

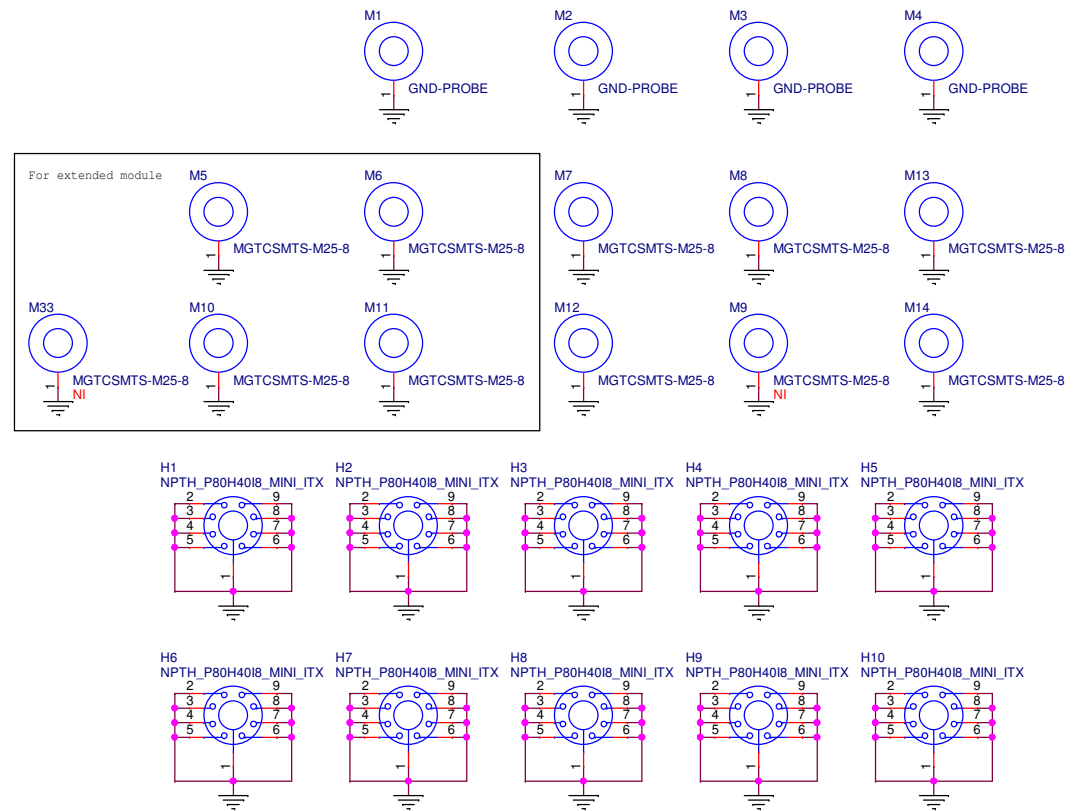
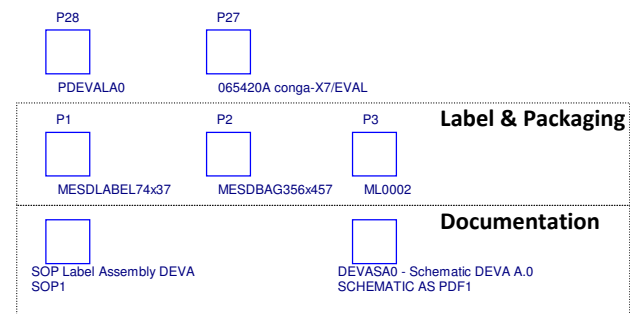
# DEVA

## COM.0 Type 7 Evaluation Baseboard

Rev. A.0

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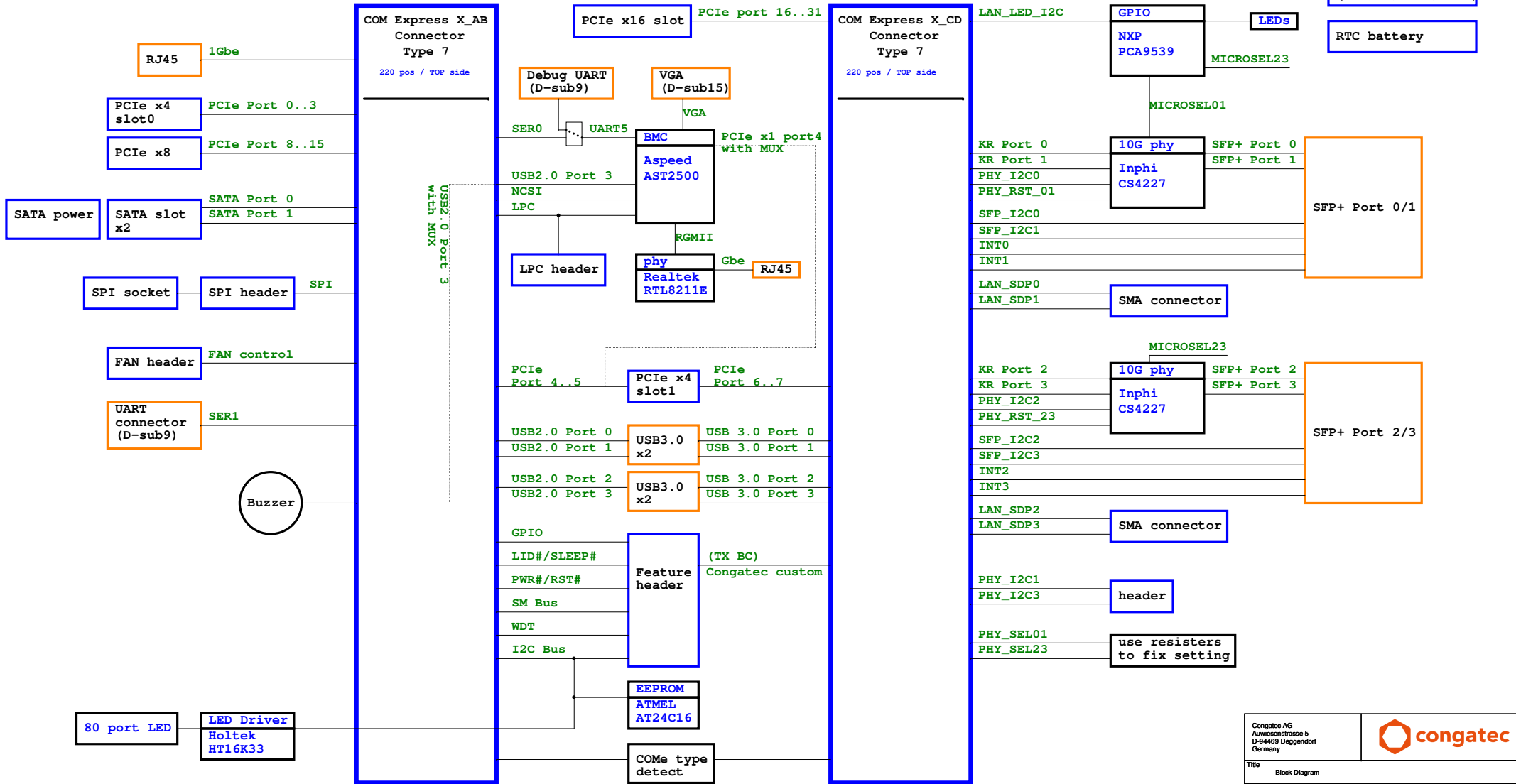
Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title Main Page			
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B	DEVA_A0	<OrgAddr4>	A.0
Date:	Thursday, May 18, 2017	Sheet	1 of 30

# DEVA System Block Diagram

- internal connector
- external connector
- chip

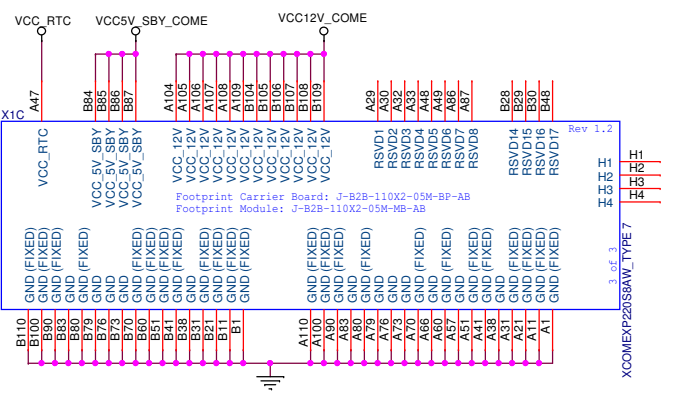
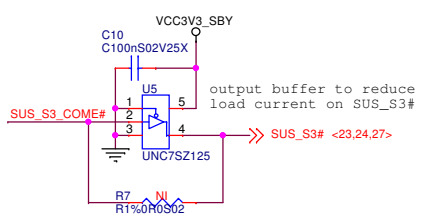
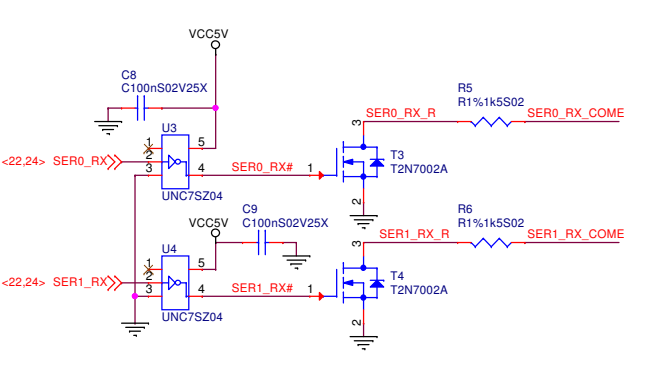
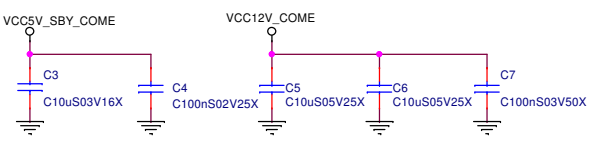
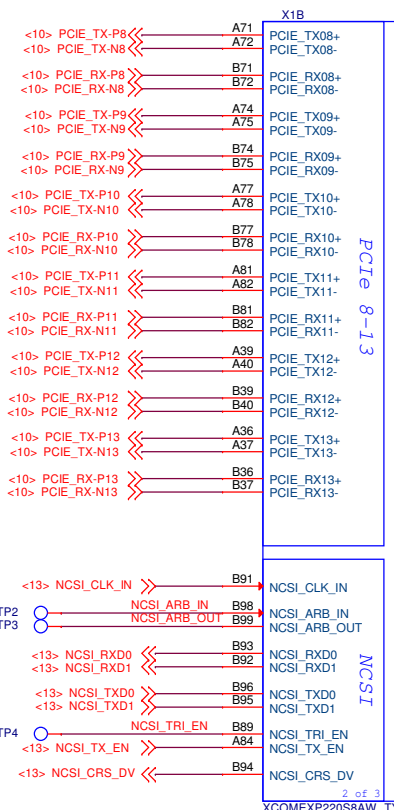
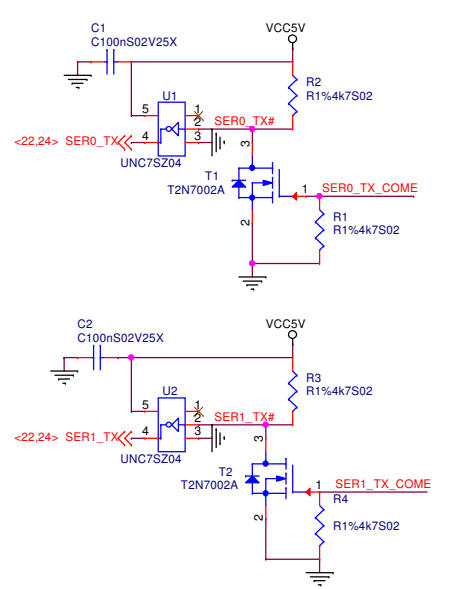
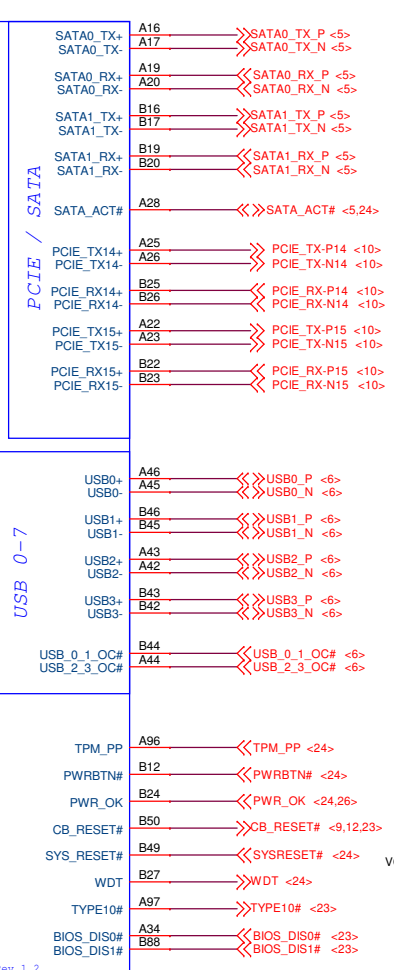
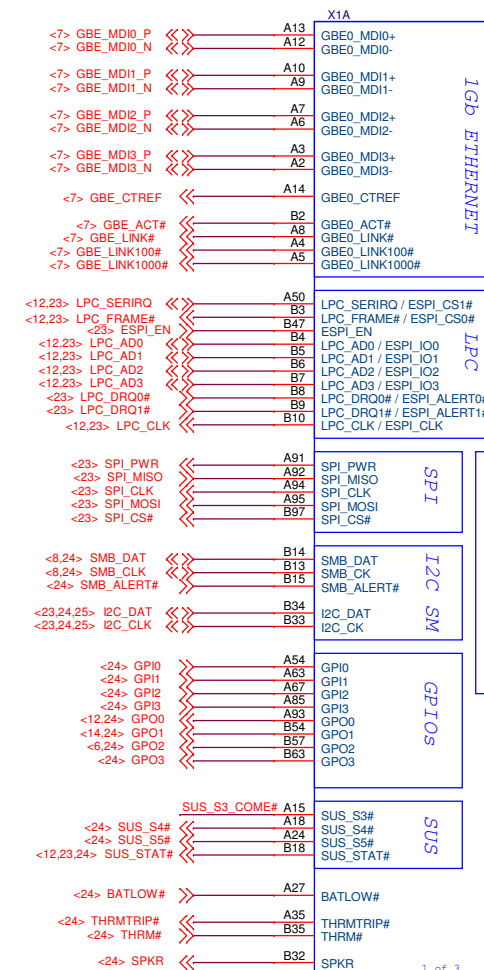
## SYSTEM SUPPLY

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



# SH03\_COM\_EXPRESS\_AB

check Footprint



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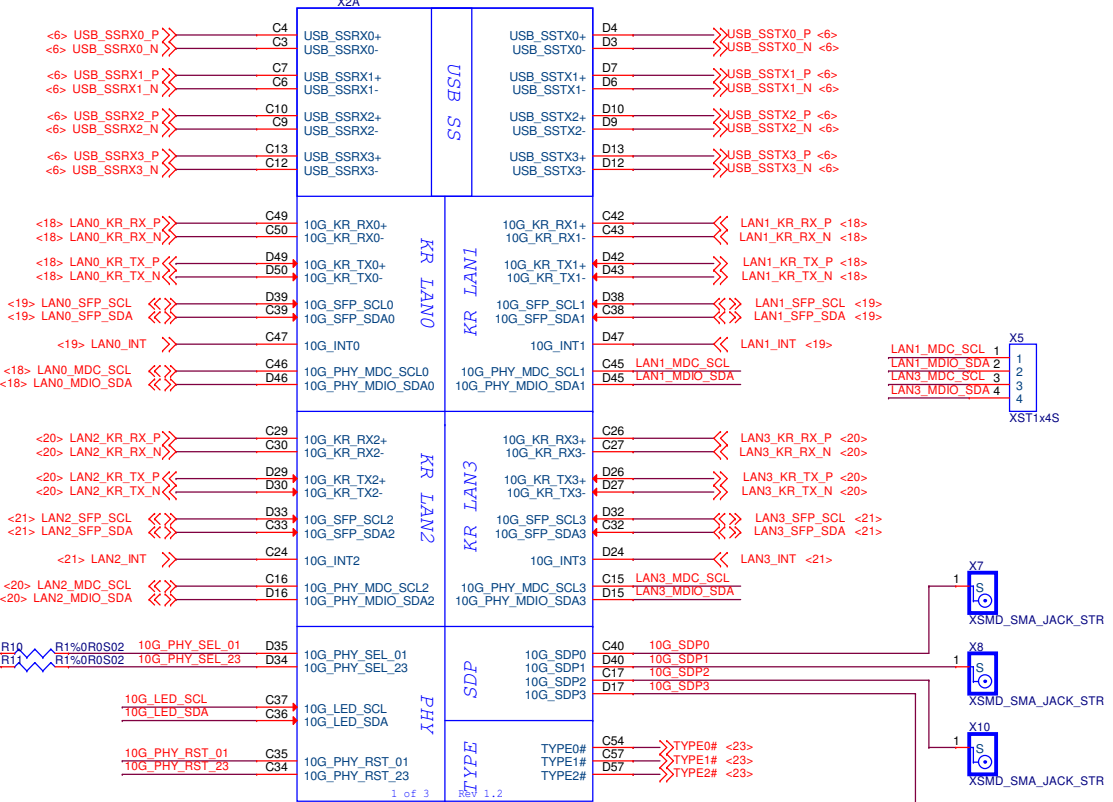
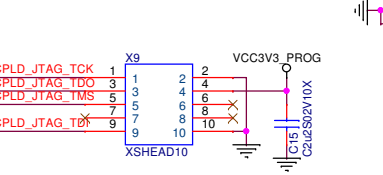
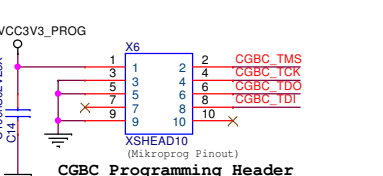
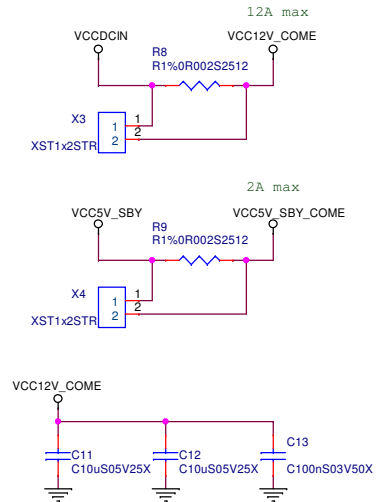
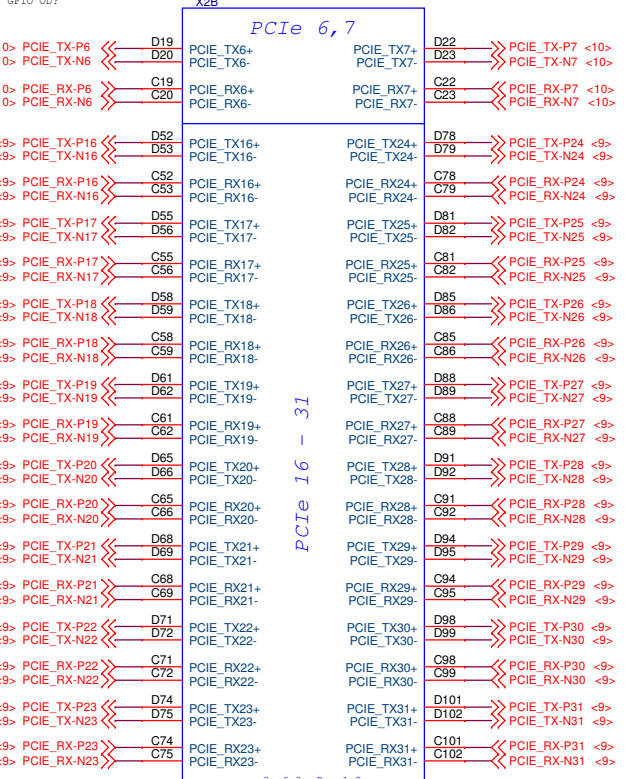
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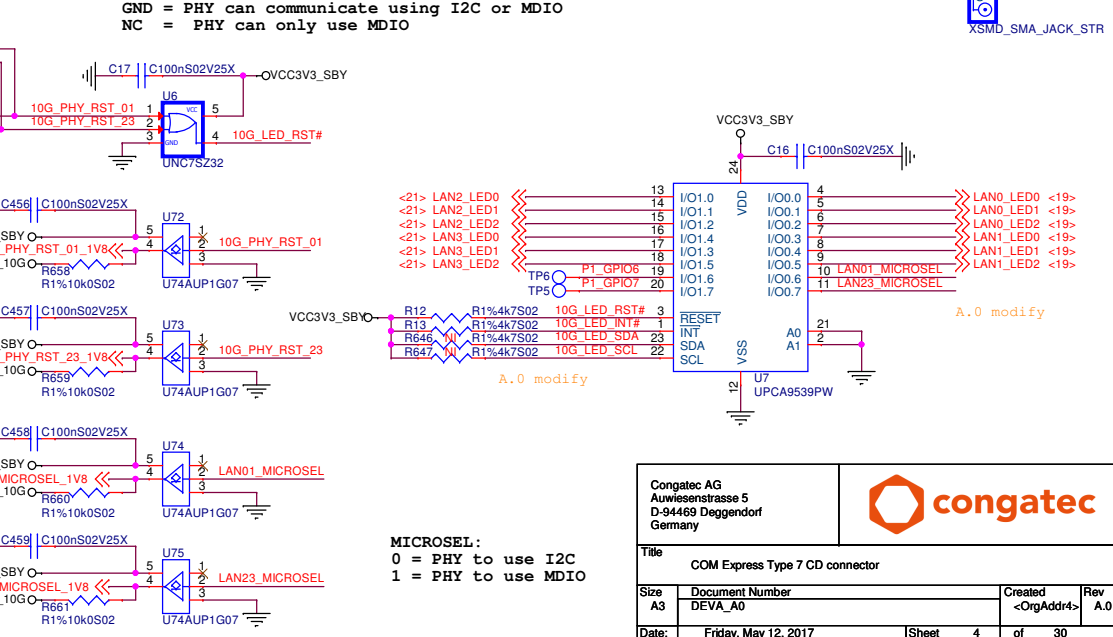
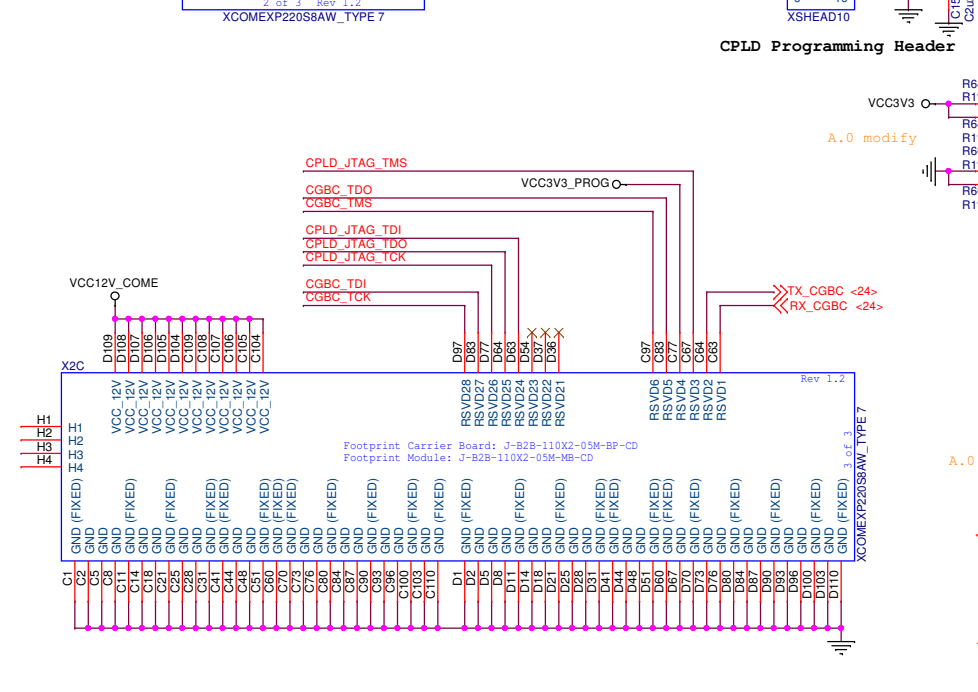
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# SH04\_COM\_EXPRESS\_CD

GPIO OD?



**10G\_PHY\_SEL:**  
GND = PHY can communicate using I2C or MDIO  
NC = PHY can only use MDIO



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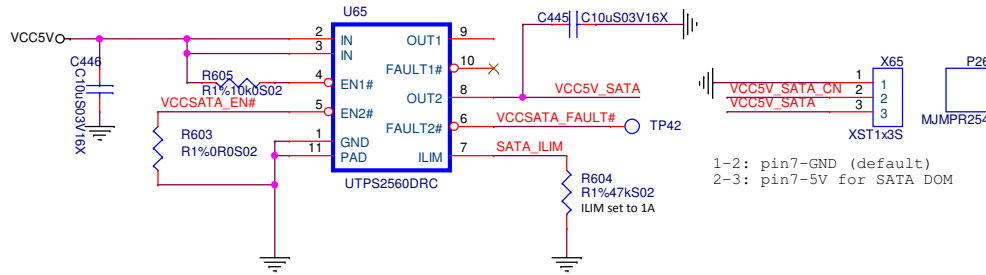
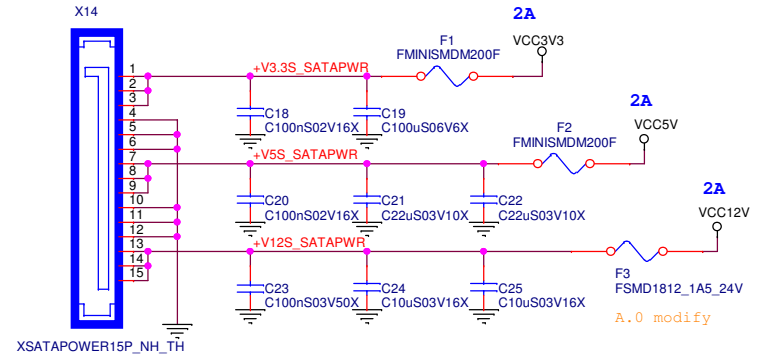
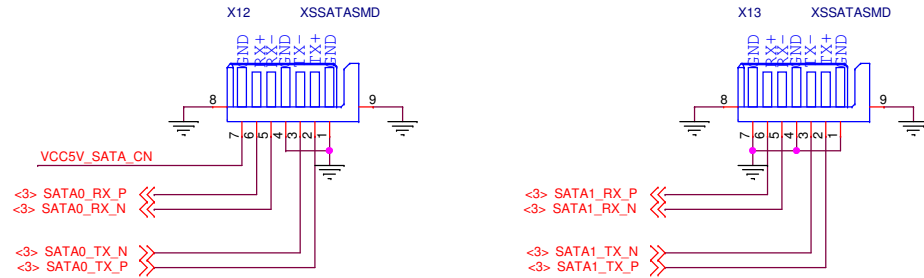
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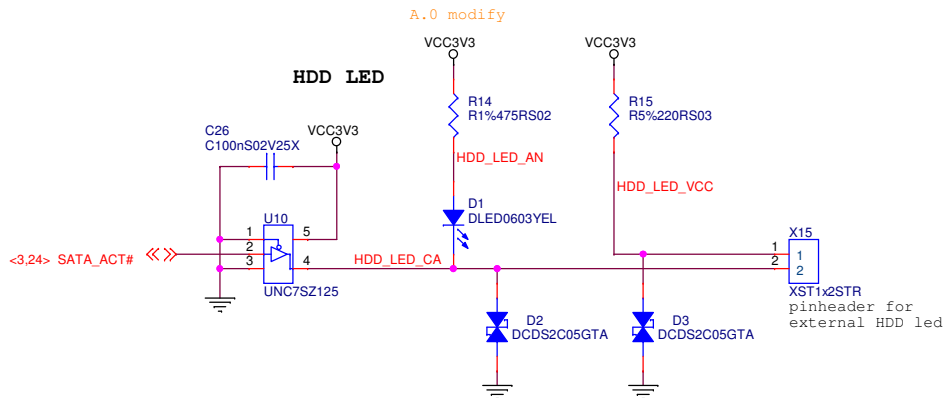
Date: Friday, May 12, 2017 | Sheet 4 of 30

SATA

SATA Power

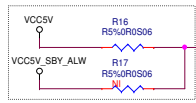


1-2: pin7-GND (default)  
 2-3: pin7-5V for SATA DOM

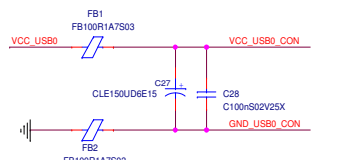
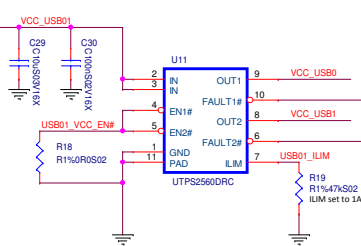


Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title SATA			
Size B	Document Number DEVA_A0	Created <OrgAddr4>	Rev A.0
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use 3-pad layout placement

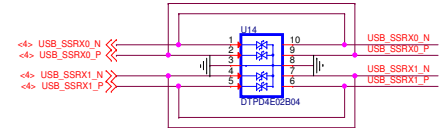
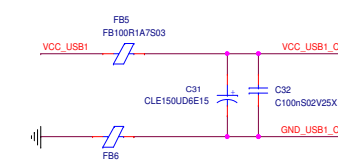
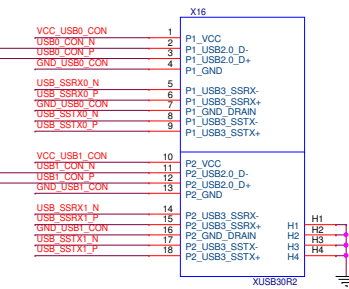


1.8A

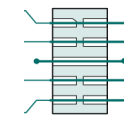


USB 3.0 spec. requires low ESR cap (>= 120 uF) directly connected to I/O connector

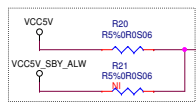
USB 3.0 0/1



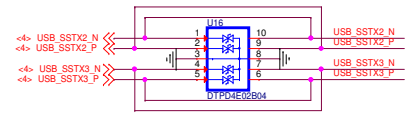
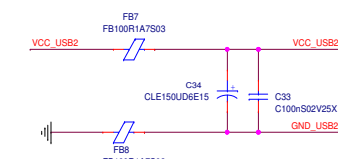
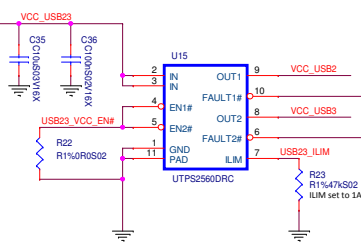
Layout note for ESD parts



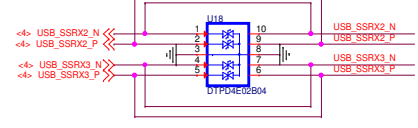
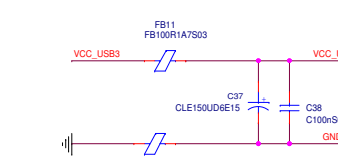
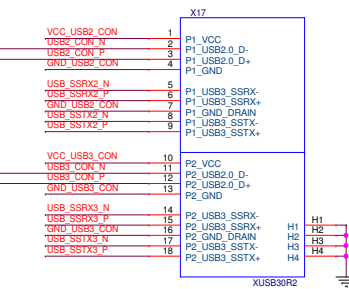
use 3-pad layout placement



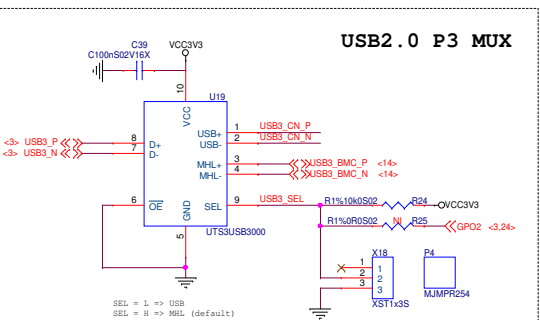
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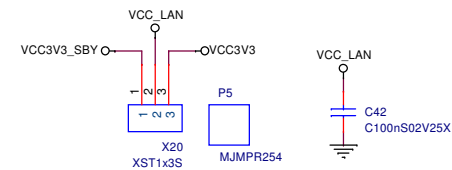
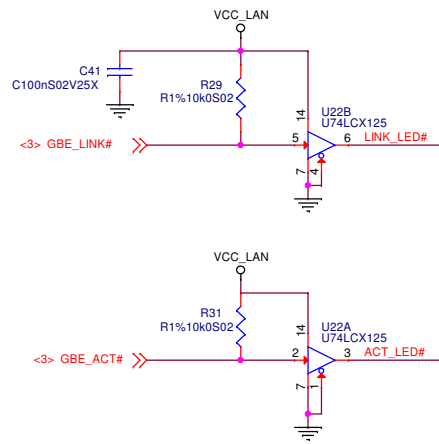
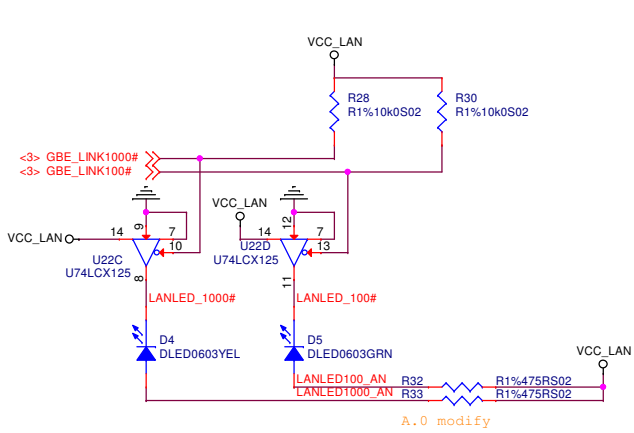
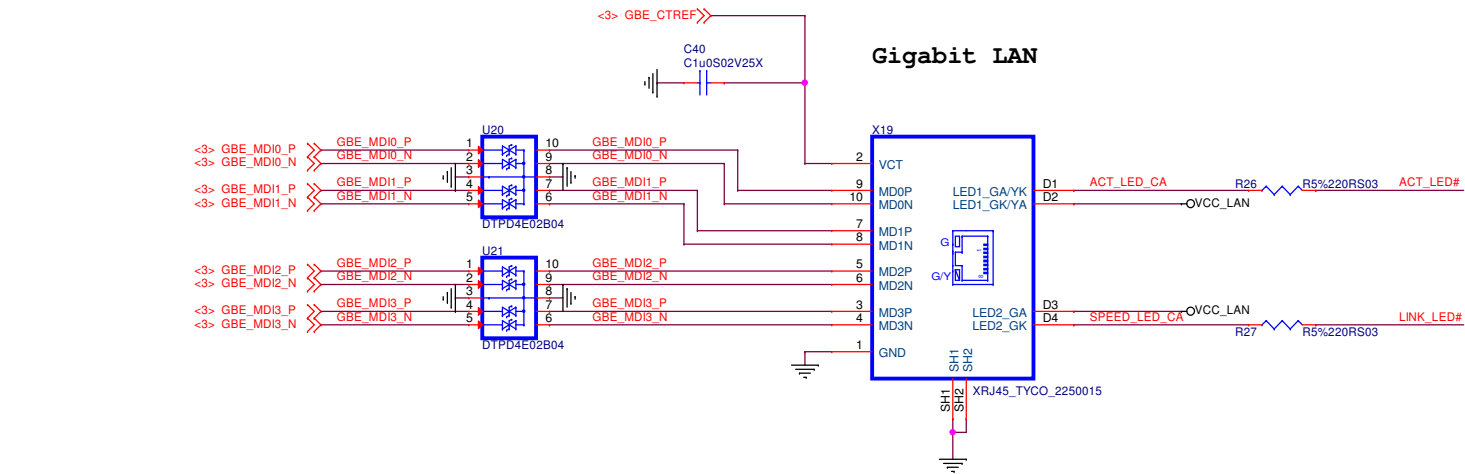
USB 3.0 2/3



USB2.0 P3 MUX

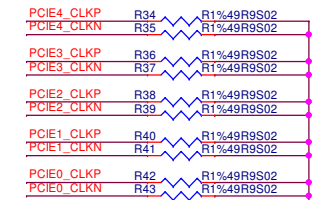
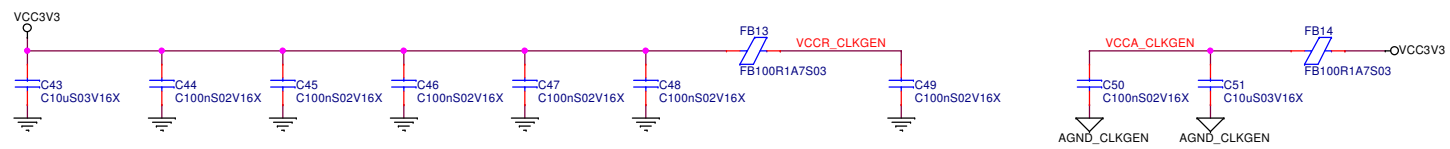


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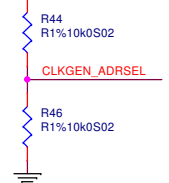


set jumper 1-2 if LAN Controller is powered from standby voltage (default)  
 set jumper 2-3 if LAN Controller is powered from S0 voltage

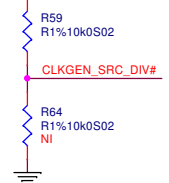
# SH08\_PCIE\_CLK



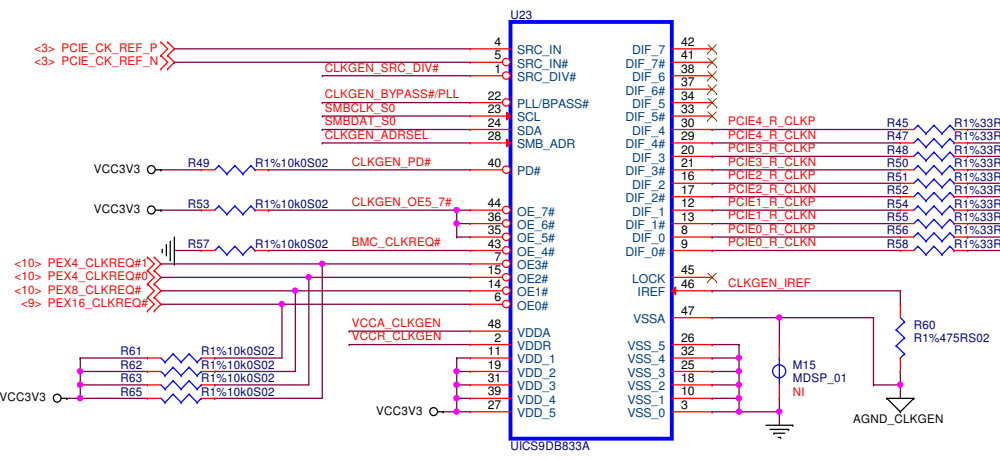
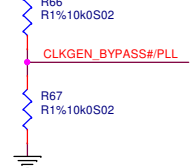
LOW ... DA/DB  
MID ... DC/DD  
HIGH ... D8/D9



determining SRC  
output freq  
0 = SRC/2  
1 = SRC

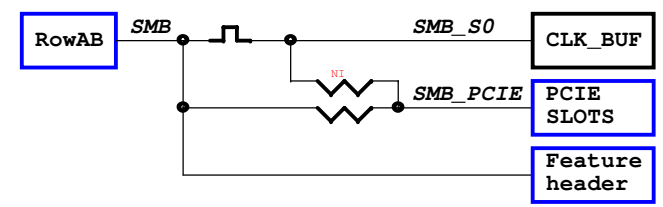
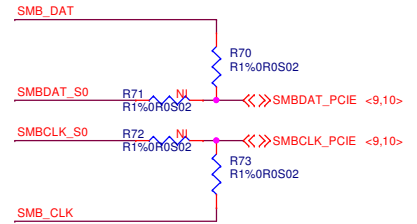
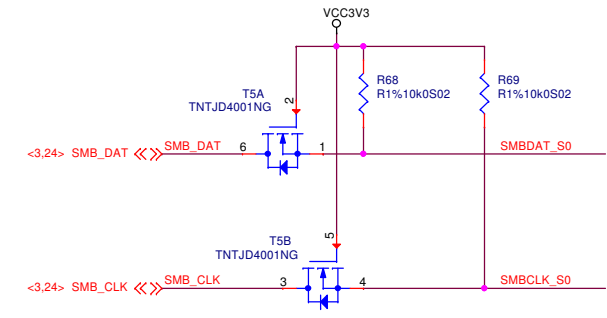


LOW ... Bypass  
MID ... PLL 100M Hi BW  
HIGH ... PLL 100M Low BW



**BMC VGA**  
**PCIE x4 P1 (12-15)**  
**PCIE x4 P0 (8-11)**  
**PCIE x8 (0-7)**  
**PCIE x16 (16-31)**

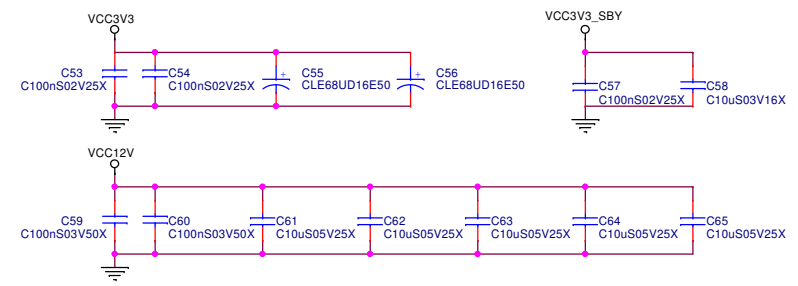
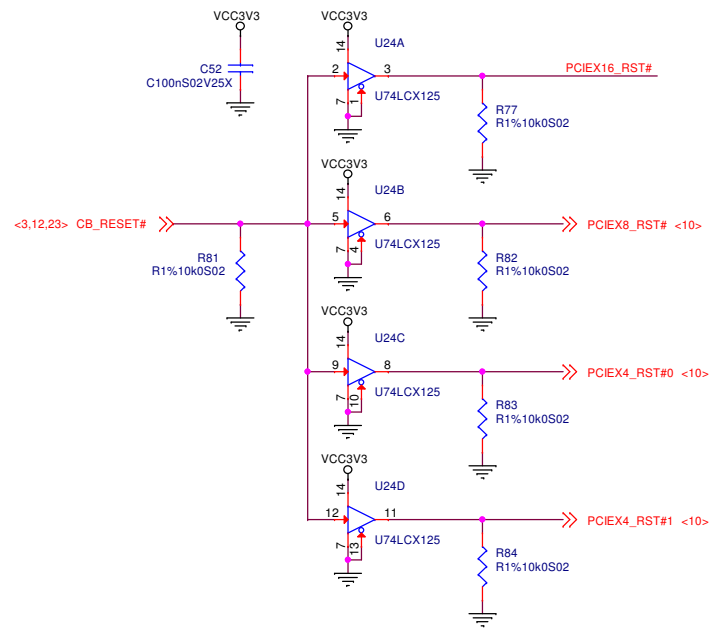
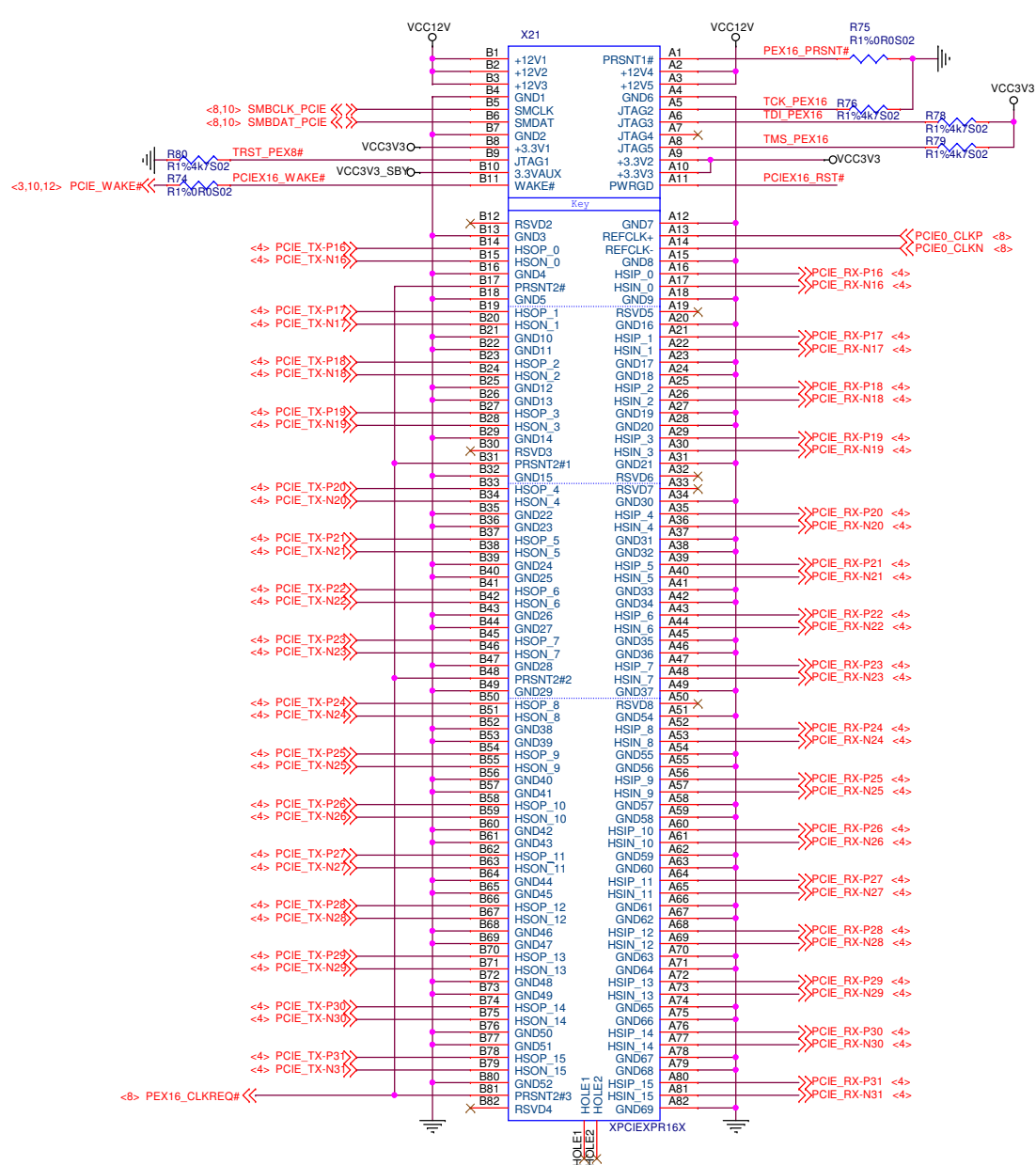
LOW ... Vin < 0.8V  
MID ... 1.2V < Vin < 1.8V  
HIGH ... Vin > 2V



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Title: PCIE CLK			
Size: A3	Document Number: DEVA_A0	Created: -OrgAddr4-	Rev: A.0
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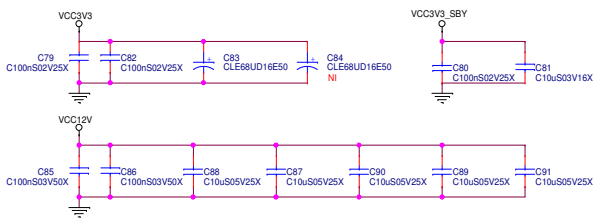
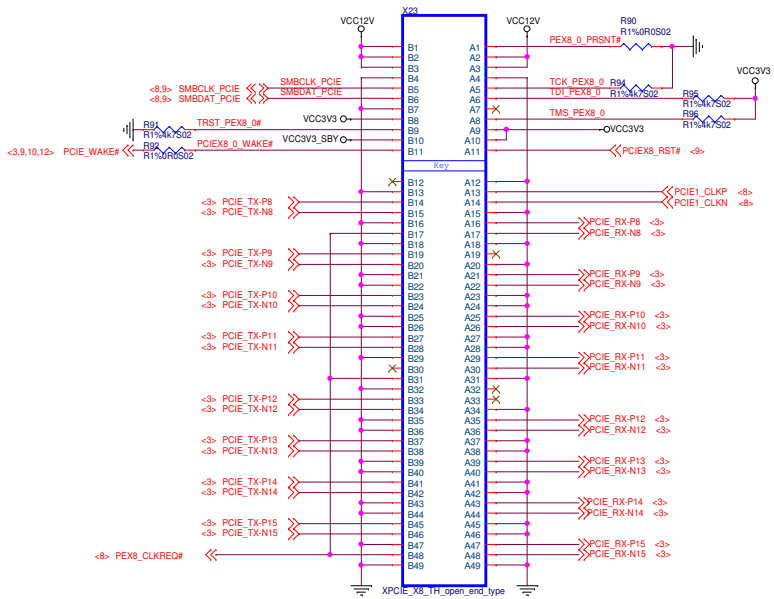
PCI Express x16



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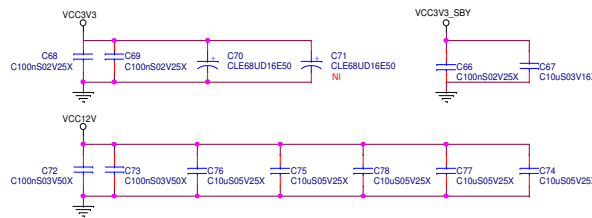
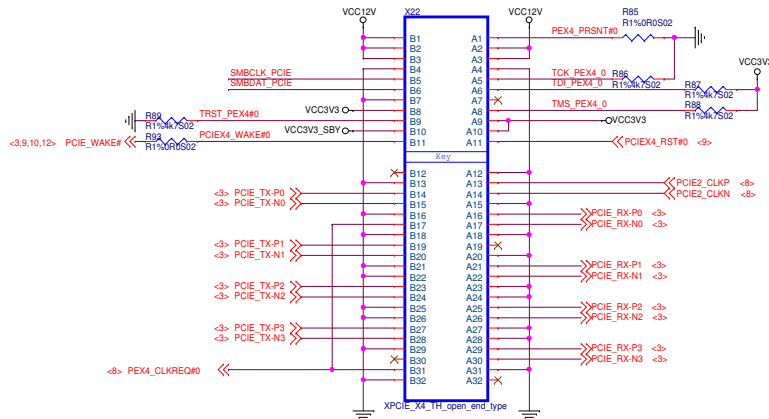
PCI Express x8

A.0 modify



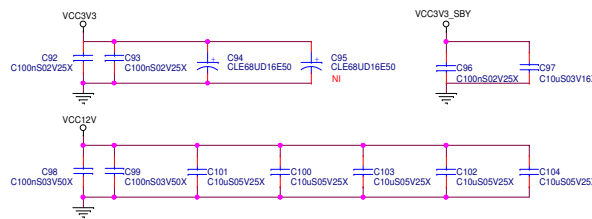
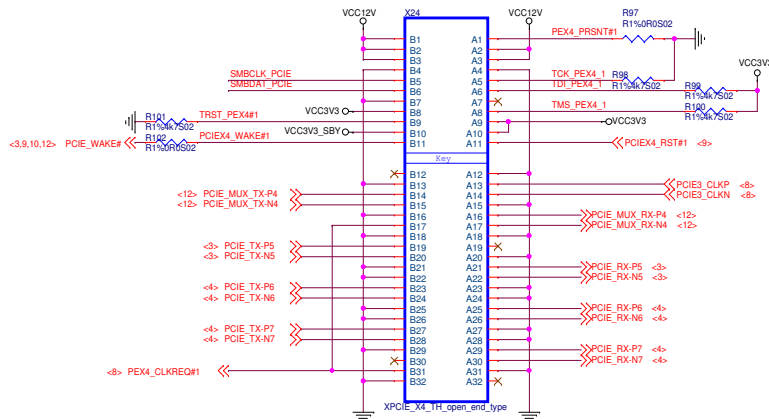
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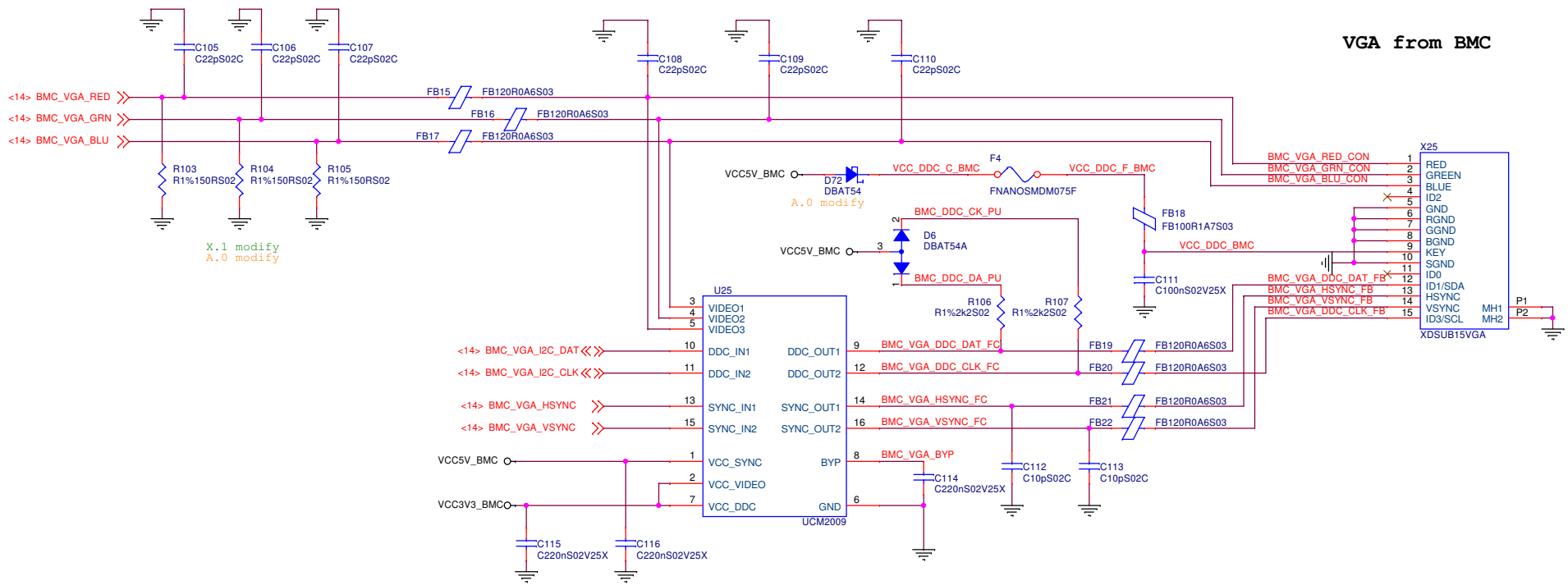
A.0 modify




PCI Express x4 P1

A.0 modify

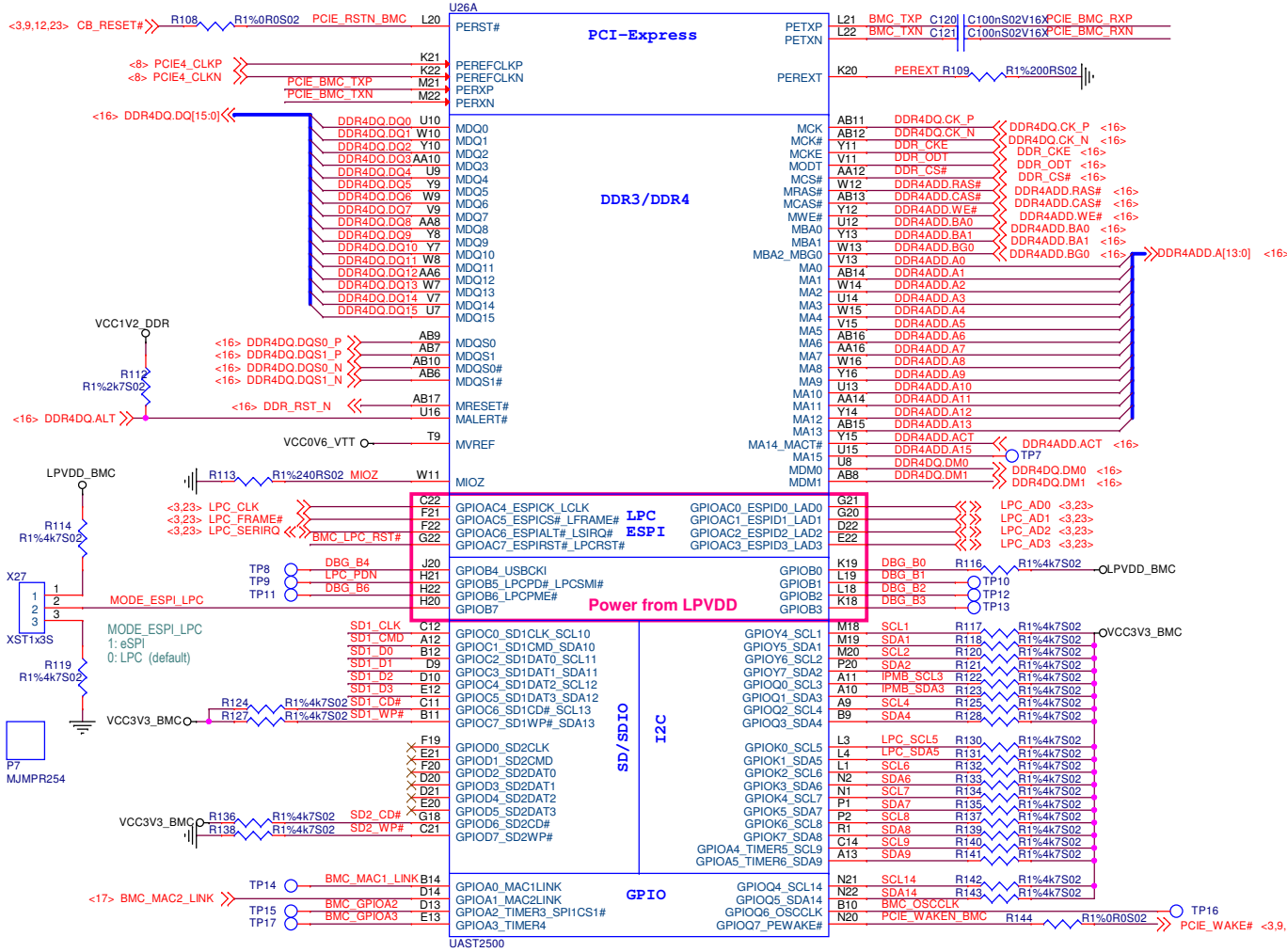




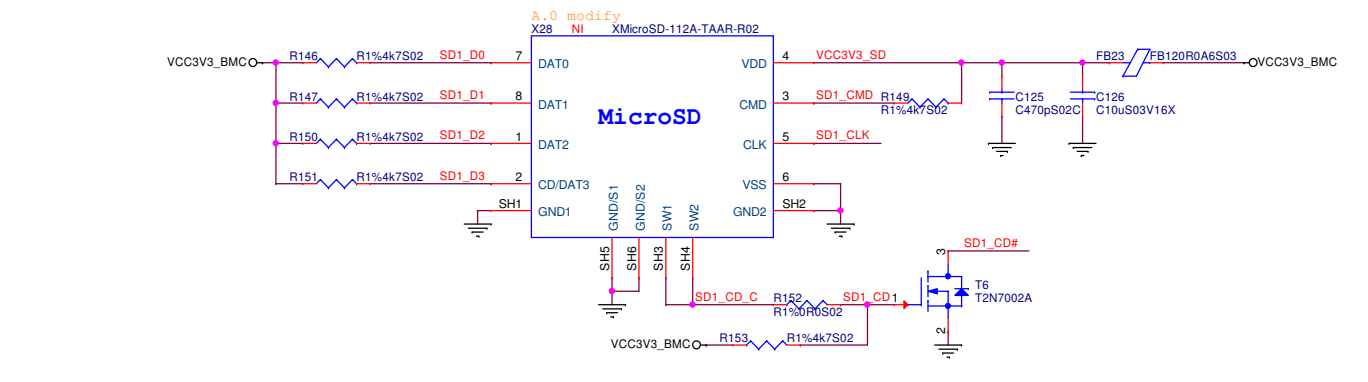
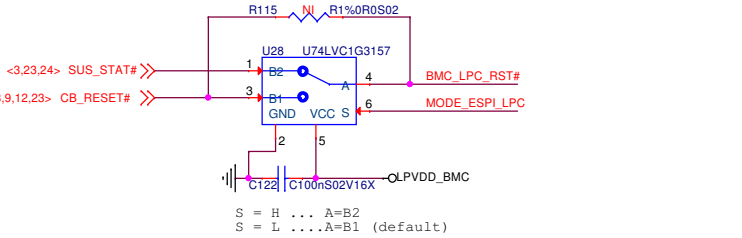
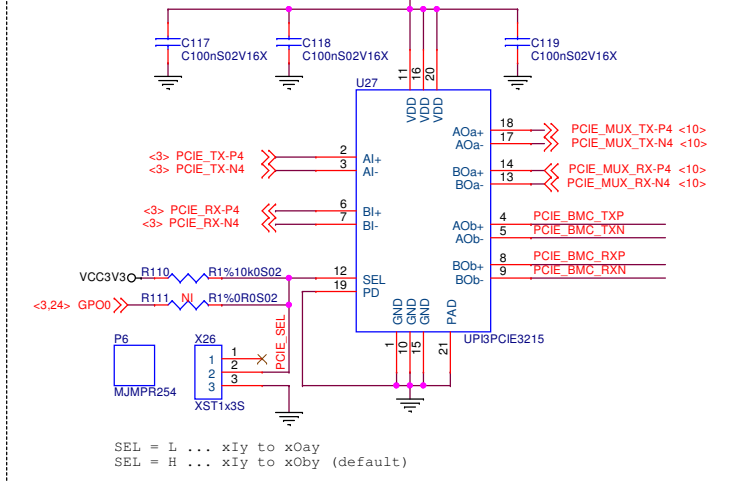
VGA from BMC

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Title: VGA			
Size A3	Document Number DEVA_A0	Created -OrgAddr4-	Rev A.0
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# SH12\_BMC (PCIE/DDR/I2C)

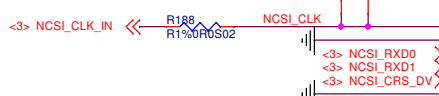
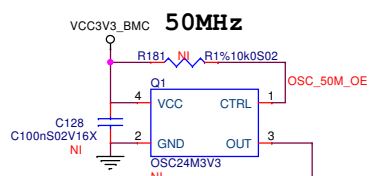
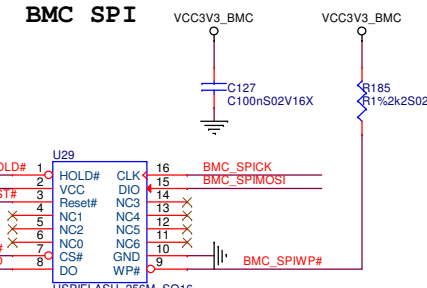
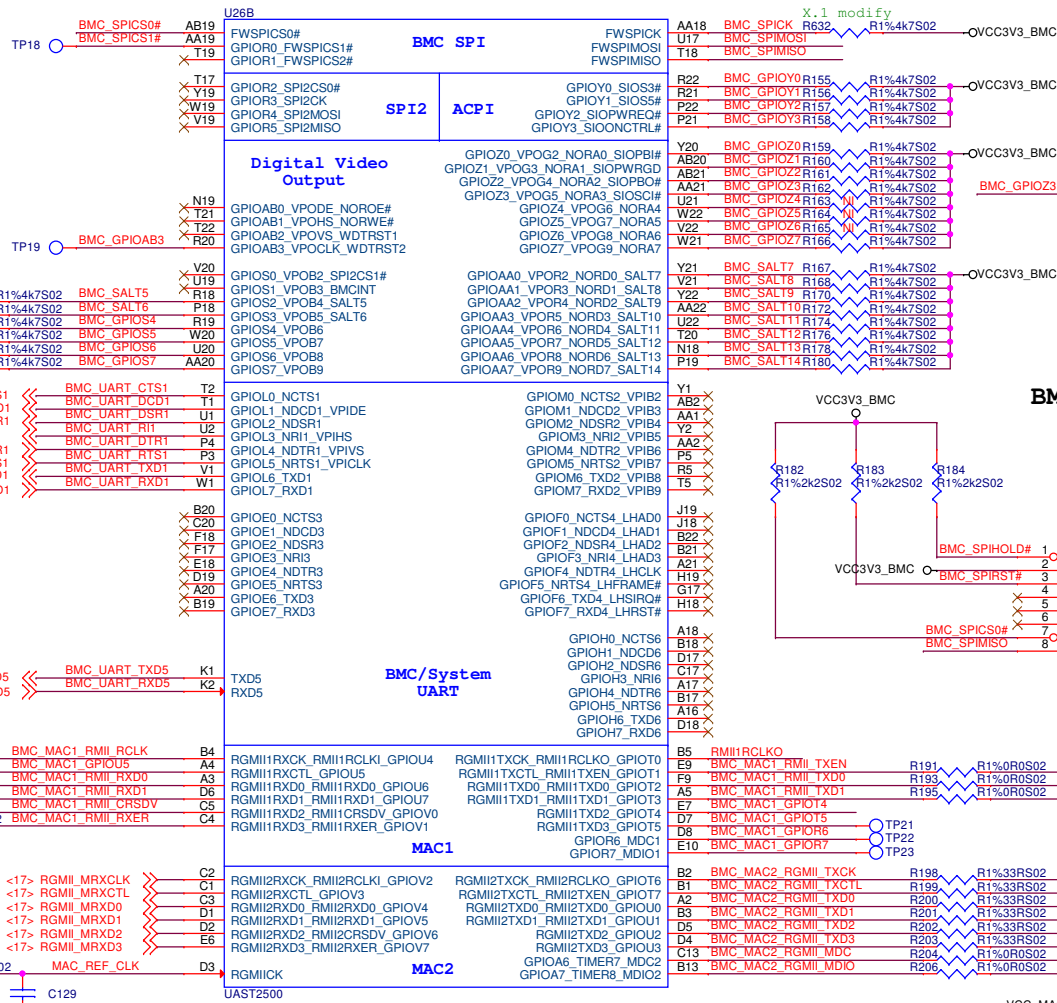


## PCIE P4 MUX



Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title: BMC(PCIE/DDR/I2C)			
Size: A3	Document Number: DEVA_A0	Created: -OrgAddr4-	Rev: A.0
Date: Sunday, April 23, 2017	Sheet: 12	of: 30	

# SH13\_BMC (UART/SPI/MAC)



**Layout Notes:**  
 Maximum routing trace length:  
 MAC2: RGMII (1G/100M/10M bps) interface is 4 inches.

X.1 modify

```

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

SPI 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]

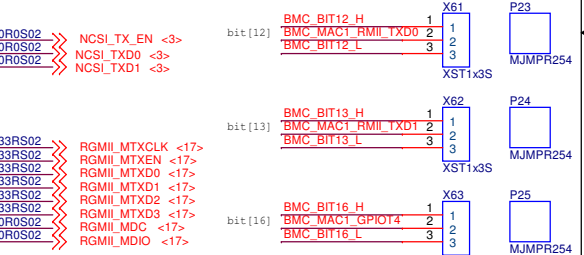
bit[7] MAC#1 interface type
0: RMIH/NCSI 1: RGMII

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
    
```



Pin	Definition	Value = 0	Value = 1
GPIO54	VGA memory size selection	16 MB	64 MB
GPIO55	Reserved	Default	Disallowed
GPIO56	Enable VGA BIOS ROM	No	Yes
GPIO57	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

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 Germany

Title: BMC(UART/SPI/MAC)

Size A3 Document Number DEVA\_A0 Created <OrgAddr> Rev A.0

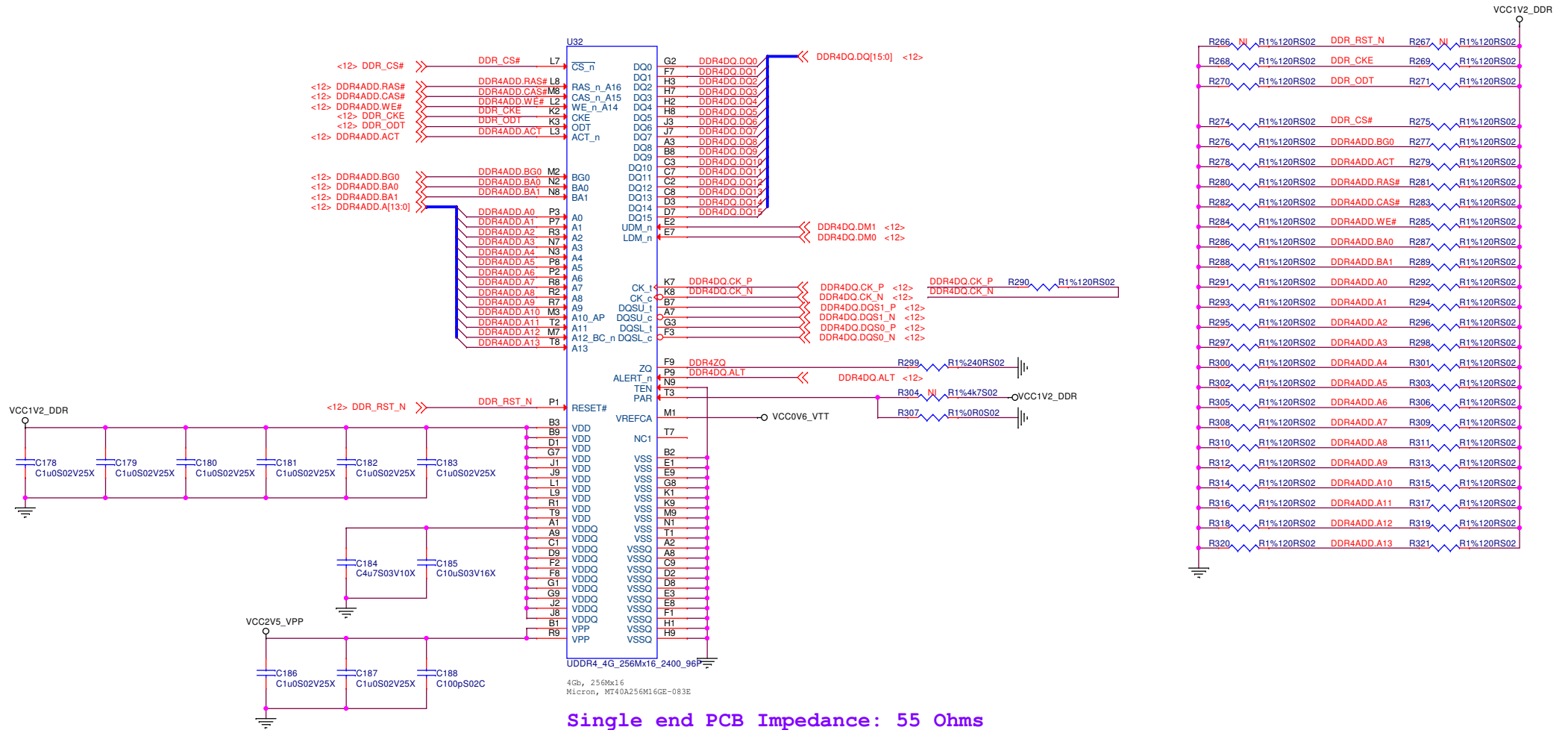
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DDR4 256Mb X16

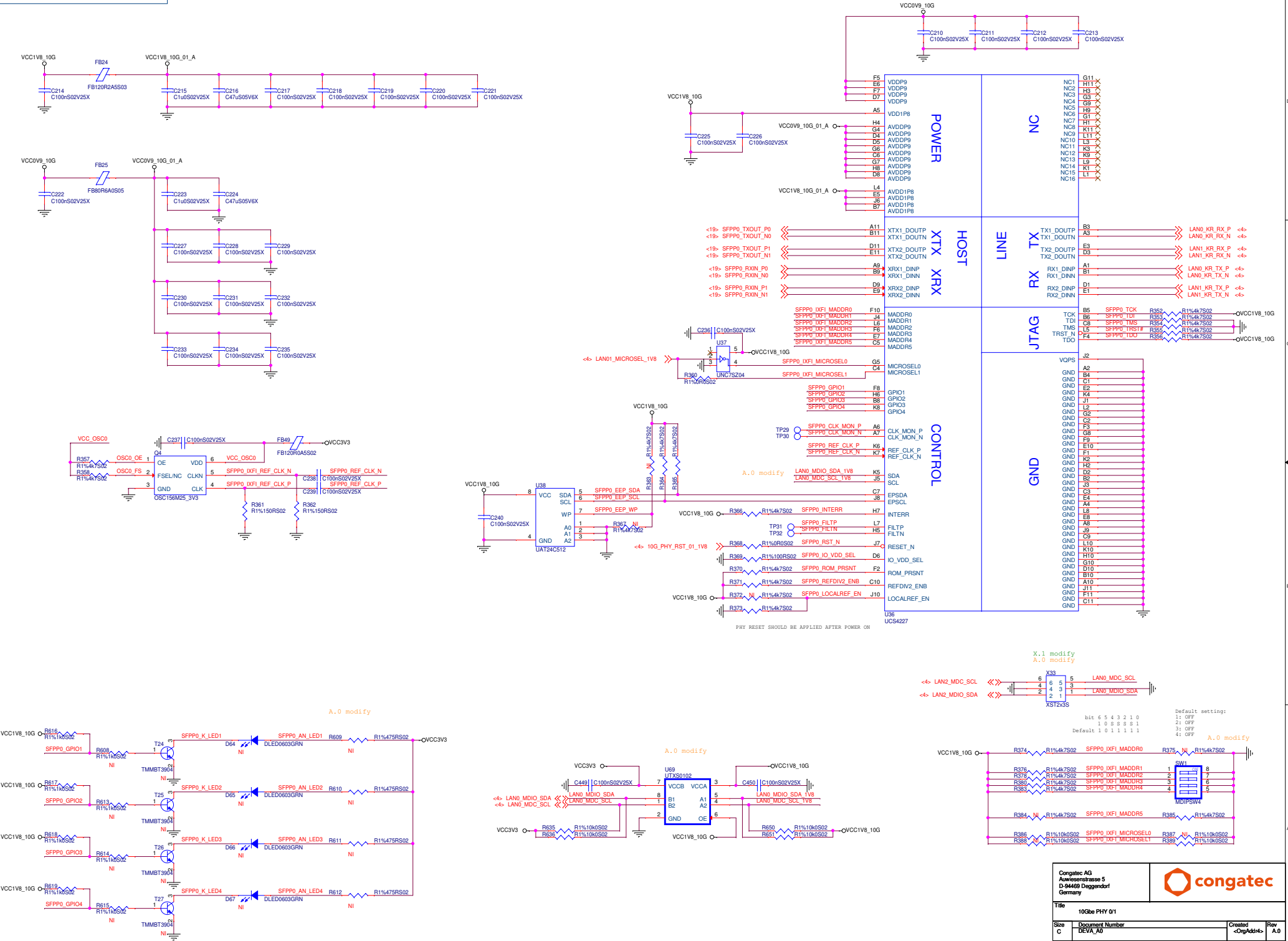


<Core Design>

Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title DDR4 256Mx16			
Size A3	Document Number DEVA_A0	Created <OrgAddr>	Rev A.0
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X.1 modify  
A.0 modify

<< LAN2\_MDC\_SCL >> X33 6 5 5 LAN0\_MDC\_SCL  
<< LAN2\_MIO\_SDA >> 4 4 3 3 LAN0\_MIO\_SDA  
2 1 1 LAN0\_MIO\_SDA

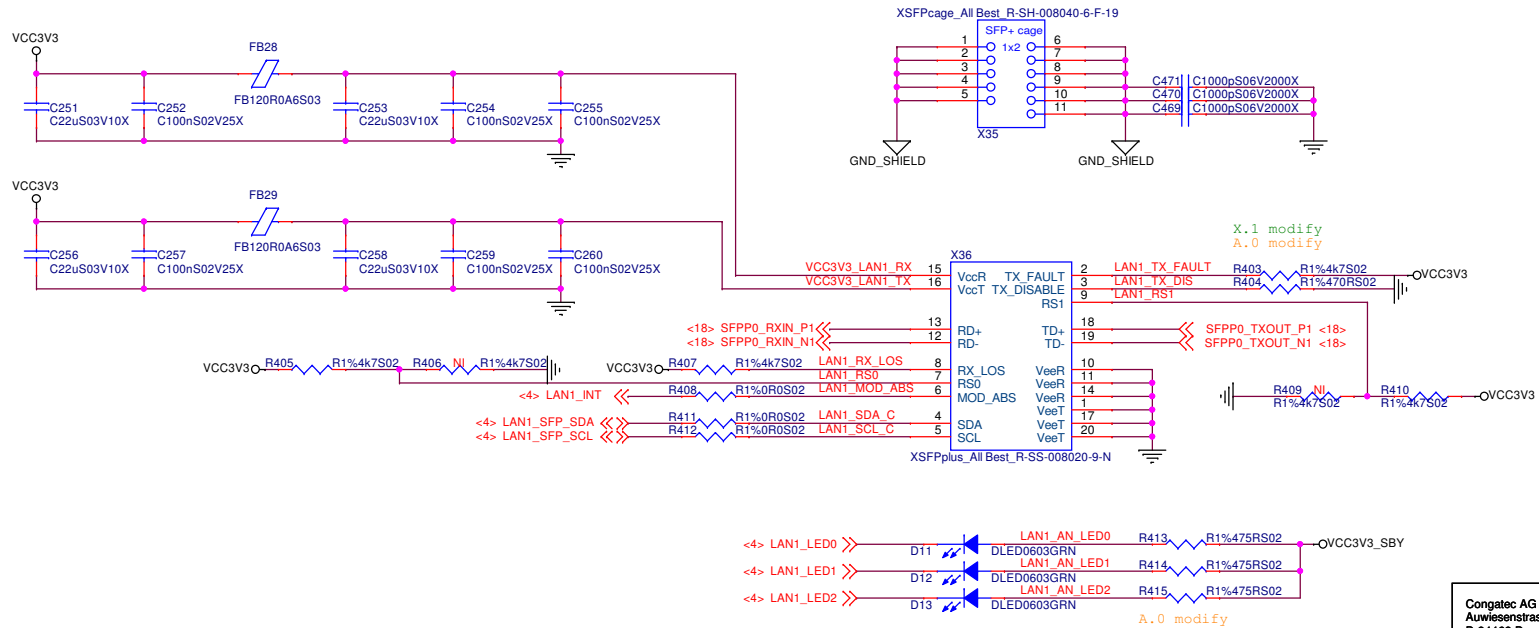
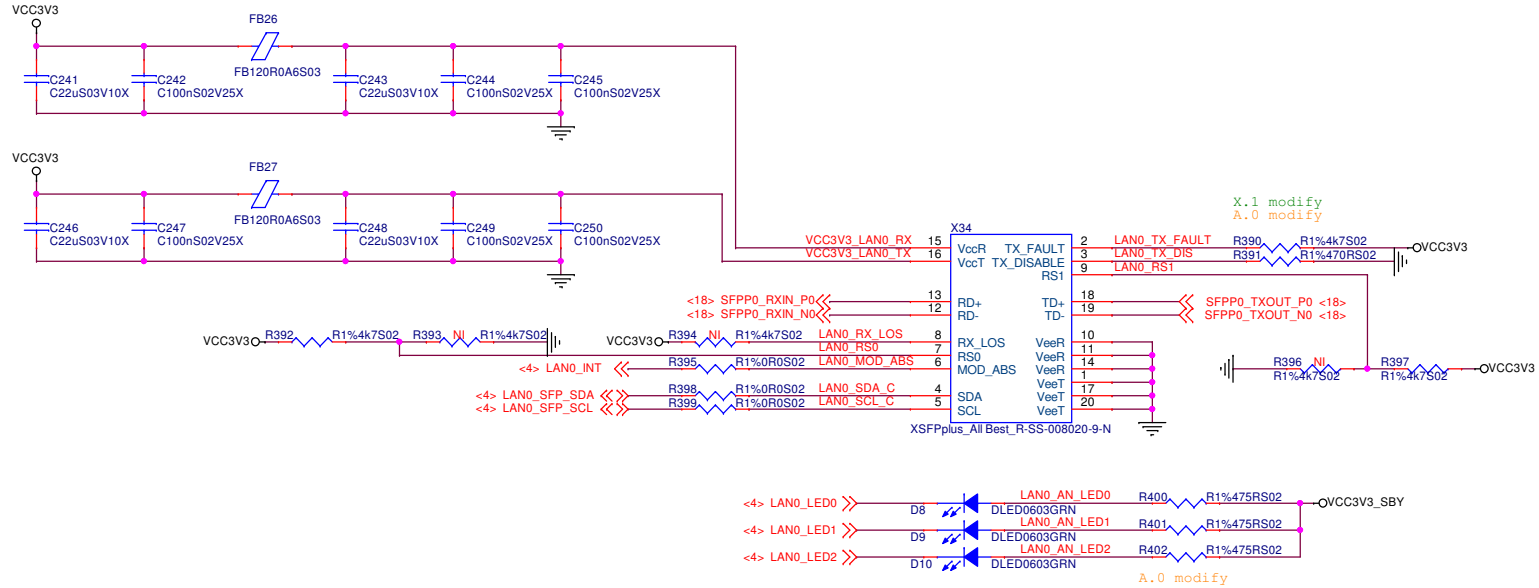
XST2x3s


bit 6 5 4 3 2 1 0  
1: OFF  
2: OFF  
3: OFF  
4: OFF

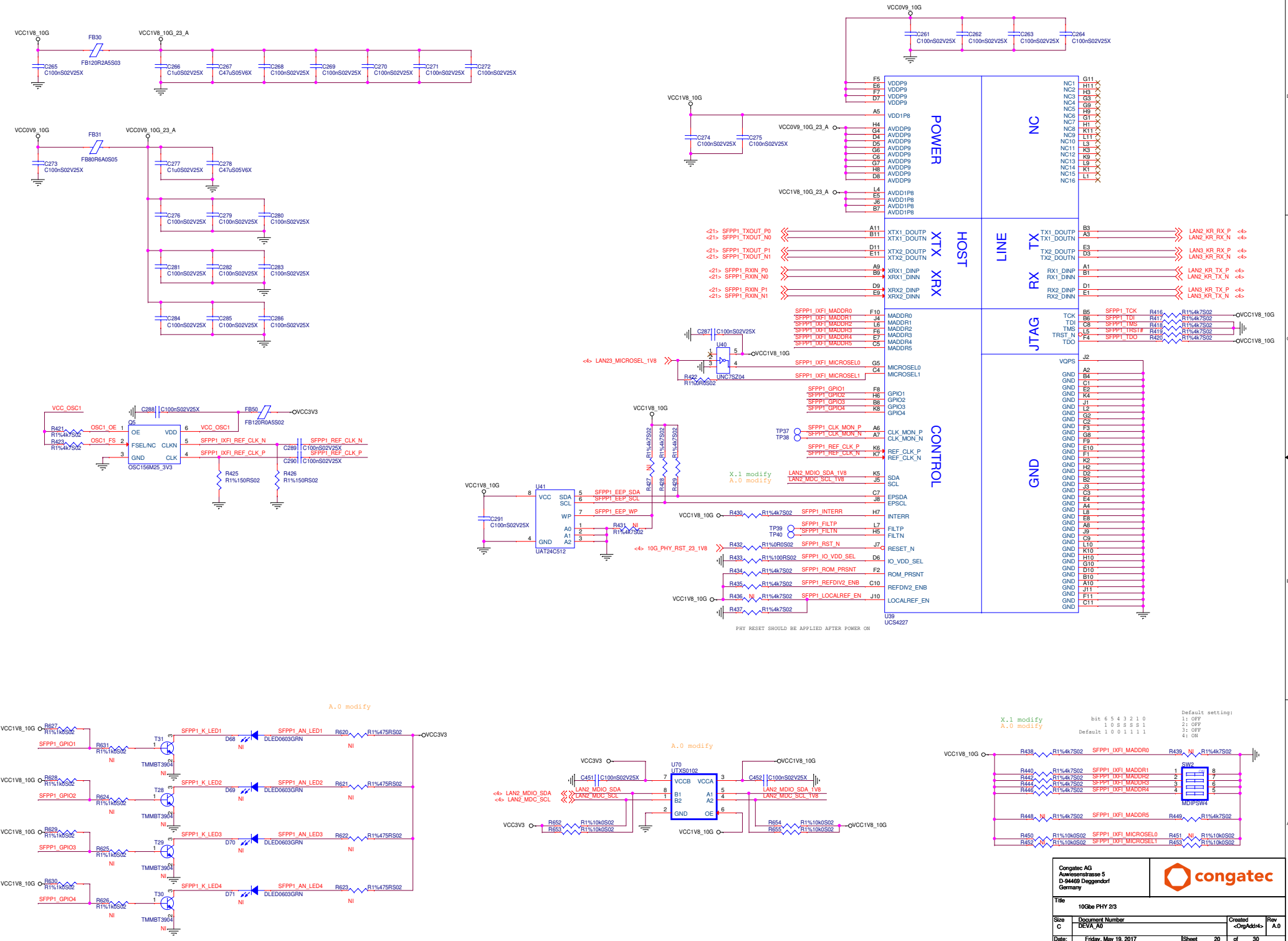
Default setting:  
A.0 modify

# SH19\_10Gbe SFP+ 0/1

CHECK STRAP

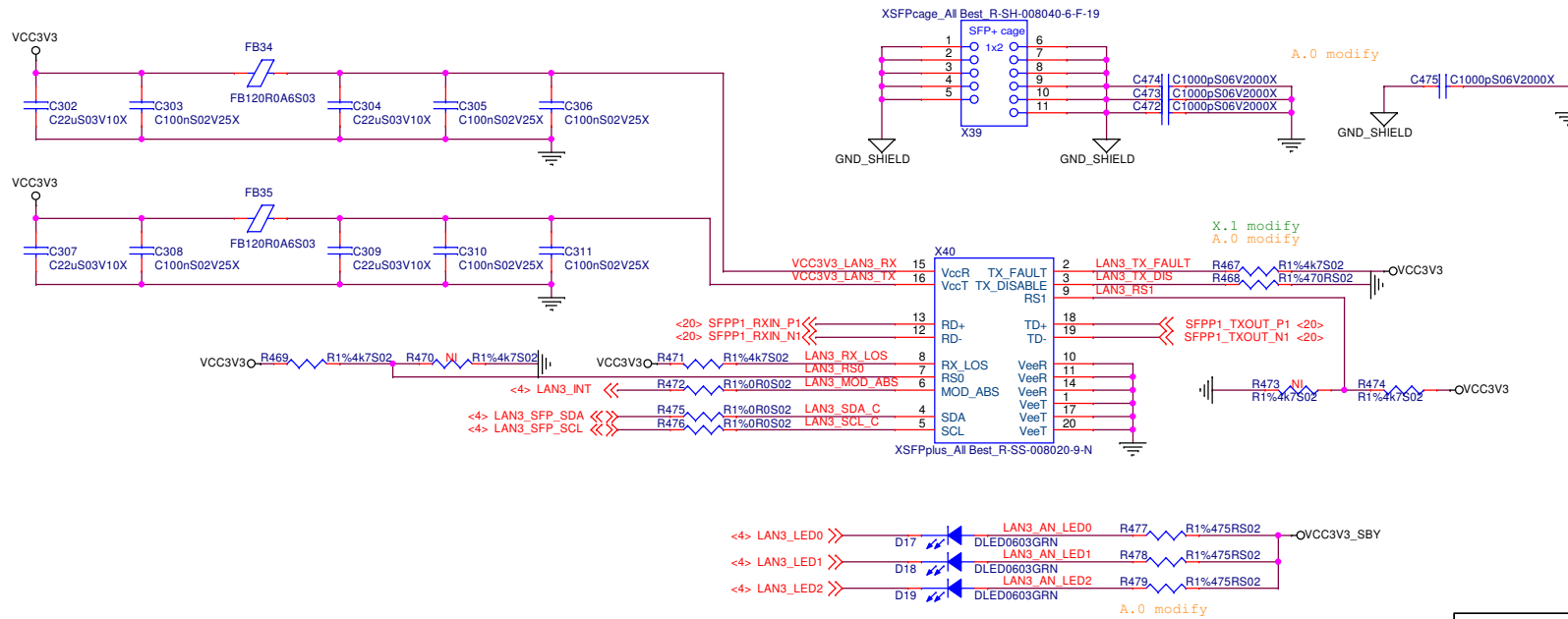
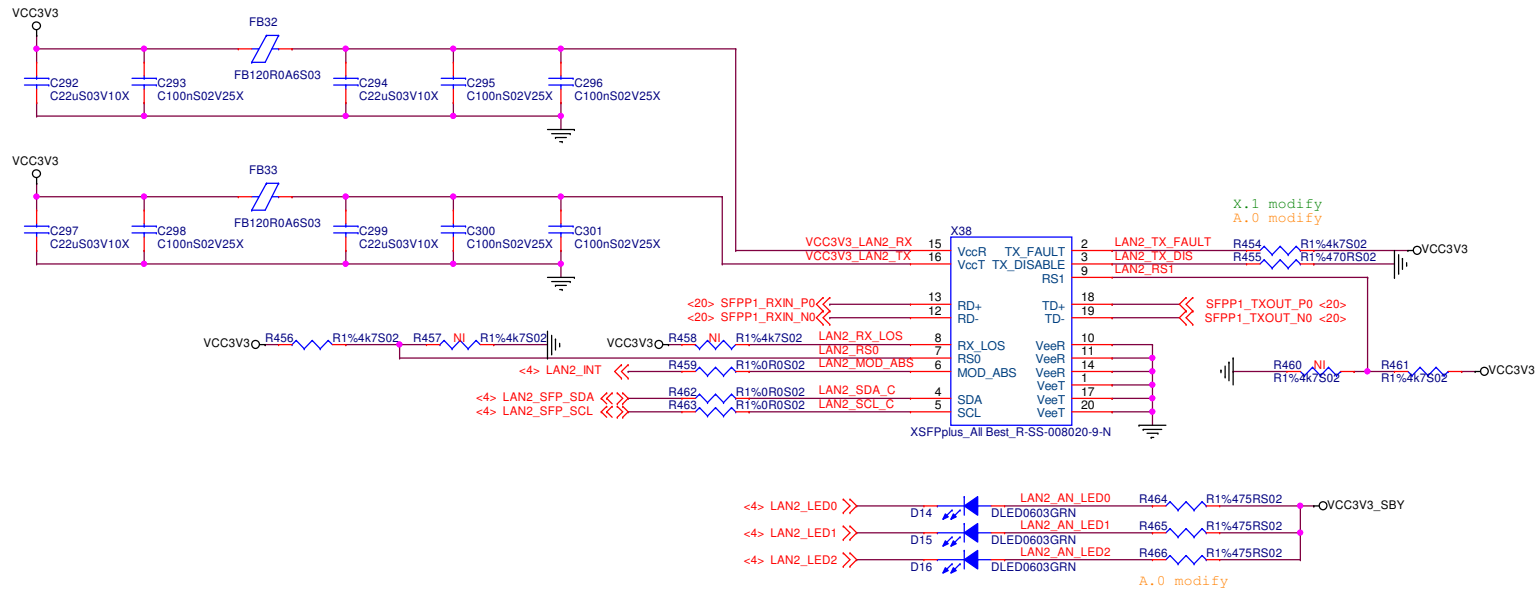



Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title: 10Gbe SFP+ 0/1			
Size: A3	Document Number: DEVA_A0	Created: <OrgAddr>	Rev: A.0
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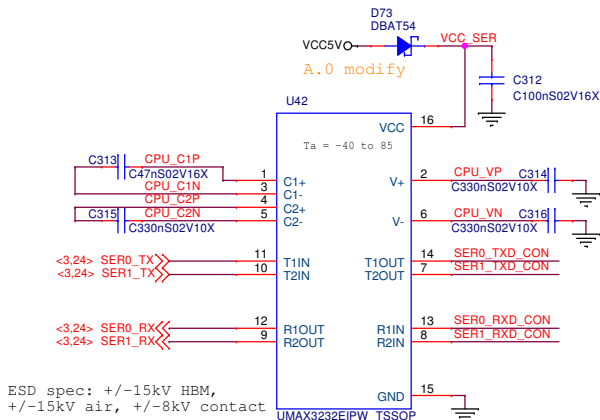


# SH21\_10Gbe SFP+ 2/3

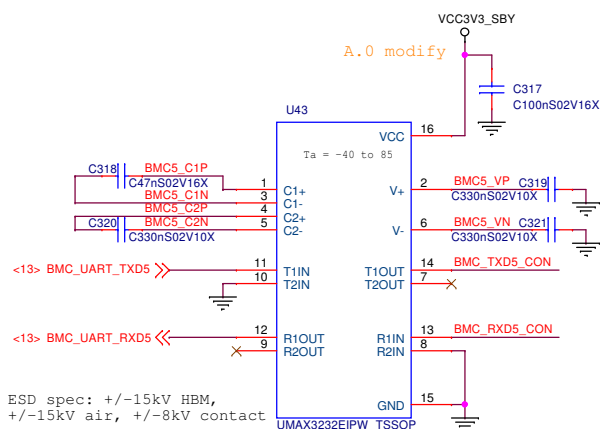
CHECK STRAP



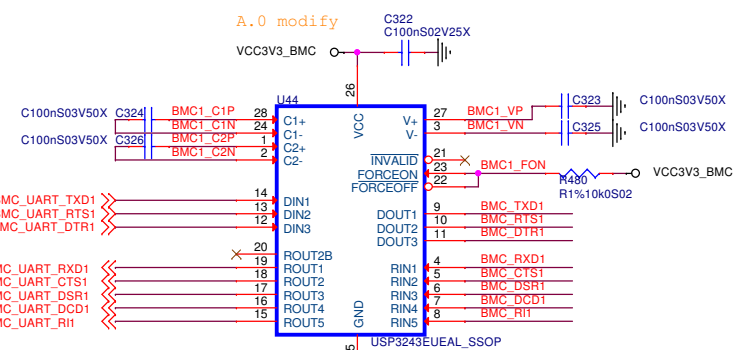
Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title: 10Gbe SFP+ 2/3			
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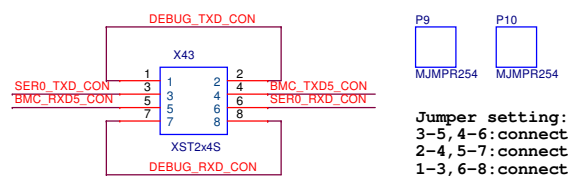
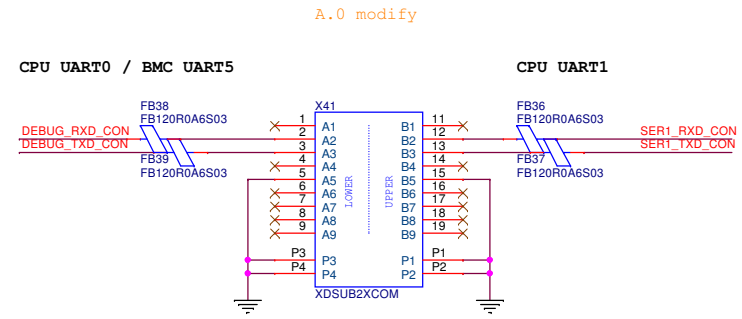
ESD spec: +/-15kV HBM,  
+/-15kV air, +/-8kV contact



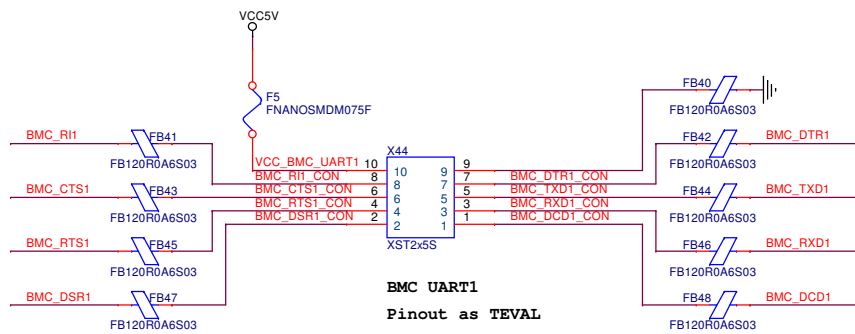
ESD spec: +/-15kV HBM,  
+/-15kV air, +/-8kV contact



ESD spec: +/-15kV HBM,  
+/-15kV air, +/-8kV contact  
Max. Data Rate: 1Mbps



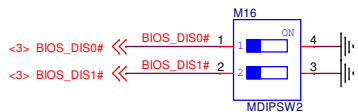
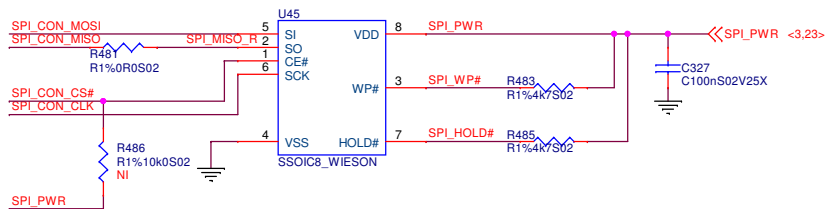
Jumper setting:  
3-5, 4-6: connect CPU and BMC (default)  
2-4, 5-7: connect BMC to DB9  
1-3, 6-8: connect CPU to DB9



BMC UART1  
Pinout as TEVAL

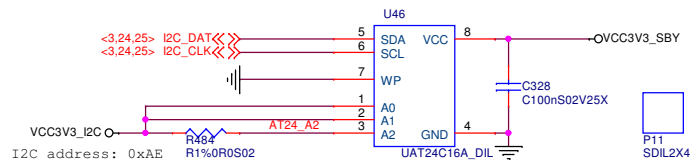
Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title UART			
Size A3	Document Number DEVA_A0	Created -OrgAddr4-	Rev A.0
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SPI BIOS Flash

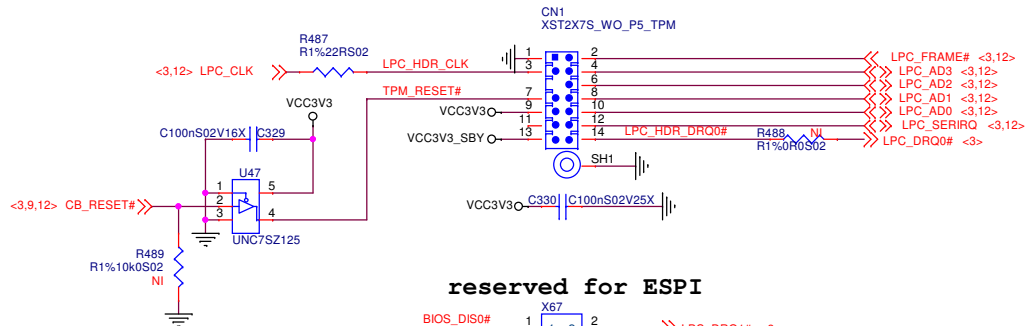


BIOS_DIS1#	BIOS_DIS0#	BIOS ENTRY / SPI_CS#
OFF	OFF	on-module firmware (default)
OFF	ON	carrier FWH (not supported)
ON	OFF	carrier firmware from SPI
ON	ON	on-module firmware, carrier SPI contains management data

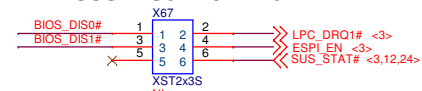
I2C EEPROM



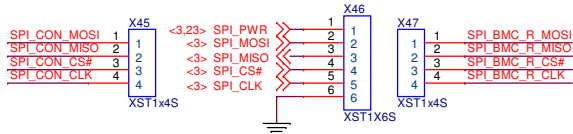
LPC/TPM header



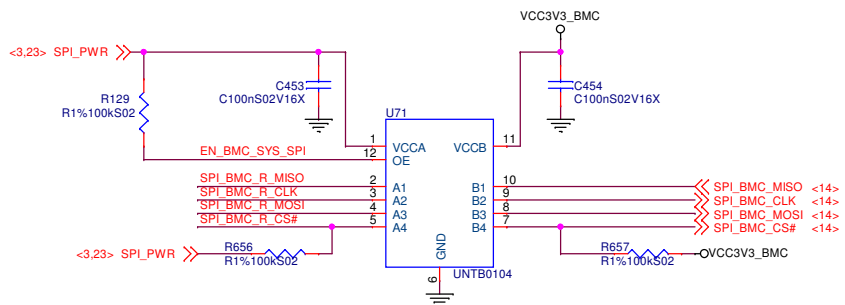
reserved for ESPI



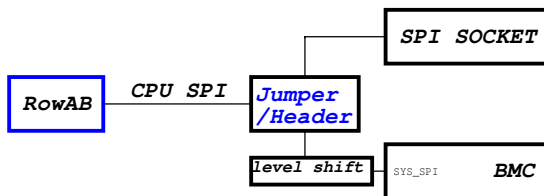
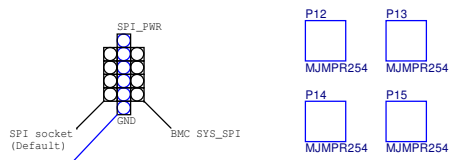
SPI BIOS jumper



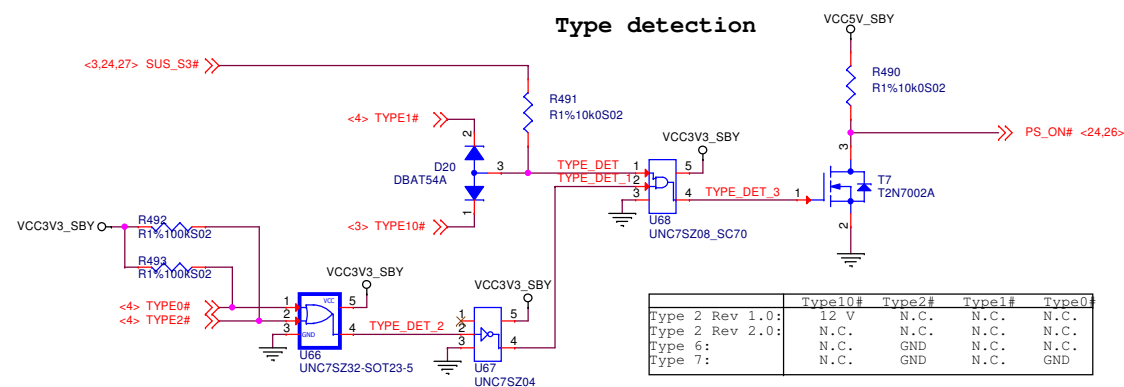
A.0 modify



SPI BIOS jumper placement



Type detection



Type	Rev	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

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 Germany

Title: SPI / I2C / TPM

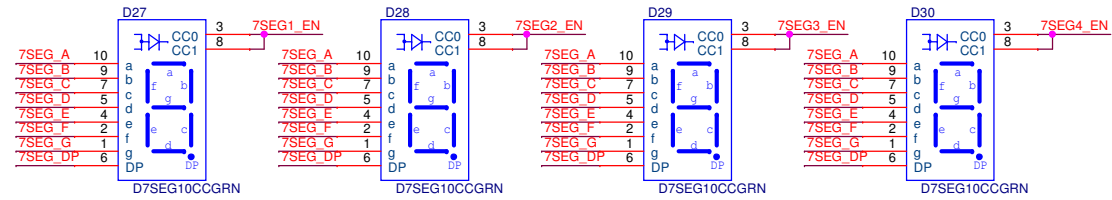
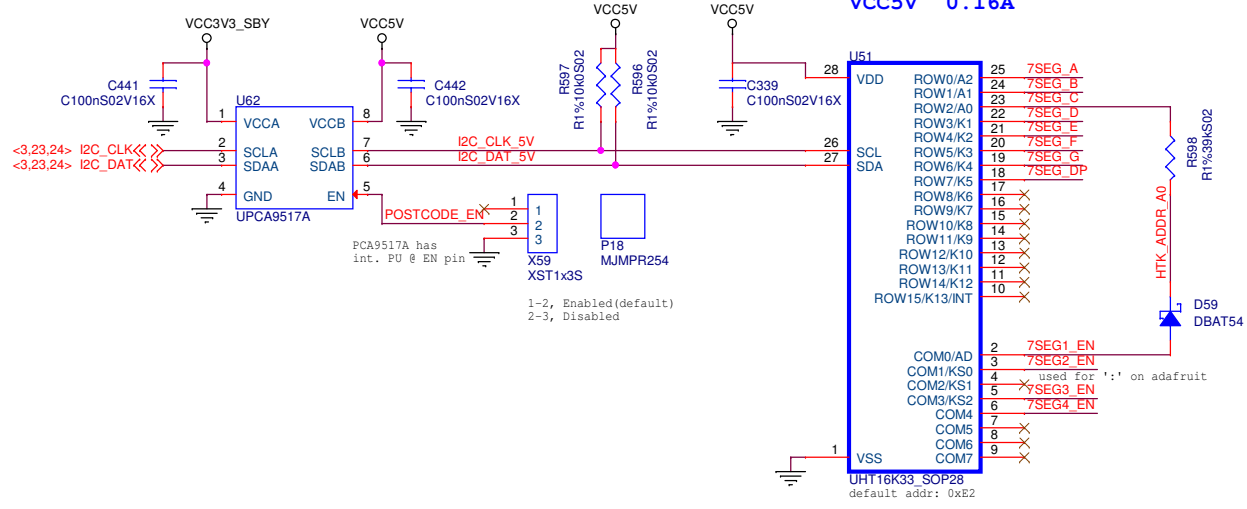
Size A3	Document Number DEVA_A0	Created -OrgAddr#	Rev A.0
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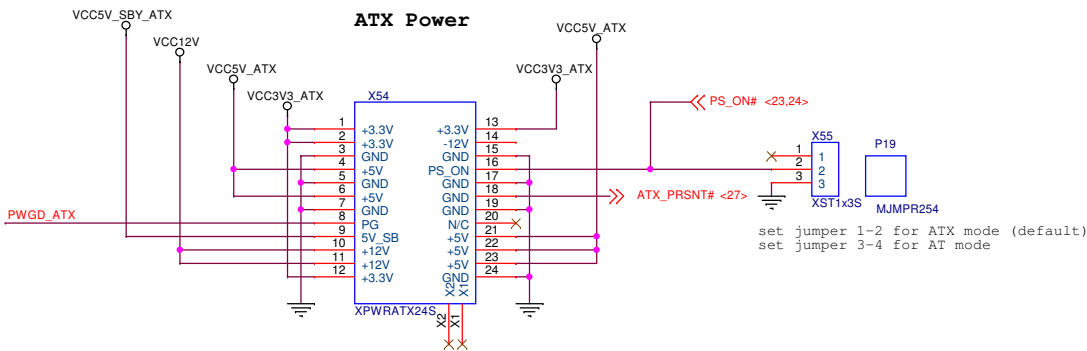
# Postcode Display

VCC5V 0.16A

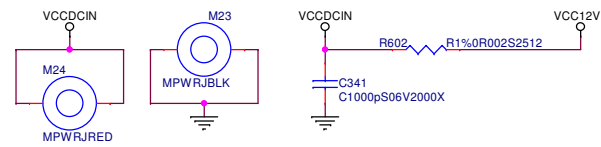


Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title: Post code			
Size B	Document Number: DEVA_A0	Created: <OrgAddr4>	Rev: A.0
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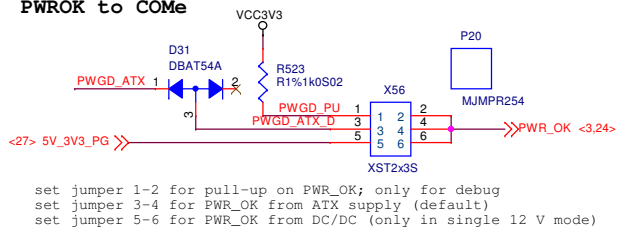
ATX Power



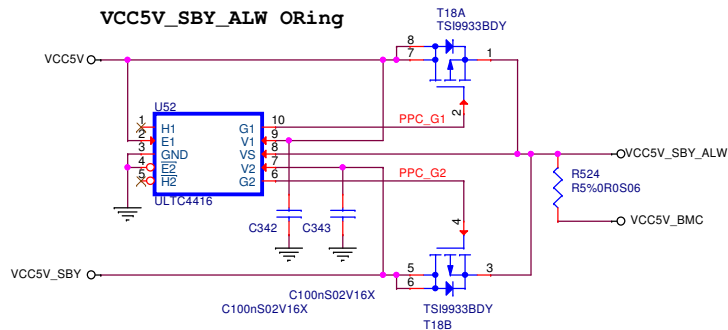
Power In connectors - BANANA JACK



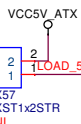
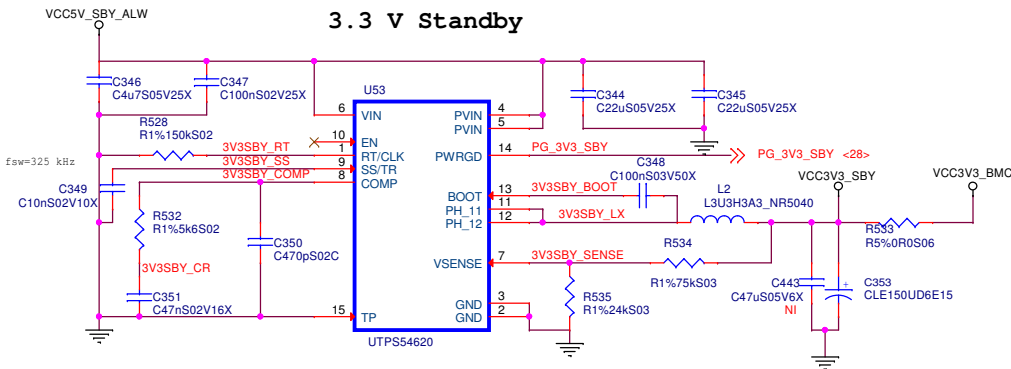
PWROK to COME



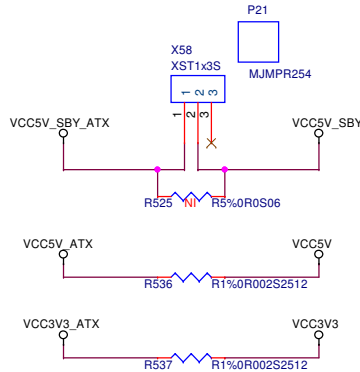
VCC5V\_SBY\_ALW ORing



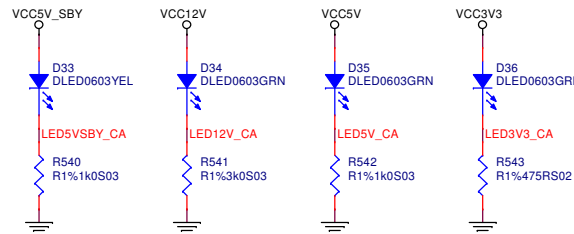
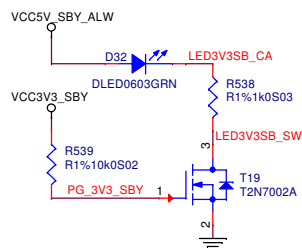
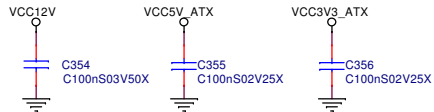
3.3 V Standby



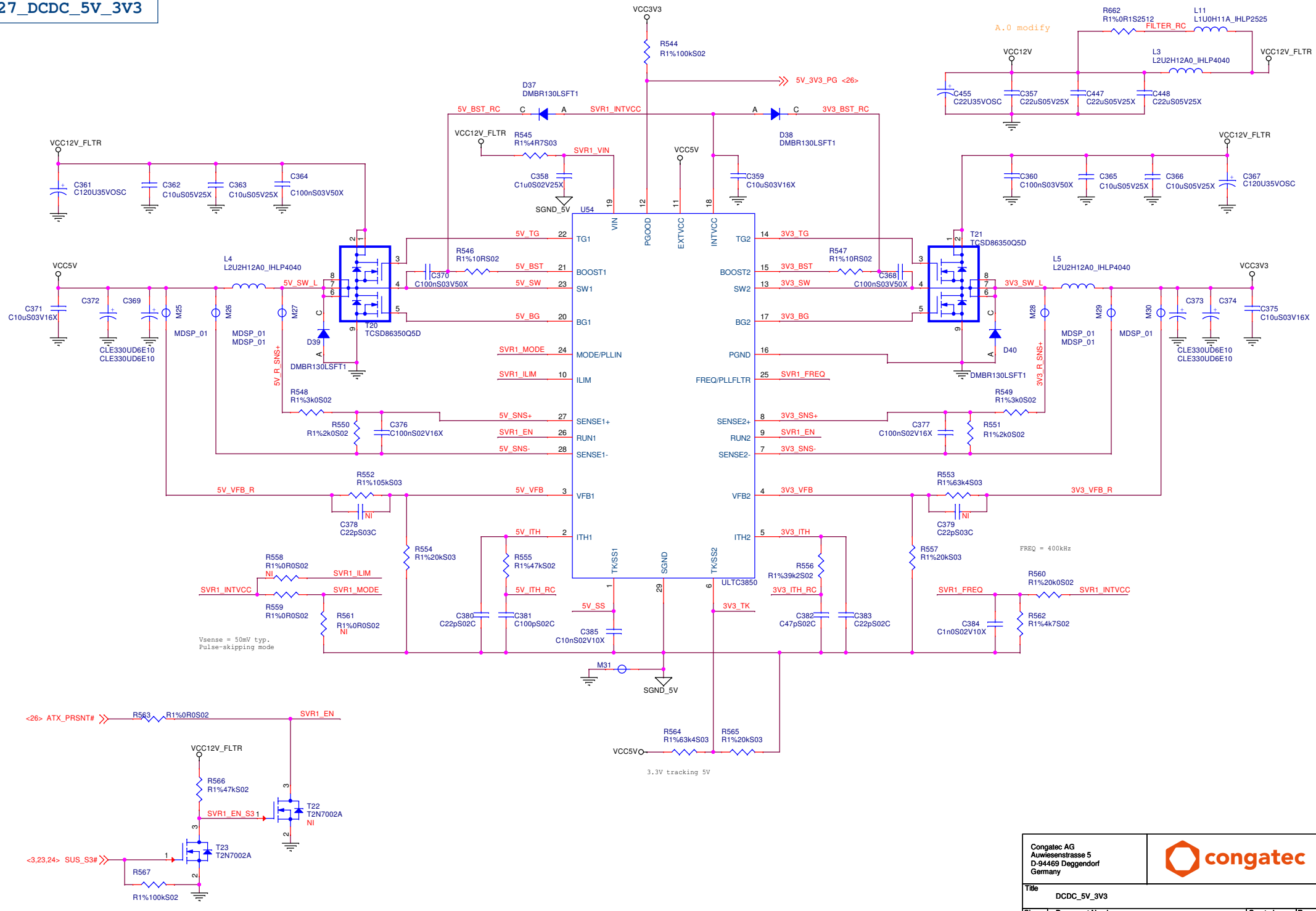
load resistors causing additional 200 mA load current at 5V\_ATX helping ATX PSU to turn on




A.0 modify

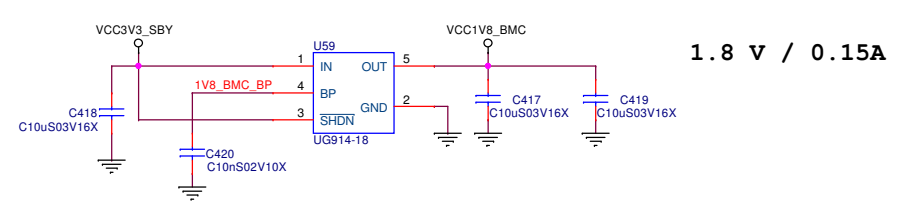
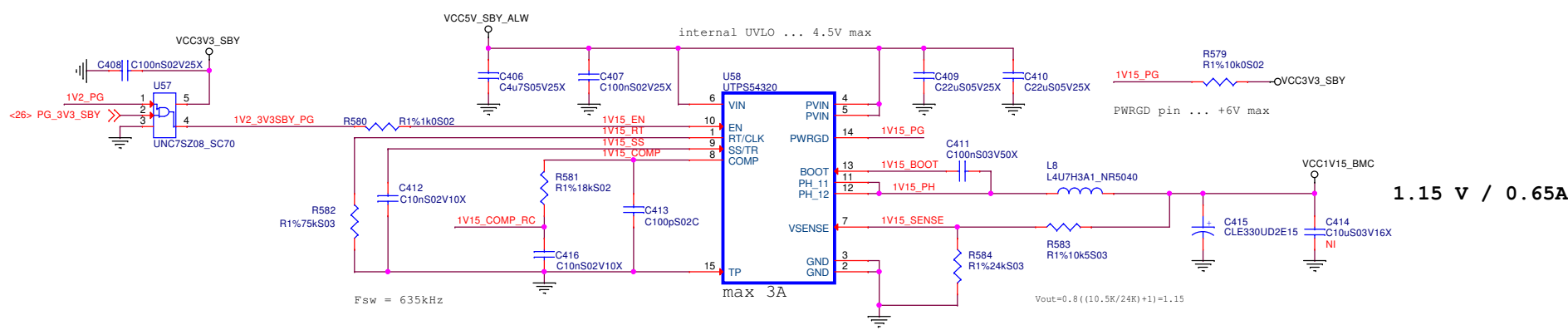
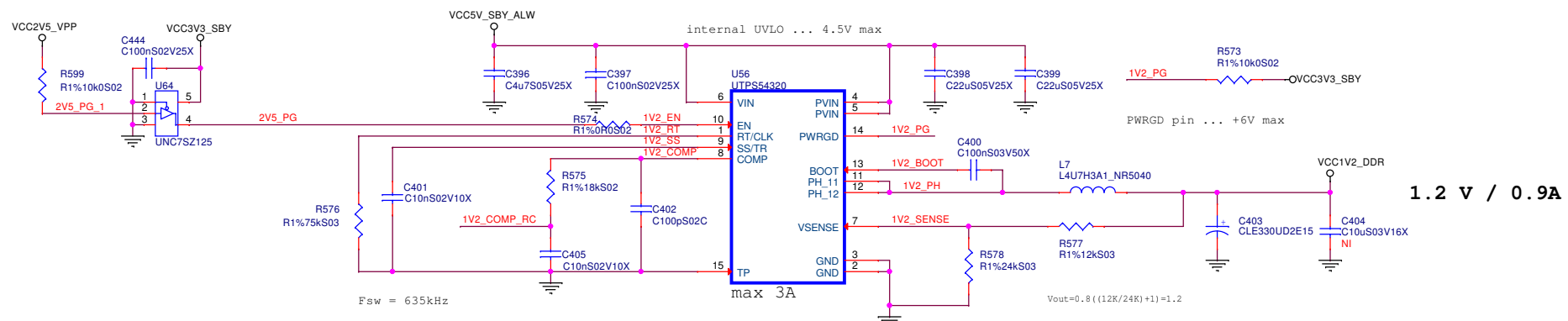
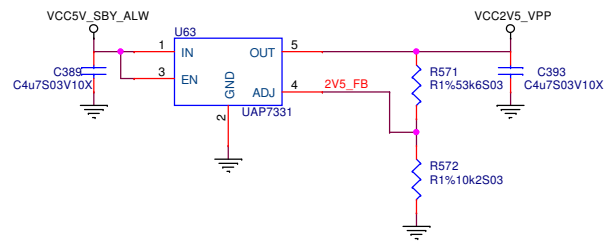


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Title Power / 5VSBY / 3V3SBY			
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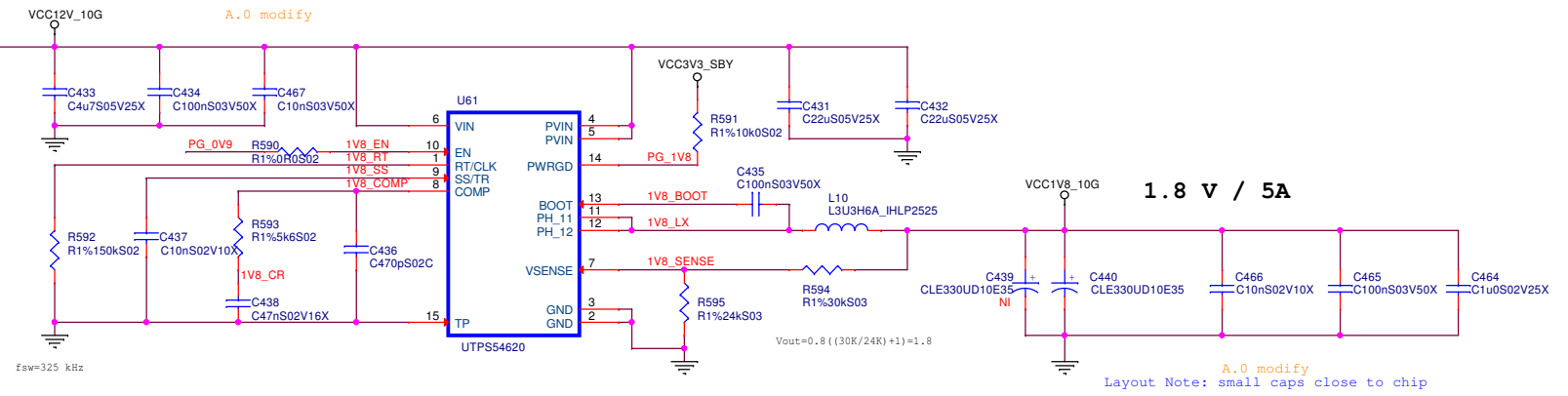
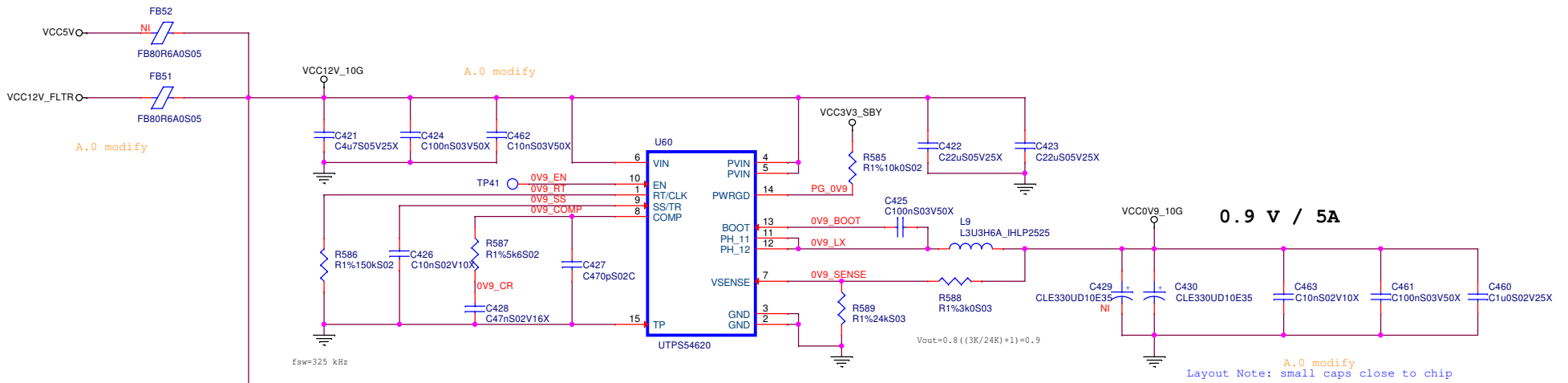


Vsense = 50mV typ.  
Pulse-skipping mode

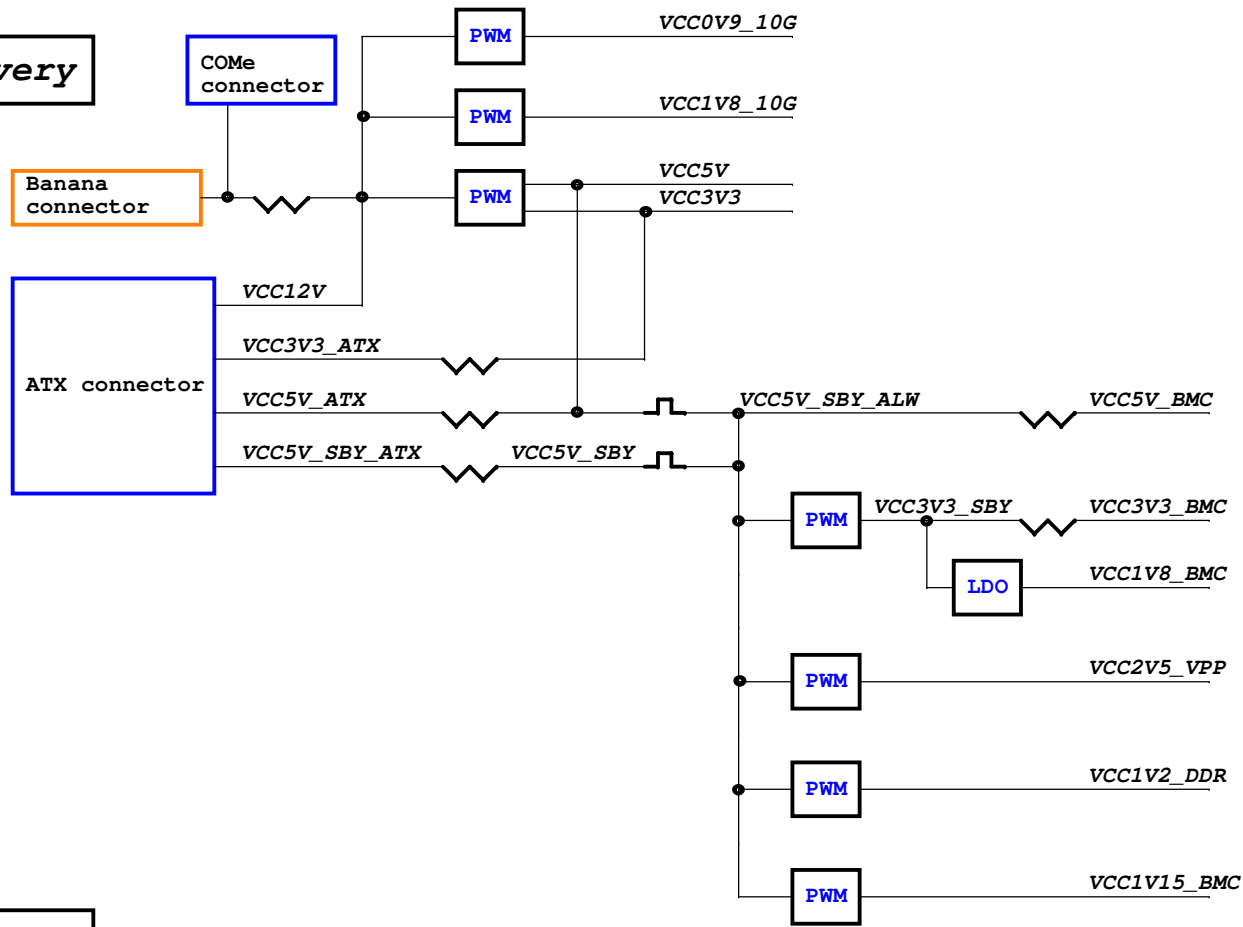
Congatec AG Aulwiesenstrasse 5 D-94469 Deggendorf Germany			
Title: DCDC_5V_3V3			
Size: A3	Document Number: DEVA_AD	Created: -OrgAddr-	Rev: A.0
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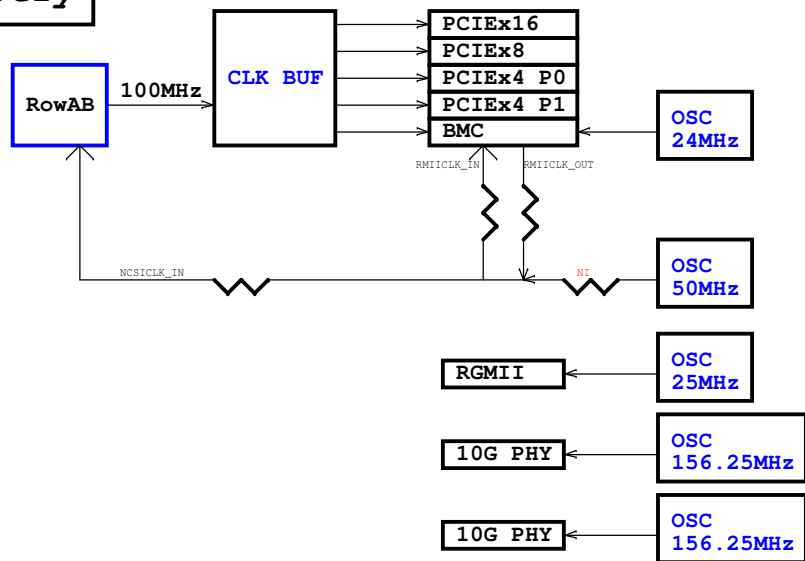
Congatec AG Auwiesenstrasse 5 D-94469 Deggendorf Germany			
Title: DCDC_1V15_2V5_1V2_1V8			
Size A3	Document Number DEVA_A0	Created -OrgAddr-	Rev A.0
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# Power Delivery



# Clock Delivery




## 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 resistors  
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 resistors 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 resistors 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 resistors

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