

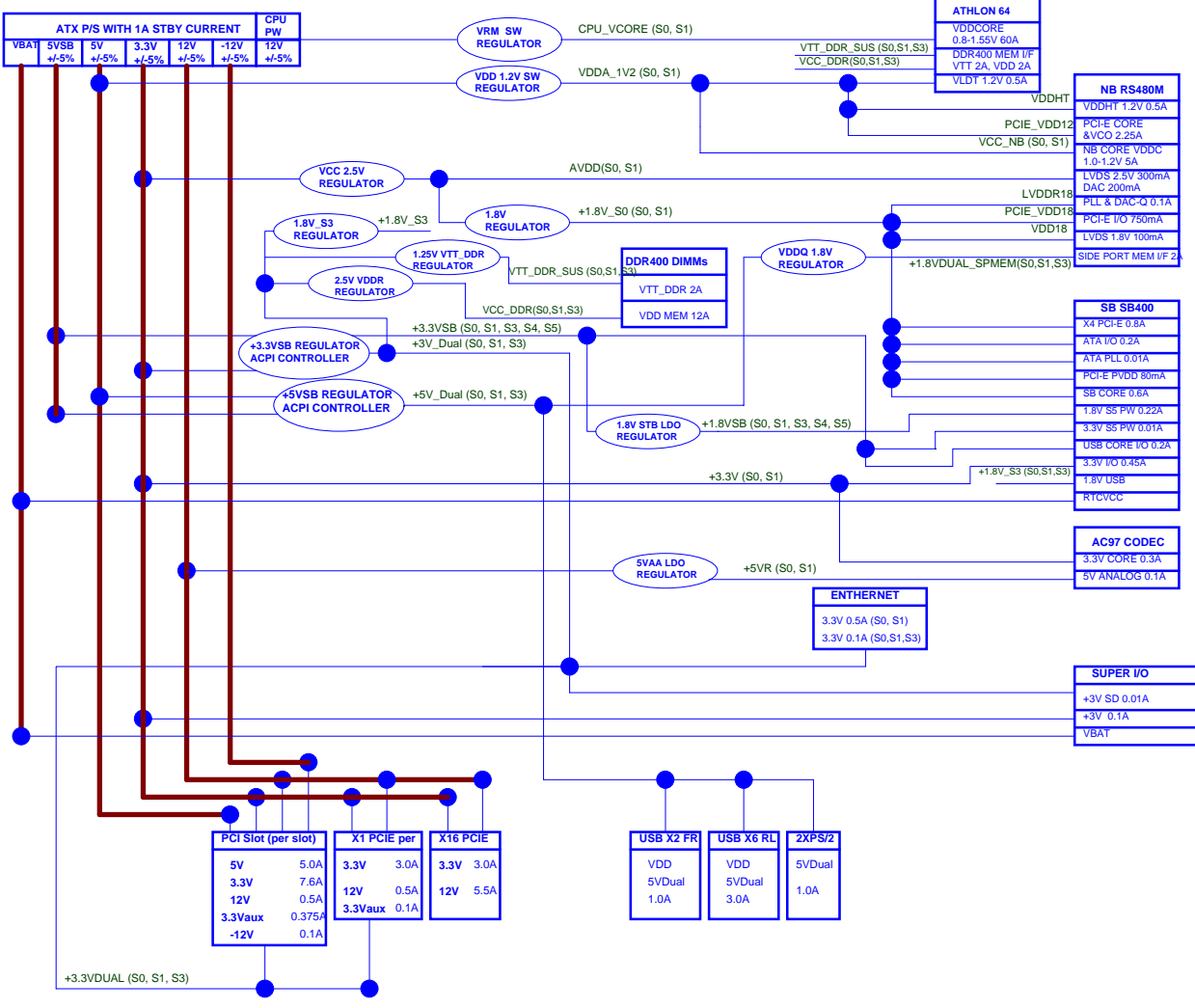
Micro Star Restricted Secret		
Title	01 BLOCK DIAGRAM	Rev 130
Document Number	MS-7050	
MICRO STAR INT'L CO. LTD. No. 89, Li-Fu St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, April 19, 2006 Sheet 1 of 41	

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P02: TABLE OF CONTENTS	P25: PCI SLOTS 1 & 2
P03: POWER DELIVERY CHART	P26: BIOS ROM
P04: CLOCK DISTRIBUTION	P27: REAR USB 2.0 PORTS 0,1,2,3,4,5
P05: ATHLON64 HT I/F CTRL & DEBUG	P28: FRONT USB 2.0 PORTS 6,7
P06: ATHLON64 DDR MEMORY I/F	P29: ATA 66/100 EIDE & CD ROM
P07: FIRST LOGICAL DDR DIMM	P30: COM PORT & LPT
P08: SECOND LOGICAL DDR DIMM	P31: AC97 2.3 CODEC
P09: ATHLON64 PWR & GND	P32: GIGABIT ETHERNET
P10: RS480-HT LINK0 I/F	P33: DESKTOP ATHLON64 PWR
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P12: RS480-PCIE LINK I/F	P35: POWER REGULATOR
P13: RS480-VIDEO I/F & CLKGEN	P36: ATX CON. /FAN/FRONT PANEL
P14: RS480-POWER	P37: BLEED OFF/LED/HOOD SENCE
P15: RS480-STRAPS	P38: DVI CONNECTOR
P16: EXTERNAL CLOCK GENERATOR	P39: CHANGE HISTORY
P17: VGA CON.	P40: MANUAL PARTS
P18: SB400- PCI-E/PCI/CPU/LPC	
P19: SB400 - APCI/GPIO/AC97/USB	
P20: SB400 - SATA/IDE	
P21: SB400 - PWR & DECOUPLING	
P22: SB400 - STRAPS	
P23: PCIE CONNECTOR	

SMBUS ADDRESS
CLOCK GEN. : D2
SIO : 5A
MS6 : 5E
DIMM : A0,A2
DVI : 70 (READ)
DVI : 71 (WRITE)

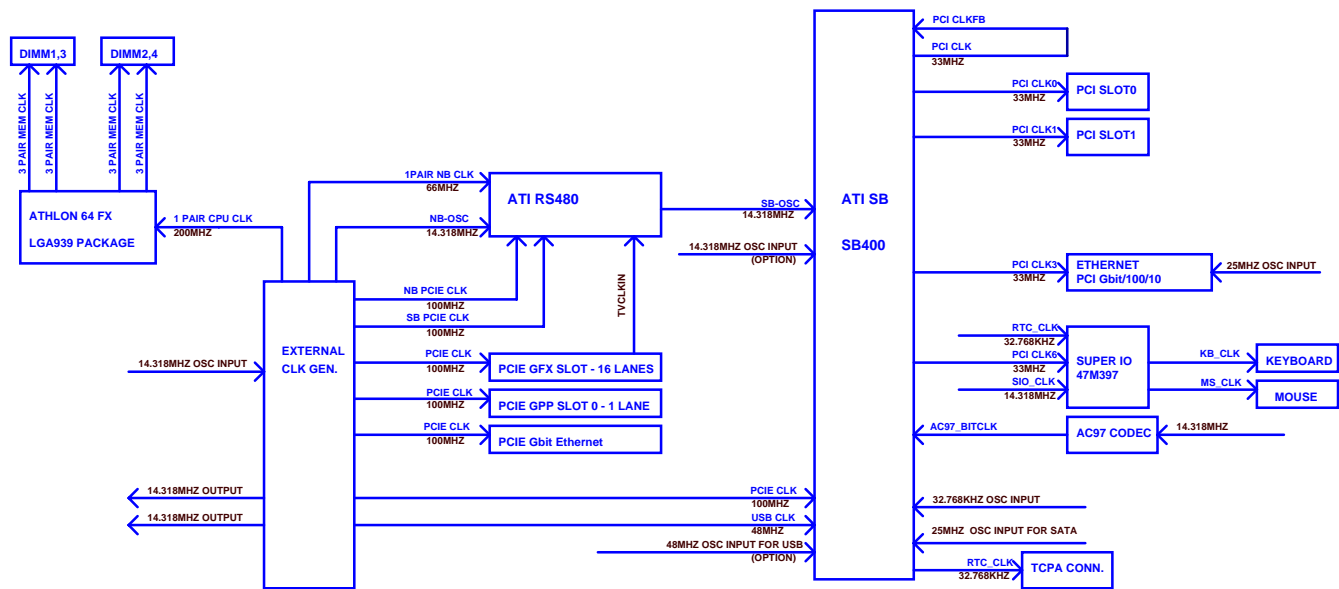
<i>Micro Star Restricted Secret</i>	
Title	Rev
02.TABLE OF CONTENTS	130
Document Number	MS-7050
MICRO STAR INT'L CO. LTD. No. 69, Li-Che St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Print Revision Date: Tuesday, April 19, 2006 Sheet
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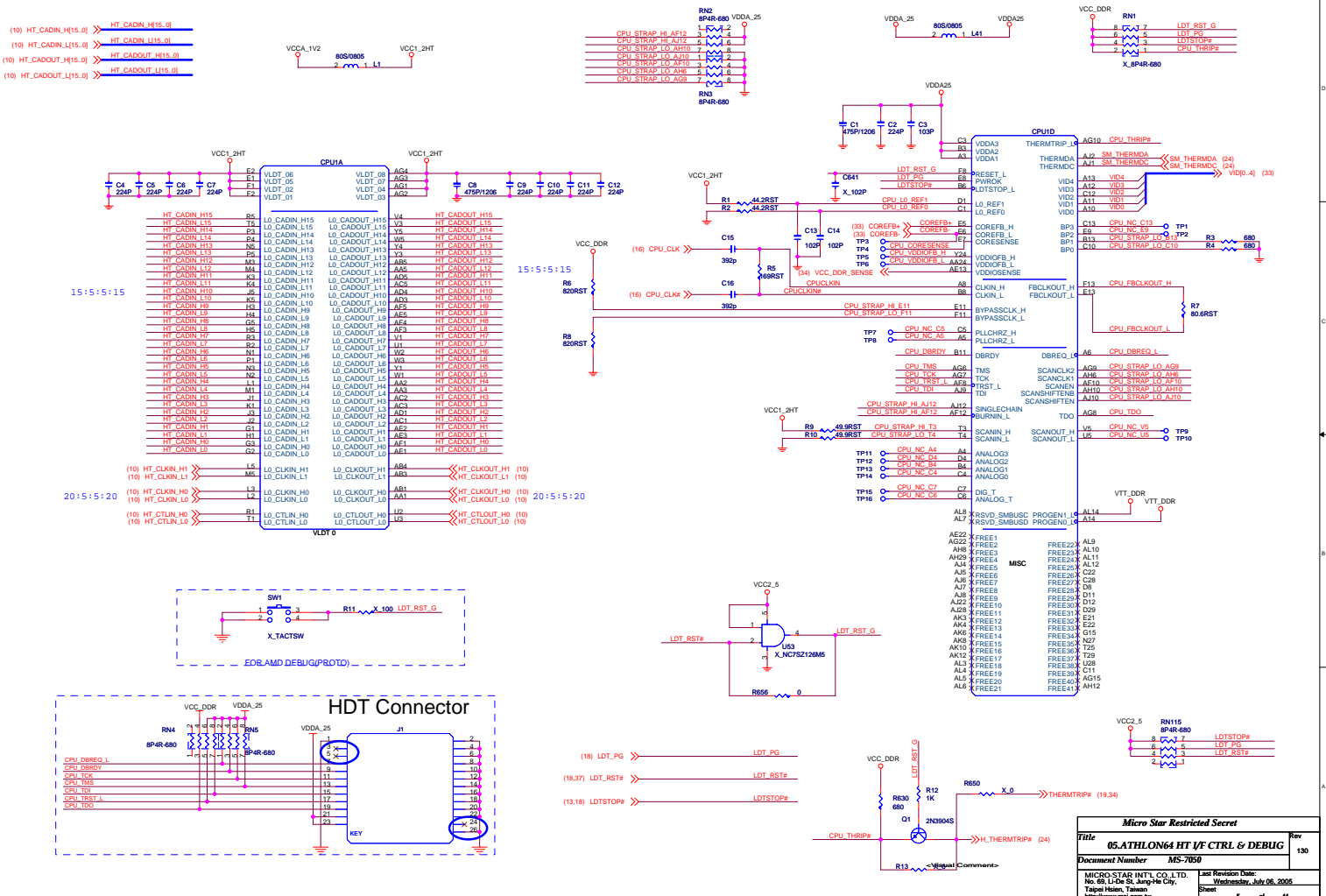
PCI Slot (per slot)	X1 PCIE per	X16 PCIE
5V 5.0A	3.3V 3.0A	3.3V 3.0A
3.3V 7.6A	12V 0.5A	12V 5.5A
12V 0.5A	3.3Vaux 0.1A	
3.3Vaux 0.375A		
-12V 0.1A		

USB X2 FR	USB X6 RL	2XPS/2
VDD 1.0A	VDD 3.0A	5VDual 1.0A

Micro Star Restricted Secret		
Title	03.POWER DELIVERY CHART	Rev 130
Document Number	MS-7050	
MICRO STAR INT'L CO. LTD. No. 89, Li-Fu St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, April 19, 2006	Sheet 3 of 41



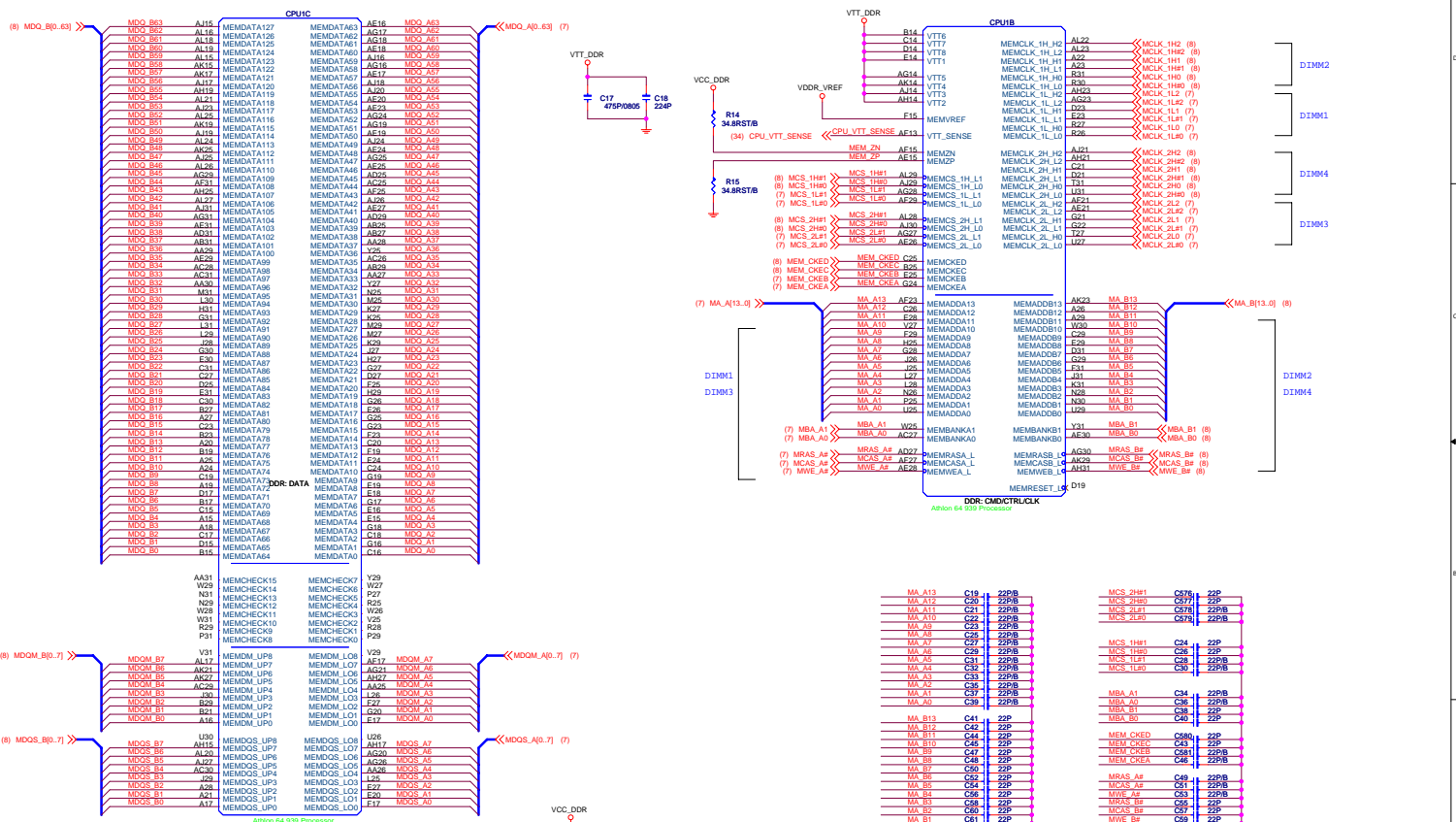
<i>Micro Star Restricted Secret</i>	
Title	Rev
04.CLOCK DISTRIBUTION	130
Document Number	MS-7650
MICRO STAR INT'L CO. LTD. No. 69, Li-Fu St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Tuesday, April 19, 2006 Sheet 4 of 41



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Micro Star Restricted Secret		
Title	Rev	130
05.ATHLON64 HT V/I CTRL & DEBUG		
Document Number	MS-7159	
MICRO STAR INT'L CO. LTD.	Last Revision Date	Wednesday, July 06, 2005
No. 69, Li-De St., Jung-Ho City, Taipei, Taiwan	Sheet	5 of 41

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.



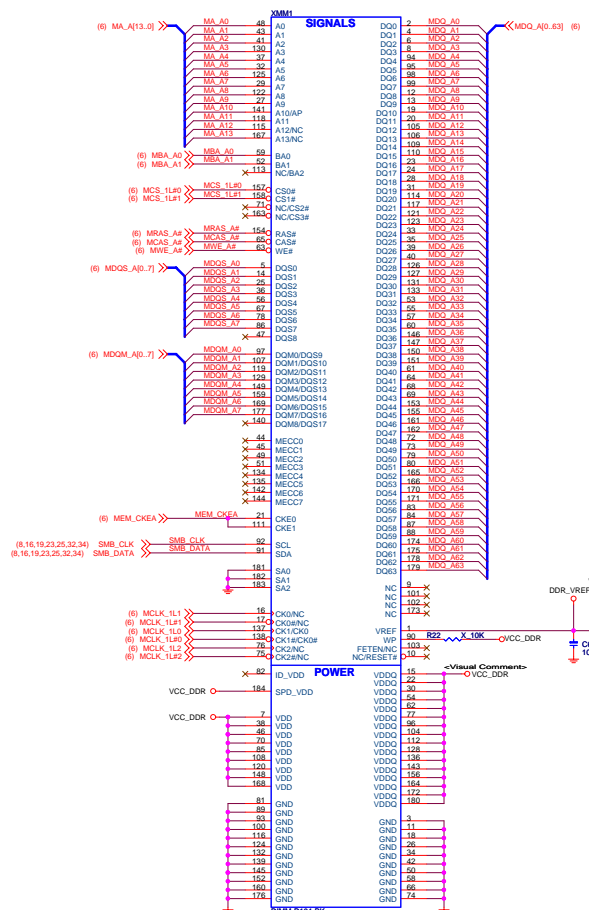
Athlon 64 330 Processor

Athlon 64 330 Processor

Micro Star Restricted Secret		
Title	06_ATHLON64 DDR MEMORY I/F	Rev 130
Document Number	MS-7059	
Micro Star Int'l Co., Ltd.	Last Revision Date	Wednesday, July 06, 2005
No. 89, Li-De St., Jung-Ho City, Taipei-Hsin, Taiwan	Drawn	6 of 41
http://www.msi.com.tw		

DDR DIMM1

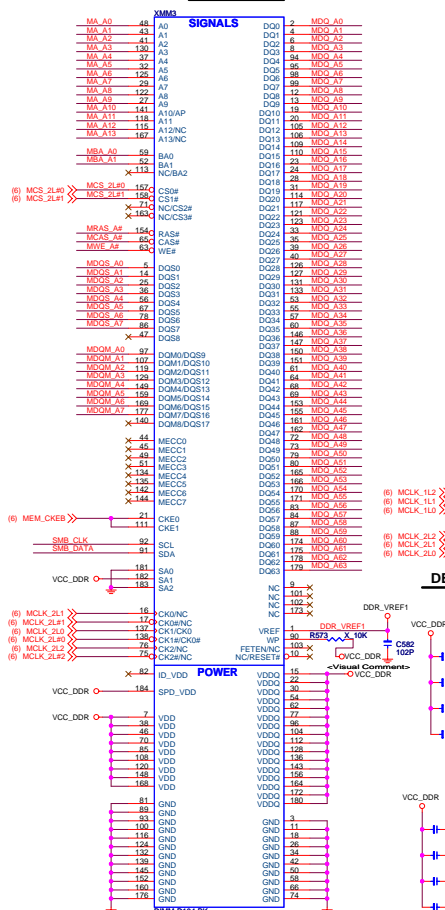
SIGNALS



ADDR.=1010000B

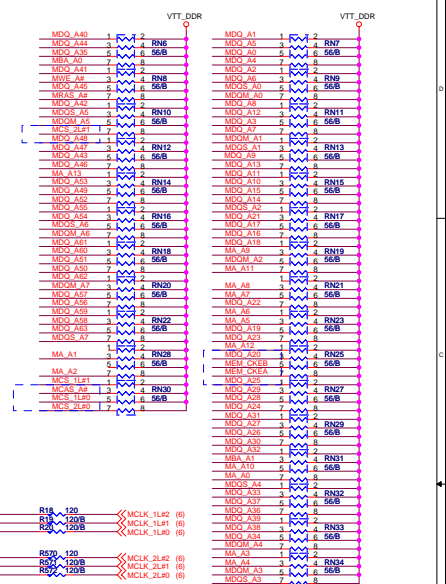
DDR DIMM3

SIGNALS

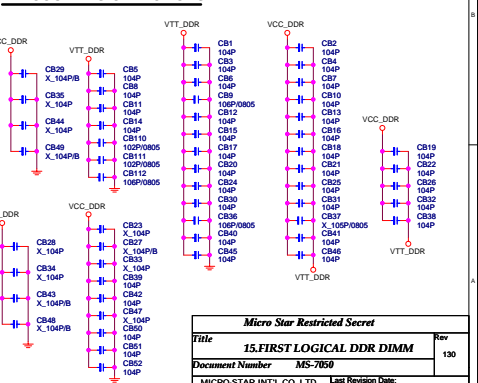


ADDR.=1010010B

DDR Terminational Resistors



DECOUPLING CAPACITORS

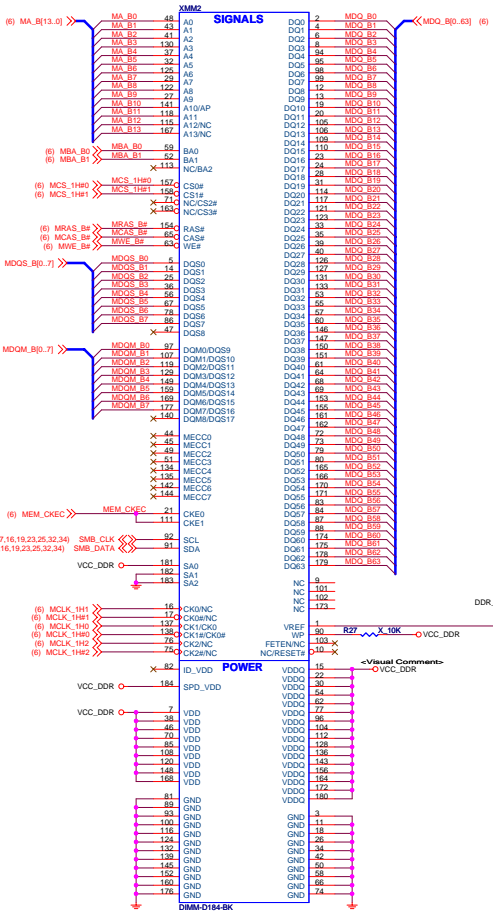


Micro Star Restricted Secret		
Title	15FIRST LOGICAL DDR DIMM	Rev 130
Document Number	MS-7050	
MICRO STAR INT'L CO., LTD. No. 89, Li-De St., Jung-Ho City, Taipei-Hsin, Taiwan		Iss. Wednesday, July 06, 2005
		7 of 41

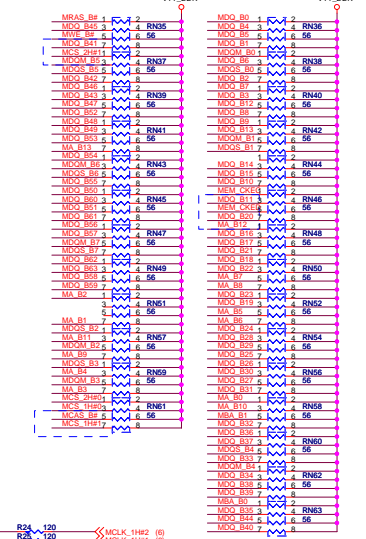
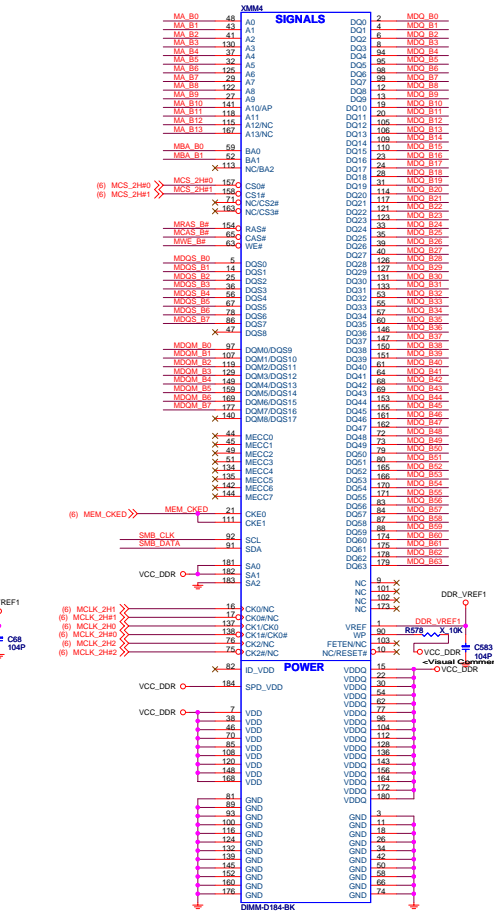
SYSTEM MEMORY

DDR Termination Resistors

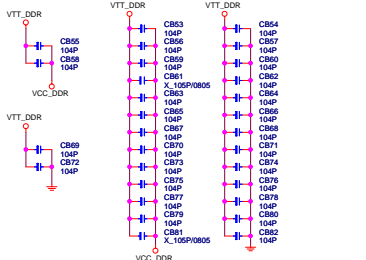
DDR DIMM2



DDR DIMM4

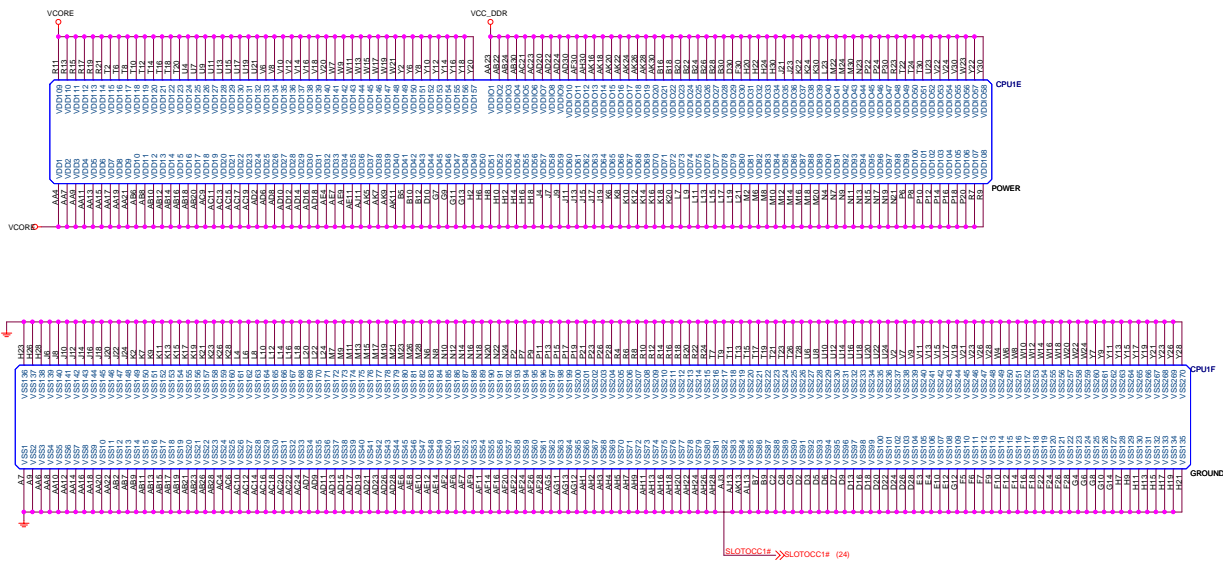


DECOUPLING CAPACITORS

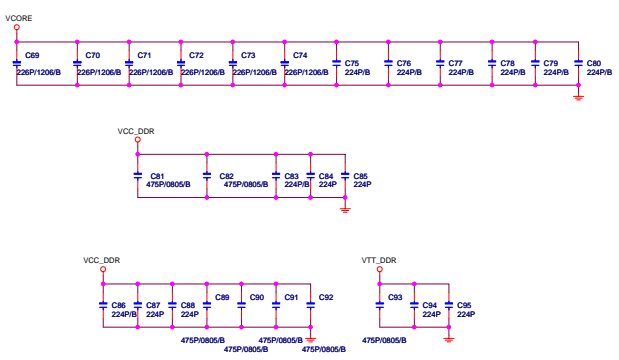


Micro Star Restricted Secret table with columns: Title (16-SECOND LOGICAL DDR DIMM), Document Number (MS-7156), and Revision (130). Includes company name and date.

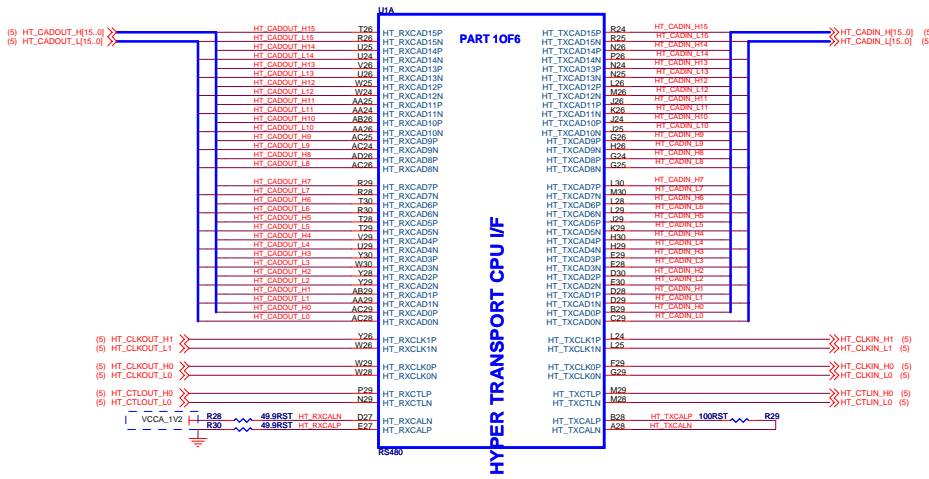




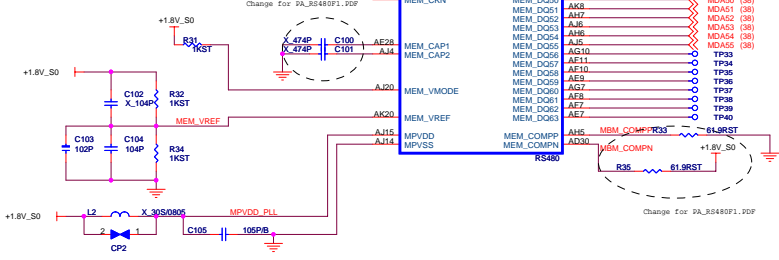
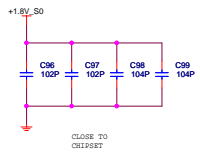
Bottomside Decoupling



Micro Star Restricted Secret		
Title	07.ATHLON64 PWR & GND	Rev 130
Document Number	MS-7850	
MICRO STAR INT'L CO. LTD. No. 69, Li-De St., Jung-Ho City, Taipei Hsin, Taiwan http://www.msi.com.tw	Last Revision Date Wednesday, July 05, 2005	Sheet 9 of 41



Micro Star Restricted Secret	
Title 08_RS480-HT LINK0 I/F	Rev 130
Document Number MS-7050	
MICRO STAR INT'L CO. LTD. No. 89, Li Da St., Jang-Mei City, Taipei Hsien, Taiwan http://www.msi.com.tw	List Revision Date: Wednesday, July 08, 2005 Sheet 10 of 41



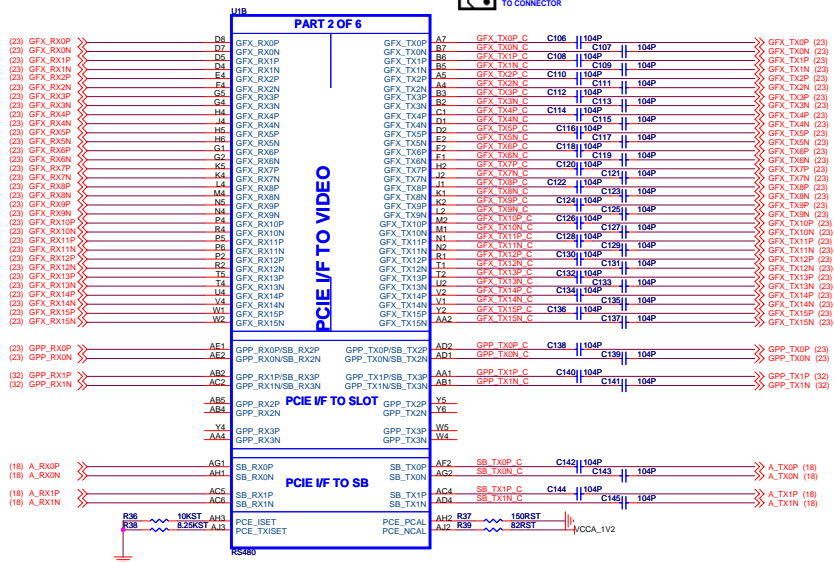
UIC

AE17	MEM_A0	MEM_D00	AE28
AK12	MEM_A1	MEM_D01	AE27
AH16	MEM_A2	MEM_D02	AG28
AE18	MEM_A3	MEM_D03	AE26
AJ22	MEM_A4	MEM_D04	AE25
AJ21	MEM_A5	MEM_D05	AE24
AK20	MEM_A6	MEM_D06	AE24
AH21	MEM_A7	MEM_D07	AG23
AK19	MEM_A8	MEM_D08	AE23
AH19	MEM_A9	MEM_D09	AG23
AG14	MEM_A10	MEM_D10	AG23
AG17	MEM_A11	MEM_D11	AH22
AH17	MEM_A12	MEM_D12	AJ28
AH18	MEM_A13	MEM_D13	AJ27
	MEM_A14	MEM_D14	AH27
AG26	MEM_DM0	MEM_D15	AE23
AJ20	MEM_DM1	MEM_D16	AE22
AE21	MEM_DM2	MEM_D17	AE22
AH24	MEM_DM3	MEM_D18	AE22
AH12	MEM_DM4	MEM_D19	AE20
AG13	MEM_DM5	MEM_D20	AG19
AJ25	MEM_DM6	MEM_D21	AE20
AE8	MEM_DM7	MEM_D22	AE19
		MEM_D23	AH26
AE25	MEM_DQS0P	MEM_D24	AJ28
AH30	MEM_DQS1P	MEM_D25	AK28
AG20	MEM_DQS2P	MEM_D26	AH25
AG25	MEM_DQS3P	MEM_D27	AG24
AH13	MEM_DQS4P	MEM_D28	AH24
AE14	MEM_DQS5P	MEM_D29	AJ23
AJ7	MEM_DQS6P	MEM_D30	AJ23
AJ8	MEM_DQS7P	MEM_D31	AH22
		MEM_D32	AK14
AG25	MEM_DQSN	MEM_D33	AK13
AH29	MEM_DQSN	MEM_D34	AJ13
AE29	MEM_DQSN	MEM_D35	AJ11
AK29	MEM_DQSN	MEM_D36	AH11
AE13	MEM_DQSN	MEM_D37	AH11
AK13	MEM_DQSN	MEM_D38	AJ10
AK13	MEM_DQSN	MEM_D39	AH10
AE9	MEM_DQSN	MEM_D40	AE15
		MEM_D41	AE15
		MEM_D42	AG14
AE17	MEM_RAS#	MEM_D43	AE14
AH19	MEM_CAS#	MEM_D44	AE12
AG15	MEM_WE#	MEM_D45	AE12
AE19	MEM_CS#	MEM_D46	AE11
AE19	MEM_CKE	MEM_D47	AE11
		MEM_D48	AJ8
AK16	MEM_CK#	MEM_D49	AJ8
AJ16	MEM_CKN	MEM_D50	AK9
		MEM_D51	AK9
		MEM_D52	AJ8
		MEM_D53	AJ8
		MEM_D54	AJ8
		MEM_D55	AJ8
		MEM_D56	AE10
		MEM_D57	AE10
		MEM_D58	AE9
		MEM_D59	AE9
		MEM_D60	AG7
		MEM_D61	AE9
		MEM_D62	AE7
		MEM_D63	AE7
		MEM_COMP#	RS33
		MEM_COMPN	RS480

MEM_A I/F

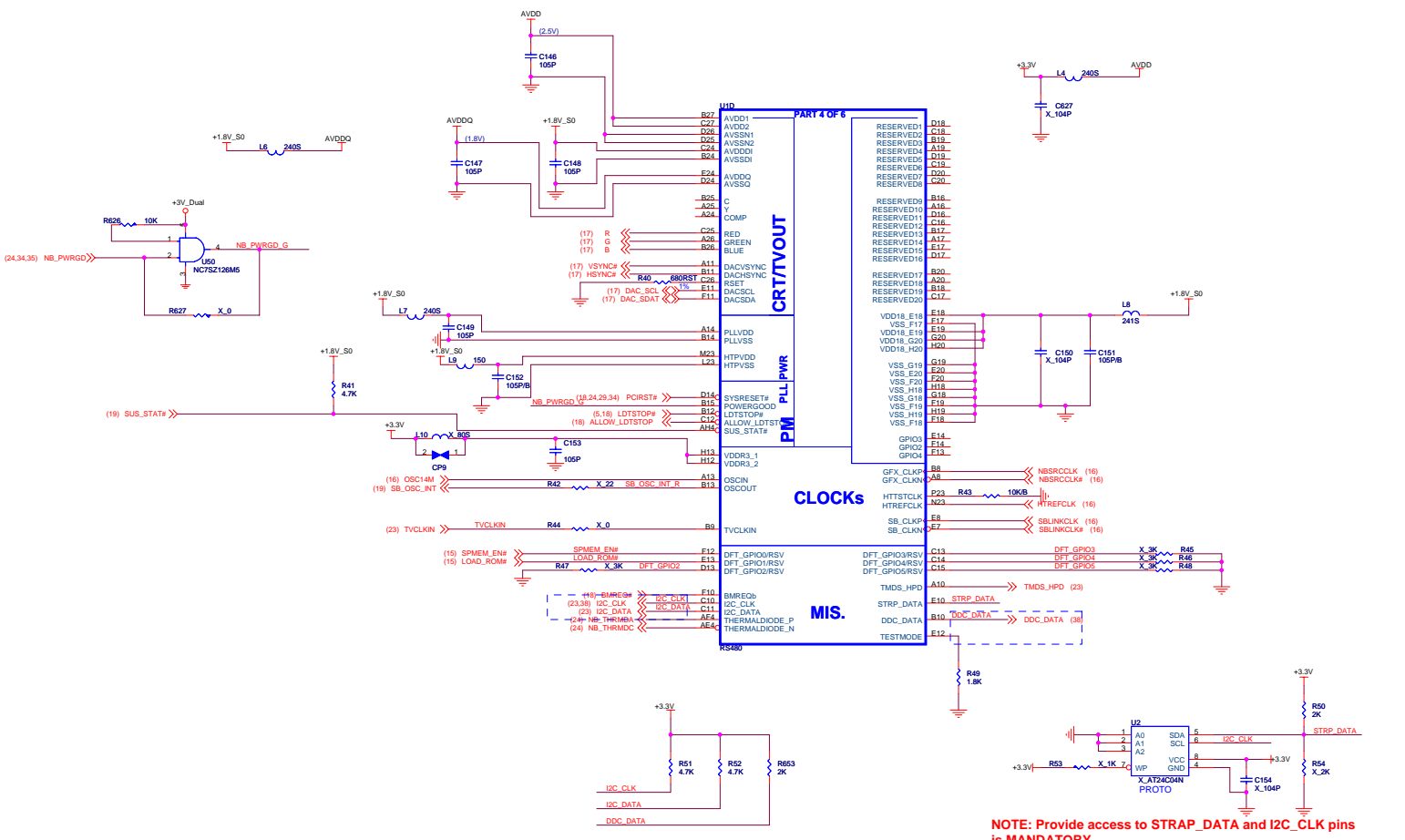
TP24	MDA33 (38)
TP25	MDA34 (38)
TP26	MDA35 (38)
TP27	MDA36 (38)
TP28	MDA37 (38)
TP29	MDA38 (38)
TP30	MDA39 (38)
TP31	MDA40 (38)
TP32	MDA41 (38)
TP33	MDA42 (38)
TP34	MDA43 (38)
TP35	MDA44 (38)
TP36	MDA45 (38)
TP37	MDA46 (38)
TP38	MDA47 (38)
TP39	MDA48 (38)
TP40	MDA49 (38)
TP41	MDA50 (38)
TP42	MDA51 (38)
TP43	MDA52 (38)
TP44	MDA53 (38)
TP45	MDA54 (38)
TP46	MDA55 (38)

Micro Star Restricted Secret		
Title	09_RS480-SIDE PORT MEMORY I/F	Rev 130
Document Number	MS-7650	
MICRO STAR INT'L CO. LTD. No. 89, Li Da St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Wednesday, July 08, 2005	Sheet
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Micro Star Restricted Secret	
Title	Rev
10.RS480-PCIE LINK I/F	130
Document Number	MS-7050
MICRO STAR INT'L CO. LTD. No. 69, Li-De St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Wednesday, July 08, 2005 Sheet 12 of 41

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AVDD	DAC VDD (2.5V)
AVDDDDI	DIGITAL VDD (1.8V)
DAC2 BANDGAP REF	(1.8V)
PLLVDD	PLL VDD (1.8V)
HTPVDD	HT PLL VDD (1.2V)

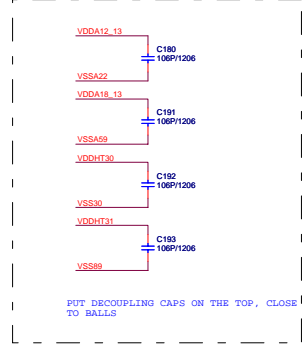
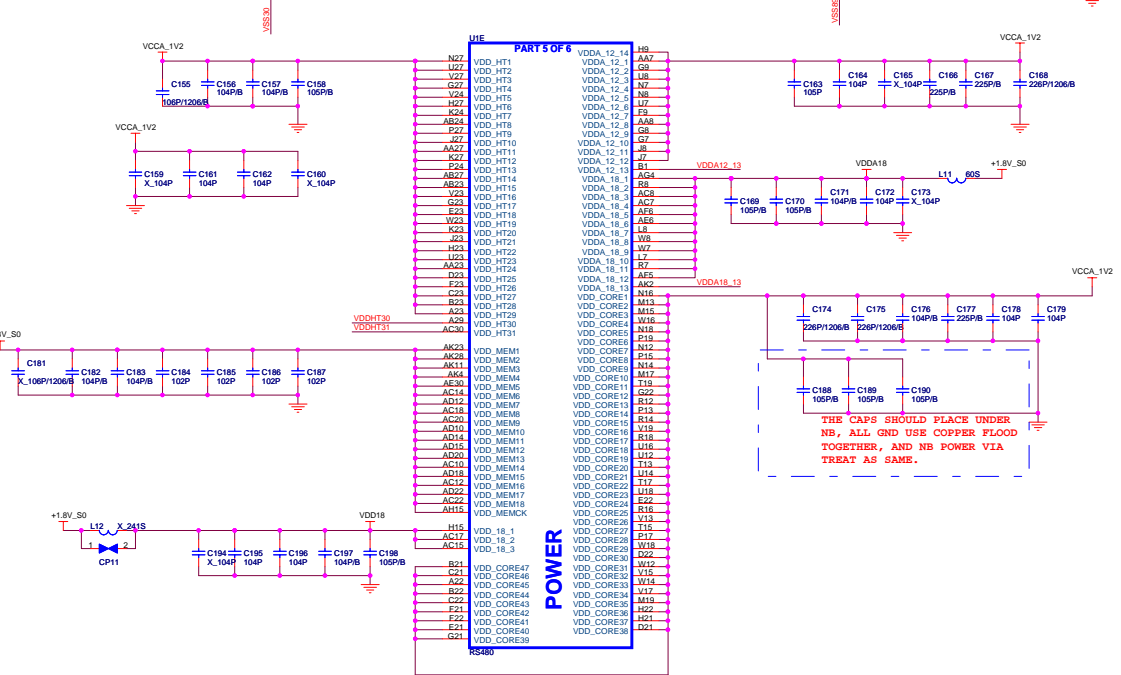
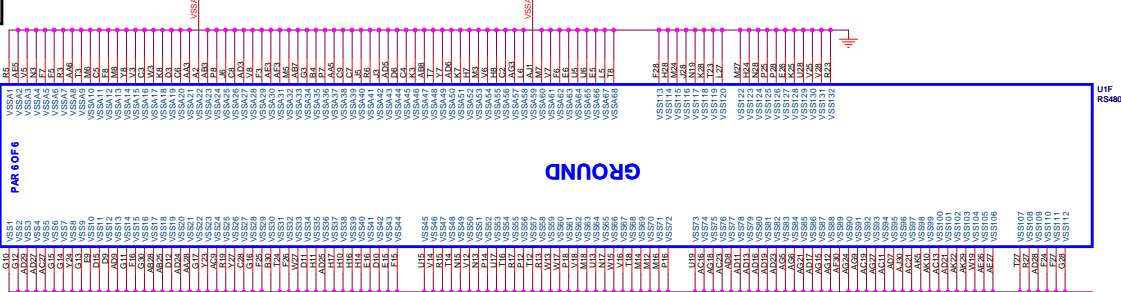
NOTE: Provide access to STRAP_DATA and I2C_CLK pins is MANDATORY.

Micro Star Restricted Secret		
Title	11_RS480-VIDEO I/F & CLKGEN	Rev
Document Number	MS-7050	130
MICRO STAR INT'L CO. LTD. No. 89, Li Da St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Print Revision Date: Wednesday, July 08, 2005	Sheet 13 of 41



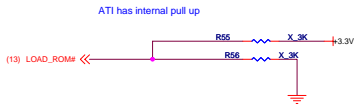
NB RS480 POWER STATES

Power Signal	S0	S1	S3	S4/S5	G3
VDDIT	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
AVDDD1	ON	ON	OFF	OFF	OFF
PLLVD	ON	ON	OFF	OFF	OFF
HTPVD	ON	ON	OFF	OFF	OFF
VDDR3	ON	ON	OFF	OFF	OFF
LPVDD	ON	ON	OFF	OFF	OFF
LVDDR18	ON	ON	OFF	OFF	OFF
LVDDR25	ON	ON	OFF	OFF	OFF



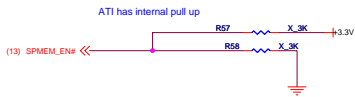
PUT DECOUPLING CAPS ON THE TOP, CLOSE TO BALLS

Micro Star Restricted Secret		
Title	12_RS480-POWER	Rev
Document Number	MS-7050	130
MICRO STAR INT'L CO. LTD.	1st Revision Date:	Tuesday, July 05, 2005
No. 89, Li-Fa St., Jung-Hsi City, Taipei Hsein, Taiwan	Sheet	14 of 41
http://www.msi.com.tw		



LOAD_ROM#-LOAD ROM STRAP ENABLE strap

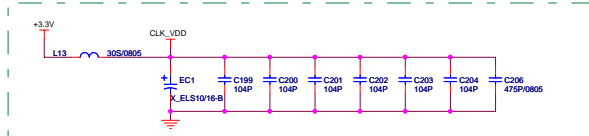
High, LOAD ROM STRAP DISABLE
Low, LOAD ROM STRAP ENABLE



SPMEM_EN#-SIDE PORT MEMORY ENABLE strap

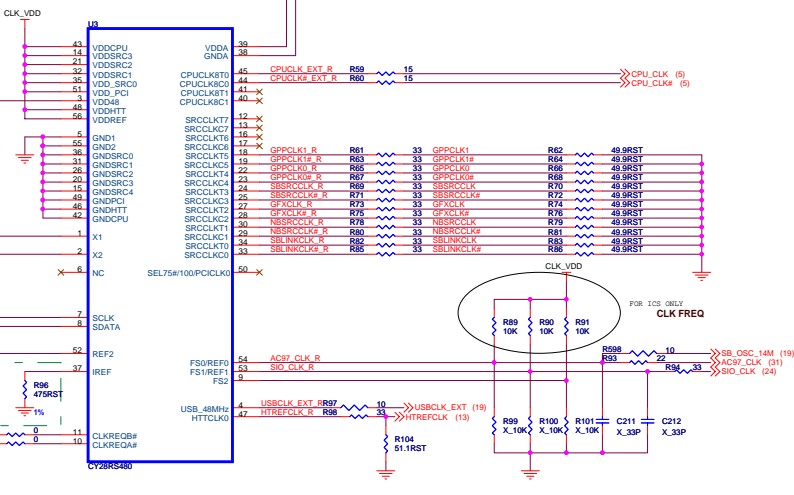
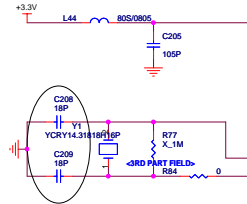
High, SIDE PORT MEMORY DISABLE
Low, SIDE PORT MEMORY ENABLE

Micro Star Restricted Secret	
Title 13_RS480-STRAPS	Rev 130
Document Number MS-7050	
MICRO STAR INT'L CO., LTD. No. 69, Li-Che St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	First Revision Date: Tuesday, April 19, 2006 Sheet 15 of 41



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

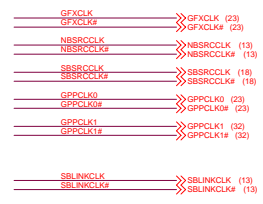
Parallel Resonance Crystal



EXT CLK FREQUENCY SELECT TABLE(MHZ)

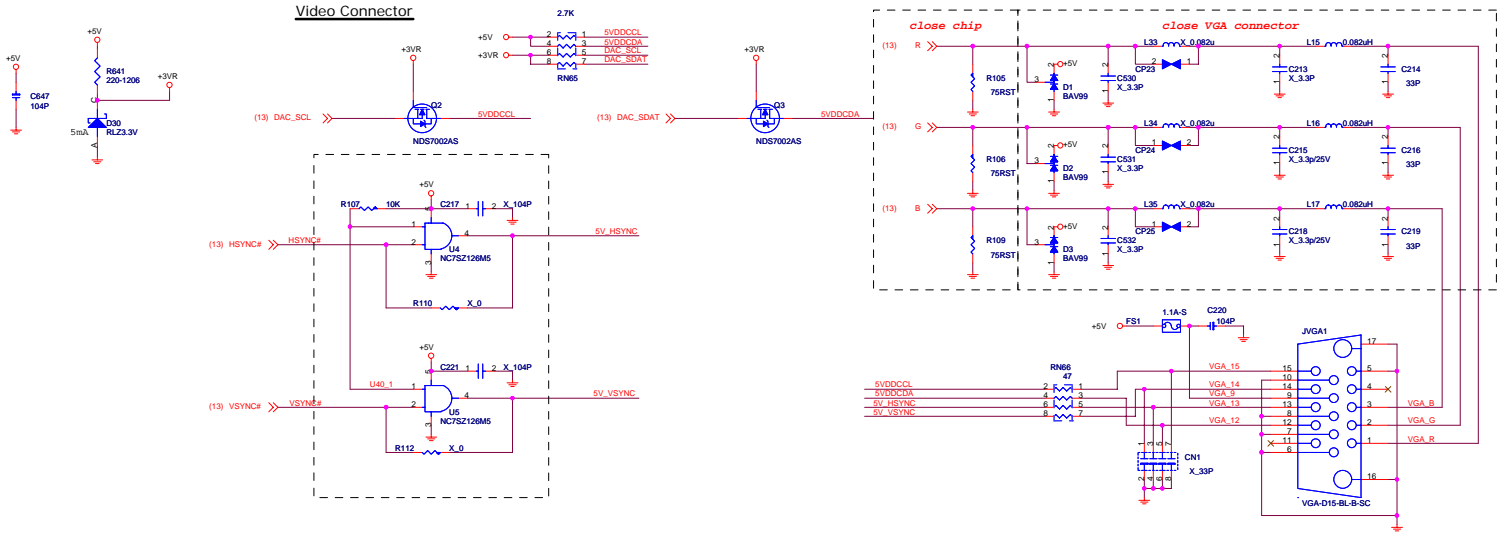
FS2	FS1	FS0	CPU	SRCCLK [2:1]	HTT	PCI	USB	COMMENT
0	0	0	Hi-Z	100.00	Hi-Z	Hi-Z	48.00	Reserved
0	0	1	X	100.00	X/3	X/6	48.00	Reserved
0	1	0	180.00	100.00	60.00	30.00	48.00	Reserved
0	1	1	220.00	100.00	35.56	73.12	48.00	Reserved
1	0	0	100.00	100.00	66.66	33.33	48.00	Reserved
1	0	1	133.33	100.00	66.66	33.33	48.00	Reserved
1	1	1	200.00	100.00	66.66	33.33	48.00	Normal HAMMER operation

OVERLAP COMMON PADS FOR DUAL-OP RESISTORS



Micro Star Restricted Secret		
Title	14.EXTERNAL CLOCK GENERATOR	Rev 130
Document Number	MS-7050	
MICRO STAR INT'L CO. LTD. No. 69, Li Da St., Jung-Mei City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Wednesday, July 08, 2005	Sheet 16 of 41

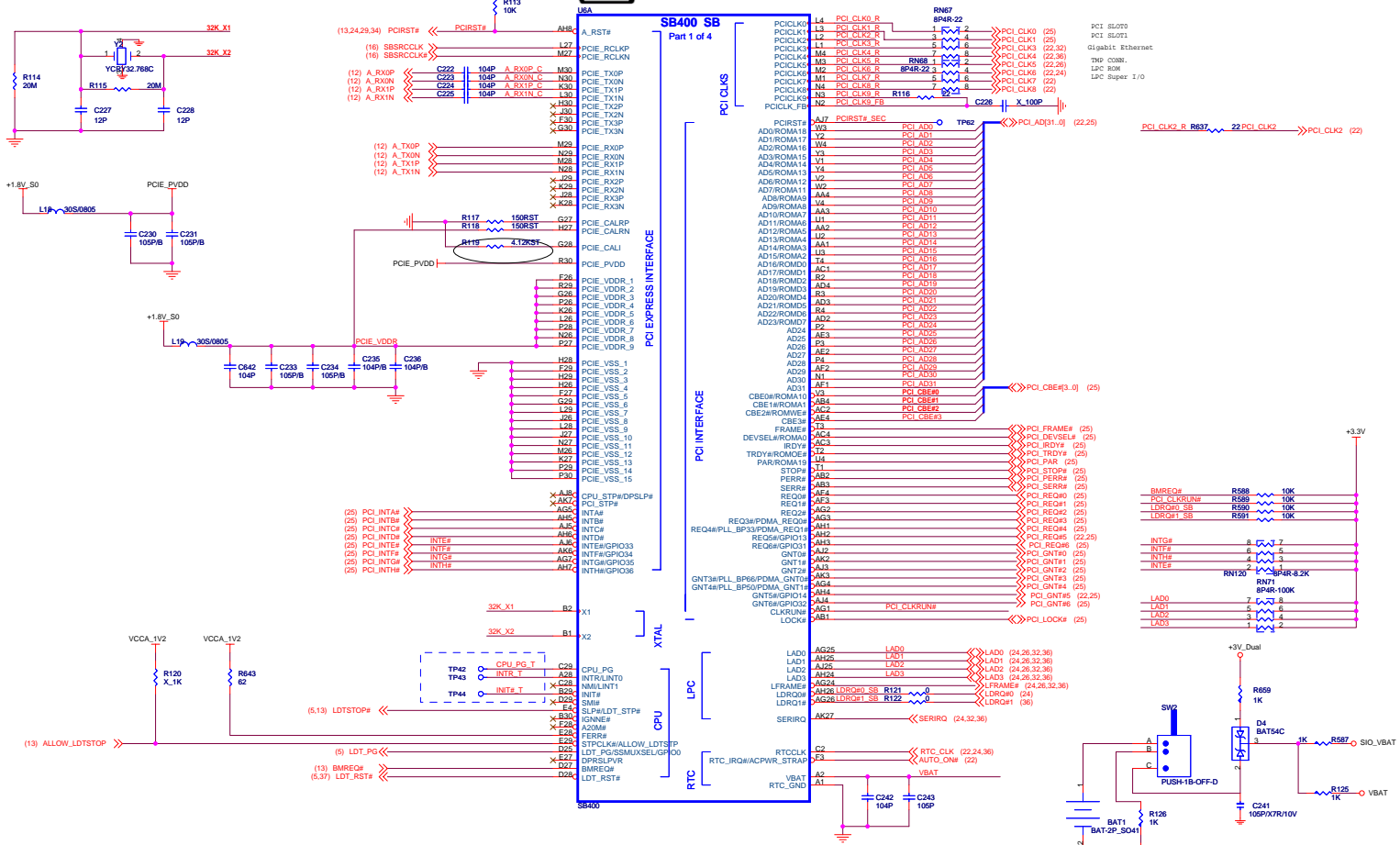
Video Connector



Micro Star Restricted Secret	
Title	17.VGA CON.
Document Number	MS-7059
MICRO STAR INT'L CO. LTD. No. 69, Li-Fu St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	List Revision Date: Wednesday, July 08, 2005 Sheet 17 of 41



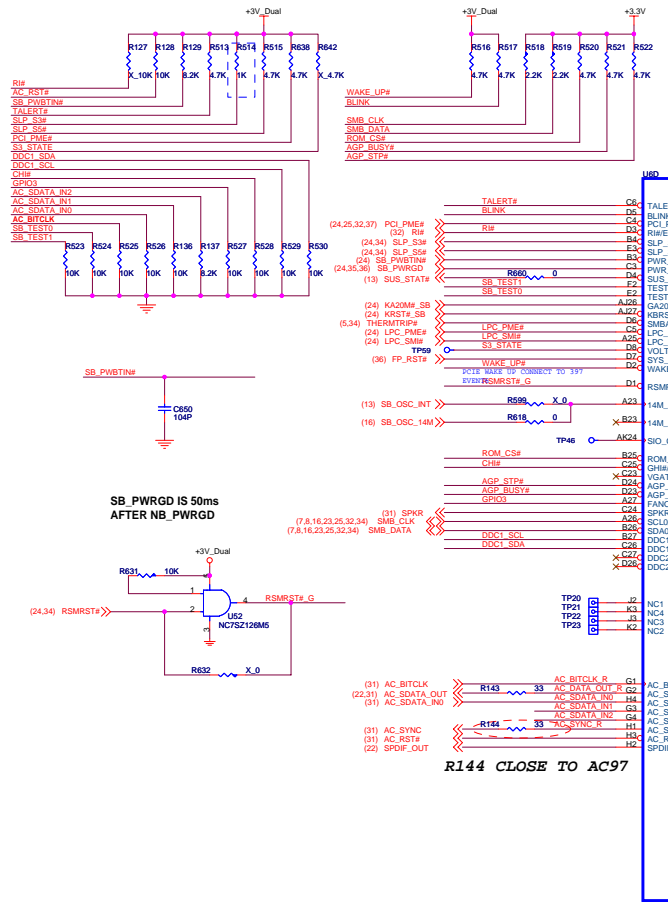
LENGTH OF (PCI_CLK9_R + A_PCI_CLK9_FB) SHOULD MATCH THE AVERAGE OF THE OTHER PCI_CLKS



Note: Overlap common pads where possible for dual-op resistors.

Micro Star Restricted Secret		
Title	Rev	
18.SB400-PCI/CPU/LPC/RTC	130	
Document Number	MS-7050	
MICRO STAR INT'L CO. LTD. No. 69, Li-Shan St., Song-Shue City, Taipei Hsien, Taiwan http://www.msi.com.tw	Issue Revision Date: Wednesday, July 06, 2005	Sheet 18 of 41

NOTE: ONLY USE FUNDAMENTAL MODE CRYSTAL



Part 4 of 4

USB INTERFACE

GPIO

CLK / RST

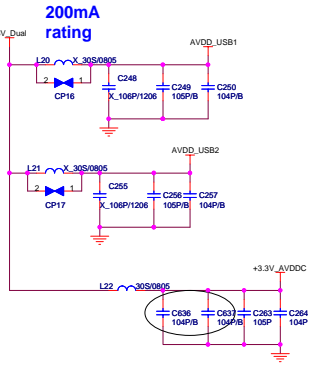
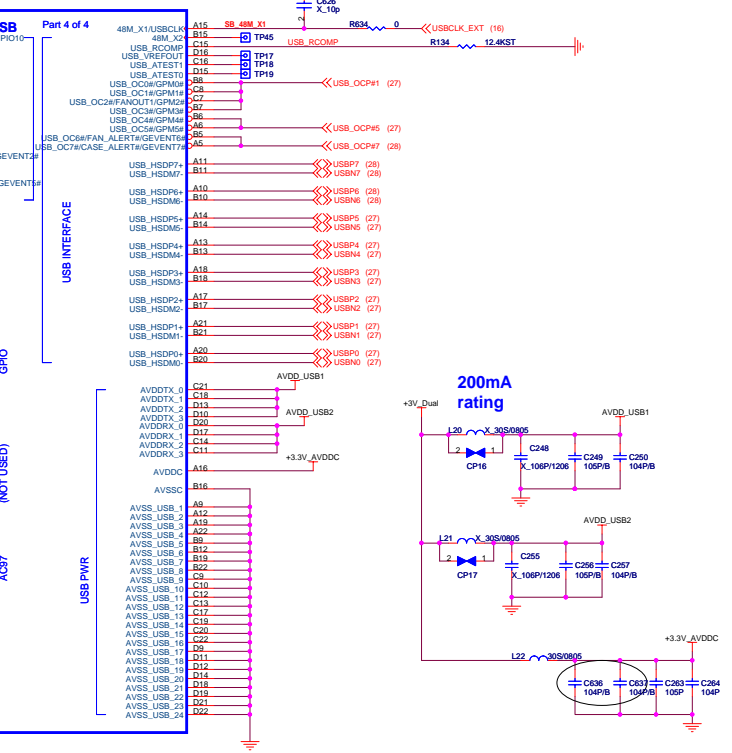
(NOT USED)

AC97

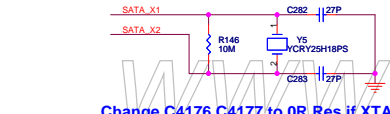
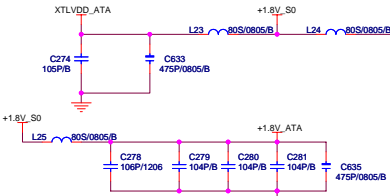
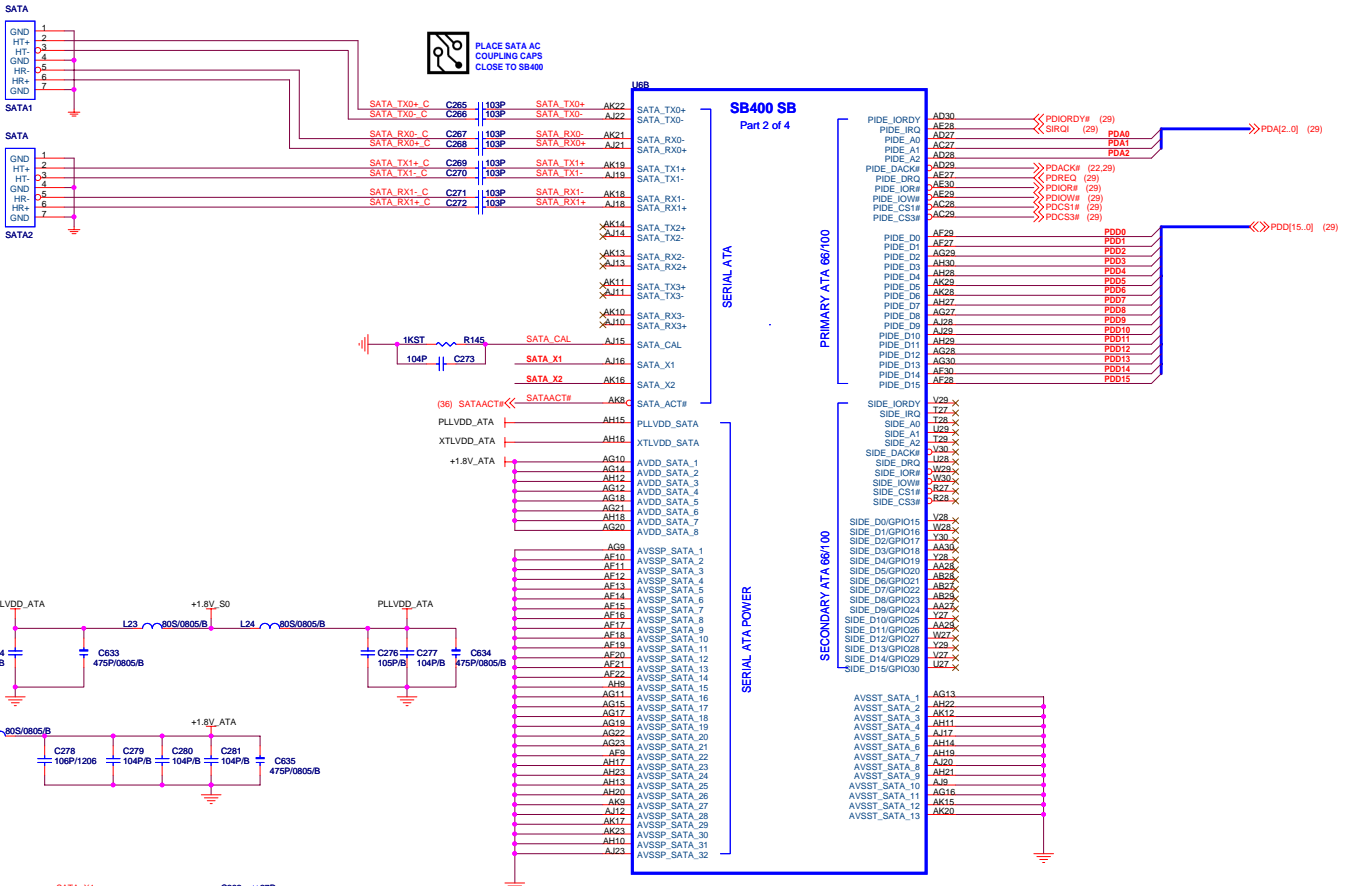
USB PWR

SB400

SB400



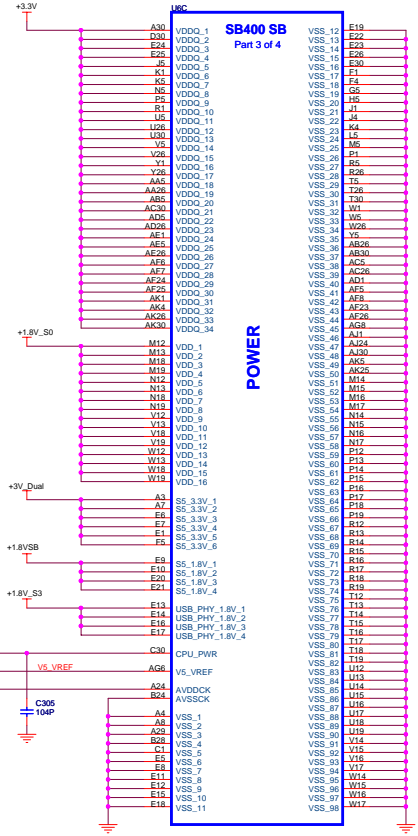
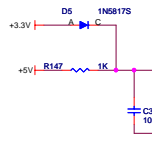
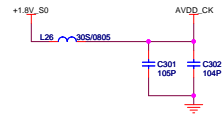
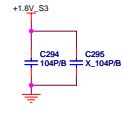
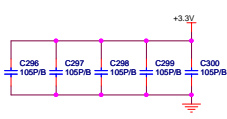
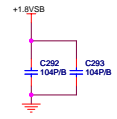
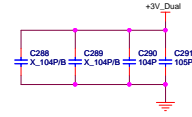
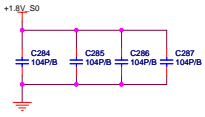
Micro Star Restricted Secret		
Title	19.SB400-ACPI/GPIO/AC97/USB	Rev
Document Number	MS-7650	130
MICRO STAR INT'L CO. LTD. No. 89, Li-Fu St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Rev. Revision Date: Wednesday, July 08, 2005	Sheet 19 of 41



www.kythuovatvinh.com

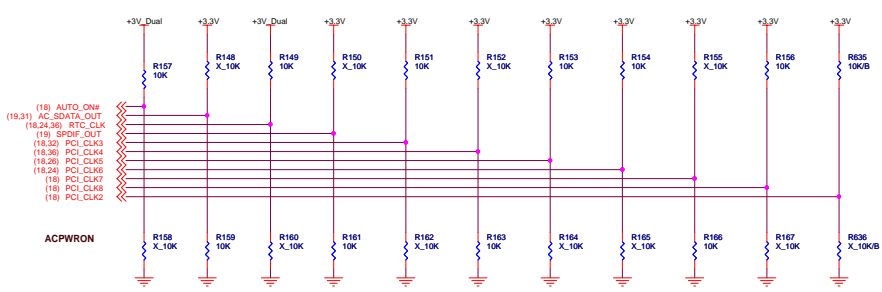
Micro Star Restricted Secret		
Title	20.SB400-SATA/IDE	Rev
Document Number	MS-7050	130
MICRO-STAR INT'L CO. LTD. No. 89, Li-De St. Jung-Hsi City, Taichung, Taiwan		Last Revision Date: Wednesday, July 05, 2005
Sheet		20 of 41

Place all the decoupling caps on this sheet close to SB.



SB400

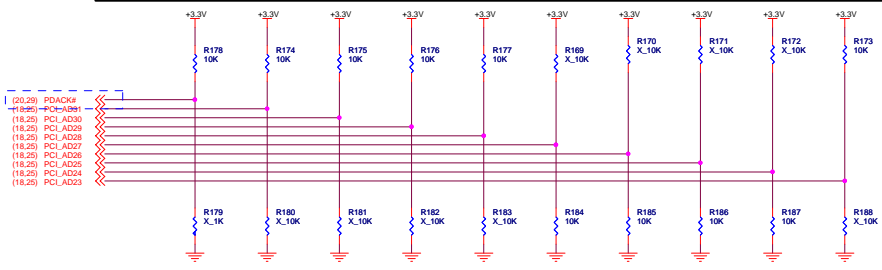
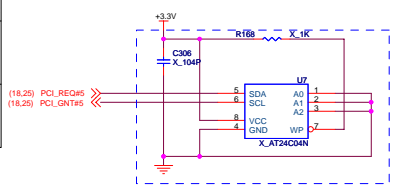
Micro Star Restricted Secret		
Title	21SB400-PWR & DECOUPLING	Rev
		130
Document Number	MS-7050	
MICRO STAR INT'L CO. LTD.	Last Revision Date:	
No. 80, L14, St. Jing-Hsi, City,	Wednesday, July 08, 2005	
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http://www.msi.com.tw		



	ACPWRON	AC_SDOUT	RTC_CLK	SPDIF_OUT	PCI_CLK3	PCI_CLK4	PCI_CLK5	PCI_CLK6	PCI_CLK7	PCI_CLK8	PCI_CLK2
PULL HIGH	MANUAL PWR ON DEFAULT	USE DEBUG STRAPS	INTERNAL RTC DEFAULT	SIO 24MHz	USB PHY PWRDOWN DISABLE DEFAULT	INTERNAL 48MHz PLL DEFAULT	14MHz OSC MODE DEFAULT	CPU VF = K8 DEFAULT	ROM TYPE H.H = PCI ROM H.L = PMC LPC ROM		
PULL LOW	AUTO PWR ON	IGNORE DEBUG STRAPS DEFAULT	EXTERNAL RTC (NOT SUPPORTED W/ IT8712) DEFAULT	SIO 48MHz DEFAULT	USB PHY PWRDOWN ENABLE	EXTERNAL 48MHz	14MHz XTAL MODE	CPU VF = P4	L.H = NORMAL LPC ROM DEFAULT L.L = FWH ROM		

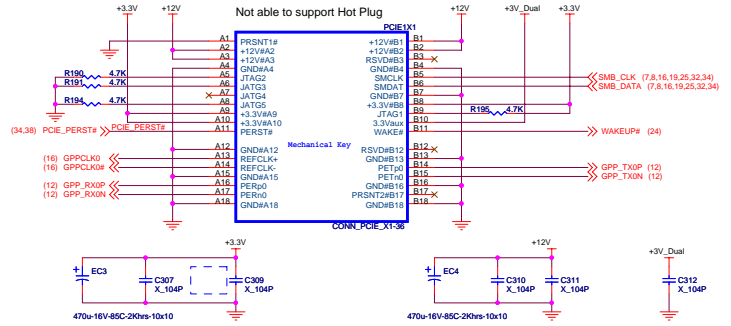
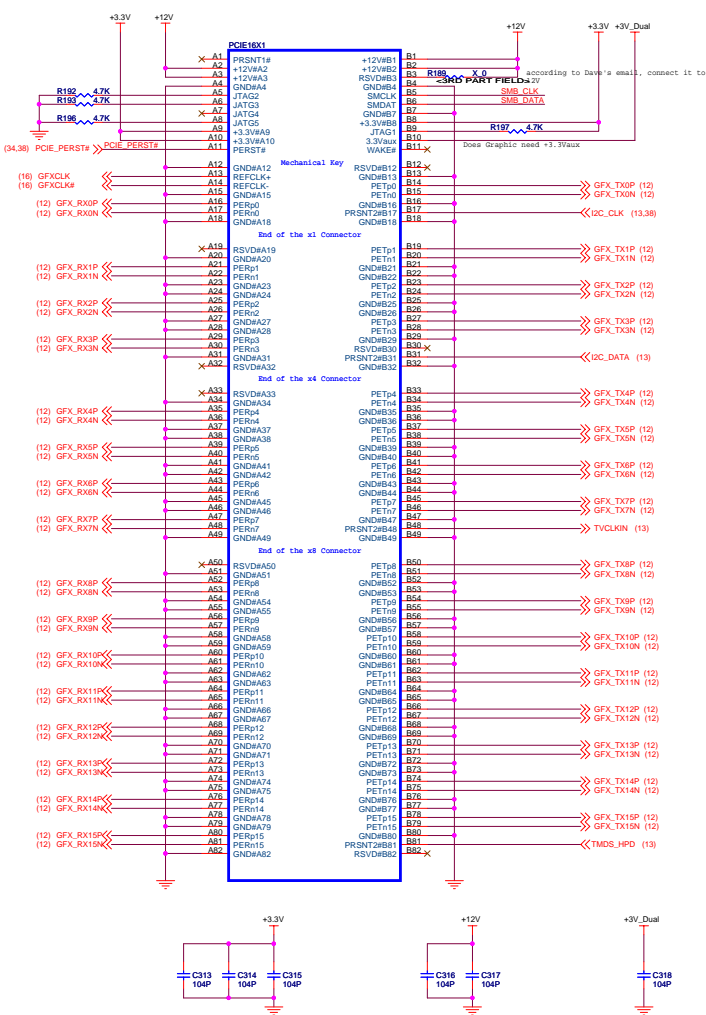
Note: Overlap common pads where possible for dual-op resistors.

SB PCIe EEPROM STRAPS

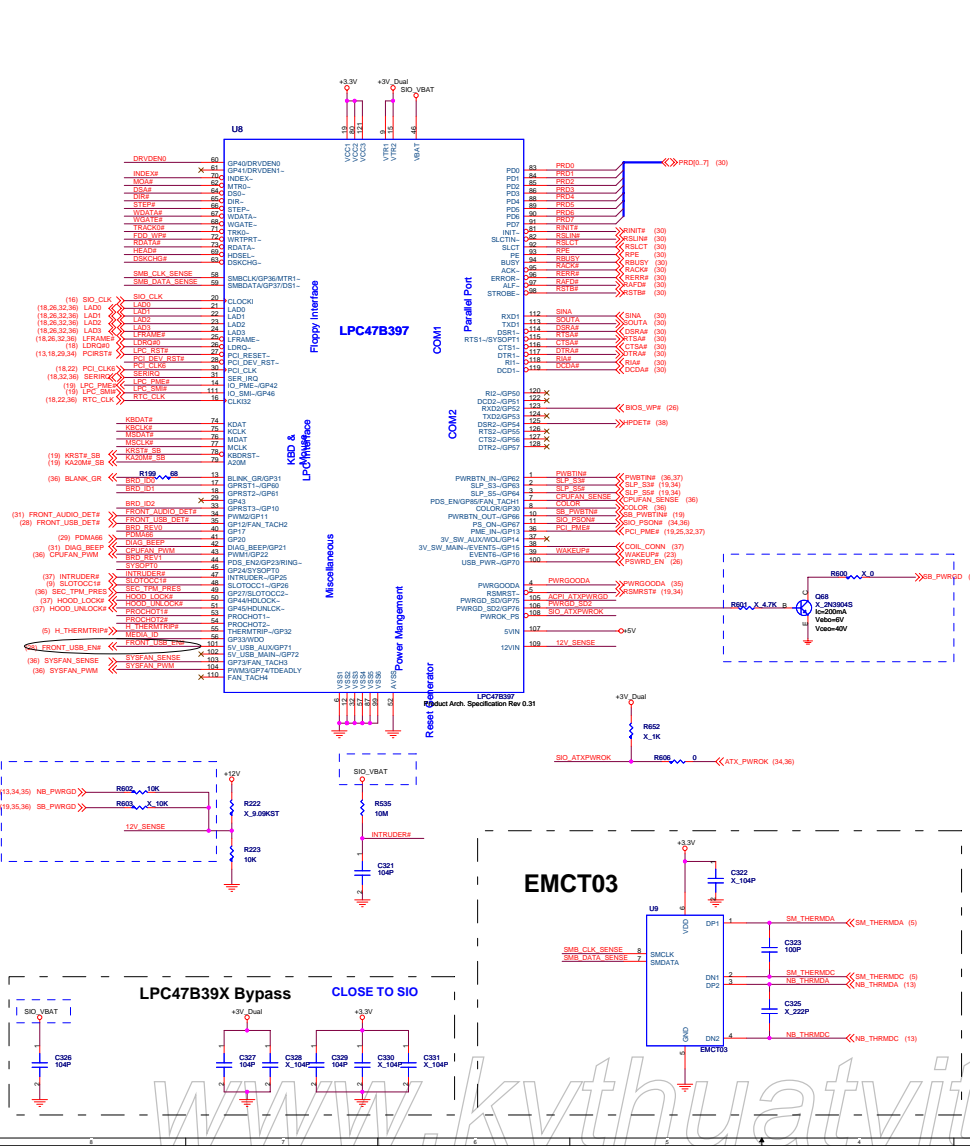


	PDAACK#	PCI_AD31	PCI_AD30	PCI_AD29	PCI_AD28	PCI_AD27	PCI_AD26	PCI_AD25	PCI_AD24	PCI_AD23
PULL HIGH	USE SHORT RESET	PLL CHARGE PUMP CTRL BIT 1 HI DEFAULT	PLL CHARGE PUMP CTRL BIT 0 HI DEFAULT	PLL VCO CTRL BIT 1 HI DEFAULT	PLL VCO CTRL BIT 0 HI DEFAULT	BYPASS PCI PLL	BYPASS ACPI BCLK	BYPASS IDE PLL	USE EEPROM PCIE STRAPS	USE USB PLL DEFAULT
PULL LOW	USE LONG RESET DEFAULT	PLL CHARGE PUMP CTRL BIT 1 LO	PLL CHARGE PUMP CTRL BIT 0 LO	PLL VCO CTRL BIT 1 LO	PLL VCO CTRL BIT 0 LO	USE PCI PLL DEFAULT	USE ACPI BCLK DEFAULT	USE IDE PLL DEFAULT	USE DEFAULT PCIE STRAPS DEFAULT	BYPASS USB PLL

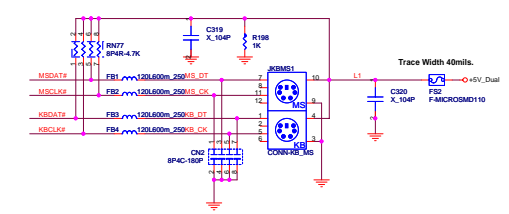
Micro Star Restricted Secret	
Title	22.SB400-STRAPS
Document Number	MS-7050
MICRO STAR INT'L CO. LTD. No. 89, Li Da St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Rev 130
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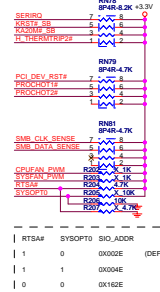
Micro Star Restricted Secret		
Title	23.PCIE CONNECTOR	Rev
Document Number	MS-7050	130
MICRO STAR INT'L CO. LTD.	No. 89, Li Da St., Jung-Hsi City, Taipei Hsein, Taiwan	Sheet
23	Revision Date: Wednesday, July 08, 2005	41
		23 of 41



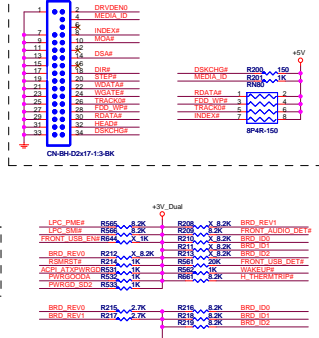
PS2 KEYBOARD & MOUSE CONNECTOR



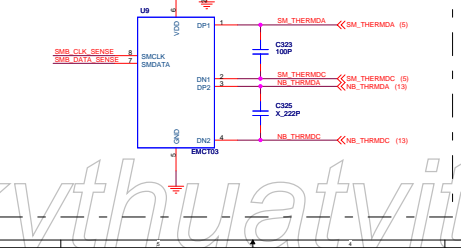
STRAPPING RESISTOR



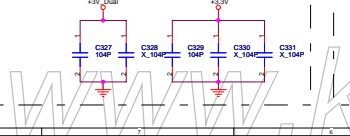
FLOPPY CONNECTOR



EMCT03



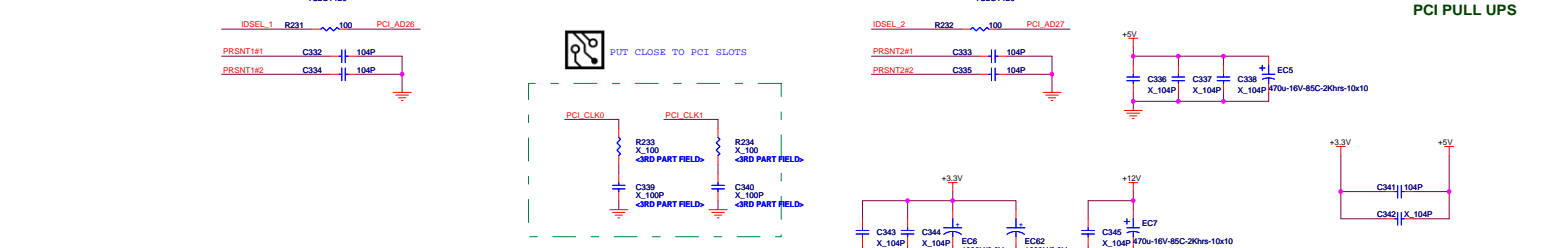
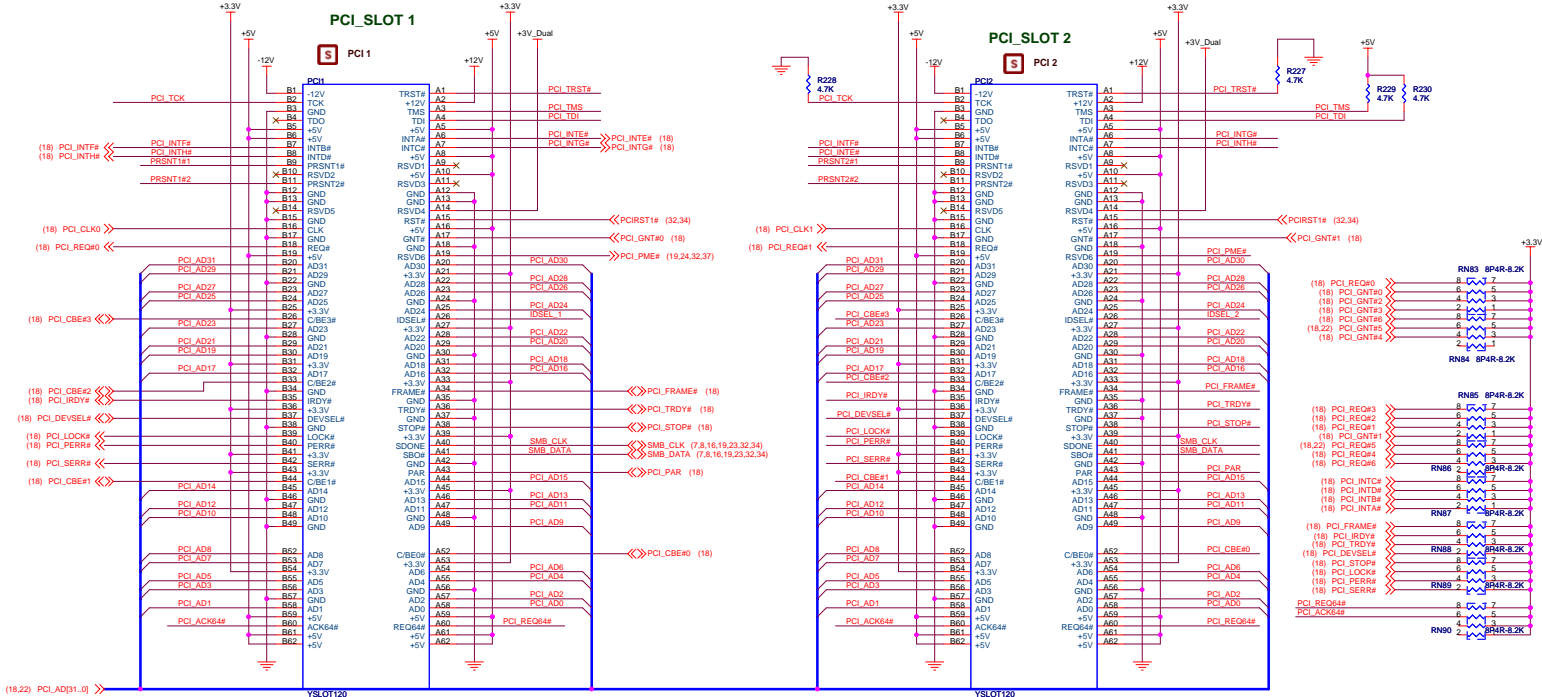
LPC47B39X Bypass



RTSA#	SYSPROT	SI0_ADJDR
1	0	0X00E (DEFAULT)
1	1	0X00E
0	0	0X16E

SLOT0CC1#	R220	SI0_VBAT
		SI0_PSON#

Micro Star Restricted Secret			
Title	Rev		
24_SIO-47M397 & KB/MS	130		
Document Number	MS-7850		
MICROSTAR INT'L CO., LTD.	4th Revision Date		
No. 91, Lida St., Song-Shan City,	Technology		
Taipei, Hsin, Taiwan	July 26, 2005		
http://www.mstar.com.tw	Sheet		
	24	of 41	



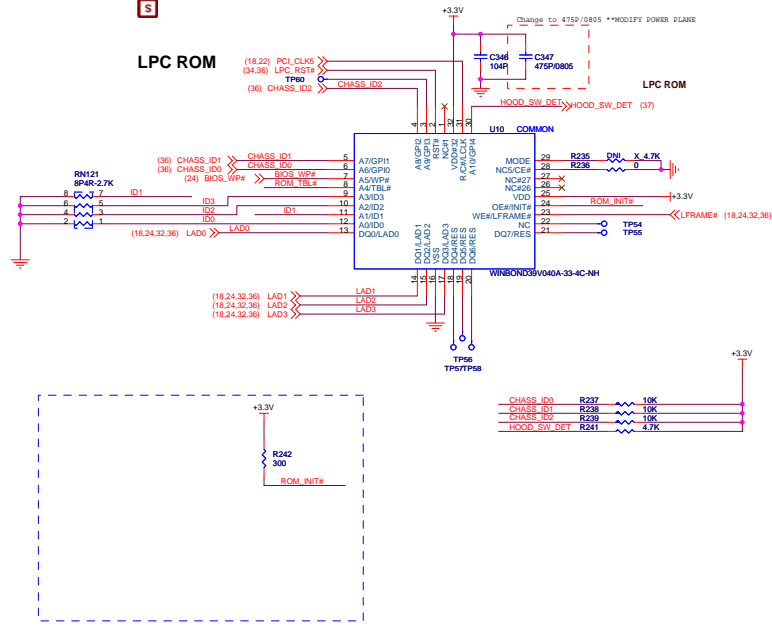
PCI PULL UPS

Signal	Component	Value
PCI_REQ#0	Resistor	8 8P4R-8.2K
PCI_REQ#1	Resistor	8 8P4R-8.2K
PCI_REQ#2	Resistor	8 8P4R-8.2K
PCI_REQ#3	Resistor	8 8P4R-8.2K
PCI_REQ#4	Resistor	8 8P4R-8.2K
PCI_REQ#5	Resistor	8 8P4R-8.2K
PCI_REQ#6	Resistor	8 8P4R-8.2K
PCI_REQ#7	Resistor	8 8P4R-8.2K
PCI_REQ#8	Resistor	8 8P4R-8.2K
PCI_REQ#9	Resistor	8 8P4R-8.2K
PCI_REQ#10	Resistor	8 8P4R-8.2K
PCI_REQ#11	Resistor	8 8P4R-8.2K
PCI_REQ#12	Resistor	8 8P4R-8.2K
PCI_REQ#13	Resistor	8 8P4R-8.2K
PCI_REQ#14	Resistor	8 8P4R-8.2K
PCI_REQ#15	Resistor	8 8P4R-8.2K
PCI_REQ#16	Resistor	8 8P4R-8.2K
PCI_REQ#17	Resistor	8 8P4R-8.2K
PCI_REQ#18	Resistor	8 8P4R-8.2K
PCI_REQ#19	Resistor	8 8P4R-8.2K
PCI_REQ#20	Resistor	8 8P4R-8.2K
PCI_REQ#21	Resistor	8 8P4R-8.2K
PCI_REQ#22	Resistor	8 8P4R-8.2K
PCI_REQ#23	Resistor	8 8P4R-8.2K
PCI_REQ#24	Resistor	8 8P4R-8.2K
PCI_REQ#25	Resistor	8 8P4R-8.2K
PCI_REQ#26	Resistor	8 8P4R-8.2K
PCI_REQ#27	Resistor	8 8P4R-8.2K
PCI_REQ#28	Resistor	8 8P4R-8.2K
PCI_REQ#29	Resistor	8 8P4R-8.2K
PCI_REQ#30	Resistor	8 8P4R-8.2K
PCI_REQ#31	Resistor	8 8P4R-8.2K
PCI_REQ#32	Resistor	8 8P4R-8.2K
PCI_REQ#33	Resistor	8 8P4R-8.2K
PCI_REQ#34	Resistor	8 8P4R-8.2K
PCI_REQ#35	Resistor	8 8P4R-8.2K
PCI_REQ#36	Resistor	8 8P4R-8.2K
PCI_REQ#37	Resistor	8 8P4R-8.2K
PCI_REQ#38	Resistor	8 8P4R-8.2K
PCI_REQ#39	Resistor	8 8P4R-8.2K
PCI_REQ#40	Resistor	8 8P4R-8.2K
PCI_REQ#41	Resistor	8 8P4R-8.2K
PCI_REQ#42	Resistor	8 8P4R-8.2K
PCI_REQ#43	Resistor	8 8P4R-8.2K
PCI_REQ#44	Resistor	8 8P4R-8.2K
PCI_REQ#45	Resistor	8 8P4R-8.2K
PCI_REQ#46	Resistor	8 8P4R-8.2K
PCI_REQ#47	Resistor	8 8P4R-8.2K
PCI_REQ#48	Resistor	8 8P4R-8.2K
PCI_REQ#49	Resistor	8 8P4R-8.2K
PCI_REQ#50	Resistor	8 8P4R-8.2K
PCI_REQ#51	Resistor	8 8P4R-8.2K
PCI_REQ#52	Resistor	8 8P4R-8.2K
PCI_REQ#53	Resistor	8 8P4R-8.2K
PCI_REQ#54	Resistor	8 8P4R-8.2K
PCI_REQ#55	Resistor	8 8P4R-8.2K
PCI_REQ#56	Resistor	8 8P4R-8.2K
PCI_REQ#57	Resistor	8 8P4R-8.2K
PCI_REQ#58	Resistor	8 8P4R-8.2K
PCI_REQ#59	Resistor	8 8P4R-8.2K
PCI_REQ#60	Resistor	8 8P4R-8.2K
PCI_REQ#61	Resistor	8 8P4R-8.2K
PCI_REQ#62	Resistor	8 8P4R-8.2K
PCI_REQ#63	Resistor	8 8P4R-8.2K
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PCI_REQ#68	Resistor	8 8P4R-8.2K
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PCI_REQ#70	Resistor	8 8P4R-8.2K
PCI_REQ#71	Resistor	8 8P4R-8.2K
PCI_REQ#72	Resistor	8 8P4R-8.2K
PCI_REQ#73	Resistor	8 8P4R-8.2K
PCI_REQ#74	Resistor	8 8P4R-8.2K
PCI_REQ#75	Resistor	8 8P4R-8.2K
PCI_REQ#76	Resistor	8 8P4R-8.2K
PCI_REQ#77	Resistor	8 8P4R-8.2K
PCI_REQ#78	Resistor	8 8P4R-8.2K
PCI_REQ#79	Resistor	8 8P4R-8.2K
PCI_REQ#80	Resistor	8 8P4R-8.2K
PCI_REQ#81	Resistor	8 8P4R-8.2K
PCI_REQ#82	Resistor	8 8P4R-8.2K
PCI_REQ#83	Resistor	8 8P4R-8.2K
PCI_REQ#84	Resistor	8 8P4R-8.2K
PCI_REQ#85	Resistor	8 8P4R-8.2K
PCI_REQ#86	Resistor	8 8P4R-8.2K
PCI_REQ#87	Resistor	8 8P4R-8.2K
PCI_REQ#88	Resistor	8 8P4R-8.2K
PCI_REQ#89	Resistor	8 8P4R-8.2K
PCI_REQ#90	Resistor	8 8P4R-8.2K
PCI_REQ#91	Resistor	8 8P4R-8.2K
PCI_REQ#92	Resistor	8 8P4R-8.2K
PCI_REQ#93	Resistor	8 8P4R-8.2K
PCI_REQ#94	Resistor	8 8P4R-8.2K
PCI_REQ#95	Resistor	8 8P4R-8.2K
PCI_REQ#96	Resistor	8 8P4R-8.2K
PCI_REQ#97	Resistor	8 8P4R-8.2K
PCI_REQ#98	Resistor	8 8P4R-8.2K
PCI_REQ#99	Resistor	8 8P4R-8.2K
PCI_REQ#100	Resistor	8 8P4R-8.2K

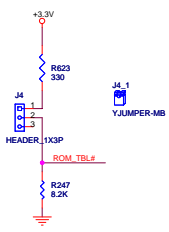
Micro Star Restricted Secret		
Title	25.PCI SLOTS 1 & 2	
Document Number	MS-7650	
MICRO STAR INT'L CO. LTD. No. 89, Lifa St., Jung-Hsi City, Tainan Hsien, Taiwan http://www.msi.com.tw	Rev	130
Sheet	25 of 41	



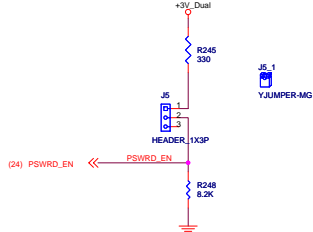
LPC ROM



BOOT BLOCK WRITE ENABLE

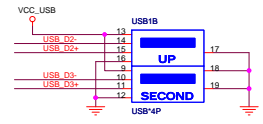
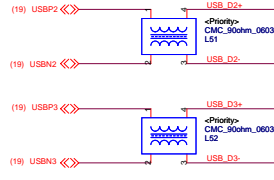
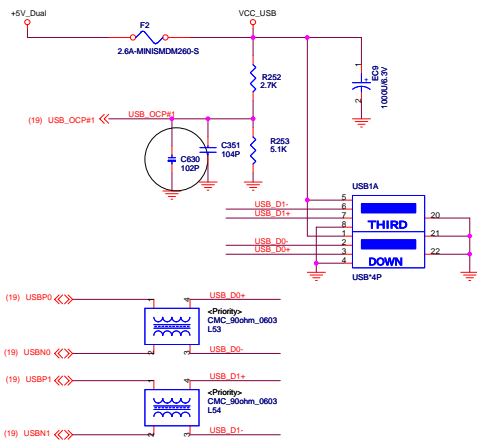
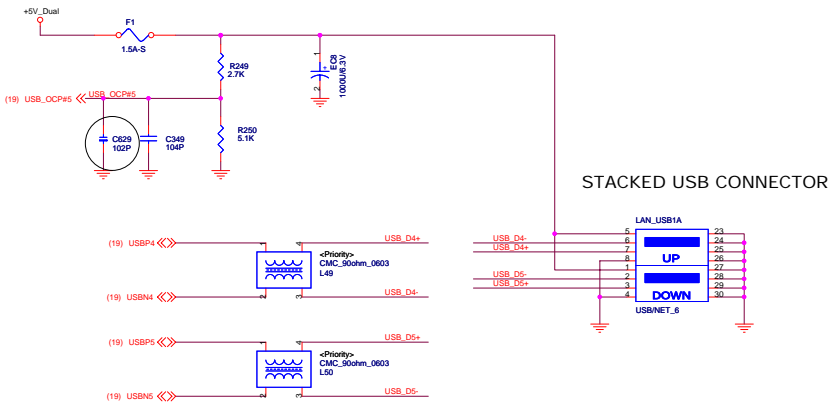


PASSWORD ENABLE

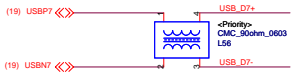
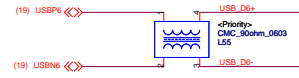
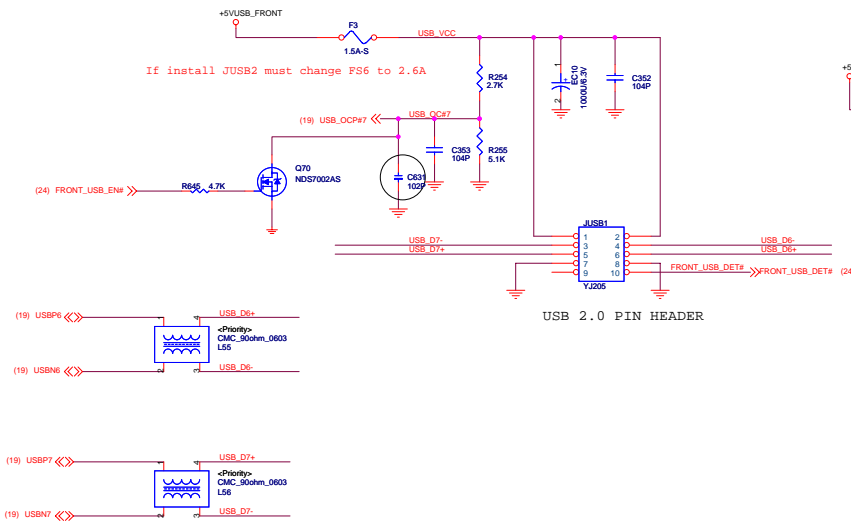


Micro Star Restricted Secret	
Title	26.BIOS ROM
Document Number	MS-7050
MICRO STAR INT'L CO., LTD. No. 69, LiJde St., Jung-Ho City, Tainan Hsiang, Taiwan http://www.msi.com.tw	List Revision Date: Wednesday, July 06, 2005
Sheet	26 of 41

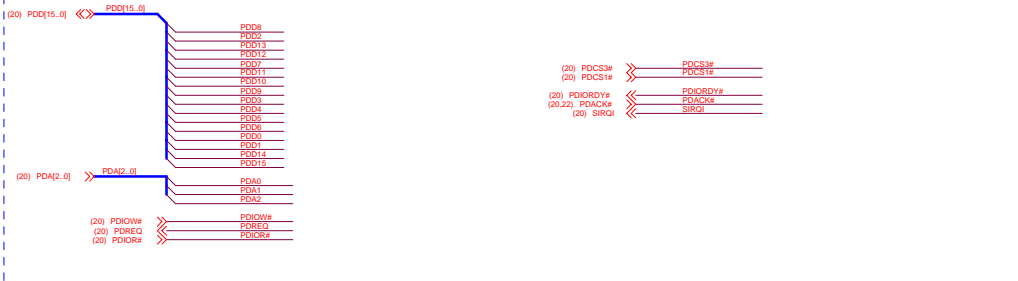
REAR USB PORT



Micro Star Restricted Secret		
Title	27.REAR USB 2.0 PORTS	Rev 130
Document Number	MS-7659	
MICRO STAR INT'L CO. LTD. No. 69, Li-Fu St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	List Revision Date: Wednesday, July 08, 2005	Sheet 27 of 41

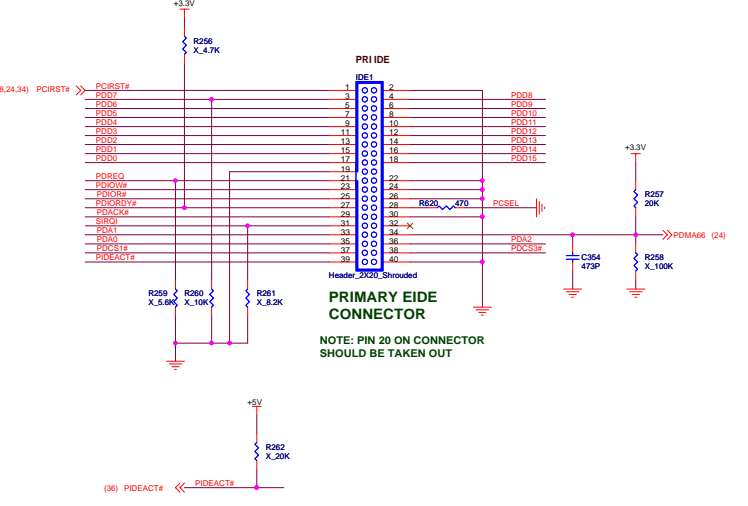


Micro Star Restricted Secret		
Title	28.FRONT USB 2.0 PORTS	Rev
Document Number	MS-7050	130
MICRO STAR INT'L CO., LTD. No. 69, LiJde St., Jung-Ho City, Tainan Hsiang, Taiwan http://www.msi.com.tw	Last Revision Date: Wednesday, July 06, 2005	Sheet
		28 of 41



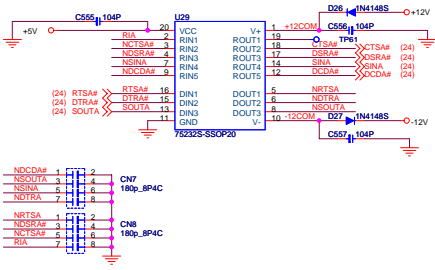
MATCH WHOLE IDE LINES (BEFORE AND AFTER DAMPING RESISTORS) WITHIN 0.5"

All series termination should be placed close to IDE connector.

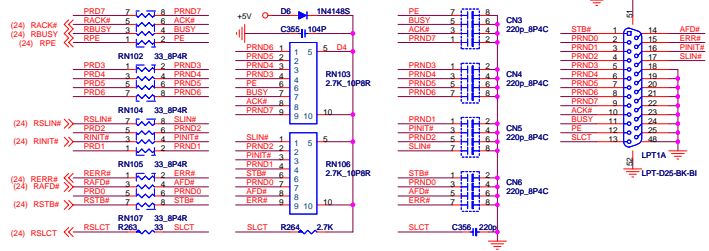


<i>Micro Star Restricted Secret</i>		
Title	29.ATA 66/100 EIDE & CD-ROM	Rev 130
Document Number	MS-7050	
MICRO STAR INT'L CO. LTD. No. 69, Li Da St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Last Revision Date: Wednesday, July 08, 2005	Sheet 29 of 41

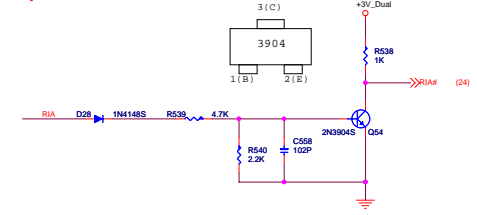
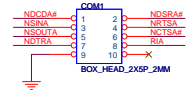
SERIAL PORT 1



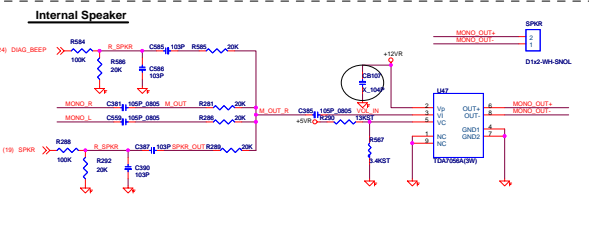
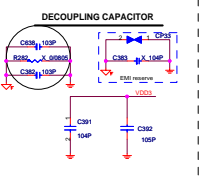
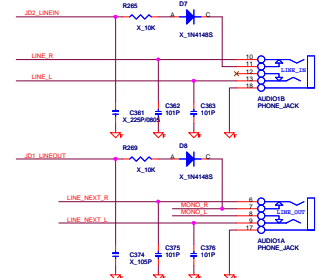
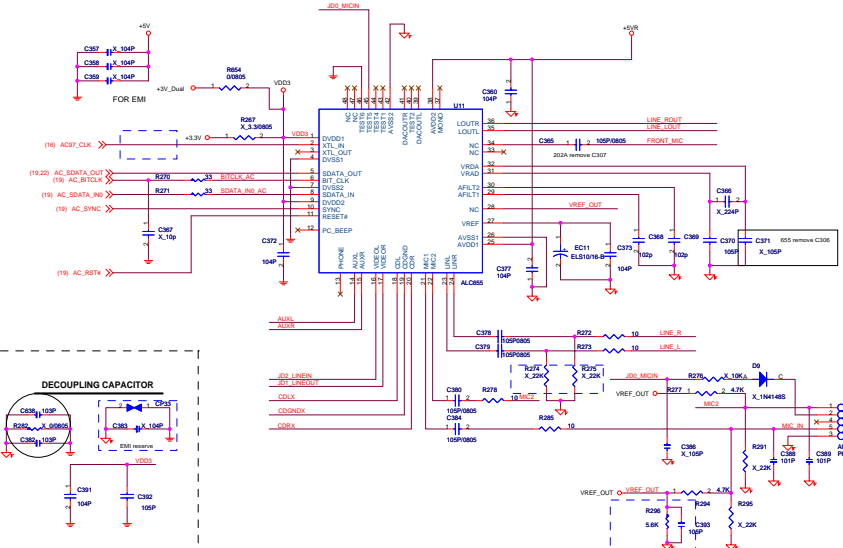
PARALLAL PORT



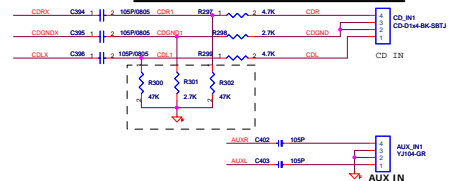
(24) PRD0..7



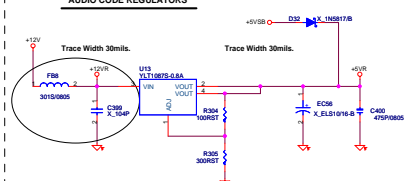
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Title	30.COM PORT & LPT
Document Number	MS-7050
MICRO STAR INT'L CO. LTD. No. 69, Li Da St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	List Revision Date: Wednesday, July 08, 2005 Sheet 30 of 41



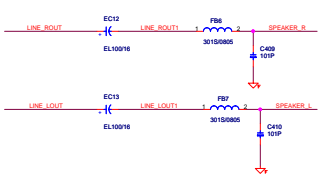
AUDIO CODE CD / AUX / MODEM IN HEADERS



AUDIO CODE REGULATORS



SPEAKER OUT CIRCUIT



FOR MSI INTERNAL HEADER

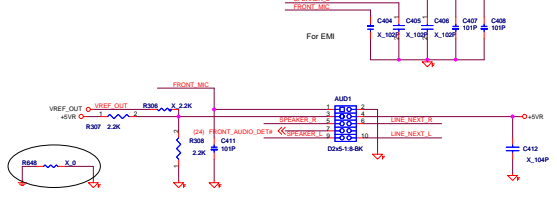


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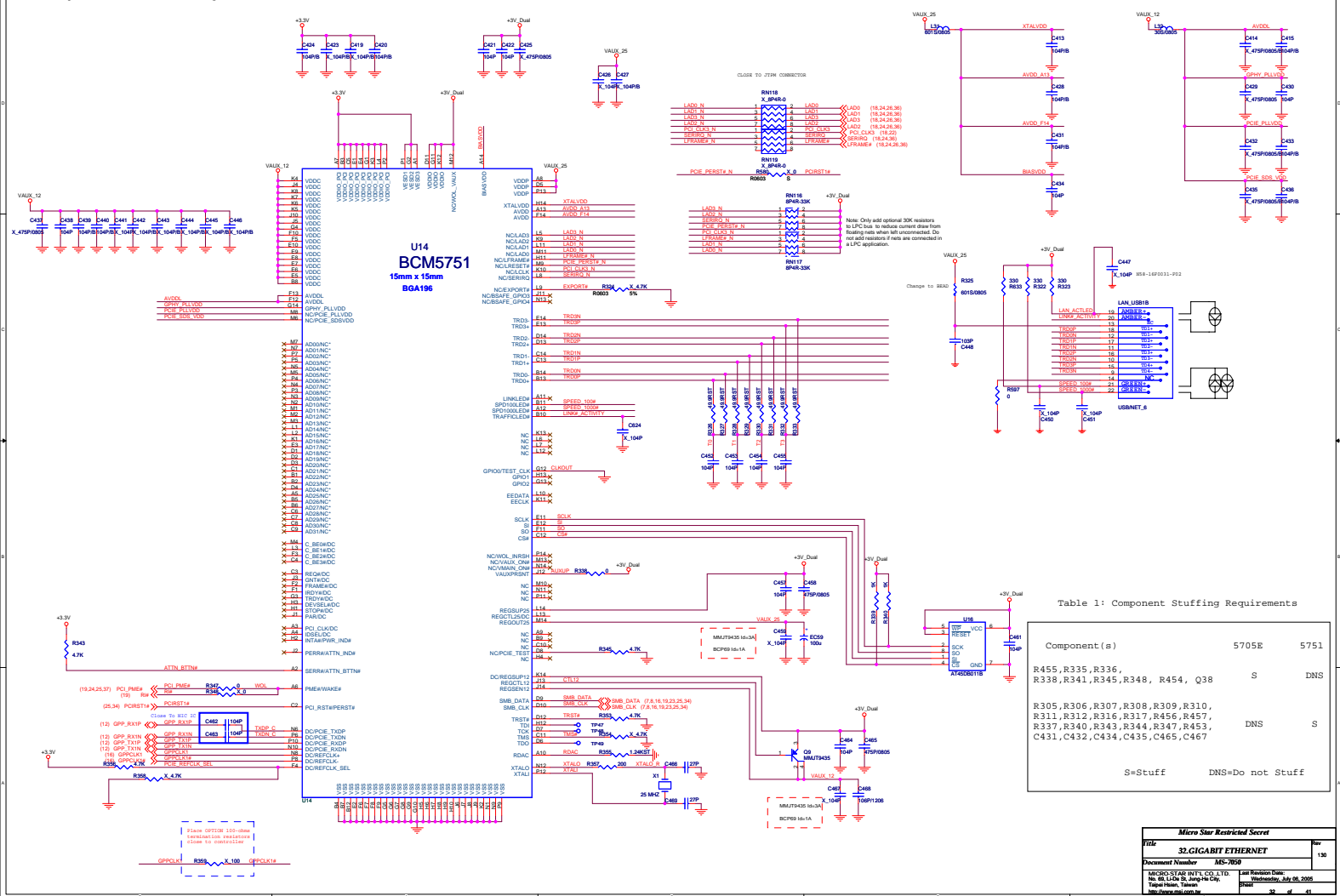


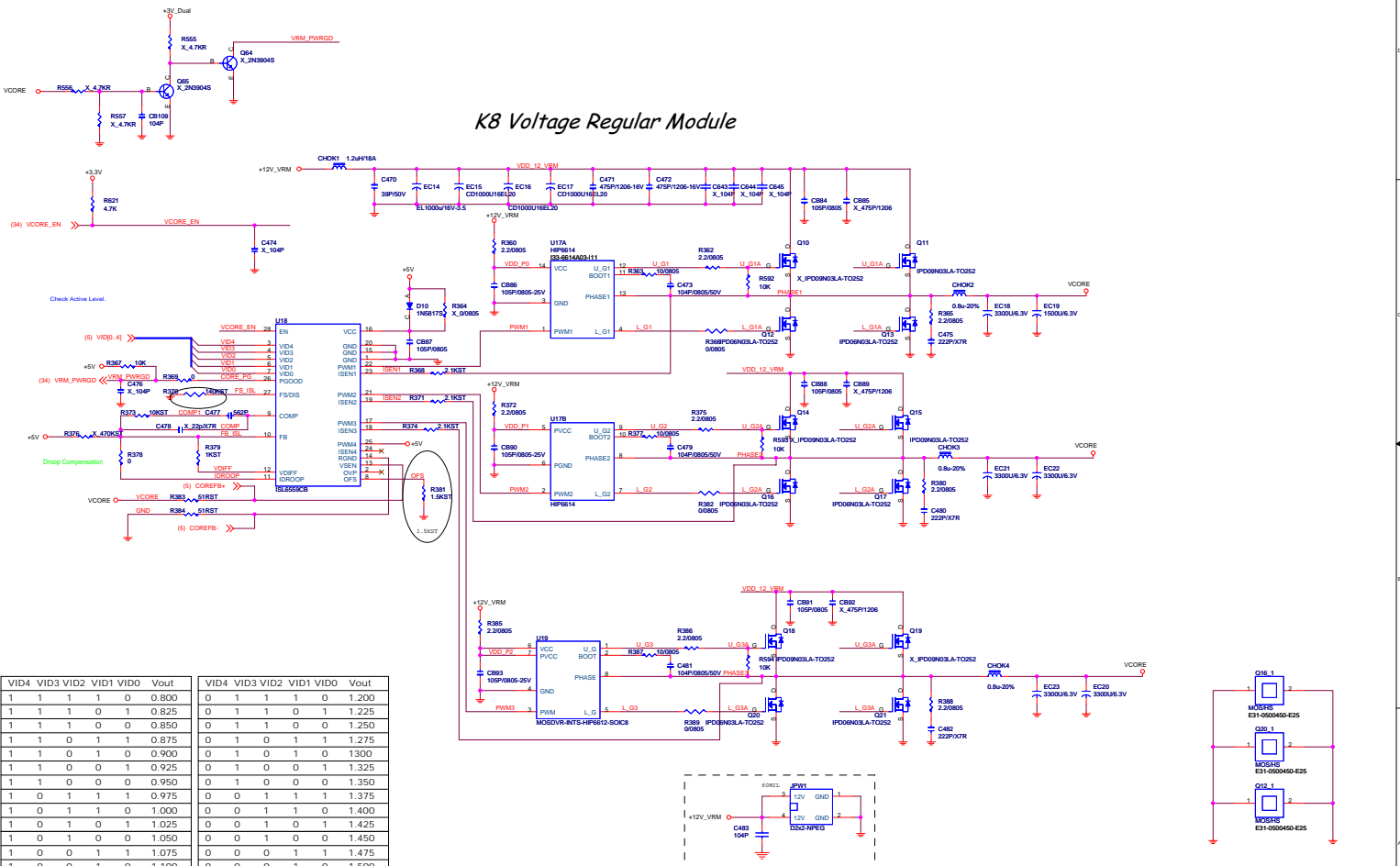
Table 1: Component Stuffing Requirements

Component(s)	5705E	5751
R455, R335, R336, R338, R341, R345, R348, R454, Q38	S	DNS
R305, R306, R307, R308, R309, R310, R311, R312, R316, R317, R456, R457, R337, R340, R343, R344, R347, R458, C431, C432, C434, C435, C465, C467	DNS	S
S=Stuff DNS=Do not Stuff		

Micro Star Restricted Secret
Title: 32 GIGABIT ETHERNET Rev: 120
Document Number: MS-7656
MICRO STAR ELECTRONICS CO., LTD. Issue Revision Date: July 08, 2005
No. 85, Li-Shan Rd., Chung-Shan City, Taipei, Taiwan, R.O.C. Email: sales@msi.com.tw



K8 Voltage Regular Module

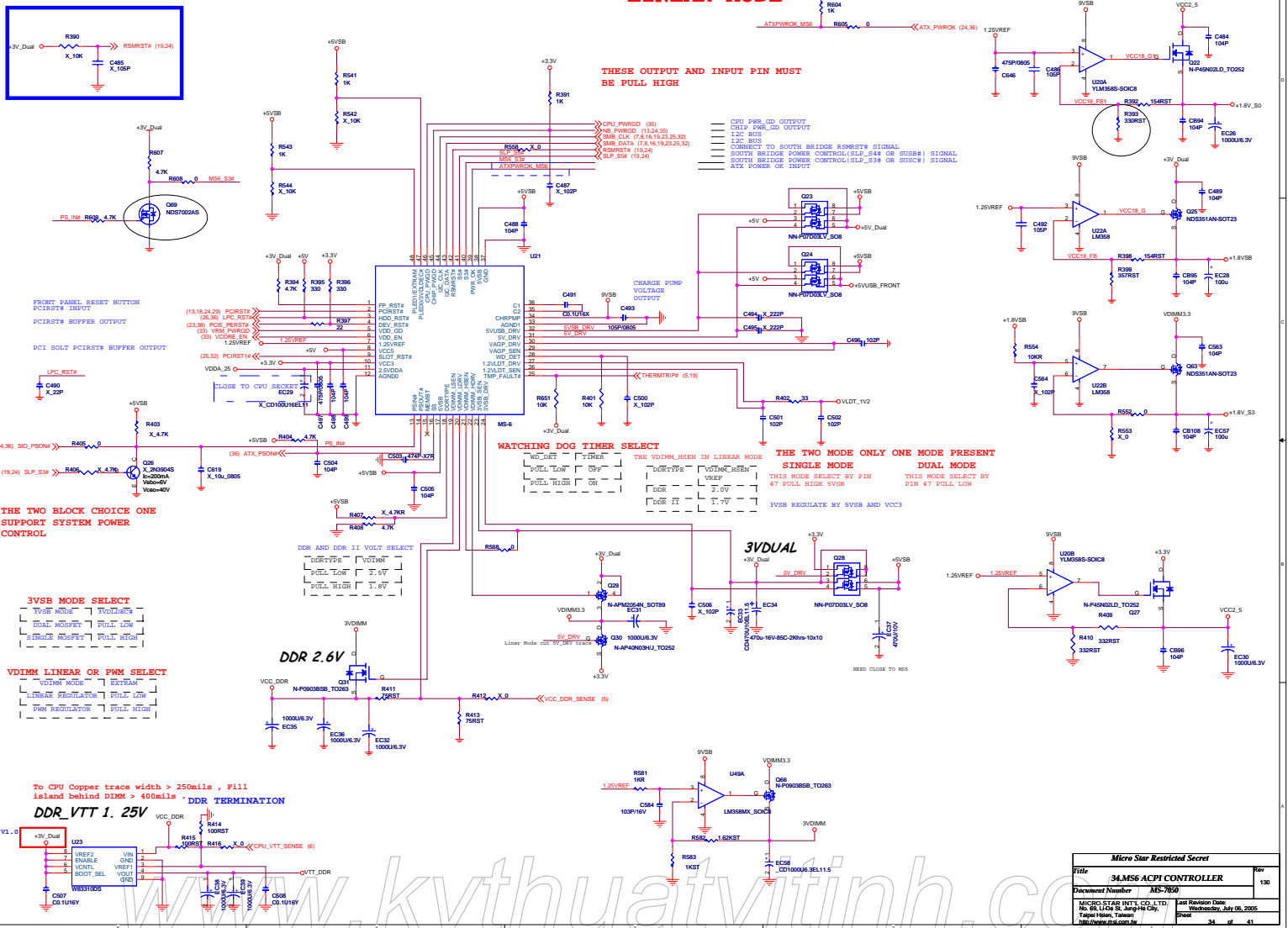


VID4	VID3	VID2	VID1	VID0	Vout
1	1	1	1	0	0.800
1	1	1	0	1	0.825
1	1	1	0	0	0.850
1	1	0	1	1	0.875
1	1	0	1	0	0.900
1	1	0	0	1	0.925
1	1	0	0	0	0.950
1	0	1	1	1	0.975
1	0	1	1	0	1.000
1	0	1	0	1	1.025
1	0	1	0	0	1.050
1	0	0	1	1	1.075
1	0	0	1	0	1.100
1	0	0	0	1	1.125
1	0	0	0	0	1.150
0	1	1	1	1	1.175
0	1	1	1	1	Shutdown

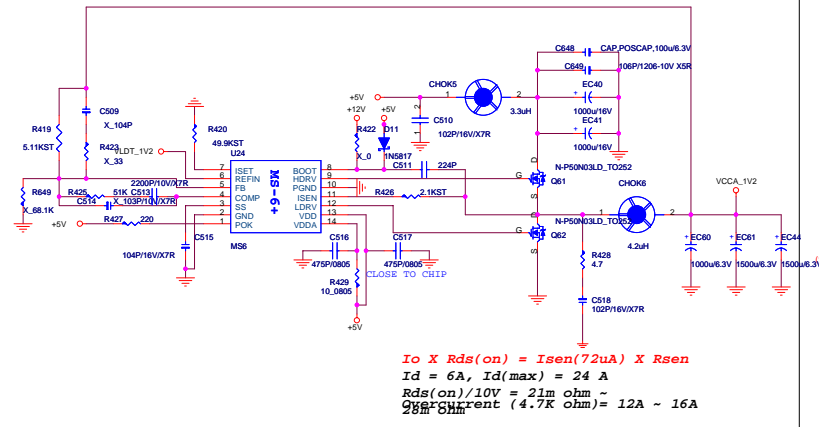
Micro Star Restricted Secret		
Title	33_DESKTOP_ATHLON64_PWR	Rev 130
Document Number	MS-7850	
MICROSTAR INT'L CO., LTD. No. 96, Liu-Lue St., Song-Shan City, Tapei Hsien, Taiwan	Alt Revision Date: Technology, July 08, 2005	Sheet 33 of 41

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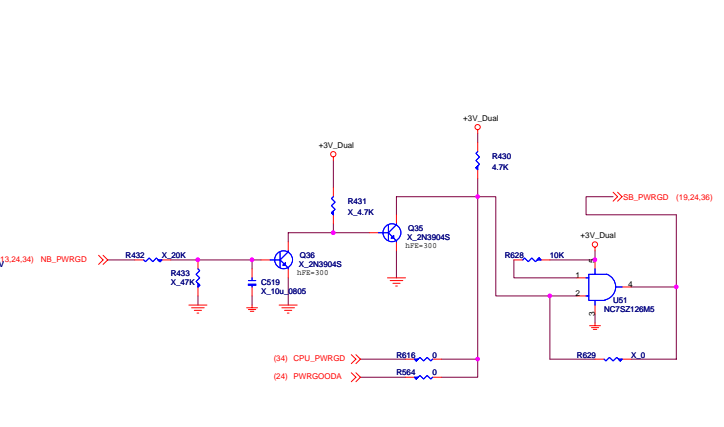
LINEAR MODE



+1.2V POWER

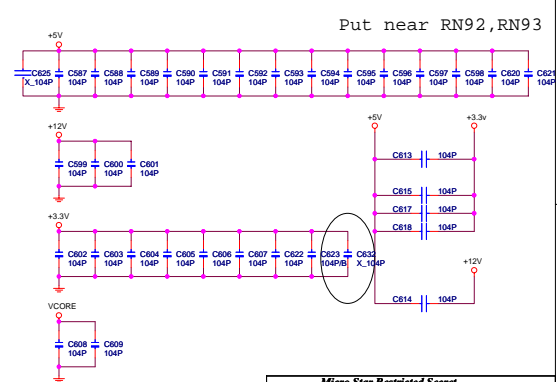


$I_o \times R_{ds(on)} = I_{sen}(72\mu A) \times R_{sen}$
 $I_d = 6A, I_d(max) = 24A$
 $R_{ds(on)}/10V = 21m\ \Omega$
 $Q_{max\ current} (4.7K\ \Omega) = 12A \sim 16A$
 $28m\ \Omega$



(34) CPU_PWRGD
 (24) PWRGOODA

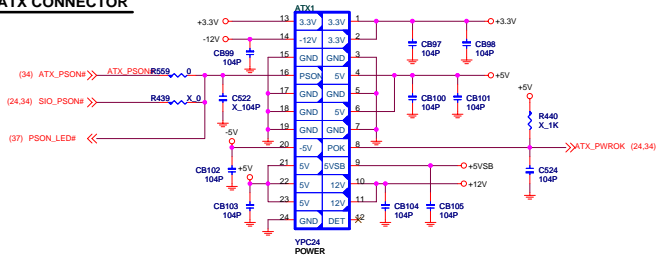
EMI DECOUPLING CAP.



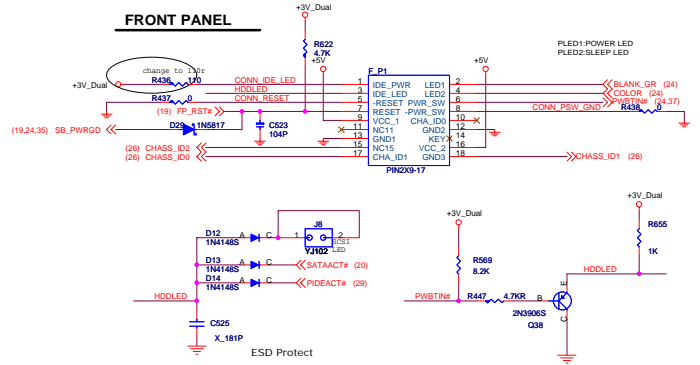
Micro Star Restricted Secret

Title	35. POWER REGULATOR	Rev	130
Document Number	MS-7050		
MICRO STAR INT'L CO. LTD.	No. 89, Li-Fu St., Jung-Hsi City, Taipei Hsien, Taiwan	Issue Revision Date	Wednesday, July 08, 2005
		Sheet	35 of 41

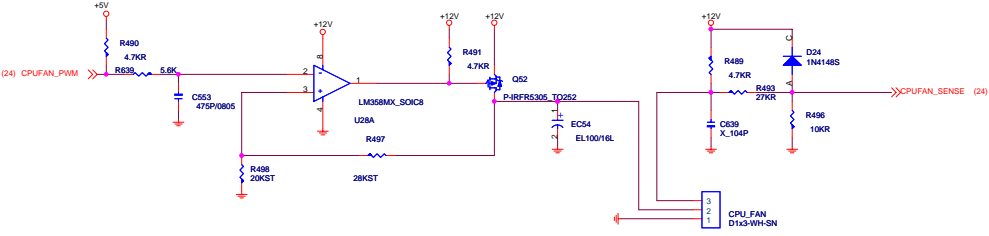
ATX CONNECTOR



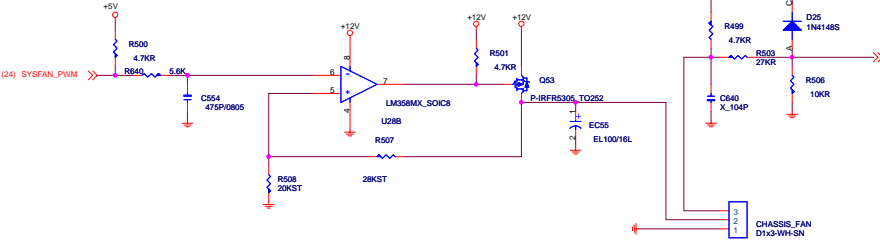
FRONT PANEL



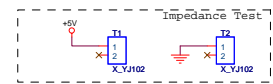
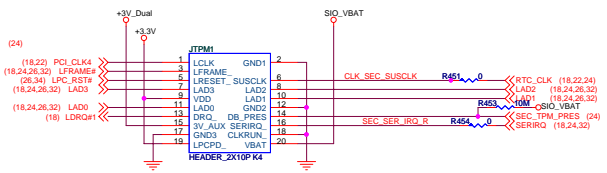
CPU FAN



SYSTEM FAN

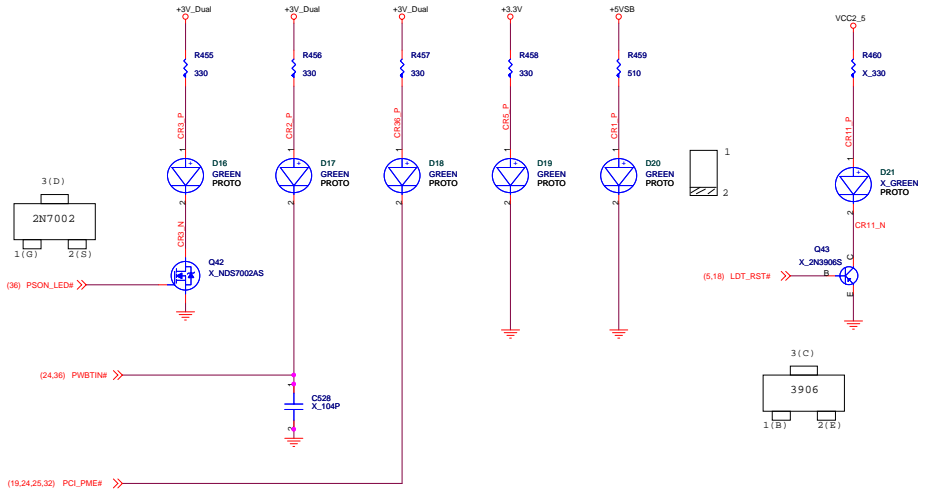


TPM CONNECTOR

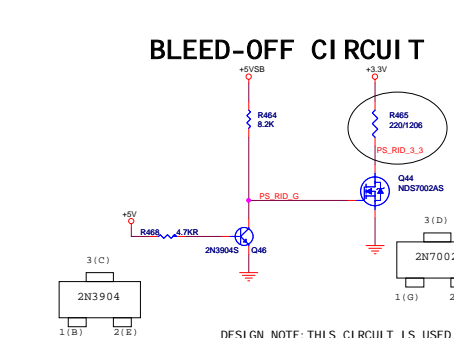
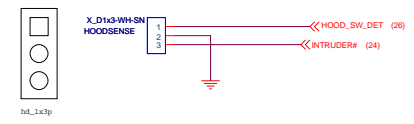


Micro Star Restricted Secret			
Title	36.ATX CONN & POWER	Rev	130
Document Number	MS-7050		
MICRO STAR INT'L CO. LTD. No. 69, Li-Fu St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Rev. Revision Date Wednesday, July 09, 2005	Sheet	38 of 41

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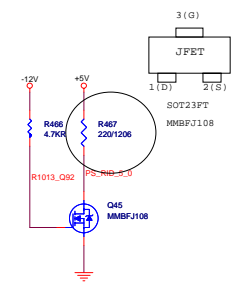


HOOD SENSE CIRCUIT

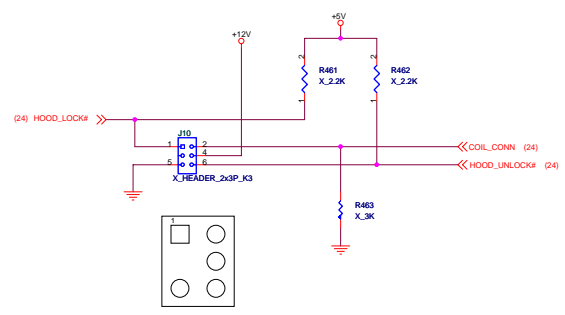


BLEED-OFF CIRCUIT

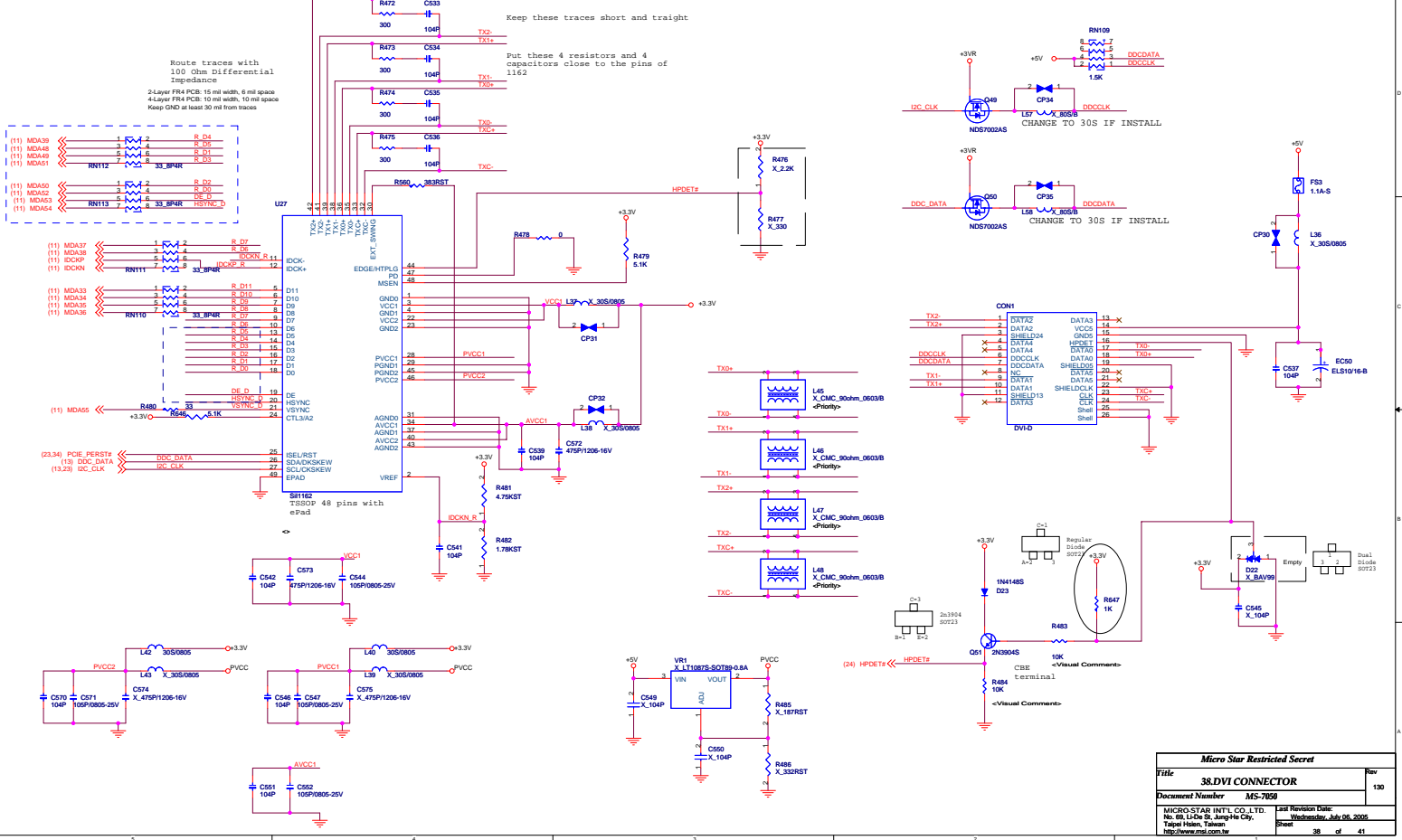
DESIGN NOTE: THIS CIRCUIT IS USED TO BLEED OFF 5.0V & 3.3V



HOOD LOCK CIRCUIT



Micro Star Restricted Secret		
Title	37.BLEED OFF/LED/HOOD SENCE	Rev 130
Document Number	MS-7050	
MICRO STAR INT'L CO. LTD. No. 89, Li Da St., Jung-Hsi City, Taipei Hsien, Taiwan http://www.msi.com.tw	Rev. Revision Date: Wednesday, July 09, 2005	Sheet 37 of 41



Micro Star Restricted Secret	
File	Rev
38.DVI CONNECTOR	130
Document Number	MS-7650
MICRO STAR INT'L. CO. LTD.	Last Revision Date:
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Taipei Hsien, Taiwan	Sheet
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MS-7050 Revision:110

Update for 0831

- 1.Swap IDCKN AND IDCKP P38
- 2.U27 PIN11 IDCK- Connect to U27 PIN2(DIVVREF) P38
- 3.U27 PIN24 Pull-up to +3.3V(R646) P38
- 4.DVI Hot plug add one pull-up resistor (R647) P38
- 5.Install R89,R90,R91 for ICS clock GENI P16
- 6.Install L23,L25 for SATA unstable issue P20
- 7.AVDD change to +3.3V P13
- 8.Isolation.NB.core.power.from.VCCA_1V2 (Add L49,L50).P14
- 9.PCIE CAL. resistor R119 change to 5.49K Ohm P18
- 10.Add C629,C630,C631,CP34,CP33 Un-pop R648 C399,CB107 FOR EMI
- 11.Change +1.8V_S0 to 1.9V-->R393 change to 287 Ohm P34
12. Reserve R649 for VCCA_1V2 change to 1.3V P35

Update for 1004

- 1.Add R651 and R650 for IDCKN option
- 2.Add C633,C634,C635 for shutdown test SATA HD drop issue
- 3.Add C636,C637,C638,C639,C640,C362 for EMI issue
- 4.Remove R545,R492,R546,R549,R547,R502,R548,R505,Q57,Q59 for 4-Wire FAN change to 3-Wire FAN
- 5.P-34 U21_pin25 the net name "H_THERMTRIP#" change to "THERMTRIP#", and add R651 10k pull-up +3Vdual.
6. P-19 U60.D6 "H_THERMTRIP#" change to "THERMTRIP#"
- 7.P-5 To add R650 0 ohm connect "H_THERMTRIP#" and "THERMTRIP#"
- 8.Change C208,C209 to 22P for ICS Clock Gen.
- 9.Install Q70, R645 for Front USB disable
- 10.Add C642 for PCIE_VDDR
- 11.Remove C229,EC10 no used Cap.
- 12.Add C641 on LDT_RST# for EMI issue
- 13.PWM HS connect to GND
- 14.Add C643-C645 for EMI issue
15. Add USB comm. chock L49-L56
- 16.USB Cal. resistor change to 12.4K 1%
- 17.Install C273 to 0.1uF
- 18.Change C323 to 100pF
- 19.Install C492,C486,C646(layout has not change)
- 20.R436 change to 110 Ohm
- 21.RN109 change to 1K Ohm
- 22.Install C636,C637,C647 for EMI issue
- 23.Remove R606 for ACPI_ATXPWRGD no used trace
- 24.Remove CP5,CP7 install L6,L8 for RGB noise issue
- 25.Change L4,L6,L7,L8,L9 to 240 Ohm Bead for VGA noise issue
- 26.Change C231 to 1uF/0603 for PCIE_PVDD stable
- 27.Install C278 to 10uF/1206 for SATA detection issue
- 28.Install D4 for SIO_VBAT standby power
- 29.Change R393 to 330 Ohm for SB core power down to 1.83V
- 30.Add R652,R606 for SIO_ATXPWROK isolation
- 31.Add CP34,CP35 for EMI issue
- 32.Install U4,U5,R107 and remove R110,R112for HSYNC,VSYNCR signal quality issue
- 33.Change J4_1 color to Black

Update for manufacture notice change to BOM

- 1.R370 change to 140K Ohm
- 2.R465,R467 change to 220 Ohm
- 3.DDR terminator change to 50 Ohm (include RN10,RN11,RN12,RN13,RN14,RN15,RN16,RN17,RN18,RN19,RN20,RN21,RN22,RN23,RN25,RN27,RN28,RN29,RN30,RN31,RN32,RN33,RN34,RN6,RN7,RN8,RN9,RN35,RN36,RN37,RN38,RN39,RN40,RN41,RN42,RN43,RN44,RN45,RN46,RN47,RN48,RN49,RN50,RN51,RN52,RN54,RN56,RN57,RN58,RN59,RN60,RN61,RN62,RN63)
- 4.Remove C641,Q43,D21,R460 and change RN115 to 680 Ohm RN for 9 LED blinking issue
- 5.Install L49-L56 for EMI issue
- 6.R411,R413 change to 75 Ohm for MS6 update

UPDATE FOR X7

- 1.Change new type clear CMOS button
- 2.Added RN121 for ROM ID strapping
- 3.Change RN109 to 1.5K Ohm
- 4.Added D32 for audio pop issue
- 5.Change D20 pull-high to +5VSB
- 6.Added R653 for DDC_DATA pull-high
- 7.Reserve C648,C649 for HSYNC jitter issue
- 8.Remove CP26 added R654 for audio pop issue
- 9.Added R655 for HDD LED issue
- 10.Added U63 and R656 for LDT_RST# rising time
- 11.Non-populate SW1 and R111
- 12.L15,L16,L17 change to 100nH and C214,C216,C219 change to 4.7PF

Update for 1117

- 1.Added R657,R658 for VBAT optional circuit
- 2.PCI slot2 PIN.A6 connect to PCI_INT# and PIN.B7 connect to PCI_INT#

Update for 1123

- 1.Non-populate D32 and R654 for Audio signal leakage issue
- 2.Non-populate C648 and C649
- 3.Non-populate R658 and populate R657 for VBAT option circuit
- 4.Non-populate C100,C101 for ATI_PA_RS480F1 Docu.
- 5.Change R33,R35 to 61.9 Ohm for ATI_PA_RS480F1 Docu.
- 6.Added R660 for ATI_PA_RS400G1 Docu.
- 7.Added R659 1K Ohm resistor for battery charge issue

Update for 1202

- 3.Remove R658 and R657 for VBAT option circuit

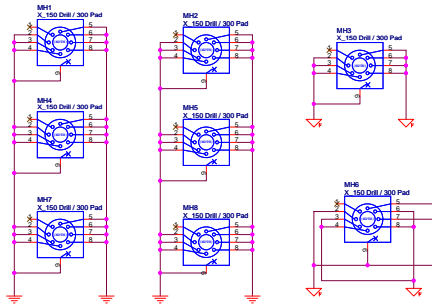
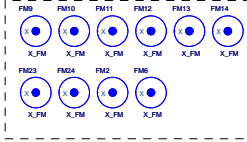
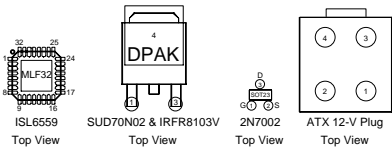
Update for 050117

- 1.SB_PWRBTIN# ADD ONE 0.1uF CAP. (C650)
- 2.PCE_TXISET change to 8.2K Ohm (R38)
- 3.PCE_NCAL change to 84.5 Ohm (R39)
- 4.C168,C174,C175 change to 22uF for VCCA_1V2 power quality issue
- 5.C166,C167,C177 change to 2.2uF for VCCA_1V2 power quality issue
- 6.EC41,EC66 change to 1500uF for VCCA_1V2 power quality issue
- 7.PCE_ISET change back to 10K Ohm (R36)
- 8.Added R661,R663 for H_THERMTRIP# pull up to +3V. Dual and BOM option to +3V
- 9.Change Intersil ISL6612,ISL6614 to new ACB version
- 10.Change C475,C480,C482 snubber cap. to 2200PF/X7R/10%

Update for 050308

- 1.C241 change to 1uF/0603X7R for RTC lose issue

Micro Star Restricted Secret	
Title	39.CHANGE HISTORY1
Document Number	MS-7050
MICRO STAR INT'L CO., LTD. No. 96, Linsen St., Songshan City, Taipei Hsien, Taiwan	Rev 130
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<i>Micro Star Restricted Secret</i>	
Title	Rev
40.Manual Parts	130
Document Number	MS-7850
MICROSTAR INT'L CO., LTD. No. 561, Li-Fu St., Jing-Jue City, Taipei Hsien, Taiwan	1st Revision Date: Wednesday, July 26, 2005 Sheet 40 of 41
http://www.msi.com.tw	

UB_A	
43	VDDCPU
44	VDDSRC3
45	VDDSRC2
46	VDDSRC1
47	VDD_SRC0
48	VDD_PCI
49	VDDH
50	VDDHTT
51	VDDREF
52	GND1
53	GND2
54	GNDSRC0
55	GNDSRC1
56	GNDSRC2
57	GNDSRC3
58	GNDSRC4
59	GNDSP0
60	GNDHTT
61	GNDCPU
62	X1
63	X2
64	NC
65	SCLK
66	SENTA
67	REF2
68	REF
69	USB_48MHz
70	HTTCLK0
71	CLKREQB#
72	CLKREQM#

UB_B	
43	VDDCPU
44	VDDSRC3
45	VDDSRC2
46	VDDSRC1
47	VDD_SRC0
48	VDD_PCI
49	VDDH
50	VDDHTT
51	VDDREF
52	GND1
53	GND2
54	GNDSRC0
55	GNDSRC1
56	GNDSRC2
57	GNDSRC3
58	GNDSRC4
59	GNDSP0
60	GNDHTT
61	GNDCPU
62	X1
63	X2
64	NC
65	SCLK
66	SENTA
67	REF2
68	REF
69	USB_48MHz
70	HTTCLK0
71	CLKREQB#
72	CLKREQM#



Micro Star Restricted Secret		
Title	41.Option Part	Rev
Document Number	MS-7850	130
MICRO STAR INT'L CO., LTD. No. 561, Li-Hua St., Song-Shan City, Tapei Hsien, Taiwan	Issue Revision Date 1/2005/ April 19, 2005	Sheet
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