

# LCFC Confidential


## GYG41/GYG51(NM-D131) MB Schematics Document

Tiger Lake UP3 with DDR4 + Audio AMP + TBT

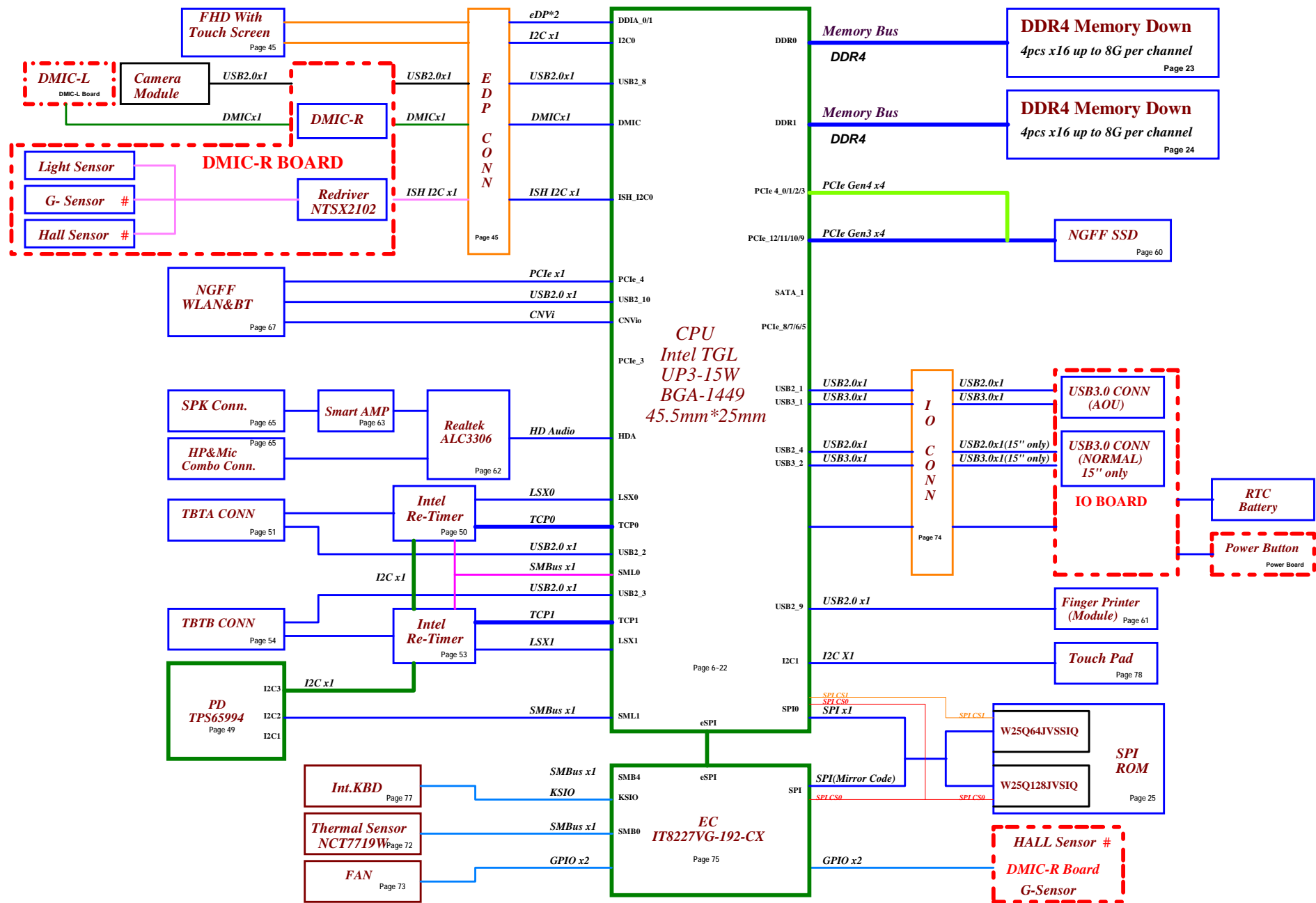
2020-02

REV:0.2

Security Classification	LC Future Center Secret Data			Title	
Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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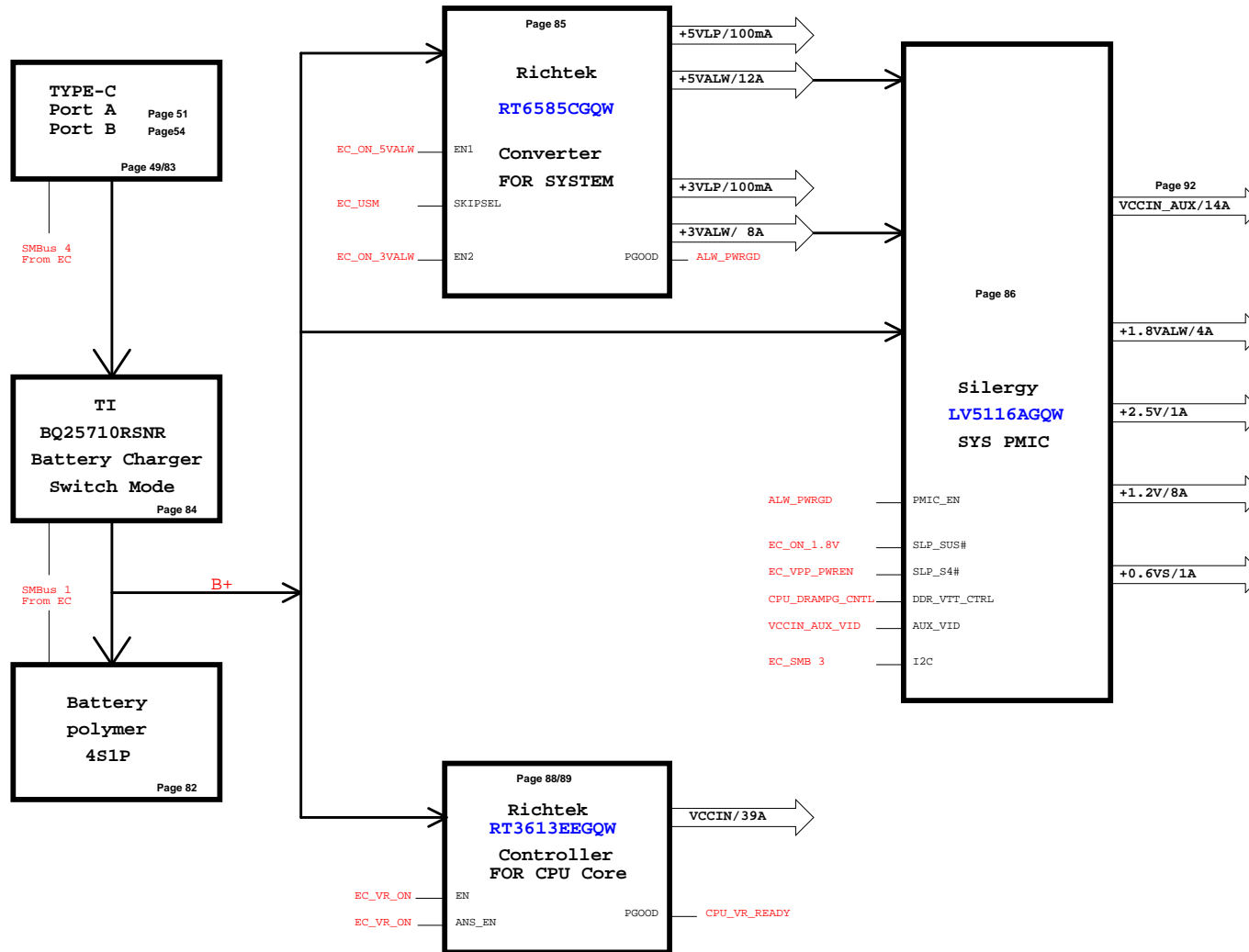


# Block Diagram\_EE



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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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# Block Diagram\_Power



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

Power Plane State	B+ +3VL +5VL	+3VALW  +5VALW	+3VSUS +3VALW_PCH +1.8VALW +1.8VALW_PCH	+1.2V +2.5V_DDR +VCCST_CPU	+5VS +3VS +1.8VS +VCCIN +VCCIN_AUX	+VCCSTG
S0	O	O	O	O	O	O
S0Ix	O	O	O	O	O	X ***
S3	O	O	O	O	X	X
S3 Battery only	O	O	O	O	X	X
S5 S4 AC Only	O	O	X ***	X	X	X
S5 S4 Battery only	O	O	X	X	X	X
S5 S4 AC & Battery don't exist	X	X	X	X	X	X

## HSIO Matrix

HSIO PORT	Function
USB2.0	1 USB3.0 AOU Port
	2 TBT A
	3 TBT B
	4 USB3.0 DB Port
	5 NC
	6 NC
	7 NC
	8 Camera
	9 Finger Print
	10 Bluetooth
USB3.0	1 USB3.0 AOU Port
	2 USB3.0 DB Port
	3 NC
	4 WLAN
PCH PCIE3	5 NC
	6 NC
	7 NC
	8 NC
	9
	10 SSD
	11
	12
CPU PCIE4	1
	2 SSD(Reserved)
	3
	4

## SMBUS Control Table

Source	EC ITS227C				PCH			PD TPS65994
	EC_SMB_0 +3VS	EC_SMB_1 +3VL_EC	EC_SMB_3 +3VL_EC	EC_SMB_4 +3VL_EC	PCH_SML_0 +3VALW_PCH	PCH_SML_1 +3VALW_PCH	ISH_I2C_0 +3VS	PD_I2C_3 VCC3_LDO_PD
DGPU								
Memory Down	X	X	X	X	X	X	X	X
SODIMM								
BATT	X	V +3VL_EC	X	X	X	X	X	X
Charger	X	V +3VL_EC	X	X	X	X	X	X
WLAN	X	X	X	X	X	X	X	X
PMIC	X	X	V +3VL_EC	X	X	X	X	X
IMVP9	X	X	X	X	X	X	X	X
Thermal Sensor	V +3VS	X	X	X	X	X	X	X
TOF								
Acce Sensor	X	X	X	X	X	X	V +3VALW_PCH	X
Light Sensor	X	X	X	X	X	X	V +3VALW_PCH	X
Re-Timer	X	X	X	X	V 3VALW_TBTA	X	X	V VCC3_LDO_PD
PD	X	X	X	V +3VL_EC	X	V VCC3_LDO_PD	X	X

## EC SMBus0 address

Device	Address
DGPU	
Thermal Sensor(NCT7718W)	
Thermal Sensor(NCT7719W)	1001_101xb
TOF	

## EC SMBus1 address

Device	Address
Smart Battery	0x16
Charger	0x12

## EC SMBus3 address

Device	Address
IMVP9	
PMIC	0x34

## EC SMBus4 address

Device	Address
PD	TBD

## PCH SML0 address

Device	Address
Re-Timer	TBD

## PD I2C3 address

Device	Address
Re-Timer	TBD

## PCH SML1 address

Device	Address
PD	TBD

## PCH ISH I2C0 address

Device	Address
TOF	
Accelerometer(MB)	001 1000b
Accelerometer(DB)	001 1001b
Light Sensor	1000 100xb

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		Date	Wednesday, March 18, 2020
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## Virtual Symbol\_EE

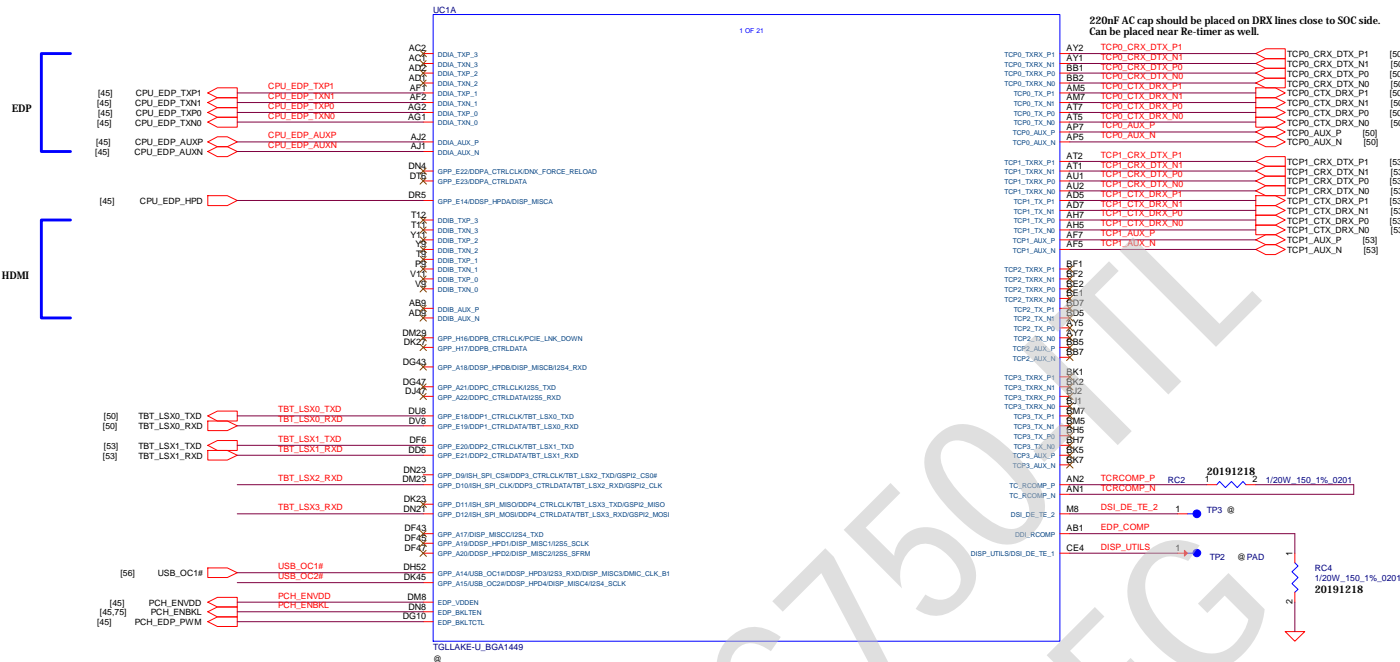
PCB	ZZZ1 NM-D131 REV0 M/B DAA0000SD00
CPU	QU77@ UC1 FH8069004314210 QU77 A1 2.7G QU7K@ SA0000APR00 UC1 FH8069004314211 QU7J SA0000APJ00 UC1 FH8069004314214 QU7M SA0000APG10 UC1 QU7N@ FH8069004314214 QU7N SA0000APG00
GPU	
DRAM MD	UD9 8Gb MIC SDP SA0000R510 UD10 8Gb SAM SDP SA0000ACB10 UD11 8Gb HYX SDP SA0000AC710 UD12 16Gb MIC SDP SA0000ADK00 UD13 16Gb SAM SDP SA0000AC020 UD14 16Gb HYX DDP SA0000AC520
VRAM	
X76	D16G_SAM@ ZZZZ 16Gb_SAM_SDP X7649T12001 D16G_HYX@ ZZZZ 16Gb_HYX_DDP X7649T12002 D16G_MIC@ ZZZZ 16Gb_MIC_SDP X7649T12002 D12G_HYX@ ZZZZ 12Gb_HYX_SDP/DDP X7649T12006 D8G_SAM@ ZZZZ 8Gb_SAM_SDP X7649T12003 D8G_HYX@ ZZZZ 8Gb_HYX_SDP X7649T12004 D8G_MIC@ ZZZZ 8Gb_MIC_SDP X7649T12005 D12G_SAM@ ZZZZ 12Gb_SAM_SDP X7649T12001
DRAM SODIM	
Re-Timer	UUS JHL8040R SLMN7 SA00009QD30 UUS JHL8040R SLMN7 SA00009QD30

## Virtual Symbol\_Power

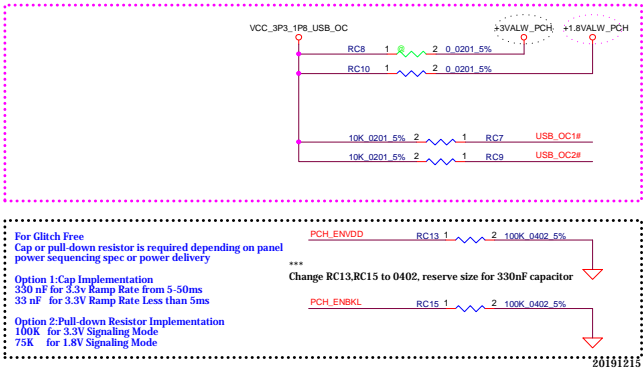
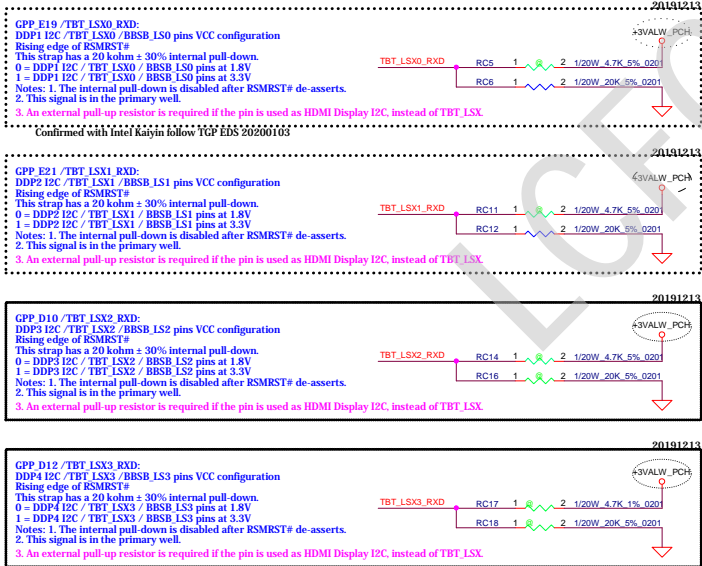
15W	25W
PR3516 11.3K_0402_1% SD00411028J 15W @ PR3527 15K_0201_1% SD04115028J 15W @ PR3533 1/20W_11K_1%_0201 SD000018J00 15W @ PR3520 1/20W_1.33K_1%_0201 SD000015200 15W @	PR3535 21K_0402_1% SD00411028J 15W @ PR3522 1/16W_28K_1%_0402 SD000015J00 15W @ PR3507 8.25K_0402_1% SD03482518J 15W @ PR3518 49.9_0402_1% SD03499A8J 15W @ PR3525 1/16W_30_1%_0402 SD000011700 15W @ PR3523 1/16W_1.18K_1%_0402 SD00001D00 15W @ PR3526 1/16W_30_1%_0402 SD000011700 15W @ PR3520 1/20W_12.1K_1%_0201 SD000018J00 15W @ PR3523 1/20W_10K_0402_1% SD03410028J 25W @ PR3525 330_0402_1% SD00000DNUJ 25W @
PQ303 AONR32340C_DFN8-5 SB00001U100 PWR_15@ PQ204 AONR32340C_DFN8-5 SB00001U100 PWR_15@ PQ8802 AONR32340C_DFN8-5 SB00001U100 PWR_15@ PQ51 AONR32314 SB00001R500 PWR_15@ PQ52 AONR32314 SB00001R500 PWR_15@ PQ53 AONR32314 SB00001R500 PWR_15@ PQ54 AONR32314 SB00001R500 PWR_15@ PQ2002 AONY36332 SB00001XMD0 PWR_15@	
LA6 BLM15PX800SN1D_2P SM01000S400 AMP_EMC@ LA7 BLM15PX800SN1D_2P SM01000S400 AMP_EMC@ LA8 BLM15PX800SN1D_2P SM01000S400 AMP_EMC@ LA9 BLM15PX800SN1D_2P SM01000S400 AMP_EMC@ CA75 470P_0201_25V_X7R_0201 SE00000628J AMP_EMC@ CA76 470P_0201_25V_X7R_0201 SE00000628J AMP_EMC@ CA77 470P_0201_25V_X7R_0201 SE00000628J AMP_EMC@ CA78 470P_0201_25V_X7R_0201 SE00000628J AMP_EMC@ UU1 SN2001024YBGR_DSBGA50 SA0000ASB00 UA1 ALC3306-VA1-CG_MQFN48P SA0000AR00	

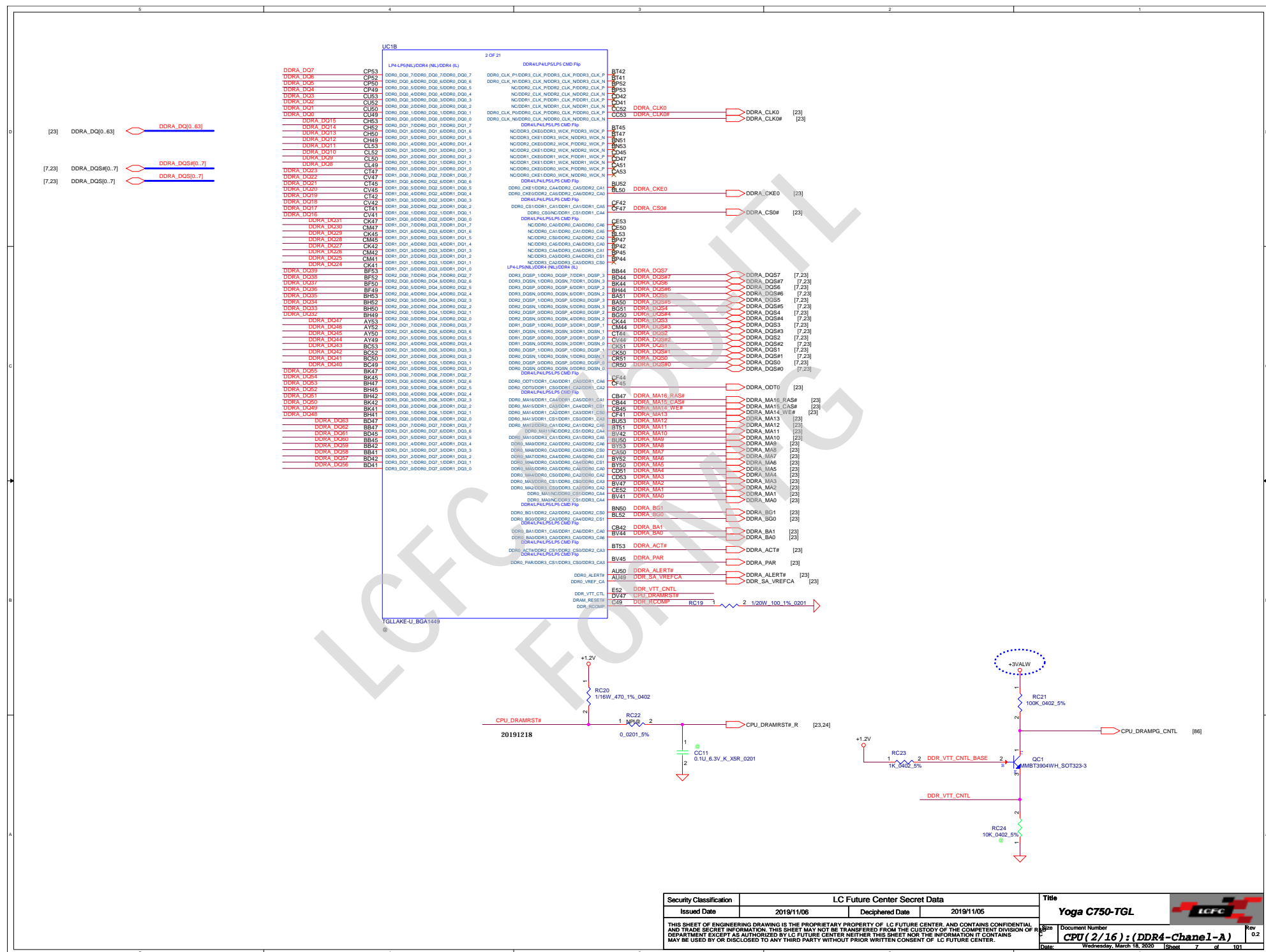
## BOM Structure


BOM Structure	Description
@	Un-stuff
FHD@	For FHD Panel Part
HDR@	For HDR Panel Part
14@	For GYG41 part
15@	For GYG51 part
8M_ROM@	For 8G BIOS ROM part
AMP@	For external Amplifier solution part
AMP_NS@	For external Amplifier solution un-stuff part
AMP_PWR@	For discrete Amplifier power solution part
ANS@	For power ANS solution part
USM@	For power USM solution part
BL@	For Key Board Backlight part
CHANNELA@	For Memory Channel A part
DDPA@	For Memory Channel A DDP part
SDPA@	For Memory Channel A SDP part
DDPB@	For Memory Channel B DDP part
SDPB@	For Memory Channel B SDP part
NPI@	For NPI Phase part
MP@	For MP Phase Part
PCIE4@	For PCIE Gen4 part
EMC@	For EMC part
EMC_15@	For GYG51 EMC part
EMC_NS@	For EMC un-stuff part
RF_NS@	For RF Un-Stuff part
AOAC@	For AOAC part
CNVI@	For CNVI WLAN part
ME@	For ME part
15W@	For CPU 15W Power Solution part
25W@	For CPU 25W Power Solution part

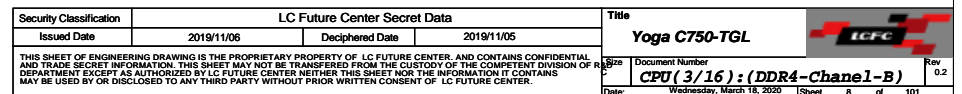


USB3/USB2 Port Pairing for USB-C Connectors				
CPU USB3 port#	TCP0	TCP1	TCP2	TCP3
PCH USB2 port#	1	2	3	4
	2	3	4	6

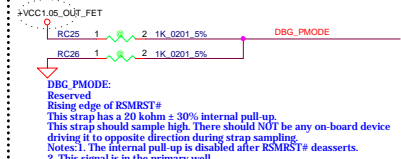




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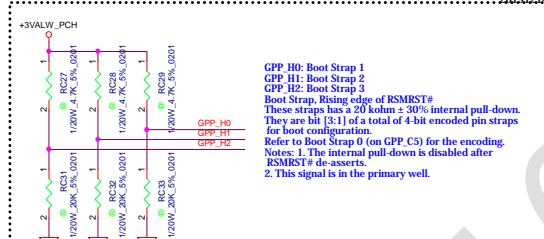
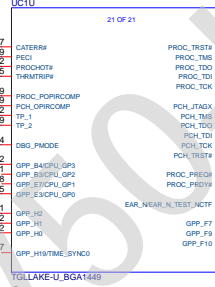
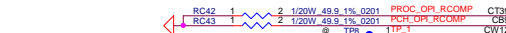
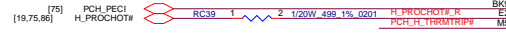
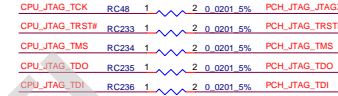
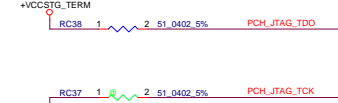
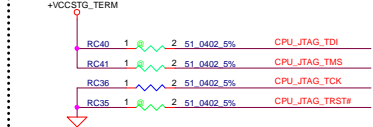




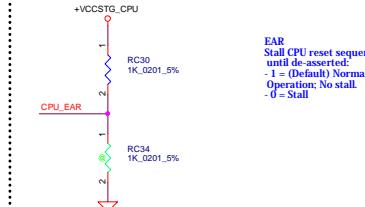


Confirmed with Intel Kaiyin, follow PDG 20200103

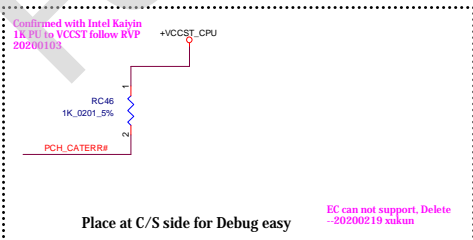
20191213



0000 = Master Attached Flash Configuration (BIOS / CSME on SPI), eSPI is enabled  
0010 = Master Attached Flash Configuration (BIOS / CSME on SPI), eSPI is disabled  
0100 = BIOS on eSPI Peripheral Channel; CSME on master attached SPI  
1000 = Slave Attached Flash Configuration (BIOS / CSME on eSPI attached device).  
1100 = BIOS on eSPI peripheral Channel; CSME on slave attached SPI

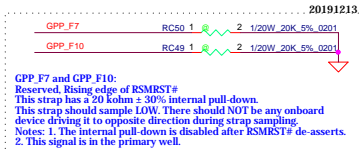


20191220



Place at C/S side for Debug easy

EC can not support, Delete --20200219 sukun



20191213

8M  
16M

PCH\_SPIO\_CLK  
PCH\_SPIO\_I03  
PCH\_SPIO\_I02  
PCH\_SPIO\_I01  
PCH\_SPIO\_I00  
PCH\_SPIO\_CS1#  
PCH\_SPIO\_CS0#

LC1E

5 OF 21

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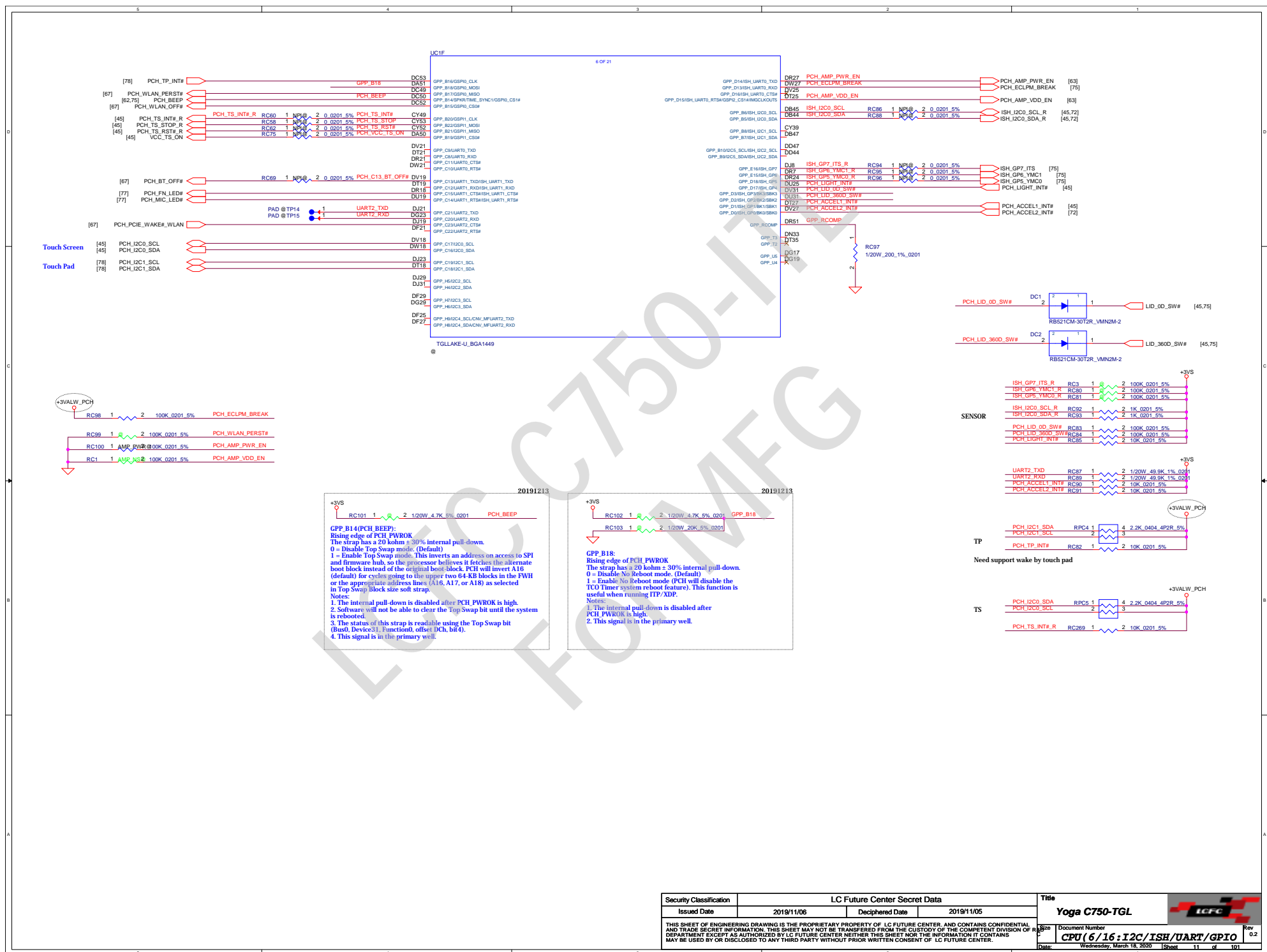
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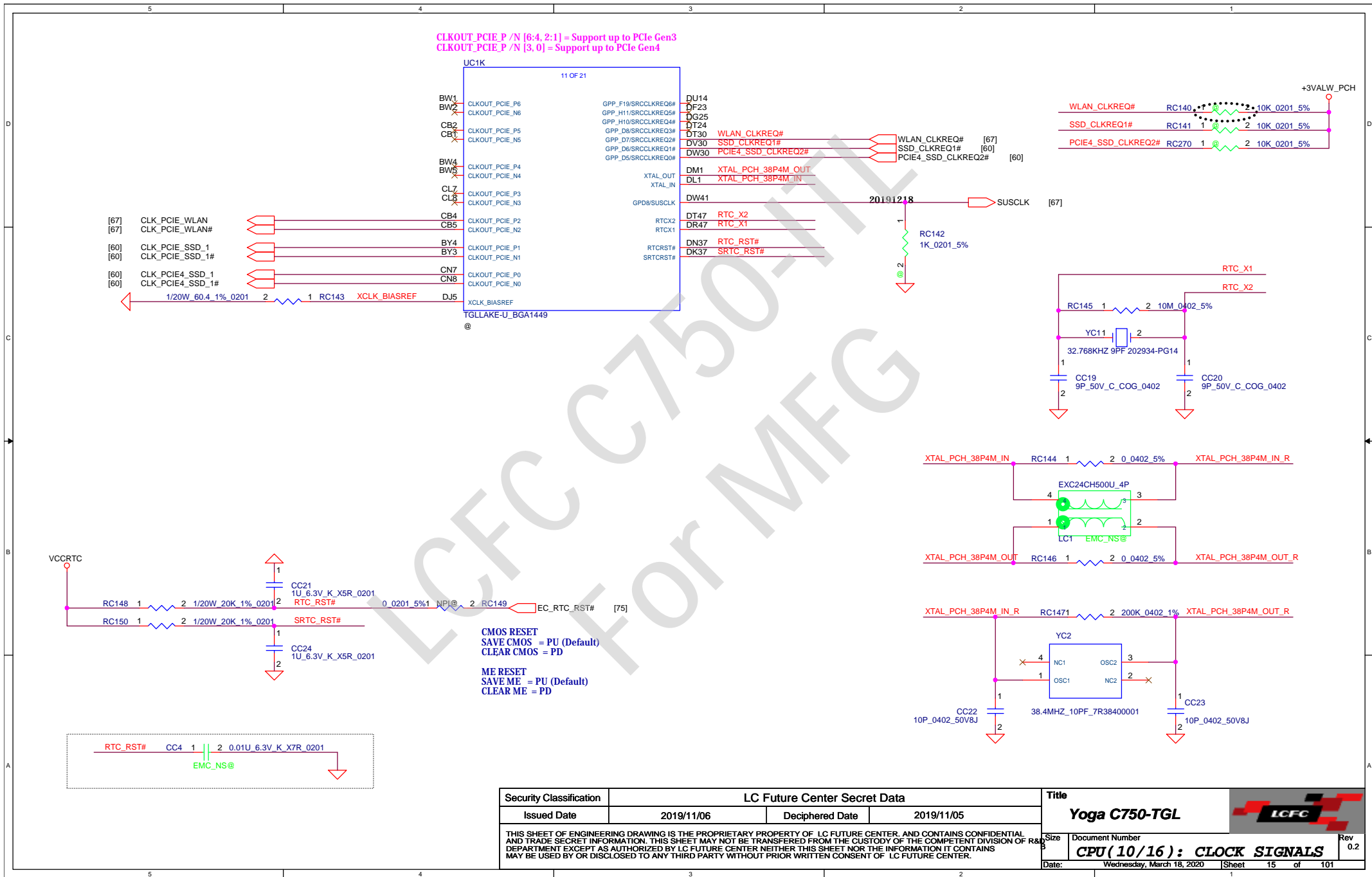
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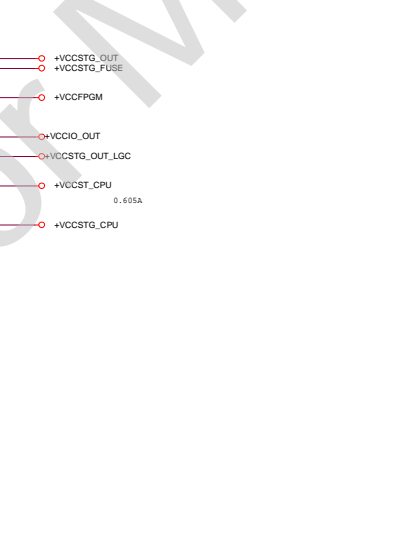
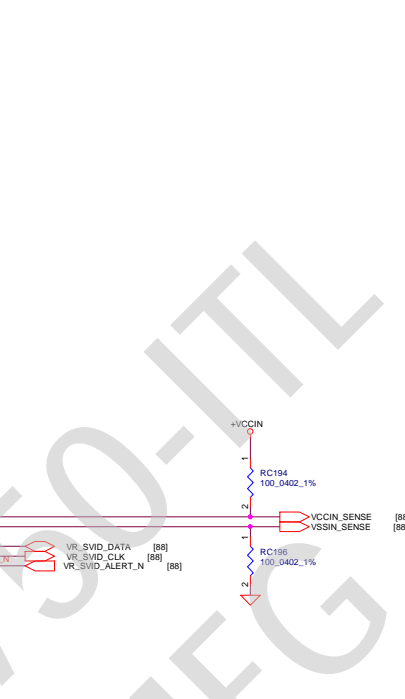
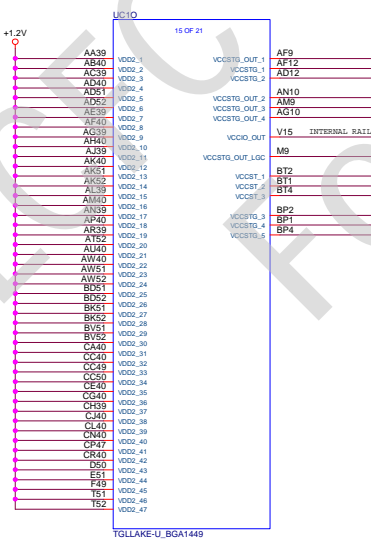
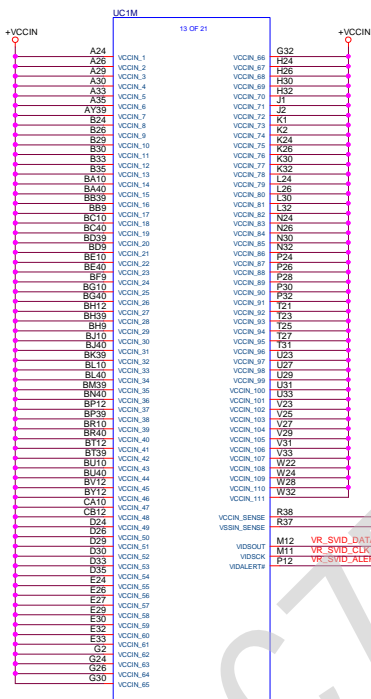
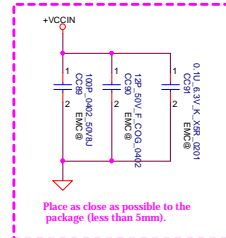
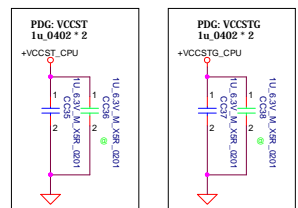
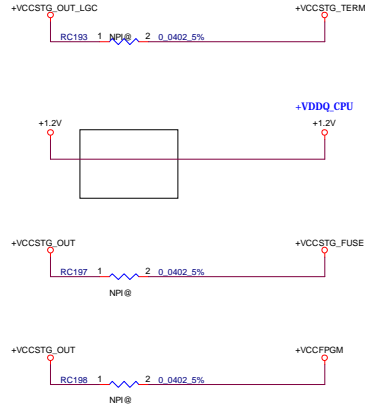
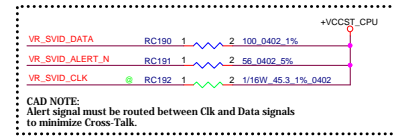






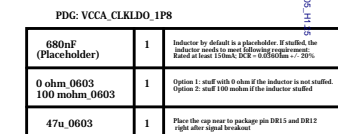






LCFC C750-ITL  
For MFG

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VCCRTC

IC6A5  
1 2  
1U 0.3V ALXSR 0007  
C6C4H  
C6D6H

IC6A6  
1 2  
0.1U 0.3V KXSR 0007  
C6C4H  
C6D6H

PDG: VCCRTC  
1u 0402 \*1 + 0.1u X5R 0402 \*1

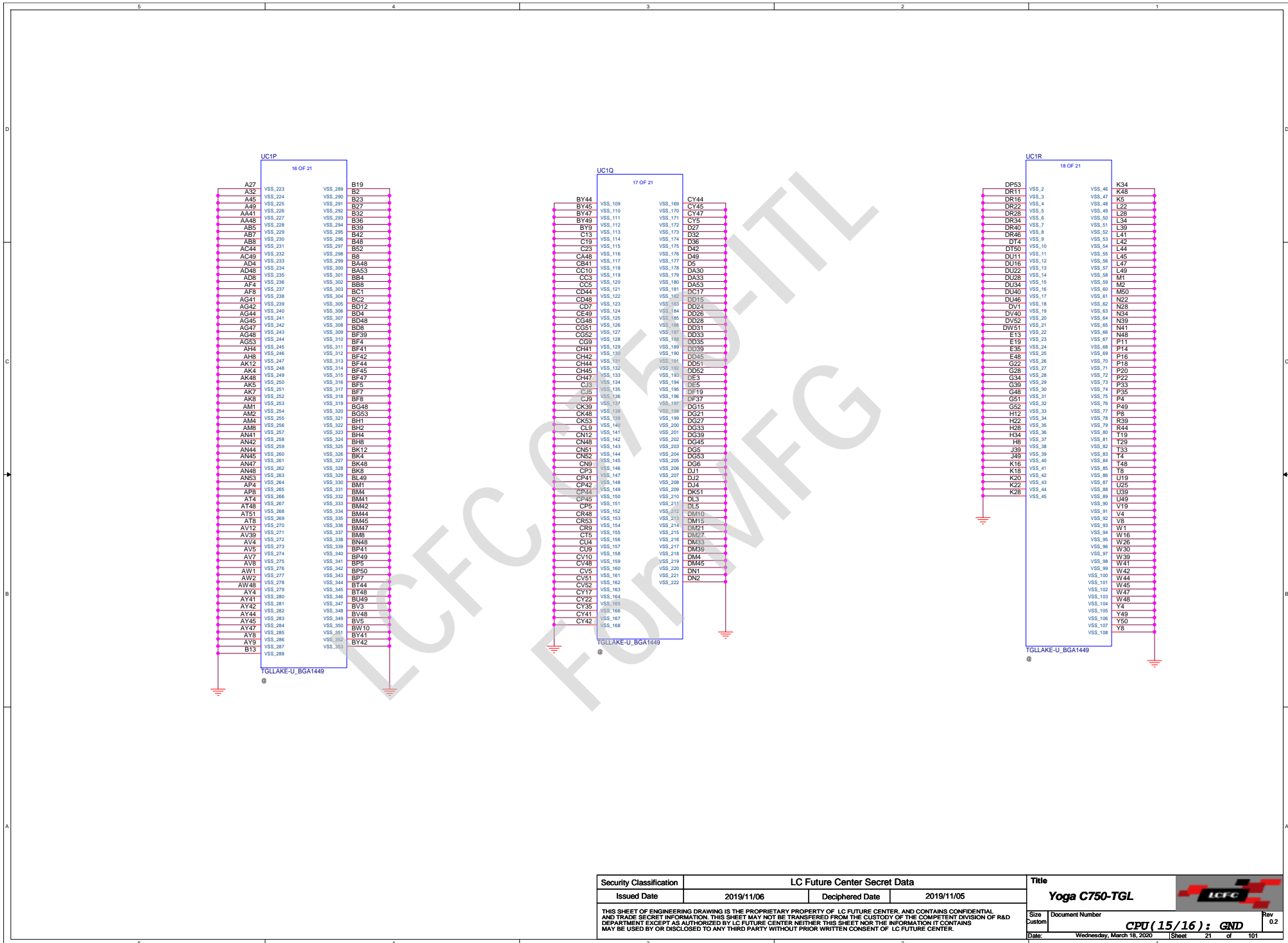
If capacitor is on primary side place it near to package pins right after signal breakout.  
If capacitor is on secondary side, make sure the capacitor pads have power(VCC) and ground (GND) via next to each other, connected to main plane

Security Classification			LC Future Center Secret Data			Title			
Issued Date		2019/11/06	Deciphered Date		2019/11/05	Yoga C750-TGL			
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Size		Document Number		CPU (14/16) : PCH		Power		Rev. 0	
Date		Wednesday, March 14, 2020		Sheet		19		of 101	

LCFC C750-ITL  
For MFG

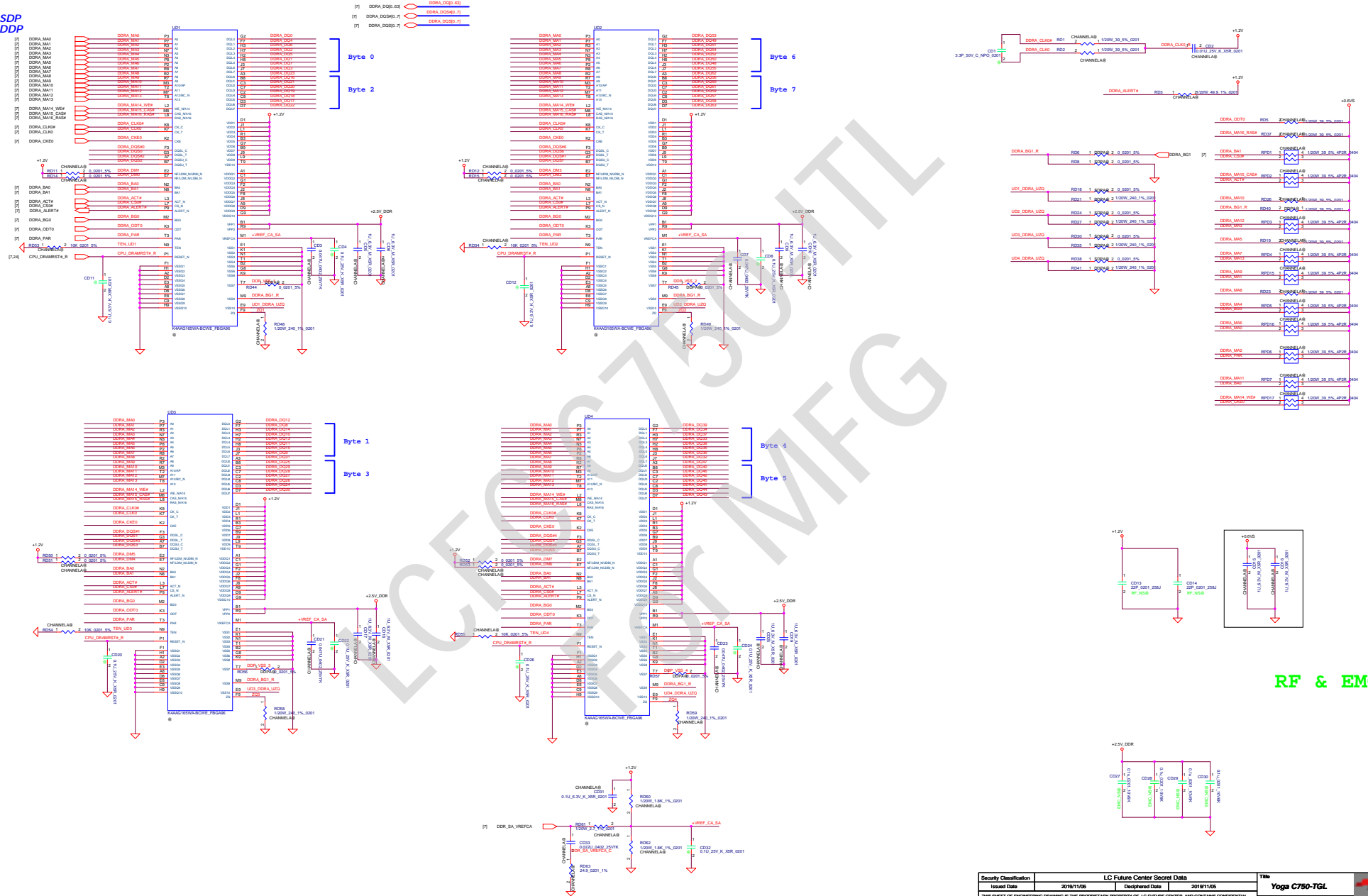
Security Classification		LC Future Center Secret Data		Title	
Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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				P	PCH PWR Reserved
				Date:	Wednesday, March 18, 2020
				Sheet	20 of 101
				Rev	0.2







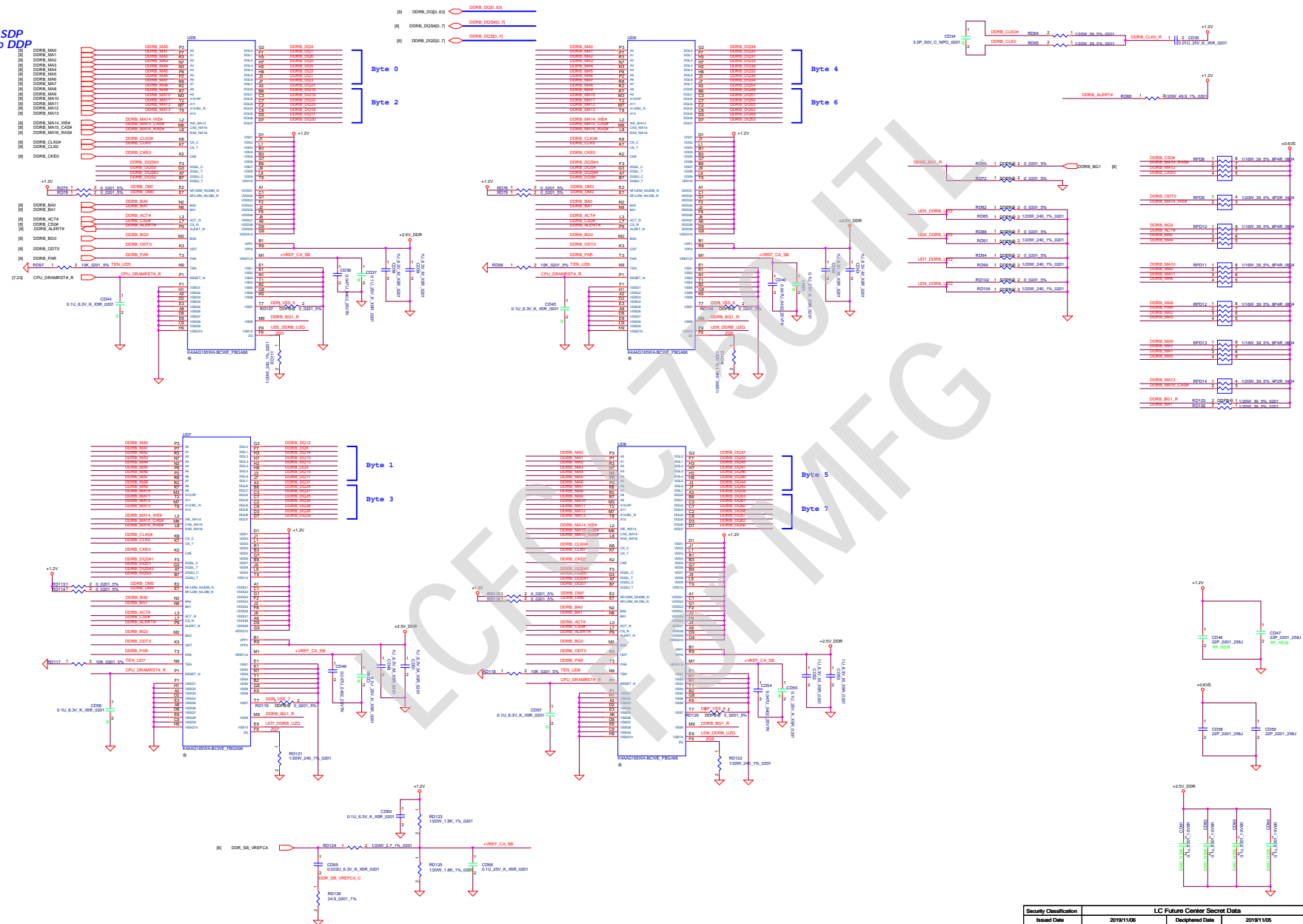
8Gb SDP  
16Gb DDP



RF & EMC

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Issued Date	2019/11/08	Discontinued Date	2019/11/08	Yoga C750-TGL	
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Doc No: Memory_C750				Rev: 0.2	

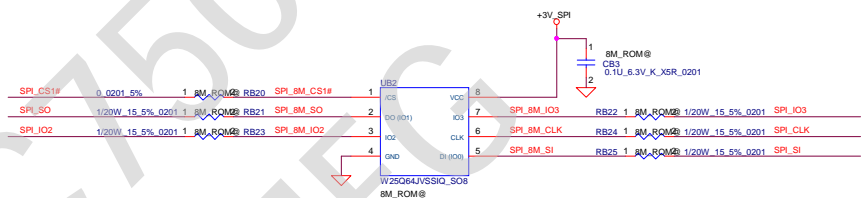
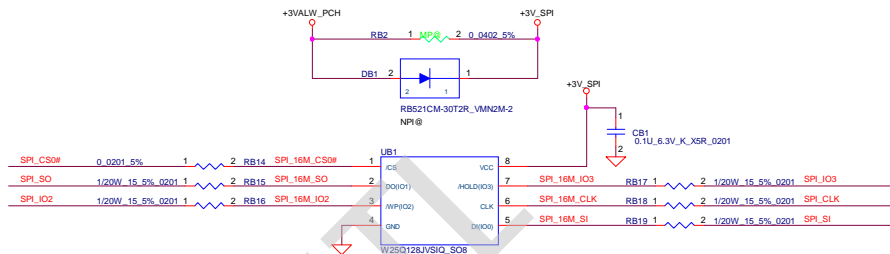
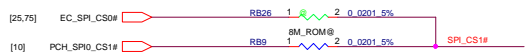
8Gb SDP  
16Gb DDP



## RF & EMC

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Issued Date	2019/11/06	Declassified Date	2019/11/05		
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				Drawing No 1-1-1 Page 1 of 30	





LCFC C750-ITL  
For MFG

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2019/11/06		2019/11/05			
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Document Number				Rev	
GPU PCIe Interface				0.2	
Sheet 26 of 101					

LCFC C750-ITL  
For MFG

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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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				Sheet 27	of 101

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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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				GPU MEM Interface(A/B)	0.2
Date: Wednesday, March 18, 2020				Sheet	28 of 101

LCFC C750-ITL  
For MFG


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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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Date: Wednesday, March 18, 2020				Sheet 29 of 101	



LCFC C750-ITL  
For MFG

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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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				P	GPU_GPIO/JTAG
Date:				Wednesday, March 18, 2020	Rev 0.2
				Sheet 30 of 101	

LCFC C750-ITL  
For MFG

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Issued Date		Deciphered Date		Yoga C750-TGL	
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				Document Number	0.2
Date:				Wednesday, March 18, 2020	
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LCFC C750-ITL  
For MFG

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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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				GPU_FWR1	0.2
Date:				Wednesday, March 18, 2020	Sheet 32 of 101






LCFC C750-ITL  
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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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Date: Wednesday, March 18, 2020				Sheet	33 of 101




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Date:				Wednesday, March 18, 2020	Sheet	34 of 101


LCFC C750-ITL  
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Issued Date		Deciphered Date		Yoga C750-TGL	
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				Rev 0.2	
				Date: Wednesday, March 18, 2020 Sheet 36 of 101	




LCFC C750-ITL  
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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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				VRAM B [31:0]	0.2
				Date: Wednesday, March 18, 2020	Sheet 37 of 101




LCFC C750-ITL  
For MFG

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Document Number				0.2	
VRAM_B [64:32]				Date: Wednesday, March 18, 2020 (Sheet 38 of 101)	

LCFC C750-ITL  
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				Rev 0.2	
				Date: Wednesday, March 18, 2020 (Sheet 39 of 101)	



LCFC C750-ITL  
For MFG


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Issued Date	2019/11/06	Deciphered Date	2019/11/05	Yoga C750-TGL	
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Date: Wednesday, March 18, 2020				Rev 0.2	
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LCFC C750-ITL  
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Date: Wednesday, March 18, 2020				Sheet 41 of 101	

LCFC C750-ITL  
For MFG

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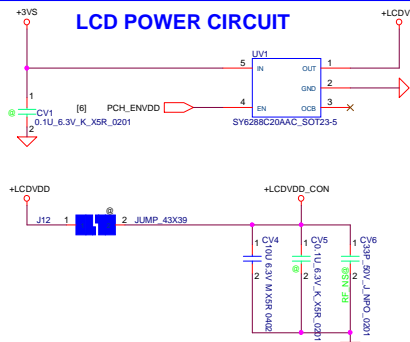
LCFC C750-ITL  
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				Date: Wednesday, March 18, 2020	Rev 0.2
				Sheet 43	of 101

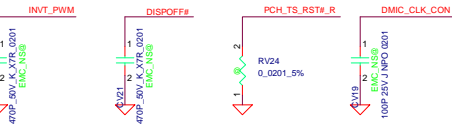
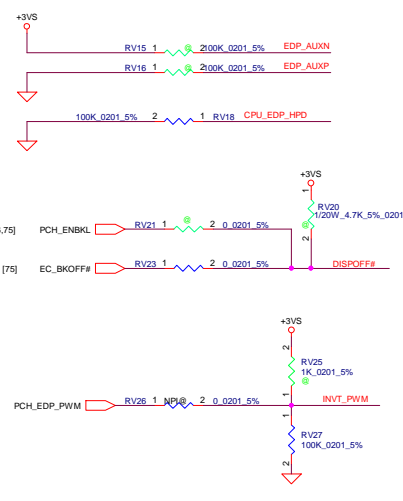
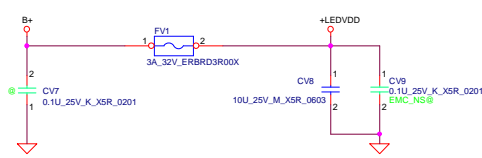
LCFC C750-ITL  
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Issued Date		Discarded Date		Yogee C750-TGL	
2019/11/05		2019/11/05			
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Doc ID				Document Number	
				NV DDS LOGIC	
Rev				Revision	
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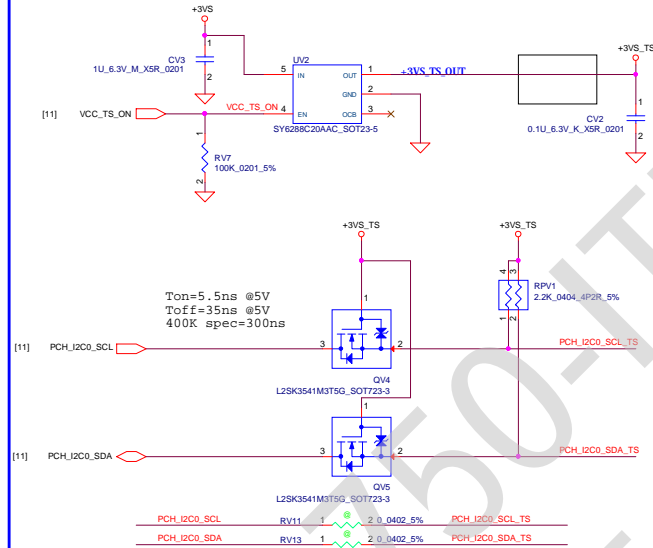
## LCD POWER CIRCUIT



## LED POWER




## TOUCH SCREEN



LCFC C750-ITL  
For MFG

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				DP	
				Rev	
				0.2	
				Date: Wednesday, March 18, 2020	
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LCFC C750-ITL  
For MFG

Security Classification		LC Future Center Secret Data		Title		
Issued Date		Deciphered Date		Yoga C750-TGL		
2019/11/06		2019/11/05		Size		Rev
Custom				Document Number		
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Date: Wednesday, March 16, 2020 18:00						Sheet 47 of 101

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				P	HDMT_CONN
Date:				Wednesday, March 18, 2020	Rev 0.2
				Sheet	48 of 101

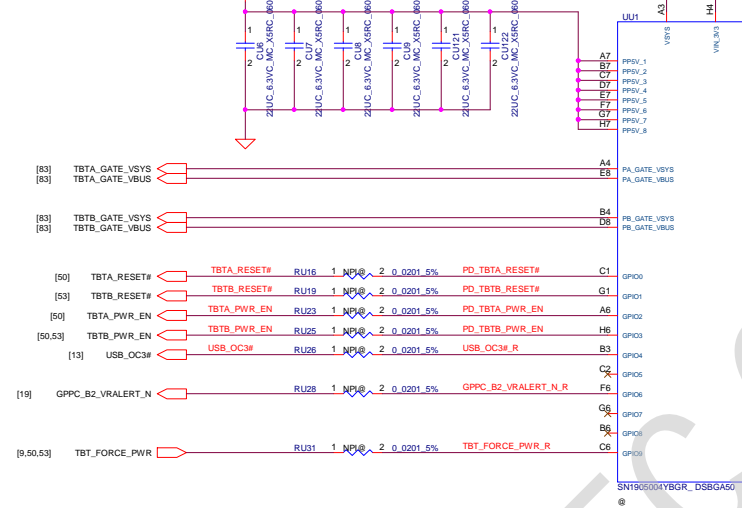


+3VALW  
VIN\_3V3

Correct net name  
VINT20\_IN -> CHARGER\_IN

CHARGER\_IN

+5VALW



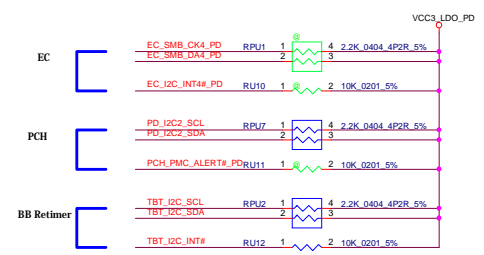
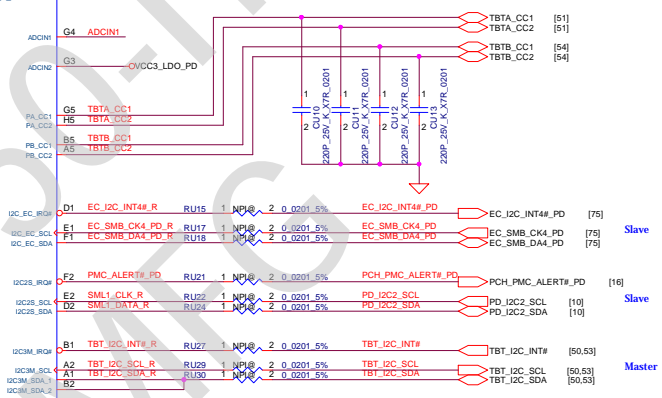
Lenovo update MPN to SN2001024YBGR  
New LCFC PN is SA0000A5B00  
Use vitural symbol untill new CIS symbol update

TABLE I2C Addressing

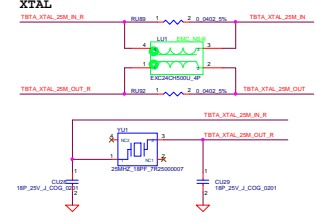
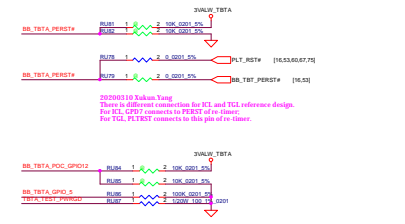
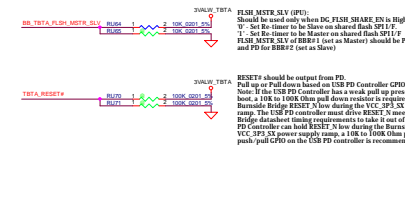
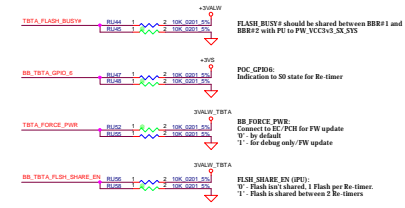
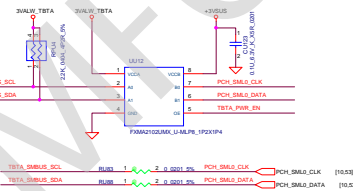
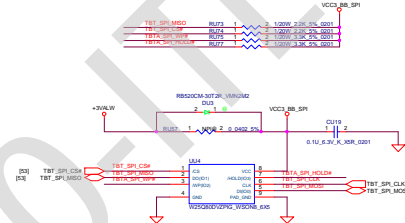
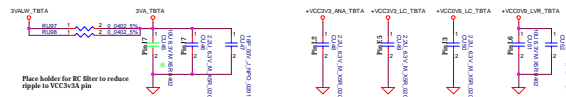
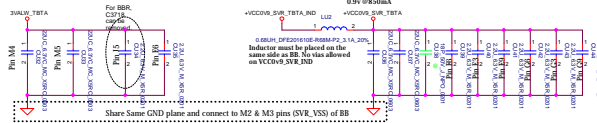
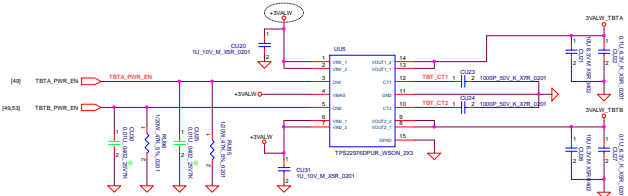
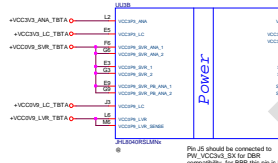
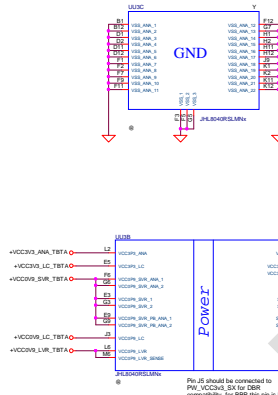
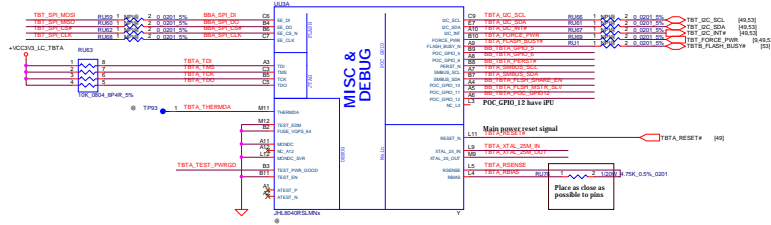
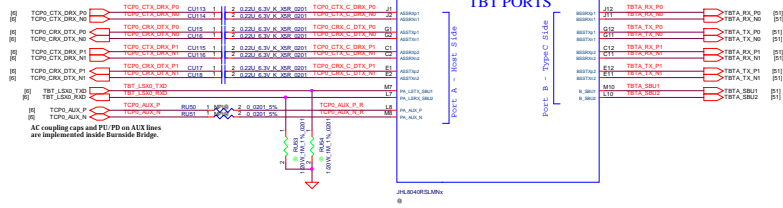
I2C1	Master: EC	TBTB PORT	0x23
	Slave: PD	TBTC PORT	0x27
I2C2	Master: PMC	TBTB PORT	0x23
	Slave: PD	TBTC PORT	0x27
I2C3	Master: PD	TBTB PORT	T.B.D.
	Slave: RT	TBTC PORT	T.B.D.


Device Functional Modes (continued)

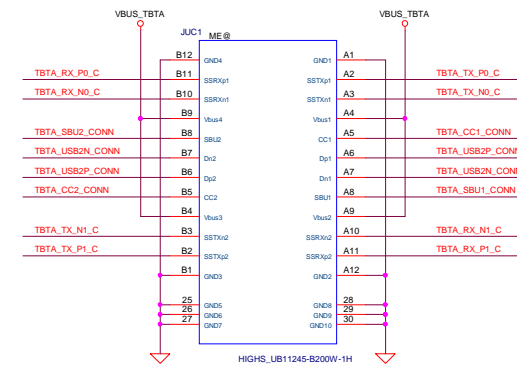
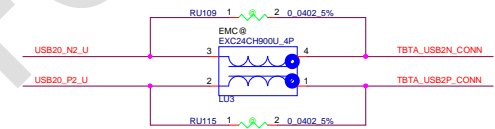
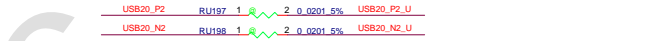
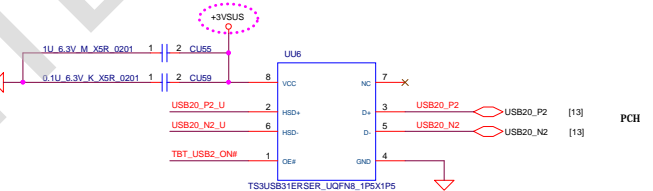
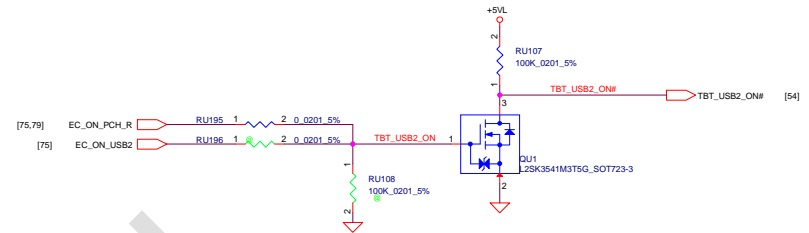
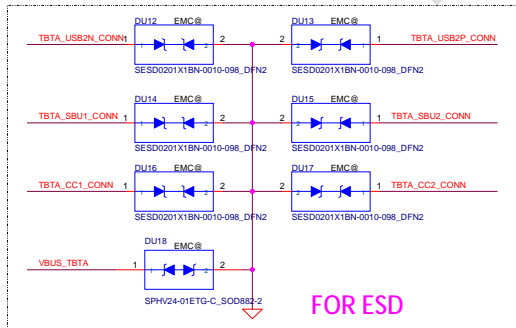
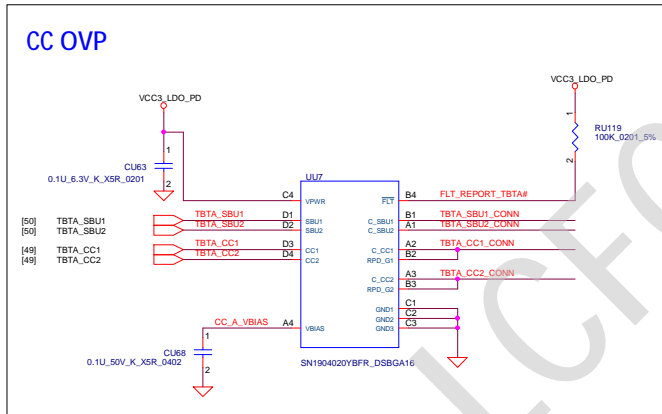
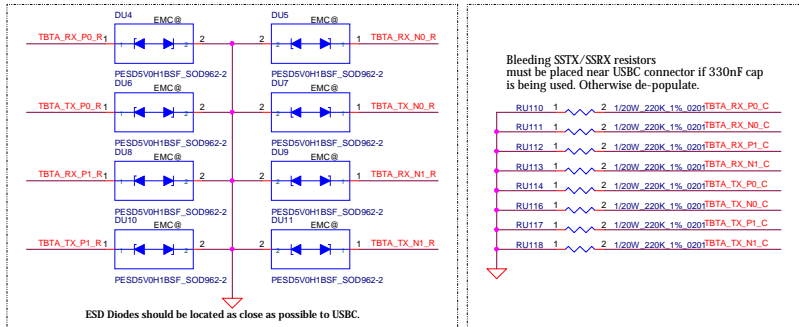
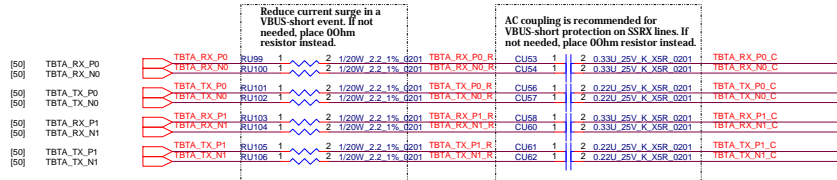
Table 1. Device Configuration using I2C0 and I2C1			
Device	Mode	Address	Value
EC	EC_I2C_INT4#_PD	EC_I2C_INT4#_PD	0x23
	EC_SMB_CK4_PD	EC_SMB_CK4_PD	0x27
	EC_SMB_DA4_PD	EC_SMB_DA4_PD	0x27
	EC_I2C_SDA	EC_I2C_SDA	0x27
PMC	PMC_ALERT#_PD	PMC_ALERT#_PD	0x23
	PMC_I2C_SCL	PMC_I2C_SCL	0x27
	PMC_I2C_SDA	PMC_I2C_SDA	0x27
	PMC_I2C_INT#	PMC_I2C_INT#	0x23
PD	PD_I2C_SCL	PD_I2C_SCL	0x23
	PD_I2C_SDA	PD_I2C_SDA	0x27
	PD_I2C_INT#	PD_I2C_INT#	0x23
	PD_I2C_SDA	PD_I2C_SDA	0x27




# Burnside Bridge Re-Timer



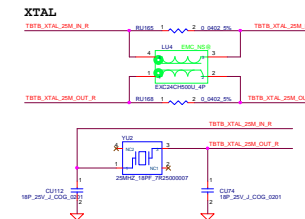
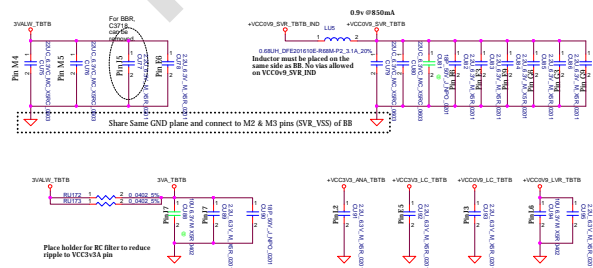
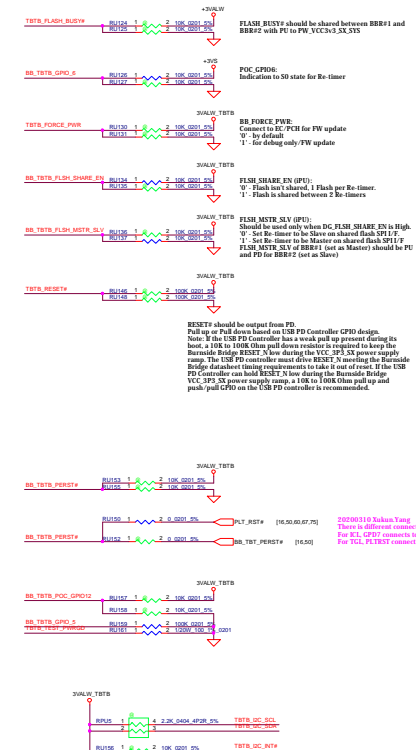
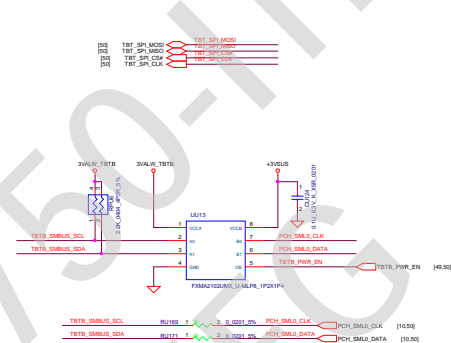
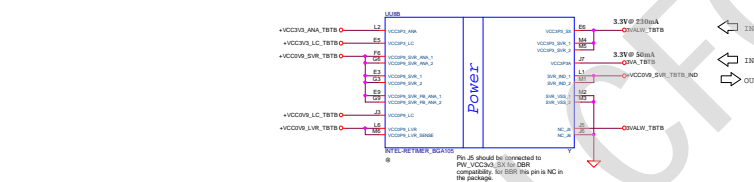
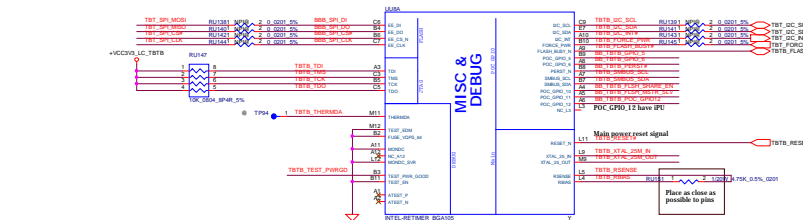
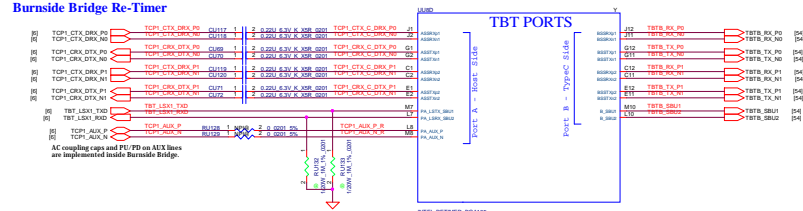
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Doc Number					
Doc Name				TYPEC_MUX_PortA	
Doc Date				Rev 1.0	




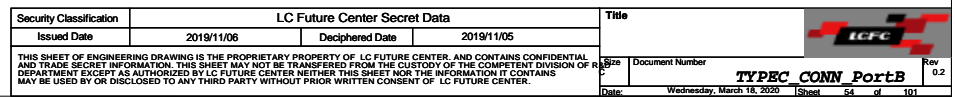
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For MFG

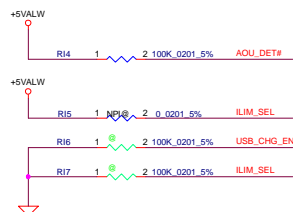
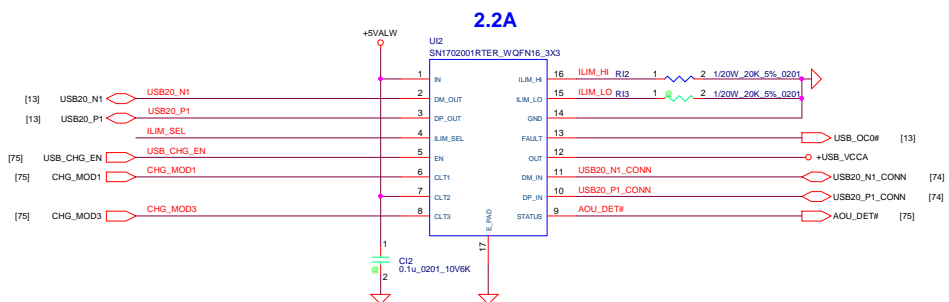
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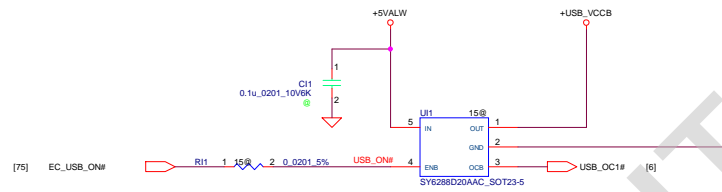
## Burnside Bridge Re-Timer



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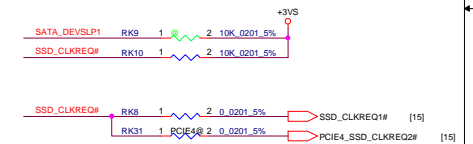
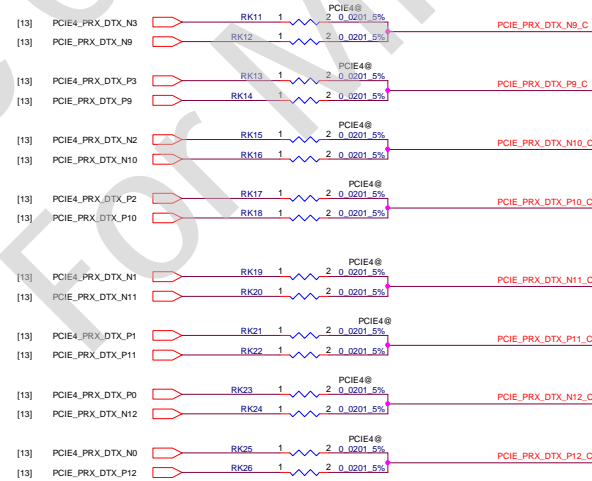
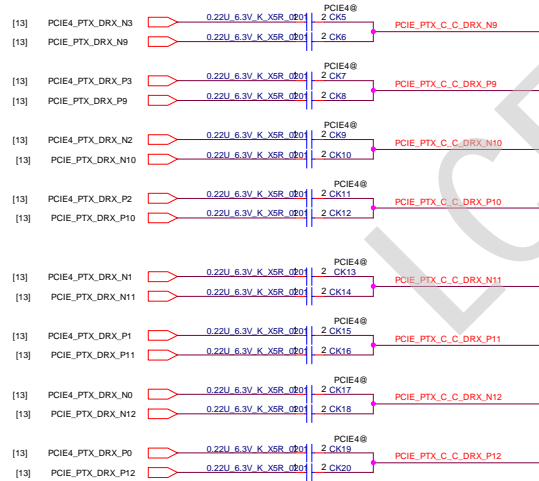
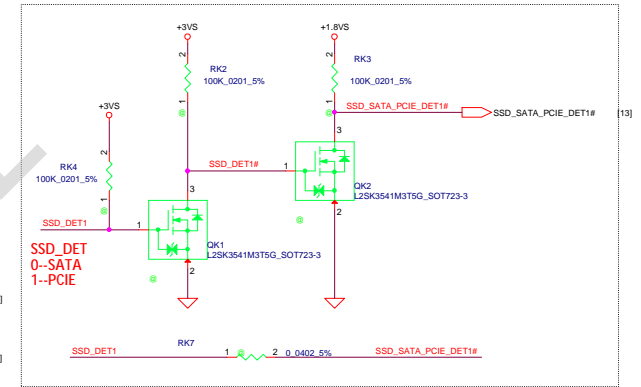
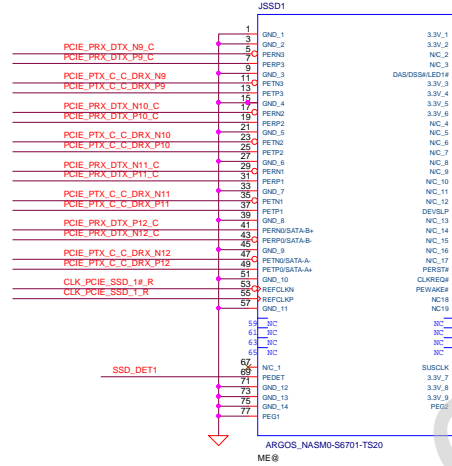
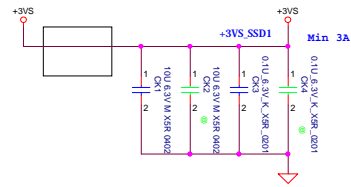
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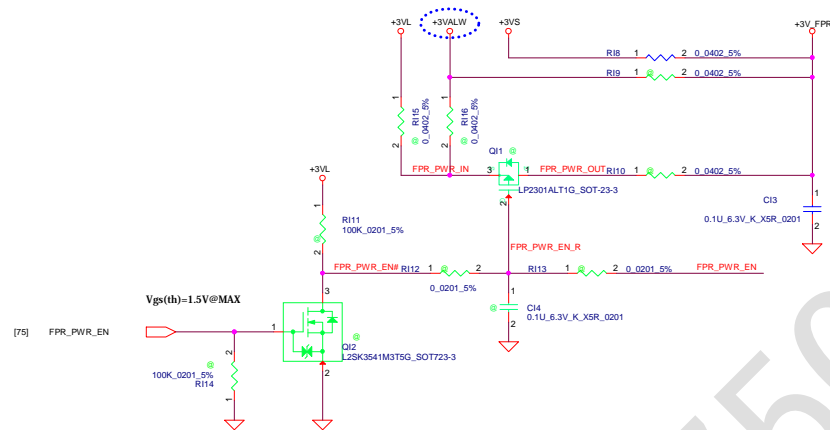
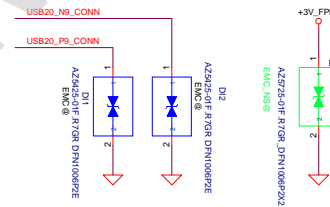
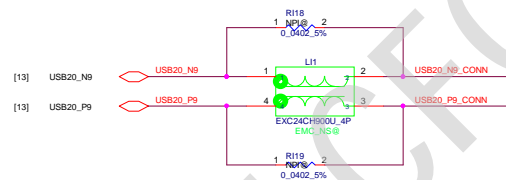
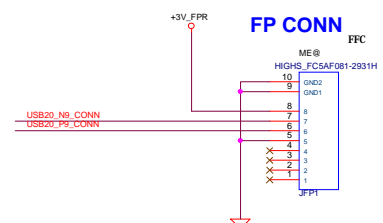

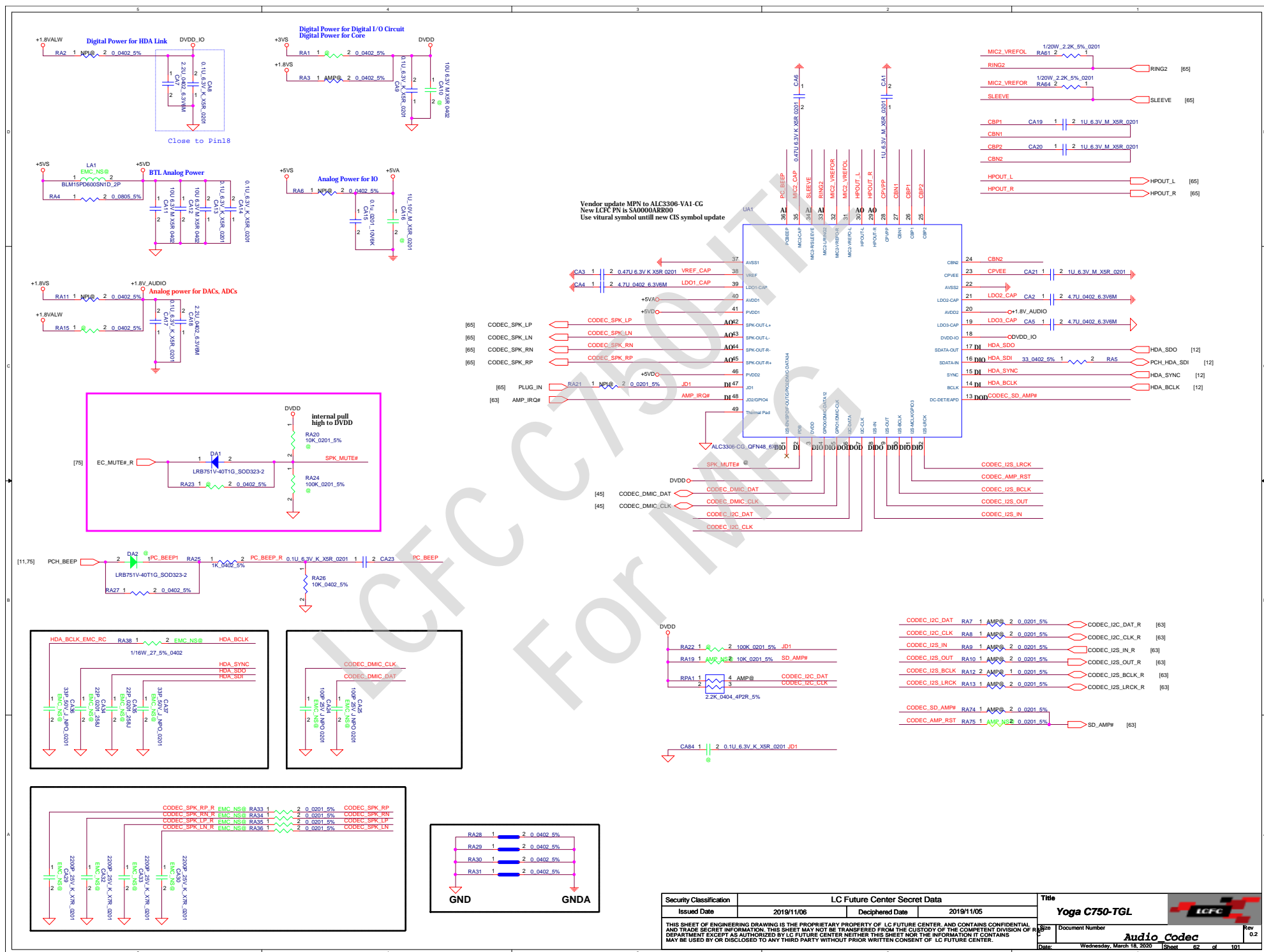
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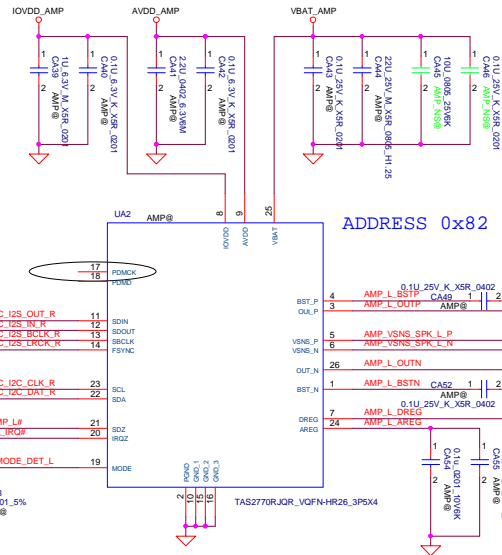
Diagram of the FP CONN connector pinout. The connector has 10 pins. Pin 10 is labeled 'ME @' and 'HIGHS\_FCSAFD01-2931H'. Pin 9 is labeled 'GND2'. Pin 8 is labeled '8'. Pin 7 is labeled '7'. Pin 6 is labeled '6'. Pin 5 is labeled '5'. Pin 4 is labeled '4'. Pin 3 is labeled '3'. Pin 2 is labeled '2'. Pin 1 is labeled '1'. The connector is labeled 'FP CONN' and 'FFC'. The pins are connected to a USB20 NG\_CONN and a USB20 NG\_CONN. The pins are also connected to a +3V\_FPR pin. The pins are also connected to a JFP1 pin.



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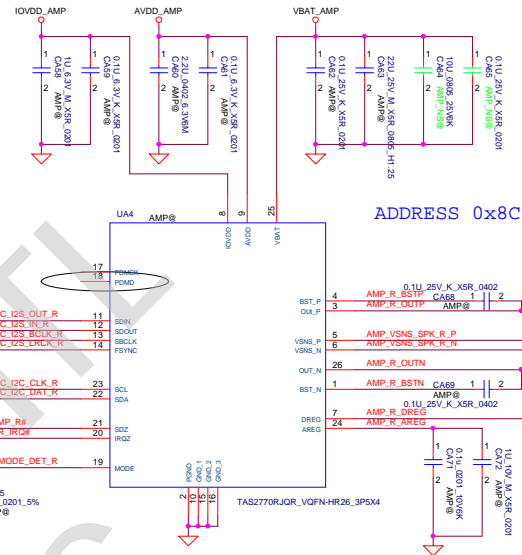
AMP\_L



ADDRESS 0x82

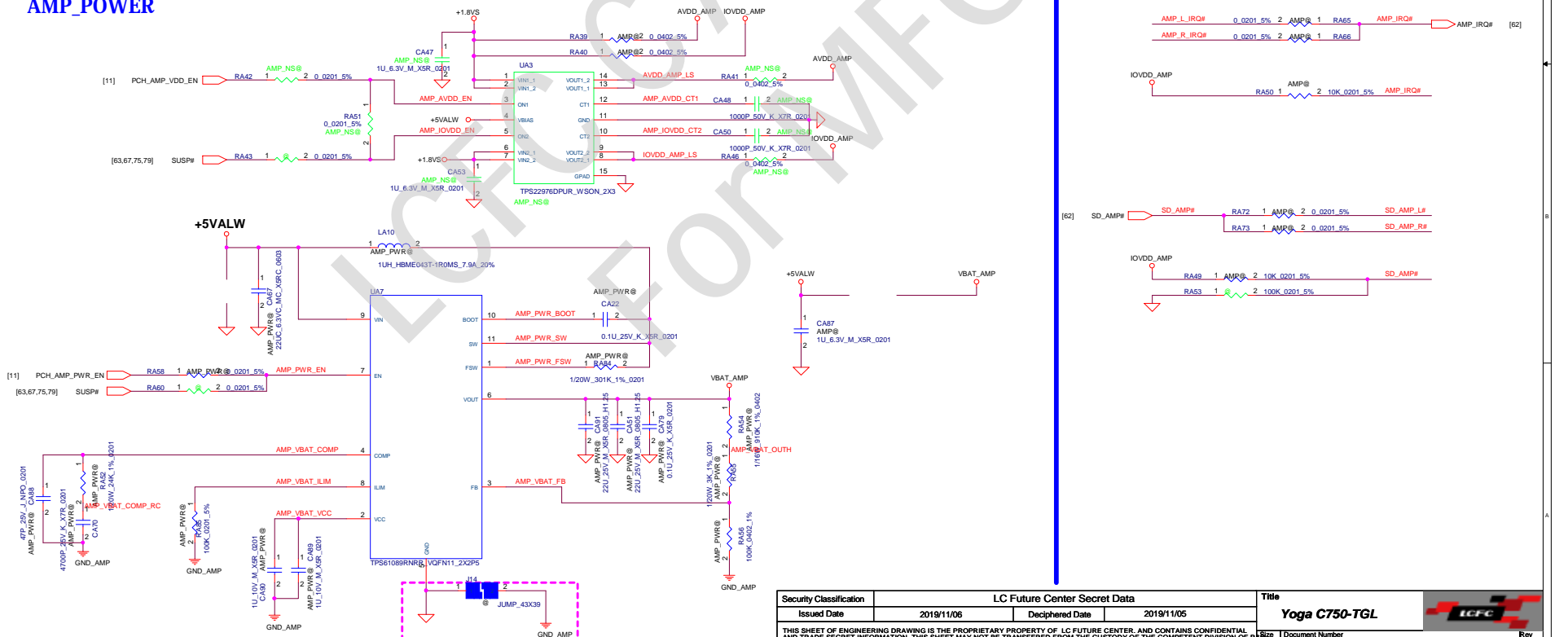
TDM/I2C Mode Address Selection	
Mode Pin	I2C Slave Address
Short to GND	0x82 *L
470ohm to GND	0x84
470ohm to IOVDD	0x86
2.2K to GND	0x88
2.2K to IOVDD	0x8A
10K to GND	0x8C *R
10K to IOVDD	0x8E
47K to IOVDD	0x90

AMP\_R



ADDRESS 0x8C

AMP\_POWER

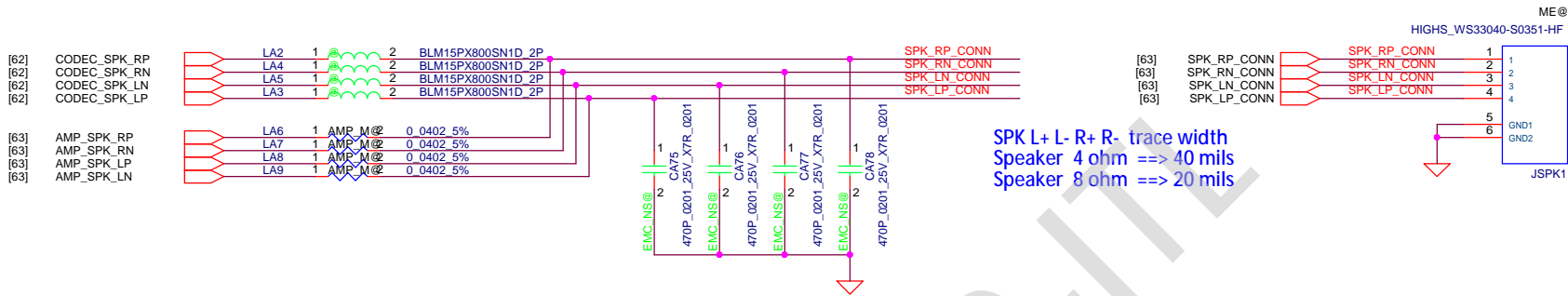


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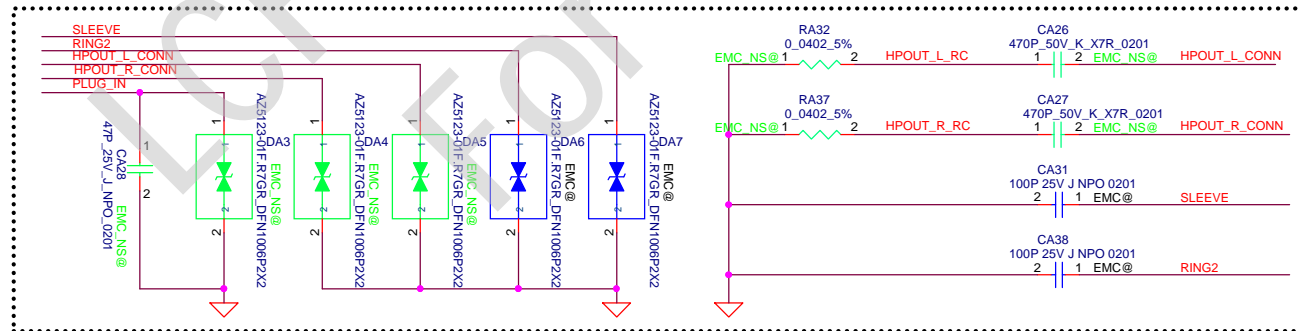
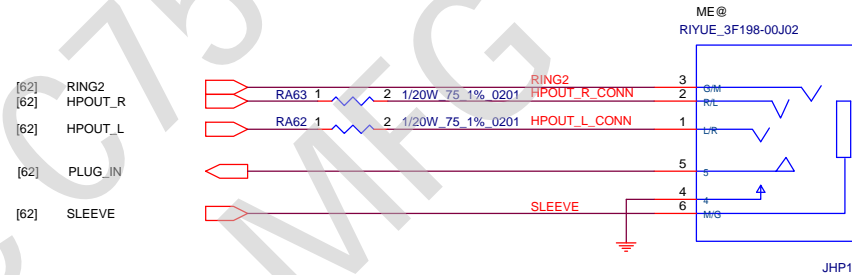
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## Speaker




## Audio Jack

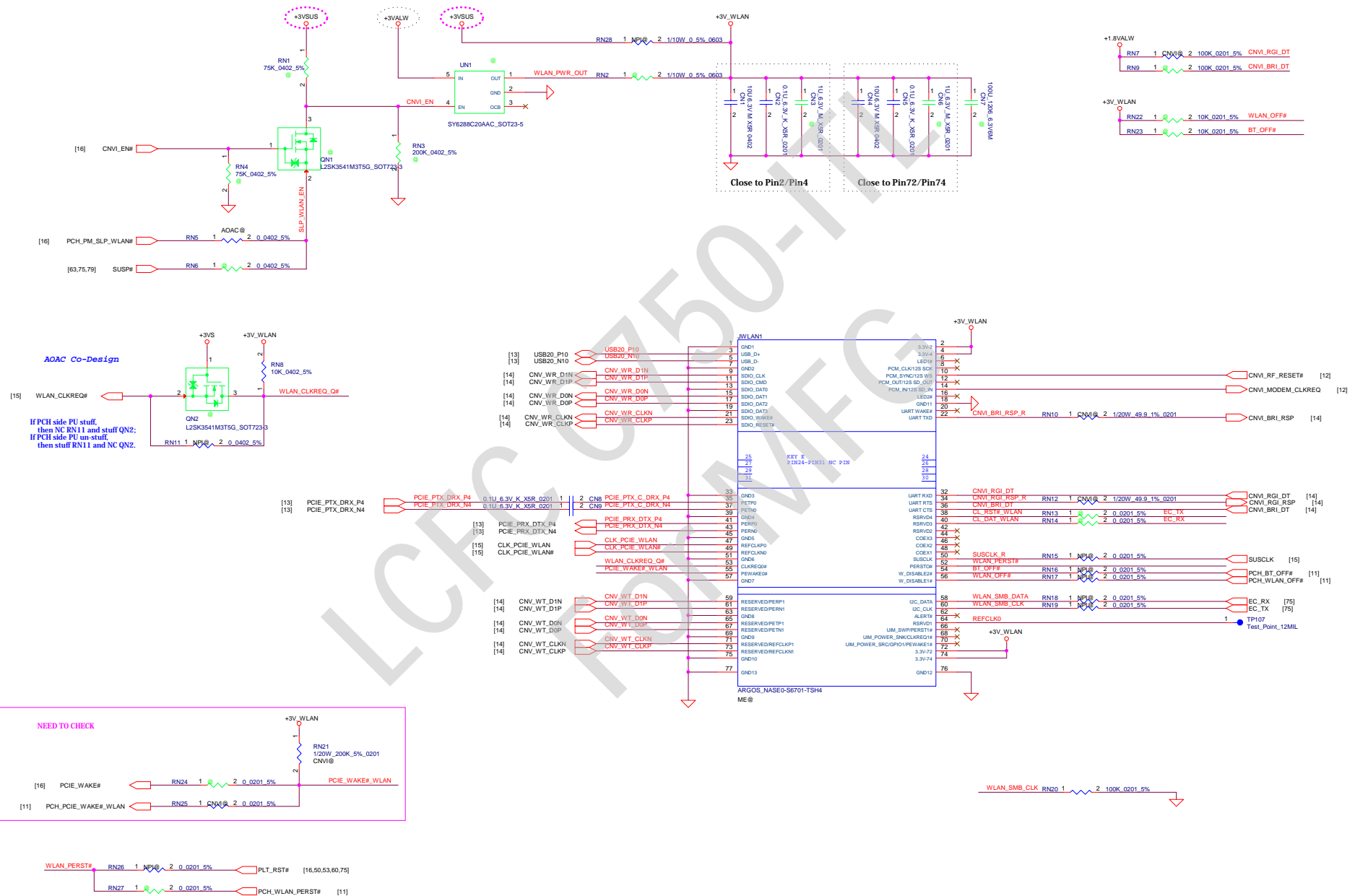



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### *Mini-Express Card(WLAN/WiMAX)*



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				P	LAN Chipset
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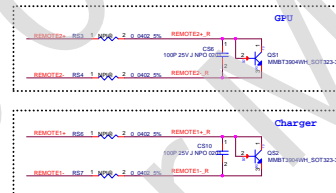
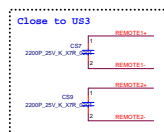
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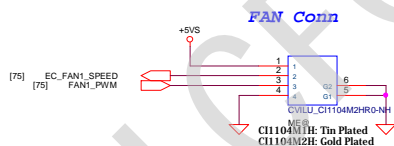
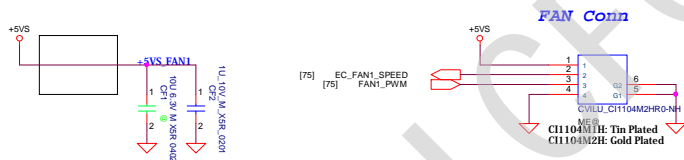
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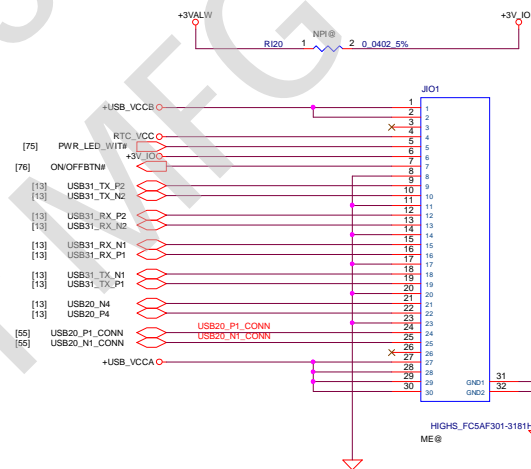
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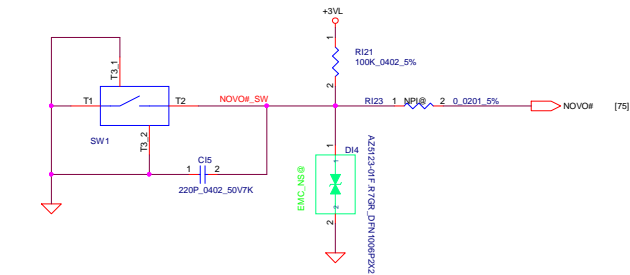
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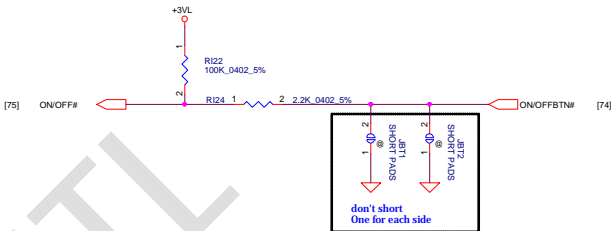
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0.2



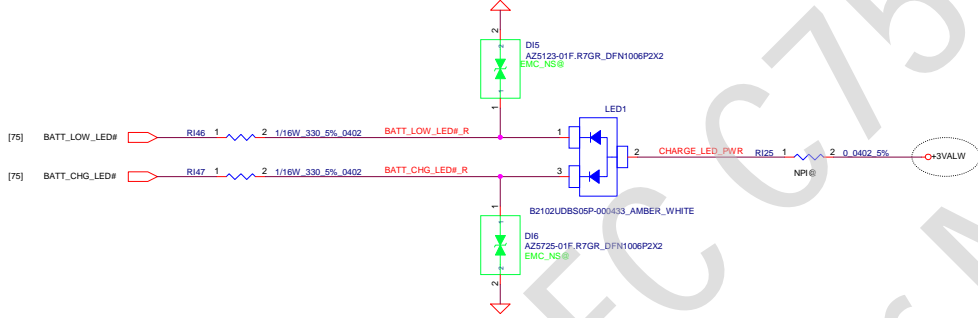
NOVO BUTTON



PWR BUTTON

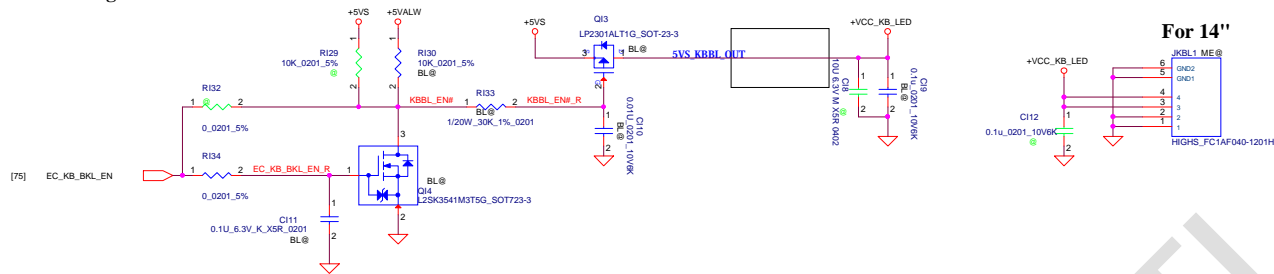


Charging LED



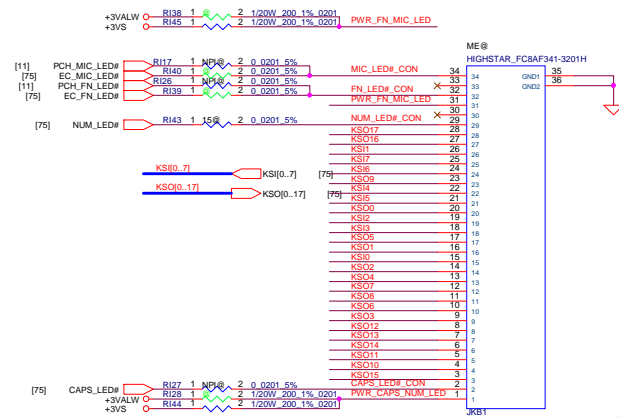
LED	State	LED Behavior
State (Same as the power button LED)	System on	White on (battery: 21%-100%)
	Standby LID closed	500ms on, 500ms off (battery: 0%-20%)
	System off	OFF
	Battery only	OFF
Charging	Charging	Amber on (battery: 1%-90%)
		White on (battery: 91%-100%)

## KB Backlight Connector

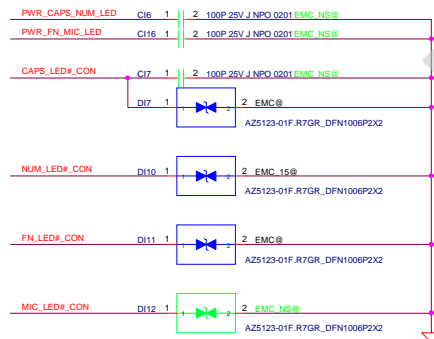



## K/B Connector

If Power Button and PWR LED on KeyBoard , then use +3VALW



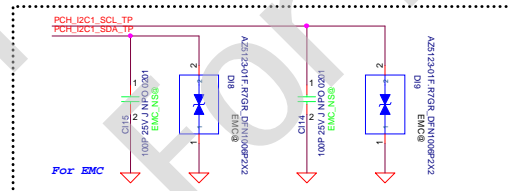
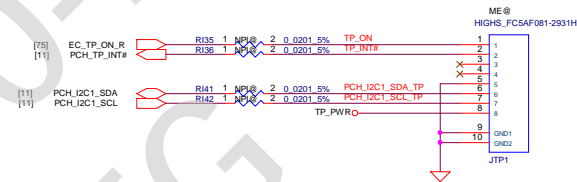
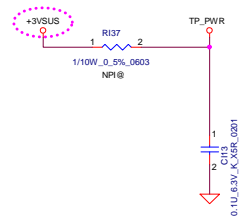
*For EMC*



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Date: <u>Wednesday, March 18, 2020</u>					Sheet <u>17</u> of <u>101</u>

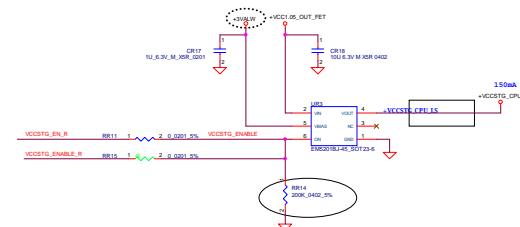
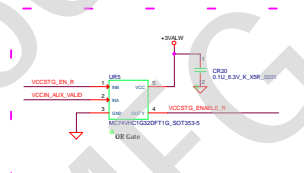
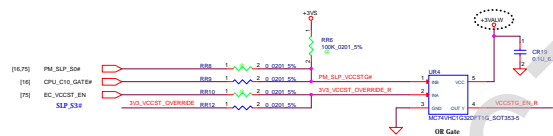
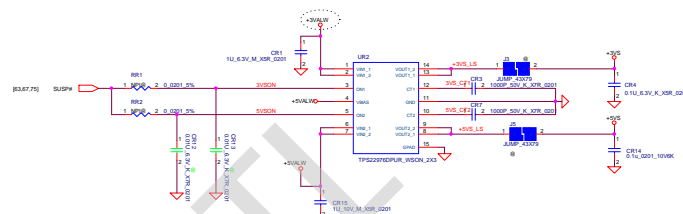
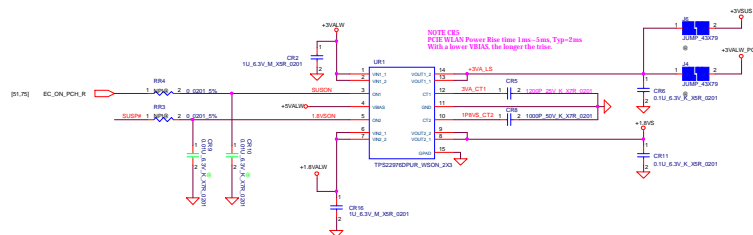
## TP/B Connector

Need support wake up by touch pad  
Follow latest UE spec

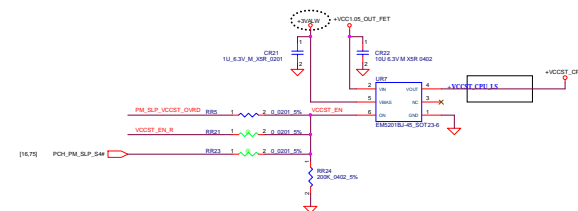
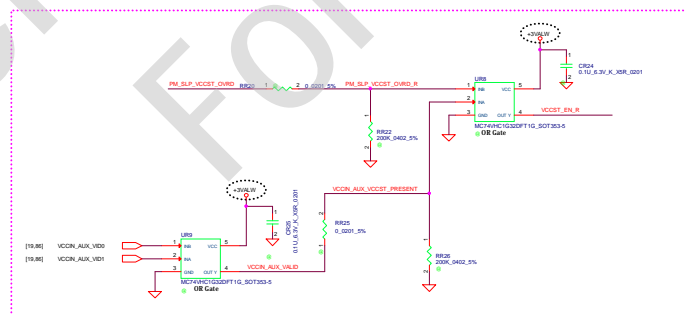
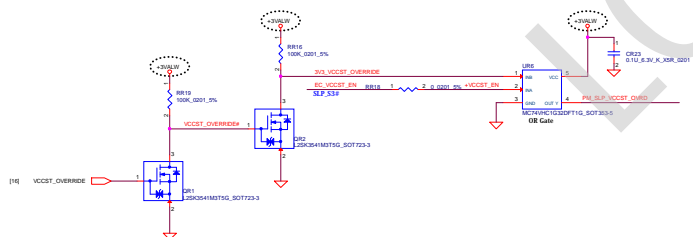



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# VCCSTG

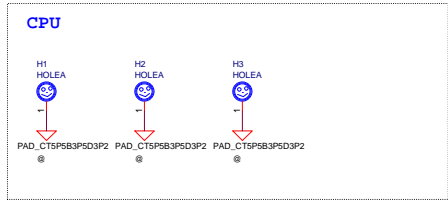


# VCCST

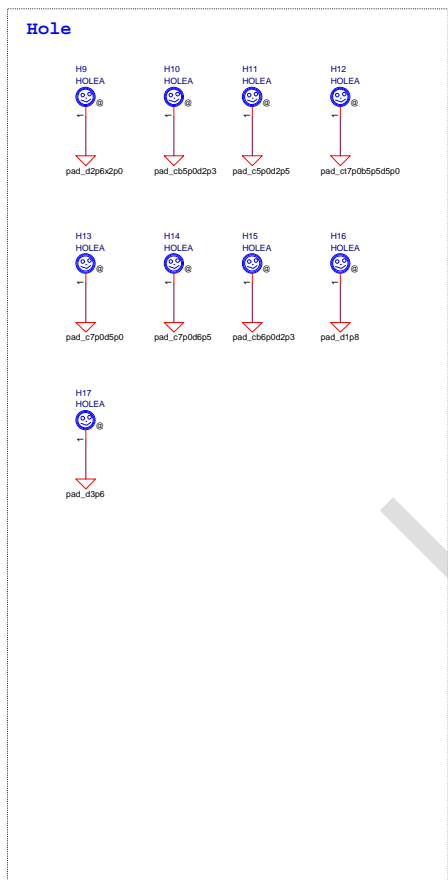
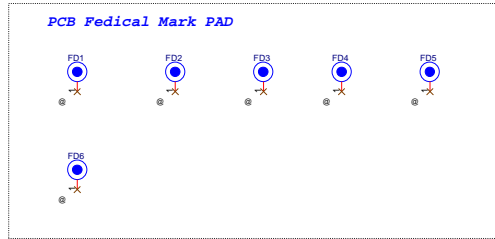


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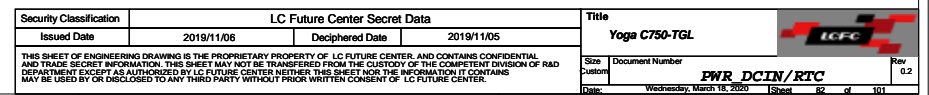


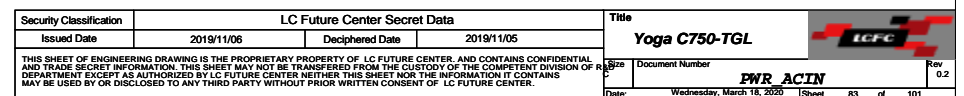
### Memory Shielding



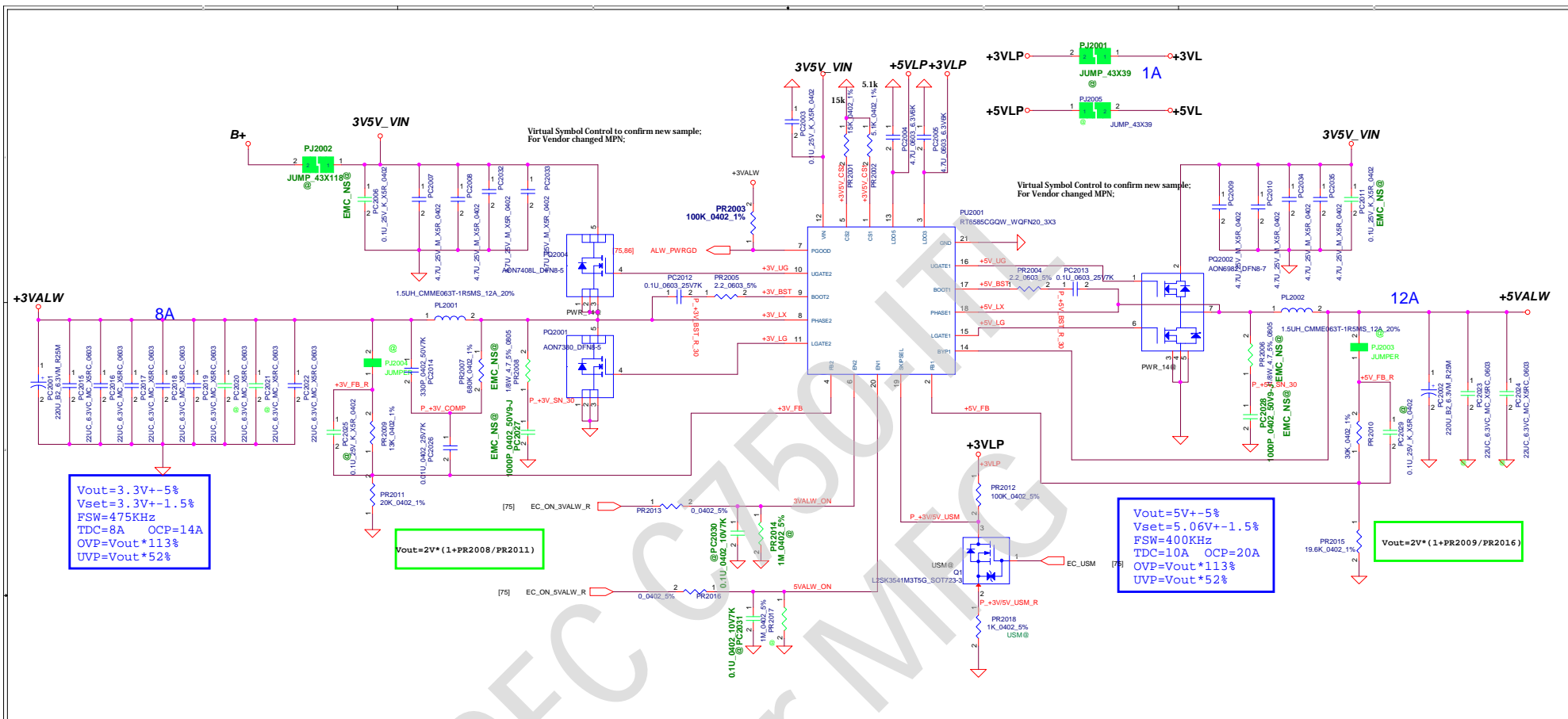
### SSD1 Shielding

### SSD2 Shielding







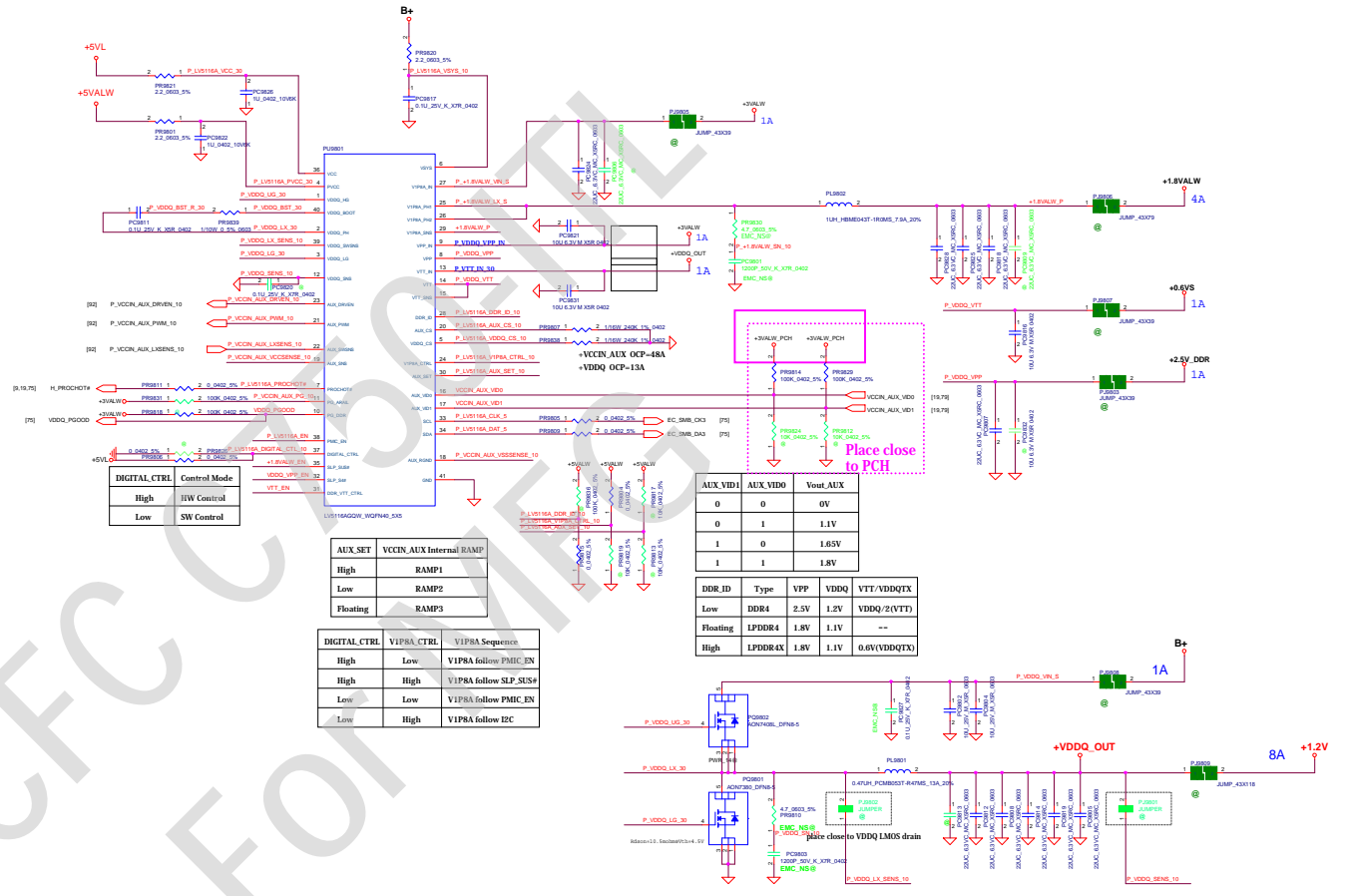
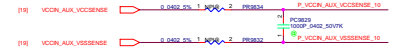
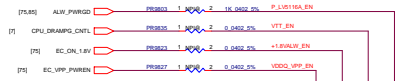


	RT6585B&TPS51285B	RT6575D&TPS51275B
Mode	DEM/CCM	USM/CCM
3V FSW	475K	355K
5V FSW	400K	300K
CSx	$R_{limit} = (I_{limit} \cdot R_{dson}) \cdot 8 / 50uA$	$R_{limit} = (I_{limit} \cdot R_{dson}) \cdot 8 / 10uA$

RT6585B&TPS51285B BOM to BOM

RT6575D&TPS51275B BOM to BOM

RT6585B&RT6575D PIN to PIN, with different work mode, FSW, and CS setting



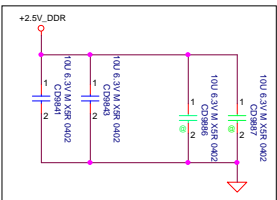
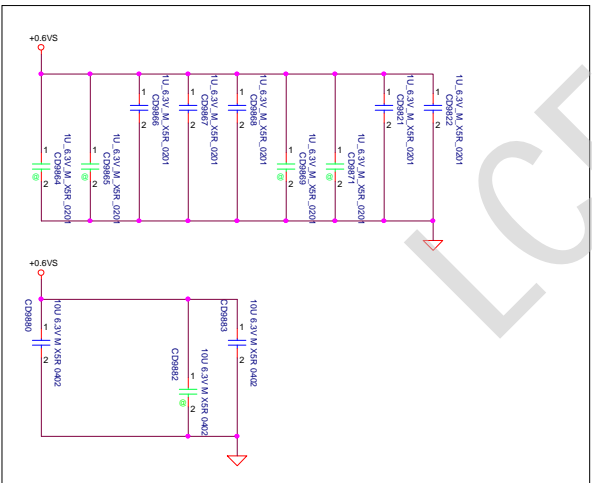
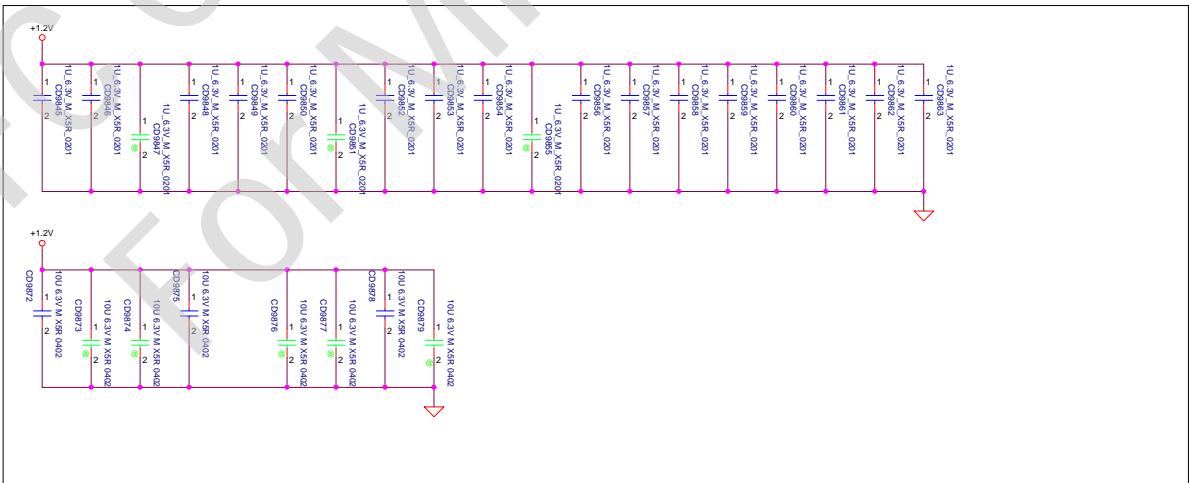
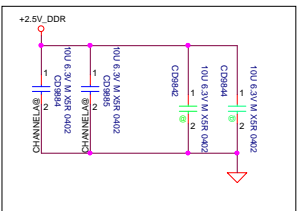
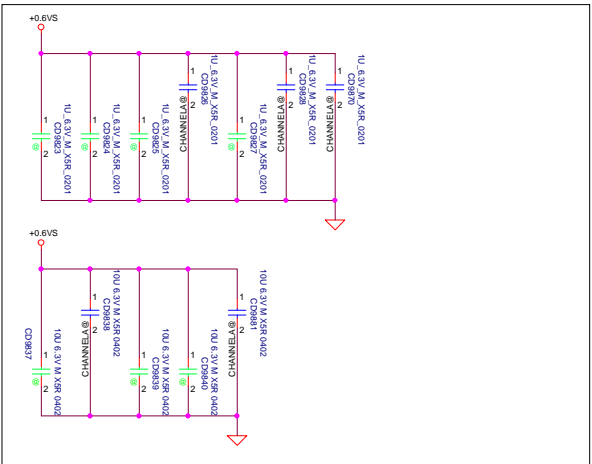
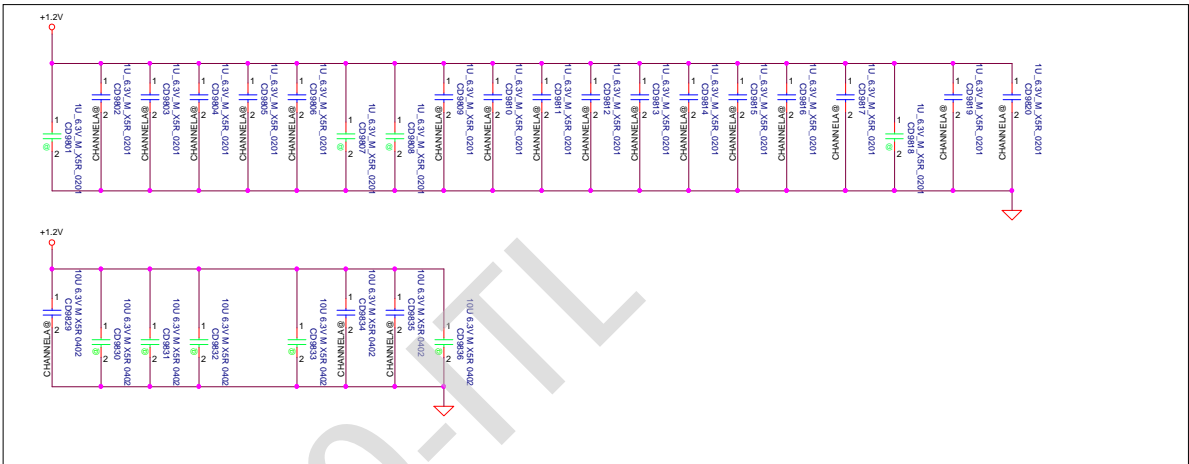
DIGITAL_CTRL	Control Mode
High	HW Control
Low	SW Control

AUX_SET	VCCIN_AUX Internal RAMP
High	RAMP1
Low	RAMP2
Floating	RAMP3

DIGITAL_CTRL	VIP8A_CTRL	VIP8A Sequence
High	Low	VIP8A follow PMIC_EN
High	High	VIP8A follow SLP_SUS#
Low	Low	VIP8A follow PMIC_EN
Low	High	VIP8A follow REC

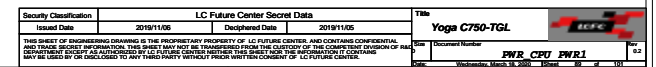
AUX_VID1	AUX_VID0	Vout_AUX
0	0	0V
0	1	1.1V
1	0	1.8V
1	1	1.8V

DDR_ID	Type	VPP	VDDQ	VTT/VDDQTX
Low	DDR4	2.5V	1.2V	VDDQ/2(VTT)
Floating	LPDDR4	1.8V	1.1V	--
High	LPDDR4X	1.8V	1.1V	0.6V(VDDQTX)






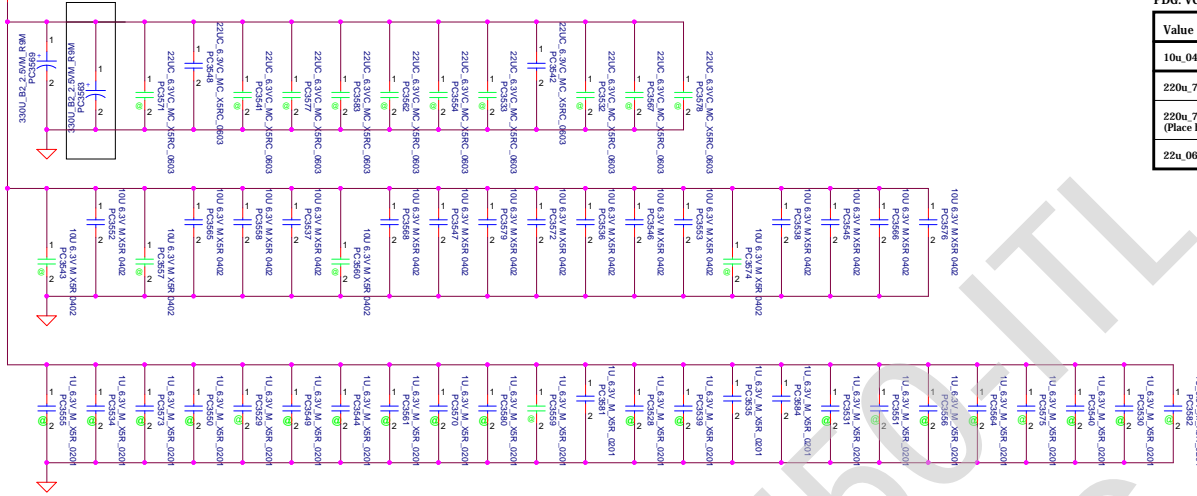




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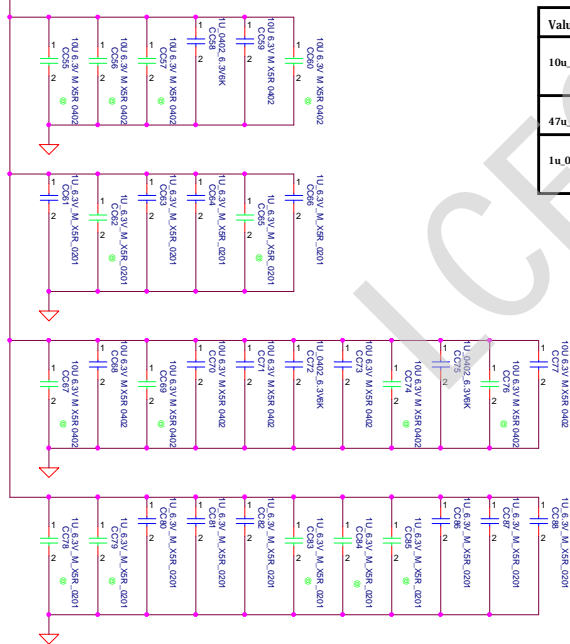
+VCCIN



PDG: VCCIN

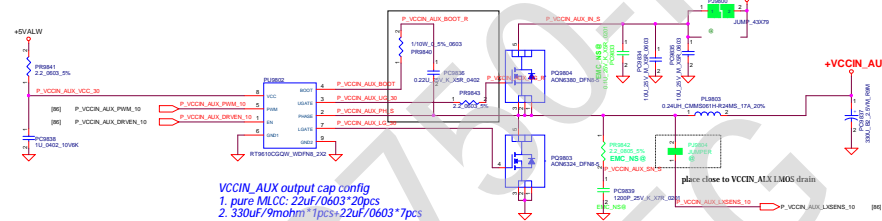
Value	Qty	Note
10u_0402	12	Secondary Side Place them as directly below the BGAs as possible.
220u_7343	2	Primary Side MCC cap recommendation based on VR solution with 100kVt VR bandwidth to 100kHz switching frequency, assuming 80V-1 is off for. Place board cap as close as possible to package pin. VR values listed in the board to package pin. VR -7343 -0603 -0603 -0603
220u_7343 (Place holder)	2	
22u_0603	8	

+1.2V



PDG: VDD2

Value	Qty	Note
10u_0402	8	Secondary Side Place on the back side of the UIC, as close as possible to the capacitor pins. Locate the capacitor such that the trace length from the QSD to the pin is minimized, and maintain the width of this trace.
47u_0603	2	Primary Side Place them as close to the VR as possible. 2 caps should be sufficient.
1u_0402	8	Primary Side Place on the primary side, as close as possible to the via that connects to the outer row of the pins. Use side trace to connect the capacitor pins to the via. Make sure to place 1 via down near the outer VDD2 BGA and 1 via down near the cap pad.




VCCIN\_AUX output cap config  
 1. pure MLCC: 22uF/0603\*20pcs  
 2. 330uF/9mohm\*1pcs+22uF/0603\*7pcs

Vboot=1.8V Loadline=6mΩ  
 AC+DC Ripple=(-10%~+5%)\*VOUT  
 IBO=14A Icomax=25A  
 CURRENT LIMIT=45A  
 Max Overshoot=2.13V/500us  
 OVP=(1.2~1.3)\*Vref  
 UVP=(0.45~0.55)\*Vref  
 Fsw=600KHz



LCFC C750-ITL  
For MFG

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Document Number			PWR GPU PWR Controller	

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				PWR GPU PWR	62

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				P	PWR VRAM PWR
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			PWR VRAM PWR Decoupling	0.2
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20200115  
1. P063: Change RA52 from 30K to 61.9K; Change CA70 from 1000pF to 680pF; Follow vendor's suggestion;  
2. P011: Add RC3,RC80,RC81; RC94,R95,RC96, and net ISH,GP7,ITS, ISH,GP6, YMC1, ISH,GP6, YMC0; for sensor design requirement;

20200131  
1. P051: Change RU108.1 from TBTA USB2\_ON# to TBT\_USB2\_ON; Change net name TBTA\_USB2\_ON# to TBT\_USB2\_ON#;  
2. P054: Delete RU182,QU2,RU183; Change net name TBTB\_USB2\_ON# to TBT\_USB2\_ON#;  
3. P075: Stuff RE38; Un-Stuff RE17; For EC Mirror need +3VALW\_PCH, then need +5VALW;

20200219  
1. P050: Change RU44.2 power rail from 3VALW\_TBTA to +3VALW; For share ROM solution, FLASH\_BUSY# should be shared between BBR#1 and BBR#2 with PU to PW\_VCC3V3\_SX\_SYS(+3VALW);  
2. P053: Change RU124.2 power rail from 3VALW\_TBTA to +3VALW; For share ROM solution;  
3. P009: Delete QC3, RC66; EC can not support CATERR# debug function;  
4. P075: Delete signal PCH\_CATERR#; EC change RE18.2 connect to ISH,GP6, YMC1;  
Change net name EC\_BATLOW#\_CATERR# to EC\_BATLOW#\_YMC1; Stuff RE18;  
5. P075: Delete RE55,CE17 and net SYSON; Change RE79.2 connect to ISH,GP5, YMC0,  
change net name EC\_SYSON to EC\_ISH\_YMC0; Stuff RE79;  
6. P086: Delete PR9837 and net SYSON;  
7. P075: Add RE97,RE98; Un-Stuff RE98; Connect RE97.1, RE98.1 to net EC\_FN\_LED#\_ISH\_ITS;  
Connect RE97.2 to net ISH,GP7,ITS; Connect RE98.2 to net EC\_FN\_LED#;  
8. P009: Stuff RC112; Design error;

20200219  
1. P063: Change UA7 from TPS61372 to TPS61089; Change LA10 from SH000012Z00 to SH000016V00; Add RA84, CA88, CA89, CA90;

20200224  
1. P063:  
Change CA88 from 24p to 47p; Follow vendor's suggest;  
Change RA52 from 61.9K 0402 to 24K 0201; Follow vendor's suggest;  
Change CA70 from 680pF 0402 to 4700pF 0201; Follow vendor's suggest;  
Change CA52 from 0.1u, 10V 0402 to 0.1u, 25V 0201;  
Change CA51 from 10uF, 25V 0805 to 22uF, 25V 0805;  
Change RA54 from 2M to 910K; For power solution changed;  
Change RA55 from 0 ohm to 3K; For power solution changed;

20200225  
1. P023: Delete RD43,RD4: RD36,RD46; RD29,RD16; RD22,RD31,RD25,RD10; RD17,RD39,RD20,RD9; RD13,RD47; RD28,RD42,RD32,RD7;  
Add RPD1, RPD2, RPD3, RPD4, RPD5, RPD6, RPD7;  
2. P024: Delete RD67,RD100,RD92,RD70; RD68,RD95; RD101,RD109,RD105,RD80; RD89,RD71,RD90,RD83; RD86,RD110,RD74,RD77; RD87,RD84,RD73,RD81; RD93,RD96;  
Add RPD8, RPD9, RPD10, RPD11, RPD12, RPD13, RPD14;  
3. P075: Add RE99; Connect RE99.1 to PCH\_BEEP, RE99.2 to EC\_MIC\_LED#; Enabled Top Swap function;  
4. P016: Change the power rail of RC170,RC171,RC173,RC175,RC176,RC165 from +3VALW to +VCCPSW\_3P3; For common design;

20200227  
1. P023: Change RPD4\_0804 to RPD4\_0404, Add RPD15\_0404; For Layout;

20200227  
1. P023:  
Change RPD5\_0804 to RPD5\_0404, Add RPD16\_0404; For Layout;  
Change RPD7\_0804 to RPD7\_0404, Add RPD17\_0404; For Layout;

20200229  
1. P075: Change PN of DE1,DE2 from SCS00006J01 to SCS00007L00; Follow GCM's suggestion;

20200302  
1. P063:  
Change LA10 from SH000016V00 2.2uH to SH00001XS00 1uH; Follow vendor's suggestion;  
Delete CA66 input CAP\_22U 0.3V; Add CA91 output CAP\_22U\_25V; Follow vendor's suggestion;  
Delete J13, no need; Add J14 for AMP\_GND and GND;

20200306:  
1. Add BOM Structure @ for UA1, UU1, UU7, UU11; Need use new LCFC P/N, use virtual symbol to control;

20200306:  
1. P051/P054: Update UU7/UU11 from SN1904020YBGR to SN1904020YBFR; For vendor update MPN, and height up from 0.5mm to 0.55mm;

20200310:  
1. P51: Stuff RU195, RU107, QU1, UU6, CU55, CU59; Un-stuff RU197, RU198; DC S5 state, plug type-C device, 3VALW\_PCH have voltage leakage through USB DP;  
2. P54: Stuff CU98, CU102, UU10; Un-stuff RU199, RU200;  
3. P50: Un-stuff DUC5; Stuff RU57; For no need update TBT\_FW on board;  
Stuff RU78; Un-stuff RU79; Follow CR8, and confirmed with intel;  
4. P53: Stuff RU150; Un-stuff RU152; Follow CR8, and confirmed with intel;  
5. P48: Un-stuff RU11; need PU at PCH side for voltage leakage;

20200314:  
1. P9: Add BOM structure NPI@ for RC112;  
2. P45: Add BOM structure NPI@ for RA77;  
3. P63: Change P/N of RA52 to LBG P/N;

20200316:  
1. P015: Change CC22 from 8pF to 10pF; Follow vendor's crystal test;  
2. Change RE80 from 1K to 0R; Change RC163 from 10K to 100K; to solve ESMRST overshoot  
3. Change RE82 from 0R to 1K; Change FR9805 from 0R to 1K; to solve ALW\_PWRGD overshoot  
4. Change RE51 from 1K to 0R; Change RC160 from 10K to 100K; to solve DPWROK overshoot

20200318:  
1. P79: Un-stuff UR5, CR20; UR9, CR25, RR25, UR8, CR24;  
2. P16: Change RC170 from 10K to 1K follow Intel Schick;

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2019.11.07:  
1. Replace all part references by common design table  
2. 3VALW MOSFET change to C740 discrete MOSFET solution  
3. VCCIN\_AUX change to S550 driver + discrete MOSFETs solution

2019.11.014:  
1. Replace PC9801 PC2002 PC2001 by B2 size sample  
2. Correct PQ2002 connecting

2019.11.25:  
1. Replace PC2007,2008,2009,2010,3519,3521,9834,9835 with 0603 size part. delete PC3514 location  
2. Delete Vccin, Vccin\_aux input resistors, add input beads  
3. Modify Capacitors RBOM with vendor's optimize

2020.02.28:  
1. change PC3563, and 8 10uf VCCIN MLCC to be mounted  
2. Add PR9843, and change PR9840 to 00HM  
3. Modify some resitors value in VR  
4. Modify 3V5V Ics resistor value

2020.03.02:  
1. change PL2001's PN from SH000011200 to SH000016N00;

2020.03.02:  
1. P91: Stuff PC3563; PC3558,PC3537,PC3568,PC3547,PC3579,PC3546,PC3553,PC3538; For VRTT test;  
2. P88: Delete PR3547,Q3; Change PR3532 from 1K to 100K;  
3. P92: Change PR9840 from 2.2R to 0R; Add PR9843 at Gate of PQ9804;

2020.03.05:  
1. Change PC2007,PC2008,PC2009,PC2010 from 10u\_0603 to 4.7u\_0402;  
2. Add PC2032,PC2033,PC2034,PC2035;

2020.03.06:  
1. P88: Change PR3533 from 10K to 7.15K, PR3507 from 8.25K to 5.62K;  
Change PR3536 from 33.2K to 34.8K, PR3510 from 28.7K to 28K, PR3513 from 1.5K to 49.9R;  
Change PR3526 and PR3542 from 3.74K to 3.9K;  
Change PC3512 from 100uF to 150uF  
2. P85: Change PR2001 from 62K to 15K, PR2002 from 24K to 5.1K

2020.03.14:  
1. Change PC2007,PC2008,PC2009,PC2010 from 10u\_0603 to 4.7u\_0402;  
2. Add PC2032,PC2033,PC2034,PC2035;

2020.03.16:  
1. Change PR3504,PR3530 FROM 1.33K TO 1.4K;  
2. CHANGE PR3516 FROM 13K TO 12.1K FOR 25W@;

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