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MS(6788)

**Version
20B**

Intel (R) Breeds Hill (GMCH) + ICH5 Chipset
Intel Northwood mPGA478B Processor

CPU:

Intel Northwood

System Chipset:

**Intel Breeds Hill - GMCH (North Bridge)
Intel ICH5 (South Bridge)**

On Board Chipset:

**BIOS -- FWH EEPROM
AC'97 Codec -- ALC655
LPC Super I/O -- W83627THF
LAN --RTL8100C/8110S
CLOCK --ICS 952611**

Main Memory:

DDR * 3 (Max 3GB)

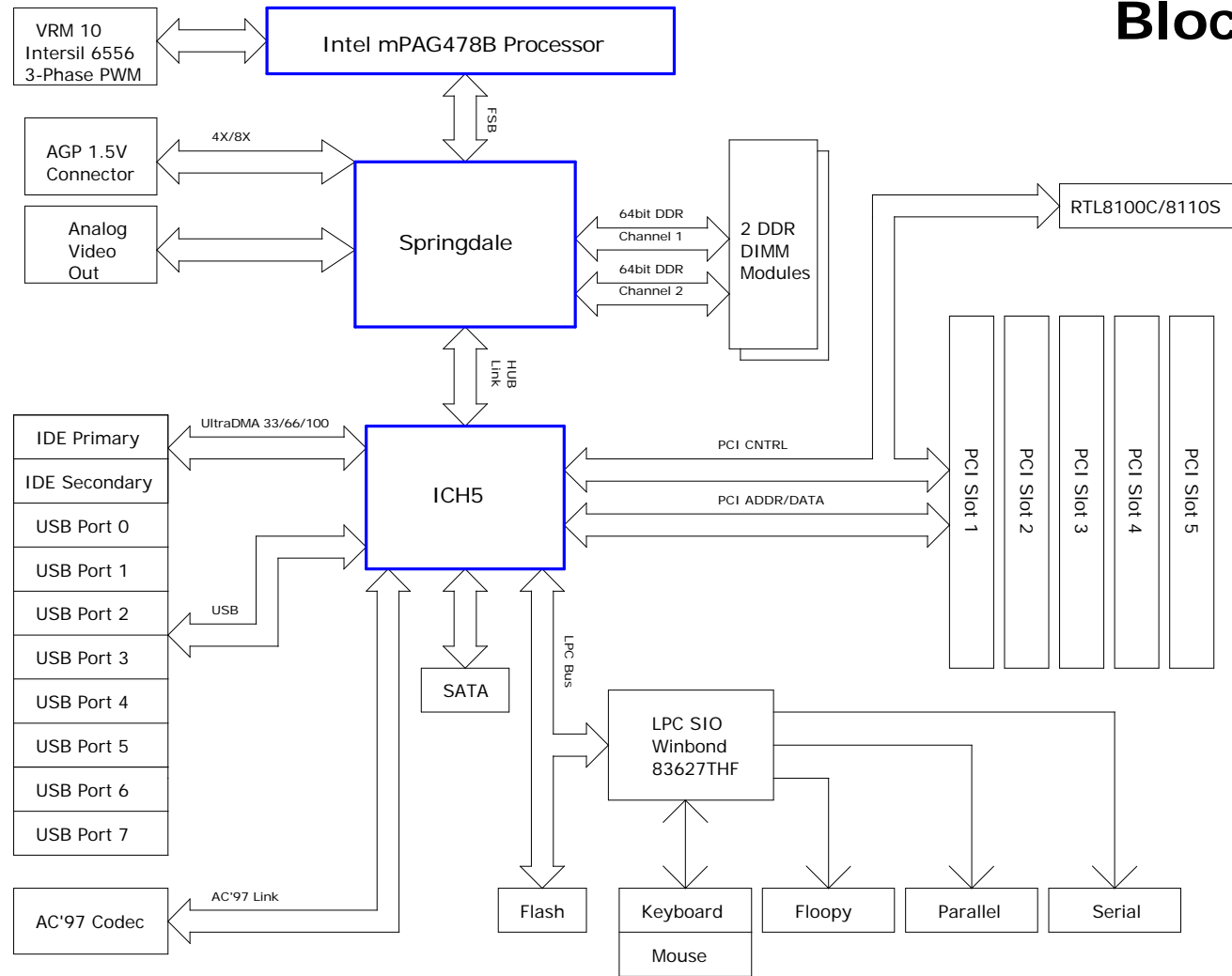
Expansion Slots:

PCI2.3 SLOT * 5

ST PWM:

Controller: ST L6710

Block Diagram



ICH5

GPIO Pin	Type	Function	Power well
GPIO 0	I	PREQ#B	MAIN
GPIO 1	I	PREQ#B	MAIN
GPIO 2	I	PIRQ#E	MAIN
GPIO 3	I	PIRQ#F	MAIN
GPIO 4	I	PIRQ#G	MAIN
GPIO 5	I	PIRQ#H	MAIN
GPIO 6	I	GPI6	MAIN
GPIO 7	I	GPI7	MAIN
GPIO 8	I	CSA_PME#	RESUME
GPIO 9	I	OC4#	RESUME
GPIO 10	I	OC5#	RESUME
GPIO 11	I	SIO_SMI#	RESUME
GPIO 12	I	EXTSMI#	RESUME
GPIO 13	I	SIO_PME#	RESUME
GPIO 14	I	OC#6	RESUME
GPIO 15	I	OC#7	RESUME
GPIO 16	O	PGNT#A	MAIN
GPIO 17	O	PGNT#B	MAIN
GPIO 18	O	GPO18	MAIN
GPIO 19	O	BIOS_WP#	MAIN
GPIO 20	O	GPO20	MAIN
GPIO 21	O	GPO21	MAIN
GPIO 22	OD	GPO22	MAIN
GPIO 23	O	GPO23	MAIN
GPIO 24	I/O	GPIO24	RESUME
GPIO 25	I/O	LAN_DISABLE#	RESUME
GPIO 27	I/O	GPIO27	RESUME
GPIO 28	I/O	GPIO28	RESUME
GPIO 32	I/O	GPIO32	MAIN
GPIO 33	I/O	GPIO33	MAIN
GPIO 34	I/O	GPIO34	MAIN
GPIO 40	I	PREQ#4	MAIN
GPIO 41	I	GPI41	MAIN
GPIO 48	O	PGNT#4	MAIN
GPIO 49	OD	CPUPWRGD	MAIN

default output
 default output
 default output
 default output
 default output
 default output

FWH

GPIO Pin	Type	Function
GPI 0	I	PD_DET
GPI 1	I	SD_DET
GPI 2	I	Pull down through 1K ohms (unused)
GPI 3	I	Pull down through 1K ohms (unused)
GPI 4	I	Pull down through 1K ohms (unused)

PCI Config.

DEVICE	MCP1 INT Pin	REQ#/GNT#	IDSEL	CLOCK	CLK GEN PIN OUT
PCI Slot 1	INTA# INTB# INTC# INTD#	PCI_REQ#0 PCI_GNT#0	AD16	PCICKL0	13 (PCI_CLK0)
PCI Slot 2	INTB# INTC# INTD# INTA#	PCI_REQ#1 PCI_GNT#1	AD17	PCICKL1	14 (PCI_CLK1)
PCI Slot 3	INTC# INTD# INTA# INTB#	PCI_REQ#2 PCI_GNT#2	AD18	PCICKL2	15 (PCI_CLK2)
PCI Slot 4	INTD# INTA# INTB# INTC#	PCI_REQ#3 PCI_GNT#3	AD19	PCICKL3	16 (PCI_CLK3)
PCI Slot 5	INTB# INTC# INTD# INTA#	PCI_REQ#4 PCI_GNT#4	AD21	PCICKL4	19 (PCI_CLK4)

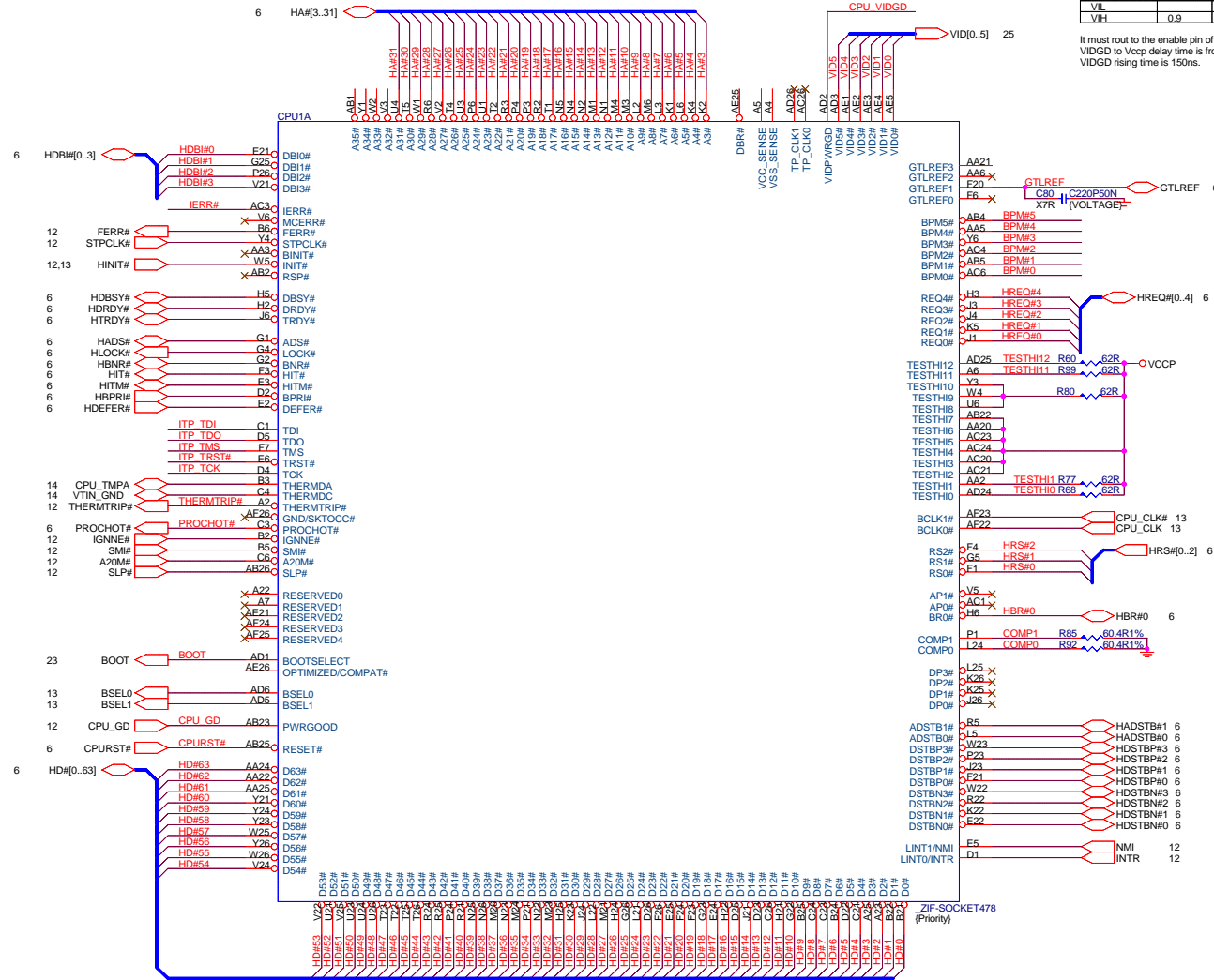
DDR DIMM Config.

DEVICE	ADDRESS	CLOCK
DIMM 1	1010000B	MCLK_A0/MCLK_A0# MCLK_A1/MCLK_A1# MCLK_A2/MCLK_A2#
DIMM 2	1010001B	MCLK_B0/MCLK_B0# MCLK_B1/MCLK_B1# MCLK_B2/MCLK_B2#

PCI RESET DEVICE

Signals	Target
PCIRST#1	Springdale, LAN, FWH, Super I/O
PCIRST#2	PCI slot 1-3, AGP slot
HD_RST#	Primary, Sccondary IDE

CPU SIGNAL BLOCK

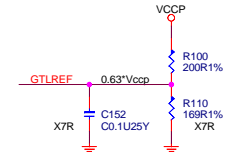


VIDPWRGD DC Specifications

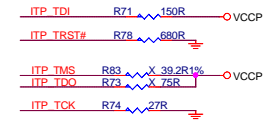
	Min	Typ	Max
VIL			0.3
VIH	0.9		

It must rout to the enable pin of PWM and CK-409. VIDGD to Vccp delay time is from 1ms to 10ms. VIDGD rising time is 150ns.

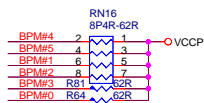
CPU GTL REFERENCE VOLTAGE BLOCK



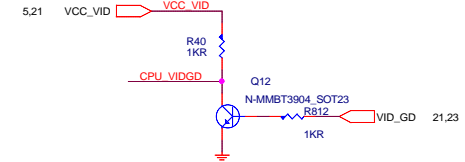
CPU ITP BLOCK



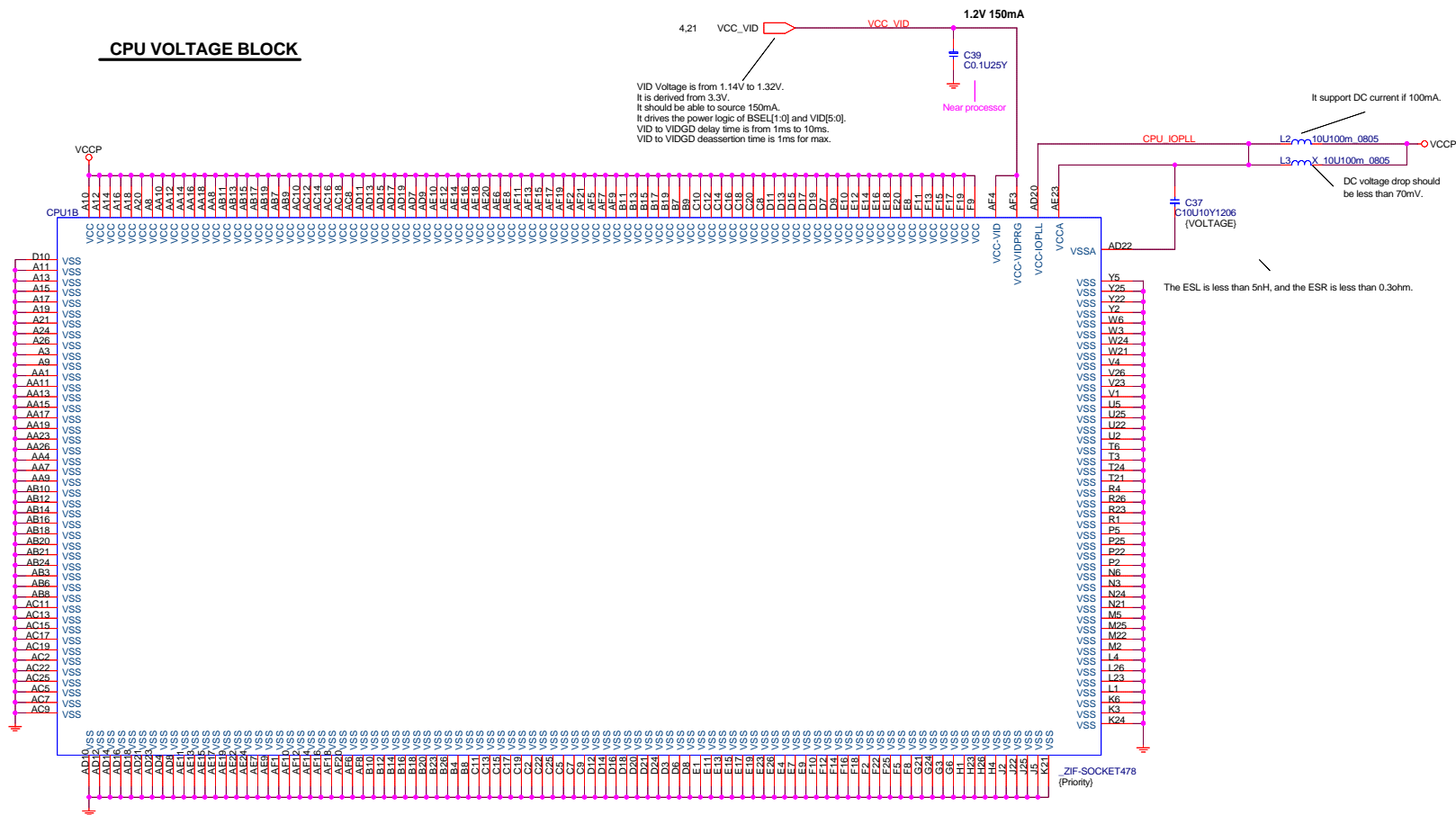
CPU STRAPPING RESISTORS



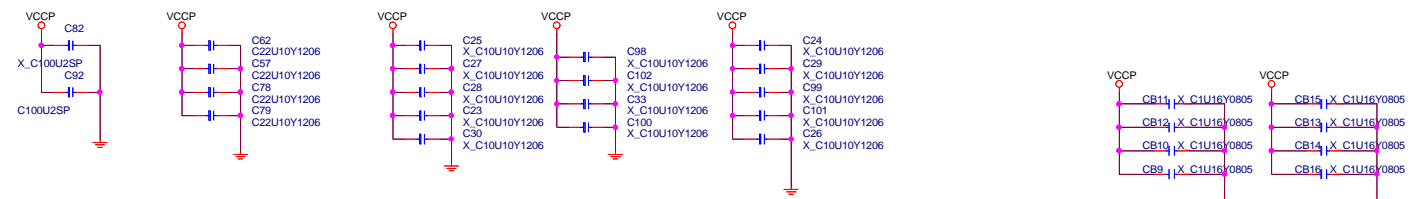
ALL COMPONENTS CLOSE TO CPU

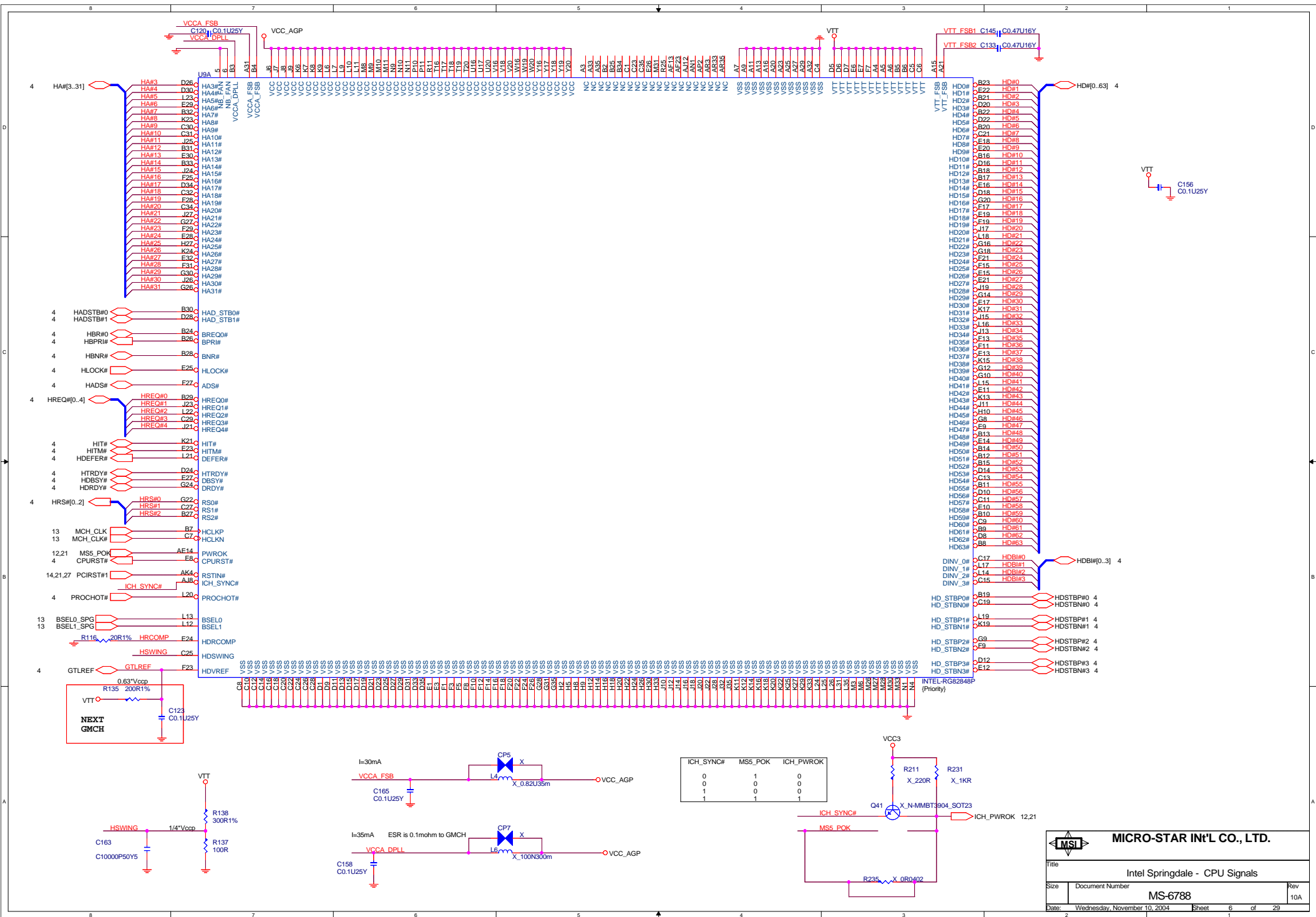


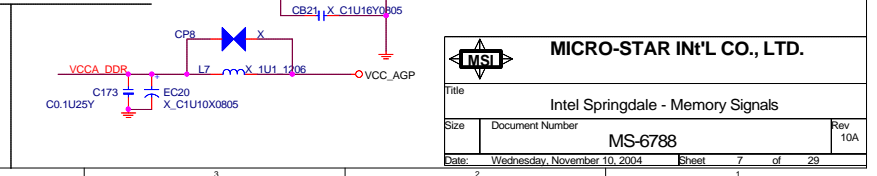
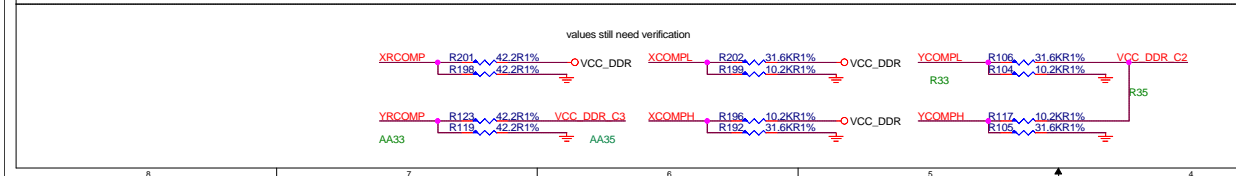
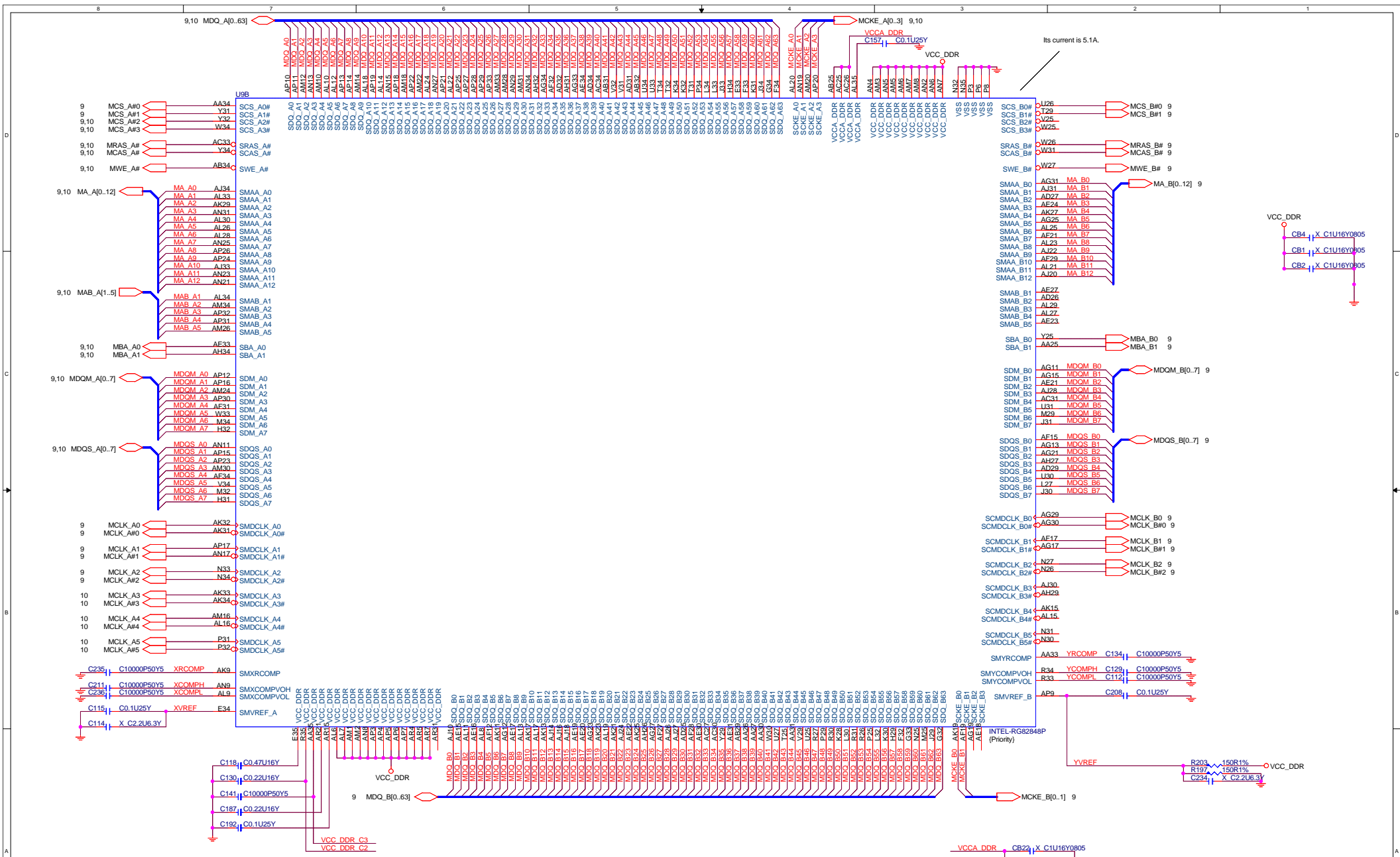
CPU VOLTAGE BLOCK



CPU DECOUPLING CAPACITORS





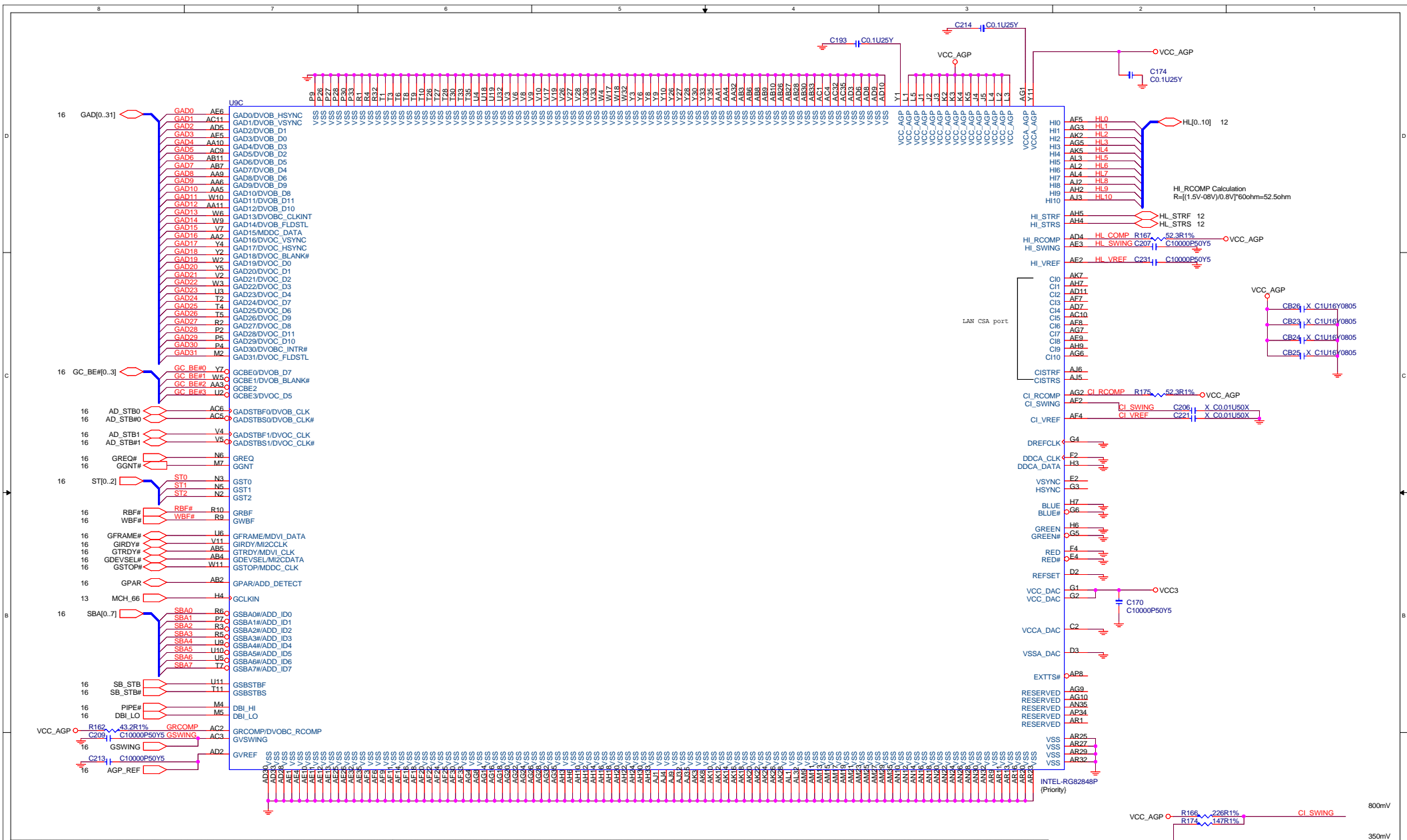


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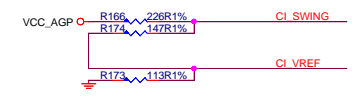
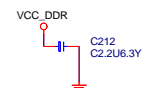
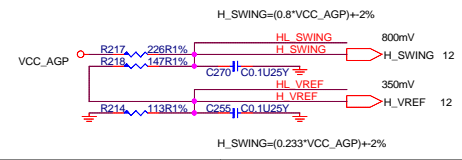
Title: Intel Springdale - Memory Signals

Size: Document Number: MS-6788

Date: Wednesday, November 10, 2004 Sheet 7 of 29



Springdale Decoupling Capacitors



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Title: Intel Springdale - AGP & HLink & LAN Signals

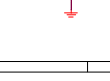
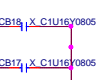
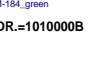
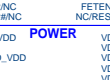
Size	Document Number	Rev
	MS-6788	10A

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DDR DIMM1

SIGNALS

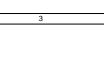
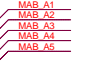
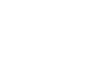
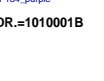
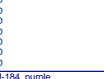
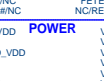
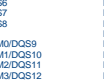
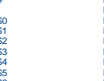
MA A0[0..12]



DDR DIMM2

SIGNALS

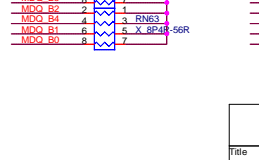
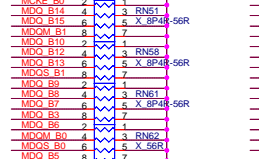
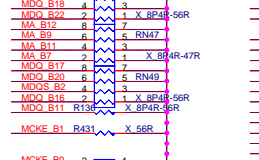
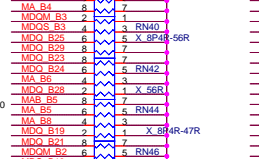
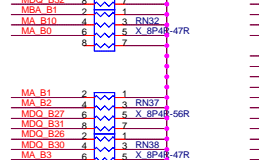
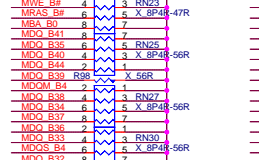
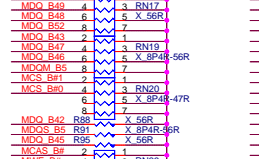
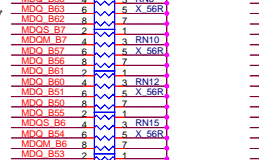
MA B0[0..12]



DDR Termination Resistors

DDR Termination Resistors

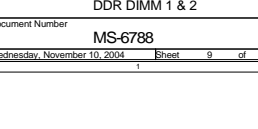
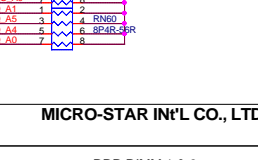
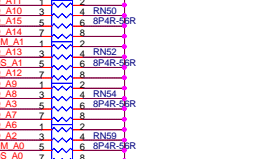
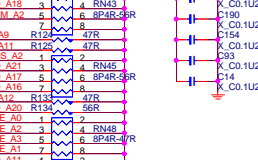
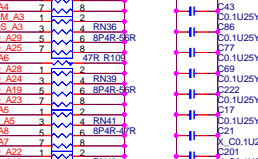
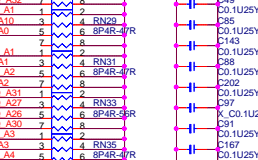
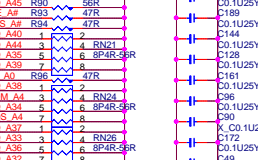
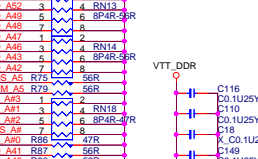
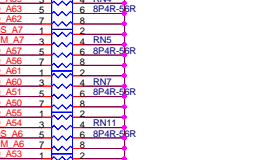
MDO B59



DDR Termination Resistors

DDR Termination Resistors

MDO A58



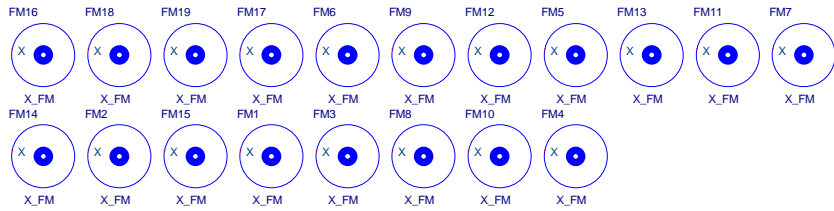
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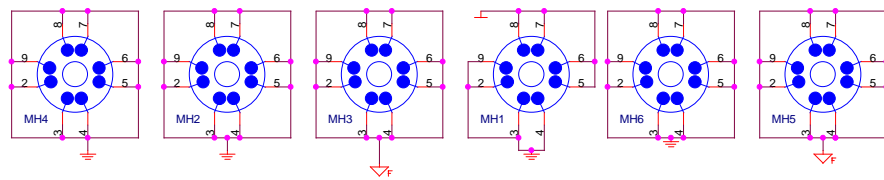
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Size	Document Number	Rev			
	MS-6788	10A			
Date:	Wednesday, November 10, 2004	Sheet	9	of 29	

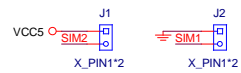
Optics Orientation Holes



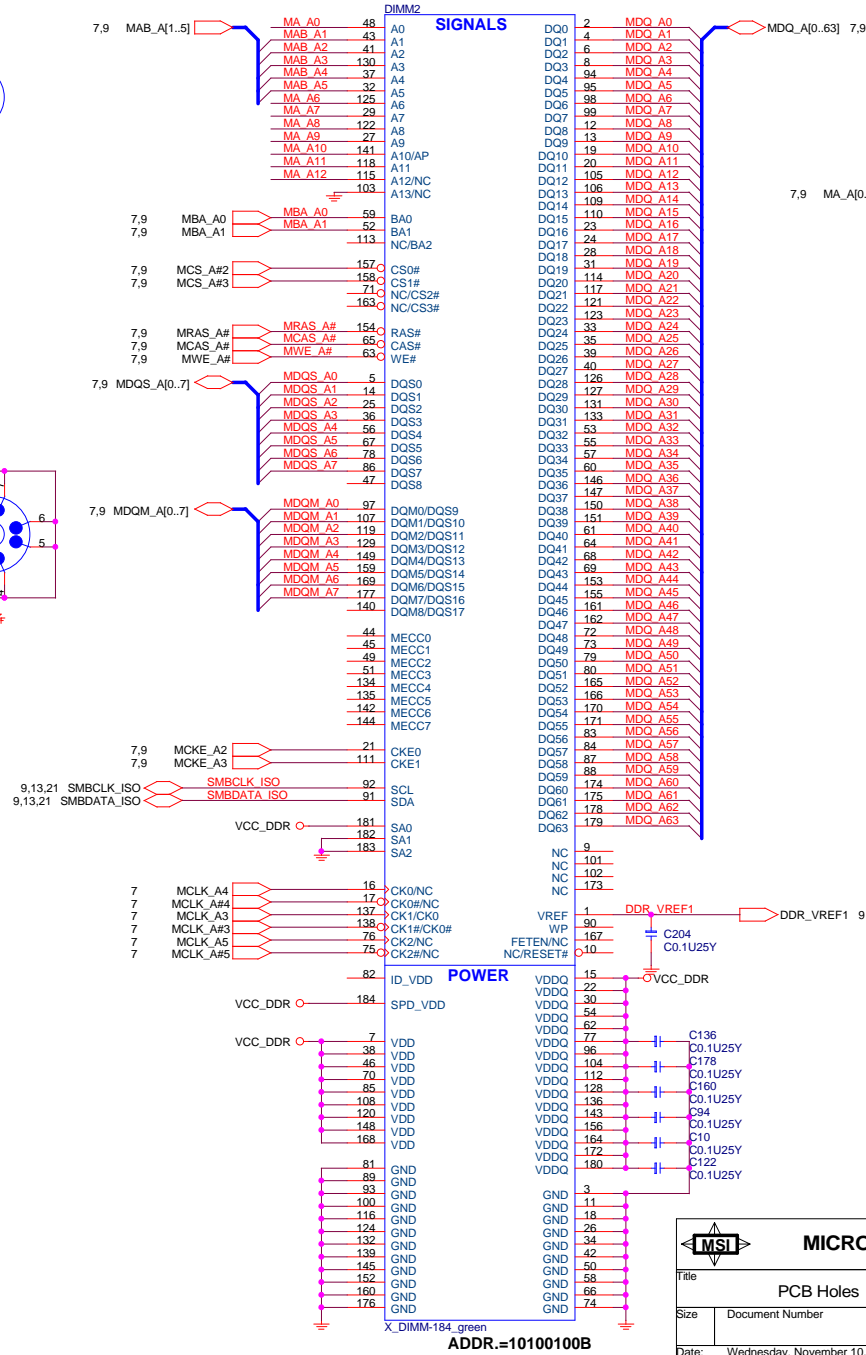
Mounting Holes



Simulation



DDR DIMM3



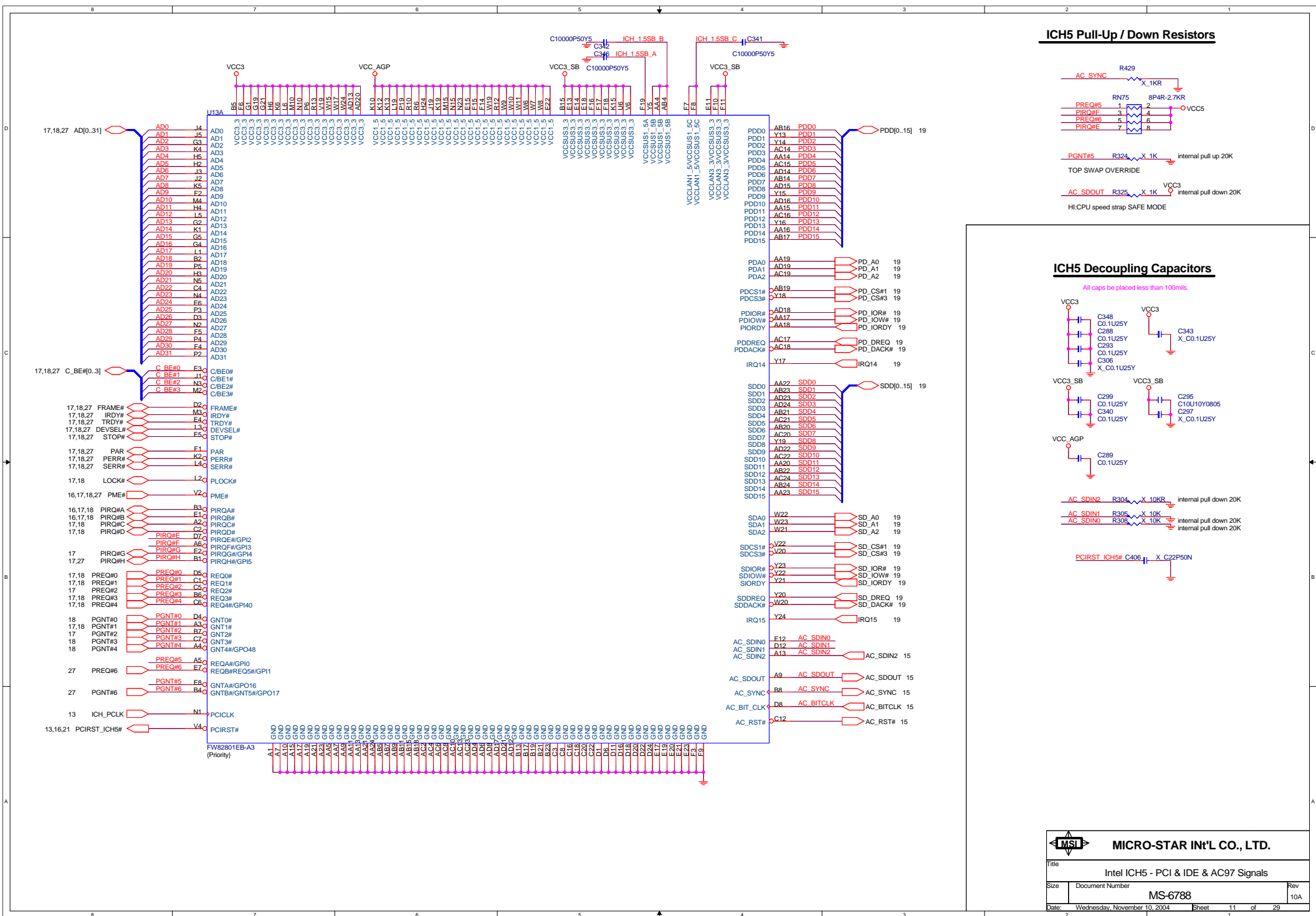
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File PCB Holes

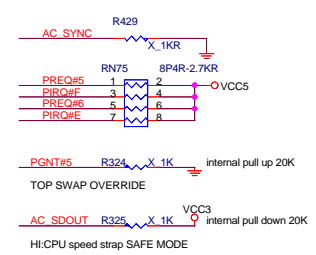
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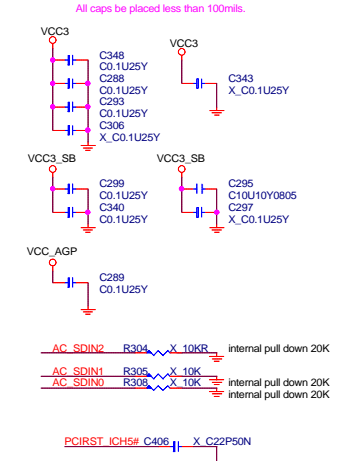
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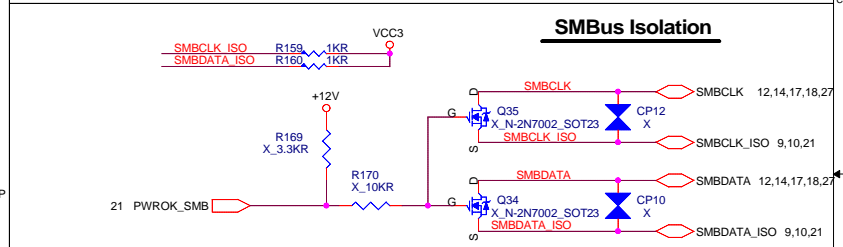
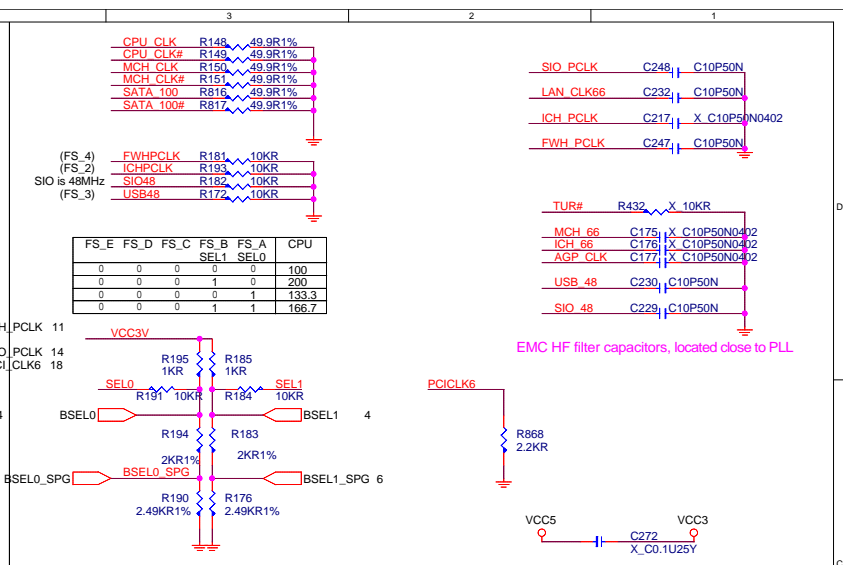
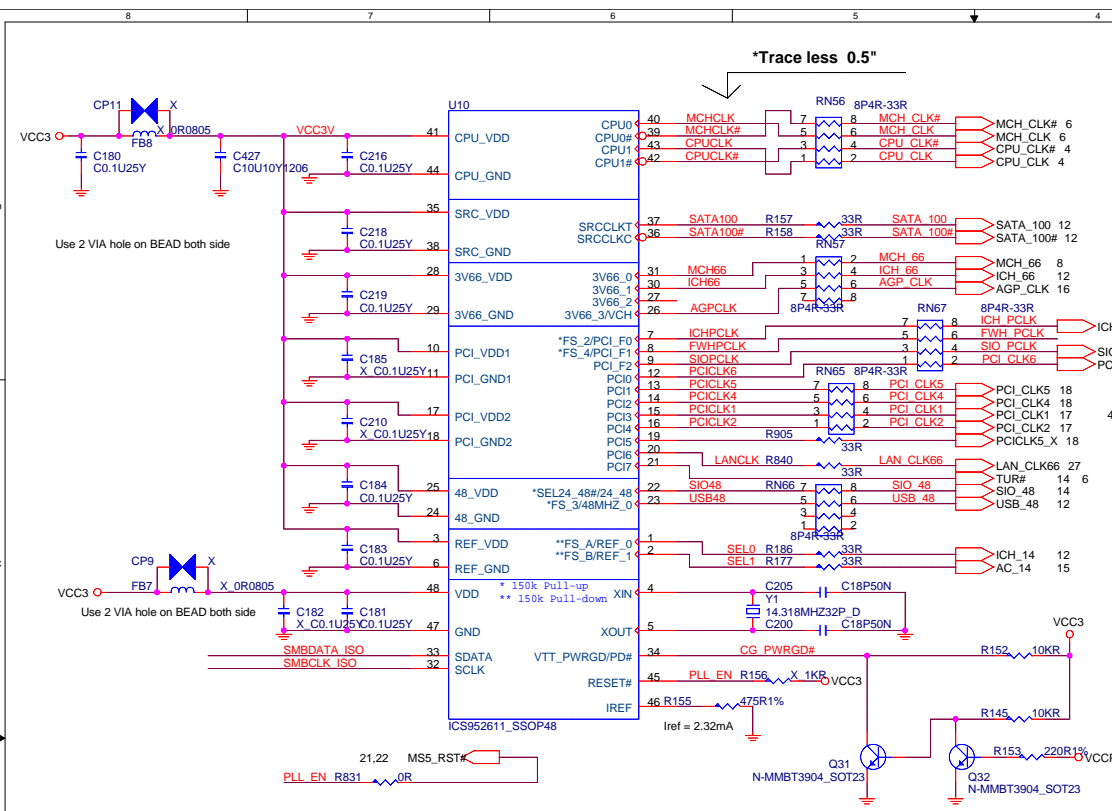


ICH5 Pull-Up / Down Resistors



ICH5 Decoupling Capacitors

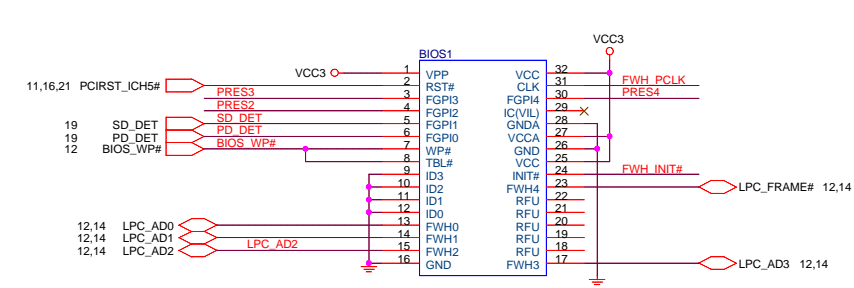




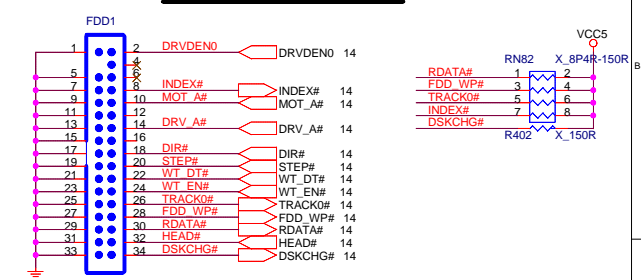
BIOS PROTECT BLOCK

BIOS Update Config.			
HIGH	Un_protected		
LOW	Protected		Default

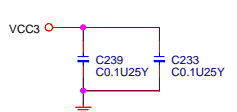
Firmware Hub (FWH)



FLOPPY CONNECTOR

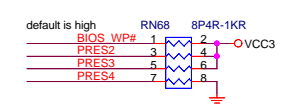


FWH DECOUPLING CAPACITORS

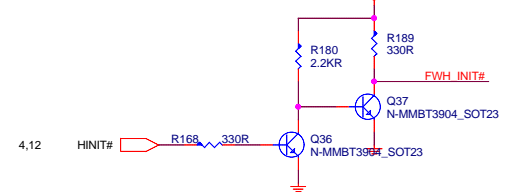


Place Cap. as Close to FWH < 350 mil

FWH Resistors



INIT signal voltage translation



Placement check to this page

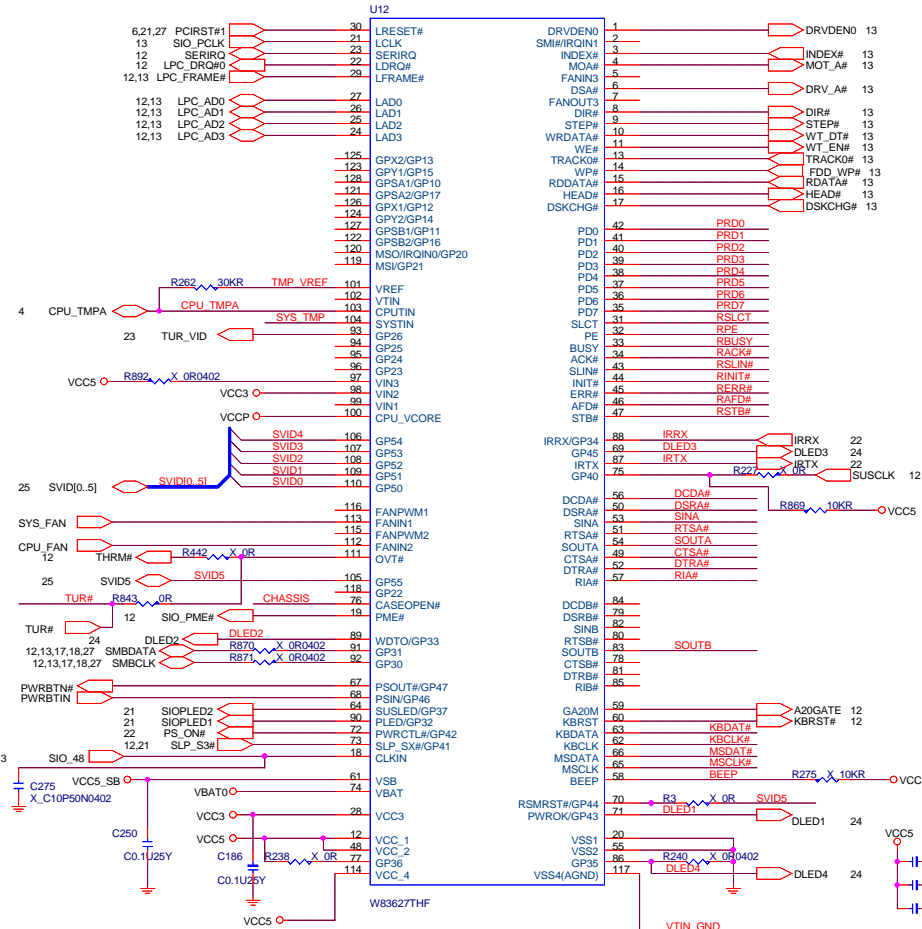
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File: ICS952619 & FWH & FDD

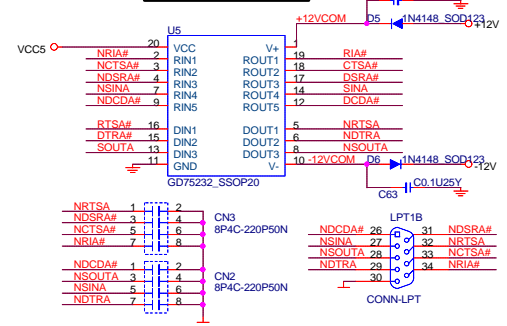
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Date: Wednesday, November 10, 2004 Sheet 13 of 29

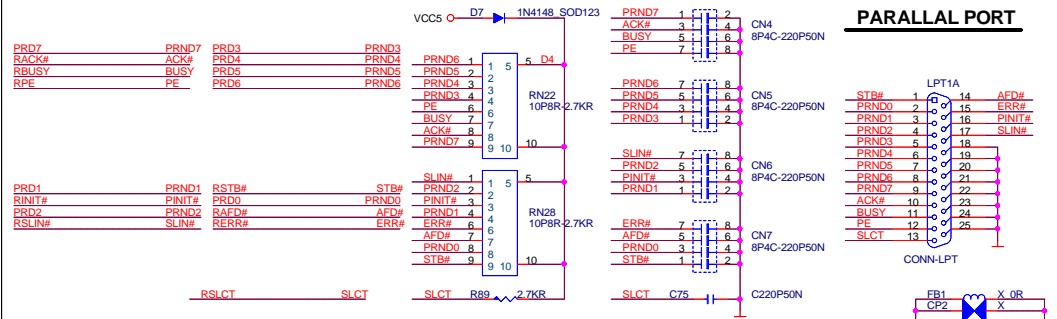
LPC SUPER I/O W83627HF/NHF/THF



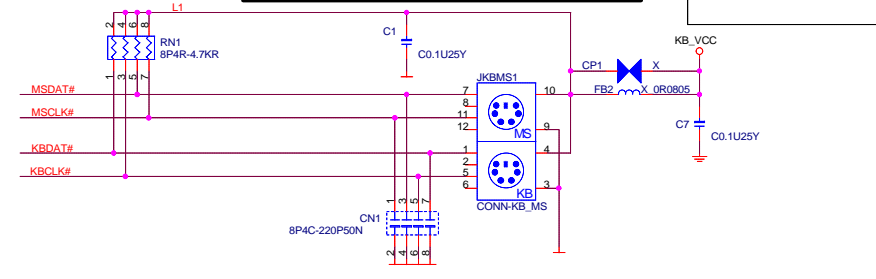
SERIAL PORT 1



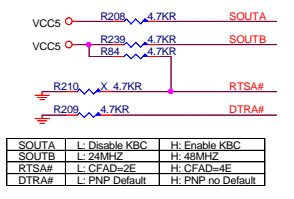
PARALLEL PORT



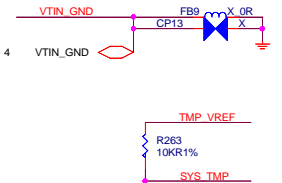
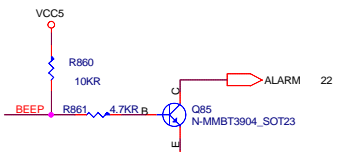
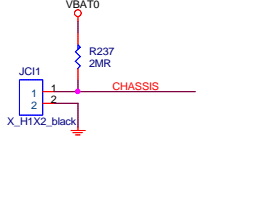
PS2 KEYBOARD & MOUSE CONNECTOR



LPC I/O STRAPPING RESISTOR



Chassis Intrusion



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Title: LPC SUPER I/O & CONNECTORS

Size: Document Number: MS-6788 Rev: 10A

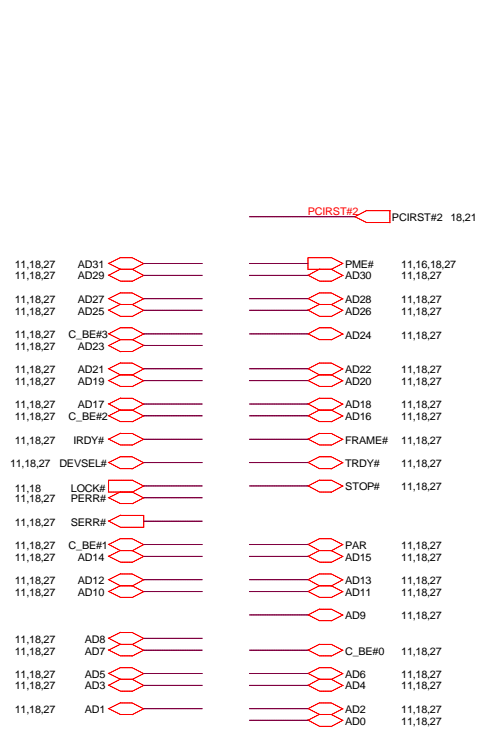
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NOTE: LOCATE CLOSE STATUS PANEL

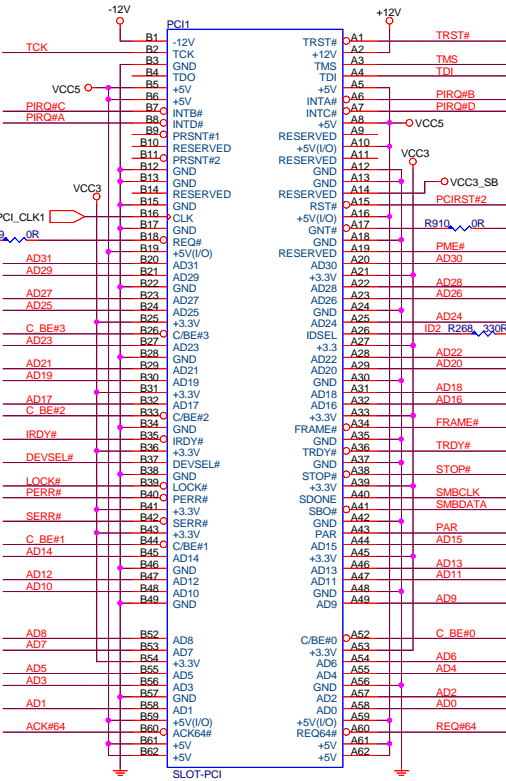
PCI SLOT 1 (PCI VER: 2.2 COMPLY)

PCI SLOT 2 (PCI VER: 2.2 COMPLY)

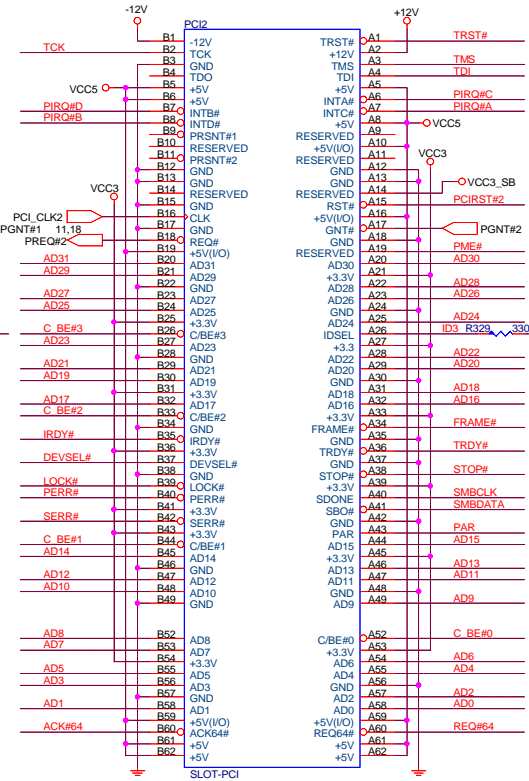
PCI SLOT 3 (PCI VER: 2.2 COMPLY)



IDSEL = AD16
MASTER = PREQ#0
PIRQ#A

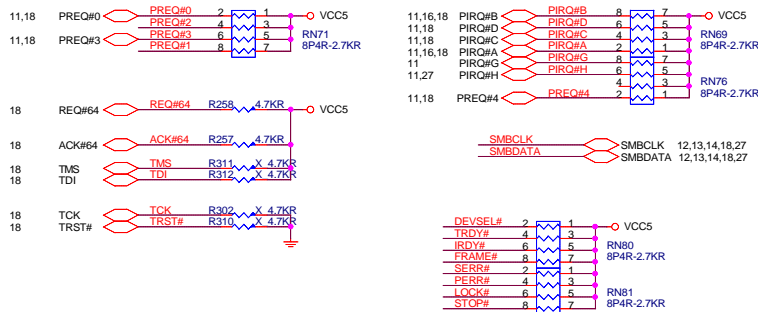


IDSEL = AD17
MASTER = PREQ#1
PIRQ#B

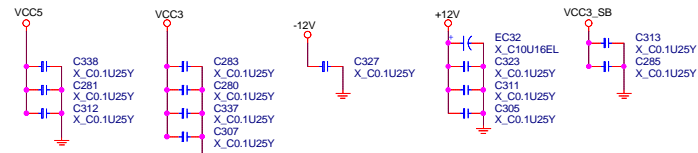


IDSEL = AD18
MASTER = PREQ#2
PIRQ#C

PCI PULL-UP / DOWN RESISTORS



PCI SLOT DECOUPLING CAPACITORS



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Title: PCI 1 & 2 & 3 Slots

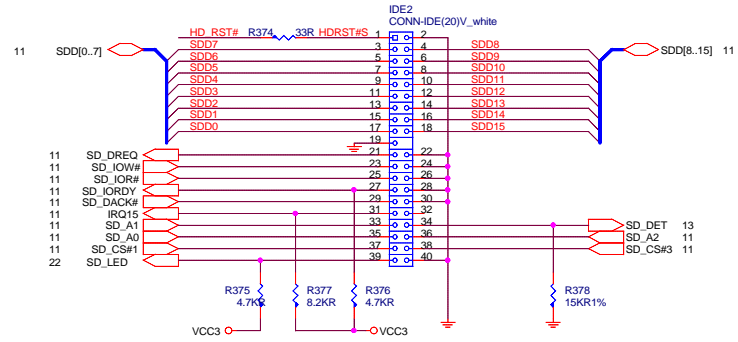
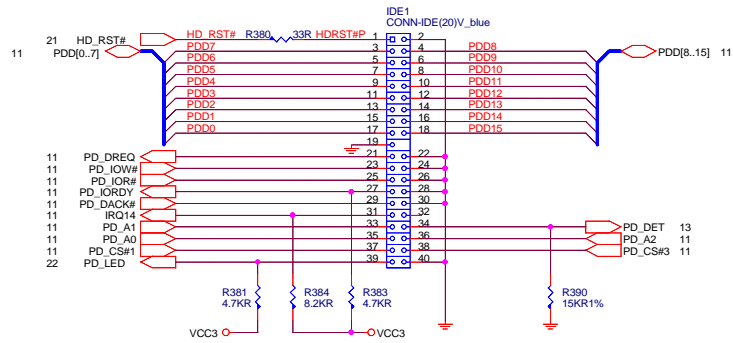
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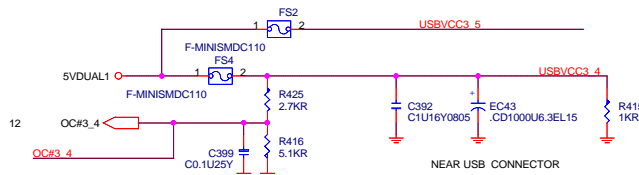
PRIMARY IDE BLOCK

ATA 33/66/100 IDE Connectors

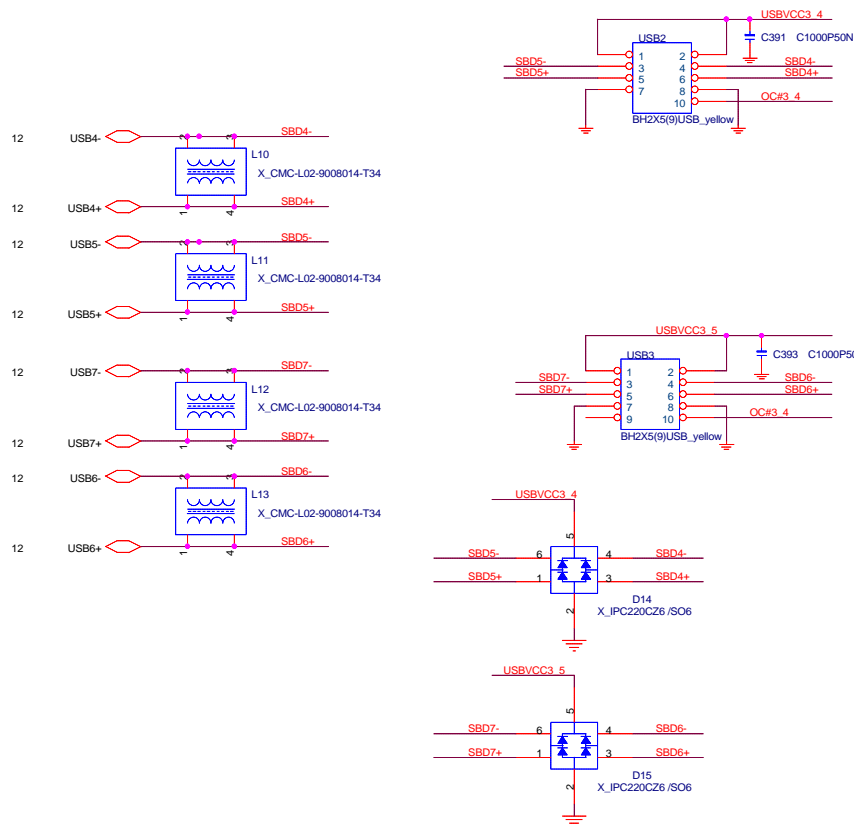
SECONDARY IDE BLOCK



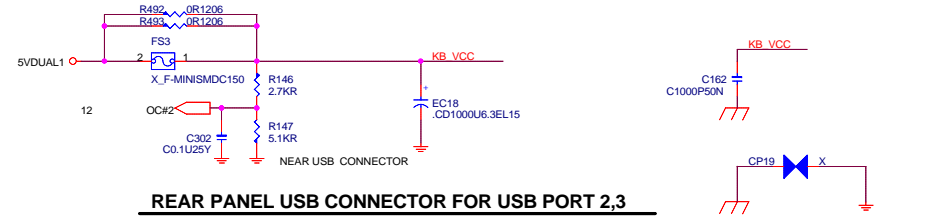
POWER CIRCUIT FOR USB PORT 4,5,6,7



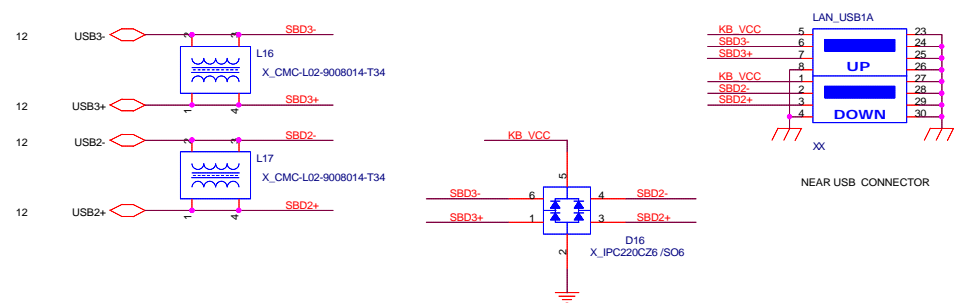
REAR PANEL USB CONNECTOR FOR USB PORT 4,5,6,7



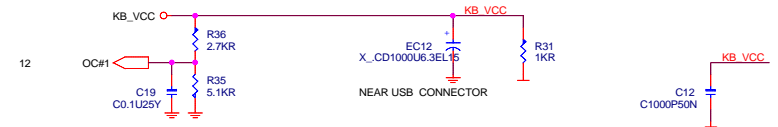
POWER CIRCUIT FOR USB PORT 2,3



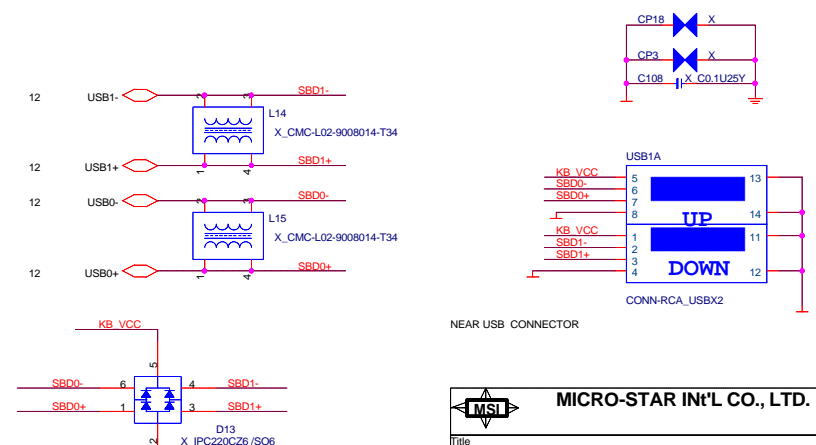
REAR PANEL USB CONNECTOR FOR USB PORT 2,3



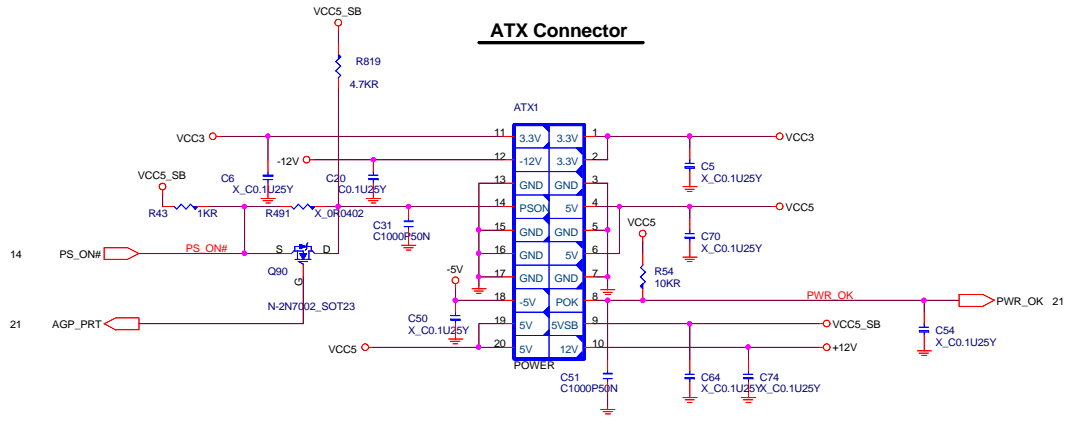
POWER CIRCUIT FOR USB PORT 0,1



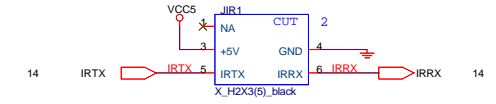
REAR PANEL USB CONNECTOR FOR USB PORT 0,1



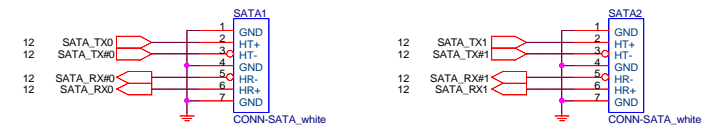
ATX Connector



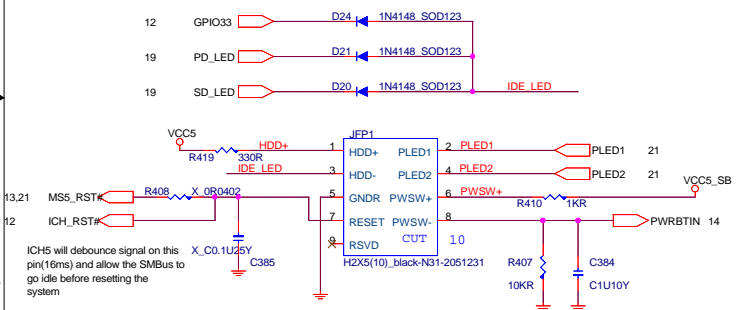
IR Connector



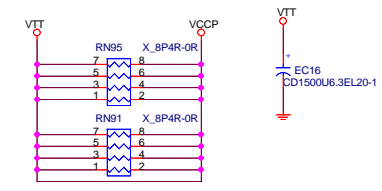
SATA CONNECTOR



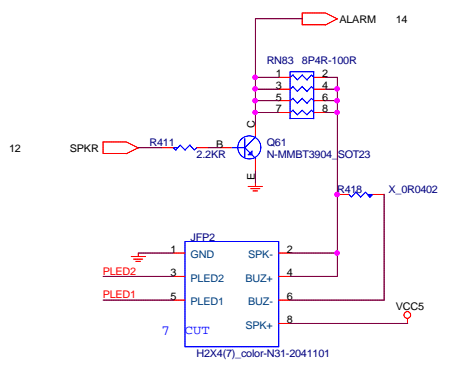
INTEL/PB Front Panel Connector

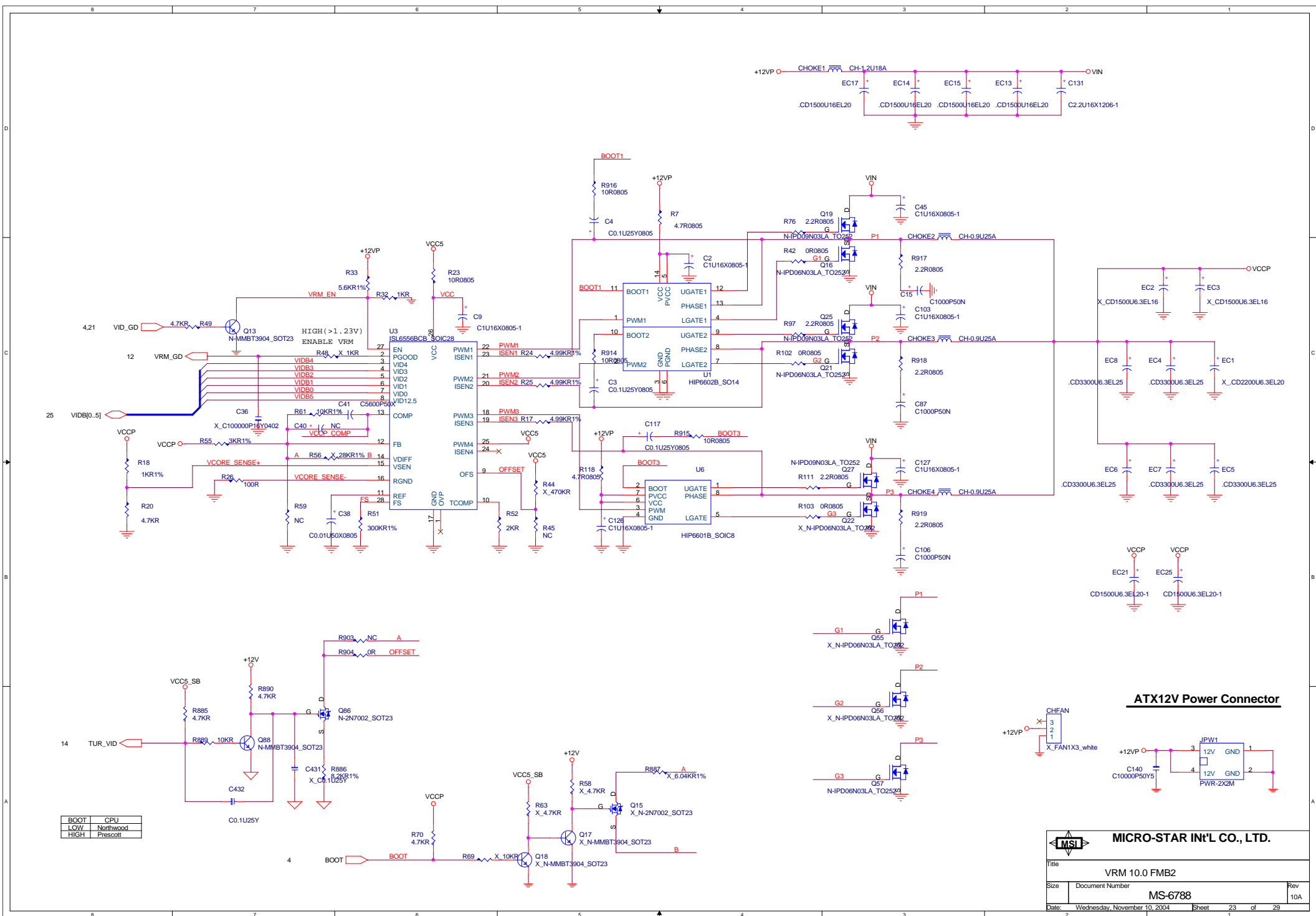


Intel reference GMCH VTT power circuit



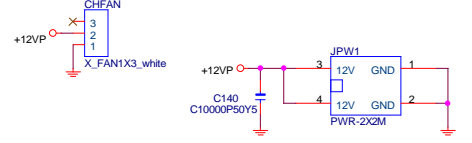
MSI Front Panel Connector





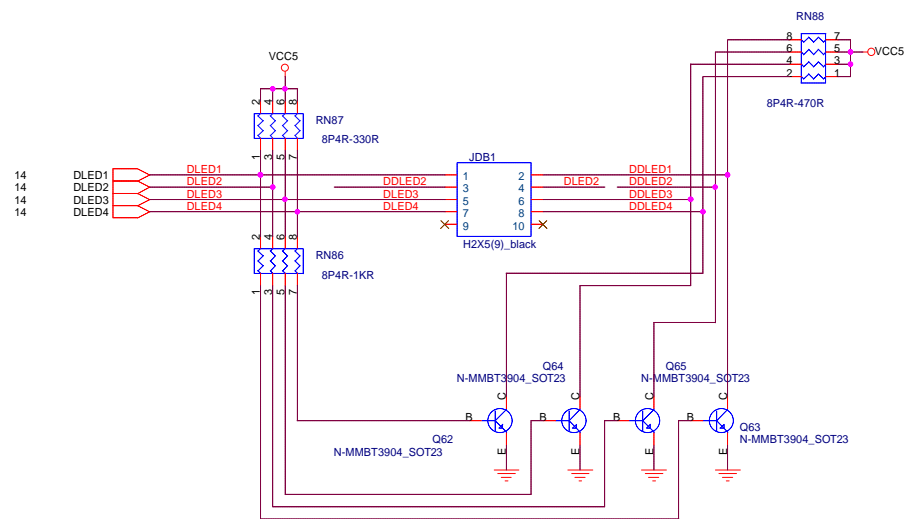
BOOT	CPU
LOW	Northwood
HIGH	Prescott

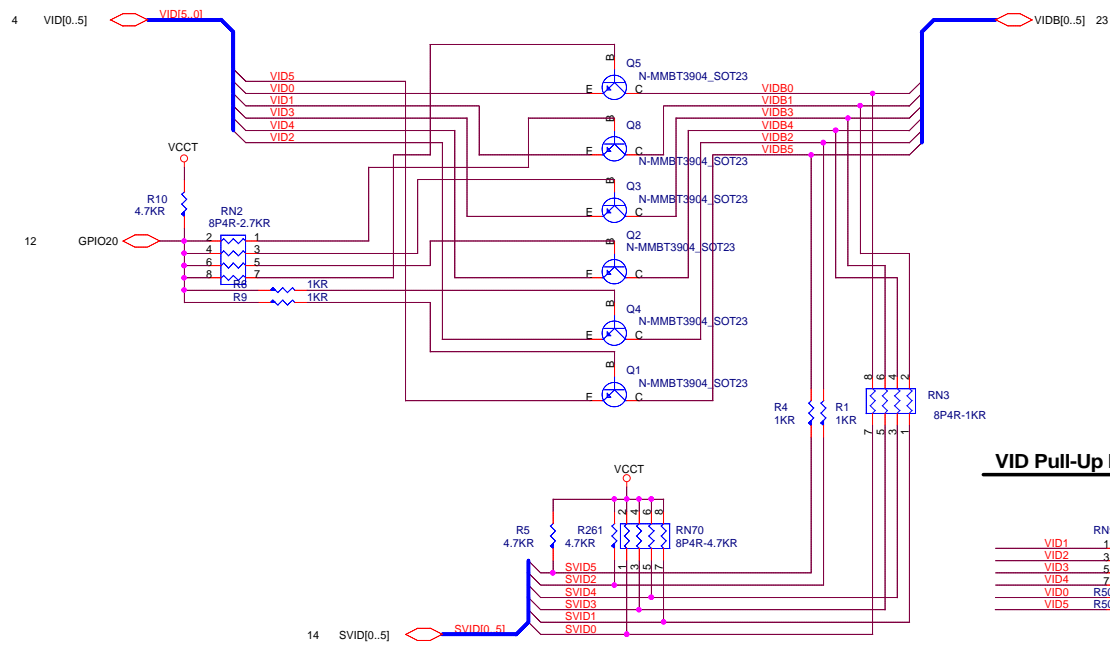
ATX12V Power Connector



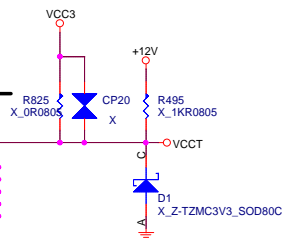
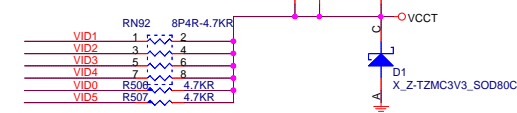
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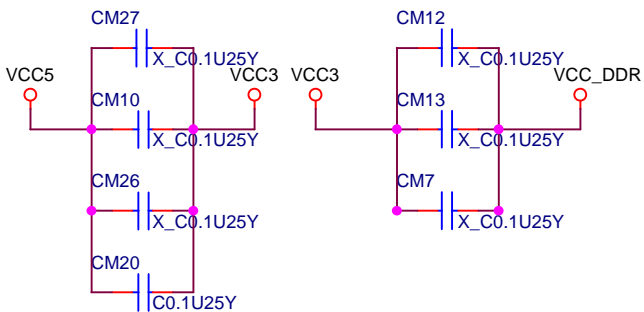
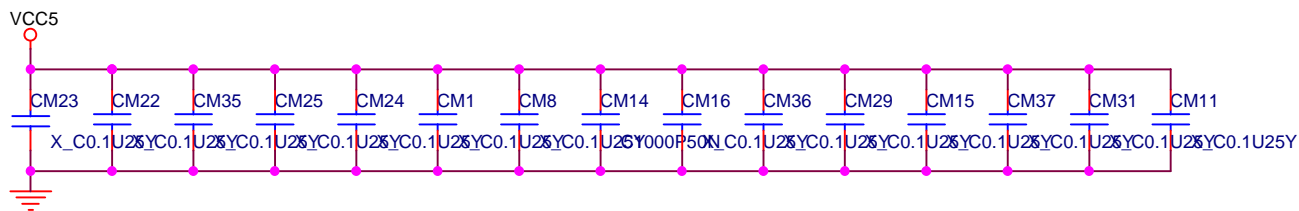
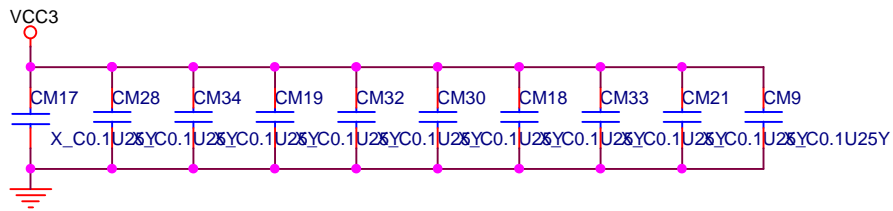




VID Pull-Up Resistors

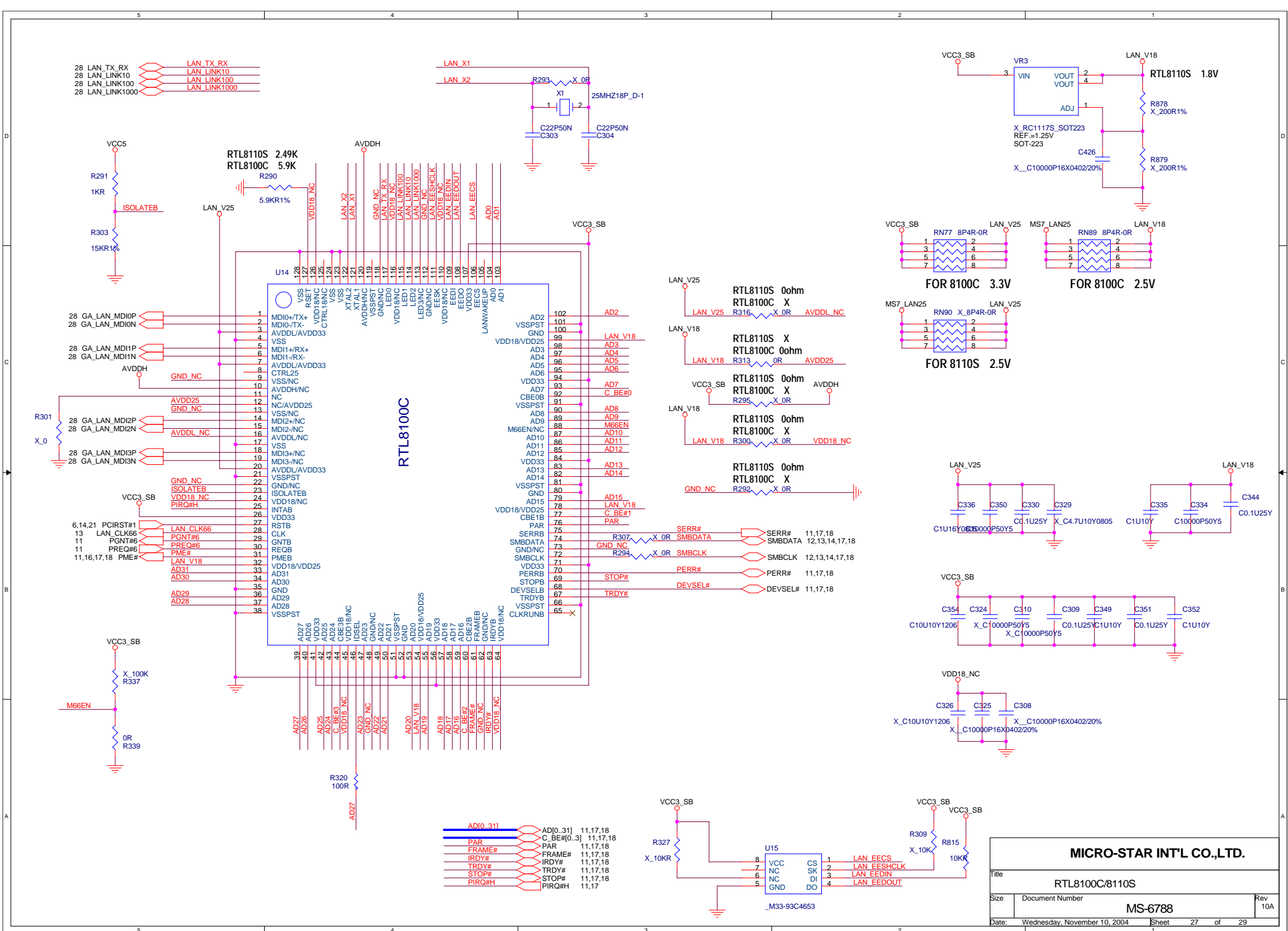


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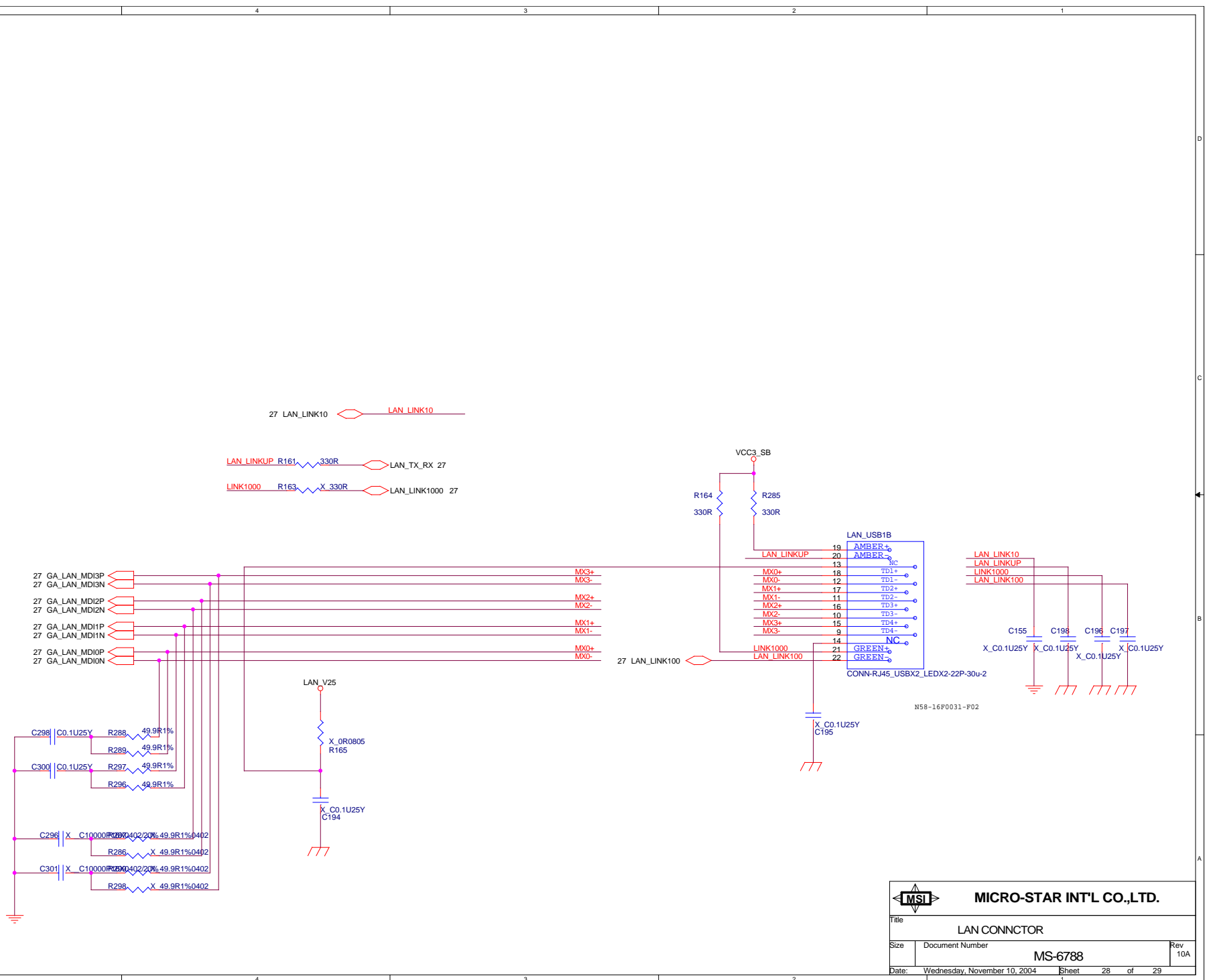



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Jumper Setting & Connector Setting

