LCFC Confidential

L340-IRH +N18P MB Schematics Document

Coffee Lake-R with DDR4 + Nvidia N18P-G0

2018-09-21

REV:0.1

Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

Title: Cover Page

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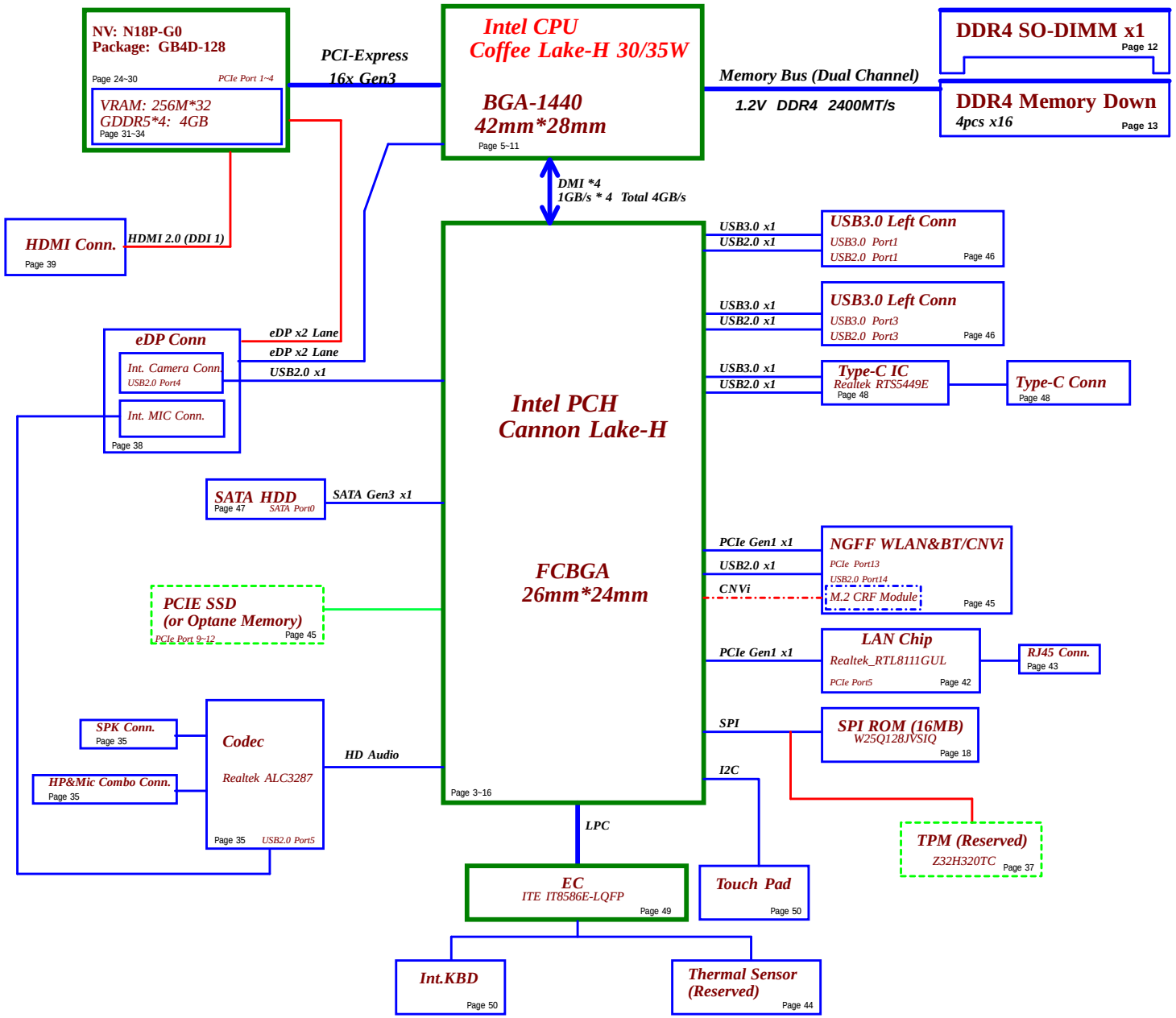

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Title: Block Diagram

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Voltage Rails (O --> Means ON , X --> Means OFF)

State \ Power Plane	V20B+	+3VALW +5VALW +3VALW_PCH +1.8VALW +1.0VALW	+1.2V +2.5V_DDR +VCCST	+5VS +3VS +VCCIO +VCCSTG +VCCSA +VCC_GT +CPU_CORE +0.6VS
S0	O	O	O	O
S3	O	O	O	X
S3 Battery only	O	O	O	X
S5 S4 AC Only	O	O	X	X
S5 S4 Battery only	O	X	X	X
S5 S4 AC & Battery don't exist	X	X	X	X

STATE \ SIGNAL		SLP_S3#	SLP_S4#	SLP_S5#	+VALW	+V	+VS	Clock
Full ON		HIGH	HIGH	HIGH	ON	ON	ON	ON
S3 (Suspend to RAM)		LOW	HIGH	HIGH	ON	ON	OFF	OFF
S4 (Suspend to Disk)		LOW	LOW	LOW	ON	OFF	OFF	OFF
S5 (Soft OFF)		LOW	LOW	LOW	ON	OFF	OFF	OFF

SMBUS Control Table

	SOURCE	BATT	Charger	DGPU	IT8586E	Memory Down	PCH	PMIC	SODIMM	Thermal Sensor	WLAN WiMAX
EC_SMB_CK1 EC_SMB_DA1	IT8586E +3VL_EC	V	V	X	V +3VL_EC	X	X	X	X	X	X
EC_SMB_CK2 EC_SMB_DA2	IT8586E +3VS	X	X	V +3VG_AON	V +3VS	X	V +3VALW_PCH	X	X	V	X
EC_SMB_CK3 EC_SMB_DA3	IT8586E +3VL_EC	X	X	X	V +3VL_EC	X	X	V	X	X	X
PCH_SMB_CLK PCH_SMB_DATA	PCH +3VALW_PCH	X	X	X	X	X	V +3VALW_PCH	X	V +3VS	X	V +3VS

HSIO PORT		Function
USB3.0	1	USB3.0 Conn Left
	2	USB Type-C
	3	USB3.0 Conn Left
	4	NC
	5	NC
	6	NC
USB2.0	1	USB3.0 Conn Left
	2	USB Type-C
	3	USB3.0 Conn Left
	4	Finger Print
	5	Cardreader
	6	Touch Panel
	7	Bluetooth
	8	Camera
	9	NC
	10	NC
PCIE	1~4 X4 PCIE	DGPU
	5	LAN
	6	WLAN
	7	SATA HDD
	8	SATA ODD
	9~12 X4 PCIE	Optane Memory
SATA	0	HDD
	1A	ODD
	1B	used as PCIE
	2	used as PCIE

BOM Structure	BTO Item
@	Not stuff
14@	For 14" part
15@	For 15" part
17@	For 17" part
15or17@	For 15" or 17" part
Cannonlake@	For Cannonlake part
CD@	For C cost down
DUALMIC@	For Dual MIC part
EMC@	For EMC part
EMC_15@	For EMC 15" part
EMC_NS@	For EMC nu-stuff part
EMC_PX@	For EMC PX part
EMC_PXNS@	For EMC PX nu-stuff part
ES@	For ES CPU
EXO@	For EXO GPU
ME@	For ME part
TS@	For touch screen part
TS_NS@	For nu-touch part
DIS@	For GPU part
OPT@	For NV GPU part
PX@	For AMD GPU part
RANKA@	For VRAM rank A part
RANKB@	For VRAM rank B part
Realtek_SD@	For Realtek SD part
SINGLEMIC@	For single MIC part
SINGLERANK@	For single VRAN rank part
DUALRANK@	For dual VRAN rank part
TPM@	For TPM part
UMA@	For UMA part

EC SMBus1 address

Device	Address
Smart Battery	need to update
Charger	0001 0010 b

EC SMBus2 address

Device	Address
Thermal Sensor(NCT7718W)	1001_100xb
PCH	need to update
DGPU	need to update

EC SMBus3 address

Device	Address
PMIC	need to update

PCH SM Bus address

Device	Address
DDR4 SODIMM	need to update
Wlan	Reserved

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Title: Notes List

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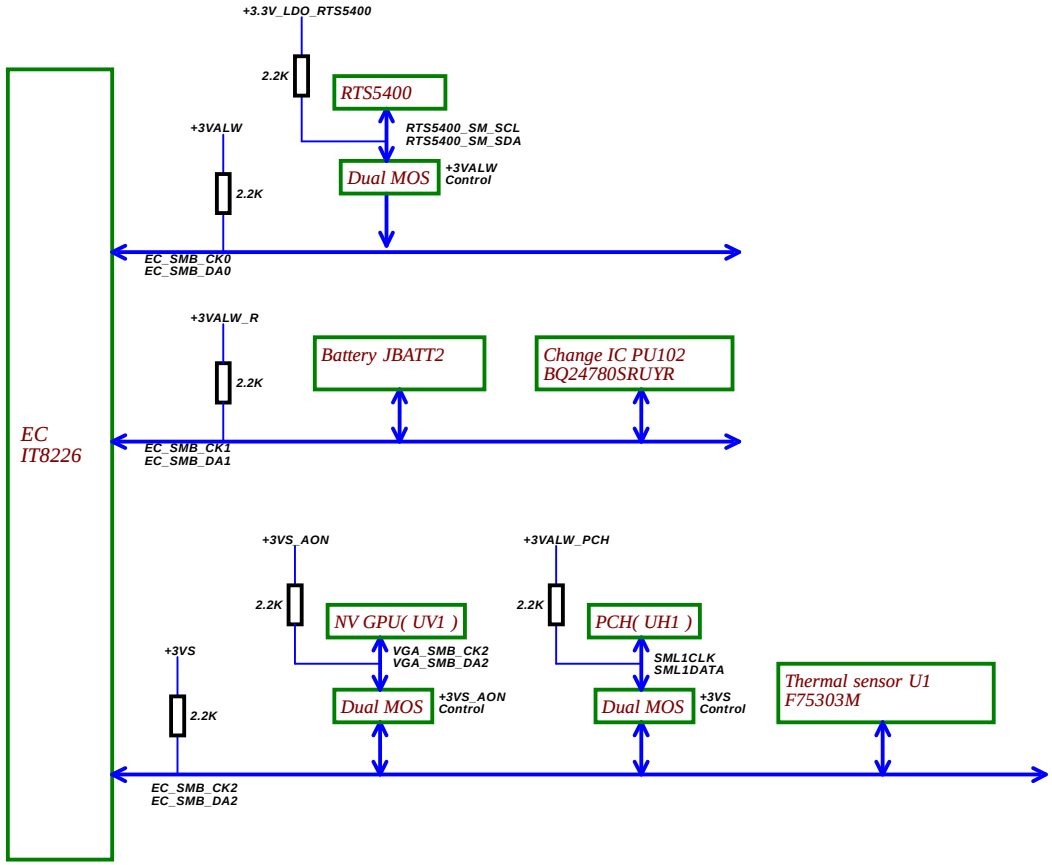

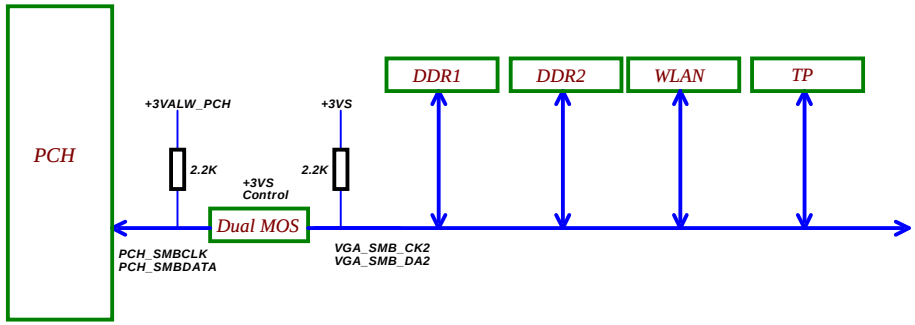

SMBUS Control Table

	SOURCE	VGA	BATT	IT8586E	SODIMM	WLAN WiMAX	Thermal Sensor	PCH	TP Module	charger
EC_SMB_CK1 EC_SMB_DA1	IT8226 +3VALW	X	V	V +3VALW	X	X	X	X	X	V
EC_SMB_CK2 EC_SMB_DA2	IT8226 +3VS	V +3VGS	X	V +3VS	X	X	V +3VS	V +3VALW_PCH	X	X
PCH_SMB_CLK PCH_SMB_DATA	PCH +3VALW_PCH	X	X	X	V +3VS	V +3VS	X	V +3VALW_PCH	X	X

EC SM Bus1 address

Device	
Smart Battery	0X16
Charger	0001 0010 b

EC SM Bus2 address

Device	Address
Thermal Sensor F75303M	1001_100xb
VGA	0x41(default)
PCH	need to update
RTS5400	0xD4

PCH SM Bus address

Device	Address
DDR DIMMA	1010 000Xb
DDR DIMMB	1010 010Xb
WLAN	Rsvd

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Title: Blank4

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Title: **CPU (1/7) DMI,PEG**

Size	Document Number	Rev
Custom	FG541/FG741	0.1

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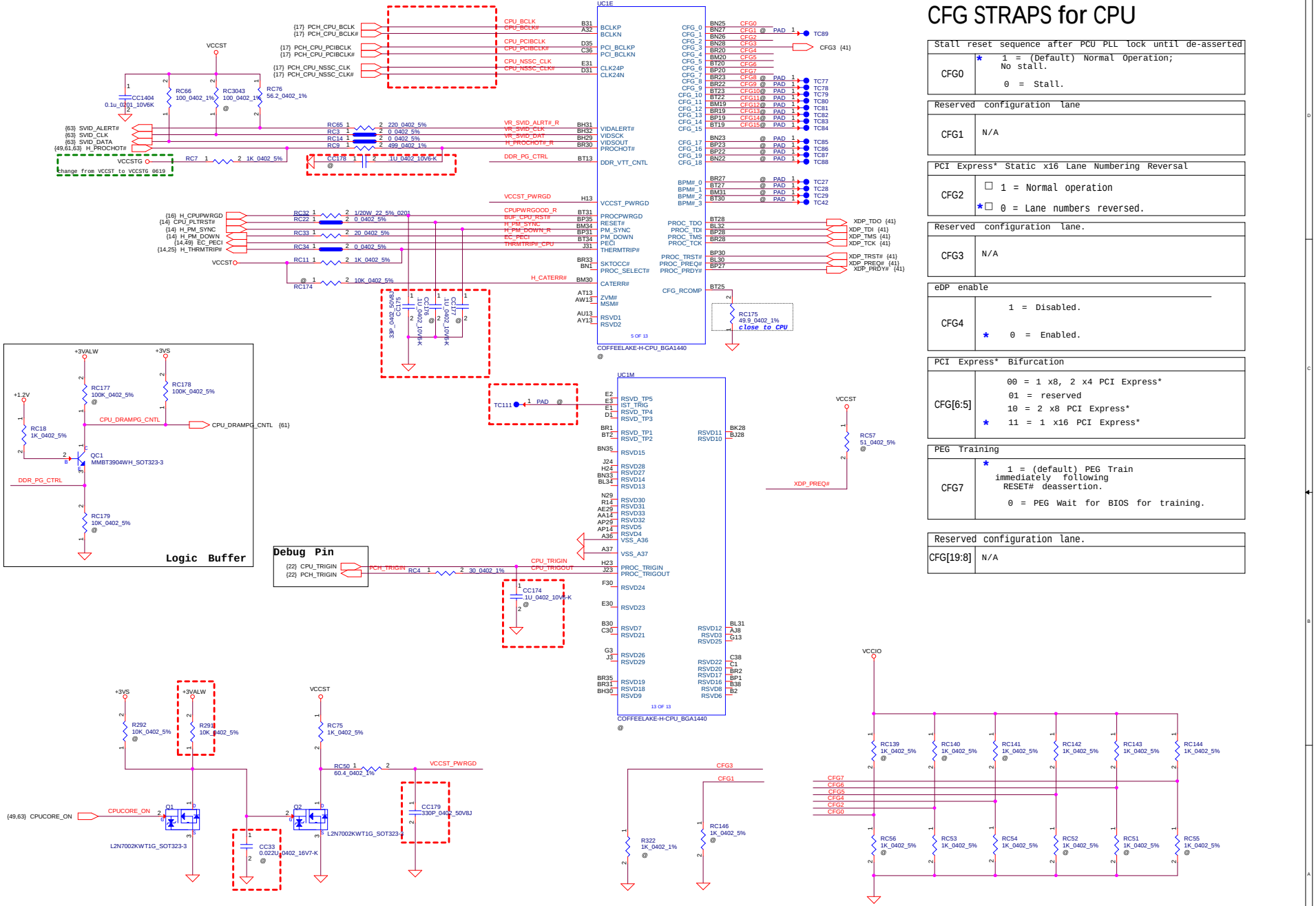

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Title: CPU (2/7) PM, XDP, CLK, CFG

Size: Custom | Document Number: FG541/FG741 | Rev: 0.1

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Title: CPU (3/7) DDRVI

Size	Document Number	Rev
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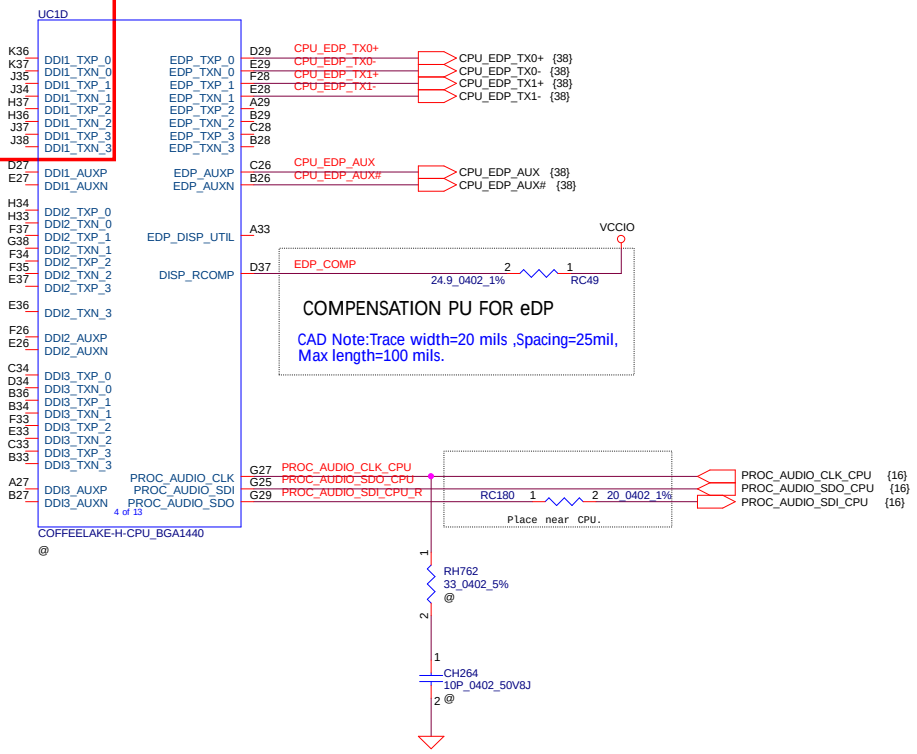
change HDMI DDI from CPU to GPU



Security Classification	LC Future Center Secret Data		
Issued Date	2015/02/26	Deciphered Date	2018/09/20

Title: CPU (4/7) eDP, DDI

Size A3	Document Number FG541/FG741	Rev 0.1
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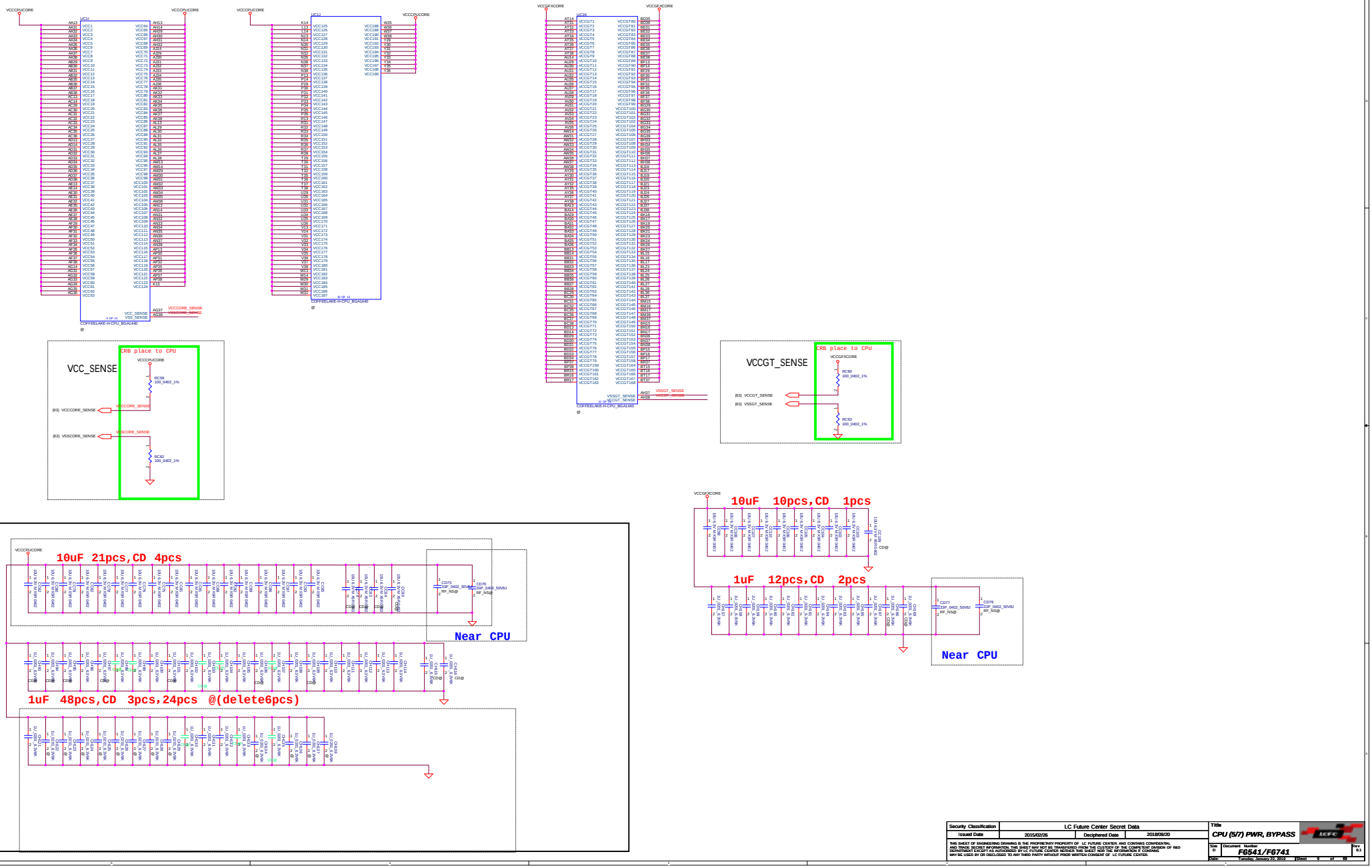

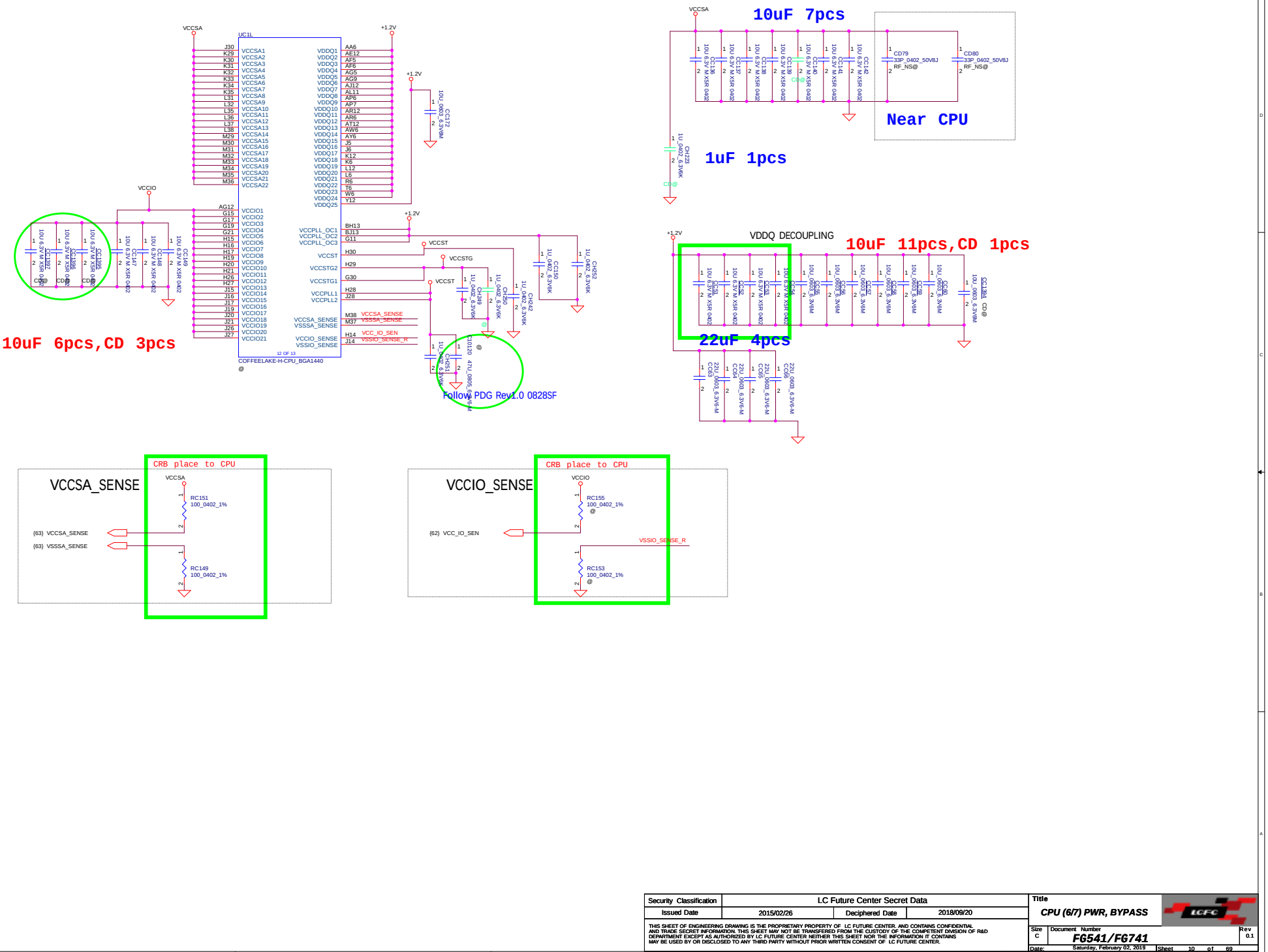

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Title	CPU (6/7) PWR, BYPASS
Size	C
Document Number	FG541/FG741
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Date:	Saturday, February 02, 2019
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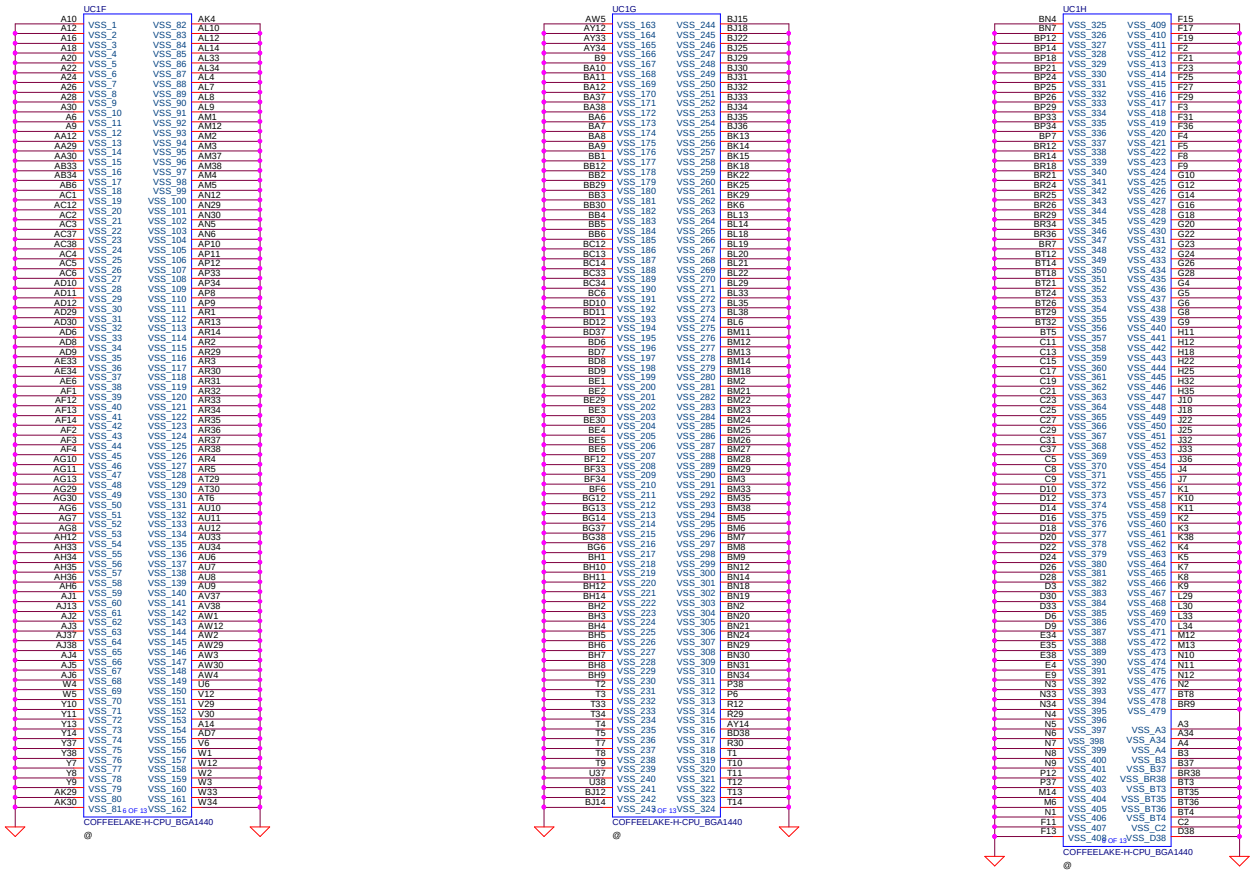

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Issued Date	2015/02/26	Deciphered Date	2018/09/20

Title: CPU (6/7) PWR, VSS

Size	Document Number	Rev
C	FG541/FG741	0.1

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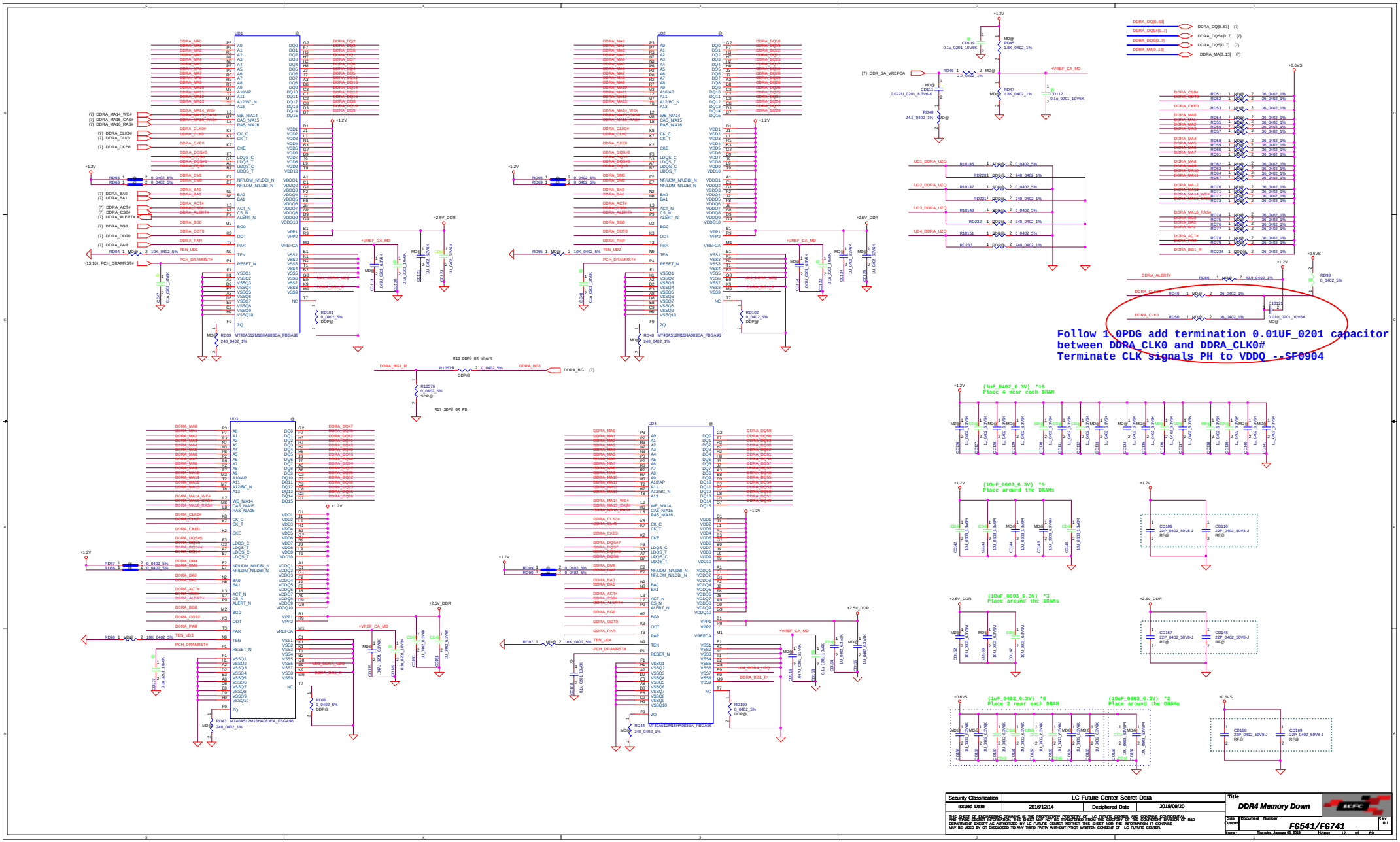

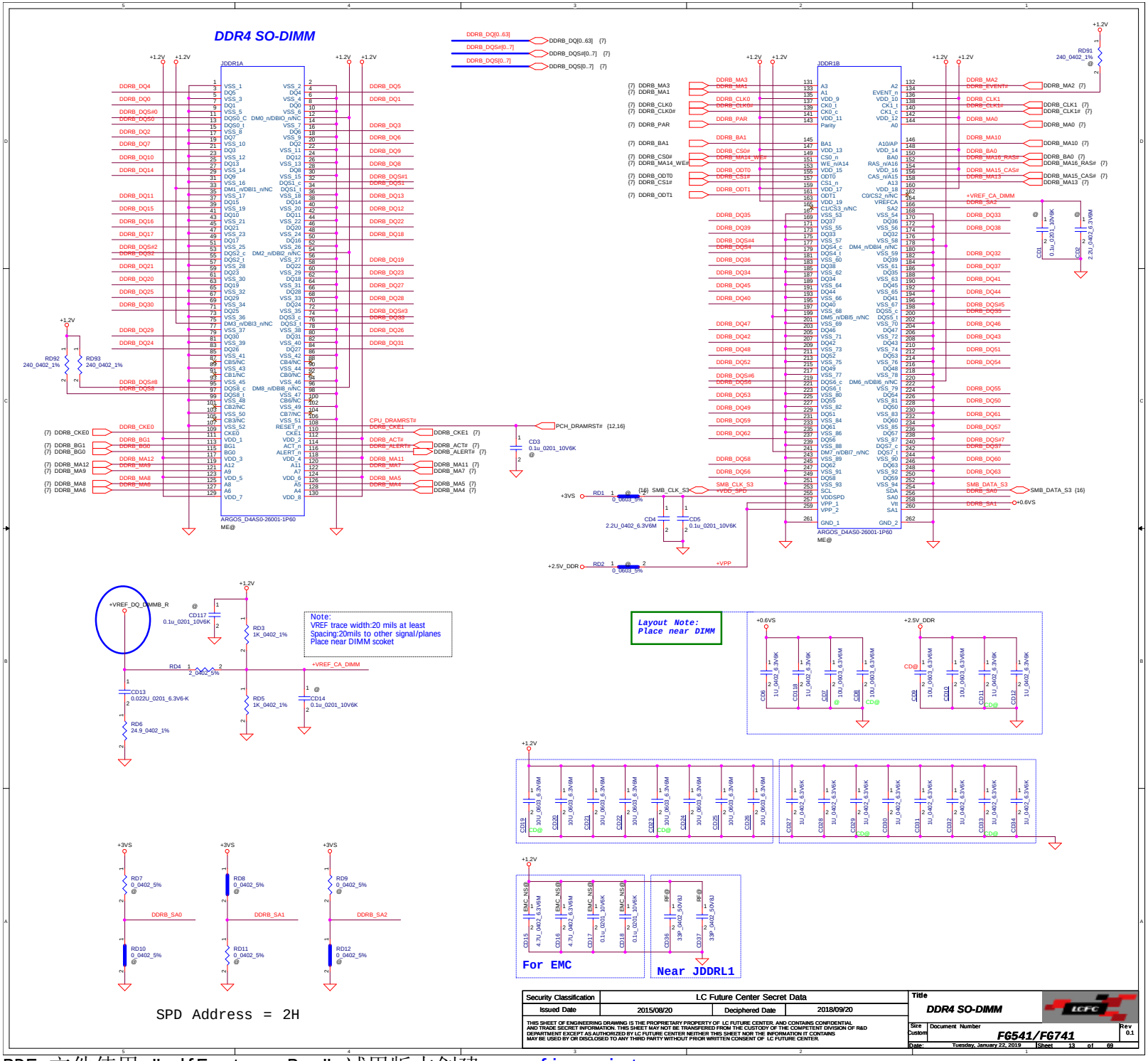

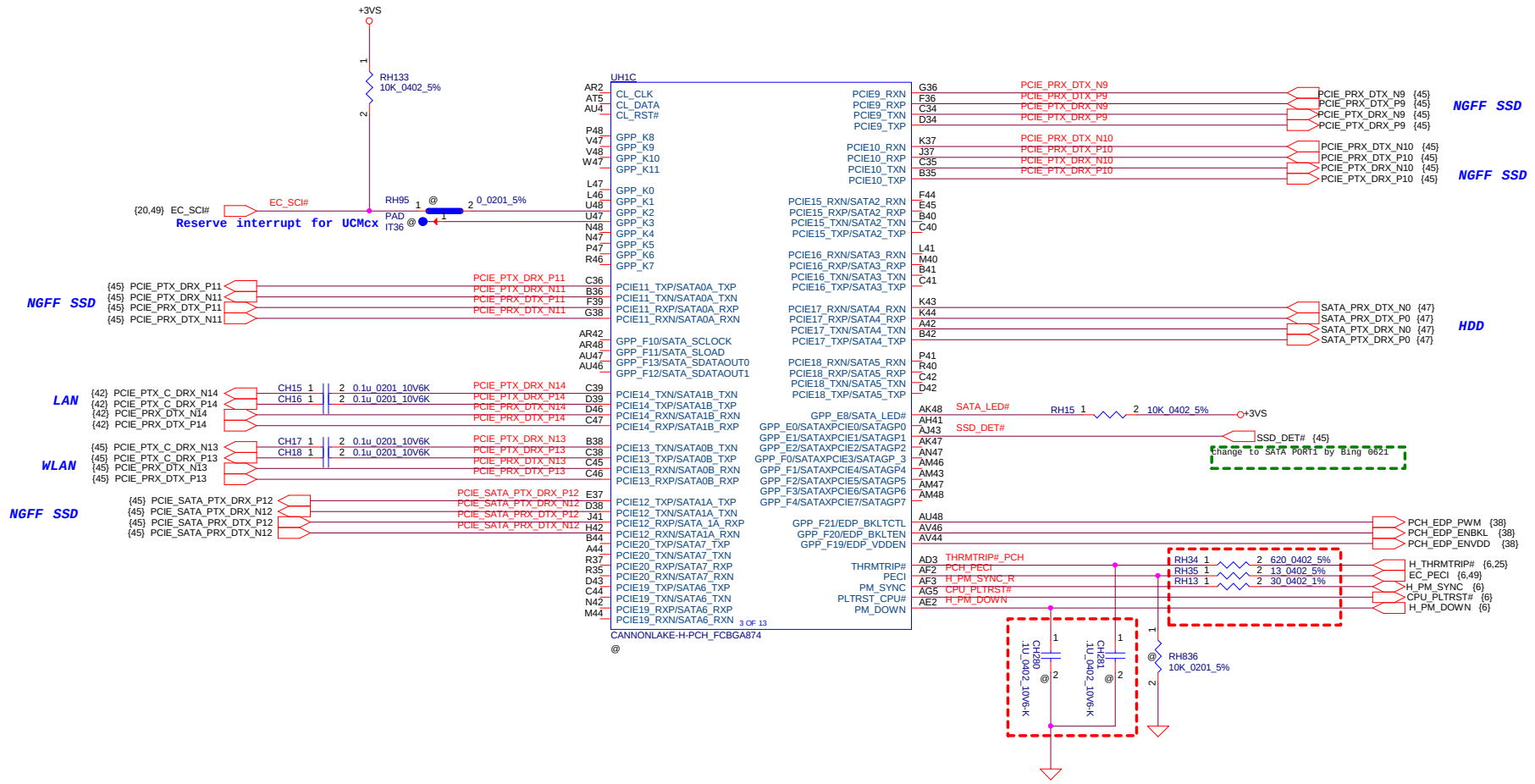

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Title: PCH (1/9) PCIe/SATA/GPPFG

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HM370 only have 4(#1-#4) USB3.1 GEN2 port

Follow PDG add R/C 1010SF close to PCH

LEFT USB3.0 / Type-C

LEFT USB3.0 / Type-C

NGFF SSD

change DEVSLP to SATA Port1 by Bing 0621
H:Sleep Mode
L:Active Mode

reserved for EMC need 0803SF

DDPB_CTRLDATA
The signal has a weak internal pull-down.
H Port B is detected.
L Port B is not detected.

DDPC_CTRLDATA
The signal has a weak internal pull-down.
H Port C is detected.
L Port C is not detected. (Default)

DDPD_CTRLDATA
The signal has a weak internal pull-down.
H Port D is detected.
L Port D is not detected. (Default)

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Title: **PCH (2/9) USB3/GPPAEFGHI**

Size	Document Number	Rev
A3	**FG541/FG741**	0.1

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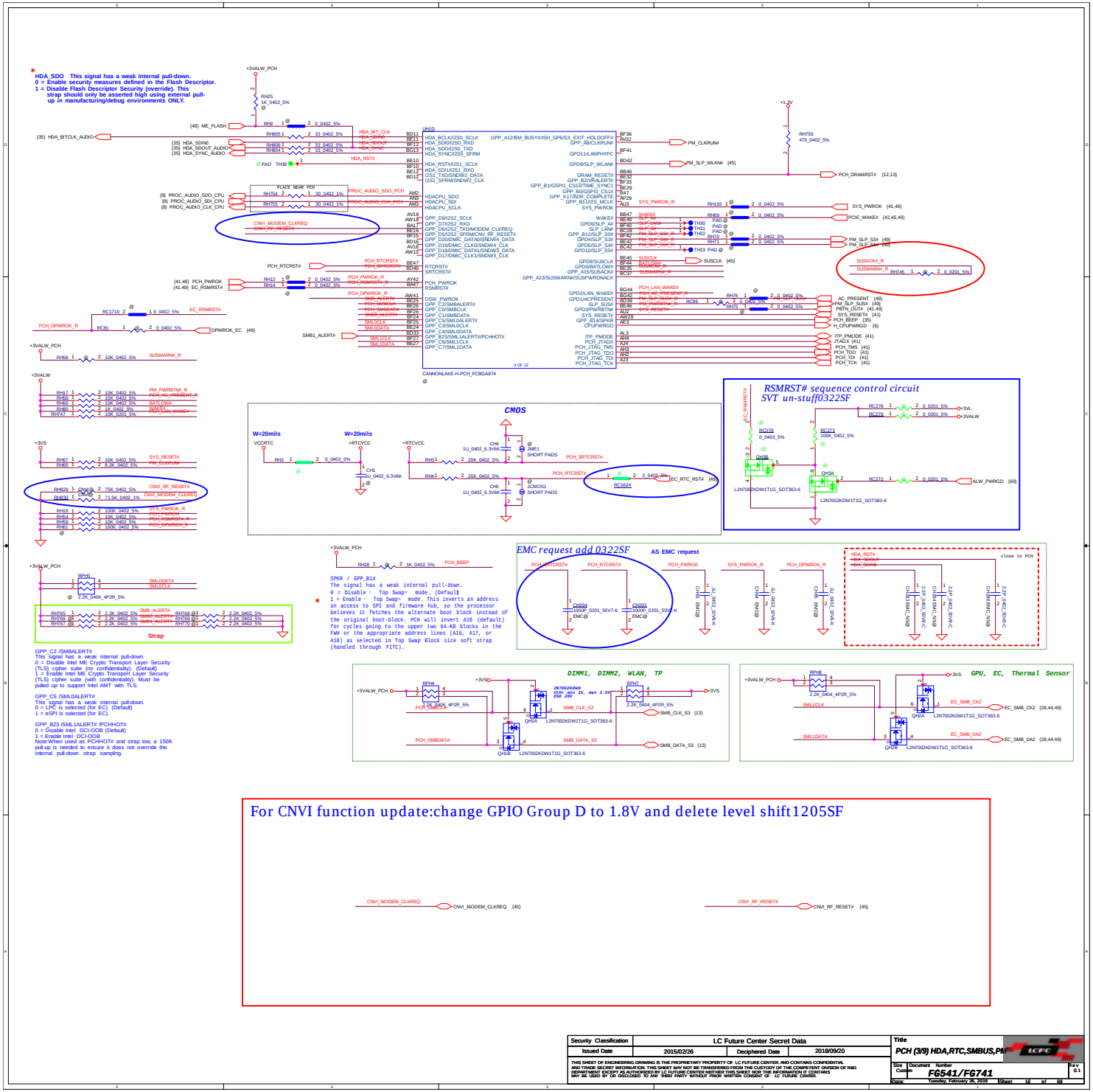

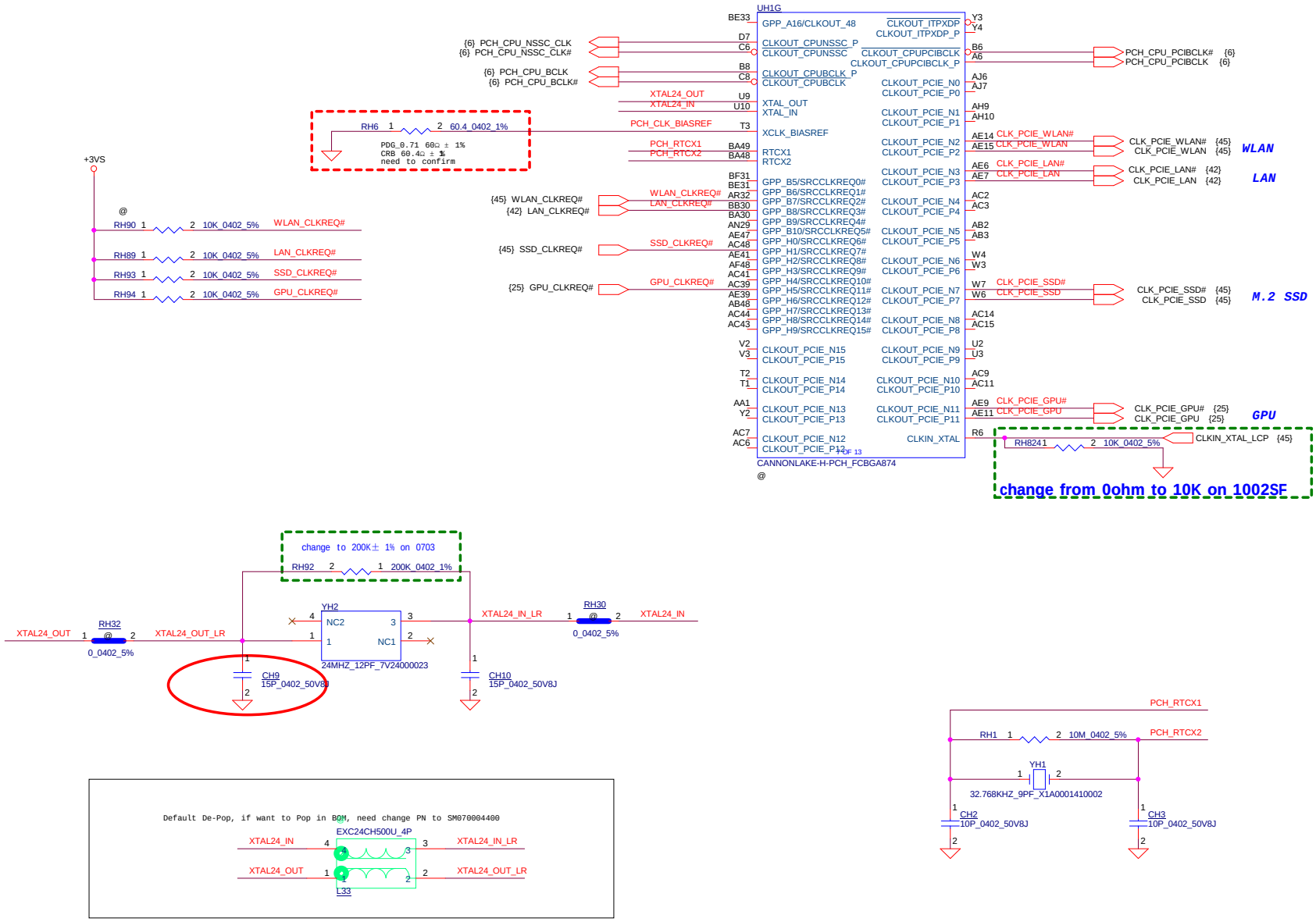

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Issued Date	2015/02/26	Deciphered Date	2018/09/20

Title: **PCH (3/9) CLOCK,GPPBH**

Size	Document Number	Rev
A3	FG541/FG741	0.1

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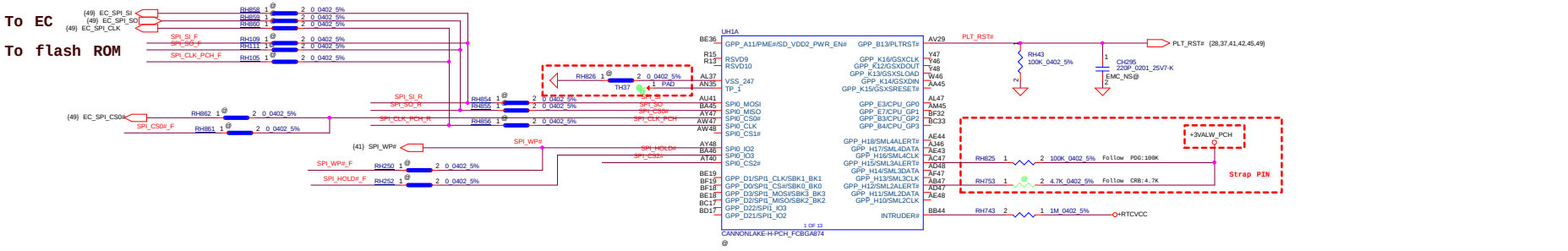

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Title: PCH (5/9) SPI,SMBUS,GPPBEGH

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A2	FG541/FG741	0.1

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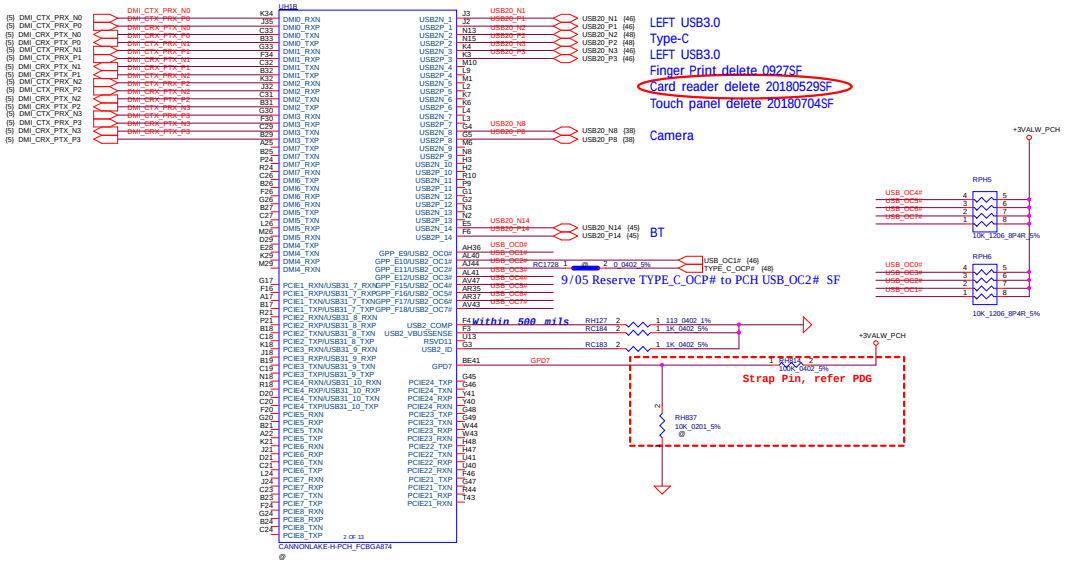

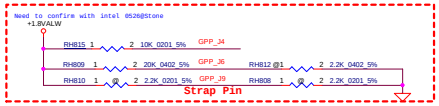

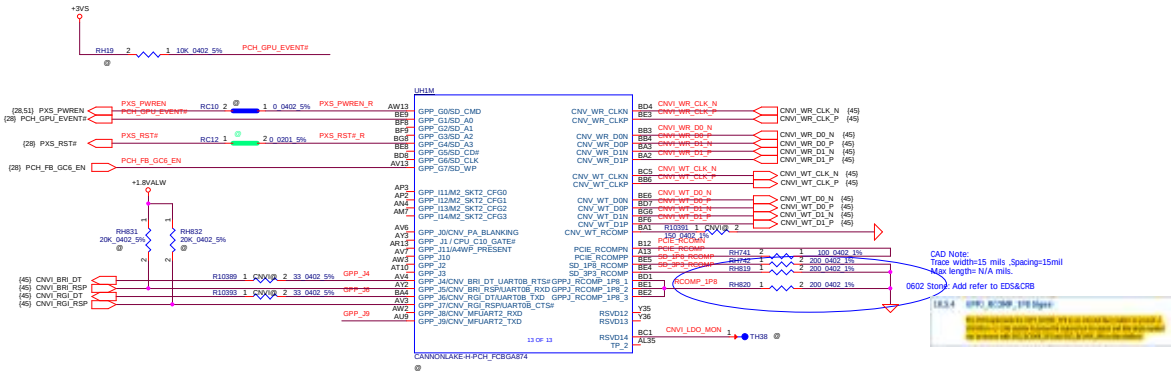

Primary Well Group J (1.8 V Only)

Signal	Usage	When Sampled	Comment
GPP_J4 / CNV_BRI_DT / UART0_RTS#	XTAL Frequency Select	Rising edge of RSMRST#	This signal has a weak internal pull-down. An external pull-up is required on this strap since 38.4 MHz XTAL is not supported on the PCH. 0 = 38.4 XTAL frequency selected. (Default) 1 = 24MHz XTAL frequency selected. **Notes:** 1. The internal pull-down is disabled after RSMRST# de-asserts. 2. This signal is in the primary well.
GPP_J6 / CNV_RGI_DT / UART0_TXD	M.2 CNV Mode Select	Rising edge of RSMRST#	An external pull-up or pull-down is required. 0 = Integrated CNVi enable. 1 = Integrated CNVi disable.
GPP_J9	1.8V VCCSPI	Rising edge of RSMRST#	The signal has a weak internal pull-down 0 = VCCSPI is connected to 3.3V rail 1 = VCCSPI is connected to 1.8V rail **Note:** If VCCSPI is connected to 1.8V rail, this pin strap must be a '1' for the proper functionality of the SPI (Flash) I/Os

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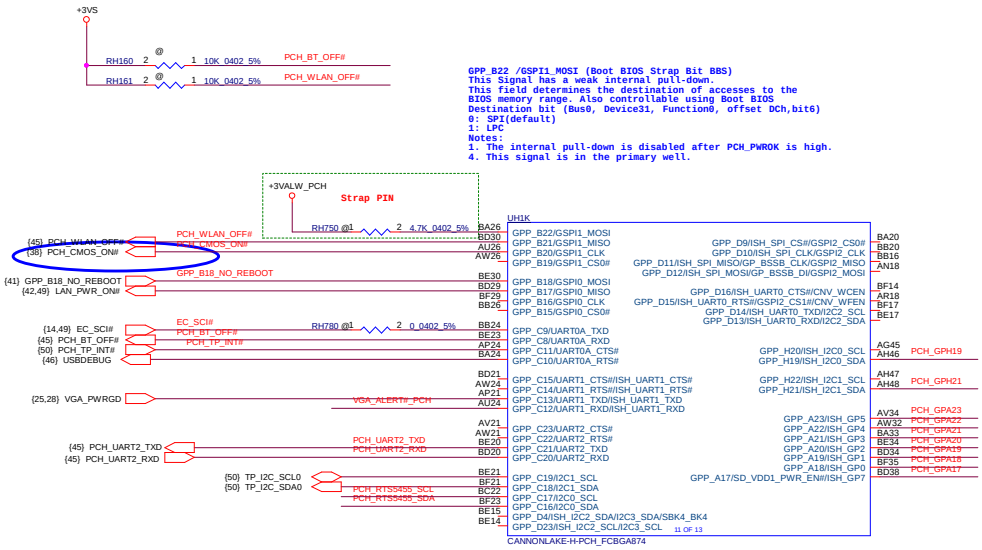
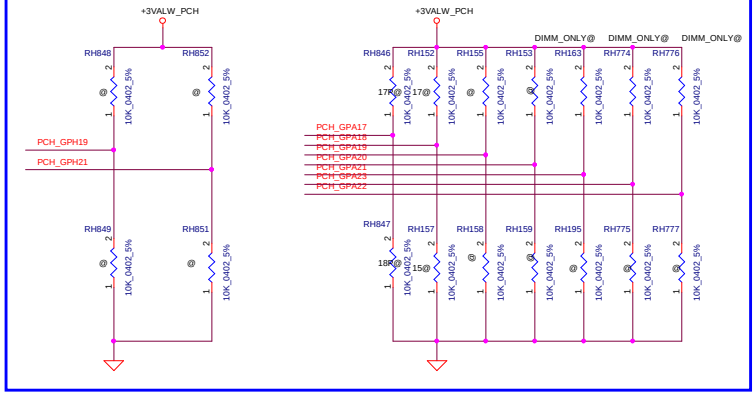
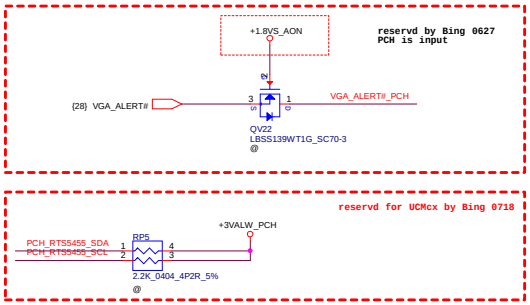


Bit 6	Boot BIOS Destination
0	SPI (Default)
1	LPC

Add Board ID reserve 1130SF





SKU ID

Board ID		Description	Stuff R
PCH_GPA18	0	15" EG530	RH157
	1	17" EG730	RH152
PCH_GPA19	0	non-touch	RH158
	1	touch	RH155
PCH_GPA20	0	non-KB BL	RH159
	1	KB BL	RH153
PCH_GPA17	0	Reserved	RH847
	1	Reserved	RH846
PCH_GPH19	0	Reserved	RH849
	1	Reserved	RH848
PCH_GPH21	0	Reserved	RH851
	1	Reserved	RH852

DRAM	Memory Down(DDR4)		DRAMCFG	PCH_GPA23	PCH_GPA22	PCH_GPA21
	Samsung 8Gb 2666 MT/s		0(0x000)	L/RH775	L/RH777	L/RH195
8Gb	Hynix 8Gb 2666 MT/s		1(0x001)	L/RH775	L/RH777	H/RH163
	Micron 8Gb 2666 MT/s		2(0x010)	L/RH775	H/RH776	L/RH195
	Samsung 4Gb 2400 MT/s		3(0x011)	L/RH775	H/RH776	H/RH163
8Gb	Hynix 4Gb 2400 MT/s		4(0x100)	H/RH774	L/RH777	L/RH195
	Micron 4Gb 2400 MT/s		5(0x101)	H/RH774	L/RH777	H/RH163
	X		6(0x110)	H/RH774	H/RH776	L/RH195
	SO-DIMM		7(0x111)	H/RH774	H/RH776	H/RH163

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Title: PCH (6/9) GPPPABCD, I2C

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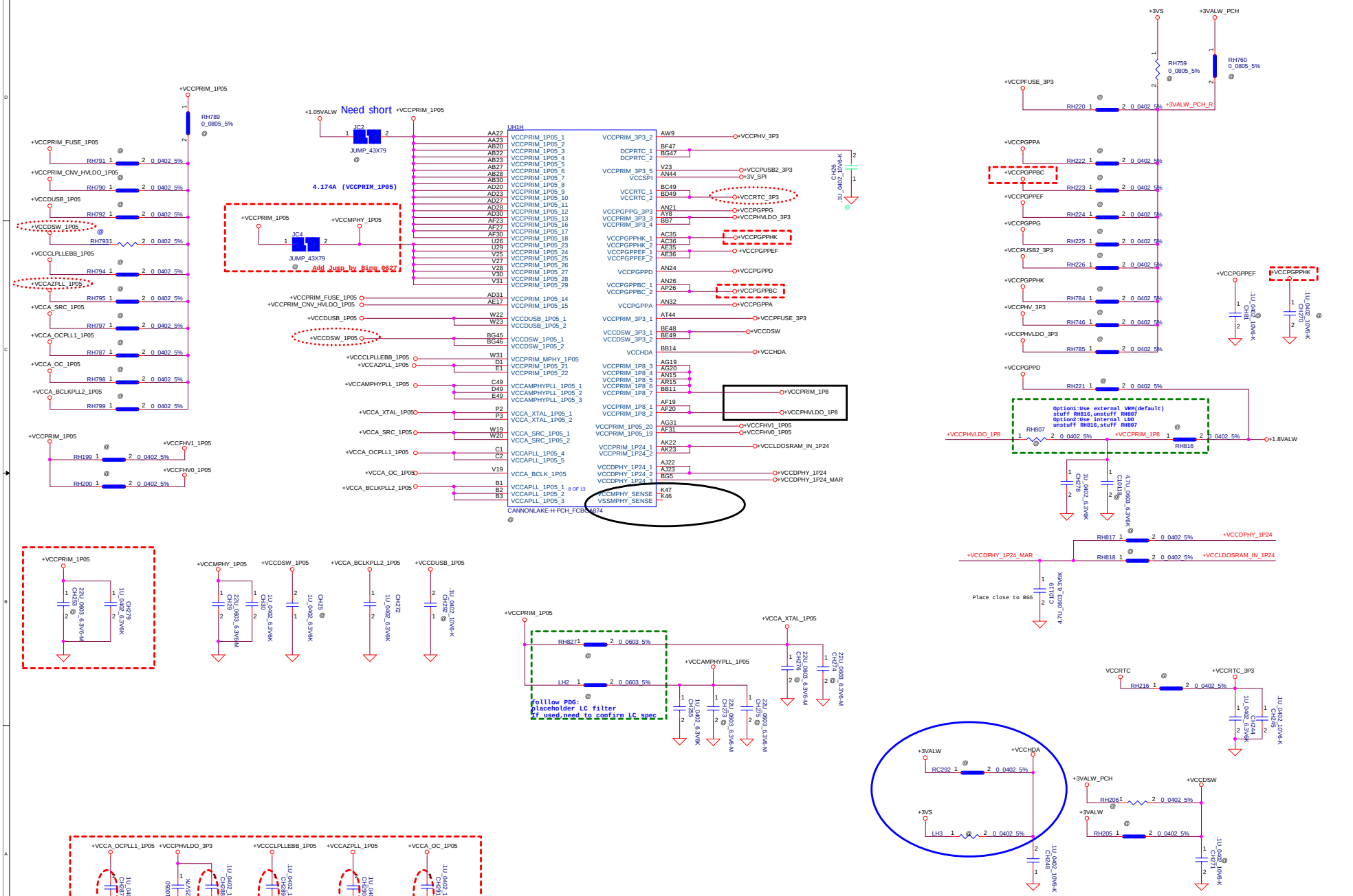

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Title: PCH (7/9) PWR

Size	Document Number	Rev
C	FG541/FG741	0.1

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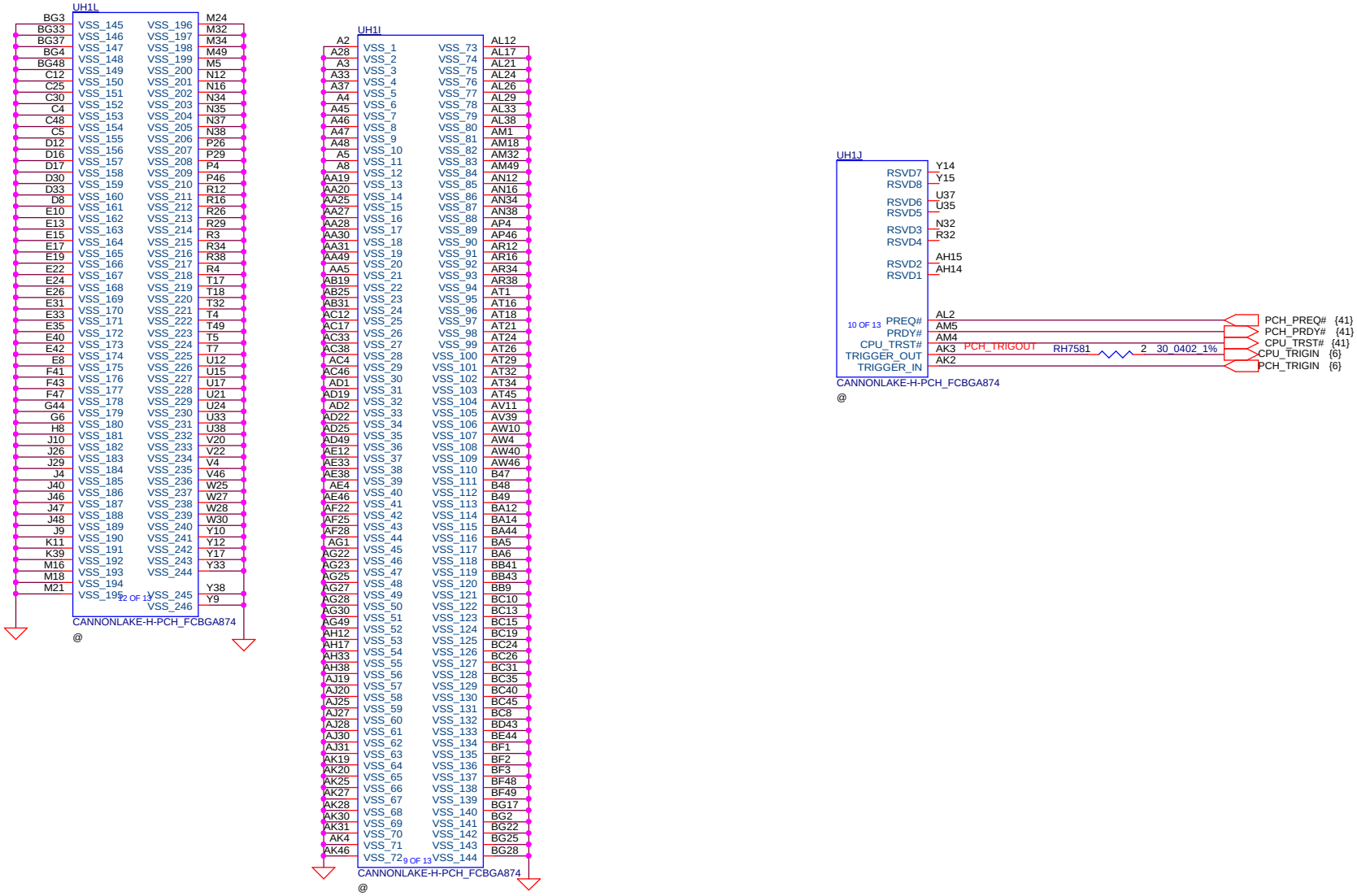

Security Classification	LC Future Center Secret Data		
Issued Date	2015/02/26	Deciphered Date	2018/09/20

Title: **PCH (9/9) VSS**

Size: B	Document Number: **FG541/FG741**	Rev: 0.1
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Title

Cover Page

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N17P-G1 GPIO

GPIO	I/O	ACTIVE	Function Description	I/O Termination
GPIO0	OUT	-	PWM Output to control NVVDD	
GPIO1	OUT	-	FB Enable for GC6 2.1	
GPIO2	IN	-	GPU wake signal for GC6 2.1	
GPIO3	OUT	-	PWM Output to control the SRAM power supply	
GPIO4	OUT	-	GPU power sequencing for GC6 2.1 --- 1V8_MAIN_EN	
GPIO5	IN	N/A	Active low Frame Lock	
GPIO6	OUT	-	Phase Shedding, NVVDD_PSI	
GPIO7	OUT	N/A	Panel Backlight enable	
GPIO8	OUT	-	Memory voltage Control	
GPIO9	I/O	-	Active Low Thermal Alert	
GPIO10	OUT	-	Memory VREF Control (100K pull Down)	
GPIO11	OUT	-	Panel Power enable	
GPIO12	IN	-	AC power detect or power supply overdraw input	(10K pull High)
GPIO13	OUT	N/A	LCD Panel Backlight Enable	
GPIO14	IN	N/A	Hot Plug Detect for IFPA	
GPIO15	IN	N/A	Hot Plug Detect for IFPB	
GPIO16	OUT	-	System side PCIe reset monitor	
GPIO17	IN	N/A	Hot Plug Detect for IFPD	
GPIO18	IN	N/A	Hot Plug Detect for IFPE	
GPIO19	OUT	N/A	3D Vision L/R Signal	
GPIO20		N/A	GC5_MODE	
GPIO21	I/O	N/A	UNUSED	
GPIO22	I/O	N/A	UNUSED	
GPIO23	OUT	-	GPU PCIe self-reset control	
GPIO24	IN	N/A	Hot Plug Detect for IFPF	
GPIO25		N/A	UNUSED	
GPIO26		N/A	UNUSED	
GPIO27	IN	N/A	Hot Plug Detect for IFPC	

STRAP2	STRAP1	STRAP0	RAMCFG[4:0]
L	L	L	00000
L	H	L	00010
L	H	H	00011
H	H	L	00110
H	H	H	00111

H=High: Tied to 1.8V
M=Middle: Tied to 0.9V
L=Low: Tied to 0V

ROM_SO	ROM_SI	ROM_SCLK	SOR_EXPOSED[3:0]
L	L	L	1111 DEFAULT
L	L	H	1110
L	H	L	1101
L	H	H	1100
H	L	L	1011
H	L	H	1010
H	H	L	1001
H	H	H	1000
L	L	M	0111
L	M	L	0110
L	M	H	0101
L	H	M	0100
H	L	M	0011
H	M	L	0010
H	M	H	0001
H	H	M	0000

1:ENABLE 0:DISABLE

SOR0/1/2/3 ENABLE

STRAP5	STRAP4	STRAP3	SMB_ALT_ADDR	DEVID_SEL	PCIE_CFG	VGA_DEVICE
M	H	H	1	1	1	1
M	H	L	1	1	1	0
M	L	H	1	1	0	1
M	L	L	1	1	0	0
L	H	M	1	0	1	1
L	M	H	1	0	1	0
L	M	L	1	0	0	1
L	L	M	1	0	0	0
H	H	H	0	1	1	1
H	H	L	0	1	1	0
H	L	H	0	1	0	1
H	L	L	0	1	0	0
L	H	H	0	0	1	1
L	H	L	0	0	1	0
L	L	H	0	0	0	1 DEFAULT
L	L	L	0	0	0	0

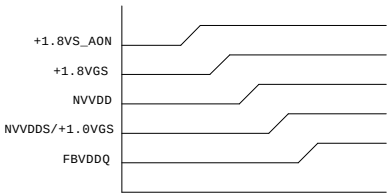
1:SMB_ALT_ADDR ENABLE
0:SMB_ALT_ADDR DISABLE

1:DEVID_SEL REBRAND
0:DEVID_SEL ORIGNAL

1:PCIE_CFG LOW POWER
0:PCIE_CFG HIGH POWER

1:VGA_DEVICE ENABLE
0:VGA_DEVICE DISABLE

N17P-G1 Power Sequence

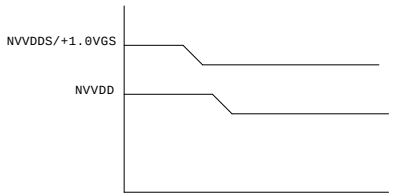


1. All power rail ramp up time should be larger than 40us and is recommended to be less than 2ms.

2. T (from 1V8_MAIN_EN to PEX_DVDD/NVVDD_Pgood) must NOT exceed 4ms.

3. All 3.3V devices that connect to the GPU must be powered after 1V8_AON; GPU can NOT have any 3.3V leakage path before 1V8_AON present.

4. The previous power rail must ramp up to 90% before the next power rail can start ramping up.



1. NVVDDS/PEX_DVDD must ramp down before NVVDD, all other power rails can ramp down together with NVVDD.

2. All 3.3V devices that connect to the GPU must be ramp down before 1V8_AON; GPU can NOT have any 3.3V leakage path after 1V8_AON and 1.8V_MAIN power down.

3. The previous power rail must ramp down to 10% before the next power rail can start ramping down.

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Title: VGA Notes List

Size: C | Document Number: FG541/FG741 | Rev: 0.1

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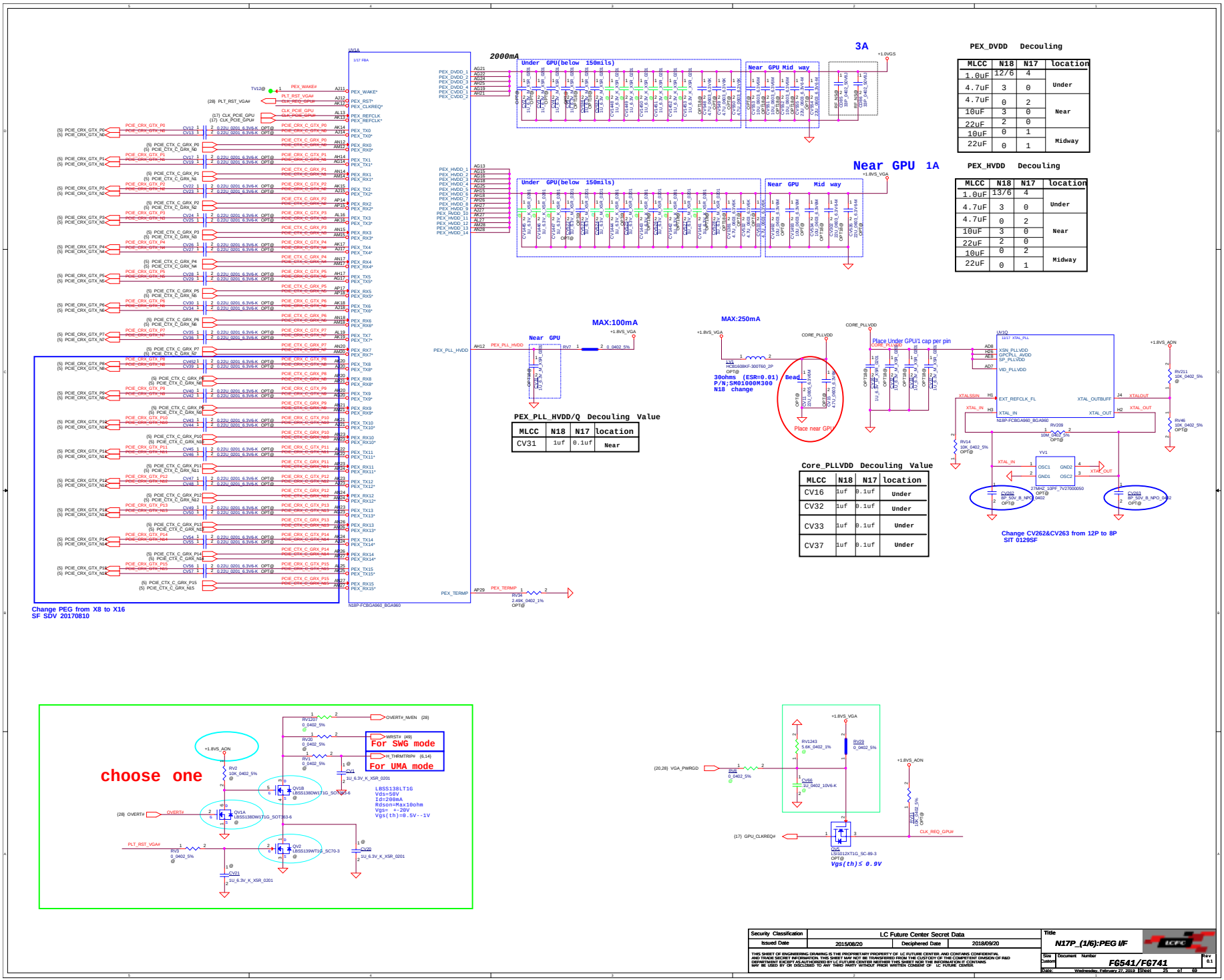
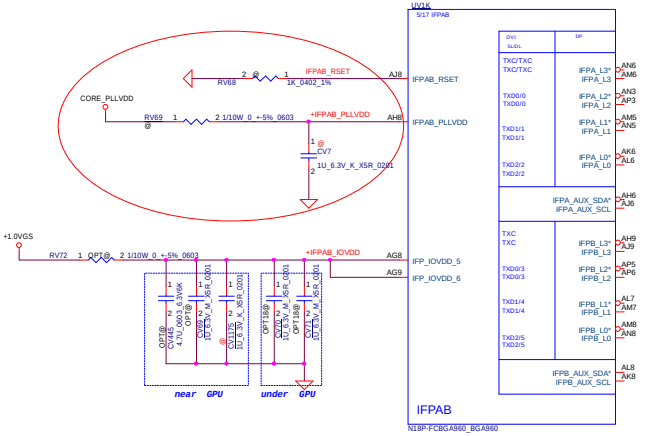
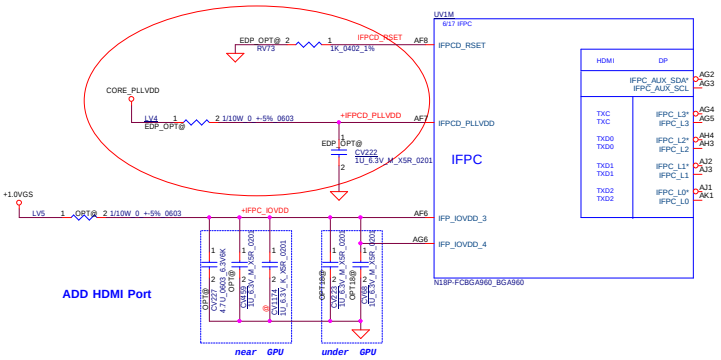
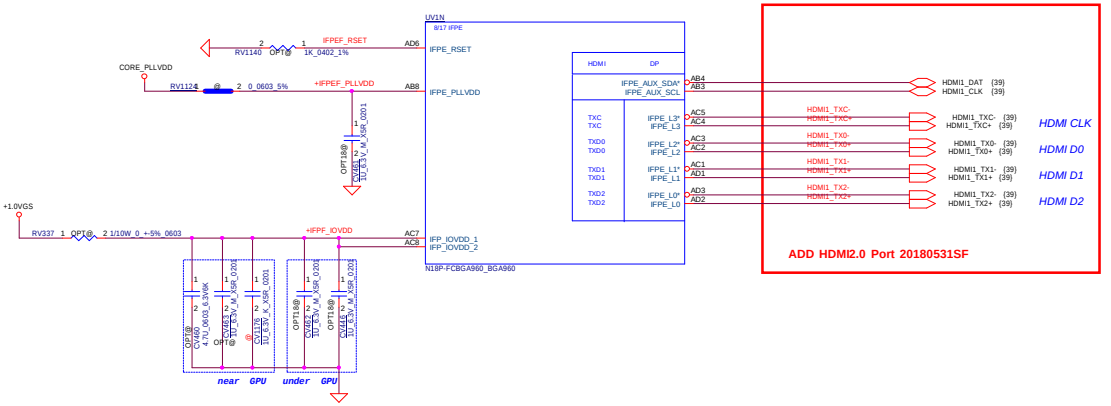


Ref NV DG-08780-001
If an IFP link is unused, in general it should be left unconnected.
This includes Main and Aux links.
IFPxy_RSET and IFPxy_PLLVDD (xy=AB,CD,EF)
can be left unconnected if neither of IFPx /IFPy is in use

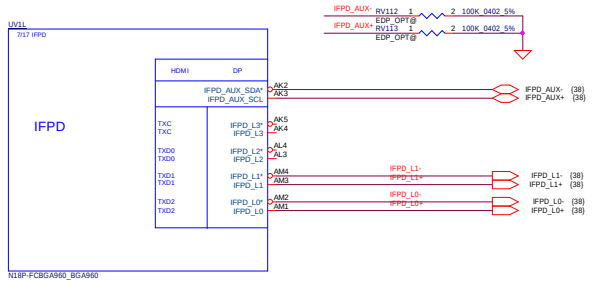






Decouling Value

MLCC	N18	N17	location
CV7	1uf	0.1uf	Under
CV222	1uf	0.1uf	Under
CV461	1uf	0.1uf	Under
CV70	1uf	0.1uf	Under
CV71	1uf	0.1uf	Under
CV223	1uf	0.1uf	Under
CV68	1uf	0.1uf	Under
CV462	1uf	0.1uf	Under
CV484	1uf	0.1uf	Under



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Title: N17P_(2/6):DIGITAL OUT I/F

Size	Document Number	Rev
Custom	FG541/FG741	0.1

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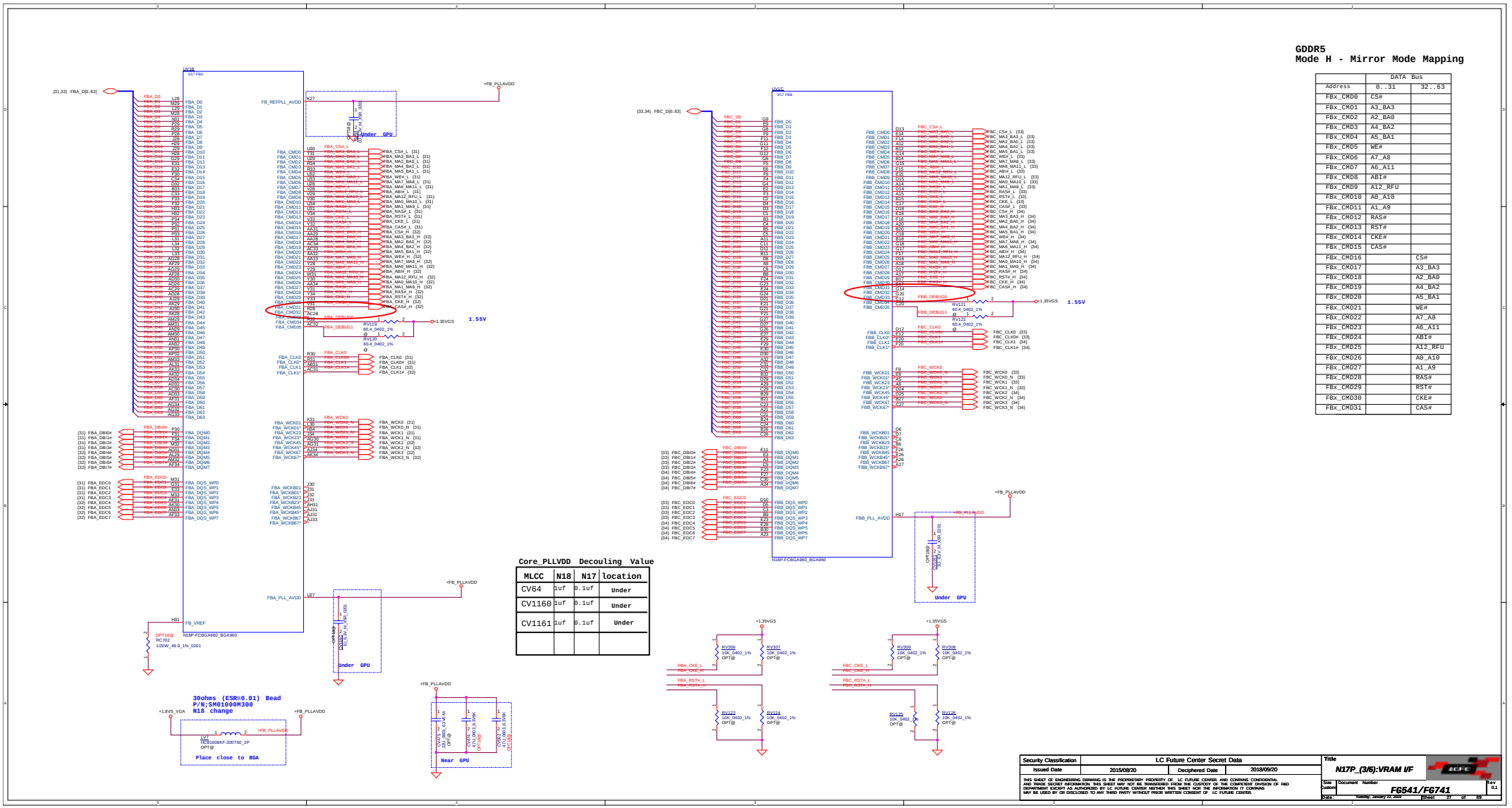

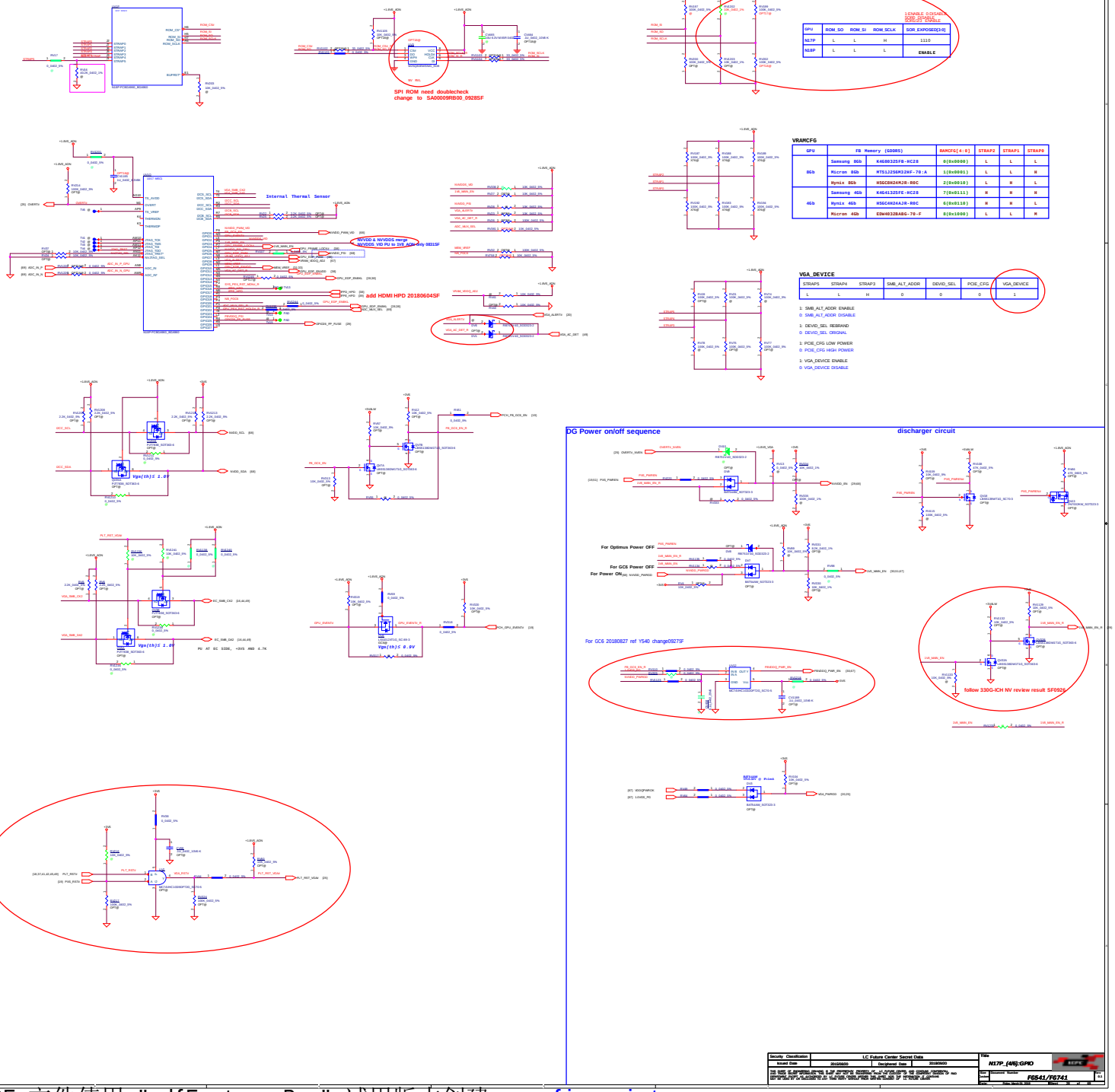

5A Peak 8A

Cost down list:
1U_4Pcs

Partition A Under GPU(below 150mils)

Partition B Under GPU(below 150mils)

for N18P reserve 0928sf

Under GPU(below 150mils)

Near GPU

Near GPU

1.8V Total 1A (AON+MAIN)

0.5A

under GPU

near GPU

FP_FUSE_SRC

FP_FUSE_GPU

1.8VS_AON Decouling Value

MLCC	N18	N17	location
CV205	1uf	0.1uf	Under
CV206	1uf	0.1uf	Under
CV1475	@	@	Under
CV1476	@	@	Under
RV94	40.2ohm	60.4ohm	

CALIBRATION PIN	N17P	N18P
FB_CAL_x_PD_VDDQ	40.20hm	40.20hm
FB_CAL_x_PU_GND	40.20hm	40.20hm
FB_CAL_xTERM_GND	60.40hm	40.20hm

Place near balls

PLACE MIDWAY BETWEEN FBA AND FBB

only for N18P

Table 15. N17/GB4C-128 and N18/GB4D-128 FB BOM Differences

FB Pin	What to do for N18/GB4D-128	What to do for N17/GB4C-128
GPU FB_VREF	Pull down to 49.9 ohm	Leave unconnected and floating
FB_CAL_TERM_GND	Pull down to 40.2 ohm	Pull down to 60.4 ohm

AG26,AJ28 NC pin,
only for under GPU 1.8VS_VGA layout trace

under GPU

near GPU

2A

AON7408L
Vds=30V
Ids=15A
Rdson=28mohm@Vgs=4.66V
=20mohm@Vgs=6V
=18mohm@Vgs>10V
Vgs=+-20V
Vgsth=1~3V

V20B+

Vg=16.4V@AC
Vg=7.38V@Battery

+1.8V_MAIN discharger circuit

Reserve PD3/PR4/PR5/CV38 for NV sequence requirement

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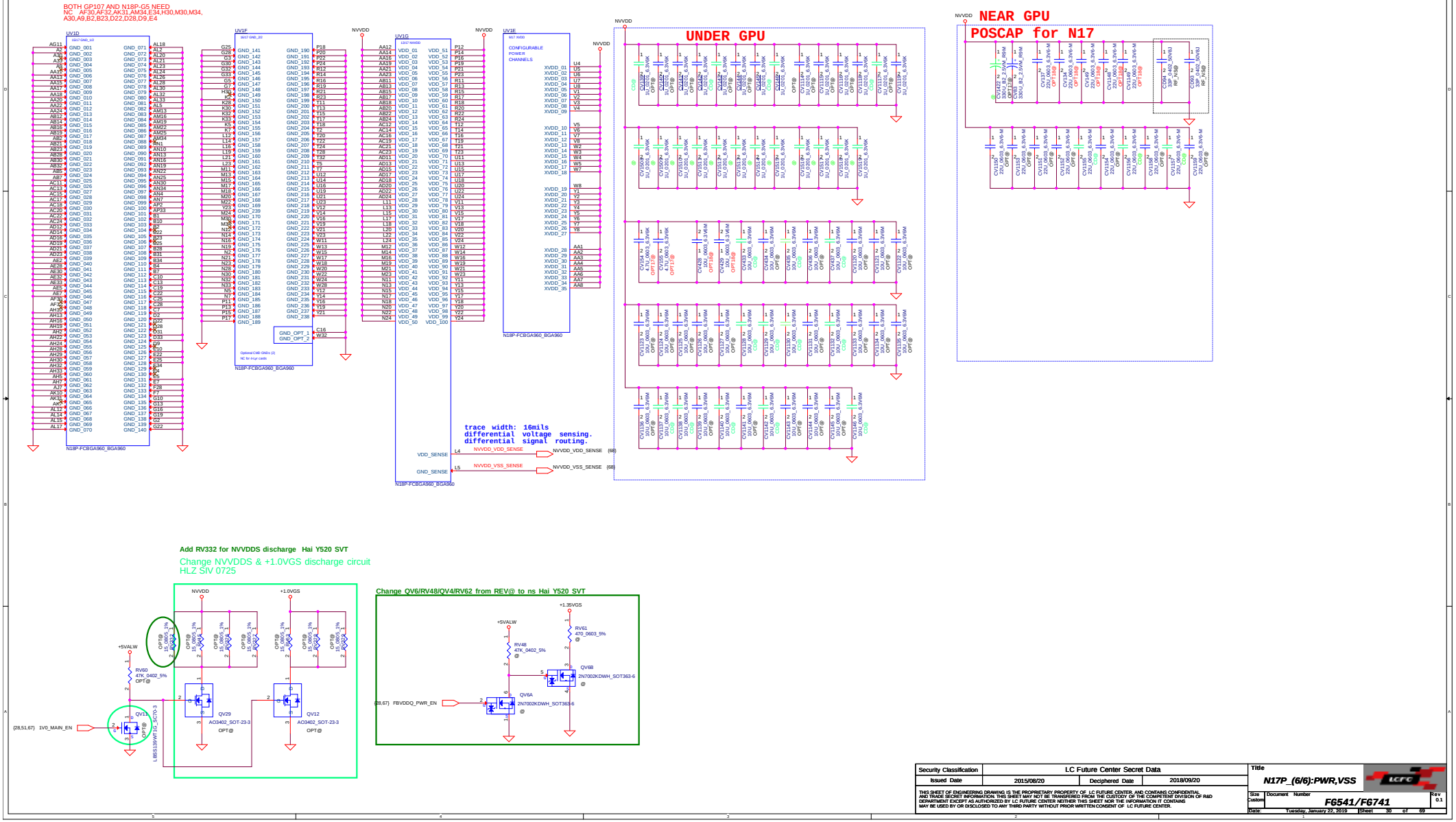
Issued Date	2015/08/20	Deciphered Date	2018/09/20

Title: N17P_(5/6):PWR

Size: Custom | Document Number: F6541/F6741 | Rev: 0.1

Date: Wednesday, February 27, 2019 | Sheet 29 of 69



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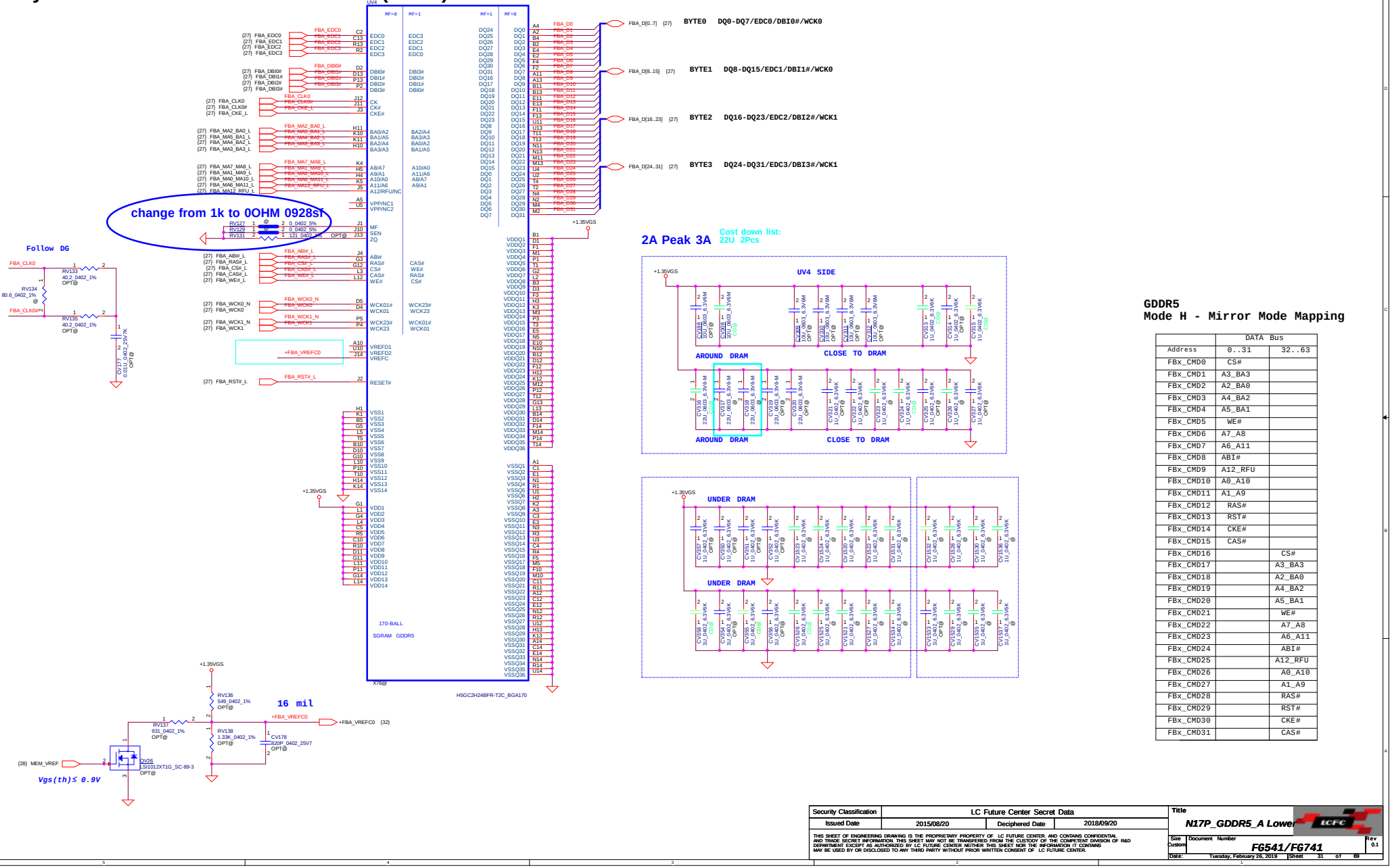
Title		
N17P_(6/6):PWR,VSS		
Size: Custom	Document Number: F6541/F6741	Rev: 0.1
Date: Tuesday, January 22, 2019	Sheet 30 of 69	

Memory Partition A - Lower 64 bits(MF=0)



GDDR5
Mode H - Mirror Mode Mapping

	DATA Bus	
Address	0..31	32..63
FBx_CMD0	CS#	
FBx_CMD1	A3_BA3	
FBx_CMD2	A2_BA0	
FBx_CMD3	A4_BA2	
FBx_CMD4	A5_BA1	
FBx_CMD5	WE#	
FBx_CMD6	A7_A8	
FBx_CMD7	A6_A11	
FBx_CMD8	ABI#	
FBx_CMD9	A12_RFU	
FBx_CMD10	A0_A10	
FBx_CMD11	A1_A9	
FBx_CMD12	RAS#	
FBx_CMD13	RST#	
FBx_CMD14	CKE#	
FBx_CMD15	CAS#	
FBx_CMD16		CS#
FBx_CMD17		A3_BA3
FBx_CMD18		A2_BA0
FBx_CMD19		A4_BA2
FBx_CMD20		A5_BA1
FBx_CMD21		WE#
FBx_CMD22		A7_A8
FBx_CMD23		A6_A11
FBx_CMD24		ABI#
FBx_CMD25		A12_RFU
FBx_CMD26		A0_A10
FBx_CMD27		A1_A9
FBx_CMD28		RAS#
FBx_CMD29		RST#
FBx_CMD30		CKE#
FBx_CMD31		CAS#

Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

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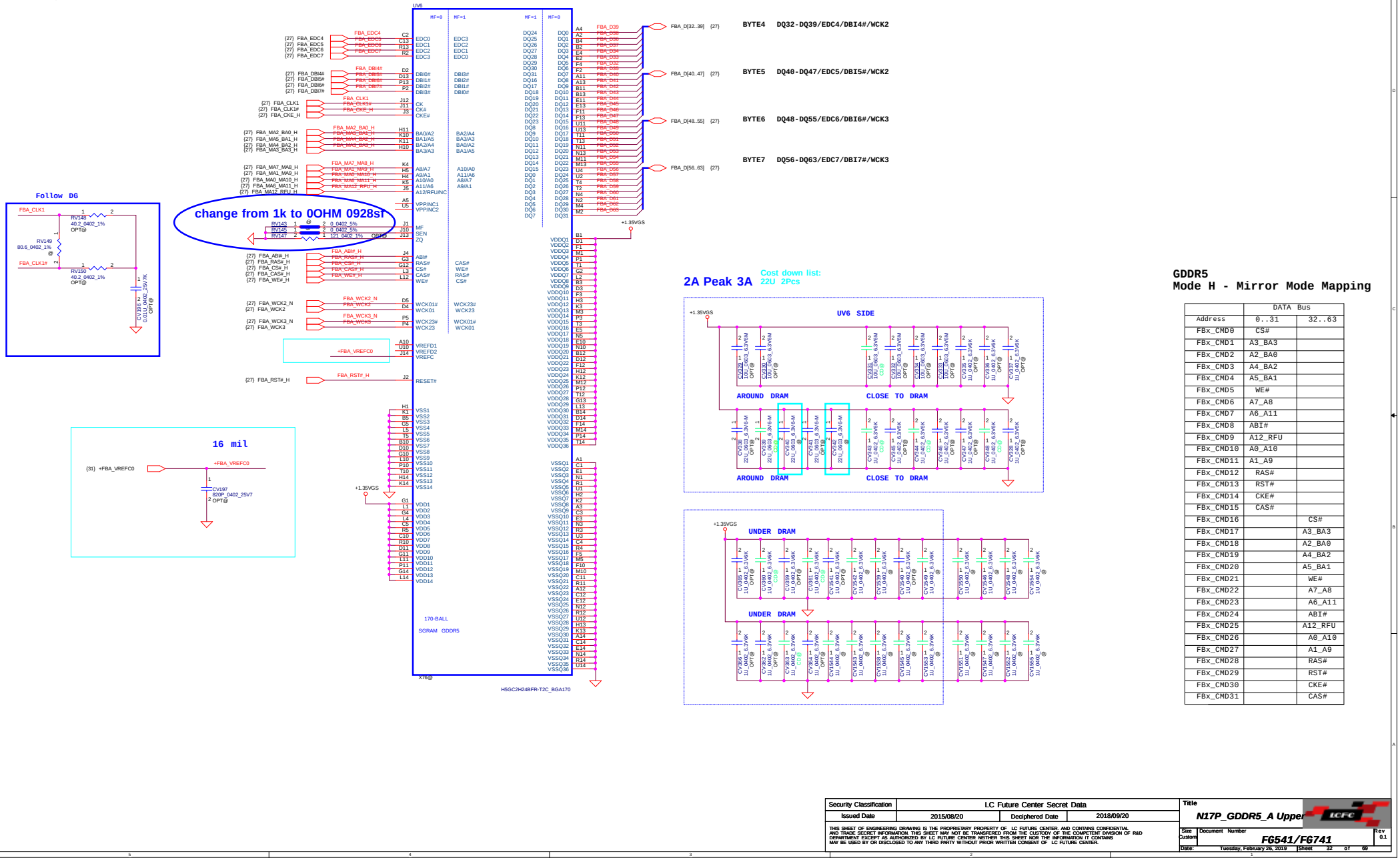
Title: N17P_GDDR5_A Lower

Size	Document Number	Rev
Custom	FG541/FG741	0.1

Date: Tuesday, February 26, 2019 Sheet 31 of 69

Memory Partition A- Upper 64 bits(MF=0)



GDDR5
Mode H - Mirror Mode Mapping

	DATA Bus	
Address	0..31	32..63
FBx_CMD0	CS#	
FBx_CMD1	A3_BA3	
FBx_CMD2	A2_BA0	
FBx_CMD3	A4_BA2	
FBx_CMD4	A5_BA1	
FBx_CMD5	WE#	
FBx_CMD6	A7_A8	
FBx_CMD7	A6_A11	
FBx_CMD8	ABI#	
FBx_CMD9	A12_RFU	
FBx_CMD10	A0_A10	
FBx_CMD11	A1_A9	
FBx_CMD12	RAS#	
FBx_CMD13	RST#	
FBx_CMD14	CKE#	
FBx_CMD15	CAS#	
FBx_CMD16		CS#
FBx_CMD17		A3_BA3
FBx_CMD18		A2_BA0
FBx_CMD19		A4_BA2
FBx_CMD20		A5_BA1
FBx_CMD21		WE#
FBx_CMD22		A7_A8
FBx_CMD23		A6_A11
FBx_CMD24		ABI#
FBx_CMD25		A12_RFU
FBx_CMD26		A0_A10
FBx_CMD27		A1_A9
FBx_CMD28		RAS#
FBx_CMD29		RST#
FBx_CMD30		CKE#
FBx_CMD31		CAS#

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Issued Date	2015/08/20	Deciphered Date	2018/09/20

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Title: N17P_GDDR5_A Upper

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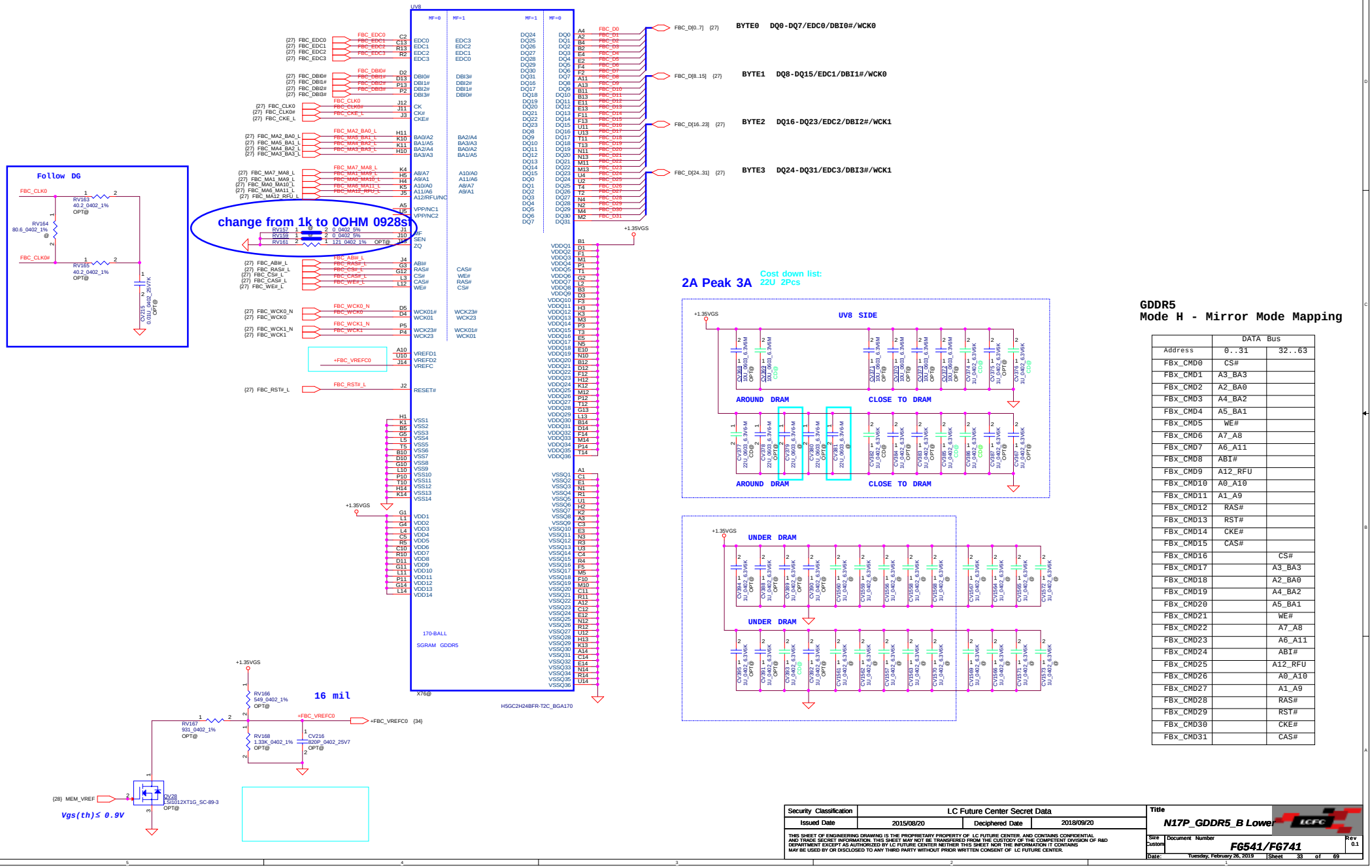
Memory Partition B - Lower 32 bits(MF=0)



GDDR5
Mode H - Mirror Mode Mapping

	DATA Bus	
Address	0..31	32..63
FBx_CMD0	CS#	
FBx_CMD1	A3_BA3	
FBx_CMD2	A2_BA0	
FBx_CMD3	A4_BA2	
FBx_CMD4	A5_BA1	
FBx_CMD5	WE#	
FBx_CMD6	A7_A8	
FBx_CMD7	A6_A11	
FBx_CMD8	ABI#	
FBx_CMD9	A12_RFU	
FBx_CMD10	A0_A10	
FBx_CMD11	A1_A9	
FBx_CMD12	RAS#	
FBx_CMD13	RST#	
FBx_CMD14	CKE#	
FBx_CMD15	CAS#	
FBx_CMD16		CS#
FBx_CMD17		A3_BA3
FBx_CMD18		A2_BA0
FBx_CMD19		A4_BA2
FBx_CMD20		A5_BA1
FBx_CMD21		WE#
FBx_CMD22		A7_A8
FBx_CMD23		A6_A11
FBx_CMD24		ABI#
FBx_CMD25		A12_RFU
FBx_CMD26		A0_A10
FBx_CMD27		A1_A9
FBx_CMD28		RAS#
FBx_CMD29		RST#
FBx_CMD30		CKE#
FBx_CMD31		CAS#

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Issued Date	2015/08/20	Deciphered Date	2018/09/20

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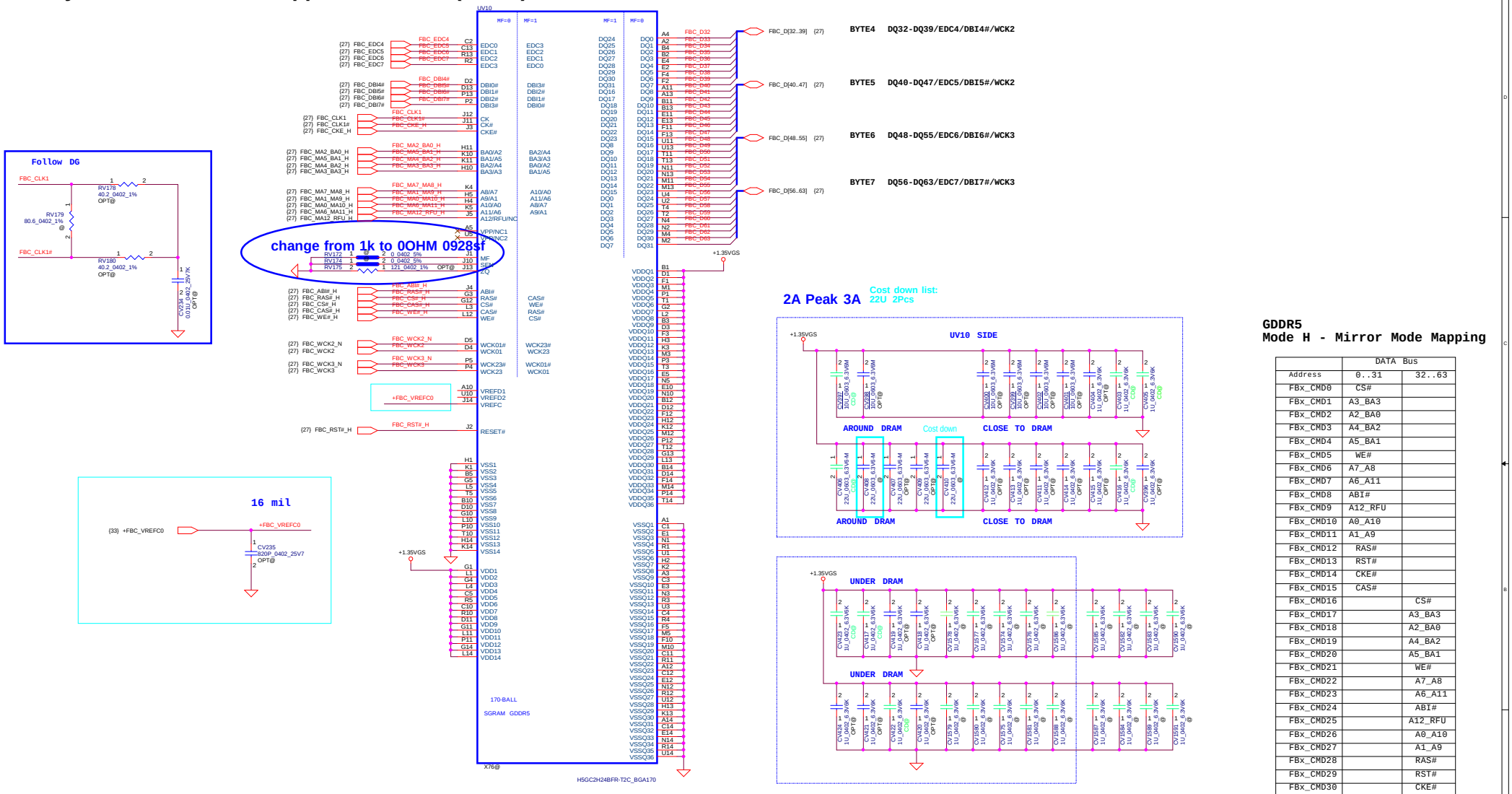
Title	N17P_GDDR5_B Lower		
Size: Custom	Document Number: F6541/F6741		Rev: 0.1
Date: Tuesday, February 26, 2019	Sheet 33 of 69		

Memory Partition B - Upper 32 bits(MF=0)



GDDR5
Mode H - Mirror Mode Mapping

	DATA Bus	
Address	0..31	32..63
FBx_CMD0	CS#	
FBx_CMD1	A3_BA3	
FBx_CMD2	A2_BA0	
FBx_CMD3	A4_BA2	
FBx_CMD4	A5_BA1	
FBx_CMD5	WE#	
FBx_CMD6	A7_A8	
FBx_CMD7	A6_A11	
FBx_CMD8	ABI#	
FBx_CMD9	A12_RFU	
FBx_CMD10	A0_A10	
FBx_CMD11	A1_A9	
FBx_CMD12	RAS#	
FBx_CMD13	RST#	
FBx_CMD14	CKE#	
FBx_CMD15	CAS#	
FBx_CMD16		CS#
FBx_CMD17		A3_BA3
FBx_CMD18		A2_BA0
FBx_CMD19		A4_BA2
FBx_CMD20		A5_BA1
FBx_CMD21		WE#
FBx_CMD22		A7_A8
FBx_CMD23		A6_A11
FBx_CMD24		ABI#
FBx_CMD25		A12_RFU
FBx_CMD26		A0_A10
FBx_CMD27		A1_A9
FBx_CMD28		RAS#
FBx_CMD29		RST#
FBx_CMD30		CKE#
FBx_CMD31		CAS#

Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

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Title: N17P_GDDR5_B Upper

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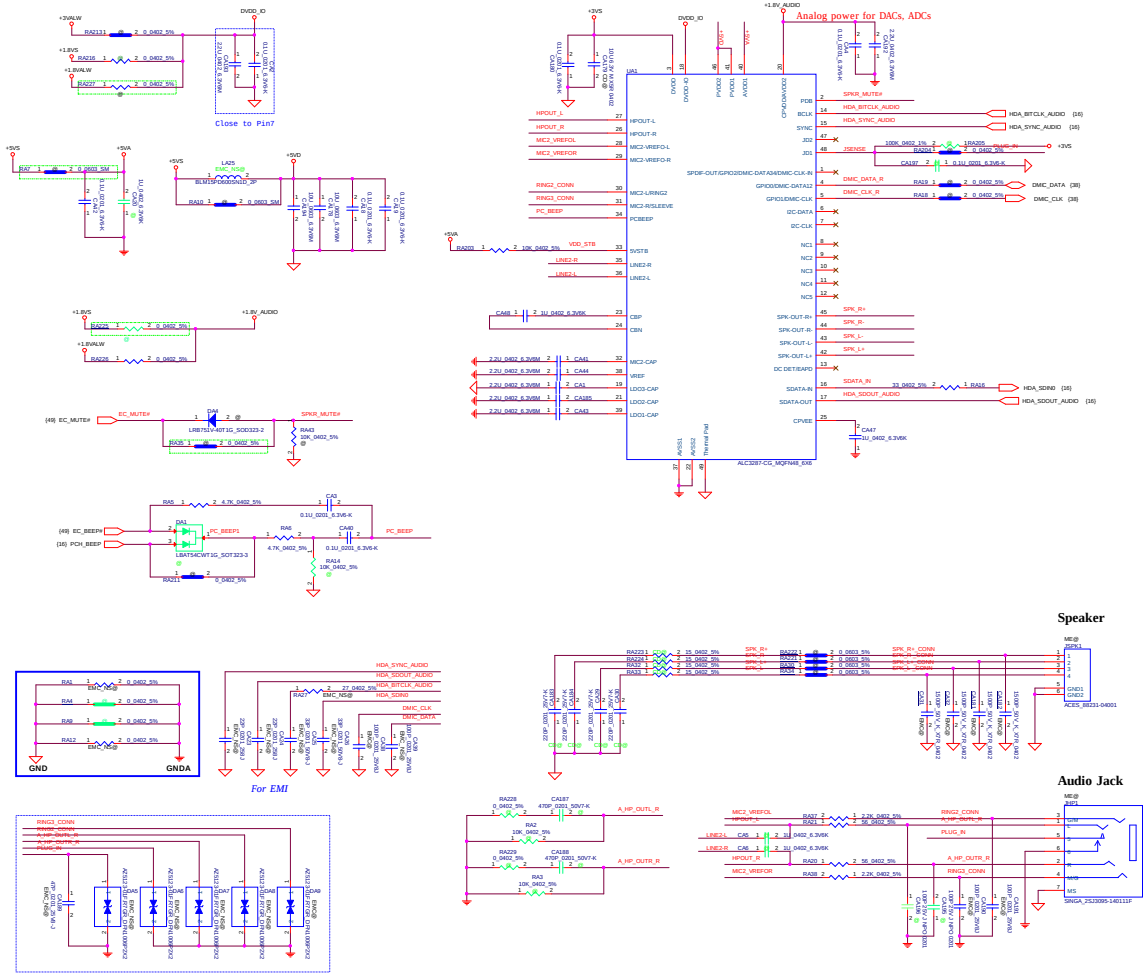

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Issued Date	2015/08/20	Deciphered Date	2015/09/20

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Size	Document Number		Rev
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Date:	Wednesday, February 27, 2013	Sheet	35 of 68

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Issued Date	2015/08/20	Deciphered Date	2018/09/20

Title

Cardreader

Size	Document Number	Rev
Custom	***FG541/FG741***	0.1

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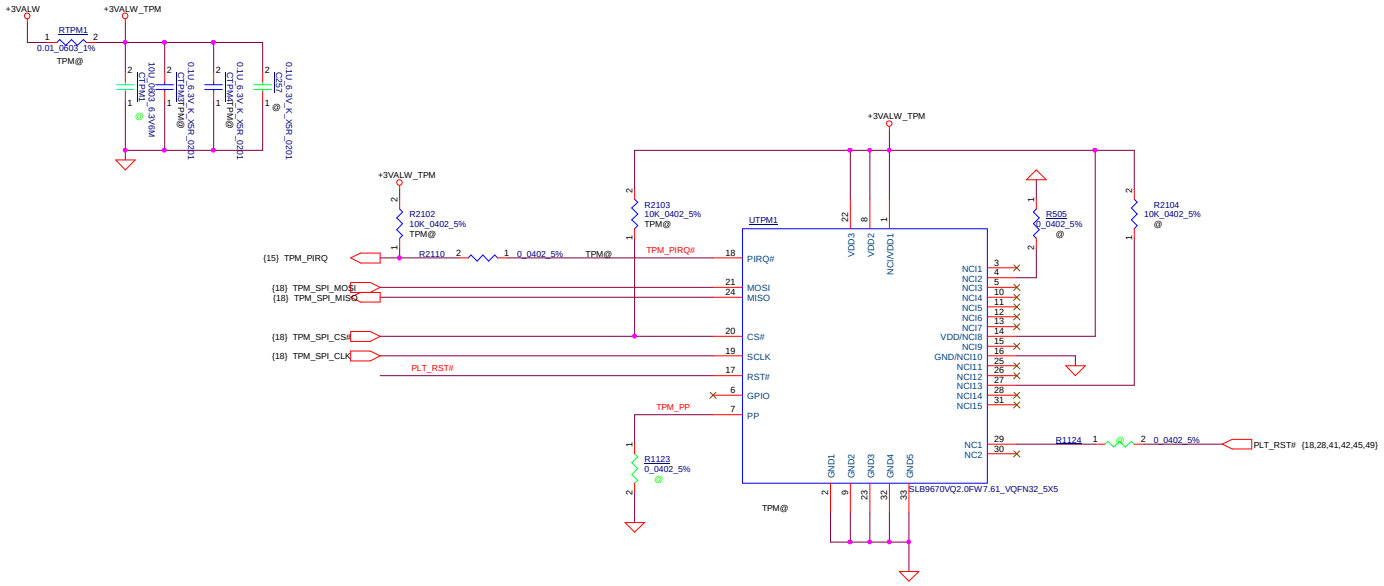

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Issued Date	2015/08/20	Deciphered Date	2018/09/20

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Title: **TPM**

Size	Document Number	Rev
C	FG541/FG741	0.1

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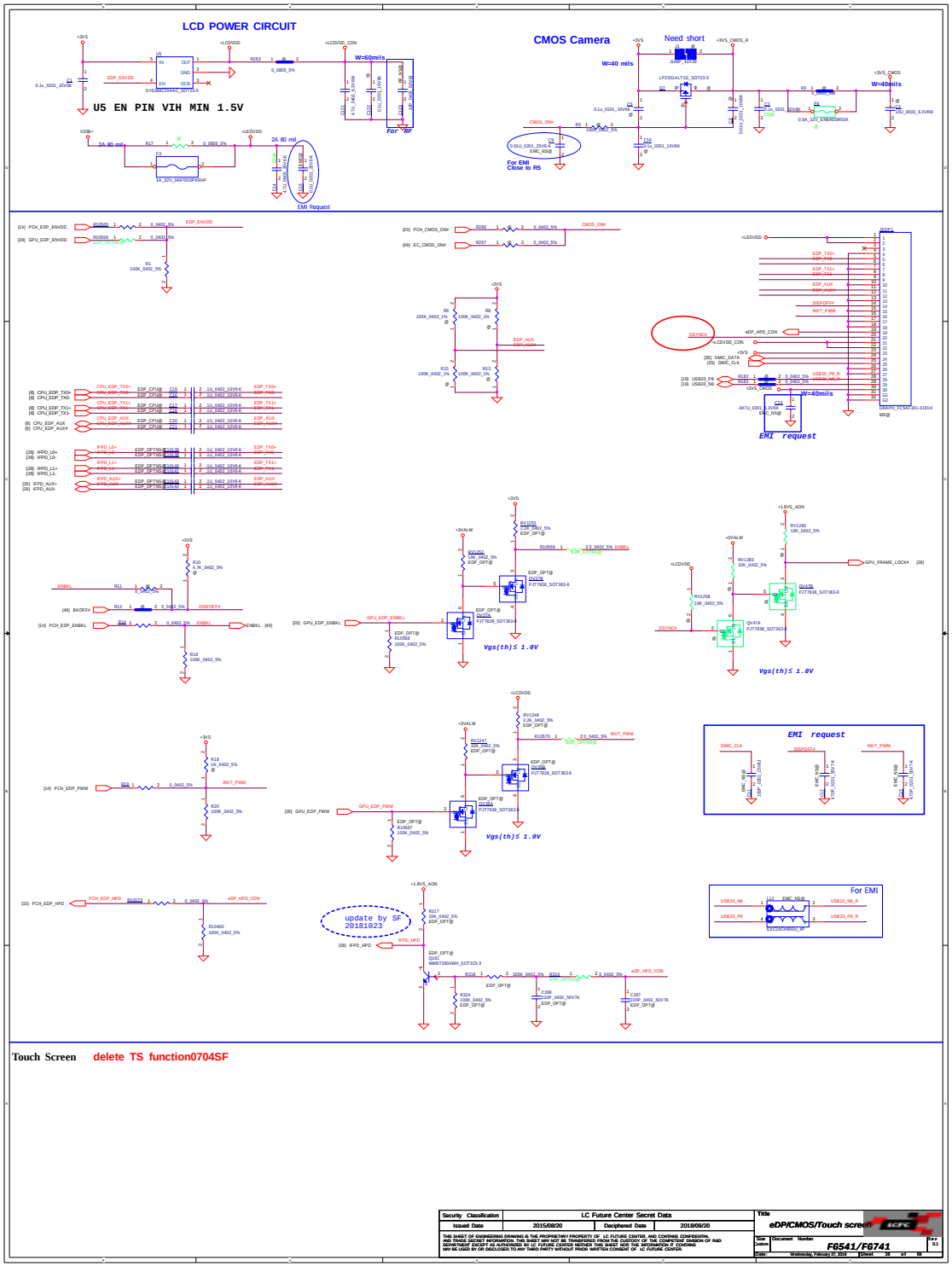

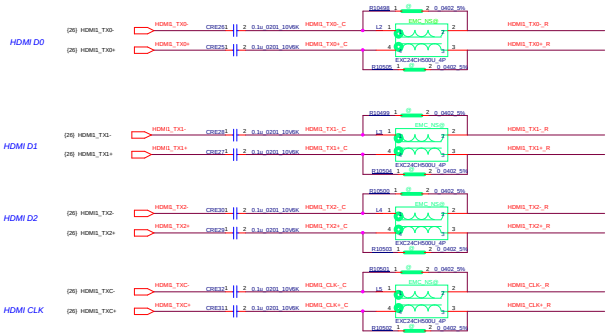

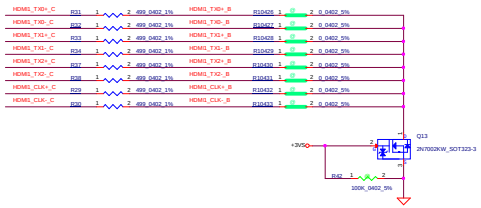

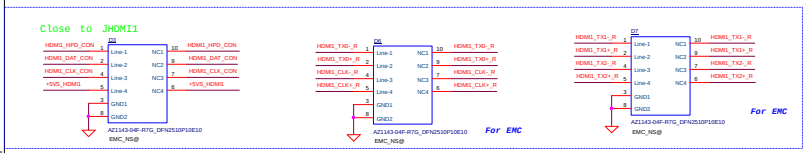

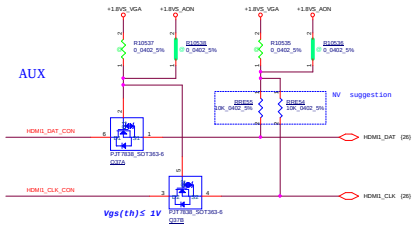

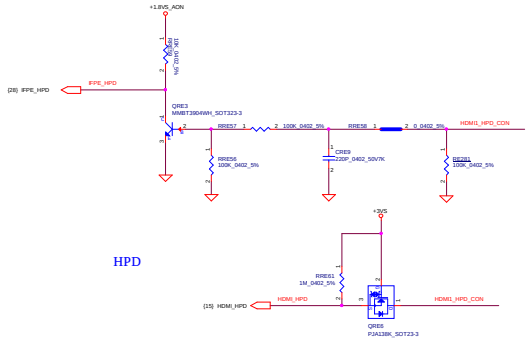

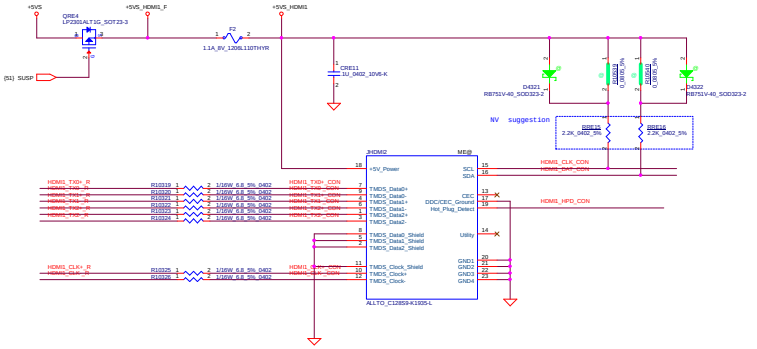

Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

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Title: HDMI_CONN

Size: D | Document Number: F6541/F6741 | Rev: 0.1

Date: Friday, March 01, 2019 | Sheet 30 of 68

Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

Title

P35-Blank

Size: Custom	Document Number: ***FG541/FG741***	Rev: 0.1
Date: Thursday, January 03, 2019	Sheet 40 of 69	

TABLE : CPU ITP DEBUG REPORT

	No use	Individual Port	DCI 2.0 w/o connector
R591	NO ASM	NO ASM	ASM
R593	NO ASM	NO ASM	ASM
R594	NO ASM	NO ASM	ASM
R595	NO ASM	NO ASM	ASM
R596	NO ASM	NO ASM	ASM
R657	NO ASM	NO ASM	ASM
R658	NO ASM	NO ASM	ASM
R102	NO ASM	ASM	NO ASM
R597	NO ASM	ASM	NO ASM
R9907	NO ASM	ASM	ASM
JXDP1	NO ASM	ASM	NO ASM
C70	NO ASM	ASM	NO ASM
R96	NO ASM	ASM	NO ASM
R101	NO ASM	ASM	NO ASM
R9909	NO ASM	ASM	ASM
R9910	NO ASM	ASM	ASM
R9916	NO ASM	ASM	ASM
R99	NO ASM	ASM	ASM
R9912	NO ASM	ASM	ASM
R9934	NO ASM	ASM	ASM
R9930	NO ASM	ASM	ASM
R9931	NO ASM	ASM	ASM
R9932	NO ASM	ASM	ASM
R9933	NO ASM	ASM	ASM

LOGIC

TABLE : PCH ITP DEBUG REPORT

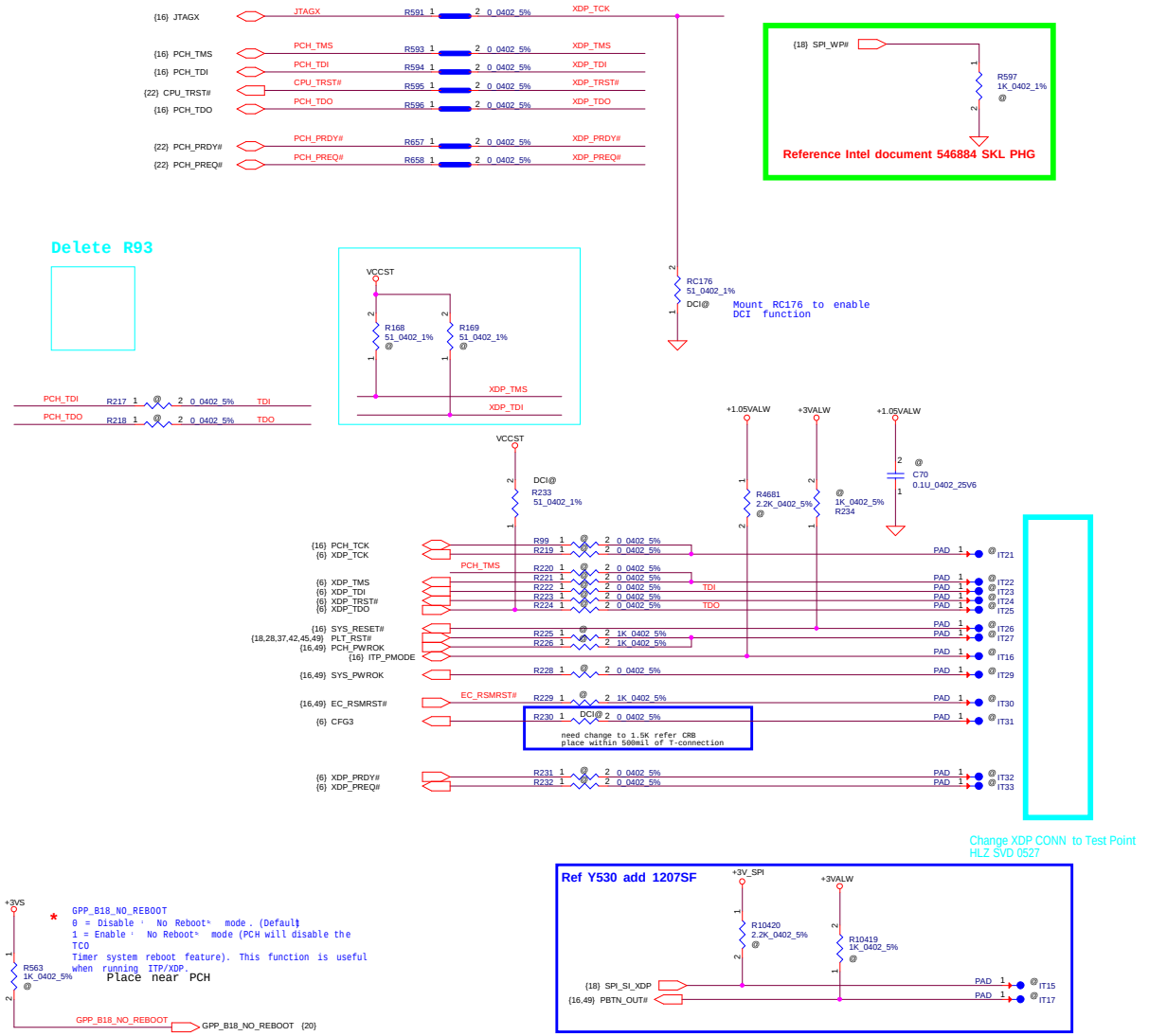
	No use	Individual Port	DCI 2.0 w/o connector
R93	NO ASM	ASM	NO ASM
JXDP1	NO ASM	ASM	NO ASM
R9917	NO ASM	ASM	NO ASM
R101	NO ASM	ASM	NO ASM
R9908	NO ASM	ASM	NO ASM
R9911	NO ASM	ASM	NO ASM
R9913	NO ASM	ASM	NO ASM
R9915	NO ASM	ASM	NO ASM

LOGIC

TABLE : Functional Strap

GPP_B18/GSPI0_MOSI (No Reboot)		R563
HIGH	Enable "No Reboot" Mode	ASM
LOW	Disable "No Reboot" Mode (Default)	NO ASM

LOGIC



Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

Title: **Blank**

Size	Document Number	Rev
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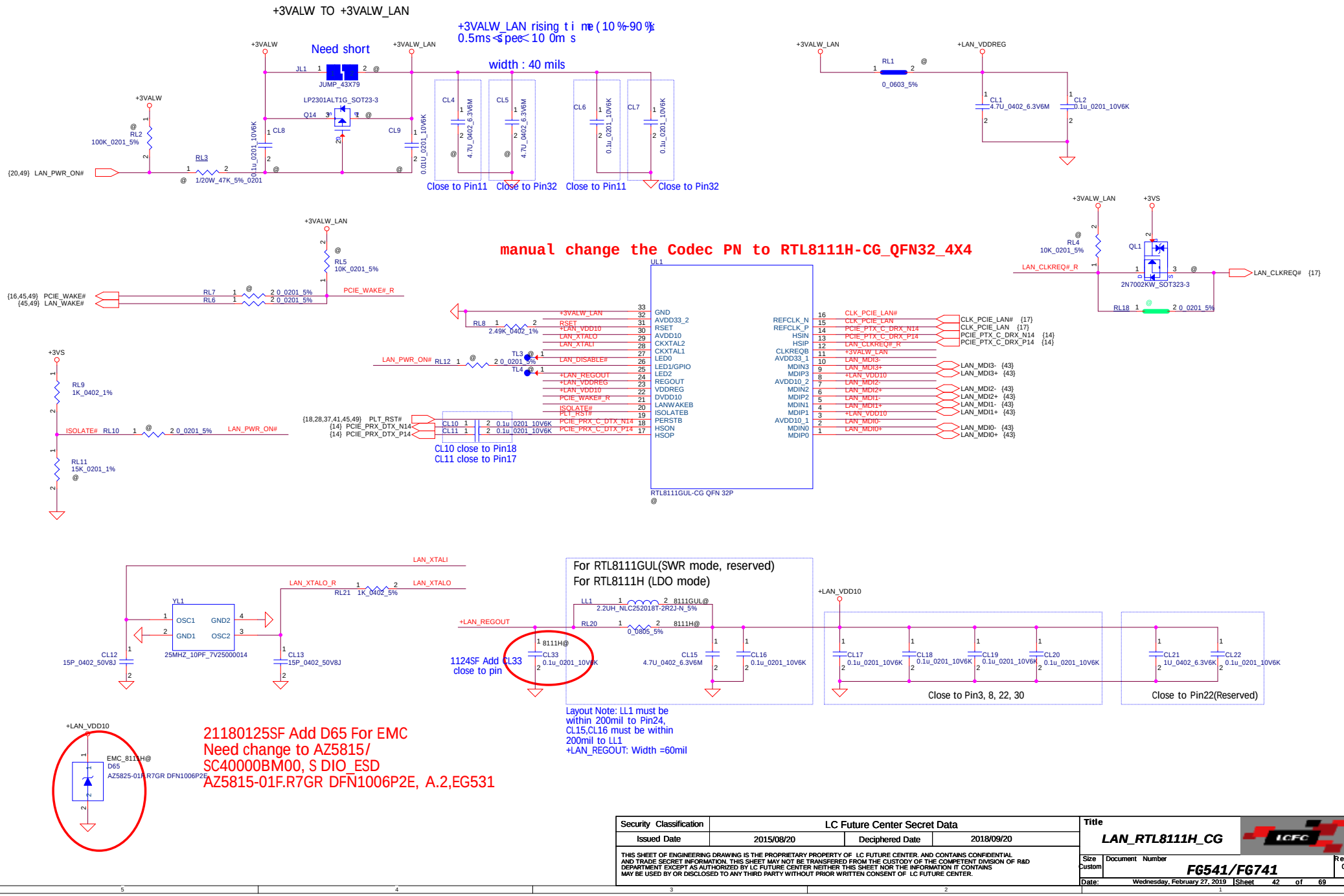

Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

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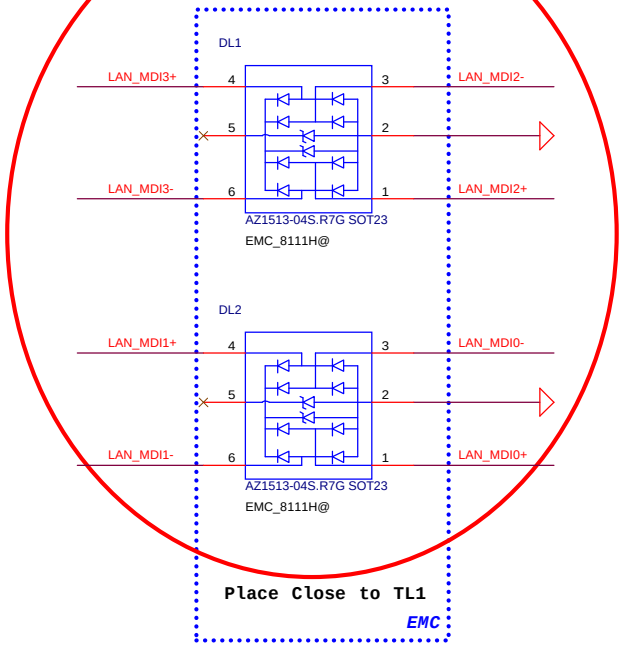
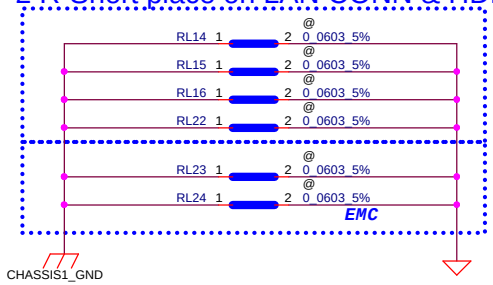
Title	LAN_RTL8111H_CG		
Size: Custom	Document Number: FG541/FG741		Rev: 0.1
Date: Wednesday, February 27, 2019	Sheet 42 of 69		

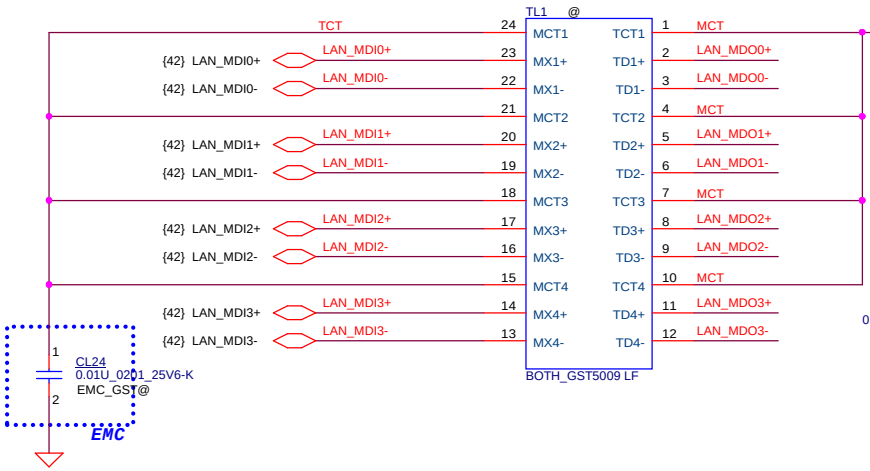
0907SF change DL1/DL2 to
S DIO(BR) AZ1215-04S.R7G SOT23-6L
PN:SC300005900 for 8111H

20180125SF:For EMC debug DL1 & DL2
Need change to SC300006100,
S DIO(BR) AZ1135-04S.R7G SOT23, A.1,EG531

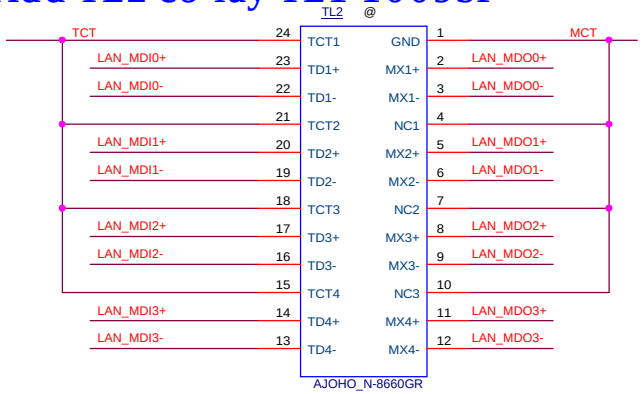


1204SF update,
4 R-Short place on DC-IN CONN & LAN CONN,
2 R-Short place on LAN CONN & HDMI CONN

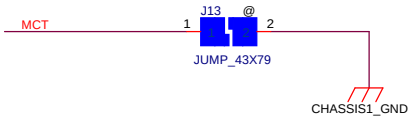


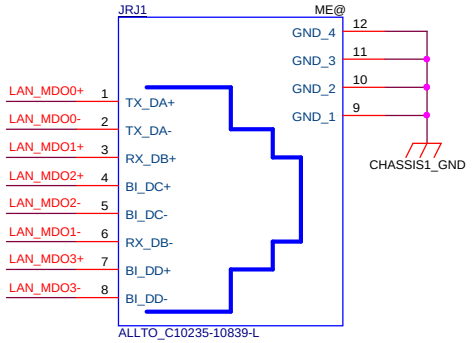


Add TL2 co-lay TL1 1009SF



Don't short





8/16 Update RJ45 P/N DC021608091 wei

Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

Title	LAN_Transformer		
Size	Document Number		Rev
B	FG541/FG741		0.1
Date:	Saturday, February 02, 2019	Sheet	43 of 69

Close to U1

C44 2200P_0201_25V7-K @ — REMOTE+_R, REMOTE-_R

R175 REMOTE+_R — REMOTE1+
R176 REMOTE+_R — REMOTE2+
R177 REMOTE-_R — REMOTE2-
R178 REMOTE-_R — REMOTE1-
0_0402_5%

REMOTE+/-_R, REMOTE1+/-, REMOTE2+/-:
Trace width/space:10/10 mil
Trace length:<8"

Near GPU&VRAM

REMOTE1+ — C45 100P_0201_25V8J @ — Q15 MMBT3904WH_SOT323-3 @ — REMOTE1-

+3VALW
R36 13.7K_0402_1%
NTC_V1
R287 100K_0402_1%_NCP15WF104F03RC
R184 0_0402_5%

for layout optimized, change the EC_AGND to GND

Near CPU core

REMOTE2+ — C46 100P_0201_25V8J @ — Q16 MMBT3904WH_SOT323-3 @ — REMOTE2-

Near CPU

+3VALW
R25 13.7K_0402_1%
NTC_V2
R288 100K_0402_1%_NCP15WF104F03RC

SMSC thermal sensor placed near DIMM

+3VS
C47 0.1u_0201_10V6K
U1 NCT7718W_MSOP8
VDD, D+, D-, T_CRIT#, SCL, SDA, ALERT#, GND
REMOTE+_R, REMOTE-_R
R51 10K_0402_5%
EC_SMB_CK2 {16,28,49}
EC_SMB_DA2 {16,28,49}

Address 1001_101xb

HW thermal sensor

+5VLP
C7 0.1u_0201_10V6K
U4 G718TM1U_SOT23-8
VCC, GND, OT1, OT2, TMSNS1, TMSNS2, PHYST1, PHYST2
R252 21.5K_0402_1%
R253 21.5K_0402_1%
R6 10K_0402_5%
R7 10K_0402_5%
R196 0_0402_5% — NTC_V1 — NTC_V1 {49}
R197 0_0402_5% — NTC_V2 — NTC_V2 {49}
{49,60,61} EC_ON

over temperature threshold:
RSET=3*RTMH
92+/-30C
Hysteresis temperature threshold.
RHYST=(RSET*RTML)/(3*RTML-RSET)
56+/-30C

+3VALW
R10530 13.7K_0402_1%
NTC_V3 — NTC_V3 {49}
R10529 100K_0402_1%_NCP15WF104F03RC
R10528 0_0402_5%

FAN Conn
need check ME SDV CONN list
Change to SP011411114 ref ME conn list,20181017SF update

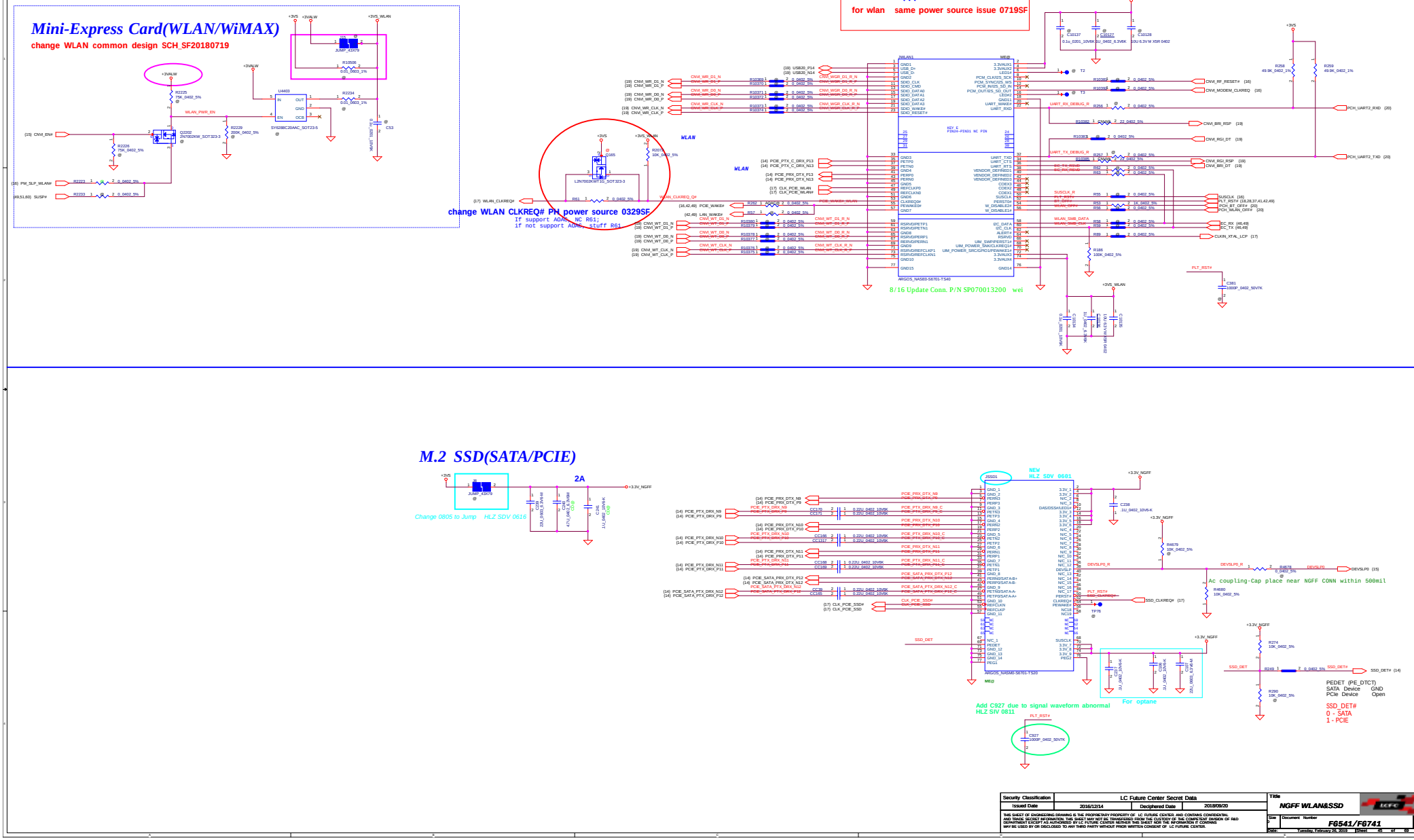
0.5A
+5VS
R52 0_0603_5%
C49 10U_0805_10V6K
C50 .1U_0402_10V6-K
+5VS_FAN1
{49} EC_FAN1_SPEED
{49} EC_FAN1_PWM
{49} EC_FAN2_PWM
{49} EC_FAN2_SPEED

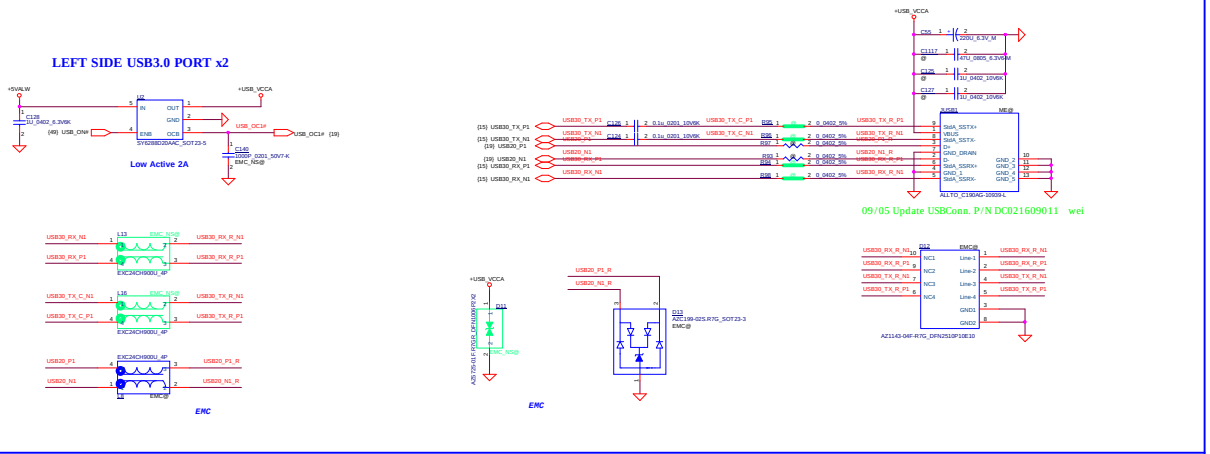
0.5A
+5VS
R75 0_0603_5%
C81 10U_0805_10V6K
C60 .1U_0402_10V6-K
+5VS_FAN2

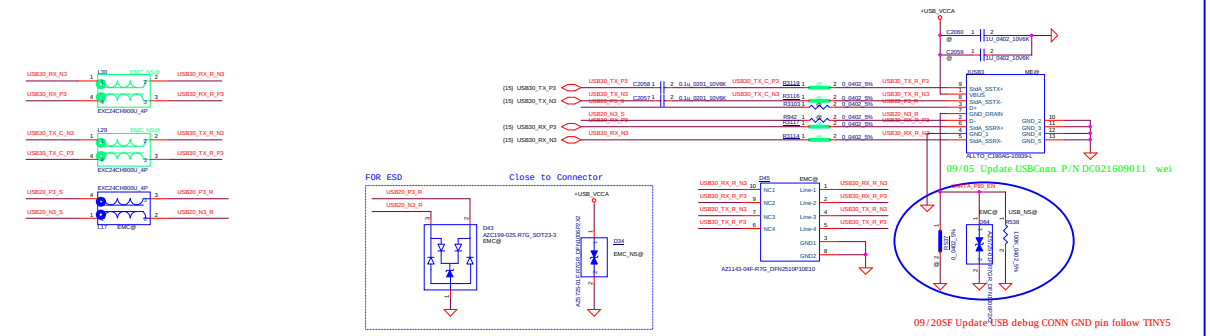
ME@ JFAN1 ACES_50228-00871-001
GND2, GND1

Security Classification	LC Future Center Secret Data		
Issued Date	2016/08/16	Deciphered Date	2018/09/20

Title: Thermal sensor/FAN CONN
Size: Custom | Document Number: FG541/FG741 | Rev: 0.1
Date: Tuesday, February 26, 2019 | Sheet 44 of 69

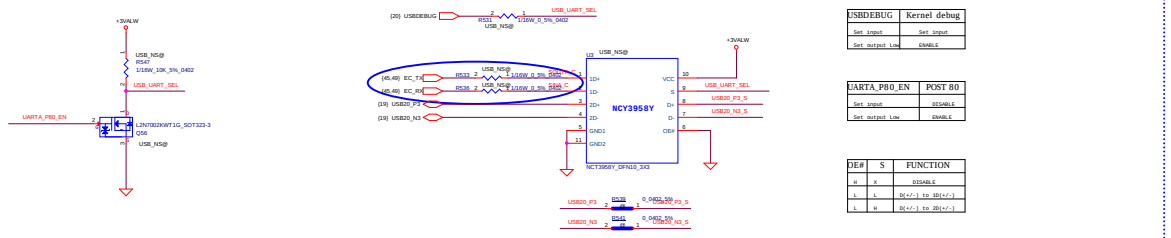






For USB Debug Function

09/20SF add USB debug follow TINY5
change from SA00007WL0D to SA00007WL00 SF1001
SVT non-staff0322SF



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Issued Date	2015/08/20
Deciphered Date	2018/09/20

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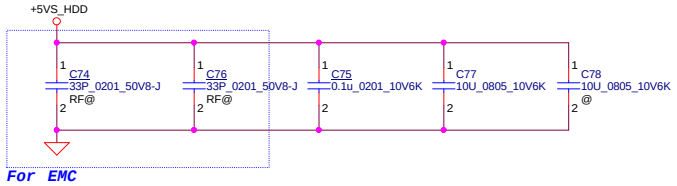
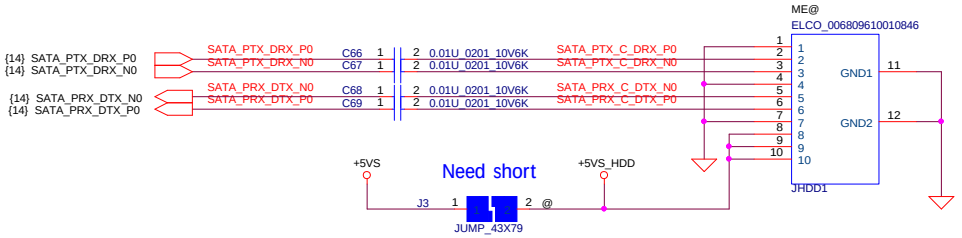
Title	USB3.0 PORT (LEFT)		
Size	Document Number		Rev
D	F6541/F6741		0.1
Date:	Friday, March 01, 2019	Sheet 46 of 68	

SATA HDD Conn.





Delete SATA ODD

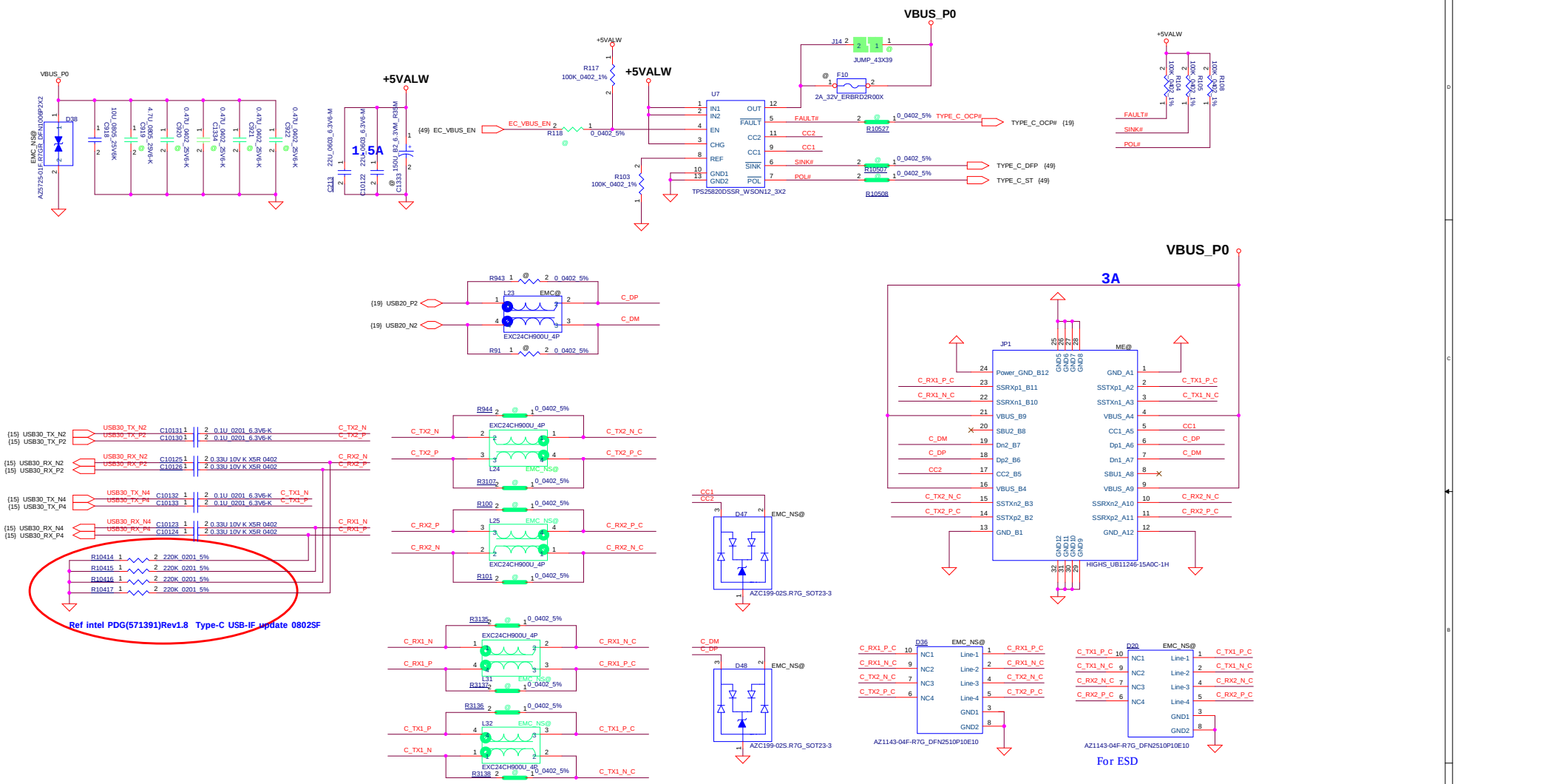
8/14 Update SF

Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

Title: **HDD/ODD CONN**

Size	Document Number	Rev
Custom	FG541/FG741	0.1

Date: Thursday, January 03, 2019 Sheet 47 of 69



Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

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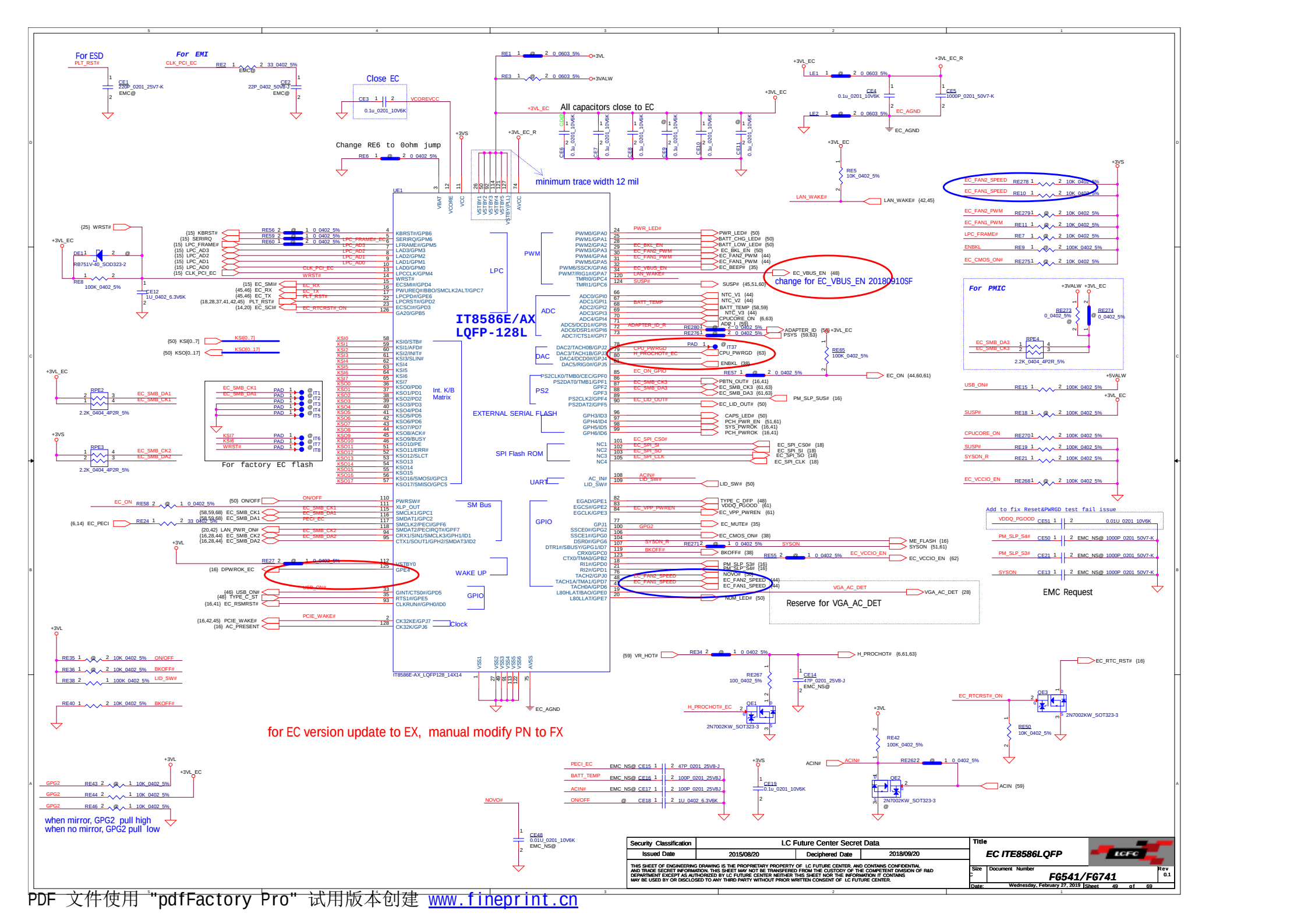
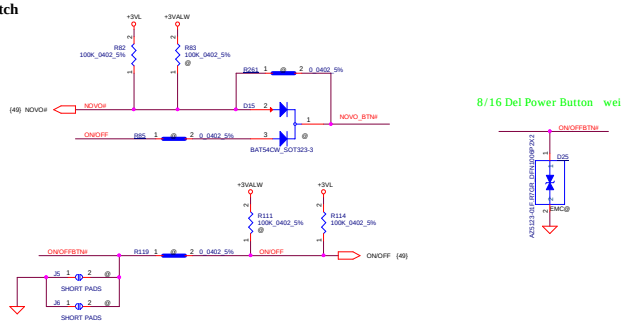
Title	3D Camera		
Size	Document Number	FG541/FG741	Rev 0.1
Date:	Friday, March 01, 2019	Sheet 48 of 69	

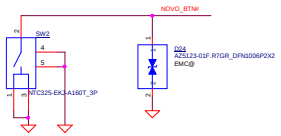


ON/OFF switch



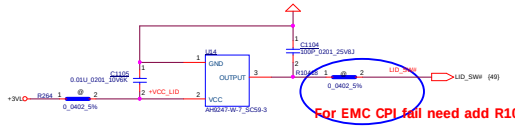
8/16 Del Power Button wei

Novo button



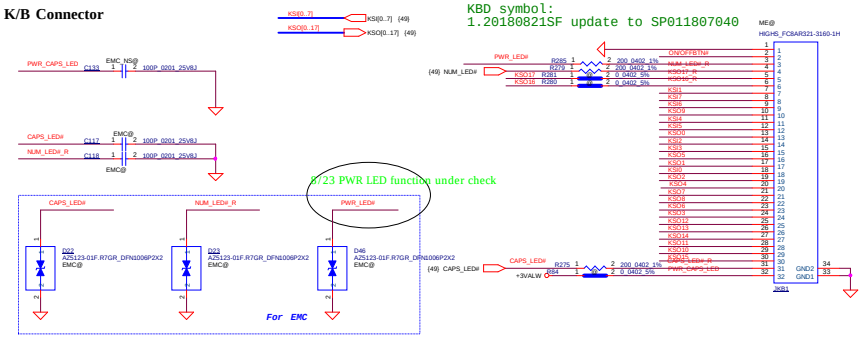
8/31 Update the P/N SN100008W00 wei

LID switch



For EMC CPI fail need add R10418---1204SF

K/B Connector

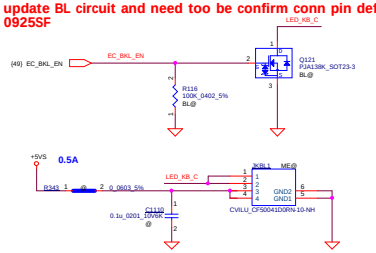


KBD symbol:
1.20180821SF update to SP011807040

8/23 PWR LED function under check

KB Backlight Connector

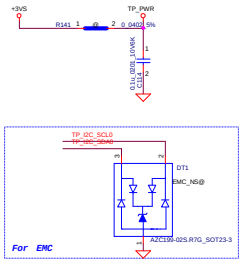
update BL circuit and need too be confirm conn pin define
0925SF

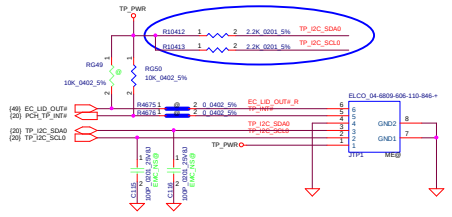


Finger Print Connector

follow OD V1.5 delete finger print function
0927SF

TP/B Connector





Security Classification	LC Future Center Secret Data		
Issued Date	2015/08/20	Deciphered Date	2018/09/20

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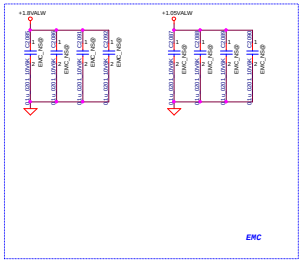
Title	KBD/PWR/IO/LED/TP Conn		
Size	Document Number		Rev
Custom	FG541/FG741		0.1
Date:	Friday, March 02, 2018	Sheet	50 of 69

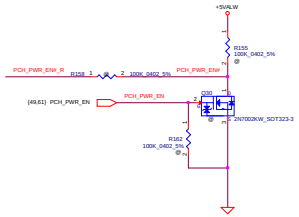
delete Load Switch 5VS and 3VS 20181101SF

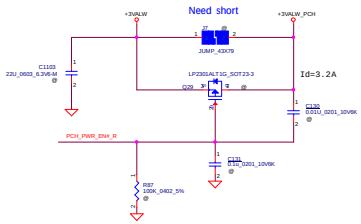
Load Switch
+5VALW To +5VS
+3VALW To +3VS

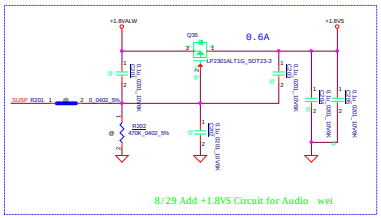
+3VS, C173 --> 2.74ms
+5VS, C176 --> 2.03ms

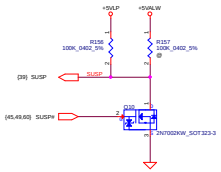
VIN 5V and 3.3V (VBIAS=5V), IMAX(per channel)=6A, Rds=16mohm



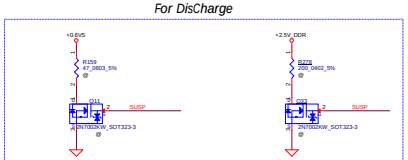






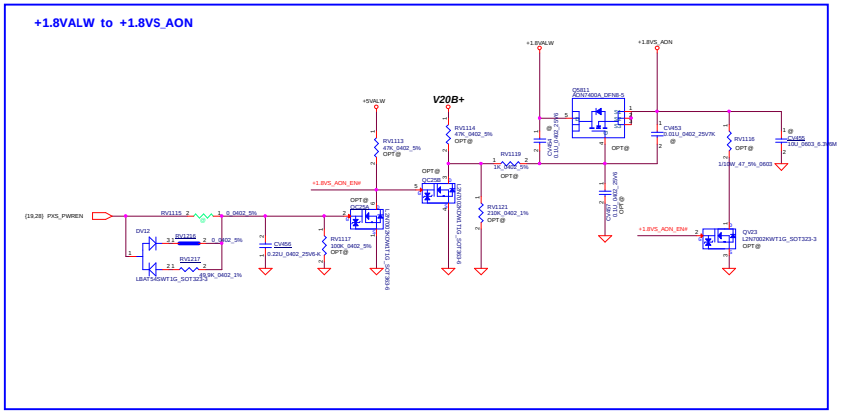


For DisCharge



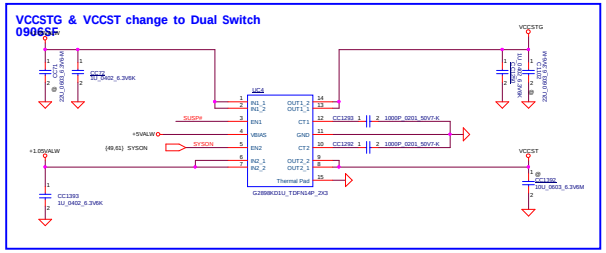
08/29: Need double check enable signal and the resistance

+1.8VALW to +1.8VS_AON

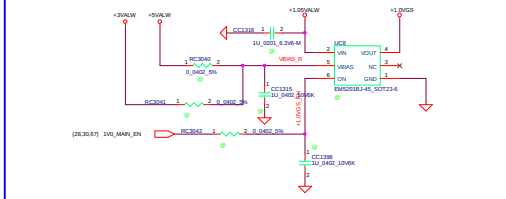


delete reserved for VCCSTG & VCCST 0928SF

VCCSTG & VCCST change to Dual Switch 0906SF



+1.0VALW TO +1.0VGS



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Title: DC V TO VS INTERFACE

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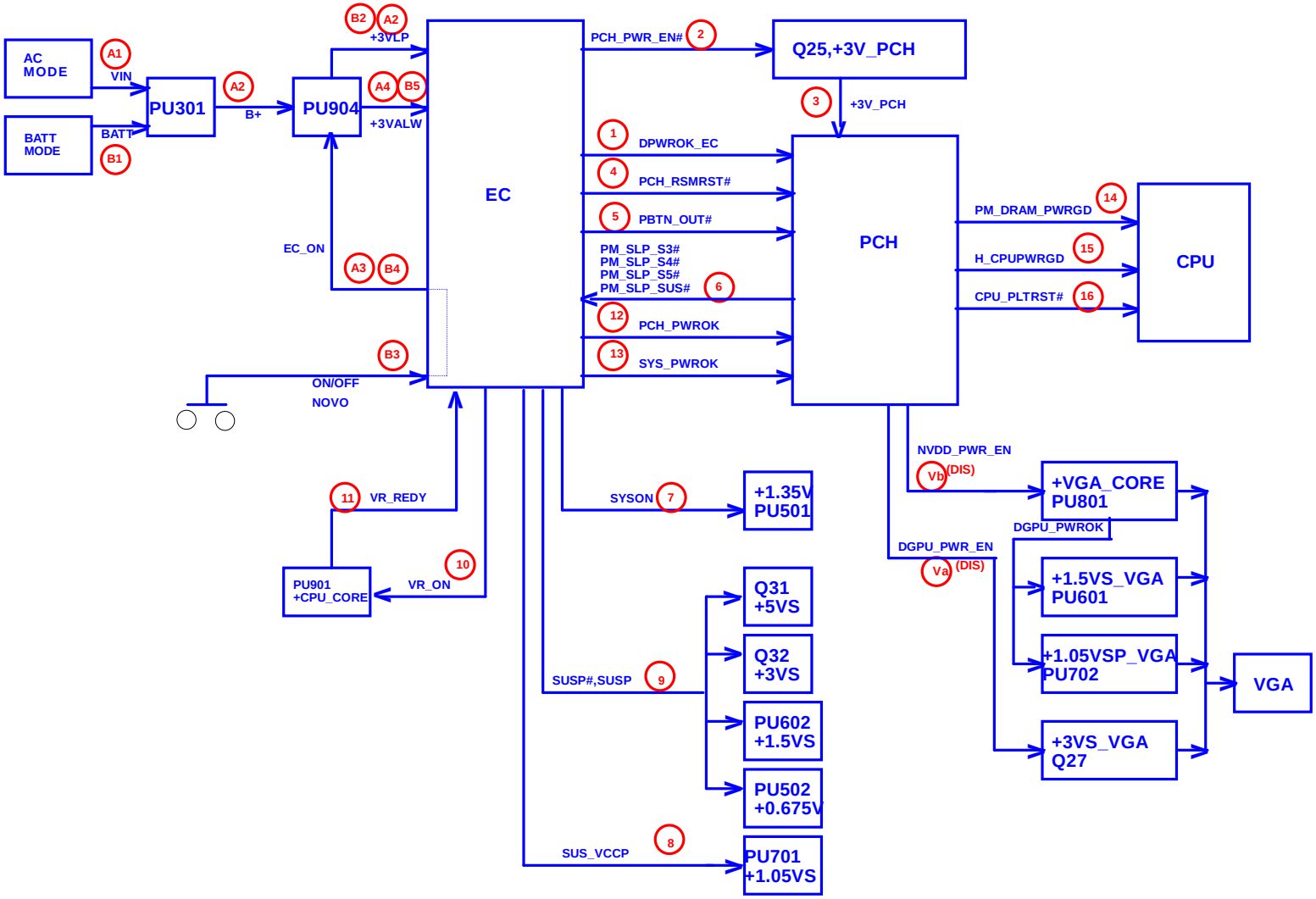

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Title: **Power sequence block**

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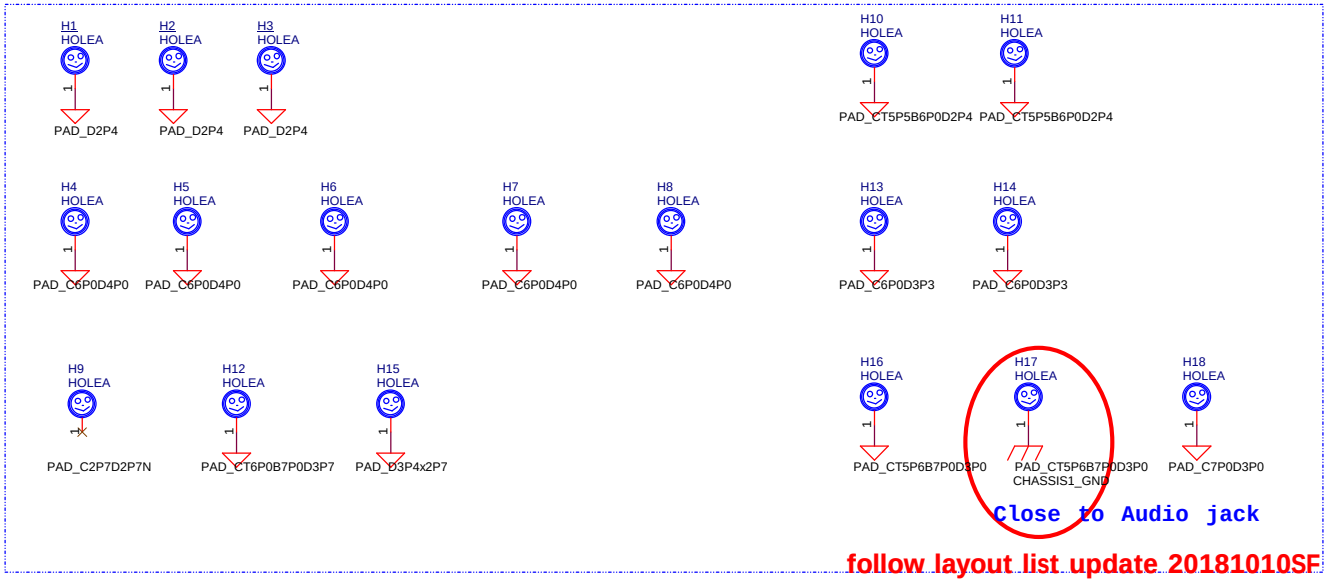
GPU Thermal Holex2 Close to RJ45 DC-IN x2

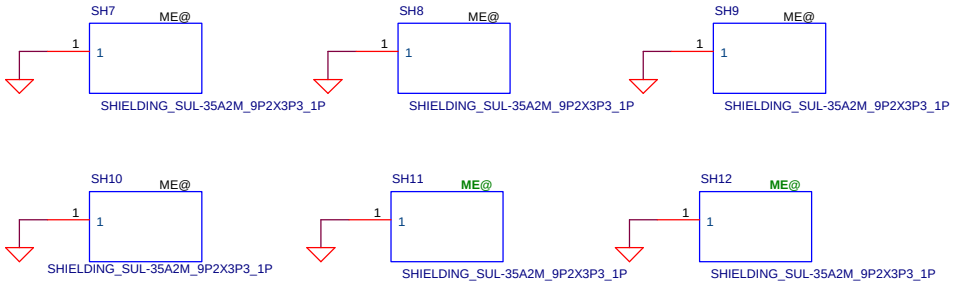
CPU Thermal Holex3 WLAN Standoff

PCB Fedical Mark PAD



follow layout list update 20181010SF

USB3.0 Shielding



DDR4 Shielding

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Title: Hole

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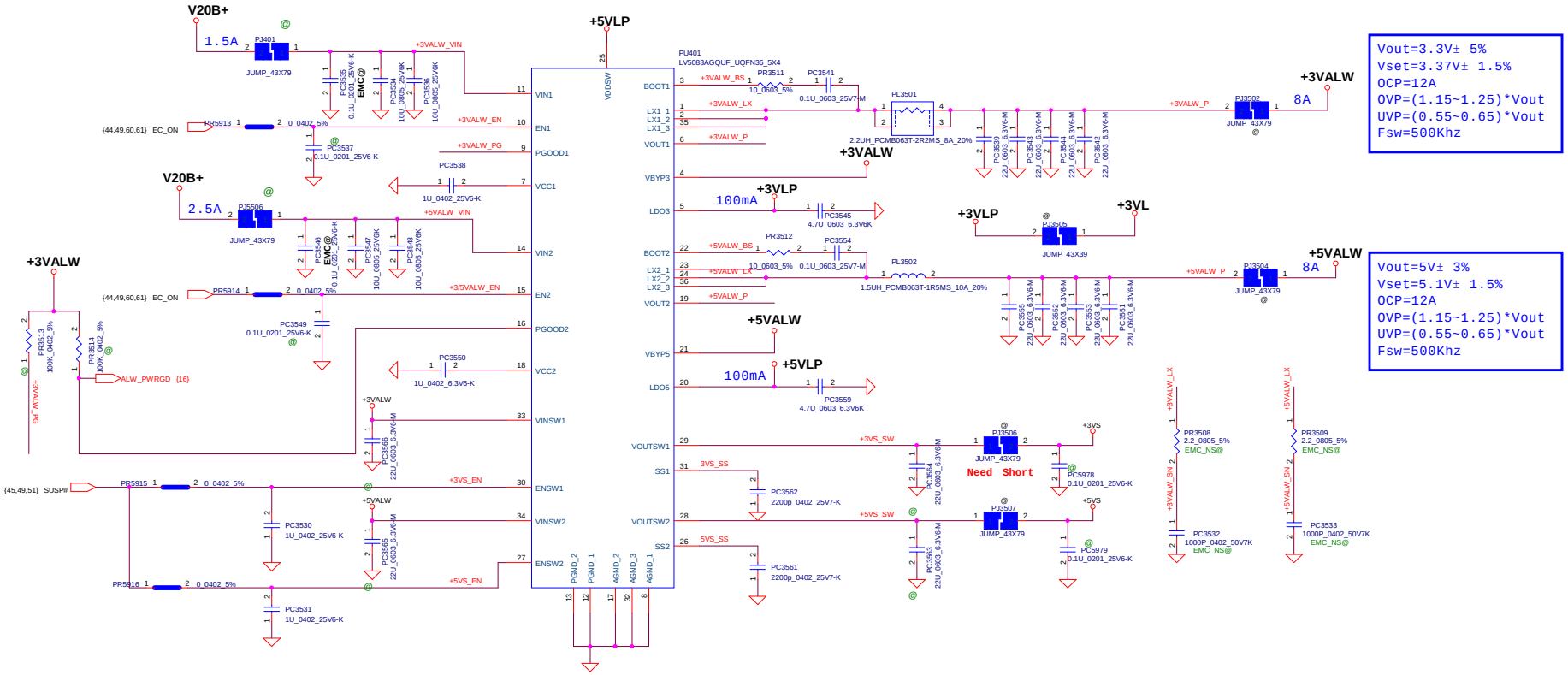

Vout=3.3V± 5%
Vset=3.37V± 1.5%
OCP=12A
OVP=(1.15~1.25)*Vout
UVP=(0.55~0.65)*Vout
Fsw=500Khz

Vout=5V± 3%
Vset=5.1V± 1.5%
OCP=12A
OVP=(1.15~1.25)*Vout
UVP=(0.55~0.65)*Vout
Fsw=500Khz

VOUT=3.07V
TDC=6A
OCP=10A
Fsw=600Khz

VOUT=5.01V
TDC=8A
OCP=12A
Fsw=600Khz

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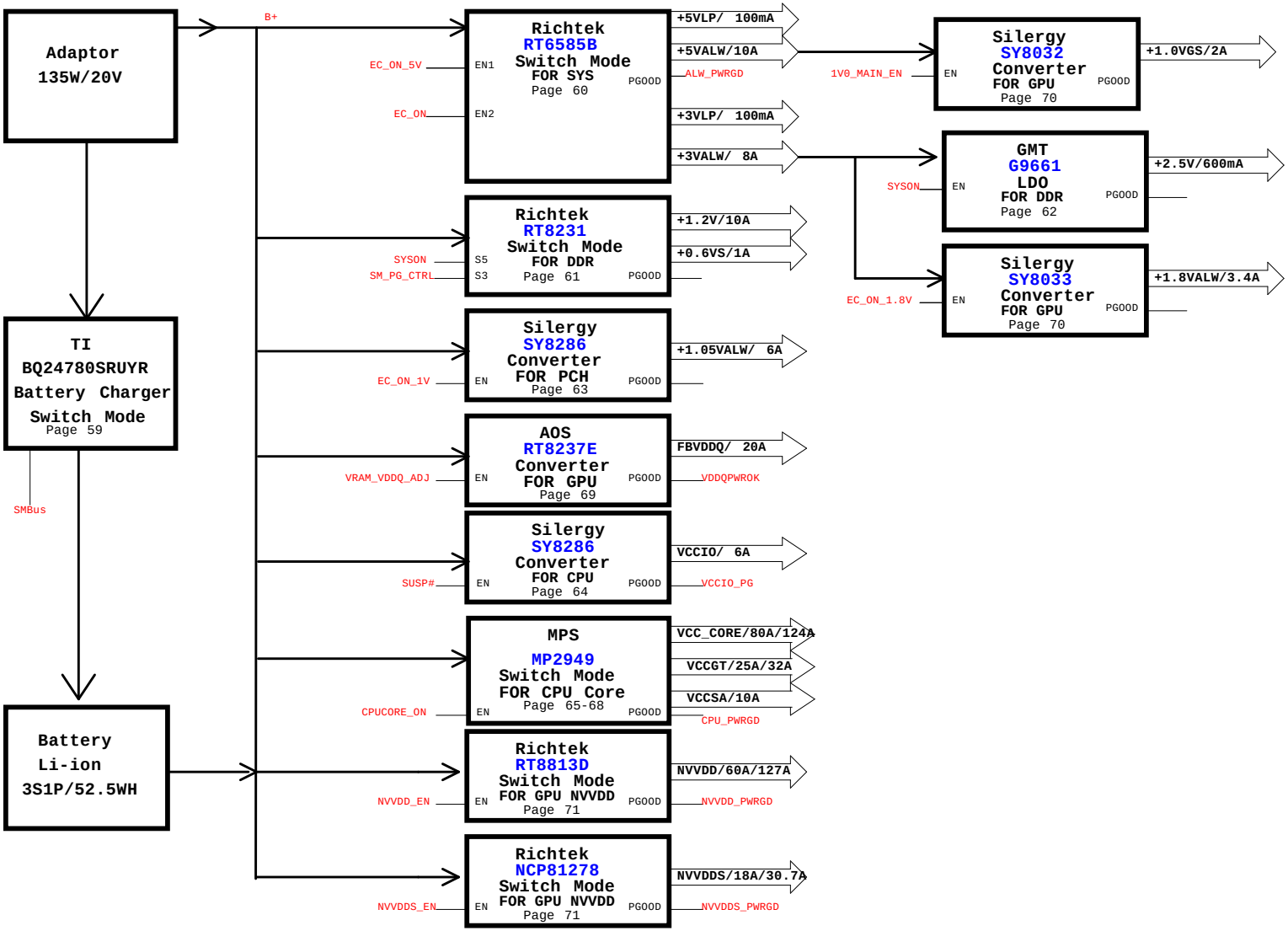

Security Classification	LC Future Center Secret Data		
Issued Date	2015/02/26	Deciphered Date	2018/09/20

Title: **Power Diagram**

Size	Document Number	Rev
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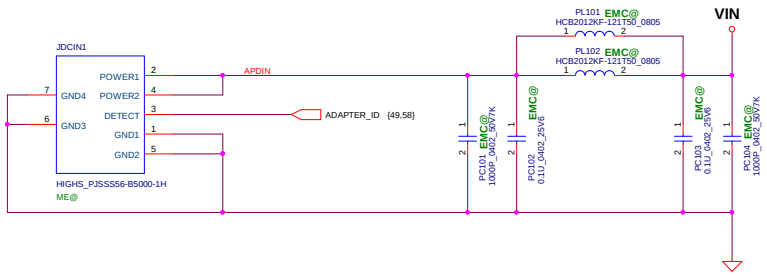
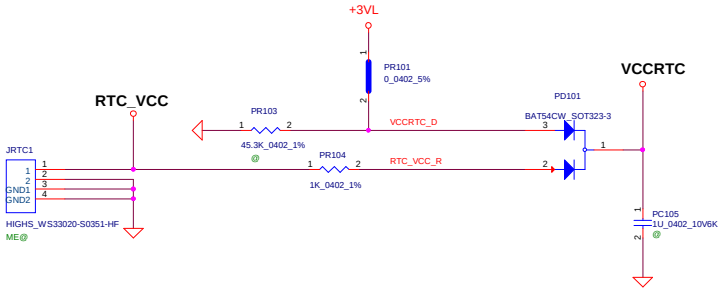
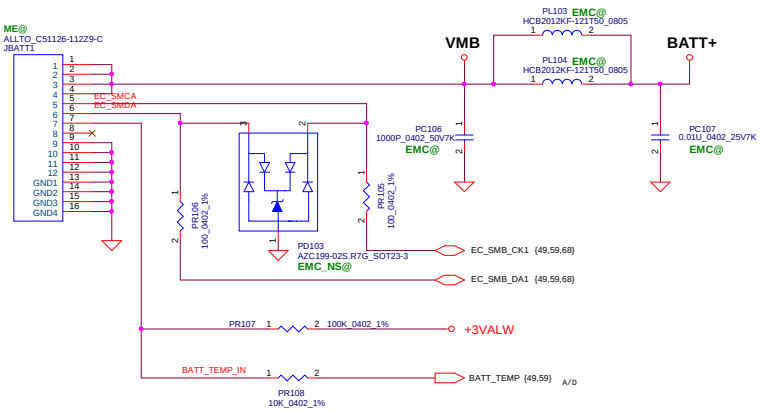


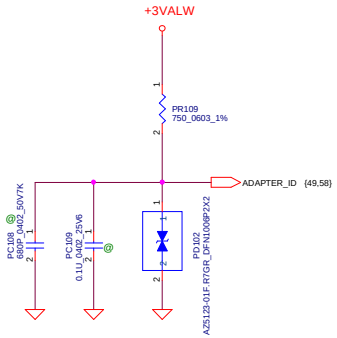
DC IN:1.DC IN connect apply for PN HIGHS_PJSSS56-B5000-1H_5P-T ,need replace connector rate current 7A



RTC:1. 0ohm delete
2.the max VCCRTC < 3.2V specification
3.RTC cable 35mm



battery IN:
1.20180821SF update to SP011808066
2.battery connector 12pin per pin 4.5A



ADP_ID:1. cost down solution
2.EC initial ID function

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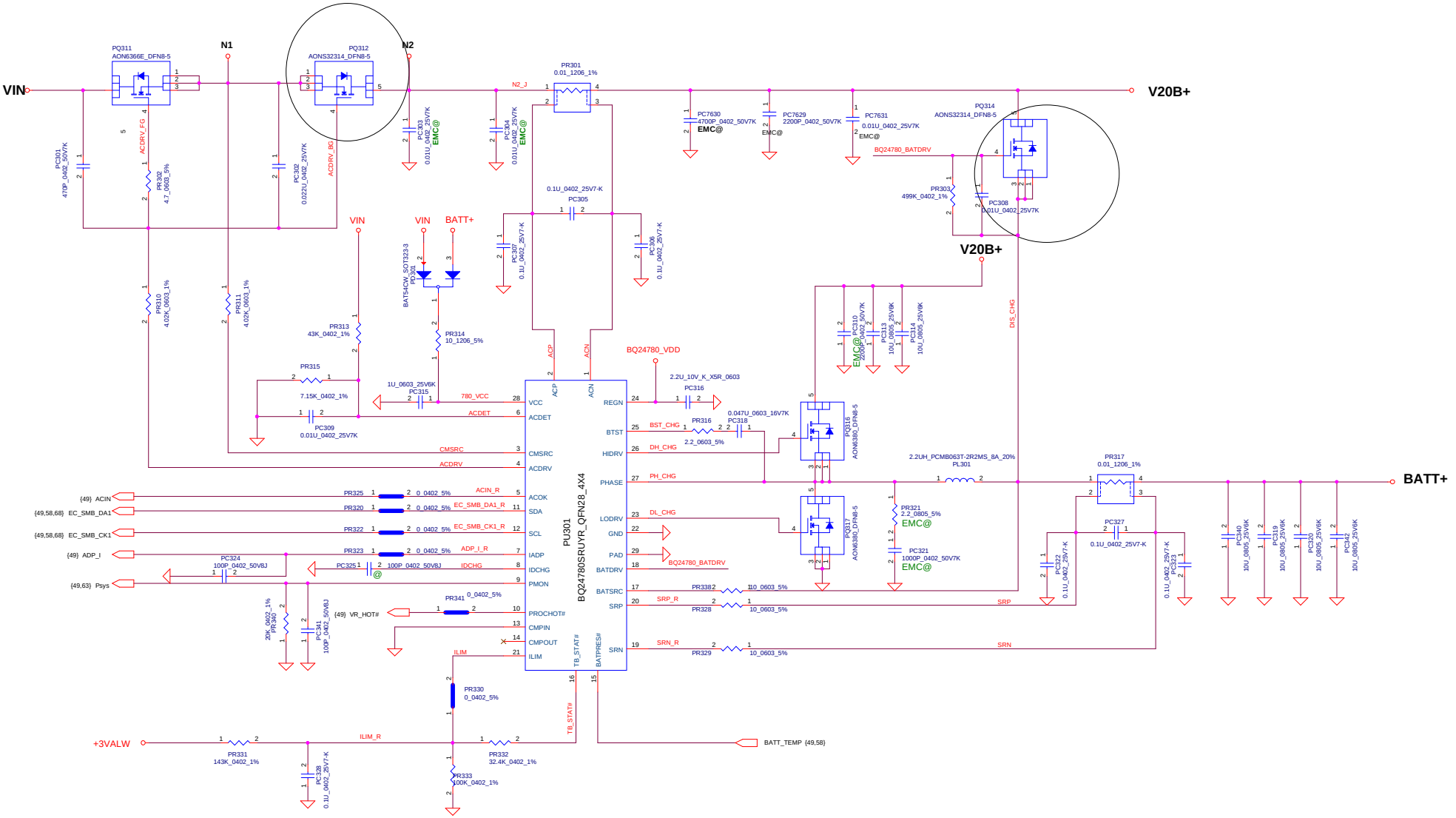

charge current:1C 5A
charge voltage:12.6V
charge frequency:800K
ILIM pin:charge7A, turbo-discharge-10A

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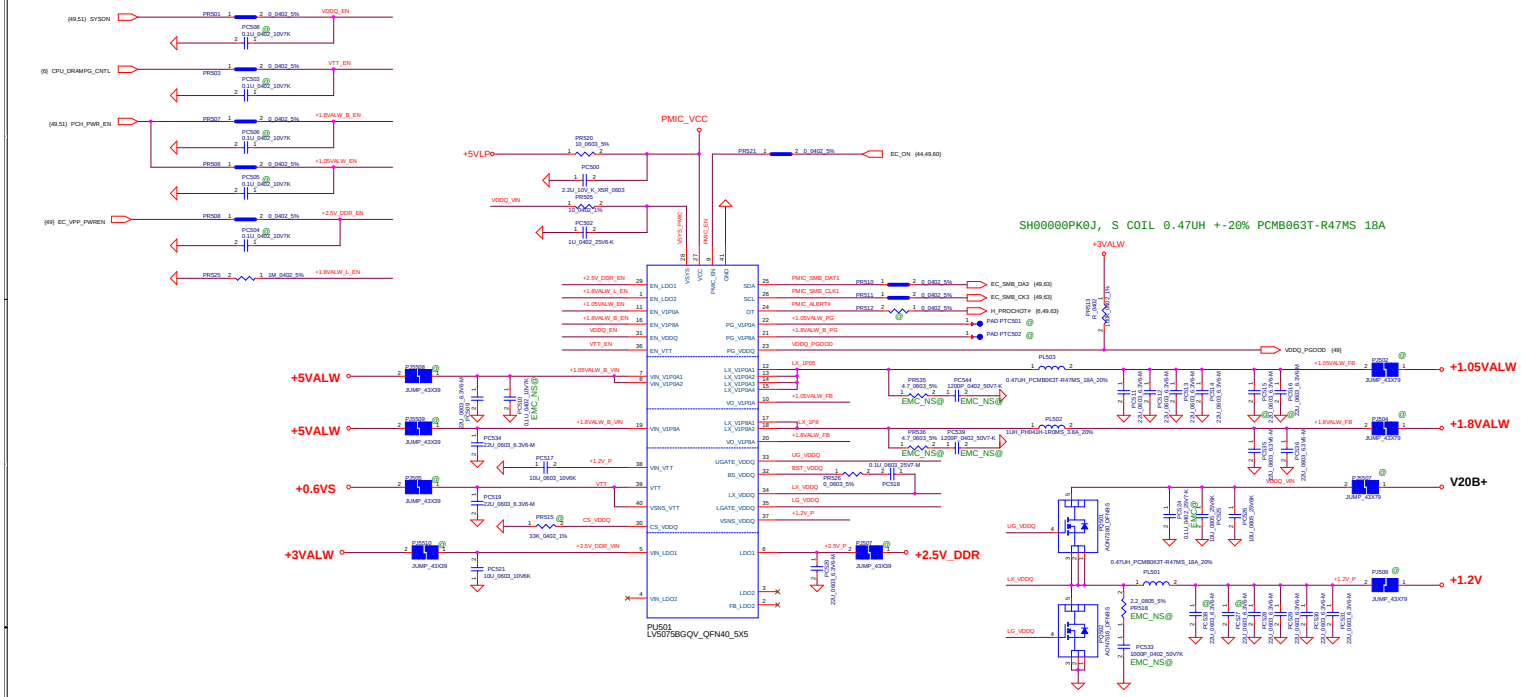

1.2V: setting 1.21V
TDC:8A
OCP:125mV/25A
OVP:120%
frequency:1Mhz
0.47UH_PCMC063T-R47MN_17.5A_20% DCR no limit
1.05V: setting 1.05V
TDC:6A
OCP:10A
OVP:120%
frequency:1Mhz
1.8V: setting 1.81V
TDC:3A
OCP:6A
OVP:120%
frequency:1Mhz

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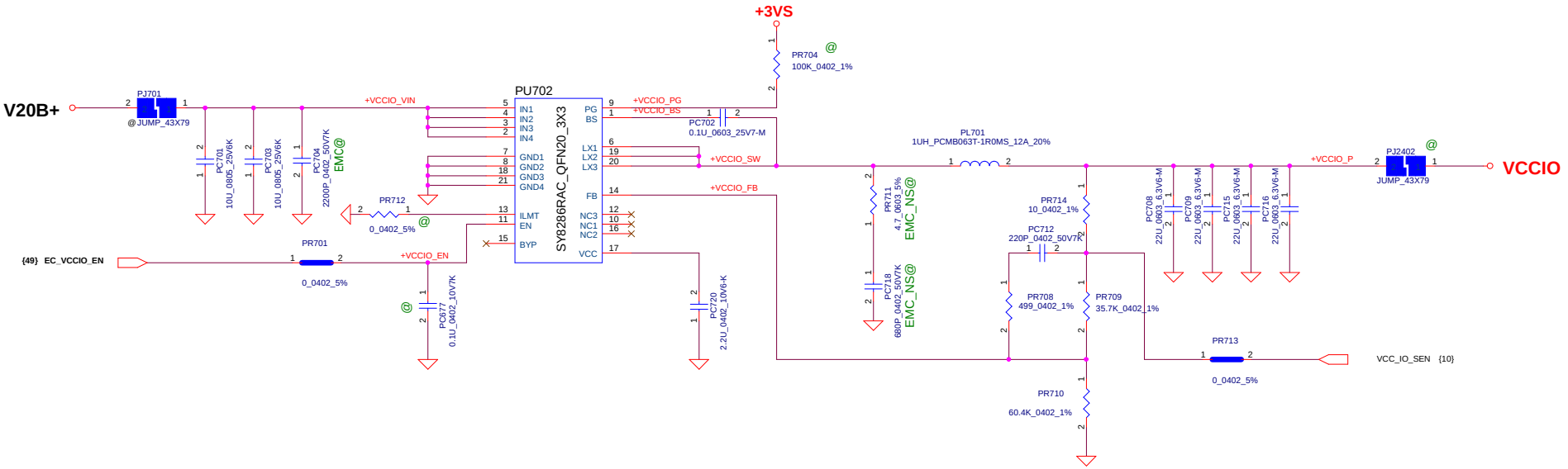

VCCIO:FB=0.6V/0.954V
TDC=6A
OCP:10A
OVP:120%
frequency:500Khz
remove sense pull high in power side

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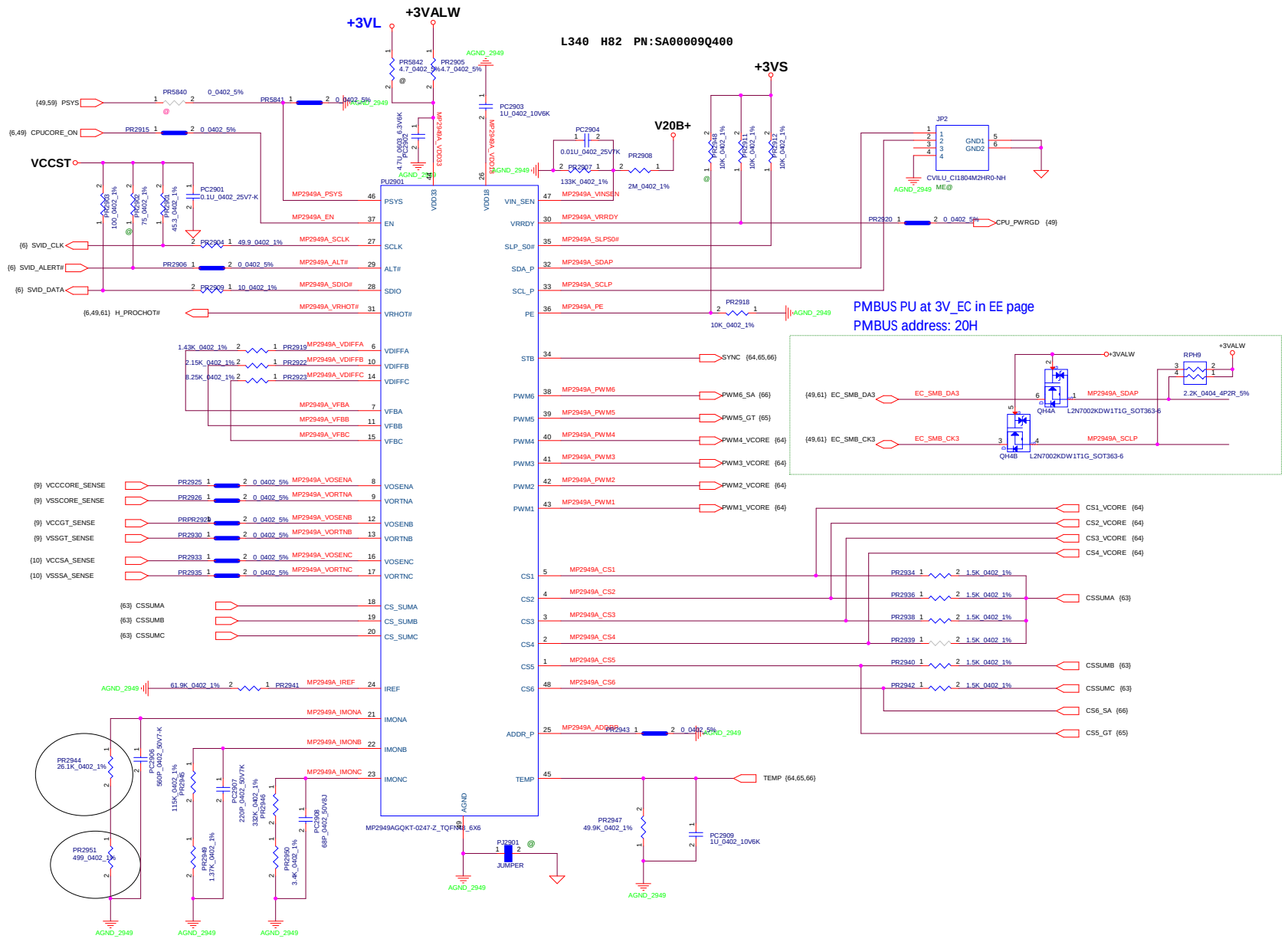

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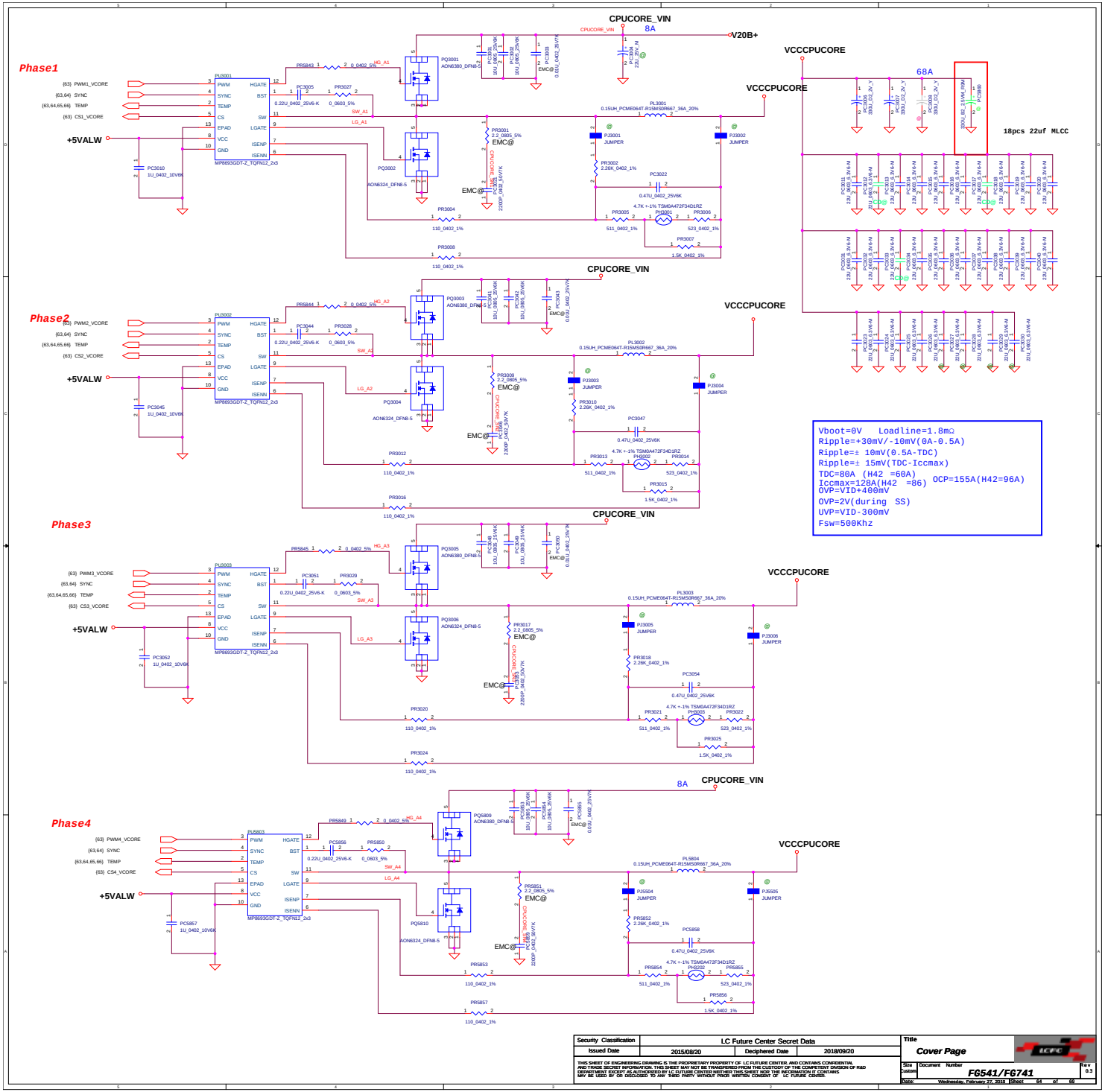

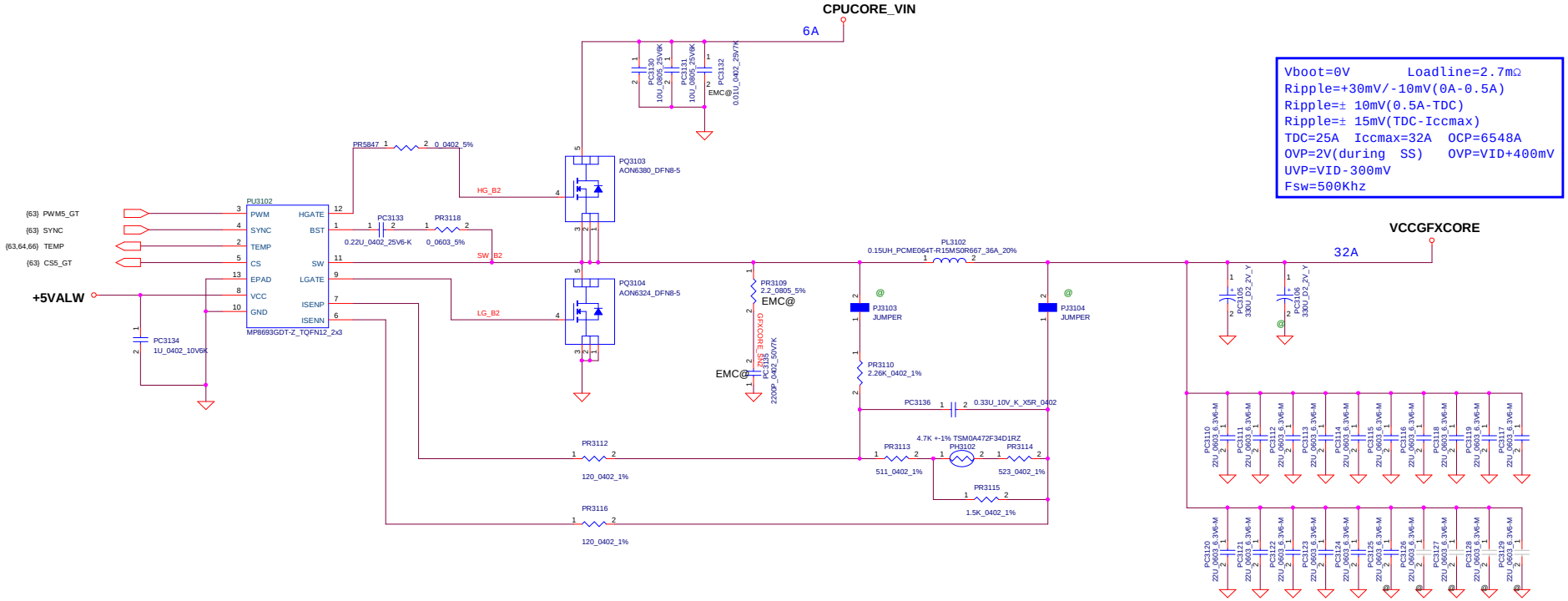

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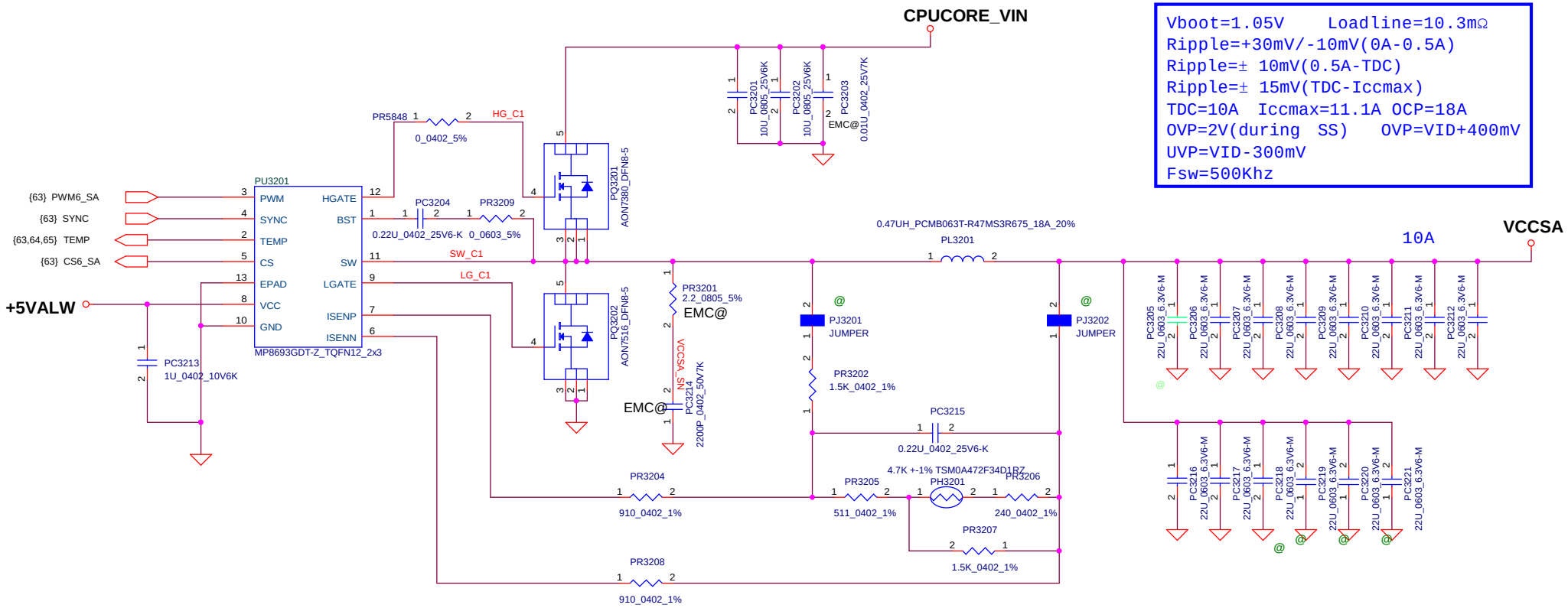

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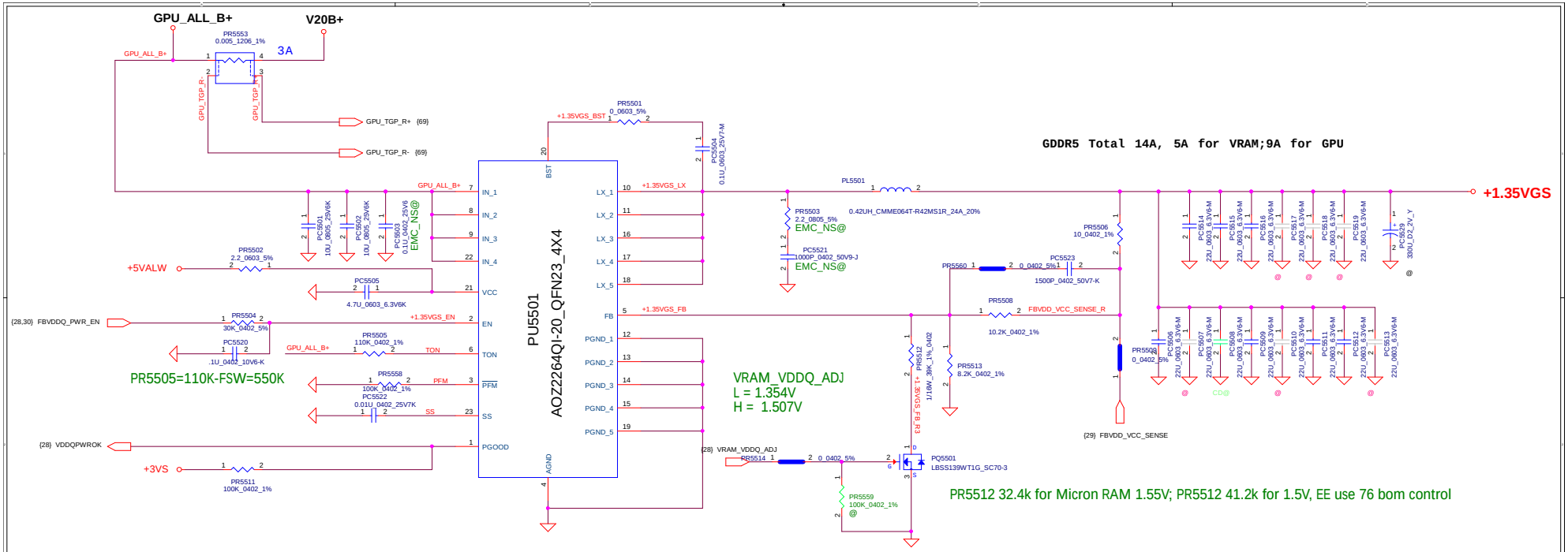

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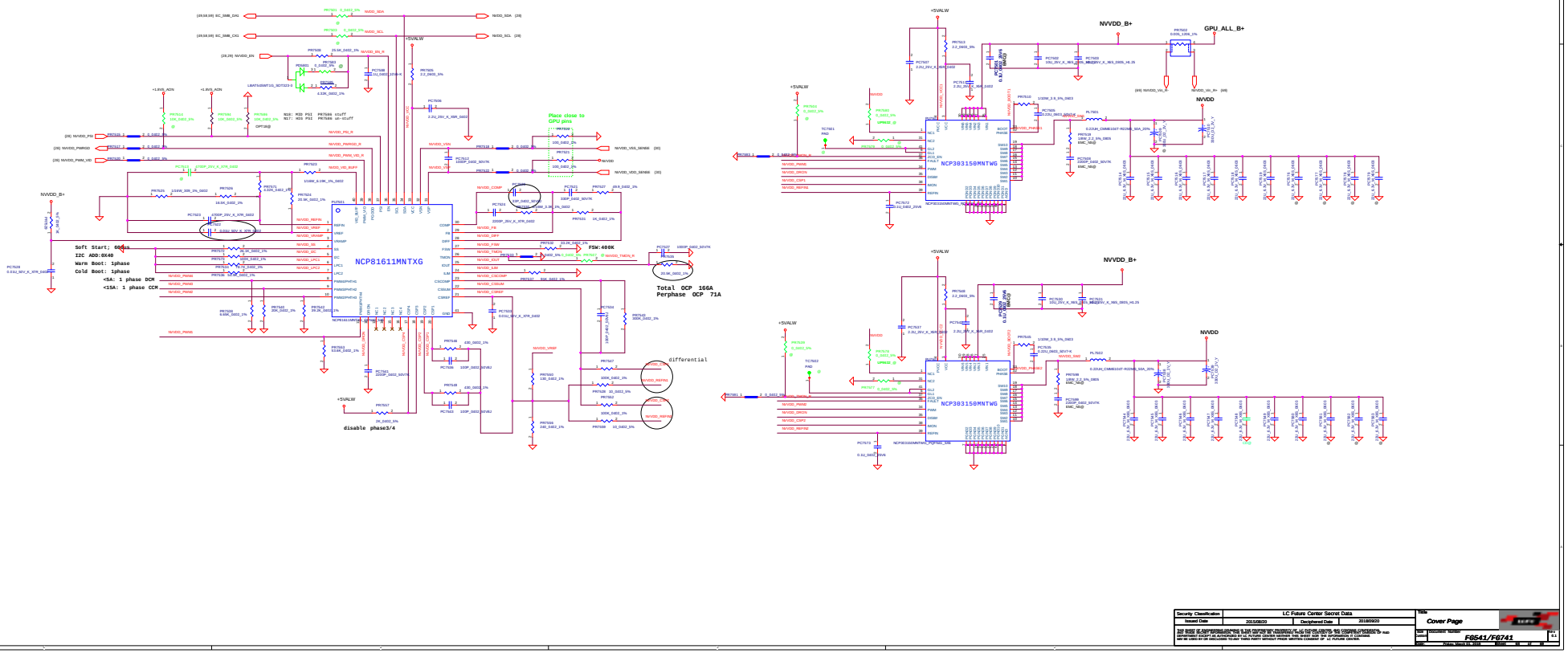

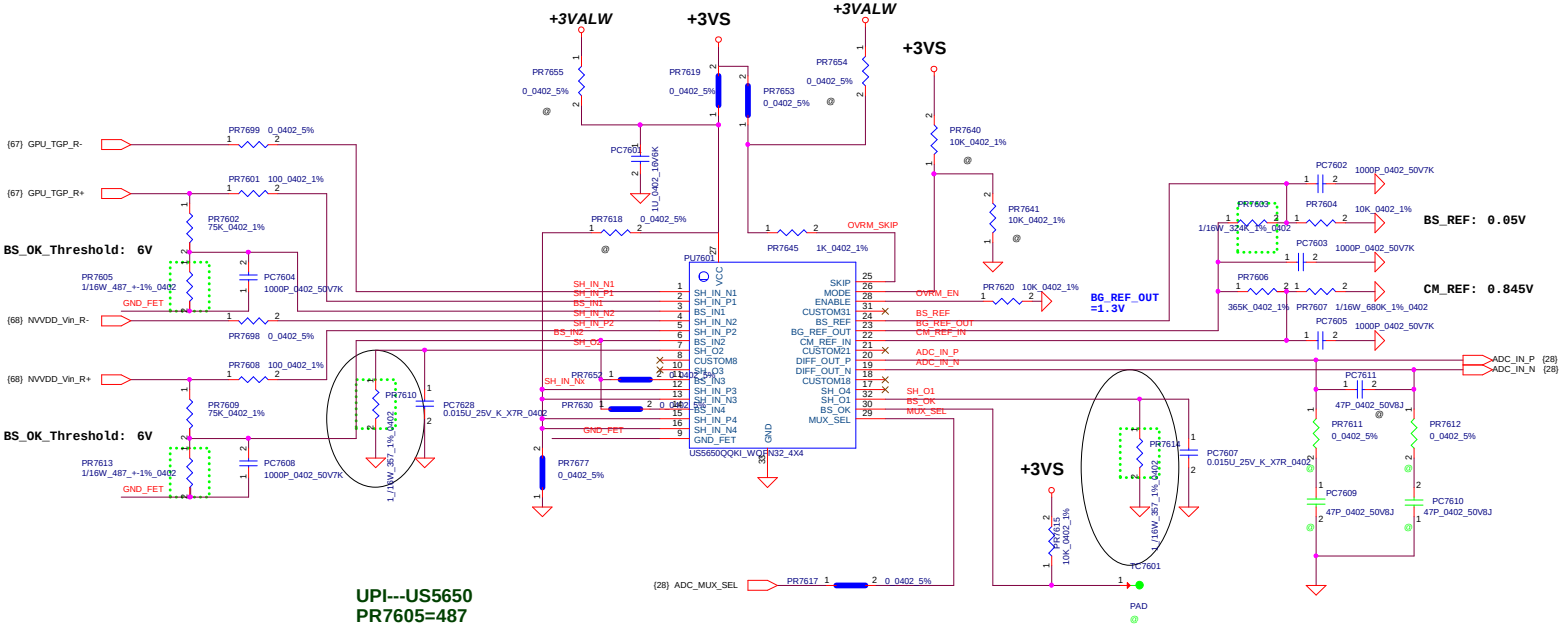

UPI---US5650
PR7605=487
PR7613=487
PR7610=357ohm for Lower 70W 215 for 75W to 90W 165 for 100W to 110W
PR7614=357ohm for Lower 70W 215 for 75W to 90W 165 for 100W to 110W
PR7603=324K
PR7602=75K
PR7609=75K
PC7604=1nF
PC7608=1nF

ON---NCP45491
PR7605=649
PR7613=649
PR7610=475ohm for lower 70W 287 for 75W to 90W 221 for 100W to 110W
PR7614=475ohm for lower 70W 287 for 75W to 90W 221 for 100W to 110W
PR7603=243K
PR7602=75K
PR7609=75K
PC7604=1nF
PC7608=1nF

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