MS-7758

ATX

Ver: 10(304.8x243.84)

Intel -MahoBay plamform H77

CPU:

IVY bridge LGA1155

System Chipset:

Panther Point H77(CO-LAY Z77)

Onboard Chip:

HD Audio Codec:ALC892 colay 887
LAN-RTL8111E colay8105E
SIO:Fintek F71868AD
Flash ROM: SPI 64 MB

Main Memory:

*DDRIII (1066/1333/1600MHz) * 4 (Dual Channel)*

ACPI:

UPI

PWM:

VRD12 -UT501 3+1 Phase

Expansion Slots:

*PCI Express (X16) Slot * 1*
*PCI Express (X1) Slot * 2*
*PCI Express (X4) Slot * 1*
*PCI Slot * 3*

Other:

SATA3.0 x2+SATA2.0 x4 (PCH)
*USB2.0 *10*
*REAL USB3.0 *2*
*FRONT USB3.0 *2*

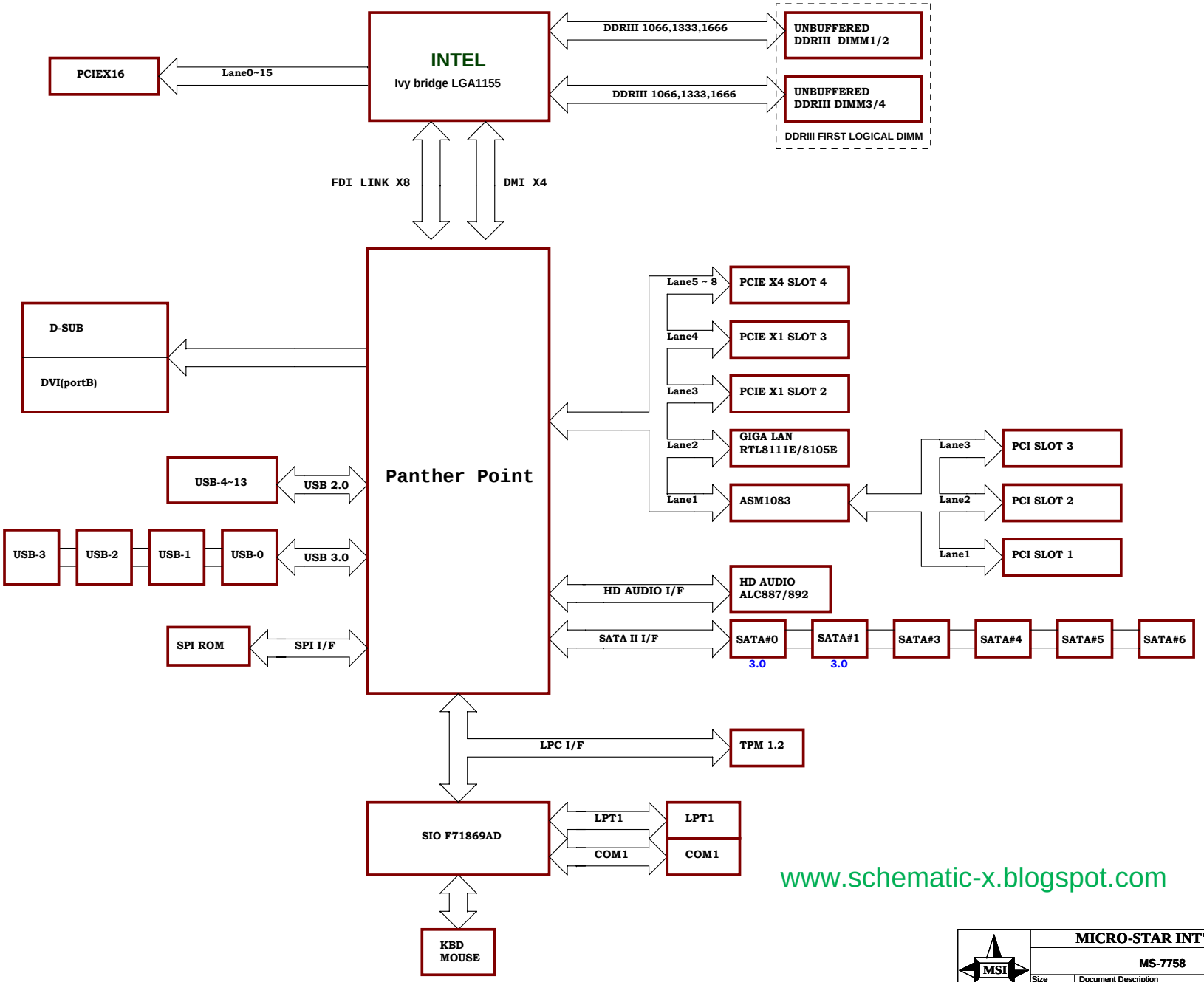
MICRO-STAR INT'L CO.,LTD

MS-7758

Size: Custom | Document Description: Cover Sheet | Rev: 0A

Date: Friday, January 06, 2012 | Sheet 1 of 44

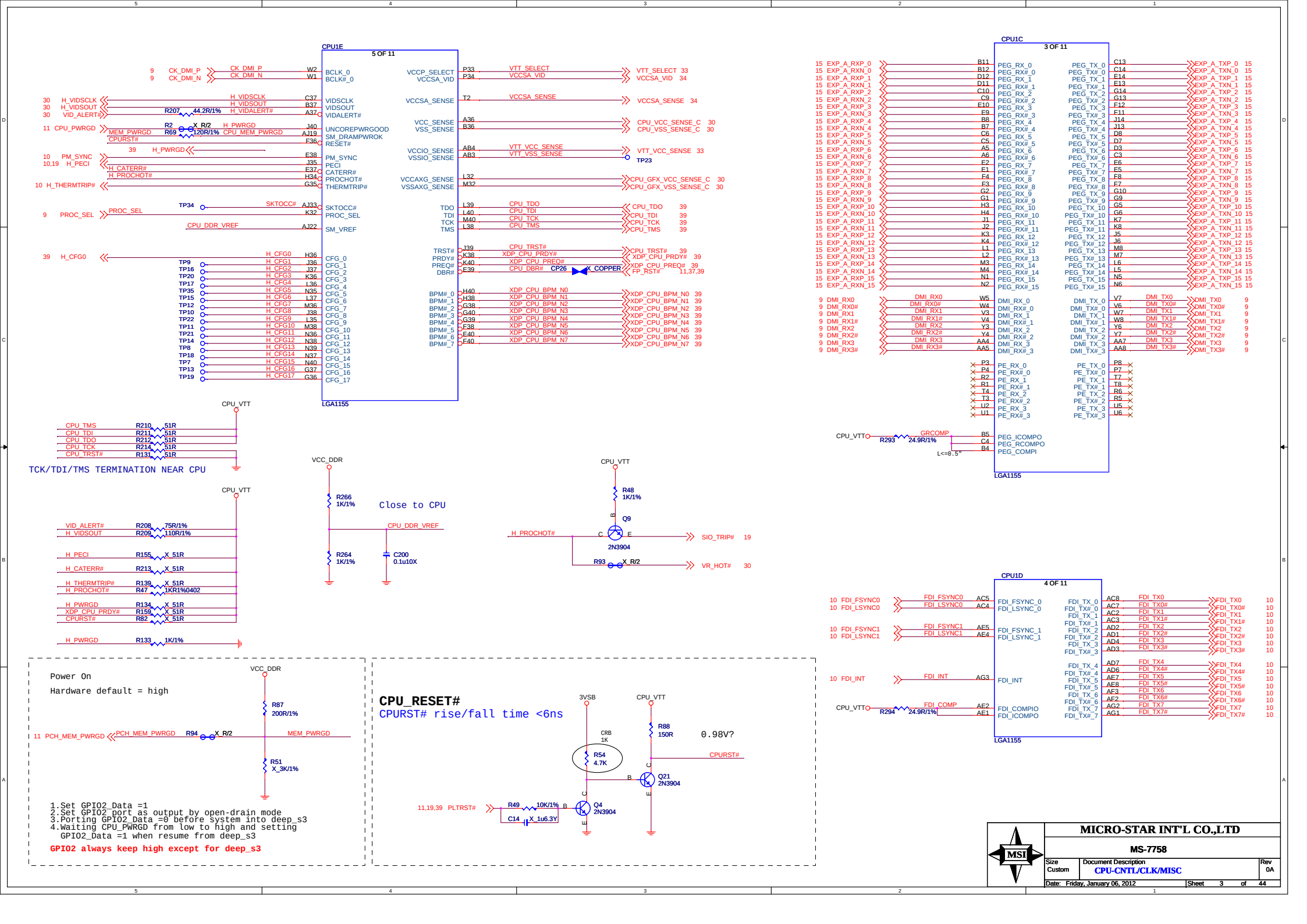
MS-7758 Block Diagram

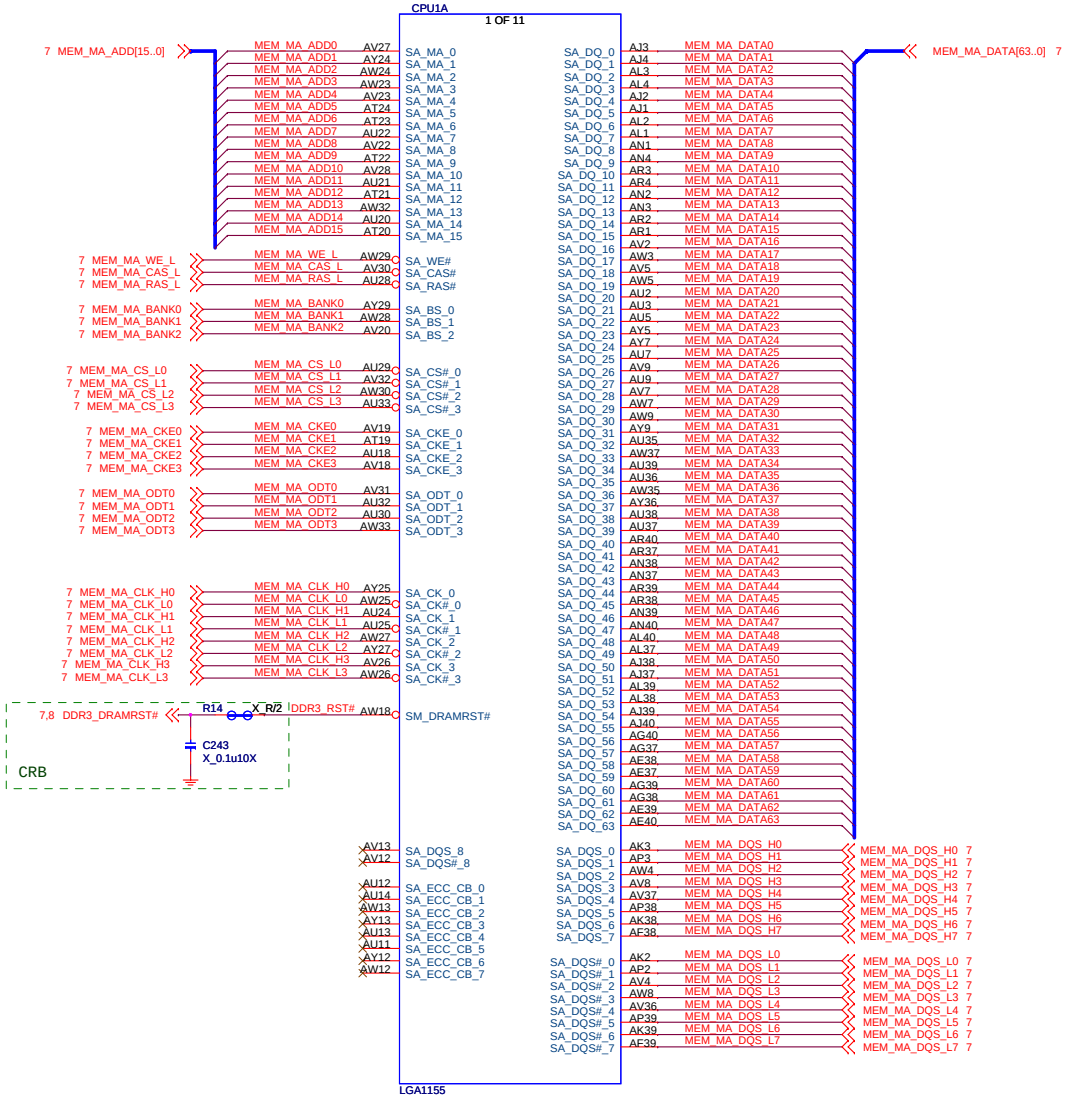


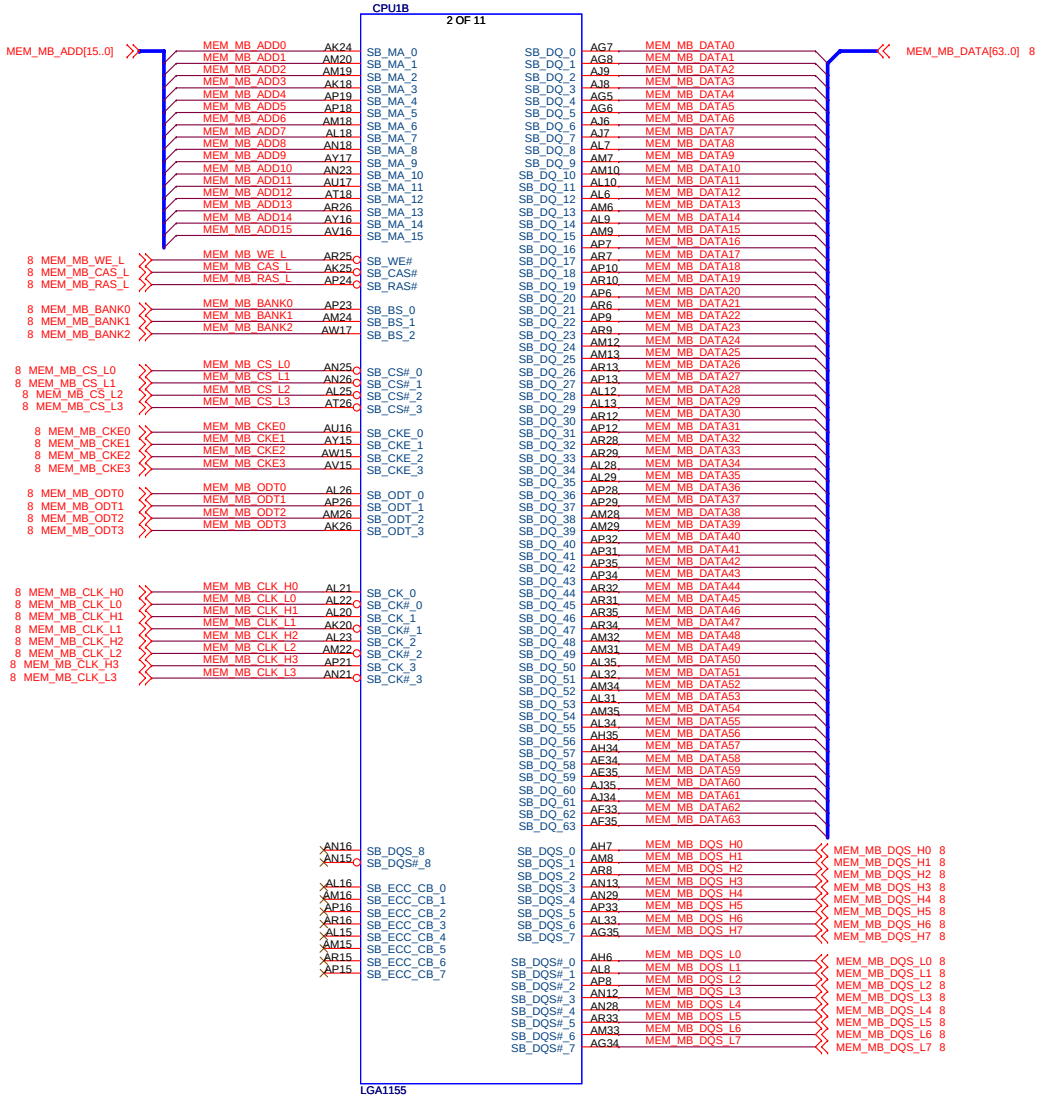
Slot Sequence:

- PCIE X1
- PCIE X16
- PCIE X1
- PCI SLOT
- PCIE X16(X4)
- PCI SLOT
- PCI SLOT

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7758	
Size: Custom	Document Description: Block Diagram	Rev: 0A
Date: Friday, January 06, 2012	Sheet 2 of 44	

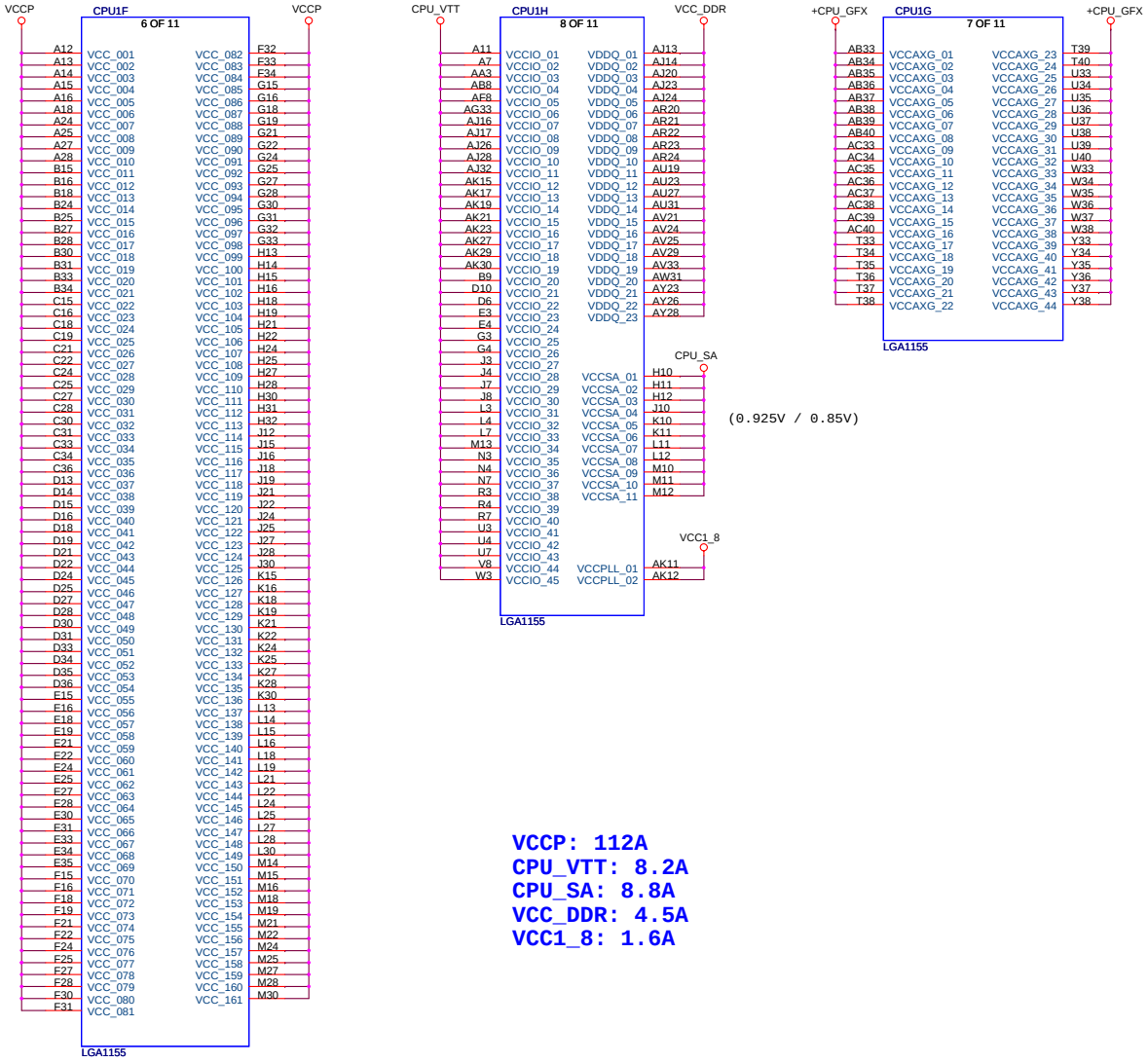

CPU1E
5 OF 11
LGA1155
CPU1C
3 OF 11
LGA1155
CPU1D
4 OF 11
LGA1155
TCK/TDI/TMS TERMINATION NEAR CPU
Close to CPU
Power On
Hardware default = high
CPU_RESET#
CPURST# rise/fall time <6ns
0.98V?
1.Set GPIO2_Data =1
2.Set GPIO2_port as output by open-drain mode
3.Porting GPIO2_Data =0 before system into deep_s3
4.Waiting CPU_PWRGD from low to high and setting
GPIO2_Data =1 when resume from deep_s3
GPIO2 always keep high except for deep_s3
MICRO-STAR INT'L CO.,LTD
MS-7758
Size
Custom
Document Description
CPU-CNTL/CLK/MISC
Rev
0A
Date: Friday, January 06, 2012
Sheet 3 of 44





MICRO-STAR INT'L CO.,LTD			
MS-7758			
Size: Custom	Document Description: CPU-Memory		Rev: 0A
Date: Friday, January 06, 2012		Sheet 4 of 44	

(1.05V / 1.00V)

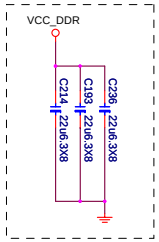


(0.925V / 0.85V)

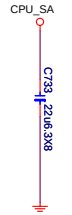
VCCP: 112A
CPU_VTT: 8.2A
CPU_SA: 8.8A
VCC_DDR: 4.5A
VCC1_8: 1.6A

+1.5V_DDR3-Decoupling

CPU SOCKET CAVITY CAPS

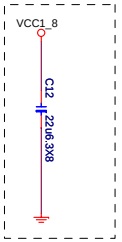


Backside



+CPU_SA Decoupling

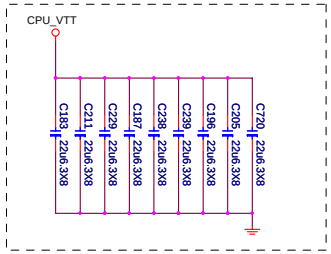
Backside



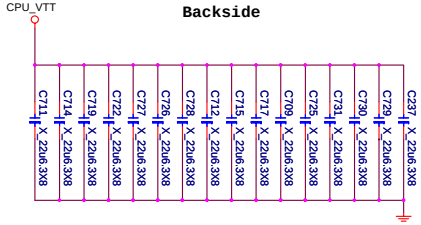
+VCC1_8 Decoupling

+CPU_VTT Decoupling

CPU SOCKET CAVITY CAPS

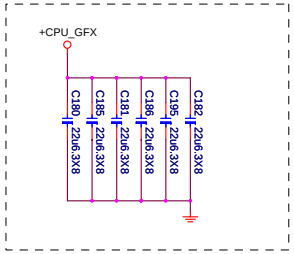


Backside

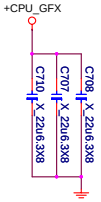


+CPU_GFX Decoupling

CPU SOCKET CAVITY CAPS

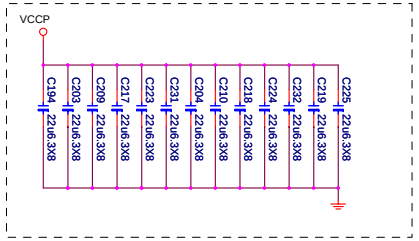


Backside

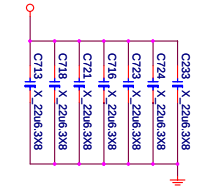


+CPU_VCCP-Decoupling

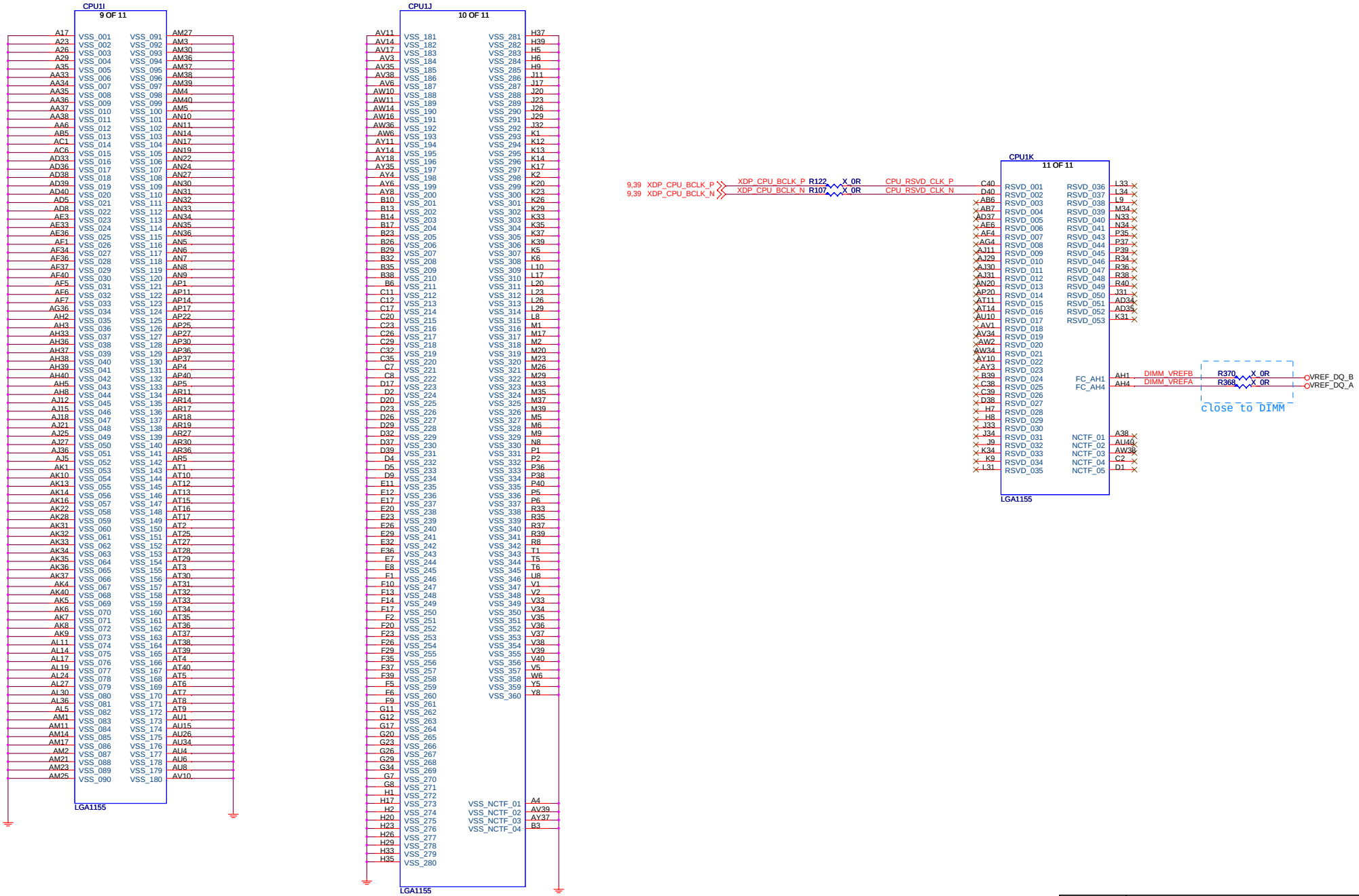
CPU SOCKET CAVITY CAPS



Backside

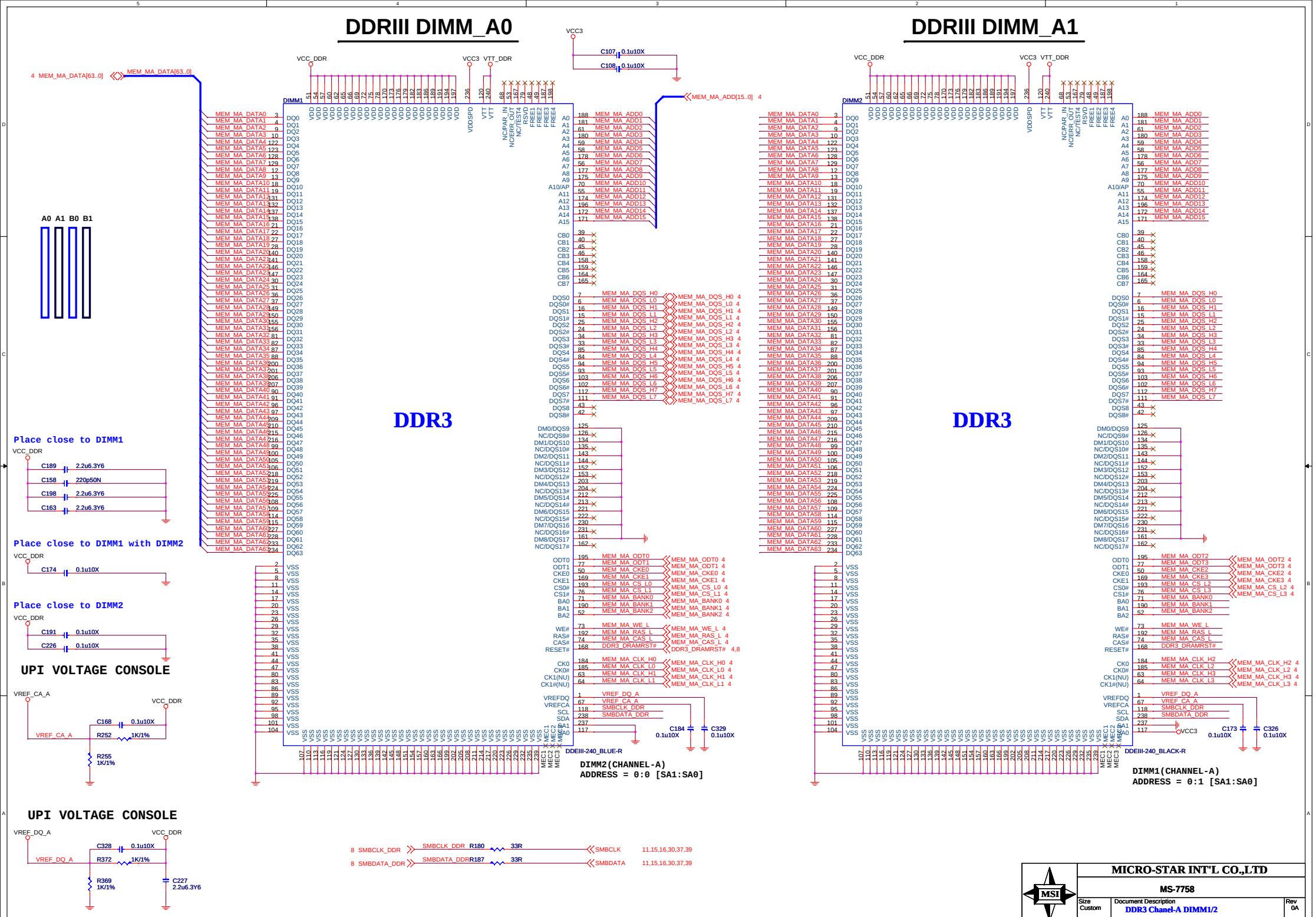


MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: CPU-Power	Rev: 0A
Date: Friday, January 06, 2012	Sheet 5 of 44	



MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: CPU-GND	Rev: 0A
Date: Friday, January 06, 2012	Sheet 6 of 44	

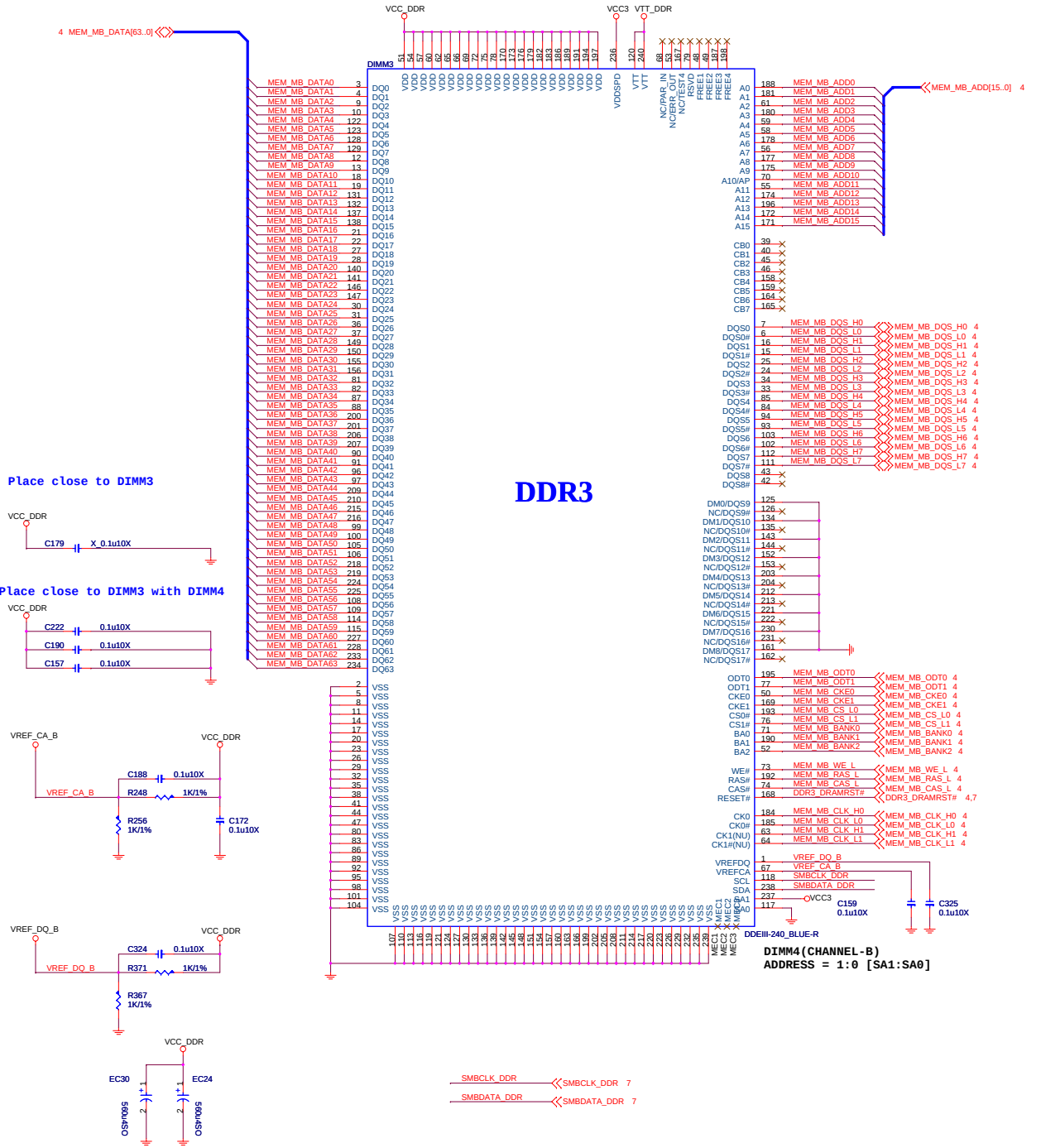
DDRIII DIMM_A0



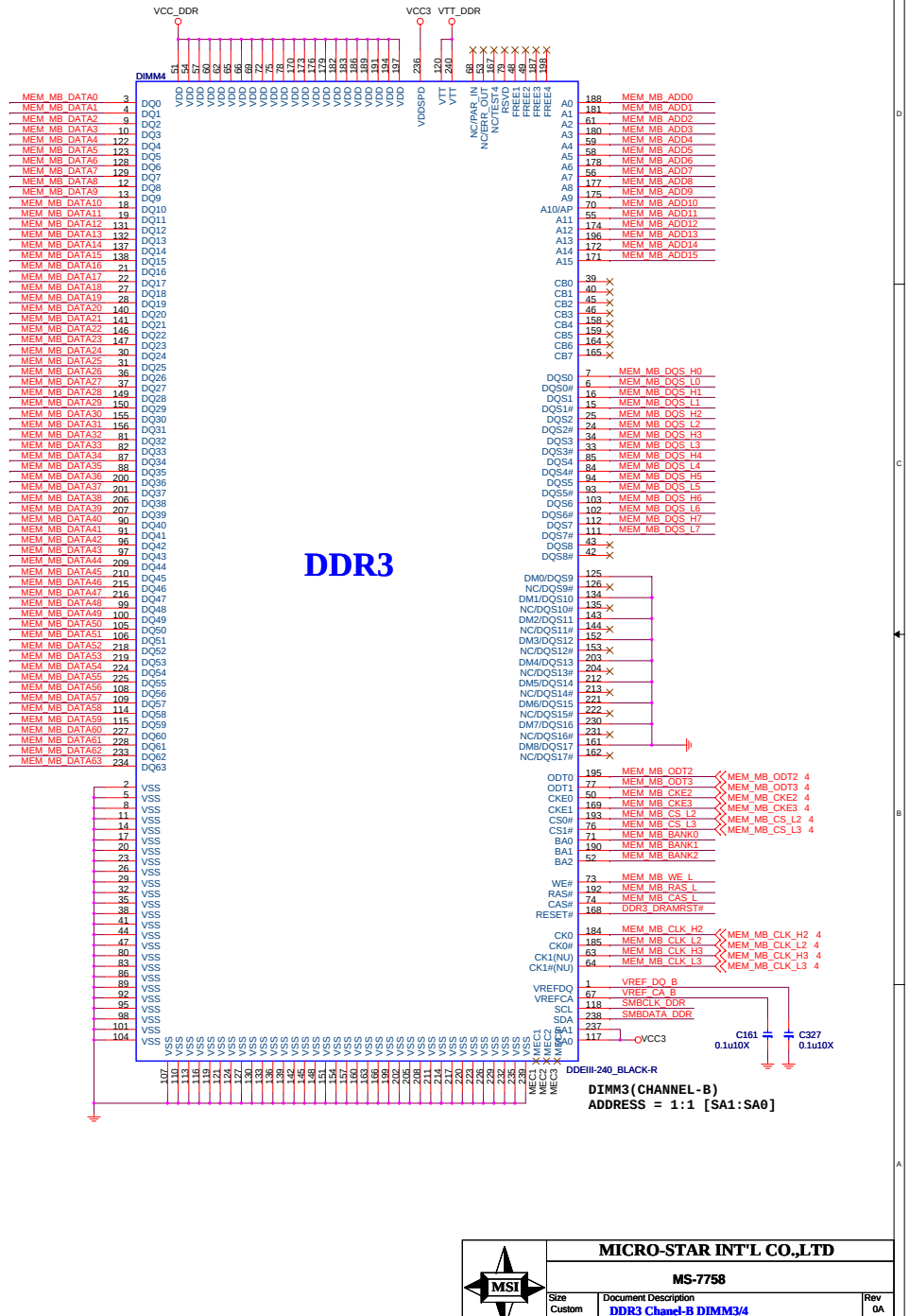
DDRIII DIMM_A1

MICRO-STAR INT'L CO.,LTD	
MS-7758	
Size: Custom	Document Description: DDR3 Chanel-A DIMM1/2
Rev: 0A	
Date: Friday, January 06, 2012	Sheet 7 of 44

DDRIII DIMM_B0



DDRIII DIMM_B1

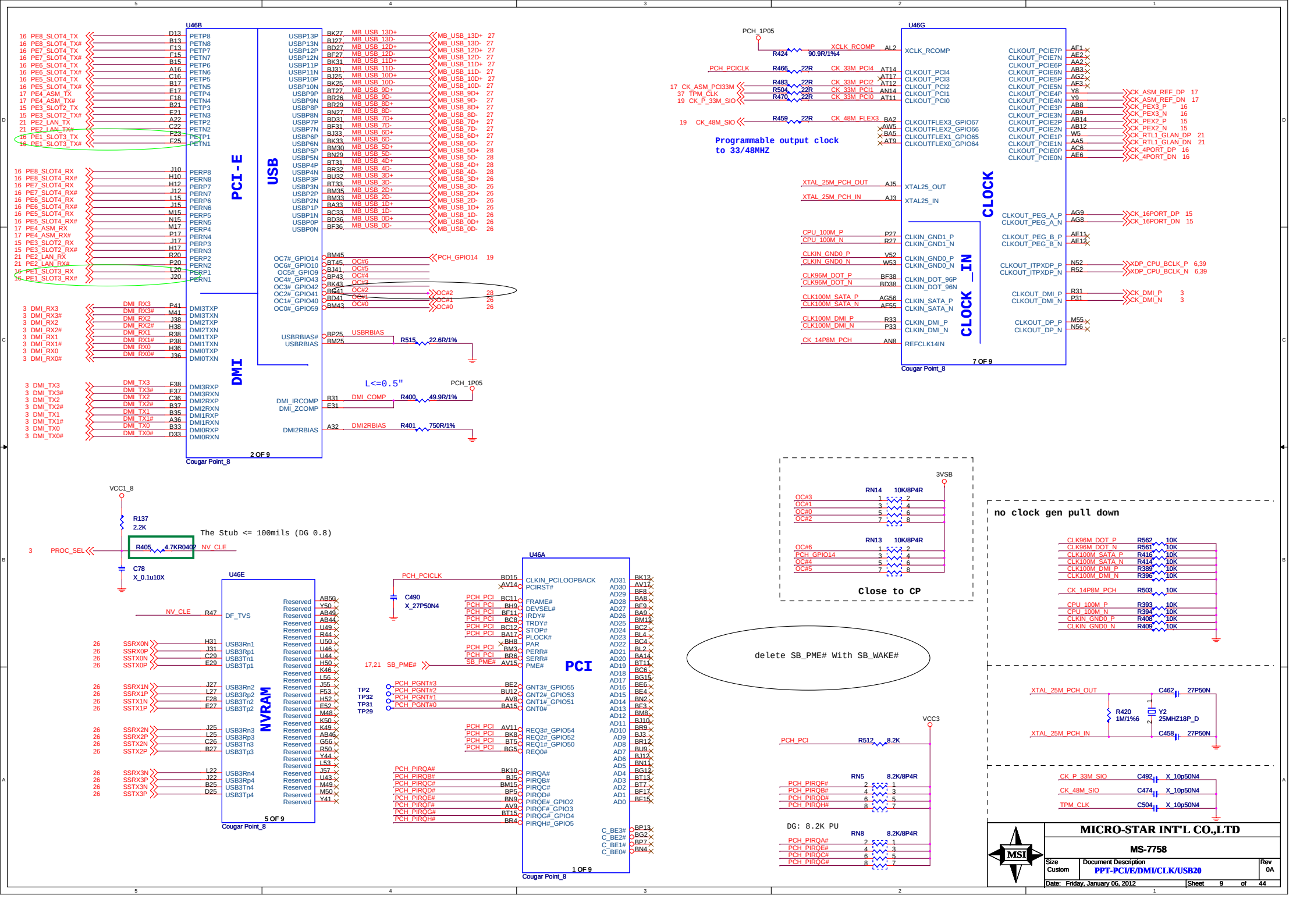


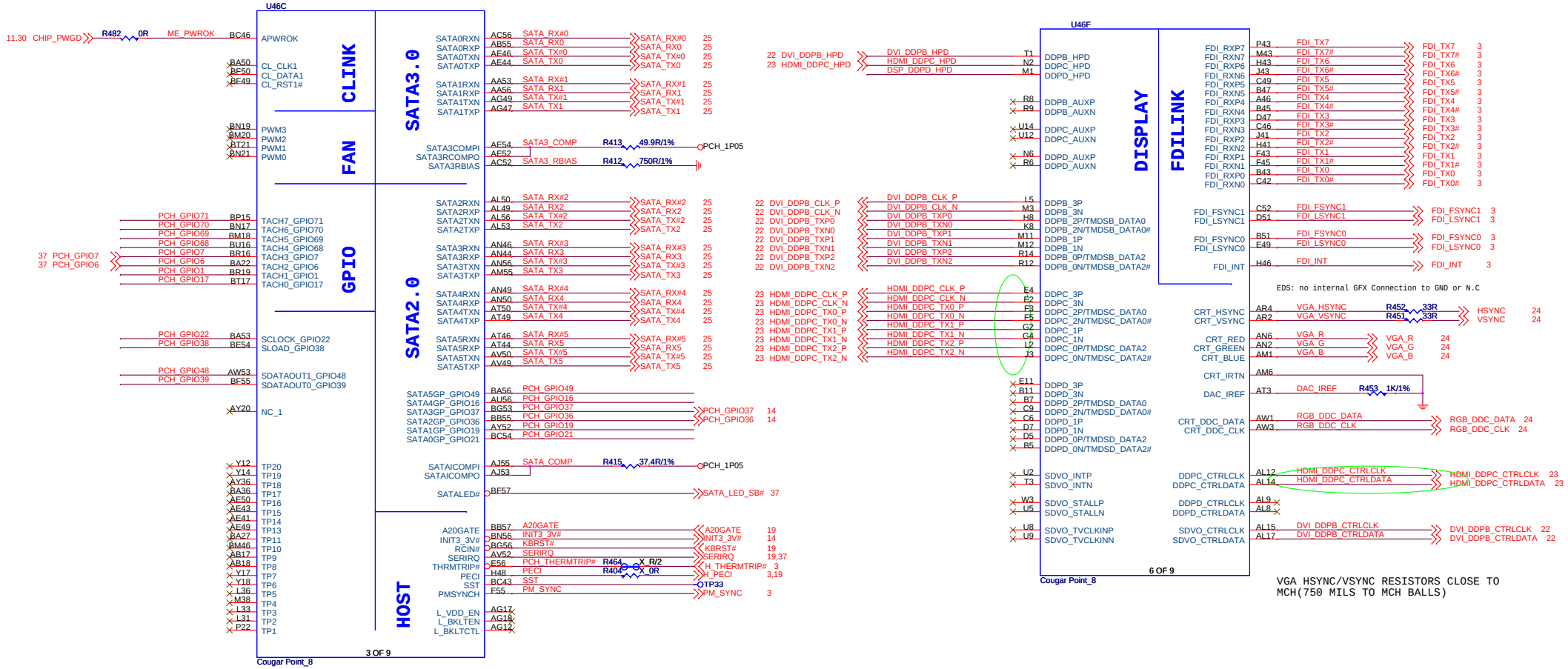
MICRO-STAR INT'L CO.,LTD

MS-7758

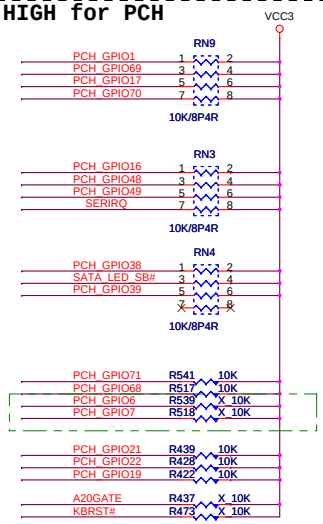
Size	Document Description	Rev
Custom	DDR3 Chanel-B DIMM3/4	0A

Date: Friday, January 06, 2012 | Sheet 8 of 44


U46B
PCI-E
USB
DMI
PETP8
PETN8
PETP7
PETN7
PETP6
PETN6
PETP5
PETN5
PETP4
PETN4
PETP3
PETN3
PETP2
PETN2
PETP1
PETN1
PERP8
PERN8
PERP7
PERN7
PERP6
PERN6
PERP5
PERN5
PERP4
PERN4
PERP3
PERN3
PERP2
PERN2
PERP1
PERN1
DMI3TXP
DMI3TXN
DMI2TXP
DMI2TXN
DMI1TXP
DMI1TXN
DMI0TXP
DMI0TXN
DMI3RXP
DMI3RXN
DMI2RXP
DMI2RXN
DMI1RXP
DMI1RXN
DMI0RXP
DMI0RXN
2 OF 9
Cougar Point_8
USBP13P
USBP13N
USBP12P
USBP12N
USBP11P
USBP11N
USBP10P
USBP10N
USBP9P
USBP9N
USBP8P
USBP8N
USBP7P
USBP7N
USBP6P
USBP6N
USBP5P
USBP5N
USBP4P
USBP4N
USBP3P
USBP3N
USBP2P
USBP2N
USBP1P
USBP1N
USBP0P
USBP0N
MB_USB_13D+
MB_USB_13D-
MB_USB_12D+
MB_USB_12D-
MB_USB_11D+
MB_USB_11D-
MB_USB_10D+
MB_USB_10D-
MB_USB_9D+
MB_USB_9D-
MB_USB_8D+
MB_USB_8D-
MB_USB_7D+
MB_USB_7D-
MB_USB_6D+
MB_USB_6D-
MB_USB_5D+
MB_USB_5D-
MB_USB_4D+
MB_USB_4D-
MB_USB_3D+
MB_USB_3D-
MB_USB_2D+
MB_USB_2D-
MB_USB_1D+
MB_USB_1D-
MB_USB_0D+
MB_USB_0D-
OC7#_GPIO14
OC6#_GPIO10
OC5#_GPIO9
OC4#_GPIO43
OC3#_GPIO42
OC2#_GPIO41
OC1#_GPIO40
OC0#_GPIO59
PCH_GPIO14
OC#6
OC#5
OC#4
OC#3
OC#2
OC#1
OC#0
USBRBIAS#
USBRBIAS
R515 22.6R/1%
DMI_IRCOMP
DMI_ZCOMP
DMI_COMP
R400 49.9R/1%
DMI2RBIAS
R401 750R/1%
L<=0.5"
PCH_1P05
DMI_RX3
DMI_RX3#
DMI_RX2
DMI_RX2#
DMI_RX1
DMI_RX1#
DMI_RX0
DMI_RX0#
DMI_TX3
DMI_TX3#
DMI_TX2
DMI_TX2#
DMI_TX1
DMI_TX1#
DMI_TX0
DMI_TX0#
U46G
CLOCK
CLOCK_IN
XCLK_RCOMP
R424 90.9R/1%4
CLKOUT_PCI4
CLKOUT_PCI3
CLKOUT_PCI2
CLKOUT_PCI1
CLKOUT_PCI0
PCH_PCICLK
R466 22R
CK_33M_PCI4
17 CK_ASM_PCI33M
37 TPM_CLK
19 CK_P_33M_SIO
R483 22R
R504 22R
R470 22R
CK_33M_PCI2
CK_33M_PCI1
CK_33M_PCI0
19 CK_48M_SIO
R459 22R
CK_48M_FLX3
CLKOUTFLEX3_GPIO67
CLKOUTFLEX2_GPIO66
CLKOUTFLEX1_GPIO65
CLKOUTFLEX0_GPIO64
Programmable output clock to 33/48MHZ
XTAL_25M_PCH_OUT
XTAL_25M_PCH_IN
XTAL25_OUT
XTAL25_IN
CPU_100M_P
CPU_100M_N
CLKIN_GND1_P
CLKIN_GND1_N
CLKIN_GND0_P
CLKIN_GND0_N
CLK96M_DOT_P
CLK96M_DOT_N
CLKIN_DOT_96P
CLKIN_DOT_96N
CLK100M_SATA_P
CLK100M_SATA_N
CLKIN_SATA_P
CLKIN_SATA_N
CLK100M_DMI_P
CLK100M_DMI_N
CLKIN_DMI_P
CLKIN_DMI_N
CK_14P8M_PCH
REFCLK14IN
CLKOUT_PCIE7P
CLKOUT_PCIE7N
CLKOUT_PCIE6P
CLKOUT_PCIE6N
CLKOUT_PCIE5P
CLKOUT_PCIE5N
CLKOUT_PCIE4P
CLKOUT_PCIE4N
CLKOUT_PCIE3P
CLKOUT_PCIE3N
CLKOUT_PCIE2P
CLKOUT_PCIE2N
CLKOUT_PCIE1P
CLKOUT_PCIE1N
CLKOUT_PCIE0P
CLKOUT_PCIE0N
CLKOUT_PEG_A_P
CLKOUT_PEG_A_N
CLKOUT_PEG_B_P
CLKOUT_PEG_B_N
CLKOUT_ITPXDP_P
CLKOUT_ITPXDP_N
CLKOUT_DMI_P
CLKOUT_DMI_N
CLKOUT_DP_P
CLKOUT_DP_N
CK_ASM_REF_DP
CK_ASM_REF_DN
CK_PEX3_P
CK_PEX3_N
CK_PEX2_P
CK_PEX2_N
CK_RTL1_GLAN_DP
CK_RTL1_GLAN_DN
CK_4PORT_DP
CK_4PORT_DN
CK_16PORT_DP
CK_16PORT_DN
XDP_CPU_BCLK_P
XDP_CPU_BCLK_N
CK_DMI_P
CK_DMI_N
7 OF 9
Cougar Point_8
VCC1_8
R137 2.2K
PROC_SEL
R405 4.7KR0402
NV_CLE
C78 X_0.1u10X
The Stub <= 100mils (DG 0.8)
U46E
NVRAM
DF_TVS
USB3Rn1
USB3Rp1
USB3Tn1
USB3Tp1
USB3Rn2
USB3Rp2
USB3Tn2
USB3Tp2
USB3Rn3
USB3Rp3
USB3Tn3
USB3Tp3
USB3Rn4
USB3Rp4
USB3Tn4
USB3Tp4
SSRX0N
SSRX0P
SSTX0N
SSTX0P
SSRX1N
SSRX1P
SSTX1N
SSTX1P
SSRX2N
SSRX2P
SSTX2N
SSTX2P
SSRX3N
SSRX3P
SSTX3N
SSTX3P
Reserved
5 OF 9
Cougar Point_8
U46A
PCI
PCH_PCICLK
C490 X_27P50N4
SB_PME#
TP2
TP32
TP31
TP29
PCH_PGNT#3
PCH_PGNT#2
PCH_PGNT#1
PCH_PGNT#0
PCH_PIRQA#
PCH_PIRQB#
PCH_PIRQC#
PCH_PIRQD#
PCH_PIRQE#
PCH_PIRQF#
PCH_PIRQG#
PCH_PIRQH#
CLKIN_PCILOOPBACK
PCIRST#
FRAME#
DEVSEL#
IRDY#
TRDY#
STOP#
PLOCK#
PAR
PERR#
SERR#
PME#
GNT3#_GPIO55
GNT2#_GPIO53
GNT1#_GPIO51
GNT0#
REQ3#_GPIO54
REQ2#_GPIO52
REQ1#_GPIO50
REQ0#
PIRQA#
PIRQB#
PIRQC#
PIRQD#
PIRQE#_GPIO2
PIRQF#_GPIO3
PIRQG#_GPIO4
PIRQH#_GPIO5
C_BE3#
C_BE2#
C_BE1#
C_BE0#
1 OF 9
Cougar Point_8
3VSB
RN14 10K/8P4R
RN13 10K/8P4R
OC#3
OC#1
OC#0
OC#2
OC#6
PCH_GPIO14
OC#4
OC#5
Close to CP
no clock gen pull down
CLK96M_DOT_P R562 10K
CLK96M_DOT_N R561 10K
CLK100M_SATA_P R416 10K
CLK100M_SATA_N R414 10K
CLK100M_DMI_P R389 10K
CLK100M_DMI_N R396 10K
CK_14P8M_PCH R503 10K
CPU_100M_P R393 10K
CPU_100M_N R394 10K
CLKIN_GND0_P R408 10K
CLKIN_GND0_N R409 10K
delete SB_PME# With SB_WAKE#
VCC3
PCH_PCI R512 8.2K
RN5 8.2K/8P4R
RN8 8.2K/8P4R
DG: 8.2K PU
XTAL_25M_PCH_OUT C462 27P50N
R420 1M/1%6
Y2 25MHZ18P_D
XTAL_25M_PCH_IN C458 27P50N
CK_P_33M_SIO C492 X_10p50N4
CK_48M_SIO C474 X_10p50N4
TPM_CLK C504 X_10p50N4
MICRO-STAR INT'L CO.,LTD
MS-7758
Size Custom
Document Description PPT-PCI/E/DMI/CLK/USB20
Rev 0A
Date: Friday, January 06, 2012
Sheet 9 of 44



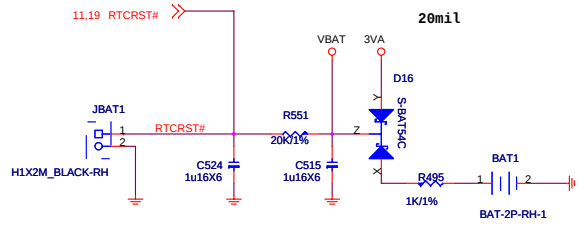
Pull HIGH for PCH



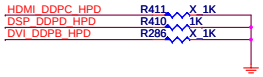
RTC and CLR_CMOS

Clear CMOS

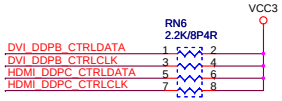
CMOS CLEAR JUMPER	
JBAT1 Clear CMOS	
1 - 2	Clear CMOS



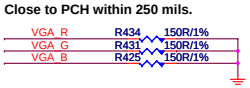
No Display port(pull down)



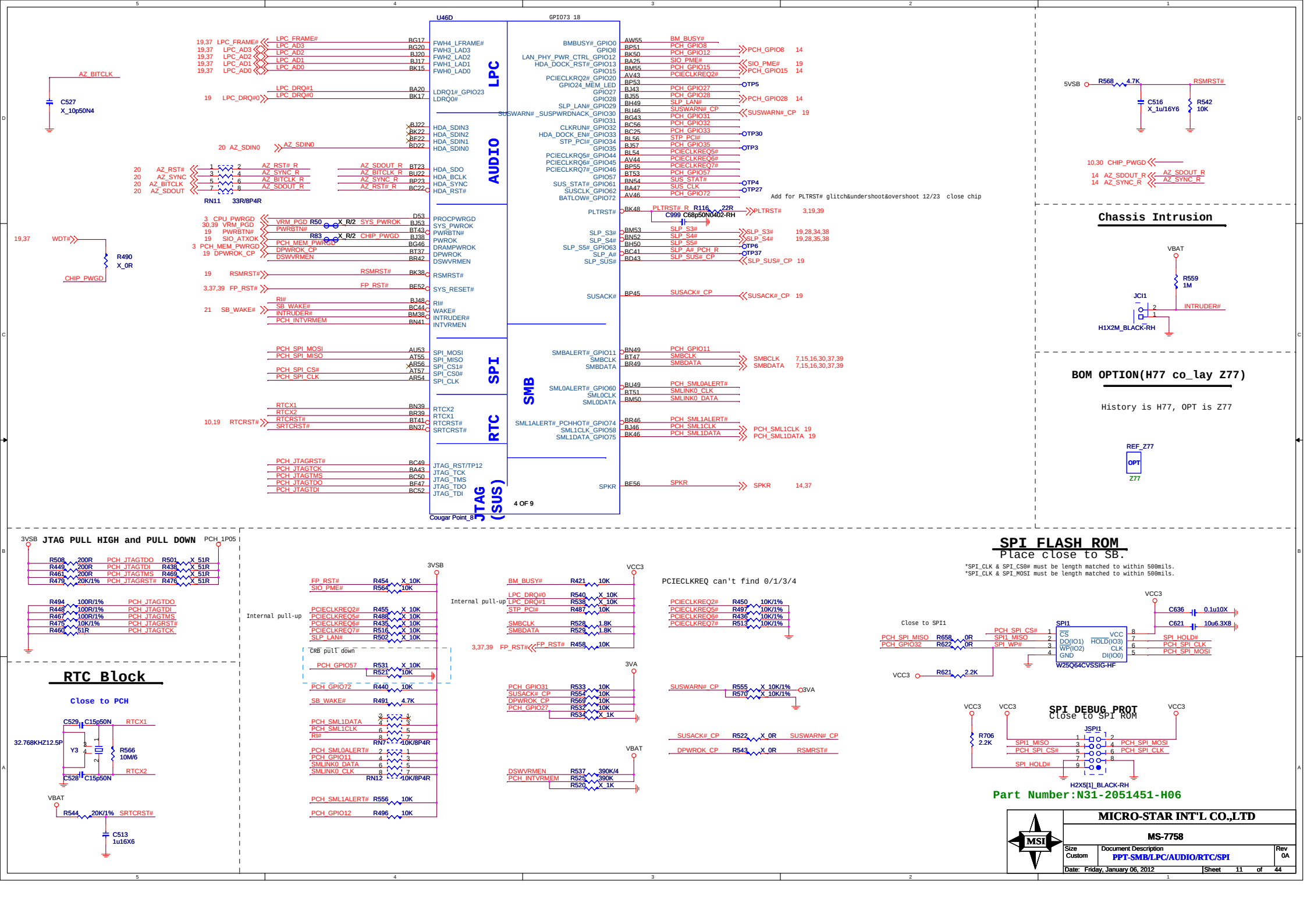
Enable VGA(CTRLCLK/DATA Pull High)

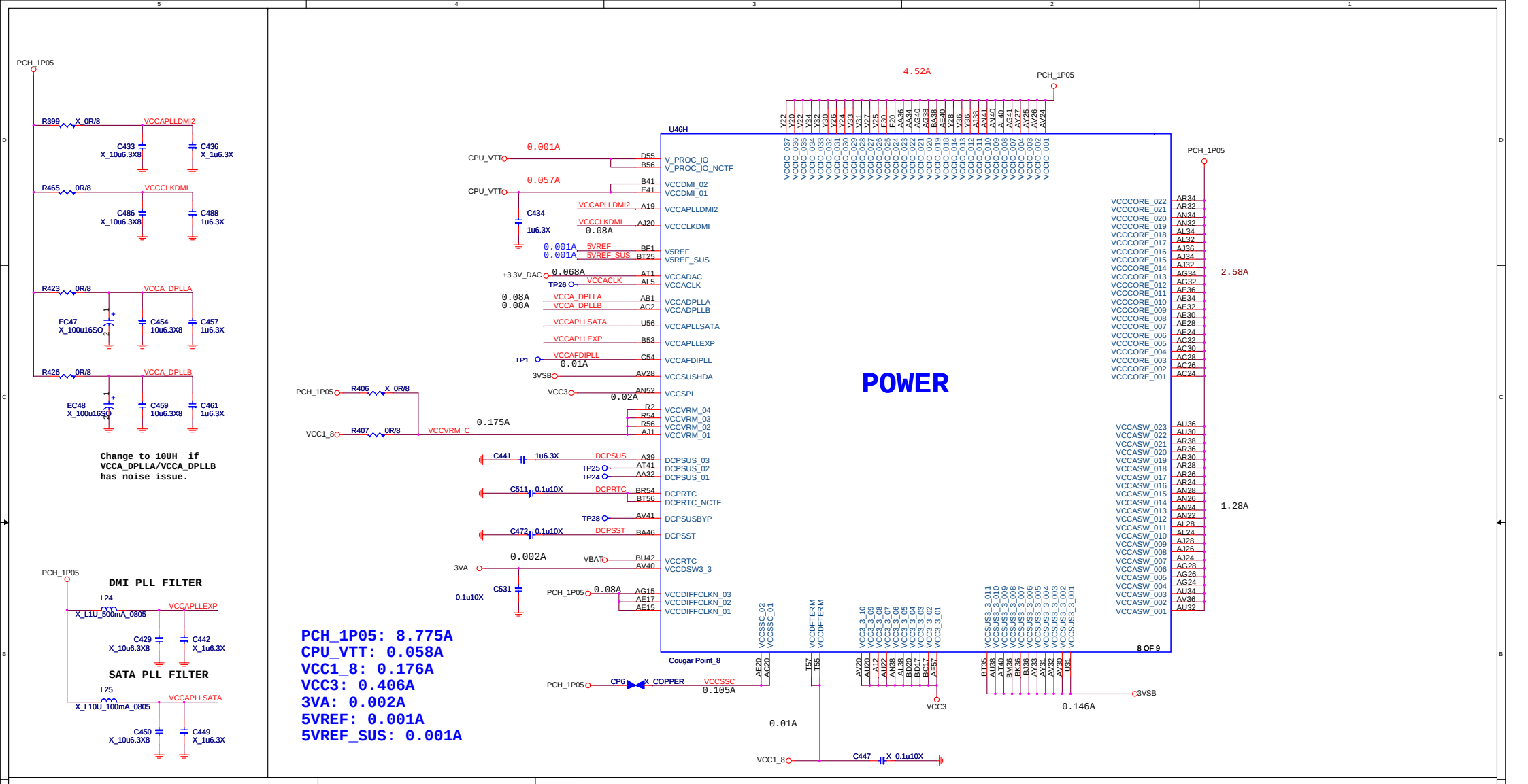


Close to PCH within 250 mils.

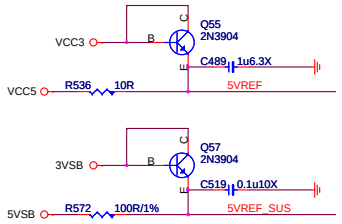


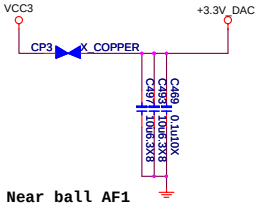
MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: PPT-SATA/HOST/GPIO/VGA/CCMOS	Rev: 0A
Date: Friday, January 06, 2012	Sheet 10 of 44	


U46D
LPC
AUDIO
SPI
SMB
RTC
JTAG (SUS)
Cougar Point_8
4 OF 9
GPI073 18
LPC_FRAME#
LPC_AD3
LPC_AD2
LPC_AD1
LPC_AD0
LPC_DRQ#1
LPC_DRQ#0
AZ_BITCLK
C527
X_10p50N4
AZ_SDIN0
RN11
33R/8P4R
AZ_RST#
AZ_SYNC
AZ_BITCLK
AZ_SDOUT
AZ_RST#_R
AZ_SYNC_R
AZ_BITCLK_R
AZ_SDOUT_R
AZ_SDOUT_R
AZ_BITCLK_R
AZ_SYNC_R
AZ_RST#_R
WDT#
R490
X_0R
CHIP_PWGD
VRM_PGD
PWRBTN#
SIO_ATXOK
PCH_MEM_PWRGD
DPWROK_CP
DSWVRMEN
R50
R83
X_R/2
SYS_PWROK
CHIP_PWGD
RSMRST#
FP_RST#
SB_WAKE#
INTRUDER#
PCH_INTVRMEM
PCH_SPI_MOSI
PCH_SPI_MISO
PCH_SPI_CS#
PCH_SPI_CLK
RTCX1
RTCX2
RTCRST#
SRTCRST#
PCH_JTAGRST#
PCH_JTAGTCK
PCH_JTAGTMS
PCH_JTAGTDO
PCH_JTAGTDI
BMBUSY#_GPIO0
LAN_PHY_PWR_CTRL_GPIO12
HDA_DOCK_RST#_GPIO13
PCIECLKRQ2#_GPIO20
GPIO24_MEM_LED
SLP_LAN#_GPIO29
SUSWARN#_SUSPWRDNACK_GPIO30
CLKRUN#_GPIO32
HDA_DOCK_EN#_GPIO33
STP_PCI#_GPIO34
PCIECLKRQ5#_GPIO44
PCIECLKRQ6#_GPIO45
PCIECLKRQ7#_GPIO46
SUS_STAT#_GPIO61
SUSCLK_GPIO62
BATLOW#_GPIO72
BM_BUSY#
PCH_GPIO8
PCH_GPIO12
SIO_PME#
PCH_GPIO15
PCIECLKREQ2#
PCH_GPIO27
PCH_GPIO28
SLP_LAN#
SUSWARN#_CP
PCH_GPIO31
PCH_GPIO32
PCH_GPIO33
STP_PCI#
PCH_GPIO35
PCIECLKREQ5#
PCIECLKREQ6#
PCIECLKREQ7#
PCH_GPIO57
SUS_STAT#
SUS_CLK
PCH_GPIO72
TP5
TP30
TP3
TP4
TP27
TP6
TP37
Add for PLTRST# glitch&undershoot&overshoot 12/23 close chip
PLTRST#
PLTRST# R R116 22R
C999 C68p50N0402-RH
SLP_S3#
SLP_S4#
SLP_S5#
SLP_A#
SLP_A# PCH R
SLP_SUS#
SLP_SUS#_CP
SUSACK#
SUSACK#_CP
SMBALERT#_GPIO11
SMBCLK
SMBDATA
SML0ALERT#_GPIO60
SML0CLK
SML0DATA
SML1ALERT#_PCHHOT#_GPIO74
SML1CLK_GPIO58
SML1DATA_GPIO75
PCH_GPIO11
SMBCLK
SMBDATA
PCH_SML0ALERT#
SMLINK0_CLK
SMLINK0_DATA
PCH_SML1ALERT#
PCH_SML1CLK
PCH_SML1DATA
SPKR
5VSB
R568
4.7K
RSMRST#
C516
X_1u/16Y6
R542
10K
10,30 CHIP_PWGD
14 AZ_SDOUT_R
14 AZ_SYNC_R
Chassis Intrusion
VBAT
R559
1M
JCI1
INTRUDER#
H1X2M_BLACK-RH
BOM OPTION(H77 co_lay Z77)
History is H77, OPT is Z77
REF_Z77
OPT
Z77
JTAG PULL HIGH and PULL DOWN
3VSB
PCH_1P05
R508 200R PCH_JTAGTDO R501 X_51R
R449 200R PCH_JTAGTDI R438 X_51R
R461 200R PCH_JTAGTMS R469 X_51R
R479 20K/1% PCH_JTAGRST# R476 X_51R
R494 100R/1% PCH_JTAGTDO
R448 100R/1% PCH_JTAGTDI
R467 100R/1% PCH_JTAGTMS
R475 10K/1% PCH_JTAGRST#
R460 51R PCH_JTAGTCK
RTC Block
Close to PCH
C529 C15p50N RTCX1
32.768KHZ12.5P
Y3
R566
10M/6
C528 C15p50N RTCX2
VBAT
R544 20K/1% SRTCRST#
C513
1u16X6
Internal pull-up
CRB pull down
FP_RST# R454 X_10K
SIO_PME# R564 10K
PCIECLKREQ2# R455 X_10K
PCIECLKREQ5# R488 X_10K
PCIECLKREQ6# R435 X_10K
PCIECLKREQ7# R516 X_10K
SLP_LAN# R502 X_10K
PCH_GPIO57 R531 X_10K
R521 10K
PCH_GPIO72 R440 10K
SB_WAKE# R491 4.7K
PCH_SML1DATA
PCH_SML1CLK
RI#
RN7 10K/8P4R
PCH_SML0ALERT#
PCH_GPIO11
SMLINK0_DATA
SMLINK0_CLK
RN12 10K/8P4R
PCH_SML1ALERT# R556 10K
PCH_GPIO12 R496 10K
VCC3
BM_BUSY# R421 10K
LPC_DRQ#0 R540 X_10K
LPC_DRQ#1 R538 X_10K
STP_PCI# R487 10K
SMBCLK R528 1.8K
SMBDATA R529 1.8K
3,37,39 FP_RST# FP_RST# R458 10K
3VA
PCH_GPIO31 R533 10K
SUSACK#_CP R554 10K
DPWROK_CP R569 10K
PCH_GPIO27 R532 10K
R534 X_1K
VBAT
DSWVRMEN R537 390K/4
PCH_INTVRMEM R525 390K
R520 X_1K
PCIECLKREQ can't find 0/1/3/4
PCIECLKREQ2# R450 10K/1%
PCIECLKREQ5# R497 10K/1%
PCIECLKREQ6# R436 10K/1%
PCIECLKREQ7# R513 10K/1%
SUSWARN#_CP R555 X_10K/1%
R570 X_10K/1%
SUSACK#_CP R522 X_0R SUSWARN#_CP
DPWROK_CP R543 X_0R RSMRST#
SPI FLASH ROM
Place close to SB.
*SPI_CLK & SPI_CS0# must be length matched to within 500mils.
*SPI_CLK & SPI_MOSI must be length matched to within 500mils.
Close to SPI1
PCH_SPI_MISO R658 0R
PCH_GPIO32 R622 0R
PCH_SPI_CS#
SPI1_MISO
SPI_WP#
SPI1
CS
DO(IO1)
WP(IO2)
GND
VCC
HOLD(IO3)
CLK
DI(IO0)
W25Q64CVSSIG-HF
C636 0.1u10X
C621 10u6.3X8
SPI_HOLD#
PCH_SPI_CLK
PCH_SPI_MOSI
R621 2.2K
SPI DEBUG PROT
Close to SPI ROM
R706 2.2K
JSPI1
SPI1_MISO
PCH_SPI_CS#
SPI_HOLD#
PCH_SPI_MOSI
PCH_SPI_CLK
H2X5[1]_BLACK-RH
Part Number:N31-2051451-H06
MICRO-STAR INT'L CO.,LTD
MS-7758
Size Custom
Document Description PPT-SMB/LPC/AUDIO/RTC/SPI
Rev 0A
Date: Friday, January 06, 2012
Sheet 11 of 44

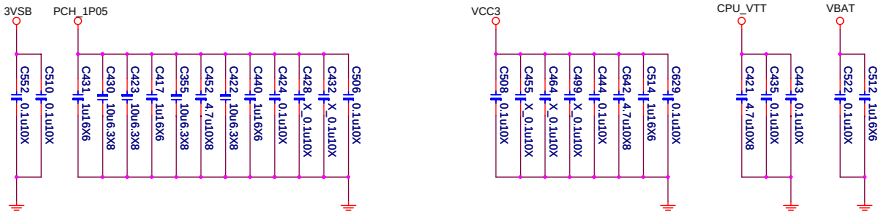


5VREF & 5VREF_SUS Sequencing Circuit

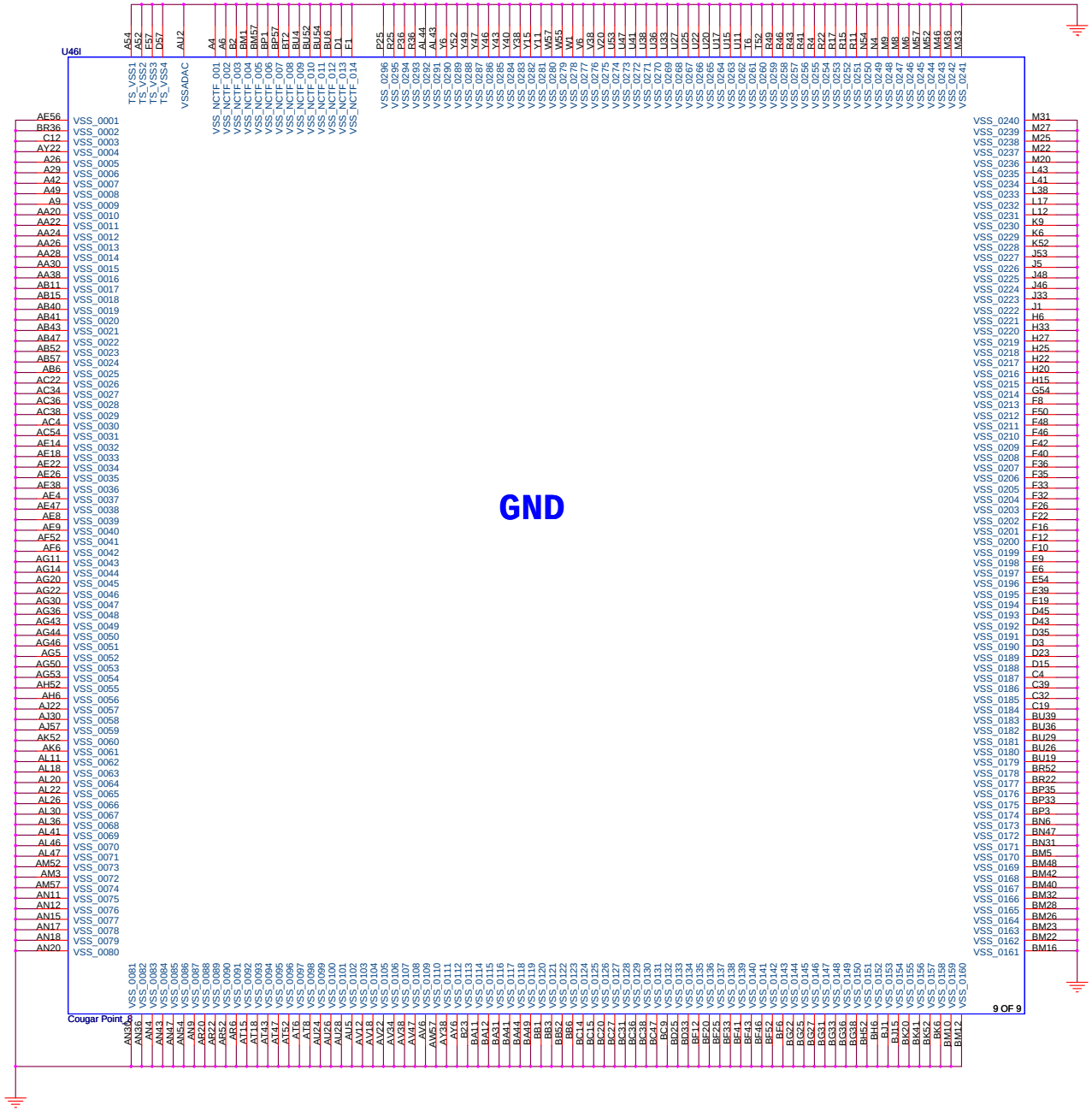




PCH decoupling cap



MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: PPT-POWER	Rev: 0A
Date: Friday, January 06, 2012	Sheet 12 of 44	



MICRO-STAR INT'L CO.,LTD	
MS-7758	
Size: Custom	Document Description: PPT-GND/NVRAM/USB30
Rev: 0A	
Date: Friday, January 06, 2012	Sheet 13 of 44

PCH Straps

SPKR
0 : Default Mode:
1 : No Reboot Mode with TCO Disabled:

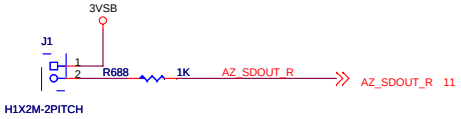
Do not pull low.

HDA_SYNC
OD PLL VR SUPPLY SEL
0: 1.8V SUPPLY *
1: 1.5V SUPPLY

Internal weak pull down. Do not pull up.

Enable TLS:GPIO15
Pull up with 1k Ohm to VccSus3.3.
Default (Disable TLS):
Leave NC. Internal pull down.

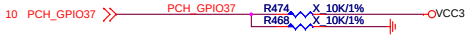
BTM
Leave floating. Do not pull low.
FCIM
Pull low with 1k Ohm to ground.
FCIM. Can be override by
softstrap through ME.



Default
Do not pull high.
Disable ME in Manufacturing Mode
Connect to VccSusHDA with 1k Ohm pull-up
resistor through a jumper.

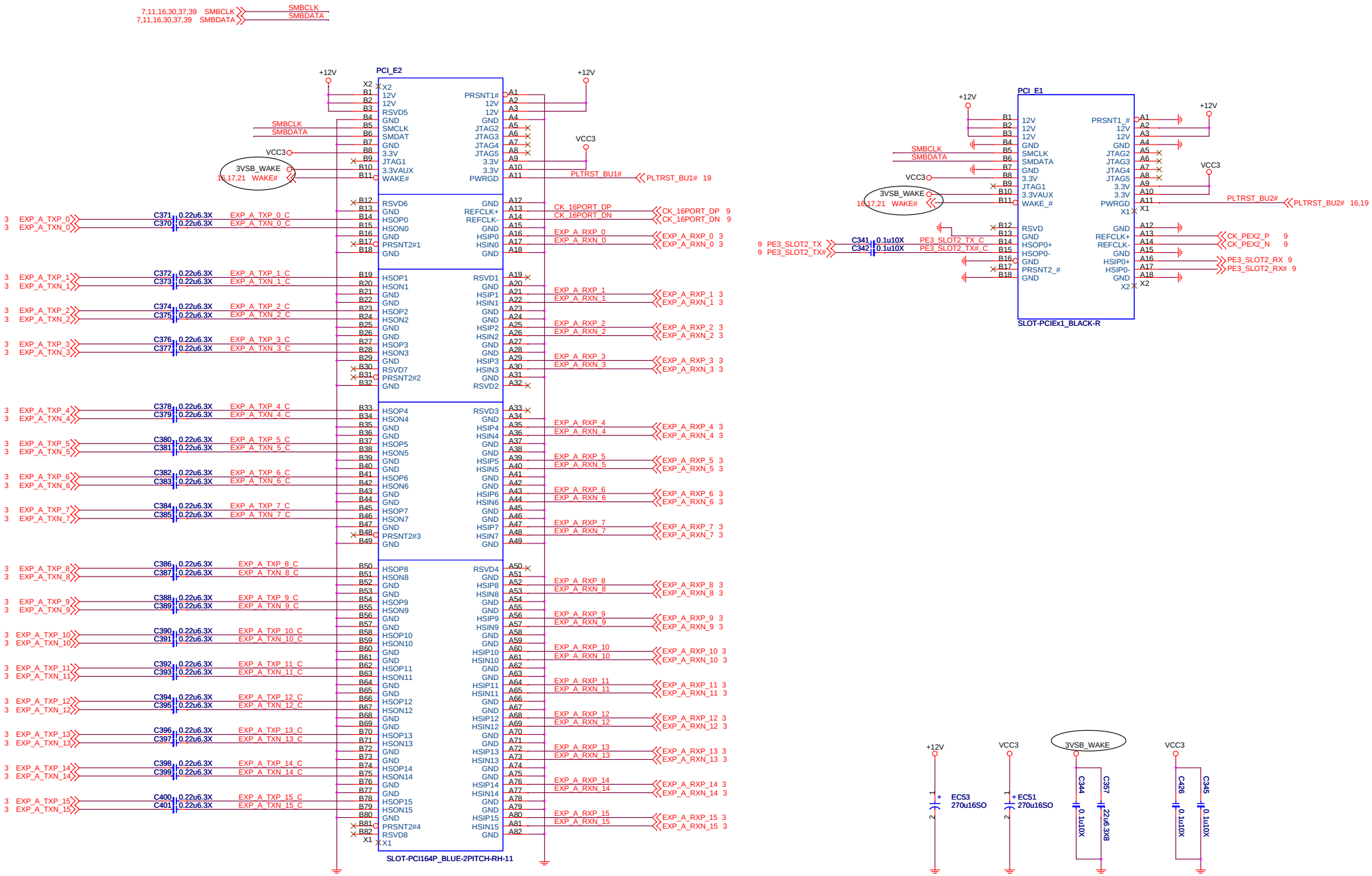
Internal weak pull up. Do not pull low.
On die PLL voltage regulator

Since Pin has strap functionality that requires internal pull-down to be sampled at rising PWROK, following guidelines are required to be followed:
a) When Used as SATA2GP/SATA3GP for Mechanical Presence detect - Use a weak external pull-up (150K-200K ohms) to Vcc3_3 OR use 10K external pull-up that is enabled only after PLTRST# de-assertion.
b) When Used as GP Input (Pin HW default) Ensure GPI is not driven high during strap sampling window
When Unused as GPIO or SATA[x]GP Use 8.2K-10K pull-down to ground.



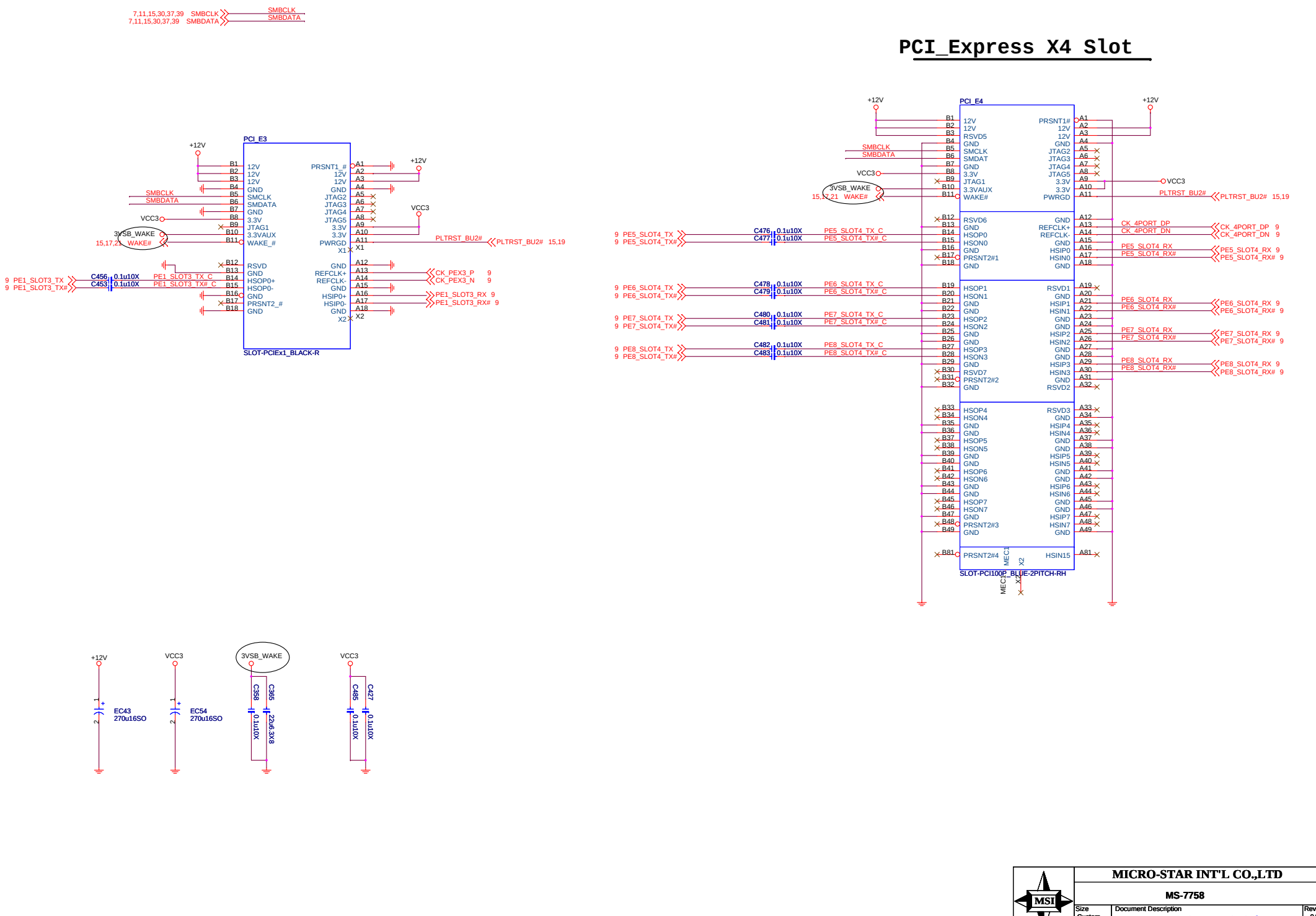
Since Pin has strap functionality that requires internal pull-down to be sampled at rising PWROK, following guidelines are required to be followed:
a) When Used as SATA2GP/SATA3GP for Mechanical Presence detect - Use a weak external pull-up (150K-200K ohms) to Vcc3_3 OR use 10K external pull-up that is enabled only after PLTRST# de-assertion.
b) When Used as GP Input (Pin HW default) Ensure GPI is not driven high during strap sampling window
When Unused as GPIO or SATA[x]GP Use 8.2K-10K pull-down to ground.

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7758	
Size: Custom	Document Description: PPT Strap	Rev: 0A
Date: Friday, January 06, 2012	Sheet 14 of 44	

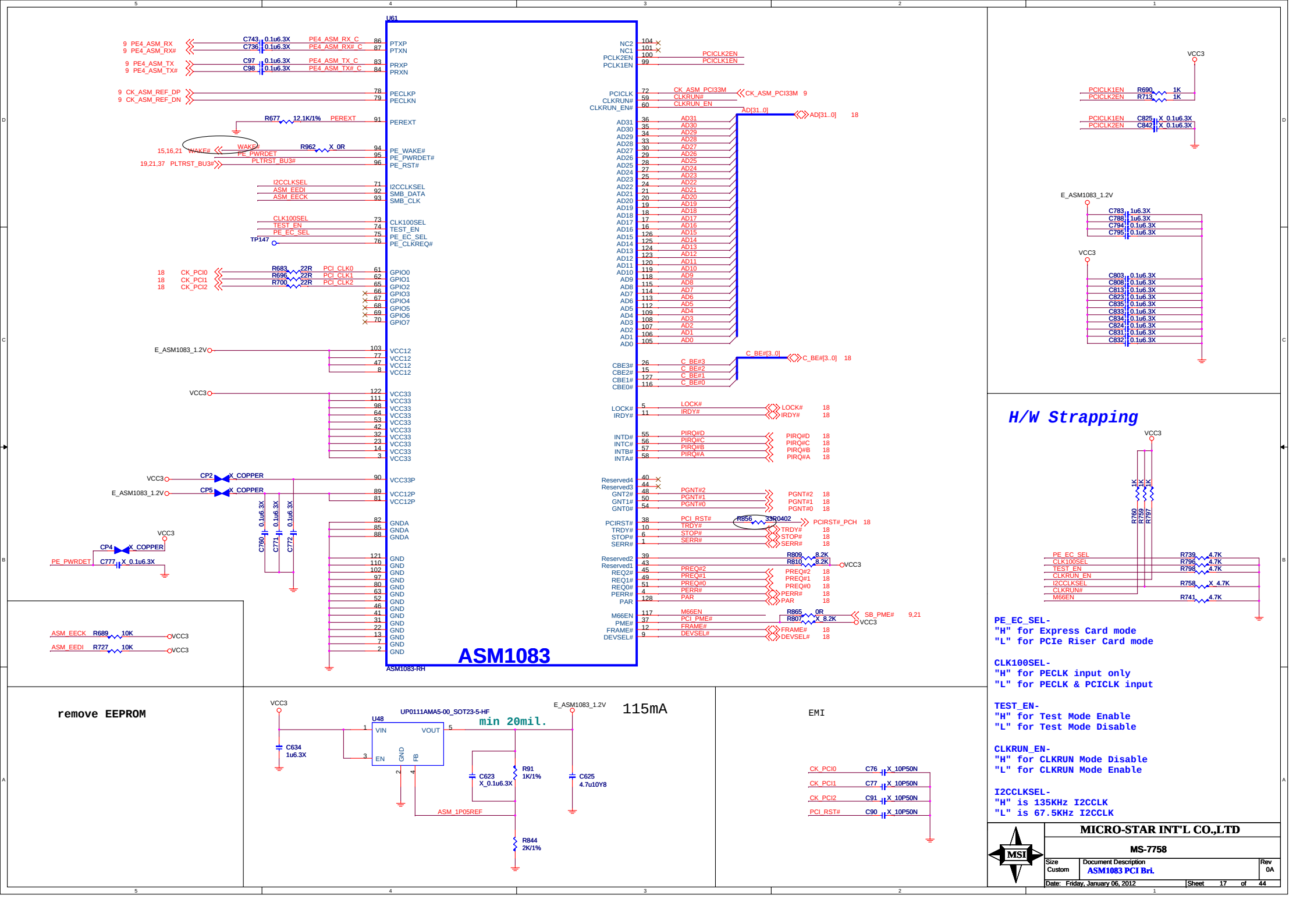


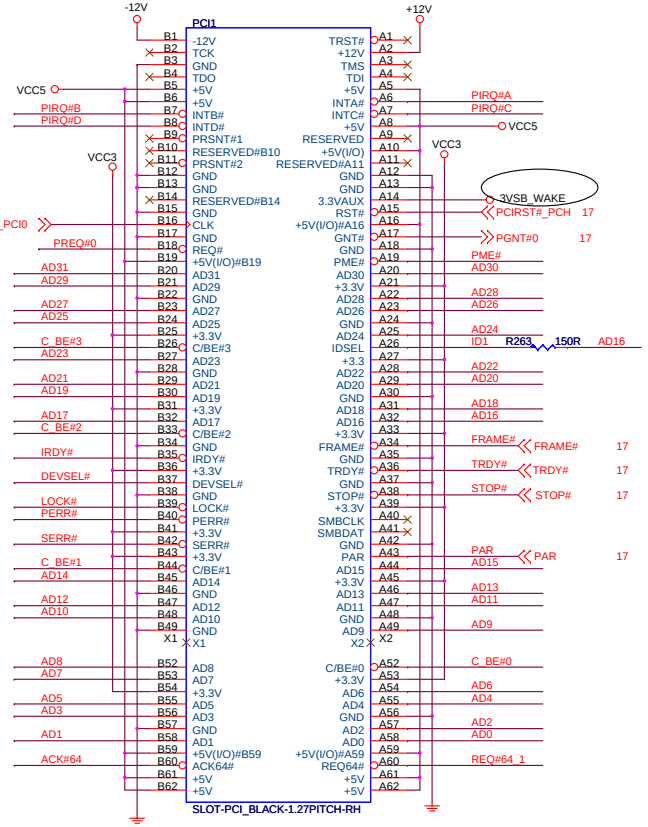
MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: PCIE1(X1) & PCIE2(X16) Slots	Rev: 0A
Date: Friday, January 06, 2012	Sheet 15 of 44	

PCI_Express X4 Slot

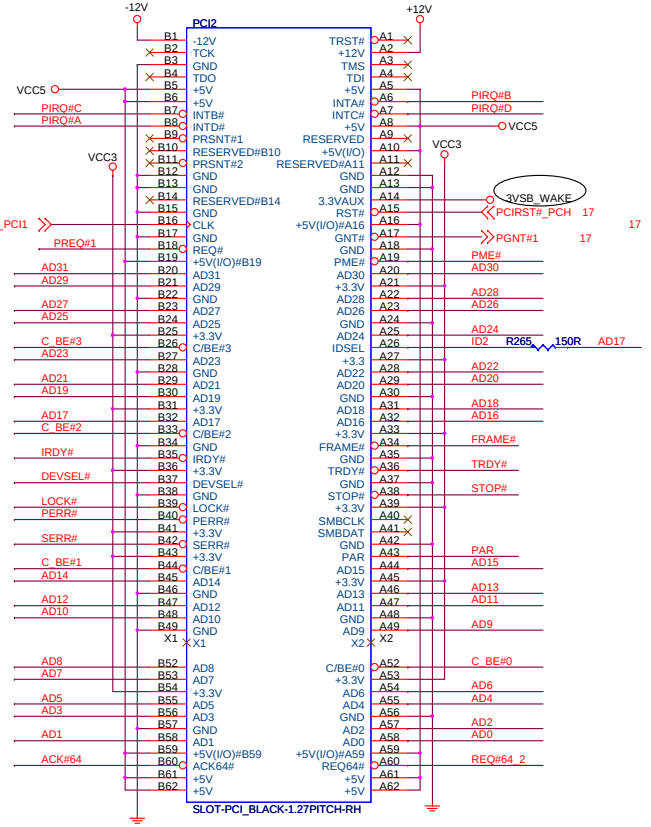


MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7758	
Size: Custom	Document Description: PCIE3(X1) & PCIE4(X4.) Slots	Rev: 0A
Date: Friday, January 06, 2012	Sheet 16 of 44	

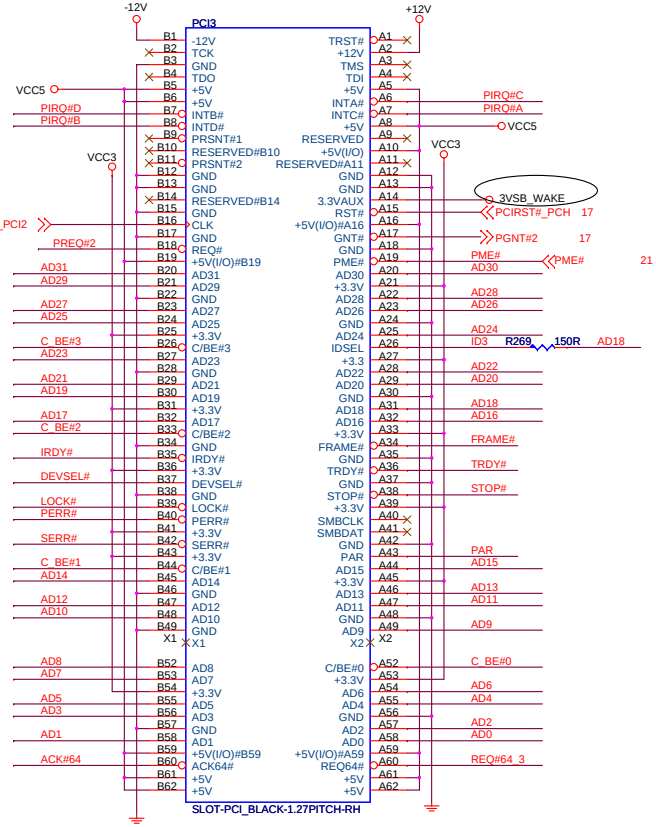

U61
ASM1083
ASM1083-RH
PTXP
PTXN
PRXP
PRXN
PECLKP
PECLKN
PEREXT
PE_WAKE#
PE_PWRDET#
PE_RST#
I2CCLKSEL
SMB_DATA
SMB_CLK
CLK100SEL
TEST_EN
PE_EC_SEL
PE_CLKREQ#
GPIO0
GPIO1
GPIO2
GPIO3
GPIO4
GPIO5
GPIO6
GPIO7
VCC12
VCC33
VCC33P
VCC12P
GND
PCICLK2EN
PCICLK1EN
CK_ASM_PCI33M
CLKRUN#
CLKRUN_EN
AD[31..0]
C_BE#[3..0]
LOCK#
IRDY#
PIRQ#D
PIRQ#C
PIRQ#B
PIRQ#A
PGNT#2
PGNT#1
PGNT#0
PCI_RST#
TRDY#
STOP#
SERR#
PREQ#2
PREQ#1
PREQ#0
PERR#
PAR
M66EN
PCI_PME#
FRAME#
DEVSEL#
E_ASM1083_1.2V
VCC3
PE4_ASM_RX_C
PE4_ASM_RX#_C
PE4_ASM_TX_C
PE4_ASM_TX#_C
CK_ASM_REF_DP
CK_ASM_REF_DN
R677 12.1K/1% PEREXT
WAKE#
PE_PWRDET
PLTRST_BU3#
R962 X_0R
CK_PCI0
CK_PCI1
CK_PCI2
R683 22R PCI_CLK0
R696 22R PCI_CLK1
R700 22R PCI_CLK2
TP147
CP2 X_COPPER
CP5 X_COPPER
CP4 X_COPPER
C777 X_0.1u6.3X
C760 0.1u6.3X
C771 0.1u6.3X
C772 0.1u6.3X
R856 33R0402
PCIRST#_PCH
R809 8.2K
R810 8.2K
R865 0R
R807 X_8.2K
SB_PME#
ASM_EECK R689 10K
ASM_EEDI R727 10K
R690 1K
R713 1K
C825 X_0.1u6.3X
C842 X_0.1u6.3X
C783 1u6.3X
C788 1u6.3X
C794 0.1u6.3X
C795 0.1u6.3X
C803 0.1u6.3X
C808 0.1u6.3X
C813 0.1u6.3X
C823 0.1u6.3X
C835 0.1u6.3X
C833 0.1u6.3X
C834 0.1u6.3X
C824 0.1u6.3X
C831 0.1u6.3X
C832 0.1u6.3X
H/W Strapping
R760 1K
R759 1K
R797 1K
PE_EC_SEL
CLK100SEL
TEST_EN
CLKRUN_EN
I2CCLKSEL
CLKRUN#
M66EN
R739 4.7K
R796 4.7K
R798 4.7K
R758 X_4.7K
R741 4.7K
PE_EC_SEL-
"H" for Express Card mode
"L" for PCIe Riser Card mode
CLK100SEL-
"H" for PECLK input only
"L" for PECLK & PCICLK input
TEST_EN-
"H" for Test Mode Enable
"L" for Test Mode Disable
CLKRUN_EN-
"H" for CLKRUN Mode Disable
"L" for CLKRUN Mode Enable
I2CCLKSEL-
"H" is 135KHz I2CCLK
"L" is 67.5KHz I2CCLK
remove EEPROM
U48
UP0111AMA5-00_SOT23-5-HF
VIN
VOUT
EN
GND
FB
C634 1u6.3X
C623 X_0.1u6.3X
R91 1K/1%
C625 4.7u10Y8
R844 2K/1%
ASM_1P05REF
min 20mil.
115mA
EMI
CK_PCI0 C76 X_10P50N
CK_PCI1 C77 X_10P50N
CK_PCI2 C91 X_10P50N
PCI_RST# C90 X_10P50N
MICRO-STAR INT'L CO.,LTD
MS-7758
Size Custom
Document Description ASM1083 PCI Bri.
Rev 0A
Date: Friday, January 06, 2012
Sheet 17 of 44



IDSEL = AD16
MASTER = PREQ#0
PIRQ#A



IDSEL = AD17
MASTER = PREQ#1
PIRQ#B

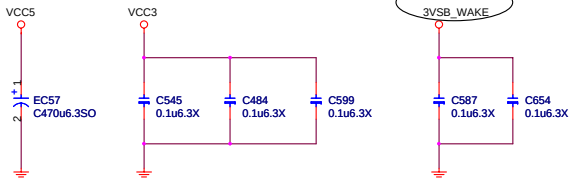


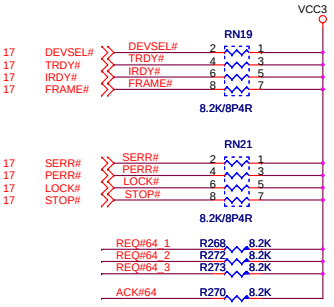
IDSEL = AD18
MASTER = PREQ#2
PIRQ#C

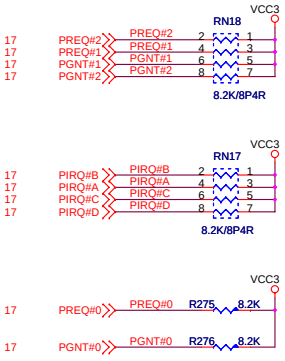
AD[31..0] — AD[31..0] 17

C_BE#[3..0] — C_BE#[3..0] 17

PCI PULL-UP / DOWN RESISTORS

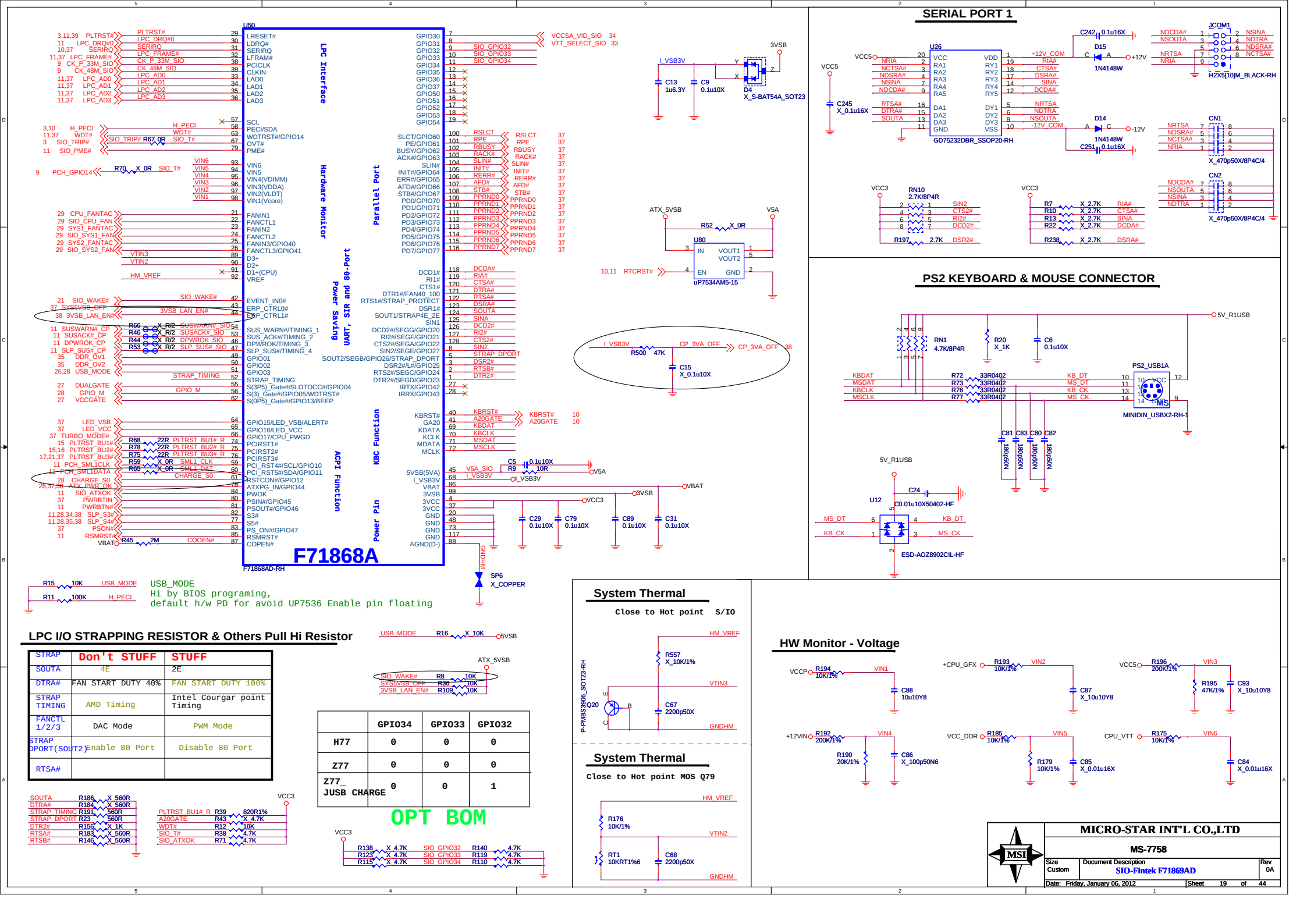




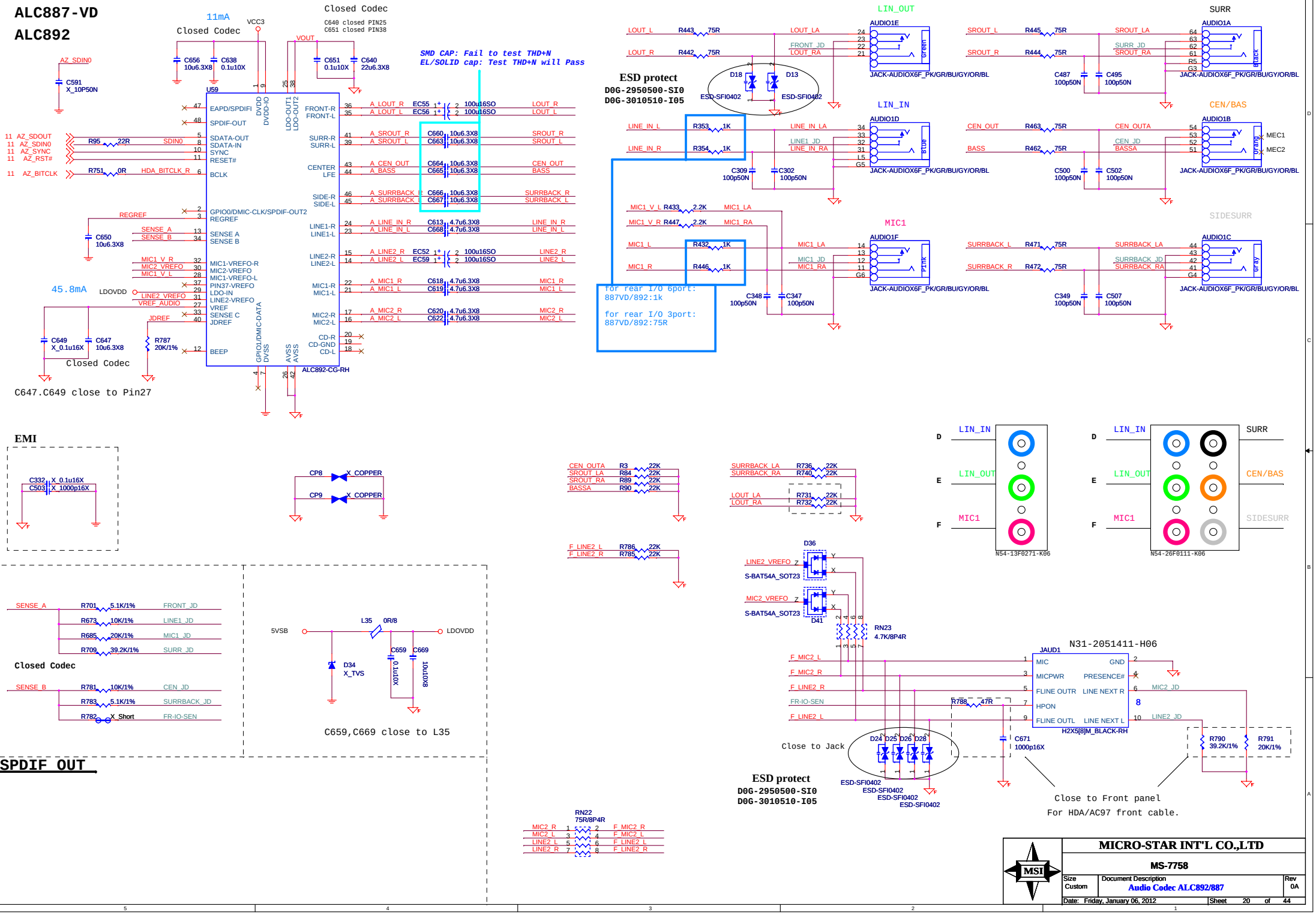


PCI slot (X3)	
+3.3Vaux (wake)	- 1125mA
+3.3Vaux (no wake)	- 60mA
+3.3V	- 7.6A
+5V	- 15A
+12V	- 1.5A

MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: PCIx1 Slots	Rev: 0A
Date: Friday, January 06, 2012	Sheet 18 of 44	


SERIAL PORT 1
PS2 KEYBOARD & MOUSE CONNECTOR
F71868A
F71868AD-RH
LPC Interface
Hardware Monitor
Parallel Port
Power Saving
UART, SIR and 80-Port
KBC Function
ACPI Function
Power Pin
USB_MODE
Hi by BIOS programing,
default h/w PD for avoid UP7536 Enable pin floating
LPC I/O STRAPPING RESISTOR & Others Pull Hi Resistor
STRAP | Don't STUFF | STUFF
SOUTA | 4E | 2E
DTRA# | FAN START DUTY 40% | FAN START DUTY 100%
STRAP TIMING | AMD Timing | Intel Cougar point Timing
FANCTL 1/2/3 | DAC Mode | PWM Mode
STRAP DPORT(SOUT2) | Enable 80 Port | Disable 80 Port
RTSA#
GPIO34 | GPIO33 | GPIO32
H77 | 0 | 0 | 0
Z77 | 0 | 0 | 0
Z77_JUSB CHARGE | 0 | 0 | 1
OPT BOM
System Thermal
Close to Hot point S/IO
System Thermal
Close to Hot point MOS Q79
HW Monitor - Voltage
MICRO-STAR INT'L CO.,LTD
MS-7758
SIO-Fintek F71869AD
Date: Friday, January 06, 2012
Sheet 19 of 44

ALC887-VD
ALC892



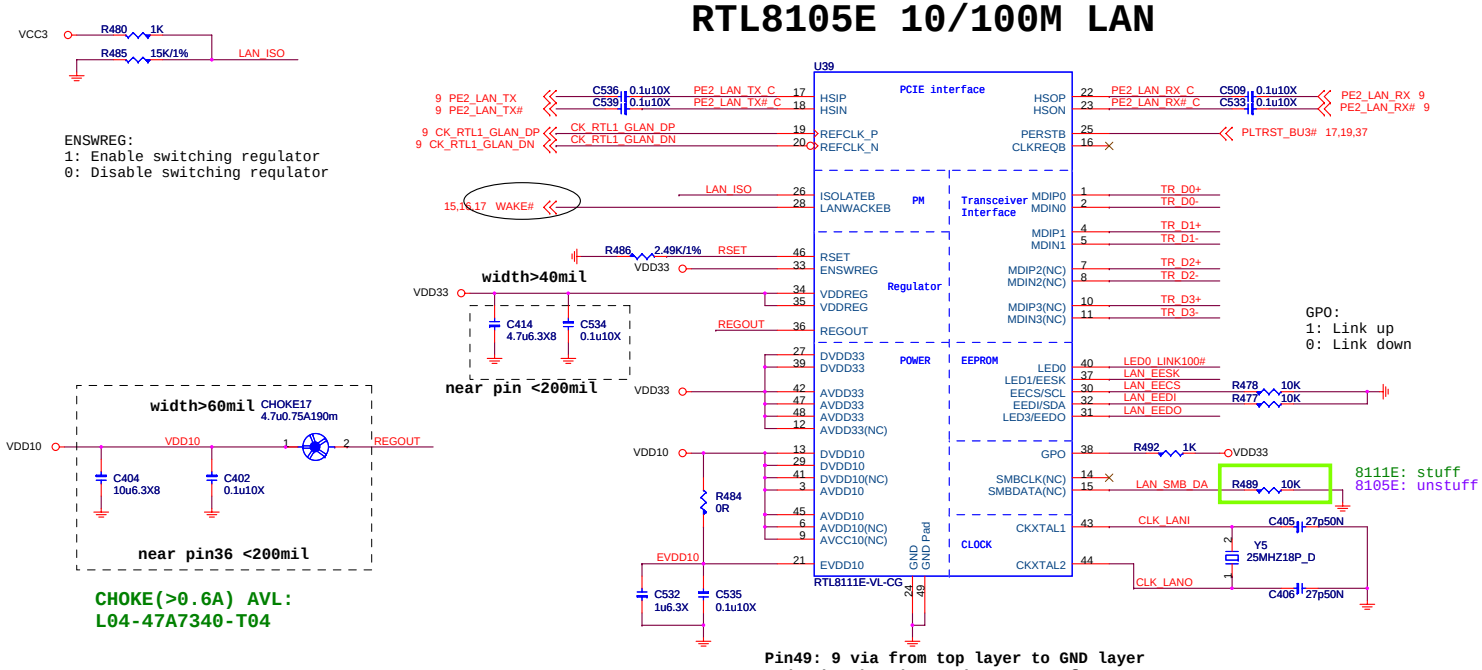
MICRO-STAR INT'L CO.,LTD

MS-7758

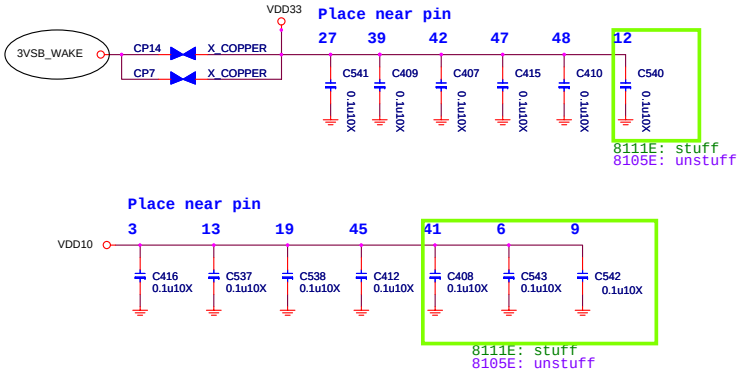
Size: Custom | Document Description: Audio Codec ALC892/887 | Rev: 0A

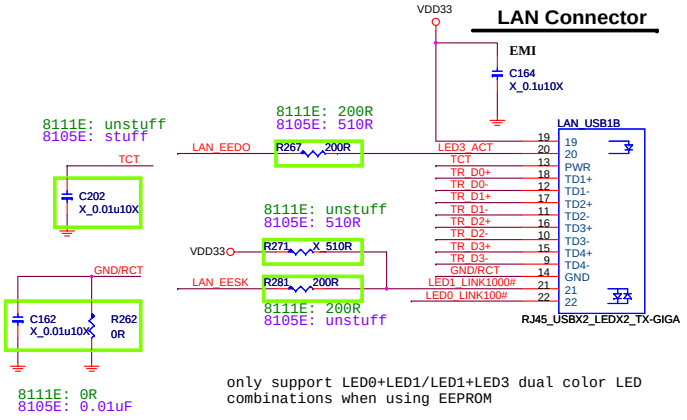
Date: Friday, January 06, 2012 | Sheet 20 of 44

RTL8111E Giga LAN
RTL8105E 10/100M LAN



3.3v Power on rise time : 1~100ms. MAX: 163mA





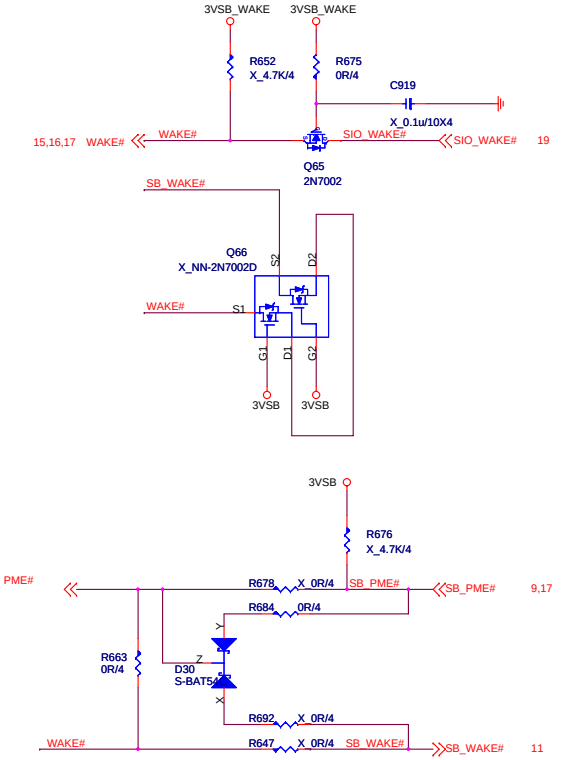
8111E POWER Consumption

	3.3V	mW
10 M Idle/TxRx	12/66	40/218
100 M Idle/TxRx	31/44	102/145
Giga Idle/TxRx	135/163	452/538
ALDPS	4	13

8105E POWER Consumption

	3.3V	mW
10 M Idle/TxRx	14/75	46/248
100 M Idle/TxRx	43/66	142/218
S0 ALDPS	3.2	11

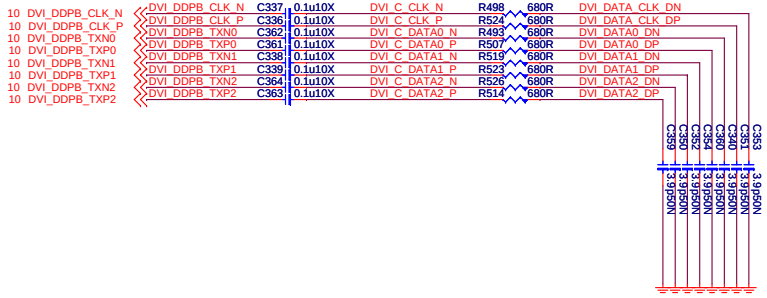
LAN/PCIE/PCI Wake Up CTRL Circuit

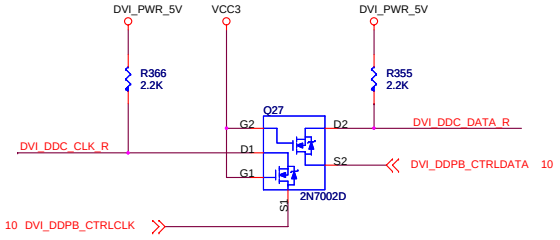


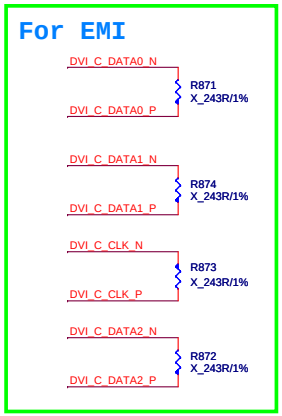
Giga-Lan	10/100-Lan
N58-22F0731	N58-22F0771
Link Yellow Active Blinking 1000 Orange 100 Green 10 None	Link Yellow Active Blinking 100 Green 10 None
19 — 250R — Yellow 20 Orange 21 — 250R — Green 22	19 — Yellow 20 21 — Green 22

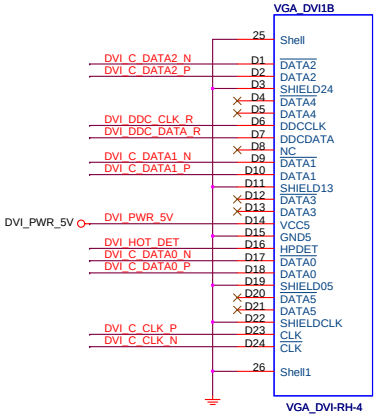
MICRO-STAR INT'L CO.,LTD	
MS-7758	
Size: Custom	Document Description: LAN-RTL8111E/8105E
Rev: 0A	
Date: Friday, January 06, 2012	Sheet 21 of 44

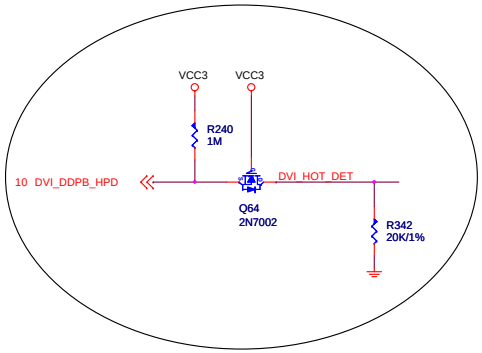
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

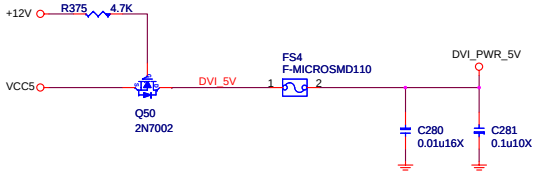


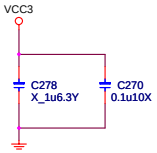


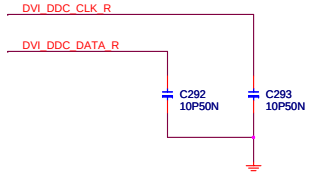












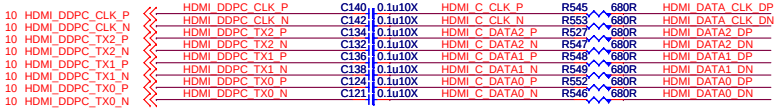
MICRO-STAR INT'L CO.,LTD

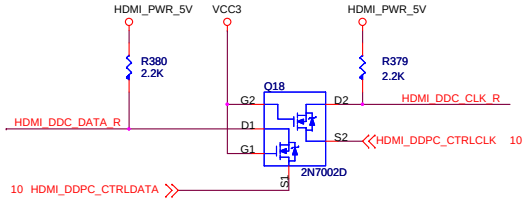
MS-7758

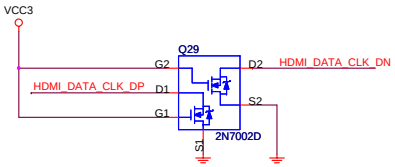
Size	Document Description	Rev
Custom	DVI Connector	0A

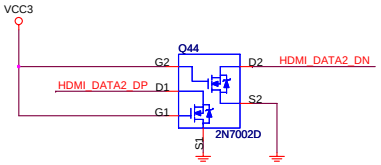
Date: Friday, January 06, 2012 Sheet 22 of 44

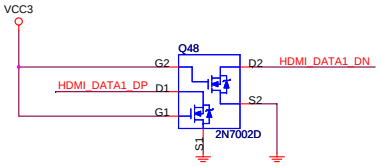
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)

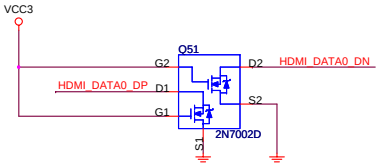


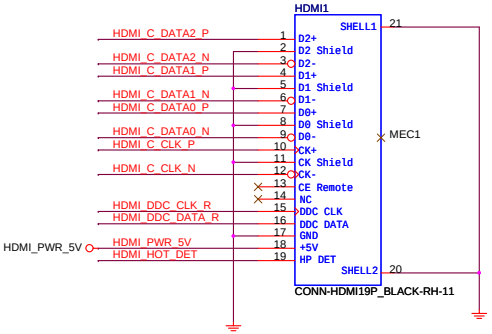


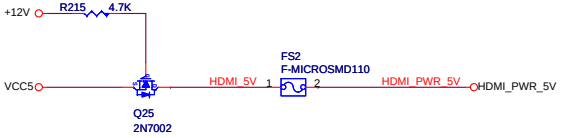


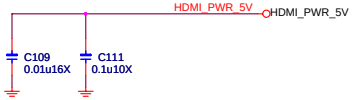


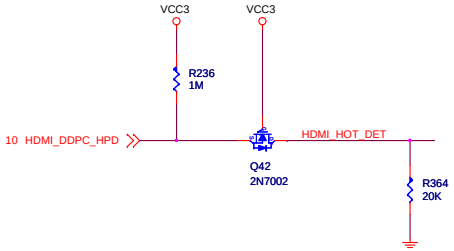


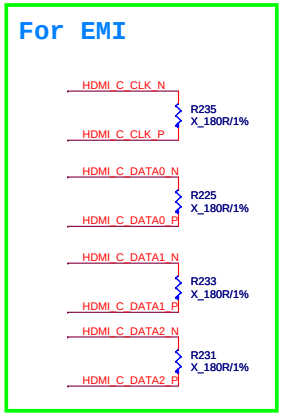


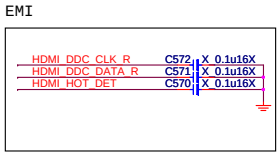












MICRO-STAR INT'L CO.,LTD

MS-7758

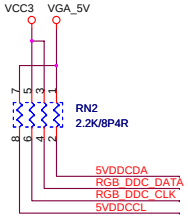
Size	Document Description	Rev
Custom	HDMI Connector	0A

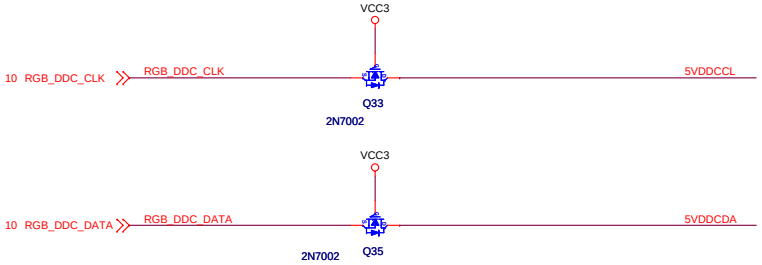
Date: Friday, January 06, 2012 Sheet 23 of 44

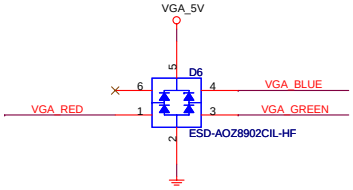
D-Sub

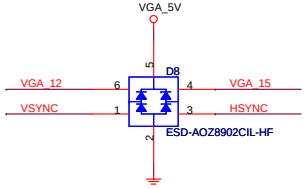
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

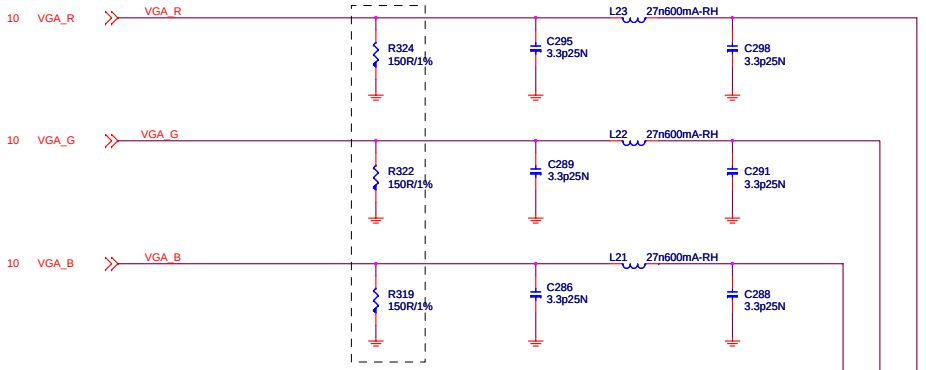
Level shift



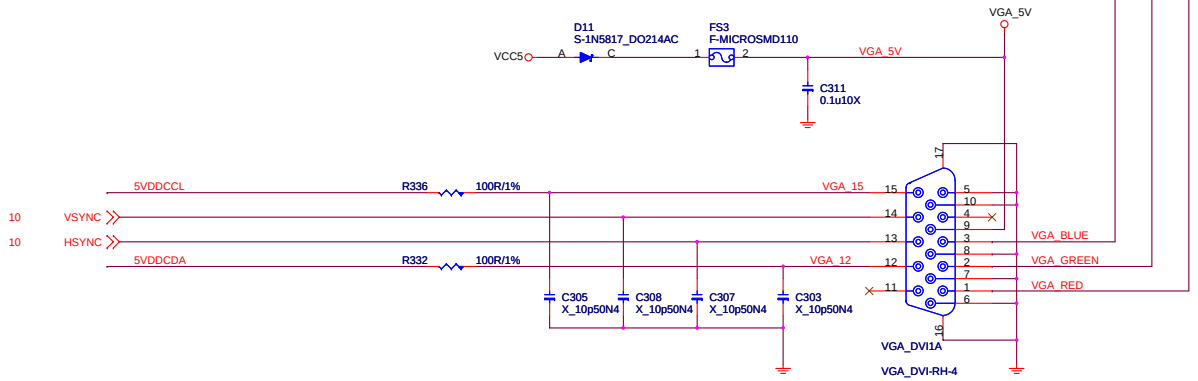








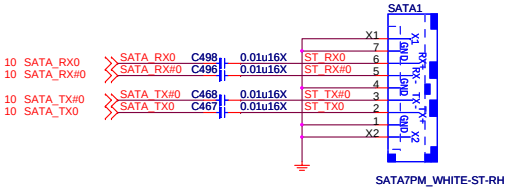
PLACE CLOSE TO VGA CONNECTOR,
WITHIN 750 MIL OF PIN

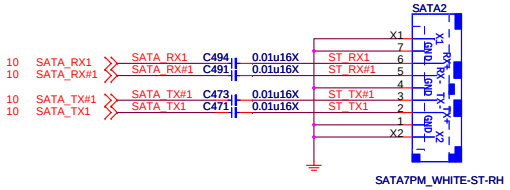


MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: VGA Connector	Rev: 0A
Date: Friday, January 06, 2012	Sheet 24 of 44	

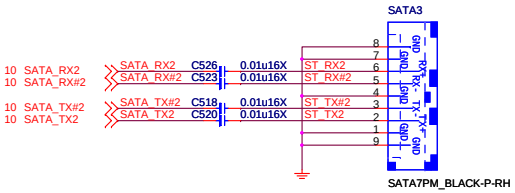
SATA 6G PORT 0,1

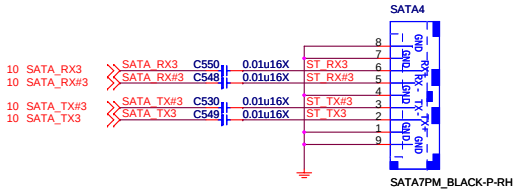
3.0 white



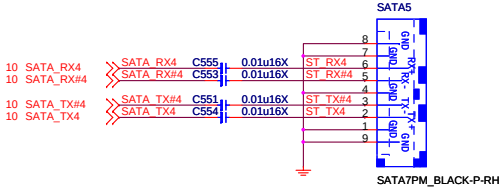


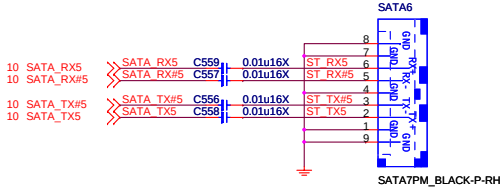
SATA 3G PORT 2,3





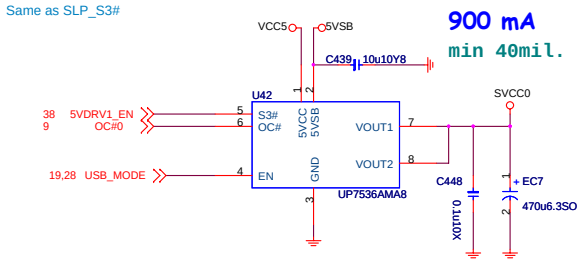
SATA 3G PORT 4,5

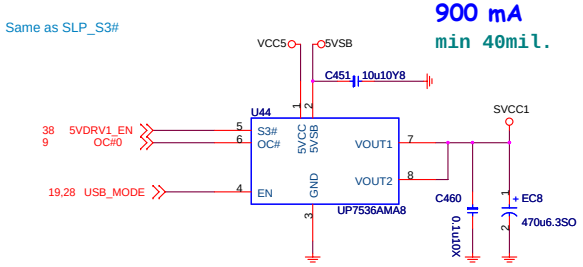


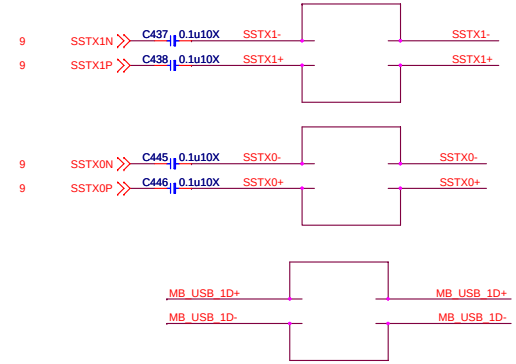


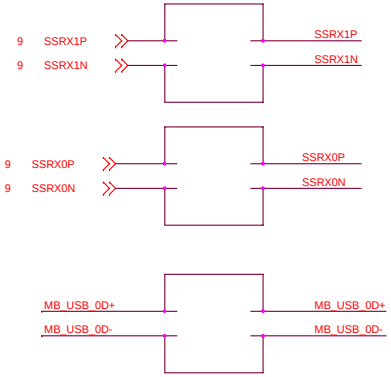
MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: SATA Connector	Rev: 0A
Date: Friday, January 06, 2012	Sheet 25 of 44	

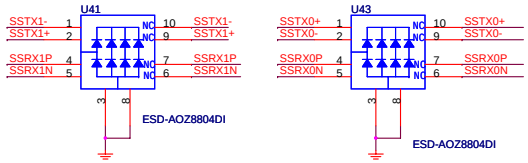
FRONT USB30 PORT 0,1

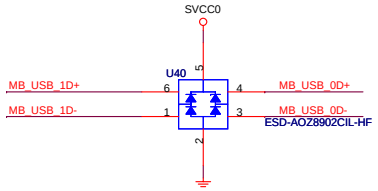


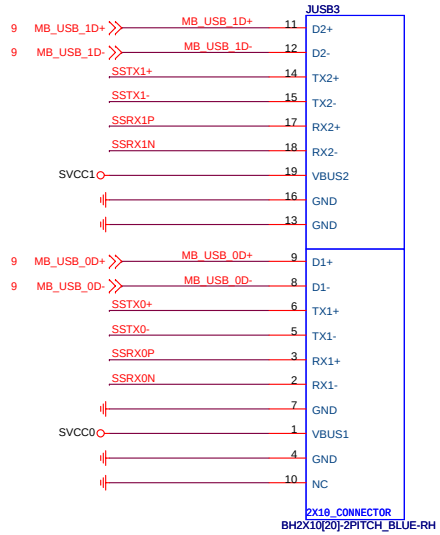




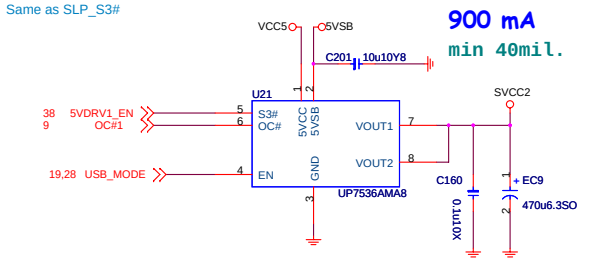


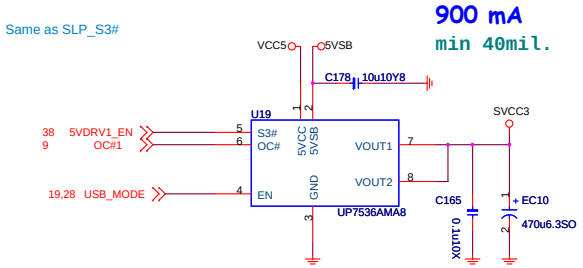






REAR USB30 PORT 2,3

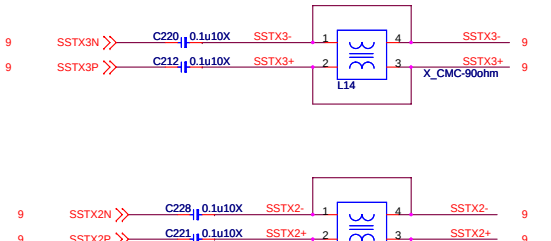


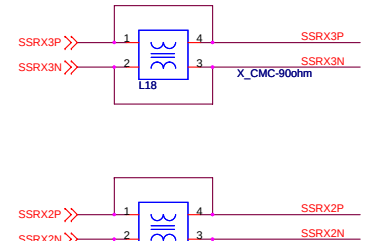


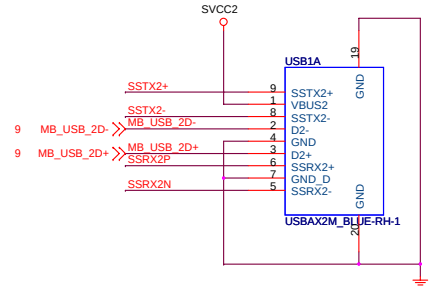
USB_MODE
Hi by BIOS programing,
default h/w PD for avoid UP7536 Enable pin floating

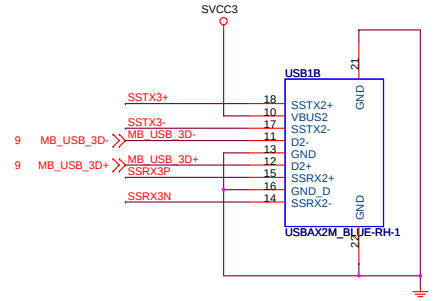
USB_MODE States

MODE	G3	S4/S5	S0	S3
EUP Disable	0	0	1	1
EUP Enable	0	0	1	1

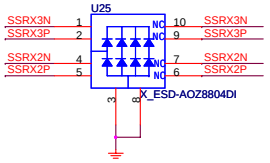


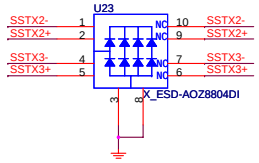


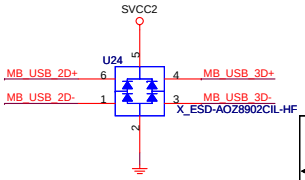




EMI







MICRO-STAR INT'L CO.,LTD

MS-7758

Size	Document Description	Rev
Custom	USB3.0 Connector	0A

Date: Friday, January 06, 2012 Sheet 26 of 44

USB2.0/PS2 POWER Control			
MODE	S5	S0	S3
S3P5_Gate#	1	1	1
S0P5_Gate#	1	1	0

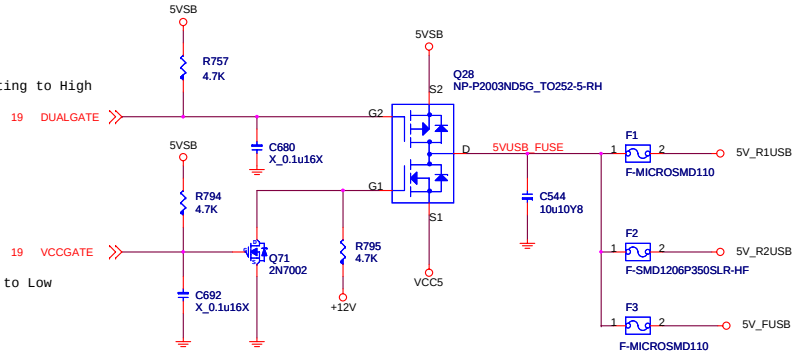
When PS2 in S5 not support wake , S3P5_Gate# in S5 must setting to High

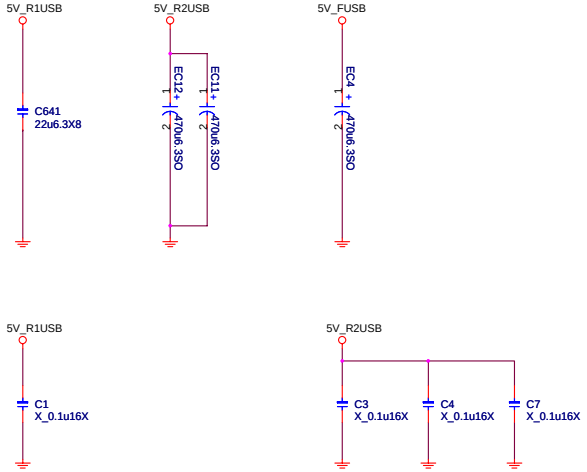
USB2.0/PS2 POWER Control			
MODE	S5	S0	S3
S3P5_Gate#	0	1	1
S0P5_Gate#	1	1	0

When PS2 in S5 support wake , S3P5_Gate# in S5 must setting to Low

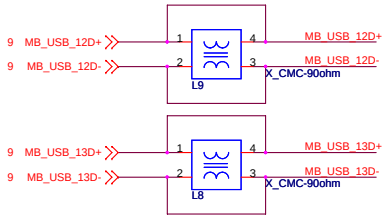
*In S5# (S3P5_Gate # pin status is Tri-state, and can be programmed Low level.

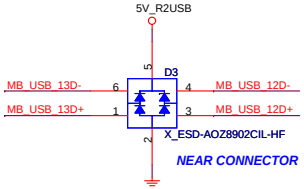
*S3P5_Gate# and S0P5_Gate# can't setting to low together, avoid leakage voltage issue

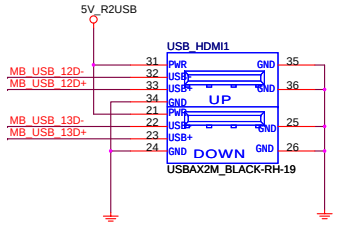




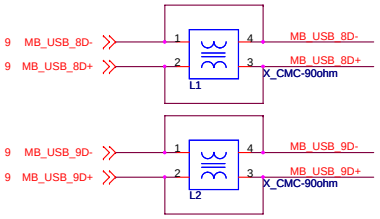
REAR USB PORT 12,13 (With LAN)

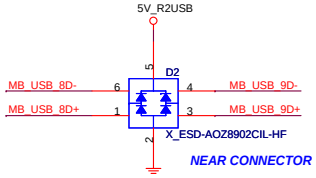


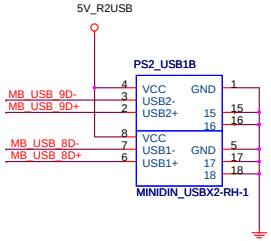




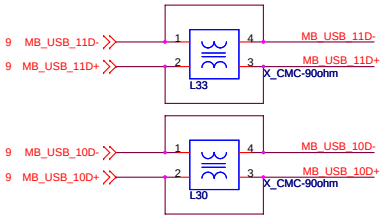
REAR USB PORT 8,9 (With HDMI)

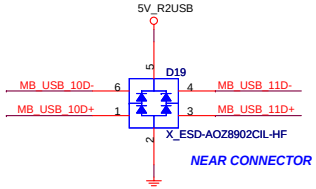


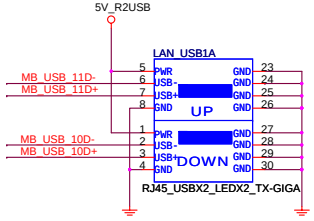




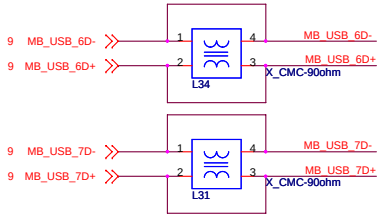
FRONT USB PORT 10,11(With PS2)

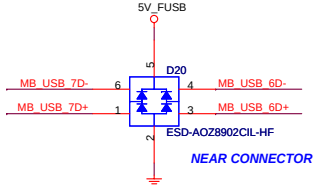


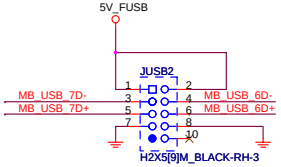




FRONT USB PORT 6.7







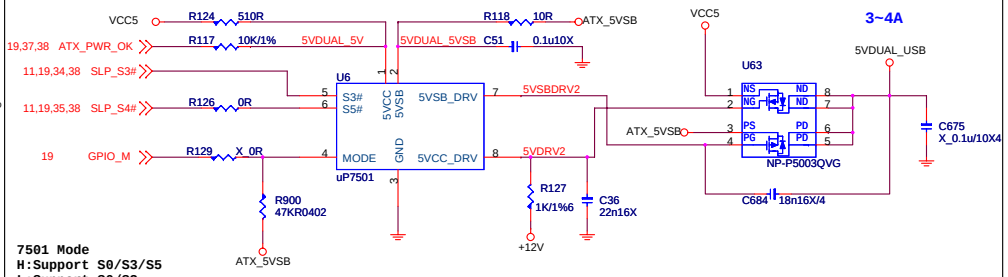
MICRO-STAR INT'L CO.,LTD

MS-7758

Size	Document Description	Rev
Custom	Rear I/O & USB2.0 Connector	0A

Date: Friday, January 06, 2012 Sheet 27 of 44

5VDUAL_USB

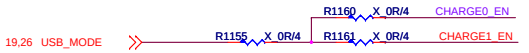


SIO GPIO40 Pin7 (I_VSB3V)

USB_CHARGE: (OD)
0: Don't support USB charge and resume.
1: Support USB charge and resume.

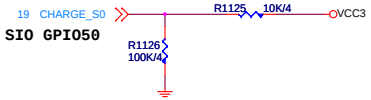
Power plug in , H/W default support USB charge.

Pin power I_3VSB or VBAT
Register power I_3VSB or VBAT
Register reset I_3VSB or VBAT

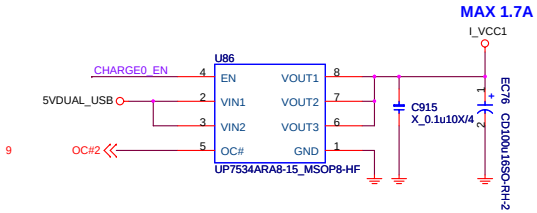


Pin power I_3VSB
Register power I_3VSB
Register reset I_3VSB

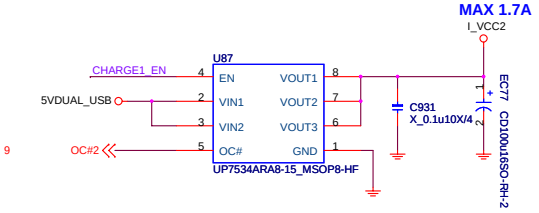
Update~2010.9.15



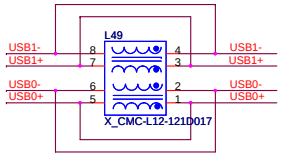
USB POWER PORT 0 For USB Charging



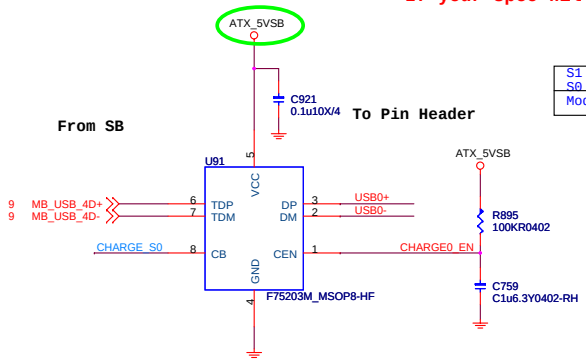
USB POWER PORT 1 For USB Charging



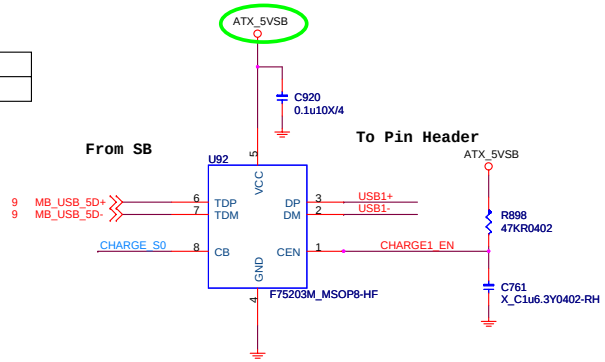
FRONT USB PORT 0,1

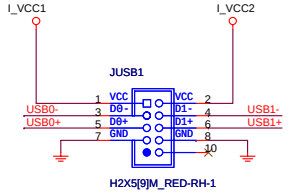


** If your spec will not need bom option, please don't co-lay blue labels.



S1	0		0	1
S0	0		1	1
Mode	AUTO		A	Y





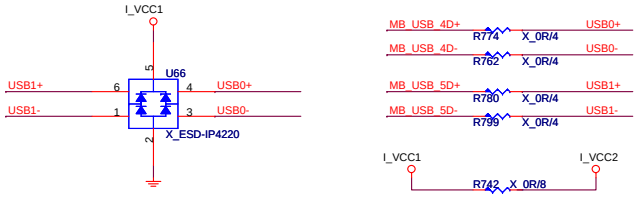
REF_JUSB
OPT
NO_CHARGE

Please name the pin header JUSB1 and use SB USB0,1 link for charger port.

A type
2.70V< D+ <3.1 V
1.85V< D- < 2.1V
For i-Pad / i-Phone 4G charges current up to 1.6A.

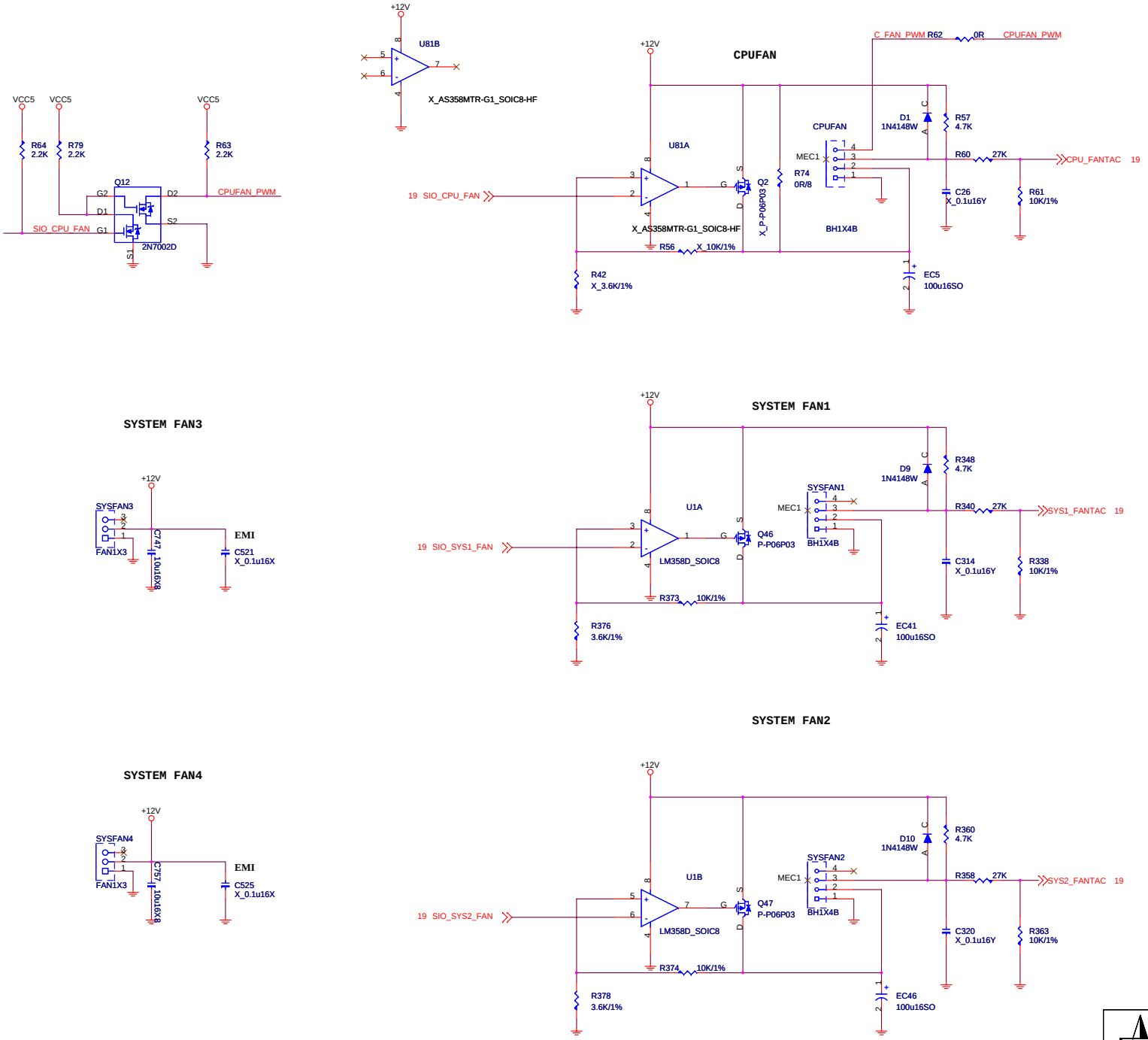
PI5USB14550 has internal EDS diode.

COLAY remove USB charger ic



Title	USB FULL CHARGE	
Size: Custom	Document Number: MS-7758	Rev: 0A
Date: Friday, January 06, 2012	Sheet 28 of 44	

FAN-COUNTROL CIRCUIT



MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: FAN Control	Rev: 0A
Date: Friday, January 06, 2012	Sheet 29 of 44	

VRMPWRGD LEVEL SHIFT

CPU_VTT, 3VSB, VCC3
R29 1K
R4 10K/1%
R6 4.7K
R5 100K
R28 4.7K
C10 X_0.1u/25Y/4
Q1 NN-CMKT3904
VRM_PGD_R
VRM_PGD 11,39
Q49 X_2N7002
34,36 SLP_S3_CTRL#
CRB

CPU_VTT
R842 56R/1%
R838 110R
H_VIDSCLK
H_VIDSOUT

3000mil < L < 6000mil
4mil / 20mil
55 ohm Impedence
must be Referenced GND

VCC5, +12VIN
R878 2.2R/1%8
R879 2.2R/1%8
C809 0.1u10X
C734 1u16X6
D29 S-BAT54A_SOT23
UT501_VCC12
UT501_BOOT1
UT501_BOOT2
VRM_PGD_R
3 VR_HOT#
VCC3
R875 4.7K
R877 0R

U4 uT501AQGK

3	VID_ALERT#	H_VIDSCLK	39	ALERT#	
3	H_VIDSCLK	H_VIDSCLK	40	SCLK	
3	H_VIDSOUT	H_VIDSOUT	38	SDATA	
	VRD_EN		5	ENPWR	
	CPU_VSS_SENSE_R		16	FBRTN	
	VCORE_FB		17	FB	
			18	COMP	
	CPU_VCC_SENSE_R		15	VOUT	
			14	TB	
	EAP		19	EAP	
	DAC		20	DAC/SS	
	IMON		21	IMON	
	GFX_VSS_SENSE_R		29	SFBRTN	
	GFX_FB		30	SFB	
			31	SCOMP	
			33	PS2/SVOUT	
			37	PS1/STB	
	SEAP		28	SEAP	
	SDAC		27	SDAC/SS	
	SIMON		32	SIMON	
	CSN		13	CSN	
	CSP		12	CSP	
	SCSN		26	SCSN	
	SCSP		25	SCSP	

			43	VRHOT#	
			34	VROK	
			35	SVROK	
			23	VCC5	
			48	VCC12	
	BOOT1	UT501_BOOT1 31	44		
	PHASE1	UT501_PH1 31	46		
	UG1	UT501_UG1 31	45		
	LG1/SIMAX	UT501_LG1 31	47		
	BOOT2	UT501_BOOT2 31	4		
	PHASE2	UT501_PH2 31	2		
	UG2	UT501_UG2 31	3		
	LG2/IMAX	UT501_LG2 31	1		
	PWM3	PWM3 31	6		
	PWM4	VCC5	7		
	ISEN1	ISEN1 31	11		
	ISEN2	ISEN2 31	10		
	ISEN3	ISEN3 31	9		
	ISEN4		8		
	SPWM	SPWM 31	24		
	TM	TM	36		
	TMAX	TEMPMAX	42		
	VBOOT	VBOOT	41		
	RT	RT	22		
	PGND		49		

PS1/2--uP1625P
STB/SVOUT--uP1625Q

CRB
34,36 SLP_S3_CTRL#
Q36 X_2N7002
+12VIN
R125 4.99K/1%
CPU_VTT
R114 X_4.7K
VRD_EN
R108 1K/1%
C49 X_0.1u16X
CPU_SA
3VSB
R359 10K/1%
R362 4.7K
Q39 2N3904
Q43 2N3904
C322 1u6.3X

add for co_lay 1625Q+ /0105

CPU_VCC_SENSE_R
R903 1K/1%
C799 X_1000p50X
R916 X_200R/1%
R924 0R
C785 33p50N
R923 X_0R
R891 15K/1%
C787 0.01u16X
CPU_VSS_SENSE_R
C789 220p50N6
R889 3K/1%
C791 X_0.1u16X
TM2
R883 1.78KR1%0402
RT6 Close CHOKE8
RT6 10KRT1%6
C782 6.8n50X6
R880 7.5K/1%
C790 X_0.1u16X
R885 3.6K/1%
GFX_VCC_SENSE_R
R904 1K/1%
C798 X_0.1u16X
R915 X_0R
R925 0R
C792 100p50N
R936 X_0R
R892 10K/1%
C797 0.01u16X
R930 0R
R917 X_0R
R894 X_3K/1%
C796 X_220p50N6
R919 20K/1%
TM3
R884 1.6KR1%0402
RT7 Close CHOKE16
R882 4.7K/1%
RT7 10KRT1%6
C800 X_0.1u16X
R886 3.3K/1%
C786 6.8n50X6
R941 1K/1%
R951 1K/1%

RT8 Close CHOKE8
UT501_VCC5
RT8 10KRT1%6
TM1
R948 X_0R
R926 1KR1%0402
R928 5.9KR1%0402
C814 X_1u16X6
RT8 Close CHOKE2

VCC5
R896 X_1M/1%
IMON
R918 37.4K/1%
C784 33p50N
R897 X_1M/1%
SIMON
R920 12.4K/1%
C801 33p50N

3 CPU_VSS_SENSE_C
R834 0R
CPU_VSS_SENSE_R
R829 100R/1%
C737 X_0.1u16X
C738 X_0.1u16X
3 CPU_VCC_SENSE_C
R843 0R
R831 100R/1%
CPU_VCC_SENSE_R
VCCP
R832 100R/1%
C739 X_0.1u16X
3 CPU_GFX_VSS_SENSE_C
R839 0R
GFX_VSS_SENSE_R
R830 100R/1%
C740 X_0.1u16X
C741 X_0.1u16X
3 CPU_GFX_VCC_SENSE_C
R845 0R
R835 100R/1%
GFX_VCC_SENSE_R
+CPU_GFX
R833 100R/1%
C742 X_0.1u16X

UPI VOLTAGE CONSOLE

0x20:RH=10K,RL=OPEN

ADDRESS	0x2A	0X28	0x26	0x24	0x22	0x20
RH (KOhm)	OPEN	3.9	3	2.2	1.3	10
RL (KOhm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%

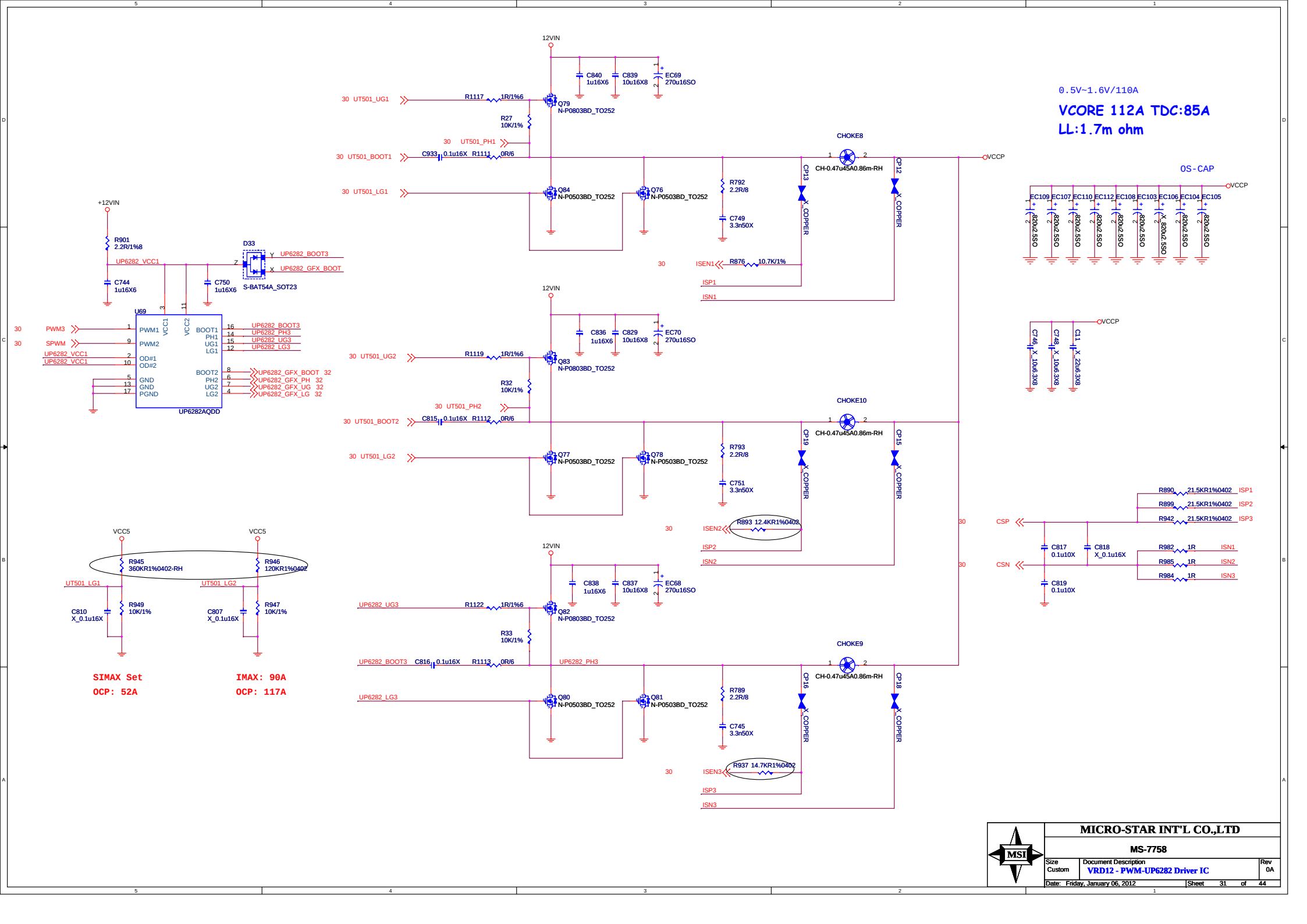
JSVID1 H1X2M-2PITCH
R101 X_10K/1%
R149 10K
Q16 2N3904
CHIP_PWGD 10,11
VBOOT
C44 X_0.1u10X
R102 12K/1%

UT501_VCC5
R934 2KR1%
TEMPMAX
C806 C0.1u16X50402-2
R935 10.5KR1%

MEC1 JPWR2 PWRCONN8P_BLACK-RH-2
+12VIN
CHOKE11 CH-0.47u45A0.86m-RH
12VIN
C998 0.01u16X
C149 10u16X8

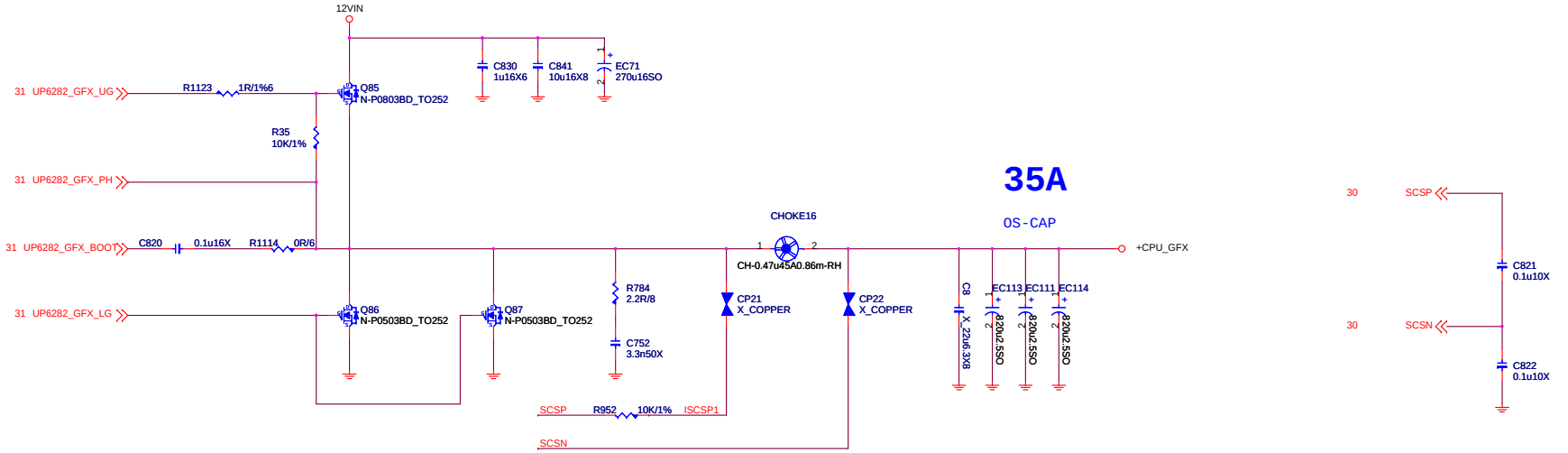
VCC5
R105 10K/1%
C547 0.1u16Y
R181 X_9.1K/1%
U57 UP1811BMA8
7,11,15,16,37,39 SMBCLK
7,11,15,16,37,39 SMBDATA
VCORE_FB_R R40 0R CPU_VCC_SENSE_R -200uA
GFX_FB_R R92 X_0R GFX_VCC_SENSE_R -200uA
VTT_FB_R R100 X_0R CPU_VTT_FB 33 -10uA

MICRO-STAR INT'L CO.,LTD	
MS-7758	
Size: Custom	Document Description: VRD12 - PWM-UT501
Rev: 0A	
Date: Friday, January 06, 2012	Sheet 30 of 44


0.5V~1.6V/110A
VCORE 112A TDC:85A
LL:1.7m ohm
OS-CAP
12VIN
VCCP
CHOKE8
CHOKE10
CHOKE9
CH-0.47u45A0.86m-RH
U69
UP6282AQDD
S-BAT54A_SOT23
SIMAX Set
OCP: 52A
IMAX: 90A
OCP: 117A
MICRO-STAR INT'L CO.,LTD
MS-7758
VRD12 - PWM-UP6282 Driver IC
Date: Friday, January 06, 2012
Sheet 31 of 44

CPU_GFX:0.25-1.52

35A FOR CPU



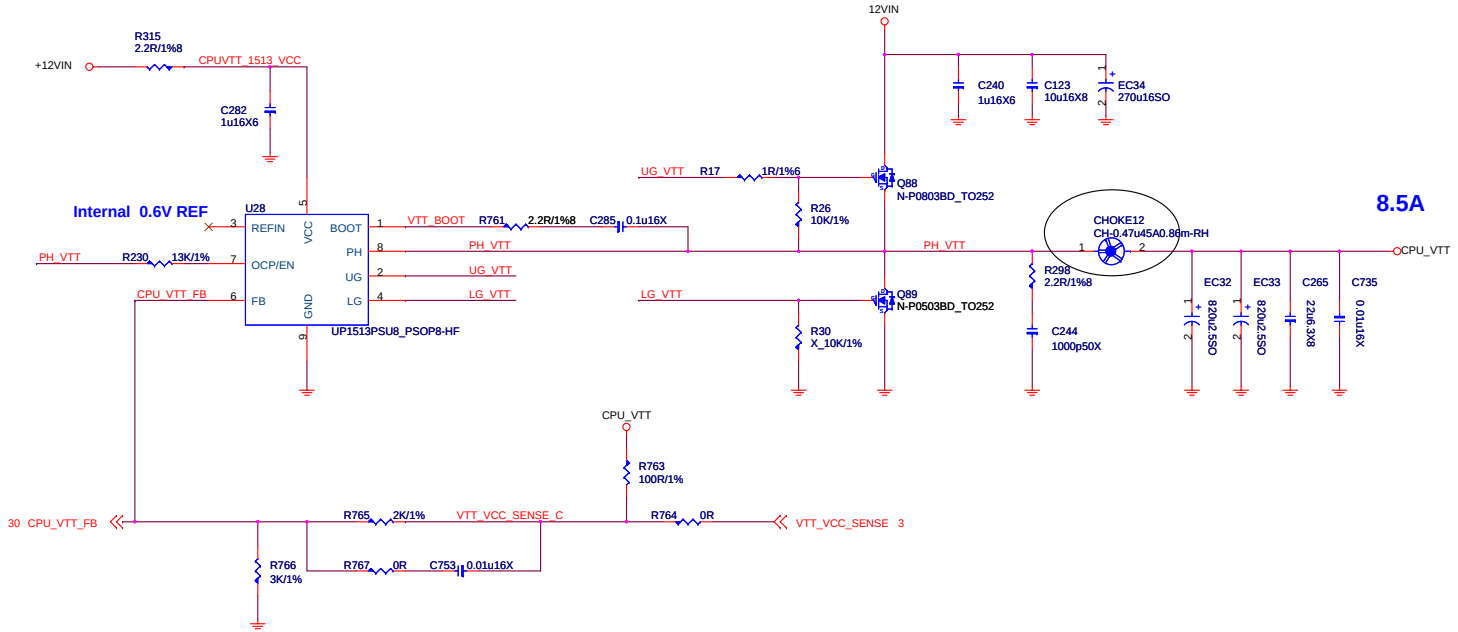
MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: VRD12 -GPU 1-Phase MOS	Rev: 0A
Date: Friday, January 06, 2012	Sheet 32 of 44	

CPU_VTT:1.05/1.00 *MAX 17.3A*

CPU VTT 8.5A SA Core =8.8A

8.5A FOR CPU

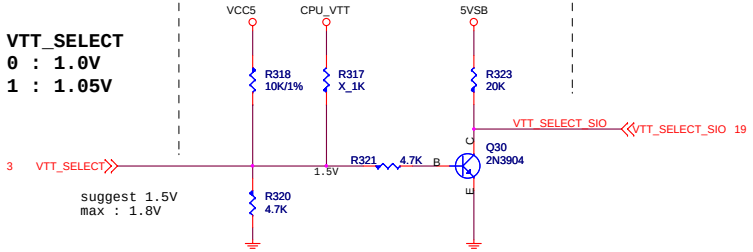
Iripple=1.92(vtt)+1.88(sa)
5*1=5A>3.8A

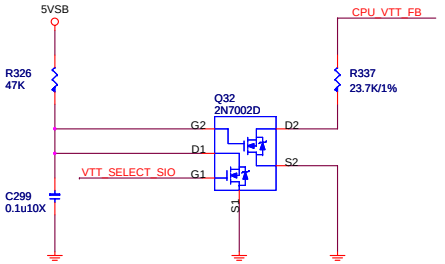


VTT_SELECT	
Low	1.0V
High	1.05V

VTT_SELECT Table	
Low	1.05V
High	1.0V

VTT_SELECT
0 : 1.0V
1 : 1.05V

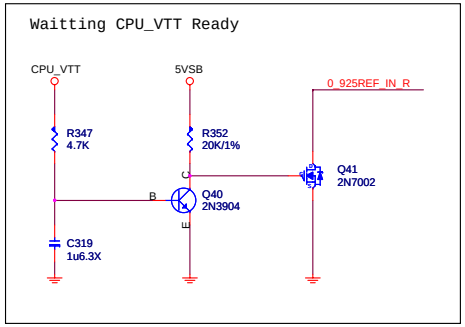


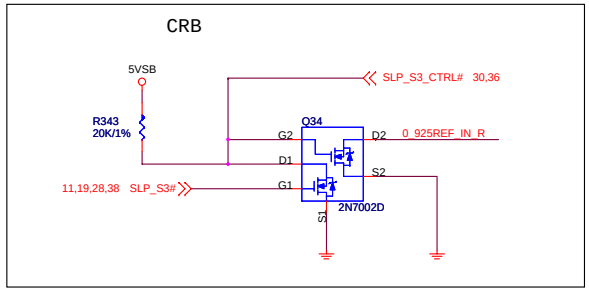


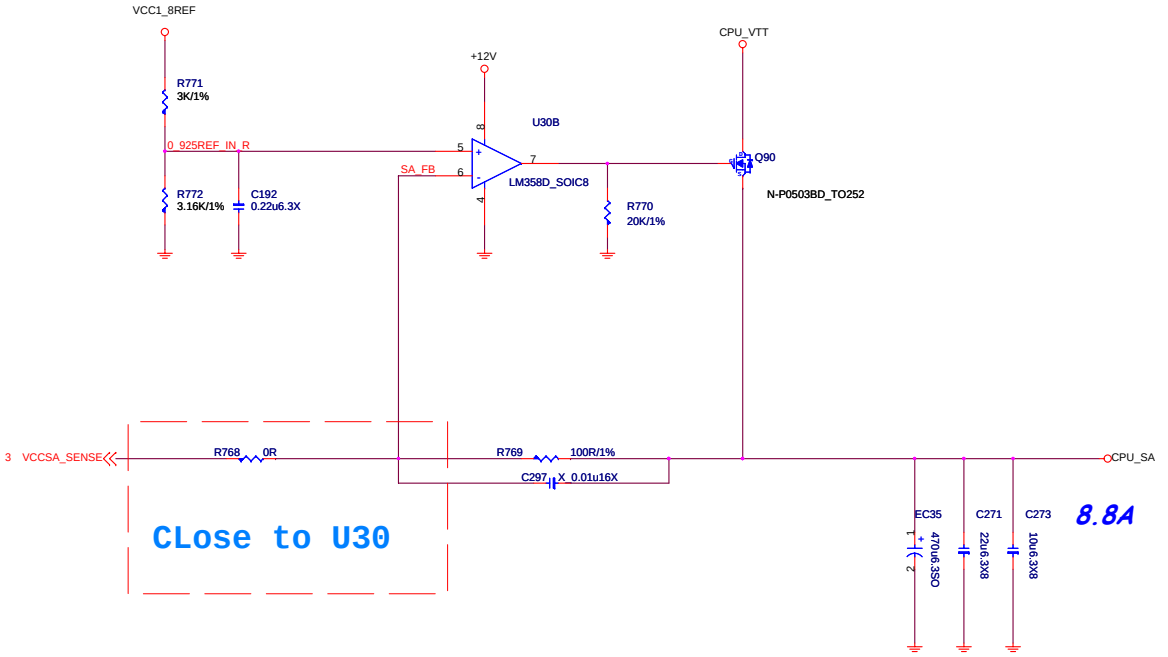
MICRO-STAR INT'L CO.,LTD		
MS-7758		
Size: Custom	Document Description: VTT POWER- uP1513- 1Phase MOS	Rev: 0A
Date: Friday, January 06, 2012	Sheet 33 of 44	

CPU_SA:0.925/0.85

SA Core =8.8A

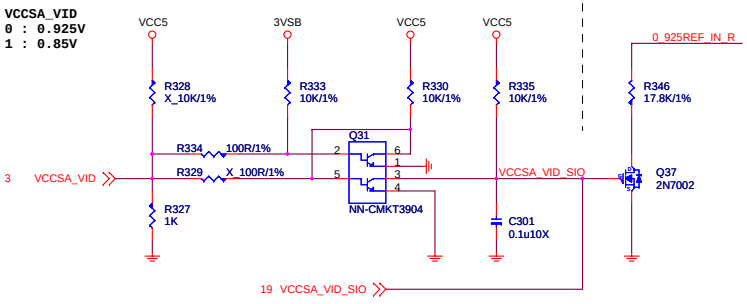






VCCSA_VID	
Low	0.925V
High	0.85V

VCCSA_VID_SIO Table	
Low	0.925V
High	0.85V



MICRO-STAR INT'L CO.,LTD	
MS-7758	
Size: Custom	Document Description: CPU_SA OP+MOS 1-Phase
Rev: 0A	
Date: Friday, January 06, 2012	Sheet 34 of 44

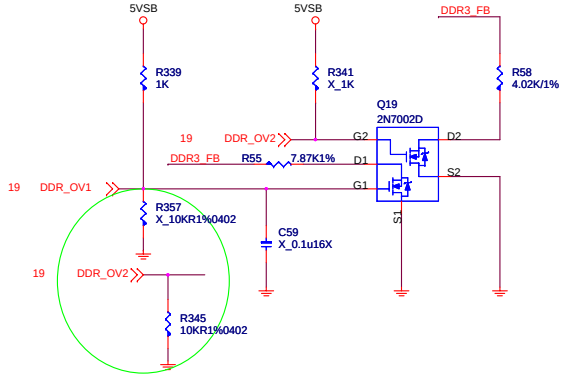
DDR Power:1.5V

DDR3_1.5V 4.75A+15A+1A=20.75A

4.75A FOR CPU
15A FOR 4DIMM
1A FOR DDR VTT

Iripple=8A
4.7*2*1=9.4A>8A

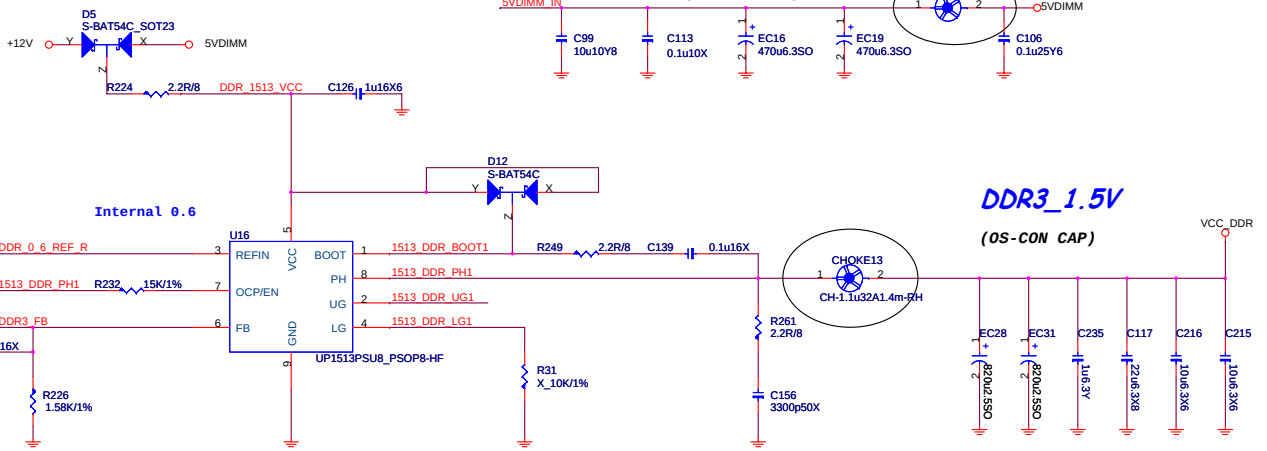
DDR OV



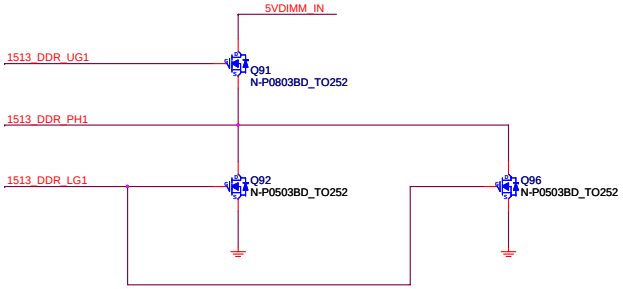
*Default 1.5V

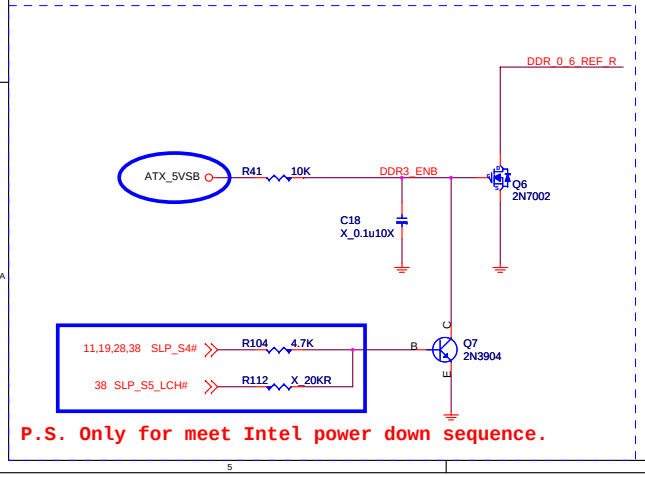
DDR_OV	1.35V	1.5V	1.65V	1.8V
DDR_OV1	Low	High	Low	High
DDR_OV2	Low	Low	High	High

DDR_OV1 = GPIO01(S/IO)
DDR_OV2 = GPIO02(S/IO)



((R221/R226)+1)*0.6=1.5V



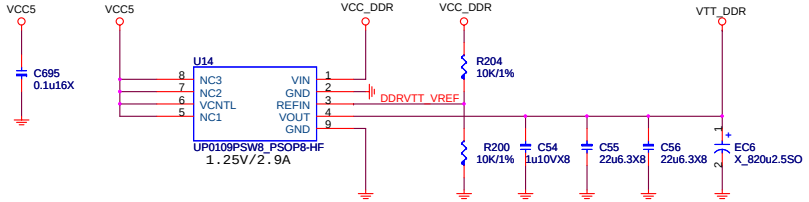


P.S. Only for meet Intel power down sequence.

DDR VTT Power

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

0.2075A*4=0.8A



MICRO-STAR INT'L CO.,LTD

MS-7758

Size	Document Description	Rev
Custom	DDR Power -UP1513 1-Phase MOS	0A

Date: Friday, January 06, 2012 Sheet 35 of 44

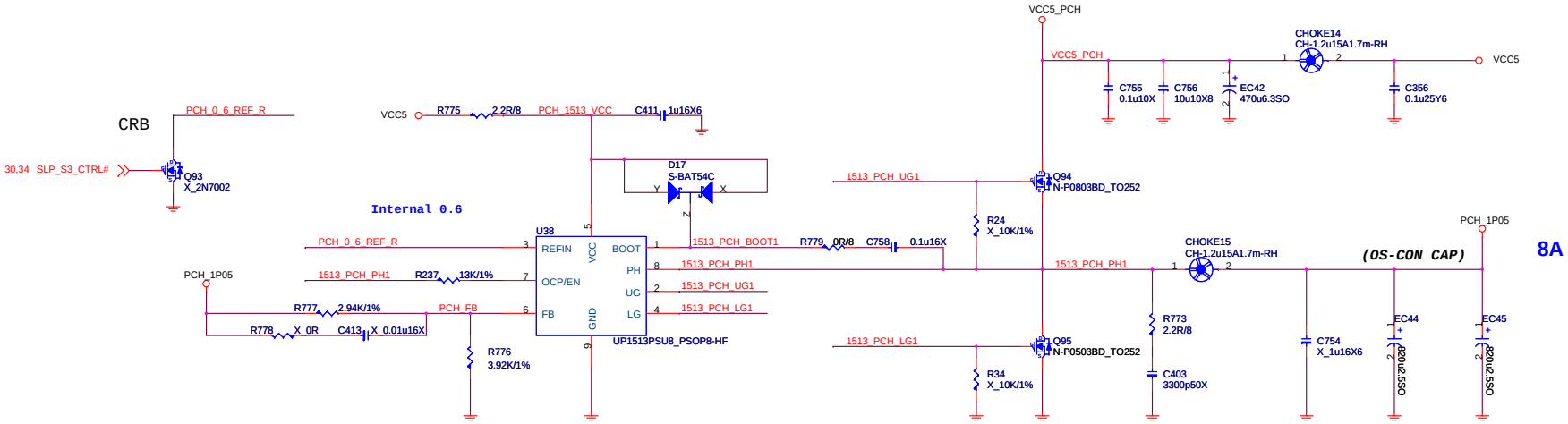
PCH Power:1.05V

PCH Core 6.2A+1.8A=8A

6.2A FOR PCH

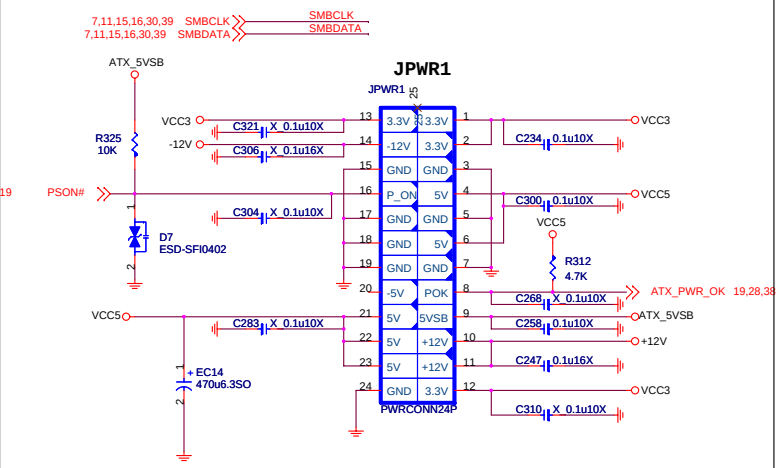
1.8A FOR ME CORE

Iripple=1.80A
5.08*1=5.08A>1.80A
(OS-CON CAP)

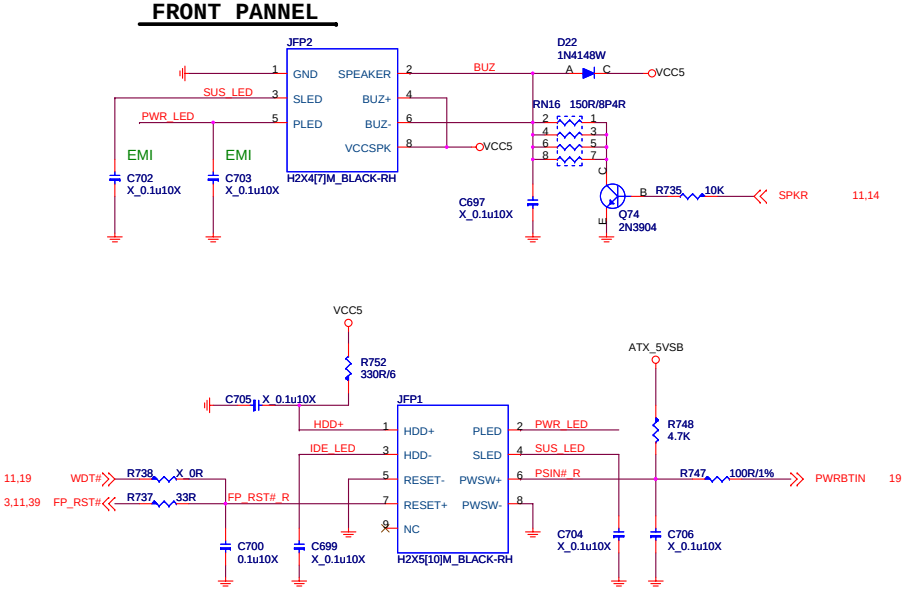


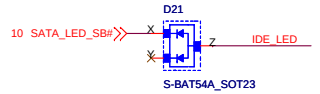
MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7758	
Size: Custom	Document Description: PCH Power - uP1513 1-Phase MOS	Rev: 0A
Date: Friday, January 06, 2012	Sheet 36 of 44	

ATX POWER CONNECTOR

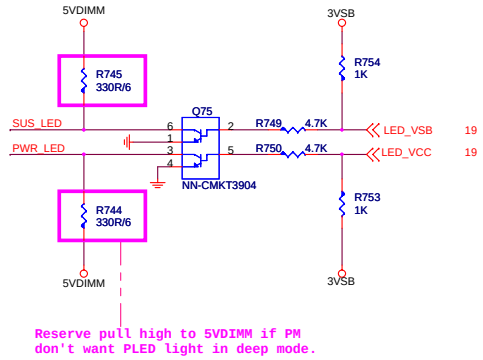


FRONT PANNEL

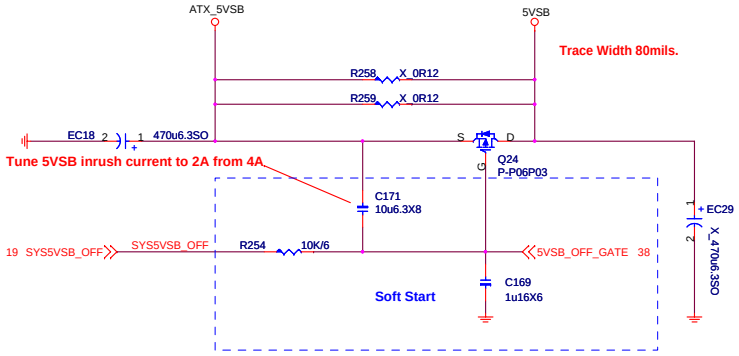




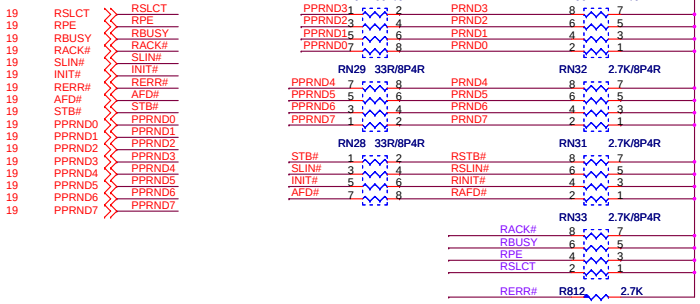
LED (for Fintek 71869)

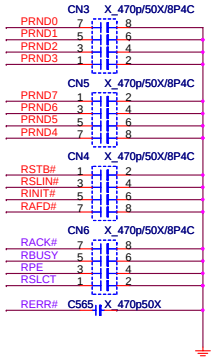


5VSB Power Switch

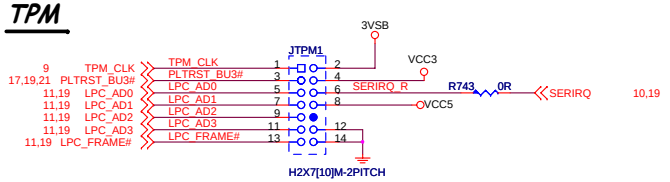


PARALLAL PORT

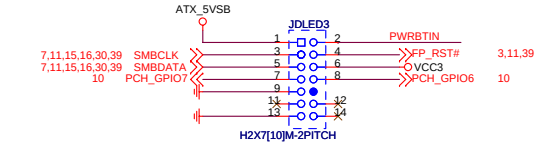




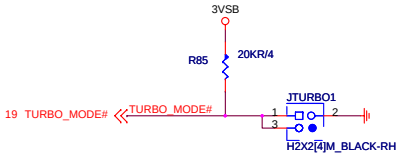
TPM

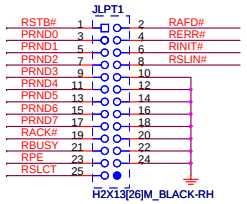


JDLED3



Turbo Button





N31-2131151-H06 : 2.0mm

N31-2131131-H06 : 2.54mm

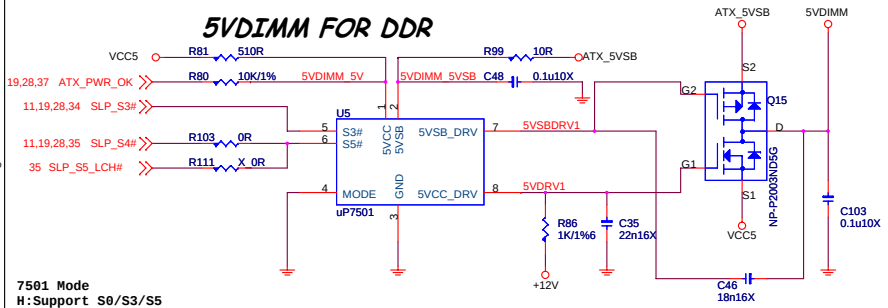
MICRO-STAR INT'L CO.,LTD

MS-7758

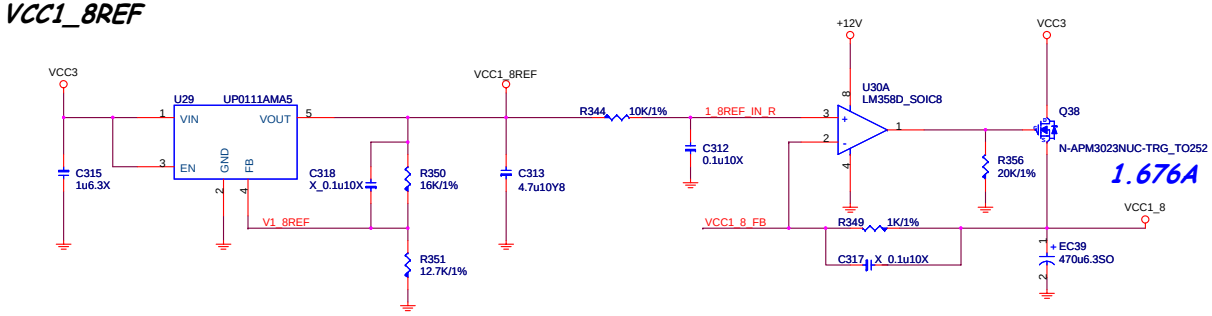
Size	Document Description	Rev
Custom	ATX F_Panel/EMI/TPM	0A

Date: Friday, January 06, 2012 Sheet 37 of 44

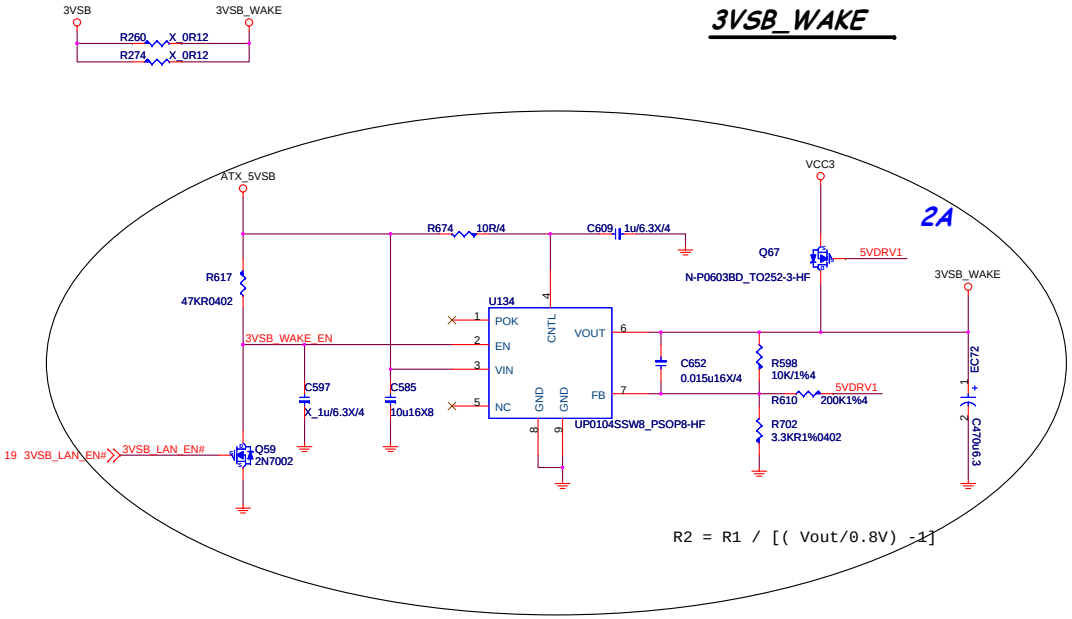
5VDIMM FOR DDR



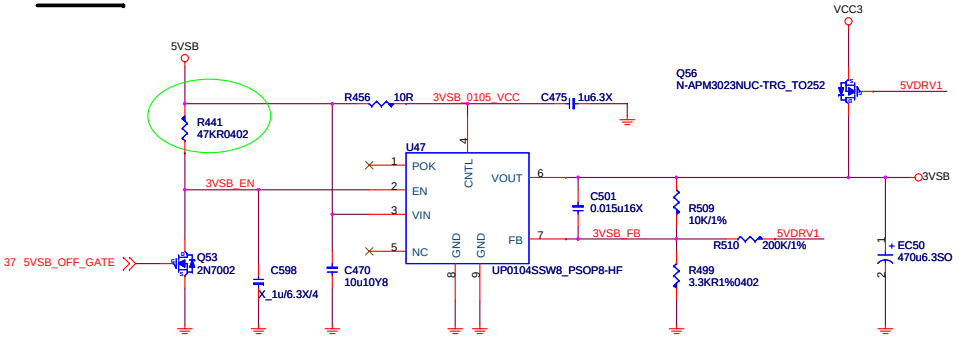
VCC1_8REF



3VSB_WAKE

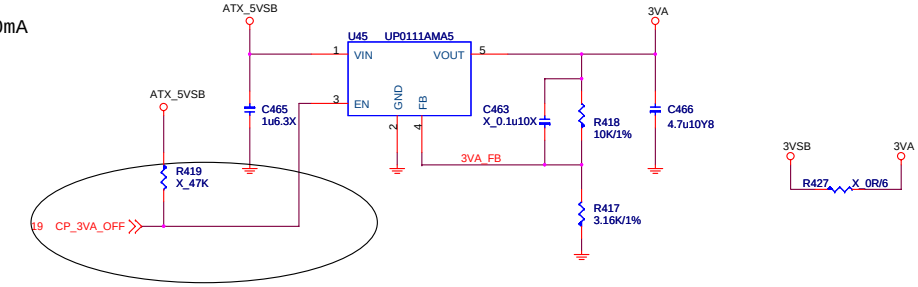


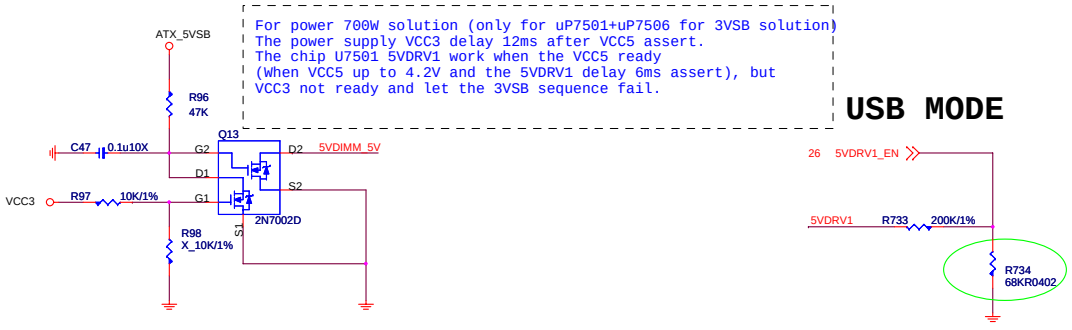
3VSB



3VA

20mA

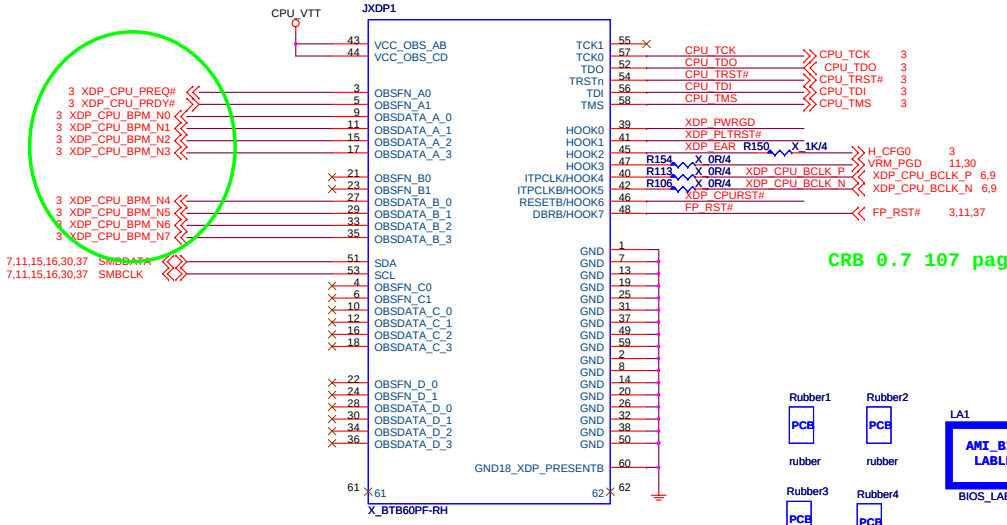




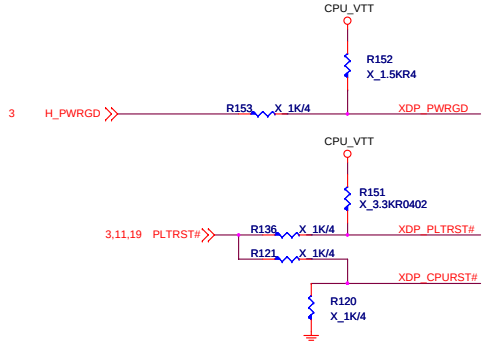
USB MODE

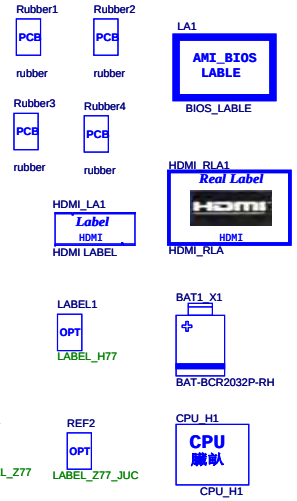
MICRO-STAR INT'L CO.,LTD			
MS-7758			
Size: Custom	Document Description: ACPI controller UPI		Rev: 0A
Date: Friday, January 06, 2012		Sheet 38 of 44	

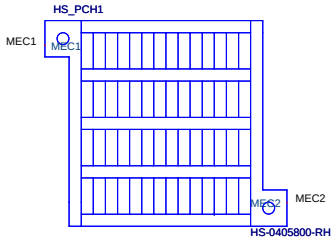
Reserve debug port 5020



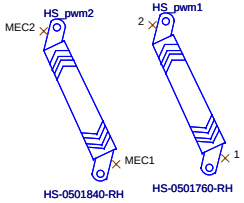
CRB 0.7 107 page



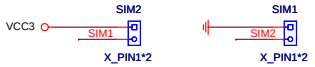




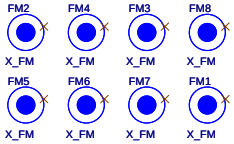
HEATSINK



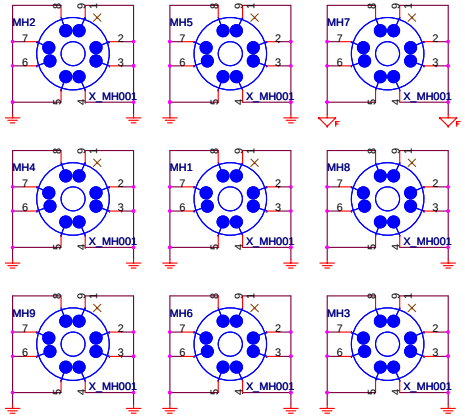
Simulation



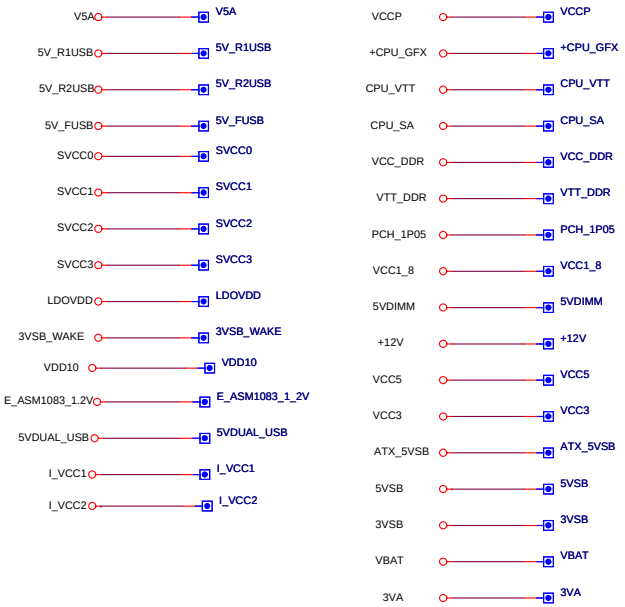
Optical Fiducial Marks-120



Mounting Holes

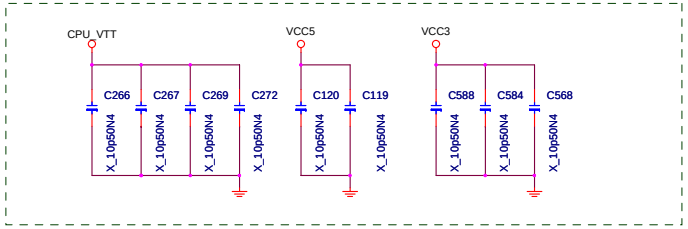


Voltage test point

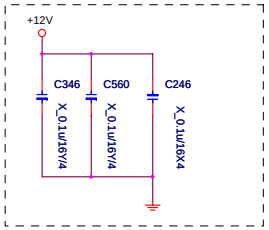


MICRO-STAR INT'L CO.,LTD	
MS-7758	
Size: Custom	Document Description: XDP / Manual Parts
Rev: 0A	
Date: Friday, January 06, 2012	Sheet 39 of 44

EMI:cap. for signal return path



EMI



MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7758	
Size: Custom	Document Description: EMI CAP	Rev: 0A
Date: Friday, January 06, 2012	Sheet 40 of 44	