DEVA

COM.0 Type 7 Evaluation Baseboard

Rev. A.0 IT version

Content

P28 PDEVALA0

P27 065421A conga-X7/EVAL/industrial

Label & Packaging

P1 MESDLABEL74x37

P2 MESDBAG356x457

P3 ML0002

Documentation

SOP Label Assembly DEVA
SOP1

DEVASA0_IT - Schematic DEVA_IT A.0
SCHEMATIC AS PDF1

M1 GND-PROBE
M2 GND-PROBE
M3 GND-PROBE
M4 GND-PROBE

For extended module

M5 MGTCSMTS-M25-8
M6 MGTCSMTS-M25-8
M7 MGTCSMTS-M25-8
M8 MGTCSMTS-M25-8
M13 MGTCSMTS-M25-8
M33 MGTCSMTS-M25-8 NI
M10 MGTCSMTS-M25-8
M11 MGTCSMTS-M25-8
M12 MGTCSMTS-M25-8
M9 MGTCSMTS-M25-8 NI
M14 MGTCSMTS-M25-8

H1 NPTH_P80H40I8_MINI_ITX
H2 NPTH_P80H40I8_MINI_ITX
H3 NPTH_P80H40I8_MINI_ITX
H4 NPTH_P80H40I8_MINI_ITX
H5 NPTH_P80H40I8_MINI_ITX
H6 NPTH_P80H40I8_MINI_ITX
H7 NPTH_P80H40I8_MINI_ITX
H8 NPTH_P80H40I8_MINI_ITX
H9 NPTH_P80H40I8_MINI_ITX
H10 NPTH_P80H40I8_MINI_ITX

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internal connector
external connector
chip

DEVA System Block Diagram

IT version

SYSTEM SUPPLY
DC connector (12V)
ATX connector (12V/5V/3.3V/5VSB)
RTC battery

COM Express X_AB Connector Type 7
220 pos / TOP side

COM Express X_CD Connector Type 7
220 pos / TOP side

RJ45 — 1Gbe
PCIe x4 slot0 — PCIe Port 0..3
PCIe x8 — PCIe Port 8..15
SATA power
SATA slot x2 — SATA Port 0, SATA Port 1
SPI socket — SPI header — SPI
FAN header — FAN control
UART connector (D-sub9) — SER1
Buzzer
80 port LED — LED Driver Holtek HT16K33

Debug UART (D-sub9) — SER0
LPC — LPC header
PCIe x16 slot — PCIe port 16..31
PCIe Port 4..5 — PCIe x4 slot1 — PCIe Port 6..7
USB2.0 Port 0, USB2.0 Port 1 — USB3.0 x2 — USB 3.0 Port 0, USB 3.0 Port 1
USB2.0 Port 2, USB2.0 Port 3 — USB3.0 x2 — USB 3.0 Port 2, USB 3.0 Port 3
GPIO, LID#/SLEEP#, PWR#/RST#, SM Bus, WDT, I2C Bus — Feature header — (TX BC) Congatec custom
EEPROM ATMEL AT24C16
COMe type detect

LAN_LED_I2C — GPIO NXP PCA9539 — LEDs
MICROSEL23
MICROSEL01

KR Port 0, KR Port 1, PHY_I2C0, PHY_RST_01 — 10G phy Inphi CS4223 — SFP+ Port 0, SFP+ Port 1 — SFP+ Port 0/1
SFP_I2C0, SFP_I2C1, INT0, INT1
LAN_SDP0, LAN_SDP1 — SMA connector

MICROSEL23
KR Port 2, KR Port 3, PHY_I2C2, PHY_RST_23 — 10G phy Inphi CS4223 — SFP+ Port 2, SFP+ Port 3 — SFP+ Port 2/3
SFP_I2C2, SFP_I2C3, INT2, INT3
LAN_SDP2, LAN_SDP3 — SMA connector

PHY_I2C1, PHY_I2C3 — header
PHY_SEL01, PHY_SEL23 — use resisters to fix setting

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Title: Block Diagram			
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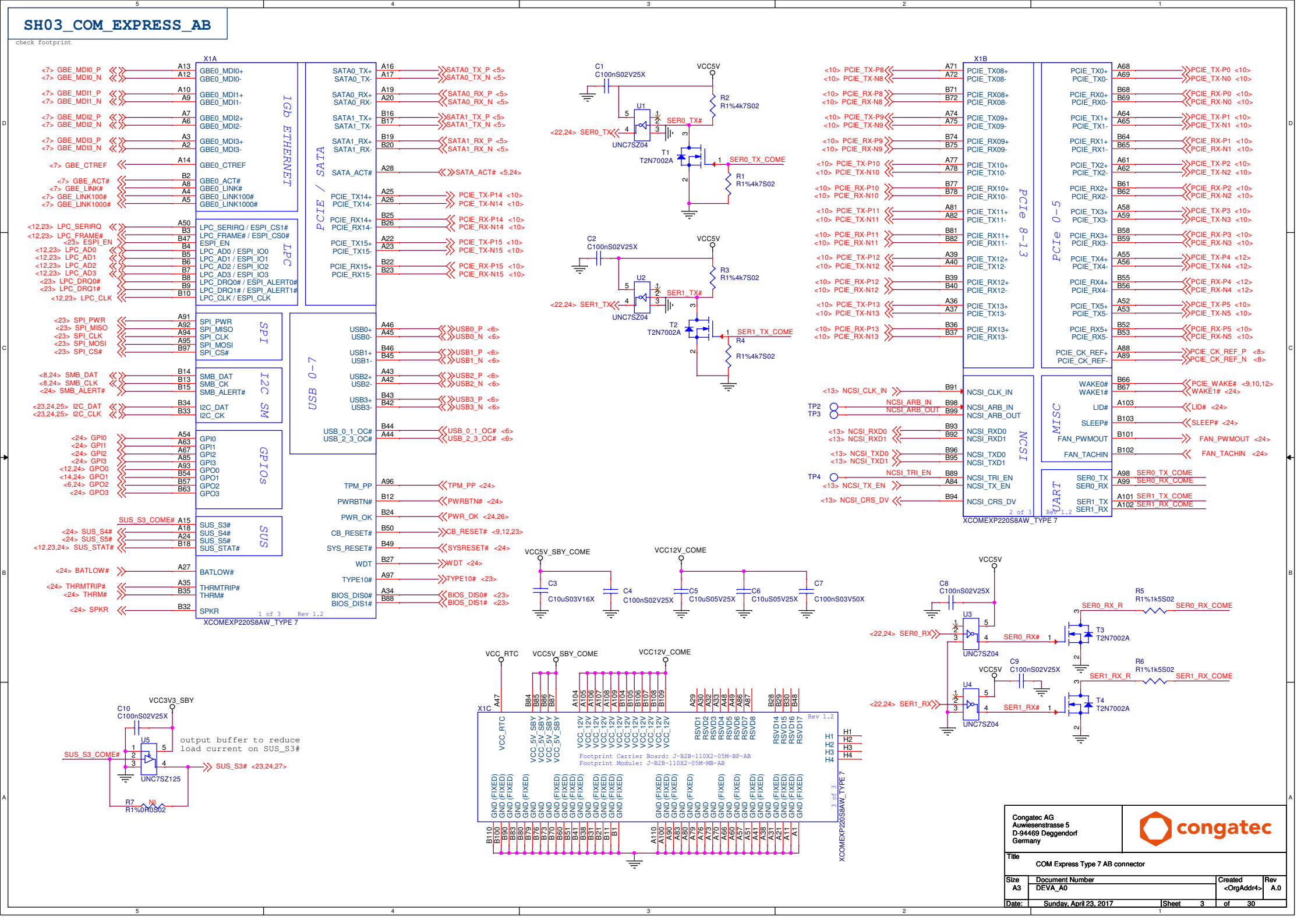
SH03_COM_EXPRESS_AB

check footprint



Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany	congatec
Title: COM Express Type 7 AB connector	
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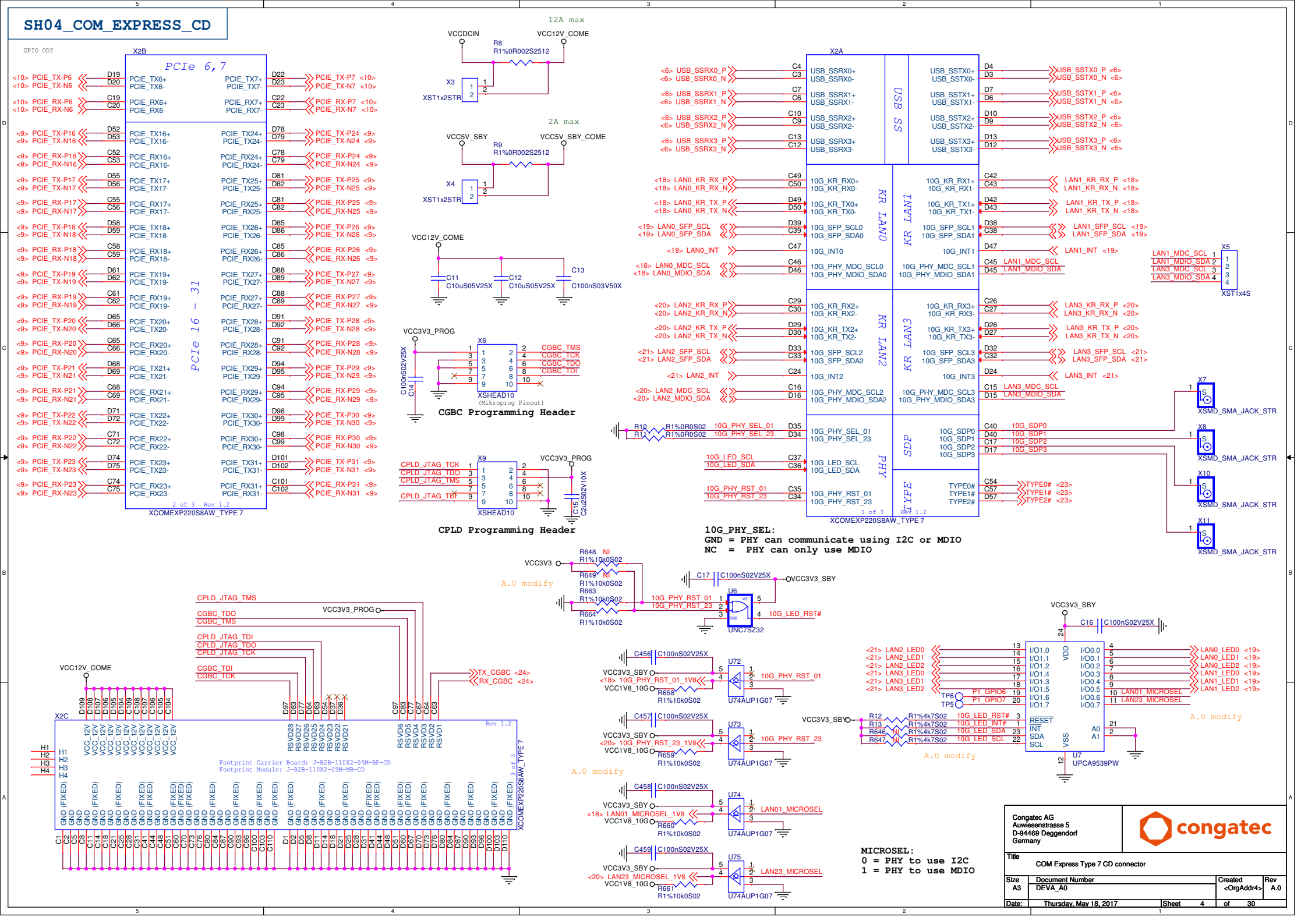
SH04_COM_EXPRESS_CD



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Title	COM Express Type 7 CD connector		
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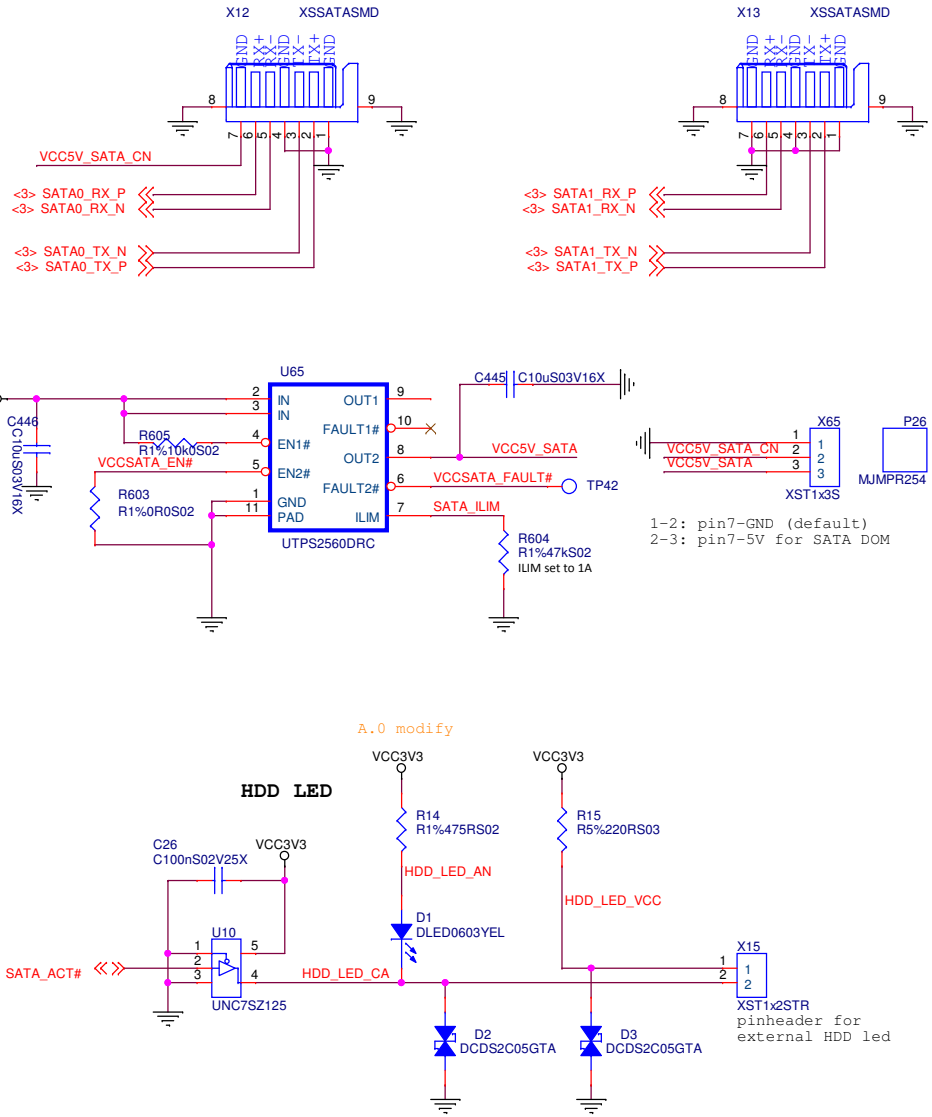
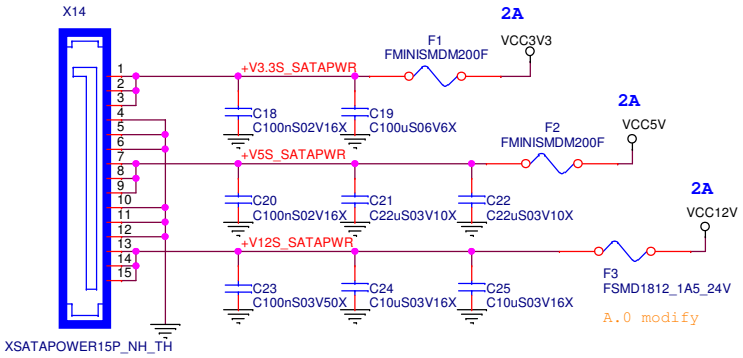
SH05_SATA

SATA



SATA Power



A.0 modify

HDD LED

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Title: SATA			
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SH06_USB_3.0

USB 3.0 spec. requires
low ESR cap (>= 120 uF)
directly connected to I/O connector

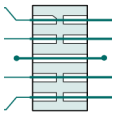
use 3-pad layout placement

1.8A

USB 3.0 0/1

USB 3.0 2/3

Layout note for ESD parts



USB2.0 P3 MUX

SEL = L => USB (default)
SEL = H => MHL

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Title: USB 3.0			
Size: C	Document Number: DEVA_A0	Created: <OrgAddrH>	Rev: A.0
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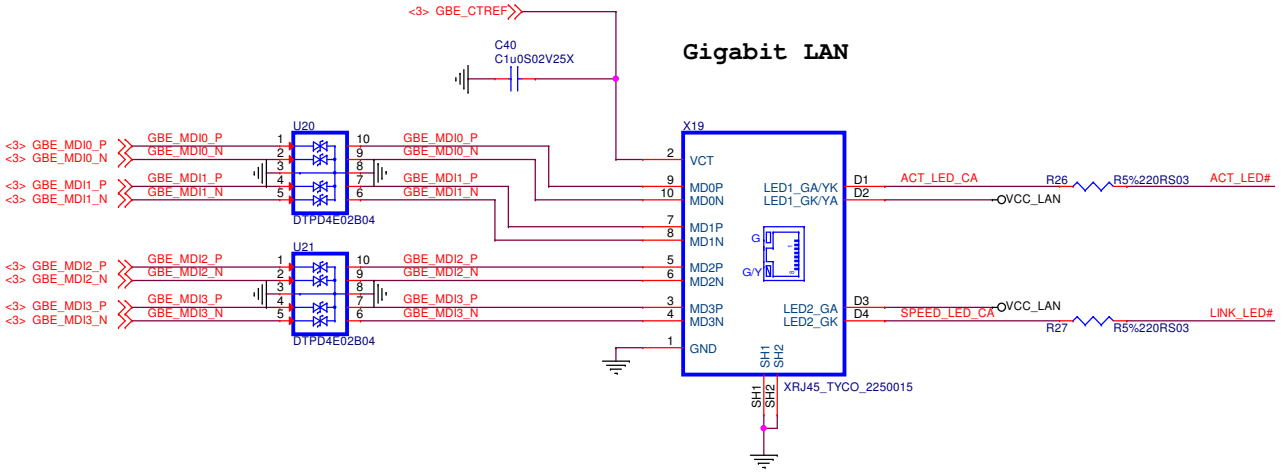
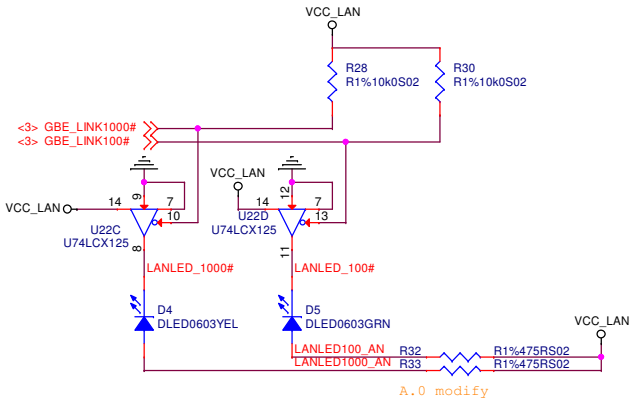
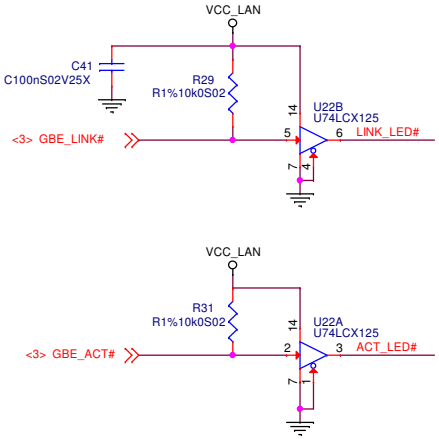
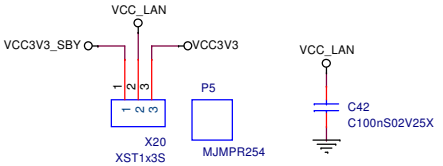
SH07_Gbe_LAN









set jumper 1-2 if LAN Controller is powered from standby voltage (default)
set jumper 2-3 if LAN Controller is powered from S0 voltage

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Title: Gbe LAN			
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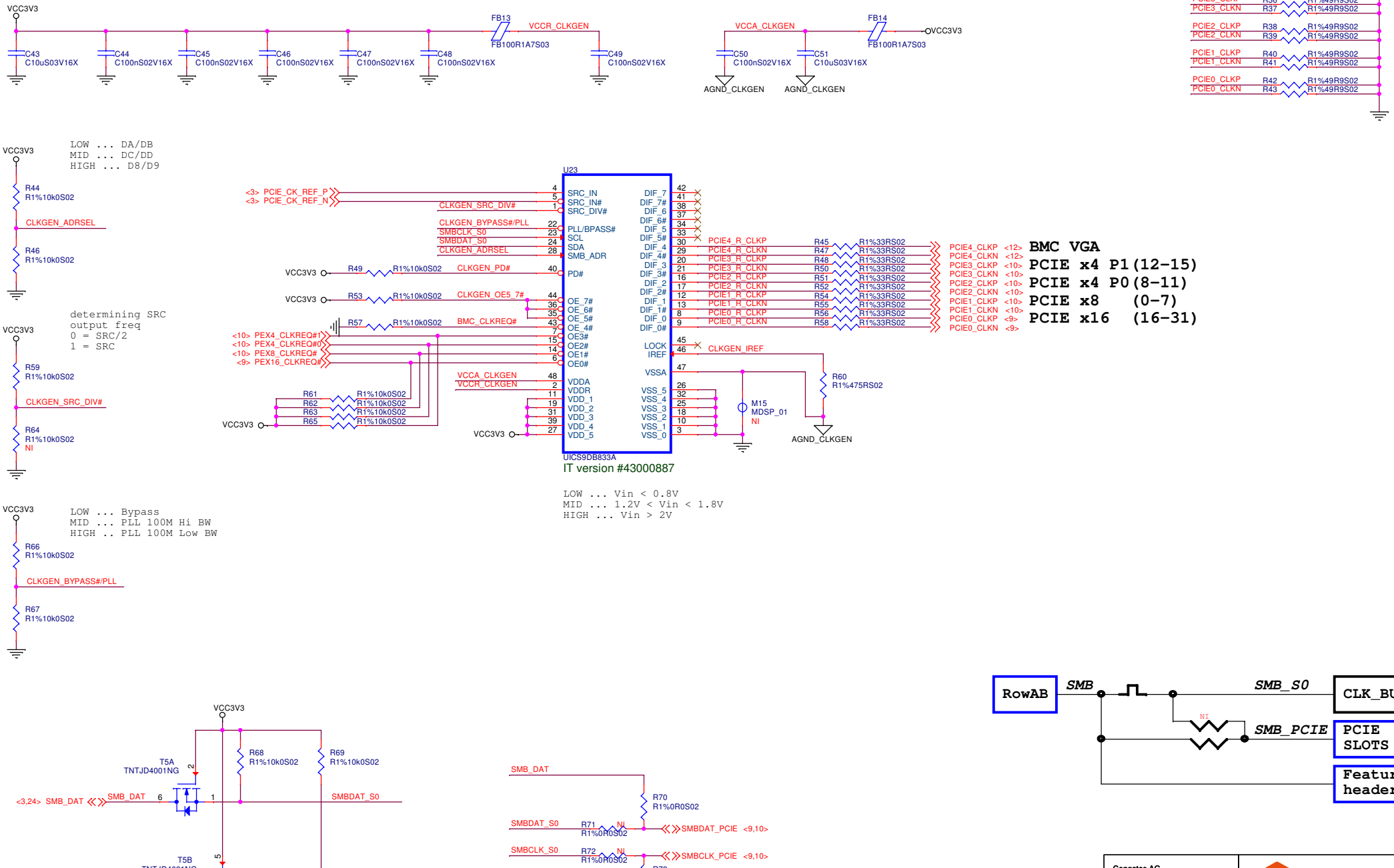
SH08_PCIE_CLK



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Title: PCIE CLK			
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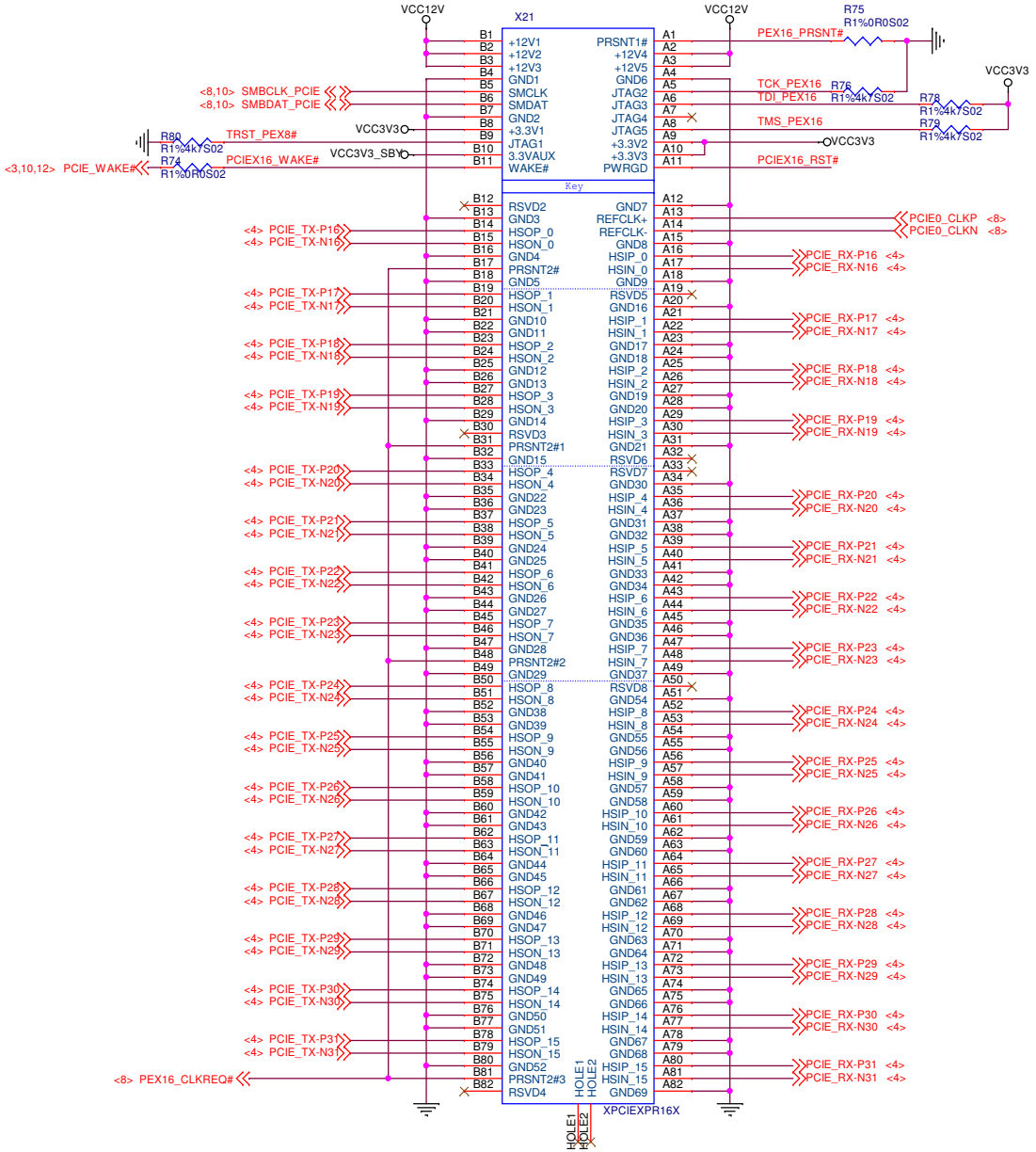
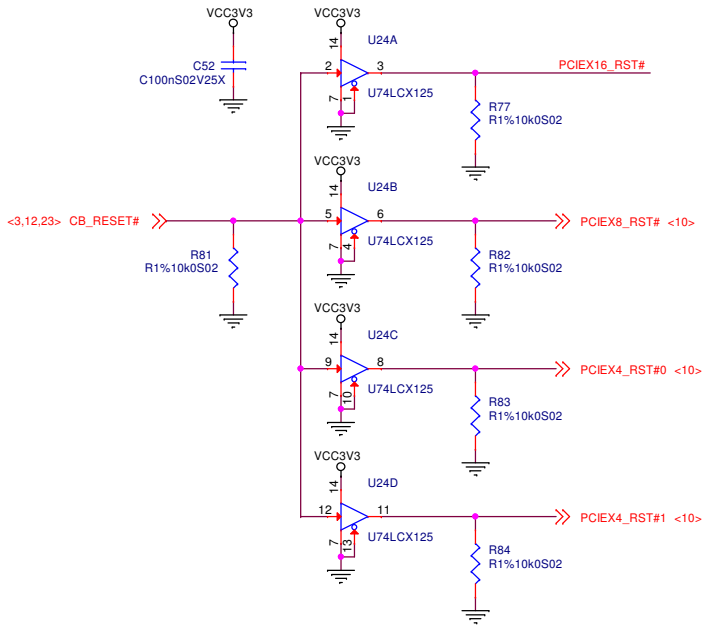
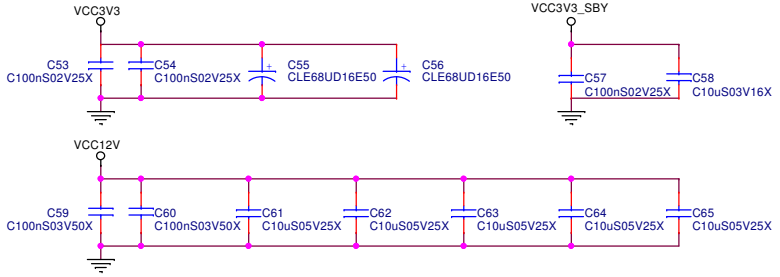
PCI Express x16







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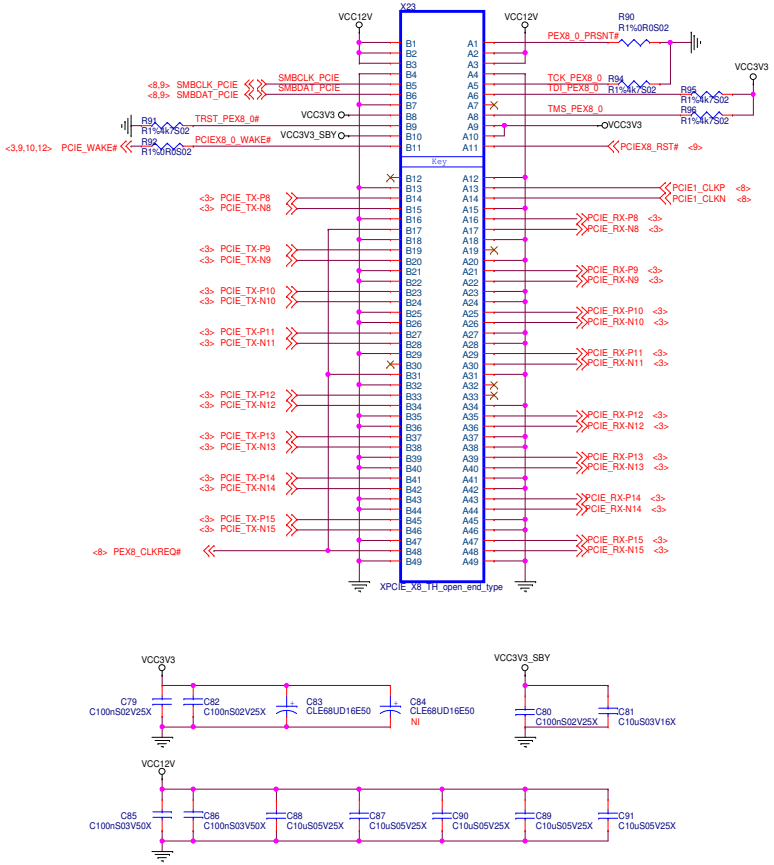
PCI Express x8

A.0 modify



PCI Express x4 P0

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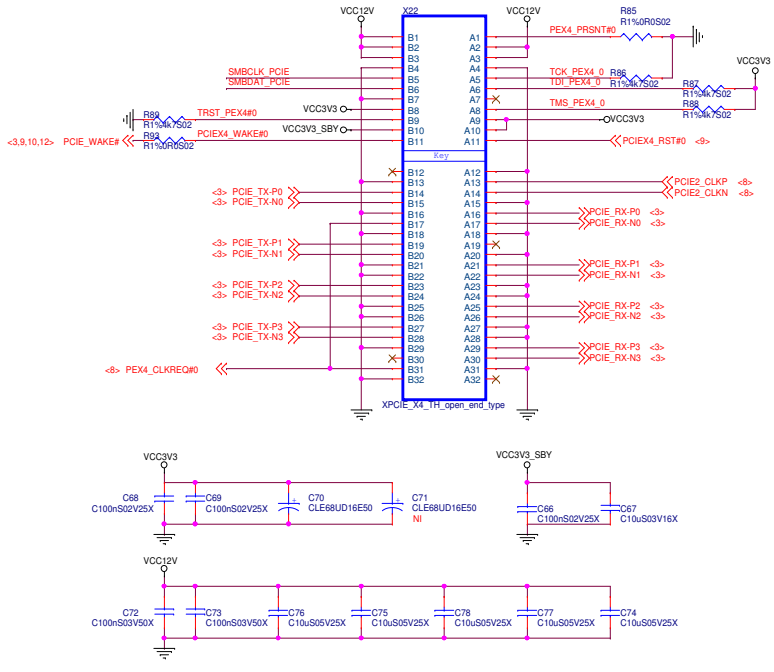

PCI Express x4 P1

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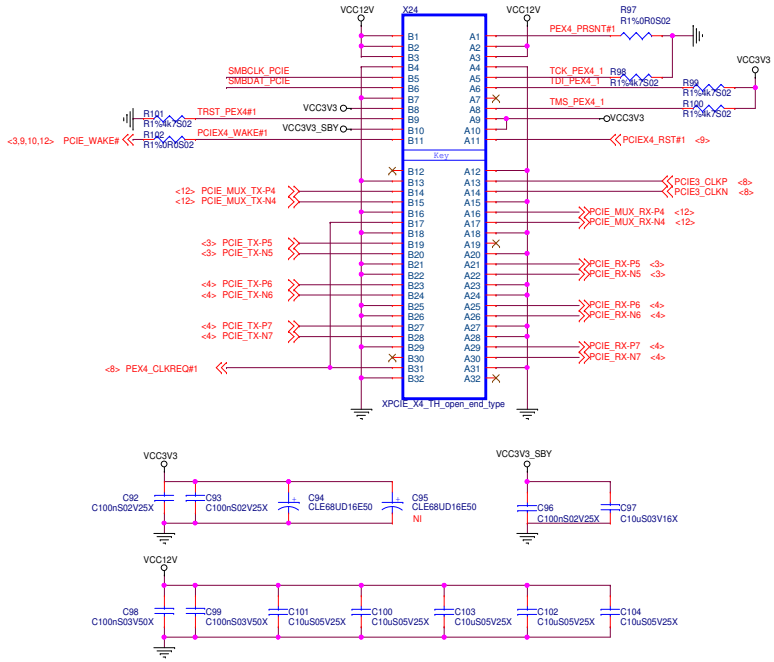

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Title	PCIEx8 0/1		
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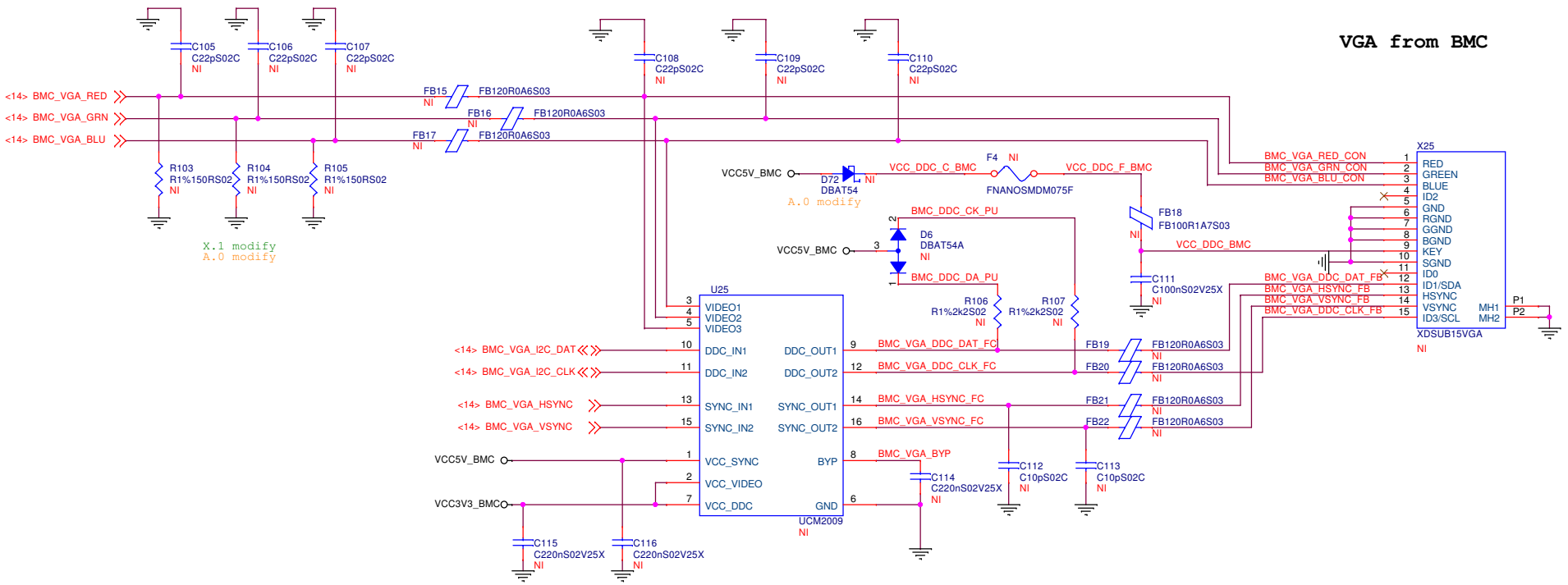
SH11_VGA

Remove in IT version



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Title: VGA			
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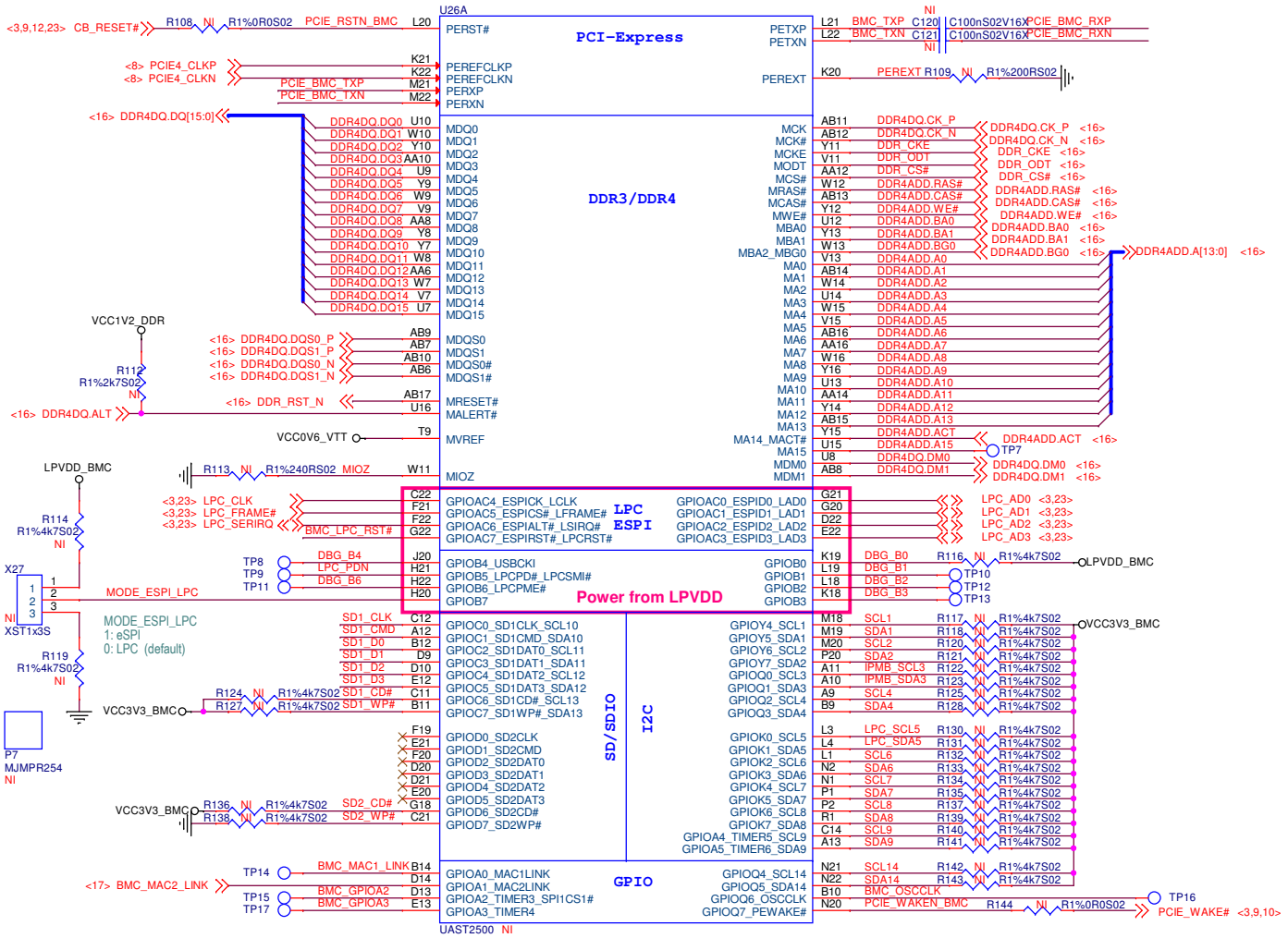
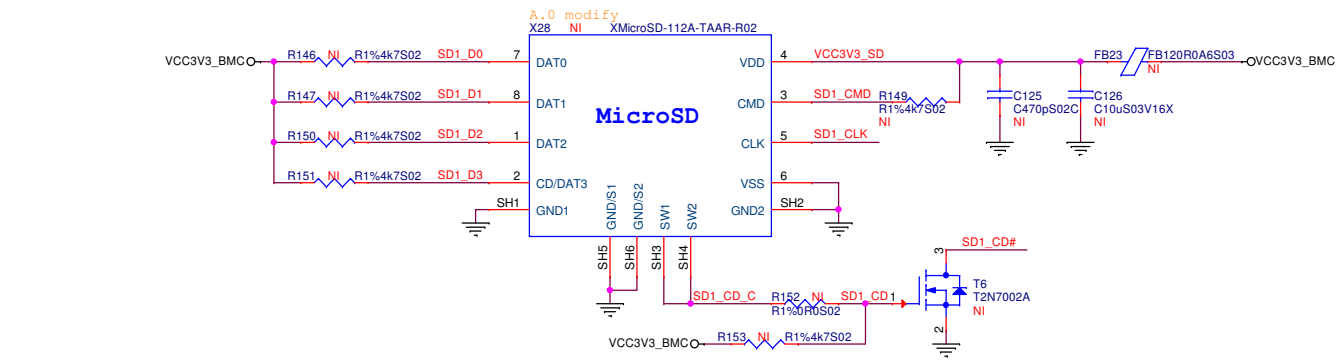
SH12_BMC(PCIE/DDR/I2C)

Remove in IT version

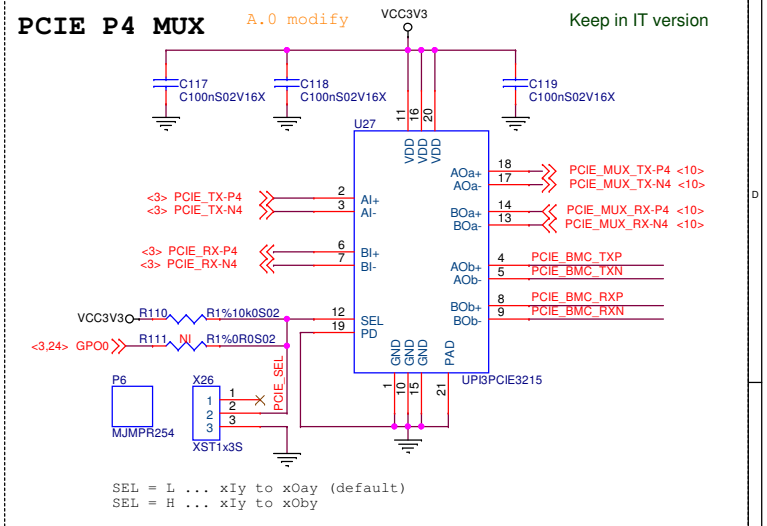


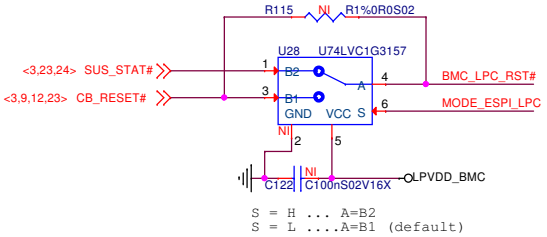


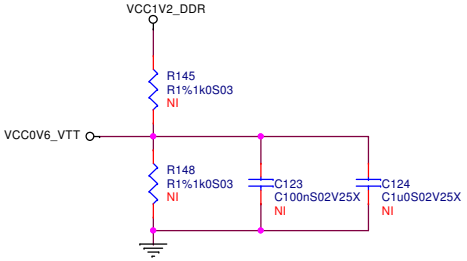
PCIE P4 MUX

A.0 modify

Keep in IT version







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Title: BMC(PCIE/DDR/I2C)			
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SH13_BMC(UART/SPI/MAC)

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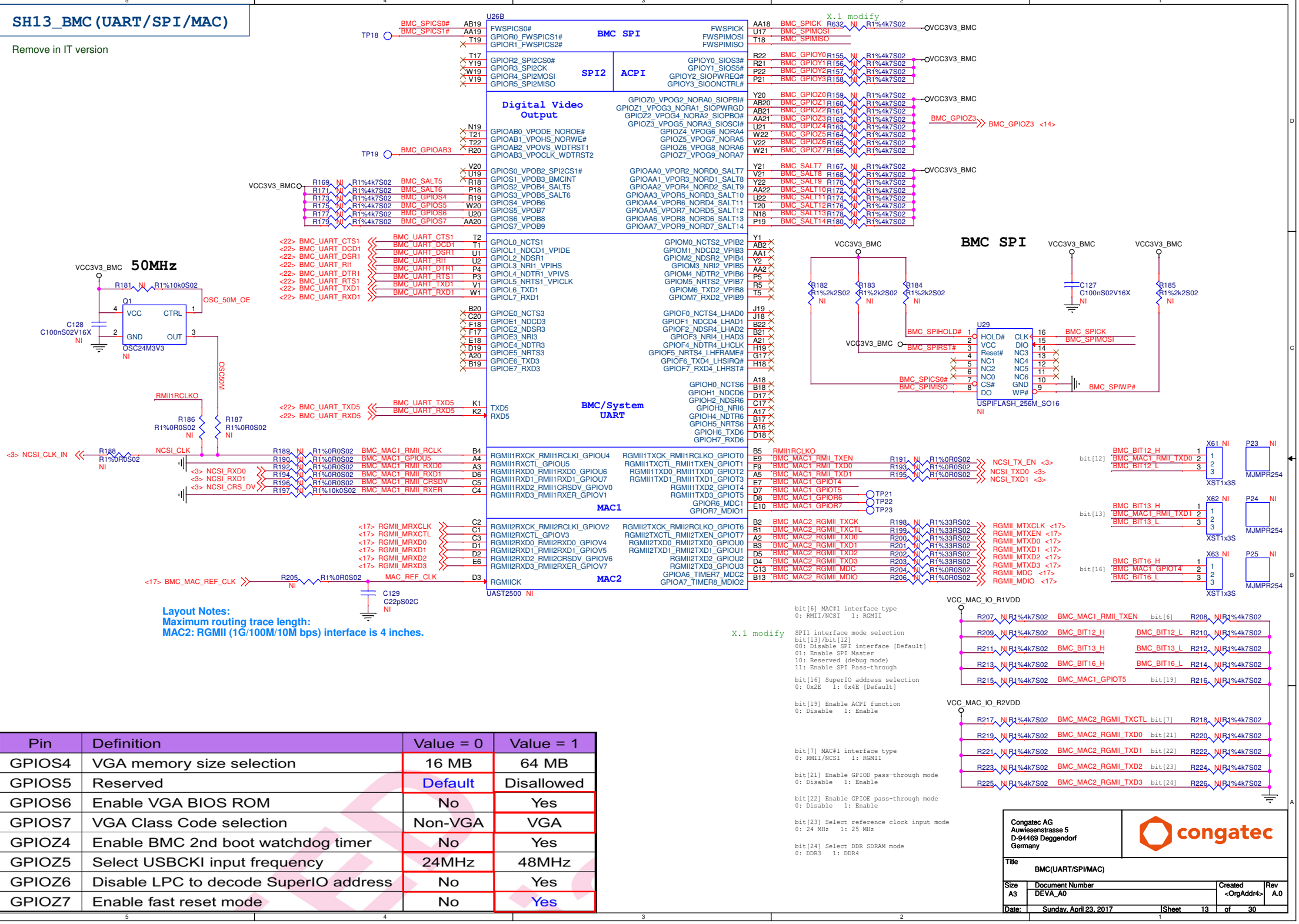

Pin	Definition	Value = 0	Value = 1
GPIOS4	VGA memory size selection	16 MB	64 MB
GPIOS5	Reserved	Default	Disallowed
GPIOS6	Enable VGA BIOS ROM	No	Yes
GPIOS7	VGA Class Code selection	Non-VGA	VGA
GPIOZ4	Enable BMC 2nd boot watchdog timer	No	Yes
GPIOZ5	Select USBCKI input frequency	24MHz	48MHz
GPIOZ6	Disable LPC to decode SuperIO address	No	Yes
GPIOZ7	Enable fast reset mode	No	Yes

bit[6] MAC#1 interface type
0: RMII/NCSI 1: RGMII

SPI1 interface mode selection
bit[13]/bit[12]
00: Disable SPI interface [Default]
01: Enable SPI Master
10: Reserved (debug mode)
11: Enable SPI Pass-through

bit[16] SuperIO address selection
0: 0x2E 1: 0x4E [Default]

bit[19] Enable ACPI function
0: Disable 1: Enable

bit[7] MAC#1 interface type
0: RMII/NCSI 1: RGMII

bit[21] Enable GPIOD pass-through mode
0: Disable 1: Enable

bit[22] Enable GPIOE pass-through mode
0: Disable 1: Enable

bit[23] Select reference clock input mode
0: 24 MHz 1: 25 MHz

bit[24] Select DDR SDRAM mode
0: DDR3 1: DDR4

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Title			
BMC(UART/SPI/MAC)			
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SH14_BMC (USB/ADC/DAC)

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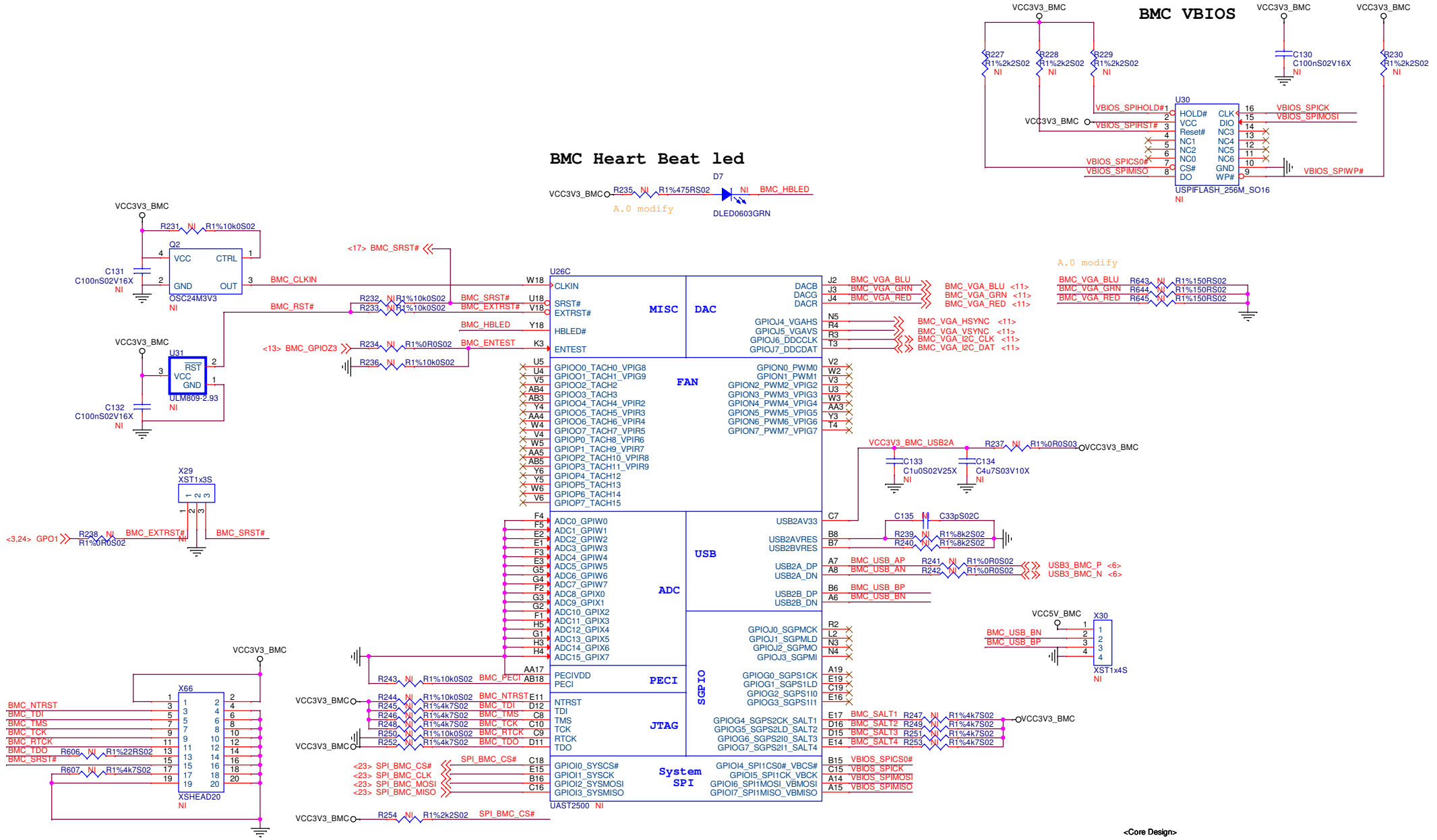

SH15_BMC (POWER)

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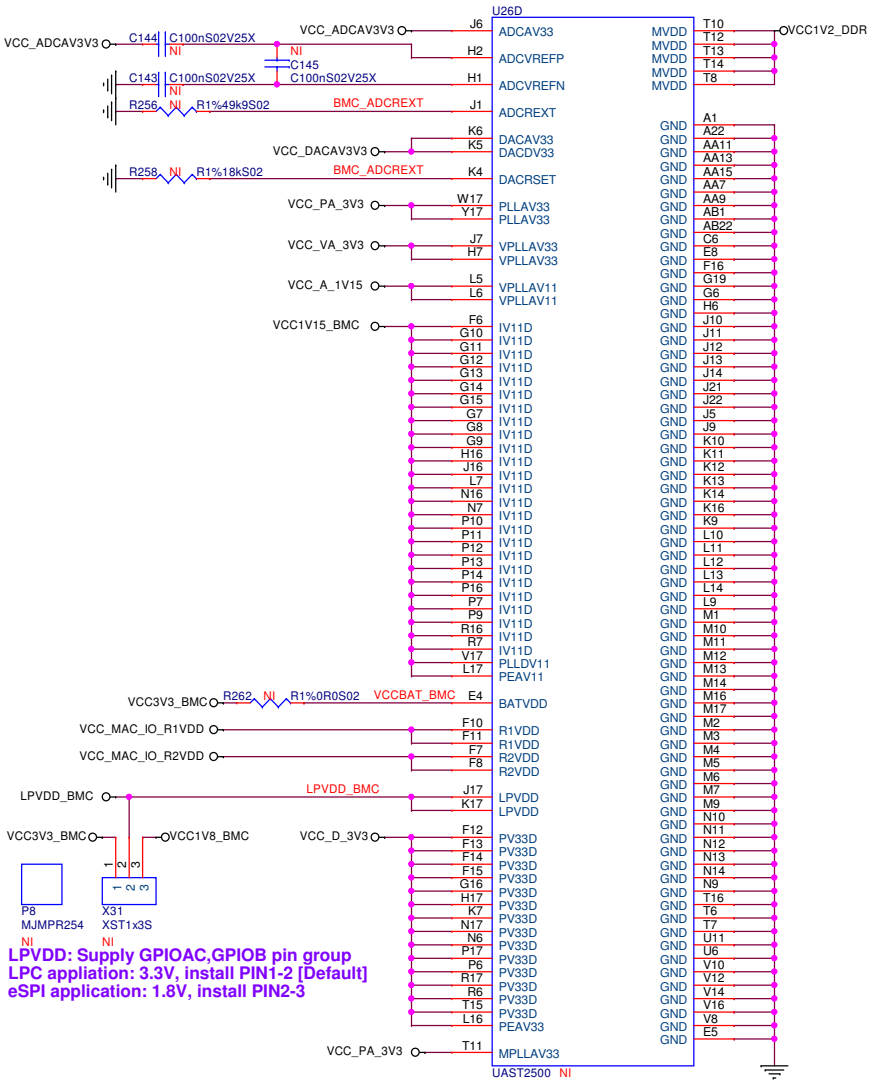

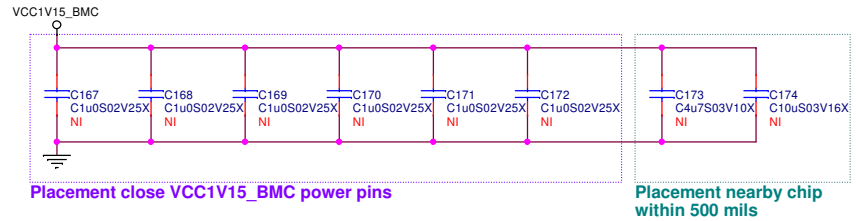

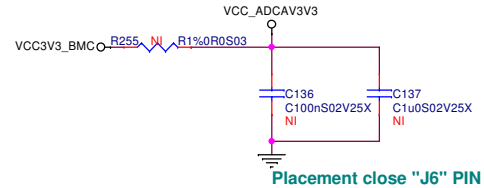

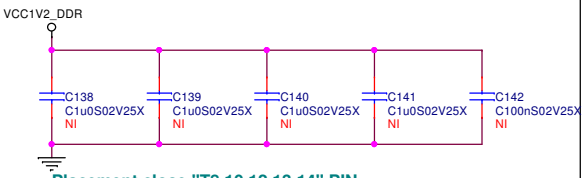

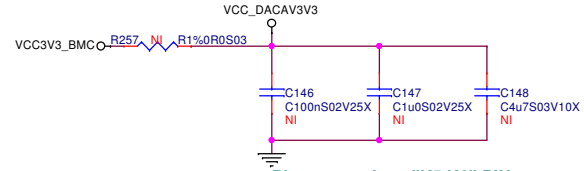

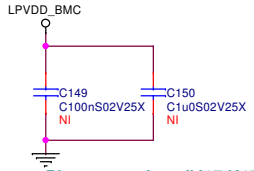

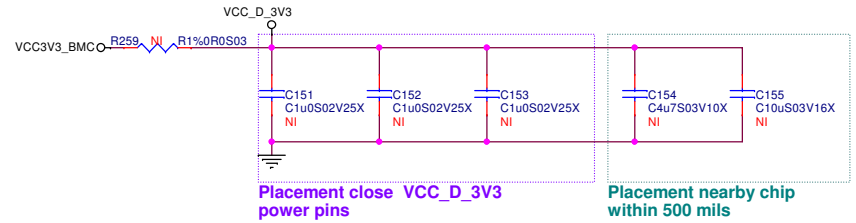

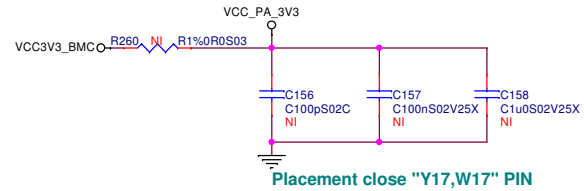

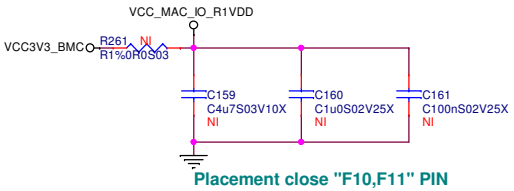

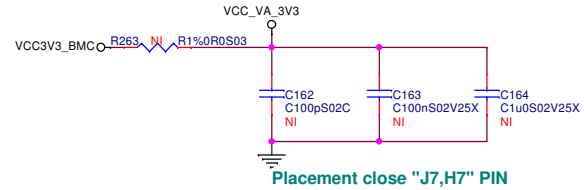

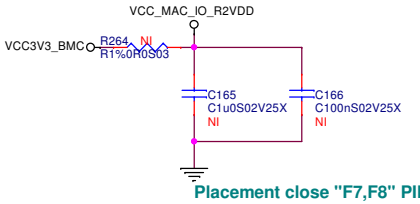

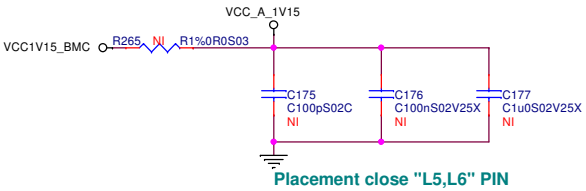

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Title: BMC(POWER)			
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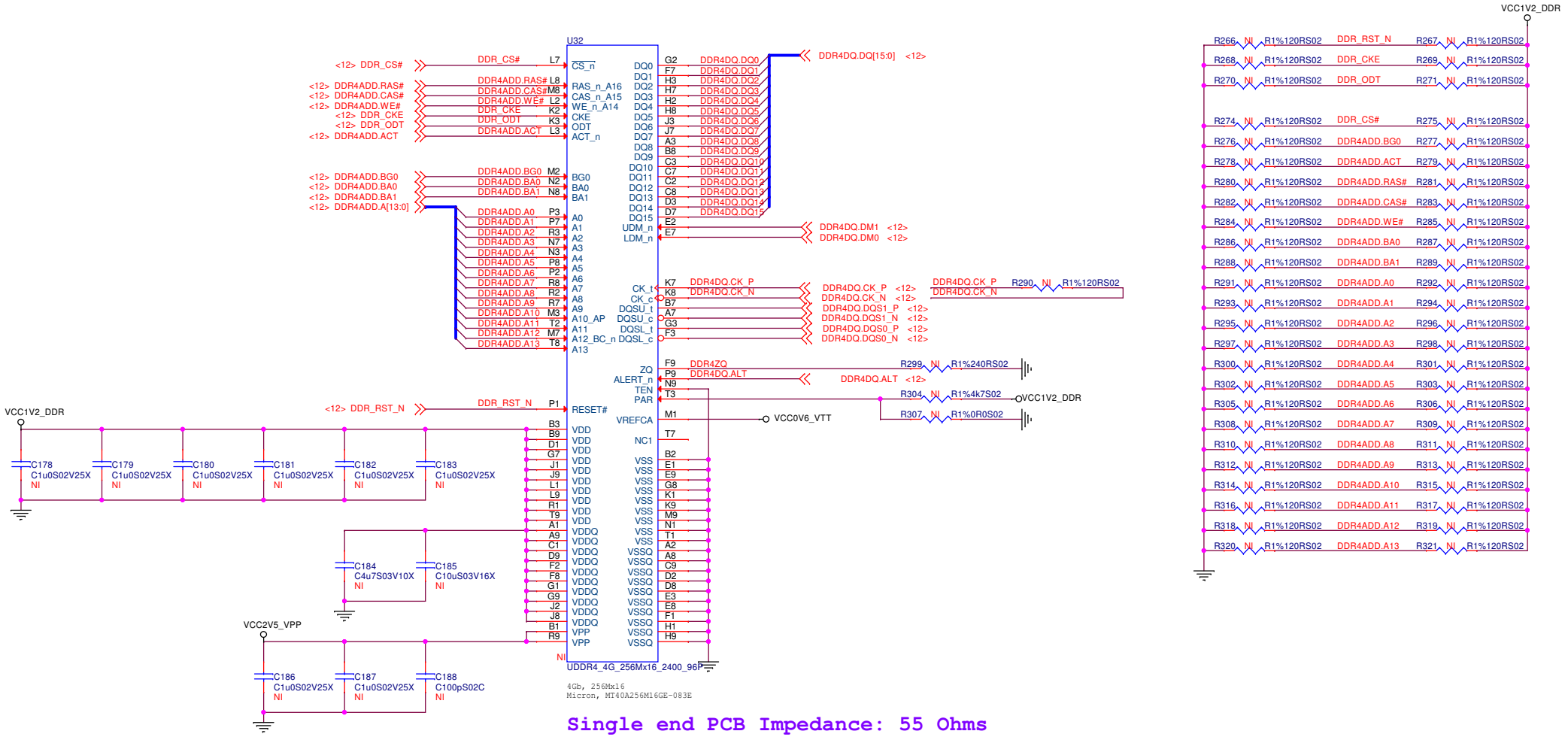
SH16_DDR4 256Mx16

Remove in IT version

DDR4 256Mb X16



Single end PCB Impedance: 55 Ohms
Differential end : 110 Ohms

<Core Design>

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Title: DDR4 256Mx16			
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SH17_RGMII

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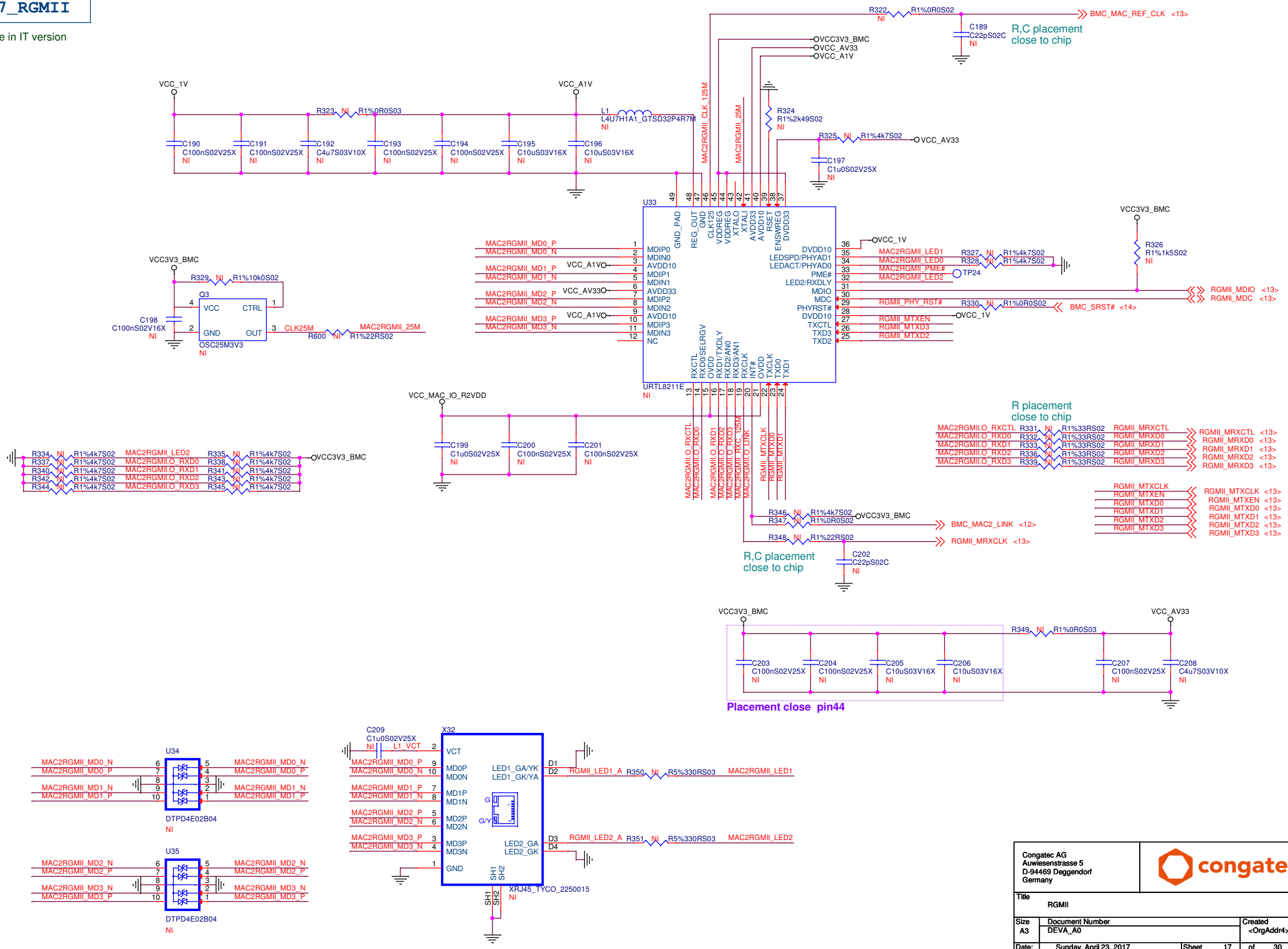

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Title: RGMII			
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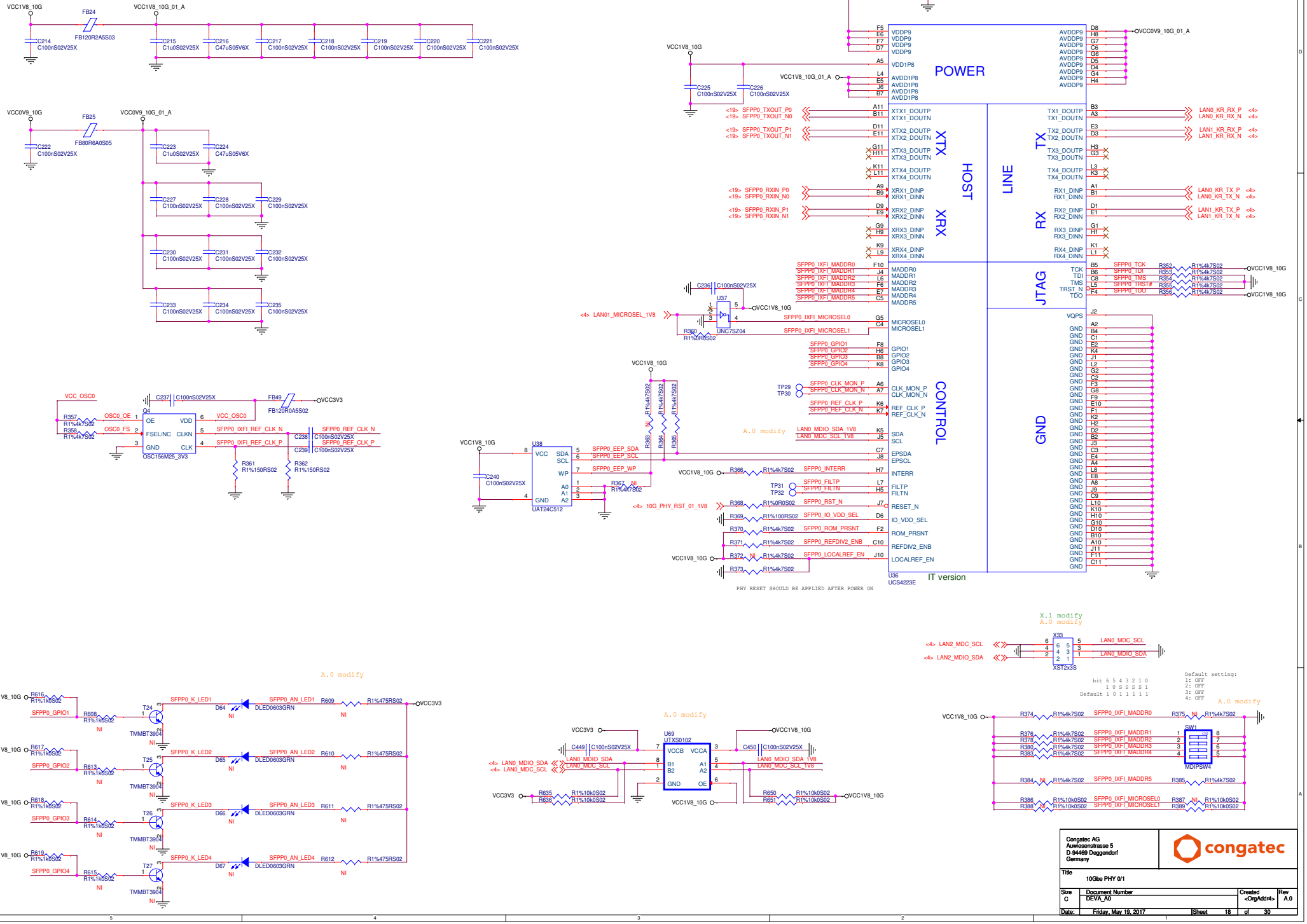
SH18_10Gbe PHY 0/1



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Title			
10Gbe PHY 0/1			
Size: C	Document Number: DEVA_A0	Created: <OrgAddr4>	Rev: A.0
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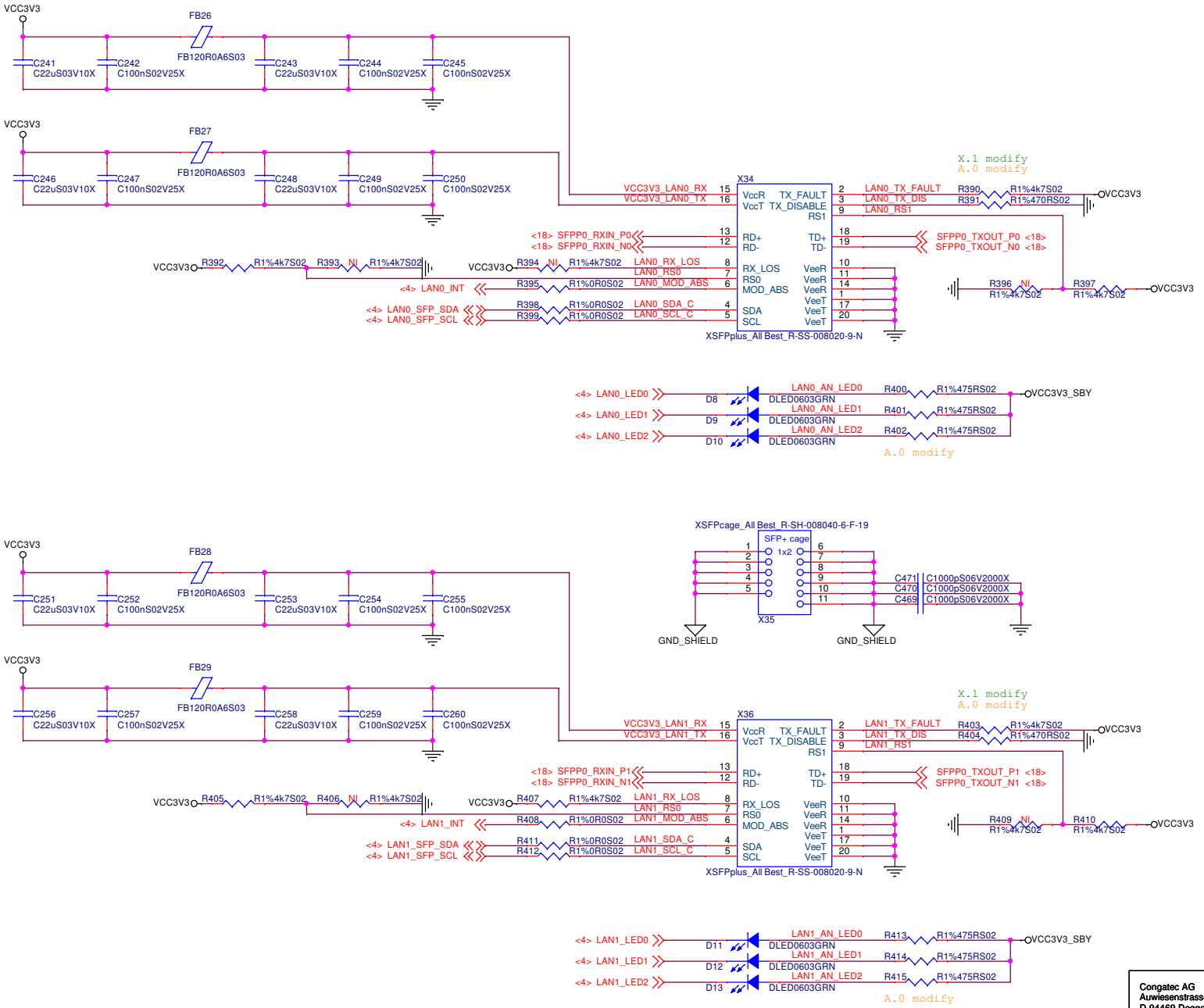
SH19_10Gbe SFP+ 0/1

CHECK STRAP



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Title	10Gbe SFP+ 0/1		
Size A3	Document Number DEVA_A0	Created <OrgAddr4>	Rev A.0
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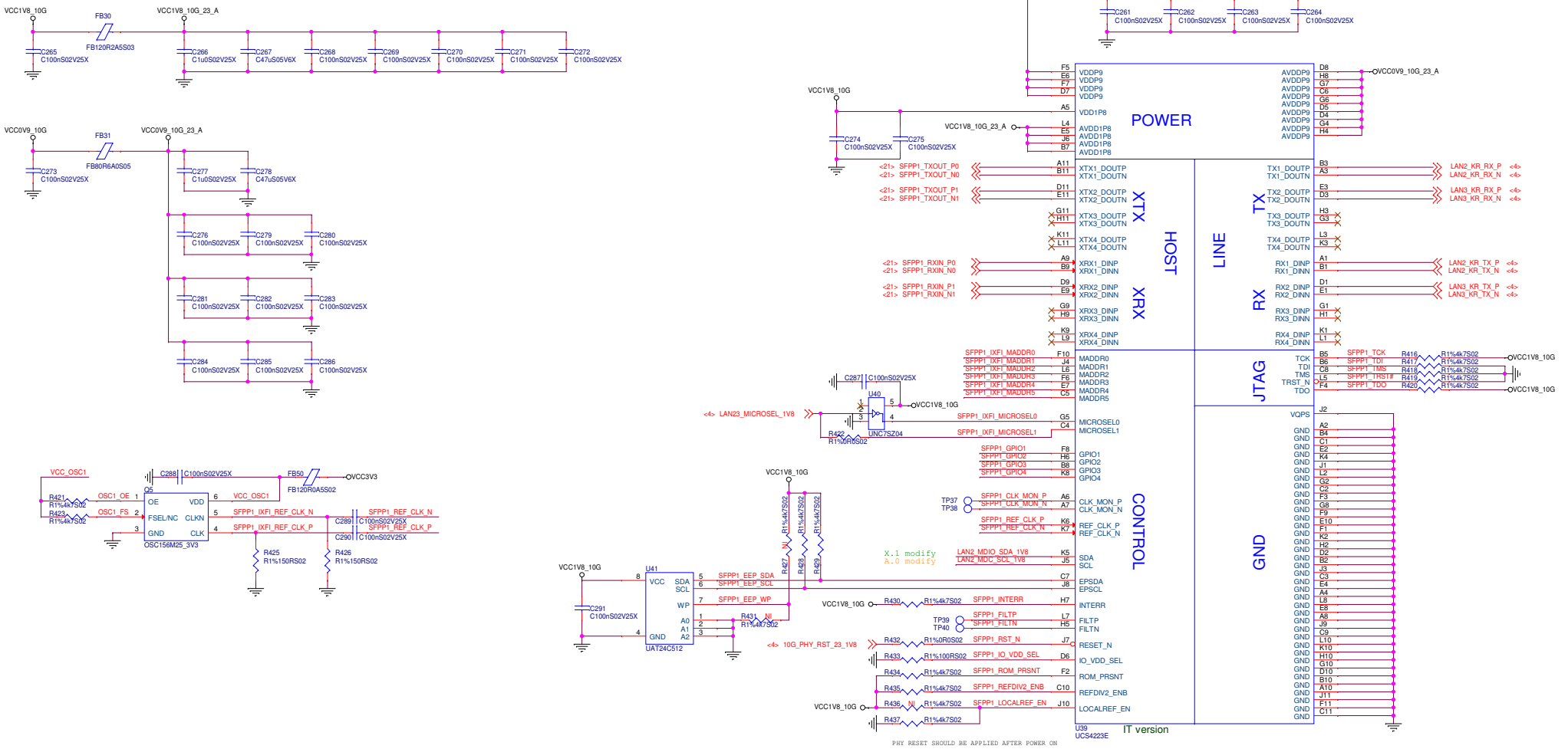
SH20_10Gbe PHY 2/3



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Title	10Gbe PHY 2/3		
Size C	Document Number DEVA_A0	Created <OrgAddr4>	Rev A.0
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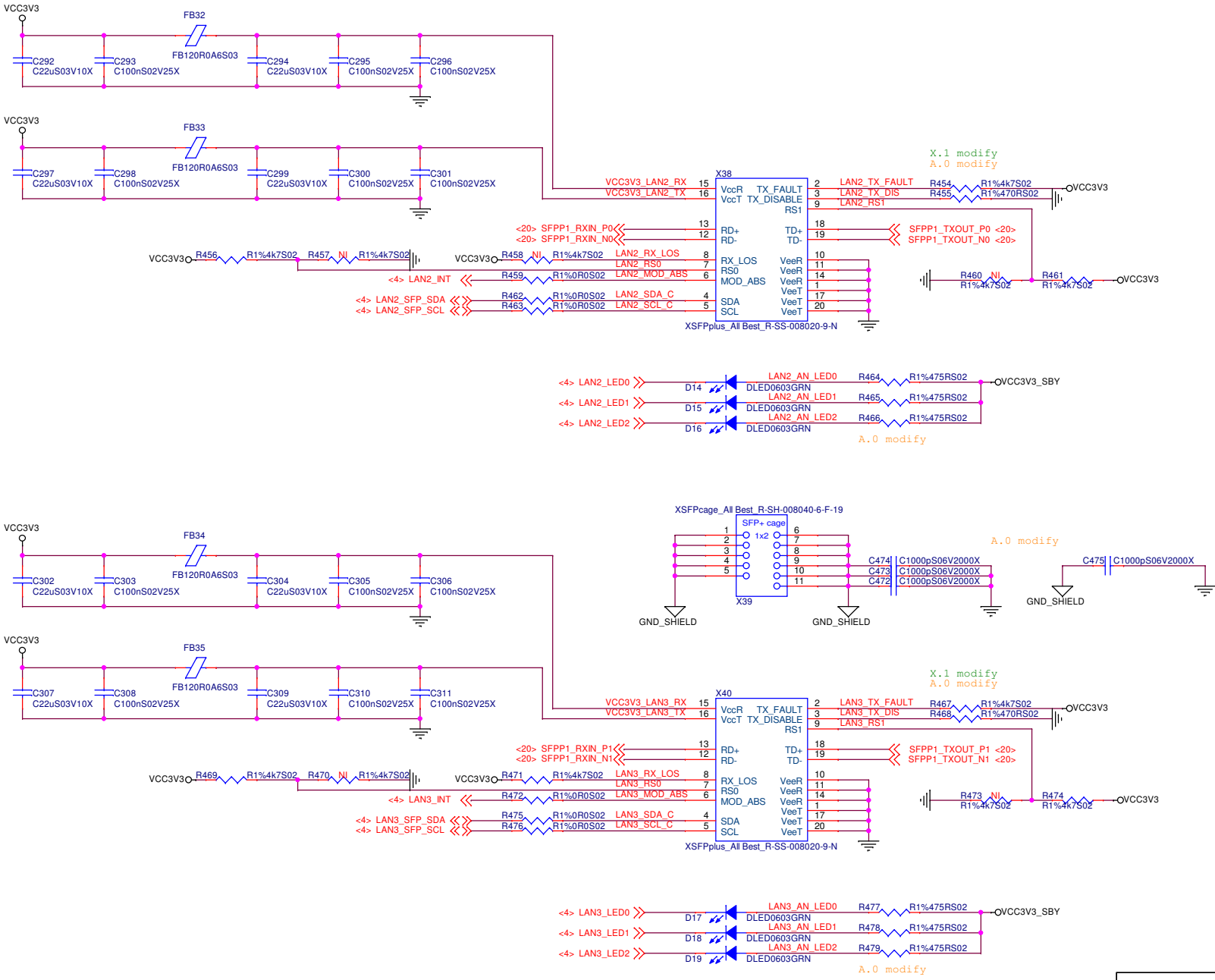
SH21_10Gbe SFP+ 2/3

CHECK STRAP



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Title	10Gbe SFP+ 2/3		
Size A3	Document Number DEVA_A0	Created <OrgAddr4>	Rev A.0
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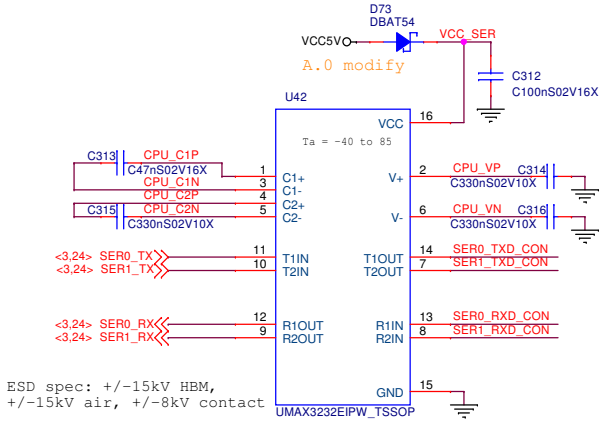
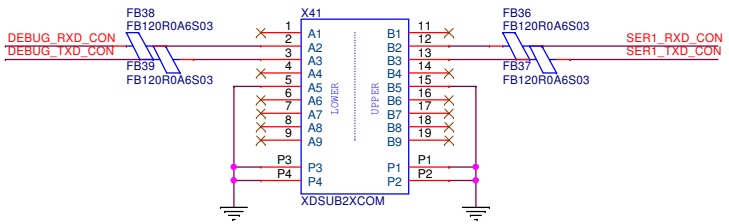
SH22_UART



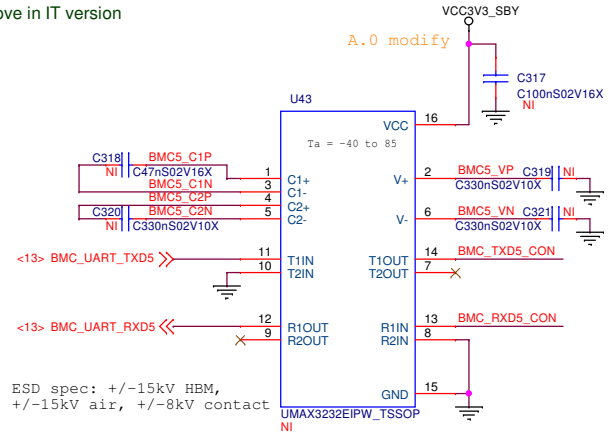
A.0 modify

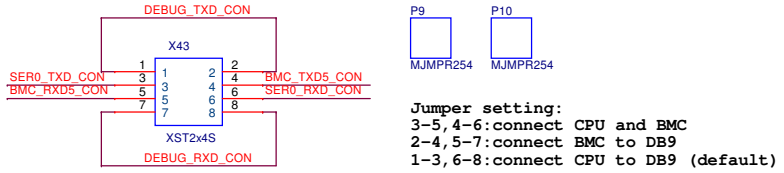
CPU UART0 / BMC UART5

CPU UART1

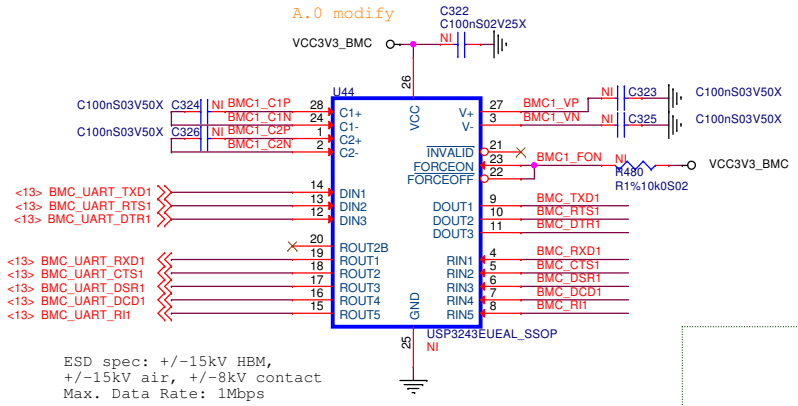


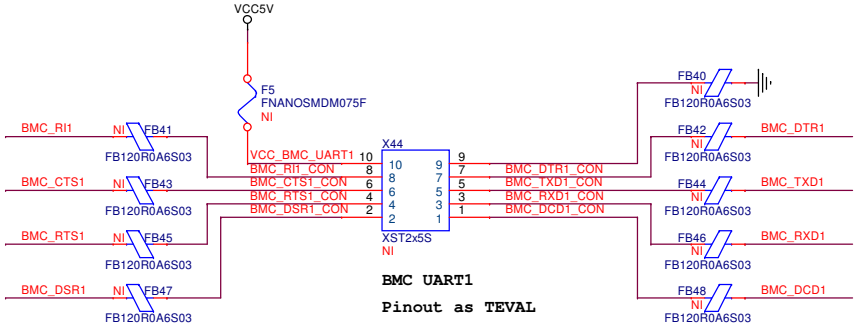
Remove in IT version





Jumper setting:
3-5,4-6:connect CPU and BMC
2-4,5-7:connect BMC to DB9
1-3,6-8:connect CPU to DB9 (default)





BMC UART1

Pinout as TEVAL

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Title: UART

Size	Document Number	Created	Rev
A3	DEVA_A0	<OrgAddr4>	A.0

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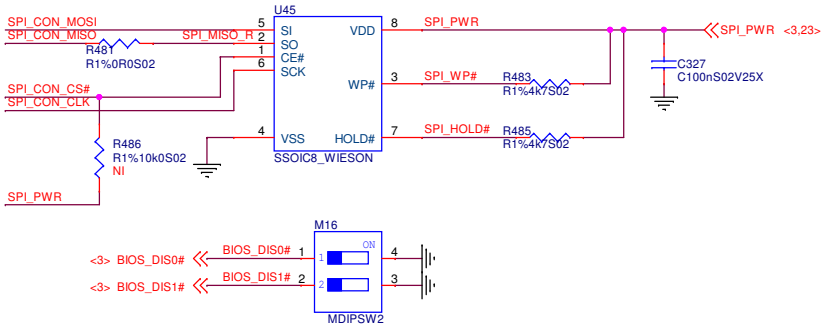
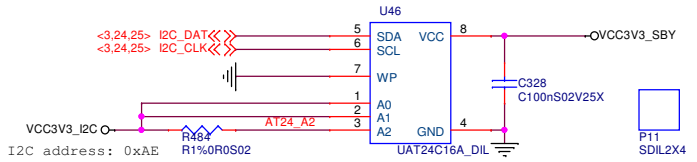
SH23_SPI_I2C_TPM

SPI BIOS Flash

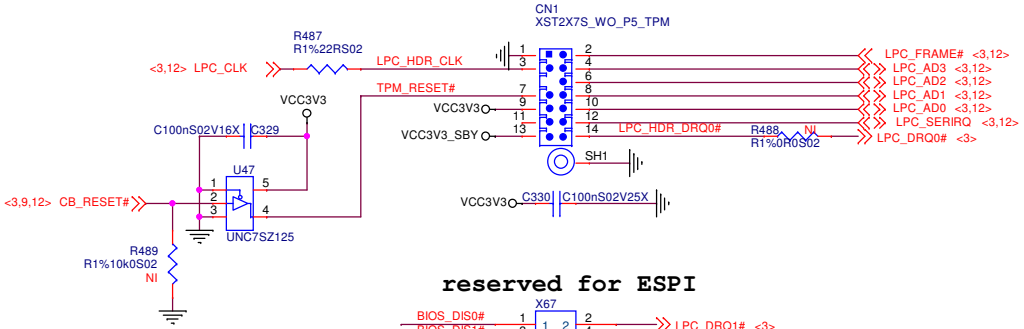


BIOS_DIS1#	BIOS_DIS0#	BIOS ENTRY / SPI_CS#
OFF	OFF	on-module firmware (default)
OFF	ON	carrier FWH (not supported)
ON	OFF	carrier firmware from SPI
ON	ON	on-module firmware, carrier SPI contains management data

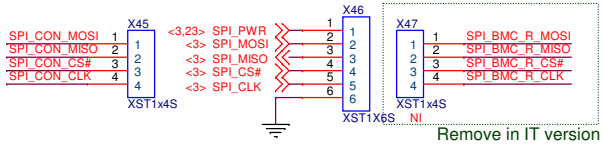
I2C EEPROM

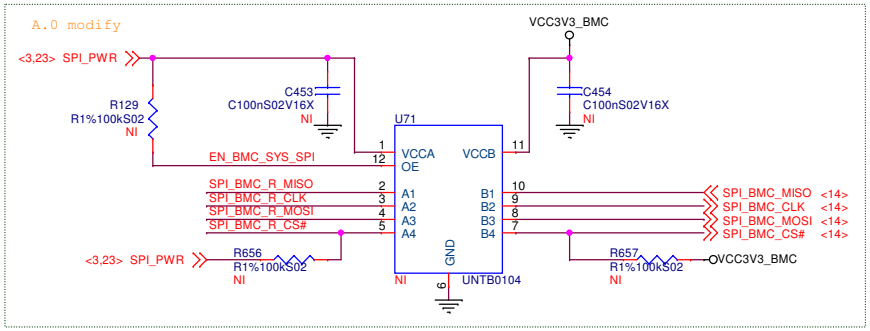


LPC/TPM header

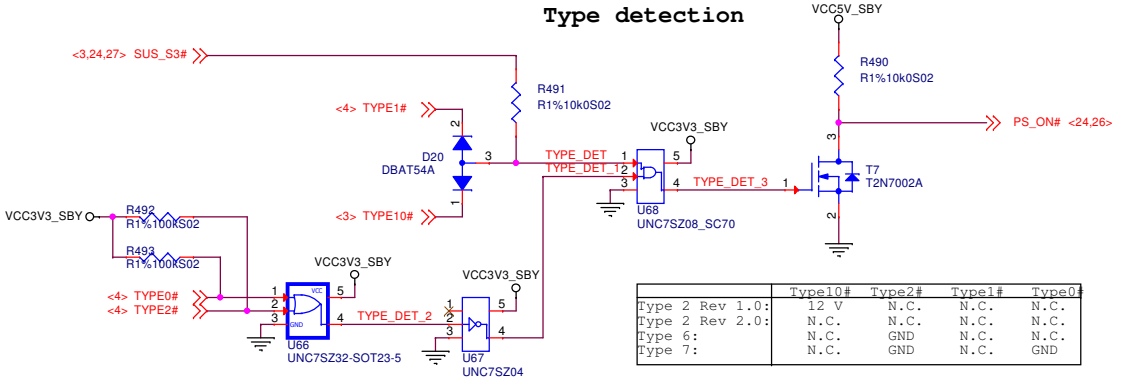


SPI BIOS jumper



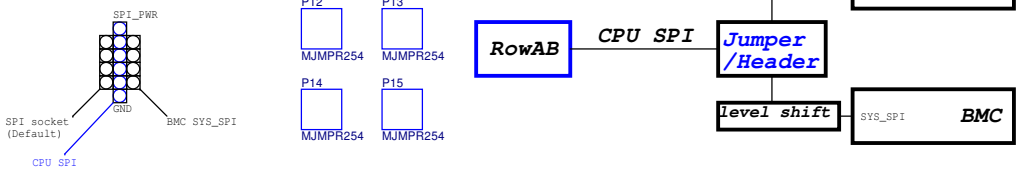


Type detection



	Type10#	Type2#	Type1#	Type0#
Type 2 Rev 1.0:	12 V	N.C.	N.C.	N.C.
Type 2 Rev 2.0:	N.C.	N.C.	N.C.	N.C.
Type 6:	N.C.	GND	N.C.	N.C.
Type 7:	N.C.	GND	N.C.	GND

SPI BIOS jumper placement



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Title: SPI / I2C / TPM

Size	Document Number	Created	Rev
A3	DEVA_A0	<OrgAddr4>	A.0

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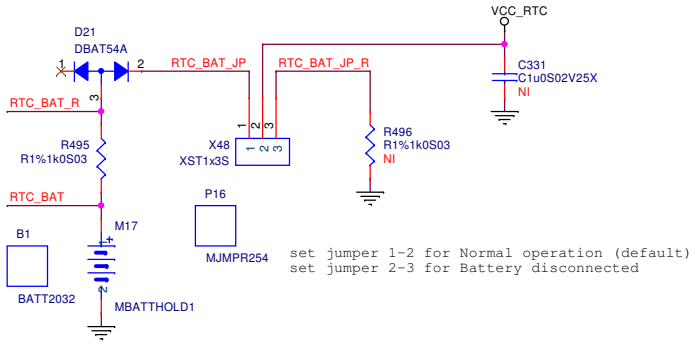
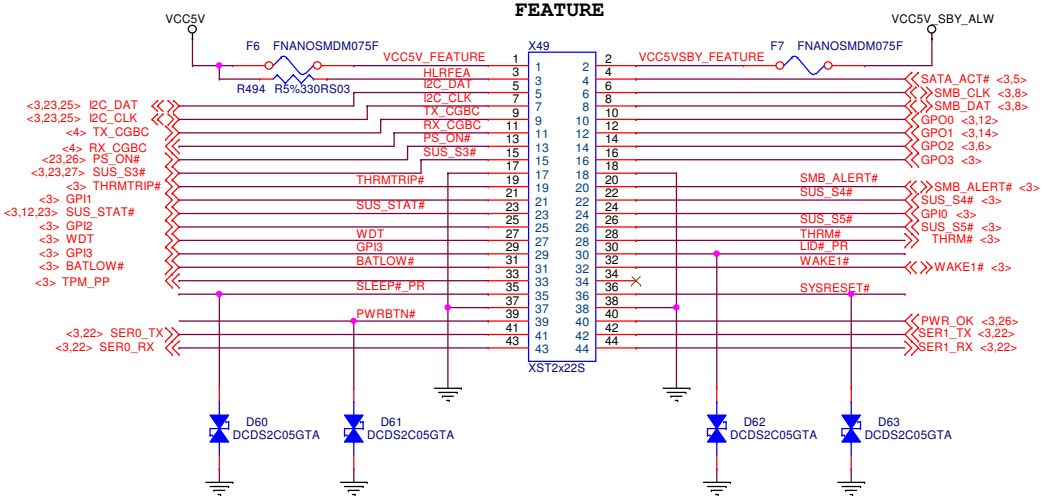
SH24_SPK_FEATURE_FAN_RTC_BTN

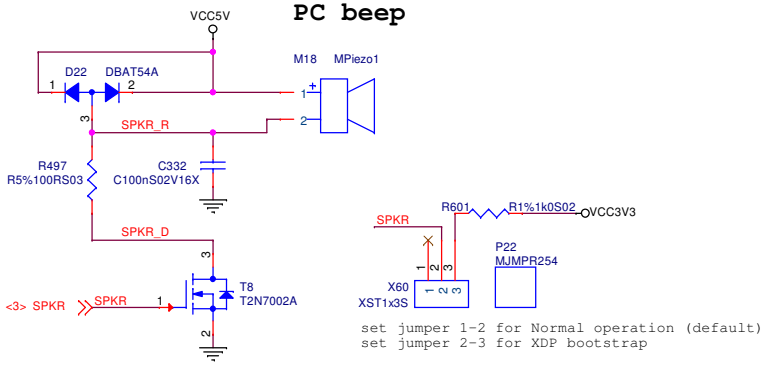
RTC / CMOS Battery



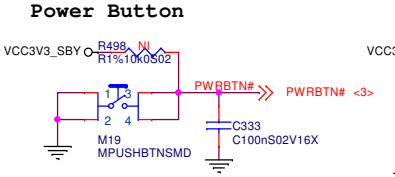
FEATURE



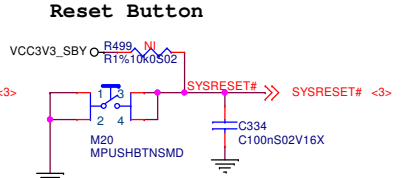
PC beep



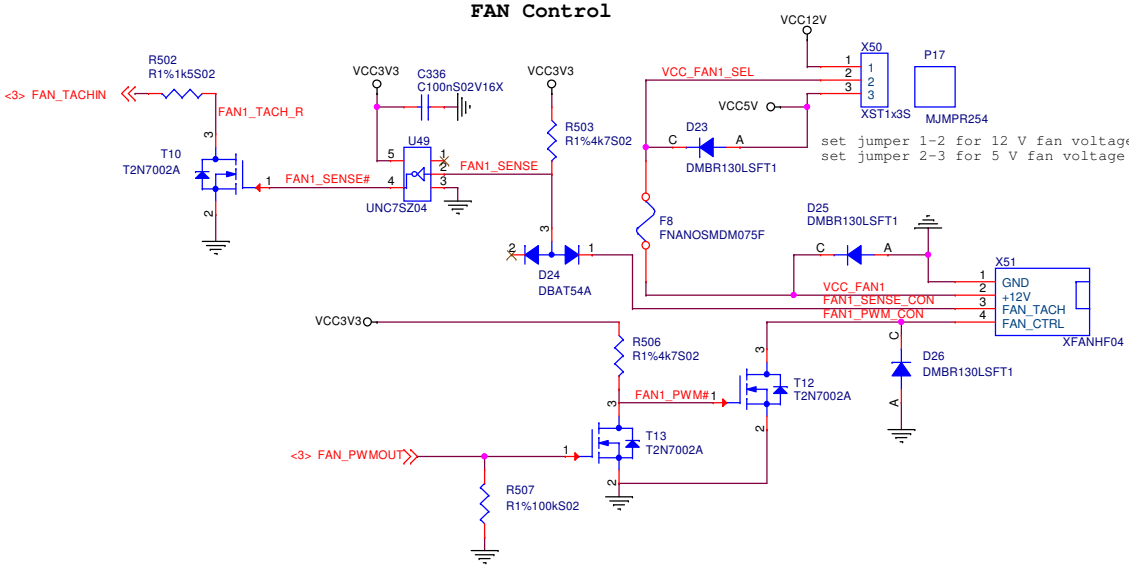
Power Button



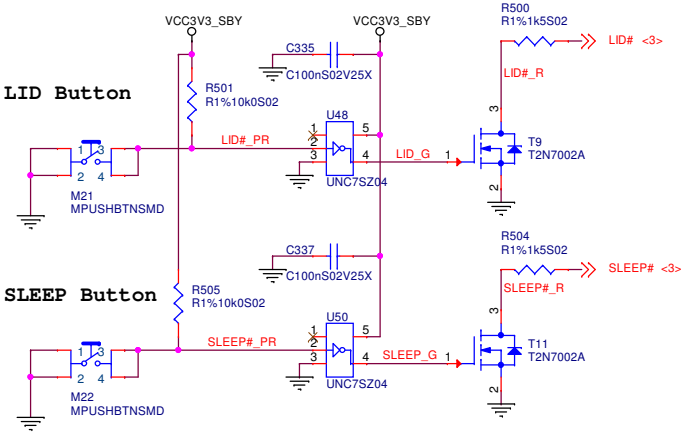
Reset Button



FAN Control



LID Button



SLEEP Button

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Title: SPK / Feature / FAN / RTC / BTN			
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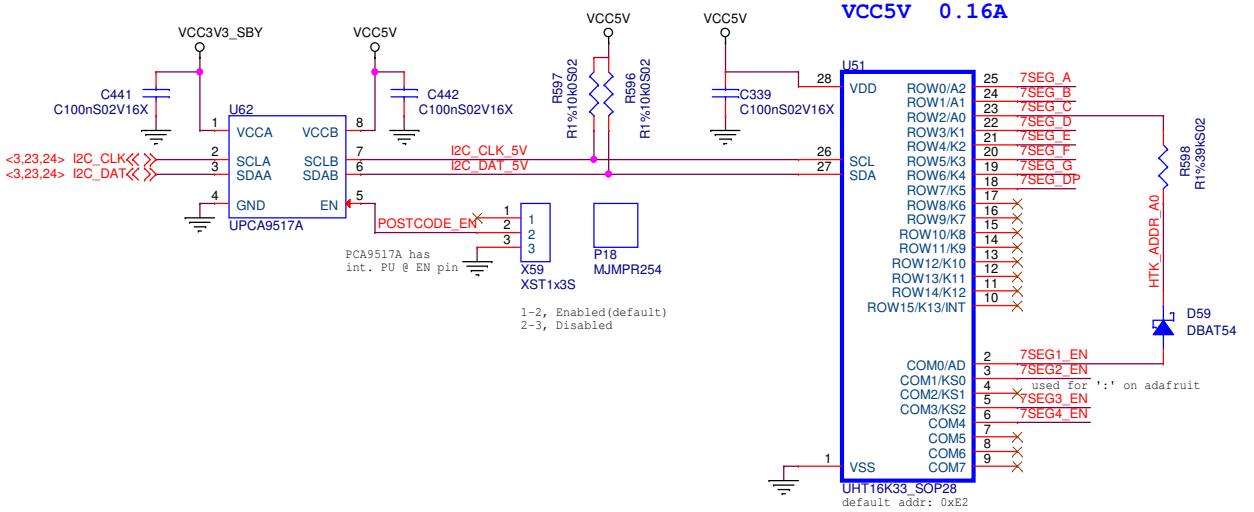
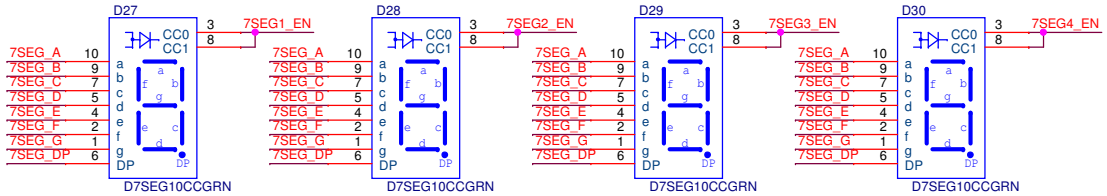
SH25_POSTCODE

Postcode Display

VCC5V 0.16A





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Title: Post code	
Size: B	Document Number: DEVA_A0
Created: <OrgAddr4>	Rev: A.0
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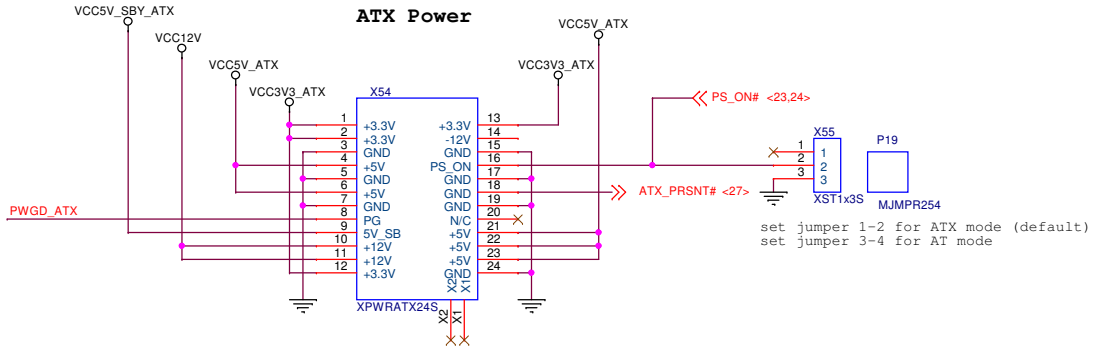
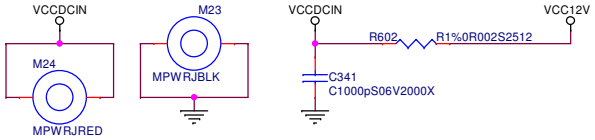
SH26_POWER

ATX Power

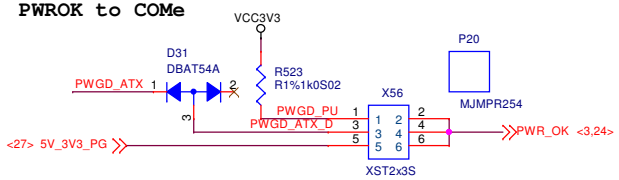


set jumper 1-2 for ATX mode (default)
set jumper 3-4 for AT mode

Power In connectors – BANANA JACK

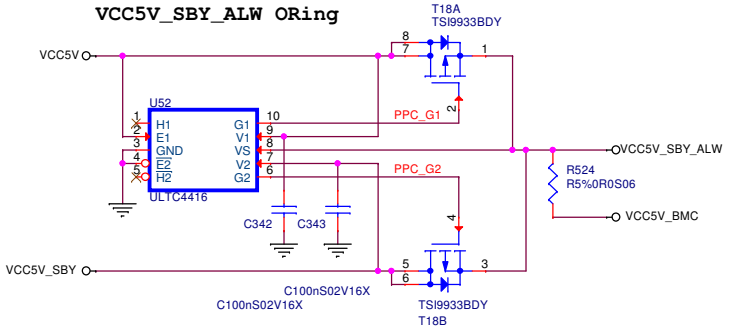


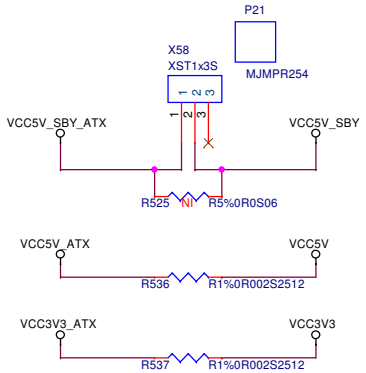
PWROK to COMe

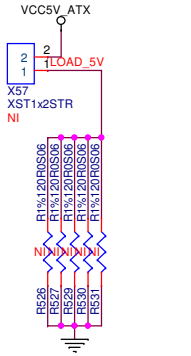


set jumper 1-2 for pull-up on PWR_OK; only for debug
set jumper 3-4 for PWR_OK from ATX supply (default)
set jumper 5-6 for PWR_OK from DC/DC (only in single 12 V mode)

VCC5V_SBY_ALW ORing

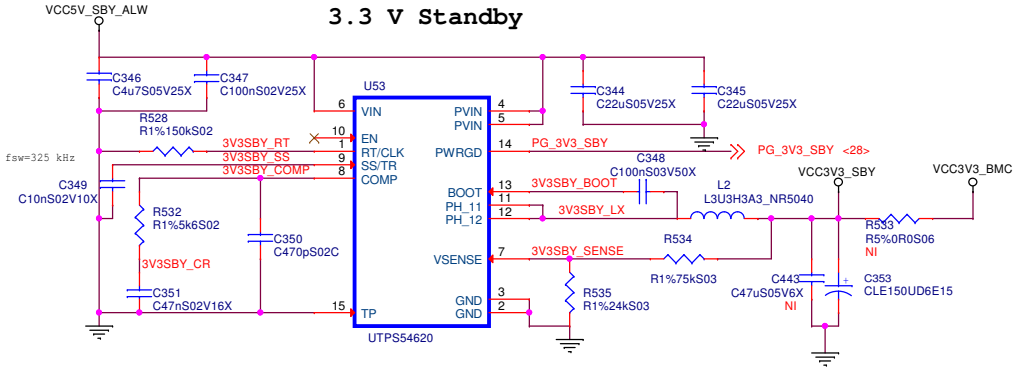




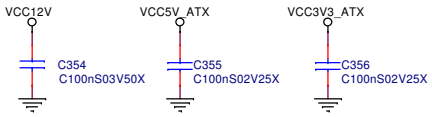


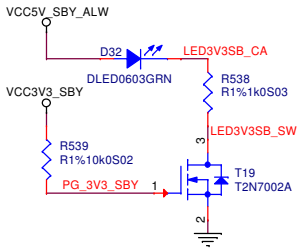
load resistors
causing additional 200 mA
load current at 5V_ATX
helping ATX PSU to turn on

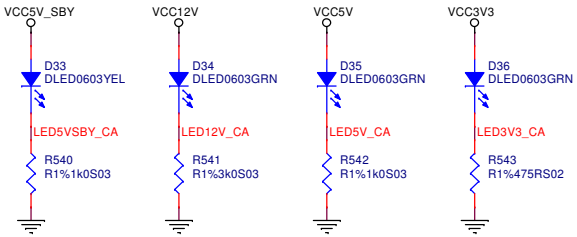
3.3 V Standby



A.0 modify







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Title: Power / 5VSBY / 3V3SBY			
Size: A3	Document Number: DEVA_A0	Created: <OrgAddr4>	Rev: A.0
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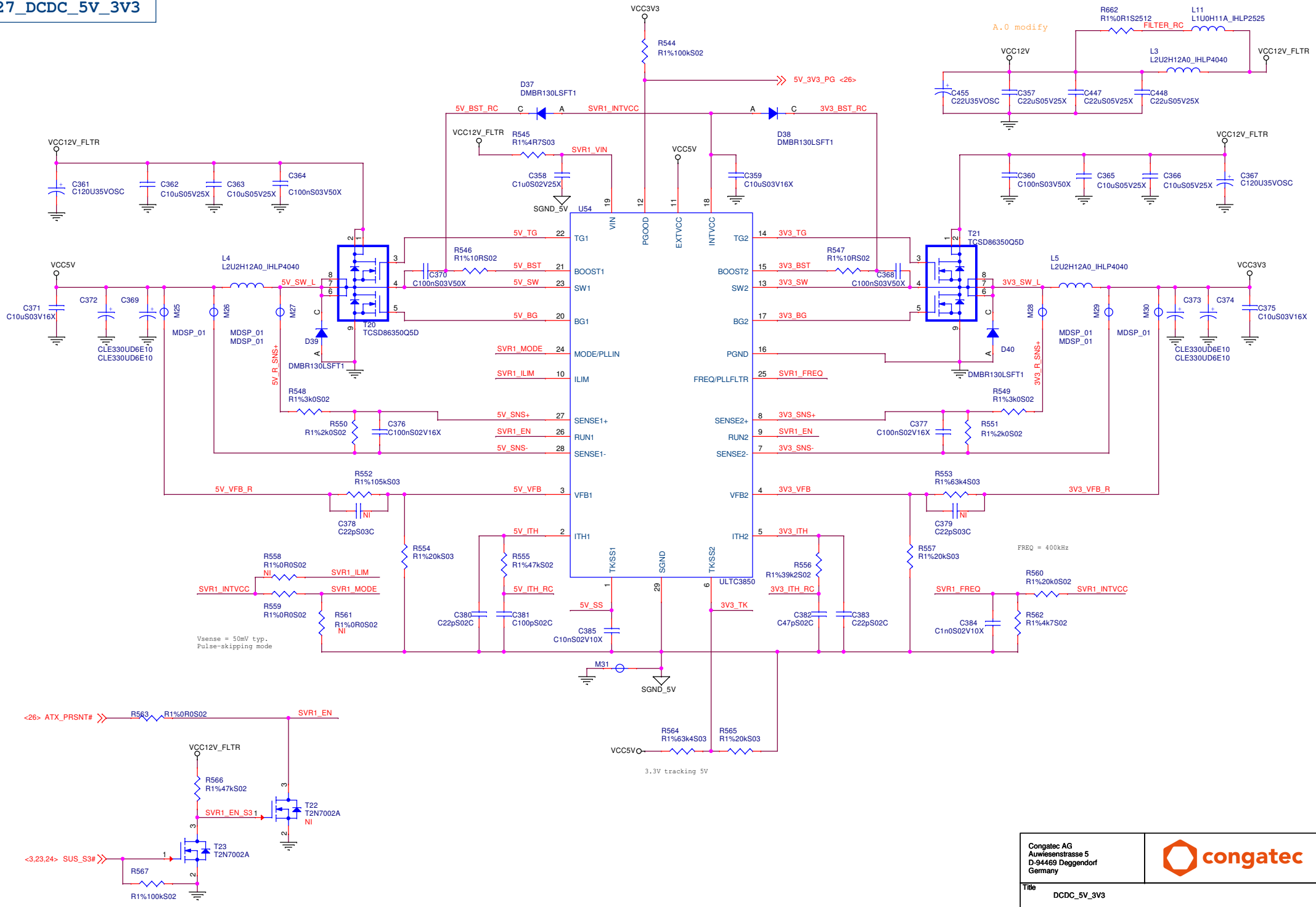
SH27_DCDC_5V_3V3



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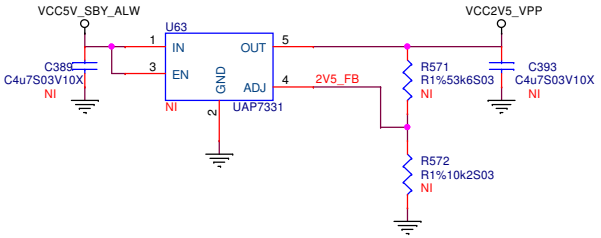
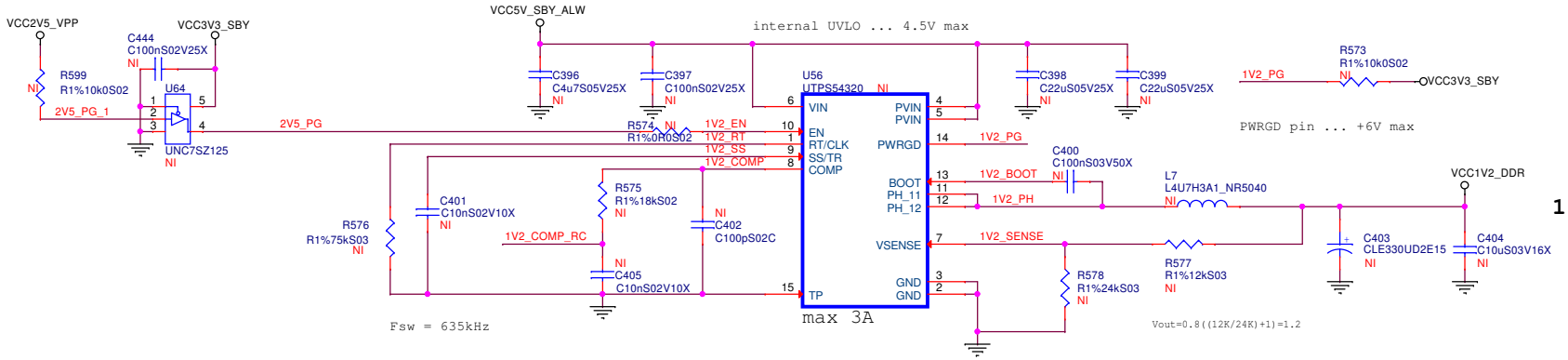
Title: DCDC_5V_3V3			
Size: A3	Document Number: DEVA_A0	Created: <OrgAddr4>	Rev: A.0
Date: Tuesday, May 09, 2017	Sheet 27 of 30		

SH28_DCDC_1V15_2V5_1V2_1V8

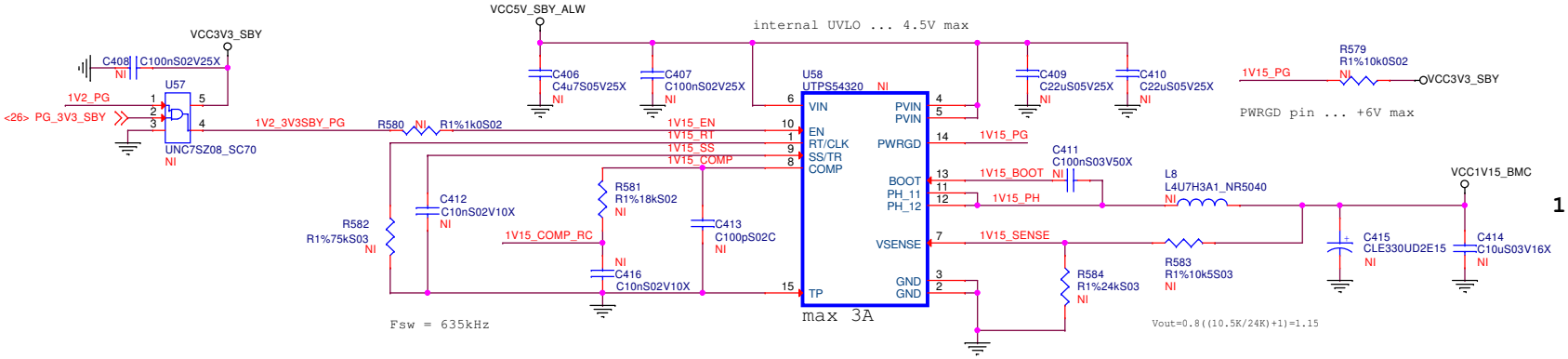
Remove in IT version



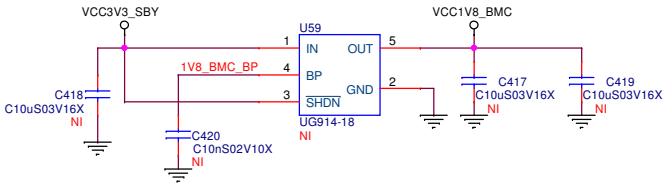
2.5 V / 0.1A



1.2 V / 0.9A



1.15 V / 0.65A



1.8 V / 0.15A

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Title: DCDC_1V15_2V5_1V2_1V8			
Size: A3	Document Number: DEVA_A0	Created: <OrgAddr4>	Rev: A.0
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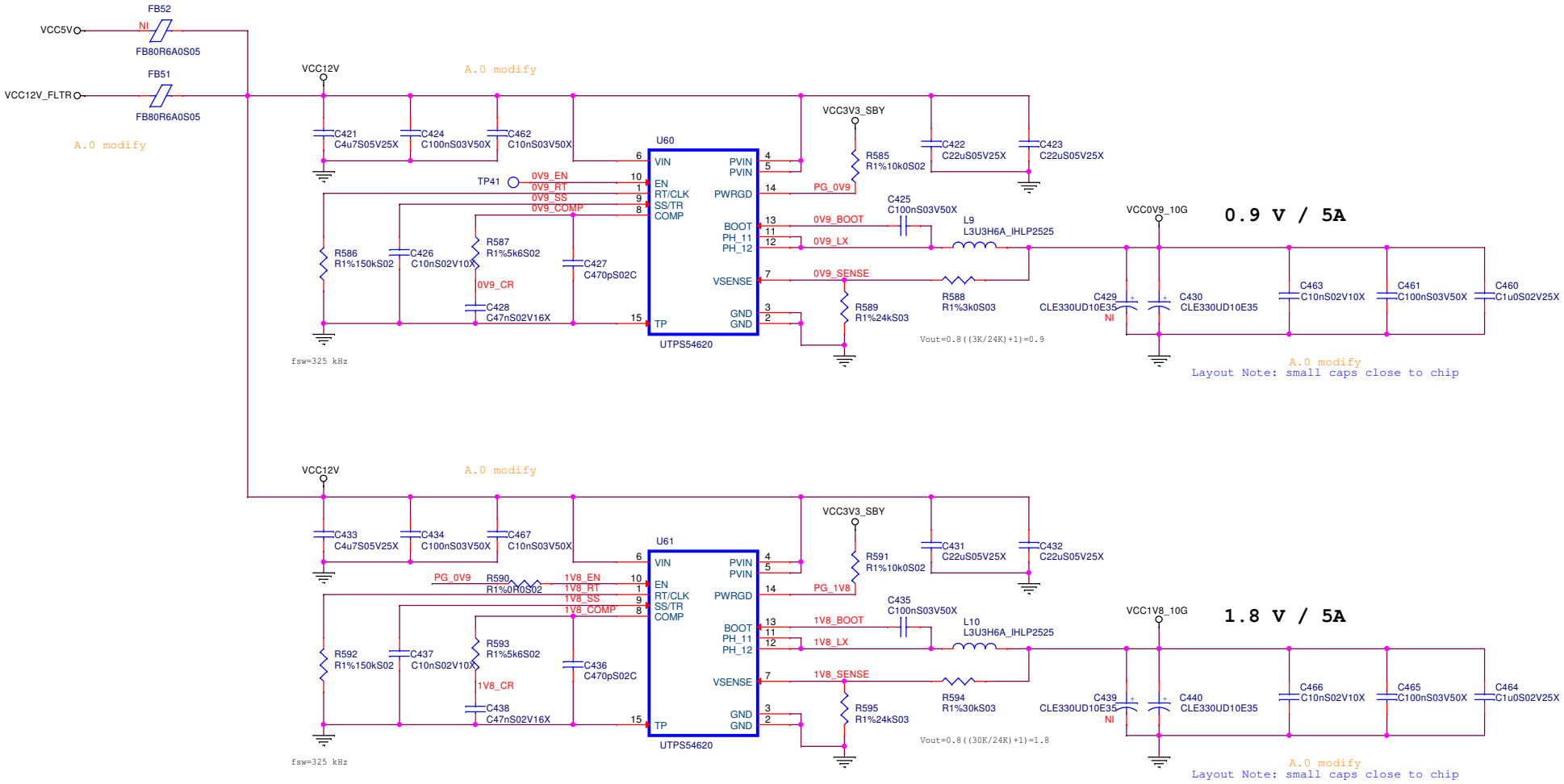
SH29_DCDC_0V9_1V8



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Title: DCDC_0V9_1V8			
Size: A3	Document Number: DEVA_A0	Created: <OrgAddr4>	Rev: A.0
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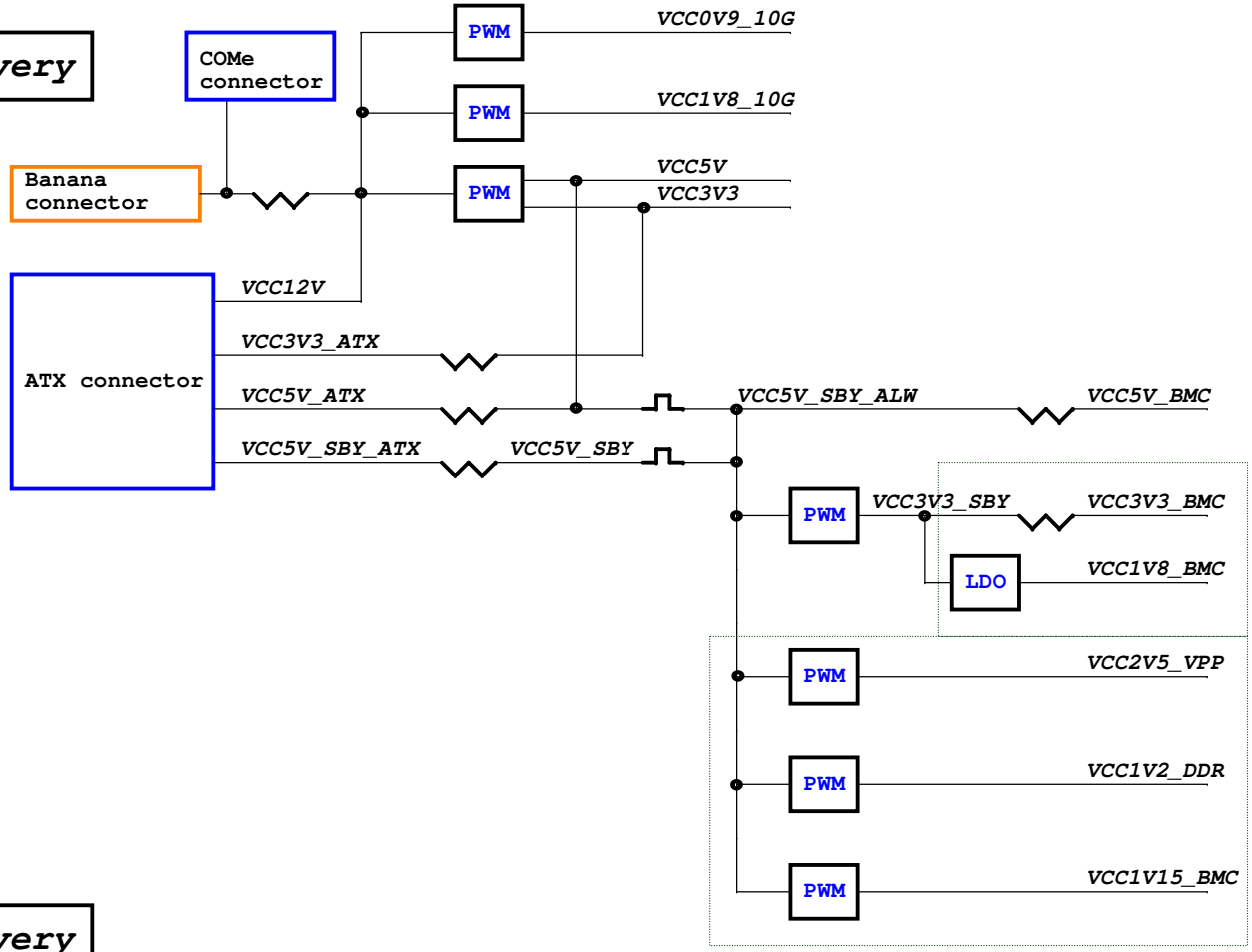
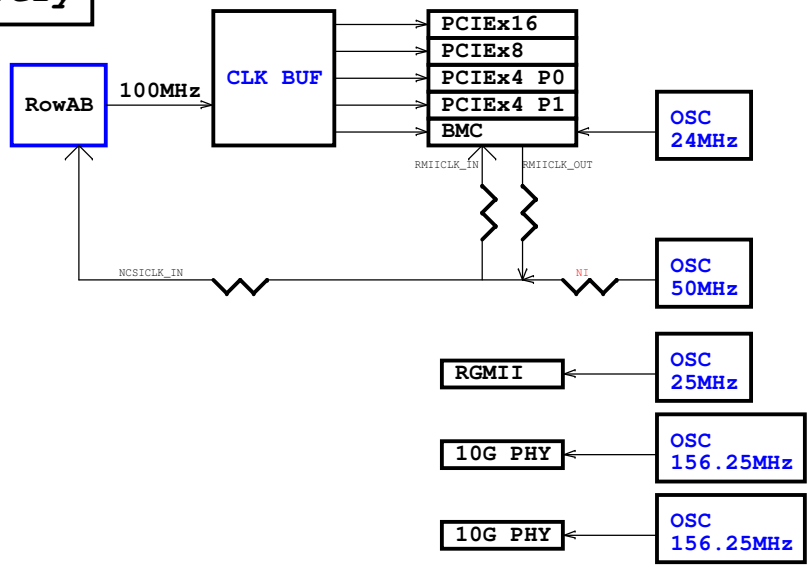
Power Delivery



Clock Delivery



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Title: Power/Clock Delivery			
Size: A3	Document Number: DEVA_A0	Created: <OrgAddr4>	Rev: A.0
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X.1 change list

SH01 modify revision to X.1

SH11 modify R103, R104, R105 to 51 ohm

SH13 add R632/4.7K on "BMC_SPICK" to "VCC3V3_BMC"
modify jumper X61 from 1-2 to 2-3

SH18 mount X33
add R635/5.6K on "LAN0_MDC_SCL" to GND
add R636/5.6K on "LAN0_MDC_SDA" to GND

SH19 BOM remove R390, R403

SH20 swap "LAN2_MDIO_SDA" and "LAN2_MDC_SCL"
mount X37
add R633/5.6K on "LAN2_MDC_SCL" to GND
add R634/5.6K on "LAN2_MDC_SDA" to GND

SH21 BOM remove R454, R467

A.0 change list

SH01 modify revision to A.0

SH02 modify PCIE0-15 routing

SH04 swap 10G_LED_SDA and 10G_LED_SCL
and reserve pull-up resisters
modify LAN23_MICROSEL to U7.11
add pull-up/down (default low) on 10G_PHY_RST* and change U6 to OR gate
change level shift solution for 10G_PHY_RST* and LAN*_MICROSEL

SH05 change D1 HDD LED to yellow
change F3 to support 12V

SH10 modify PCIE0-15 routing

SH11 add D72 to prevent leakage from VGA monitor
BOM modify R103, R104, R105 to 150 ohm

SH12 modify test from PCIE P14 MUX to PCIE P4 MUX
modify VCC of U27 to VCC3V3
BOM remove X28 SD card

SH14 add 150 ohm on RGB signal

SH18 add U69 for level shift
remove pull-down resisters on X33
change X33 to 2x3 header
connect LAN2_MDC_SCL/SDA to X33
add SW1 to set address
BOM remove D64-D67, T24-T27, R608-R615

SH19 on X34.3 LAN0_TX_FAULT -> LAN0_TX_DIS
on X36.3 LAN1_TX_FAULT -> LAN1_TX_DIS
BOM add R390, R403
BOM remove R394
add C469-C471 and GND_SHIELD to improve EMC

SH20 add U70 for level shift
remove X37 and pull-down resisters on X37
add SW2 to set address
BOM remove D68-D71, T28-T31, R620-R626, R631

SH21 on X38.3 LAN2_TX_FAULT -> LAN2_TX_DIS
on X40.3 LAN3_TX_FAULT -> LAN3_TX_DIS
BOM add R454, R467
BOM remove R458
change LED power to 3.3VSB
add C472-C475 and GND_SHIELD to improve EMC

SH22 modify VCC of U43 to VCC3V3_SBY, U44 to VCC3V3_BMC
add D73 to prevent leakage
remove X42 and change X41 to stackup

SH23 add level shift chip on SPI bus between module and BMC

SH27 add C455, R662, L11 and change L3 to improve EMC

SH29 add C460-C467 and FB51, FB52 to improve EMC

Tune all LED's resisters

IT version modify page 6, 11-17, 18, 20, 22, 23, 26, 28

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Title: Power/Clock Delivery

Size	Document Number	Created	Rev
A3	DEVA_A0	<OrgAddr4>	A.0

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