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MS-7504 Micro ATX Version: 1.0

CPU: Intel Pentium 4 Cedar Mill / Prescott , Pentium D Smithfield / Presler and Conroe / Kentsfield family processors in LGA775 Package.

System Chipset:

NVIDIA MCP73

On Board Device:

BIOS -- SPI Flash 8M
Azalia Codec -- ALC888S
LPC Super I/O -- FINTEK F71882FG
LAN -- Realtek RTL8211BL-GR
CLOCK Gen -- Integrated in MCP73
1394 Controller -- VT6308P

Main Memory:

Single-channel DDR-II * 2 (Max 4GB)

Expansion Slots:

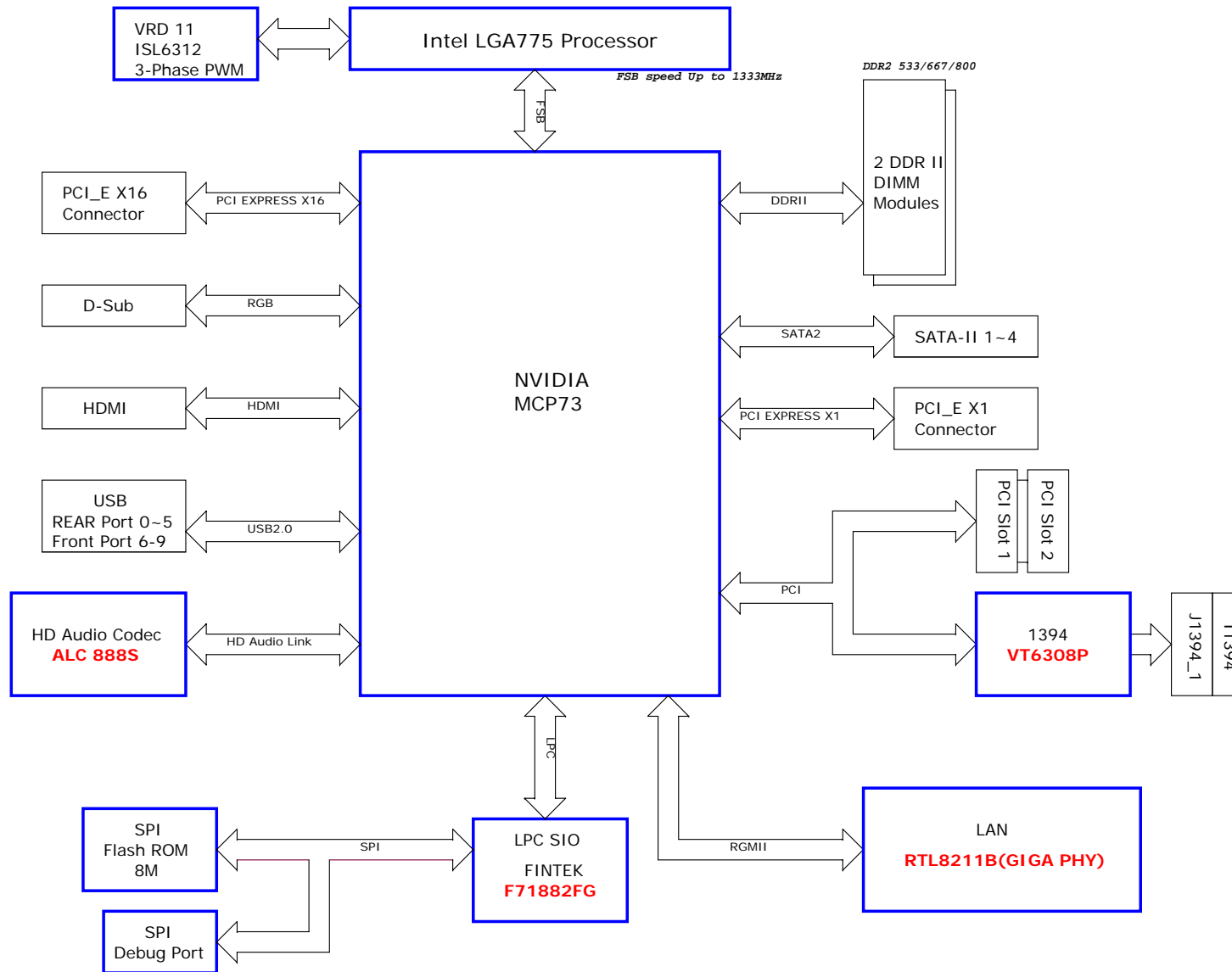
PCI EXPRESS X16 SLOT *1
PCI EXPRESS X1 SLOT * 1
PCI SLOT * 2

Intersil PWM:

Controller: Intersil ISL6312 (3 Phases)
Driver: Intersil ISL6612

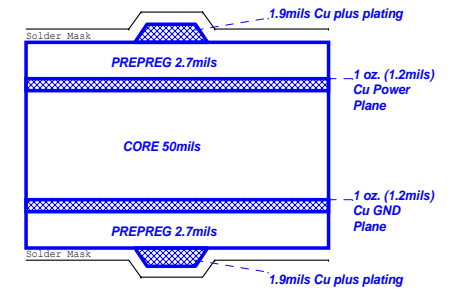
OPT	Function	Orcad Configure	BOM
	MCP73PV (HDMI) / F71882FG/ALC888S/RTL8211BL/VT6308	cfg-7504	

Block Diagram



Board Stack-up

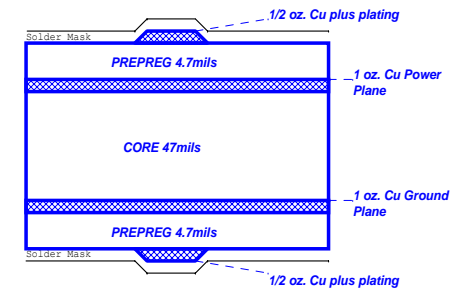
(1080 Prepreg Considerations)



Single End 50ohm Top/Bottom : 4mils
 USB2.0 - 90ohm : 15/4.5/7.5/4.5/15
 SATA - 95ohm : 15/4/8/4/15
 LAN - 100ohm : 15/4/8/4/15
 PCIE - 95ohm : 15/4/8/4/15
 IEEE1394 - 110ohm : 15/4/9/4/15

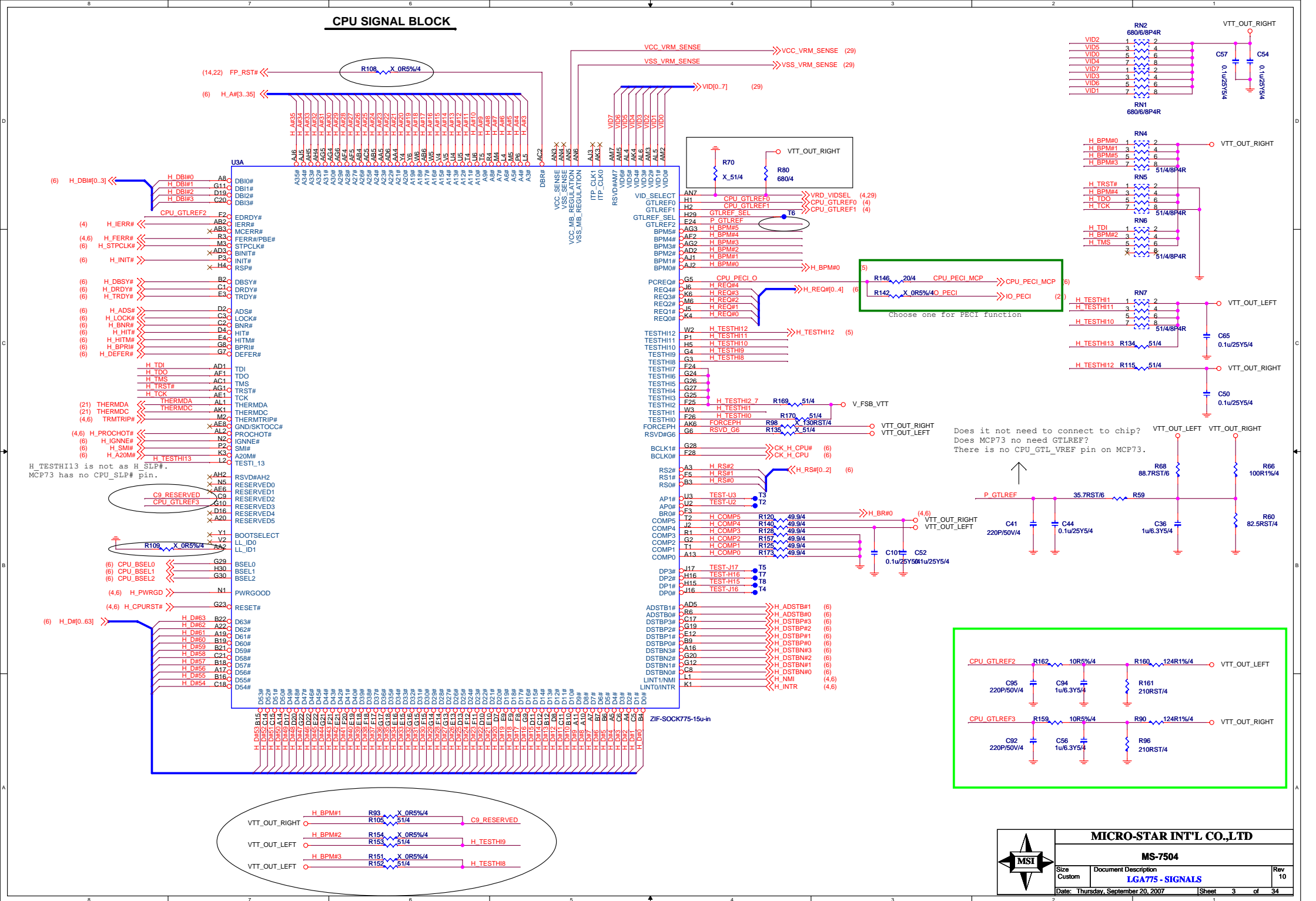
Board Stack-up

(2116 Prepreg Considerations)



Single End 60ohm Top/Bottom : 5mils
 IEEE1394 - 110ohm Top : 5/7/5
 PCIE, LAN, SATA - 100ohm Top : 5/6/5
 USB2.0 - 90ohm Top : 7.5/7.5/7.5

CPU SIGNAL BLOCK



(3) H_DBI#0[0..3] >> H_DBI#0[0..3]

(3) H_DSTBP#0 >> V36 CPU_DSTBP0#
(3) H_DSTBN#0 >> W36 CPU_DSTBN0#
(3) H_DSTBP#1 >> N31 CPU_DSTBP1#
(3) H_DSTBN#1 >> P30 CPU_DSTBN1#
(3) H_DSTBP#2 >> G33 CPU_DSTBP2#
(3) H_DSTBN#2 >> G35 CPU_DSTBN2#
(3) H_DSTBP#3 >> M38 CPU_DSTBP3#
(3) H_DSTBN#3 >> N36 CPU_DSTBN3#

(3) H_A#3[3..35] >> H_A#3 W34 CPU_A3#
H_A#4 AA34 CPU_A4#
H_A#5 W31 CPU_A5#
H_A#6 W33 CPU_A6#
H_A#7 W32 CPU_A7#
H_A#8 AA32 CPU_A8#
H_A#9 AA31 CPU_A9#
H_A#10 AB30 CPU_A10#
H_A#11 AA30 CPU_A11#
H_A#12 AC35 CPU_A12#
H_A#13 AC34 CPU_A13#
H_A#14 AC33 CPU_A14#
H_A#15 AC32 CPU_A15#
H_A#16 AC31 CPU_A16#
H_A#17 AE30 CPU_A17#
H_A#18 AC30 CPU_A18#
H_A#19 AE34 CPU_A19#
H_A#20 AE33 CPU_A20#
H_A#21 AE31 CPU_A21#
H_A#22 AG33 CPU_A22#
H_A#23 AE32 CPU_A23#
H_A#24 AG35 CPU_A24#
H_A#25 AG34 CPU_A25#
H_A#26 AF30 CPU_A26#
H_A#27 AG31 CPU_A27#
H_A#28 AG30 CPU_A28#
H_A#29 AJ32 CPU_A29#
H_A#30 AJ34 CPU_A30#
H_A#31 AJ33 CPU_A31#
H_A#32 AJ30 CPU_A32#
H_A#33 AJ31 CPU_A33#
H_A#34 AL35 CPU_A34#
H_A#35 AK30 CPU_A35#

(3) H_ADSTB#0 >> AA33 CPU_ADSTB0#
(3) H_ADSTB#1 >> AG32 CPU_ADSTB1#
(3) H_REQ#0[0..4] >> H_REQ#0 V30 CPU_REQ0#
H_REQ#1 U31 CPU_REQ1#
H_REQ#2 W30 CPU_REQ2#
H_REQ#3 W35 CPU_REQ3#
H_REQ#4 U30 CPU_REQ4#

(3) H_ADS# >> AF37 CPU_ADS#
(3) H_BNR# >> AF36 CPU_BNR#
(3,4) H_BR#0 >> AH37 CPU_BR0#
(3) H_BPR# >> AC36 CPU_BPR#
(3) H_DBSY# >> AE35 CPU_DBSY#
(3) H_DEFER# >> AC37 CPU_DEFER#
(3) H_DRDY# >> AG36 CPU_DRDY#
(3) H_HIT# >> AG38 CPU_HIT#
(3) H_HITM# >> AG37 CPU_HITM#
(3) H_LOCK# >> AE36 CPU_LOCK#
(3) H_TRDY# >> AG38 CPU_TRDY#
(3) H_RS#0[0..2] >> H_RS#0 AD36 CPU_RS0#
H_RS#1 AD37 CPU_RS1#
H_RS#2 AD35 CPU_RS2#

(3,4) H_FERR# >> H_FERR# AL38 FERR#
(3) H_A20M# >> AH38 A20M#
(3) H_IGNNE# >> AK36 IGNE#
(3) H_INIT# >> AL36 INIT#
(3) H_SMI# >> AL37 SMI#
(3,4) H_INTR# >> AH36 INTR#
(3,4) H_NMI# >> AH35 NMI#
(3,4) H_STPCLK# >> H_STPCLK# AJ36 STPCLK#
(3,4) H_PWRGD# >> AK37 PWRGD#

VTT_OUT_LEFT >> R192 49.9/4 AM38 CPU_COMP_VCC
R194 49.9/4 AM37 CPU_COMP_GND

U8A
7
MCP73
SEC 1 OF 10

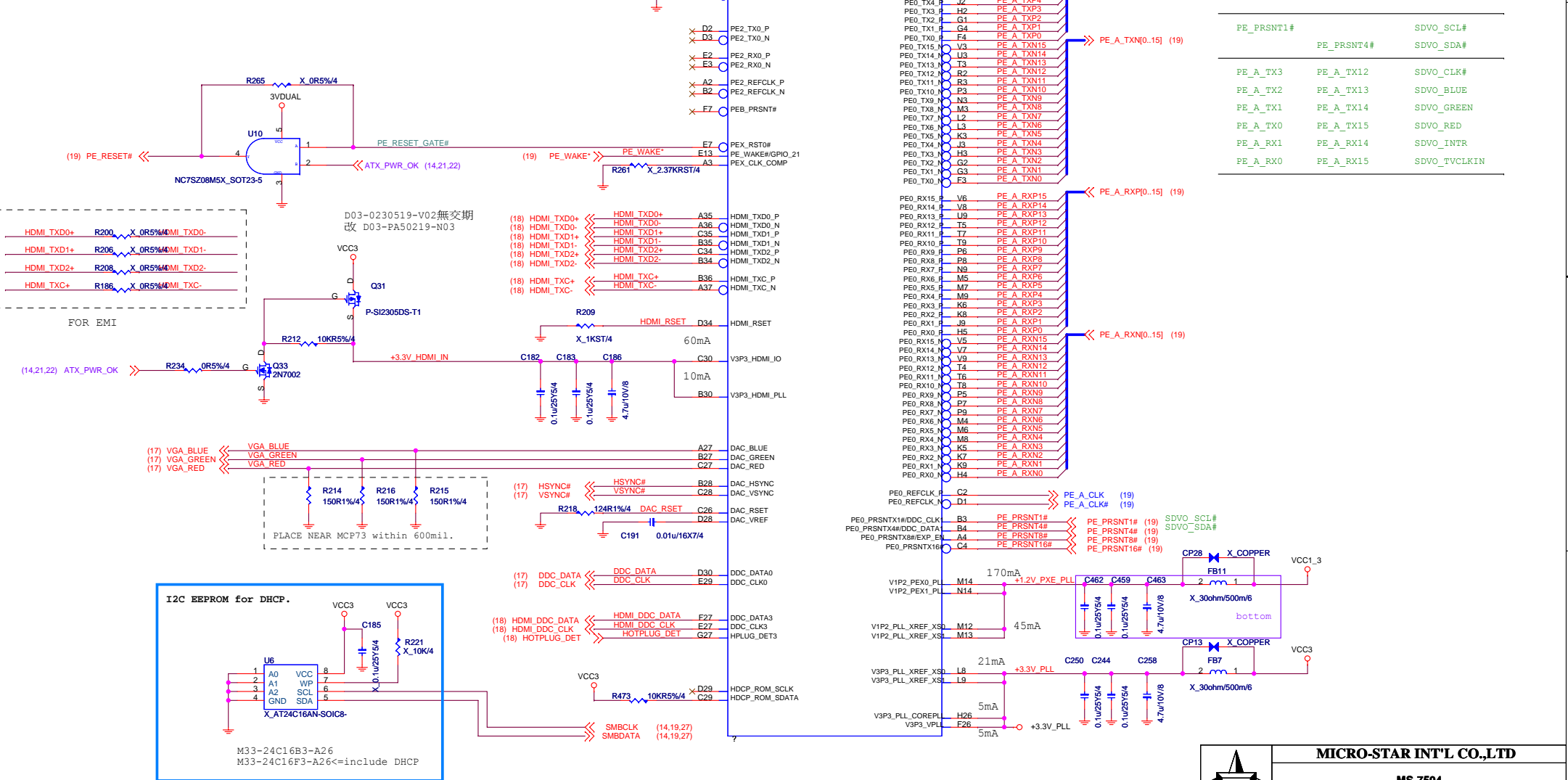
CPU_D0# AB36 H_D#0
CPU_D1# AA36 H_D#1
CPU_D2# AB37 H_D#2
CPU_D3# Y36 H_D#3
CPU_D4# AA35 H_D#4
CPU_D5# Y35 H_D#5
CPU_D6# Y37 H_D#6
CPU_D7# Y38 H_D#7
CPU_D8# U35 H_D#8
CPU_D9# T35 H_D#9
CPU_D10# U36 H_D#10
CPU_D11# T36 H_D#11
CPU_D12# V37 H_D#12
CPU_D13# T37 H_D#13
CPU_D14# R37 H_D#14
CPU_D15# T38 H_D#15
CPU_D16# R31 H_D#16
CPU_D17# U33 H_D#17
CPU_D18# U34 H_D#18
CPU_D19# R30 H_D#19
CPU_D20# U32 H_D#20
CPU_D21# R32 H_D#21
CPU_D22# R33 H_D#22
CPU_D23# R35 H_D#23
CPU_D24# N30 H_D#24
CPU_D25# N32 H_D#25
CPU_D26# N33 H_D#26
CPU_D27# N34 H_D#27
CPU_D28# L30 H_D#28
CPU_D29# L31 H_D#29
CPU_D30# L33 H_D#30
CPU_D31# L32 H_D#31
CPU_D32# L35 H_D#32
CPU_D33# L34 H_D#33
CPU_D34# K30 H_D#34
CPU_D35# J34 H_D#35
CPU_D36# J31 H_D#36
CPU_D37# J30 H_D#37
CPU_D38# J33 H_D#38
CPU_D39# J32 H_D#39
CPU_D40# G31 H_D#40
CPU_D41# G34 H_D#41
CPU_D42# G36 H_D#42
CPU_D43# F33 H_D#43
CPU_D44# E33 H_D#44
CPU_D45# E35 H_D#45
CPU_D46# D35 H_D#46
CPU_D47# D36 H_D#47
CPU_D48# J36 H_D#48
CPU_D49# M37 H_D#49
CPU_D50# R36 H_D#50
CPU_D51# N35 H_D#51
CPU_D52# P37 H_D#52
CPU_D53# P36 H_D#53
CPU_D54# L36 H_D#54
CPU_D55# M35 H_D#55
CPU_D56# M36 H_D#56
CPU_D57# L37 H_D#57
CPU_D58# H36 H_D#58
CPU_D59# H35 H_D#59
CPU_D60# K36 H_D#60
CPU_D61# K37 H_D#61
CPU_D62# H38 H_D#62
CPU_D63# H37 H_D#63

CPU_RESET# C36 >> H_CPURST# (3,4)
BCLK_OUT_CPU_P >> G38 CPUCLK
BCLK_OUT_CPU_N >> G37 CPUCLK#
BCLK_OUT_ITP_P >> AN36 CPUCLK#
BCLK_OUT_ITP_N >> AM35 CPUCLK#
BCLK_OUT_MCP_P >> D37 BCLK_OUT MCP P
BCLK_OUT_MCP_N >> D38 BCLK_OUT MCP N
BCLK_IN_N >> C37 BCLK_IN N
BCLK_IN_P >> C38 BCLK_IN P
BSEL0 F36 CPU_BSEL0
BSEL1 F36 CPU_BSEL1
BSEL2 F37 CPU_BSEL2
PECL CPU_PECI MCP >> CPU_PECI_MCP (3)
PROCHOT# AM36 H_PROCHOT# R
THERMITRIP# AJ35 TRMITRIP# (3,4)
BCLK_COMP B38 >> X 2.37KRST4

RN15 V_FSB_VTT
(3) CPU_BSEL1 >> 8
(3) CPU_BSEL0 >> 6
(3) CPU_BSEL2 >> 4
470/48P4R

BSEL[2..0]	FSB CLK (MHz)
000	266MHz
001	133MHz
010	200MHz
100	333MHz
TBD	Reserved

if CPU processor hot cause system shutdown, remove OR.



SDVO Muxing on X16 PCI Express		
PE_PRSNT1#		SDVO_SCL#
	PE_PRSNT4#	SDVO_SDA#
PE_A_TX3	PE_A_TX12	SDVO_CLK#
PE_A_TX2	PE_A_TX13	SDVO_BLUE
PE_A_TX1	PE_A_TX14	SDVO_GREEN
PE_A_TX0	PE_A_TX15	SDVO_RED
PE_A_RX1	PE_A_RX14	SDVO_INTR
PE_A_RX0	PE_A_RX15	SDVO_TVCLKIN



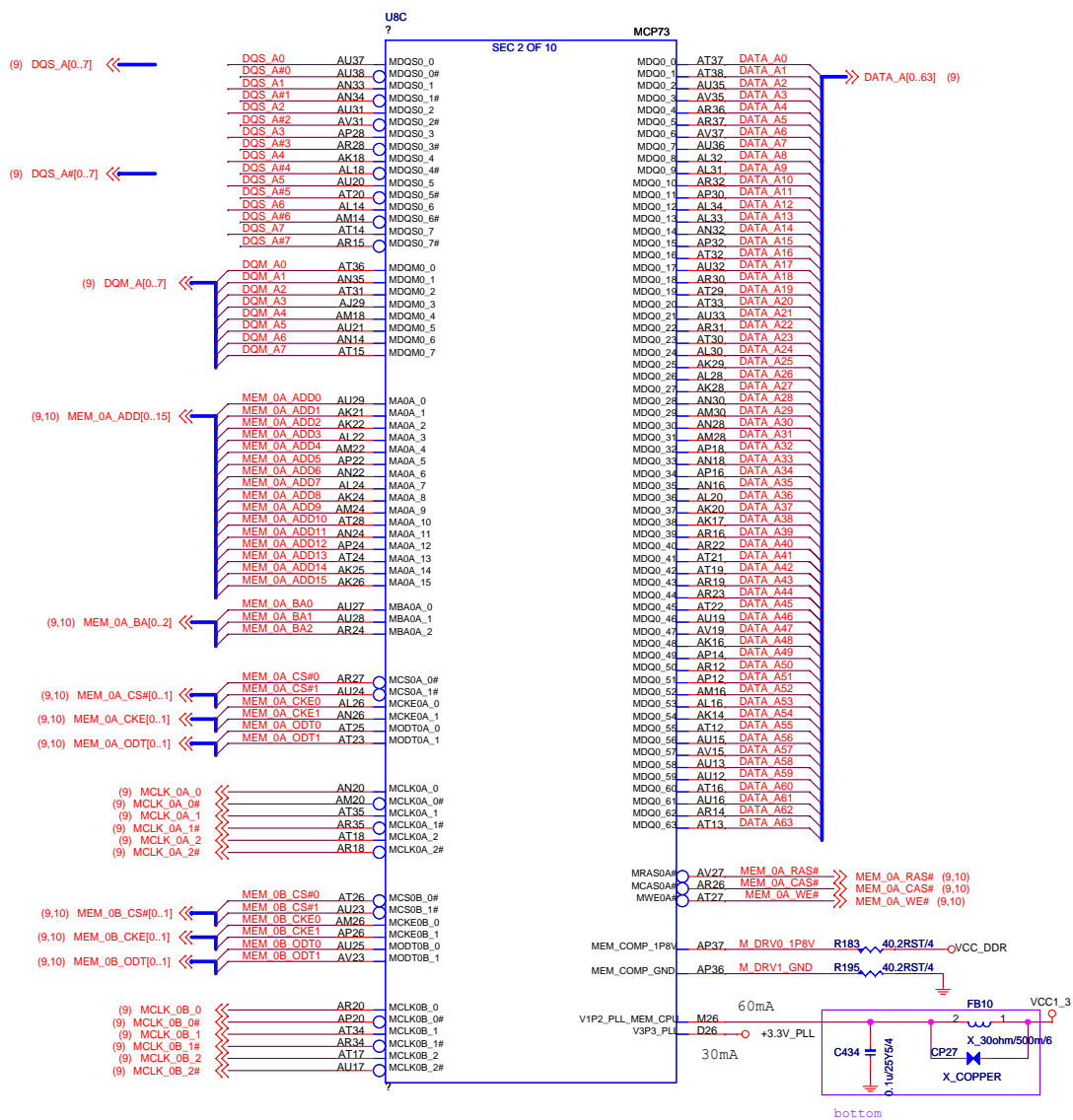
MICRO-STAR INT'L CO.,LTD

MS-7504

Size	Document Description
Custom	MCP73-PCIE/DAC/HDMI

Date: Thursday, September 20, 2007	Sheet 7 of 34
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DATA 0		DIMM 1	ADDR 0A / CNTL 0A
		DIMM 2	ADDR 0B / CNTL 0B

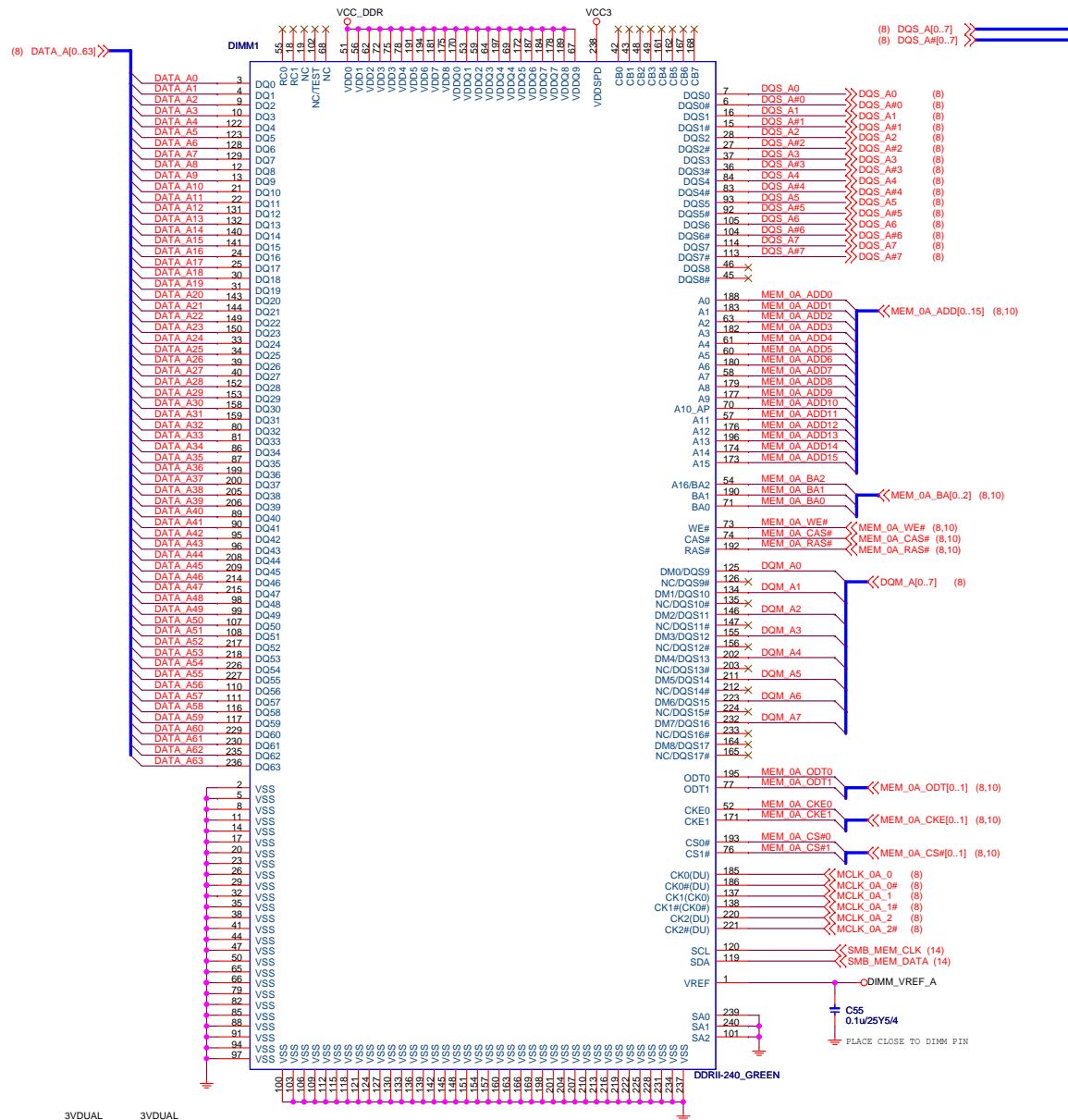
DIMM 0A

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Size Custom	Document Description MCP73-MEM	Rev 10
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DIMM1 / 0A



**ADDRESS: 000
0xA0**

ADDRESS: 001
0xA2

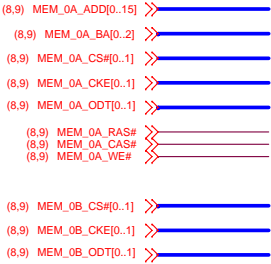
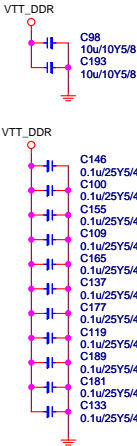


MICRO-STAR INT'L CO.,LTD

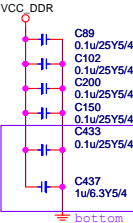
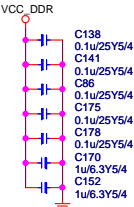
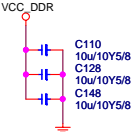
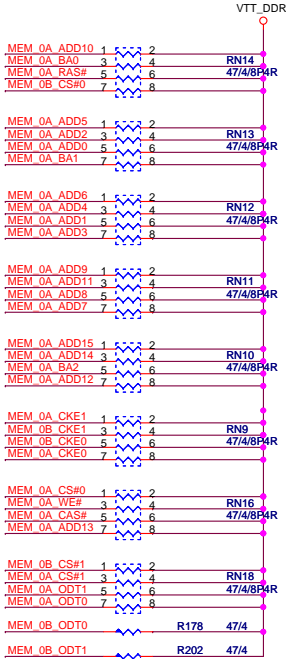
MS-7504

Size Custom	Document Description DDR II - DIMM 1 & 2 Sockets	Rev 10
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CHANNEL A VTT_DDR DECOUPLING CAPS



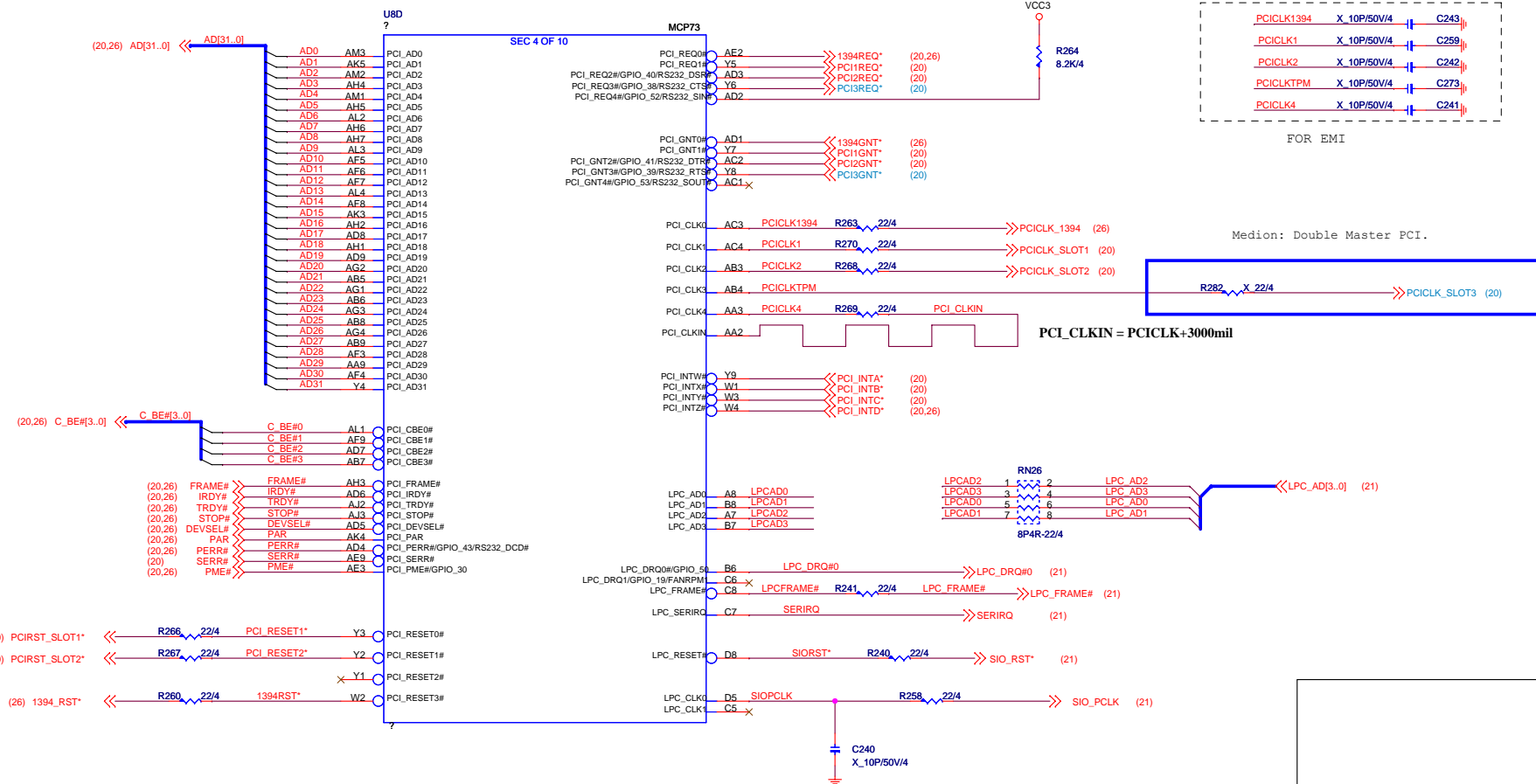
CHANNEL A ---- 0A , 0B



公板上0.1u X5, 1uX3, 10uX3
兩根再x2



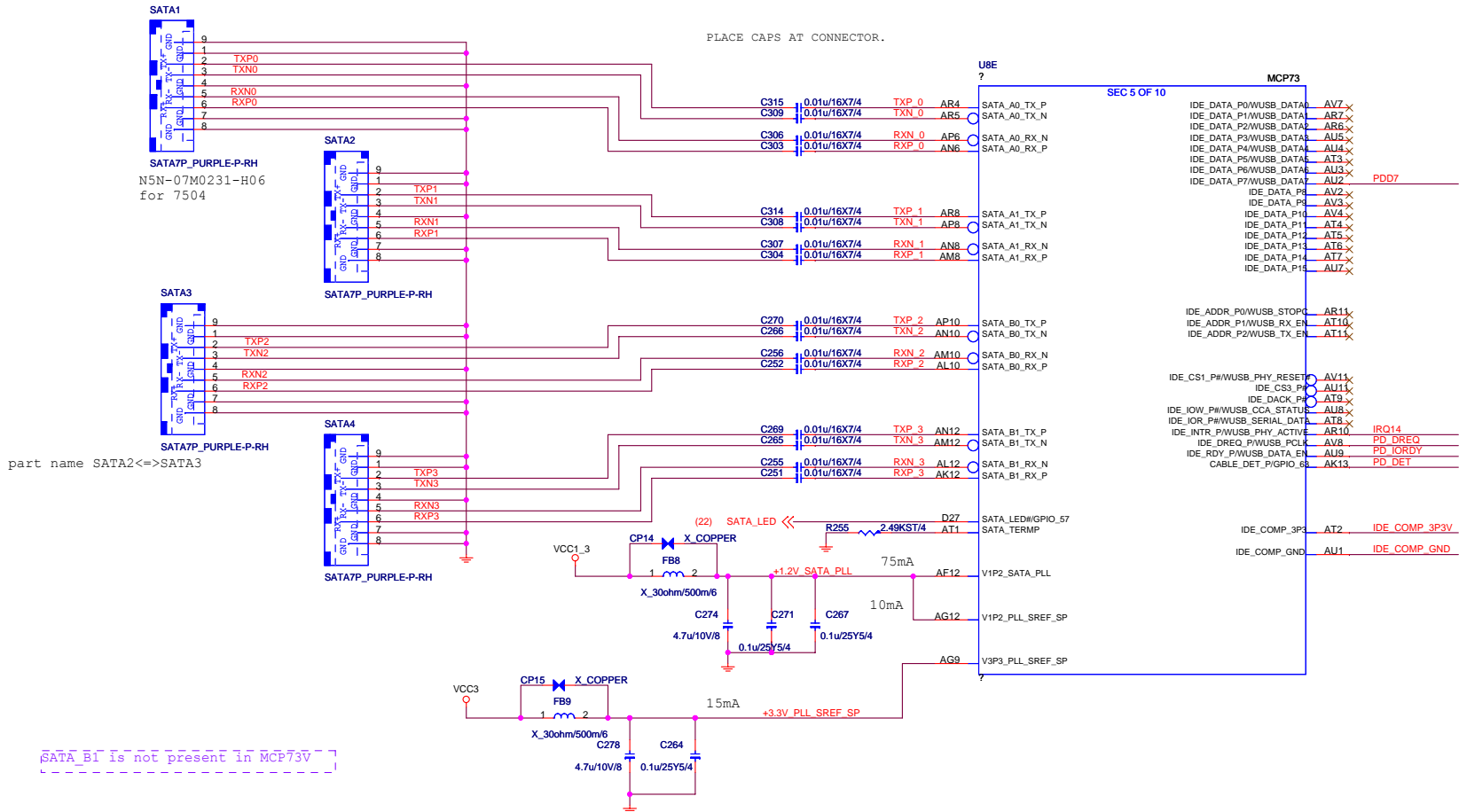
MICRO-STAR INT'L CO.,LTD			
MS-7504			
Size	Document Description	Rev	
Custom	DDR II VTT Termination & Decoupling	10	
Date: Thursday, September 20, 2007		Sheet	10 of 34

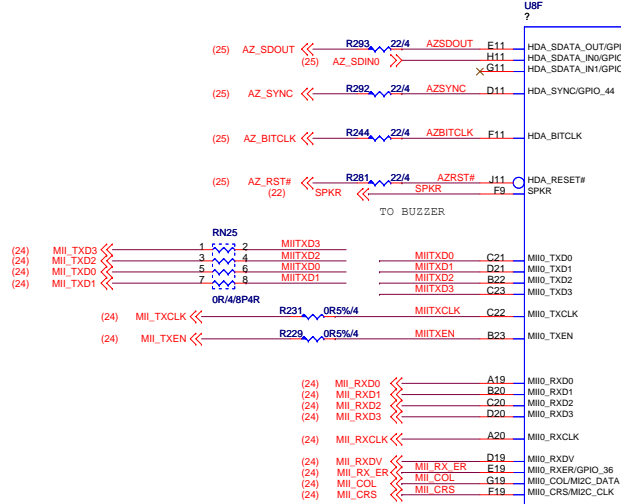
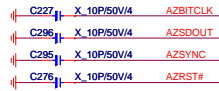
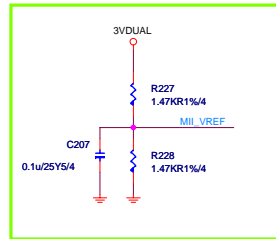
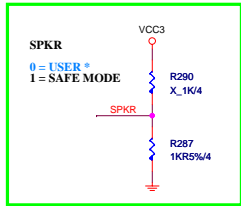
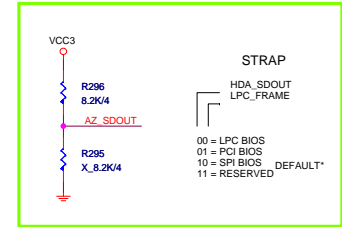
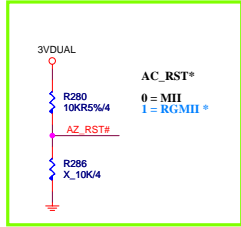
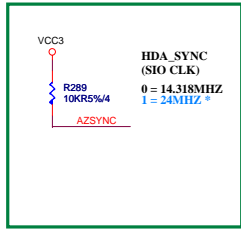


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Custom	MCP73-PCI/LPC	10
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USB_OC0#/GPIO_24 B14 >> USB_OCP#0 (23)

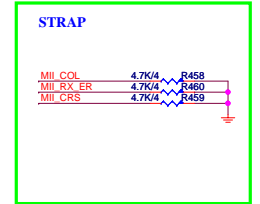
USB_OC1#/GPIO_25 C14 >> USB_OCP#2 (23)

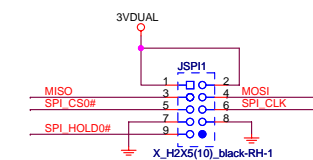
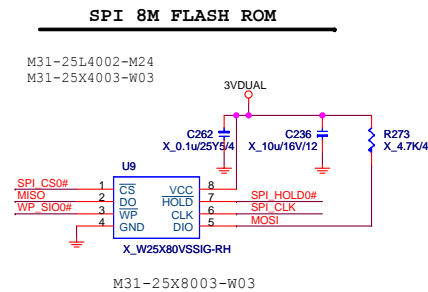
USB_OC2#/GPIO_26 D13 >> USB_OCP#4 (23)

USB_OC3#/GPIO_28MGPIO_ C13 >> USB_OCP#6 (23)

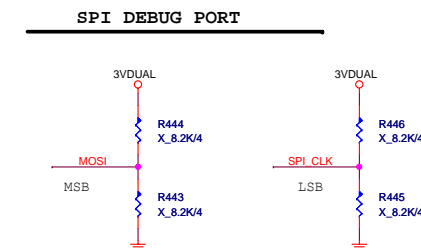
USB_OC4#/GPIO_29MGPIO_ D12 >> USB_OCP#8 (23)

JUSB3--USB[8..9] is not present in MCP73V/D





Place close to SPI ROM



STRAPPING

MSB=MOSI
LSB=SPI_C

00 = 31MHz DEFAULT
01 = 42MHz
10 = 25MHz
11 = 1Mhz

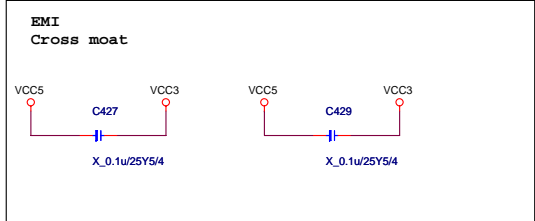
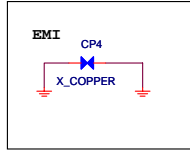
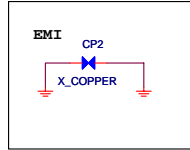
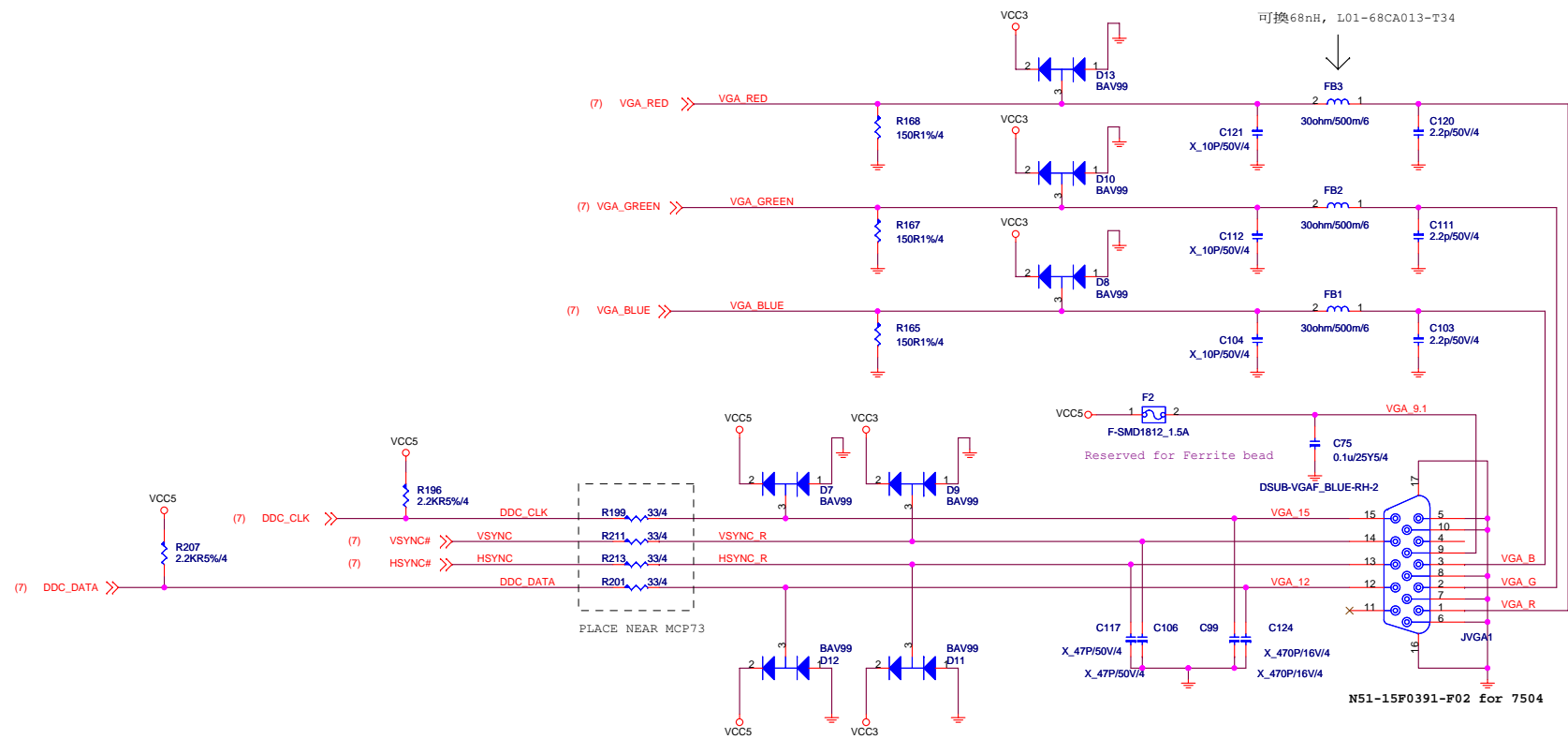


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Size Custom	Document Description MCP73-SPI/SMB	Rev 10
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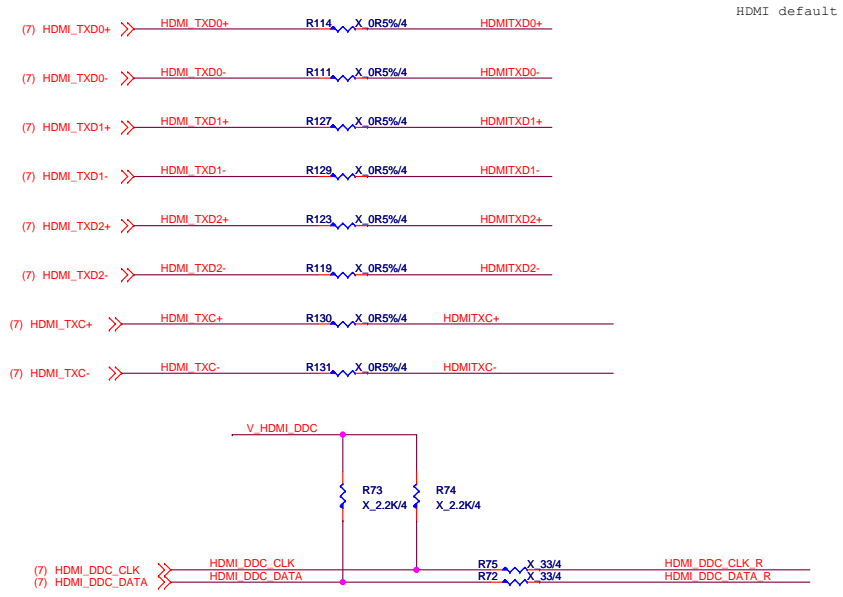
PLACE NEAR VGA CONNECTOR



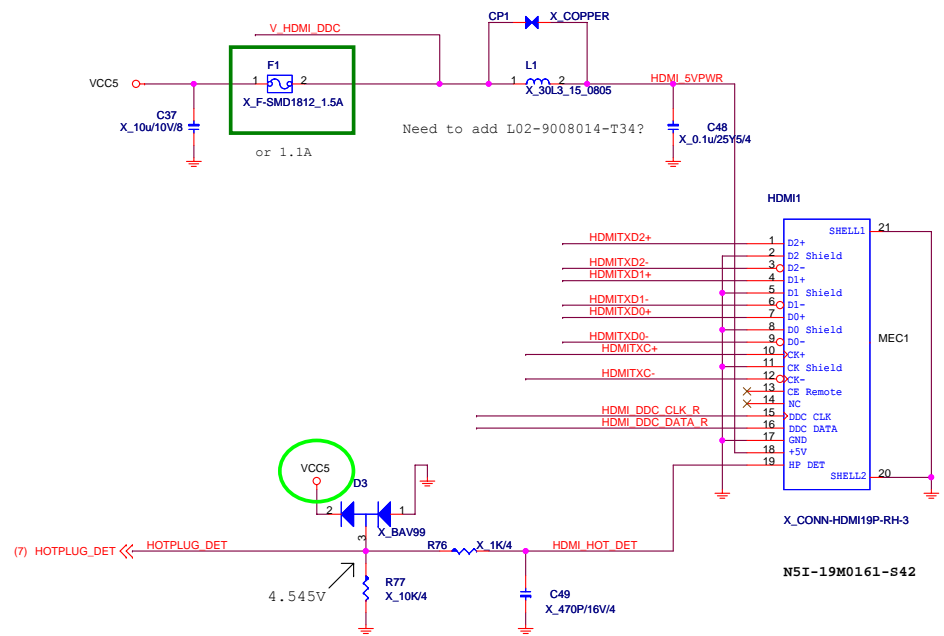
MICRO-STAR INT'L CO.,LTD

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Custom	D-SUB	10
Date:	Thursday, September 20, 2007	Sheet 17 of 34

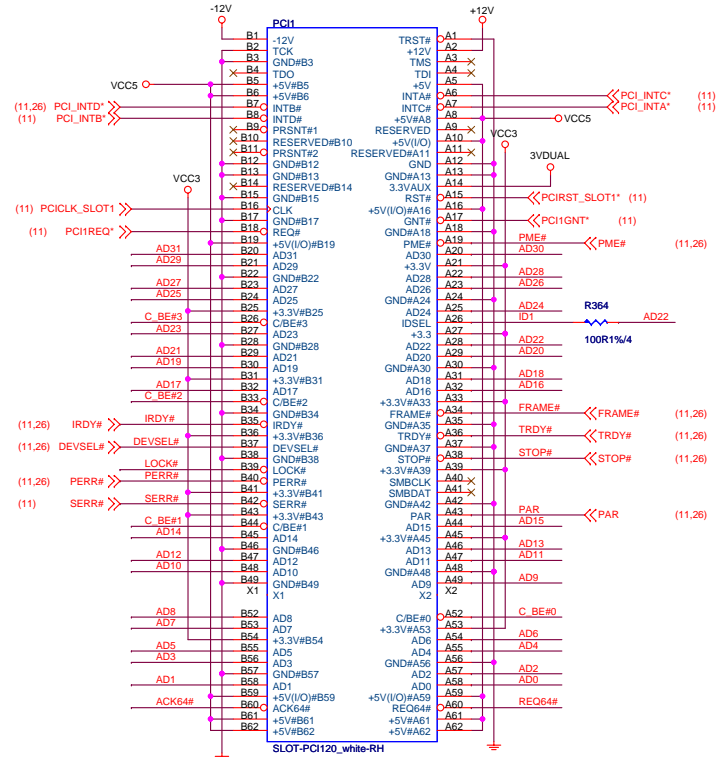


HDMI CONNECTOR



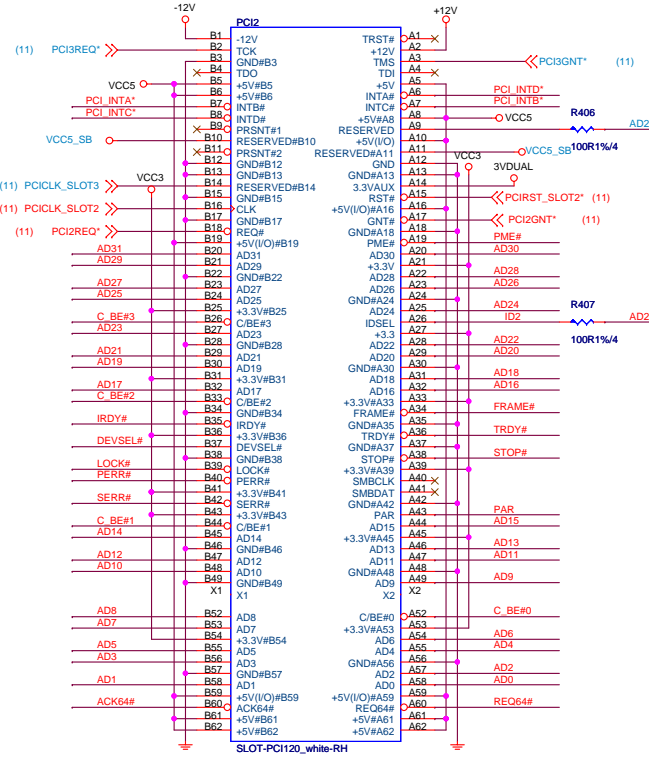
MICRO-STAR INT'L CO.,LTD		
MS-7504		
Size	Document Description	Rev
Custom	HDMI	10
Date:	Thursday, September 20, 2007	Sheet 18 of 34

PCI SLOT 1 (PCI VER: 2.2 COMPLY)



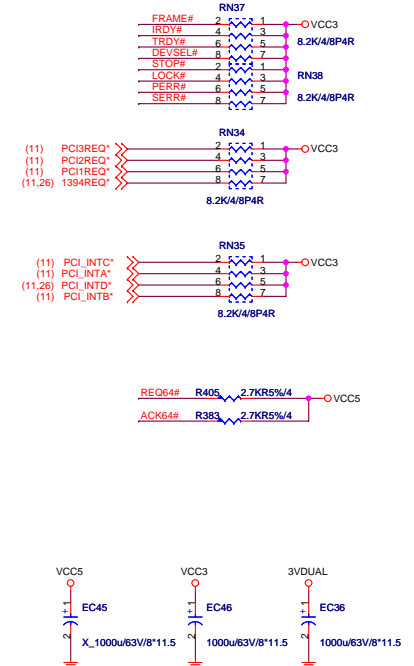
IDSEL = AD22
MASTER = PC11REQ*
PC11GNT*

PCI SLOT 2 (PCI VER: 2.2 COMPLY)



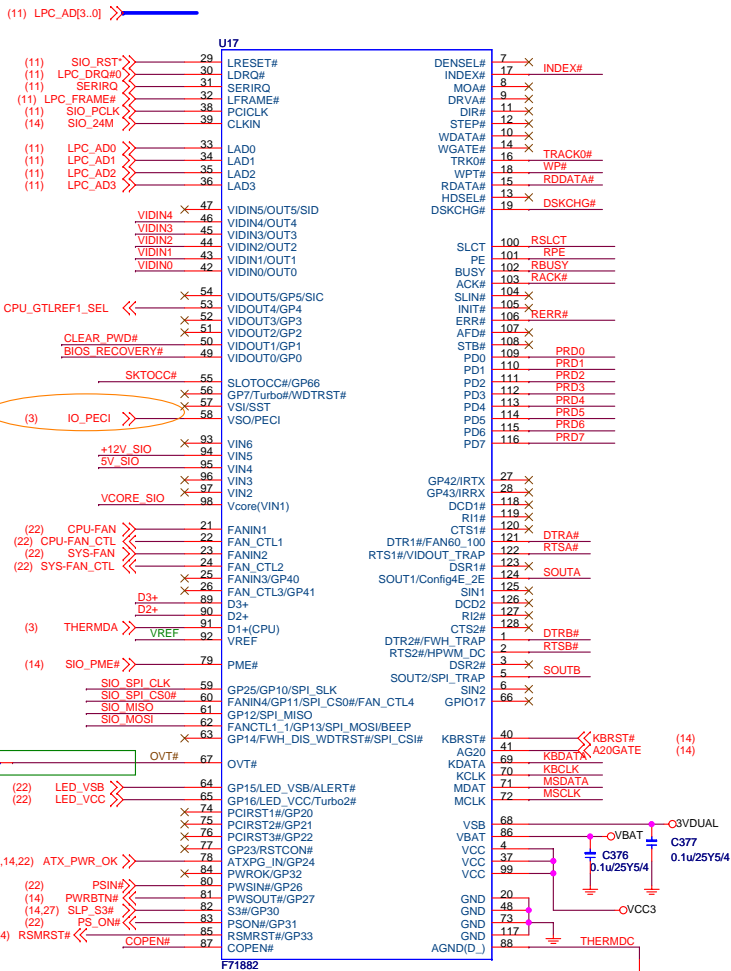
IDSEL = AD23
MASTER = PC12REQ*
PC12GNT*

PCI PULL-UP / DOWN RESISTORS

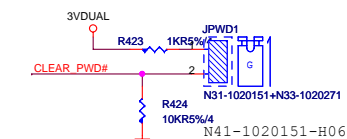


Super I/O

LPC SUPER I/O F71882

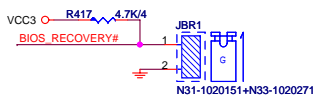


PASSWORD CLEAR JUMPER



Short : Normal
Open - Short : Clear Password

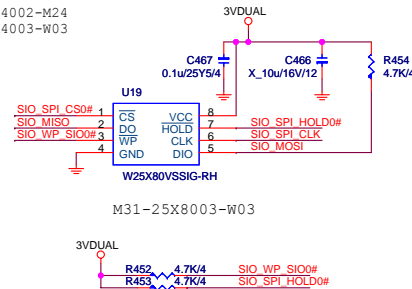
BIOS Recovery



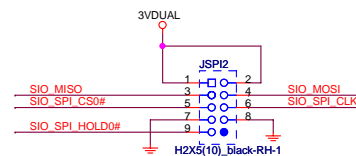
Short : Normal
Open - Short : BIOS Recovery

SPI 8M FLASH ROM

M31-25L4002-M24
M31-25X4003-W03



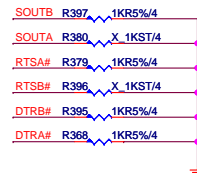
SPI DEBUG PORT



Part Number : N31-2051451-H06

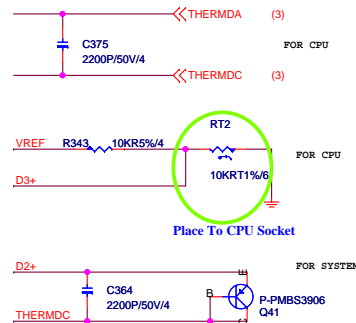
Place close to SPI ROM

Strapping



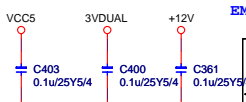
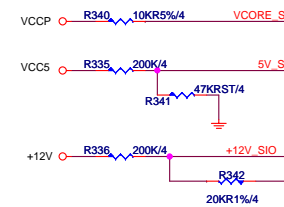
Temperature Sensing

DIODE SENSING CIRCUIT

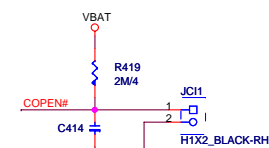


VOLTAGE SENSING(H/W Monitor).

The best voltage input level is about 1V.



CASE OPEN CIRCUIT



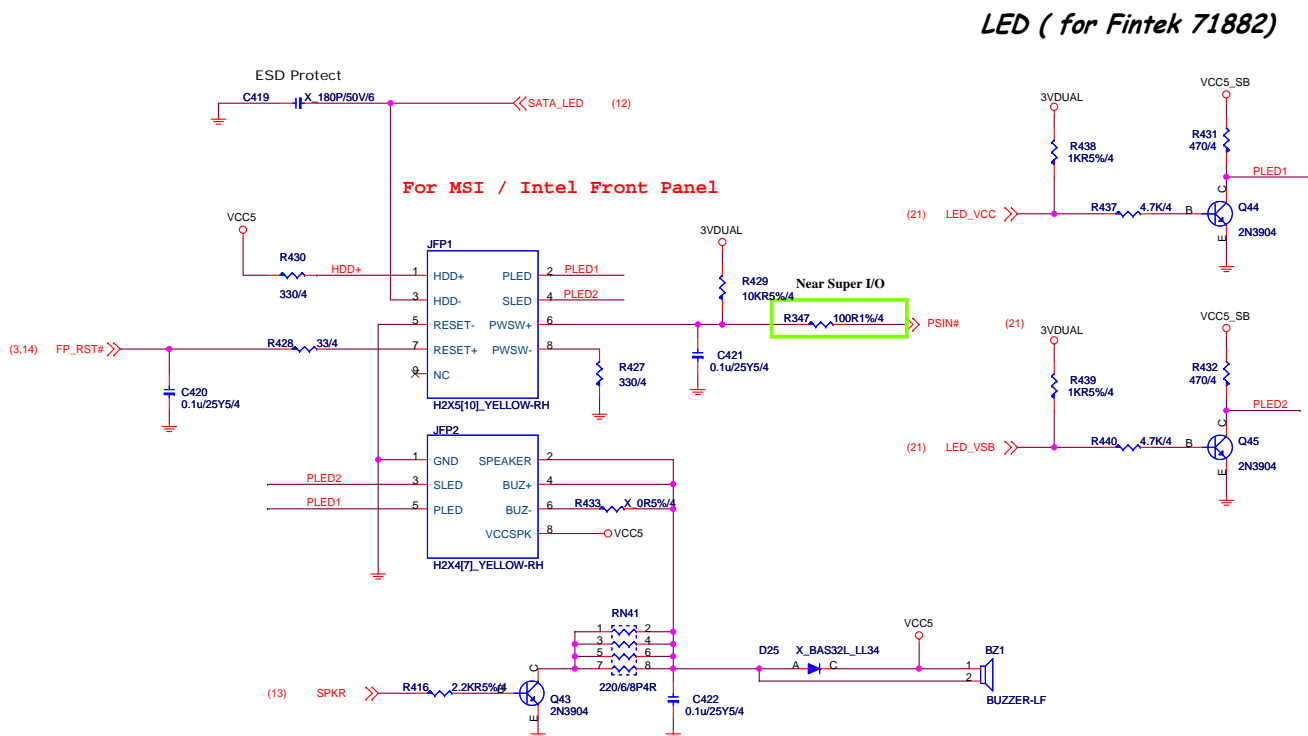
MICRO-STAR INT'L CO.,LTD

MS-7504

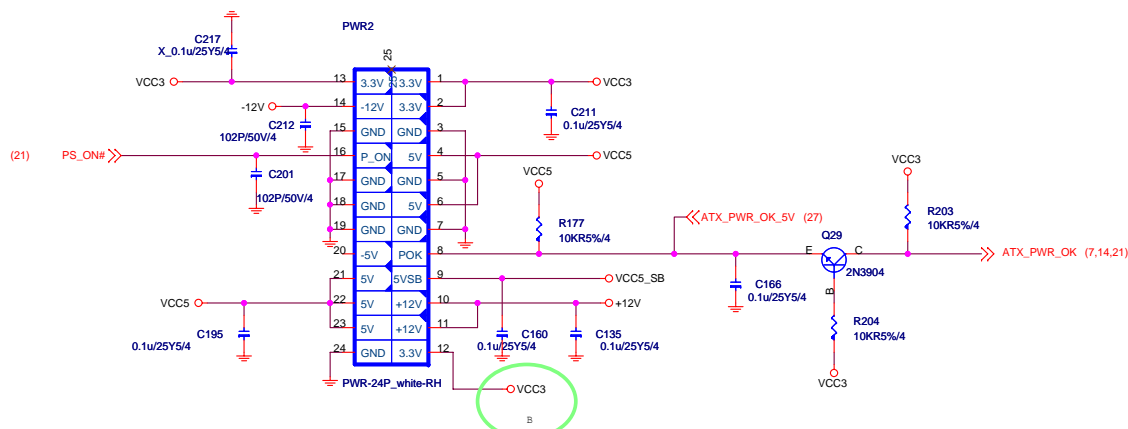
Size	Document Description	Rev
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ATX connector / Front Panel

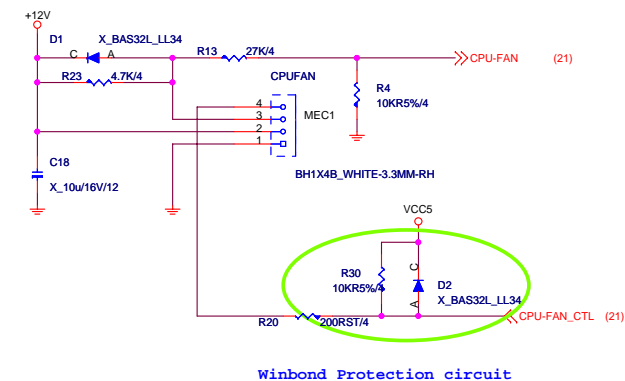
Intel Front Panel



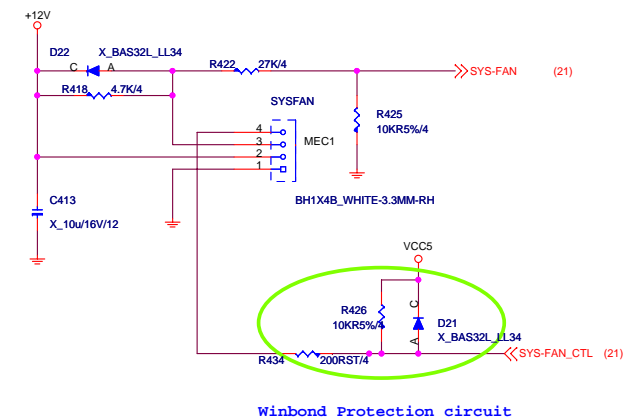
ATX Connector



CPU FAN



SYSTEM FAN

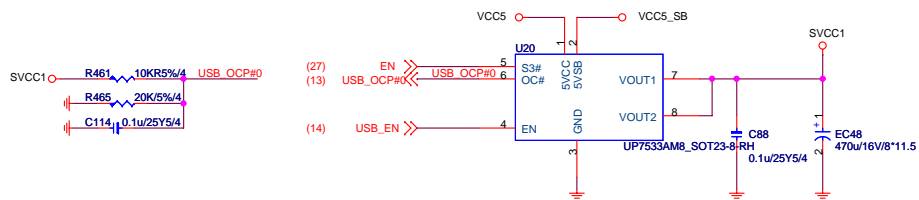


MICRO-STAR INT'L CO.,LTD

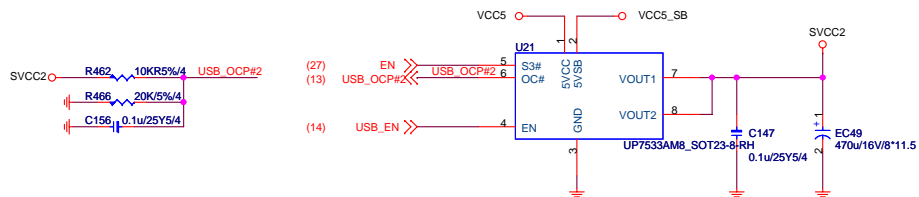
MS-7504

Size	Document Description	Rev
Custom	ATX/Front Panel/FAN	10
Date:	Thursday, September 20, 2007	Sheet 22 of 34

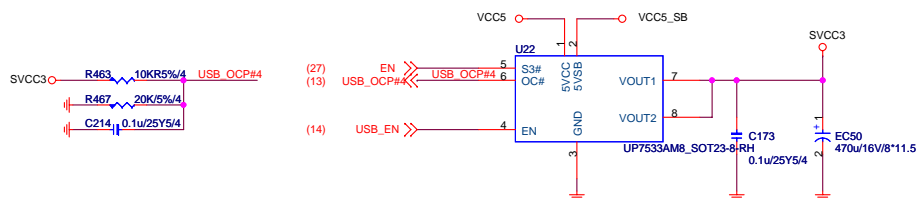
POWER CIRCUIT FOR USB PORT 0,1



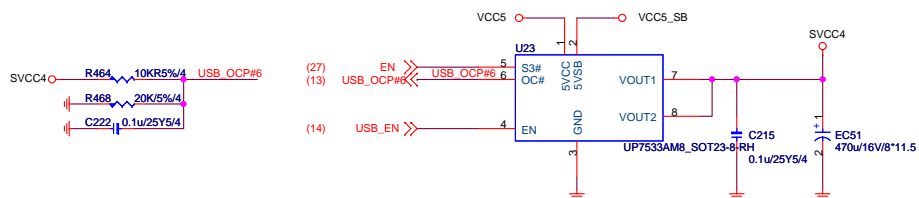
POWER CIRCUIT FOR USB PORT 2,3



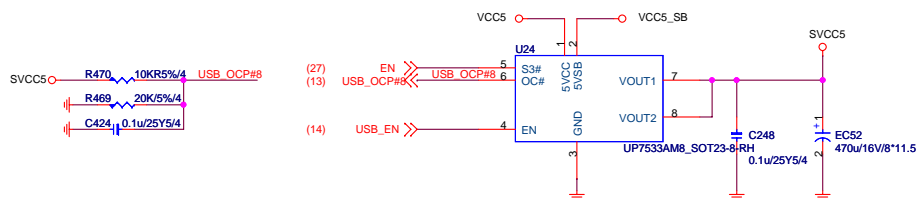
POWER CIRCUIT FOR USB PORT 4,5



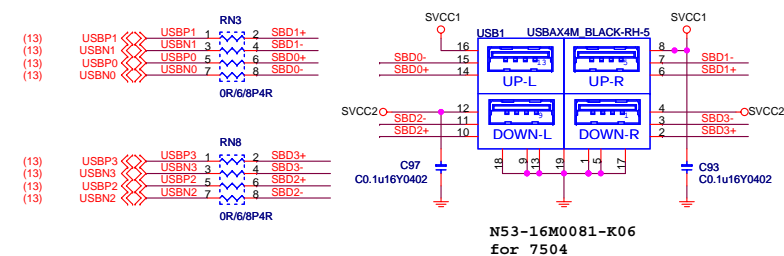
POWER CIRCUIT FOR USB PORT 6,7



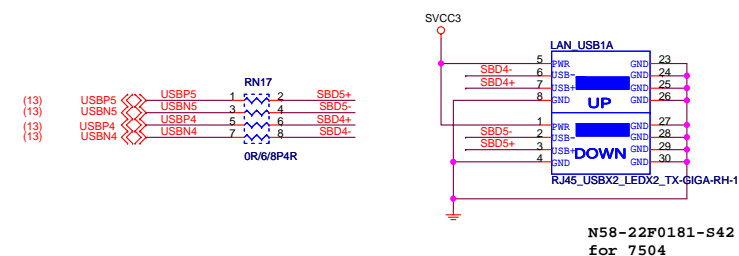
POWER CIRCUIT FOR USB PORT 8,9



REAR PANEL USB CONNECTOR FOR USB PORT 0,1,2,3

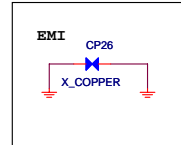
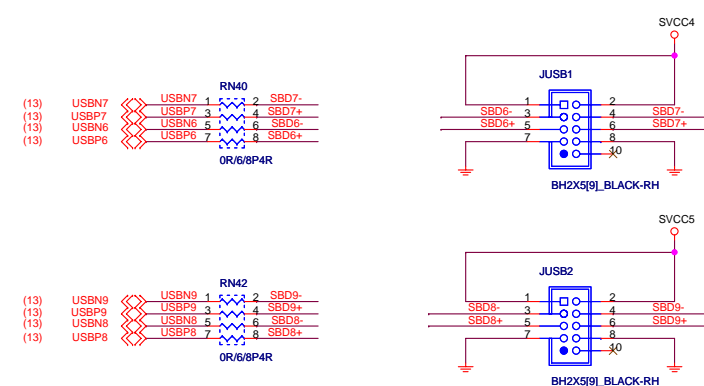


REAR PANEL USB CONNECTOR FOR USB PORT 4,5



NEAR USB CONNECTOR
22 / 7.5 / 7.5 / 7.5 / 22 / 7.5 / 7.5 / 7.5 / 22

FRONT PANEL USB CONNECTOR FOR USB PORT 6,7,8,9



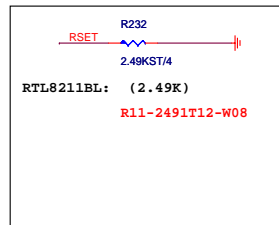
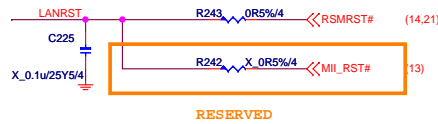
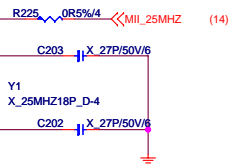
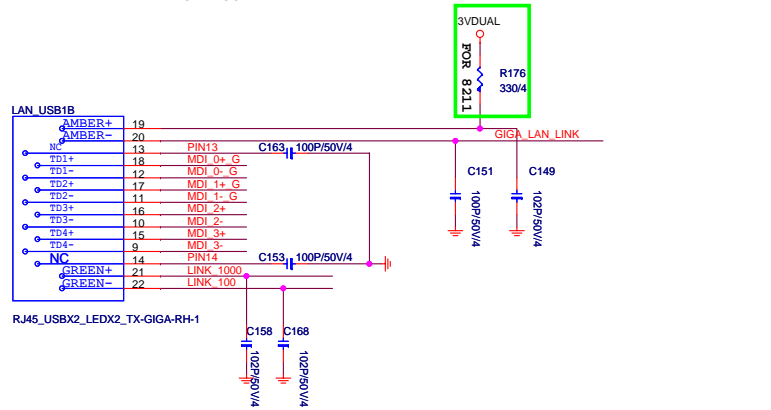
NEAR USB CONNECTOR

22 / 7.5 / 7.5 / 7.5 / 22 / 7.5 / 7.5 / 7.5 / 22

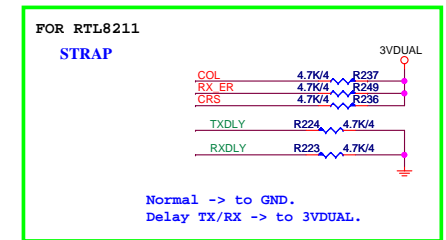
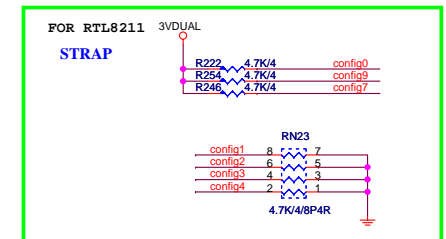
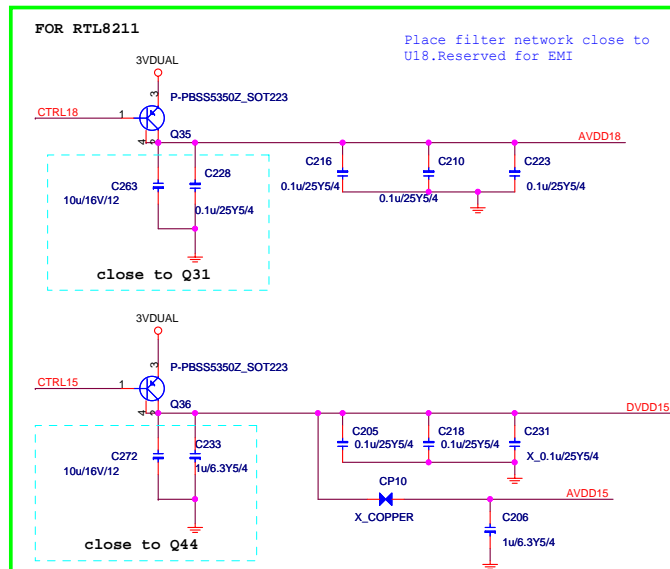


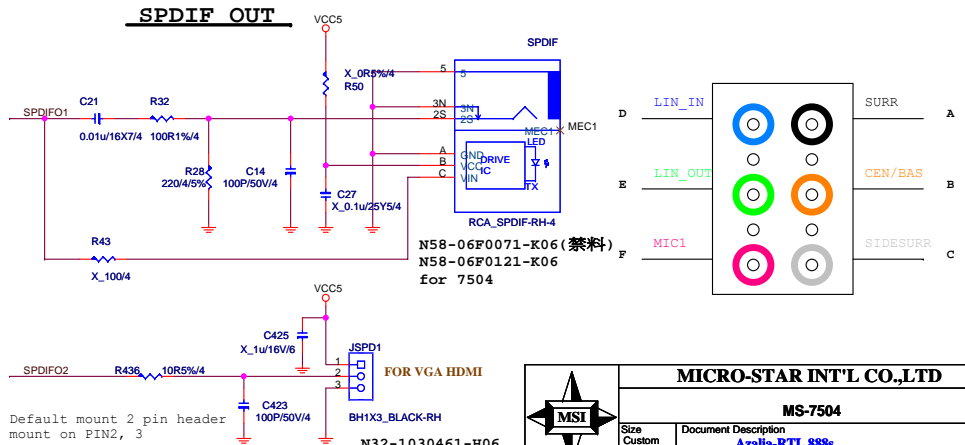
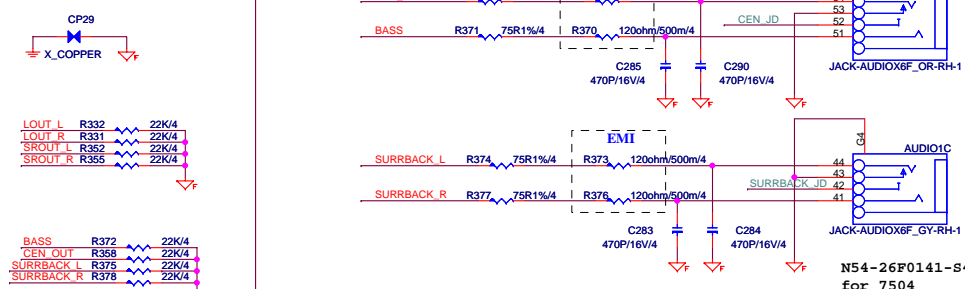
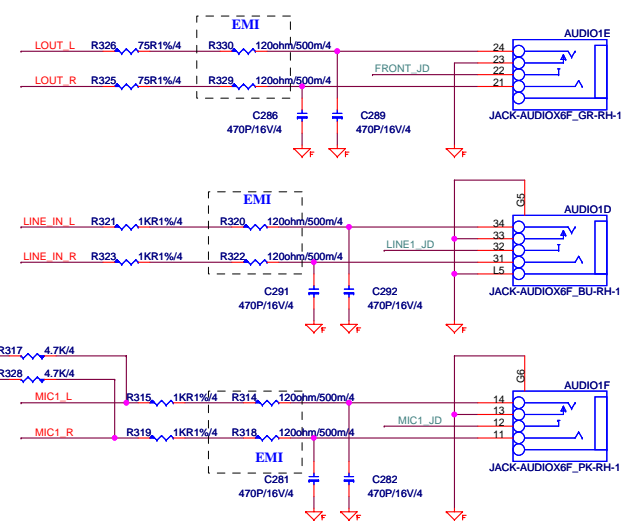
MICRO-STAR INT'L CO.,LTD		
MS-7504		
Size	Document Description	Rev
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N58-22F0181-S42
for 7504

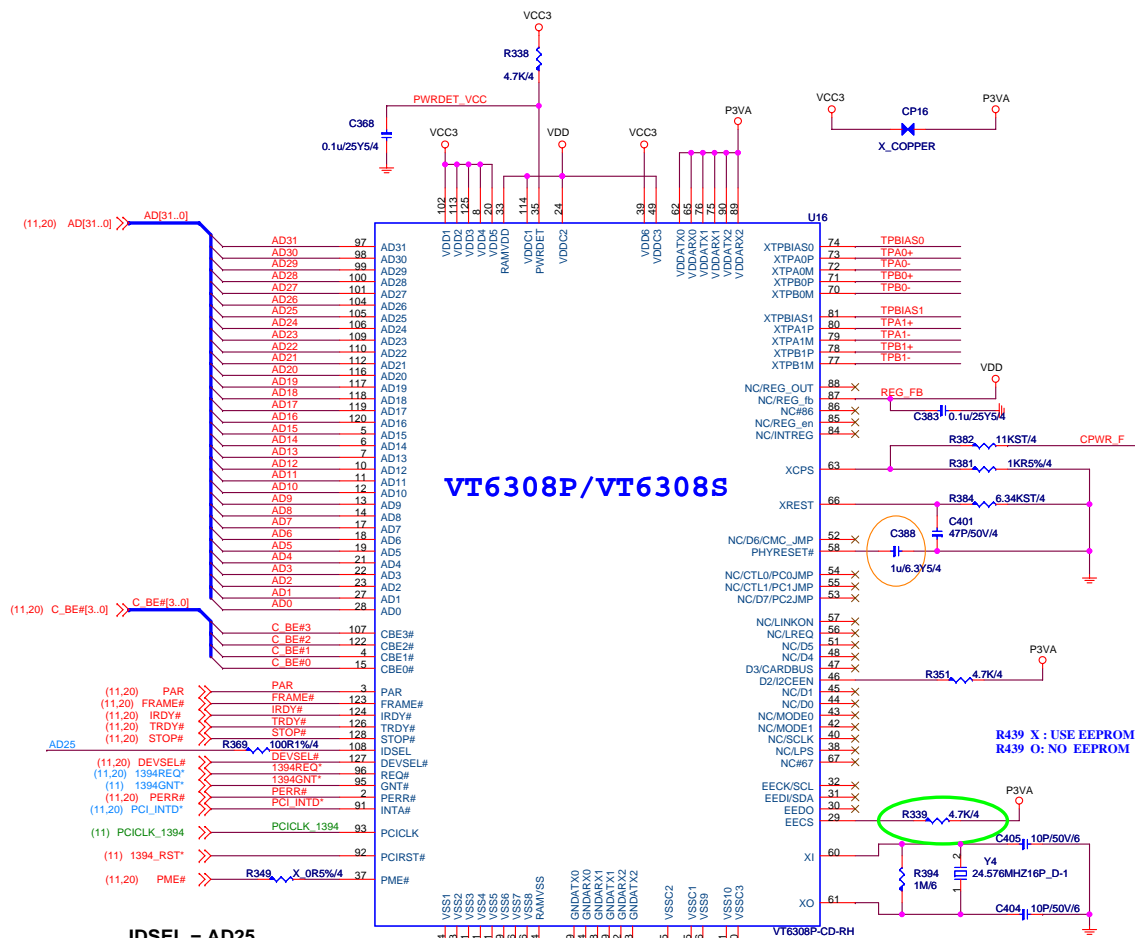


Giga-Lan	10/100-Lan
N58-22F0181-S42	N58-22F0201-S42
N58-22F0341-S42	N58-22F0341-S42
N58-22F0281-F02	N58-22F0281-F02
Link Yellow	Link Yellow
Active Blinking	Active Blinking
1000 Orange	100 Green
100 Green	10 None
10 None	
19	19
20	20
21	21
22	22





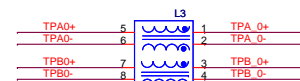
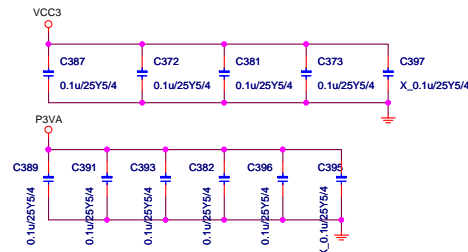
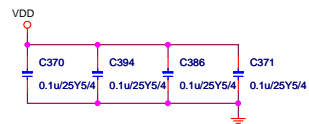
VT6308P - 1394 Controller



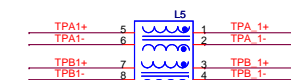
```

IDSEL = AD25
INT = PCI_INTD*
MASTER = 1394REQ*
          1394GNT*

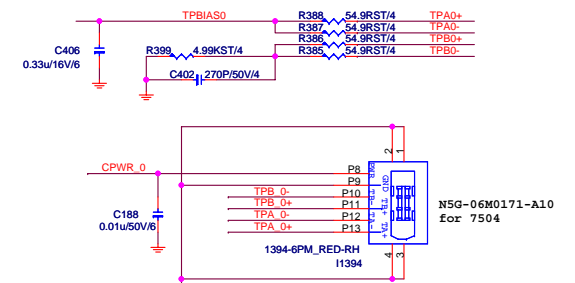
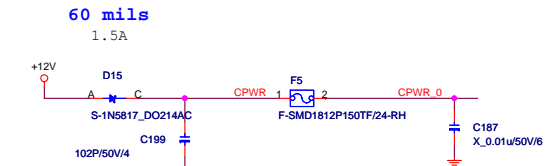
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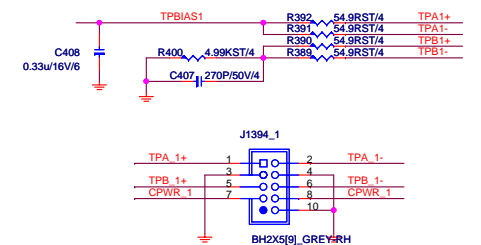
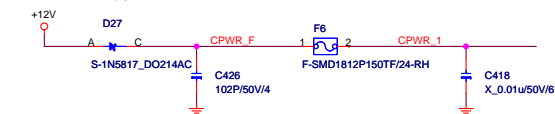
X_CMC-L12-121D017-LF



X_CMC-L12-121D017-LF



60 mils



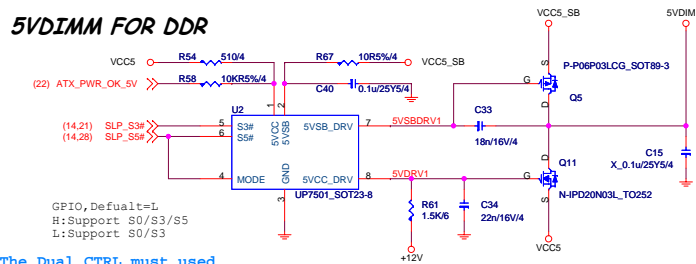
N32-2051571-H06
for MS-7504

For Intel 1394 pinheader



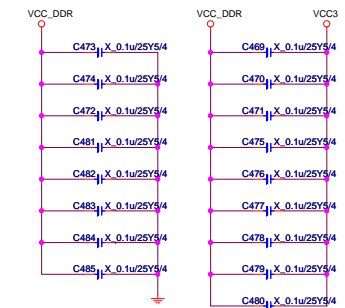
MICRO-STAR INT'L CO.,LTD			
MS-7504			
Size Custom	Document Description 1394 Controller - 6308P		Rev 10
Date: Thursday, September 20, 2007		Sheet	26 of 34

5VDIMM FOR DDR

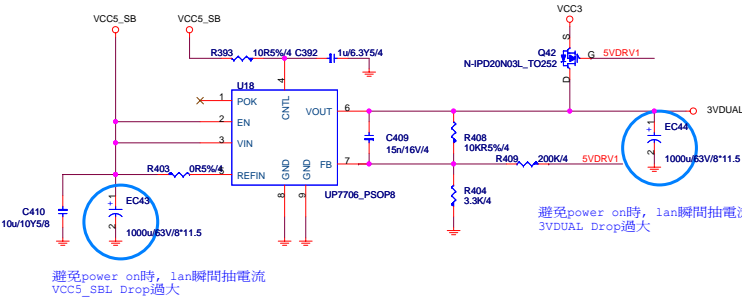


The Dual_CTRL must used default "Output- Low"

EMI Cross moat



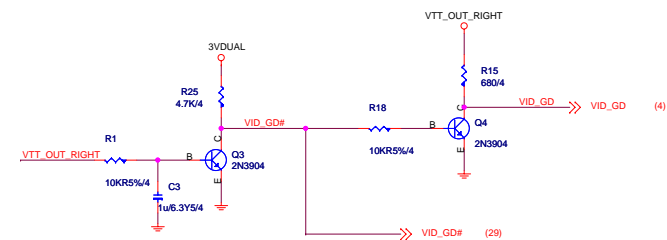
3VDUAL, 1.7A



避免power on時, lan瞬間抽電流
3VDUAL Drop過大

避免power on時, lan瞬間抽電流
VCC5_SBL Drop過大

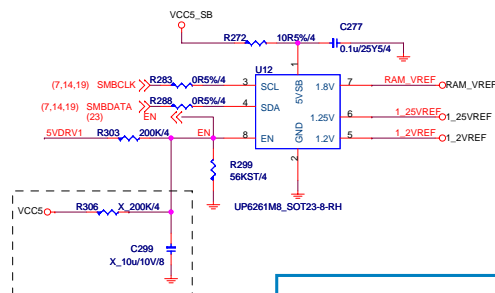
VID_GD# to PWM and VID_GD to CPU
for VRM10 power sequence.



Reference Voltage

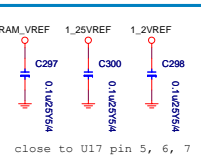
up6261: High Precision Voltage Console

ONLY OVER DDR Voltage to 2V



EN : 0.4~1.4V

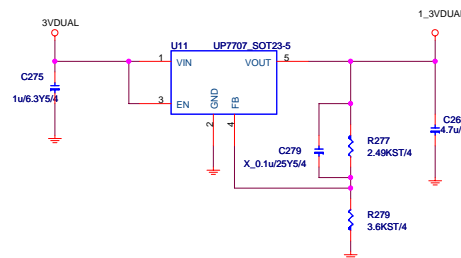
I32-0626109-U33, delay 20 ms
避免EN比 5VDRV1早, MCP73 core power
抽到VCC5_SB



close to U17 pin 5, 6, 7

1_3VDUAL, 25mA

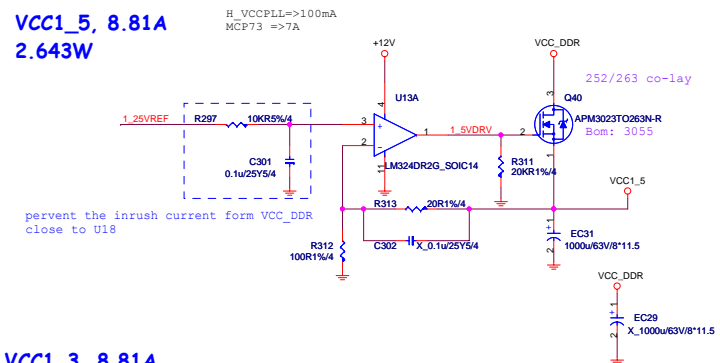
up7707: 600mA Low Dropout Linear Regulator



Vout=0.8* (R1+R2)/R1

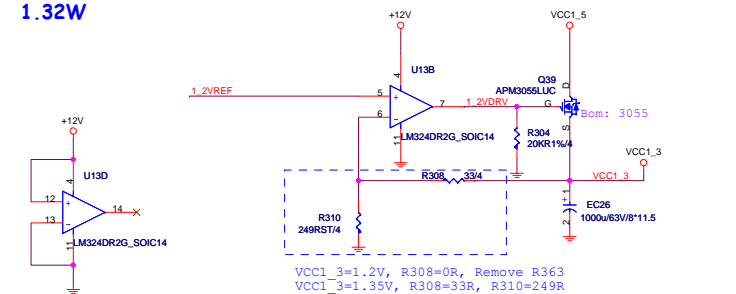
R277=1.8K, 1_3VDUAL=1.2V for chipset ver:A01
R279=2.47K, 1_3VDUAL=1.35V for chipset ver:A02 later

VCC1_5, 8.81A
2.643W



pervent the inrush current form VCC_DDR
close to U18

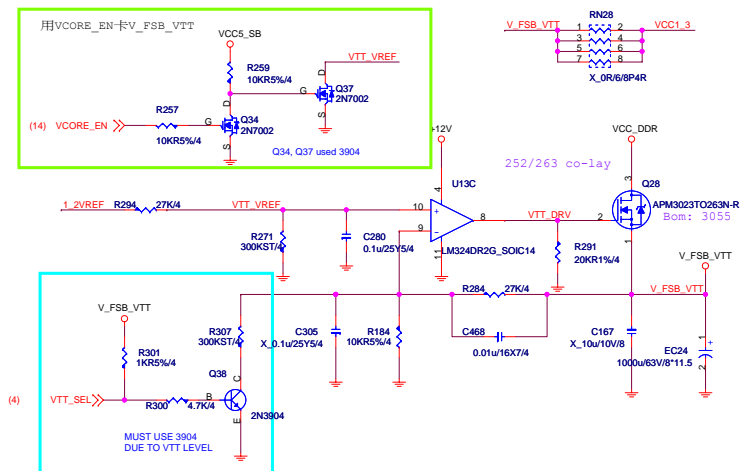
VCC1_3, 8.81A
1.32W



VCC1_3=1.2V, R308=0R, Remove R363
VCC1_3=1.35V, R308=33R, R310=249R

FSB_VTT, 6.1A
3.66W

U18:
I71-LM32403-T07
I71-LM32413-O05
I71-LM32413-F01
I71-LM32413-N04



VTT_SEL = L	V_FSB_VTT=1.1V	For future KENTSFIELD processor. (FSB1333, Quad-Core)
VTT_SEL = H	V_FSB_VTT=1.2V	For normal processors.



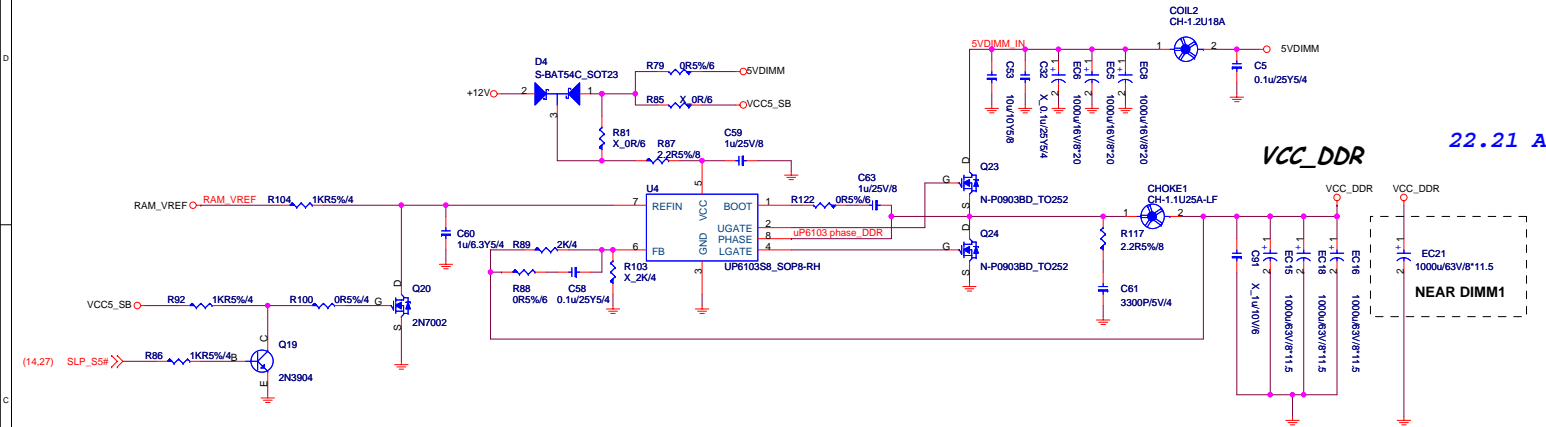
MICRO-STAR INT'L CO.,LTD

MS-7504

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Custom	ACPI Controller UPI	10
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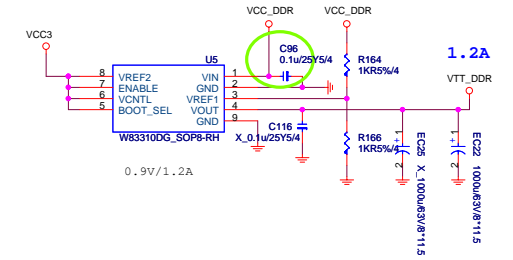
DDR II 1.8V POWER

$I_{ripple} = 22.21 \times 0.6 \times 0.8 / 1 = 10.66A$
 $2.35 \times 3 \times 1.7 = 11.985A > 10.08A$

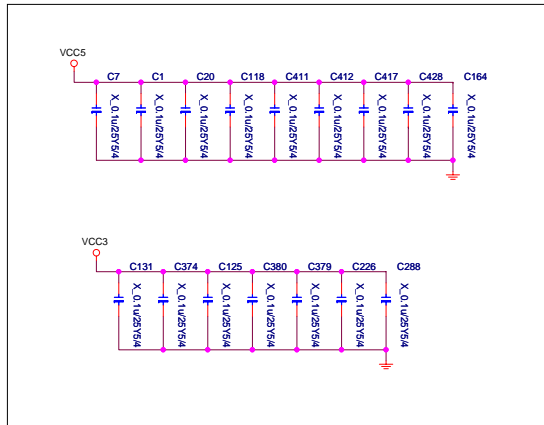


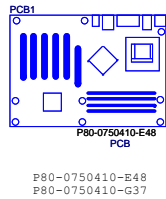
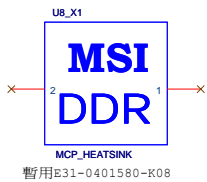
DDR VTT Power

To CPU Copper trace width > 200mils

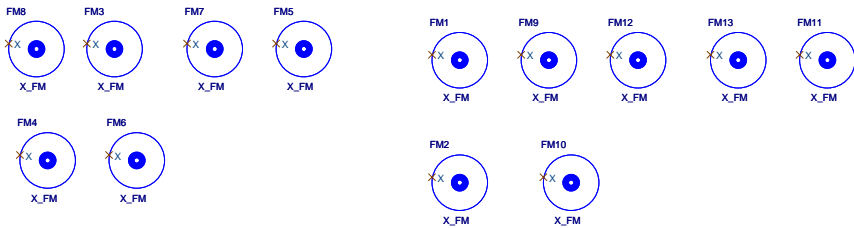


EMI

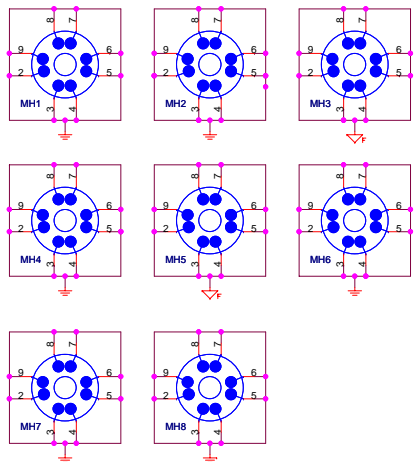




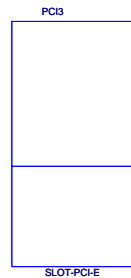
Optics Orientation Holes



Mounting Holes



Medion BLUE PCI SLOT



IDSEL = AD24
MASTER = PCI3REQ*
PCI3GNT*

Table 1-4. Comparison of Different MCP73 Models

Features	MCP73D	MCP73PV	MCP730	MCP73S	MCP73V
IGPU	No	DX9 SM3.0	DX9 SM3.0	DX9 SM3.0	DX9 SM3.0
Display Interface	N/A	HDMI, DVI, RGB, sDVO	DVI, RGB, sDVO	DVI, RGB, sDVO	RGB
Integrated HDCP	N/A	Yes	Yes	Yes	No
FSB	1333	1333	1333	1066	1066
Memory	DDR2-667 64-bit	DDR2-667 64-bit	DDR2-667 64-bit	DDR2-667 64-bit	DDR2-667 64-bit
PCI Express	1 x16, 2 x1	1 x16, 2 x1	1 x16, 2 x1	1 x16, 2 x1	1 x16, 2 x1
USB Ports	8	10	10	10	8
Networking	10/100/1000	10/100/1000	10/100/1000	10/100/1000	10/100
SATA II Ports	4	4	4	4	4
RAID	0, 1	0, 1, 0+1, 5	0, 1, 0+1, 5	0, 1, 0+1, 5	0, 1
PATA-133	Two devices	Two devices	Two devices	Two devices	Two devices
iGPU Dev-ID	N/A	0x7E0	0x7E1	0x7E2	0x7E3
Marketing Brand Name	NVIDIA nForce 630i	NVIDIA nForce 630i GeForce 7050	NVIDIA nForce 630i GeForce 7050	NVIDIA nForce 630i GeForce 7025	NVIDIA nForce 610i GeForce 7025

Table 1. MCP73 SKU Definition

Features	MCP73PV	MCP73S	MCP73V
FSB	1333	1333	1066
Memory	DDR2-800 64 bit	DDR2-667 64 bit	DDR2-667 64 bit
Display	HDMI, DVI, RGB, sDVO	DVI, RGB, sDVO	RGB
Integrated HDCP	Yes	Yes	No
Integrated Networking	10/100/1000	10/100/1000	10/100
Vista Premium	Yes	Yes	Yes
PCI-E	1 x16, 2 x1	1 x16, 2 x1	1 x16, 2 x1
USB Ports	10	10	8
SATA II Ports	4	4	4
RAID	0,1,0+1,5	0,1,0+1,5	0, 1
PATA Drives	2	2	2

Simulation

