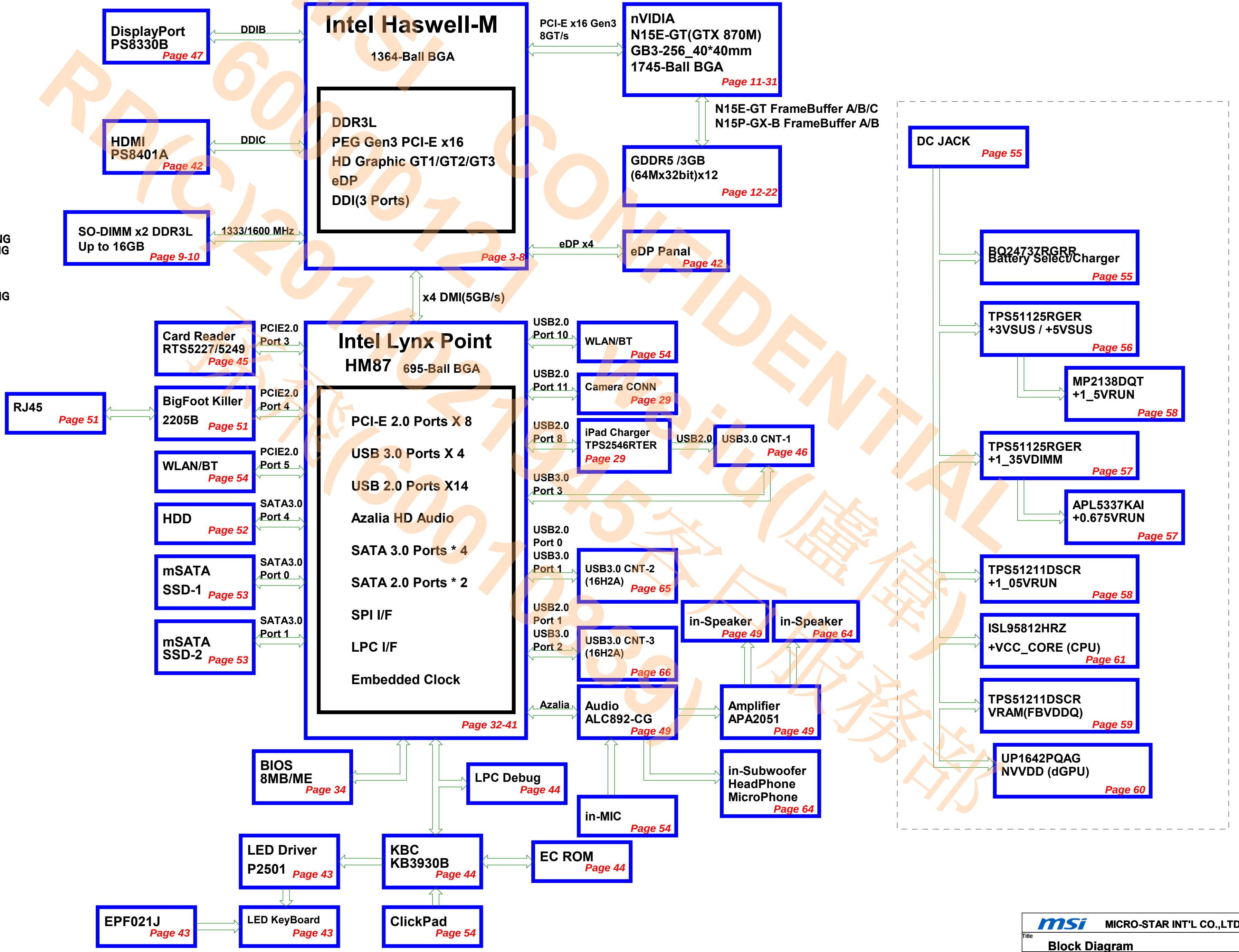
MS-16H2 Ver:1.0

Shark Bay Mobile

Thursday, February 13, 2014

Page 01: Block Diagram
Page 02: Platform
Page 03: CPU-1 (Host Bus)
Page 04: CPU-2 (DDR3L)
Page 05: CPU-3 (Display/Reserved)
Page 06: CPU-4 (Power)
Page 07: CPU-6 (Power & GND)
Page 08: CPU-5 (GND)
Page 09: DDR3L SODIMM 0
Page 10: DDR3L SODIMM 1
Page 11: DGPU_PCI-E Host
Page 12: DGPU_MEM IF A/B
Page 13: DGPU_GDDR5 FrameBuffer A0
Page 14: DGPU_GDDR5 FrameBuffer A1
Page 15: DGPU_GDDR5 FrameBuffer B0
Page 16: DGPU_GDDR5 FrameBuffer B1
Page 17: DGPU_GDDR5 FB-A_DECOUPLING
Page 18: DGPU_GDDR5 FB-B_DECOUPLING
Page 19: DGPU_MEM IF C/D
Page 20: DGPU_GDDR5 FrameBuffer C
Page 21: DGPU_GDDR5 FrameBuffer C
Page 22: DGPU_GDDR5 FB-C_DECOUPLING
Page 23: DGPU_GPU DECOUPLING A
Page 24: DGPU_GPU DECOUPLING B
Page 25: DGPU_DACA,Display IF
Page 26: DGPU_GPIO,I2C
Page 27: DGPU MIO & XTAL
Page 28: DGPU_ROM,HW Straps
Page 29: DGPU NVVDD, FBVDDQ
Page 30: DGPU GND
Page 31: DGPU_Power Control
Page 32: PCH-1 (HDA/JTAG/SATA)
Page 33: PCH-2 (CLK)
Page 34: PCH-3 (LPC,SMBUS)
Page 35: PCH-4 (DMI,FDI)
Page 36: PCH-5 (PCI,DDI)
Page 37: PCH-6 (GPIO,MISC)
Page 38: PCH-7 (PCIE,USB)
Page 39: PCH-8 (Power)
Page 40: PCH-8 (Power)
Page 41: PCH-8 (GND)
Page 42: eDP Connector
Page 43: LED Driver IC/LED_8051
Page 44: KBC(KB3930QFB1)
Page 45: Card Reader/USB3.0 CNT-1/-2
Page 46: USB 3.0 / iCharger
Page 47: DP with Repeater
Page 48: HDMI Repeater
Page 49: Audio CODEC/Audio AMP
Page 50: CPU FAN/BTB CONN
Page 51: GIGA LAN(BigFoot BFN2205B)
Page 52: HDD With Repeater
Page 53: SSD/ DGPU FAN
Page 54: WLAN /Camera/ClickPad/LID
Page 55: Battery Select/Charger
Page 56: System Power
Page 57: +1.35VDIMM/+0.675VRUN
Page 58: +1_05VRUN / +1_5VRUN
Page 59: DGPU POWER FBVDDQ
Page 60: DGPU POWER NVVDD
Page 61: CPU Power (ISL95812HRZ)
Page 62: EMI
Page 63: Screw/ME
Page 64: [A] Audio
Page 65: [A] USB3.0 CNT-3/-4
Page 66: LED Board
Page 67: Power SW Board
Page 68: Power Delivery Map
Page 69: Power on Block Diagram
Page 70: Power down Sequence
Page 71: Power on Sequence



DisplayPort PS8330B Page 47
DDIB
Intel Haswell-M
1364-Ball BGA
DDR3L
PEG Gen3 PCI-E x16
HD Graphic GT1/GT2/GT3
eDP
DDI(3 Ports)
Page 3-8
PCI-E x16 Gen3 8GT/s
nVIDIA N15E-GT(GTX 870M) GB3-256_40*40mm 1745-Ball BGA Page 11-31
N15E-GT FrameBuffer A/B/C
N15P-GX-B FrameBuffer A/B
GDDR5 /3GB (64Mx32bit)x12 Page 12-22
HDMI PS8401A Page 42
DDIC
SO-DIMM x2 DDR3L Up to 16GB Page 9-10
1333/1600 MHz
eDP x4
eDP Panal Page 42
x4 DMI(5GB/s)
Intel Lynx Point
HM87 695-Ball BGA
PCI-E 2.0 Ports X 8
USB 3.0 Ports X 4
USB 2.0 Ports X14
Azalia HD Audio
SATA 3.0 Ports * 4
SATA 2.0 Ports * 2
SPI I/F
LPC I/F
Embedded Clock
Page 32-41
Card Reader RTS5227/5249 Page 45
PCIE2.0 Port 3
RJ45 Page 51
BigFoot Killer 2205B Page 51
PCIE2.0 Port 4
WLAN/BT Page 54
PCIE2.0 Port 5
HDD Page 52
SATA3.0 Port 4
mSATA SSD-1 Page 53
SATA3.0 Port 0
mSATA SSD-2 Page 53
SATA3.0 Port 1
USB2.0 Port 10
WLAN/BT Page 54
USB2.0 Port 11
Camera CONN Page 29
USB2.0 Port 8
iPad Charger TPS2546RTER Page 29
USB2.0
USB3.0 CNT-1 Page 46
USB3.0 Port 3
USB2.0 Port 0
USB3.0 Port 1
USB3.0 CNT-2 (16H2A) Page 65
USB2.0 Port 1
USB3.0 Port 2
USB3.0 CNT-3 (16H2A) Page 66
in-Speaker Page 49
in-Speaker Page 64
Azalia
Audio ALC892-CG Page 49
Amplifier APA2051 Page 49
in-Subwoofer HeadPhone MicroPhone Page 64
in-MIC Page 54
BIOS 8MB/ME Page 34
LPC Debug Page 44
LED Driver P2501 Page 43
KBC KB3930B Page 44
EC ROM Page 44
EPF021J Page 43
LED KeyBoard Page 43
ClickPad Page 54
DC JACK Page 55
BQ24737RGRR Battery Select/Charger Page 55
TPS51125RGER +3VSUS / +5VSUS Page 56
MP2138DQT +1_5VRUN Page 58
TPS51125RGER +1_35VDIMM Page 57
APL5337KAI +0.675VRUN Page 57
TPS51211DSCR +1_05VRUN Page 58
ISL95812HRZ +VCC_CORE (CPU) Page 61
TPS51211DSCR VRAM(FBVDDQ) Page 59
UP1642PQAG NVVDD (dGPU) Page 60

MSI CONFIDENTIAL

MICRO-STAR INT'L CO.,LTD.

Title: Block Diagram

Document Number: MS-16H

Rev 1.0

Sheet 1 of 72

SCHEMATIC ANNOTATIONS AND BOARD INFORMATION

Voltage Rails

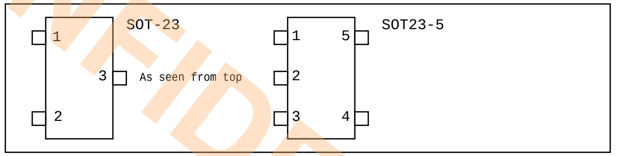
Voltage	Description	Control Signal
PWR_SRC	AC ADAPTER OR BATTERY IN	
+5VALW	5.0V always on power rail	PWR_SRC
+3VALW	3.3V always on power rail	PWR_SRC
+5VSUS	5.0V power rail	SUS_ON
+3VSUS	3.3V power rail	SUS_ON
+1_35VDIMM	1.35V DDR3L power rail (off in S4-S5)	DIMM_ON
+0_675VRUN	0.675V DDR3L Termination voltage (off in S3-S5)	PM_SLP_S3#
+5VRUN	5.0V switched power rail (off in S3-S5)	RUN_ON
+3VRUN	3.3V switched power rail (off in S3-S5 / M0)	RUN_ON
+1_5VRUN	1.5V switched power rail (off in S3-S5)	RUN_ON
+VCC_CORE	1.8V Core Voltage for Processor	EC_ALLSYSPG
+1_05VRUN	1.05V rail for Processor	RUN_ON
NVVDD	V Core Voltage for nVIDIA dGPU	NVVDD_EN
+3V3_NV	3.3V PEX power rail (off in Optimus OFF)	DGPU_PWR_EN#
FBVDDQ	1.35V FB / GDDR5 power rail (off in Optimus OFF)	FBVDDQ_ON
PEX_VDD	1.05V PLL power rail (off in Optimus OFF)	NVVDD_EN

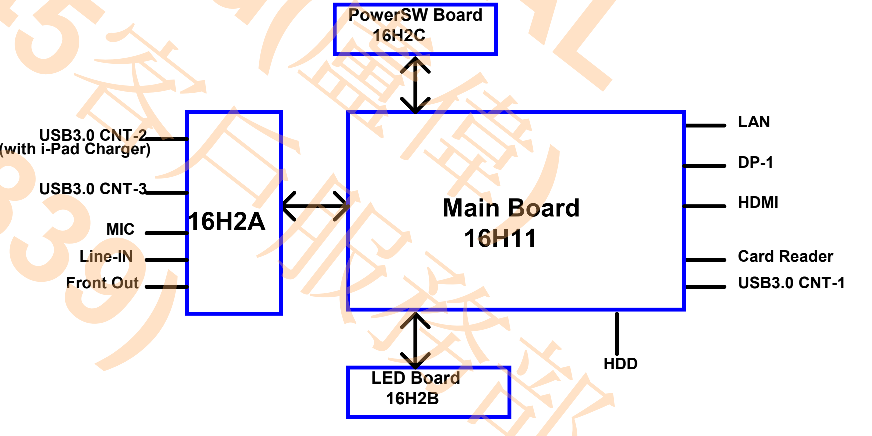
Net Naming Conventions

Suffix
= Active Low Signal

Prefix
H = Host
M = DDR Memory
TP = Test Point (does not connect anywhere else)
FB = DGPU VRAM
VIAxxx = Like Test Point, but using VIA.

PCB Footprints





POWER STATES

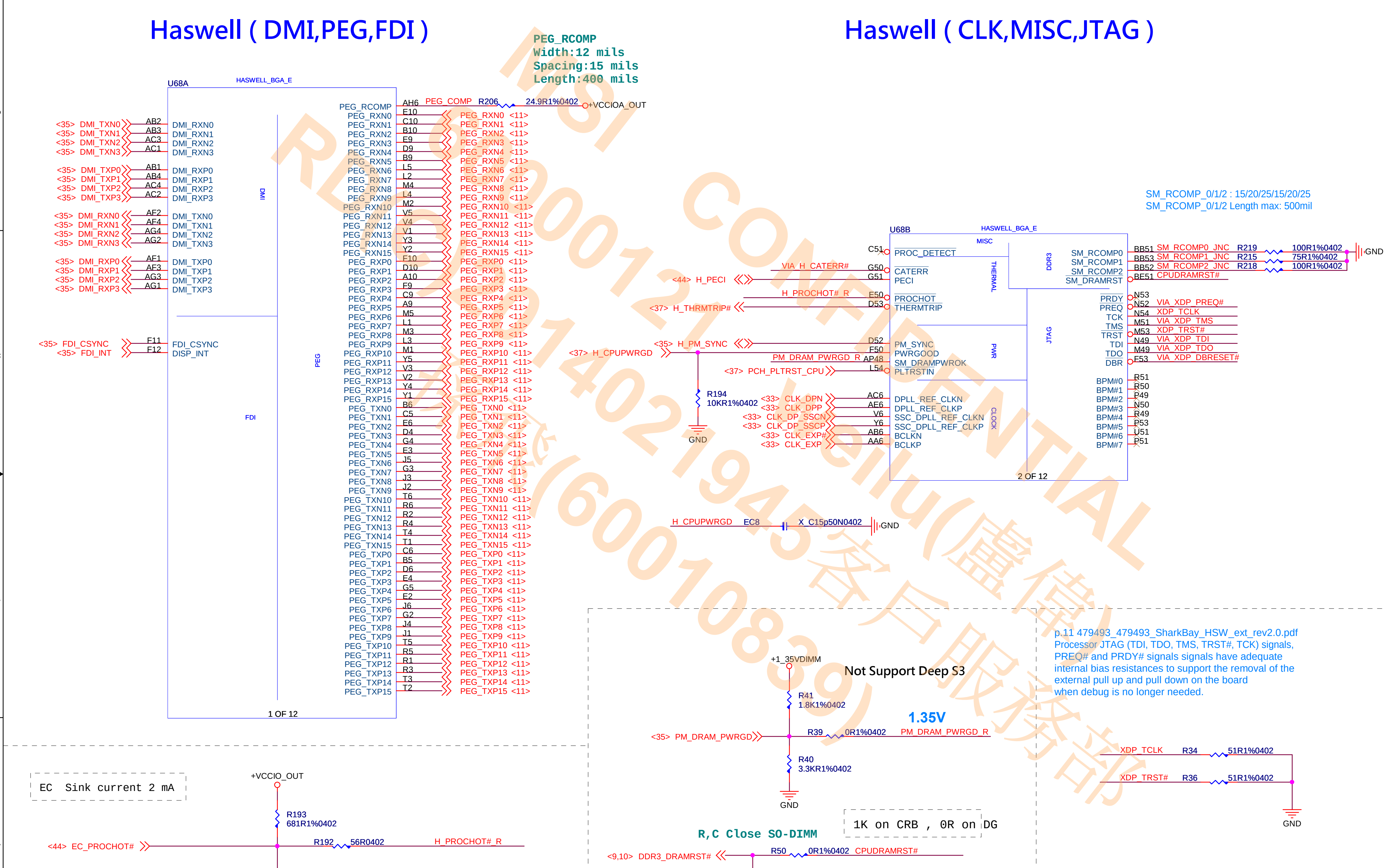
STATE \ SIGNAL	SLP_S3#	SLP_S4#	SLP_S5#	+V*ALW	+*VSUS	+*VRUN	Clocks
S0(Full ON)	HIGH	HIGH	HIGH	ON	ON	ON	ON
S3(Suspend to RAM)	LOW	HIGH	HIGH	ON	ON	OFF	OFF
S4(Suspend to Disk)	LOW	LOW	HIGH	ON	OFF	OFF	OFF
S5 (Soft OFF)	LOW	LOW	LOW	ON	OFF	OFF	OFF

Note : WHEN AC MODE , System turn on and +V*SUS always keep high

MSI 600001211 RD(C)2014021945 CONFIDENTIAL weilu(

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

Title	Platform
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	2 of 72



Haswell (DMI,PEG,FDI)
Haswell (CLK,MISC,JTAG)
PEG_RCOMP
Width:12 mils
Spacing:15 mils
Length:400 mils
U68A
HASWELL_BGA_E
<35> DMI_TXN0
<35> DMI_TXN1
<35> DMI_TXN2
<35> DMI_TXN3
<35> DMI_TXP0
<35> DMI_TXP1
<35> DMI_TXP2
<35> DMI_TXP3
<35> DMI_RXN0
<35> DMI_RXN1
<35> DMI_RXN2
<35> DMI_RXN3
<35> DMI_RXP0
<35> DMI_RXP1
<35> DMI_RXP2
<35> DMI_RXP3
DMI_RXN0 DMI_RXN1 DMI_RXN2 DMI_RXN3
DMI_RXP0 DMI_RXP1 DMI_RXP2 DMI_RXP3
DMI_TXN0 DMI_TXN1 DMI_TXN2 DMI_TXN3
DMI_TXP0 DMI_TXP1 DMI_TXP2 DMI_TXP3
DMI
<35> FDI_CSYNC
<35> FDI_INT
FDI_CSYNC
DISP_INT
FDI
PEG
PEG_RCOMP
AH6 PEG_COMP R206 24.9R1%0402 +VCCIOA_OUT
PEG_RXN0 … PEG_RXN15 <11>
PEG_RXP0 … PEG_RXP15 <11>
PEG_TXN0 … PEG_TXN15 <11>
PEG_TXP0 … PEG_TXP15 <11>
1 OF 12
SM_RCOMP_0/1/2 : 15/20/25/15/20/25
SM_RCOMP_0/1/2 Length max: 500mil
U68B
HASWELL_BGA_E
MISC
THERMAL
DDR3
JTAG
PWR
CLOCK
C51 PROC_DETECT
VIA_H_CATERR# G50 CATERR
<44> H_PECI G51 PECI
H_PROCHOT#_R E50 PROCHOT
<37> H_THRMTRIP# D53 THERMTRIP
<35> H_PM_SYNC D52 PM_SYNC
<37> H_CPUPWRGD F50 PWRGOOD
PM_DRAM_PWRGD_R AP48 SM_DRAMPWROK
<37> PCH_PLTRST_CPU L54 PLTRSTIN
R194 10KR1%0402
GND
<33> CLK_DPN AC6 DPLL_REF_CLKN
<33> CLK_DPP AE6 DPLL_REF_CLKP
<33> CLK_DP_SSCN V6 SSC_DPLL_REF_CLKN
<33> CLK_DP_SSCP Y6 SSC_DPLL_REF_CLKP
<33> CLK_EXP# AB6 BCLKN
<33> CLK_EXP AA6 BCLKP
SM_RCOMP0 BB51 SM_RCOMP0_JNC R219 100R1%0402
SM_RCOMP1 BB53 SM_RCOMP1_JNC R215 75R1%0402
SM_RCOMP2 BB52 SM_RCOMP2_JNC R218 100R1%0402
GND
SM_DRAMRST BE51 CPUDRAMRST#
PRDY N53
PREQ N52 VIA_XDP_PREQ#
TCK N54 XDP_TCLK
TMS M51 VIA_XDP_TMS
TRST M53 XDP_TRST#
TDI N49 VIA_XDP_TDI
TDO M49 VIA_XDP_TDO
DBR F53 VIA_XDP_DBRESET#
BPM#0 R51
BPM#1 R50
BPM#2 P49
BPM#3 N50
BPM#4 R49
BPM#5 P53
BPM#6 U51
BPM#7 P51
2 OF 12
H_CPUPWRGD EC8 X_C15p50N0402 GND
p.11 479493_479493_SharkBay_HSW_ext_rev2.0.pdf
Processor JTAG (TDI, TDO, TMS, TRST#, TCK) signals,
PREQ# and PRDY# signals signals have adequate
internal bias resistances to support the removal of the
external pull up and pull down on the board
when debug is no longer needed.
+1_35VDIMM
Not Support Deep S3
R41 1.8K1%0402
1.35V
<35> PM_DRAM_PWRGD R39 0R1%0402 PM_DRAM_PWRGD_R
R40 3.3KR1%0402
GND
XDP_TCLK R34 51R1%0402
XDP_TRST# R36 51R1%0402
GND
EC Sink current 2 mA
+VCCIO_OUT
R193 681R1%0402
<44> EC_PROCHOT# R192 56R0402 H_PROCHOT#_R
<61> IMVP_PROCHOT# 1 2
JNC9 X_0402
47P close PWM
1K on CRB , 0R on DG
R,C Close SO-DIMM
<9,10> DDR3_DRAMRST# R50 0R1%0402 CPUDRAMRST#
EC1 X_C0.1u50X70402
GND

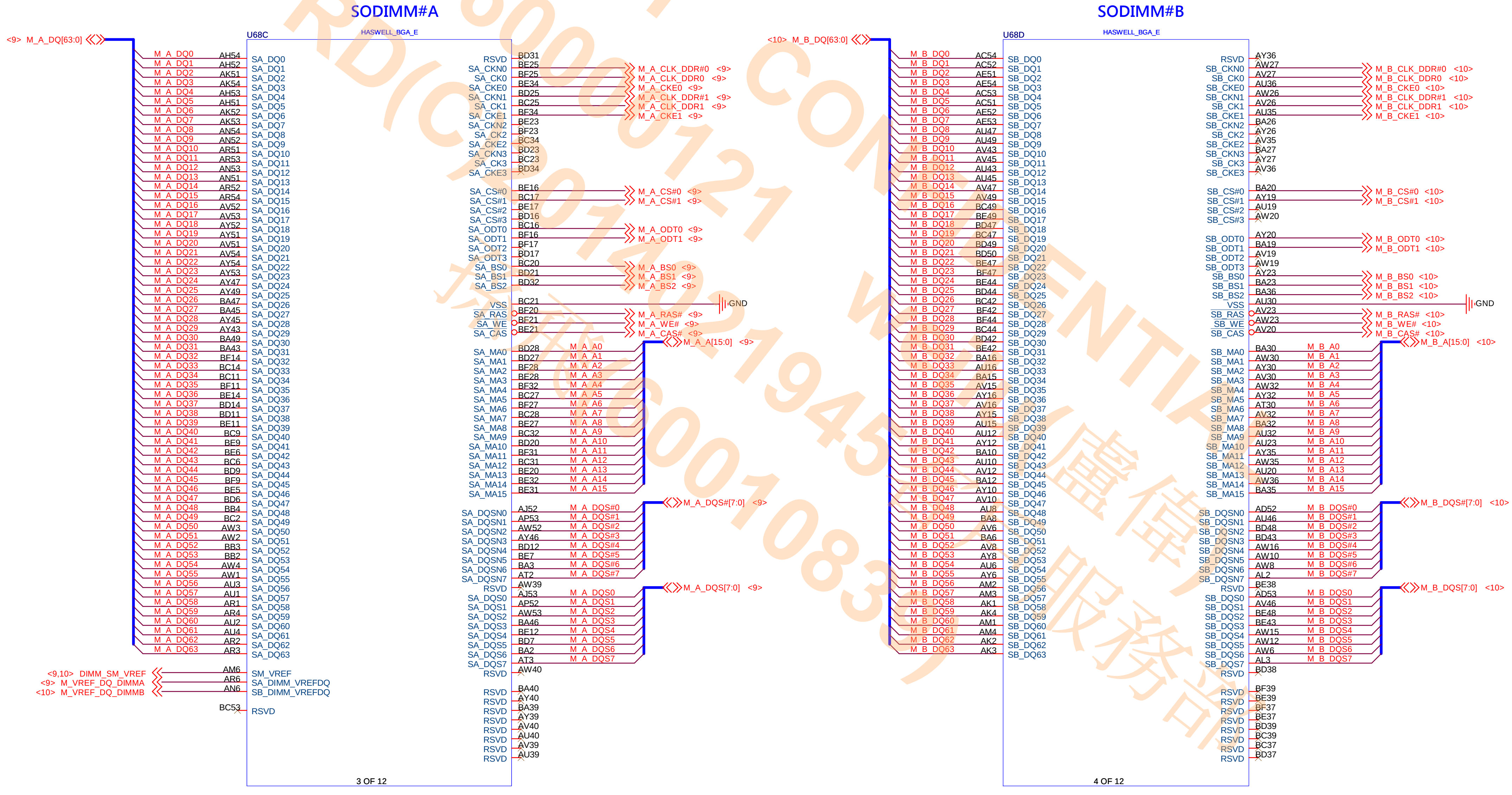
MICRO-STAR INT'L CO.,LTD.

Title: CPU-1 (Host Bus)

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Thursday, February 13, 2014 | Sheet 3 of 72

Haswell (DDR3L)



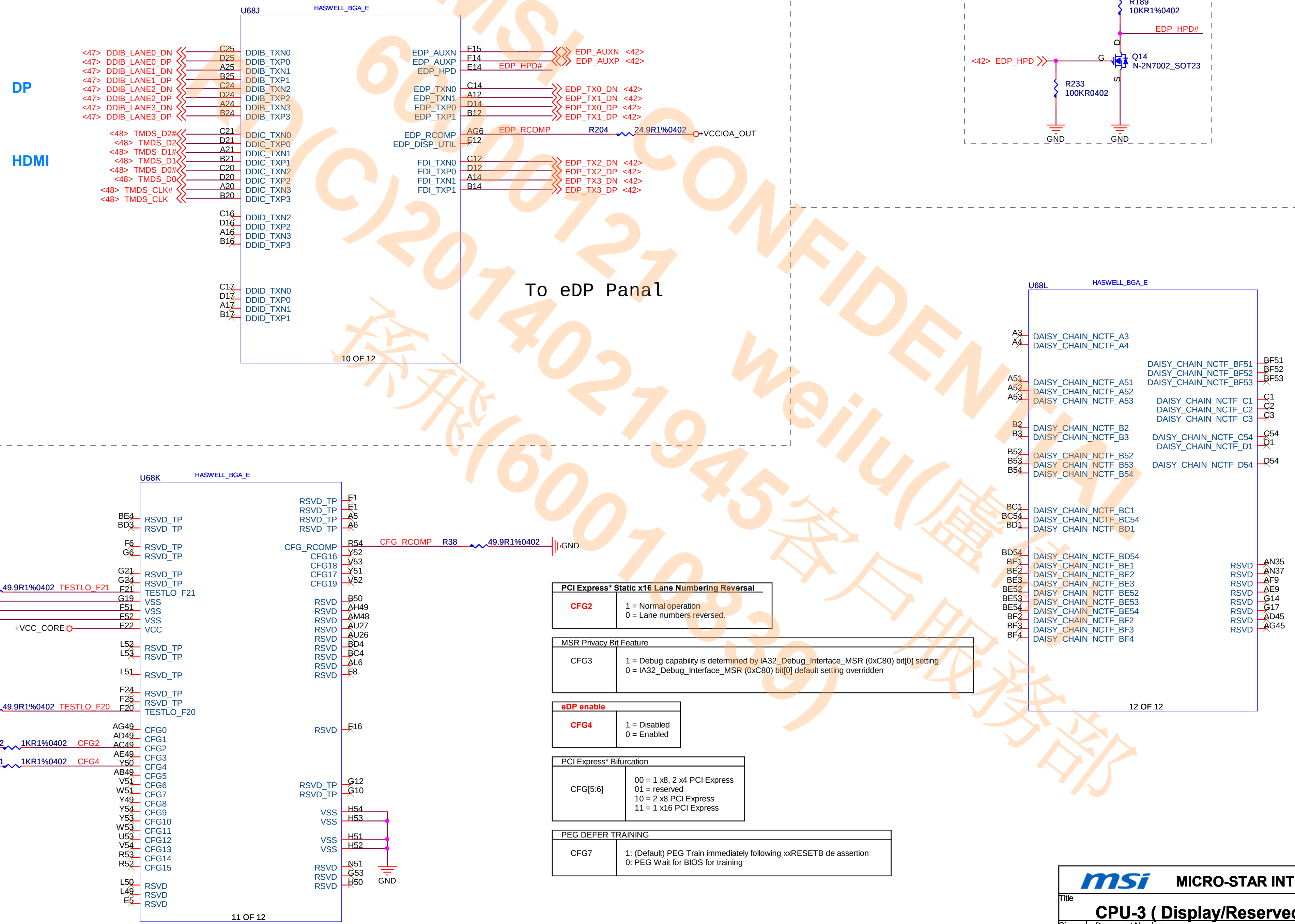
SODIMM#A
U68C
HASWELL_BGA_E
<9> M_A_DQ[63:0]
SA_DQ0 … SA_DQ63
M_A_DQ0 … M_A_DQ63
RSVD
SA_CKN0 SA_CK0 SA_CKE0 SA_CKN1 SA_CK1 SA_CKE1 SA_CKN2 SA_CK2 SA_CKE2 SA_CKN3 SA_CK3 SA_CKE3
M_A_CLK_DDR#0 <9>
M_A_CLK_DDR0 <9>
M_A_CKE0 <9>
M_A_CLK_DDR#1 <9>
M_A_CLK_DDR1 <9>
M_A_CKE1 <9>
SA_CS#0 SA_CS#1 SA_CS#2 SA_CS#3
M_A_CS#0 <9>
M_A_CS#1 <9>
SA_ODT0 SA_ODT1 SA_ODT2 SA_ODT3
M_A_ODT0 <9>
M_A_ODT1 <9>
SA_BS0 SA_BS1 SA_BS2
M_A_BS0 <9>
M_A_BS1 <9>
M_A_BS2 <9>
VSS
GND
SA_RAS SA_WE SA_CAS
M_A_RAS# <9>
M_A_WE# <9>
M_A_CAS# <9>
SA_MA0 … SA_MA15
M_A_A0 … M_A_A15
M_A_A[15:0] <9>
SA_DQSN0 … SA_DQSN7
M_A_DQS#0 … M_A_DQS#7
M_A_DQS#[7:0] <9>
SA_DQS0 … SA_DQS7
M_A_DQS0 … M_A_DQS7
M_A_DQS[7:0] <9>
<9,10> DIMM_SM_VREF
<9> M_VREF_DQ_DIMMA
<10> M_VREF_DQ_DIMMB
SM_VREF
SA_DIMM_VREFDQ
SB_DIMM_VREFDQ
3 OF 12
SODIMM#B
U68D
HASWELL_BGA_E
<10> M_B_DQ[63:0]
SB_DQ0 … SB_DQ63
M_B_DQ0 … M_B_DQ63
SB_CKN0 SB_CK0 SB_CKE0 SB_CKN1 SB_CK1 SB_CKE1 SB_CKN2 SB_CK2 SB_CKE2 SB_CKN3 SB_CK3 SB_CKE3
M_B_CLK_DDR#0 <10>
M_B_CLK_DDR0 <10>
M_B_CKE0 <10>
M_B_CLK_DDR#1 <10>
M_B_CLK_DDR1 <10>
M_B_CKE1 <10>
SB_CS#0 SB_CS#1 SB_CS#2 SB_CS#3
M_B_CS#0 <10>
M_B_CS#1 <10>
SB_ODT0 SB_ODT1 SB_ODT2 SB_ODT3
M_B_ODT0 <10>
M_B_ODT1 <10>
SB_BS0 SB_BS1 SB_BS2
M_B_BS0 <10>
M_B_BS1 <10>
M_B_BS2 <10>
SB_RAS SB_WE SB_CAS
M_B_RAS# <10>
M_B_WE# <10>
M_B_CAS# <10>
SB_MA0 … SB_MA15
M_B_A0 … M_B_A15
M_B_A[15:0] <10>
SB_DQSN0 … SB_DQSN7
M_B_DQS#0 … M_B_DQS#7
M_B_DQS#[7:0] <10>
SB_DQS0 … SB_DQS7
M_B_DQS0 … M_B_DQS7
M_B_DQS[7:0] <10>
4 OF 12

MSI CONFIDENTIAL

MICRO-STAR INT'L CO.,LTD.

Title	CPU-2 (DDR3L)
Size	
Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	4 of 72

Display/Reserved



DP
HDMI
U68J
HASWELL_BGA_E
<47> DDIB_LANE0_DN C25 DDIB_TXN0
<47> DDIB_LANE0_DP D25 DDIB_TXP0
<47> DDIB_LANE1_DN A25 DDIB_TXN1
<47> DDIB_LANE1_DP B25 DDIB_TXP1
<47> DDIB_LANE2_DN C24 DDIB_TXN2
<47> DDIB_LANE2_DP D24 DDIB_TXP2
<47> DDIB_LANE3_DN A24 DDIB_TXN3
<47> DDIB_LANE3_DP B24 DDIB_TXP3
<48> TMDS_D2# C21 DDIC_TXN0
<48> TMDS_D2 D21 DDIC_TXP0
<48> TMDS_D1# A21 DDIC_TXN1
<48> TMDS_D1 B21 DDIC_TXP1
<48> TMDS_D0# C20 DDIC_TXN2
<48> TMDS_D0 D20 DDIC_TXP2
<48> TMDS_CLK# A20 DDIC_TXN3
<48> TMDS_CLK B20 DDIC_TXP3
C16 DDID_TXN2
D16 DDID_TXP2
A16 DDID_TXN3
B16 DDID_TXP3
C17 DDID_TXN0
D17 DDID_TXP0
A17 DDID_TXN1
B17 DDID_TXP1
EDP_AUXN F15 EDP_AUXN <42>
EDP_AUXP F14 EDP_AUXP <42>
EDP_HPD E14 EDP_HPD#
EDP_TXN0 C14 EDP_TX0_DN <42>
EDP_TXN1 A12 EDP_TX1_DN <42>
EDP_TXP0 D14 EDP_TX0_DP <42>
EDP_TXP1 B12 EDP_TX1_DP <42>
EDP_RCOMP AG6 EDP_RCOMP R204 24.9R1%0402 +VCCIOA_OUT
EDP_DISP_UTIL E12
FDI_TXN0 C12 EDP_TX2_DN <42>
FDI_TXP0 D12 EDP_TX2_DP <42>
FDI_TXN1 A14 EDP_TX3_DN <42>
FDI_TXP1 B14 EDP_TX3_DP <42>
10 OF 12
To eDP Panal
+VCCIO_OUT
R189 10KR1%0402
EDP_HPD#
<42> EDP_HPD
Q14 N-2N7002_SOT23
R233 100KR0402
GND
U68K
HASWELL_BGA_E
BE4 RSVD_TP
BD3 RSVD_TP
F6 RSVD_TP
G6 RSVD_TP
G21 RSVD_TP
G24 RSVD_TP
GND R190 49.9R1%0402 TESTLO_F21 F21 TESTLO_F21
G19 VSS
F51 VSS
F52 VSS
+VCC_CORE F22 VCC
L52 RSVD_TP
L53 RSVD_TP
L51 RSVD_TP
F24 RSVD_TP
F25 RSVD_TP
GND R191 49.9R1%0402 TESTLO_F20 F20 TESTLO_F20
AG49 CFG0
AD49 CFG1
R202 1KR1%0402 CFG2 AC49 CFG2
AE49 CFG3
R201 1KR1%0402 CFG4 Y50 CFG4
AB49 CFG5
V51 CFG6
W51 CFG7
Y49 CFG8
Y54 CFG9
Y53 CFG10
W53 CFG11
U53 CFG12
V54 CFG13
R53 CFG14
R52 CFG15
L50 RSVD
L49 RSVD
E5 RSVD
RSVD_TP F1
RSVD_TP E1
RSVD_TP A5
RSVD_TP A6
CFG_RCOMP R54 CFG_RCOMP R38 49.9R1%0402 GND
CFG16 Y52
CFG18 V53
CFG17 Y51
CFG19 V52
RSVD B50
RSVD AH49
RSVD AM48
RSVD AU27
RSVD AU26
RSVD BD4
RSVD BC4
RSVD AL6
RSVD F8
RSVD F16
RSVD_TP G12
RSVD_TP G10
VSS H54
VSS H53
VSS H51
VSS H52
RSVD N51
RSVD G53
RSVD H50
11 OF 12
U68L
HASWELL_BGA_E
A3 DAISY_CHAIN_NCTF_A3
A4 DAISY_CHAIN_NCTF_A4
A51 DAISY_CHAIN_NCTF_A51
A52 DAISY_CHAIN_NCTF_A52
A53 DAISY_CHAIN_NCTF_A53
B2 DAISY_CHAIN_NCTF_B2
B3 DAISY_CHAIN_NCTF_B3
B52 DAISY_CHAIN_NCTF_B52
B53 DAISY_CHAIN_NCTF_B53
B54 DAISY_CHAIN_NCTF_B54
BC1 DAISY_CHAIN_NCTF_BC1
BC54 DAISY_CHAIN_NCTF_BC54
BD1 DAISY_CHAIN_NCTF_BD1
BD54 DAISY_CHAIN_NCTF_BD54
BE1 DAISY_CHAIN_NCTF_BE1
BE2 DAISY_CHAIN_NCTF_BE2
BE3 DAISY_CHAIN_NCTF_BE3
BE52 DAISY_CHAIN_NCTF_BE52
BE53 DAISY_CHAIN_NCTF_BE53
BE54 DAISY_CHAIN_NCTF_BE54
BF2 DAISY_CHAIN_NCTF_BF2
BF3 DAISY_CHAIN_NCTF_BF3
BF4 DAISY_CHAIN_NCTF_BF4
DAISY_CHAIN_NCTF_BF51 BF51
DAISY_CHAIN_NCTF_BF52 BF52
DAISY_CHAIN_NCTF_BF53 BF53
DAISY_CHAIN_NCTF_C1 C1
DAISY_CHAIN_NCTF_C2 C2
DAISY_CHAIN_NCTF_C3 C3
DAISY_CHAIN_NCTF_C54 C54
DAISY_CHAIN_NCTF_D1 D1
DAISY_CHAIN_NCTF_D54 D54
RSVD AN35
RSVD AN37
RSVD AF9
RSVD AE9
RSVD G14
RSVD G17
RSVD AD45
RSVD AG45
12 OF 12

PCI Express* Static x16 Lane Numbering Reversal

CFG2	1 = Normal operation 0 = Lane numbers reversed.

MSR Privacy Bit Feature

CFG3	1 = Debug capability is determined by IA32_Debug_Interface_MSR (0xC80) bit[0] setting 0 = IA32_Debug_Interface_MSR (0xC80) bit[0] default setting overridden

eDP enable

CFG4	1 = Disabled 0 = Enabled

PCI Express* Bifurcation

CFG[5:6]	00 = 1 x8, 2 x4 PCI Express 01 = reserved 10 = 2 x8 PCI Express 11 = 1 x16 PCI Express

PEG DEFER TRAINING

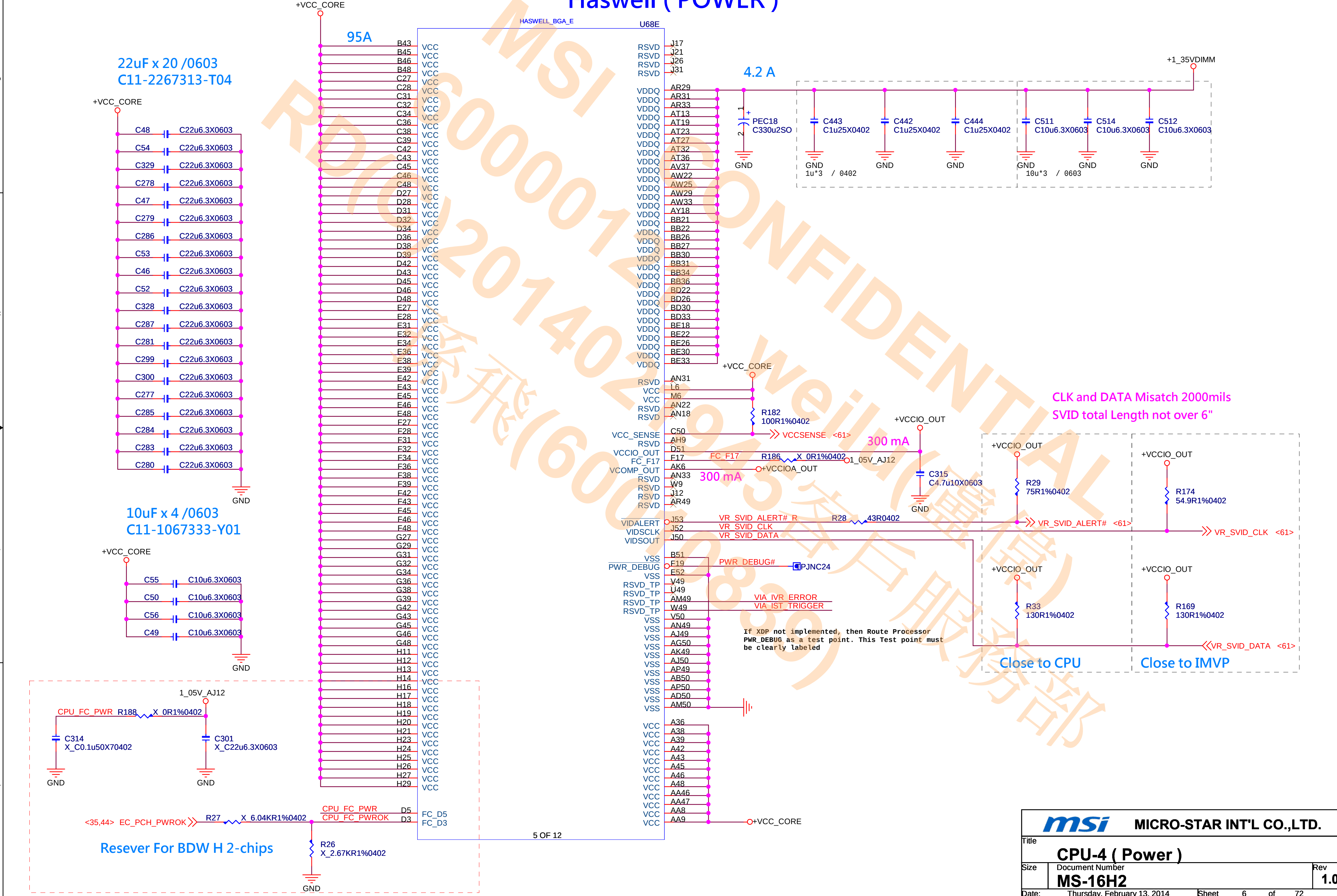
CFG7	1: (Default) PEG Train immediately following xxRESETB de assertion 0: PEG Wait for BIOS for training

MICRO-STAR INT'L CO.,LTD.

Title	CPU-3 (Display/Reserved)	
Size	Document Number: MS-16H2	Rev 1.0
Date: Friday, January 03, 2014	Sheet 5 of 72	

MSI CONFIDENTIAL
FD(C)2014021945 weilu(盧偉)
60010839 60012108 徐飛(60010839)客戶服務部

Haswell (POWER)



+VCC_CORE
95A
HASWELL_BGA_E
U68E
22uF x 20 /0603
C11-2267313-T04
C48 C22u6.3X0603
C54 C22u6.3X0603
C329 C22u6.3X0603
C278 C22u6.3X0603
C47 C22u6.3X0603
C279 C22u6.3X0603
C286 C22u6.3X0603
C53 C22u6.3X0603
C46 C22u6.3X0603
C52 C22u6.3X0603
C328 C22u6.3X0603
C287 C22u6.3X0603
C281 C22u6.3X0603
C299 C22u6.3X0603
C300 C22u6.3X0603
C277 C22u6.3X0603
C285 C22u6.3X0603
C284 C22u6.3X0603
C283 C22u6.3X0603
C280 C22u6.3X0603
GND
10uF x 4 /0603
C11-1067333-Y01
C55 C10u6.3X0603
C50 C10u6.3X0603
C56 C10u6.3X0603
C49 C10u6.3X0603
4.2 A
+1_35VDIMM
PEC18 C330u2SO
C443 C1u25X0402
C442 C1u25X0402
C444 C1u25X0402
C511 C10u6.3X0603
C514 C10u6.3X0603
C512 C10u6.3X0603
1u*3 / 0402
10u*3 / 0603
R182 100R1%0402
VCCSENSE <61>
+VCCIO_OUT
300 mA
FC_F17
R186 X_0R1%0402
1_05V_AJ12
+VCCIOA_OUT
C315 C4.7u10X0603
CLK and DATA Misatch 2000mils
SVID total Length not over 6"
R29 75R1%0402
R174 54.9R1%0402
VR_SVID_ALERT#_R
R28 43R0402
VR_SVID_ALERT# <61>
VR_SVID_CLK
VR_SVID_CLK <61>
VR_SVID_DATA
R33 130R1%0402
R169 130R1%0402
VR_SVID_DATA <61>
Close to CPU
Close to IMVP
PWR_DEBUG#
PJNC24
VIA_IVR_ERROR
VIA_IST_TRIGGER
If XDP not implemented, then Route Processor
PWR_DEBUG as a test point. This Test point must
be clearly labeled
CPU_FC_PWR R188 X_0R1%0402
C314 X_C0.1u50X70402
C301 X_C22u6.3X0603
<35,44> EC_PCH_PWROK
R27 X_6.04KR1%0402
CPU_FC_PWR
CPU_FC_PWROK
FC_D5
FC_D3
R26 X_2.67KR1%0402
Resever For BDW H 2-chips
5 OF 12

MSI CONFIDENTIAL RD(C)20140213 weilu

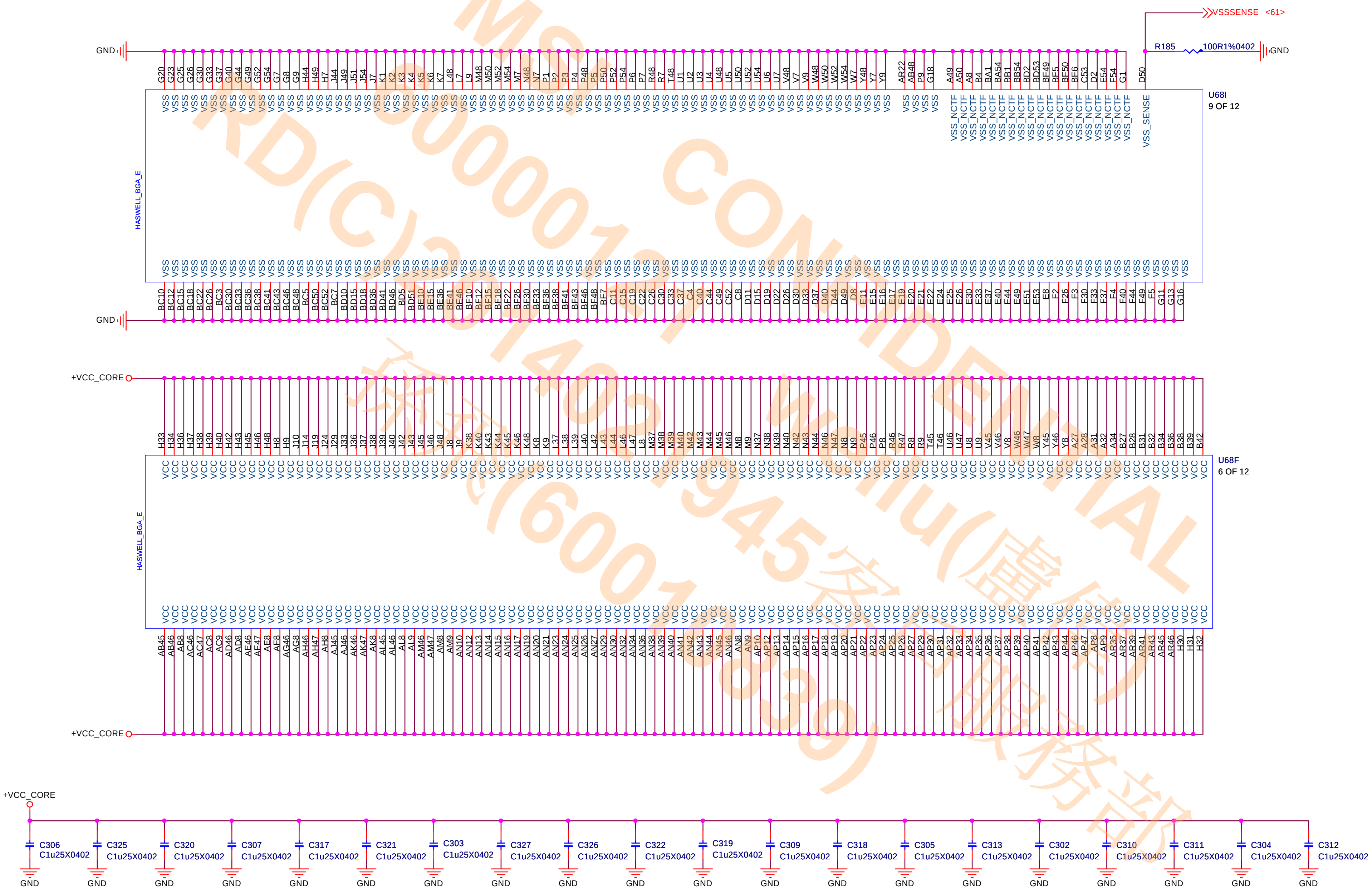
MICRO-STAR INT'L CO.,LTD.

Title: CPU-4 (Power)

Size	Document Number	Rev
	MS-16H2	1.0

Date: Thursday, February 13, 2014 Sheet 6 of 72

Haswell (Power & GND)



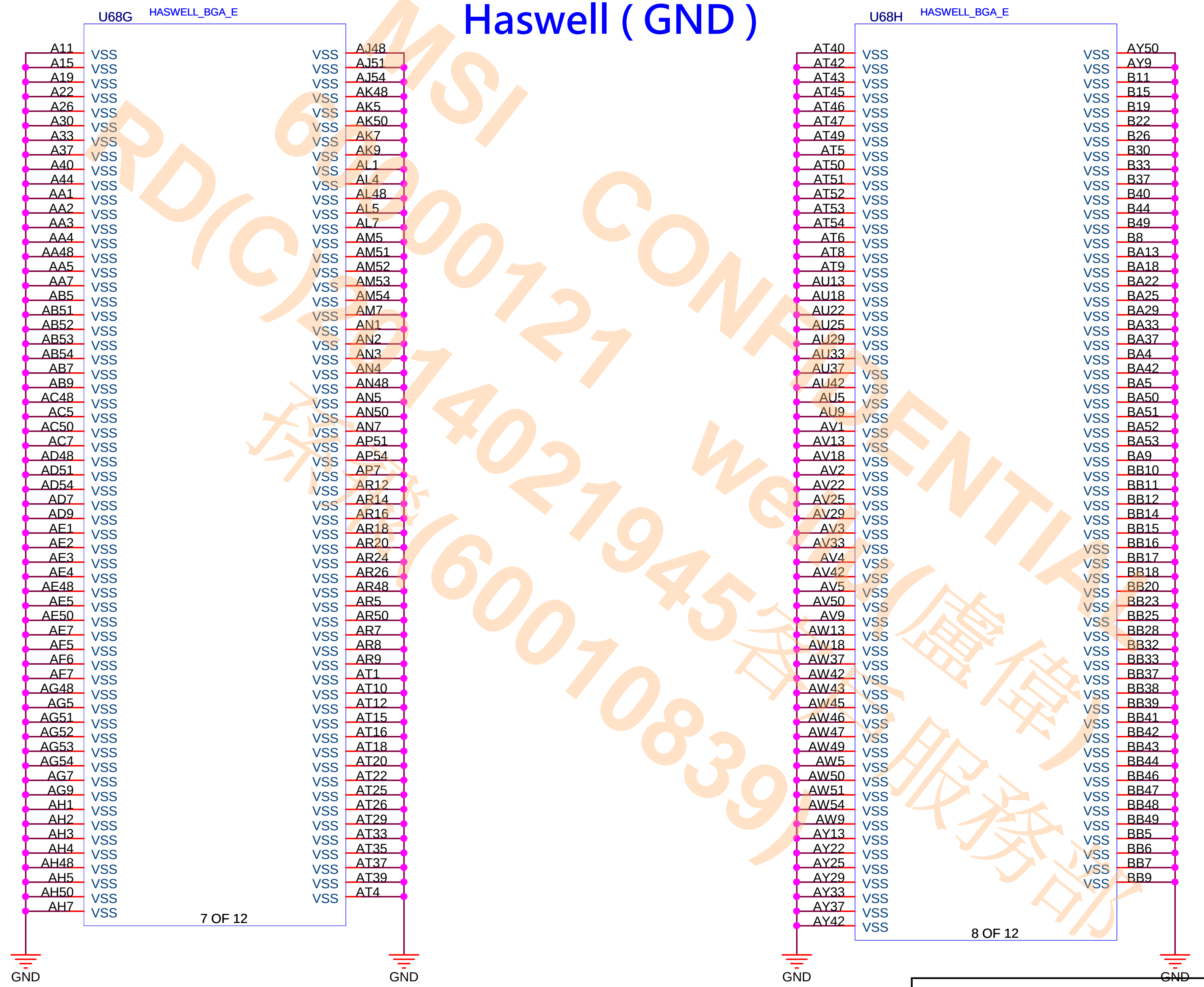
MICRO-STAR INT'L CO.,LTD.

Title: CPU-6 (Power & GND)

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Friday, January 03, 2014 | Sheet 7 of 72

Haswell (GND)

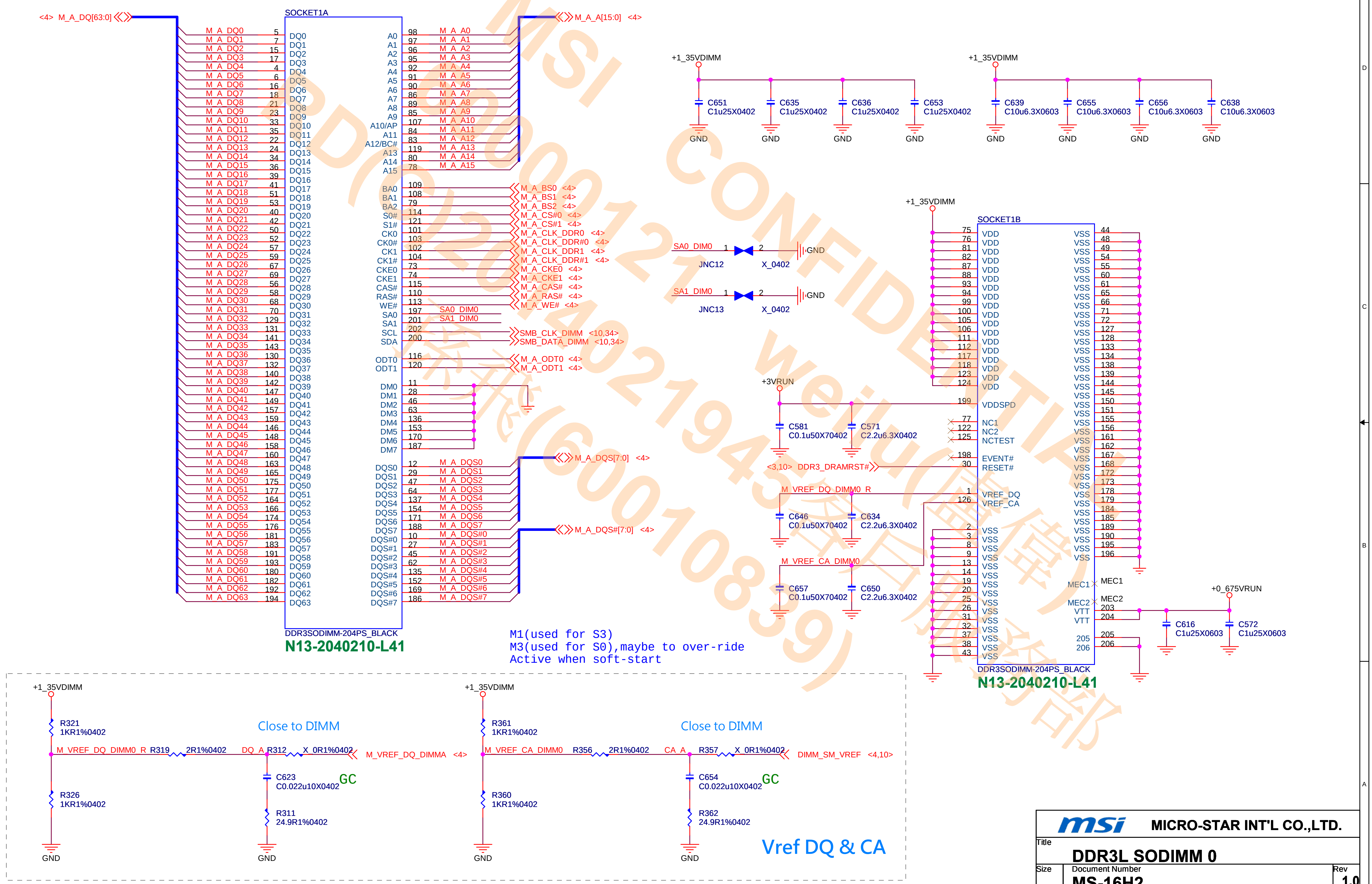

U68G
HASWELL_BGA_E
A11 A15 A19 A22 A26 A30 A33 A37 A40 A44 AA1 AA2 AA3 AA4 AA48 AA5 AA7 AB5 AB51 AB52 AB53 AB54 AB7 AB9 AC48 AC5 AC50 AC7 AD48 AD51 AD54 AD7 AD9 AE1 AE2 AE3 AE4 AE48 AE5 AE50 AE7 AF5 AF6 AF7 AG48 AG5 AG51 AG52 AG53 AG54 AG7 AG9 AH1 AH2 AH3 AH4 AH48 AH5 AH50 AH7
VSS
AJ48 AJ51 AJ54 AK48 AK5 AK50 AK7 AK9 AL1 AL4 AL48 AL5 AL7 AM5 AM51 AM52 AM53 AM54 AM7 AN1 AN2 AN3 AN4 AN48 AN5 AN50 AN7 AP51 AP54 AP7 AR12 AR14 AR16 AR18 AR20 AR24 AR26 AR48 AR5 AR50 AR7 AR8 AR9 AT1 AT10 AT12 AT15 AT16 AT18 AT20 AT22 AT25 AT26 AT29 AT33 AT35 AT37 AT39 AT4
7 OF 12
GND
GND
U68H
HASWELL_BGA_E
AT40 AT42 AT43 AT45 AT46 AT47 AT49 AT5 AT50 AT51 AT52 AT53 AT54 AT6 AT8 AT9 AU13 AU18 AU22 AU25 AU29 AU33 AU37 AU42 AU5 AU9 AV1 AV13 AV18 AV2 AV22 AV25 AV29 AV3 AV33 AV4 AV42 AV5 AV50 AV9 AW13 AW18 AW37 AW42 AW43 AW45 AW46 AW47 AW49 AW5 AW50 AW51 AW54 AW9 AY13 AY22 AY25 AY29 AY33 AY37 AY42
VSS
AY50 AY9 B11 B15 B19 B22 B26 B30 B33 B37 B40 B44 B49 B8 BA13 BA18 BA22 BA25 BA29 BA33 BA37 BA4 BA42 BA5 BA50 BA51 BA52 BA53 BA9 BB10 BB11 BB12 BB14 BB15 BB16 BB17 BB18 BB20 BB23 BB25 BB28 BB32 BB33 BB37 BB38 BB39 BB41 BB42 BB43 BB44 BB46 BB47 BB48 BB49 BB5 BB6 BB7 BB9
8 OF 12
GND
GND

MSI CONFIDENTIAL

MICRO-STAR INT'L CO.,LTD.

Title	CPU-5 (GND)	
Size	Document Number: MS-16H2	Rev 1.0
Date: Friday, January 03, 2014	Sheet 8 of 72	

SODIMM#A


SOCKET1A
<4> M_A_DQ[63:0]
M_A_A[15:0] <4>
DQ0 … DQ63
A0 … A9, A10/AP, A11, A12/BC#, A13, A14, A15
M_A_A0 … M_A_A15
BA0, BA1, BA2, S0#, S1#, CK0, CK0#, CK1, CK1#, CKE0, CKE1, CAS#, RAS#, WE#, SA0, SA1, SCL, SDA
M_A_BS0 <4>
M_A_BS1 <4>
M_A_BS2 <4>
M_A_CS#0 <4>
M_A_CS#1 <4>
M_A_CLK_DDR0 <4>
M_A_CLK_DDR#0 <4>
M_A_CLK_DDR1 <4>
M_A_CLK_DDR#1 <4>
M_A_CKE0 <4>
M_A_CKE1 <4>
M_A_CAS# <4>
M_A_RAS# <4>
M_A_WE# <4>
SA0_DIM0
SA1_DIM0
SMB_CLK_DIMM <10,34>
SMB_DATA_DIMM <10,34>
ODT0, ODT1
M_A_ODT0 <4>
M_A_ODT1 <4>
DM0 … DM7
DQS0 … DQS7, DQS#0 … DQS#7
M_A_DQS[7:0] <4>
M_A_DQS#[7:0] <4>
DDR3SODIMM-204PS_BLACK
N13-2040210-L41
+1_35VDIMM
C651 C1u25X0402
C635 C1u25X0402
C636 C1u25X0402
C653 C1u25X0402
C639 C10u6.3X0603
C655 C10u6.3X0603
C656 C10u6.3X0603
C638 C10u6.3X0603
GND
SA0_DIM0 JNC12 X_0402 GND
SA1_DIM0 JNC13 X_0402 GND
SOCKET1B
VDD, VDDSPD, NC1, NC2, NCTEST, EVENT#, RESET#, VREF_DQ, VREF_CA, VSS, MEC1, MEC2, VTT
+3VRUN
C581 C0.1u50X70402
C571 C2.2u6.3X0402
<3,10> DDR3_DRAMRST#
M_VREF_DQ_DIMM0_R
C646 C0.1u50X70402
C634 C2.2u6.3X0402
M_VREF_CA_DIMM0
C657 C0.1u50X70402
C650 C2.2u6.3X0402
+0_675VRUN
C616 C1u25X0603
C572 C1u25X0603
DDR3SODIMM-204PS_BLACK
N13-2040210-L41
M1(used for S3)
M3(used for S0),maybe to over-ride
Active when soft-start
+1_35VDIMM
R321 1KR1%0402
M_VREF_DQ_DIMM0_R R319 2R1%0402 DQ_A R312 X_0R1%0402
M_VREF_DQ_DIMMA <4>
Close to DIMM
C623 C0.022u10X0402 GC
R326 1KR1%0402
R311 24.9R1%0402
R361 1KR1%0402
M_VREF_CA_DIMM0 R356 2R1%0402 CA_A R357 X_0R1%0402
DIMM_SM_VREF <4,10>
C654 C0.022u10X0402 GC
R360 1KR1%0402
R362 24.9R1%0402
Vref DQ & CA

MSI CONFIDENTIAL

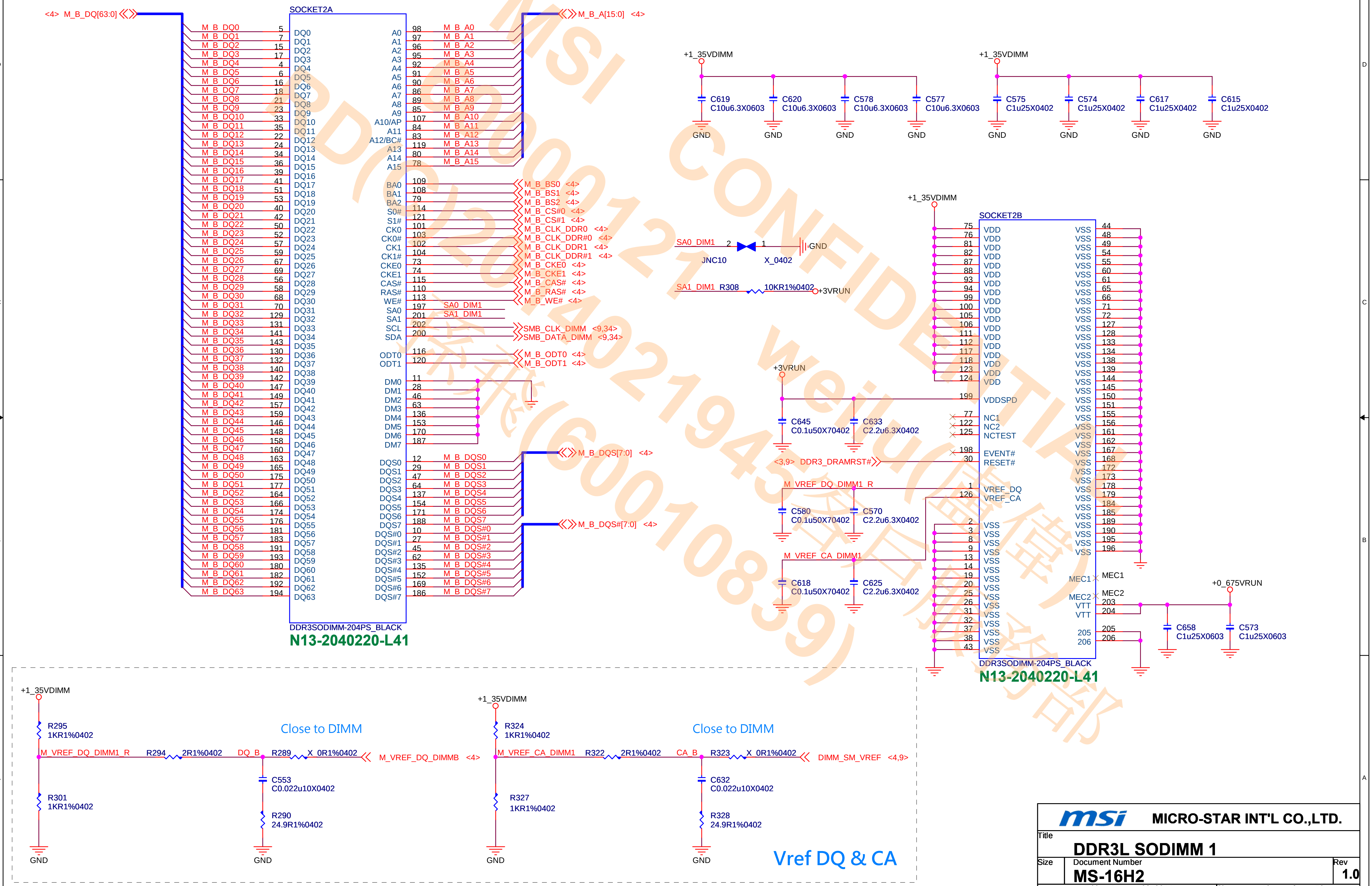
msi MICRO-STAR INT'L CO.,LTD.

Title: DDR3L SODIMM 0

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Friday, January 03, 2014 | Sheet 9 of 72

SODIMM#B



<4> M_B_DQ[63:0]
M_B_DQ0 … M_B_DQ63
SOCKET2A
DQ0 … DQ63
A0 … A9, A10/AP, A11, A12/BC#, A13, A14, A15
BA0, BA1, BA2, S0#, S1#, CK0, CK0#, CK1, CK1#, CKE0, CKE1, CAS#, RAS#, WE#, SA0, SA1, SCL, SDA, ODT0, ODT1
DM0 … DM7
DQS0 … DQS7, DQS#0 … DQS#7
M_B_A[15:0] <4>
M_B_A0 … M_B_A15
M_B_BS0 <4>
M_B_BS1 <4>
M_B_BS2 <4>
M_B_CS#0 <4>
M_B_CS#1 <4>
M_B_CLK_DDR0 <4>
M_B_CLK_DDR#0 <4>
M_B_CLK_DDR1 <4>
M_B_CLK_DDR#1 <4>
M_B_CKE0 <4>
M_B_CKE1 <4>
M_B_CAS# <4>
M_B_RAS# <4>
M_B_WE# <4>
SA0_DIM1
SA1_DIM1
SMB_CLK_DIMM <9,34>
SMB_DATA_DIMM <9,34>
M_B_ODT0 <4>
M_B_ODT1 <4>
M_B_DQS[7:0] <4>
M_B_DQS#[7:0] <4>
DDR3SODIMM-204PS_BLACK
N13-2040220-L41
+1_35VDIMM
C619 C10u6.3X0603
C620 C10u6.3X0603
C578 C10u6.3X0603
C577 C10u6.3X0603
C575 C1u25X0402
C574 C1u25X0402
C617 C1u25X0402
C615 C1u25X0402
GND
SA0_DIM1 JNC10 X_0402
SA1_DIM1 R308 10KR1%0402 +3VRUN
SOCKET2B
VDD, VSS, VDDSPD, NC1, NC2, NCTEST, EVENT#, RESET#, VREF_DQ, VREF_CA, MEC1, MEC2, VTT
+3VRUN
C645 C0.1u50X70402
C633 C2.2u6.3X0402
<3,9> DDR3_DRAMRST#
M_VREF_DQ_DIMM1_R
C580 C0.1u50X70402
C570 C2.2u6.3X0402
M_VREF_CA_DIMM1
C618 C0.1u50X70402
C625 C2.2u6.3X0402
+0_675VRUN
C658 C1u25X0603
C573 C1u25X0603
DDR3SODIMM-204PS_BLACK
N13-2040220-L41
+1_35VDIMM
R295 1KR1%0402
M_VREF_DQ_DIMM1_R
R294 2R1%0402
DQ_B
R289 X_0R1%0402
M_VREF_DQ_DIMMB <4>
Close to DIMM
R301 1KR1%0402
C553 C0.022u10X0402
R290 24.9R1%0402
R324 1KR1%0402
M_VREF_CA_DIMM1
R322 2R1%0402
CA_B
R323 X_0R1%0402
DIMM_SM_VREF <4,9>
R327 1KR1%0402
C632 C0.022u10X0402
R328 24.9R1%0402
Vref DQ & CA

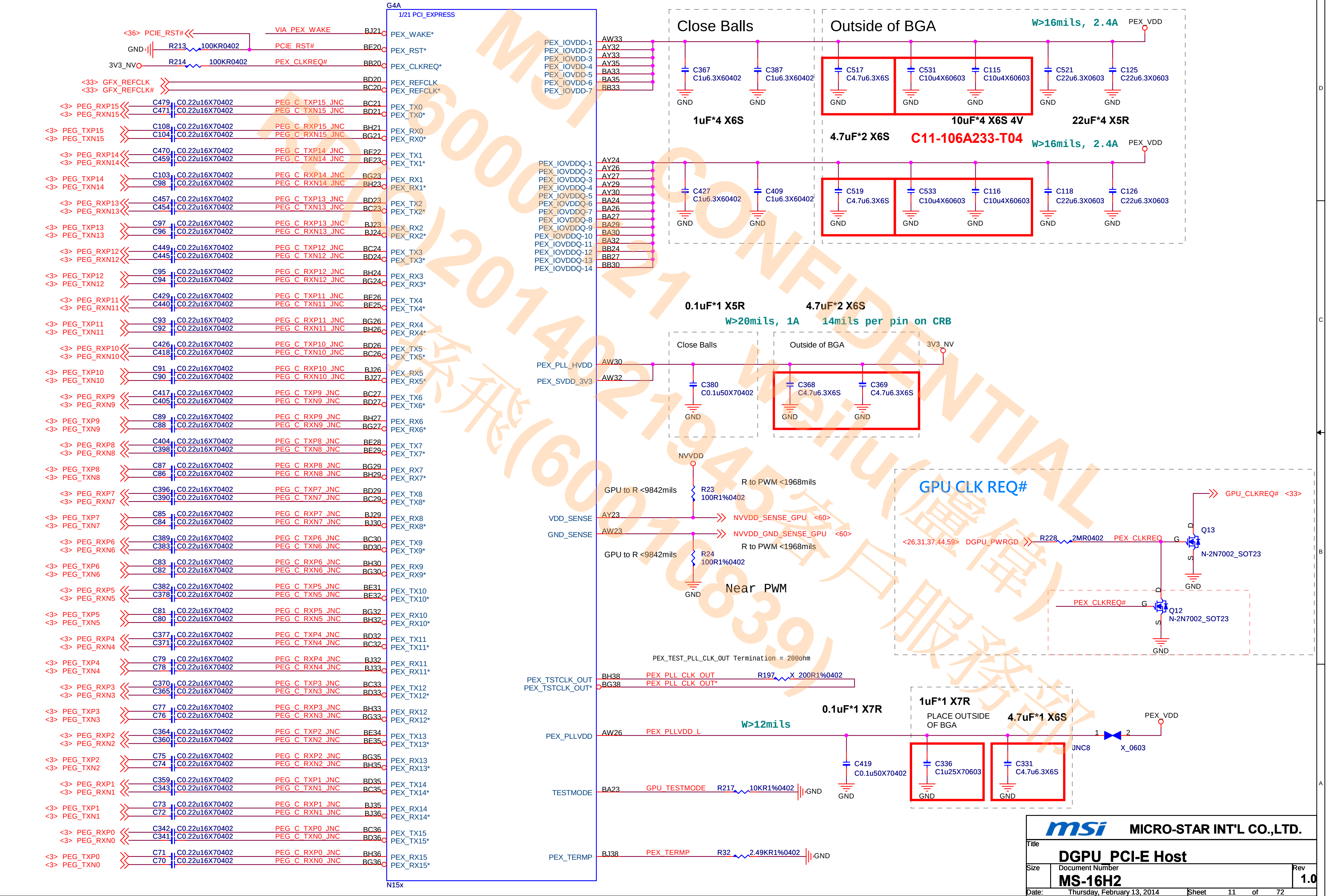
msi MICRO-STAR INT'L CO.,LTD.

Title: DDR3L SODIMM 1

Size | Document Number: MS-16H2 | Rev 1.0

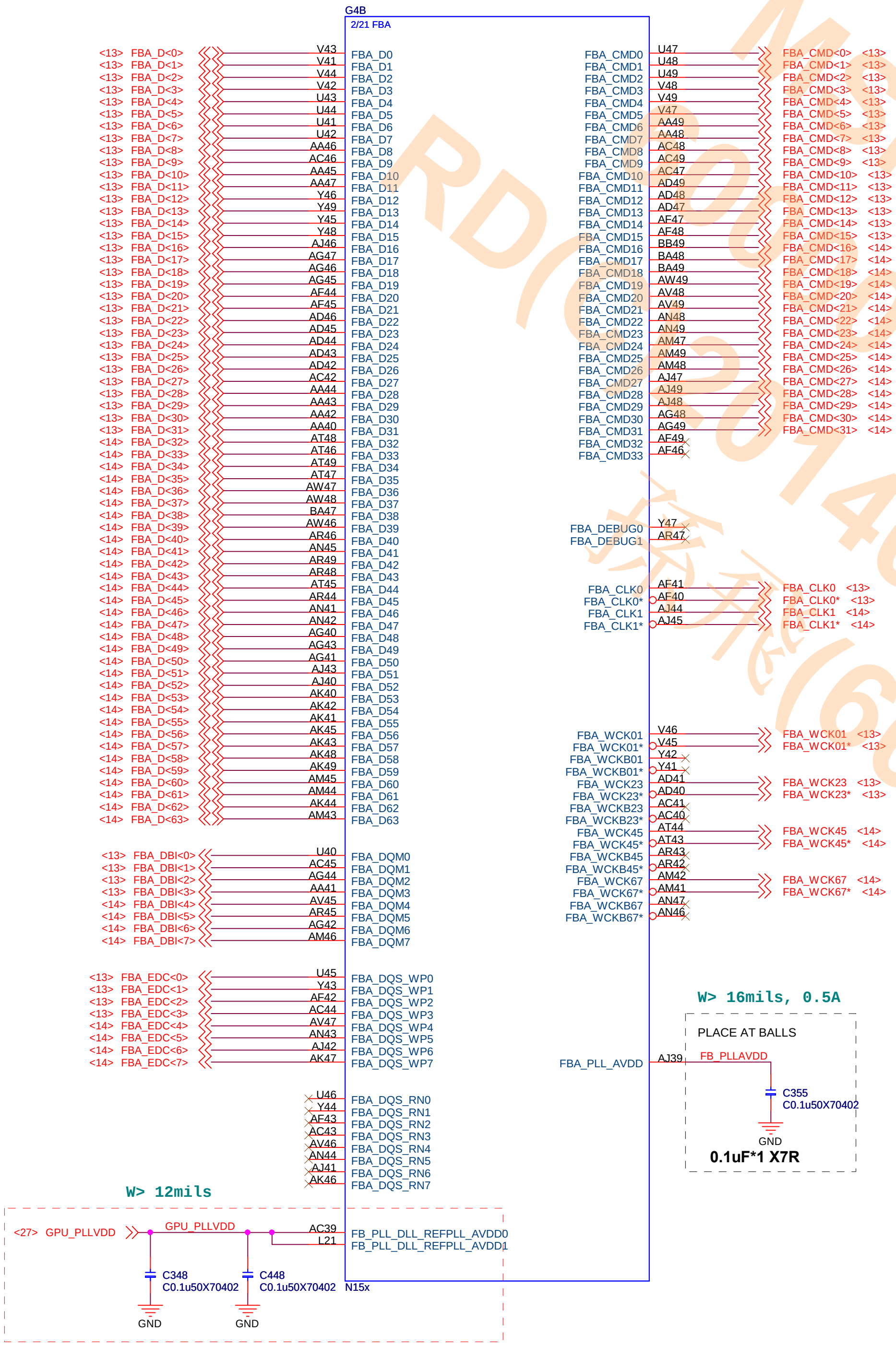
Date: Friday, January 03, 2014 | Sheet 10 of 72

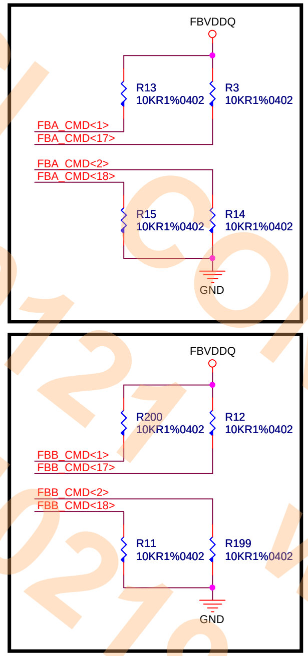
GPU PCI EXPRESS


G4A
1/21 PCI_EXPRESS
N15x
Close Balls
Outside of BGA
W>16mils, 2.4A
PEX_VDD
1uF*4 X6S
10uF*4 X6S 4V
22uF*4 X5R
4.7uF*2 X6S
C11-106A233-T04
PEX_IOVDD-1
PEX_IOVDD-2
PEX_IOVDD-3
PEX_IOVDD-4
PEX_IOVDD-5
PEX_IOVDD-6
PEX_IOVDD-7
PEX_IOVDDQ-1
PEX_IOVDDQ-14
0.1uF*1 X5R
4.7uF*2 X6S
W>20mils, 1A
14mils per pin on CRB
PEX_PLL_HVDD
PEX_SVDD_3V3
3V3_NV
NVVDD
GPU to R <9842mils
R to PWM <1968mils
VDD_SENSE
GND_SENSE
NVVDD_SENSE_GPU <60>
NVVDD_GND_SENSE_GPU <60>
Near PWM
GPU CLK REQ#
GPU_CLKREQ# <33>
<26,31,37,44,59> DGPU_PWRGD
R228 2MR0402
PEX_CLKREQ
Q13 N-2N7002_SOT23
Q12 N-2N7002_SOT23
PEX_CLKREQ#
PEX_TEST_PLL_CLK_OUT Termination = 200ohm
PEX_TSTCLK_OUT
PEX_TSTCLK_OUT*
PEX_PLL_CLK_OUT
PEX_PLL_CLK_OUT*
R197 X_200R1%0402
0.1uF*1 X7R
1uF*1 X7R
PLACE OUTSIDE OF BGA
4.7uF*1 X6S
W>12mils
PEX_PLLVDD
PEX_PLLVDD_L
JNC8 X_0603
TESTMODE
GPU_TESTMODE R217 10KR1%0402
PEX_TERMP
PEX_TERMP R32 2.49KR1%0402
<36> PCIE_RST#
VIA_PEX_WAKE
PCIE_RST#
PEX_CLKREQ#
R213 100KR0402
R214 100KR0402
3V3_NV
<33> GFX_REFCLK
<33> GFX_REFCLK#
PEX_WAKE*
PEX_RST*
PEX_CLKREQ*
PEX_REFCLK
PEX_REFCLK*
<3> PEG_RXP15 ... <3> PEG_RXN0
<3> PEG_TXP15 ... <3> PEG_TXN0
C0.22u16X70402
PEX_TX0 ... PEX_TX15*
PEX_RX0 ... PEX_RX15*

MICRO-STAR INT'L CO.,LTD.	
Title	DGPU_PCI-E Host
Size / Document Number	MS-16H2
Rev	1.0
Date:	Thursday, February 13, 2014
Sheet	11 of 72

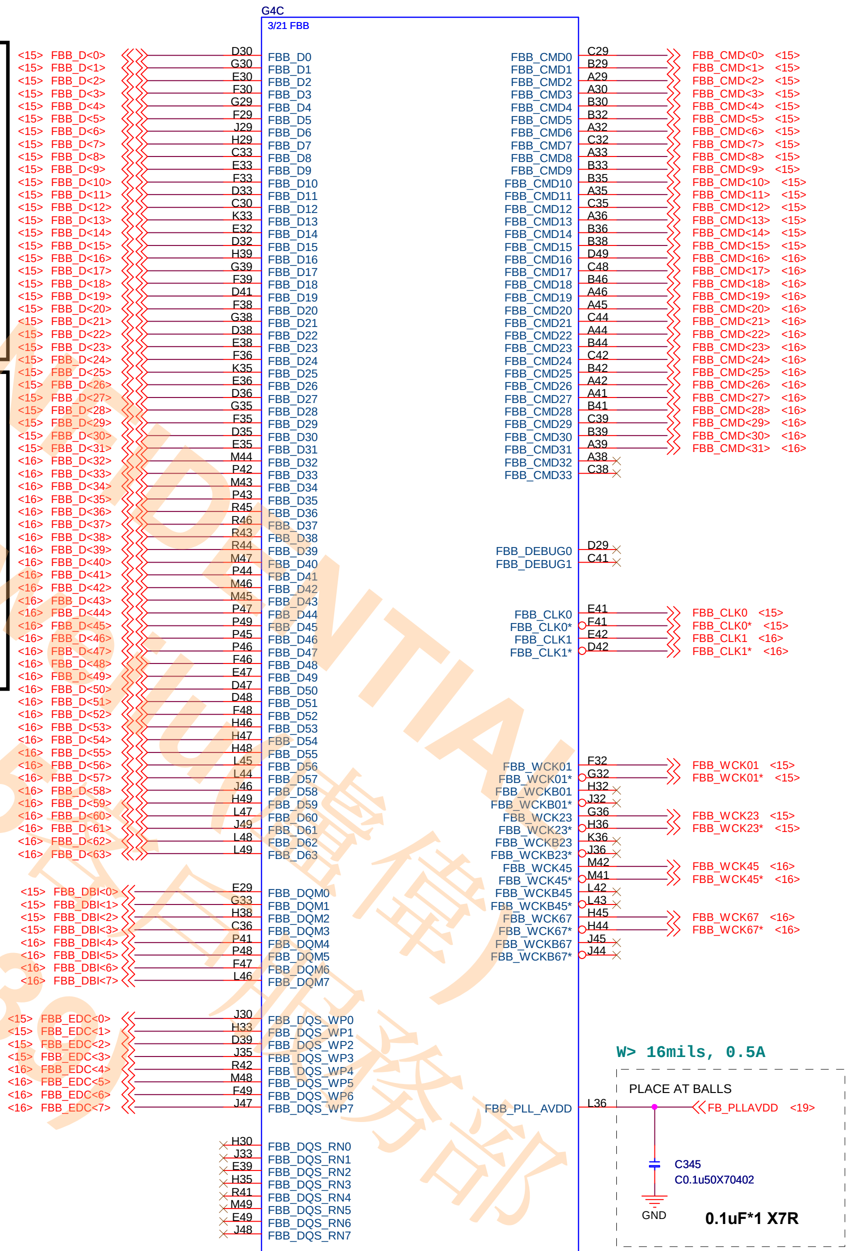
GPU Frame Buffer Partition A/B


G4B
2/21 FBA
FBA_D0 … FBA_D63
FBA_DQM0 … FBA_DQM7
FBA_DQS_WP0 … FBA_DQS_WP7
FBA_DQS_RN0 … FBA_DQS_RN7
FBA_CMD0 … FBA_CMD33
FBA_DEBUG0
FBA_DEBUG1
FBA_CLK0
FBA_CLK0*
FBA_CLK1
FBA_CLK1*
FBA_WCK01
FBA_WCK01*
FBA_WCK23
FBA_WCK23*
FBA_WCK45
FBA_WCK45*
FBA_WCK67
FBA_WCK67*
FBA_PLL_AVDD
FB_PLLAVDD
FB_PLL_DLL_REFPLL_AVDD0
FB_PLL_DLL_REFPLL_AVDD1
W> 12mils
<27> GPU_PLLVDD
C348 C0.1u50X70402
C448 C0.1u50X70402
GND
N15x
W> 16mils, 0.5A
PLACE AT BALLS
C355 C0.1u50X70402
0.1uF*1 X7R


FBVDDQ
R13 10KR1%0402
R3 10KR1%0402
FBA_CMD<1>
FBA_CMD<17>
FBA_CMD<2>
FBA_CMD<18>
R15 10KR1%0402
R14 10KR1%0402
GND
FBVDDQ
R200 10KR1%0402
R12 10KR1%0402
FBB_CMD<1>
FBB_CMD<17>
FBB_CMD<2>
FBB_CMD<18>
R11 10KR1%0402
R199 10KR1%0402
GND

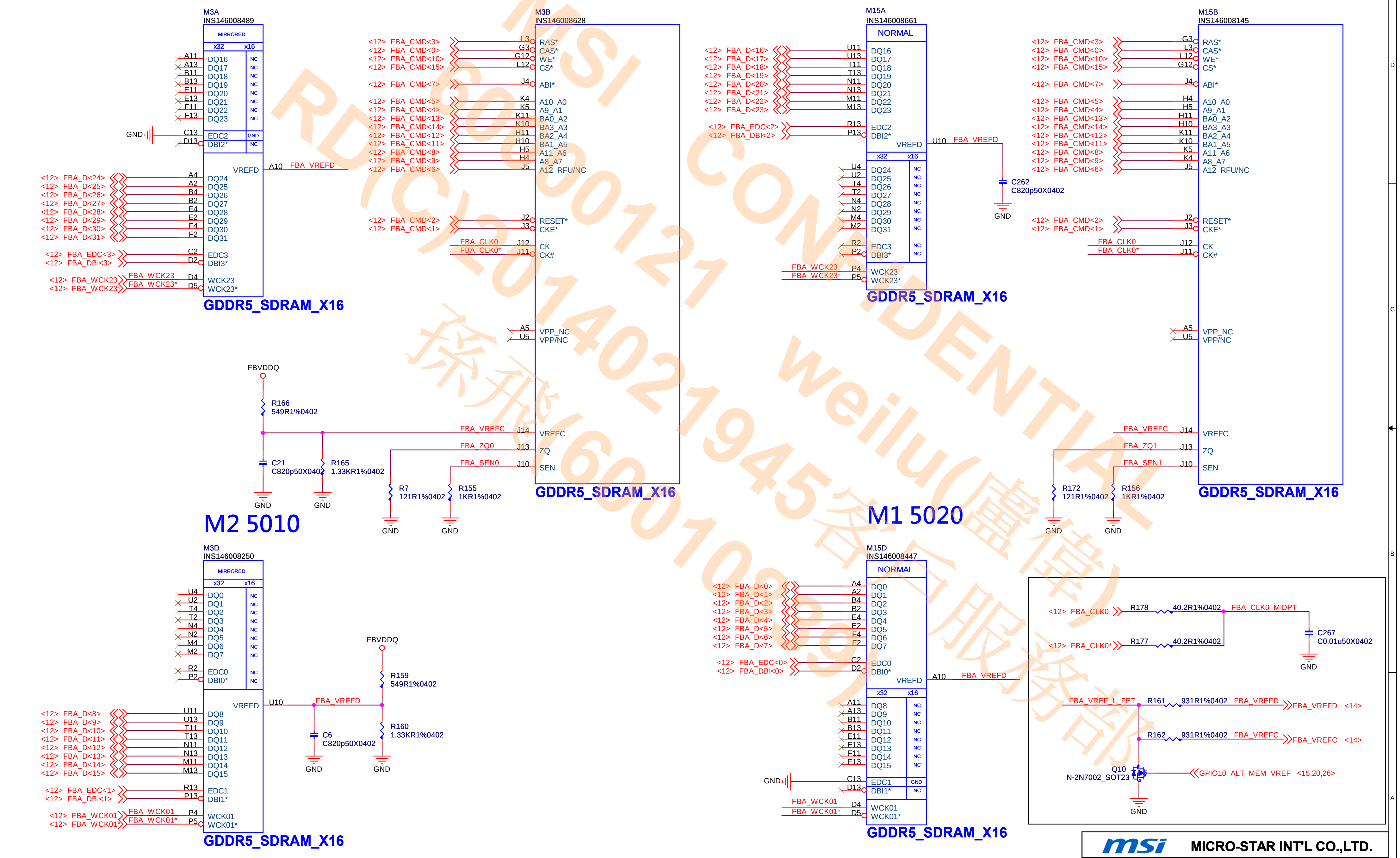
GDDR5 Mode F Mapping By GB3-256

	0..31	32..63
CMD0	CAS*	
CMD1	CKE*	
CMD2	RST*	
CMD3	RAS*	
CMD4	A1_A9	
CMD5	A0_A10	
CMD6	A12_RFU	
CMD7	ABI*	
CMD8	A6_A11	
CMD9	A7_A8	
CMD10	WE*	
CMD11	A5_BA1	
CMD12	A4_BA2	
CMD13	A2_BA0	
CMD14	A3_BA3	
CMD15	CS*	
CMD16		CAS*
CMD17		CKE*
CMD18		RST*
CMD19		RAS*
CMD20		A1_A9
CMD21		A0_A10
CMD22		A12_RFU
CMD23		ABI*
CMD24		A6_A11
CMD25		A7_A8
CMD26		WE*
CMD27		A5_BA1
CMD28		A4_BA2
CMD29		A2_BA0
CMD30		A3_BA3
CMD31		CS*


G4C
3/21 FBB
FBB_D0 … FBB_D63
FBB_DQM0 … FBB_DQM7
FBB_DQS_WP0 … FBB_DQS_WP7
FBB_DQS_RN0 … FBB_DQS_RN7
FBB_CMD0 … FBB_CMD33
FBB_DEBUG0
FBB_DEBUG1
FBB_CLK0
FBB_CLK0*
FBB_CLK1
FBB_CLK1*
FBB_WCK01
FBB_WCK01*
FBB_WCK23
FBB_WCK23*
FBB_WCK45
FBB_WCK45*
FBB_WCK67
FBB_WCK67*
FBB_PLL_AVDD
FB_PLLAVDD <19>
N15x
W> 16mils, 0.5A
PLACE AT BALLS
C345 C0.1u50X70402
GND
0.1uF*1 X7R

MICRO-STAR INT'L CO.,LTD.	
Title	DGPU_MEM IF A/B
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	12 of 72

DGPU_GDDR5 FrameBuffer A0



M3A
INS146008489
MIRRORED
GDDR5_SDRAM_X16
M3B
INS146008628
GDDR5_SDRAM_X16
M15A
INS146008661
NORMAL
GDDR5_SDRAM_X16
M15B
INS146008145
GDDR5_SDRAM_X16
M2 5010
M1 5020
M3D
INS146008250
MIRRORED
GDDR5_SDRAM_X16
M15D
INS146008447
NORMAL
GDDR5_SDRAM_X16
FBVDDQ
R166 549R1%0402
C21 C820p50X0402
R165 1.33KR1%0402
R7 121R1%0402
R155 1KR1%0402
C262 C820p50X0402
R172 121R1%0402
R156 1KR1%0402
R159 549R1%0402
R160 1.33KR1%0402
C6 C820p50X0402
R178 40.2R1%0402
R177 40.2R1%0402
C267 C0.01u50X0402
FBA_CLK0_MIDPT
R161 931R1%0402
R162 931R1%0402
FBA_VREF_L_FET
Q10 N-2N7002_SOT23
<12> FBA_CLK0
<12> FBA_CLK0*
FBA_VREFD <14>
FBA_VREFC <14>
GPIO10_ALT_MEM_VREF <15,20,26>
GND

MSI CONFIDENTIAL RD(C)201402 weilu(盧偉) 600121 1945 6001089 徐飛 客戶服務部

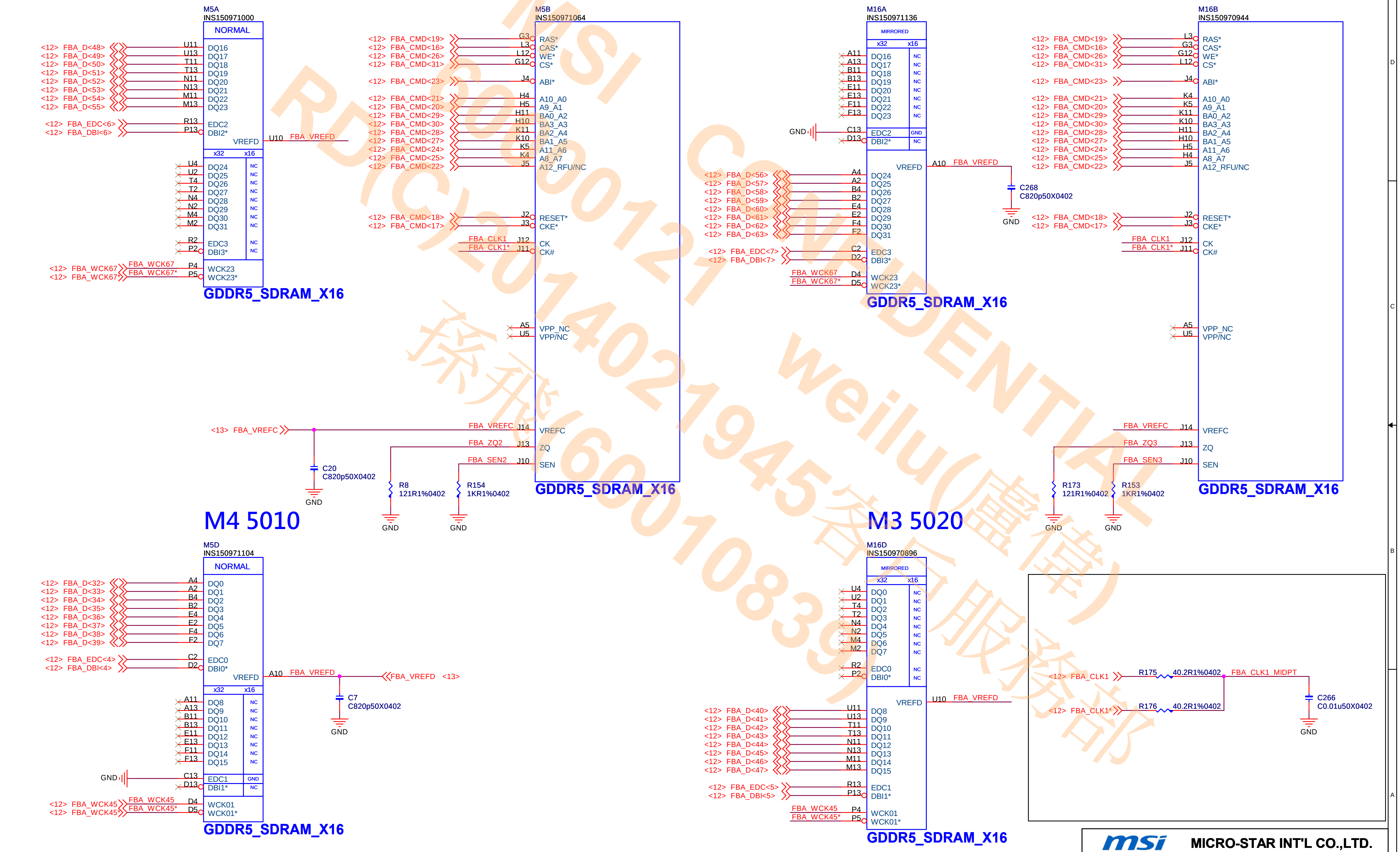
MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GDDR5 FrameBuffer A0

Size | Document Number: MS-16H2 | Rev 1.0

Date: Friday, January 03, 2014 | Sheet 13 of 72

DGPU_GDDR5 FrameBuffer A1

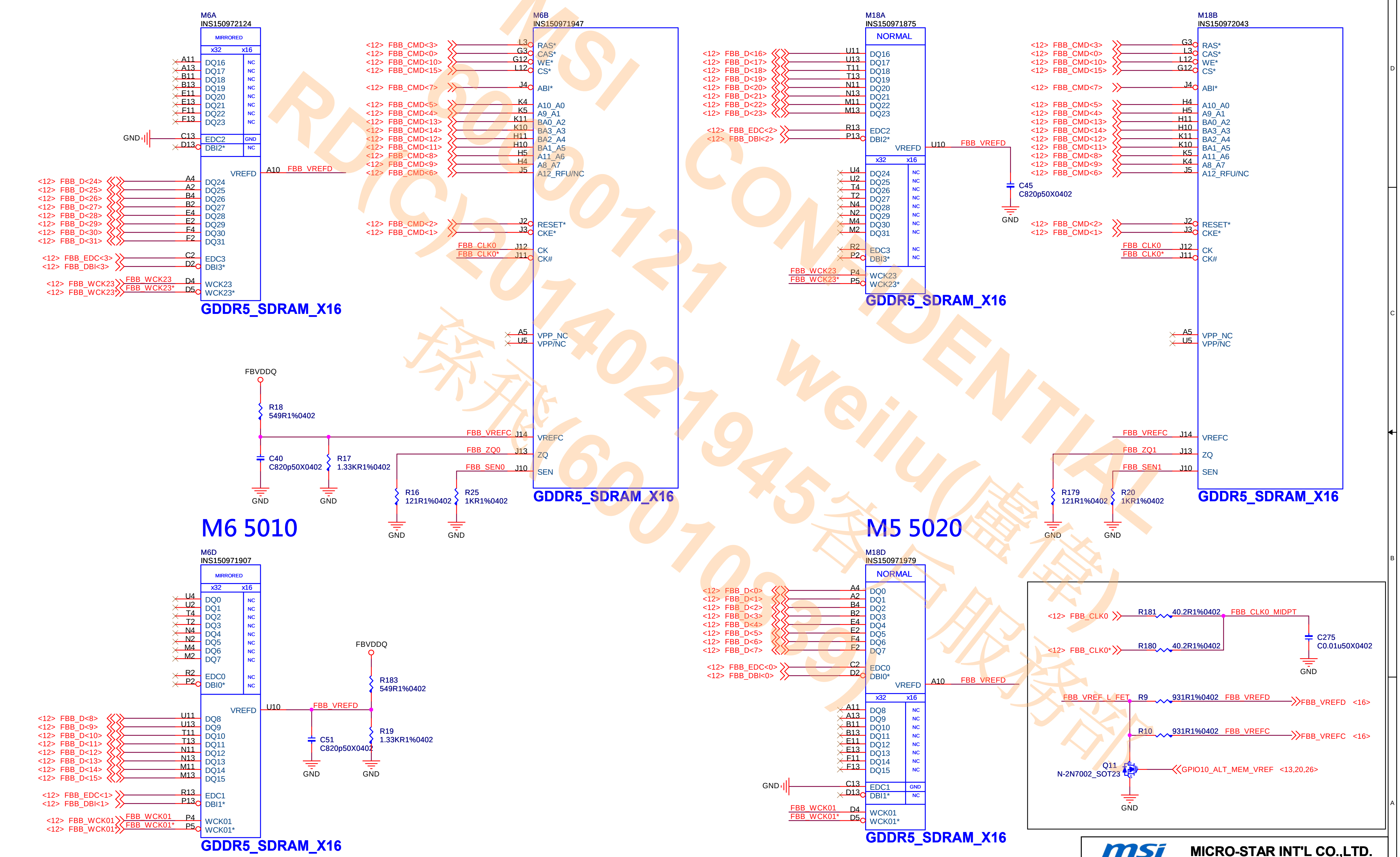


MSI CONFIDENTIAL

MICRO-STAR INT'L CO.,LTD.

Title	DGPU_GDDR5 FrameBuffer A1	
Size	Document Number MS-16H2	Rev 1.0
Date: Friday, January 03, 2014	Sheet 14 of 72	

DGPU_GDDR5 FrameBuffer B0



M6A
INS150972124
MIRRORED
GDDR5_SDRAM_X16
M6B
INS150971947
GDDR5_SDRAM_X16
M18A
INS150971875
NORMAL
GDDR5_SDRAM_X16
M18B
INS150972043
GDDR5_SDRAM_X16
M6 5010
M5 5020
M6D
INS150971907
MIRRORED
GDDR5_SDRAM_X16
M18D
INS150971979
NORMAL
GDDR5_SDRAM_X16
FBVDDQ
R18 549R1%0402
C40 C820p50X0402
R17 1.33KR1%0402
R16 121R1%0402
R25 1KR1%0402
C45 C820p50X0402
R179 121R1%0402
R20 1KR1%0402
R183 549R1%0402
C51 C820p50X0402
R19 1.33KR1%0402
R181 40.2R1%0402 FBB_CLK0_MIDPT
R180 40.2R1%0402
C275 C0.01u50X0402
FBB_VREF_L_FET R9 931R1%0402 FBB_VREFD
R10 931R1%0402 FBB_VREFC
Q11 N-2N7002_SOT23
GPIO10_ALT_MEM_VREF <13,20,26>
GND

MSI 60000121 RD(C)2014021945 weilu(盧偉) CONFIDENTIAL 孫飛(60010939)客户服务部

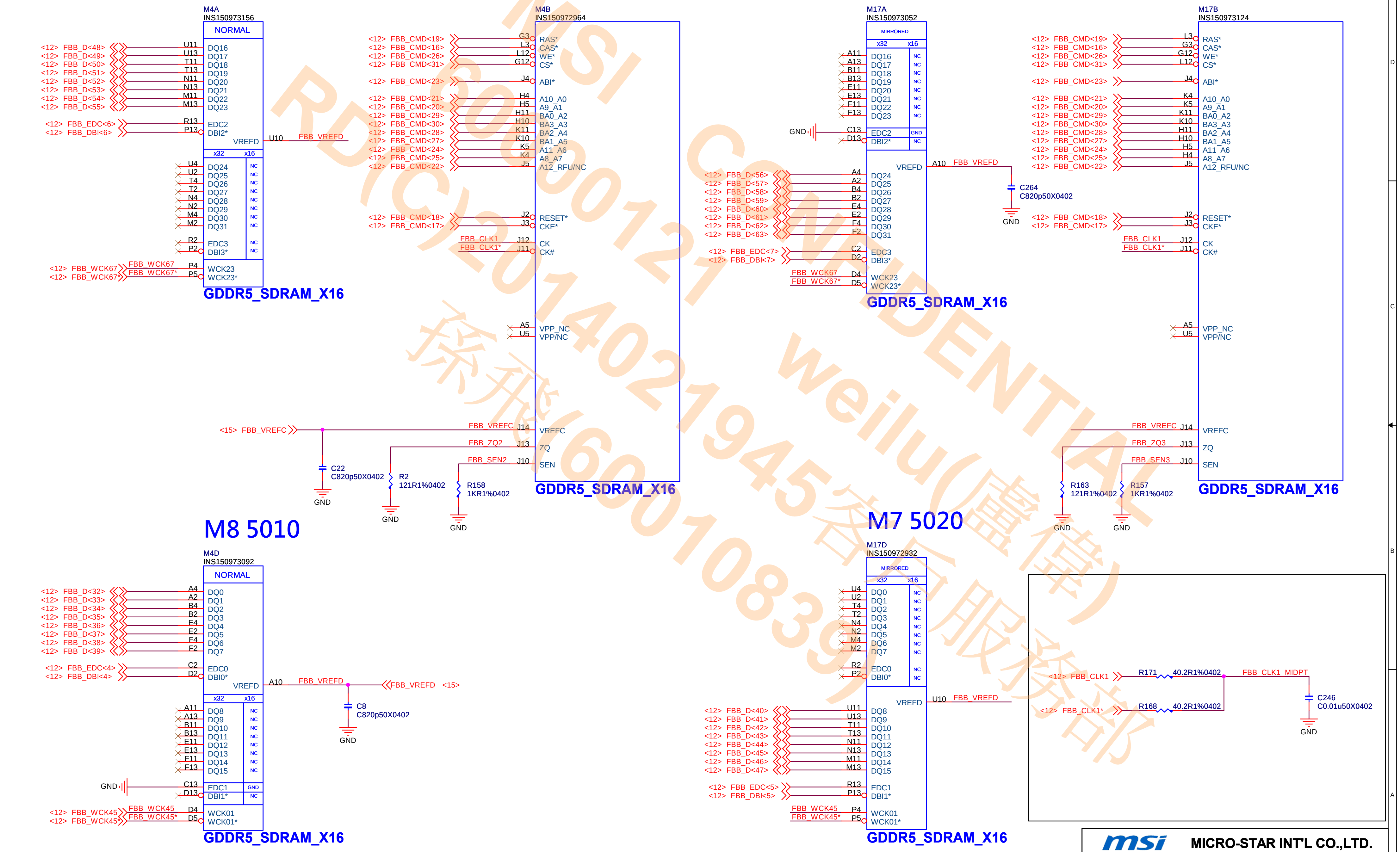
MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GDDR5 FrameBuffer B0

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Wednesday, January 15, 2014 | Sheet 15 of 72

DGPU_GDDR5 FrameBuffer B1



M4A
INS150973156
NORMAL
<12> FBB_D<48> U11 DQ16
<12> FBB_D<49> U13 DQ17
<12> FBB_D<50> T11 DQ18
<12> FBB_D<51> T13 DQ19
<12> FBB_D<52> N11 DQ20
<12> FBB_D<53> N13 DQ21
<12> FBB_D<54> M11 DQ22
<12> FBB_D<55> M13 DQ23
<12> FBB_EDC<6> R13 EDC2
<12> FBB_DBI<6> P13 DBI2*
VREFD U10 FBB_VREFD
x32 x16
U4 DQ24 NC
U2 DQ25 NC
T4 DQ26 NC
T2 DQ27 NC
N4 DQ28 NC
N2 DQ29 NC
M4 DQ30 NC
M2 DQ31 NC
R2 EDC3 NC
P2 DBI3* NC
<12> FBB_WCK67 FBB_WCK67 P4 WCK23
<12> FBB_WCK67* FBB_WCK67* P5 WCK23*
GDDR5_SDRAM_X16
M4B
INS150972964
<12> FBB_CMD<19> G3 RAS*
<12> FBB_CMD<16> L3 CAS*
<12> FBB_CMD<26> L12 WE*
<12> FBB_CMD<31> G12 CS*
<12> FBB_CMD<23> J4 ABI*
<12> FBB_CMD<21> H4 A10_A0
<12> FBB_CMD<20> H5 A9_A1
<12> FBB_CMD<29> H11 BA0_A2
<12> FBB_CMD<30> H10 BA3_A3
<12> FBB_CMD<28> K11 BA2_A4
<12> FBB_CMD<27> K10 BA1_A5
<12> FBB_CMD<24> K5 A11_A6
<12> FBB_CMD<25> K4 A8_A7
<12> FBB_CMD<22> J5 A12_RFU/NC
<12> FBB_CMD<18> J2 RESET*
<12> FBB_CMD<17> J3 CKE*
FBB_CLK1 J12 CK
FBB_CLK1* J11 CK#
A5 VPP_NC
U5 VPP/NC
<15> FBB_VREFC FBB_VREFC J14 VREFC
FBB_ZQ2 J13 ZQ
FBB_SEN2 J10 SEN
C22
C820p50X0402
GND
R2
121R1%0402
GND
R158
1KR1%0402
GND
GDDR5_SDRAM_X16
M4A
M17A
INS150973052
MIRRORED
x32 x16
A11 DQ16 NC
A13 DQ17 NC
B11 DQ18 NC
B13 DQ19 NC
E11 DQ20 NC
E13 DQ21 NC
F11 DQ22 NC
F13 DQ23 NC
GND C13 EDC2 GND
D13 DBI2* NC
VREFD A10 FBB_VREFD
C264
C820p50X0402
GND
<12> FBB_D<56> A4 DQ24
<12> FBB_D<57> A2 DQ25
<12> FBB_D<58> B4 DQ26
<12> FBB_D<59> B2 DQ27
<12> FBB_D<60> E4 DQ28
<12> FBB_D<61> E2 DQ29
<12> FBB_D<62> F4 DQ30
<12> FBB_D<63> F2 DQ31
<12> FBB_EDC<7> C2 EDC3
<12> FBB_DBI<7> D2 DBI3*
FBB_WCK67 D4 WCK23
FBB_WCK67* D5 WCK23*
GDDR5_SDRAM_X16
M17B
INS150973124
<12> FBB_CMD<19> L3 RAS*
<12> FBB_CMD<16> G3 CAS*
<12> FBB_CMD<26> G12 WE*
<12> FBB_CMD<31> L12 CS*
<12> FBB_CMD<23> J4 ABI*
<12> FBB_CMD<21> K4 A10_A0
<12> FBB_CMD<20> K5 A9_A1
<12> FBB_CMD<29> K11 BA0_A2
<12> FBB_CMD<30> K10 BA3_A3
<12> FBB_CMD<28> H11 BA2_A4
<12> FBB_CMD<27> H10 BA1_A5
<12> FBB_CMD<24> H5 A11_A6
<12> FBB_CMD<25> H4 A8_A7
<12> FBB_CMD<22> J5 A12_RFU/NC
<12> FBB_CMD<18> J2 RESET*
<12> FBB_CMD<17> J3 CKE*
FBB_CLK1 J12 CK
FBB_CLK1* J11 CK#
A5 VPP_NC
U5 VPP/NC
FBB_VREFC J14 VREFC
FBB_ZQ3 J13 ZQ
FBB_SEN3 J10 SEN
R163
121R1%0402
GND
R157
1KR1%0402
GND
GDDR5_SDRAM_X16
M8 5010
M4D
INS150973092
NORMAL
<12> FBB_D<32> A4 DQ0
<12> FBB_D<33> A2 DQ1
<12> FBB_D<34> B4 DQ2
<12> FBB_D<35> B2 DQ3
<12> FBB_D<36> E4 DQ4
<12> FBB_D<37> E2 DQ5
<12> FBB_D<38> F4 DQ6
<12> FBB_D<39> F2 DQ7
<12> FBB_EDC<4> C2 EDC0
<12> FBB_DBI<4> D2 DBI0*
VREFD A10 FBB_VREFD FBB_VREFD <15>
C8
C820p50X0402
GND
x32 x16
A11 DQ8 NC
A13 DQ9 NC
B11 DQ10 NC
B13 DQ11 NC
E11 DQ12 NC
E13 DQ13 NC
F11 DQ14 NC
F13 DQ15 NC
GND C13 EDC1 GND
D13 DBI1* NC
<12> FBB_WCK45 FBB_WCK45 D4 WCK01
<12> FBB_WCK45* FBB_WCK45* D5 WCK01*
GDDR5_SDRAM_X16
M7 5020
M17D
INS150972932
MIRRORED
x32 x16
U4 DQ0 NC
U2 DQ1 NC
T4 DQ2 NC
T2 DQ3 NC
N4 DQ4 NC
N2 DQ5 NC
M4 DQ6 NC
M2 DQ7 NC
R2 EDC0 NC
P2 DBI0* NC
VREFD U10 FBB_VREFD
<12> FBB_D<40> U11 DQ8
<12> FBB_D<41> U13 DQ9
<12> FBB_D<42> T11 DQ10
<12> FBB_D<43> T13 DQ11
<12> FBB_D<44> N11 DQ12
<12> FBB_D<45> N13 DQ13
<12> FBB_D<46> M11 DQ14
<12> FBB_D<47> M13 DQ15
<12> FBB_EDC<5> R13 EDC1
<12> FBB_DBI<5> P13 DBI1*
FBB_WCK45 P4 WCK01
FBB_WCK45* P5 WCK01*
GDDR5_SDRAM_X16
<12> FBB_CLK1 R171 40.2R1%0402 FBB_CLK1_MIDPT
<12> FBB_CLK1* R168 40.2R1%0402
C246
C0.01u50X0402
GND

MSI CONFIDENTIAL
RD(C)201402 weilu(盧偉)
60012119450010839
徐飛(60010839)客服服務部

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

Title	DGPU_GDDR5 FrameBuffer B1
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	16 of 72

Frame Buffer Partition A Decoupling

FBVDDQ
SPARE
DECOUPLING AROUND FBA MEMORIES (DQ0-DQ31)
C255 C0.1u50X70402
C240 C0.1u50X70402
C16 C0.1u50X70402
C30 C0.1u50X70402
C27 C1u6.3X60402
C254 C1u6.3X60402
C242 C1u6.3X60402
C15 C1u6.3X60402
C26 C1u6.3X60402
C32 C1u6.3X60402
C260 C4.7u6.3X6S
C237 C4.7u6.3X6S
C35 C4.7u6.3X6S
C12 C4.7u6.3X6S
C233 C10u4X60603
C9 C10u4X60603
GND
C11-106A233-T04
FBA_MF1
R170 1KR1%0402
M15C INS150975090
Normal
MF add 1k to VSS
J1
R4 1KR1%0402
FBA_MF0
M3C INS150975200
Mirrored
MF add 1k to VDD
FBA_MF2
R6 1KR1%0402
M5C INS150974702
Normal
R164 1KR1%0402
FBA_MF3
M16C INS150974972
Mirrored
VSS VDD VSSQ VDDQ
VDD_1 … VDD_14
VSS_1 … VSS_14
VDDQ_1 … VDDQ_36
VSSQ_1 … VSSQ_36
GDDR5_SDRAM_X16
SPARE
DECOUPLING AROUND FBA MEMORIES (DQ32-DQ63)
C23 C0.1u50X70402
C243 C0.1u50X70402
C31 C0.1u50X70402
C14 C0.1u50X70402
C252 C1u6.3X60402
C256 C1u6.3X60402
C241 C1u6.3X60402
C29 C1u6.3X60402
C253 C1u6.3X60402
C17 C1u6.3X60402
C235 C4.7u6.3X6S
C238 C4.7u6.3X6S
C11 C4.7u6.3X6S
C13 C4.7u6.3X6S
C234 C10u4X60603
C10 C10u4X60603
C11-106A233-T04

MSI 60000212 CONFIDENTIAL RD(C)201901940(Vein 广州)服务部

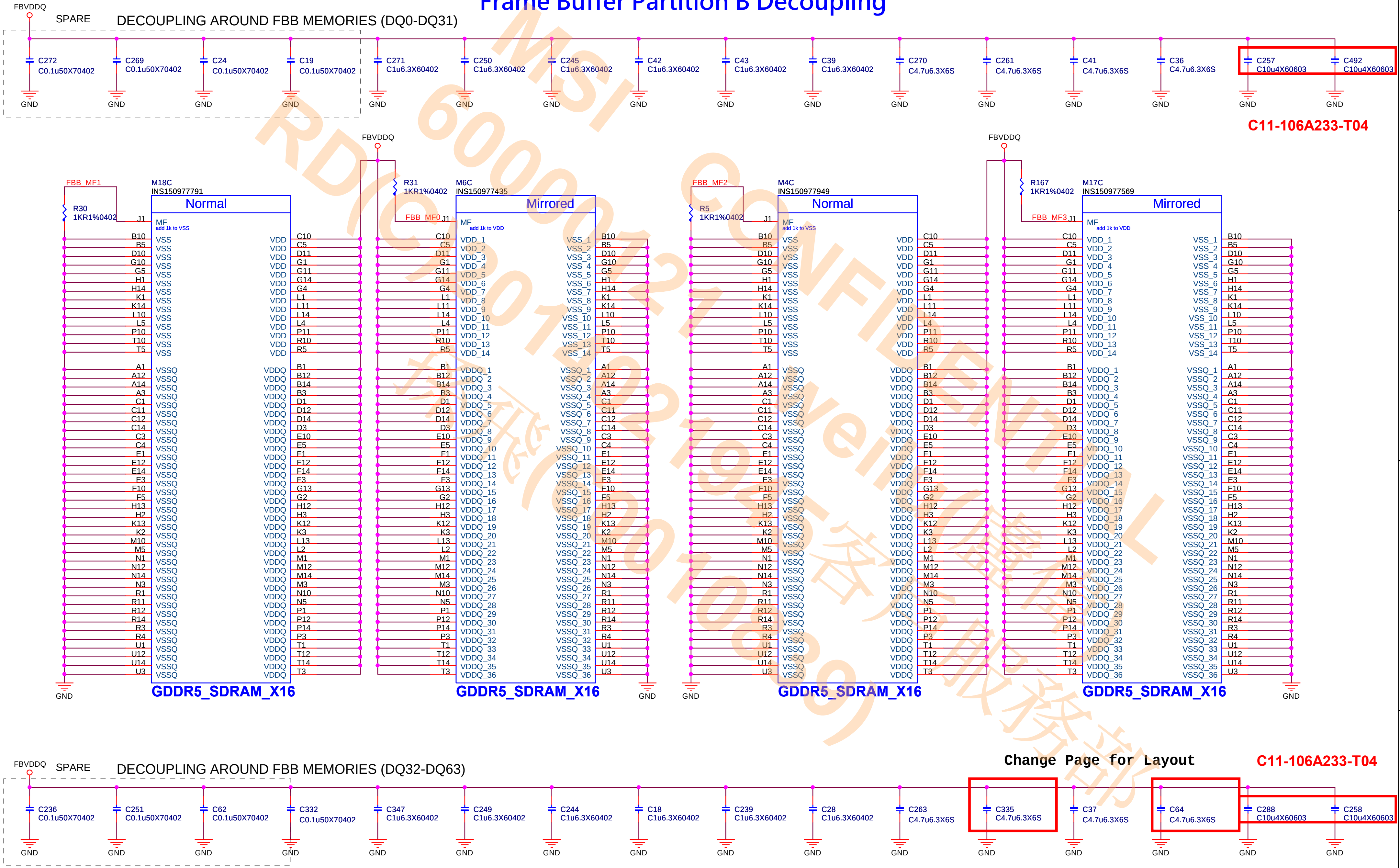
msi MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GDDR5 FB-A_DECOUPLING

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Tuesday, January 07, 2014 | Sheet 17 of 72

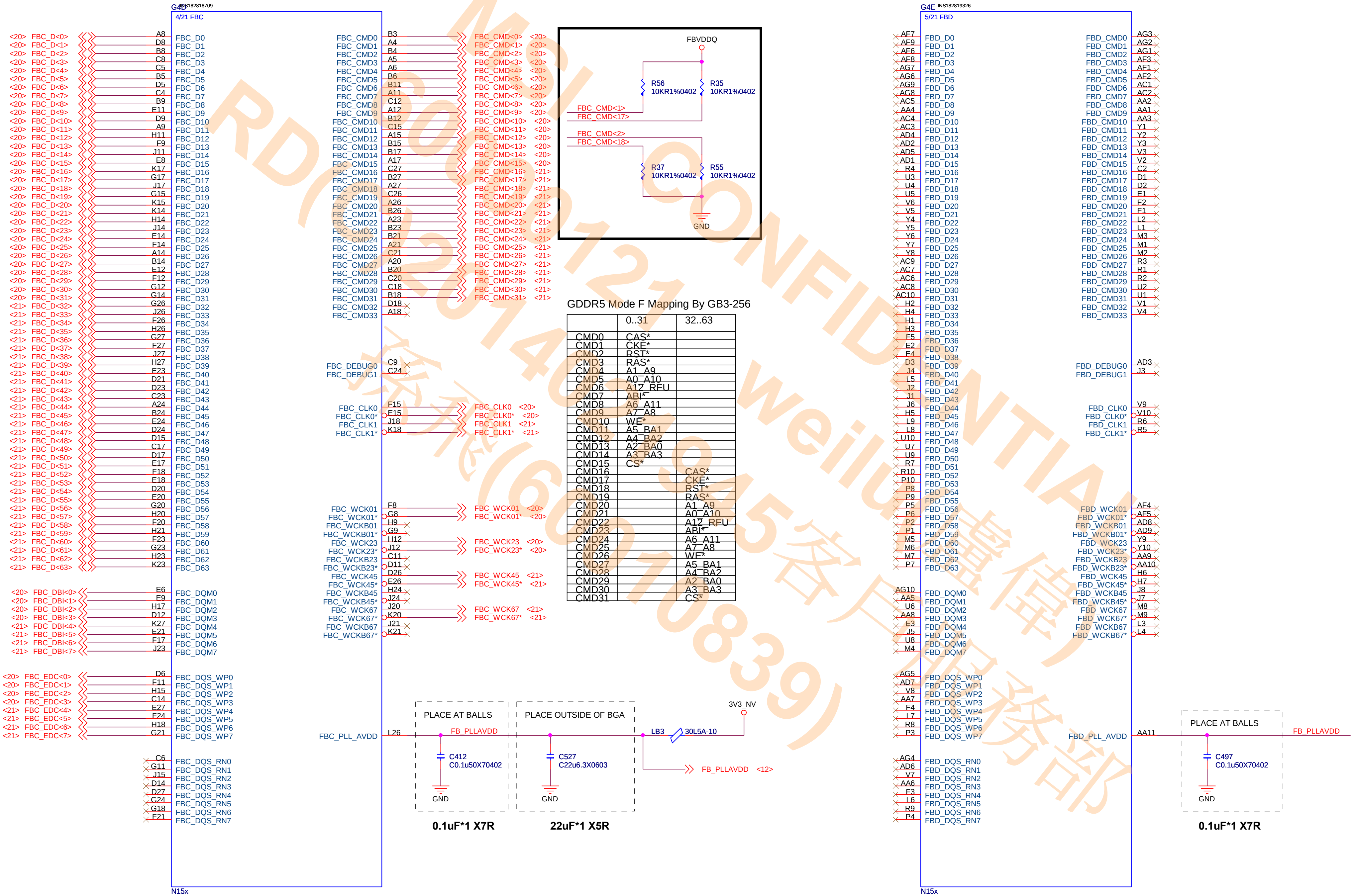
Frame Buffer Partition B Decoupling



FBVDDQ
SPARE
DECOUPLING AROUND FBB MEMORIES (DQ0-DQ31)
C272 C0.1u50X70402
C269 C0.1u50X70402
C24 C0.1u50X70402
C19 C0.1u50X70402
C271 C1u6.3X60402
C250 C1u6.3X60402
C245 C1u6.3X60402
C42 C1u6.3X60402
C43 C1u6.3X60402
C39 C1u6.3X60402
C270 C4.7u6.3X6S
C261 C4.7u6.3X6S
C41 C4.7u6.3X6S
C36 C4.7u6.3X6S
C257 C10u4X60603
C492 C10u4X60603
GND
C11-106A233-T04
FBB_MF1
R30 1KR1%0402
M18C INS150977791
Normal
GDDR5_SDRAM_X16
R31 1KR1%0402
FBB_MF0
M6C INS150977435
Mirrored
GDDR5_SDRAM_X16
FBB_MF2
R5 1KR1%0402
M4C INS150977949
Normal
GDDR5_SDRAM_X16
R167 1KR1%0402
FBB_MF3
M17C INS150977569
Mirrored
GDDR5_SDRAM_X16
MF add 1k to VSS
MF add 1k to VDD
VSS VDD VSSQ VDDQ
DECOUPLING AROUND FBB MEMORIES (DQ32-DQ63)
Change Page for Layout
C11-106A233-T04
C236 C0.1u50X70402
C251 C0.1u50X70402
C62 C0.1u50X70402
C332 C0.1u50X70402
C347 C1u6.3X60402
C249 C1u6.3X60402
C244 C1u6.3X60402
C18 C1u6.3X60402
C239 C1u6.3X60402
C28 C1u6.3X60402
C263 C4.7u6.3X6S
C335 C4.7u6.3X6S
C37 C4.7u6.3X6S
C64 C4.7u6.3X6S
C288 C10u4X60603
C258 C10u4X60603

MICRO-STAR INT'L CO.,LTD.			
Title	DGPU_GDDR5 FB-B_DECOUPLING		
Size	Document Number: MS-16H2		Rev 1.0
Date: Tuesday, January 07, 2014	Sheet 18 of 72		

GPU Frame Buffer Partition C/D



GDDR5 Mode F Mapping By GB3-256

	0..31	32..63
CMD0	CAS*	
CMD1	CKE*	
CMD2	RST*	
CMD3	RAS*	
CMD4	A1_A9	
CMD5	A0_A10	
CMD6	A12_RFU	
CMD7	ABI*	
CMD8	A6_A11	
CMD9	A7_A8	
CMD10	WE*	
CMD11	A5_BA1	
CMD12	A4_BA2	
CMD13	A2_BA0	
CMD14	A3_BA3	
CMD15	CS*	
CMD16		CAS*
CMD17		CKE*
CMD18		RST*
CMD19		RAS*
CMD20		A1_A9
CMD21		A0_A10
CMD22		A12_RFU
CMD23		ABI*
CMD24		A6_A11
CMD25		A7_A8
CMD26		WE*
CMD27		A5_BA1
CMD28		A4_BA2
CMD29		A2_BA0
CMD30		A3_BA3
CMD31		CS*

MSI CONFIDENTIAL

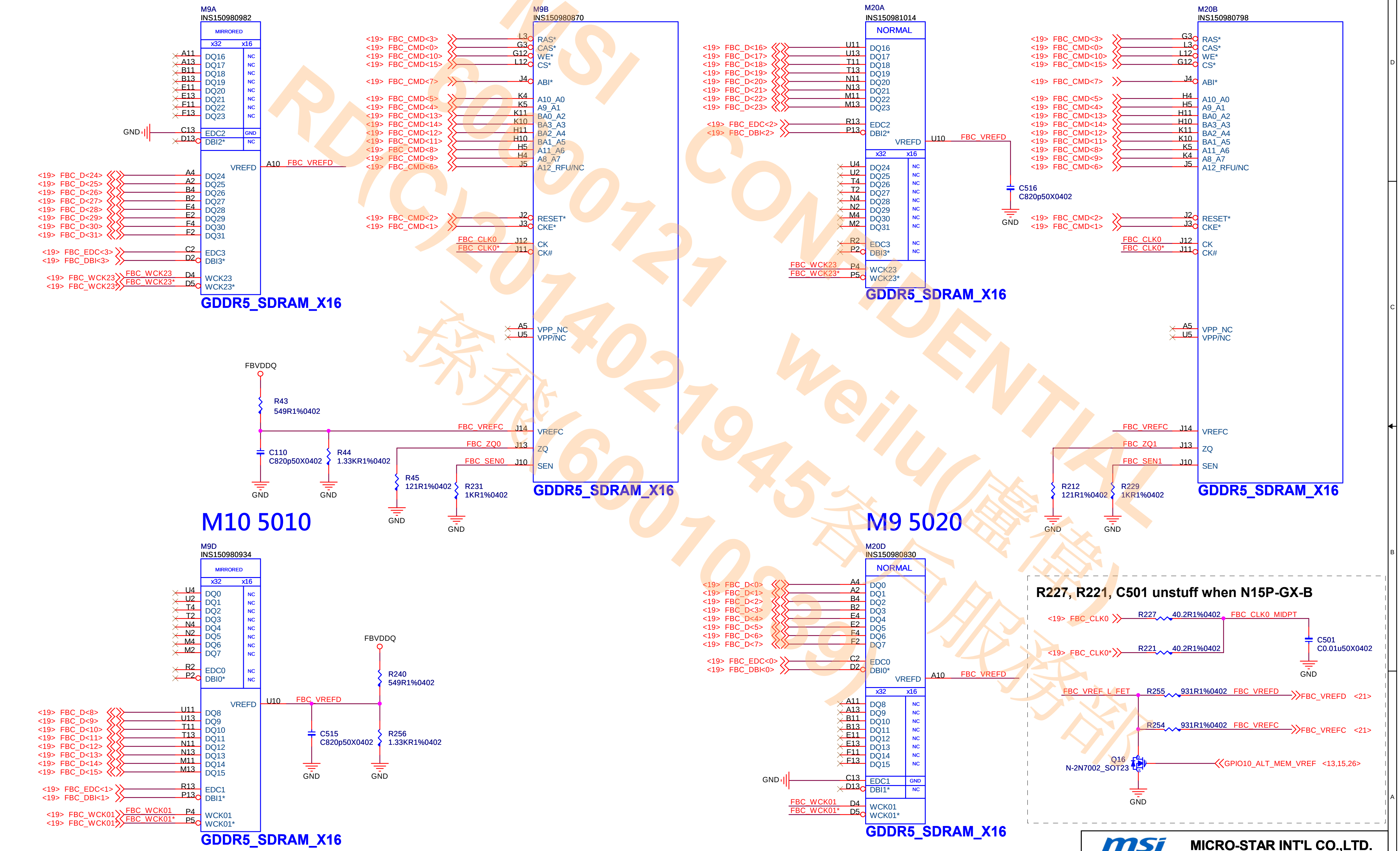
MICRO-STAR INT'L CO.,LTD.

Title: DGPU_MEM IF C/D

Size | Document Number: MS-16H2 | Rev 1.0

DGPU_GDDR5 FrameBuffer C0

(N15P-GX-B ALL unstuff)



M9A
INS150980982
MIRRORED
x32 x16
DQ16 DQ17 DQ18 DQ19 DQ20 DQ21 DQ22 DQ23
A11 A13 B11 B13 E11 E13 F11 F13
GND C13 EDC2
D13 DBI2*
VREFD A10 FBC_VREFD
<19> FBC_D<24> … <19> FBC_D<31>
A4 A2 B4 B2 E4 E2 F4 F2
DQ24 DQ25 DQ26 DQ27 DQ28 DQ29 DQ30 DQ31
<19> FBC_EDC<3> C2 EDC3
<19> FBC_DBI<3> D2 DBI3*
<19> FBC_WCK23 FBC_WCK23 D4 WCK23
<19> FBC_WCK23* FBC_WCK23* D5 WCK23*
GDDR5_SDRAM_X16
M9B
INS150980870
<19> FBC_CMD<3> L3 RAS*
<19> FBC_CMD<0> G3 CAS*
<19> FBC_CMD<10> G12 WE*
<19> FBC_CMD<15> L12 CS*
<19> FBC_CMD<7> J4 ABI*
<19> FBC_CMD<5> K4 A10_A0
<19> FBC_CMD<4> K5 A9_A1
<19> FBC_CMD<13> K11 BA0_A2
<19> FBC_CMD<14> K10 BA3_A3
<19> FBC_CMD<12> H11 BA2_A4
<19> FBC_CMD<11> H10 BA1_A5
<19> FBC_CMD<8> H5 A11_A6
<19> FBC_CMD<9> H4 A8_A7
<19> FBC_CMD<6> J5 A12_RFU/NC
<19> FBC_CMD<2> J2 RESET*
<19> FBC_CMD<1> J3 CKE*
FBC_CLK0 J12 CK
FBC_CLK0* J11 CK#
A5 VPP_NC
U5 VPP/NC
FBVDDQ
R43 549R1%0402
C110 C820p50X0402
R44 1.33KR1%0402
FBC_VREFC J14 VREFC
FBC_ZQ0 J13 ZQ
FBC_SEN0 J10 SEN
R45 121R1%0402
R231 1KR1%0402
GND
GDDR5_SDRAM_X16
M10 5010
M20A
INS150981014
NORMAL
<19> FBC_D<16> … <19> FBC_D<23>
U11 U13 T11 T13 N11 N13 M11 M13
DQ16 DQ17 DQ18 DQ19 DQ20 DQ21 DQ22 DQ23
<19> FBC_EDC<2> R13 EDC2
<19> FBC_DBI<2> P13 DBI2*
VREFD U10 FBC_VREFD
C516 C820p50X0402
GND
U4 U2 T4 T2 N4 N2 M4 M2
DQ24 DQ25 DQ26 DQ27 DQ28 DQ29 DQ30 DQ31
R2 EDC3
P2 DBI3*
FBC_WCK23 P4 WCK23
FBC_WCK23* P5 WCK23*
GDDR5_SDRAM_X16
M20B
INS150980798
<19> FBC_CMD<3> G3 RAS*
<19> FBC_CMD<0> L3 CAS*
<19> FBC_CMD<10> L12 WE*
<19> FBC_CMD<15> G12 CS*
<19> FBC_CMD<7> J4 ABI*
<19> FBC_CMD<5> H4 A10_A0
<19> FBC_CMD<4> H5 A9_A1
<19> FBC_CMD<13> H11 BA0_A2
<19> FBC_CMD<14> H10 BA3_A3
<19> FBC_CMD<12> K11 BA2_A4
<19> FBC_CMD<11> K10 BA1_A5
<19> FBC_CMD<8> K5 A11_A6
<19> FBC_CMD<9> K4 A8_A7
<19> FBC_CMD<6> J5 A12_RFU/NC
<19> FBC_CMD<2> J2 RESET*
<19> FBC_CMD<1> J3 CKE*
FBC_CLK0 J12 CK
FBC_CLK0* J11 CK#
A5 VPP_NC
U5 VPP/NC
FBC_VREFC J14 VREFC
FBC_ZQ1 J13 ZQ
FBC_SEN1 J10 SEN
R212 121R1%0402
R229 1KR1%0402
GND
GDDR5_SDRAM_X16
M9 5020
M9D
INS150980934
MIRRORED
U4 U2 T4 T2 N4 N2 M4 M2
DQ0 DQ1 DQ2 DQ3 DQ4 DQ5 DQ6 DQ7
R2 EDC0
P2 DBI0*
VREFD U10 FBC_VREFD
FBVDDQ
R240 549R1%0402
C515 C820p50X0402
R256 1.33KR1%0402
<19> FBC_D<8> … <19> FBC_D<15>
U11 U13 T11 T13 N11 N13 M11 M13
DQ8 DQ9 DQ10 DQ11 DQ12 DQ13 DQ14 DQ15
<19> FBC_EDC<1> R13 EDC1
<19> FBC_DBI<1> P13 DBI1*
<19> FBC_WCK01 FBC_WCK01 P4 WCK01
<19> FBC_WCK01* FBC_WCK01* P5 WCK01*
GDDR5_SDRAM_X16
M20D
INS150980830
NORMAL
<19> FBC_D<0> … <19> FBC_D<7>
A4 A2 B4 B2 E4 E2 F4 F2
DQ0 DQ1 DQ2 DQ3 DQ4 DQ5 DQ6 DQ7
<19> FBC_EDC<0> C2 EDC0
<19> FBC_DBI<0> D2 DBI0*
VREFD A10 FBC_VREFD
A11 A13 B11 B13 E11 E13 F11 F13
DQ8 DQ9 DQ10 DQ11 DQ12 DQ13 DQ14 DQ15
GND C13 EDC1
D13 DBI1*
FBC_WCK01 D4 WCK01
FBC_WCK01* D5 WCK01*
GDDR5_SDRAM_X16
R227, R221, C501 unstuff when N15P-GX-B
<19> FBC_CLK0 R227 40.2R1%0402 FBC_CLK0_MIDPT
<19> FBC_CLK0* R221 40.2R1%0402
C501 C0.01u50X0402
FBC_VREF_L_FET R255 931R1%0402 FBC_VREFD FBC_VREFD <21>
R254 931R1%0402 FBC_VREFC FBC_VREFC <21>
Q16 N-2N7002_SOT23
GPIO10_ALT_MEM_VREF <13,15,26>
GND

MSI 600121 RD(C)2014021945 CONFIDENTIAL weilu(盧偉) 徐飛(600109) 客戶服務部

MICRO-STAR INT'L CO.,LTD.

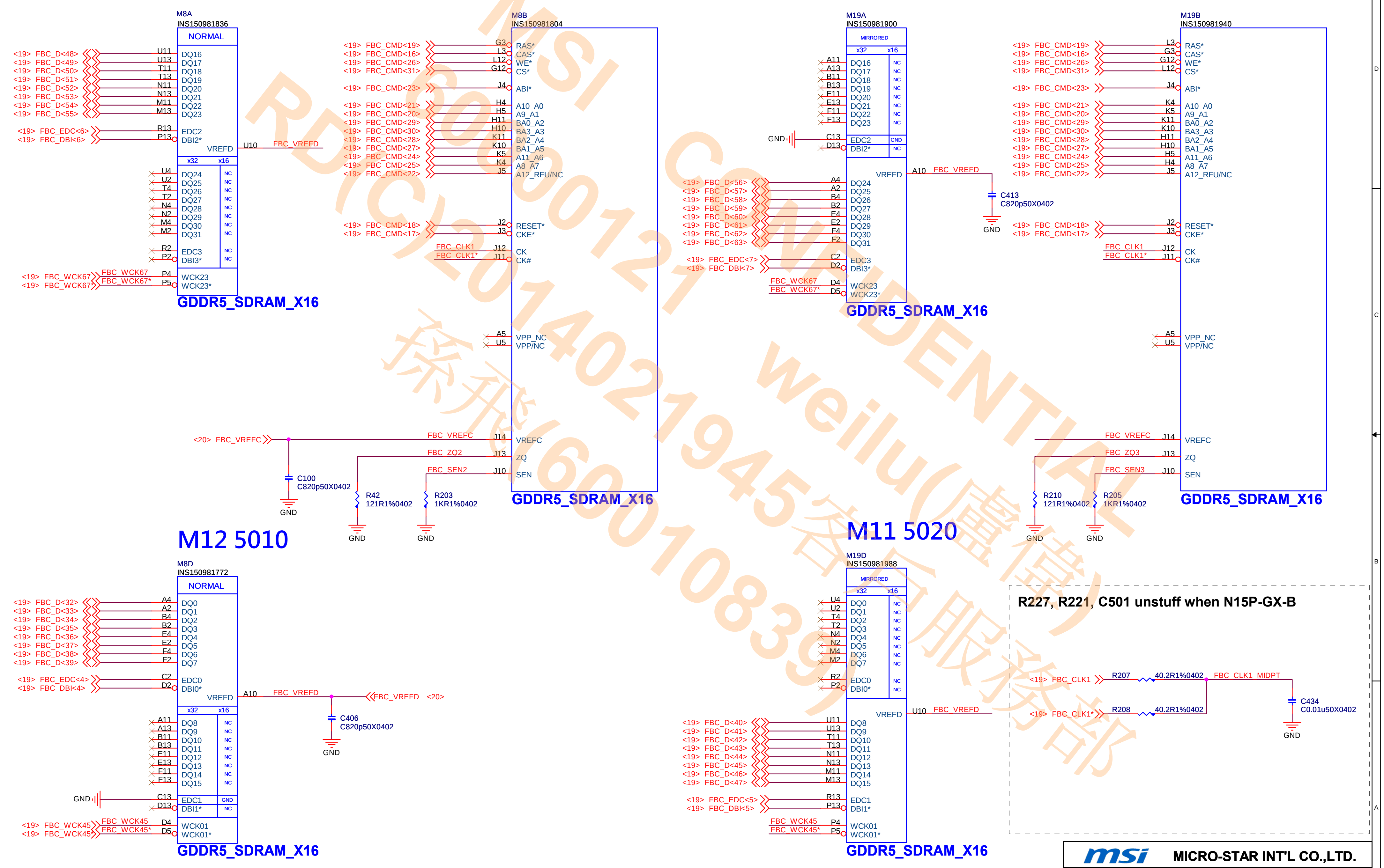
Title: DGPU_GDDR5 FrameBuffer C

Size | Document Number: MS-16H2 | Rev 1.0

Date: Friday, January 03, 2014 | Sheet 20 of 72

DGPU_GDDR5 FrameBuffer C1

(N15P-GX-B ALL unstuff)



M8A
INS150981836
NORMAL
<19> FBC_D<48> U11 DQ16
<19> FBC_D<49> U13 DQ17
<19> FBC_D<50> T11 DQ18
<19> FBC_D<51> T13 DQ19
<19> FBC_D<52> N11 DQ20
<19> FBC_D<53> N13 DQ21
<19> FBC_D<54> M11 DQ22
<19> FBC_D<55> M13 DQ23
<19> FBC_EDC<6> R13 EDC2
<19> FBC_DBI<6> P13 DBI2*
VREFD U10 FBC_VREFD
x32 x16
U4 DQ24, U2 DQ25, T4 DQ26, T2 DQ27, N4 DQ28, N2 DQ29, M4 DQ30, M2 DQ31
R2 EDC3, P2 DBI3*
<19> FBC_WCK67 P4 WCK23
<19> FBC_WCK67* P5 WCK23*
GDDR5_SDRAM_X16
M8B
INS150981804
<19> FBC_CMD<19> G3 RAS*
<19> FBC_CMD<16> L3 CAS*
<19> FBC_CMD<26> L12 WE*
<19> FBC_CMD<31> G12 CS*
<19> FBC_CMD<23> J4 ABI*
<19> FBC_CMD<21> H4 A10_A0
<19> FBC_CMD<20> H5 A9_A1
<19> FBC_CMD<29> H11 BA0_A2
<19> FBC_CMD<30> H10 BA3_A3
<19> FBC_CMD<28> K11 BA2_A4
<19> FBC_CMD<27> K10 BA1_A5
<19> FBC_CMD<24> K5 A11_A6
<19> FBC_CMD<25> K4 A8_A7
<19> FBC_CMD<22> J5 A12_RFU/NC
<19> FBC_CMD<18> J2 RESET*
<19> FBC_CMD<17> J3 CKE*
FBC_CLK1 J12 CK
FBC_CLK1* J11 CK#
A5 VPP_NC
U5 VPP/NC
<20> FBC_VREFC FBC_VREFC J14 VREFC
FBC_ZQ2 J13 ZQ
FBC_SEN2 J10 SEN
C100 C820p50X0402
R42 121R1%0402
R203 1KR1%0402
GND
GDDR5_SDRAM_X16
M19A
INS150981900
MIRRORED
A11 DQ16, A13 DQ17, B11 DQ18, B13 DQ19, E11 DQ20, E13 DQ21, F11 DQ22, F13 DQ23
GND C13 EDC2
D13 DBI2*
VREFD A10 FBC_VREFD
C413 C820p50X0402
<19> FBC_D<56> A4 DQ24
<19> FBC_D<57> A2 DQ25
<19> FBC_D<58> B4 DQ26
<19> FBC_D<59> B2 DQ27
<19> FBC_D<60> E4 DQ28
<19> FBC_D<61> E2 DQ29
<19> FBC_D<62> F4 DQ30
<19> FBC_D<63> F2 DQ31
<19> FBC_EDC<7> C2 EDC3
<19> FBC_DBI<7> D2 DBI3*
FBC_WCK67 D4 WCK23
FBC_WCK67* D5 WCK23*
GDDR5_SDRAM_X16
M19B
INS150981940
<19> FBC_CMD<19> L3 RAS*
<19> FBC_CMD<16> G3 CAS*
<19> FBC_CMD<26> G12 WE*
<19> FBC_CMD<31> L12 CS*
<19> FBC_CMD<23> J4 ABI*
<19> FBC_CMD<21> K4 A10_A0
<19> FBC_CMD<20> K5 A9_A1
<19> FBC_CMD<29> K11 BA0_A2
<19> FBC_CMD<30> K10 BA3_A3
<19> FBC_CMD<28> H11 BA2_A4
<19> FBC_CMD<27> H10 BA1_A5
<19> FBC_CMD<24> H5 A11_A6
<19> FBC_CMD<25> H4 A8_A7
<19> FBC_CMD<22> J5 A12_RFU/NC
<19> FBC_CMD<18> J2 RESET*
<19> FBC_CMD<17> J3 CKE*
FBC_CLK1 J12 CK
FBC_CLK1* J11 CK#
A5 VPP_NC
U5 VPP/NC
FBC_VREFC J14 VREFC
FBC_ZQ3 J13 ZQ
FBC_SEN3 J10 SEN
R210 121R1%0402
R205 1KR1%0402
GND
GDDR5_SDRAM_X16
M12 5010
M8D
INS150981772
NORMAL
<19> FBC_D<32> A4 DQ0
<19> FBC_D<33> A2 DQ1
<19> FBC_D<34> B4 DQ2
<19> FBC_D<35> B2 DQ3
<19> FBC_D<36> E4 DQ4
<19> FBC_D<37> E2 DQ5
<19> FBC_D<38> F4 DQ6
<19> FBC_D<39> F2 DQ7
<19> FBC_EDC<4> C2 EDC0
<19> FBC_DBI<4> D2 DBI0*
VREFD A10 FBC_VREFD FBC_VREFD <20>
C406 C820p50X0402
A11 DQ8, A13 DQ9, B11 DQ10, B13 DQ11, E11 DQ12, E13 DQ13, F11 DQ14, F13 DQ15
GND C13 EDC1
D13 DBI1*
<19> FBC_WCK45 D4 WCK01
<19> FBC_WCK45* D5 WCK01*
GDDR5_SDRAM_X16
M11 5020
M19D
INS150981988
MIRRORED
U4 DQ0, U2 DQ1, T4 DQ2, T2 DQ3, N4 DQ4, N2 DQ5, M4 DQ6, M2 DQ7
R2 EDC0, P2 DBI0*
VREFD U10 FBC_VREFD
<19> FBC_D<40> U11 DQ8
<19> FBC_D<41> U13 DQ9
<19> FBC_D<42> T11 DQ10
<19> FBC_D<43> T13 DQ11
<19> FBC_D<44> N11 DQ12
<19> FBC_D<45> N13 DQ13
<19> FBC_D<46> M11 DQ14
<19> FBC_D<47> M13 DQ15
<19> FBC_EDC<5> R13 EDC1
<19> FBC_DBI<5> P13 DBI1*
FBC_WCK45 P4 WCK01
FBC_WCK45* P5 WCK01*
GDDR5_SDRAM_X16
R227, R221, C501 unstuff when N15P-GX-B
<19> FBC_CLK1 R207 40.2R1%0402 FBC_CLK1_MIDPT
<19> FBC_CLK1* R208 40.2R1%0402
C434 C0.01u50X0402
GND

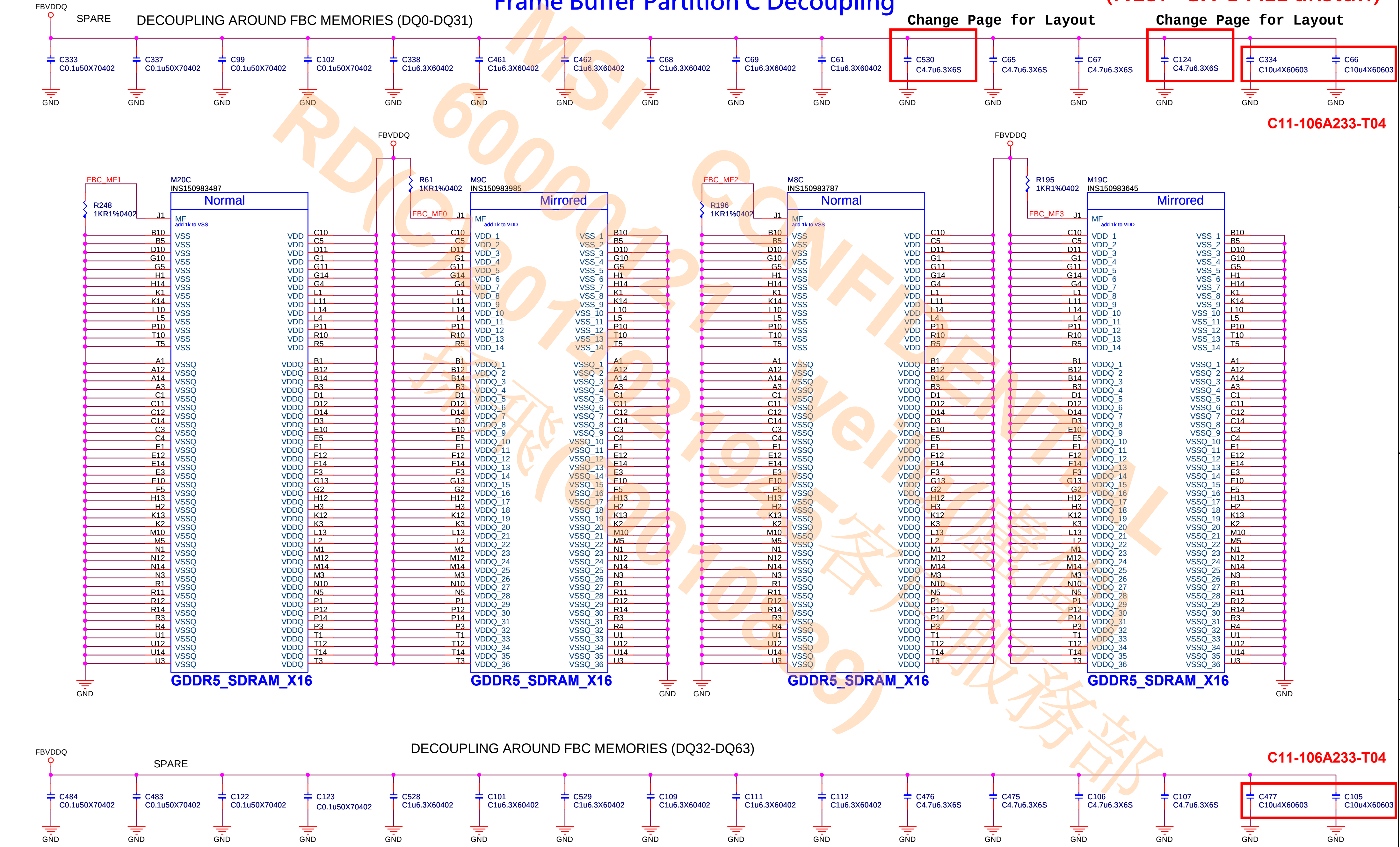
MSI CONFIDENTIAL RD(C)201402 weilu(廬偉)

MICRO-STAR INT'L CO.,LTD.

Title	DGPU_GDDR5 FrameBuffer C
Size / Document Number	MS-16H2
Rev	1.0
Date	Friday, January 03, 2014
Sheet	21 of 72

Frame Buffer Partition C Decoupling

(N15P-GX-B ALL unstuff)



FBVDDQ
SPARE
DECOUPLING AROUND FBC MEMORIES (DQ0-DQ31)
Change Page for Layout
Change Page for Layout
C333 C0.1u50X70402
C337 C0.1u50X70402
C99 C0.1u50X70402
C102 C0.1u50X70402
C338 C1u6.3X60402
C461 C1u6.3X60402
C462 C1u6.3X60402
C68 C1u6.3X60402
C69 C1u6.3X60402
C61 C1u6.3X60402
C530 C4.7u6.3X6S
C65 C4.7u6.3X6S
C67 C4.7u6.3X6S
C124 C4.7u6.3X6S
C334 C10u4X60603
C66 C10u4X60603
GND
C11-106A233-T04
FBC_MF1
R248 1KR1%0402
M20C INS150983487
Normal
R61 1KR1%0402
FBC_MF0
M9C INS150983985
Mirrored
FBC_MF2
R196 1KR1%0402
M8C INS150983787
Normal
R195 1KR1%0402
FBC_MF3
M19C INS150983645
Mirrored
MF add 1k to VSS
MF add 1k to VDD
GDDR5_SDRAM_X16
GDDR5_SDRAM_X16
GDDR5_SDRAM_X16
GDDR5_SDRAM_X16
DECOUPLING AROUND FBC MEMORIES (DQ32-DQ63)
C11-106A233-T04
C484 C0.1u50X70402
C483 C0.1u50X70402
C122 C0.1u50X70402
C123 C0.1u50X70402
C528 C1u6.3X60402
C101 C1u6.3X60402
C529 C1u6.3X60402
C109 C1u6.3X60402
C111 C1u6.3X60402
C112 C1u6.3X60402
C476 C4.7u6.3X6S
C475 C4.7u6.3X6S
C106 C4.7u6.3X6S
C107 C4.7u6.3X6S
C477 C10u4X60603
C105 C10u4X60603

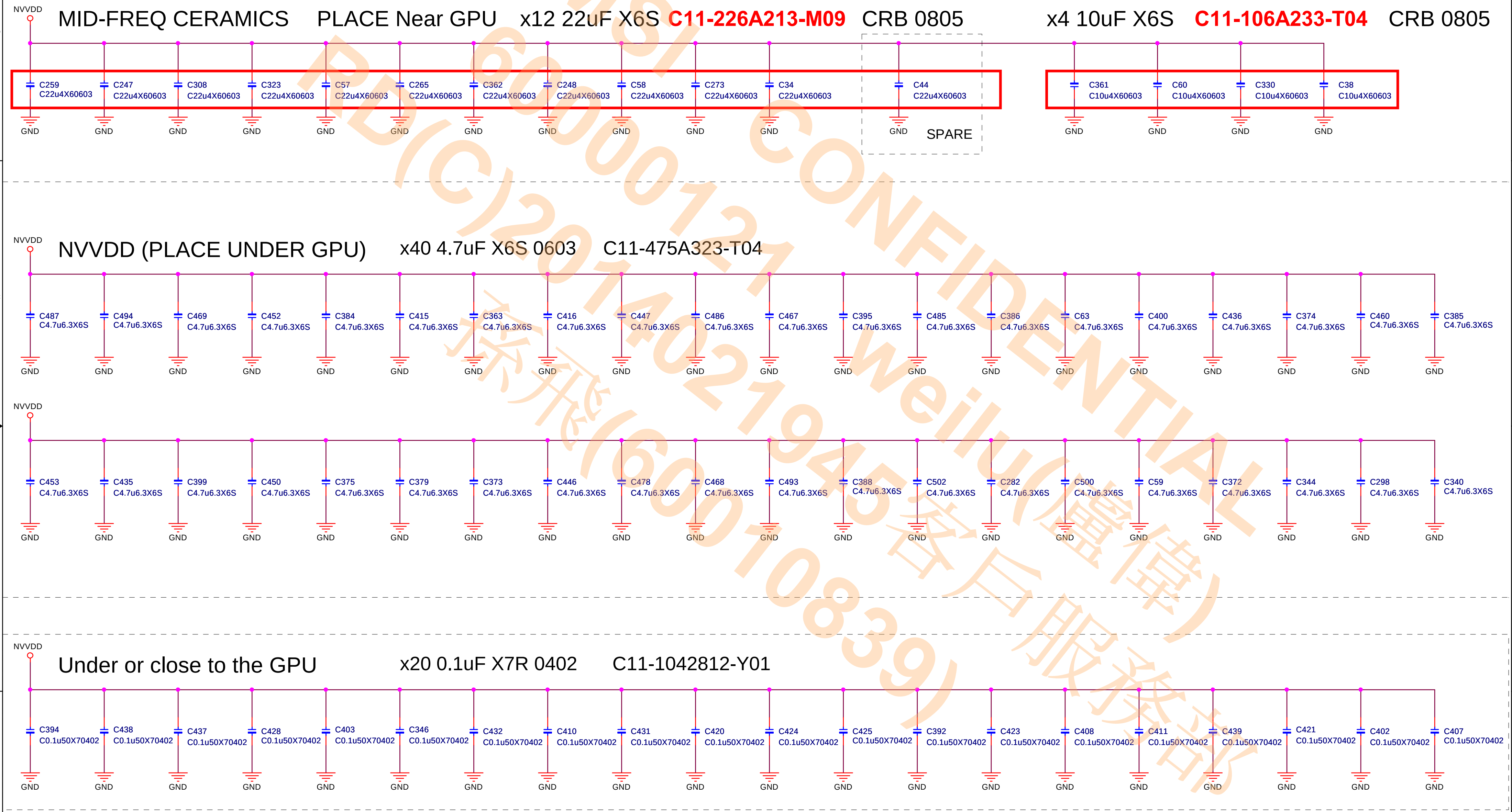
MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GDDR5 FB-C_DECOUPLING

Size | Document Number: MS-16H2 | Rev 1.0

Date: Tuesday, January 07, 2014 | Sheet 22 of 72

GPU DECOUPLING A

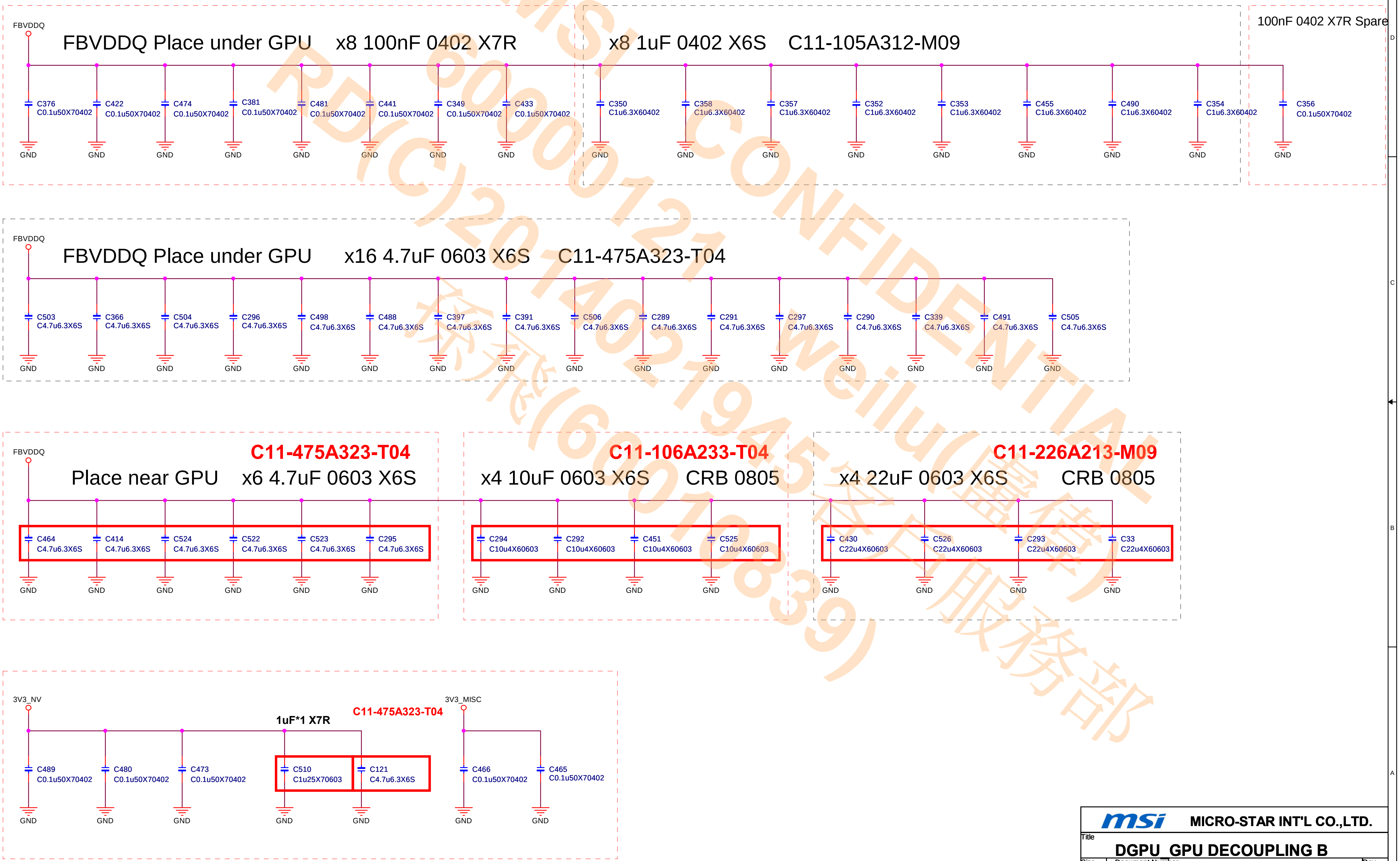


NVVDD
MID-FREQ CERAMICS
PLACE Near GPU
x12 22uF X6S C11-226A213-M09 CRB 0805
x4 10uF X6S C11-106A233-T04 CRB 0805
C259 C22u4X60603
C247 C22u4X60603
C308 C22u4X60603
C323 C22u4X60603
C57 C22u4X60603
C265 C22u4X60603
C362 C22u4X60603
C248 C22u4X60603
C58 C22u4X60603
C273 C22u4X60603
C34 C22u4X60603
C44 C22u4X60603
SPARE
C361 C10u4X60603
C60 C10u4X60603
C330 C10u4X60603
C38 C10u4X60603
GND
NVVDD (PLACE UNDER GPU)
x40 4.7uF X6S 0603
C11-475A323-T04
C487 C4.7u6.3X6S
C494 C4.7u6.3X6S
C469 C4.7u6.3X6S
C452 C4.7u6.3X6S
C384 C4.7u6.3X6S
C415 C4.7u6.3X6S
C363 C4.7u6.3X6S
C416 C4.7u6.3X6S
C447 C4.7u6.3X6S
C486 C4.7u6.3X6S
C467 C4.7u6.3X6S
C395 C4.7u6.3X6S
C485 C4.7u6.3X6S
C386 C4.7u6.3X6S
C63 C4.7u6.3X6S
C400 C4.7u6.3X6S
C436 C4.7u6.3X6S
C374 C4.7u6.3X6S
C460 C4.7u6.3X6S
C385 C4.7u6.3X6S
C453 C4.7u6.3X6S
C435 C4.7u6.3X6S
C399 C4.7u6.3X6S
C450 C4.7u6.3X6S
C375 C4.7u6.3X6S
C379 C4.7u6.3X6S
C373 C4.7u6.3X6S
C446 C4.7u6.3X6S
C478 C4.7u6.3X6S
C468 C4.7u6.3X6S
C493 C4.7u6.3X6S
C388 C4.7u6.3X6S
C502 C4.7u6.3X6S
C282 C4.7u6.3X6S
C500 C4.7u6.3X6S
C59 C4.7u6.3X6S
C372 C4.7u6.3X6S
C344 C4.7u6.3X6S
C298 C4.7u6.3X6S
C340 C4.7u6.3X6S
Under or close to the GPU
x20 0.1uF X7R 0402
C11-1042812-Y01
C394 C0.1u50X70402
C438 C0.1u50X70402
C437 C0.1u50X70402
C428 C0.1u50X70402
C403 C0.1u50X70402
C346 C0.1u50X70402
C432 C0.1u50X70402
C410 C0.1u50X70402
C431 C0.1u50X70402
C420 C0.1u50X70402
C424 C0.1u50X70402
C425 C0.1u50X70402
C392 C0.1u50X70402
C423 C0.1u50X70402
C408 C0.1u50X70402
C411 C0.1u50X70402
C439 C0.1u50X70402
C421 C0.1u50X70402
C402 C0.1u50X70402
C407 C0.1u50X70402

MSI CONFIDENTIAL
600012171 weiliu(盧偉)
RD(C)20140219452 客戶服務部
徐飛(600010839)

msi	MICRO-STAR INT'L CO.,LTD.	
Title	DGPU_GPU DECOUPLING A	
Size	Document Number MS-16H2	Rev 1.0
Date: Tuesday, January 07, 2014	Sheet 23 of 72	

GPU DECOUPLING B



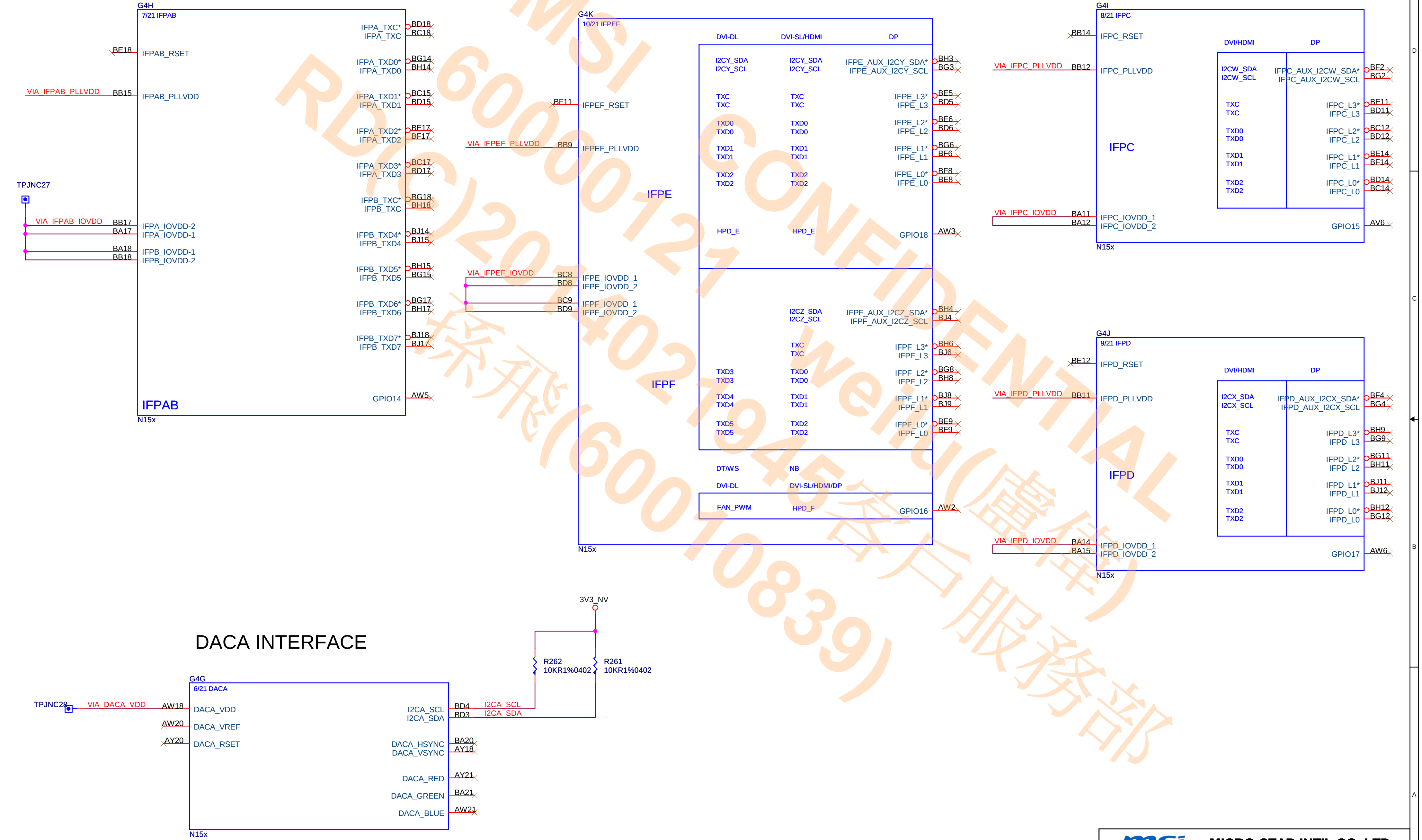
FBVDDQ
FBVDDQ Place under GPU x8 100nF 0402 X7R
x8 1uF 0402 X6S C11-105A312-M09
100nF 0402 X7R Spare
C376 C0.1u50X70402
C422 C0.1u50X70402
C474 C0.1u50X70402
C381 C0.1u50X70402
C481 C0.1u50X70402
C441 C0.1u50X70402
C349 C0.1u50X70402
C433 C0.1u50X70402
C350 C1u6.3X60402
C358 C1u6.3X60402
C357 C1u6.3X60402
C352 C1u6.3X60402
C353 C1u6.3X60402
C455 C1u6.3X60402
C490 C1u6.3X60402
C354 C1u6.3X60402
C356 C0.1u50X70402
GND
FBVDDQ
FBVDDQ Place under GPU x16 4.7uF 0603 X6S C11-475A323-T04
C503 C4.7u6.3X6S
C366 C4.7u6.3X6S
C504 C4.7u6.3X6S
C296 C4.7u6.3X6S
C498 C4.7u6.3X6S
C488 C4.7u6.3X6S
C397 C4.7u6.3X6S
C391 C4.7u6.3X6S
C506 C4.7u6.3X6S
C289 C4.7u6.3X6S
C291 C4.7u6.3X6S
C297 C4.7u6.3X6S
C290 C4.7u6.3X6S
C339 C4.7u6.3X6S
C491 C4.7u6.3X6S
C505 C4.7u6.3X6S
GND
FBVDDQ
C11-475A323-T04
Place near GPU x6 4.7uF 0603 X6S
C11-106A233-T04
x4 10uF 0603 X6S CRB 0805
C11-226A213-M09
x4 22uF 0603 X6S CRB 0805
C464 C4.7u6.3X6S
C414 C4.7u6.3X6S
C524 C4.7u6.3X6S
C522 C4.7u6.3X6S
C523 C4.7u6.3X6S
C295 C4.7u6.3X6S
C294 C10u4X60603
C292 C10u4X60603
C451 C10u4X60603
C525 C10u4X60603
C430 C22u4X60603
C526 C22u4X60603
C293 C22u4X60603
C33 C22u4X60603
GND
3V3_NV
3V3_MISC
1uF*1 X7R
C11-475A323-T04
C489 C0.1u50X70402
C480 C0.1u50X70402
C473 C0.1u50X70402
C510 C1u25X70603
C121 C4.7u6.3X6S
C466 C0.1u50X70402
C465 C0.1u50X70402
GND

MSI CONFIDENTIAL
RD(C)2014021945 Weiliu(盧偉)
600121
徐飛(6010839)
客户服务部

MICRO-STAR INT'L CO.,LTD.

Title	DGPU_GPU DECOUPLING B
Size / Document Number	MS-16H2
Rev	1.0
Date	Tuesday, January 07, 2014
Sheet	24 of 72

DACA,Display IF



G4H
7/21 IFPAB
BE18 IFPAB_RSET
VIA_IFPAB_PLLVDD BB15 IFPAB_PLLVDD
TPJNC27
VIA_IFPAB_IOVDD
BB17 IFPA_IOVDD-2
BA17 IFPA_IOVDD-1
BA18 IFPB_IOVDD-1
BB18 IFPB_IOVDD-2
IFPA_TXC* BD18
IFPA_TXC BC18
IFPA_TXD0* BG14
IFPA_TXD0 BH14
IFPA_TXD1* BC15
IFPA_TXD1 BD15
IFPA_TXD2* BE17
IFPA_TXD2 BF17
IFPA_TXD3* BC17
IFPA_TXD3 BD17
IFPB_TXC* BG18
IFPB_TXC BH18
IFPB_TXD4* BJ14
IFPB_TXD4 BJ15
IFPB_TXD5* BH15
IFPB_TXD5 BG15
IFPB_TXD6* BG17
IFPB_TXD6 BH17
IFPB_TXD7* BJ18
IFPB_TXD7 BJ17
GPIO14 AW5
IFPAB
N15x
G4K
10/21 IFPEF
BF11 IFPEF_RSET
VIA_IFPEF_PLLVDD BB9 IFPEF_PLLVDD
VIA_IFPEF_IOVDD
BC8 IFPE_IOVDD_1
BD8 IFPE_IOVDD_2
BC9 IFPF_IOVDD_1
BD9 IFPF_IOVDD_2
IFPE
IFPF
DVI-DL DVI-SL/HDMI DP
I2CY_SDA I2CY_SDA IFPE_AUX_I2CY_SDA* BH3
I2CY_SCL I2CY_SCL IFPE_AUX_I2CY_SCL BG3
TXC TXC IFPE_L3* BE5
TXC TXC IFPE_L3 BD5
TXD0 TXD0 IFPE_L2* BE6
TXD0 TXD0 IFPE_L2 BD6
TXD1 TXD1 IFPE_L1* BG6
TXD1 TXD1 IFPE_L1 BF6
TXD2 TXD2 IFPE_L0* BF8
TXD2 TXD2 IFPE_L0 BE8
HPD_E HPD_E GPIO18 AW3
I2CZ_SDA IFPF_AUX_I2CZ_SDA* BH4
I2CZ_SCL IFPF_AUX_I2CZ_SCL BJ4
TXC IFPF_L3* BH6
TXC IFPF_L3 BJ6
TXD3 TXD0 IFPF_L2* BG8
TXD3 TXD0 IFPF_L2 BH8
TXD4 TXD1 IFPF_L1* BJ8
TXD4 TXD1 IFPF_L1 BJ9
TXD5 TXD2 IFPF_L0* BE9
TXD5 TXD2 IFPF_L0 BF9
DT/WS NB
DVI-DL DVI-SL/HDMI/DP
FAN_PWM HPD_F GPIO16 AW2
N15x
G4I
8/21 IFPC
BB14 IFPC_RSET
VIA_IFPC_PLLVDD BB12 IFPC_PLLVDD
IFPC
DVI/HDMI DP
I2CW_SDA IFPC_AUX_I2CW_SDA* BF2
I2CW_SCL IFPC_AUX_I2CW_SCL BG2
TXC IFPC_L3* BE11
TXC IFPC_L3 BD11
TXD0 IFPC_L2* BC12
TXD0 IFPC_L2 BD12
TXD1 IFPC_L1* BE14
TXD1 IFPC_L1 BF14
TXD2 IFPC_L0* BD14
TXD2 IFPC_L0 BC14
VIA_IFPC_IOVDD BA11 IFPC_IOVDD_1
BA12 IFPC_IOVDD_2
GPIO15 AV6
N15x
G4J
9/21 IFPD
BE12 IFPD_RSET
VIA_IFPD_PLLVDD BB11 IFPD_PLLVDD
IFPD
DVI/HDMI DP
I2CX_SDA IFPD_AUX_I2CX_SDA* BF4
I2CX_SCL IFPD_AUX_I2CX_SCL BG4
TXC IFPD_L3* BH9
TXC IFPD_L3 BG9
TXD0 IFPD_L2* BG11
TXD0 IFPD_L2 BH11
TXD1 IFPD_L1* BJ11
TXD1 IFPD_L1 BJ12
TXD2 IFPD_L0* BH12
TXD2 IFPD_L0 BG12
VIA_IFPD_IOVDD BA14 IFPD_IOVDD_1
BA15 IFPD_IOVDD_2
GPIO17 AW6
N15x
3V3_NV
R262 10KR1%0402
R261 10KR1%0402
DACA INTERFACE
G4G
6/21 DACA
TPJNC28 VIA_DACA_VDD AW18 DACA_VDD
AW20 DACA_VREF
AY20 DACA_RSET
I2CA_SCL BD4 I2CA_SCL
I2CA_SDA BD3 I2CA_SDA
DACA_HSYNC BA20
DACA_VSYNC AY18
DACA_RED AY21
DACA_GREEN BA21
DACA_BLUE AW21
N15x

MSI CONFIDENTIAL
RD(C)600012104021945 Wei Ru(廣信)
徐飛(60010839)客戶服務部

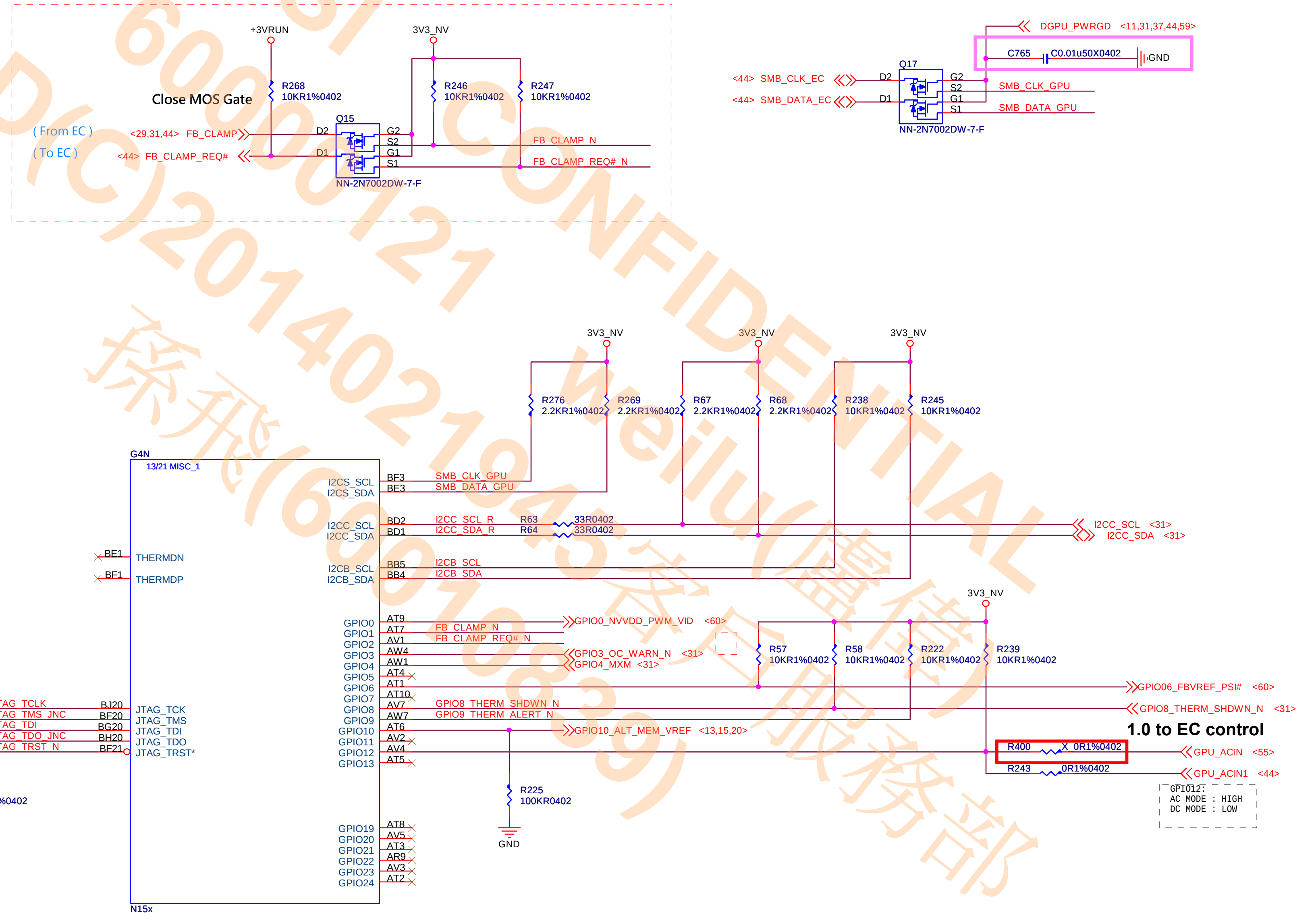
MICRO-STAR INT'L CO.,LTD.

Title	DGPU_DACA,Display IF	
Size	Document Number: MS-16H2	Rev: 1.0
Date: Thursday, February 13, 2014	Sheet 25 of 72	

DGPU GPIO, I2C

GB3-256 GPIO(Design Guide Table 12-2)

GPIO	I/O	Function
0	OUT	PWM VID
1	IN	FB_CLAMP_MON
2	OUT	FB_CLAMP_MON_TGL_REQ
3	IN	OC_WARN
4	N/A	Reserved
5	N/A	Reserved
6	OUT	PSI
7	OUT	LCD PWM
8	OUT	OVERT
9	I/O	ALERT
10	OUT	MEM_VREF_CTL
11	OUT	LCD_VCC
12	IN	PWM LEVEL
13	OUT	LCD_BLEN
14	IN	HPD_AB
15	IN	HPD_C
16	IN	HPD_F or HPD_B
17	IN	HPD_D
18	IN	HPD_E
19	OUT	3DVision
20	N/A	Reserved
21	I/O	RASTER_SYNC
22	IN	SWAP_RDY
23	N/A	Reserved
24	OUT	MEM_VDD_CTL



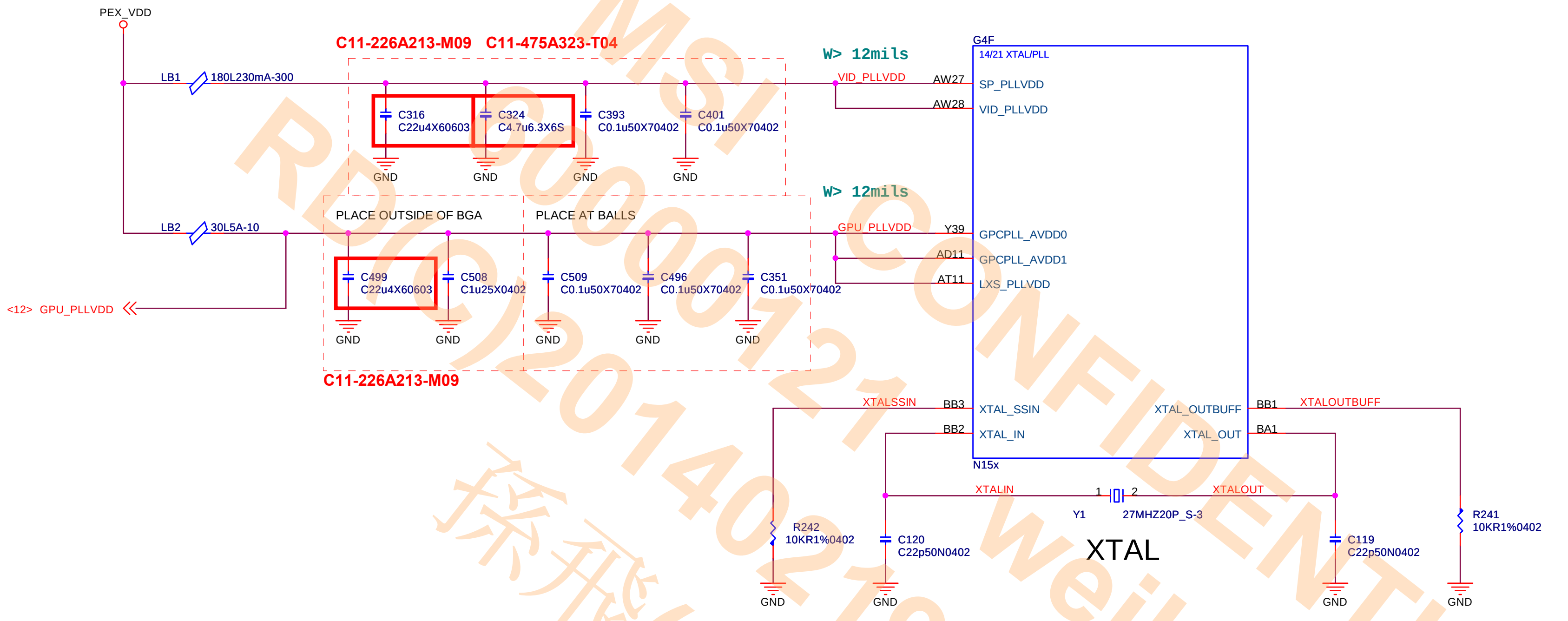
Close MOS Gate
(From EC)
(To EC)
+3VRUN
3V3_NV
R268 10KR1%0402
R246 10KR1%0402
R247 10KR1%0402
Q15
NN-2N7002DW-7-F
<29,31,44> FB_CLAMP
<44> FB_CLAMP_REQ#
FB_CLAMP_N
FB_CLAMP_REQ#_N
DGPU_PWRGD <11,31,37,44,59>
C765 C0.01u50X0402 GND
Q17
<44> SMB_CLK_EC
<44> SMB_DATA_EC
SMB_CLK_GPU
SMB_DATA_GPU
NN-2N7002DW-7-F
R276 2.2KR1%0402
R269 2.2KR1%0402
R67 2.2KR1%0402
R68 2.2KR1%0402
R238 10KR1%0402
R245 10KR1%0402
G4N
13/21 MISC_1
THERMDN
THERMDP
I2CS_SCL
I2CS_SDA
I2CC_SCL
I2CC_SDA
I2CB_SCL
I2CB_SDA
SMB_CLK_GPU
SMB_DATA_GPU
I2CC_SCL_R
I2CC_SDA_R
R63 33R0402
R64 33R0402
I2CC_SCL <31>
I2CC_SDA <31>
I2CB_SCL
I2CB_SDA
GPIO0 … GPIO13
GPIO19 … GPIO24
GPIO0_NVVDD_PWM_VID <60>
FB_CLAMP_N
FB_CLAMP_REQ#_N
GPIO3_OC_WARN_N <31>
GPIO4_MXM <31>
GPIO06_FBVREF_PSI# <60>
GPIO8_THERM_SHDWN_N
GPIO8_THERM_SHDWN_N <31>
GPIO9_THERM_ALERT_N
GPIO10_ALT_MEM_VREF <13,15,20>
R57 10KR1%0402
R58 10KR1%0402
R222 10KR1%0402
R239 10KR1%0402
1.0 to EC control
R400 X_0R1%0402
GPU_ACIN <55>
R243 0R1%0402
GPU_ACIN1 <44>
GPIO12:
AC MODE : HIGH
DC MODE : LOW
R225 100KR0402
GND
JTAG_TCLK
JTAG_TMS_JNC
JTAG_TDI
JTAG_TDO_JNC
JTAG_TRST_N
TPJNC25
TPJNC1
JTAG_TCK
JTAG_TMS
JTAG_TDI
JTAG_TDO
JTAG_TRST*
R47 10KR1%0402
R48 X_10KR1%0402
R46 10KR1%0402
N15x

MSI CONFIDENTIAL
RD(C)20140219 Weiliu(60000121)

MICRO-STAR INT'L CO.,LTD.

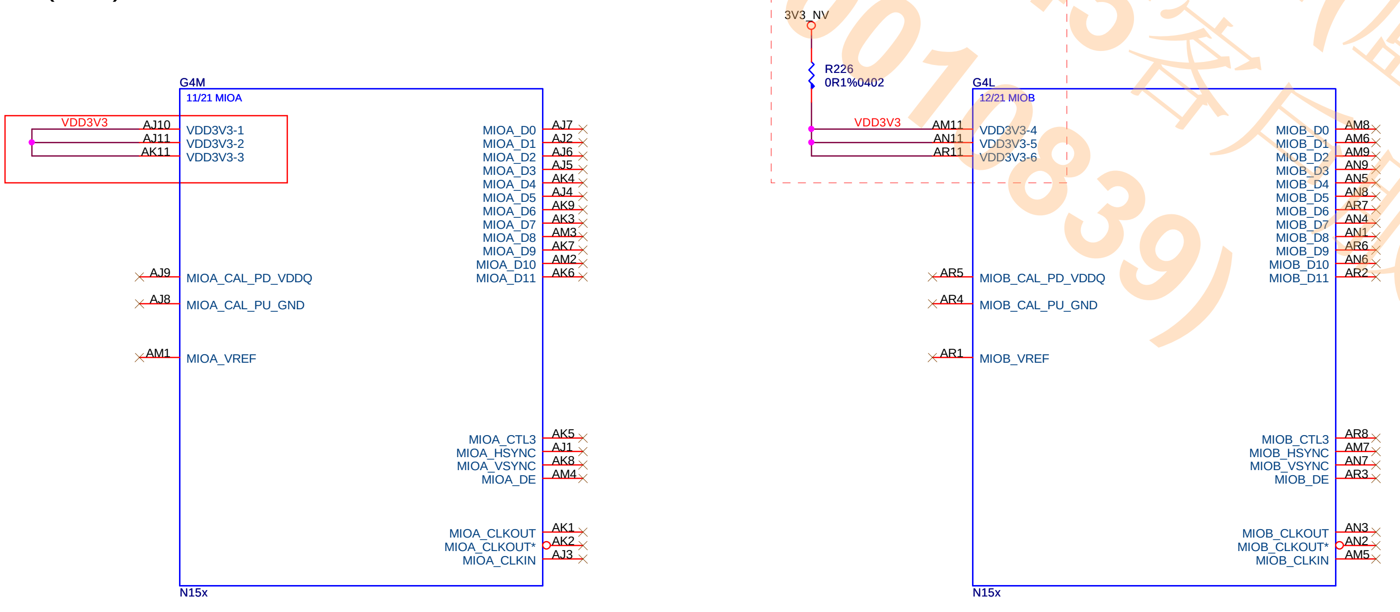
Title	DGPU_GPIO,I2C
Size / Document Number	MS-16H2
Rev	1.0
Date	Friday, January 03, 2014
Sheet	26 of 72

DGPU MIO & XTAL



PEX_VDD
LB1 180L230mA-300
LB2 30L5A-10
C11-226A213-M09
C11-475A323-T04
W> 12mils
VID_PLLVDD
C316 C22u4X60603
C324 C4.7u6.3X6S
C393 C0.1u50X70402
C401 C0.1u50X70402
GND
PLACE OUTSIDE OF BGA
PLACE AT BALLS
GPU_PLLVDD
C499 C22u4X60603
C508 C1u25X0402
C509 C0.1u50X70402
C496 C0.1u50X70402
C351 C0.1u50X70402
C11-226A213-M09
<12> GPU_PLLVDD
G4F
14/21 XTAL/PLL
AW27 SP_PLLVDD
AW28 VID_PLLVDD
Y39 GPCPLL_AVDD0
AD11 GPCPLL_AVDD1
AT11 LXS_PLLVDD
XTALSSIN BB3 XTAL_SSIN
BB2 XTAL_IN
XTAL_OUTBUFF BB1 XTALOUTBUFF
XTAL_OUT BA1
N15x
XTALIN
XTALOUT
Y1 27MHZ20P_S-3
R242 10KR1%0402
C120 C22p50N0402
XTAL
C119 C22p50N0402
R241 10KR1%0402

Multi-use IO(MIO) Interface



3V3_NV
R226 0R1%0402
G4M
11/21 MIOA
VDD3V3
AJ10 VDD3V3-1
AJ11 VDD3V3-2
AK11 VDD3V3-3
MIOA_D0 AJ7
MIOA_D1 AJ2
MIOA_D2 AJ6
MIOA_D3 AJ5
MIOA_D4 AK4
MIOA_D5 AJ4
MIOA_D6 AK9
MIOA_D7 AK3
MIOA_D8 AM3
MIOA_D9 AK7
MIOA_D10 AM2
MIOA_D11 AK6
AJ9 MIOA_CAL_PD_VDDQ
AJ8 MIOA_CAL_PU_GND
AM1 MIOA_VREF
MIOA_CTL3 AK5
MIOA_HSYNC AJ1
MIOA_VSYNC AK8
MIOA_DE AM4
MIOA_CLKOUT AK1
MIOA_CLKOUT* AK2
MIOA_CLKIN AJ3
N15x
G4L
12/21 MIOB
VDD3V3
AM11 VDD3V3-4
AN11 VDD3V3-5
AR11 VDD3V3-6
MIOB_D0 AM8
MIOB_D1 AM6
MIOB_D2 AM9
MIOB_D3 AN9
MIOB_D4 AN5
MIOB_D5 AN8
MIOB_D6 AR7
MIOB_D7 AN4
MIOB_D8 AN1
MIOB_D9 AR6
MIOB_D10 AN6
MIOB_D11 AR2
AR5 MIOB_CAL_PD_VDDQ
AR4 MIOB_CAL_PU_GND
AR1 MIOB_VREF
MIOB_CTL3 AR8
MIOB_HSYNC AM7
MIOB_VSYNC AN7
MIOB_DE AR3
MIOB_CLKOUT AN3
MIOB_CLKOUT* AN2
MIOB_CLKIN AM5
N15x

MSI CONFIDENTIAL
RD(C)20140219 weilu(盧偉)
徐飛(60010839)客户服务部

MICRO-STAR INT'L CO.,LTD.

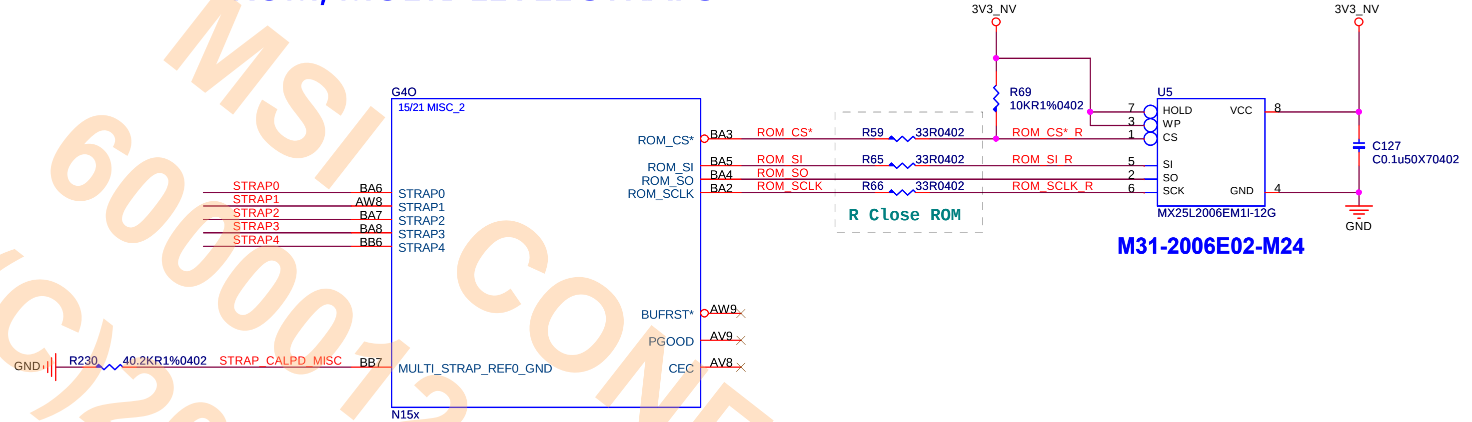
Title: DGPU MIO & XTAL

Size | Document Number: MS-16H2 | Rev 1.0

Date: Tuesday, January 07, 2014 | Sheet 27 of 72

ROM, MULTI-LEVEL STRAPS

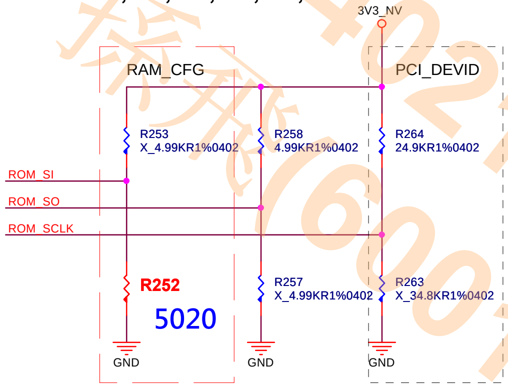
	GND	3V3
5K	0000	1000
10K	0001	1001
15K	0010	1010
20K	0011	1011
25K	0100	1100
30K	0101	1101
35K	0110	1110
45K	0111	1111
	PD	PU



M12-4132525-S02

RCFG1 Hynix 128Mx16bit	GDDR5M1 5010	GDDR5M2 5020
R11-3482T12-W08	M12-5GQ2HL5-H23	M12-5GQ2HL5-H23
X_34.8KR1%0402	X_H5GQ2H24AFR	X_H5GQ2H24AFR
RCFG2 Samsung 128Mx16bit	**GDDR5M3 5010**	**GDDR5M4 5020**
R11-4532T12-W08	M12-2032585-S02	M12-2032585-S02
X_45.3KR1%0402	X_K4G20325FD	X_K4G20325FD
RCFG3 Hynix 256Mx16bit	**GDDR5M5 5010**	**GDDR5M6 5020**
R11-0153T12-W08	M12-5GC4H05-H23	M12-5GC4H05-H23
X_15KR1%0402	X_H5GC4H24MFR	X_H5GC4H24MFR
RCFG4 Elpida 256Mx16bit	**GDDR5M7 5010**	**GDDR5M8 5020**
R11-0103T12-W08	M12-4032B05-E59	M12-4032B05-E59
X_10KR1%0402	X_EDW4032BABG	X_EDW4032BABG

GDDR5 Parts
5020 : M15, M16, M17, M18, M19, M20
5010 : M3, M4, M5, M6, M8, M9



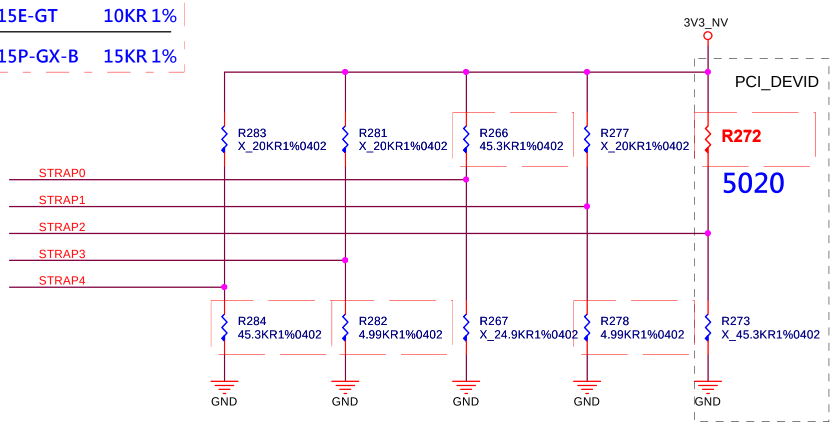
R252	
For Hynix 128Mx16	35KR 1%
For Samsung 128Mx16	45KR 1%
For Hynix 256Mx16	15KR 1%
For Elpida 256Mx16	10KR 1%

Setting	R252	5010	5020
Hynix 128Mx16	RCFG1	GDDR5M1	GDDR5M2
Samsung 128Mx16	RCFG2	GDDR5M3	GDDR5M4
Hynix 256Mx16	RCFG3	GDDR5M5	GDDR5M6
Elpida 256Mx16	RCFG4	GDDR5M7	GDDR5M8

STRAP0	USER_BIT[3:0]	0xF: EDID	45K PU	
STRAP1	3GIO_PADCFG_LUT_ADR[3:0]	0x0: DDI no used	5K PD	
STRAP2	PCI_DEVID[3:0]	15E-GT 0x1199 15P-GX-B 0x119A	10K PU 15K PU	
ROM_SO	VGA_DEVICE SMB_ALT_ADDR FB_0_BAR_SIZE XCLK_417	0x0001	5K PU	
ROM_SI	RAM_CFG_0	0110	35K PD	Hynix 128x16bit
	RAM_CFG_1	0111	45K PD	Samsung 128x16bit
	RAM_CFG_2	0010	15K PD	Hynix 256xbit
	RAM_CFG_3	0001	10K PD	Elpida 256xbit
ROM_SCLK	PCI_DEVID[4] SUB_VENDOR PCI_DEVID[5] PEX_PLL_EN_TERM100	1: 0x119=>1001 1: VBIOS ROM is Present 0: 0x119=>1001	25K PU	
STRAP3	SOR_EXposed [3:0]	0000	5K PD	
STRAP4	Reserved PCIE_Speed_Change_Gen3 PCIE_MAX_SPEED DP_PLL_VDD_33V	0 1: Enable PCIE Gen3 operation 1: Allow booting to GEN2/Gen3 1: ENABLED	45K PD	

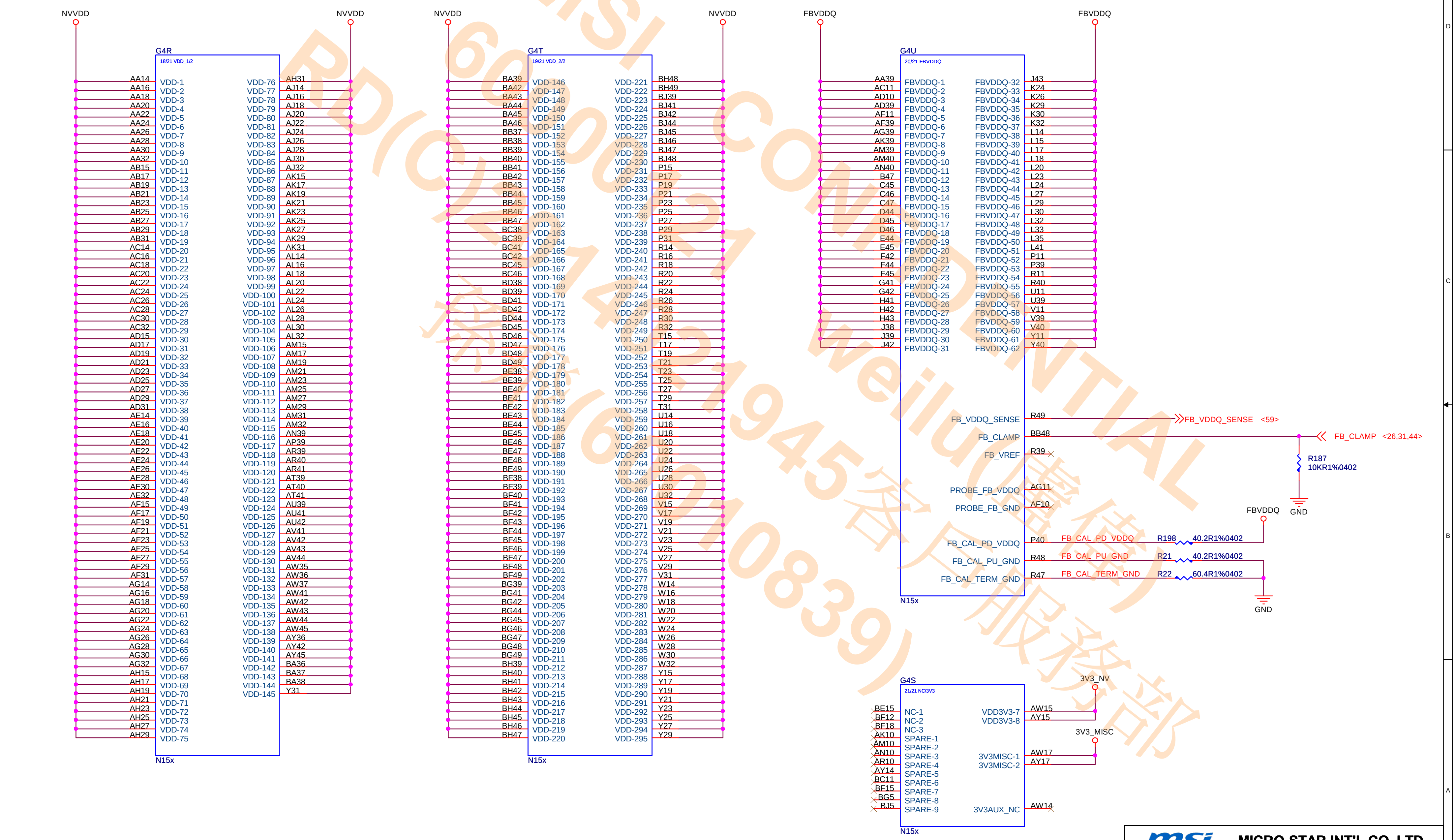
RGPU1 N15E-GT 5020	
R11-0103T12-W08	
X_10KR1%0402	
DGPU1 5010	
B03-0N15E05-N08	
X_N15E-GT-A2	
RGPU2 N15P-GX-B 5020	
R11-0153T12-W08	
X_15KR1%0402	
DGPU2 5010	
B03-0N15P35-N08	
X_N15P-GX-B-A2	

R272	
N15E-GT	10KR 1%
N15P-GX-B	15KR 1%



MSI CONFIDENTIAL

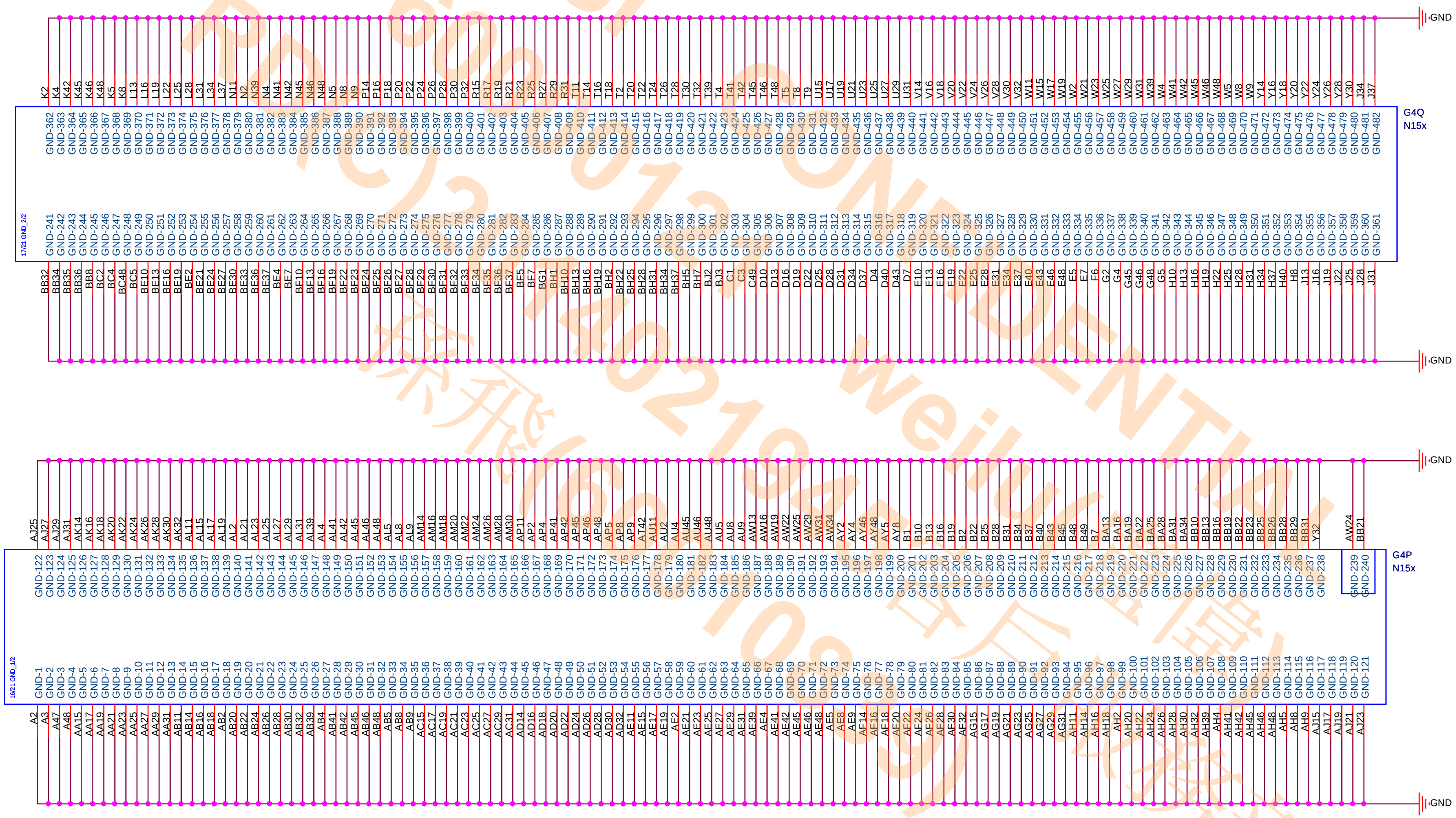
GPU NVVDD, FBVDDQ



MSI CONFIDENTIAL

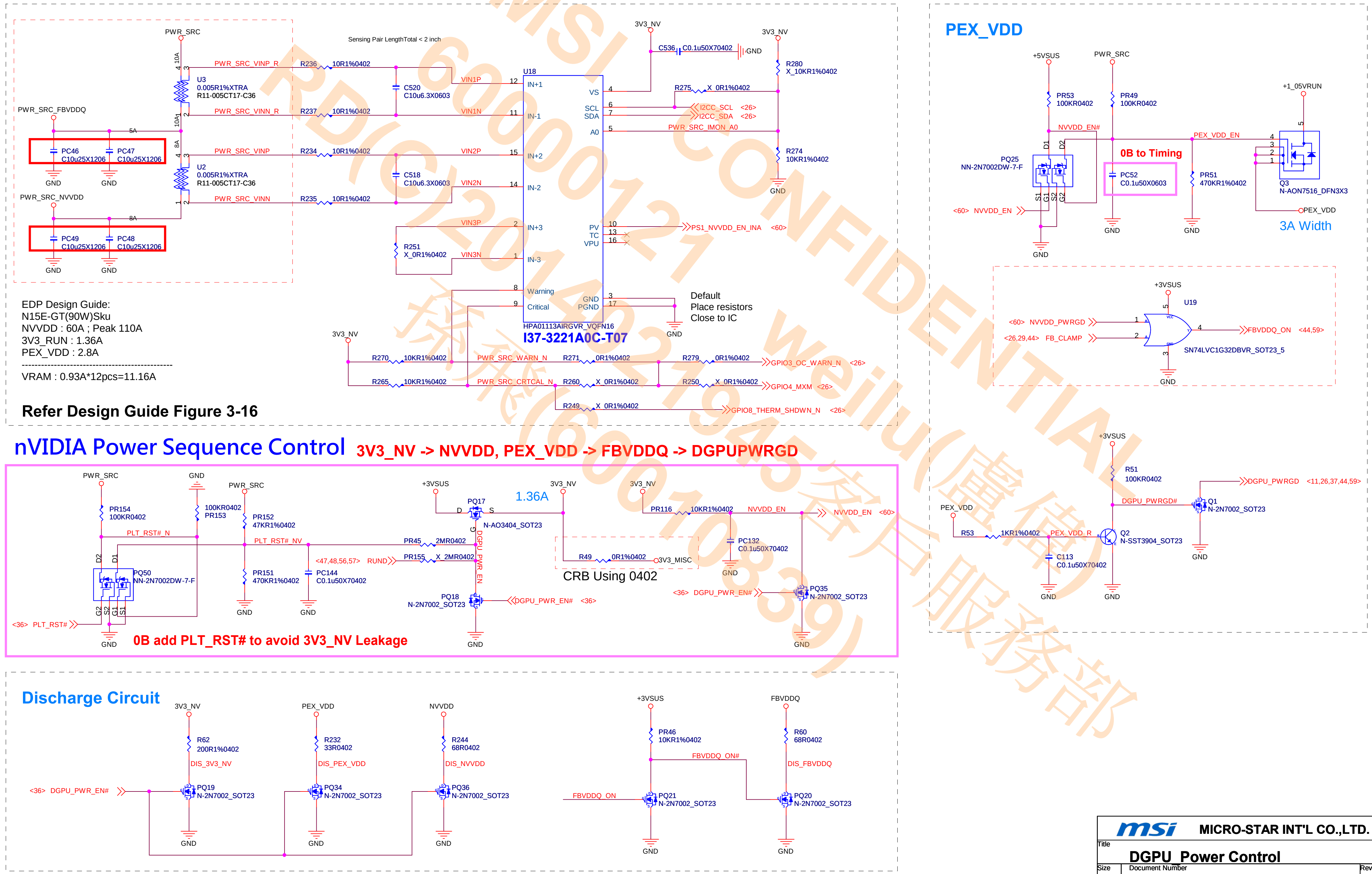
msi	MICRO-STAR INT'L CO.,LTD.
Title	DGPU NVVDD, FBVDDQ
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	29 of 72

DGPU GND



msi	MICRO-STAR INT'L CO.,LTD.
Title	DGPU GND
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	30 of 72

DGPU_Power Control



PEX_VDD
nVIDIA Power Sequence Control
3V3_NV -> NVVDD, PEX_VDD -> FBVDDQ -> DGPUPWRGD
Discharge Circuit
EDP Design Guide:
N15E-GT(90W)Sku
NVVDD : 60A ; Peak 110A
3V3_RUN : 1.36A
PEX_VDD : 2.8A
VRAM : 0.93A*12pcs=11.16A
Refer Design Guide Figure 3-16
Sensing Pair LengthTotal < 2 inch
Default
Place resistors
Close to IC
U18
HPA01113AIRGVR_VQFN16
I37-3221A0C-T07
PWR_SRC
PWR_SRC_FBVDDQ
PWR_SRC_NVVDD
U3
0.005R1%XTRA
R11-005CT17-C36
U2
0.005R1%XTRA
R11-005CT17-C36
PC46 C10u25X1206
PC47 C10u25X1206
PC49 C10u25X1206
PC48 C10u25X1206
PWR_SRC_VINP_R
PWR_SRC_VINN_R
PWR_SRC_VINP
PWR_SRC_VINN
R236 10R1%0402
R237 10R1%0402
R234 10R1%0402
R235 10R1%0402
C520 C10u6.3X0603
C518 C10u6.3X0603
R251 X_0R1%0402
VIN1P
VIN1N
VIN2P
VIN2N
VIN3P
VIN3N
IN+1
IN-1
IN+2
IN-2
IN+3
IN-3
Warning
Critical
VS
SCL
SDA
A0
PV
TC
VPU
GND
PGND
3V3_NV
C536 C0.1u50X70402
R280 X_10KR1%0402
R275 X_0R1%0402
R274 10KR1%0402
I2CC_SCL <26>
I2CC_SDA <26>
PWR_SRC_IMON_A0
PS1_NVVDD_EN_INA <60>
R270 10KR1%0402
R265 10KR1%0402
PWR_SRC_WARN_N
PWR_SRC_CRTCAL_N
R271 0R1%0402
R279 0R1%0402
R260 X_0R1%0402
R250 X_0R1%0402
R249 X_0R1%0402
GPIO3_OC_WARN_N <26>
GPIO4_MXM <26>
GPIO8_THERM_SHDWN_N <26>
+5VSUS
PR53 100KR0402
PR49 100KR0402
NVVDD_EN#
PQ25
NN-2N7002DW-7-F
<60> NVVDD_EN
0B to Timing
PC52 C0.1u50X0603
PR51 470KR1%0402
PEX_VDD_EN
+1_05VRUN
Q3
N-AON7516_DFN3X3
PEX_VDD
3A Width
+3VSUS
U19
<60> NVVDD_PWRGD
<26,29,44> FB_CLAMP
FBVDDQ_ON <44,59>
SN74LVC1G32DBVR_SOT23_5
R51 100KR0402
DGPU_PWRGD <11,26,37,44,59>
DGPU_PWRGD#
Q1 N-2N7002_SOT23
R53 1KR1%0402
PEX_VDD_R
Q2 N-SST3904_SOT23
C113 C0.1u50X70402
PR154 100KR0402
100KR0402 PR153
PR152 47KR1%0402
PLT_RST#_N
PLT_RST#_NV
PQ50
NN-2N7002DW-7-F
<36> PLT_RST#
PR151 470KR1%0402
PC144 C0.1u50X70402
0B add PLT_RST# to avoid 3V3_NV Leakage
PR45 2MR0402
PR155 X_2MR0402
<47,48,56,57> RUND
PQ17
N-AO3404_SOT23
1.36A
DGPU_PWR_EN
PQ18
N-2N7002_SOT23
DGPU_PWR_EN# <36>
R49 0R1%0402
3V3_MISC
CRB Using 0402
PR116 10KR1%0402
NVVDD_EN
NVVDD_EN <60>
PC132 C0.1u50X70402
<36> DGPU_PWR_EN#
PQ35 N-2N7002_SOT23
R62 200R1%0402
DIS_3V3_NV
R232 33R0402
DIS_PEX_VDD
R244 68R0402
DIS_NVVDD
PQ19 N-2N7002_SOT23
PQ34 N-2N7002_SOT23
PQ36 N-2N7002_SOT23
NVVDD
FBVDDQ
PR46 10KR1%0402
R60 68R0402
FBVDDQ_ON#
DIS_FBVDDQ
FBVDDQ_ON
PQ21 N-2N7002_SOT23
PQ20 N-2N7002_SOT23
GND

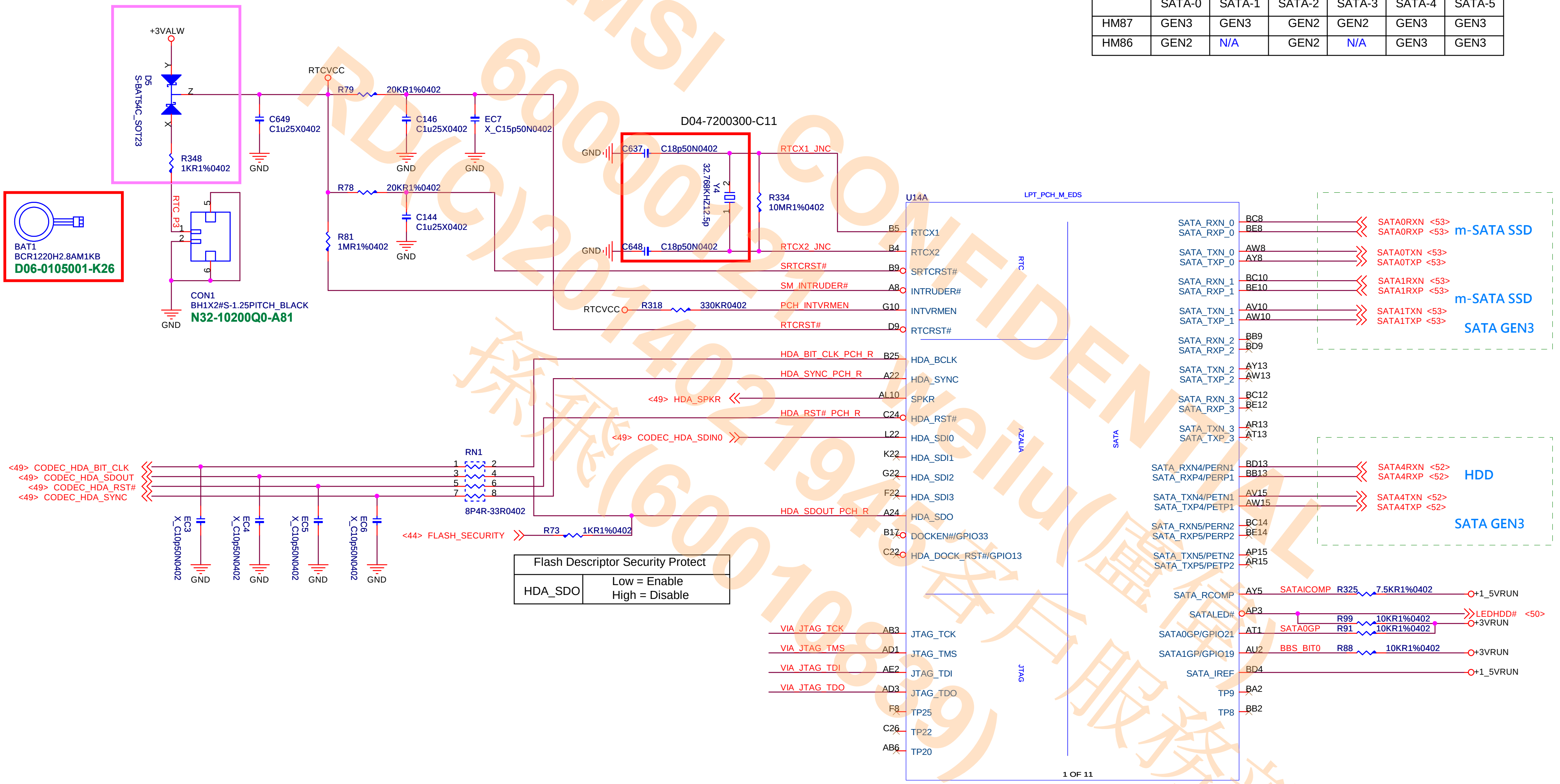
MSI CONFIDENTIAL
600012 RD(C)20140219 weilu(盧偉)
徐飛(60010839) 客戶服務部

MICRO-STAR INT'L CO.,LTD.

Title	DGPU_Power Control
Size / Document Number	MS-16H2
Rev	1.0
Date:	Tuesday, January 07, 2014
Sheet	31 of 72

Lynx Point (HDA/JTAG/SATA)

SKU	High Speed SATA I/O Ports					
	SATA-0	SATA-1	SATA-2	SATA-3	SATA-4	SATA-5
HM87	GEN3	GEN3	GEN2	GEN2	GEN3	GEN3
HM86	GEN2	N/A	GEN2	N/A	GEN3	GEN3



+3VALW
D5 S-BAT54C_SOT23
R348 1KR1%0402
RTC_P3
BAT1 BCR1220H2.8AM1KB
D06-0105001-K26
CON1 BH1X2#S-1.25PITCH_BLACK
N32-10200Q0-A81
C649 C1u25X0402
RTCVCC
R79 20KR1%0402
C146 C1u25X0402
EC7 X_C15p50N0402
R78 20KR1%0402
C144 C1u25X0402
R81 1MR1%0402
D04-7200300-C11
C637 C18p50N0402
C648 C18p50N0402
Y4 32.768KHZ12.5p
R334 10MR1%0402
RTCX1_JNC
RTCX2_JNC
SRTCRST#
SM_INTRUDER#
R318 330KR0402
PCH_INTVRMEN
RTCRST#
HDA_BIT_CLK_PCH_R
HDA_SYNC_PCH_R
<49> HDA_SPKR
HDA_RST#_PCH_R
<49> CODEC_HDA_SDIN0
<49> CODEC_HDA_BIT_CLK
<49> CODEC_HDA_SDOUT
<49> CODEC_HDA_RST#
<49> CODEC_HDA_SYNC
RN1 8P4R-33R0402
EC3 X_C10p50N0402
EC4 X_C10p50N0402
EC5 X_C10p50N0402
EC6 X_C10p50N0402
HDA_SDOUT_PCH_R
<44> FLASH_SECURITY
R73 1KR1%0402
VIA_JTAG_TCK
VIA_JTAG_TMS
VIA_JTAG_TDI
VIA_JTAG_TDO
U14A LPT_PCH_M_EDS
RTCX1 RTCX2 SRTCRST# INTRUDER# INTVRMEN RTCRST#
HDA_BCLK HDA_SYNC SPKR HDA_RST# HDA_SDI0 HDA_SDI1 HDA_SDI2 HDA_SDI3 HDA_SDO DOCKEN#/GPIO33 HDA_DOCK_RST#/GPIO13
JTAG_TCK JTAG_TMS JTAG_TDI JTAG_TDO TP25 TP22 TP20
SATA_RXN_0 SATA_RXP_0 SATA_TXN_0 SATA_TXP_0
SATA_RXN_1 SATA_RXP_1 SATA_TXN_1 SATA_TXP_1
SATA_RXN_2 SATA_RXP_2 SATA_TXN_2 SATA_TXP_2
SATA_RXN_3 SATA_RXP_3 SATA_TXN_3 SATA_TXP_3
SATA_RXN4/PERN1 SATA_RXP4/PERP1 SATA_TXN4/PETN1 SATA_TXP4/PETP1
SATA_RXN5/PERN2 SATA_RXP5/PERP2 SATA_TXN5/PETN2 SATA_TXP5/PETP2
SATA_RCOMP SATALED# SATA0GP/GPIO21 SATA1GP/GPIO19 SATA_IREF TP9 TP8
1 OF 11
SATA0RXN <53> SATA0RXP <53> SATA0TXN <53> SATA0TXP <53>
m-SATA SSD
SATA1RXN <53> SATA1RXP <53> SATA1TXN <53> SATA1TXP <53>
m-SATA SSD
SATA GEN3
SATA4RXN <52> SATA4RXP <52> SATA4TXN <52> SATA4TXP <52>
HDD
SATA GEN3
SATAICOMP R325 7.5KR1%0402 +1_5VRUN
LEDHDD# <50>
R99 10KR1%0402 +3VRUN
SATA0GP R91 10KR1%0402
BBS_BIT0 R88 10KR1%0402 +3VRUN
+1_5VRUN

Flash Descriptor Security Protect	
HDA_SDO	Low = Enable High = Disable

SPK	The Signal has a weak internal pull-down Note: the internal pull-down is disabled after PLTRST# deasserts. If the signal is sampled high, this indicates that the system is strapped to the "No Reboot" mode (Panther Point will disable the TCO Timer system reboot feature)

MSI CONFIDENTIAL

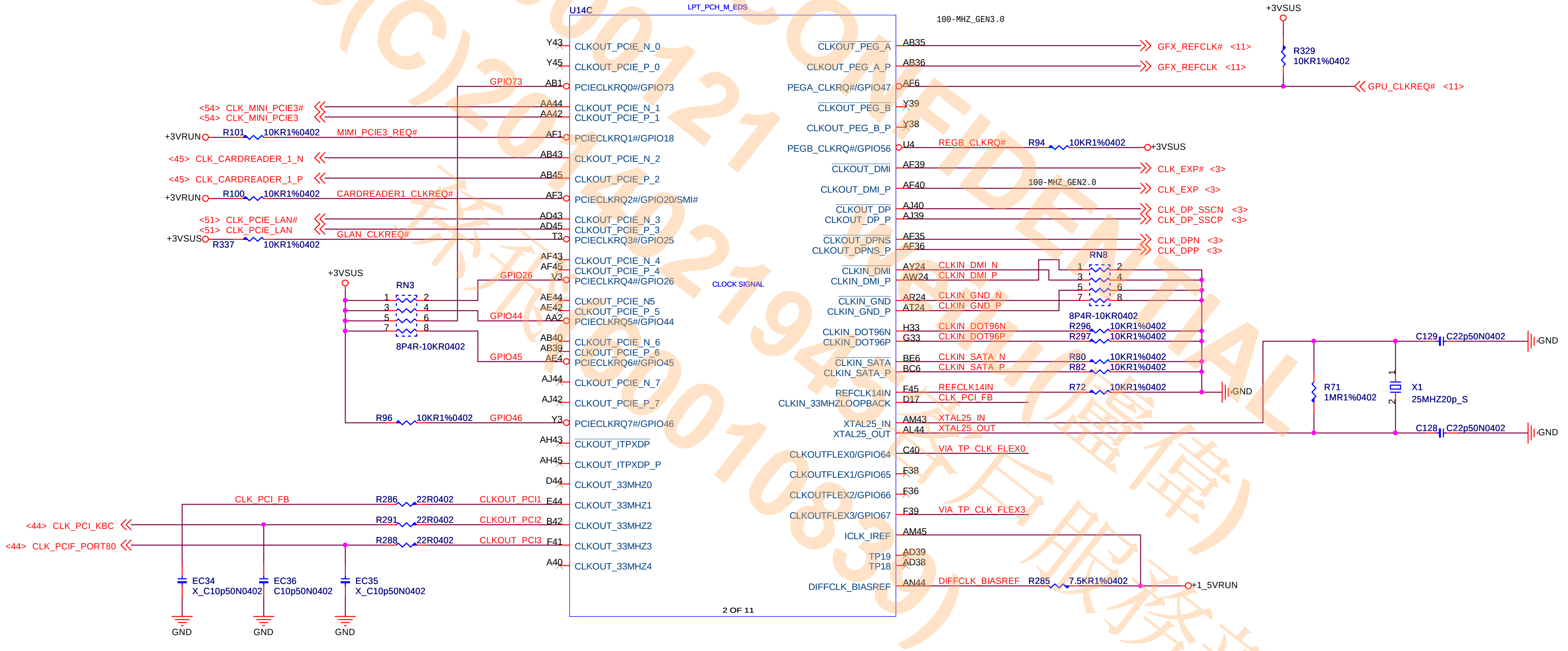
msi MICRO-STAR INT'L CO.,LTD.

Title: PCH-1 (HDA/JTAG/SATA)

Size | Document Number: MS-16H2 | Rev 1.0

Lynx Point (Clock)

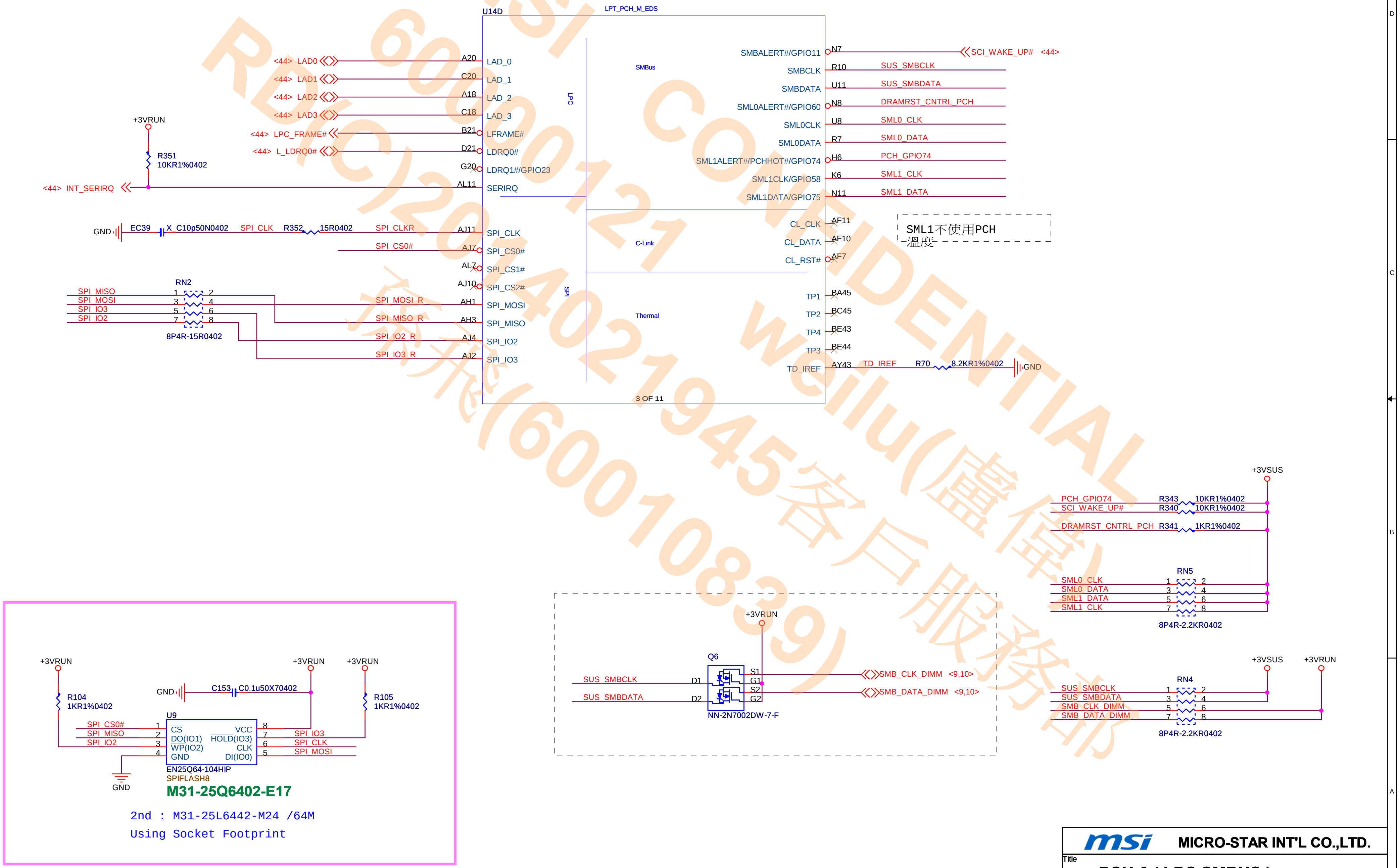
```
PCIe devices or addin cards that do NOT support CLKREQ# functionality should not route this signal to PCH.
Intel recommends terminating PCIECLKRQx# pin on PCH with 10 kΩ ±10% external pull-up resistor instead of No Connect.
Only PCIECLKRQ[2:1]# on PCH are core well powered. All other PCIECLKRQx# are suspend well powered.
```



U14C
LPT_PCH_M_EDS
CLKOUT_PCIE_N_0
CLKOUT_PCIE_P_0
PCIECLKRQ0#/GPIO73
CLKOUT_PCIE_N_1
CLKOUT_PCIE_P_1
PCIECLKRQ1#/GPIO18
CLKOUT_PCIE_N_2
CLKOUT_PCIE_P_2
PCIECLKRQ2#/GPIO20/SMI#
CLKOUT_PCIE_N_3
CLKOUT_PCIE_P_3
PCIECLKRQ3#/GPIO25
CLKOUT_PCIE_N_4
CLKOUT_PCIE_P_4
PCIECLKRQ4#/GPIO26
CLKOUT_PCIE_N5
CLKOUT_PCIE_P_5
PCIECLKRQ5#/GPIO44
CLKOUT_PCIE_N_6
CLKOUT_PCIE_P_6
PCIECLKRQ6#/GPIO45
CLKOUT_PCIE_N_7
CLKOUT_PCIE_P_7
PCIECLKRQ7#/GPIO46
CLKOUT_ITPXDP
CLKOUT_ITPXDP_P
CLKOUT_33MHZ0
CLKOUT_33MHZ1
CLKOUT_33MHZ2
CLKOUT_33MHZ3
CLKOUT_33MHZ4
CLKOUT_PEG_A
CLKOUT_PEG_A_P
PEGA_CLKRQ#/GPIO47
CLKOUT_PEG_B
CLKOUT_PEG_B_P
PEGB_CLKRQ#/GPIO56
CLKOUT_DMI
CLKOUT_DMI_P
CLKOUT_DP
CLKOUT_DP_P
CLKOUT_DPNS
CLKOUT_DPNS_P
CLKIN_DMI
CLKIN_DMI_P
CLKIN_GND
CLKIN_GND_P
CLKIN_DOT96N
CLKIN_DOT96P
CLKIN_SATA
CLKIN_SATA_P
REFCLK14IN
CLKIN_33MHZLOOPBACK
XTAL25_IN
XTAL25_OUT
CLKOUTFLEX0/GPIO64
CLKOUTFLEX1/GPIO65
CLKOUTFLEX2/GPIO66
CLKOUTFLEX3/GPIO67
ICLK_IREF
TP19
TP18
DIFFCLK_BIASREF
CLOCK SIGNAL
2 OF 11
100-MHZ_GEN3.0
100-MHZ_GEN2.0
GFX_REFCLK# <11>
GFX_REFCLK <11>
GPU_CLKREQ# <11>
+3VSUS
R329 10KR1%0402
REGB_CLKRQ#
R94 10KR1%0402
CLK_EXP# <3>
CLK_EXP <3>
CLK_DP_SSCN <3>
CLK_DP_SSCP <3>
CLK_DPN <3>
CLK_DPP <3>
RN8 8P4R-10KR0402
R296 10KR1%0402
R297 10KR1%0402
R80 10KR1%0402
R82 10KR1%0402
R72 10KR1%0402
C129 C22p50N0402
C128 C22p50N0402
R71 1MR1%0402
X1 25MHZ20p_S
VIA_TP_CLK_FLEX0
VIA_TP_CLK_FLEX3
R285 7.5KR1%0402
+1_5VRUN
<54> CLK_MINI_PCIE3#
<54> CLK_MINI_PCIE3
R101 10KR1%0402 MIMI_PCIE3_REQ#
<45> CLK_CARDREADER_1_N
<45> CLK_CARDREADER_1_P
R100 10KR1%0402 CARDREADER1_CLKREQ#
<51> CLK_PCIE_LAN#
<51> CLK_PCIE_LAN
R337 10KR1%0402 GLAN_CLKREQ#
+3VRUN
RN3 8P4R-10KR0402
R96 10KR1%0402
CLK_PCI_FB
R286 22R0402 CLKOUT_PCI1
R291 22R0402 CLKOUT_PCI2
R288 22R0402 CLKOUT_PCI3
<44> CLK_PCI_KBC
<44> CLK_PCIF_PORT80
EC34 X_C10p50N0402
EC36 C10p50N0402
EC35 X_C10p50N0402
GND


```
The CLKREQ# function can be disabled via intel management engine FW .Please refer to INTEL ME FW Bring up guide for configuring/disabling CLKREQ#
```

Lynx Point (LPC,SMBUS)



U14D
LPT_PCH_M_EDS
LAD_0
LAD_1
LAD_2
LAD_3
LFRAME#
LDRQ0#
LDRQ1#/GPIO23
SERIRQ
LPC
SMBus
SMBALERT#/GPIO11
SMBCLK
SMBDATA
SML0ALERT#/GPIO60
SML0CLK
SML0DATA
SML1ALERT#/PCHHOT#/GPIO74
SML1CLK/GPIO58
SML1DATA/GPIO75
C-Link
CL_CLK
CL_DATA
CL_RST#
SPI_CLK
SPI_CS0#
SPI_CS1#
SPI_CS2#
SPI_MOSI
SPI_MISO
SPI_IO2
SPI_IO3
SPI
Thermal
TP1
TP2
TP4
TP3
TD_IREF
3 OF 11
<44> LAD0
<44> LAD1
<44> LAD2
<44> LAD3
<44> LPC_FRAME#
<44> L_LDRQ0#
<44> INT_SERIRQ
+3VRUN
R351
10KR1%0402
GND
EC39
X_C10p50N0402
SPI_CLK
R352
15R0402
SPI_CLKR
SPI_CS0#
RN2
SPI_MISO
SPI_MOSI
SPI_IO3
SPI_IO2
8P4R-15R0402
SPI_MOSI_R
SPI_MISO_R
SPI_IO2_R
SPI_IO3_R
SCI_WAKE_UP# <44>
SUS_SMBCLK
SUS_SMBDATA
DRAMRST_CNTRL_PCH
SML0_CLK
SML0_DATA
PCH_GPIO74
SML1_CLK
SML1_DATA
SML1不使用PCH溫度
TD_IREF
R70
8.2KR1%0402
GND
+3VSUS
PCH_GPIO74
SCI_WAKE_UP#
DRAMRST_CNTRL_PCH
R343 10KR1%0402
R340 10KR1%0402
R341 1KR1%0402
RN5
SML0_CLK
SML0_DATA
SML1_DATA
SML1_CLK
8P4R-2.2KR0402
+3VRUN
Q6
SUS_SMBCLK
SUS_SMBDATA
NN-2N7002DW-7-F
SMB_CLK_DIMM <9,10>
SMB_DATA_DIMM <9,10>
+3VSUS
+3VRUN
RN4
SUS_SMBCLK
SUS_SMBDATA
SMB_CLK_DIMM
SMB_DATA_DIMM
8P4R-2.2KR0402
+3VRUN
R104
1KR1%0402
GND
C153
C0.1u50X70402
R105
1KR1%0402
U9
SPI_CS0#
SPI_MISO
SPI_IO2
CS
DO(IO1)
WP(IO2)
GND
VCC
HOLD(IO3)
CLK
DI(IO0)
SPI_IO3
SPI_CLK
SPI_MOSI
EN25Q64-104HIP
SPIFLASH8
M31-25Q6402-E17
2nd : M31-25L6442-M24 /64M
Using Socket Footprint

MSI CONFIDENTIAL
RD(C)20140219 weiliu(盧偉)
600121 600108 徐飛(600108 39) 客戶服務部

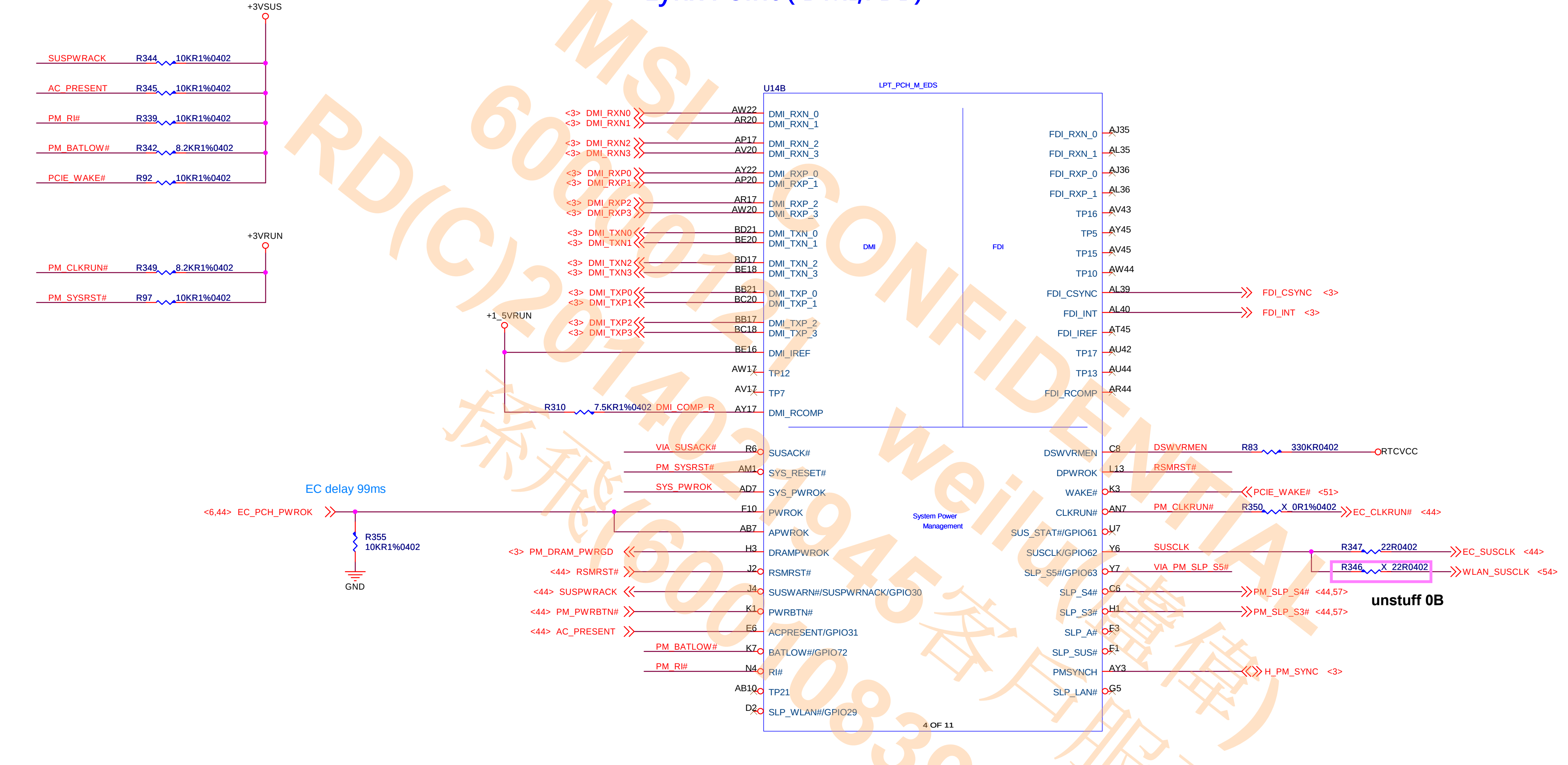
MICRO-STAR INT'L CO.,LTD.

Title: PCH-3 (LPC,SMBUS)

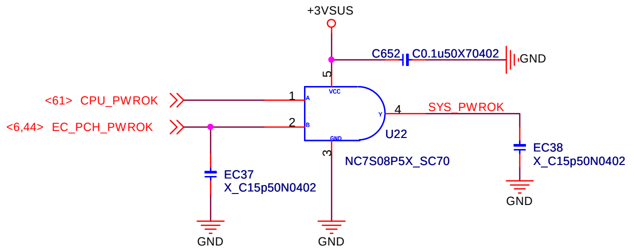
Size | Document Number: MS-16H2 | Rev: 1.0

Date: Friday, January 03, 2014

Lynx Point (DMI,FDI)



+3VSUS
SUSPWRACK R344 10KR1%0402
AC_PRESENT R345 10KR1%0402
PM_RI# R339 10KR1%0402
PM_BATLOW# R342 8.2KR1%0402
PCIE_WAKE# R92 10KR1%0402
+3VRUN
PM_CLKRUN# R349 8.2KR1%0402
PM_SYSRST# R97 10KR1%0402
+1_5VRUN
U14B
LPT_PCH_M_EDS
<3> DMI_RXN0 AW22 DMI_RXN_0
<3> DMI_RXN1 AR20 DMI_RXN_1
<3> DMI_RXN2 AP17 DMI_RXN_2
<3> DMI_RXN3 AV20 DMI_RXN_3
<3> DMI_RXP0 AY22 DMI_RXP_0
<3> DMI_RXP1 AP20 DMI_RXP_1
<3> DMI_RXP2 AR17 DMI_RXP_2
<3> DMI_RXP3 AW20 DMI_RXP_3
<3> DMI_TXN0 BD21 DMI_TXN_0
<3> DMI_TXN1 BE20 DMI_TXN_1
<3> DMI_TXN2 BD17 DMI_TXN_2
<3> DMI_TXN3 BE18 DMI_TXN_3
<3> DMI_TXP0 BB21 DMI_TXP_0
<3> DMI_TXP1 BC20 DMI_TXP_1
<3> DMI_TXP2 BB17 DMI_TXP_2
<3> DMI_TXP3 BC18 DMI_TXP_3
BE16 DMI_IREF
AW17 TP12
AV17 TP7
R310 7.5KR1%0402 DMI_COMP_R AY17 DMI_RCOMP
DMI
FDI
FDI_RXN_0 AJ35
FDI_RXN_1 AL35
FDI_RXP_0 AJ36
FDI_RXP_1 AL36
TP16 AV43
TP5 AY45
TP15 AV45
TP10 AW44
FDI_CSYNC AL39 FDI_CSYNC <3>
FDI_INT AL40 FDI_INT <3>
FDI_IREF AT45
TP17 AU42
TP13 AU44
FDI_RCOMP AR44
VIA_SUSACK# R6 SUSACK#
PM_SYSRST# AM1 SYS_RESET#
SYS_PWROK AD7 SYS_PWROK
EC delay 99ms
<6,44> EC_PCH_PWROK F10 PWROK
R355 10KR1%0402
GND
AB7 APWROK
<3> PM_DRAM_PWRGD H3 DRAMPWROK
<44> RSMRST# J2 RSMRST#
<44> SUSPWRACK J4 SUSWARN#/SUSPWRNACK/GPIO30
<44> PM_PWRBTN# K1 PWRBTN#
<44> AC_PRESENT E6 ACPRESENT/GPIO31
PM_BATLOW# K7 BATLOW#/GPIO72
PM_RI# N4 RI#
AB10 TP21
D2 SLP_WLAN#/GPIO29
System Power Management
DSWVRMEN C8 DSWVRMEN R83 330KR0402 RTCVCC
DPWROK L13 RSMRST#
WAKE# K3 PCIE_WAKE# <51>
CLKRUN# AN7 PM_CLKRUN# R350 X_0R1%0402 EC_CLKRUN# <44>
SUS_STAT#/GPIO61 U7
SUSCLK/GPIO62 Y6 SUSCLK R347 22R0402 EC_SUSCLK <44>
SLP_S5#/GPIO63 Y7 VIA_PM_SLP_S5# R346 X_22R0402 WLAN_SUSCLK <54>
unstuff 0B
SLP_S4# C6 PM_SLP_S4# <44,57>
SLP_S3# H1 PM_SLP_S3# <44,57>
SLP_A# F3
SLP_SUS# F1
PMSYNCH AY3 H_PM_SYNC <3>
SLP_LAN# G5
4 OF 11



APWROK not supporting Intel AMT , it can be connected to PWROK
GPIO31 : If not used,require pull up +3VSUS
DSWVRMEN - On Die DSW VR Enable HIGH : Enable internal 1.05V regulator LOW : Disable
DPWROK Without deep s4/s5 support tied together with RSMRST#

GPIO Setting : Ref 486708_LPT_EDS Section2.18

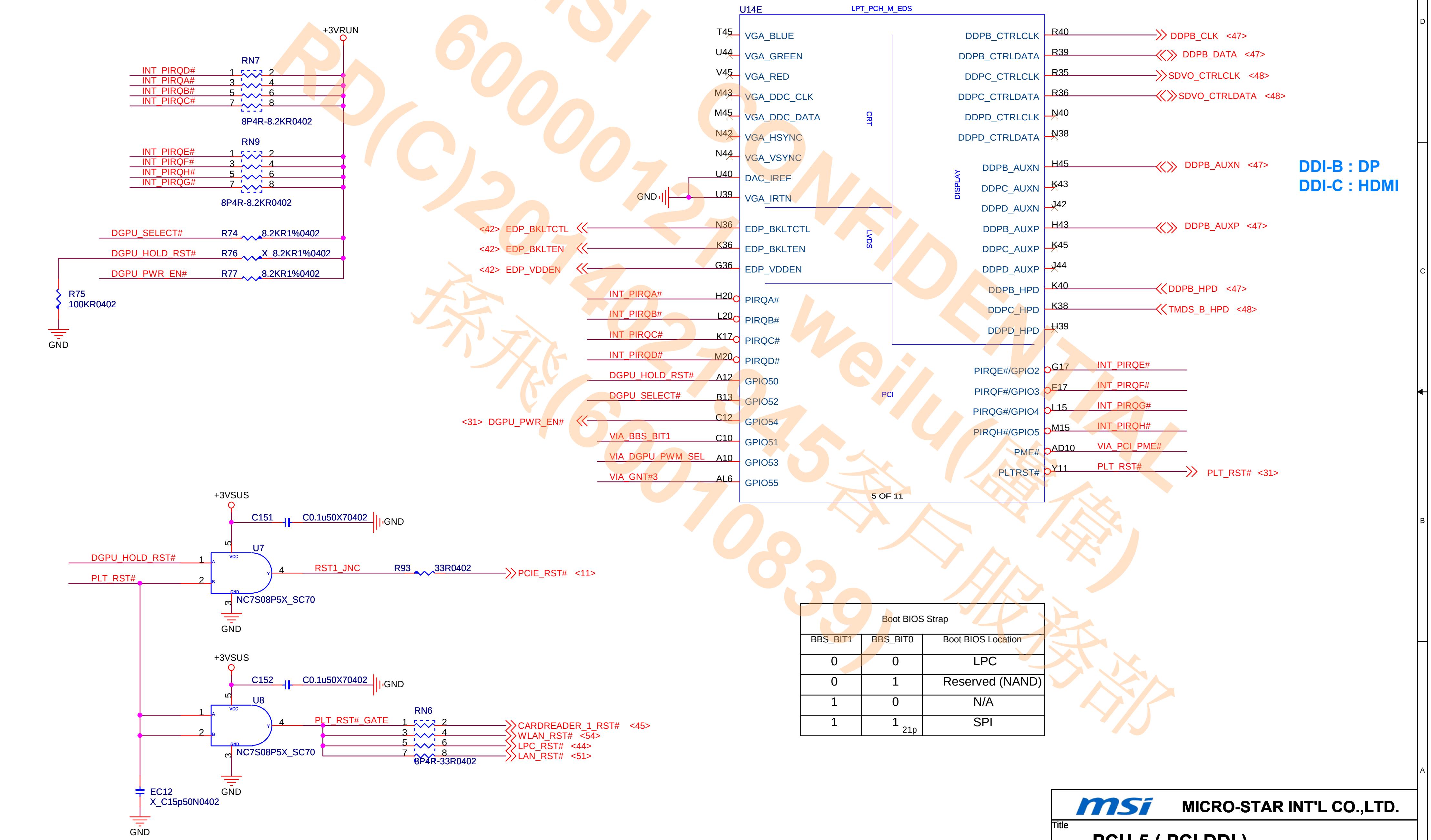
PLL ON DIE VR_ENABLE	
GPIO62	Internal pull high (Enable)
	Low: Disable

MSI CONFIDENTIAL
RD(C)2014020945 weili
6001839 探飛(6001839)

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

Title	PCH-4 (DMI,FDI)	
Size	Document Number MS-16H2	Rev 1.0
Date: Thursday, February 13, 2014	Sheet 35 of 72	

Lynx Point (PCI,DDI)



U14E
LPT_PCH_M_EDS
+3VRUN
RN7
INT_PIRQD#
INT_PIRQA#
INT_PIRQB#
INT_PIRQC#
8P4R-8.2KR0402
RN9
INT_PIRQE#
INT_PIRQF#
INT_PIRQH#
INT_PIRQG#
8P4R-8.2KR0402
DGPU_SELECT# R74 8.2KR1%0402
DGPU_HOLD_RST# R76 X_8.2KR1%0402
DGPU_PWR_EN# R77 8.2KR1%0402
R75 100KR0402
GND
T45 VGA_BLUE
U44 VGA_GREEN
V45 VGA_RED
M43 VGA_DDC_CLK
M45 VGA_DDC_DATA
N42 VGA_HSYNC
N44 VGA_VSYNC
U40 DAC_IREF
U39 VGA_IRTN
CRT
<42> EDP_BKLTCTL N36 EDP_BKLTCTL
<42> EDP_BKLTEN K36 EDP_BKLTEN
<42> EDP_VDDEN G36 EDP_VDDEN
LVDS
INT_PIRQA# H20 PIRQA#
INT_PIRQB# L20 PIRQB#
INT_PIRQC# K17 PIRQC#
INT_PIRQD# M20 PIRQD#
DGPU_HOLD_RST# A12 GPIO50
DGPU_SELECT# B13 GPIO52
<31> DGPU_PWR_EN# C12 GPIO54
VIA_BBS_BIT1 C10 GPIO51
VIA_DGPU_PWM_SEL A10 GPIO53
VIA_GNT#3 AL6 GPIO55
PCI
5 OF 11
DDPB_CTRLCLK R40 DDPB_CLK <47>
DDPB_CTRLDATA R39 DDPB_DATA <47>
DDPC_CTRLCLK R35 SDVO_CTRLCLK <48>
DDPC_CTRLDATA R36 SDVO_CTRLDATA <48>
DDPD_CTRLCLK N40
DDPD_CTRLDATA N38
DISPLAY
DDPB_AUXN H45 DDPB_AUXN <47>
DDPC_AUXN K43
DDPD_AUXN J42
DDPB_AUXP H43 DDPB_AUXP <47>
DDPC_AUXP K45
DDPD_AUXP J44
DDPB_HPD K40 DDPB_HPD <47>
DDPC_HPD K38 TMDS_B_HPD <48>
DDPD_HPD H39
PIRQE#/GPIO2 G17 INT_PIRQE#
PIRQF#/GPIO3 F17 INT_PIRQF#
PIRQG#/GPIO4 L15 INT_PIRQG#
PIRQH#/GPIO5 M15 INT_PIRQH#
PME# AD10 VIA_PCI_PME#
PLTRST# Y11 PLT_RST# PLT_RST# <31>
DDI-B : DP
DDI-C : HDMI
+3VSUS
C151 C0.1u50X70402 GND
U7
DGPU_HOLD_RST#
PLT_RST#
RST1_JNC R93 33R0402 PCIE_RST# <11>
NC7S08P5X_SC70
GND
+3VSUS
C152 C0.1u50X70402 GND
U8
PLT_RST#_GATE
RN6
CARDREADER_1_RST# <45>
WLAN_RST# <54>
LPC_RST# <44>
LAN_RST# <51>
8P4R-33R0402
NC7S08P5X_SC70
EC12
X_C15p50N0402
GND

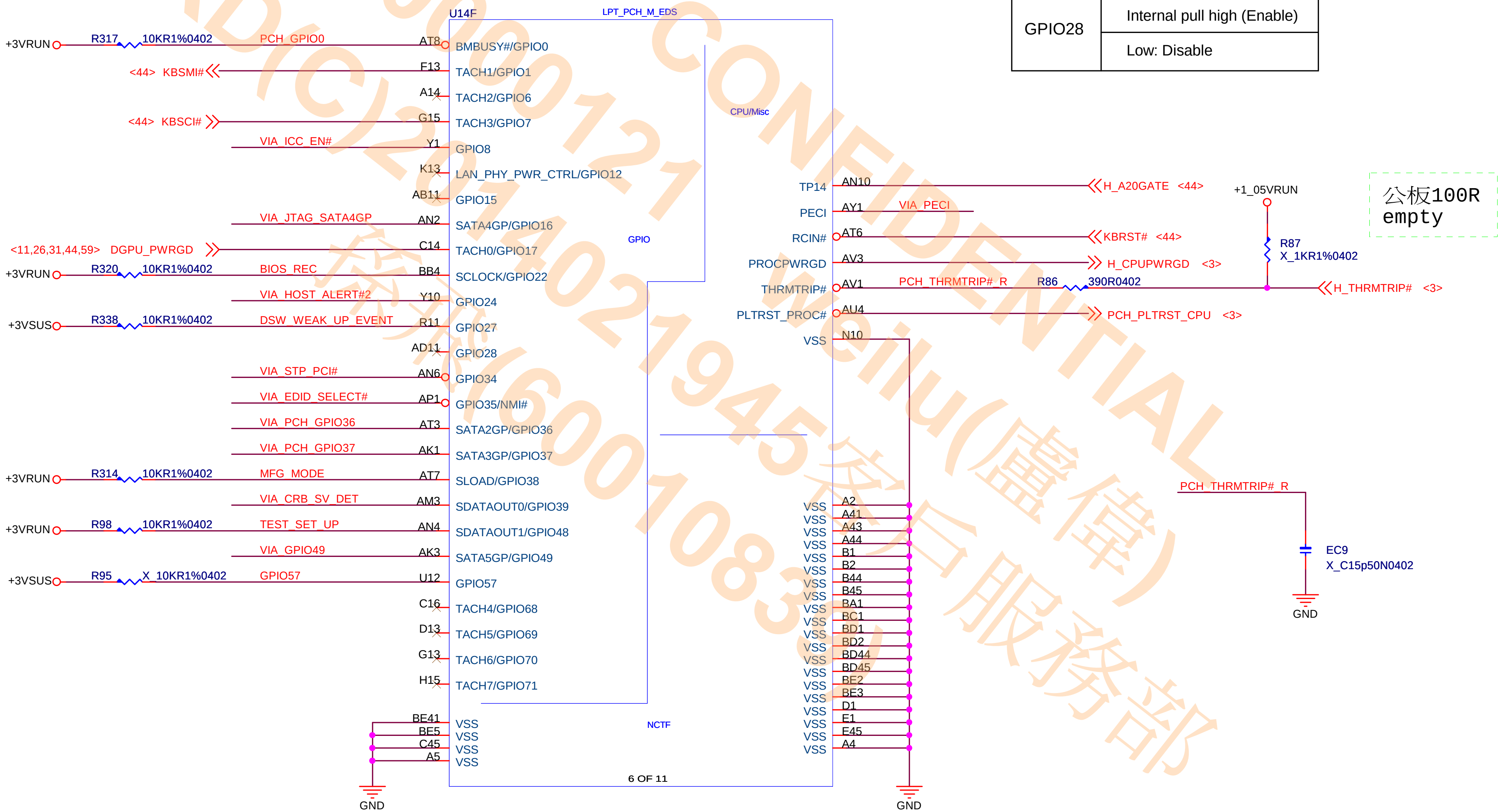
Boot BIOS Strap

BBS_BIT1	BBS_BIT0	Boot BIOS Location
0	0	LPC
0	1	Reserved (NAND)
1	0	N/A
1	1	SPI

21p

MSI CONFIDENTIAL
RD(C)2014/02/13
600012845 weilu(盧偉)
徐飛(600010839)客戶服務部

Lynx Point (GPIO,MISC)



U14F
LPT_PCH_M_EDS
+3VRUN R317 10KR1%0402 PCH_GPIO0 AT8 BMBUSY#/GPIO0
<44> KBSMI# F13 TACH1/GPIO1
A14 TACH2/GPIO6
<44> KBSCI# G15 TACH3/GPIO7
VIA_ICC_EN# Y1 GPIO8
K13 LAN_PHY_PWR_CTRL/GPIO12
AB11 GPIO15
VIA_JTAG_SATA4GP AN2 SATA4GP/GPIO16
<11,26,31,44,59> DGPU_PWRGD C14 TACH0/GPIO17
+3VRUN R320 10KR1%0402 BIOS_REC BB4 SCLOCK/GPIO22
VIA_HOST_ALERT#2 Y10 GPIO24
+3VSUS R338 10KR1%0402 DSW_WEAK_UP_EVENT R11 GPIO27
AD11 GPIO28
VIA_STP_PCI# AN6 GPIO34
VIA_EDID_SELECT# AP1 GPIO35/NMI#
VIA_PCH_GPIO36 AT3 SATA2GP/GPIO36
VIA_PCH_GPIO37 AK1 SATA3GP/GPIO37
+3VRUN R314 10KR1%0402 MFG_MODE AT7 SLOAD/GPIO38
VIA_CRB_SV_DET AM3 SDATAOUT0/GPIO39
+3VRUN R98 10KR1%0402 TEST_SET_UP AN4 SDATAOUT1/GPIO48
VIA_GPIO49 AK3 SATA5GP/GPIO49
+3VSUS R95 X_10KR1%0402 GPIO57 U12 GPIO57
C16 TACH4/GPIO68
D13 TACH5/GPIO69
G13 TACH6/GPIO70
H15 TACH7/GPIO71
BE41 BE5 C45 A5 VSS VSS VSS VSS
GND
GPIO
CPU/Misc
NCTF
6 OF 11
TP14 AN10 H_A20GATE <44>
PECI AY1 VIA_PECI
RCIN# AT6 KBRST# <44>
PROCPWRGD AV3 H_CPUPWRGD <3>
THRMTRIP# AV1 PCH_THRMTRIP#_R R86 390R0402 H_THRMTRIP# <3>
PLTRST_PROC# AU4 PCH_PLTRST_CPU <3>
VSS N10
VSS A2 A41 A43 A44 B1 B2 B44 B45 BA1 BC1 BD1 BD2 BD44 BD45 BE2 BE3 D1 E1 E45 A4
GND
+1_05VRUN
R87 X_1KR1%0402
公板100R empty
PCH_THRMTRIP#_R
EC9 X_C15p50N0402
GND

GPIO Setting : Ref 486708_LPT_EDS Section2.24

PLL ON DIE VR_ENABLE	
GPIO28	Internal pull high (Enable)
	Low: Disable

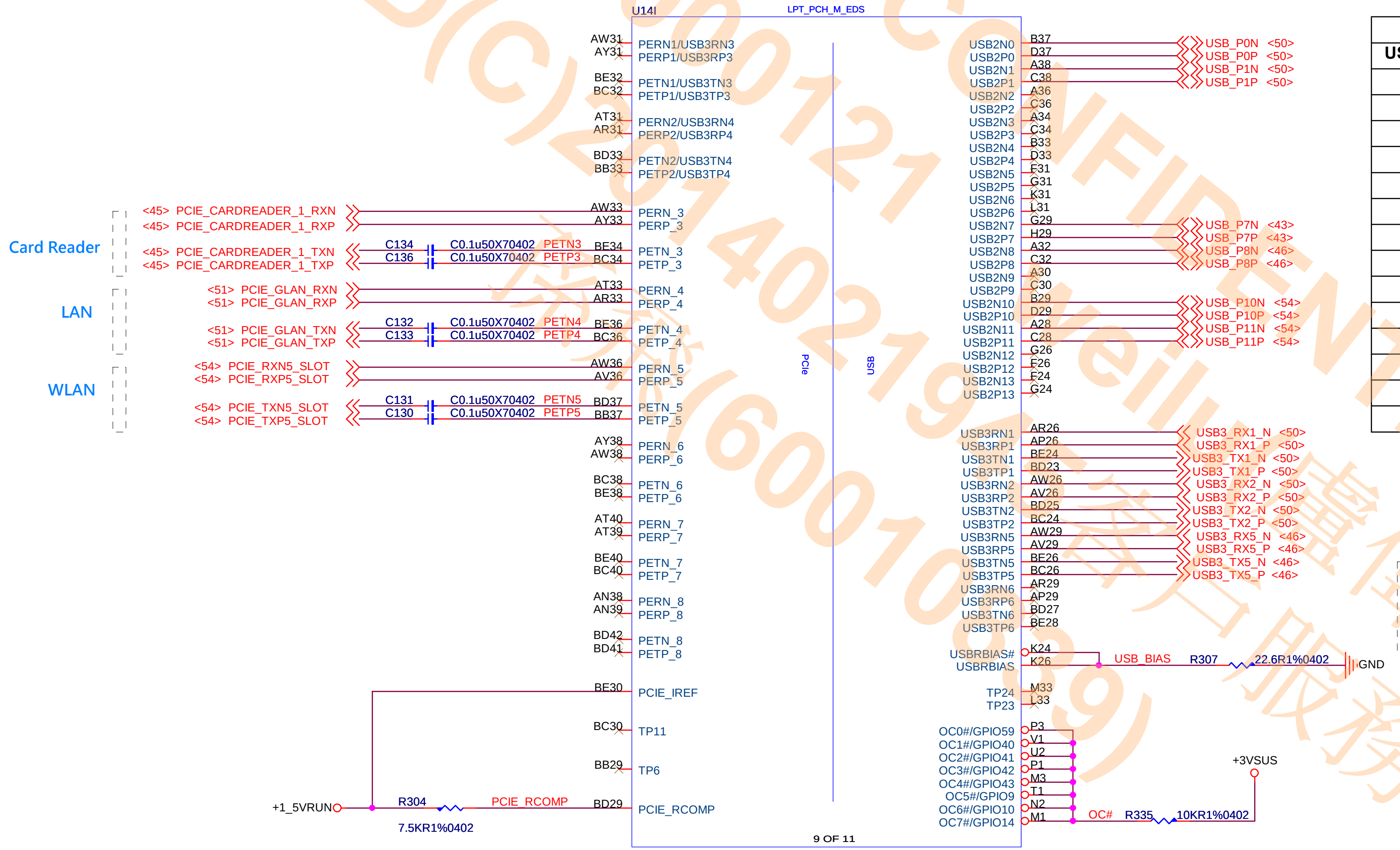
MSI CONFIDENTIAL RD(C)20140219 徐冰(60000121) 600010834 Weilu(盧偉) 客户服务部

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

Title	PCH-6 (GPIO,MISC)	
Size	Document Number MS-16H2	Rev 1.0
Date: Thursday, February 13, 2014	Sheet 37 of 72	

Lynx Point (PCIE,USB)

Intel Lynx Point ECHI USB(2.0) debug transport 需接Port1 or Port9



U14I
LPT_PCH_M_EDS
Card Reader
LAN
WLAN
<45> PCIE_CARDREADER_1_RXN
<45> PCIE_CARDREADER_1_RXP
<45> PCIE_CARDREADER_1_TXN
<45> PCIE_CARDREADER_1_TXP
<51> PCIE_GLAN_RXN
<51> PCIE_GLAN_RXP
<51> PCIE_GLAN_TXN
<51> PCIE_GLAN_TXP
<54> PCIE_RXN5_SLOT
<54> PCIE_RXP5_SLOT
<54> PCIE_TXN5_SLOT
<54> PCIE_TXP5_SLOT
C134 C0.1u50X70402 PETN3
C136 C0.1u50X70402 PETP3
C132 C0.1u50X70402 PETN4
C133 C0.1u50X70402 PETP4
C131 C0.1u50X70402 PETN5
C130 C0.1u50X70402 PETP5
AW31 PERN1/USB3RN3
AY31 PERP1/USB3RP3
BE32 PETN1/USB3TN3
BC32 PETP1/USB3TP3
AT31 PERN2/USB3RN4
AR31 PERP2/USB3RP4
BD33 PETN2/USB3TN4
BB33 PETP2/USB3TP4
AW33 PERN_3
AY33 PERP_3
BE34 PETN_3
BC34 PETP_3
AT33 PERN_4
AR33 PERP_4
BE36 PETN_4
BC36 PETP_4
AW36 PERN_5
AV36 PERP_5
BD37 PETN_5
BB37 PETP_5
AY38 PERN_6
AW38 PERP_6
BC38 PETN_6
BE38 PETP_6
AT40 PERN_7
AT39 PERP_7
BE40 PETN_7
BC40 PETP_7
AN38 PERN_8
AN39 PERP_8
BD42 PETN_8
BD41 PETP_8
BE30 PCIE_IREF
BC30 TP11
BB29 TP6
BD29 PCIE_RCOMP
+1_5VRUN
R304 7.5KR1%0402 PCIE_RCOMP
PCIe
USB
9 OF 11
B37 USB2N0
D37 USB2P0
A38 USB2N1
C38 USB2P1
A36 USB2N2
C36 USB2P2
A34 USB2N3
C34 USB2P3
B33 USB2N4
D33 USB2P4
F31 USB2N5
G31 USB2P5
K31 USB2N6
L31 USB2P6
G29 USB2N7
H29 USB2P7
A32 USB2N8
C32 USB2P8
A30 USB2N9
C30 USB2P9
B29 USB2N10
D29 USB2P10
A28 USB2N11
C28 USB2P11
G26 USB2N12
F26 USB2P12
F24 USB2N13
G24 USB2P13
USB_P0N <50>
USB_P0P <50>
USB_P1N <50>
USB_P1P <50>
USB_P7N <43>
USB_P7P <43>
USB_P8N <46>
USB_P8P <46>
USB_P10N <54>
USB_P10P <54>
USB_P11N <54>
USB_P11P <54>
AR26 USB3RN1
AP26 USB3RP1
BE24 USB3TN1
BD23 USB3TP1
AW26 USB3RN2
AV26 USB3RP2
BD25 USB3TN2
BC24 USB3TP2
AW29 USB3RN5
AV29 USB3RP5
BE26 USB3TN5
BC26 USB3TP5
AR29 USB3RN6
AP29 USB3RP6
BD27 USB3TN6
BE28 USB3TP6
USB3_RX1_N <50>
USB3_RX1_P <50>
USB3_TX1_N <50>
USB3_TX1_P <50>
USB3_RX2_N <50>
USB3_RX2_P <50>
USB3_TX2_N <50>
USB3_TX2_P <50>
USB3_RX5_N <46>
USB3_RX5_P <46>
USB3_TX5_N <46>
USB3_TX5_P <46>
K24 USBRBIAS#
K26 USBRBIAS
USB_BIAS R307 22.6R1%0402 GND
M33 TP24
L33 TP23
P3 OC0#/GPIO59
V1 OC1#/GPIO40
U2 OC2#/GPIO41
P1 OC3#/GPIO42
M3 OC4#/GPIO43
T1 OC5#/GPIO9
N2 OC6#/GPIO10
M1 OC7#/GPIO14
OC# R335 10KR1%0402
+3VSUS

USB			
USB 2.0	USB 3.0	Device	Note
0	1	USB 3.0 Port 1	16H2A
1	2	USB 3.0 Port 2	16H2A
2			
3			NC
4			NC
5			NC
6			NC
7		EPF021	3 色KBC
8	3	USB 3.0 Port 5	16H21
9			NC
10		WLAN	
11		WebCam	
12		SECOND DISPLAY	
13			NC

HM86 沒USB3.0 PORT 5,6

MSI CONFIDENTIAL

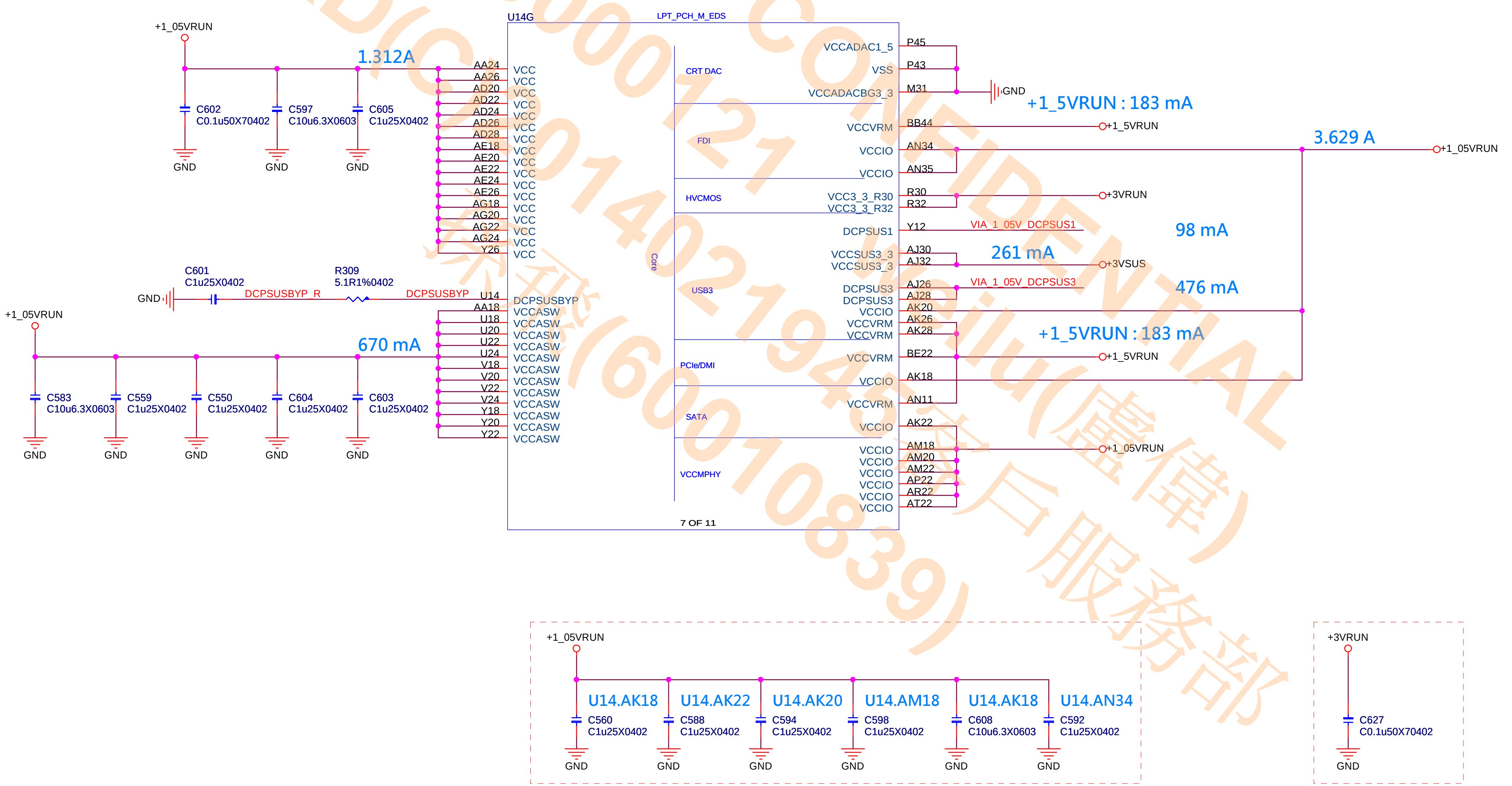
MICRO-STAR INT'L CO.,LTD.

Title: PCH-7 (PCIE,USB)

Size | Document Number: MS-16H2 | Rev 1.0

Date: Friday, January 03, 2014 | Sheet 38 of 72

Lynx Point (Power)



U14G
LPT_PCH_M_EDS
+1_05VRUN
1.312A
C602
C0.1u50X70402
C597
C10u6.3X0603
C605
C1u25X0402
GND
AA24 AA26 AD20 AD22 AD24 AD26 AD28 AE18 AE20 AE22 AE24 AE26 AG18 AG20 AG22 AG24 Y26
VCC
C601
C1u25X0402
R309
5.1R1%0402
DCPSUSBYP_R
DCPSUSBYP
U14
DCPSUSBYP
670 mA
AA18 U18 U20 U22 U24 V18 V20 V22 V24 Y18 Y20 Y22
VCCASW
C583
C10u6.3X0603
C559
C1u25X0402
C550
C1u25X0402
C604
C1u25X0402
C603
C1u25X0402
CRT DAC
FDI
HVCMOS
USB3
Core
PCIe/DMI
SATA
VCCMPHY
7 OF 11
VCCADAC1_5 P45
VSS P43
VCCADACBG3_3 M31
VCCVRM BB44
VCCIO AN34
VCCIO AN35
VCC3_3_R30 R30
VCC3_3_R32 R32
DCPSUS1 Y12
VCCSUS3_3 AJ30
VCCSUS3_3 AJ32
DCPSUS3 AJ26
DCPSUS3 AJ28
VCCIO AK20
VCCVRM AK26
VCCVRM AK28
VCCVRM BE22
VCCIO AK18
VCCVRM AN11
VCCIO AK22
VCCIO AM18
VCCIO AM20
VCCIO AM22
VCCIO AP22
VCCIO AR22
VCCIO AT22
+1_5VRUN : 183 mA
+1_5VRUN
3.629 A
+1_05VRUN
+3VRUN
VIA_1_05V_DCPSUS1
98 mA
261 mA
+3VSUS
VIA_1_05V_DCPSUS3
476 mA
+1_5VRUN : 183 mA
+1_5VRUN
+1_05VRUN
U14.AK18
C560
C1u25X0402
U14.AK22
C588
C1u25X0402
U14.AK20
C594
C1u25X0402
U14.AM18
C598
C1u25X0402
U14.AK18
C608
C10u6.3X0603
U14.AN34
C592
C1u25X0402
+3VRUN
C627
C0.1u50X70402

MSI CONFIDENTIAL

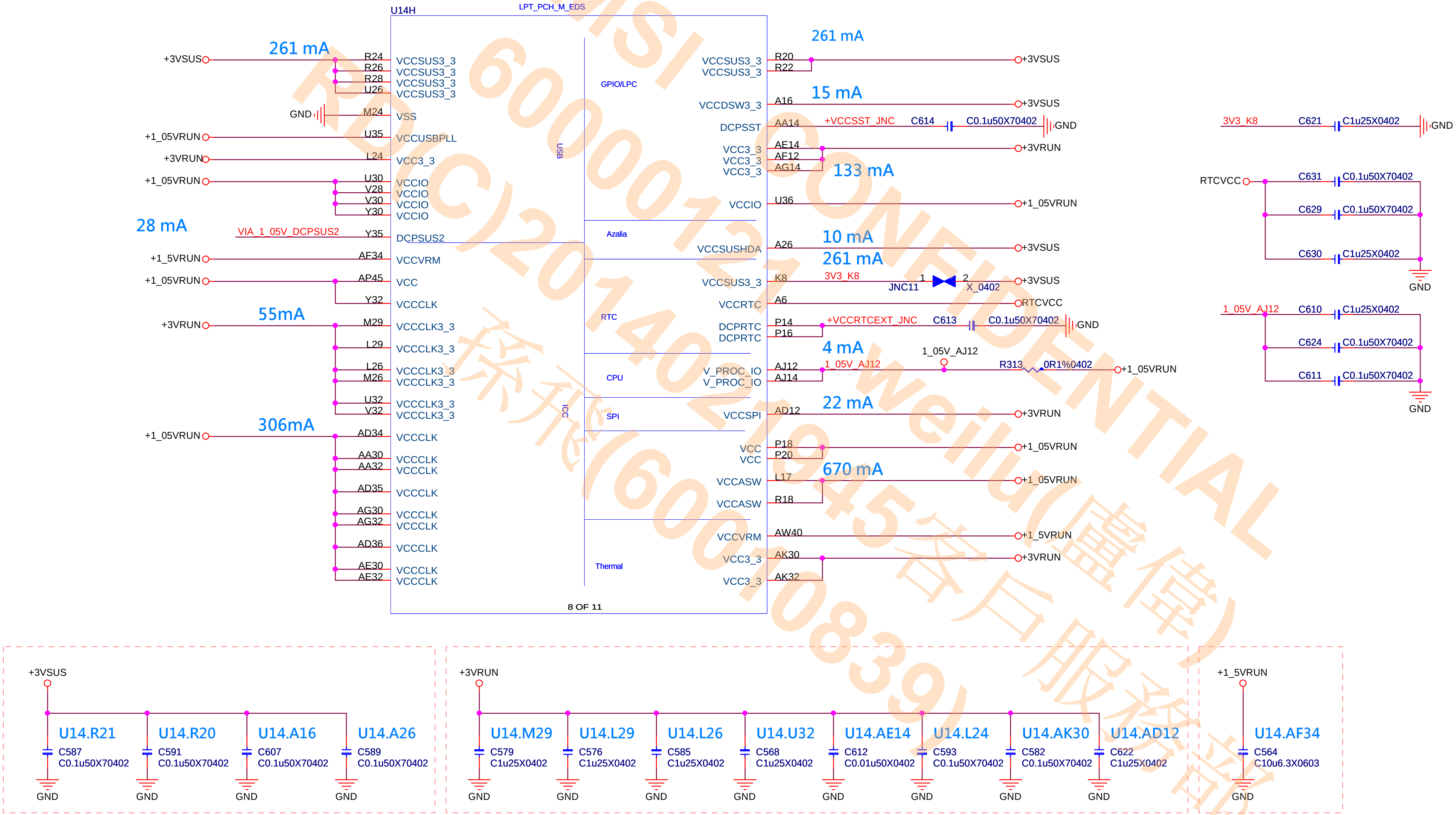
MICRO-STAR INT'L CO.,LTD.

Title: PCH-8 (Power)

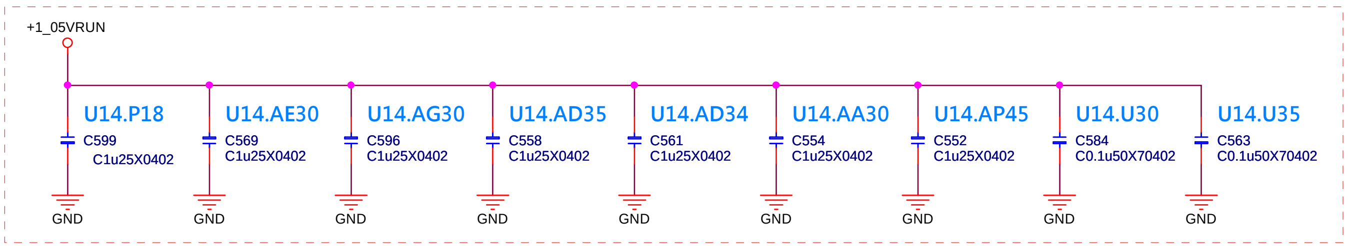
Size | Document Number: MS-16H2 | Rev 1.0

Date: Thursday, February 13, 2014

Lynx Point (Power)



U14H
LPT_PCH_M_EDS
261 mA
+3VSUS
R24 VCCSUS3_3
R26 VCCSUS3_3
R28 VCCSUS3_3
U26 VCCSUS3_3
GND
M24 VSS
+1_05VRUN
U35 VCCUSBPLL
+3VRUN
L24 VCC3_3
U30 VCCIO
V28 VCCIO
V30 VCCIO
Y30 VCCIO
28 mA
VIA_1_05V_DCPSUS2
Y35 DCPSUS2
+1_5VRUN
AF34 VCCVRM
AP45 VCC
Y32 VCCCLK
55mA
M29 VCCCLK3_3
L29 VCCCLK3_3
L26 VCCCLK3_3
M26 VCCCLK3_3
U32 VCCCLK3_3
V32 VCCCLK3_3
306mA
AD34 VCCCLK
AA30 VCCCLK
AA32 VCCCLK
AD35 VCCCLK
AG30 VCCCLK
AG32 VCCCLK
AD36 VCCCLK
AE30 VCCCLK
AE32 VCCCLK
GPIO/LPC
USB
Azalia
RTC
CPU
ICC
SPI
Thermal
8 OF 11
VCCSUS3_3 R20
VCCSUS3_3 R22
VCCDSW3_3 A16
15 mA
DCPSST AA14
+VCCSST_JNC
C614
C0.1u50X70402
VCC3_3 AE14
VCC3_3 AF12
VCC3_3 AG14
133 mA
VCCIO U36
VCCSUSHDA A26
10 mA
261 mA
VCCSUS3_3 K8
3V3_K8
JNC11
X_0402
VCCRTC A6
RTCVCC
DCPRTC P14
DCPRTC P16
+VCCRTCEXT_JNC
C613
C0.1u50X70402
4 mA
1_05V_AJ12
V_PROC_IO AJ12
V_PROC_IO AJ14
R313
0R1%0402
22 mA
VCCSPI AD12
VCC P18
VCC P20
670 mA
VCCASW L17
VCCASW R18
VCCVRM AW40
VCC3_3 AK30
VCC3_3 AK32
3V3_K8 C621 C1u25X0402
RTCVCC C631 C0.1u50X70402
C629 C0.1u50X70402
C630 C1u25X0402
1_05V_AJ12 C610 C1u25X0402
C624 C0.1u50X70402
C611 C0.1u50X70402
+3VSUS
U14.R21 C587 C0.1u50X70402
U14.R20 C591 C0.1u50X70402
U14.A16 C607 C0.1u50X70402
U14.A26 C589 C0.1u50X70402
+3VRUN
U14.M29 C579 C1u25X0402
U14.L29 C576 C1u25X0402
U14.L26 C585 C1u25X0402
U14.U32 C568 C1u25X0402
U14.AE14 C612 C0.01u50X0402
U14.L24 C593 C0.1u50X70402
U14.AK30 C582 C0.1u50X70402
U14.AD12 C622 C1u25X0402
+1_5VRUN
U14.AF34 C564 C10u6.3X0603



+1_05VRUN
U14.P18 C599 C1u25X0402
U14.AE30 C569 C1u25X0402
U14.AG30 C596 C1u25X0402
U14.AD35 C558 C1u25X0402
U14.AD34 C561 C1u25X0402
U14.AA30 C554 C1u25X0402
U14.AP45 C552 C1u25X0402
U14.U30 C584 C0.1u50X70402
U14.U35 C563 C0.1u50X70402
GND

MSI CONFIDENTIAL

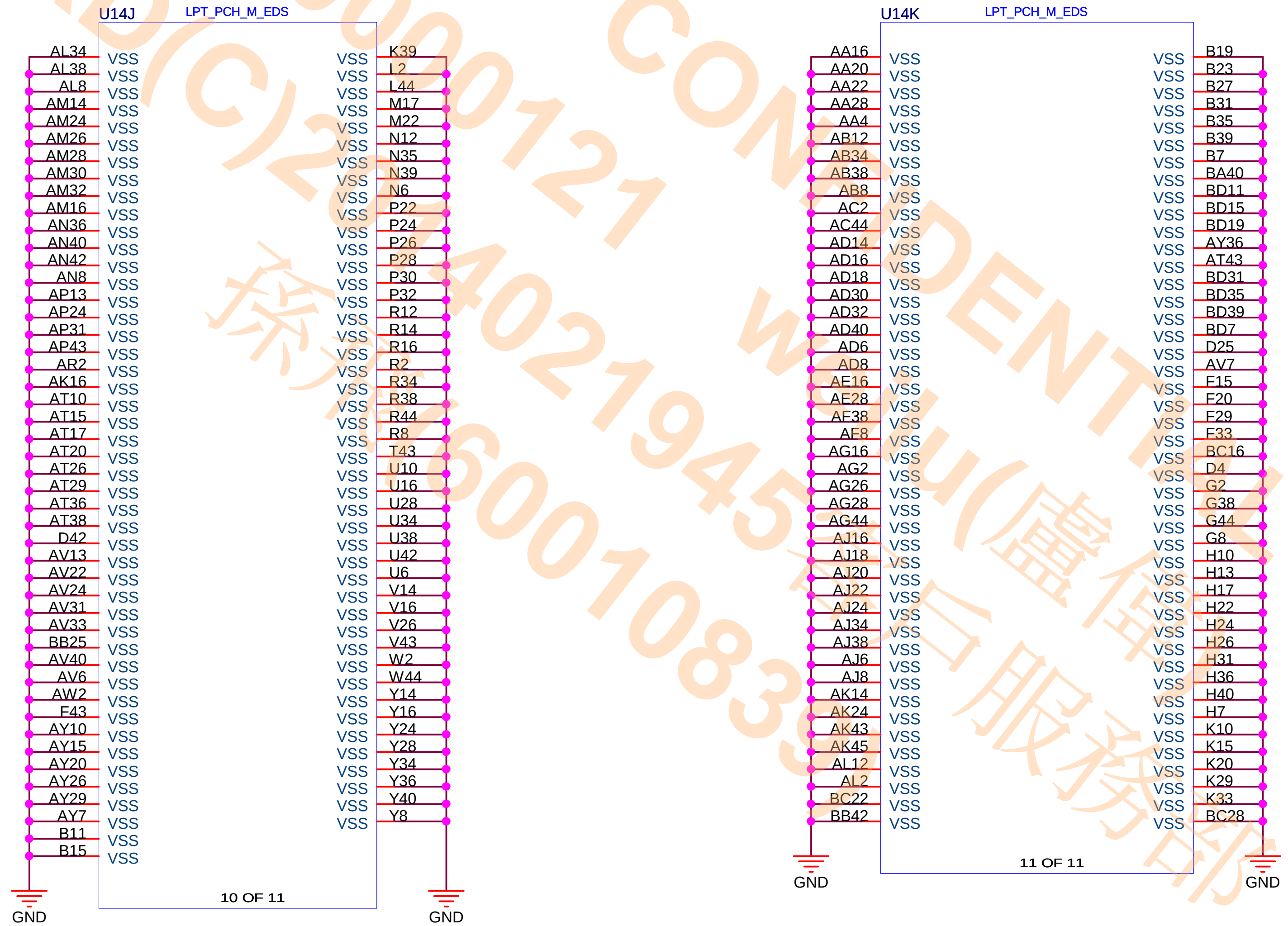
MICRO-STAR INT'L CO.,LTD.

Title: PCH-8 (Power)

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Thursday, February 13, 2014 | Sheet 40 of 72

Lynx Point (GND)



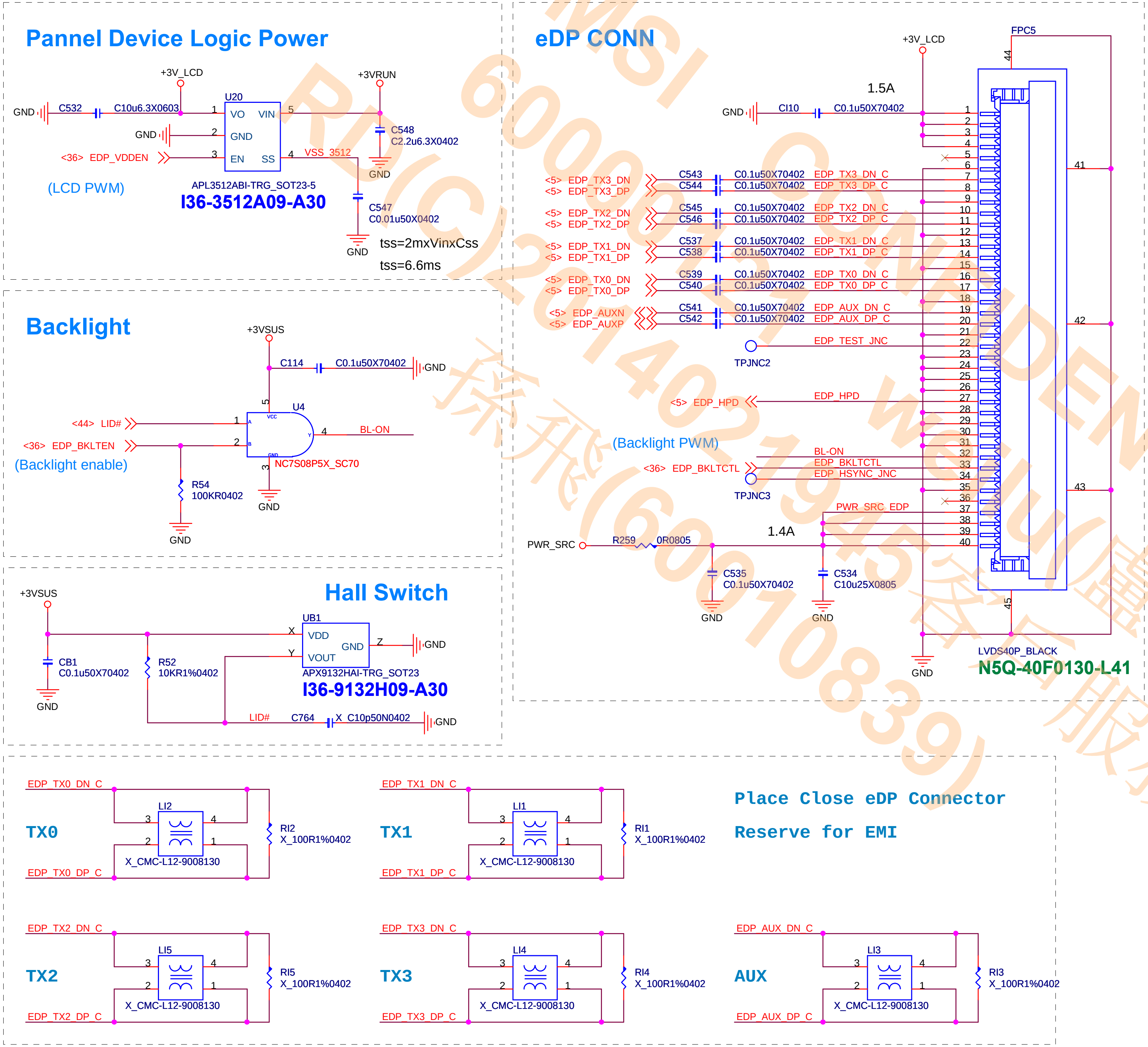
U14J
LPT_PCH_M_EDS
AL34 VSS
AL38 VSS
AL8 VSS
AM14 VSS
AM24 VSS
AM26 VSS
AM28 VSS
AM30 VSS
AM32 VSS
AM16 VSS
AN36 VSS
AN40 VSS
AN42 VSS
AN8 VSS
AP13 VSS
AP24 VSS
AP31 VSS
AP43 VSS
AR2 VSS
AK16 VSS
AT10 VSS
AT15 VSS
AT17 VSS
AT20 VSS
AT26 VSS
AT29 VSS
AT36 VSS
AT38 VSS
D42 VSS
AV13 VSS
AV22 VSS
AV24 VSS
AV31 VSS
AV33 VSS
BB25 VSS
AV40 VSS
AV6 VSS
AW2 VSS
F43 VSS
AY10 VSS
AY15 VSS
AY20 VSS
AY26 VSS
AY29 VSS
AY7 VSS
B11 VSS
B15 VSS
VSS K39
VSS L2
VSS L44
VSS M17
VSS M22
VSS N12
VSS N35
VSS N39
VSS N6
VSS P22
VSS P24
VSS P26
VSS P28
VSS P30
VSS P32
VSS R12
VSS R14
VSS R16
VSS R2
VSS R34
VSS R38
VSS R44
VSS R8
VSS T43
VSS U10
VSS U16
VSS U28
VSS U34
VSS U38
VSS U42
VSS U6
VSS V14
VSS V16
VSS V26
VSS V43
VSS W2
VSS W44
VSS Y14
VSS Y16
VSS Y24
VSS Y28
VSS Y34
VSS Y36
VSS Y40
VSS Y8
10 OF 11
GND
GND
U14K
LPT_PCH_M_EDS
AA16 VSS
AA20 VSS
AA22 VSS
AA28 VSS
AA4 VSS
AB12 VSS
AB34 VSS
AB38 VSS
AB8 VSS
AC2 VSS
AC44 VSS
AD14 VSS
AD16 VSS
AD18 VSS
AD30 VSS
AD32 VSS
AD40 VSS
AD6 VSS
AD8 VSS
AE16 VSS
AE28 VSS
AE38 VSS
AF8 VSS
AG16 VSS
AG2 VSS
AG26 VSS
AG28 VSS
AG44 VSS
AJ16 VSS
AJ18 VSS
AJ20 VSS
AJ22 VSS
AJ24 VSS
AJ34 VSS
AJ38 VSS
AJ6 VSS
AJ8 VSS
AK14 VSS
AK24 VSS
AK43 VSS
AK45 VSS
AL12 VSS
AL2 VSS
BC22 VSS
BB42 VSS
VSS B19
VSS B23
VSS B27
VSS B31
VSS B35
VSS B39
VSS B7
VSS BA40
VSS BD11
VSS BD15
VSS BD19
VSS AY36
VSS AT43
VSS BD31
VSS BD35
VSS BD39
VSS BD7
VSS D25
VSS AV7
VSS F15
VSS F20
VSS F29
VSS F33
VSS BC16
VSS D4
VSS G2
VSS G38
VSS G44
VSS G8
VSS H10
VSS H13
VSS H17
VSS H22
VSS H24
VSS H26
VSS H31
VSS H36
VSS H40
VSS H7
VSS K10
VSS K15
VSS K20
VSS K29
VSS K33
VSS BC28
11 OF 11
GND
GND

MSI
RD(C)2014021945
600121 CONFIDENTIAL
徐雅6001083
wolu(盧偉)
客戶服務部

MICRO-STAR INT'L CO.,LTD.

Title	PCH-8 (GND)	
Size	Document Number MS-16H2	Rev 1.0
Date: Friday, January 03, 2014	Sheet 41 of 72	

eDP Connector

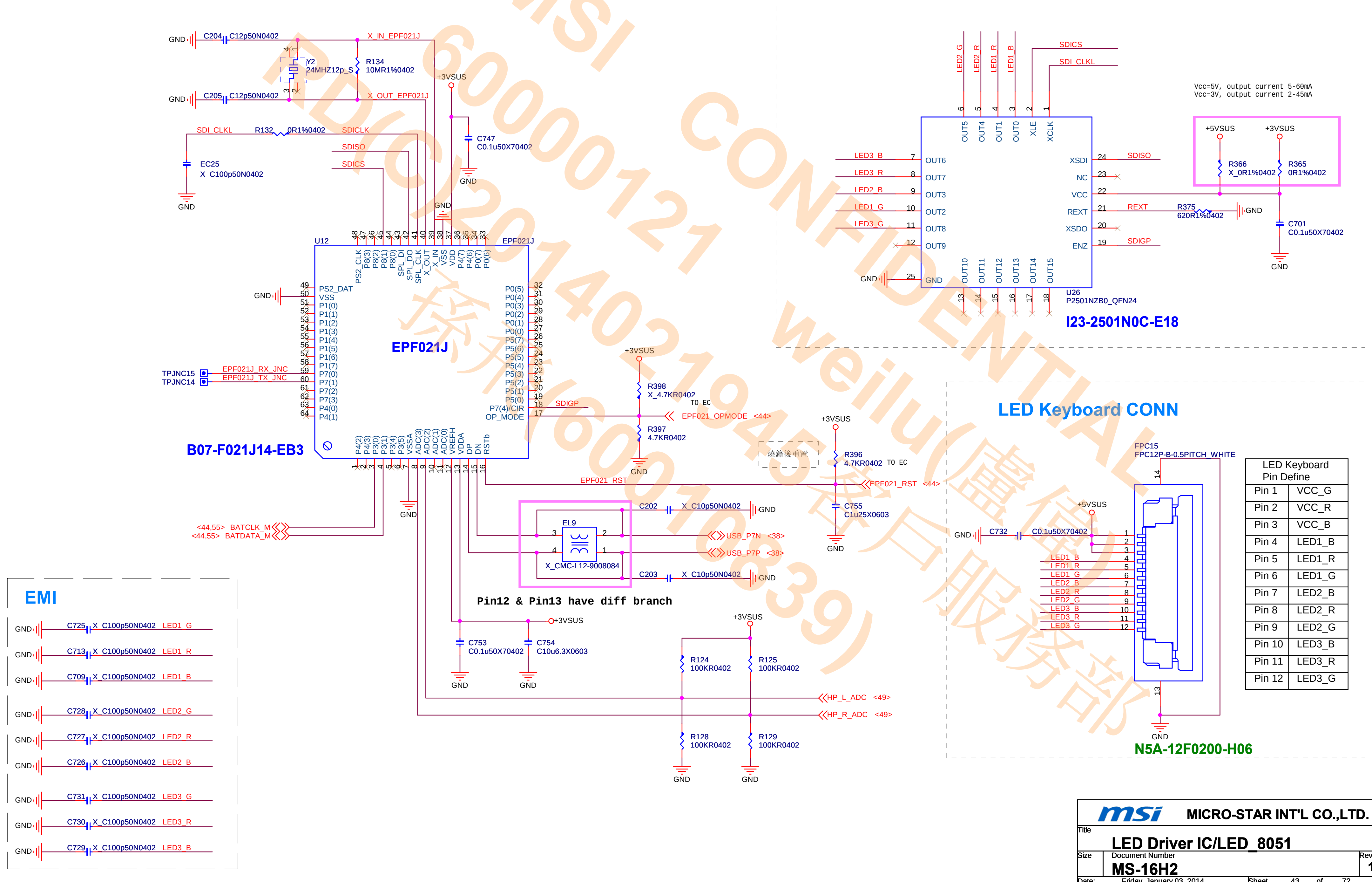


Pannel Device Logic Power
+3V_LCD
+3VRUN
U20
VO VIN GND EN SS
C532 C10u6.3X0603
C548 C2.2u6.3X0402
<36> EDP_VDDEN
VSS_3512
(LCD PWM)
APL3512ABI-TRG_SOT23-5
I36-3512A09-A30
C547 C0.01u50X0402
tss=2mxVinxCss
tss=6.6ms
Backlight
+3VSUS
C114 C0.1u50X70402
U4
<44> LID#
<36> EDP_BKLTEN
BL-ON
(Backlight enable)
NC7S08P5X_SC70
R54 100KR0402
Hall Switch
UB1
VDD GND VOUT
CB1 C0.1u50X70402
R52 10KR1%0402
APX9132HAI-TRG_SOT23
I36-9132H09-A30
LID#
C764 X_C10p50N0402
eDP CONN
+3V_LCD
FPC5
1.5A
CI10 C0.1u50X70402
<5> EDP_TX3_DN
<5> EDP_TX3_DP
<5> EDP_TX2_DN
<5> EDP_TX2_DP
<5> EDP_TX1_DN
<5> EDP_TX1_DP
<5> EDP_TX0_DN
<5> EDP_TX0_DP
<5> EDP_AUXN
<5> EDP_AUXP
EDP_TEST_JNC
TPJNC2
<5> EDP_HPD
(Backlight PWM)
<36> EDP_BKLTCTL
EDP_HSYNC_JNC
TPJNC3
PWR_SRC_EDP
1.4A
PWR_SRC
R259 0R0805
C535 C0.1u50X70402
C534 C10u25X0805
LVDS40P_BLACK
N5Q-40F0130-L41
Place Close eDP Connector
Reserve for EMI
TX0
TX1
TX2
TX3
AUX
X_CMC-L12-9008130
X_100R1%0402

LCD Module Pin Define

Pin No	Symbol	Description
1	WP	EEPROM Write Protect(Keep open)
2	H_GND	High Speed Ground(0V)
3	eDP_Rx_3N	Complement Signal Link Lane 3
4	eDP_Rx_3P	True Signal Link Lane 3
5	H_GND	High Speed Ground(0V)
6	eDP_Rx_2N	Complement Signal Link Lane 2
7	eDP_Rx_2P	True Signal Link Lane 2
8	H_GND	H_GND
9	eDP_Rx_1N	Complement Signal Link Lane 1
10	eDP_Rx_1P	True Signal Link Lane 1
11	H_GND	H_GND
12	eDP_Rx_0N	Complement Signal Link Lane 0
13	eDP_Rx_0P	True Signal Link Lane 0
14	H_GND	H_GND
15	eDP_AUX_CH_P	True Signal Aux Channel
16	eDP_AUX_CH_N	Complement Signal Aux Channel
17	H_GND	H_GND
18	LCD_VCC	LCD logic and driver power
19	LCD_VCC	LCD logic and driver power
20	LCD_VCC	LCD logic and driver power
21	LCD_VCC	LCD logic and driver power
22	TEST	LCD Test Port
23	LCD_GND	LCD logic and driver ground(0V)
24	LCD_GND	LCD logic and driver ground(0V)
25	LCD_GND	LCD logic and driver ground(0V)
26	LCD_GND	LCD logic and driver ground(0V)
27	eDP_HPD	HPD signal pin
28	BL_GND	Backlight ground(0V)
29	BL_GND	Backlight ground(0V)
30	BL_GND	Backlight ground(0V)
31	BL_GND	Backlight ground(0V)
32	BL_ENABLE	Backlight enable
33	BL_PWM_DIM	System PWM signal input
34	SDA	I2C-bus Data
35	SCL	I2C-bus Clock
36	BL_PWR	Backlight power (5~21V)
37	BL_PWR	Backlight power (5~21V)
38	BL_PWR	Backlight power (5~21V)
39	BL_PWR	Backlight power (5~21V)
40	HSYNC	HSYNC output from Tcon

LED 8051 Controller



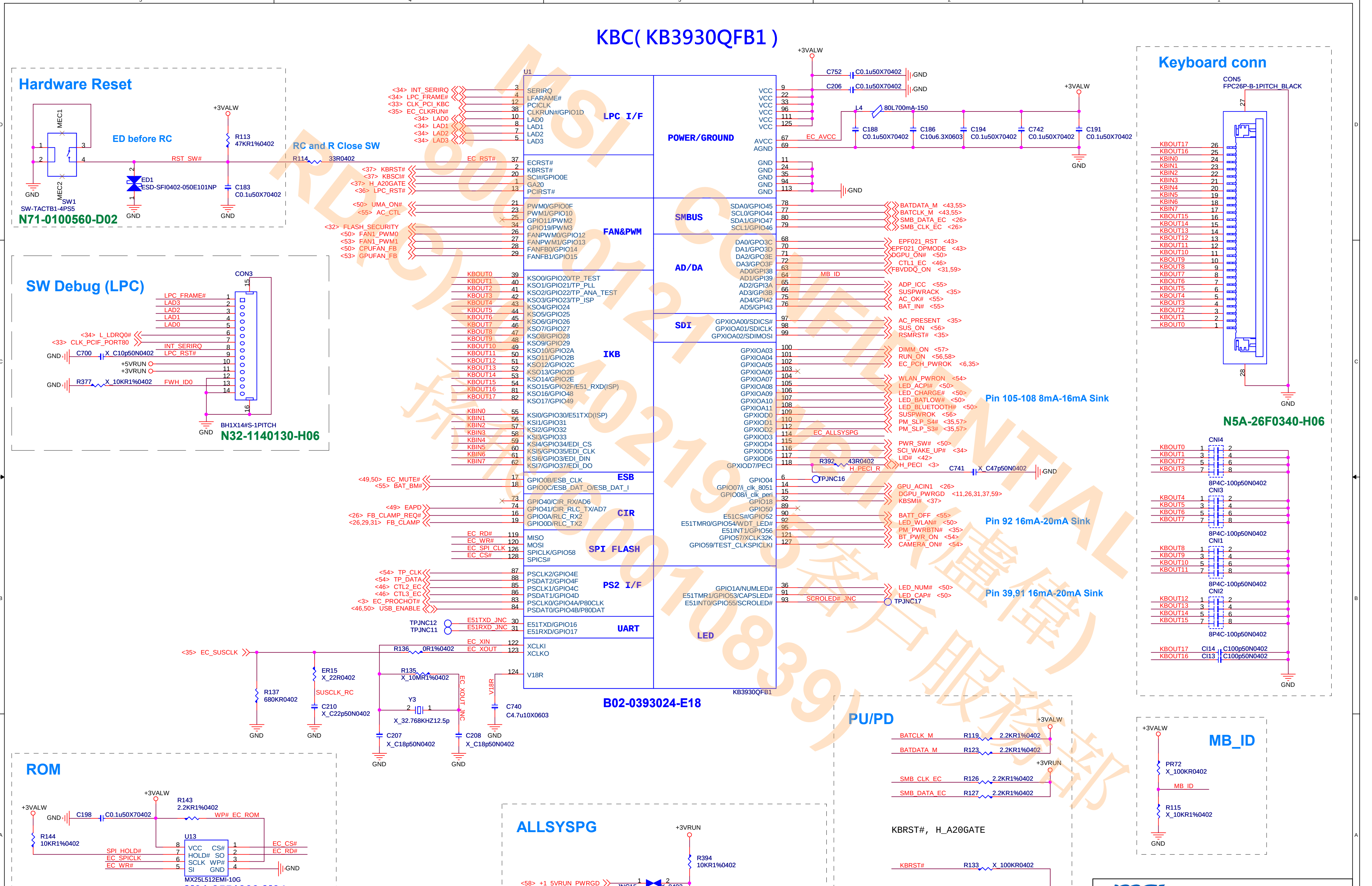
B07-F021J14-EB3
U12
EPF021J
Y2 24MHZ12p_S
R134 10MR1%0402
C204 C12p50N0402
C205 C12p50N0402
X_IN_EPF021J
X_OUT_EPF021J
SDI_CLKL
R132 0R1%0402
SDICLK
SDISO
SDICS
EC25 X_C100p50N0402
C747 C0.1u50X70402
+3VSUS
GND
TPJNC15
TPJNC14
EPF021J_RX_JNC
EPF021J_TX_JNC
SDIGP
R398 X_4.7KR0402
R397 4.7KR0402
TO EC
EPF021_OPMODE <44>
R396 4.7KR0402
EPF021_RST
EPF021_RST <44>
C755 C1u25X0603
燒錄後重置
<44,55> BATCLK_M
<44,55> BATDATA_M
EL9
X_CMC-L12-9008084
C202 X_C10p50N0402
C203 X_C10p50N0402
USB_P7N <38>
USB_P7P <38>
Pin12 & Pin13 have diff branch
C753 C0.1u50X70402
C754 C10u6.3X0603
R124 100KR0402
R125 100KR0402
R128 100KR0402
R129 100KR0402
HP_L_ADC <49>
HP_R_ADC <49>
U26
P2501NZB0_QFN24
I23-2501N0C-E18
OUT5 OUT4 OUT1 OUT0 XLE XCLK
OUT6 OUT7 OUT3 OUT2 OUT8 OUT9 GND
XSDI NC VCC REXT XSDO ENZ
OUT10 OUT11 OUT12 OUT13 OUT14 OUT15
LED2_G LED2_R LED1_R LED1_B
SDICS
SDI_CLKL
LED3_B LED3_R LED2_B LED1_G LED3_G
SDISO
REXT
SDIGP
R375 620R1%0402
Vcc=5V, output current 5-60mA
Vcc=3V, output current 2-45mA
+5VSUS
+3VSUS
R366 X_0R1%0402
R365 0R1%0402
C701 C0.1u50X70402
LED Keyboard CONN
FPC15
FPC12P-B-0.5PITCH_WHITE
+5VSUS
C732 C0.1u50X70402
N5A-12F0200-H06
EMI
C725 X_C100p50N0402 LED1_G
C713 X_C100p50N0402 LED1_R
C709 X_C100p50N0402 LED1_B
C728 X_C100p50N0402 LED2_G
C727 X_C100p50N0402 LED2_R
C726 X_C100p50N0402 LED2_B
C731 X_C100p50N0402 LED3_G
C730 X_C100p50N0402 LED3_R
C729 X_C100p50N0402 LED3_B

LED Keyboard Pin Define

Pin 1	VCC_G
Pin 2	VCC_R
Pin 3	VCC_B
Pin 4	LED1_B
Pin 5	LED1_R
Pin 6	LED1_G
Pin 7	LED2_B
Pin 8	LED2_R
Pin 9	LED2_G
Pin 10	LED3_B
Pin 11	LED3_R
Pin 12	LED3_G

MSI 600012 RD(C)201402194 weilu(盧偉) CONFIDENTIAL 客戶服務部

MICRO-STAR INT'L CO.,LTD.
Title: LED Driver IC/LED_8051
Document Number: MS-16H2
Rev: 1.0
Date: Friday, January 03, 2014
Sheet 43 of 72



KBC(KB3930QFB1)
Hardware Reset
ED before RC
RC and R Close SW
RST_SW#
EC_RST#
R113 47KR1%0402
R114 33R0402
C183 C0.1u50X70402
ED1 ESD-SFI0402-050E101NP
SW1 SW-TACTB1-4PSS
N71-0100560-D02
SW Debug (LPC)
CON3
BH1X14#S-1PITCH
N32-1140130-H06
U1
LPC I/F
POWER/GROUND
FAN&PWM
SMBUS
AD/DA
SDI
IKB
ESB
CIR
SPI FLASH
PS2 I/F
UART
LED
B02-0393024-E18
KB3930QFB1
Keyboard conn
CON5 FPC26P-B-1PITCH_BLACK
N5A-26F0340-H06
Pin 105-108 8mA-16mA Sink
Pin 92 16mA-20mA Sink
Pin 39,91 16mA-20mA Sink
8P4C-100p50N0402
PU/PD
KBRST#, H_A20GATE
MB_ID
ROM
U13 MX25L512EMI-10G
M31-2551222-M24
ALLSYSPG

MICRO-STAR INT'L CO.,LTD.

Title: KBC(KB3930QFB1)

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Friday, January 03, 2014 | Sheet 44 of 72

CardReader (RTS5249)

RTS5249 Colay RTS5227

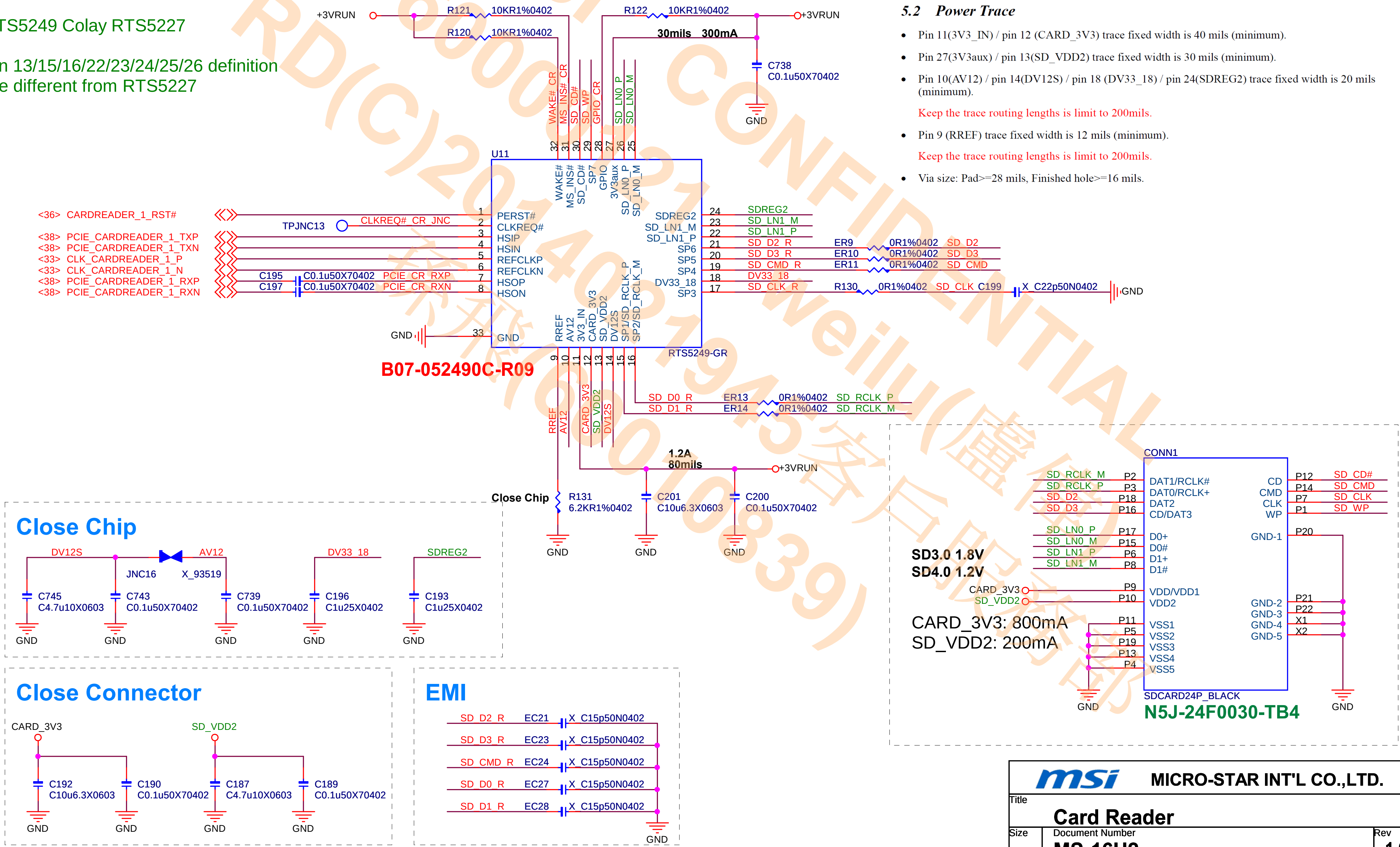
Pin 13/15/16/22/23/24/25/26 definition are different from RTS5227

5.2 *Power Trace*

- Pin 11(3V3_IN) / pin 12 (CARD_3V3) trace fixed width is 40 mils (minimum).
- Pin 27(3V3aux) / pin 13(SD_VDD2) trace fixed width is 30 mils (minimum).
- Pin 10(AV12) / pin 14(DV12S) / pin 18 (DV33_18) / pin 24(SDREG2) trace fixed width is 20 mils (minimum).

  Keep the trace routing lengths is limit to 200mils.
- Pin 9 (RREF) trace fixed width is 12 mils (minimum).

  Keep the trace routing lengths is limit to 200mils.
- Via size: Pad>=28 mils, Finished hole>=16 mils.

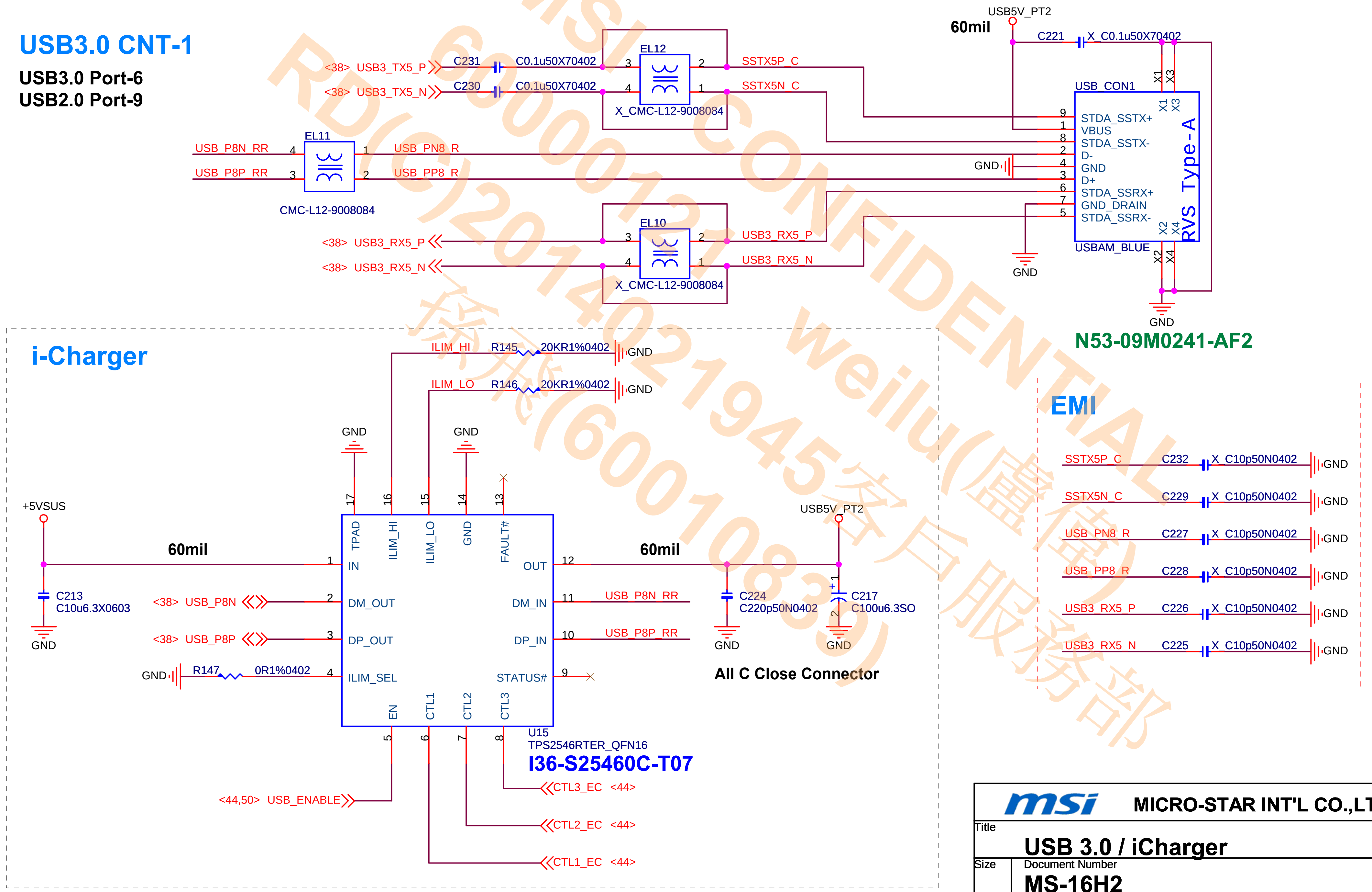


+3VRUN
R121 10KR1%0402
R120 10KR1%0402
R122 10KR1%0402
30mils 300mA
C738 C0.1u50X70402
GND
WAKE#_CR
MS_INS#_CR
SD_CD#
SD_WP
GPIO_CR
SD_LN0_P
SD_LN0_M
U11
WAKE# MS_INS# SD_CD# SP7 GPIO 3V3aux SD_LN0_P SD_LN0_M
<36> CARDREADER_1_RST#
TPJNC13
CLKREQ#_CR_JNC
<38> PCIE_CARDREADER_1_TXP
<38> PCIE_CARDREADER_1_TXN
<33> CLK_CARDREADER_1_P
<33> CLK_CARDREADER_1_N
<38> PCIE_CARDREADER_1_RXP
<38> PCIE_CARDREADER_1_RXN
C195 C0.1u50X70402 PCIE_CR_RXP
C197 C0.1u50X70402 PCIE_CR_RXN
PERST# CLKREQ# HSIP HSIN REFCLKP REFCLKN HSOP HSON GND
SDREG2 SD_LN1_M SD_LN1_P SP6 SP5 SP4 DV33_18 SP3
SDREG2 SD_LN1_M SD_LN1_P SD_D2_R SD_D3_R SD_CMD_R DV33_18 SD_CLK_R
ER9 0R1%0402 SD_D2
ER10 0R1%0402 SD_D3
ER11 0R1%0402 SD_CMD
R130 0R1%0402 SD_CLK C199 X_C22p50N0402 GND
RREF AV12 3V3_IN CARD_3V3 SD_VDD2 DV12S SP1/SD_RCLK_P SP2/SD_RCLK_M
RTS5249-GR
B07-052490C-R09
SD_D0_R ER13 0R1%0402 SD_RCLK_P
SD_D1_R ER14 0R1%0402 SD_RCLK_M
RREF AV12 CARD_3V3 SD_VDD2 DV12S
1.2A 80mils
Close Chip
R131 6.2KR1%0402
C201 C10u6.3X0603
C200 C0.1u50X70402
Close Chip
DV12S AV12 DV33_18 SDREG2
JNC16 X_93519
C745 C4.7u10X0603
C743 C0.1u50X70402
C739 C0.1u50X70402
C196 C1u25X0402
C193 C1u25X0402
Close Connector
CARD_3V3 SD_VDD2
C192 C10u6.3X0603
C190 C0.1u50X70402
C187 C4.7u10X0603
C189 C0.1u50X70402
EMI
SD_D2_R EC21 X_C15p50N0402
SD_D3_R EC23 X_C15p50N0402
SD_CMD_R EC24 X_C15p50N0402
SD_D0_R EC27 X_C15p50N0402
SD_D1_R EC28 X_C15p50N0402
CONN1
SD_RCLK_M P2 SD_RCLK_P P3 SD_D2 P18 SD_D3 P16
DAT1/RCLK# DAT0/RCLK+ DAT2 CD/DAT3
SD_LN0_P P17 SD_LN0_M P15 SD_LN1_P P6 SD_LN1_M P8
D0+ D0# D1+ D1#
CARD_3V3 P9 SD_VDD2 P10
VDD/VDD1 VDD2
P11 P5 P19 P13 P4
VSS1 VSS2 VSS3 VSS4 VSS5
CD CMD CLK WP
P12 SD_CD# P14 SD_CMD P7 SD_CLK P1 SD_WP
GND-1 P20
GND-2 GND-3 GND-4 GND-5
P21 P22 X1 X2
SDCARD24P_BLACK
N5J-24F0030-TB4
SD3.0 1.8V
SD4.0 1.2V
CARD_3V3: 800mA
SD_VDD2: 200mA

MSI CONFIDENTIAL

MICRO-STAR INT'L CO.,LTD.		
Title	Card Reader	
Size	Document Number: MS-16H2	Rev 1.0
Date: Friday, January 03, 2014	Sheet 45 of 72	

USB 3.0 / iCharger



USB3.0 CNT-1
USB3.0 Port-6
USB2.0 Port-9
<38> USB3_TX5_P
<38> USB3_TX5_N
C231 C0.1u50X70402
C230 C0.1u50X70402
EL12
X_CMC-L12-9008084
SSTX5P_C
SSTX5N_C
USB5V_PT2
60mil
C221 X_C0.1u50X70402
USB_CON1
STDA_SSTX+
VBUS
STDA_SSTX-
D-
GND
D+
STDA_SSRX+
GND_DRAIN
STDA_SSRX-
RVS_Type-A
USBAM_BLUE
N53-09M0241-AF2
EL11
USB_P8N_RR
USB_P8P_RR
USB_PN8_R
USB_PP8_R
CMC-L12-9008084
EL10
<38> USB3_RX5_P
<38> USB3_RX5_N
USB3_RX5_P
USB3_RX5_N
X_CMC-L12-9008084
GND
i-Charger
ILIM_HI R145 20KR1%0402
ILIM_LO R146 20KR1%0402
+5VSUS
60mil
C213 C10u6.3X0603
<38> USB_P8N
<38> USB_P8P
GND R147 0R1%0402
TPAD ILIM_HI ILIM_LO GND FAULT#
IN DM_OUT DP_OUT ILIM_SEL
OUT DM_IN DP_IN STATUS#
EN CTL1 CTL2 CTL3
U15
TPS2546RTER_QFN16
I36-S25460C-T07
60mil
USB5V_PT2
C224 C220p50N0402
C217 C100u6.3SO
All C Close Connector
<44,50> USB_ENABLE
CTL3_EC <44>
CTL2_EC <44>
CTL1_EC <44>
EMI
SSTX5P_C C232 X_C10p50N0402
SSTX5N_C C229 X_C10p50N0402
USB_PN8_R C227 X_C10p50N0402
USB_PP8_R C228 X_C10p50N0402
USB3_RX5_P C226 X_C10p50N0402
USB3_RX5_N C225 X_C10p50N0402

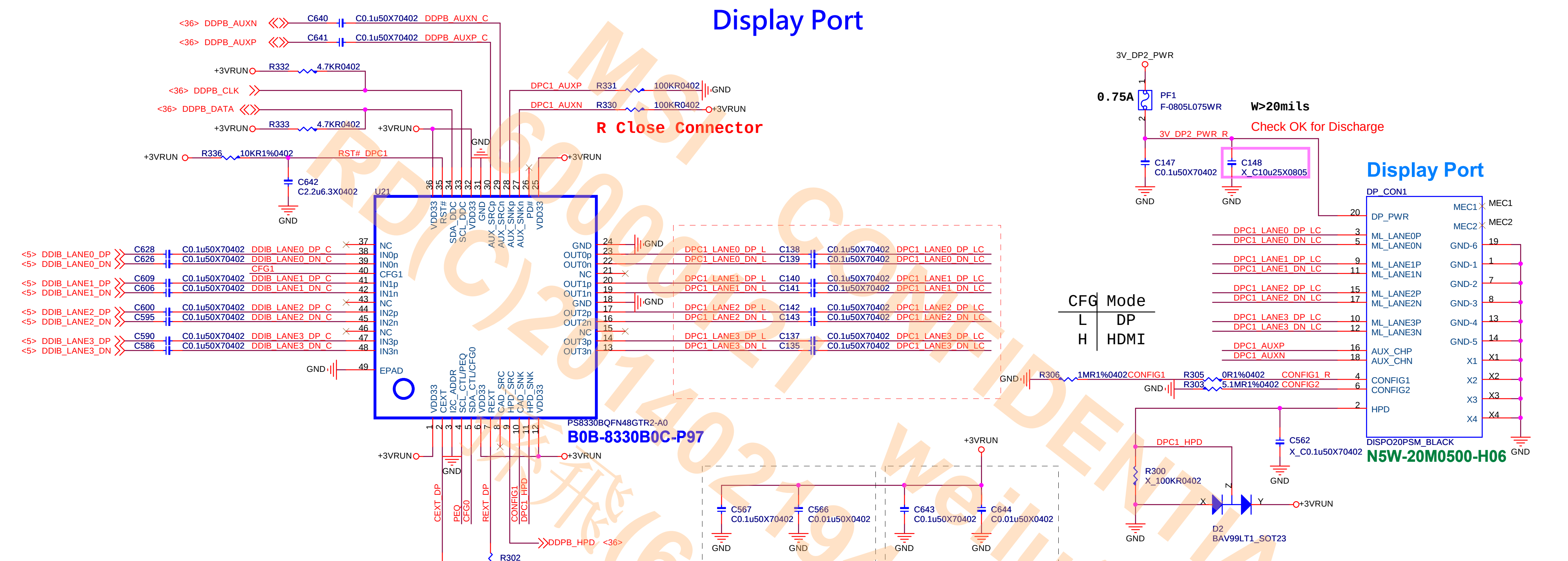
MICRO-STAR INT'L CO.,LTD.

Title: USB 3.0 / iCharger

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Friday, January 03, 2014 | Sheet 46 of 72

Display Port

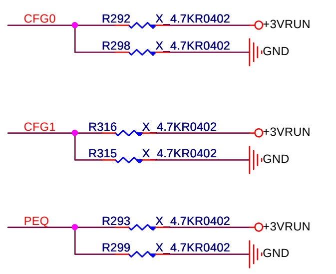


CFG	Mode
L	DP
H	HDMI

3 Level Input:
- L: LOW
- H: HIGH
- M: VDD33/2, connect both pull-up and pull-down resistors

CAD_SNK Have internal Pull down 1Mohm.

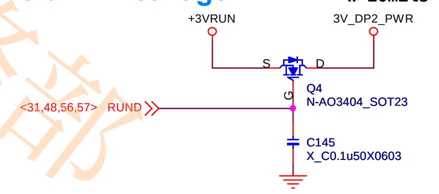
HPD_SNK Have internal Pull down 150kohm.
No problem with Leakage from DP device
The DP_PWR and RETURN pins of the
box-to-box connectors must support the
maximum current rating of 500mA.



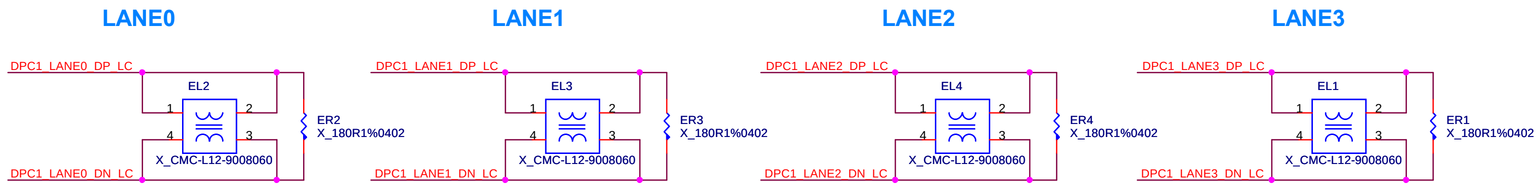

```
Configuration pin for automatic EQ and AUX interception; Internal pull down at ~150k Ohm, 3.3V I/O.
   L: default, automatic EQ enable & AUX interception enable
   H: automatic EQ disable & AUX interception enable
   M: automatic EQ disable & AUX interception disable, no pre-emphasis, 600mVpp swing

Configuration pin for auto test and input offset cancellation, 3.3V IO, internal pull up at ~150K Ohm
   H: default, auto test disable & input offset cancellation enable
   L: auto test enable & input offset cancellation enable
   M: auto test disable & input offset cancellation disable

Programmable input equalization levels; Internal pull down at ~150k Ohm, 3.3V I/O.
   L: default, LEQ, compensate channel loss up to 12dB @ HBR2
   H: HEQ, compensate channel loss up to 15dB @ HBR2
   M: LLEQ, compensate channel loss up to 5dB @ HBR2
```

Avoid DP Leakage

W>20mils



EMI Close Connector

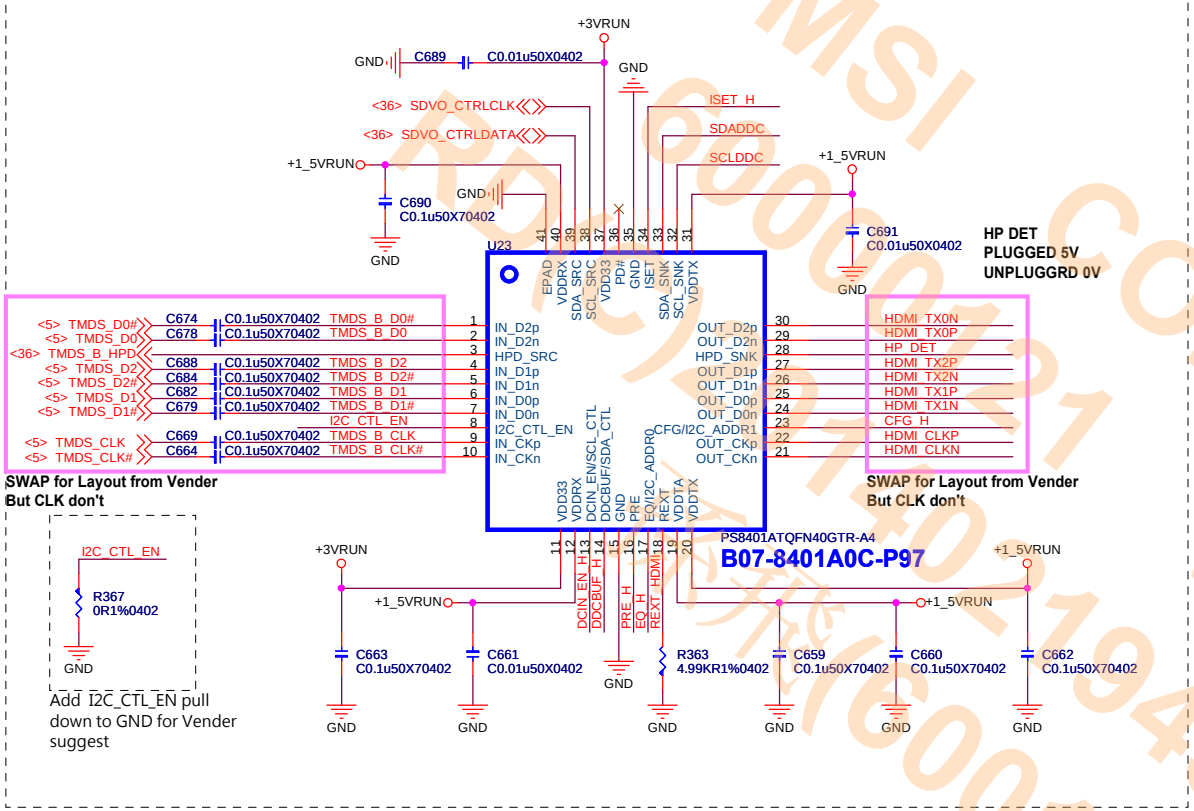


MICRO-STAR INT'L CO.,LTD.

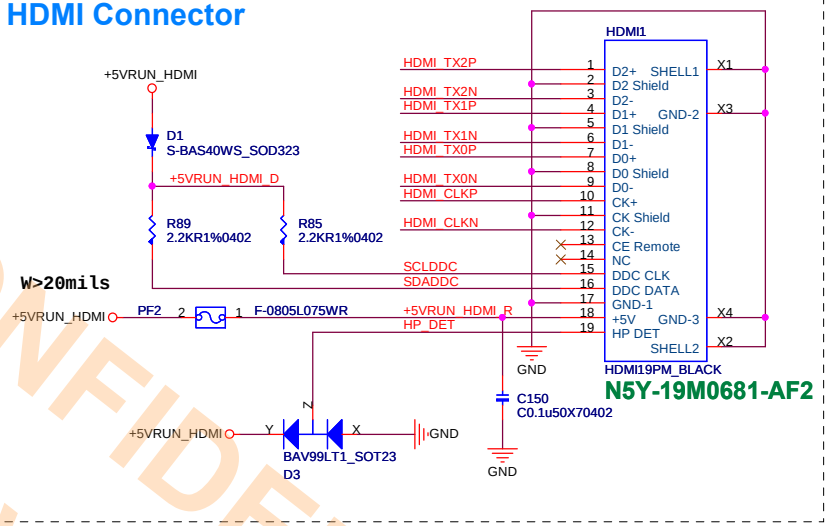
Title	DP witch Repeater
Size / Document Number	MS-16H2
Rev	1.0
Date	Friday, January 03, 2014
Sheet	47 of 72

MSI CONFIDENTIAL RD(C)2014-02-19 6000947 weilu(盧偉)客戶服務部 (60010839) 陳泰飛(6000839)

HDMI Repeater



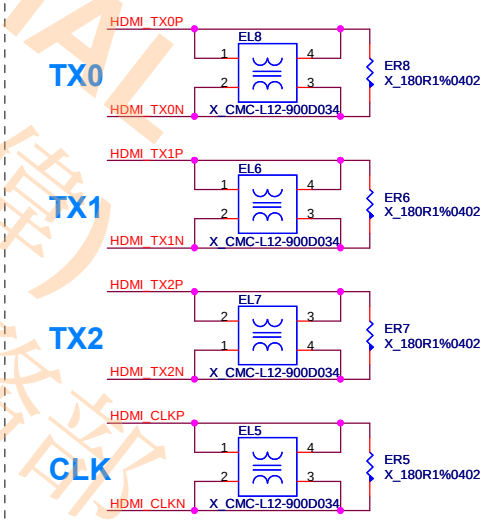
HDMI Connector

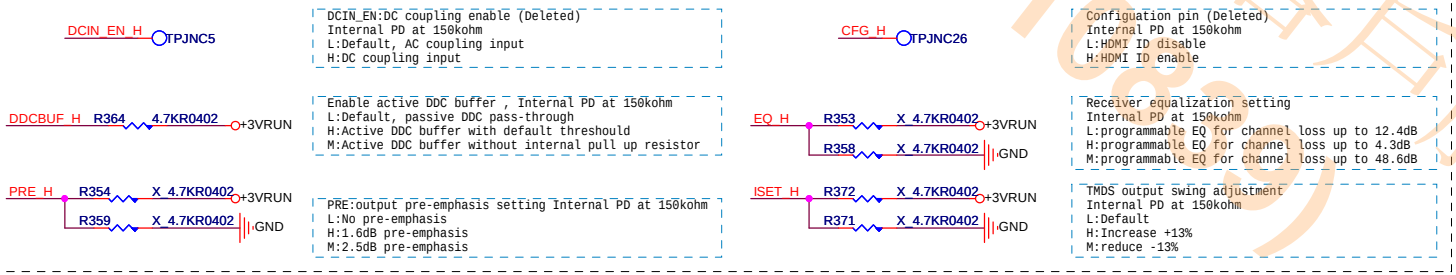


An HDMI Source shall have +5V Power signal over-current protection of no more than 0.5A.

HPD_SNK Internal PD 150kohm

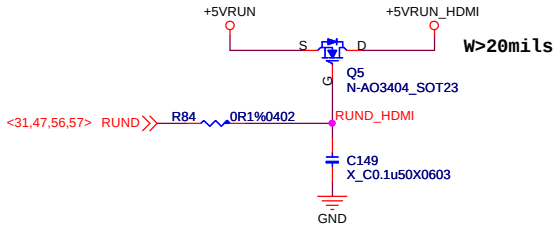
EMI Close Connector





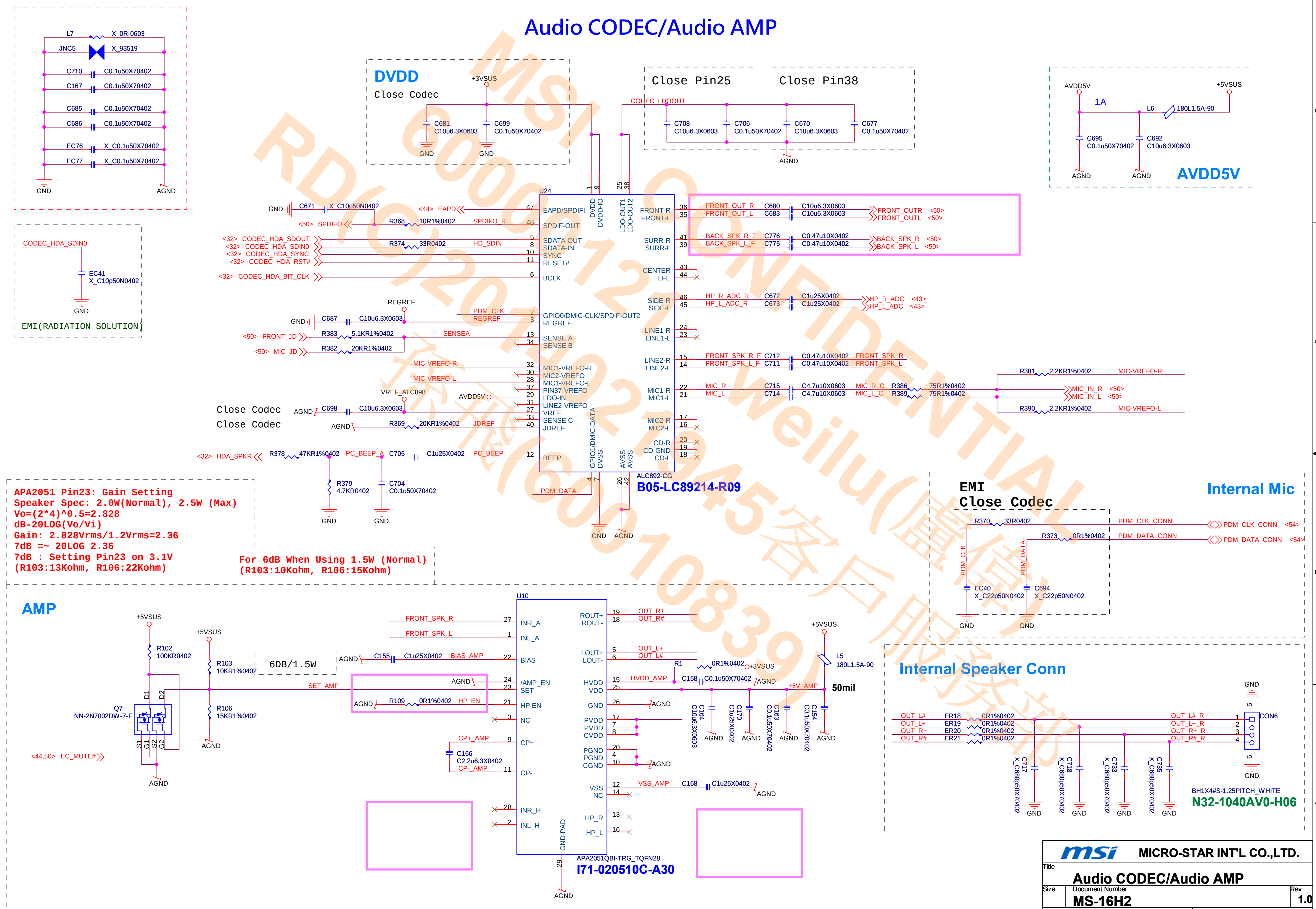
ADDR1 (CFG)	ADDR0 (EQ)	I2C control bus address (Internal pull down at ~150kΩ, 3.3V I/O)
0	0	0x4C / 4D (default)
0	1	0x5C / 5D
1	0	0xCC / CD
1	1	0xEC / ED

Avoid HDMI Leakage



msi	MICRO-STAR INT'L CO.,LTD.		
Title	HDMI Repeater		
Size	Document Number MS-16H2		Rev 1.0
Date:	Friday, January 03, 2014	Sheet 48 of 72	

Audio CODEC/Audio AMP



DVDD
Close Codec
+3VSUS
C681 C10u6.3X0603
C699 C0.1u50X70402
GND
Close Pin25
Close Pin38
CODEC_LDOOUT
C708 C10u6.3X0603
C706 C0.1u50X70402
C670 C10u6.3X0603
C677 C0.1u50X70402
AGND
AVDD5V
+5VSUS
1A
L6 180L1.5A-90
C695 C0.1u50X70402
C692 C10u6.3X0603
AVDD5V
L7 X_0R-0603
JNC5 X_93519
C710 C0.1u50X70402
C167 C0.1u50X70402
C685 C0.1u50X70402
C686 C0.1u50X70402
EC76 X_C0.1u50X70402
EC77 X_C0.1u50X70402
CODEC_HDA_SDIN0
EC41 X_C10p50N0402
EMI(RADIATION SOLUTION)
U24
EAPD/SPDIFI
SPDIF-OUT
SDATA-OUT
SDATA-IN
SYNC
RESET#
BCLK
GPIO0/DMIC-CLK/SPDIF-OUT2
REGREF
SENSE A
SENSE B
MIC1-VREFO-R
MIC2-VREFO
MIC1-VREFO-L
PIN37-VREFO
LDO-IN
LINE2-VREFO
VREF
SENSE C
JDREF
BEEP
FRONT-R
FRONT-L
SURR-R
SURR-L
CENTER
LFE
SIDE-R
SIDE-L
LINE1-R
LINE1-L
LINE2-R
LINE2-L
MIC1-R
MIC1-L
MIC2-R
MIC2-L
CD-R
CD-GND
CD-L
ALC892-CG
B05-LC89214-R09
<44> EAPD
<50> SPDIFO
<32> CODEC_HDA_SDOUT
<32> CODEC_HDA_SDIN0
<32> CODEC_HDA_SYNC
<32> CODEC_HDA_RST#
<32> CODEC_HDA_BIT_CLK
C671 X_C10p50N0402
R368 10R1%0402 SPDIFO_R
R374 33R0402 HD_SDIN
REGREF
C687 C10u6.3X0603
PDM_CLK
<50> FRONT_JD
R383 5.1KR1%0402 SENSEA
<50> MIC_JD
R382 20KR1%0402
MIC-VREFO-R
MIC-VREFO-L
VREF_ALC898
AVDD5V
Close Codec
Close Codec
C698 C10u6.3X0603
R369 20KR1%0402 JDREF
<32> HDA_SPKR
R378 47KR1%0402 PC_BEEP_A
C705 C1u25X0402 PC_BEEP
R379 4.7KR0402
C704 C0.1u50X70402
PDM_DATA
FRONT_OUT_R C680 C10u6.3X0603 FRONT_OUTR <50>
FRONT_OUT_L C683 C10u6.3X0603 FRONT_OUTL <50>
BACK_SPK_R_F C776 C0.47u10X0402 BACK_SPK_R <50>
BACK_SPK_L_F C775 C0.47u10X0402 BACK_SPK_L <50>
HP_R_ADC_R C672 C1u25X0402 HP_R_ADC <43>
HP_L_ADC_R C673 C1u25X0402 HP_L_ADC <43>
FRONT_SPK_R_F C712 C0.47u10X0402 FRONT_SPK_R
FRONT_SPK_L_F C711 C0.47u10X0402 FRONT_SPK_L
R381 2.2KR1%0402 MIC-VREFO-R
MIC_R C715 C4.7u10X0603 MIC_R_C R386 75R1%0402 MIC_IN_R <50>
MIC_L C714 C4.7u10X0603 MIC_L_C R389 75R1%0402 MIC_IN_L <50>
R390 2.2KR1%0402 MIC-VREFO-L
EMI
Close Codec
Internal Mic
R370 33R0402 PDM_CLK_CONN <54>
R373 0R1%0402 PDM_DATA_CONN <54>
EC40 X_C22p50N0402
C694 X_C22p50N0402
AMP
U10
INR_A
INL_A
BIAS
/AMP_EN
SET
HP EN
NC
CP+
CP-
INR_H
INL_H
GND-PAD
ROUT+
ROUT-
LOUT+
LOUT-
HVDD
VDD
GND
PVDD
PVDD
CVDD
PGND
PGND
CGND
VSS
NC
HP_R
HP_L
APA2051QBI-TRG_TQFN28
I71-020510C-A30
FRONT_SPK_R
FRONT_SPK_L
6DB/1.5W
C155 C1u25X0402 BIAS_AMP
SET_AMP
R109 0R1%0402 HP_EN
CP+_AMP
C166 C2.2u6.3X0402
CP-_AMP
+5VSUS
R102 100KR0402
R103 10KR1%0402
R106 15KR1%0402
Q7 NN-2N7002DW-7-F
<44,50> EC_MUTE#
OUT_R+
OUT_R#
OUT_L+
OUT_L#
R1 0R1%0402 +3VSUS
HVDD_AMP
C158 C0.1u50X70402
+5V_AMP
50mil
L5 180L1.5A-90
C164 C10u6.3X0603
C170 C1u25X0402
C163 C0.1u50X70402
C154 C0.1u50X70402
VSS_AMP C168 C1u25X0402
Internal Speaker Conn
ER18 0R1%0402
ER19 0R1%0402
ER20 0R1%0402
ER21 0R1%0402
C717 X_C680p50X70402
C718 X_C680p50X70402
C733 X_C680p50X70402
C735 X_C680p50X70402
CON6
BH1X4#S-1.25PITCH_WHITE
N32-1040AV0-H06

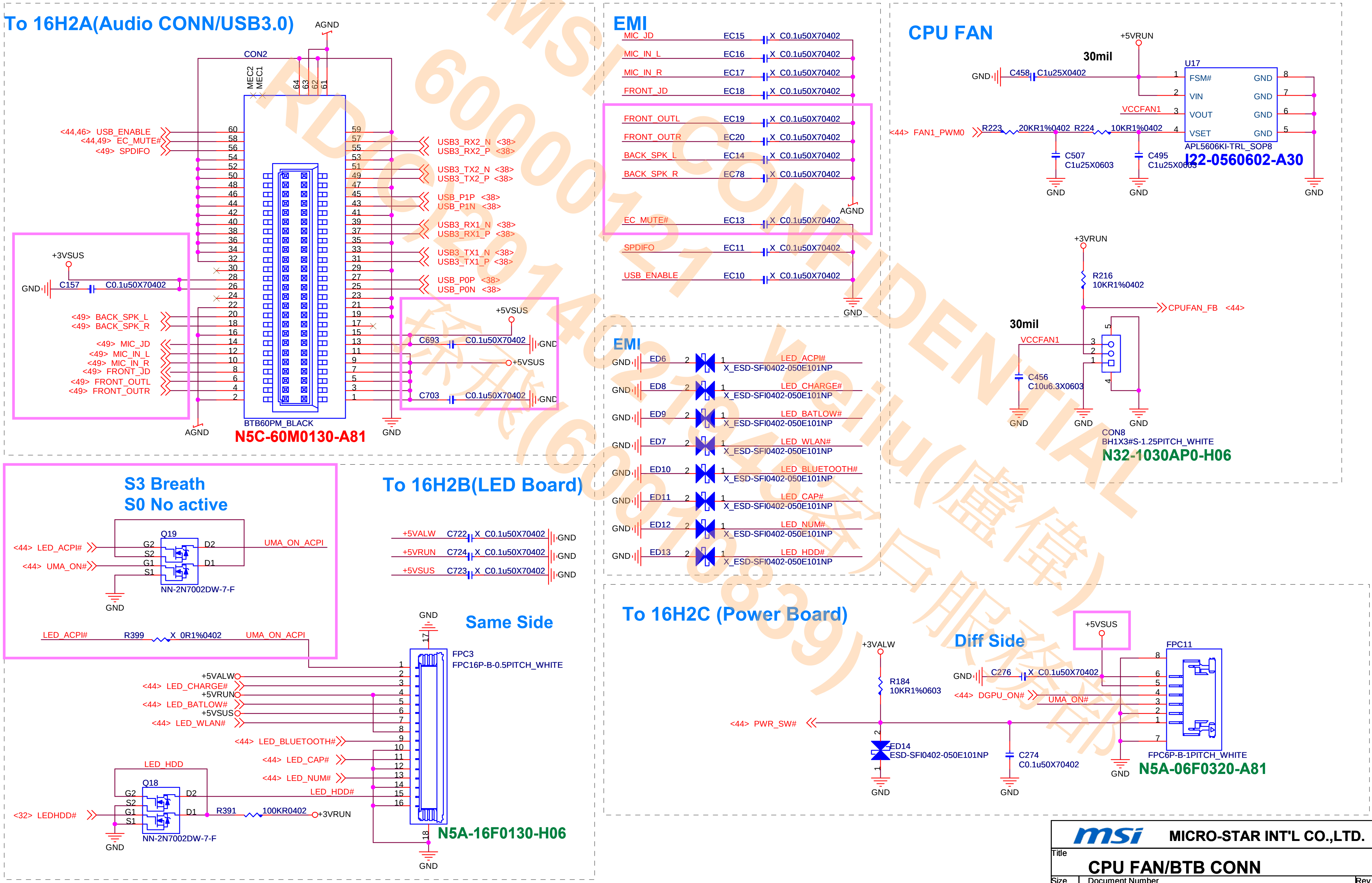
APA2051 Pin23: Gain Setting
Speaker Spec: 2.0W(Normal), 2.5W (Max)
Vo=(2*4)^0.5=2.828
dB-20LOG(Vo/Vi)
Gain: 2.828Vrms/1.2Vrms=2.36
7dB =~ 20LOG 2.36
7dB : Setting Pin23 on 3.1V
(R103:13Kohm, R106:22Kohm)

For 6dB When Using 1.5W (Normal)
(R103:10Kohm, R106:15Kohm)

MSI CONFIDENTIAL

msi	MICRO-STAR INT'L CO.,LTD.
Title	Audio CODEC/Audio AMP
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	49 of 72

CPU FAN/BTB CONN

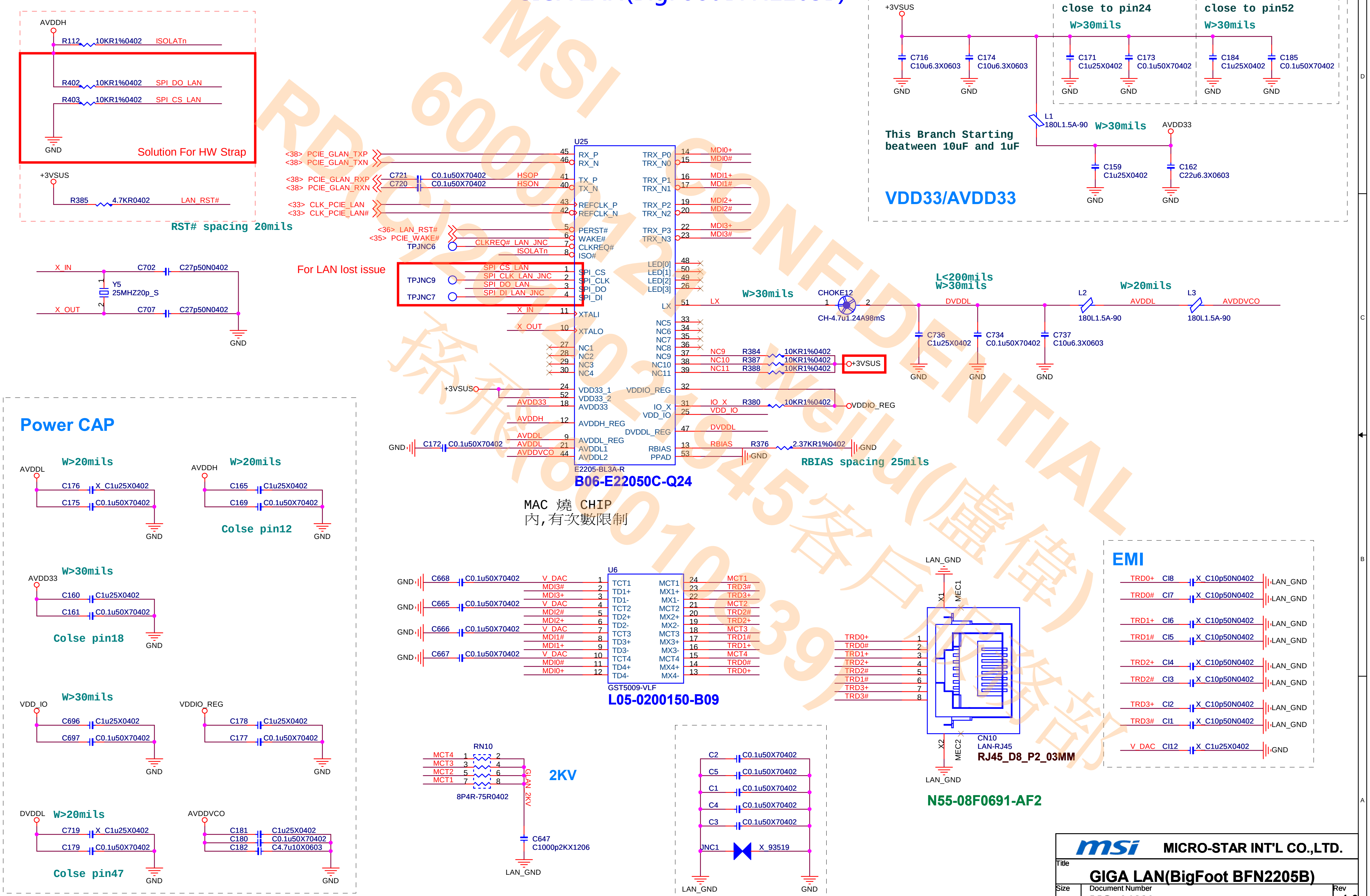


To 16H2A(Audio CONN/USB3.0)
CON2
BTB60PM_BLACK
N5C-60M0130-A81
<44,46> USB_ENABLE
<44,49> EC_MUTE#
<49> SPDIFO
USB3_RX2_N <38>
USB3_RX2_P <38>
USB3_TX2_N <38>
USB3_TX2_P <38>
USB_P1P <38>
USB_P1N <38>
USB3_RX1_N <38>
USB3_RX1_P <38>
USB3_TX1_N <38>
USB3_TX1_P <38>
USB_P0P <38>
USB_P0N <38>
+3VSUS
C157 C0.1u50X70402
<49> BACK_SPK_L
<49> BACK_SPK_R
<49> MIC_JD
<49> MIC_IN_L
<49> MIC_IN_R
<49> FRONT_JD
<49> FRONT_OUTL
<49> FRONT_OUTR
+5VSUS
C693 C0.1u50X70402
C703 C0.1u50X70402
AGND
GND
EMI
MIC_JD EC15 X_C0.1u50X70402
MIC_IN_L EC16 X_C0.1u50X70402
MIC_IN_R EC17 X_C0.1u50X70402
FRONT_JD EC18 X_C0.1u50X70402
FRONT_OUTL EC19 X_C0.1u50X70402
FRONT_OUTR EC20 X_C0.1u50X70402
BACK_SPK_L EC14 X_C0.1u50X70402
BACK_SPK_R EC78 X_C0.1u50X70402
EC_MUTE# EC13 X_C0.1u50X70402
SPDIFO EC11 X_C0.1u50X70402
USB_ENABLE EC10 X_C0.1u50X70402
CPU FAN
+5VRUN
30mil
C458 C1u25X0402
U17
FSM#
VIN
VOUT
VSET
APL5606KI-TRL_SOP8
I22-0560602-A30
VCCFAN1
<44> FAN1_PWM0
R223 20KR1%0402
R224 10KR1%0402
C507 C1u25X0603
C495 C1u25X0603
+3VRUN
R216 10KR1%0402
CPUFAN_FB <44>
C456 C10u6.3X0603
CON8
BH1X3#S-1.25PITCH_WHITE
N32-1030AP0-H06
EMI
ED6 X_ESD-SFI0402-050E101NP LED_ACPI#
ED8 X_ESD-SFI0402-050E101NP LED_CHARGE#
ED9 X_ESD-SFI0402-050E101NP LED_BATLOW#
ED7 X_ESD-SFI0402-050E101NP LED_WLAN#
ED10 X_ESD-SFI0402-050E101NP LED_BLUETOOTH#
ED11 X_ESD-SFI0402-050E101NP LED_CAP#
ED12 X_ESD-SFI0402-050E101NP LED_NUM#
ED13 X_ESD-SFI0402-050E101NP LED_HDD#
S3 Breath
S0 No active
Q19
NN-2N7002DW-7-F
<44> LED_ACPI#
<44> UMA_ON#
UMA_ON_ACPI
R399 X_0R1%0402
To 16H2B(LED Board)
+5VALW C722 X_C0.1u50X70402
+5VRUN C724 X_C0.1u50X70402
+5VSUS C723 X_C0.1u50X70402
Same Side
FPC3
FPC16P-B-0.5PITCH_WHITE
N5A-16F0130-H06
<44> LED_CHARGE#
<44> LED_BATLOW#
<44> LED_WLAN#
<44> LED_BLUETOOTH#
<44> LED_CAP#
<44> LED_NUM#
LED_HDD#
Q18
NN-2N7002DW-7-F
<32> LEDHDD#
R391 100KR0402
To 16H2C (Power Board)
Diff Side
+3VALW
R184 10KR1%0603
<44> PWR_SW#
ED14 ESD-SFI0402-050E101NP
C276 X_C0.1u50X70402
C274 C0.1u50X70402
<44> DGPU_ON#
UMA_ON#
FPC11
FPC6P-B-1PITCH_WHITE
N5A-06F0320-A81

MSI CONFIDENTIAL

MICRO-STAR INT'L CO.,LTD.			
Title: CPU FAN/BTB CONN			
Size	Document Number: MS-16H2		Rev: 1.0
Date: Friday, January 03, 2014	Sheet 50	of 72	

GIGA LAN(BigFoot BFN2205B)



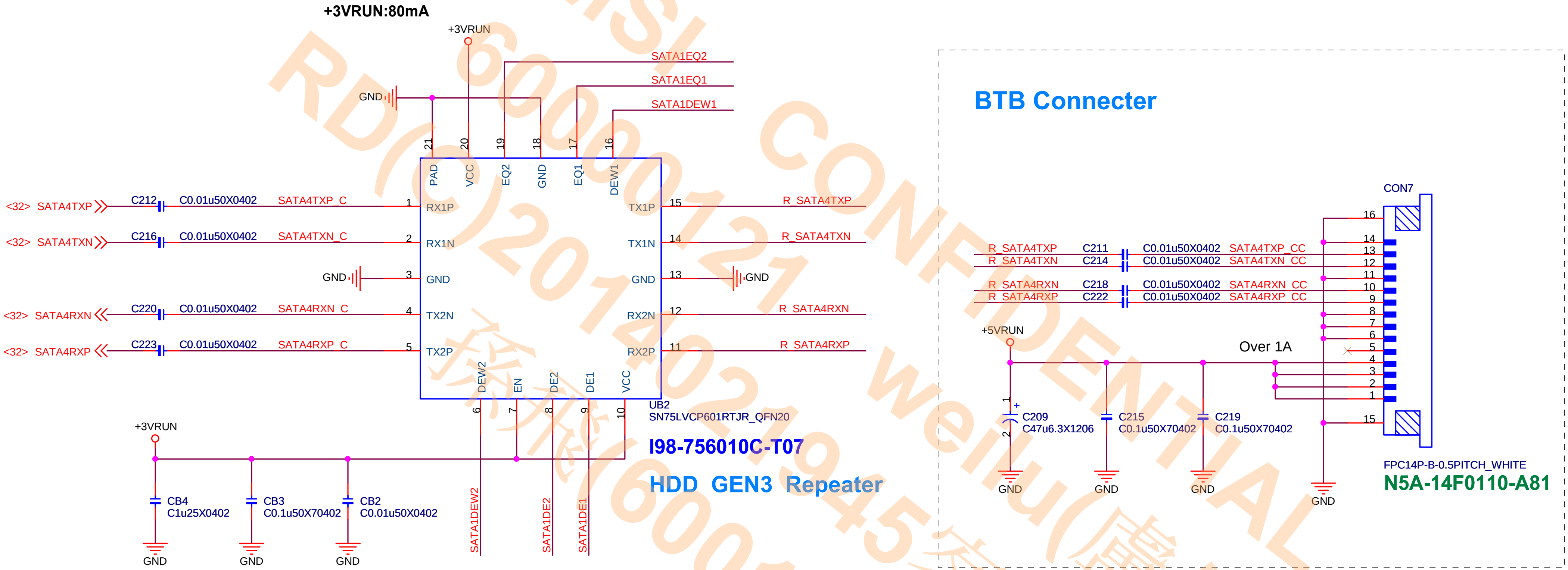
AVDDH
R112 10KR1%0402 ISOLATn
R402 10KR1%0402 SPI_DO_LAN
R403 10KR1%0402 SPI_CS_LAN
GND
Solution For HW Strap
+3VSUS
R385 4.7KR0402 LAN_RST#
RST# spacing 20mils
X_IN C702 C27p50N0402
Y5 25MHZ20p_S
X_OUT C707 C27p50N0402
For LAN lost issue
TPJNC9
TPJNC7
TPJNC6
<38> PCIE_GLAN_TXP
<38> PCIE_GLAN_TXN
<38> PCIE_GLAN_RXP
<38> PCIE_GLAN_RXN
<33> CLK_PCIE_LAN
<33> CLK_PCIE_LAN#
<36> LAN_RST#
<35> PCIE_WAKE#
C721 C0.1u50X70402 HSOP
C720 C0.1u50X70402 HSON
CLKREQ#_LAN_JNC
SPI_CS_LAN
SPI_CLK_LAN_JNC
SPI_DO_LAN
SPI_DI_LAN_JNC
U25
RX_P RX_N TX_P TX_N REFCLK_P REFCLK_N PERST# WAKE# CLKREQ# ISO#
SPI_CS SPI_CLK SPI_DO SPI_DI XTALI XTALO NC1 NC2 NC3 NC4
VDD33_1 VDD33_2 AVDD33 AVDDH_REG AVDDL_REG AVDDL1 AVDDL2
TRX_P0 TRX_N0 TRX_P1 TRX_N1 TRX_P2 TRX_N2 TRX_P3 TRX_N3
LED[0] LED[1] LED[2] LED[3] LX NC5 NC6 NC7 NC8 NC9 NC10 NC11
VDDIO_REG IO_X VDD_IO DVDDL_REG RBIAS PPAD
MDI0+ MDI0# MDI1+ MDI1# MDI2+ MDI2# MDI3+ MDI3#
E2205-BL3A-R
B06-E22050C-Q24
MAC 燒 CHIP
內,有次數限制
C172 C0.1u50X70402
R384 10KR1%0402
R387 10KR1%0402
R388 10KR1%0402
+3VSUS
R380 10KR1%0402 VDDIO_REG
R376 2.37KR1%0402
RBIAS spacing 25mils
W>30mils
CHOKE12 CH-4.7u1.24A98mS
L<200mils
W>30mils
DVDDL
L2 180L1.5A-90
W>20mils
AVDDL
L3 180L1.5A-90
AVDDVCO
C736 C1u25X0402
C734 C0.1u50X70402
C737 C10u6.3X0603
+3VSUS
close to pin24
W>30mils
close to pin52
W>30mils
C716 C10u6.3X0603
C174 C10u6.3X0603
C171 C1u25X0402
C173 C0.1u50X70402
C184 C1u25X0402
C185 C0.1u50X70402
L1 180L1.5A-90
W>30mils
AVDD33
This Branch Starting beatween 10uF and 1uF
C159 C1u25X0402
C162 C22u6.3X0603
VDD33/AVDD33
Power CAP
AVDDL W>20mils
C176 X_C1u25X0402
C175 C0.1u50X70402
AVDDH W>20mils
C165 C1u25X0402
C169 C0.1u50X70402
Colse pin12
AVDD33 W>30mils
C160 C1u25X0402
C161 C0.1u50X70402
Colse pin18
VDD_IO W>30mils
C696 C1u25X0402
C697 C0.1u50X70402
VDDIO_REG
C178 C1u25X0402
C177 C0.1u50X70402
DVDDL W>20mils
C719 X_C1u25X0402
C179 C0.1u50X70402
Colse pin47
AVDDVCO
C181 C1u25X0402
C180 C0.1u50X70402
C182 C4.7u10X0603
U6
C668 C0.1u50X70402
C665 C0.1u50X70402
C666 C0.1u50X70402
C667 C0.1u50X70402
TCT1 TD1+ TD1- TCT2 TD2+ TD2- TCT3 TD3+ TD3- TCT4 TD4+ TD4-
MCT1 MX1+ MX1- MCT2 MX2+ MX2- MCT3 MX3+ MX3- MCT4 MX4+ MX4-
GST5009-VLF
L05-0200150-B09
RN10 8P4R-75R0402
MCT4 MCT3 MCT2 MCT1
GLAN_2KV
2KV
C647 C1000p2KX1206
LAN_GND
C2 C5 C1 C4 C3 C0.1u50X70402
JNC1 X_93519
TRD0+ TRD0# TRD1+ TRD2+ TRD2# TRD1# TRD3+ TRD3#
CN10 LAN-RJ45
RJ45_D8_P2_03MM
N55-08F0691-AF2
EMI
TRD0+ CI8 X_C10p50N0402
TRD0# CI7 X_C10p50N0402
TRD1+ CI6 X_C10p50N0402
TRD1# CI5 X_C10p50N0402
TRD2+ CI4 X_C10p50N0402
TRD2# CI3 X_C10p50N0402
TRD3+ CI2 X_C10p50N0402
TRD3# CI1 X_C10p50N0402
V_DAC CI12 X_C1u25X0402

MSI CONFIDENTIAL

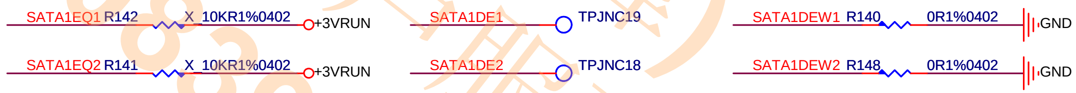
MICRO-STAR INT'L CO.,LTD.

Title	GIGA LAN(BigFoot BFN2205B)
Size / Document Number	MS-16H2
Rev	1.0
Date	Friday, January 03, 2014
Sheet	51 of 72

HDD (With Repeater)



+3VRUN:80mA
+3VRUN
GND
SATA1EQ2
SATA1EQ1
SATA1DEW1
PAD
VCC
EQ2
GND
EQ1
DEW1
<32> SATA4TXP
C212
C0.01u50X0402
SATA4TXP_C
RX1P
TX1P
R_SATA4TXP
<32> SATA4TXN
C216
C0.01u50X0402
SATA4TXN_C
RX1N
TX1N
R_SATA4TXN
GND
GND
<32> SATA4RXN
C220
C0.01u50X0402
SATA4RXN_C
TX2N
RX2N
R_SATA4RXN
<32> SATA4RXP
C223
C0.01u50X0402
SATA4RXP_C
TX2P
RX2P
R_SATA4RXP
DEW2
EN
DE2
DE1
VCC
UB2
SN75LVCP601RTJR_QFN20
I98-756010C-T07
HDD GEN3 Repeater
+3VRUN
CB4
C1u25X0402
CB3
C0.1u50X70402
CB2
C0.01u50X0402
GND
SATA1DEW2
SATA1DE2
SATA1DE1
BTB Connecter
CON7
R_SATA4TXP
C211
C0.01u50X0402
SATA4TXP_CC
R_SATA4TXN
C214
C0.01u50X0402
SATA4TXN_CC
R_SATA4RXN
C218
C0.01u50X0402
SATA4RXN_CC
R_SATA4RXP
C222
C0.01u50X0402
SATA4RXP_CC
+5VRUN
Over 1A
C209
C47u6.3X1206
C215
C0.1u50X70402
C219
C0.1u50X70402
FPC14P-B-0.5PITCH_WHITE
N5A-14F0110-A81



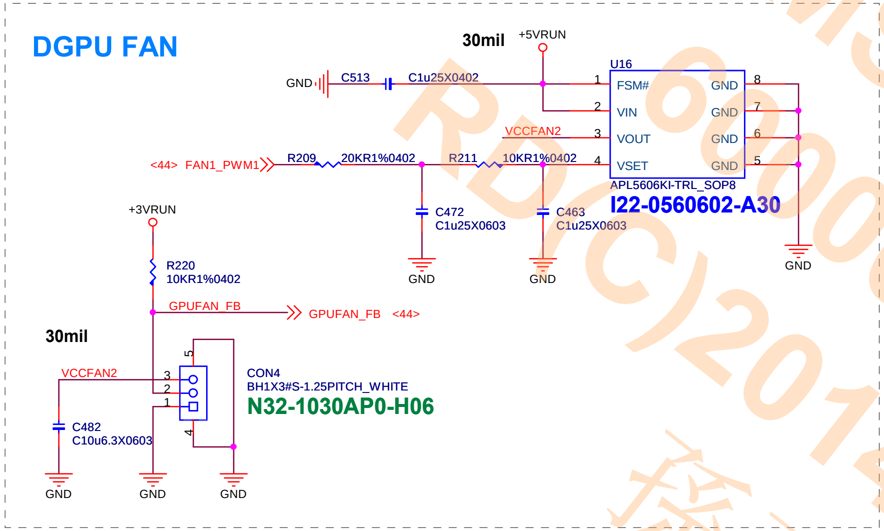
TI SN75LVCP601RTJR HW Setting

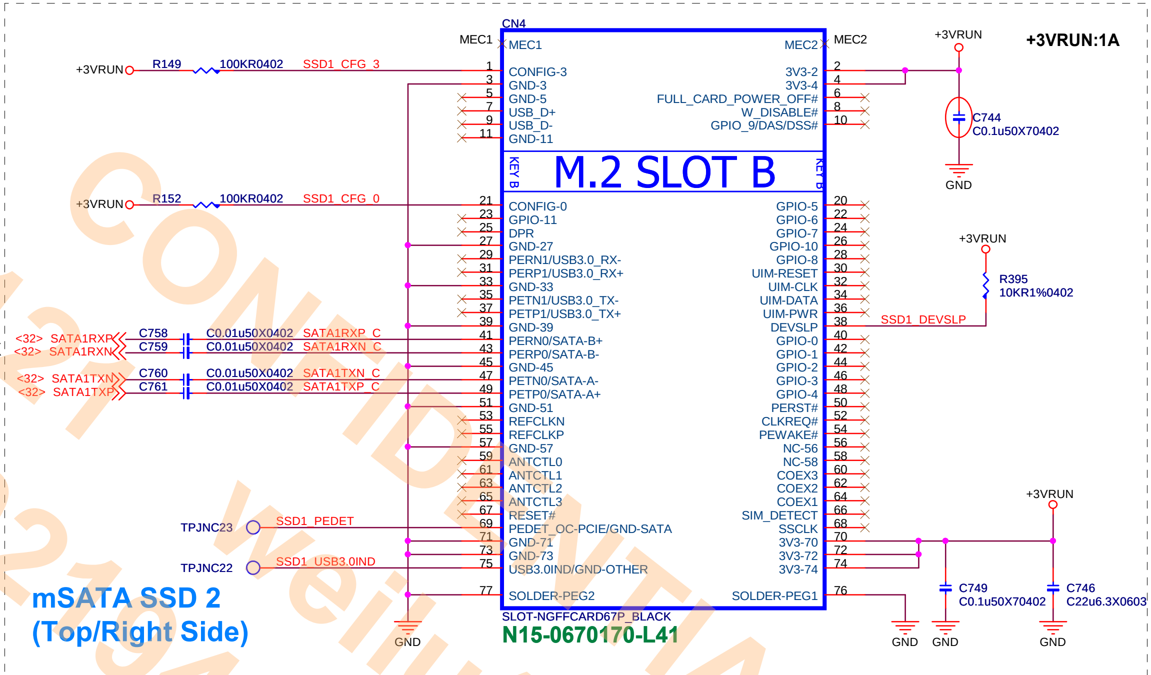
DE1/DE2	CH1/CH2De-Emphasis dB (at 6Gbps)	EQ1/EQ2	CH1/CH2Equalization dB (at 6Gbps)
NC (***default***)	–4	NC (***default***)	0
0	0	0	7
1	–2	1	14

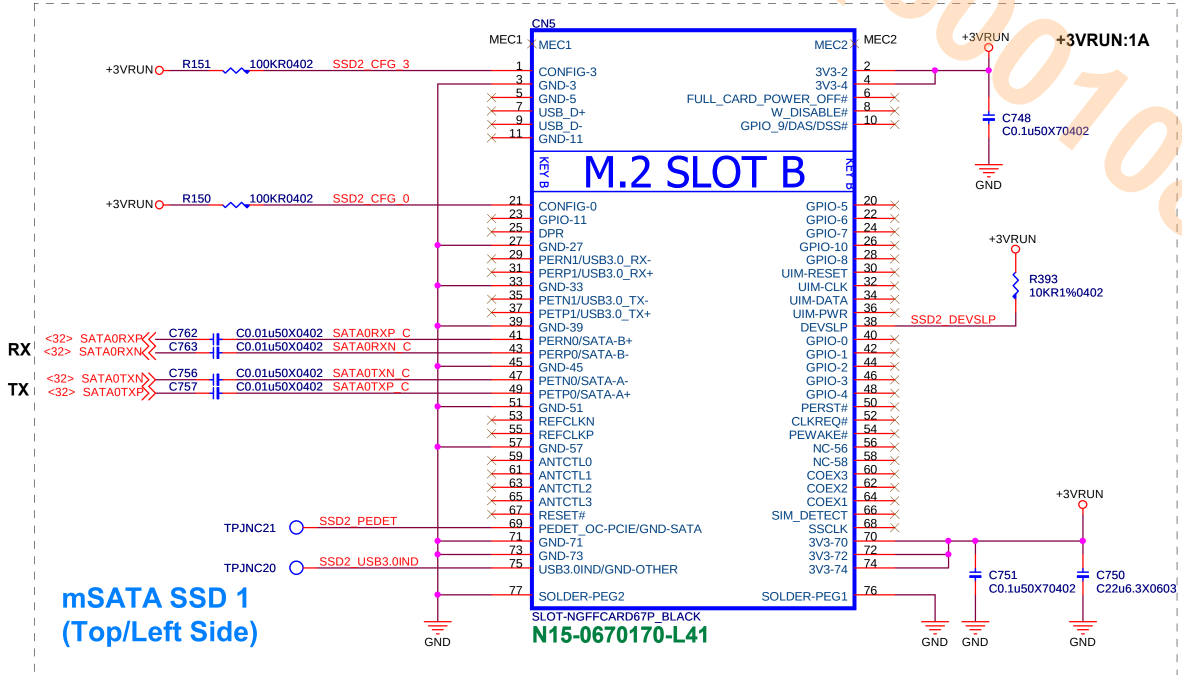
DEW1/DEW2	Device Function → DE Width for CH1/CH2
0	De-emphasis pulse duration, short (recommended setting when link operates at SATA 1.5/3/6 Gbps)
1 (***default***)	De-emphasis pulse duration, long (recommended setting when link operates at SATA 1.5/3 Gbps speed only)

MSI CONFIDENTIAL

SSD/ DGPU FAN


DGPU FAN
30mil
+5VRUN
U16
APL5606KI-TRL_SOP8
I22-0560602-A30
FSM#
VIN
VOUT
VSET
GND
C513 C1u25X0402
VCCFAN2
<44> FAN1_PWM1
R209 20KR1%0402
R211 10KR1%0402
C472 C1u25X0603
C463 C1u25X0603
+3VRUN
R220 10KR1%0402
GPUFAN_FB
GPUFAN_FB <44>
CON4
BH1X3#S-1.25PITCH_WHITE
N32-1030AP0-H06
C482 C10u6.3X0603


CN4
+3VRUN:1A
M.2 SLOT B
R149 100KR0402 SSD1_CFG_3
R152 100KR0402 SSD1_CFG_0
RX
TX
<32> SATA1RXP
<32> SATA1RXN
<32> SATA1TXN
<32> SATA1TXP
C758 C759 C760 C761 C0.01u50X0402
TPJNC23 SSD1_PEDET
TPJNC22 SSD1_USB3.0IND
R395 10KR1%0402
SSD1_DEVSLP
C744 C0.1u50X70402
C749 C0.1u50X70402
C746 C22u6.3X0603
SLOT-NGFFCARD67P_BLACK
N15-0670170-L41
mSATA SSD 2
(Top/Right Side)


CN5
+3VRUN:1A
M.2 SLOT B
R151 100KR0402 SSD2_CFG_3
R150 100KR0402 SSD2_CFG_0
RX
TX
<32> SATA0RXP
<32> SATA0RXN
<32> SATA0TXN
<32> SATA0TXP
C762 C763 C756 C757 C0.01u50X0402
TPJNC21 SSD2_PEDET
TPJNC20 SSD2_USB3.0IND
R393 10KR1%0402
SSD2_DEVSLP
C748 C0.1u50X70402
C751 C0.1u50X70402
C750 C22u6.3X0603
SLOT-NGFFCARD67P_BLACK
N15-0670170-L41
mSATA SSD 1
(Top/Left Side)

40	NC	No Connect
41	SATA-B+/PERn0	Host receiver differential signal pair
42	NC	No Connect
43	SATA-B-/PERp0	Host receiver differential signal pair
44	NC	No Connect
45	GND	Ground
46	NC	No Connect
47	SATA-A-/PETn0	Host Transmitter differential signal pair
48	NC	No Connect
49	SATA-A+/PETp0	Host transmitter differential signal pair

MICRO-STAR INT'L CO.,LTD.

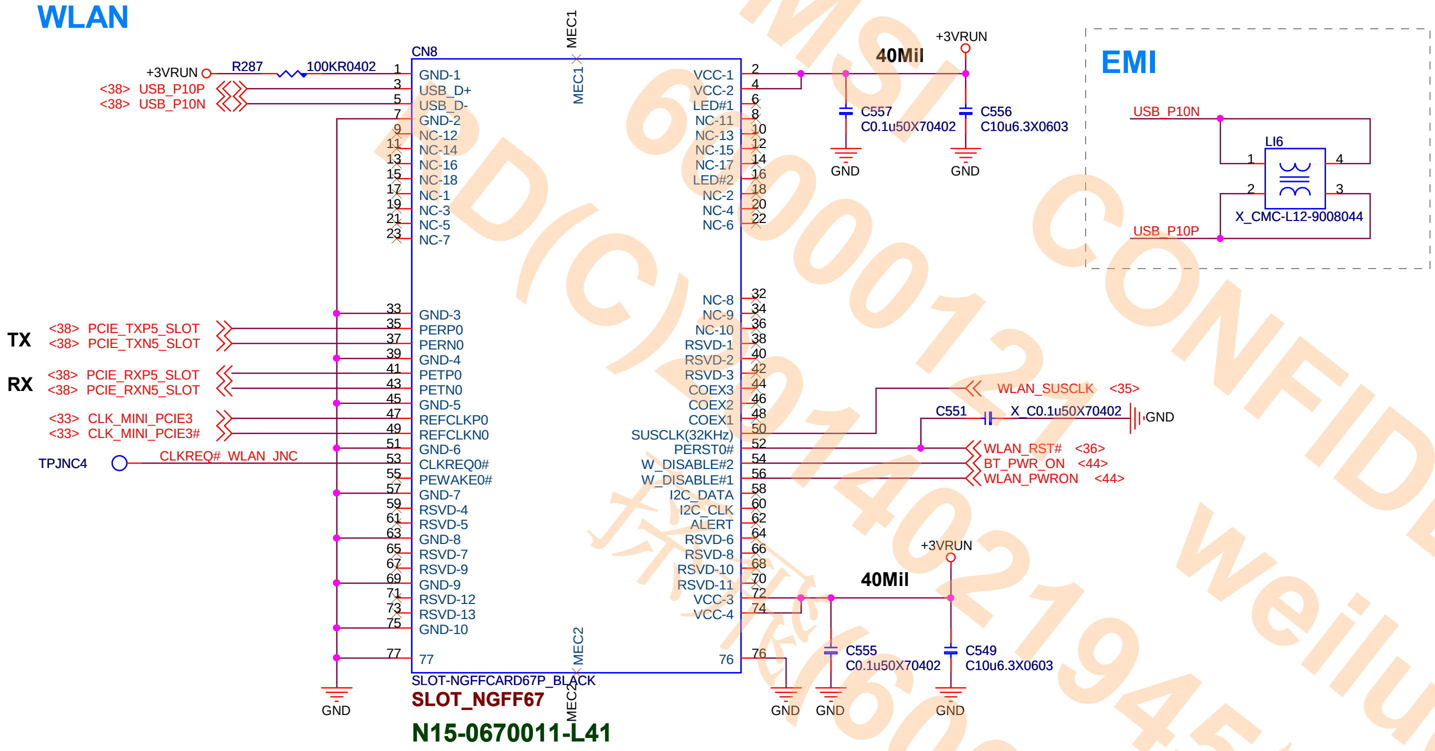
Title: SSD/ DGPU FAN

Size | Document Number: MS-16H2 | Rev 1.0

Date: Wednesday, January 08, 2014 | Sheet 53 of 72

WLAN /Camera/ClickPad/FP

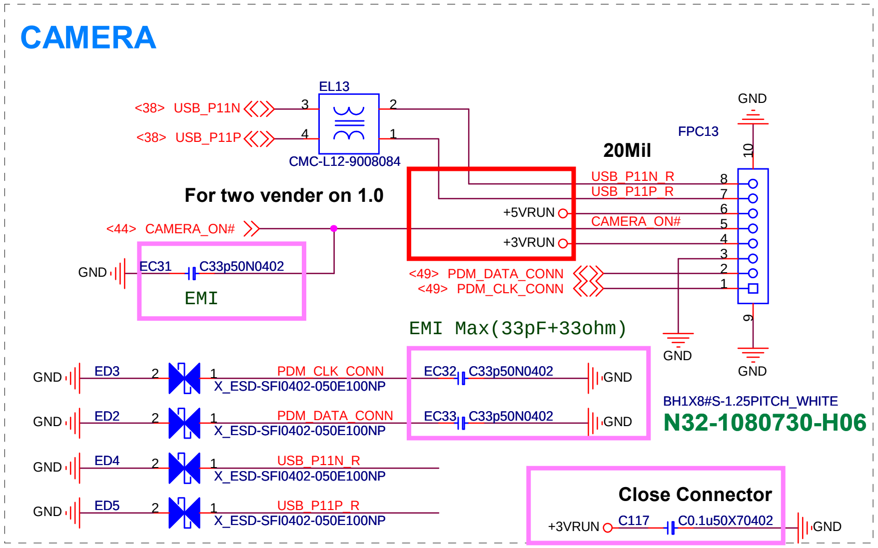
WLAN



+3VRUN
R287 100KR0402
<38> USB_P10P
<38> USB_P10N
CN8
MEC1
GND-1
USB_D+
USB_D-
GND-2
VCC-1
VCC-2
LED#1
LED#2
40Mil
C557 C0.1u50X70402
C556 C10u6.3X0603
GND
TX
<38> PCIE_TXP5_SLOT
<38> PCIE_TXN5_SLOT
RX
<38> PCIE_RXP5_SLOT
<38> PCIE_RXN5_SLOT
<33> CLK_MINI_PCIE3
<33> CLK_MINI_PCIE3#
TPJNC4
CLKREQ#_WLAN_JNC
PERP0
PERN0
PETP0
PETN0
REFCLKP0
REFCLKN0
CLKREQ0#
PEWAKE0#
SUSCLK(32KHz)
PERST0#
W_DISABLE#2
W_DISABLE#1
I2C_DATA
I2C_CLK
ALERT
COEX3
COEX2
COEX1
WLAN_SUSCLK <35>
C551 X_C0.1u50X70402
WLAN_RST# <36>
BT_PWR_ON <44>
WLAN_PWRON <44>
C555 C0.1u50X70402
C549 C10u6.3X0603
SLOT-NGFFCARD67P_BLACK
SLOT_NGFF67
N15-0670011-L41
EMI
USB_P10N
USB_P10P
LI6
X_CMC-L12-9008044

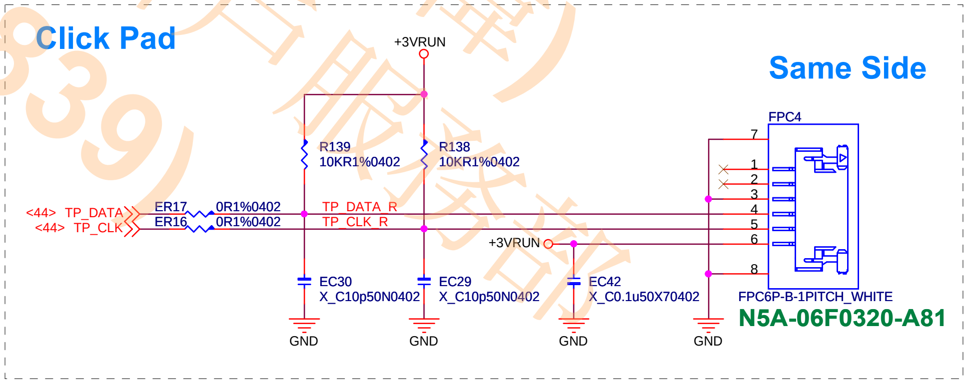
Pin 1	GND		
Pin 3	USB_D+	Pin 2	3.3V
Pin 5	USB_D-	Pin 4	3.3V
Pin 7	GND	Pin 6	LED1#
Pin 9	Module Key	Pin 8	Module Key
Pin 11	Module Key	Pin 10	Module Key
Pin 13	Module Key	Pin 12	Module Key
Pin 15	Module Key	Pin 14	Module Key
Pin 17	N/C	Pin 16	LED2#
Pin 19	N/C	Pin 18	GND
Pin 21	N/C	Pin 20	N/C
Pin 23	N/C	Pin 22	N/C
Pin 25	Module Key	Pin 24	Module Key
Pin 27	Module Key	Pin 26	Module Key
Pin 29	Module Key	Pin 28	Module Key
Pin 31	Module Key	Pin 30	Module Key
Pin 33	GND	Pin 32	N/C
Pin 35	PERP0	Pin 34	N/C
Pin 37	PERN0	Pin 36	N/C
Pin 39	GND	Pin 38	Clink Reset (I 3.3V)
Pin 41	PETP0	Pin 40	N/C
Pin 43	PETN0	Pin 42	N/C
Pin 45	GND	Pin 44	N/C
Pin 47	REFCLKP0	Pin 46	N/C
Pin 49	REFCLKN0	Pin 48	N/C
Pin 51	GND	Pin 50	N/C (SUSCLK (32kHz) for DSx)
Pin 53	CLKREQ0#	Pin 52	PERST0#
Pin 55	PEWAKE0#	Pin 54	BT_EN (W_DISABLE2#)
Pin 57	GND	Pin 56	WLAN_EN (W_DISABLE2#)
Pin 59	N/C	Pin 58	N/C
Pin 61	N/C	Pin 60	N/C
Pin 63	GND	Pin 62	N/C
Pin 65	N/C	Pin 64	Resever
Pin 67	N/C	Pin 66	N/C
Pin 69	GND	Pin 68	N/C
Pin 71	N/C	Pin 70	N/C
Pin 73	N/C	Pin 72	3.3V
Pin 75	GND	Pin 74	3.3V

CAMERA



<38> USB_P11N
<38> USB_P11P
EL13
CMC-L12-9008084
For two vender on 1.0
<44> CAMERA_ON#
EC31 C33p50N0402
EMI
20Mil
FPC13
USB_P11N_R
USB_P11P_R
+5VRUN
+3VRUN
CAMERA_ON#
<49> PDM_DATA_CONN
<49> PDM_CLK_CONN
EMI Max(33pF+33ohm)
ED3 ED2 ED4 ED5
X_ESD-SFI0402-050E100NP
PDM_CLK_CONN
PDM_DATA_CONN
EC32 C33p50N0402
EC33 C33p50N0402
BH1X8#S-1.25PITCH_WHITE
N32-1080730-H06
Close Connector
+3VRUN C117 C0.1u50X70402
GND

Click Pad

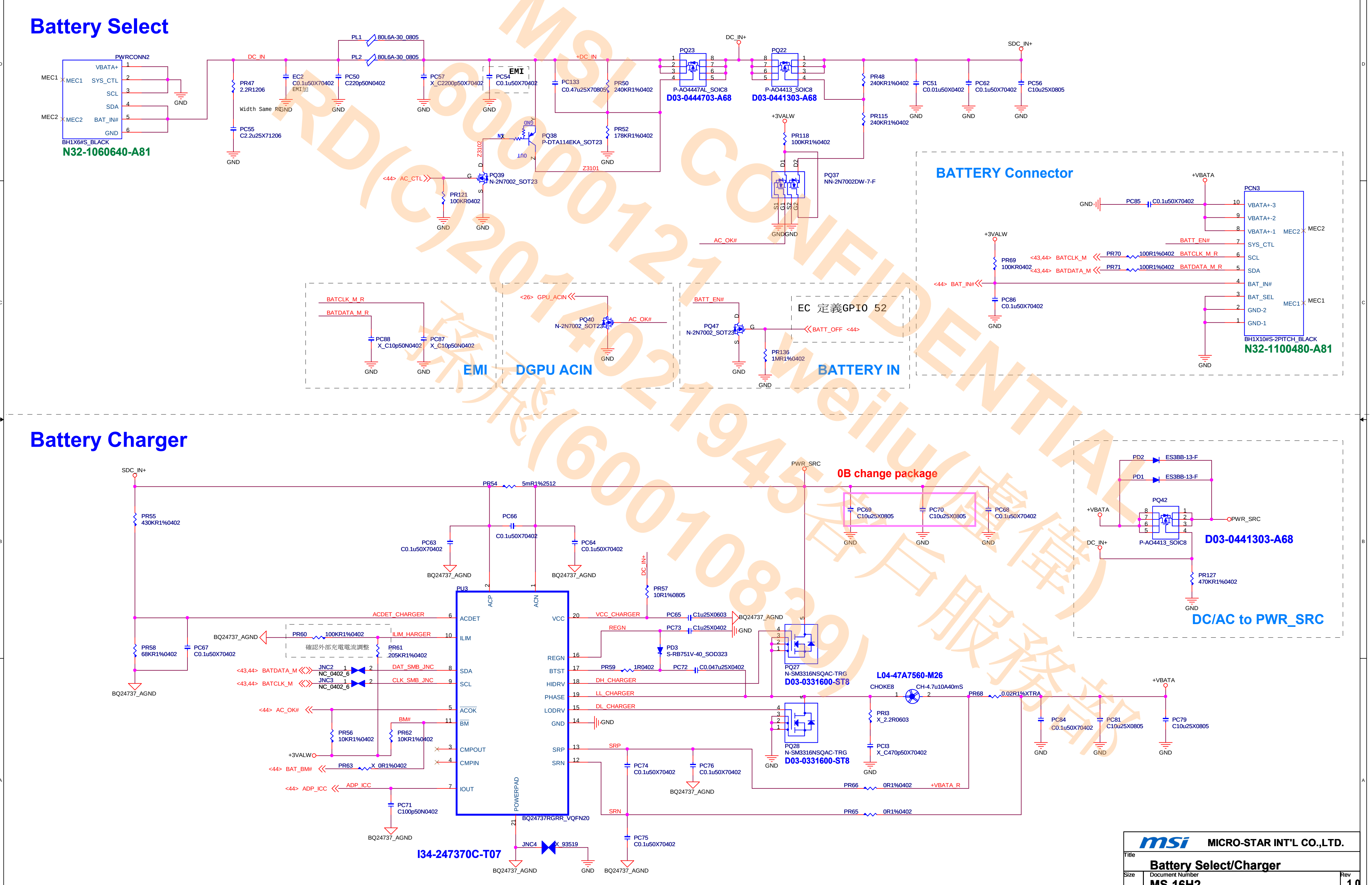


MSI CONFIDENTIAL

MICRO-STAR INT'L CO.,LTD.

Title	WLAN /Camera/ClickPad/FP	
Size	Document Number: MS-16H2	Rev 1.0
Date: Friday, January 03, 2014	Sheet 54 of 72	

Battery Select/Charger

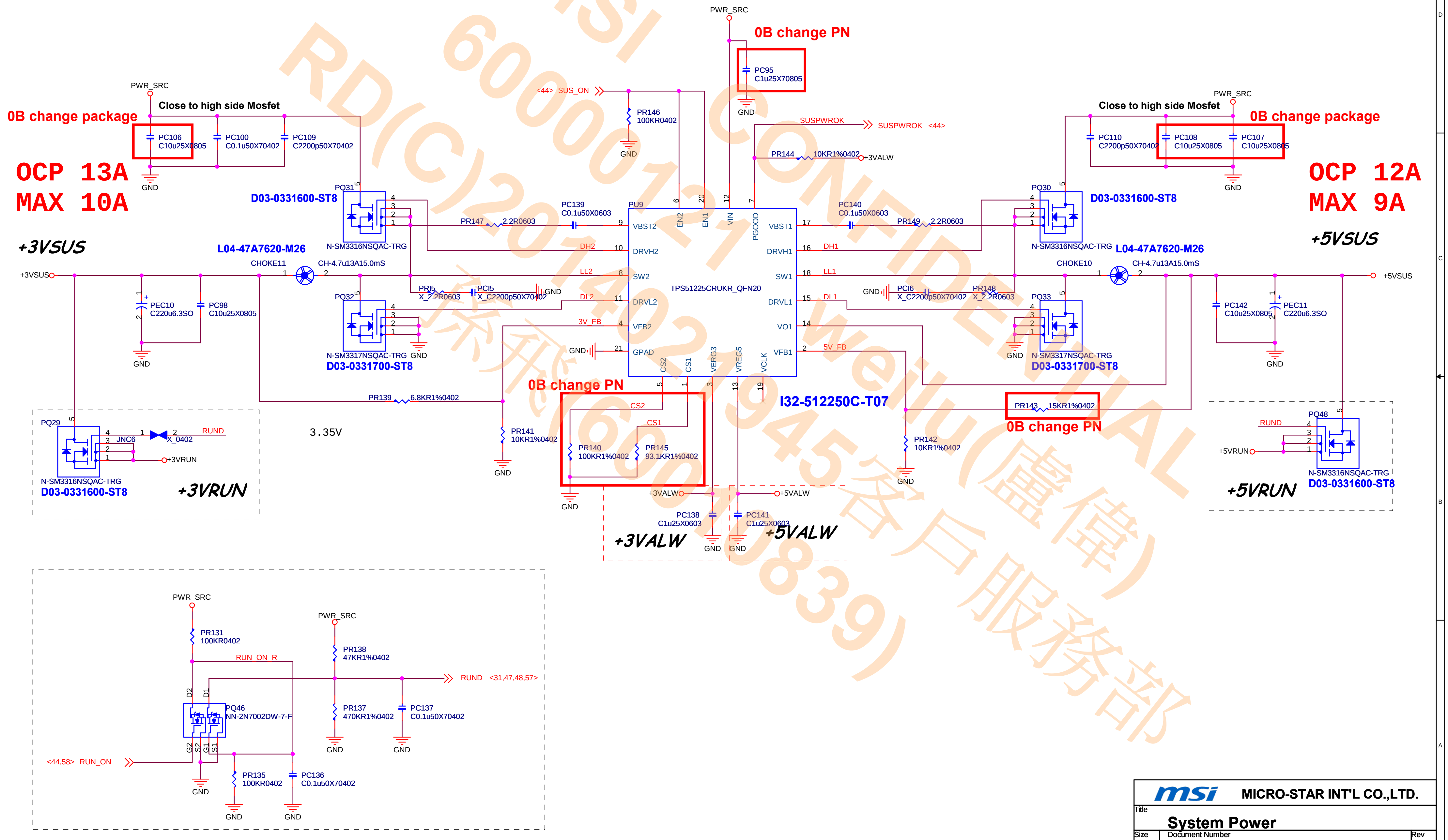


Battery Select
PWRCONN2
VBATA+
SYS_CTL
SCL
SDA
BAT_IN#
GND
MEC1
MEC2
BH1X6#S_BLACK
N32-1060640-A81
DC_IN
PL1 80L6A-30_0805
PL2 80L6A-30_0805
PR47 2.2R1206
EC2 C0.1u50X70402
PC50 C220p50N0402
PC57 X_C2200p50X70402
PC54 C0.1u50X70402
EMI
PC55 C2.2u25X71206
Width Same R
+DC_IN
PC133 C0.47u25X70805
PR50 240KR1%0402
PR52 178KR1%0402
PQ38 P-DTA114EKA_SOT23
PQ39 N-2N7002_SOT23
<44> AC_CTL
PR121 100KR0402
Z3101
Z3102
DC_IN+
PQ23 P-AO4447AL_SOIC8
D03-0444703-A68
PQ22 P-AO4413_SOIC8
D03-0441303-A68
SDC_IN+
PR48 240KR1%0402
PR115 240KR1%0402
PC51 C0.01u50X0402
PC62 C0.1u50X70402
PC56 C10u25X0805
+3VALW
PR118 100KR1%0402
PQ37 NN-2N7002DW-7-F
AC_OK#
GND
BATTERY Connector
+VBATA
PCN3
PC85 C0.1u50X70402
VBATA+-3
VBATA+-2
VBATA+-1
SYS_CTL
SCL
SDA
BAT_IN#
BAT_SEL
GND-2
GND-1
BATT_EN#
PR69 100KR0402
<43,44> BATCLK_M
<43,44> BATDATA_M
PR70 100R1%0402 BATCLK_M_R
PR71 100R1%0402 BATDATA_M_R
<44> BAT_IN#
PC86 C0.1u50X70402
BH1X10#S-2PITCH_BLACK
N32-1100480-A81
BATCLK_M_R
BATDATA_M_R
PC88 X_C10p50N0402
PC87 X_C10p50N0402
EMI
<26> GPU_ACIN
PQ40 N-2N7002_SOT23
AC_OK#
DGPU ACIN
BATT_EN#
PQ47 N-2N7002_SOT23
EC 定義GPIO 52
BATT_OFF <44>
PR136 1MR1%0402
BATTERY IN
Battery Charger
SDC_IN+
PR54 5mR1%2512
PR55 430KR1%0402
PC66 C0.1u50X70402
PC63 C0.1u50X70402
PC64 C0.1u50X70402
BQ24737_AGND
PWR_SRC
0B change package
PC69 C10u25X0805
PC70 C10u25X0805
PC68 C0.1u50X70402
PD2 ES3BB-13-F
PD1 ES3BB-13-F
PQ42 P-AO4413_SOIC8
D03-0441303-A68
PR127 470KR1%0402
DC/AC to PWR_SRC
PU3
ACDET_CHARGER
ACDET
ILIM
SDA
SCL
ACOK
BM
CMPOUT
CMPIN
IOUT
ACP
ACN
VCC
REGN
BTST
HIDRV
PHASE
LODRV
GND
SRP
SRN
POWERPAD
BQ24737RGRR_VQFN20
I34-247370C-T07
PR57 10R1%0805
VCC_CHARGER
PC65 C1u25X0603
PC73 C1u25X0402
PD3 S-RB751V-40_SOD323
PR59 1R0402
PC72 C0.047u25X0402
DH_CHARGER
LL_CHARGER
DL_CHARGER
PR60 100KR1%0402
ILIM_HARGER
確認外部充電電流調整
PR61 205KR1%0402
PR58 68KR1%0402
PC67 C0.1u50X70402
<43,44> BATDATA_M
<43,44> BATCLK_M
JNC2 NC_0402_6
JNC3 NC_0402_6
DAT_SMB_JNC
CLK_SMB_JNC
<44> AC_OK#
BM#
PR56 10KR1%0402
PR62 10KR1%0402
+3VALW
<44> BAT_BM#
PR63 X_0R1%0402
<44> ADP_ICC
ADP_ICC
PC71 C100p50N0402
JNC4 X_93519
PQ27 N-SM3316NSQAC-TRG
D03-0331600-ST8
PQ28 N-SM3316NSQAC-TRG
D03-0331600-ST8
L04-47A7560-M26
CHOKE8 CH-4.7u10A40mS
PR68 0.02R1%XTRA
+VBATA
PR13 X_2.2R0603
PC13 X_C470p50X70402
PC84 C0.1u50X70402
PC81 C10u25X0805
PC79 C10u25X0805
SRP
SRN
PC74 C0.1u50X70402
PC76 C0.1u50X70402
PC75 C0.1u50X70402
PR66 0R1%0402 +VBATA_R
PR65 0R1%0402

MSI CONFIDENTIAL
RD(C)20140219 weiliu(劉偉)
600012145
綜資(600108839)客戶服務部

msi	MICRO-STAR INT'L CO.,LTD.	
Title	Battery Select/Charger	
Size	Document Number: MS-16H2	Rev: 1.0
Date: Thursday, February 13, 2014	Sheet 55 of 72	

System Power



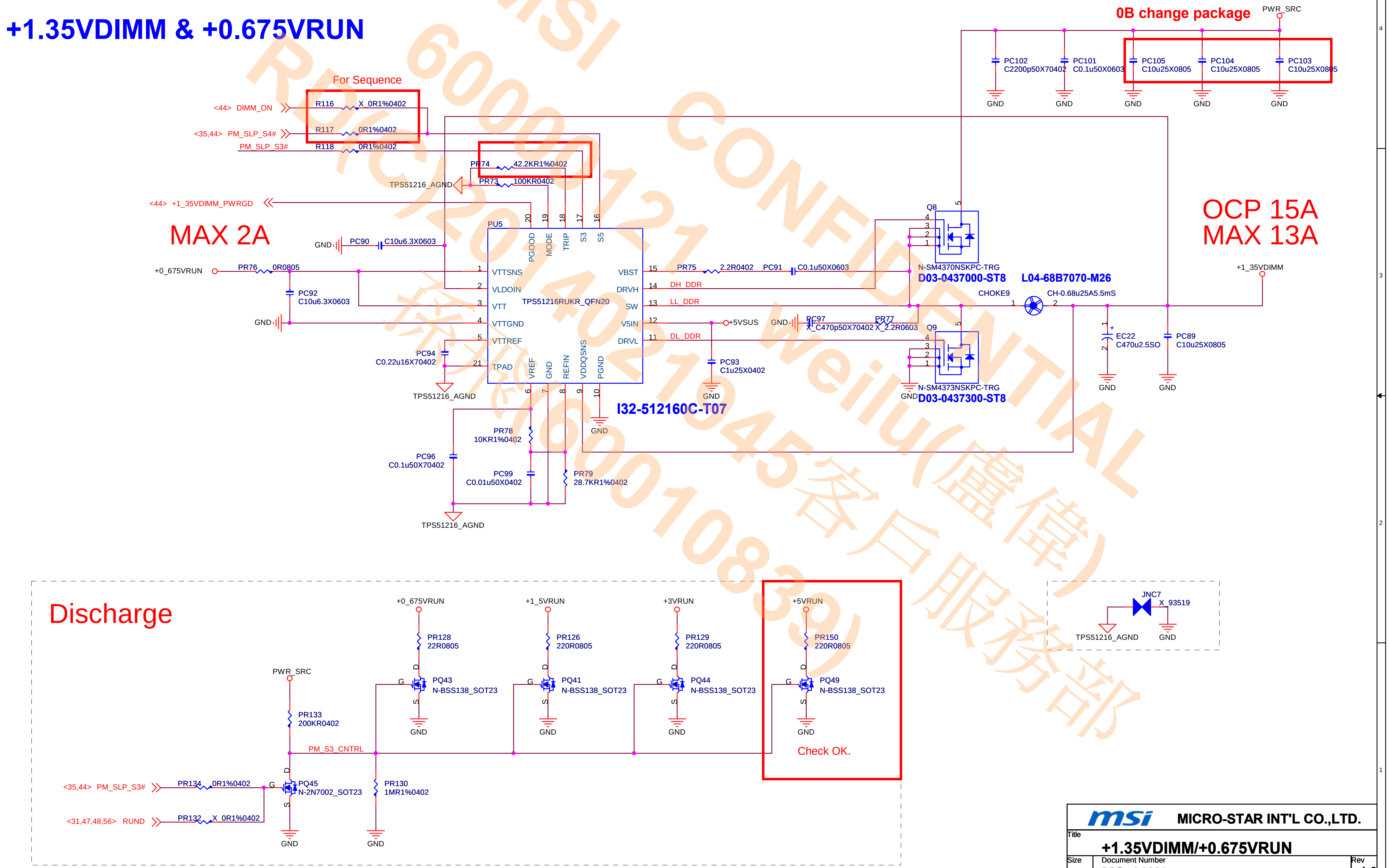
PWR_SRC
0B change PN
PC95
C1u25X70805
GND
<44> SUS_ON
PR146
100KR0402
SUSPWROK
SUSPWROK <44>
PR144
10KR1%0402
+3VALW
0B change package
Close to high side Mosfet
PC106
C10u25X0805
PC100
C0.1u50X70402
PC109
C2200p50X70402
PC110
C2200p50X70402
PC108
C10u25X0805
PC107
C10u25X0805
OCP 13A
MAX 10A
OCP 12A
MAX 9A
PQ31
D03-0331600-ST8
N-SM3316NSQAC-TRG
PQ30
D03-0331600-ST8
PC139
C0.1u50X70603
PR147
2.2R0603
PC140
C0.1u50X70603
PR149
2.2R0603
PU9
VBST2
DRVH2
SW2
DRVL2
VFB2
GPAD
EN2
EN1
VIN
PGOOD
VBST1
DRVH1
SW1
DRVL1
VO1
VFB1
CS2
CS1
VREG3
VREG5
VCLK
TPS51225CRUKR_QFN20
DH2
LL2
DL2
3V_FB
DH1
LL1
DL1
5V_FB
+3VSUS
+5VSUS
L04-47A7620-M26
CHOKE11
CH-4.7u13A15.0mS
CHOKE10
PR15
X_2.2R0603
PC15
X_C2200p50X70402
PC16
X_C2200p50X70402
PR148
X_2.2R0603
PQ32
N-SM3317NSQAC-TRG
D03-0331700-ST8
PQ33
N-SM3317NSQAC-TRG
D03-0331700-ST8
PEC10
C220u6.3SO
PC98
C10u25X0805
PC142
C10u25X0805
PEC11
C220u6.3SO
PR139
6.8KR1%0402
0B change PN
PR141
10KR1%0402
PR140
100KR1%0402
PR145
93.1KR1%0402
I32-512250C-T07
PR143
15KR1%0402
0B change PN
PR142
10KR1%0402
3.35V
PQ29
JNC6
X_0402
RUND
+3VRUN
N-SM3316NSQAC-TRG
D03-0331600-ST8
+3VRUN
+3VALW
+5VALW
PC138
C1u25X0603
PC141
C1u25X0603
+3VALW
+5VALW
PQ48
RUND
+5VRUN
N-SM3316NSQAC-TRG
D03-0331600-ST8
+5VRUN
PR131
100KR0402
RUN_ON_R
PR138
47KR1%0402
RUND <31,47,48,57>
PQ46
NN-2N7002DW-7-F
PR137
470KR1%0402
PC137
C0.1u50X70402
<44,58> RUN_ON
PR135
100KR0402
PC136
C0.1u50X70402

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

Title	System Power	
Size	Document Number: MS-16H2	Rev: 1.0
Date: Friday, January 03, 2014	Sheet 56 of 72	

MSI CONFIDENTIAL 600012 RD(C)2014/2/9 weilu(盧偉) 深圳(600839) 客戶服務部

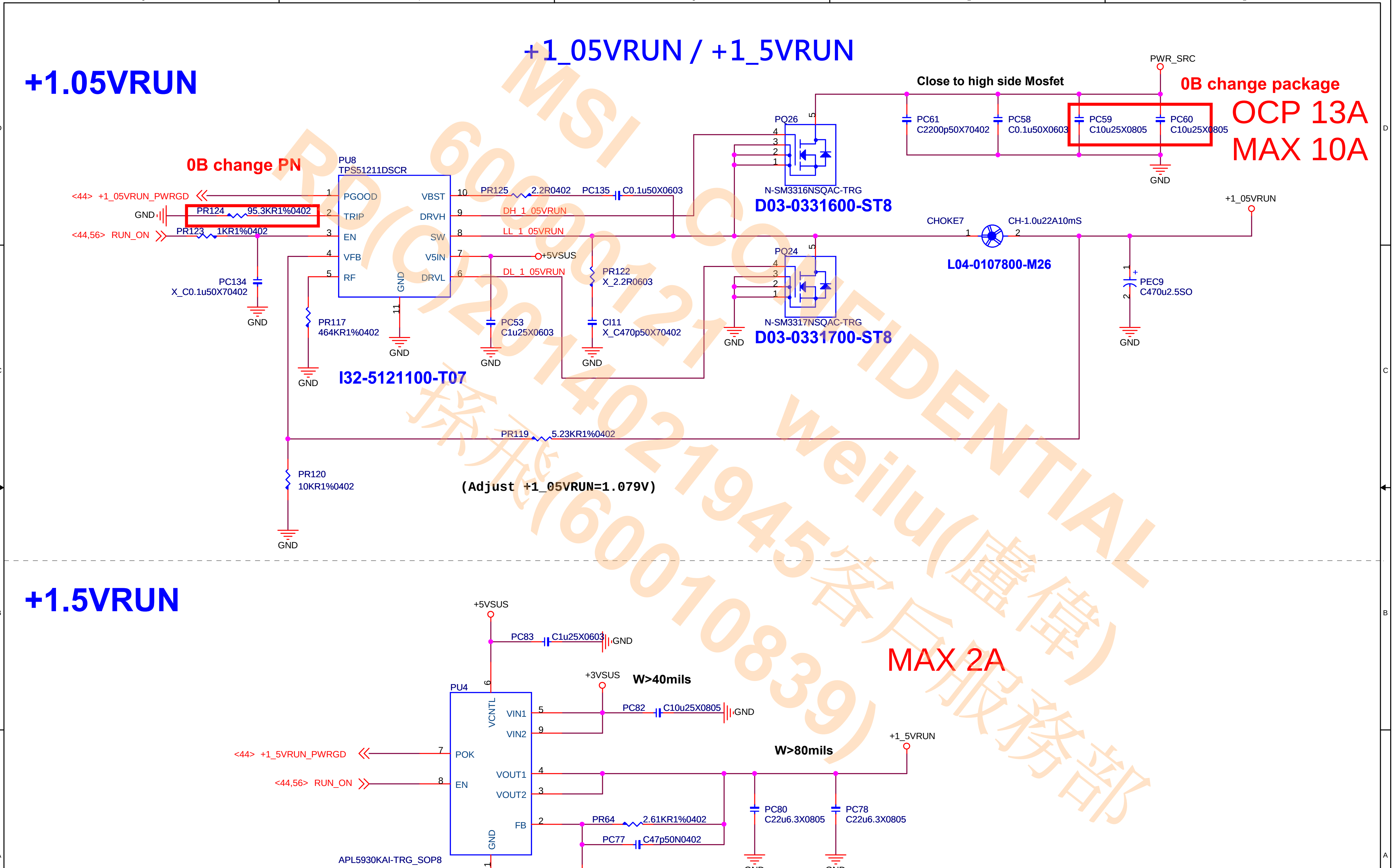
+1.35VDIMM/+0.675VRUN


+1.35VDIMM & +0.675VRUN
For Sequence
<44> DIMM_ON
R116 X_0R1%0402
<35,44> PM_SLP_S4#
R117 0R1%0402
PM_SLP_S3#
R118 0R1%0402
PR74 42.2KR1%0402
PR73 100KR0402
TPS51216_AGND
<44> +1_35VDIMM_PWRGD
MAX 2A
GND
PC90 C10u6.3X0603
PU5
PGOOD MODE TRIP S3 S5
+0_675VRUN
PR76 0R0805
VTTSNS VLDOIN VTT VTTGND VTTREF TPAD
PC92 C10u6.3X0603
TPS51216RUKR_QFN20
VBST DRVH SW V5IN DRVL
VREF GND REFIN VDDQSNS PGND
PC94 C0.22u16X70402
PR75 2.2R0402
PC91 C0.1u50X0603
DH_DDR
LL_DDR
DL_DDR
+5VSUS
PC97 X_C470p50X70402
PR77 X_2.2R0603
PC93 C1u25X0402
I32-512160C-T07
Q8
N-SM4370NSKPC-TRG
D03-0437000-ST8
Q9
N-SM4373NSKPC-TRG
D03-0437300-ST8
L04-68B7070-M26
CHOKE9
CH-0.68u25A5.5mS
0B change package
PWR_SRC
PC102 C2200p50X70402
PC101 C0.1u50X0603
PC105 C10u25X0805
PC104 C10u25X0805
PC103 C10u25X0805
OCP 15A
MAX 13A
+1_35VDIMM
EC22 C470u2.5SO
PC89 C10u25X0805
PR78 10KR1%0402
PC96 C0.1u50X70402
PC99 C0.01u50X0402
PR79 28.7KR1%0402
Discharge
+0_675VRUN
PR128 22R0805
PQ43 N-BSS138_SOT23
+1_5VRUN
PR126 220R0805
PQ41 N-BSS138_SOT23
+3VRUN
PR129 220R0805
PQ44 N-BSS138_SOT23
+5VRUN
PR150 220R0805
PQ49 N-BSS138_SOT23
Check OK.
PR133 200KR0402
PM_S3_CNTRL
<35,44> PM_SLP_S3#
PR134 0R1%0402
PQ45 N-2N7002_SOT23
PR130 1MR1%0402
<31,47,48,56> RUND
PR132 X_0R1%0402
JNC7 X_93519

MSI 60000121 CONFIDENTIAL
RD(C)20140219 Weiliu(盧偉)
深圳(60010839)客户服务部

MICRO-STAR INT'L CO.,LTD.

Title	+1.35VDIMM/+0.675VRUN
Size / Document Number	MS-16H2
Rev	1.0
Date	Thursday, February 13, 2014
Sheet	57 of 72



+1_05VRUN / +1_5VRUN
+1.05VRUN
0B change PN
0B change package
OCP 13A
MAX 10A
Close to high side Mosfet
PWR_SRC
PC61 C2200p50X70402
PC58 C0.1u50X0603
PC59 C10u25X0805
PC60 C10u25X0805
GND
PQ26
N-SM3316NSQAC-TRG
D03-0331600-ST8
PU8
TPS51211DSCR
<44> +1_05VRUN_PWRGD
GND
PR124 95.3KR1%0402
<44,56> RUN_ON
PR123 1KR1%0402
PGOOD
TRIP
EN
VFB
RF
VBST
DRVH
SW
V5IN
DRVL
GND
PR125 2.2R0402
PC135 C0.1u50X0603
DH_1_05VRUN
LL_1_05VRUN
DL_1_05VRUN
+5VSUS
PR122 X_2.2R0603
CI11 X_C470p50X70402
PC53 C1u25X0603
PC134 X_C0.1u50X70402
PR117 464KR1%0402
I32-5121100-T07
PQ24
N-SM3317NSQAC-TRG
D03-0331700-ST8
CHOKE7
CH-1.0u22A10mS
L04-0107800-M26
+1_05VRUN
PEC9 C470u2.5SO
PR119 5.23KR1%0402
PR120 10KR1%0402
(Adjust +1_05VRUN=1.079V)
+1.5VRUN
MAX 2A
+5VSUS
PC83 C1u25X0603
+3VSUS
W>40mils
PC82 C10u25X0805
PU4
VCNTL
VIN1
VIN2
POK
EN
VOUT1
VOUT2
FB
<44> +1_5VRUN_PWRGD
<44,56> RUN_ON
W>80mils
+1_5VRUN
PR64 2.61KR1%0402
PC77 C47p50N0402
PC80 C22u6.3X0805
PC78 C22u6.3X0805
PR67 3.01KR1%0402
APL5930KAI-TRG_SOP8
I31-0593002-A30

MSI CONFIDENTIAL
RD(C)60001212014021945 weilu(盧偉)
徐飛(60010839)客戶服務部

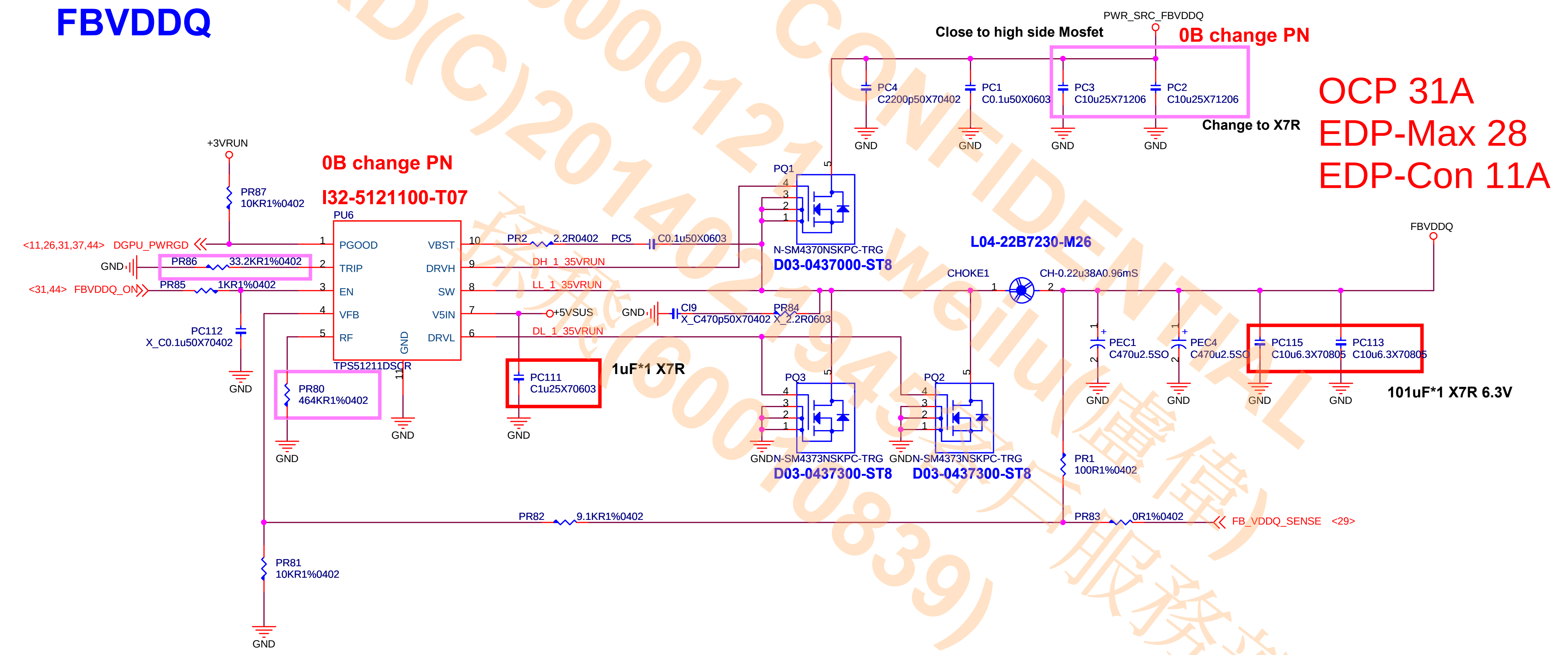
msi MICRO-STAR INT'L CO.,LTD.

Title: +1_05VRUN / +1_5VRUN

Size | Document Number: MS-16H2 | Rev 1.0

Date: Friday, January 03, 2014 | Sheet 58 of 72

DGPU POWER FBVDDQ



FBVDDQ
Close to high side Mosfet
PWR_SRC_FBVDDQ
0B change PN
OCP 31A
EDP-Max 28
EDP-Con 11A
PC4
C2200p50X70402
PC1
C0.1u50X0603
PC3
C10u25X71206
PC2
C10u25X71206
Change to X7R
+3VRUN
PR87
10KR1%0402
0B change PN
I32-5121100-T07
PU6
<11,26,31,37,44> DGPU_PWRGD
GND
PR86
33.2KR1%0402
<31,44> FBVDDQ_ON
PR85
1KR1%0402
PC112
X_C0.1u50X70402
PGOOD
TRIP
EN
VFB
RF
VBST
DRVH
SW
V5IN
DRVL
TPS51211DSCR
PR80
464KR1%0402
PR2
2.2R0402
PC5
C0.1u50X0603
DH_1_35VRUN
LL_1_35VRUN
DL_1_35VRUN
+5VSUS
CI9
X_C470p50X70402
PR84
X_2.2R0603
PC111
C1u25X70603
1uF*1 X7R
PQ1
N-SM4370NSKPC-TRG
D03-0437000-ST8
L04-22B7230-M26
CHOKE1
CH-0.22u38A0.96mS
FBVDDQ
PEC1
C470u2.5SO
PEC4
C470u2.5SO
PC115
C10u6.3X70805
PC113
C10u6.3X70805
101uF*1 X7R 6.3V
PQ3
N-SM4373NSKPC-TRG
D03-0437300-ST8
PQ2
N-SM4373NSKPC-TRG
D03-0437300-ST8
PR1
100R1%0402
PR82
9.1KR1%0402
PR83
0R1%0402
FB_VDDQ_SENSE <29>
PR81
10KR1%0402

MSI 600001211 CONFIDENTIAL RD(C)20140279 weilu(盧偉) 客服(600070839) 服務部

MICRO-STAR INT'L CO.,LTD.

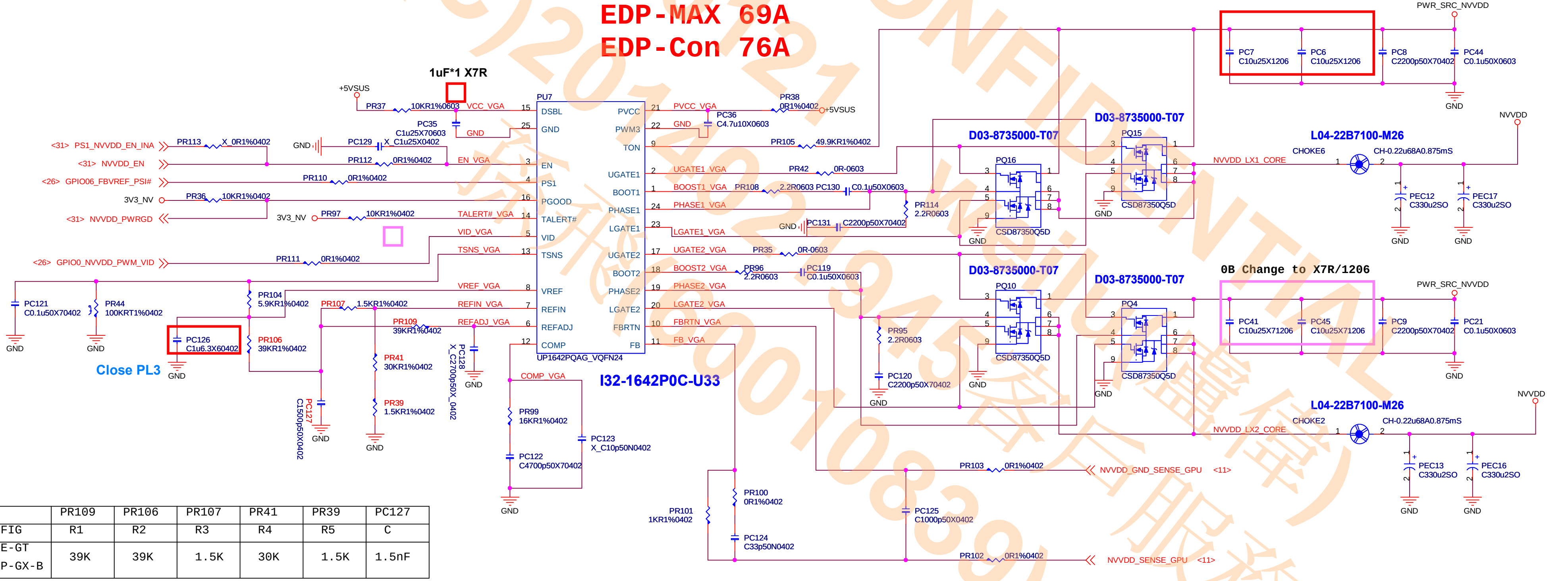
Title	DGPU POWER FBVDDQ
Size	
Document Number	MS-16H2
Rev	1.0
Date:	Tuesday, January 07, 2014
Sheet	59 of 72

DGPU POWER NVVDD

DGPU POWER / UP1642PQAG

CONFIG B
VBoot:0.9V
Vmin:0.6V / Vmax:1.2V

EDP-Peak 135A
EDP-MAX 69A
EDP-Con 76A

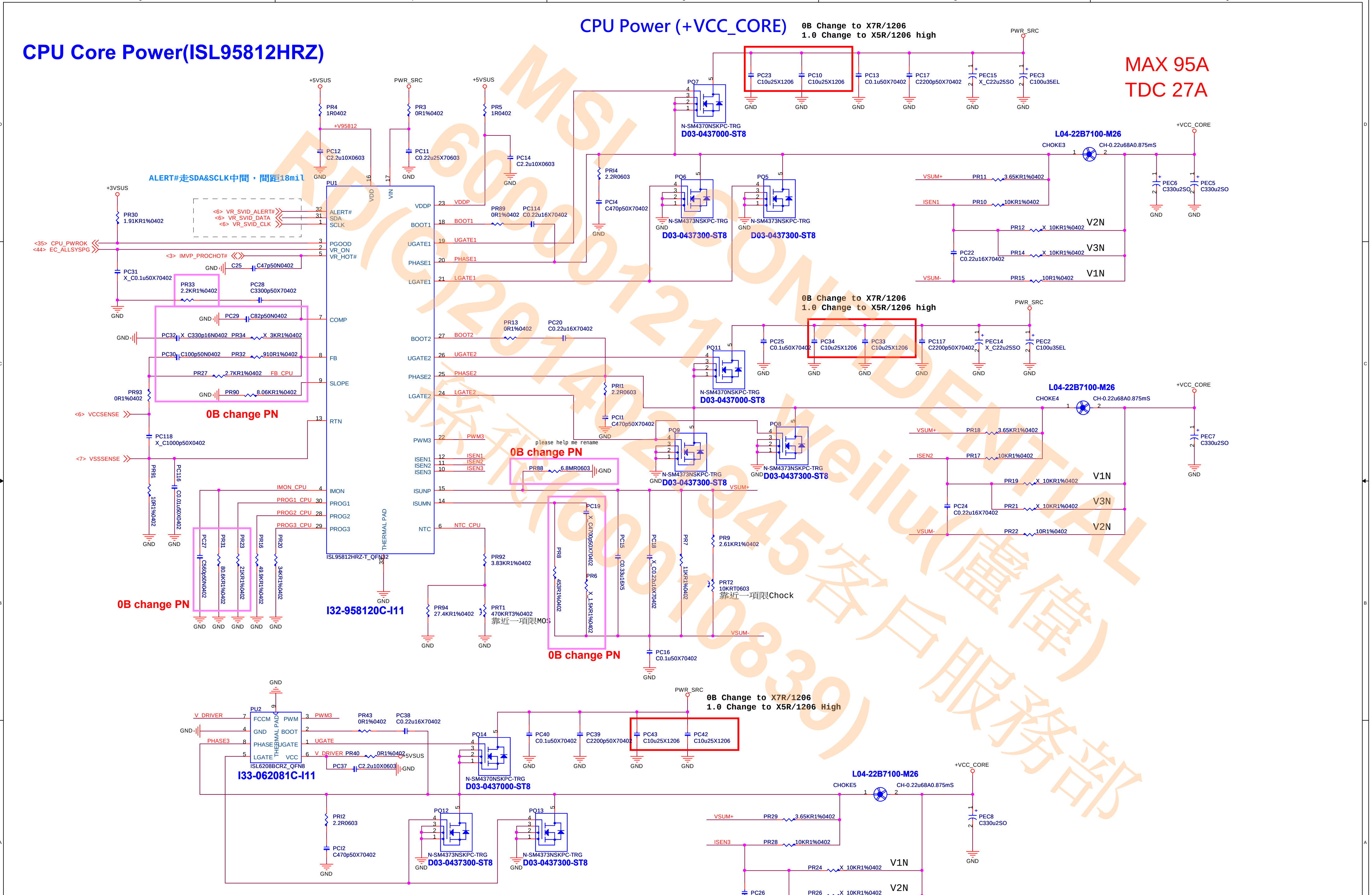


0B Change to X7R/1206
1.0 Change to X5R/1206 high
PWR_SRC_NVVDD
PC7 C10u25X1206
PC6 C10u25X1206
PC8 C2200p50X70402
PC44 C0.1u50X0603
1uF*1 X7R
+5VSUS
PR37 10KR1%0603 VCC_VGA
PC35 C1u25X70603
PU7
DSBL
GND
EN
PS1
PGOOD
TALERT#
VID
TSNS
VREF
REFIN
REFADJ
COMP
PVCC
PWM3
TON
UGATE1
BOOT1
PHASE1
LGATE1
UGATE2
BOOT2
PHASE2
LGATE2
FBRTN
FB
UP1642PQAG_VQFN24
I32-1642P0C-U33
PR38 0R1%0402
PC36 C4.7u10X0603
PR105 49.9KR1%0402
<31> PS1_NVVDD_EN_INA
<31> NVVDD_EN
<26> GPIO06_FBVREF_PSI#
3V3_NV
<31> NVVDD_PWRGD
<26> GPIO0_NVVDD_PWM_VID
PR113 X_0R1%0402
PC129 X_C1u25X0402
PR112 0R1%0402 EN_VGA
PR110 0R1%0402
PR36 10KR1%0402
PR97 10KR1%0402 TALERT#_VGA
VID_VGA
PR111 0R1%0402 TSNS_VGA
VREF_VGA
REFIN_VGA
REFADJ_VGA
PC121 C0.1u50X70402
PR44 100KRT1%0402
PR104 5.9KR1%0402
PR107 1.5KR1%0402
PR109 39KR1%0402
PC126 C1u6.3X60402
PR106 39KR1%0402
Close PL3
PR41 30KR1%0402
PR39 1.5KR1%0402
PC127 C1500p50X0402
PC128 X_C2700p50X_0402
COMP_VGA
PR99 16KR1%0402
PC123 X_C10p50N0402
PC122 C4700p50X70402
UGATE1_VGA
BOOST1_VGA
PHASE1_VGA
LGATE1_VGA
UGATE2_VGA
BOOST2_VGA
PHASE2_VGA
LGATE2_VGA
FBRTN_VGA
FB_VGA
PR42 0R-0603
PR108 2.2R0603
PC130 C0.1u50X0603
PR114 2.2R0603
PC131 C2200p50X70402
PR35 0R-0603
PR96 2.2R0603
PC119 C0.1u50X0603
PR95 2.2R0603
PC120 C2200p50X70402
D03-8735000-T07
PQ16 CSD87350Q5D
PQ15 CSD87350Q5D
PQ10 CSD87350Q5D
PQ4 CSD87350Q5D
L04-22B7100-M26
CHOKE6 CH-0.22u68A0.875mS
CHOKE2 CH-0.22u68A0.875mS
NVVDD_LX1_CORE
NVVDD_LX2_CORE
NVVDD
PEC12 C330u2SO
PEC17 C330u2SO
PEC13 C330u2SO
PEC16 C330u2SO
0B Change to X7R/1206
PC41 C10u25X71206
PC45 C10u25X71206
PC9 C2200p50X70402
PC21 C0.1u50X0603
PR103 0R1%0402 NVVDD_GND_SENSE_GPU <11>
PR102 0R1%0402 NVVDD_SENSE_GPU <11>
PR100 0R1%0402
PR101 1KR1%0402
PC124 C33p50N0402
PC125 C1000p50X0402
GND

	PR109	PR106	PR107	PR41	PR39	PC127
CONFIG	R1	R2	R3	R4	R5	C
N15E-GT N15P-GX-B	39K	39K	1.5K	30K	1.5K	1.5nF

MSI CONFIDENTIAL
RD(C)2014021945(劉偉)
6000001721 60001083)
客戶服務部

MICRO-STAR INT'L CO.,LTD.
Title: DGPU POWER NVVDD
Size | Document Number: MS-16H2 | Rev 1.0
Date: Thursday, February 13, 2014 | Sheet 60 of 72


CPU Core Power(ISL95812HRZ)
CPU Power (+VCC_CORE)
0B Change to X7R/1206
1.0 Change to X5R/1206 high
MAX 95A
TDC 27A
ALERT#走SDA&SCLK中間，間距18mil
0B change PN
please help me rename
I32-958120C-I11
ISL95812HRZ-T_QFN32
I33-062081C-I11
ISL6208BCRZ_QFN8
L04-22B7100-M26
CH-0.22uH68A0.875mS
N-SM4370NSKPC-TRG
D03-0437000-ST8
N-SM4373NSKPC-TRG
D03-0437300-ST8
靠近一項限Chock
靠近一項限MOS
0B Change to X7R/1206
1.0 Change to X5R/1206 High
PWR_SRC
+VCC_CORE
+5VSUS
+3VSUS
<35> CPU_PWROK
<44> EC_ALLSYSPG
<3> IMVP_PROCHOT#
<6> VR_SVID_ALERT#
<6> VR_SVID_DATA
<6> VR_SVID_CLK
<6> VCCSENSE
<7> VSSSENSE
V1N
V2N
V3N
MSI CONFIDENTIAL
RD(C)2014021?
60001219 Weilu(盧偉)
徐飛(60010839)客戶服務部

MICRO-STAR INT'L CO.,LTD.

Title: CPU Power (ISL95812HRZ)

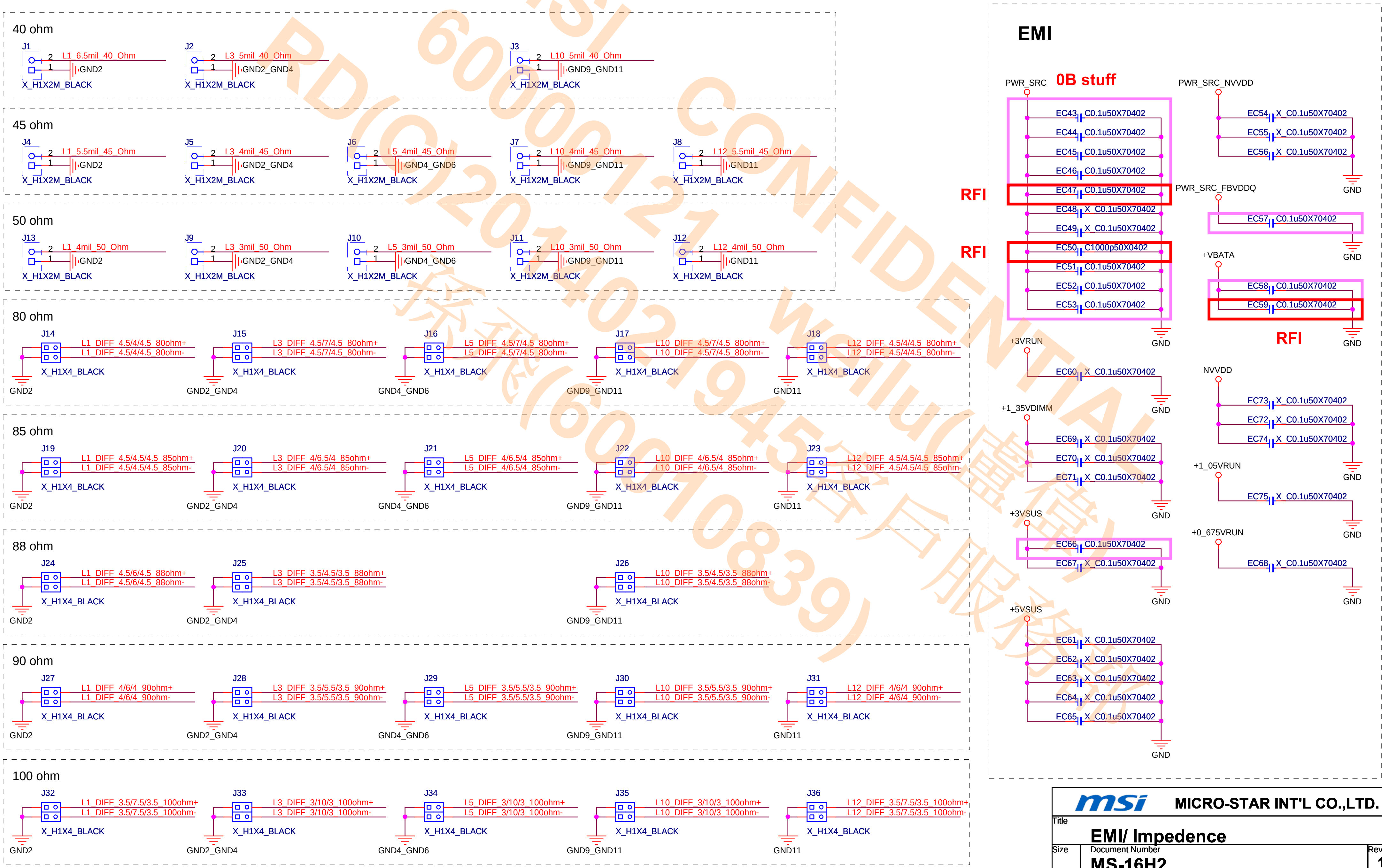
Size | Document Number: MS-16H2 | Rev: 1.0

Date: Thursday, February 13, 2014 | Sheet 61 of 72

EMI/ Impedence

Impedence Connector No PN

MSI CONFIDENTIAL
600012 RD(C)20140219 weiliu(廣精)
徐飛(600010839) 客戶服務部

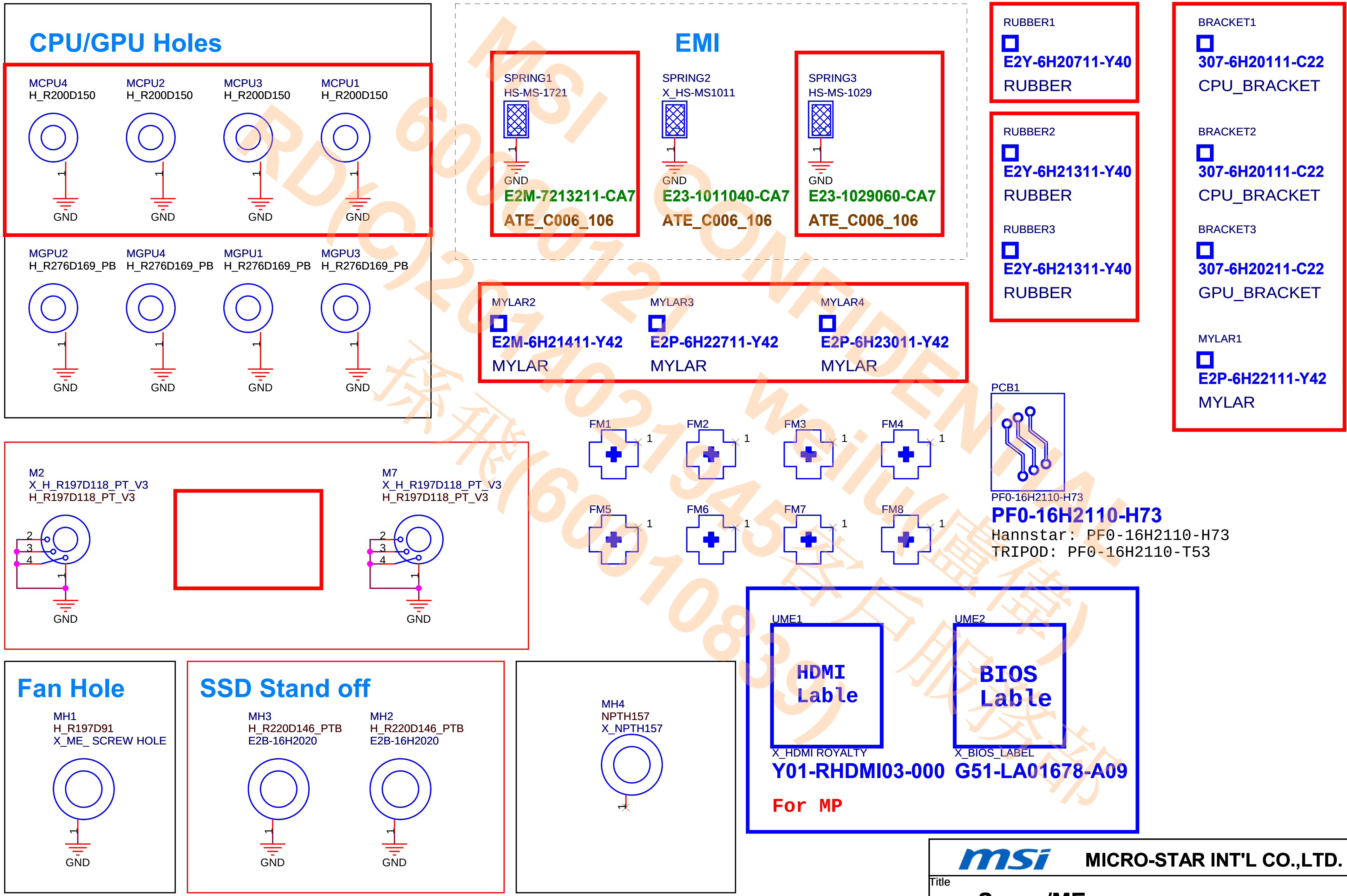


MICRO-STAR INT'L CO.,LTD.

Title: EMI/ Impedence

Size | Document Number: MS-16H2 | Rev: 1.0

Date: Thursday, February 13, 2014 | Sheet 62 of 72


CPU/GPU Holes
MCPU4 H_R200D150
MCPU2 H_R200D150
MCPU3 H_R200D150
MCPU1 H_R200D150
MGPU2 H_R276D169_PB
MGPU4 H_R276D169_PB
MGPU1 H_R276D169_PB
MGPU3 H_R276D169_PB
GND
EMI
SPRING1 HS-MS-1721
E2M-7213211-CA7
ATE_C006_106
SPRING2 X_HS-MS1011
E23-1011040-CA7
ATE_C006_106
SPRING3 HS-MS-1029
E23-1029060-CA7
ATE_C006_106
RUBBER1 E2Y-6H20711-Y40 RUBBER
RUBBER2 E2Y-6H21311-Y40 RUBBER
RUBBER3 E2Y-6H21311-Y40 RUBBER
BRACKET1 307-6H20111-C22 CPU_BRACKET
BRACKET2 307-6H20111-C22 CPU_BRACKET
BRACKET3 307-6H20211-C22 GPU_BRACKET
MYLAR1 E2P-6H22111-Y42 MYLAR
MYLAR2 E2M-6H21411-Y42 MYLAR
MYLAR3 E2P-6H22711-Y42 MYLAR
MYLAR4 E2P-6H23011-Y42 MYLAR
FM1 FM2 FM3 FM4 FM5 FM6 FM7 FM8
PCB1 PF0-16H2110-H73
PF0-16H2110-H73
Hannstar: PF0-16H2110-H73
TRIPOD: PF0-16H2110-T53
M2 X_H_R197D118_PT_V3 H_R197D118_PT_V3
M7 X_H_R197D118_PT_V3 H_R197D118_PT_V3
Fan Hole
MH1 H_R197D91 X_ME_ SCREW HOLE
SSD Stand off
MH3 H_R220D146_PTB E2B-16H2020
MH2 H_R220D146_PTB E2B-16H2020
MH4 NPTH157 X_NPTH157
UME1 HDMI Lable X_HDMI ROYALTY Y01-RHDMI03-000
UME2 BIOS Lable X_BIOS_LABEL G51-LA01678-A09
For MP

MSI CONFIDENTIAL
MSI 60001231 RD(C)2014021945 weiliu(劉偉)
徐飛(6001083) 客戶服務部

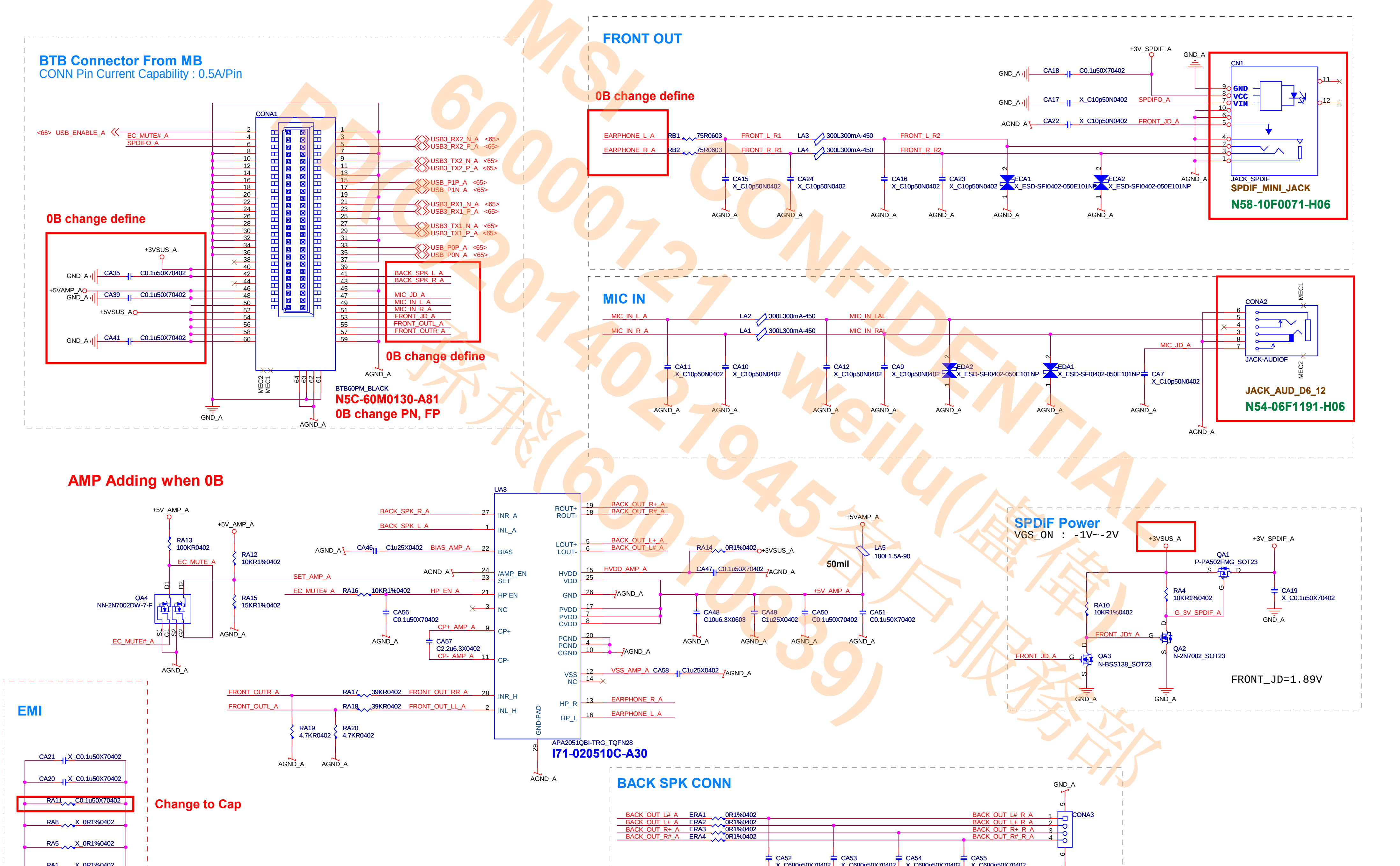
MICRO-STAR INT'L CO.,LTD.

Title: **Screw/ME**

Size | Document Number: **MS-16H2** | Rev: **1.0**

Date: Thursday, February 06, 2014 | Sheet 63 of 72

16H2-A Board (Audio CONN)


BTB Connector From MB
CONN Pin Current Capability : 0.5A/Pin
CONA1
BTB60PM_BLACK
N5C-60M0130-A81
0B change PN, FP
0B change define
FRONT OUT
0B change define
EARPHONE_L_A
EARPHONE_R_A
FRONT_L_R1
FRONT_R_R1
FRONT_L_R2
FRONT_R_R2
CN1
JACK_SPDIF
SPDIF_MINI_JACK
N58-10F0071-H06
+3V_SPDIF_A
MIC IN
MIC_IN_L_A
MIC_IN_R_A
MIC_IN_LAL
MIC_IN_RAL
MIC_JD_A
CONA2
JACK-AUDIOF
JACK_AUD_D6_12
N54-06F1191-H06
0B change define
BACK_SPK_L_A
BACK_SPK_R_A
MIC_JD_A
MIC_IN_L_A
MIC_IN_R_A
FRONT_JD_A
FRONT_OUTL_A
FRONT_OUTR_A
AMP Adding when 0B
UA3
APA2051QBI-TRG_TQFN28
I71-020510C-A30
50mil
SPDIF Power
VGS_ON : -1V~-2V
FRONT_JD=1.89V
EMI
Change to Cap
Change to Cap
BACK SPK CONN
CONA3
BH1X4#S-1.25PITCH_WHITE
N32-1040AV0-H06

MICRO-STAR INT'L CO.,LTD.

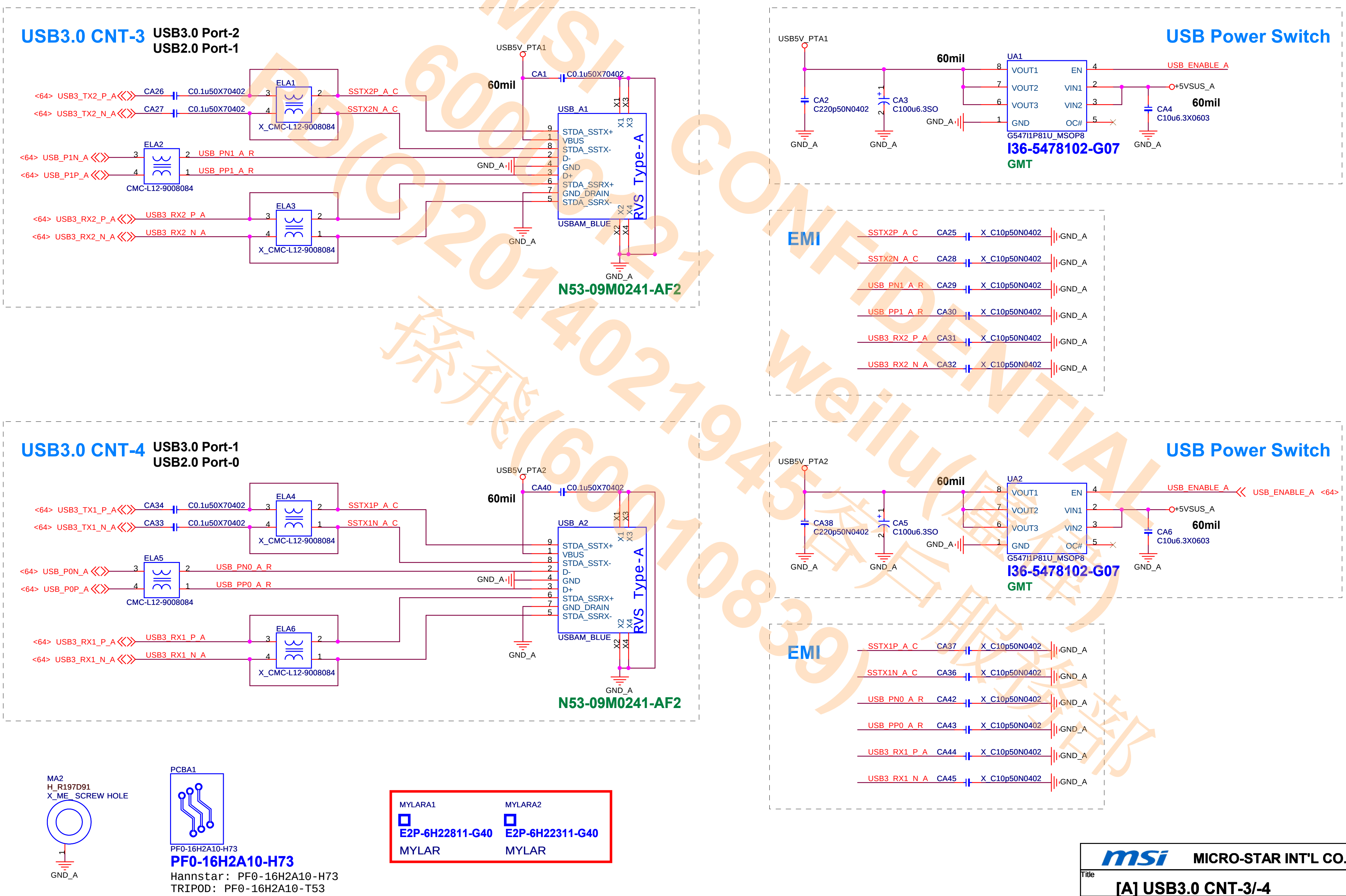
Title: [A] Audio

Document Number: MS-16H2 | Rev 1.0

Date: Thursday, February 13, 2014 | Sheet 64 of 72

MSI CONFIDENTIAL

[A] USB3.0 CNT-2/-3

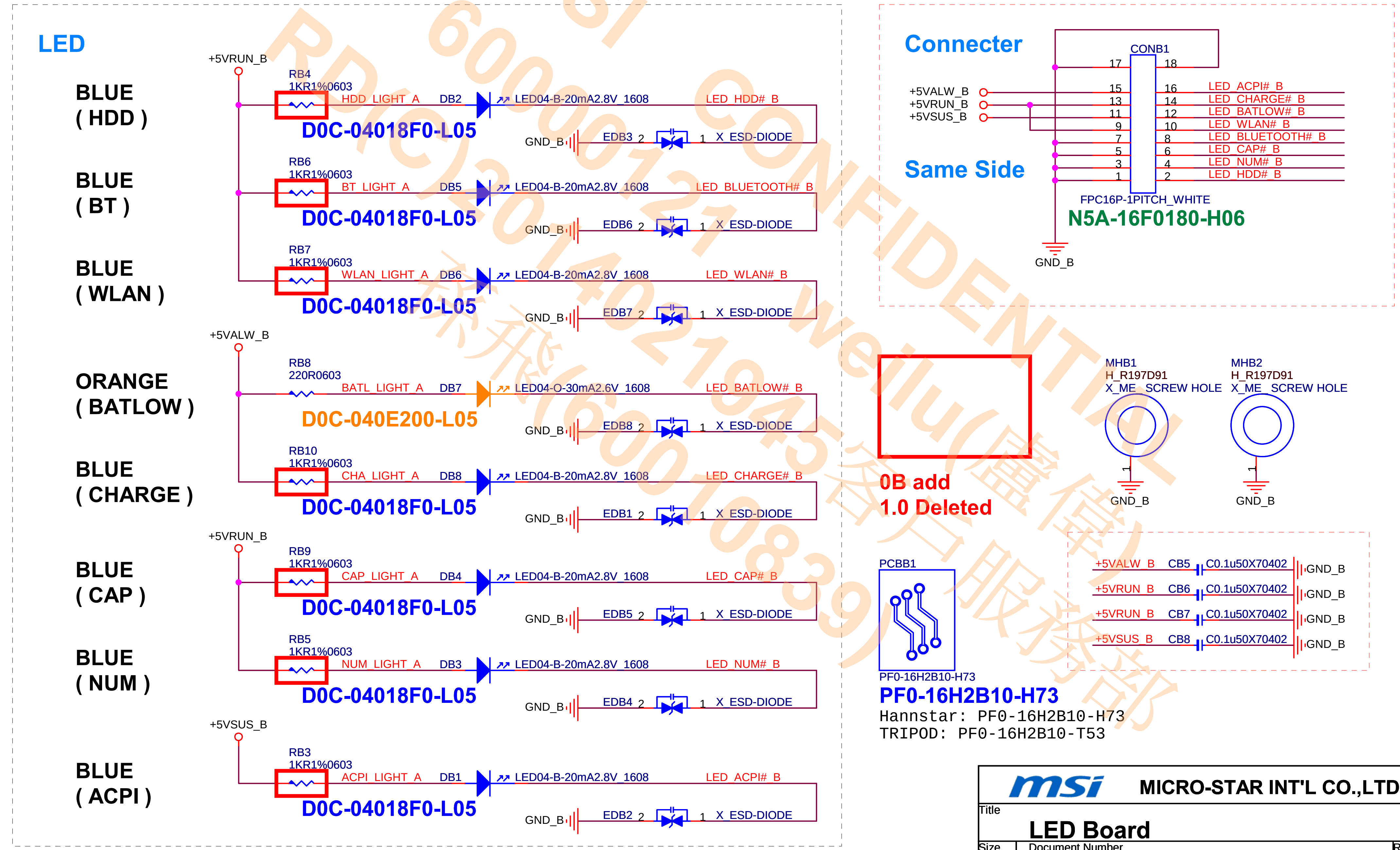


USB3.0 CNT-3
USB3.0 Port-2
USB2.0 Port-1
<64> USB3_TX2_P_A
<64> USB3_TX2_N_A
CA26 C0.1u50X70402
CA27 C0.1u50X70402
ELA1
X_CMC-L12-9008084
SSTX2P_A_C
SSTX2N_A_C
ELA2
CMC-L12-9008084
<64> USB_P1N_A
<64> USB_P1P_A
USB_PN1_A_R
USB_PP1_A_R
ELA3
<64> USB3_RX2_P_A
<64> USB3_RX2_N_A
USB3_RX2_P_A
USB3_RX2_N_A
USB5V_PTA1
CA1 C0.1u50X70402
60mil
USB_A1
STDA_SSTX+
VBUS
STDA_SSTX-
D-
GND
D+
STDA_SSRX+
GND_DRAIN
STDA_SSRX-
RVS Type-A
USBAM_BLUE
GND_A
N53-09M0241-AF2
USB Power Switch
UA1
VOUT1 EN
VOUT2 VIN1
VOUT3 VIN2
GND OC#
G547I1P81U_MSOP8
I36-5478102-G07
GMT
CA2 C220p50N0402
CA3 C100u6.3SO
CA4 C10u6.3X0603
USB_ENABLE_A
+5VSUS_A
EMI
SSTX2P_A_C CA25 X_C10p50N0402
SSTX2N_A_C CA28 X_C10p50N0402
USB_PN1_A_R CA29 X_C10p50N0402
USB_PP1_A_R CA30 X_C10p50N0402
USB3_RX2_P_A CA31 X_C10p50N0402
USB3_RX2_N_A CA32 X_C10p50N0402
USB3.0 CNT-4
USB3.0 Port-1
USB2.0 Port-0
<64> USB3_TX1_P_A
<64> USB3_TX1_N_A
CA34 C0.1u50X70402
CA33 C0.1u50X70402
ELA4
SSTX1P_A_C
SSTX1N_A_C
ELA5
<64> USB_P0N_A
<64> USB_P0P_A
USB_PN0_A_R
USB_PP0_A_R
ELA6
<64> USB3_RX1_P_A
<64> USB3_RX1_N_A
USB3_RX1_P_A
USB3_RX1_N_A
USB5V_PTA2
CA40 C0.1u50X70402
USB_A2
UA2
CA38 C220p50N0402
CA5 C100u6.3SO
CA6 C10u6.3X0603
USB_ENABLE_A <64>
SSTX1P_A_C CA37 X_C10p50N0402
SSTX1N_A_C CA36 X_C10p50N0402
USB_PN0_A_R CA42 X_C10p50N0402
USB_PP0_A_R CA43 X_C10p50N0402
USB3_RX1_P_A CA44 X_C10p50N0402
USB3_RX1_N_A CA45 X_C10p50N0402
MA2
H_R197D91
X_ME_SCREW HOLE
PCBA1
PF0-16H2A10-H73
Hannstar: PF0-16H2A10-H73
TRIPOD: PF0-16H2A10-T53
MYLARA1 E2P-6H22811-G40 MYLAR
MYLARA2 E2P-6H22311-G40 MYLAR

MSI CONFIDENTIAL
600021 PD(C)20140219455 weilu(魏伟)
徐飛(60010839) 客戶服務部

MICRO-STAR INT'L CO.,LTD.		
Title: [A] USB3.0 CNT-3/-4		
Size	Document Number: MS-16H2	Rev: 1.0
Date: Friday, January 03, 2014	Sheet 65 of 72	

16H2-B Board (LED Board)



LED
BLUE (HDD)
BLUE (BT)
BLUE (WLAN)
ORANGE (BATLOW)
BLUE (CHARGE)
BLUE (CAP)
BLUE (NUM)
BLUE (ACPI)
+5VRUN_B
RB4 1KR1%0603 HDD_LIGHT_A DB2 LED04-B-20mA2.8V_1608 LED_HDD#_B
D0C-04018F0-L05
GND_B EDB3 2 1 X_ESD-DIODE
RB6 1KR1%0603 BT_LIGHT_A DB5 LED04-B-20mA2.8V_1608 LED_BLUETOOTH#_B
D0C-04018F0-L05
GND_B EDB6 2 1 X_ESD-DIODE
RB7 1KR1%0603 WLAN_LIGHT_A DB6 LED04-B-20mA2.8V_1608 LED_WLAN#_B
D0C-04018F0-L05
GND_B EDB7 2 1 X_ESD-DIODE
+5VALW_B
RB8 220R0603 BATL_LIGHT_A DB7 LED04-O-30mA2.6V_1608 LED_BATLOW#_B
D0C-040E200-L05
GND_B EDB8 2 1 X_ESD-DIODE
RB10 1KR1%0603 CHA_LIGHT_A DB8 LED04-B-20mA2.8V_1608 LED_CHARGE#_B
D0C-04018F0-L05
GND_B EDB1 2 1 X_ESD-DIODE
+5VRUN_B
RB9 1KR1%0603 CAP_LIGHT_A DB4 LED04-B-20mA2.8V_1608 LED_CAP#_B
D0C-04018F0-L05
GND_B EDB5 2 1 X_ESD-DIODE
RB5 1KR1%0603 NUM_LIGHT_A DB3 LED04-B-20mA2.8V_1608 LED_NUM#_B
D0C-04018F0-L05
GND_B EDB4 2 1 X_ESD-DIODE
+5VSUS_B
RB3 1KR1%0603 ACPI_LIGHT_A DB1 LED04-B-20mA2.8V_1608 LED_ACPI#_B
D0C-04018F0-L05
GND_B EDB2 2 1 X_ESD-DIODE
Connecter
Same Side
CONB1
+5VALW_B
+5VRUN_B
+5VSUS_B
17 18
15 16 LED_ACPI#_B
13 14 LED_CHARGE#_B
11 12 LED_BATLOW#_B
9 10 LED_WLAN#_B
7 8 LED_BLUETOOTH#_B
5 6 LED_CAP#_B
3 4 LED_NUM#_B
1 2 LED_HDD#_B
FPC16P-1PITCH_WHITE
N5A-16F0180-H06
GND_B
0B add
1.0 Deleted
MHB1 H_R197D91 X_ME_SCREW HOLE
MHB2 H_R197D91 X_ME_SCREW HOLE
GND_B
GND_B
+5VALW_B CB5 C0.1u50X70402 GND_B
+5VRUN_B CB6 C0.1u50X70402 GND_B
+5VRUN_B CB7 C0.1u50X70402 GND_B
+5VSUS_B CB8 C0.1u50X70402 GND_B
PCBB1
PF0-16H2B10-H73

PF0-16H2B10-H73

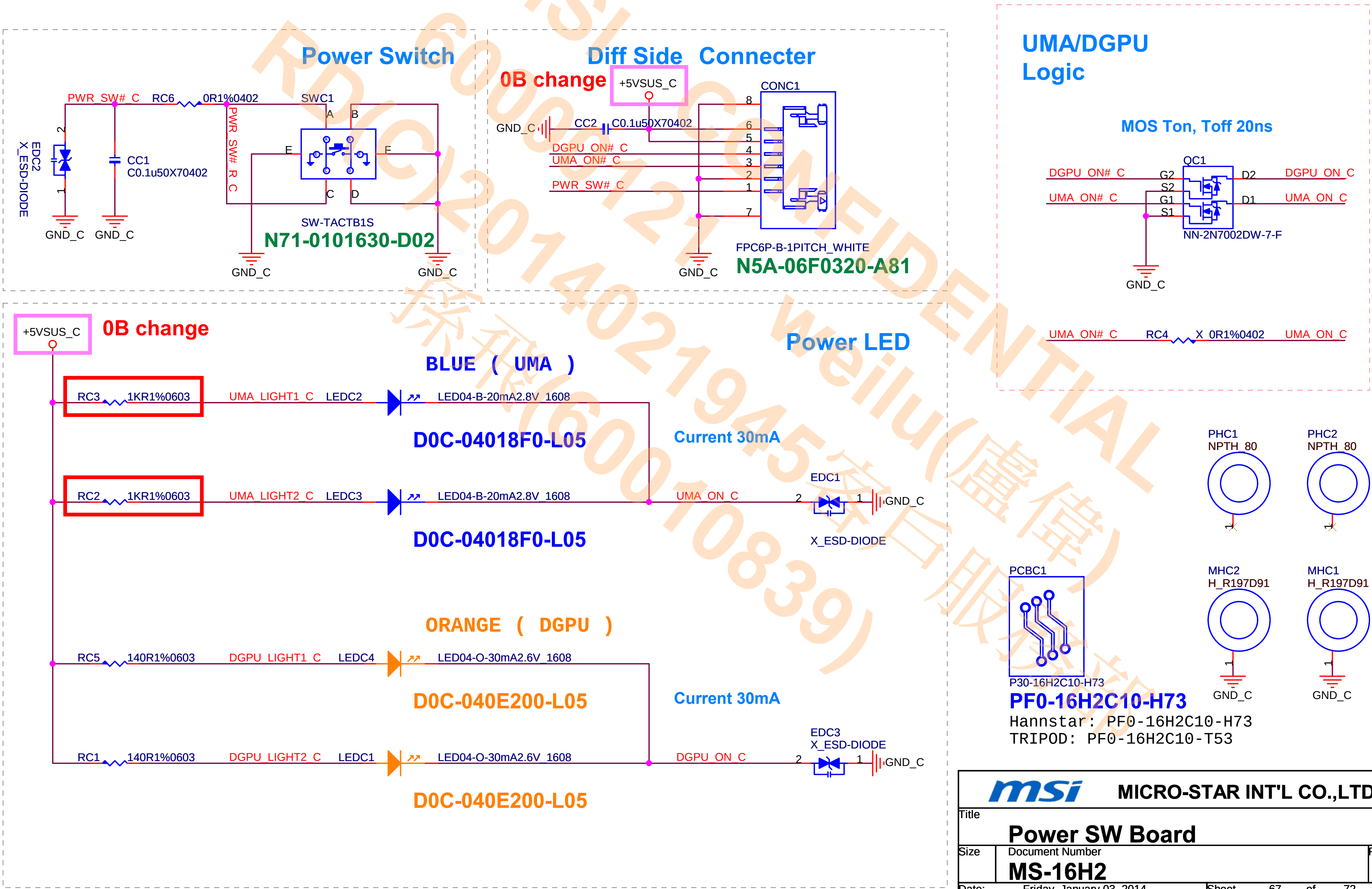
Hannstar: PF0-16H2B10-H73
TRIPOD: PF0-16H2B10-T53

MSI CONFIDENTIAL RD(C)2014021945 600012 weilu(盧偉) 6001 0839 資訊服務部 微飛

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

Title	LED Board
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	66 of 72

16H2-C Board (Power SW Board)



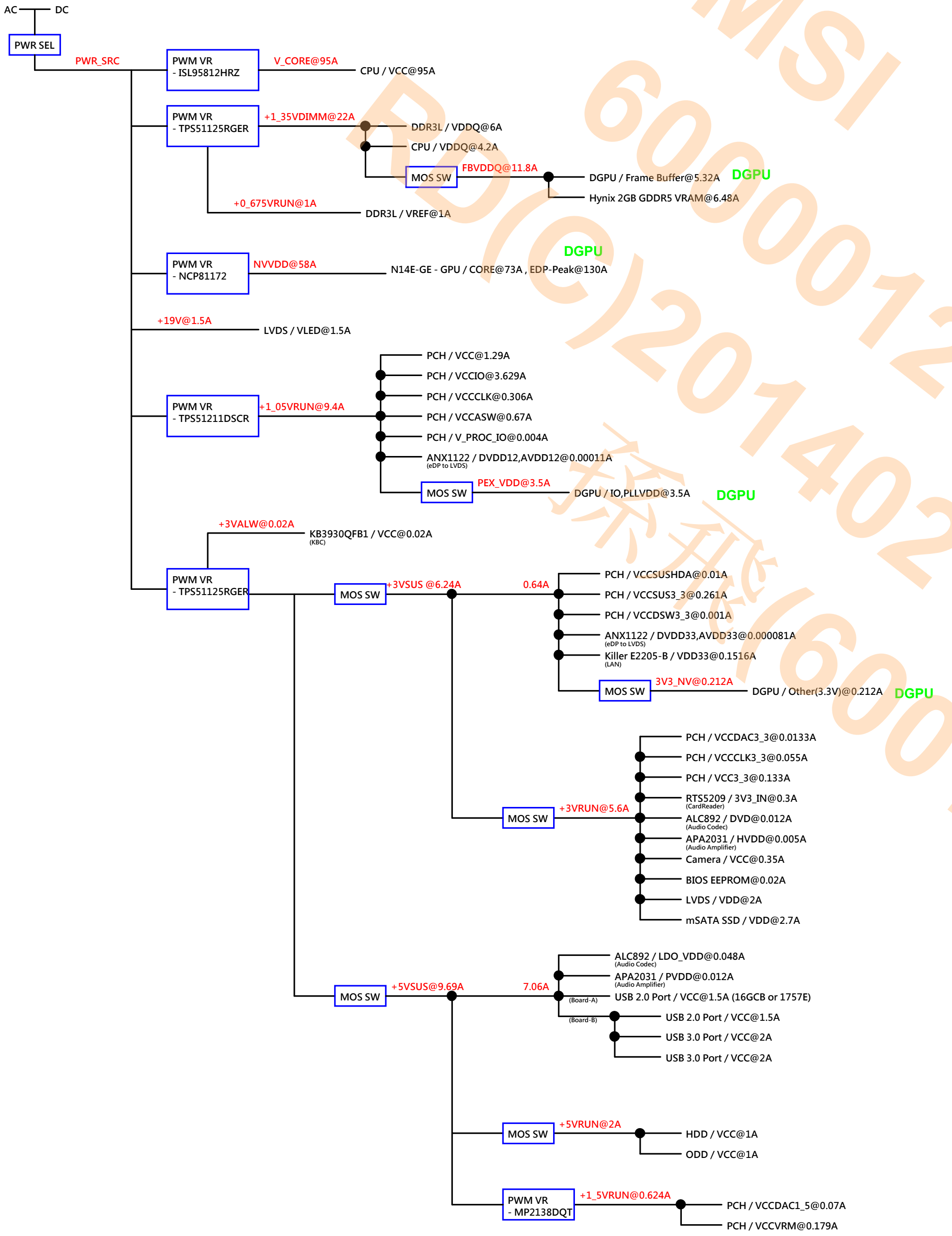
Power Switch
PWR_SW#_C
RC6
0R1%0402
SWC1
PWR_SW#_R_C
EDC2
X_ESD-DIODE
CC1
C0.1u50X70402
GND_C
SW-TACTB1S
N71-0101630-D02
Diff Side Connecter
0B change
+5VSUS_C
CONC1
GND_C
CC2
C0.1u50X70402
DGPU_ON#_C
UMA_ON#_C
PWR_SW#_C
FPC6P-B-1PITCH_WHITE
N5A-06F0320-A81
UMA/DGPU Logic
MOS Ton, Toff 20ns
QC1
DGPU_ON_C
UMA_ON_C
NN-2N7002DW-7-F
RC4
X_0R1%0402
Power LED
BLUE (UMA)
RC3
1KR1%0603
UMA_LIGHT1_C
LEDC2
LED04-B-20mA2.8V_1608
D0C-04018F0-L05
Current 30mA
RC2
UMA_LIGHT2_C
LEDC3
EDC1
X_ESD-DIODE
ORANGE (DGPU)
RC5
140R1%0603
DGPU_LIGHT1_C
LEDC4
LED04-O-30mA2.6V_1608
D0C-040E200-L05
RC1
DGPU_LIGHT2_C
LEDC1
EDC3
PHC1
NPTH_80
PHC2
MHC2
H_R197D91
MHC1
PCBC1
P30-16H2C10-H73
PF0-16H2C10-H73
Hannstar: PF0-16H2C10-H73
TRIPOD: PF0-16H2C10-T53

MICRO-STAR INT'L CO.,LTD.

Title	Power SW Board	
Size	Document Number: MS-16H2	Rev 1.0
Date: Friday, January 03, 2014	Sheet 67 of 72	

MSI CONFIDENTIAL

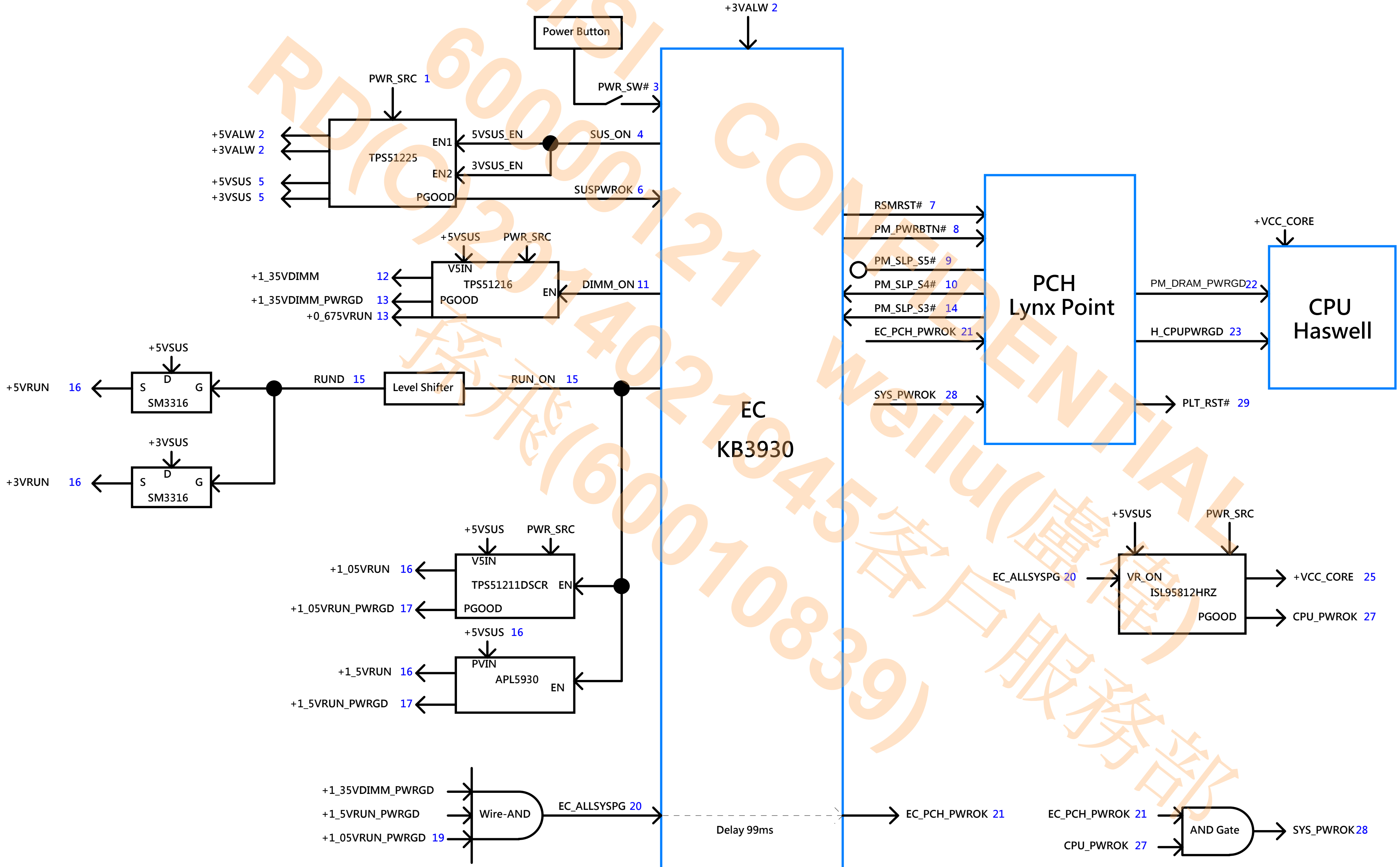
MS-16H2 Power Delivery Chart



AC
DC
PWR SEL
PWR_SRC
PWM VR
- ISL95812HRZ
V_CORE@95A
CPU / VCC@95A
PWM VR
- TPS51125RGER
+1_35VDIMM@22A
DDR3L / VDDQ@6A
CPU / VDDQ@4.2A
MOS SW
FBVDDQ@11.8A
DGPU / Frame Buffer@5.32A
DGPU
Hynix 2GB GDDR5 VRAM@6.48A
+0_675VRUN@1A
DDR3L / VREF@1A
PWM VR
- NCP81172
NVVDD@58A
DGPU
N14E-GE - GPU / CORE@73A , EDP-Peak@130A
+19V@1.5A
LVDS / VLED@1.5A
PWM VR
- TPS51211DSCR
+1_05VRUN@9.4A
PCH / VCC@1.29A
PCH / VCCIO@3.629A
PCH / VCCCLK@0.306A
PCH / VCCASW@0.67A
PCH / V_PROC_IO@0.004A
ANX1122 / DVDD12,AVDD12@0.00011A
(eDP to LVDS)
MOS SW
PEX_VDD@3.5A
DGPU / IO,PLLVDD@3.5A
DGPU
+3VALW@0.02A
KB3930QFB1 / VCC@0.02A
(KBC)
PWM VR
- TPS51125RGER
MOS SW
+3VSUS @6.24A
0.64A
PCH / VCCSUSHDA@0.01A
PCH / VCCSUS3_3@0.261A
PCH / VCCDSW3_3@0.001A
ANX1122 / DVDD33,AVDD33@0.000081A
(eDP to LVDS)
Killer E2205-B / VDD33@0.1516A
(LAN)
MOS SW
3V3_NV@0.212A
DGPU / Other(3.3V)@0.212A
DGPU
PCH / VCCDAC3_3@0.0133A
PCH / VCCCLK3_3@0.055A
PCH / VCC3_3@0.133A
RTS5209 / 3V3_IN@0.3A
(CardReader)
MOS SW
+3VRUN@5.6A
ALC892 / DVD@0.012A
(Audio Codec)
APA2031 / HVDD@0.005A
(Audio Amplifier)
Camera / VCC@0.35A
BIOS EEPROM@0.02A
LVDS / VDD@2A
mSATA SSD / VDD@2.7A
ALC892 / LDO_VDD@0.048A
(Audio Codec)
APA2031 / PVDD@0.012A
(Audio Amplifier)
MOS SW
+5VSUS@9.69A
7.06A
(Board-A)
USB 2.0 Port / VCC@1.5A (16GCB or 1757E)
(Board-B)
USB 2.0 Port / VCC@1.5A
USB 3.0 Port / VCC@2A
USB 3.0 Port / VCC@2A
MOS SW
+5VRUN@2A
HDD / VCC@1A
ODD / VCC@1A
PWM VR
- MP2138DQT
+1_5VRUN@0.624A
PCH / VCCDAC1_5@0.07A
PCH / VCCVRM@0.179A

MSI CONFIDENTIAL
600000121 weilu(盧偉)
RD(C)20140219458客戶服務部
徐飛(60010839)

MS-16H2 Power on Block Diagram



+3VALW 2
Power Button
PWR_SW# 3
PWR_SRC 1
+5VALW 2
+3VALW 2
+5VSUS 5
+3VSUS 5
TPS51225
EN1
EN2
PGOOD
5VSUS_EN
3VSUS_EN
SUS_ON 4
SUSPWROK 6
+5VSUS
PWR_SRC
V5IN
TPS51216
PGOOD
EN
+1_35VDIMM 12
+1_35VDIMM_PWRGD 13
+0_675VRUN 13
DIMM_ON 11
+5VSUS
+5VRUN 16
SM3316
+3VSUS
+3VRUN 16
SM3316
RUND 15
Level Shifter
RUN_ON 15
EC
KB3930
RSMRST# 7
PM_PWRBTN# 8
PM_SLP_S5# 9
PM_SLP_S4# 10
PM_SLP_S3# 14
EC_PCH_PWROK 21
SYS_PWROK 28
PCH
Lynx Point
PM_DRAM_PWRGD 22
H_CPUPWRGD 23
PLT_RST# 29
+VCC_CORE
CPU
Haswell
+5VSUS
PWR_SRC
V5IN
TPS51211DSCR
EN
PGOOD
+1_05VRUN 16
+1_05VRUN_PWRGD 17
+5VSUS 16
PVIN
APL5930
EN
+1_5VRUN 16
+1_5VRUN_PWRGD 17
+5VSUS
PWR_SRC
EC_ALLSYSPG 20
VR_ON
ISL95812HRZ
PGOOD
+VCC_CORE 25
CPU_PWROK 27
+1_35VDIMM_PWRGD
+1_5VRUN_PWRGD
+1_05VRUN_PWRGD 19
Wire-AND
EC_ALLSYSPG 20
Delay 99ms
EC_PCH_PWROK 21
EC_PCH_PWROK 21
CPU_PWROK 27
AND Gate
SYS_PWROK 28

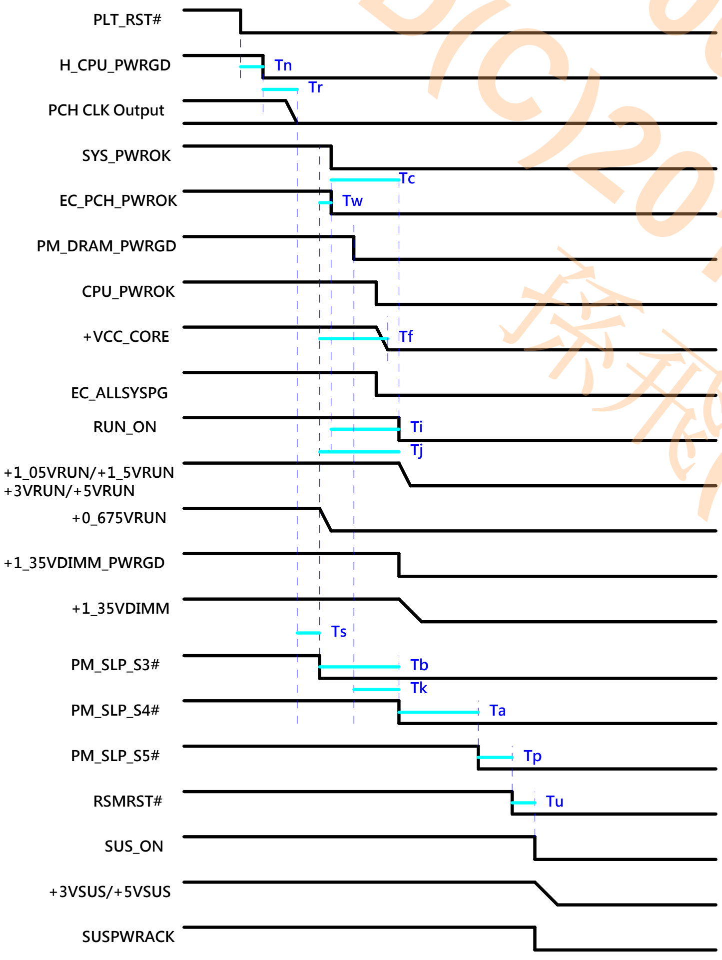
MSI CONFIDENTIAL
RD(C)20140219 60000121 weilu(盧偉) 60010839 徐飛(60010839)客戶服務部

msi MICRO-STAR INT'L CO.,LTD.
Title: Power on Block Diagram
Size | Document Number: MS-16H2 | Rev 1.0
Date: Friday, January 03, 2014 | Sheet 69 of 72

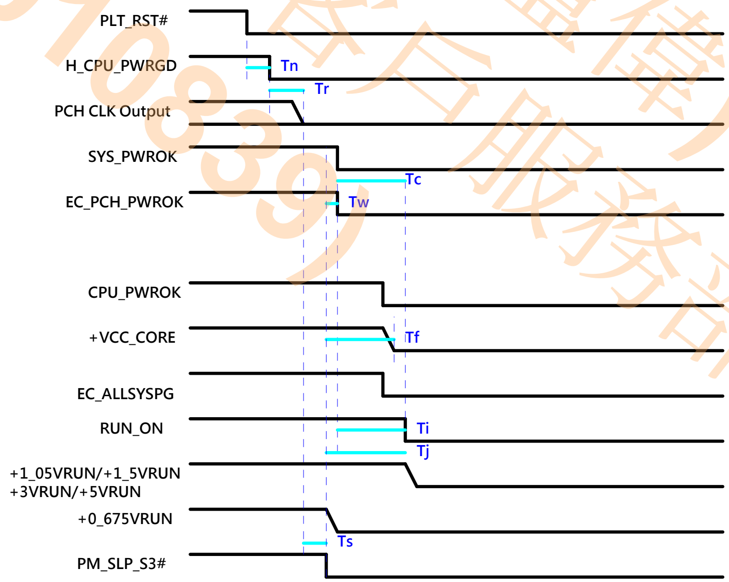
Power down Sequence

	MIN	MAX	Units	Description
Ta	30		us	SLP_S4# assertion to SLP_S5# assertion.
Tb	30		us	SLP_S3# assertion to SLP_S4# assertion.
Tc	40		ns	APWROK de-assertion to VCCASW/VCCSPI rails falling.
Tf		500	ms	SLP_S3# assertion to VCCIN(CPU) rail completely off.
Ti	40		ns	PWROK de-assertion to VCCCore (PCH) rail falling (-5% of nominal value).
Tj	5		us	SLP_S3# assertion to VCCCore (PCH) rails falling (-5% of nominal value).
Tk	-100		ns	DRAMPWROK de-assertion to SLP_S4# assertion
Tn	30		us	PLTRST# assertion to CPUPWRGOOD de-assertion.
Tp	500		us	Last SLP_Sx# or SLP_A# assertion to RSMRST# assertion
Tr	10		us	CPUPWRGOOD de-assertion to PCH clock outputs turning off.
Ts	1		us	PCH Clock outputs turning OFF to SLP_S3# assertion.
Tu	40		ns	RSMRST# assertion to VCCSUS rails falling (-5% of nominal value).
Tw	0		ms	SLP_S3# assertion to PWROK de-assertion.

S0 -> G3

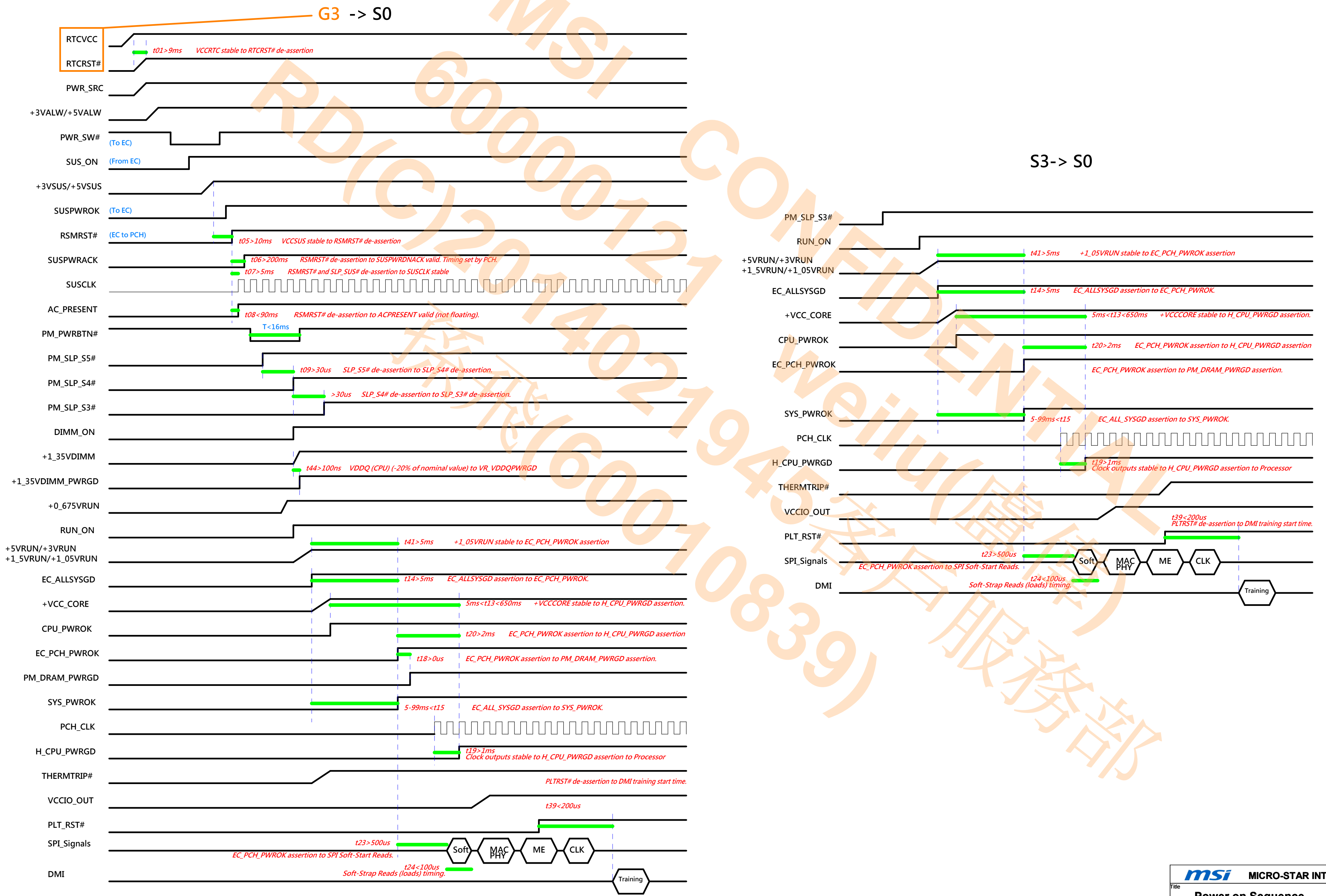


S0 -> S3



MSI CONFIDENTIAL
60001211 RD(C)20140219 wellu(盧偉)
徐飛(60010839)客戶服務部

Power on Sequence


G3 -> S0
RTCVCC
RTCRST#
t01>9ms VCCRTC stable to RTCRST# de-assertion
PWR_SRC
+3VALW/+5VALW
PWR_SW# (To EC)
SUS_ON (From EC)
+3VSUS/+5VSUS
SUSPWROK (To EC)
RSMRST# (EC to PCH)
t05>10ms VCCSUS stable to RSMRST# de-assertion
SUSPWRACK
t06>200ms RSMRST# de-assertion to SUSPWRDNACK valid. Timing set by PCH.
t07>5ms RSMRST# and SLP_SUS# de-assertion to SUSCLK stable
SUSCLK
AC_PRESENT
t08<90ms RSMRST# de-assertion to ACPRESENT valid (not floating).
PM_PWRBTN#
T<16ms
PM_SLP_S5#
t09>30us SLP_S5# de-assertion to SLP_S4# de-assertion.
PM_SLP_S4#
>30us SLP_S4# de-assertion to SLP_S3# de-assertion.
PM_SLP_S3#
DIMM_ON
+1_35VDIMM
t44>100ns VDDQ (CPU) (-20% of nominal value) to VR_VDDQPWRGD
+1_35VDIMM_PWRGD
+0_675VRUN
RUN_ON
+5VRUN/+3VRUN
+1_5VRUN/+1_05VRUN
t41>5ms +1_05VRUN stable to EC_PCH_PWROK assertion
EC_ALLSYSGD
t14>5ms EC_ALLSYSGD assertion to EC_PCH_PWROK.
+VCC_CORE
5ms<t13<650ms +VCCCORE stable to H_CPU_PWRGD assertion.
CPU_PWROK
t20>2ms EC_PCH_PWROK assertion to H_CPU_PWRGD assertion
EC_PCH_PWROK
t18>0us EC_PCH_PWROK assertion to PM_DRAM_PWRGD assertion.
PM_DRAM_PWRGD
SYS_PWROK
5-99ms<t15 EC_ALL_SYSGD assertion to SYS_PWROK.
PCH_CLK
H_CPU_PWRGD
t19>1ms
Clock outputs stable to H_CPU_PWRGD assertion to Processor
THERMTRIP#
PLTRST# de-assertion to DMI training start time.
VCCIO_OUT
t39<200us
PLT_RST#
SPI_Signals
t23>500us
EC_PCH_PWROK assertion to SPI Soft-Start Reads.
Soft
MAC PHY
ME
CLK
DMI
t24<100us
Soft-Strap Reads (loads) timing.
Training
S3-> S0
PM_SLP_S3#
RUN_ON
+5VRUN/+3VRUN
+1_5VRUN/+1_05VRUN
t41>5ms +1_05VRUN stable to EC_PCH_PWROK assertion
EC_ALLSYSGD
t14>5ms EC_ALLSYSGD assertion to EC_PCH_PWROK.
+VCC_CORE
5ms<t13<650ms +VCCCORE stable to H_CPU_PWRGD assertion.
CPU_PWROK
t20>2ms EC_PCH_PWROK assertion to H_CPU_PWRGD assertion
EC_PCH_PWROK
EC_PCH_PWROK assertion to PM_DRAM_PWRGD assertion.
SYS_PWROK
5-99ms<t15 EC_ALL_SYSGD assertion to SYS_PWROK.
PCH_CLK
H_CPU_PWRGD
t19>1ms
Clock outputs stable to H_CPU_PWRGD assertion to Processor
THERMTRIP#
VCCIO_OUT
t39<200us
PLTRST# de-assertion to DMI training start time.
PLT_RST#
SPI_Signals
t23>500us
EC_PCH_PWROK assertion to SPI Soft-Start Reads.
Soft
MAC PHY
ME
CLK
DMI
t24<100us
Soft-Strap Reads (loads) timing.
Training

msi	MICRO-STAR INT'L CO.,LTD.
Title	Power on Sequence
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	71 of 72

History

0B: Hardware part

01. Remove All GAP for power parts.
02. Add 3V3_NV part for leakage
03. Change cardreader PN.
04. Change BTB PN
05. Change SPDIF/ Audio Jack PN
06. R116 unstuff, R117 stuff.
07. R346 unstuff
08. Remove SUBWOOFER
09. Add one more AMP for SPK

0B: Power part

01. PR33 2.2Kohm R11-0222T12-W08
02. PC29 82pF/50V C11-8201012-W08
03. PC30 100pF/16V C11-1011032-W08
04. PR34 unstuff
05. PC32 unstuff
06. PR27 2.7Kohm R11-0272T12-W08
07. PR90 8.06Kohm R11-8061T12-W08
08. PR32 910Rohm R11-0911T12-W08
09. PC27 560pF/16V C11-5611812-W08
10. PR31 80.6Kohm R11-8062T12-W08
11. PR23 21Kohm R11-0213T12-W08
12. PR88 6.8Mohm R11-0685T13-W08
13. PR8 453Rohm R11-4530T22-W08
14. PC19 unstuff
15. PR6 unstuff
16. PR140 100Kohm R11-0104T12-W08
17. PR145 93.1Kohm R11-9312T12-R01
18. PR143 15Kohm R11-0153T12-W08
19. PR124 95.3Kohm R11-9532T12-W08
20. PR86 28.7Kohm R11-2872T12-W08
21. PC69, PC70 change to 1206 package
22. PR88 6.8Mohm R11-0685T13-W08

MSI CONFIDENTIAL
weilu(盧偉)
客户服务部

msi	MICRO-STAR INT'L CO.,LTD.
Title	History
Size / Document Number	MS-16H2
Rev	1.0
Date:	Friday, January 03, 2014
Sheet	72 of 72