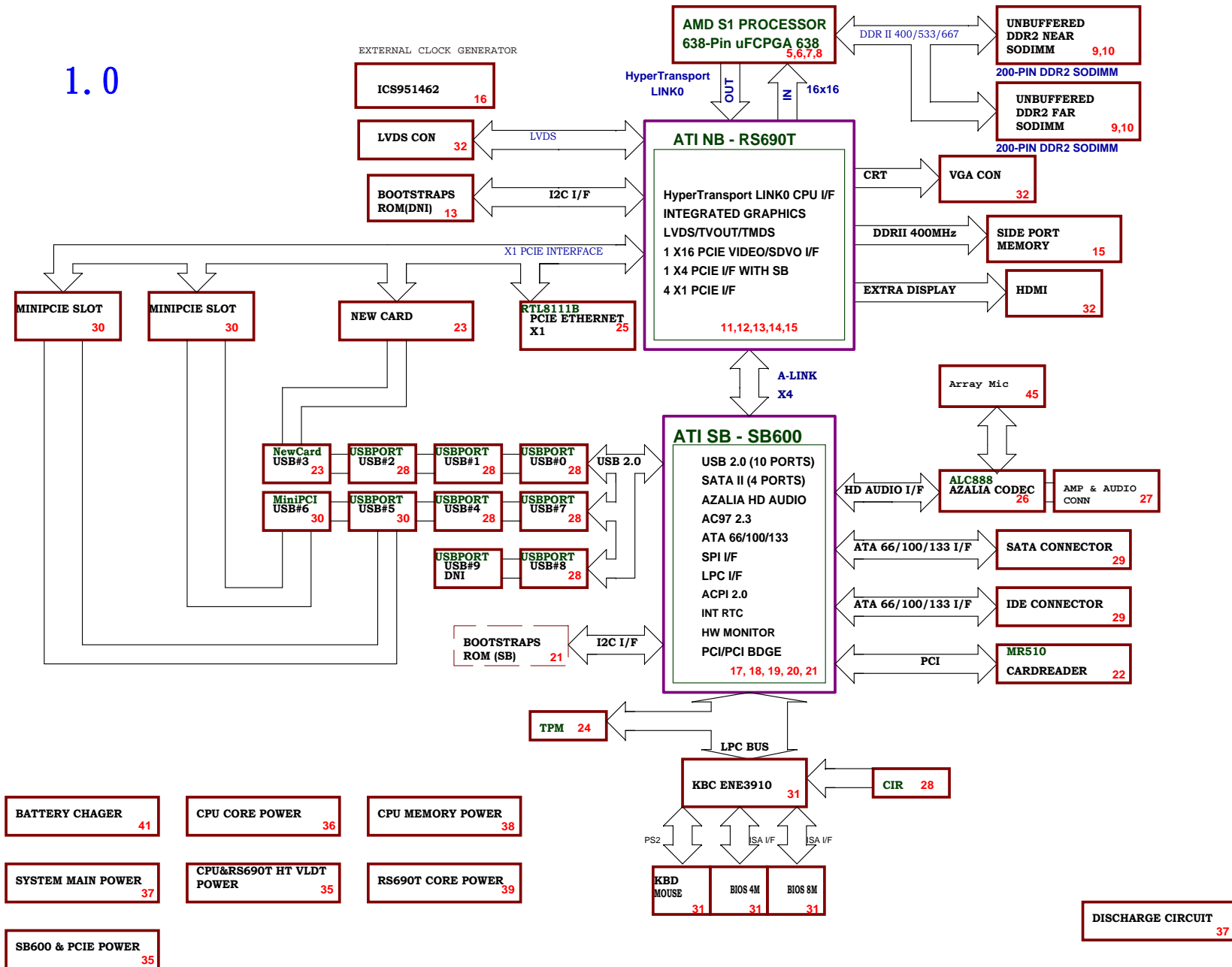
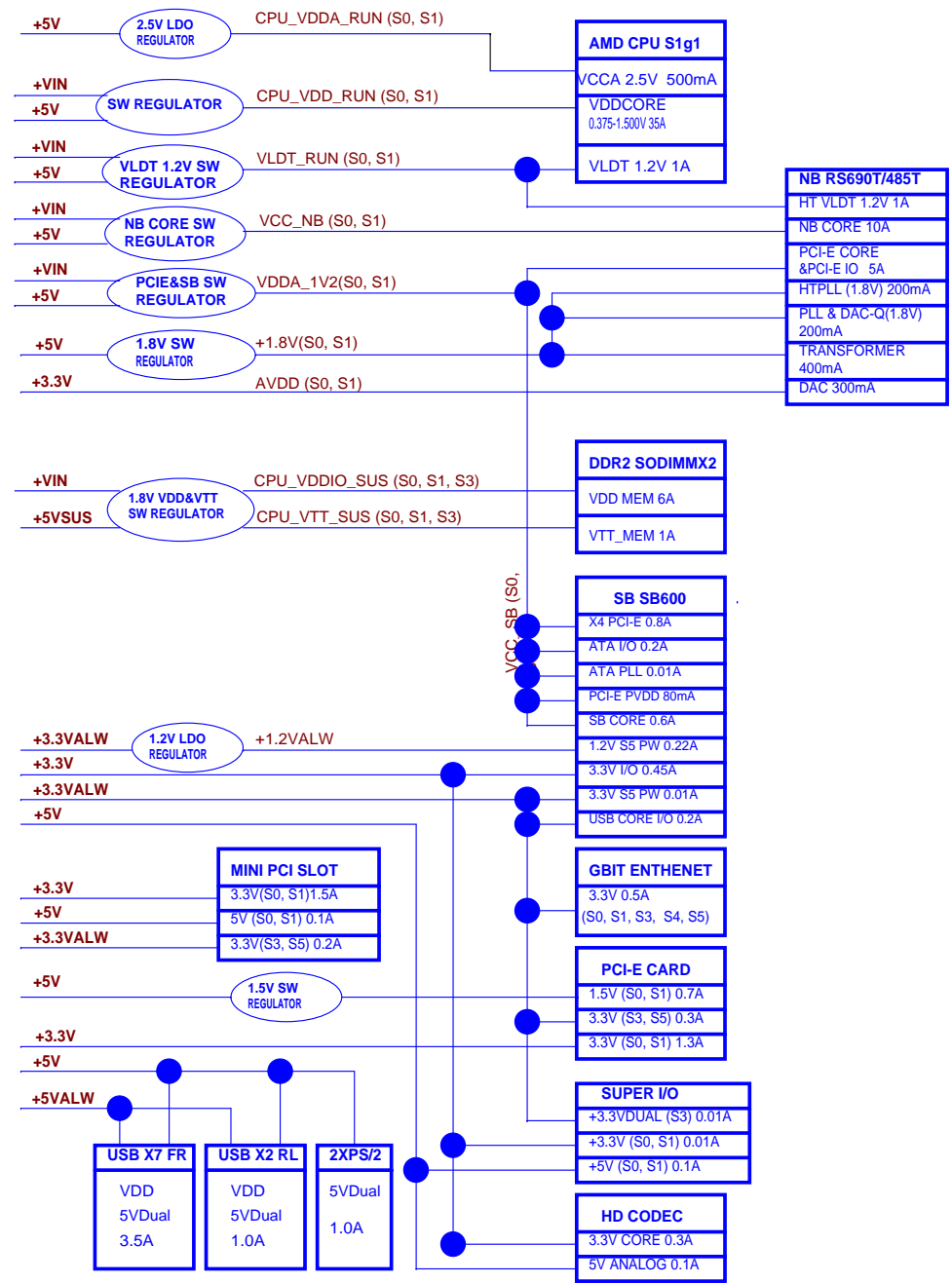
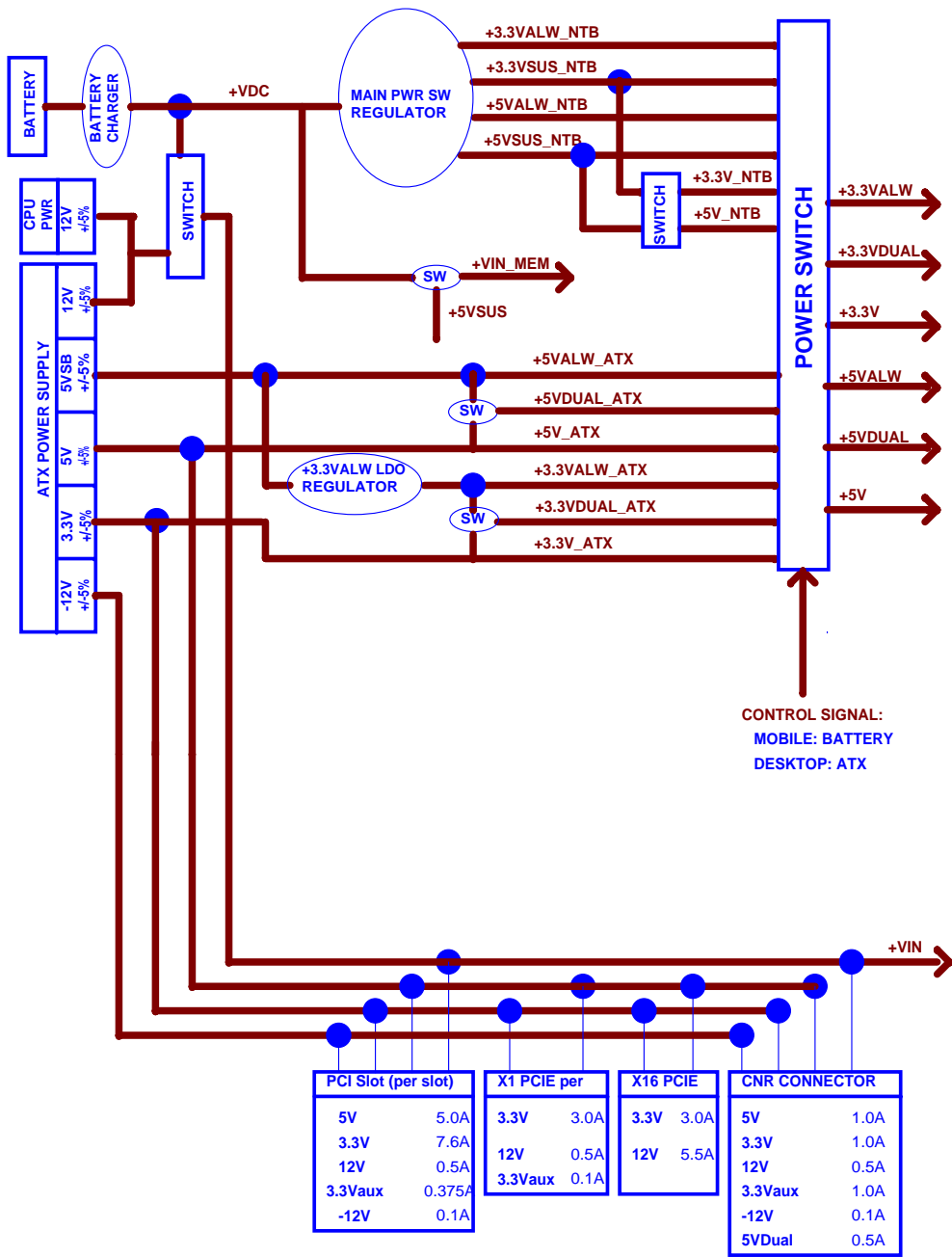


1.0





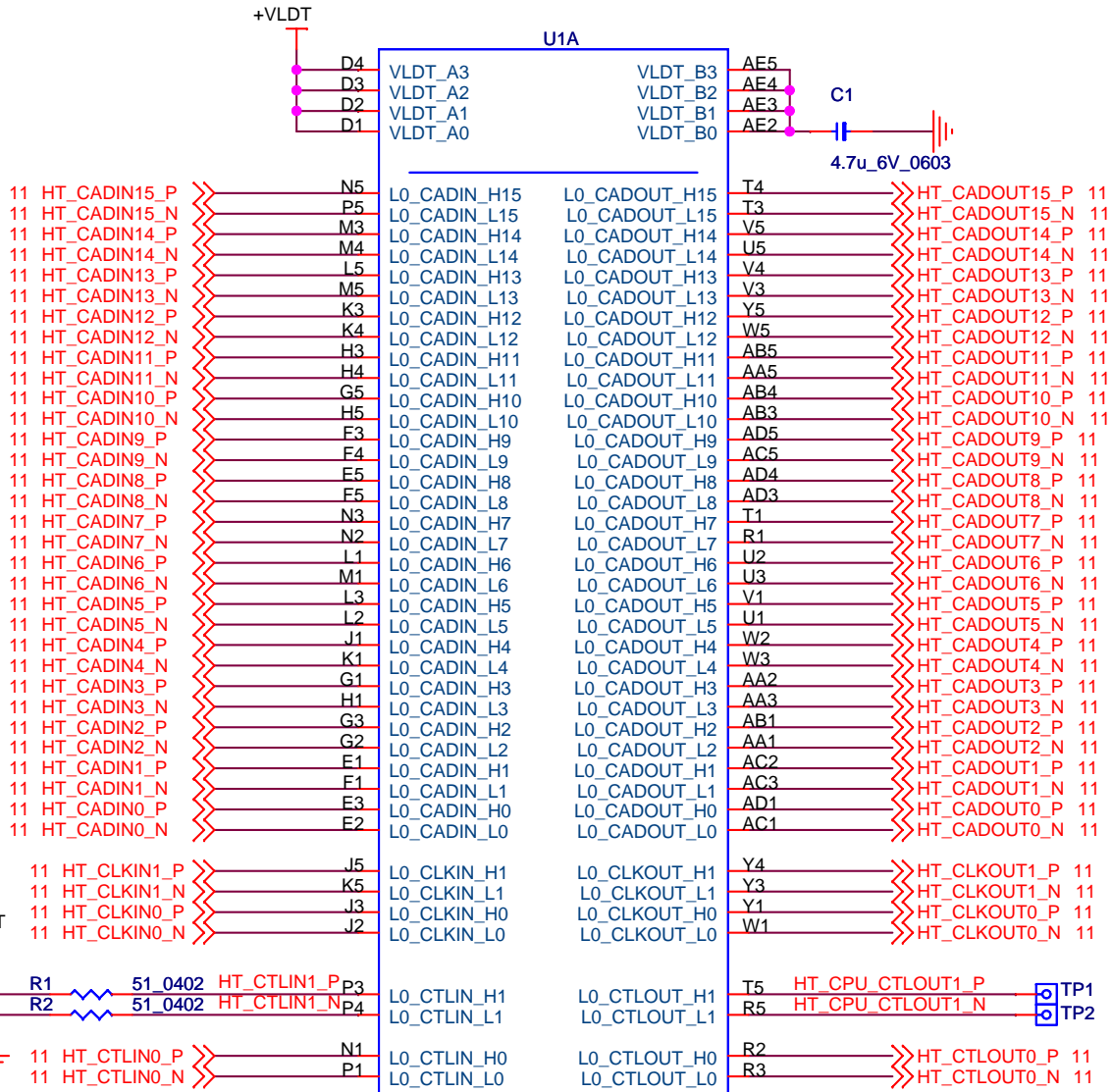




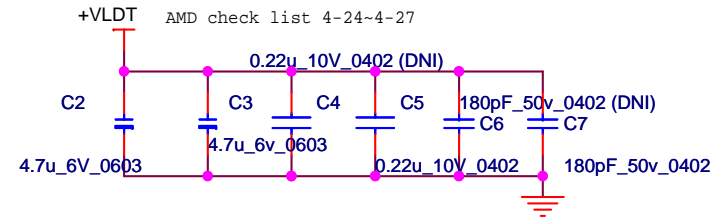


# PROCESSOR HYPERTRANSPORT INTERFACE

VLDT\_Ax AND VLDT\_Bx ARE CONNECTED TO THE LDT\_RUN POWER SUPPLY THROUGH THE PACKAGE OR ON THE DIE. IT IS ONLY CONNECTED ON THE BOARD TO DECOUPLING NEAR THE CPU PACKAGE




Athlon 64 S1  
Processor  
Socket



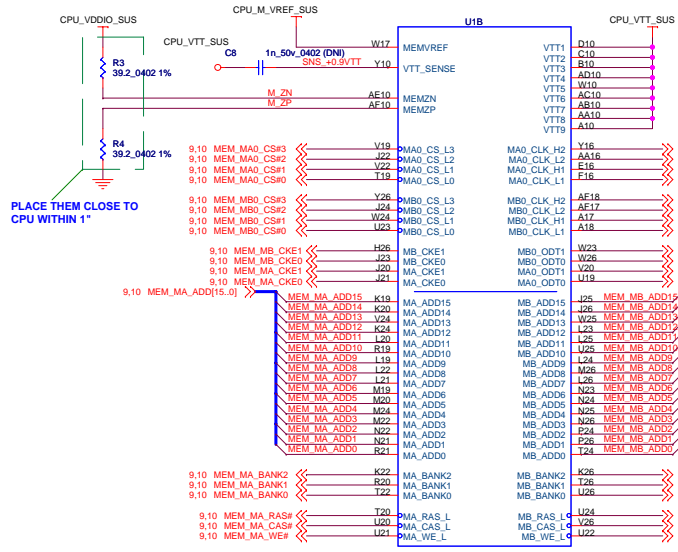
**LAYOUT: Place bypass cap on topside of board**  
 NEAR HT POWER PINS THAT ARE NOT CONNECTED DIRECTLY TO DOWNSTREAM HT DEVICE, BUT CONNECTED INTERNALLY TO OTHER HT POWER PINS  
 PLACE CLOSE TO VLDT0 POWER PINS



 Link to the Future		<b>MICRO-STAR INT'L CO.,LTD.</b>	
<b>SOCKET S1 HT I/F</b>			
Title		Rev	
Size	Document Number	1.0	
Custom	<b>MS-12221</b>		
Date:	Thursday, February 01, 2007	Sheet	5 of 45

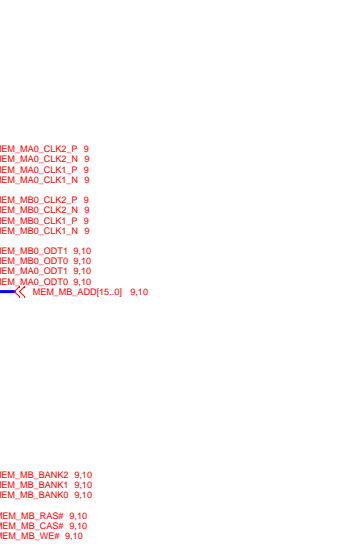
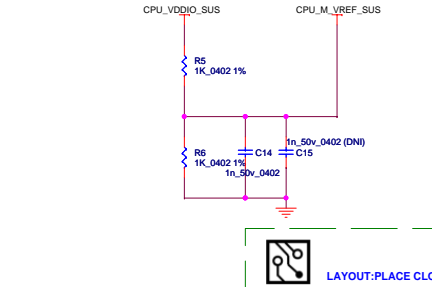
# Processor DDR2 Memory Interface

VDD VTT SUS. CPU IS CONNECTED TO THE VDD VTT SUS POWER SUPPLY THROUGH THE PACKAGE OR ON THE DIE. IT IS ONLY CONNECTED ON THE BOARD TO DECOUPLING NEAR THE CPU PACKAGE.



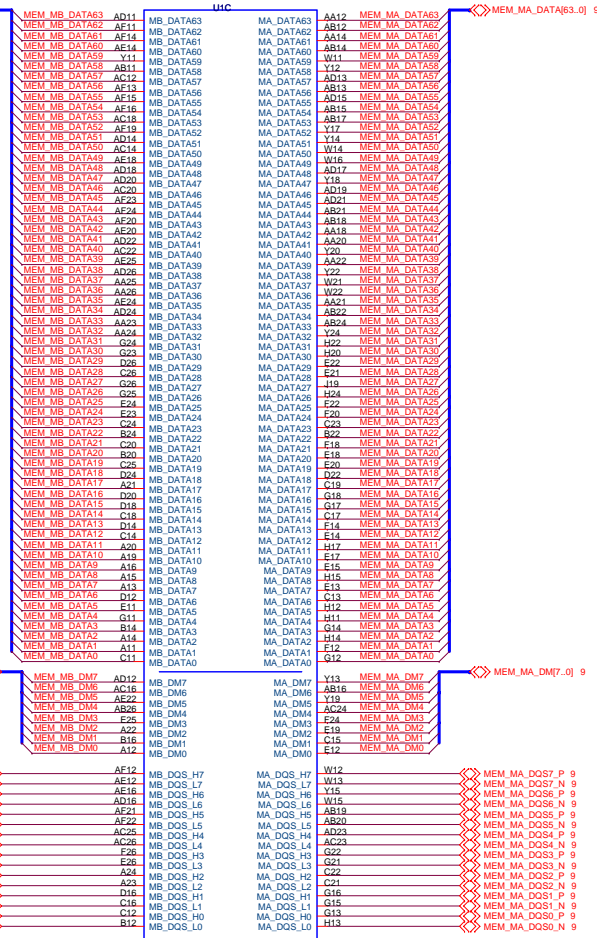
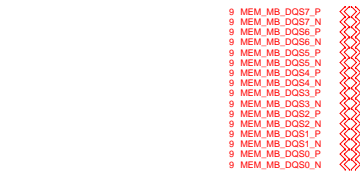
PLACE THEM CLOSE TO CPU WITHIN 1"

## VDD VREF SUS CPU



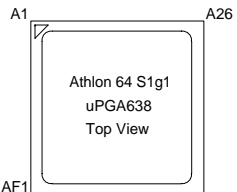
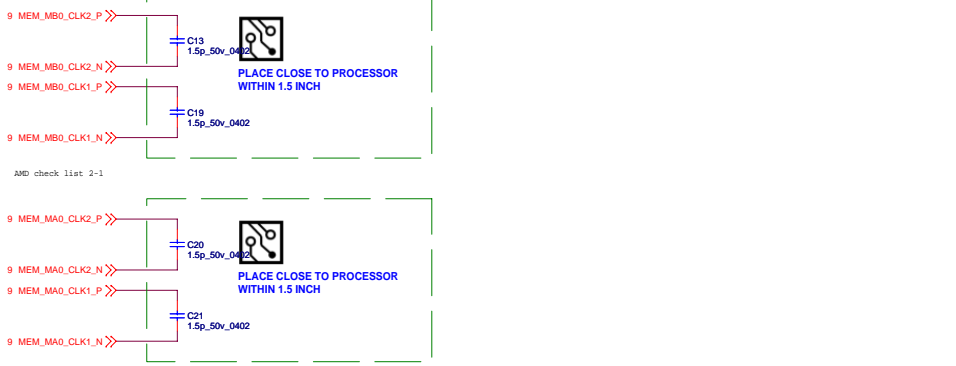
## DDR II: CMD/CTRL/CLK

Athlon 64 S1 Processor Socket



## DDR: DATA

Athlon 64 S1 Processor Socket

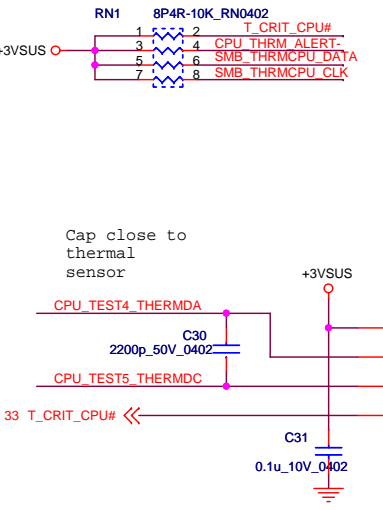
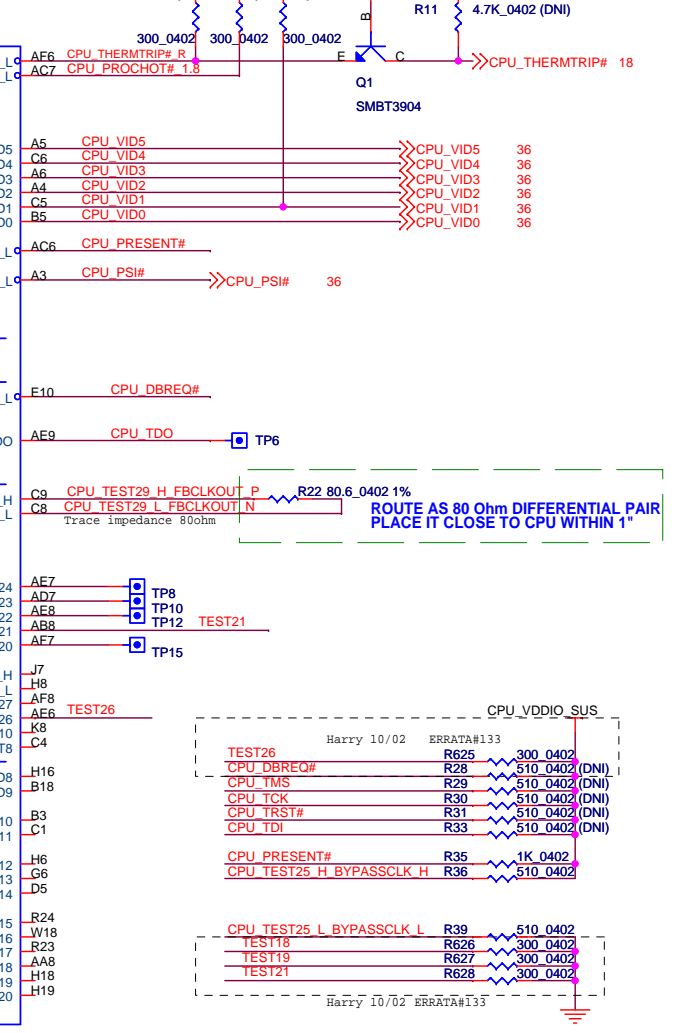
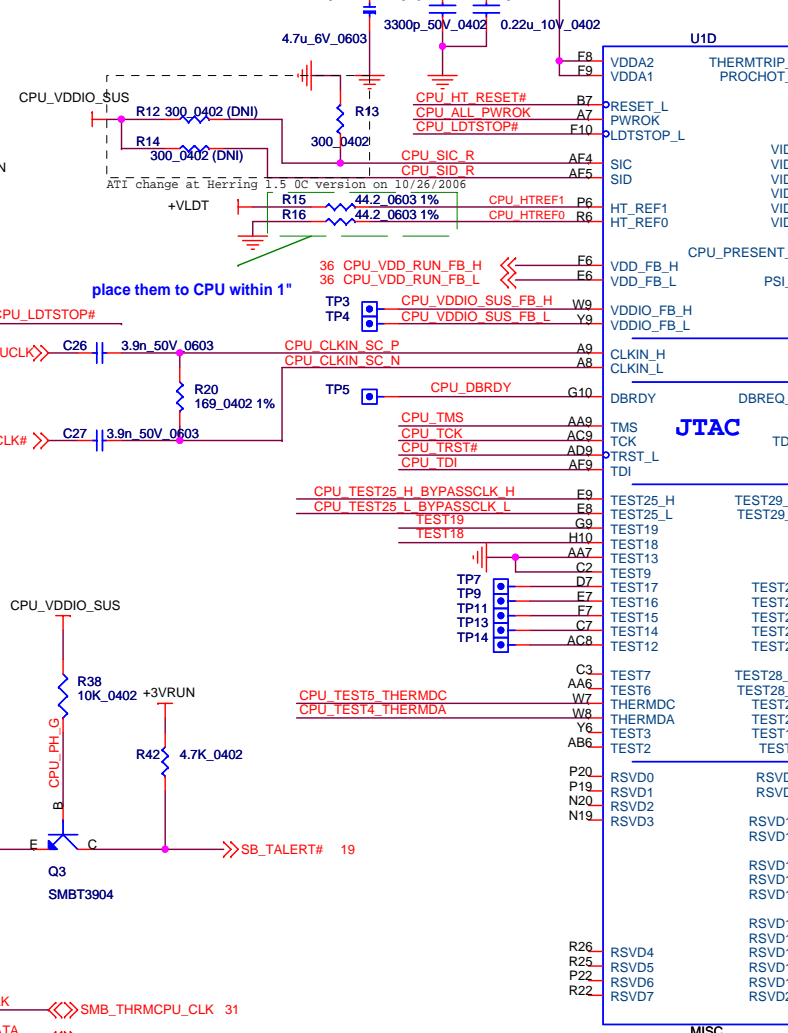
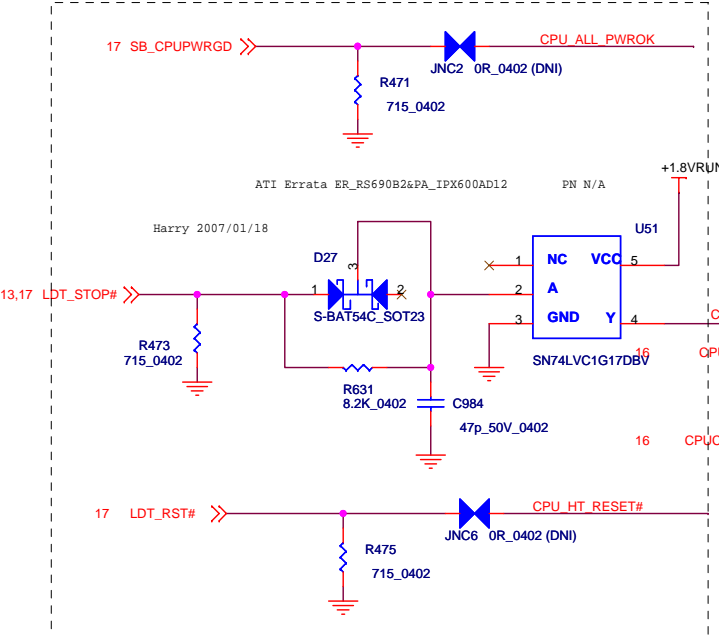




LAYOUT: ROUTE VDDA TRACE APPROX. 50 mils WIDE (USE 2x25 mil TRACES TO EXIT BALL FIELD) AND 500 mils LONG.

# ATHLON Control and Debug

## CPU\_VDDA\_2.5\_RUN

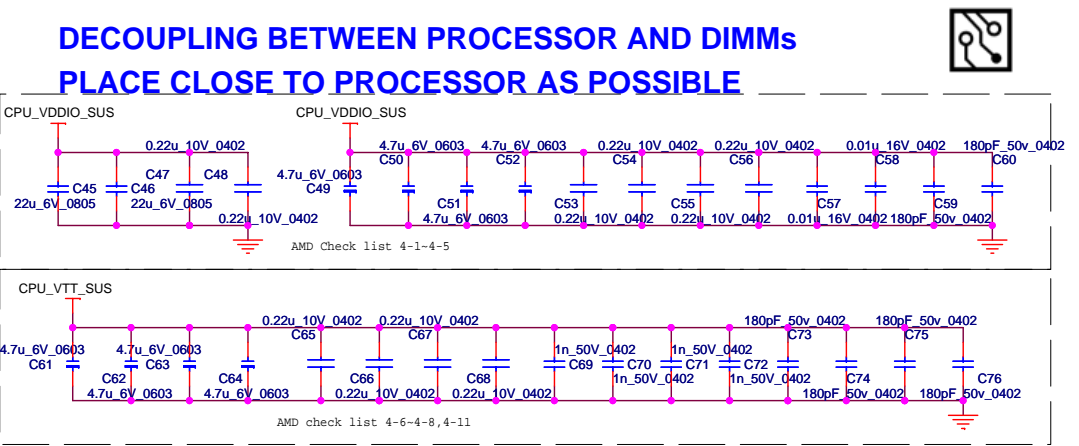
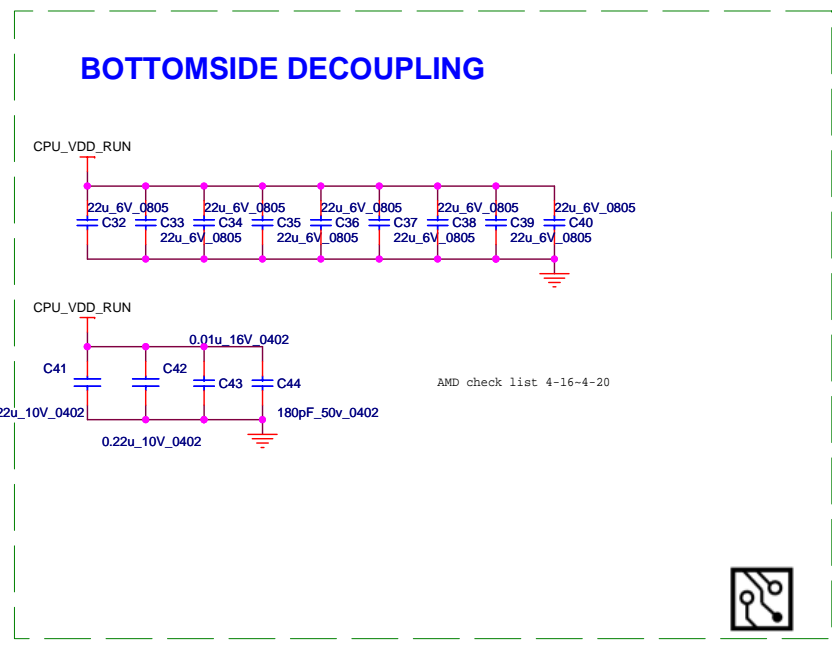
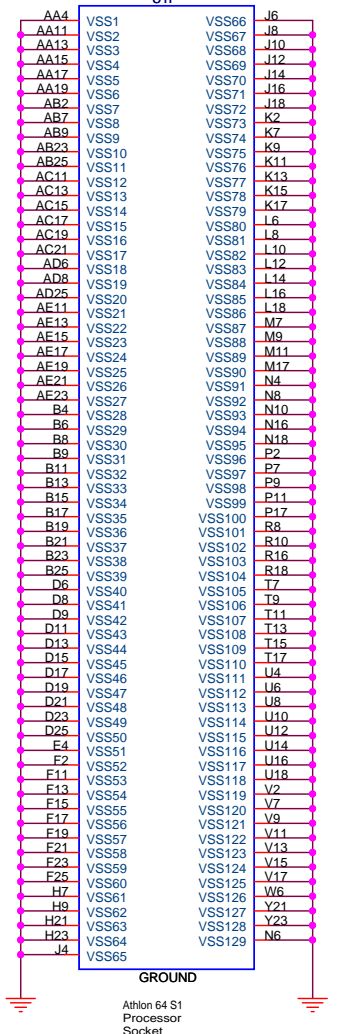
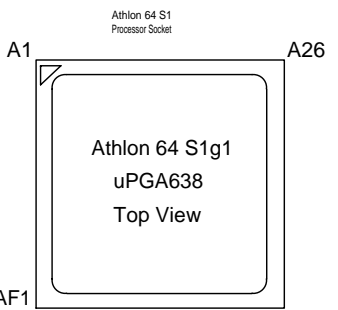
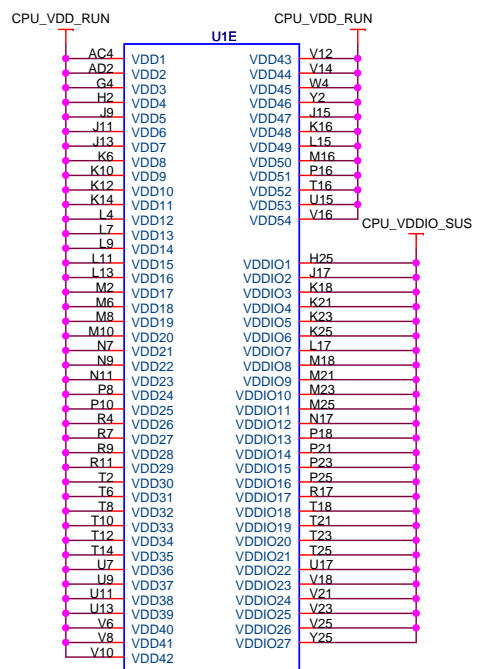


**MSI** MICRO-STAR INT'L CO.,LTD.

Title: **SOCKET S1 CTRL**

Size B Document Number: **MS-12221** Rev 1.0

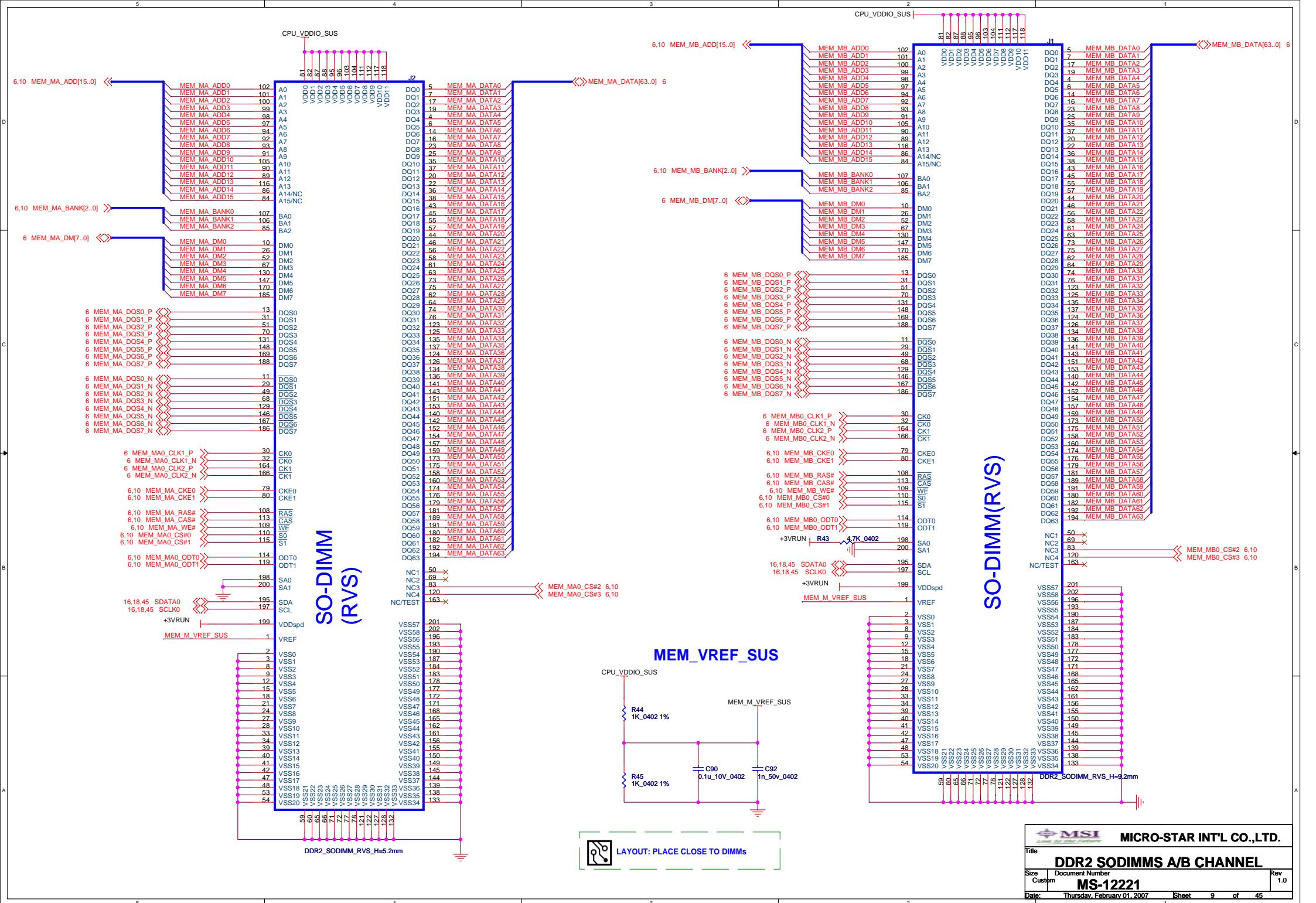
Date: Thursday, February 01, 2007 Sheet 7 of 45



# PROCESSOR POWER AND GROUND

		<b>MICRO-STAR INT'L CO.,LTD.</b>	
Title			
<b>SOCKET S1 PWR &amp; GND</b>			
Size	Document Number		Rev
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Date:	Thursday, February 01, 2007		Sheet 8 of 45





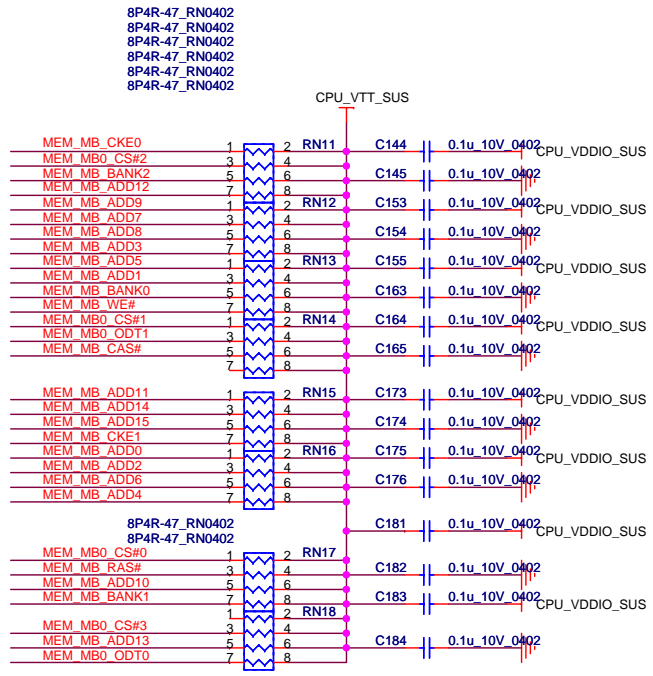
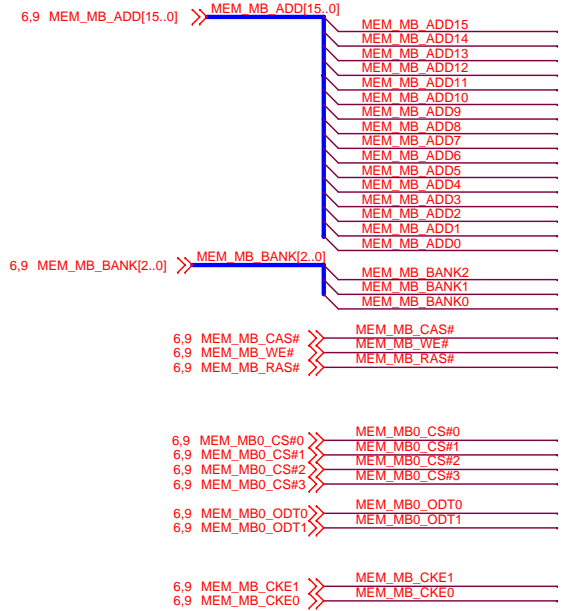
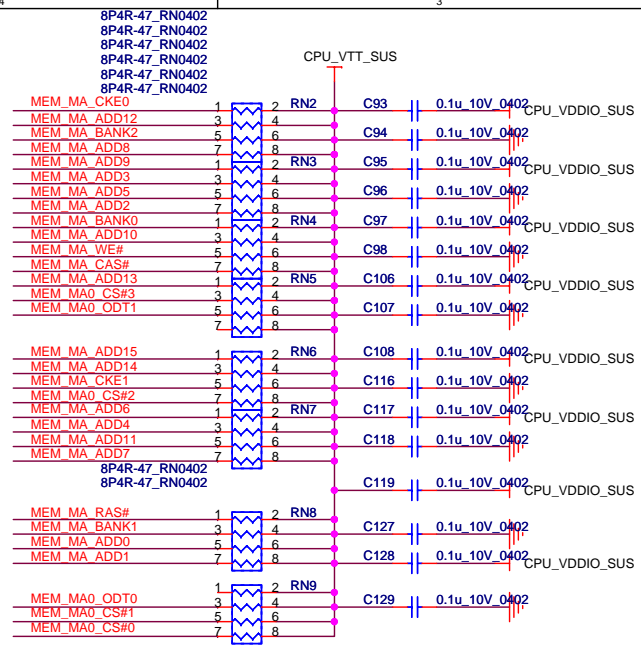
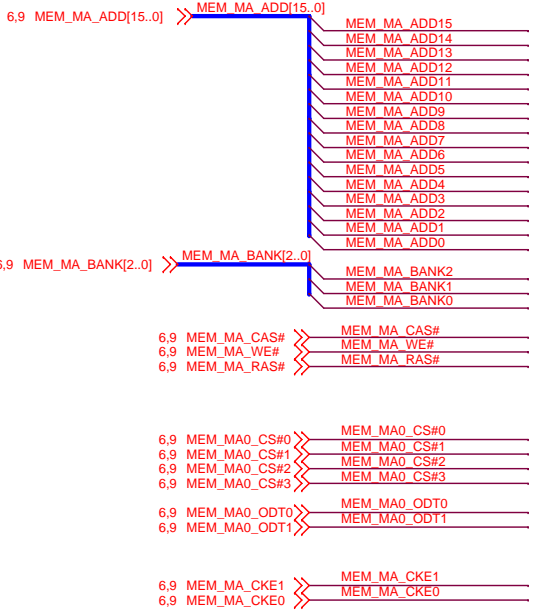
LAYOUT: PLACE CLOSE TO DIMMS

**MSI MICRO-STAR INT'L CO.,LTD.**

Title: **DDR2 SODIMMS A/B CHANNEL**

Size: Custom Document Number: **MS-12221** Rev: 1.0

Date: Thursday, February 01, 2007 Sheet: 9 of 45

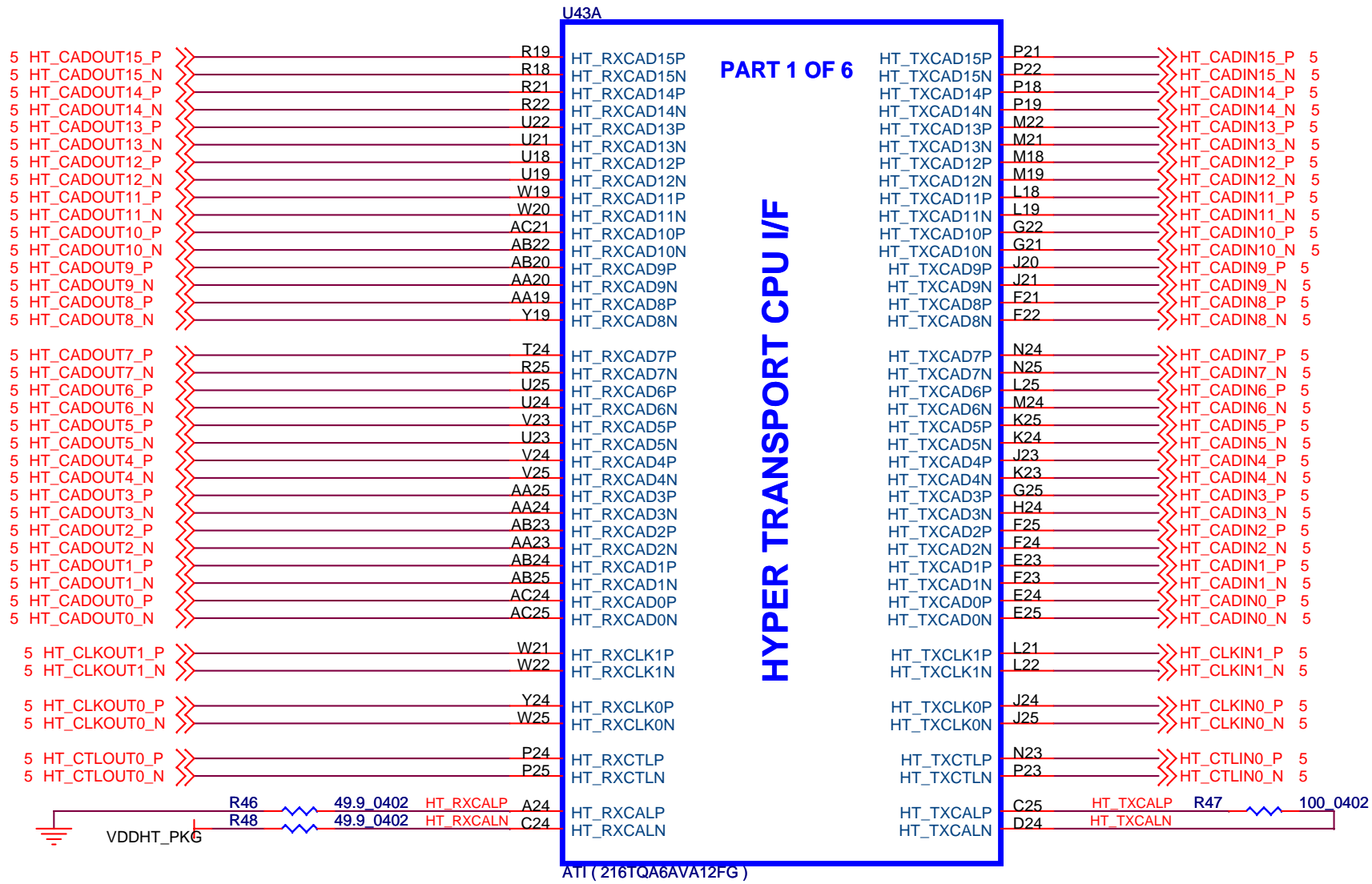


MSI MICRO-STAR INT'L CO.,LTD.

Title: **DDR2 SODIMMS TERMINATIONS**

Size: Custom Document Number: **MS-12221** Rev: 1.0

Date: Thursday, February 01, 2007 Sheet 10 of 45



**MSI**  
Link to the Future

**MICRO-STAR INT'L CO.,LTD.**

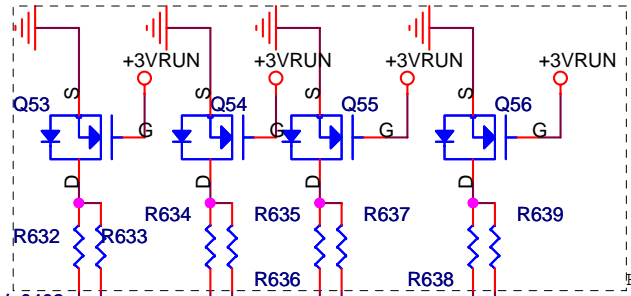
Title: **RS690T HT LINK I/F**

Size: A	Document Number: <b>MS-12221</b>	Rev: 1.0
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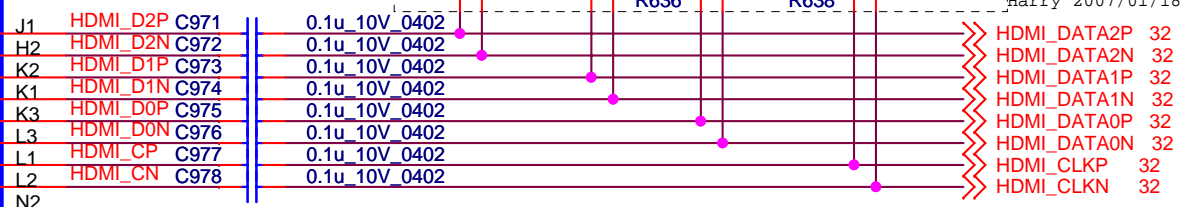
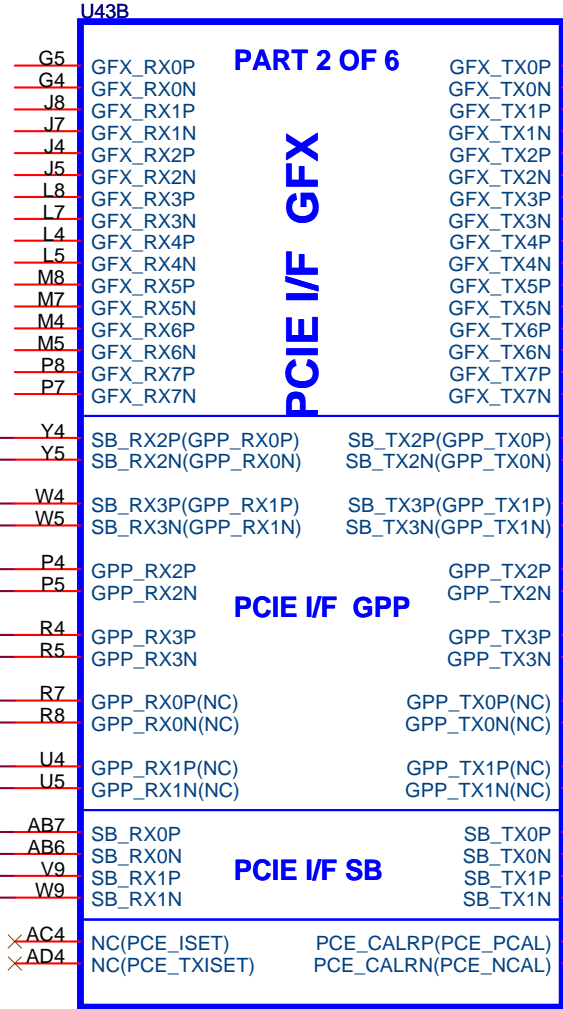
Date: Thursday, February 01, 2007    Sheet 11 of 45

Errata PA\_IGPGENF5

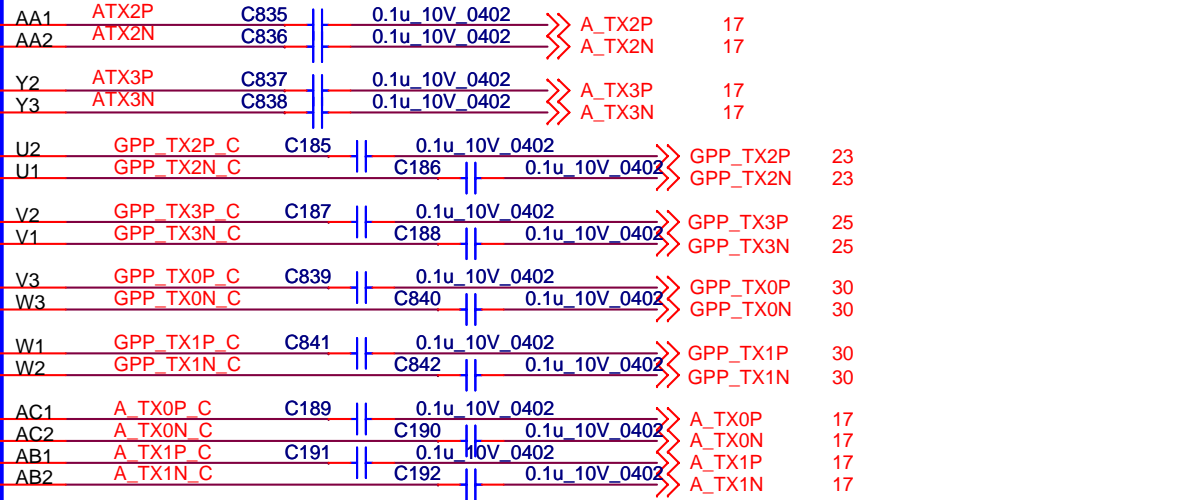
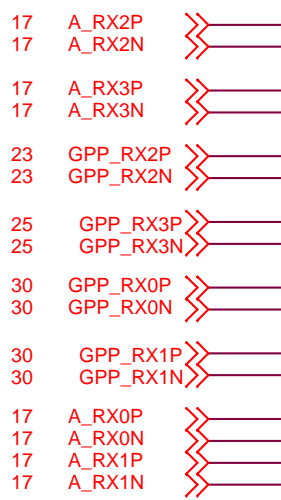
- 715\_0402 N-2N7002\_SOT23
- 715\_0402 N-2N7002\_SOT23
- 715\_0402 N-2N7002\_SOT23
- 715\_0402 N-2N7002\_SOT23
- 715\_0402 N-2N7002\_SOT23
- 715\_0402 N-2N7002\_SOT23



Harry 2007/01/18



Place these Caps close to HDMI connect HDMI I/F



R50 5620hm  
R52 2K0hm

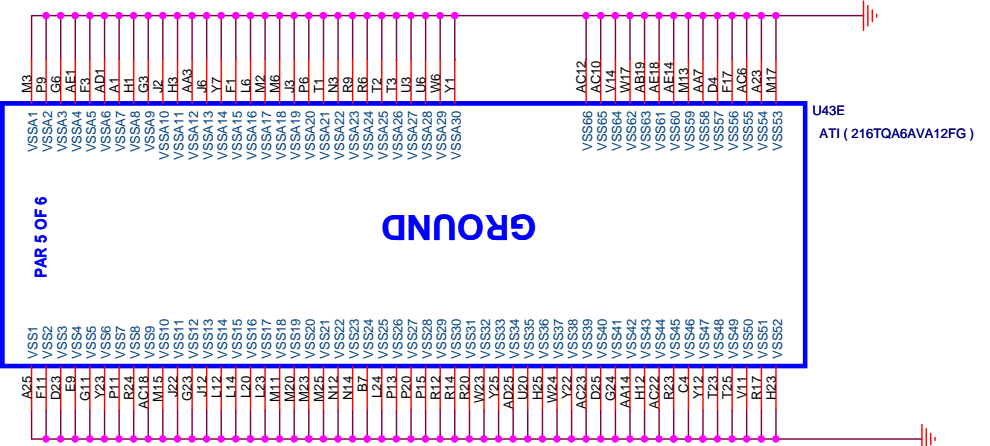
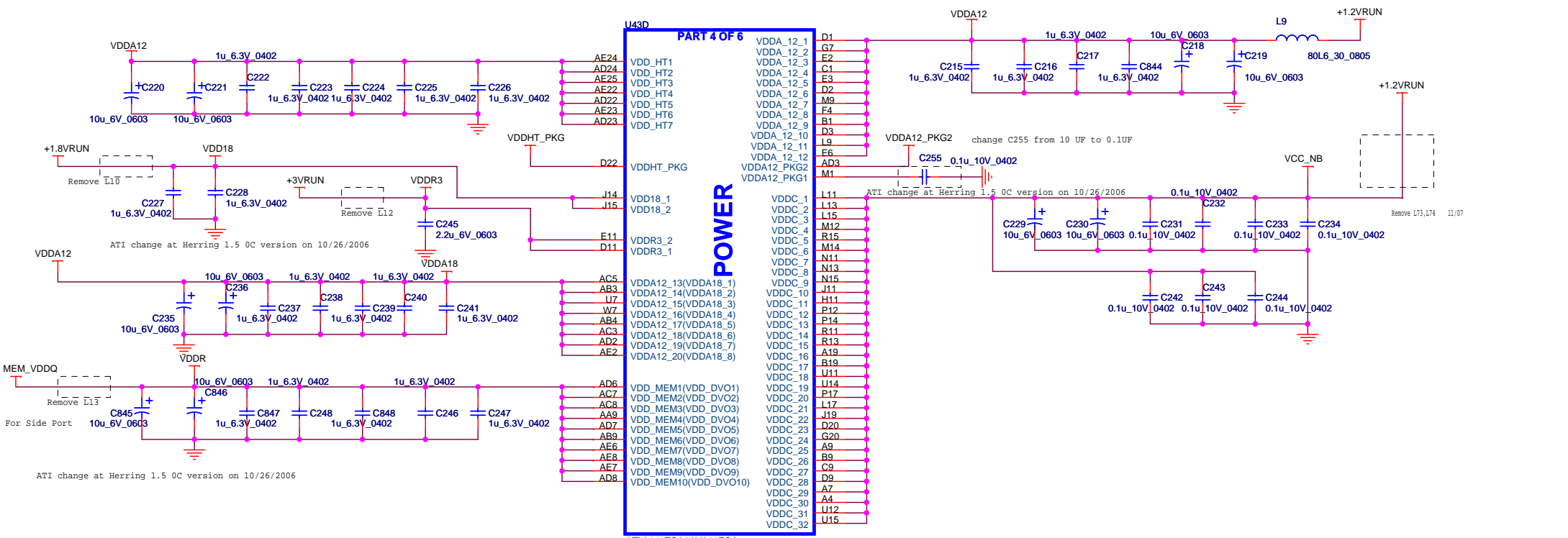
**MICRO-STAR INT'L CO.,LTD.**

Title: **RS690T PCI-E LINK&HDMI I/F**

Size A	Document Number <b>MS-12221</b>	Rev 1.0
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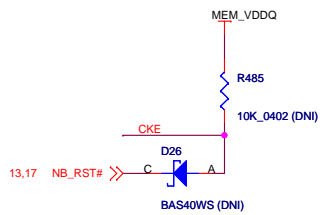
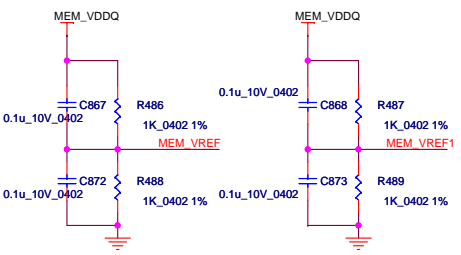
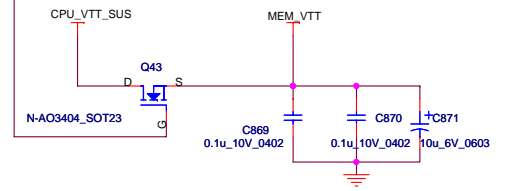
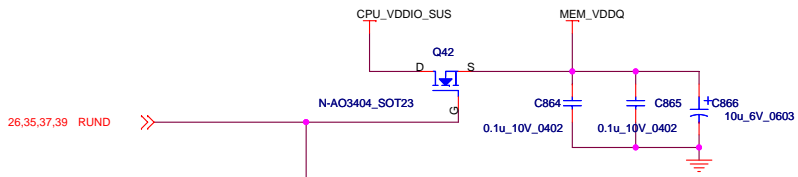
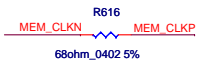
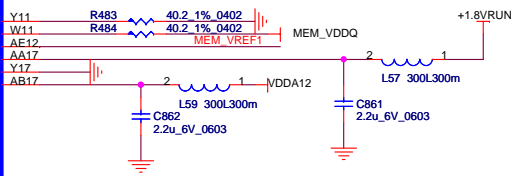
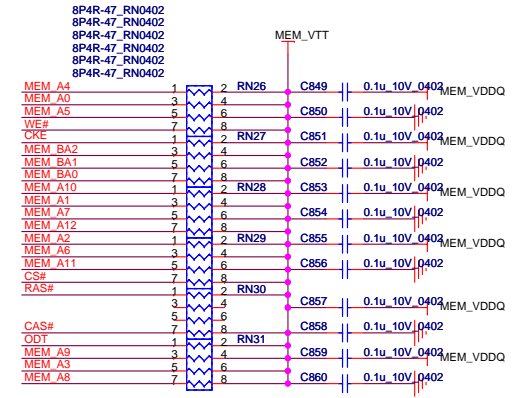
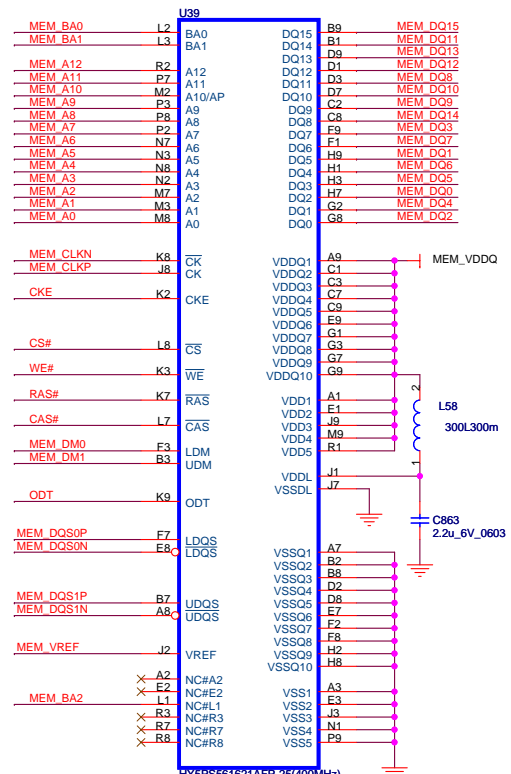


**MSI**  
MICRO-STAR INT'L CO.,LTD.

Title: **RS690T POWER & GND**

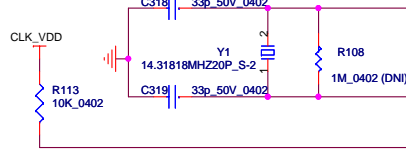
Size B Document Number: **MS-12221** Rev 1.0

Date: Thursday, February 01, 2007 Sheet 14 of 45

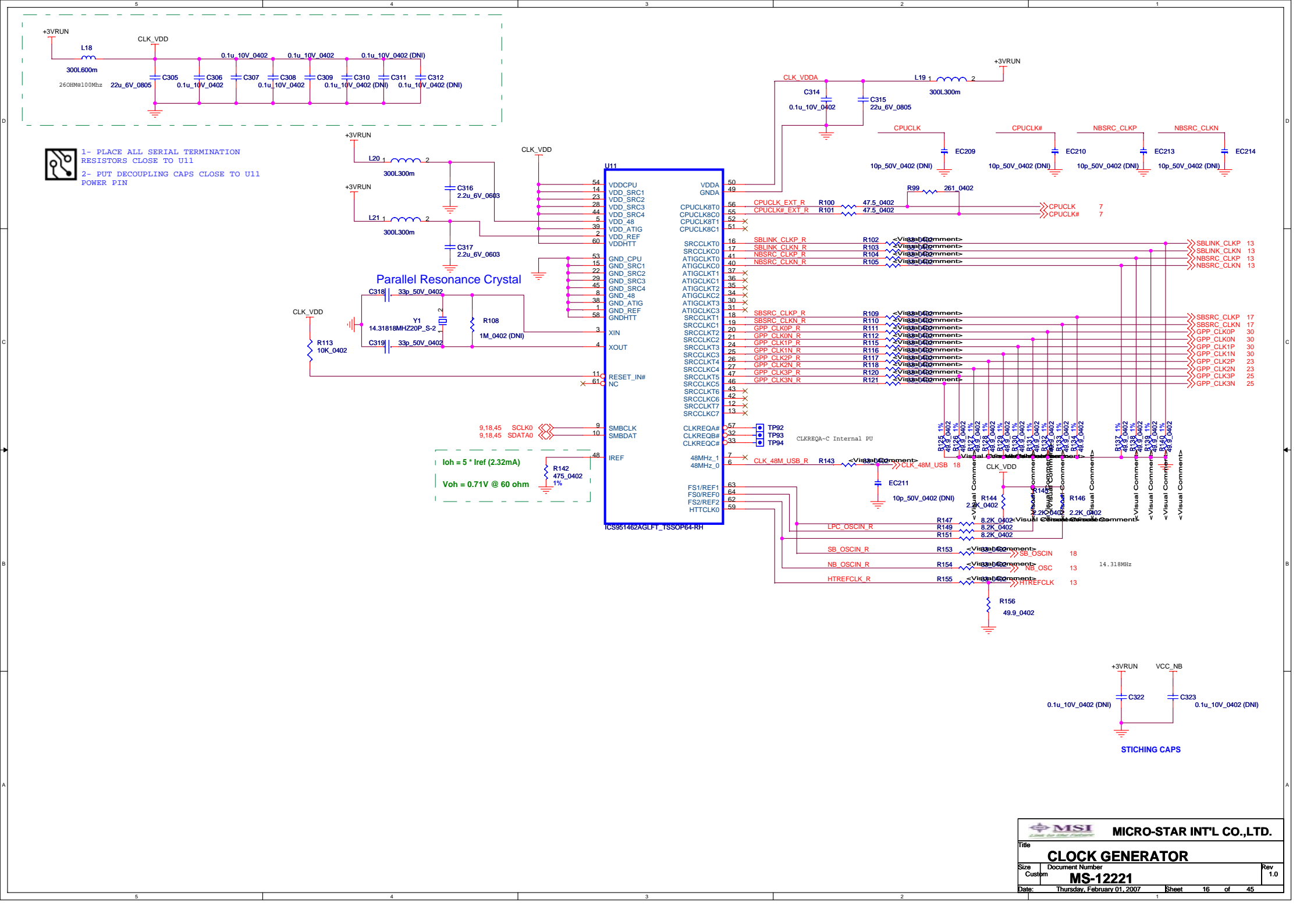


- 1- PLACE ALL SERIAL TERMINATION RESISTORS CLOSE TO U11
- 2- PUT DECOUPLING CAPS CLOSE TO U11 POWER PIN

### Parallel Resonance Crystal



$I_{oh} = 5 \cdot I_{ref} (2.32mA)$   
 $V_{oh} = 0.71V @ 60 \text{ ohm}$







PLACE THESE PCIE AC COUPLING CAPS CLOSE TO SB600

	SB600
C325 to C332	0.1uF
R165	562 Ohm 1%
R166	2.05K 1%
R167	0 Ohm
R179	10K

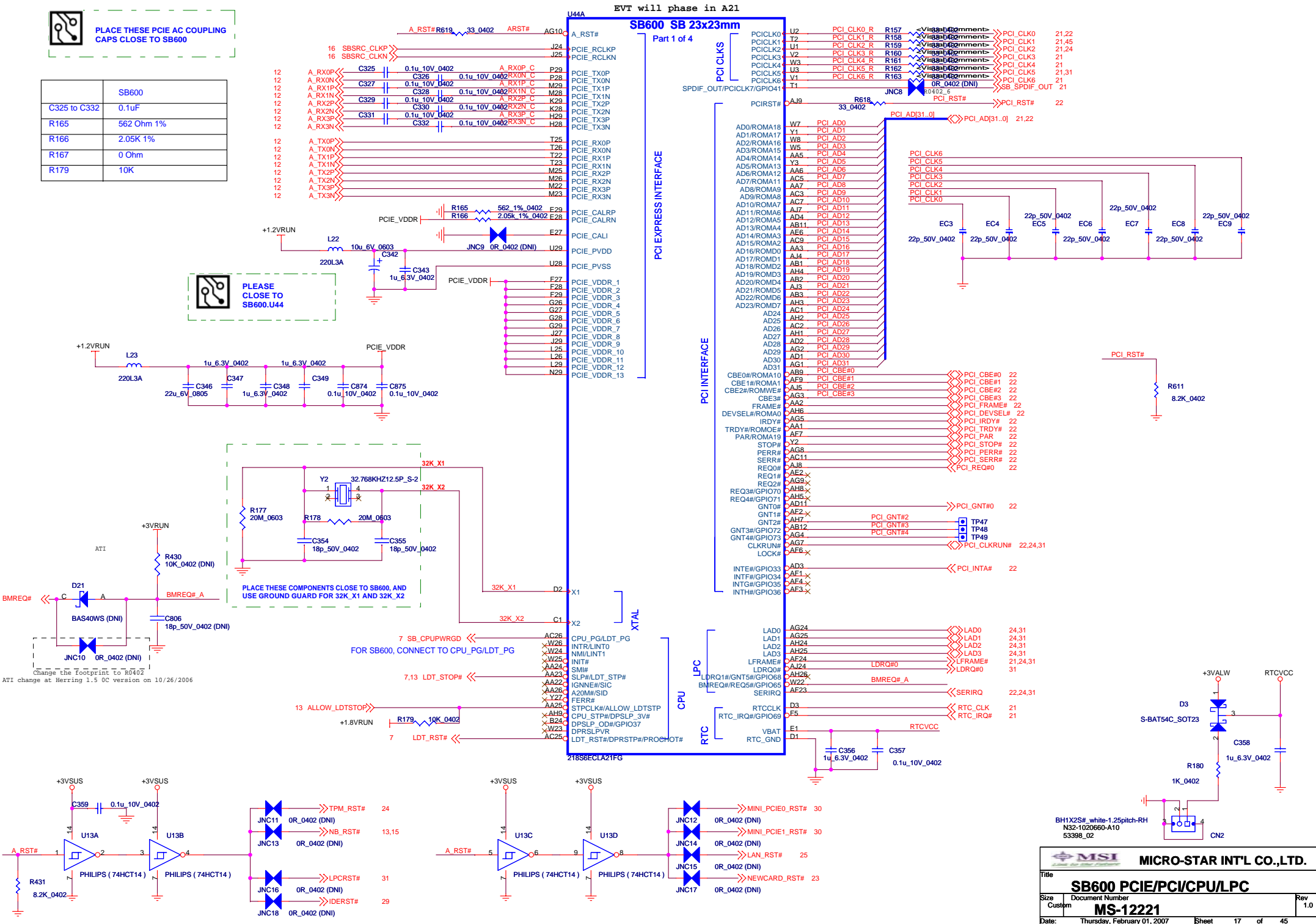


PLEASE CLOSE TO SB600,U44

EVT will phase in A21

### SB600 SB 23x23mm

Part 1 of 4



ATI change at Herring 1.5 00 version on 10/26/2006

PLACE THESE COMPONENTS CLOSE TO SB600, AND USE GROUND GUARD FOR 32K\_X1 AND 32K\_X2

7 SB\_CPUUPWRGD <<< FOR SB600, CONNECT TO CPU\_PG/LDT\_PG

7,13 LDT\_STOP# <<<

13 ALLOW\_LDTSTOP# <<<

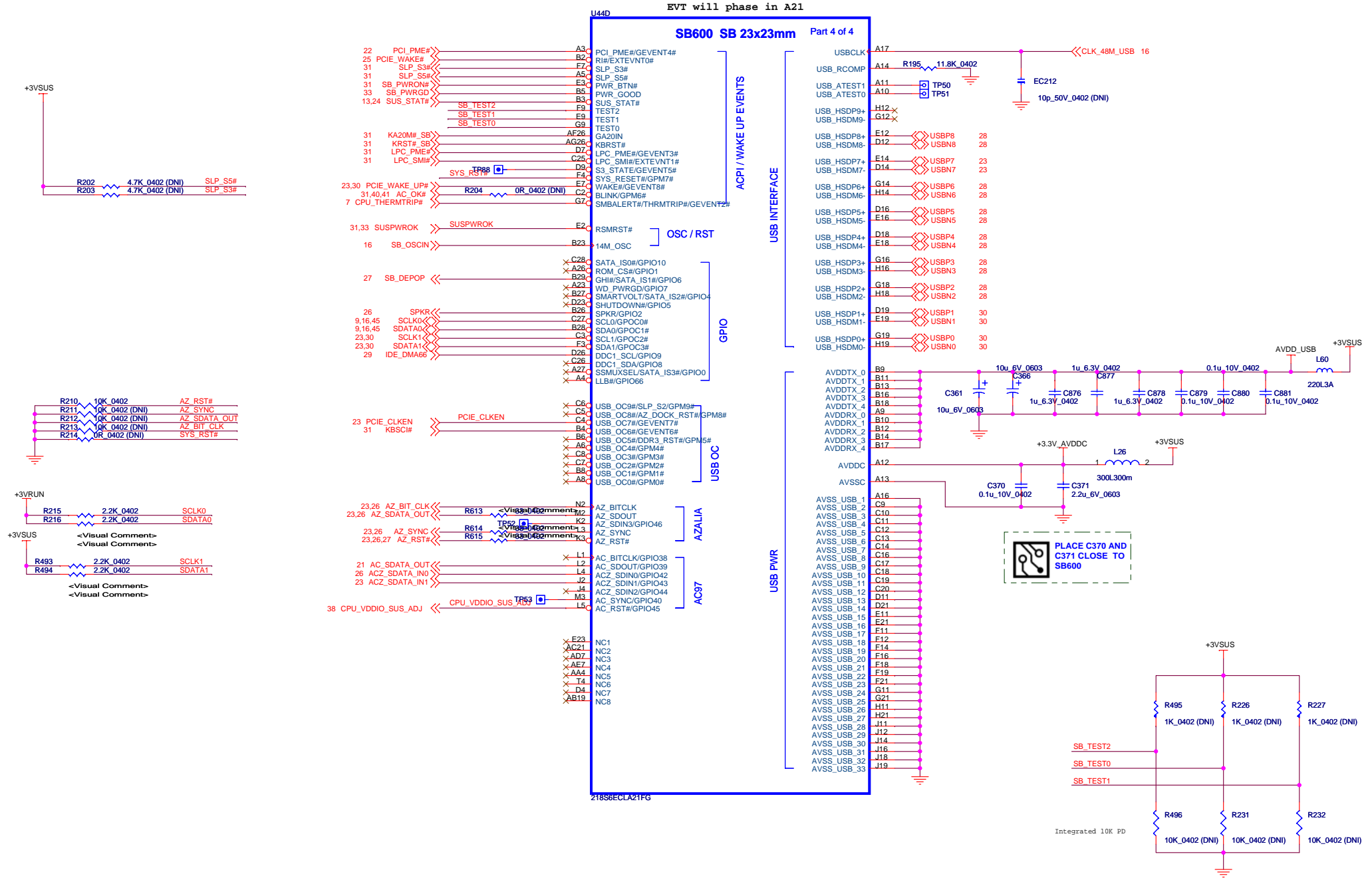
7 LDT\_RST# <<<

**MSI MICRO-STAR INT'L CO.,LTD.**

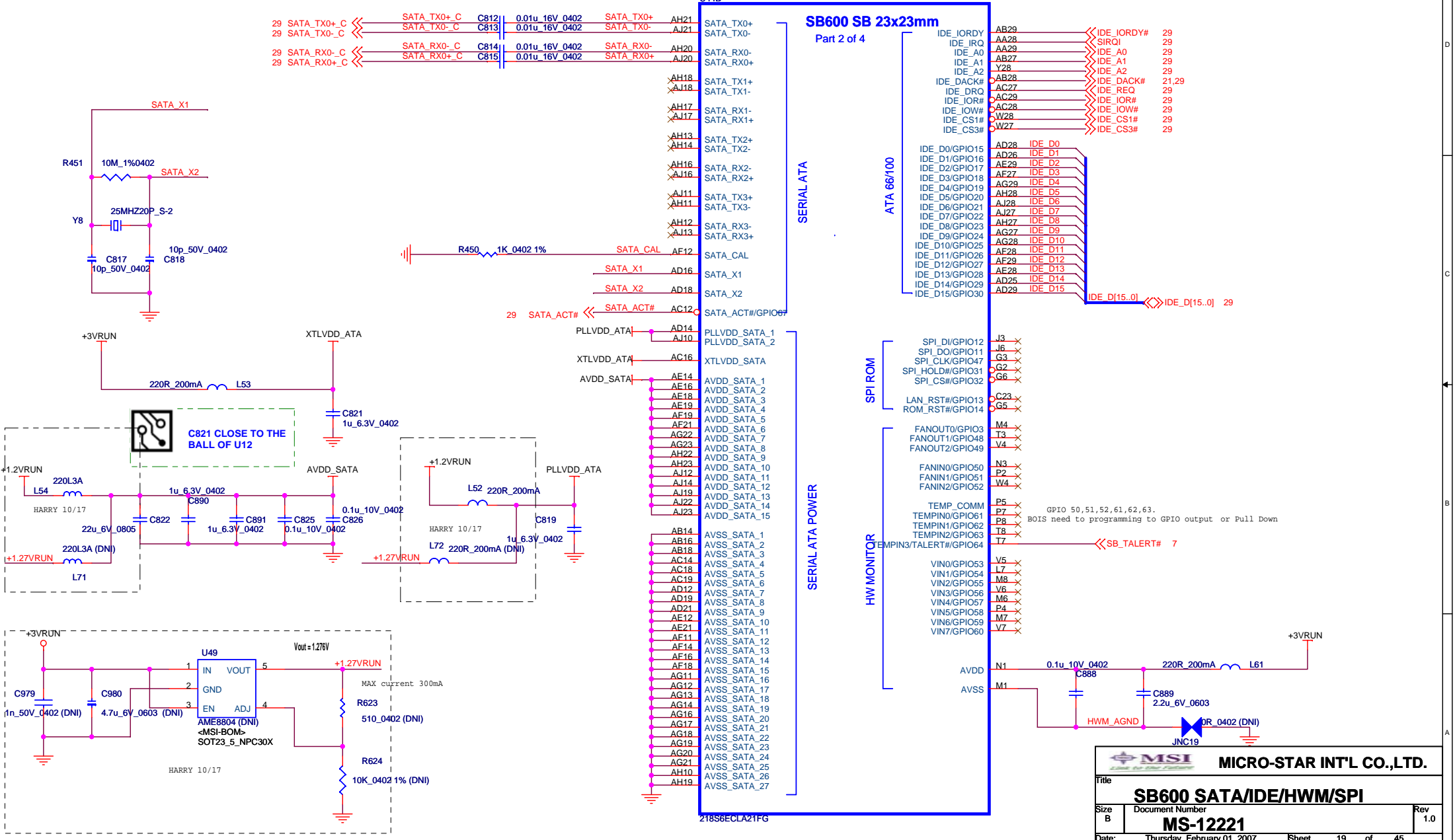
Title: **SB600 PCIE/PCI/CPU/LPC**

Size: Custom Document Number: **MS-12221** Rev: 1.0

Date: Thursday, February 01, 2007 Sheet: 17 of 45



EVT will phase in A21



**MSI**  
MICRO-STAR INT'L CO.,LTD.

Title: **SB600 SATA/IDE/HWM/SPI**

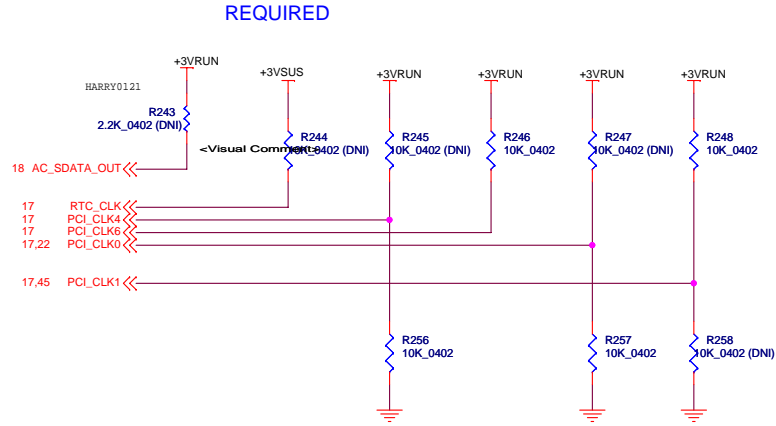
Size B Document Number: **MS-12221** Rev 1.0

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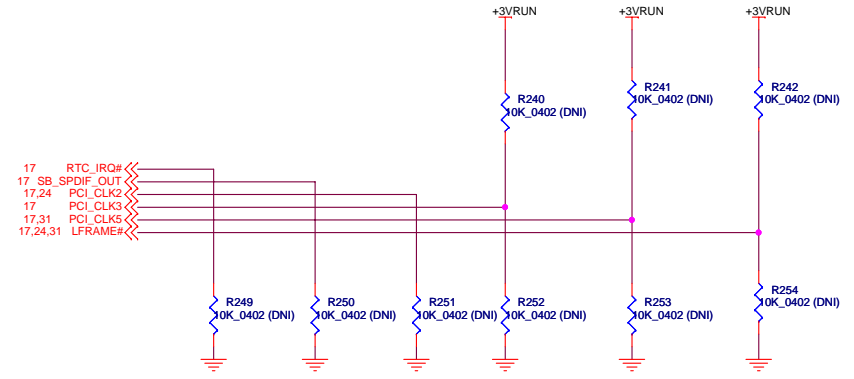


# REQUIRED STRAPS

NPTE: FOR SB460, EXTERNAL PU/PD ARE REQUIRED



SB600 HAS 15K INTERNAL PU FOR PCI\_AD[31:23]

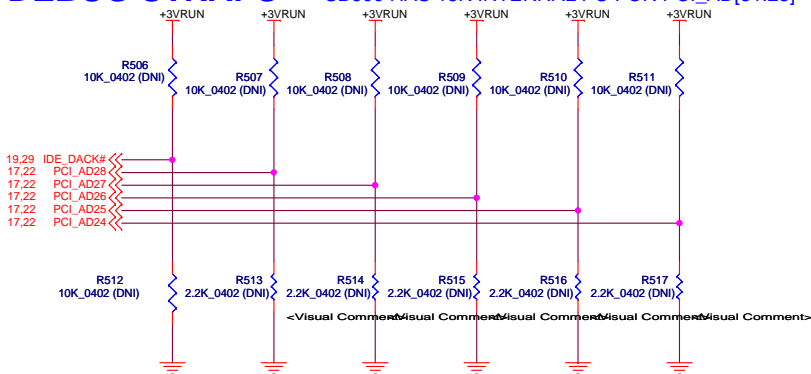


SB600						
	AC_SDOUT	RTC_CLK	PCI_CLK4	PCI_CLK6	PCI_CLK0	PCI_CLK1
<b>PULL HIGH</b>	USE DEBUG STRAPS	INTERNAL RTC DEFAULT	USE INT. PLL48	CPU IF=K8 DEFAULT	ROM TYPE: H, H = PCI ROM H, L = SPI ROM L, L = LPC ROM L, L = FWH ROM	
<b>PULL LOW</b>	IGNORE DEBUG STRAPS DEFAULT	EXTERNAL RTC	USE EXT. 48MHZ DEFAULT	CPU IF=P4	DEFAULT	

	ACPWRON	SPDIF_OUT	PCI_CLK2	PCI_CLK3	PCI_CLK5	LFRAME#
<b>PULL HIGH</b>	MANUAL PWR ON DEFAULT	SIO 24MHz	XTAL MODE NOT SUPPORTED	USB PHY POWERDOWN DISABLE DEFAULT	PCIE_CM_SET LOW DEFAULT	ENABLE THERMTRIP# DEFAULT
<b>PULL LOW</b>	AUTO PWR ON	SIO 48MHz DEFAULT	48MHZ OSC MODE DEFAULT	USB PHY POWERDOWN ENABLE	PCIE_CM_SET HIGH	DISABLE THERMTRIP#

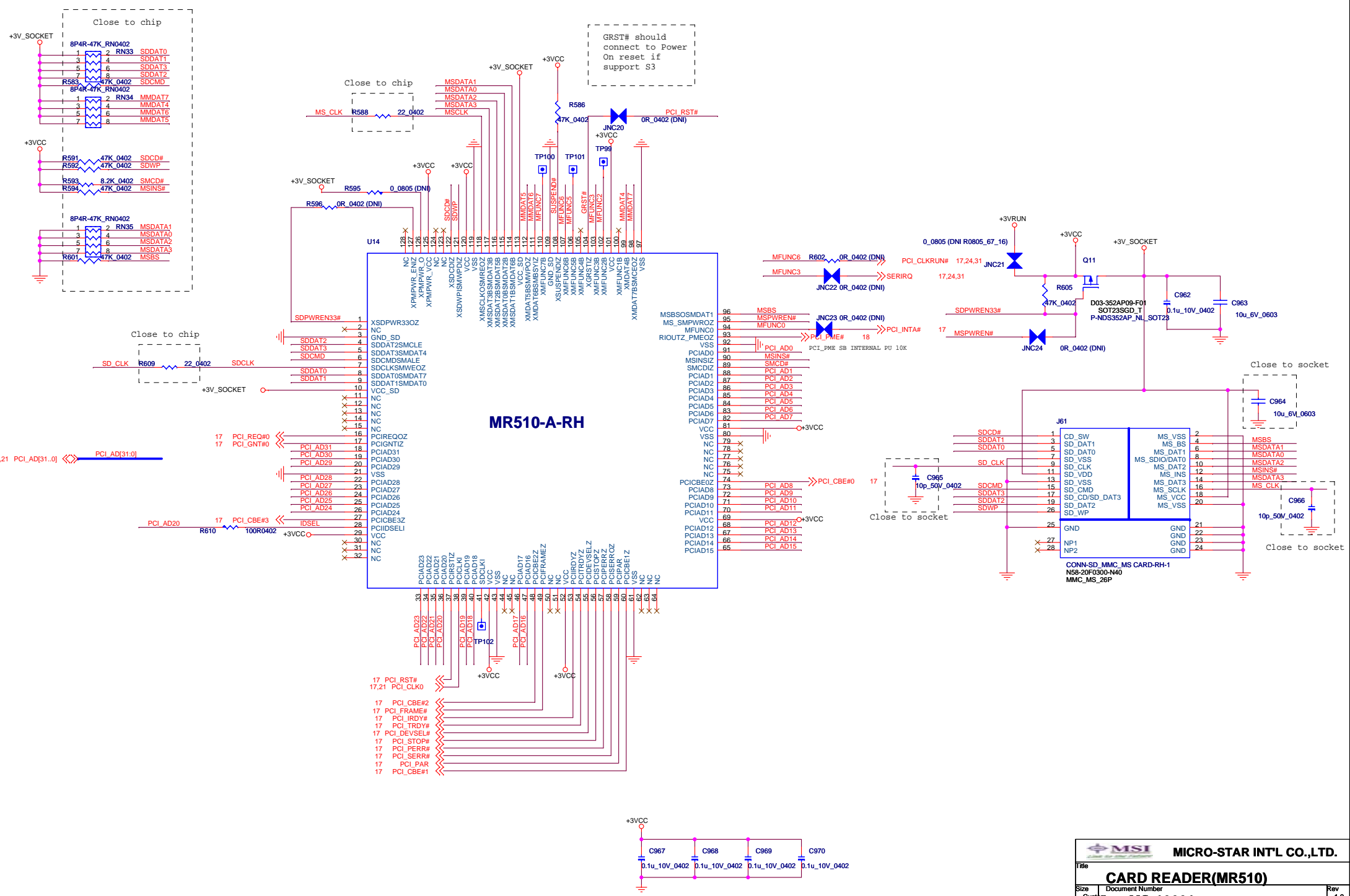
# DEBUG STRAPS

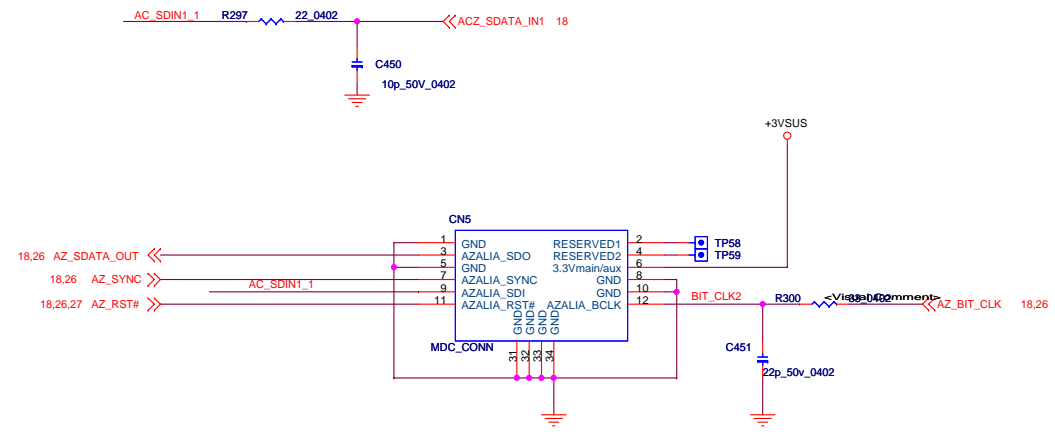
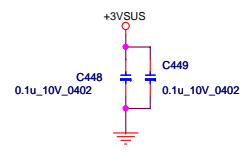
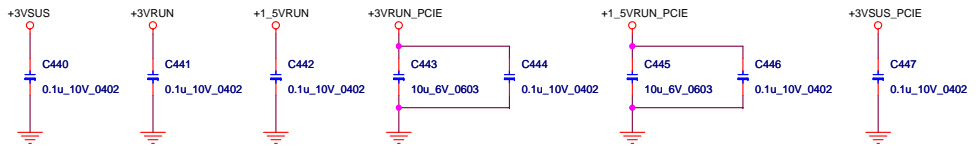
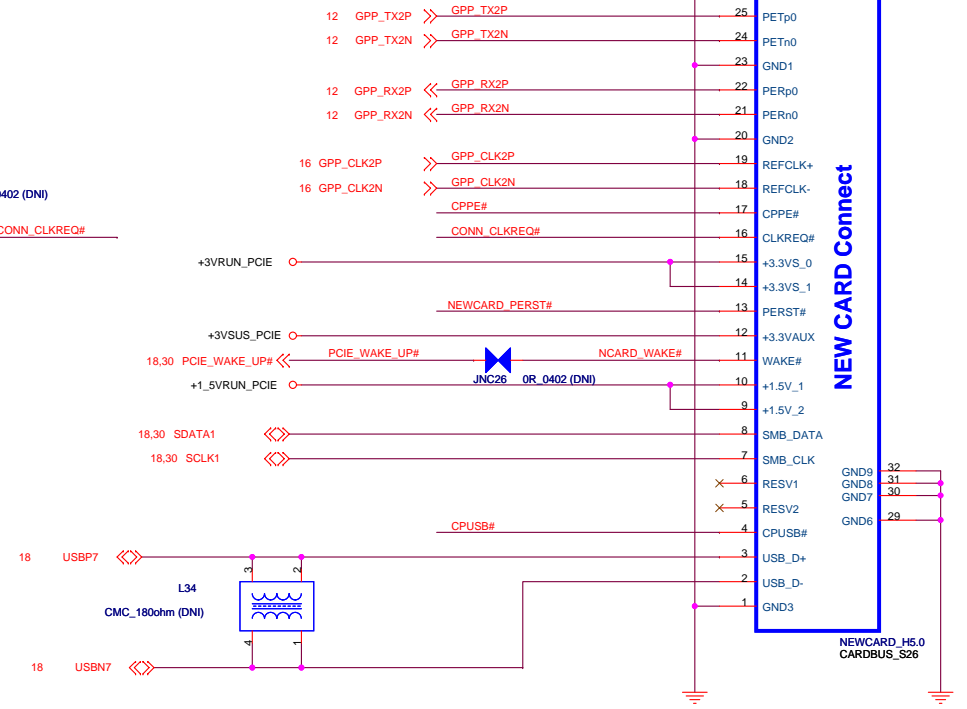
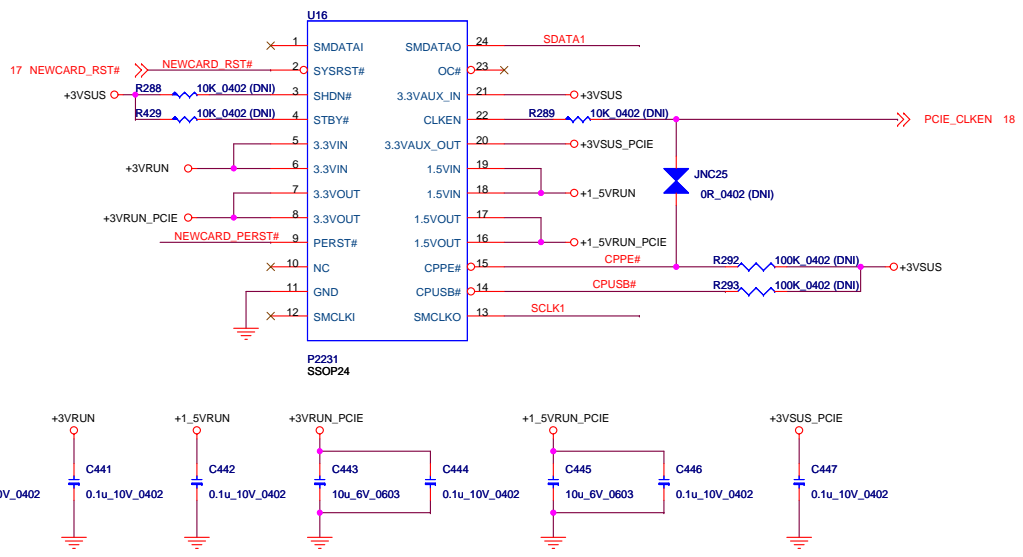
SB600 HAS 15K INTERNAL PU FOR PCI\_AD[31:23]

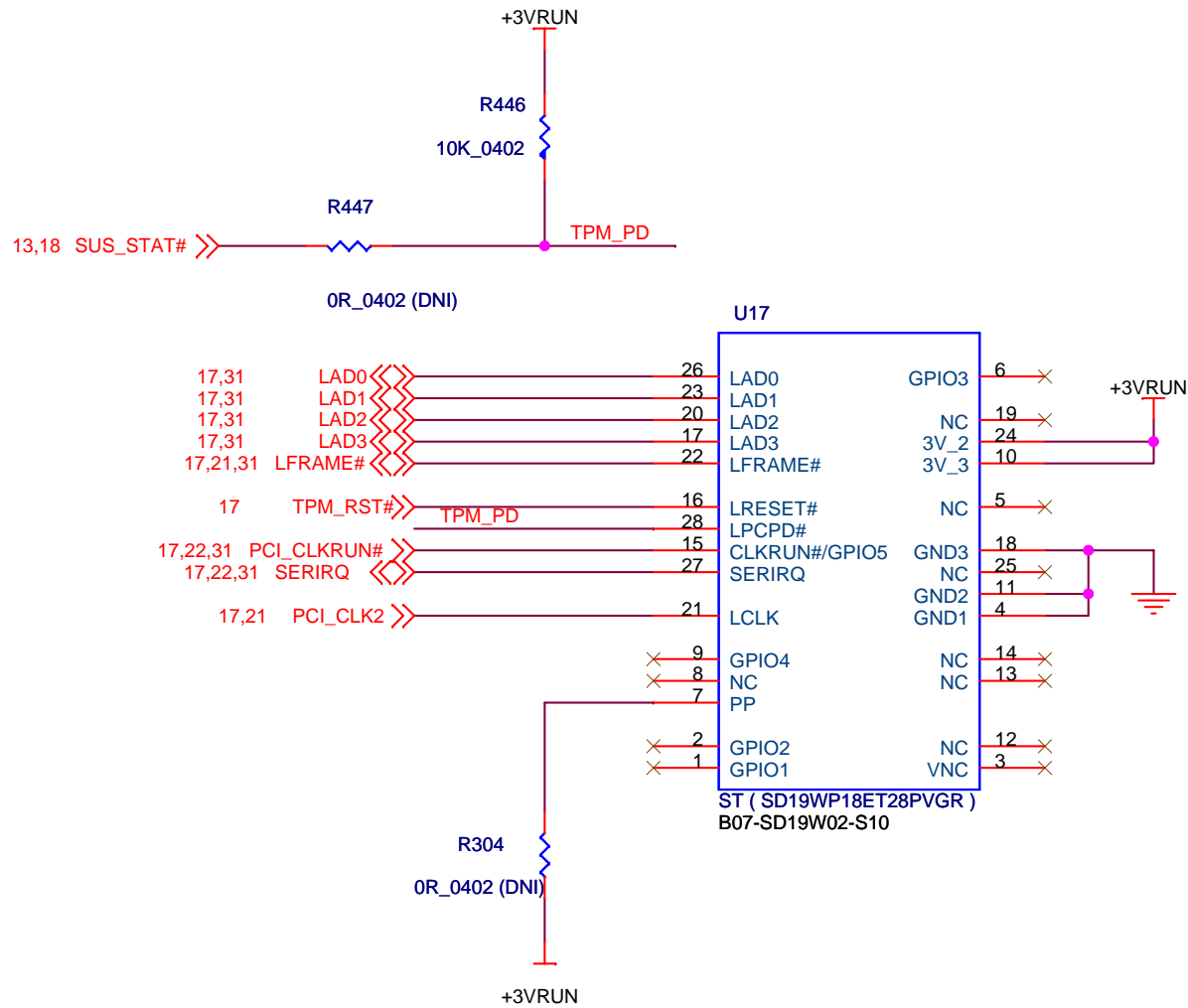



OVERLAP COMMON PADS WHERE POSSIBLE FOR DUAL-OP RESISTORS.

	PCI_AD28	PCI_AD27	PCI_AD26	PCI_AD25	PCI_AD24
<b>PULL HIGH</b>	USE LONG RESET DEFAULT	USE PCI PLL DEFAULT	USE ACPI BCLK DEFAULT	USE IDE PLL DEFAULT	USE DEFAULT PCIE STRAPS DEFAULT
<b>PULL LOW</b>	USE SHORT RESET	BYPASS PCI PLL	BYPASS ACPI BCLK	BYPASS IDE PLL	USE EEPROM PCIE STRAPS



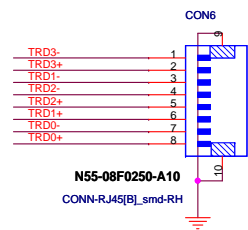
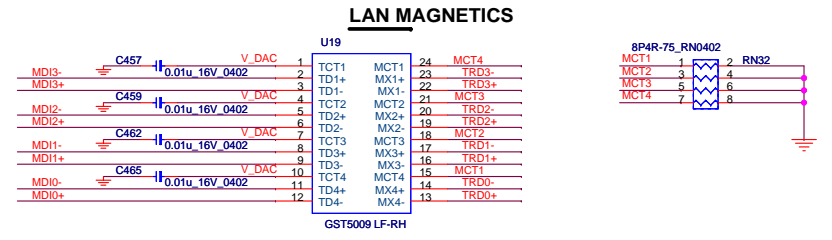
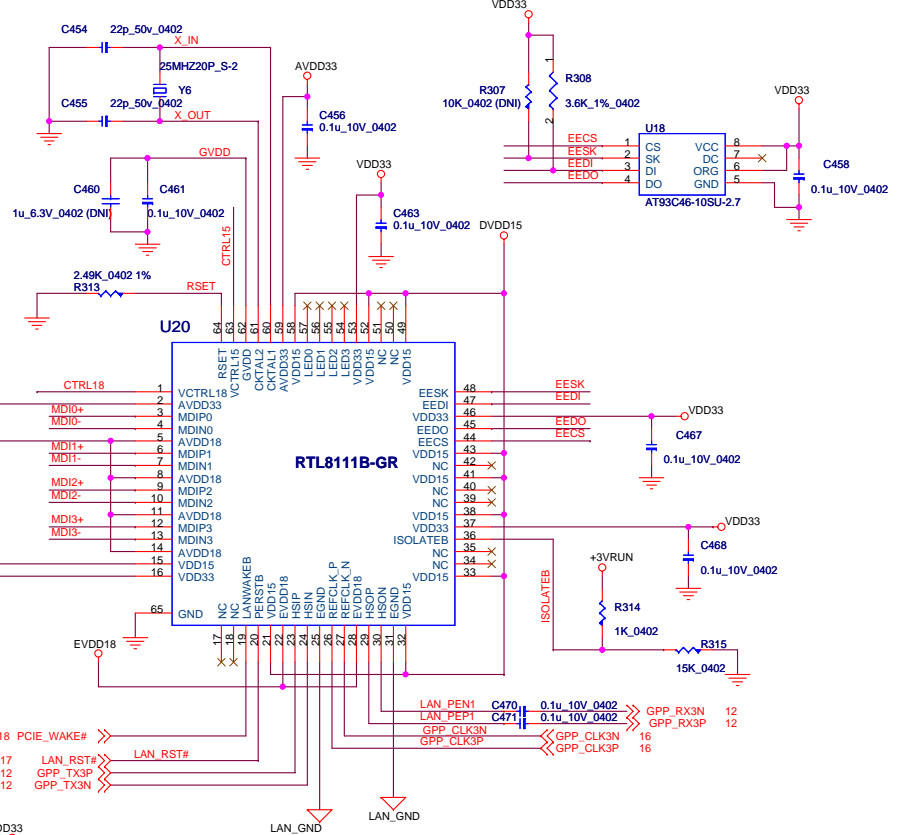




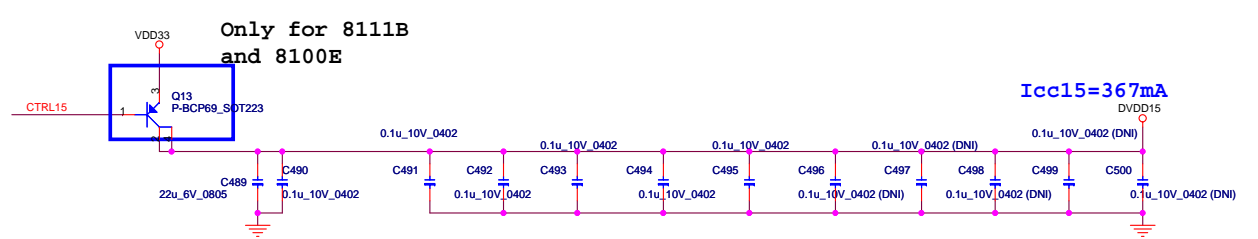
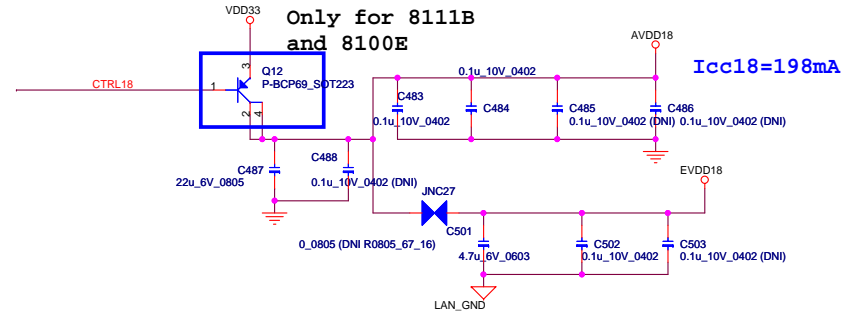
 <b>MICRO-STAR INT'L CO.,LTD.</b>	
Title	
<b>TPM (ST19WP18-TPM-C)</b>	
Size	Document Number
A	<b>MS-12221</b>
Date:	Rev
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24	45



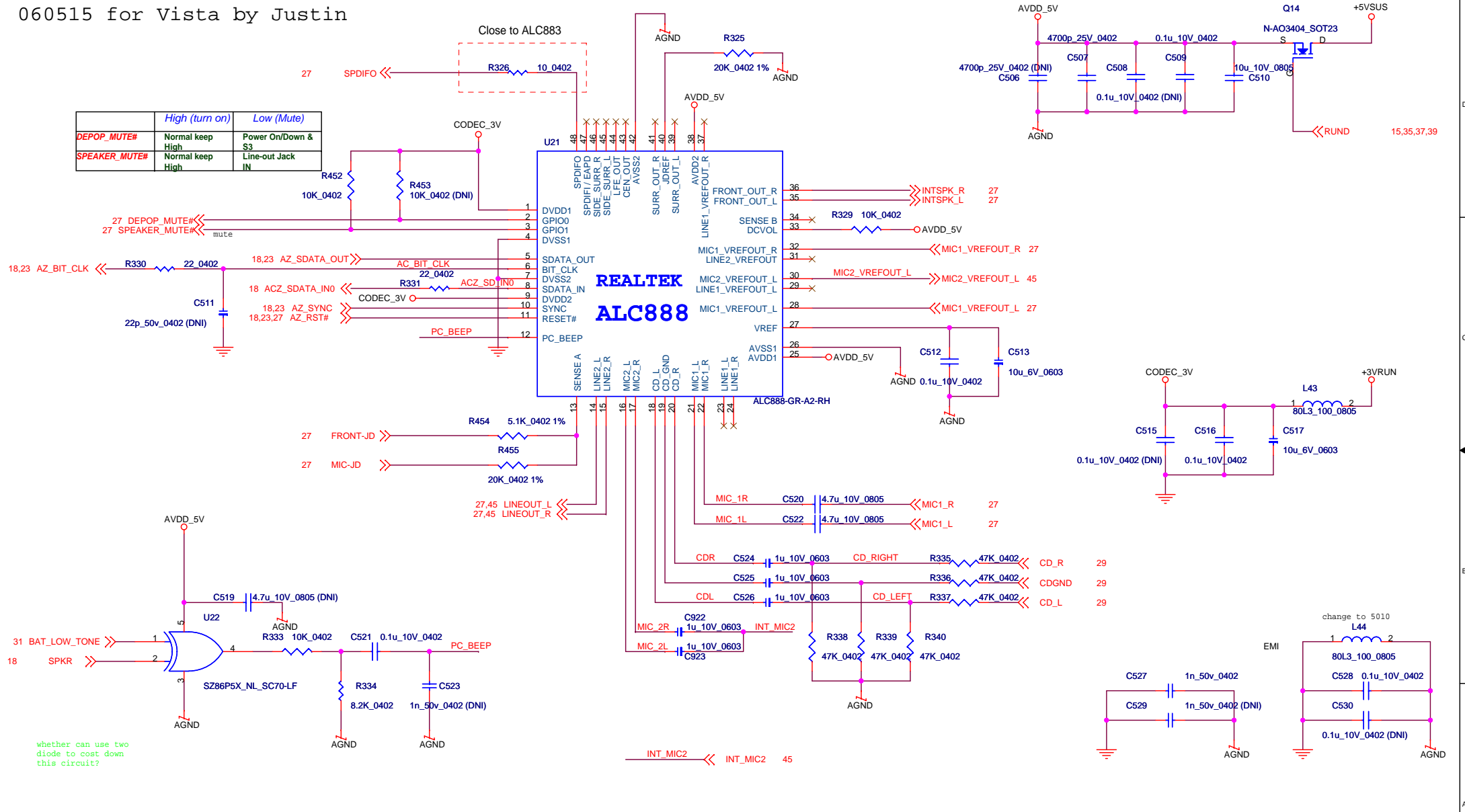
**DNI component check with Realtek's reference design OK**



**Icc33=103mA**  
**Total (LAN)=Icc33+Icc18+Icc15**  
**=103+198+367**  
**=668mA**



	High (turn on)	Low (Mute)
DEPOP_MUTE#	Normal keep High	Power On/Down & S3
SPEAKER_MUTE#	Normal keep High	Line-out Jack IN

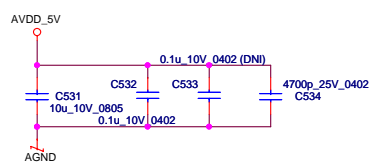


**MSI** MICRO-STAR INT'L CO.,LTD.

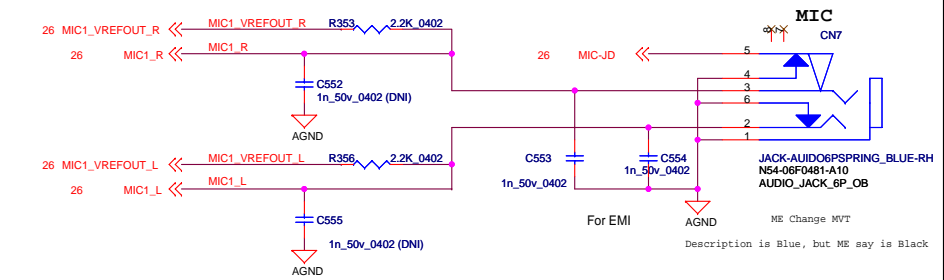
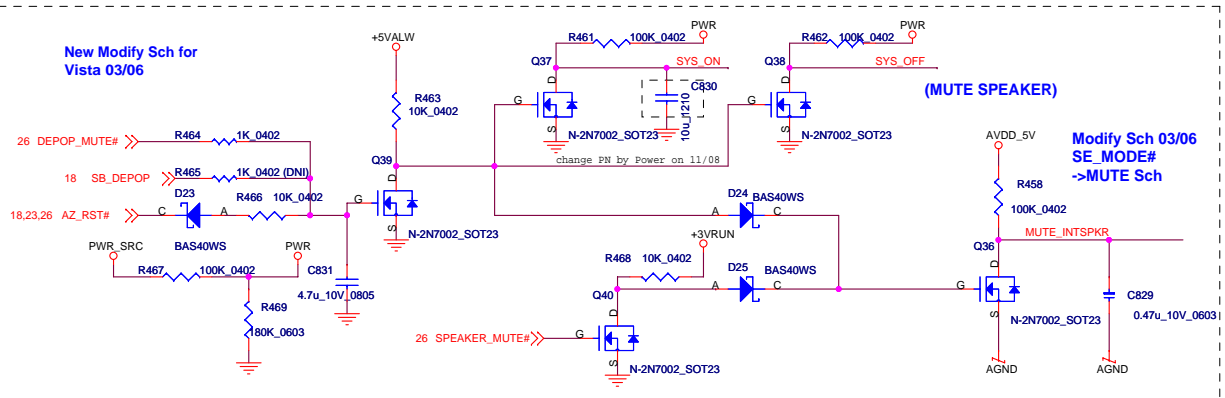
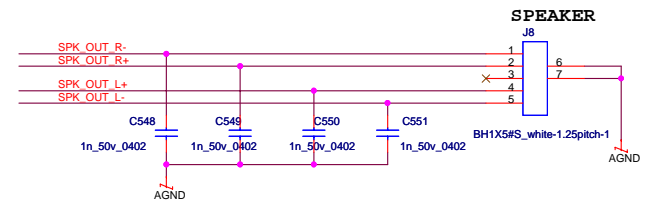
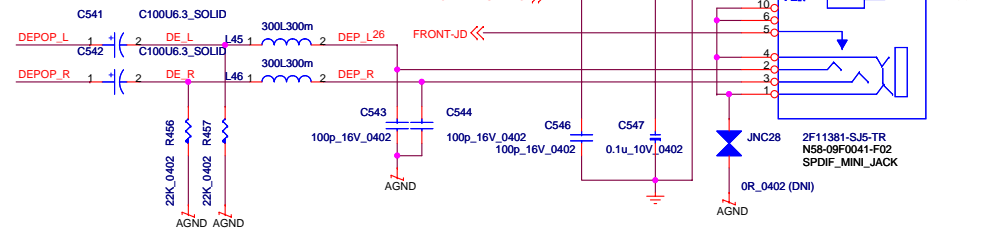
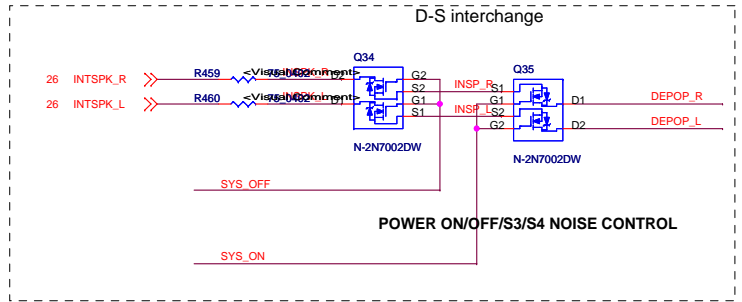
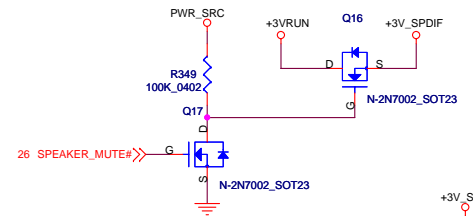
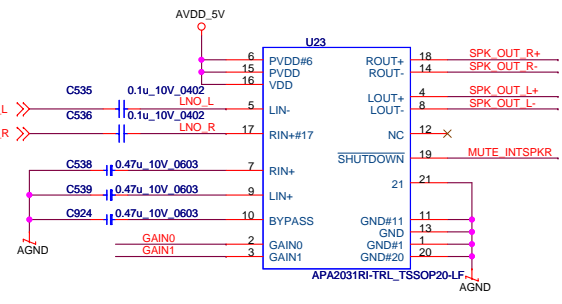
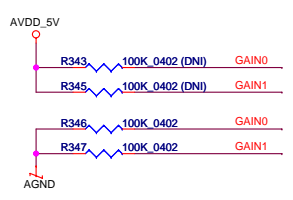
Title: **AUDIO(ALC888)**

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	GAIN0	GAIN1	SE/BTL#
6dB	0	0	0
10dB	0	1	0
15.6dB	1	0	0
21.6dB	1	1	0
4.3dB	X	X	1



**Mobile Configuration:**

(3 external jacks, 1 internal Mic, 2 sets stereo internal speaker)

Pin Assignment	Location	Re-tasking
FRONT (pin-35/36)	SPDIF jack, AMP	SPDIF output, AMP output (Int.SPKR), ?
SURR (pin-39/41)	X	X
CEN/LFE (pin-43/44)	X	X
SIDESURR (pin-45/46)	X	X
LINE1 (pin-23/24)	Line-in jack	Line input, ?
MIC1 (pin-21/22)	MIC-in jack	Mic input, ?
MIC2 (pin-16/17)	Int.MIC	Int.Mic input

Close To Power Source  
POWER ON/OFF/S3/S4 NOISE CONTROL

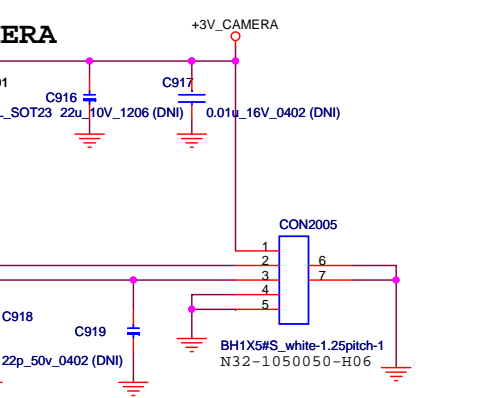
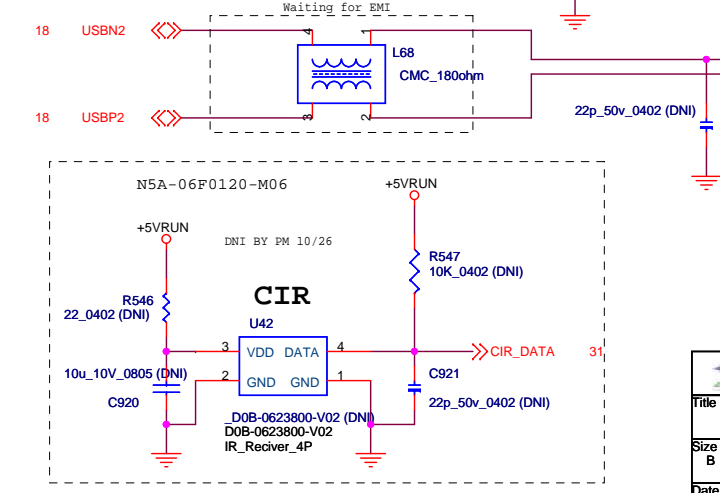
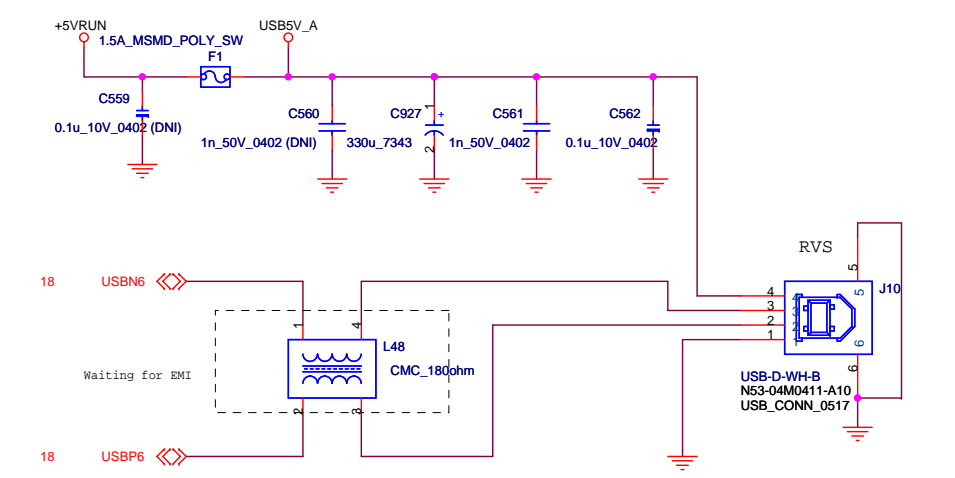
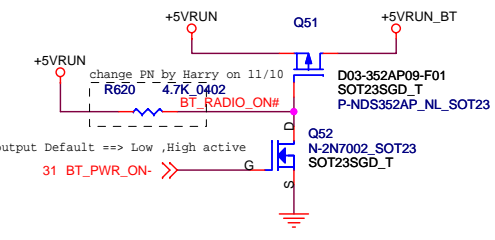
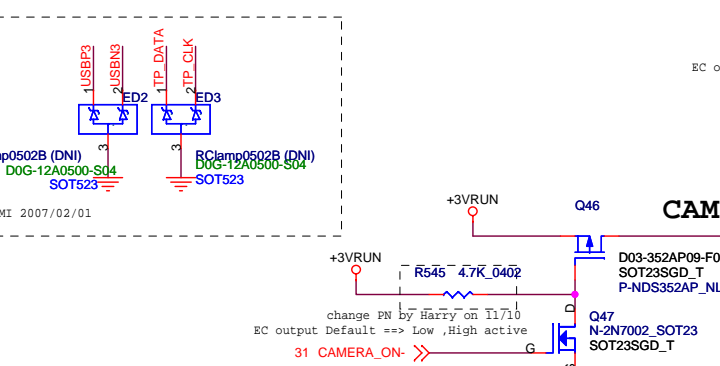
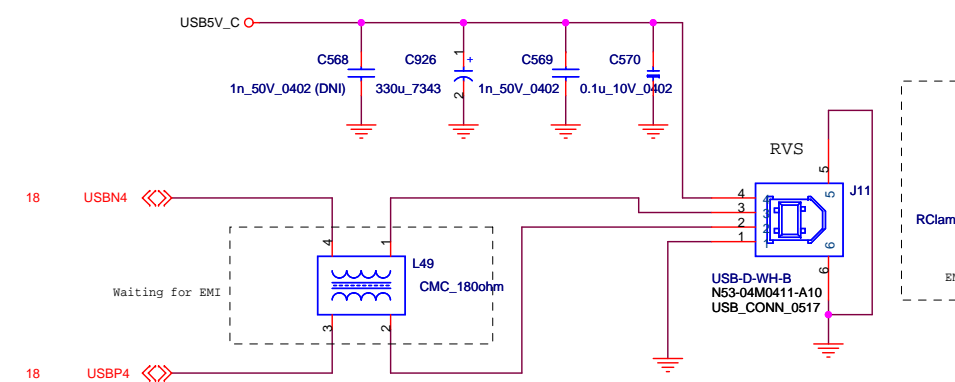
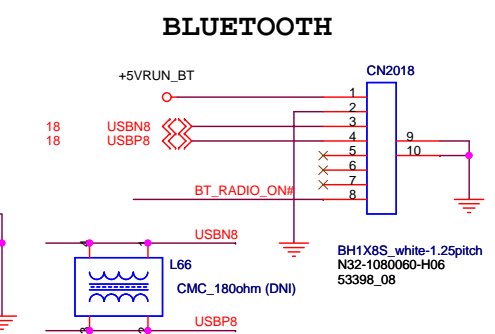
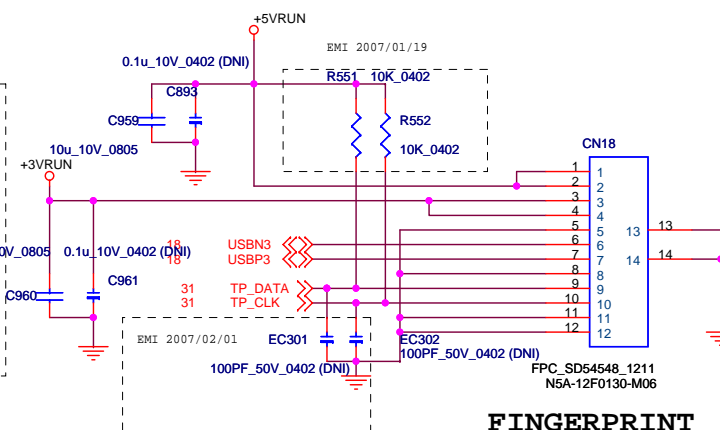
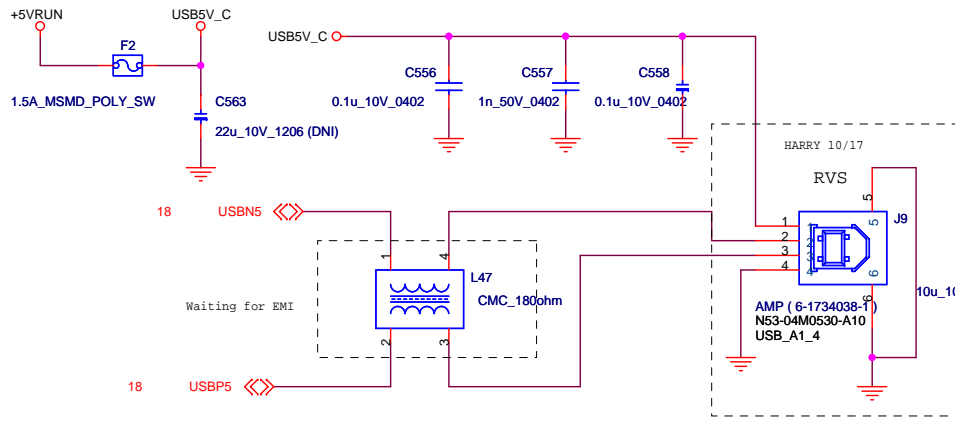
POWER ON/OFF/S3/S4 NOISE CONTROL


**MSI MICRO-STAR INT'L CO.,LTD.**

Title: **AMP & SPK & MIC & SPK**

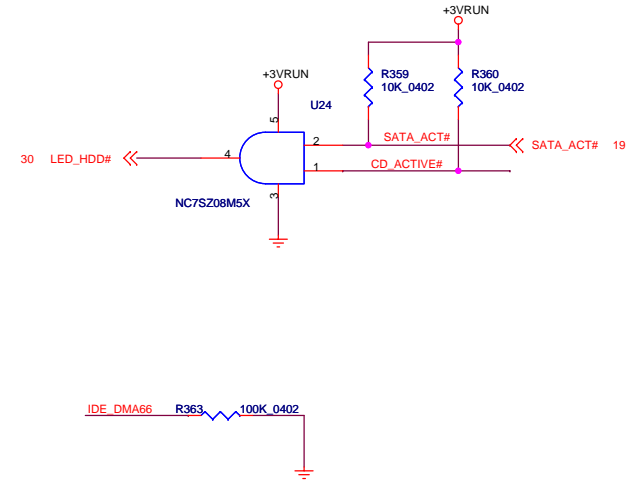
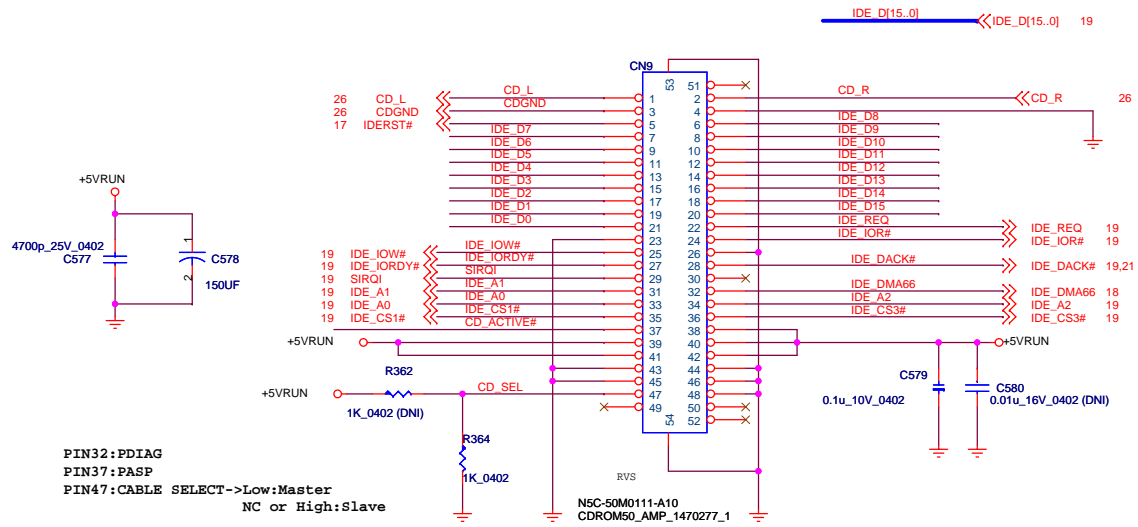
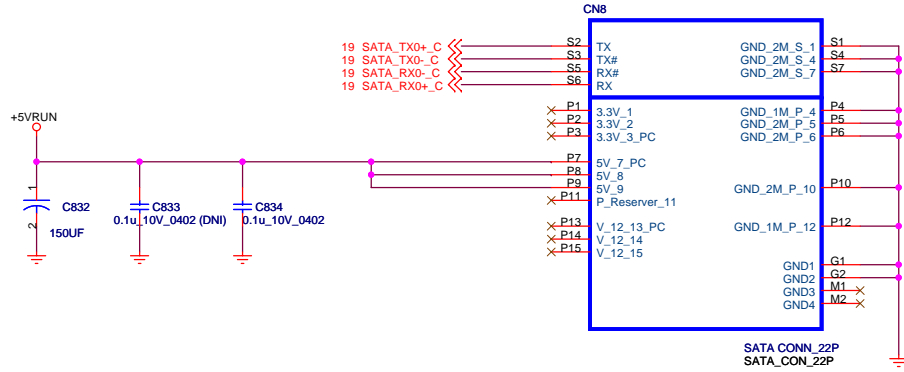
Size: Custom Document Number: **MS-12221** Rev: 1.0

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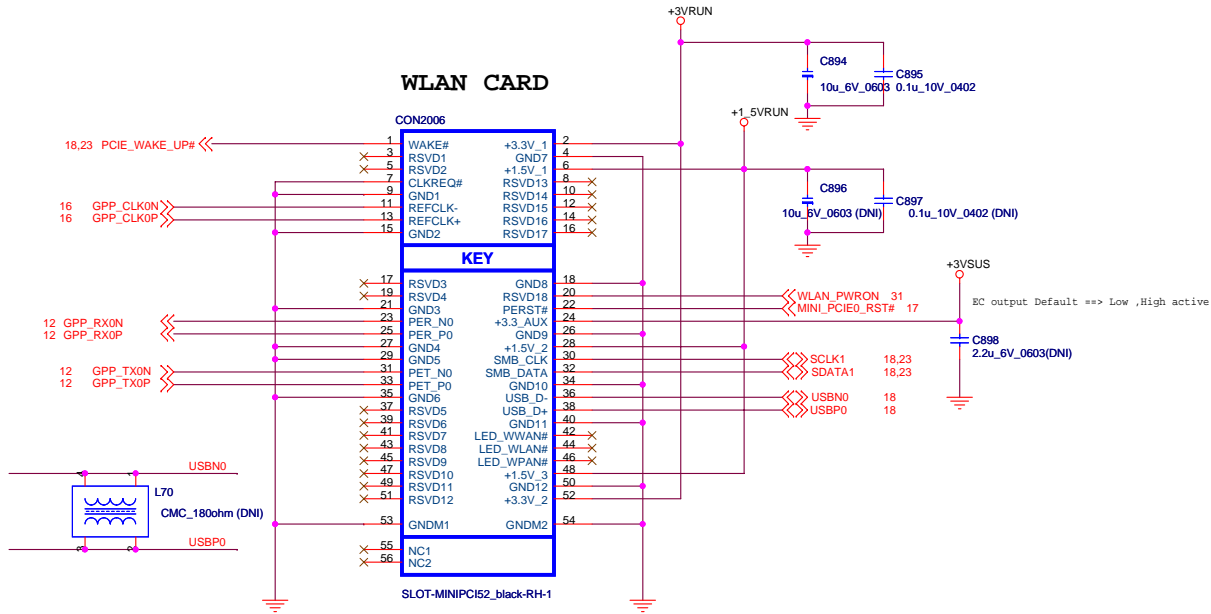
 <b>MICRO-STAR INT'L CO.,LTD.</b>		
<b>USB,CIR,BT,FP,CAMERA</b>		
Size B	Document Number	Rev 1.0
<b>MS-12221</b>		
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# 2.5"HD DRIVE

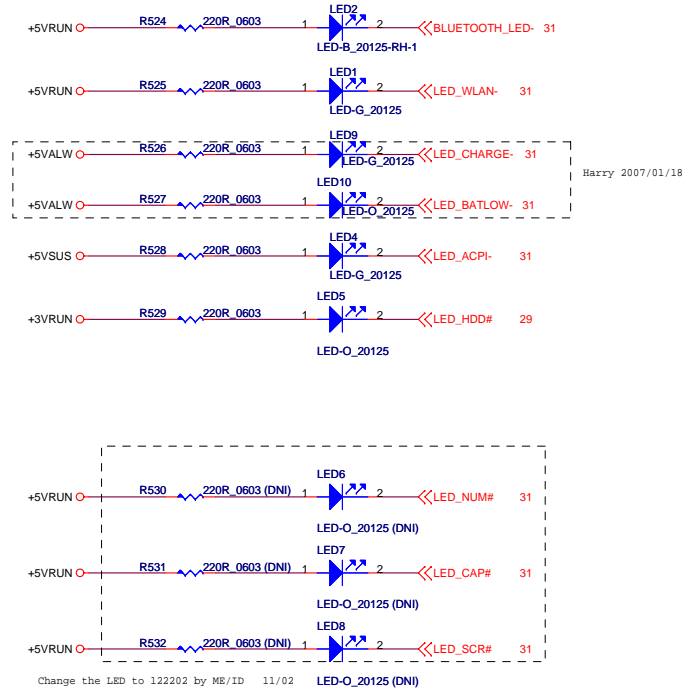


PIN32:PDIAG  
PIN37:PASP  
PIN47:CABLE SELECT->Low:Master  
NC or High:slave

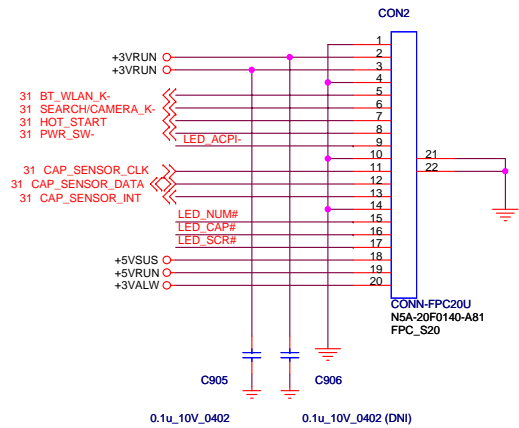
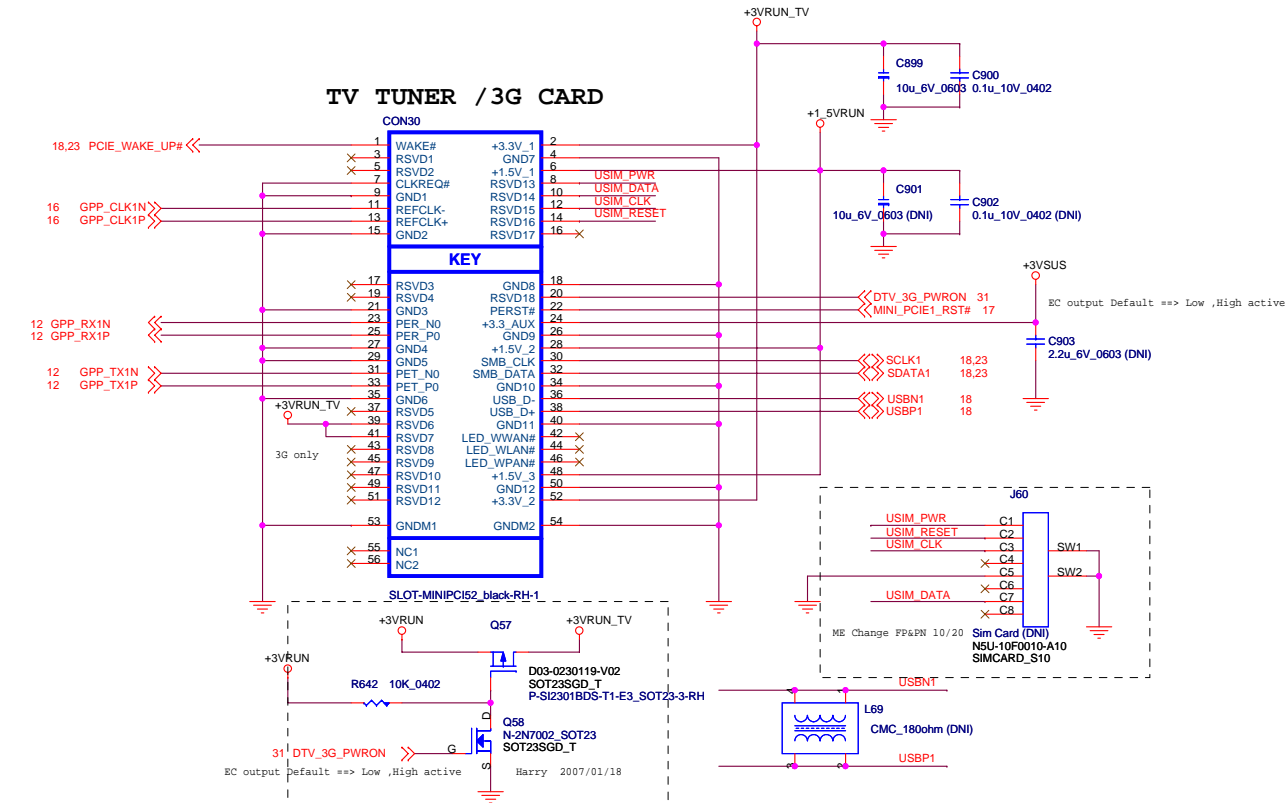
### WLAN CARD

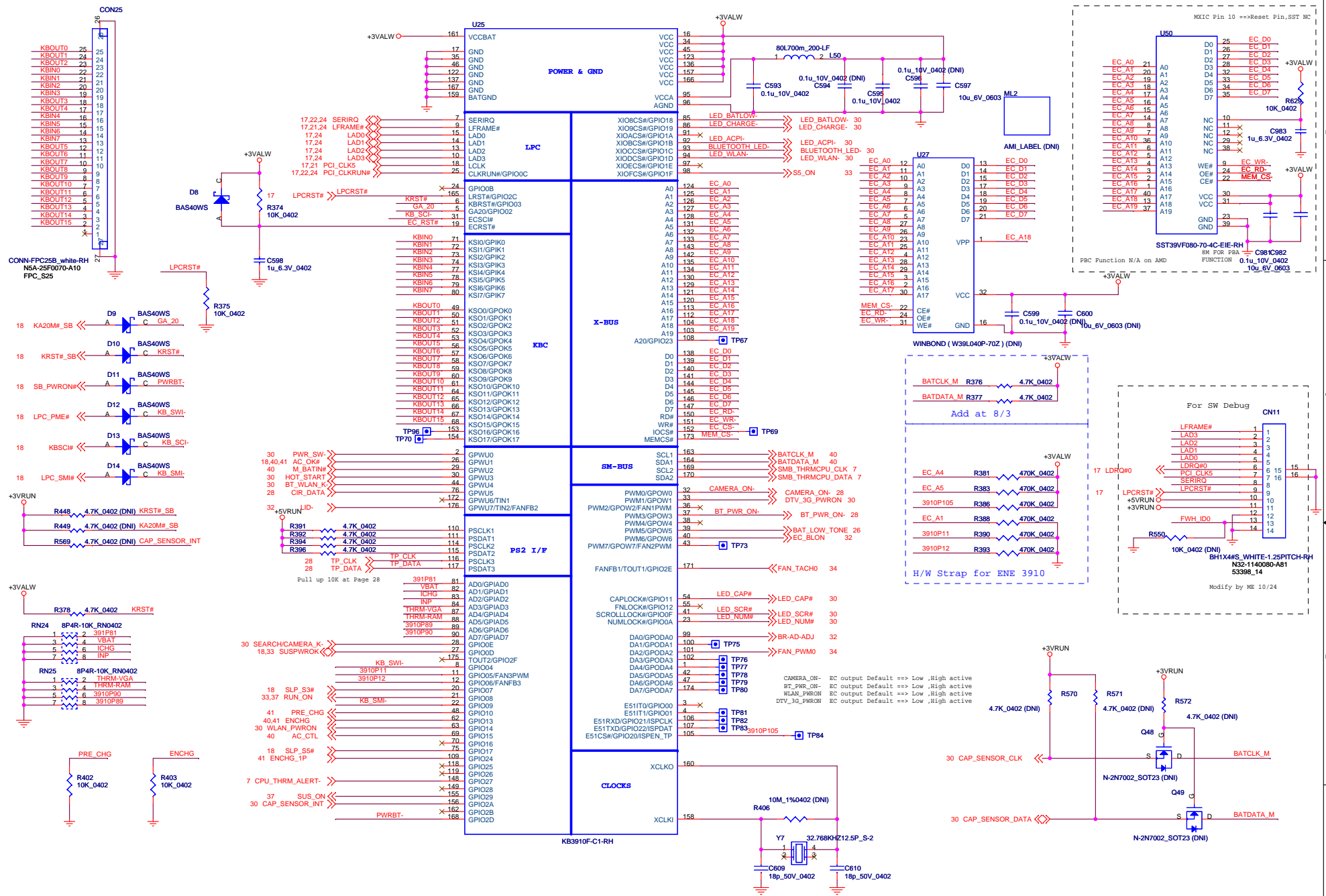


### Main PCB



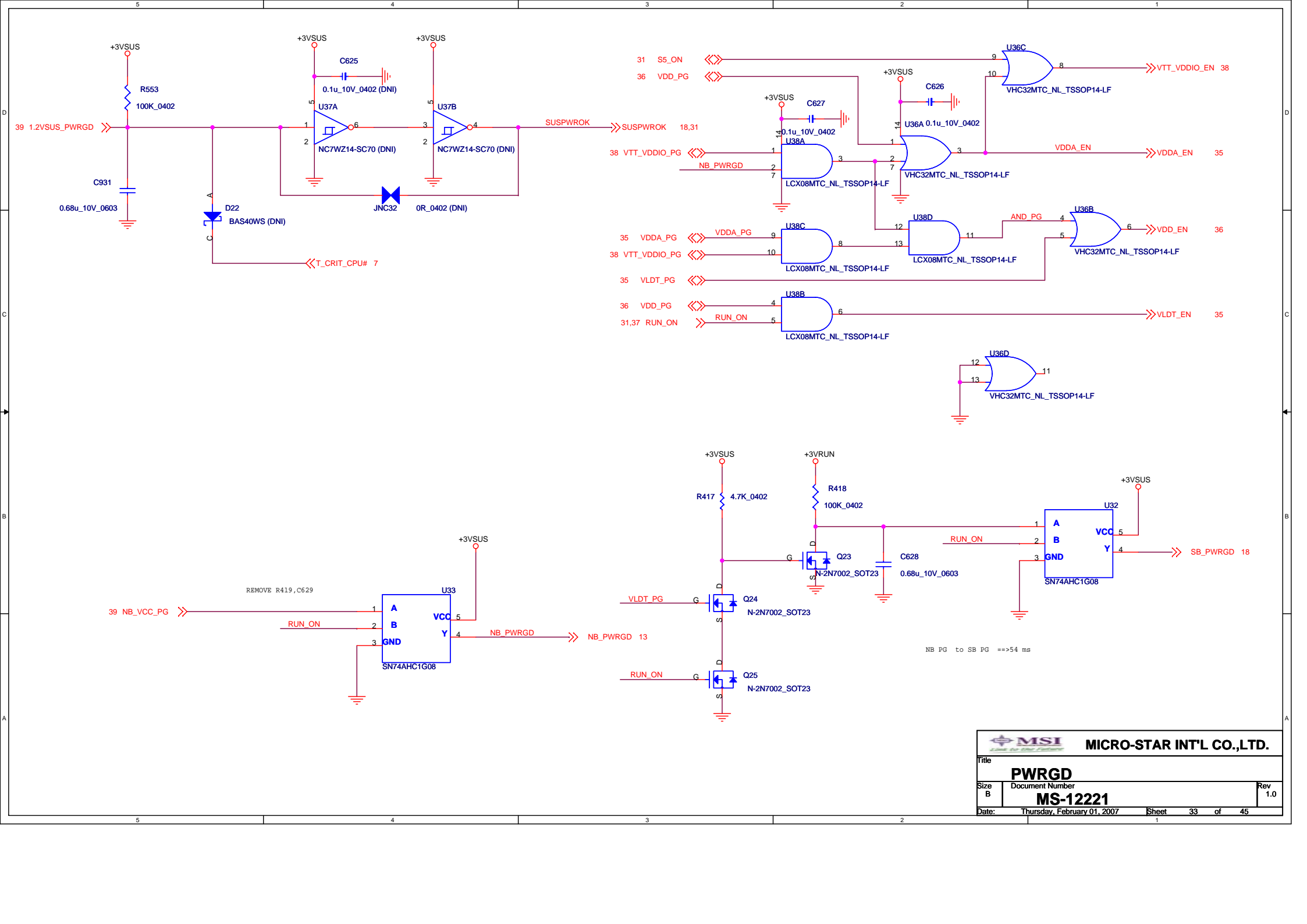
### TV TUNER /3G CARD




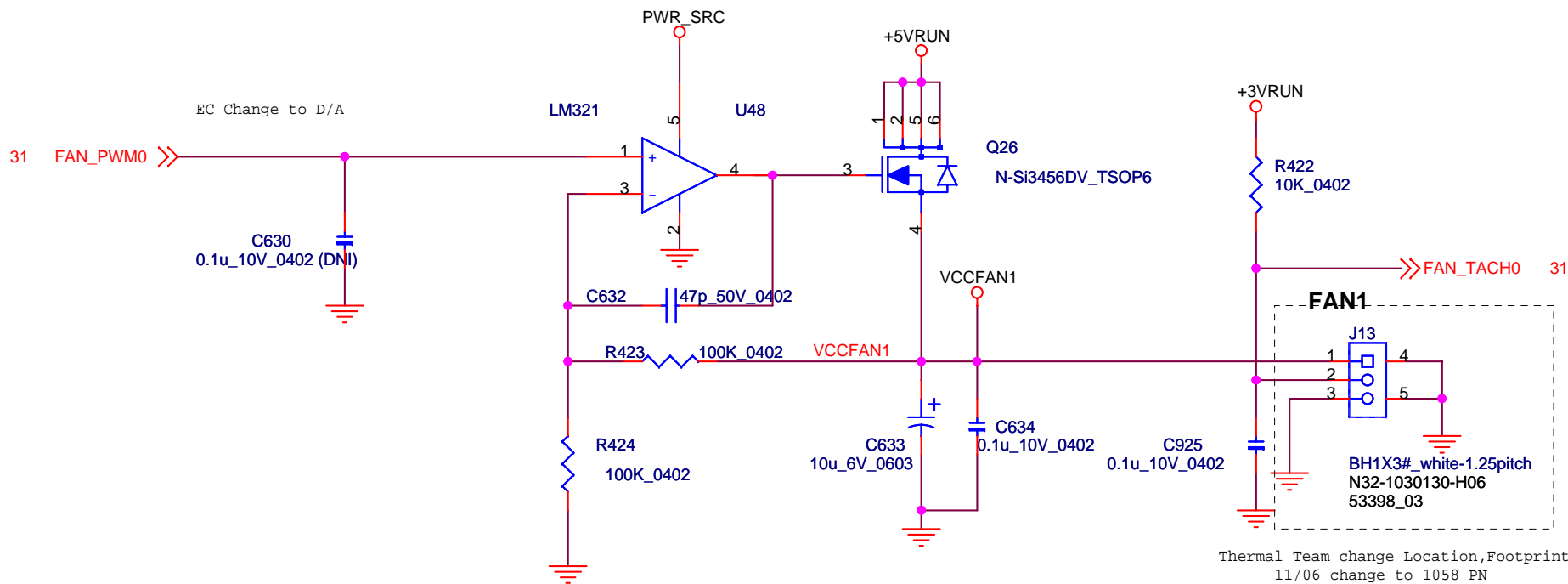





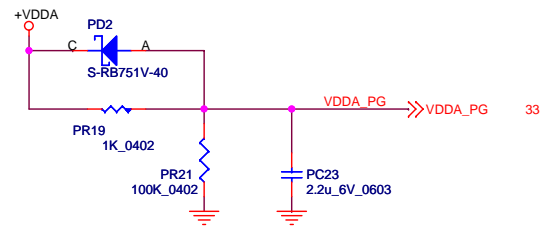
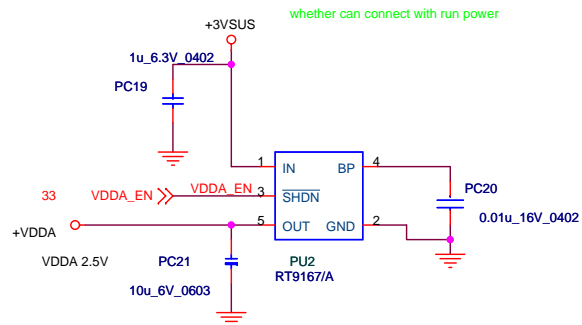
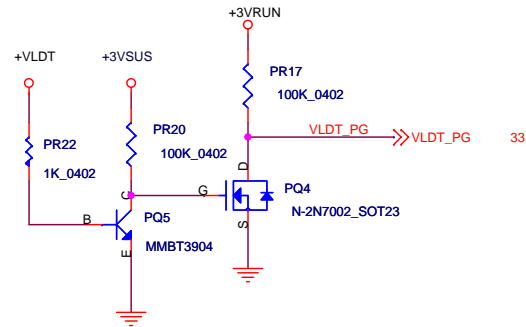
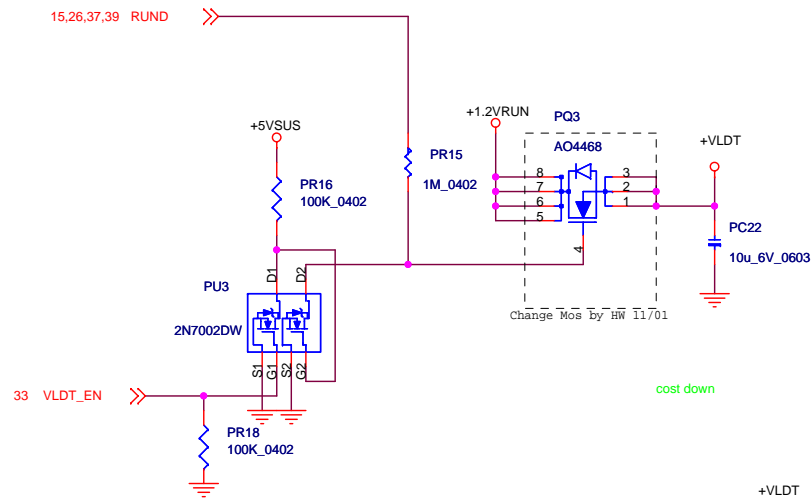





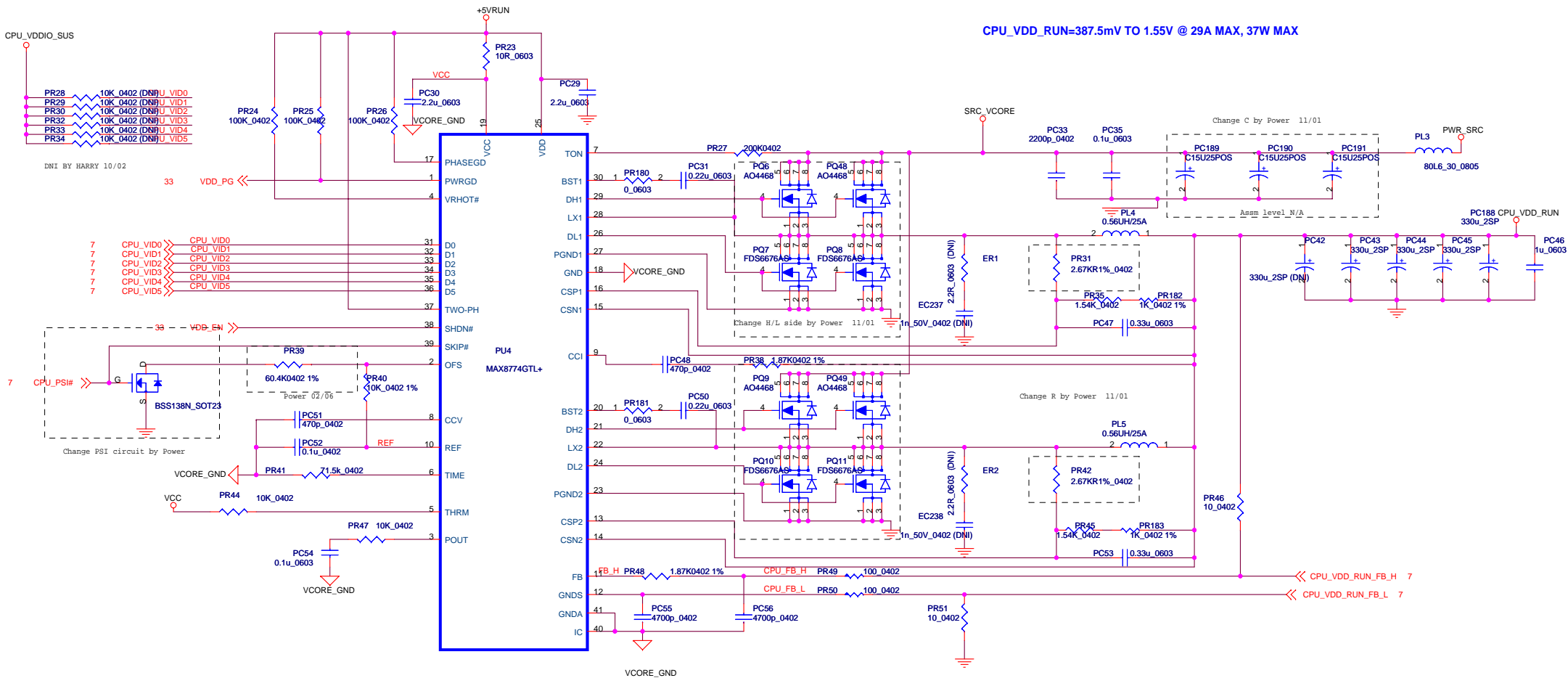
 <b>MICRO-STAR INT'L CO.,LTD.</b>	
Title	
<b>PWRGD</b>	
Size	Document Number
B	<b>MS-12221</b>
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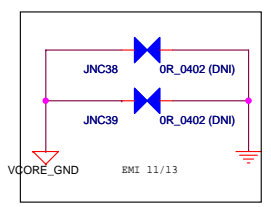
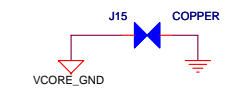
 <b>MSI</b> <small>MICRO-STAR INTERNATIONAL</small> <i>Link to the Future</i>		<b>MICRO-STAR INT'L CO.,LTD.</b>	
Title			
<b>FAN</b>			
Size	Document Number		Rev
A	<b>MS-12221</b>		1.0
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		<b>MICRO-STAR INT'L CO.,LTD.</b>	
Title			
<b>M 1.2V VDDA 2.5V VLDT</b>			
Size	Document Number		Rev
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CPU\_VDD\_RUN=387.5mV TO 1.55V @ 29A MAX, 37W MAX



 MICRO-STAR INT'L CO.,LTD.		
Title <b>VCORE</b>		
Size Custom	Document Number <b>MS-12221</b>	Rev 1.0
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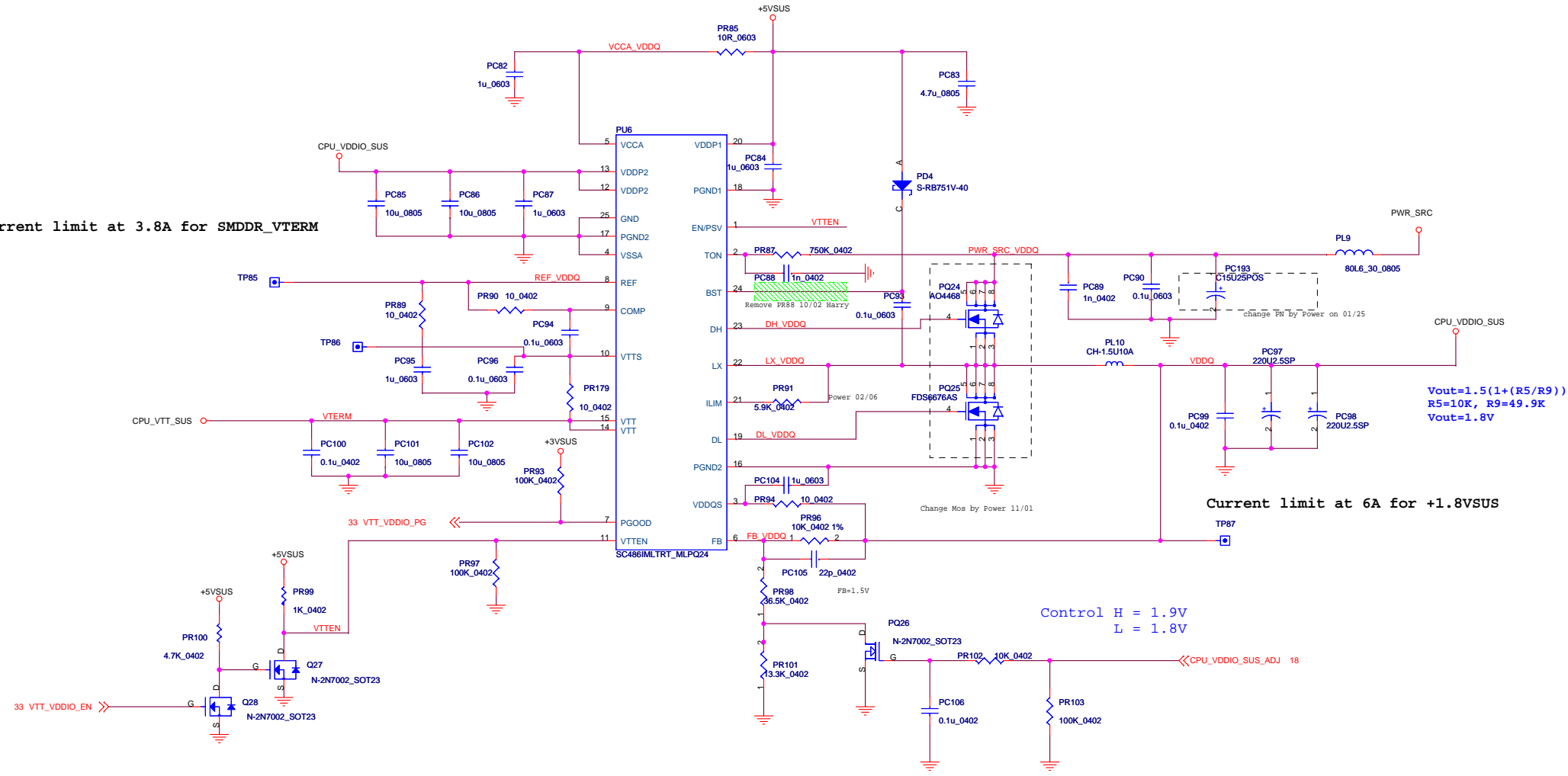



Current limit at 3.8A for SMDR\_VTERM

Current limit at 6A for +1.8VSUS

Control H = 1.9V  
L = 1.8V

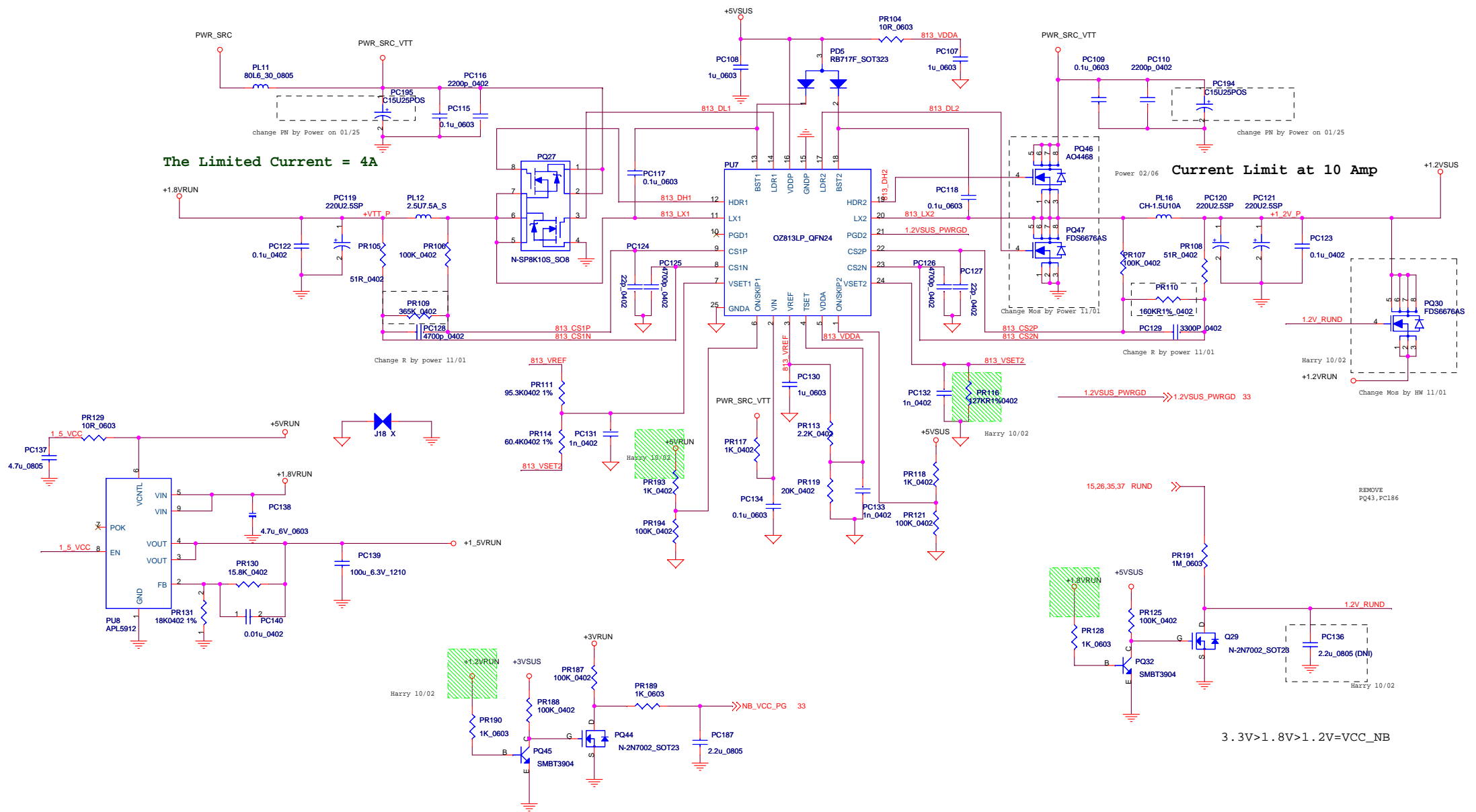
$V_{out} = 1.5(1 + (R5/R9))$   
 $R5 = 10K, R9 = 49.9K$   
 $V_{out} = 1.8V$




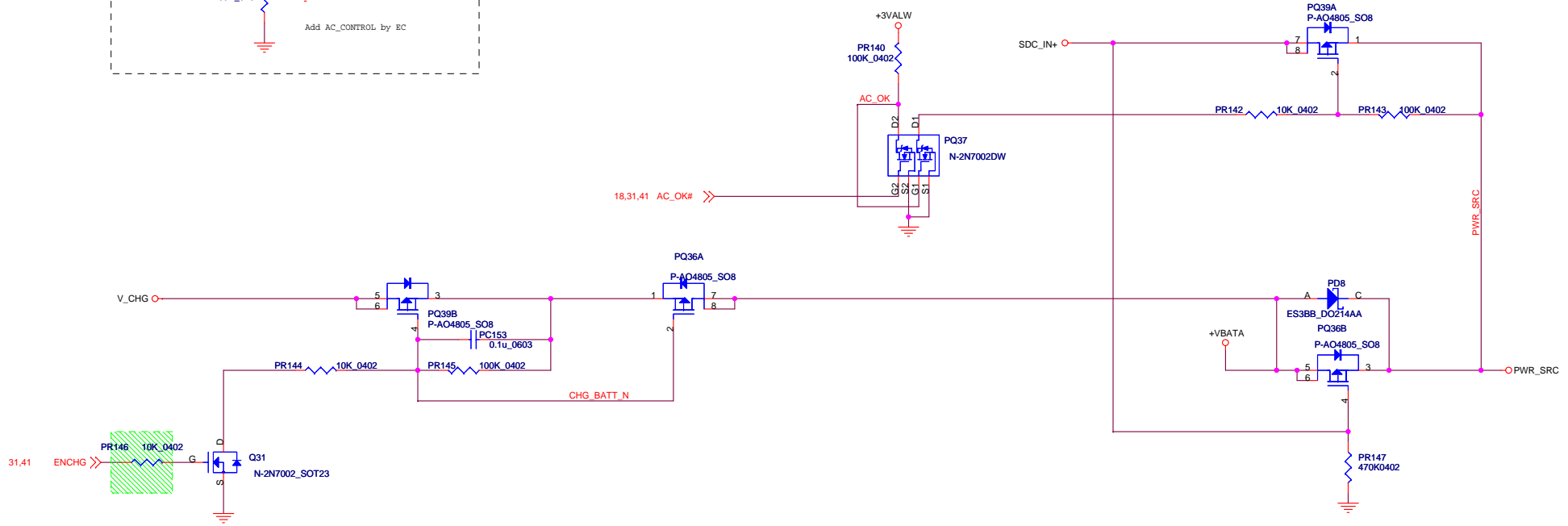
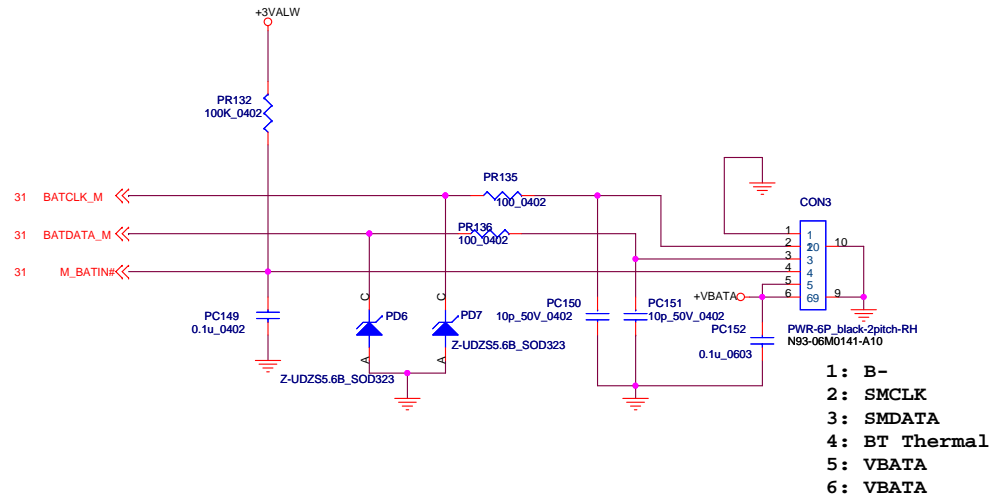
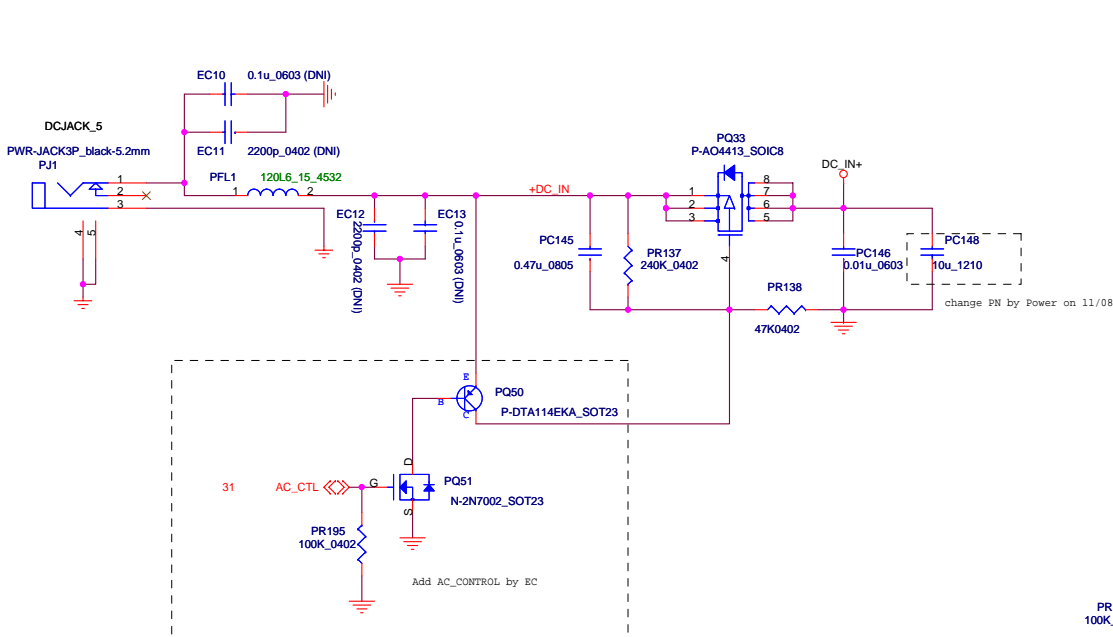
 <b>MICRO-STAR INT'L CO.,LTD.</b>	
Title <b>DDR2 1.8V VTT 0.9V</b>	
Size	Document Number
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The Limited Current = 4A

Current Limit at 10 Amp

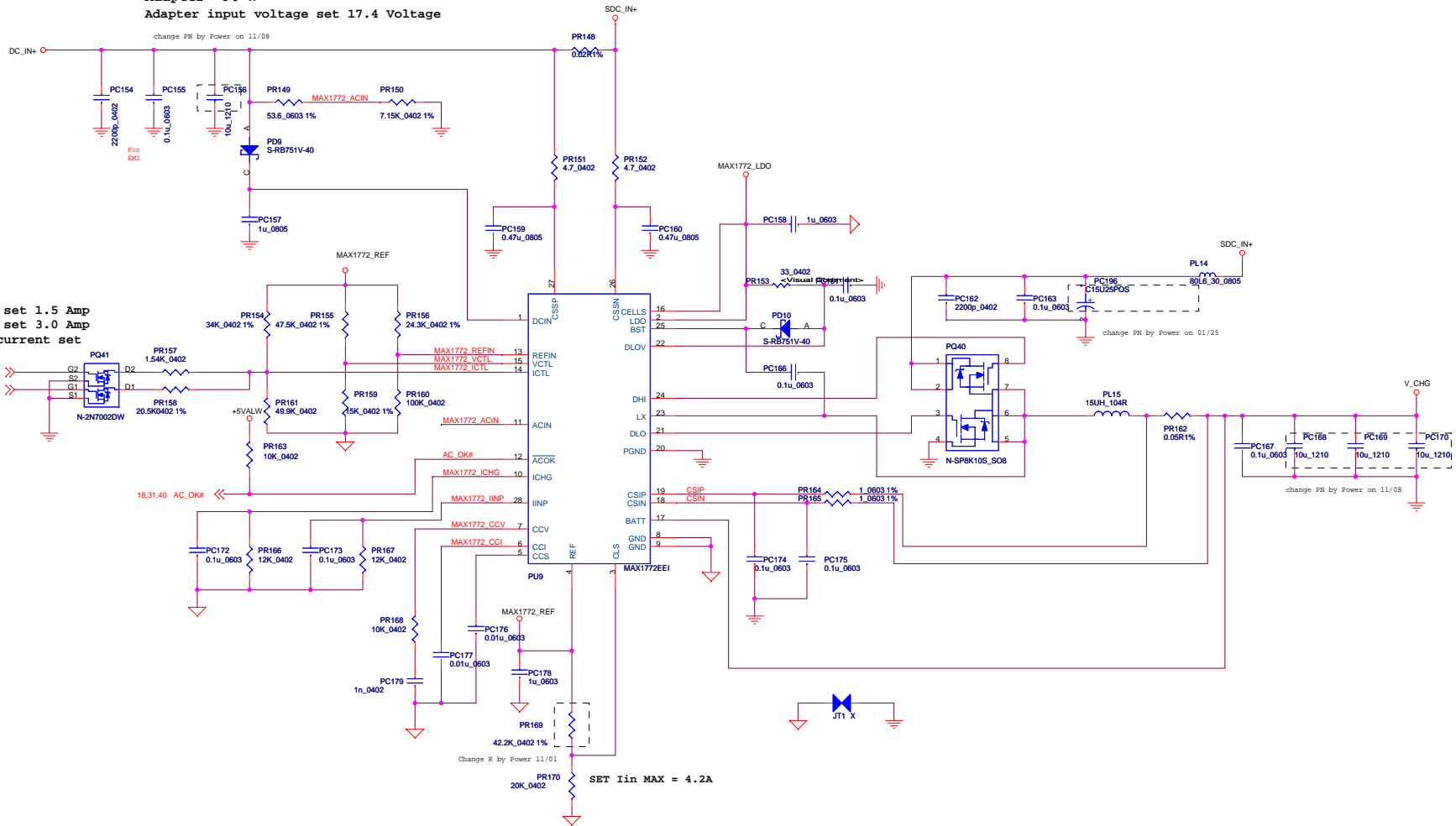


 MICRO-STAR INT'L CO.,LTD.	
<b>Title</b> VCC NB 1.2VSUS 1.5VRUN 1.8VRUN	
Size	Document Number
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Adapter = 90 W  
 Adapter input voltage set 17.4 Voltage

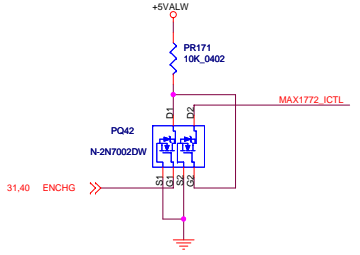


4S1P: Charge current set 1.5 Amp  
 4S2P: Charge current set 3.0 Amp  
 Pre-charger: Charge current set 200mA

31 PRE\_CHG  
 31 ENCHG\_1P

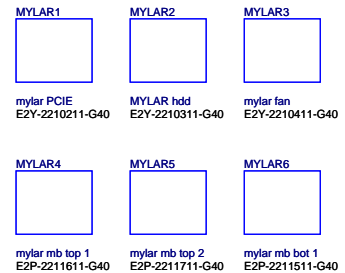
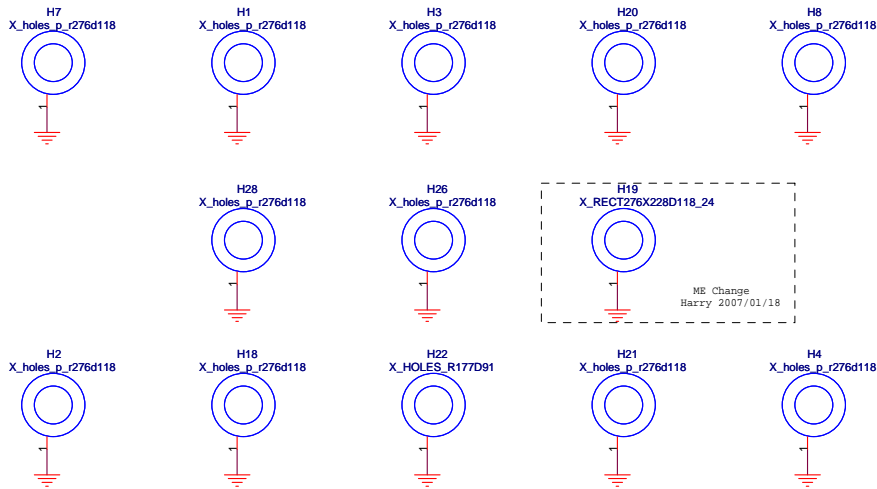
18.31.40 AC\_OK#

Change R by Power 11/01  
 SET I<sub>in</sub> MAX = 4.2A

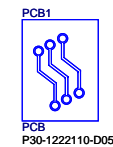
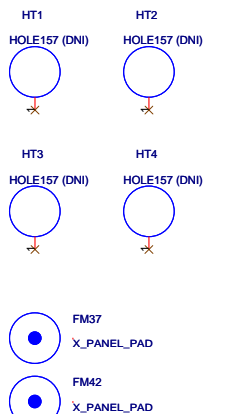
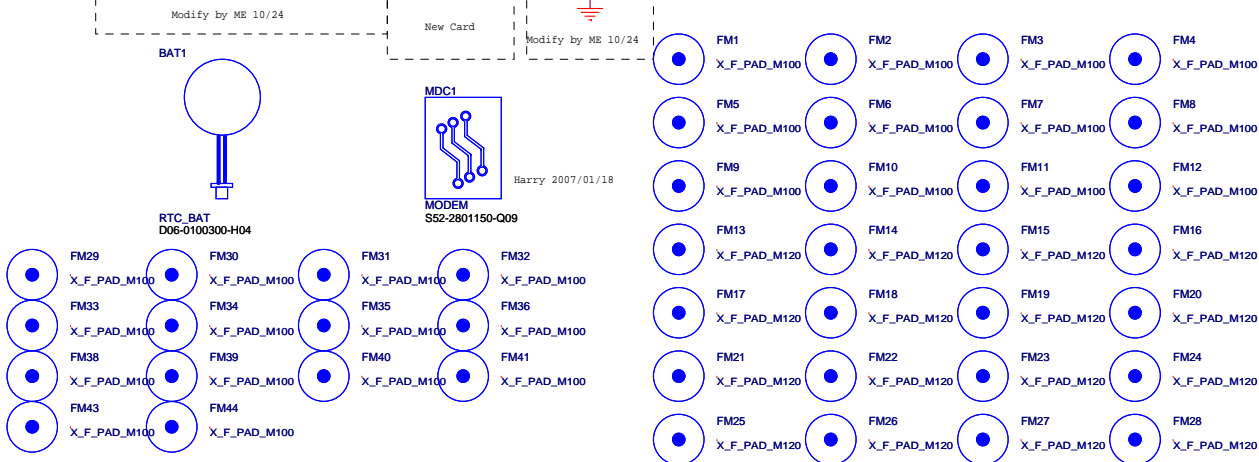
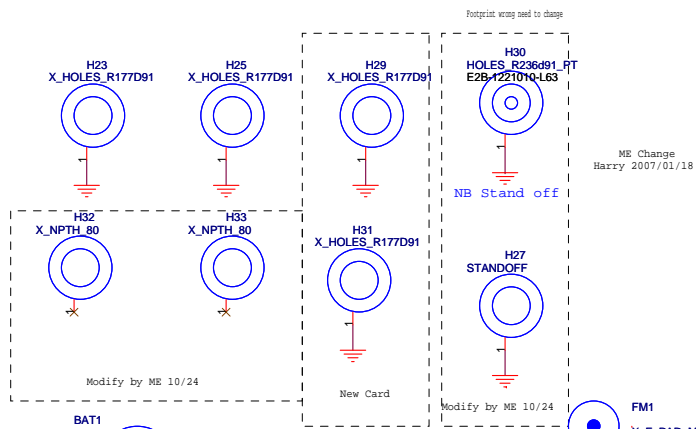


ENCHG-1P	PRE_CHG	ENCHG	
0	1	1	Pre-charge
1	0	1	4S1P-Fast charge
X	X	0	STOP CHARGE

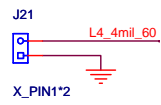
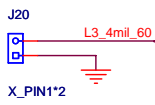
Define on 4S2P charge current



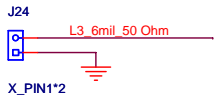
CPU HEATSINK



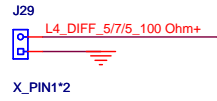
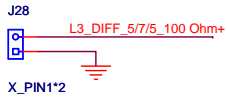
MICRO-STAR INT'L CO.,LTD.		
Title <b>ME Parts</b>		
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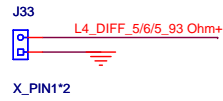
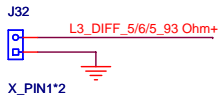
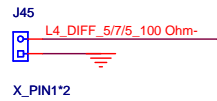
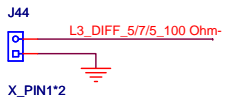
Normal Signal 60 Ohm



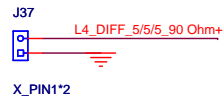
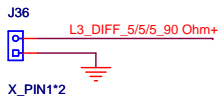
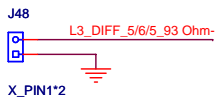
RGB Signal 50 Ohm



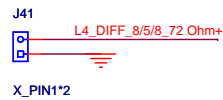
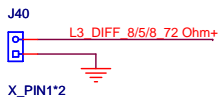
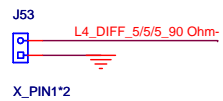
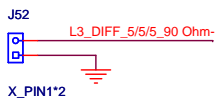
Differential Pair 100 Ohm



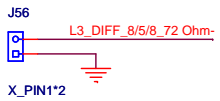
Differential Pair 93 Ohm




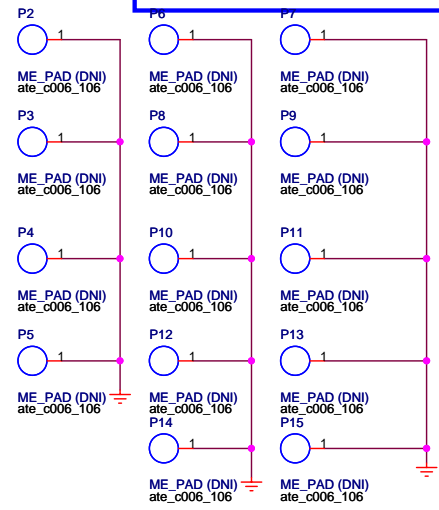
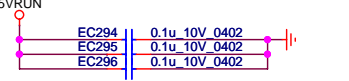
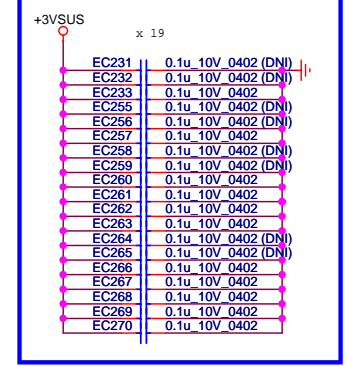
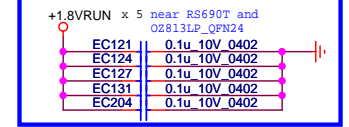
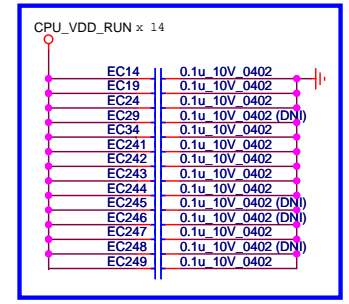
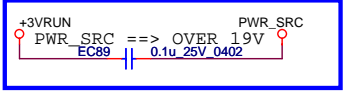
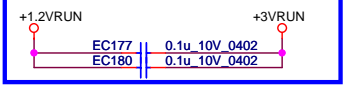
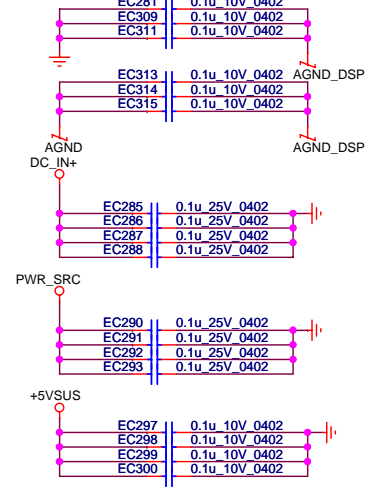
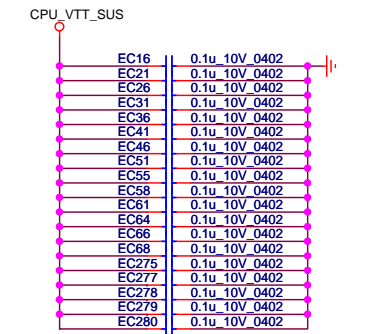
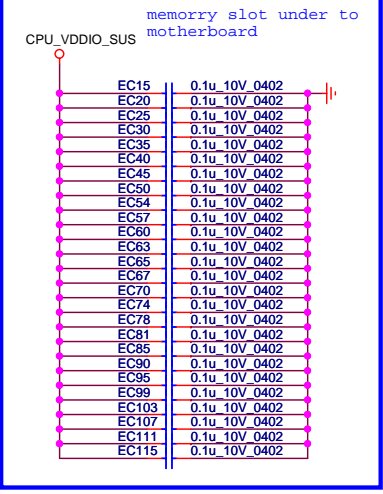
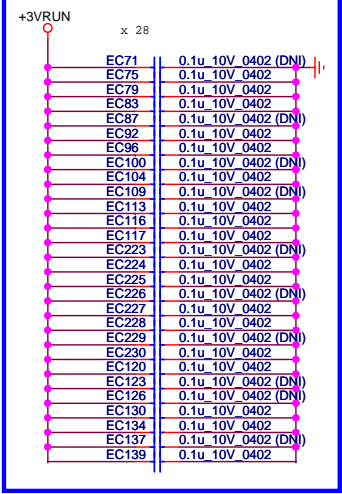
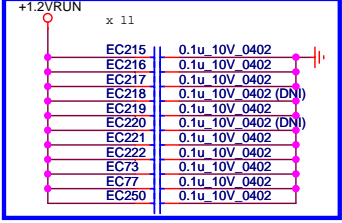
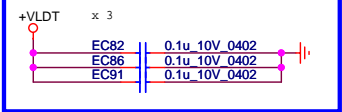
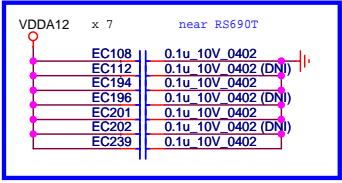
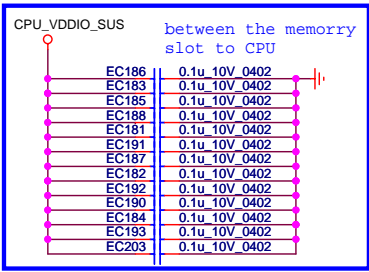
Differential Pair 90 Ohm



Differential Pair 72 Ohm



 <b>MICRO-STAR INT'L CO.,LTD.</b>	
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<b>IMPEDANCE</b>	
Size	Document Number
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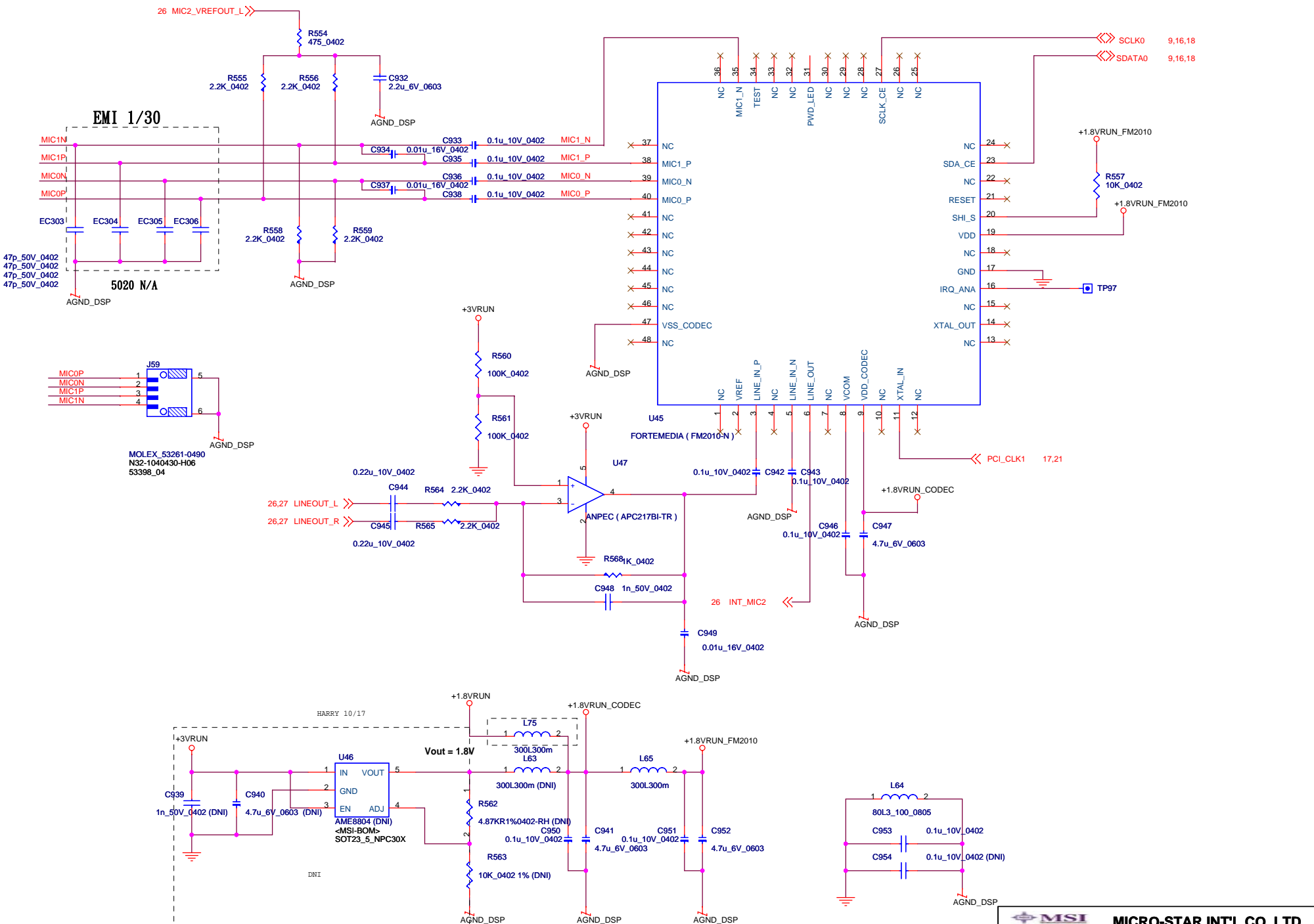
MSI MICRO-STAR INT'L CO.,LTD.

Title: **EMI**

Size B Document Number: **MS-12221**

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$$V_{out} = 1.215(R_u + R_d) / R_d$$

<b>MSI</b> MICRO-STAR INT'L CO.,LTD.	
Title: <b>Array Mic FM2010</b>	
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