

# MS-7712

Version : 0B

## CPU :

**INTEL Sandy Bridge-E Processor**

## System Chipset :

**INTEL Patsburg Chipset**

## On Board Chipset :

**VRM 12 -- ISL6366 6 Phase**

**Gigabit LAN -- RTL8111E**

**USB 3.0 -- UPD720200\*2**

**HDA Codec -- Realtek ALC892**

**Super I/O -- F71889AD**

**SPI Flash 64Mb**

## Main Memory :

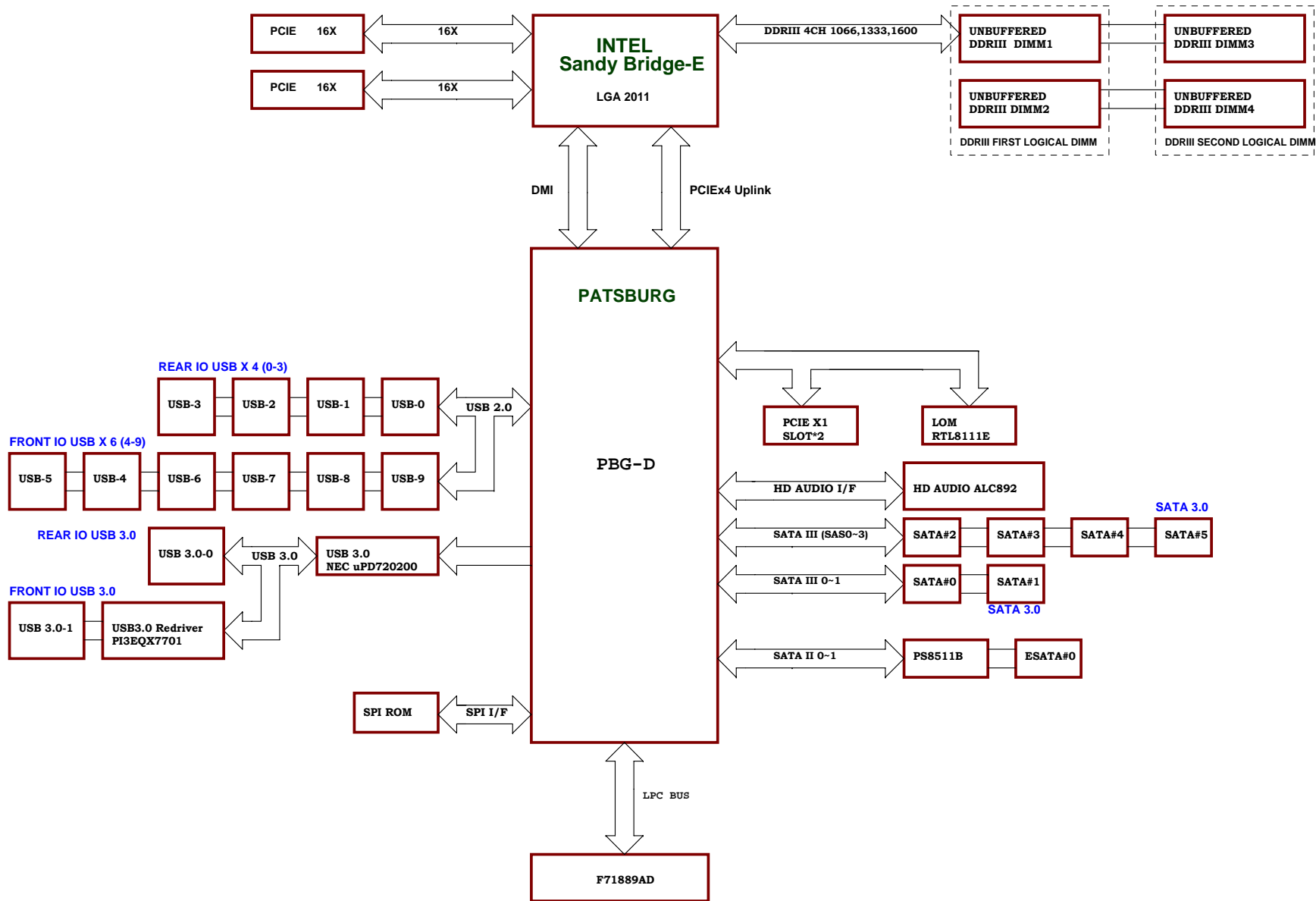
**4 Channel DDR III \* 4 (Max 16GB)**

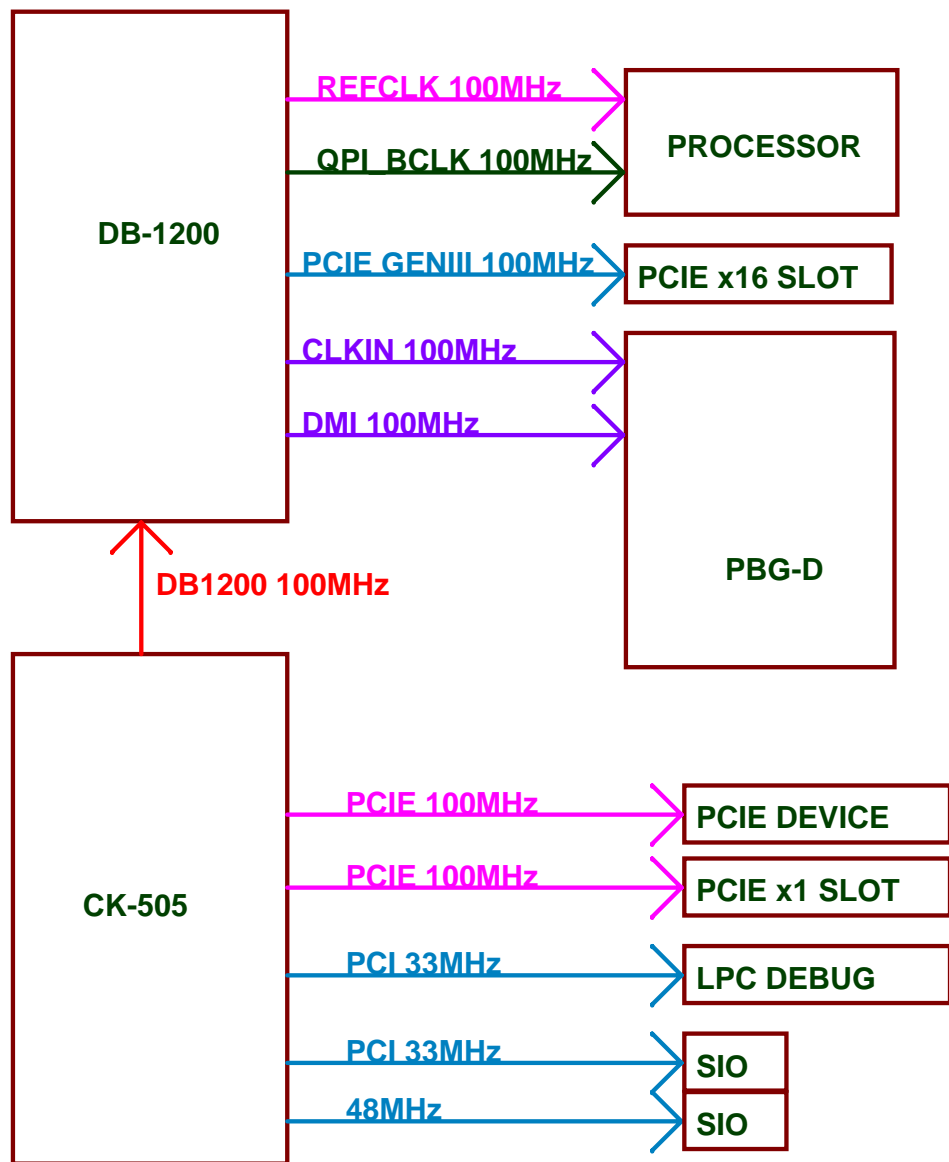
## Expansion Slot :

**PCI Express x16 Slot \* 2**

**PCI Express x1 Slot \* 2**

1	Cover Sheet
2	System Block Diagram
3	Clock Distribution
4	SNB-E MEMORY 1 & 2
5	SNB-E MEMORY 3 & 4
6	SNB-E MEMORY CONTROLLER
7	SNB-E MISC/RESERVED
8	SNB-E PCIE/DMI
9	SNB-E POWER
10	SNB-E GND
11	DDR III DIMM 1 / DIMM 2
12	DDR III DIMM 3 / DIMM 4
13	DDR III DQ VREF
14	PBG-PCIE/USB/DMI/SAS
15	PBG-PCI/SATA
16	PBG-SMB/LPC/AUDIO/RTC
17	PBG-NVRAM
18	PBG-POWER
19	PBG-GND
20	Clock Gen 932SQ420D
21	Clock Buffer DB1200
22	PCIE X16 slot
23	PCIE x1 Slots
24	SIO-Fintek F71889AD
25	Gigabit LAN - RTL8111E
26	USB 3.0 NEC UPD720200
27	ESATA Port
28	SATA Port
29	Audio Codec ALC892
30	FAN Port
31	Front / Rear USB Connectors
32	PBG Core Power
33	DDR Power
34	CPU_VTT
35	VRD12 - ISL6366
36	VSA POWER
37	VCCP POWER
38	CPU Decoupling Caps
39	ATX F_Panel/EMI/LED
40	CPU XDP





11 MEM\_MA\_DATA[63..0] ← MEM\_MA\_DATA[63..0]

MEM_MA_DATA0	CC7	DDR0_DQ_00	CH8	MEM_MA_DQS_H0	MEM_MA_DQS_H0_11
MEM_MA_DATA1	CD8	DDR0_DQ_01	CG7	MEM_MA_DQS_L0	MEM_MA_DQS_L0_11
MEM_MA_DATA2	CK8	DDR0_DQ_02	CF4	MEM_MA_DQS_H1	MEM_MA_DQS_H1_11
MEM_MA_DATA3	CL9	DDR0_DQ_03	CE3	MEM_MA_DQS_L1	MEM_MA_DQS_L1_11
MEM_MA_DATA4	BY6	DDR0_DQ_04	CK14	MEM_MA_DQS_H2	MEM_MA_DQS_H2_11
MEM_MA_DATA5	CA7	DDR0_DQ_05	CH14	MEM_MA_DQS_L2	MEM_MA_DQS_L2_11
MEM_MA_DATA6	CL7	DDR0_DQ_06	CE11	MEM_MA_DQS_H3	MEM_MA_DQS_H3_11
MEM_MA_DATA7	CB4	DDR0_DQ_07	CD10	MEM_MA_DQS_L3	MEM_MA_DQS_L3_11
MEM_MA_DATA8	CB4	DDR0_DQ_08	CC33	MEM_MA_DQS_H4	MEM_MA_DQS_H4_11
MEM_MA_DATA9	CH4	DDR0_DQ_09	CE33	MEM_MA_DQS_L4	MEM_MA_DQS_L4_11
MEM_MA_DATA10	CH4	DDR0_DQ_10	CJ33	MEM_MA_DQS_H5	MEM_MA_DQS_H5_11
MEM_MA_DATA11	CA1	DDR0_DQ_11	CL33	MEM_MA_DQS_L5	MEM_MA_DQS_L5_11
MEM_MA_DATA12	CA3	DDR0_DQ_12	CD40	MEM_MA_DQS_H6	MEM_MA_DQS_H6_11
MEM_MA_DATA13	CG5	DDR0_DQ_13	CB40	MEM_MA_DQS_L6	MEM_MA_DQS_L6_11
MEM_MA_DATA14	CG5	DDR0_DQ_14	CK40	MEM_MA_DQS_H7	MEM_MA_DQS_H7_11
MEM_MA_DATA15	CK12	DDR0_DQ_15	CH40	MEM_MA_DQS_L7	MEM_MA_DQS_L7_11
MEM_MA_DATA16	CM12	DDR0_DQ_16			
MEM_MA_DATA17	CK16	DDR0_DQ_17			
MEM_MA_DATA18	CM16	DDR0_DQ_18			
MEM_MA_DATA19	CG13	DDR0_DQ_19			
MEM_MA_DATA20	CL11	DDR0_DQ_20			
MEM_MA_DATA21	CL15	DDR0_DQ_21			
MEM_MA_DATA22	BY10	DDR0_DQ_22			
MEM_MA_DATA23	CB12	DDR0_DQ_23			
MEM_MA_DATA24	CB12	DDR0_DQ_24			
MEM_MA_DATA25	BY9	DDR0_DQ_25			
MEM_MA_DATA26	CA9	DDR0_DQ_26			
MEM_MA_DATA27	CH10	DDR0_DQ_27			
MEM_MA_DATA28	CF10	DDR0_DQ_28			
MEM_MA_DATA29	CE31	DDR0_DQ_29			
MEM_MA_DATA30	CE31	DDR0_DQ_30			
MEM_MA_DATA31	CL13	DDR0_DQ_31			
MEM_MA_DATA32	CL13	DDR0_DQ_32			
MEM_MA_DATA33	CB18	DDR0_DQ_33			
MEM_MA_DATA34	CC11	DDR0_DQ_34			
MEM_MA_DATA35	CC32	DDR0_DQ_35			
MEM_MA_DATA36	CB32	DDR0_DQ_36			
MEM_MA_DATA37	CB32	DDR0_DQ_37			
MEM_MA_DATA38	CB32	DDR0_DQ_38			
MEM_MA_DATA39	CB32	DDR0_DQ_39			
MEM_MA_DATA40	CK32	DDR0_DQ_40			
MEM_MA_DATA41	CH32	DDR0_DQ_41			
MEM_MA_DATA42	CK32	DDR0_DQ_42			
MEM_MA_DATA43	CH32	DDR0_DQ_43			
MEM_MA_DATA44	CK30	DDR0_DQ_44			
MEM_MA_DATA45	CH30	DDR0_DQ_45			
MEM_MA_DATA46	CK34	DDR0_DQ_46			
MEM_MA_DATA47	CH34	DDR0_DQ_47			
MEM_MA_DATA48	CB38	DDR0_DQ_48			
MEM_MA_DATA49	CD38	DDR0_DQ_49			
MEM_MA_DATA50	CE41	DDR0_DQ_50			
MEM_MA_DATA51	CD42	DDR0_DQ_51			
MEM_MA_DATA52	CC47	DDR0_DQ_52			
MEM_MA_DATA53	CE47	DDR0_DQ_53			
MEM_MA_DATA54	CC41	DDR0_DQ_54			
MEM_MA_DATA55	CB42	DDR0_DQ_55			
MEM_MA_DATA56	CH38	DDR0_DQ_56			
MEM_MA_DATA57	CK38	DDR0_DQ_57			
MEM_MA_DATA58	CH42	DDR0_DQ_58			
MEM_MA_DATA59	CK42	DDR0_DQ_59			
MEM_MA_DATA60	CJ37	DDR0_DQ_60			
MEM_MA_DATA61	CL37	DDR0_DQ_61			
MEM_MA_DATA62	CJ41	DDR0_DQ_62			
MEM_MA_DATA63	CL41	DDR0_DQ_63			

CE15  
CC15  
CH18  
CF18  
CB14  
CD14  
CG17  
CK18

SNB-E

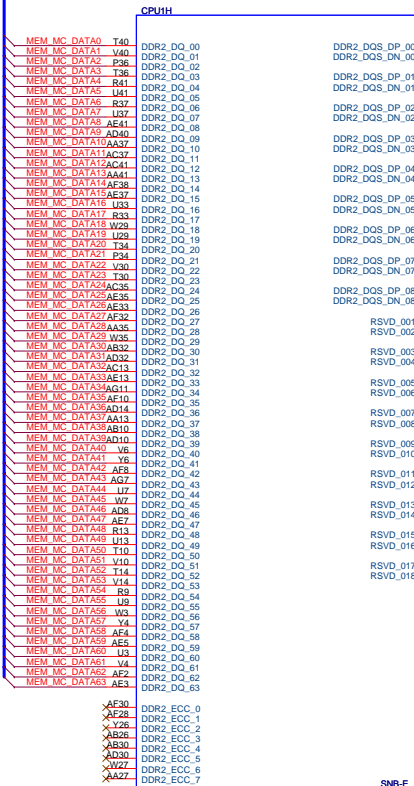
11 MEM\_MB\_DATA[63..0] ← MEM\_MB\_DATA[63..0]

MEM_MB_DATA0	CP4	DDR1_DQ_00	CR3	MEM_MB_DQS_H0	MEM_MB_DQS_H0_11
MEM_MB_DATA1	CP2	DDR1_DQ_01	CT4	MEM_MB_DQS_L0	MEM_MB_DQS_L0_11
MEM_MB_DATA2	CV4	DDR1_DQ_02	DE9	MEM_MB_DQS_H1	MEM_MB_DQS_H1_11
MEM_MB_DATA3	CV4	DDR1_DQ_03	DC9	MEM_MB_DQS_L1	MEM_MB_DQS_L1_11
MEM_MB_DATA4	CM4	DDR1_DQ_04	CU9	MEM_MB_DQS_H2	MEM_MB_DQS_H2_11
MEM_MB_DATA5	CV2	DDR1_DQ_05	CV8	MEM_MB_DQS_L2	MEM_MB_DQS_L2_11
MEM_MB_DATA6	CV2	DDR1_DQ_06	CU15	MEM_MB_DQS_H3	MEM_MB_DQS_H3_11
MEM_MB_DATA7	DA7	DDR1_DQ_07	CR15	MEM_MB_DQS_L3	MEM_MB_DQS_L3_11
MEM_MB_DATA8	DA7	DDR1_DQ_08	CP32	MEM_MB_DQS_H4	MEM_MB_DQS_H4_11
MEM_MB_DATA9	DC7	DDR1_DQ_09	CT32	MEM_MB_DQS_L4	MEM_MB_DQS_L4_11
MEM_MB_DATA10	DE11	DDR1_DQ_10	DB34	MEM_MB_DQS_H5	MEM_MB_DQS_H5_11
MEM_MB_DATA11	DE11	DDR1_DQ_11	CU34	MEM_MB_DQS_L5	MEM_MB_DQS_L5_11
MEM_MB_DATA12	CV6	DDR1_DQ_12	CU38	MEM_MB_DQS_H6	MEM_MB_DQS_H6_11
MEM_MB_DATA13	DB6	DDR1_DQ_13	CB38	MEM_MB_DQS_L6	MEM_MB_DQS_L6_11
MEM_MB_DATA14	DB10	DDR1_DQ_14	DC38	MEM_MB_DQS_H7	MEM_MB_DQS_H7_11
MEM_MB_DATA15	DB10	DDR1_DQ_15	DE38	MEM_MB_DQS_L7	MEM_MB_DQS_L7_11
MEM_MB_DATA16	CV7	DDR1_DQ_16			
MEM_MB_DATA17	CV7	DDR1_DQ_17			
MEM_MB_DATA18	CP10	DDR1_DQ_18			
MEM_MB_DATA19	CP10	DDR1_DQ_19			
MEM_MB_DATA20	CP6	DDR1_DQ_20			
MEM_MB_DATA21	CV9	DDR1_DQ_21			
MEM_MB_DATA22	CR13	DDR1_DQ_22			
MEM_MB_DATA23	CU13	DDR1_DQ_23			
MEM_MB_DATA24	CR17	DDR1_DQ_24			
MEM_MB_DATA25	CU17	DDR1_DQ_25			
MEM_MB_DATA26	CU17	DDR1_DQ_26			
MEM_MB_DATA27	CV12	DDR1_DQ_27			
MEM_MB_DATA28	CV16	DDR1_DQ_28			
MEM_MB_DATA29	CV16	DDR1_DQ_29			
MEM_MB_DATA30	CV16	DDR1_DQ_30			
MEM_MB_DATA31	CV16	DDR1_DQ_31			
MEM_MB_DATA32	CV16	DDR1_DQ_32			
MEM_MB_DATA33	CP30	DDR1_DQ_33			
MEM_MB_DATA34	CT34	DDR1_DQ_34			
MEM_MB_DATA35	CP24	DDR1_DQ_35			
MEM_MB_DATA36	CU29	DDR1_DQ_36			
MEM_MB_DATA37	CR29	DDR1_DQ_37			
MEM_MB_DATA38	CU33	DDR1_DQ_38			
MEM_MB_DATA39	CR33	DDR1_DQ_39			
MEM_MB_DATA40	DA33	DDR1_DQ_40			
MEM_MB_DATA41	DD32	DDR1_DQ_41			
MEM_MB_DATA42	DC35	DDR1_DQ_42			
MEM_MB_DATA43	DA36	DDR1_DQ_43			
MEM_MB_DATA44	DA31	DDR1_DQ_44			
MEM_MB_DATA45	CV32	DDR1_DQ_45			
MEM_MB_DATA46	DE34	DDR1_DQ_46			
MEM_MB_DATA47	DE36	DDR1_DQ_47			
MEM_MB_DATA48	CR37	DDR1_DQ_48			
MEM_MB_DATA49	CU37	DDR1_DQ_49			
MEM_MB_DATA50	CR41	DDR1_DQ_50			
MEM_MB_DATA51	CU41	DDR1_DQ_51			
MEM_MB_DATA52	CT36	DDR1_DQ_52			
MEM_MB_DATA53	CV36	DDR1_DQ_53			
MEM_MB_DATA54	CT40	DDR1_DQ_54			
MEM_MB_DATA55	CV40	DDR1_DQ_55			
MEM_MB_DATA56	DE37	DDR1_DQ_56			
MEM_MB_DATA57	DE38	DDR1_DQ_57			
MEM_MB_DATA58	DD40	DDR1_DQ_58			
MEM_MB_DATA59	DB40	DDR1_DQ_59			
MEM_MB_DATA60	DA37	DDR1_DQ_60			
MEM_MB_DATA61	DC37	DDR1_DQ_61			
MEM_MB_DATA62	DA39	DDR1_DQ_62			
MEM_MB_DATA63	DE40	DDR1_DQ_63			

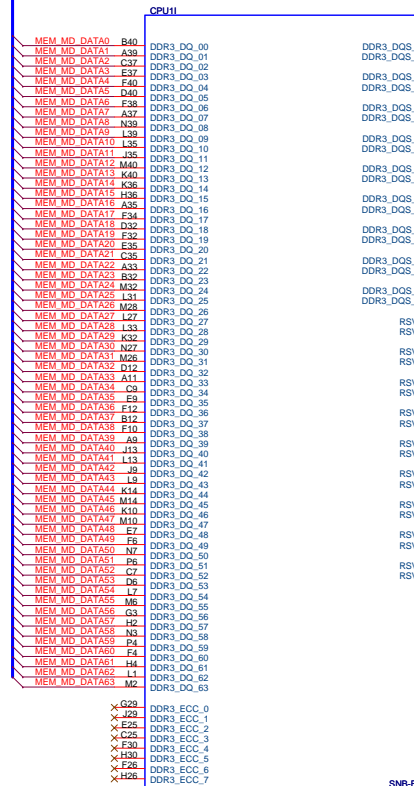
DE13  
DE14  
DD16  
DB16  
DA13  
DC13  
DA15  
DE16

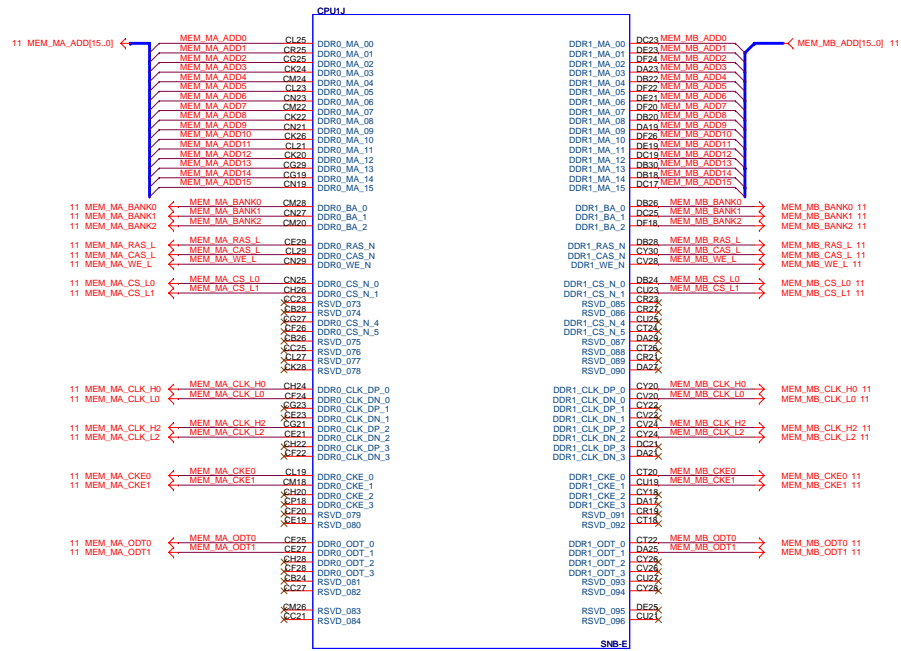
SNB-E

12 MEM\_MC\_DATA[63..0] <--

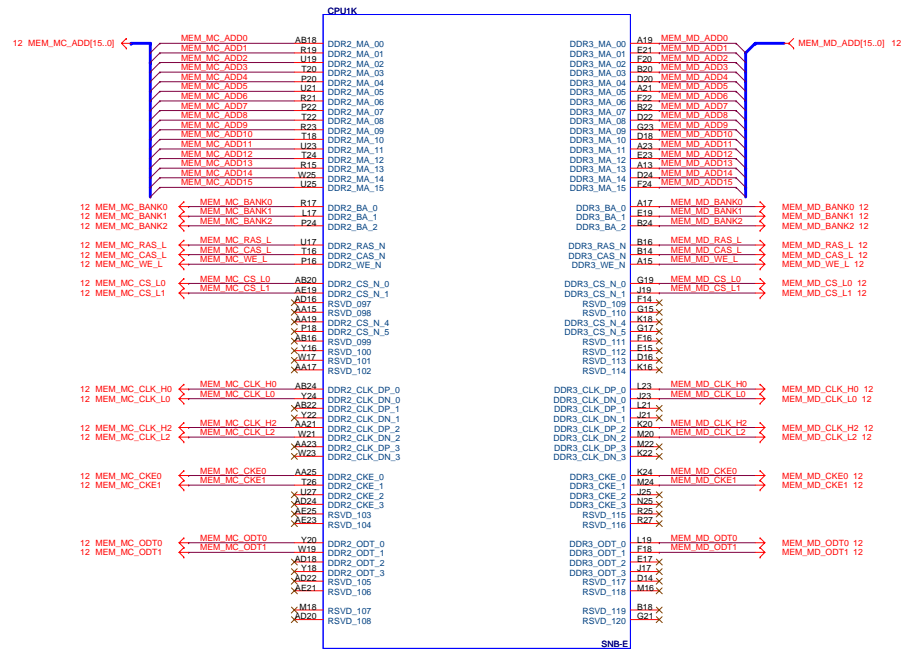


12 MEM\_MD\_DATA[63..0] <--

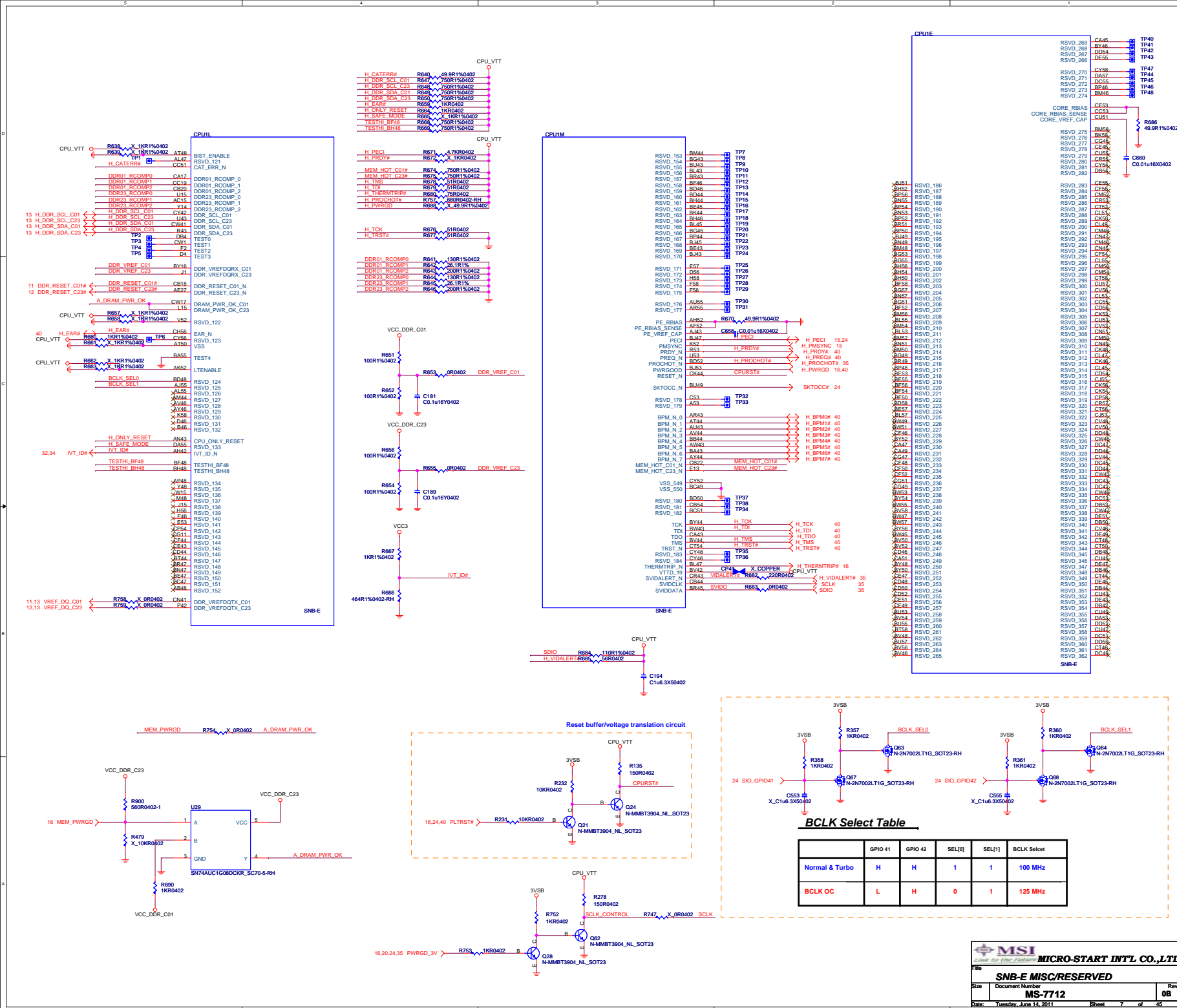


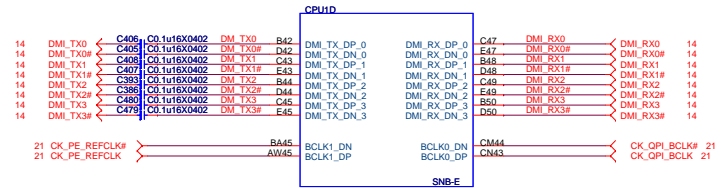
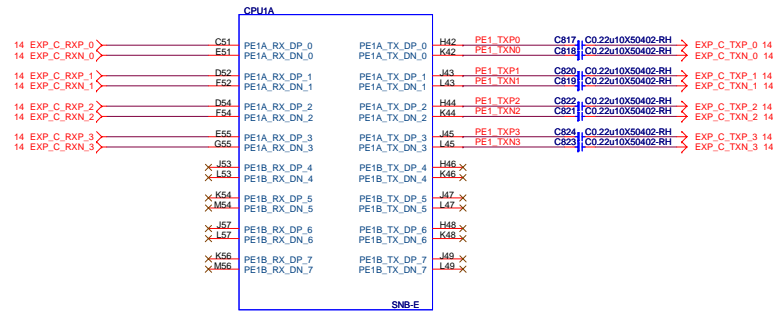
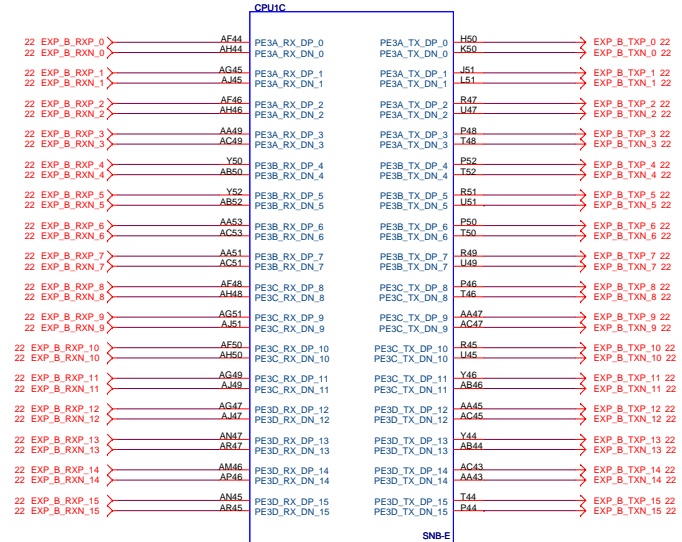
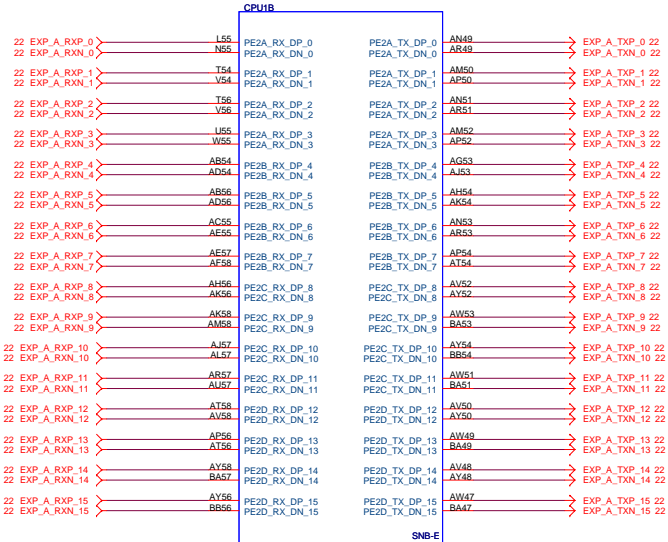


SNB-E

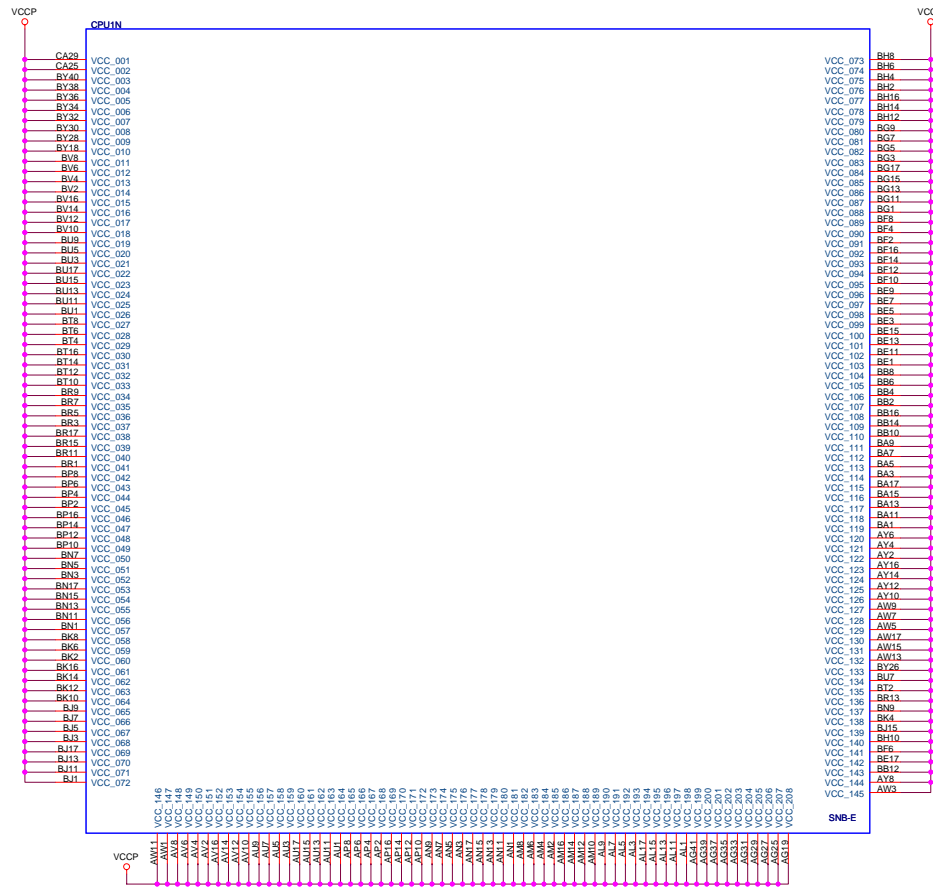


SNB-E

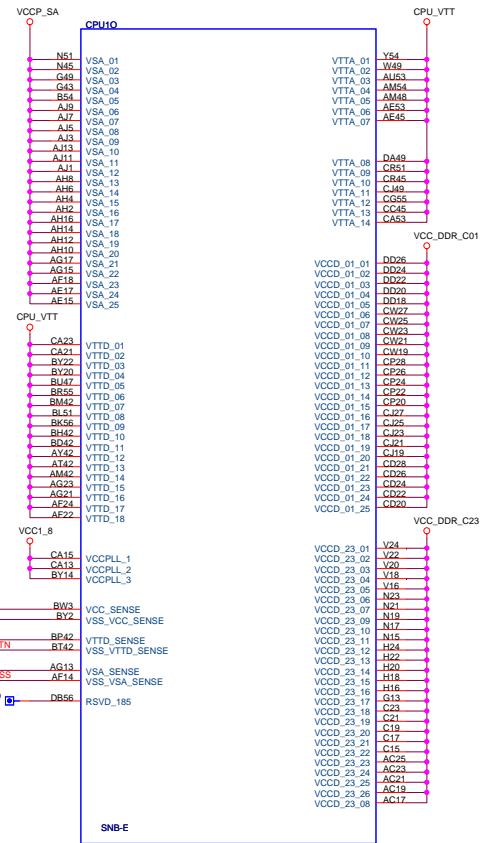


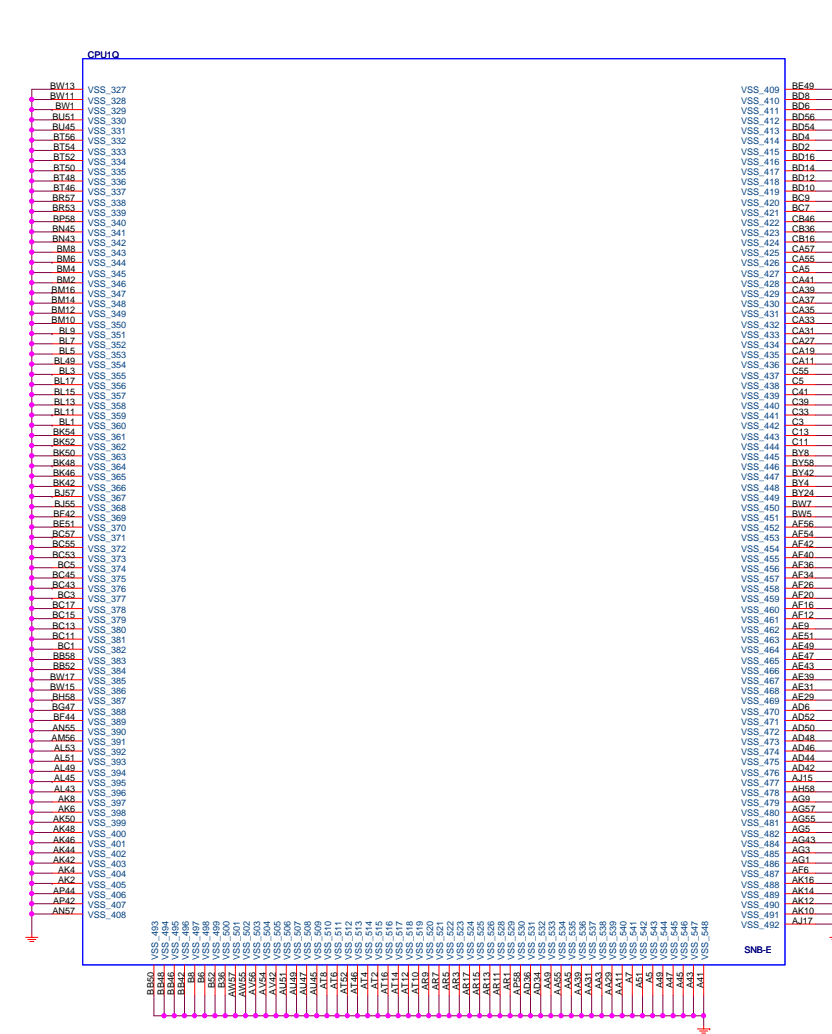
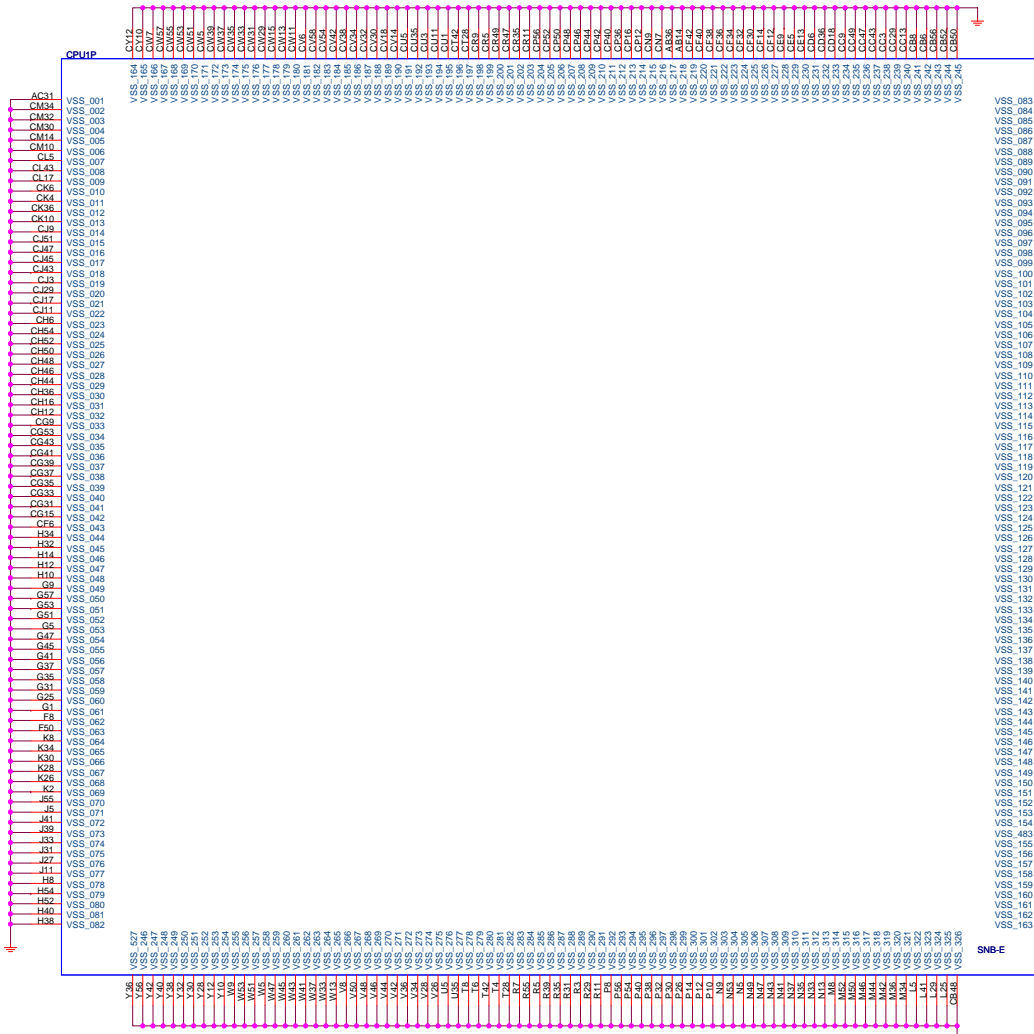






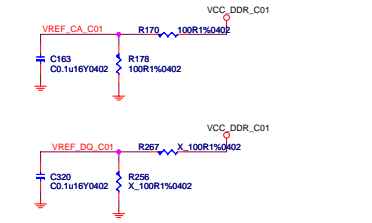
35 CPU\_VCC\_SENSE CPU\_VCC\_SENSE BW3  
35 CPU\_VSS\_SENSE CPU\_VSS\_SENSE BY2  
34 CPU\_VTT\_SENSE CPU\_VTT\_SENSE BP42  
34 CPU\_VTT\_SENSE\_RTIN CPU\_VTT\_SENSE\_RTIN BT42  
35 CPU\_VSA\_SENSE CPU\_VSA\_SENSE AG13  
35 CPU\_VSA\_SENSE\_VSS CPU\_VSA\_SENSE\_VSS AF14



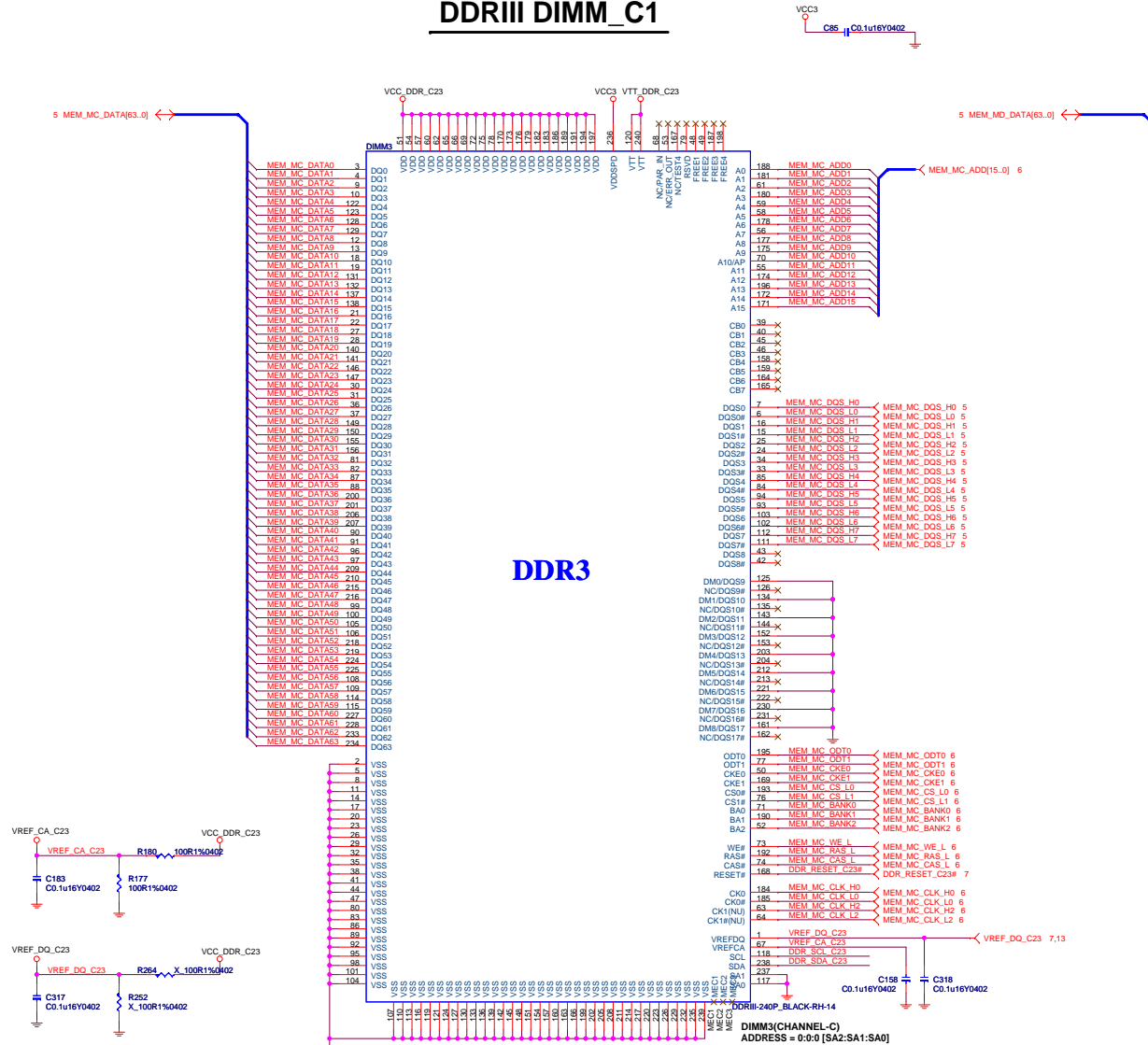




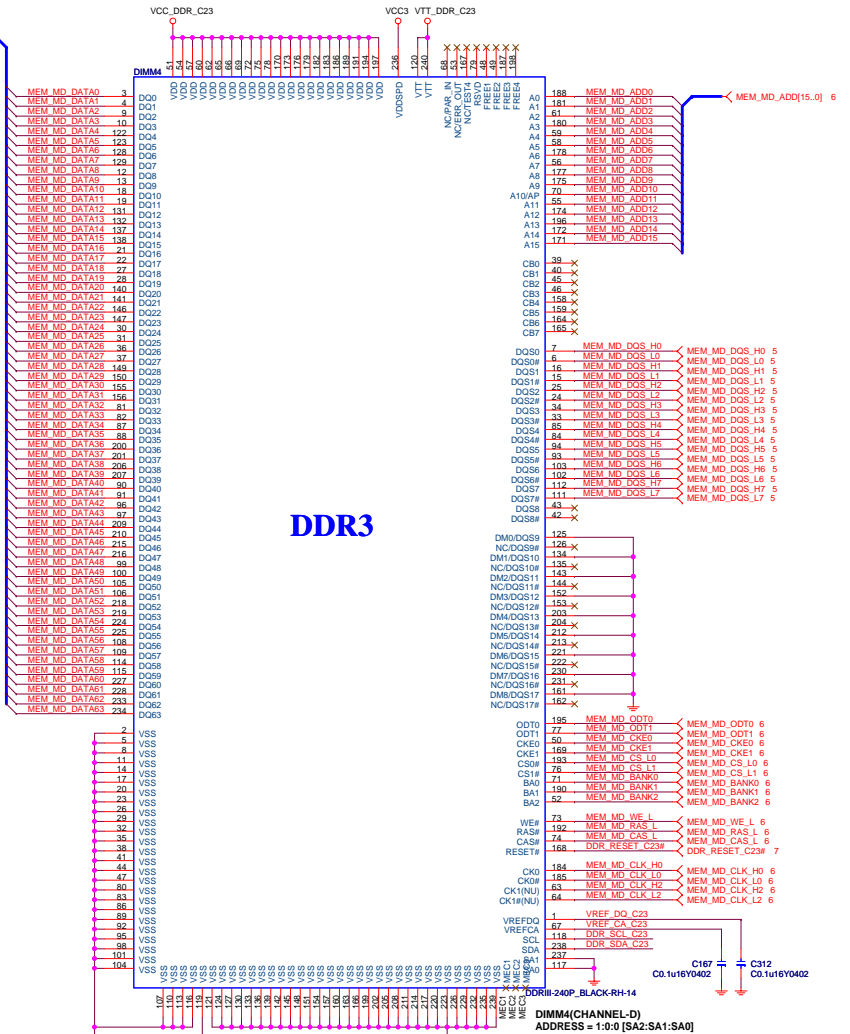
## VTT\_DDR\_C01



# DDR3 DIMM\_C1

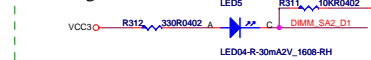


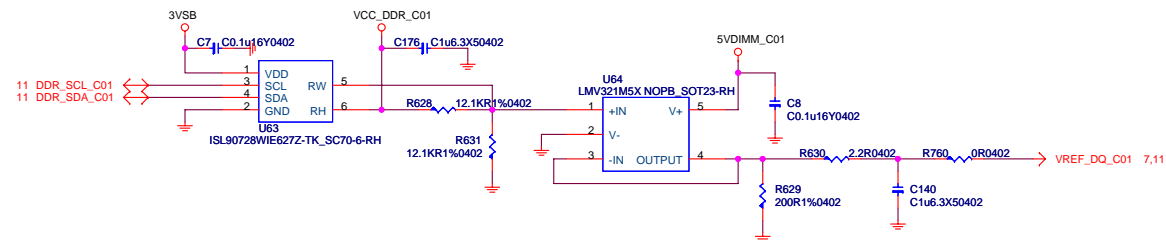
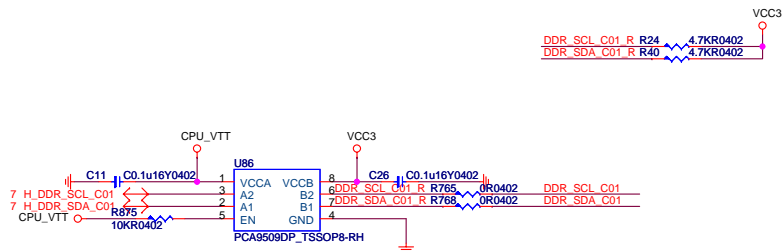
# DDR3 DIMM\_D1



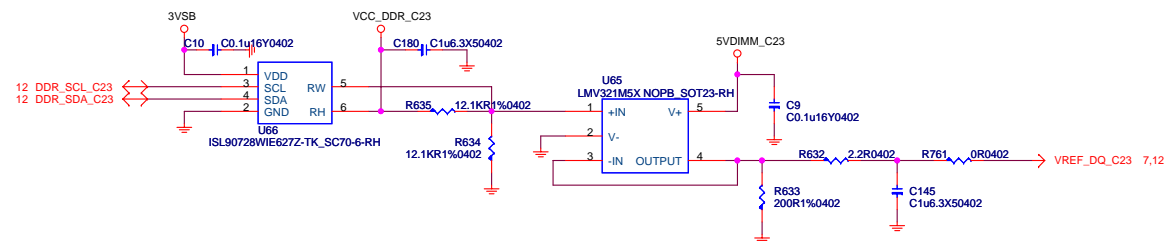
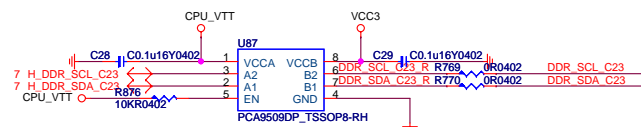
FOR EMI

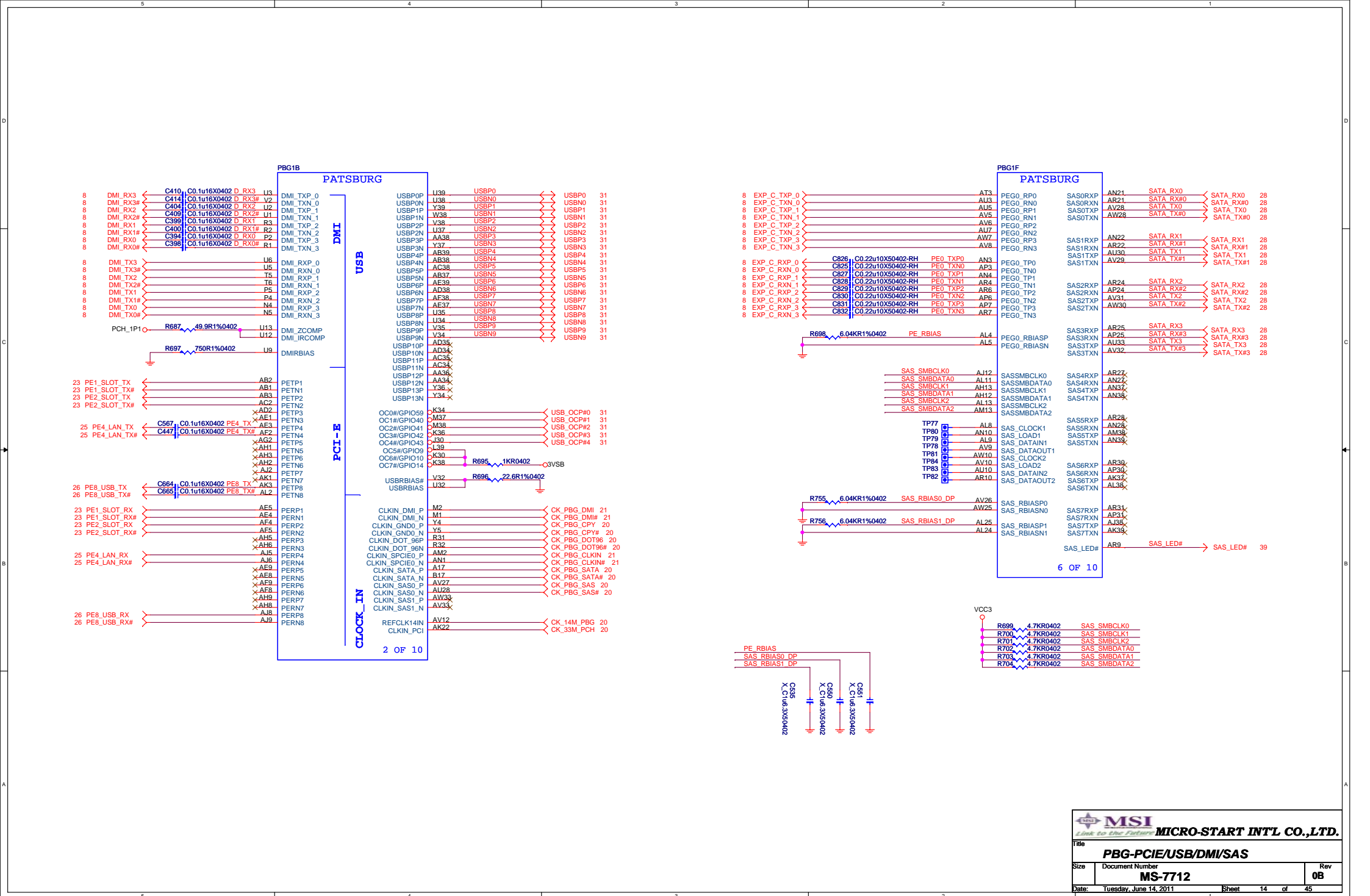
Warning LED





DDR SCL C23 R R46 4.7KR0402  
DDR SDA C23 R R56 4.7KR0402



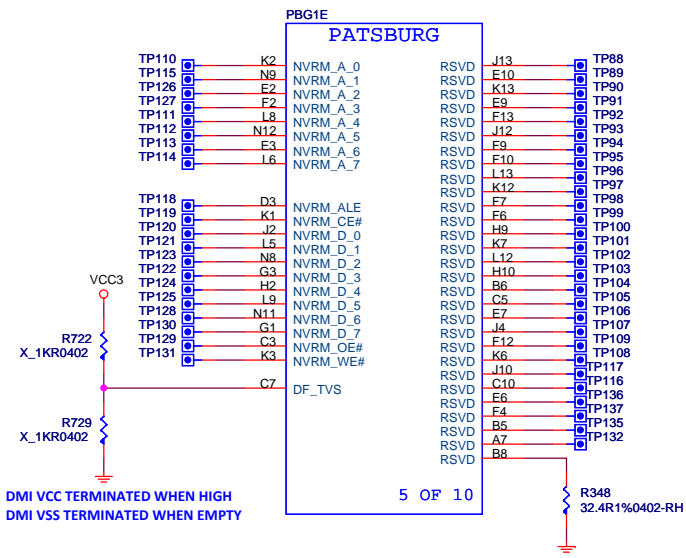
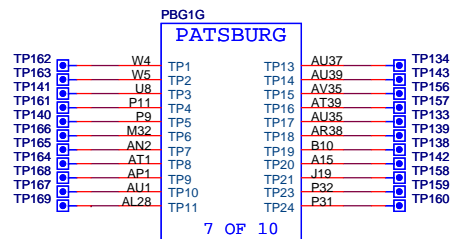


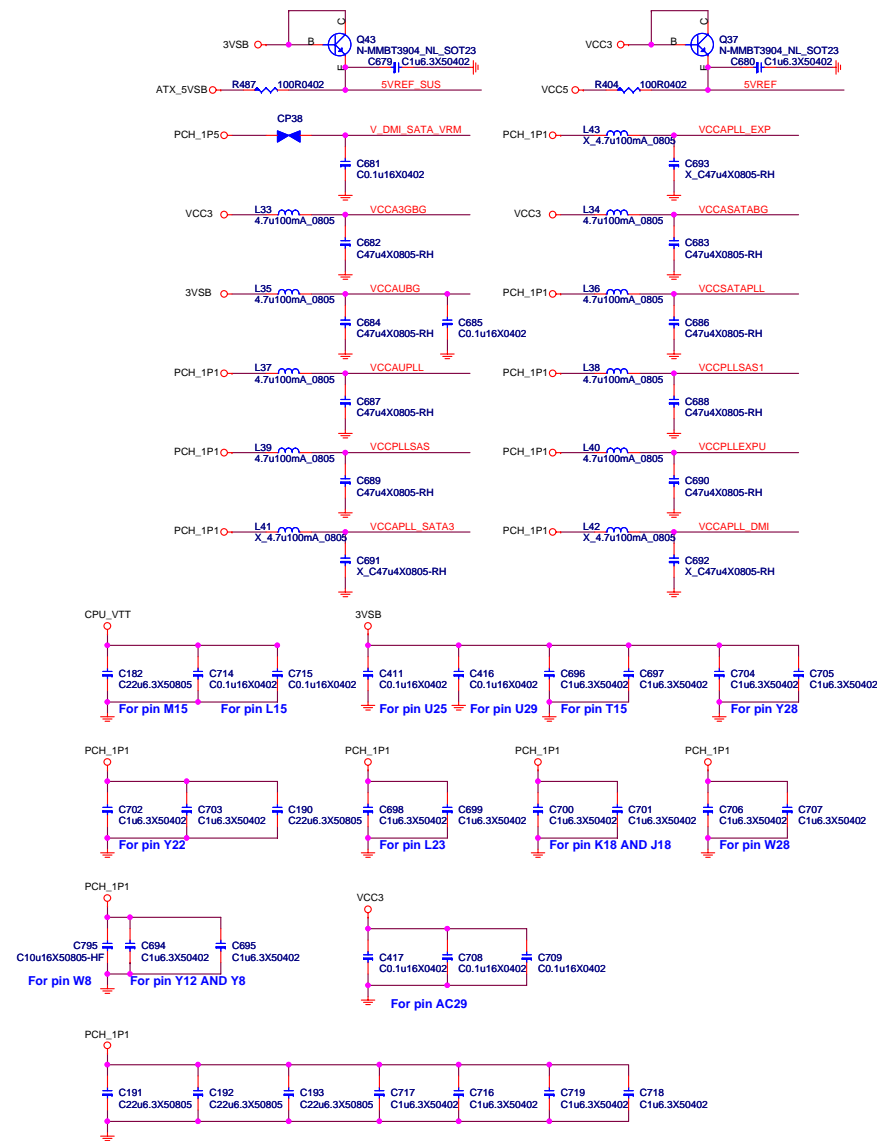






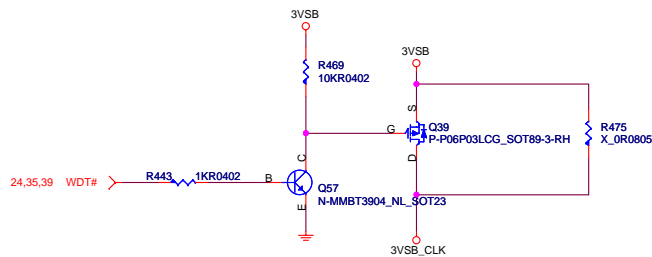
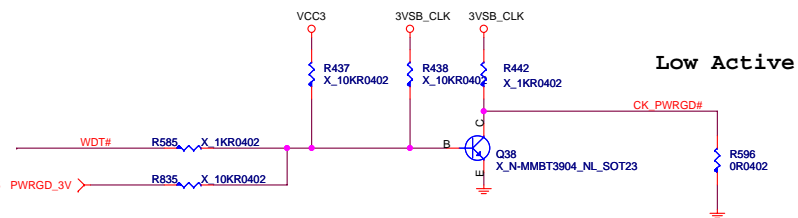
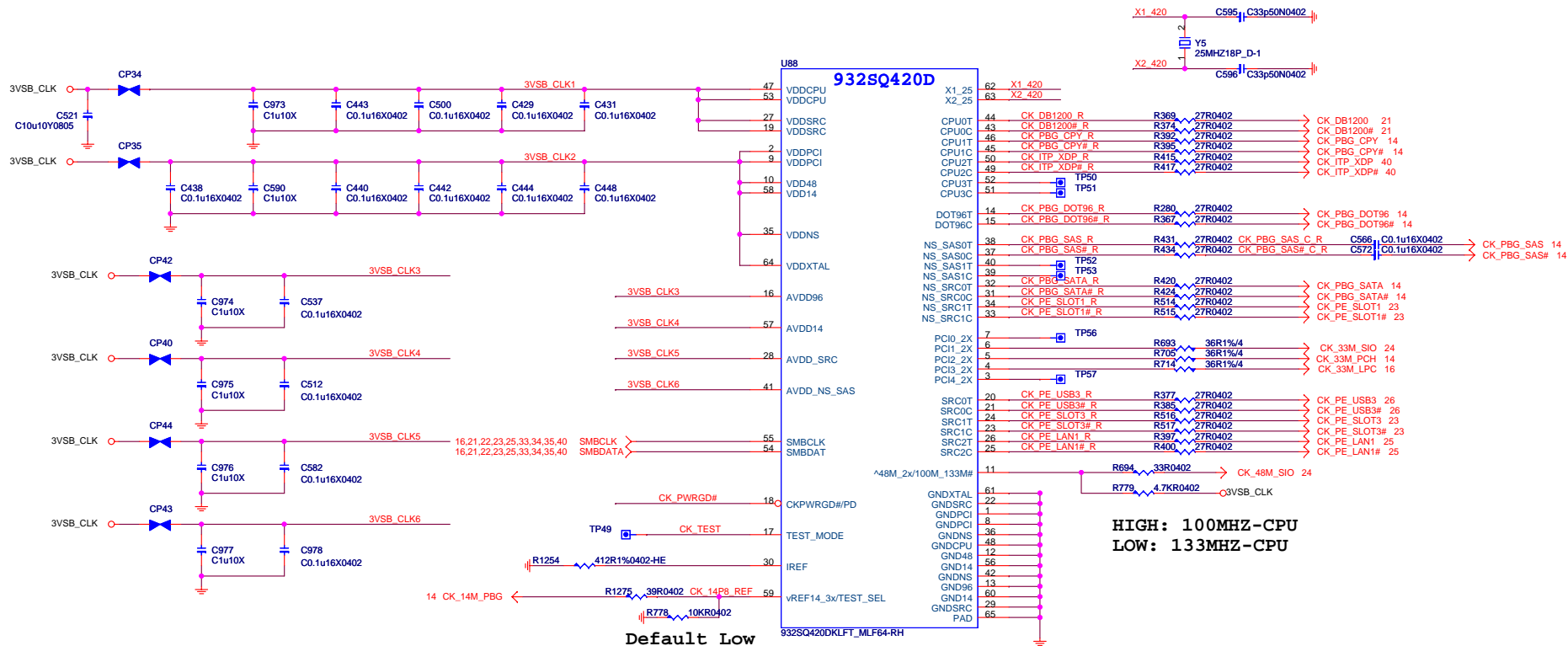






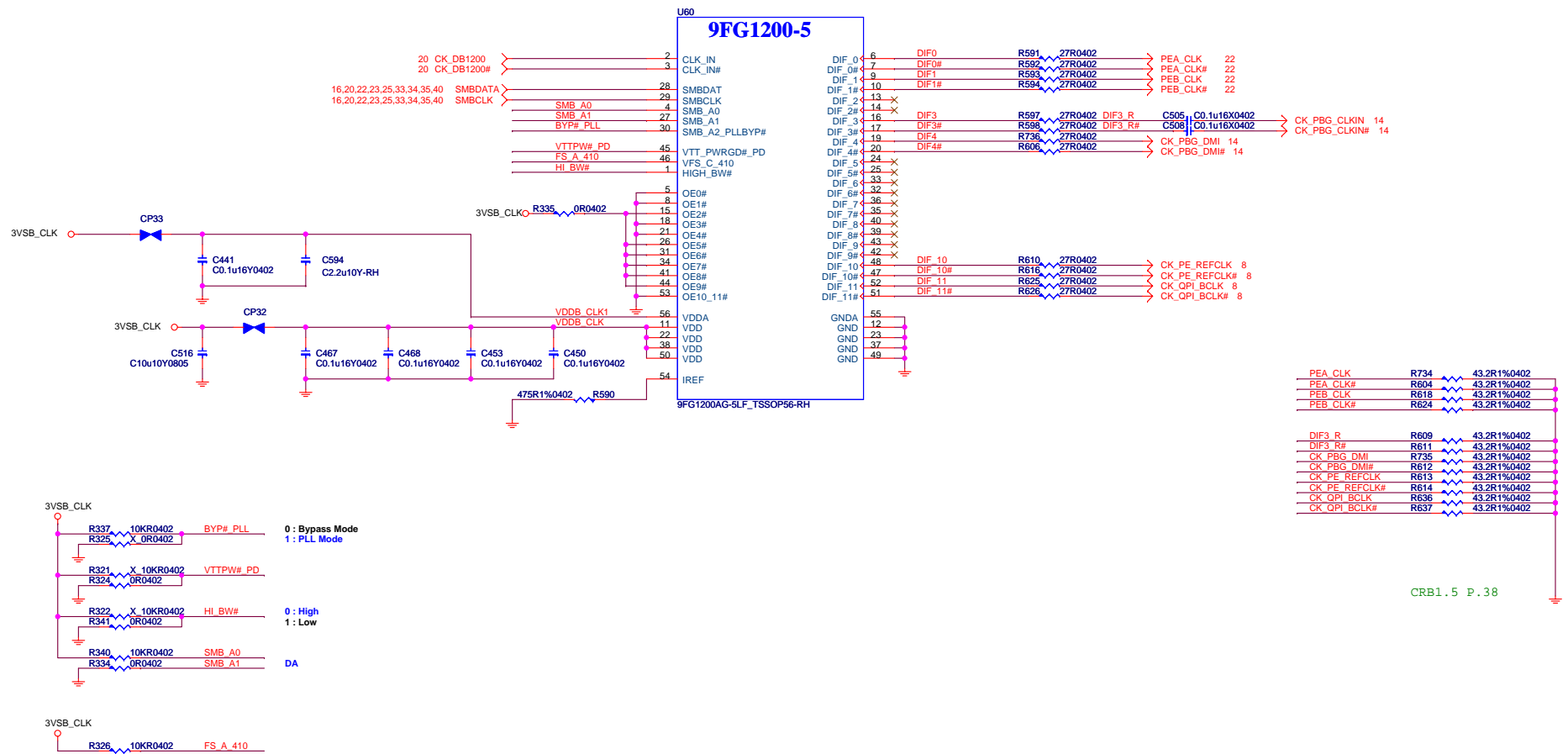


**Clock Gen 932SQ420D**



CK DB120#	R401	43.2R1%0402
CK DB1200#	R402	43.2R1%0402
CK PBG CPY	R447	43.2R1%0402
CK PBG CPY#	R485	43.2R1%0402
CK PBG CPY#	R486	43.2R1%0402
CK ITP XDP#	R485	43.2R1%0402
CK PBG DOT96	R486	43.2R1%0402
CK PBG DOT96#	R489	43.2R1%0402
CK PBG SAS# C R	R489	43.2R1%0402
CK PBG SAS# C R	R494	43.2R1%0402
CK PBG SATA	R532	43.2R1%0402
CK PBG SATA#	R540	43.2R1%0402
CK PE S11	R516	43.2R1%0402
CK PE S1011#	R530	43.2R1%0402
CK PE USB3	R489	43.2R1%0402
CK PE USB3#	R503	43.2R1%0402
CK PE SLO73	R583	43.2R1%0402
CK PE SLO73#	R540	43.2R1%0402
CK PE LAN1	R504	43.2R1%0402
CK PE LAN1#	R513	43.2R1%0402

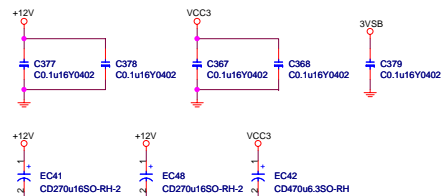
# **Clock Buffer 9FG1200D**



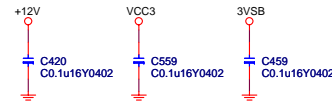
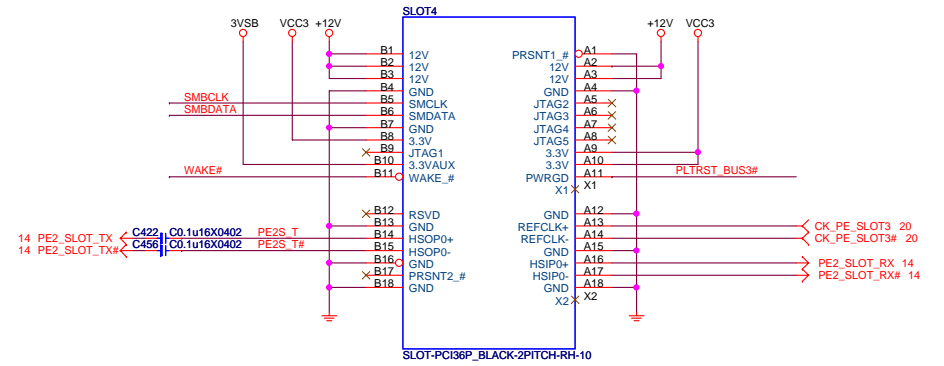
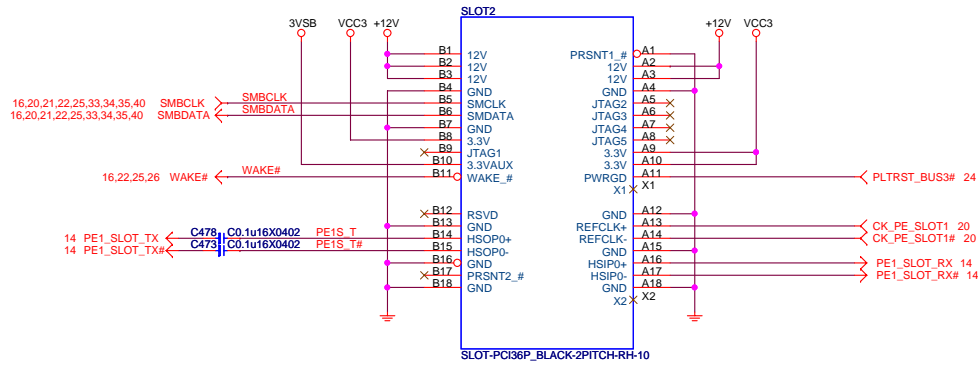
CRB1.5 P.38

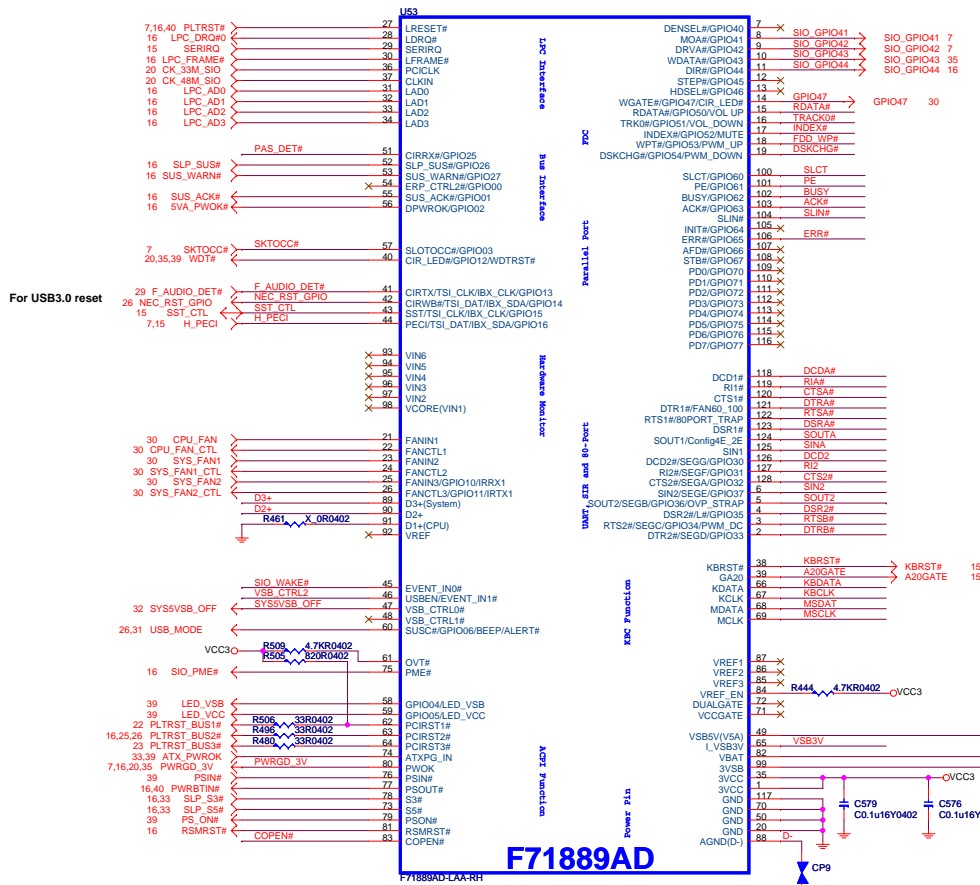
T0T1			
CX2	PRSN1T16	A1	+12V
12VBW1	12V	A2	C556; X Co 1016Y402
RSVSDP3B3	12VWAS3	A3	
SMCLK	JTAG5	A4	X
SMCLK	JTAG6	A5	X
GND	JTAG4	A6	X
GND	JTAG5	A7	X
3.3VB88	JTAG6	A8	X
3.3VALX	JTAG7	A9	X
WAKE#	3.3VWA0	A10	VCC3
	PWRG0	A11	PLTRST_BUS1#
RSVDWB12	GND	A12	PEB_CLK
HSOP0	REFCLK	A13	PEB_CLK#
HSOP0	REFCLK	A15	
GND	HSIP0	A16	EXP_B_RXP 15
PRNST2#	HSIN0	A17	EXP_B_RXN 15
GND	GND	A18	
HSOP1	RSVD	A19-X	
HSOP1	GND	A21	EXP_B_RXP 14
GND	HSIP1	A22	EXP_B_RXN 14
HSOP2	HSIN1	A23	
HSOP2	GND	A25	EXP_B_RXP 13
GND	HSIP2	A26	EXP_B_RXN 13
HSOP3	HSIN2	A27	
GND	GND	A28	EXP_B_RXP 12
RSVDWB30	HSIP3	A29	EXP_B_RXN 12
PRNST2#B31	RSVDWB30	A31	
GND	RSVDA32	A32-X	
HSOP4	RSVDA33	A33-X	
HSOP4	GND	A34	EXP_B_RXP 11
GND	HSIP4	A35	EXP_B_RXN 11
HSOP5	HSIN4	A36	
HSOP5	GND	A37	
GND	HSIP5	A38	EXP_B_RXP 10
HSOP6	HSIN5	A39	EXP_B_RXN 10
HSOP6	GND	A40	
GND	HSIP6	A41	EXP_B_RXP 9
HSOP7	HSIN6	A42	EXP_B_RXN 9
GND	GND	A43	
HSOP7	HSIP7	A44	EXP_B_RXP 8
PRNST2#B48	PRNST2#B48	A45	EXP_B_RXN 8
GND	GND	A46	
HSOP8	RSVDA50	A50-X	
HSOP8	GND	A51	
GND	HSIP8	A52	EXP_B_RXP 7
HSOP9	HSIN8	A53	EXP_B_RXN 7
HSOP9	GND	A54	
GND	HSIP9	A55	EXP_B_RXP 6
HSOP10	HSIN9	A56	EXP_B_RXN 6
HSOP10	GND	A57	
GND	HSIP10	A58	EXP_B_RXP 5
HSOP11	HSIN10	A59	EXP_B_RXN 5
HSOP11	GND	A60	
GND	HSIP11	A61	EXP_B_RXP 4
HSOP12	HSIN11	A62	EXP_B_RXN 4
HSOP12	GND	A63	
GND	HSIP12	A64	EXP_B_RXP 3
HSOP13	HSIN12	A65	EXP_B_RXN 3
HSOP13	GND	A66	
GND	HSIP13	A67	EXP_B_RXP 2
HSOP14	HSIN13	A68	EXP_B_RXN 2
HSOP14	GND	A69	
GND	HSIP14	A70	EXP_B_RXP 1
HSOP15	HSIN14	A71	EXP_B_RXN 1
HSOP15	GND	A72	
PRNST2#B81	RSVDA73	A73	EXP_B_RXP 0
RSVDWB82	HSIP15	A74	EXP_B_RXN 0
	GND	A75	
	X1	A76	
		A77	
		A78	
		A79	
		A80	
		A81	
		A82	
		A83	
		A84	
		A85	
		A86	
		A87	
		A88	
		A89	
		A90	
		A91	
		A92	
		A93	
		A94	
		A95	
		A96	
		A97	
		A98	
		A99	
		A100	

SLOT-PC164P\_BLACK-2P1TCH-RH-24

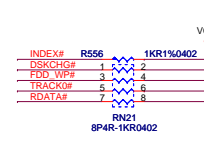


# **PCI EXPRESS X1 SLOT**





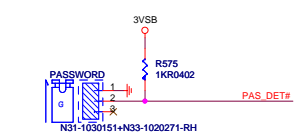
## FLOPPY CONNECTOR



## LPT CONNECTOR

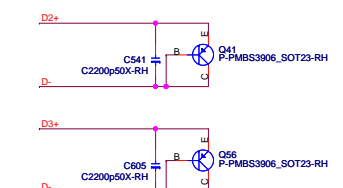


## PASSWORD DETECTION



PAS\_DET#  
1-2 Short: Clear password  
1-2 Open: -

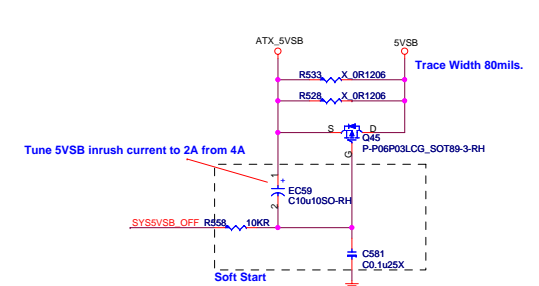
## Temperature Sensing



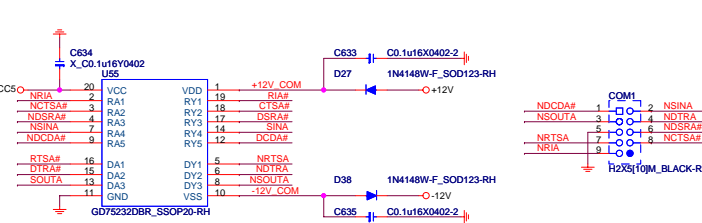
## Chassis Intrusion



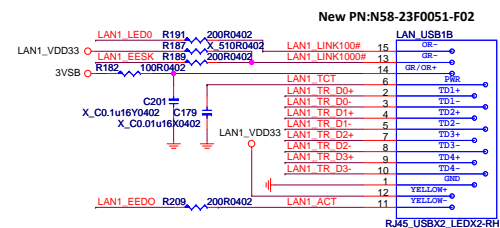
## 5VSB Power Switch



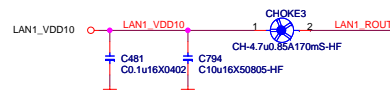
## SERIAL PORT





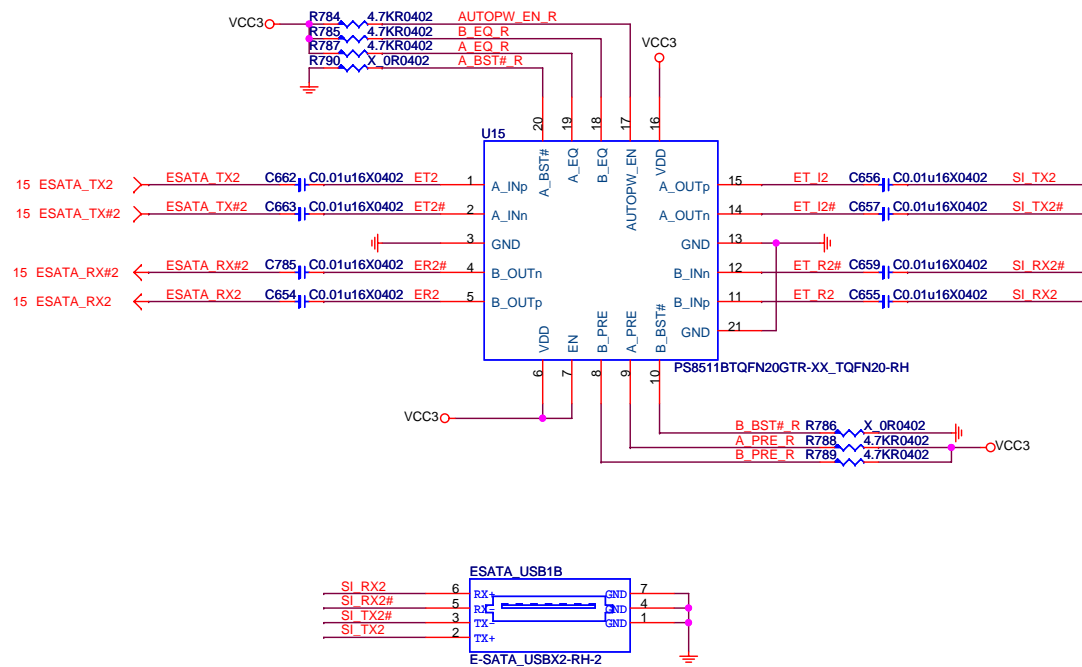


3.3v Power on rise time : 1~100ms.

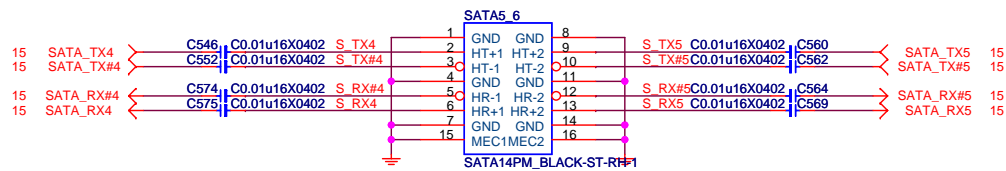
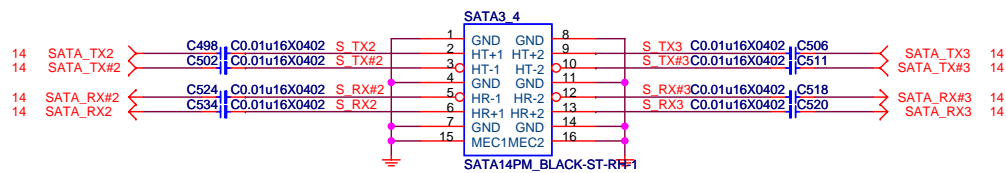
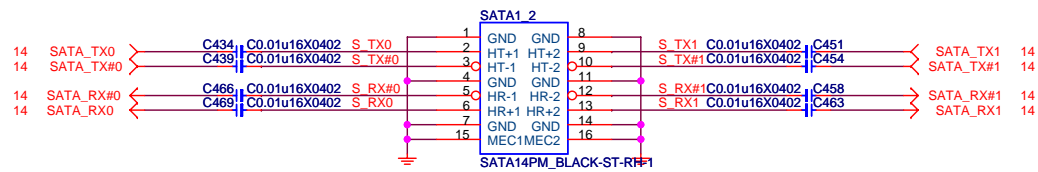





# ESATA Connector



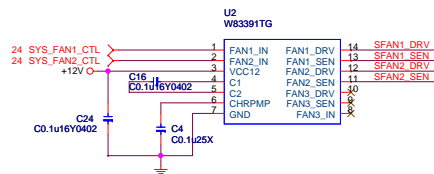
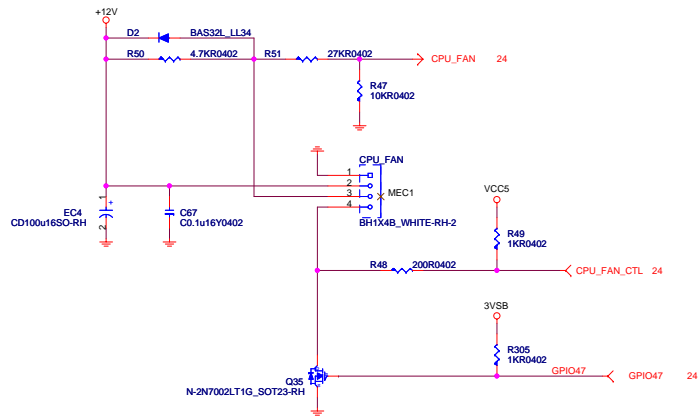
## SATA Connector



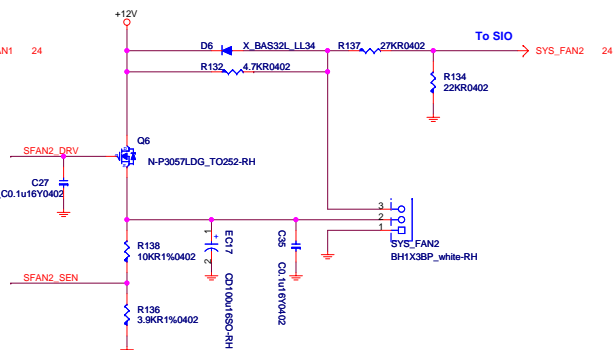
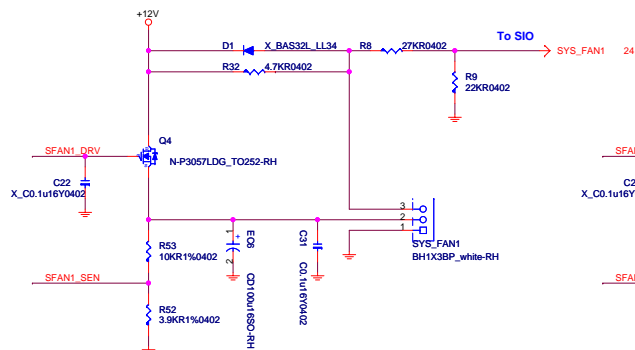
 <b>MICRO-START INT'L CO.,LTD.</b>		
Title <b>SATA Port</b>		
Size	Document Number <b>MS-7712</b>	Rev <b>0B</b>
Date:	Tuesday, June 14, 2011	Sheet 28 of 45



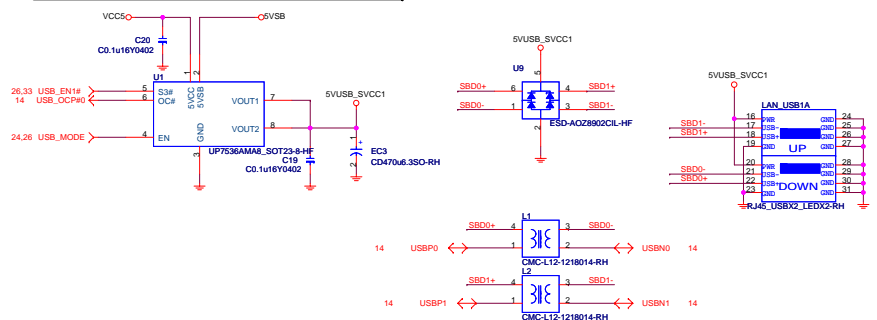
## CPU Fan



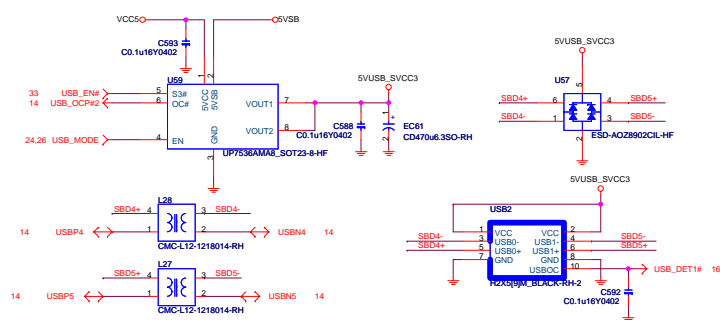
## System Fan



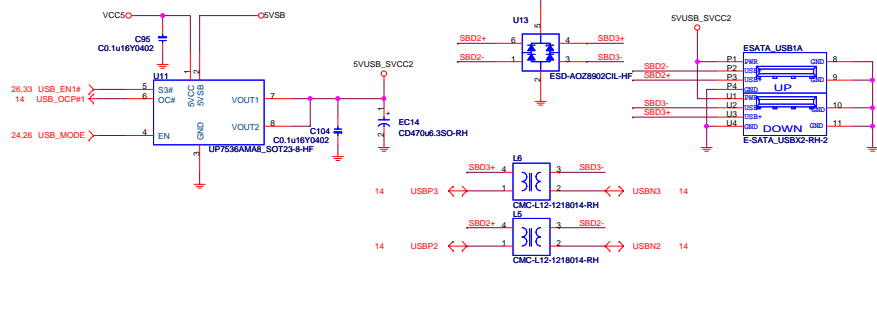
### Rear USB Connector For USB Port 0 / 1



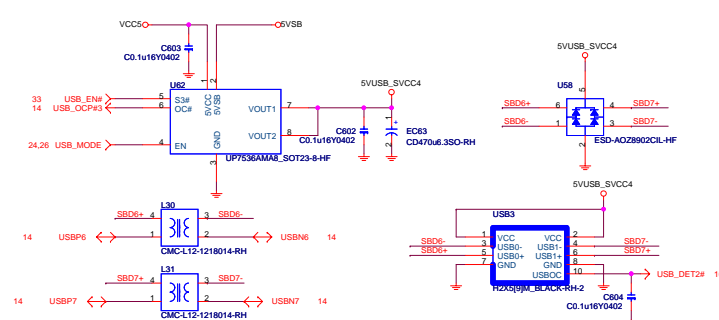
### Front Panel USB Connector For USB Port 4 / 5



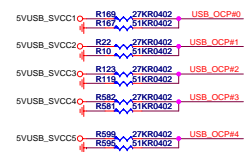
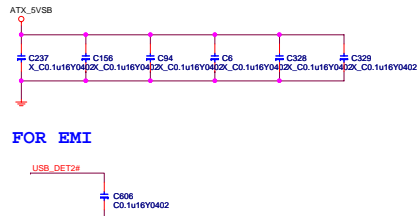
### Rear USB Connector For USB Port 2 / 3



### Front Panel USB Connector For USB Port 6 / 7

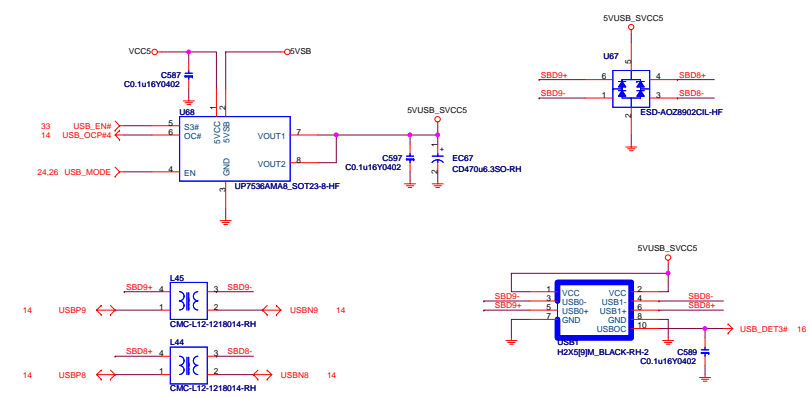


### FOR EMI

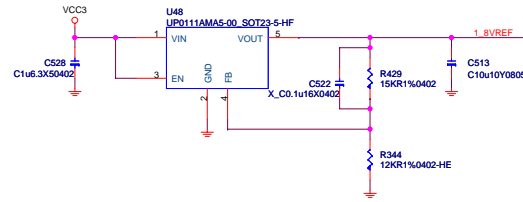


### FOR EMI

### Front Panel USB Connector For USB Port 8 / 9

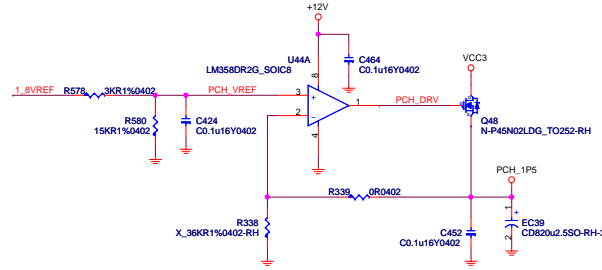


### 1.8V Reference Power



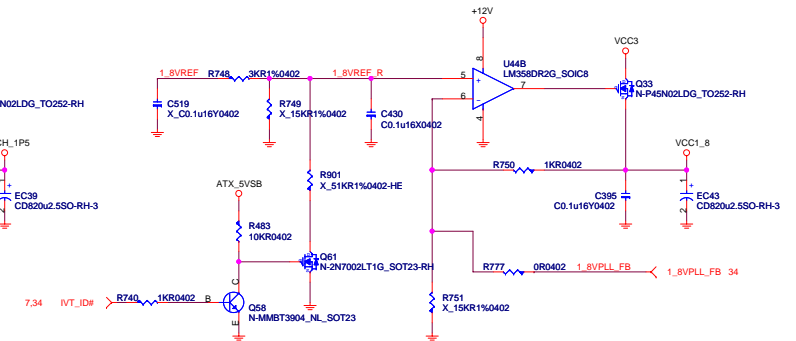
### PBG 1.5V Power Rail

Linear 1.5V, 0.512A Imax



### VCCPLL Power Rail

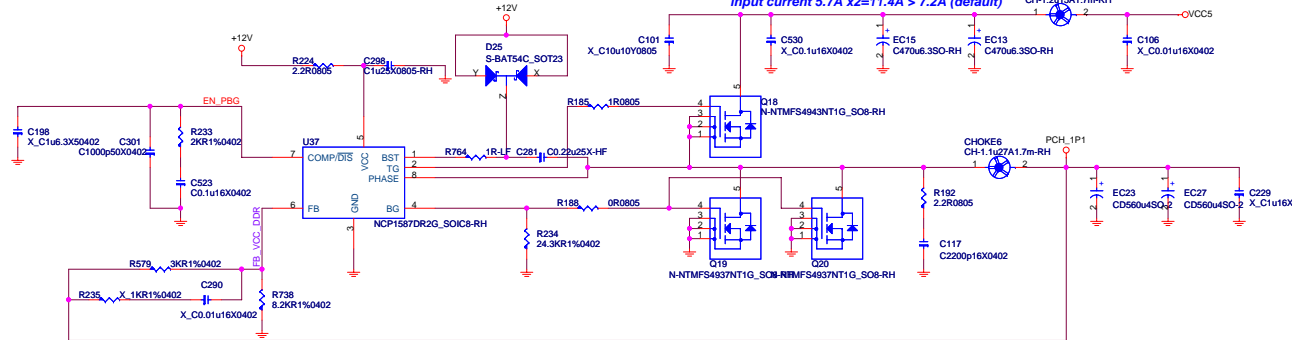
Linear 1.8V, 2A Imax



IVT_ID#		VOLTAGE
H	SNB-E	1.8V(normal)
L	IVB-E	1.7V

### PBG Core Power Rail

Switching 1 phase 1.1V, 16.4A Imax



$$V_{out} = 0.8 \left[ \frac{R_{738}(GND) + R_{579}}{R_{738}} \right]$$

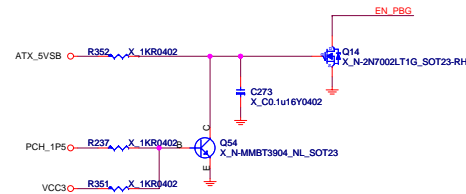
$$= 0.8 \left[ \frac{(8.2 + 3)}{8.2} \right]$$

$$= 1.09268 (V)$$

$$I_{octr} = (I_{ocet} * R_{ocet}) / R_{dson}$$

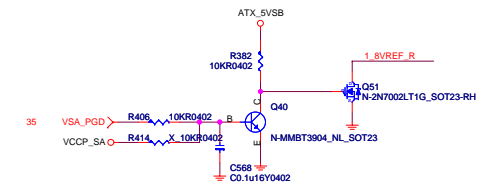
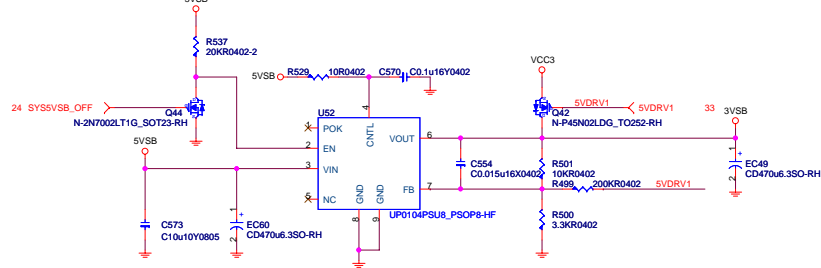
$$= (10uA * 24.3K) / 7.2m$$

$$= 33.75A (> 1.5 * 16.64A)$$



### 3VSB Power Rail

1.09A

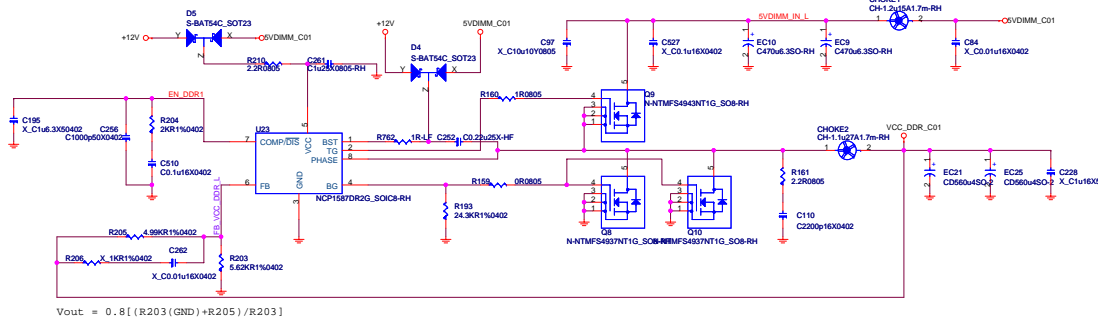




## DDR III 1.5V POWER

Switch 1 Phase 1.5V 17A

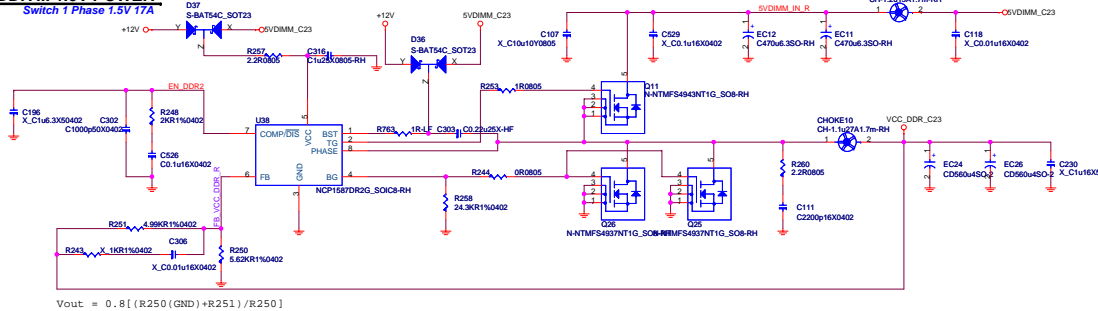
input current 5.7A x2=11.4A > 7.8A (default)



## DDR III 1.5V POWER

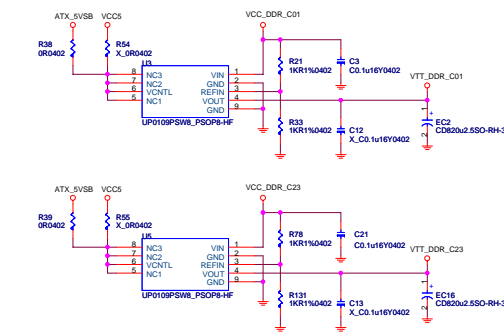
Switch 1 Phase 1.5V 17A

input current 5.7A x2=11.4A > 7.8A (default)

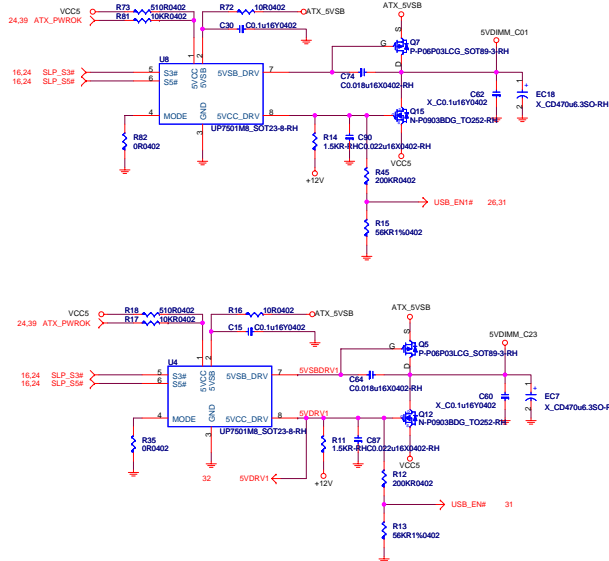


## DDR III Termination Power

Linear, 0.75V - 1A



## DDR III Regulator Power Source



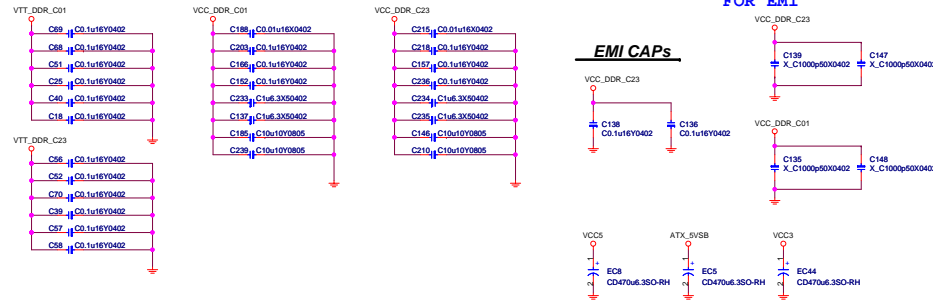
## UPI VOLTAGE CONSOLE

ADDRESS	0x2A	0X28	0x26	0x24	0x22	0x20
RH (Kohm)	OPEN	3.9	3	2.2	1.3	10
RL (Kohm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%

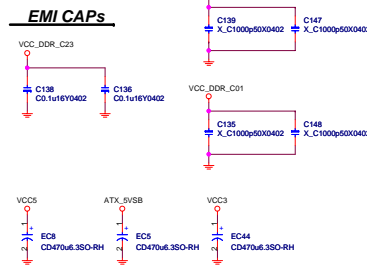
## UPI VOLTAGE CONSOLE

ADDRESS	0x2A	0X28	0x26	0x24	0x22	0x20
RH (Kohm)	OPEN	3.9	3	2.2	1.3	10
RL (Kohm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%

## DDR III I/O Power Decoupling Caps.

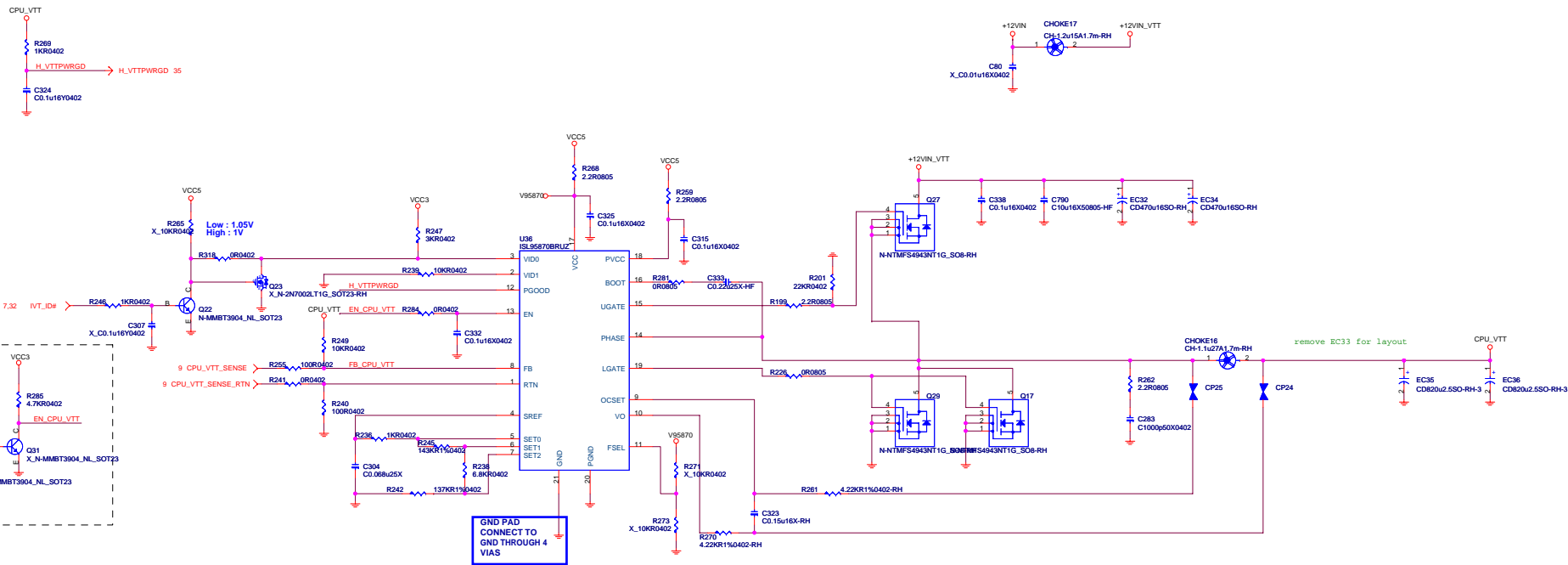


## FOR EMI



# CPU VTT Power Rail

## Switch 1 Phase 1.05V 22A

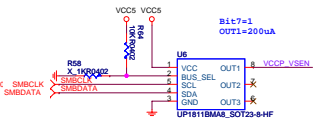
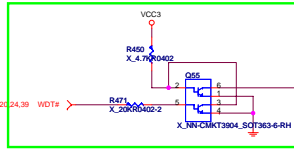
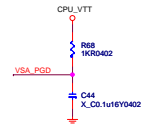
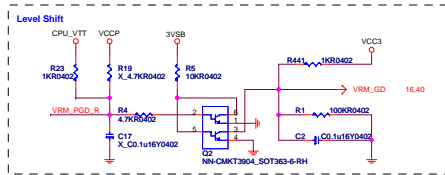


1.  $R_{ocset} = I_{out} \cdot DCR / I_{ocset}$ ;  $I_{ocset} = 10\mu A$   
If  $DCR = 1m$ ;  $I_{out} = 20A$ ,  $R_{ocset} = 20A \cdot 1m / 10\mu A \rightarrow R_{ocset} = 2K$
2.  $C_{sen} = L / R_{ocset} \cdot DCR$   
If  $DCR = 1m$ ;  $L = 1\mu$ ,  $C_{sen} = 1\mu / 2K \cdot 1m \rightarrow C_{sen} = 0.5U$

### UPI VOLTAGE CONSOLE

ADDRESS	0x2A	0x28	0x26	0x24	0x22	0x20
RH (KOhm)	OPEN	3.9	3	2.2	1.3	10
RL (KOhm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%

## Voltage Regular Module (VRD12)

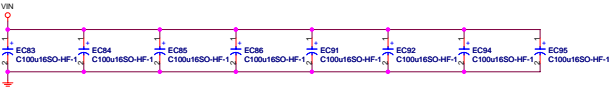
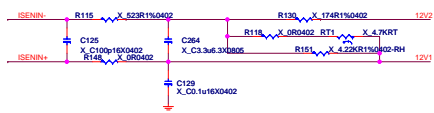
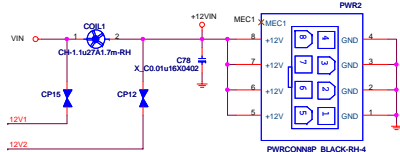


### UPI VOLTAGE CONSOLE

0x20:RH=10K,RL=open;Bit7=1

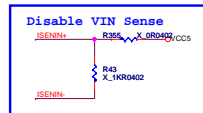
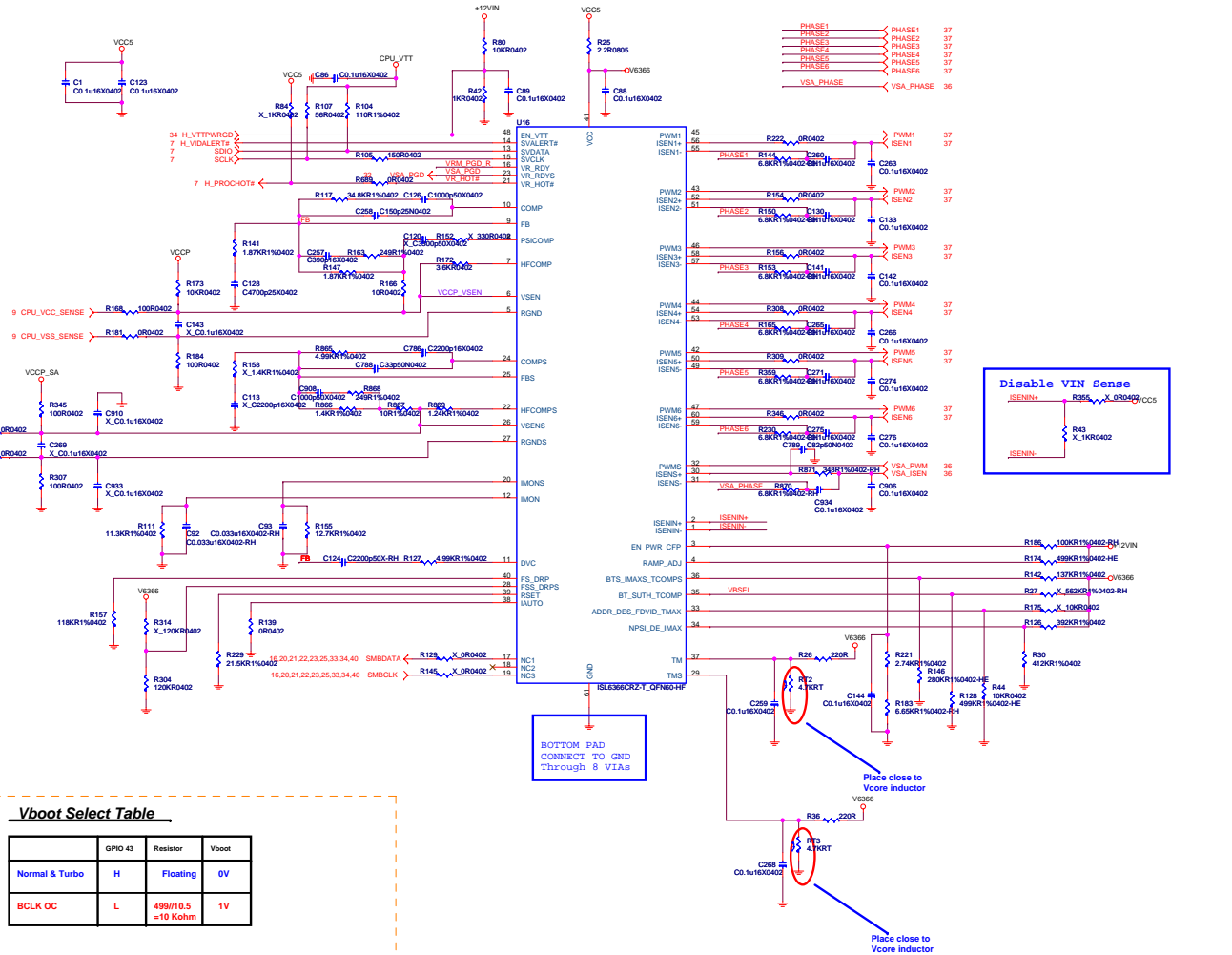
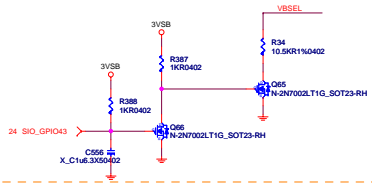
ADDRESS	0x2A	0X28	0x26	0x24	0x22	0x20
RH (Kohm)	OPEN	3.9	3	2.2	1.3	10
RL (Kohm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%

### CPU Core Power +12V Input



### Vboot Select Table

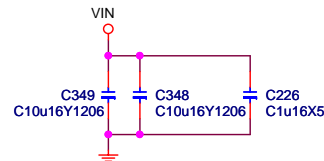
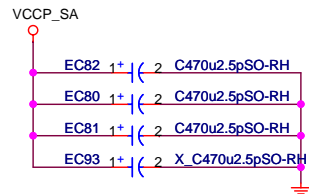
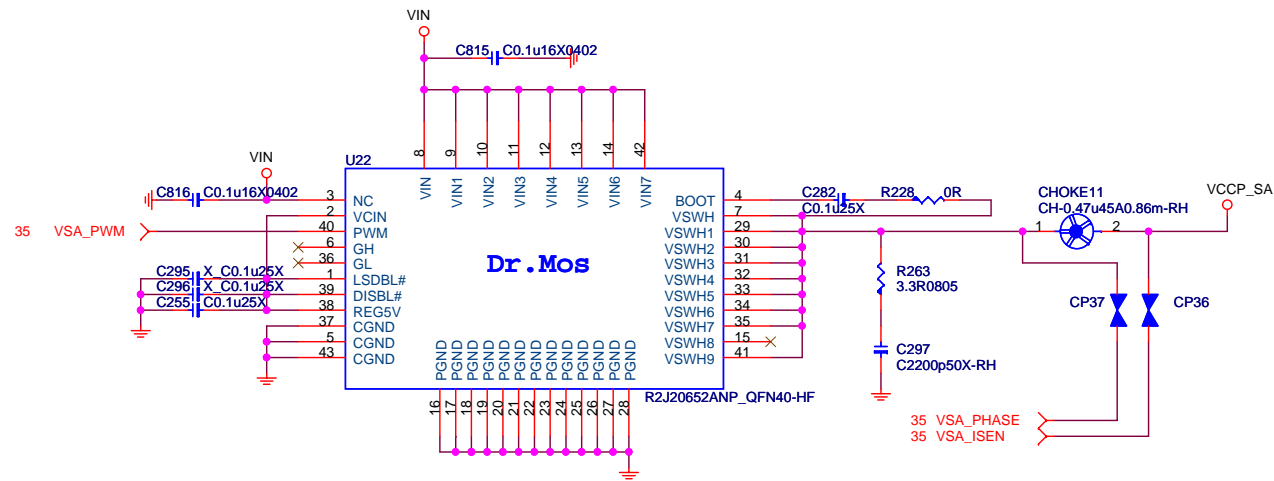
	GPIO 43	Resistor	Vboot
Normal & Turbo	H	Floating	0V
BCLK OC	L	499/10.5 ±10 Kohm	1V

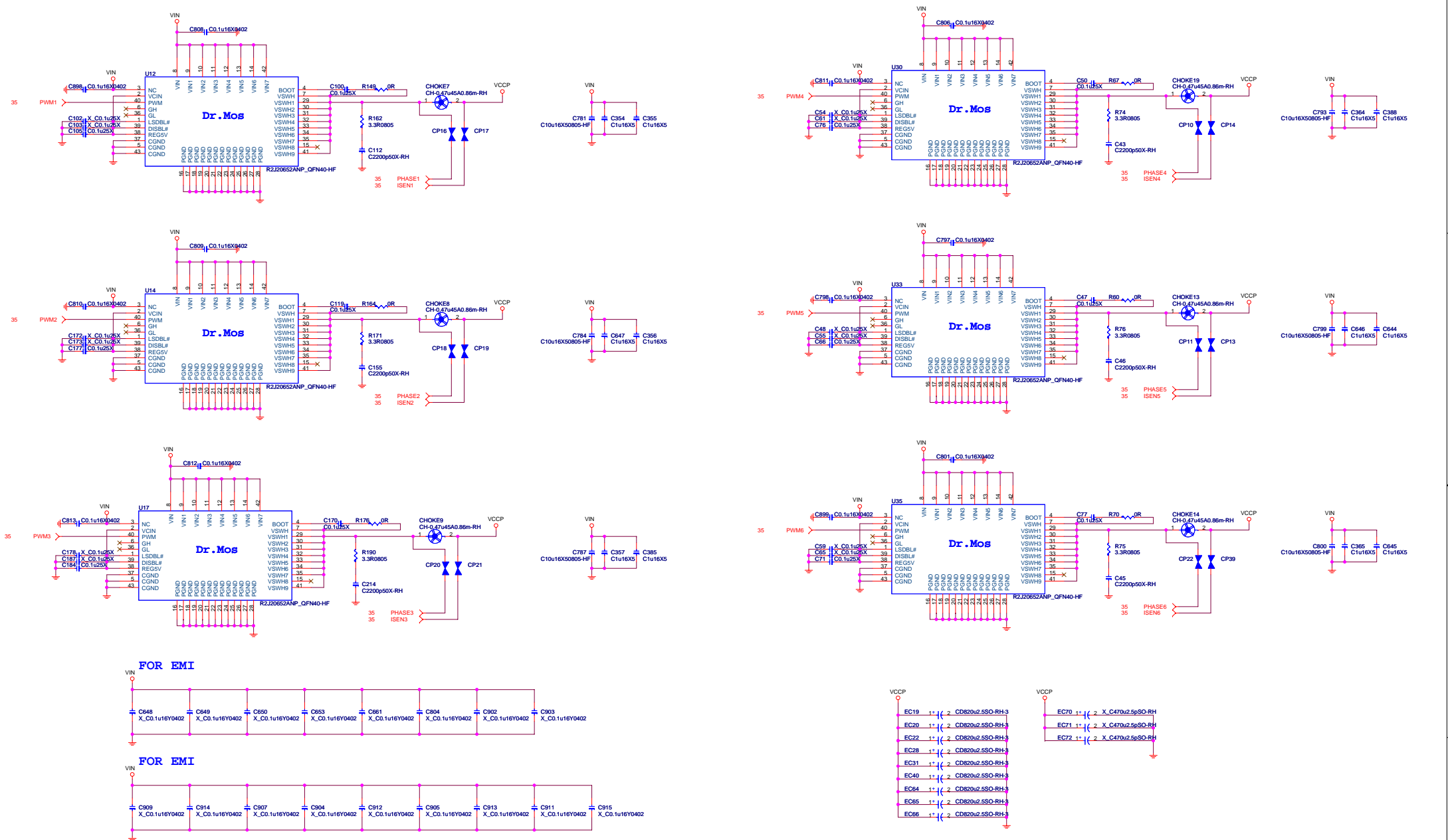


BOTTOM PAD  
CONNECT TO GND  
Through 8 VIAs

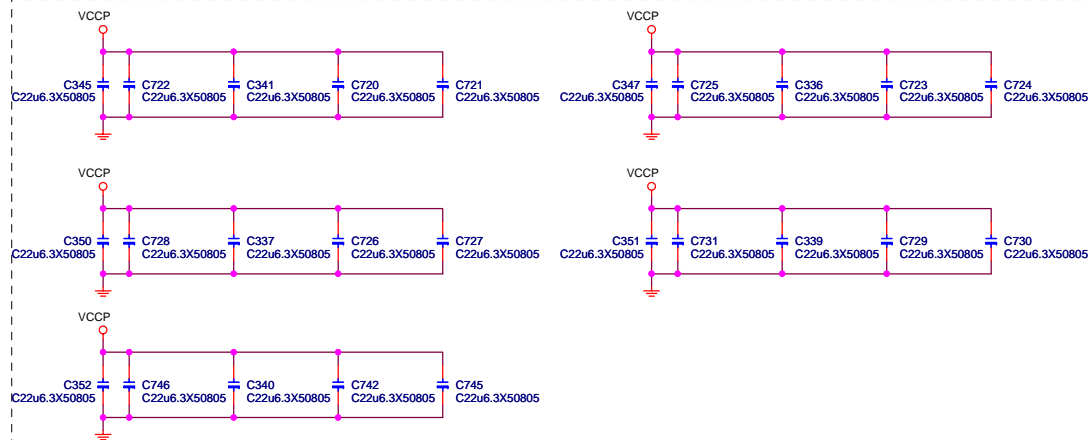
Place close to  
Vcore inductor

Place close to  
Vcore inductor



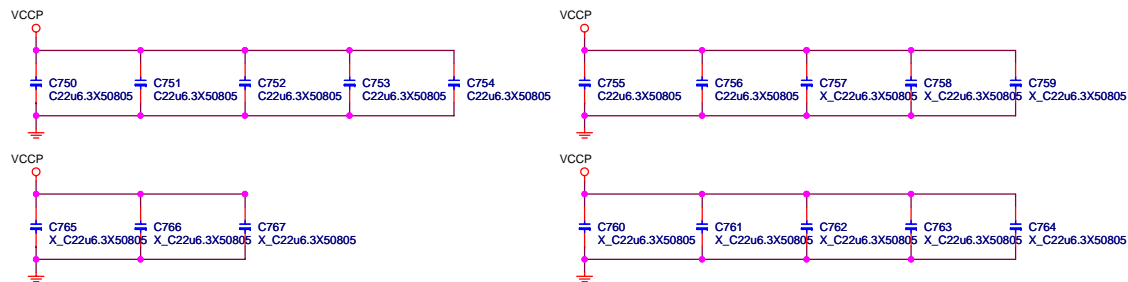


## VCCP Decoupling



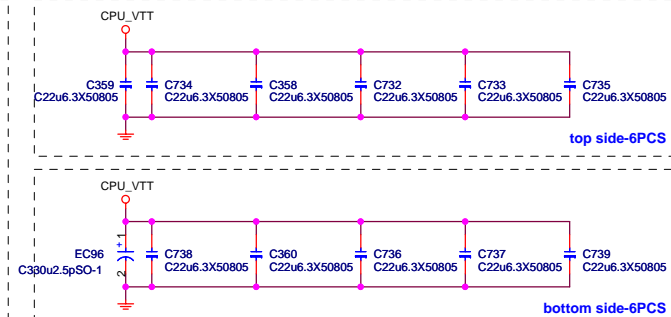
top side-25PCS

## VCCP Decoupling Bottom Side

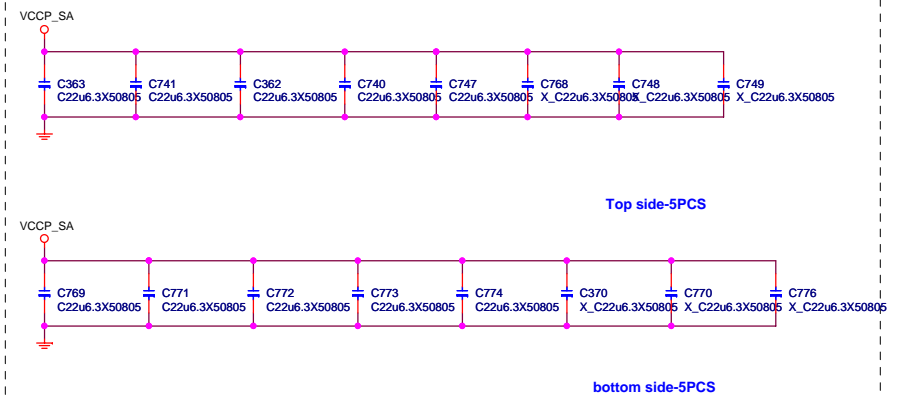


bottom side-6PCS

## CPU VTT Decoupling



## CPU VSA Decoupling

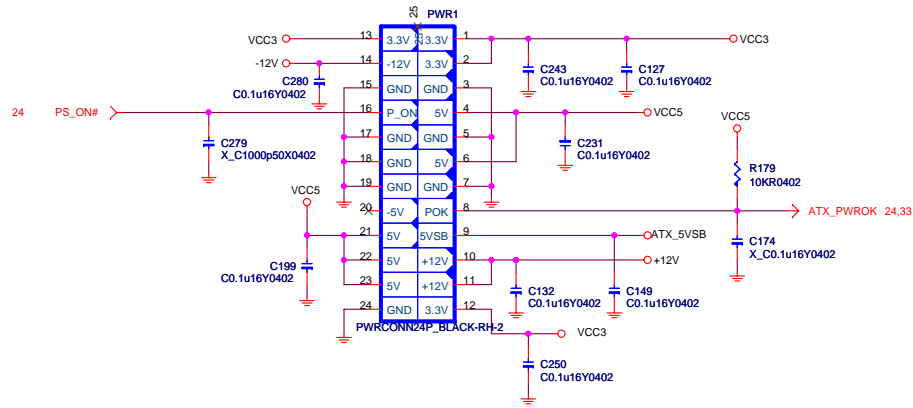


## CPU VCC DDR Decoupling

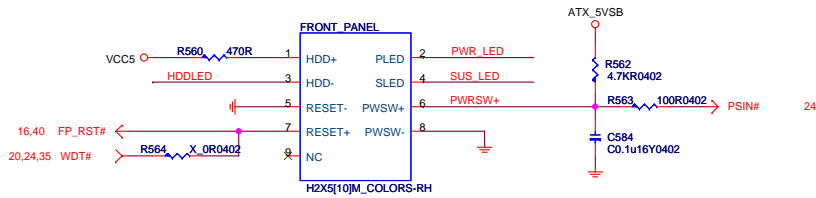


# ATX Power Connector / Front Panel / LED

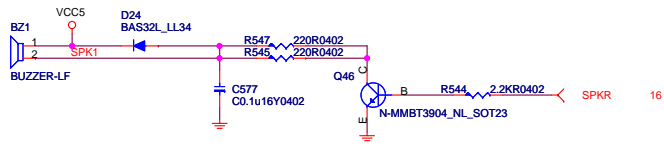
## 24 Pin ATX Power Connector



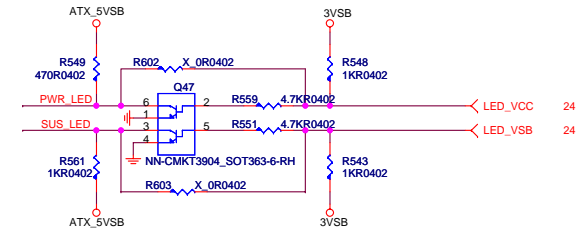
## Front Panel



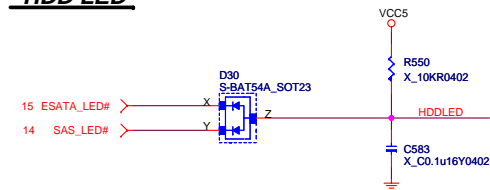
## Buzzer Circuit



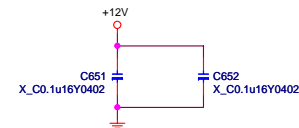
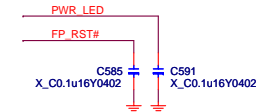
## Power LED



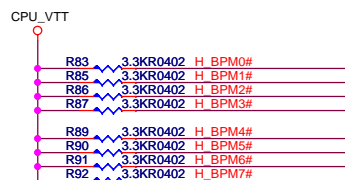
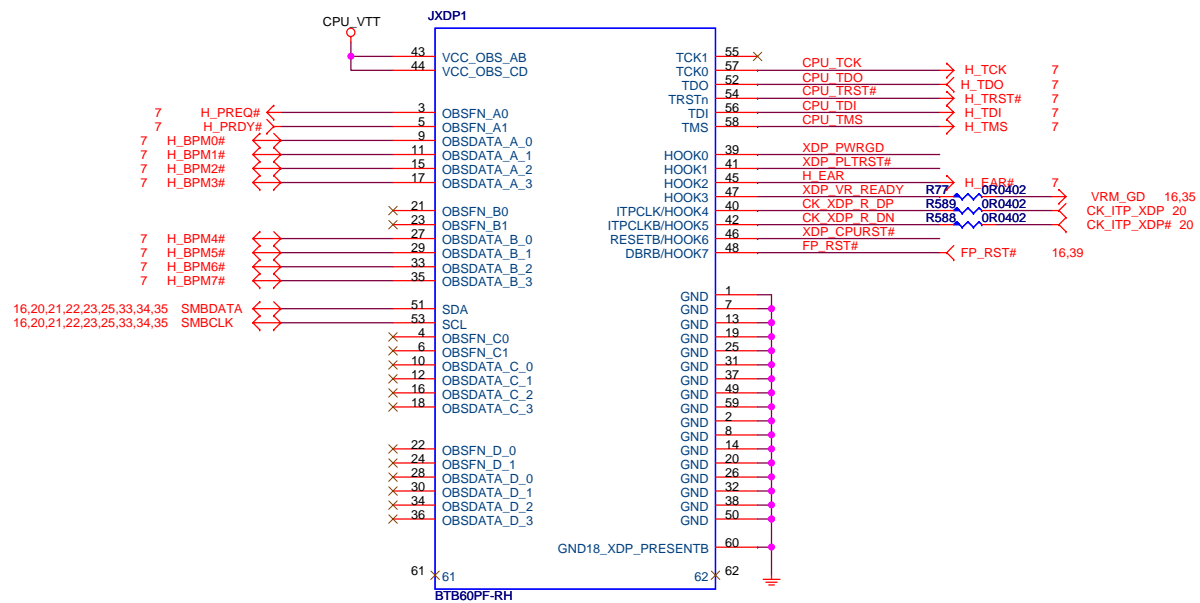
## HDD LED



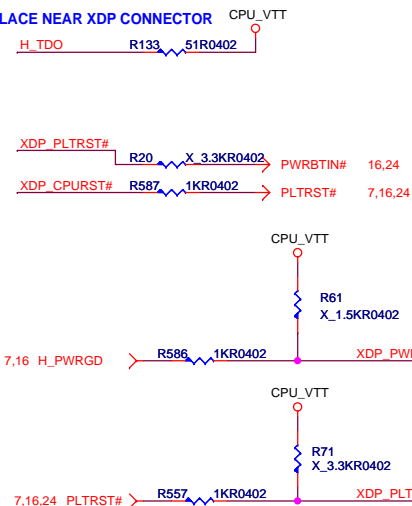
For EMI  
(close pin header)



## CPU XDP PORT

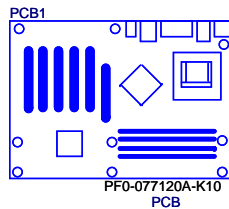


PLACE NEAR XDP CONNECTOR CPU\_VTT

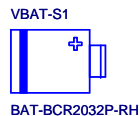




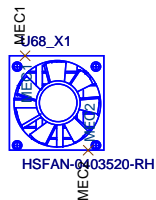
Manual Parts



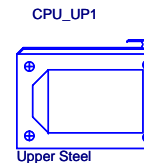
慶生PF0-077120A-K10



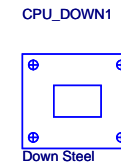
BAT-BCR2032P-RH



HSFAN-0403520-RH



Upper Steel



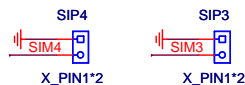
Down Steel

Simulation



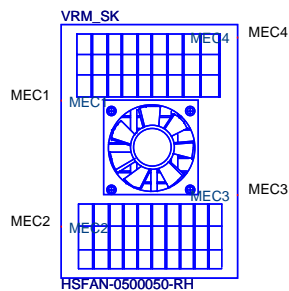
X\_PIN1\*2

X\_PIN1\*2



X\_PIN1\*2

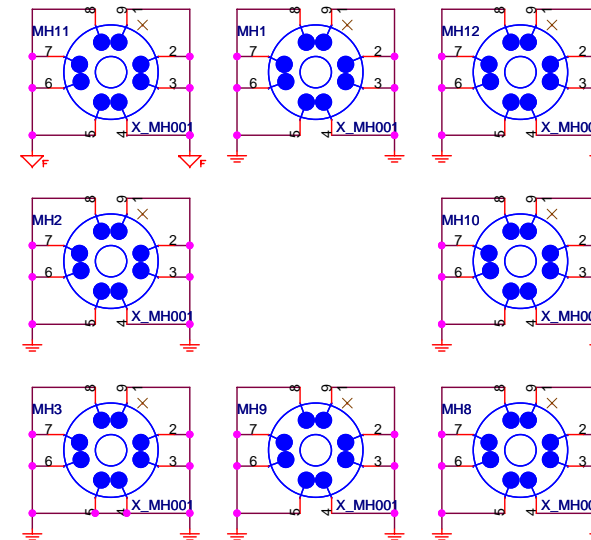
X\_PIN1\*2



HSFAN-0500050-RH

PCB Mounting Holes

Mounting Holes



Optics Orientation Holes

Optical Fiducial Marks-120



X\_FM

X\_FM

X\_FM

X\_FM

X\_FM

X\_FM

X\_FM

X\_FM