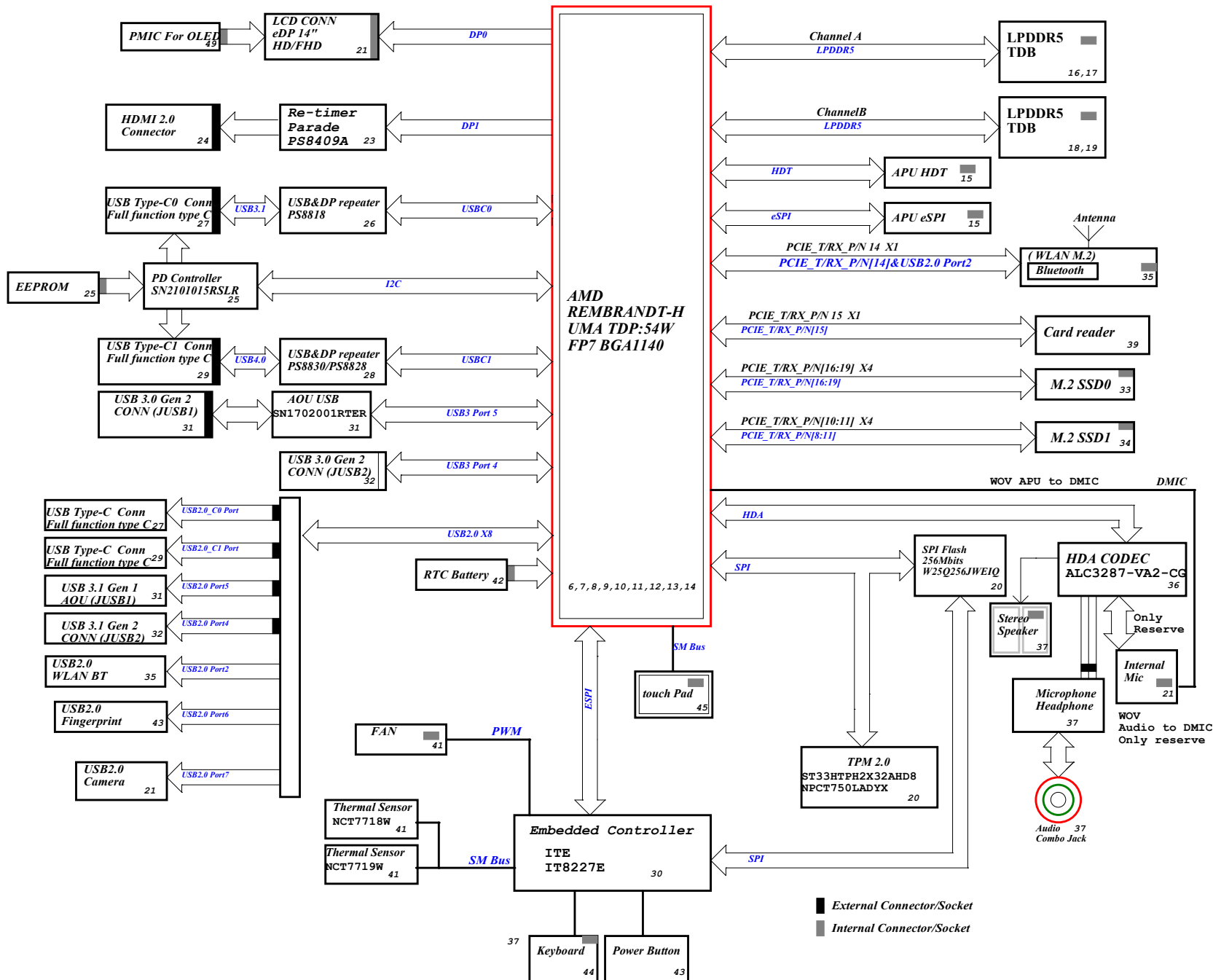
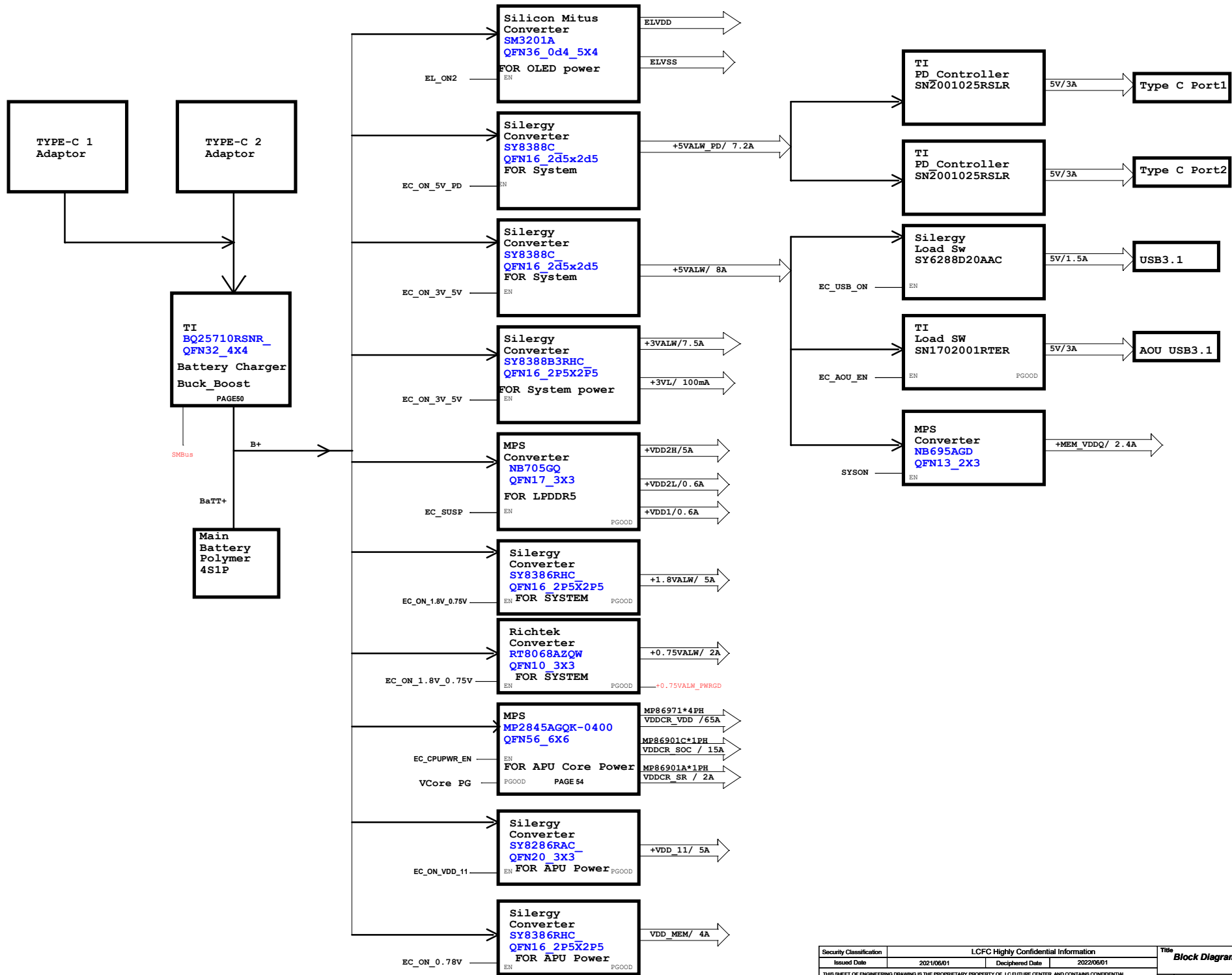


ARN33 AMD Rembrandt-H

| | |
|--------------------------------|-------------------------------|
| P001-Cover Page | P036-Audio_Codec |
| P002-Block Diagram_EE | P037-Audio_SPK/Jack |
| P003-Block Diagram_PWR | P038-BLANK |
| P004-Notes_PWR Map/SMBUS/HSIO | P039-PCIE SD Card |
| P005-Notes_For BOM | P040-BLANK |
| P006-CPU(1/8):(EDP/HDMI) | P041-Thermal |
| P007-CPU(2/8):(LPDDR5-CHA) | P042-RTC |
| P008-CPU(3/8):(LPDDR5-CHB) | P043-Buttons/CHR LED/FPR/ICON |
| P009-CPU(4/8):SPI/CLK/LPC/UART | P044-KB CONN |
| P010-CPU(5/8):I2C/HDA/GPIO | P045-TouchPad CONN |
| P011-CPU(6/8): PCIE/USB | P046-DCDC_SYSTEM PWR |
| P012-CPU(7/8):CPU Power | P047-Hole/Shielding |
| P013-CPU(8/8): GND | P048-BATT CONN |
| P014-SMBUS SW | P049-OLED PMIC |
| P015-HDT/eSPI Debug | P050-PWR_CHARGER_BQ25710RSNR |
| P016-Memory_CHA1 | P051-BLANK |
| P017-Memory_CHA2 | P052-PWR_3VALW&PWR_5VALW |
| P018-Memory_CHB1 | P053-PWR_Memory PWR_LPDDR5 |
| P019-Memory_CHB2 | P054-PWR_CPU PWR Controller |
| P020-SPI ROM/TPM | P055-PWR_CPU PWR Decoupling |
| P021-eDP/CAM/DMIC/ALS | P056-PWR_CPU PWR1_+0.75VALW |
| P022-BLANK | P057-PWR_CPU PWR2_+1.8VALW |
| P023-HDMI2.1 RETIMER | P058-PWR_CPU PWR3_+VDD11 |
| P024-HDMI_CONN | P059-PWR_CPU PWR4_+VDD_MEM |
| P025-PD_Controller | P060-Change List_EE |
| P026-TYPEC0_REDRIIVER | P061-Change List_PWR |
| P027-TYPEC0_CONN | |
| P028-TYPEC1_REDRIIVER | |
| P029-TYPEC1_CONN | |
| P030-EC_IT8227E | |
| P031-USBA_PortA | |
| P032-USBA_PortB | |
| P033-M.2 SSD1 | |
| P034-M.2 SSD2 | |
| P035-M.2 WLAN | |





PD I2C address table

| Port | Master | Slave | End Port | Address | Description |
|--------|--------|-------------|-------------|-------------|---|
| I2C_EC | EC | PD | PORTA | 0x23 | ADCIN1=0.1079#2 ; ADCIN2=1#7 ADCIN1 decoded value = 2 ADCIN2 decoded value = 7 I2C address index = #4 A port: 0100011 B port: 0100111 |
| | | | PORTB | 0x27 | |
| I2C2S | APU | PD | PORTA | 0x23 | Confirm with Max |
| | | | PORTB | 0x27 | |
| I2C3M | PD | APU | USBC0 | 0x54 | The USB PD I2C Slave responds to a 7-bit address. |
| | | | USBC1 | 0x58 | |
| | PD | EEPROM | EEPROM | 0x50 | |
| | | | | | |
| | PD | Redriver-C0 | Redriver-C0 | PS8818:0XD0 | (CP101,CP100) : LL=0x10; LH=0x20; HL=0x30; HH=0x40; PS8828:0X10 PS8830:0X10 |
| | | Redriver-C1 | Redriver-C1 | PS8830:0X10 | |

EC I2C address table

| Port | Master | Slave | End Port | Address | Description |
|------------------|--------|---------|--------------|---------------|---|
| SMCLK0 SMDAT0 | EC | VRM | VRM | 0x20 | To support multiple VR devices used with the same PMBusTM interface, PMBusTM address programming either by ADDR |
| | EC | CHARGER | CHARGER | 0x12 | The device performs only as a SMBus slave device with address 0b0010010 (0x12h) and does not initiate communication on the bus. |
| | EC | Battery | Battery | 0x16 | Confirm with changxia |
| | | | | | |
| | | | | | |
| SMCLK1 SMDAT1 | EC | PD | PD | N/A | Refer to PD table |
| SMCLK2 SMDAT2 | EC | APU | APU Thermal | 0x98 | confirm with dingyanlong |
| | EC | HDMI | HDMI | 0x80h / 0x81h | PS8409A |
| | EC | ALS | ALS | 0x44 | SY3079AS22-J01 |
| | EC | TS 1 | TS 1 | 0x4D | NCT7719W I2C/SMBUSTM address is 1001_101xb |
| | EC | TS 2 | TS 2 (SMBUS) | 0x4C | NCT7718W I2C/ SMBusTM address is 1001100xb |

APU I2C address table

| Port | Master | Slave | End Port | Address | Description |
|-----------------|--------|----------------|-----------|----------------------------|---|
| I2C0 | APU | PD | PORTA | 0x23 | Confirm with Max |
| | | | PORTB | 0x27 | |
| | APU | ALS | ALS | 0x44 | SY3079AS22-J01 |
| I2C1 | APU | T_PANEL | T_PANEL | 0x10 ELAN | |
| I2C2 | APU | Touch_PAD | Touch_PAD | 0x15 0x2C | SB974A-22H0 I2C device address: 0x15 TM-P3652 I2C device address: 0x2C |
| I2C3 (SMBUS) | APU | TYPEC0 REDRIVE | TYPEC | PS8818:0XD0 | |
| | APU | TYPEC1 REDRIVE | TYPEC | PS8828:0X10 PS8830:0X10 | |

APU HSIO table

| AMD Rembrandt HS I/O port assignment | | | |
|--------------------------------------|------------------|--------------|--------|
| Port# | FP7 Rembrandt | 14P GEN3 | Notes |
| 1 | DP0 | EDP Panel | |
| 2 | DP1 | HDMI2.1 | |
| 3 | USBC0/DP2/USB3 0 | Type-C Port0 | USB3.1 |
| 4 | USBC1/DP3/USB3 1 | Type-C Port1 | USB4.0 |
| 5 | USBC4/DP4/USB3 4 | Type-A Port0 | USB3.2 |
| 6 | USB3 5 | Type-A Port1 | USB3.2 |
| 7 | USB2 0 | Type-C Port0 | |
| 8 | USB2 1 | Type-C Port1 | |
| 9 | USB2 2 | Nx2 BT | |
| 10 | USB2 3 | NA | |
| 11 | USB2 4 | Type-A Port0 | |
| 12 | USB2 5 | Type-A Port1 | |
| 13 | USB2 6 | Fingerprint | |
| 14 | USB2 7 | CAMERA | |
| 1 | PCIe0-PCIe7 | NA | |
| 9 | PCIe8 | | |
| 10 | PCIe9 | | |
| 11 | PCIe10/SATA1 | SSD1 | GEN4 |
| 12 | PCIe11/SATA0 | | |
| 13 | PCIe12 | NA | |
| 14 | PCIe13 | NA | |
| 15 | PCIe14 | WLAN | GEN3 |
| 16 | PCIe15 | SD Card | GEN1 |
| 17 | PCIe16 | | |
| 18 | PCIe17 | SSD0 | GEN4 |
| 19 | PCIe18 | | |
| 20 | PCIe19 | | |

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2021/06/01

Deciphered Date

2022/06/01

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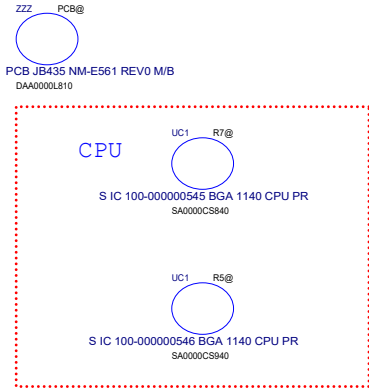
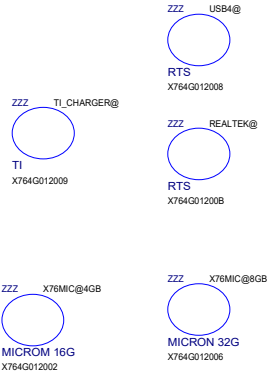
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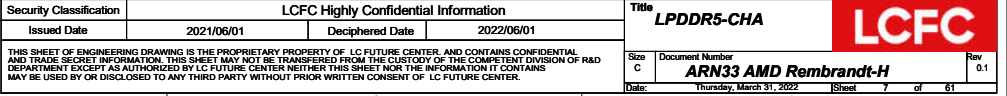
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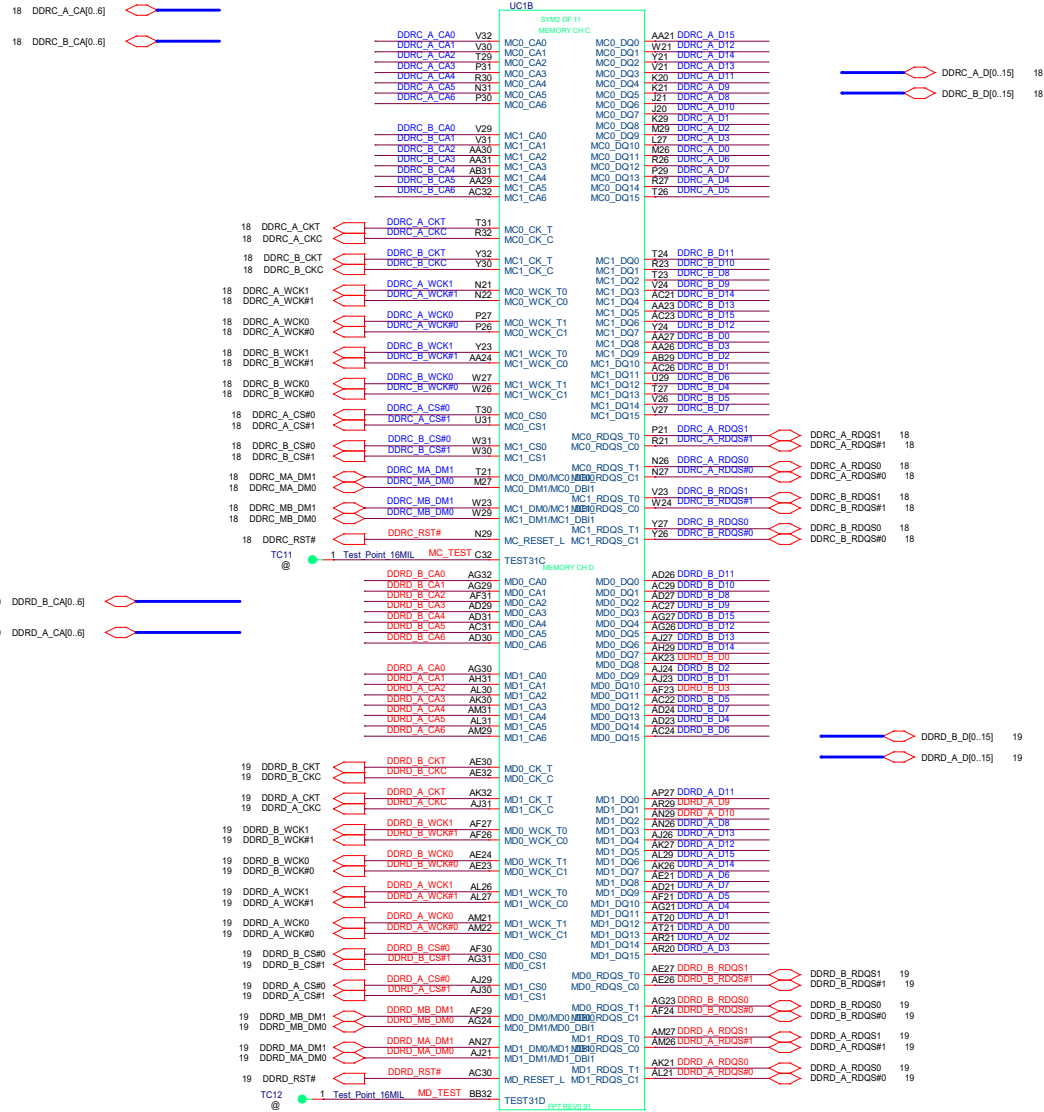
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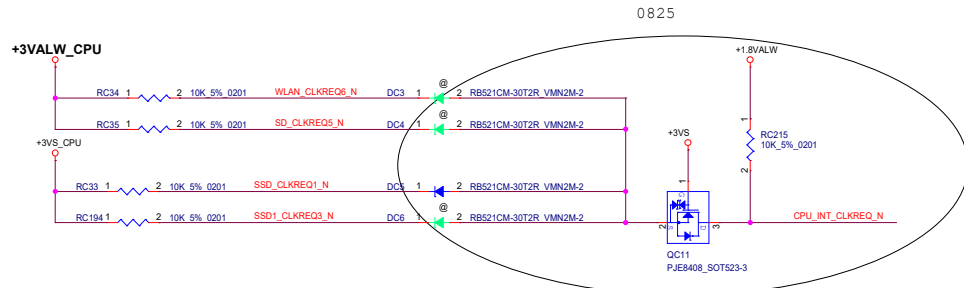
Map/SMBUS/HSIO

LCFC

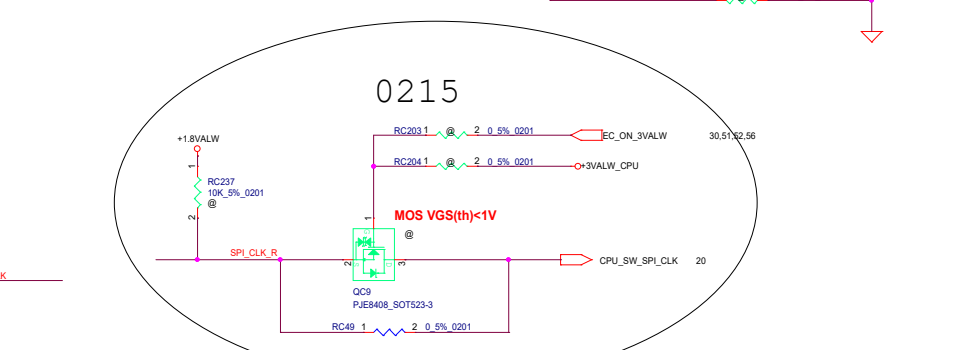
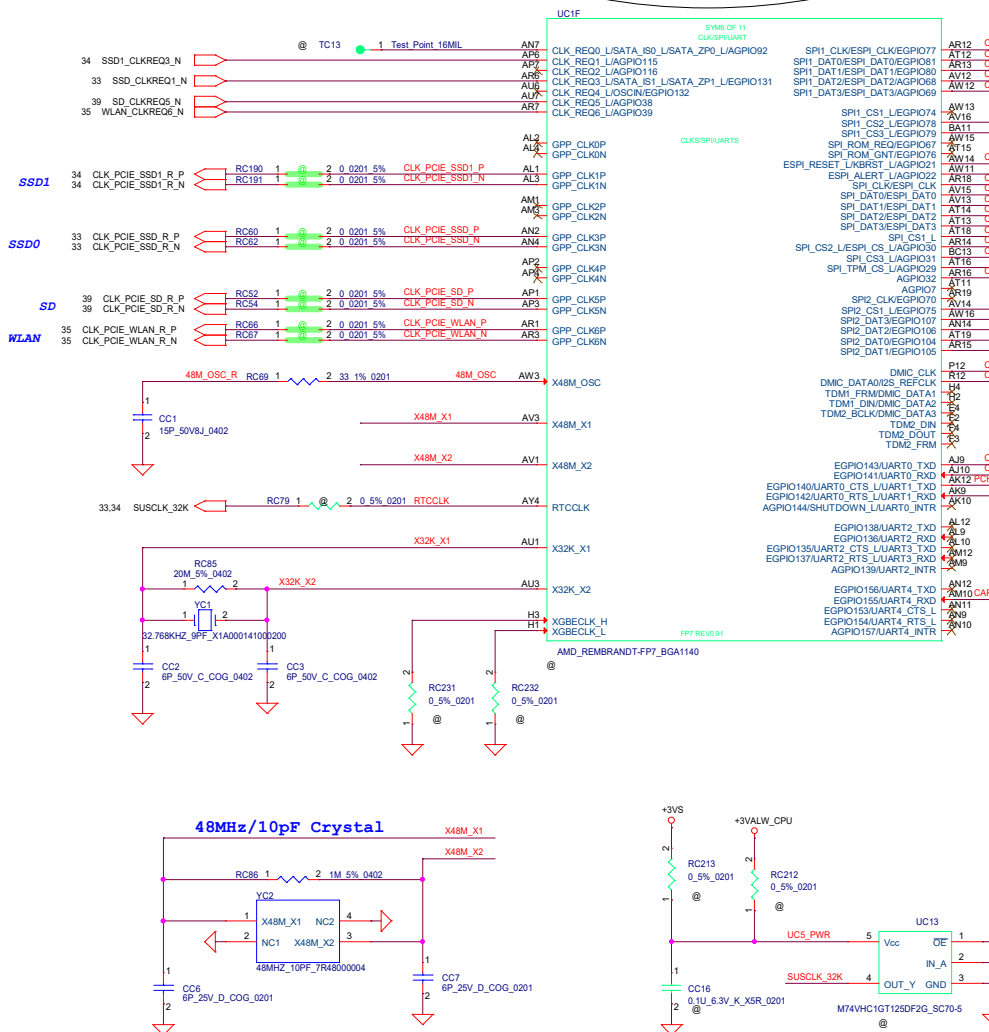


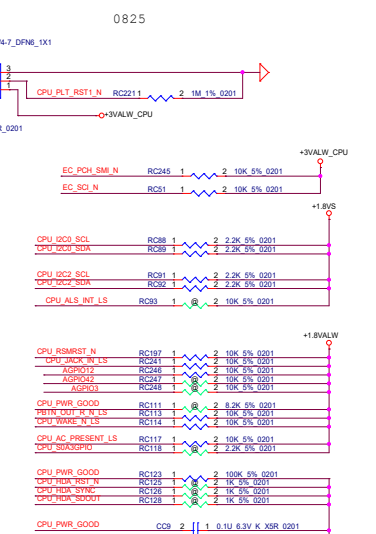




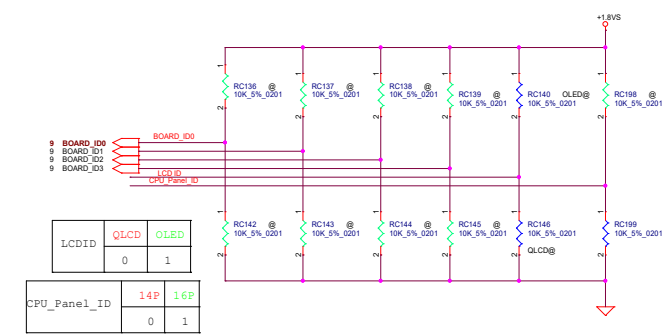


| STRAP PINS | Description |
|-------------|---|
| SPI_CLK | 1:USE 48MHZ CRYSTAL CLOCK AND GENERATE BOTH INTERNAL AND EXTERNAL CLOCKS(DEFAULT) 0:USE 100MHZ PCIE CLOCK AS REFERENCE CLOCK AND GENERATE INTERNAL CLOCKS ONLY |
| SYS_RESET_L | 1:NORMAL RESET MODE(DEFAULT) 0:SHORT RESET MODE |

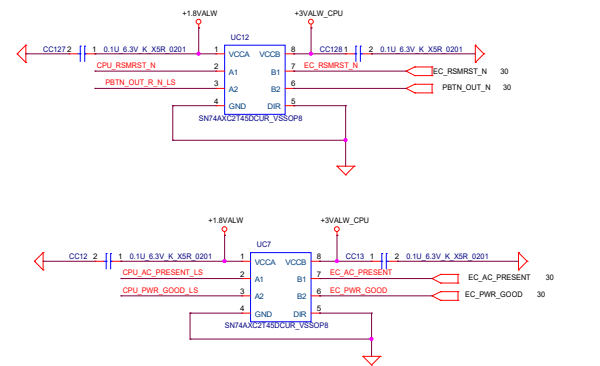





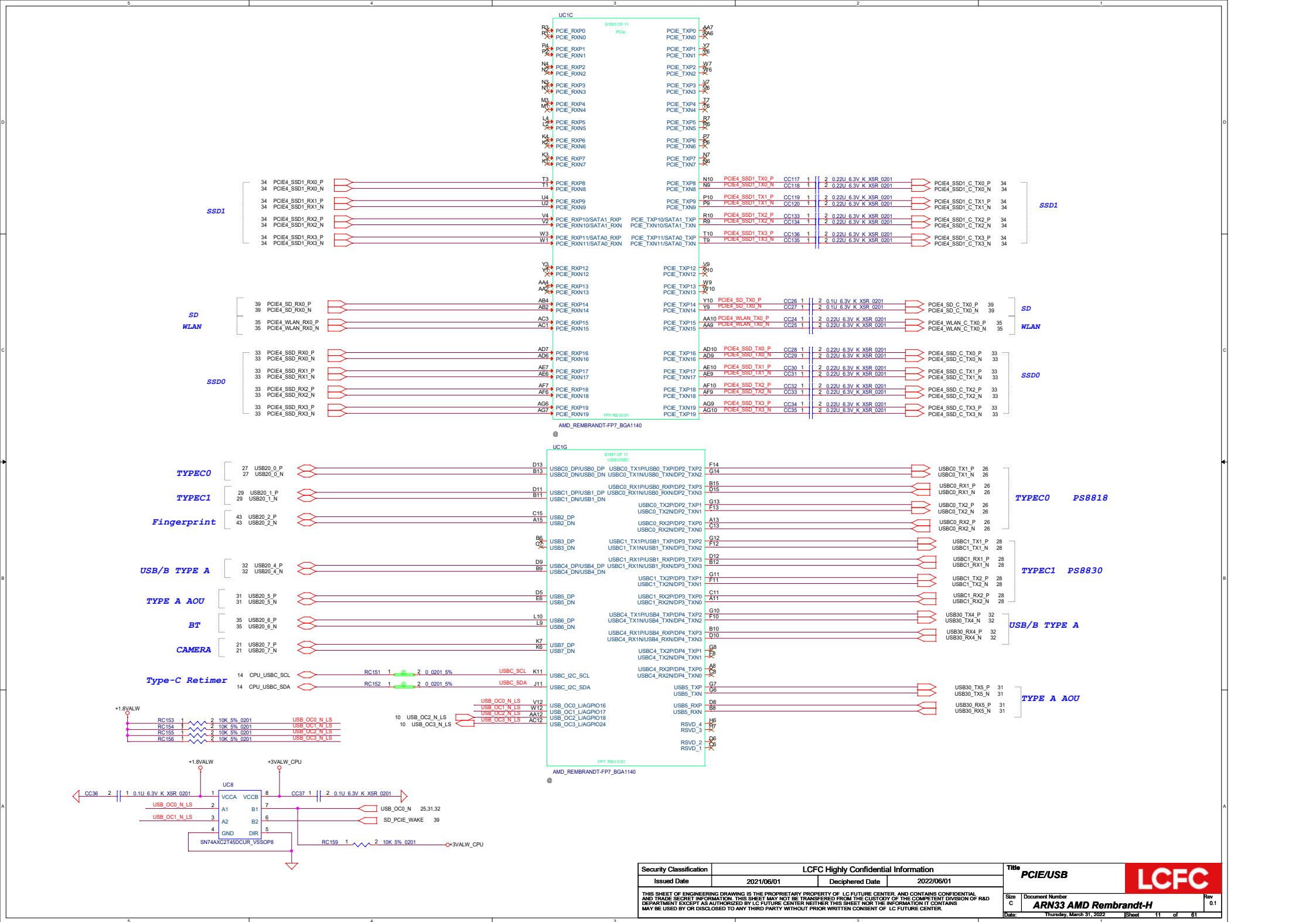
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|--------------------------|-------------|--------------|
| Board ID (3, 2, 1, 0) | 0000 | Samsung 2GB |
| | 0001 | Samsung 4GB |
| | 0010 | Samsung 8GB |
| | | Samsung 16GB |
| | 0011 | Hynix 2GB |
| | 0100 | Hynix 4GB |
| | 0101 | Hynix 8GB |
| | | Hynix 16GB |
| | 0110 | Micron 2GB |
| | 0111 | Micron 4GB |
| | 1000 | Micron 8GB |
| | | Micron 16GB |
| | | |
| | | |

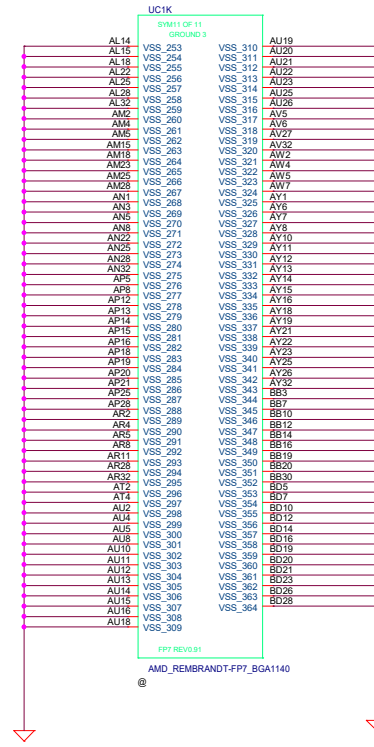
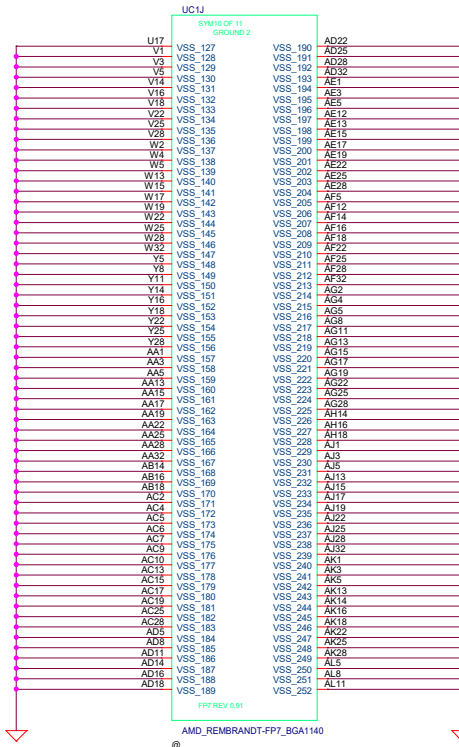
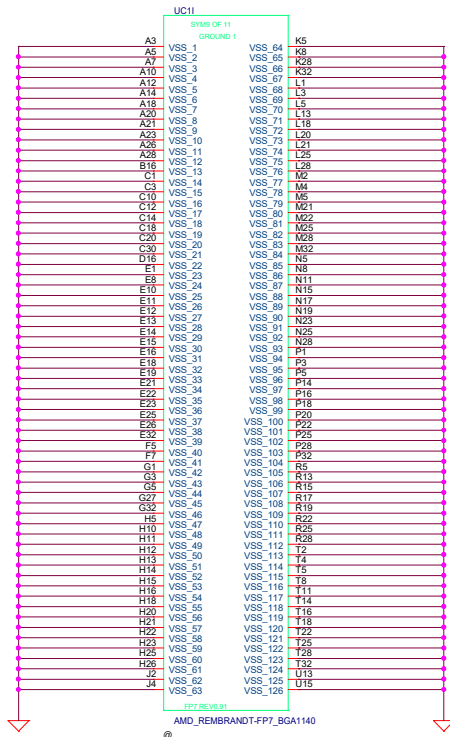


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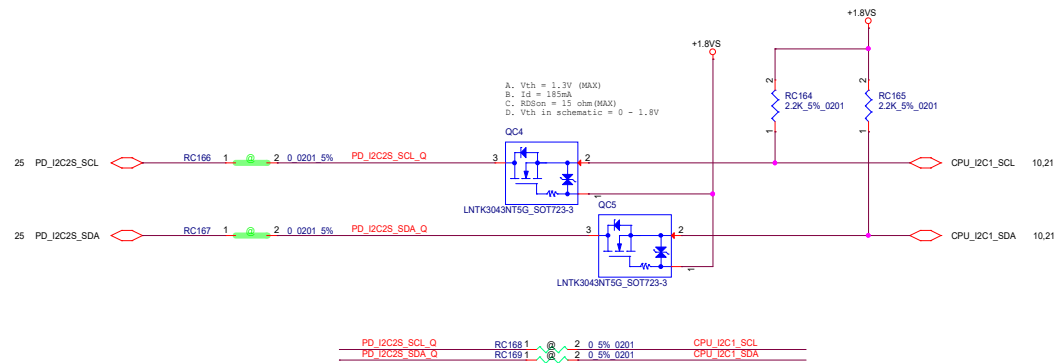


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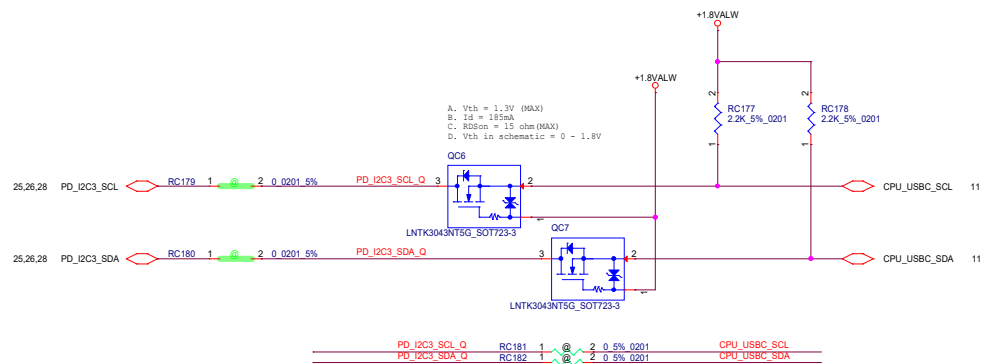


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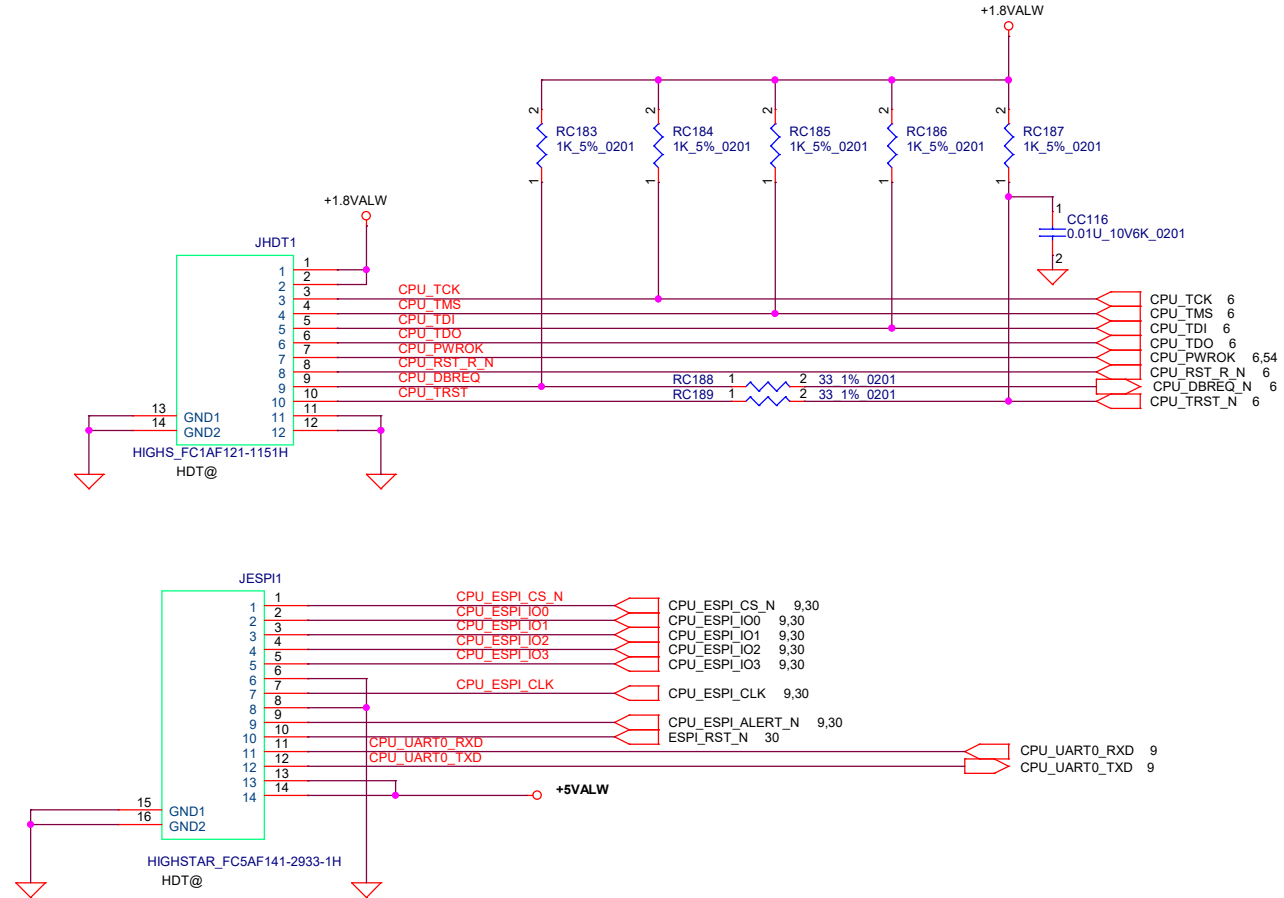
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Type-C Retimer



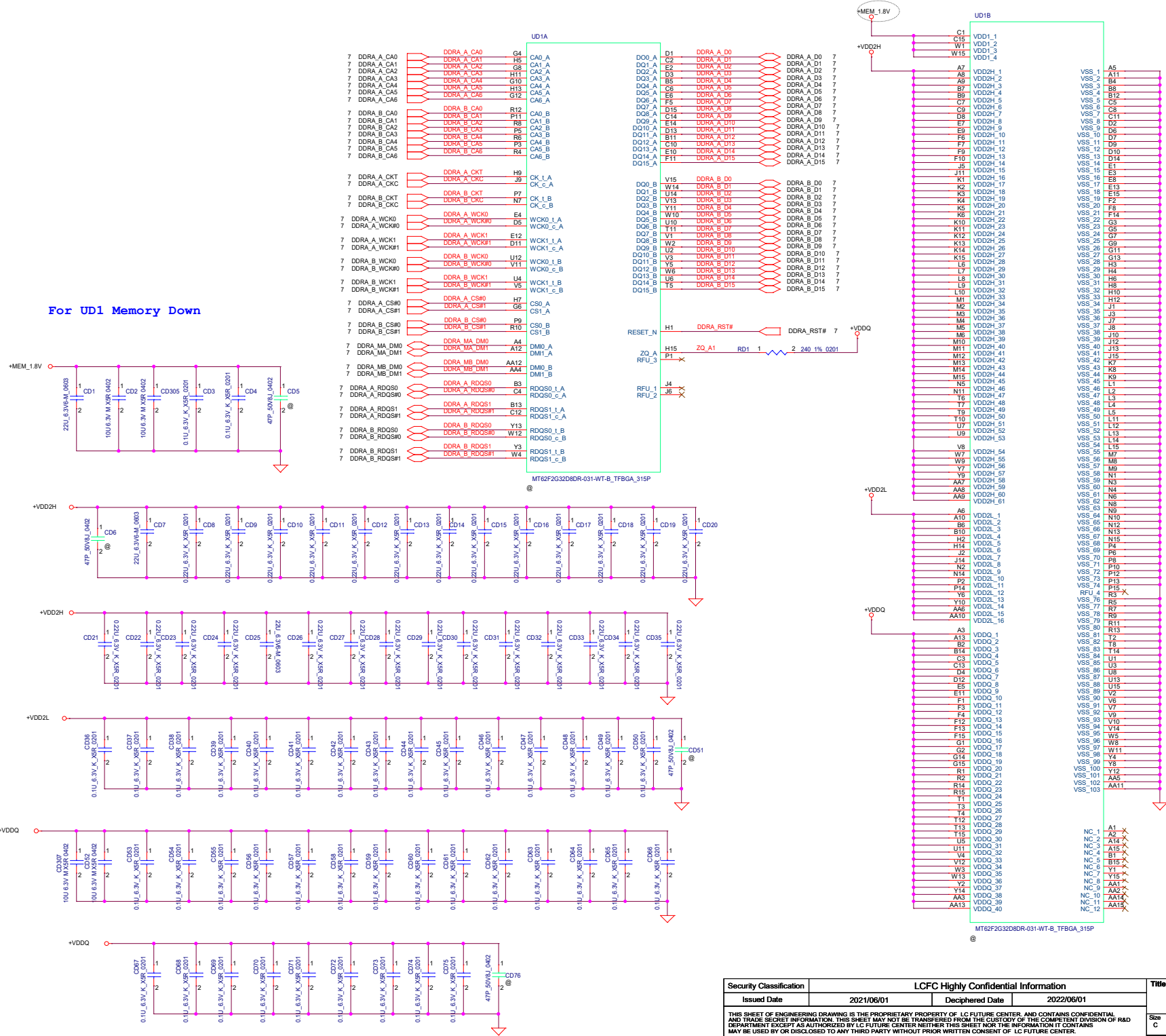
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HDT&ESPI Debug CONN

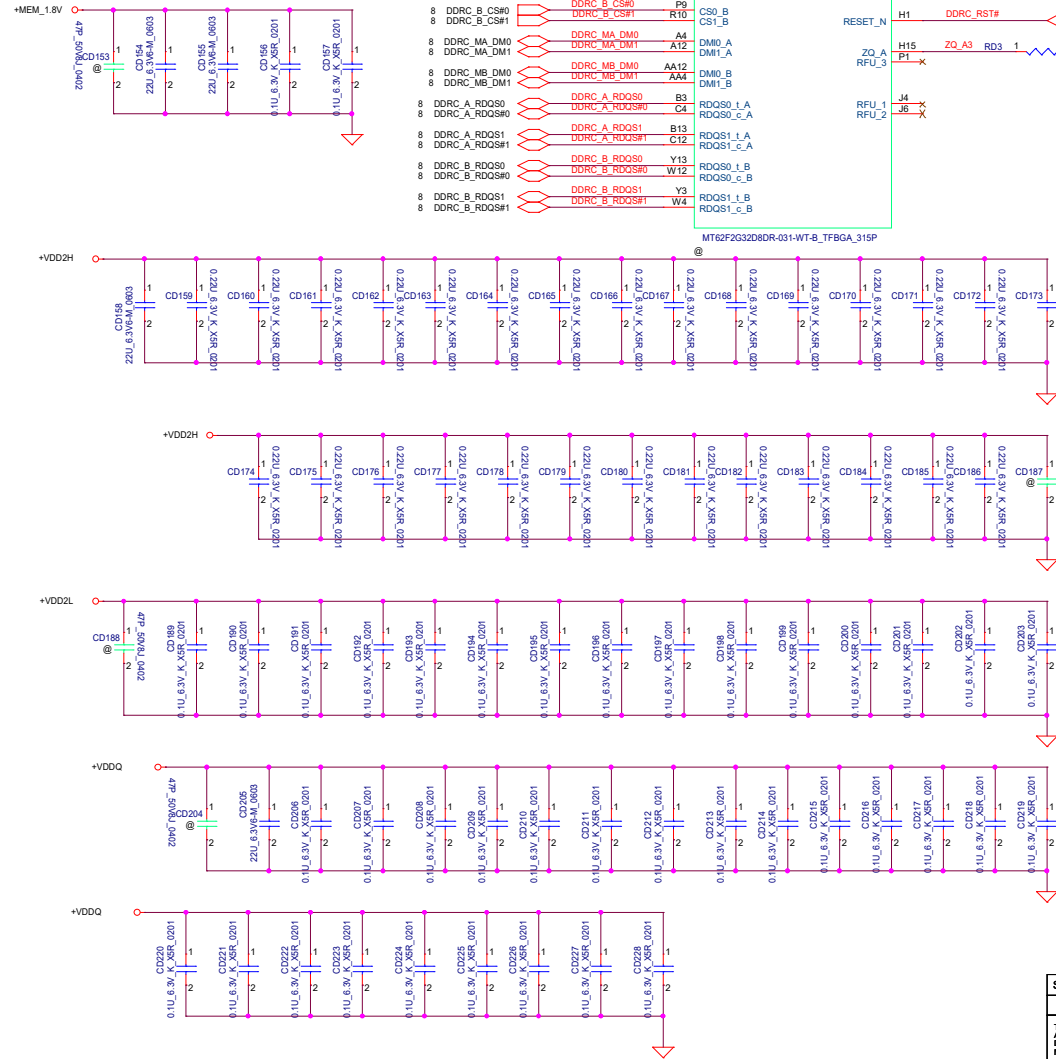


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For UD1 Memory Down

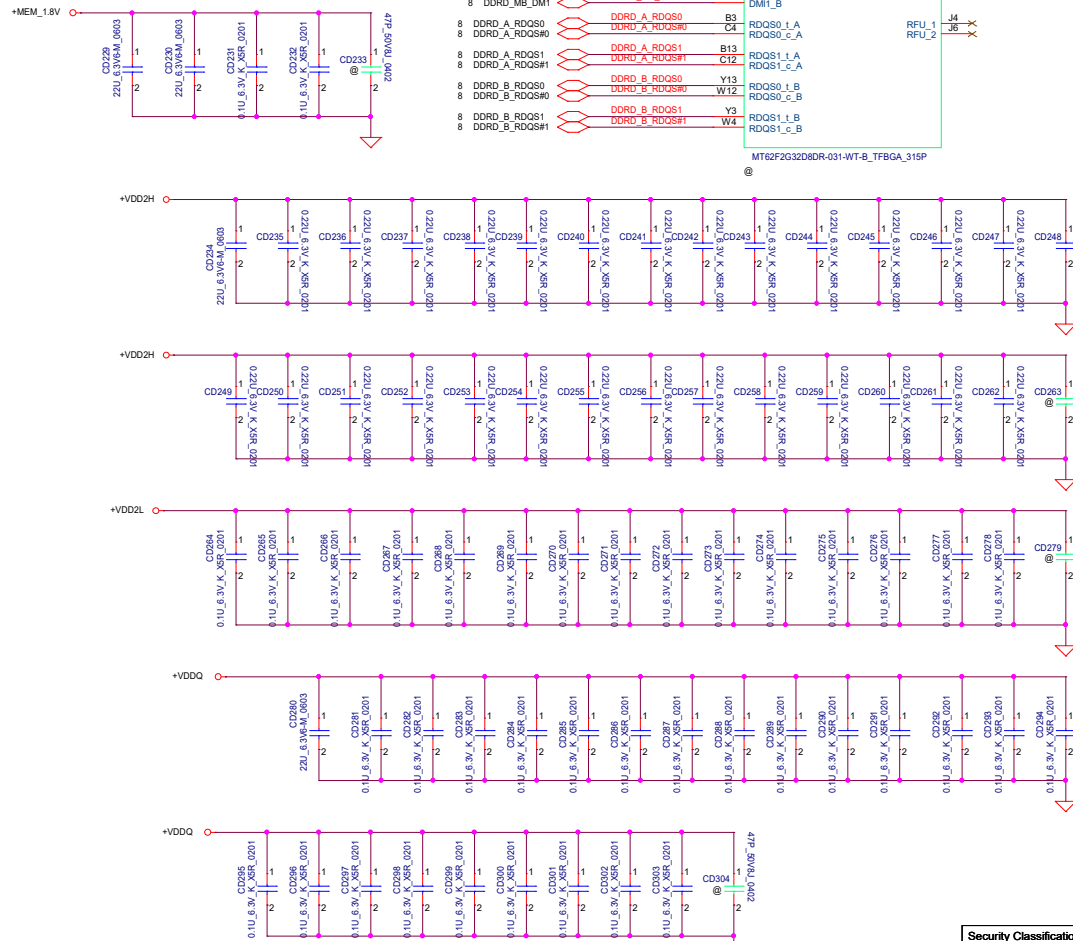


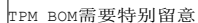
For UD3 Memory Down



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For UD4 Memory Down

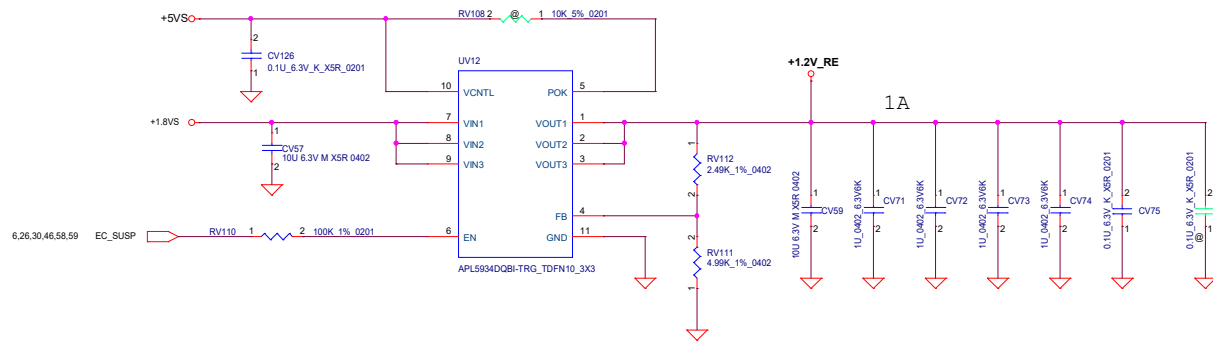




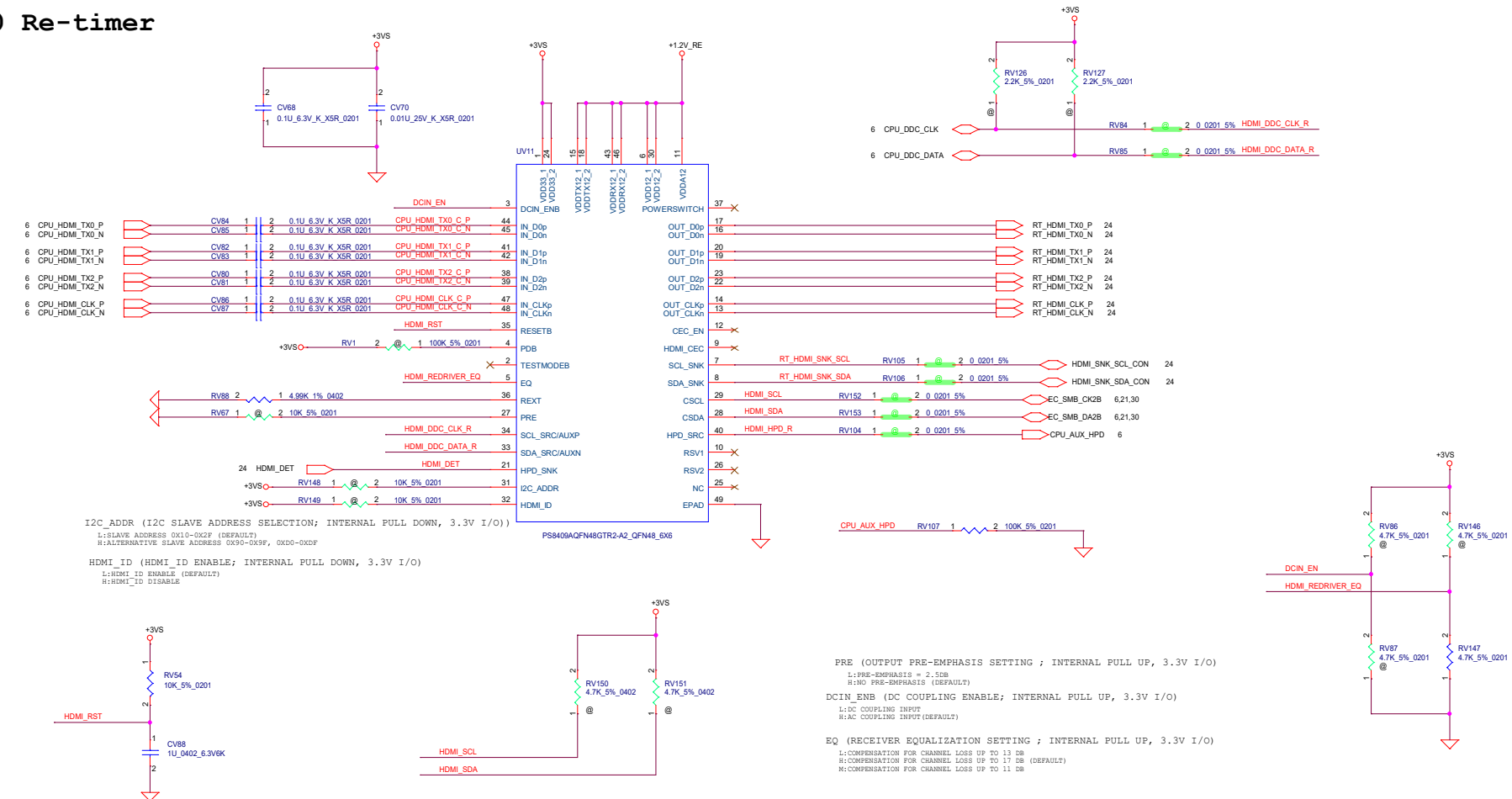
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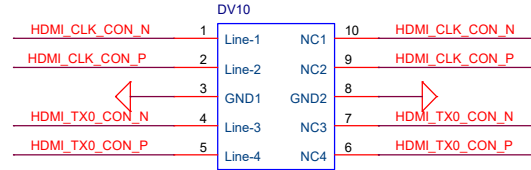
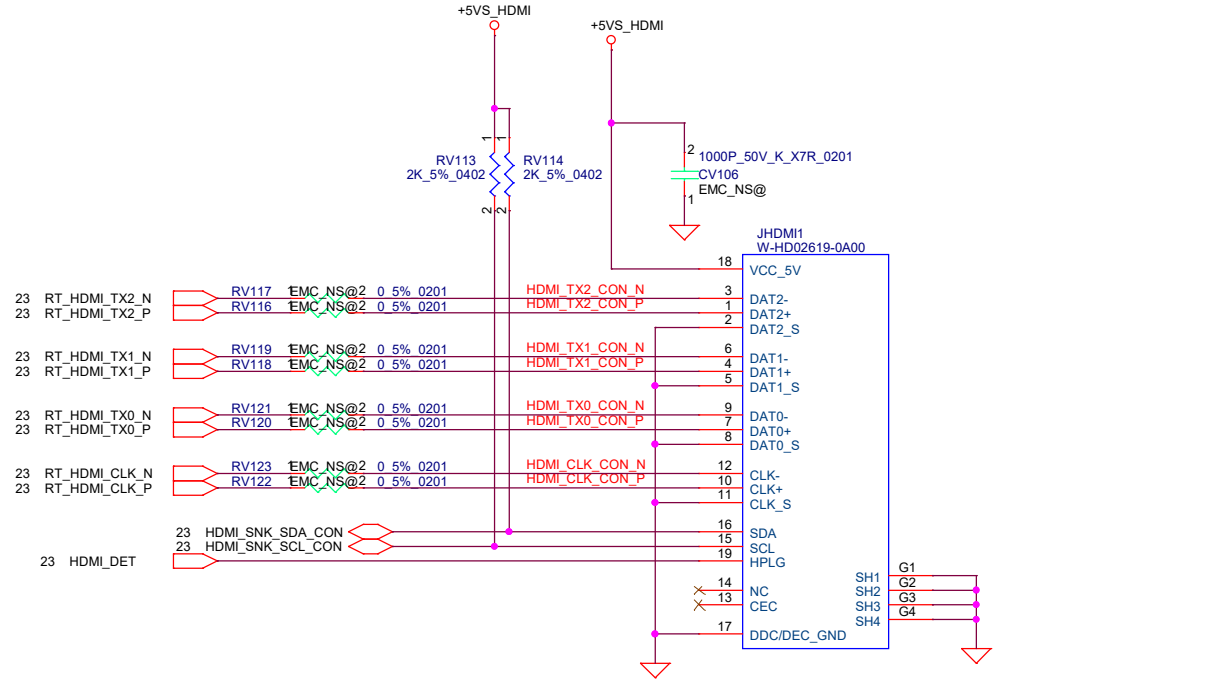
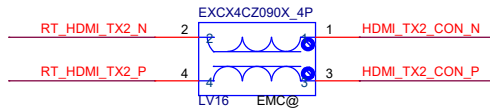
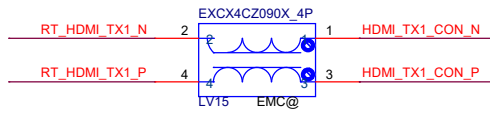
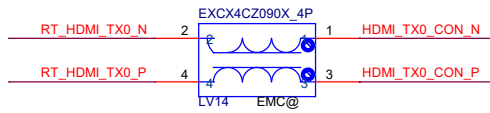
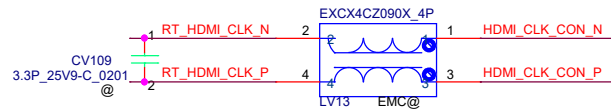
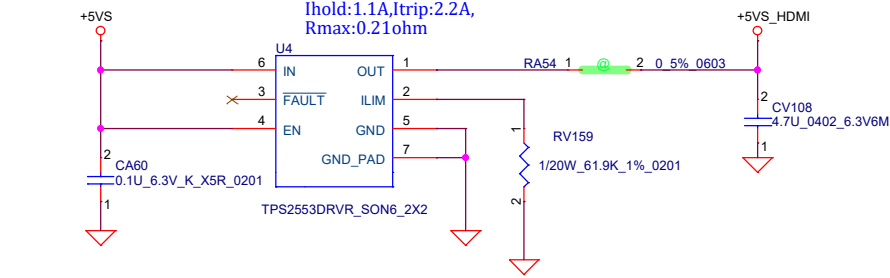


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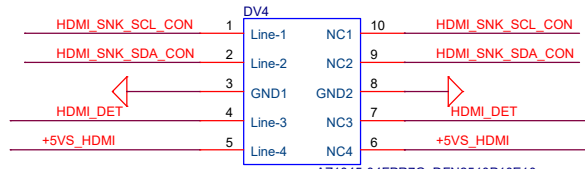


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HDMI Power

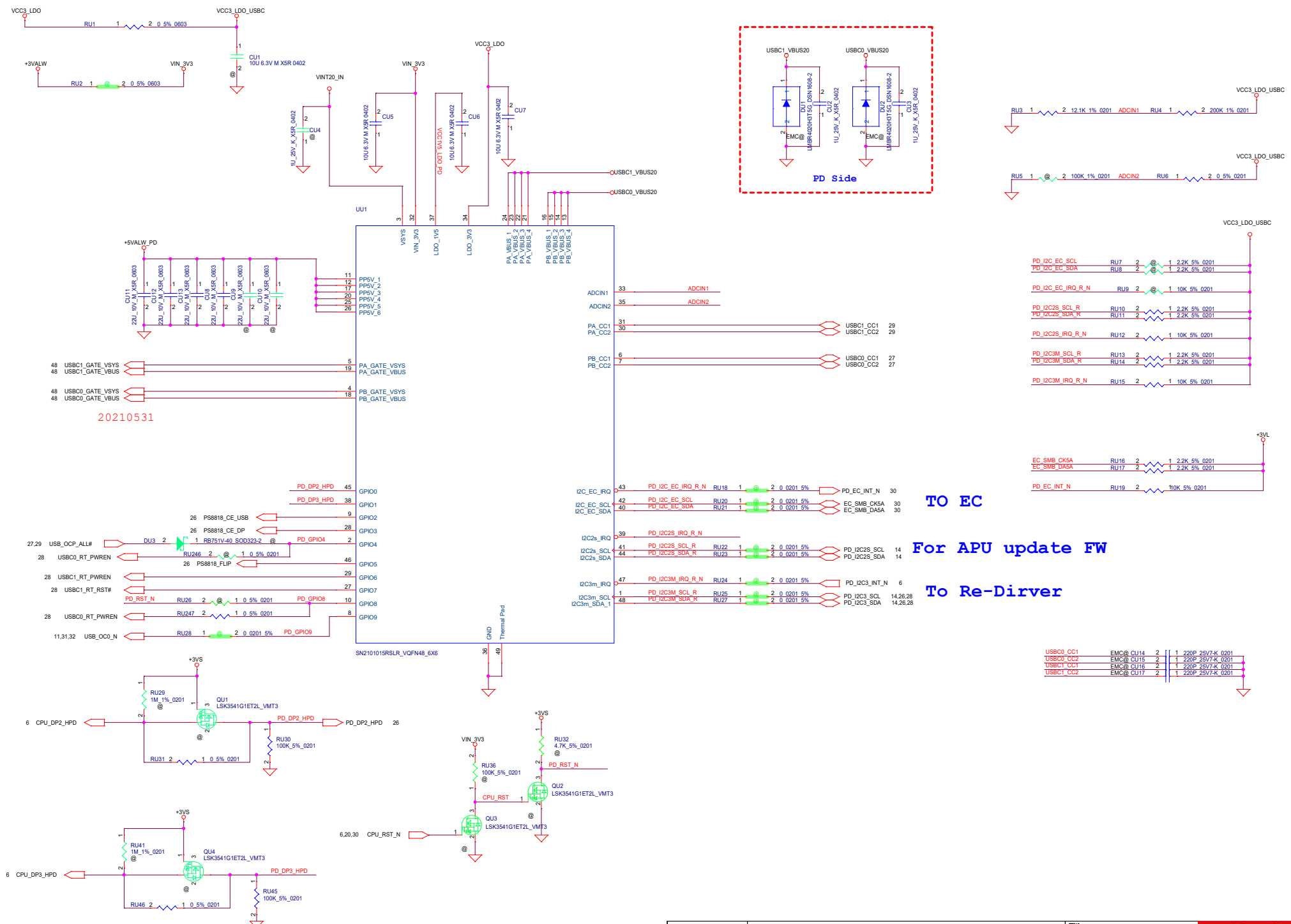


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AZ1045-04FPR7G_DFN2510P10E10
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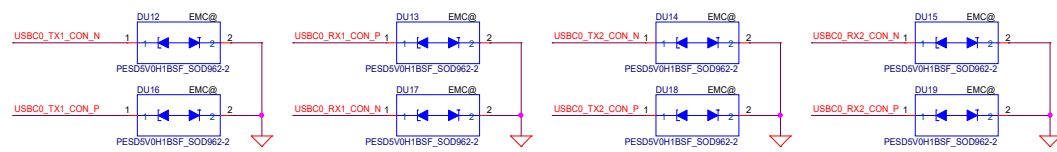
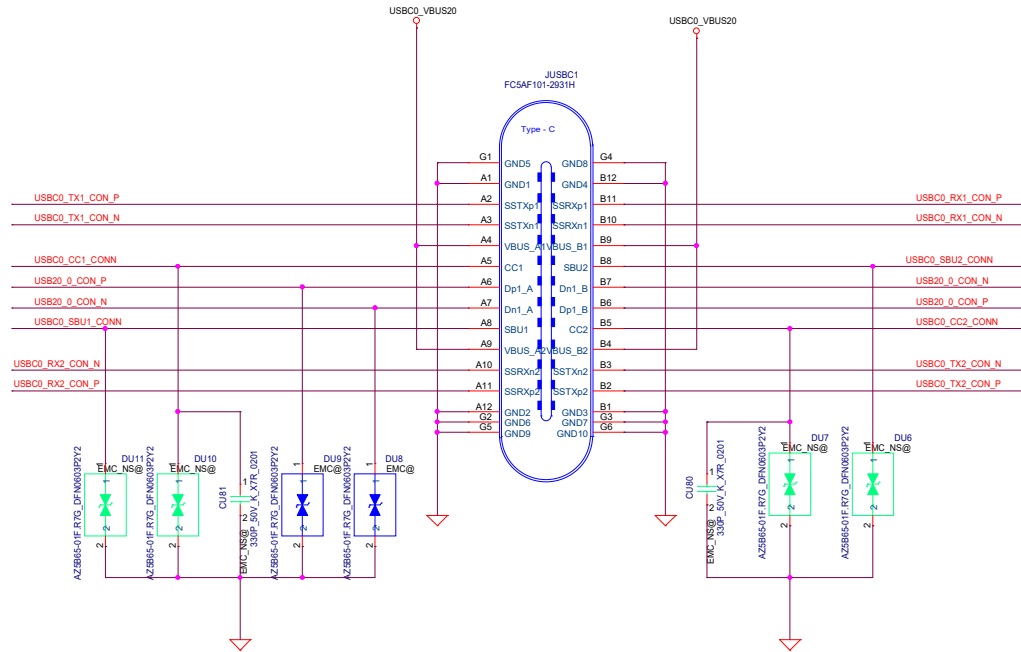
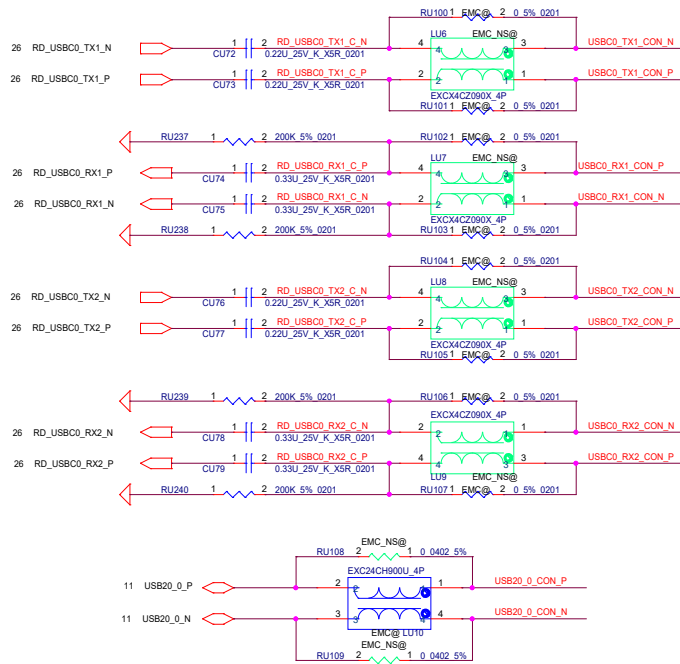
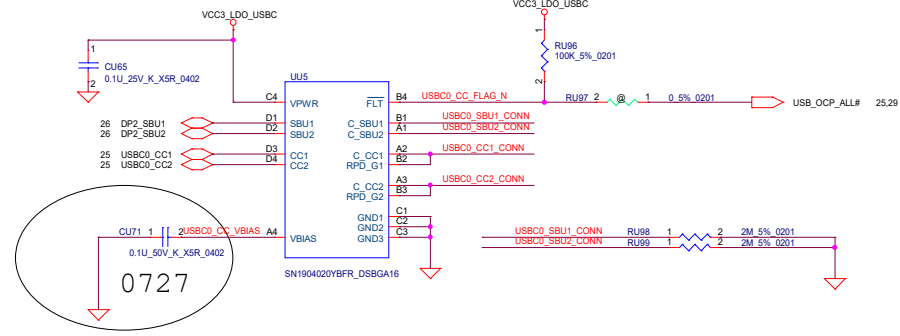
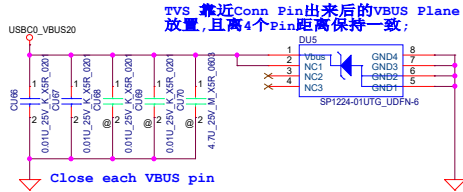


TO EC

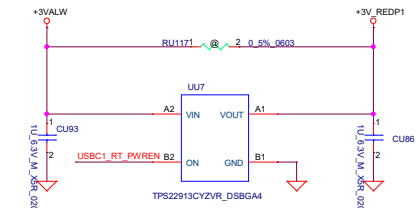
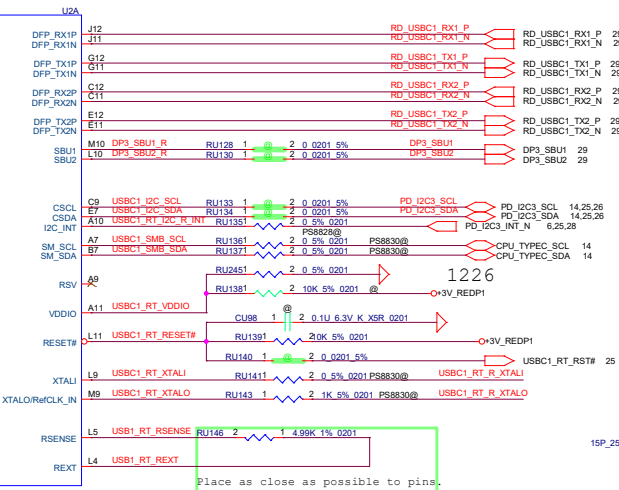
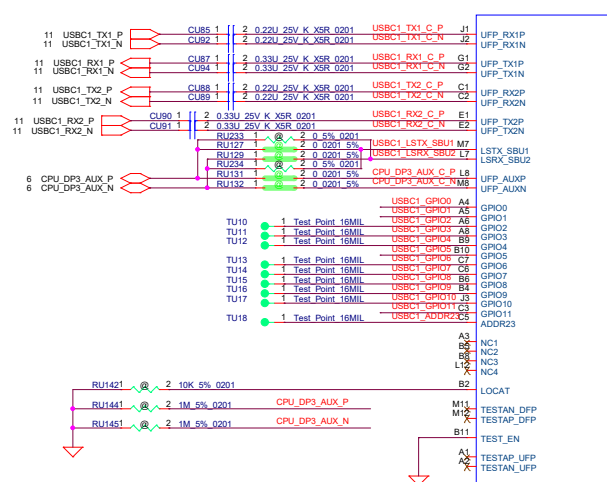
For APU update FW

To Re-Dirver

| | | | | | | | |
|--|--------------------------------------|-----------------|------------|-------|--------------------------|-------|----------|
| Security Classification | LCFC Highly Confidential Information | | | Title | PD_Controller | | LCFC |
| Issued Date | 2021/06/01 | Deciphered Date | 2022/06/01 | Size | Document Number | Rev | |
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| | | | | Date: | Thursday, March 31, 2022 | Sheet | 25 of 61 |



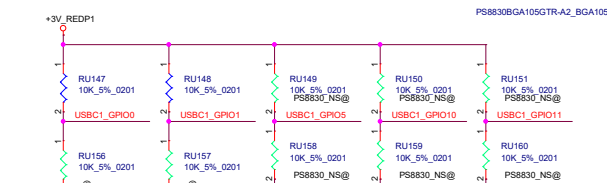
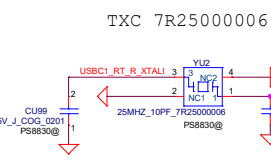
PS8830 Co-lay PS8828



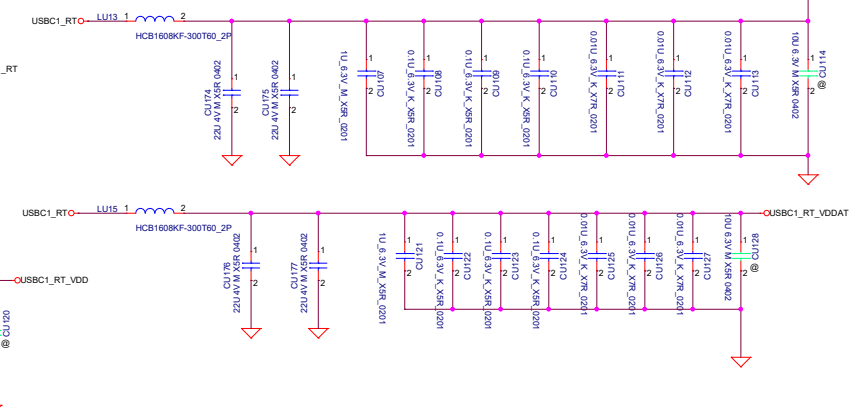
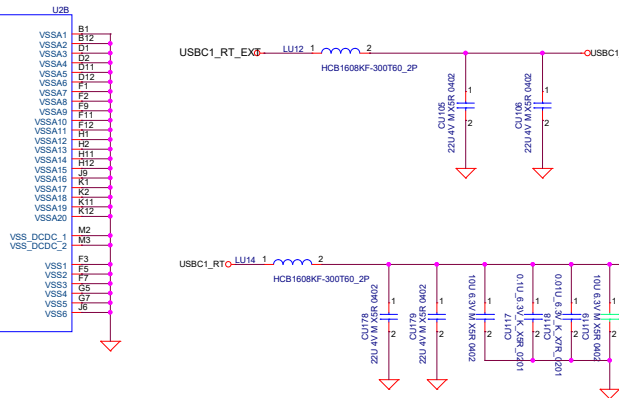
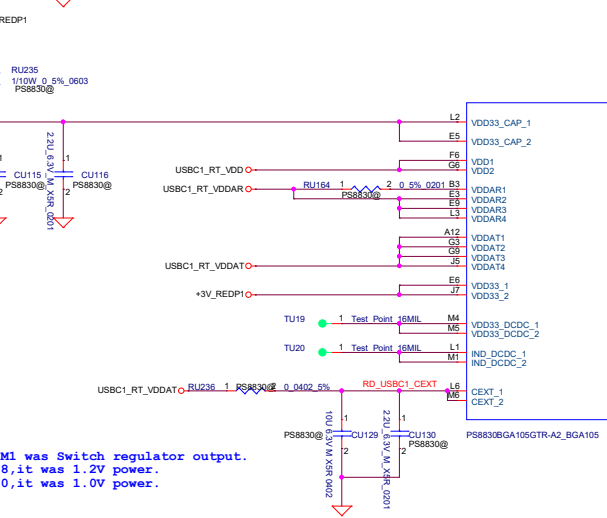
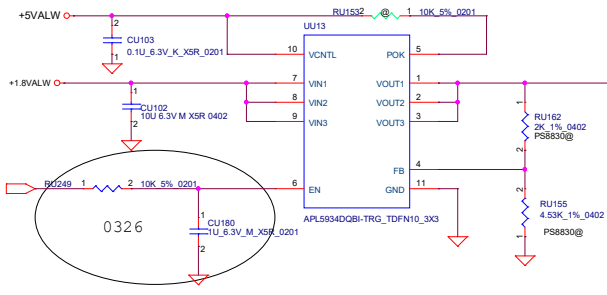
1.15V 1.8A For PS8830
1.2V 1.0A For PS8828

| Vout (V) | R1 (KΩ) | R2 (KΩ) |
|----------|---------|---------|
| 1.15 | 1.13 | 4.53 |
| 1.2 | 2.49 | 4.99 |

$V_{OUT} = 0.8 \times (1 + R1/R2)$

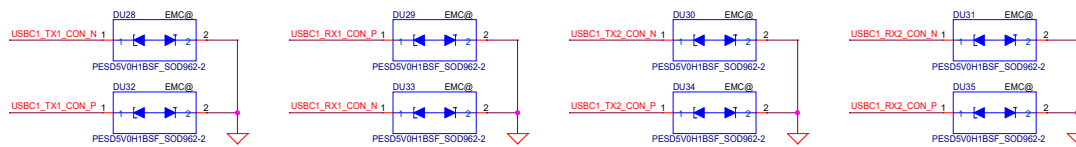
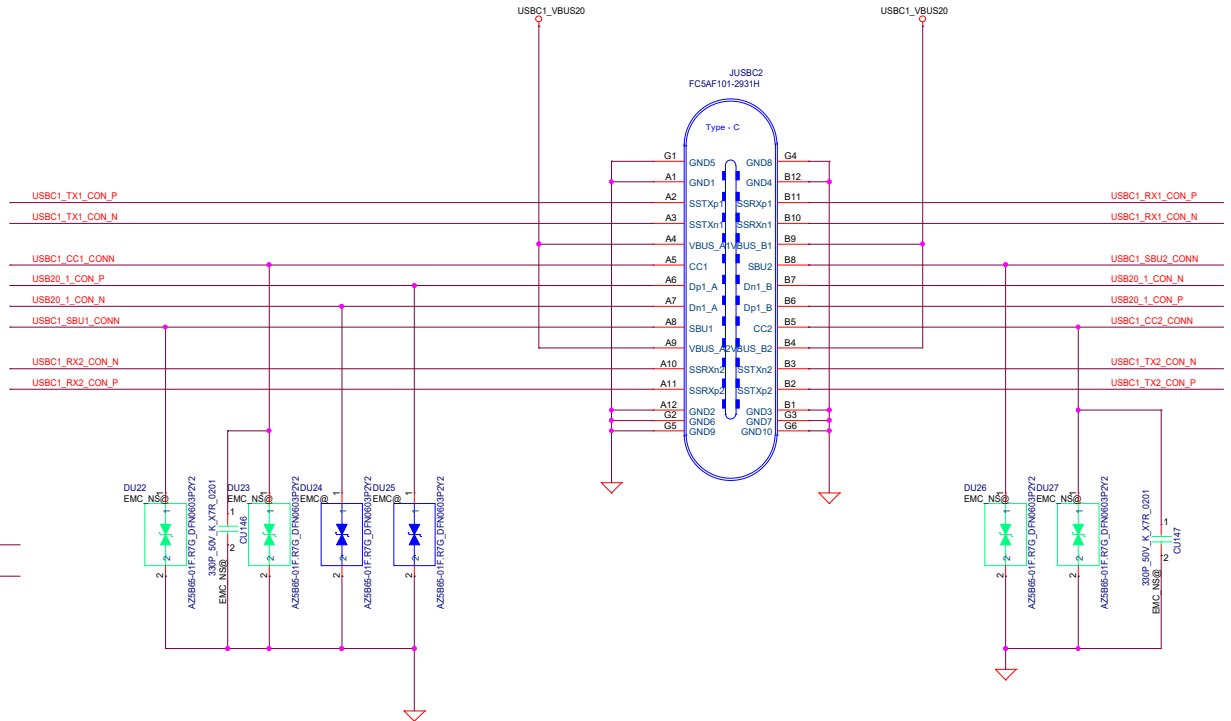
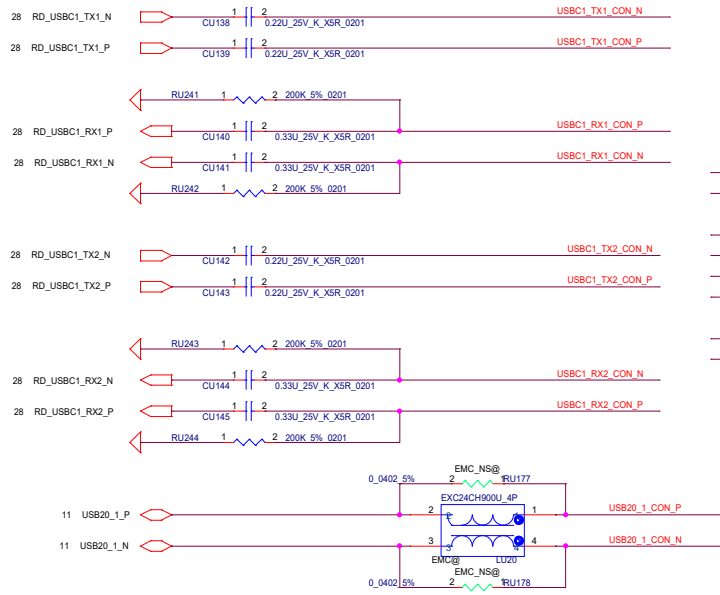
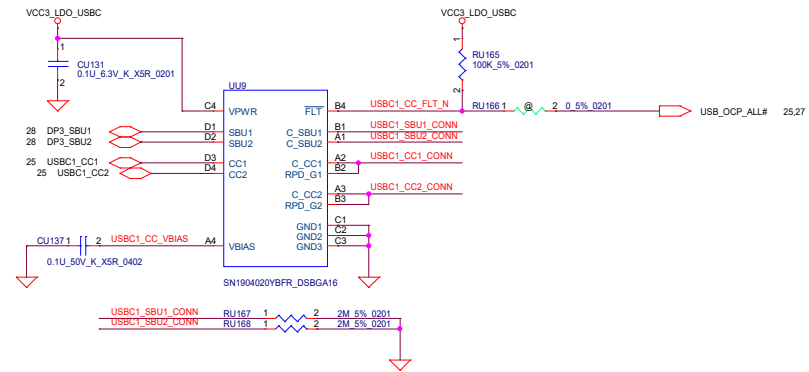
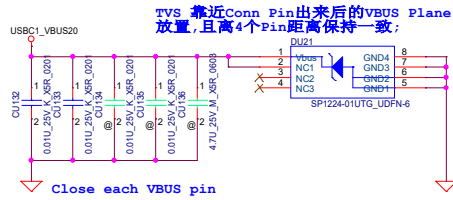


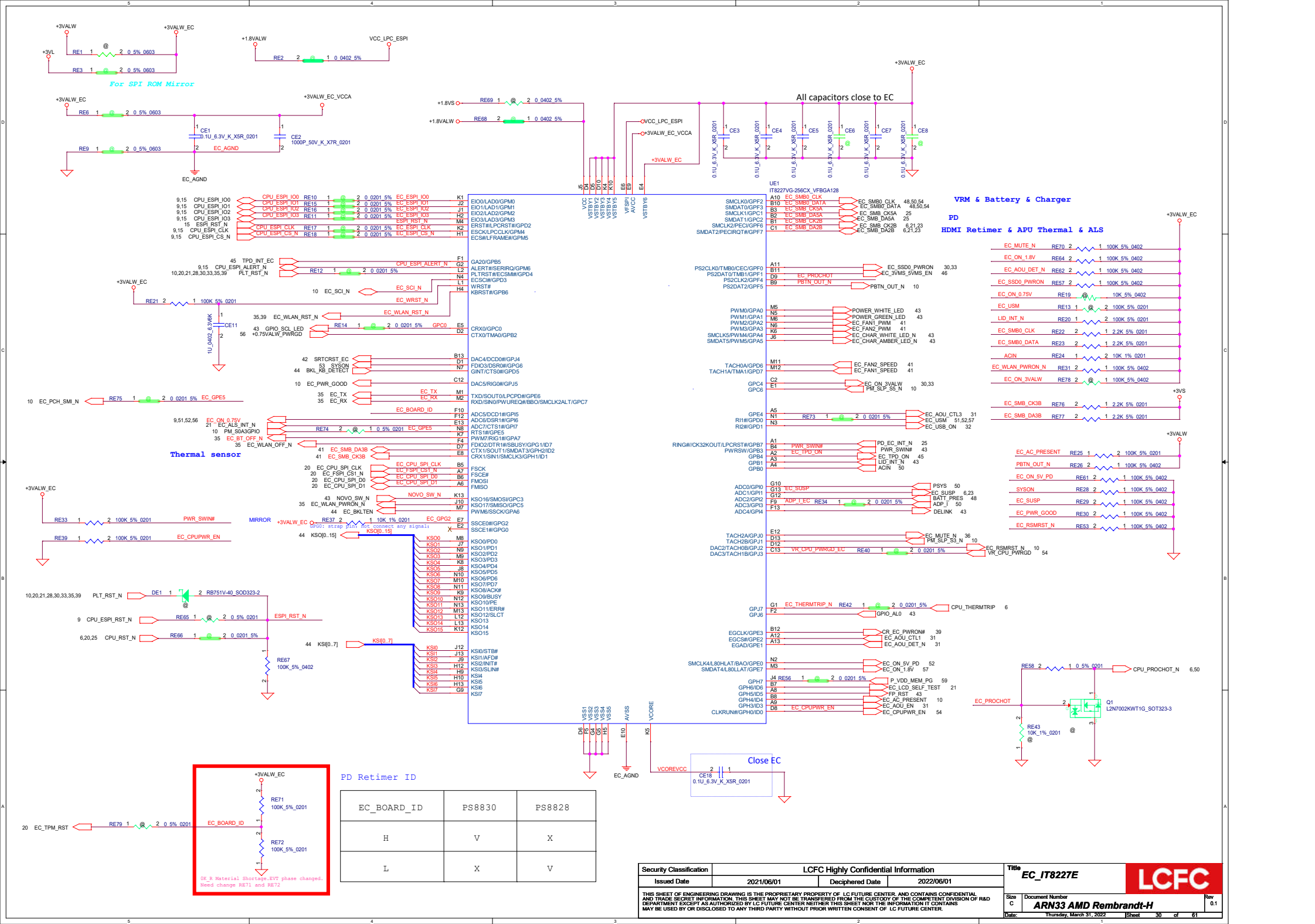
```
For PS8828:I2C slave Address
[ADDR1,ADDR0]=[GPIO1,GPIO0]
LL:0x10~0x23
LH:0x30~0x43
HL:0x50~0x63
HH:0x90~0xD3
For PS8830:[GPIO1,GPIO0]
LL:0x10; LH:0x20; HL:0x30; HH:0x40;
```



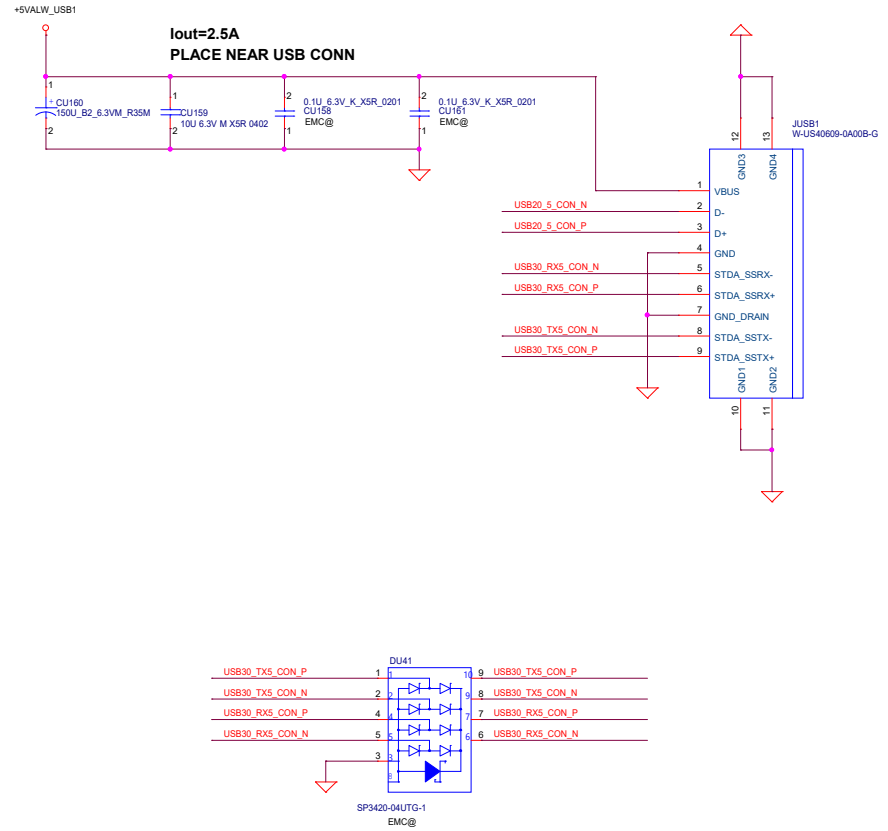
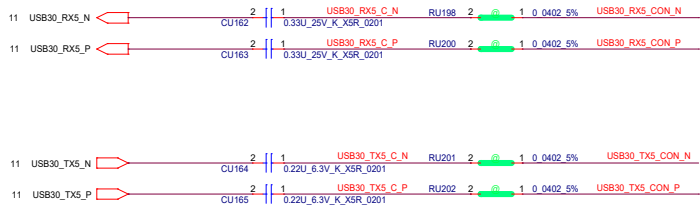
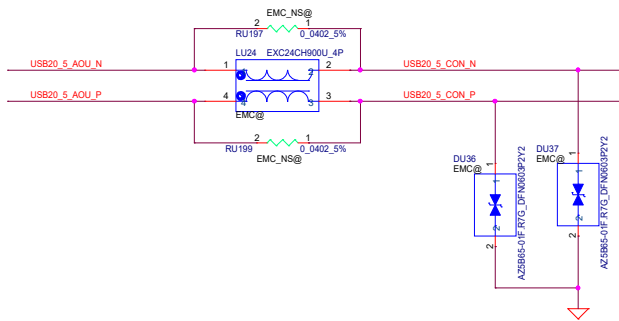
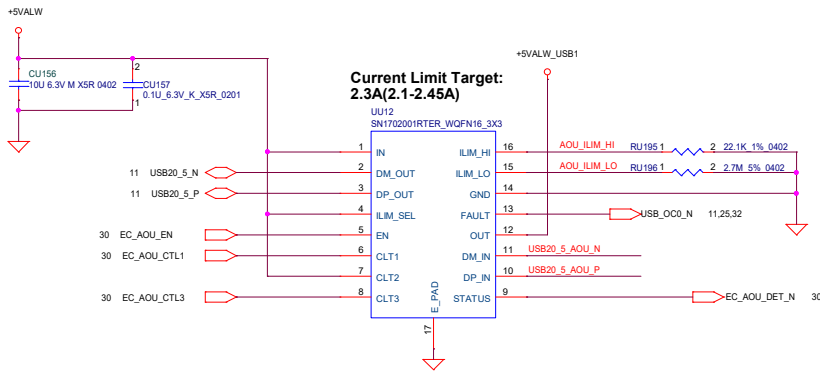
Pin L1 & M1 was Switch regulator output.
For PS8828,it was 1.2V power.
For PS8830,it was 1.0V power.

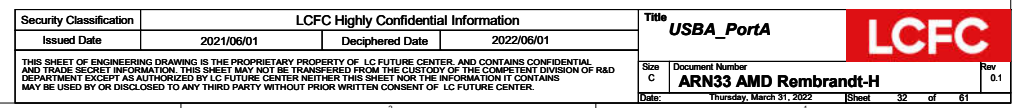
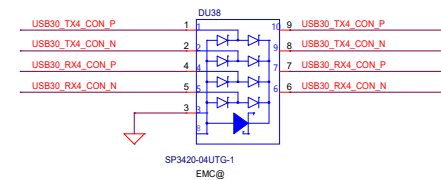
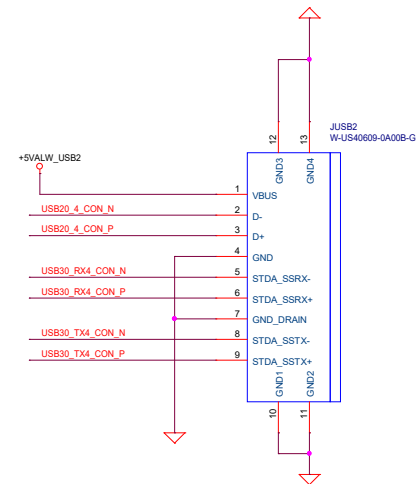
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| <div> <div>Doc Number</div> <div>Rev</div> </div> | | <div> <div>Document Number</div> <div>Rev</div> </div> | | | | | |
| <div> <div>ARN3</div> <div>0.1</div> </div> | | <div> <div>ARN3 And Rembrandt</div> <div>0.1</div> </div> | | | | | |
| <div> <div>Date</div> <div>Sheet</div> </div> | | <div> <div>Thursday, March 31, 2022</div> <div>28 of 61</div> </div> | | | | | |

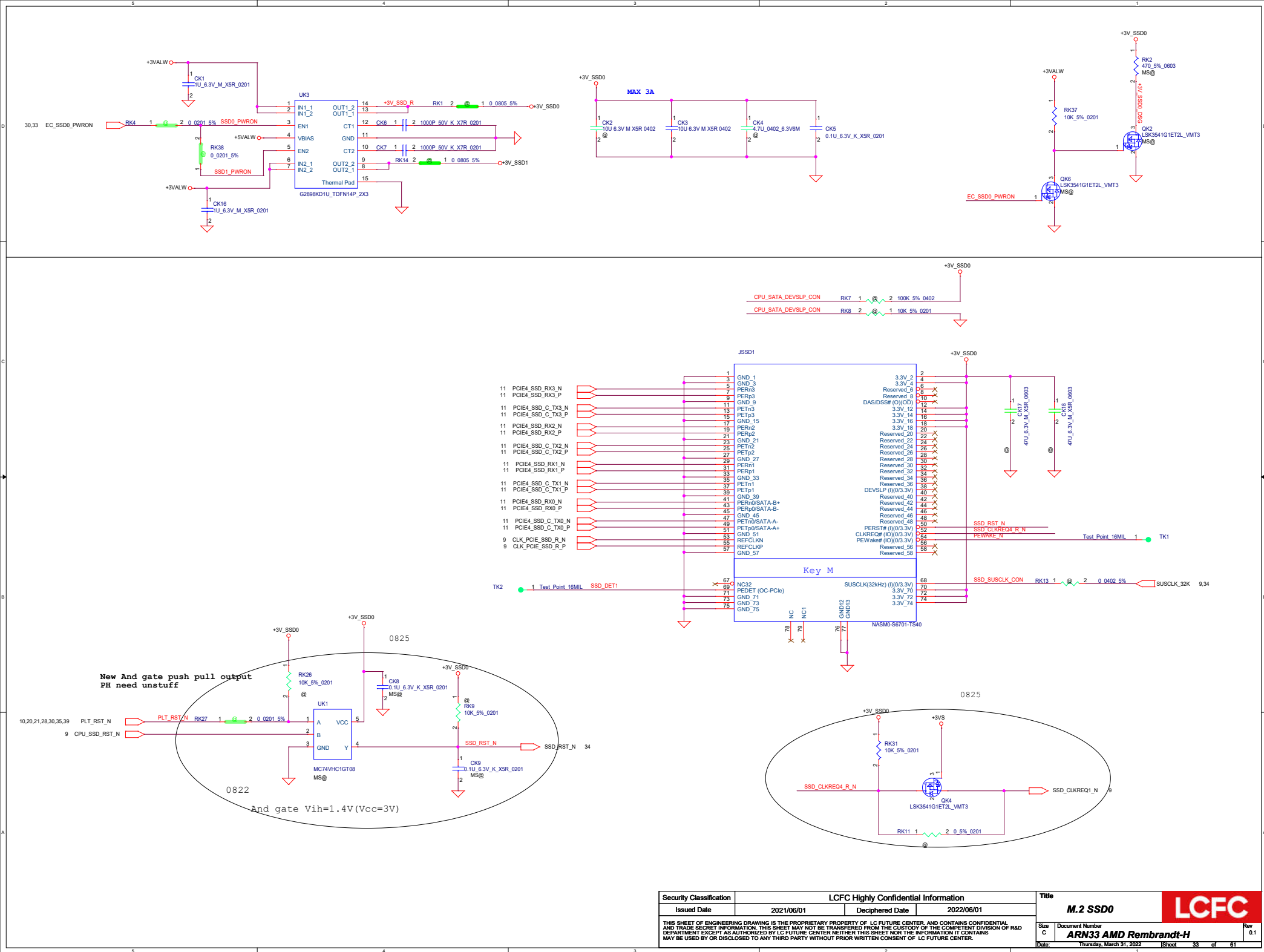


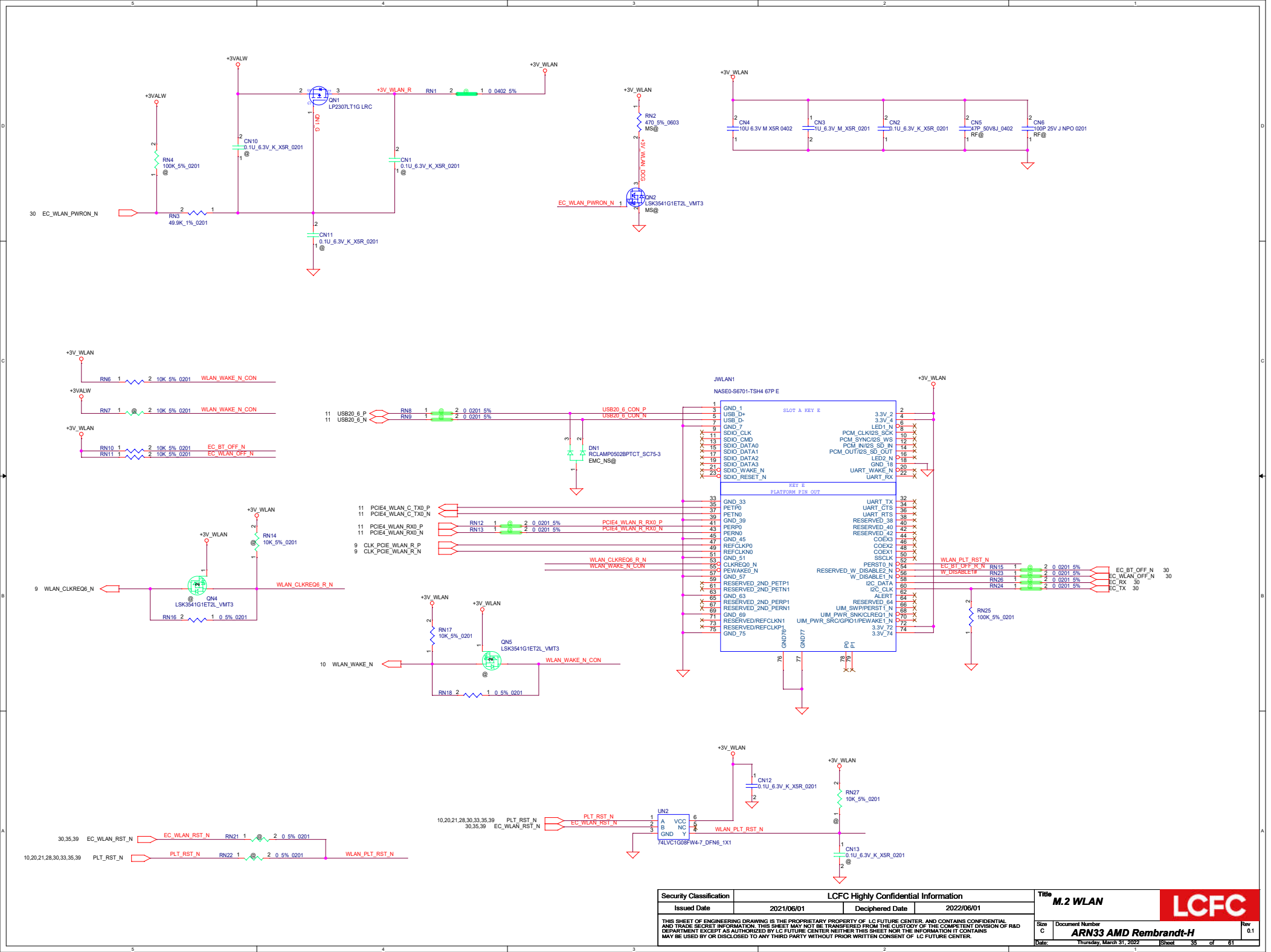


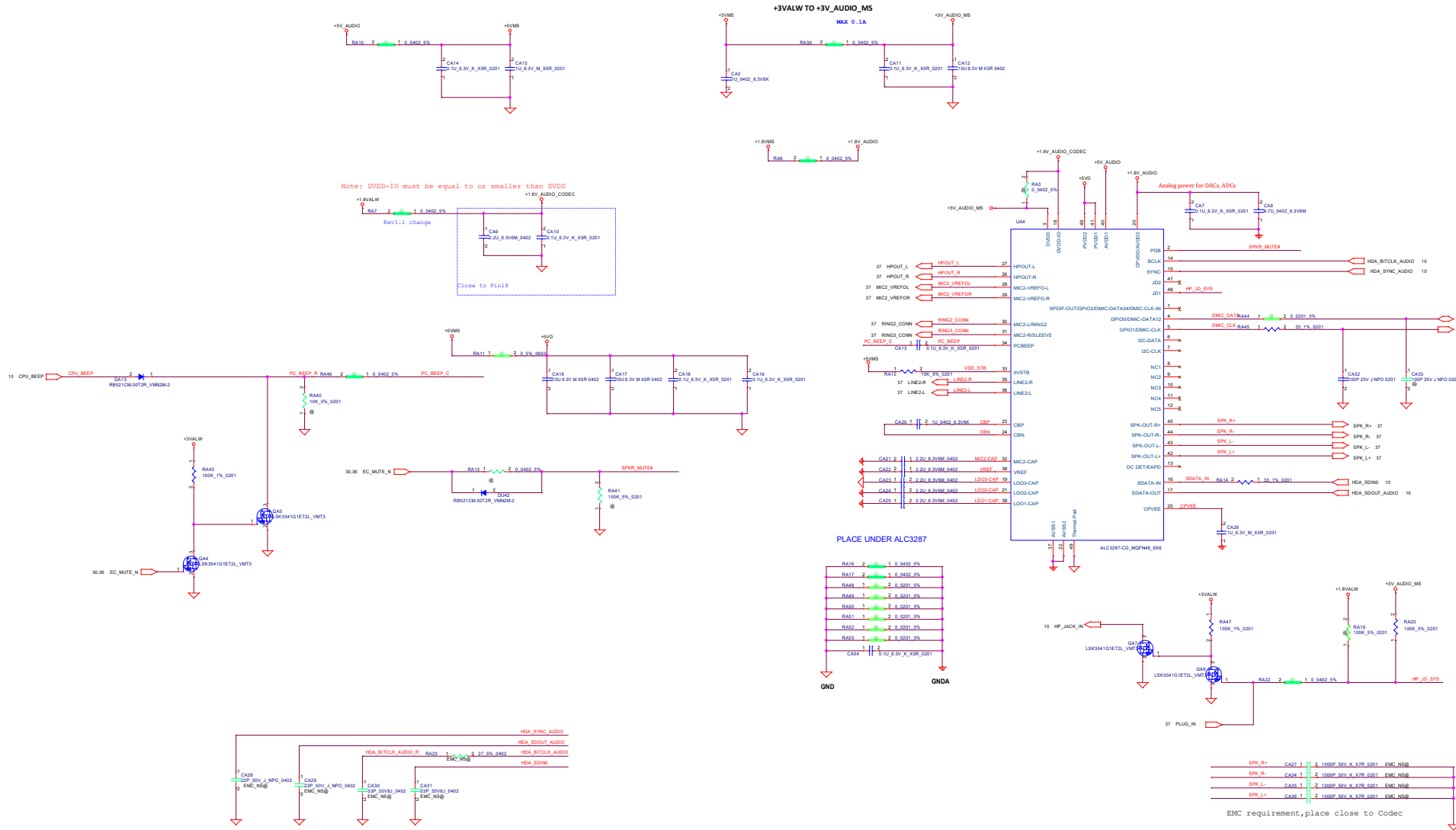
| | |
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| SA00008HF00 | SN1702001RTER |
| SA0000BPE00 | PI5USB2546JZHEX |
| SA0000C6Z00 | CW3048BA |



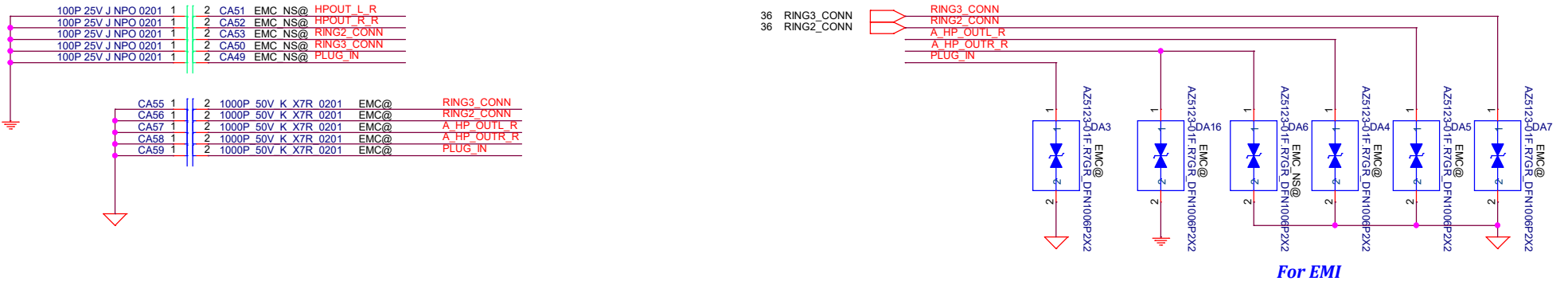
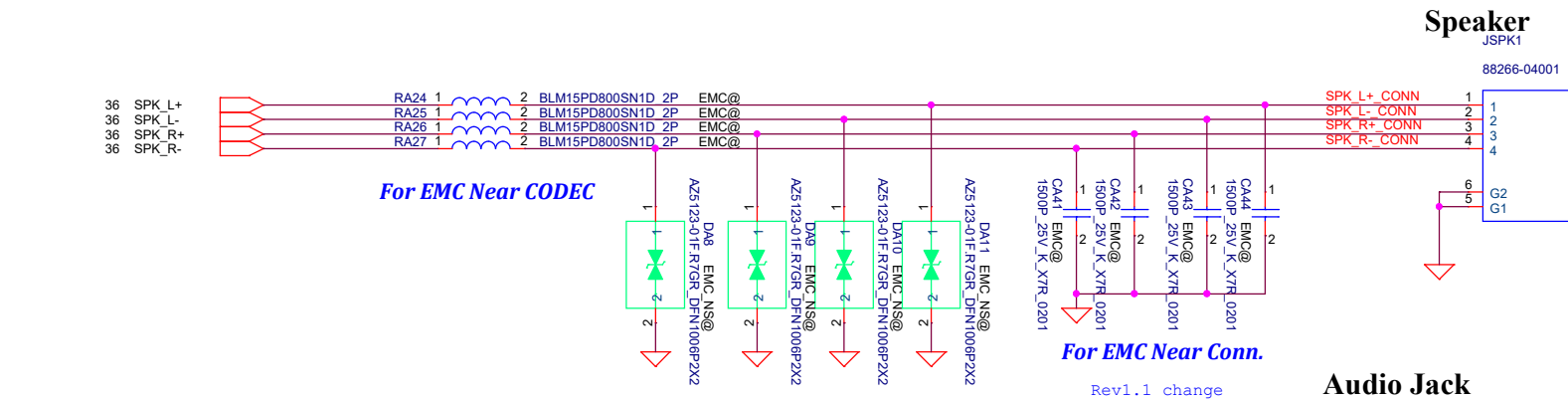








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| Design Date | | 20220901 | | LCFC | |
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| Date | 20220901 | Rev | 01 | Sheet | 01 |




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| | | | | Size B | ARN33 AMD Rembrandt-H | Rev 0.1 |
| Date: | | Thursday, March 31, 2022 | | Sheet | 37 | of 61 |

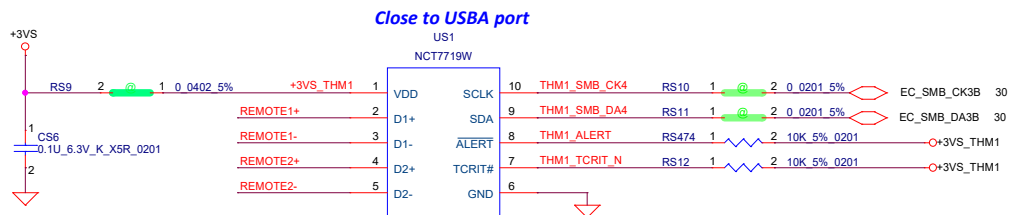
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| Issued Date | 2021/06/01 | Deciphered Date | 2022/06/01 | BLANK | |
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| | | | | C | ARN33 AMD Rembrandt-H |
| | | | | Date: | Thursday, March 31, 2022 |
| | | | | Sheet | 38 of 61 |
| | | | | Rev | 0.1 |



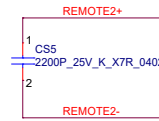
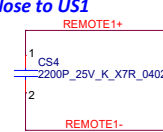
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| Issued Date | 2021/06/01 | Deciphered Date | 2022/06/01 | | | | |
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| Date: Thursday, March 31, 2022 | | | | Sheet | 40 | of | 61 |



ADDR:1001101xb

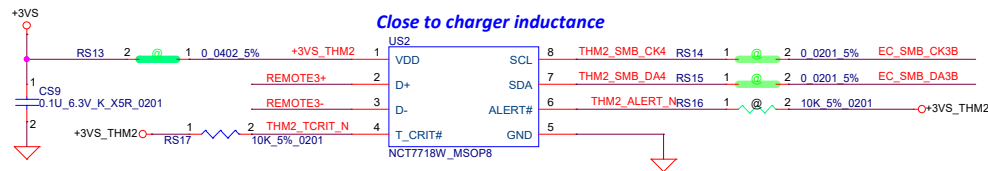
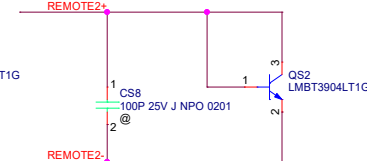
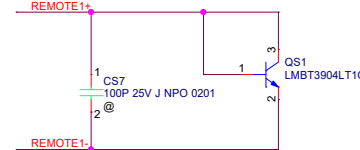
Close to US1



Close to between CPU and memory

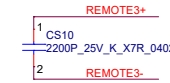
REMOTE2+/-:
Trace width/space:10/10 mil
Trace length:<8"

Close to between CPU and memory



NCT7718W I2
C/ SMBus™ address is 1001100xb (x is R/W bit).

Close to US3



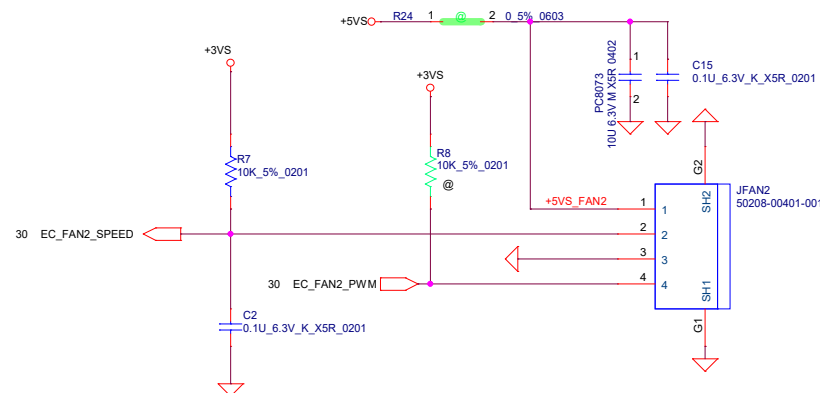
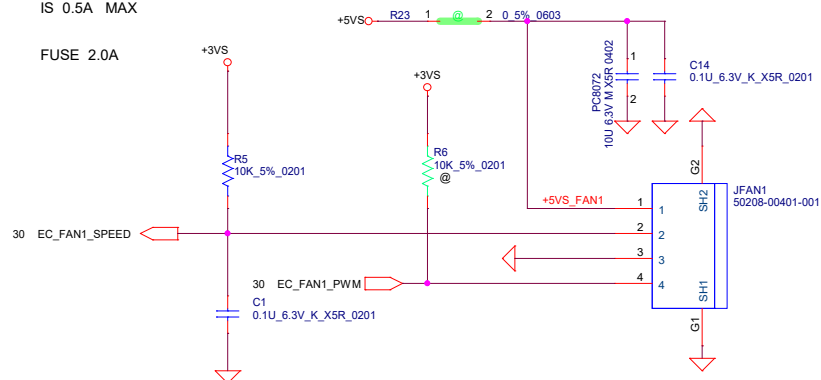
Close to Type-c port



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

FAN CURRENT
IS 0.5A MAX

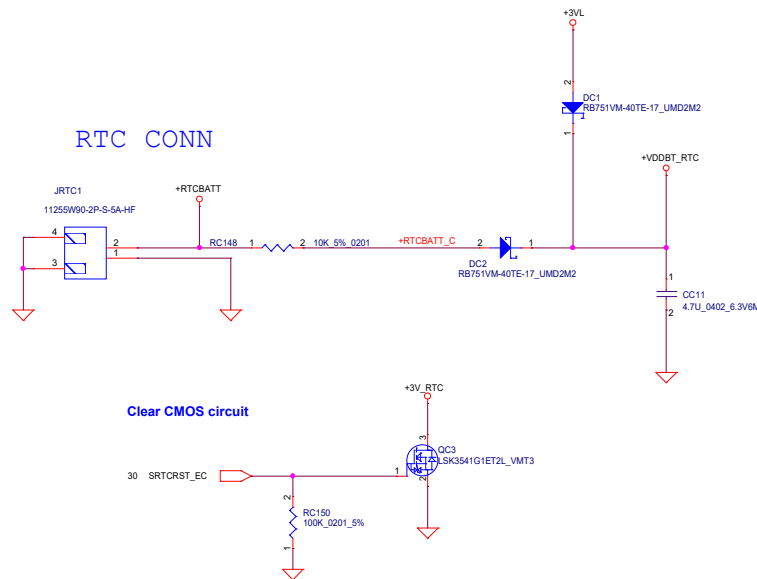
FUSE 2.0A



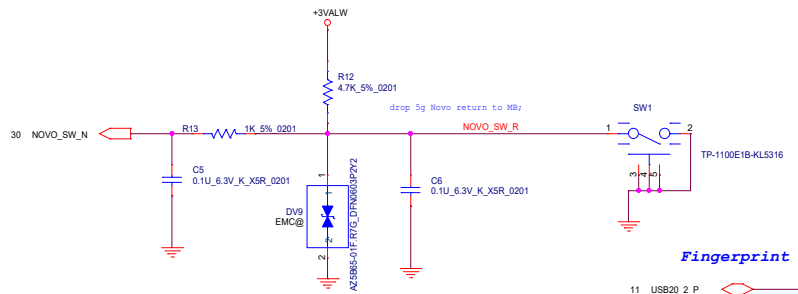
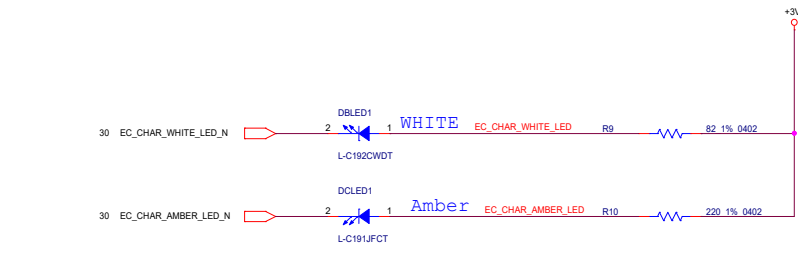
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| Title | Thermal | |
|--------|--------------------------|----------------|
| Size | Document Number | Rev |
| Custom | ARN33 AMD Rembrandt-H | 0.1 |
| Date: | Thursday, March 31, 2022 | Sheet 41 of 61 |

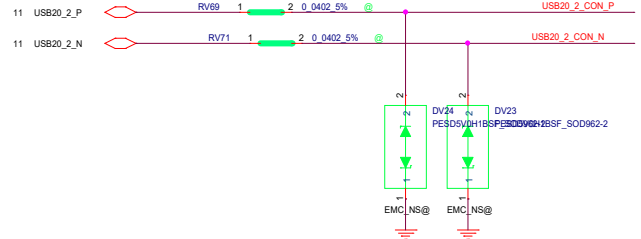
LCFC



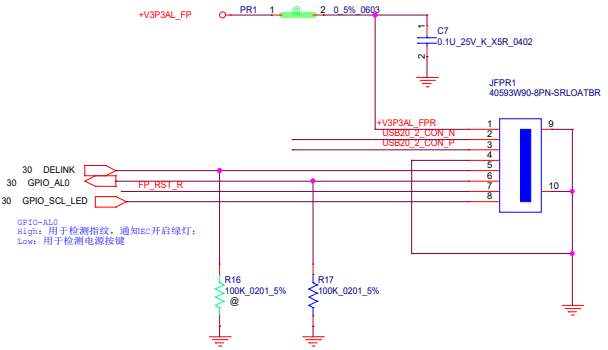
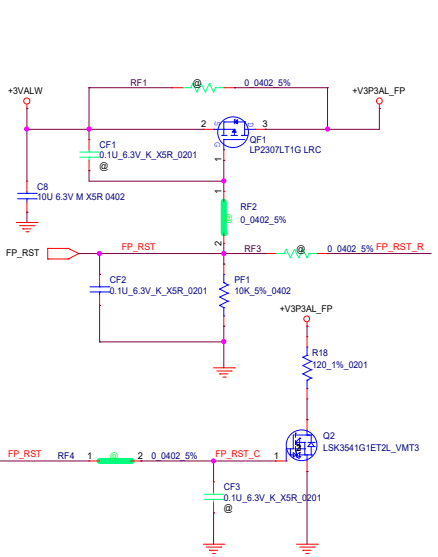
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| Security Classification | | LCFC Highly Confidential Information | | | | Title | | <div>LCFC</div> | | | |
| Issued Date | | 2021/06/01 | | Deciphered Date | | 2022/06/01 | | | | RTC | |
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| Size | C | | Document Number | | ARN33 AMD Rembrandt-H | | | | Rev | 0.1 | |
| Date: | | Thursday, March 31, 2022 | | Sheet | | 42 | | of 61 | | | |



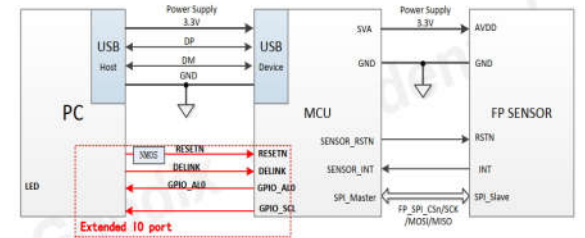
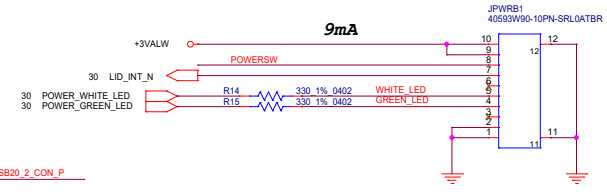
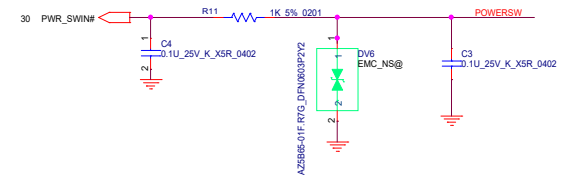
Fingerprint



FRP和PWR Button led是集成到一个小板上 (vendor), 到主板是两个CONN, same as V540;



| NO. | PIN NAME | PIN DEFINE |
|-----|----------|------------|
| 1 | LED | LED控制信号 |
| 2 | RESETN | MCU 复位信号 |
| 3 | GPIO_AL0 | 电源屏蔽 |
| 4 | DELINK | 电源状态指示 |
| 5 | GND | 信号地 |
| 6 | DP | USB信号DP |
| 7 | DM | USB信号DM |
| 8 | D3V3 | 3.3V电源 |

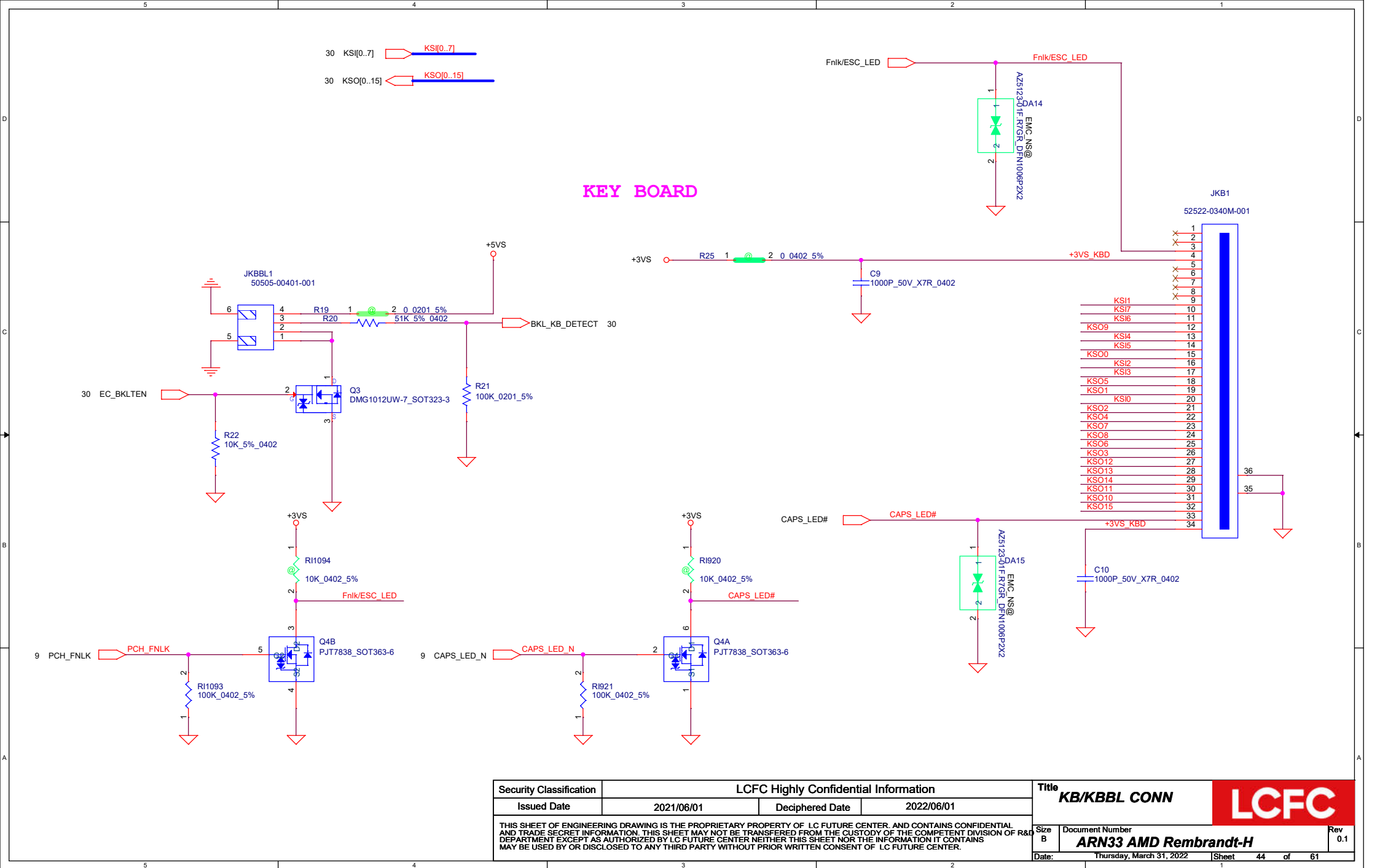


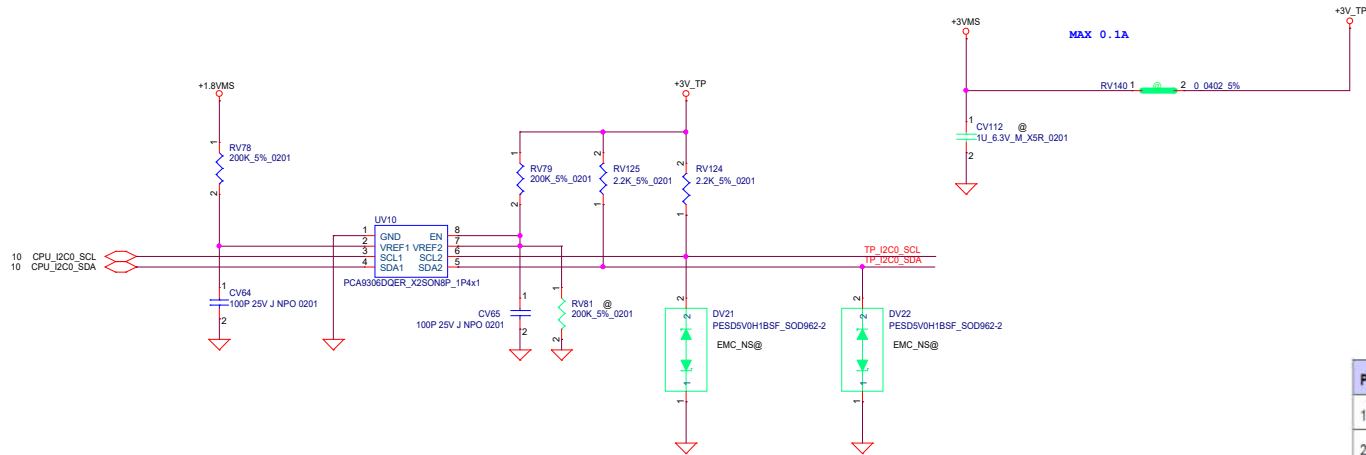
扩展IO接口:

- RESETN: PC输出高电平复位MCU
- DELINK: PC输出口
- GPIO_AL0: PC输入口,用于电源键屏蔽和LED控制
- GPIO_SCL: I2C/GPIO复用pin, 上电默认I2C_SCL功能; 高电平; 配置为GPIO后, 默认为输入上拉

说明:

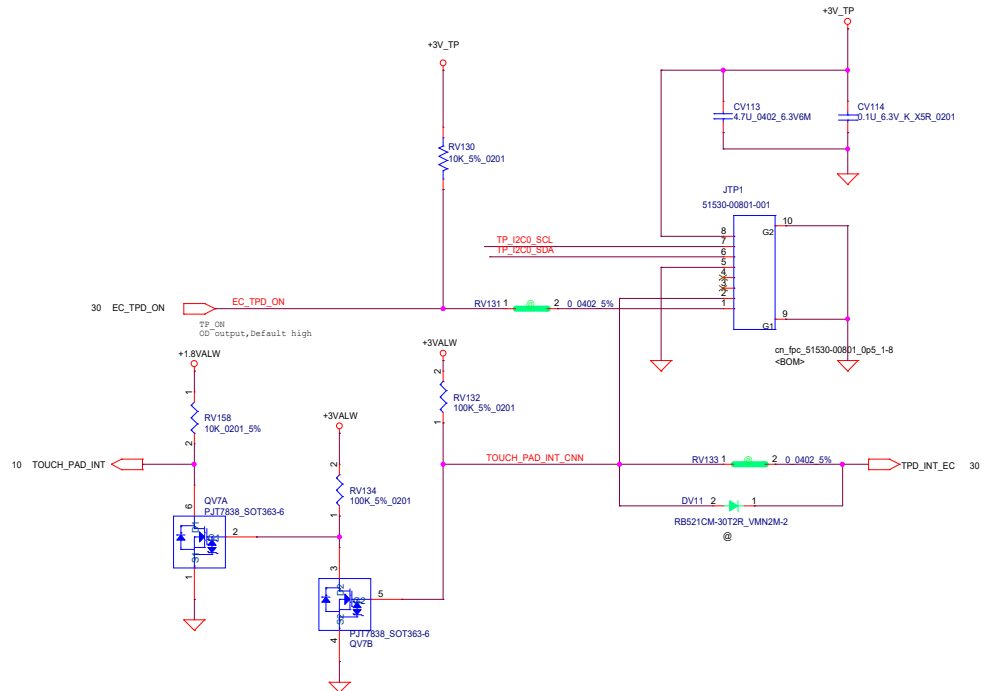
- 指纹设备始终保持供电状态
- MCU DELINK、GPIO_AL0、GPIO_SCL默认内部200k下拉

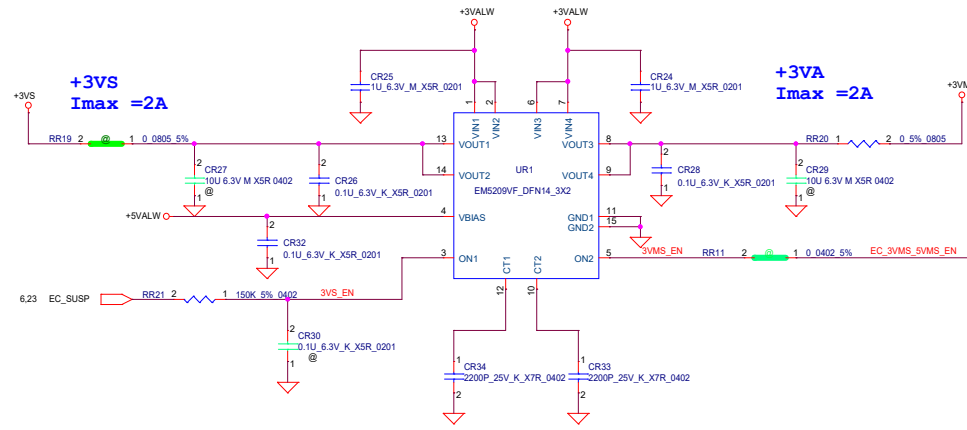




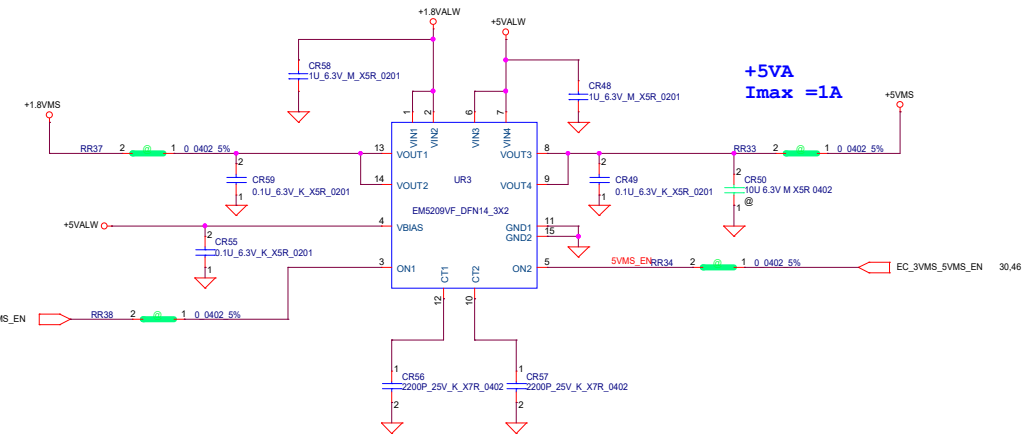
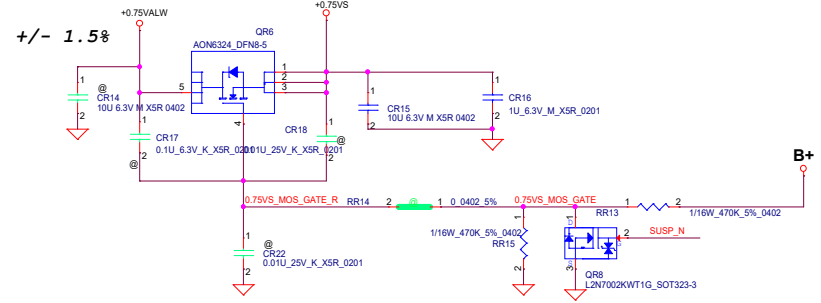
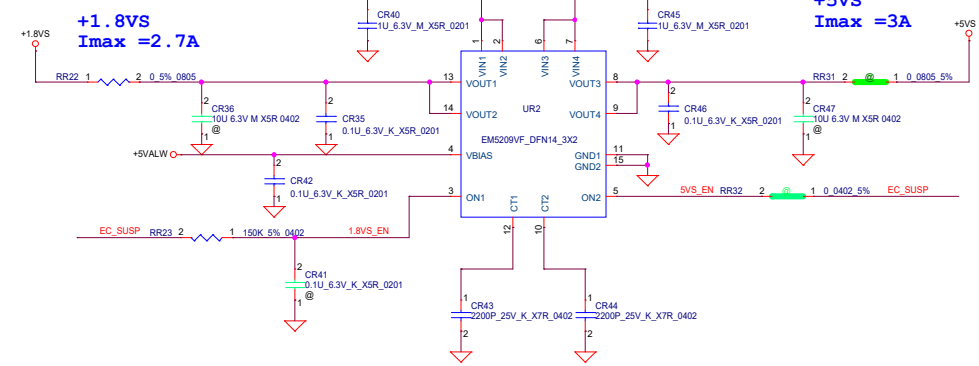
| Pin Number | Pin Name | Description |
|------------|-----------|--|
| 1 | VDD | Power |
| 2 | I2C-CLK | I2C_Clock |
| 3 | I2C-DAT | I2C_Data |
| 4 | GND | Ground |
| 5 | N/C | N/C |
| 6 | N/C | N/C |
| 7 | ATTN | Attention/Interrupt (Active Low, Open Drain) |
| 8 | LID CLOSE | Input for LID Close event/Disable Touch Pad (Active Low) |

Touch Pad

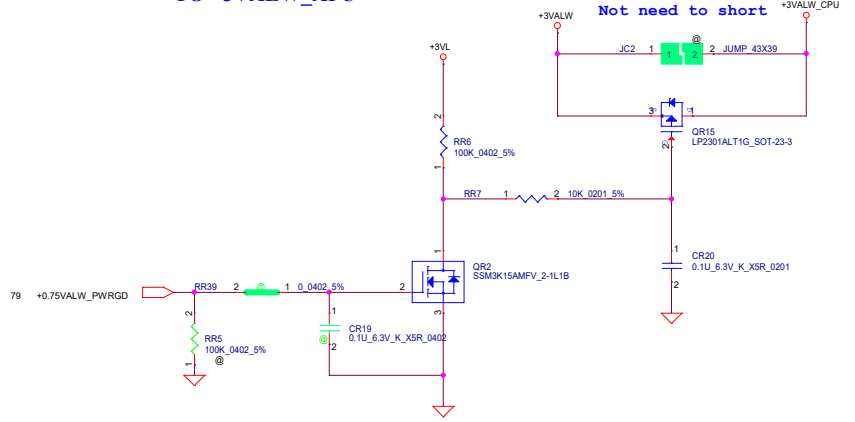




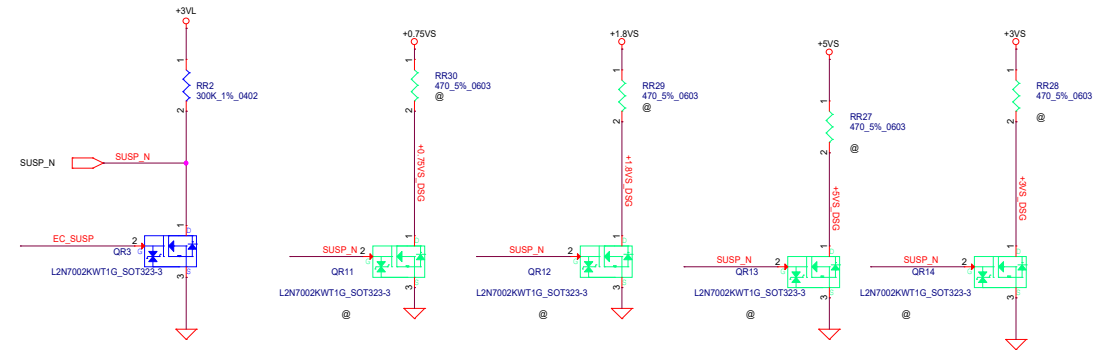
+1.8V_HDMI_RT 2.7A request

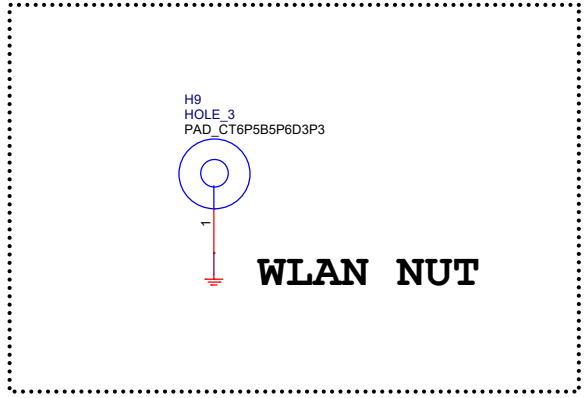
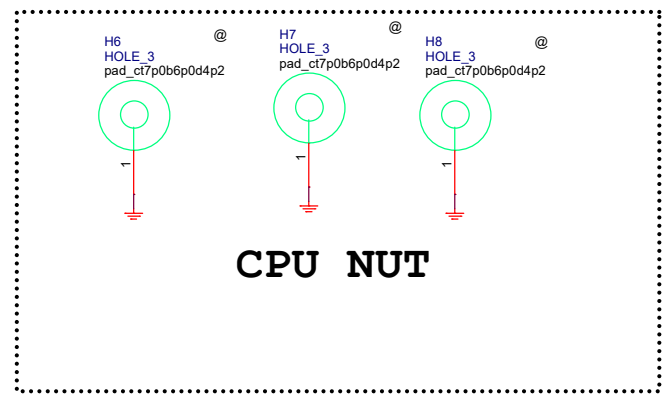
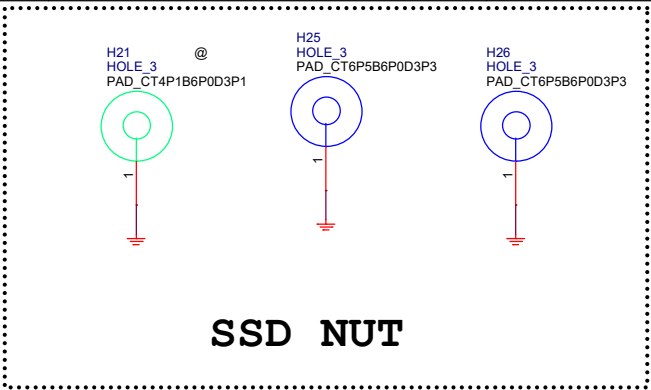
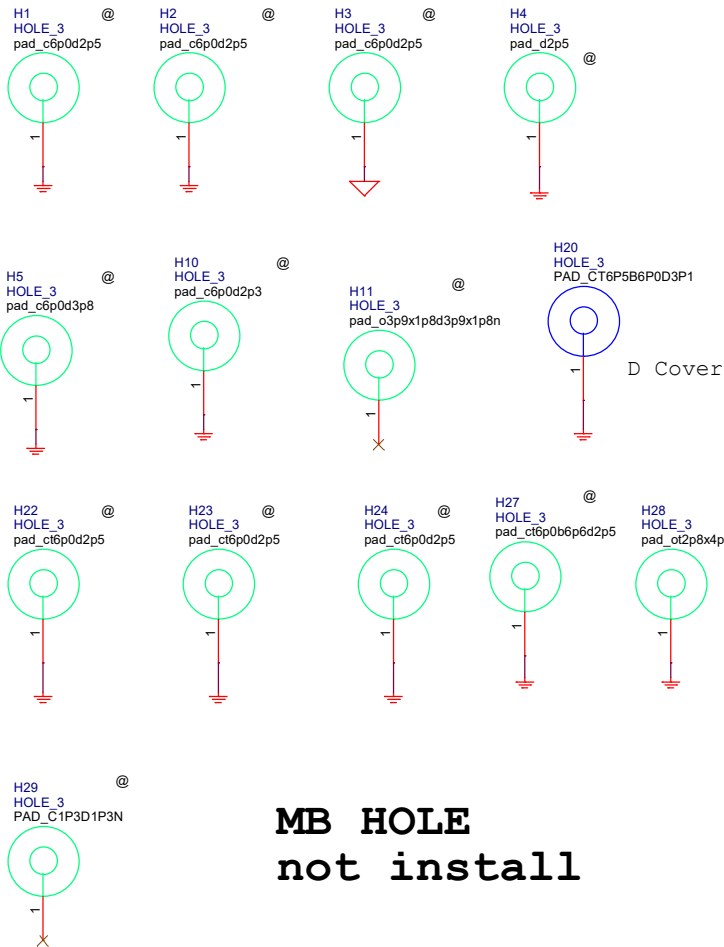


TO +3VALW_APU

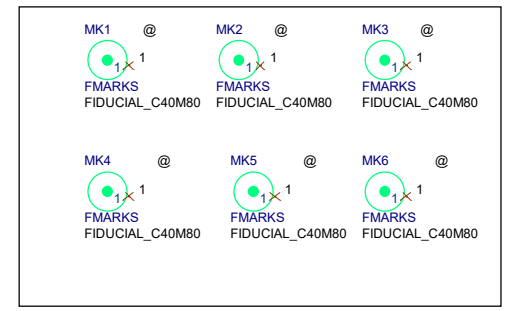


For DisCharge



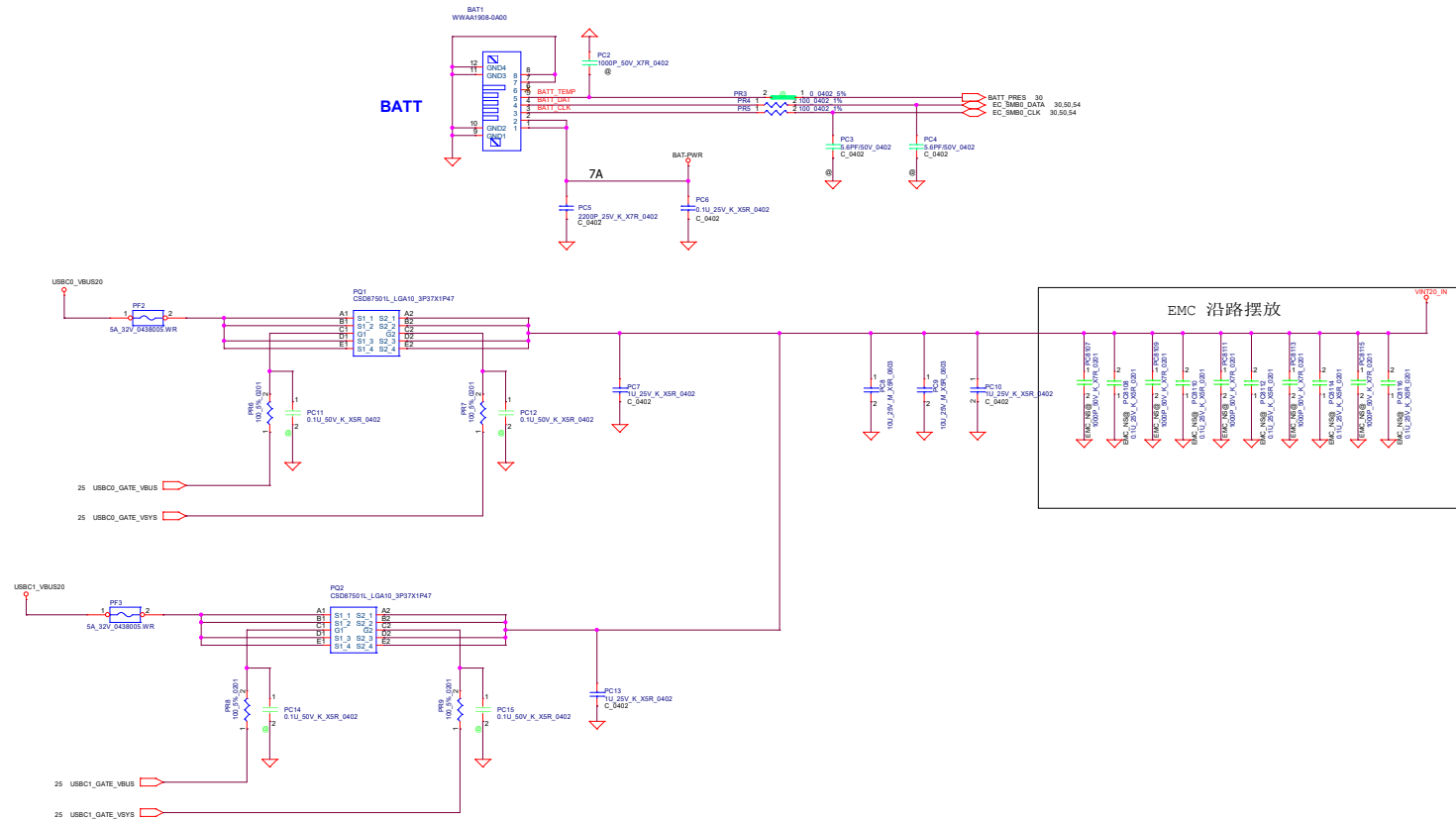


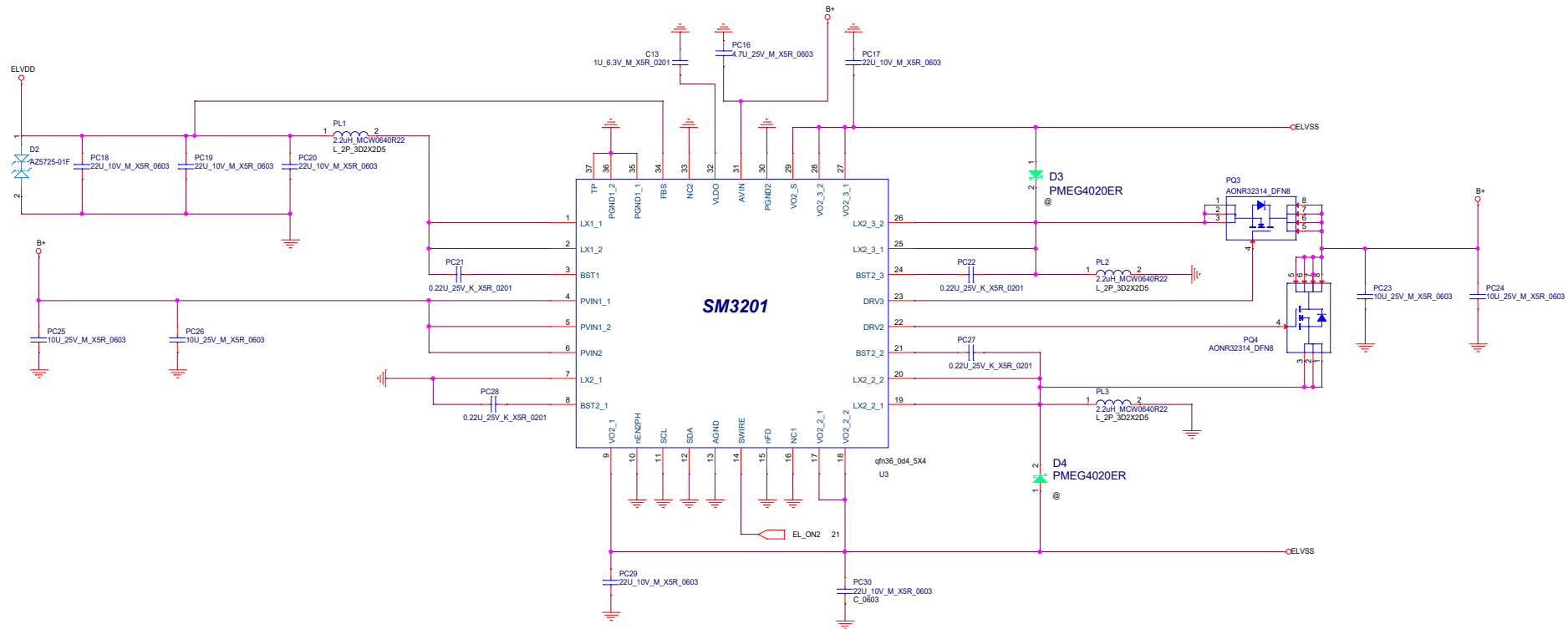
**optical dot
top 3pcs
bot 3pcs**



| | | | | | | | | | |
|---|------------|--------------------------------------|------------|-------|--------------------------|-----------------------|----|------|-----|
| Security Classification | | LCFC Highly Confidential Information | | Title | | Hole/Shielding | | LCFC | |
| Issued Date | 2021/06/01 | Deciphered Date | 2022/06/01 | Size | Document Number | ARN33 AMD Rembrandt-H | | Rev | 0.1 |
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BATTERY CONNECTOR

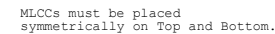




MLCCs must be placed
symmetrically on Top and Bottom.

Keep these two signals
as pair routing

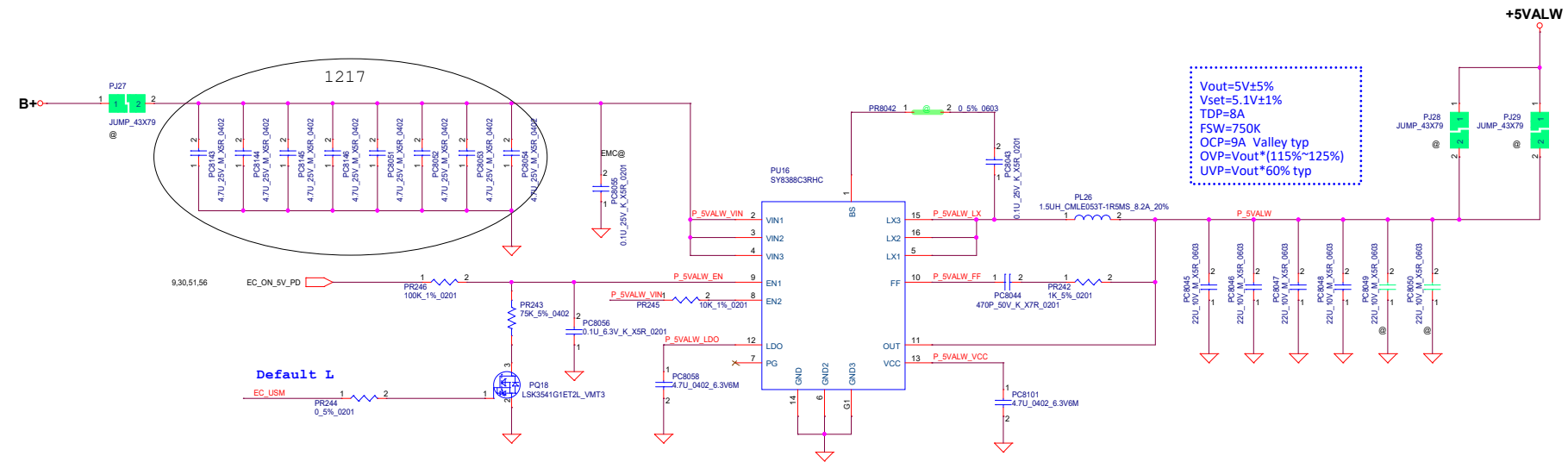
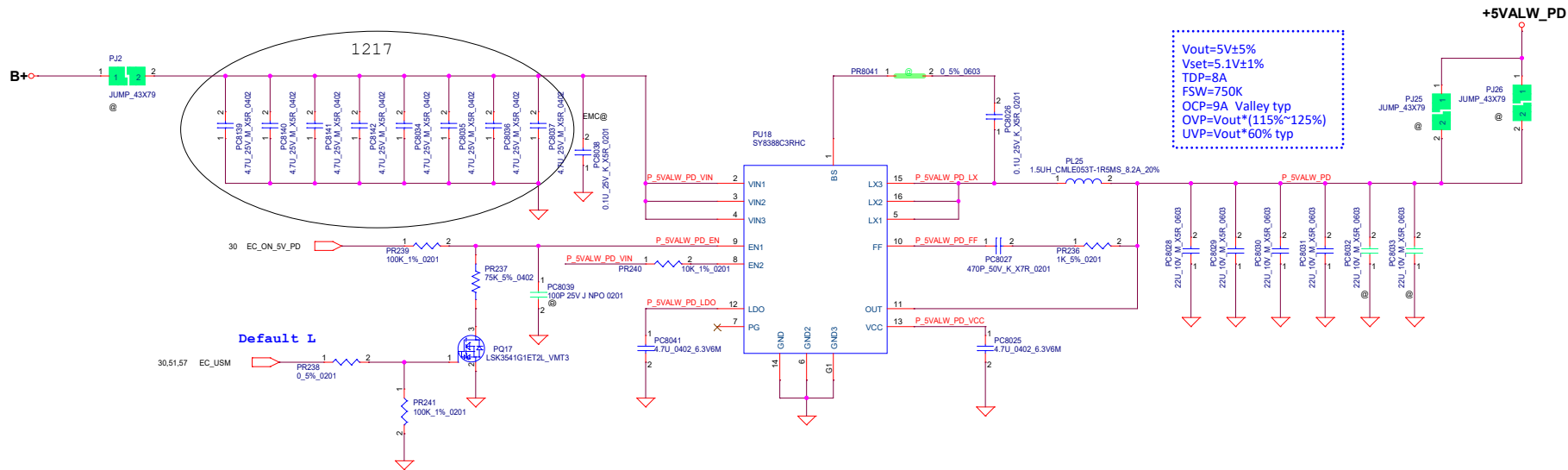
Table PL5301



← LOGIC

← LOGIC

| | | | | | | |
|--|-----------------|--------------------------------------|------------|----------|--|------------------------------------|
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| Size | Document Number | | Scale | Revision | | <div>North arrow pointing up</div> |
| Unit | AR33 AMSI 2022 | | 1 | | 1 | |
| <div>Drawn: [Blank] Checked: [Blank] Approved: [Blank]</div> | | | | | | |



Vout=0.9V±5%
TDC=0.6A
 $V_{out}=0.5 \cdot (1+R_1/R_2)$

Vout=1.065V±5%
OCP=14A
Vref=1.065V
OVP=(1.25~1.35)*Vref
UVP=(0.7~0.8)*Vref
Fsw=700Khz

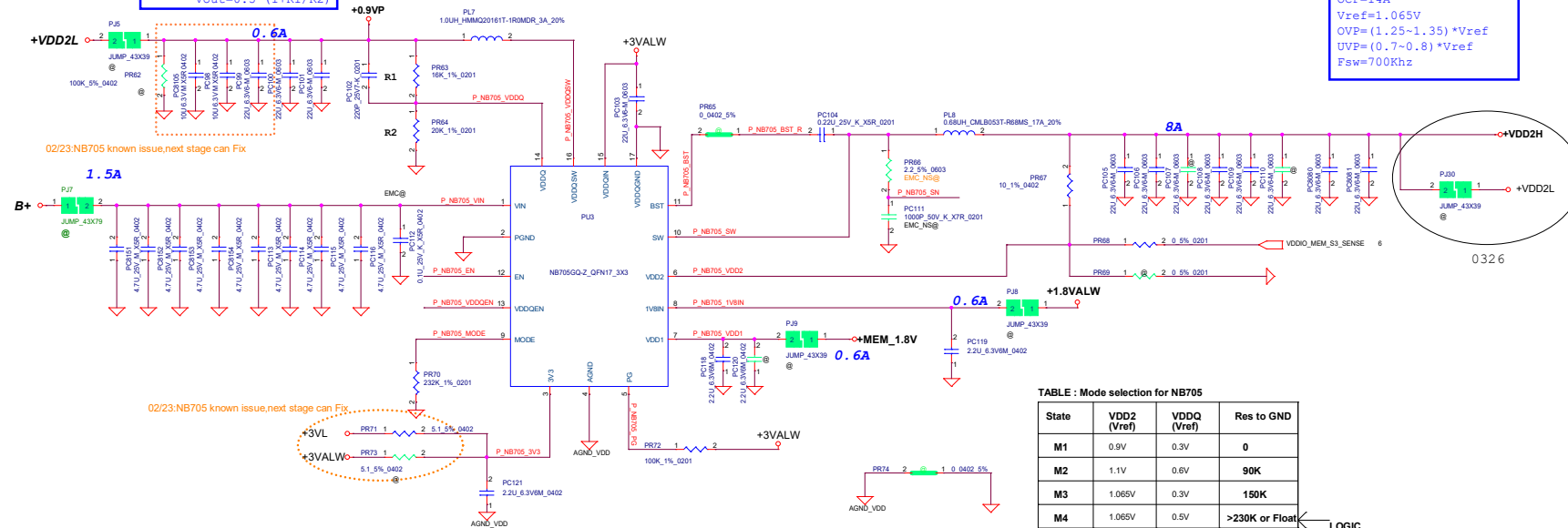
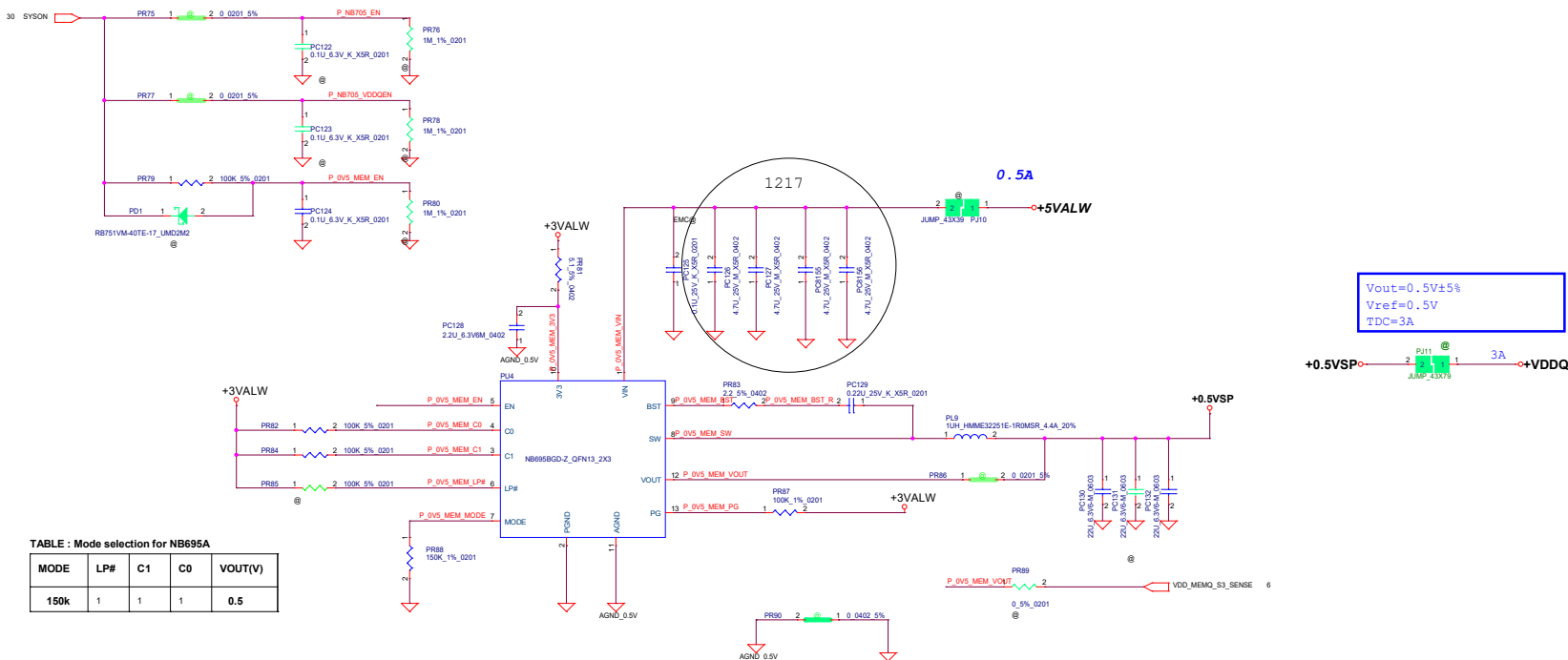


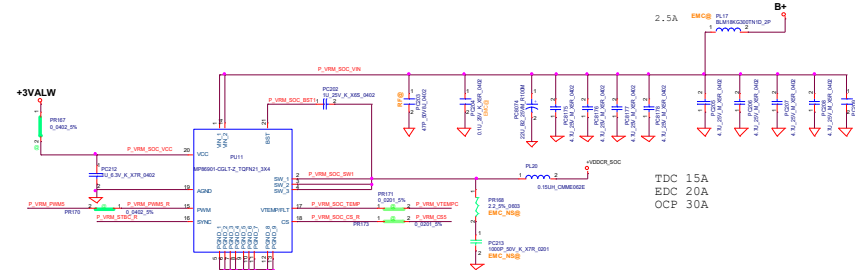
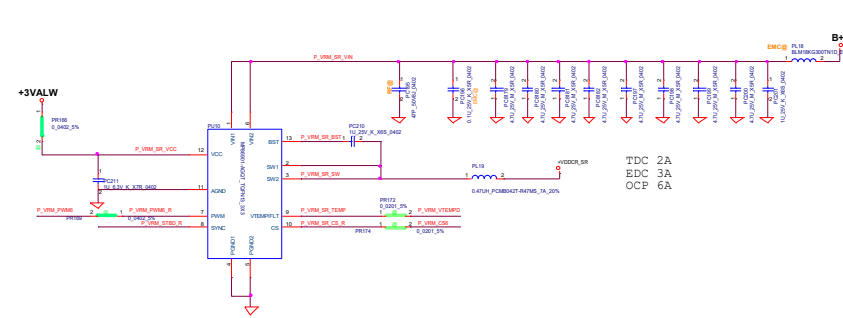
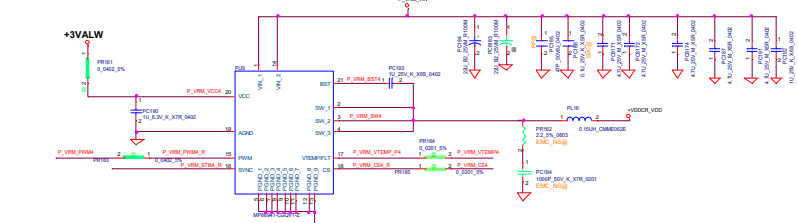
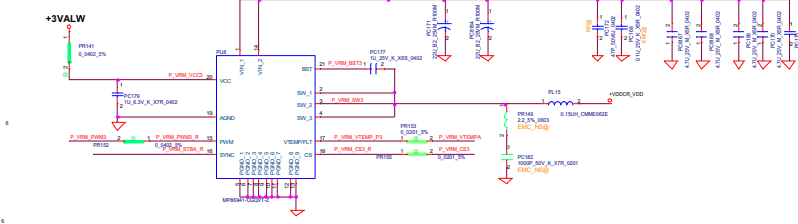
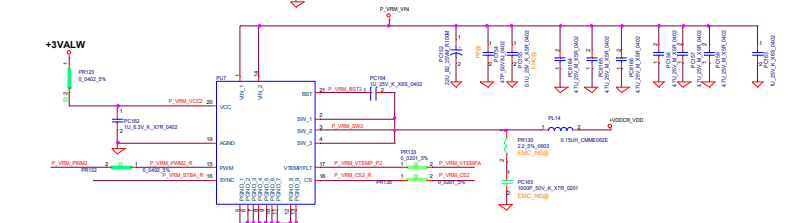
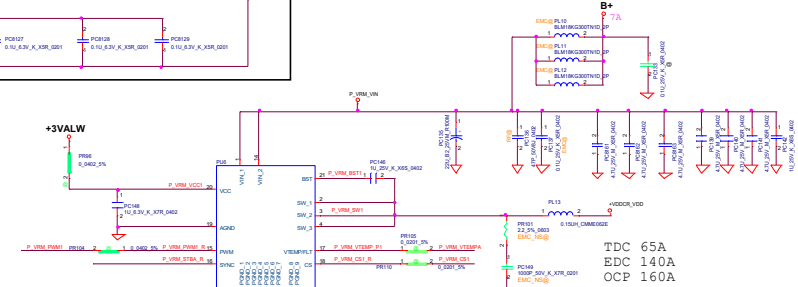
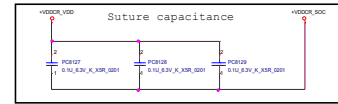
TABLE : Mode selection for NB705

| State | VDD2 (Vref) | VDDQ (Vref) | Res to GND |
|-------|----------------|----------------|--------------|
| M1 | 0.9V | 0.3V | 0 |
| M2 | 1.1V | 0.6V | 90K |
| M3 | 1.065V | 0.3V | 150K |
| M4 | 1.065V | 0.5V | >230K or Flo |

LOGIC

**TABLE : Mode selection for NB695A**

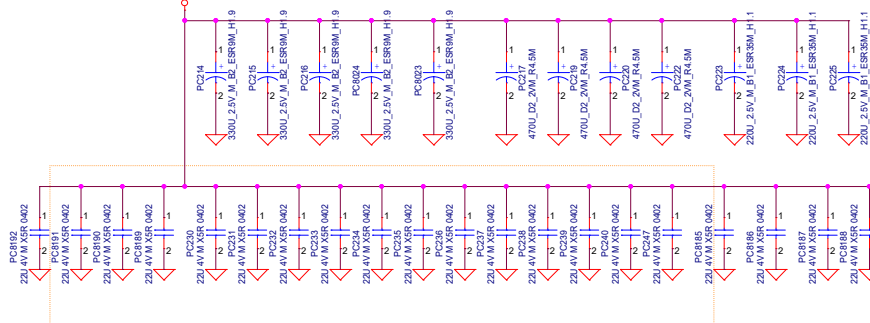
| MODE | LP# | C1 | C0 | VOUT(V) |
|------|-----|----|----|---------|
| 150k | 1 | 1 | 1 | 0.5 |



Part Reference:
PX1100~PX11**

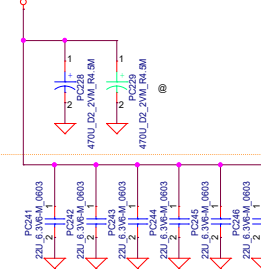
Note: Rembrandt
330uF/9mohm*5pcs B2+470uF/4.5mohm*4pcs D2+220uF/34mohm*3pcs B2
22uF/0603*12pcs
10uF/0402*40pcs

+VDDCR_VDD



All BU(on bot side beside CPU)

+VDDCR_SOC

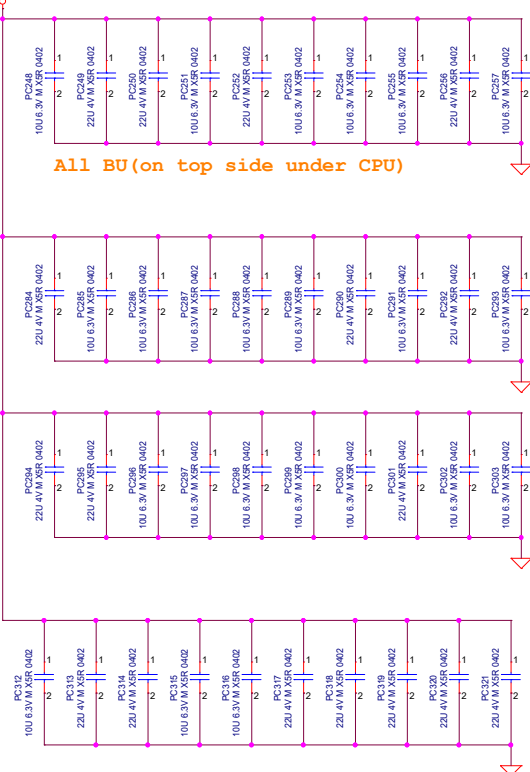


All BU(on bot side beside CPU)

Rembrandt
470uF/4.5mohm*2pcs D2
22uF/0603*6pcs
10uF/0402*26 pcs

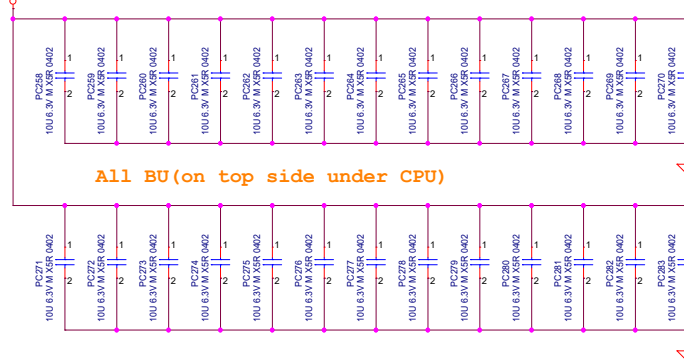
15 PCS BU + 11 PCS BO

+VDDCR_VDD



All BU(on top side under CPU)

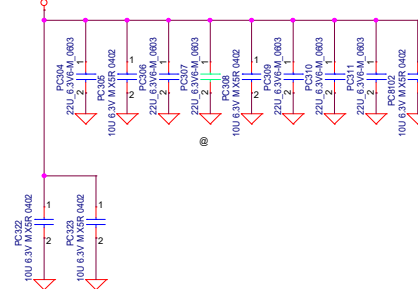
+VDDCR_SOC



All BU(on top side under CPU)

+VDDCR_SR

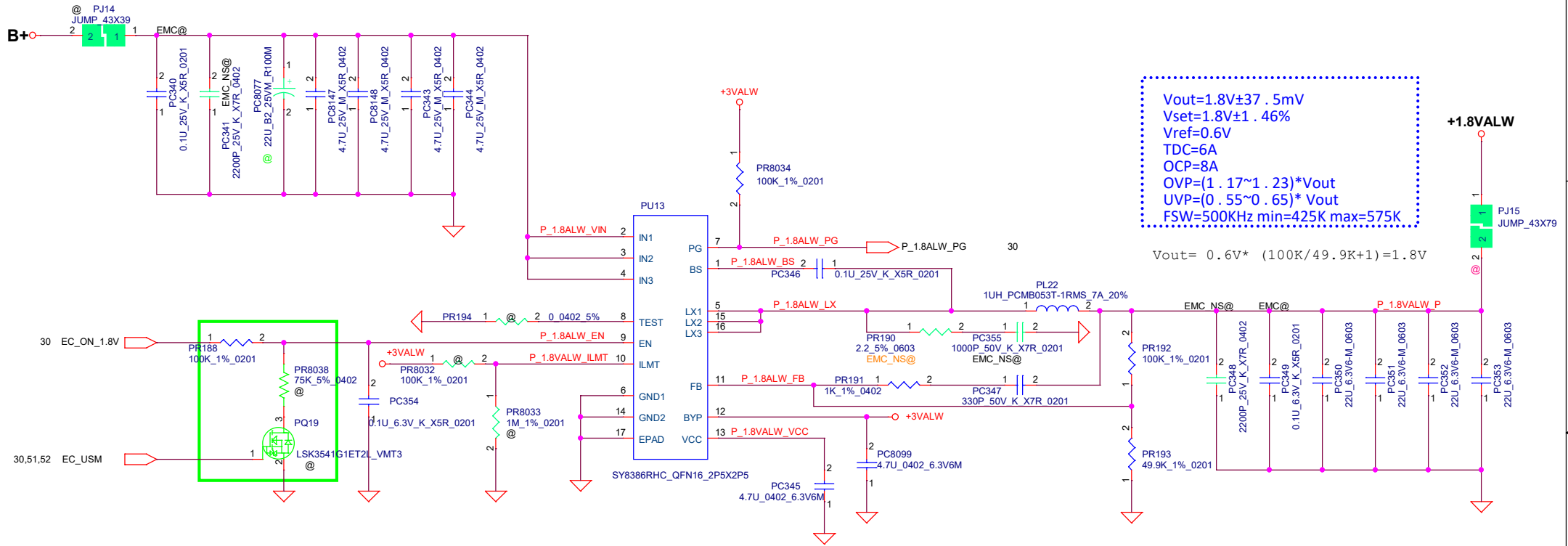
3 PCS BU



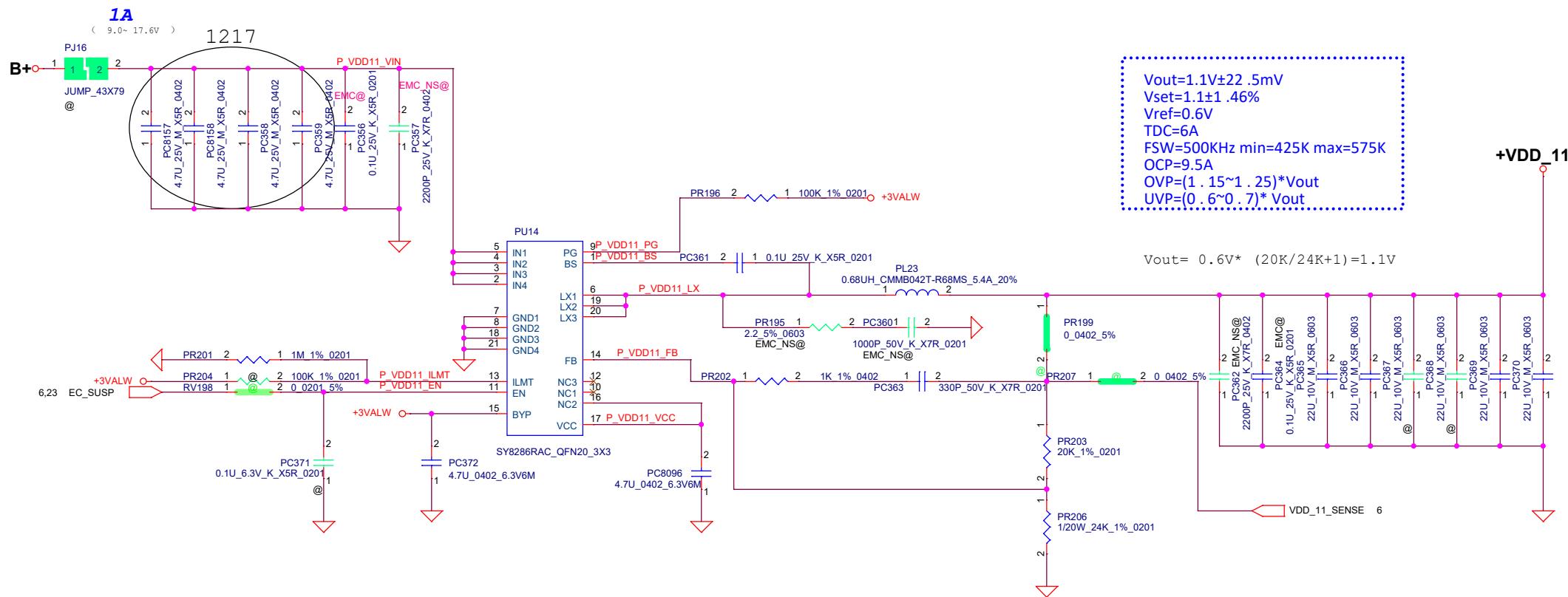
Rembrandt
22uF/0603*6pcs
10uF/0402*5pcs

| | | | | | | |
|--|--------------------------------------|-----------------|------------|----------------|-----------------|------|
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| Issued Date | 2021/06/01 | Deciphered Date | 2022/06/01 | Size | Document Number | |
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| Date: Thursday, March 31, 2022 | | | | | | 8.1 |
| Sheet 55 of 61 | | | | | | |

1.2A

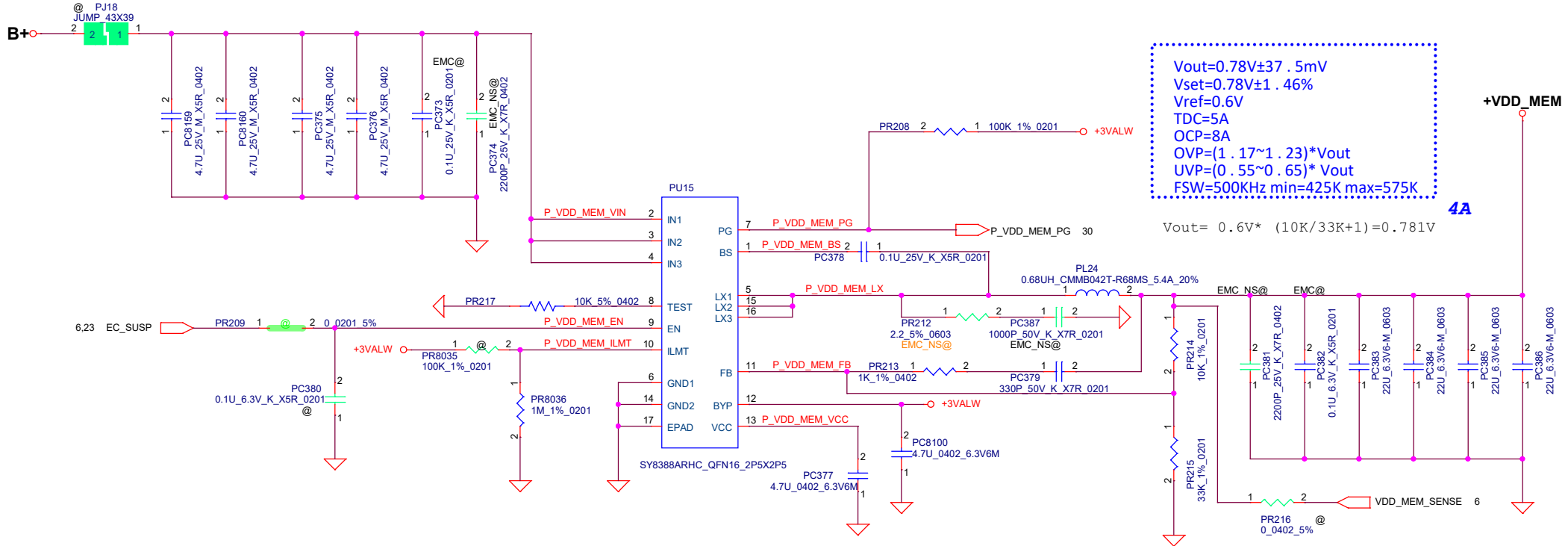


| | | | | | | | | |
|---|------------|--------------------------------------|------------|---------------|----|-----------------|-----------------------|-----|
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| | | | | | | B | ARN33 AMD Rembrandt-H | 0.1 |
| Date: | | Thursday, March 31, 2022 | | Sheet | 57 | of | 61 | |



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| Date: Thursday, March 31, 2022 | | | | Document Number ARN33 AMD Rembrandt-H | | |
| Sheet 58 of 61 | | | | | | |

0.5A



| | | | | | | | | | |
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| Size | | Document Number | | Rev | | | | | |
| B | | ARN33 AMD Rembrandt-H | | 0.1 | | | | | |
| Date: | | Thursday, March 31, 2022 | | Sheet | | 59 | | of 61 | |

2021/11/02

- 1.UV12/UU4/UU13 Change to APL5934DQBI-TRG
- 2.RU147/RU148 Change to not stuff
- 3.RU156/RU157 Change to stuff
- 4.RU217 Change to not stuff
- 5.RU218/RU223/RU224/RU225 Change to stuff
- 6.PL1/PL2/PL3 Change to SH00002EX0B
- 7.RV115 Change to RVF1
- 8.PL7 Change to HMMQ20161T-1R0MDR

2021/11/10

- 9.PC8103,PC321,PC234,PC252,PC232,PC8104,PC250,PC294,PC249,PC319,PC295,PC314,PC318,PC290,PC301,PC317,PC320,PC284,PC256,PC313 chang to 22U
- 10.PC224 Change to stuff
- 11.KB Power change to 3VS

2021/11/10

- 1.PC343/PC8130 Co-lay PC8077
- 2.PR246/PR227 Change to 100K
- 3.PC8056 Change to 0.1U
- 4.PC412 Change to 0.1U