Lunar Bear

MS-7400 Version 10

MS-6448 N1	ERP Number	Functiom
MS-7400-10	601-7400-01S	Mainboard
MS-4046-2A	604-4046-020	Power Buttom/LED board
MS-4085-10	604-4085-010	Front Audio Board
MS-4048-3A	604-4048-06S	Front 1394/USB Board
MS-4121-10	604-4121-01S	Riser Card

CPU:
Intel Conroe/Conroe-L 65W
(FSB1333/1066/800/533)

System Chipset:
Intel BearlakeQ35 - GMCH (North Bridge)
Intel ICH9 DO (South Bridge W/ AMT)

On Board Chipset:
BIOS - SPI FLASH
HD Audio - Realtek ALC262 C2
LPC Super I/O : SMSC SCH5017
Gigabit LAN - Intel Nineveh 82566
Clock GEN - Cypress CY505YC64CT
IDE Controller - VIA VT6410(IDE Mode)
TPM - SLB 9635 TT1.2

Main Memory:
DDR II(800/667)*2 (Up to 4GByte)

Intersil PWM:
Controller - Intersil 6326 3Phase

Expansion Slots:
PCI-E[X16] Slot *1
Riser Slot : (PCI*1/PCI-E[X1]*1)

Model option table

Model type	Function	BOM Config	ERP BOM No	BOM Opt.
MS-7400N1-10	Bearlake Q35+ICH9 DO+Nineveh82566+VT6410	Cfg-7400-LB	601-7400-01S	L

MSI Link to the Future MICRO-START INT'L CO.,LTD.

Title: COVER SHEET

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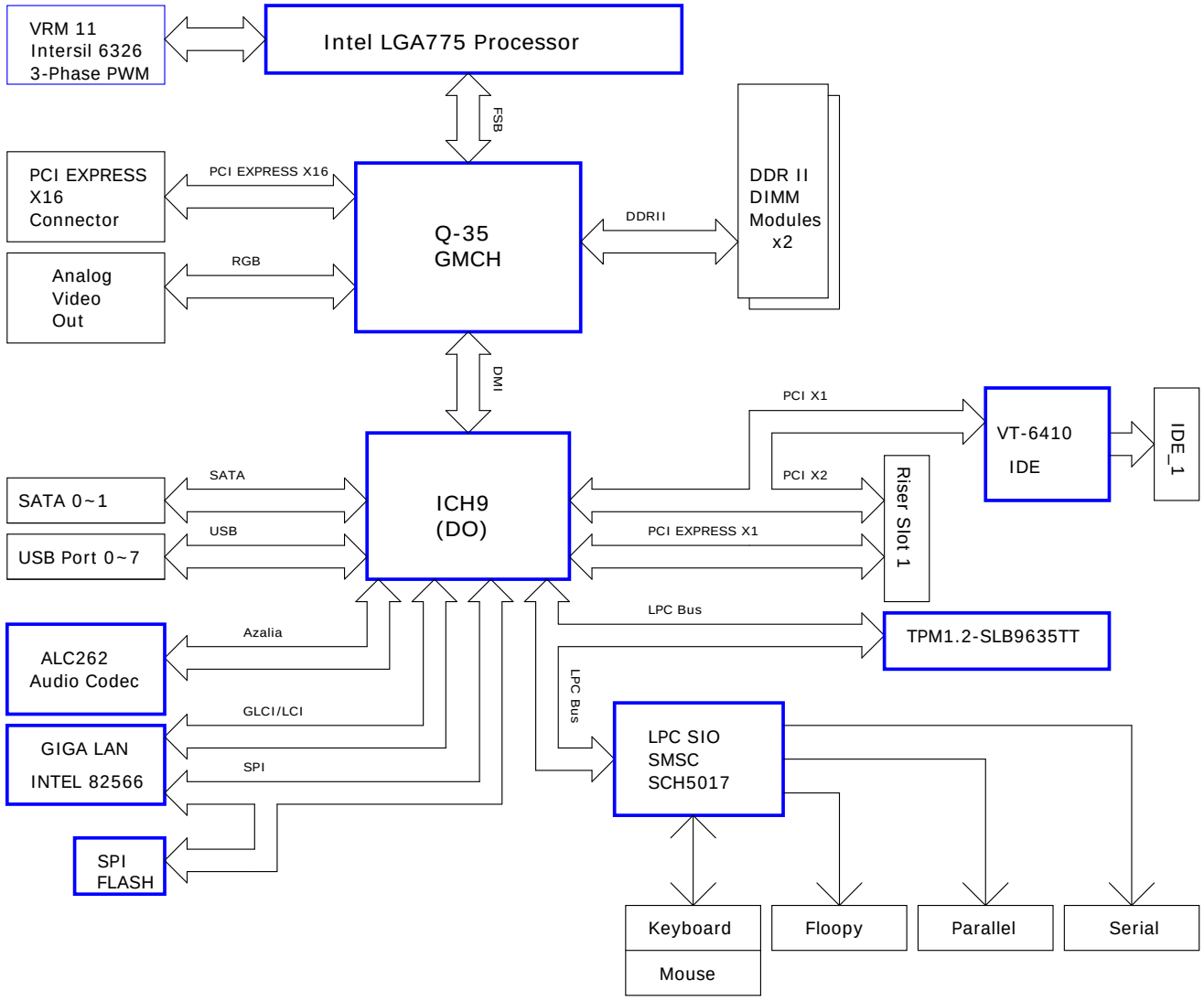
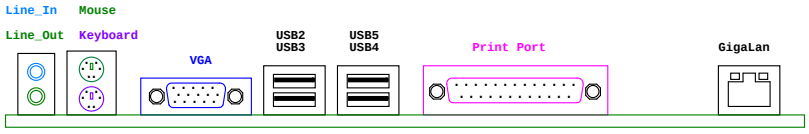
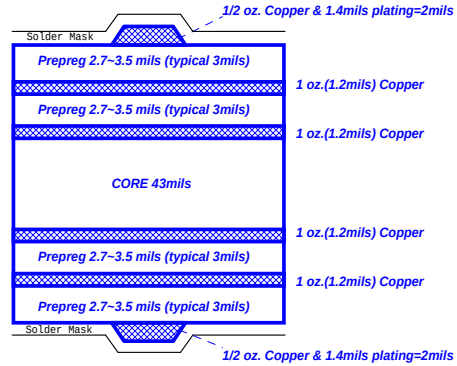
Block Diagram





Board Stack-up (6 layers)

(1080 Prepreg Considerations)



Single End 50ohm Top/Bottom : 4mils
USB2.0 - 90ohm : 15/4.5/7.5/4.5/15
SATA - 95ohm : 15/4/8/4/15
LAN - 100ohm : 15/4/8/4/15
PCIE - 95ohm : 15/4/8/4/15
IEEE1394 - 110ohm : 15/4/9/4/15
Differencial Clock : 18/4/10/4/18

Example Fab Drawing Note (1080 Prepreg PCB)

Trace Width (mils)	Differential Spacing (mils)	Target Impedance	Tolerance
4.0	NA	50-ohm,single-ended	15%
6.5	NA	40-ohm,single-ended	15%
7.5	NA	37-ohm,single-ended	15%
9.5	NA	32-ohm,single-ended	15%
3.9	8.1	95-ohm,differential	20%,reference only
4.5	7.5	90-ohm,differential	20%,reference only

Bearlake(GMCH) Impedance Requirements by Interface

Interface	Impedance Required
FSB(All)	4x signals 42-ohm,others 50-hom,single-ended
Controller Link	50-ohm,single-ended
DDR2(DQ,DQS,DM,CLK,CLK#)	40-ohm,single-ended
DDR2(Control)	43-ohm,single-ended
DDR2(Command)	33-ohm,single-ended
DDR3(CLK,CLK#)	36-ohm,single-ended
DDR3(DQ,DQS,DM)	50/37-ohm,single-ended
DDR3(Control)	36-ohm,single-ended
DDR3(Command)	32-ohm,single-ended
PCI Express,DMI	95-ohm,differential
VGA	37-ohm,single-ended at MCH breakout,then 50-ohm,single-ended to VGA connector

ICH9 Impedance Requirements by Interface

Interface	Impedance Required
PCI	50-ohm,single-ended
Controller Link	50-ohm,single-ended
Miscellaneous	50-ohm,single-ended
PCI Express,DMI	95-ohm,differential
SATA	95-ohm,differential
USB	90-ohm,differential

MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

Title: **BLOCK DIAGRAM**

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	MS-7400	10

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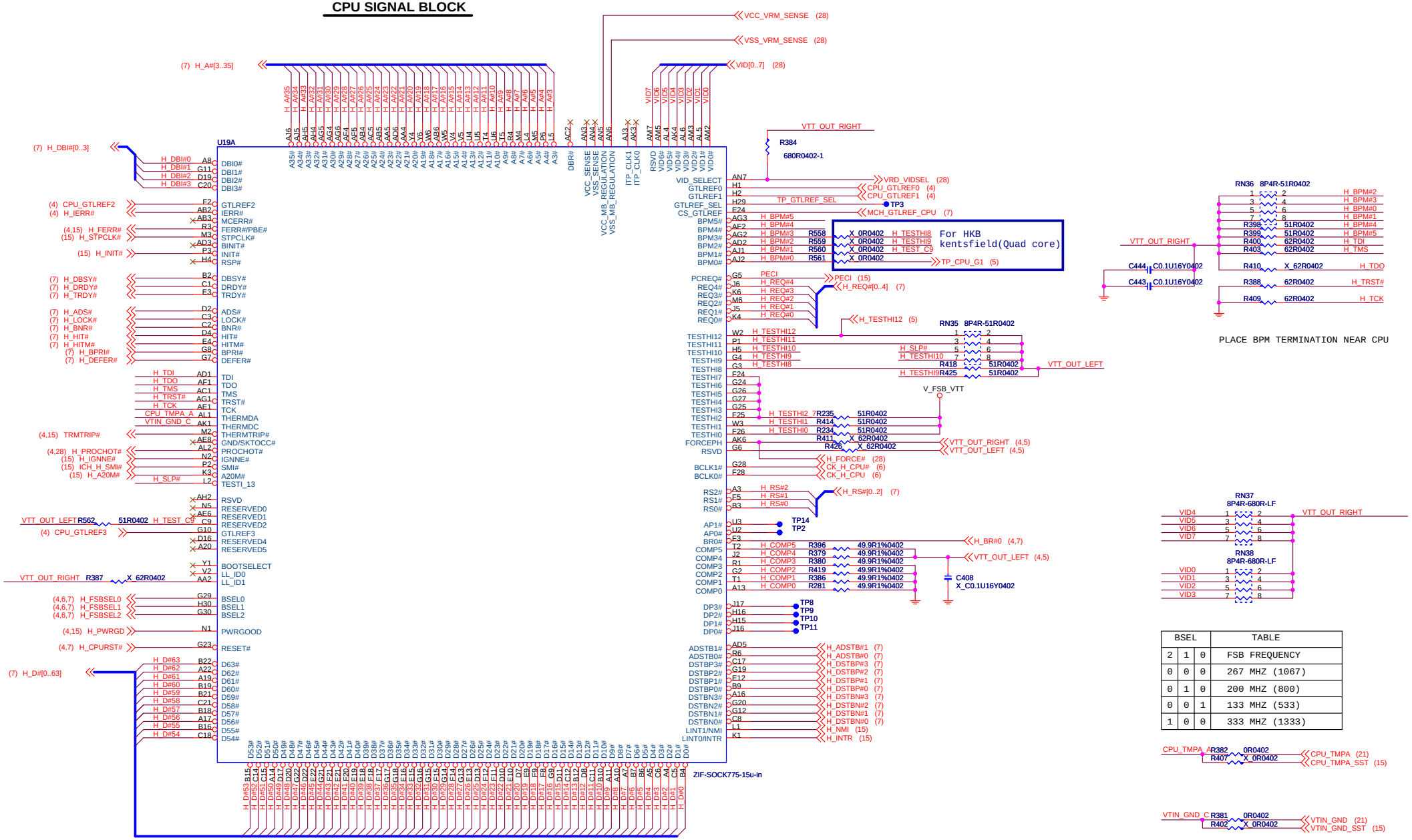
CPU SIGNAL BLOCK



BSEL			TABLE
2	1	0	FSB FREQUENCY
0	0	0	267 MHZ (1067)
0	1	0	200 MHZ (800)
0	0	1	133 MHZ (533)
1	0	0	333 MHZ (1333)

MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

Title: **INTEL LGA775 CPU SIGNAL**

Size	Document Number	Rev
	MS-7400	10

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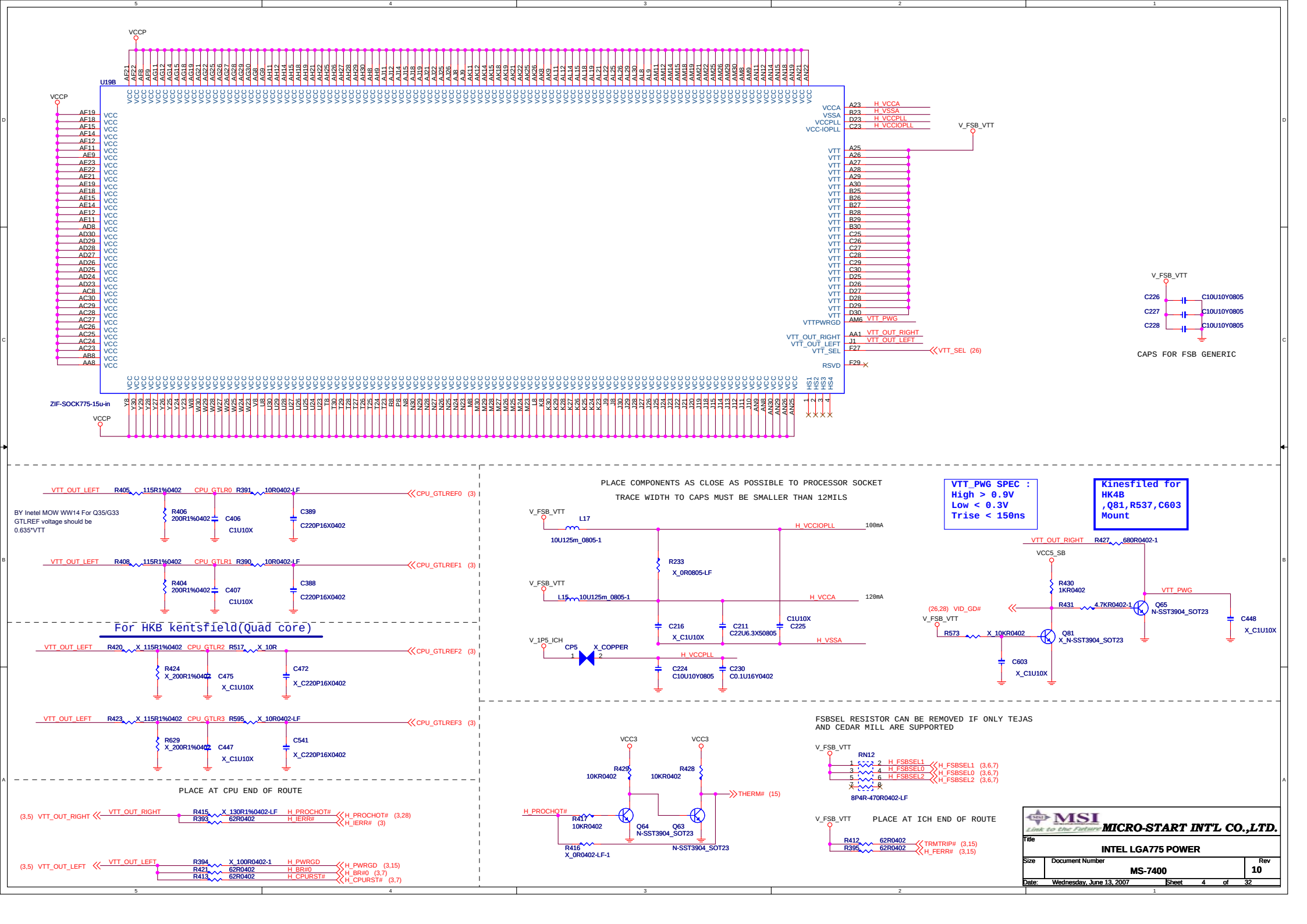
VCCP
U19B
ZIF-SOCK775-15u-in
VCCA
VSSA
VCCPLL
VCC-IOPLL
H_VCCA
H_VSSA
H_VCCPLL
H_VCCIOPLL
V_FSB_VTT
VTT
VTTPWRGD
VTT_PWG
VTT_OUT_RIGHT
VTT_OUT_LEFT
VTT_SEL
VTT_SEL (26)
RSVD
C226 C10U10Y0805
C227 C10U10Y0805
C228 C10U10Y0805
CAPS FOR FSB GENERIC
VTT_OUT_LEFT R405 115R1%0402 CPU_GTLR0 R391 10R0402-LF CPU_GTLREF0 (3)
BY Inetel MOW WW14 For Q35/G33
GTLREF voltage should be
0.635*VTT
R406 200R1%0402 C406 C1U10X C389 C220P16X0402
VTT_OUT_LEFT R408 115R1%0402 CPU_GTLR1 R390 10R0402-LF CPU_GTLREF1 (3)
R404 200R1%0402 C407 C1U10X C388 C220P16X0402
For HKB kentsfield(Quad core)
VTT_OUT_LEFT R420 X_115R1%0402 CPU_GTLR2 R517 X_10R CPU_GTLREF2 (3)
R424 X_200R1%0402 C475 X_C1U10X C472 X_C220P16X0402
VTT_OUT_LEFT R423 X_115R1%0402 CPU_GTLR3 R595 X_10R0402-LF CPU_GTLREF3 (3)
R629 X_200R1%0402 C447 X_C1U10X C541 X_C220P16X0402
PLACE AT CPU END OF ROUTE
(3,5) VTT_OUT_RIGHT VTT_OUT_RIGHT R415 X_130R1%0402-LF H_PROCHOT# H_PROCHOT# (3,28)
R393 62R0402 H_IERR# H_IERR# (3)
(3,5) VTT_OUT_LEFT VTT_OUT_LEFT R394 X_100R0402-1 H_PWRGD H_PWRGD (3,15)
R421 62R0402 H_BR#0 H_BR#0 (3,7)
R413 62R0402 H_CPURST# H_CPURST# (3,7)
PLACE COMPONENTS AS CLOSE AS POSSIBLE TO PROCESSOR SOCKET
TRACE WIDTH TO CAPS MUST BE SMALLER THAN 12MILS
V_FSB_VTT L17 10U125m_0805-1 H_VCCIOPLL 100mA
R233 X_0R0805-LF
V_FSB_VTT L15 10U125m_0805-1 H_VCCA 120mA
C216 X_C1U10X C211 C22U6.3X50805 C1U10X C225 H_VSSA
V_1P5_ICH CP5 X_COPPER H_VCCPLL
C224 C10U10Y0805 C230 C0.1U16Y0402
VTT_PWG SPEC :
High > 0.9V
Low < 0.3V
Trise < 150ns
Kinesfiled for
HK4B
,Q81,R537,C603
Mount
VTT_OUT_RIGHT R427 680R0402-1
VCC5_SB
R430 1KR0402
VTT_PWG
(26,28) VID_GD#
R431 4.7KR0402-1 Q65 N-SST3904_SOT23
V_FSB_VTT
R573 X_10KR0402 Q81 X_N-SST3904_SOT23
C448 X_C1U10X
C603 X_C1U10X
VCC3
R429 10KR0402
R428 10KR0402
THERM# (15)
H_PROCHOT#
R417 10KR0402
Q64 N-SST3904_SOT23
Q63 N-SST3904_SOT23
R416 X_0R0402-LF-1
FSBSEL RESISTOR CAN BE REMOVED IF ONLY TEJAS
AND CEDAR MILL ARE SUPPORTED
V_FSB_VTT
RN12
H_FSBSEL1
H_FSBSEL0
H_FSBSEL2
H_FSBSEL1 (3,6,7)
H_FSBSEL0 (3,6,7)
H_FSBSEL2 (3,6,7)
8P4R-470R0402-LF
V_FSB_VTT
PLACE AT ICH END OF ROUTE
R412 62R0402
R395 62R0402
TRMTRIP# (3,15)
H_FERR# (3,15)
MSI
MICRO-START INT'L CO.,LTD.
Title
INTEL LGA775 POWER
Size
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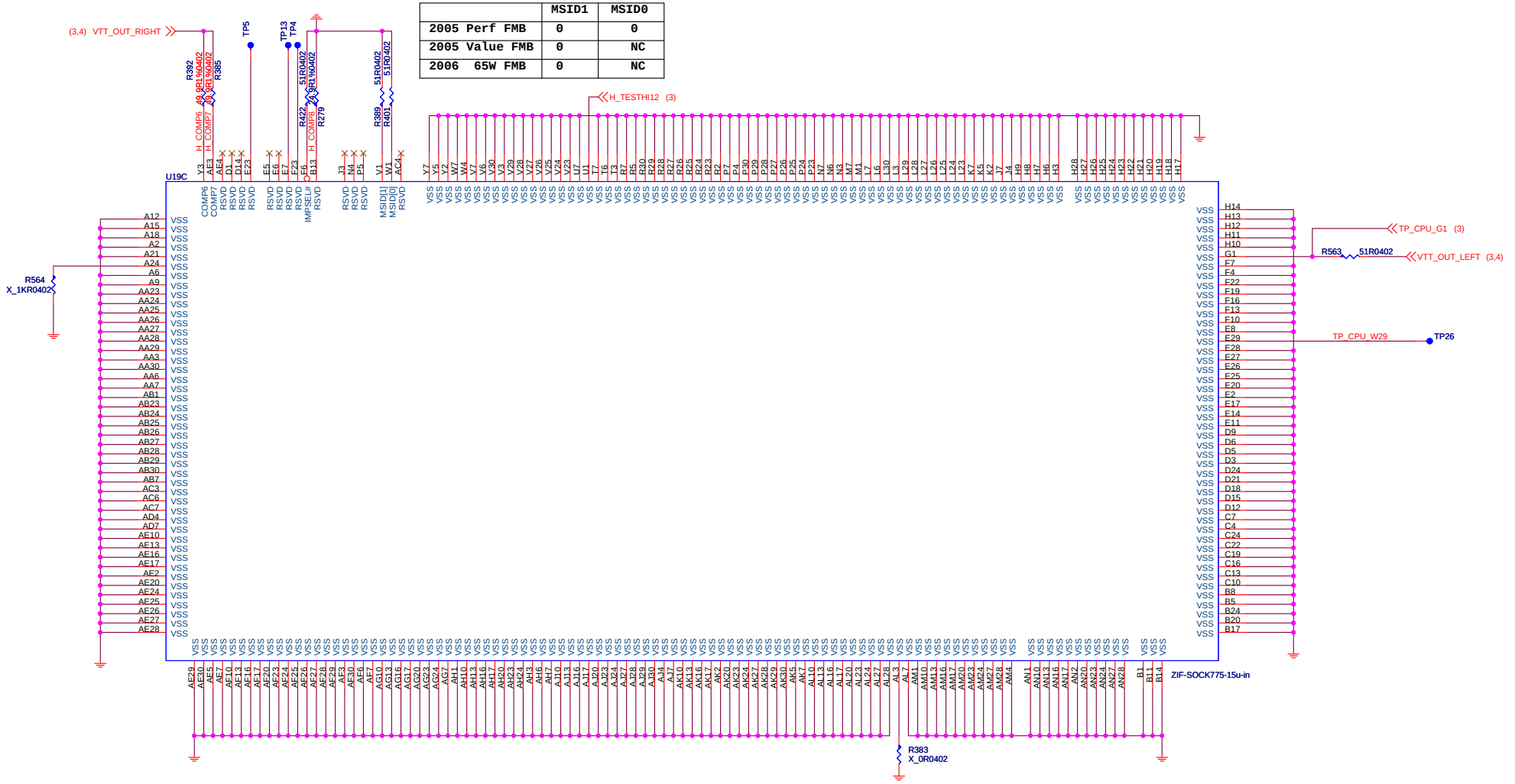
	MSID1	MSID0
2005 Perf FMB	0	0
2005 Value FMB	0	NC
2006 65W FMB	0	NC



Title	INTEL LGA775 GND
Size	Document Number: MS-7400
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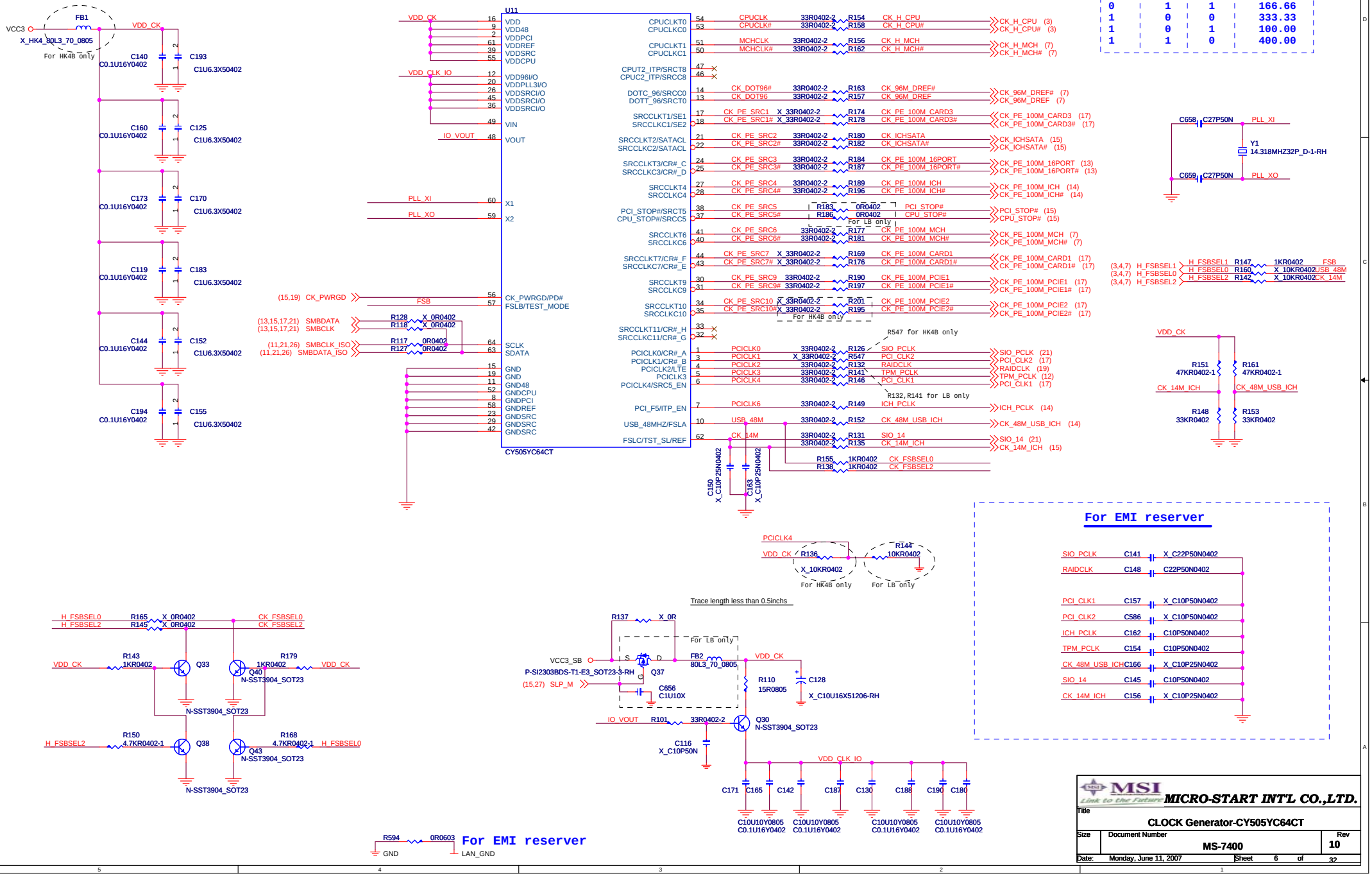
MSI Link to the Future MICRO-START INT'L CO.,LTD.

CLOCK Generator - CY505YC64DT

FSC Bit7	FSB Bit6	FSA Bit5	CPU MHz
0	0	0	266.66
0	0	1	133.33
0	1	0	200.00
0	1	1	166.66
1	0	0	333.33
1	0	1	100.00
1	1	0	400.00



MICRO-START INT'L CO.,LTD.

Title: CLOCK Generator-CY505YC64CT

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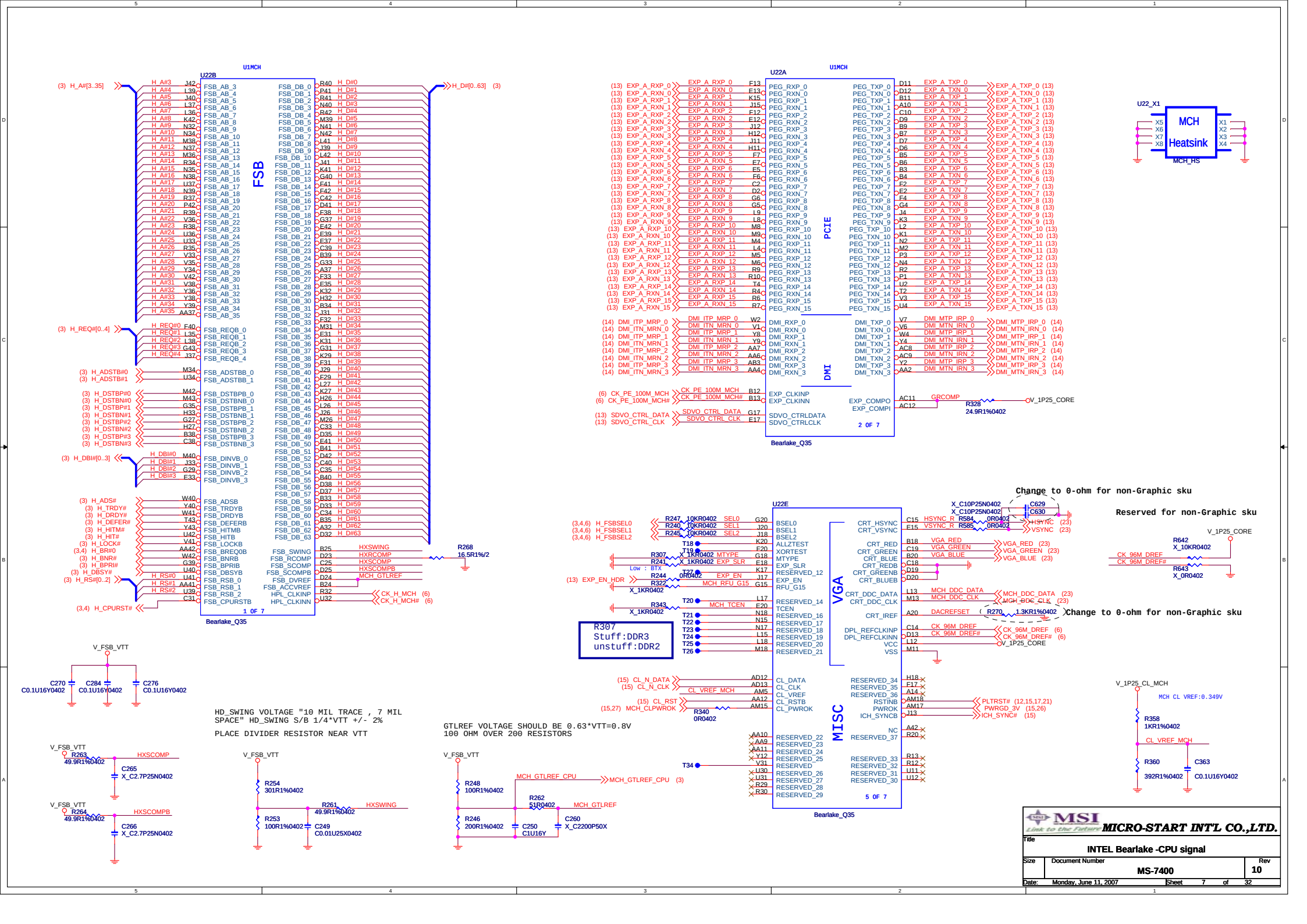
Date: Monday, June 11, 2007 | Sheet 6 of 32


U1MCH
U22B
FSB
Bearlake_Q35
1 OF 7
U1MCH
U22A
PCIE
DMI
VGA
MISC
Bearlake_Q35
2 OF 7
5 OF 7
U22_X1
MCH
Heatsink
MCH_HS
Change to 0-ohm for non-Graphic sku
Reserved for non-Graphic sku
Change to 0-ohm for non-Graphic sku
R307
Stuff:DDR3
unstuff:DDR2
HD_SWING VOLTAGE "10 MIL TRACE , 7 MIL
SPACE" HD_SWING S/B 1/4*VTT +/- 2%
PLACE DIVIDER RESISTOR NEAR VTT
GTLREF VOLTAGE SHOULD BE 0.63*VTT=0.8V
100 OHM OVER 200 RESISTORS
MCH CL VREF:0.349V
MICRO-START INT'L CO.,LTD.
INTEL Bearlake -CPU signal
MS-7400
10
Monday, June 11, 2007
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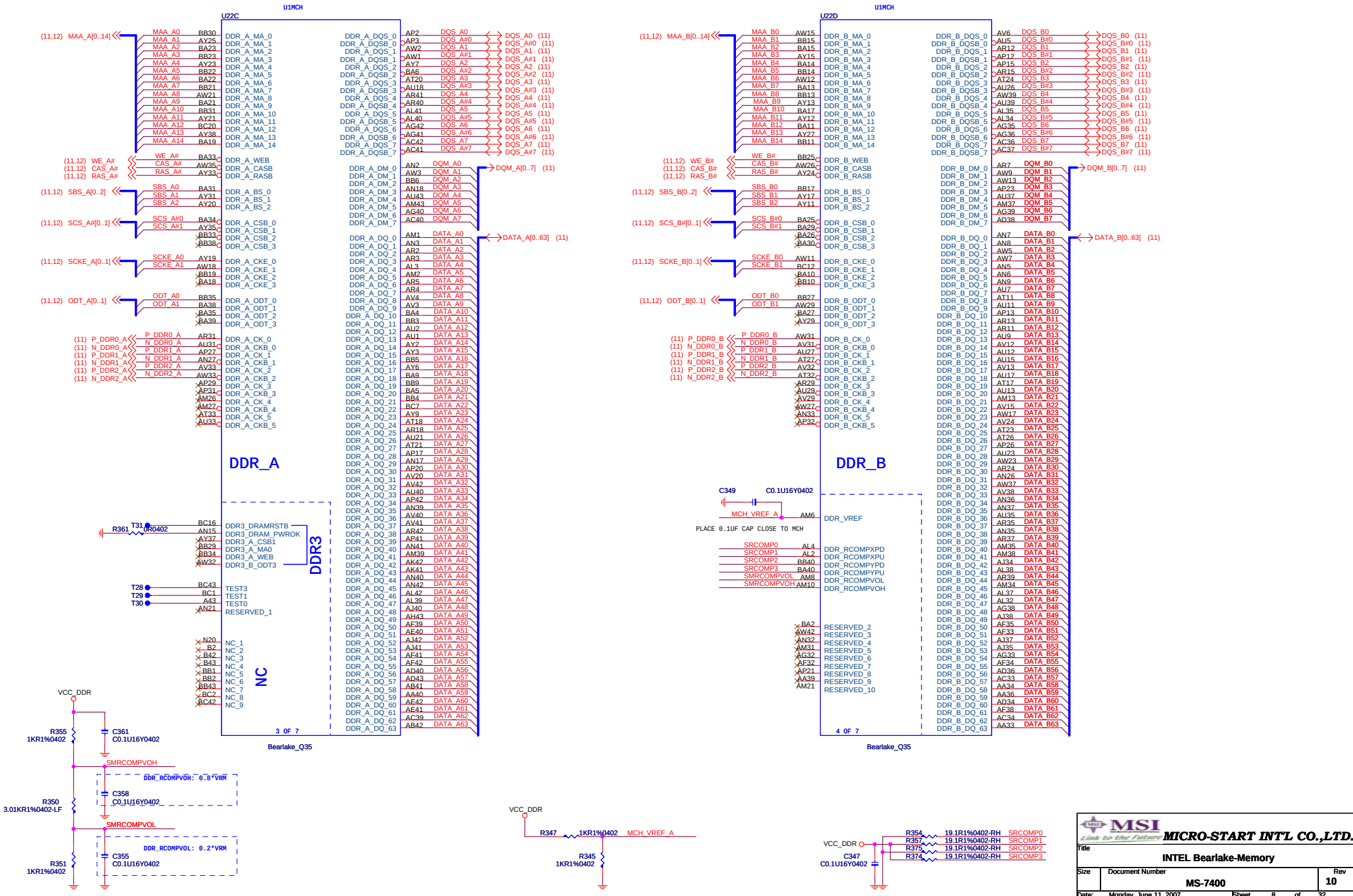
32


U1MCH
U22C
DDR_A
DDR3
NC
3 OF 7
Bearlake_Q35
U1MCH
U22D
DDR_B
4 OF 7
Bearlake_Q35
PLACE 0.1UF CAP CLOSE TO MCH
DDR_RCOMPVOH: 0.8*VRM
DDR_RCOMPVOL: 0.2*VRM
MICRO-START INTL CO.,LTD.
INTEL Bearlake-Memory
MS-7400
Rev 10
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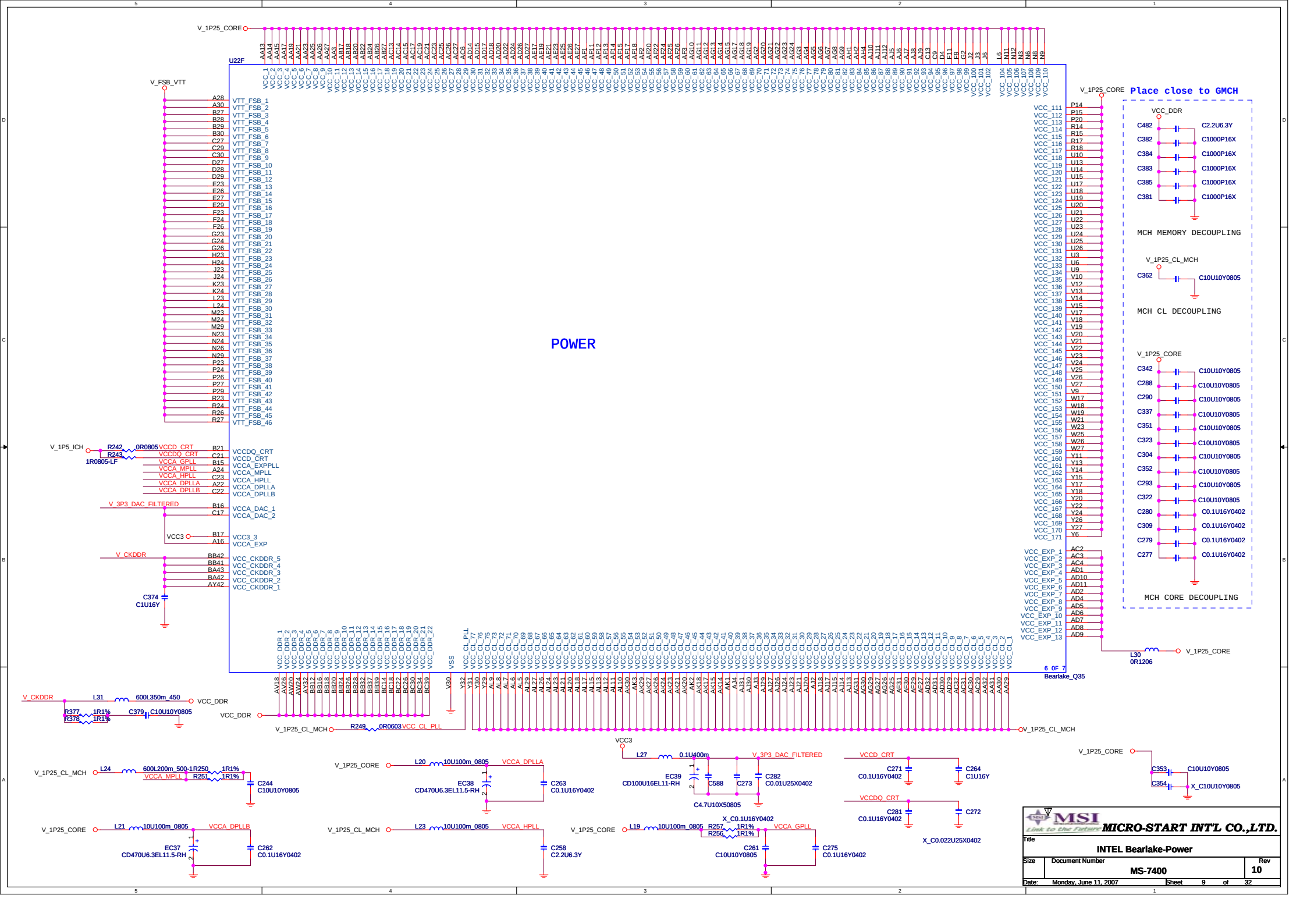
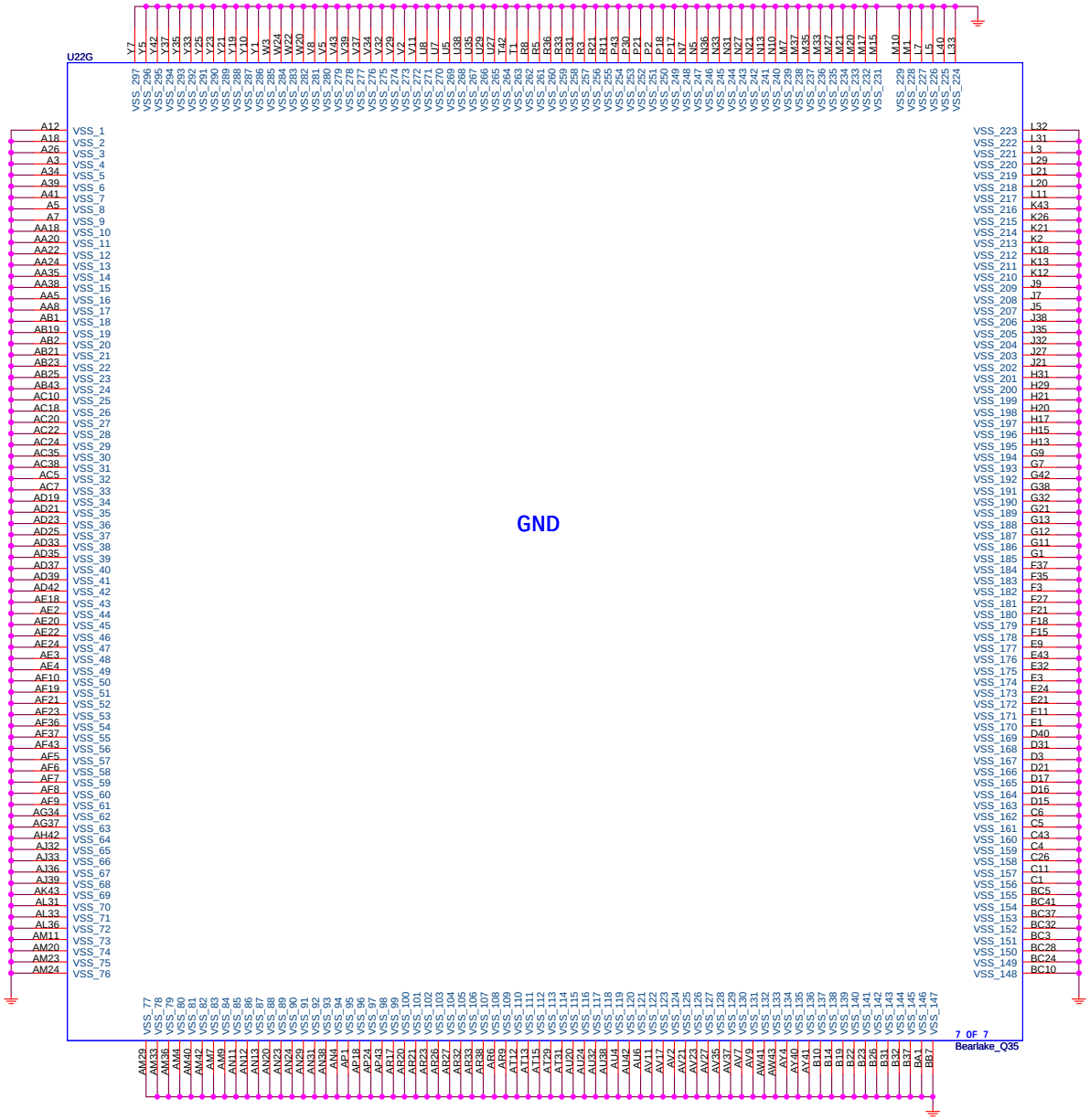

POWER
U22F
V_1P25_CORE
V_FSB_VTT
Place close to GMCH
MCH MEMORY DECOUPLING
MCH CL DECOUPLING
MCH CORE DECOUPLING
V_1P5_ICH
V_3P3_DAC_FILTERED
V_CKDDR
VCC3
V_1P25_CL_MCH
VCC_DDR
6 OF 7
Bearlake_Q35
MICRO-START INT'L CO.,LTD.
INTEL Bearlake-Power
MS-7400
10
Monday, June 11, 2007
9
32



MSI MICRO-START INT'L CO.,LTD.		
Title: INTEL Bearlake-GND		
Size	Document Number: MS-7400	Rev: 10
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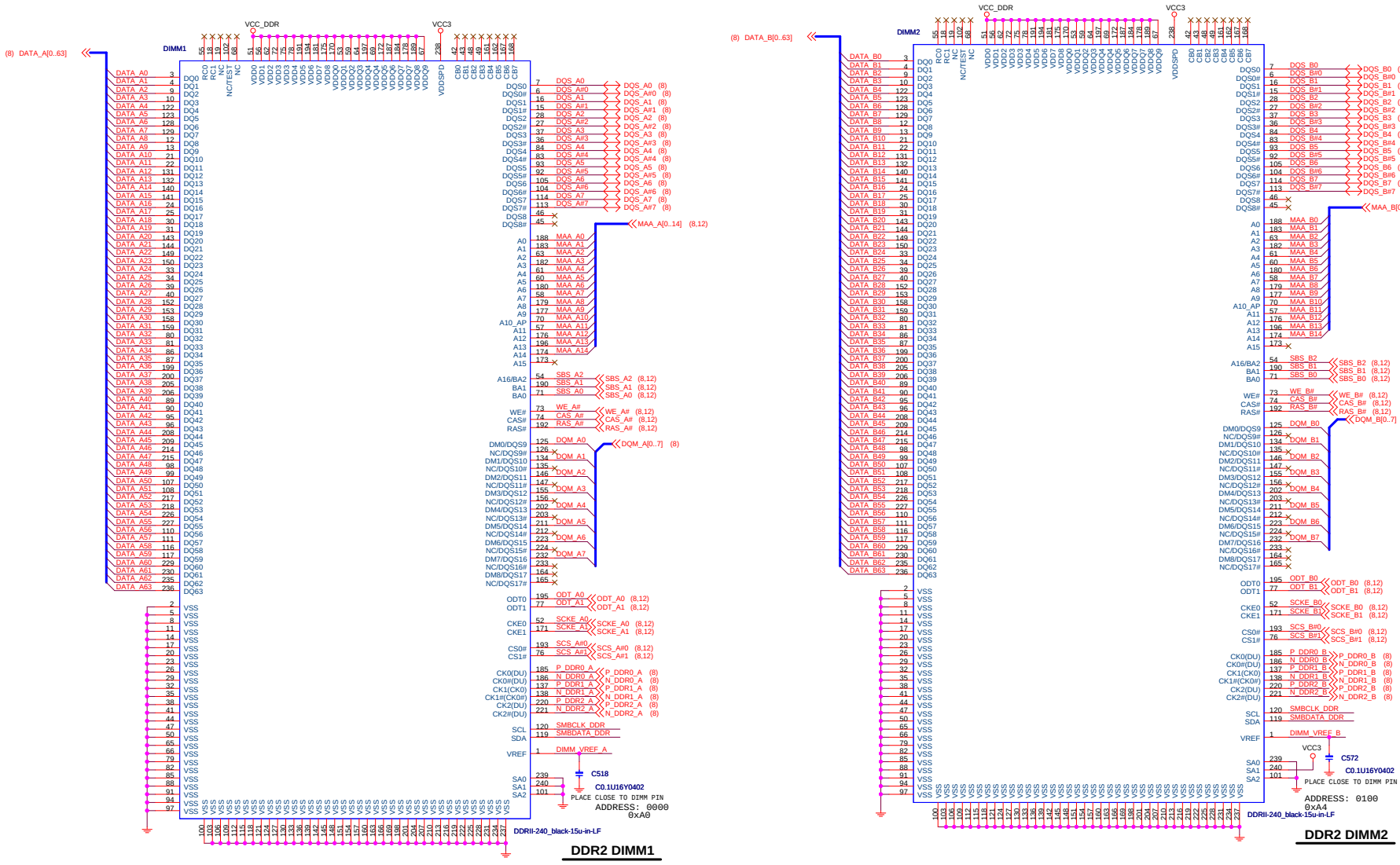

MSI MICRO-START INT'L CO.,LTD.			
Title: DDR2 DIMM 1 & 2			
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CHANNEL A V_SM_VTT DECOULPING CAPS

VTT_DDR
C513 C0.1U16Y0402
C507 C0.1U16Y0402

VTT_DDR
C517 C4.7U10Y0805
C512 C10U10Y0805

VTT_DDR
C515 C0.1U16Y0402
C516 C0.1U16Y0402
C508 C0.1U16Y0402
C519 C0.1U16Y0402
C510 C0.1U16Y0402

CHANNEL B V_SM_VTT DECOULPING CAPS

VTT_DDR
C570 C4.7U10Y0805
C557 X_C4.7U10Y0805

VTT_DDR
C567 C0.1U16Y0402
C559 C0.1U16Y0402
C560 C0.1U16Y0402
C561 C0.1U16Y0402
C562 C0.1U16Y0402
C563 C0.1U16Y0402

VTT_DDR
C564 C0.1U16Y0402
C549 C0.1U16Y0402
C558 C0.1U16Y0402
C571 C0.1U16Y0402

VTT_DDR

MAA_A4 MAA_A3 MAA_A2 MAA_A1 — RN43 8P4R-33R0402-1
MAA_A9 MAA_A5 MAA_A8 MAA_A6 — RN40 8P4R-33R0402-1
SBS_A2 MAA_A12 MAA_A11 MAA_A7 — RN45 8P4R-33R0402-1
MAA_A13 R473 33R0402-2
(8,11) RAS_A# — RAS_A#
(8,11) WE_A# — WE_A#
RN41 8P4R-33R0402-1
(8,11) CAS_A# — CAS_A#
MAA_A0 SBS_A1 MAA_A10 — RN39 8P4R-33R0402-1
SBS_A0
MAA_A14 R474 33R0402-2
ODT_A1 R472 43R0402
SCKE_A1 — RN44
SCKE_A0 — 8P4R-43R0402-RH
SCS_A#0 SCS_A#1 ODT_A0 — RN42 8P4R-43R0402-RH

(8,11) MAA_A[0..14]
(8,11) SBS_A[0..2]
(8,11) SCS_A#[0..1]
(8,11) SCKE_A[0..1]
(8,11) ODT_A[0..1]

VTT_DDR

MAA_B1 MAA_B2 MAA_B3 MAA_B4 — RN50 8P4R-33R0402-1
MAA_B9 MAA_B8 MAA_B5 MAA_B6 — RN49 8P4R-33R0402-1
SBS_B2 MAA_B12 MAA_B11 MAA_B7 — RN48 8P4R-33R0402-1
MAA_B0 SBS_B1 SBS_B0 MAA_B10 — RN51 8P4R-33R0402-1
(8,11) RAS_B# — RAS_B#
(8,11) WE_B# — WE_B#
(8,11) CAS_B# — CAS_B#
RN52 8P4R-33R0402-1
MAA_B13 R501 33R0402-2
MAA_B14 R500 33R0402-2
SCS_B#0 SCS_B#1 ODT_B0 — RN46 8P4R-43R0402-RH
SCKE_B1 SCKE_B0 — RN47 8P4R-43R0402-RH
ODT_B1 R502 43R0402

(8,11) MAA_B[0..14]
(8,11) SBS_B[0..2]
(8,11) SCS_B#[0..1]
(8,11) SCKE_B[0..1]
(8,11) ODT_B[0..1]

VCC_DDR
EC72 CD1000U6.3EL15
EC70 X_CD1000U6.3EL15

VCC_DDR
C505 C1U10X
C484 C1U10X
C485 C1U10X
C552 C1U10X
C386 C1U10X
C488 C1U10X

VCC_DDR
C532 C1U10X
C530 C1U10X
C489 C1U10X

VCC_DDR
C569 C0.01U25X0402
C525 X_C0.1U16Y0402
C568 C0.01U25X0402
C566 C0.01U25X0402
C509 X_C0.1U16Y0402
C565 C0.01U25X0402
C551 X_C0.1U16Y0402
C527 X_C0.1U16Y0402
VTT_DDR

TPM 1.2 (For LB only)

IO Address:0x02E

U8

(15,21) LPC_AD0 — LPC_AD0 — LAD0
(15,21) LPC_AD1 — LPC_AD1 — LAD1
(15,21) LPC_AD2 — LPC_AD2 — LAD2
(15,21) LPC_AD3 — LPC_AD3 — LAD3
(15,21) LPC_FRAME# — LPC_FRAME# — LFRAME#
(7,15,17,21) PLTRST# — LRESET#
(15) LPCPD# — LPCPD#
TPM_CLKRUN# — CLKRUN#
(15,17,21) SERIRQ — SERIRQ — SERIRQ
(6) TPM_PCLK — TPM_PCLK — LCLK
R170 0R0402 TPM_ADDR — TESTBI/BADD
R129 0R0402 — TESTI
R171 X_0R0402 — PP
R172 X_0R0402 — NC3
R173 X_0R0402 — NC4
GPIO
3V_1 3V_2 3V_3 — VCC3
3VSB — VCC3_SB
GND1 GND2 GND3 GND4
XTALO XTALI/32KIN
NC1 NC2
Y2 32.768KHZ12.5P_D-LF
C189 C12P50N0402
C186 C12P50N0402
SLB9635TT1.2-FW1.02

VCC3
VCC3
VCC3
VCC3_SB

C139 C0.1U16Y0402
C137 C0.1U16Y0402
C176 C1000P16X0402
C177 C0.1U16Y0402

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

Title	DDR II VTT DECOUPLING & TPM1.2	
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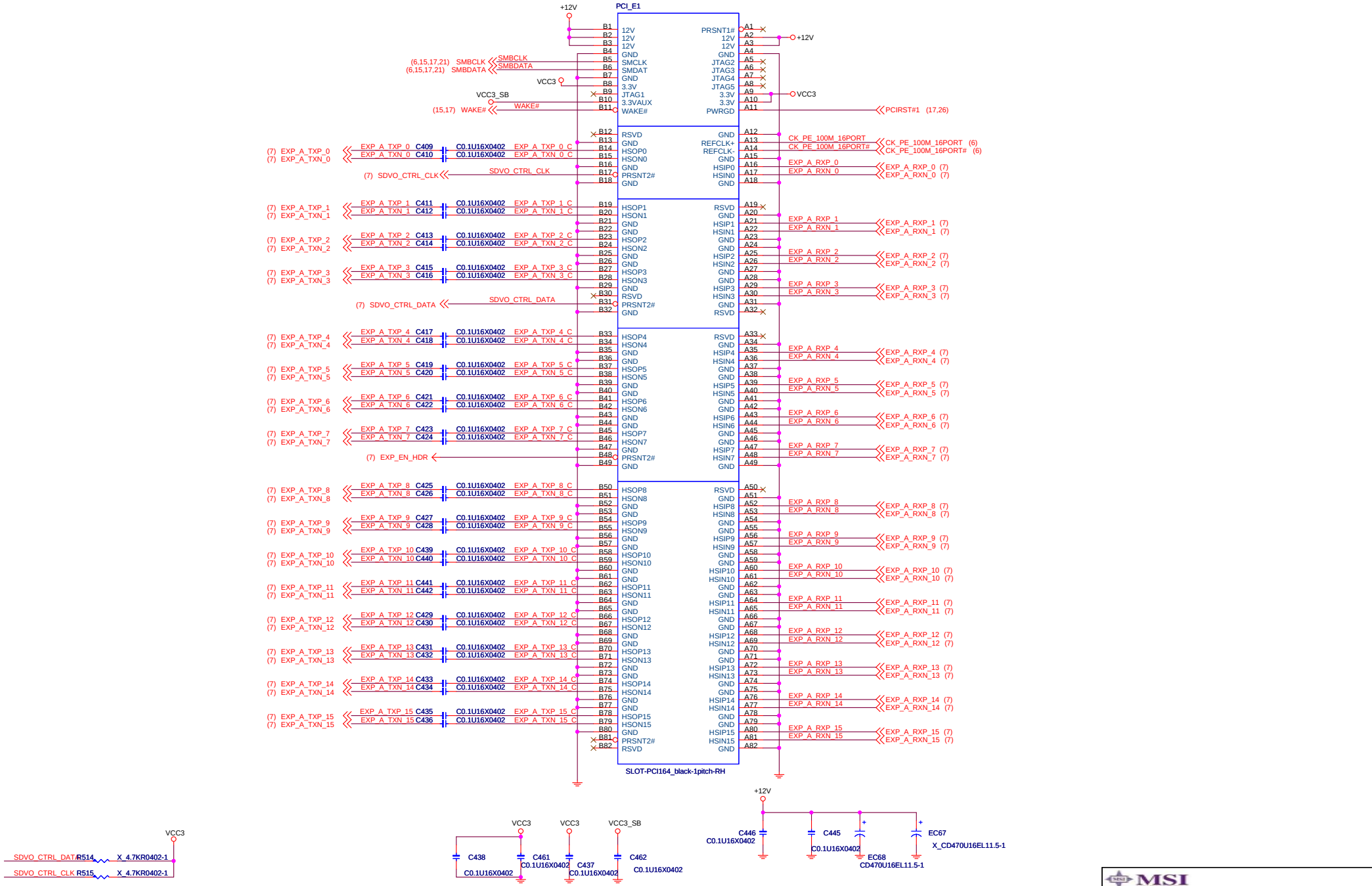

MSI Link to the Future	MICRO-START INT'L CO.,LTD.	
Title	PCI EXPRESS 16 PORT	
Size	Document Number MS-7400	Rev 10
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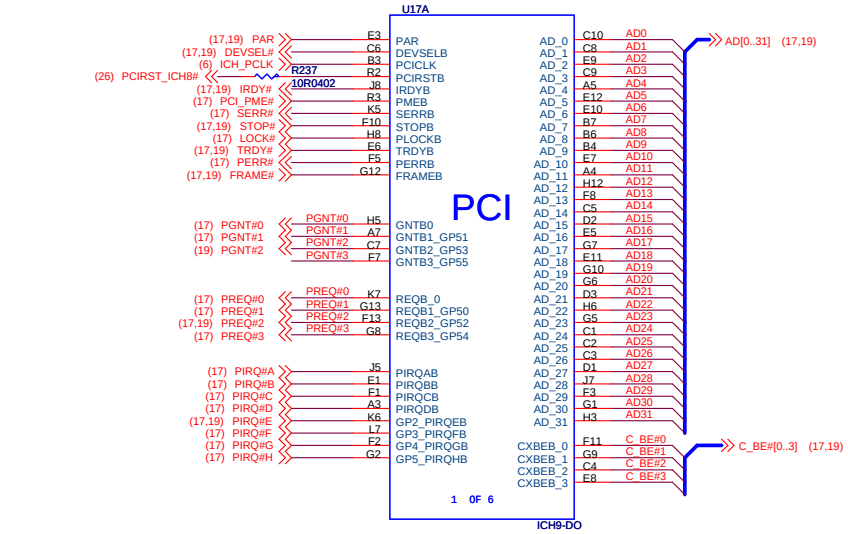
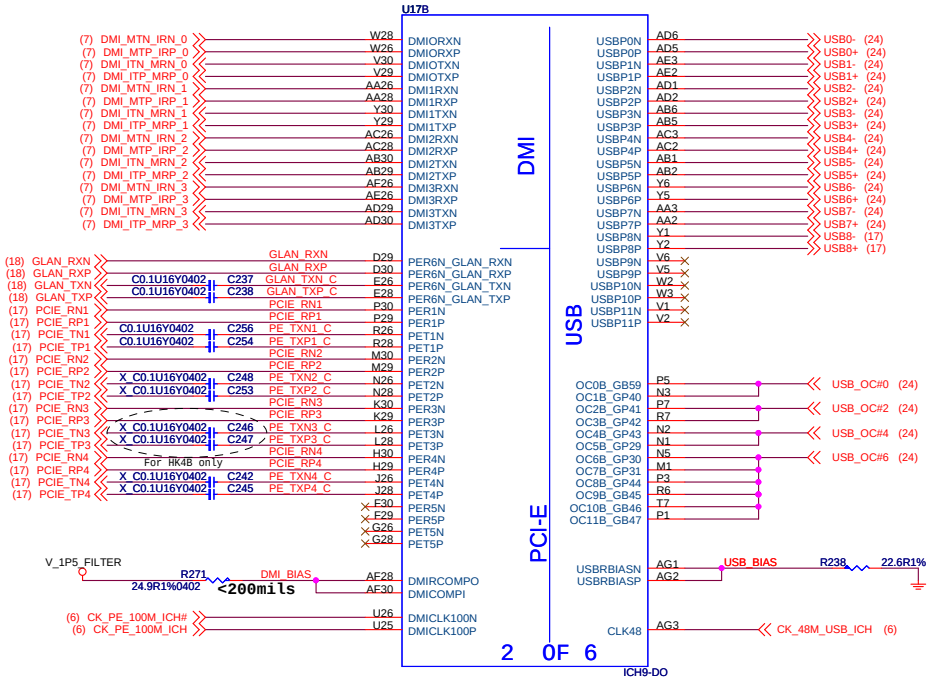
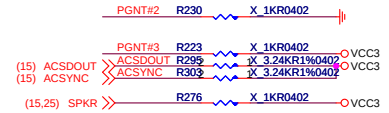
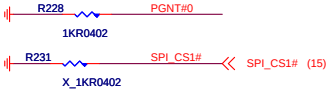




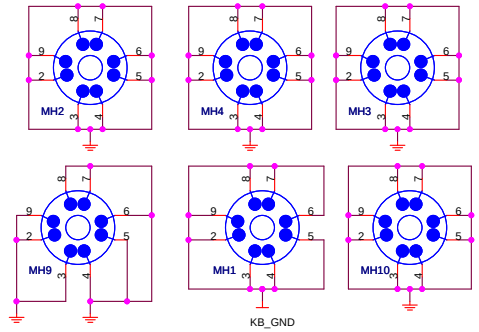
ICH9 H/W STRAPS			
SIGNAL	H	L	DES.
SPKR	DIS	EN	REBOOT
GNT3	DIS	EN	A16 OVERIDE
INTVRMEN	EN	DIS	INT VRM
SATALED	NORM	REVERSE	PCIE 0-3 ORDER
HDA_SDOUT	DFX/ PCIE	N/A	XOR MODE/PCIE PORT CONFIG BIT 1
HDA_SYNC	SET BIT	N/A	PCIE PORT CONFIG BIT 0 (1-4)
GNT2	N/A	SET BIT	PCIE PORT CONFIG 2 BIT 0 (5-6)



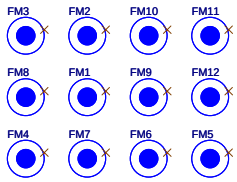
BOOT SELECT STRAPS			
BOOT DEVICE	GNT#0	SPI_CS1#	
FWH	1	1	
SPI	0	X	(Default)
PCI	1	0	



Mounting Holes

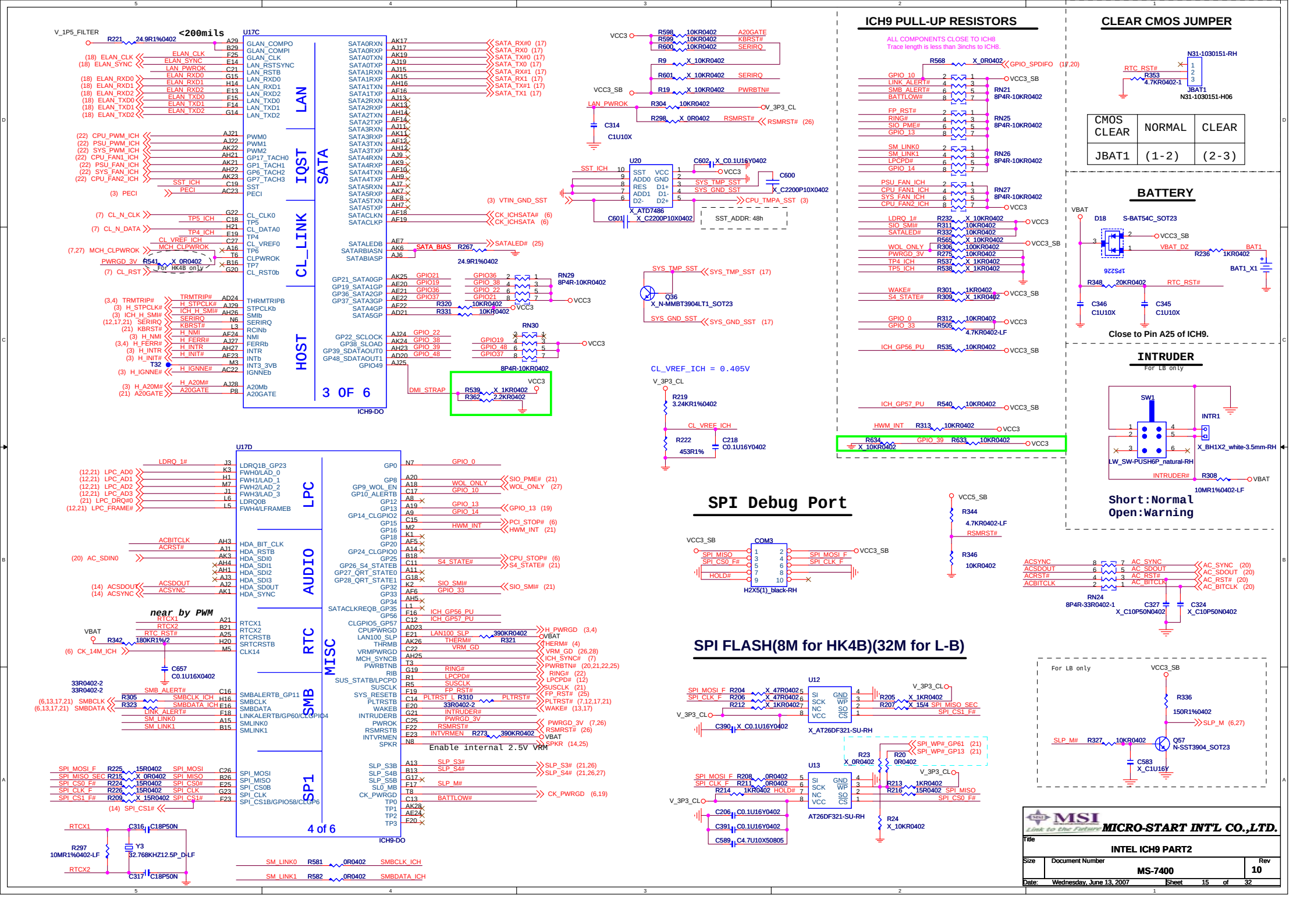


Optics Orientation Holes

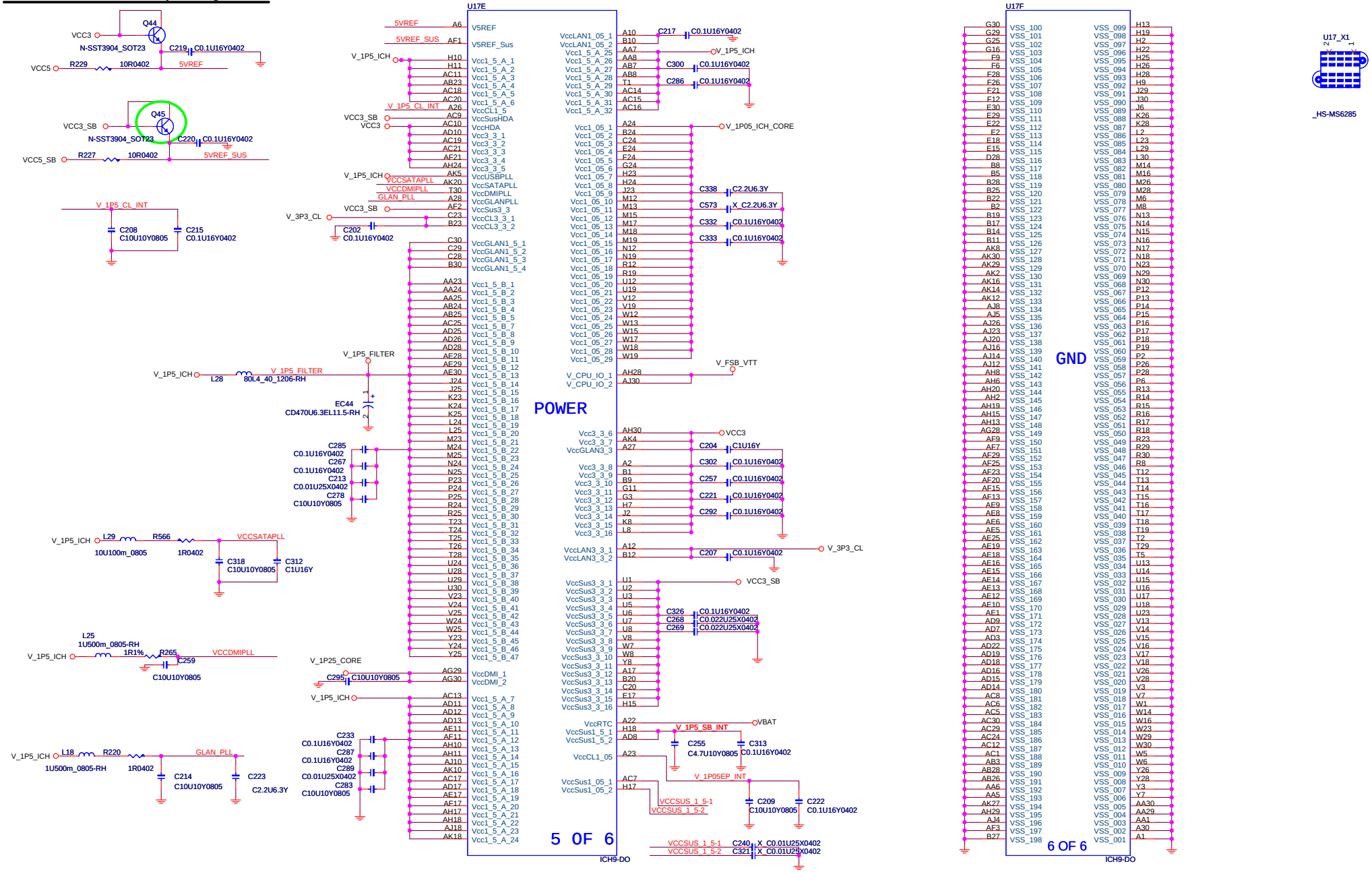


MICRO-START INT'L CO.,LTD.

Title	INTEL ICH9 PART1	
Size	Document Number MS-7400	Rev 10
Date: Monday, June 11, 2007	Sheet 14 of 32	


ICH9 PULL-UP RESISTORS
ALL COMPONENTS CLOSE TO ICH8
Trace length is less than 3inchs to ICH8.
CLEAR CMOS JUMPER
CMOS CLEAR | NORMAL | CLEAR
JBAT1 | (1-2) | (2-3)
BATTERY
Close to Pin A25 of ICH9.
INTRUDER
For LB only
Short:Normal
Open:Warning
SPI Debug Port
SPI FLASH(8M for HK4B)(32M for L-B)
CL_VREF_ICH = 0.405V
Enable internal 2.5V VRM
near by PWM
3 OF 6
4 of 6
ICH9-DO
MICRO-START INT'L CO.,LTD.
INTEL ICH9 PART2
MS-7400
Wednesday, June 13, 2007

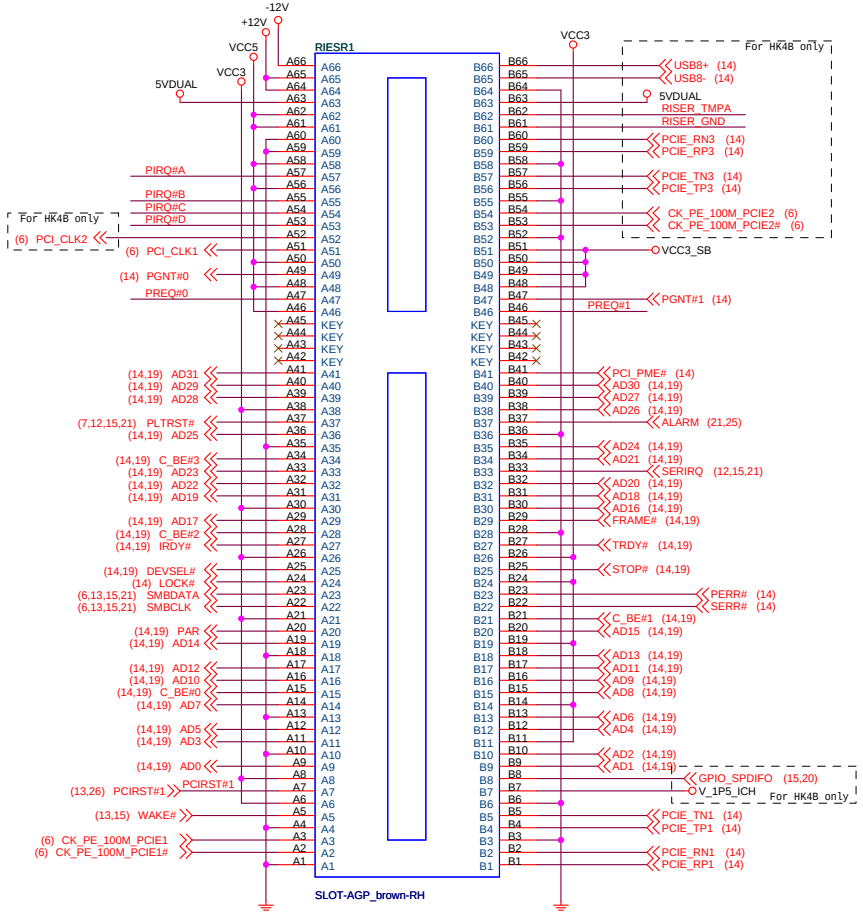
5VREF & 5VREF_SUS Sequencing Circuit



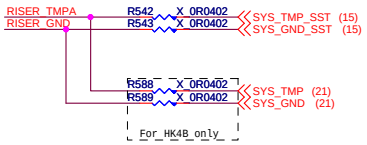
MICRO-START INT'L CO.,LTD.

Title	INTEL ICH9 POWER	
Size	Document Number: MS-7400	Rev: 10
Date: Monday, June 11, 2007	Sheet 16 of 32	

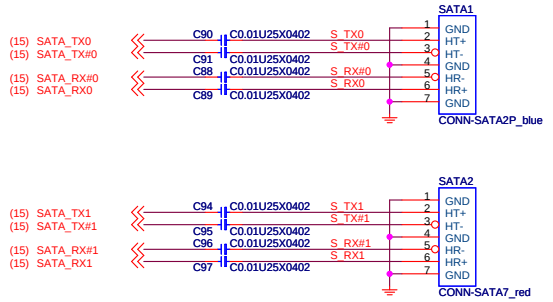
LB&HK4B riser card interface



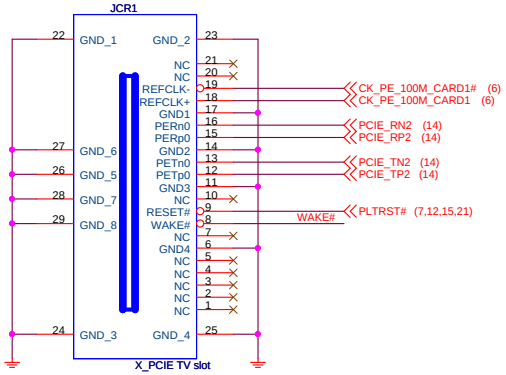
IDSEL = AD16
MASTER = PREQ#0
PIRQ#A

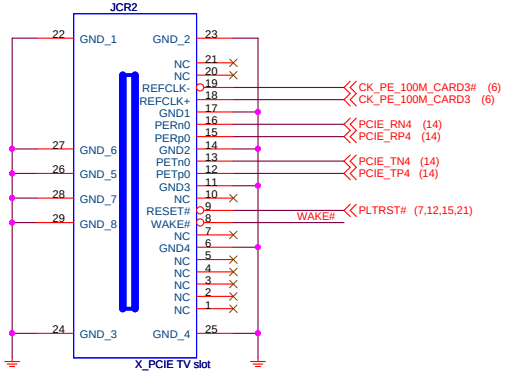


SERIAL ATA CONNECTOR BLOCK

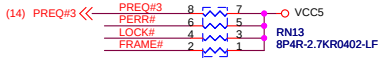


Lunar Bear not mount : JCR1, JCR2 & JCR5
HK4B : populate JCR1, reserve JCR2 & JCR5

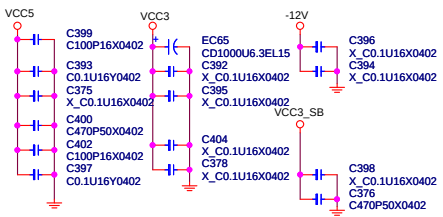


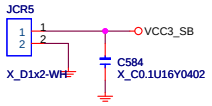


PCI PULL-UP / DOWN RESISTORS



PCI SLOT DECOUPLING CAPACITORS





MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

Title: **RISER & JCR& SATA Slots**

Size	Document Number	Rev
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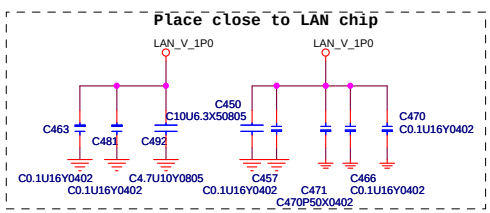
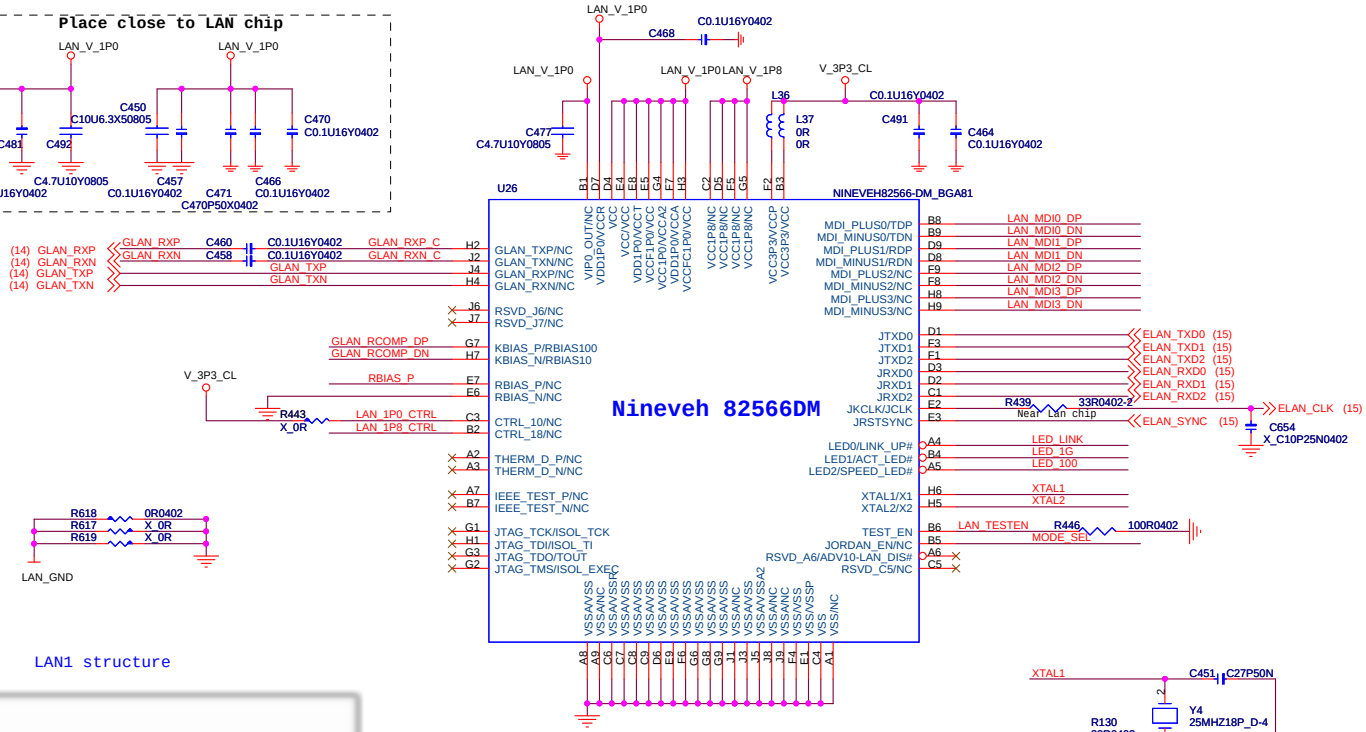
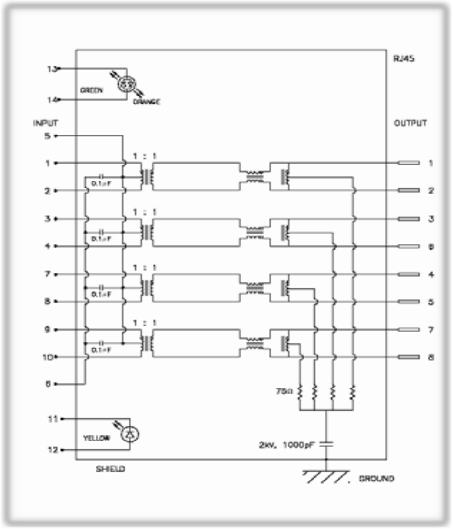
LAN - NINEVEH

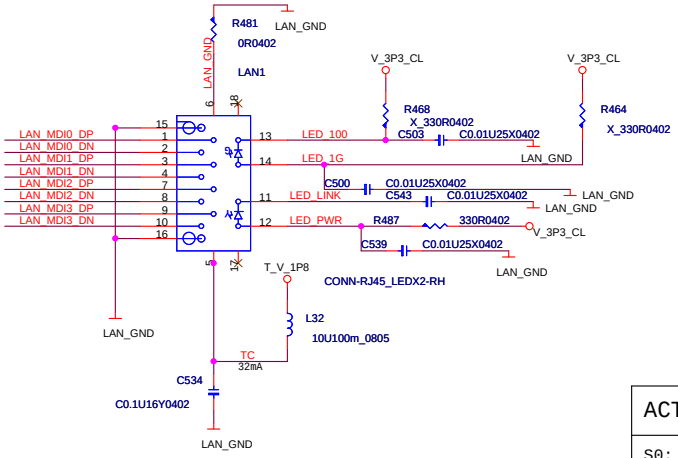




LAN1 structure

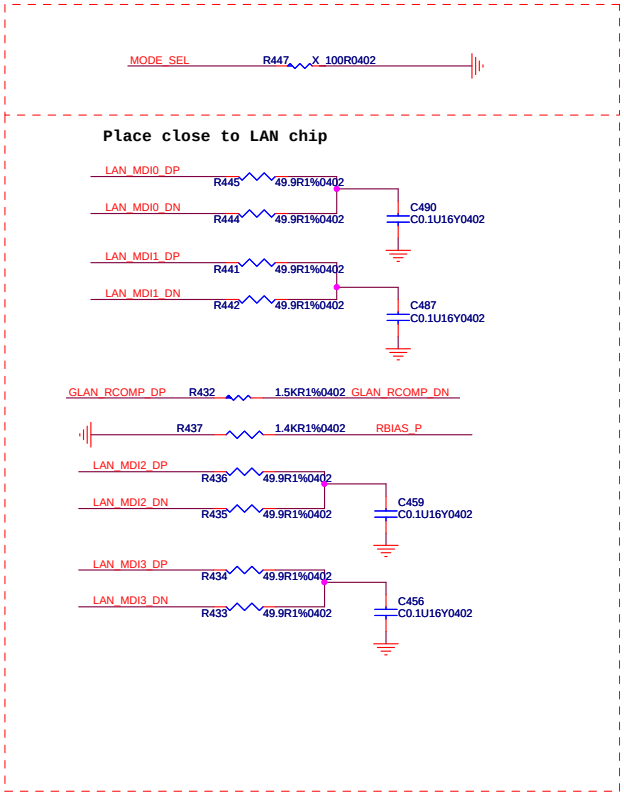


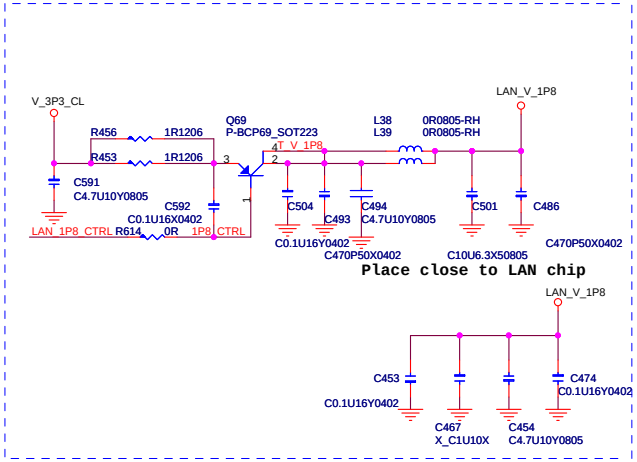
LAN CONNECTOR



Speed LED Type
1000Mbps : Orange
100Mbps : Green
10Mbps : LED off

For Active/Link:
Yellow



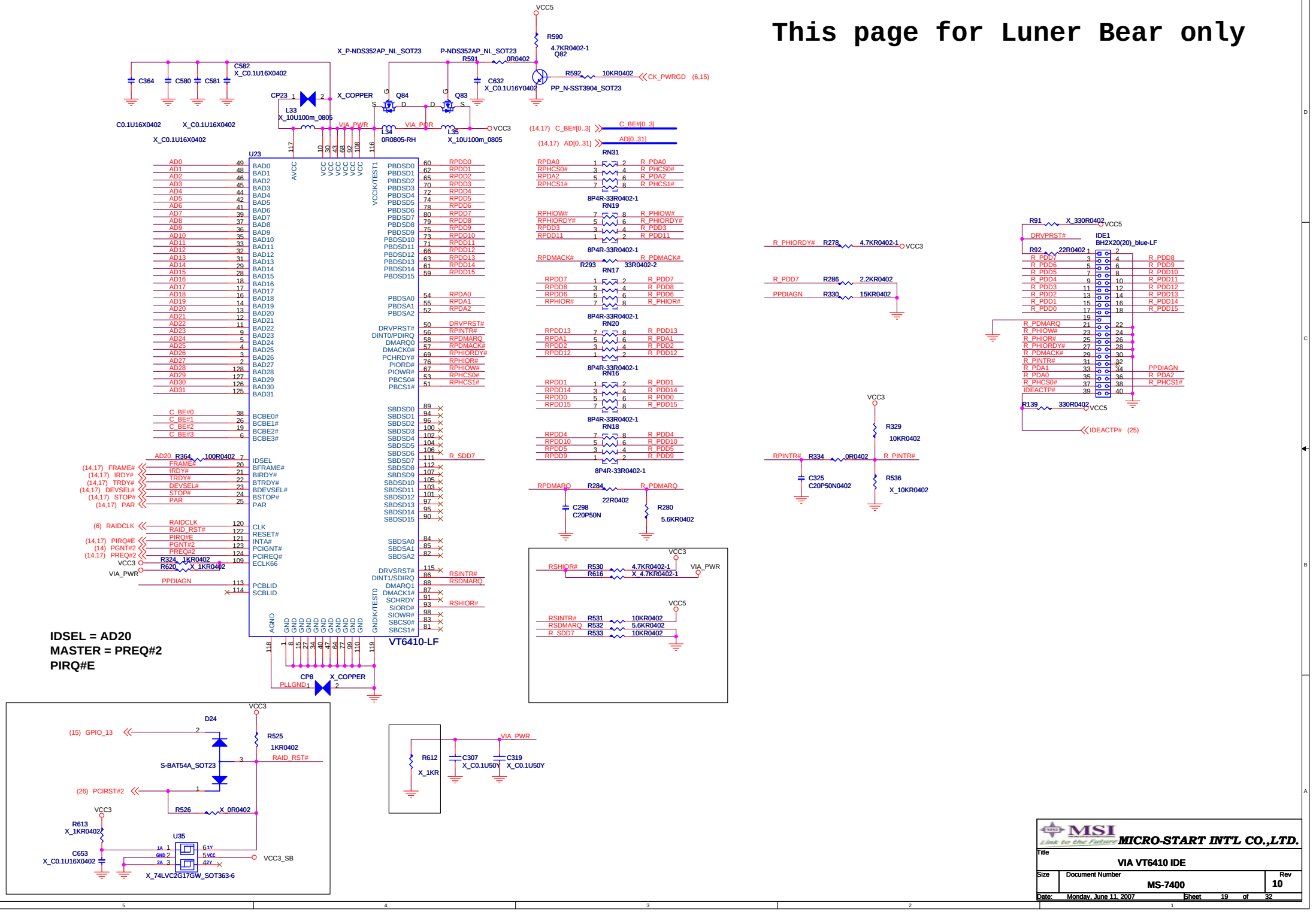


ACT_LED	Link_LED
S0: LOW	S0: LOW
S1/S3/S4/S5: HIGH	S5: HIGH
	S1/S3/S4: WOL EN-->LOW WOL DIS-->HIGH

MICRO-START INT'L CO.,LTD.

Title: LAN-NINEVEH 82566		
Size	Document Number: MS-7400	Rev: 10
Date: Monday, June 11, 2007	Sheet 18 of 32	

This page for Luner Bear only



MSI	MICRO-START INT'L CO.,LTD.
Title	VIA VT6410 IDE
Size	Document Number: MS-7400
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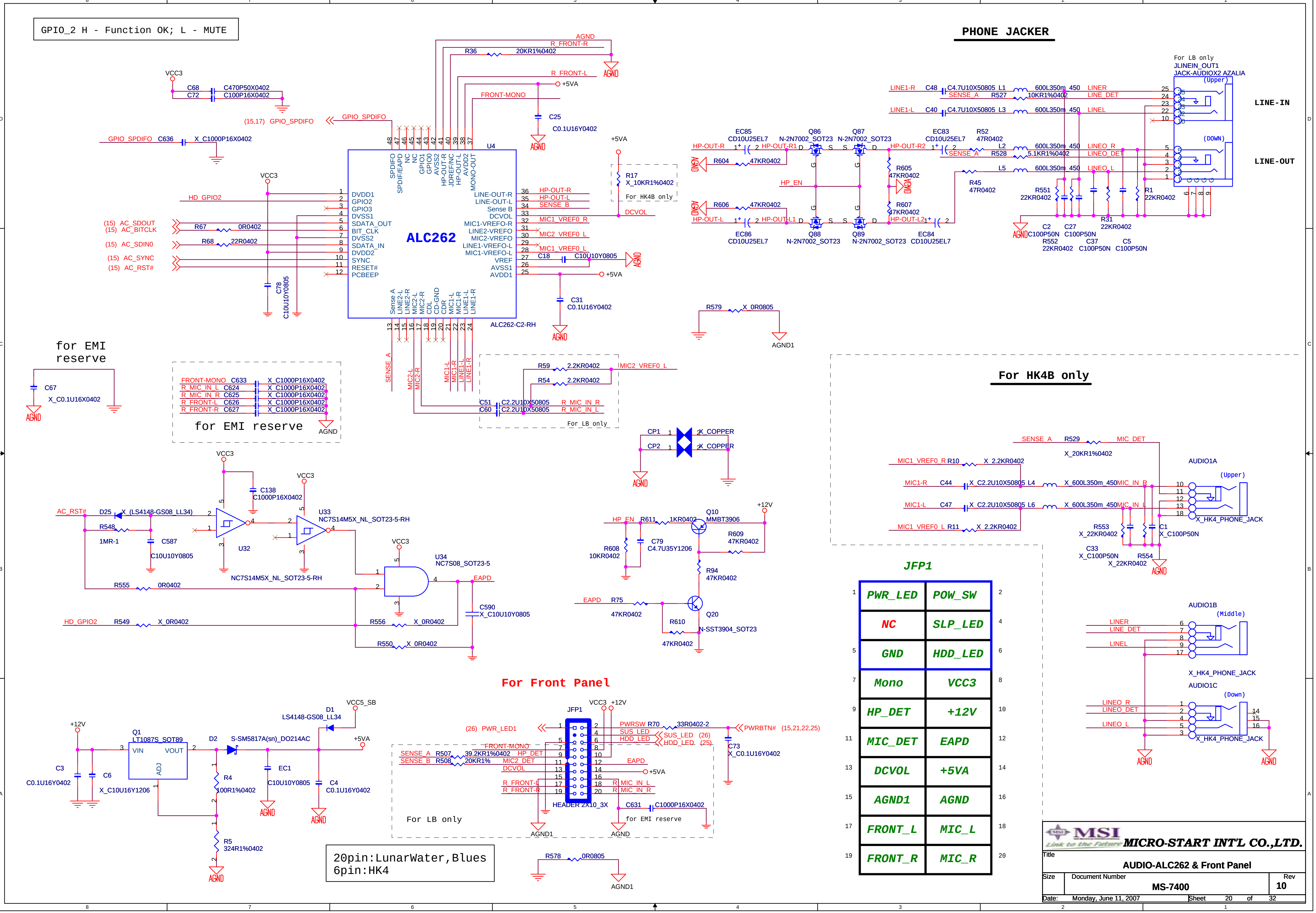

GPIO_2 H - Function OK; L - MUTE
PHONE JACKER
ALC262
U4
ALC262-C2-RH
LINE-IN
LINE-OUT
For LB only
JLINEIN_OUT1
JACK-AUDIOX2 AZALIA
(Upper)
(DOWN)
(Middle)
(Down)
For HK4B only
For HK4B only
For LB only
for EMI reserve
for EMI reserve
For Front Panel
AUDIO1A
AUDIO1B
AUDIO1C
X_HK4_PHONE_JACK
JFP1
HEADER 2X10_3X
U32
U33
U34
NC7S14M5X_NL_SOT23-5-RH
NC7S08_SOT23-5
Q1
LT1087S_SOT89
Q10
MMBT3906
Q20
N-SST3904_SOT23
Q86
Q87
Q88
Q89
N-2N7002_SOT23
20pin:LunarWater,Blues
6pin:HK4
MICRO-START INT'L CO.,LTD.
Title
AUDIO-ALC262 & Front Panel
Size
Document Number
MS-7400
Rev
10
Date: Monday, June 11, 2007
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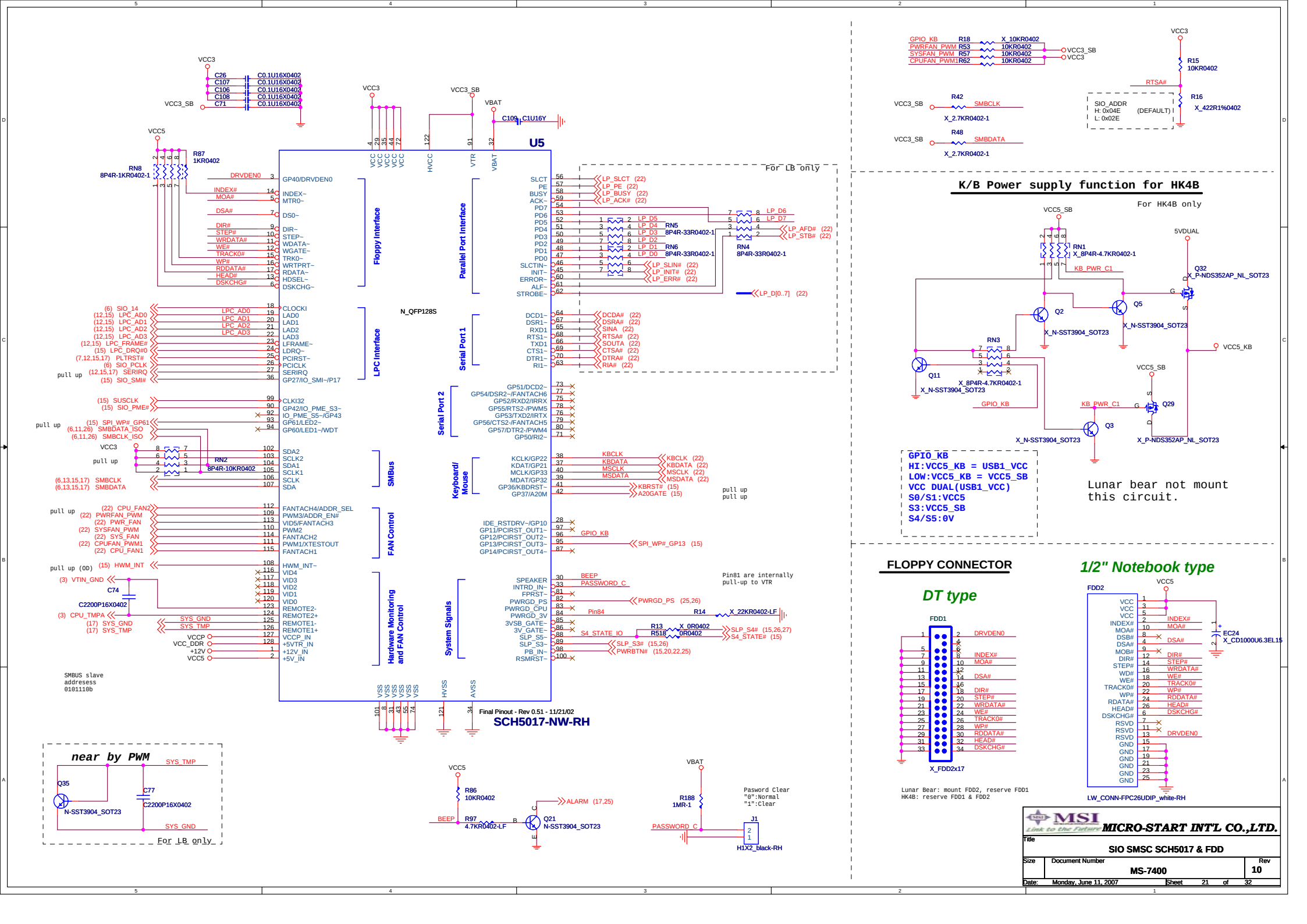
JFP1

1	PWR_LED	POW_SW	2
	NC	SLP_LED	4
5	GND	HDD_LED	6
7	Mono	VCC3	8
9	HP_DET	+12V	10
11	MIC_DET	EAPD	12
13	DCVOL	+5VA	14
15	AGND1	AGND	16
17	FRONT_L	MIC_L	18
19	FRONT_R	MIC_R	20


U5
N_QFP128S
SCH5017-NW-RH
Final Pinout - Rev 0.51 - 11/21/02
Floppy Interface
Parallel Port Interface
LPC Interface
Serial Port 1
Serial Port 2
SMBus
Keyboard/ Mouse
FAN Control
Hardware Monitoring and FAN Control
System Signals
For LB only
SMBUS slave addresess 0101110b
near by PWM
N-SST3904_SOT23
C2200P16X0402
Pin81 are internally pull-up to VTR
Pasword Clear "0":Normal "1":Clear
H1X2_black-RH
K/B Power supply function for HK4B
For HK4B only
GPIO_KB
HI:VCC5_KB = USB1_VCC
LOW:VCC5_KB = VCC5_SB
VCC DUAL(USB1_VCC)
S0/S1:VCC5
S3:VCC5_SB
S4/S5:0V
Lunar bear not mount this circuit.
FLOPPY CONNECTOR
DT type
FDD1
X_FDD2x17
1/2" Notebook type
FDD2
LW_CONN-FPC26UDIP_white-RH
Lunar Bear: mount FDD2, reserve FDD1
HK4B: reserve FDD1 & FDD2
MICRO-START INT'L CO.,LTD.
SIO SMSC SCH5017 & FDD
MS-7400
Rev 10
Monday, June 11, 2007
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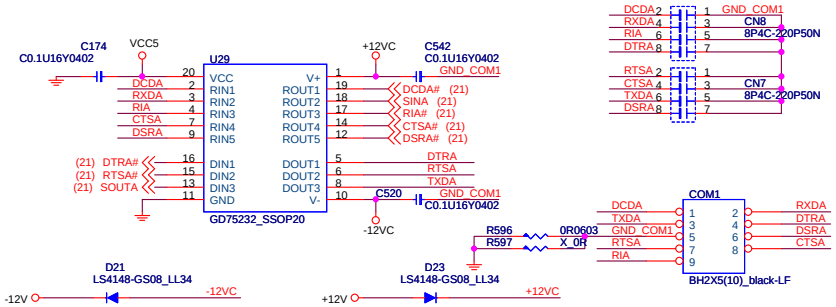
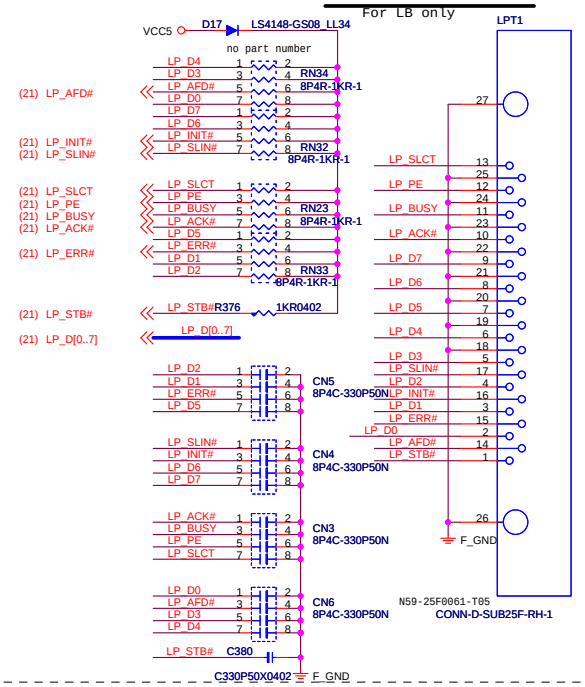
SERIAL PORT 1

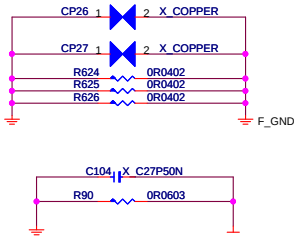
For LB only

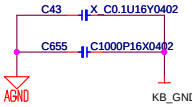


PARALLAL PORT

For LB only

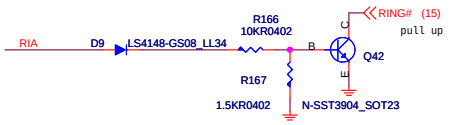


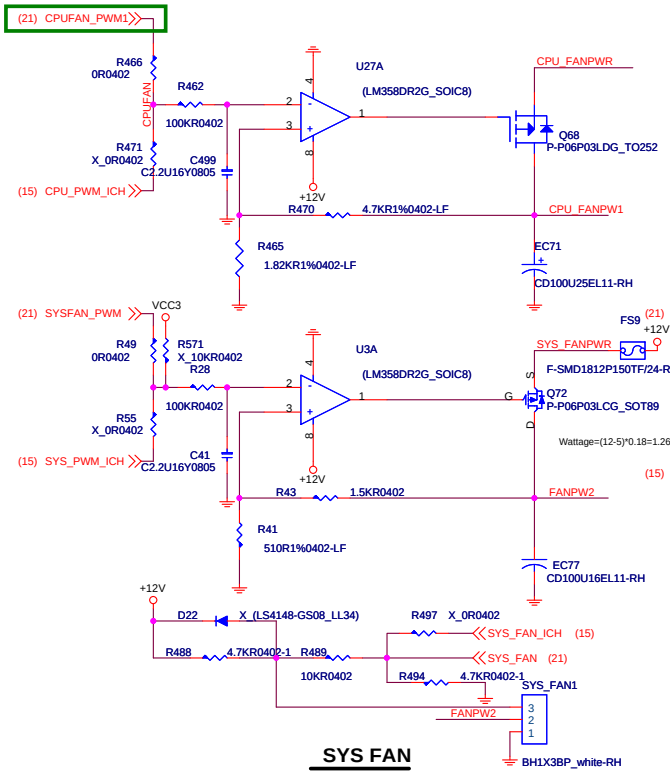




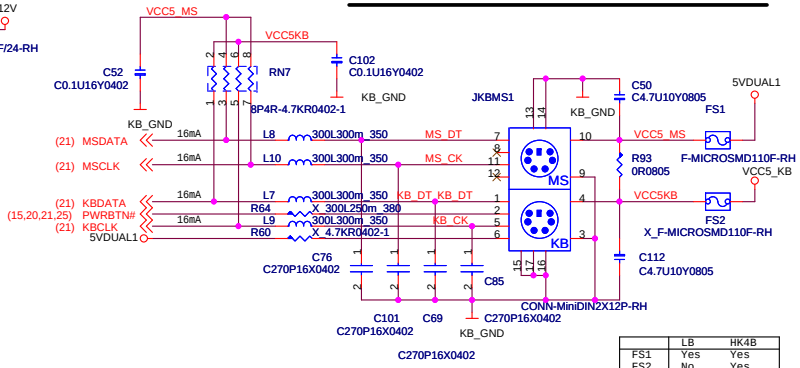
Wake On Modem Header

For LB only



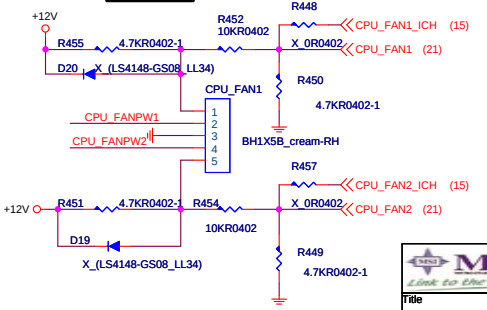


PS2 KEYBOARD & MOUSE CONNECTOR



	LB	HK4B
FS1	Yes	Yes
FS2	No	Yes
R93	Yes	No
R60	No	Yes
R64	No	Yes
L8	Yes	No
L10	Yes	No
C76	Yes	No
C101	Yes	No

CPU FAN



MSI MICRO-START INT'L CO.,LTD.		
Title	KB/MS/LPT/COM Port/FAN	
Size	Document Number	Rev
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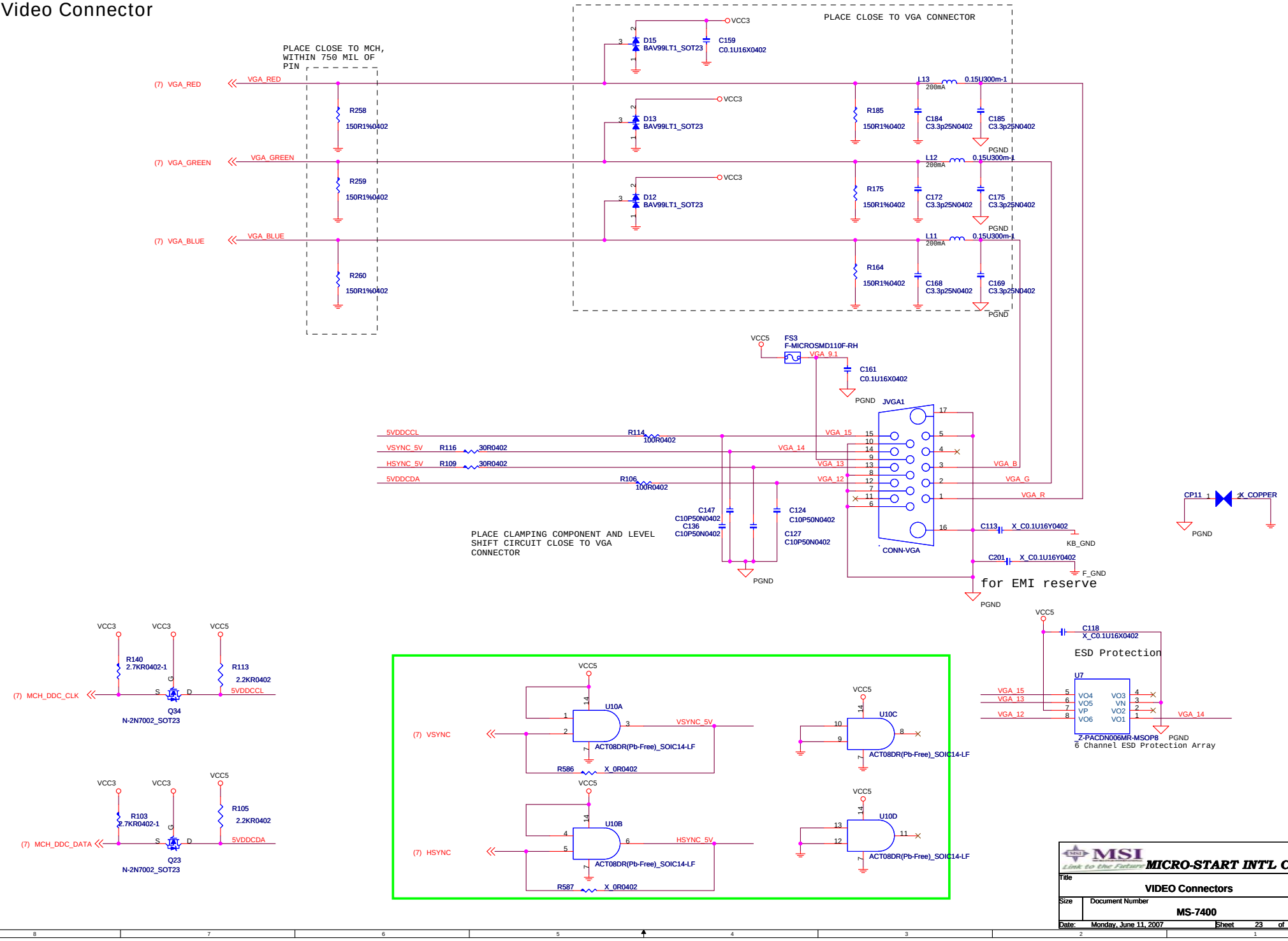
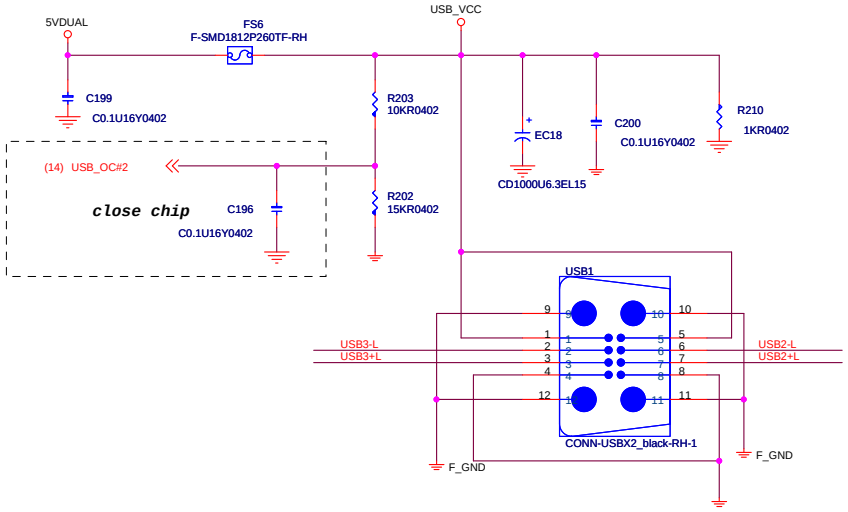
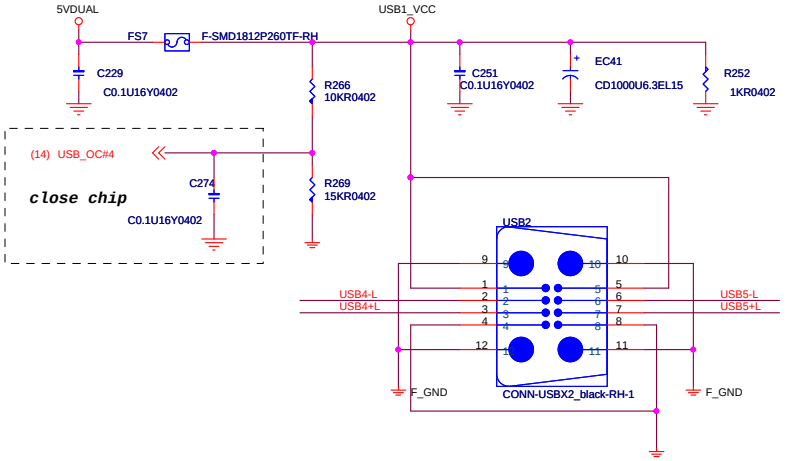
Video Connector



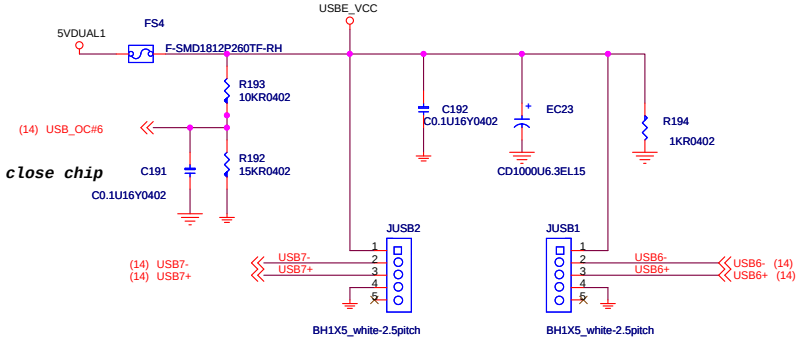
MSI Link to the Future	MICRO-START INT'L CO.,LTD.	
Title	VIDEO Connectors	
Size	Document Number: MS-7400	Rev: 10
Date: Monday, June 11, 2007	Sheet 23 of 32	

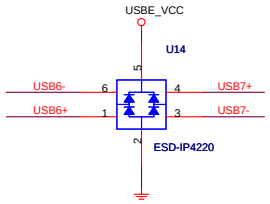
REAR USB PORT



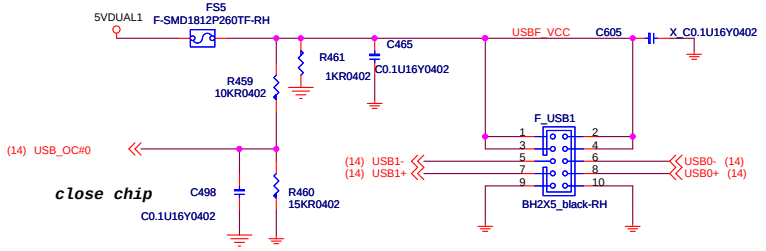


EXTERNAL USB PORT 0,1





FRONT PANEL USB PORT 6,7 CONNECTOR



MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

Title: USB Connectors		
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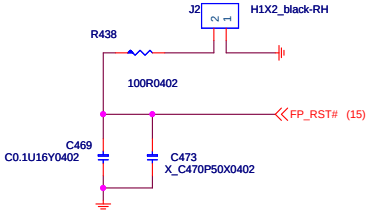
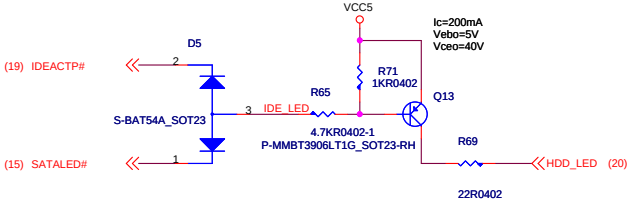
ATX connector / IR

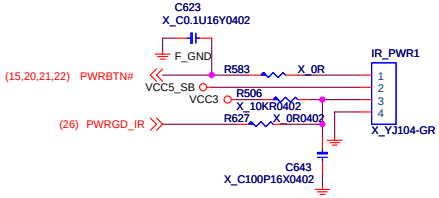
For Debug

Remove after MP

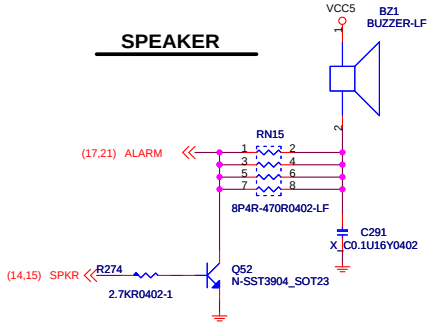




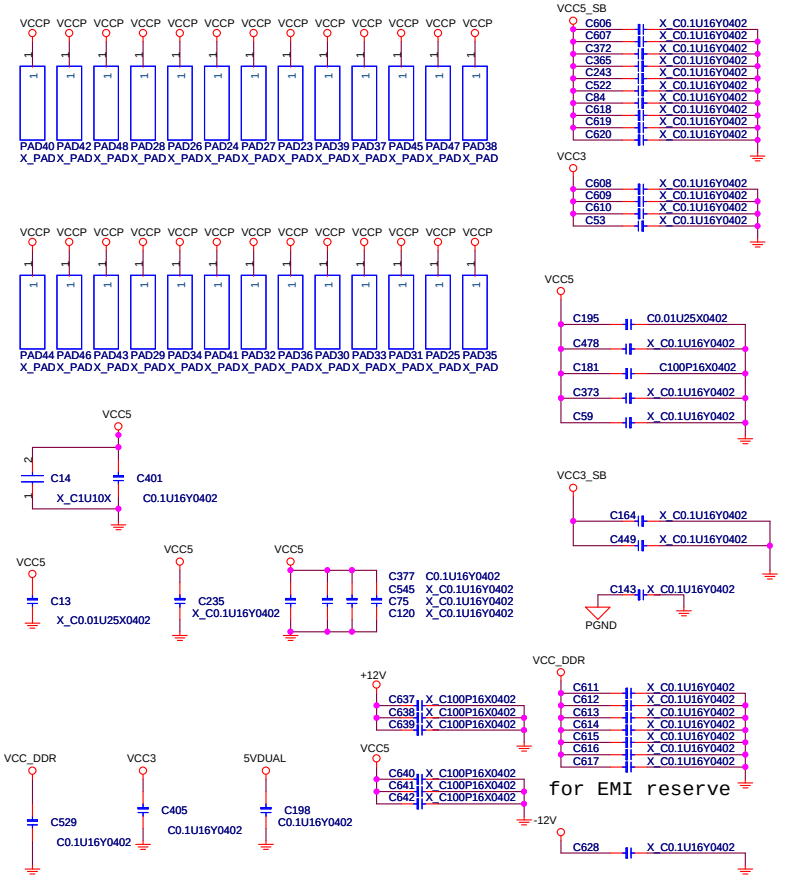
IR Connector



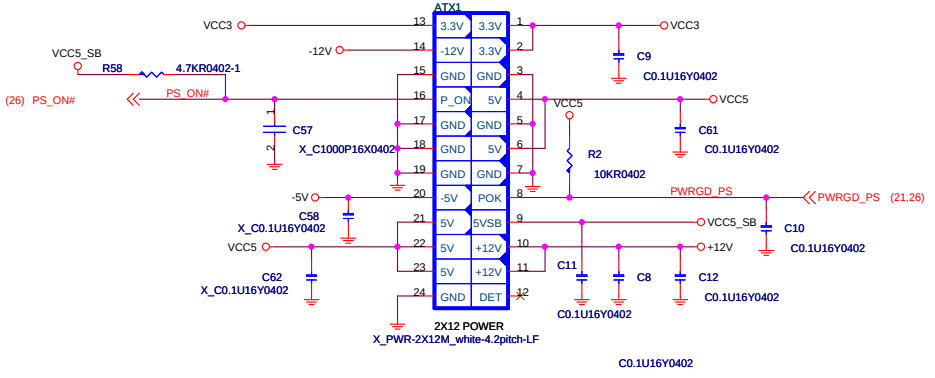
SPEAKER

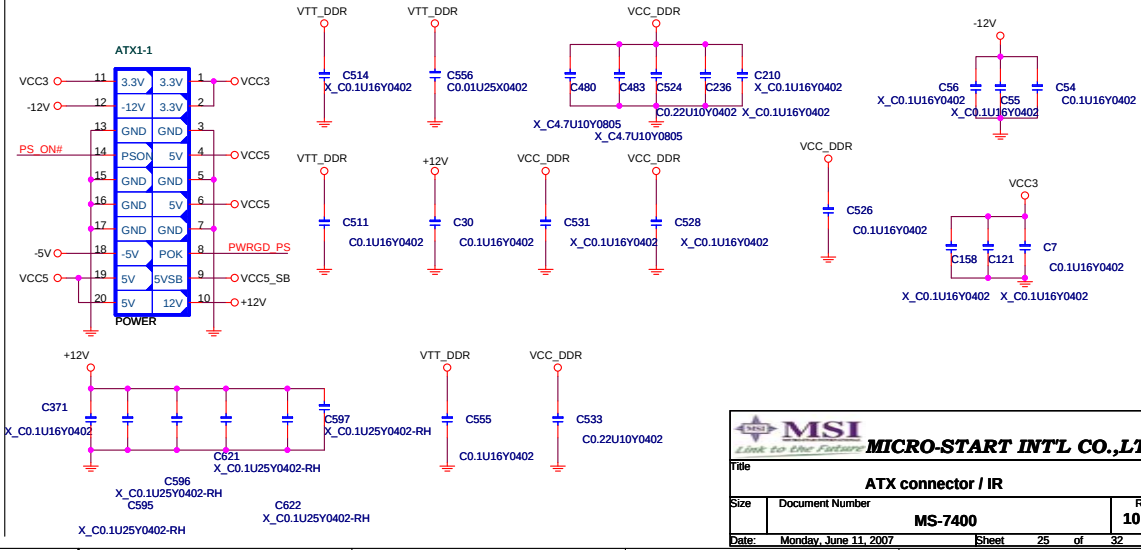


for EMI reserve



ATX Connector





MSI Link to the Future	MICRO-START INT'L CO.,LTD.	
Title	ATX connector / IR	
Size	Document Number: MS-7400	Rev: 10
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VDIMM LINEAR OR PWM SELECT

VDIMM MODE	EXTRAM
LINEAR REGULATOR	PULL LOW
PWM REGULATOR	PULL HIGH

3VSB MODE SELECT

3VSB MODE	3VDLDEC#
SINGLE MOSFET	PULL HIGH
DUAL MOSFET	PULL LOW

ACPI Controller

1.2V POWER (5.8A)

THIS PIN IS OPEN DRAIN OUTPUT

CHARGE PUMP VOLTAGE OUTPUT

Wide Trace

Wide Trace

Close to MS-11

ALL DRV and Gate Pin should be more than 8 Mils Routing

ICH9 1.5V POWER (2.75A)

ICH9 1.05V POWER (2A)

5VDIMM

5V DUAL Power

5VDIMM for iAMT

Ripplecur=2350mA

Kinesfiled VTT SEL for HK4B

Remove R509,R510,R547
Stuff R575,R511,C604,U31,R513,Q77,R512,Q91,R637,R638,R639

Reserved for VIDGD test.

near USB

Title	ACPI CONTROLLER MS7
Size	Document Number: MS-7400
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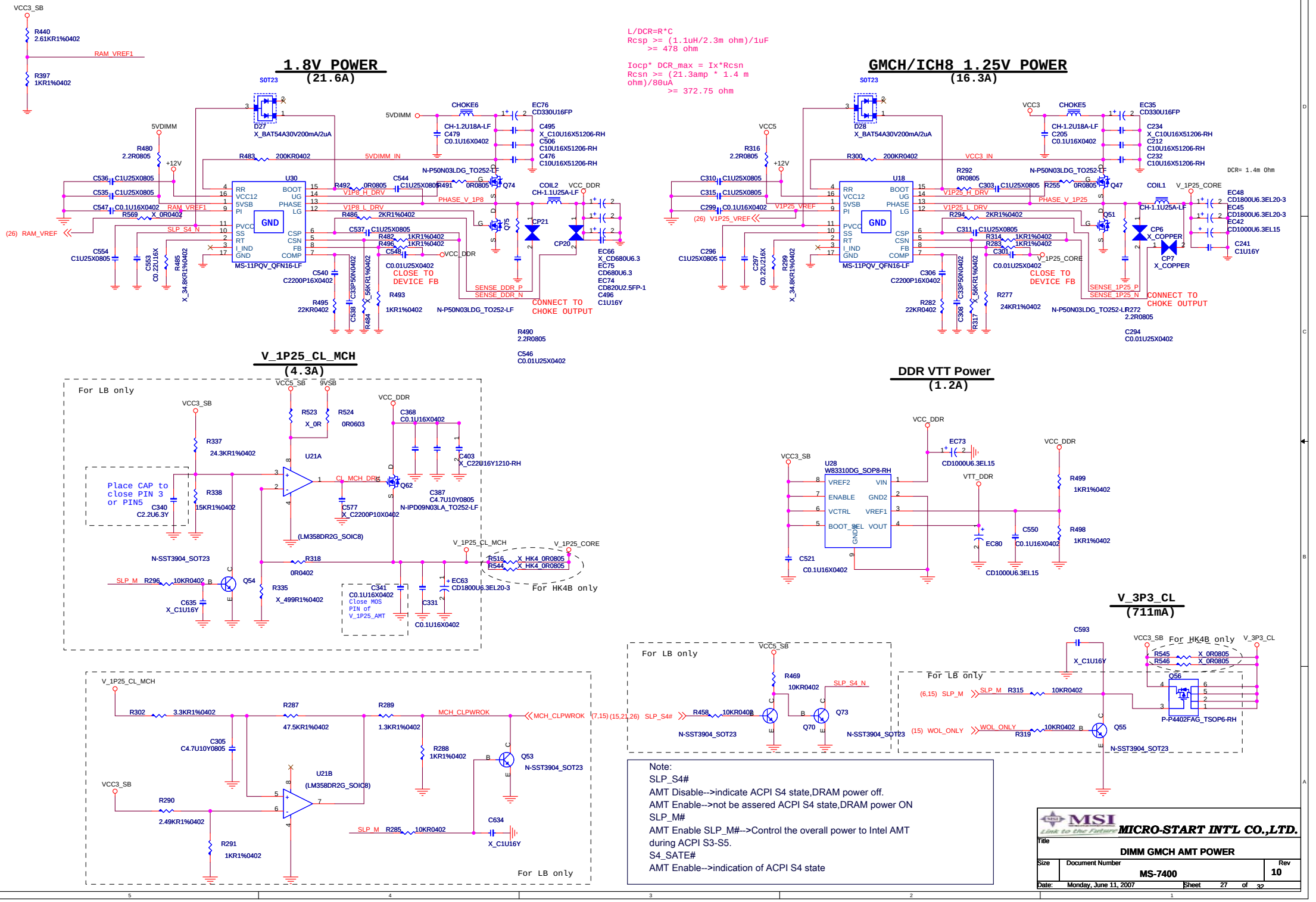
MICRO-START INT'L CO.,LTD.


1.8V POWER
(21.6A)
GMCH/ICH8 1.25V POWER
(16.3A)
V_1P25_CL_MCH
(4.3A)
DDR VTT Power
(1.2A)
V_3P3_CL
(711mA)
L/DCR=R*C
Rcsp >= (1.1uH/2.3m ohm)/1uF
>= 478 ohm
Iocp* DCR_max = Ix*Rcsn
Rcsn >= (21.3amp * 1.4 m ohm)/80uA
>= 372.75 ohm
DCR= 1.4m Ohm
CLOSE TO DEVICE FB
CONNECT TO CHOKE OUTPUT
For LB only
For HK4B only
Place CAP to close PIN 3 or PIN5
Close MOS PIN of V_1P25_AMT
Note:
SLP_S4#
AMT Disable-->indicate ACPI S4 state,DRAM power off.
AMT Enable-->not be assered ACPI S4 state,DRAM power ON
SLP_M#
AMT Enable SLP_M#-->Control the overall power to Intel AMT during ACPI S3-S5.
S4_SATE#
AMT Enable-->indication of ACPI S4 state
MICRO-START INT'L CO.,LTD.
Title
DIMM GMCH AMT POWER
Size
Document Number
MS-7400
Rev
10
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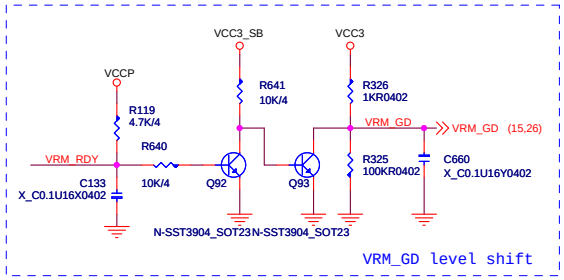
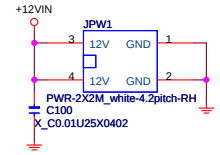
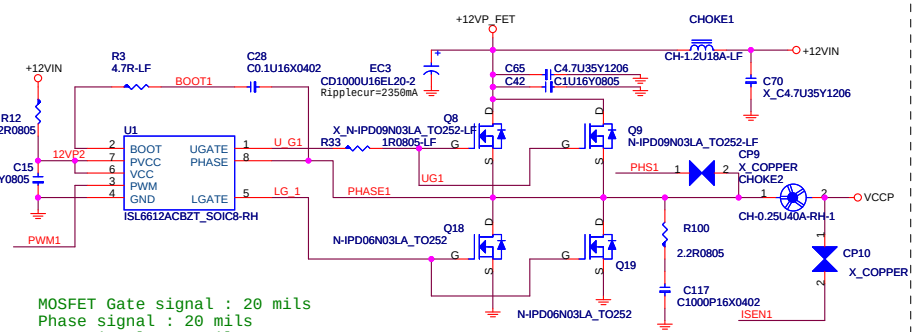
ATX12V Power Connector

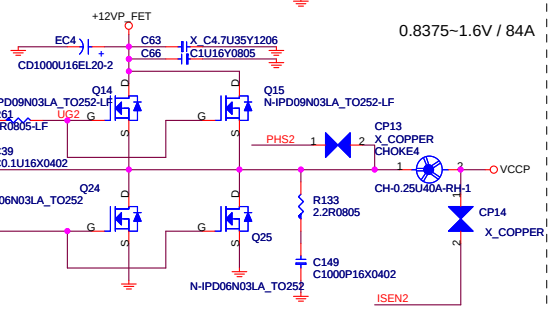


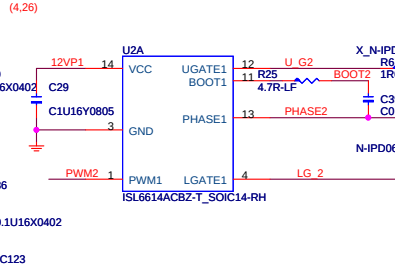




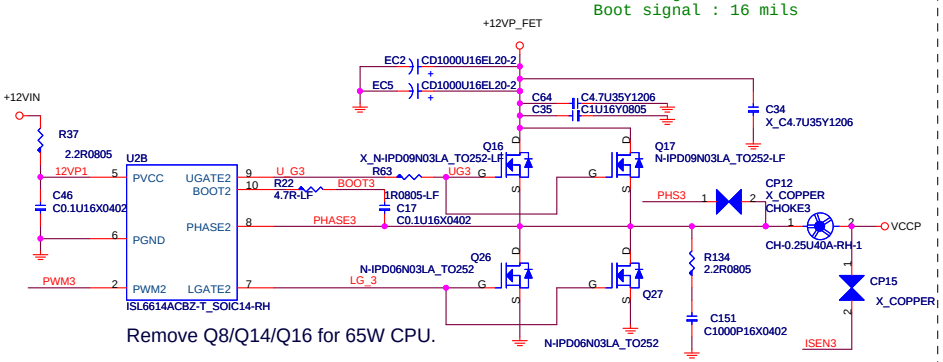
MOSFET Gate signal : 20 mils
Phase signal : 20 mils
Boot signal : 16 mils

0.8375~1.6V / 84A

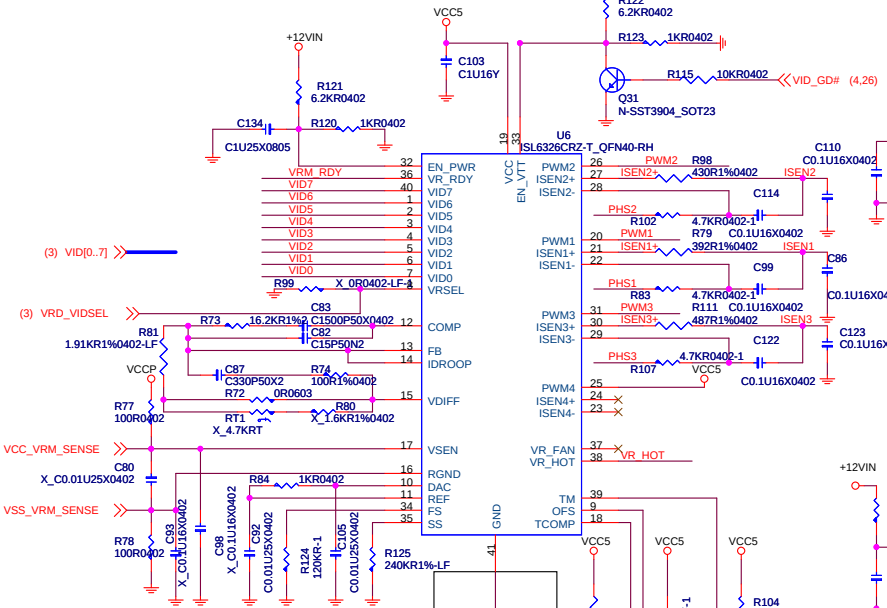


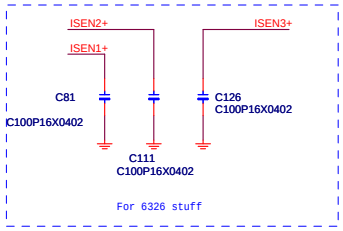


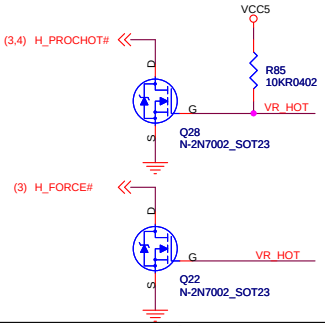
MOSFET Gate signal : 20 mils
Phase signal : 20 mils
Boot signal : 16 mils



Remove Q8/Q14/Q16 for 65W CPU.

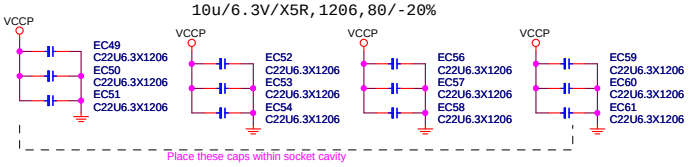


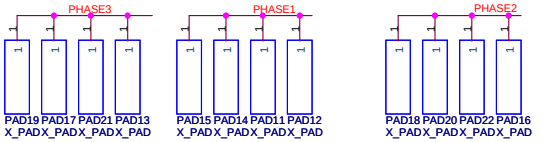


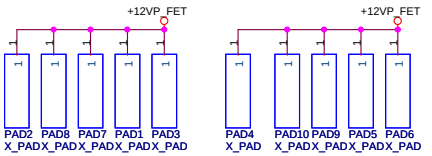


CPU DECOUPLING CAPACITORS

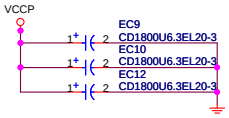
10u/6.3V/X5R,1206,80/-20%



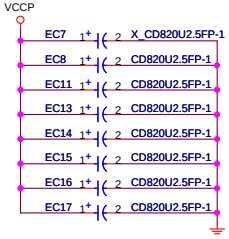




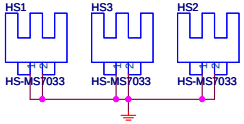
EL Capacitors



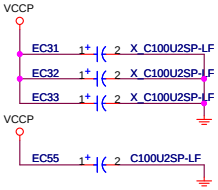
OS-CON Capactiors



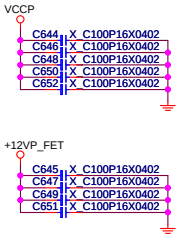
MOSFET Heatsinks



SP Capacitors



for EMI reserve



MSI Link to the Future MICRO-START INT'L CO.,LTD.

Title	VRM 11 - Intersil 6326 3 Phases	
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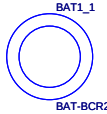
Date: Monday, June 11, 2007	Sheet 28 of 32	

Auto-BOM Manual Parts

PCB1
P30-0740010-E48

P30-0740010-E48

BAT1_1



BAT-BCR2032P-RH

U22_A1
HS_HOOK1X3(2)_black-LF-1

U22_B1
HS_HOOK1X3(2)_black-LF-1

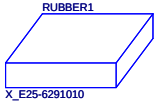
U22_C1
HS_HOOK1X3(2)_black-LF-1

U22_D1
HS_HOOK1X3(2)_black-LF-1

U13_L1

BIOS_LABEL

RUBBER1



X_E25-6291010

LAB1

MODEL_LABEL

J1(1-2)
_JUMPER-1X2B_black-RH

JBAT1(1-2)
_JUMPER-1X2B_black-RH

JFP1-1

X_H2X3(3)_black-RH

JFP1

1	***PWR_LED***	***POW_SW***	2
	NC	***SLP_LED***	4
5	***GND***	***HDD_LED***	6

For HK4B

MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

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Date: Wednesday, June 13, 2007	Sheet 29 of 32	

ICH9

GPIO Pin	Type	Default	Function	Power	MUXED/ UNMUXED	Pin-out
GPIO 0	I/O	GPI	Pull-up to VCC3 with 10K	VCC3	MUXED	N7
GPIO 1	I/O	GPI	Pull-up to VCC3 with 10K	VCC3	MUXED	AK21
GPIO 2	I/O	GPI	PIRQ#E pull-up to VCC3 with 8.2K	VCC3		K6
GPIO 3	I/O	GPI	PIRQ#F pull-up to VCC3 with 8.2K	VCC3		L7
GPIO 4	I/O	GPI	PIRQ#G pull-up to VCC3 with 8.2K	VCC3		F2
GPIO 5	I/O	GPI	PIRQ#H pull-up to VCC3 with 8.2K	VCC3		G2
GPIO 6	I/O	GPI	Pull-up to VCC3 with 10K	VCC3	MUXED	AH22
GPIO 7	I/O	GPI	Pull-up to VCC3 with 10K	VCC3	MUXED	AK23
GPIO 8	I/O	GPI	SIO_PME# connect to SIO,pull_up VCC3_SB with 10k	VCC3_SB	UNMUXED	A20
GPIO 9	I/O	GPO/WOL	WOL_ENABLE/GPIO9, pull-down with 100K	VCC3_SB	MUXED	A18
GPIO 10	I/O	GPI	Detect AUDIO Devices, Pull-up to VCC3_SB with 10K	VCC3_SB	MUXED	C17
GPIO 11	I/O	SMBALERT#	SMB_ALERT# pull-up to VCC3_SB with 10K	VCC3_SB		C16
GPIO 12	I/O	GPO	NC	VCC3_SB	UNMUXED	A8
GPIO 13	I/O	GPI	Enable/Disable VT6410 IDE controller, pull-up VCC3_SB with 10K	VCC3_SB	UNMUXED	A19
GPIO 14	I/O	GPI	Pull-up to VCC3_SB with 10K directly	VCC3_SB	MUXED	A9
GPIO 15	I/O	GPO	PCI_STOP# for CK505(Not Use)	VCC3_SB	MUXED	C15
GPIO 16	I/O	GPO	SIO HWM_INT,pull_up VCC3 with 10K(change to GPI)	VCC3	UNMUXED	M2
GPIO 17	I/O	GPI	Pull-up to VCC3 with 10K directly	VCC3	MUXED	AH21
GPIO 18	I/O	GPO	NC	VCC3	UNMUXED	K1
GPIO 19	I/O	GPI	Pull-up to VCC3 with 10K	VCC3		AE20
GPIO 20	I/O	GPO	NC	VCC3	UNMUXED	AF5
GPIO 21	I/O	GPI	Pull-up to VCC3 with 10K	VCC3		AK25
GPIO 22	I/O	GPI	Pull-up to VCC3 with 10K	VCC3	MUXED	AJ24
GPIO 23	I/O	LDRQ1#	LDRQ_1# pull_up VCC3 with 10K(Not Use)	VCC3	MUXED	J3
GPIO 24	I/O	GPO	NC	3.3V_SB	MUXED	A14
GPIO 25	I/O	GPO	CPU_STOP# for CK505(Not Use)	3.3V_SB	UNMUXED	B18
GPIO 26	I/O	GPO	S4 STATE#	3.3V_SB		C11
GPIO 27	I/O	GPO	NC	3.3V_SB		A11
GPIO 28	I/O	GPO	NC	3.3V_SB		G18
GPIO 29	I/O	OC5#	OC#4 connect to USB connector	3.3V_SB		N1
GPIO 30	I/O	OC6#	OC#6 connect to USB connector	3.3V_SB		N5
GPIO 31	I/O	OC7#	OC#6 connect to USB connector	3.3V_SB		M1
GPIO 32	I/O	GPO	SIO_SMI# connect to SIO,pull up VCC3 with 10k	VCC3	UNMUXED	K2
GPIO 33	I/O	GPO	Pull-up to VCC3 with 4.7K	VCC3	UNMUXED	AF6
GPIO 34	I/O	GPO	NC	VCC3	UNMUXED	AH5
GPIO 35	I/O	GPO	NC	VCC3		L1
GPIO 36	I/O	GPI	Pull-up to VCC3 with 10K directly	VCC3		AE21
GPIO 37	I/O	GPI	Pull-up to VCC3 with 10K directly	VCC3		AE22
GPIO 38	I/O	GPI	Pull-up to VCC3 with 10K directly	VCC3		AK24
GPIO 39	I/O	GPI	Pull-down to GND with 10K directly	VCC3		AH23
GPIO 40	I/O	OC1#	OC#0 connect to USB connector	3.3V_SB		N3
GPIO 41	I/O	OC2#	OC#2 connect to USB connector	3.3V_SB		P7
GPIO 42	I/O	OC3#	OC#2 connect to USB connector	3.3V_SB		R7
GPIO 43	I/O	OC4#	OC#4 connect to USB connector	3.3V_SB		N2
GPIO 44/45	I/O	OC8/9#	OC#6 connect to USB connector	3.3V_SB		P3/R6
GPIO 46/47	I/O	OC10/11#	OC#6 connect to USB connector	3.3V_SB		T7/P1
GPIO 48	I/O	GPI	Pull-up to VCC3 with 10K directly	VCC3		AD20
GPIO 49	I/O	GPO	DMI strapping ,pull-dowm 2.2K to GND	VCC3		AJ25
GPIO 50	I/O	REQ1#	REQ1 pull-up to VCC5 with 2.7K	VCC5	MUXED	G13
GPIO 51	I/O	GNT1#	GNT1#	VCC3	MUXED	A7
GPIO 52	I/O	REQ2#	REQ2 pull-up to VCC5 with 8.2K	VCC5	MUXED	F13
GPIO 53	I/O	GNT2#	GNT2#	VCC3	MUXED	C7
GPIO 54	I/O	REQ3#	REQ3 pull-up to VCC5 with 2.7K	VCC5	MUXED	G8
GPIO 55	I/O	GNT3#	GNT3#(Not Use)	VCC3	MUXED	F7
GPIO 56	I/O	GPI	Pull-up to VCC3_SB with 10K directly	3.3V_SB	MUXED	F16
GPIO 57	I/O	GPI	Pull-up to VCC3_SB with 10K directly	3.3V_SB	MUXED	C12
GPIO 58	I/O	SPI_CS1	SPI_CS#(Not Use) , SPI_CS1_F#(Not Use)	3.3V_SB	MUXED	F23
GPIO 59	I/O	OC0#	OC#0 connect to USB connector	3.3V_SB		P5
GPIO 60	I/O	LINKALERT	LINKALERT# pull-up to VCC3_SB with 10K	3.3V_SB		F18

PCI Configuration

DEVICE	MCP1 INT Pin	REQ#/GNT#	IDSEL	CLOCK
VT6410	PIRQ#F	PREQ#2 PGNT#2	AD20	RAIDCLK
Riser slot (PCI1)	PIRQ#B PIRQ#C PIRQ#D PIRQ#A	PREQ#1 PGNT#1	AD17	PCI_CLK1
Riser slot (CARD1)	PIRQ#C PIRQ#D PIRQ#A PIRQ#B	PREQ#0 PGNT#0	AD18	PCI_CLK2

DDRII DIMM Config.

DEVICE	ADDRESS	CLOCK
DIMM 1	0A0H	SCLK_A0/SCLK_A0# SCLK_A1/SCLK_A1# SCLK_A2/SCLK_A2#
DIMM 2	0A4H	SCLK_B0/SCLK_B0# SCLK_B1/SCLK_B1# SCLK_B2/SCLK_B2#

SIO SCH5017

PIN NAME	PIN#	USAGE	Input/Output
GP12	96	GPIO_KB	OUTPUT
GP27	36	SIO_SMI#	OUTPUT
GP42	90	SIO_PME#	OUTPUT
Intrd_in~	33	Clear Password	INPUT

SMBus DISTRIBUTION

SMBus	Power	Load
SMBCLK	VCC3_SB	ICH9, PCI EXPRESS x16,x1
SMBCLK_ISO	VCC3	DIMM, CLK GEN, SIO, MS7

JUMPER SETTING

JBAT1	(1-2)Normal	(2-3)Clear
J1	(1-2) OPEN Clear	(1-2) short Normal

MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

Title: **GPIO PIN definition**

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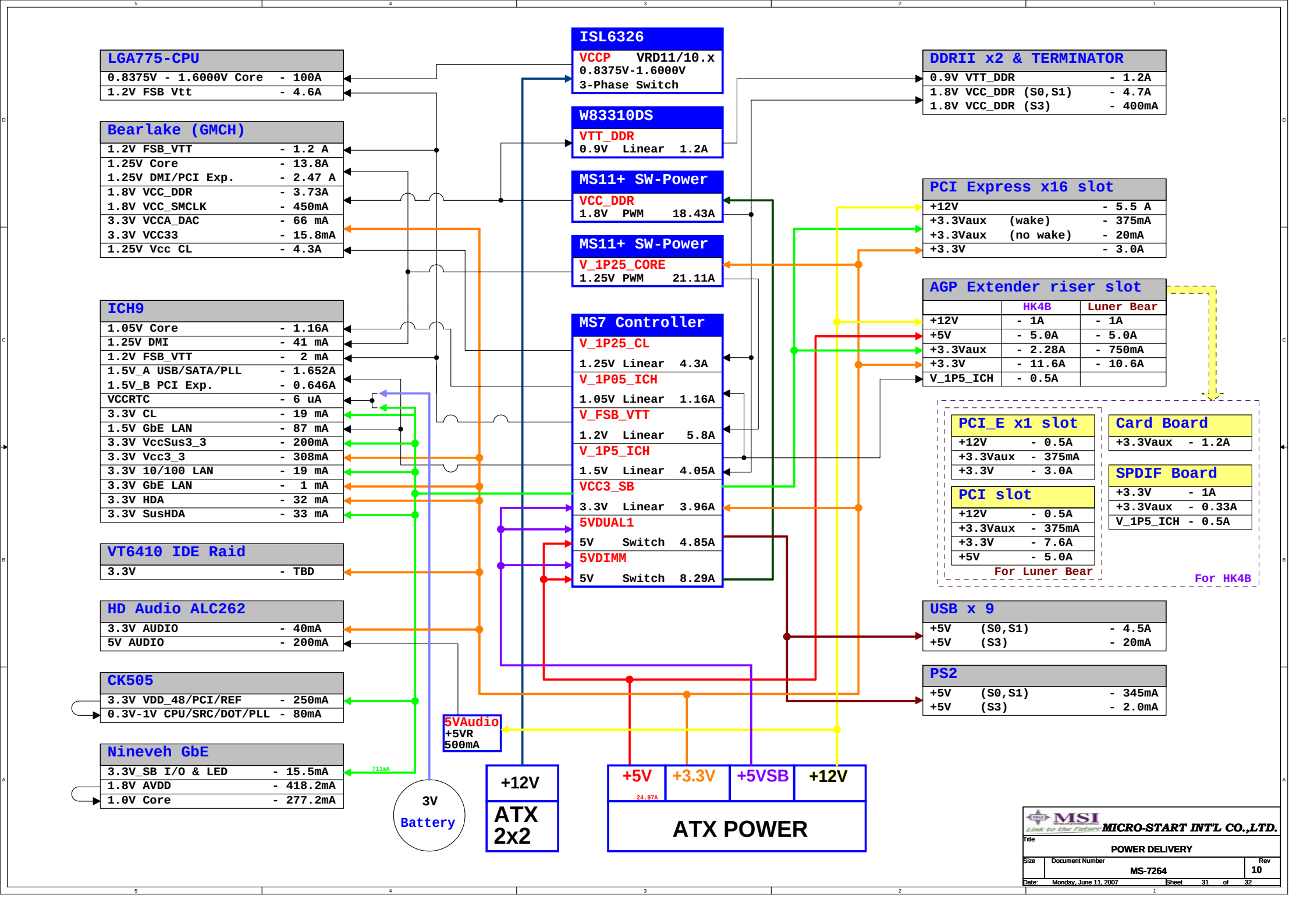
LGA775-CPU
0.8375V - 1.6000V Core - 100A
1.2V FSB Vtt - 4.6A
Bearlake (GMCH)
1.2V FSB_VTT - 1.2 A
1.25V Core - 13.8A
1.25V DMI/PCI Exp. - 2.47 A
1.8V VCC_DDR - 3.73A
1.8V VCC_SMCLK - 450mA
3.3V VCCA_DAC - 66 mA
3.3V VCC33 - 15.8mA
1.25V Vcc CL - 4.3A
ICH9
1.05V Core - 1.16A
1.25V DMI - 41 mA
1.2V FSB_VTT - 2 mA
1.5V_A USB/SATA/PLL - 1.652A
1.5V_B PCI Exp. - 0.646A
VCCRTC - 6 uA
3.3V CL - 19 mA
1.5V GbE LAN - 87 mA
3.3V VccSus3_3 - 200mA
3.3V Vcc3_3 - 308mA
3.3V 10/100 LAN - 19 mA
3.3V GbE LAN - 1 mA
3.3V HDA - 32 mA
3.3V SusHDA - 33 mA
VT6410 IDE Raid
3.3V - TBD
HD Audio ALC262
3.3V AUDIO - 40mA
5V AUDIO - 200mA
CK505
3.3V VDD_48/PCI/REF - 250mA
0.3V-1V CPU/SRC/DOT/PLL - 80mA
Nineveh GbE
3.3V_SB I/O & LED - 15.5mA
1.8V AVDD - 418.2mA
1.0V Core - 277.2mA
711mA
ISL6326
VCCP VRD11/10.x
0.8375V-1.6000V
3-Phase Switch
W83310DS
VTT_DDR
0.9V Linear 1.2A
MS11+ SW-Power
VCC_DDR
1.8V PWM 18.43A
MS11+ SW-Power
V_1P25_CORE
1.25V PWM 21.11A
MS7 Controller
V_1P25_CL
1.25V Linear 4.3A
V_1P05_ICH
1.05V Linear 1.16A
V_FSB_VTT
1.2V Linear 5.8A
V_1P5_ICH
1.5V Linear 4.05A
VCC3_SB
3.3V Linear 3.96A
5VDUAL1
5V Switch 4.85A
5VDIMM
5V Switch 8.29A
5VAudio
+5VR
500mA
3V
Battery
+12V
ATX
2x2
+5V
24.97A
+3.3V
+5VSB
+12V
ATX POWER
DDRII x2 & TERMINATOR
0.9V VTT_DDR - 1.2A
1.8V VCC_DDR (S0,S1) - 4.7A
1.8V VCC_DDR (S3) - 400mA
PCI Express x16 slot
+12V - 5.5 A
+3.3Vaux (wake) - 375mA
+3.3Vaux (no wake) - 20mA
+3.3V - 3.0A
AGP Extender riser slot
HK4B
Luner Bear
+12V - 1A - 1A
+5V - 5.0A - 5.0A
+3.3Vaux - 2.28A - 750mA
+3.3V - 11.6A - 10.6A
V_1P5_ICH - 0.5A
PCI_E x1 slot
+12V - 0.5A
+3.3Vaux - 375mA
+3.3V - 3.0A
PCI slot
+12V - 0.5A
+3.3Vaux - 375mA
+3.3V - 7.6A
+5V - 5.0A
For Luner Bear
Card Board
+3.3Vaux - 1.2A
SPDIF Board
+3.3V - 1A
+3.3Vaux - 0.33A
V_1P5_ICH - 0.5A
For HK4B
USB x 9
+5V (S0,S1) - 4.5A
+5V (S3) - 20mA
PS2
+5V (S0,S1) - 345mA
+5V (S3) - 2.0mA
MSI
Link to the Future
MICRO-START INT'L CO.,LTD.
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0A Change To 0B : (2007/04/18)

Page3.
* Reserve R383 between VRDSEL(AL3) and GND.(Intel core2 processor recommend)
Page6.
* Change C154/157/162 from 22p to 10p to slove rise/fall time issue.
Page15.
* Reserve pull high selection resistor R9/R19 for SIO's PWRBTN# and KBRST#.
Page18.
* Change C451&C452 from 22P to 27P and place a serial resistor(R130/30ohm) on XTAL2.(Intel TA-181 recommend)
Page22.
* Change Q4/Q72 from P-SI2303/SOT23 to P06P03LCG_SOT89-3 for SYS/PWR fan.
Page23.
* Change C134/C129/C126(22P50N2) to 3.3P50N2 and add 3.3P50N2 on C130/C127/C125 for RGB rise/fall time issue.
Page26.
* For AMT initial fail when power-off by push power bottom 4secs, add 5VDIMM for AMT circuit.
(R628/R631/R630/R632/D29/D30/Q76/Q90/Q95/Q96)
* For Kensfield VTT_SEL ref voltage level fine tune, Change R511 from 33R to 2.7K, R513 from 365R to 30K.
* Remove EC87 on circuit for more layout spacing.
Page27.
* For AMT initial issue, add R397/R440 to change the refer source of RAM_VREF.
* Change EC74 from 560uf to 820uf to uniform componet.
Page28.
* Change choke2/3/4 from 0.3u/40A to 0.25u/40A.
* Change EC7/8/13/14/15/16/17 from 560uf to 820uf.
* Change R73 from 20K to 11K, R74 from 750ohm to 100ohm, R81from 1.8K to 1.54K, R95 from 18K to 24.3K,
R79 from 430ohm to 402ohm, R111 from 430ohm to 487ohm; Change C82 from 100p to 10p, C87 from 680p to 470p.
* Remove EC31/EC32/EC33.
(MSIT Power Team Recommend)

0B Change To 10 : (2007/06/12)

Page4.
* For Q35/G33 GTLREF voltage should be 0.635*VTT.
Unchabged for MCH_GTLREF_CPU.(Inetel MOW WW14)
Page6.
* Un-stuff the EMI cap of C157/C586 for the PCI_CLK of riser card.(HW/EMI)
Page14.
* Change the pull high reserve resistor of PGNT#3 from VCC3_SB to VCC3.(Intel ICH9)
Page15.
* For SPI_WP#, to add net GPIO13/61 from SIO, select GPIO13 for Ver.10.(NEC)
Page22.
* Change the library of Q4/Q72.(HW)
* Change the power source of KB/MS to separate the fuse function.(HW)
Page25.
Unstuff IR_PWR1 connector, only reserve.(NECP)
Page26.
* Add EC36 for V_FSB_VTT.(HW)
* Change R622/R623 to R26/R27 for LB.(HW)
Page27.
* Change C305 from 1uf to 4.7uf for more meet Intel CRB power sequency.(HW)
* Change C306/C540 from 1000p to 2200p for heavy load ring problem.(Power team)
Page28.
* Change R73 to 16.2k, R81 to 1.91K, C82 to 15pF, C87 to 330pF, R95 to 20.5k, R79 to 392R.
Change EC9/EC10/EC12 to 1800uF *3.(Power team)
* Remove Q8/Q14/Q16 for LB(95W CPU) only.(Power team)
* Remove the footprint of EC25/26/27/29/30 for VCCP power plane completeness.(Power team)

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