

MS-7668 Ver:1.0

CPU:

INTEL - Lynnfield/ Clarkdale LGA 1156

System Chipset:

INTEL-IBEXPEAK PCH (P - 55)

OnBoard Chipset:

Clock Gen:ICS 4105B

IDE X1 MARVEL9128

HD Audio Codec:ALC892

LAN:RTL8111D 10/100/1000

SIO:F71889

Flash ROM: 32 Mb SPI (CHIP)

Main Memory:

DDRIII (800/1066/1333MHz) * 4 (Dual Channel)

Expansion Slots:

PCI Express (X16) Slot * 2

PCI Express (X1) Slot * 2

PCI Slot *3

PWM:

Controller: uP6206

(3-Phase use STD MOS -- 95W)

OV by uP6264 or SIO

uP6103 (CPU_VTT)

Linear (PCH)

uP6103(DDR)

GPU Power -ISL6314

ACPI: uPI+SIO

Other:

SATA(SATA2-300MB/s) *6

USB2.0 *10 (Rear*4 / Front*6)

PRINT Header *1

COM pin header *2

TPM Header *1

on BOARD BUZZER

D-SUB *1

DVI PORT*1

HDMI PORT*1

BOM SKUs

H55:chiset

S:solid cap

EL:EL cap

G:giga lan 8111DL

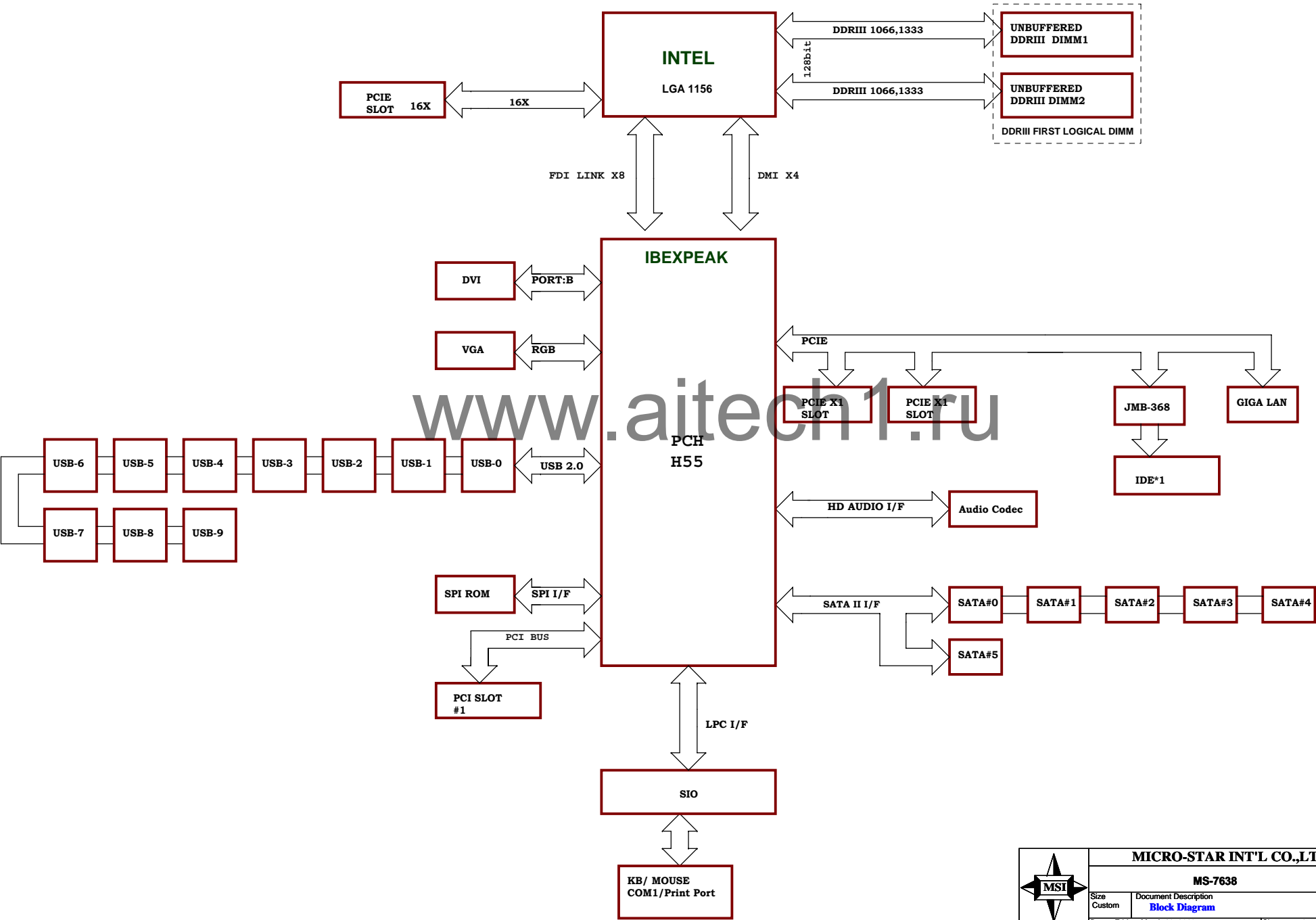
M:Miga lan 8103EL

6: 6 ports

DVI: DVI Stuff

| | | |
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| MS-7638 | | |
| Size Custom | Document Description Cover Sheet | Rev 10 |
| Date: Friday, March 19, 2010 | Sheet 1 of 38 | |

| Title | Page |
|---|------------|
| Cover Sheet | 1 |
| Block Diagram/Device Map/GPIO Table/history | 2, 3, 4, 5 |
| CPU-CLK/Control/MISC/PEG ,CPU-Memory | 6 ,7 |
| CPU-Power,CPU-GND | 8 ,9 |
| DDR III DIMM 1 / 2 | 10,11 |
| CLK GEN ICS4105 | 12 |
| PCH-PCI-E/PCI/DMI/USB/CLK | 13 |
| PCH-SATA/HOST/FAN/GPIO/Display | 14 |
| PCH-SMB/LPC/AUDIO/RTC/SPI/JTAG/RST | 15 |
| PCH-POWER,GND/NVRAM | 16,17 |
| SIO-Fintek F71889ED/Print Port/COM1 | 18 |
| PCIE x16 & x1, x1 Slots | 19 |
| PCI SLOT | 20 |
| LAN-RTL8111DL | 21 |
| Audio Codec ALC889 | 22 |
| 23 MARVELL SATA3.0 IDE X1 | 23 |
| VGA - D-Sub | 24 |
| DVI-D | 25 |
| SATA conn / FAN Control | 26 |
| USB | 27 |
| ATX F_Panel/EMI/TPM/Buzzer/KB | 28 |
| ACPI Controller (uPI solution) | 29 |
| DDR Power - uP6103 1-Phase | 30 |
| PCH Power - 1P05-Linear | 31 |
| CPU_VTT Power - uP6103_1 Phase | 32 |
| GPU Power -ISL6314_1-Phase | 33 |
| CPU Power - uP6206 3-Phase | 34 |
| 36 VIA6315N 1394 | 35 |
| Manual & Option parts | 36 |
| | |
| | |
| | |
| | |



DDR DIMM config.

| Device | Address | Clock |
|-----------|-----------|------------------------|
| CHA DIMM1 | 10100001B | MEM_MA_CLK_H0/L0 H1/L1 |
| CHB DIMM2 | 10100000B | MEM_MB_CLK_H0/L0 H1/L1 |

PCI Config.

| DEVICE | MCP1 INT Pin | REQ#/GNT# | IDSEL | CLOCK |
|------------|--|------------------------|-------|----------------------|
| PCI Slot 1 | PCI_INT#A PCI_INT#B PCI_INT#C PCI_INT#D | PCI_REQ0# PCI_GNT0# | AD16 | PCH CLKOUT_PCI<0> |
| TPM | | | | PCH CLKOUT_PCI<3> |
| SIO | | | | PCH CLKOUT_PCI<2> |

TABLE 9↓
USB PORT MAPPING (SUBJECT TO CHANGE)

| Controller | Port | Destination | Fused | ESD Pads | Bulk Cap | Over-Current Detection |
|------------------|---------|--------------------------------|-------|----------|----------|------------------------|
| UHCI #1, EHCI #1 | Port 0 | Internal (Ready Boost - P151) | Yes | Yes | No | Yes |
| | Port 1 | Internal (Ready Boost - P151) | Yes | Yes | No | Yes |
| UHCI #2, EHCI #1 | Port 2 | Internal (Media Reader - P150) | Yes | Yes | No | Yes |
| | Port 3 | Internal (Media Reader - P150) | Yes | Yes | No | Yes |
| UHCI #3, EHCI #1 | Port 4 | Front I/O | Yes | Yes | No | Yes |
| | Port 5 | Front I/O | Yes | Yes | No | Yes |
| UHCI #4, EHCI #2 | Port 6 | Front I/O | Yes | Yes | Yes | Yes |
| | Port 7 | Front I/O | Yes | Yes | Yes | Yes |
| UHCI #5, EHCI #2 | Port 8 | Rear I/O | Yes | Yes | Yes | Yes |
| | Port 9 | Rear I/O | Yes | Yes | Yes | Yes |
| UHCI #6, EHCI #2 | Port 10 | Rear I/O | Yes | Yes | Yes | Yes |
| | Port 11 | Rear I/O | Yes | Yes | Yes | Yes |
| UHCI #7, EHCI #2 | Port 12 | Rear I/O | Yes | Yes | Yes | Yes |
| | Port 13 | Rear I/O | Yes | Yes | Yes | Yes |

PCI RESET DEVICE

| IBEXPEAK | |
|-------------|--------------|
| Signals | Target |
| PCIRST#_PCH | PCISLOT1 |
| PLTRST_BU1# | JMB368 IDE |
| PLTRST_BU2# | PCIE*16 / *1 |
| PLTRST_BU3# | LAN&TPM |
| PLTRST# | SIO |



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MS-7638

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|------------------------------|------------------------------------|--------|
| Size Custom | Document Description Device Map | Rev 10 |
| Date: Friday, March 19, 2010 | Sheet 3 of 38 | |

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History

- 1.2009-10-13 Change VCC_SENSE to CPU_VCC_SENSE
- 2.2009-10-13 Add HDMI circuit,change USB circuit,JSP1 circuit update
- 3.2009-10-13 update NCT3016 circuit ,add VTIN3 circuit for VRM MOS
- 4.2009-10-18 Add C589 C590
- 5.2009-10-18 Add R561 R562 For HDMI HPDET
- 6.2009-10-20 Add R602,Swap HDMI wire for layout
- 7.2009-10-21 NCT3016 circuit update:add R637 Q65 R592,Change U27 pin16 tp NCT_GPIO16,delete C121
- 8.2009-10-21A NCT3016 citcui update:add Q85,chang SATA1&SATA2 to SATA1_2
- 9.2009-10-23 change JUSB2 & JUSB1 for layout
- 10.2009-10-23A NCT3016 circuit update:add R850
- 11.2009-10-24 delete VCCGATE and DUALGATE circuit
- 12.2009-10-26 delete C534
- 13.2009-10-26 Swap RN40

change to MS-7638-0A

- 1. 2009-11-09 添加1394---VIA 6315N
- 2. 2009-11-09 EUP-改用F71889ED
- 3. 2009-11-09 Page23 添加SATA3.0-23 MARVELL
- 4. 2009-11-09 Page36 去除debug port 预留
- 5. 2009-11-09 添加PCIE 4X slot
- 6. 2009-11-09 添加两个PCI slot
- 7. 2010-01-04 Power solution:
R7=21K(R11-0213T13-W08)
R110=34k(R11-0343T13-W08)
R18=R51=R71=51.1K(R11-5112T12-W08, ocp=108a)
R48=13K (R11-0133T23-W08, thermal balance)
R364=43.2K(R11-4322T12-W08, GPU_CORE Droop)
- 8. 2010-01-11 C601改top層，並上件
Add HDA co-lay PCIEx1,add R840 R841 RN40
Remove BUZ1
- 9. 2010-01-11 JPW1&JBAT1的料號請更換成N41-1030141-H06
- 10.2010-01-11 R693上件
- 11.2010-01-13 Remove C179 for SI VGA
- 12.2010-01-13 R208 change to 330ohm for SI HDMI
- 13.2010-01-13 预留R842位置
- 14.2010-01-18 L3/L4/L5上件120nH, C157/C165/C169上件20p for EMI
- 15.2010-01-18 C337上件0.1u, C102/ C99/ C148/ C186上件0.1u, C412/C414/C419上件10p for EMI
- 16.2010-01-18 stuff R189,Q30 ,Remove D4 for SI
- 17.2010-01-18 stuff R536 R684 R690 Q74 Q76 Q82 Q83 for F71889ED LAA
- 18.2010-01-18 Remove R530 R545 R650 R683 R688 for F71889ED LAA
- 19.2010-01-18 ADD R844 C605,change R276(10K) R697(10R)for F71889ED LAA
- 19.2010-01-18 ADD R88 R247,Remove R91 R246 R810 R818 for F71889ED LAA

CHANGE TO MS-7668-0A

2個PCI-Ex16 做成16/0 or 8/8
H55 CHANGE TO P55
ADD USB3.0 SATA6G
REMOVE JMB368

CHANGE TO MS-7668-1.0

- 1. 2010-03-19 USB3.0 ESD D0G-05A0500-N47 footprint XSON10 change to ESD_2_5X1
- 2. 2010-03-19 change USB3.0 power OC pull high to 3VSB
- 3. 2010-03-19 R762 change to 20K
- 4. 2010-03-19 PCI_E4换成低耳扣的N11-1640961-L06
- 5. 2010-03-19 R50 change to 15.4K
- 6. 2010-03-19 C527上件C11-1067014-T04 (X5R)
- 7. 2010-03-19 PS2改上SPDIF,N58-09F0091-A10
- 8. 2010-03-19 R762 change to 0K,Q61 change to 7002
- 9. 2010-03-22 KB_SPDIFO2A change to KB_SPDIFO1A
- 10. 2010-03-22 R190 change to 20Kohm
- 11. 2010-03-22 R44,R219 change footprint to 0603
- 12. 2010-03-22 SWAP RN1.3-> MSDAT RN1.1-> MSCLK
- 13. 2010-03-23 Change IDE connect REF IDE2 to IDE1
- 14. 2010-03-24 RESERVER NEC_3VSB control to SLP_S4#
- 15. 2010-03-24 USB3_0 ESD D0G-05A0500-N47 lab change

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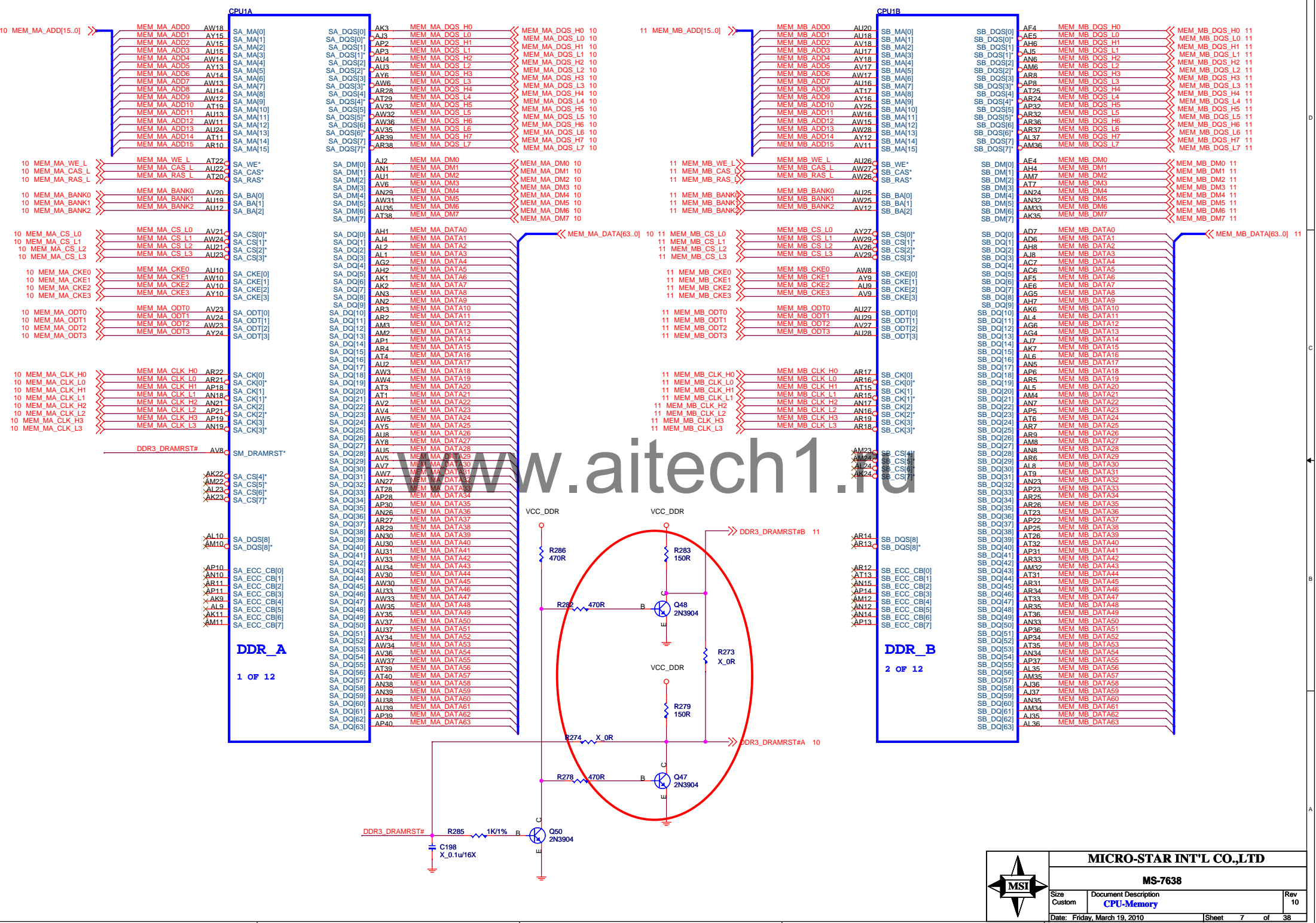


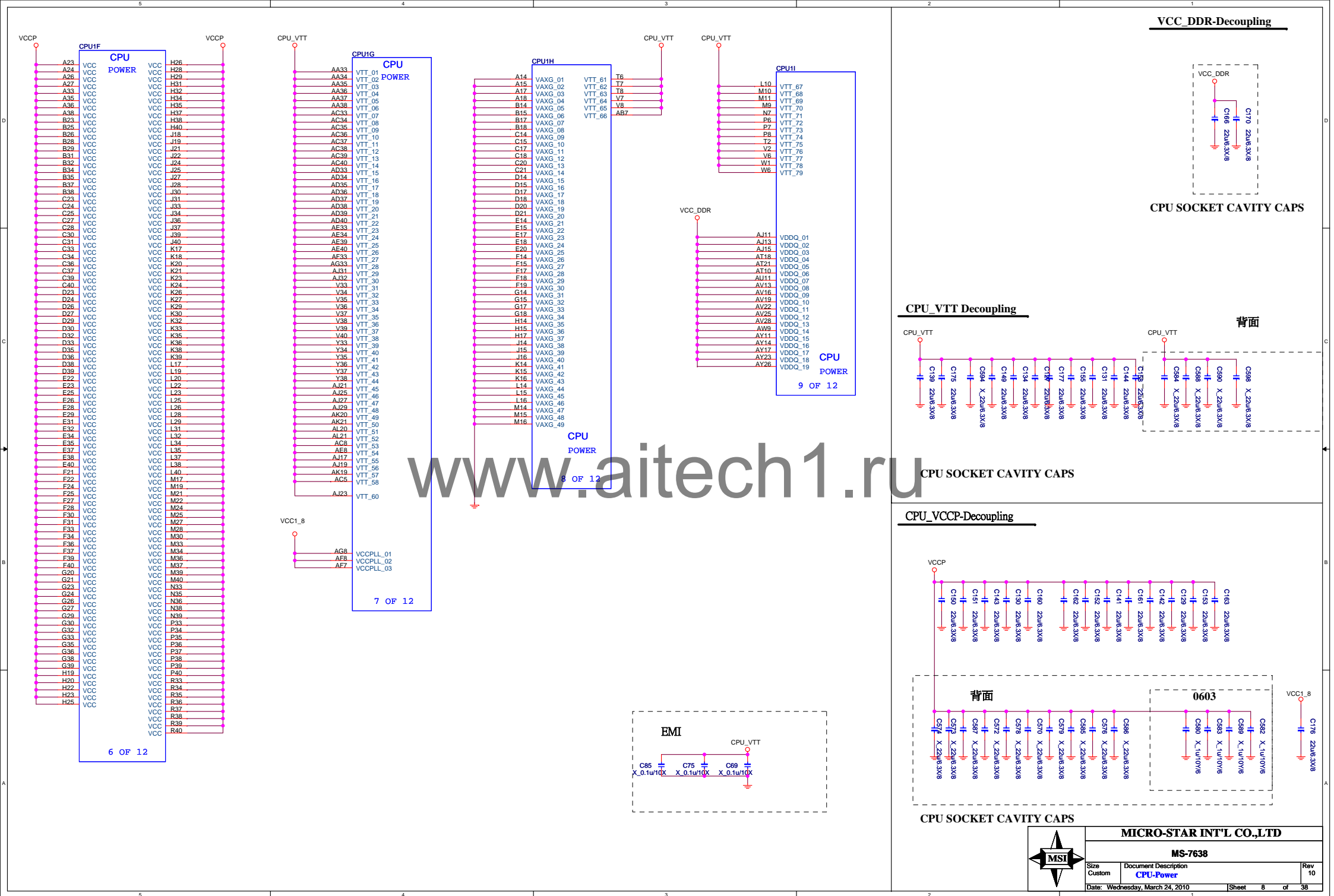
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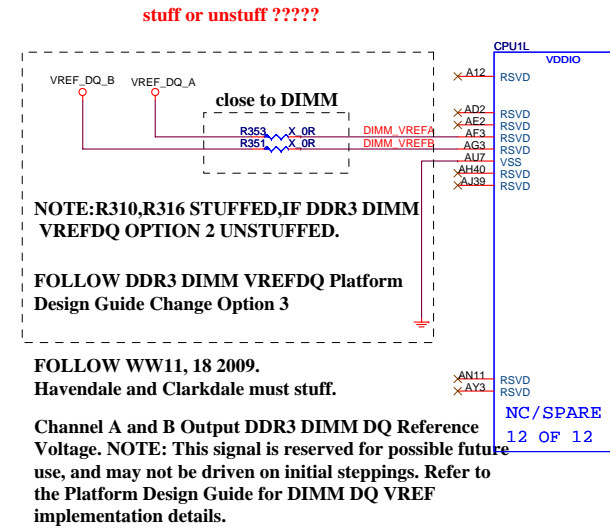
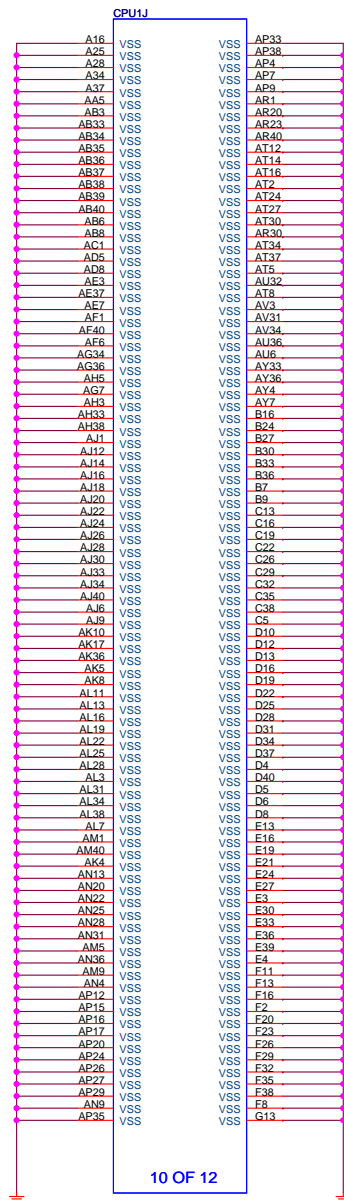
MS-7638

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| Size Custom | Document Description CPU-CNTL/CLK/MISC | Rev 10 |
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Date: Friday, March 19, 2010 Sheet 6 of 38

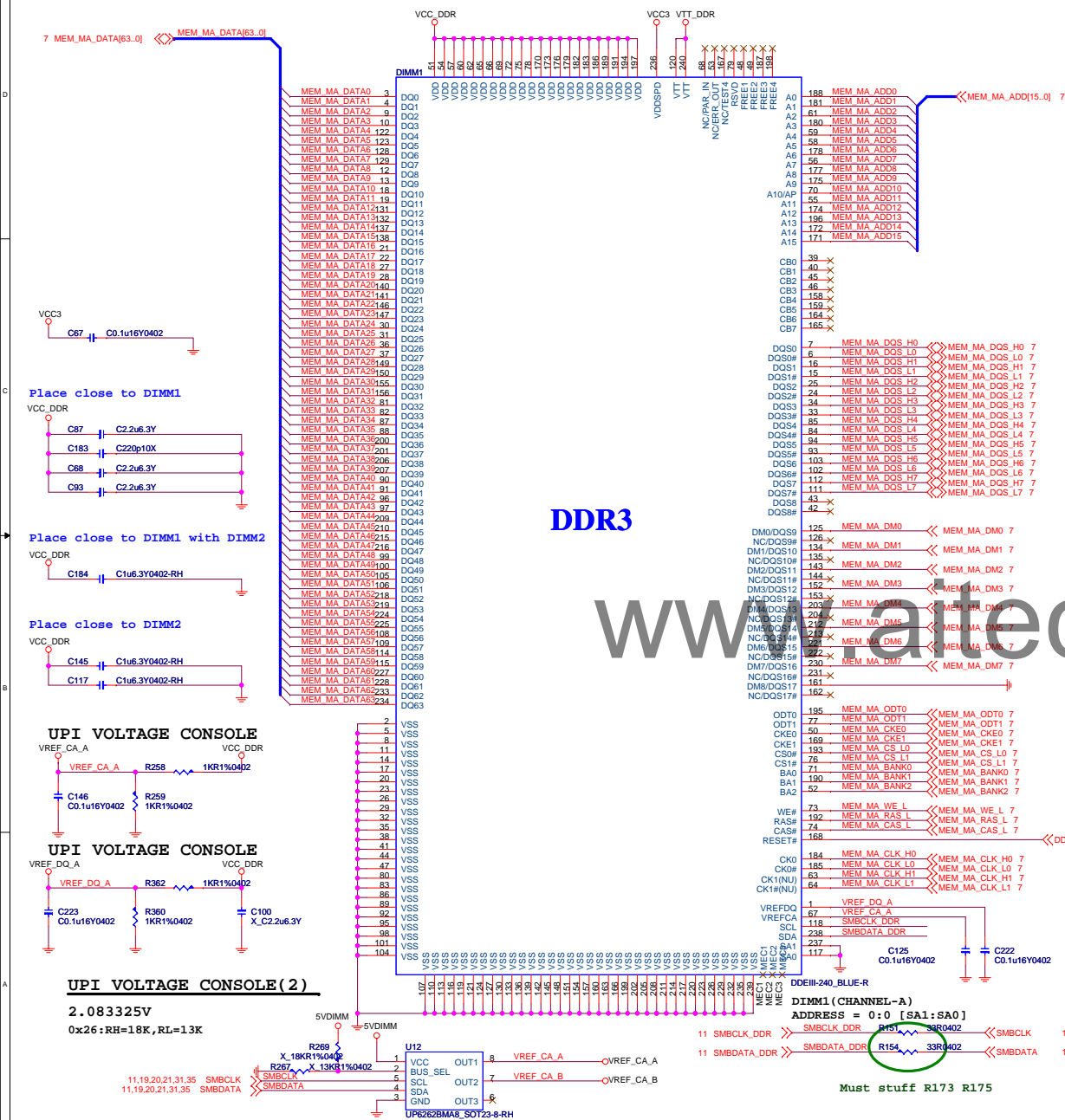




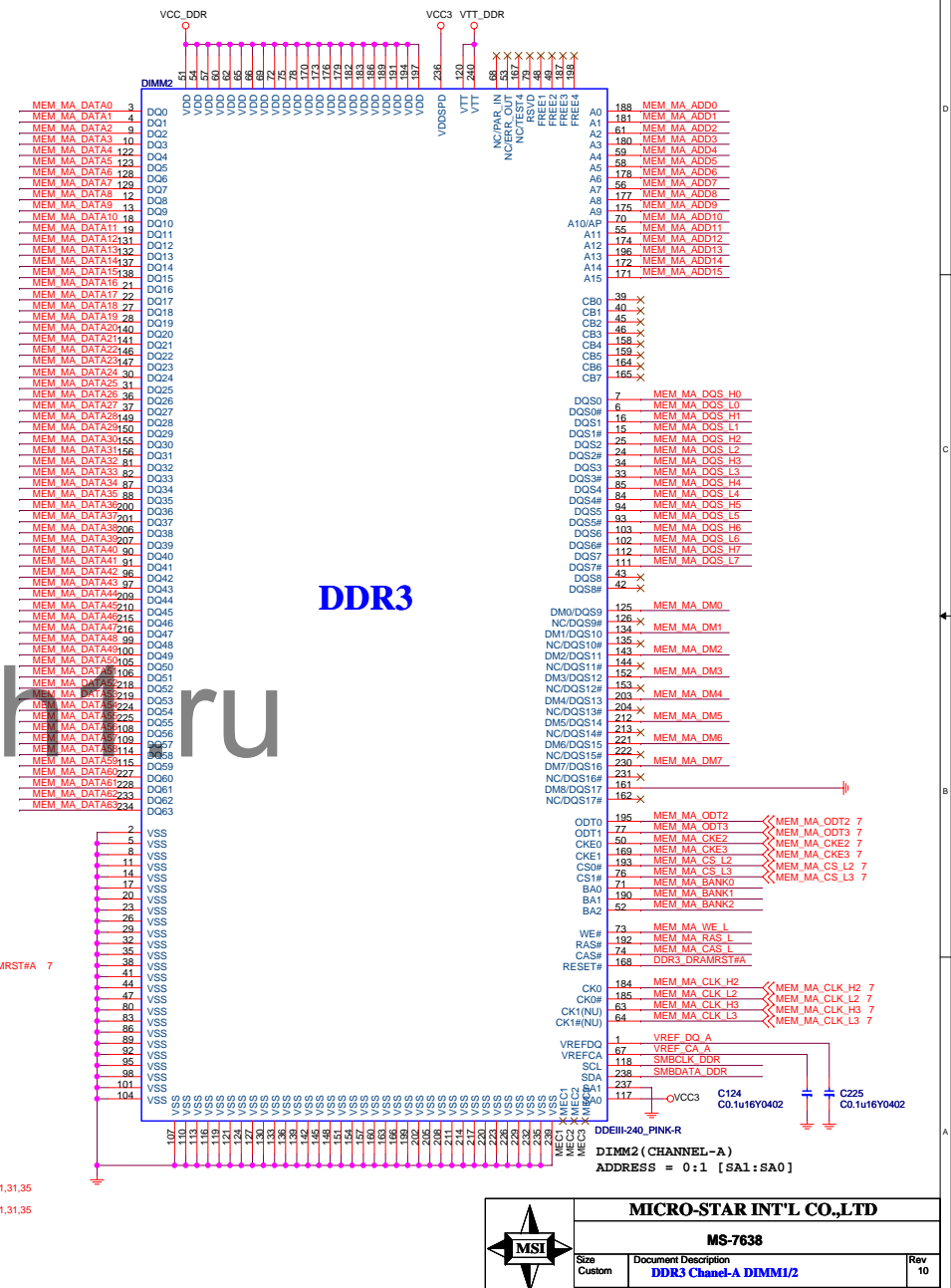


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DDRIII DIMM_A1



DDRIII DIMM_A2



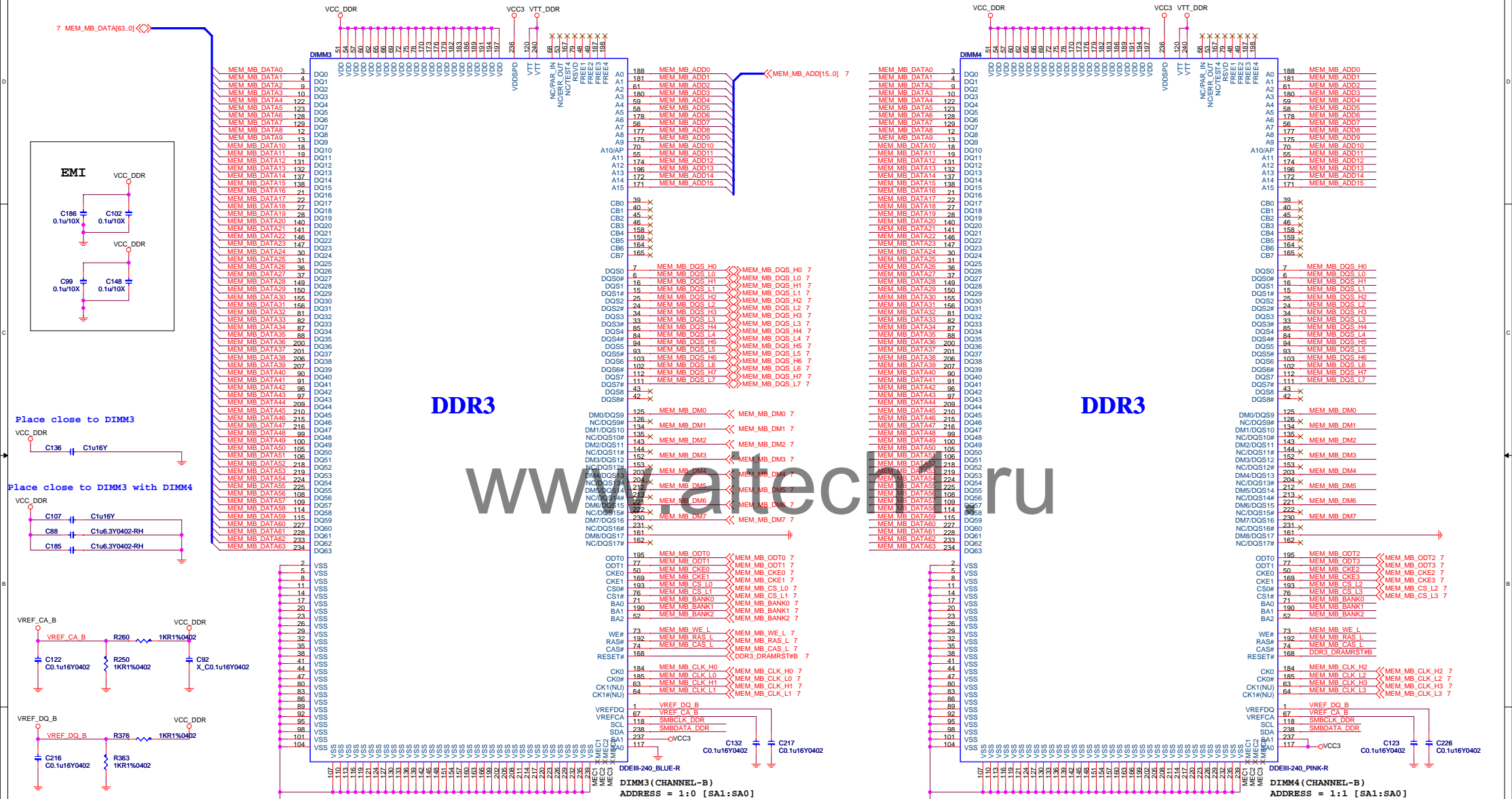
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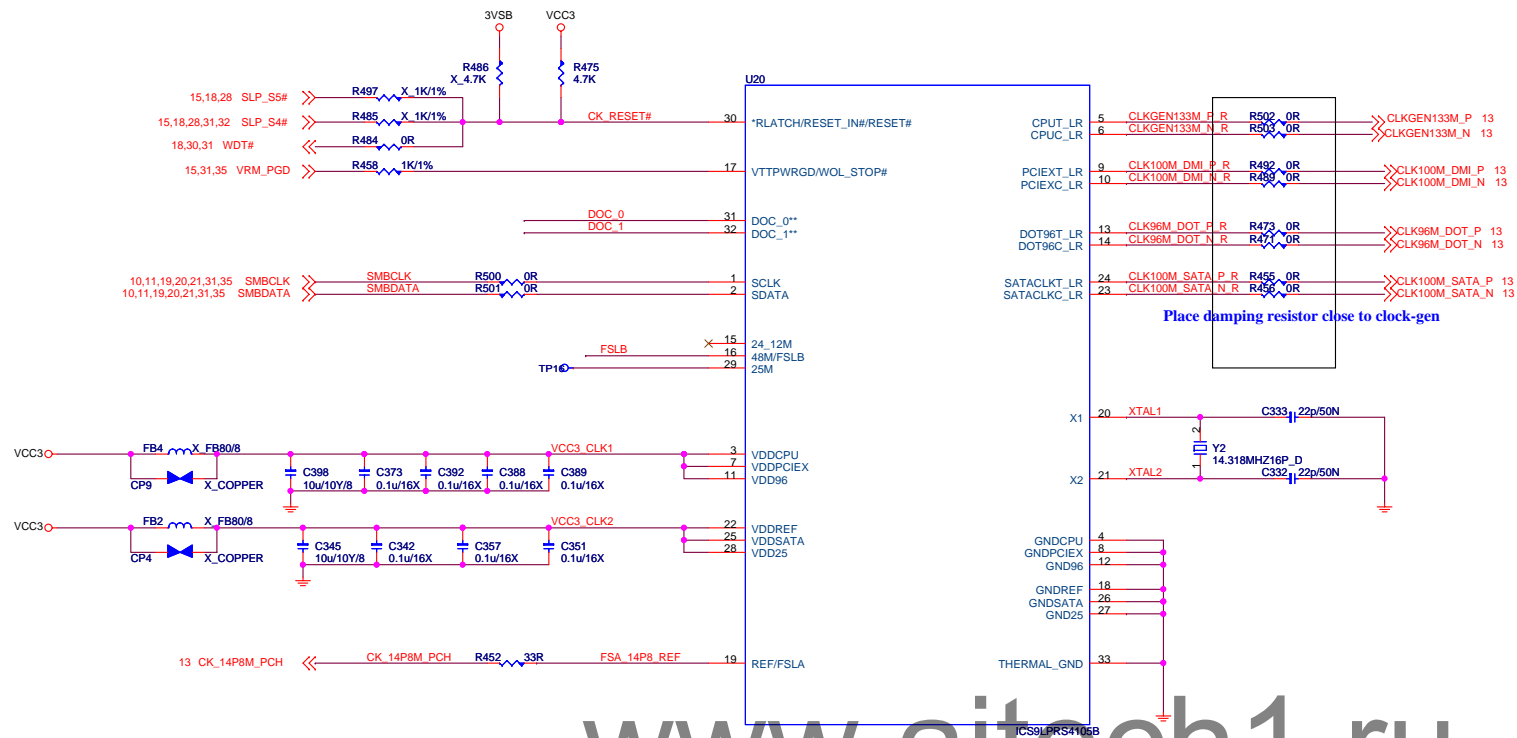
MS-7638

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| Size Custom | Document Description DDR3 Chanel-A DIMM1/2 | Rev 10 |
| Date: Friday, March 19, 2010 | | Sheet 10 of 38 |

DDR3 DIMM_B1

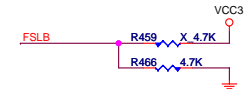
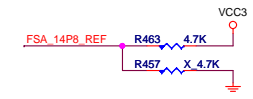
DDR3 DIMM_B2





CLOCK GEN STRAPING

| FS4 | FS3 | FS2 | FSB | FSA | CPU | Spread |
|------|------|------|------|------|--------|--------|
| B0b4 | B0b3 | B0b2 | B0b1 | B0b0 | Mhz | % |
| 0 | 0 | 0 | 0 | 0 | 100.00 | -0.5 |
| 0 | 0 | 0 | 0 | 1 | 133.33 | -0.5 |
| 0 | 0 | 0 | 1 | 0 | 200.00 | -0.5 |
| 0 | 0 | 0 | 1 | 1 | 166.66 | -0.5 |

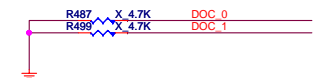


Pin16: 48MHz clock output. / 3.3V tolerant input for CPU frequency selection. Low voltage threshold inputs, see input electrical characteristics for Vil_FS and Vih_FS values.

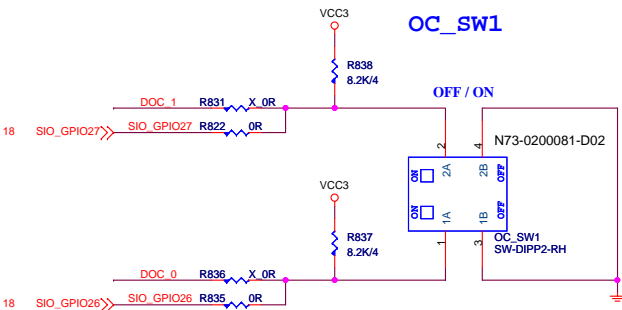
Pin19: 14.318 MHz reference clock./ 3.3V tolerant input for CPU frequency selection. Refer to input electrical characteristics for Vil_FS and Vih_FS values.

OC

DOC_0*:Dynamic Over Clocking pin: real time frequency selection 0: Normal; 1: Frequency will transition to a preprogrammed value in the I2C.



OC_SW1



OFF=1 ; ON=0

| DOC | TABLE |
|-----|---------------------|
| 1 0 | CPU FREQUENCY |
| 1 1 | 133 MHz (default) |
| 1 0 | 142 MHz |
| 0 1 | 150 MHz |
| 0 0 | 166 MHz |

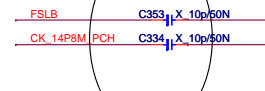
(Default) OFF / OFF

OFF / ON

ON / OFF

ON / ON

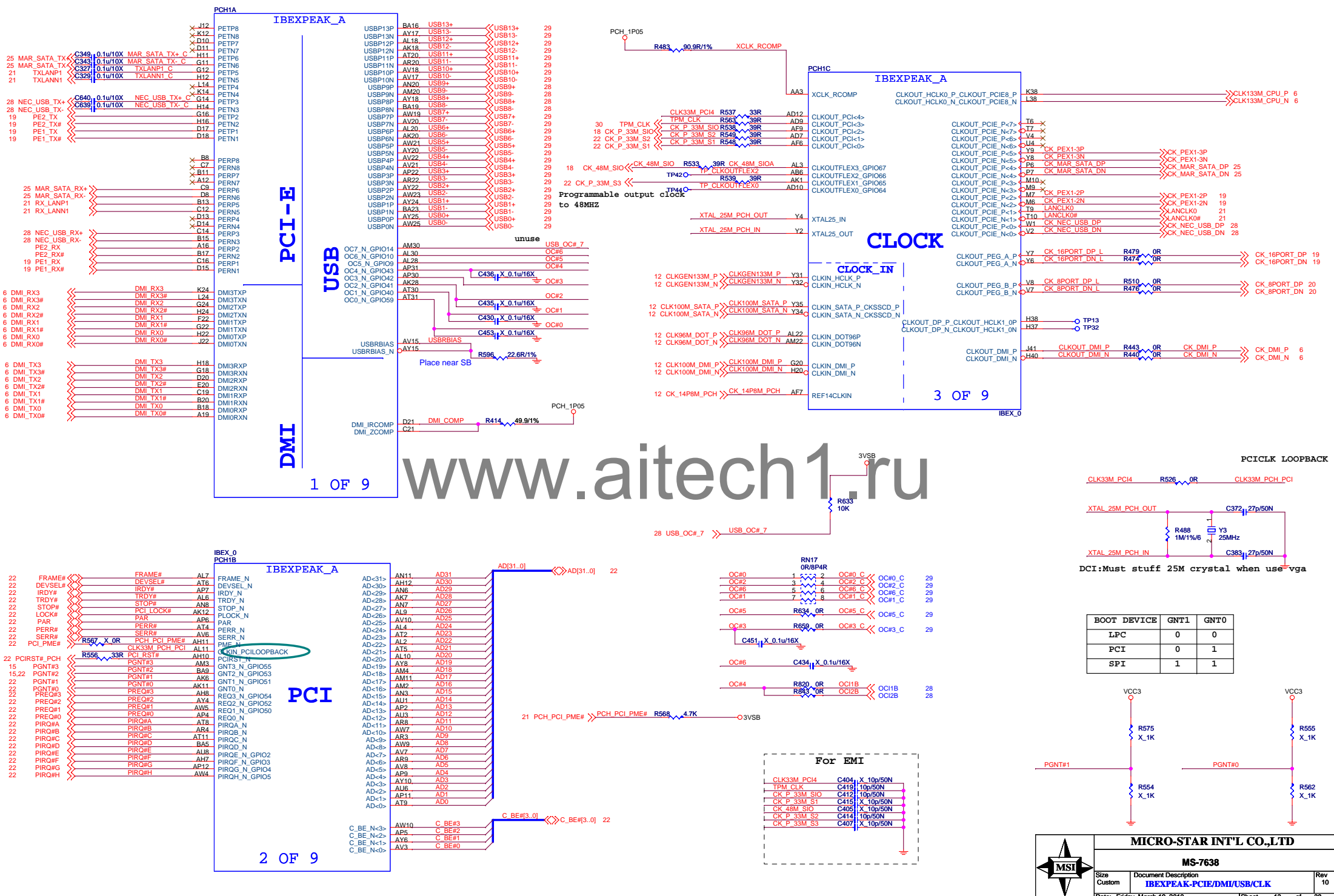
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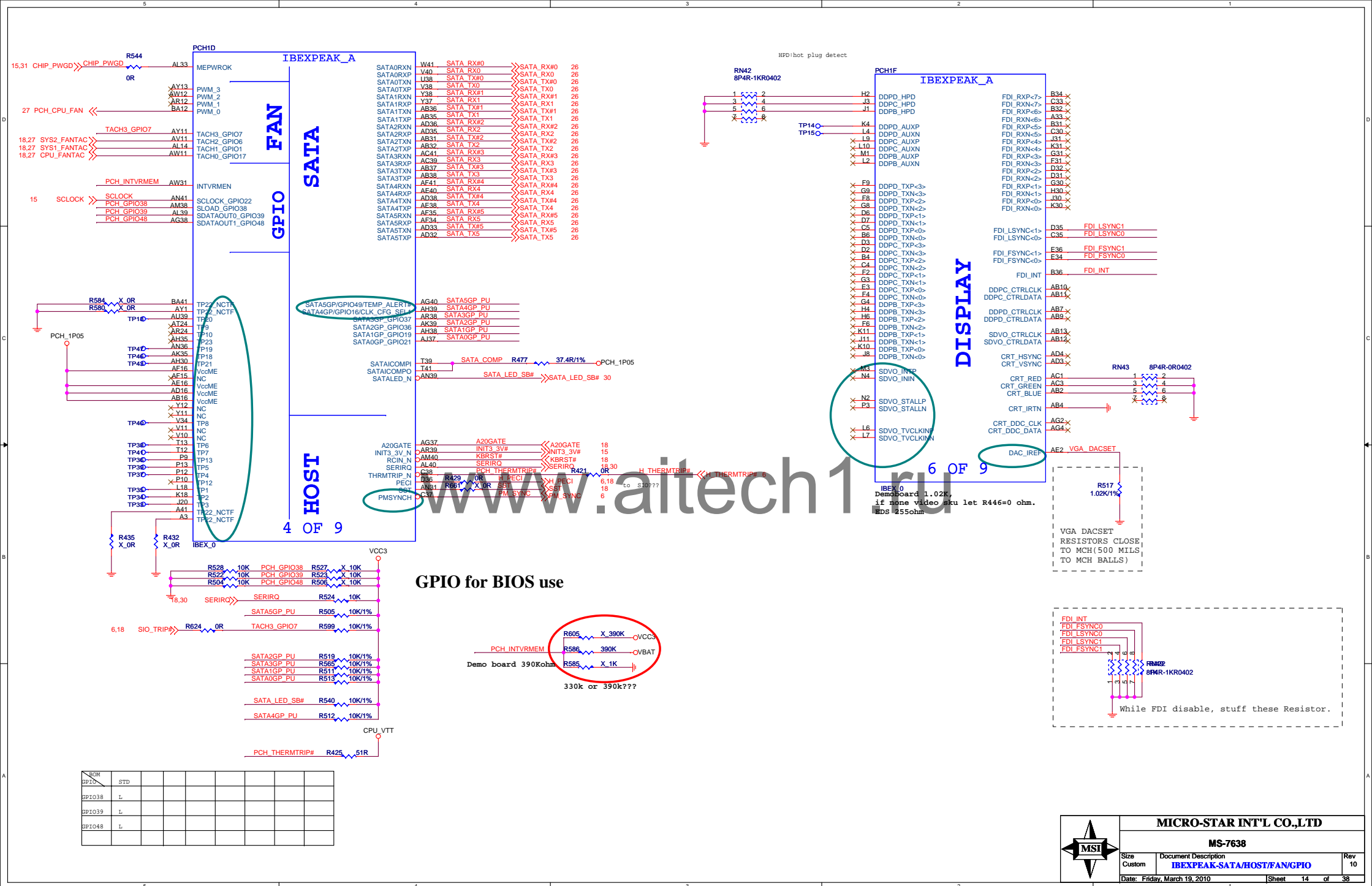


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MS-7638

| Size | Document Description | Rev |
|--------|------------------------|----------------|
| Custom | CLK IC99LRS4105B | 10 |
| Date: | Friday, March 19, 2010 | Sheet 12 of 38 |





Change CP13, CP14 to 10uH
if VCCA_DPLLA/VCCA_DPLLH
has noise issue.

C601 place TOP
close to Pin
as short as possible

POWER

7 OF 9

PCH decoupling cap

EMI

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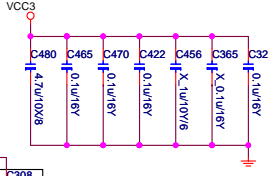
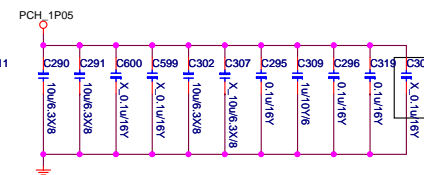
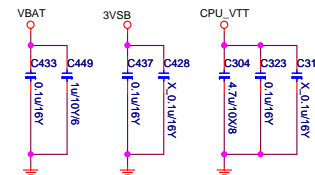
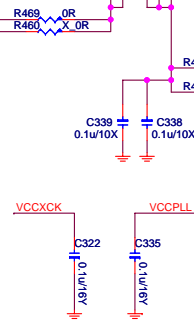
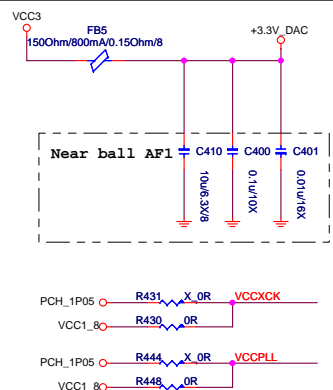
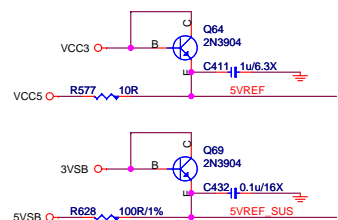
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IBEXPEAK-POWER

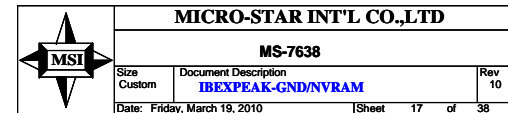
Date: Friday, March 19, 2010 Sheet 16 of 38



5VREF & 5VREF_SUS Sequencing Circuit

5VREF must be powered up before VCC3 or after VCC3 within 0.7V.
Also, 5VREF must power down after VCC3 or before VCC3 within 0.7V.
This rule is also applies to 5VREF_SUS and 3VSB.
However, the 3VSB is derived from the 5VSB on the power supply
thru a voltage regulator and therefore, they can satisfy the requirement.

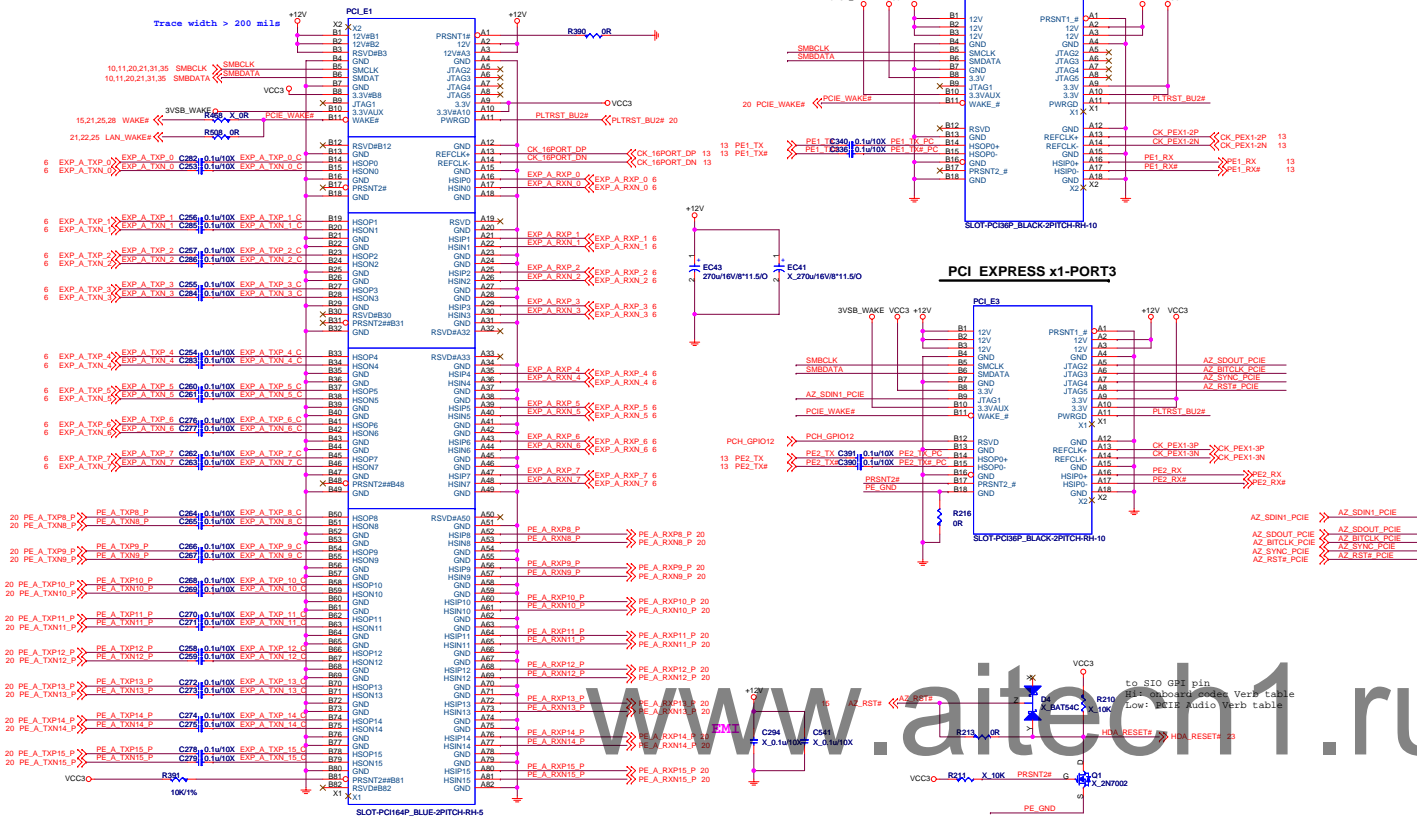




PCI Express X16 Slot

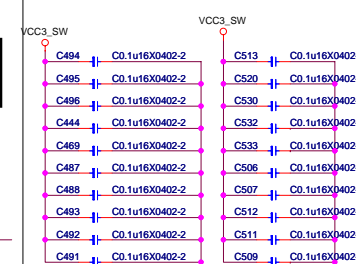
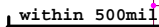
PCI EXPRESS x1-PORT2

PCI EXPRESS x1-PORT3



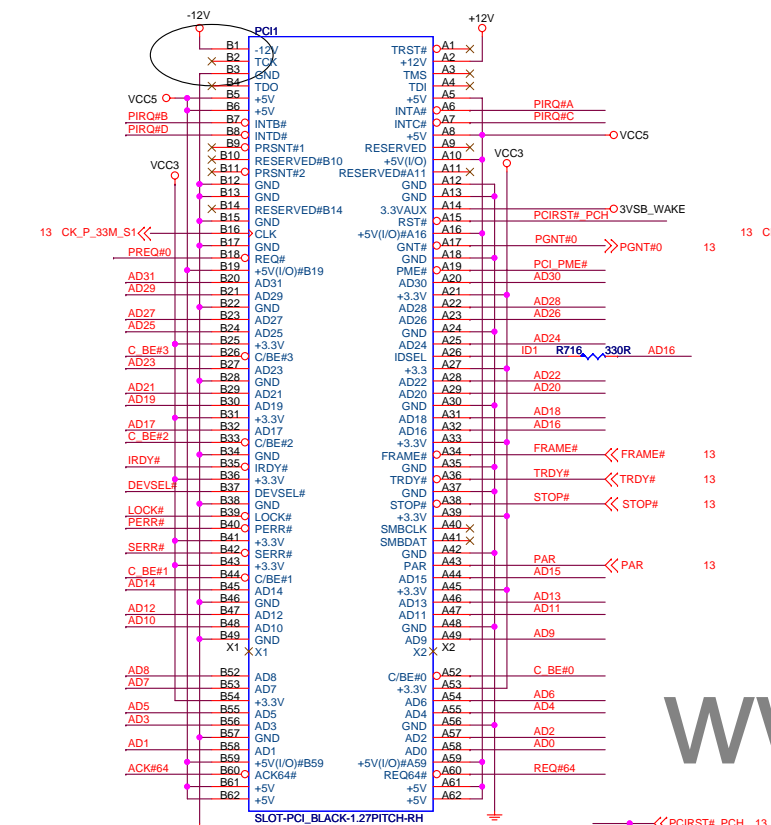
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Trace width > 200 mils



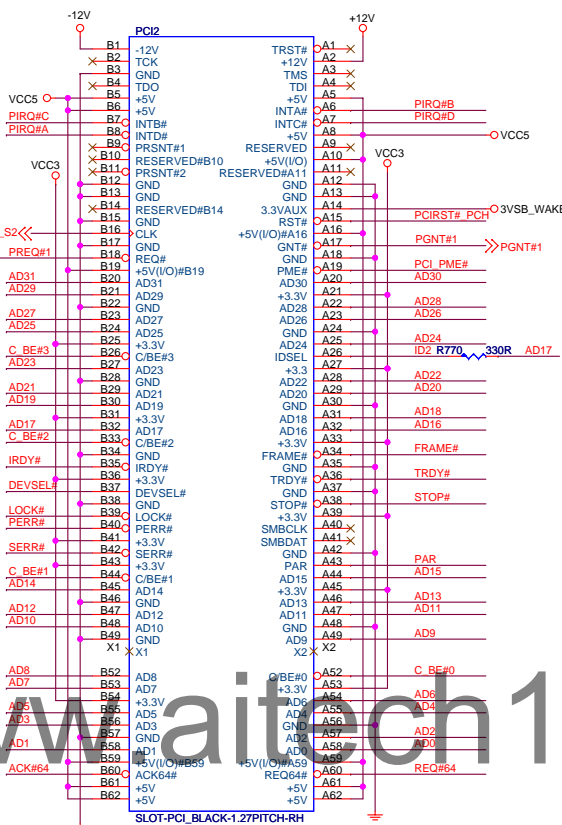
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| Date: Friday, March 19, 2010 | | Sheet 20 of 29 |

PCI SLOT 1 (PCI VER: 2.2 COMPLY)



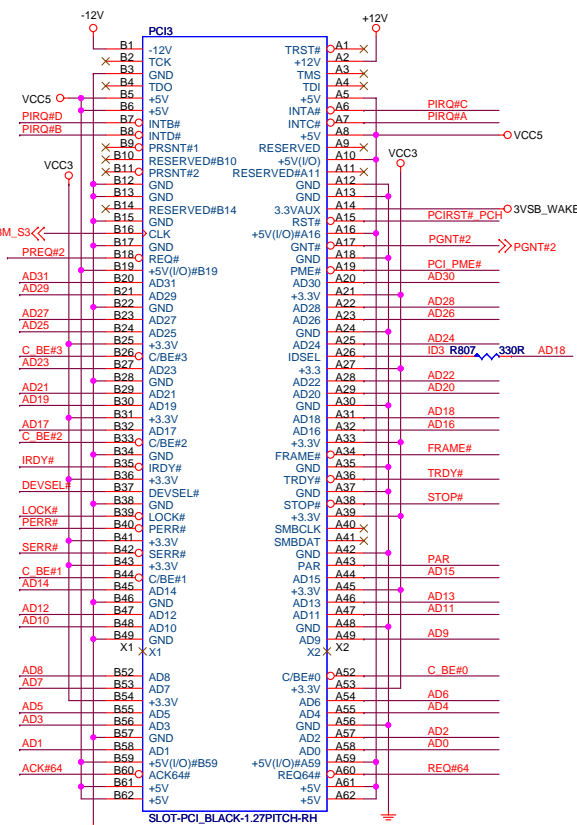
ISSEL = AD16
MASTER = PREQ#0
PIRQ#A

PCI SLOT 2 (PCI VER: 2.2 COMPLY)



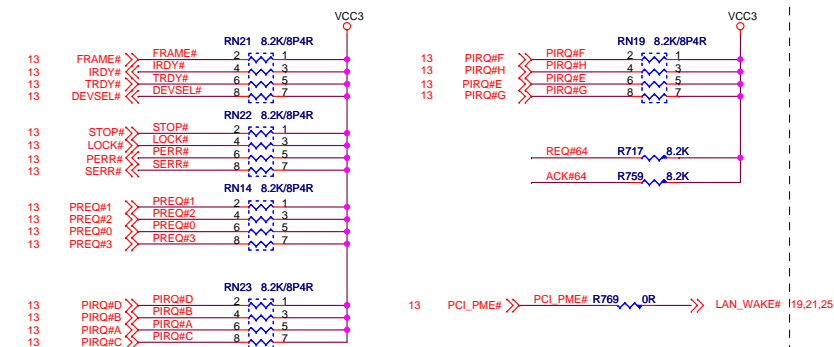
ISSEL = AD17
MASTER = PREQ#1
PIRQ#B

PCI SLOT 3 (PCI VER: 2.2 COMPLY)

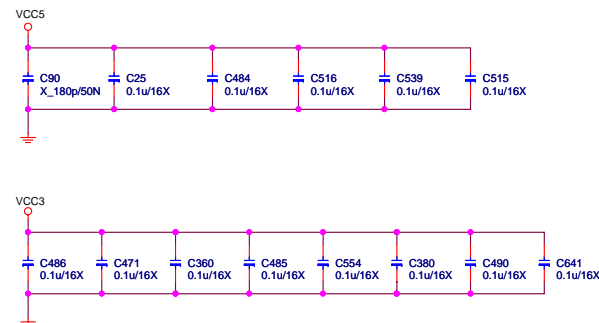


ISSEL = AD18
MASTER = PREQ#2
PIRQ#C

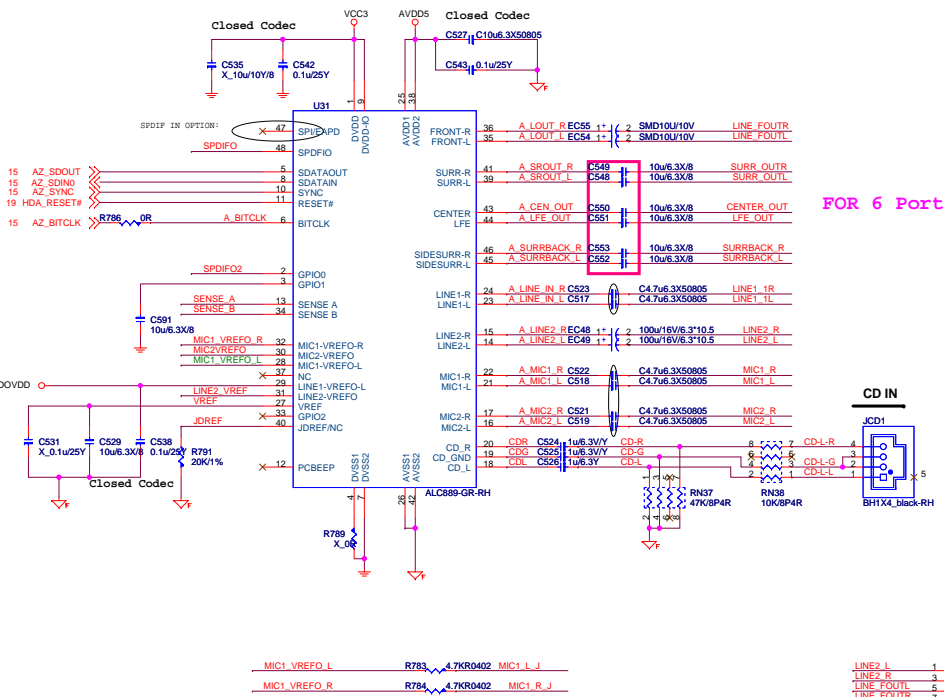
PCI PULL-UP / DOWN RESISTORS



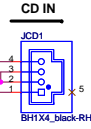
PCI SLOT DECOUPLING CAPACITORS



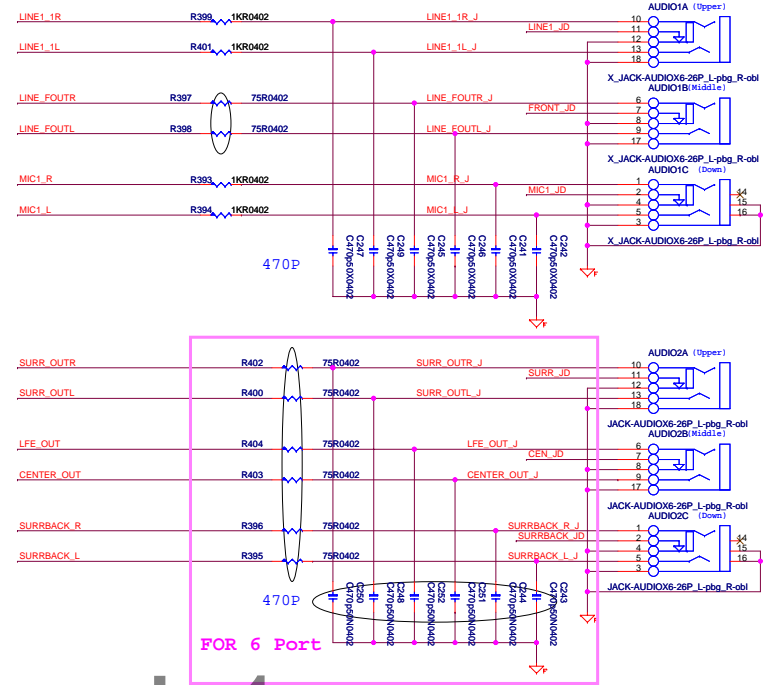
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| Size | Document Description | Rev | |
| Custom | PCI Slot | 10 | |
| Date: Friday, March 19, 2010 | Sheet 22 of 38 | | |



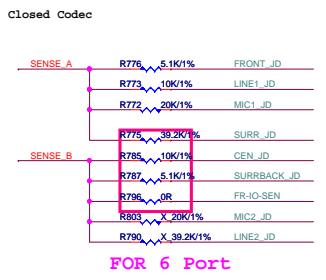
FOR 6 Port



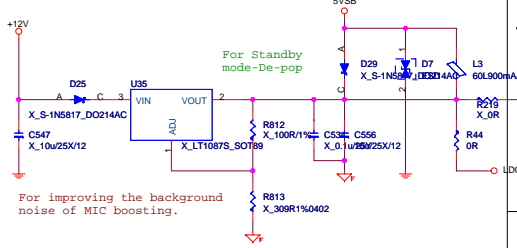
ALC888 JACK



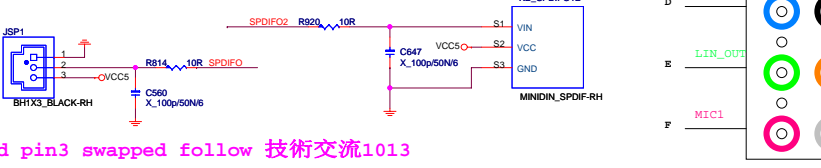
FOR 6 Port



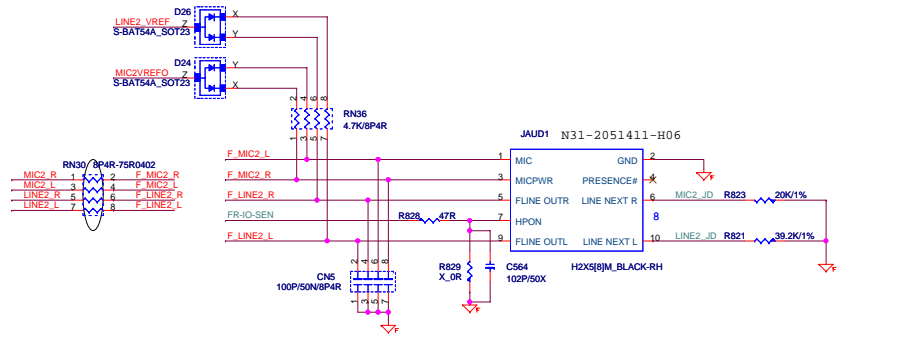
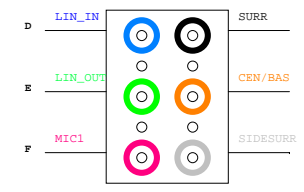
FOR 6 Port



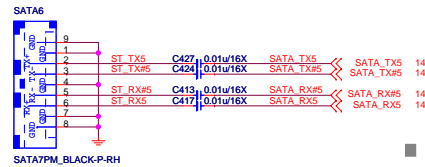
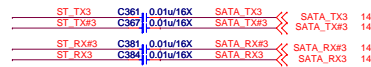
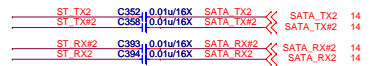
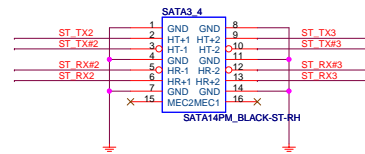
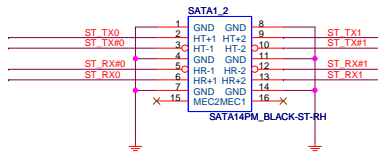
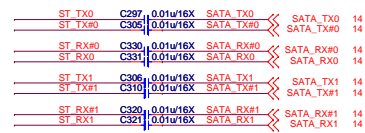
SPDIF OUT



Pin1 and pin3 swapped follow 技術交流1013

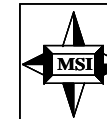
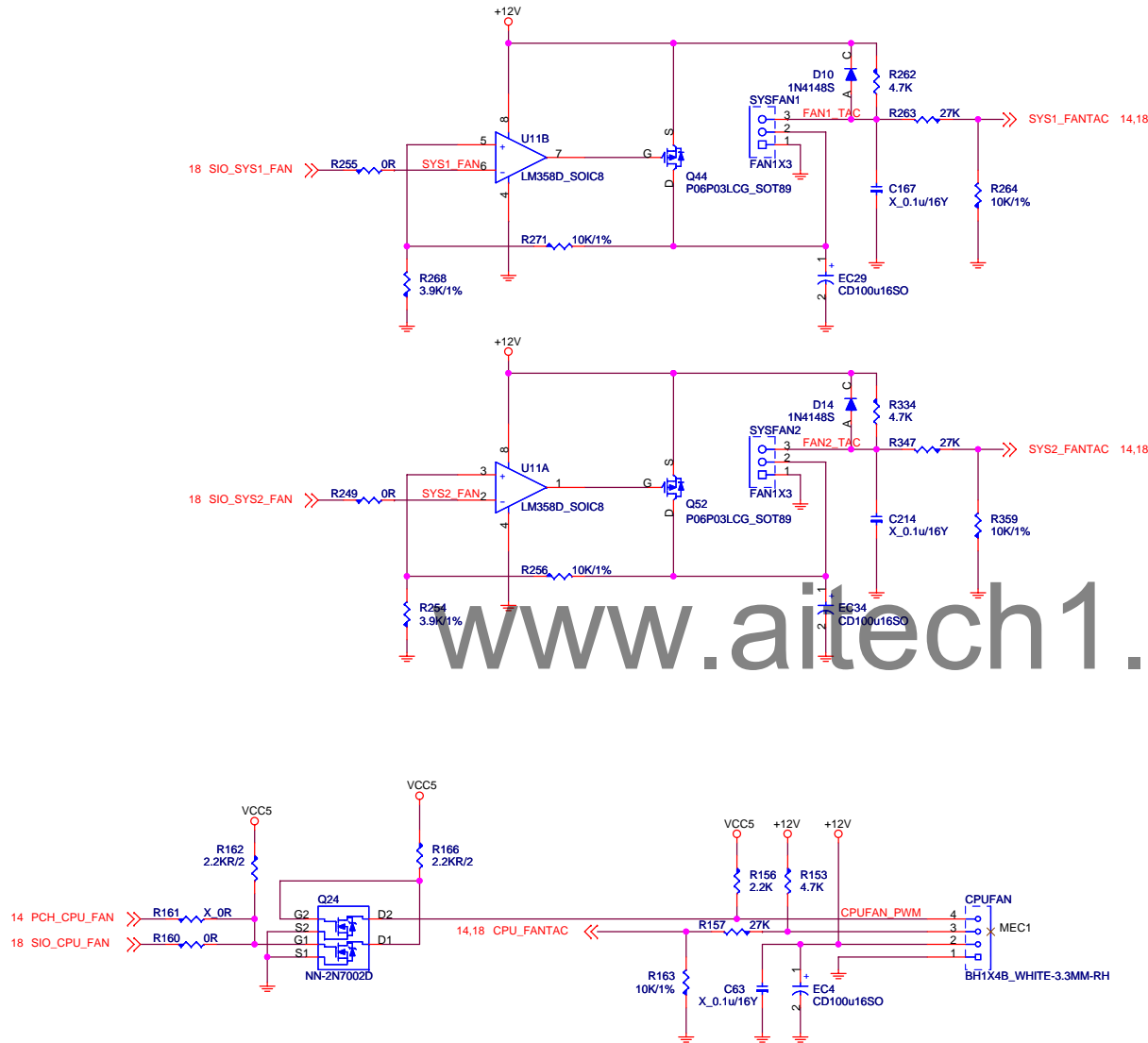


SATA connector (color:Black)



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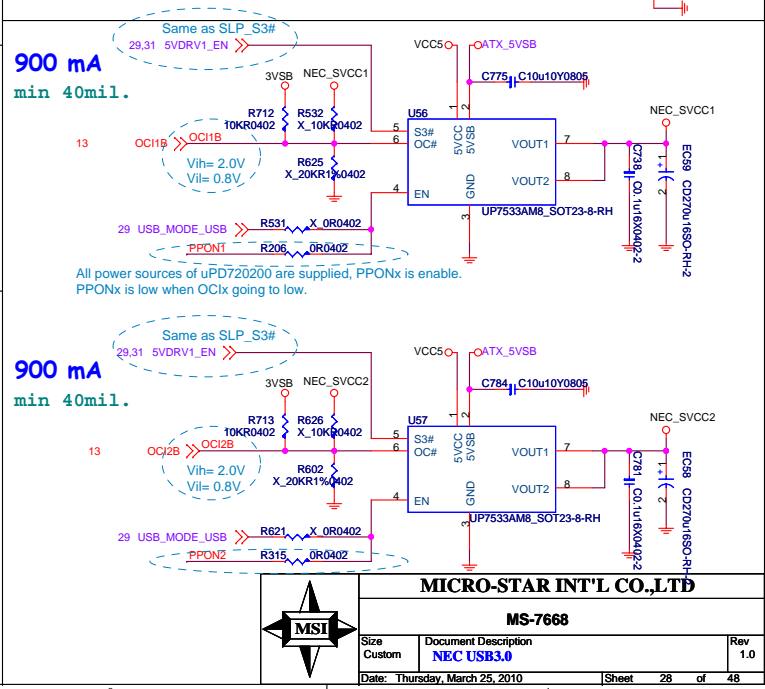
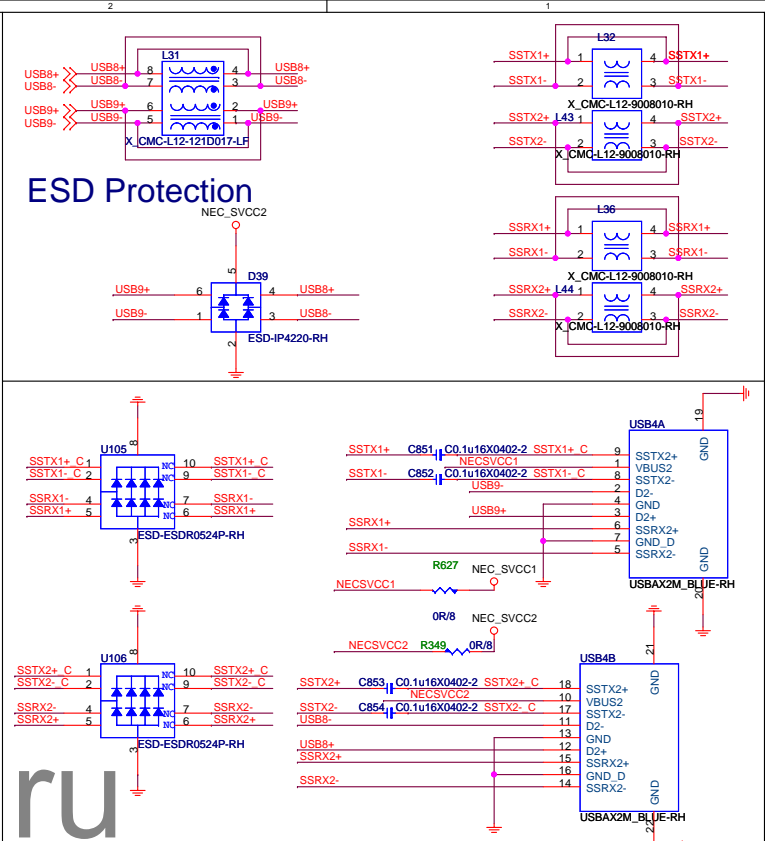
FAN-COUNTROL CIRCUIT



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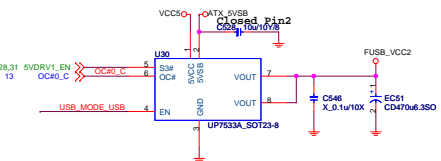
MS-7638

| Size | Document Description | Rev |
|--------|------------------------|----------------|
| Custom | Fan Control | 10 |
| Date: | Friday, March 19, 2010 | Sheet 27 of 38 |

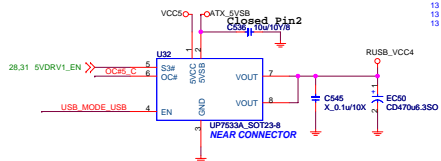


Rear USB Connector

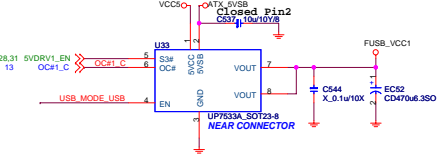
USB POWER FOR PORT 0,1



USB POWER FOR PORT 4,5

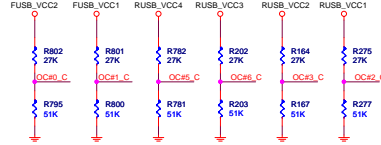


USB POWER REAL PORT 2,3



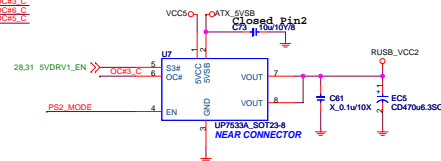
USB_MODE for USB voltage

H: Follow 5VSB
L: Always off

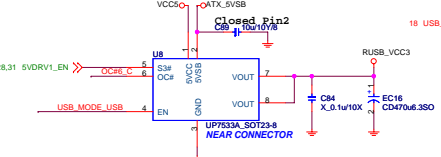


Front USB Connector

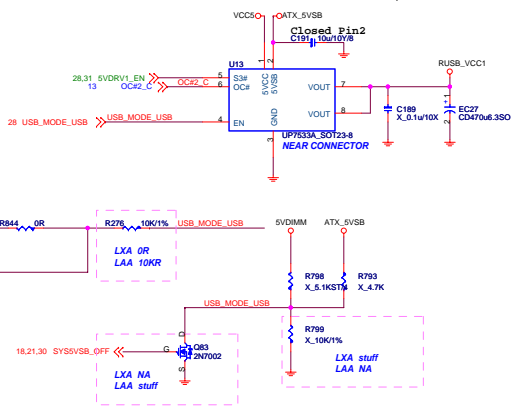
USB POWER FOR PORT 10,11



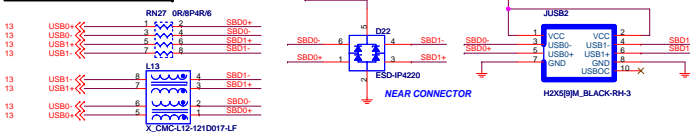
USB POWER FOR PORT 8,9



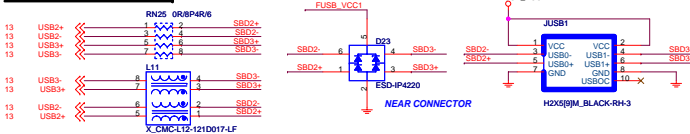
USB POWER FOR PORT 12,13



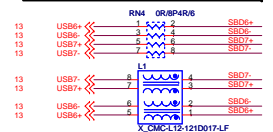
FRONT USB PORT 0,1



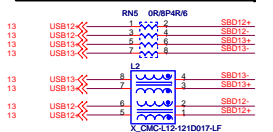
FRONT USB PORT 2,3



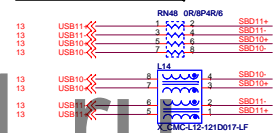
REAR USB PORT 10,11



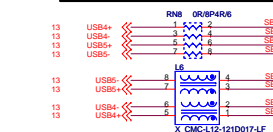
REAR USB PORT 8,9



Front USB PORT 4,5

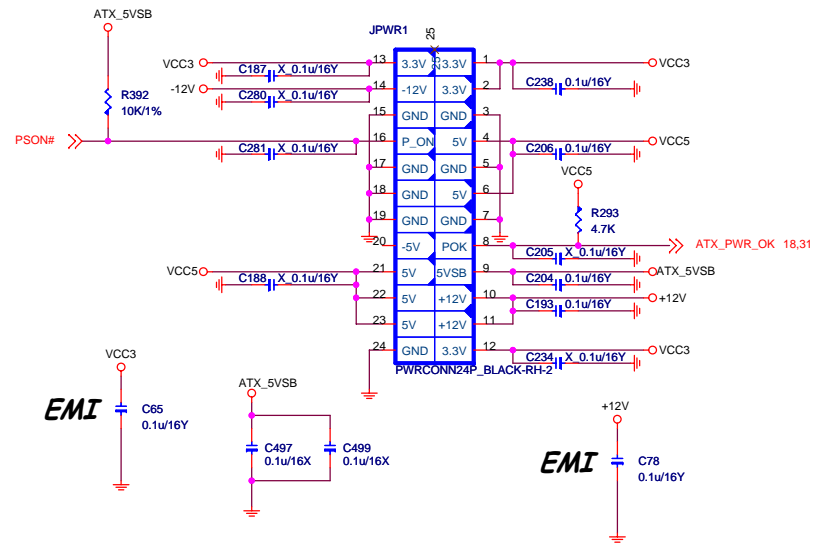


REAR USB PORT 12,13

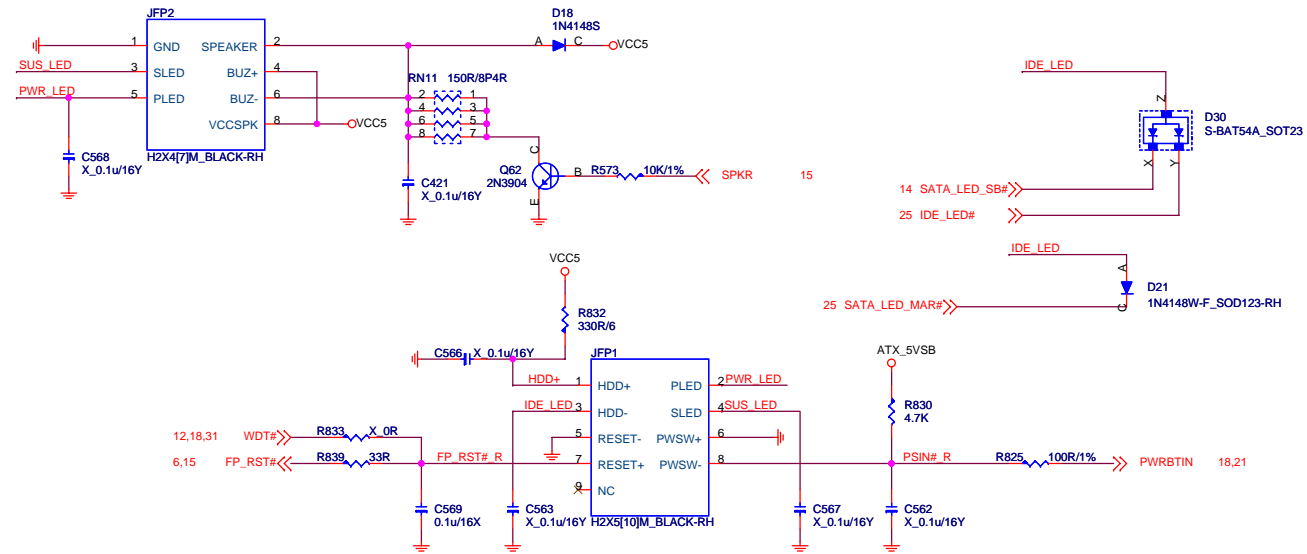


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ATX POWER CONNECTOR



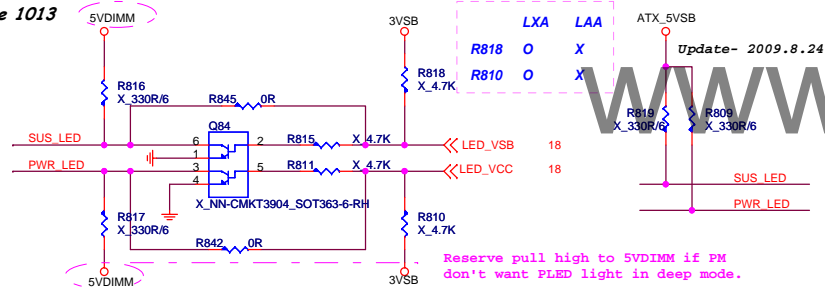
FRONT PANNEL



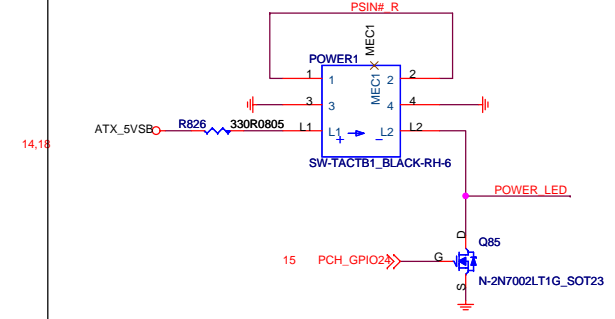
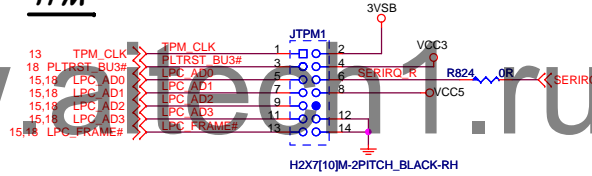
LED (for Fintek 71889)

If use F71889ED LED Ctrl,
SIO LED_VCC / LED_VSB can not to use.

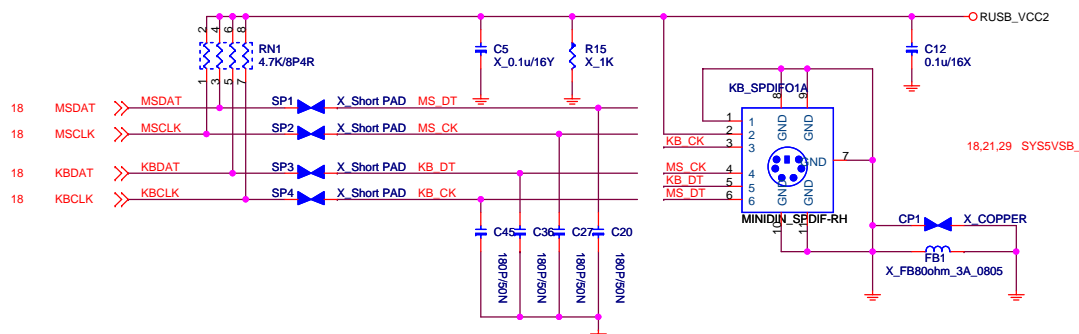
Update 1013



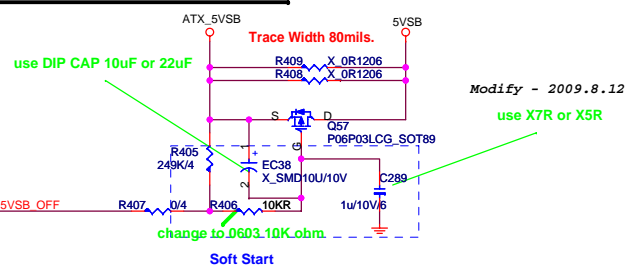
TPM



PS2 KEYBOARD & MOUSE CONNECTOR



5VSB Power Switch



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MS-7638

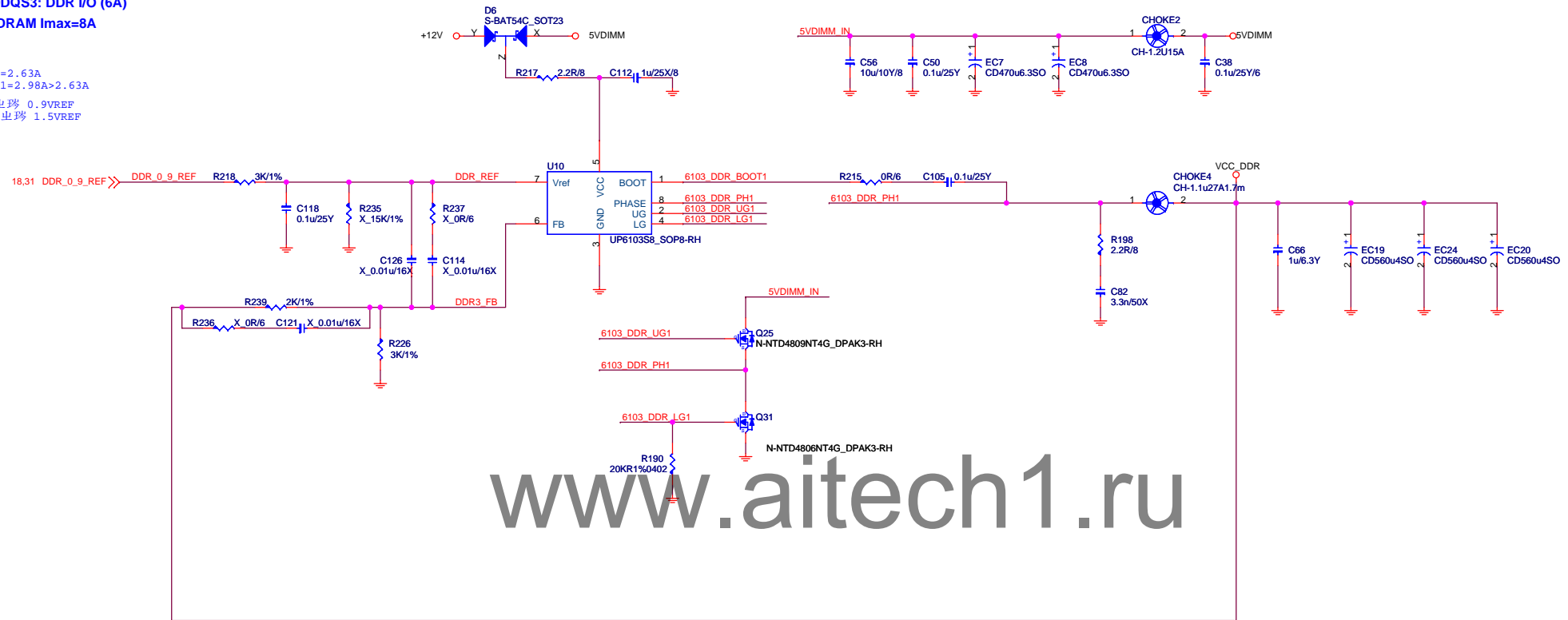
| Size | Document Description | Rev |
|------------------------------|---------------------------------------|-----|
| Custom | ATX PWR-Connector & Front Panel & EMI | 10 |
| Date: Monday, March 22, 2010 | Sheet 30 of 38 | |

DDR3_1.5V

$$21.25A = 6A + 8A + 0.75A + 6.5A$$

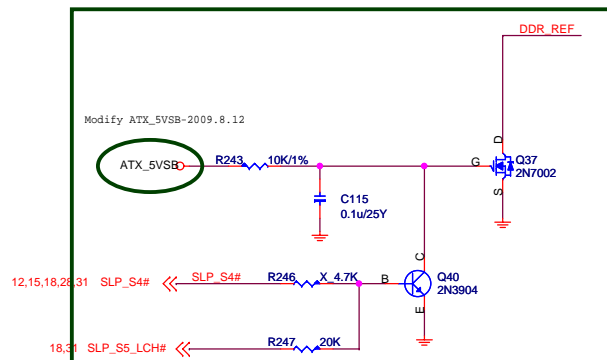
V1.5DDQS3: DDR I/O (6A)
DDR DRAM I_{max}=8A

Tripple=2.63A
1.49*2*1=2.98A>2.63A
SIO 业界 0.9VREF
6264 业界 1.5VREF



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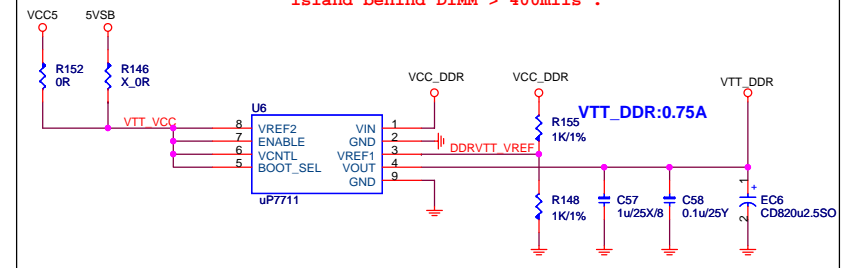
If you use LAA and can support deep_s3,
please use SLP_S5_LCH#, else use SLP_S4#.
R247 stuff, R246 remove



Only for meet Intel power down sequence.

DDR VTT Power

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



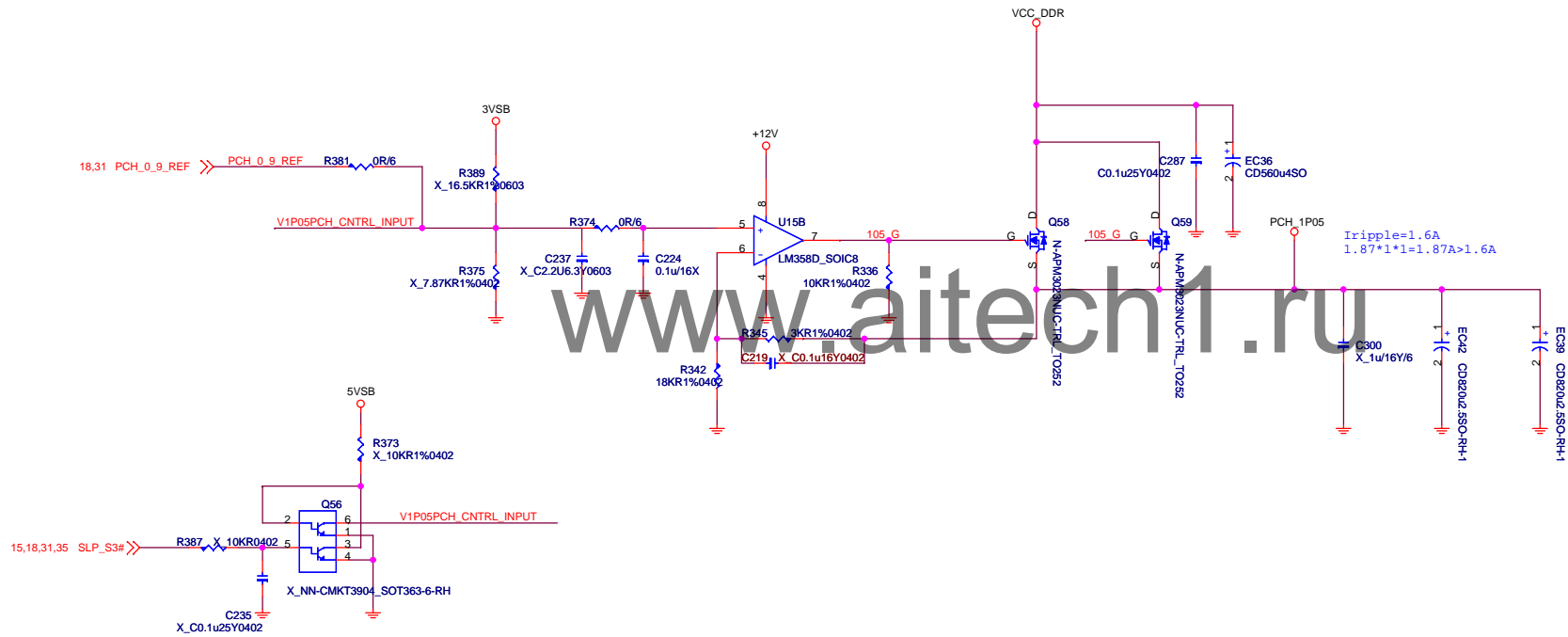
MICRO-STAR INT'L CO.,LTD

MS-7638

| Size | Document Description | Rev |
|------------------------------|-----------------------------|-------|
| Custom | DDR POWER - UPI6103_1-Phase | 10 |
| Date: Monday, March 22, 2010 | Sheet 32 | of 38 |

PCH Core 6.8A

V1.05PCHS0: Vcc, VccExp, VccDMI, VccSATA,
VccSATAPLL, VccAUPLL, VccSSC, VccDIFFCLK,
VccDIFFCLKN, VccUSBCORE, VccDPLL, VccDPLL_EXP, VccDPLL_FDI (4.5A)
V1.05MEM: VccMEW, VccAUX, VccME (2.3A)

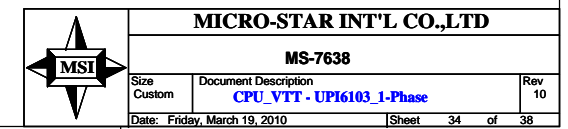


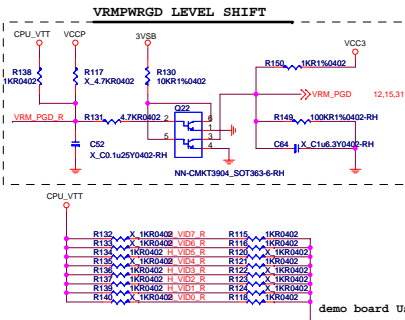
MICRO-STAR INT'L CO.,LTD

MS-7638

| Size | Document Description | Rev |
|---------------------------------|-----------------------------|----------------|
| Custom | PCH POWER - UPI6103_1-Phase | 10 |
| Date: Wednesday, March 24, 2010 | | Sheet 33 of 38 |

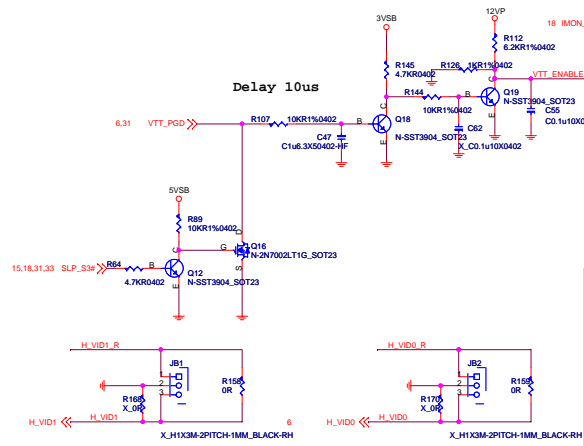
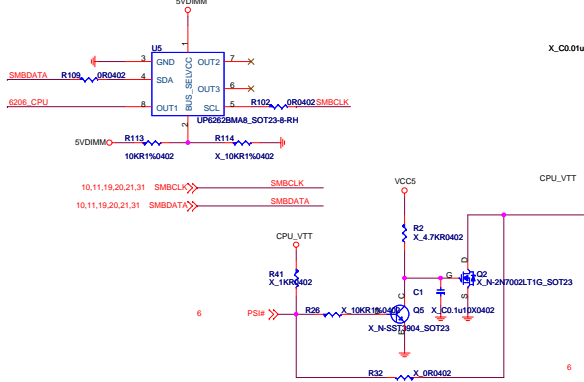
VTT50: 1.1V/1.05V CPU Uncore, MCP I/O (30A)
 $I_{ripple}=8.28A$
 $6.1*2*1=12.2A>8.28A$





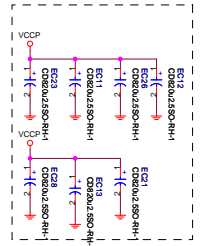
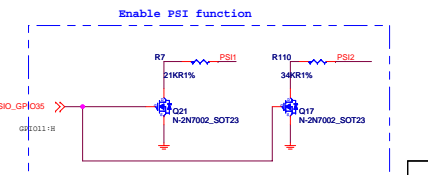
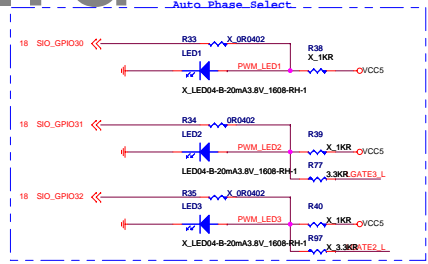
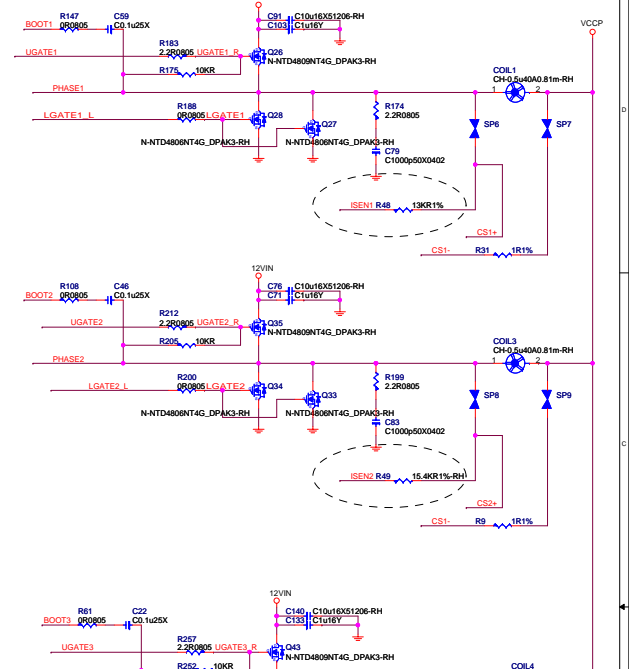
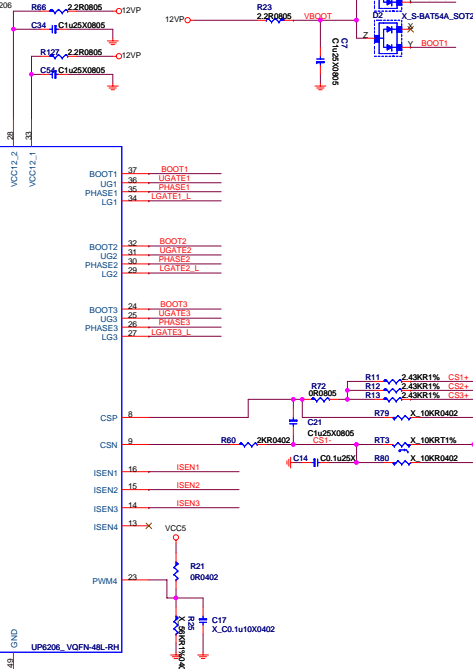
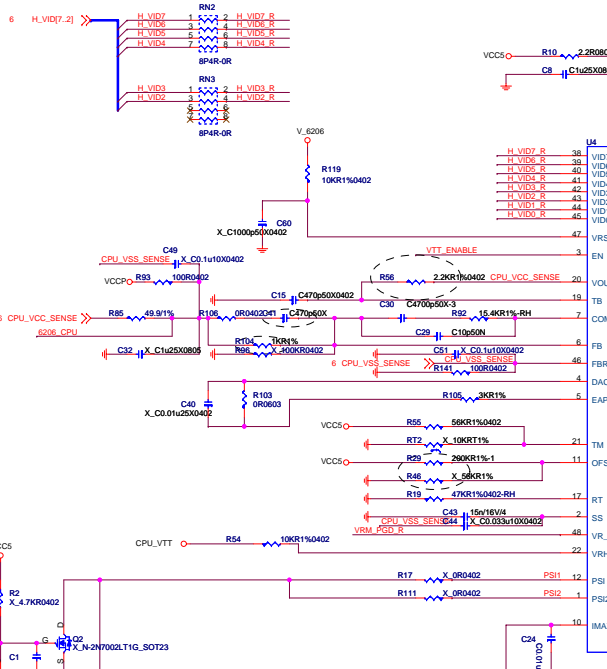
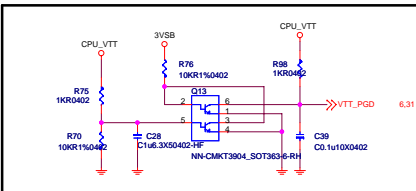
UPI VOLTAGE CONSOLE(1)

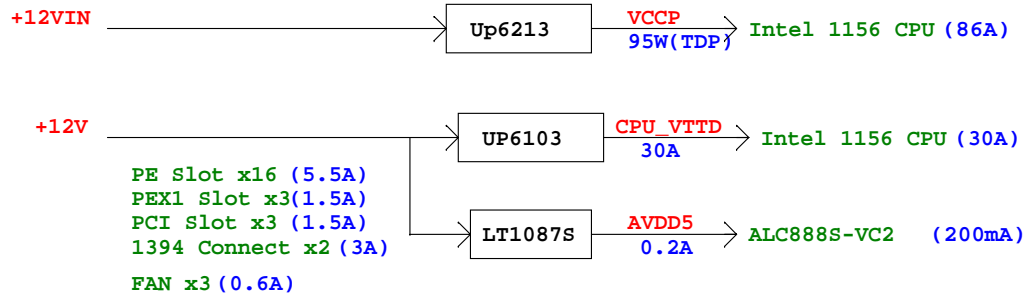
0x20:RH=10K,RL=NC



+CPU_VTT STABLE TO VTTWGOOD ASSERTION

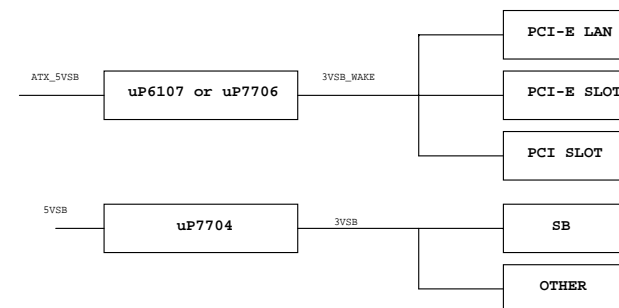
MIN:100ns



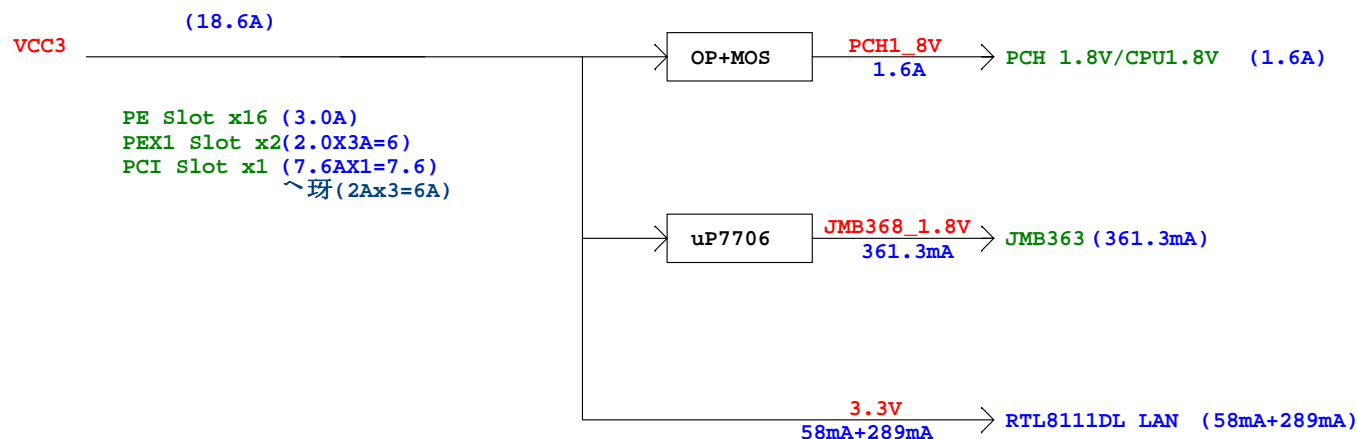
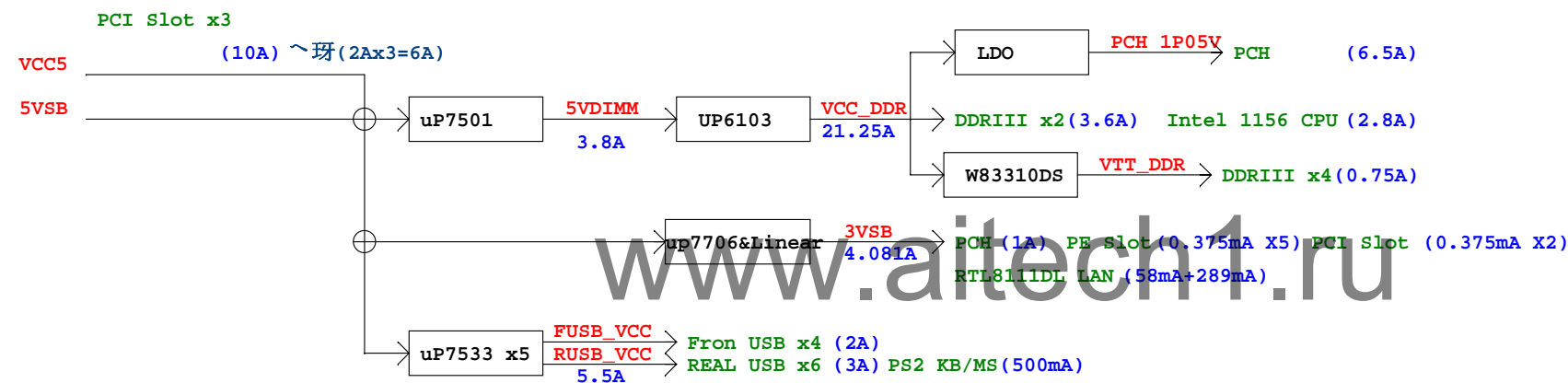


3VSB and 3VSB_WAKE POWER MAP

Add- 2009.9.28

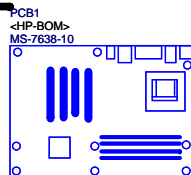


Power Delivery



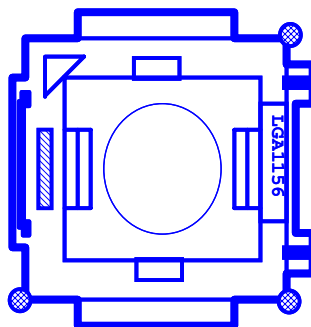
| MICRO-STAR INT'L CO.,LTD | | | |
|--------------------------|------------------------|-------|----------|
| MS-7638 | | | |
| Size | Document Description | | Rev |
| Custom | Power Map | | 10 |
| Date: | Friday, March 19, 2010 | Sheet | 36 of 38 |

PCB

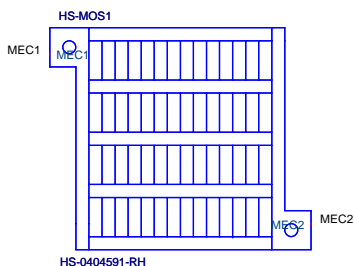


CPU SOCKET

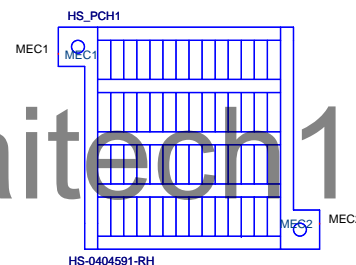
XU1_X1
<HP-BOM>
CPU SOCKET



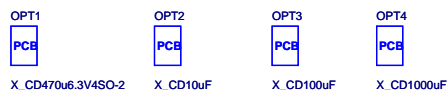
HEATPIPE



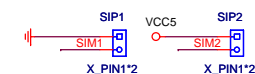
BATTERY



EL CAP



Simulation



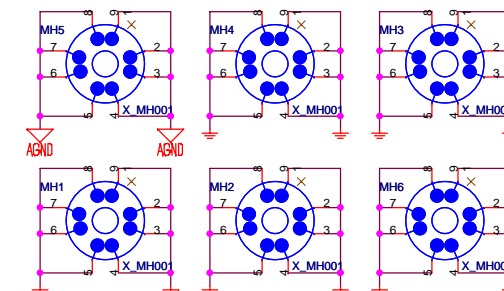
Optical Fiducial Marks-120



Optical Fiducial Marks-100



Mounting Holes



H55EB3:3孔audio (888S VC2) ,GB LAN, OC-switch 不上, DVI,HDMI 不上,
JMB368 不上(IDE 也不上), APS LED 不上 (SW APS) 半固.
H55SG6DVI:Full spec