



# MS-7409 Ver:0A

## CPU:

AMD M2 Athlon 64

## System Chipset:

ATI RS690

ATI SB600

## On Board Chipset:

WINBOND Super I/O -- W83627DHG

LAN\*1 -- Realtek 8111B/8111C

HD Codec --ALC888

BIOS -- SPI ROM 8Mbit

## Main Memory:

DDR \* 1 (Max 2GB)

## Expansion Slots:

MINI PCI-E\*1

PCI 2.2 Slot X 1

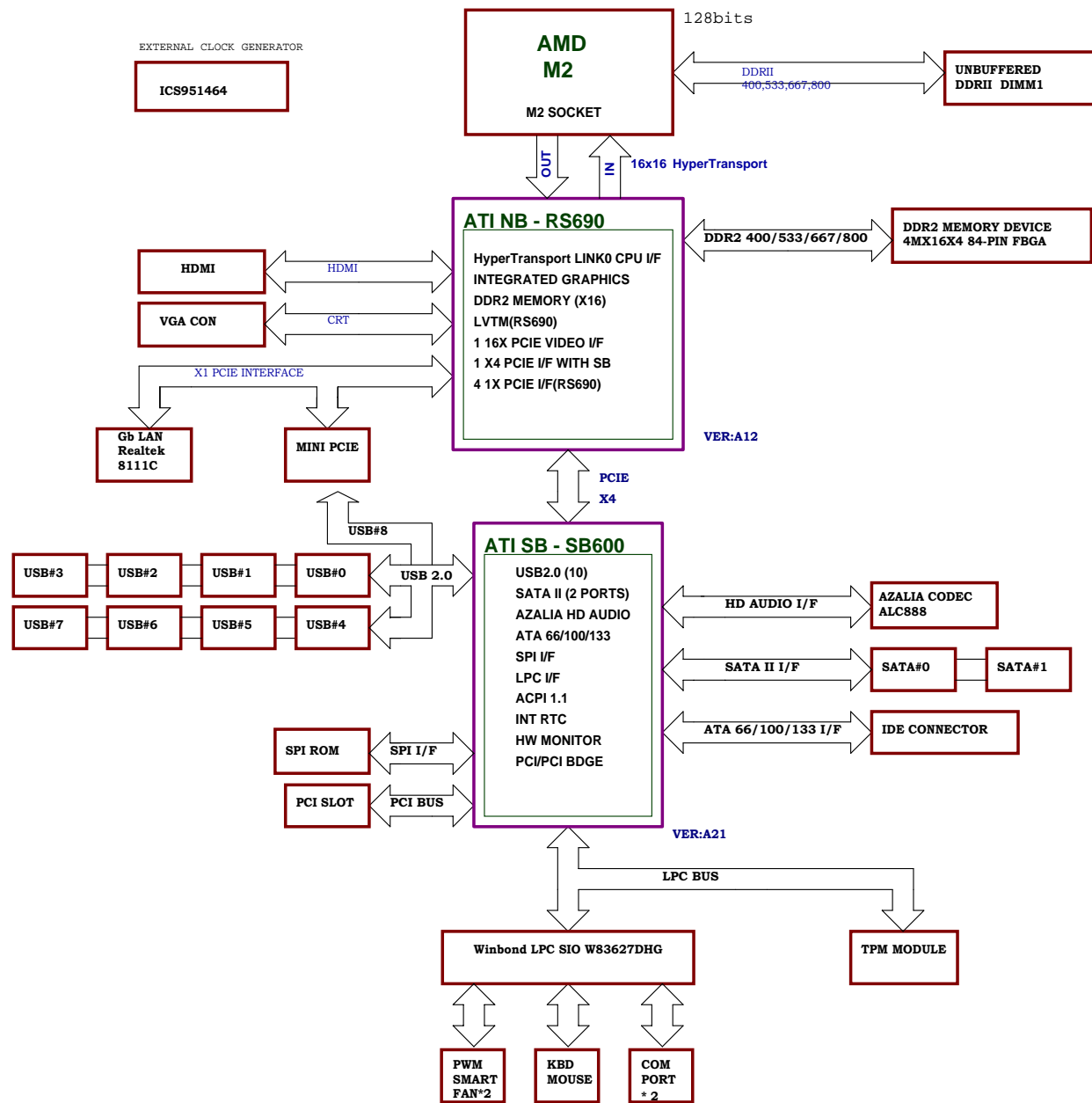
## PWM:

Controller--Intersil ISL6312CR 3 Phase

## Clock Generator:

Controller--ICS951464AGLFT

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Micro Star Restricted Secret		
Title	Block Diagram	Rev 0B
Document Number	MS-7409	
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SB600 GPIO Config.

GPIO Pin	Type	Default	Power	Function
SSMUXSEL /SATA_IS3#/GPIO0	I/OD(3.3V)	Output(Low)	Main	NC
ROM_CS#/GPIO1	I/O(3.3V)	by Strapping	Main	NC
SPKR/GPIO2	I/O(3.3V)	Input(TS)	Main	NC
FANOUT0/ GPIO3	I/O(3.3V)	Input(PU)	Main	NC
SMARTVOLT/SATA_IS2#/GPIO4	I/O(3.3V)	Input(TS)	Main	NC
SHUTDOWN#/ GPIO5	I/O(3.3V)	Input(TS)	Main	NC
GHI#/SATA_IS1#/GPIO6	I/OD(3.3V)	Output(TS)	Main	GHI#
WD_PWRGD/ GPIO7	I/O(3.3V)	by Strapping	Main	NC
DDC1_SDA/ GPIO8	I/O(3.3V)	Input(TS)	Main	NC (Not Default)
DDC1_SCL/GPIO9	I/O(3.3V)	Input(TS)	Main	PD_DET (Not Default)
SATA_ISO#/GPIO10	I/O(3.3V)	Input(TS)	Main	NC (Not Default)
SPI_DO/GPIO11	I/O(S5_3.3V)	Output(PD)	Standby	SPI_DATAOUT
SPI_DI/GPIO12	I/O(S5_3.3V)	Output(PD)	Standby	SPI_DATAIN
LAN_RST#/GPIO13	O(3.3V)	Output(Low)	Main	LAN_RST#
ROM_RST#/GPIO14	I/O(3.3V)	Output(Low)	Main	NC
IDE_D[0..15]/GPIO[15..30]	I/O(3.3V)	Output(High)	Main	IDE_D[0..15]
SPI_HOLD#/GPIO31	I/O(S5_3.3V)	Input(PU)	Standby	SPI_HOLD#
SPI_CS#/GPIO32	I/O(S5_3.3V)	Input(PU)	Standby	SPI_CS#
INTE#/GPIO33	I/O(3.3V)	Input(PU)	Main	INTE#
INTF#/GPIO34	I/O(3.3V)	Input(PU)	Main	INTF#
INTG#/GPIO35	I/O(3.3V)	Input(PU)	Main	INTG#
INTH#/GPIO36	I/O(3.3V)	Input(PU)	Main	INTH#
DPSLP_OD#/GPIO37	I/O(3.3V)	Input(TS)	Main	TP16
AC_BITCLK/GPIO38	I/O(3.3V)	Input(PD)	Main	NC
AC_SDOUT/GPIO39	I/O(3.3V)	Output(Low)	Main	AC_SDATA_OUT
AC_SYNC/GPIO40	I/O(3.3V)	Output(Low)	Main	NC
SPDIF_OUT/PCICLK7/GPIO41	I/O(3.3V)	Output(Low)	Main	NC
ACZ_SDIN0/GPIO42	I/O(S5_3.3V)	Input(PD)	Standby	AZ_SDIN0
ACZ_SDIN1/GPIO43	I/O(S5_3.3V)	Input(PD)	Standby	NC
ACZ_SDIN2/GPIO44	I/O(S5_3.3V)	Input(PD)	Standby	NC
AC_RST#/GPIO45	I/O(S5_3.3V)	Output(Low)	Standby	NC
AC_SDIN3/GPIO46	I/O(S5_3.3V)	Input(PD)	Standby	GPIO46
SPI_CLK/GPIO47	I/O(S5_3.3V)	Input(PD)	Standby	SPI_CLK
FANOUT1/ GPIO48	I/O(3.3V)	Input(PU)	Main	NC (Program to Output)
FANOUT2/ GPIO49	I/O(3.3V)	Input(PU)	Main	NC (Program to Output)
FANIN0/ GPIO50	I/O(3.3V)	Input(TS)	Main	NC (Program to Output)
FANIN1/ GPIO51	I/O(3.3V)	Input(TS)	Main	NC (Program to Output)
FANIN2/ GPIO52	I/O(3.3V)	Input(TS)	Main	NC (Program to Output)
VIN[0..7]/GPIO[53..60]	I/O(3.3V)	Input(TS)	Main	NC (Program to Output)
TEMPIN0/ GPIO61	I/O(3.3V)	Input(TS)	Main	NC (Program to Output)
TEMPIN1/ GPIO62	I/O(3.3V)	Input(TS)	Main	NC (Program to Output)
TEMPIN2/ GPIO63	I/O(3.3V)	Input(TS)	Main	NC (Program to Output)
TEMPIN3/TALERT#/ GPIO64	I/O(3.3V)	Input(TS)	Main	TALERT# (Not Default)
BMREQ#/REQ5#/GPIO65	I/O(3.3V)	Input(TS)	Main	BMREQ# (Not Default)
LLB#/GPIO66	I/O(S5_3.3V)	Input(PU)	Standby	NC
SATA_ACT#/ GPIO67	OD(3.3V)	Output(TS)	Main	SATA_ACT#
LDRQ1#/GNT5#/ GPIO68	I/O(3.3V)	Input(PU)	Main	NC
RTC_IRQ#/GPIO69	I/O(S5_3.3V)/VBAT	Input(PU)	Standby	AUTO_ON#
REQ3#/GPIO70	I/O(3.3V)	Input(PU)	Main	NC
REQ4#/GPIO71	I/O(3.3V)	Input(PU)	Main	NC
GNT3#/GPIO72	I/O(3.3V)	Output(TS)	Main	NC
GNT4#/GPIO73	I/O(3.3V)	Output(TS)	Main	NC

SB600 GPM Config.

GPM Pin	Type	Default	Power	Function
USB_OC0#/ GPM#0	I/O(S5_3.3V)	Input(PU)	Standby	USB OverCurrent for PORT0,1,2,3 (Not Default)
USB_OC1#/ GPM#1	I/O(S5_3.3V)	Input(PU)	Standby	USB OverCurrent for PORT4,5,6,7 (Not Default)
USB_OC2#/ GPM#2	I/O(S5_3.3V)	Input(PU)	Standby	
USB_OC3#/ GPM#3	I/O(S5_3.3V)	Input(PU)	Standby	NC
USB_OC4#/ GPM#4	I/O(S5_3.3V)	Output(Low)	Standby	NC
USB_OC5#/DDR3_RST#/GPM#5	I/O/OD(S5_3.3V)	Input(PU)	Standby	WLAN_PWRON (Not Default)
BLINK/ GPM#6	I/O(S5_3.3V)	Input(PU)	Standby	GPM6#
SYS_RESET#/GPM#7	I/O(S5_3.3V)	Input(PU)	Standby	SYS_RESET# (Not Default)
USB_OC8#/AZ_DOCK_RST#/ GPM#8	I/O(S5_3.3V)	Input(PU)	Standby	NC
USB_OC9#/SLP_S2#/ GPM#9	I/O(S5_3.3V)	Input(PD)	Standby	NC

SB600 GPOC Config.

GPOC Pin	Type	Default	Power	Function
SCL0/ GPOC0#	I/O(3.3V)	Input(TS)	Main	SMBUS1 (Not Default)
SDA0/GPOC1#	I/O(3.3V)	Input(TS)	Main	SMBUS1 (Not Default)
SCL1/ GPOC2#	I/O(S5_3.3V)	Input(TS)	Standby	SMBUS2 (Not Default)
SDA1/GPOC3#	I/O(S5_3.3V)	Input(TS)	Standby	SMBUS2 (Not Default)

SB600 EXTEVENT & GEVENT Config.

GPM Pin	Type	Default	Power	Function
RI#/ EXTEVENT0#	I/O(S5_3.3V)	Input(PU)	Standby	NC
LPC_SMI#/EXTEVENT1#	I/O(3.3V)	Input(PU)	Main	NC
SMBALERT#/ THRMTRIP#GEVENT2#	I/O(S5_3.3V)	Input(PU)	Standby	THRMTRIP# (Reserved)
LPC_PME#/ GEVENT3#	I/O(S5_3.3V)	Input(PU)	Standby	LPC_PME# (Not Default)
PCI_PME#/ GEVENT4#	I/O(S5_3.3V)	Input(PU)	Standby	PCI_PME# (Not Default)
S3_STATE/GEVENT5#	I/O(S5_3.3V)	by Strapping	Standby	NC
USB_OC6#/ GEVENT6#	I/O(S5_3.3V)	Input(PU)	Standby	NC
USB_OC7#/ GEVENT7#	I/O(S5_3.3V)	Input(PU)	Standby	NC
WAKE#/GEVENT8#	I/O(S5_3.3V)	Input(PU)	Standby	PCIE_WAKE# (Not Default)

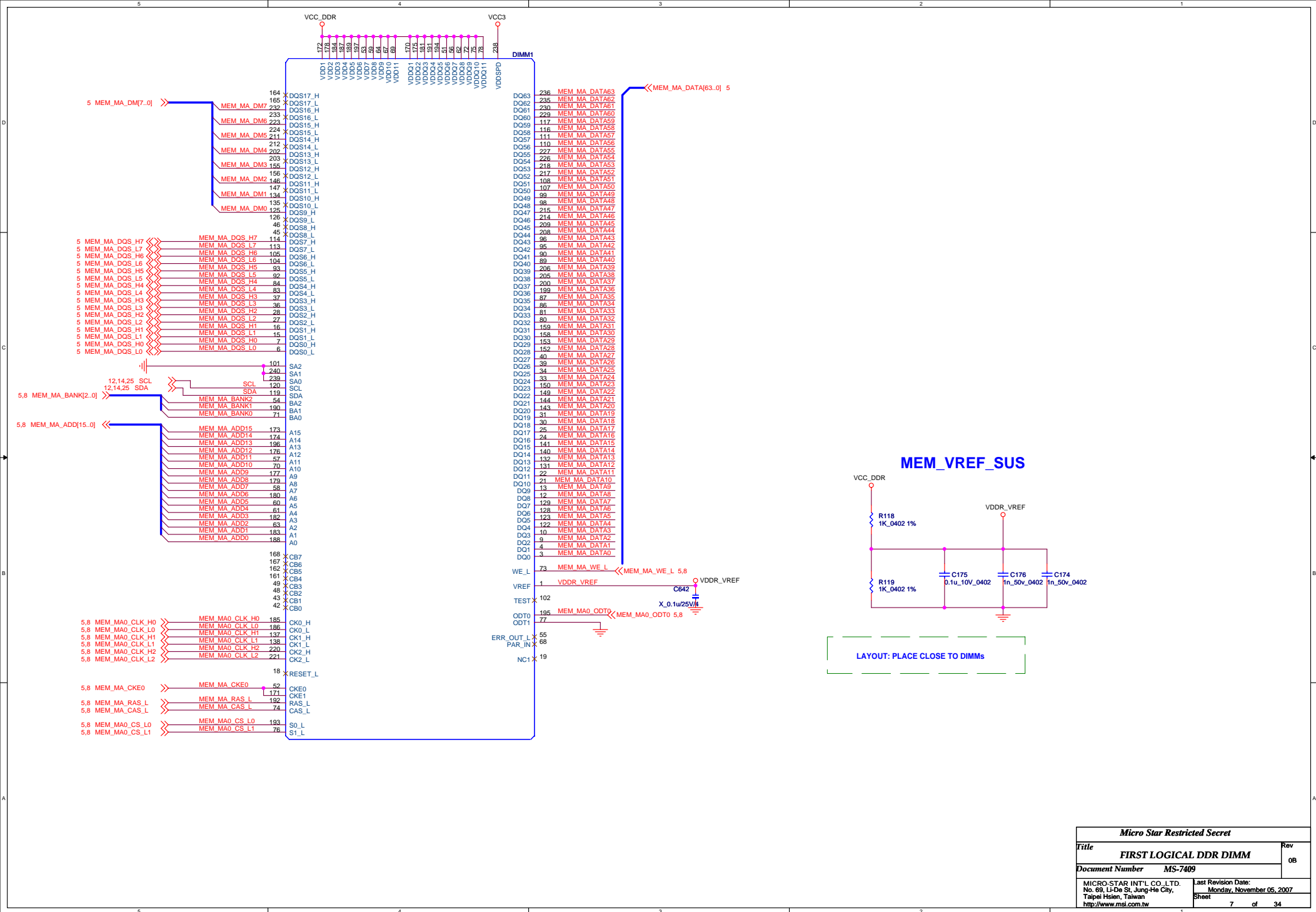
PCI Config.

	CLOCK	REQ#	GNT#	IDSEL	INTA#	INTB#	INTC#	INTD#
IEEE 1394								
GIGA LAN								
PCI1								
PCI2								
Super I/O								

<b><i>Micro Star Restricted Secret</i></b>			
<b>Title</b>			<b>Rev</b>
<b>M2 HT I/F CTRL &amp; DEBUG</b>			<b>0B</b>
<b>Document Number</b>			
<b>MS-7409</b>			
<b>MICRO-STAR INT'L CO., LTD.</b> No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		<b>Last Revision Date:</b>	
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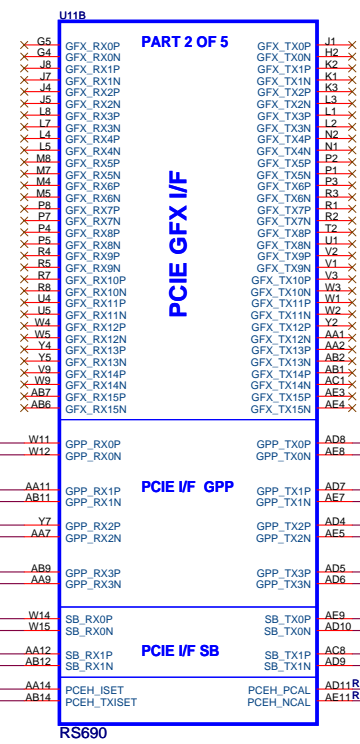
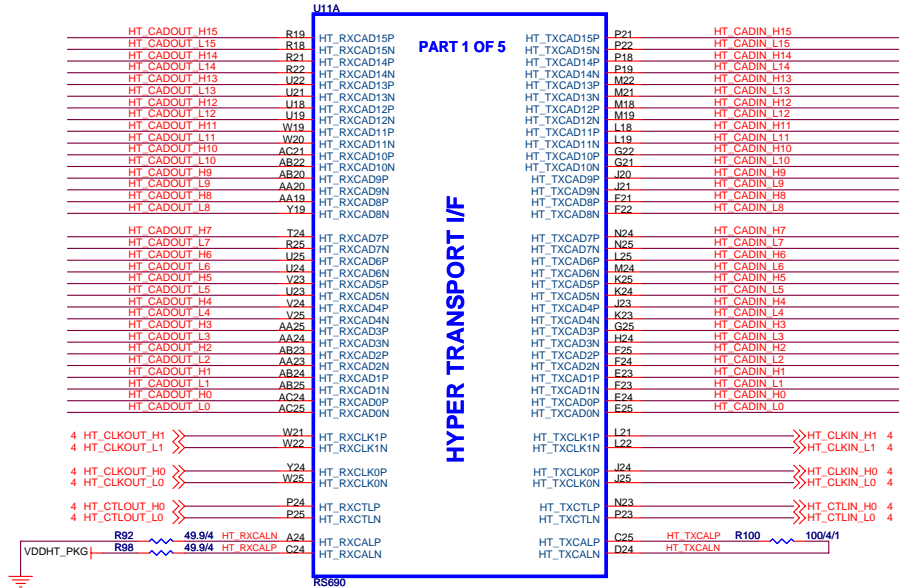




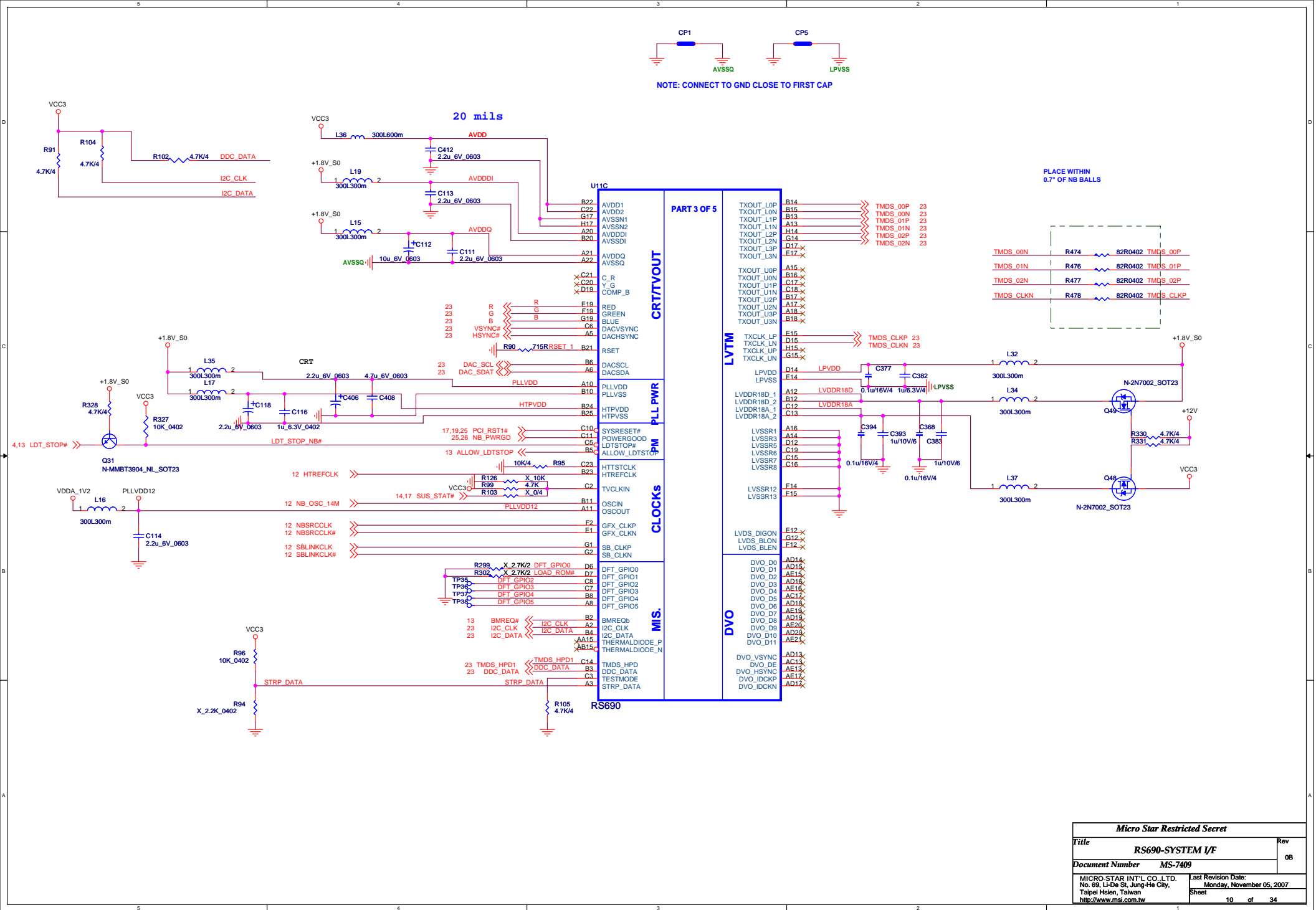


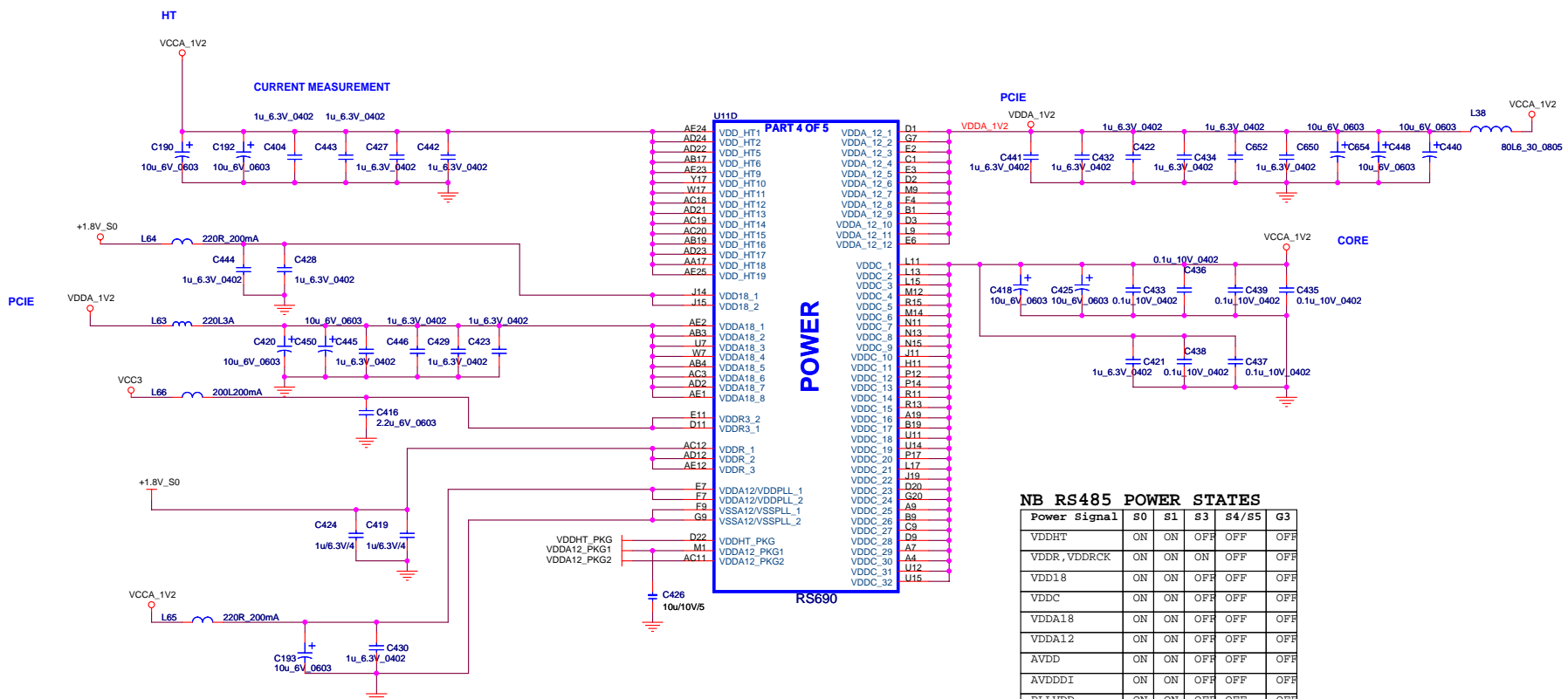


4 HT\_CADIN\_H[15..0] >> HT\_CADIN\_H[15..0]  
4 HT\_CADIN\_L[15..0] >> HT\_CADIN\_L[15..0]  
4 HT\_CADOUT\_H[15..0] >> HT\_CADOUT\_H[15..0]  
4 HT\_CADOUT\_L[15..0] >> HT\_CADOUT\_L[15..0]

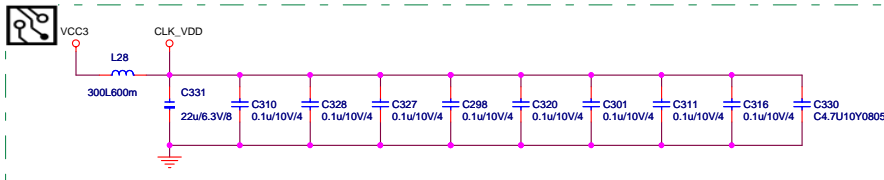


mini pcie  
lan

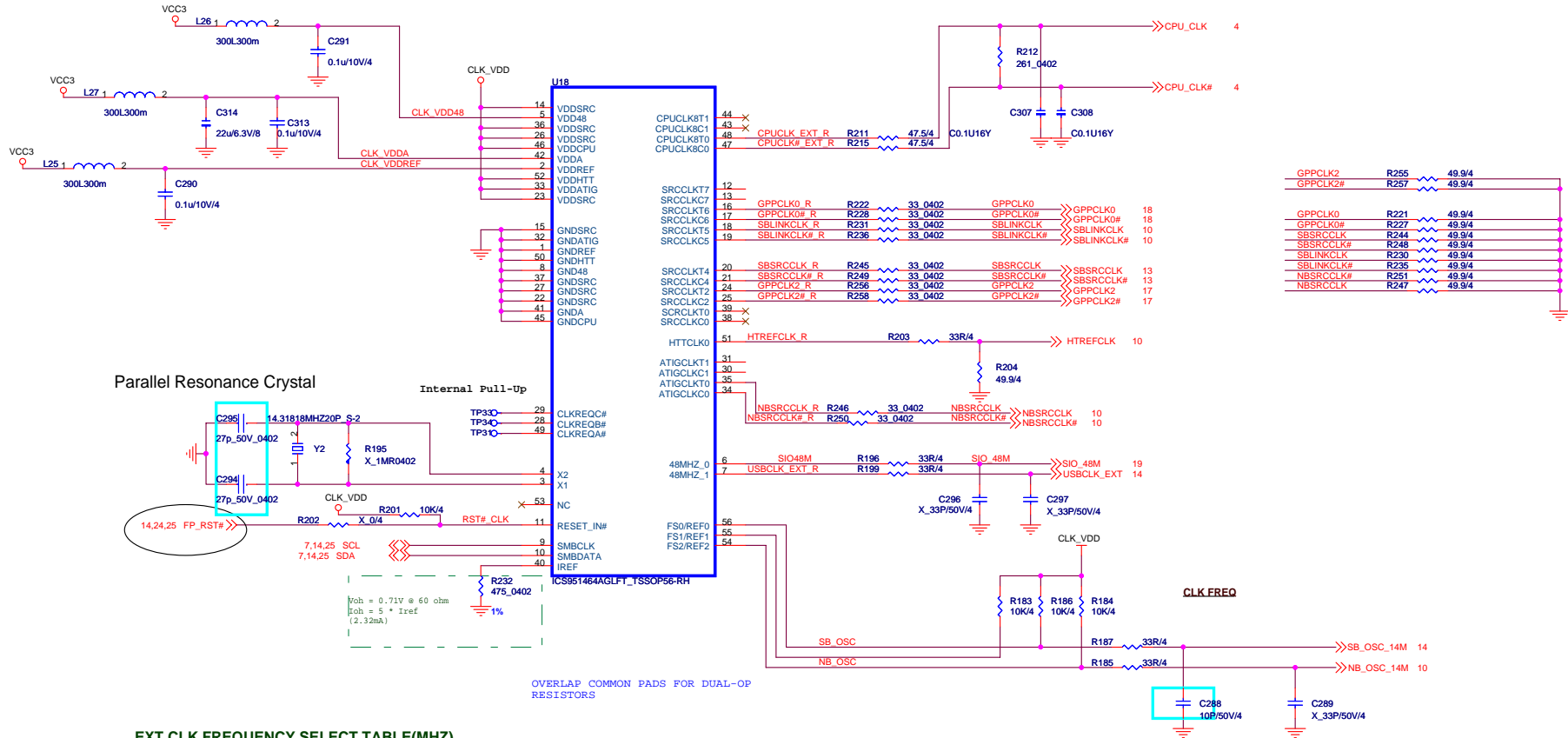




NB RS485 POWER STATES					
Power Signal	S0	S1	S3	S4/S5	G3
VDDHT	ON	ON	OFF	OFF	OFF
VDDR,VDDRCK	ON	ON	OFF	OFF	OFF
VDD18	ON	ON	OFF	OFF	OFF
VDDC	ON	ON	OFF	OFF	OFF
VDDA18	ON	ON	OFF	OFF	OFF
VDDA12	ON	ON	OFF	OFF	OFF
AVDD	ON	ON	OFF	OFF	OFF
AVDDDI	ON	ON	OFF	OFF	OFF
PLLVD	ON	ON	OFF	OFF	OFF
HTPVDD	ON	ON	OFF	OFF	OFF
VDDR3	ON	ON	OFF	OFF	OFF
LPVDD	ON	ON	OFF	OFF	OFF
LVDDR18D	ON	ON	OFF	OFF	OFF
LVDDR18A	ON	ON	OFF	OFF	OFF



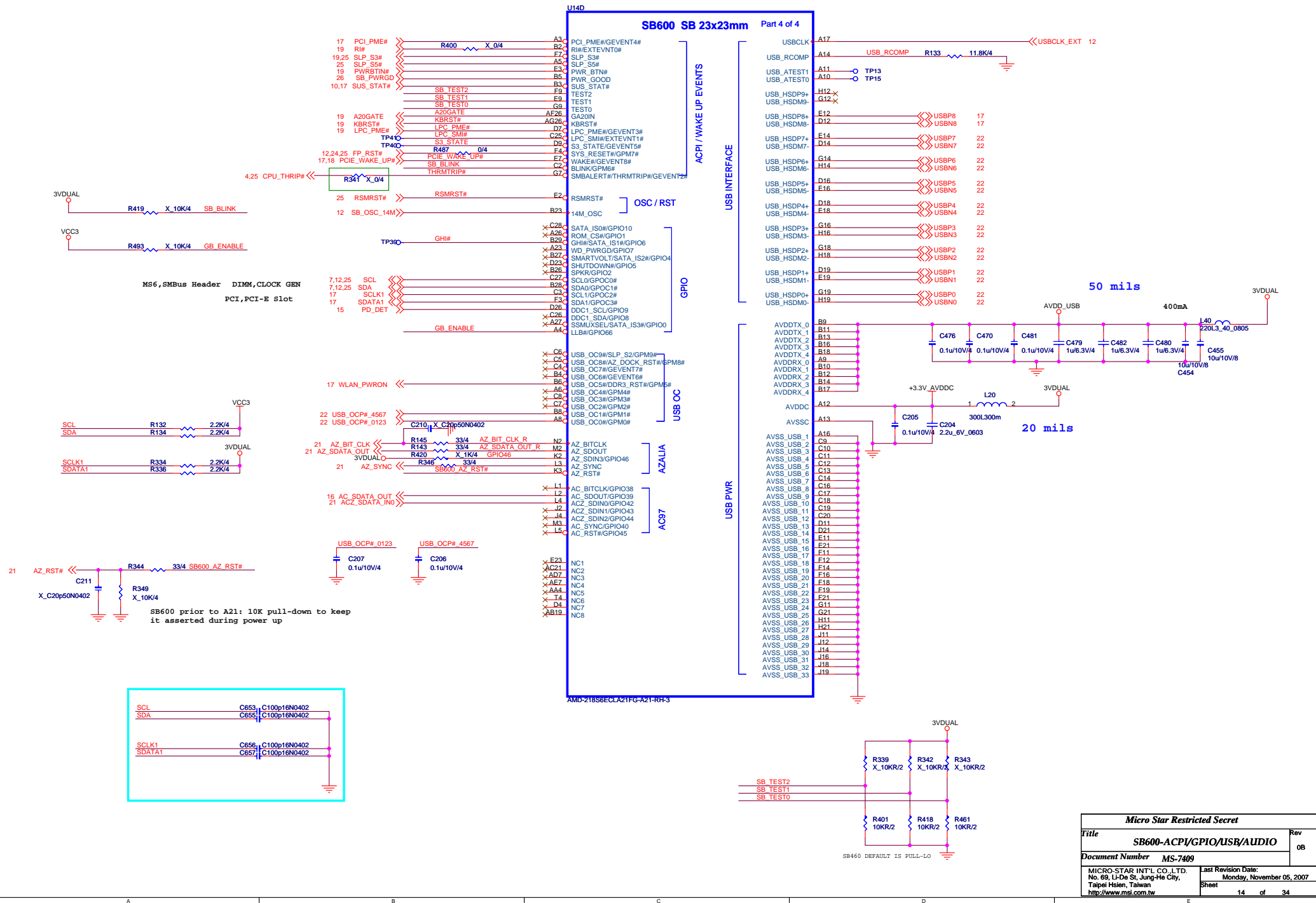
- 1- PLACE ALL THE SERIES TERMINATION RESISTORS AS CLOSE AS U300 AS POSSIBLE
- 2- ROUTE ALL CPUCCLK/#, NBSRCCLK/#, GPPCLK/# AS DIFFERENT PAIR RULE
- 3- PUT DECOUPLING CAPS CLOSE TO U300 POWER PIN



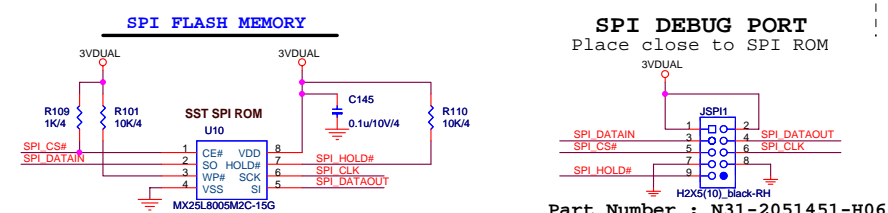
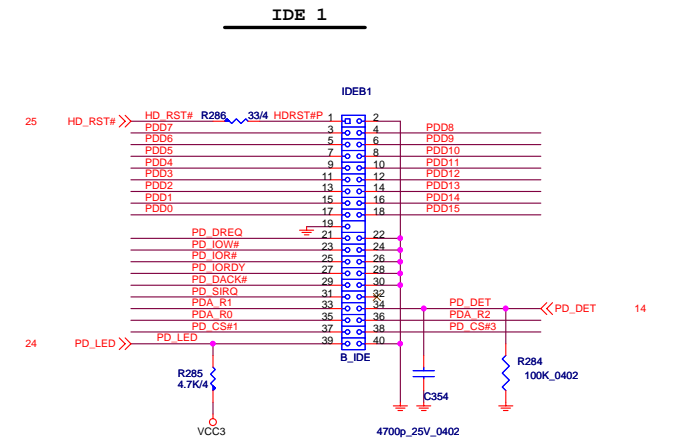
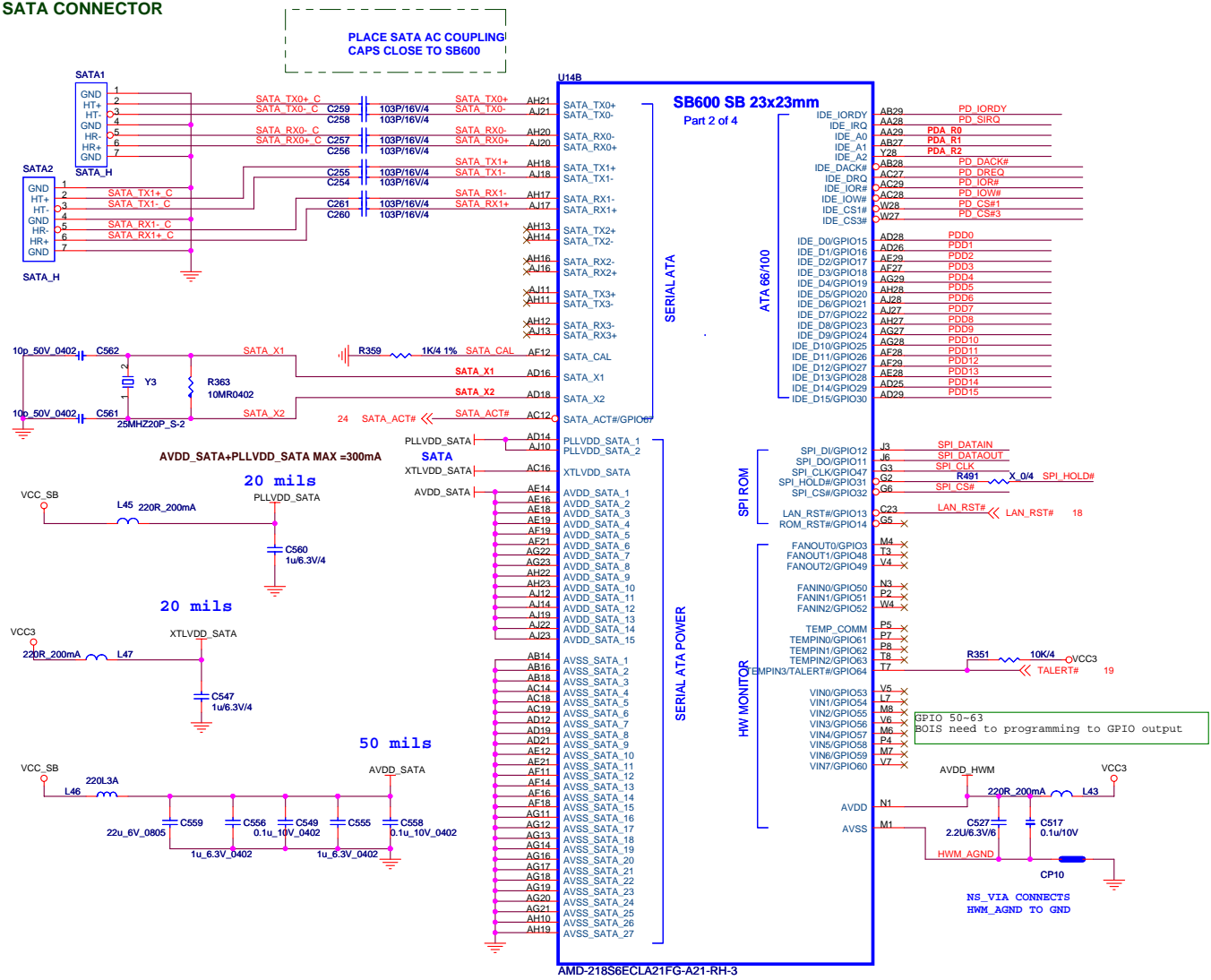
EXT CLK FREQUENCY SELECT TABLE(MHZ)

FS2	FS1	FS0	CPU	SRCCLK [2:1]	HTT	PCI	USB	COMMENT
0	0	0	Hi-Z	100.00	Hi-Z	Hi-Z	48.00	Reserved
0	0	1	X	100.00	X/3	X/6	48.00	Reserved
0	1	0	180.00	100.00	60.00	30.00	48.00	Reserved
0	1	1	220.00	100.00	36.56	73.12	48.00	Reserved
1	0	0	100.00	100.00	66.66	33.33	48.00	Reserved
1	0	1	133.33	100.00	66.66	33.33	48.00	Reserved
1	1	1	200.00	100.00	66.66	33.33	48.00	Normal HAMMER operation





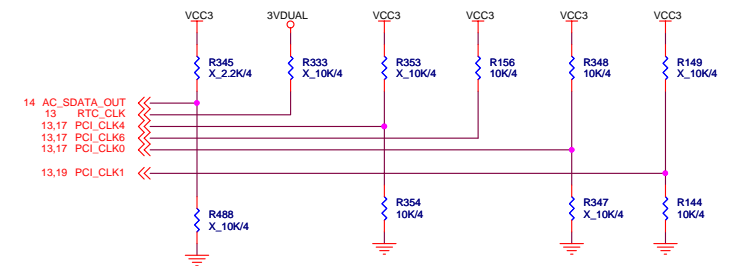
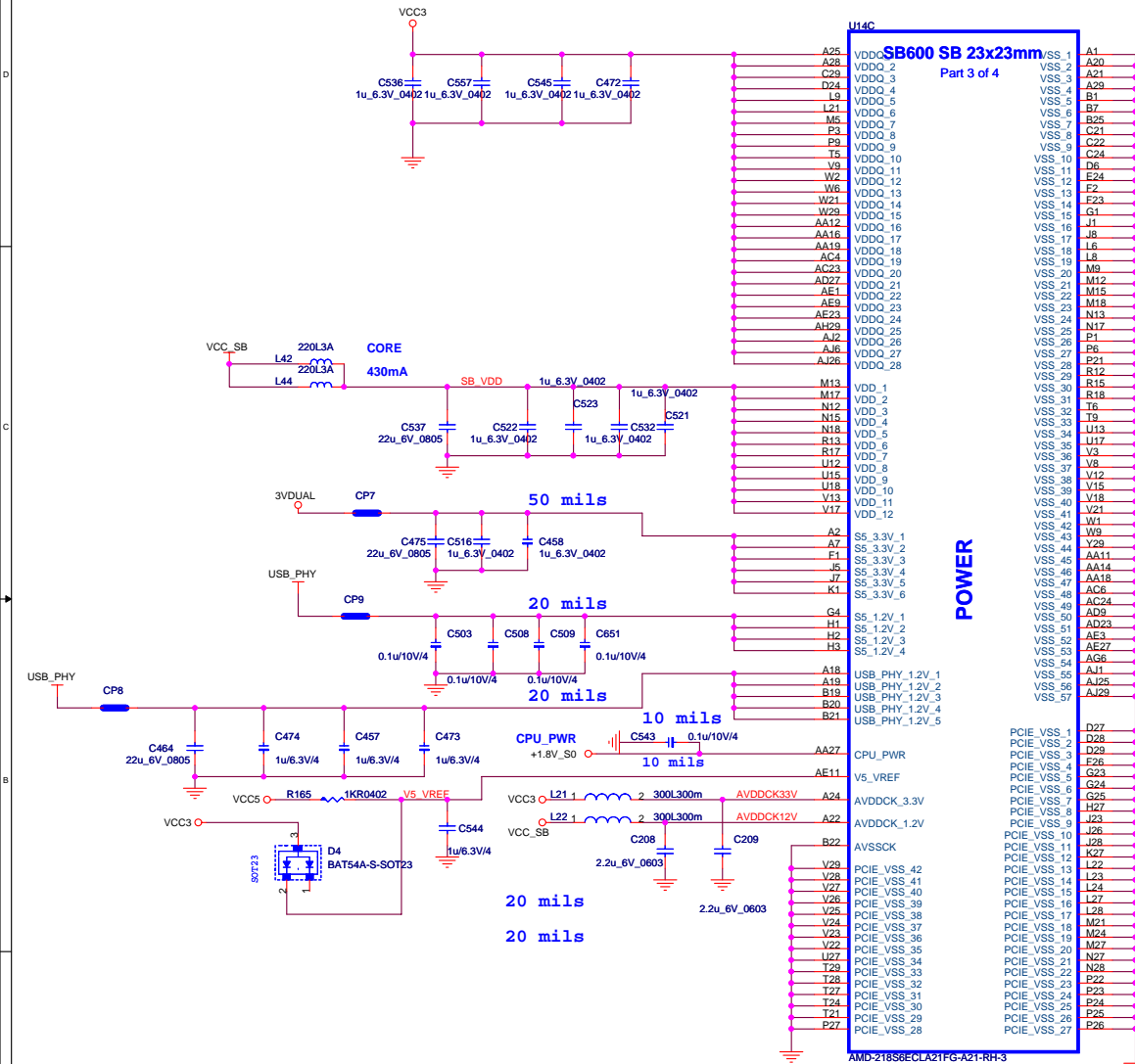
## SATA CONNECTOR



<b>Micro Star Restricted Secret</b>	
<b>Title</b>	Rev
<b>SB600-SATA/IDE/SPI</b>	0B
<b>Document Number</b>	<b>MS-7409</b>
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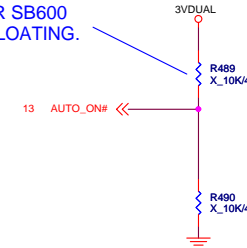


## REQUIRED STRAPS



	AC_SDOUT	RTC_CLK	PCI_CLK4	PCI_CLK6	PCI_CLK0	PCI_CLK1
PULL HIGH	USE DEBUG STRAPS	INTERNAL RTC DEFAULT	USE INT. PLL48	CPU IF=K8 DEFAULT	ROM TYPE: H, H = PCI ROM H, L = SPI ROM L, H = LPC ROM L, L = FWH ROM	DEFAULT
PULL LOW	IGNORE DEBUG STRAPS DEFAULT	EXTERNAL RTC	USE EXT. 48MHZ DEFAULT	CPU IF=P4		

NOTE: R489 PU RESISTOR FOR  
RTC\_IRQ# IS REQUIRED FOR SB600  
TO KEEP THE INPUT FROM FLOATING.

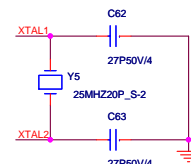


Micro Star Restricted Secret

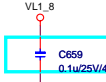
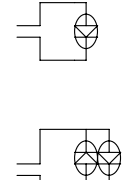
Title	SB600-POWER & DECOUPLING	Rev	0B
Document Number	MS-7409		
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Power consumption		
	1G	100M
3.3V	103mA	TBD
1.5V	367mA	TBD
1.8V	198mA	TBD

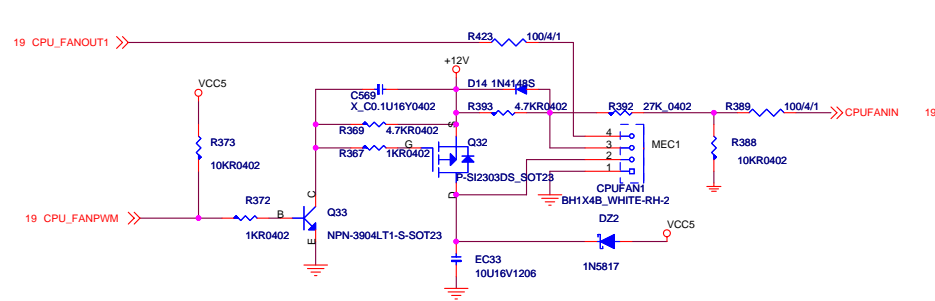


	RTL8111B / RTL8101E	RTL8111C	
AVDD33	3.3V	3.3V	
AVDD18	1.8V	1.2V	
EVDD18	1.8V	1.2V	
DVDD15	1.5V	1.2V	

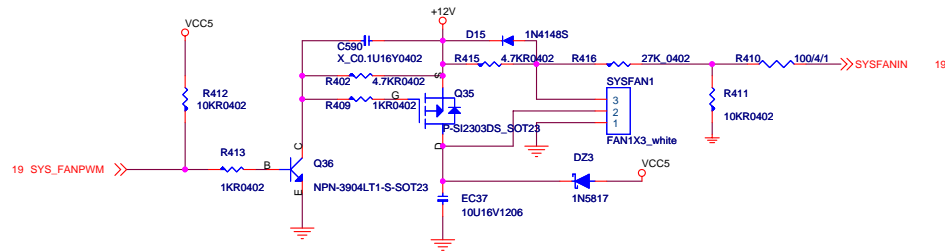
RTL8111B	<i>Need</i>	<i>Need</i>
RTL8111C	<i>N/A</i>	<i>N/A</i>



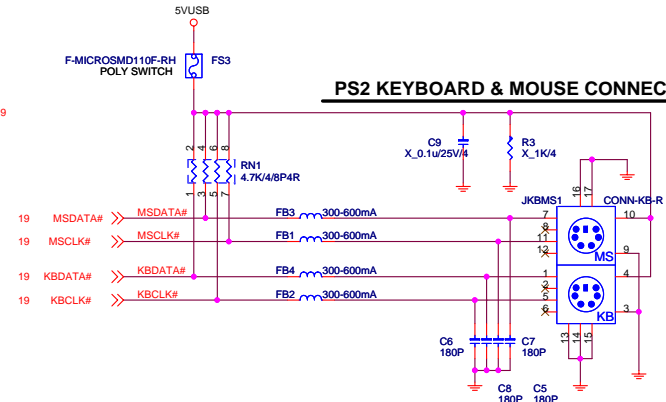
# CPU FAN PWM MODE



# SYS FAN PWM MODE

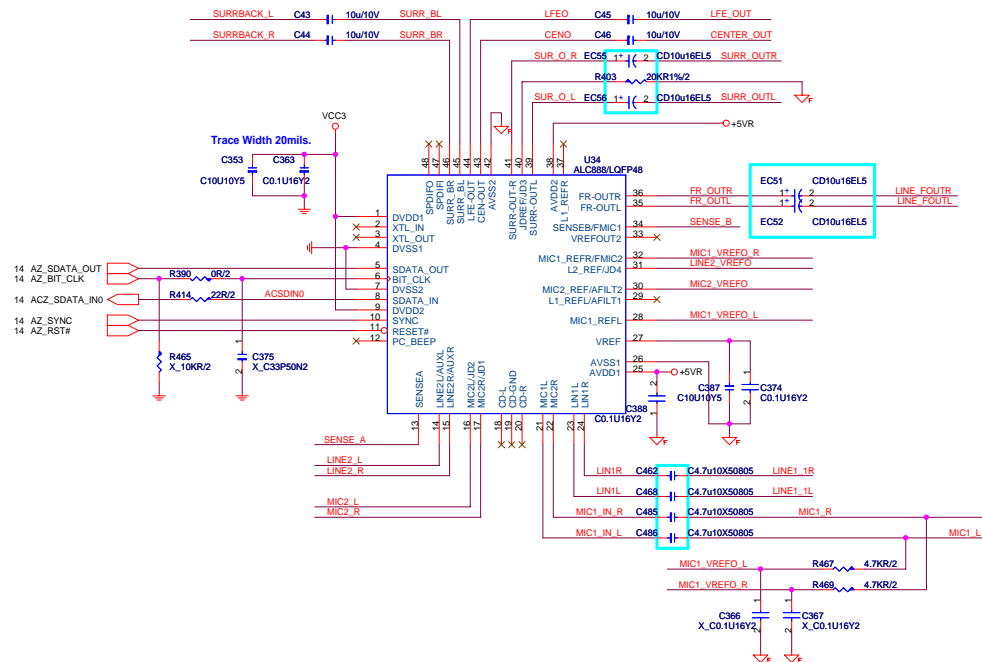


# PS2 KEYBOARD & MOUSE CONNECTOR

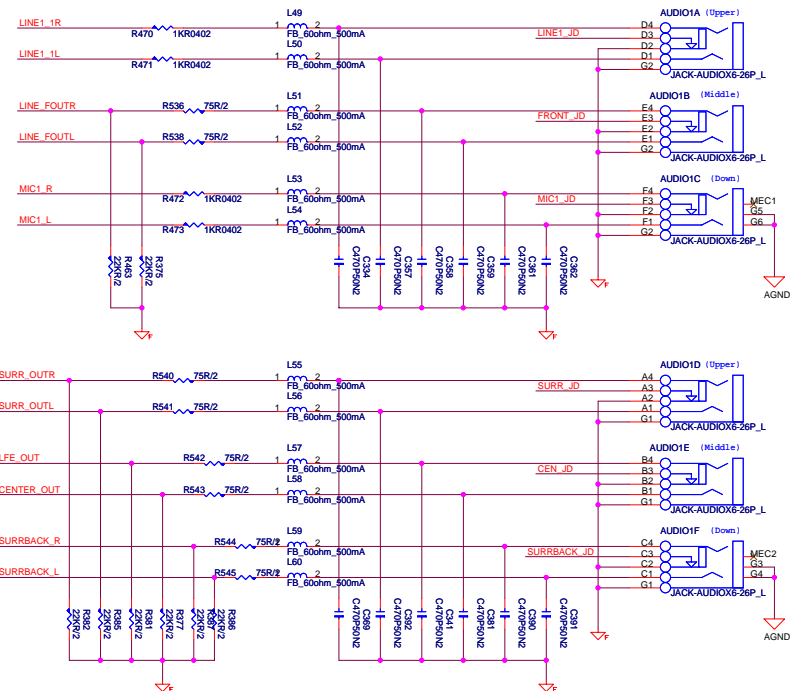


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# ALC888 CODEC



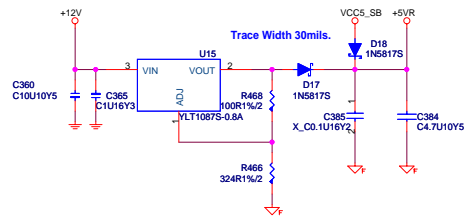
## ALC888 JACK



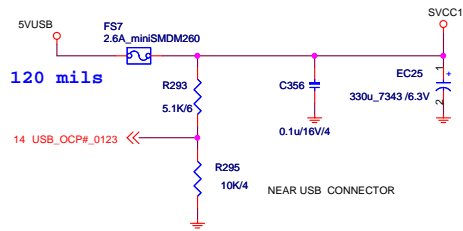
## ALC888 JACK DETECT



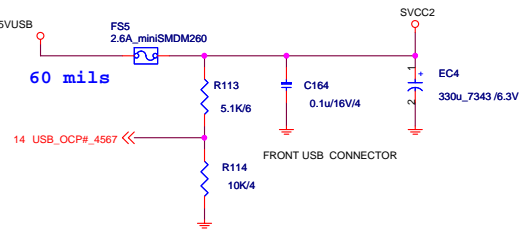
## AUDIO CODE REGULATORS



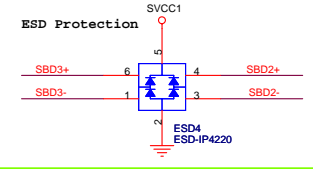
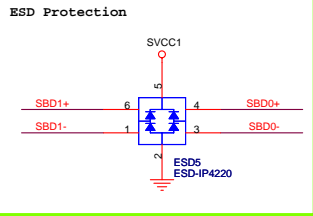
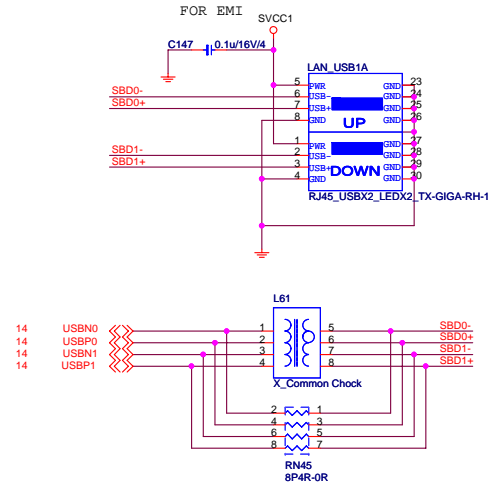
## POWER CIRCUIT FOR USB PORT 0,1,2,3



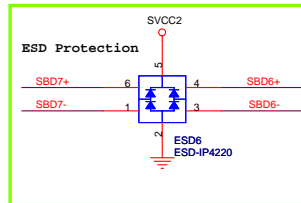
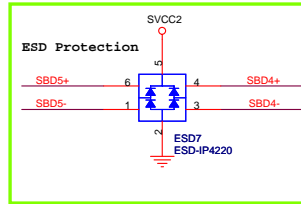
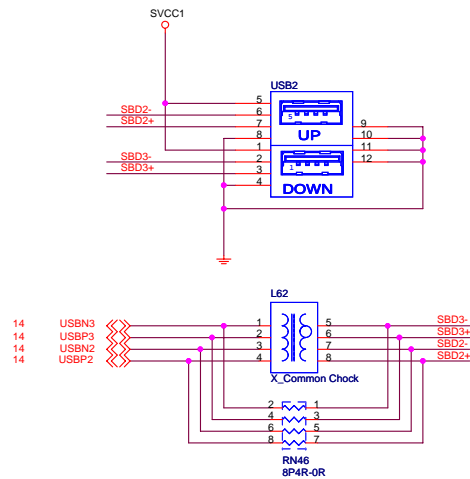
## POWER CIRCUIT FOR USB PORT 4,5,6,7



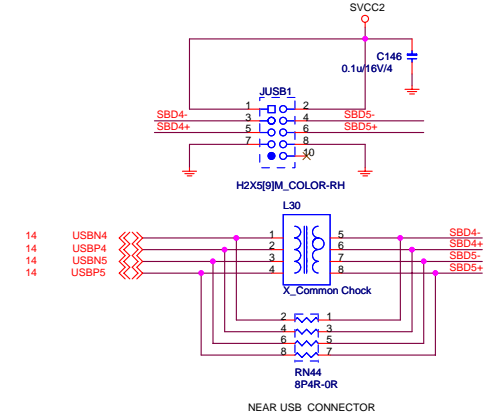
## REAR PANEL USB CONNECTOR FOR USB PORT 0,1



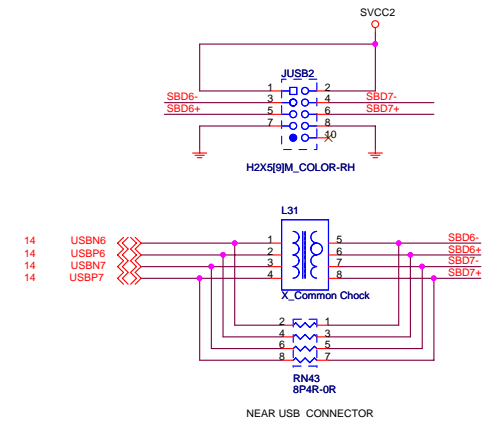
## REAR PANEL USB CONNECTOR FOR USB PORT 2,3



## FRONT PANEL USB CONNECTOR FOR USB PORT 4,5

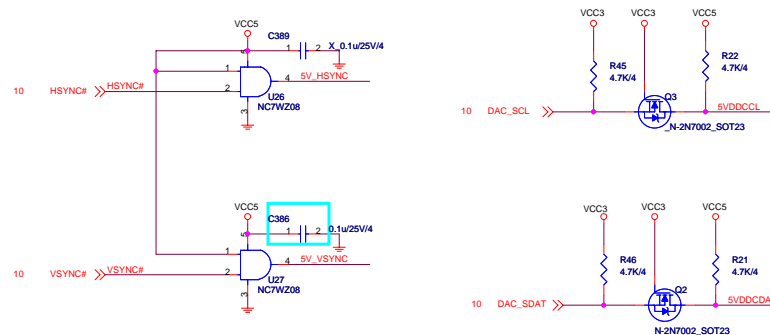
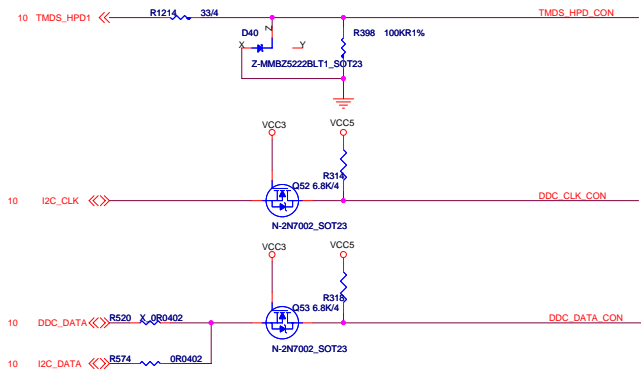
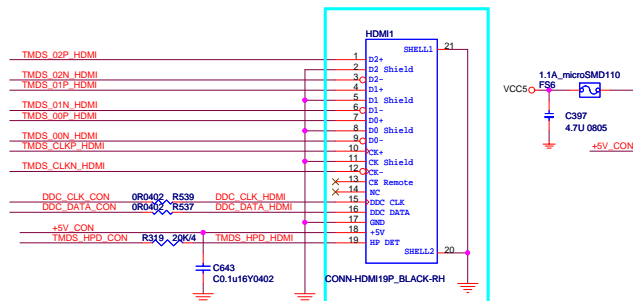
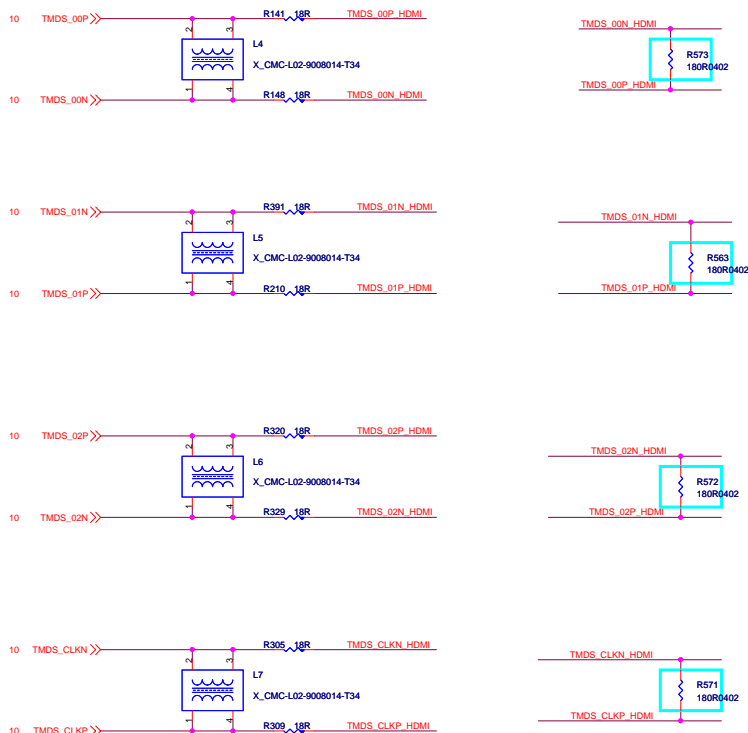


## FRONT PANEL USB CONNECTOR FOR USB PORT 6,7

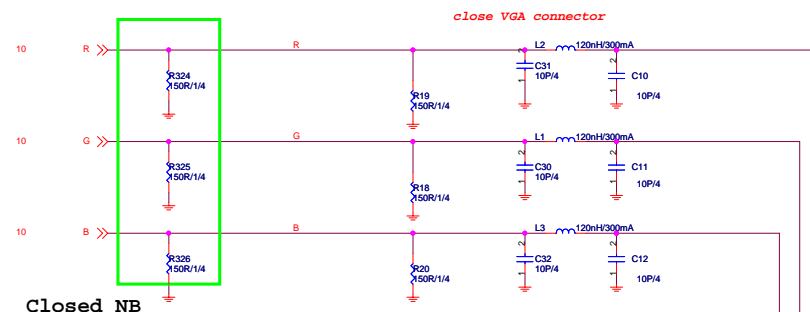


SHARE COMMON PADS  
AVIOD STUB

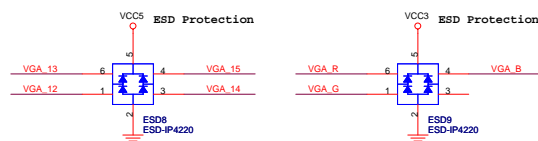
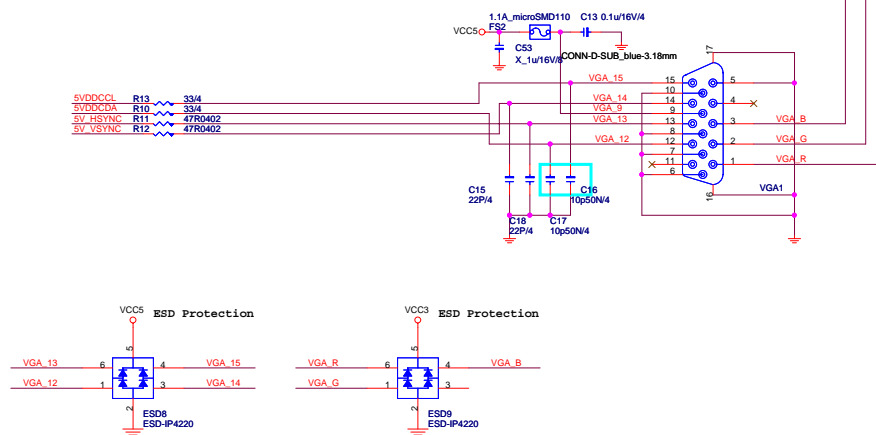
## HDMI



## VGA CONNECTOR

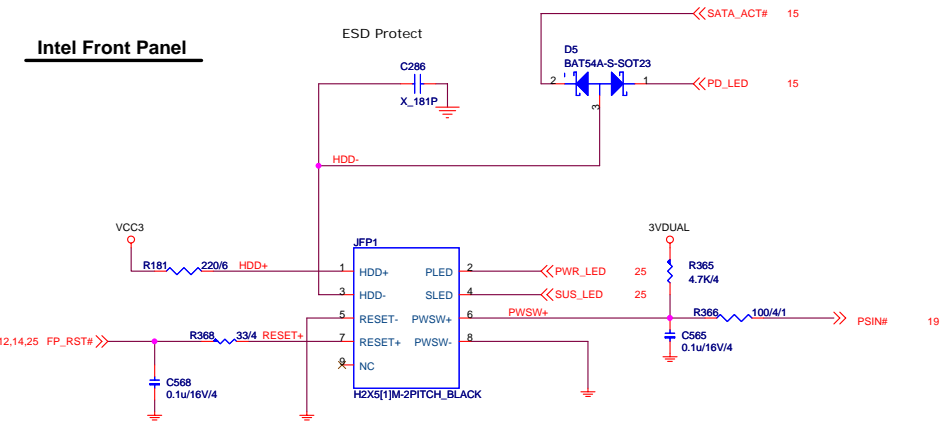


## Closed NB

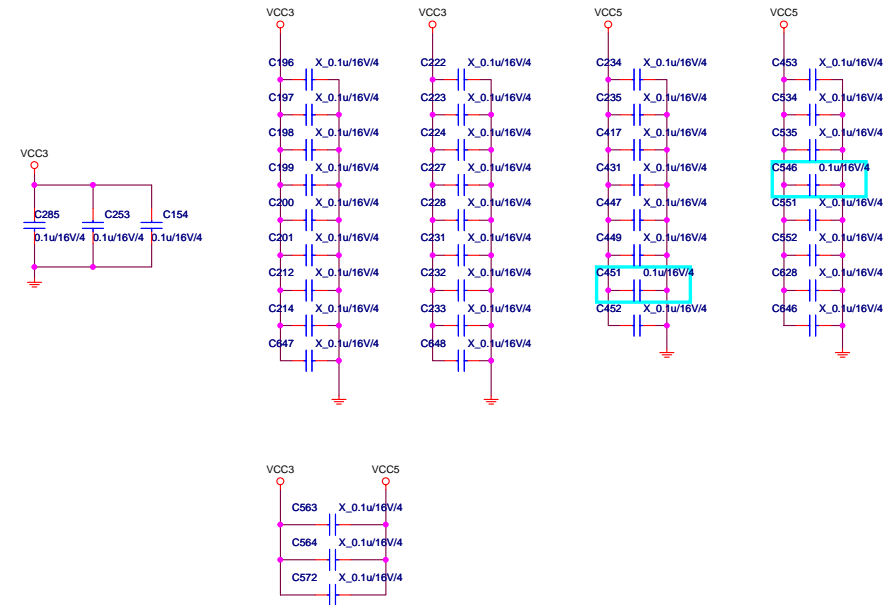


## Intel Front Panel

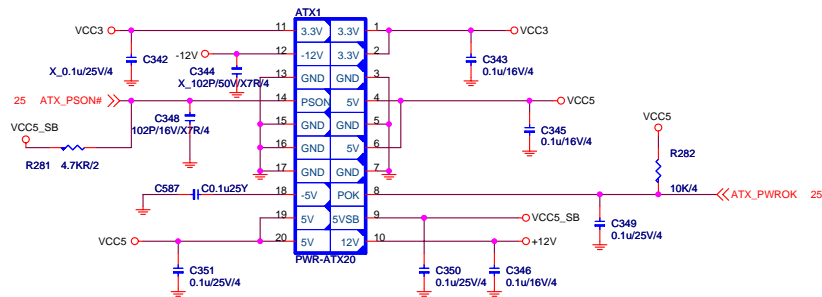
ESD Protect



## EMI solution



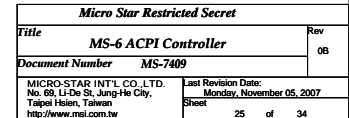
## ATX Connector



Micro Star Restricted Secret		
Title	ATX connector / Front Panel / EMI	Rev
Document Number	MS-7409	0B
MICRO-STAR INT'L CO., LTD. No. 69, Li-De St., Jung-Hsi City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: Monday, November 05, 2007 Sheet 24 of 34

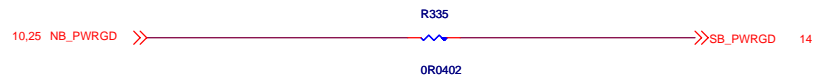
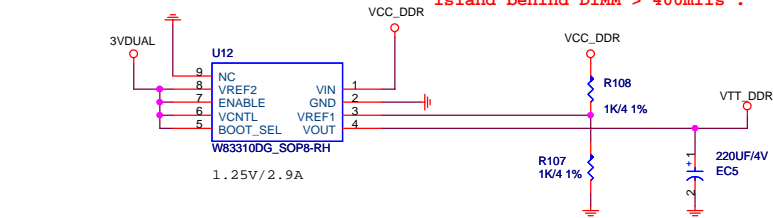


THESE OUTPUT AND INPUT PIN MUST  
BE PULL HIGH

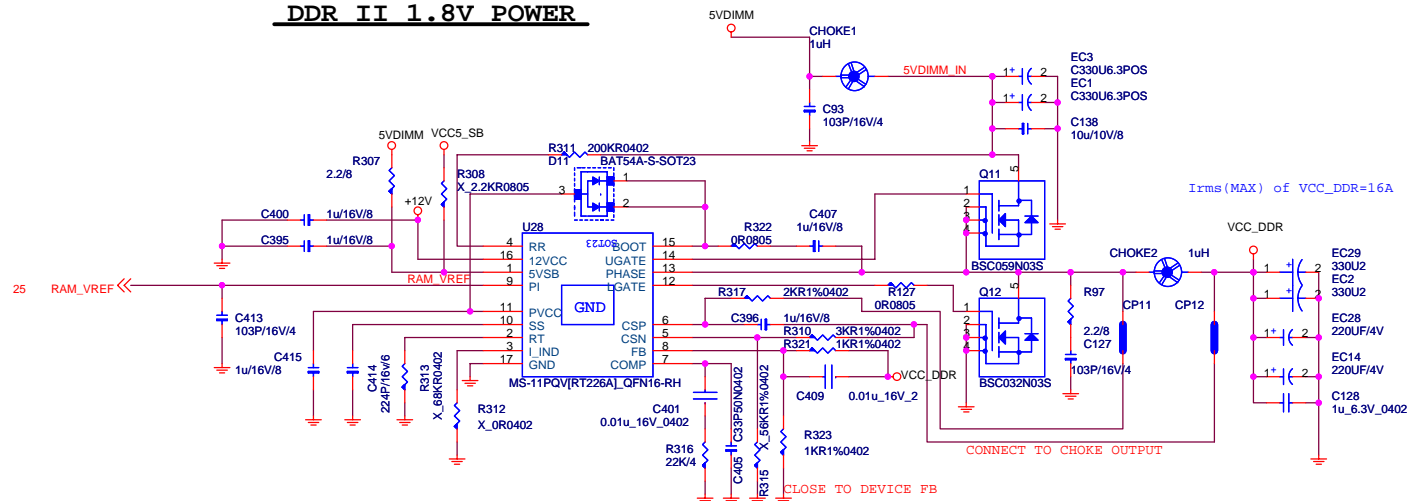


### DDR VTT Power

To CPU Copper trace width > 250mils , Fill island behind DIMM > 400mils .

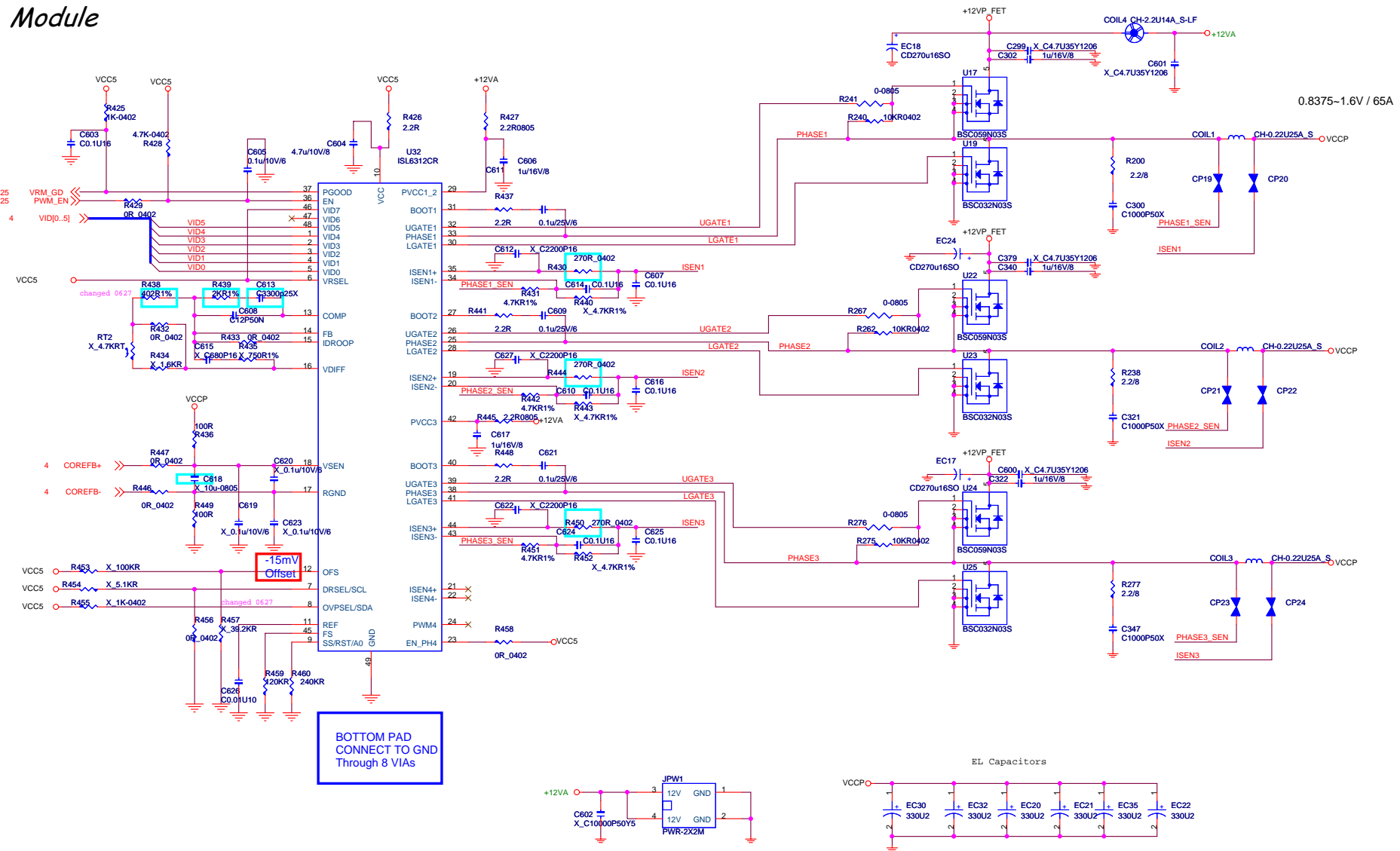

$$I_{ripple} = 16 \times 0.6 \times 0.8 / 1 = 7.68A$$
$$7.68A / 1.7 = 4.5A$$

## DDR II 1.8V POWER



<b>Micro Star Restricted Secret</b>	
<b>Title</b>	<b>Rev</b>
<b>MS-11 DDR2 POWER</b>	<b>0B</b>
<b>Document Number</b>	<b>MS-7409</b>
<b>MICRO STAR INT'L CO.,LTD.</b> No. 69, Li-De St., Jung-Hsi City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>	<b>Last Revision Date:</b> <b>Monday, November 05, 2007</b> <b>Sheet</b> <b>26 of 34</b>

## Voltage Regular Module



<b>Micro Star Restricted Secret</b>		
<b>Title</b>	<b>Intersil 6312CR 3Phase</b>	<b>Rev</b>
<b>Document Number</b>	<b>MS-7409</b>	<b>0B</b>
MICRO-STAR INT'L CO. LTD. No. 68, Li-De St, Jung-Hs City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		<b>Last Revision Date:</b> Monday, November 05, 2007 <b>Sheet</b> 27 <b>of</b> 34

- 10/9
1. Change R438: 402 ohm (droop)

2. Change R439: 2k ohm (comp)

3. Change C613: 3.3n F (comp)

4. Change R430: 270 ohm (Isen)

5. Change R444: 270 ohm (Isen)

6. Change R450: 270 ohm (Isen)

7. C618: NC

- 10/18
1. Change C51,C52,C462,C468,C485,C486,C493,C495 解audio prescion issue.

2. Change HDMI connector.

3. add C288(10P) 解SB\_OSC\_14M rise/fall time.

4. remove C644,C813 依造reeltek建議.

5. remove R83,R84,R89,R93 for IDE stardard.

6. change C16,C17 from 22P to 10P.解DDCDA&DDCCLK rise/fall time.

7. add C653,C655,C656,C657 100P解SMB gilter.

- 10/24
1. Change R111&R112 from 16.9ohm to 15ohm.(解CPU\_M\_VREF).

- 10/25
1. add R563,R571,R572,R573 180ohm解HDMI signal.

2. remove TPM circuit.

- 10/30
1. C218 Change to 68p.

2. C546 , C810 , C451 , C386 , C588 , C631 , Change to 104p.

3. C167 , C272 , C463 , C477 , C553 , C284 Change to 47P.

4. Add DVDD15 to GND 電容 104p C658,C660.

5. Add VL1\_8 to GND 電容 104p C659.

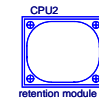
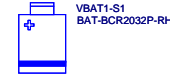
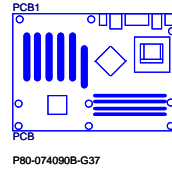
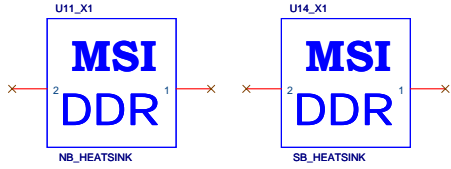
6. remove JCASE1.

7. Change C294,C295 to 27PF.

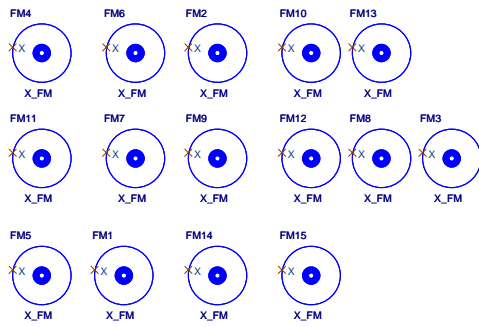
- 10/30
1. remove CD IN circuit.

2. change rear line out EL cap.

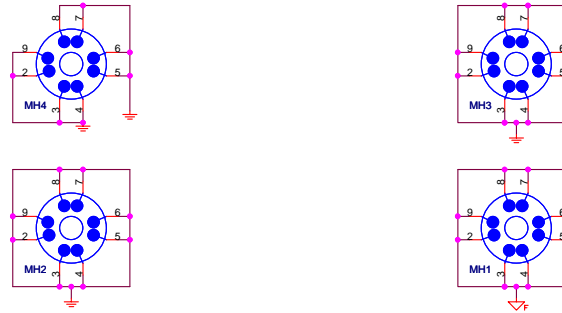
Micro Star Restricted Secret		
Title	REVERSE	Rev
Document Number	MS-7409	0B
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-Ho City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: Monday, November 05, 2007
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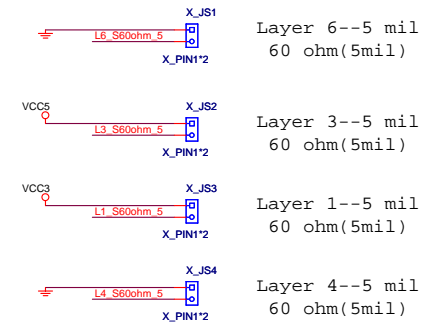
### Optics Orientation Holes



### Mounting Holes



### Simulation



Micro Star Restricted Secret		
Title	MANUAL PARTS	Rev
Document Number	MS-7409	0B
MICRO-STAR INT'L CO., LTD. No. 69, Li-De St., Jung-Hsi City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: Monday, November 05, 2007 Sheet 29 of 34