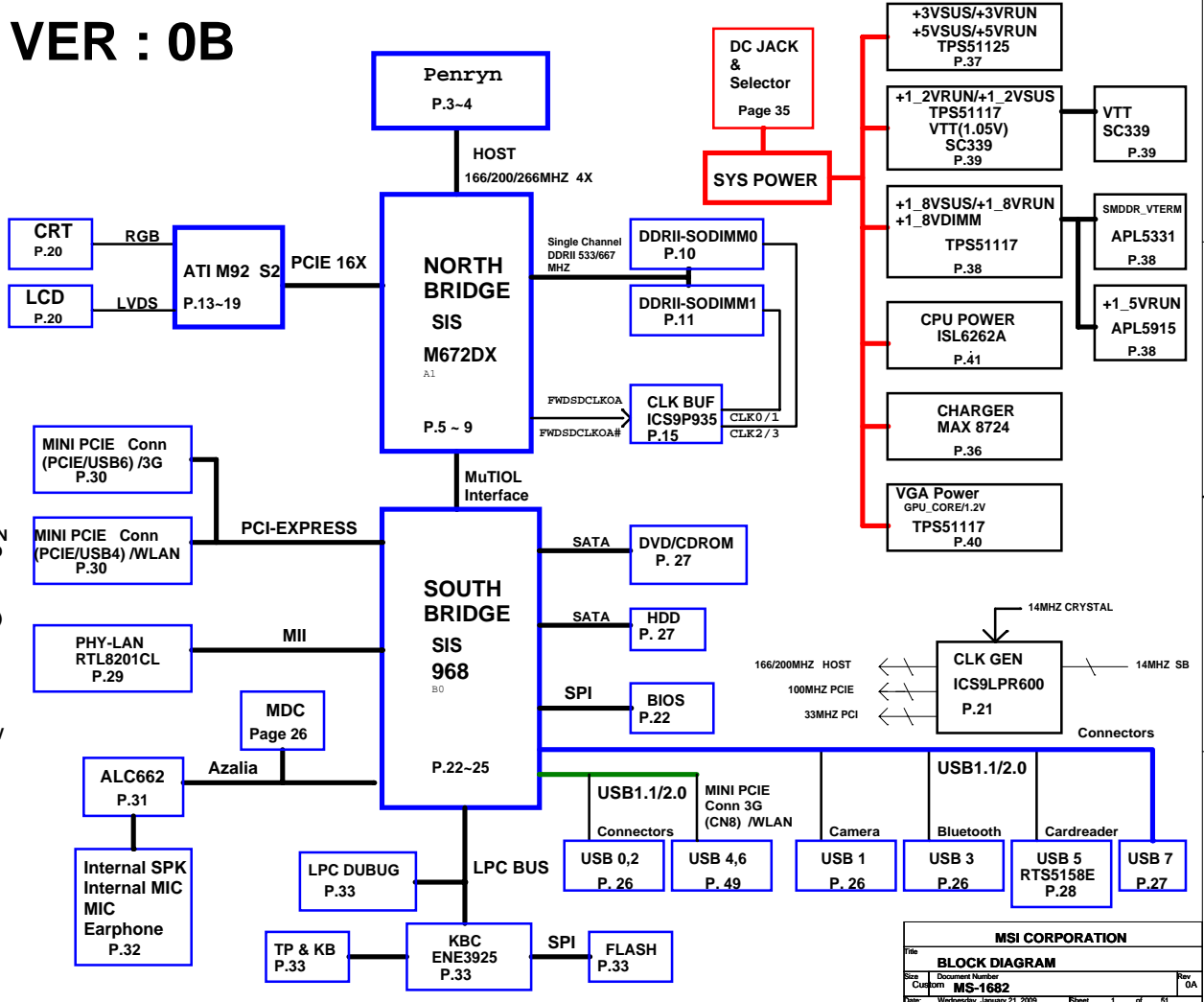


# MS-1682 VER : 0B

- 01\_BLOCK DIAGRAM
- 02\_PLATFORM
- 03\_PENRYN-1 (HOST BUS)
- 04\_PENRYN-2 (POWER/GND)
- 05\_M672DX-1 (HOST BUS & PCIE)
- 06\_M672DX-2 (MutI/O)
- 07\_M672DX-3 (DDR2)
- 08\_M672DX-4 (POWER)
- 09\_M672DX-5 (VSS)
- 10\_DDR2 SODIMM 0
- 11\_DDR2 SODIMM 1
- 12\_DDR2 TERMINATION
- 13\_M92M-host-lvds
- 14\_M92M-IO
- 15\_M92M-power
- 16\_M92M-power-straps
- 17\_M92M\_MEM\_Interface
- 18\_M92M\_DDR2\_A0
- 19\_M92M\_DDR2\_A1
- 20\_CRT & LVDS\_CONN
- 21\_CLOCK GEN & Dimm BUF
- 22\_SIS968-1 (PCI/IDE/SPI/MutI/O)
- 23\_SIS968-2 (USB/SATA)
- 24\_SIS968-3 (CPU/HD/PCIE/GPIO)
- 25\_SIS968-4 (POWER/GND)
- 26\_USBX2&Camera&MDC&BT\_CONN
- 27\_HDD & ODD CONN & NEW CARD
- 28\_RT55158E\_CARD READER
- 29\_PHY LAN (RTL8201CL)
- 30\_MINI\_PCIECARD & LED & SW
- 31\_AUDIO(ALC662) / AMP(APA2031)
- 32\_SPK & HP & MIC
- 33\_KBC/EC/uP (ENE3925)
- 34\_PWRGD & FAN & C3/C4
- 35\_Battery select
- 36\_Battery Charger
- 37\_M\_System Power
- 38\_M\_1.8V & SMDRR\_VTERM & 1.5V
- 39\_M\_1.2V & VTT power
- 40\_VGA power
- 41\_CPU power
- 42\_Screw
- 43\_EMI
- 44\_Power Sequence-1
- 45\_Power Sequence-2
- 46\_Power Sequence\_3
- 47\_Launch Board
- 48\_TP Board
- 49\_USBx2 & RJ45 & RJ11 Board



| MSI CORPORATION |                             |               |
|-----------------|-----------------------------|---------------|
| File:           | BLOCK DIAGRAM               |               |
| Size:           | Document Number:            | Rev: 0A       |
| Custom:         | MS-1682                     |               |
| Date:           | Wednesday, January 21, 2009 | Sheet 1 of 61 |

## Voltage Rails

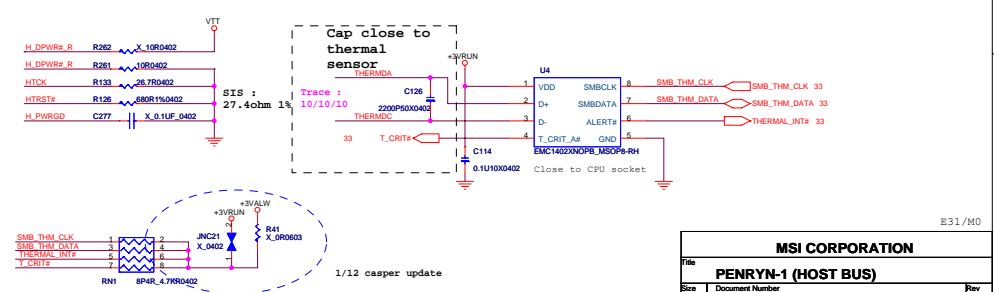
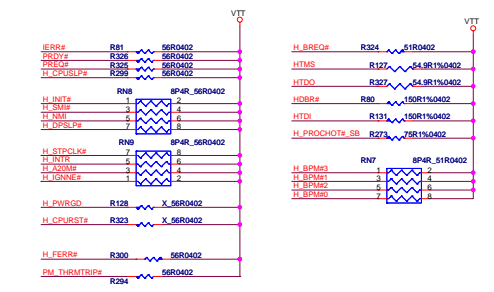
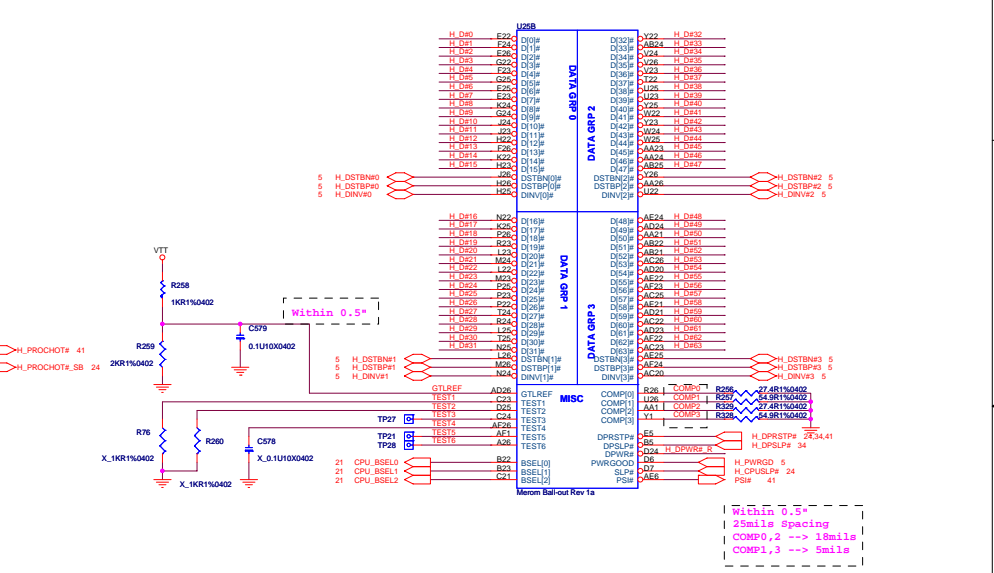
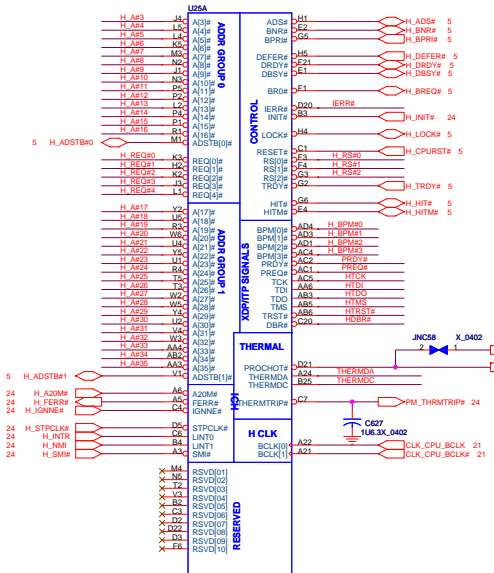
| Voltage     | Description   | Control Signal  |
|-------------|---|-----------------|
| PWR_SRC     | AC ADAPTER OR BATTERY IN                                      |                 |
| V_CORE      | Core Voltage for Processor                                    | VR_ON           |
| +VTT        | 1.05 rail for Processor & SIS968 GTL IO                       | +1_5VM_PG       |
| +1_5VRUN    | 1.5V switched power rail(off in S3-S5)                        | +5VRUN          |
| +1_2VRUN    | 1.2V power rail SISM672FX Analog (off in S3-S5)               | RUND ( RUN_ON ) |
| +3VRUN      | 3.3V switched power rail(off in S3-S5)                        | RUND ( RUN_ON ) |
| +5VRUN      | 5.0V switched power rail(off in S3-S5)                        | RUND (RUN_ON )  |
| SMDDR_VTERM | 0.9V DDR Termination voltage (off in S4-S5)                   | RUN_ON          |
| +1_8VDIMM   | 1.8V power rail DDRII (off in S4-S5)                          | DIMM_ON         |
| +1_8VRUN    | 1.8V power for SIS968 MuTIOL IO and core logic (off in S3-S5) | RUND (RUN_ON )  |
| +1_8VSUS    | 1.8V power rail for SB core logic (off in S4-S5)              | SUS_ON          |
| +3VSUS      | 3.3V power rail (off in S4-S5)                                | SUS_ON          |
| +5VSUS      | 5.0V power rail (off in S4-S5)                                | SUS_ON          |
| +3VALW      | 3.3V always on power rail                                     | PWR_SRC         |
| +5VALW      | 5.0V always on power rail                                     | PWR_SRC         |
| +V5_AUDIO   | 5.0V Power rail Audio codec(off in S3-S5)                     | RUND            |
| +1_2VSUS    | 1.2V power rail SISM672FX Digital (off in S4-S5)              | SUS_ON          |
|             |   |                 |
|             |   |                 |

## POWER STATES

| STATE                | SIGNAL | SLP_S3# | SLP_S5# | +V*ALWAYS | +V*SUS | +V*RUN | Clocks | +1_8VDIMM |
|----------------------|--------|---------|---------|-----------|--------|--------|--------|-----------|
| Full ON              |        | HIGH    | HIGH    | ON        | ON     | ON     | ON     | ON        |
| S1(Power On Suspend) |        | HIGH    | HIGH    | ON        | ON     | ON     | LOW    | ON        |
| S3( Suspend to RAM)  |        | LOW     | HIGH    | ON        | ON     | OFF    | OFF    | ON        |
| S4( Suspend to Disk) |        | LOW     | LOW     | ON        | OFF    | OFF    | OFF    | OFF       |
| S5 / Soft OFF        |        | LOW     | LOW     | ON        | OFF    | OFF    | OFF    | OFF       |

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

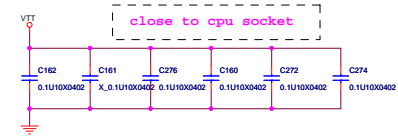
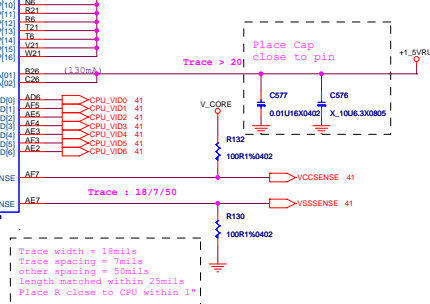
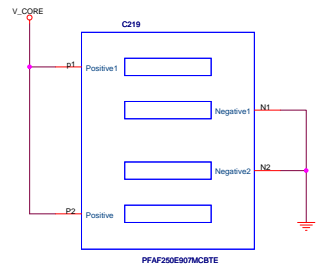
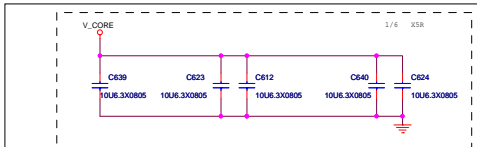
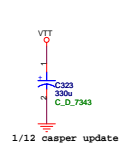
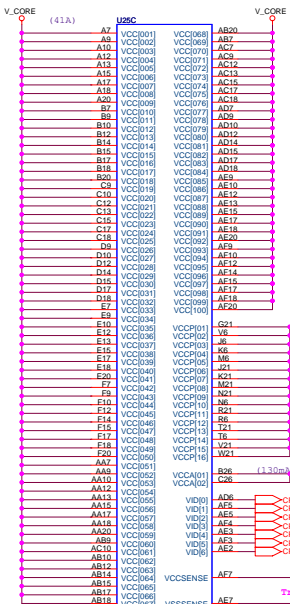
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|-----------------|-----------------------------|---------------|
| File            | PLATFORM                    |               |
| Size            | Document Number             | Rev           |
| Custom          | MS-1682                     | 0A            |
| Date            | Wednesday, January 21, 2009 | Sheet 2 of 51 |



| MSI CORPORATION |                             |
|-----------------|-----------------------------|
| File            | PENRYN-1 (HOST BUS)         |
| Doc             | Document Number             |
| Rev             | 0A                          |
| Part            | MS-1682                     |
| Date            | Wednesday, January 21, 2009 |
| Sheet           | 3 of 61                     |

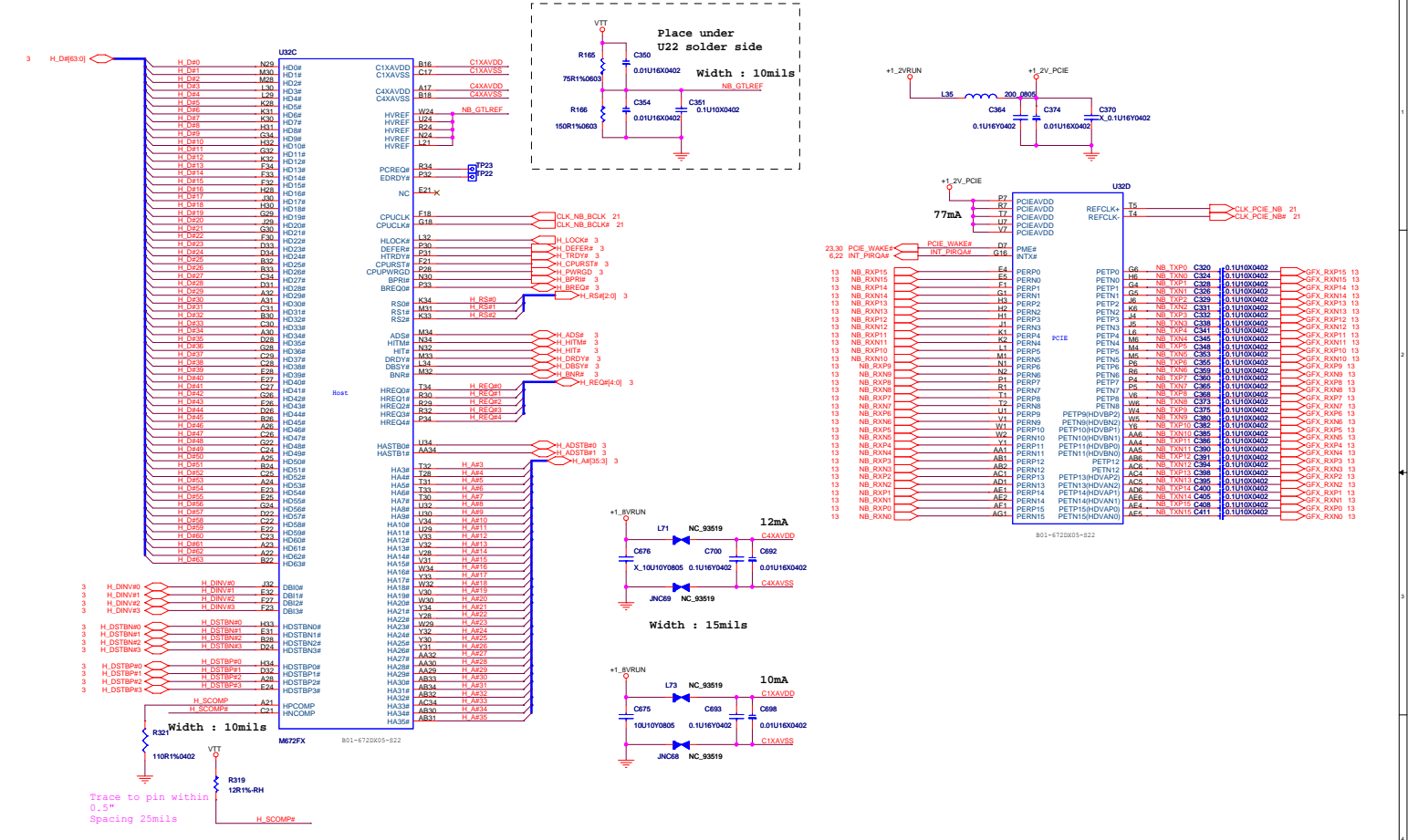
E31/M0

| U29D |        |        |      |
|------|--------|--------|------|
| A1   | VSS001 | VSS082 | R6   |
| A11  | VSS002 | VSS083 | P24  |
| A13  | VSS003 | VSS084 | R4   |
| A14  | VSS004 | VSS085 | R4   |
| A15  | VSS005 | VSS086 | R4   |
| A19  | VSS006 | VSS087 | R22  |
| K21  | VSS007 | VSS088 | R26  |
| AE2  | VSS008 | VSS089 | T1   |
| BA   | VSS009 | VSS090 | R2   |
| BA1  | VSS010 | VSS091 | T23  |
| B11  | VSS011 | VSS092 | T26  |
| B12  | VSS012 | VSS093 | U2   |
| B13  | VSS013 | VSS094 | U21  |
| B14  | VSS014 | VSS095 | U2   |
| B24  | VSS015 | VSS096 | V2   |
| B2   | VSS016 | VSS097 | V2   |
| C1   | VSS017 | VSS098 | V2   |
| C11  | VSS018 | VSS099 | V2   |
| C14  | VSS019 | VSS100 | V26  |
| C16  | VSS020 | VSS101 | W1   |
| C18  | VSS021 | VSS102 | W1   |
| C2   | VSS022 | VSS103 | W23  |
| C21  | VSS023 | VSS104 | W26  |
| C24  | VSS024 | VSS105 | V6   |
| D1   | VSS025 | VSS106 | C2   |
| D4   | VSS026 | VSS107 | Y24  |
| DA   | VSS027 | VSS108 | AA2  |
| D11  | VSS028 | VSS109 | AA2  |
| D13  | VSS029 | VSS110 | AA2  |
| D19  | VSS030 | VSS111 | AA8  |
| D18  | VSS031 | VSS112 | AA11 |
| D19  | VSS032 | VSS113 | AA14 |
| D21  | VSS033 | VSS114 | AA16 |
| D26  | VSS034 | VSS115 | AA19 |
| E1   | VSS035 | VSS116 | AA22 |
| E6   | VSS036 | VSS117 | AA25 |
| E11  | VSS037 | VSS118 | AB1  |
| E14  | VSS038 | VSS119 | AB4  |
| E16  | VSS039 | VSS120 | AB8  |
| E19  | VSS040 | VSS121 | AB11 |
| E21  | VSS041 | VSS122 | AB16 |
| E24  | VSS042 | VSS123 | AB19 |
| E4   | VSS043 | VSS124 | AB26 |
| FA   | VSS044 | VSS125 | AC2  |
| F11  | VSS045 | VSS126 | AC2  |
| F13  | VSS046 | VSS127 | AC3  |
| F14  | VSS047 | VSS128 | AC6  |
| F16  | VSS048 | VSS129 | AC6  |
| F19  | VSS049 | VSS130 | AC11 |
| F2   | VSS050 | VSS131 | AC14 |
| F21  | VSS051 | VSS132 | AC16 |
| G4   | VSS052 | VSS133 | AC21 |
| G1   | VSS053 | VSS134 | AC24 |
| G21  | VSS054 | VSS135 | AD2  |
| G24  | VSS055 | VSS136 | AD6  |
| H1   | VSS056 | VSS137 | AD6  |
| H3   | VSS057 | VSS138 | AD11 |
| H6   | VSS058 | VSS139 | AD11 |
| H21  | VSS059 | VSS140 | AD13 |
| H24  | VSS060 | VSS141 | AD16 |
| J5   | VSS061 | VSS142 | AD16 |
| J6   | VSS062 | VSS143 | AD22 |
| J21  | VSS063 | VSS144 | AD22 |
| J24  | VSS064 | VSS145 | AE1  |
| K1   | VSS065 | VSS146 | AE4  |
| K2   | VSS066 | VSS147 | AE8  |
| K26  | VSS067 | VSS148 | AE8  |
| L3   | VSS068 | VSS149 | AE11 |
| L4   | VSS069 | VSS150 | AE16 |
| L6   | VSS070 | VSS151 | AE19 |
| L21  | VSS071 | VSS152 | AE22 |
| L24  | VSS072 | VSS153 | AE26 |
| M2   | VSS073 | VSS154 | AE4  |
| M5   | VSS074 | VSS155 | AE8  |
| M22  | VSS075 | VSS156 | AE8  |
| M24  | VSS076 | VSS157 | AE11 |
| N4   | VSS077 | VSS158 | AE16 |
| N21  | VSS078 | VSS159 | AE19 |
| N24  | VSS079 | VSS160 | AE19 |
| N6   | VSS080 | VSS161 | AE21 |
| PA   | VSS081 | VSS162 | AE26 |
| PA   | VSS082 | VSS163 | AE26 |

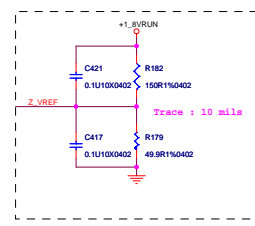
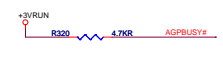
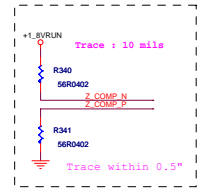
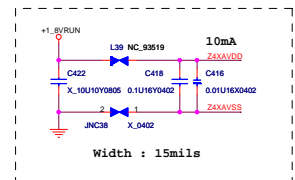
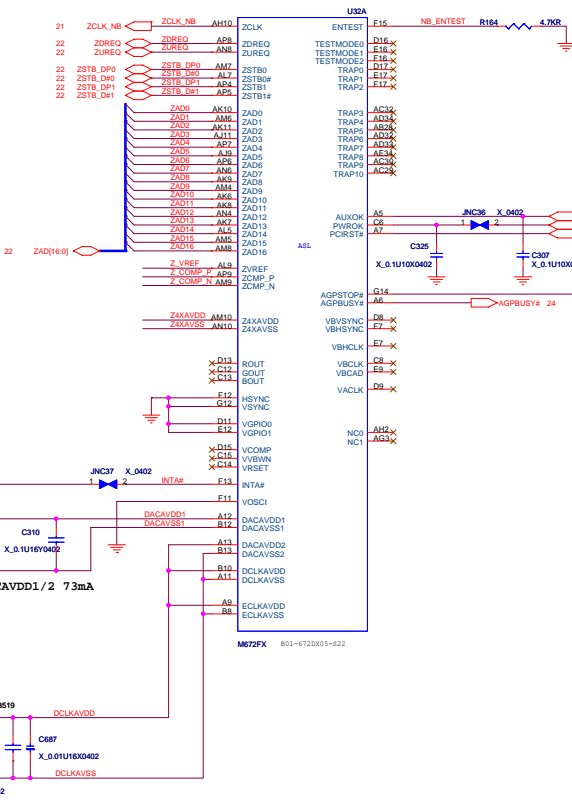


Trace width = 18mils  
Trace spacing = 7mils  
other spacing = 50mils  
length matched within 25mils  
Place R close to CPU within 1"

|                                   |                             |               |
|-----------------------------------|-----------------------------|---------------|
| <b>MSI CORPORATION</b>            |                             |               |
| File: <b>PENRYN-2 (POWER/GND)</b> |                             |               |
| Size                              | Document Number             | Rev           |
| Custom                            | <b>MS-1682</b>              | 0A            |
| Date:                             | Wednesday, January 21, 2009 | Sheet 4 of 61 |

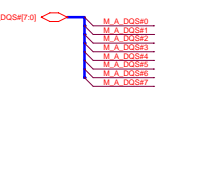
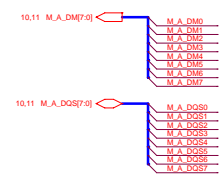
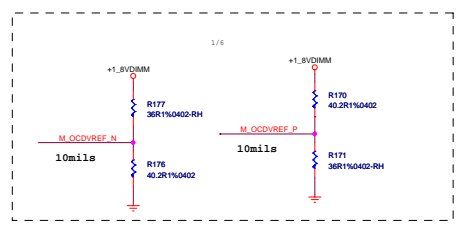
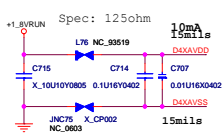
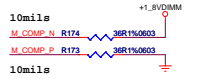
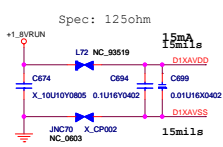
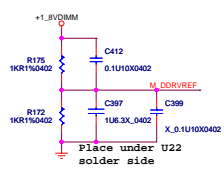


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|-------|--|-----------------------------|--|
| File  |  | 672DX-1 (HOST BUS & PCIE)   |  |
| Size  |  | Custom                      |  |
| Date  |  | Wednesday, January 21, 2009 |  |
| Sheet |  | 6 of 61                     |  |



E1.2/M0

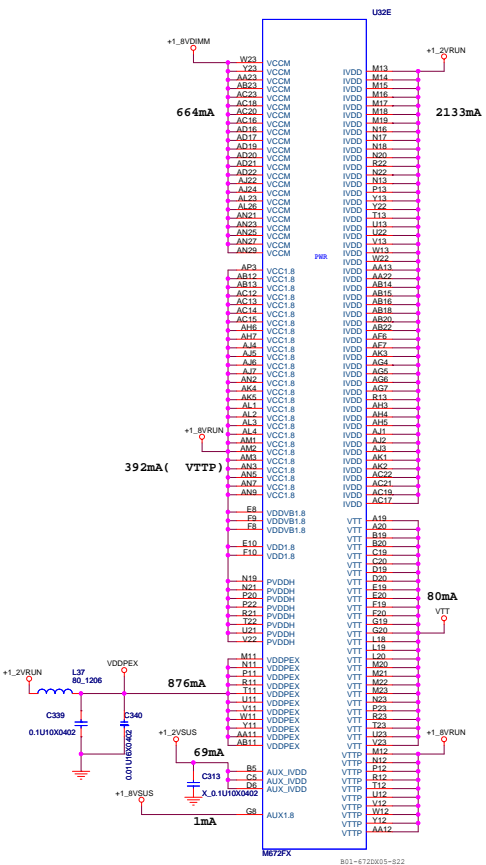
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| File                   | <b>672DX-2 (MultiO&amp;VGA)</b> |               |
| Size                   | Document Number                 | Rev           |
| Custom                 | <b>MS-1682</b>                  | 0A            |
| Date                   | Wednesday, January 21, 2009     | Sheet 6 of 61 |



801-6722005-022

E17/M0

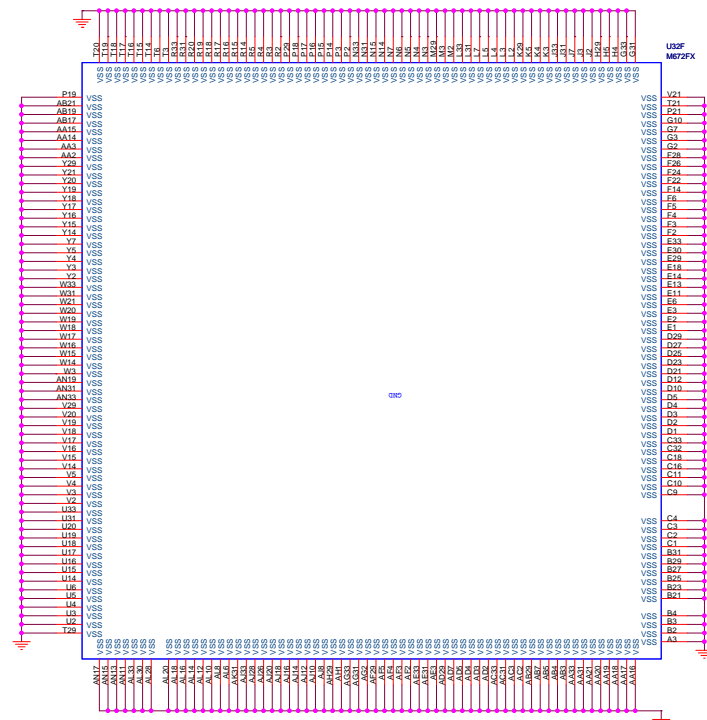
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| Size                   | Document Number             | Rev           |
| Custom                 | <b>MS-1682</b>              | <b>0A</b>     |
| Date                   | Wednesday, January 21, 2009 | Sheet 7 of 81 |



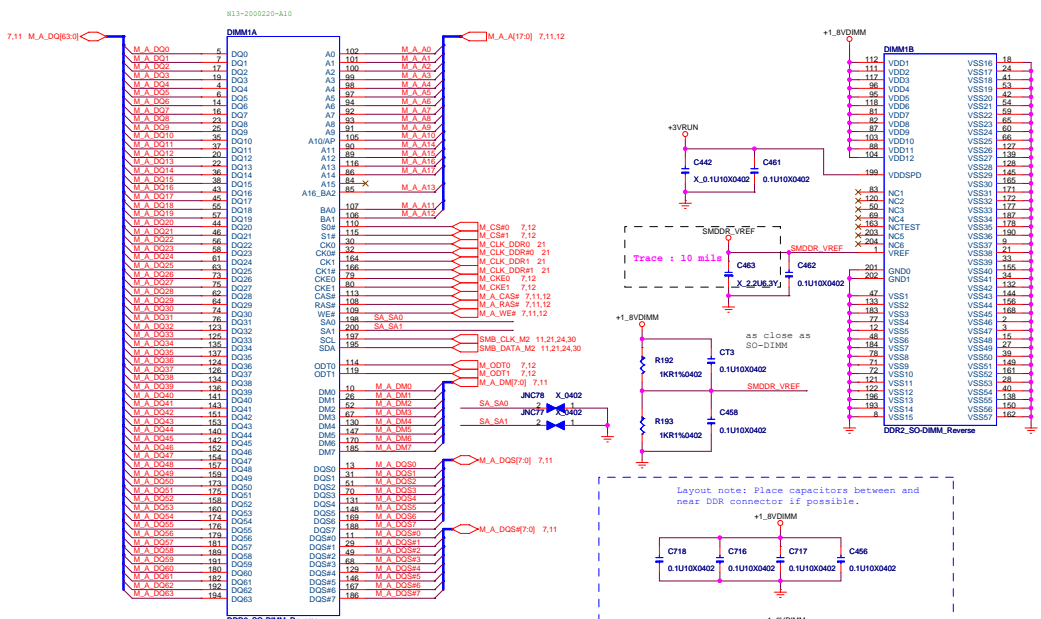
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| Size:                        | Document Number:            | Rev: 0A |         |
| Custom:                      | <b>MS-1682</b>              |         |         |
| Date:                        | Wednesday, January 21, 2009 | Sheet:  | 8 of 81 |





| MSI CORPORATION |                             |               |
|-----------------|-----------------------------|---------------|
| File            | 672DX-6 (VSS)               | E1 / M0       |
| Size            | Document Number             | Rev           |
| Custom          | MS-1682                     | 0A            |
| Date            | Wednesday, January 21, 2009 | Sheet 8 of 81 |

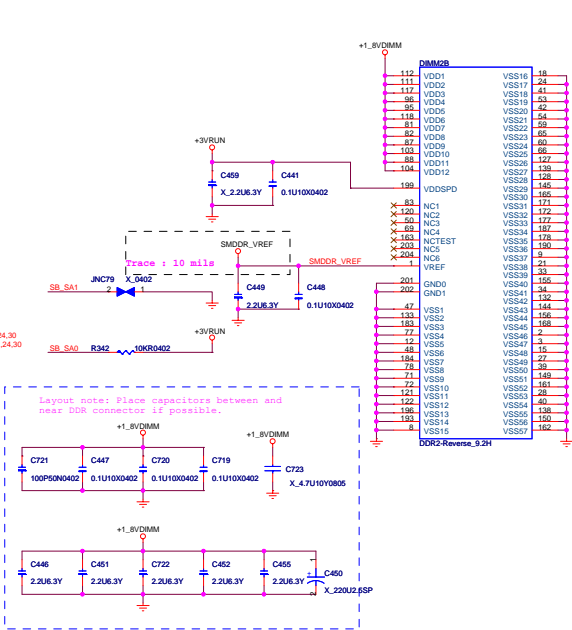
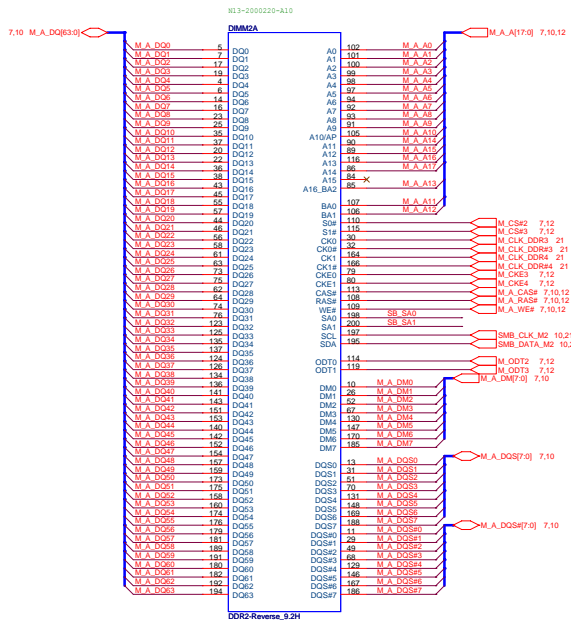


**MSI CORPORATION**

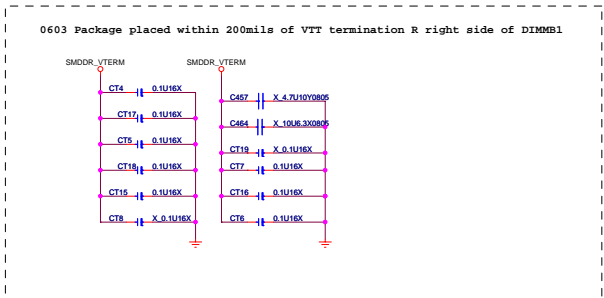
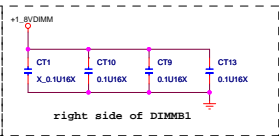
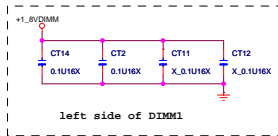
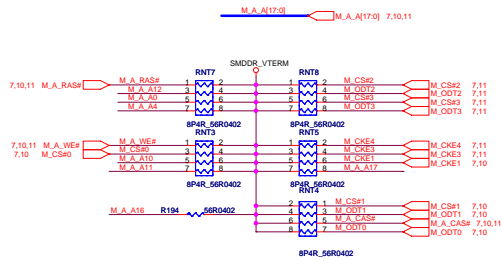
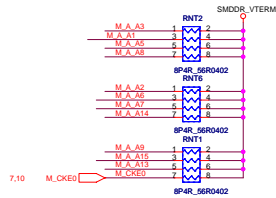
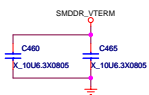
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Size: Custom    Document Number: MS-1682    Rev: 0A

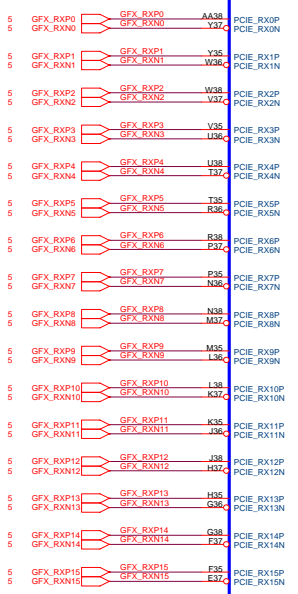
Date: Wednesday, January 21, 2009    Sheet: 10 of 61



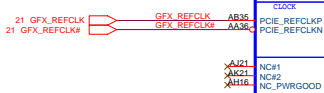
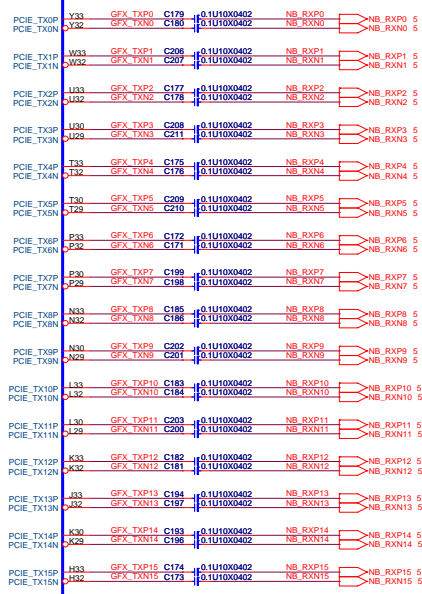
| MSI CORPORATION |                             |                |
|-----------------|-----------------------------|----------------|
| File            | DDR2 SODIMM 1               |                |
| Size            | Document Number             | Rev            |
| Custom          | MS-1682                     | 0A             |
| Date            | Wednesday, January 21, 2009 | Sheet 11 of 51 |



U22A

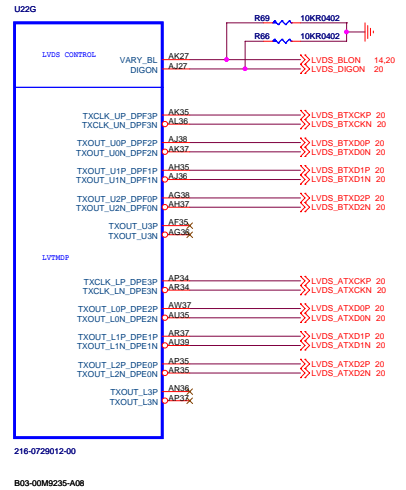


PCI EXPRESS INTERFACE



216-0729012-00

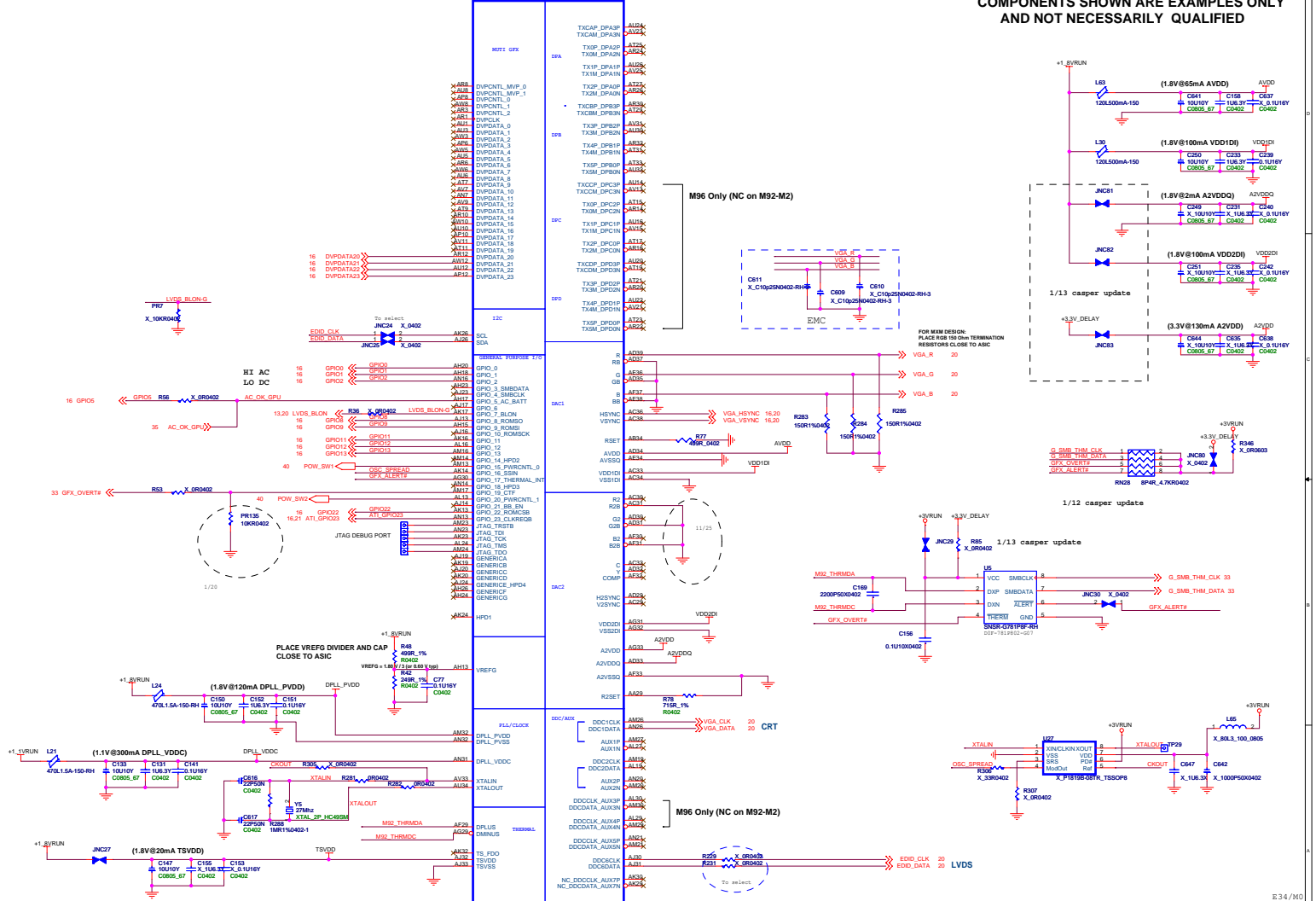
### LVDS Interface



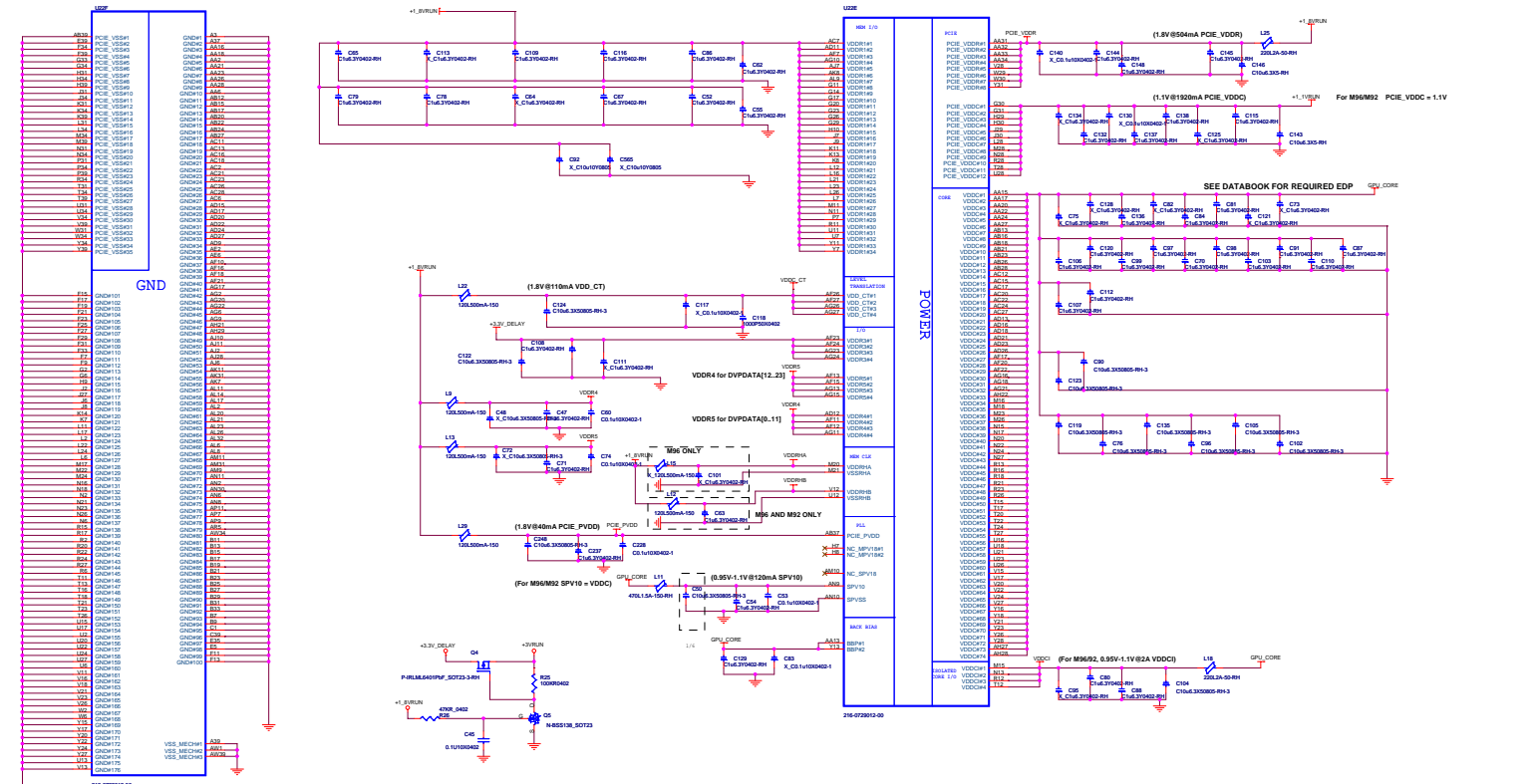
### DisplayPort E Configuration

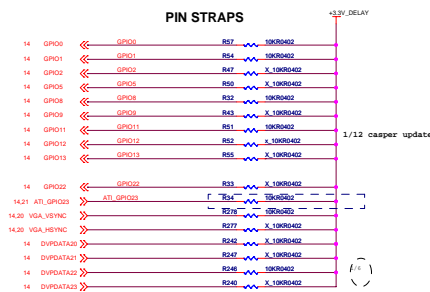
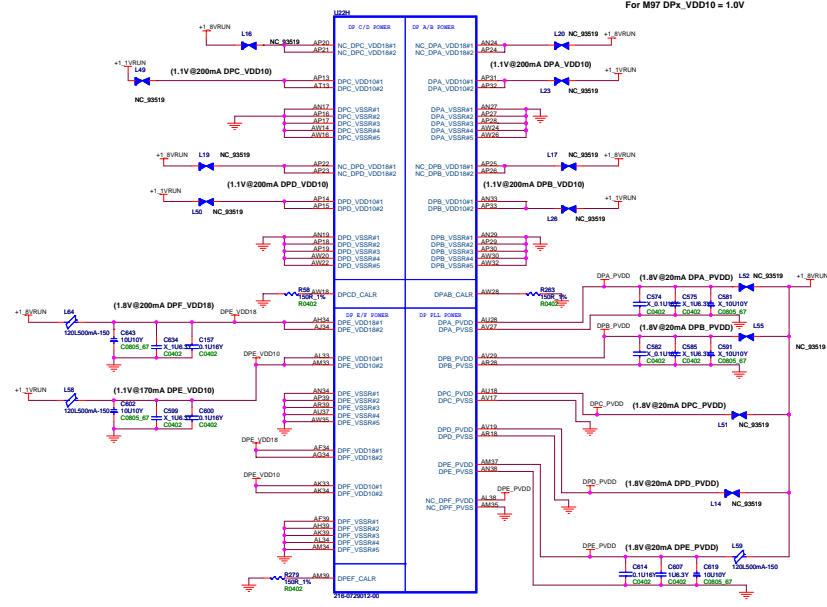
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| File                   | M92M-HOST/LVDS              |
| Size                   | Document Number             |
| Custom                 | MS-1682                     |
| Date                   | Wednesday, January 21, 2009 |
| Sheet                  | 13 of 51                    |
| Rev                    | 0A                          |

COMPONENTS SHOWN ARE EXAMPLES ONLY  
AND NOT NECESSARILY QUALIFIED



|                 |                             |
|-----------------|-----------------------------|
| MSI CORPORATION |                             |
| File:           | M92M-I0                     |
| Size:           | Document Number             |
| C:              | MS-1682                     |
| Date:           | Wednesday, January 21, 2009 |
| Page:           | 14 of 51                    |





**CONFIGURATION STRAPS**  
ALLOW FOR PULLUP PADS FOR THESE STRAPS AND IF THESE GPHOS ARE USED, THEY MUST NOT CONFLICT DURING RESET

| STRAPS               | PIN               | DESCRIPTION OF DEFAULT SETTINGS   | RECOMMENDED SETTINGS |
|----------------------|-------------------|---|----------------------|
| TX_PWRS_ENB          | GPD0              | Transmitter Power Saving Enable<br>0:20% Tx output swing (default setting for desktop)<br>1:Full Tx output swing (default setting for desktop)  | 1                    |
| TX_DEEMPH_EN         | GPD1              | PCI Express Transmitter De-emphasis Enable<br>0:Tx de-emphasis disabled for mobile mode<br>1:Tx de-emphasis enabled (default setting for desktop)   | 1                    |
| BIF_GEN2_EN          | GPD2              | 0 = Advertises the PCIe device as 2.0 GT/s capable at power-on<br>1 = Advertises the PCIe device as 3.0 GT/s capable at power-on<br>2:0 GT/s Capability will be advertised by   | 0                    |
| STRAP_BIF_CLK_PAL_EN | GPD8              | Enables CLKREQ Power Management<br>0: CLKREQ Power Management capability is disabled<br>1: CLKREQ Power Management capability is enabled  | 0                    |
| BIF_VGA_DIS          | GPD9              | VGA ENABLED   | 0                    |
| BIF_RX_FLT_CALIB_BP  | GPD21             |   | 0                    |
| BOS_ROM_EN           | GPD_22_ROMCS8     | Enables external BIOS ROM device<br>0: disable external BIOS ROM device<br>1: enable external BIOS ROM device   | 0                    |
| config2<br>T<br>0    | GPD13<br>12<br>11 | GPD 0,13,12,11:CONFIG 3,2,1,0<br>0: If BIOS_ROM_EN = 0, then Config[3:0] defines the rom type<br>1: If BIOS_ROM_EN = 0, then Config[3:0] defines the Aperture size  | 0 0 1 256MB          |
| Mem type             | DVDDAP021,22      | If VIP_DEVICE_STRAP_EN is set to '1' then this pin is used to sense whether a VIP device is connected to the VIP bus (requires a VIP_DEVICE_STRAP_EN is set to '0'). If this pin is not used as a strap set all '0's. Its value during reset is unimportant, and it can be used as a regular GPIO | 0 0 0 vendor         |
| VIP_DEVICE_STRAP_EN  | V5VSYNC           |   | 0                    |
| RSVD                 | HSVSYNC           |   | 0                    |
| AUX0                 | GENERIC           |   | 1                    |
| AUX1                 | HSVSYNC           |   | 1                    |

| DV DATA | 23 | 22 | 21 | 20 |       |
|---------|----|----|----|----|-------|
| SAMSUNG | 0  | 0  | 0  | 0  | 32*16 |
| Hynix   | 0  | 0  | 0  | 1  | 32*16 |
| SAMSUNG | 0  | 0  | 1  | 0  | 64*16 |
| Hynix   | 0  | 1  | 0  | 0  | 64*16 |

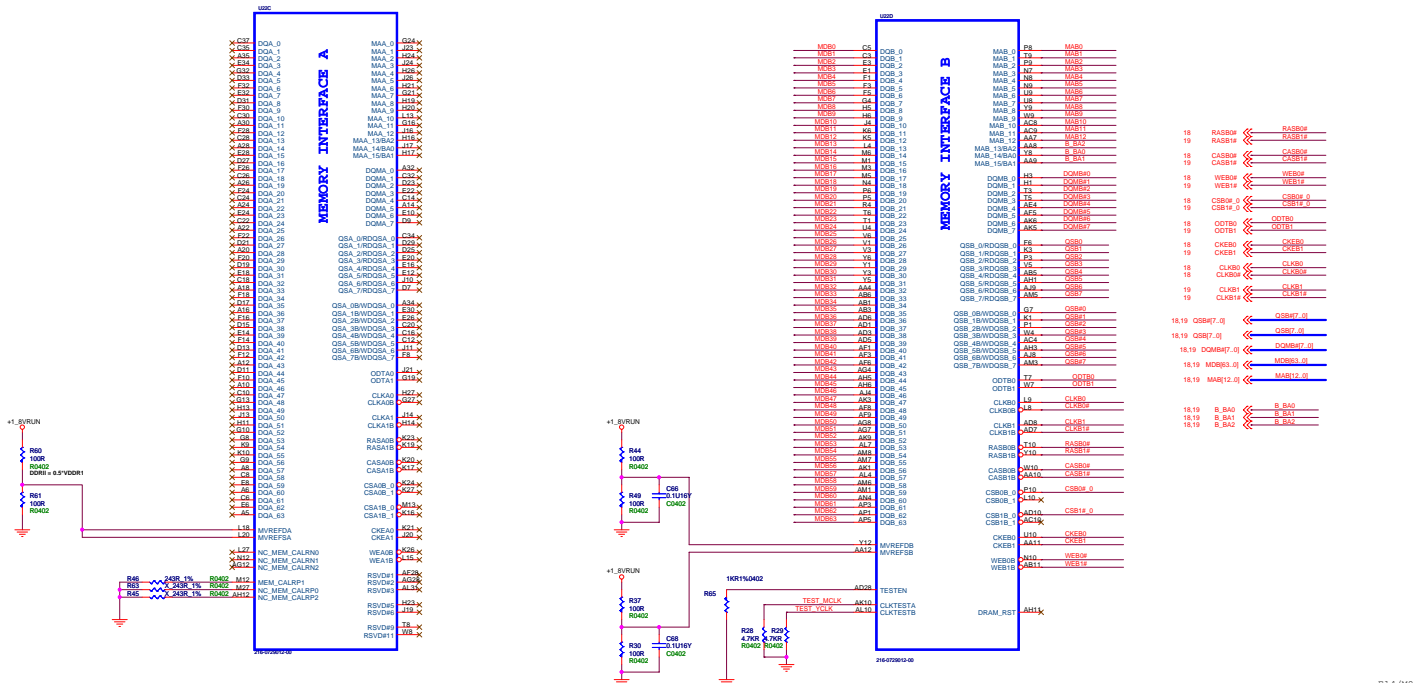
**MSI CORPORATION**

MS-1682

Version: 1.0

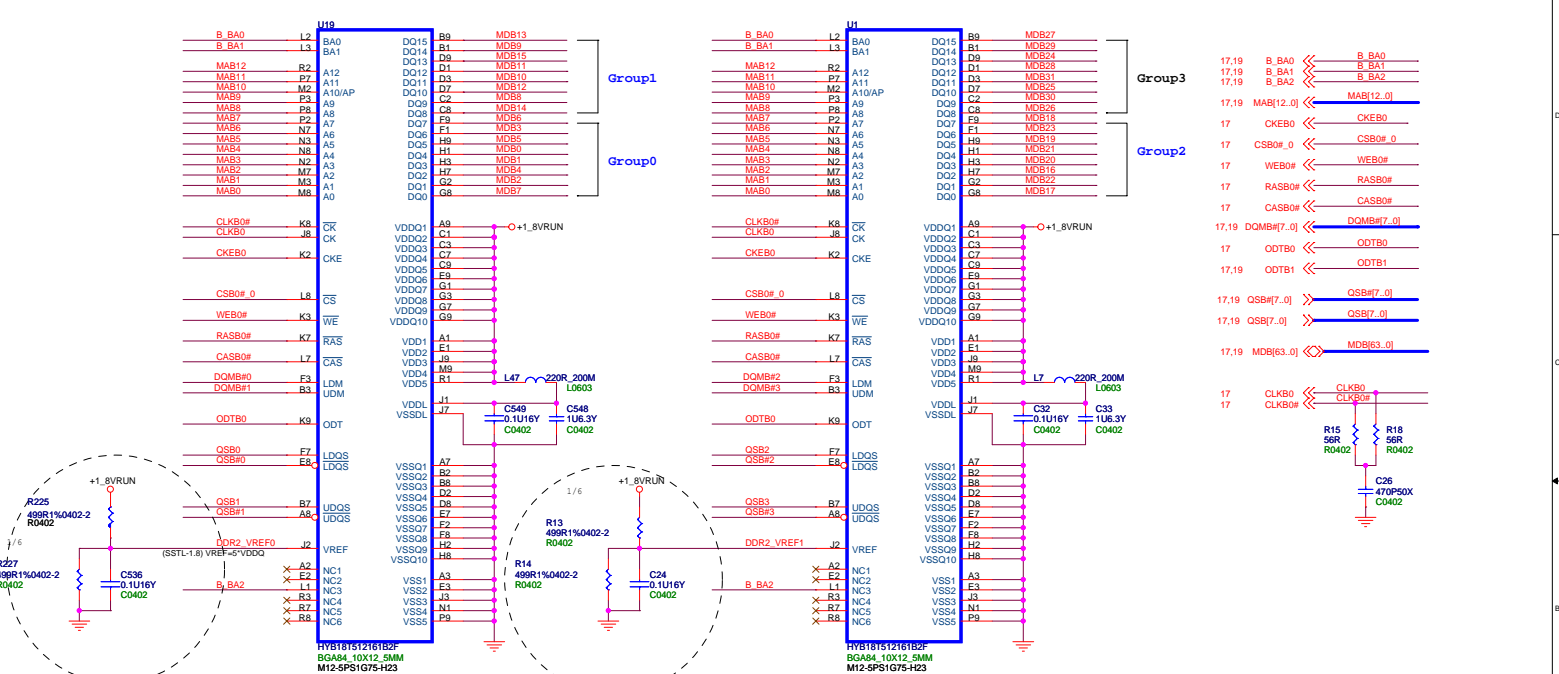
Created: 2008.08.21





E14 / M0

|                                       |         |
|---------------------------------------|---------|
| <b>MSI MICRO-STAR INT'L CO., LTD.</b> |         |
| <b>M92-S MEM IF</b>                   |         |
| Doc No                                | MS-1682 |
| Rev                                   | 1A      |
| Date: 2005/06/21                      |         |

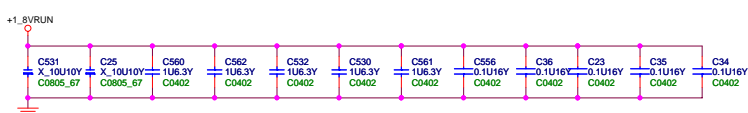
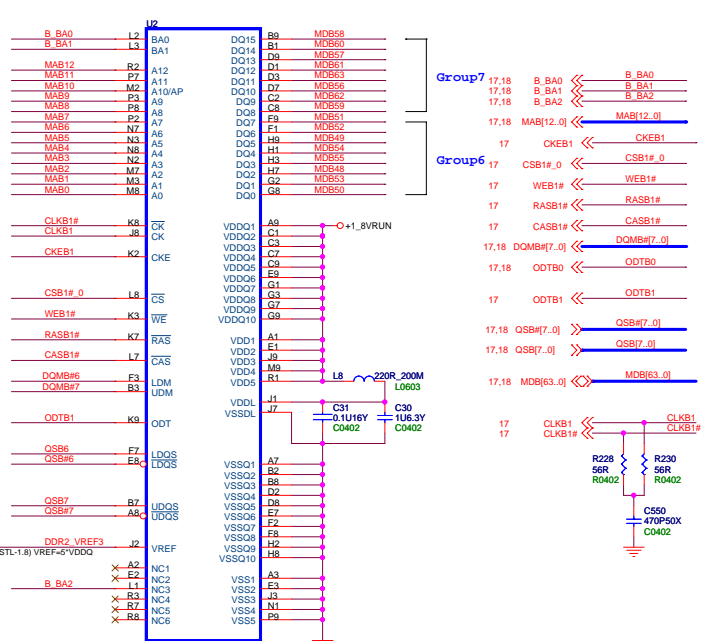
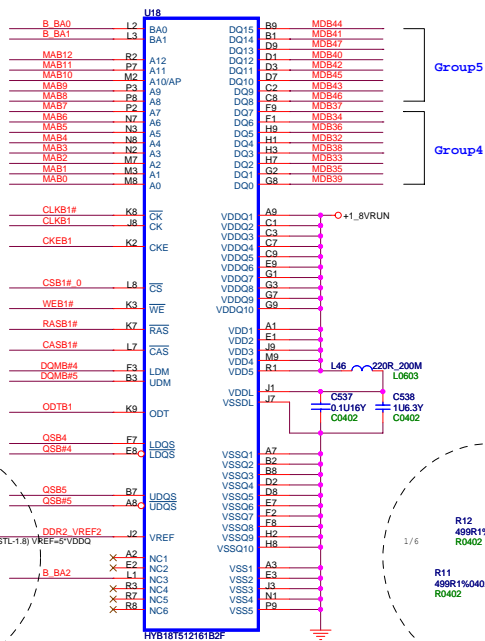


E27/M0

**MSI**  
MEMORIES

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

|       |                             |       |          |
|-------|-----------------------------|-------|----------|
| File  | <b>MEM DDR2 A0</b>          |       |          |
| Size  | Document Number             | Rev   |          |
| B     | <b>MS-1682</b>              | 0A    |          |
| Date: | Wednesday, January 21, 2009 | Sheet | 18 of 51 |



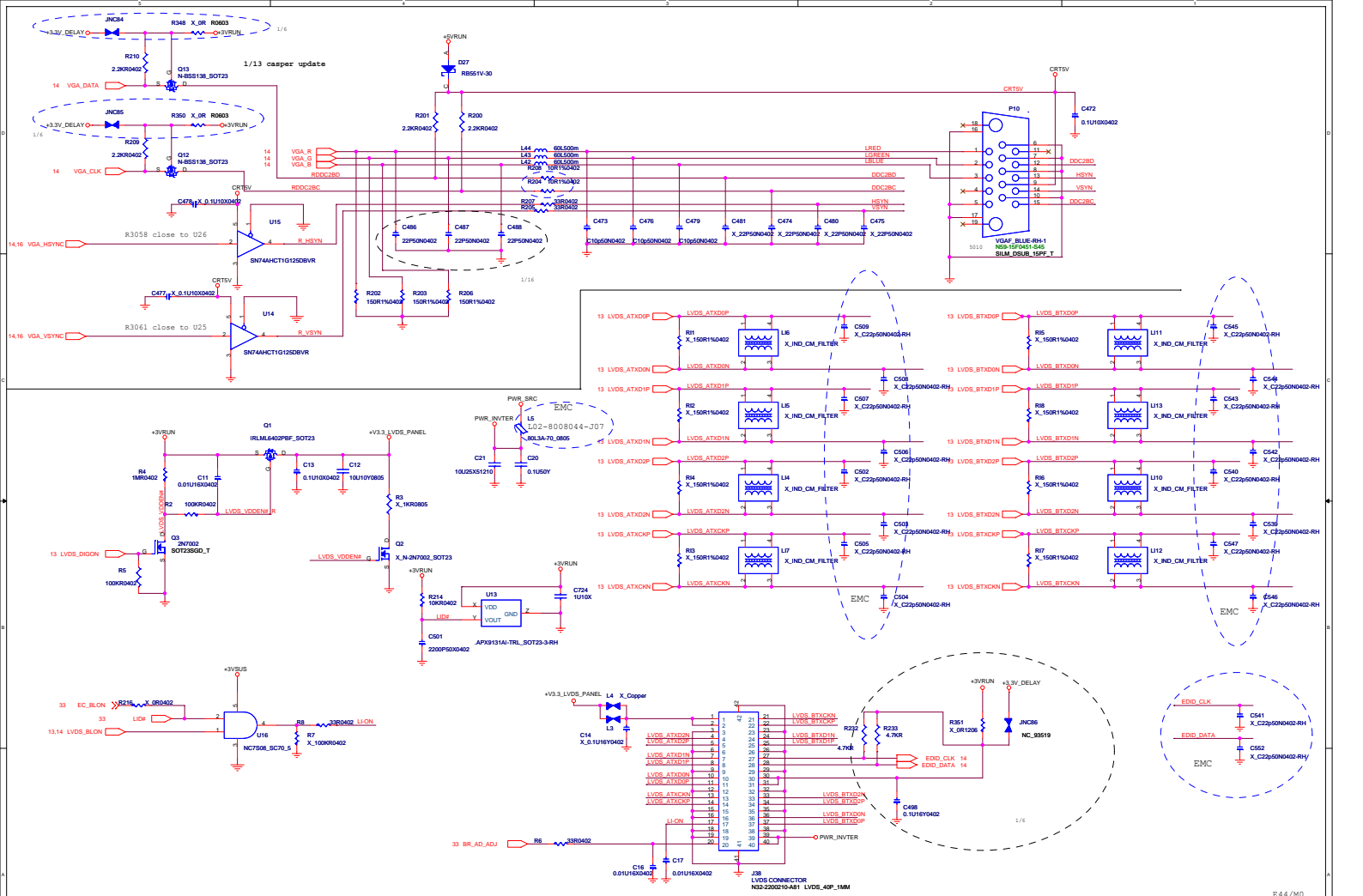
E27/M0

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

File: **MEM DDR2 A1**

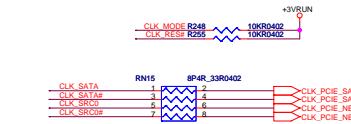
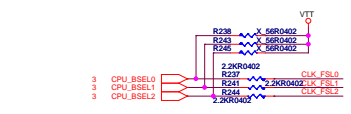
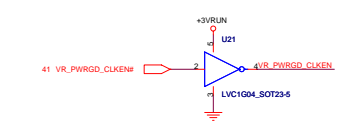
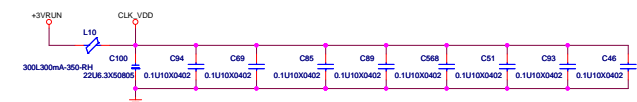
Size: B Document Number: **MS-1682** Rev: 0A

Date: Wednesday, January 21, 2009 Sheet: 19 of 51



E44/30

|                                   |                             |
|-----------------------------------|-----------------------------|
| <b>MICRO-STAR INT'L CO., LTD.</b> |                             |
| <b>CRT &amp; LVDS &amp; CONN</b>  |                             |
| <b>MS-1682</b>                    |                             |
| Rev                               | DA                          |
| Date                              | Wednesday, January 21, 2009 |
| Page                              | 20 of 51                    |

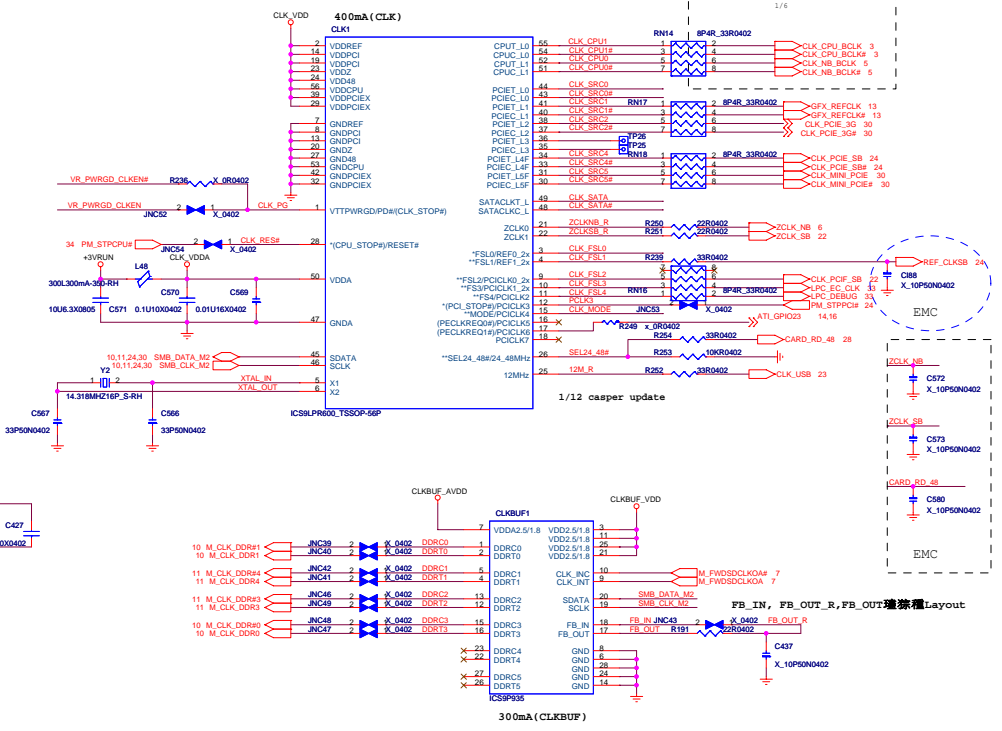
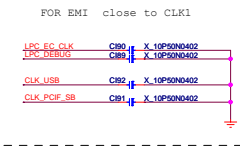


Strapping Configuration(IC5)

| PIN# | High                | Low(DeFault)       |
|------|---------------------|--------------------|
| 15   | Pin 16/17 : PCLKREQ | Pin 16/17 : PCICLK |

CPU Table

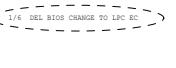
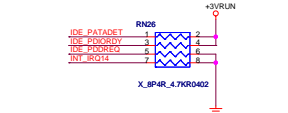
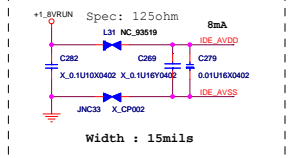
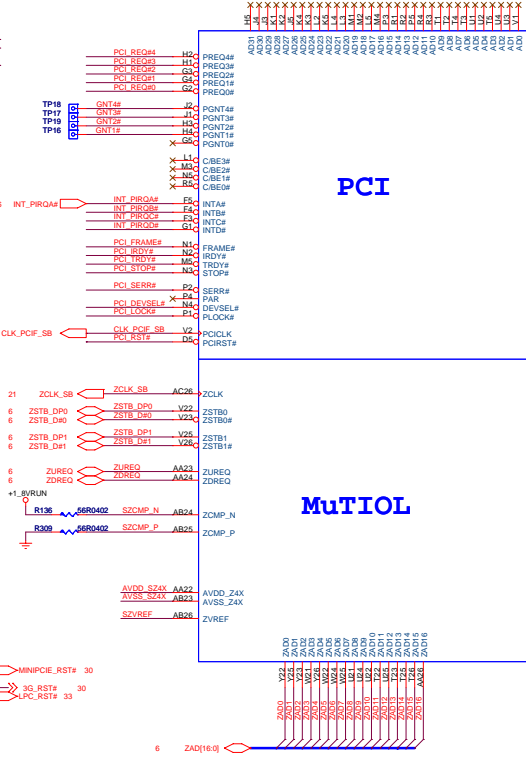
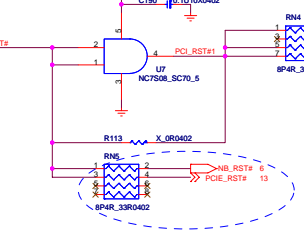
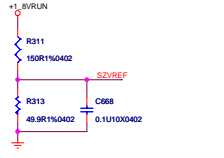
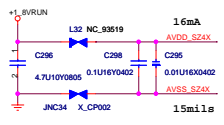
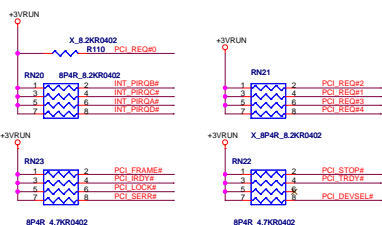
| BSEL[2] | BSEL[1] | BSEL[0] | FSB Freq (MHz) |
|---------|---------|---------|----------------|
| L       | H       | H       | 667 MHz        |
| L       | H       | L       | 800 MHz        |
| L       | L       | L       | 1066 MHz       |



1/16 JNC39,40,41,42 +1.5" AND JNC43 +2"FOR 3D MARK 06 BUG ,

E45/M0

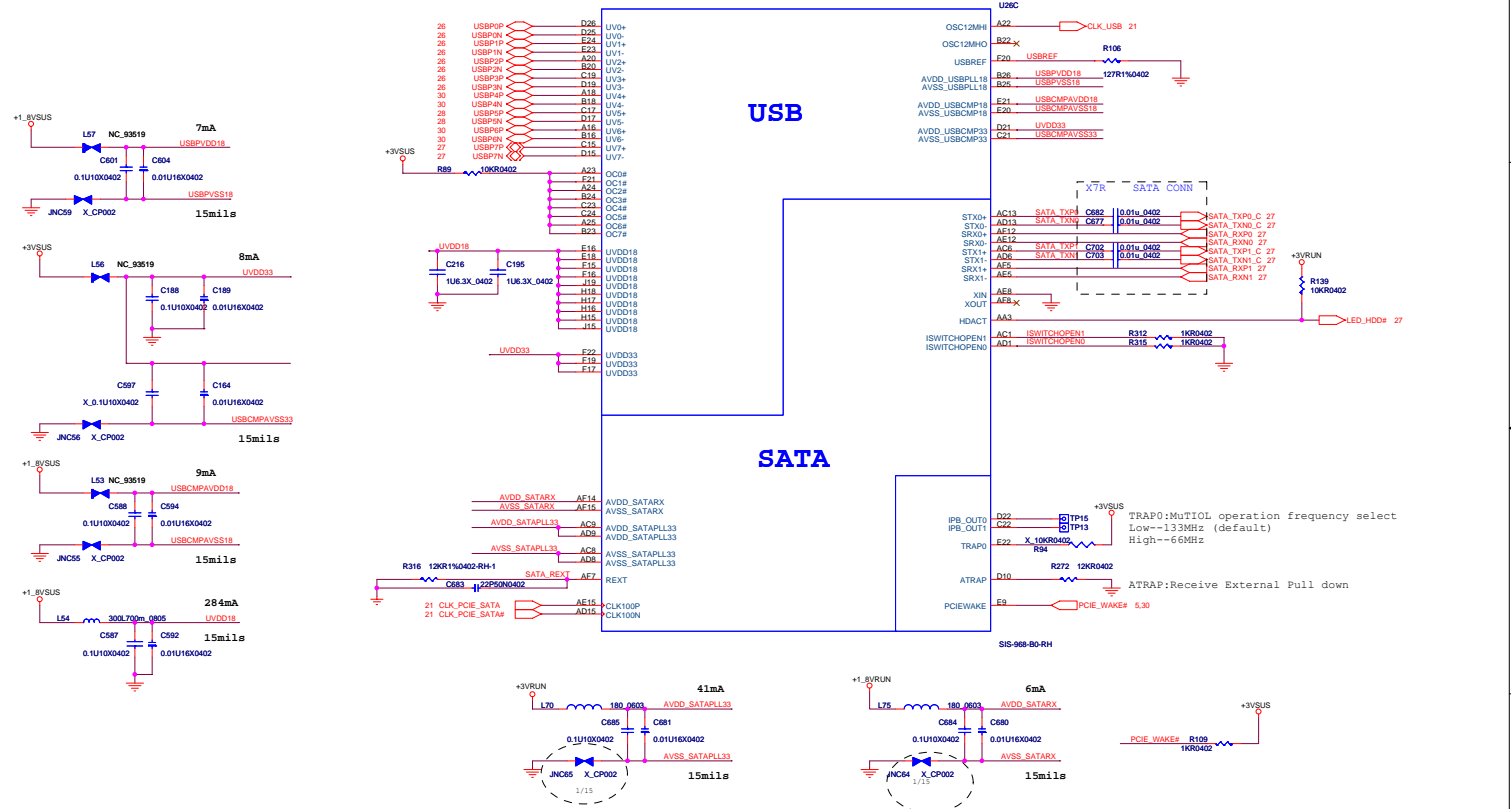
MSI CORPORATION  
**CLOCK Generator ' Dimm BUF**  
 Size Custom Document Number MS-1682 Rev 0A  
 Date: Wednesday, January 21, 2009 Sheet 21 of 51



SPI\_HARDWARE\_TRAP;  
Low-LPC interface (default)  
High-SPI interface

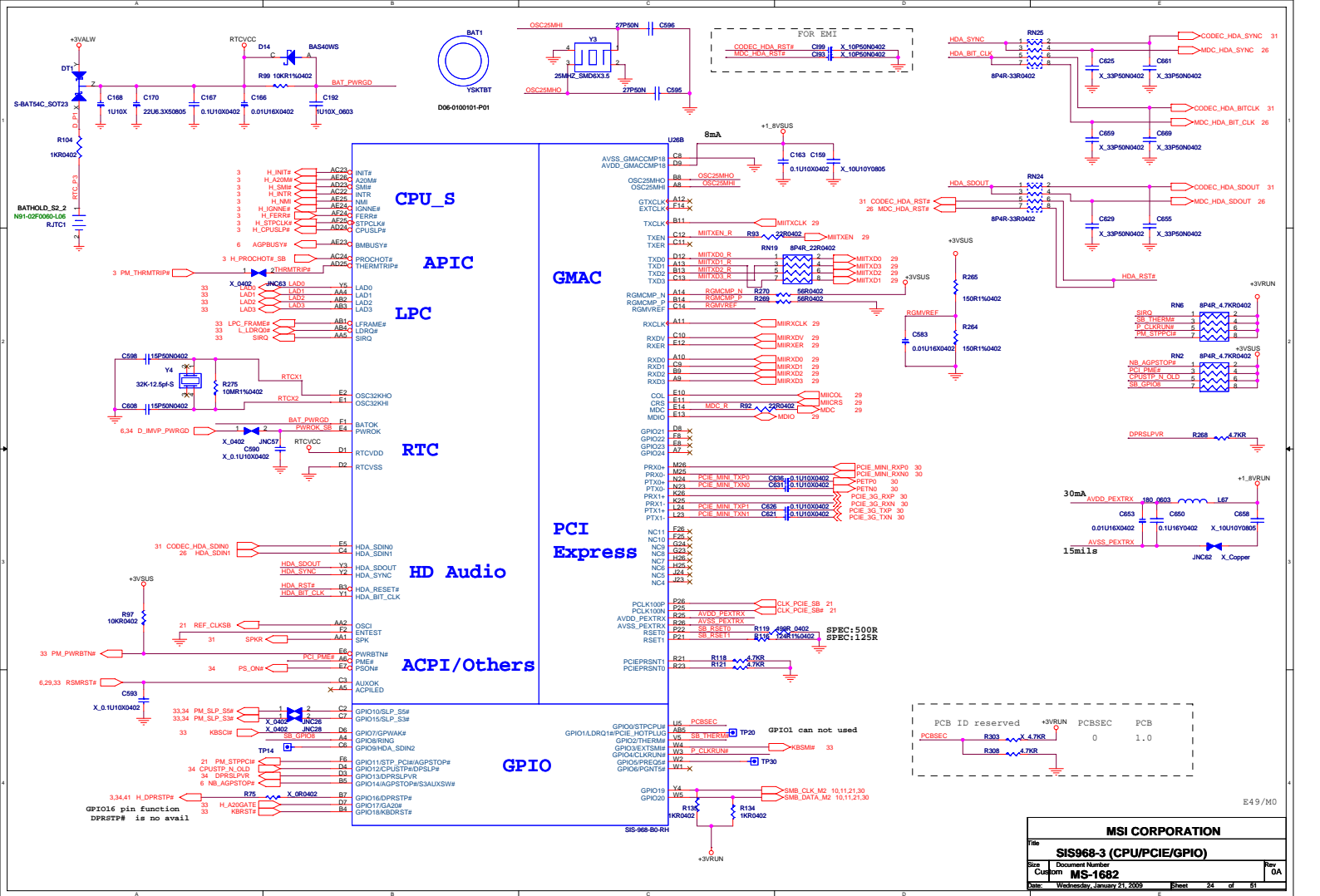
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|------------------------|-------------------------------------|-------|-----------|
| <b>MSI CORPORATION</b> |                                     |       |           |
| File                   | <b>SIS968-1 (PCI/IDE/SPI/MutIO)</b> |       | E2.4 / M0 |
| Size                   | Document Number                     |       | Rev       |
| Custom                 | <b>MS-1682</b>                      |       | 0A        |
| Date                   | Wednesday, January 21, 2009         | Sheet | 22 of 61  |

|                    |
|--------------------|
| USB 0 ,USB 0,2,4,5 |
| USB 1 ,USB 1,3,5,7 |



E32/M0

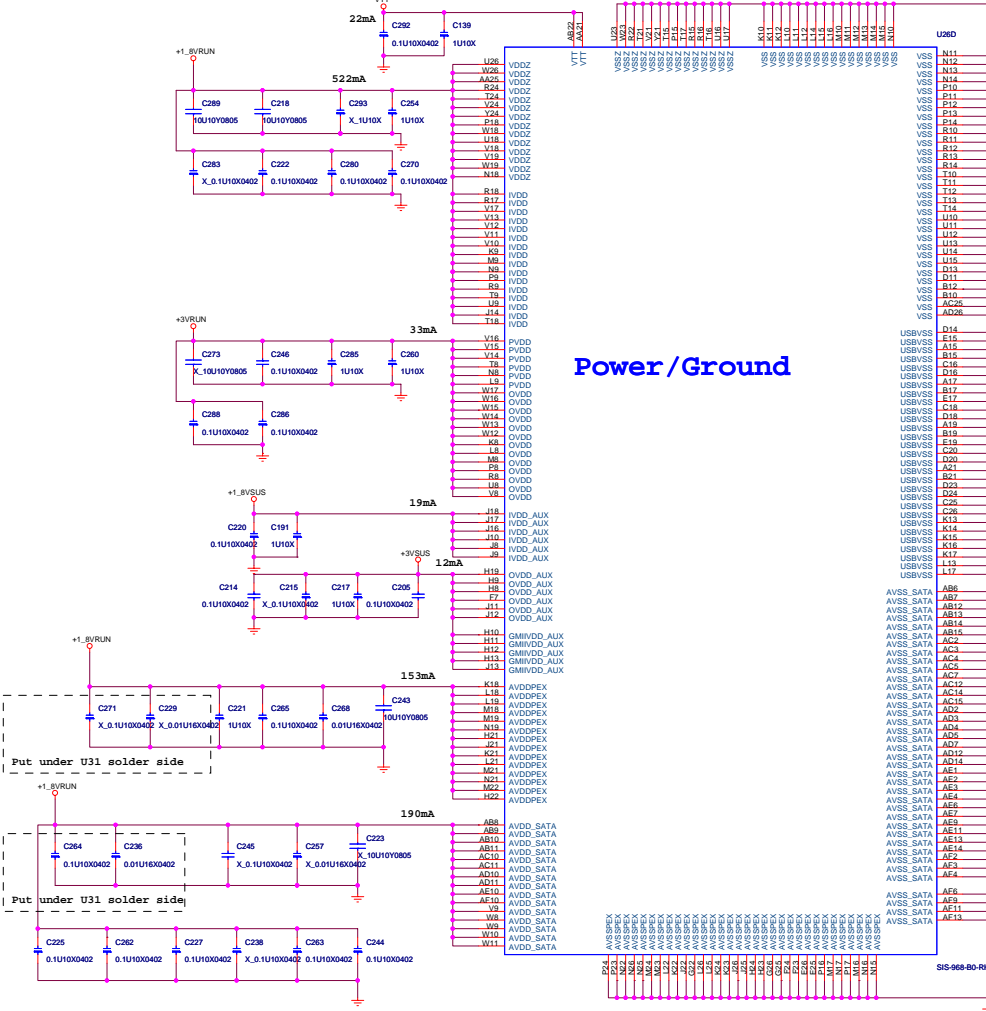
|                                   |                                 |
|-----------------------------------|---------------------------------|
| <b>MSI CORPORATION</b>            |                                 |
| File: <b>SIS968-2 (USB/SATA)</b>  |                                 |
| Size: Custom                      | Document Number: <b>MS-1682</b> |
| Date: Wednesday, January 21, 2009 | Sheet: 23 of 51                 |



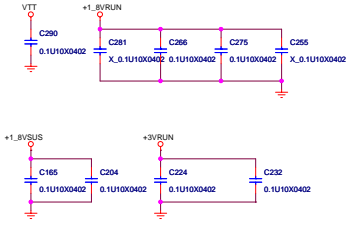
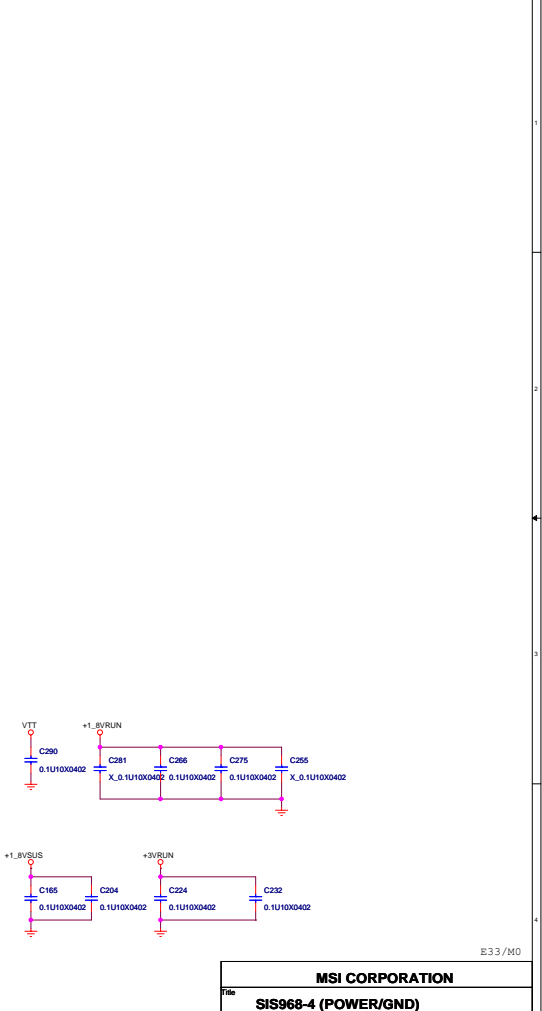
|        |                             |       |          |
|--------|-----------------------------|-------|----------|
| File   | SIS968-3 (CPU/PCIe/GPIO)    | Rev   | 0A       |
| Size   | Document Number             |       |          |
| Custom | MS-1682                     |       |          |
| Date   | Wednesday, January 21, 2009 | Sheet | 24 of 51 |

E49/30

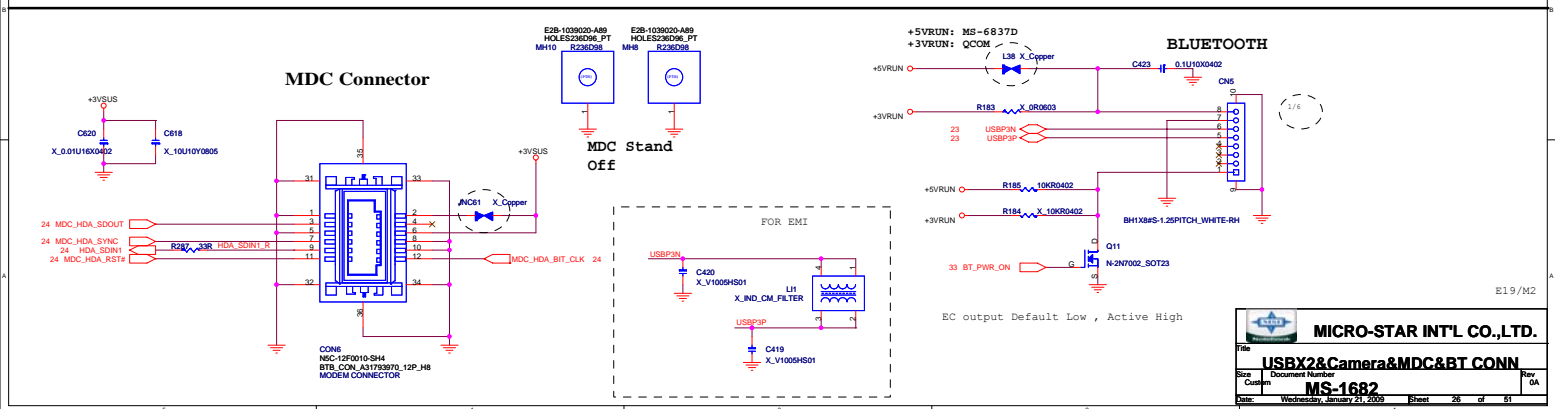
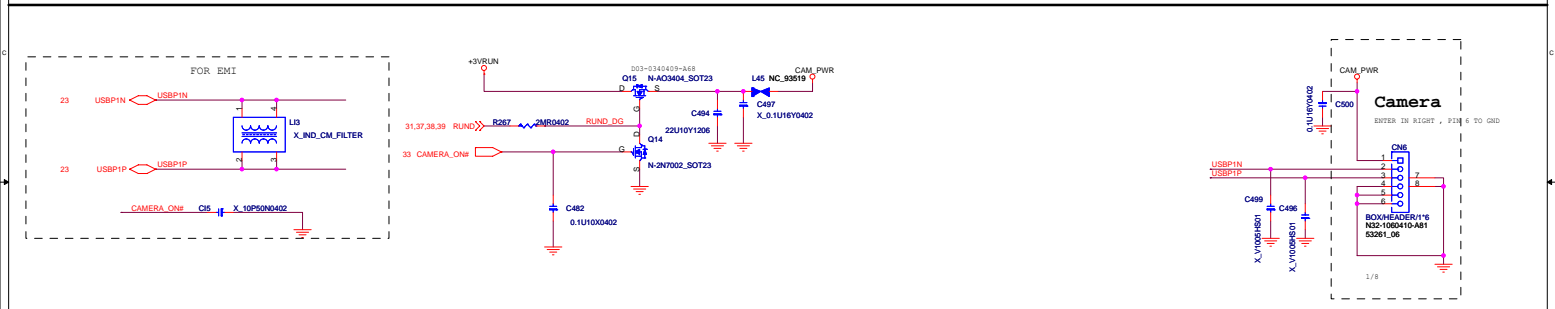
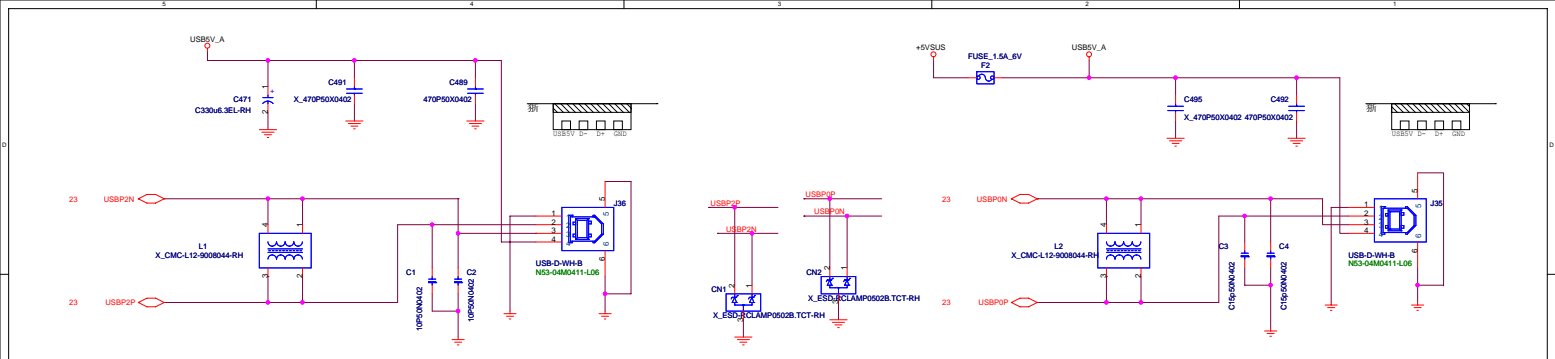




## Power / Ground



|                                   |                                 |         |
|-----------------------------------|---------------------------------|---------|
| <b>MSI CORPORATION</b>            |                                 |         |
| File: <b>SIS968-4 (POWER/GND)</b> |                                 |         |
| Size: Custom                      | Document Number: <b>MS-1682</b> | Rev: 0A |
| Date: Wednesday, January 21, 2009 | Sheet: 25                       | of 51   |



B19/M2

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

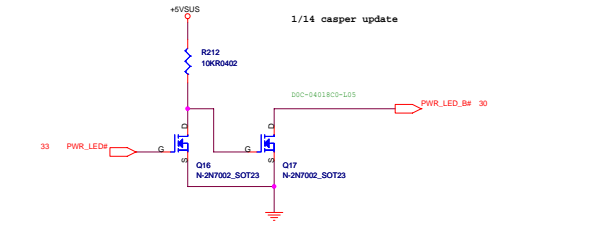
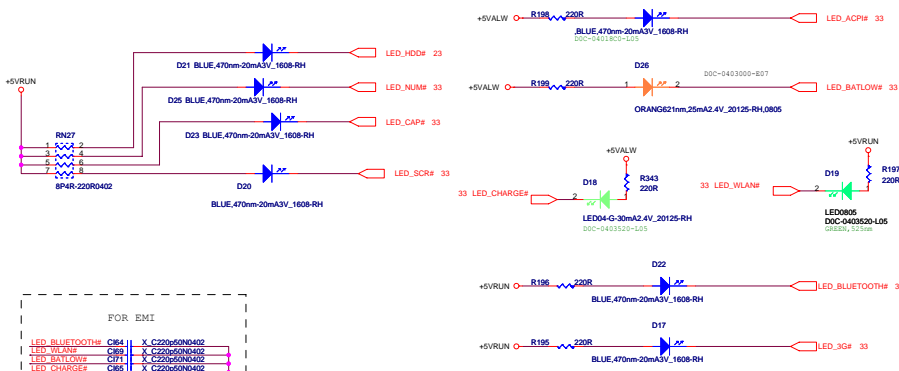
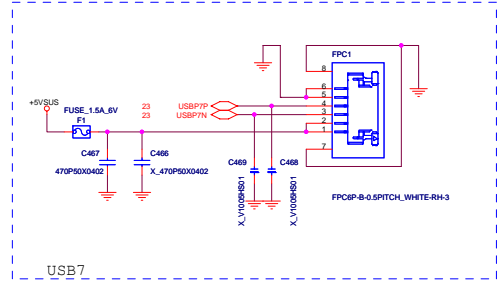
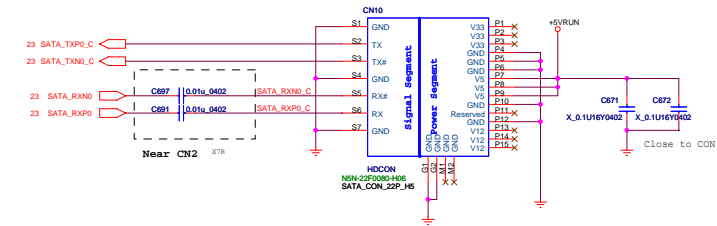
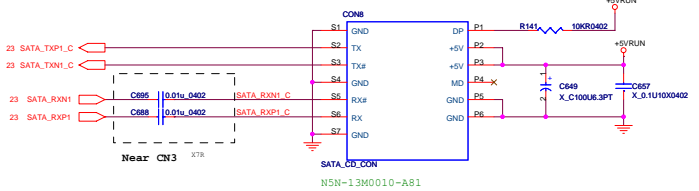
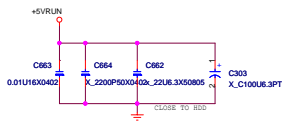
File: **USBX2&Camera&MDC&BT CONN**

Size: **MS-1682**

Customer: **MS-1682**

Date: **Wednesday, January 21, 2009** Sheet **26** of **51**

Rev: **0A**



FOR EMI

|                |      |   |               |
|----------------|------|---|---------------|
| LED_BLUETOOTH# | C664 | X | C2200P50N0402 |
| LED_WLAN#      | C665 | X | C2200P50N0402 |
| LED_BATLOW#    | C666 | X | C2200P50N0402 |
| LED_CHARGE#    | C667 | X | C2200P50N0402 |
| LED_SCR#       | C668 | X | C2200P50N0402 |
| LED_CAP#       | C669 | X | C2200P50N0402 |
| LED_NUM#       | C670 | X | C2200P50N0402 |
| LED_HDD#       | C671 | X | C2200P50N0402 |
| LED_3G#        | C672 | X | C2200P50N0402 |
| LED_3G#        | C470 | X | C2200P50N0402 |

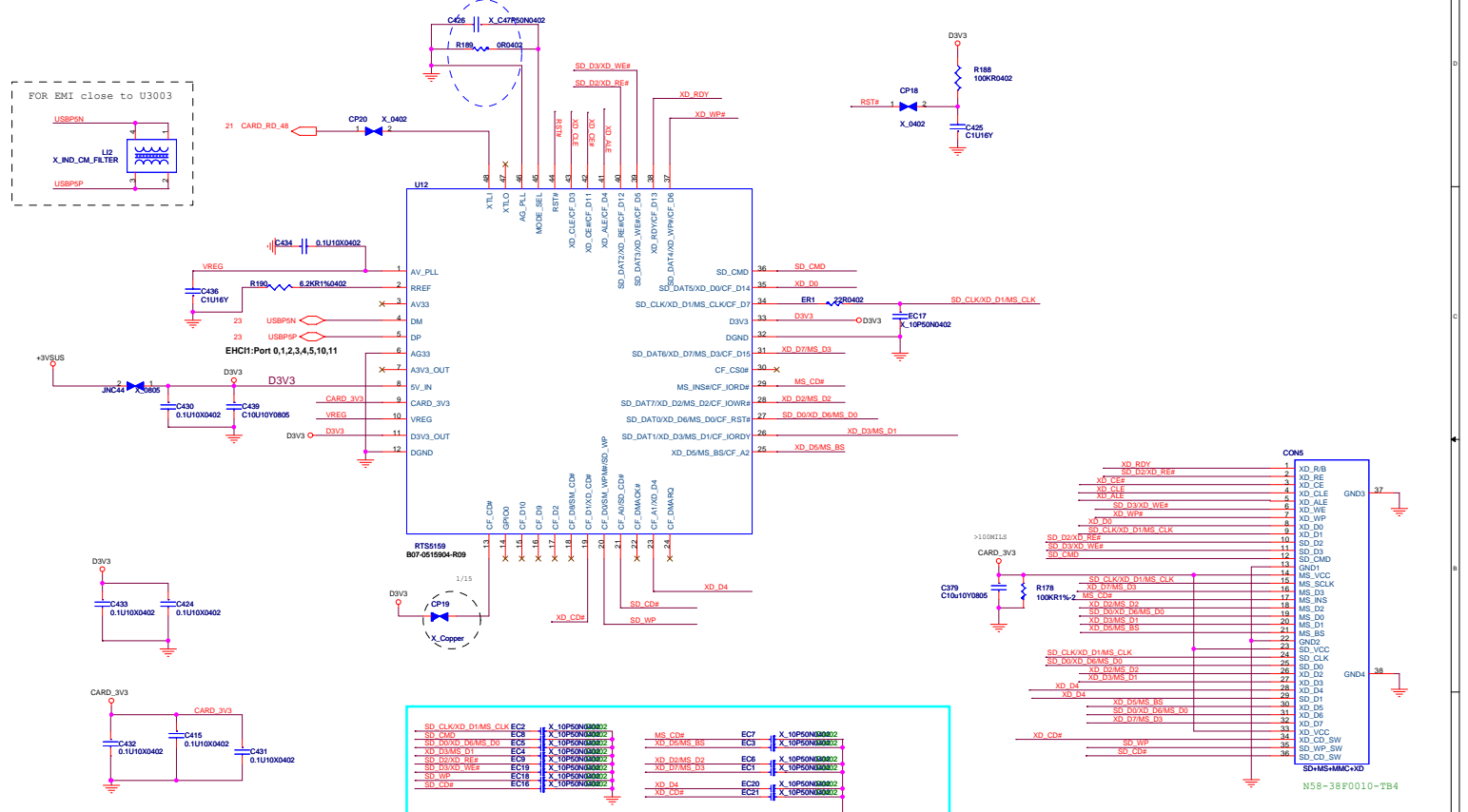
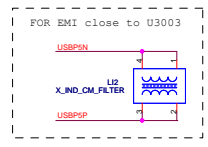
**MICRO-STAR INT'L CO.,LTD.**

File: **HDD & ODD CONN & USB7 & LED**

Size: Custom Document Number: **MS-1682** Rev: 0A

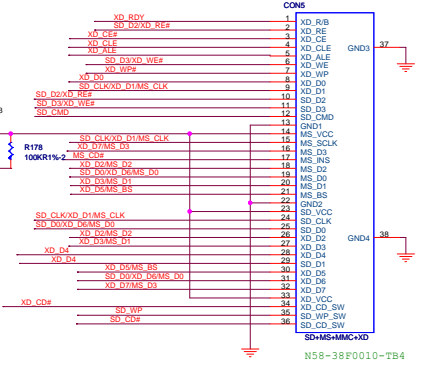
Date: Wednesday, January 21, 2009 Sheet: 27 of 51

B.32/M0



|                   |      |               |            |      |               |
|-------------------|------|---------------|------------|------|---------------|
| SD_CLKXD_D1MS_CLK | EC2  | X_10P50N03002 | MS_CDE#    | EC7  | X_10P50N03002 |
| SD_D0XD_D6MS_D0   | EC5  | X_10P50N03002 | XD_D6MS_BS | EC3  | X_10P50N03002 |
| XD_D3MS_D1        | EC4  | X_10P50N03002 | XD_D2MS_D2 | EC6  | X_10P50N03002 |
| SD_D3XD_WE#       | EC9  | X_10P50N03002 | XD_D7MS_D3 | EC1  | X_10P50N03002 |
| SD_WP             | EC18 | X_10P50N03002 | XD_D4      | EC20 | X_10P50N03002 |
| SD_CDE#           | EC16 | X_10P50N03002 | XD_CDE#    | EC21 | X_10P50N03002 |
| XD_RDY#           | EC15 | X_10P50N03002 |            |      |               |
| XD_CLE#           | EC14 | X_10P50N03002 |            |      |               |
| XD_CLE            | EC13 | X_10P50N03002 |            |      |               |
| XD_ALE            | EC12 | X_10P50N03002 |            |      |               |
| XD_WP#            | EC11 | X_10P50N03002 |            |      |               |
| XD_D0             | EC10 | X_10P50N03002 |            |      |               |

For EMI suggestion :  
 Clock Line add CAP close to IC  
 Data Line add CAP close to Conn



E18/M0

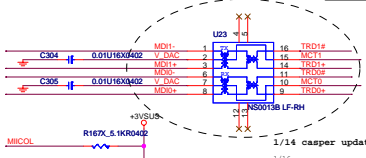
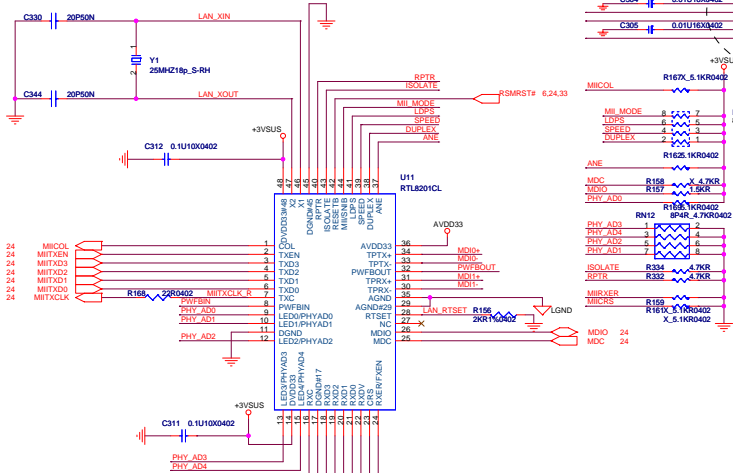
**MICRO-STAR INT'L CO.,LTD.**

File: **RTS5158E\_CARD READER**

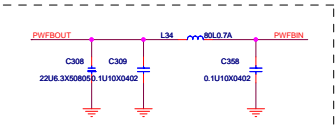
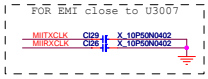
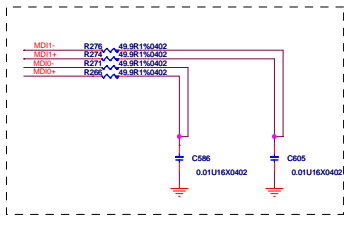
Size: Custom      Document Number: **MS-1682**      Rev: 0A

Date: Wednesday, January 21, 2009      Sheet: 28 of 51

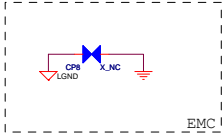
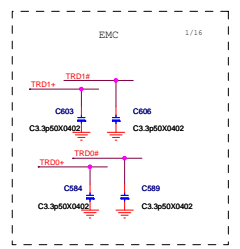
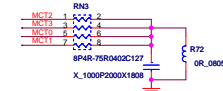
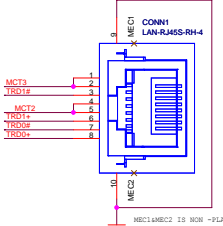
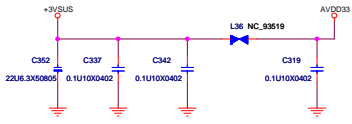
1/12 casper update



1/14 casper update



please C308, C309, L307 close to PWFBOU (U3007.32) and C309 close to PWFBI (U3007.8)

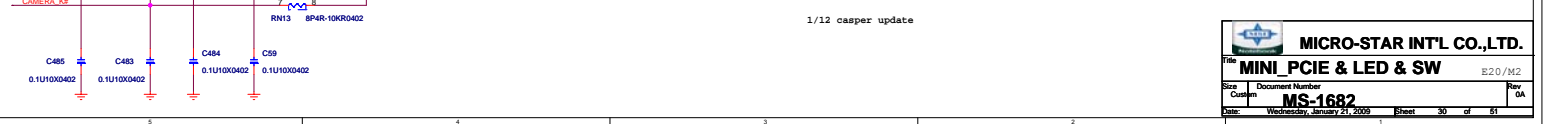
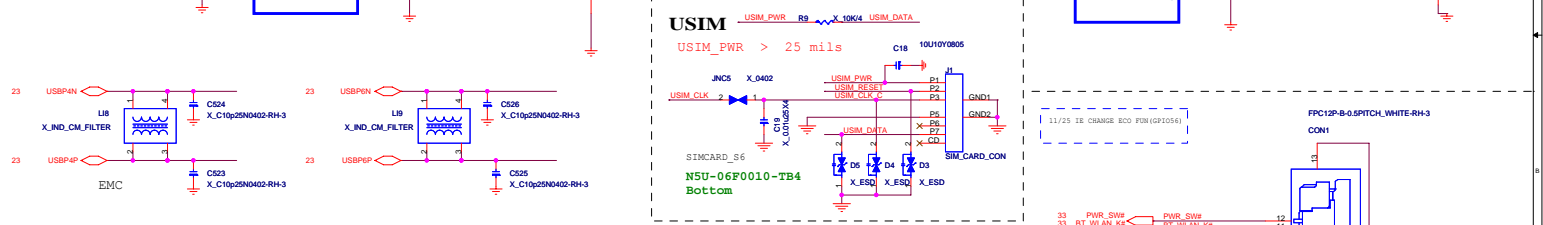
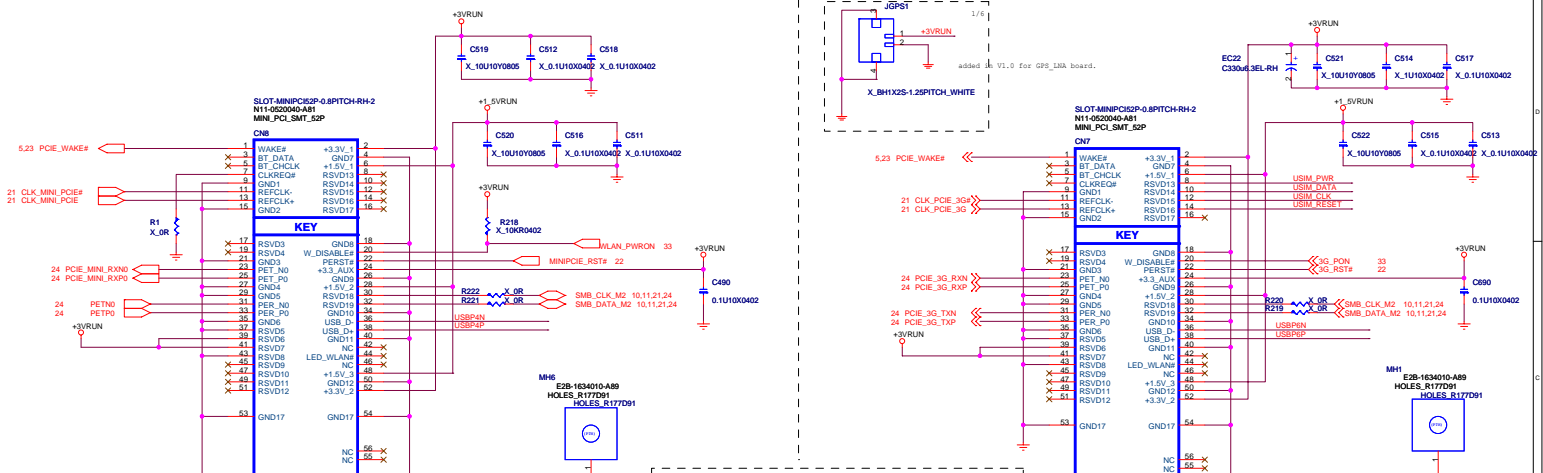


MICRO-STAR INT'L CO., LTD.

Title: **PHY LAN (RTL8201CL)** E37/M0

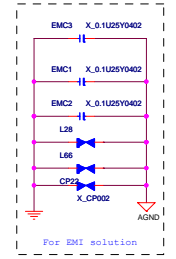
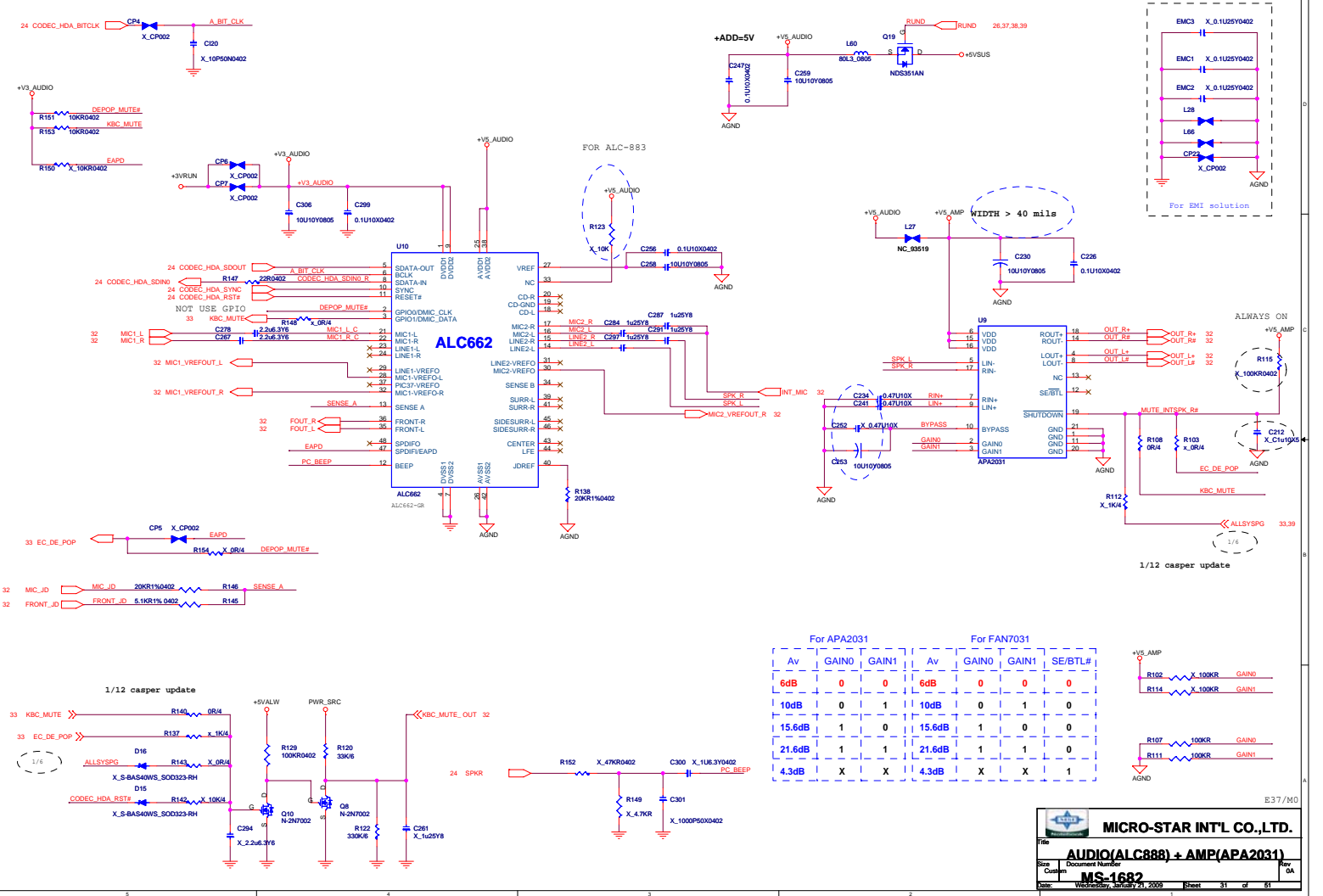
Size: **MS-1682** Rev: 0A

Date: Wednesday, January 21, 2009 Sheet: 25 of 51

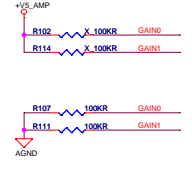


**MICRO-STAR INT'L CO.,LTD.**  
**MINI-PCIE & LED & SW**  
 Size: E20/M2  
 Custom: MS-1682  
 Date: Wednesday, January 21, 2009  
 Sheet: 30 of 51

1/12 casper update



| For APA2031 |       |       | For FAN7031 |       |       |         |
|-------------|-------|-------|-------------|-------|-------|---------|
| Av          | GAIN0 | GAIN1 | Av          | GAIN0 | GAIN1 | SE/BTL# |
| 6dB         | 0     | 0     | 6dB         | 0     | 0     | 0       |
| 10dB        | 0     | 1     | 10dB        | 0     | 1     | 0       |
| 15.6dB      | 1     | 0     | 15.6dB      | 1     | 0     | 0       |
| 21.6dB      | 1     | 1     | 21.6dB      | 1     | 1     | 0       |
| 4.3dB       | X     | X     | 4.3dB       | X     | X     | 1       |



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

File: **AUDIO(ALC888) + AMP(APA2031)**

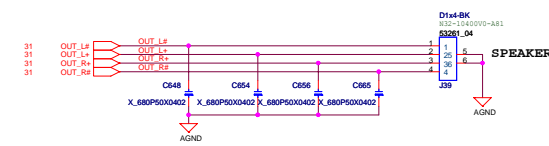
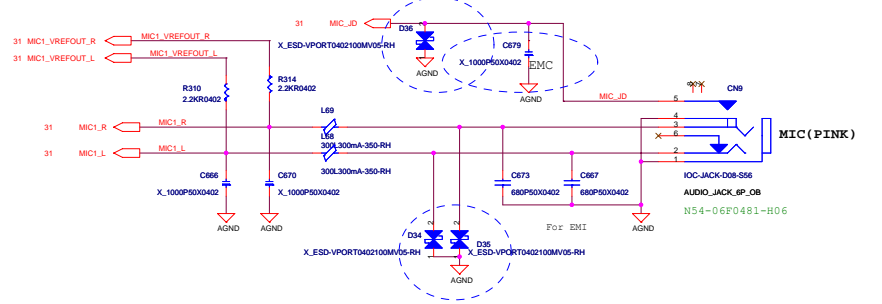
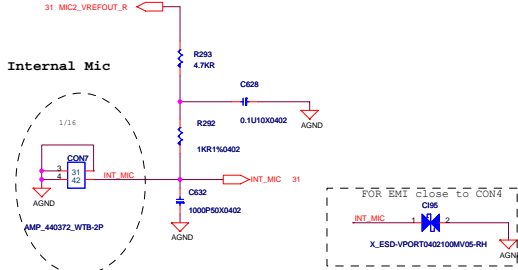
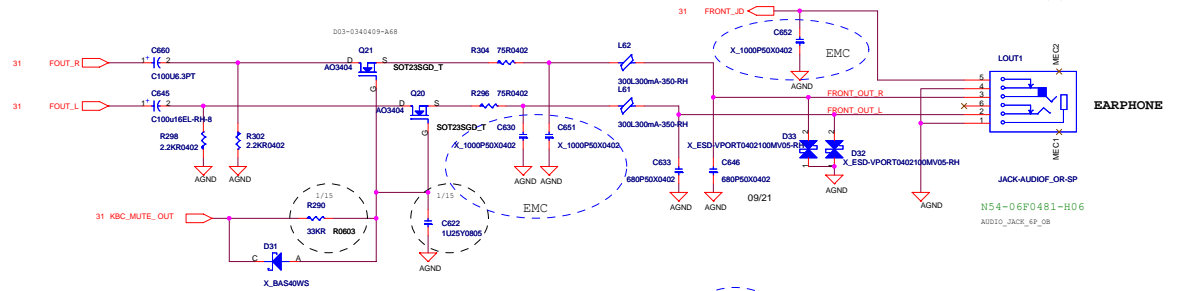
Size: **MS-1682**

Date: Wednesday, January 25, 2006 Sheet: 31 of 51

E37/M0

1/20 EAPD DELAY 650ms

RP IN IS LOW

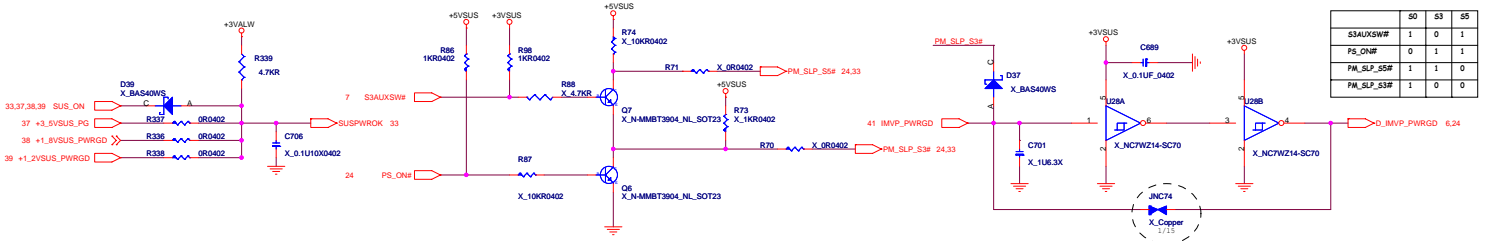
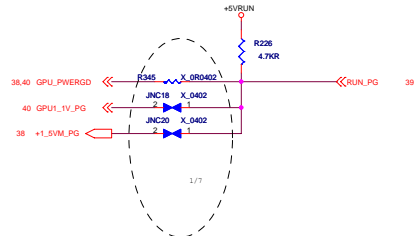
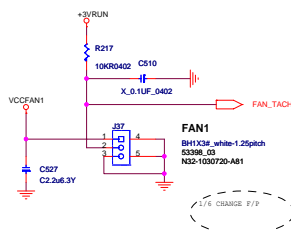
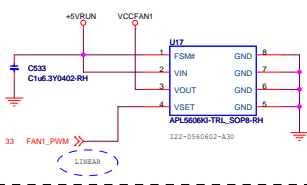


|                                  |                             |          |          |
|----------------------------------|-----------------------------|----------|----------|
| <b>MICRO-STAR INT'L CO.,LTD.</b> |                             |          |          |
| Title                            | <b>SPK / HP / MIC</b>       |          | Rev      |
| Size                             | Document Number             | E28 / M0 |          |
| Customer                         | <b>MS-1682</b>              |          | Rev      |
| Date                             | Wednesday, January 21, 2009 | Sheet    | 32 of 51 |

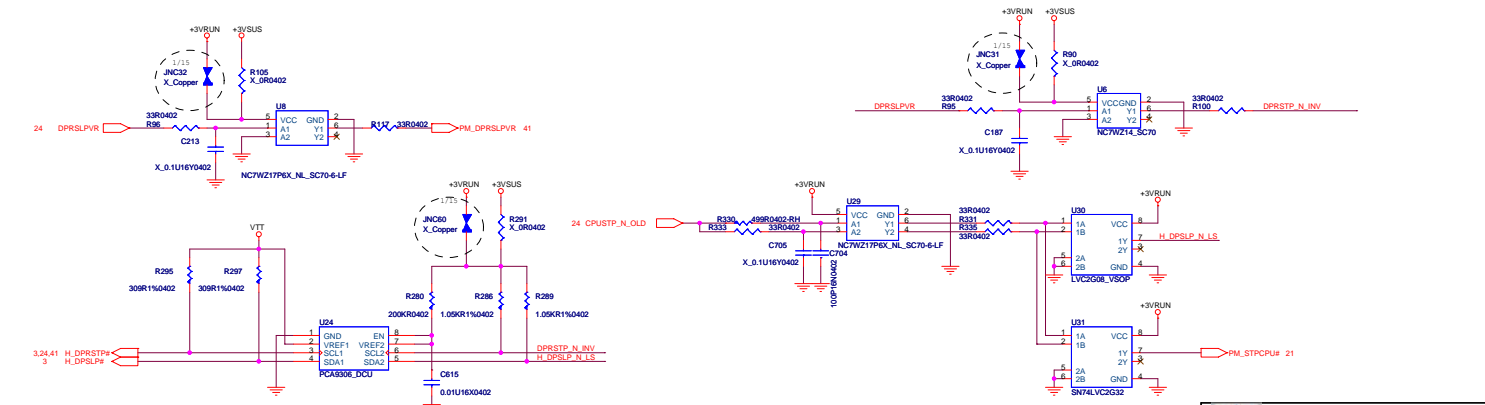




$$VCCFAN1 = 1.6 + FAN1\_PWM$$



|           | S0 | S3 | S5 |
|-----------|----|----|----|
| S3AUXSW#  | 1  | 0  | 1  |
| PS_ON#    | 0  | 1  | 1  |
| PM_SLP_S# | 1  | 1  | 0  |
| PM_SLP_S# | 1  | 0  | 0  |

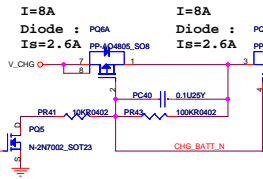
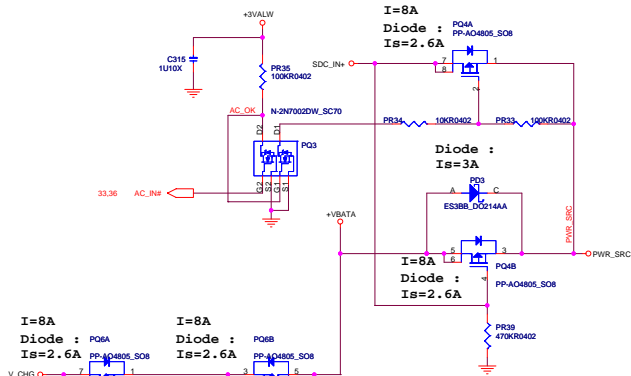
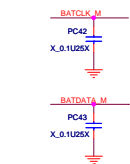
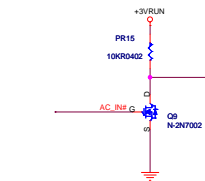
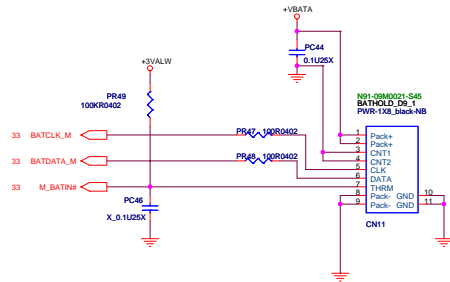
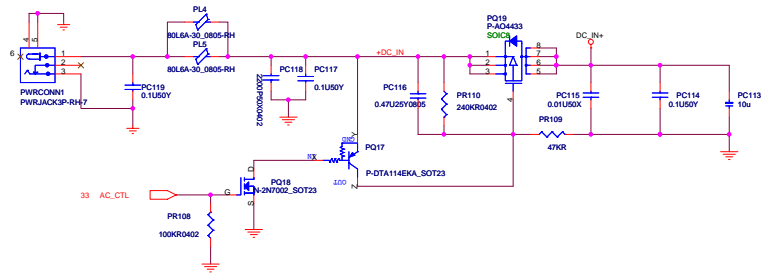


**MICRO-STAR INT'L CO.,LTD.**

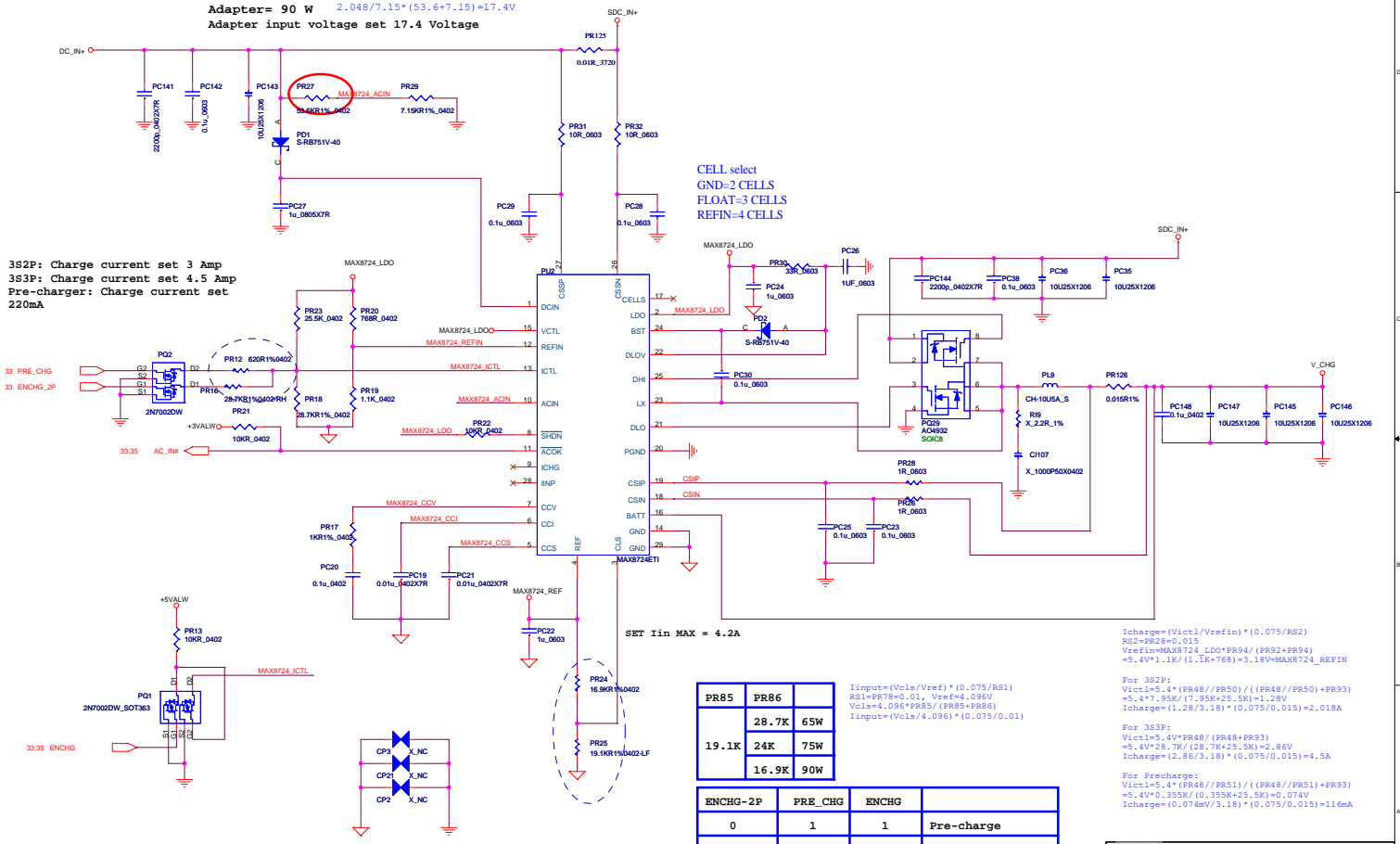
File: **PWRGD & FAN & C3/C4** E33/M0

Size: **MS-1682** Rev: **0A**

Date: Wednesday, January 21, 2009 Sheet: **34** of **51**



Adapter= 90 W  $2.048/7.15*(53.6+7.15)=17.4V$   
 Adapter input voltage set 17.4 Voltage



3S2P: Charge current set 3 Amp  
 3S3P: Charge current set 4.5 Amp  
 Pre-charger: Charge current set 220mA

CELL select  
 GND=2 CELLS  
 FLOAT=3 CELLS  
 REFIN=4 CELLS

SET Iin MAX = 4.2A

| FR85  | FR86  |     |
|-------|-------|-----|
| 19.1K | 28.7K | 65W |
|       | 24K   | 75W |
|       | 16.9K | 90W |

$I_{in} = (V_{c1s}/V_{ref}) * (0.075/RS1)$   
 $RS1 = PR78 + 0.01$ ,  $V_{ref} = 1.096V$   
 $V_{c1s} = 4.096 * PR85 / (FR85 + PR86)$   
 $I_{in} = (V_{c1s}/4.096) * (0.075/0.01)$

$I_{charge} = (V_{c1t1}/V_{refin}) * (0.075/RS2)$   
 $RS2 = PR28 + 0.015$   
 $V_{refin} = MAX8724\_LDO\_LDO + PR94 / (PR92 + PR94)$   
 $= 5.4V * 1.1K / (1.1K + 768) = 3.18V = MAX8724\_REFIN$

For 3S2P:  
 $V_{c1t1} = 5.4 * (PR48 / PR50) / ((PR48 / PR50) + PR93)$   
 $= 5.4 * 7.95K / (7.95K + 25.5K) = 1.28V$   
 $I_{charge} = (1.28 / 3.18) * (0.075 / 0.015) = 2.018A$

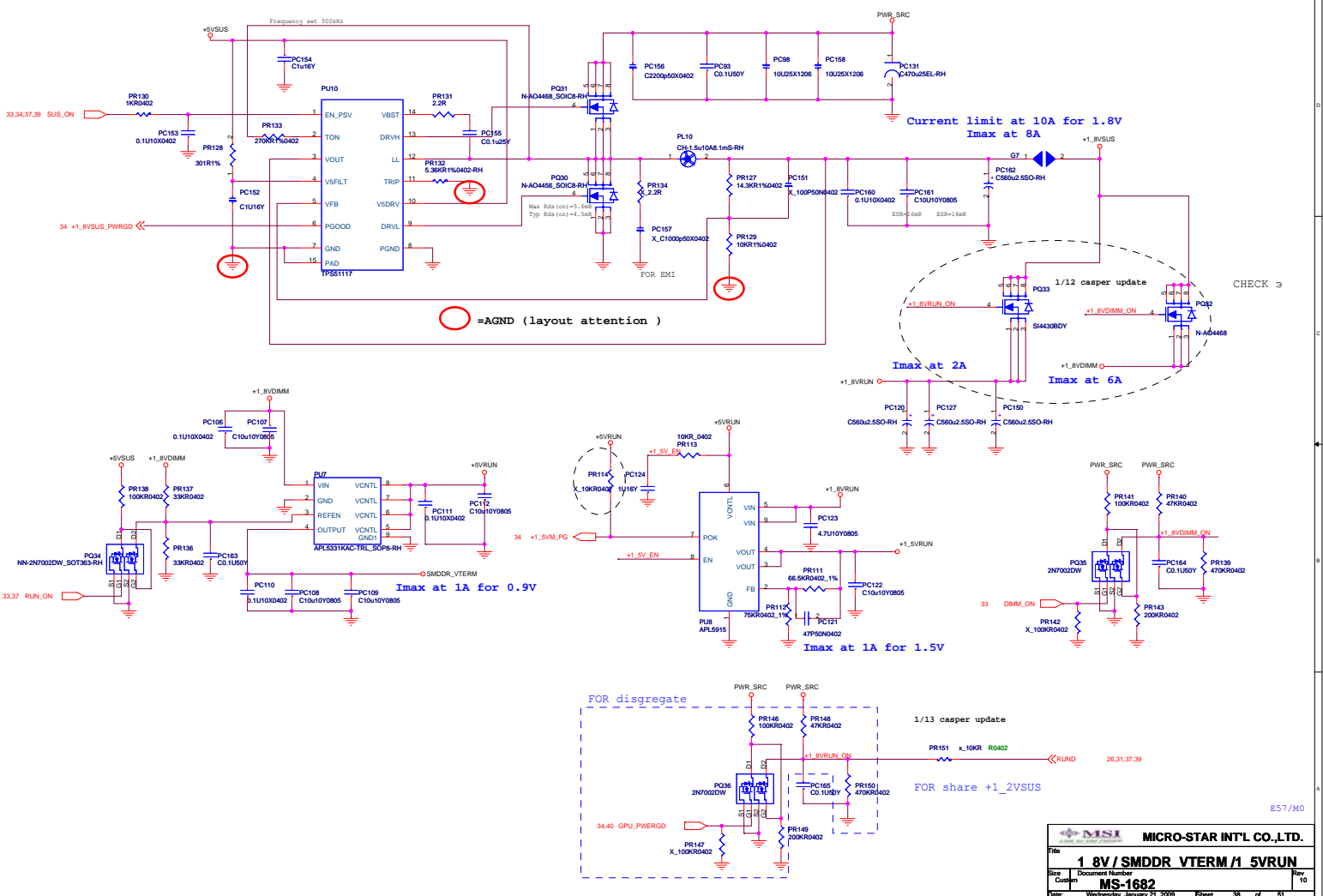
For 3S3P:  
 $V_{c1t1} = 5.4 * PR48 / (PR48 + PR93)$   
 $= 5.4 * 28.7K / (28.7K + 25.5K) = 2.86V$   
 $I_{charge} = (2.86 / 3.18) * (0.075 / 0.015) = 4.5A$

For Precharge:  
 $V_{c1t1} = 5.4 * (PR48 / PR51) / ((PR48 / PR51) + PR93)$   
 $= 5.4 * 0.355K / (0.355K + 25.5K) = 0.074V$   
 $I_{charge} = (0.074mV / 3.18) * (0.075 / 0.015) = 116mA$

| ENCHG-2P | PRE_CHG | ENCHG |                  |
|----------|---------|-------|------------------|
| 0        | 1       | 1     | Pre-charge       |
| 1        | 0       | 1     | 3S2P-Fast charge |
| 0        | 0       | 1     | 3S3P-Fast charge |
| 0        | 0       | 0     | STOP CHARGE      |

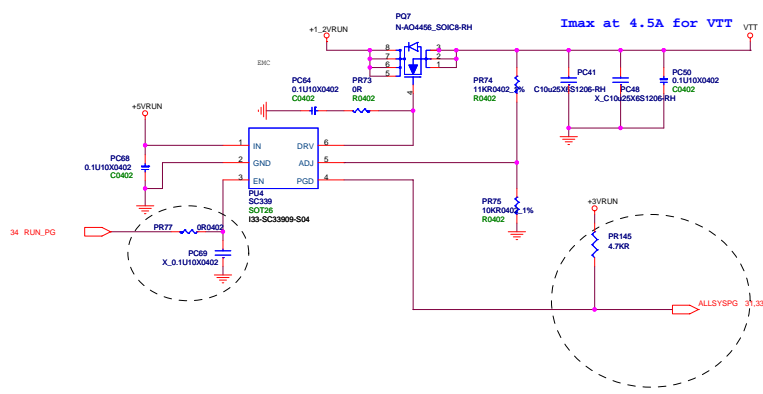
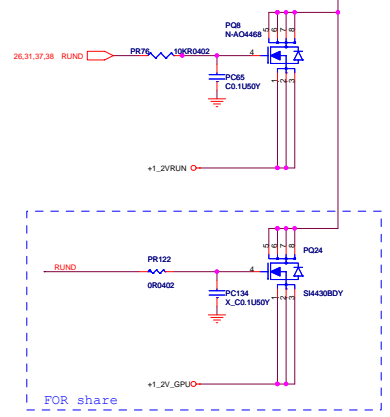
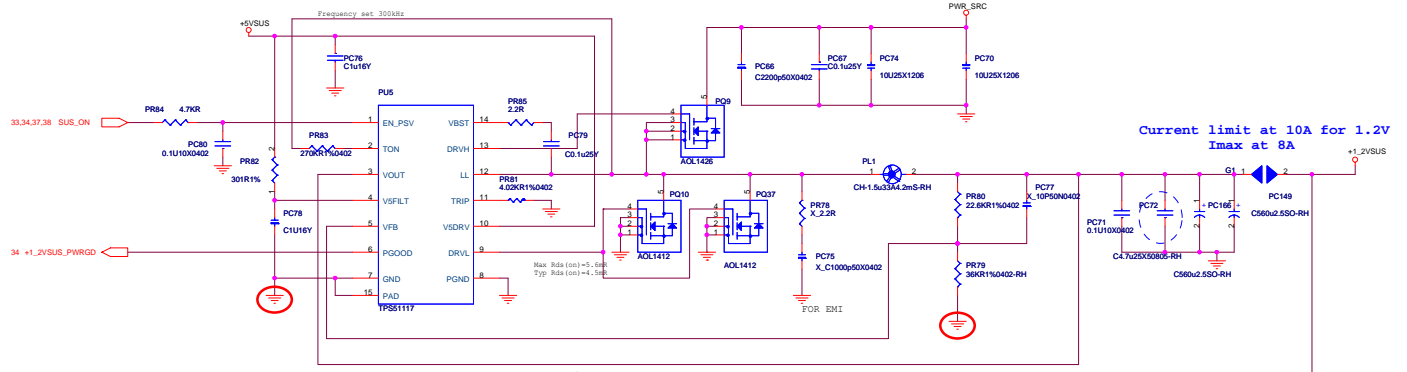
**MICRO-STAR INT'L CO.,LTD.**  
 File: **Battery Charger** E51/M0  
 Size: Custom Document Number: **MS-1682** Rev: 10  
 Date: Wednesday, January 21, 2009 Sheet: 35 of 51



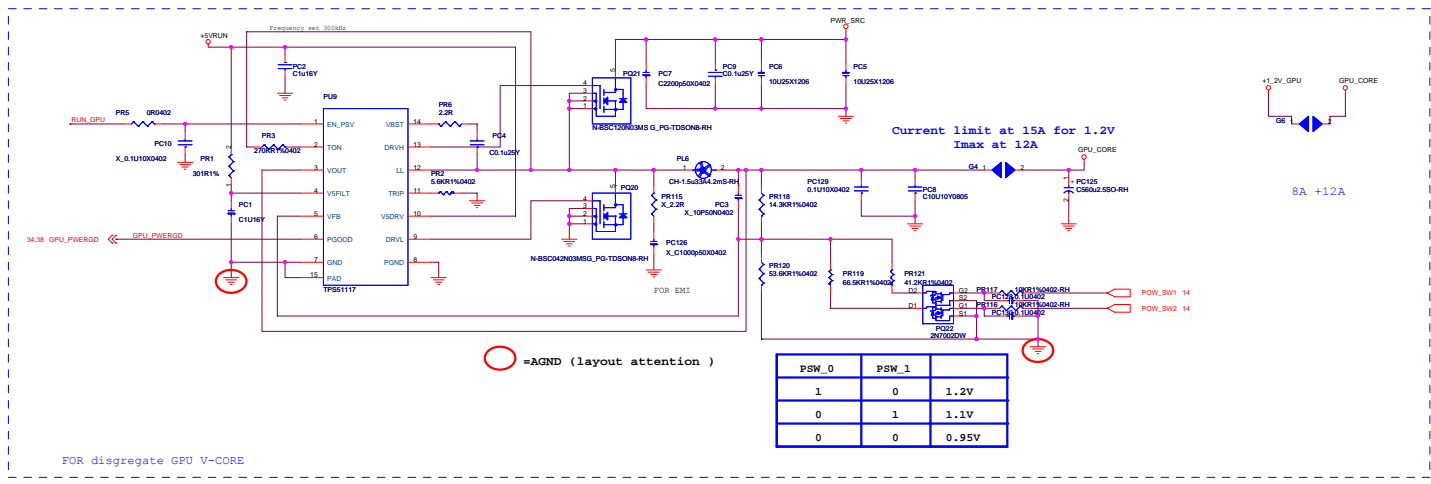


E57/H0

|            |                             |                                  |          |
|------------|-----------------------------|----------------------------------|----------|
| <b>MSI</b> |                             | <b>MICRO-STAR INT'L CO.,LTD.</b> |          |
| File       | 1.8V / SMDR_VTERM / 1.5VRUN |                                  |          |
| Size       | Document Number             | MS-1682                          |          |
| Customer   |                             |                                  |          |
| Date       | Wednesday, January 21, 2009 | Sheet                            | 33 of 51 |

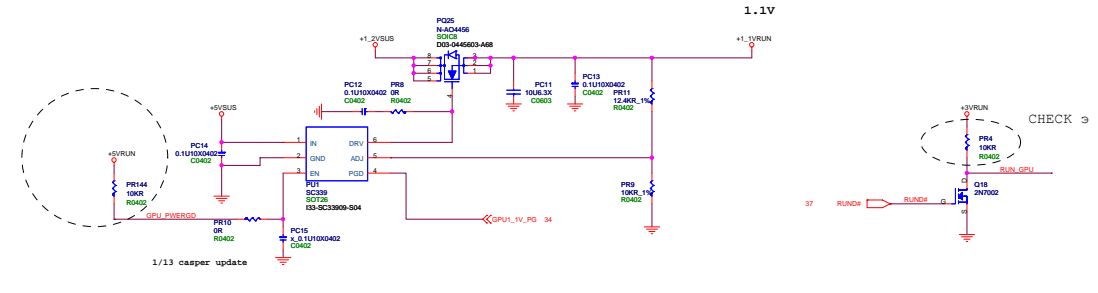
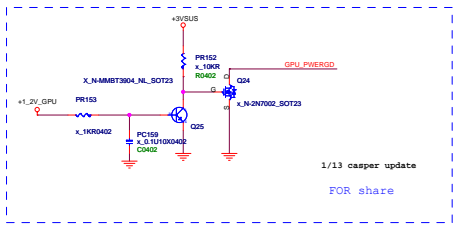


|            |                             |                                  |                |
|------------|-----------------------------|----------------------------------|----------------|
| <b>MSI</b> |                             | <b>MICRO-STAR INT'L CO.,LTD.</b> |                |
| Title      | <b>1.2V &amp; VTT</b>       |                                  | E38 / M0       |
| Size       | Document Number             |                                  | Rev            |
| Custom     | <b>MS-1682</b>              |                                  | 10             |
| Date       | Wednesday, January 21, 2009 |                                  | Sheet 93 of 91 |



| PSW_0 | PSW_1 | Output Voltage |
|-------|-------|----------------|
| 1     | 0     | 1.2V           |
| 0     | 1     | 1.1V           |
| 0     | 0     | 0.95V          |

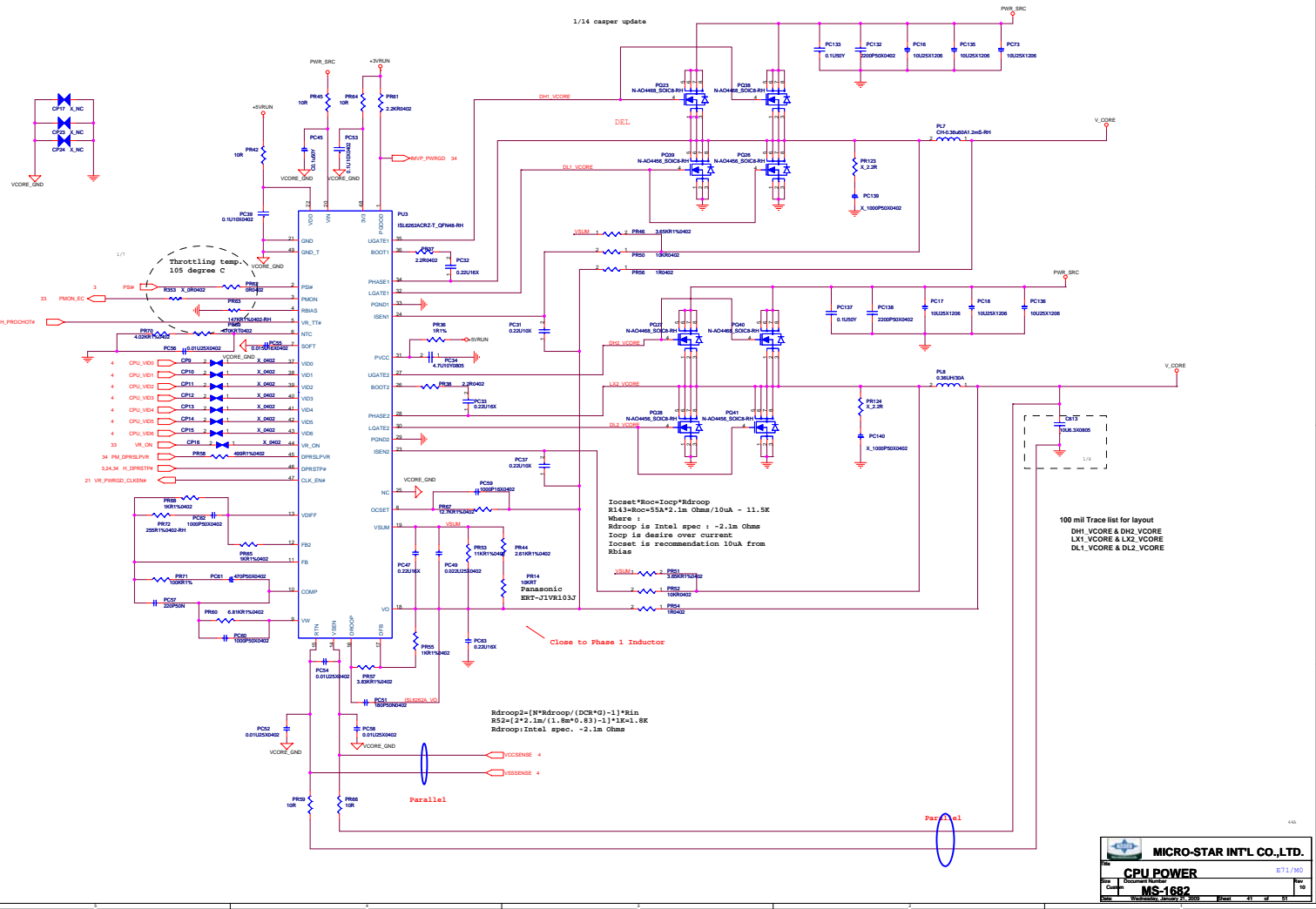
○ =AGND (layout attention)



|      |                      |               |
|------|----------------------|---------------|
| File | <Title>              | E417/00       |
| Size | Document Number      | M5-1682       |
| Rev  | Rev                  | 0000          |
| Date | Wed 04/20/2011 10:00 | Page 40 of 51 |



1/14 casper update



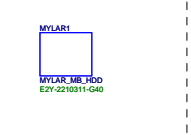
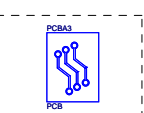
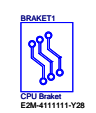
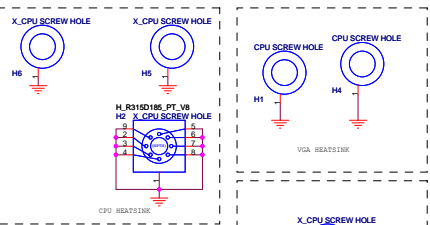
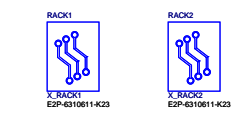
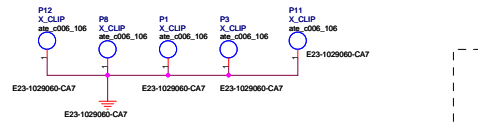
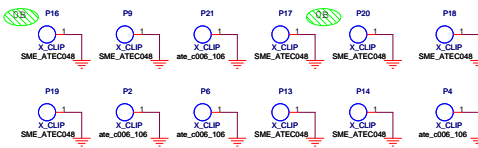
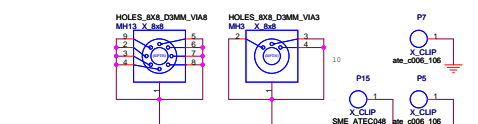
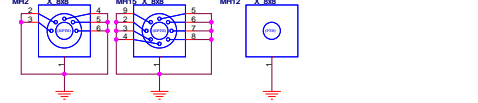
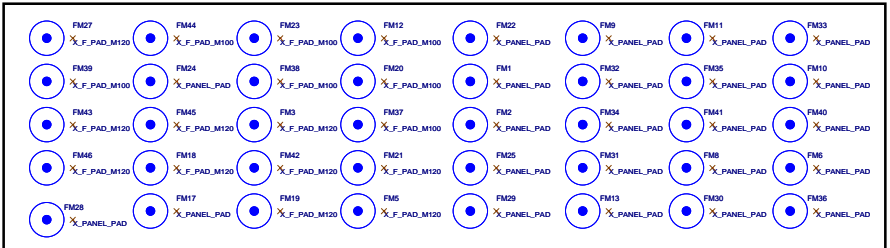
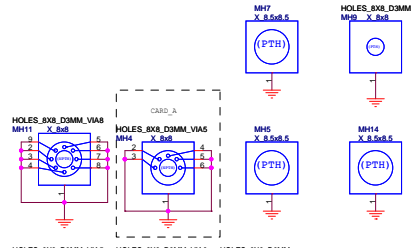
Throttling temp.  
105 degree C

$I_{ocset} = I_{oc} \times I_{ocp} \times R_{idrop}$   
 $R_{idrop} = 55A \times 2.1m \text{ Ohms} / 10uA = 11.5k$   
 Where :  
 $R_{idrop}$  is Intel spec : -2.1m Ohms  
 $I_{ocp}$  is desire over current  
 $I_{ocset}$  is recommendation 10uA from BIOS

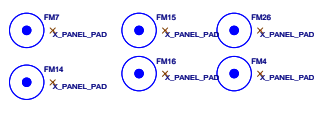
$R_{idrop2} = (N \times R_{idrop}) / (DCR \times 10^{-4}) \times R_{in}$   
 $R_{idrop2} = (2 \times 11.5k) / (1.5m \times 10^{-4}) \times 1k = 1.5k \times 1k = 1.5M \text{ Ohms}$   
 $R_{idrop}$ : Intel spec. - 2.1m Ohms

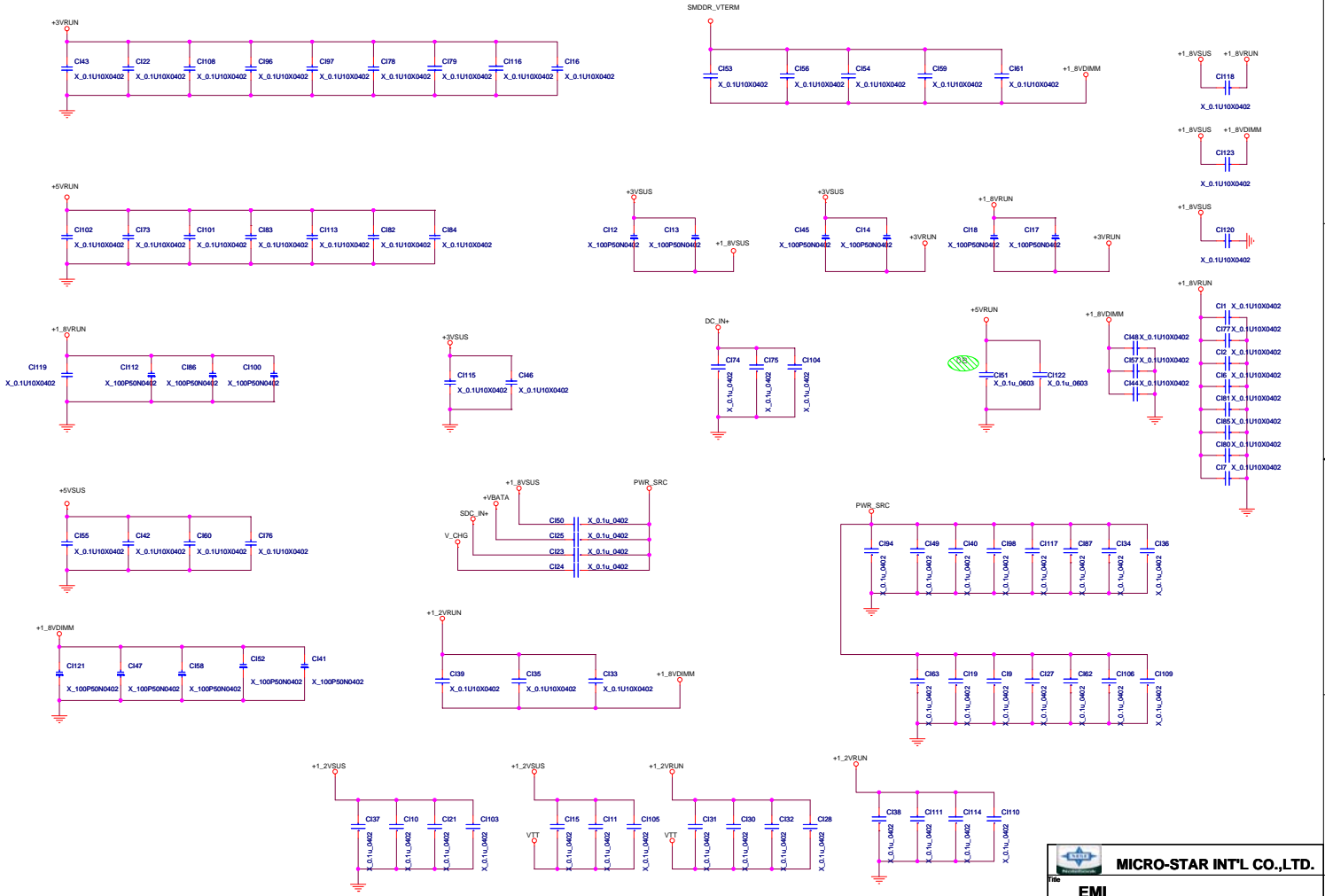
100 mil Trace list for layout  
 DH1\_VCORE & DH2\_VCORE  
 LX1\_VCORE & LX2\_VCORE  
 DL1\_VCORE & DL2\_VCORE

|                                   |          |
|-----------------------------------|----------|
| <b>MICRO-STAR INT'L CO., LTD.</b> |          |
| <b>CPU POWER</b>                  |          |
| Rev: 1.0                          | E71/A0   |
| MS-1682                           |          |
| Doc: MS-1682-000                  | Rev: 1.0 |

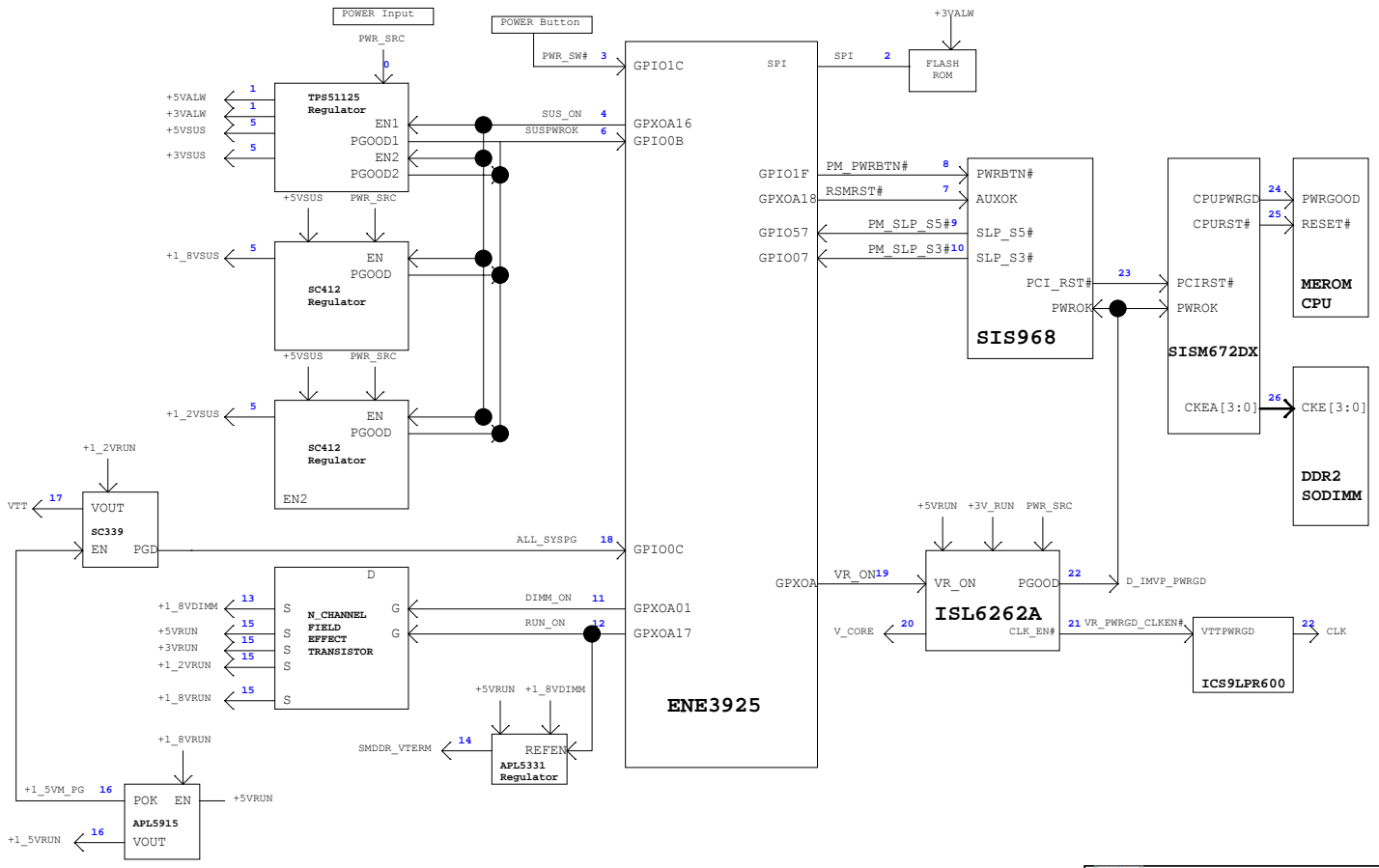


P30-1682128-H73, 墊 (銅珠/螺絲仁) -  
 P30-1682128-D05, 彈 ( ) 彈 簧



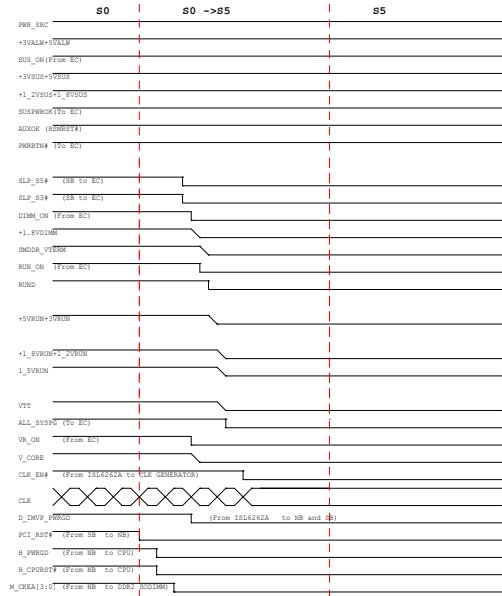
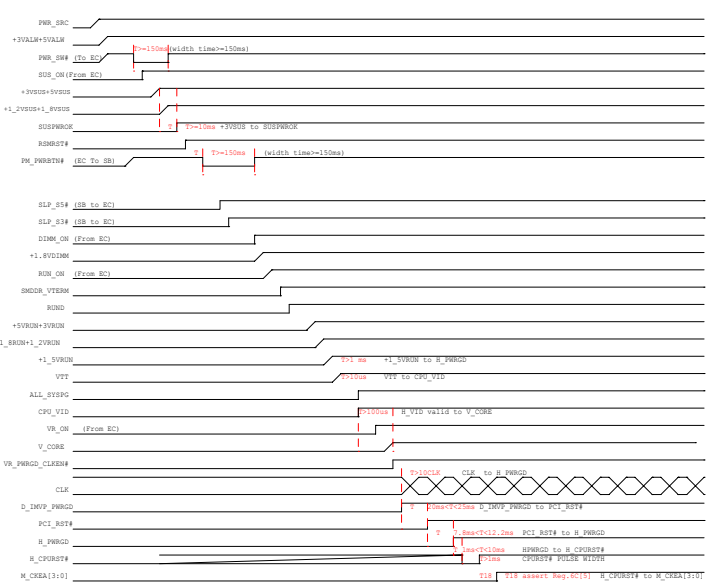



|          |                             |
|----------|-----------------------------|
|          |                             |
| File     | <b>FMI</b>                  |
| Size     | Document Number             |
| Customer | <b>MS-1682</b>              |
| Date     | Wednesday, January 21, 2009 |
| Sheet    | 43 of 51                    |
| Rev      | 0A                          |



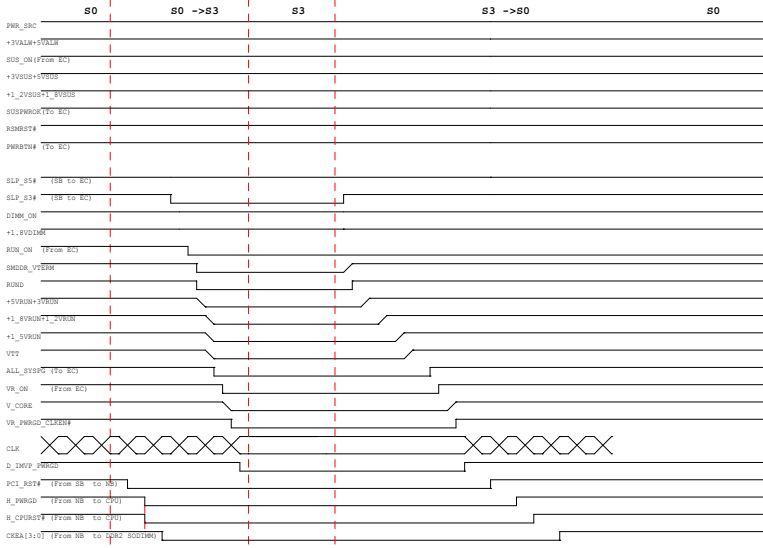
AC S5-S0  
EC programming timing  
SiSM672FX + 968 timing SPEC

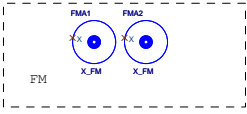
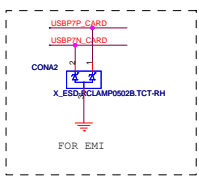
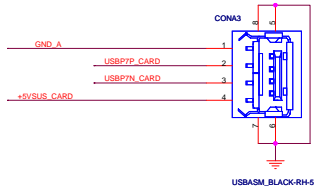
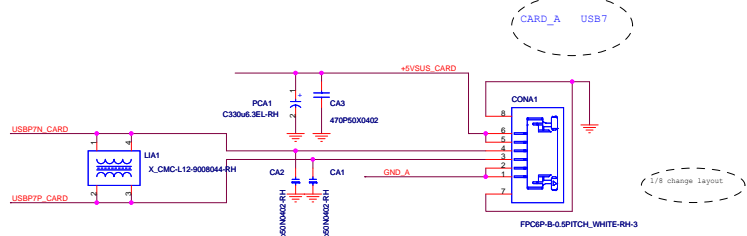
AC S0-S5  
EC programming timing  
SiSM672FX + 968 timing SPEC



|  |                  |                           |                             |
|--|------------------|---------------------------|-----------------------------|
|  |                  | MICRO-STAR INT'L CO.,LTD. |                             |
| File   | Power Sequency-2 |                           |                             |
| Size   | Document Number  | MS-1682                   |                             |
| Customer   | Date             |                           | Wednesday, January 21, 2009 |
| Sheet  |                  | 45                        | of 51                       |
| Rev  |                  | 0A                        |                             |

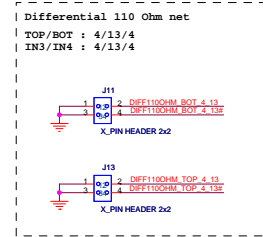
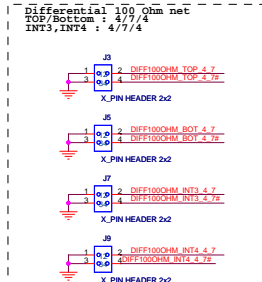
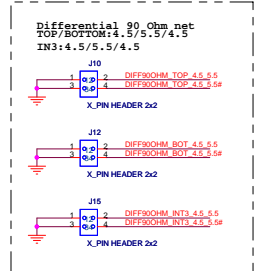
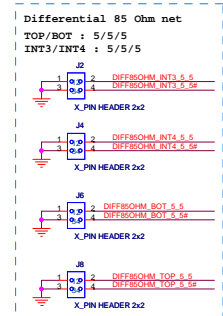
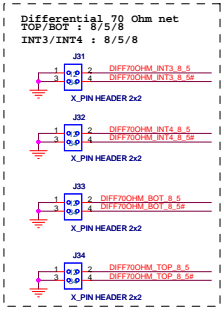
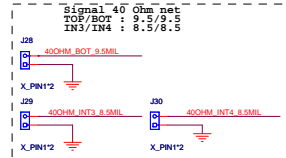
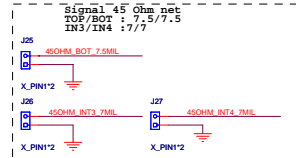
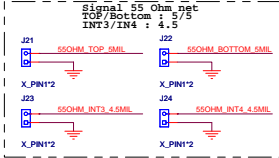
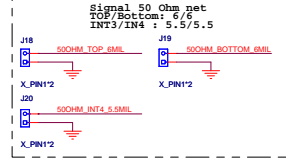
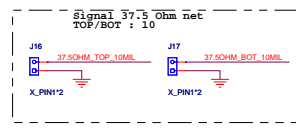
AC S0-S3-S0  
 EC programming timing  
 SiSM672FX + 968 timing SPEC





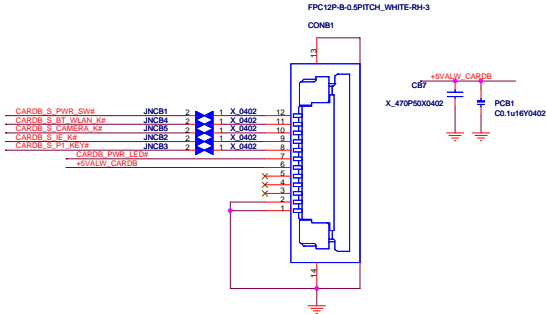
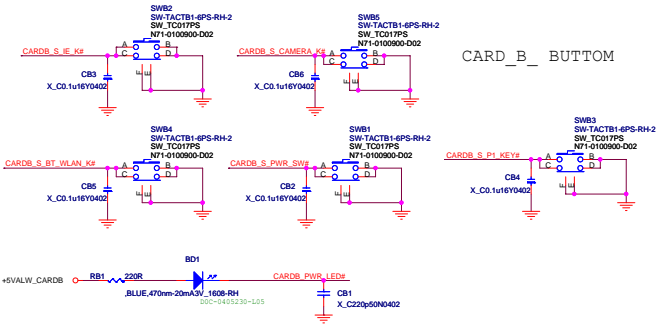
P30-1682A0B-H73, 胜 痲缺(履集亡)  
P30-1682A0B-D05, 線( )線 喇),

|                                  |   |
|----------------------------------|---|
| <b>MICRO-STAR INT'L CO.,LTD.</b> |   |
| <b>Title</b>                     | <b>USB Board</b> <span style="float: right;">E5/M0</span>                     |
| <b>Size</b>                      | Custom  |
| <b>Document Number</b>           | <b>MS-16821A</b> <span style="float: right;">Rev 0A</span>                    |
| <b>Date</b>                      | Wednesday, January 21, 2009 <span style="float: right;">Sheet 47 of 51</span> |

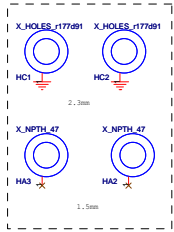




# CARD\_B\_ BUTTOM



F30-1682B0B-H73, 胜 痴缺 (履集仁)  
F30-1682B0B-D05, 纜 ( ) 纜 喇),



|        |                             |                                  |          |
|--------|-----------------------------|----------------------------------|----------|
|        |                             | <b>MICRO-STAR INT'L CO.,LTD.</b> |          |
| File   |                             | E10/M0                           |          |
| Title  |                             | <b>Button Board</b>              |          |
| Size   | Document Number             | Rev                              |          |
| Custom |                             | <b>MS-16821B</b>                 |          |
| Date   | Wednesday, January 21, 2009 | Sheet                            | 49 of 51 |

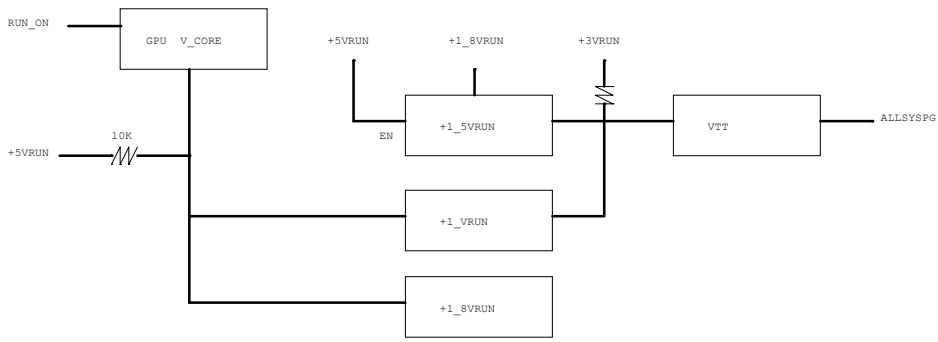
0A -- 0B Note

MS-1682

P03, C579 INSTALL by SA BUG ,R41 CHANGE F/P TO R0603  
 P04, C639,C623,C612,C640,C624 INSTALL X5R  
 P06, R322 INSTALL  
 P07, R177,R171 CHANGE 36R , R170,R176 CHANGE 40.2R ,JNC70,JNC75 CHANGE F/P TO NC\_0603  
 P14, R124,R125,R301 CHANG JNC81,JNC82,JNC83 AND INSTALL , R67,R68 DEL ,ADD PR135,RN28,JNC80,R346 ,R346 CHANGE F/P TO R0603, U5 PIN 8 ,7 CHANGE NET NAME ,JNC29 &R85 CHANGE  
 P15, C50 INSTALL  
 P16, R52,R246 INSTALL ,R51,R242 DON'T INSTALL  
 P18, R225,R227,R13,R14 CHANGE 499R  
 P19, R223,R224,R12,R11 CHANGE 499R  
 P20, CHANGE U15 FOOTPRINT TO " SOT23\_5\_NPC30X " , VGA\_DATA AND VGA\_CLK AND "J38 : PIN 30 "CHANGE TO +3.3V\_DELAY , R232,R233 ,C486,C487,C488 INSTALL  
 P21, RN14 PIN 2,4 SWAP PIN 6,8  
 P22, DEL SPI SKET1,JNC66,JNC67,JNC71,JNC72,CON4 , R318 INSTALL, R317 DON'T INSTALL ,JNC34 ,JNC33 CHANGE F/P TO NC\_0603  
 P23, JNC65,JNC64,JNC59,JNC56,JNC55 INSTALL by SA BUG ,R41 CHANGE F/P TO R0603  
 P26, CN5 CHANGE CAD, CN6 CHANGE LAYOUT AND PIN 6 TO GND  
 P27, DEL D1,D2, R212 CHANGE TO +5VSUS  
 P28, R189 CHANGE 0 Ohm AND INSTALL , CHANGE CON5 PIN 29,20,27 NET NAME, DEL R187,R186 , U12 CHANGE 5159 "B07-0515904-R09 "  
 P29, Y1 CHANGE F/P, U23 NET CHANGE  
 P30, JGFS1 DON'T INSTALL, USIM\_PWR > 25 mils, DEL SW1,SW2,SW3,SW4,JNC1,2,3,4  
 P31, R112,D16 TO ALLSYSFG, R115,C212 NOT INSTALL, R108 INSTALL  
 P32, R290 CHANGE TO 33K ,C622 CHANGE TO 4.7U,CON7 SWAP PIN 1 &PIN 2  
 P33, U20 CHANGE FOOTPRINT SIC8\_SST\_S2A , CN3 CHANGE NEW PN , DEL R346 TO RUN\_PG, U3 PIN 113 CHANGE TO PIN 23 , U3 PIN 98 & PIN 130 SWAP,JNC8 CGANGE R38 , ADD R354 220HM , SW5,SW6 SWAP LAYOUT, YT1 MOVE  
 P34, JNC19 CHANGE R345 DON'T INSTALL ,J37 CHANGE FOOT PRINT  
 P36, PR12 360 CHANGE 620 (R11-0621T12-R01) ( spre-charge current), PR16 9.31K CHANGE 28.7K(R11-2872T12-W08) ( >6-CELL charge current)  
 P37, PR107 CHANGE 10K ,INSTALL PC103  
 P38, ADD PQ36 TO DELAY +1 8VRUN, DEL PR135,PC159 , DON'T INSTALL PR114  
 P39, PU4 PIN4 TO ALLSYSFG ,PR77 CHANGE 0 Ohm, PC69 DON'T INSTALL ,PC72 10uF CHANGE 4.7uF(C11-4753014-W08) ( >jitter)  
 P40, PR4 CHANGE TO 10K Ohm ,PR63 147 CHANGE 147K(R11-1473T12-Y01) ,ADD GPU\_PWERGD NET WAY  
 P41, PR63 CHANGE TO 147K Ohm , ADD R353 DON'T INSTALL ,C613 INSTALL  
 P42 , H1:P30 , MH1:CHANGE TO 5020  
 P47 , CONA1 CHANGE LAYOUT

JNC21, JNC80 齐全  
 ADD PR144 TO +5VRUN #check  
 ADD PR145 TO +3VRUN #check

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