LCFC Confidential

ADL-P LCFC Griffin Schematics Document

Griffin / Roc M/B SCHEMATICS

Intel AlderLake Processy with DDR4

REV:0.01

Document Number			LCFC
Size: Custom	Title: Project Name		Rev: 0.01
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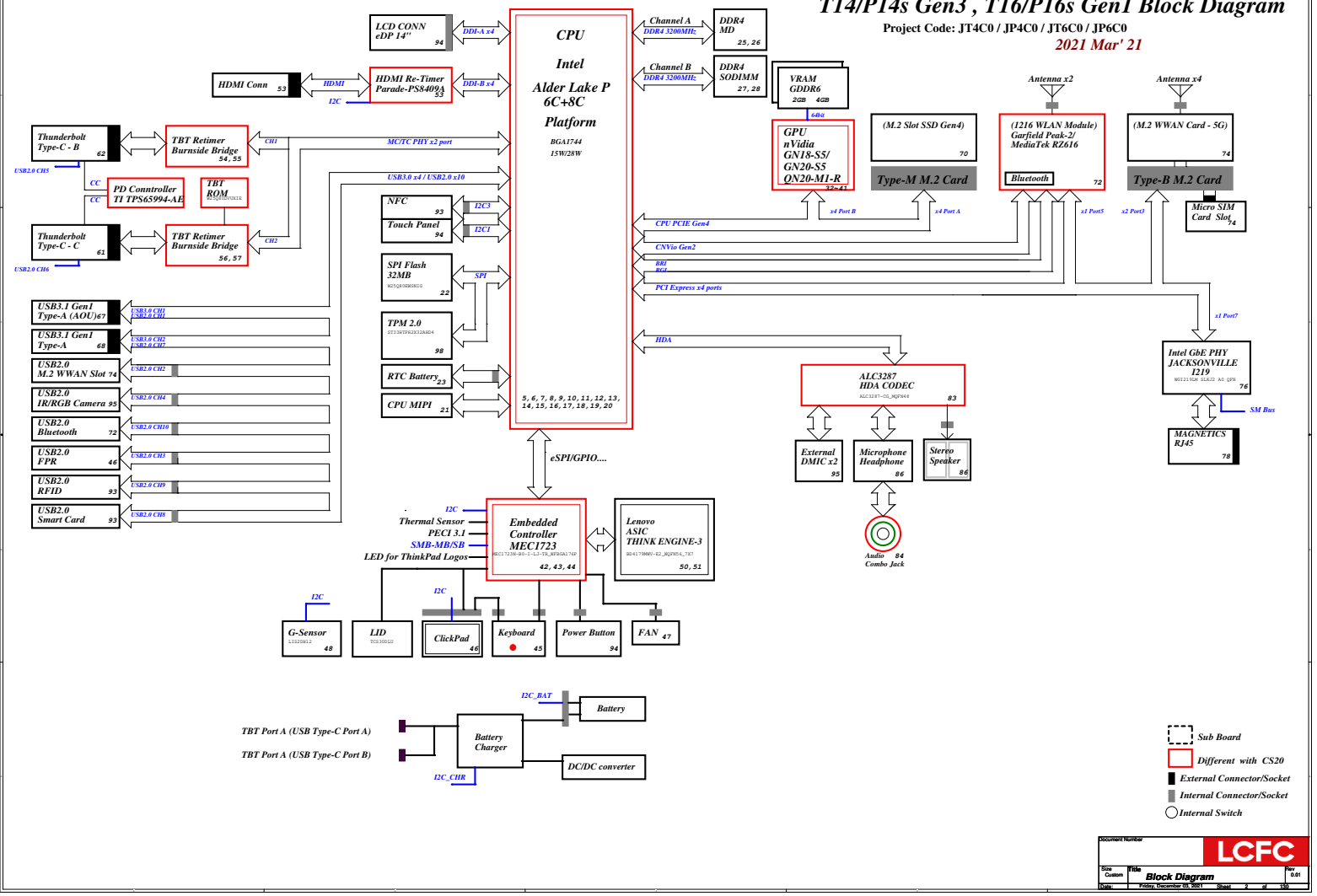
T14/P14s Gen3 , T16/P16s Gen1 Block Diagram

Project Code: JT4C0 / JP4C0 / JT6C0 / JP6C0

2021 Mar' 21



EC HISTORY

627205_ADL P_PDG_Rev0p7

10.11.4 Power States

Table 760. System with M3 State Supported

Rails	SK Us	S0/M D3	C10[2]	S0ix/M -off[4]	S3/M3	S3/M -off	S4 and S5/M3	S4 and S5/M-off	Deep S4/S5	G3[1]
VCCRTC	All	ON	ON	ON	ON	ON	ON	ON	ON	ON
VCCDSW_3P3	All	ON	ON	ON	ON	ON	ON	ON	ON	No Power
VBATA (VDC)	All	ON	ON	ON	ON	ON	ON	ON	ON	No Power
VCCPRIM_3P3	All	ON	ON	ON	ON	ON	ON	ON	OFF	No Power
VCCPRIM_1P8	All	ON	ON	ON	ON	ON	ON	ON	OFF	No Power
VCCPRIM_OPB2	S	ON	ON	ON	ON	ON	ON	ON	OFF	No Power
VCCPRIM_1P05	S	ON	ON	ON	ON	ON	ON	ON	OFF	No Power
V3.3M[5]	All	ON	ON	OFF	ON[13]	OFF	ON[13]	OFF	OFF	No Power
V1.8M[5]	All	ON	ON	OFF	ON[13]	OFF	ON[13]	OFF	OFF	No Power
VDD2	All	ON	ON	ON	ON	ON	OFF	OFF	OFF	No Power
VPP	All	ON	ON	ON	ON	ON	OFF	OFF	OFF	No Power
VCC1P05_PROC	All	ON	ON	ON	ON [12, 13]	ON [12, 13]	ON [12, 13]	ON [12, 13]	OFF	No Power
VCCIN_AUX	All	ON	ON[14]/ OFF[9]	ON[14]/ OFF[9]	ON[14]/O FF	ON[14]/ OFF	ON[14]/O FF	ON[14]/OF F	OFF	No Power
VCC1P8_PROC	All	ON	ON[14]/ OFF[9]	ON[14]/ OFF[9]	ON[14]/O FF	ON[14]/ OFF	ON[14]/O FF	ON[14]/OF F	OFF	No Power

continued...

Rails	SK Us	S0/M D3	C10[2]	S0ix/M -off[4]	S3/M3	S3/M -off	S4 and S5/M3	S4 and S5/M-off	Deep S4/S5	G3[1]
VCC_MIPI_LP[19]	P	ON	OFF[18]	OFF[18]	OFF	OFF	OFF	OFF	OFF	No Power
VCCCORE	All	ON	OFF[17]	OFF	OFF	OFF	OFF	OFF	OFF	No Power
VCCGT	All	ON	OFF[17]	OFF	OFF	OFF	OFF	OFF	OFF	No Power

Notes:
1. The state of this system without RTC well powered can also be considered G3.
2. VCCIN_AUX may turn off if the VIDs are low.
3. S0/M0 state includes all Package C-states from C0-C10
4. Assume SLP_S0# and CPU_C10_GATE# have asserted from the PCH
5. V3.3M and V1.8M are platform rails used by external devices which ME operates during Sx/M3 states. These rails are not used directly by the CPU/PCH, and are not present on non-M3 supported systems
6. NA
7. NA
8. NA
9. NA
10. For no M3 support on external devices, V3.3M/V1.8M will be OFF in Sx/M3
11. NA
12. If VCCIN_AUX is ON, VCC1P05_PROC needs to be ON
13. VCC1P05_PROC can be turned ON in S5 state through VCCST_OVERRIDE
14. VCCIN_AUX may be ON in those power states if required by the SOC.
15. For systems that use FIVR based PCH parts the processor requires that any time AUX is ON at a non-zero voltage that VCC1P8_PROC be powered as well. This means that the VCC1P8_PROC enable must use the AUX VIDs as part of the enable logic since AUX can be ON in Sx states with FIVR based PCH parts
16. NA
17. This supply is expected to be OFF during states where CPU_C10_GATE# is asserted. It may be left on during this condition but the Processor will not achieve it's lowest power consumption. Specific power up latencies apply when exiting this state.
18. If MIPI is not used, this power rail will be powered by VCC1P05_PROC and stays ON in S0ix. If MIPI is used with a LDO to make 1.24V its enable should be controlled by CPU_C10_GATE# to allow shutdown in S0ix.
19. VCC_MIPILP must ramp with or after VCC1P05_PROC. Recommend before IPMP for ease of implementation. While exiting from S0ix, must be ramped by the time STG timer expires in PCH (65us). No specific order required for discharge requirement.

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Griffin/Roc EVT Planar Logic Schematics

001.Project Name
002.Block diagram
003.EC list Or Component Tolence
004.Title Page
005.CPU(01/16):DDI/Type-C
006.CPU(02/16):DDR(1/2)
007.CPU(03/16):DDR(2/2)
008.CPU(04/16):MISC/JTAG
009.CPU(05/16):SPI/ESPI/SMB/CL
010.CPU(06/16):I2C/ISH/UART/GPIO
011.CPU(07/16):AUDIO
012.CPU(08/16):PCIE/USB/SATA
013.CPU(09/16):CSI-2/CNVI
014.CPU(10/16):CLOCK SIGNALS
015.CPU(11/16):SYSTEM PM
016.CPU(12/16):CPU Power (1/2)
017.CPU(13/16):CPU Power (2/2)
018.CPU(14/16):PCH Power
019.CPU(15/16):GND
020.CPU(16/16):CFG/RESERVED
021.MIPI60 DEBUG PORT
022.SPI FIASH
023.RTC BATTERY
024.BLANK
025.DDR4 SUB CHANNEL-A MD_1
026.DDR4 SUB CHANNEL-A MD_2
027.DDR4 SUB CHANNEL-B SODIMM_1
028.DDR4 SUB CHANNEL-B SODIMM_2
029.(BLANK)
030.(BLANK)
031.GN18/20-S5 OVR-M
032.GN18/20-S5(1/7) PEG I/F
033.GN18/20-S5(2/7) VRAM I/F
034.GN18/20-S5(3/7) DIGITA / XTAL
035.GN18/20-S5(4/7) STRAP / GPIO
036.GN18/20-S5(5/7) POWER
037.GN18/20-S5(6/7) POWER 2
038.GN18/20-S5(7/7) GND
039.GN18/20-S5 : GDDR6 VRAM CH_A
040.GN18/20-S5 : GDDR6 VRAM CH_A CAP
041.BLANK
042.MEC1723 (1/3)
043.MEC1723 (2/3)
044.MEC1723 (3/3)
045.Keyboard / Track point
046.TOUCH PAD/FPR POINT/PWR BTN
047.FAN
048.APS G-SENSOR
049.HPD G-SENSOR
050.Think Engine (1/2)
051.Think Engine (2/2)
052.BLANK
053.HDMI Retimer & Connector
054.Thunderbolt Retimer B (1/2)
055.Thunderbolt Retimer B(2/2)
056.Thunderbolt Retimer C(1/2)
057.Thunderbolt Retimer C(2/2)
058.(BLANK)
059.USB PD Controller
060.(BLANK)
061.Thunderbolt C Connector PORT C
062.Thunderbolt C Connector PORT B
063.(BLANK)
064.(BLANK)
065.TYPEC_DCIN
066.(BLANK)
067.USB TYPE-A CONNECTOR (AOU)
068.USB TYPE-A CONNECTOR
069.(BLANK)
070.M.2 Socket 3 Module I/F
071.(BLANK)
072.M.2 Type 1216 Module
073.(BLANK)
074.M.2 Socket 2 Module I/F
075.(BLANK)
076.GBE Jacksonville
077.(BLANK)
078.RJ45 Connector
079.(BLANK)
080.(BLANK)
081.(BLANK)
082.(BLANK)
083.Audio Codec (ALC3286)
084.Audio Connector
085.Audio Jack
086.Audio Speaker
087.Audio Beep
088.ENERGY ESTIMATION ENGINE
089.(BLANK)
090.(BLANK)
091.(BLANK)
092.(BLANK)
093.Smart Card Reader / NFC
094.LCD / Touch interface
095.LID / IR Camera / MIC
096.(BLANK)
097.(BLANK)
098.Discrete TPM 2.0
099.(BLANL)
100.(BLANK)
101.BATTERY INPUT
102.BATTERY CHARGER (BQ25710)
103.DC/DC VCC5M (NB690)
104.DC/DC VCC5M_PD (NB693GQ)
105.DC/DC VCC3M (TPS51393P)
106.DC/DC VCC1R065A/(NB705)
107.DC/DC VCC1R8_SUS (TPS56637R)
108.DC/DC ADL(MP2964
109.DC/DC_VCCCPUCORE(MP86971
110.DC/DC VCCCPUCORE_DE_CAP
111.DC/DC VCCGT(MP86943
112.DC/DC VCCPCHCORE(MP2961
113.DC/DC VCCPCHCORE DE_CAP
114.BLANK
115.DC/DC VCCGFXCORE_D (NCP8127)
116.DC/DC VCC1R2VIDEO(MP2941A)
117.DC/DC VCC1R8VIDEO (BD9B304)
118.Load SW VIDEO
119.DC/DC VCC1R0VIDEO(BD9B304)
120.LOAD SW VCC3_SUS
121.LOAD SW VCCST & VCCSTG
122.LOAD SW LAN
123.LOAD SW B
124.LOAD SW TOUCH PANEL
125.(BLANK)
126.(BLANK)
127.(BLANK)
128.System Power Tree
129.System Power Sequence
130.(BLANK)

TABLE: Chip Part Dimension

Size [mm]	mm Size Code	Inch Size Code
0.40 x 0.20	0402	01005
0.60 x 0.30	0603	0201
1.00 x 0.50	1005	0402
1.60 x 0.80	1608	0603
2.00 x 1.25	2125	0805
2.00 x 1.60	2016	0806
2.50 x 2.00	2520	1008
3.20 x 1.60	3216	1206
3.20 x 2.50	3225	1210
4.50 x 1.60	4516	1806
4.50 x 2.50	4525	1810
4.50 x 3.20	4532	1812
5.00 x 2.50	5025	2010
6.40 x 3.20	6432	2512

LOGIC

TABLE: Chip Capacitor Thermal Characteristics

		Code
-55 to 150degC -55 to 125degC	+/-30ppm/degC +/-30ppm/degC	NPO C0G
-55 to 125degC -55 to 105degC -55 to 85degC	+/-15% +/-22% +/-15%	X7R X6S X5R

TABLE: Chip Capacitor Tolerance

Tolerance	Code
+/-0.25pF +/-0.5pF	C D
+/-5% +/-10% +/-20% +80/-20%	J K M Z

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TABLE : Functional Strap

GPP_E19/DDP1_CTRLDATA/TBT_LSX0_RXD (DDP1 I2C / TBT_LSX0 Pin VCC Configuration)	
GPP_E21/DDP2_CTRLDATA/TBT_LSX1_RXD (DDP2 I2C / TBT_LSX1 Pin VCC Configuration)	
GPP_D10/DDP3_CTRLDATA/TBT_LSX2_RXD (DDP3 I2C / TBT_LSX2 Pin VCC Configuration)	
GPP_D12/DDP4_CTRLDATA/TBT_LSX3_RXD (DDP4 I2C / TBT_LSX3 Pin VCC Configuration)	
HIGH	3.3V for HDMI Display I2C (External Pull-Up Resistor Required)
LOW	1.8V for Thunderbolt LSX (Default)

TABLE : DGFX_config

DFX_VRAM_ID[1..0]	
00B	GN18
01B	NA
10B	QN20
11B	UMA

TABLE : -DISCRETE_PRESENCE

Model	Part
SWG	R99237
UMA	R0521

VCC3_SUS
R99240 1/20W_10K_5%_0201
R99241 1/20W_10K_5%_0201
DGFX_VRAM_ID0
DGFX_VRAM_ID1
R99254 1/20W_10K_5%_0201
R99238 1/20W_10K_5%_0201

R0525 1/20W_1M_1%_0201 1R8VIDEO_AON_ON
R0517 1/20W_1M_1%_0201 -GPU_RST
C0501 2 @ 1UPC_25VC_JC_NPOC_0201

VCC3B
R0506 1/20W_2.2K_5%_0201 DDIB_CTRLCLK
R0507 1/20W_2.2K_5%_0201 DDIB_CTRLDATA
R0523 @ 1/20W_100K_5%_0201 -CAM_PRIVACY

VCC3B
UMA@
R0521 1/20W_100K_5%_0201 -DISCRETE_PRESENCE
SWG@
R99237 1/20W_100K_5%_0201

46,93 NFC_ACTIVE NFC_ACTIVE R0502 1/20W_0_5%_0201 NFC_ACTIVE_R

VCC3_SUS
R0504 1/20W_10K_5%_0201 -USB_TCSS_OC1
R0505 1/20W_10K_5%_0201 -USB2_P7_OC2
C0502 2200P_25V_K_X7R_0201 EMC_NS@
C0503 2200P_25V_K_X7R_0201 EMC_NS@

VCC3B
R0526 Config_T@ 1/20W_100K_5%_0201 UMA_DIS_IDENTIFY
R0527 Config_P@ 1/20W_100K_5%_0201

eDP
HDMI

UCPU1A

94 EDP_TXP3 — EDP_TXP3 — W3 DDIA_TXP_3
94 EDP_TXN3 — EDP_TXN3 — AA3 DDIA_TXN_3
94 EDP_TXP2 — EDP_TXP2 — AA1 DDIA_TXP_2
94 EDP_TXN2 — EDP_TXN2 — AB1 DDIA_TXN_2
94 EDP_TXP1 — EDP_TXP1 — AB3 DDIA_TXP_1
94 EDP_TXN1 — EDP_TXN1 — AC3 DDIA_TXN_1
94 EDP_TXP0 — EDP_TXP0 — AD1 DDIA_TXP_0
94 EDP_TXN0 — EDP_TXN0 — AD1 DDIA_TXN_0
94 EDP_AUXP — EDP_AUXP — AF3 DDIA_AUXP
94 EDP_AUXN — EDP_AUXN — AG3 DDIA_AUXN
32 -GPU_RST — -GPU_RST — ER23
35,117 1R8VIDEO_AON_ON — 1R8VIDEO_AON_ON — ET23 GPP_E22/DDPA_CTRLCLK/DNX_FORCE_RELOAD
GPP_E23/DDPA_CTRLDATA
EDP_HPD_CPU — EV25 GPP_E14/DDSP_HPDA/DISP_MISC_A

53 DDIB_3P — DDIB_3P — AP3 DDIB_TXP_3
53 DDIB_3N — DDIB_3N — AP1 DDIB_TXN_3
53 DDIB_2P — DDIB_2P — AM6 DDIB_TXP_2
53 DDIB_2N — DDIB_2N — AM8 DDIB_TXN_2
53 DDIB_1P — DDIB_1P — AK3 DDIB_TXP_1
53 DDIB_1N — DDIB_1N — AK1 DDIB_TXN_1
53 DDIB_0P — DDIB_0P — AH3 DDIB_TXP_0
53 DDIB_0N — DDIB_0N — AH1 DDIB_TXN_0
AE3 DDIB_AUXP
AE1 DDIB_AUXN

53 DDIB_CTRLCLK — DDIB_CTRLCLK — EK46 GPP_H15/DDPB_CTRLCLK/PCIE_LINK_DOWN
53 DDIB_CTRLDATA — DDIB_CTRLDATA — EL46 GPP_H17/DDPB_CTRLDATA
53 HDMI_HPD — HDMI_HPD — EB47 GPP_A18/DDSP_HPDB/DISP_MISCB
DGFX_VRAM_ID0 — DV54 GPP_A21/DDPC_CTRLCLK
DGFX_VRAM_ID1 — DV52 GPP_A22/DDPC_CTRLDATA

54 TBT_LSX0_TXD — TBT_LSX0_TXD — ER29 GPP_E18/DDP1_CTRLCLK/TBT_LSX0_TXD/BSSB_LS0_RX
54 TBT_LSX0_RXD — TBT_LSX0_RXD — ET25 GPP_E19/DDP1_CTRLDATA/TBT_LSX0_RXD/BSSB_LS0_TX
-DISCRETE_PRESENCE — EL26
UMA_DIS_IDENTIFY — EN26 GPP_E20/DDP2_CTRLCLK/TBT_LSX1_TXD/BSSB_LS1_RX
GPP_E21/DDP2_CTRLDATA/TBT_LSX1_RXD/BSSB_LS1_TX

56 TBT_LSX2_TXD — TBT_LSX2_TXD — FC37 GPP_D9/ISH_SPI_CS#/DDP3_CTRLCLK/TBT_LSX2_TXD/BSSB_LS2_RX/GSPI2_CS0#
56 TBT_LSX2_RXD — TBT_LSX2_TXD — EV37 GPP_D10/ISH_SPI_CLK/DDP3_CTRLDATA/TBT_LSX2_RXD/BSSB_LS2_TX/GSPI2_CLK
95 -CAM_PRIVACY — -CAM_PRIVACY — EY37 GPP_D11/ISH_SPI_MISO/DDP4_CTRLCLK/TBT_LSX3_TXD/BSSB_LS3_RX/GSPI2_MISO
FAST_SPI_CS1# — FA7 GPP_D12/ISH_SPI_MOSI/DDP4_CTRLDATA/TBT_LSX3_RXD/BSSB_LS3_TX/GSPI2_MOSI

95 -IR_CAM_DTCT — -IR_CAM_DTCT — DV54 GPP_A17/DISP_MISCC
Test_Point_16MIL TP0501 — HPD_DTCT — EB49 GPP_A19/DDSP_HPD1/DISP_MISC1
NFC_ACTIVE_R — EB51 GPP_A20/DDSP_HPD2/DISP_MISC2

59,68 -USB_TCSS_OC1 — -USB_TCSS_OC1 — DV47 GPP_A14/USB_OC1#/DDSP_HPD3/DISP_MISC3
67 -USB2_P7_OC2 — -USB2_P7_OC2 — DY49 GPP_A15/USB_OC2#/DDSP_HPD4/DISP_MISC4

PANEL_POWER_ON_CPU — EN21 VDDEN
42 VGA_BLON — VGA_BLON — EL21 EDP_BKLTEN
PANEL_BKLT_CTRL_CPU — EDP_BKLTCTL
R0501 1/20W_100K_5%_0201
1 OF 22
ALDERLAKE-P-CPU_BGA1744

TCP0_TXRX_P1 — BE8 — TCP0_TXRX_P1 — TCP0_TXRX_P1 54
TCP0_TXRX_N1 — BE6 — TCP0_TXRX_N1 — TCP0_TXRX_N1 54
TCP0_TXRX_P0 — BG8 — TCP0_TXRX_P0 — TCP0_TXRX_P0 54
TCP0_TXRX_N0 — BG6 — TCP0_TXRX_N0 — TCP0_TXRX_N0 54
TCP0_TX_P1 — BE3 — TCP0_TX_P1 — TCP0_TX_P1 54
TCP0_TX_N1 — BE1 — TCP0_TX_N1 — TCP0_TX_N1 54
TCP0_TX_P0 — BD3 — TCP0_TX_P0 — TCP0_TX_P0 54
TCP0_TX_N0 — BD1 — TCP0_TX_N0 — TCP0_TX_N0 54
TCP0_AUX_P — BB1 — TCP0_AUXP — TCP0_AUXP 54
TCP0_AUX_N — TCP0_AUXN — TCP0_AUXN 54
UBB1_JUSBC1

TCP1_TXRX_P1 — AV8
TCP1_TXRX_N1 — AV6
TCP1_TXRX_P0 — AY8
TCP1_TXRX_N0 — AY6
TCP1_TX_P1 — BA3
TCP1_TX_N1 — BA1
TCP1_TX_P0 — AW3
TCP1_TX_N0 — AW1
TCP1_AUX_P — AU1
TCP1_AUX_N

TCP2_TXRX_P1 — BN8 — TCP2_TXRX_P1 — TCP2_TXRX_P1 56
TCP2_TXRX_N1 — BN6 — TCP2_TXRX_N1 — TCP2_TXRX_N1 56
TCP2_TXRX_P0 — BL8 — TCP2_TXRX_P0 — TCP2_TXRX_P0 56
TCP2_TXRX_N0 — BL6 — TCP2_TXRX_N0 — TCP2_TXRX_N0 56
TCP2_TX_P1 — BK3 — TCP2_TX_P1 — TCP2_TX_P1 56
TCP2_TX_N1 — BM3 — TCP2_TX_N1 — TCP2_TX_N1 56
TCP2_TX_P0 — BK1 — TCP2_TX_P0 — TCP2_TX_P0 56
TCP2_TX_N0 — BM1 — TCP2_TX_N0 — TCP2_TX_N0 56
TCP2_AUX_P — BH1 — TCP2_AUXP — TCP2_AUXP 56
TCP2_AUX_N — BK1 — TCP2_AUXN — TCP2_AUXN 56
UBB2_JUSBC1

TCP3_TXRX_P1 — BW8
TCP3_TXRX_N1 — BW6
TCP3_TXRX_P0 — BU8
TCP3_TXRX_N0 — BU6
TCP3_TX_P1 — BV3
TCP3_TX_N1 — BV1
TCP3_TX_P0 — BR3
TCP3_TX_N0 — BR1
TCP3_AUX_P — BT1
TCP3_AUX_N

VSS_SBU — AM1 — TC_RCOMP — R0509 2 1 1/20W_2.2K_1%_0201
TCP_RCOMP — AF32 — R0520 2 1 1/20W_100K_5%_0201
DISP_UTILS_2
DDIA_RCOMP — AJ1 — DDIA_RCOMP — R0510 1 2 1/20W_150_1%_0201
DDIB_RCOMP — AL1 — DDIB_RCOMP — R0516 1 2 1/20W_150_1%_0201
DISP_UTILS_1 — DJ1

R0509 place as near asa possible to SOC pins.

Bypass
R0514 1 2 1/20W_0_5%_0201

VCC3_SUS -> VCC3M =>for layout
VCC3M
R0511 1/20W_1M_5%_0201
VCC3LCD
R0512 1/20W_100K_5%_0201
INTEL_HAO_BANG_BANG
EDP_HPD_CPU
94 EDP_HPD
Q0501 LSK3541G1ET2L_VMT3
Q0502 LSK3541G1ET2L_VMT3
@R0513 1/20W_100K_5%_0201
R0515 1/20W_100K_5%_0201

ePrivacy HPD VOH less than Intel VIH

44,94 LCD_SELF_TEST_ON
PANEL_POWER_ON_CPU — D0501 — RB520CM-30T2R_VMN2M2 — PANEL_POWER_ON 51
LCD_SELF_TEST_ON — D0502 — RB520CM-30T2R_VMN2M2 — R0503 1/20W_100K_5%_0201
PANEL_BKLT_CTRL_CPU — D0503 — RB520CM-30T2R_VMN2M2 — PANEL_BKLT_CTRL 94
LCD_SELF_TEST_ON — D0504 — RB520CM-30T2R_VMN2M2 — R0508 1/20W_10K_5%_0201

EDP_BKLTCTL pin relies on R10606 to avoid floating

Document Number
LCFC
Size Custom
Title 005_CPU(1/16): DDI/TYPE-C
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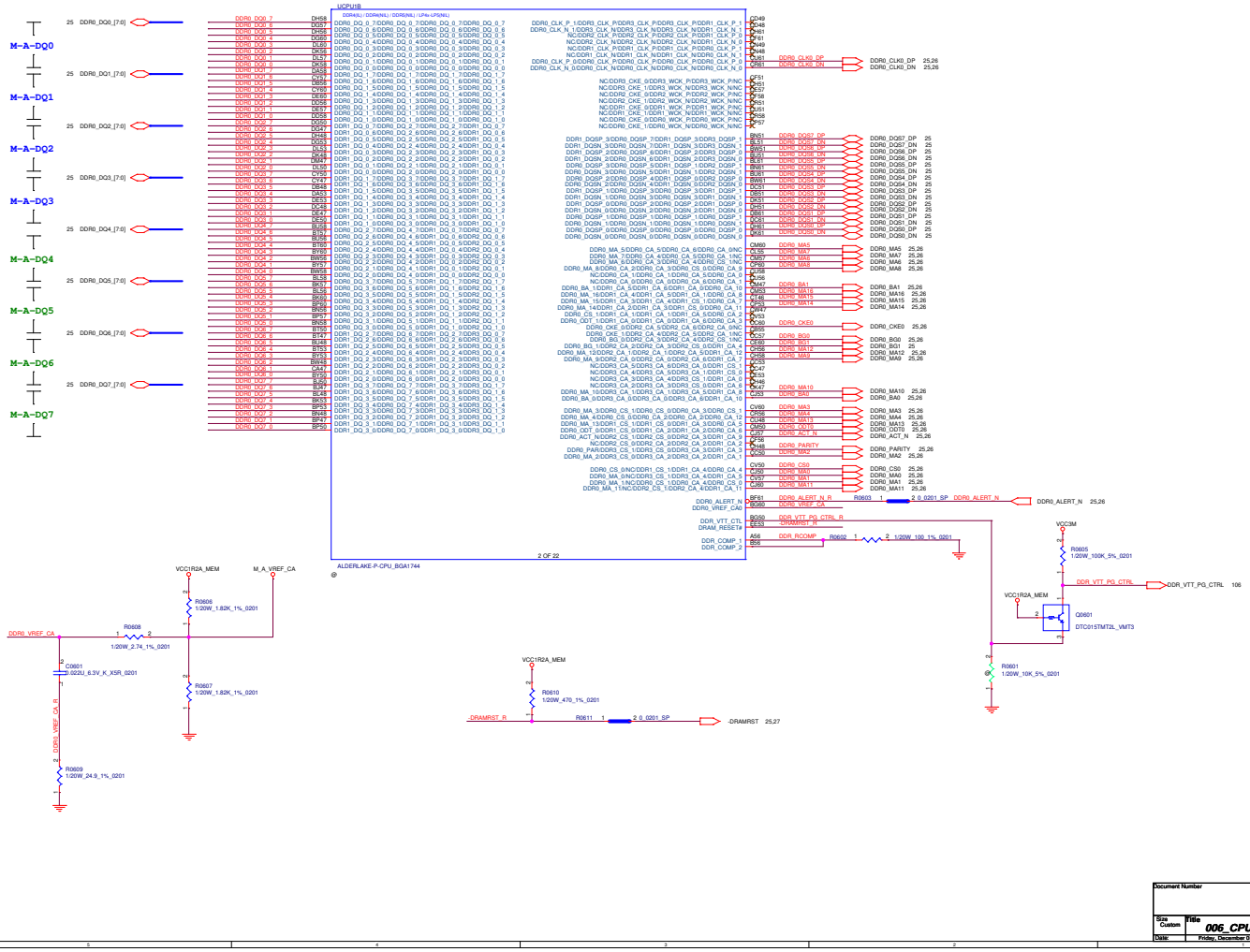
M-A-DQ0
M-A-DQ1
M-A-DQ2
M-A-DQ3
M-A-DQ4
M-A-DQ5
M-A-DQ6
M-A-DQ7
UCPU1B
ALDERLAKE-P-CPU_BGA1744
2 OF 22
VCC1R2A_MEM
M_A_VREF_CA
DDR0_VREF_CA
R0608 1/20W_1.82K_1%_0201
R0608 1/20W_2.74_1%_0201
R0607 1/20W_1.82K_1%_0201
C0801 0.022U_6.3V_K_X5R_0201
R0609 1/20W_24.9_1%_0201
R0610 1/20W_470_1%_0201
R0611 0_0201_SP
DRAMRST_R
-DRAMRST 25,27
R0603 0_0201_SP
DDR0_ALERT_N 25,26
R0602 1/20W_100_1%_0201
VCC3M
R0605 1/20W_100K_5%_0201
R0601 1/20W_10K_5%_0201
Q0601 DTC015TMT2L_VMT3
DDR_VTT_PG_CTRL
106
Document Number
LCFC
Size Custom
Title 006_CPU(2/16): DDR (1/2)
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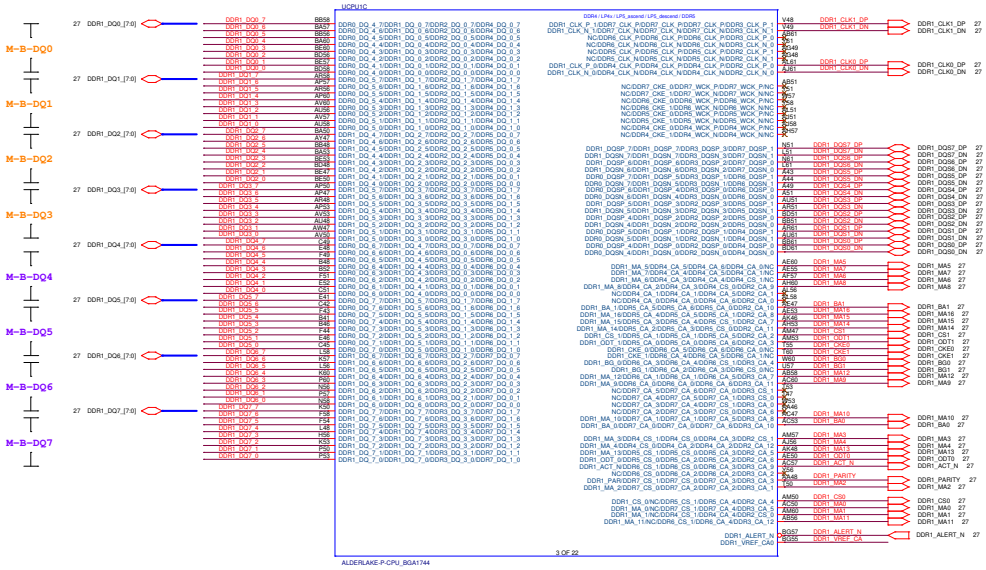
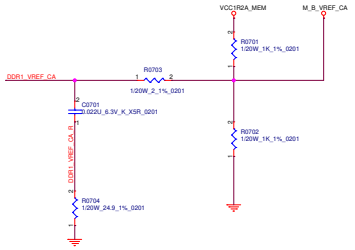
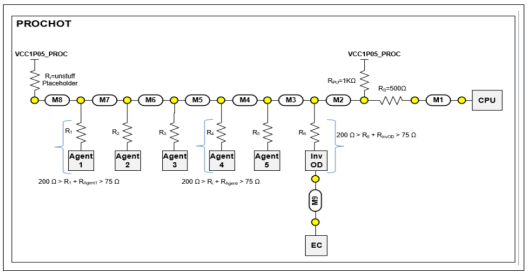


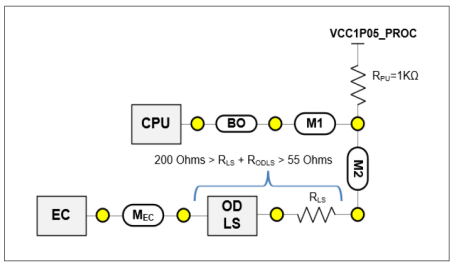


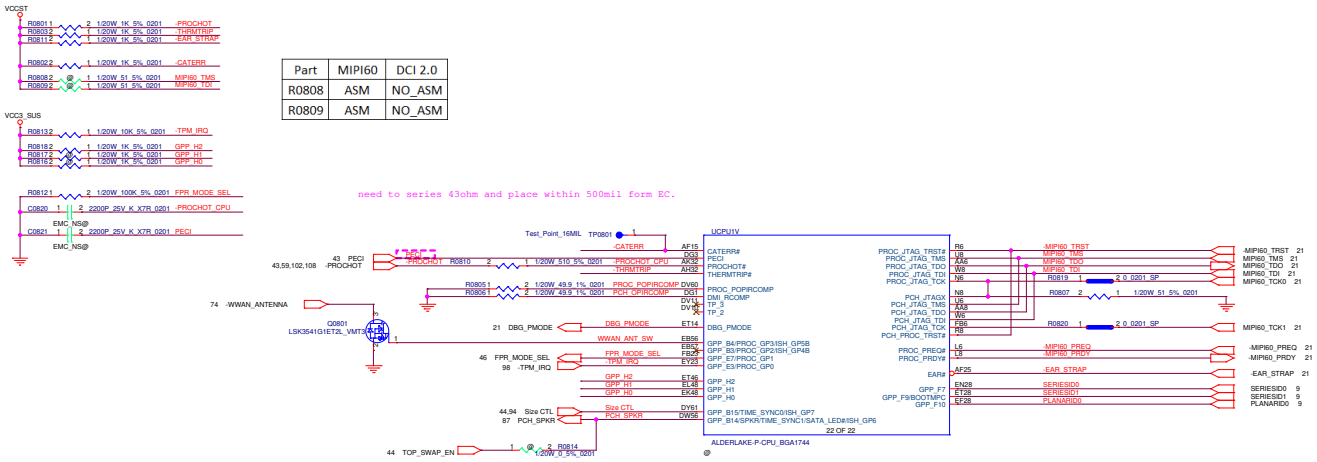
Document Number		LCFC		
Size: Custom	Title: 007_CPU(3/16): DDR (2/2)			Rev: 0.01
Date: Friday, December 03, 2021	Sheet 7 of 130			

CPU Sideband - PROCHOT# Topology



CPU Sideband - THERMTRIP#





Part	MIPI60	DCI 2.0
R0808	ASM	NO_ASM
R0809	ASM	NO_ASM

Top Swap Override	DFx Test Mode
GPP_B14/SPKR (Internal PD 20K)	DBG_PMODE (Internal PU 20K)
0 = Disable "Top Swap" mode (Default)	0 = DFx Test Mode Enabled
1 = Enable "Top Swap" mode	1 = DFx Test Mode Disabled (default)

TABLE : Functional Strap

GPP_C5/SML0ALERT# (Boot Strap Bit 0)	
GPP_H0 (Boot Strap Bit 1)	
GPP_H1 (Boot Strap Bit 2)	
GPP_H2 (Boot Strap Bit 3)	
0000b	Master Attached Flash Configuration (Default)
0010b	Master Attached Flash Configuration eSPI is disable
0100b	BIOS on eSPI Peripheral Channel CSME on master attached device
1000b	Slave Attached Flash Configuration
1100b	BIOS on eSPI Peripheral Channel CSME on slave attached SPI

TABLE : Functional Strap

GPP_F7 (Reserved) - Should Sample LOW	
HIGH	
LOW	(Default)

TABLE : Functional Strap

GPP_F10 (Reserved) - Should Sample LOW	
HIGH	
LOW	(Default)

Document Number: LCFC

Size: C | Title: 008_CPU(4/16): Misc/JTAG | Rev: 0.01

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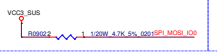
Boot Halt

SPI0_MOSI (External PU 4.7K)

0 = Enable

1 = Disable

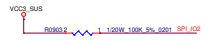


Consent Strap

SPI0_MOSI (External PU 100K)

0 = Enable

1 = Disable



A0 Personality Strap

SPI0_IO3 (External PU 100K)

0 = Enable

1 = Disable

TLS Confidentiality

GPP_C2/SMBALERT# (Internal PD 20K)

0 = Disable ME Crypto TLS (Default)

1 = Enable ME Crypto TLS with Confidentiality

CPUNSSC Clock Frequency

GPP_B23/SML1ALERT#/PCHHOT# (Internal PD 20K)

0 = 38.4MHz Clock (Direct from Crystal) (Default)

1 = 19.2MHz Clock (Derived from 38.4MHz Crystal)

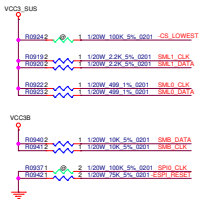
JTAG ODT Disable

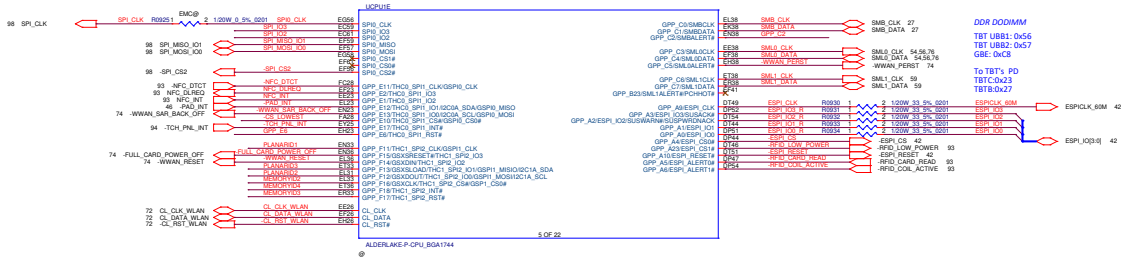
GPP_E6/THC0_SPI1_RST# (External PU 100K)

0 = JTAG ODT Disable

1 = JTAG ODT Enabled

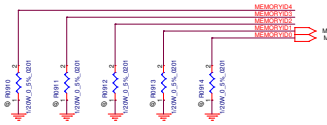
Project	OrtiFlexTec	
PD Controller	TPS65994AB	
Topology	PD port A	PD port B
	TCP2	TCP0
	TBT4	TBT4
net name	TBTC	TBTB
DC1 SCL/SDA NetName	DC1_CLK_PD	DC1_DATA_PD
To where	EC	
Address	0x30	0x24
DC2 SCL/SDA NetName	SML1_CLK	SML1_DATA
To where	PMC	
Address	0x23	0x27
DC3 SCL/SDA NetName	DC3_CLK_PD	DC3_DATA_PD
To where	BB	
Address	0x57	0x56
PMC to BB's I2C	SML0_CLK	SML0_DATA
Address	0x55	0x56

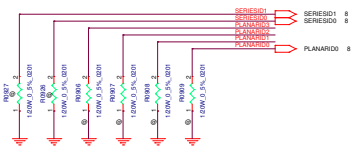




TABLE

LEVEL	MEMORY ID		
	4	3	2
	R0910	R0911	R0912
1	NA	NA	NA
0	ASM	ASM	ASM





TABLE

LEVEL	Series ID	
	1	0
	R0927	R0926
1	T	ThinkPAD
0	Ts/X	NEC

TABLE

LEVEL	PLANAR ID			
	3	2	1	0
	R0906	R0907	R0908	R0909
1	NA	NA	NA	NA
0	ASM	ASM	ASM	ASM

TABLE

LEVEL	PLANARID[3:0]
EVT	0000b
FVT	0001b
SIT	0100b
SVT	1111b

TABLE:

MEMORYID[4:2]	U2501,U2601,U2701,U2801				Total Memory	LCFC PN
	Supplier	Supplier's P/N	Capacity			
0h (000b)	Micron	MT40A1G16RC-062E:B	16Gb	SDP	8GB	SA0000A4K10
1h (001b)		MT40A2G16SKL-062E:B	32Gb	DDP	16GB	SA0000ADR00
2h (010b)	Samsung	K4AAG165WB-BCWE		SDP	8GB	SA0000C6N00
3h (011b)		K4ABG165WB-MCWE		DDP	16GB	SA0000C6P00
4h (100b)	Hynix	H5ANAG6NCJR-XNC		SDP	8GB	SA0000B5K00
5h (101b)		H5ANBG6NCMR-XNC		DDP	16GB	SA0000C6T00

Document Number: LCFC

Size: Custom | Title: 009_CPU(5/16): ESPI/SPI/SMB/JTAG/C | Rev:

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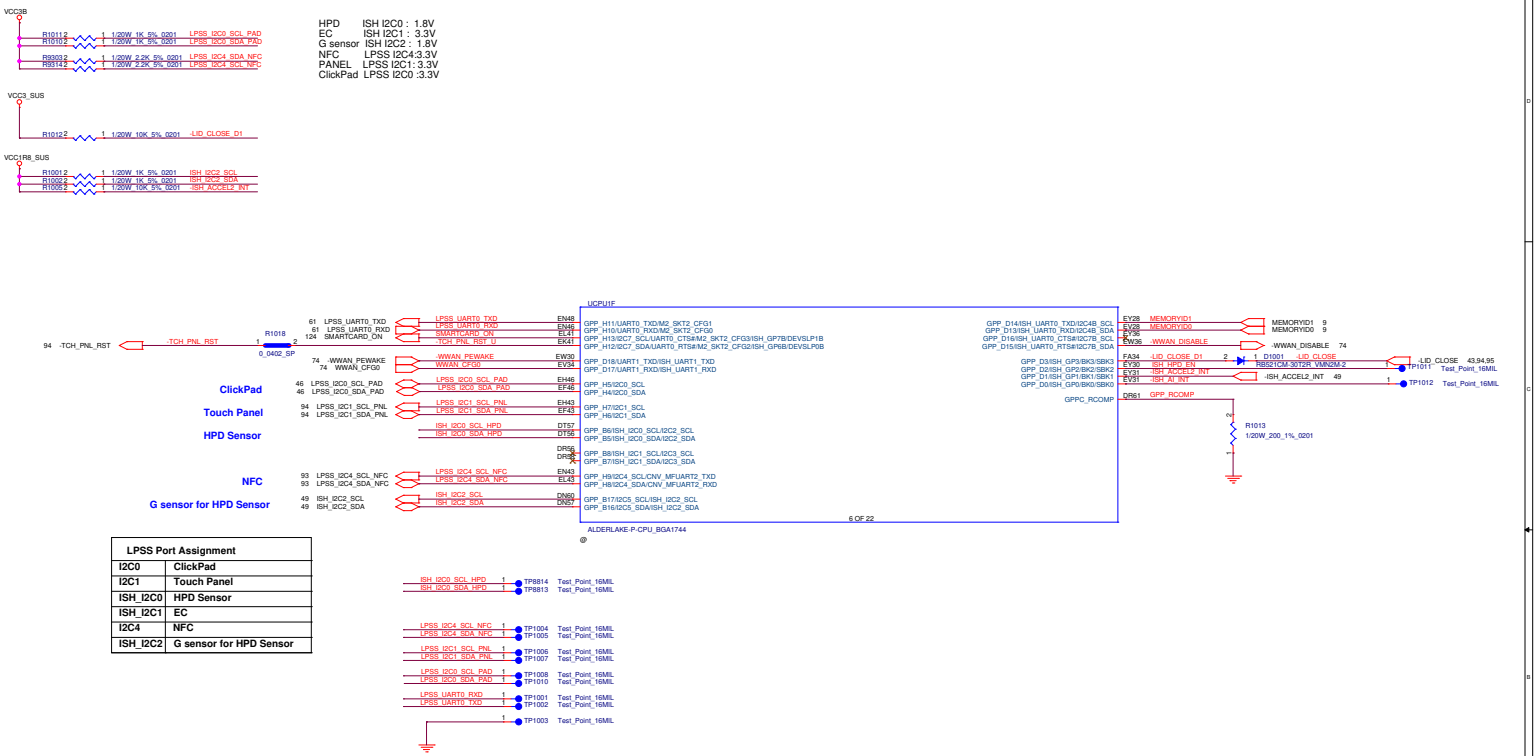


LPSS Port Assignment	
I2C0	ClickPad
I2C1	Touch Panel
ISH_I2C0	HPD Sensor
ISH_I2C1	EC
I2C4	NFC
ISH_I2C2	G sensor for HPD Sensor

Document Number

LCFC

Size	Title	Rev
C	010_CPU(6/16): LPSS/ISH	0.01
Date: Friday, December 03, 2021	Sheet 10 of 130	

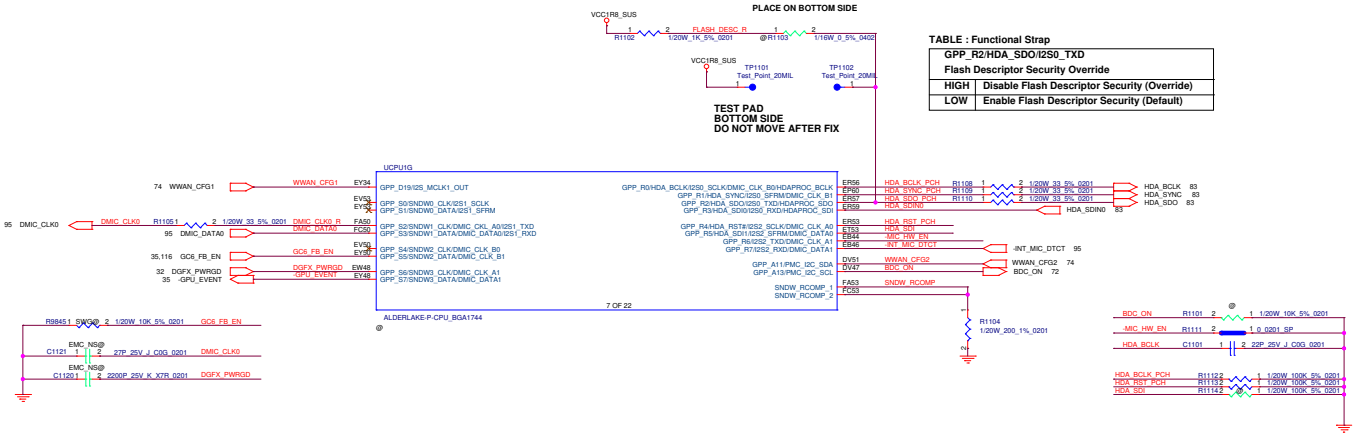


TABLE : Functional Strap

GPP_R2/HDA_SDO/I2S0_TXD	
Flash Descriptor Security Override	
HIGH	Disable Flash Descriptor Security (Override)
LOW	Enable Flash Descriptor Security (Default)

Document Number	LCFC		
Size: C	Title: 011_CPU(7/16): AUDIO		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 11 of 130		

Flexible I/O Configuration

HSIO Port	High Speed Signals	PCI Device	PCI Function	HSIO Configuration	Descriptor for PCIe	Net Name	PCI Device	PCI Function
PCH L0	USB 3.1 #1 / PCIe Gen3 #1	1Ch	0h	USB 3.1 #1	1x2, 2x1 Lane Reversal Enabled	N/A	14h	0h
PCH L1	USB 3.1 #2 / PCIe Gen3 #2		1h	USB 3.1 #2		USB3_P2		
PCH L2	USB 3.1 #3 / PCIe Gen3 #3		2h	PCIe Gen3 #3		PCIE3_P1_L1		
PCH L3	USB 3.1 #4 / PCIe Gen3 #4		3h	PCIe Gen3 #4		PCIE3_P1_L0	1Ch	0h
PCH L4	PCIe Gen3 #5	1Ch	4h	PCIe Gen3 #5	4x1 Lane Reversal Disabled	N/A	1Fh	6h
PCH L5	PCIe Gen3 #6		5h	PCIe Gen3 #6		N/A		
PCH L6	PCIe Gen3 #7 (GbE)		6h	PCIe Gen3 #7 (GbE)		PCIE3_P7		
PCH L7	PCIe Gen3 #8 (GbE)		7h	PCIe Gen3 #8		N/A		
PCH L8	PCIe Gen3 #9 (GbE)	1Dh	0h	PCIe Gen3 #9 (x4)	1x4 Lane Reversal Disabled	N/A		
PCH L9	PCIe Gen3 #10		1h	PCIe Gen3 #10 (x4)		N/A		
PCH L10	PCIe Gen3 #11 / SATA #0		2h	PCIe Gen3 #11 (x4)		N/A		
PCH L11	PCIe Gen3 #12 / SATA #1		3h	PCIe Gen3 #12 (x4)		N/A		
CPU_A L0	PCIe Gen4 x4Lane 0	06h	0h	PCIe Gen4 (x4) L0	1x4 Lane Reversal Disabled	PCIE4_L0	06h	0h
CPU_A L1	PCIe Gen4 x4Lane 1			PCIe Gen4 (x4) L1		PCIE4_L1		
CPU_A L2	PCIe Gen4 x4Lane 2			PCIe Gen4 (x4) L2		PCIE4_L2		
CPU_A L3	PCIe Gen4 x4Lane 3			PCIe Gen4 (x4) L3		PCIE4_L3		
CPU_B L0	PCIe Gen4 x4Lane 0			PCIe Gen4 (x4) L0	1x4 Lane Reversal Disabled	PCIE4_L0		
CPU_B L1	PCIe Gen4 x4Lane 1			PCIe Gen4 (x4) L1		PCIE4_L1		
CPU_B L2	PCIe Gen4 x4Lane 2			PCIe Gen4 (x4) L2		PCIE4_L2		
CPU_B L3	PCIe Gen4 x4Lane 3			PCIe Gen4 (x4) L3		PCIE4_L3		

PCIe Port Assignment

PCIE3_P1	(USB3_P1)
PCIE3_P2	(USB3_P2)
PCIE3_P3	WWAN Lane 1
PCIE3_P4	WWAN Lane 0
PCIE3_P5	(WLAN)
PCIE3_P6	(Reserved)
PCIE3_P7	GbE
PCIE3_P8	(Reserved)
PCIE3_P9	(Reserved)
PCIE4 (x4)	NVMe SSD
PCIE4 (x4)	DGPU

SATA Port Assignment

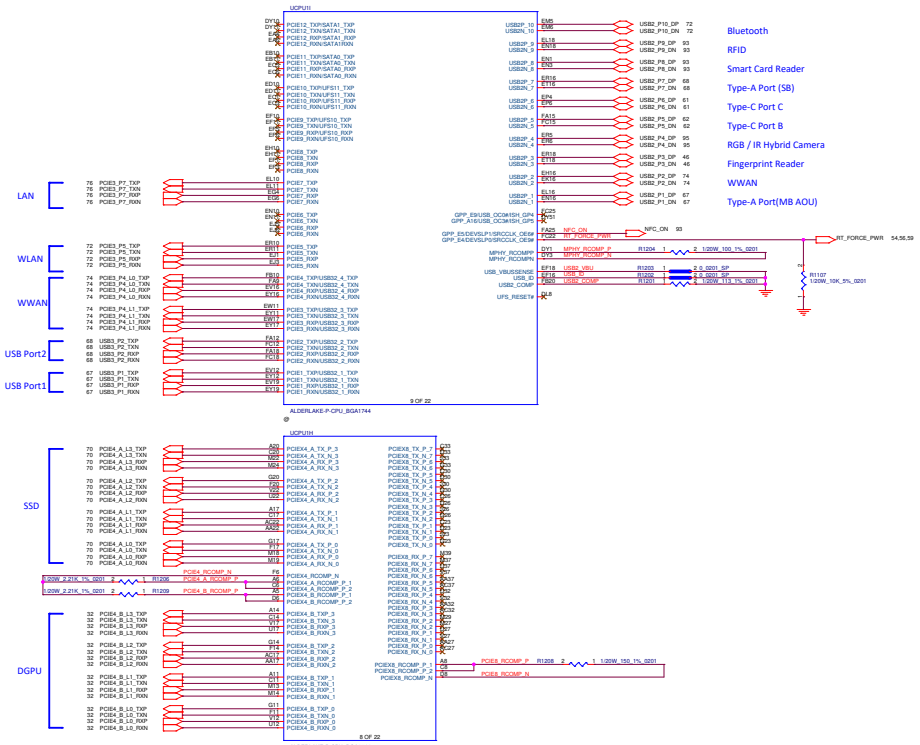
SATA_P0	(PCIE3_P11)
SATA_P1	(PCIE3_P12)

USB 3.1 Port Assignment

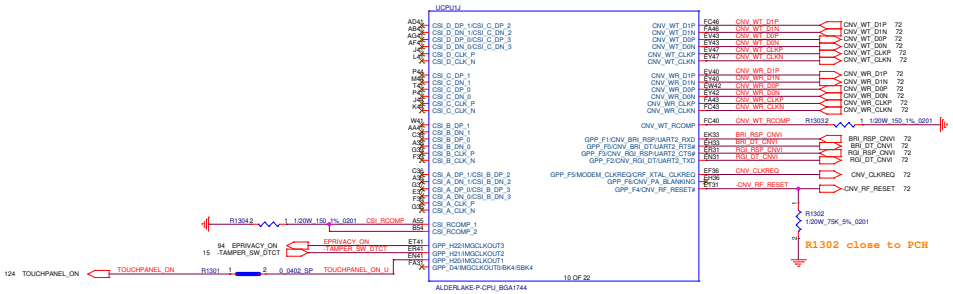
USB3_P1	Type-A Port (AOU)
USB3_P2	(Type-A Port)
USB3_P3	(PCIE3_P3)
USB3_P4	(PCIE3_P4)

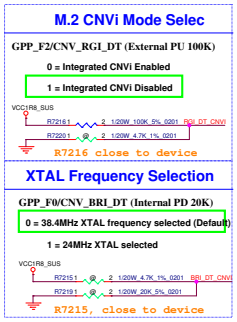
USB 2.0 Port Assignment

USB2_P1	Type-A Port (AOU)
USB2_P2	WWAN
USB2_P3	Fingerprint Reader
USB2_P4	RGB / IR Hybrid Camera
USB2_P5	Type-C Port B
USB2_P6	Type-C Port C
USB2_P7	(Type-A Port)
USB2_P8	(Smart Card Reader)
USB2_P9	(RFID)
USB2_P10	(Bluetooth)



Document Number			Rev
		LCFC	1.01
Size: Custom	Title: 012_CPU(8/16): PCIE/USB/SATA		
Date: Friday, December 03, 2021	Sheet 12 of 136		





CNVi_WT_RCOMP

Interface	Ball Number	Pin Name	Board Rterm (Ohm)	Board DC resistance (ohms)	Board parasitic capacitance (pF)	Resistor Stuffing	Notes
PCH interface	FC40	CNV_WT_RCOMP	150 ohm +/-1 % pull-down to GND	<0.5	-	Mandatory	Pkg trace + Board trace <1pF should be sufficient

[Issue Symptom]
All PCIe device can't recognize

[Root cause]
GPP_F0 strap not correct setting.

[Solution]
GPIO need to set up "native" and can't have PU resistance.

Document Number	LCFC		
Size: Custom	Title: 013_CPU(9/16): CSI-2/CNVI		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 13 of 130		

PCIECLK and CLKREQ# Port Assignment		
Port 0	PCIe Gen4 A(x4)	NVMe SSD
Port 1	PCIe Gen3 P5	(M.2 WLAN)
Port 2	PCIe Gen3 P1	M.2 WWAN
Port 3	PCIe Gen4 B (x4)	(dGPU)
Port 4	PCIe Gen3 P7	GbE
Port 5	PCIe Gen3 P8	
Port 6	PCIe Gen3 P6	(Reserved)

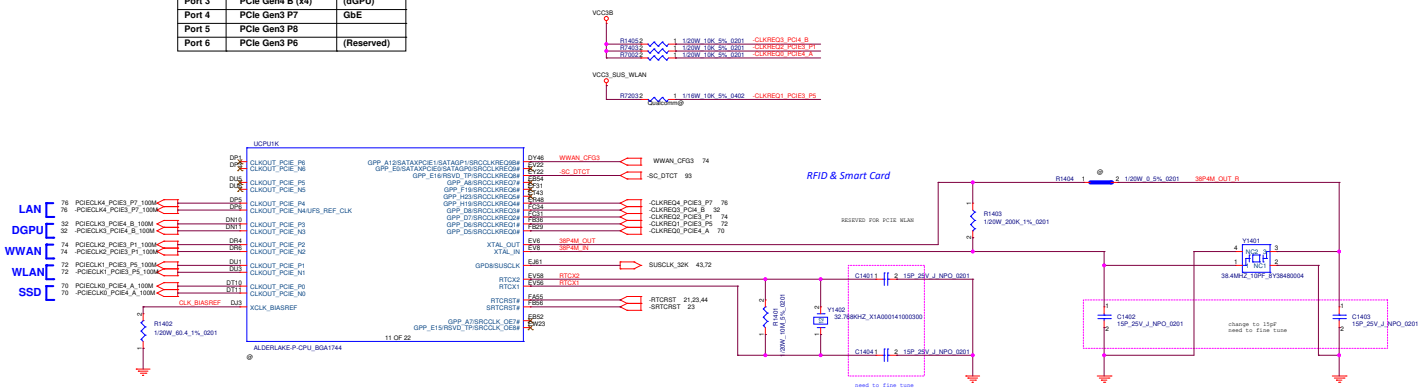
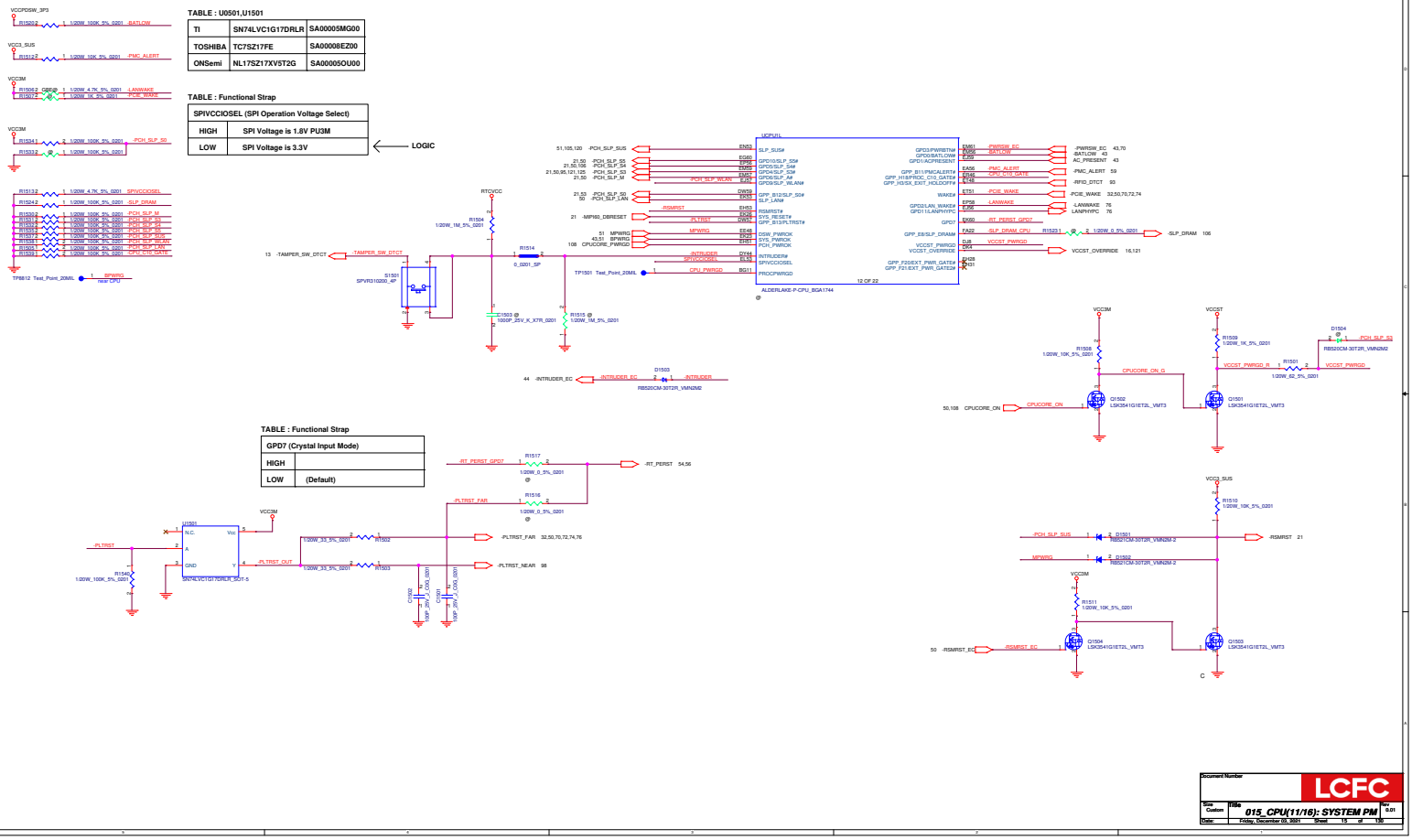


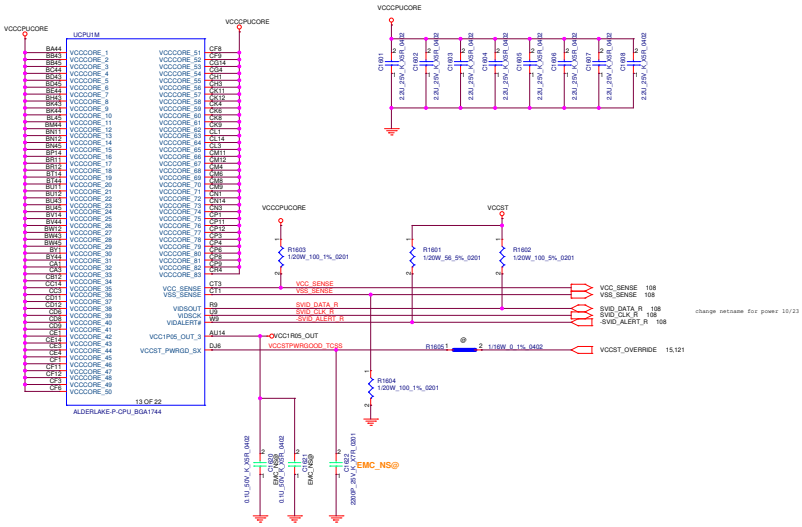
TABLE of Y1402		
Vendor	P/N	LCFC P/N
EPSON	X1A0001410003	SJ10000LM00
TXC	9H03280013	SJ100011T00
KDS	7BD03276A2S	SJ100011W00

TABLE of Y1401		
Vendor	P/N	LCFC P/N
TXC	8Y38480004	SJ10000SN00
KDS	7AF03840A04	SJ10000XG00
MURATA	XRCGB38M400F2T10R0	SJ100012100

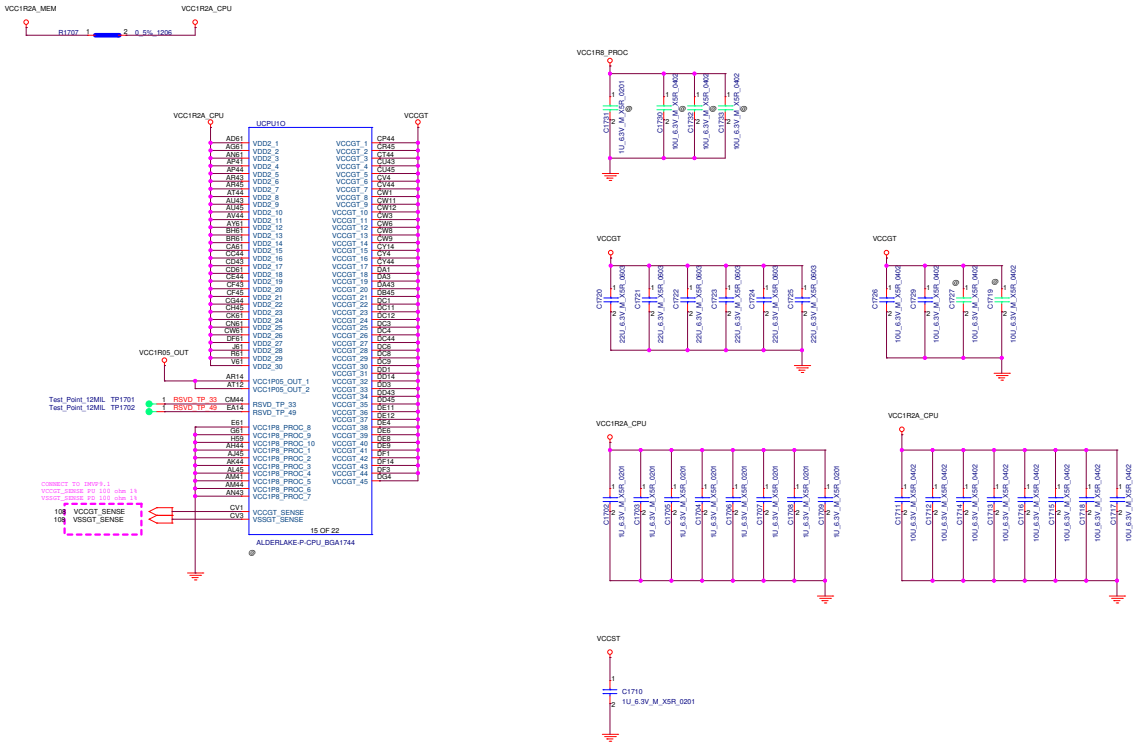
Document Number			LCFC
Size: Custom	Title: 014_CPU(10/16): CLOCK SIGNALS		Rev:
Date: Friday, December 03, 2021	Sheet 14 of 130		



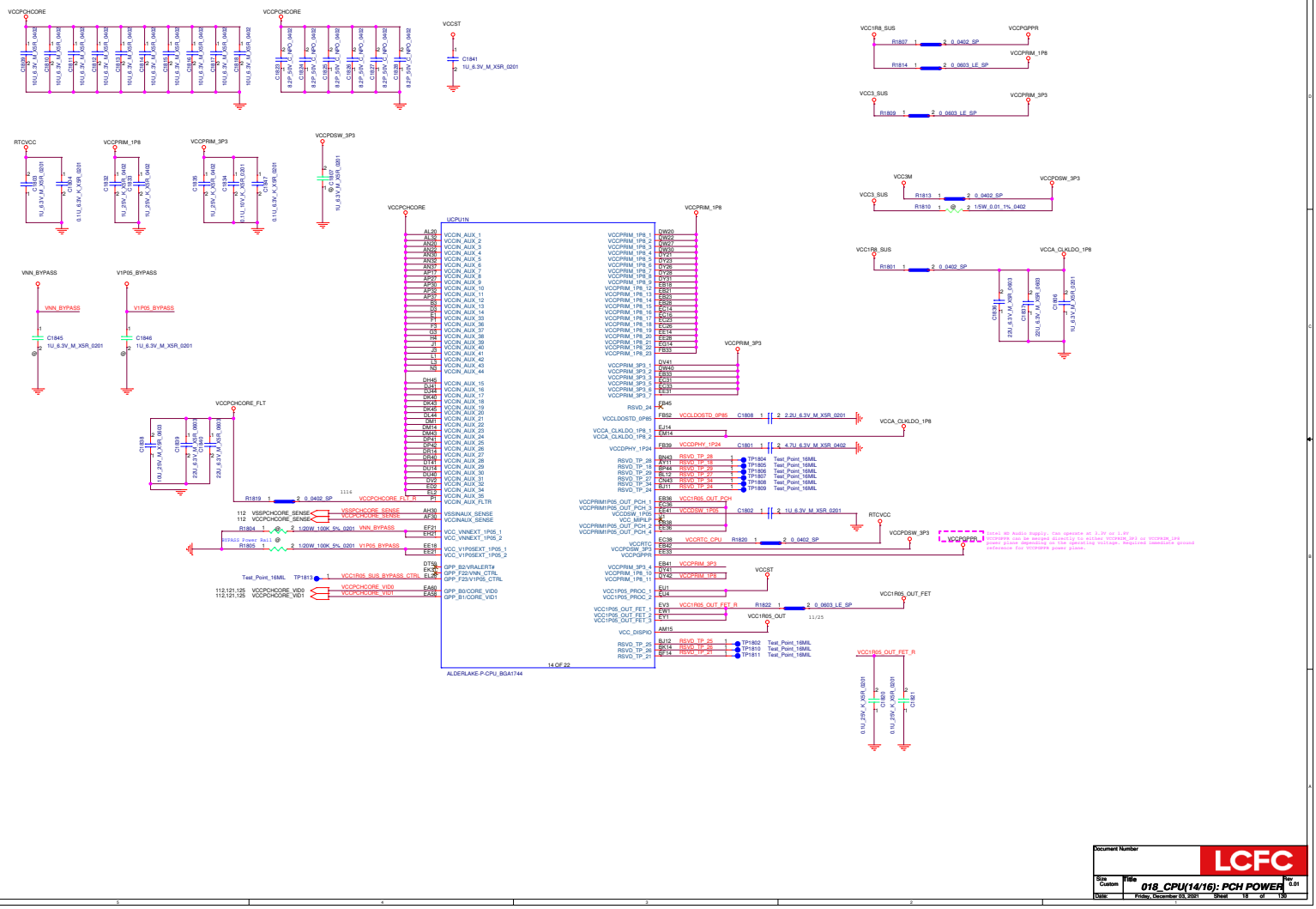
Document Number		LCFC	
Size: Custom	Title: 015_CPU(11/16): SYSTEM PM		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 15 of 130		



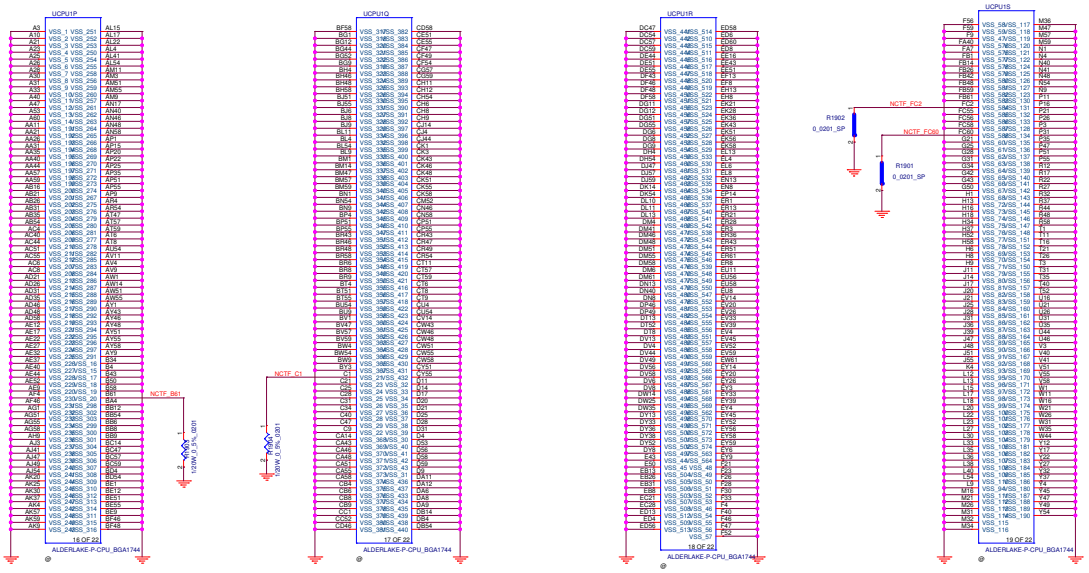
Document Number			LCFC
Size: Custom	Title: 016_CPU(12/16): CPU POWER (1/2)		Rev: (VR)
Date: Friday, December 03, 2021	Sheet 16 of 130		



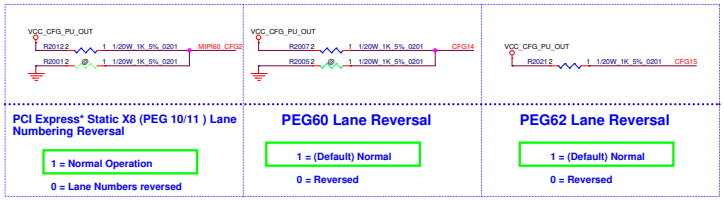
Document Number		LCFC	
Size C	Title	017_CPU(13/16): CPU POWER(2/2)	Rev
Date: Friday, December 03, 2021	Sheet 17 of 130		



Document Number		LCFC	
Size: Custom	Title: 018_CPU(14/16): PCH POWER		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 18 of 130		



Document Number			LCFC
Size: Custom	Title: 019_CPU(15/16): GND		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 19 of 130		



No Reboot

GPP_B18 / ADR_COMPLETE (Internal PD 20K)

0 = Disabled REBOOT ENABLED (Default)

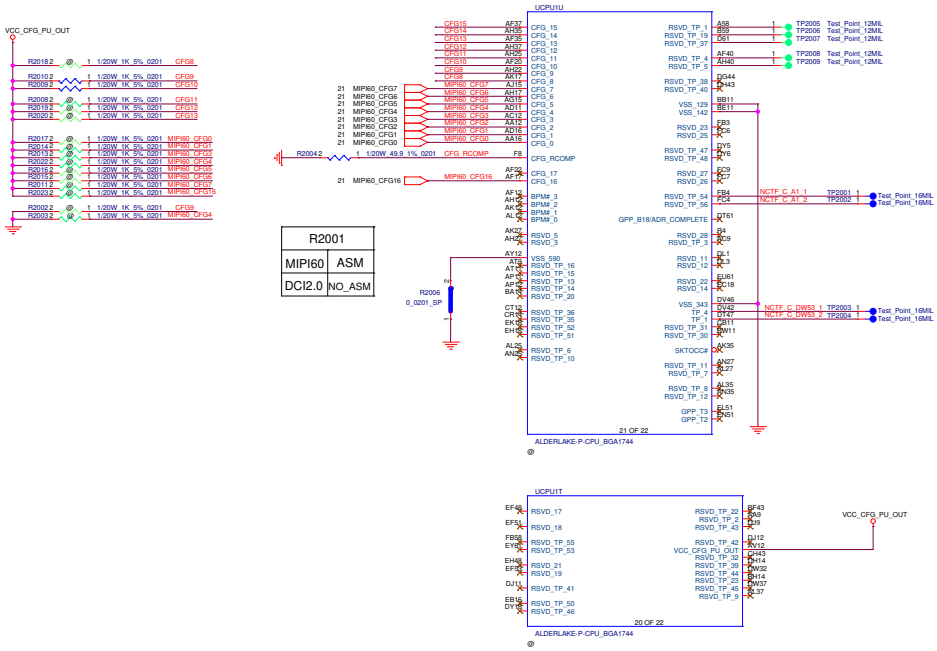
1 = Enabled NO REBOOT

CFG Signals Functionality and Termination

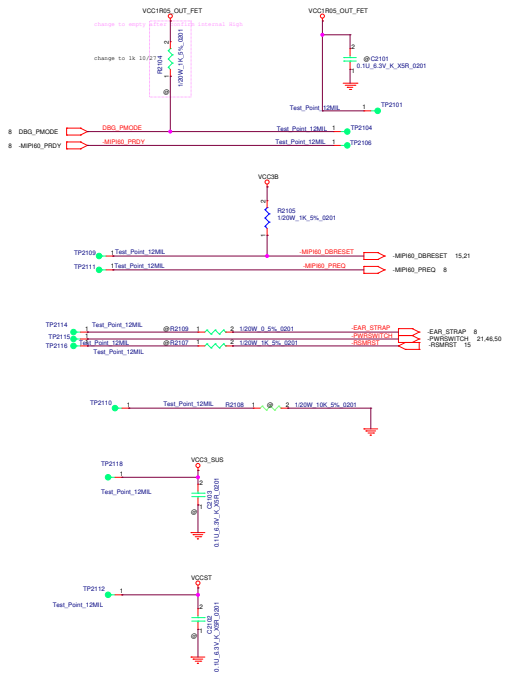
CFG	Description	Termination	Resistor
EAR	Stall CPU reset sequence until de-asserted: - 1 = (Default) Normal Operation; No stall. - 0 = Stall	Pull -Up to VCC1P05_PROC	1K ohm
CFG[0]	RSVD	None	
CFG[1]	RSVD	None	

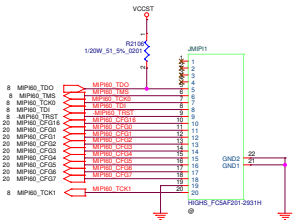
CFG	Description	Termination	Resistor
CFG[2]	PCI Express* Static X8 (PEG 10/11) Lane Numbering Reversal • 1:Normal Operation • 0: Lane Numbers reversed	Pull -Up to VCC_CFG_PU_OUT / Pull-down- Platform design dependent	1K ohm
CFG[3]	RSVD	None	
CFG[4]	RSVD	None	
CFG[5]	RSVD	None	
CFG[6]	RSVD	NONE	
CFG[8:7]	RSVD	None	
CFG[10:9]	RSVD	Pull -Up to VCC_CFG_PU_OUT[1]	1K Ohm
CFG[13:11]	RSVD	None	
CFG[14]	PEG60 Lane Reversal: • - 1 - (Default) Normal • - 0 - Reversed	Pull -Up to VCC_CFG_PU_OUT / Pull-down- Platform design dependent	1K ohm
CFG[15]	PEG62 Lane Reversal: • - 1 - (Default) Normal • - 0 - Reversed	Pull -Up to VCC_CFG_PU_OUT / Pull-down- Platform design dependent	1K ohm
CFG[17:16]	RSVD	None	

Note: 1.To ensure reliable boot across HVM.

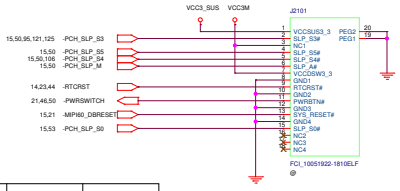


Document Number			Rev
		LCFC	
Size C	Title	020_CPU(16/16): CFG/RESERVED	
Date: Friday, December 03, 2021	Sheet 20 of 130		





APS/PETS Interface



TABLE

Logic	Ref Des	MIPI60	DCI 2.0
Page8	R0808	ASM	NO_ASM
	R0809	ASM	NO_ASM
Page 20	R2001	ASM	NO_ASM
Page 21	J8	ASM	NO_ASM
	C2101	ASM	NO_ASM
	C2102	ASM	NO_ASM
	C2103	ASM	NO_ASM
	R2108	ASM	NO_ASM
	R2106	ASM	ASM
	R2105	ASM	ASM
	R2104	ASM	NO_ASM
	R2107	ASM	NO_ASM
	R2109	ASM	NO_ASM

LOGIC

Document Number

LCFC

Size: Custom | Title: 021_MIPI60 DEBUG PORT | Rev: 0.01

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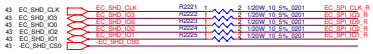


close to EC

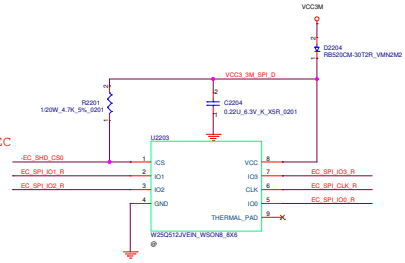
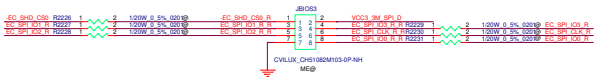


TABLE:U2203

64MB (512Mb) 8x6mm WSON		Part Number
Winbond	W25Q512JVEIN	SA0000BUN00
GigaDevie	GD25B512MEYIGR	SA0000BV300
Macronix	MX25L51273GZ4I-08G	SA0000CDT00



Document Number			LCFC
Size: Custom	Title: 022_SPI FLASH		Rev: 0.01
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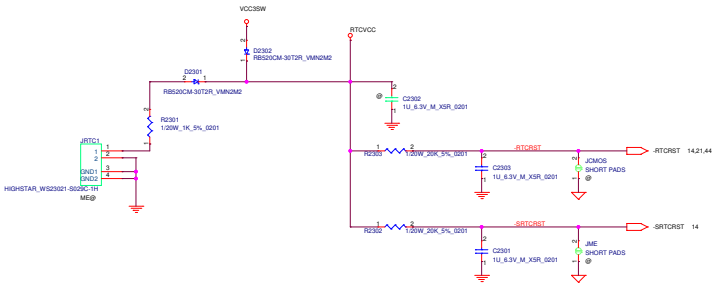

Document Number	LCFC	
Size: Custom	Title: 023_RTC BATTERY	Rev: 0.01
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CPU

ADL-U28 Vpro CPU

UCPU1
- i7-1280P_U28 vPro — SA0000CY310 — U28_I7_VP_1280@
- i5-1250P_U28 vPro — SA0000D1100 — U28_I5_VP_1250@
- i7-1270P_U28 vPro — SA0000D1200 — U28_I7_VP_1270@

ADL-U28 non Vpro CPU

UCPU1
- i5-1240P_U28 non vPro — SA0000DQY10 — U28_I5_NVP_1240@
- i7-1260P_U28 non vPro — SA0000DSP10 — U28_I7_NVP_1260@

SPI ROM

U2003
- Winbond Non-RPMC — SA0000BJN00 — W_NRPMC@
- GigaDevice Non-RPMC — SA0000BV300 — GIGA_NRPMC@

Garfield Peak2

UWLAN1
- Garfield Peak2 AX211.D2WGQ — PK2950017T10 — GP2@
- Garfield Peak2 AX211.D2WG — PK2950017T60 — GP2_NV@

Qualcomm

UWLAN2
- Qualcomm — PK2950017X00 — Qualcomm@

PCB

ZZZ
- PCB 1UB NM-D882 REV0 M/B — DA60009HB10 — EVT@

GBE

U7801
- WGI219LM SLKJ2 — SA0000752G0 — GBE_V@
- WGI219V SLKJ4 — SA0000722Y0 — GBE_NV@

TPM

U9801
- ST — SA0000C8600 — ST@
- Nuvoton — SA0000C3000 — NUVOTON@
- NationZ — SA0000C1500 — Nation2@
- Infineon — SA0000C3310 — Infineon@

DDR X76 / DRAM Option

	U2501	U2601	U2701	U2801
Samsung 8G	K4AAG165WB-BCWK — SA0000C5N00 — SBG_X76@	K4AAG165WB-BCWK — SA0000C5N00 — SBG@	K4AAG165WB-BCWE — SA0000C5N00 — SBG@	K4AAG165WB-BCWE — SA0000C5N00 — SBG@
Micron 8G	MT40A1G16RC-062E:B — SA0000A4K10 — MBG_X76@	MT40A1G16RC-062E:B — SA0000A4K10 — MBG@	MT40A1G16RC-062E:B — SA0000A4K10 — MBG@	MT40A1G16RC-062E:B — SA0000A4K10 — MBG@
Hynix 8G	H5ANAG6NCJR-XNC — SA0000B5K00 — H8G_X76@	H5ANAG6NCJR-XNC — SA0000B5K00 — H8G@	H5ANAG6NCJR-XNC — SA0000B5K00 — H8G@	H5ANAG6NCJR-XNC — SA0000B5K00 — H8G@
Samsung 16G	K4ABG165WB-MCWE — SA0000C6P00 — S16G_X76@	K4ABG165WB-MCWE — SA0000C6P00 — S16G@	K4ABG165WB-MCWE — SA0000C6P00 — S16G@	K4ABG165WB-MCWE — SA0000C6P00 — S16G@
Micron 16G	MT40A2G16SKL-062E:B — SA0000AEN00 — M16G_X76@	MT40A2G16SKL-062E:B — SA0000AEN00 — M16G@	MT40A2G16SKL-062E:B — SA0000AEN00 — M16G@	MT40A2G16SKL-062E:B — SA0000AEN00 — M16G@
Hynix 16G	H5ANBG6NCMR-XNC — SA0000C6T00 — H16G_X76@	H5ANBG6NCMR-XNC — SA0000C6T00 — H16G@	H5ANBG6NCMR-XNC — SA0000C6T00 — H16G@	H5ANBG6NCMR-XNC — SA0000C6T00 — H16G@

MEMORY Configure Option

MEMORYID4	MEMORYID3	MEMORYID2	MEMORYID1	MEMORYID0
R9010 1/20W 0_5% 0201 SD040J000YT SBG@	R9011 1/20W 0_5% 0201 SD040J000YT MBG@	R9012 1/20W 0_5% 0201 SD040J000YT SBG@		
R9010 1/20W 0_5% 0201 SD040J000YT MBG@	R9011 1/20W 0_5% 0201 SD040J000YT MBG@	R9012 1/20W 0_5% 0201 SD040J000YT MBG@		
	R9011 1/20W 0_5% 0201 SD040J000YT H8G@	R9012 1/20W 0_5% 0201 SD040J000YT H8G@		
R9010 1/20W 0_5% 0201 SD040J000YT S16G@				
R9010 1/20W 0_5% 0201 SD040J000YT M16G@	R9011 1/20W 0_5% 0201 SD040J000YT M16G@			
	R9011 1/20W 0_5% 0201 SD040J000YT H16G@			

VSS_E9 (SDP/DDP)

SDP
- R2503 1/20W 0_5% 0201 SD040J000YT SDP@
- R2506 1/20W 0_5% 0201 SD040J000YT SDP@
- R2509 1/20W 0_5% 0201 SD040J000YT SDP@
- R2512 1/20W 0_5% 0201 SD040J000YT SDP@

DDP
- R2503 1/20W 243_1% 0201 SD000015BFT DDP@
- R2506 1/20W 243_1% 0201 SD000015BFT DDP@
- R2509 1/20W 243_1% 0201 SD000015BFT DDP@
- R2512 1/20W 243_1% 0201 SD000015BFT DDP@

TABLE:

MEMORYID[4:2]	U2501,U2601,U2701,U2801					
	Supplier	Supplier's P/N	Capacity		Total Memory	LCFC PN
0h (000b)	Micron	MT40A1G16RC-062E:B	16Gb	SDP	8GB	SA0000A4K10
1h (001b)		MT40A2G16SKL-062E:B	32Gb	DDP	16GB	SA0000ADR00
2h (010b)	Samsung	K4AAG165WB-BCWE		SDP	8GB	SA0000C6N00
3h (011b)		K4ABG165WB-MCWE		DDP	16GB	SA0000C6P00
4h (100b)	Hynix	H5ANAG6NCJR-XNC		SDP	8GB	SA0000B5K00
5h (101b)		H5ANBG6NCMR-XNC		DDP	16GB	SA0000C6T00

BIOS Config / Strap

BIOS Config	Strap	DFX_VRAM_ID1	DFX_VRAM_ID0	FB_VREF (83302)	
				1Ch/4ch	GN20 / GN18
				Solution	FB / MB data
GN18 — GN18-S5-A1 BGA 771P GPU QS — SA000C27A00 — GN18_GPU@	00B	R99254 10K_5% 0201 SD047100ZYT GN18_GPU@	R99236 10K_5% 0201 SD047100ZYT GN18_GPU@	R9302 49.9_1% 0201 SD038B97DYT GN18@	
GN20 — GN20-S7-A1 BGA 771P GPU MP 01 ! — SA000CWJ20 — GN20_GPU@	01B	R99254 10K_5% 0201 SD047100ZYT GN20_GPU@	R99241 10K_5% 0201 SD047100ZYT GN20_GPU@	R9302 2.49K_1% 0201 SD038024BYT GN20@	
QN20 — QN20-M1-R BGA 771P GPU 01 ! — SA000CA110 — GN20_GPU@	10B	R99240 10K_5% 0201 SD047100ZYT GN20_GPU@	R99238 10K_5% 0201 SD047100ZYT GN20_GPU@		
UMA	11B	R99240 10K_5% 0201 SD047100ZYT UMA@	R99241 10K_5% 0201 SD047100ZYT UMA@		

C3105
- 6800P_0402 — SD21048JH0T — GN18_GPU@
- 6800P_0402 — SD21048JH0T — GN20_GPU@
- 0.1U_0402 — SD000011Z00T — GN20_GPU@

VCC1_SUS
- R99241 1/20W_10K_5%_0201 @
- R99240 1/20W_10K_5%_0201 @
- DDR5_VRAM_ID0
- DDR5_VRAM_ID1
- R99238 1/20W_10K_5%_0201 @
- R99254 1/20W_10K_5%_0201 @

VRAM X76 / VRAM Option

VRAM X76	VRAM Option	STRAP0 R3601(H) R3613(L)	STRAP1 R3602(H) R3614(L)	STRAP2 R3603(H) R3615(L)
GN18-S5 (Samsung 2G) — GN18 SS2G J1 JT4C0 — X764E20100C — GN18_S2G_X76@	Samsung 2G (0x0 _000) — UV1 K4ZG0325BC-HC14 — SA0000BL410 — GN18_S2G@ — UV2 SA0000BL410 GN18_S2G@	R3613 100K_1% 0201 SD047100ZFT GN18_S2G@	R3614 100K_1% 0201 SD047100ZFT GN18_S2G@	R3615 100K_1% 0201 SD047100ZFT GN18_S2G@
GN18-S5 (Hynix 2G) — GN18 HY V2G JT4C0 — X764E20100E — GN18_H2G_X76@	Hynix 2G(0x2 010) — UV1 H56C8H24AIR-S2C — SA0000B4E00 — GN18_H2G@ — UV2 SA0000B4E00 GN18_H2G@	R3613 100K_1% 0201 SD047100ZFT GN18_H2G@	R3602 100K_1% 0201 SD047100ZFT GN18_H2G@	R3615 100K_1% 0201 SD047100ZFT GN18_H2G@
GN18-S5 (Hynix 2G) — GN18 HY V2G_2 JT4C0 — X764E20100J — GN18_H2G_2_X76@	Hynix 2G(0x5 101) — UV1 H56G32CS4DX005 — SA0000CBK00 — GN18_H2G_2@ — UV2 SA0000CBK00 GN18_H2G_2@	R3601 100K_1% 0201 SD047100ZFT GN18_H2G_2@	R3614 100K_1% 0201 SD047100ZFT GN18_H2G_2@	R3603 100K_1% 0201 SD047100ZFT GN18_H2G_2@
QN20-M1-R (Samsung 4G) — QN20 SS V4G JT4C0 — X764E20100A — GN20_S4G_X76@	Samsung 4G(0x9 — UV1 K4ZAF325BM-HC14 — SA0000BQV20 — GN20_S4G@ — UV2 SA0000BQV20 GN20_S4G@	R3613 100K_1% 0201 SD047100ZFT GN20_S4G@	R3602 100K_1% 0201 SD047100ZFT GN20_S4G@ R3614 100K_1% 0201 SD047100ZFT GN20_S4G@	R3615 100K_1% 0201 SD047100ZFT GN20_S4G@
QN20-M1-R (Micron 4G) — QN20 SS V4G JT4C0 — X764E20100F — GN20_M4G_X76@	Micron 4G(0x7 — UV1 MT61K512M32KPA-14 — SA0000C0940 — GN20_M4G@ — UV2 SA0000C0940 GN20_M4G@	R3601 100K_1% 0201 SD047100ZFT GN20_M4G@	R3602 100K_1% 0201 SD047100ZFT GN20_M4G@	R3603 100K_1% 0201 SD047100ZFT GN20_M4G@
QN20-M1-R (Hynix 4G) — QN20 HY V4G JT4C0 — X764E20100G — GN20_H4G_X76@	Hynix 4G(0x8 — UV1 MT61K512M32KPA-14 — SA0000CMU10 — GN20_H4G@ — UV2 SA0000CMU10 GN20_H4G@	R3601 100K_1% 0201 SD047100ZFT GN20_H4G@ R3613 100K_1% 0201 SD047100ZFT GN20_H4G@	R3614 100K_1% 0201 SD047100ZFT GN20_H4G@	R3615 100K_1% 0201 SD047100ZFT GN20_H4G@
GN20-S7 (Samsung 2G) — GN20 SS V2G JT4C0 — X764E20100F — GN20_S2G_X76@	Samsung 2G(0X9 — UV1 K4ZAF325BM-HC14 — SA0000BQV20 — GN20_S2G@ — UV2 SA0000BQV20 GN20_S2G@	R3613 100K_1% 0201 SD047100ZFT GN20_S2G@	R3602 100K_1% 0201 SD047100ZFT GN20_S2G@ R3614 100K_1% 0201 SD047100ZFT GN20_S2G@	R3615 100K_1% 0201 SD047100ZFT GN20_S2G@
GN20-S7 (Hynix 2G) — GN20 MC V2G JT4C0 — X764E20100G — GN20_H2G_X76@	Hynix 2G(0x8 — UV1 H56G42AS2DX014N — SA0000CMU10 — GN20_H2G@ — UV2 SA0000CMU10 GN20_H2G@	R3601 100K_1% 0201 SD047100ZFT GN20_H2G@ R3613 100K_1% 0201 SD047100ZFT GN20_H2G@	R3614 100K_1% 0201 SD047100ZFT GN20_H2G@	R3615 100K_1% 0201 SD047100ZFT GN20_H2G@
GN20-S7 (Micron 2G) — GN20 MC V2G JT4C0 — X764E20100H — GN20_M2G_X76@	Micron 2G(0X7 — UV1 MT61K512M32KPA-14 IC — SA0000C0940 — GN20_M2G@ — UV2 SA0000C0940 GN20_M2G@	R3601 100K_1% 0201 SD047100ZFT GN20_M2G@	R3602 100K_1% 0201 SD047100ZFT GN20_M2G@	R3603 100K_1% 0201 SD047100ZFT GN20_M2G@

OVRM / OVRM (Strap) / OVRM (OPTION)

OVRM (On) — GN20 MC V2G JT4C0 — X764E20100J — OVRM_ON_X76@

U3101
- NCP45491XMNTWG — SA000039R00 — OVRM_ON@

OVRM (Strap)	OVRM (OPTION)
R3121 442_1% 0201 SD000039FFT OVRM_ON@	R3124 0_5% 0201 SD040J000YT OVRM_ON@
R3125 634_1% 0201 SD000039EDT OVRM_ON@	
R3113 665_1% 0201 SD000012Y0T OVRM_ON@	
R3119 665_1% 0201 SD000012Y0T OVRM_ON@	
R3103 237K_1% 0201 SD000039E0T OVRM_ON@	

OVRM (UPI) — GN20 MC V2G JT4C0 — X764E20100K — OVRM_UPI_X76@

U3101
- US6650QOKI — SA0000YH0R0 — OVRM_UPI@

OVRM (Strap)	OVRM (OPTION)
R3121 332_1% 0201 SD000021F0T OVRM_UPI@	R3130 0_5% 0201 SD040J000YT OVRM_UPI@
R3125 475_1% 0201 SD000039D0T OVRM_UPI@	
R3113 499_1% 0201 SD000014F0T OVRM_UPI@	
R3119 499_1% 0201 SD000014F0T OVRM_UPI@	
R3103 316K_1% 0201 SD000015WPT OVRM_UPI@	

File	<Title>
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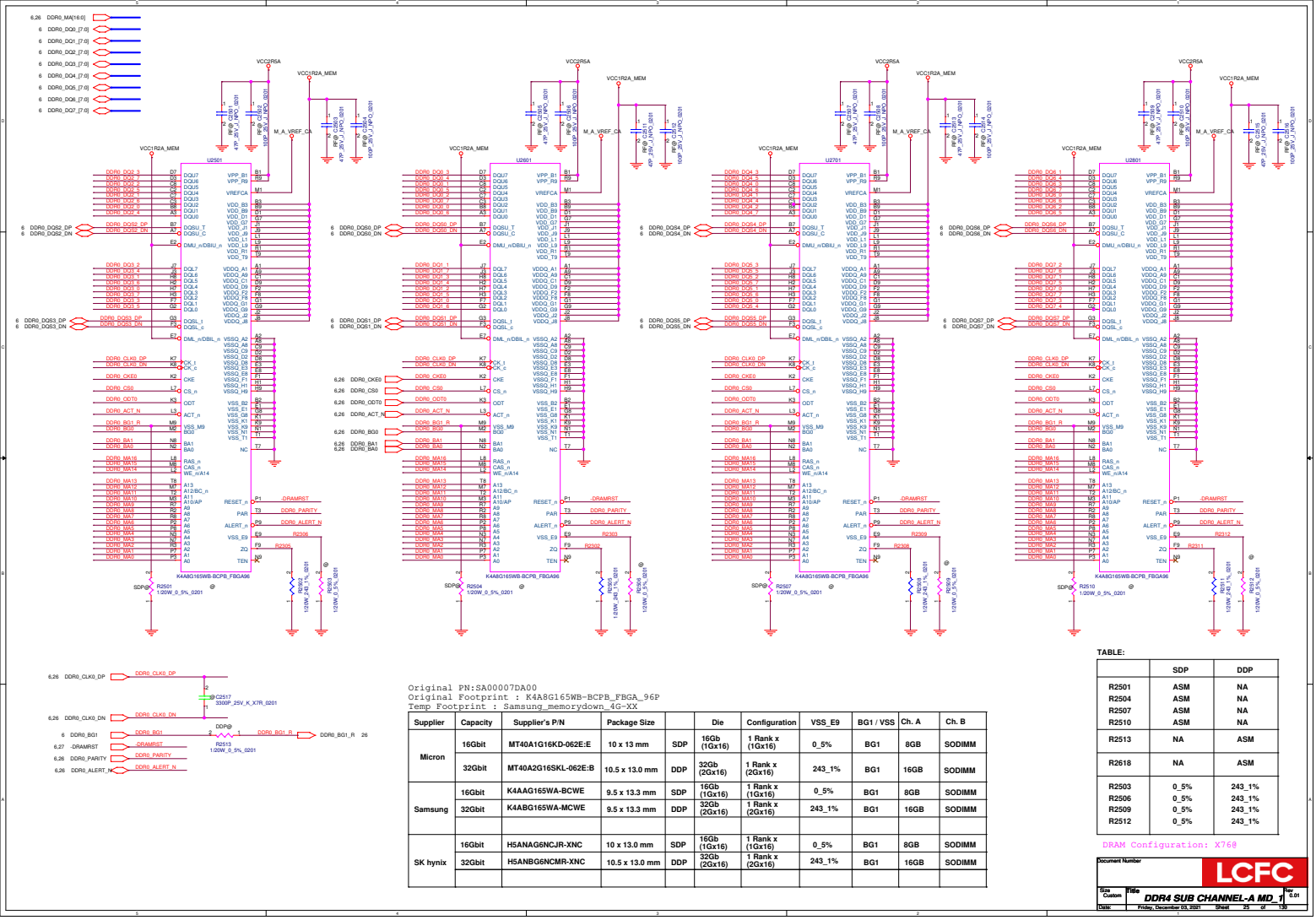

Original PN:SA00007DA00
Original Footprint : K4A8G165WB-BCPB_FBGA_96P
Temp Footprint : Samsung_memorydown_4G-XX

Supplier	Capacity	Supplier's P/N	Package Size		Die	Configuration	VSS_E9	BG1 / VSS	Ch. A	Ch. B
Micron	16Gbit	MT40A1G16KD-062E:E	10 x 13 mm	SDP	16Gb (1Gx16)	1 Rank x (1Gx16)	0_5%	BG1	8GB	SODIMM
	32Gbit	MT40A2G16SKL-062E:B	10.5 x 13.0 mm	DDP	32Gb (2Gx16)	1 Rank x (2Gx16)	243_1%	BG1	16GB	SODIMM
Samsung	16Gbit	K4AAG165WA-BCWE	9.5 x 13.3 mm	SDP	16Gb (1Gx16)	1 Rank x (1Gx16)	0_5%	BG1	8GB	SODIMM
	32Gbit	K4ABG165WA-MCWE	9.5 x 13.3 mm	DDP	32Gb (2Gx16)	1 Rank x (2Gx16)	243_1%	BG1	16GB	SODIMM
SK hynix	16Gbit	H5ANAG6NCJR-XNC	10 x 13.0 mm	SDP	16Gb (1Gx16)	1 Rank x (1Gx16)	0_5%	BG1	8GB	SODIMM
	32Gbit	H5ANBG6NCMR-XNC	10.5 x 13.0 mm	DDP	32Gb (2Gx16)	1 Rank x (2Gx16)	243_1%	BG1	16GB	SODIMM

TABLE:

	SDP	DDP
R2501	ASM	NA
R2504	ASM	NA
R2507	ASM	NA
R2510	ASM	NA
R2513	NA	ASM
R2618	NA	ASM
R2503	0_5%	243_1%
R2506	0_5%	243_1%
R2509	0_5%	243_1%
R2512	0_5%	243_1%

DRAM Configuration: X76@

Document Number		LCFC	
Size: Custom	Title: DDR4 SUB CHANNEL-A MD_1		Rev: 0.01
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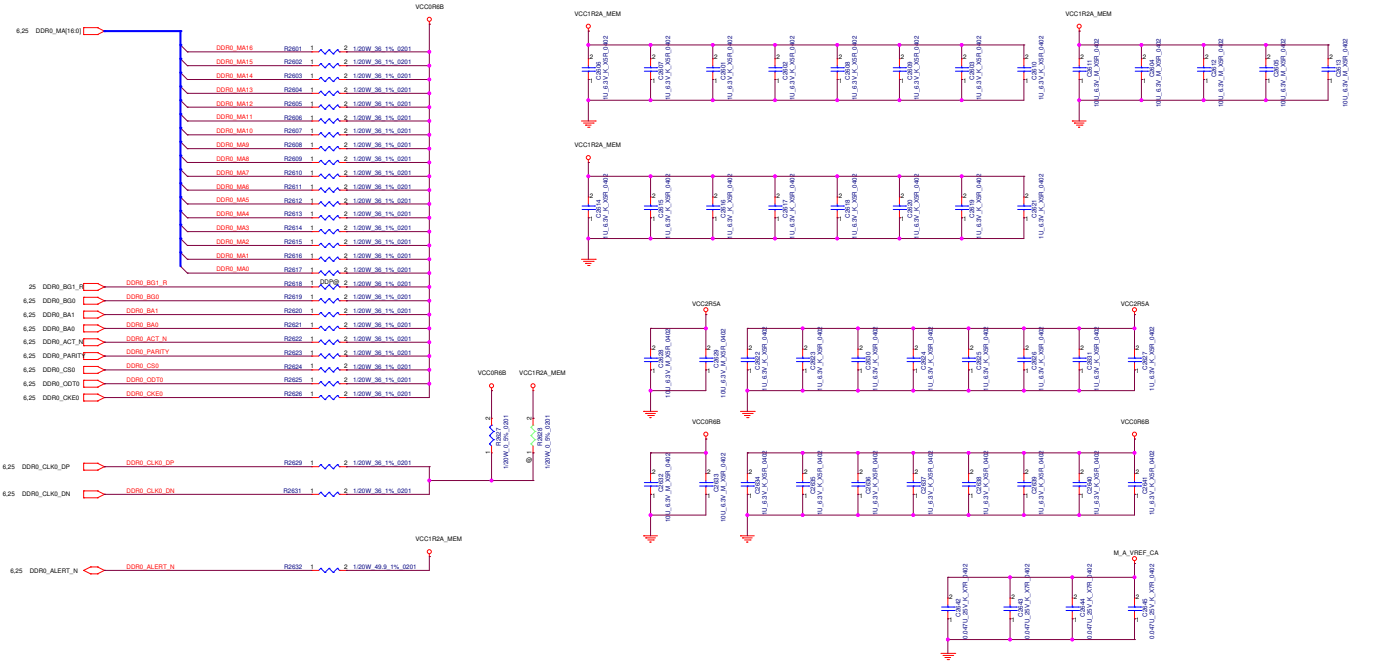
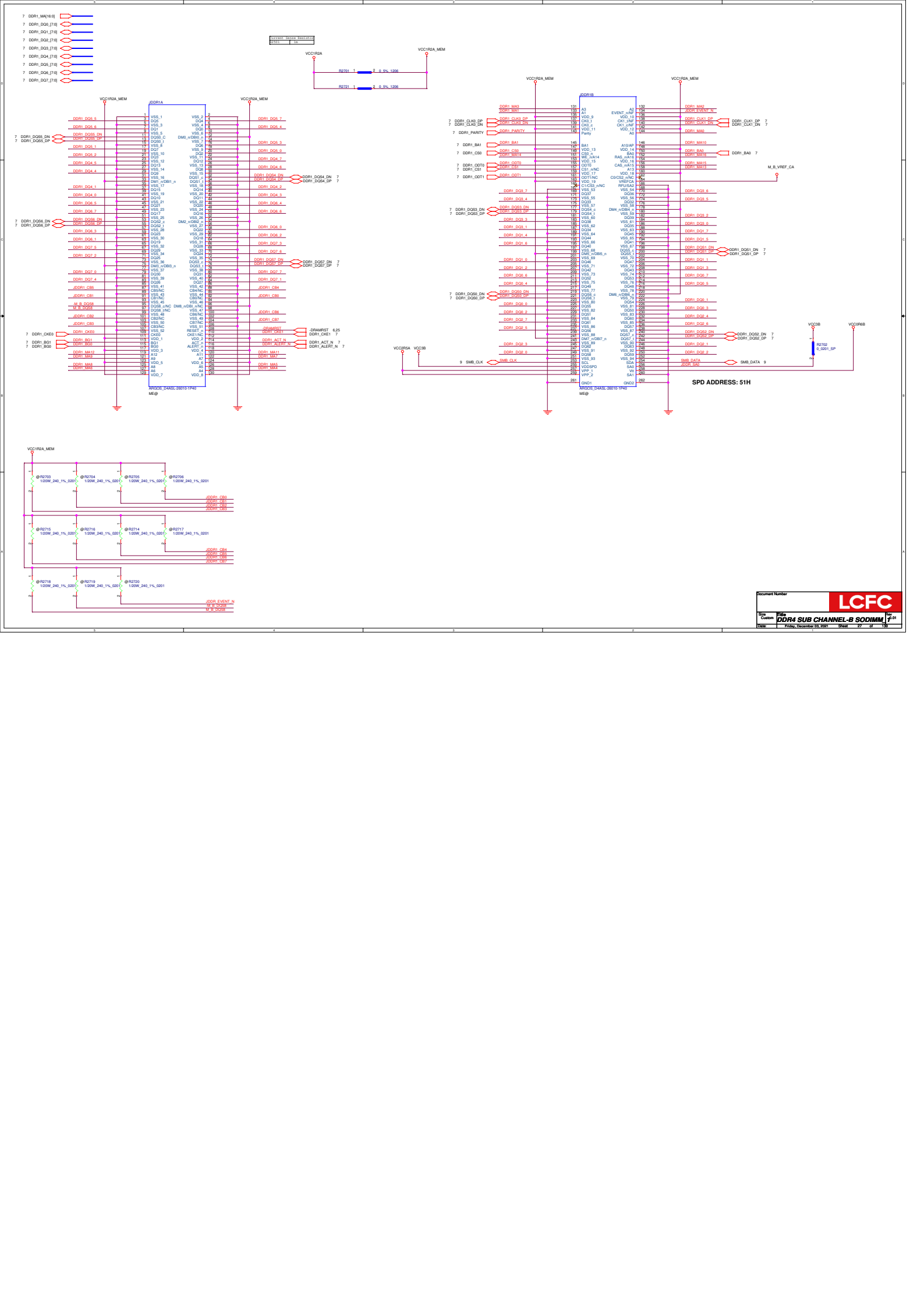
VCC1R2A	PDG	LCFC
1uF_0402	16	HW:16/PWR:0
10uF_0603	5	HW:5/PWR:0

VCC0R6B	PDG	LCFC
1uF_0402	8	HW:8/PWR:0
10uF_0603	2	HW:2/PWR:0

VCC2R5A	PDG	LCFC
1uF_0402	8	HW:8/PWR:0
10uF_0603	2	HW:2/PWR:0



Document Number		LCFC	
Size: Custom	Title: DDR4 SUB CHANNEL-A MD_2		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 25 of 130		


DDR1_MA[16:0]
DDR1_DQ0_[7:0]
DDR1_DQ1_[7:0]
DDR1_DQ2_[7:0]
DDR1_DQ3_[7:0]
DDR1_DQ4_[7:0]
DDR1_DQ5_[7:0]
DDR1_DQ6_[7:0]
DDR1_DQ7_[7:0]
Current Sense Resistor
R2701 1m
VCC1R2A
VCC1R2A_MEM
R2701 1 2 0_5%_1206
R2721 1 2 0_5%_1206
JDDR1A
JDDR1B
ARGOS_04ASL-26010-1P40
ME@
DDR1_DQS_5
DDR1_DQS_6
DDR1_DQS_4
DDR1_DQS_3
DDR1_DQS_0
DDR1_DQS_2
DDR1_DQS_7
DDR1_DQS_1
DDR1_DQS_DN
DDR1_DQS_DP
DDR1_DQS4_DN
DDR1_DQS4_DP
DDR1_DQS7_DN
DDR1_DQS7_DP
DDR1_DQS6_DN
DDR1_DQS6_DP
DDR1_DQS5_DN
DDR1_DQS5_DP
DDR1_DQS0_DN
DDR1_DQS0_DP
DDR1_DQS1_DN
DDR1_DQS1_DP
DDR1_DQS2_DN
DDR1_DQS2_DP
DDR1_DQS3_DN
DDR1_DQS3_DP
DDR1_DQ4_5
DDR1_DQ4_0
DDR1_DQ4_1
DDR1_DQ4_4
DDR1_DQ5_1
DDR1_DQ5_2
DDR1_DQ5_5
DDR1_DQ6_7
DDR1_DQ6_5
DDR1_DQ6_1
DDR1_DQ7_5
DDR1_DQ7_2
DDR1_DQ7_0
DDR1_DQ7_4
JDDR1_CB5
JDDR1_CB1
M_B_DQS8
M_B_DQS8
JDDR1_CB2
JDDR1_CB3
DDR1_CKE0
DDR1_BG1
DDR1_BG0
DDR1_MA12
DDR1_MA9
DDR1_MA8
DDR1_MA6
DDR1_DQ5_3
DDR1_DQ5_0
DDR1_DQ4_7
DDR1_DQ4_6
DDR1_DQ4_2
DDR1_DQ4_3
DDR1_DQ6_4
DDR1_DQ6_6
DDR1_DQ6_0
DDR1_DQ6_2
DDR1_DQ7_3
DDR1_DQ7_6
DDR1_DQ7_7
DDR1_DQ7_1
JDDR1_CB4
JDDR1_CB0
JDDR1_CB6
JDDR1_CB7
DRAMRST 6,25
DDR1_CKE1 7
DDR1_ACT_N 7
DDR1_ALERT_N 7
DDR1_MA11
DDR1_MA7
DDR1_MA5
DDR1_MA4
DDR1_MA[16:0]
DDR1_DQ[7:0]
DDR1_CLK0_DP
DDR1_CLK0_DN
DDR1_PARITY
DDR1_BA1
DDR1_CS0
DDR1_MA14
DDR1_ODT0
DDR1_CS1
DDR1_ODT1
DDR1_MA3
DDR1_MA1
DDR1_MA2
DDR1_EVENT_N
DDR1_CLK1_DP
DDR1_CLK1_DN
DDR1_MA0
DDR1_MA10
DDR1_BA0
DDR1_MA8
DDR1_MA15
DDR1_MA13
DDR1_BA0
M_B_VREF_CA
DDR1_DQ3_7
DDR1_DQ3_4
DDR1_DQ3_3
DDR1_DQ3_1
DDR1_DQ1_4
DDR1_DQ1_6
DDR1_DQ1_2
DDR1_DQ1_0
DDR1_DQ0_6
DDR1_DQ0_4
DDR1_DQ0_0
DDR1_DQ0_2
DDR1_DQ0_5
DDR1_DQ0_3
DDR1_DQ0_1
DDR1_DQ2_7
DDR1_DQ2_5
DDR1_DQ2_4
DDR1_DQ2_6
DDR1_DQ2_1
DDR1_DQ2_2
DDR1_DQ3_6
DDR1_DQ3_5
DDR1_DQ3_2
DDR1_DQ3_0
DDR1_DQ1_7
DDR1_DQ1_5
DDR1_DQ1_1
DDR1_DQ0_7
DDR1_DQ0_5
DDR1_DQ0_1
DDR1_DQ0_3
DDR1_DQ2_3
DDR1_DQ2_0
SMB_CLK
SMB_DATA
JDDR_SAU
VCC3R5A
VCC3B
VCC0R6B
R2702 0_0201_5P
SPD ADDRESS: 51H
R2703 1/20W_240_1%_0201
R2704 1/20W_240_1%_0201
R2705 1/20W_240_1%_0201
R2706 1/20W_240_1%_0201
R2715 1/20W_240_1%_0201
R2716 1/20W_240_1%_0201
R2714 1/20W_240_1%_0201
R2717 1/20W_240_1%_0201
R2718 1/20W_240_1%_0201
R2719 1/20W_240_1%_0201
R2720 1/20W_240_1%_0201
JDDR_EVENT_N
M_B_DQS8
M_B_DQS8
Document Number
LCFC
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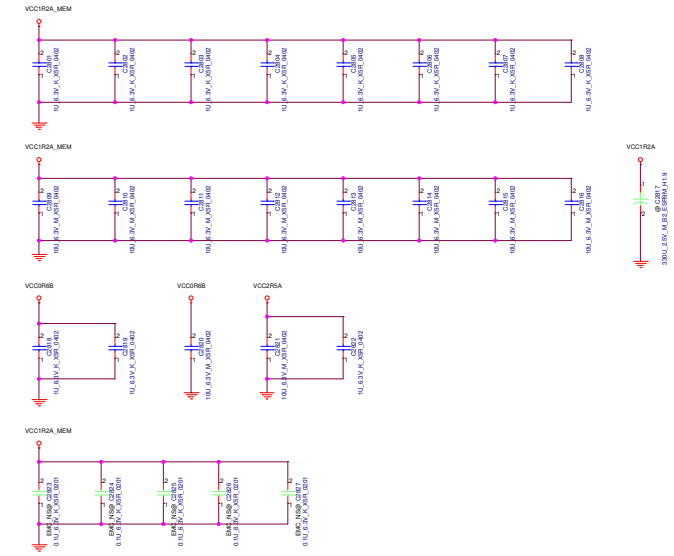
VCC1R2A	PDG	LCFC
1uF_0402	8	HW:8/PWR:0
10uF_0603	8	HW:8/PWR:0
330uF_B2	1	HW:0/PWR:0

JDDR1.255	PDG	LCFC
0.1uF_0402	1	HW:1/PWR:0
2.2uF_0402	1	HW:1/PWR:0

VCC0R6B	PDG	LCFC
1uF_0402	2	HW:2/PWR:0
10uF_0603	1	HW:1/PWR:0

VCC2R5A	PDG	LCFC
1uF_0402	1	HW:1/PWR:0
10uF_0603	1	HW:1/PWR:0



Document Number		LCFC	
Size: Custom	Title: DDR4 SUB CHANNEL-B SODIMM		Rev: 01
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Document Number

LCFC

Size	Title	Rev
Custom	029_BLANK	0.01
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Document Number		LCFC
Size: Custom	Title: 030_GN20-S5 OVR-M	Rev: 0.01
Date: Friday, December 03, 2021	Sheet 30 of 130	

Netname	
SH_IN_N1/P1	Monitor NVVDD
SH_IN_N2/P2	Monitor FBVDD

OVR-M GEN1

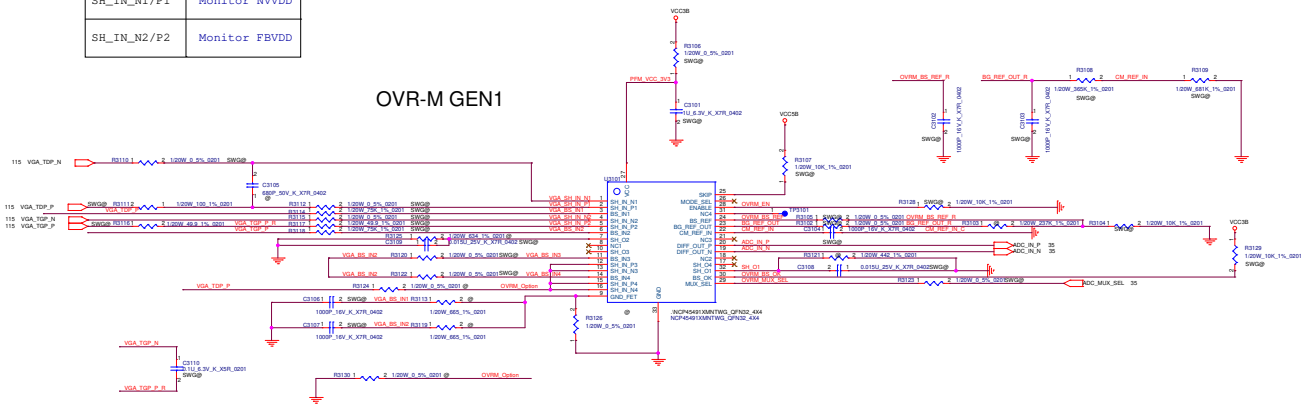
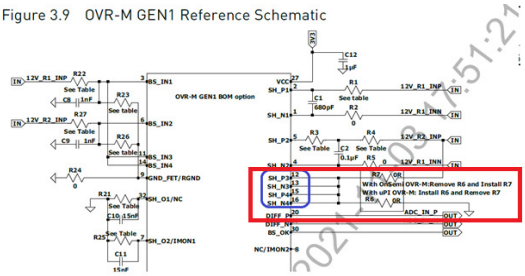
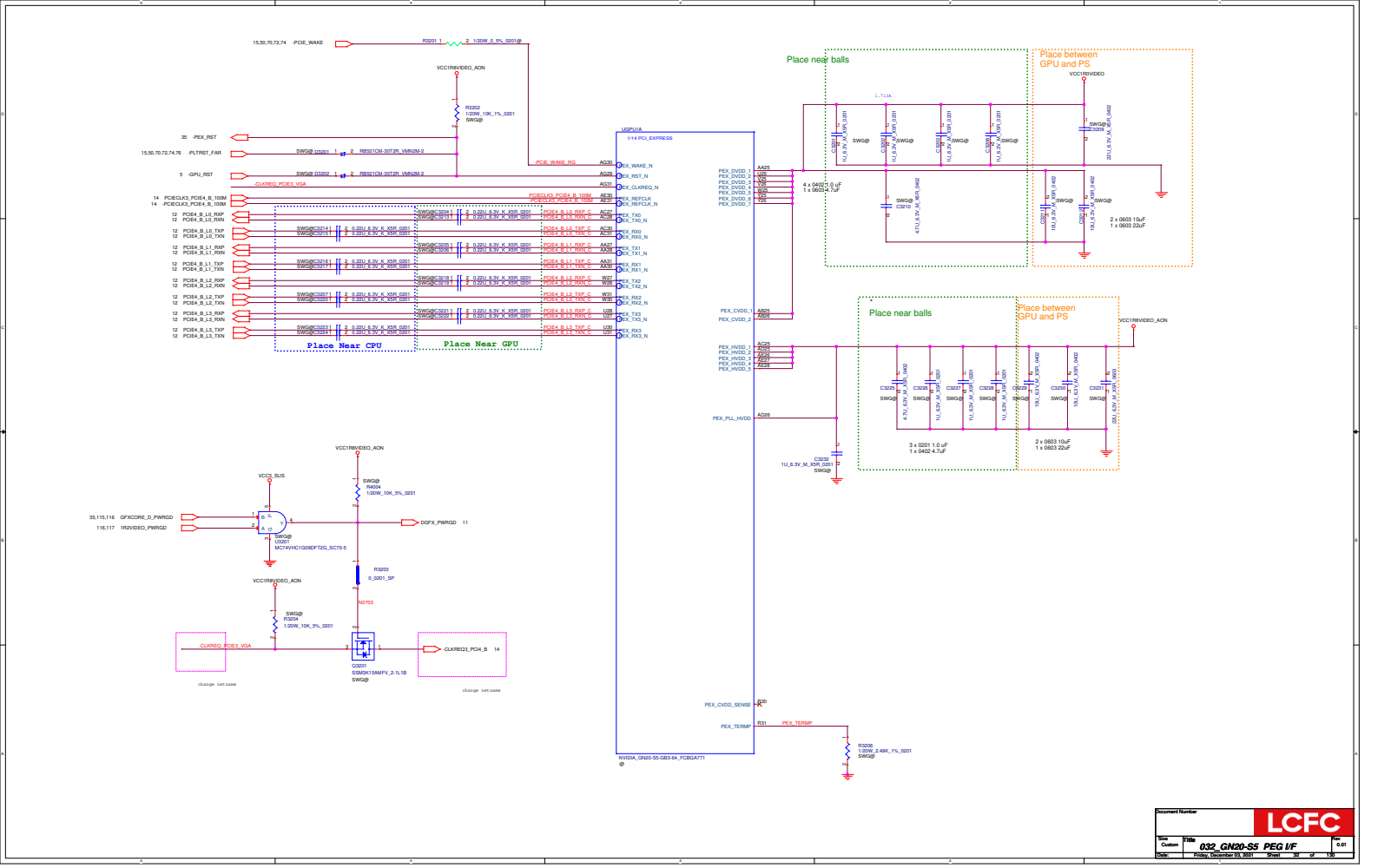


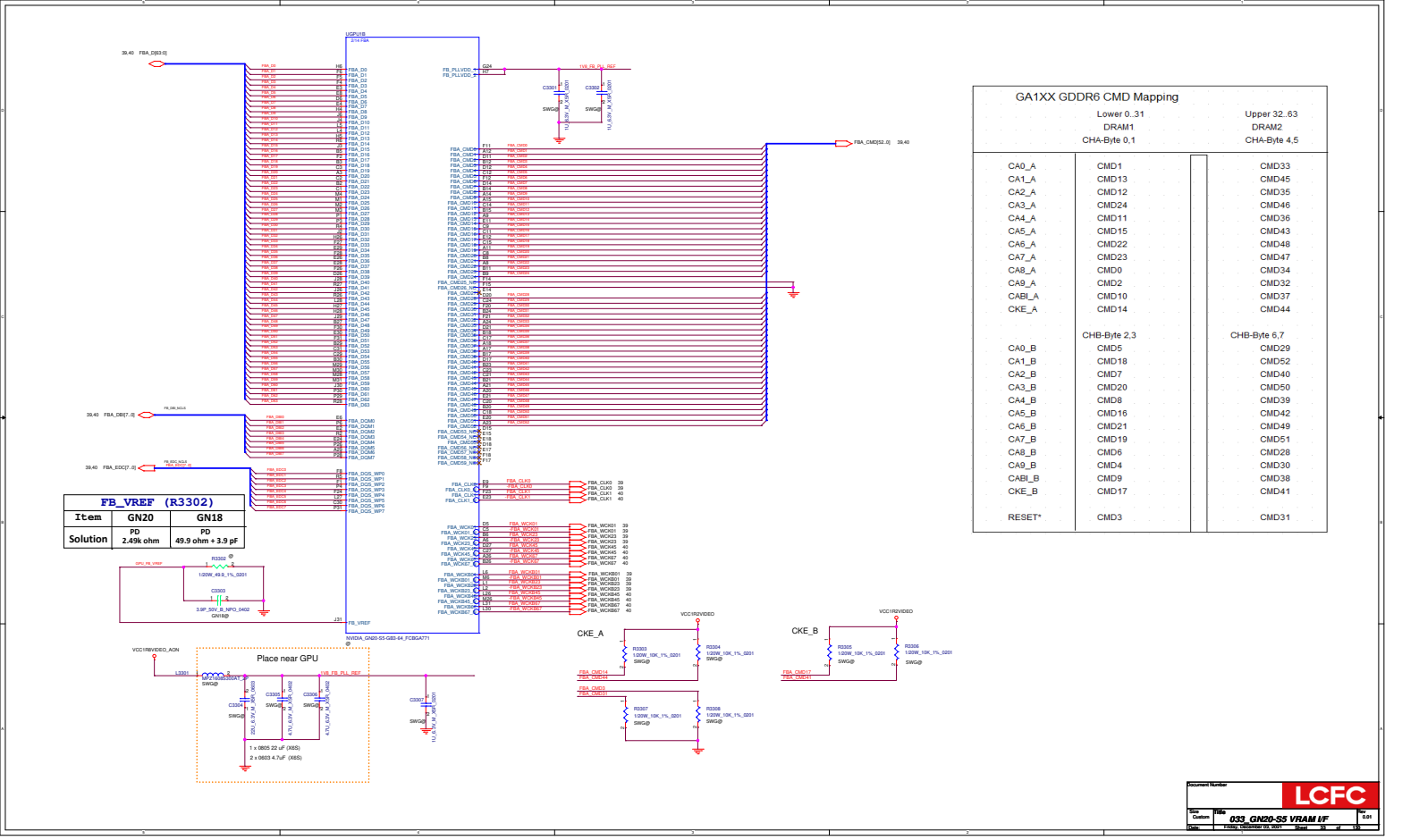
Figure 3.9 OVR-M GEN1 Reference Schematic



	OnSemi	UPI
R3121	442 Ω	332 Ω
R3125	634 Ω	475 Ω
R3113/R3119	665 Ω	499 Ω
R3103	237 KΩ	316 KΩ



Document Number			LCFC
Size: Custom	Title: 032_GN20-S5 PEG I/F		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 32 of 130		



FB_VREF (R3302)

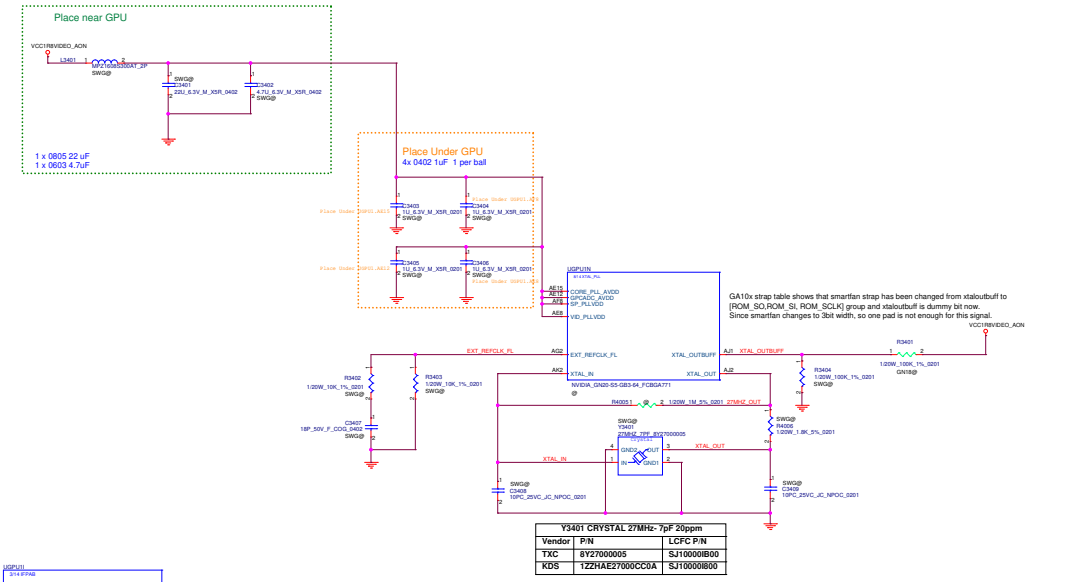
Item	GN20	GN18
Solution	PD 2.49k ohm	PD 49.9 ohm + 3.9 pF

GA1XX GDDR6 CMD Mapping

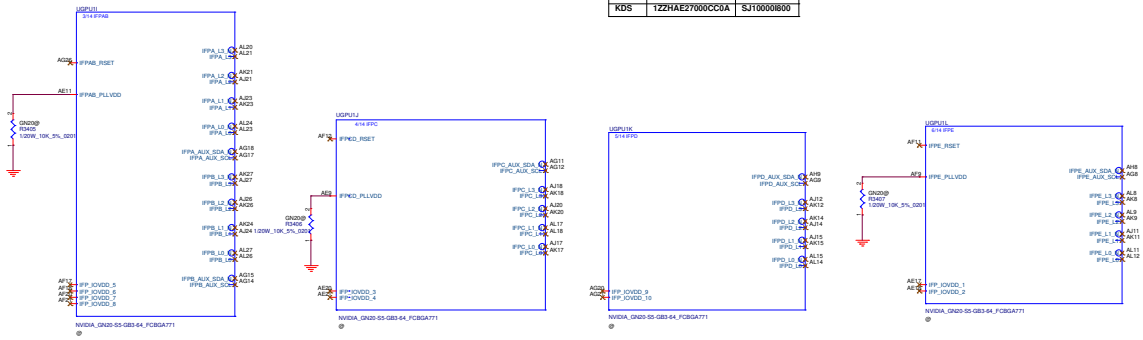
	Lower 0..31 DRAM1 CHA-Byte 0,1	Upper 32..63 DRAM2 CHA-Byte 4,5
CA0_A	CMD1	CMD33
CA1_A	CMD13	CMD45
CA2_A	CMD12	CMD35
CA3_A	CMD24	CMD46
CA4_A	CMD11	CMD36
CA5_A	CMD15	CMD43
CA6_A	CMD22	CMD48
CA7_A	CMD23	CMD47
CA8_A	CMD0	CMD34
CA9_A	CMD2	CMD32
CABI_A	CMD10	CMD37
CKE_A	CMD14	CMD44
	CHB-Byte 2,3	CHB-Byte 6,7
CA0_B	CMD5	CMD29
CA1_B	CMD18	CMD52
CA2_B	CMD7	CMD40
CA3_B	CMD20	CMD50
CA4_B	CMD8	CMD39
CA5_B	CMD16	CMD42
CA6_B	CMD21	CMD49
CA7_B	CMD19	CMD51
CA8_B	CMD6	CMD28
CA9_B	CMD4	CMD30
CABI_B	CMD9	CMD38
CKE_B	CMD17	CMD41
RESET*	CMD3	CMD31

Document Number: LCFC

Size	Title	Rev
Custom	033_GN20-S5 VRAM I/F	0.01
Date: Friday, December 03, 2021	Sheet 33 of 135	



Y3401 CRYSTAL 27MHz- 7pF 20ppm		
Vendor	P/N	LCFC P/N
TXC	8Y27000005	SJ10000IB00
KDS	1ZZHAE27000CC0A	SJ10000IB00



Document Number		LCFC	
Size: Custom	Title: 034_GN20-S5 DIGITA / XTAL		Rev: 0.01
Date: Wednesday, December 08, 2021	Sheet 34 of 130		

C

	GPU_GPIO26
GN20	-ROM_WP
GN18	FUSE_1V8_EN

Gpio Pin Name	G83-64 GPIO Name	G83B-64 GPIO Name
GPIO0	NVVDD_PWM_VID	NVVDD_PWM_VID
GPIO1	GC6_FB_EN	GC6_FB_EN
GPIO2	UNUSED	UNUSED
GPIO3	DISP_MUX_CNTL	DISP_MUX_CNTL
GPIO4	NVVDD_EN	NVVDD_EN
GPIO5	FRAME_LOCK*	FRAME_LOCK*
GPIO6	NVVDD_PSI*	NVVDD_PSI*
GPIO7	LCD_BL_PWM	LCD_BL_PWM
GPIO8	MEM_VDD_CTL	MEM_VDD_CTL
GPIO9	THERM_ALERT*	THERM_ALERT*
GPIO10	MEM_VREF_CTL	MEM_VREF_CTL
GPIO11	LCD_VDD	LCD_VDD
GPIO12	PWR_LEVEL	PWR_LEVEL
GPIO13	IGPU_BL_EN	IGPU_BL_EN
GPIO14	HPD_IFPA*	HPD_IFPA*
GPIO15	HPD_IFPB*	HPD_IFPB*
GPIO16	DISP_MUX_PWM_CNTL	DISP_MUX_PWM_CNTL
GPIO17	HPD_IFPC*	HPD_IFPC*
GPIO18	HPD_IFPE*	HPD_IFPE*
GPIO19	3D VISION/STEREO	3D VISION/STEREO
GPIO20	UNUSED	UNUSED
GPIO21	LCD_BLEN	LCD_BLEN
GPIO22	ADC_MUX_SEL	ADC_MUX_SEL
GPIO23	UNUSED	UNUSED
GPIO24	RESERVED	RESERVED
GPIO25	FBVDD_PSI*	FBVDD_PSI*
GPIO26	ROM_WP*	FP_FUSE
GPIO27	HPD_IFPC*	HPD_IFPC*
GPIO28	RESERVED	RESERVED
GPIO29	RESERVED	RESERVED
GPIO30	RESERVED	RESERVED
GPIO31	UNUSED	UNUSED
GPIO32	UNUSED	UNUSED
GPIO33	UNUSED	UNUSED
GPIO34	UNUSED	UNUSED
GPIO35	UNUSED	UNUSED

D3504,D3505 change SCS0000A500 to SCS0000AW00
(because SCS0000AW00 has no footprint)

Delay core power disable for around 100us to make sure PCIE power drop earlier than core power.

PEX VDD Enable

NVVDD Enable

Document Number			LCFC
Size: Custom	Title: 035_GN20-S5 GPIO		Rev: 0.01
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Table 9.5 SMB ALT_ADDR, DEVID_SEL, PCIE_CFG, VGA_DEVICE

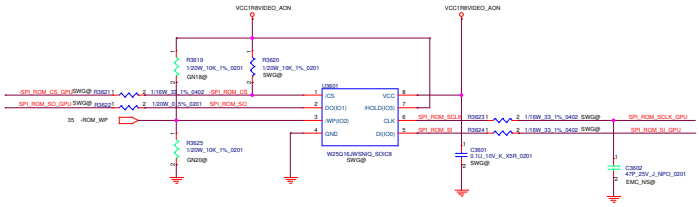
Strap Pins See Note			Functions Selected by This Strapping			
STRAP5	STRAP4	STRAP3	SMB_ALT_ADDR	DEVID_SEL	PCIE_CFG	VGA_DEVICE
L	L	L	0	0	0	0
L	L	H	0	0	0	1
L	H	L	0	0	1	0
L	H	H	0	0	1	1
H	L	L	0	1	0	0
H	L	H	0	1	0	1
H	H	L	0	1	1	0
H	H	H	0	1	1	1
L	L	M	1	0	0	0
L	M	L	1	0	0	1
L	M	H	1	0	1	0
L	H	M	1	0	1	1
M	L	L	1	1	0	0
M	L	H	1	1	0	1
M	H	L	1	1	1	0
M	H	H	1	1	1	1

1:SMB_ALT_ADDR ENABLE
0:SMB_ALT_ADDR DISABLE

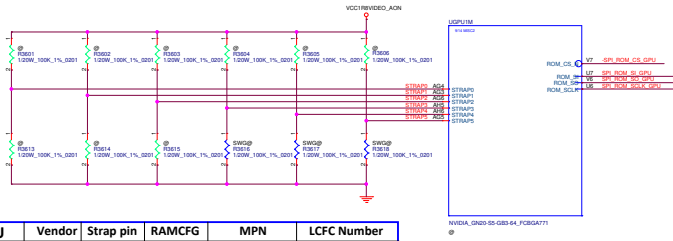
1:DEVID_SEL REBRAND
0:DEVID_SEL ORIGINAL

1:PCIE_CFG LOW POWER
0:PCIE_CFG HIGH POWER

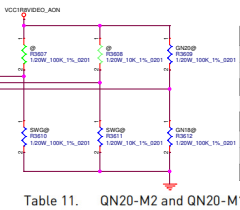
1:VGA_DEVICE ENABLE
0:VGA_DEVICE DISABLE



Provide VIA at ROM_SO close to GPU at bottom



GPU	Vendor	Strap pin	RAMCFG	MPN	LCFC Number
GN18-S5 GN20-S5	Samsung	0x0	000	K4Z80325BC-HC14	SA00009L410
	Hynix	0x2	010	H56C8H24AIR-S2C	SA0000B4E00
	Hynix	0x5	101	H56G32CS4DX005	SA0000C8K00
QN20	Samsung	0x9		K4ZAF325BM-HC14	SA00009QV20
	Hynix	TBD	TBD	TBD	TBD



Failsafe Over-Temperature Protection Strap (GB3-64/GN20-S5)				
	Strap Pins			FS_OVERT* Function
Result	ROM_SO	ROM_SI	ROM_SCLK	
Pass	L	L	H	FS_OVERT* Function ENABLE

Failsafe Over-Temperature Protection Strap (GB3B-64/GN18-S5)				
	Strap Pins			FS_OVERT* Function
Result	ROM_SO	ROM_SI	ROM_SCLK	
Pass	L	L	L	FS_OVERT* Function ENABLE

Table 11. QN20-M2 and QN20-M1-R GDDR6 Recommended Memories

Memory Density	Allowed Memory Configuration	FBVDD/Q	Vendor	Manufacturer Part Number	Die Revision	Strap	Memory Speed Grade	Date Code Alert	Qual Plan	Status	Supported GPU Milestone
16 Gb	2Chx512Mx16	1.35V 1.25V 1.2V [1]	Samsung	K4ZAF325BM-HC14	M-die	0x9	14 Gbps	2028	Full	Production candidate	ES or later
				TBD (new 1znm)	C-die	0xA	16 Gbps	N/A	Full	Post-production	TBD

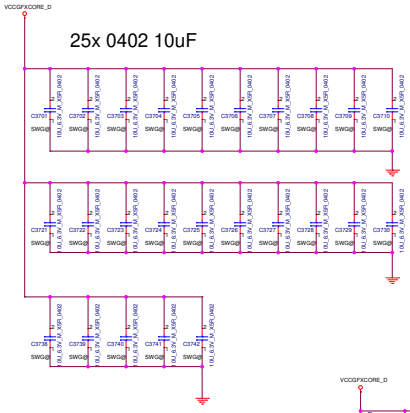
Table 5. GN20-S5 and GN18-S5 GDDR6 Recommended Memories

Memory Density	Allowed Memory Configuration	FBVDD/Q	Vendor	Manufacturer Part Number	Die Revision	Strap	Memory Speed Grade	Date Code Alert	Qual Plan	Status	Supported GPU Milestone
8 Gb	2Chx256Mx16	1.35V 1.25V 1.2V [1]	Samsung	K4Z80325BC-HC14	C-die	0x0	14 Gbps	2001	Full	Production candidate	ES or later
			Hynix	H56C8H24AIR-S2C	A-die	0x2	14 Gbps	N/A	Full	Production candidate	QS or later
			Hynix	H56G32CS4DX005	C-die	0x5	16 Gbps	N/A	Full	Production candidate	PS or later

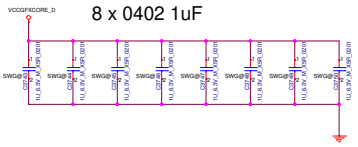
Notes:
[1] Refer to GN20-S and GN18-S GeForce GPU Product Spec for memory voltages and clocks.
For GN20-S5 and GN18-S5, the maximum allowable memory case temperature is 95 °C.

Table 9.3 RAMCFG

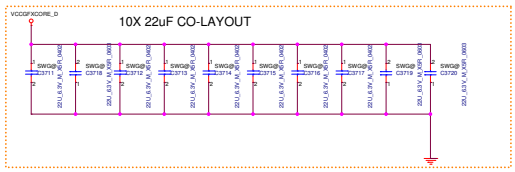
Strap Pins see Note			RAMCFG Setting Number
STRAP2	STRAP1	STRAP0	(see Memory RVL for memory configs corresponding to these numbers)
L	L	L	0 (0x0000)
L	L	H	1 (0x0001)
L	H	L	2 (0x0002)
L	H	H	3 (0x0003)
H	L	L	4 (0x0004)
H	L	H	5 (0x0005)
H	H	L	6 (0x0006)
H	H	H	7 (0x0007)
L	L	M	8 (0x0008)
L	M	L	9 (0x0009)



Under GPU



NVVDD



Near GPU

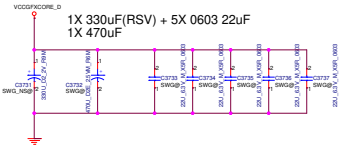
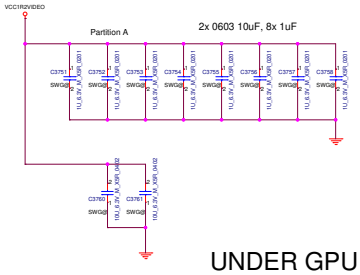


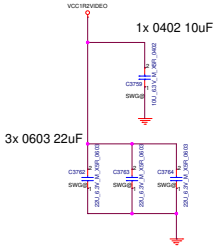
Table 3.11 GB3-64, GB3B-64 Power Rail Filtering

Rail (GPU Ball Name)	Balls	Voltage	Filtering under GPU			Filtering near GPU		
			Footprint	BOM[1]	Value[2]	Footprint	BOM[1]	Value[2]
NVVDD + MSVDD (merged)	113	Varies	8 25	8 25	1uF 10uF	20 3	15 2	22uF 330uF



UNDER GPU

FBVDD



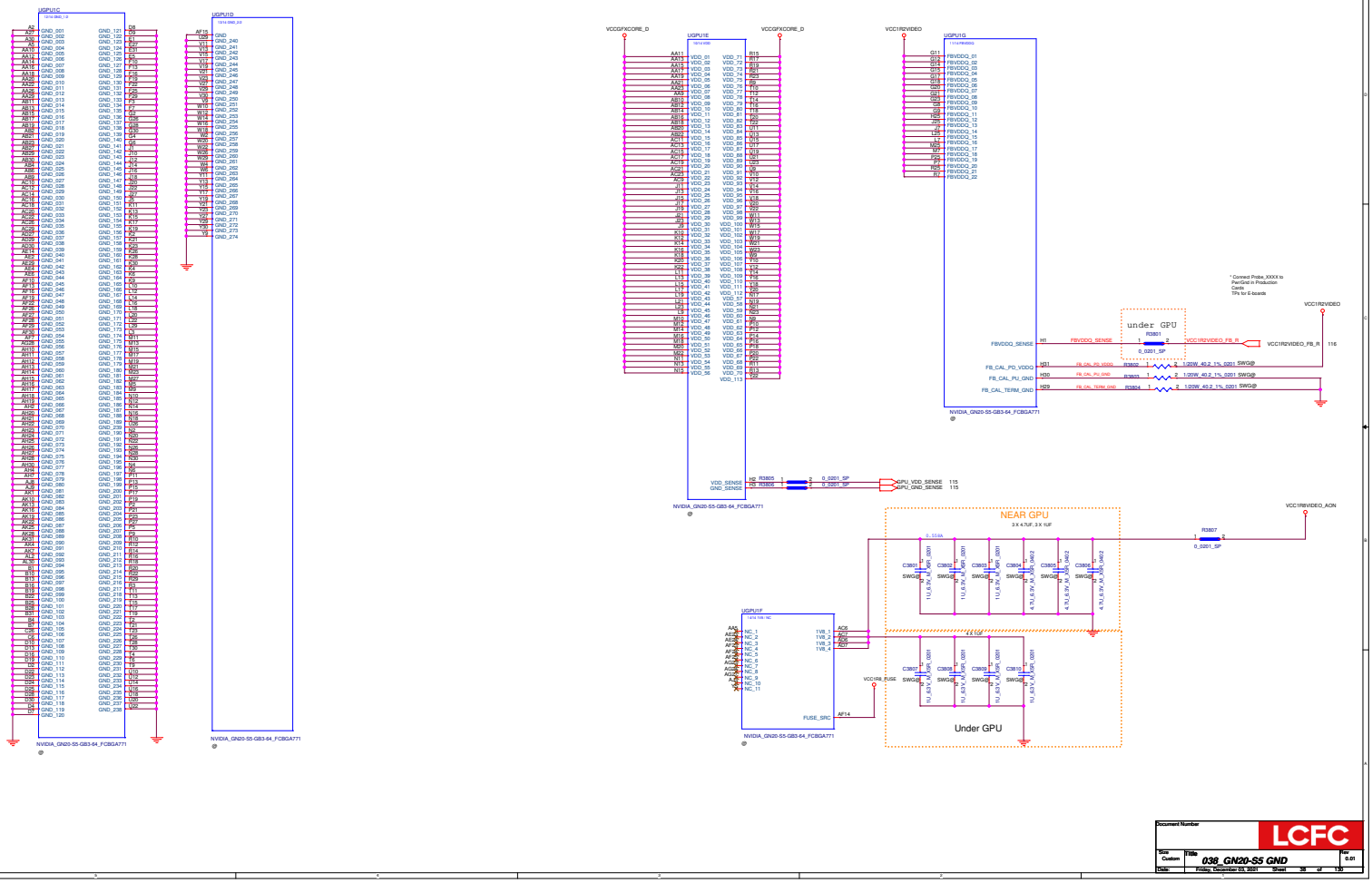
Close GPU

Table 3.11 GB3-64, GB3B-64 Power Rail Filtering

Rail (GPU Ball Name)	Balls	Voltage	Filtering under GPU			Filtering near GPU		
			Footprint	BOM[1]	Value[2]	Footprint	BOM[1]	Value[2]
FBVDDQ (GPU side)[1,3]	22	1.20V / 1.25V / 1.35V	8 2	8 2	1uF 10uF	1 3	1 3	10uF 22uF

LCFC

037_GN20-S5 NVVDD & GFXCORE CAP



Document Number			LCFC
Size: Custom	Title: 038_GN20-S5 GND		Rev: 0.01
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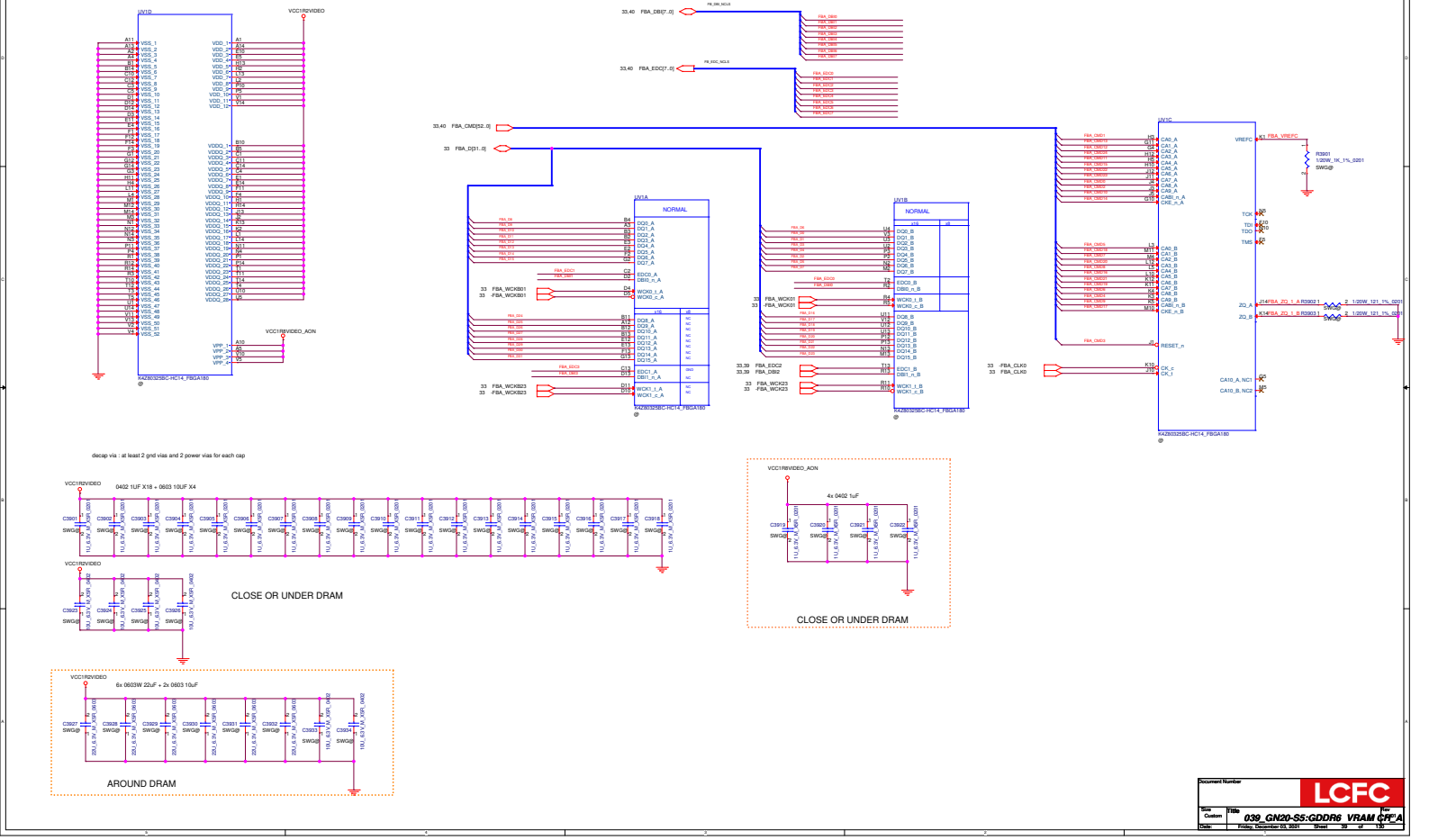
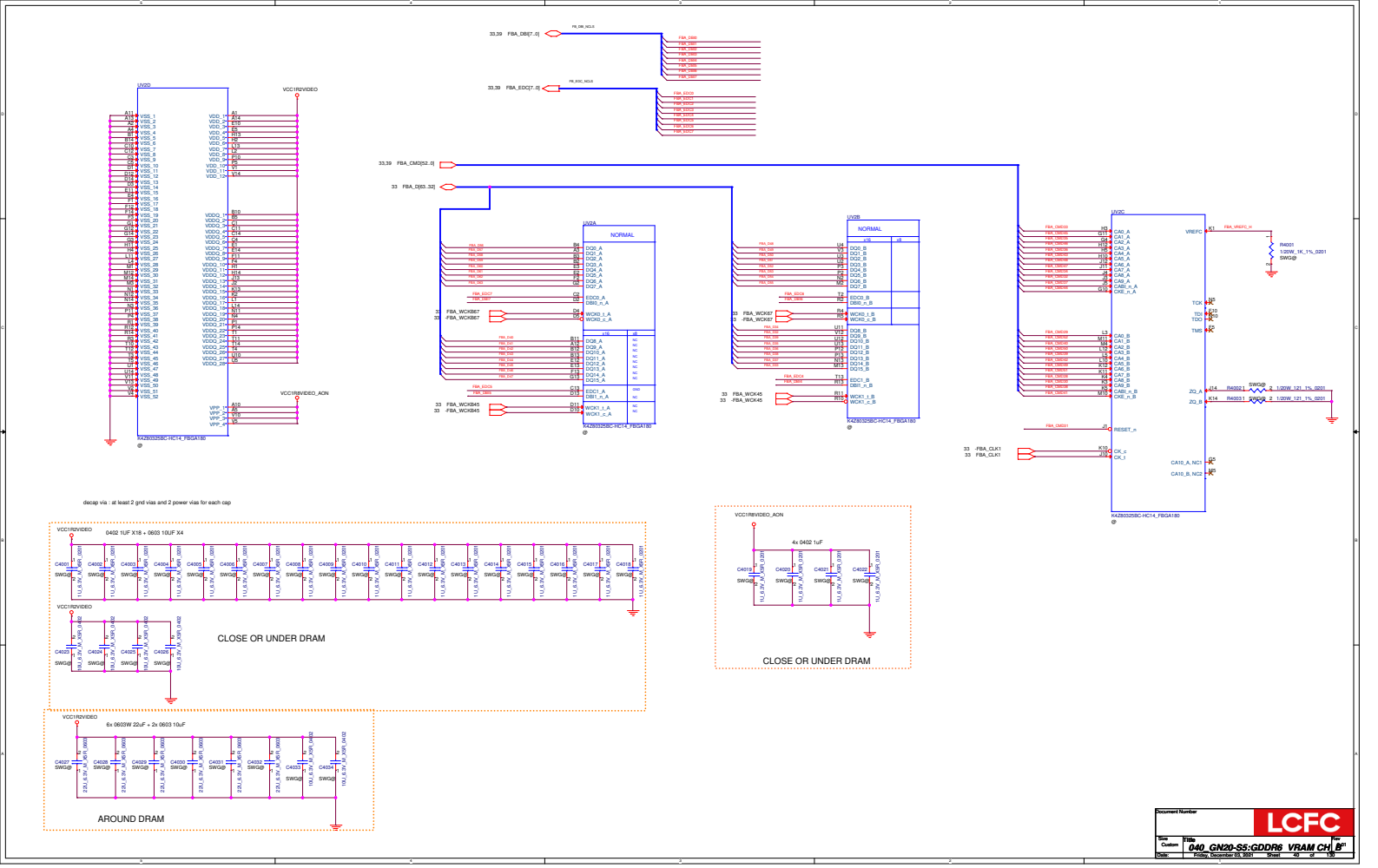


decap via : at least 2 gnd vias and 2 power vias for each cap

Document Number			LCFC
Size: Custom	Title: 039_GN20-S5:GDDR6 VRAM CH_A		Rev: A
Date: Friday, December 03, 2021	Sheet 39 of 139		



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Date: Friday, December 03, 2021	Sheet 45 of 139		

Document Number

LCFC

Size	Title	Rev
Custom	041_BLANK	0.01
Date: Friday, December 03, 2021	Sheet 41 of 130	

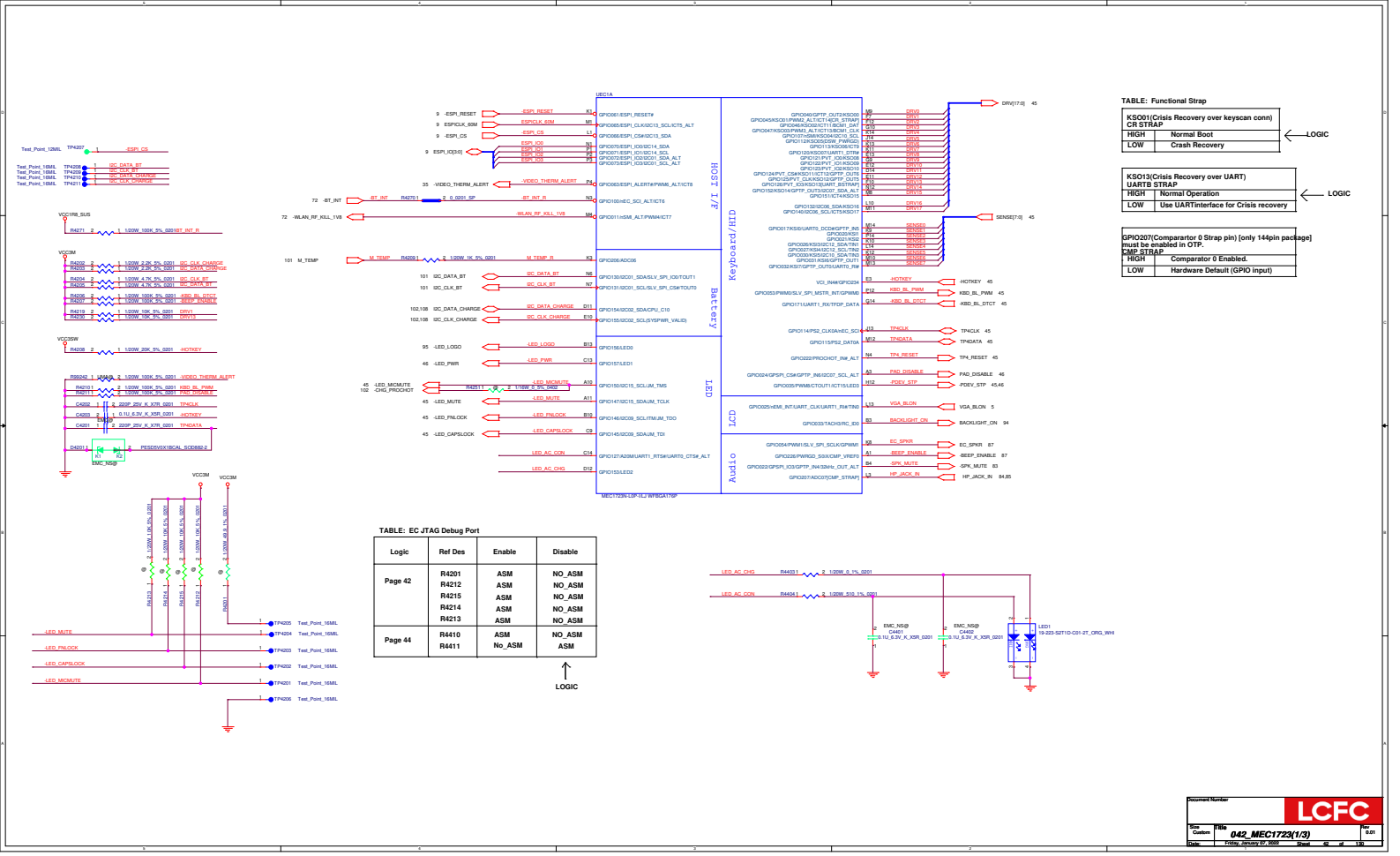

TABLE: EC JTAG Debug Port

Logic	Ref Des	Enable	Disable
Page 42	R4201	ASM	NO_ASM
	R4212	ASM	NO_ASM
	R4215	ASM	NO_ASM
	R4214	ASM	NO_ASM
	R4213	ASM	NO_ASM
Page 44	R4410	ASM	NO_ASM
	R4411	No_ASM	ASM

LOGIC

TABLE: Functional Strap

KSO01(Crisis Recovery over keyscan conn) CR STRAP	
HIGH	Normal Boot
LOW	Crash Recovery

LOGIC

KSO13(Crisis Recovery over UART) UARTB STRAP	
HIGH	Normal Operation
LOW	Use UARTinterface for Crisis recovery

LOGIC

GPIO207(Comparartor 0 Strap pin) [only 144pin package] must be enabled in OTP. CMP STRAP	
HIGH	Comparator 0 Enabled.
LOW	Hardware Default (GPIO input)

Document Number			Rev
		LCFC	0.01
Size: Custom	Title: 042_MEC1723(1/3)		
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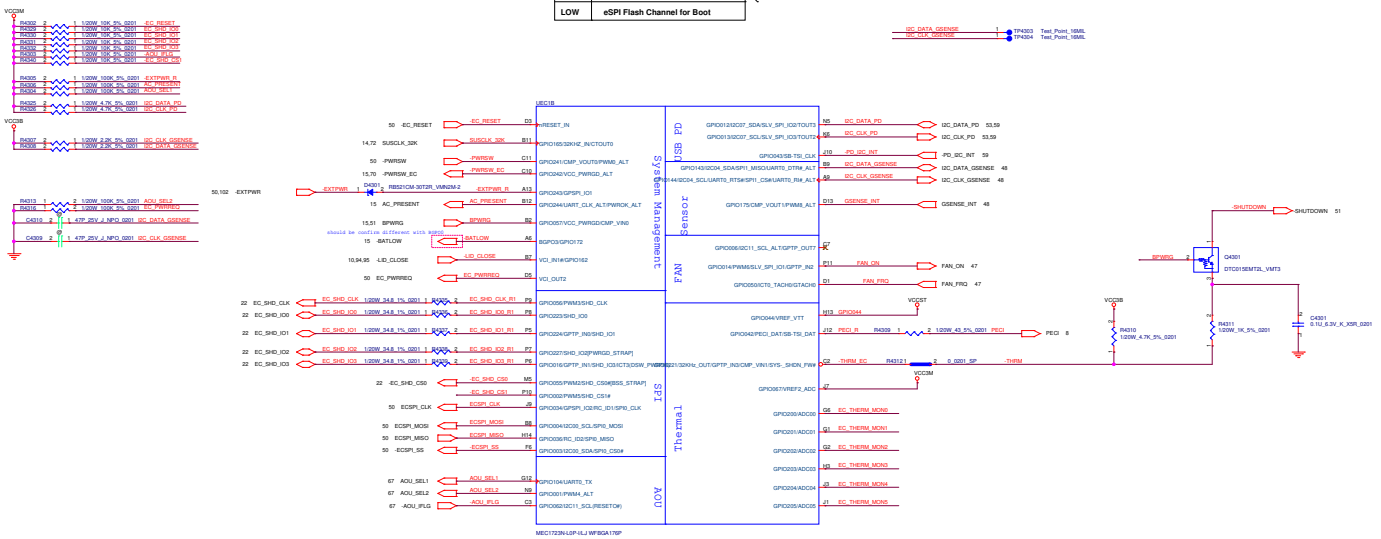
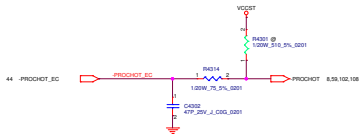
TABLE : Functional Strap

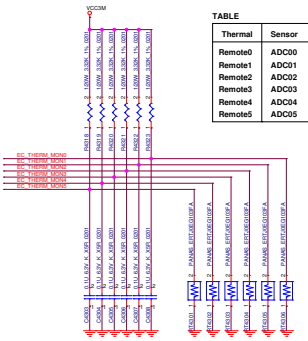
GPIO055 (Boot Source Select Starp)	
HIGH	Shared SPI pins for Boot
LOW	eSPI Flash Channel for Boot

LOGIC

GPIO227 (PWRGD Starp)







PLACE NEAR MEC1503

TABLE

Thermal	Sensor	Device	Placed on
Remote0	ADC00	FAN FIN	BOT RT4306
Remote1	ADC01	GPU VRAM	BOT RT4305
Remote2	ADC02	DIMM	TOP RT4304
Remote3	ADC03	CPU CORE	BOT RT4303
Remote4	ADC04	SSD	BOT RT4302
Remote5	ADC05	Ambient	BOT RT4301

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Size Custom | File 043_MEC1723(2/3) | Rev 0.01
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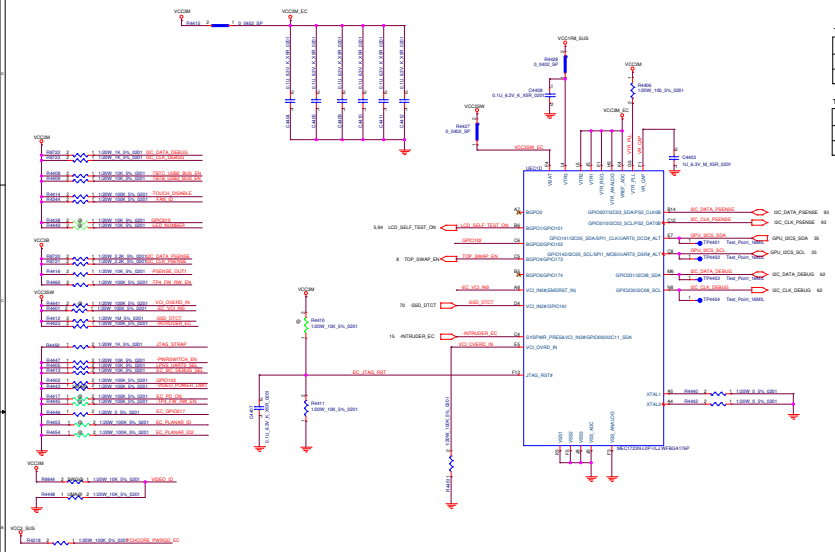
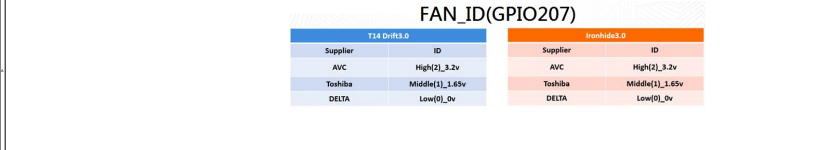


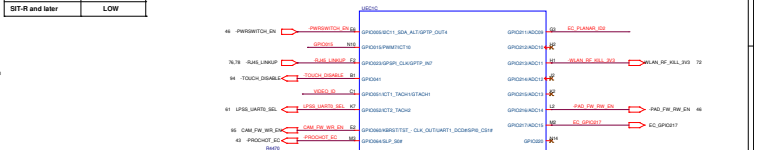
TABLE:EC PLANAR ID (GPIO111)

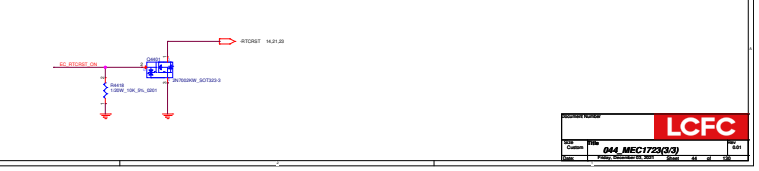
LEVEL	EC_PLANAR_ID
EVT,FVT	HIGH
SIT,and later	LOW

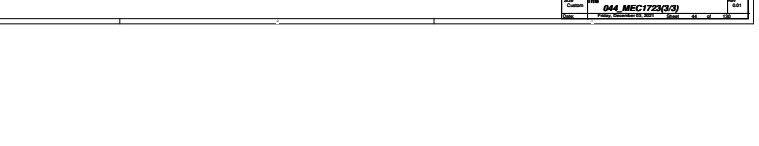
TABLE:EC PLANAR ID2 (GPIO211)

LEVEL	EC_PLANAR_ID2
EVT~SIT	HIGH
SIT-R and later	LOW





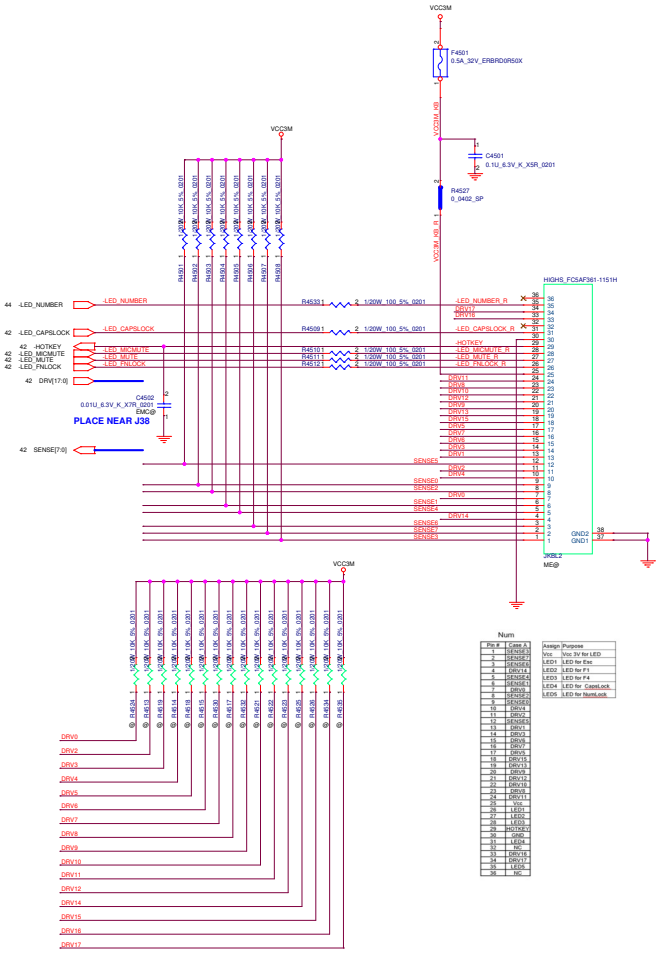




FAN_ID(GPIO207)

T14 Drift3.0	
Supplier	ID
AVC	High(2)_3.2v
Toshiba	Middle(1)_1.65v
DELTA	Low(0)_0v

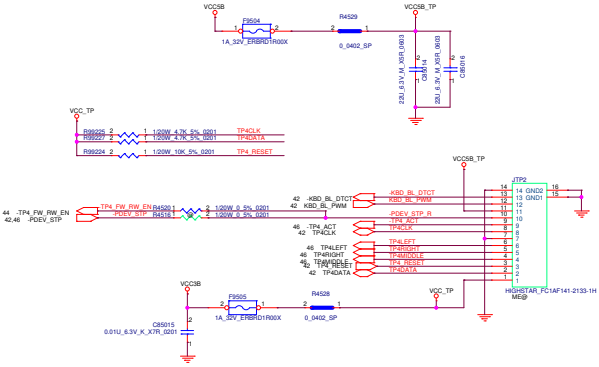
Ironhide3.0	
Supplier	ID
AVC	High(2)_3.2v
Toshiba	Middle(1)_1.65v
DELTA	Low(0)_0v



Num

Pin #	Case A
1	SENSE3
2	SENSE7
3	SENSE6
4	DRV14
5	SENSE4
6	SENSE1
7	DRV0
8	SENSE0
9	DRV1
10	KBV4
11	DRV2
12	SENSE5
13	DRV13
14	DRV3
15	DRV4
16	DRV7
17	DRV5
18	DRV15
19	DRV12
20	DRV11
21	DRV10
22	DRV8
23	DRV9
24	DRV11
25	Y26
26	LED1
27	LED2
28	LED3
29	HOTKEY
30	LED4
31	NC
32	NC
33	DRV16
34	DRV17
35	LED5
36	NC

Assign Purpose
Vcc Vcc 3V for LED
LED1 LED for Esc
LED2 LED for F1
LED3 LED for F4
LED4 LED for CapsLock
LED5 LED for NumLock



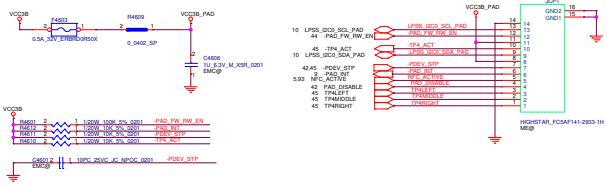
TrackPoint Cable Pin assignment

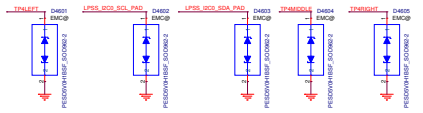
Pin #	Assign
1	VCC (3.3V)
2	IPD DATA
3	IPD RST
4	MIDDLE
5	RIGHT
6	LEFT
7	IPD GND
8	IPD CLK
9	-TP4_ACT
10	-TP4_FW_RW_EN
11	LED VCC5 (5V)
12	LED PWM
13	Backlight detection
14	LED GND

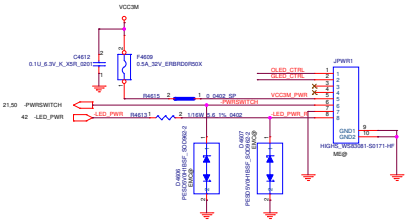
Document Number: LCFC

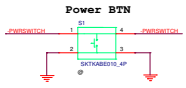
Size: Custom | Title: 045_KEYBOARD & TRACK POINT | Rev:

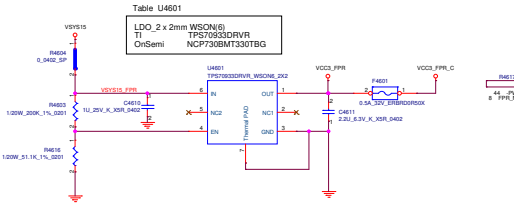
Date: Friday, December 03, 2021 | Sheet 45 of 130









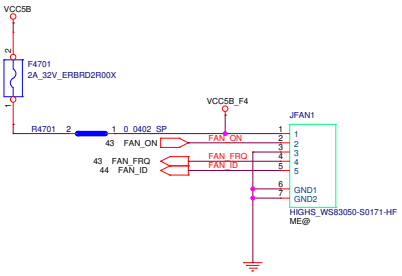


5/20 change pin define for click pad spec change

Connector to planer

Name	Pin#	Type	Function
GND	1	Power	Signal Ground
I2C_CLK	2	IN/OUT	I2C Clock to System I2C I/F on CPU/PCH
-PAD_FW_RW_EN	3	IN	Enable FW update.
VDDIO	4	Power	IO power.
-TP4_ACT	5	IN	TrackPoint Activity status. Please refer to “4.2.8”
I2C_DAT	6	IN/OUT	I2C Data to System I2C I/F on CPU/PCH
V_{DD}	7	Power	Supply power from system. Power is not supplied when system is in S3, S4, S5 and G5 state. (Refer to electrical requirement)
- PDEV_STP	8	IN	This signal is used to disable to report button status and finger status to system when system LCD lid is closed or is in Tent /Stand /Tablet modes (Yoga case). Please refer to “4.2.6-PDEV_STP”
-I2C_INT	9	OUT	Interrupt for I2C communication
NFC_Active	10	IN	This signal should use if NFC Antenna is implemented under touch pad PCBA. This signal should be NC or not be used in touch pad PCBA if NFC antenna is not implemented under touch pad PCBA. Please refer to “4.2.7 NFC_Active”
PAD_DISABLE	11	IN	This signal is used to disable touch pad. Please refer to “4.2.5 PAD_DISABLE”.
TP4LEFT	12	OUT	TrackPoint button signal
TP4MIDDLE	13	OUT	TrackPoint button signal
TP4RIGHT	14	OUT	TrackPoint button signal

Document Number			LCFC
Size: Custom	Title: 046_TOUCH PAD/FPR POINT/PWR BTN		Rev:
Date: Friday, December 04, 2020	Sheet 48 of 139		



Document Number		LCFC
Size: Custom	Title: 047_FAN CONNECTOR	Rev: 0.01
Date: Friday, December 03, 2021	Sheet 47 of 130	

TABLE : G-Sensor Power

HDD Support	VCC3M
SSD Only	VCC3B

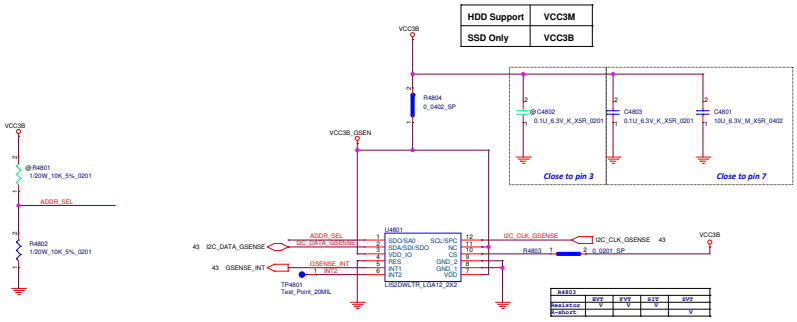


TABLE : U4801

P/N	ADDR_SEL	Address
LIS2DWLTR	H L	32h (W) & 33h (R) 30h (W) & 31h (R)
KX022-1020	H L	
BMA422	H L	32h (W) & 33h (R) 30h (W) & 31h (R)

ST and Bosch I2C address is same but can be identified by Chip_ID

TABLE of G-Sensor (U4801)		
Vendor	P/N	LCFC P/N
ST	LIS2DWLTR	SA00009AQ00
Kionix	KX022-1020	SA000081E00
BOSCH	BMA422	SA0000C1V00

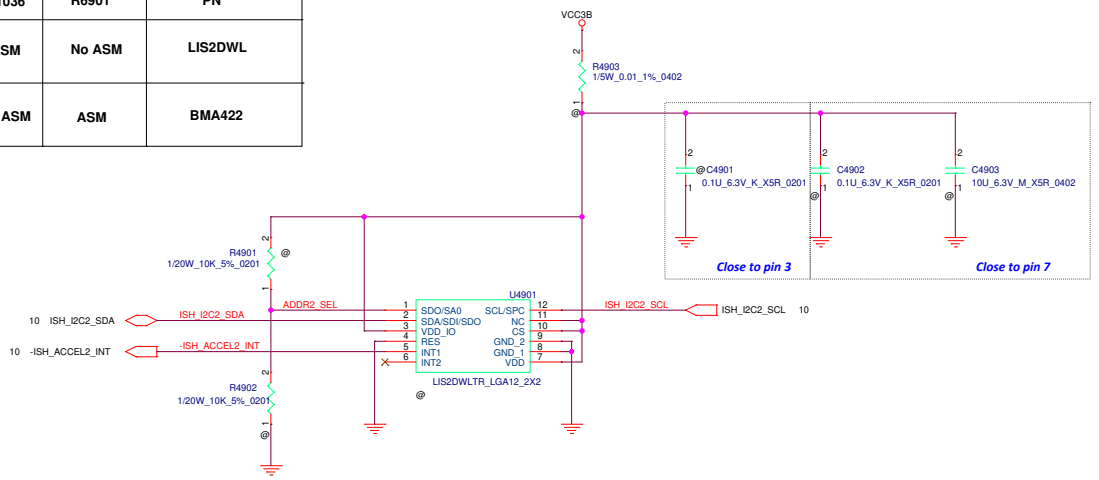
Document Number: LCFC

Size: Custom | Title: 048_APS G-SENSOR | Rev: 0.01

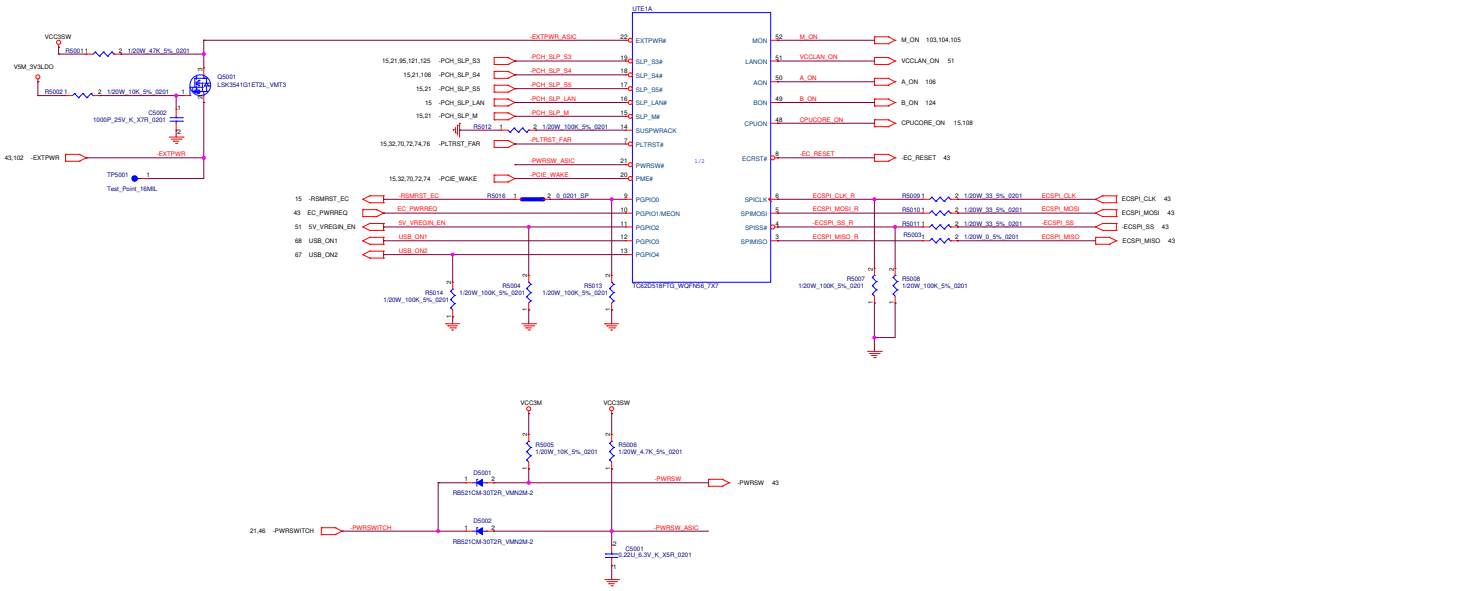
Date: Friday, December 03, 2021 | Sheet 48 of 130

TABLE

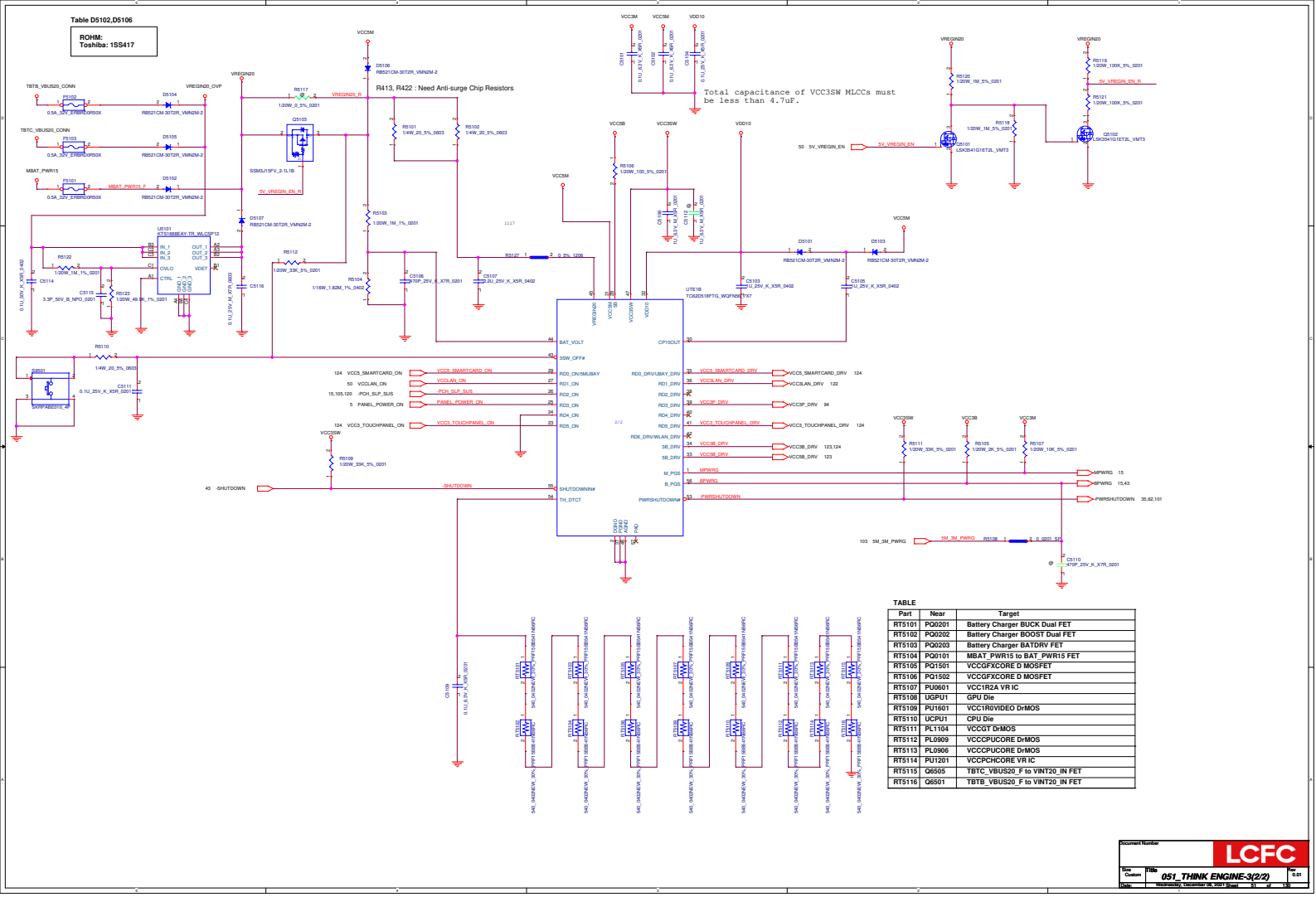
SDO	I2C Address	R1036	R6901	PN
L	30h (W) & 31h (R)	ASM	No ASM	LIS2DWL
H	TBD	No ASM	ASM	BMA422



Document Number			
Size B	Title 049_HPD G-SENSOR		Rev 0.01
Date: Friday, December 03, 2021	Sheet 49 of 130		



Document Number		LCFC	
Size: Custom	Title: 050_THINK ENGINE-3(1/2)		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 50 of 130		



TABLE

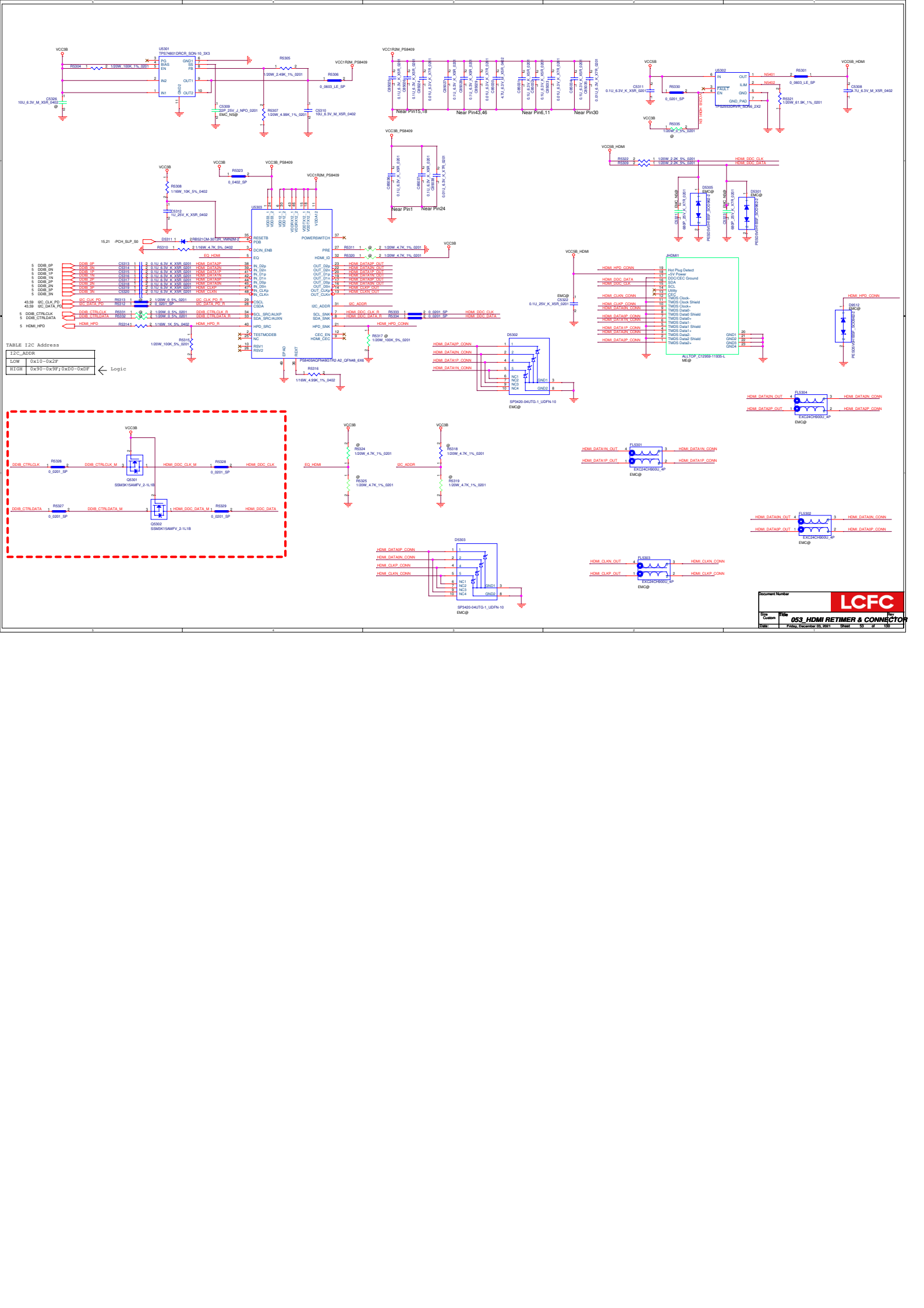
Part	Near	Target
RT5101	PQ0201	Battery Charger BUCK Dual FET
RT5102	PQ0202	Battery Charger BOOST Dual FET
RT5103	PQ0203	Battery Charger BATDRV FET
RT5104	PQ0101	MBAT_PWR15 to BAT_PWR15 FET
RT5105	PQ1501	VCCGFXCORE D MOSFET
RT5106	PQ1502	VCCGFXCORE D MOSFET
RT5107	PU0601	VCC1R2A VR IC
RT5108	UGPU1	GPU Die
RT5109	PU1601	VCC1R0VIDEO DrMOS
RT5110	UCPU1	CPU Die
RT5111	PL1104	VCCGT DrMOS
RT5112	PL0909	VCCCPUCORE DrMOS
RT5113	PL0906	VCCCPUCORE DrMOS
RT5114	PU1201	VCCPCHCORE VR IC
RT5115	Q6505	TBTC_VBUS20_F to VINT20_IN FET
RT5116	Q6501	TBTB_VBUS20_F to VINT20_IN FET

Document Number			LCFC
Size: Custom	Title: 051_THINK ENGINE-3(2/2)		Rev: 0.01
Date: Wednesday, December 08, 2021	Sheet 51 of 139		

Document Number

LCFC

Size	Title	Rev
Custom	052_BLANK	0.01
Date: Friday, December 03, 2021	Sheet 52 of 130	


VCC3B
U5301
TPS74801DRCR_SON-10_3X3
RS304
1/20W_100K_1%_0201
RS305
1/20W_2.49K_1%_0201
VCC1R2M_PS8409
RS306
0_0603_LE_SP
CS326
10U_6.3V_M_XSR_0402
CS309
22P_25V_J_NPO_0201
EMC_NS@
RS307
1/20W_4.99K_1%_0201
CS310
10U_6.3V_M_XSR_0402
Near Pin15,18
Near Pin43,46
Near Pin6,11
Near Pin30
VCC5B
U5302
TPS2553DRVR_SON6_2X2
RS330
0_0201_SP
RS335
1/20W_0_5%_0201
RS401
RS402
RS301
0_0603_LE_SP
RS321
1/20W_61.9K_1%_0201
VCC5B_HDMI
CS308
4.7U_6.3V_M_XSR_0402
VCC3B_PS8409
Near Pin1
Near Pin24
RS322
RS309
1/20W_2.2K_5%_0201
HDMI_DDC_CLK
HDMI_DDC_DATA
DS301
DS302
DS303
PESD5V0T1BSF_SOD882
RS308
1/16W_10K_5%_0402
CS312
1U_25V_K_XSR_0402
RS323
0_0402_SP
U5303
PS8409AQFN48G1R2-A2_QFN48_6X6
RESETB
POB
DCIN_ENB
EQ
POWERSWITCH
PRE
HDMI_ID
I2C_ADDR
SCL_SNK
SDA_SNK
HPD_SNK
CEC_EN
HDMI_CEC
TESTMODEB
NC
RSV1
RSV2
REXT
EP_AD
15,21 PCH_SLP_S0
DS311
RBS21CM-30FZR_VMN2M-2
RS310
2.1/16W_4.7K_5%_0402
EQ_HDMI
I2C_ADDR
RS320
RS311
RS333
RS334
HDMI_DDC_CLK_R
HDMI_DDC_DATA_R
HDMI_HPD_CONN
RS314
1/16W_1K_5%_0402
HDMI_HPD_R
RS315
1/20W_100K_5%_0201
RS317
1/20W_100K_5%_0201
RS316
1/16W_4.99K_1%_0402
DDIB_0P
DDIB_0N
DDIB_1P
DDIB_1N
DDIB_2P
DDIB_2N
DDIB_3P
DDIB_3N
I2C_CLK_PD
I2C_DATA_PD
DDIB_CTRLCLK
DDIB_CTRLDATA
HDMI_HPD
TABLE I2C Address
I2C_ADDR
LOW 0x10~0x2F
HIGH 0x90~0x9F;0xD0~0xDF
Logic
HDMI_DATA0P_OUT
HDMI_DATA0N_OUT
HDMI_DATA1P_OUT
HDMI_DATA1N_OUT
HDMI_DATA2P_OUT
HDMI_DATA2N_OUT
HDMI_CLKP_OUT
HDMI_CLKN_OUT
VCC5B_HDMI
JHDMI1
Hot Plug Detect
+5V Power
DDC/CEC Ground
SDA
SCL
Utility
CEC
TMDS Clock-
TMDS Clock Shield
TMDS Clock+
TMDS Data0-
TMDS Data0 Shield
TMDS Data0+
TMDS Data1-
TMDS Data1 Shield
TMDS Data1+
TMDS Data2-
TMDS Data2 Shield
TMDS Data2+
ALLTOP_C12959-11935-L
ME@
HDMI_HPD_CONN
D9512
PESD5V0T1BSF_SOD882
HDMI_DDC_DATA
HDMI_DDC_CLK
HDMI_CLKN_CONN
HDMI_CLKP_CONN
HDMI_DATA0N_CONN
HDMI_DATA0P_CONN
HDMI_DATA1N_CONN
HDMI_DATA1P_CONN
HDMI_DATA2N_CONN
HDMI_DATA2P_CONN
SP3420-04UTG-1_UDFN-10
EMC@
FLS304
EXC24CH900U_4P
FLS301
FLS302
FLS303
RS326
RS327
RS328
RS329
0_0201_SP
QS301
QS302
SSM3K15AMFV_2-1L1B
RS324
RS325
RS318
RS319
1/20W_4.7K_1%_0201
Document Number
LCFC
Size
Custom
Title
053_HDMI RETIMER & CONNECTOR
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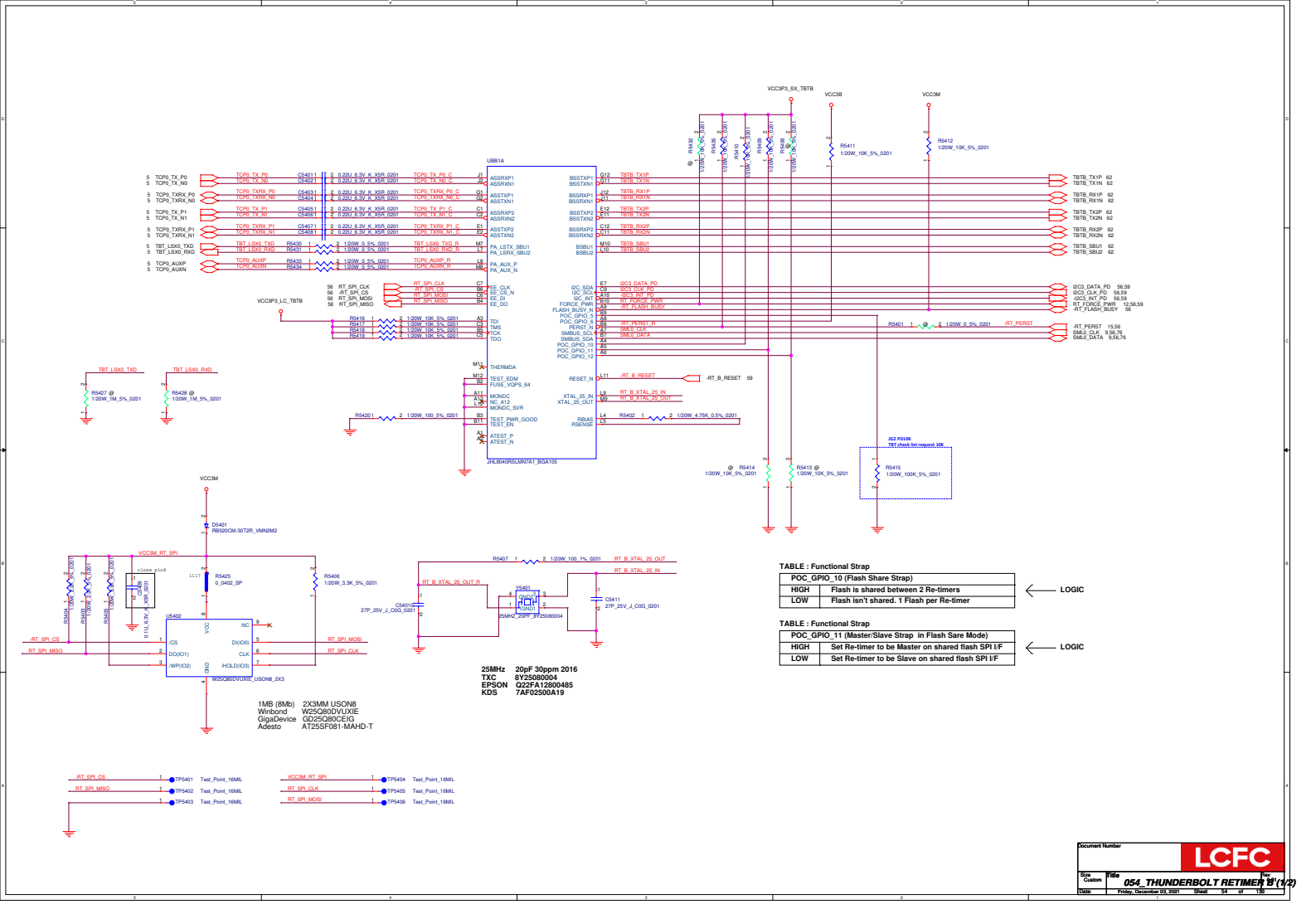
136


VCC3P3_SX_TBTB
VCC3B
VCC3M
UBB1A
TBTB_TX1P 62
TBTB_TX1N 62
TBTB_RX1P 62
TBTB_RX1N 62
TBTB_TX2P 62
TBTB_TX2N 62
TBTB_RX2P 62
TBTB_RX2N 62
TBTB_SBU1 62
TBTB_SBU2 62
I2C3_DATA_PD 56,59
I2C3_CLK_PD 56,59
-I2C3_INT_PD 56,59
RT_FORCE_PWR 12,56,59
-RT_FLASH_BUSY 56
-RT_PERST 15,56
SMLI0_CLK 9,56,76
SMLI0_DATA 9,56,76
VCC3P3_LC_TBTB
THERMDA
TEST_EDM
FUSE_VQPS_64
MONDC
NC_A12
MONDC_SVR
TEST_PWR_GOOD
TEST_EN
ATEST_P
ATEST_N
JHL8040RSLMN7A1_BGA105
-RT_B_RESET 59
RT_B_XTAL_25_IN
RT_B_XTAL_25_OUT
TBT_LSX0_TXD
TBT_LSX0_RXD
JG2 PD10K
TBT check list request 10K
VCC3M
DS401
RB520CM-3/T2R_VMN2M2
VCC3M_RT_SPI
US402
W25Q80DVUXIE_USON8_2X3
RT_SPI_CS
RT_SPI_MISO
RT_SPI_MOSI
RT_SPI_CLK
RT_B_XTAL_25_OUT_R
RT_B_XTAL_25_OUT
RT_B_XTAL_25_IN
VS401
25MHz_20PF_8Y25080004
TABLE : Functional Strap
POC_GPIO_10 (Flash Share Strap)
HIGH Flash is shared between 2 Re-timers
LOW Flash isn't shared. 1 Flash per Re-timer
LOGIC
TABLE : Functional Strap
POC_GPIO_11 (Master/Slave Strap in Flash Sare Mode)
HIGH Set Re-timer to be Master on shared flash SPI I/F
LOW Set Re-timer to be Slave on shared flash SPI I/F
LOGIC
25MHz 20pF 30ppm 2016
TXC 8Y25080004
EPSON Q22FA12800485
KDS 7AF02500A19
1MB (8Mb) 2X3MM USON8
Winbond W25Q80DVUXIE
GigaDevice GD25Q80CEIG
Adesto AT25SF081-MAHD-T
TP5401 Test_Point_16MIL
TP5402 Test_Point_16MIL
TP5403 Test_Point_16MIL
TP5404 Test_Point_16MIL
TP5405 Test_Point_16MIL
TP5406 Test_Point_16MIL
Document Number
LCFC
Size Custom
Title 054_THUNDERBOLT RETIMER B (1/2)
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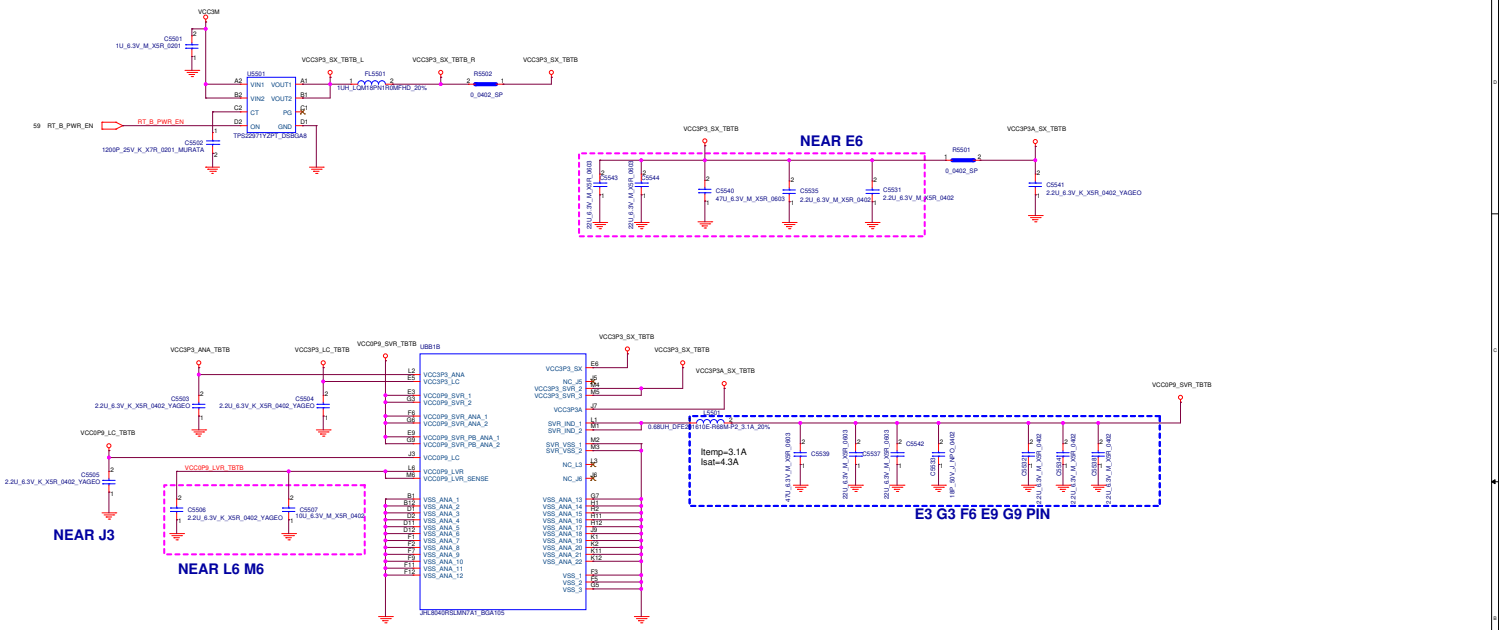

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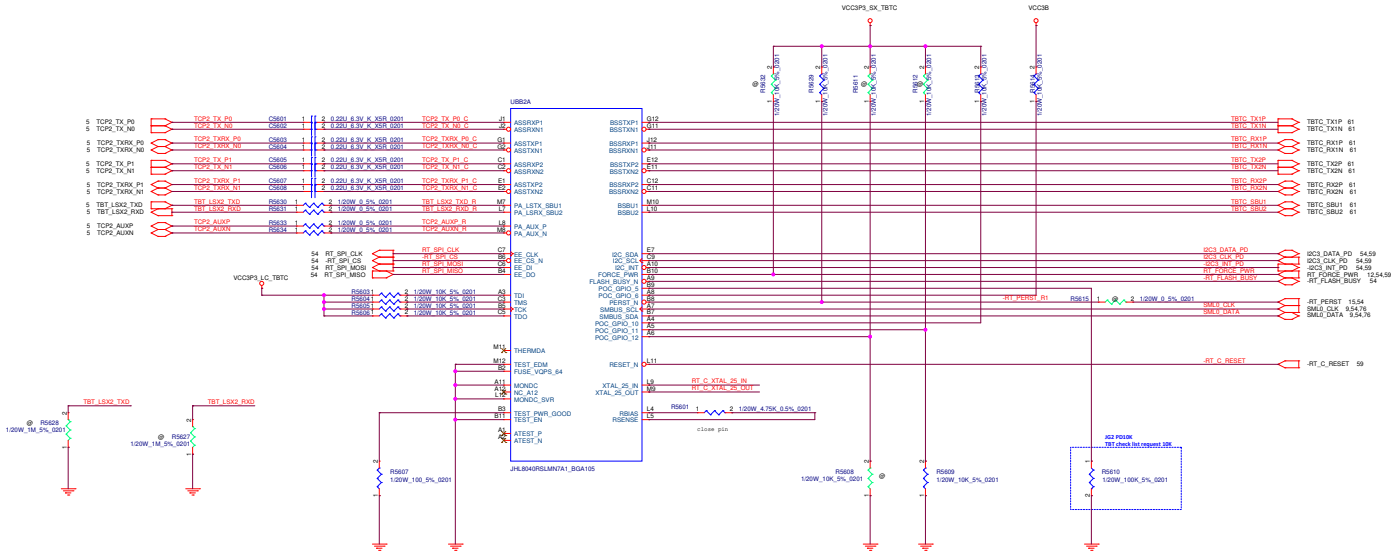
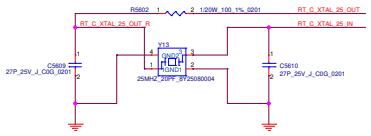
Size: Custom	Title: 055_THUNDERBOLT RETIMER B (122)		Rev:
Date: Friday, December 03, 2021	Sheet 55 of 130		





25MHz 20pF 30ppm 2016
TXC 8Y25080004
EPSON Q22FA12800485
KDS 7AF02500A19

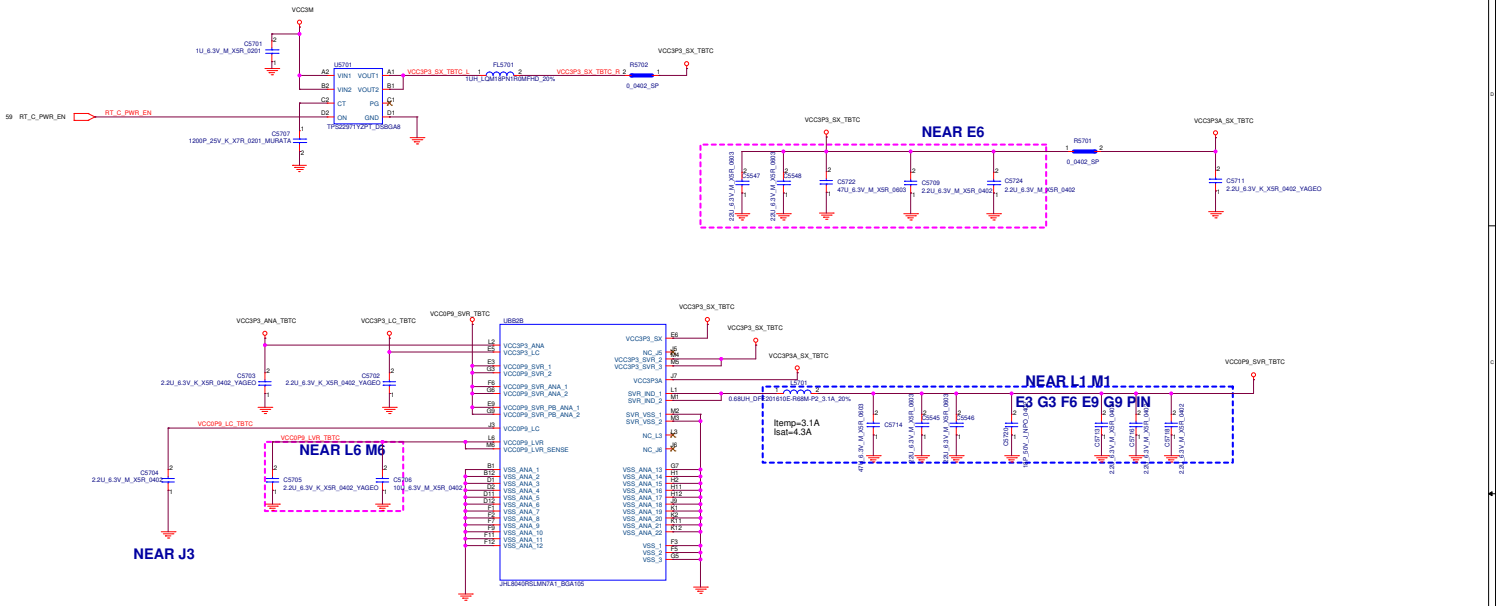
TABLE : Functional Strap

POC_GPIO_10 (Flash Share Strap)		
HIGH	Flash is shared between 2 Re-timers	← LOGIC
LOW	Flash isn't shared. 1 Flash per Re-timer	

TABLE : Functional Strap

POC_GPIO_11 (Master/Slave Strap in Flash Sare Mode)		
HIGH	Set Re-timer to be Master on shared flash SPI I/F	← LOGIC
LOW	Set Re-timer to be Slave on shared flash SPI I/F	

Document Number		LCFC	
Size: Custom	Title: 056_THUNDERBOLT RETIMER C (1/2)		Rev:
Date: Friday, December 03, 2021	Sheet 58 of 130		

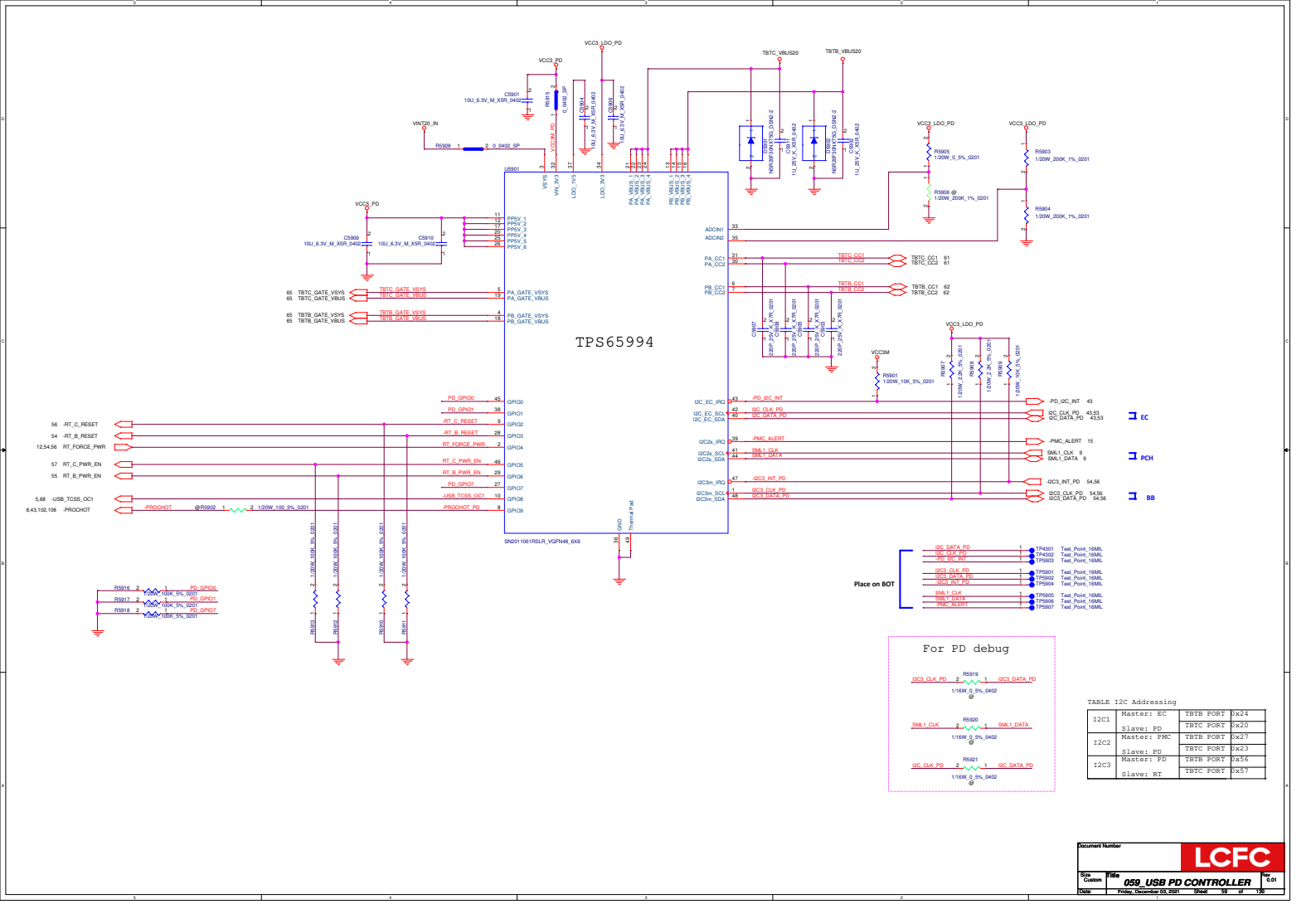


Document Number			LCFC
Size: Custom	Title: 057_THUNDERBOLT RETIMER C (2/2)		Rev:
Date: Friday, December 03, 2021	Sheet 57 of 130		

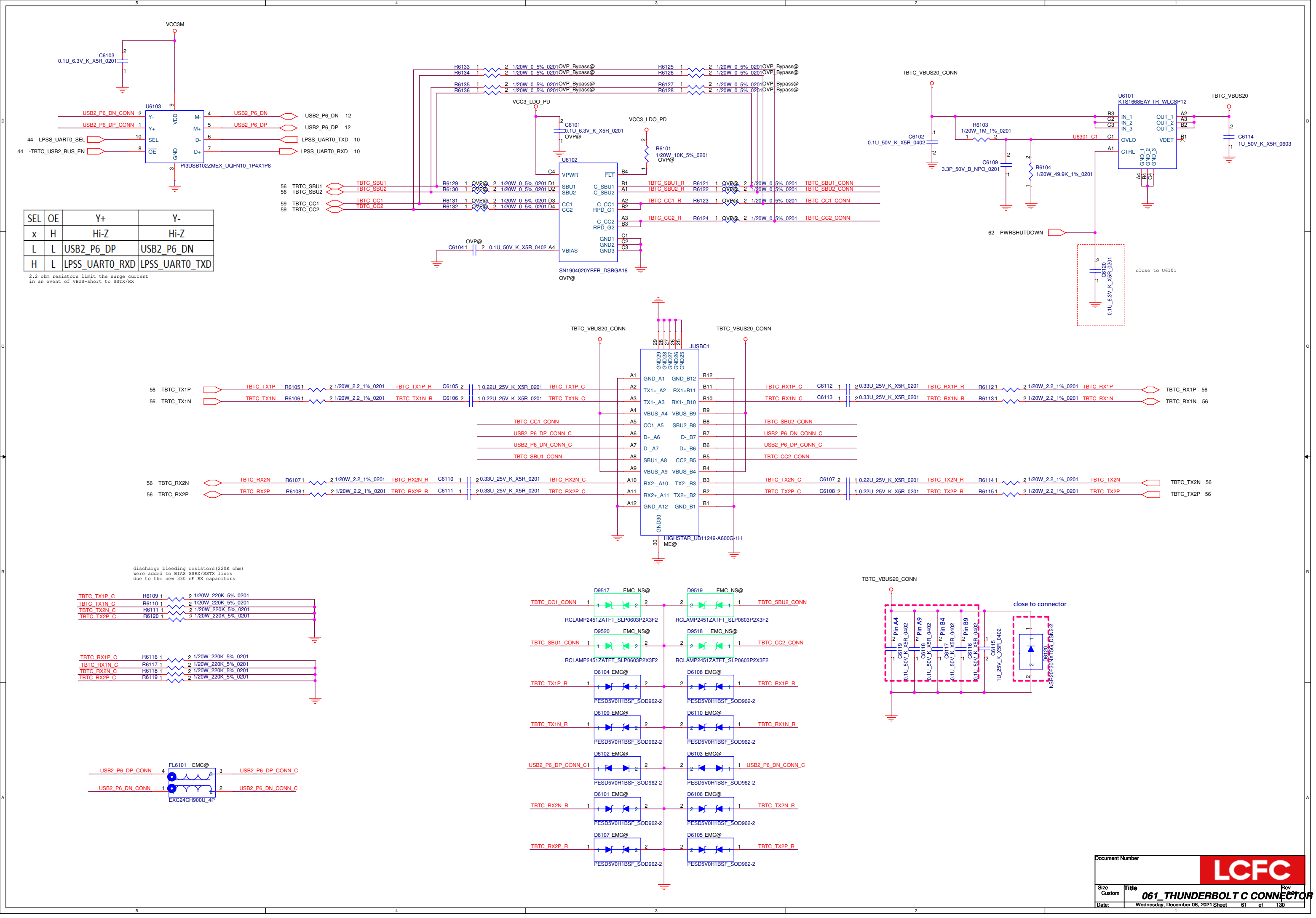
Document Number

LCFC

Size	Title	Rev
Custom	058_BLANK	0.01
Date: Friday, December 03, 2021	Sheet 58 of 130	


TPS65994
SN2011061RSLR_VQFN48_6X6
VCC3_LDO_PD
VCC5_PD
TBTC_VBUS20
TBTB_VBUS20
VINT20_IN
Place on BOT
For PD debug
TABLE I2C Addressing
I2C1 Master: EC TBTB PORT 0x24
Slave: PD TBTC PORT 0x20
I2C2 Master: PMC TBTB PORT 0x27
Slave: PD TBTC PORT 0x23
I2C3 Master: PD TBTB PORT 0x56
Slave: RT TBTC PORT 0x57
Document Number
LCFC
Size Custom
Title 059_USB PD CONTROLLER
Rev 0.01
Date: Friday, December 03, 2021
Sheet 59 of 130

Document Number	LCFC	
Size A	Title *060_BLANK*	Rev 0.01
Date:	Friday, December 03, 2021 Sheet 60 of 130	



SEL	OE	Y+	Y-
x	H	Hi-Z	Hi-Z
L	L	USB2_P6_DP	USB2_P6_DN
H	L	LPSS_UART0_RXD	LPSS_UART0_TXD

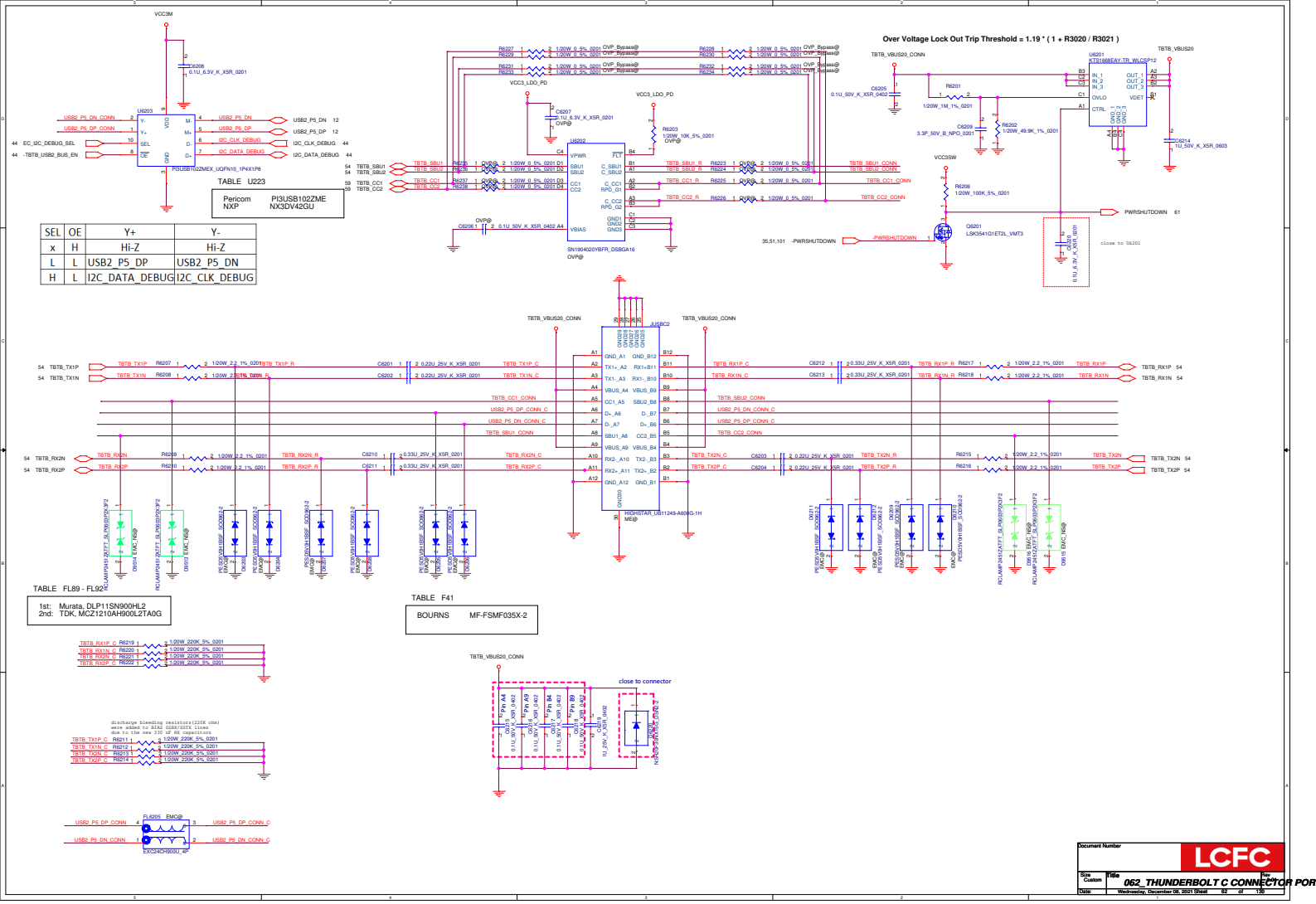
2.2 ohm resistors limit the surge current in an event of VBUS-short to SSTX/RX

LCFC

Title: 061_THUNDERBOLT C CONNECTOR PORT

Size: Custom

Date: Wednesday, December 08, 2021 Sheet 61 of 130


Over Voltage Lock Out Trip Threshold = 1.19 * (1 + R3020 / R3021)
TABLE U223
Pericom PI3USB102ZME
NXP NX3DV42GU
SEL | OE | Y+ | Y-
x | H | Hi-Z | Hi-Z
L | L | USB2_P5_DP | USB2_P5_DN
H | L | I2C_DATA_DEBUG | I2C_CLK_DEBUG
TABLE FL89 - FL92
1st: Murata, DLP11SN900HL2
2nd: TDK, MCZ1210AH900L2TA0G
TABLE F41
BOURNS MF-FSMF035X-2
close to connector
Document Number
LCFC
Size Custom
Title 062_THUNDERBOLT C CONNECTOR POR
Date Wednesday, December 08, 2021 Sheet 62 of 130

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Custom	063_BLANK	0.01
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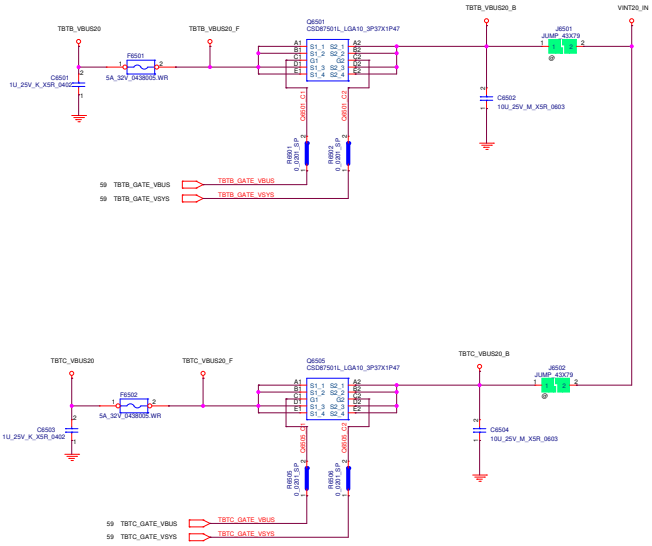
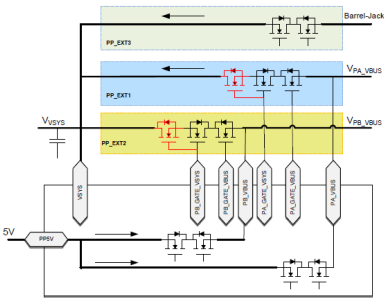
Size	Title	Rev
Custom	064_BLANK	0.01
Date: Friday, December 03, 2021	Sheet 64 of 130	





Document Number		LCFC	
Size: Custom	Title: 065_TYPEC_DCIN		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 65 of 139		

Document Number

LCFC

Size	Title	Rev
Custom	066_BLANK	0.01
Date:	Friday, December 03, 2021 Sheet 68 of 130	

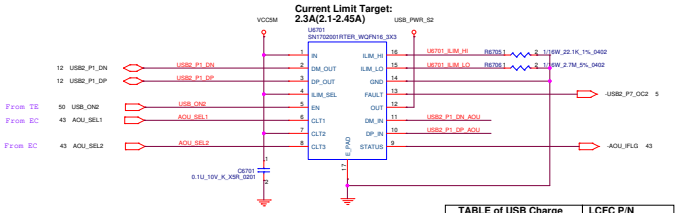
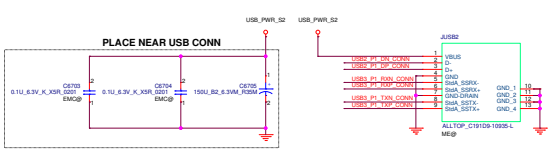
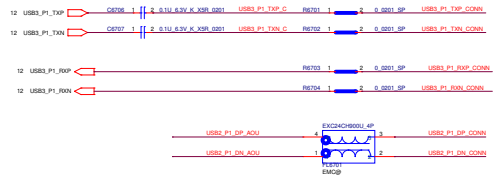
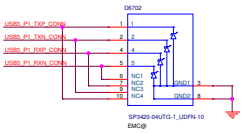
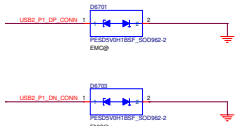


TABLE of USB Charge	LCFC P/N
TI	SN1702001RTER	SA00008HF00
Cellwise	CW3048BAAQ	SA0000C6Z00





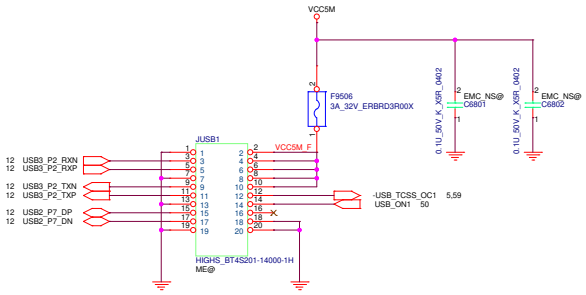




Document Number

LCFC

Size	Title	Rev
Custom	067_USB TYPE-A CONNECTOR PORT B	
Date: Friday, December 03, 2021	Sheet 67 of 100	



Document Number		LCFC
Size: Custom	Title: 068_USB TYPE-A CONNECTOR PORT A	Rev: A
Date: Friday, December 03, 2021	Sheet 68 of 130	

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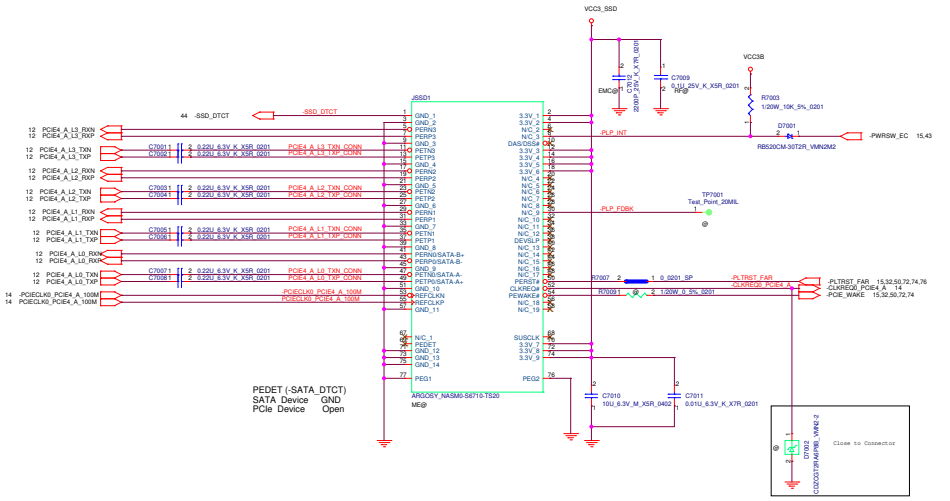
Size	Title	Rev
Custom	069_BLANK	0.01
Date: Friday, December 03, 2021	Sheet 69 of 130	

M.2 Socket 3 (Key-M) for 2280 S3 SSD

H=2.65mm Connector



Document Number			LCFC
Size: Custom	Title: 070_M.2 SOCKET 3 MODULE		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 70 of 130		

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Size	Title	Rev
Custom	071_BLANK	0.01
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	Voltage
CNVI	1.8/3.3
QualC	1.8
MTK	3.3

M.2 Type 1216 Module for WLAN / Bluetooth

TABLE

Companion RF (CRF)	CNVio	REFCLK	CLKREQ
Garfield Peak 2 (GIP2)	Gen2	Not Supported	Not Supported

TABLE

Platform	CNVio	PCH IP	REFCLK
Alder Lake	Gen2	Solar	Generated inside SoC

M6602,M6603 close to M.2

BRI_RSP (INTERNAL PU 20K)
0:PLL at 1280M (/IP)
1:PLL at 1320 (HeP and other future parts)

R7213,R7214 close to PCH

R7210,R7212 close to device

R7209,R7211 close to PCH

co-lay with UWLAN1A

Document Number

LCFC

Size	Title	Rev
Custom	073_BLANK	0.01
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M.2 Socket 2 (Key-B) for 3042 S3 WWAN

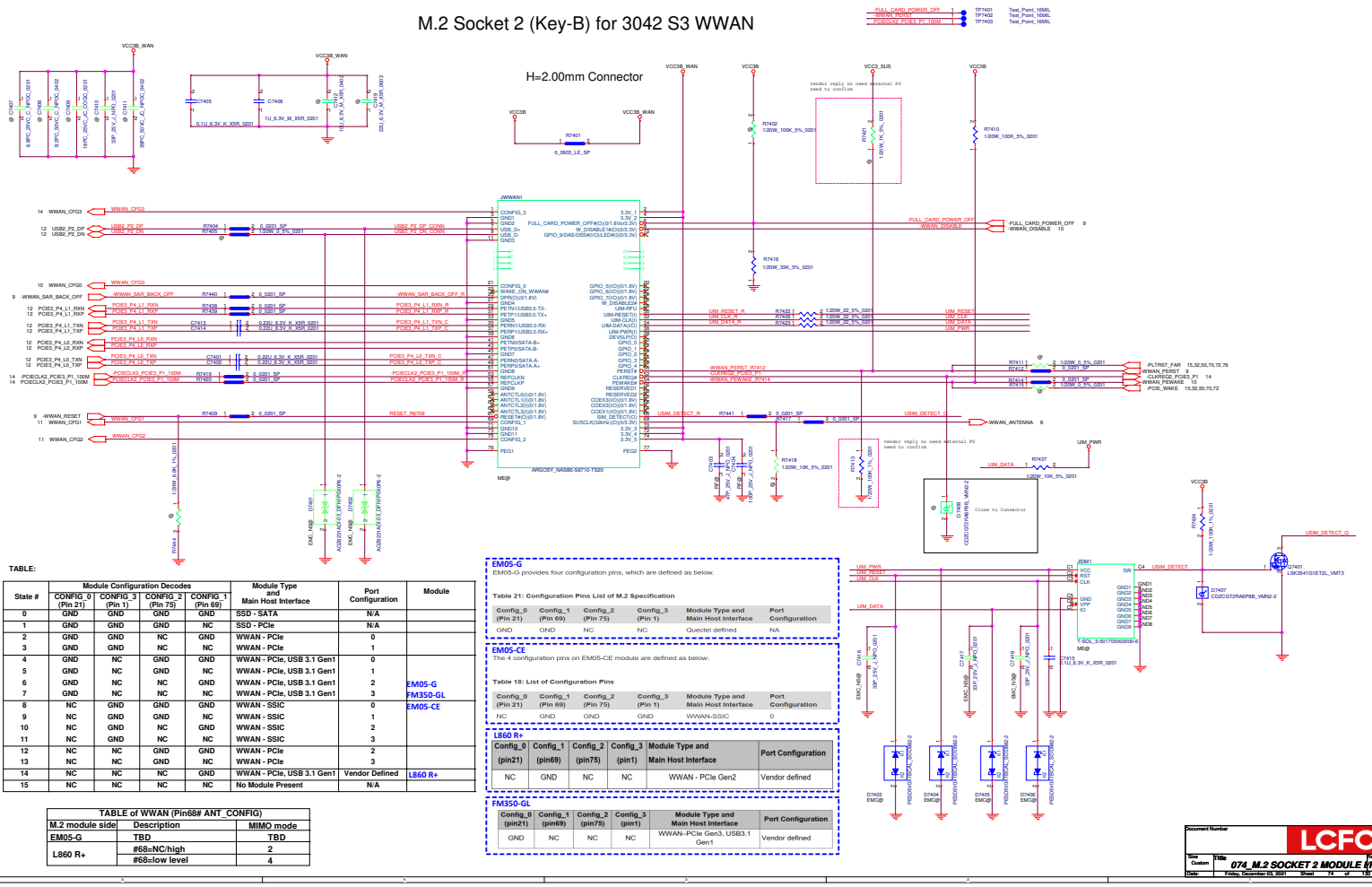

TABLE:

State #	Module Configuration Decodes CONFIG_0 (Pin 21)	CONFIG_3 (Pin 1)	CONFIG_2 (Pin 75)	CONFIG_1 (Pin 69)	Module Type and Main Host Interface	Port Configuration	Module
0	GND	GND	GND	GND	SSD - SATA	N/A	
1	GND	GND	GND	NC	SSD - PCIe	N/A	
2	GND	GND	NC	GND	WWAN - PCIe	0	
3	GND	GND	NC	NC	WWAN - PCIe	1	
4	GND	NC	GND	GND	WWAN - PCIe, USB 3.1 Gen1	0	
5	GND	NC	GND	NC	WWAN - PCIe, USB 3.1 Gen1	1	
6	GND	NC	NC	GND	WWAN - PCIe, USB 3.1 Gen1	2	EM05-G
7	GND	NC	NC	NC	WWAN - PCIe, USB 3.1 Gen1	3	FM350-GL
8	NC	GND	GND	GND	WWAN - SSIC	0	EM05-CE
9	NC	GND	GND	NC	WWAN - SSIC	1	
10	NC	GND	NC	GND	WWAN - SSIC	2	
11	NC	GND	NC	NC	WWAN - SSIC	3	
12	NC	NC	GND	GND	WWAN - PCIe	2	
13	NC	NC	GND	NC	WWAN - PCIe	3	
14	NC	NC	NC	GND	WWAN - PCIe, USB 3.1 Gen1	Vendor Defined	L860 R+
15	NC	NC	NC	NC	No Module Present	N/A	

TABLE of WWAN (Pin68# ANT_CONFIG)		
M.2 module side	Description	MIMO mode
EM05-G	TBD	TBD
L860 R+	#68=NC/high	2
	#68=low level	4

EM05-G

EM05-G provides four configuration pins, which are defined as below.

Table 21: Configuration Pins List of M.2 Specification

Config_0 (Pin 21)	Config_1 (Pin 69)	Config_2 (Pin 75)	Config_3 (Pin 1)	Module Type and Main Host Interface	Port Configuration
GND	GND	NC	NC	Quectel defined	NA

EM05-CE

The 4 configuration pins on EM05-CE module are defined as below:

Table 18: List of Configuration Pins

Config_0 (Pin 21)	Config_1 (Pin 69)	Config_2 (Pin 75)	Config_3 (Pin 1)	Module Type and Main Host Interface	Port Configuration
NC	GND	GND	GND	WWAN-SSIC	0

L860 R+

Config_0 (pin21)	Config_1 (pin69)	Config_2 (pin75)	Config_3 (pin1)	Module Type and Main Host Interface	Port Configuration
NC	GND	NC	NC	WWAN - PCIe Gen2	Vendor defined

FM350-GL

Config_0 (pin21)	Config_1 (pin69)	Config_2 (pin75)	Config_3 (pin1)	Module Type and Main Host Interface	Port Configuration
GND	NC	NC	NC	WWAN–PCIe Gen3, USB3.1 Gen1	Vendor defined

LCFC

Document Number

Size: Custom | Title: 074_M.2 SOCKET 2 MODULE | Rev: V1.01

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LCFC

Size	Title	Rev
Custom	075_BLANK	0.01
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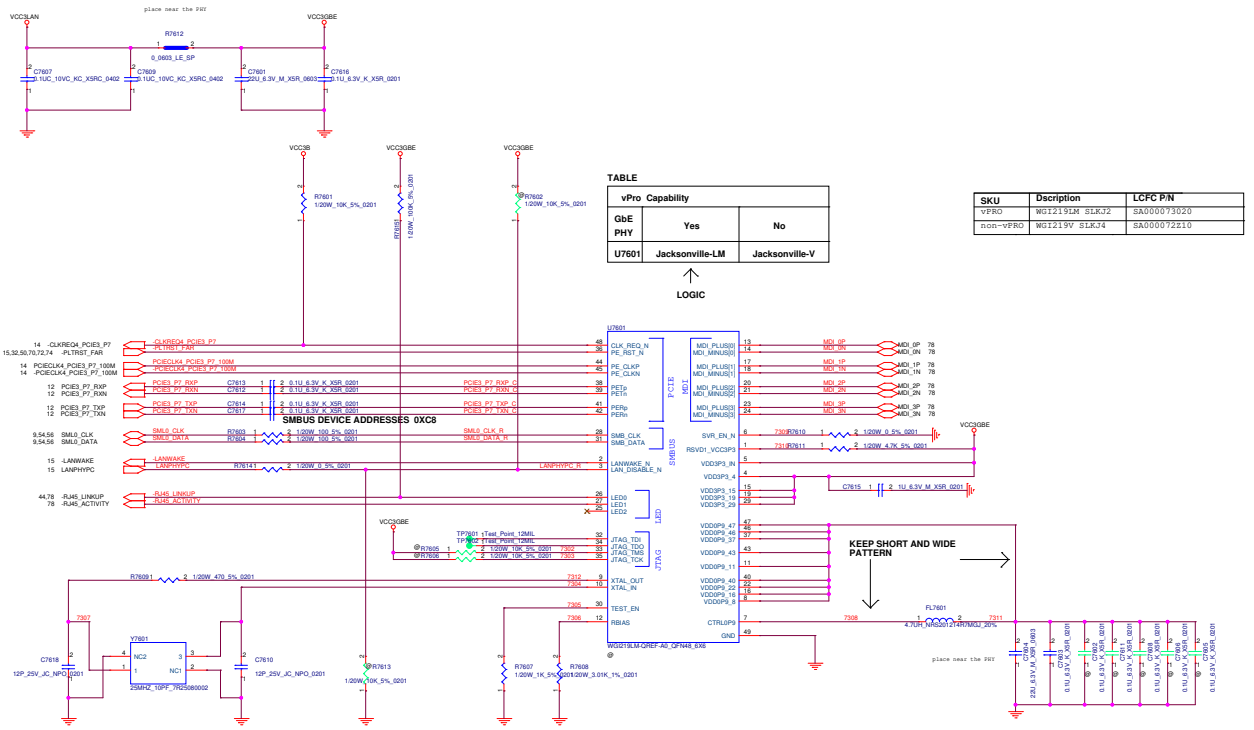

Y7601 CRYSTAL - 25MHz 10pF 30ppm 2016		
Vendor	P/N	LCFC P/N
TXC	7R25080002	SJ10000PP00
KDS	1ZZHAE25000CC0B	SJ10000MN00
Epson	Q22FA1280055900	SJ10000PU00

Document Number

LCFC

Size	Title	Rev
Custom	076_GBE JACKSONVILLE	0.01
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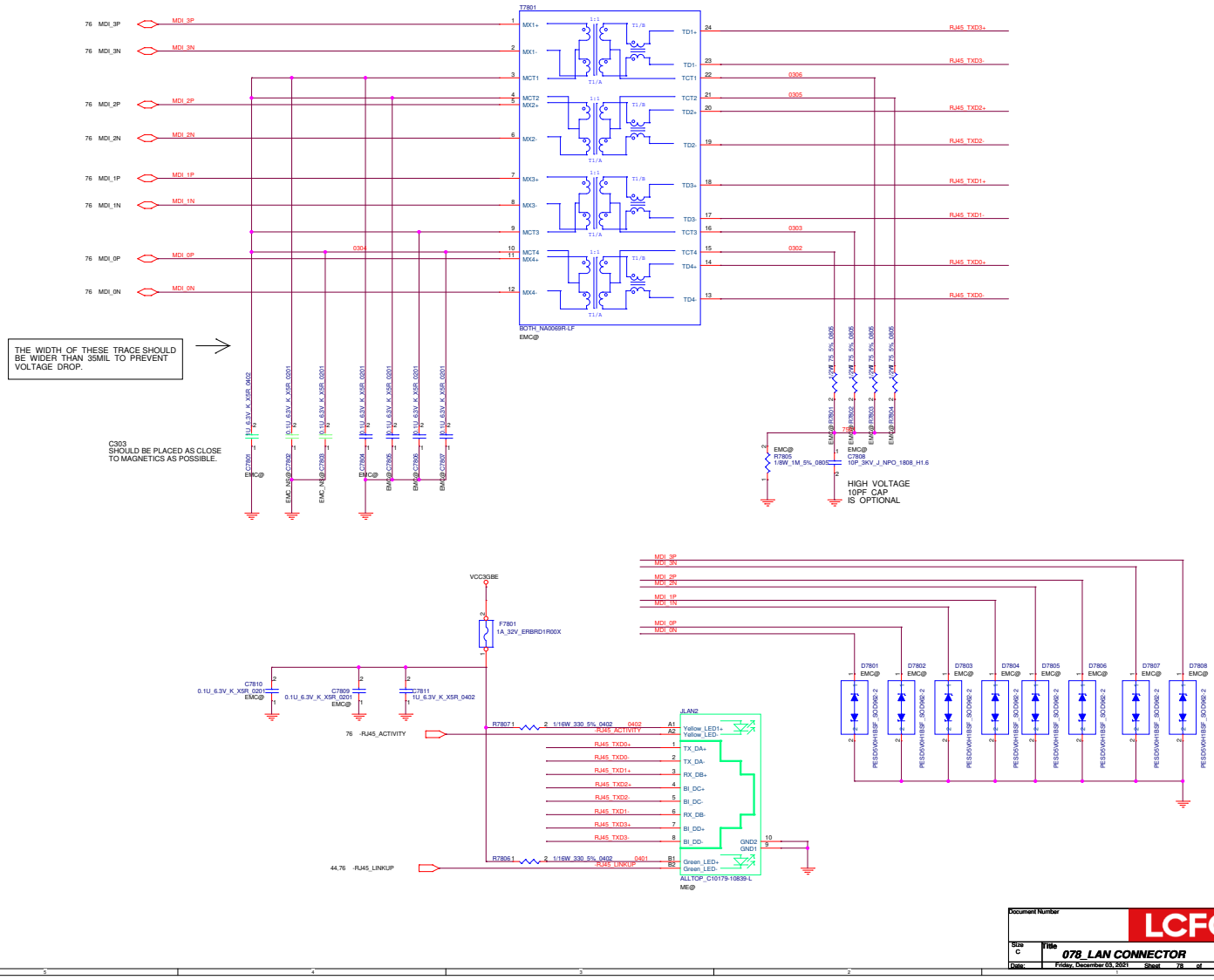
Document Number		LCFC
Size: Custom	Title: 077_LAN SWITCH	Rev: 0.01
Date: Friday, December 03, 2021	Sheet 77 of 130	



Document Number		LCFC	
Size C	Title 078_LAN CONNECTOR		Rev 0.01
Date: Friday, December 03, 2021	Sheet 78 of 130		

Document Number	LCFC	
Size A	Title *079_BLANK*	Rev 0.01
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Document Number				LCFC
Size A	Title *080_BLANK*			Rev 0.01
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Document Number

LCFC

Size: Custom

Title: 081_MEDIACARD CONTROLLER

Rev: 01

Date: Friday, December 03, 2021 Sheet 81 of 130

Document Number

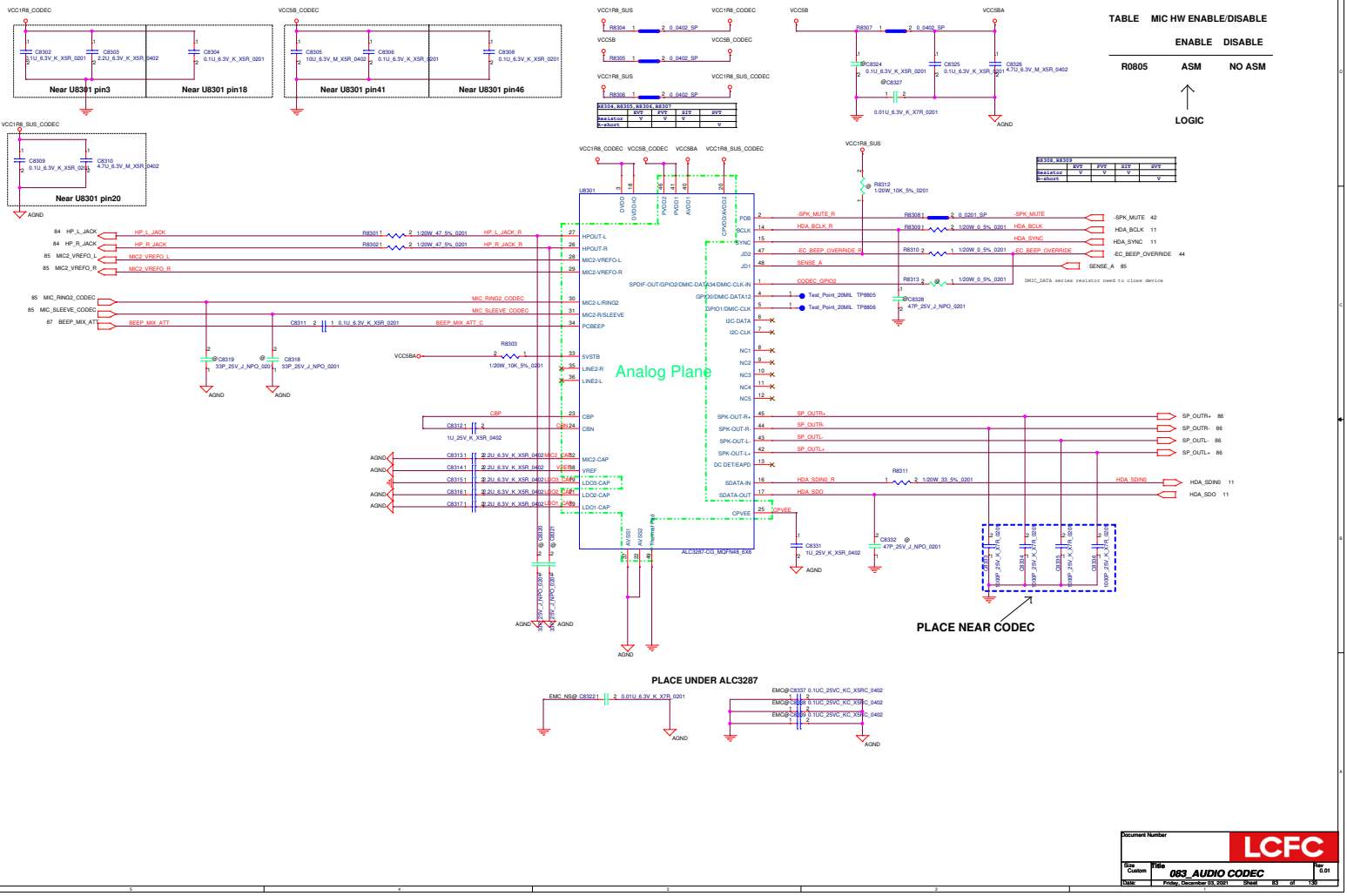
LCFC

Size
B

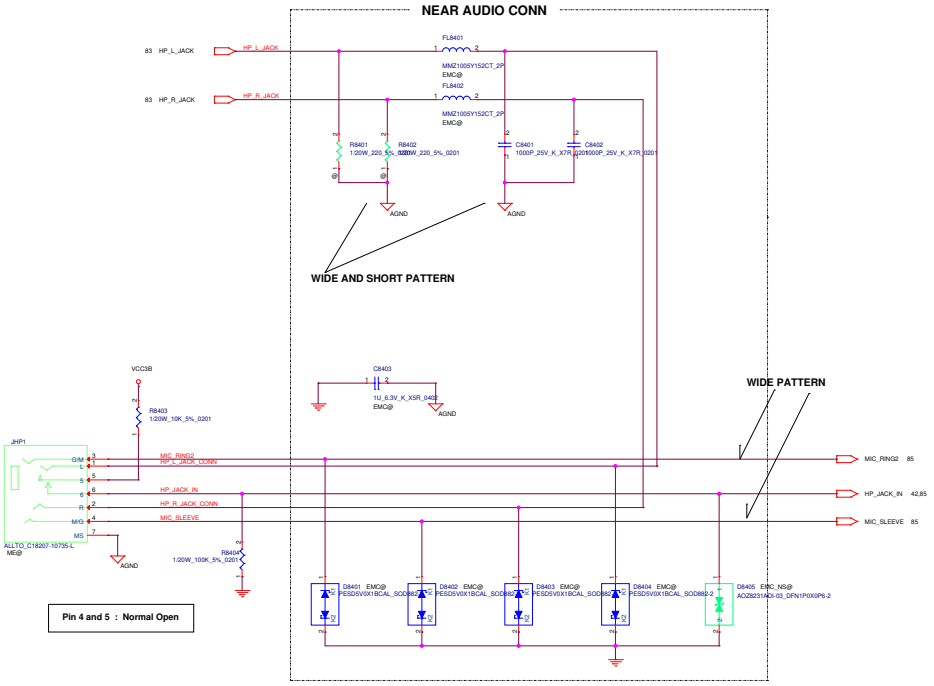
Title
082_MEDIA CARD CONNECTOR

Rev
101

Date: Friday, December 03, 2021 Sheet 82 of 130

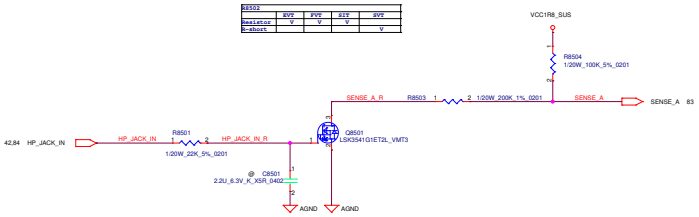


Document Number			LCFC
Size: Custom	Title: 083_AUDIO CODEC		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 83 of 130		

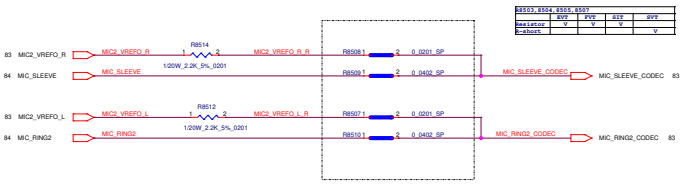


Document Number	LCFC	
Size: Custom	Title: 084_AUDIO JACK	Rev: 0.01
Date: Friday, December 03, 2021	Sheet 84 of 130	

R8502				
	SVT	FVT	SIT	SVT
Resistor	V	V	V	
D-short				V

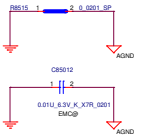


R8503,R8504,R8505,R8507				
	SVT	FVT	SIT	SVT
Resistor	V	V	V	
D-short				V



NEAR EXT MIC CONN

R8109				
	SVT	FVT	SIT	SVT
Resistor	V	V	V	
D-short				V

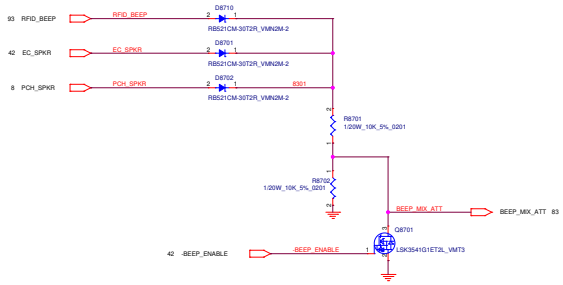


Document Number

LCFC

Size	Title	Rev
Custom	085_AUDIO JACK SENSE_MIC_VF	
Date:	Friday, December 03, 2021	Sheet 85 of 130

Document Number		LCFC	
Size: Custom	Title: 086_AUDIO SPEAKER		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 88 of 130		



Document Number		LCFC	
Size: Custom	Title: 087_AUDIO BEEP		Rev: 0.01
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Size	Title	Rev
Custom	088_BLANK	0.01
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Document Number	LCFC	
Size A	Title *089_BLANK*	Rev 0.01
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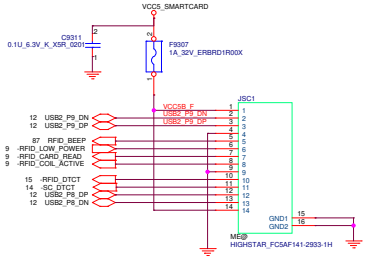
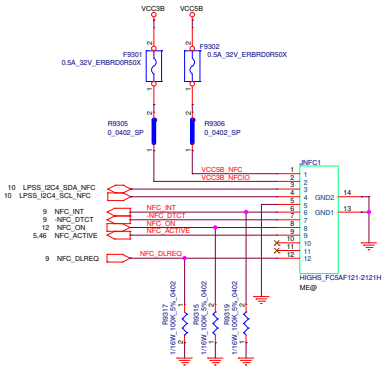
Document Number				LCFC
Size A	Title ***090_BLANK***			Rev 0.01
Date:	Friday, December 03, 2021	Sheet 90	of 130	

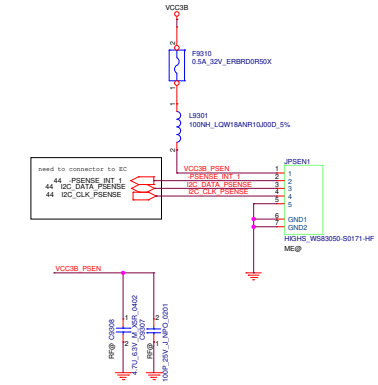
Document Number				LCFC
Size A	Title ***091_BLANK***			Rev 0.01
Date:	Friday, December 03, 2021	Sheet 91	of 130	

Document Number				LCFC
Size A	Title ***092_BLANK***			Rev 0.01
Date:	Friday, December 03, 2021	Sheet 92	of 130	



RFID & Smart Card		NFC	
Pin1	VBUS_5V	VBUS_5V_NFC	
Pin2	USB_D-	VBUS_3V_NFC	
Pin3	USB_D+	I2C0_DATA_NFC	
Pin4	GND	I2C0_CLK_NFC	
Pin5	BEEP	GND	
Pin6	LOW_POWER	NFC_INT	
Pin7	CARD_READ	-NFC_DTCT	
Pin8	COIL_ACTIVE	NFC_ON	
Pin9	GND	NFC_ACTIVE	
Pin10	-RFID_DTCT	NC	
Pin11	-SC_DTCT	NC	
Pin12	USB_D-	NFC_DLREQ	
Pin13	USB_D+		
PIN14	VCC +5V		





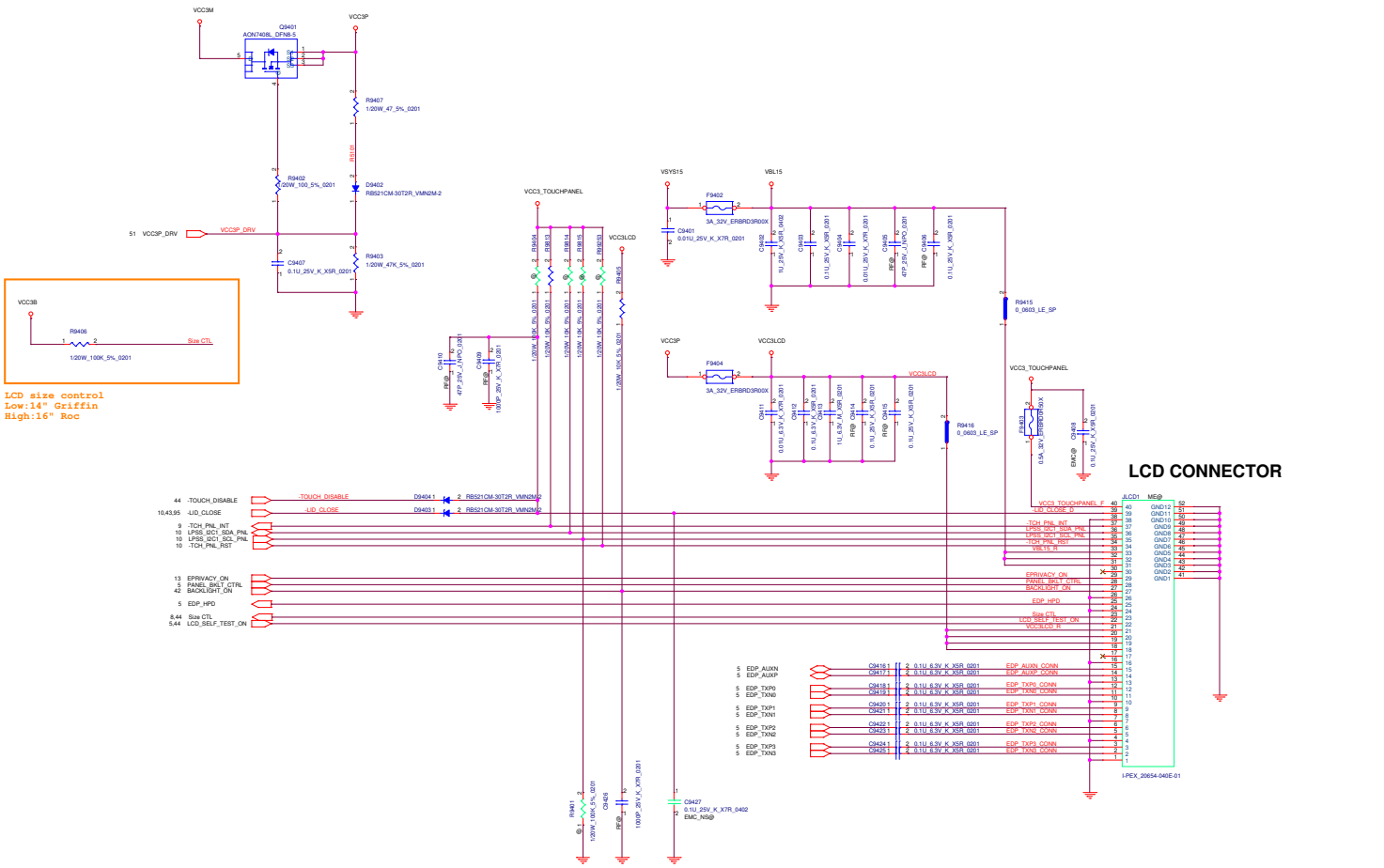
P-sensor IC

WLCSP-9

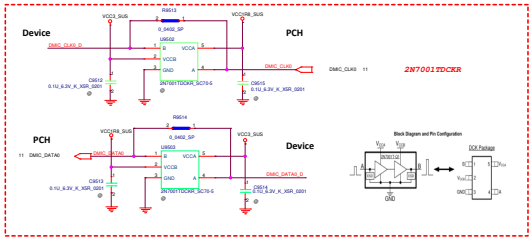
(Channel 0)

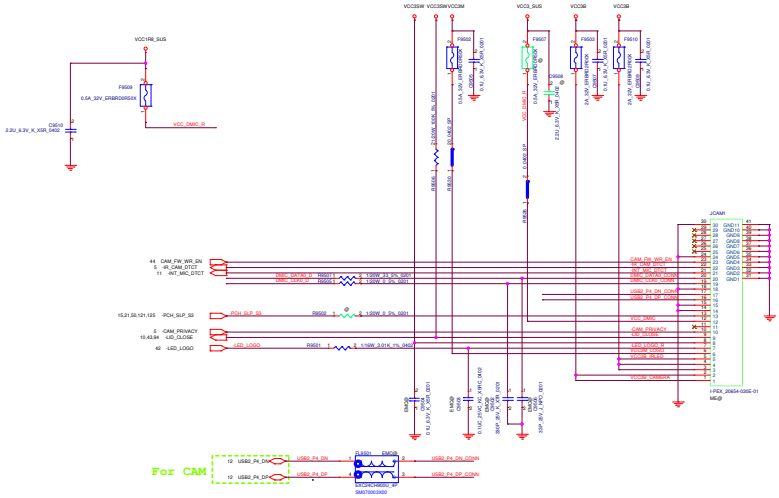
Ping number	MB Net name	P-IC Net name
1	VCC3B_PSEN_3.3V	VDDHI
2	-PSENSE_INT_1	GPIO/RDY
3	I2C_DATA_PSENSE	SDA
4	I2C_CLK_PSENSE	SCL
5	GND	VSS

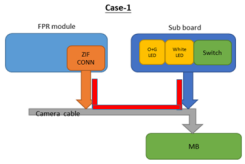
Document Number	LCFC		
Size C	Title	093_Smart Card Reader/NFC/P-Sensor	Rev
Date: Friday, December 03, 2021	Sheet 93 of 130		



Document Number	LCFC		
Size: Custom	Title: 094_LCD INTERFACE		Rev: 0.01
Date: Friday, December 03, 2021	Sheet 94 of 130		







WTB - Camera
- FPR
- PWR SUB BD
-Hall Sensor

For HPD

Pin assignment

No.		No.	
17	IR_VCC	18	IR_VCC
1	MIC_DET	16	MIC_VCC
2	-WP	15	MIC_CLK
3	NC	14	MIC_DATA
4	NC	13	NC
5	CAM_3V3	12	CAM_3V3
6	-Reverse	11	D-
7	MIC_GND	10	D-
8	DGND	9	DGND
19	IR_GND	20	IR_GND

For Hybrid & RGB

Pin assignment

No.		No.	
17	IR_VCC	18	IR_VCC
1	MIC_DET	16	MIC_VCC
2	-WP	15	MIC_CLK
3	NC	14	MIC_DATA
4	NC	13	NC
5	CAM_3V3	12	CAM_3V3
6	-Reverse	11	D-
7	MIC_GND	10	D-
8	DGND	9	DGND
19	IR_GND	20	IR_GND

PIN	State	
GPIO_AL0	High	Disable Power Button
	Low	Enable Power Button
DELINK	High	S0/S03
	Low	S3/S4/S5

case1-connctor type
Connected to system

FPR

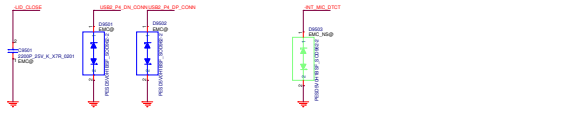
PIN	SIGNAL	
1	D3V3	3V3_S
2	Reset	reset pin for goodix
3	GPIO_AL0	GPIO for Power Button Suppression Indicate to host whether should suppress button press
4	DELINK	GPIO for OS stats
5	OLED_CTRL	Green LED
6	OLED_CTRL	Orange LED
7	GND	GND
8	USBDP	USB DP
9	USBDM	USB DN
10	NC	NC

FPR_RWS_SHIELD

case1
O/G LED on sub card
White LED on sub card

Subcard

PIN	SIGNAL	
1	OLED	Orange LED
2	OLED	Green LED
3	DSP0	VCC3B
4	NC	
5	DSP3	VCC3B
6	PRBTN-	Power botton out
7	GND	GND
8	PRLED-	White LED



Document Number

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Custom	096_BLANK	0.01
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Size C

Title *097_BLANK*

Rev 0.01

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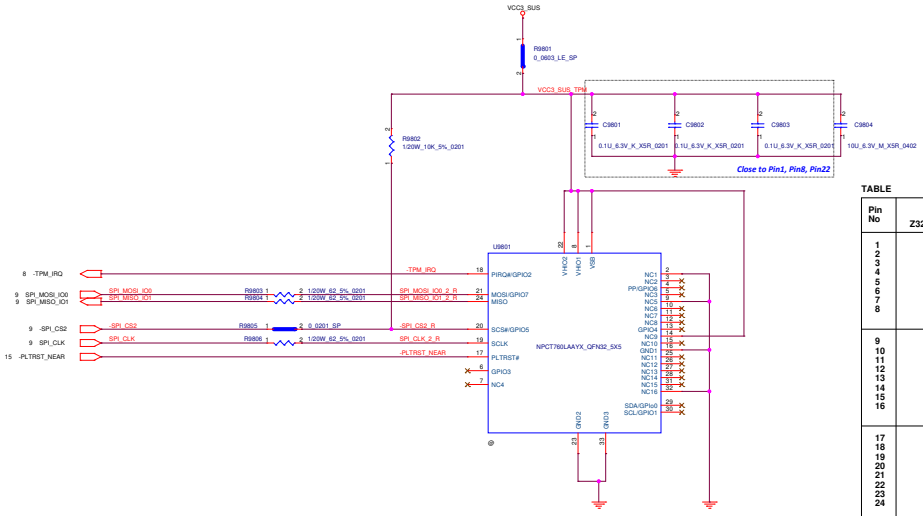


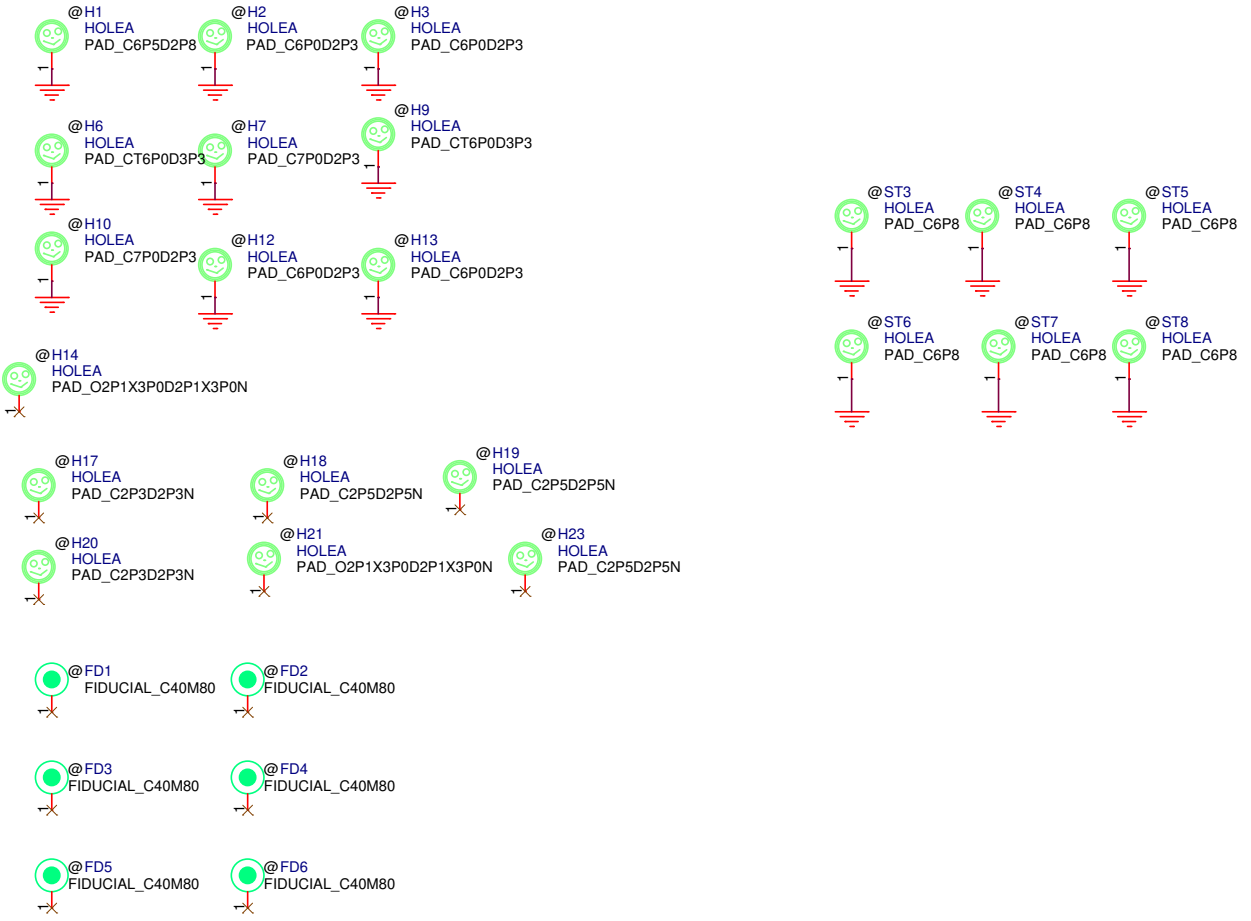
TABLE of TPM (U9801)		
Vendor	P/N	LCFC P/N
ST Micro	ST33HTPH2X32AHE0	SA0000C8600
Nuvoton	NPCT760LAAYX	SA0000C3000
Nations	Z32H330TC-SQN-L4	SA0000C1S00

TABLE

Pin No	Nations Z32H330TC-SQN-L4	Nuvoton NPCT760LAAYX	ST Micro ST33HTPH2X32AHE0
1	VDD	VSB	NC
2	GND	NC	GND
3	NC	NC	NC
4	NC	GPIO/PP	NC
5	NC	NC	NC
6	NC	GPIO3	GPIO_LP
7	PP	NC	GPIO_PP
8	VDD	VHIO	NC
9	GND	NC	NC
10	NC	NC	NC
11	NC	NC	NC
12	NC	NC	NC
13	NC	GPIO4	NC
14	VDD	NC	NC
15	NC	NC	NC
16	GND	GND	NC
17	SPI_RST#	RST#	SPI_RST#
18	SPI_PIRQ#	PIRQ#/GPIO2	SPI_PIRQ#
19	SPI_CLK	SCLK	SPI_CLK
20	SPI_CS#	SCS#/GPIO5	SPI_CS#
21	MOSI	MOSI/GPIO7	MOSI
22	VDD	VHIO	VPS
23	GND	GND	NC
24	MISO	MISO	MISO
25	NC	NC	NC
26	NC	NC	NC
27	NC	NC	NC
28	NC	NC	NC
29	NC	SDA/GPIO0	NC
30	NC	SDA/GPIO1	NC
31	NC	NC	NC
32	GND	NC	NC

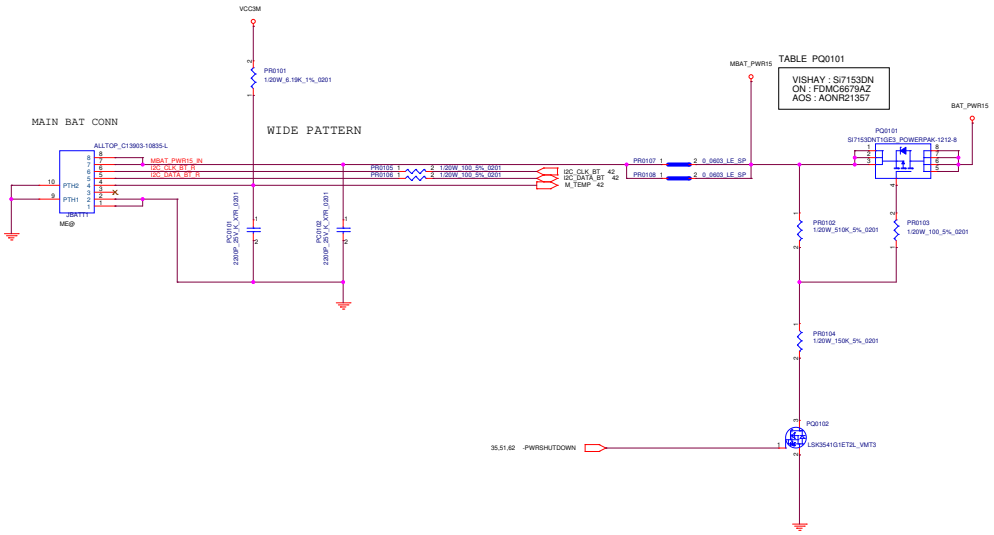
Document Number: LCFC

Size	Title	Rev
Custom	098_DISCRETE TPM 2.0	0.01
Date: Friday, December 03, 2021	Sheet 98 of 139	



Document Number		LCFC
Size A	Title **099_SCREW HOLES**	Rev 0.01
Date: Friday, December 03, 2021	Sheet 99 of 130	

Document Number		LCFC
Size: Custom	Title: BLANK	Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 100 of 130	



Document Number	LCFC	
Size: Custom	Title: 101_BATTERY INPUT	Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 101 of 130	

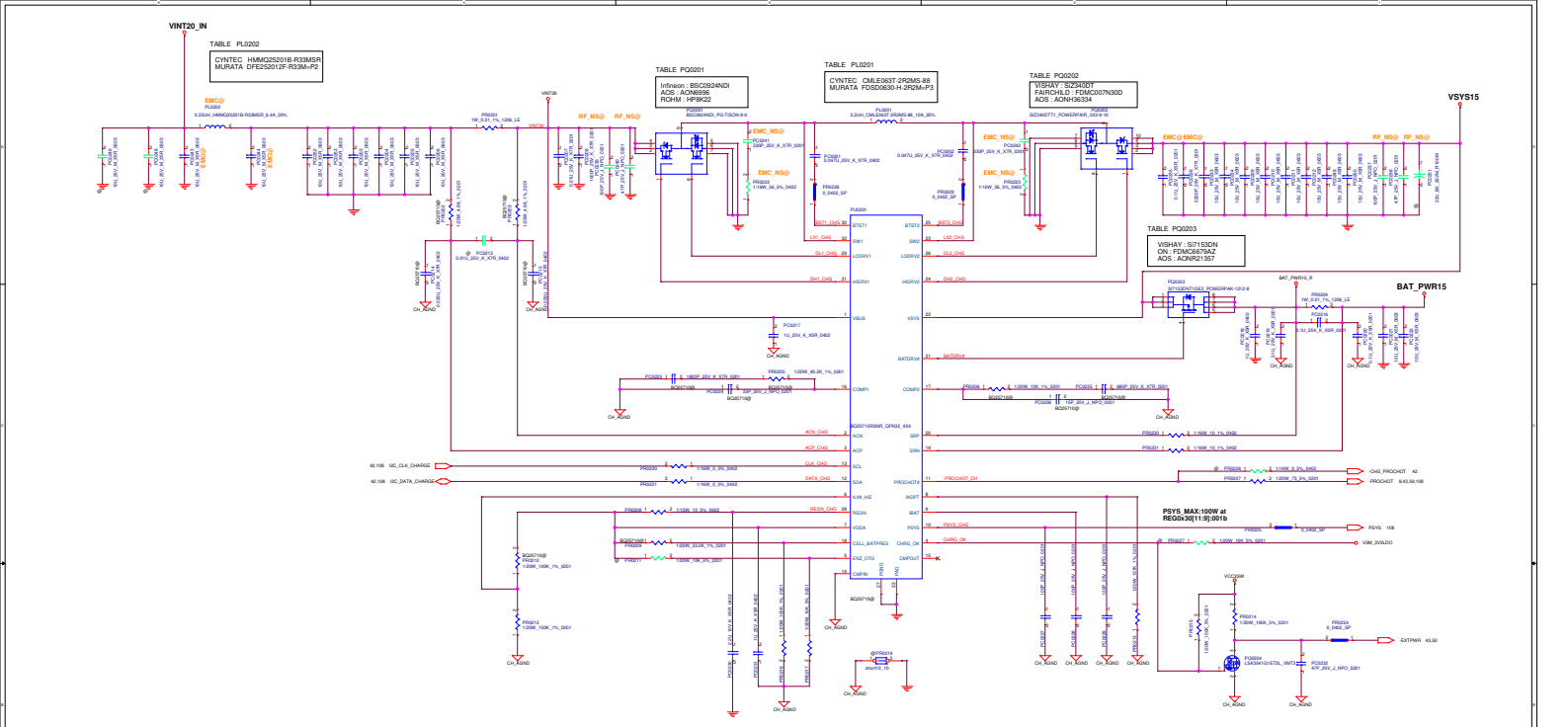


TABLE : ILIM_HIZ

IDPM	V (ILIM)	BQ25710RSNR	SC8885LQDER	
500mA	1.2V			
1.0A	1.4V			
1.5A	1.6V			
2.0A	1.8V	237K	191K	← W/ 65W adapter
3.0A	2.2V	174K	137K	
3.25A	2.3V	162K	127K	
4A	2.6V	131K		
5A	3V	100K		← W/ 100W adapter

TABLE : CELL_BATPRES (PR0209)

# of CELL	V (CELL_PRES)	BQ25710RSNR	SC8885LQDER
1-CELL	1.5V	301K	249K
2-CELL	2.5V	140K	110K
3-CELL	3.5V	71.5K	49.9K
4-CELL	4.5V	33.2K	16.5K

← LOGIC

TABLE

Inductor	R(IADP)	fsw@POR
1.0uH	93kohm	800kHz
2.2uH	137kohm	800kHz
3.3uH	169kohm	800kHz

← LOGIC

Charger BOM table

IC	U195	BQ25710RSNR	SC8885LQDER
ACP	PR0202	4.99ohm_1%_0201	10ohm_1%_0201
ACN	PR0203	4.99ohm_1%_0201	10ohm_1%_0201
ACP	PC0214	0.033uF_10%_25V_0402	NO_ASM
ACN	PC0215	0.033uF_10%_25V_0402	NO_ASM
COMP1	PR0205	40.2k_1%_0201	100k_1%_0201
COMP1	PC0223	1800pF_10%_25V_0201	1000pF_10%_25V_0201
COMP1	PC0224	33pF_5%_25V_0201	10pF_5%_25V_0201
COMP2	PR0206	10k_1%_0201	330k_1%_0201
COMP2	PC0225	680pF_10%_25V_0201	1000pF_10%_25V_0201
COMP2	PC0226	15pF_5%_25V_0201	220pF_10%_25V_0201
ILIM_HIZ	PR0210	174k_1%_0201	137k_1%_0201
CELL_BATPRESZ	PR0209	33.2k_1%_0201	16.5k_1%_0201

← LOGIC

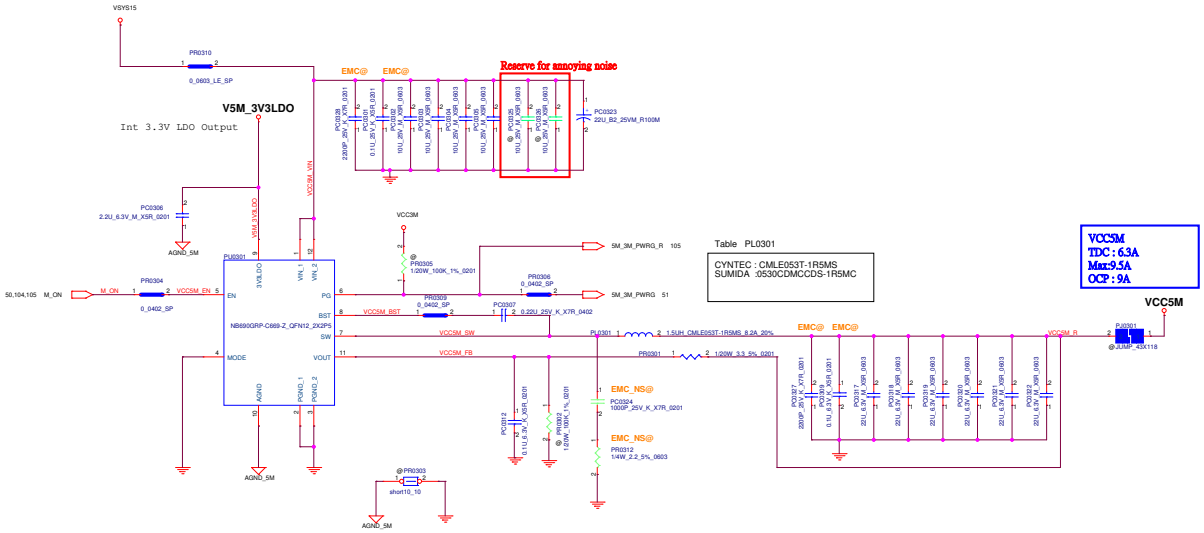


TABLE: NB690 Mode Control

RMode	MODE	VOUT	3V3LDO
0	Ceramic Cout	5.1V	3.3V
60K	POSCAP Cout	5.1V	3.3V
120K	Ceramic Cout	5V	3.3V
180K	POSCAP Cout	5V	3.3V
Floating	X	3.3V	3.3V

← LOGIC

Document Number

LCFC

Size: Custom | Title: 103_DC/DC VCC5M (NB690) | Rev: 0.01

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TABLE1: NB693A CLM

Mode	CLM	Resister to GND
M1	7A	0
M2	10A	90K
M3	13A	150K
M4	16A	>230K or Float

LOGIC

TABLE 2: NB693A Mode 1 Control

Mode	VOUT	FS	Resister to GND
M1	Vo<3V, Vref=0.6V	700KHz	0
M2	Vo<3V, Vref=0.6V	1000KHz	90K
M3	Vo=>3V, Vref=1.8V	1000KHz	150K
M4	Vo=>3V, Vref=1.8V	700KHz	>230K or Float

LOGIC

VCC5_PD
IDC : 5.8A
OCP : 10A

Reserve for annoying noise

Table PL0401

CYNTEC : CMLE053T-1R5MS
SUMIDA :0530CDMCCDS-1R5MC

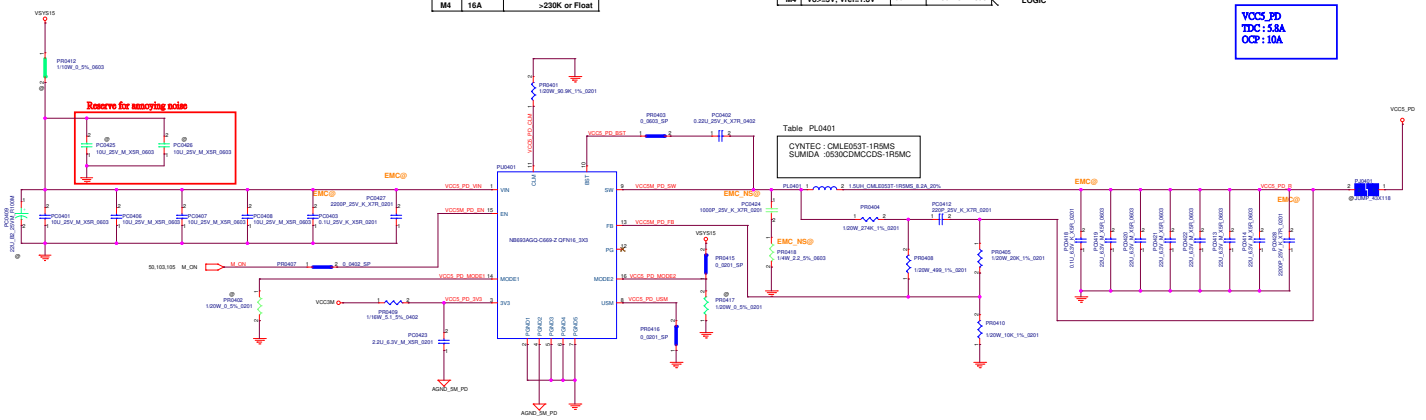


TABLE 3: NB693A MODE2 Selection

State	State	Mode2
M1	Internal Vcc	0
M2	External Vcc	Pull to VIN

LOGIC

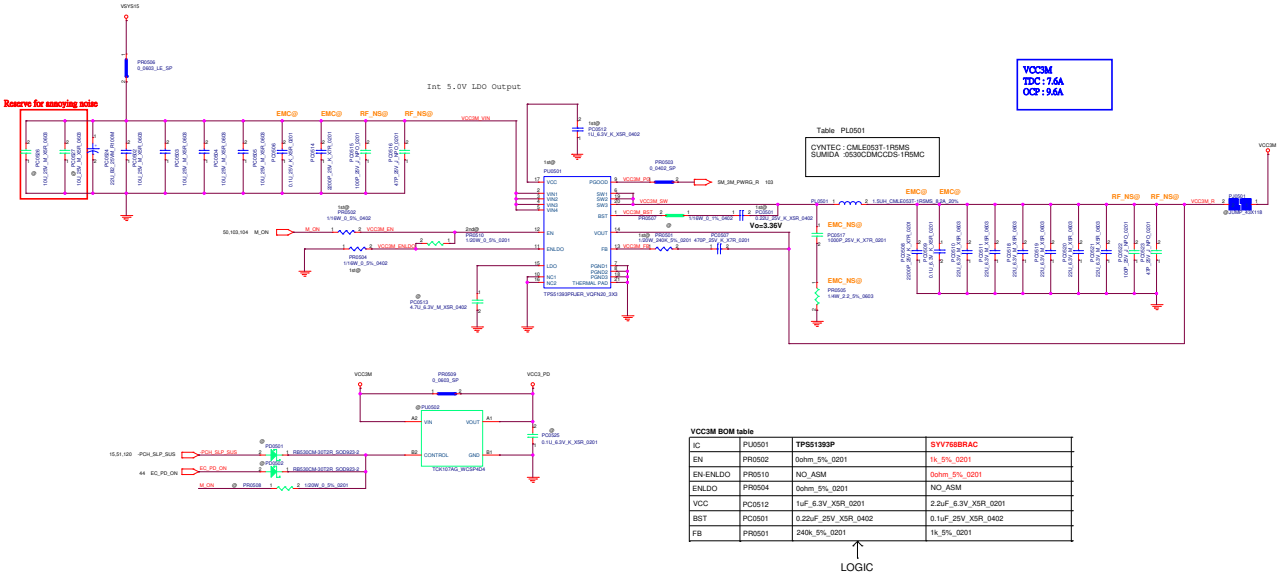
TABLE 4: USM Selection

State	USM	Resister to GND
M1	Y	0
M2	N	Floating

LOGIC

@PR0411 short10_10 AGND_SM_PD

Document Number		LCFC	
Size: Custom	Title: 104_DC/DC VCC5_PD (NB693AGQ)		1.0.1
Date: Tuesday, January 04, 2022	Sheet 104 of 139		



VCC3M BOM table

IC	PU0501	**TPS51393P**	**SYV768BRAC**
EN	PR0502	0ohm_5%_0201	1k_5%_0201
EN-ENLDO	PR0510	NO_ASM	0ohm_5%_0201
ENLDO	PR0504	0ohm_5%_0201	NO_ASM
VCC	PC0512	1uF_6.3V_X5R_0201	2.2uF_6.3V_X5R_0201
BST	PC0501	0.22uF_25V_X5R_0402	0.1uF_25V_X5R_0402
FB	PR0501	240k_5%_0201	1k_5%_0201

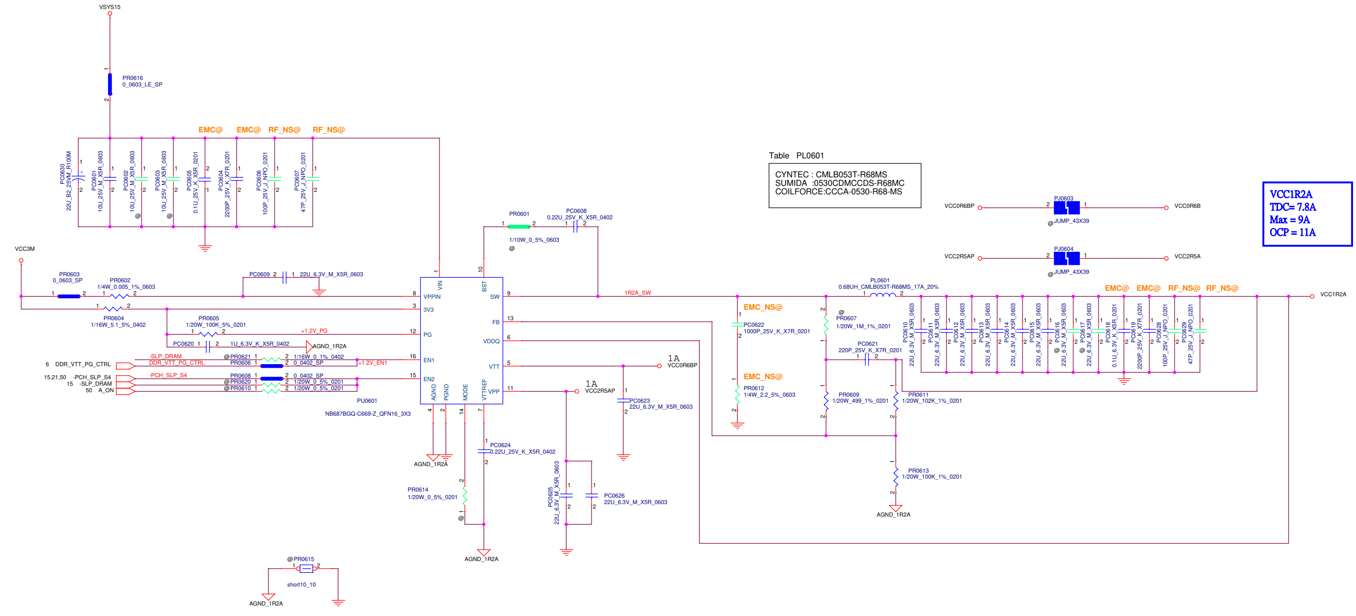


TABLE NB687GQ:EN1/EN2

State	EN1	EN2	VDDQ	VTTREF	VTT	VPP
S0	High	High	ON	ON	ON	ON
S3	Low	High	ON	ON	OFF(High-Z)	ON
S4/S5	Low	Low	OFF	OFF	OFF	OFF
Others	High	Low	OFF	OFF	OFF	OFF

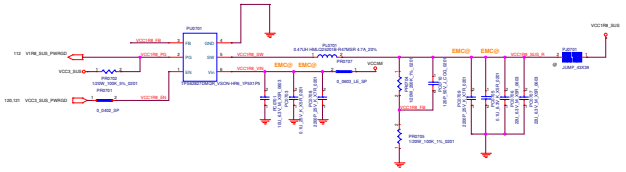
TABLE NB687GQ:MODE

State	USM	Fs	Resistor to GND
M1	NO	700KHz	0
M2	YES	700KHz	90K
M3	NO	500KHz	150K
M4	YES	500KHz	>230K or Float

Table PL0701

MURATA : DFE252012F-R47M-P2
CYNTEC : HMLQ252018-R47MSR
SUMIDA: 252012CDMCDDS-R47MC

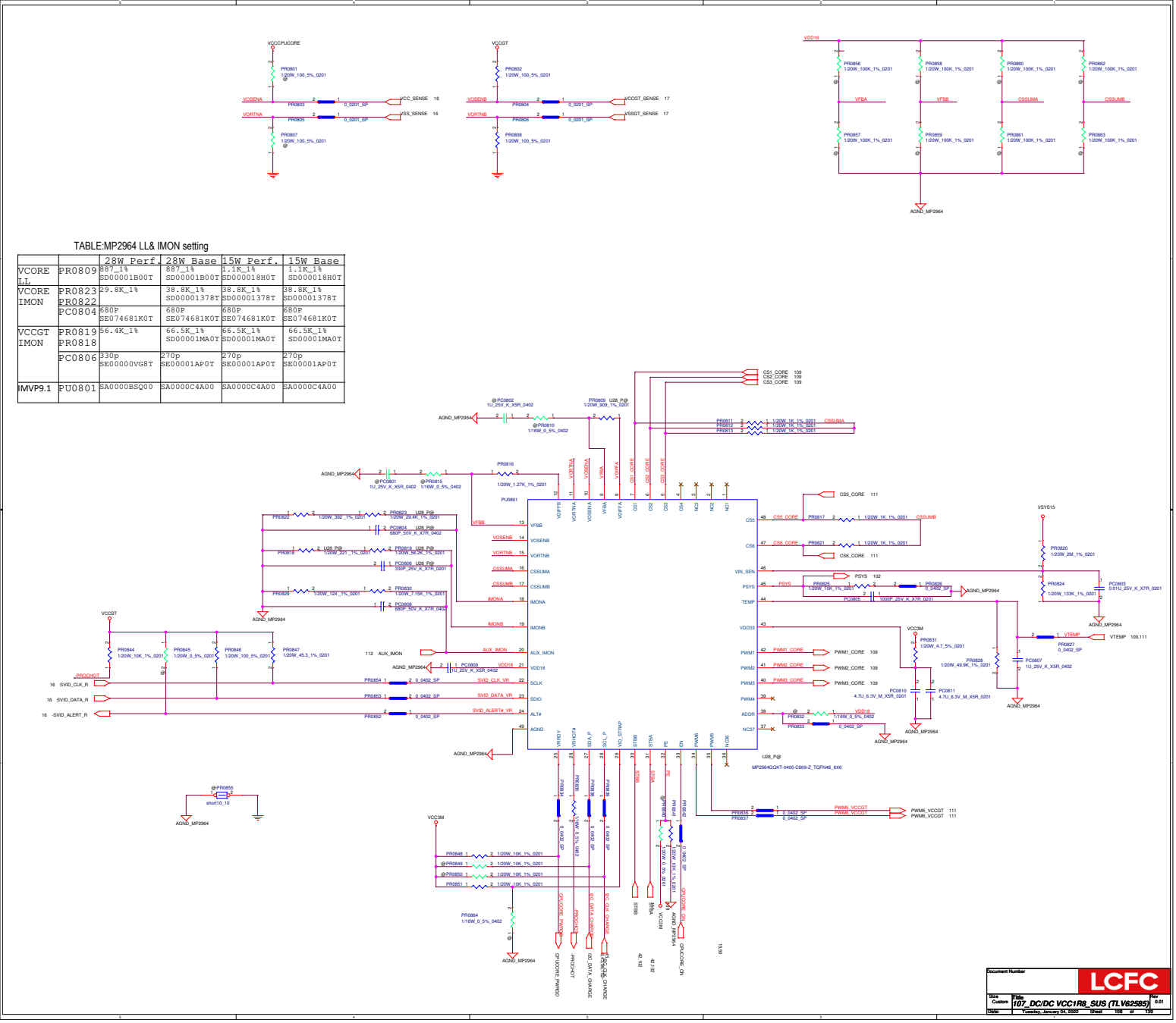
VCC1R8_SUS
Imax= 3A



Size: D	Project:	Rev: 0.01	
Date:	File:	R07_DC/DC VCC1R8_SUS (TPS62827)	

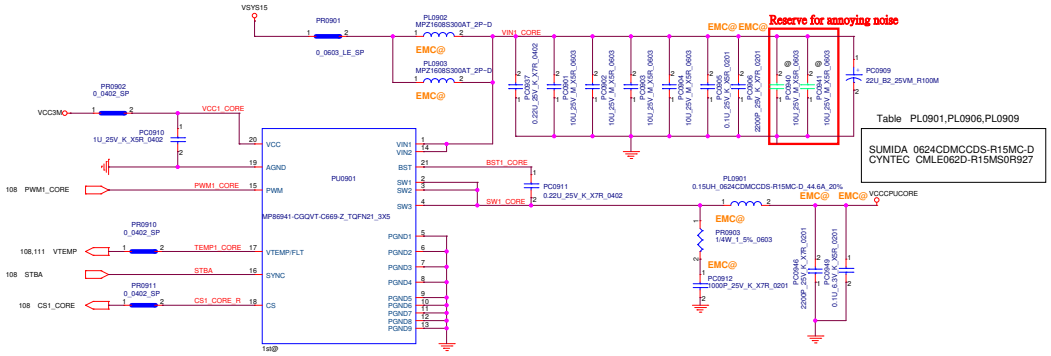
TABLE:MP2964 LL& IMON setting

		28W Perf.	28W Base	15W Perf.	15W Base
VCORE LL	PR0809	887_1% SD00001B00T	887_1% SD00001B00T	1.1K_1% SD00018H0T	1.1K_1% SD00018H0T
VCORE IMON	PR0823 PR0822	29.8K_1%	38.8K_1% SD00001378T	38.8K_1% SD00001378T	38.8K_1% SD00001378T
	PC0804	680P SE074681K0T	680P SE074681K0T	680P SE074681K0T	680P SE074681K0T
VCCGT IMON	PR0819 PR0818	56.4K_1%	66.5K_1% SD00001MA0T	66.5K_1% SD00001MA0T	66.5K_1% SD00001MA0T
	PC0806	330p SE00000VG8T	270p SE00001AP0T	270p SE00001AP0T	270p SE00001AP0T
IMVP9.1	PU0801	SA0000BSQ00	SA0000C4A00	SA0000C4A00	SA0000C4A00

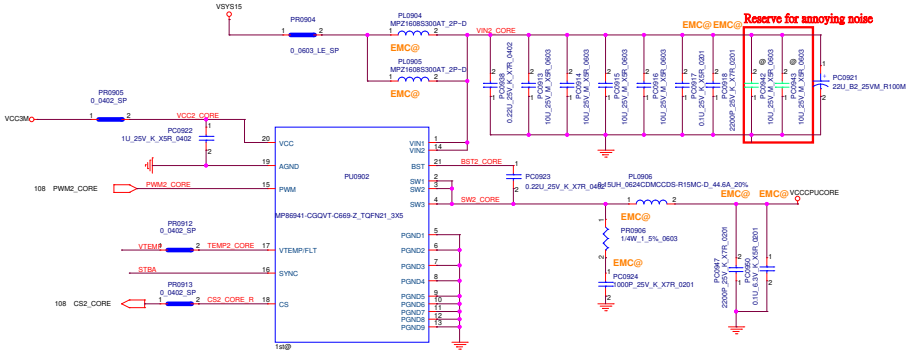


Vcore: PWM1/2/3
28W perf TDC:63A IccMax:109A
28W Base TDC:47A IccMax:80A
15W perf TDC:43A IccMax:80A
15W base TDC:32A IccMax:60A

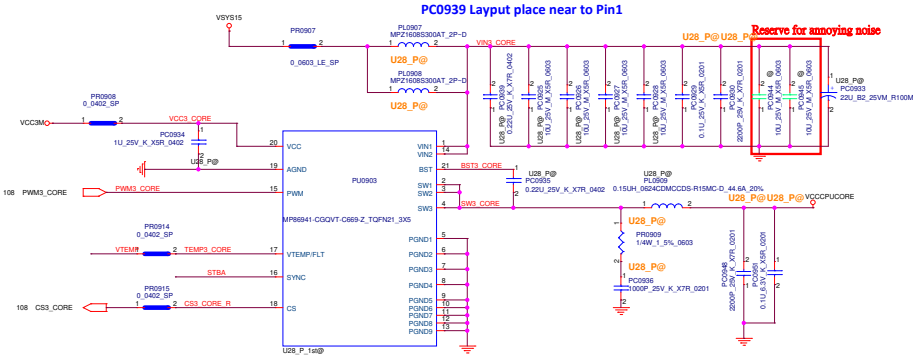
PC0937 Layput place near to Pin1



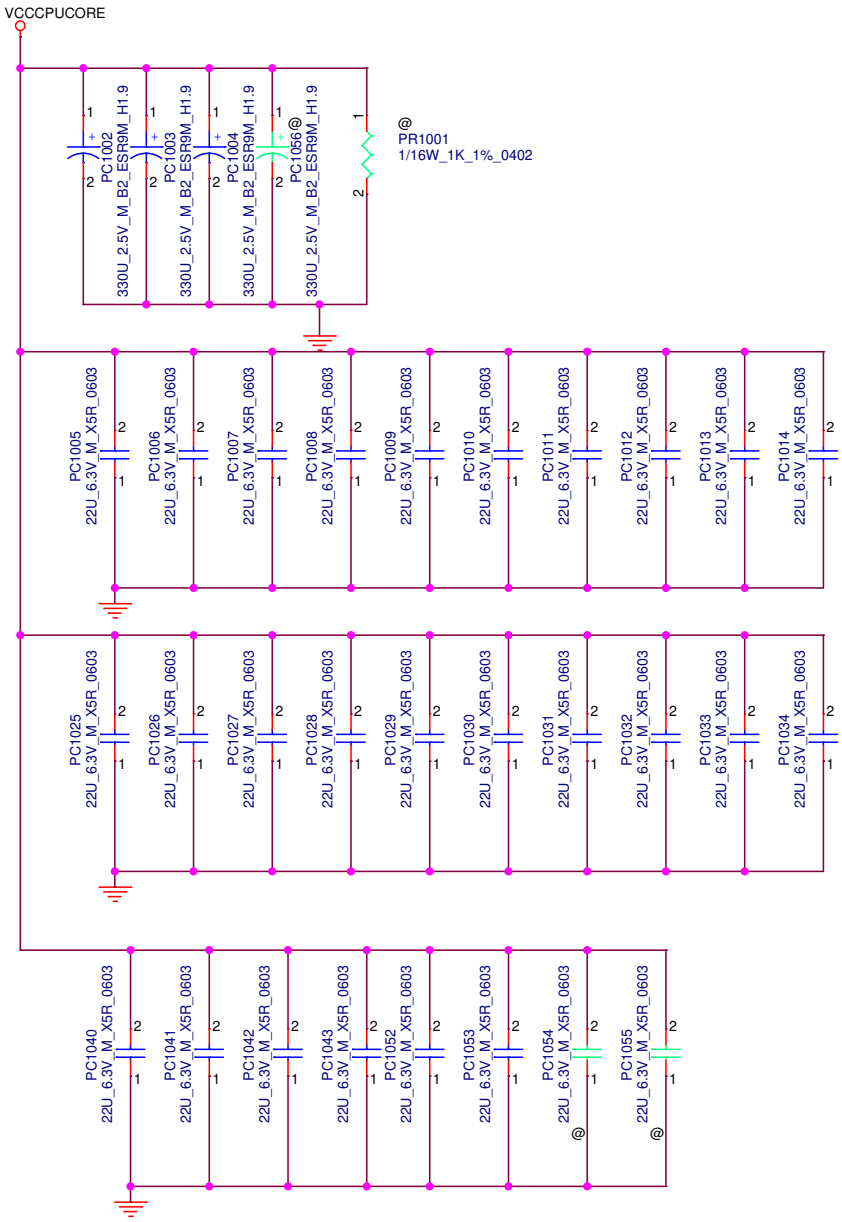
PC0938 Layput place near to Pin1



PC0939 Layput place near to Pin1



Document Number		LCFC	
Size: Custom	Title: 109_DC/DC_VCCCPUCORE(MP86971		Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 109 of 130		



Document Number		LCFC
Size: Custom	Title: *110_DC/DC VCCCPUCORE_DE_CAP*	Rev: 0.01
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VccGT: PWM6/5
28W performance TDC:30A IccMax:50A
28W Base/15W performance/15W base TDC:23A IccMax:40A

VCCGT1-->PWM6/CS6
PC1168 Layput place near to Pin1

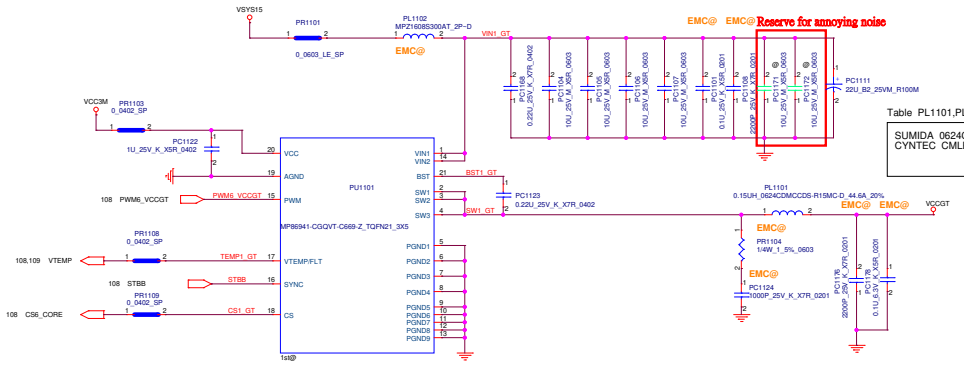
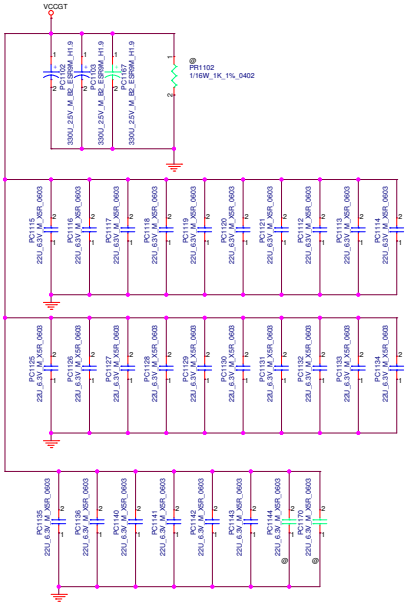
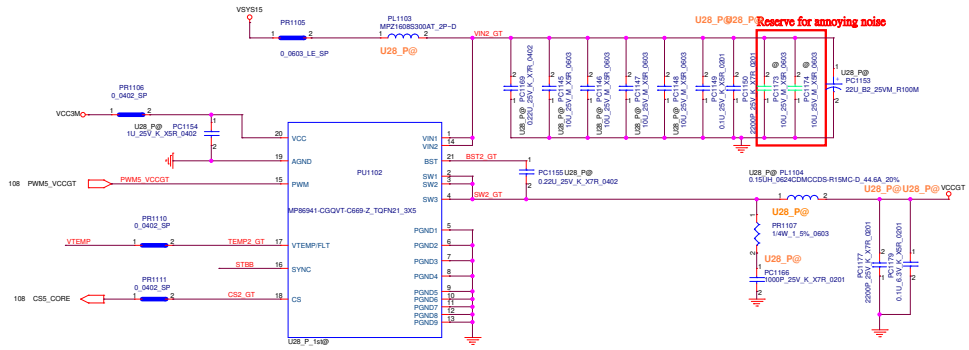


Table PL1101,PL1104

SUMIDA 0624CDMCCDS-R15MC-D CYNTEC CMLE062D-R15MS0R927



VCCGT2-->PWM5/CS5
PC1169 Layput place near to Pin1



Document Number		LCFC	
Size C	Title 111_DC/DC VCCGT(MP86943		Rev 0.01
Date: Tuesday, January 04, 2022	Sheet 111 of 130		

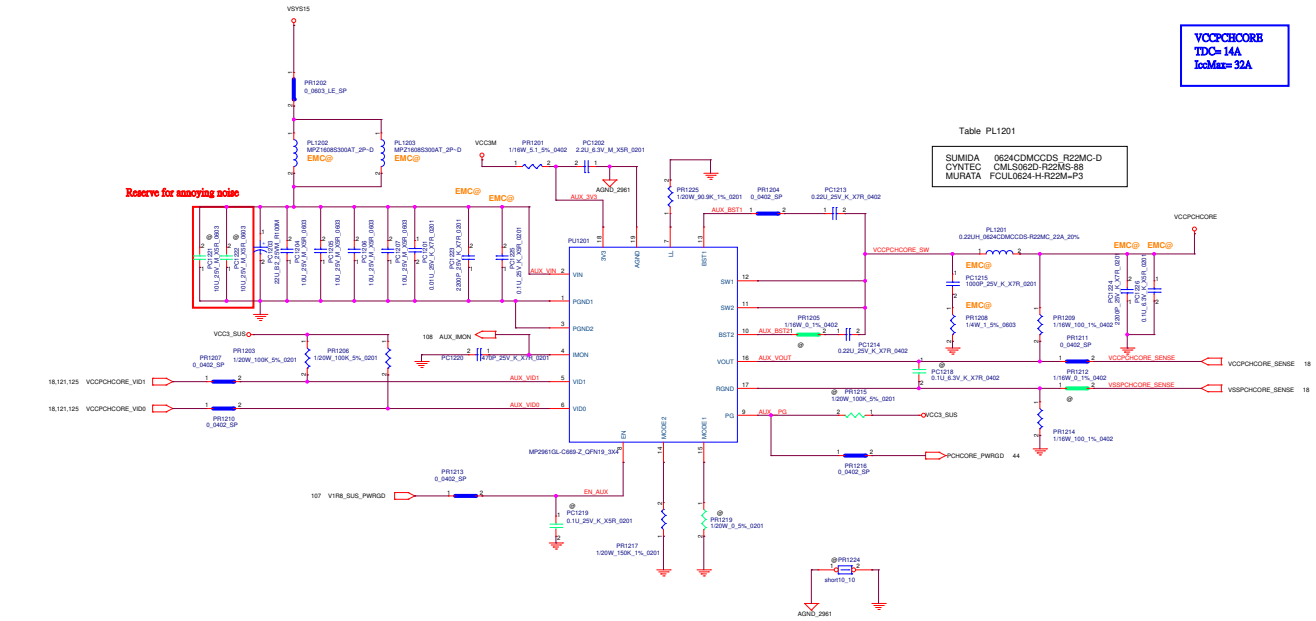


TABLE:MODE2 select

State	FS(KHz)	CLM	Resistor to GND
M1	800	12A	0
M2	1200	12A	90K
M3	800	17A	150K
M4	1200	17A	>230K or float

Logic →

TABLE:LL

State	Load Line	Resistor to GND
M1	1m	0
M2	1.5m	90K
M3	2m	150K
M4	2.5m	>230K or float

← Logic

TABLE:MODE1 select

State	Interleaving	VID Down option	Resistor to GND
M1	No	Slew down	0
M2	Yes	Slew down	90K
M3	Yes	Decay	150K
M4	No	Decay	>230K or float

Logic →

TABLE : VID control Bit logics

VID1	VID0	VOUT(V)
0	0	0
0	1	1.1
1	0	1.65
1	1	1.8

Document Number			
Size: Custom	File: 112_DC/DC VCCPCHCORE/MP2961		Rev: 0.01
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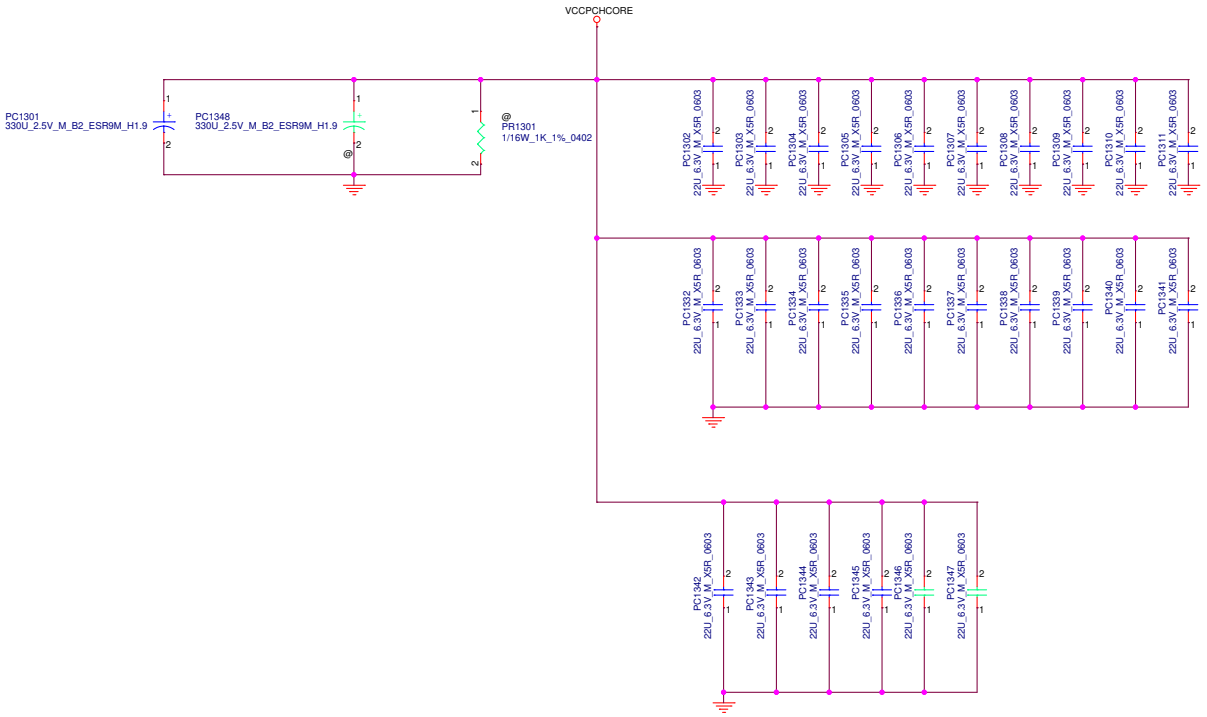

Document Number	LCFC	
Size: Custom	Title: *113_DC/DC VCCPCHCORE DE_CAP*	Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 113 of 130	

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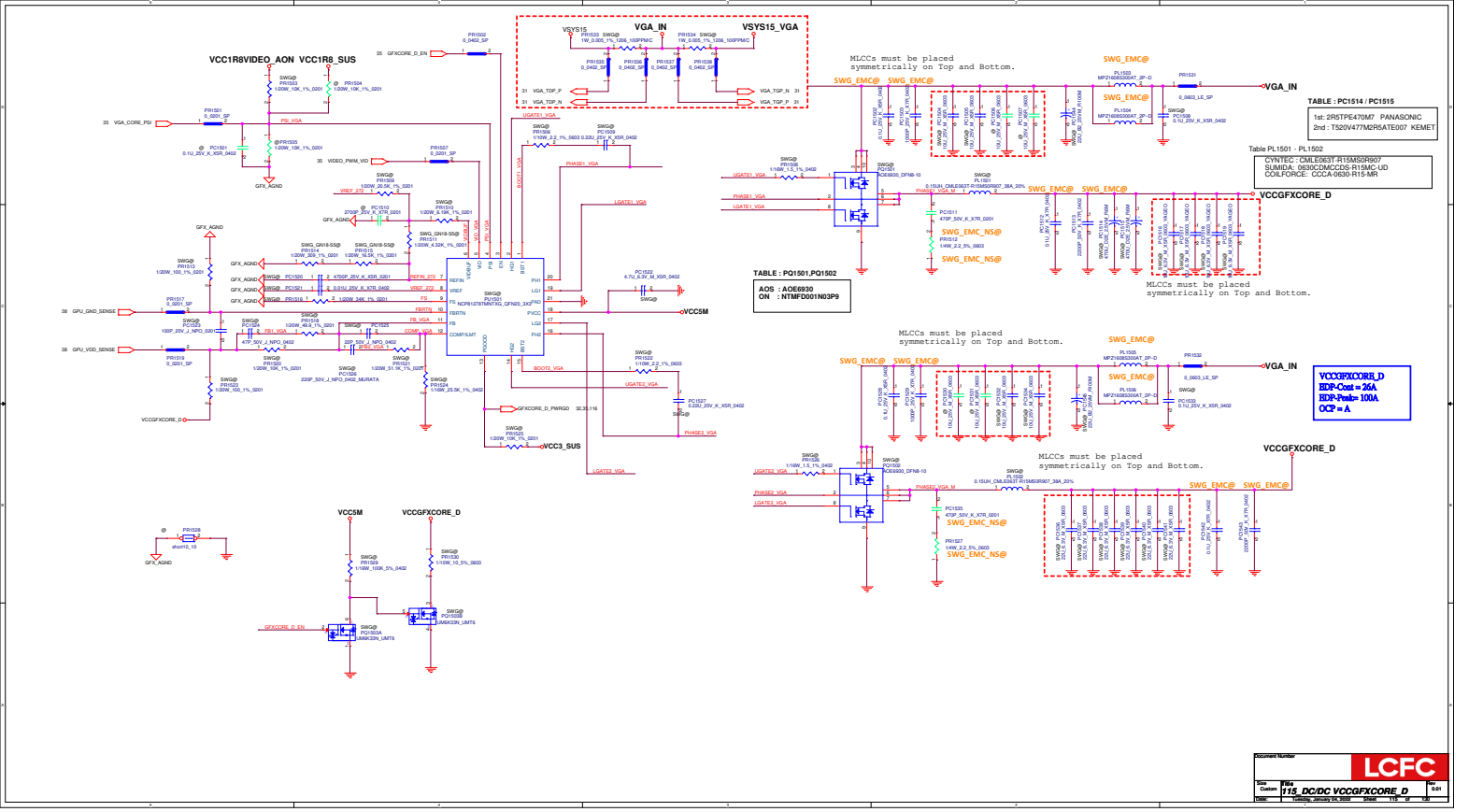
Document Number		LCFC
Size: Custom	Title: 114_BLANK	Rev: 0.01
Date:	Tuesday, January 04, 2022 Sheet 114 of 139	


VCC1R8VIDEO_AON VCC1R8_SUS
VSYS15
VGA_IN
VSYS15_VGA
MLCCs must be placed symmetrically on Top and Bottom.
VGA_IN
VCCGFXCORE_D
TABLE : PC1514 / PC1515
1st: 2R5TPE470M7 PANASONIC
2nd : T520V477M2R5ATE007 KEMET
Table PL1501 - PL1502
CYNTEC : CMLE063T-R15MS0R907
SUMIDA: 0630CDMCCDS-R15MC-LID
COILFORCE: CCCA-0630-R15-MR
TABLE : PQ1501,PQ1502
AOS : AOE6930
ON : NTMFD001N03P9
VCCGFXCORE_D
EDP-Cont = 26A
EDP-Peak= 100A
OCP = A
VCC5M
VCCGFXCORE_D
VCC3_SUS
GFX_AGND
Document Number
LCFC
Size: Custom
File: 11S_DC/DC VCCGFXCORE_D
Rev: 0.01
Date: Tuesday, January 04, 2022
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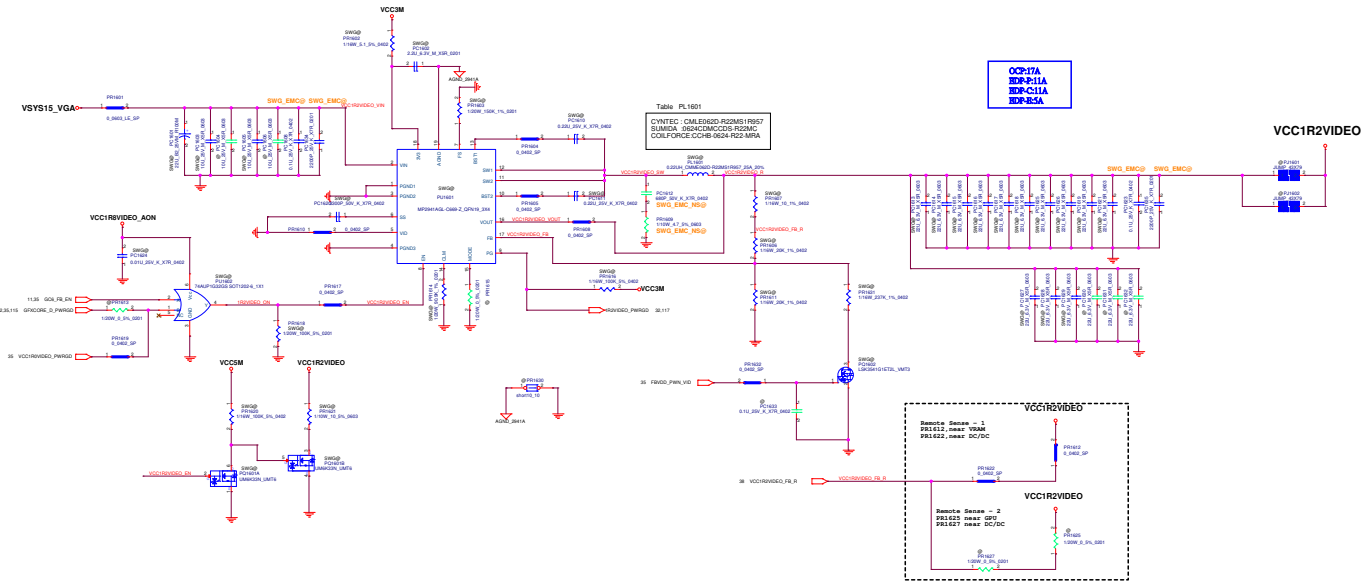
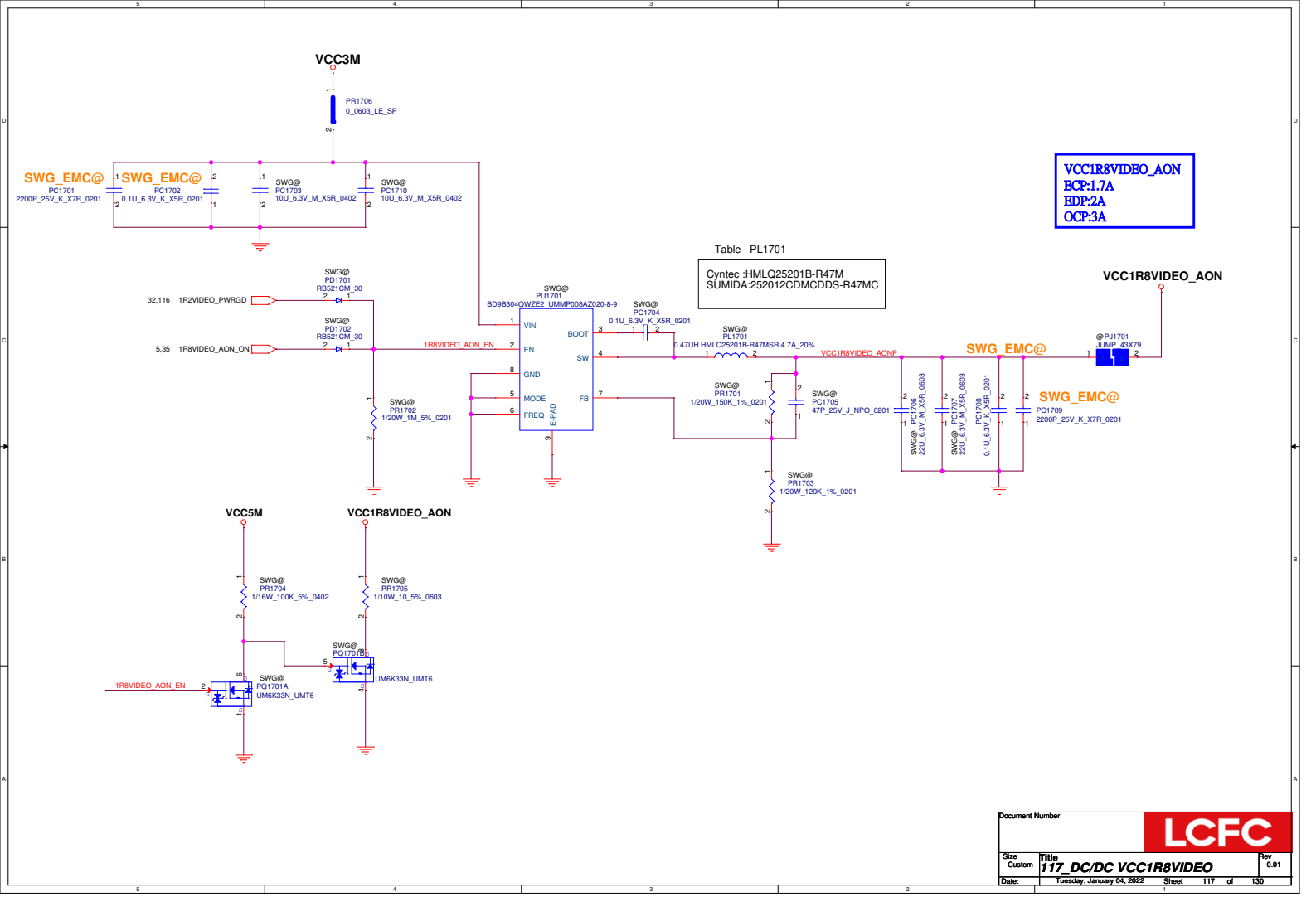


Size: Custom	Title: T16_DC/DC VCC1R2VIDEO(MP2941A)		Rev:
Date: Tuesday, January 08, 2013	Sheet: 1	of: 1	



Document Number		LCFC
Size: Custom	Title: *117_DC/DC VCC1R8VIDEO*	Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 117 of 130	

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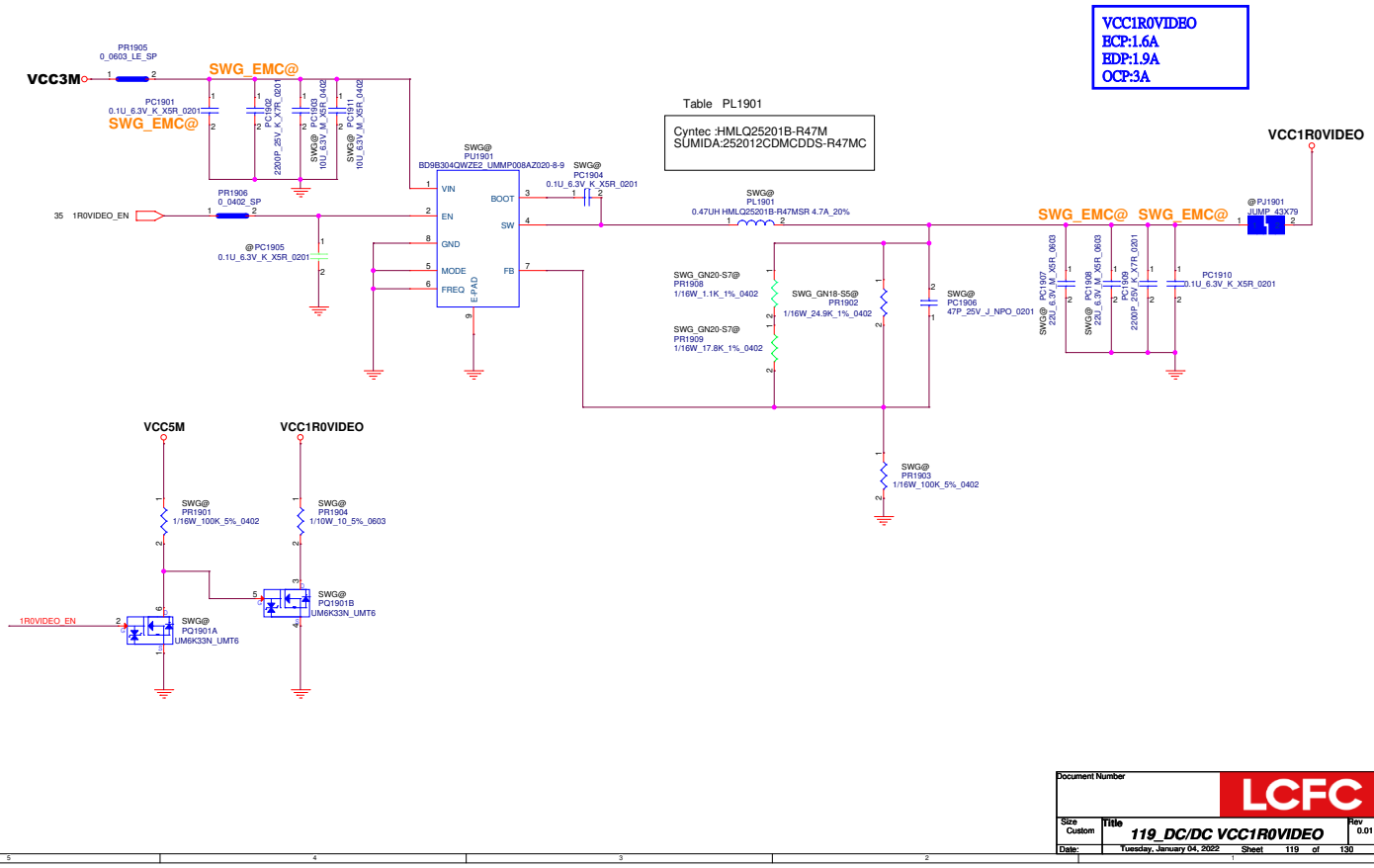
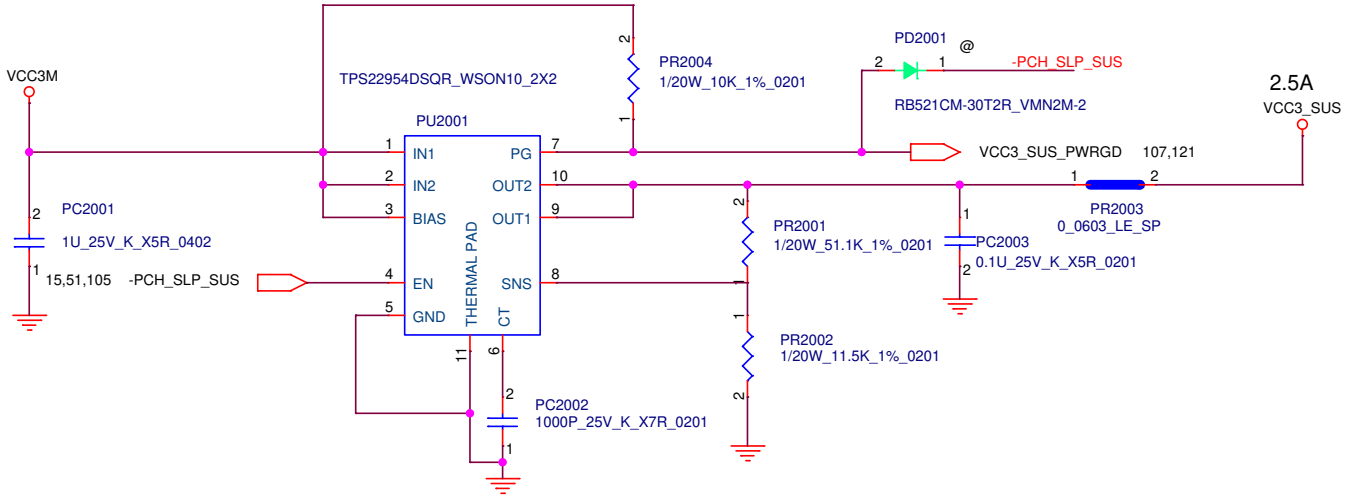
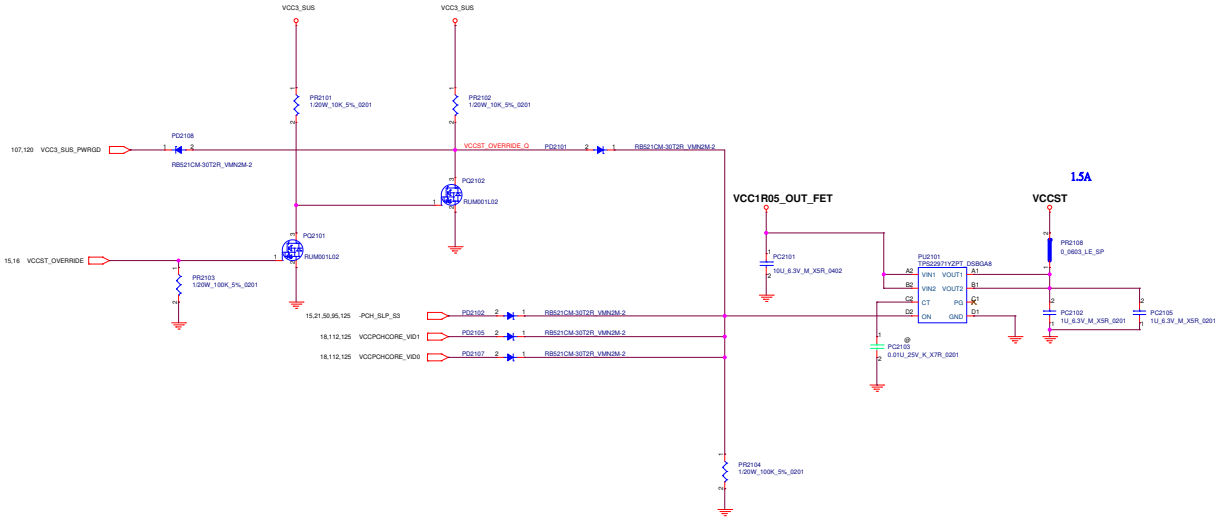
Document Number		LCFC
Size A	Title ***118_BLANK***	Rev 0.01
Date:	Tuesday, January 04, 2022 Sheet 118 of 130	



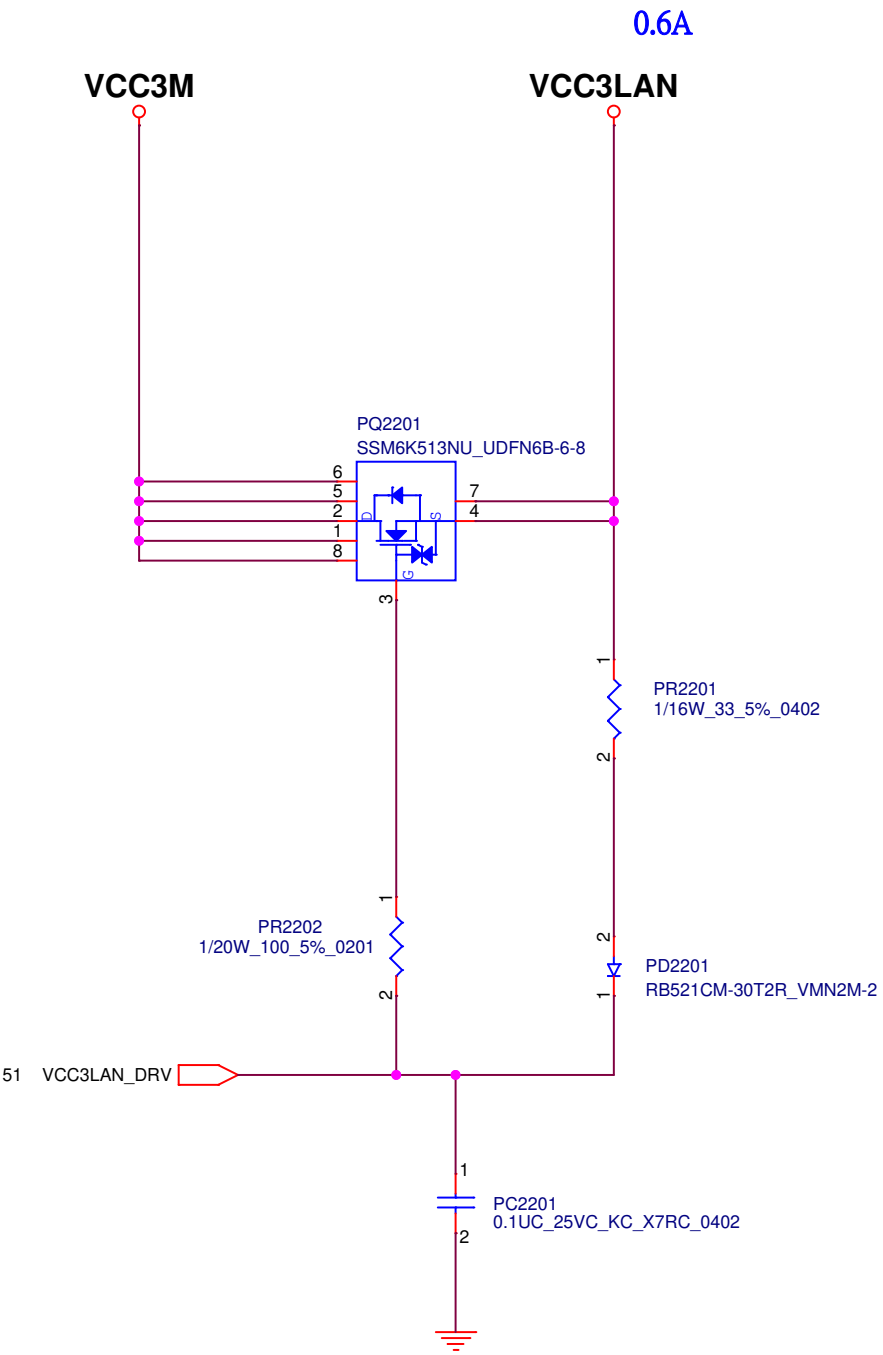
Document Number	LCFC	
Size: Custom	Title: *119_DC/DC VCC1R0VIDEO*	Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 119 of 130	



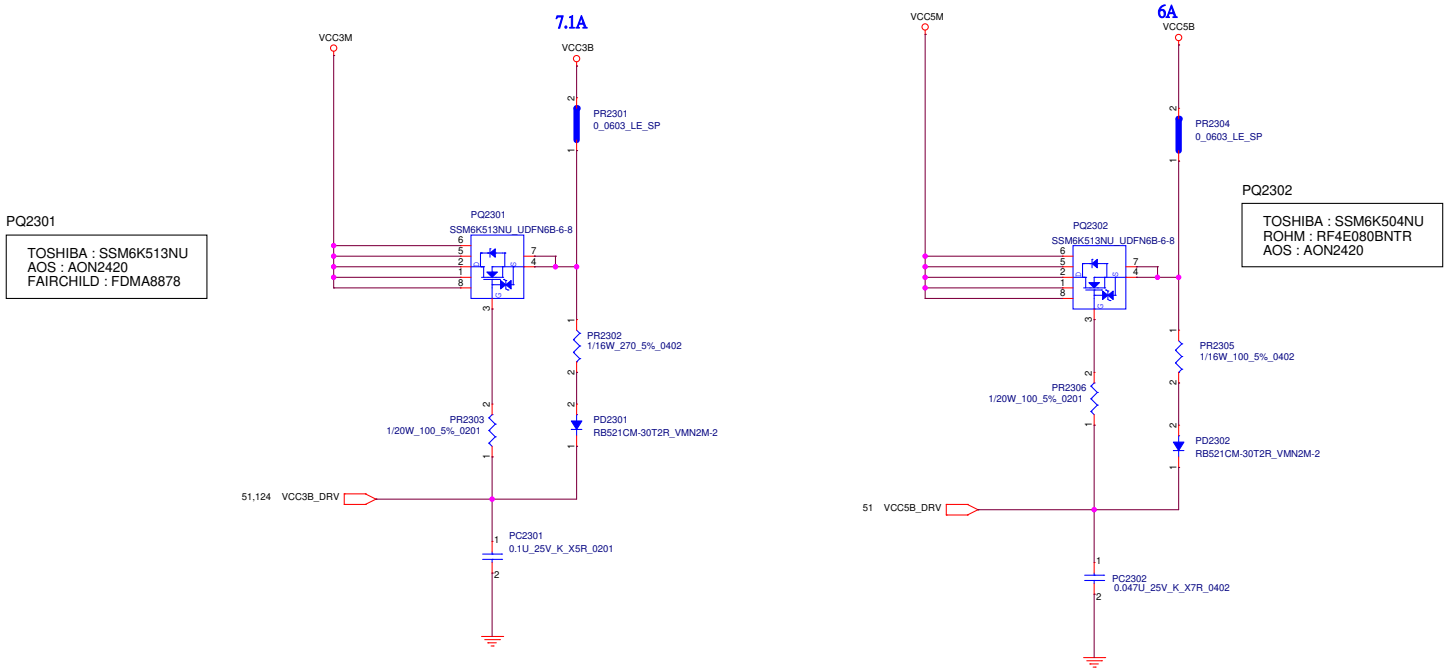
Document Number		LCFC
Size A	Title *120_LOAD SW VIDEO*	Rev 0.01
Date: Tuesday, January 04, 2022	Sheet 120 of 130	



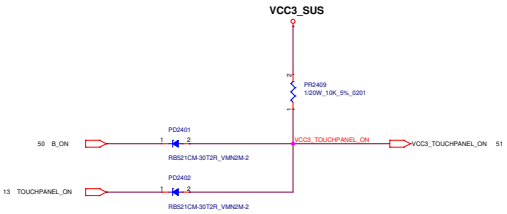
Document Number			LCFC
Size: Custom	Title: 121_LOAD SW VCCST & VCCSTG		Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 121 of 130		

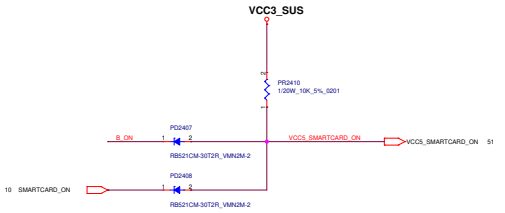


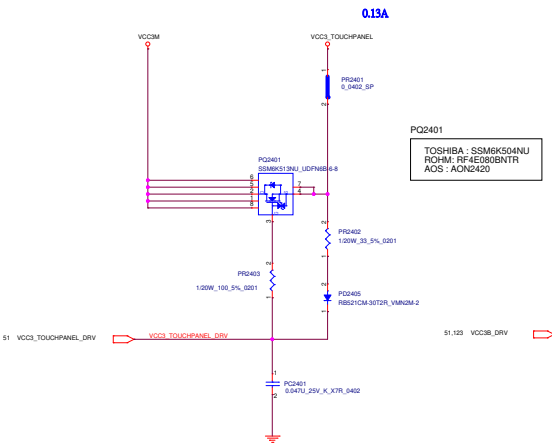
Document Number		LCFC
Size: Custom	Title: *122_LOAD SW LAN*	Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 122 of 130	



Document Number		LCFC
Size: Custom	Title: 123_LOAD SW B	Rev: 0.01
Date: Tuesday, January 04, 2022	Sheet 123 of 130	

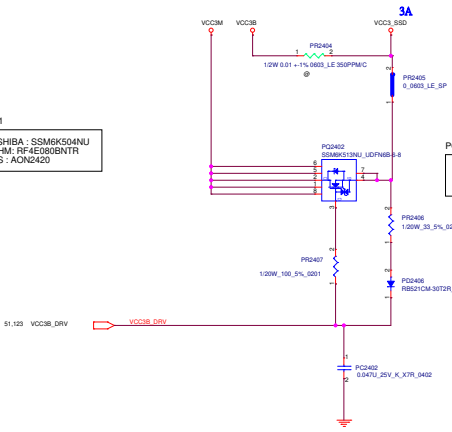






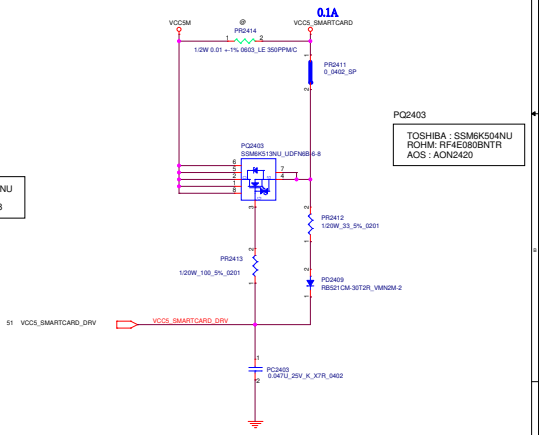
PQ2401

TOSHIBA : SSM6K504NU
ROHM: RF4E080BNTR
AOS : AON2420



PQ2402

TOSHIBA : SSM6K513NU
AOS : AON2420
FAIRCHILD:FDMA8878



PQ2403

TOSHIBA : SSM6K504NU
ROHM: RF4E080BNTR
AOS : AON2420

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Size: Custom	Title: 124_LOAD SW TOUCH PANEL		Rev: 0.01
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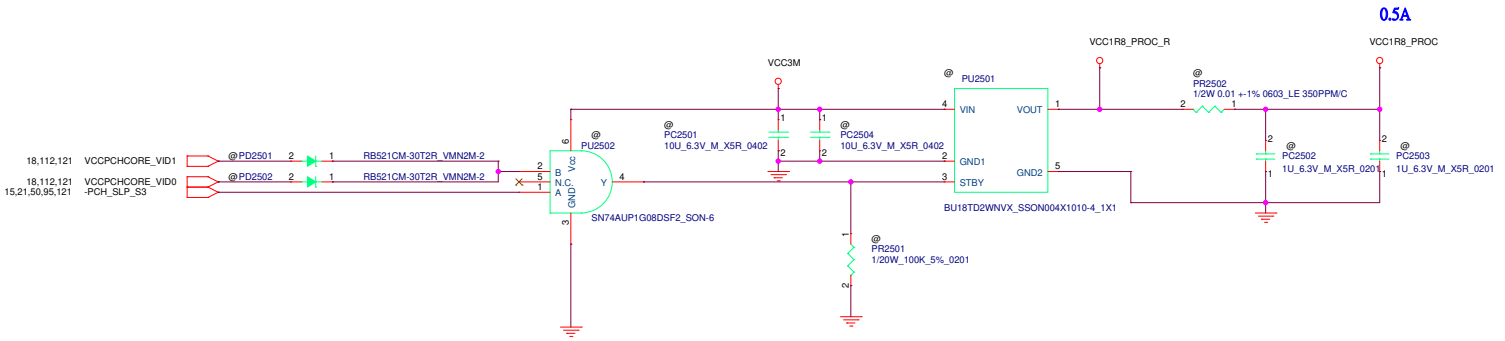

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Size: Custom	Title: *125_VCC1R8_PROC*	Rev: 0.01
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Size A	Title ***BLANK***	Rev 0.01
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PR0809
U28_B@
1/20W_909_1%_0201

PR0809
U15_P@
1/20W 1.1K +-1% 0201

PR0809
U15_B@
1/20W 1.1K +-1% 0201

PC0512
2nd@
2.2U_6.3V_M_X5R_0402

PC0501
2nd@
0.1U_25V_K_X5R_0402

PR0501
2nd@
1/20W_1K_1%_0201

PU0501
2nd@
SYV768BRAC_QFN_20P

PR0502
2nd@
1/16W_1K_1%_0402

PR0823
U28_B@
1/20W 38.3K +-1% 0201

PR0823
U15_P@
1/20W 38.3K +-1% 0201

PR0823
U15_B@
1/20W 38.3K +-1% 0201

PC0804
U28_B@
680P_50V_K_X7R_0402

PC0804
U15_P@
680P_50V_K_X7R_0402

PC0804
U15_B@
680P_50V_K_X7R_0402

PR0819
U28_B@
1/20W 66.5K +-1% 0201

PR0819
U15_P@
1/20W 66.5K +-1% 0201

PR0819
U15_B@
1/20W 66.5K +-1% 0201

PR0818
U28_B@
1/20W_0_5%_0201

PR0818
U15_P@
1/20W_0_5%_0201

PR0818
U15_B@
1/20W_0_5%_0201

PC0806
U28_B@
270P_25V_K_X7R_0201

PC0806
U15_P@
270P_25V_K_X7R_0201

PC0806
U15_B@
270P_25V_K_X7R_0201

PR0209
1/20W_16.5K_1%_0201
SD00001XV0T
SC8885@

PR0210
1/20W_137K_1%_0201
SD00002210T
SC8885@

PR0206
1/20W_330K_1%_0201
SD00001ZD0T
SC8885@

PC0225
1000P_25V_K_X7R_0201
SE17010ZKMT
SC8885@

PC0226
220P_25V_K_X7R_0201
SE00000RGMT
SC8885@

PR0205
1/20W_100K_1%_0201
SD00100S0T
SC8885@

PC0223
1000P_25V_K_X7R_0201
SE17010ZKMT
SC8885@

PC0224
10P_25V_J_NPO_0201
SE00001G0T
SC8885@

PU0801
U28_B@
MP2964GQKT-0705-C669--Z

PU0801
U15_P@
MP2964GQKT-0705-C669--Z

PU0801
U15_B@
MP2964GQKT-0705-C669--Z

PR1511
SWG_GN23-S7@
1/20W_2.8K_1%_0201

PR1515
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1/20W_14K_1%_0201

PR1514
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PU0201
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PR0202
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PR0203
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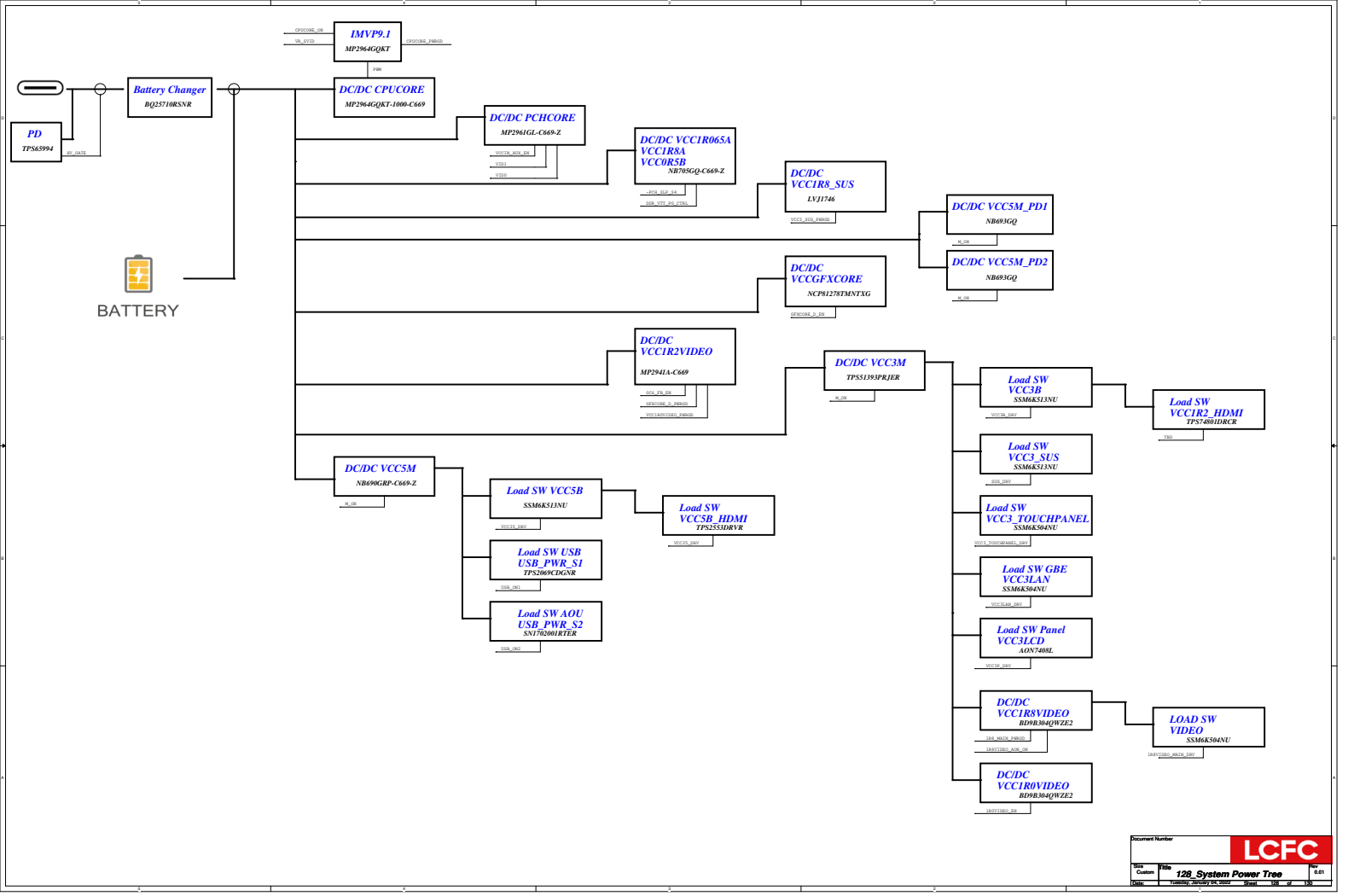

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DORAEMON

LCFC

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