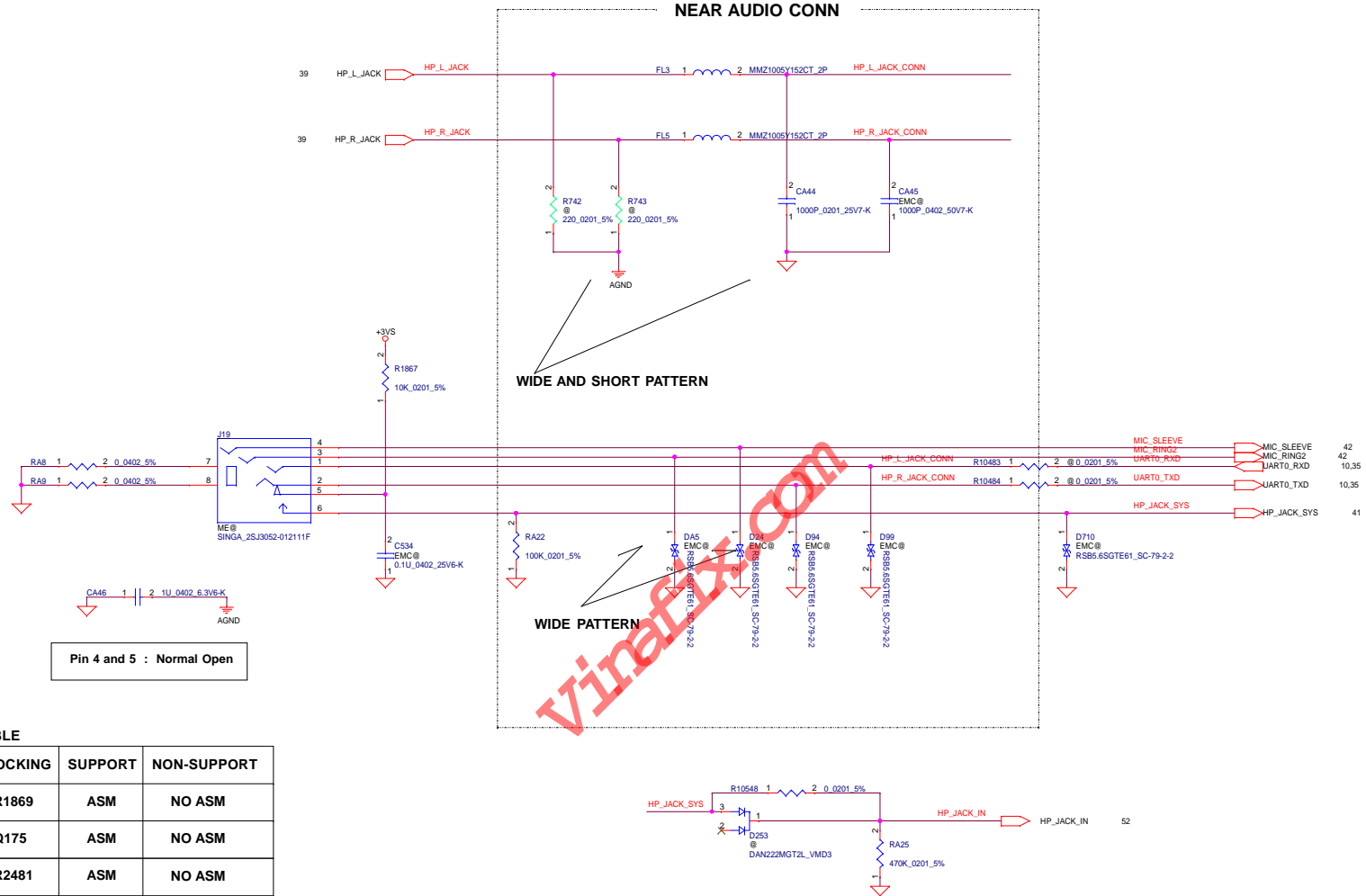


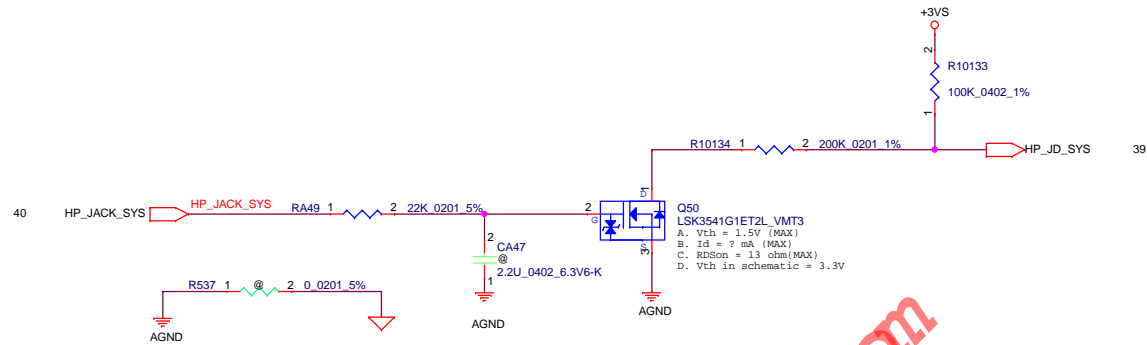
Security Classification		LC Future Center Secret Data		Title	
Issued Date	2016/09/29	Deciphered Date	2015/08/10	MEDIA CARD INTERFACE	
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TABLE

DOCKING	SUPPORT	NON-SUPPORT
R1869	ASM	NO ASM
Q175	ASM	NO ASM
R2481	ASM	NO ASM
Q197	ASM	NO ASM

↑
LOGIC




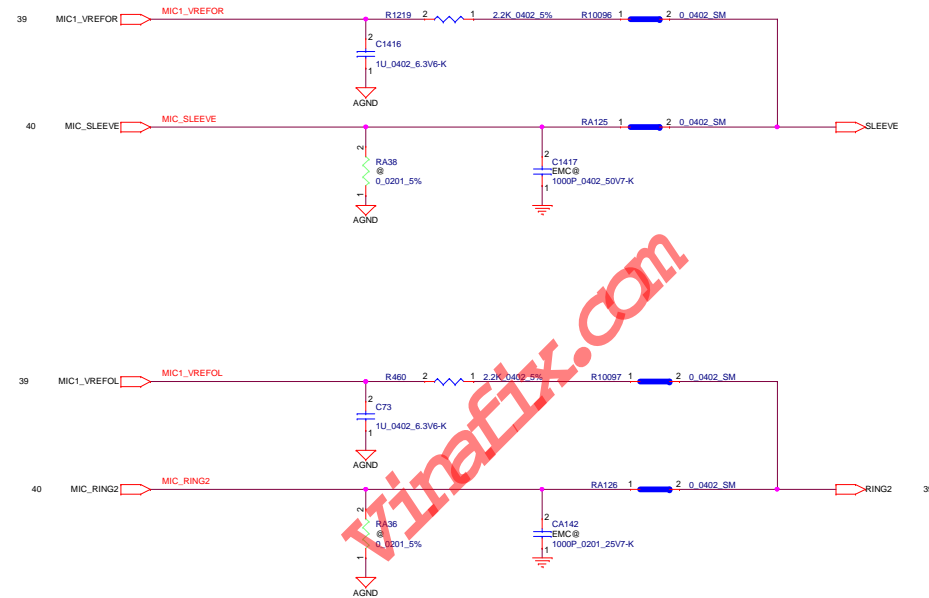


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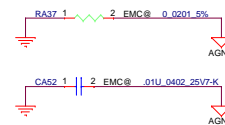
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	ENABLE	DISABLE	
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R290	ASM	NO ASM	NO ASM
R46	ASM	NO ASM	NO ASM
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R52	ASM	NO ASM	NO ASM
Q6	ASM	NO ASM	NO ASM
R319	ASM	ASM	NO ASM
R2572	ASM	ASM	NO ASM

↑
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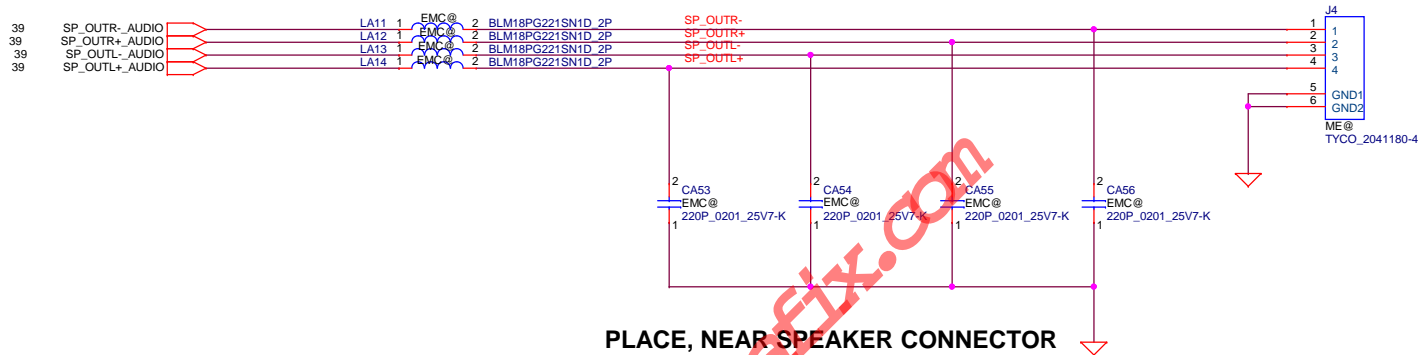


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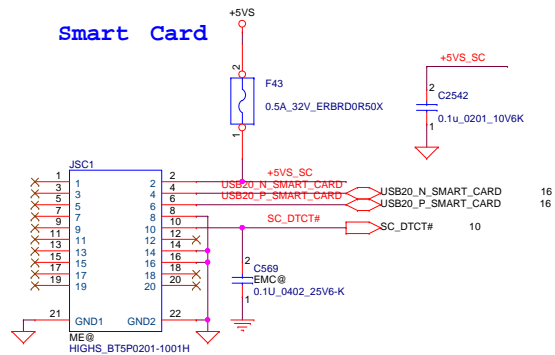
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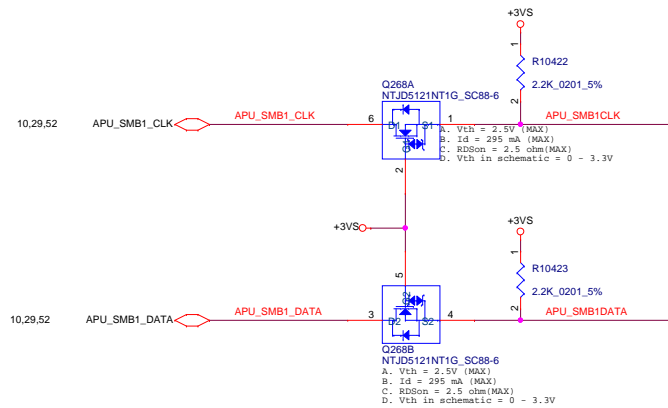
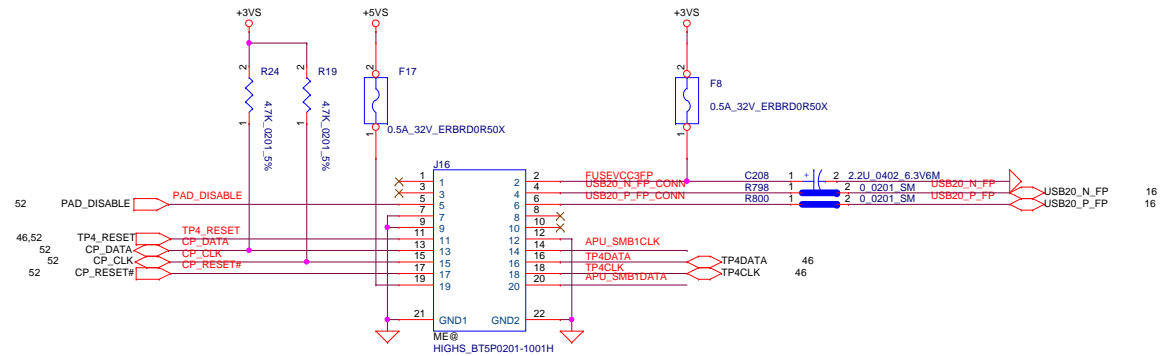
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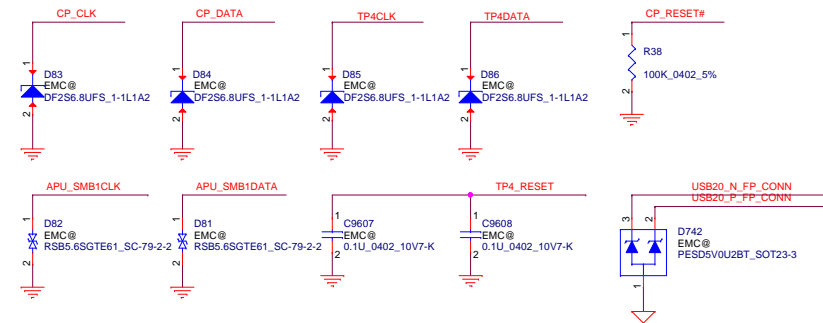
Smart Card



Finger Print / Click Pad



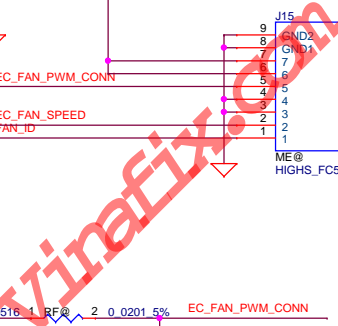
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								Sheet		47 of 84	

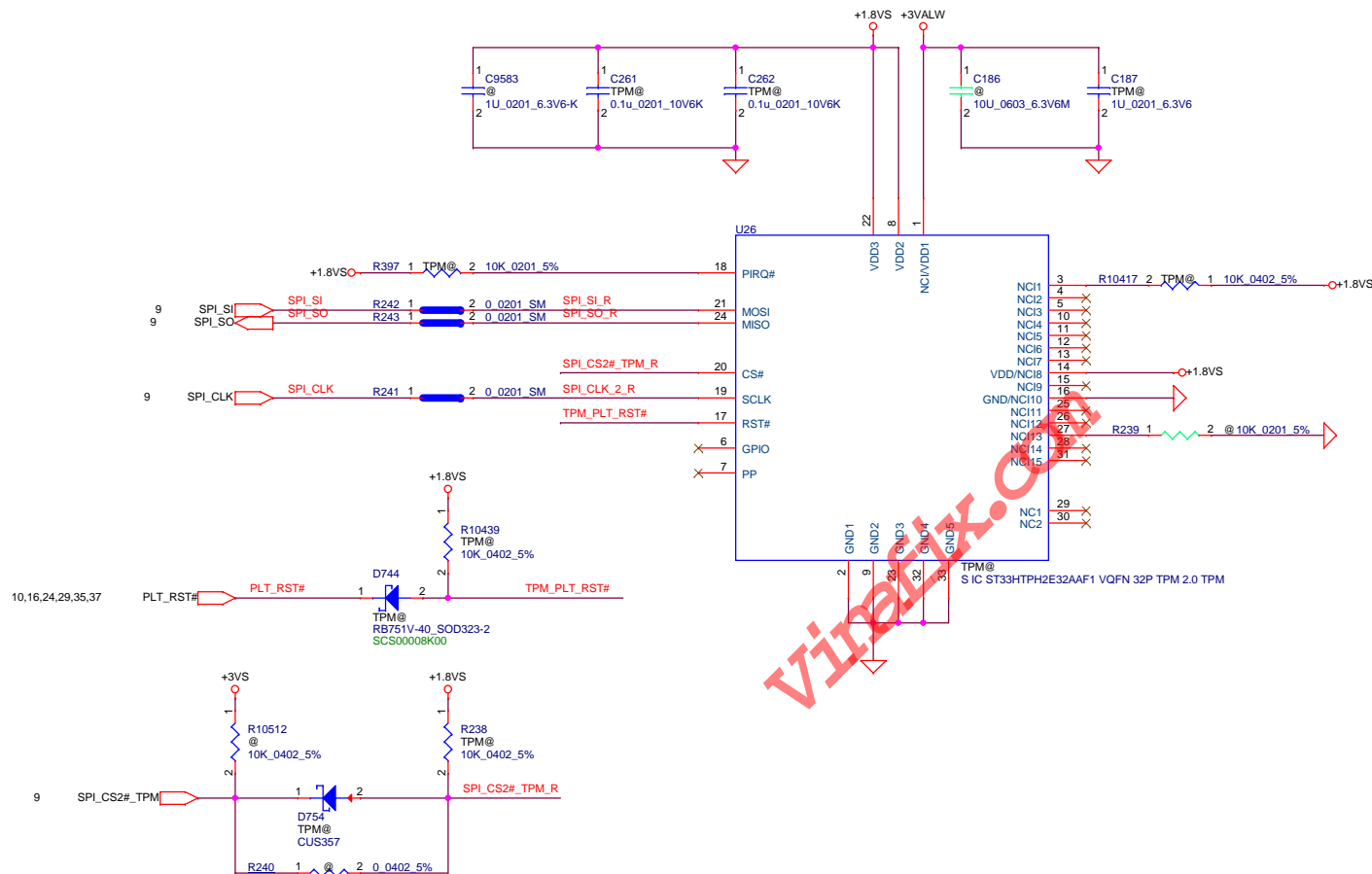
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Rev

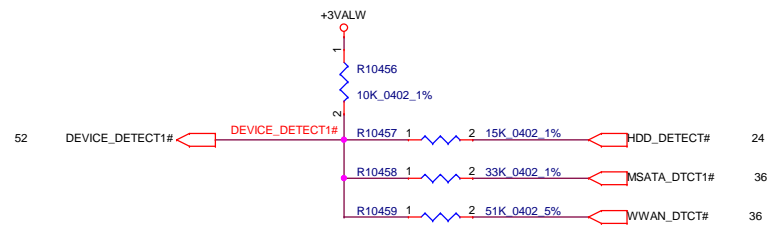


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Size Custom	Document Number WOLVERINE4 AMD	Rev SIT	
Date: Tuesday, May 08, 2017		Sheet 48 of 84	

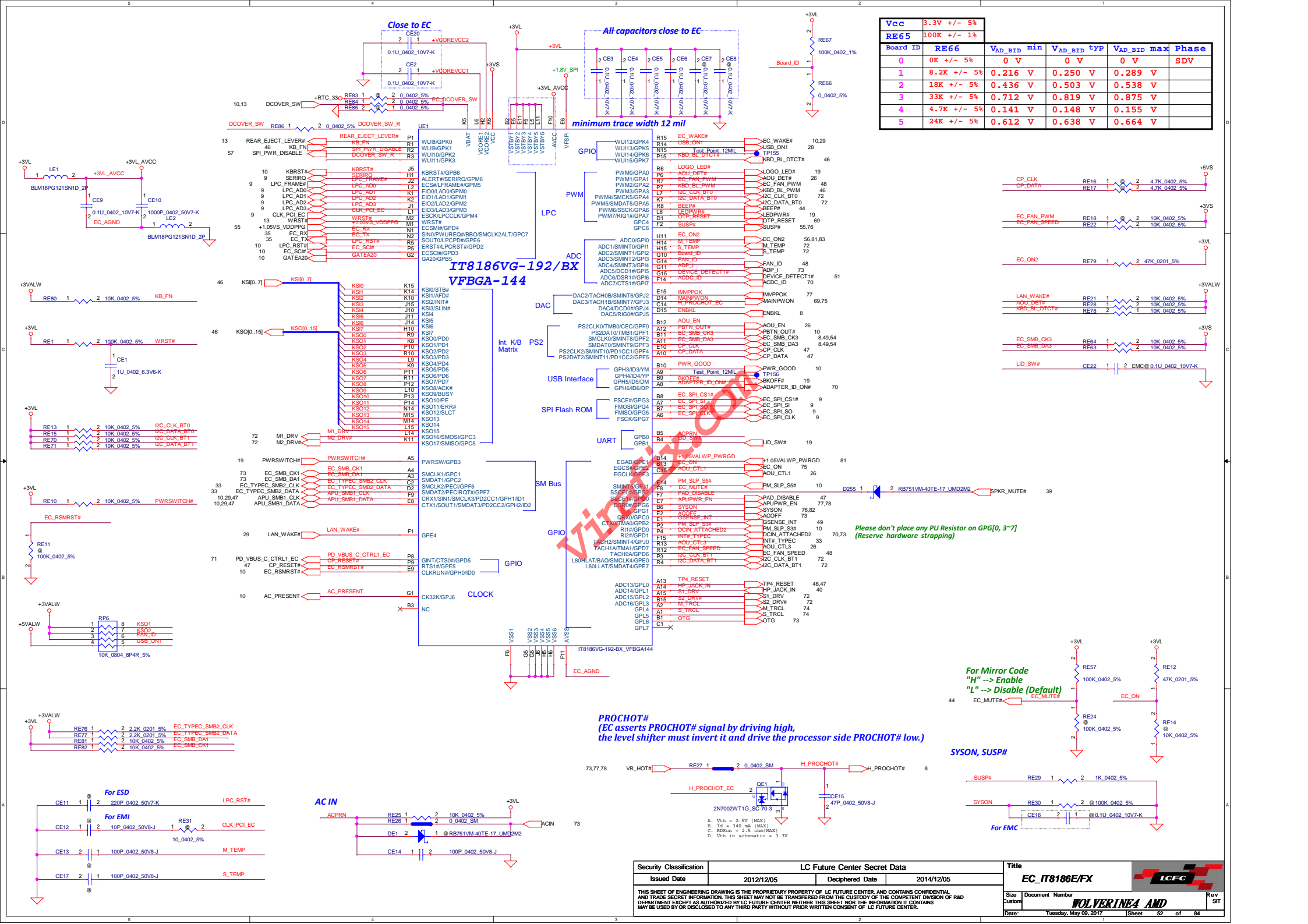


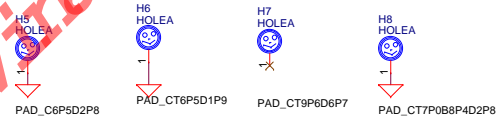
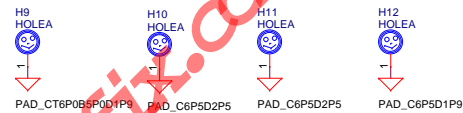
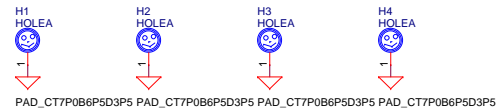
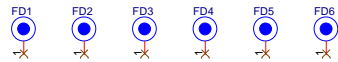
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Vcc	3.3V					
R10456	10K +/- 1%					
DEVICE_DETECT1#	1.9928V	1.6843V	1.7822V	2.7754V	2.5448V	3.3V
HDD_DETECT#	V	V	V	X	X	X
MSATA_DTCT1#	X	V	X	X	V	X
WWAN_DTCT#	X	X	V	V	X	X

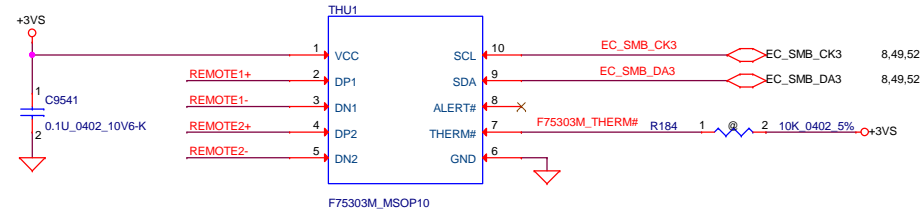
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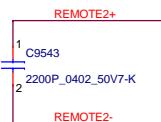
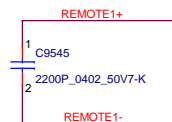
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**Thermal Sensor
placed near by VRAM**

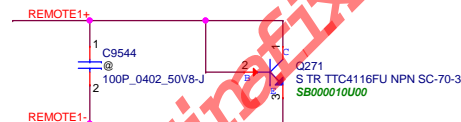


Address 1001_101xb
Internal pull up 1.2K to 1.5V
R for init i d t her nd shut do wte mp

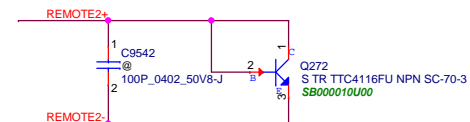
Close to U1



Close to +VCC_CORE



Close JDIMM1&JDIMM2



REMOTE2+/-:
Trace width/space:10/10 mil
Trace length:<8"

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[illegible]

52.76

5V ALW

R127
1K_0402_1%

SUSP

SUSP#

Q34
2N7002WT1G_1N_SC70-3

0.6V S

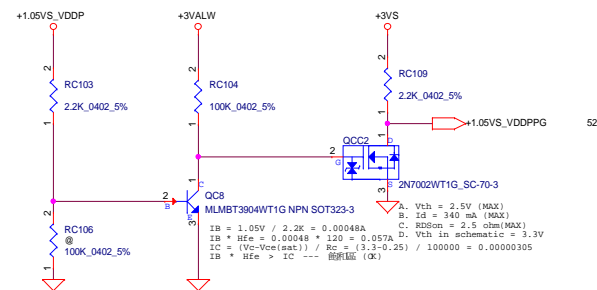
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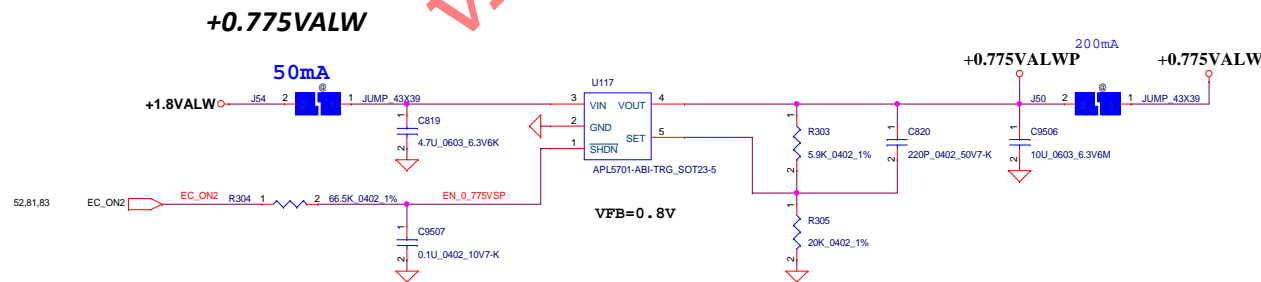
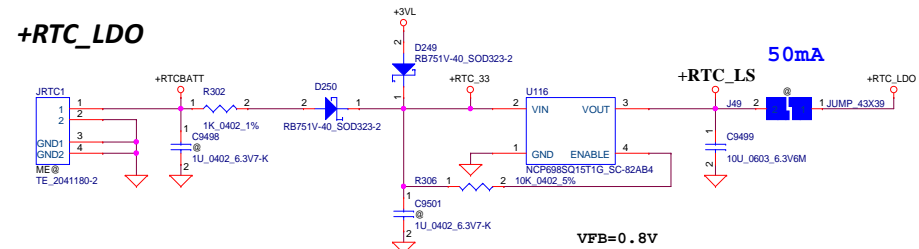
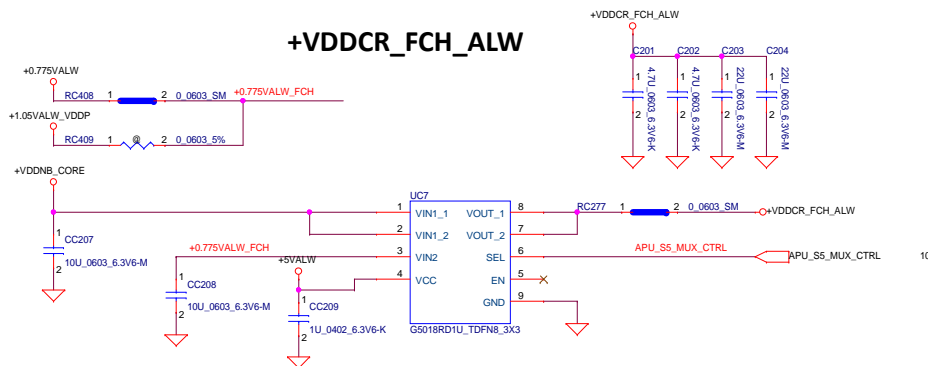
Q35
2N7002WT1G_1N_SC70-3


A. Vth = 2.5V (MAX)
B. Id = 340 mA (MAX)
C. RDSon = 2.5 ohm(MAX)
D. Vth in schematic = 3.3V

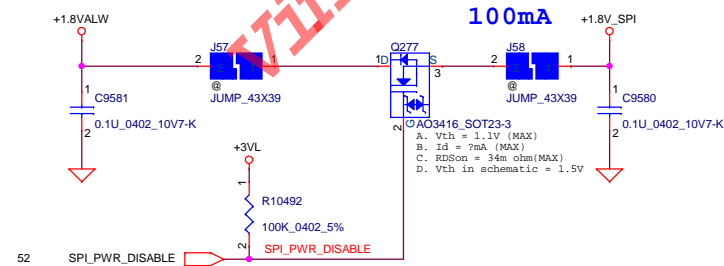
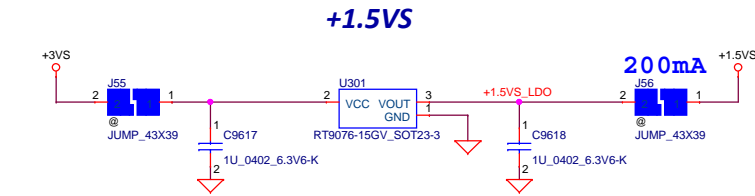
A. Vth = 2.5V (MAX)
B. Id = 340 mA (MAX)
C. RDSon = 2.5 ohm(MAX)
D. Vth in schematic = 5V




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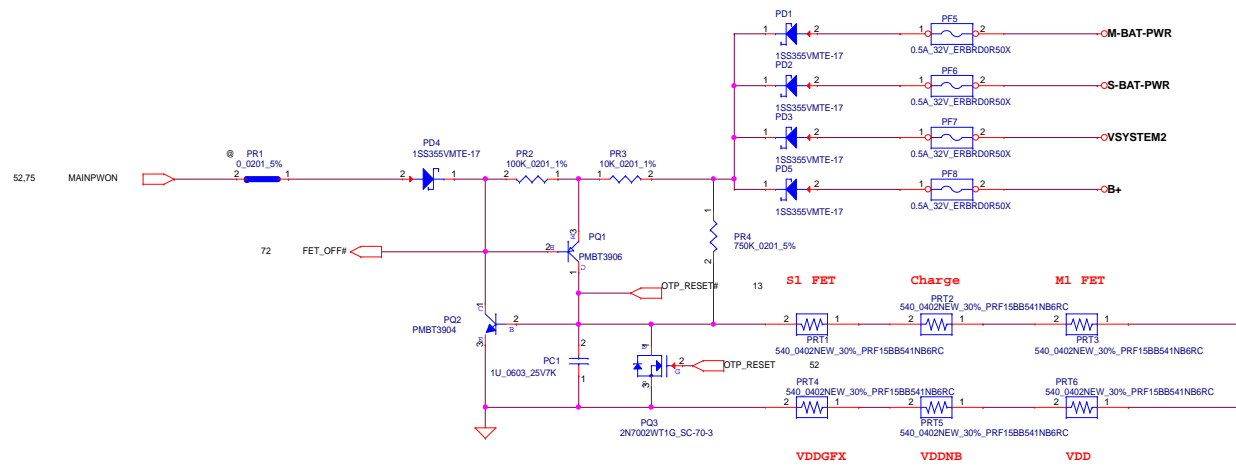
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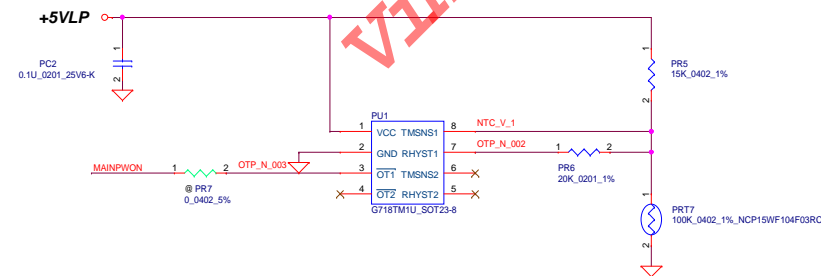
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PRT7 under CPU bottom side :
CPU thermal protection at 93 \pm 3 degree C
Recovery at 56 \pm 3 degree C



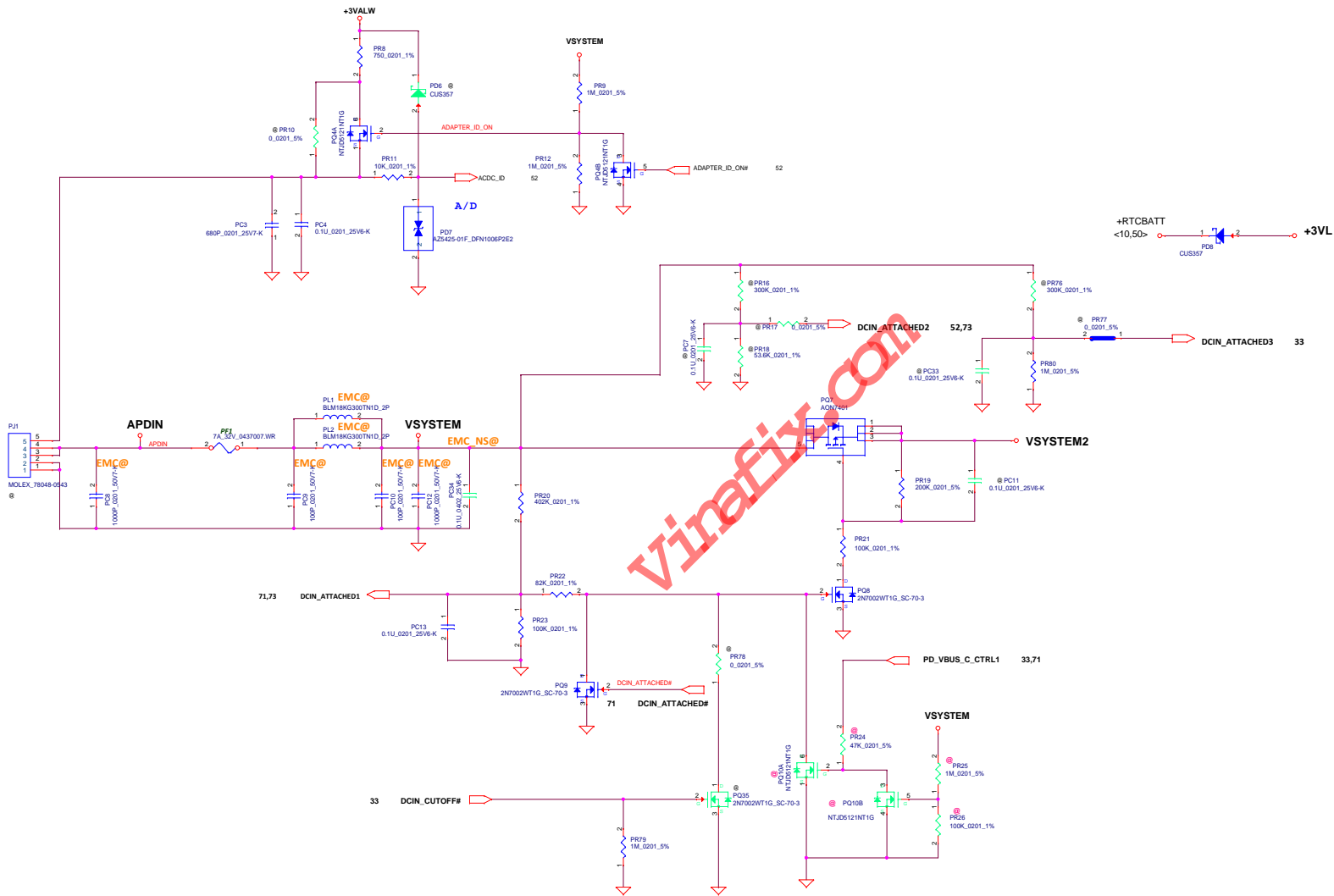
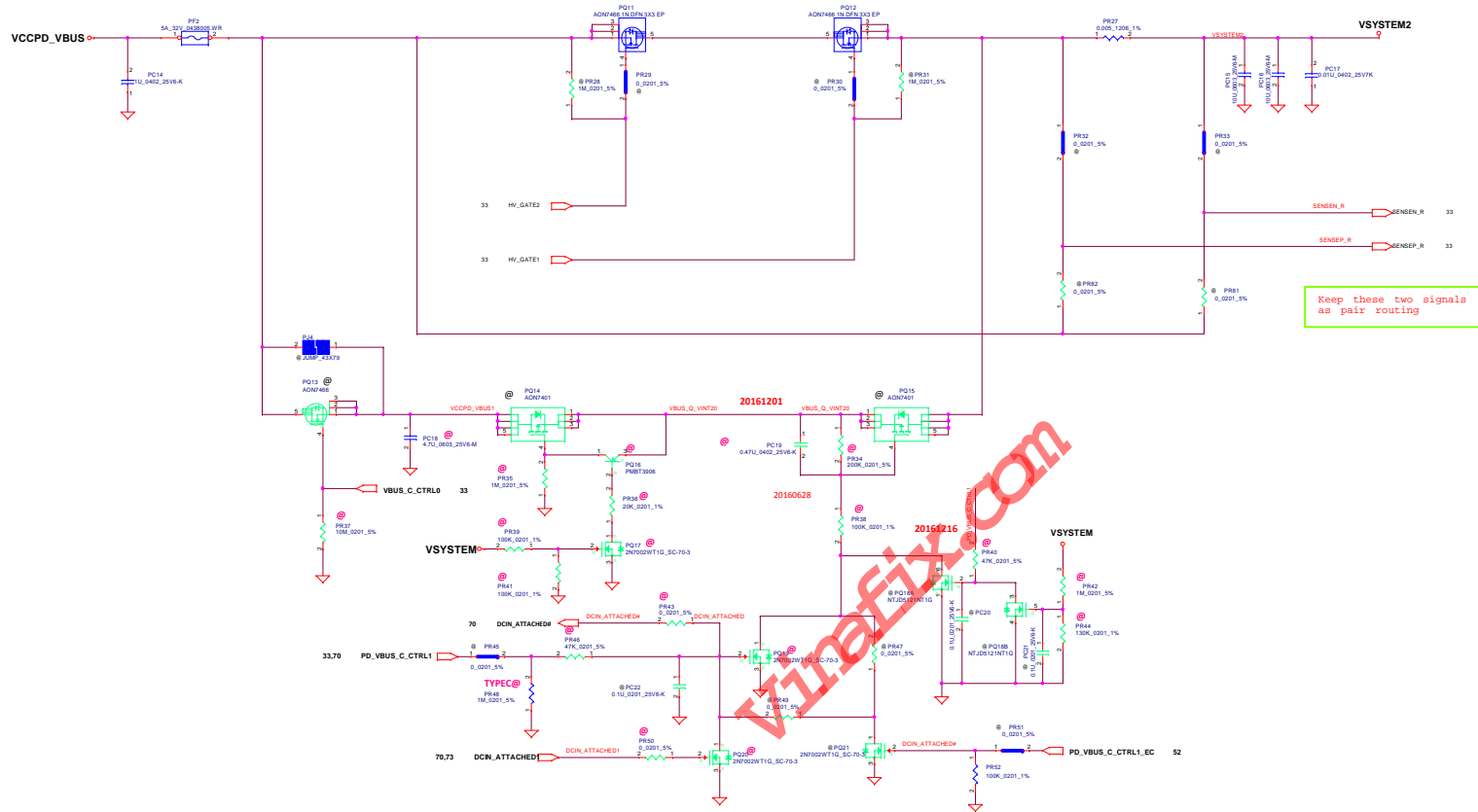
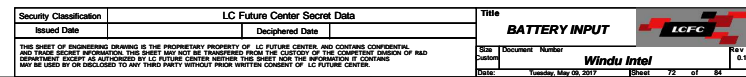
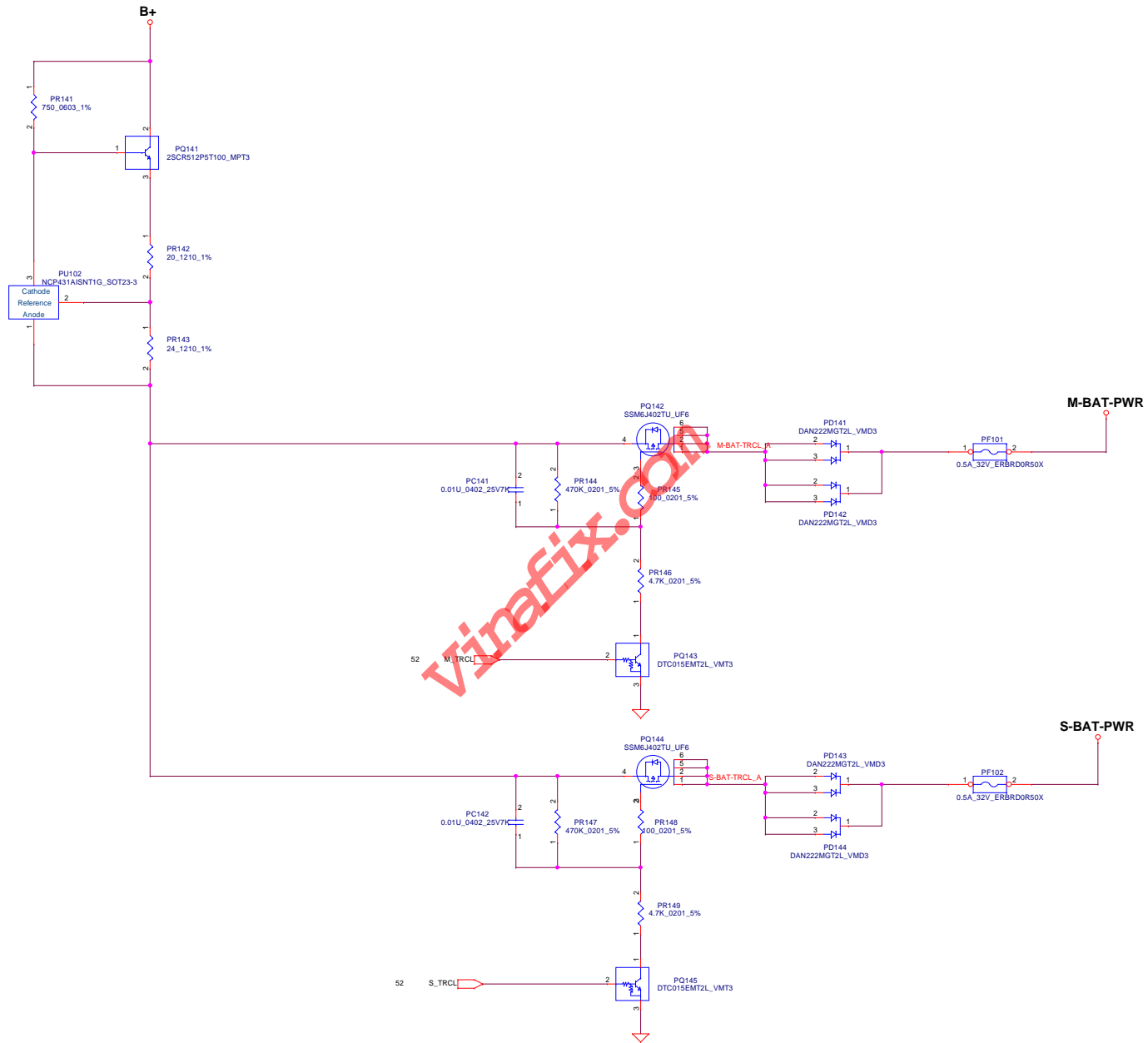


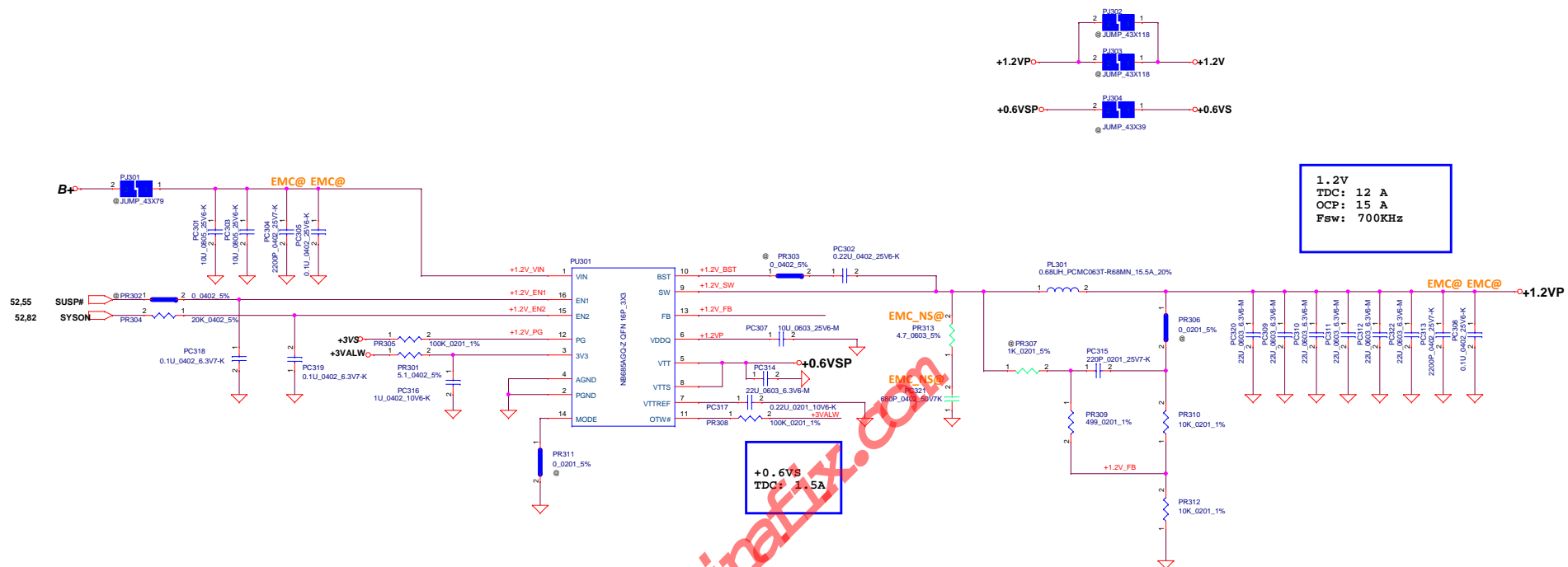
Table	PQ11-PQ12
1st : AON7466	AOS
2nd : SIS406DN	VISHAY



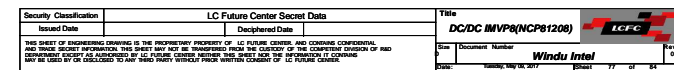
Keep these two signals as pair routing







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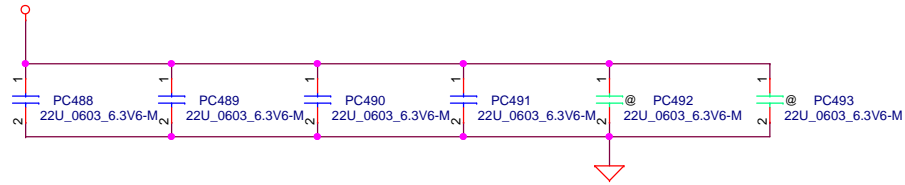


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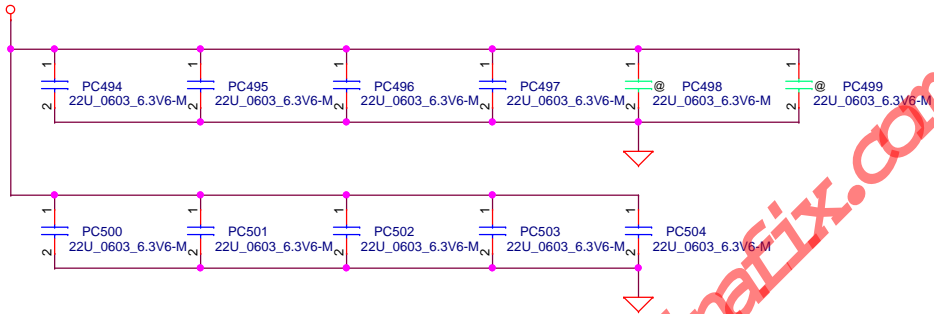
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+VDDNB_CORE

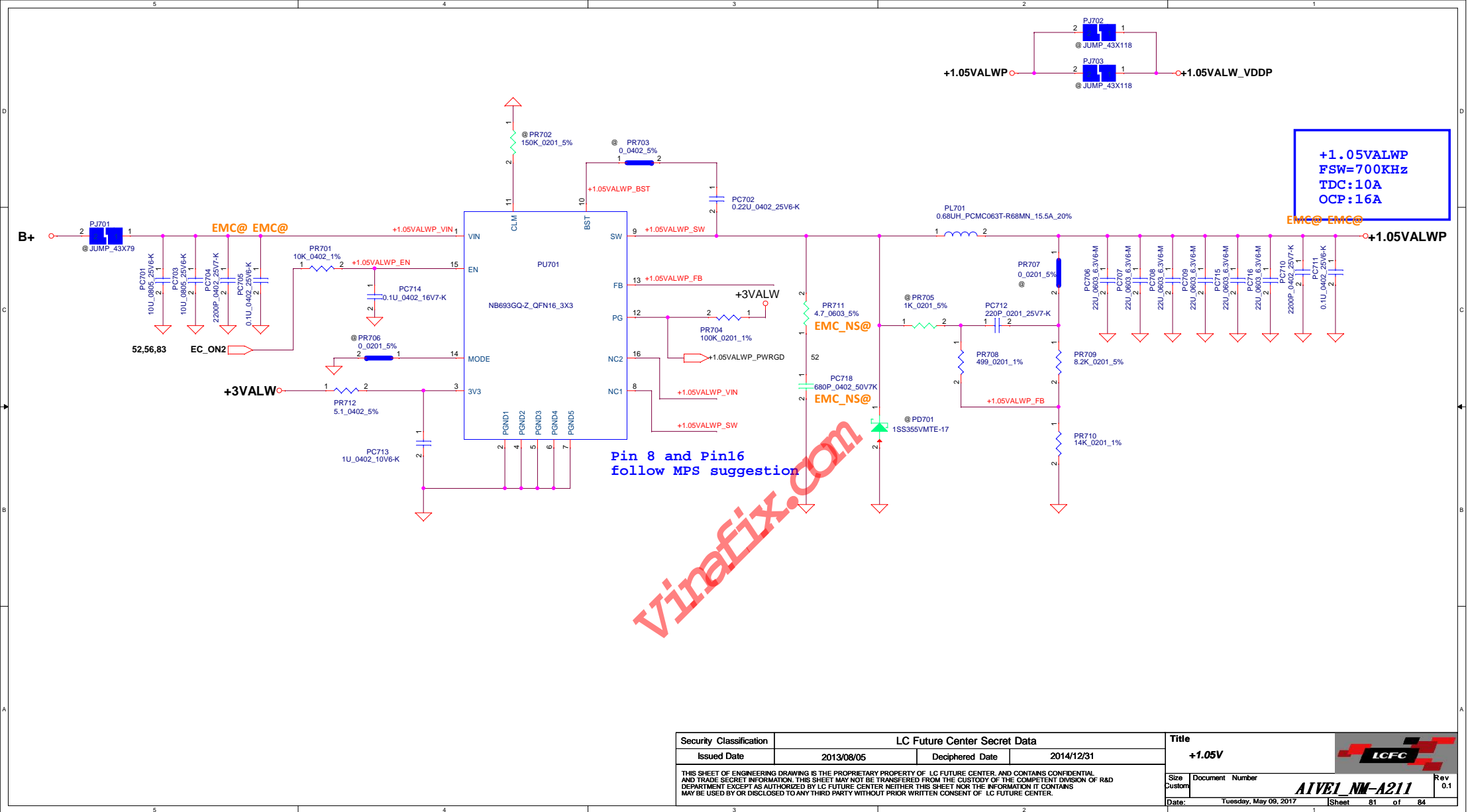


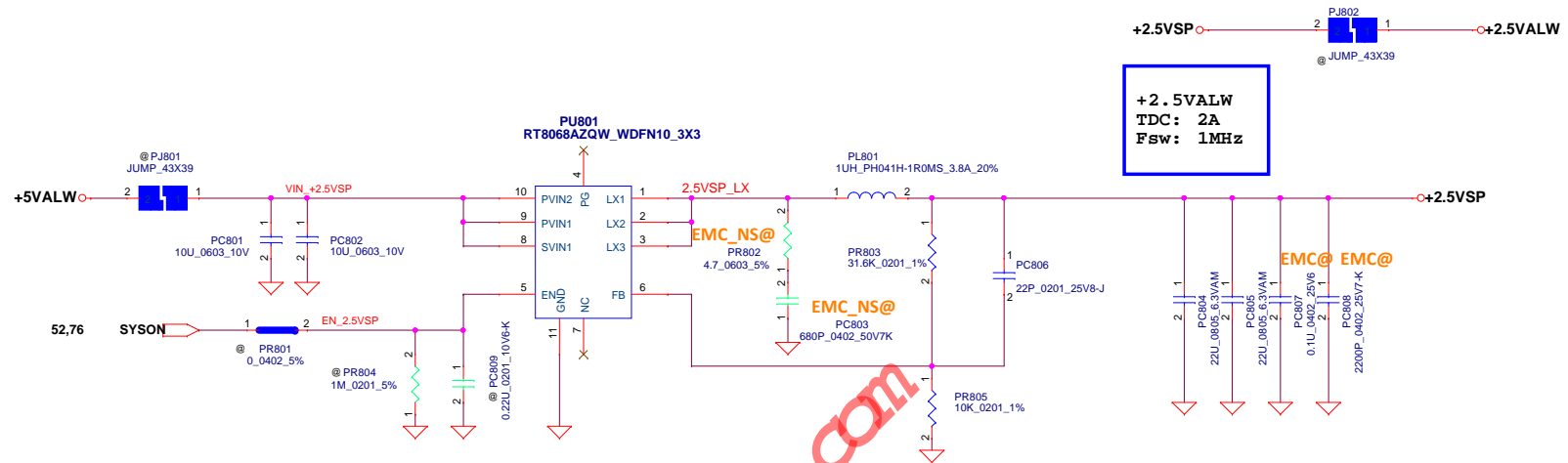
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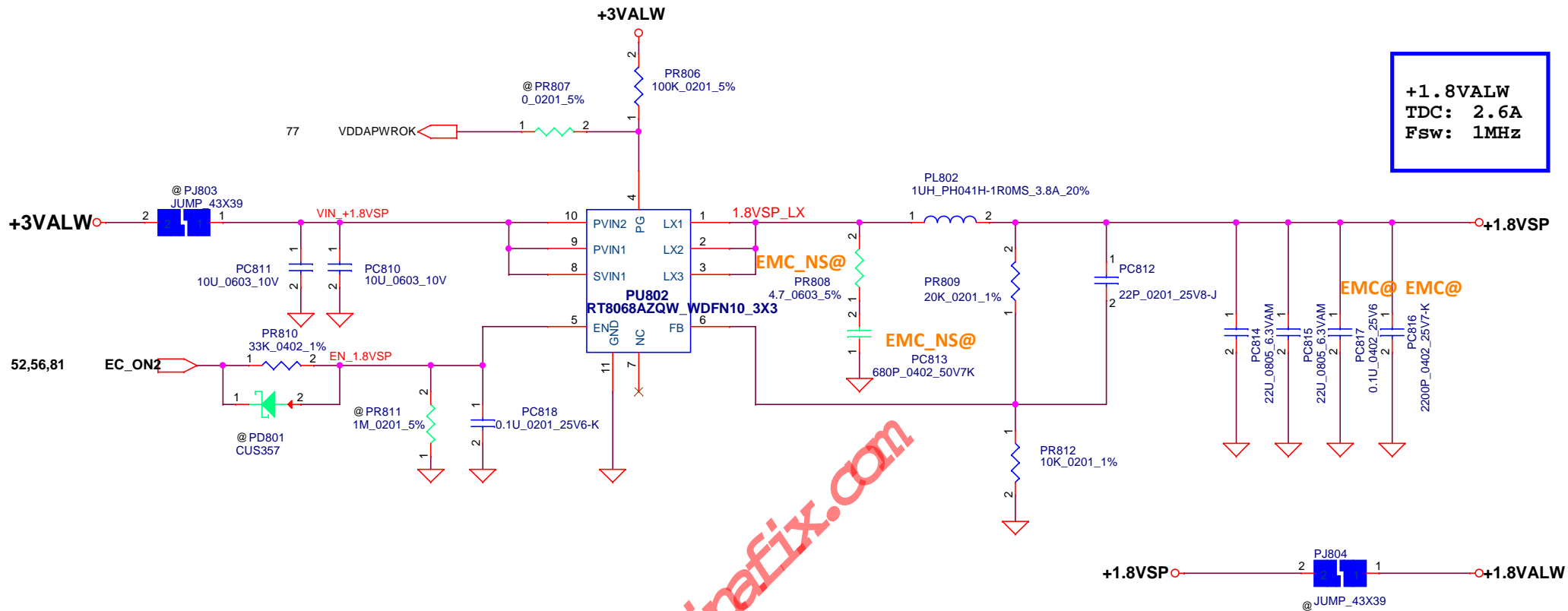
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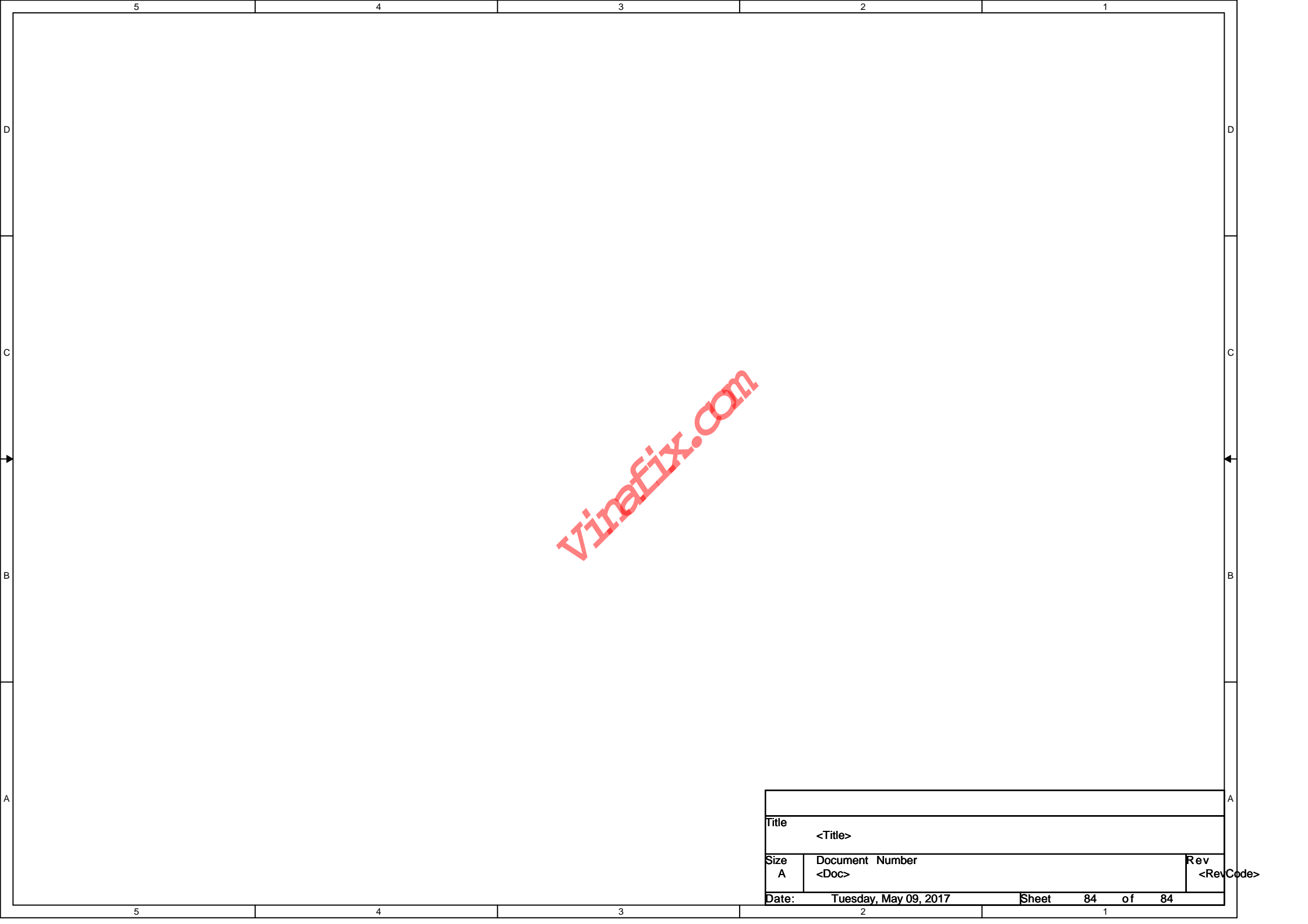




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