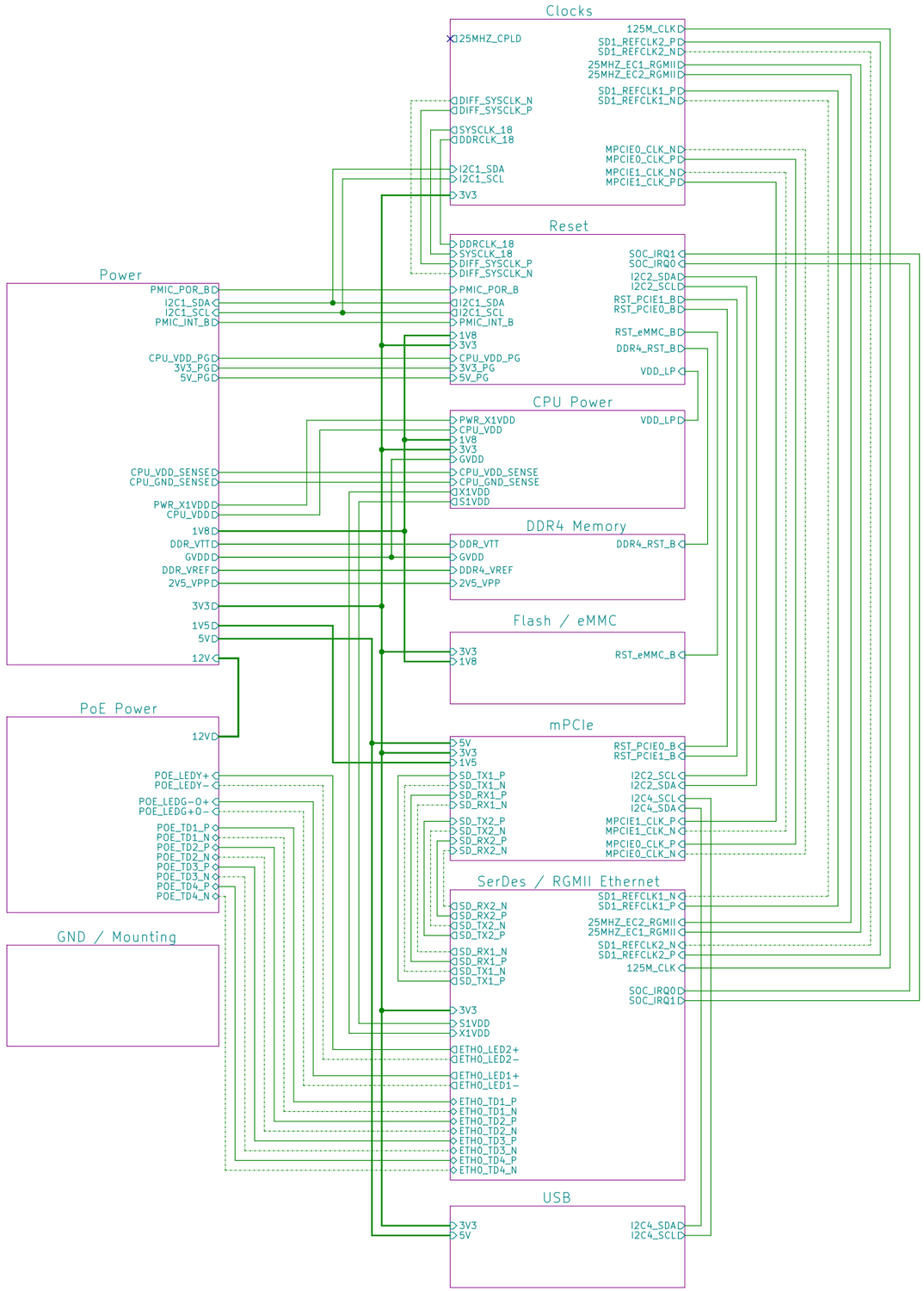
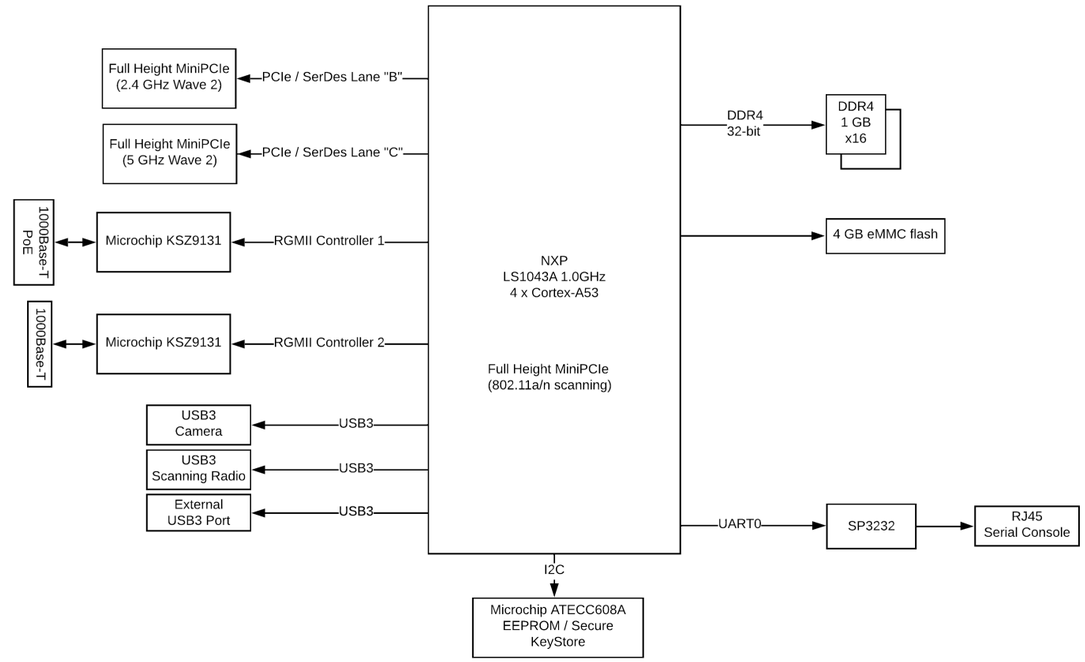


ImageStream AP2100v2
System Architecture



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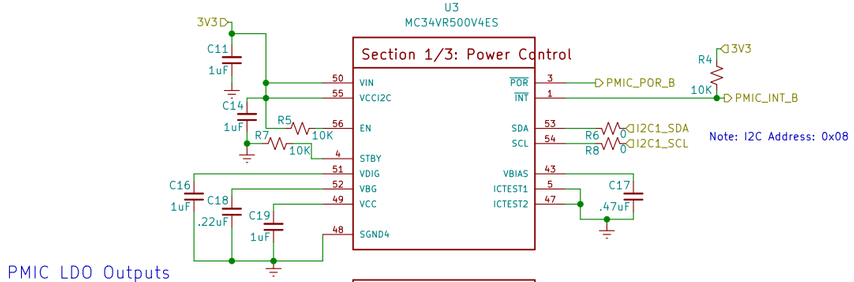
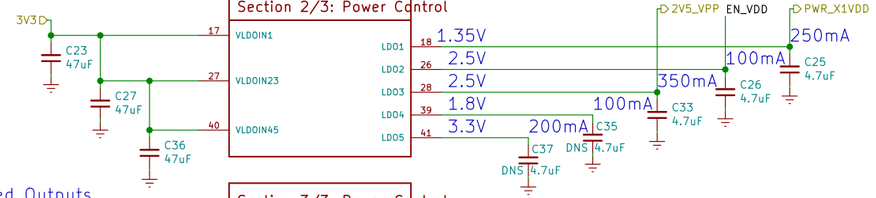
ISis ImageStream Internet Solutions, Inc.		
Sheet: /		
File: AP2100.kicad_sch		
Title: AP2100		
Size: USLedger	Date: 2020−10−06	**Rev: 1**
KiCad E.D.A. kicad 5.99.0−unknown−85444aadd104ubuntu20.04.1		Id: 1/12

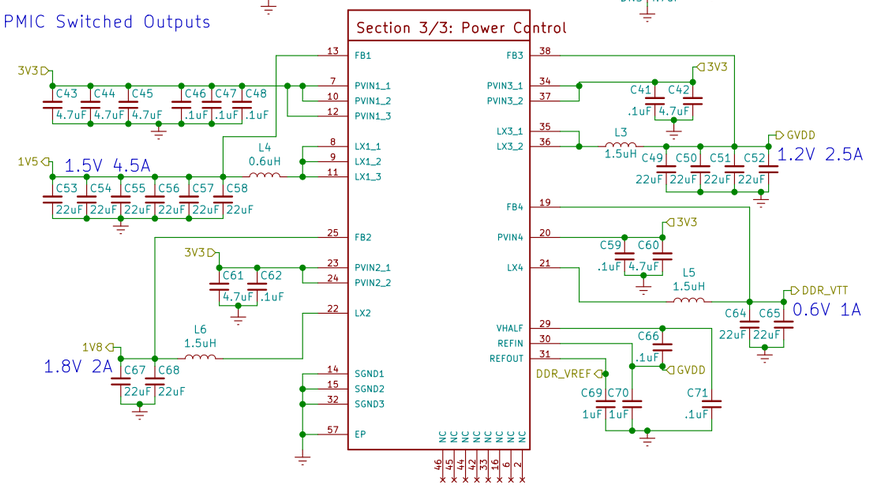
PMIC Control



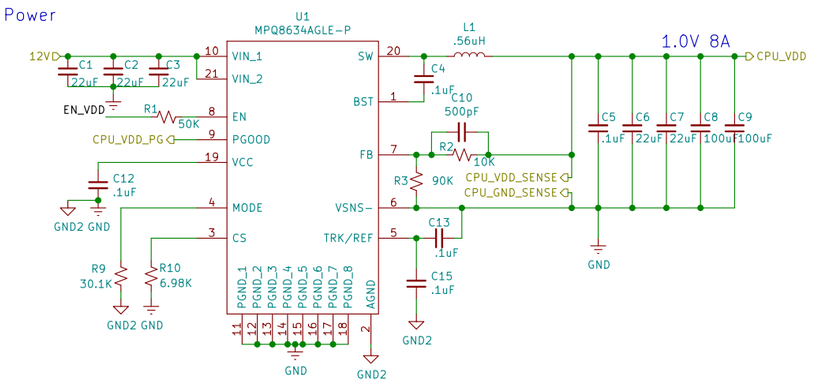
PMIC LDO Outputs



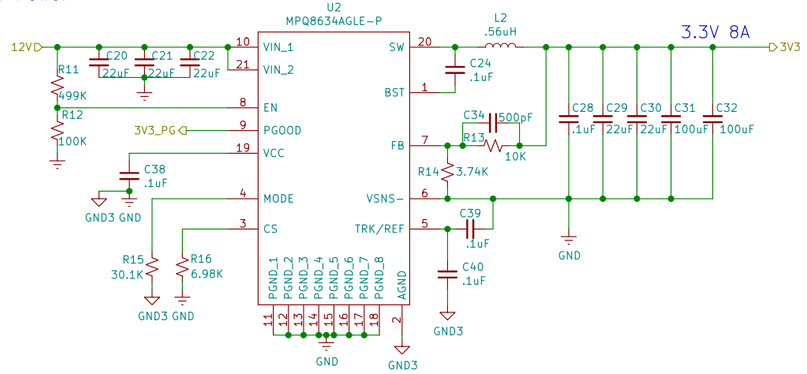
PMIC Switched Outputs



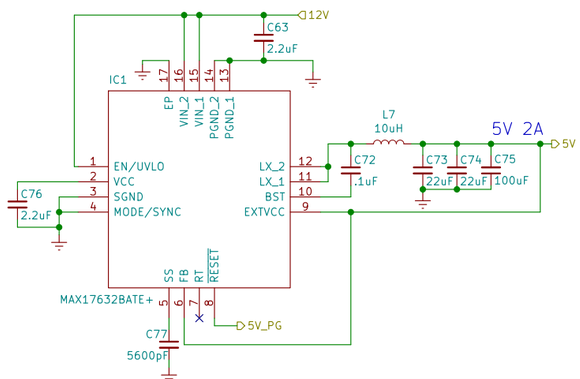
CPU VDD Power



3.3V Power



5V Power



ISis ImageStream Internet Solutions, Inc.

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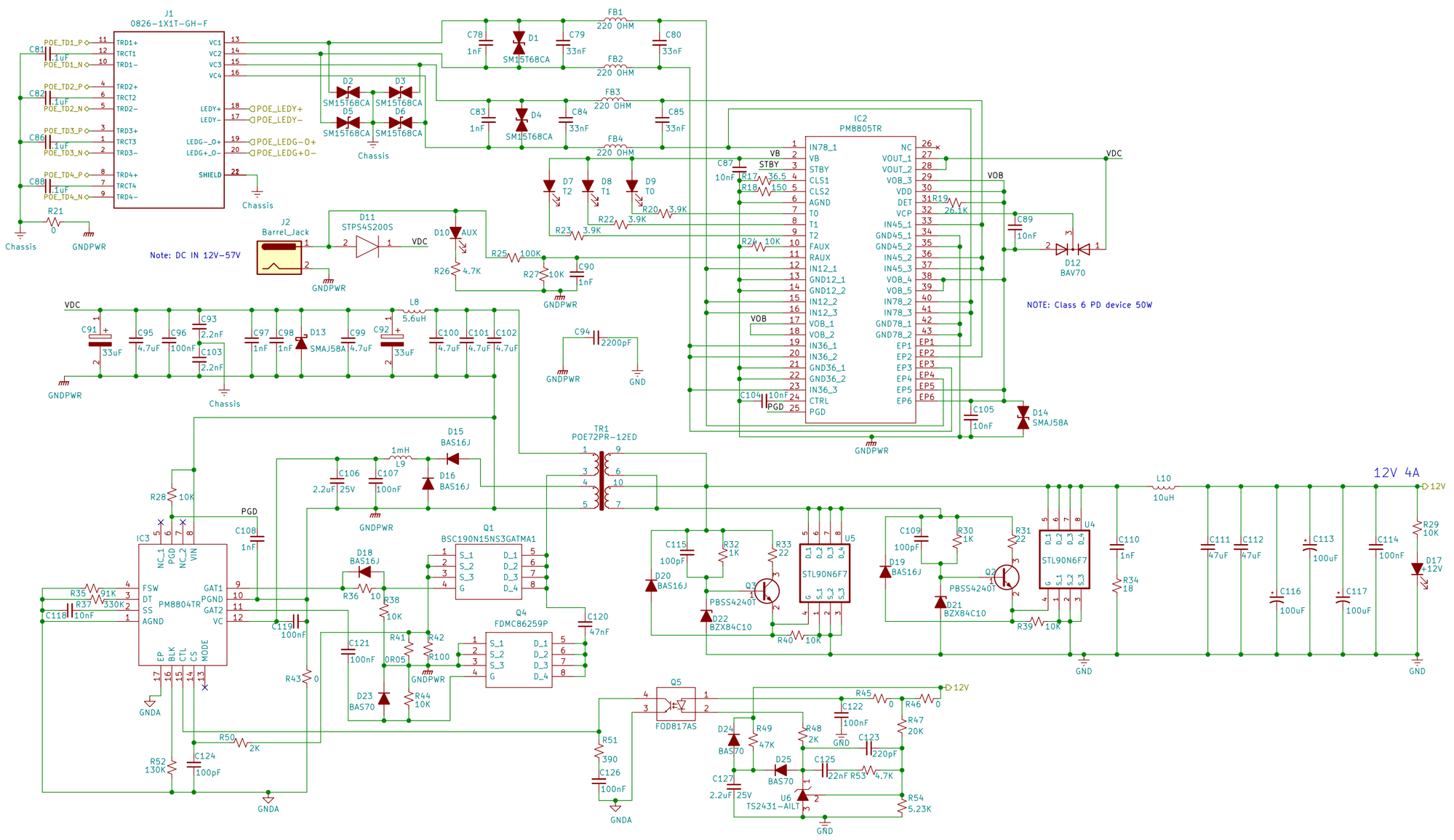
Title: AP2100

Size: USLedger	Date: 2020-10-06	**Rev: 1**
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1		Id: 2/12



ISis ImageStream Internet Solutions, Inc.

Sheet: /PoE Power/

File: poe.kicad_sch

Title: AP2100

Size: USLedger	Date: 2020-10-06	Rev: 1
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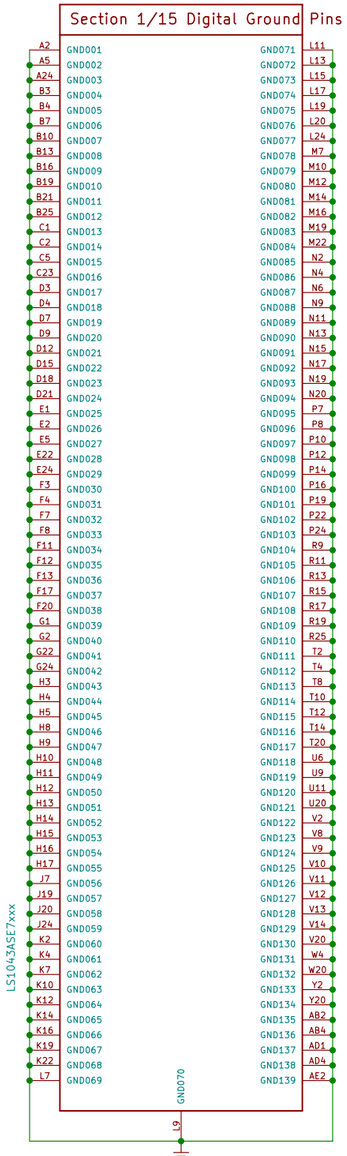

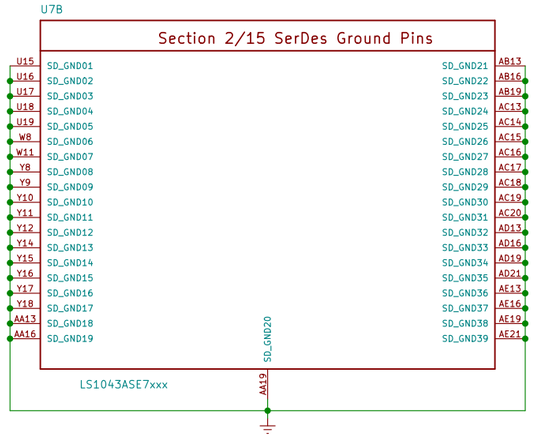

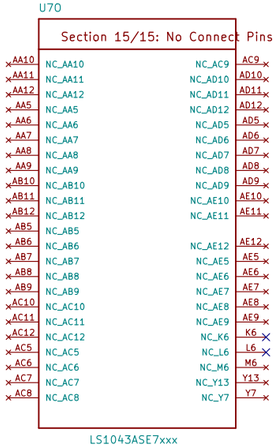

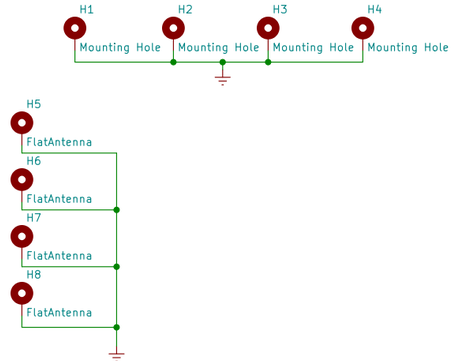

ISis ImageStream Internet Solutions, Inc.	
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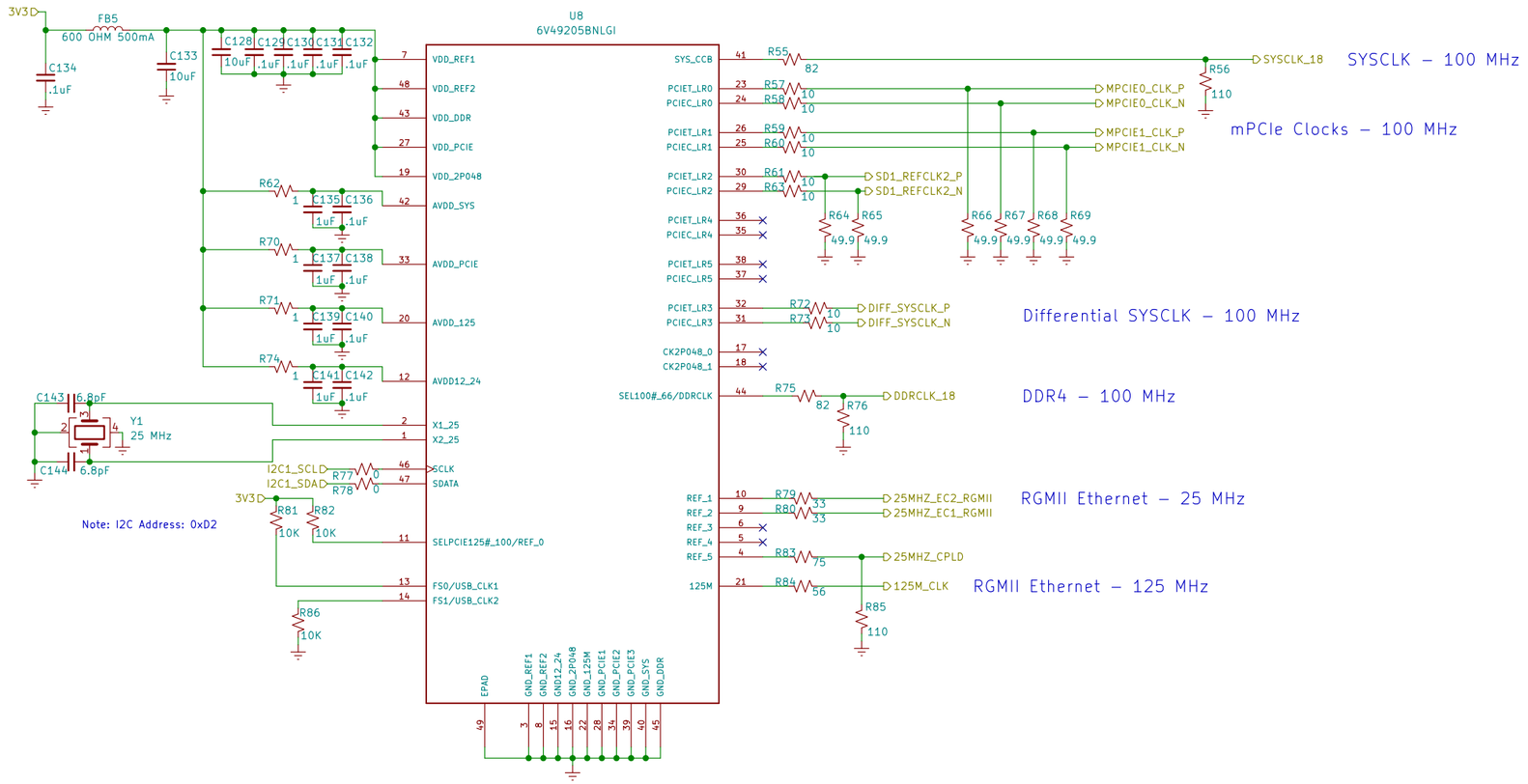
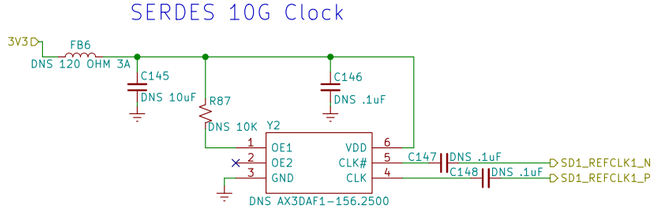
Title: AP2100	
Size: USLedger Date: 2020-10-06	**Rev: 1**
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1	Id: 4/12





ISis ImageStream Internet Solutions, Inc.	
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Title: AP2100	
Size: USLedger | Date: 2020-10-06	**Rev: 1**
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1	Id: 5/12

U7E
LS1043ASE7xxx

Section 5/15: JTAG, UARTs, Interrupts and Miscellaneous Functions

IRQ00	(OVDD: 1.8V)	(Note 1)	(DVDD: 3.3V/1.8V)	GPIO1_17/UART1_SIN	H2	UART_RX
IRQ01	(OVDD: 1.8V)	(Note 1)	(DVDD: 3.3V/1.8V)	GPIO1_15/UART1_SOUT	H1	UART_TX
IRQ02	(OVDD: 1.8V)	(Note 1)	(DVDD: 3.3V/1.8V)	GPIO1_21/UART1_CTS	J1	UART_CTS
IRQ11/GPIO1_31	(LVDD: 2.5V/1.8V)	(Note 1)	(DVDD: 3.3V/1.8V)	GPIO1_19/UART1_RTS	J2	UART_RTS
IRQ03/GPIO1_23	(DVDD: 3.3V/1.8V) (Note 1)					
IRQ04/GPIO1_24	(DVDD: 3.3V/1.8V) (Note 1)	(Note 1)	(DVDD: 3.3V/1.8V)	GPIO1_18/UART2_SIN	K1	RST_PCIE0
IRQ05/GPIO1_25	(DVDD: 3.3V/1.8V) (Note 1)	(Note 1)	(DVDD: 3.3V/1.8V)	GPIO1_16/UART2_SOUT	L2	RST_PCIE1
IRQ06/GPIO1_26	(DVDD: 3.3V/1.8V) (Note 1)	(Note 1)	(DVDD: 3.3V/1.8V)	GPIO1_22/UART2_CTS	M2	RESET_BTN_B
IRQ07/GPIO1_27	(DVDD: 3.3V/1.8V) (Note 1)	(Note 1)	(DVDD: 3.3V/1.8V)	GPIO1_20/UART2_RTS	L1	
IRQ08/GPIO1_28	(DVDD: 3.3V/1.8V) (Note 1)					
IRQ09/GPIO1_29	(DVDD: 3.3V/1.8V) (Note 1)		(DVDD: 3.3V/1.8V)	IIC1_SCL	N1	I2C1_SCL
IRQ10/GPIO1_30	(DVDD: 3.3V/1.8V) (Note 1)		(DVDD: 3.3V/1.8V)	IIC1_SDA	M1	I2C1_SDA
TA_TMP_DETECT	(OVDD: 1.8V)		(OVDD: 1.8V)	ASLEEP/GPIO1_13/CFG_SOIC_USE	E9	
TA_BB_TMP_DETECT	(TA_BB_VDD: 0.9V/1V)					
TA_BB_RTC	(TA_BB_VDD: 0.9V/1V)		(DVDD: 1.8V)	TBSCAN_EN	C21	
			(DVDD: 1.8V)	TEST_SEL	E21	
RESET_REQ	(OVDD: 1.8V)					
HRESET	(OVDD: 1.8V)		(Analog)	TD1_ANODE	R6	
PORESET	(OVDD: 1.8V)		(Analog)	TD1_CATHODE	P6	
SYSCLK	(OVDD: 1.8V)					
DDRCLK	(OVDD: 1.8V)	(Note 1)	(DVDD: 2.5V/1.8V)	GPIO4_02/IIC2_SCL	K3	I2C2_SCL
		(Note 1)	(DVDD: 2.5V/1.8V)	GPIO4_03/IIC2_SDA	L3	I2C2_SDA
DIFF_SYSCLK	(OVDD: 1.8V)					
DIFF_SYSCLK	(OVDD: 1.8V)		(OVDD: 1.8V)	EVT0	E10	
			(OVDD: 1.8V)	EVT1	E13	
CLK_OUT	(OVDD: 1.8V)		(OVDD: 1.8V)	EVT2	E8	
TH_TPA	(Analog)		(OVDD: 1.8V)	EVT3	E12	
			(OVDD: 1.8V)	EVT4	E11	
RTC/GPIO1_14	(OVDD: 1.8V)		(OVDD: 1.8V)	EVT9	H7	
TDI	(OVDD: 1.8V)		(OVDD: 1.8V)	CKSTP_OUT	H18	
TDO	(OVDD: 1.8V)		(OVDD: 1.8V)	SCAN_MODE	A21	
TCK	(OVDD: 1.8V)		(OVDD: 1.8V)	JTAG_BSR_VSEL	F21	
TMS	(OVDD: 1.8V)		(Reserved, Analog)	FA_ANALOG_PIN	T7	
TRST	(OVDD: 1.8V)		(Reserved, Analog)	FA_ANALOG_G_V	U7	

Note1: This pin has other functions not listed here.

JTAG

J3
Conn_ARM_JTAG_SWD_10

Reset Logic

IC4
MIC2774N-29YM5-TR

U12 74LVC1G08

U13 74LVC1G08

PWRLED

U14 74LVC1G07
U15 74LVC1G07
U16 74LVC1G08
U17 74LVC1G07
U19 74LVC1G08
U20 74LVC1G07

LEDs

Real Time Clock

IC5
PCF2129T_2,518

Note: I2C Address: 0x51

CPU Temp

U10
SA56004EDP,118

Note: I2C Address: 0x4C

U9A 74LVC2G08
U9B 74LVC2G08

Crypto / Key Storage

U18
ATECC608A-MAHDA

Note: I2C Address: 0x60

Serial Console

U11
SP3232EBEY-L/TR

J4
RJ45

ISIs ImageStream Internet Solutions, Inc.	
Sheet: /Reset/	
File: reset.kicad_sch	
Title: AP2100	
Size: USLedger | Date: 2020-10-06	**Rev: 1**
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1	Id: 6/12

U7C
LS1043ASE7xxx

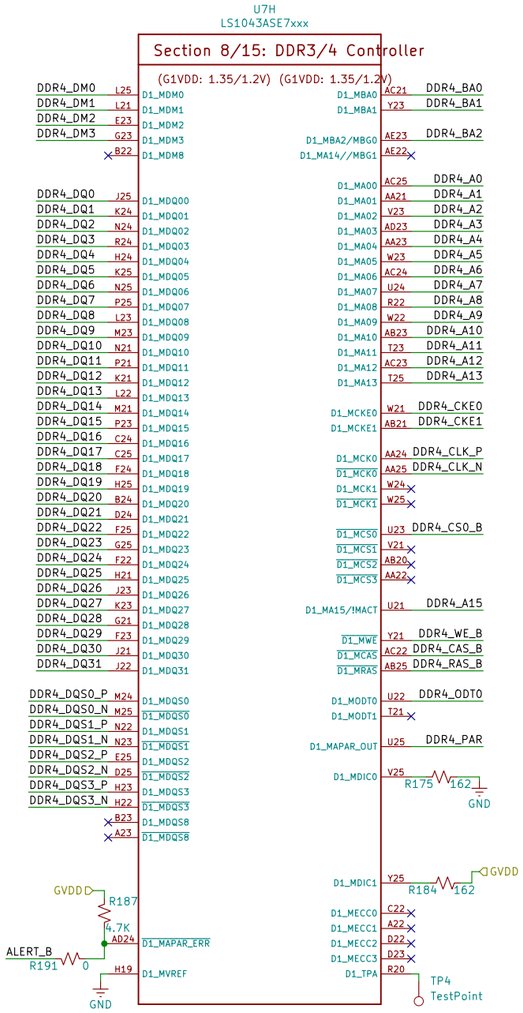
Section 3/15 Power Pins

U7D
LS1043ASE7xxx

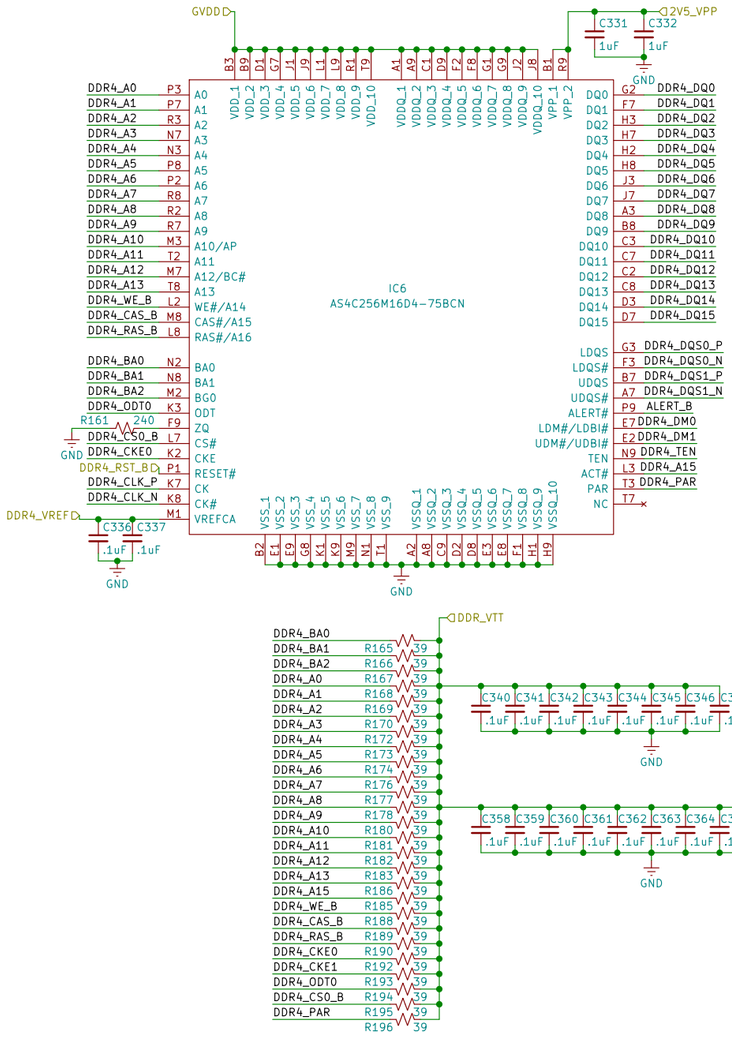
Section 4/15: Power Pins

ISis ImageStream Internet Solutions, Inc.
Sheet: /CPU Power/
File: CPU_power.kicad_sch
Title: AP2100
Size: USLedger | Date: 2020-10-06 | Rev: 1
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1 | Id: 7/12

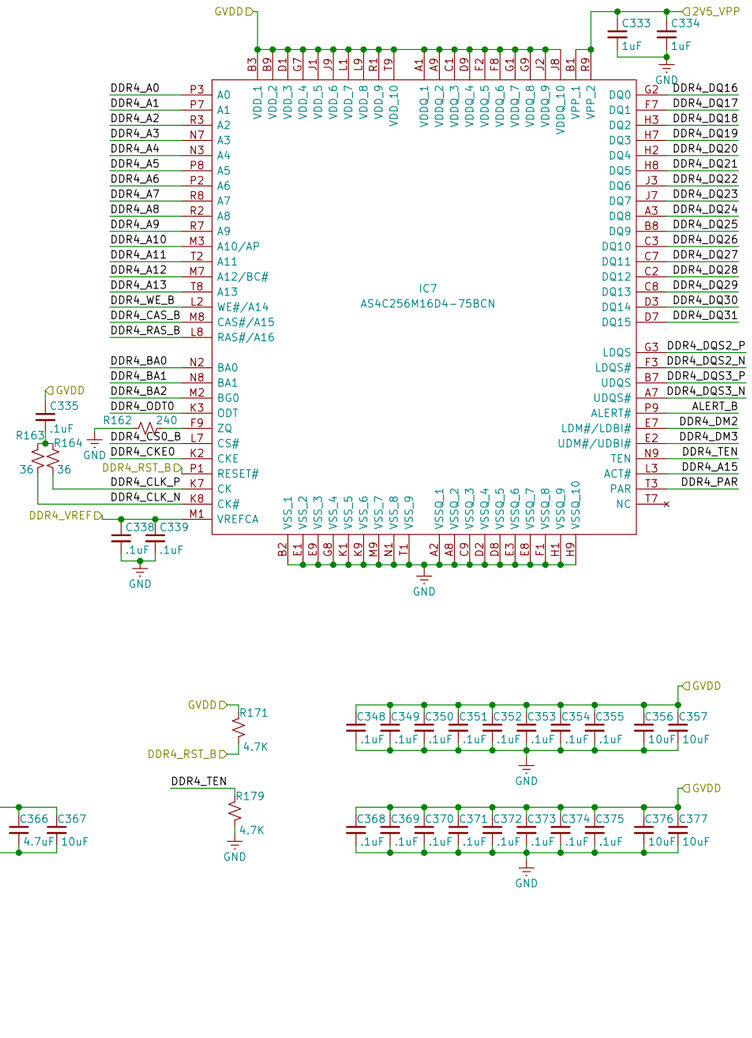
1GB DDR4 Memory

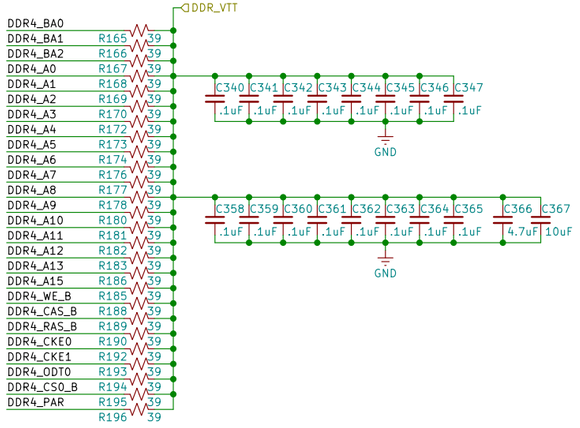


DDR4 256Mx16



DDR4 256Mx16





ISis ImageStream Internet Solutions, Inc.

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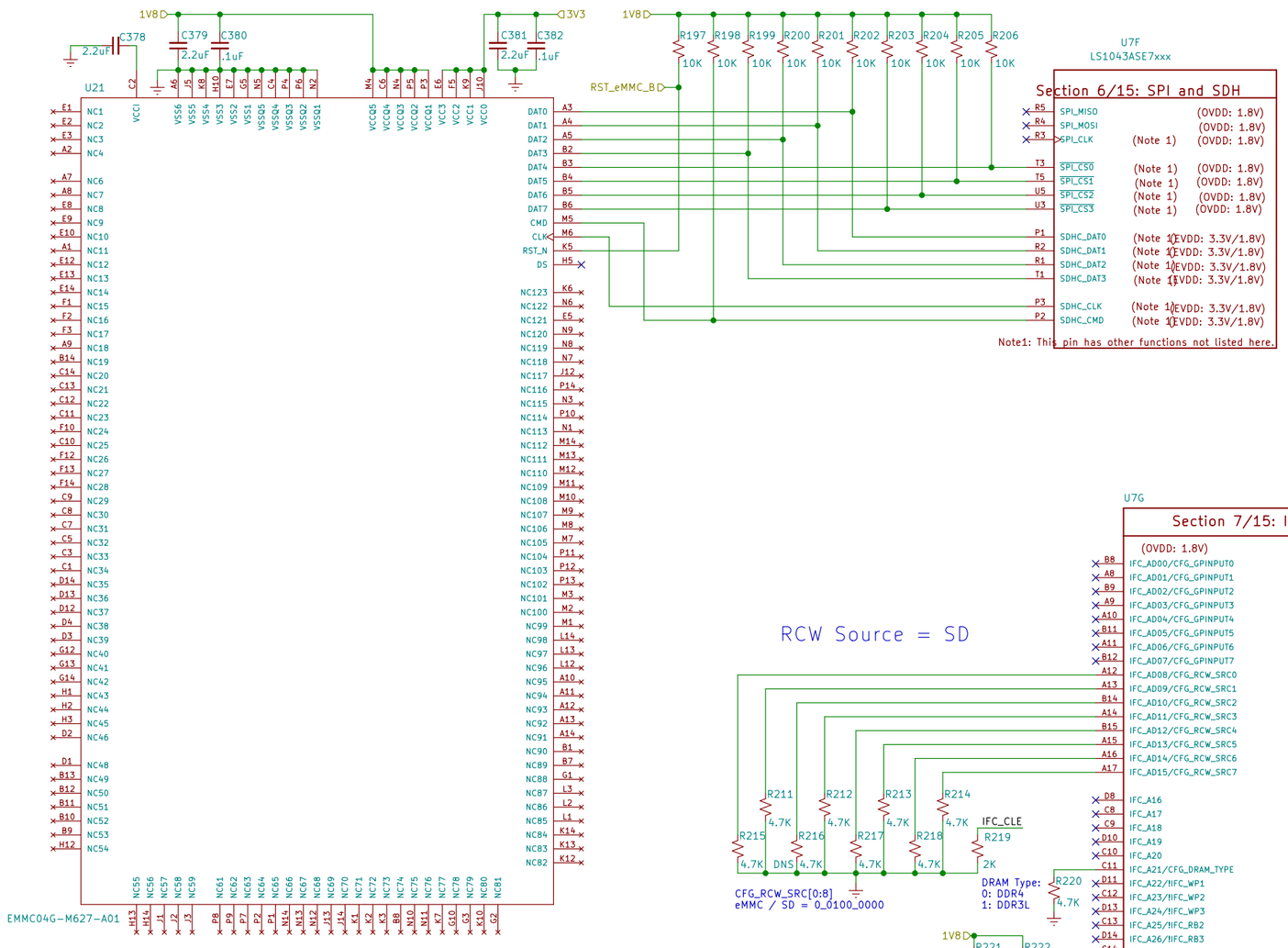
Title: AP2100

Size: USLedger	Date: 2020-10-06	**Rev: 1**
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1		Id: 8/12

4GB eMMC Flash



ISIs ImageStream Internet Solutions, Inc.	
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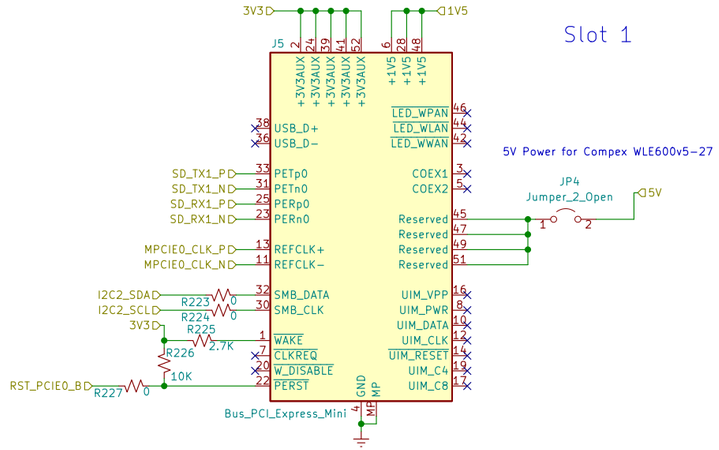
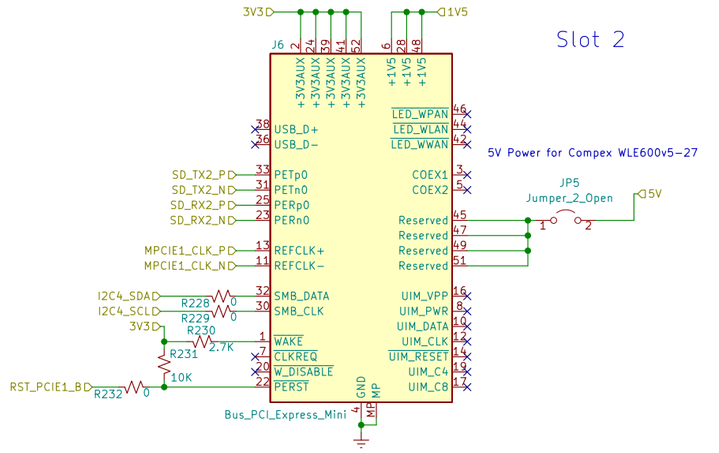
Size: USLedger Date: 2020-10-06	**Rev: 1**
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1	Id: 9/12

Mini PCI Express

Slot 1



Slot 2



ISis ImageStream Internet Solutions, Inc.	
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Title: AP2100	
Size: USLedger	Date: 2020-10-06
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1	Id: 10/12

Rev: 1

Ethernet 0 (PoE In)

U7L

Section 12/15: Ethernet Controller 1

(LVDD: 2.5V/1.8V)

EC1_RXD0 W2
EC1_RXD1 W1
EC1_RXD2 V1
EC1_RXD3 U2
EC1_RX_DV Y1
EC1_RX_CLK U1
EC1_TXD0 Y3
EC1_TXD1 W3
EC1_TXD2 V4
EC1_TXD3 V3
EC1_TX_EN Y4
EC1_GTX_CLK U4
EMI1_MDIO W5
EMI1_MDC Y5
EC1_GTX_CLK125 AA3 ← 125M_CLK

Note1: All pin have other functions not listed here.

LS1043ASE7xxx

3V3 → NTA4151P Q6 → R233 0 → LDO_O

IC8 KSZ9131RNXC

AVDDL_1 4, AVDDL_2 9, AVDDL_PLL 44, DVDDL_1 18, DVDDL_2 23, DVDDL_3 26, DVDDL_4 30, DVDDL_5 39
AVDDH_1 1, AVDDH_2 12, DVDDH_1 16, DVDDH_2 34, DVDDH_3 40

R236 22 P0_RXD0 → RXD0/MODE0 32
R237 22 P0_RXD1 → RXD1/MODE1 31
R238 22 P0_RXD2 → RXD2/MODE2 28
R241 22 P0_RXD3 → RXD3/MODE3 27

TXRXP_A 2 → ETH0_TD1_P
TXRXM_A 3 → ETH0_TD1_N
TXRXP_B 5 → ETH0_TD2_P
TXRXM_B 6 → ETH0_TD2_N
TXRXP_C 7 → ETH0_TD3_P
TXRXM_C 8 → ETH0_TD3_N
TXRXP_D 10 → ETH0_TD4_P
TXRXM_D 11 → ETH0_TD4_N

TXD0 19
TXD1 20
TXD2 21
TXD3 22

R242 22 P0_RX_CTL/CLK125_EN → RX_CTL/CLK125_EN 33
TX_CTL 25

MDIO 37
MDC 36

3V3 → R245 1K → INT_N/PME_N2/ALLPHYAD 38

R246 22 P0_RX_CLK SOC_IRQ0 → RXC/PHYAD2 35
TXC 24

25MHZ_EC1_RGMII → XI 46
XO 45

LED1/PME_N1//PHYAD0 17 → P0_LED1 → 3V3 R243 220 → ETH0_LED1+ / ETH0_LED1−
LED2/PHYAD1 15 → P0_LED2 → 3V3 R244 220 → ETH0_LED2+ / ETH0_LED2−

CLK125_NDO/LED_MODE 41 → R247 10K → 3V3
RESET_N 42 → R248 100K

NC_1 13, NC_2 14, NC_3 47
VSS 29, P_VSS 49
ISET 48 → R261 6.04K

NOTE: LED Mode is Individual

NOTE: 125MHz Output Clock is Disabled

P0_RX_CTL/CLK125_EN → R249 1K

NOTE: Mode is 1110 = 10/100 F/H, 1000BT Full (RGMII)

3V3 → R253 10K, R254 10K, R255 10K, R256 DNP 10K
P0_RXD3 P0_RXD2 P0_RXD1 P0_RXD0
R262 DNP 1K, R263 DNP 1K, R264 DNP 1K, R265 1K

NOTE: PHY Address is 01h

3V3 → R257 DNP 10K, R258 DNP 10K, R259 10K
P0_RX_CLK P0_LED2 P0_LED1
R266 1K, R267 1K, R268 DNP 1K

Mode [3:0] Description
1000 10/100 Full and Half, 1000BT Full (RGMII), PME Enable on LED1
1010 10/100 Full and Half, 1000BT Full (RGMII), PME Enable on INT_N
1100 1000BT Full (RGMII)
1110 10/100 Full and Half, 1000BT Full (RGMII)

U7N

Section 14/15: SerDes

NOTE: 10G interface unused

SD1_REFCLK1_P SD1_REFCLK1_N → R240 4.7K, R239 4.7K

SD1_REFCLK1_P W10 → SD1_REF_CLK1_P
SD1_REFCLK1_N W9 → SD1_REF_CLK1_N
SD1_REFCLK2_P AE20 → SD1_REF_CLK2_P
SD1_REFCLK2_N AD20 → SD1_REF_CLK2_N

TP5 V16 → SD1_PLL1_TPA
TP6 V15 → SD1_PLL1_TPD
TP7 V18 → SD1_PLL2_TPA
TP8 V17 → SD1_PLL2_TPD

X1VDD S1VDD → R250 R251 698 200 → SD1_IMP_CAL_TX W19, SD1_IMP_CAL_RX W13

SD1_TX0_P AA14, SD1_TX0_N AB14
SD1_RX0_P AE14, SD1_RX0_N AD14 → R235 4.7K, R234 4.7K
SD1_TX1_P AA15 → SD_TX1_P, SD1_TX1_N AB15 → SD_TX1_N
SD1_RX1_P AE15 → SD_RX1_P, SD1_RX1_N AD15 → SD_RX1_N
SD1_TX2_P AA17 → SD_TX2_P, SD1_TX2_N AB17 → SD_TX2_N
SD1_RX2_P AE17 → SD_RX2_P, SD1_RX2_N AD17 → SD_RX2_N
SD1_TX3_P AA18, SD1_TX3_N AB18
SD1_RX3_P AE18, SD1_RX3_N AD18 → R260 4.7K, R252 4.7K

LS1043ASE7xxx

Ethernet 1

U7M

Section 13/15: Ethernet Controller 2

(LVDD: 2.5V/1.8V)

EC2_RXD0 AC2
EC2_RXD1 AC1
EC2_RXD2 AB1
EC2_RXD3 AA2
EC2_RX_DV AD2
EC2_RX_CLK AA1
EC2_TXD0 AD3
EC2_TXD1 AC4
EC2_TXD2 AC3
EC2_TXD3 AB3
EC2_TX_EN AE3
EC2_GTX_CLK AA4
EMI2_MDIO W6
TVDD: 1.2V
EMI2_MDC Y6
(LVDD: 2.5V/1.8V)
EC2_GTX_CLK125 AE4 ← 125M_CLK

Note1: All pin have other functions not listed here.

LS1043ASE7xxx

3V3 → NTA4151P Q7 → R269 0 → LDO_O

IC9 KSZ9131RNXC

AVDDL_1 4, AVDDL_2 9, AVDDL_PLL 44, DVDDL_1 18, DVDDL_2 23, DVDDL_3 26, DVDDL_4 30, DVDDL_5 39
AVDDH_1 1, AVDDH_2 12, DVDDH_1 16, DVDDH_2 34, DVDDH_3 40

R270 22 P1_RXD0 → RXD0/MODE0 32
R271 22 P1_RXD1 → RXD1/MODE1 31
R272 22 P1_RXD2 → RXD2/MODE2 28
R273 22 P1_RXD3 → RXD3/MODE3 27

TXRXP_A 2
TXRXM_A 3
TXRXP_B 5
TXRXM_B 6
TXRXP_C 7
TXRXM_C 8
TXRXP_D 10
TXRXM_D 11

TXD0 19
TXD1 20
TXD2 21
TXD3 22

R274 22 P1_RX_CTL/CLK125_EN → RX_CTL/CLK125_EN 33
TX_CTL 25

MDIO 37
MDC 36

3V3 → R277 1K → INT_N/PME_N2/ALLPHYAD 38

R278 22 P1_RX_CLK SOC_IRQ1 → RXC/PHYAD2 35
TXC 24

25MHZ_EC2_RGMII → XI 46
XO 45

LED1/PME_N1//PHYAD0 17 → P1_LED1 → R275 220 → 3V3
LED2/PHYAD1 15 → P1_LED2 → R276 220

CLK125_NDO/LED_MODE 41 → R279 10K → 3V3
RESET_N 42 → R280 100K

NC_1 13, NC_2 14, NC_3 47
VSS 29, P_VSS 49
ISET 48 → R282 6.04K

NOTE: LED Mode is Individual

NOTE: 125MHz Output Clock is Disabled

P1_RX_CTL/CLK125_EN → R281 1K

NOTE: Mode is 1110 = 10/100 F/H, 1000BT Full (RGMII)

3V3 → R283 10K, R284 10K, R285 10K, R286 DNP 10K
P1_RXD3 P1_RXD2 P1_RXD1 P1_RXD0
R290 DNP 1K, R291 DNP 1K, R292 DNP 1K, R293 1K

NOTE: PHY Address is 02h

3V3 → R287 DNP 10K, R288 10K, R289 DNP 10K
P1_RX_CLK P1_LED2 P1_LED1
R294 1K, R295 DNP 1K, R296 1K

Mode [3:0] Description
1000 10/100 Full and Half, 1000BT Full (RGMII), PME Enable on LED1
1010 10/100 Full and Half, 1000BT Full (RGMII), PME Enable on INT_N
1100 1000BT Full (RGMII)
1110 10/100 Full and Half, 1000BT Full (RGMII)

J7

C383 1uF: TRD1+ 11, TRCT1 12, TRD1− 10
C384 1uF: TRD2+ 4, TRCT2 6, TRD2− 5
C385 1uF: TRD3+ 3, TRCT3 1, TRD3− 2
C386 1uF: TRD4+ 8, TRCT4 7, TRD4− 9

3V3 → YELLOW 14/13, GRN 16, ORG 17
SHIELD 15, S2

L836-1J1T-43

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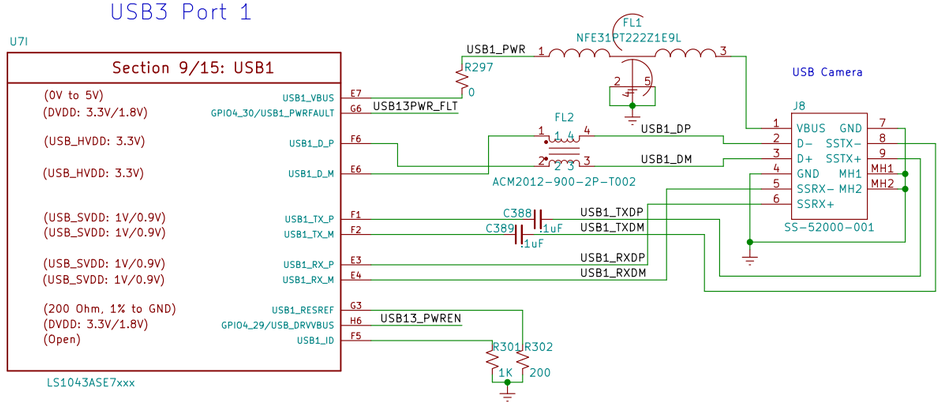
Sheet: /SerDes / RGMII Ethernet/
File: SerDes_RGMII.kicad_sch

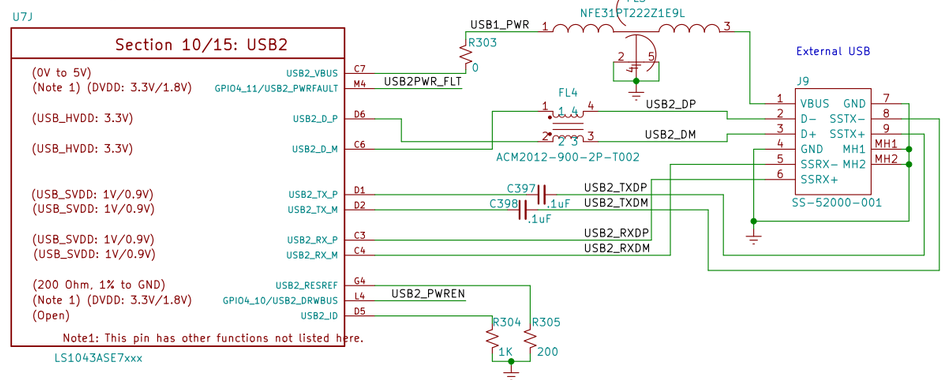
Title: AP2100

Size: USLedger | Date: 2020-10-06 | **Rev: 1**
KiCad E.D.A. kicad 5.99.0-unknown-85444aadd104ubuntu20.04.1 | Id: 11/12

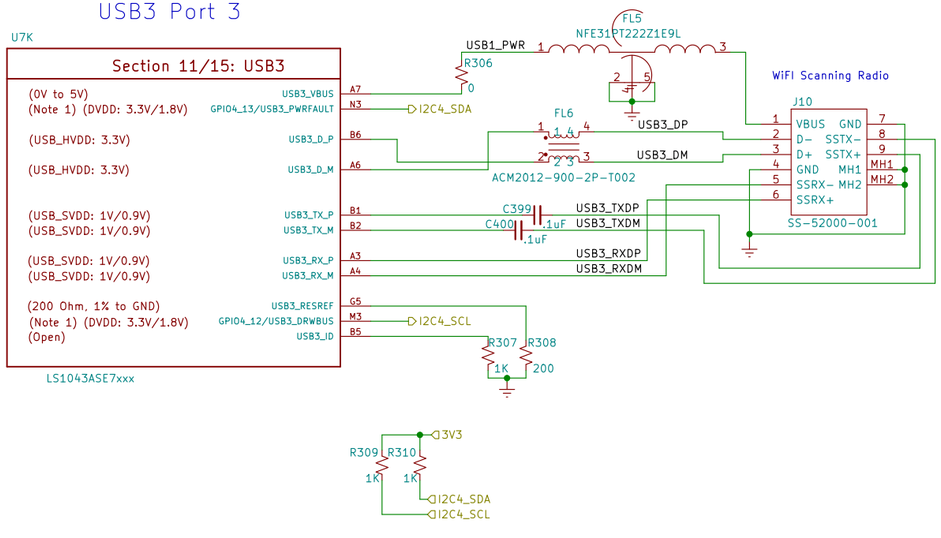
USB3 Port 1



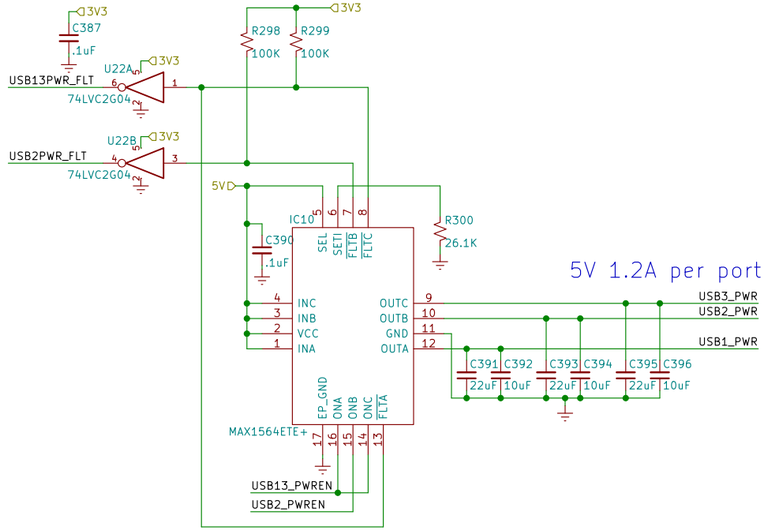
USB3 Port 2



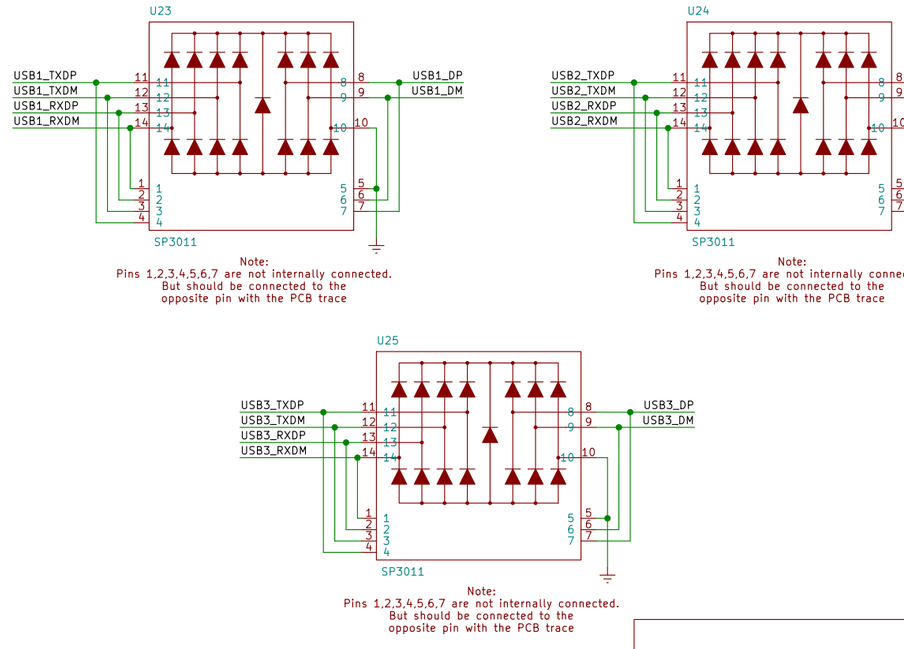
USB3 Port 3



USB Power



ESD Protection



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File: USB.kicad_sch

Title: AP2100

Size: USLedger	Date: 2020-10-06	**Rev: 1**
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