MS-7693

Ver:1.0

CPU

AMD M3 Phenom/Athlon 64 FX AM3/AM3R2

System Chipset

AMD RX980

ATI SB950

On Board Chip

FINTEK Super I/O -- F71889AD
LAN -- RTL8111EL
HD Codec --ALC892
ASM1042 USB3.0
BIOS -- SPI ROM 32M

Main Memory

DDR III X 4 (Max 8GB)

Expansion Slots

PCI-E X 16*1

PCI-E X 4 *1

PCI-E X 1 *2

PCI 2.2 Slot X 2

PWM

Controller--IUPI1601 4+1 Phase
Vcore 4 Phase (MOS HIGHX2 LOWX2)
Vnb 1 Phase (MOS HIGHX1 LOWX2)

Clock Generator

Controller--RTM880N-793

Title: Cover Sheet	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011
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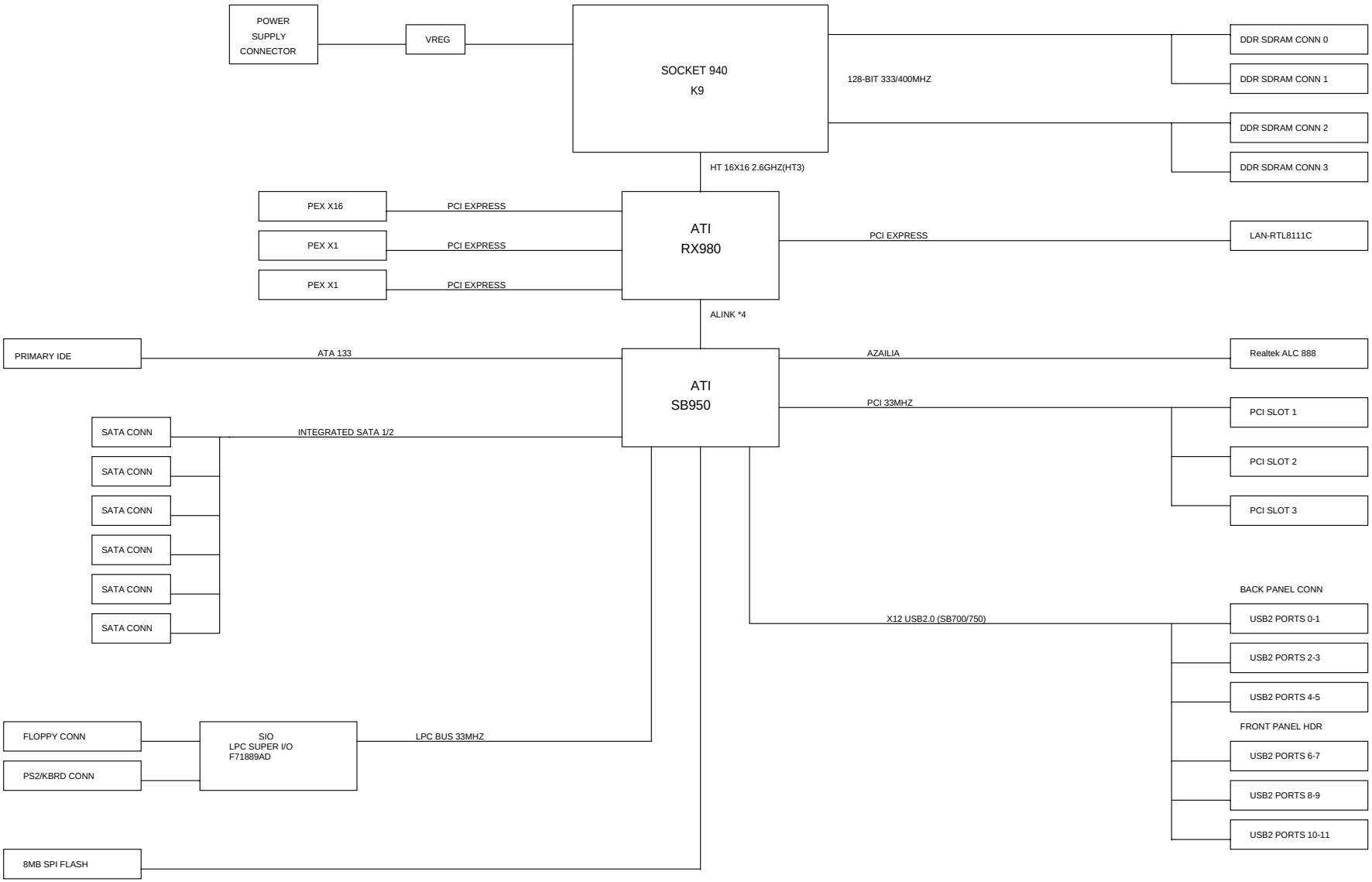
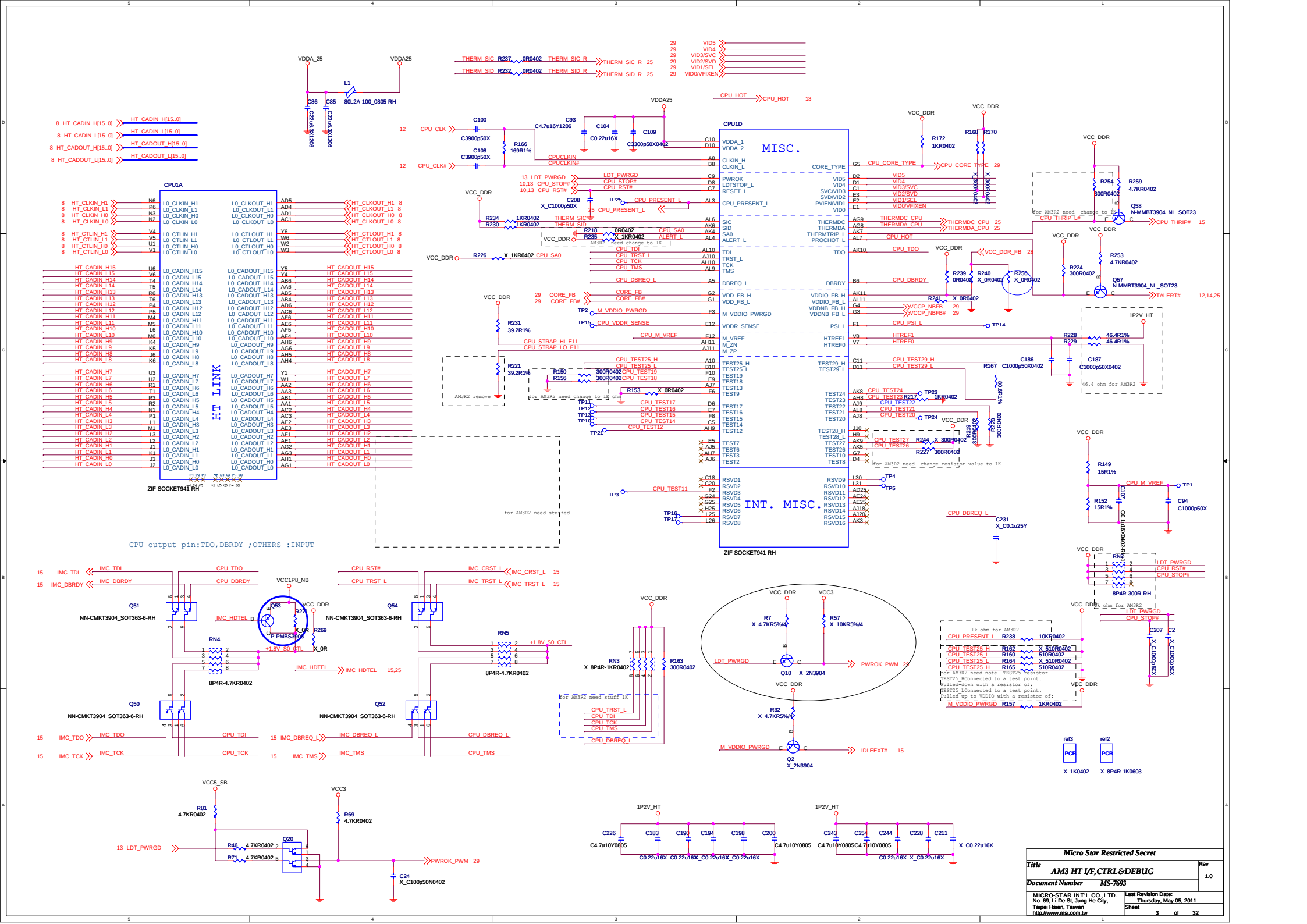
BLOCK DIAGRAM



Micro Star Restricted Secret		
Title	***Block Diagram***	**Rev** 1.0
Document Number	***MS-7693***	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	**Last Revision Date:** Tuesday, May 03, 2011	
	Sheet 2 of 32	


CPU1A
HT LINK
ZIF-SOCKET941-RH
CPU1D
MISC.
INT. MISC.
ZIF-SOCKET941-RH
CPU output pin:TDO,DBRDY ;OTHERS :INPUT
Q51
NN-CMKT3904_SOT363-6-RH
Q54
NN-CMKT3904_SOT363-6-RH
Q53
P-PMBS3906
Q50
NN-CMKT3904_SOT363-6-RH
Q52
NN-CMKT3904_SOT363-6-RH
RN4
8P4R-4.7KR0402
RN5
8P4R-4.7KR0402
RN3
X_8P4R-1KR0402
RN6
8P4R-300R-RH
Q10
X_2N3904
Q2
X_2N3904
Q20
Q57
N-MMBT3904_NL_SOT23
Q58
N-MMBT3904_NL_SOT23
for AM3R2 need stuffed
for AM3R2 need change to 1K ohm
for AM3R2 need change resistor value to 1K
for AM3R2 need stuff 1K
1k ohm for AM3R2
6.4 ohm for AM3R2
AM3R2 remove
Micro Star Restricted Secret
Title
AM3 HT I/F,CTRL&DEBUG
Rev
1.0
Document Number
MS-7693
MICRO-STAR INT'L CO.,LTD.
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Taipei Hsien, Taiwan
http://www.msi.com.tw
Last Revision Date:
Thursday, May 05, 2011
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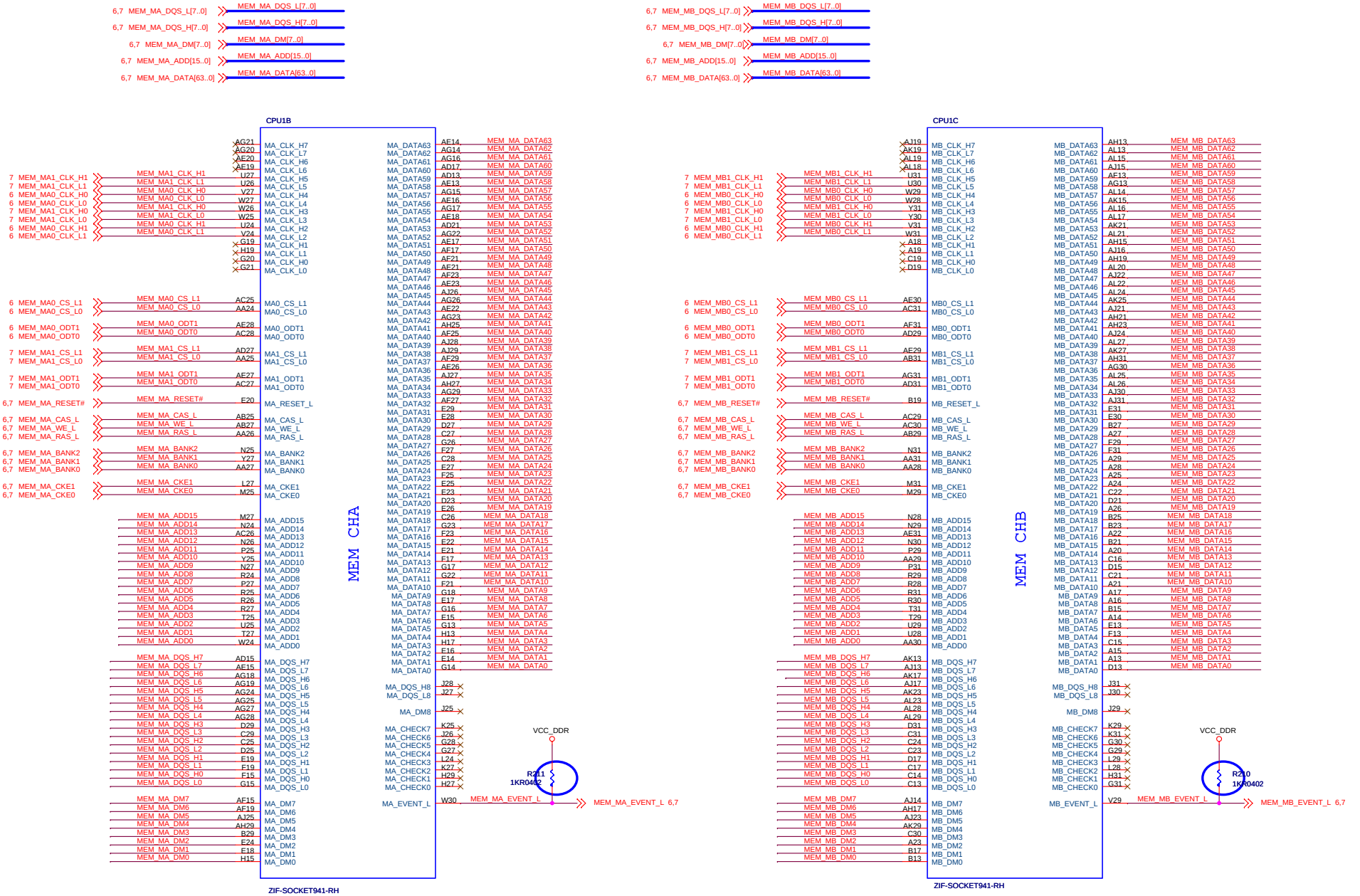
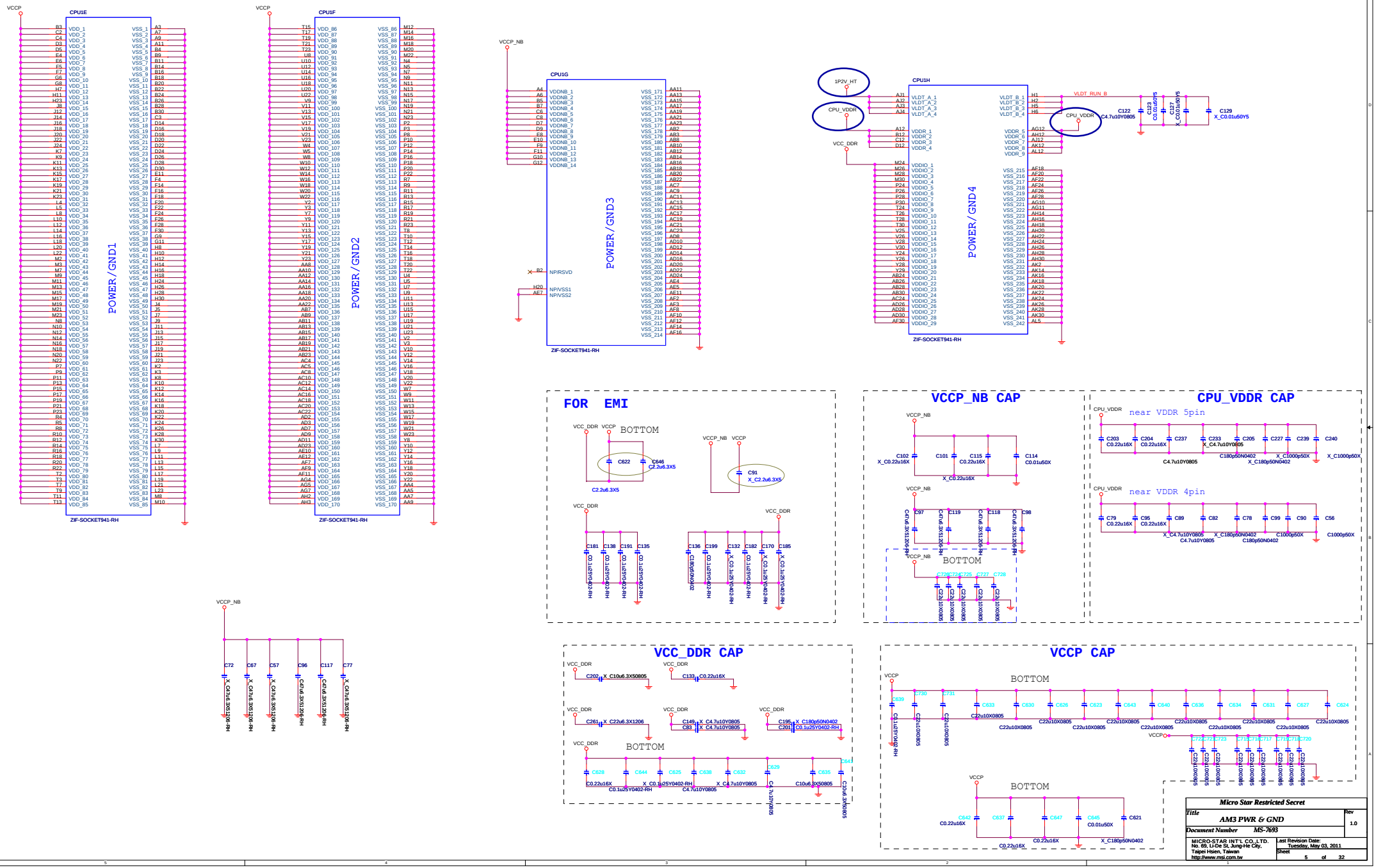


Micro Star Restricted Secret	
Title: AM3 DDR MEMORY I/F	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011 Sheet 4 of 32


CPU1E
CPU1F
CPU1G
CPU1H
POWER/GND1
POWER/GND2
POWER/GND3
POWER/GND4
ZIF-SOCKET941-RH
VCCP
VCCP_NB
VCC_DDR
CPU_VDDR
1P2V_HT
VLDT_RUN_B
NP/RSVD
NP/VSS1
NP/VSS2
FOR EMI
BOTTOM
VCCP_NB CAP
CPU_VDDR CAP
near VDDR 5pin
near VDDR 4pin
VCC_DDR CAP
VCCP CAP
Micro Star Restricted Secret
Title
AM3 PWR & GND
Rev
1.0
Document Number
MS-7693
MICRO-STAR INT'L CO.,LTD.
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http://www.msi.com.tw
Last Revision Date:
Tuesday, May 03, 2011
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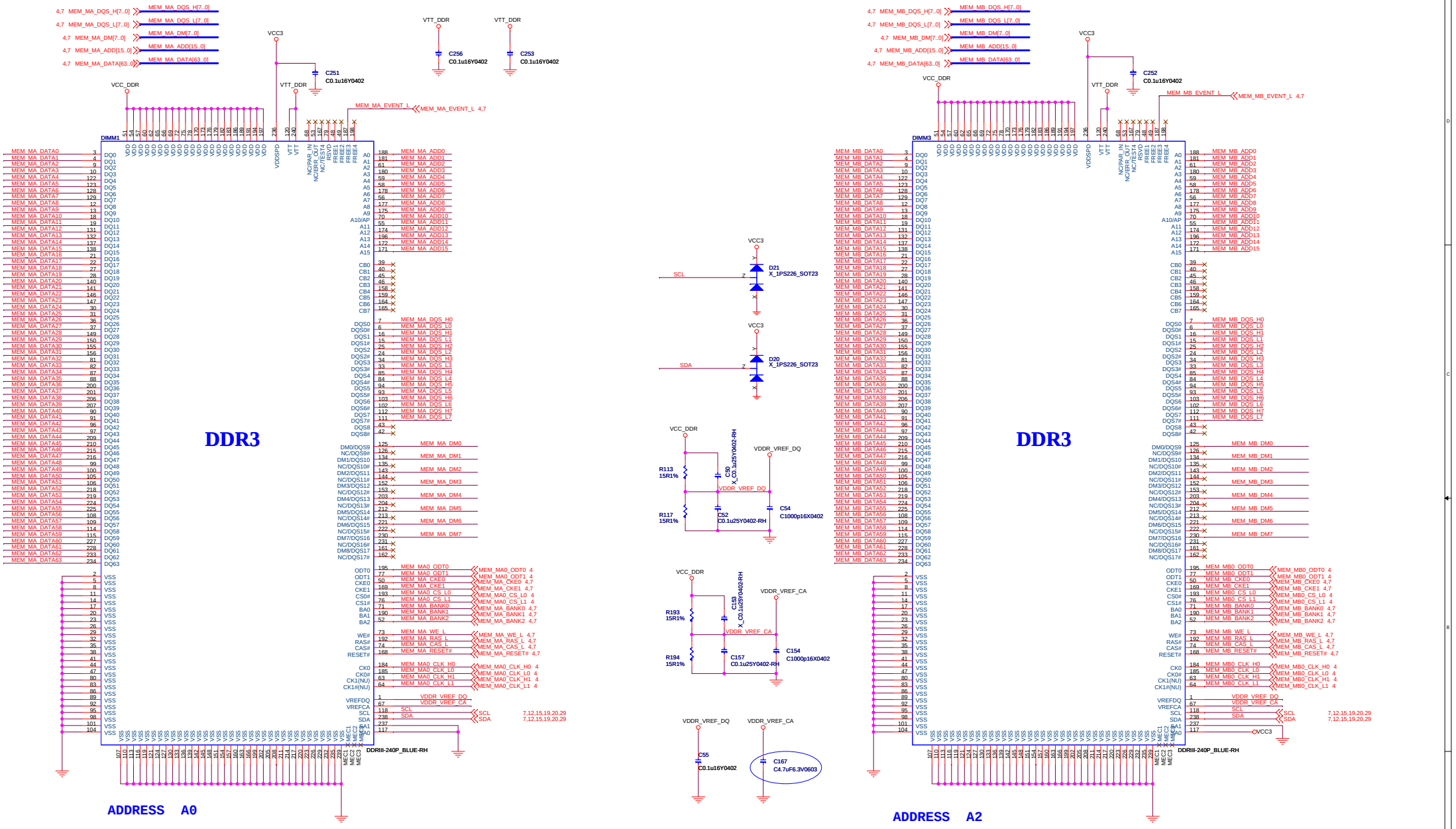
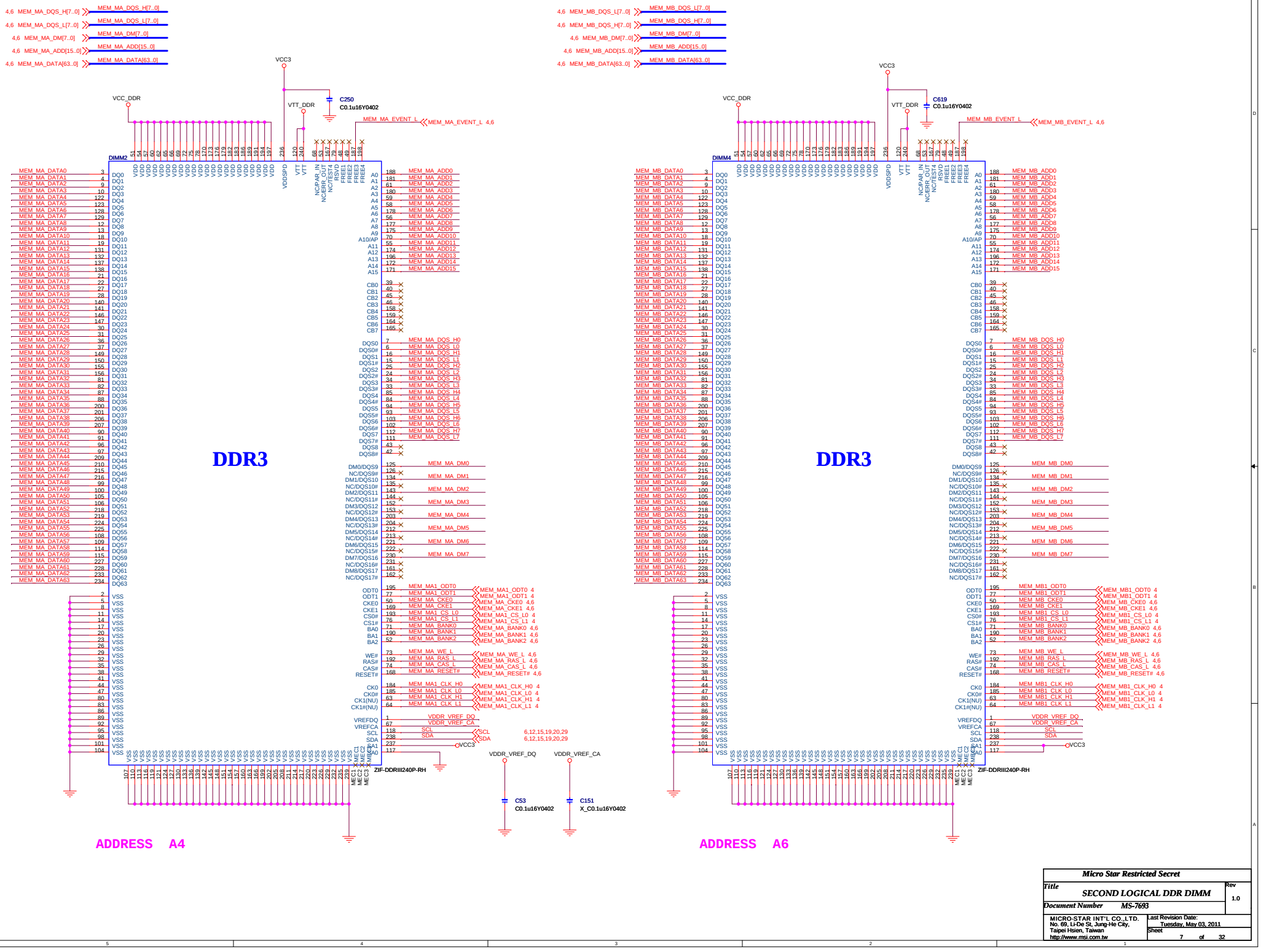
32



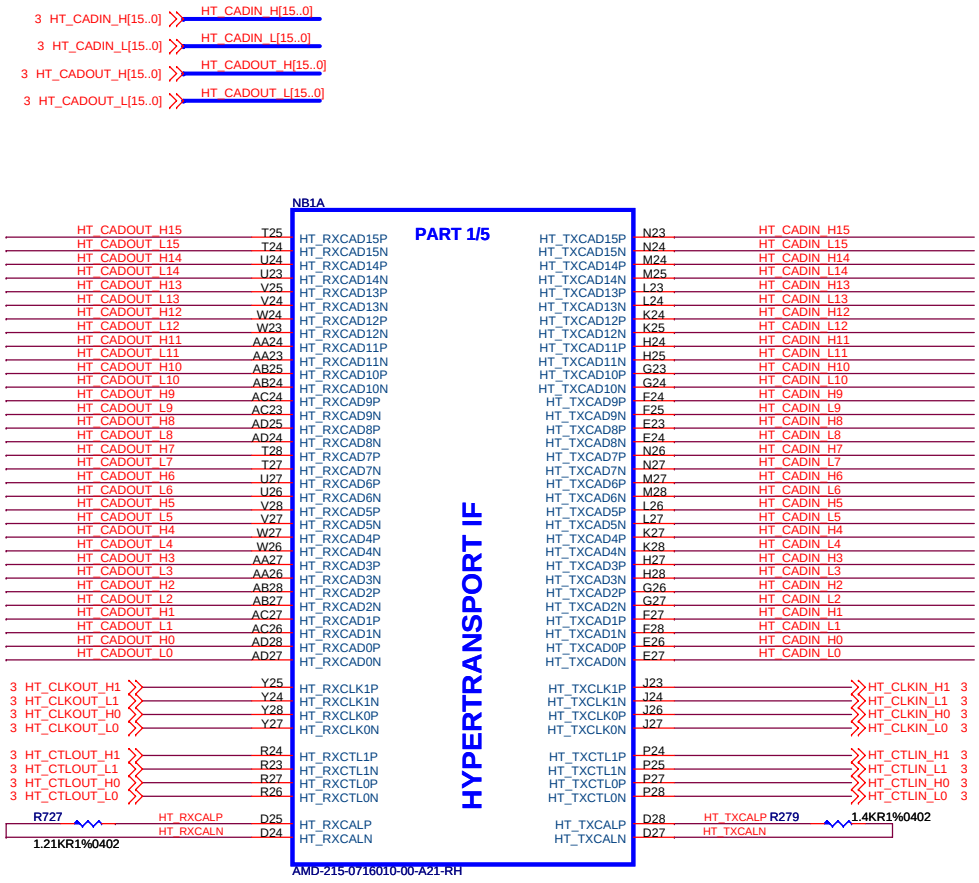
SMBus Addressing

SMBus 0	
Device	8-bit Address (hex)
DIMMA0	A0
DIMMB0	A2
DIMMA1	A4
DIMMB1	A6

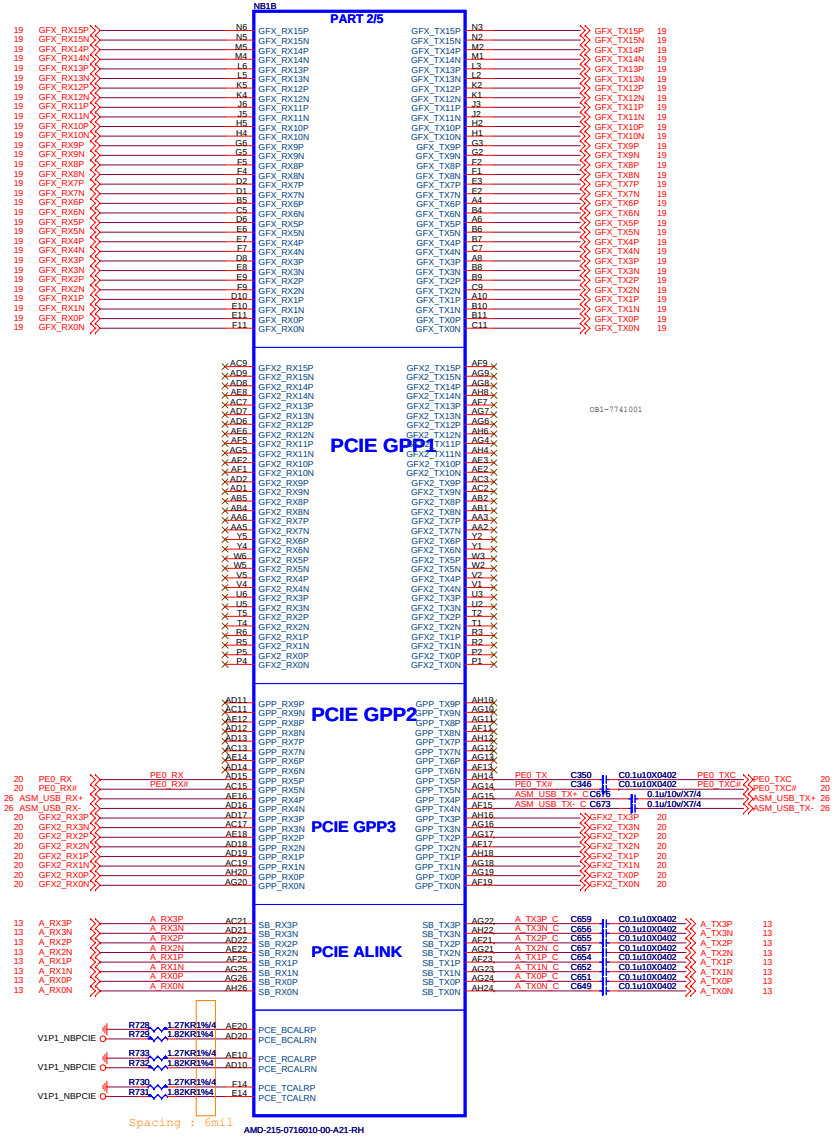
Micro Star Restricted Secret	
Title: FIRST LOGICAL DDR DIMM	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011
	Sheet 6 of 32



Micro Star Restricted Secret	
Title: SECOND LOGICAL DDR DIMM	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011
	Sheet 7 of 32



Micro Star Restricted Secret		
Title *RD780-HT LINK I/F*		Rev 1.0
Document Number *MS-7963*		
MICRO-STAR INT'L CO., LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Friday, May 06, 2011	
	Sheet 8 of 32	



Micro Star Restricted Secret	
Title: RD780-PCIE I/F	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Friday, May 06, 2011
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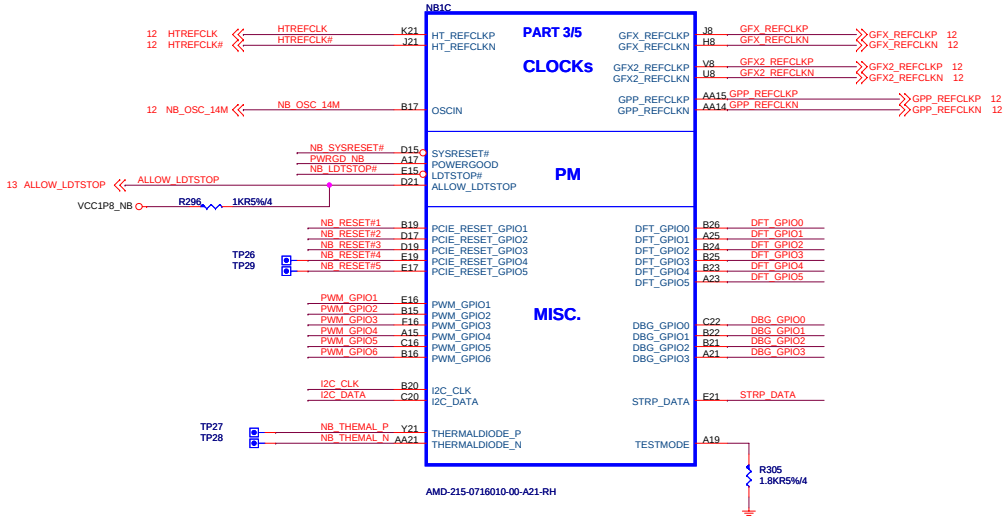
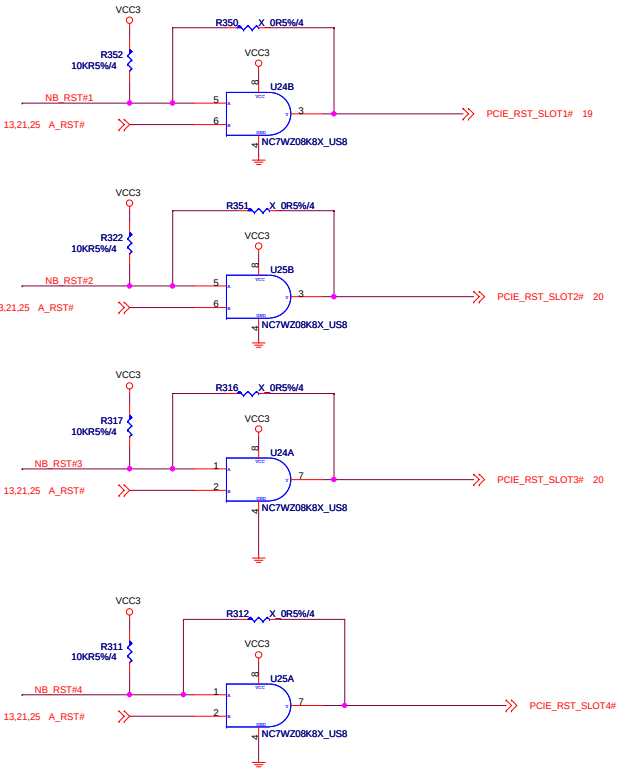
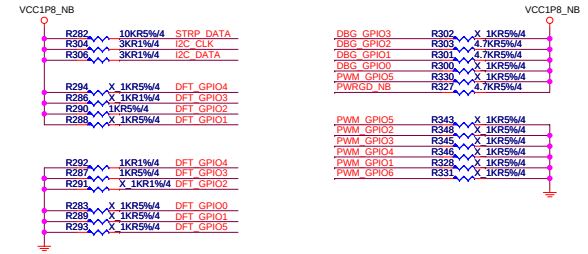
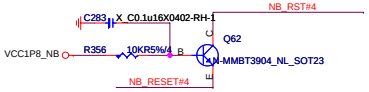


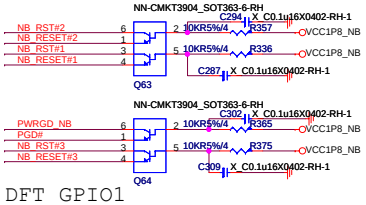


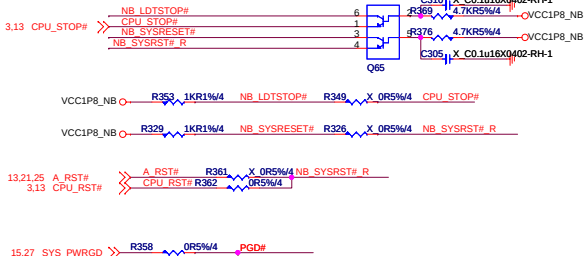




DFT_GPIO[4:2]
STRAP_PCIE_GPP_CFG

111: 1-1-1-1-1-1	Mode L	
110: 1-1-1-1-1-1	Mode L	
101: 2-0-2-0-2-0	Mode C2	
100: 2-0-2-0-1-1	Mode K	
011: 2-0-1-1-1-1	Mode E	
010: 1-1-1-1-1-1	Mode L	
001: 4-0-0-0-1-1	Mode C	default
000: 4-0-0-0-2-0	Mode B	





PWM_GPIO[5:2]
Reserved.
Make provision for an external pull-down resistor on each of the pins, but do not install a resistor.

DFT_GPIO0
Reserved. Make provision for an external pull-down resistor on this pin, but do not install a resistor.

DFT_GPIO1
Selects loading of strap values from EEPROM
0: I2C master can load strap values from EEPROM if connected, or use hardware default values if not connected
1: Use hardware default values (Default)

DFT_GPIO5
Reserved. Make provision for an external pull-down resistor on this pin, but do not install a resistor.

Micro Star Restricted Secret

Title RD780-SYSTEM I/F	Rev 1.0
Document Number MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Friday, May 06, 2011
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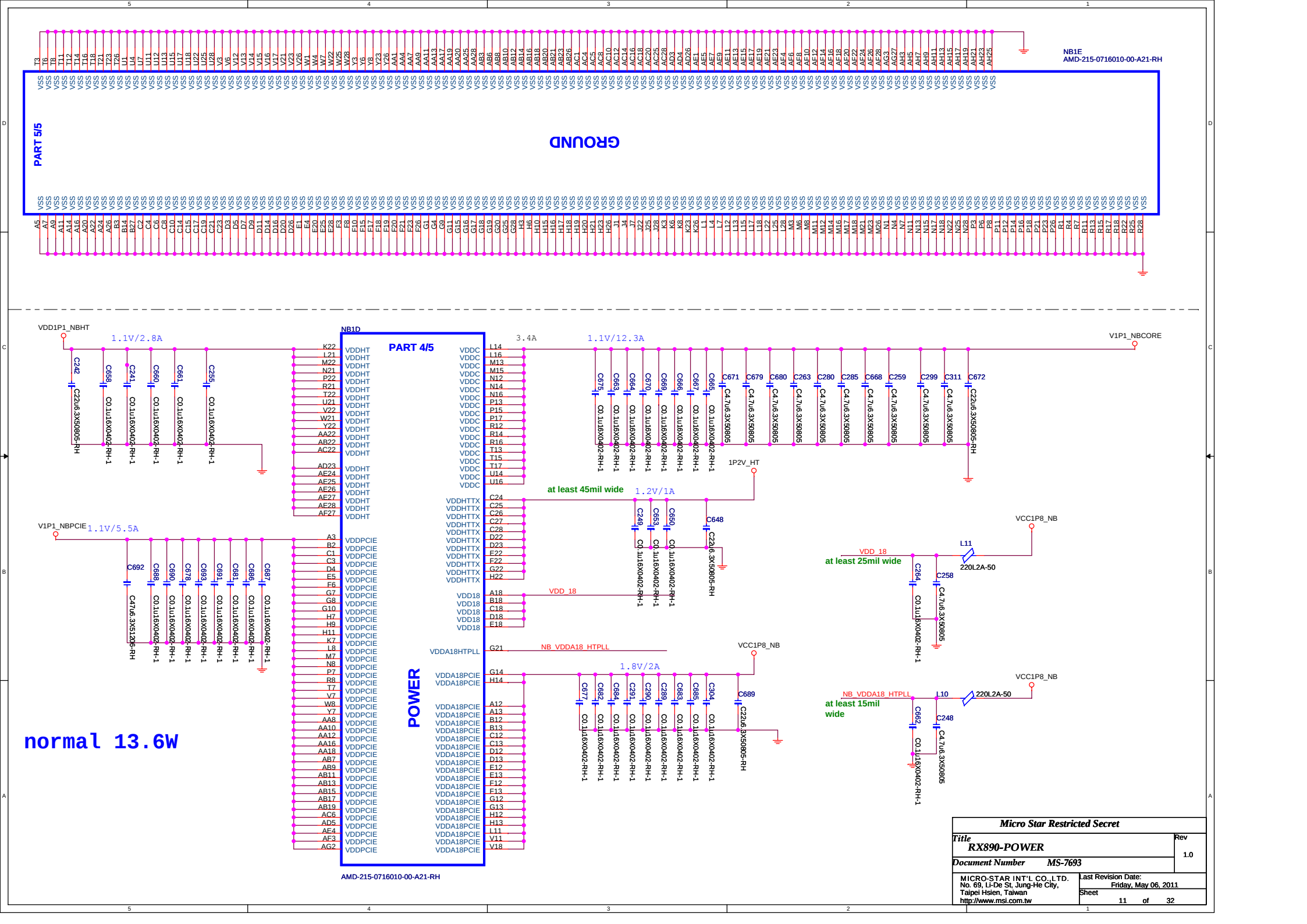

Micro Star Restricted Secret	
Title: RX890-POWER	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Friday, May 06, 2011
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VCC3 CP13 CLK_VDD
L22 X_28L900m_100_0805
C456 C10u10Y0805
C413 C0.1u16X0402-2
C412 C0.1u16X0402-2
C431 C0.1u16X0402-2
C459 C0.1u16X0402-2
C430 C0.1u16X0402-2
C460 C0.1u16X0402-2
C445 C0.1u16X0402-2
C410 C0.1u16X0402-2

1- PLACE ALL THE SERIES TERMINATION RESISTORS AS CLOSE AS U19 AS POSSIBLE

2- ROUTE ALL CPUCLK/#, NBSRCCLK/#, GPPCLK/# AS DIFFERENT PAIR RULE

3- PUT DECOUPLING CAPS CLOSE TO U19 POWER PIN

VCC3 CP10 L16 X_28L900m_100_0805 CLK_VDDA
C400 X_C10u10Y0805 C411 C0.1u16X0402-2
CLK_VDD
VCC3 CP12 L21 X_28L900m_100_0805 VDD48
C450 C1u6.3Y0402-RH

U30

44	VDDA	CPUK8_0T	50
43	GNDA	CPUK8_0C	49
60	VDDREF	CPUK8_1T	46
61	GNDREF	CPUK8_1C	45
39	VDDSATA	ATIG0T	38
42	GNDSATA	ATIG0C	37
64	VDD48	ATIG1T	36
3	GND48	ATIG1C	35
48	VDDCPU	ATIG2T	32
47	GNDCPU	ATIG2C	31
56	VDDHTT	ATIG3T	30
53	GNDHTT	ATIG3C	29
34	VDDATIG	SB_SRC0T	27
11	VDDSRC	SB_SRC0C	26
16	VDDSRC	SB_SRC1T	23
25	VDDSB	SB_SRC1C	22
33	GNDATIG	SRC0T	21
28	GNDATIG	SRC0C	20
10	GNDSRC	SRC1T	19
17	GNDSRC	SRC1C	18
24	GNDSB	SRC2T	15
62	X1	SRC2C	14
63	X2	SRC3T	13
52	*RESTORE#	SRC3C	12
4	SMBCLK	SRC4T	9
5	SMBDAT	SRC4C	8
51	*PD#	**DOC_1/SRC5T	7
59	**SEL_HTT66/REF0	**DOC_0/SRC5C	6
58	*SEL_SATA/REF1	SRC6T/SATAT	41
57	REF2	SRC6C/SATAC	40
		HTT0T/66M	55
		HTT0C/66M	54
		48Mz_0	2
		*SEL_DOC/48Mz_1	1
		TGND	65

RTM880N-793-VB-GR_QFN64-RH

CPU_CLK 3 CPU_CLK# 3
GFX_REFCLKP GFX_REFCLKN GFX2_REFCLKP GFX2_REFCLKN
GFX_CLKP GFX_CLKN
GPP_REFCLKP GPP_REFCLKN
SBSRCCLK SBSRCCLK#
R479 0R0402 GFX2_CLKP
R490 0R0402 GFX2_CLKN
GPPCLK1 GPPCLK1# GPPCLK0 GPPCLK0#
LAN_CLK0 LAN_CLK0# R509 X_R/2 R508 X_R/2 LANCLK0 LANCLK0#
CK_USB_DP CK_USB_DN
DOC1# DOC0#
need same_PLL
R522 X_10K/4 DOC0#
R521 X_10K/4 DOC1#
HTREFCLK HTREFCLK#
SIO_CLK_R USBCLK_EXT_R R507 33R0402 R515 X_22R0402
SIO_CLK 25 USBCLK_EXT 15
SB_USB_clock need using internal clock
C464 C10p50N0402 C465 X_C10p50N0402
Change 1.0 for emi

C425 C22p50N 14.318MHZ16P_D-RH Y4 R467 10MR1%0402
C446 C22p50N
VCC3 R429 X_4.7KR0402 RST#_CLK
15,27,31 FP_RST#
6,7,15,19,20,29 SCL R439 X_R/2 R511 X_R/2
6,7,15,19,20,29 SDA R512 X_R/2
CLK_VDD R428 1KR1%0402 PD#

	NB_OSC_14M
RS740	3.3V IN
RX980	1.8V 75R/100R

CLK_VDD R494 X_10KR0402 R483 X_10KR0402
SEL_HTT66
15 SB_OSC_14M
10 NB_OSC_14M
R465 33R0402
R468 82.5R1%0402 OSC14M_REFOUT
R460 130R1%0402 R484 10KR0402 R471 2.2KR0402
realtek FAE suggestion for SRC06

SEL_HTT66 : 'L' 100Mhz FOR 780
'H' 66Mhz FOR 740

VCC3 R506 X_10KR0402
SEL_DOC: latched input
1 = DOC Input
0 = SRC5
USBCLK_EXT_R
R510 10KR0402

3,14,25 TALERT#
R532 X_4.7KR0402
Q78 X_N-MMBT3904_NL_SOT23
DOC0#

Micro Star Restricted Secret	
Title: Clock Generator RTM880N-793	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO., LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011
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For EMI

SB850 Part 1 of 5

PLACE PCIE CAPS CLOSE TO U13

outed with 85ohm ± 15% differential impedance

length need under 8 inch GEN2, under 12 inch GEN1

length should under 12 inche and over1 inch

Adding some 0.1uF stitching capacitors for crossing a split when these signals change different reference layer.

P=3.3*3.3/510=0.02135W

update cap value as checklist 1.04 suggestion

PLACE THESE COMPONENTS CLOSE TO U600, AND USE GROUND GUARD FOR 32K_X1 AND 32K_X2

length need under 1.5inch

B01-SB70035-A08

AMD-218-0697002-00-A12-RH

Micro Star Restricted Secret	
Title: SB700-PCIE/PCI/CPU/LPC	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Thursday, May 05, 2011
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SATA_TX[5:0]P/N: Routed with 90-ohm ± 10% differential impedance.
SATA_RX[5:0]P/N: Routed with 90-ohm ± 10% differential impedance.
Gen3: Signal length from the Southbridge to connector ≤ 2.5".

SATA1
SATA_TX0+_C
SATA_TX0-_C
SATA_RX0-_C
SATA_RX0+_C
SATA7P_BLACK-P-RH

SATA2
SATA_TX1+_C
SATA_TX1-_C
SATA_RX1-_C
SATA_RX1+_C
SATA7P_BLACK-P-RH

SATA3
SATA_TX2+_C
SATA_TX2-_C
SATA_RX2-_C
SATA_RX2+_C
SATA7P_BLACK-P-RH

SATA4
SATA_TX3+_C
SATA_TX3-_C
SATA_RX3-_C
SATA_RX3+_C
SATA7P_BLACK-P-RH

SATA5
SATA_TX4+_C
SATA_TX4-_C
SATA_RX4-_C
SATA_RX4+_C
SATA7P_BLACK-P-RH

SATA6
SATA_TX5+_C
SATA_TX5-_C
SATA_RX5-_C
SATA_RX5+_C
SATA7P_BLACK-P-RH

SB1B

SB850
Part 2 of 5

SERIAL ATA
SATA_TX0P AH9
SATA_TX0N AJ9
SATA_RX0N AJ8
SATA_RX0P AH8
SATA_TX1P AH10
SATA_TX1N AJ10
SATA_RX1N AG10
SATA_RX1P AF10
SATA_TX2P AG12
SATA_TX2N AF12
SATA_RX2N AJ12
SATA_RX2P AH12
SATA_TX3P AH14
SATA_TX3N AJ14
SATA_RX3N AG14
SATA_RX3P AF14
SATA_TX4P AG17
SATA_TX4N AF17
SATA_RX4N AJ17
SATA_RX4P AH17
SATA_TX5P AJ18
SATA_TX5N AH18
SATA_RX5N AH19
SATA_RX5P AJ19
SATA_CALRP AB14
SATA_CALRN AA14
SATA_ACT#/GPIO67 AD11
SATA_X1 AD16
SATA_X2 AC16

GPIOD
FC_CLK AH28
FC_FBCLKOUT AG28
FC_FBCLKIN AE26
FC_OE#/GPIOD145 AE28
FC_AVD#/GPIOD146 AG29
FC_WE#/GPIOD148 AG26
FC_CE1#/GPIOD149 AF27
FC_CE2#/GPIOD150 AE29
FC_INT1/GPIOD144 AF29
FC_INT2/GPIOD147 AH27
FC_ADQ0/GPIOD128 AJ27
FC_ADQ1/GPIOD129 AJ26
FC_ADQ2/GPIOD130 AH25
FC_ADQ3/GPIOD131 AH24
FC_ADQ4/GPIOD132 AG23
FC_ADQ5/GPIOD133 AH23
FC_ADQ6/GPIOD134 AJ22
FC_ADQ7/GPIOD135 AG21
FC_ADQ8/GPIOD136 AF21
FC_ADQ9/GPIOD137 AH22
FC_ADQ10/GPIOD138 AJ23
FC_ADQ11/GPIOD139 AF23
FC_ADQ12/GPIOD140 AJ24
FC_ADQ13/GPIOD141 AJ25
FC_ADQ14/GPIOD142 AG25
FC_ADQ15/GPIOD143 AH26

HW MONITOR
FANOUT0/GPIO52 W5
FANOUT1/GPIO53 W6
FANOUT2/GPIO54 Y9
FANIN0/GPIO56 W7
FANIN1/GPIO57 V9
FANIN2/GPIO58 W8
TEMPIN0/GPIO171 B6
TEMPIN1/GPIO172 A6
TEMPIN2/GPIO173 A5
TEMPIN3/TALERT#/GPIO174 B5
TEMP_COMM C7
VIN0/GPIO175 A3
VIN1/GPIO176 B4
VIN2/GPIO177 A4
VIN3/GPIO178 C5
VIN4/GPIO179 A7
VIN5/GPIO180 B7
VIN6/GBE_STAT3/GPIO181 B8
VIN7/GBE_LED3/GPIO182 A8

SPI ROM
SPI_DI/GPIO164 J5
SPI_DO/GPIO163 E2
SPI_CLK/GPIO162 K4
SPI_CS1#/GPIO165 K9
ROM_RST#/GPIO161 G2

NC1 G27
NC2 Y2

AMD-218-0697002-00-A12-RH

VDDAN_1.1_SATA
R737 1K/4/1%
R738 931R1%0402
SATA_CALRP
SATA_CALRN

SATA_LED
31 SATA_LED

C457 X_C22p50N0402
C458 X_C22p50N0402
Y5 X_25MHZ/18pf/HC49S
R504 X_1MR1%0402
SATA_X1
SATA_X2
no further than 1.5
reference 7640-1.0 bom

SPI_CLK
C566 X_10p/50v/N/4

SPI_DATAIN
SPI_DATAOUT
SPI_CLK
SPI_CS#
TP42

SB_GPIO171 R556 10K/4
SB_GPIO172 R547 10K/4
SB_GPIO173 R561 10K/4

R554 10K/4 3VDUAL
TALERT# 3,12,25
R541 0R0402

RN10 8P4R-10K/4
SB_GPIO178
SB_GPIO177
SB_GPIO176
SB_GPIO175

RN9 8P4R-10K/4
SB_GPIO182
SB_GPIO181
SB_GPIO180
SB_GPIO179

all the VIN pin need config as GPIO mode

SPI FLASH MEMORY

SPI DEBUG PORT

Place close to SPI ROM

3VDUAL
SPI_WP# R682 10K/4
SPI_HOLD# R673 10K/4
SPI_CS# R686 1KR0402

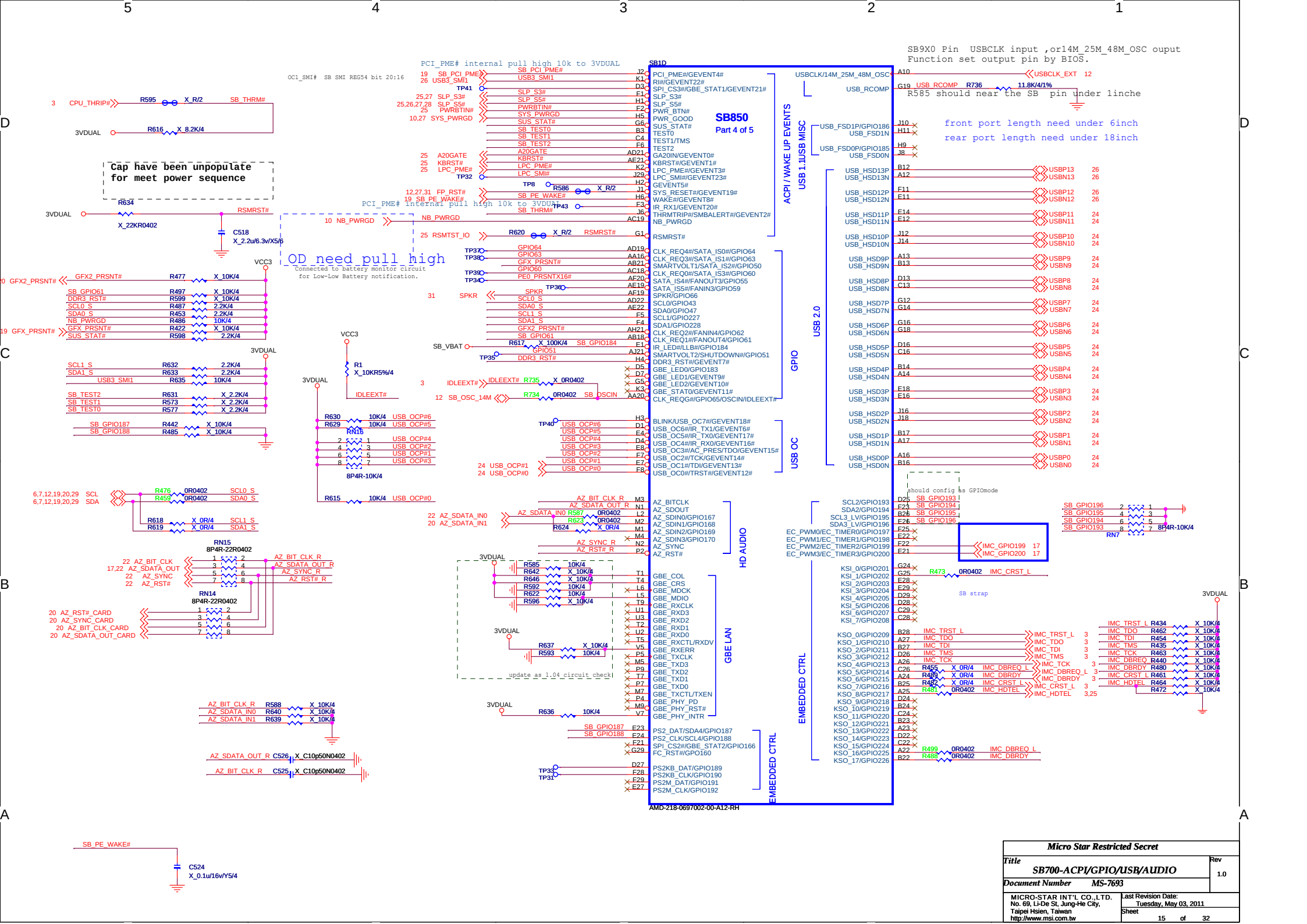
JSPI1
SPI_DATAIN
SPI_CS#
SPI_HOLD#
SPI_DATAOUT
SPI_CLK
H2X5[1]M-2mm_Black

Part Number : N31-2051451-H06

3VDUAL
C555 C22U6.3X50805-RH
C559 0.1u/25v/Y5/4

SPI1
SPI_CS#
SPI_DATAIN
SPI_WP#
CS
DO(IO1)
WP(IO2)
GND
VCC
HOLD(IO3)
CLK
DI(IO0)
SPI_HOLD#
SPI_CLK
SPI_DATAOUT
W25Q64BVSSIG-RH

Micro Star Restricted Secret		
Title: SB700-SATA/IDE/HWM/SPI		Rev: 1.0
Document Number: MS-7693		
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Thursday, May 05, 2011	Sheet 14 of 32


SB9X0 Pin USBCLK input ,or14M_25M_48M_OSC ouput
Function set output pin by BIOS.
PCI_PME# internal pull high 10k to 3VDUAL
Cap have been unpopulate
for meet power sequence
OD need pull high
Connected to battery monitor circuit
for Low-Low Battery notification.
SB850
Part 4 of 5
ACPI / WAKE UP EVENTS
USB 1.1USB MISC
USB 2.0
GPIO
USB OC
HD AUDIO
GBE LAN
EMBEDDED CTRL
EMBEDDED CTRL
front port length need under 6inch
rear port length need under 18inch
R585 should near the SB pin under 1inche
should config as GPIOmode
SB strap
update as 1.04 circuit check
AMD-218-0697002-00-A12-RH
Micro Star Restricted Secret
SB700-ACPI/GPIO/USB/AUDIO
MS-7693
1.0
MICRO-STAR INT'L CO.,LTD.
No. 69, Li-De St, Jung-He City,
Taipei Hsien, Taiwan
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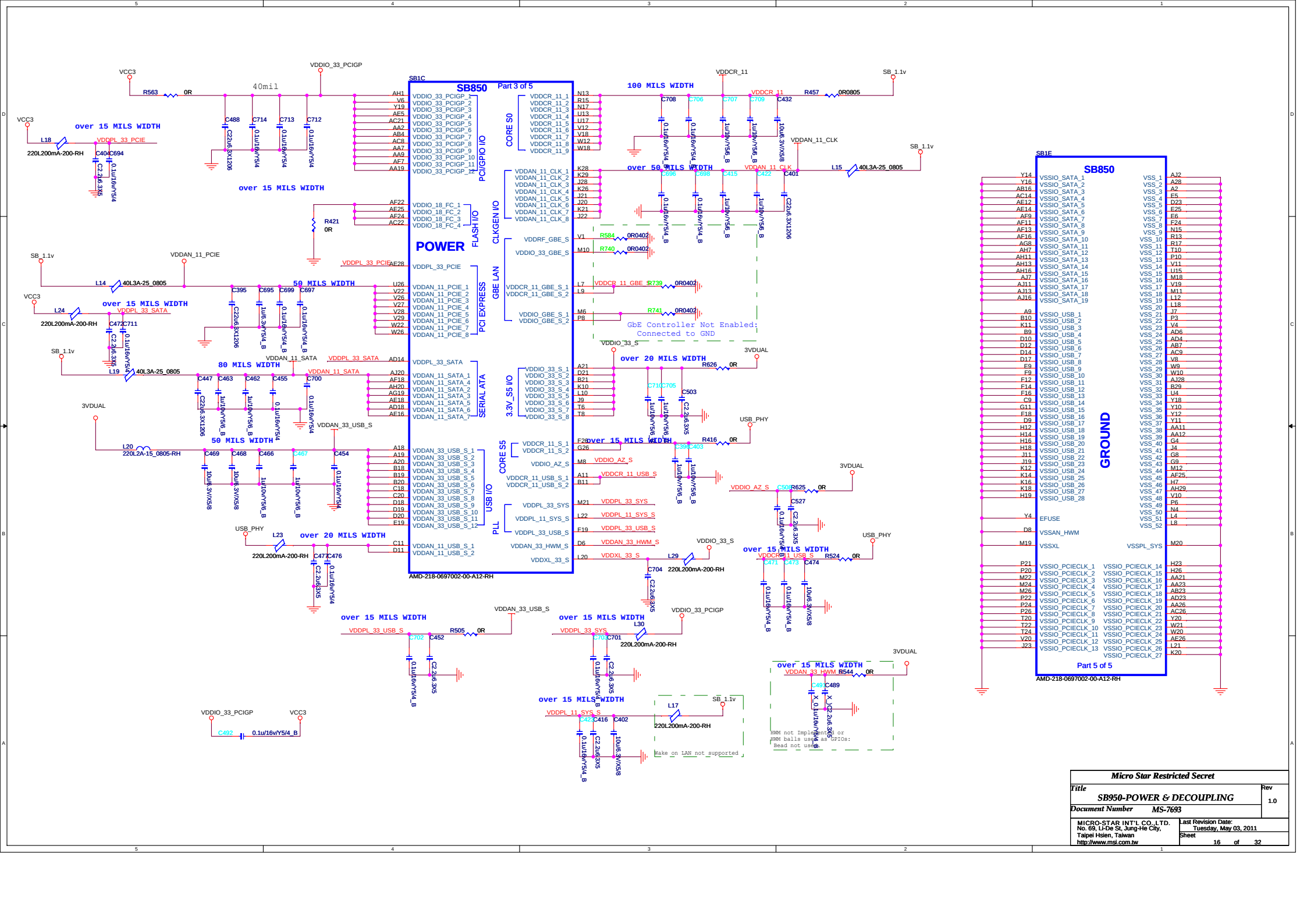
Tuesday, May 03, 2011
15 of 32


SB850
Part 3 of 5
POWER
CORE S0
PCI/GPIO I/O
CLKGEN I/O
FLASH I/O
GBE LAN
PCI EXPRESS
3.3V_S5 I/O
SERIAL ATA
USB I/O
PLL
CORE S5
100 MILS WIDTH
over 50 MILS WIDTH
over 15 MILS WIDTH
over 20 MILS WIDTH
80 MILS WIDTH
50 MILS WIDTH
GbE Controller Not Enabled:
Connected to GND
Wake on LAN not supported
HWM not Implemented or
HWM balls used as GPIOs:
Bead not used
AMD-218-0697002-00-A12-RH
SB850
GROUND
Part 5 of 5
AMD-218-0697002-00-A12-RH
Micro Star Restricted Secret
SB950-POWER & DECOUPLING
MS-7693
1.0
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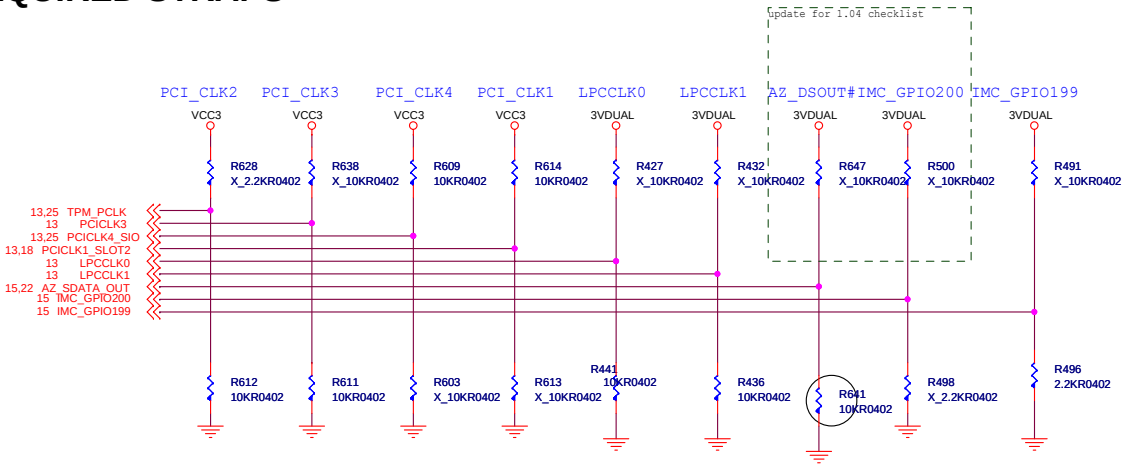
Tuesday, May 03, 2011
16 of 32

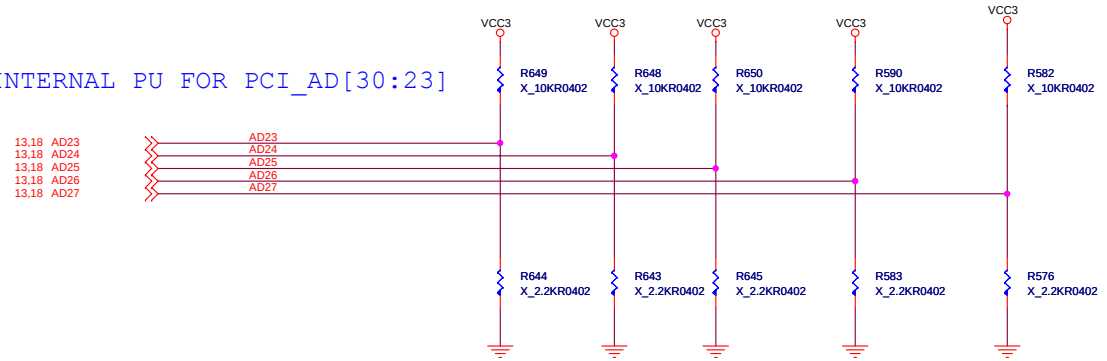
REQUIRED STRAPS

NOTE: SB700 HAS INTERNAL 15K PULL UP RESISTOR FOR RTC_CLK



	PCI_CLK1	PCI_CLK2	PCI_CLK3	PCI_CLK4	LPC_CLK0	LPC_CLK1	AZ_DOUT#	IMC_GPIO200 IMC_GPIO199
PULL HIGH	ALLOW PCIE GEN2 DEFAULT	WATCHDOG TIMER ON NB_PWRGD ENABLED	USE DEBUG STRAPS	NON-FUSION CPU CLOCK MODE DEFAULT	EC ENABLE	CLKGEN ENABLED		ROM TYPE: H, H = Reserved H, L = SPI ROM DEFAULT
PULL LOW	FORCE PCIE GEN1	WATCHDOG TIMER ON NB_PWRGD DISABLED DEFAULT	IGNORE DEBUG STRAPS DEFAULT	FUSION CPU CLOCK MODE	DISABLE EC DEFAULT	CLKGEN DISABLED DEFAULT	PERFORMANCE MODE DEFAULT	L, H = LPC ROM L, L = FWH ROM

SB800 HAS 15K INTERNAL PU FOR PCI_AD[30:23]



DEBUG STRAPS

	PCI_AD27	PCI_AD26	PCI_AD25	PCI_AD24	PCI_AD23
PULL HIGH	USE PCI PLL DEFAULT	DISABLE ILA AUTORUN DEFAULT	USE FC PLL DEFAULT	USE DEFAULT PCIE STRAPS DEFAULT	DISABLE PCI MEM BOOT DEFAULT
PULL LOW	BYPASS PCI PLL	ENABLE ILA AUTORUN	BYPASS FC PLL	USE EEPROM PCIE STRAPS	ENABLE PCI MEM BOOT

Title: SB950-STRAPS

Rev: 1.0

Document Number: MS-7693

MICRO-STAR INT'L CO.,LTD.
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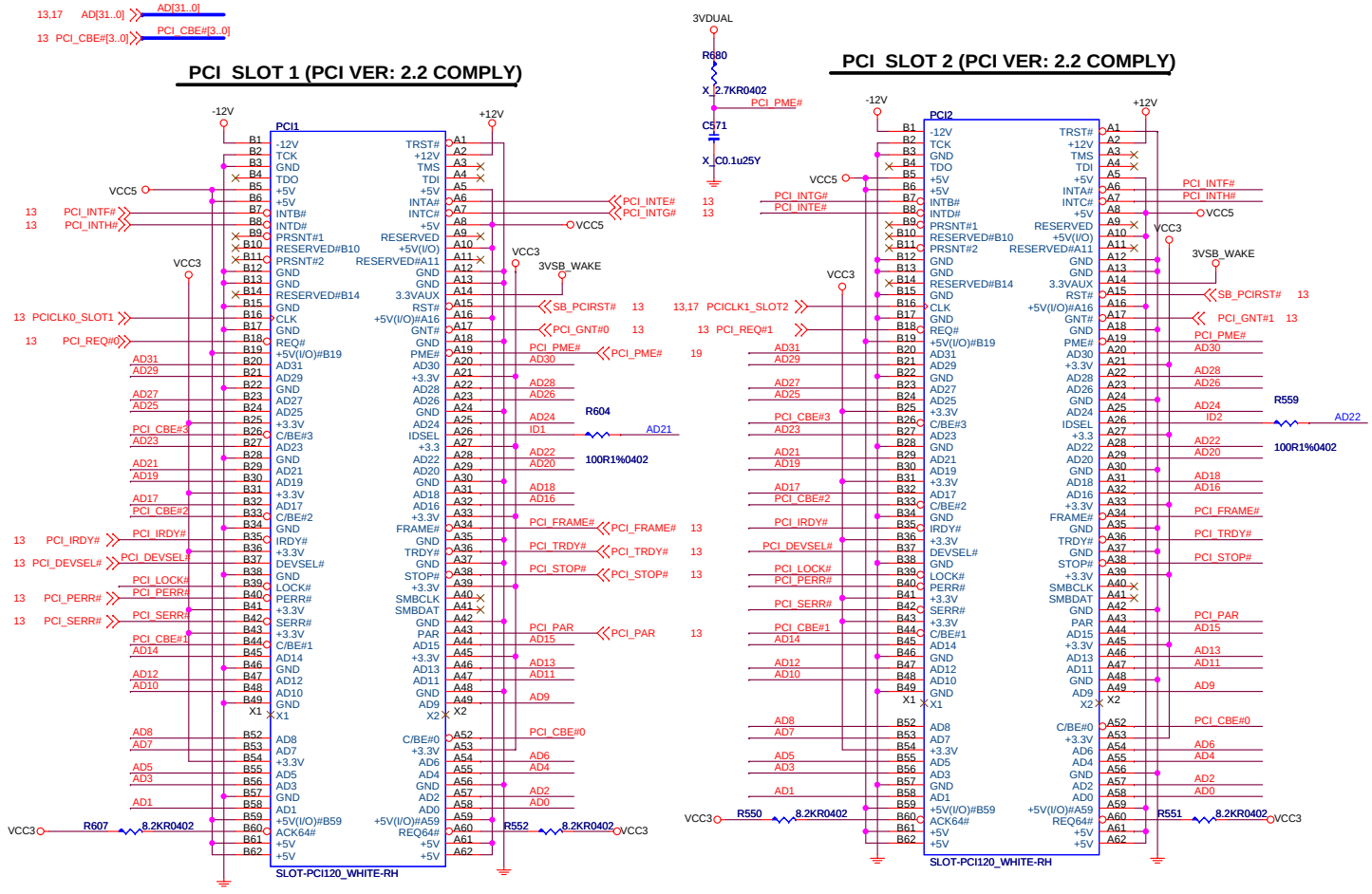
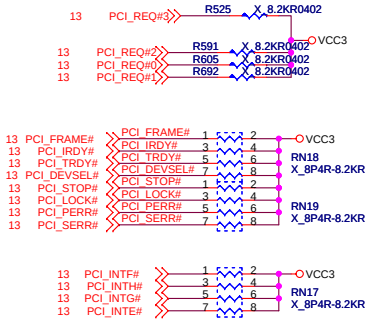
Last Revision Date: Wednesday, May 04, 2011

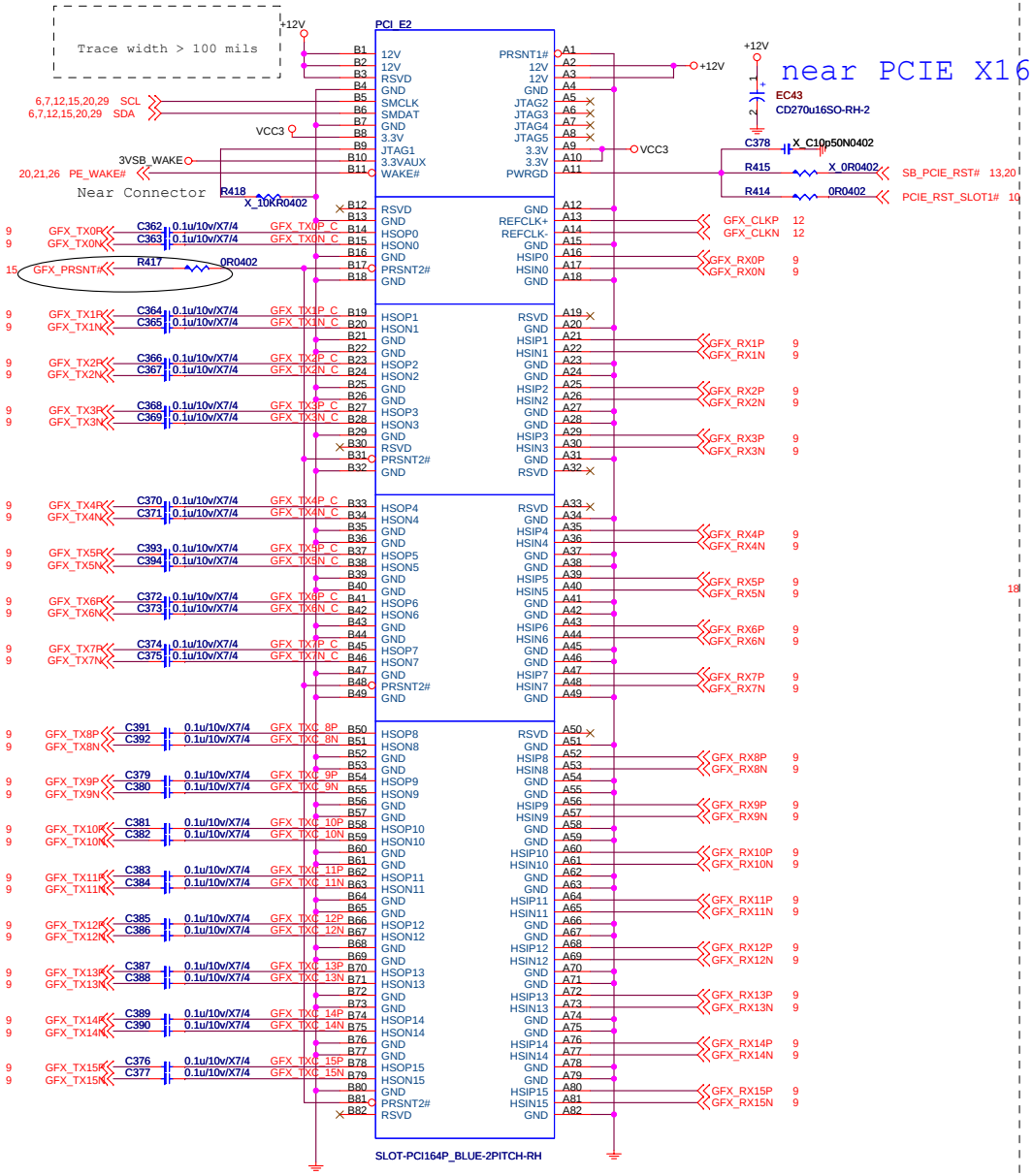


PCI PULL-UP / DOWN RESISTORS

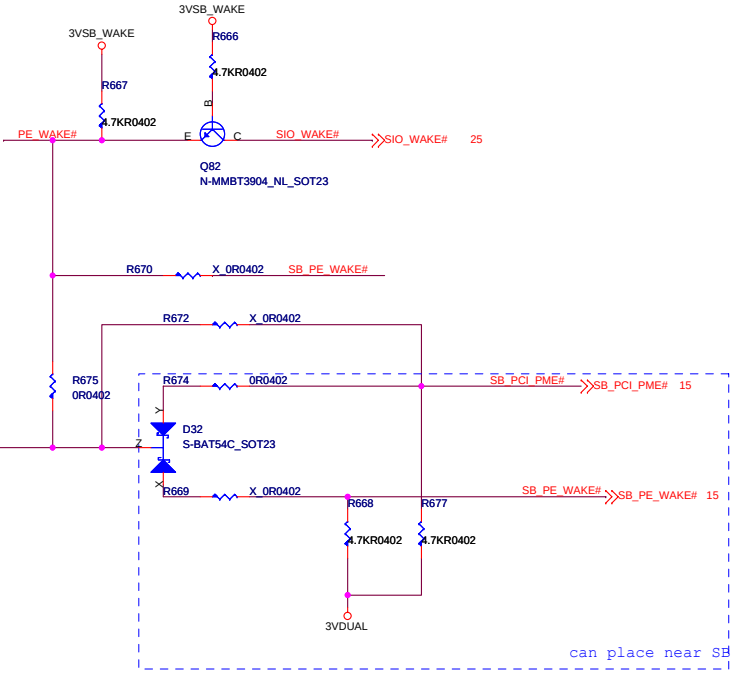


Micro Star Restricted Secret	
Title: PCI Slot 1,2 ,3& PCI Extender	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011
	Sheet 18 of 32

PCI EXPRESS_16



near PCIE X16 Slot



Digital Switch
SEL pin **SLI function**

SEL (X8_X8#)	Output	X8_SW	PCI-E_Slot 1/2
Low	Oa	Low	X8 / X8
Hi	Ob	Hi	X16 / 0

Micro Star Restricted Secret

Title: PCI-E X16 , X1 Slot	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Friday, May 06, 2011
	Sheet 19 of 32

PCI EXPRESS X4

near PCIE X3

+12V
EC51
CD270u16SO-RH-2

Trace width > 100 mils

within 500mil

PCI_E4

SLOT-PCI164P_BLUE-2PITCH-RH-2

PCI-Express x1 SLOT 1

PCI_E1

PCIE X1

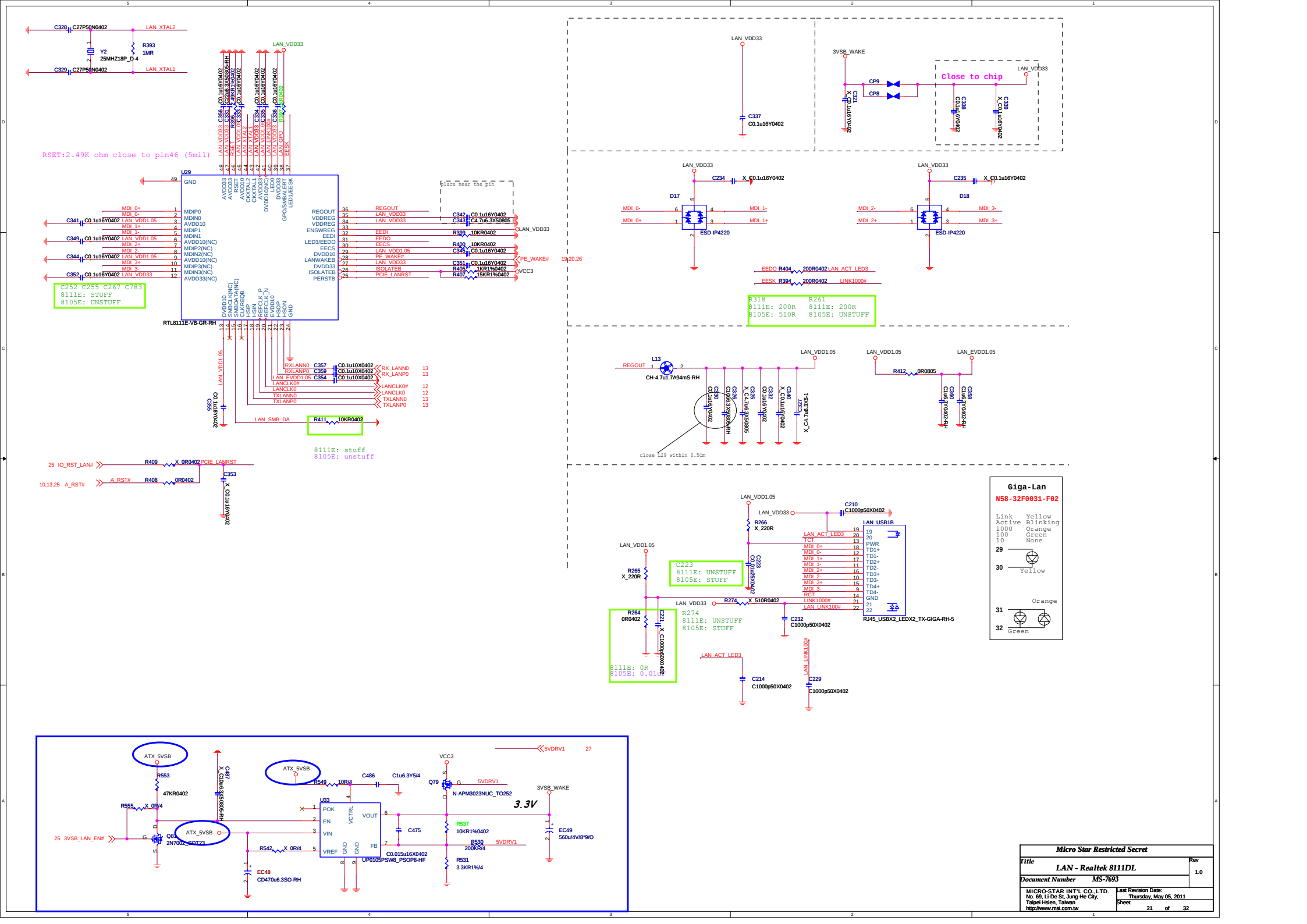
EC56
CD470u6.3SO-RH

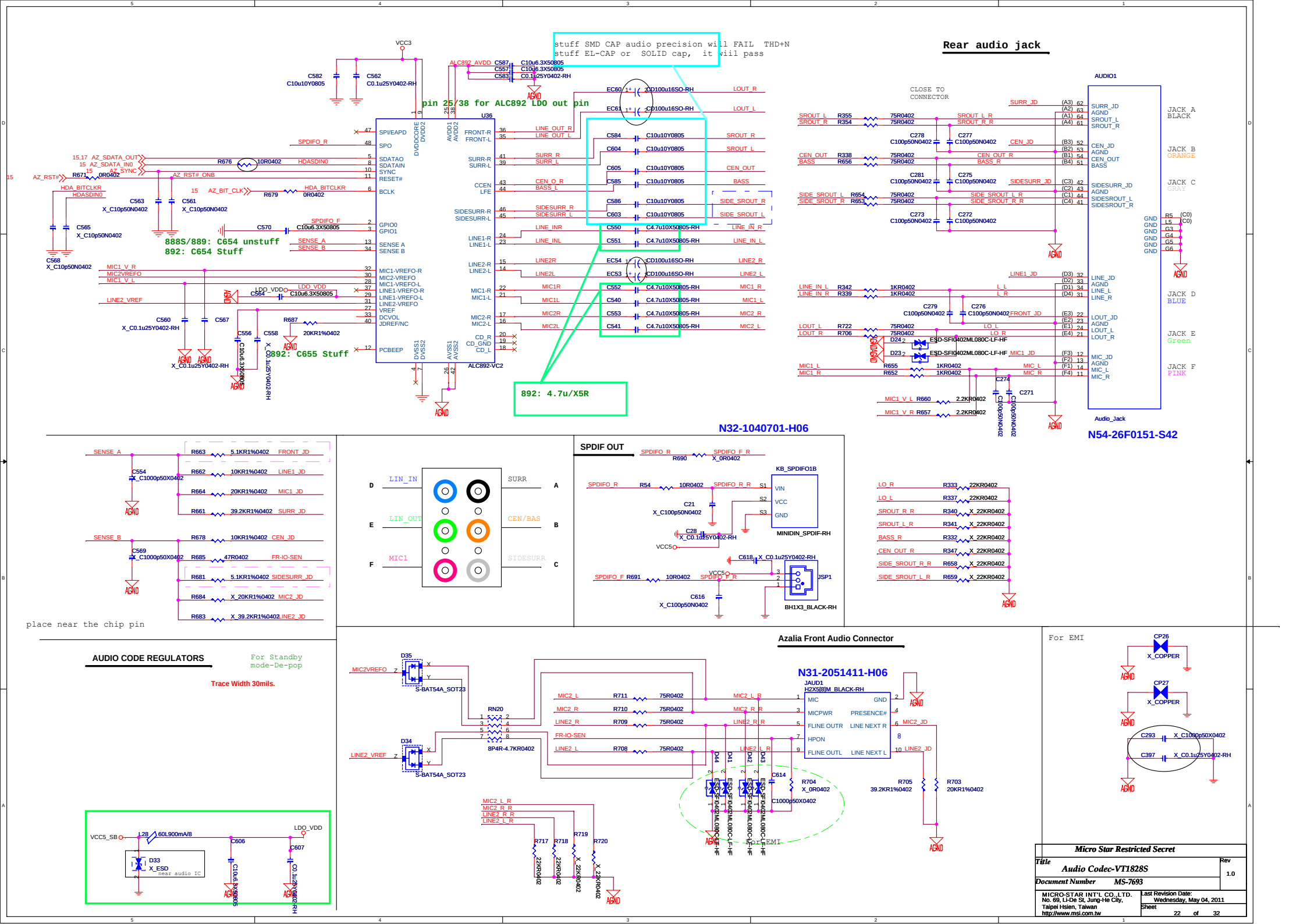
PCI-Express x1 SLOT 1

PCI_E3

PCIE X1

Micro Star Restricted Secret	
Title: PCIE X1 Slot 1 , 2	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO., LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011
	Sheet 20 of 32


C328 C27P50N0402
LAN_XTAL2
Y2
25MHZ18P_D-4
R393
1MR
C329 C27P50N0402
LAN_XTAL1
LAN_VDD33
RSET:2.49K ohm close to pin46 (5mil)
U29
RTL8111E-VB-GR-RH
MDI 0+
MDI 0-
MDI 1+
MDI 1-
MDI 2+
MDI 2-
MDI 3+
MDI 3-
LAN_VDD1.05
LAN_VDD33
REGOUT
EEDI
EEDO
EECS
PE_WAKE#
ISOLATEB
PCIE_LANRST
C252 C255 C267 C783
8111E: STUFF
8105E: UNSTUFF
RXLANN0
RXLANP0
TXLANN0
TXLANP0
LANCLK0#
LANCLK0
LAN_SMB_DA
R411 10KR0402
8111E: stuff
8105E: unstuff
25 IO_RST_LAN#
A_RST#
PCIE_LANRST
LAN_VDD33
3VSB_WAKE
CP9
CP8
Close to chip
LAN_VDD33
C337
C0.1u16Y0402
D17
D18
ESD-IP4220
C234
C235
EEDO R404 200R0402 LAN_ACT_LED3
EESK R394 200R0402 LINK1000#
R318 R261
8111E: 200R 8111E: 200R
8105E: 510R 8105E: UNSTUFF
L13
CH-4.7u1.7A94mS-RH
close L29 within 0.5Cm
LAN_VDD1.05
LAN_EVDD1.05
R412 0R0805
C210 C1000p50X0402
R266 X_220R
R265 X_220R
C223
8111E: UNSTUFF
8105E: STUFF
R264 0R0402
R274 X_510R0402
R274
8111E: UNSTUFF
8105E: STUFF
8111E: 0R
8105E: 0.01u
C232 C1000p50X0402
LAN_USB1B
RJ45_USBX2_LEDX2_TX-GIGA-RH-5
LAN_ACT_LED3
LAN_LINK100#
C214 C1000p50X0402
C229 C1000p50X0402
Giga-Lan
N58-32F0031-F02
Link Yellow
Active Blinking
1000 Orange
100 Green
10 None
Yellow
Orange
Green
ATX_5VSB
R553 47KR0402
R555 X_0R/4
25 3VSB_LAN_EN#
Q83 2N7002_SOT23
R542 X_0R/4
R549 10R/4
C486 C1u6.3Y5/4
U33
UP0105PSW8_PSOP8-HF
POK
EN
VIN
VREF
VCTRL
VOUT
FB
GND
C475
C0.015u16X0402
EC48 CD470u6.3SO-RH
VCC3
Q79 N-APM3023NUC_TO252
5VDRV1
R537 10KR1%0402
R530 200KR/4
R531 3.3KR1%/4
3.3V
3VSB_WAKE
EC49 560u/4V/8*9/O
Micro Star Restricted Secret
Title
LAN - Realtek 8111DL
Rev 1.0
Document Number MS-7693
MICRO-STAR INT'L CO.,LTD.
No. 69, Li-De St, Jung-He City,
Taipei Hsien, Taiwan
http://www.msi.com.tw
Last Revision Date:
Thursday, May 05, 2011
Sheet 21 of 32


stuff SMD CAP audio precision will FAIL THD+N
stuff EL-CAP or SOLID cap, it will pass
pin 25/38 for ALC892 LDO out pin
888S/889: C654 unstuff
892: C654 Stuff
892: C655 Stuff
892: 4.7u/X5R
Rear audio jack
CLOSE TO CONNECTOR
AUDIO1
JACK A BLACK
JACK B ORANGE
JACK C GRAY
JACK D BLUE
JACK E Green
JACK F PINK
Audio_Jack
N32-1040701-H06
N54-26F0151-S42
place near the chip pin
SPDIF OUT
KB_SPDIFO1B
MINIDIN_SPDIF-RH
BH1X3_BLACK-RH
AUDIO CODE REGULATORS
For Standby mode-De-pop
Trace Width 30mils.
Azalia Front Audio Connector
N31-2051411-H06
JAUD1
H2X5[8]M_BLACK-RH
For EMI
Micro Star Restricted Secret
Audio Codec-VT1828S
MS-7693
1.0
MICRO-STAR INT'L CO.,LTD.
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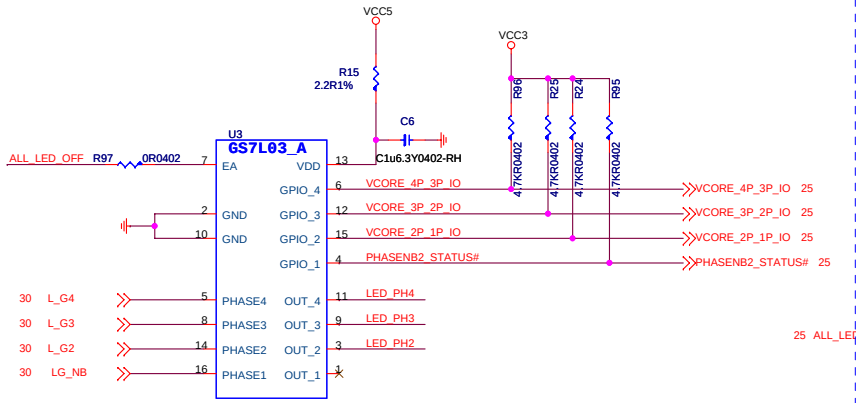
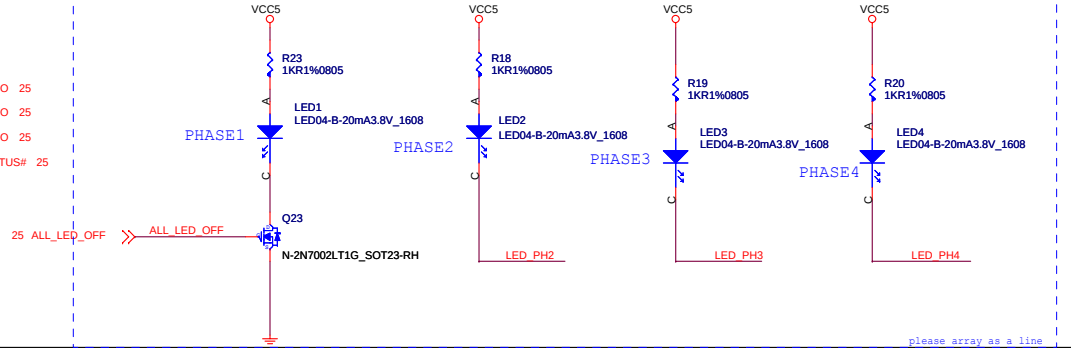
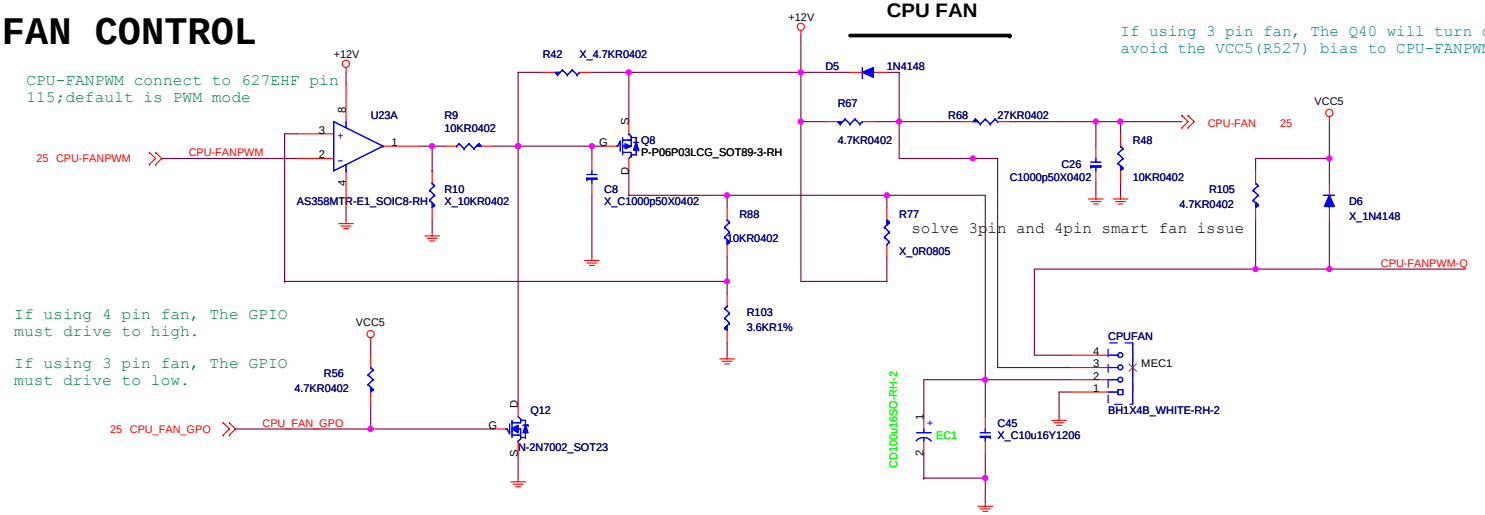
Last Revision Date: Wednesday, May 04, 2011
Sheet 22 of 32



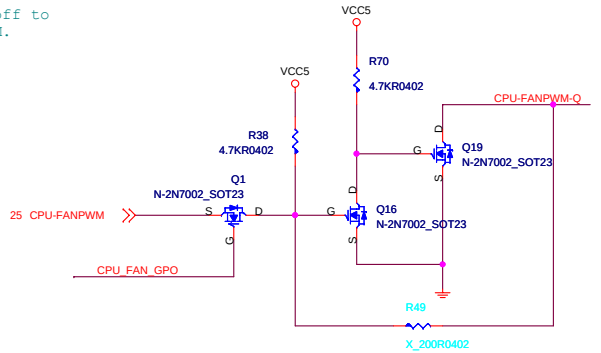


FAN CONTROL

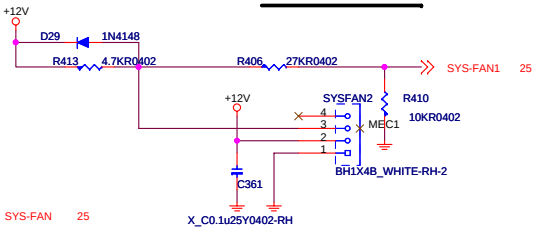
CPU FAN



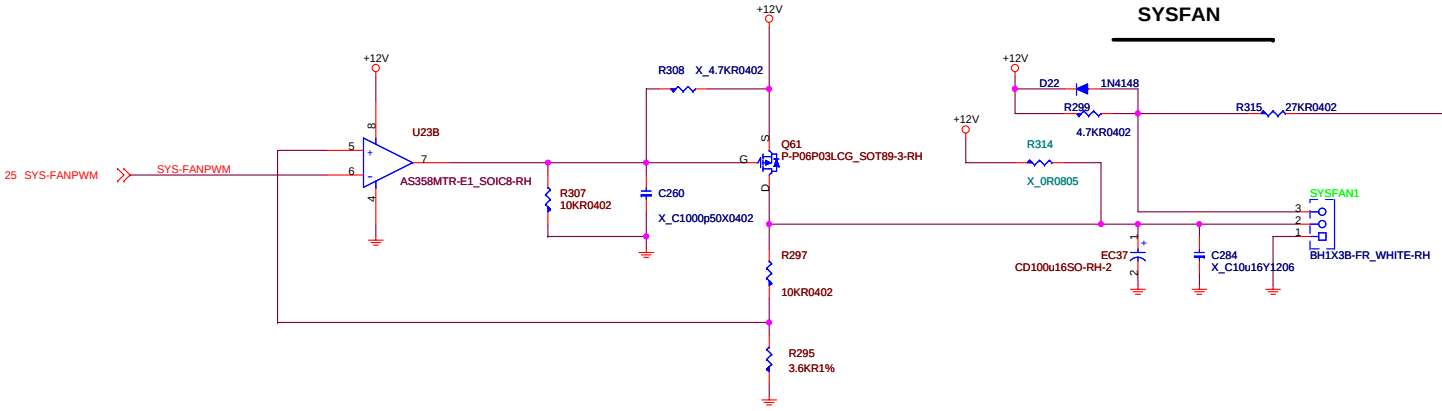
If using 3 pin fan, The Q40 will turn off to avoid the VCC5(R527) bias to CPU-FANPWM.



SYS FAN2

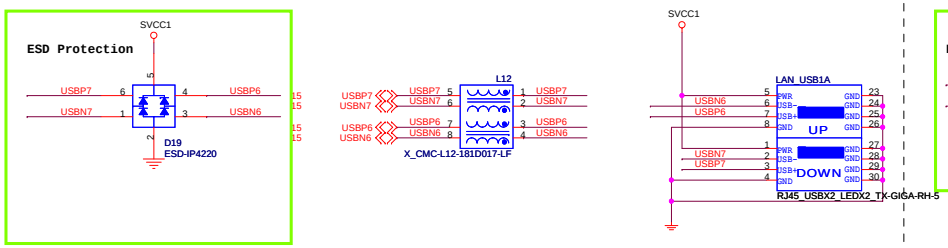


SYSFAN

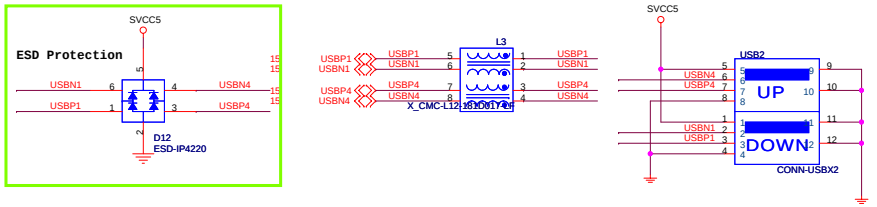


Micro Star Restricted Secret		
Title: IDE Conn/FAN/LPT/SATA		Rev: 1.0
Document Number: MS-7693		
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011	Sheet 23 of 32

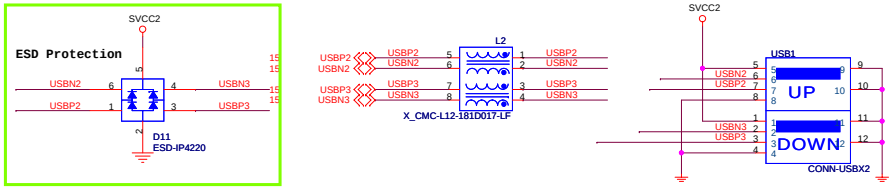
REAR PANEL USB CONNECTOR FOR USB PORT 0,1



REAR PANEL USB CONNECTOR FOR USB PORT 2,3

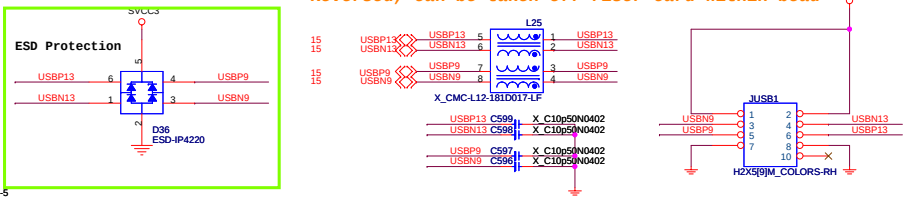


REAR PANEL USB CONNECTOR FOR USB PORT 4,5

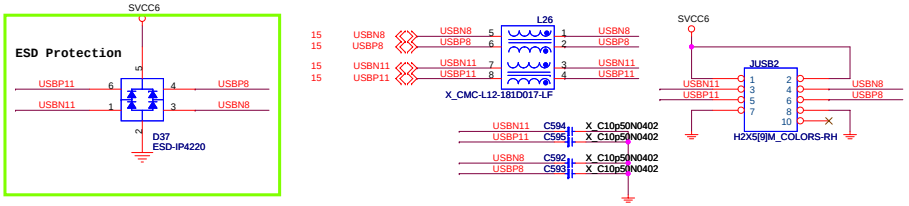


FRONT PANEL USB CONNECTOR FOR USB PORT 6,7

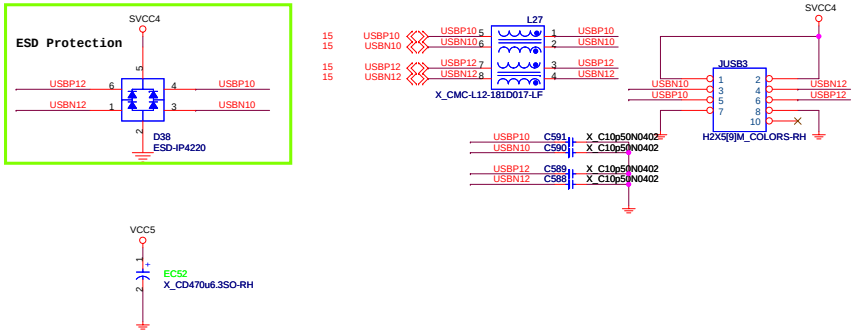
Reversed, can be taken off riser card within bead



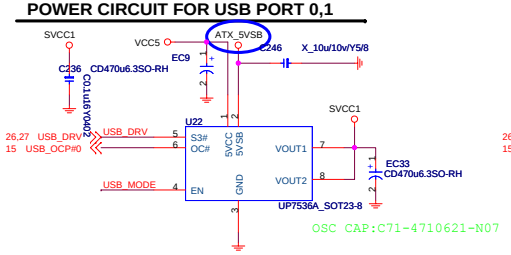
FRONT PANEL USB CONNECTOR FOR USB PORT 8,9



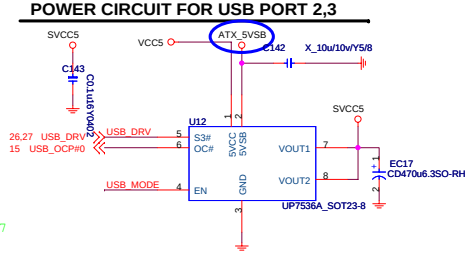
FRONT PANEL USB CONNECTOR FOR USB PORT10,11



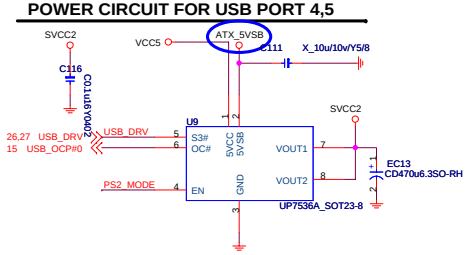
POWER CIRCUIT FOR USB PORT 0,1



POWER CIRCUIT FOR USB PORT 2,3

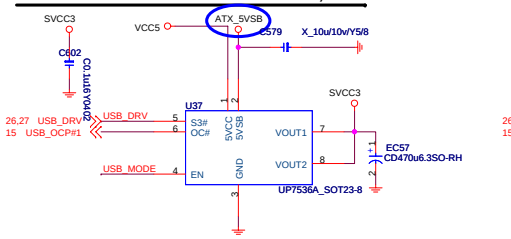


POWER CIRCUIT FOR USB PORT 4,5

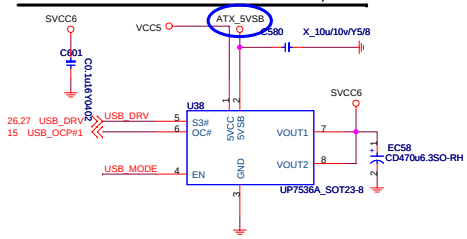


OSC CAP:C71-4710621-N07

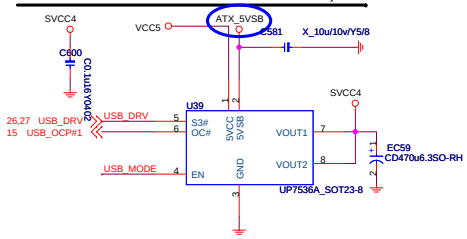
POWER CIRCUIT FOR USB PORT 6,7

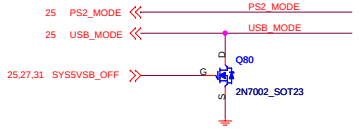


POWER CIRCUIT FOR USB PORT 8,9



POWER CIRCUIT FOR USB PORT 10,11





Micro Star Restricted Secret

Title: USB CONNECTORS	Rev: 1.0
Document Number: MS-7693	
MICRO-STAR INT'L CO.,LTD. No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, May 03, 2011
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Super I/O

LPC SUPER I/O F71889

	audio_card_detect	PCIE_GND
OnBo_Audio	1	1
PCIE_Audio	1	0

F71889AD

F71889AD-LAB-RH

place this two capacitor near pin 65

near the SIO pin

place near the sio pin

Chasis Intrusion

LPC I/O STRAPPING RESISTOR

	Don't STUFF	STUFF
RTS2#	PWM FAN	LINEAR FAN
RTSA#	80Port enable	80Port disable
SOUTA	4E	2E
DTRA#	FAN START DUTY 60%	FAN START DUTY 100%
SOUT2	Disable alarm mode	Enable force mode

Thermal Resistor

CHANGE 1.0

NOTE: LOCATE CLOSE S VRM mosfet ,for VRM mosfet temperature detect only

Micro Star Restricted Secret

Title: LPC SUPER I/O & LPC & CONNECTORS

Rev: 1.0

Document Number: MS-7693

MICRO-STAR INT'L CO.,LTD.
No. 69, Li-De St, Jung-He City,
Taipei Hsien, Taiwan
http://www.msi.com.tw

Last Revision Date: Tuesday, May 03, 2011

Sheet 25 of 32

PCIE length need over USB length

PCI-E CLK (100Ohm-Diff)

PCIE BUS need work at GEN2 for USB3.0

all the PCIE LENGTH need under 6inch

PCI-E (85Ohm-Diff) for GEN2

USB3.0 Length under 2 inch

USB HS (90Ohm-Diff)

USB SS (85Ohm-Diff)

USB HS (90Ohm-Diff)

USB SS (85Ohm-Diff)

3.3V :83.5mA
3.3VSUS:8.15mA

1.2V :318.3mA
1.2VSUS:6.58mA

Rear USB3 CONN

ASM1042 3VSB Circuit

ASM1042 1_2VSB Power

326 mA

Correction- 2010.1.10

ESD Protection
NEAR CONNECTOR

min 40mil.
900 mA

min 40mil.
900 mA

Please self-design delay circuit.
PONRST# must meet D3Hot 50ms~80ms spec.

GPIO0	GPIO1	GPIO2	Function
1	1	0	Asynchronous Mode(default)
1	1	1	Debug/Test Mode
0	0	x	

* GPIO0 GPIO1 GPIO2 internal Pull-high

Function

鎖 SBT や穿SMI GPIO
パ pin low笆 ,
SB狠惠pull hi to 3VSB

Micro Star Restricted Secret

Title	MANUAL PARTS	Rev 1.0
Document Number	MS-7693	

MICRO-STAR INT'L CO.,LTD.
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Taipei Hsien, Taiwan
http://www.msi.com.tw

Last Revision Date: Tuesday, May 03, 2011

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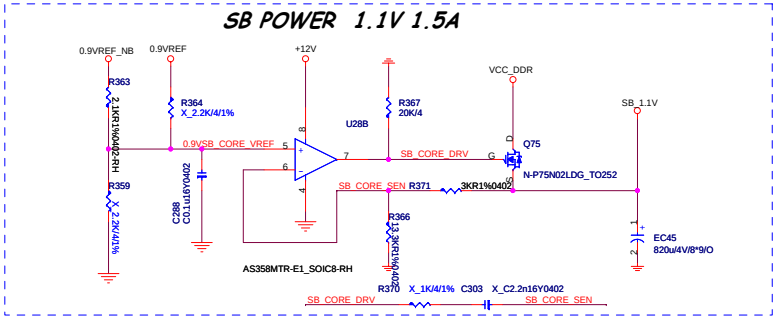
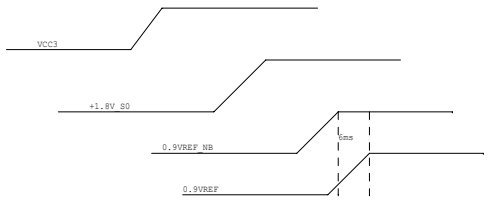
SB POWER 1.1V 1.5A

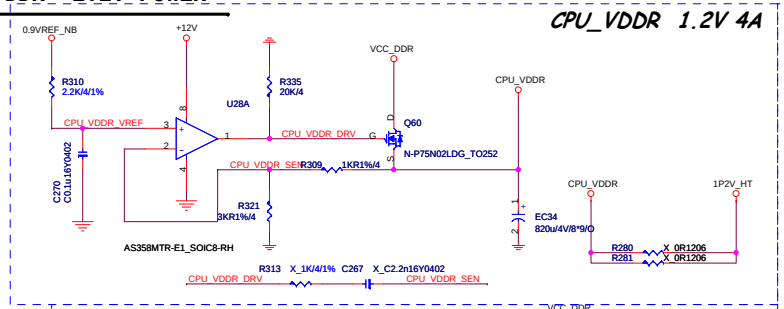


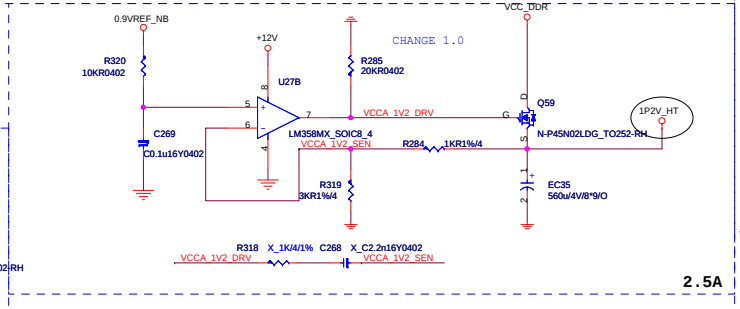


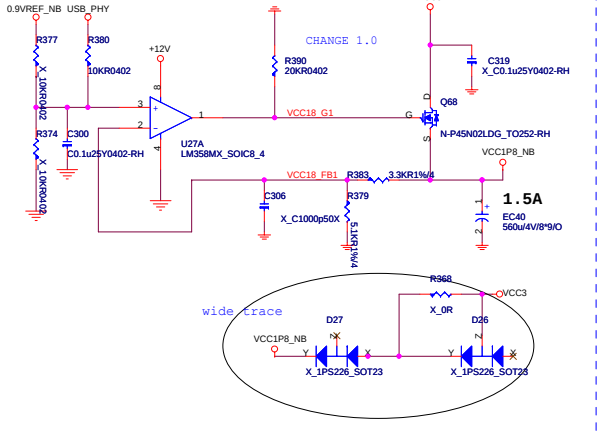
power sequence 3.3v-1.8v-1.1v

CPU_VDDR 1.2V POWER

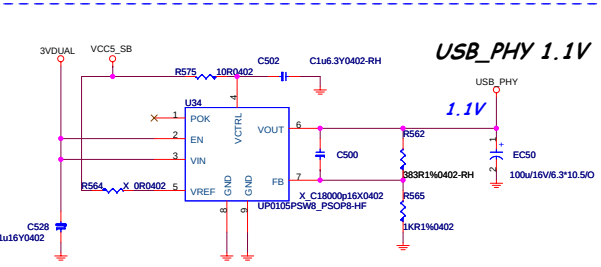
CPU_VDDR 1.2V 4A





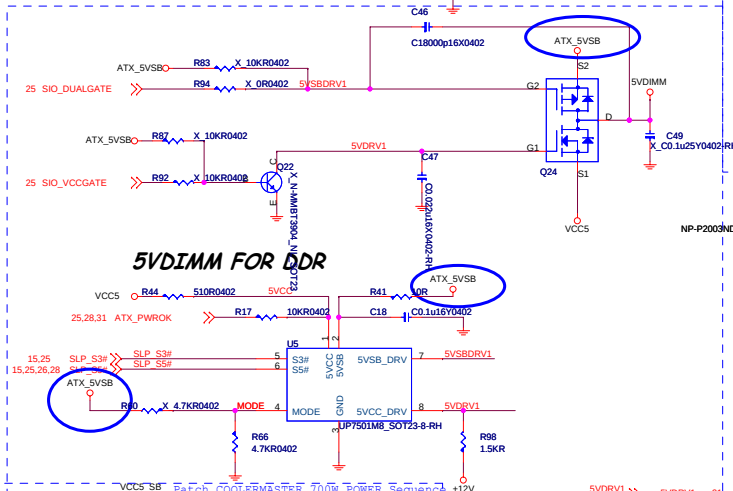


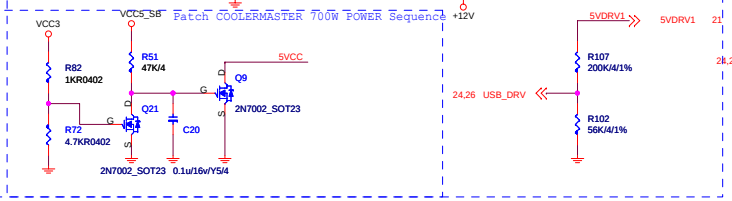
2.5A

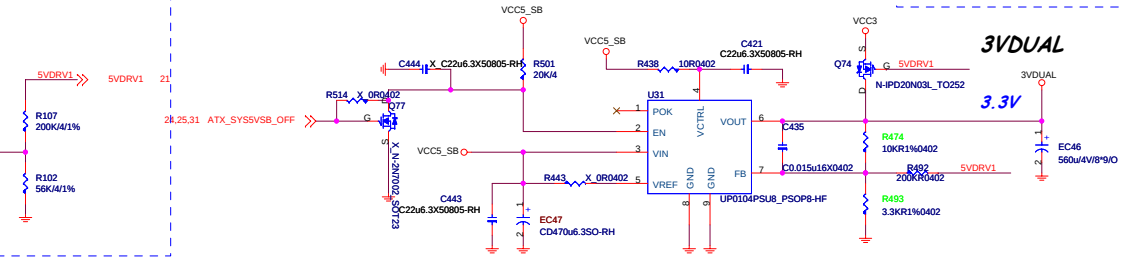


USB_PHY 1.1V

5VDIMM FOR DDR







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Document Number: MS-7693	
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RX780 power up sequence

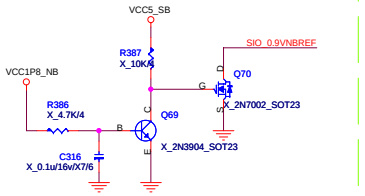
VCC3

VCC1.8_S0

1P2V_HT

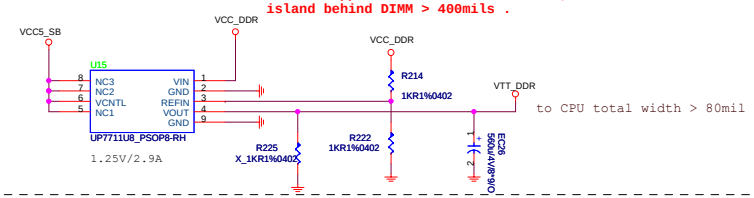
VCC1_1

Reserve for RX980 POS



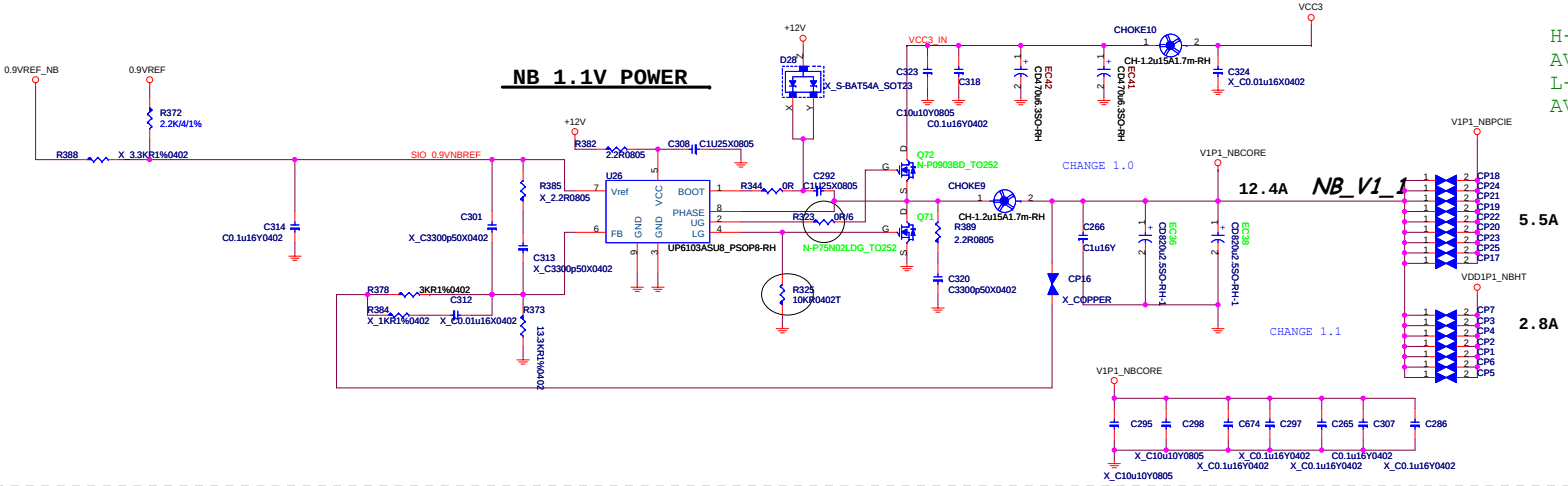
DDR VTT Power

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



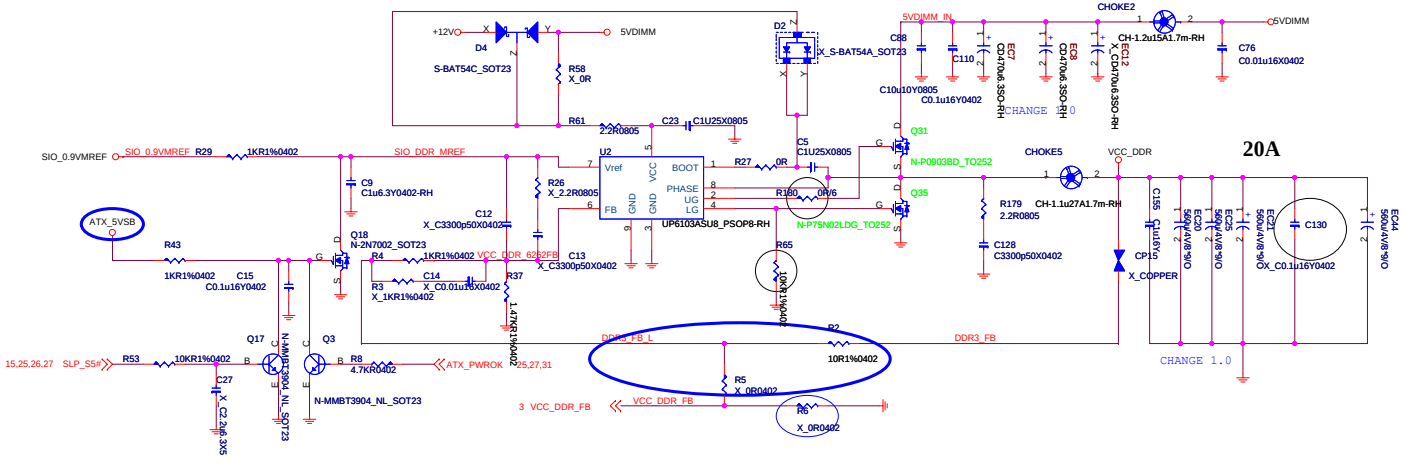
NB 1.1V POWER

H-MOS: D03-0903BDB-N03
AVL: D03-0480900-005
L-MOS: D03-75N022B-N03
AVL: D03-0480600-005



DDR III 1.5V POWER

VCC_DDR



Micro Star Restricted Secret	
Title: VCC_DDR&VCC1_1	Rev: 1.0
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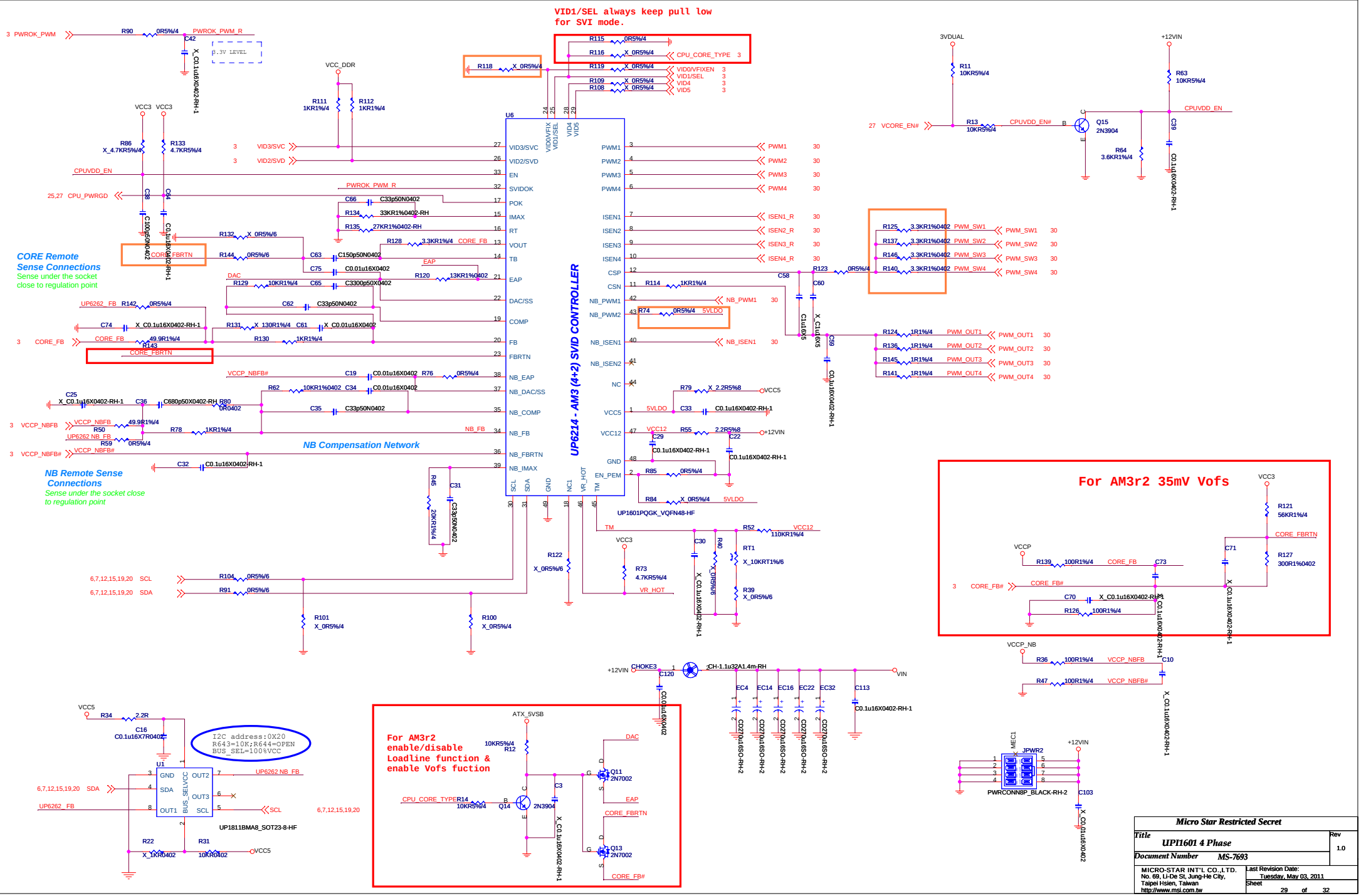
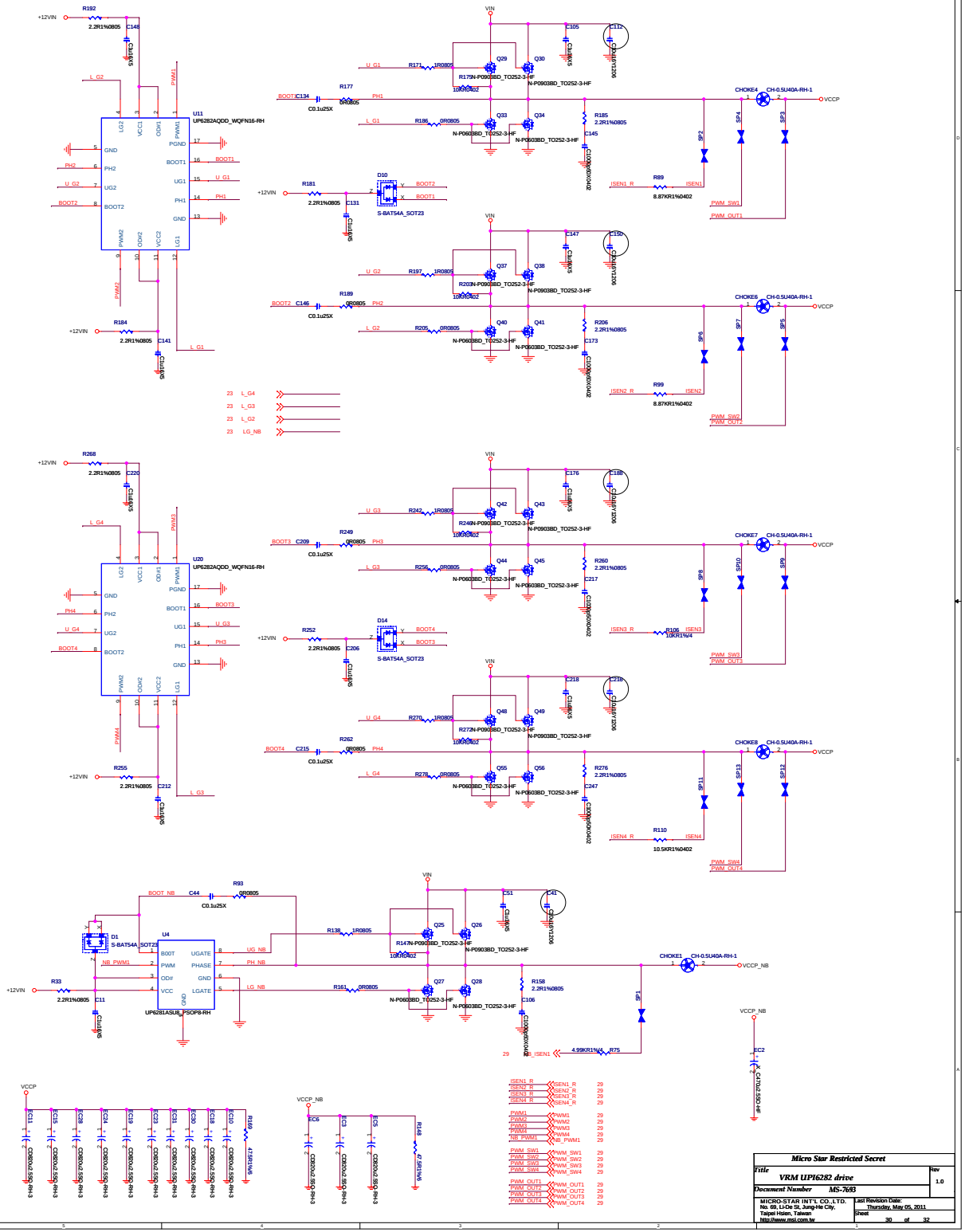
VID1/SEL always keep pull low for SVI mode.




+12VIN
R192
2.2R1%0805
C148
U11
UP6282AQDD_WQFN16-RH
L_G2
PWM1
PHASE1
LG2
VCC1
ODV1
PWM1
GND
PGND
PH2
BOOT1
U_G2
UG2
UG1
BOOT2
PH1
PWM2
ODV2
VCC2
LG1
C145X6S
C141
L_G1
R184
2.2R1%0805
VIN
C105
C112
C10U25V6M
Q29
Q30
R175N-P0903BD_TO252-3-HF
N-P0903BD_TO252-3-HF
U_G1
R171
1R0805
10KR0402
R177
0R0805
BOOT1
C134
C0.1u25X
PH1
Q33
Q34
R186
0R0805
R185
2.2R1%0805
C145
C100V0X0Z
CHOKE4
CH-0.5U40A-RH-1
VCCP
SP2
SP4
SP3
ISEN1_R
R89
8.87KR1%0402
ISEN1
PWM_SW1
PWM_OUT1
D10
S-BAT54A_SOT23
R181
2.2R1%0805
C131
C147
C150
Q37
Q38
R203N-P0903BD_TO252-3-HF
U_G2
R197
1R0805
R189
0R0805
BOOT2
C146
C0.1u25X
PH2
Q40
Q41
R205
0R0805
R206
2.2R1%0805
C173
CHOKE5
CH-0.5U40A-RH-1
SP6
SP7
SP5
ISEN2_R
R99
8.87KR1%0402
ISEN2
PWM_SW2
PWM_OUT2
23 L_G4
23 L_G3
23 L_G2
23 LG_NB
R268
2.2R1%0805
C220
U20
UP6282AQDD_WQFN16-RH
L_G4
PWM3
PHASE3
PH4
BOOT3
U_G4
U_G3
PH3
BOOT4
PWM4
R255
2.2R1%0805
C212
L_G3
C176
C188
Q42
Q43
R240N-P0903BD_TO252-3-HF
U_G3
R242
1R0805
R249
0R0805
BOOT3
C209
C0.1u25X
PH3
Q44
Q45
R256
0R0805
R260
2.2R1%0805
C217
CHOKE7
CH-0.5U40A-RH-1
SP8
SP10
SP9
ISEN3_R
R106
10KR1%4
ISEN3
PWM_SW3
PWM_OUT3
D14
S-BAT54A_SOT23
R252
2.2R1%0805
C206
C218
C219
Q48
Q49
R272N-P0903BD_TO252-3-HF
U_G4
R270
1R0805
R262
0R0805
BOOT4
C215
C0.1u25X
PH4
Q55
Q56
R278
0R0805
R276
2.2R1%0805
C247
CHOKE8
CH-0.5U40A-RH-1
SP11
SP13
SP12
ISEN4_R
R110
10.5KR1%0402
ISEN4
PWM_SW4
PWM_OUT4
BOOT_NB
C44
C0.1u25X
R93
0R0805
D1
S-BAT54A_SOT23
U4
UP6281ASUB_PSOP8-RH
NB_PWM1
R33
2.2R1%0805
C11
C51
C41
R138
1R0805
Q25
Q26
R147N-P0903BD_TO252-3-HF
UG_NB
PH_NB
LG_NB
Q27
Q28
R161
0R0805
R158
2.2R1%0805
C106
CHOKE1
CH-0.5U40A-RH-1
VCCP_NB
SP1
R75
4.99KR1%4
29 NB_ISEN1
EC2
VCCP
EC11
EC18
EC28
EC24
EC19
EC23
EC31
EC6
EC10
R169
4.75R1%4
VCCP_NB
EC6
EC23
EC25
R148
4.75R1%4
ISEN1_R
ISEN2_R
ISEN3_R
ISEN4_R
PWM1
PWM2
PWM3
PWM4
NB_PWM1
PWM_SW1
PWM_SW2
PWM_SW3
PWM_SW4
PWM_OUT1
PWM_OUT2
PWM_OUT3
PWM_OUT4
Micro Star Restricted Secret
Title
VRM UP16282 drive
Rev
1.0
Document Number
MS-7693
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ATX connector / Front Panel

Intel Front Panel

ESD Protect

R713 X_330R — VCC3

SATA_LED 14

C611 X_C180p50N0402

D40 S-BAT54A_SOT23

EMI

For MSI / Intel Front Panel

3VDUAL VCC5 C608 X_C0.1u25Y0402-RH

R698 HDD+ R702 330R0402 HDD- X_4.7KR0402

12,15,27 FP_RST# R701 33R0402 RESET+ C613 C0.1u25Y0402-RH

JFP1: HDD+ HDD- RESET- RESET+ NC / PLED SLED PWSW+ PWSW- / PWR_LED SUS_LED PWSW+

PWR_LED SUS_LED 25

ATX_5VSB R699 4.7KR0402

PWSW+ R700 100R1%0402 Near Super I/O PSIN 25

C609 C610 X_C0.1u25Y0402-RH X_C0.1u25Y0402-RH EMI

C612 X_C0.1u25Y0402-RH EMI

CHANGE 1.0

JFP2: GND SPEAKER / SLED BUZ+ / PLED BUZ- / VCCSPK VCC5 — H2X4[7]M_COLOR-RH

SUS_LED PWR_LED

follow latest technology suggestion

D39 BAS32L_LL34

RN21 8P4R-100R0402

15 SPKR R693 2.2KR0402 Q84 N-MMBT3904_NL_SOT23

C617 X_C0.1u25Y0402-RH

VCC5: C572 C490 C213 C1 C121 C88 C577 C496 C483 C348

VCC3: C578 C495 C451 C615 C574 C575 C531 C494 C573

PS2 KEYBOARD & MOUSE CONNECTOR

SVCC2

RN1 8P4R-4.7KR0402

C17 X_C0.1u25Y0402-RH

R35 X_1KR1%0402

KB_SPDIFO1A — MINIDIN_SPDIF-RH

25 MSDATA MSDATA

25 MSCLK MSCLK

25 KBDATA KBDATA

25 KBCLK KBCLK

KBCLK MSCLK KBDATA MSDATA

SVCC2

C37 C180p50N0402 C43 C180p50N0402 C40 C180p50N0402 C48 C180p50N0402

KBDATA KBCLK MSDATA MSCLK

D7 ESD-IP4220

SERIAL PORT 1

U7: VCC V+ / RIN1 ROUT1 / RIN2 ROUT2 / RIN3 ROUT3 / RIN4 ROUT4 / RIN5 ROUT5 / DIN1 DOUT1 / DIN2 DOUT2 / DIN3 DOUT3 / GND V- — 75232S-SSOP20

VCC5

NRIA# NCTSA# NDSRA# NSINA NDCDA#

RIA# CTSA# DSRA# SINA DCDA#

25 RTSA# DTRA# SOUTA

NRTSA NDTRA NSOUTA

+12VCOM C69 X_C0.1u25Y0402-RH D8 1N4148 +12V

-12VCOM D9 1N4148 -12V C84 X_C0.1u25Y0402-RH

NDCDA# NSINA NSOUTA NDTRA — NDSRA# NRTSA NCTSA# NRIA#

COM1 CONN-COM

CN1 8p4C-330p50N

CN2 8p4C-330p50N

ATX Connector

JPWR1

VCC3 C224 X_C0.1u25Y0402-RH

-12V C315 X_C1000p50X0402

25 ATX_PSON# R324 33R0402 C282 C1000p50X0402

3.3V 3.3V / -12V 3.3V / GND GND / P_ON 5V / GND GND / GND 5V / GND GND / -5V POK / 5V 5VSB / 5V +12V / 5V +12V / GND 3.3V

VCC3 C296 X_C0.1u25Y0402-RH

VCC5 EC55 CD470u6.3-O-RH C262 X_C0.1u25Y0402-RH

VCC5 R298 X_330R0805

VCC5 R277 10KR0402

ATX_PWROK 25,27,28

ATX_5VSB C245 C0.1u25Y0402-RH

+12V C238 C230 X_C0.1u25Y0402-RH X_C0.1u25Y0402-RH

VCC5 C257 X_C0.1u25Y0402-RH

PWRCONN24P_CREAM-RH-1

ATX_5VSB D25 BAS32L_LL34 ATX_PSON#

CP14

5VSB Power Switch

Trace Width 80mils.

VCC5_SB ATX_5VSB

Option ..... for Normal State

R398 X_0R1206 R395 X_0R1206

Q73 P-P06P03LCG_SOT89-3-RH

use DIP CAP 10uF or 22uF

change to 0603 10K ohm

ATX_SYS5VSB_OFF

use X7R or X5R

C317 C1u6.3X5/B C1045 3X5/0805 R391 10KR SYS5VSB_OFF SYS5VSB_OFF 24,25,27

Tune 5VSB inrush current to 2A from 4A

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MK1

G51-M1SP990-Q13

HS_SB1

MEC1

MEC2

HS-040163A-RH

HS_NB1

MEC1

MEC2

HS-0405370-RH

PCB1

PK0-0769310-G37

PCB

VBAT1-S1

BAT-BCR2032P-RH

CPU1_1

E91-0000076

Rubber1

PCB

rubber1/2

Rubber2

PCB

rubber1/2

Optics Orientation Holes

FM10 FM8 FM4 FM2 FM3

FM7 FM13 FM6 FM12 FM11 FM1

FM5 FM9

X_FM

Mounting Holes

MH3 MH4 MH5

MH6 MH1 MH2

X_MH001

AGND

Simulation

X_JS1

SIM2

X_PIN1*2

VCC5

X_JS2

SIM1

X_PIN1*2

HS_PWM

MEC1

MEC2

E31-0501740-K08

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