Last Schematic Update Date:

10/29/2002 V20b

MS-6535 VERSION:2.0B

SIS 651 CHIPSET

Willamette/Northwood 478pin mPGA-B Processor Schematics

CPU:

Willamette/Northwood mPGA-478B Processor

System SIS651 Chipset:

SIS 651 (North Bridge B0)
+ 962L (South Bridge C1)

On Board Chip:

LPC Super I/O -- W83697HF_UB
BIOS -- ISA
AC' 97 CODEC -- ALC650 Ver:F
CLOCK GENERATION -- ICS 952001
LAN -- RTL8101L
PCMCIA -- OZ6933
DVO -- SIS301B DVI + TV-OUT + 2nd CRT
1394 -- NEC72874- 2ports VER:E
MEMORY STICK -- W83L518D Ver:B

Expansion Slots:

PCI2.2 SLOT* 1 (RISER CARD PCI*2)

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Title: COVER PAGE

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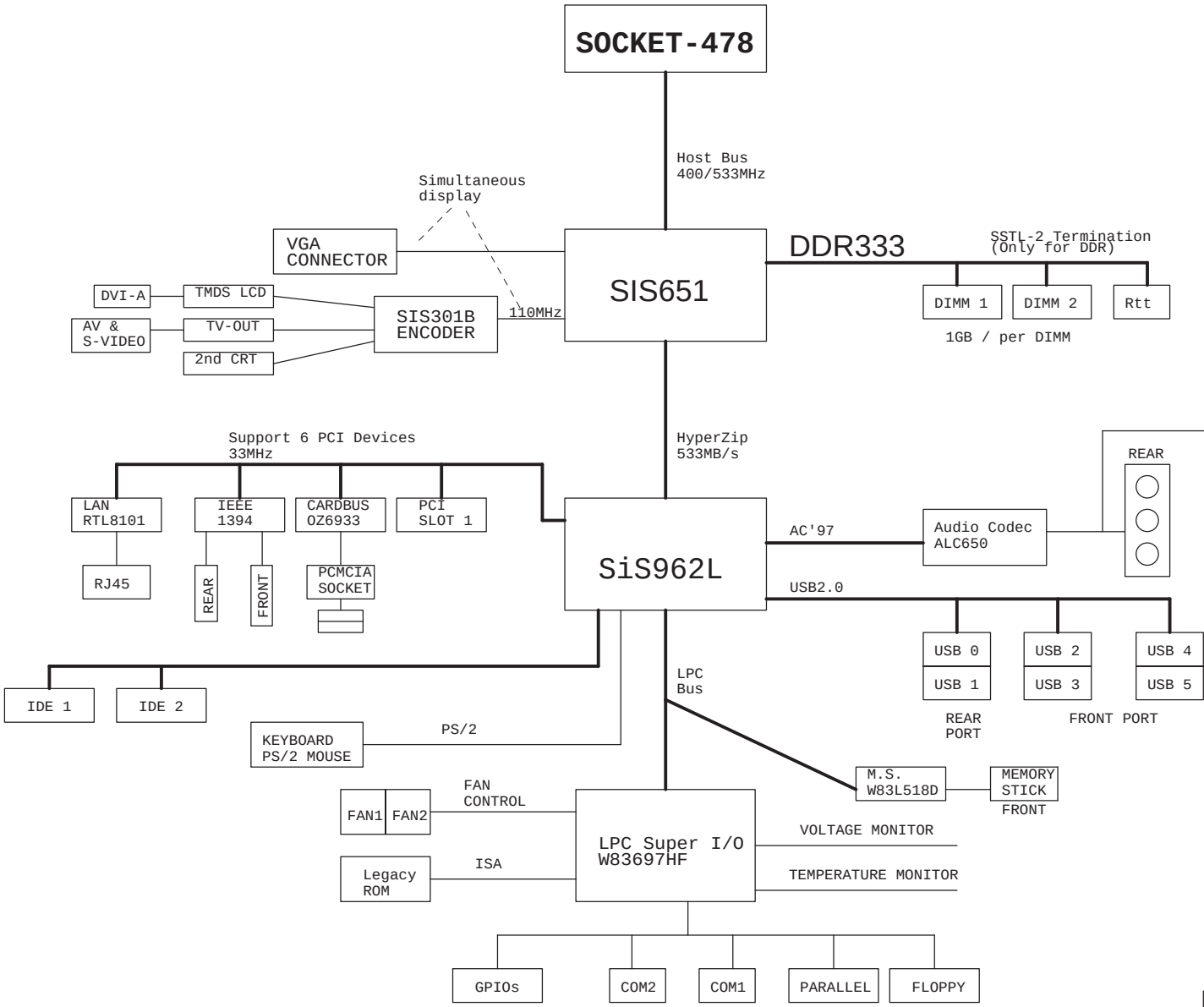
System Block Diagram



PCI DEVICE ROUTING TABLE

DEVICE	INT pin	IDSEL
1394	INTD#	AD23
LAN	INTC#	AD26
MODEM	INTB#	
VGA	INTA#	
PCMCIA	INTB#	AD25
PCI SLOT	INTB# INTC# INTD# INTA#	AD17

PCI RISER

DEVICE	INT pin	IDSEL
PCI #1	INTB# INTC# INTD# INTA#	AD17
PCI #2	INTC# INTD# INTA# INTB#	AD18

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Title: System Block Diagram

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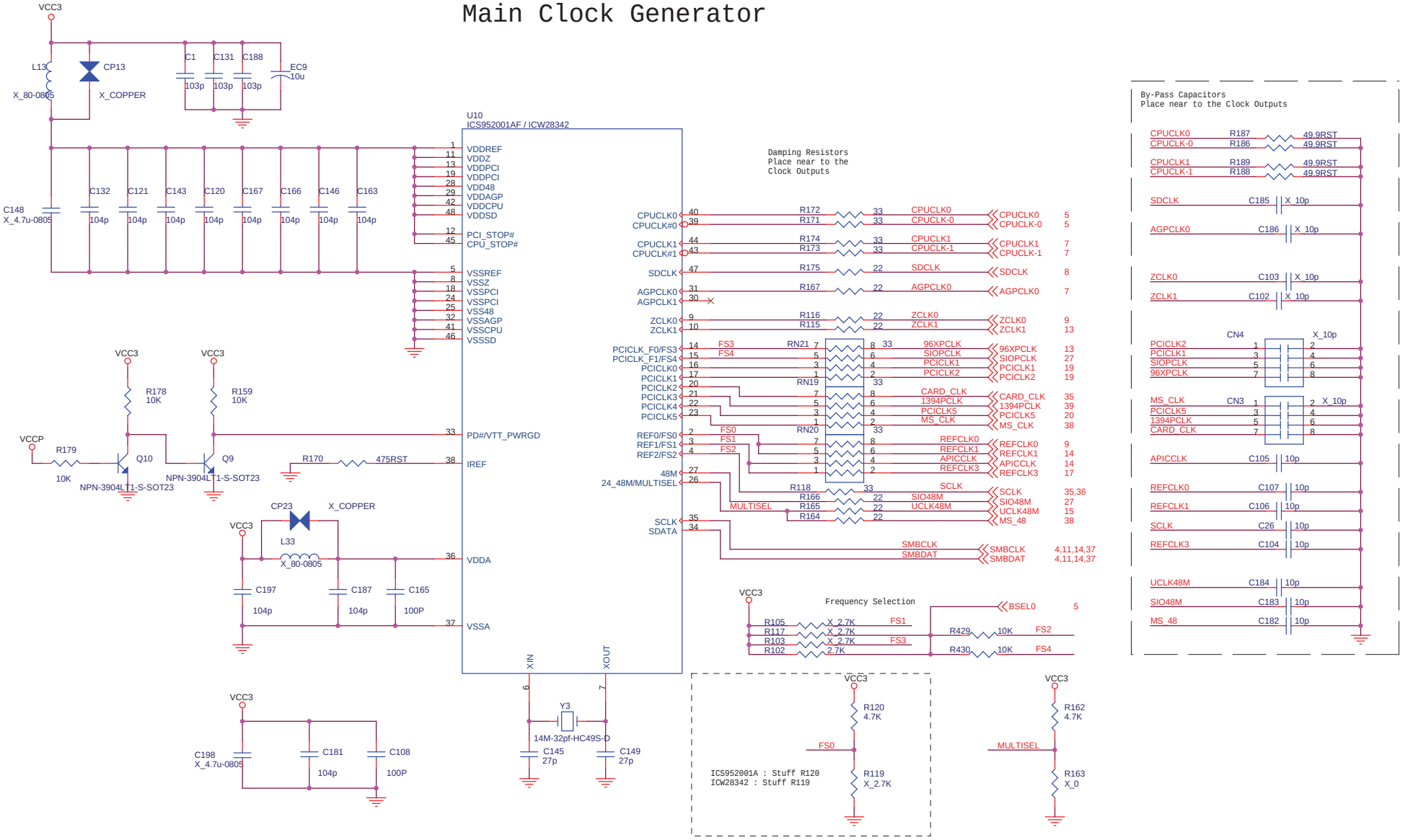
Main Clock Generator



FS4	FS3	FS2	FS1	FS0	CPU	SDRAM	ZCLK	AGP	PCI
0	0	0	0	1	100	100	66	66	33
1	0	1	0	1	133	100	66	66	33

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Title	MAIN CLOCK GEN
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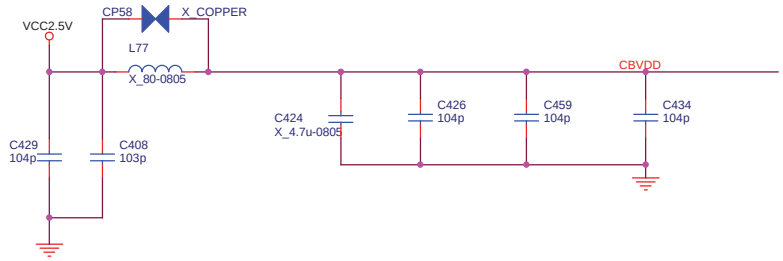
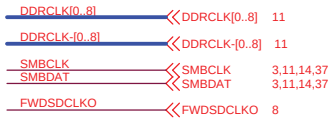
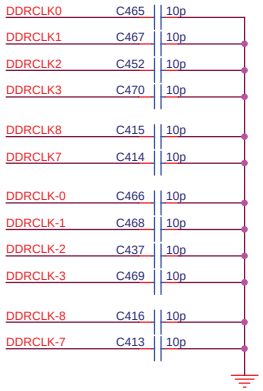
Clock Buffer (DDR)

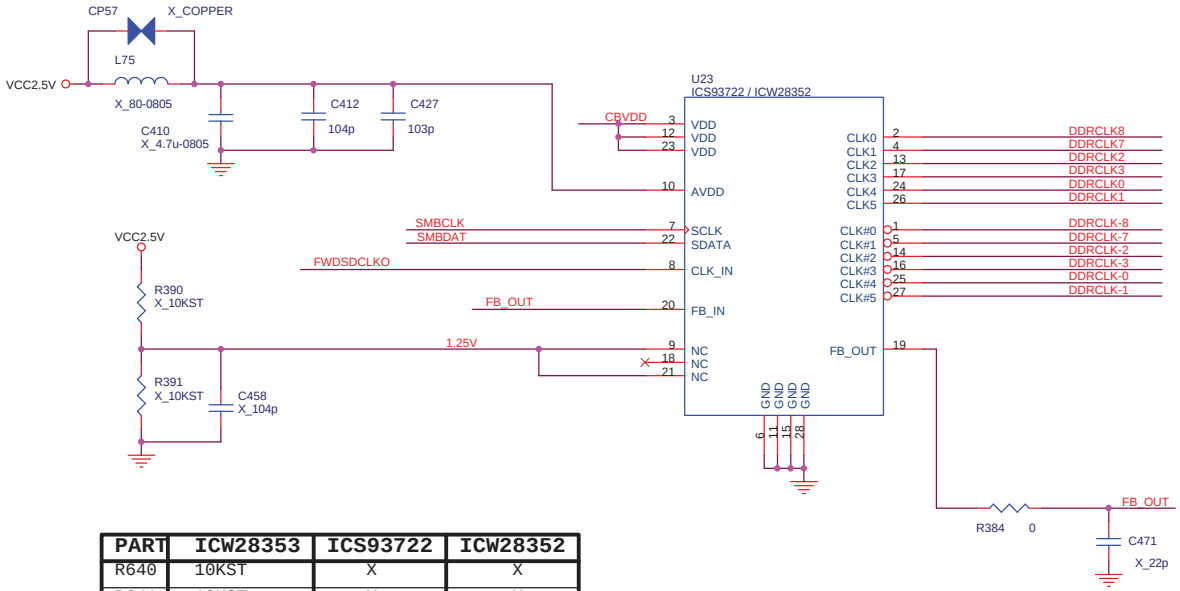
(OPTIONS)
1: (ICS-93705)





By-Pass Capacitors
Place near to the Clock Buffer





PART	ICW28353	ICS93722	ICW28352
R640	10KST	X	X
R641	10KST	X	X
C642	104p	X	X

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Title: DDR CLOCK BUFFER			
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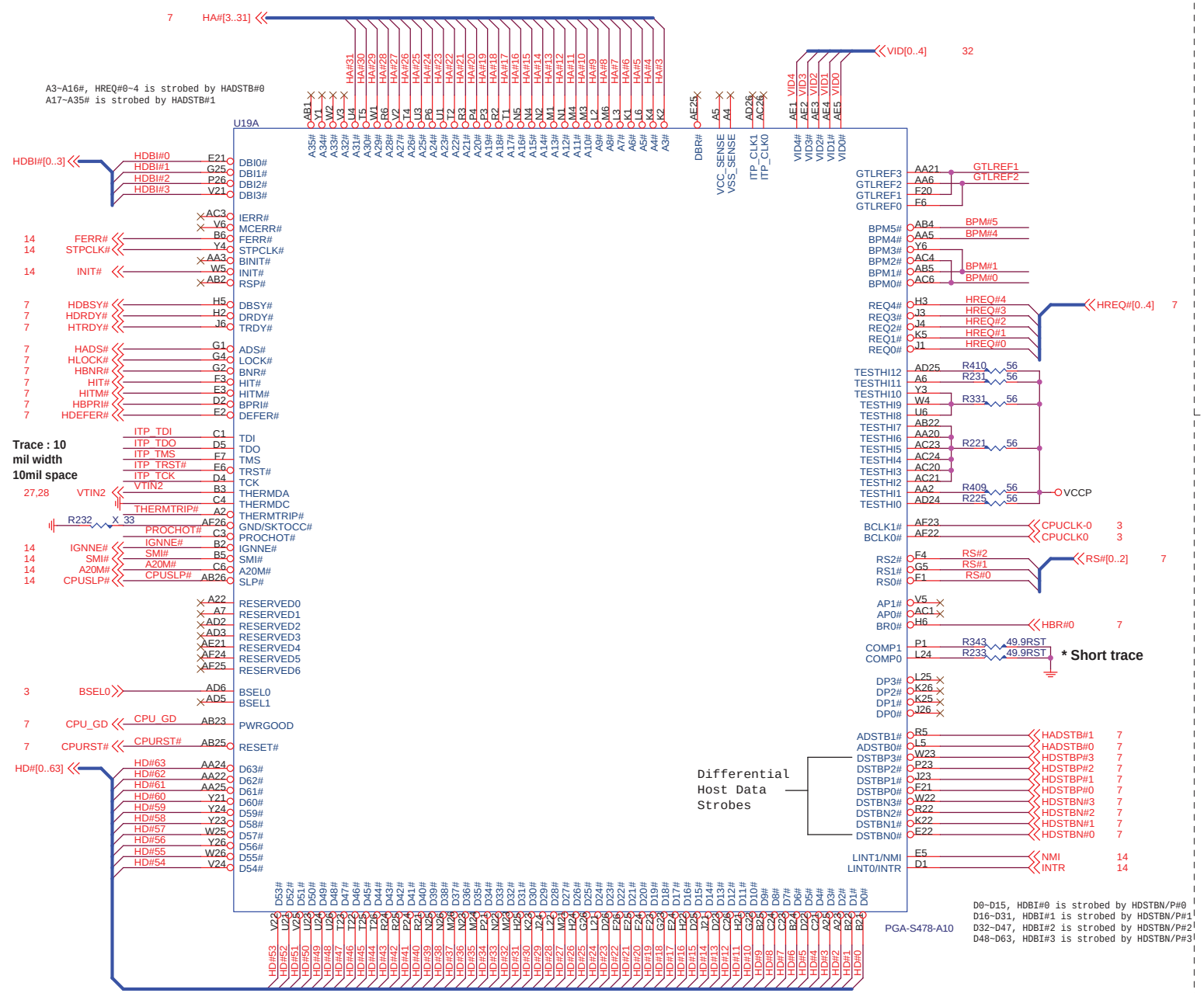
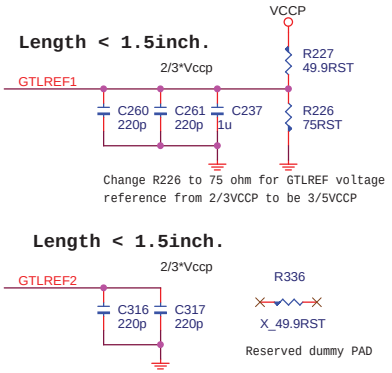
CPU SIGNAL BLOCK

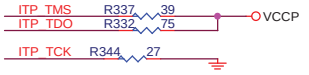


CPU GTL REFERNCE VOLTAGE BLOCK



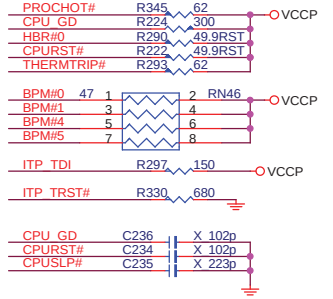
Every pin put one 220pF cap near it.
Trace Width 15mils, Space 15mils.
Keep the voltage dividers within 1.5 inches of the first GTLREF Pin

CPU ITP BLOCK



CPU STRAPPING RESISTORS

ALL COMPONENTS CLOSE TO CPU



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Title: mPGA478 CPU-1		
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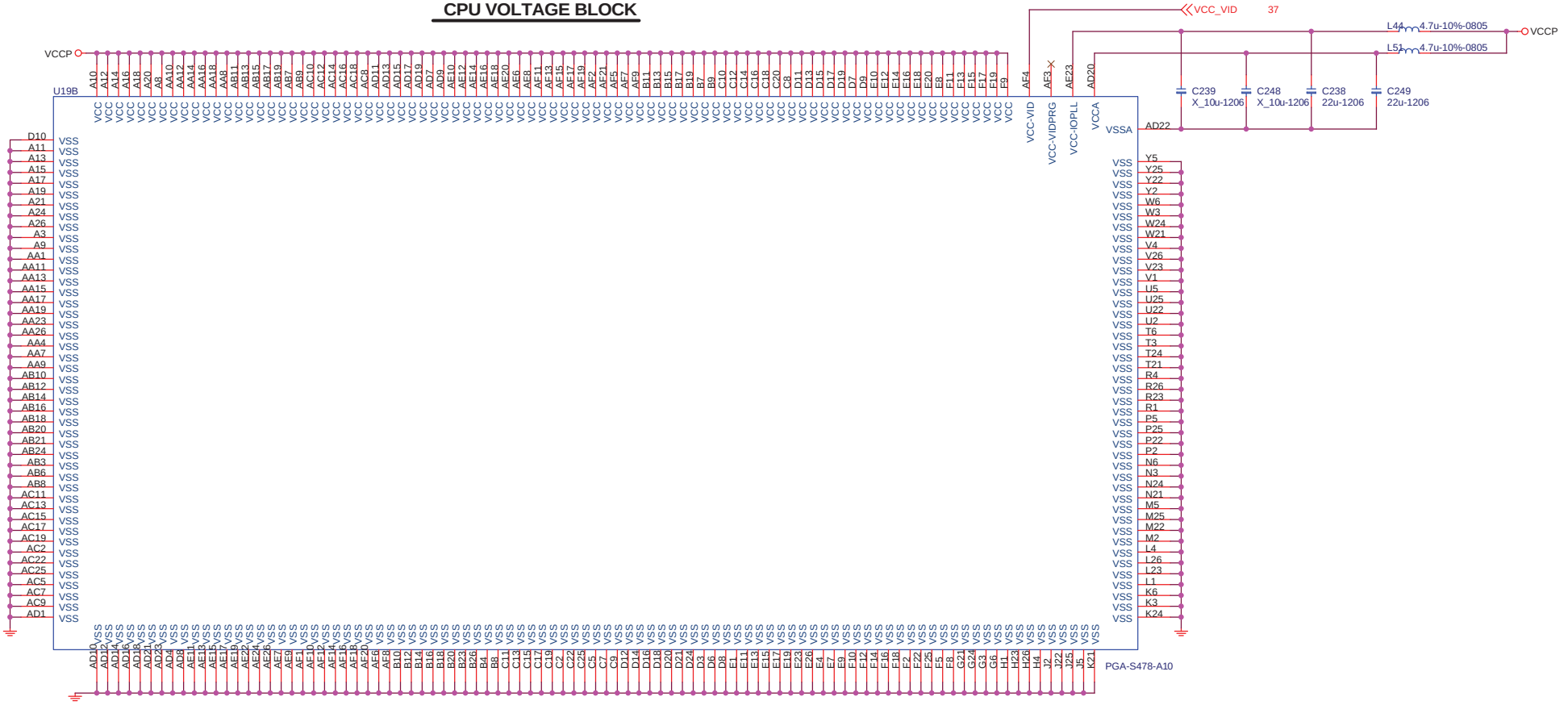
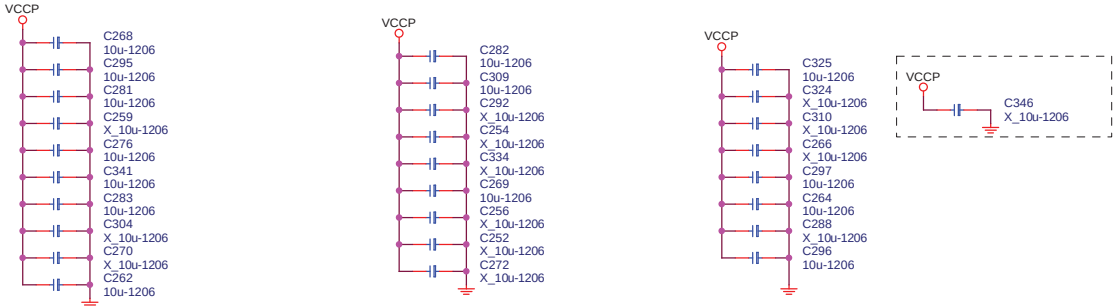
CPU VOLTAGE BLOCK



CPU DECOUPLING CAPACITORS



PLACE CAPS WITHIN CPU CAVITY

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Title: mPGA478 CPU-2

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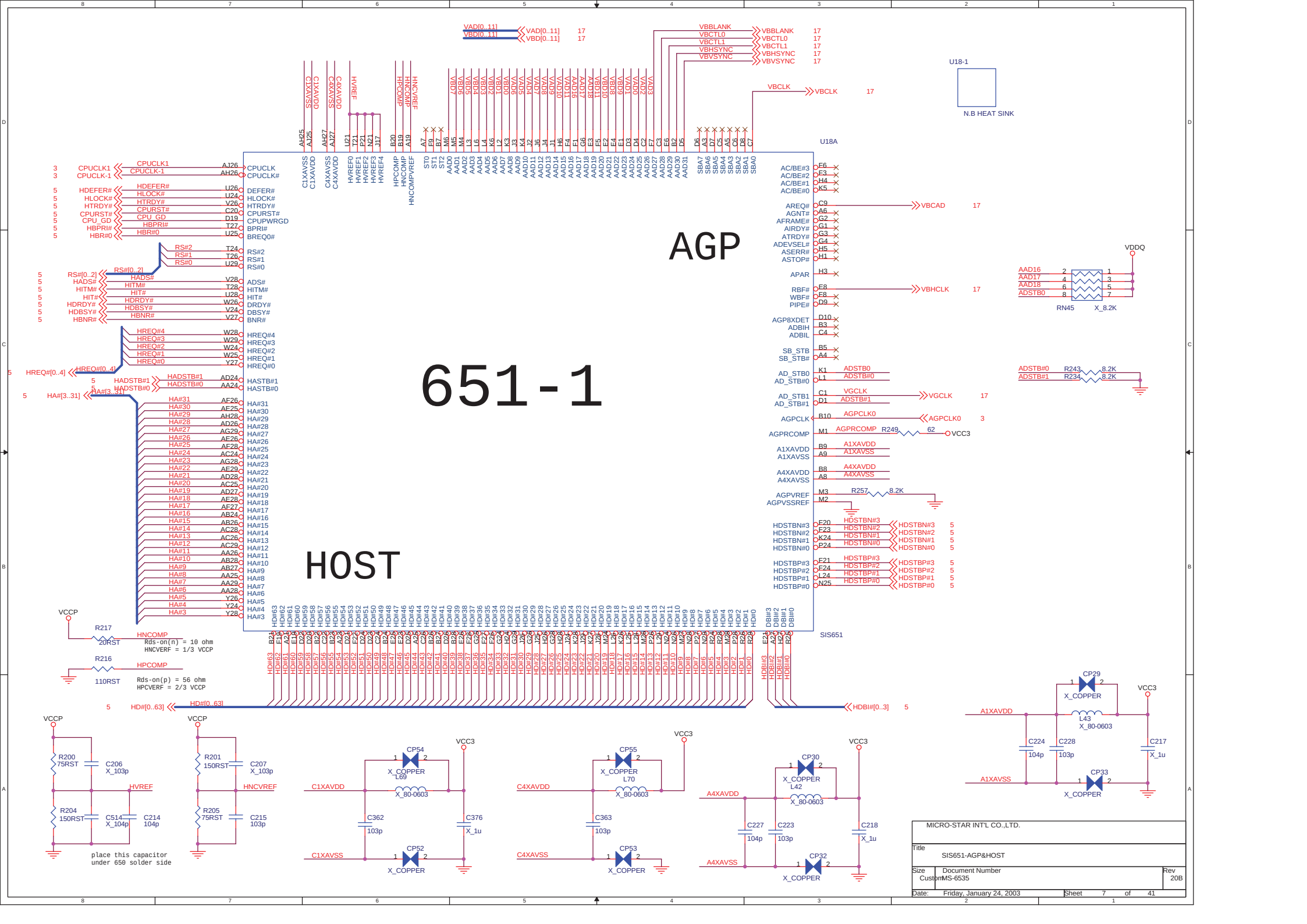
651-1
AGP
HOST
SIS651
U18A
U18-1
N.B HEAT SINK
VBCLK
VBCAD
VBHCLK
VGCLK
AGPCLK0
VCC3
VDDQ
RN45
X_8.2K
R257
8.2K
R249
62
R243
8.2K
R234
8.2K
ADSTB0
ADSTB#0
ADSTB1
ADSTB#1
AGPCOMP
HDSTBN#3
HDSTBN#2
HDSTBN#1
HDSTBN#0
HDSTBP#3
HDSTBP#2
HDSTBP#1
HDSTBP#0
HD#[0..63]
HDBI#[0..3]
VCCP
R217
20RST
HNCOMP
Rds-on(n) = 10 ohm
HNCVERF = 1/3 VCCP
R216
110RST
HPCOMP
Rds-on(p) = 56 ohm
HPCVERF = 2/3 VCCP
R200
75RST
C206
X_103p
HVREF
R204
150RST
C514
X_104p
C214
104p
R201
150RST
C207
X_103p
HNCVREF
R205
75RST
C215
103p
place this capacitor
under 650 solder side
CP54
X_COPPER
L69
X_80-0603
C362
103p
C376
X_1u
C1XAVDD
C1XAVSS
CP55
X_COPPER
L70
X_80-0603
C363
103p
C4XAVDD
C4XAVSS
CP30
X_COPPER
L42
X_80-0603
C227
104p
C223
103p
C218
X_1u
A4XAVDD
A4XAVSS
CP52
CP53
CP32
CP29
X_COPPER
L43
X_80-0603
C224
104p
C228
103p
C217
X_1u
A1XAVDD
A1XAVSS
CP33
MICRO-STAR INT'L CO.,LTD.
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SIS651-AGP&HOST
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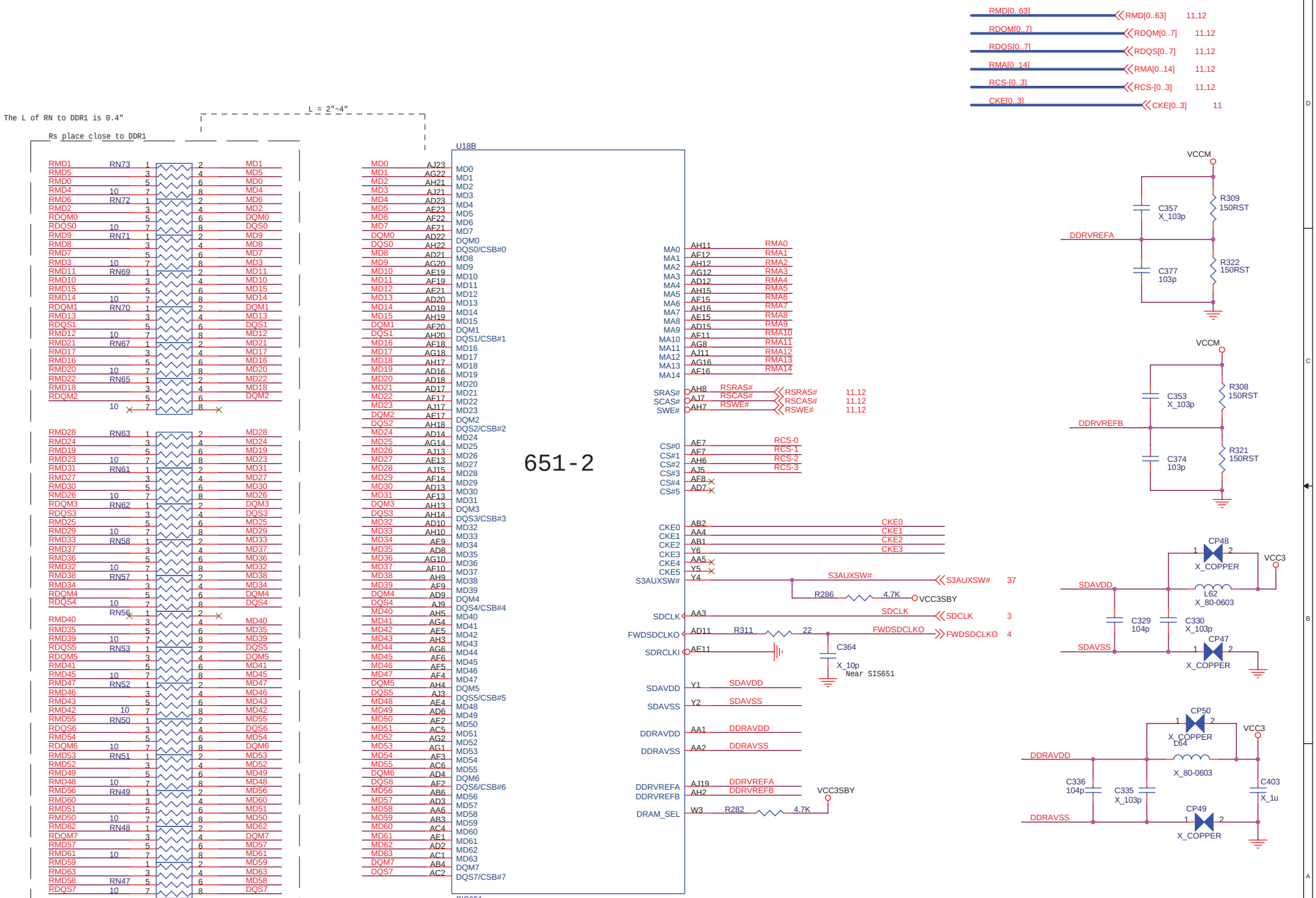
RMD[0..63] RMD[0..63] 11,12
RDQM[0..7] RDQM[0..7] 11,12
RDQS[0..7] RDQS[0..7] 11,12
RMA[0..14] RMA[0..14] 11,12
RCS-[0..3] RCS-[0..3] 11,12
CKE[0..3] CKE[0..3] 11
The L of RN to DDR1 is 0.4"
L = 2"~4"
Rs place close to DDR1
RN73
RN72
RN71
RN69
RN70
RN67
RN65
RN63
RN61
RN58
RN57
RN56
RN53
RN52
RN50
RN51
RN49
RN48
RN47
U18B
651-2
SIS651
MD0 MD1 MD2 MD3 MD4 MD5 MD6 MD7 DQM0 DQS0/CSB#0 MD8 MD9 MD10 MD11 MD12 MD13 MD14 MD15 DQM1 DQS1/CSB#1 MD16 MD17 MD18 MD19 MD20 MD21 MD22 MD23 DQM2 DQS2/CSB#2 MD24 MD25 MD26 MD27 MD28 MD29 MD30 MD31 DQM3 DQS3/CSB#3 MD32 MD33 MD34 MD35 MD36 MD37 MD38 MD39 DQM4 DQS4/CSB#4 MD40 MD41 MD42 MD43 MD44 MD45 MD46 MD47 DQM5 DQS5/CSB#5 MD48 MD49 MD50 MD51 MD52 MD53 MD54 MD55 DQM6 DQS6/CSB#6 MD56 MD57 MD58 MD59 MD60 MD61 MD62 MD63 DQM7 DQS7/CSB#7
MA0 MA1 MA2 MA3 MA4 MA5 MA6 MA7 MA8 MA9 MA10 MA11 MA12 MA13 MA14
SRAS# SCAS# SWE#
CS#0 CS#1 CS#2 CS#3 CS#4 CS#5
CKE0 CKE1 CKE2 CKE3 CKE4 CKE5
S3AUXSW#
SDCLK
FWDSDCLKO
SDRCLKI
SDAVDD
SDAVSS
DDRAVDD
DDRAVSS
DDRVREFA
DDRVREFB
DRAM_SEL
R286 4.7K
R311 22
C364 X_10p Near SIS651
R282 4.7K
VCC3SBY
VCCM
C357 X_103p
R309 150RST
R322 150RST
C377 103p
C353 X_103p
R308 150RST
R321 150RST
C374 103p
CP48 X_COPPER
CP47 X_COPPER
C329 104p
C330 X_103p
L62 X_80-0603
CP50 X_COPPER
L64 X_80-0603
C336 104p
C335 X_103p
C403 X_1u
CP49 X_COPPER
DQS2 R433 10 RDQS2
MD44 R413 10 RMD44
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Title SIS651-MEMORY
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NOTE: This page is for universal PCB design(suitable for both 645 or 650)

NB Hardware Trap Table

	0	1	Default	embedded pull-low (30~50K Ohm)
DLLEN#	enable PLL	disable PLL	0	yes
DRAM_SEL	SDR	DDR	1(DDR)	yes
TRAP0	normal	NB debug mode	0	yes
TRAP1	TV selection, NTSC/PAL(0/1)		0	
CSYNC	enable VB		0	
RSYNC	enable VGA interface		1	
LSYNC	enable panel link		0	

13 ZAD[0..15] ZAD[0..15]
13 ZSTB[0..1] ZSTB[0..1]
13 ZSTB-[0..1] ZSTB-[0..1]

U18C
SIS651

VGA

Stereo Glass

HyperZip

651-3

3 ZCLK0 ZCLK0 V3 ZCLK
13 ZUREQ ZUREQ U6 ZUREQ
13 ZDREQ ZDREQ U1 ZDREQ
ZSTB0 T3 ZSTB0
ZSTB-0 T1 ZSTB#0
ZSTB1 P1 ZSTB1
ZSTB-1 P3 ZSTB#1
ZAD0 T4 ZAD0
ZAD1 R3 ZAD1
ZAD2 T5 ZAD2
ZAD3 T6 ZAD3
ZAD4 R2 ZAD4
ZAD5 R6 ZAD5
ZAD6 R1 ZAD6
ZAD7 R4 ZAD7
ZAD8 P4 ZAD8
ZAD9 N3 ZAD9
ZAD10 P5 ZAD10
ZAD11 P6 ZAD11
ZAD12 N1 ZAD12
ZAD13 N6 ZAD13
ZAD14 N2 ZAD14
ZAD15 N4 ZAD15
ZVREF U3 ZVREF
VDDZCMP V5 VDDZCMP
ZCMP_N U4 ZCMP_N
ZCMP_P U2 ZCMP_P
VSSZCMP V6 VSSZCMP
Z1XAVDD W1 Z1XAVDD
Z1XAVSS W2 Z1XAVSS
Z4XAVDD V2 Z4XAVDD
Z4XAVSS V1 Z4XAVSS

PCIRST# Y3
PWROK W4
AUXOK W6
TRAP1 D11
TRAP0 E10
TESTMODE2 A10
TESTMODE1 E11
TESTMODE0 C11
DLLEN# E11
ENTEST E10

17,27,37 PCIRST#1 PCIRST#1
14,37 PWRGD PWRGD
14,37 AUXOK AUXOK
TRAP1
ENTEST

W = 5mil
VOSCI C15 REFCLK0 REFCLK0 3
ROUT A12 ROUT R218 0_X ROUT ROUT 33
GOUT B13 GOUT R219 0_X GOUT GOUT 33
BOUT A13 BOUT R220 0_X BOUT BOUT 33
HSYNC F13 R210 33 HSYNC HSYNC 33
VSYNC E13 R211 33 VSYNC VSYNC 33
VGPIO0 D13 R213 100 DDC1CLK DDC1CLK 33
VGPIO1 D12 R212 100 DDC1DATA DDC1DATA 33
INT#A B11 INTA# INTA# 13,17,19
CSYNC E12 CSYNC
RSYNC A11 RSYNC
LSYNC F12 LSYNC
VCOMP E14 VCOMP
VRSET D14 VRSET
VVBWN F14 VVBWN
DACAVDD1 B12
DACAVSS1 C12
DACAVDD2 C13 DACAVDD1/2
DACAVSS2 C14 DACAVSS1/2
DCLKAVDD B15 DCLKAVDD
DCLKAVSS A15 DCLKAVSS
ECLKAVDD B14 ECLKAVDD
ECLKAVSS A14 ECLKAVSS

for 650 only
VCC3
RSYNC R214 4.7K
TRAP1 R215 4.7K
CSYNC R206 4.7K
LSYNC R207 4.7K

ENTEST R209 4.7K
PWRGD C320 X_104p

VCC1_8
R277 150RST C298 X_104p ZVREF
R276 150RST C289 104p

CP43 X_COPPER L57 X_80-0603 Z1XAVDD
C331 X_1u C305 104p
CP44 X_COPPER Z1XAVSS

CP41 X_COPPER L55 X_80-0603 Z4XAVDD
C299 104p
CP40 X_COPPER Z4XAVSS

CP36 X_COPPER L52 X_80-0603 VDDZCMP
C278 X_1u C273 104p
R266 56 ZCMP_N
R271 56 ZCMP_P
CP37 X_COPPER VSSZCMP

CP26 X_COPPER L38 X_80-0603 VCC3 DCLKAVDD
C212 104p CP28 X_COPPER X_80-0603 L41 C506 X_1u DCLKAVSS

CP31 X_COPPER L39 X_80-0603 VCC3 ECLKAVDD
C219 104p CP27 X_COPPER L40 X_80-0603 ECLKAVSS

VVBWN C220 104p
VCOMP C221 104p
DACAVDD1/2
C222 104p
C216 1u
DACAVSS1/2
Near B12 pin
Near C13 pin
CP24 X_COPPER L36 X_80-0603
CP25 X_COPPER L37 X_80-0603
VRSET
VCC1_8
C263 X_1u
R203 130RST

MICRO-STAR INT'L CO.,LTD.			
Title: SIS651-VGA & Z-link			
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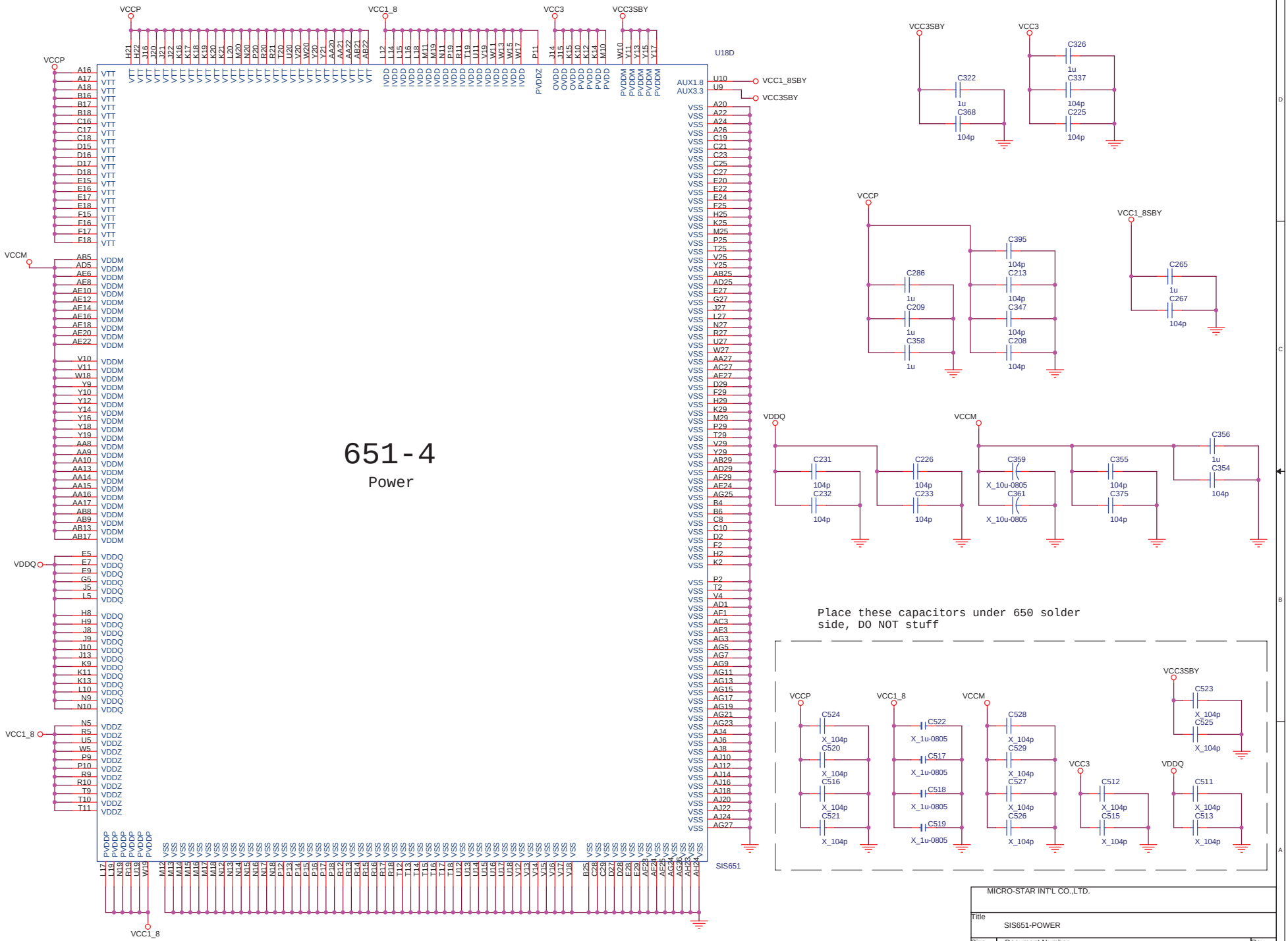

MICRO-STAR INT'L CO.,LTD.	
Title	SIS651-POWER
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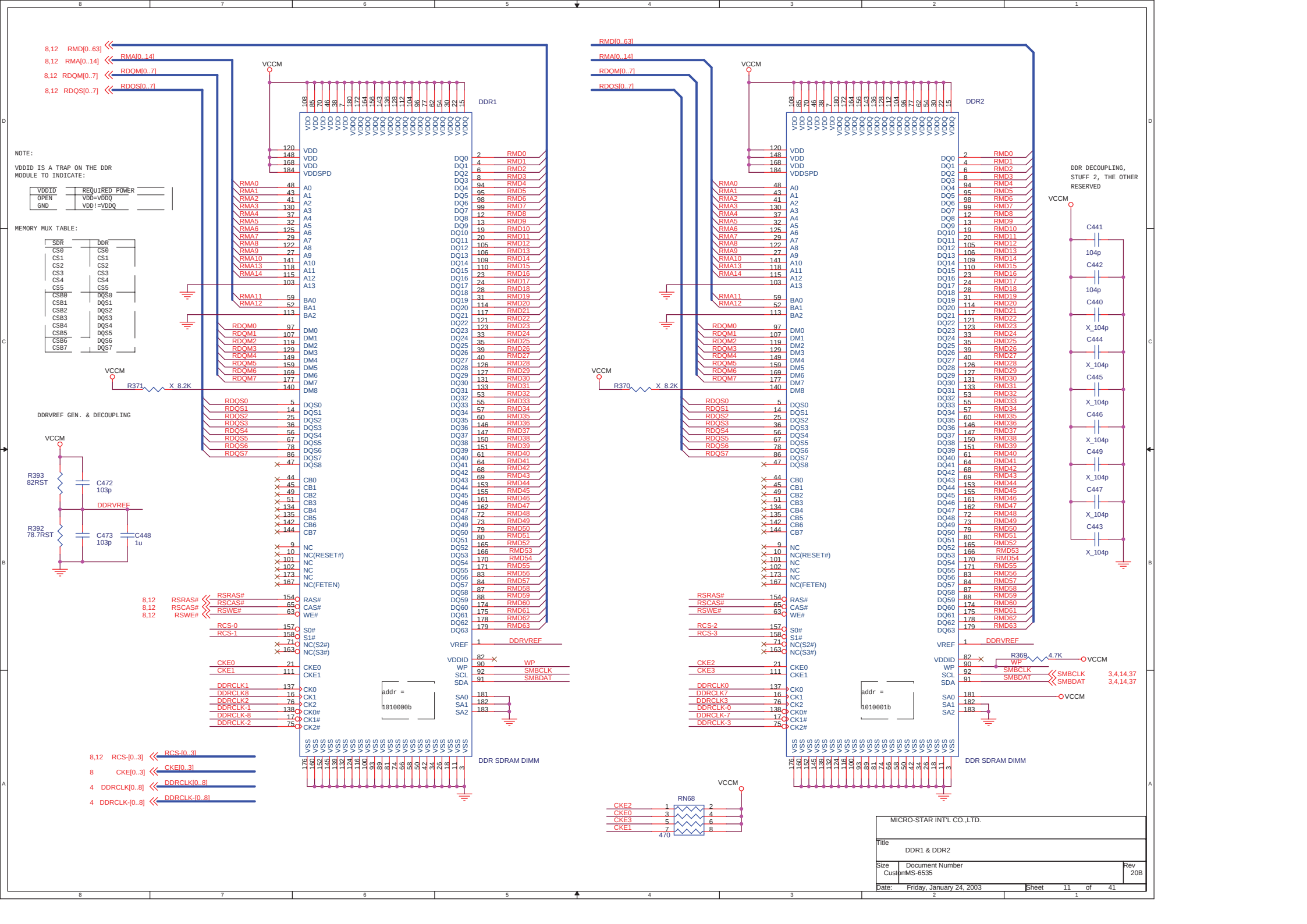
8,12 RMD[0..63]
8,12 RMA[0..14]
8,12 RDQM[0..7]
8,12 RDQS[0..7]
RMD[0..63]
RMA[0..14]
RDQM[0..7]
RDQS[0..7]
NOTE:
VDDID IS A TRAP ON THE DDR MODULE TO INDICATE:
VDDID REQUIRED POWER
OPEN VDD=VDDQ
GND VDD!=VDDQ
MEMORY MUX TABLE:
SDR DDR
CS0 CS0
CS1 CS1
CS2 CS2
CS3 CS3
CS4 CS4
CS5 CS5
CSB0 DQS0
CSB1 DQS1
CSB2 DQS2
CSB3 DQS3
CSB4 DQS4
CSB5 DQS5
CSB6 DQS6
CSB7 DQS7
DDRVREF GEN. & DECOUPLING
VCCM
R393 82RST
C472 103p
DDRVREF
R392 78.7RST
C473 103p
C448 1u
R371 X 8.2K
R370 X 8.2K
DDR1
DDR2
DDR SDRAM DIMM
addr = 1010000b
addr = 1010001b
RN68
470
DDR DECOUPLING, STUFF 2, THE OTHER RESERVED
C441 104p
C442 104p
C440 X_104p
C444 X_104p
C445 X_104p
C446 X_104p
C449 X_104p
C447 X_104p
C443 X_104p
R369 4.7K
8,12 RCS-[0..3]
8 CKE[0..3]
4 DDRCLK[0..8]
4 DDRCLK-[0..8]
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Title DDR1 & DDR2
Size Custom
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SSTL-2 Termination Resistors

RMD[0..63] — RMD[0..63] 8,11
RDQM[0..7] — RDQM[0..7] 8,11
RDQS[0..7] — RDQS[0..7] 8,11
RMA[0..14] — RMA[0..14] 8,11
RCS-[0..3] — RCS-[0..3] 8,11

	SDR	Rs	DDR	Rs	Rtt
MD/DQM(/DQS)	LV-CMOS	0/10/-	SSTL-2	10	47
MA/Control	LV-CMOS	10	SSTL-2	0	47
CS	LV-CMOS	0	SSTL-2	0	47
CKE	OD 3.3V		OD 2.5V		

L = 0.4"

RN88: RMD1, RMD5, RMD0, RMD4
RN87: RMD6, RMD2, RDQM0, RDQS0
RN86: RMD9, RMD8, RMD7, RMD3
RN85: RDQM1, RMD13, RDQS1, RMD12
RN84: RMD11, RMD10, RMD15, RMD14
RN82: RMA9, RDQS2, RMA13, RMD21
RN83: RMD17, RMD16, RMA14, RMD20
RN80: RMD19, RMD23, RMA5, RMA8
RN77: RMD27, RMD30, RMD26, RMA3
RN78: RDQM3, RMA4, RDQS3, RMD29
RN81: RMA7, RMD22, RMD18, RDQM2
RN79: RMD25, RMD28, RMA6, RMD24
RN76: RMA0, RMA1, RMA2, RMD31
RN99: RMD39, RMA11, RMD38, RMD34

DDR_VTT

RN101: RMD36, RMD32, RMA12, RMA10
RN100: RDQM4, RDQS4, RMD33, RMD37
8,11 RSRAS# — RN98: RSRAS#, RMD44, RMD40, RMD35
RN94: RMD47, RMD46, RMD43, RMD42
RN96: RCS-3, RCS-2, RCS-0
RN93: RMD53, RMD52, RMD49, RMD48
RN92: RMD55, RDQS6, RMD54, RDQM6
RN89: RMD59, RMD63, RMD58, RDQS7
RN91: RMD56, RMD60, RMD51, RMD50
RN90: RMD62, RDQM7, RMD57, RMD61

DDR_VTT

RN95: RDQS5, RDQM5, RCS-1
8,11 RSCAS# — RN97: RSCAS#, RMD41, RMD45
8,11 RSWE# — RSWE#

L = 0.4" except RSC0~3 (L=1.2")

DDR_VTT

DECOUPLING CAPACITOR FOR SSTL-2 END TERMIANTION VTT ISLAND
0603 Package placed within 200mils of VTT Termination R-packs

C474 X_1u, C475 1u, C476 X_1u, C477 1u
C478 X_1u, C479 1u, C480 X_1u, C481 1u
C482 X_1u, C483 1u, C484 X_1u, C485 1u
C486 X_1u, C487 1u, C488 X_1u, C489 1u

C540 10u-1206

Add 10uF-1206 Cap at the center of DIMM conn for DDR_VTT DC power

DDR_VTT

C490 X_1u, C491 1u, C492 X_1u, C493 1u
C494 X_1u, C495 1u, C496 X_1u, C497 1u
C498 X_1u, C499 1u, C500 X_1u, C501 1u
C502 X_1u, C503 1u, C504 X_1u, C505 1u

Did not stuff C476,C479,C482,C485,C488,C491,C494,C497,C500,C503 for DDR_VTT OK

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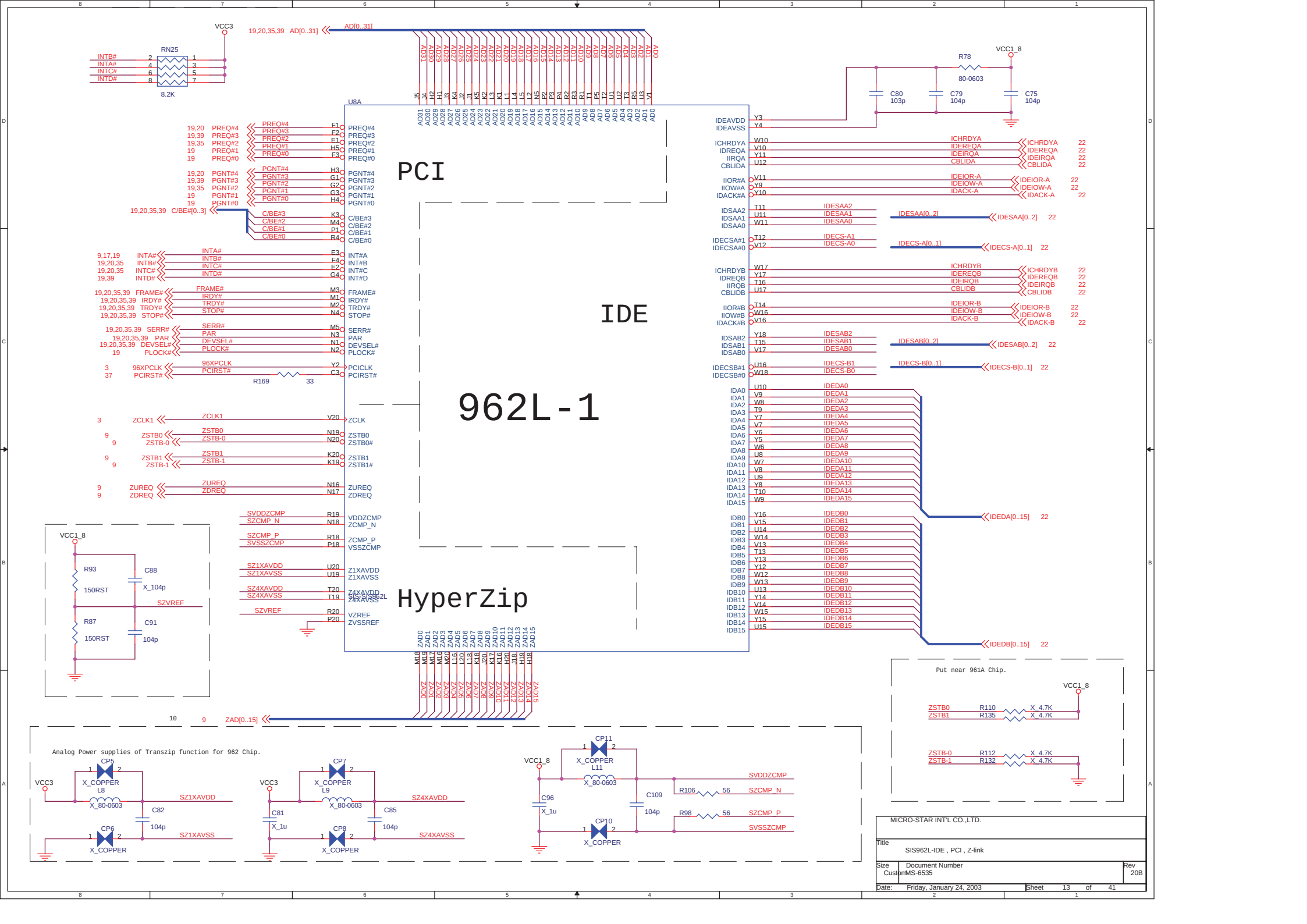
PCI
IDE
962L-1
HyperZip
U8A
RN25
8.2K
INTB#
INTA#
INTC#
INTD#
AD[0..31]
PREQ#4
PREQ#3
PREQ#2
PREQ#1
PREQ#0
PGNT#4
PGNT#3
PGNT#2
PGNT#1
PGNT#0
C/BE#[0..3]
C/BE#3
C/BE#2
C/BE#1
C/BE#0
INT#A
INT#B
INT#C
INT#D
FRAME#
IRDY#
TRDY#
STOP#
SERR#
PAR
DEVSEL#
PLOCK#
96XPCLK
PCIRST#
R169
33
ZCLK1
ZSTB0
ZSTB-0
ZSTB1
ZSTB-1
ZUREQ
ZDREQ
SVDDZCMP
SZCMP_N
SZCMP_P
SVSSZCMP
SZ1XAVDD
SZ1XAVSS
SZ4XAVDD
SZ4XAVSS
SZVREF
ZAD[0..15]
IDEAVDD
IDEAVSS
ICHRDYA
IDREQA
IIRQA
CBLIDA
IIOR#A
IIOW#A
IDACK#A
IDSAA2
IDSAA1
IDSAA0
IDECSA#1
IDECSA#0
ICHRDYB
IDREQB
IIRQB
CBLIDB
IIOR#B
IIOW#B
IDACK#B
IDSAB2
IDSAB1
IDSAB0
IDECSB#1
IDECSB#0
IDEDA[0..15]
IDEDB[0..15]
R78
80-0603
C80
103p
C79
104p
C75
104p
VCC1_8
VCC3
R93
150RST
C88
X_104p
R87
150RST
C91
104p
Analog Power supplies of Transzip function for 962 Chip.
CP5
CP6
CP7
CP8
X_COPPER
L8
L9
X_80-0603
C82
C81
C85
X_1u
CP11
CP10
L11
C96
C109
R106
R98
56
SZCMP_N
SZCMP_P
Put near 961A Chip.
ZSTB0
ZSTB1
ZSTB-0
ZSTB-1
R110
R135
R112
R132
X_4.7K
MICRO-STAR INT'L CO.,LTD.
Title
SIS962L-IDE , PCI , Z-link
Size
Custom
Document Number
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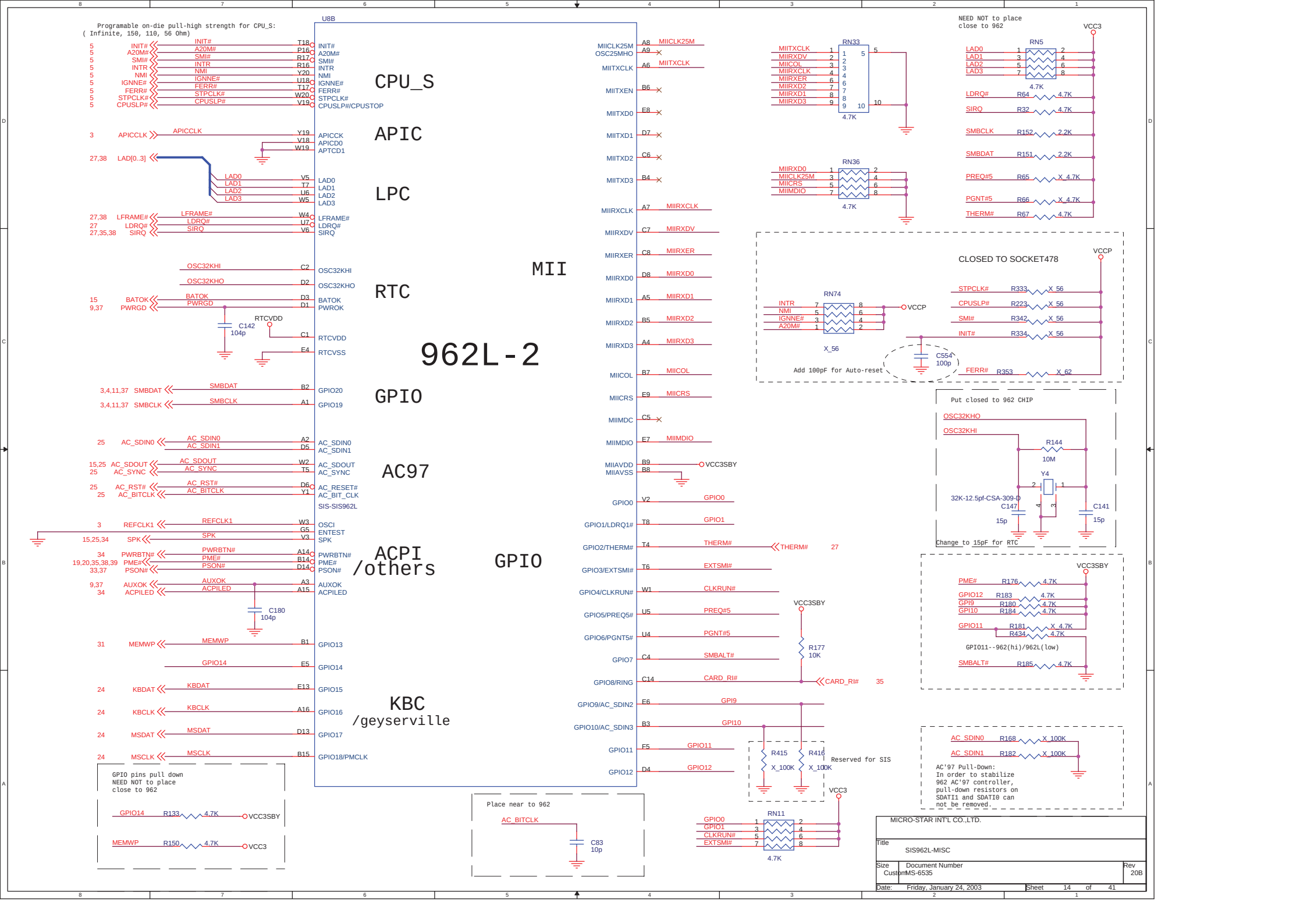
U8B
962L-2
CPU_S
APIC
LPC
RTC
GPIO
AC97
ACPI /others
KBC /geyserville
MII
GPIO
Programable on-die pull-high strength for CPU_S:
(Infinite, 150, 110, 56 Ohm)
INIT#
A20M#
SMI#
INTR
NMI
IGNNE#
FERR#
STPCLK#
CPUSLP#
APICCLK
LAD[0..3]
LAD0
LAD1
LAD2
LAD3
LFRAME#
LDRQ#
SIRQ
OSC32KHI
OSC32KHO
BATOK
PWRGD
RTCVDD
C142
104p
RTCVSS
SMBDAT
SMBCLK
AC_SDIN0
AC_SDIN1
AC_SDOUT
AC_SYNC
AC_RST#
AC_BITCLK
REFCLK1
SPK
PWRBTN#
PME#
PSON#
AUXOK
ACPILED
C180
104p
MEMWP
GPIO14
KBDAT
KBCLK
MSDAT
MSCLK
GPIO pins pull down
NEED NOT to place
close to 962
R133
4.7K
VCC3SBY
R150
VCC3
MIICLK25M
MIITXCLK
MIITXEN
MIITXD0
MIITXD1
MIITXD2
MIITXD3
MIIRXCLK
MIIRXDV
MIIRXER
MIIRXD0
MIIRXD1
MIIRXD2
MIIRXD3
MIICOL
MIICRS
MIIMDC
MIIMDIO
MIIAVDD
MIIAVSS
VCC3SBY
GPIO0
GPIO1/LDRQ1#
GPIO2/THERM#
GPIO3/EXTSMI#
GPIO4/CLKRUN#
GPIO5/PREQ5#
GPIO6/PGNT5#
GPIO7
GPIO8/RING
GPIO9/AC_SDIN2
GPIO10/AC_SDIN3
GPIO11
GPIO12
THERM#
EXTSMI#
CLKRUN#
PREQ#5
PGNT#5
SMBALT#
CARD_RI#
GPI9
GPI10
R177
10K
Reserved for SIS
R415
R416
X_100K
Place near to 962
AC_BITCLK
C83
10p
RN11
4.7K
RN33
RN36
NEED NOT to place
close to 962
RN5
LAD0
LAD1
LAD2
LAD3
LDRQ#
SIRQ
SMBCLK
SMBDAT
PREQ#5
PGNT#5
THERM#
R64
R32
R152
R151
R65
R66
R67
4.7K
2.2K
X_4.7K
CLOSED TO SOCKET478
VCCP
RN74
INTR
NMI
IGNNE#
A20M#
X_56
C554
100p
Add 100pF for Auto-reset
STPCLK#
CPUSLP#
SMI#
INIT#
FERR#
R333
R223
R342
R334
R353
X_56
X_62
Put closed to 962 CHIP
OSC32KHO
OSC32KHI
R144
10M
Y4
32K-12.5pf-CSA-309-D
C147
C141
15p
Change to 15pF for RTC
PME#
GPIO12
GPI9
GPI10
GPIO11
SMBALT#
R176
R183
R180
R184
R181
R434
R185
GPIO11--962(hi)/962L(low)
AC_SDIN0
AC_SDIN1
R168
R182
AC'97 Pull-Down:
In order to stabilize
962 AC'97 controller,
pull-down resistors on
SDATI1 and SDATI0 can
not be removed.
MICRO-STAR INT'L CO.,LTD.
Title
SIS962L-MISC
Size
Custom
Document Number
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20B
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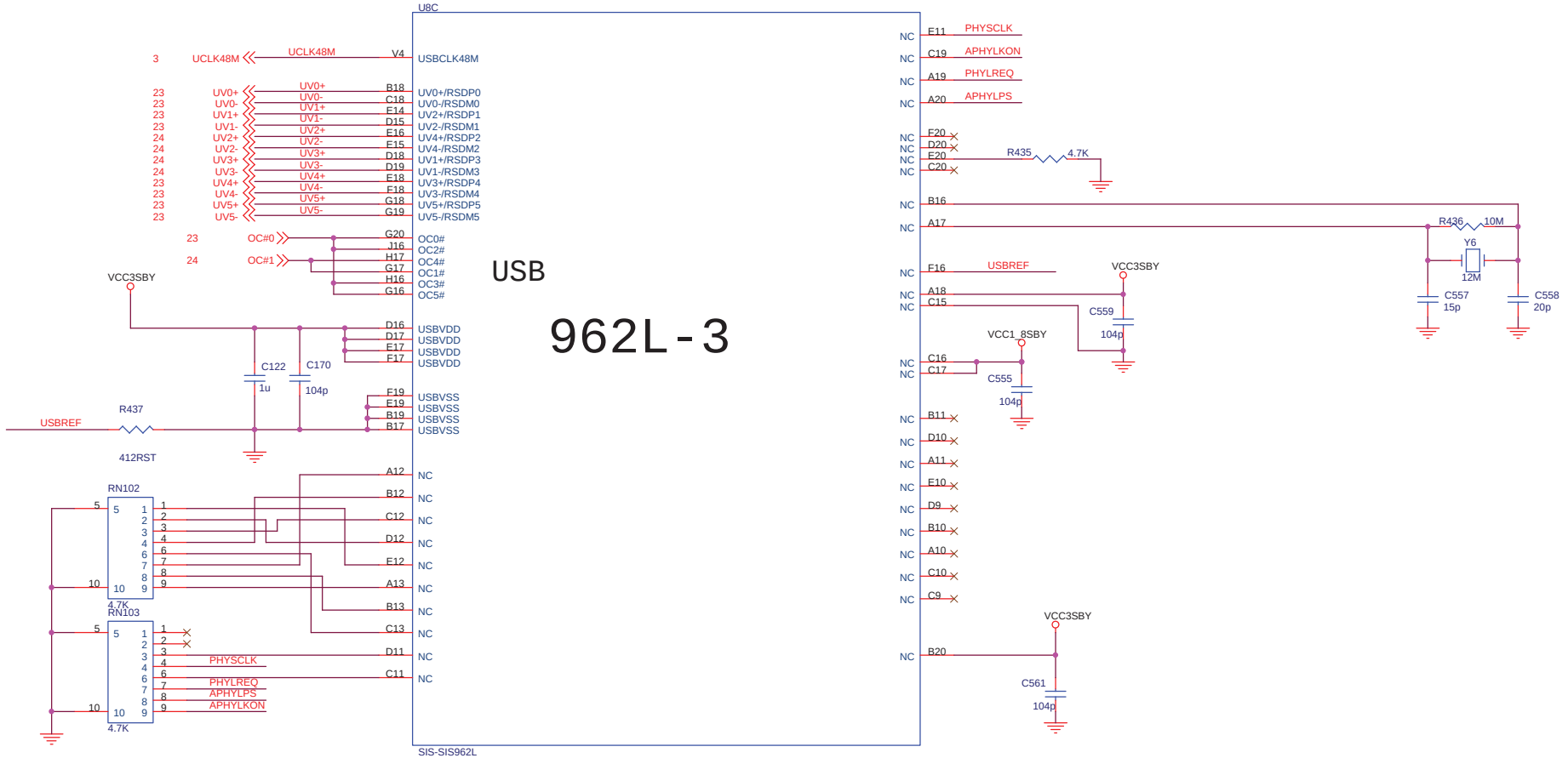

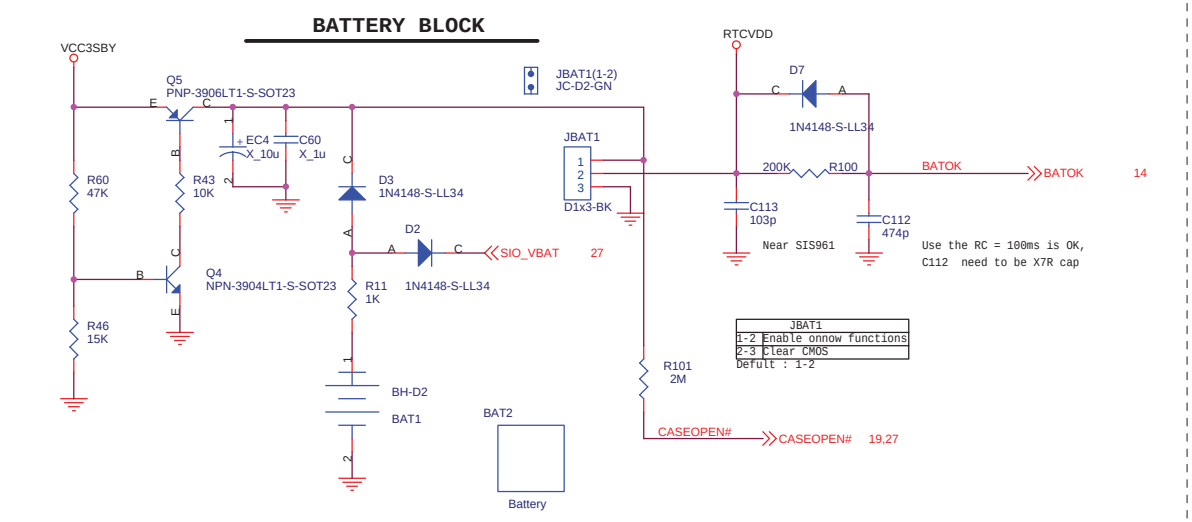

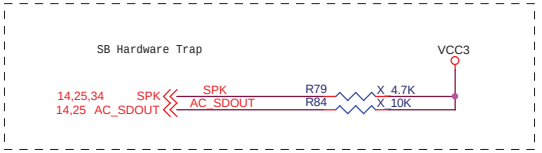

	0	1	Default	
SPKR(LPC addr mapping)	disable	enable	0	yes
SDATO(PCICLK PLL)	enable	disable	0	yes

embedded pull-low (30~50K Ohm)

MICRO-STAR INT'L CO.,LTD.	
Title: SIS962L-USB	
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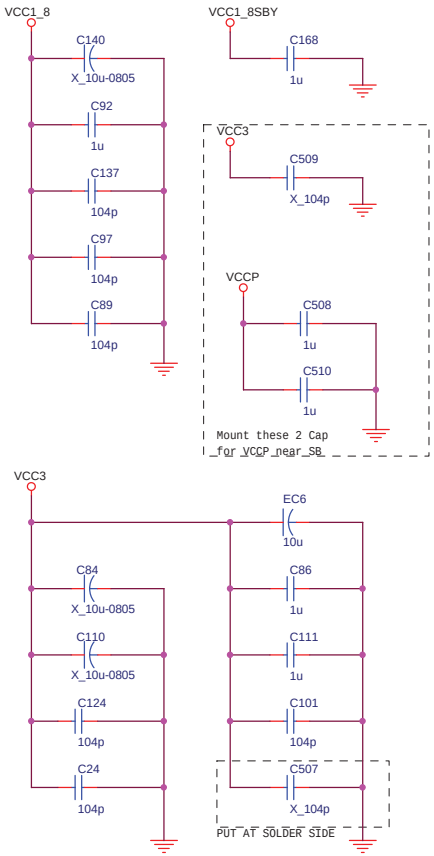
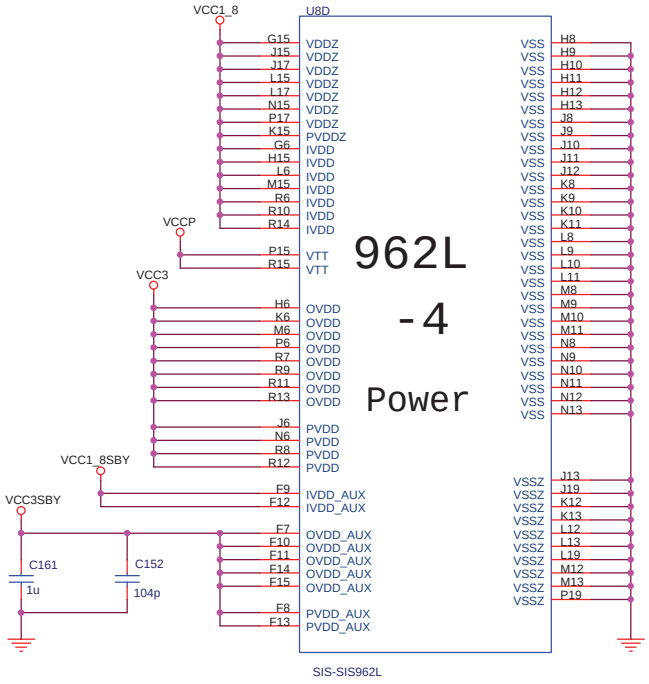
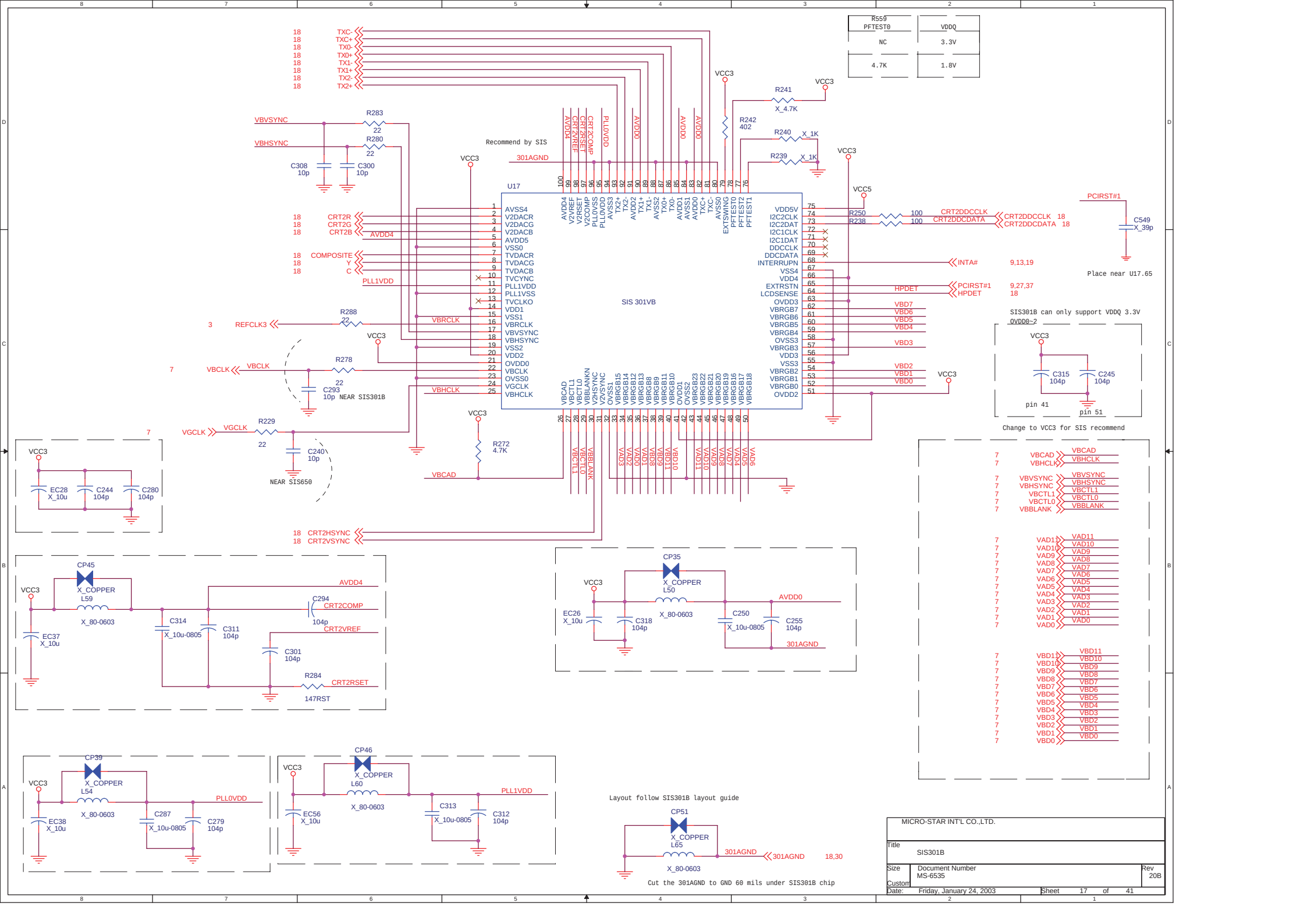




MICRO-STAR INT'L CO.,LTD.		
Title: SIS962L-POWER		
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 16 of 41	


R559
PFTEST0
NC
4.7K
VDDQ
3.3V
1.8V
U17
SIS 301VB
Recommend by SIS
301AGND
VCC3
VCC5
R241
X_4.7K
R242
402
R240
X_1K
R239
X_1K
R283
22
R280
22
C308
10p
C300
10p
R288
22
R278
22
C293
10p NEAR SIS301B
R229
22
C240
10p
NEAR SIS650
R272
4.7K
R250
100
R238
100
CRT2DDCCLK
CRT2DDCDATA
CRT2DDCCLK 18
CRT2DDCDATA 18
PCIRST#1
C549
X_39p
Place near U17.65
INTA#
9,13,19
PCIRST#1
9,27,37
HPDET
18
SIS301B can only support VDDQ 3.3V
OVDD0~2
C315
104p
C245
104p
pin 41
pin 51
Change to VCC3 for SIS recommend
REFCLK3
VBCLK
VGCLK
VBHCLK
VBRCLK
VBVSYNC
VBHSYNC
VBCTL1
VBCTL0
VBBLANK
VBCAD
CRT2HSYNC
CRT2VSYNC
CRT2R
CRT2G
CRT2B
COMPOSITE
Y
C
PLL1VDD
AVDD4
CP45
X_COPPER
L59
X_80-0603
EC37
X_10u
C314
X_10u-0805
C311
104p
C294
104p
CRT2COMP
CRT2VREF
C301
104p
R284
147RST
CRT2RSET
CP35
L50
EC26
X_10u
C318
104p
C250
X_10u-0805
C255
104p
AVDD0
CP39
L54
EC38
X_10u
C287
X_10u-0805
C279
104p
PLL0VDD
CP46
L60
EC56
X_10u
C313
X_10u-0805
C312
104p
Layout follow SIS301B layout guide
CP51
L65
Cut the 301AGND to GND 60 mils under SIS301B chip
MICRO-STAR INT'L CO.,LTD.
Title
SIS301B
Size
Custom
Document Number
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20B
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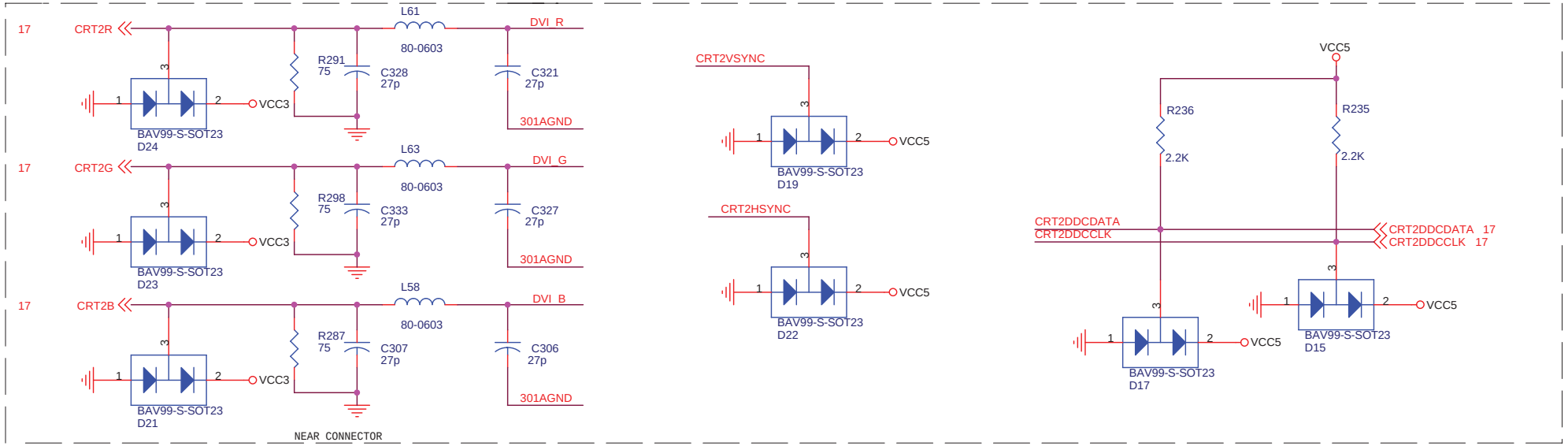
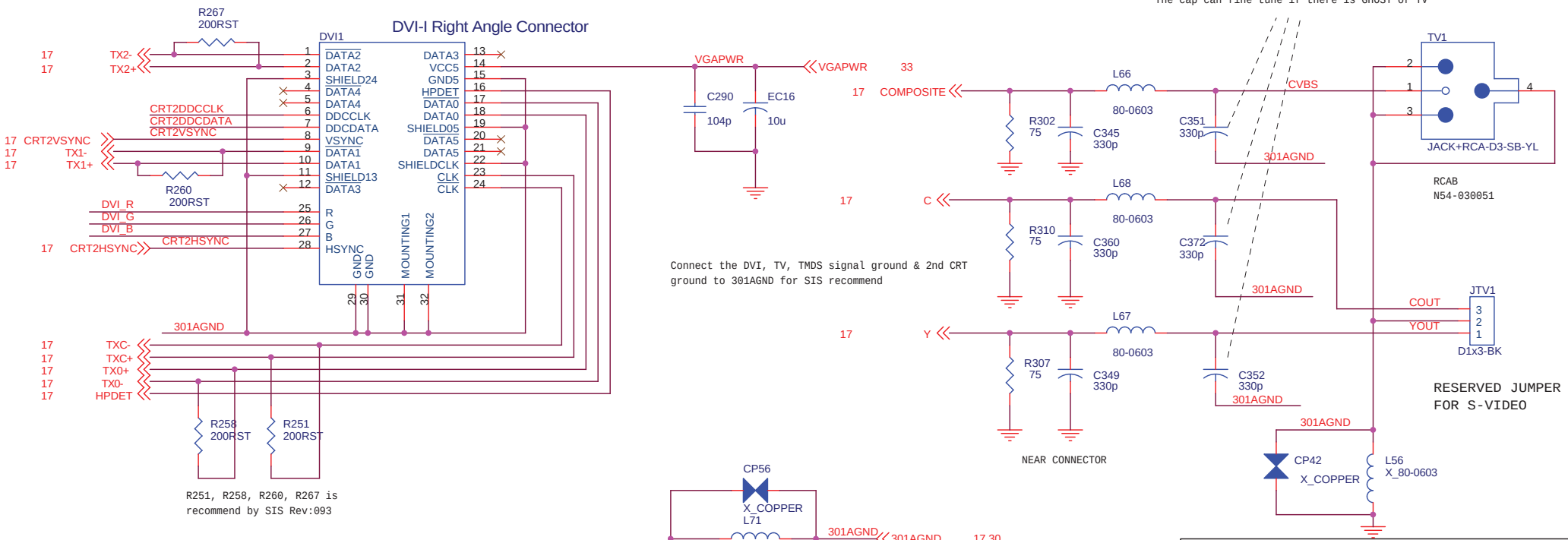
DVI Interface





MSI COMPUTER		
Title: DVI, TV-OUT, 2nd CRT CONN		
Size: Custom	Document Number: MS-6535	Rev: 20B
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13,20,35,39 AD[31..0] — AD[31..0]

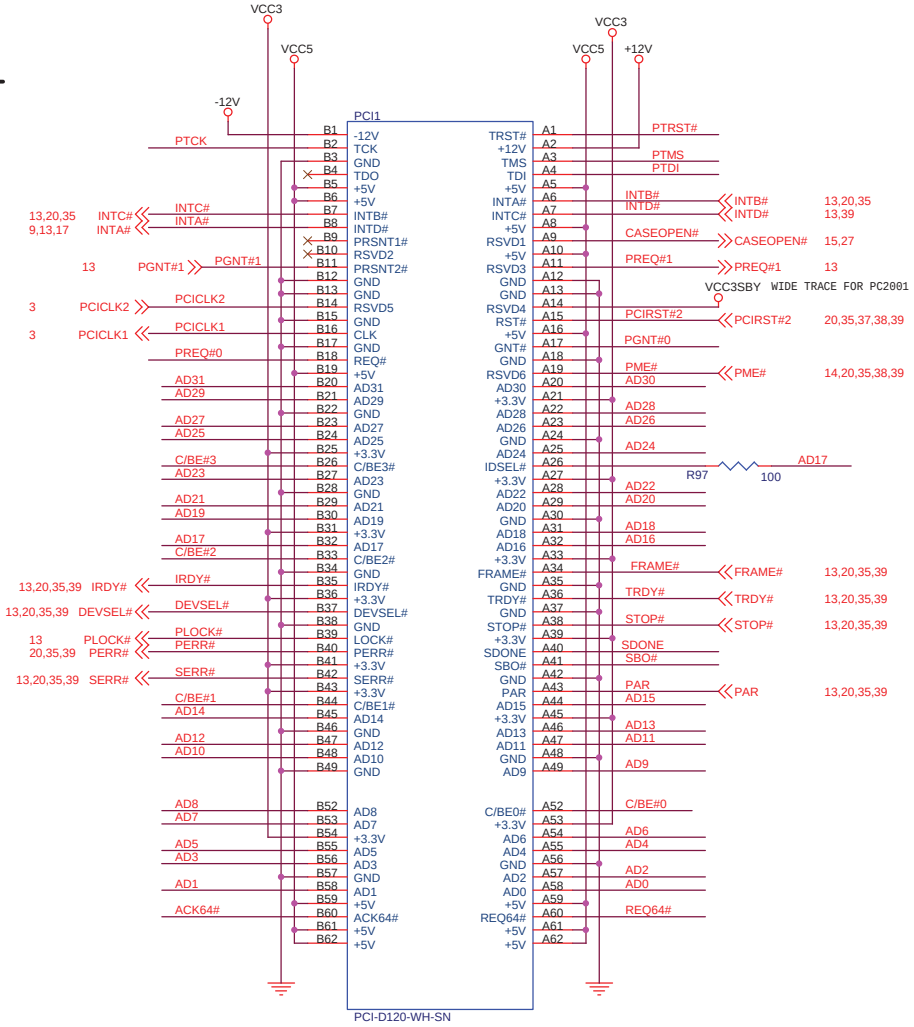
13,20,35,39 C/BE#[3..0] — C/BE#[3..0]

PCI RISER CARD PCI1 & 2 : AD17 & AD18

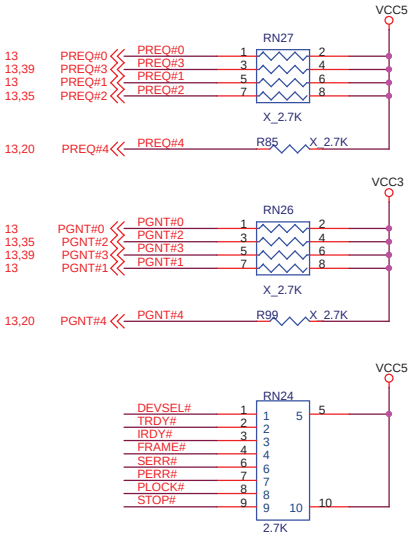
PCI SLOT

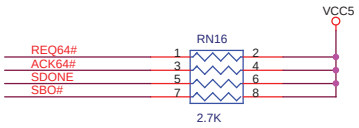
AD17

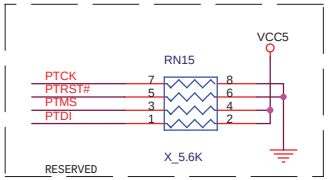
INTB#



PCI BUS PULL-UP





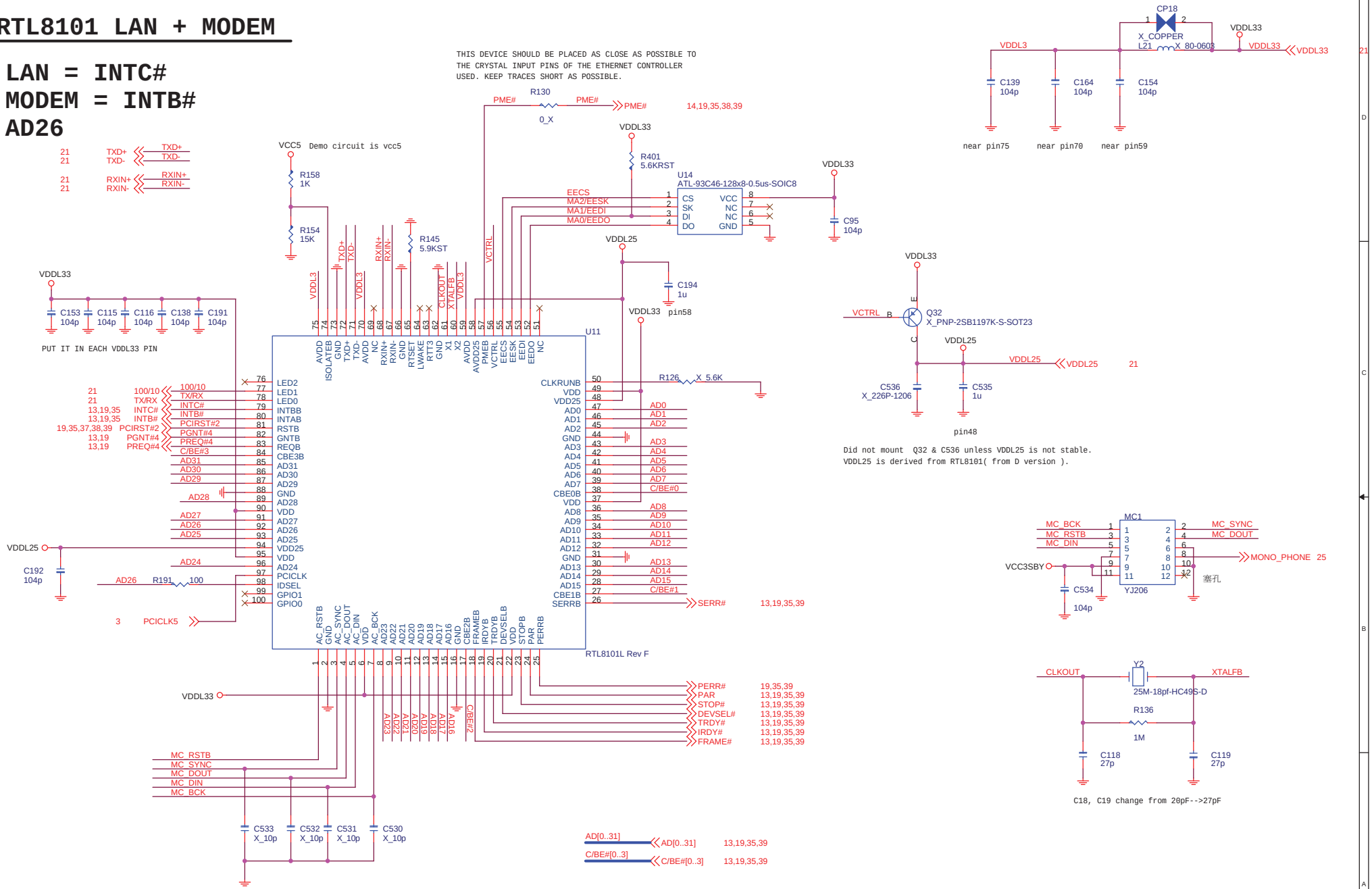


MICRO-STAR INT'L CO.,LTD.		
Title: PCI SLOT		
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 19 of 41	

RTL8101 LAN + MODEM

LAN = INTC#
MODEM = INTB#
AD26

THIS DEVICE SHOULD BE PLACED AS CLOSE AS POSSIBLE TO
THE CRYSTAL INPUT PINS OF THE ETHERNET CONTROLLER
USED. KEEP TRACES SHORT AS POSSIBLE.



Did not mount Q32 & C536 unless VDDL25 is not stable.
VDDL25 is derived from RTL8101(from D version).

C18, C19 change from 20pF-->27pF

MICRO-STAR INT'L CO., LTD.			
Title: LAN CONTROLLER			
Size	Document Number: MS-6535		Rev: 20B
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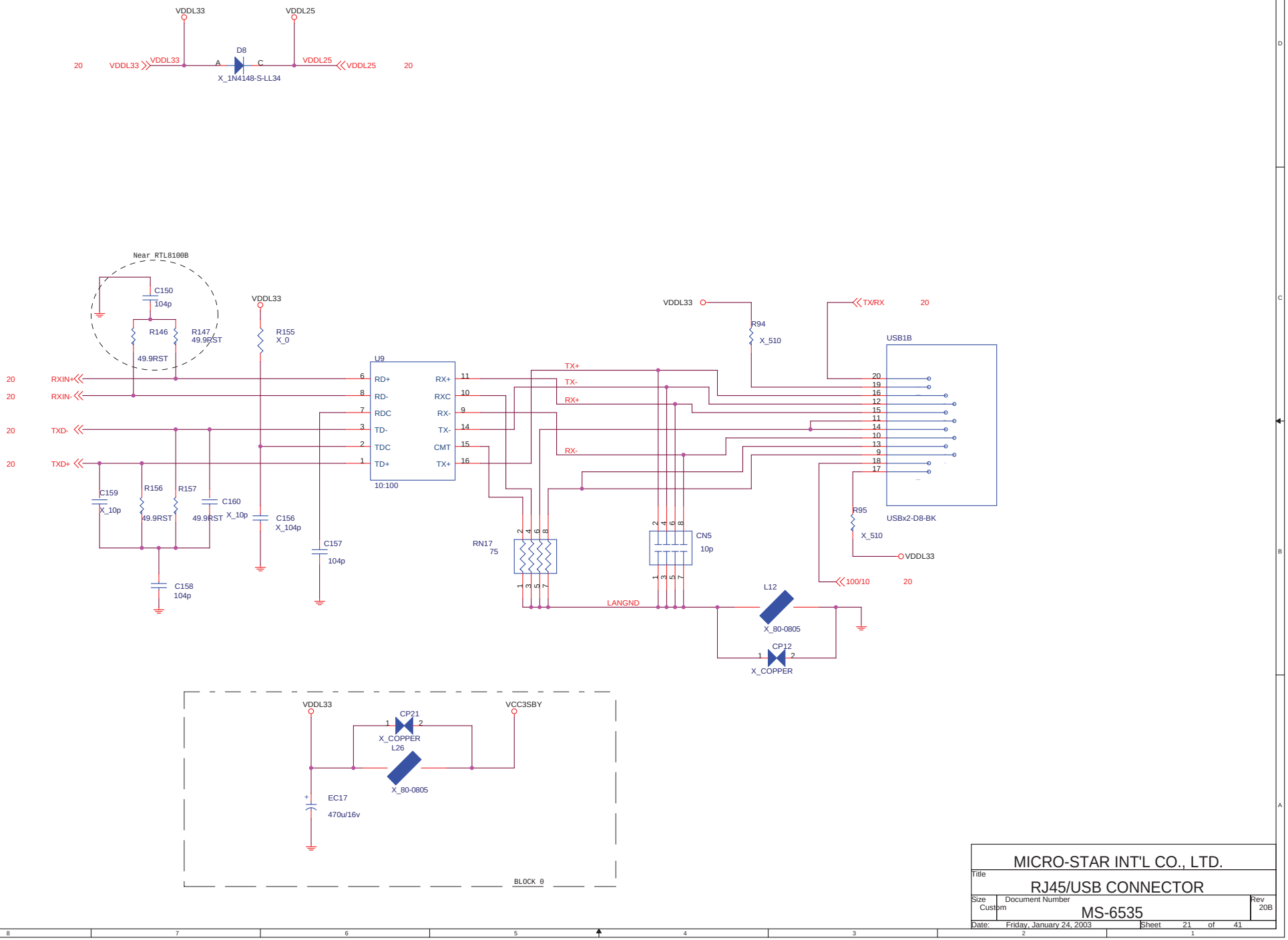
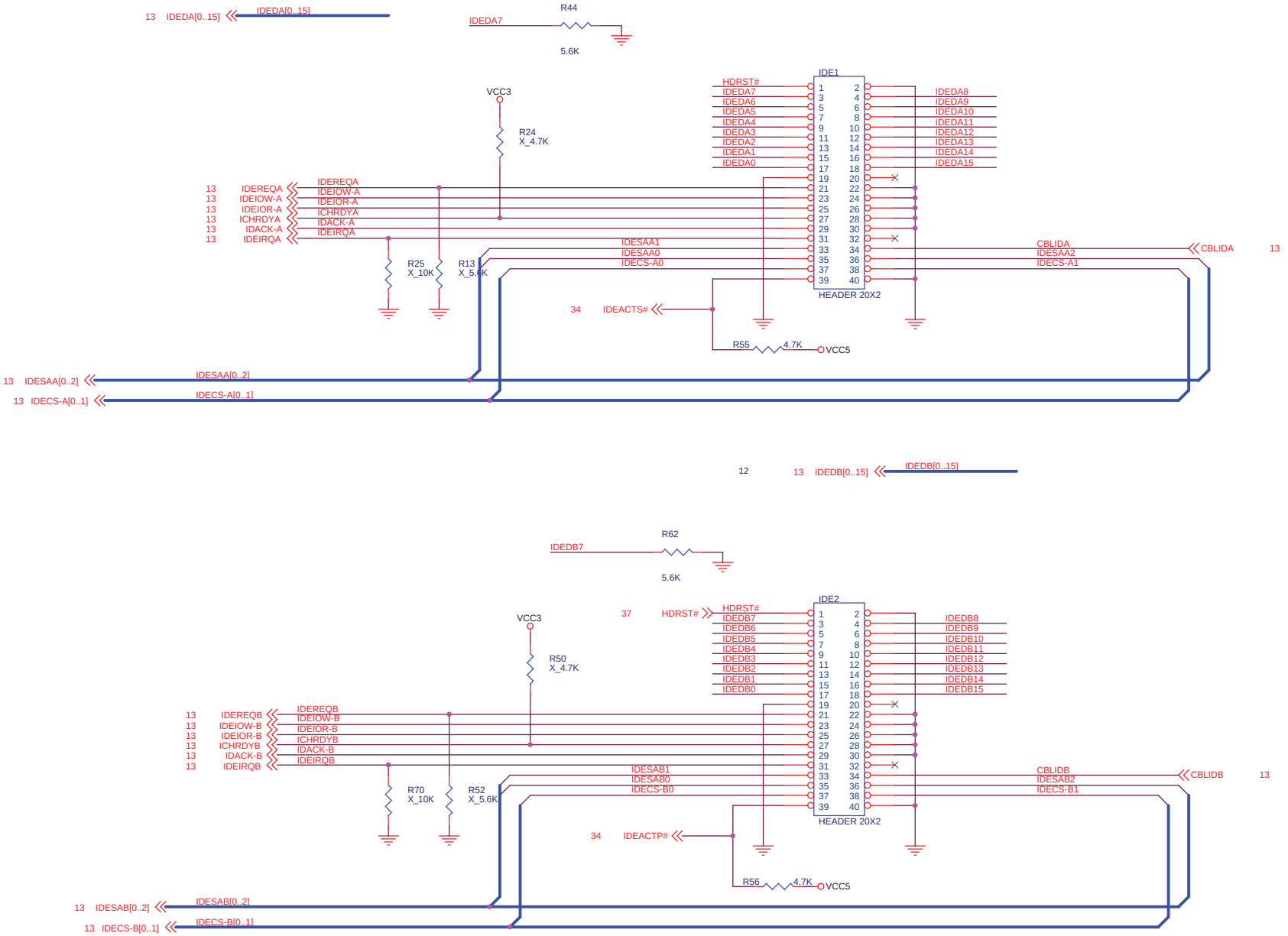
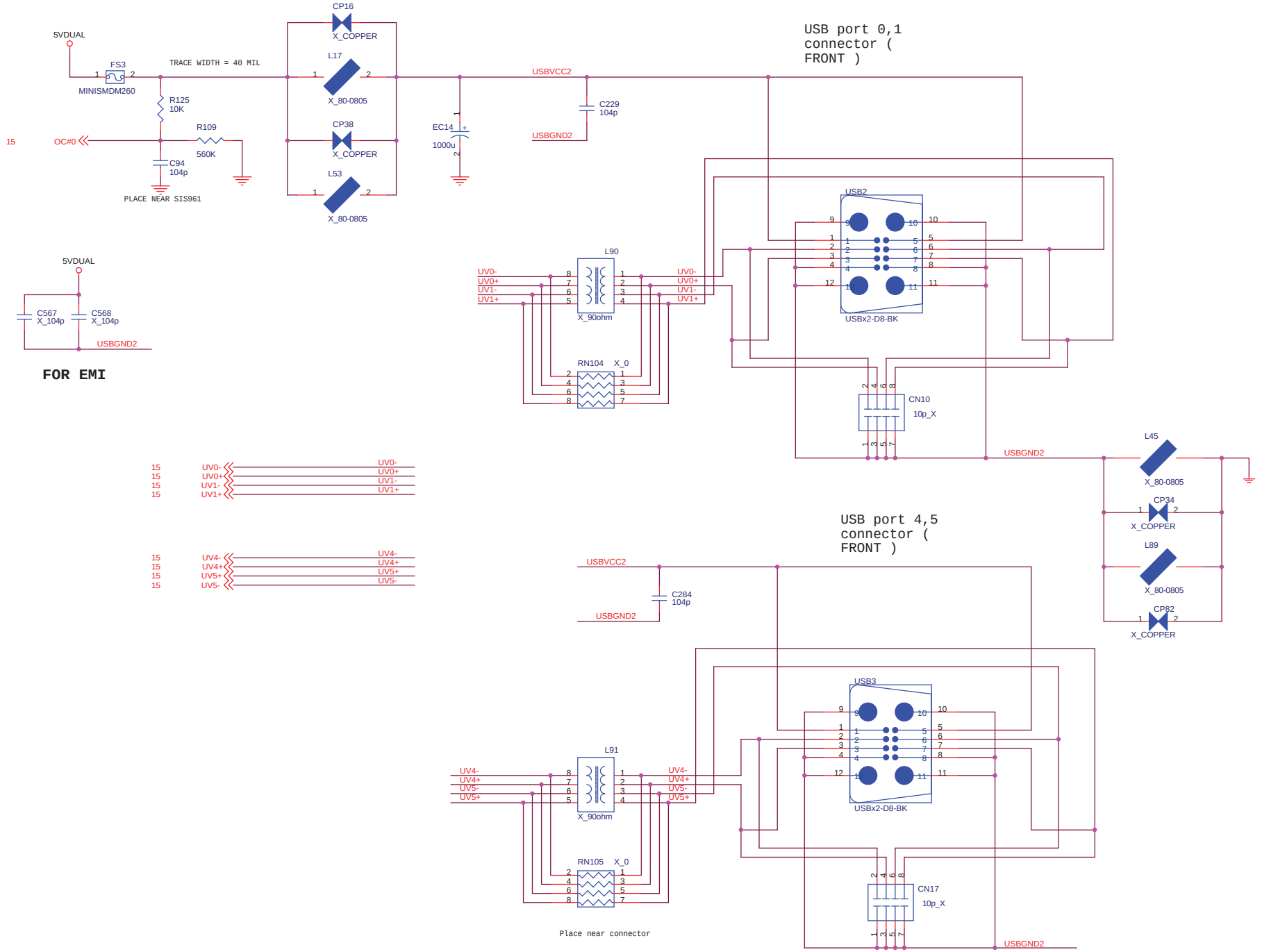


MICRO-STAR INT'L CO., LTD.		
Title: RJ45/USB CONNECTOR		
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 21 of 41	



The series esistor of " IDESAB0~2, IDECS-B0~1, IDEIOR-B, IDEIOW-B, IDACK-B " is close to SIS650. The others is near connector

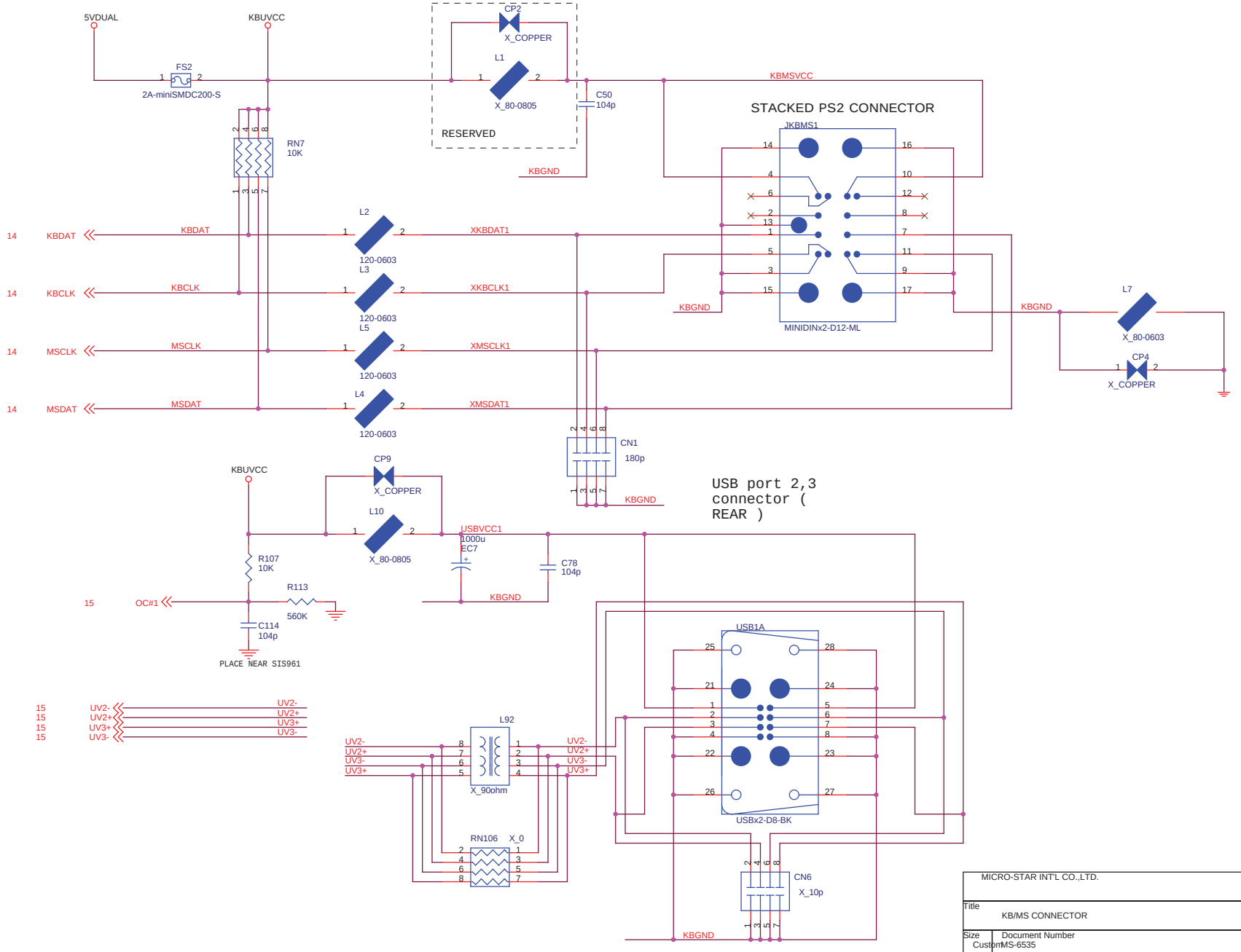
MICRO-STAR INT'L CO.,LTD.		
Title: IDE CONNECTOR		
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 22 of 41	



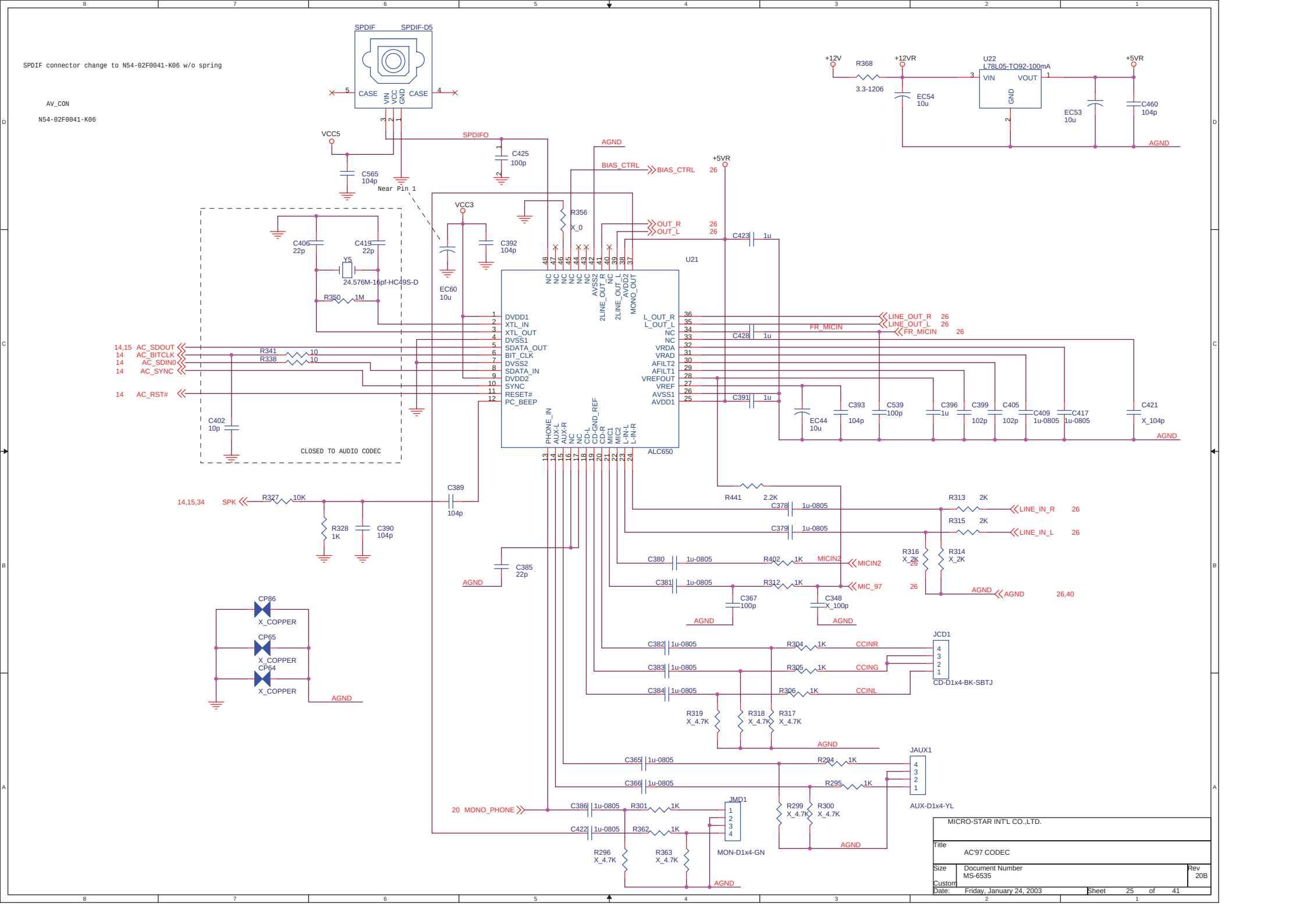
MICRO-STAR INT'L CO.,LTD.

Title	USB CONNECTOR	
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 23 of 41	

KEYBOARD/MOUSE PORTS



MICRO-STAR INT'L CO.,LTD.		
Title: KB/MS CONNECTOR		
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 24 of 41	


SPDIF connector change to N54-02F0041-K06 w/o spring
AV_CON
N54-02F0041-K06
SPDIF
SPDIF-D5
CASE
VIN
VCC
GND
CASE
VCC5
SPDIFO
C565 104p
Near Pin 1
C425 100p
AGND
BIAS_CTRL
+12V
R368 3.3-1206
+12VR
EC54 10u
U22 L78L05-TO92-100mA
VIN
VOUT
GND
EC53 10u
+5VR
C460 104p
AGND
VCC3
C406 22p
C419 22p
Y5
24.576M-16pf-HC49S-D
R350 1M
EC60 10u
C392 104p
R356 X_0
U21
ALC650
DVDD1
XTL_IN
XTL_OUT
DVSS1
SDATA_OUT
BIT_CLK
DVSS2
SDATA_IN
DVDD2
SYNC
RESET#
PC_BEEP
L_OUT_R
L_OUT_L
NC
VRDA
VRAD
AFILT2
AFILT1
VREFOUT
VREF
AVSS1
AVDD1
OUT_R
OUT_L
C423 1u
C428 1u
C391 1u
FR_MICIN
LINE_OUT_R
LINE_OUT_L
14,15 AC_SDOUT
14 AC_BITCLK
14 AC_SDIN0
14 AC_SYNC
14 AC_RST#
R341 10
R338 10
C402 10p
CLOSED TO AUDIO CODEC
EC44 10u
C393 104p
C539 100p
C396 1u
C399 102p
C405 102p
C409 1u-0805
C417 1u-0805
C421 X_104p
14,15,34 SPK
R327 10K
R328 1K
C390 104p
C389 104p
C385 22p
R441 2.2K
C378 1u-0805
C379 1u-0805
C380 1u-0805
C381 1u-0805
R402 1K
R312 1K
MICIN2
MIC_97
C367 100p
C348 X_100p
R313 2K
R315 2K
R316 X_2K
R314 X_2K
LINE_IN_R
LINE_IN_L
CP86 X_COPPER
CP65 X_COPPER
CP64 X_COPPER
C382 1u-0805
C383 1u-0805
C384 1u-0805
R304 1K
R305 1K
R306 1K
CCINR
CCING
CCINL
JCD1
CD-D1x4-BK-SBTJ
R319 X_4.7K
R318 X_4.7K
R317 X_4.7K
C365 1u-0805
C366 1u-0805
R294 1K
R295 1K
JAUX1
AUX-D1x4-YL
20 MONO_PHONE
C386 1u-0805
C422 1u-0805
R301 1K
R362 1K
JMD1
MON-D1x4-GN
R299 X_4.7K
R300 X_4.7K
R296 X_4.7K
R363 X_4.7K
MICRO-STAR INT'L CO.,LTD.
Title
AC'97 CODEC
Size
Document Number
MS-6535
Rev
20B
Custom
Date: Friday, January 24, 2003
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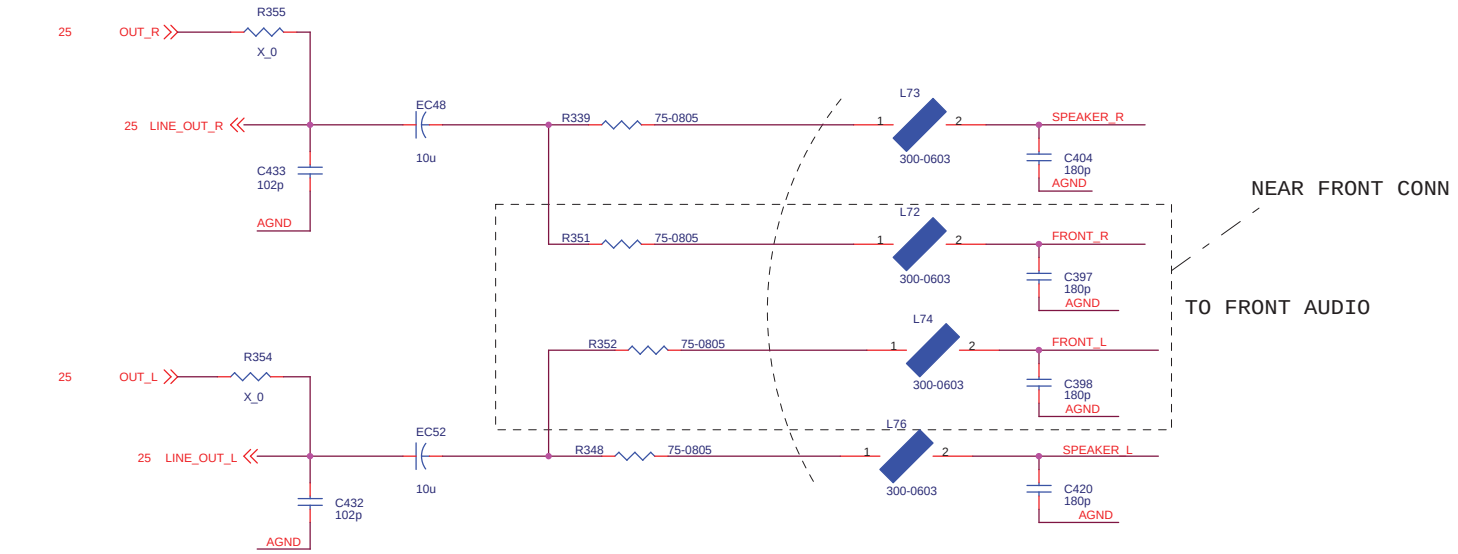
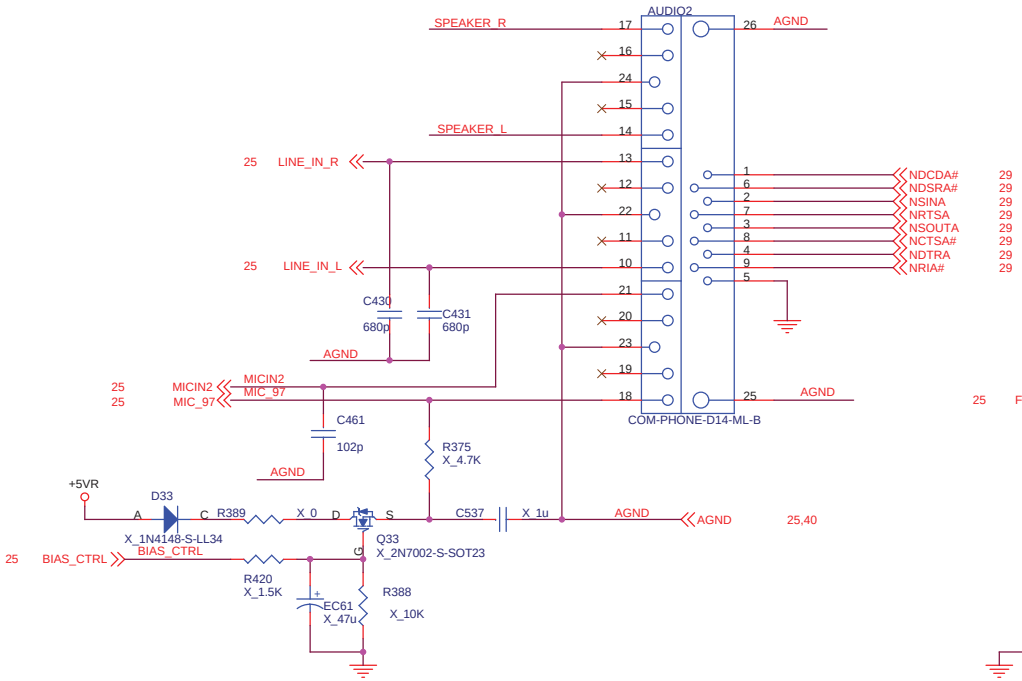
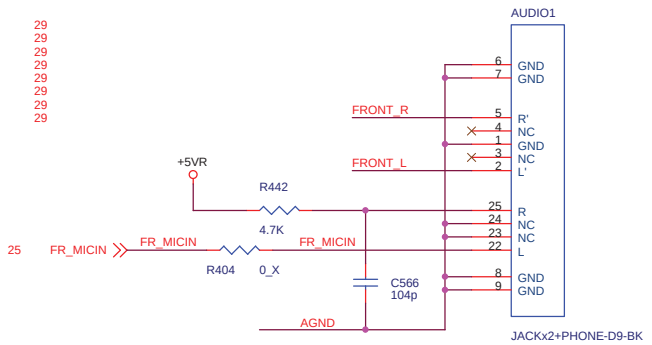


Add a AGND trace at the 3rd layer for Audio

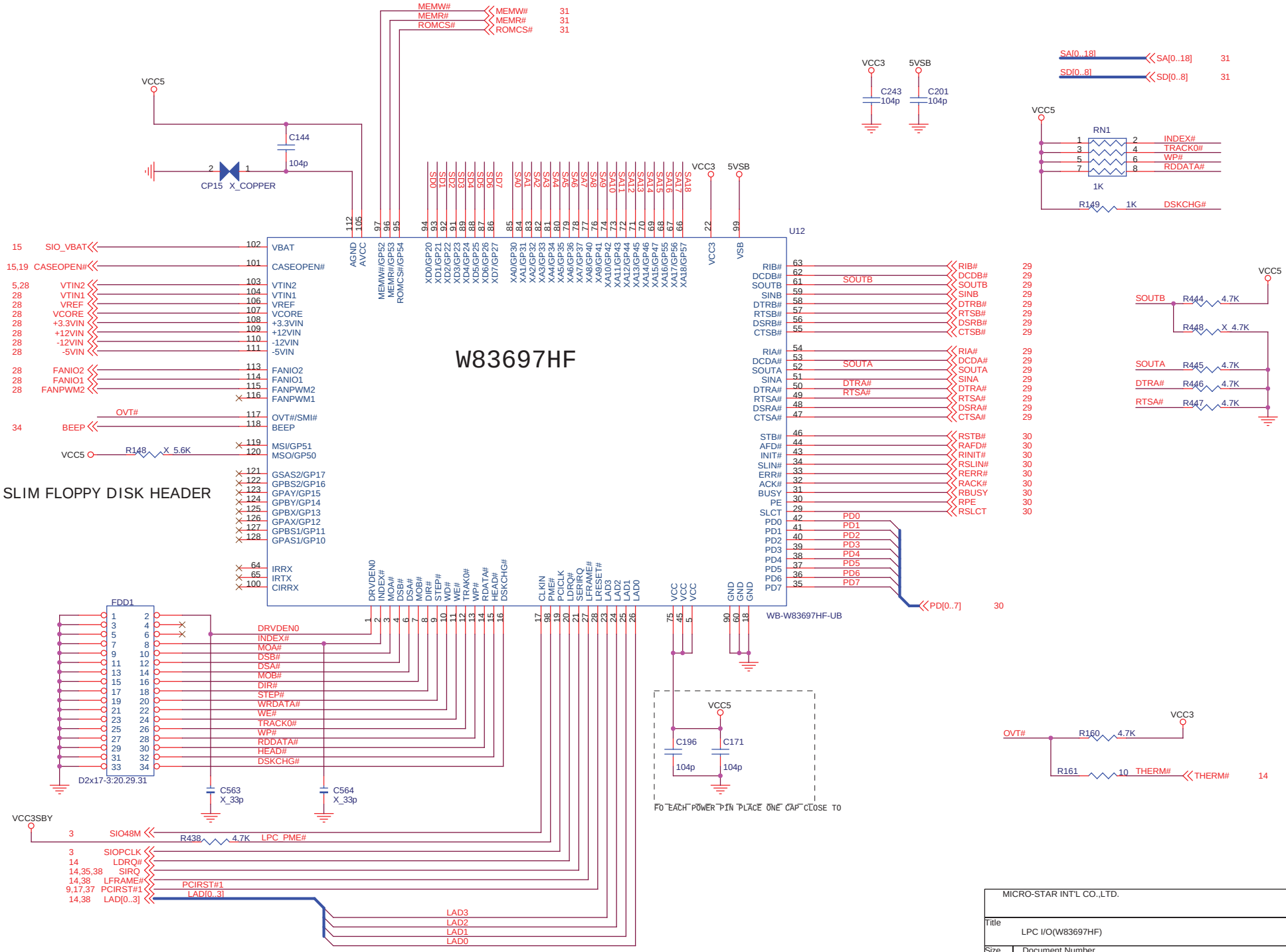




FRONT AUDIO

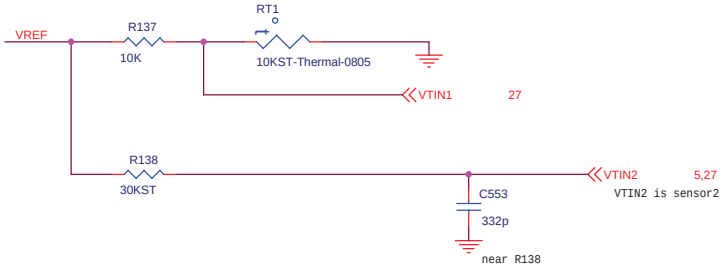
FOR EMI

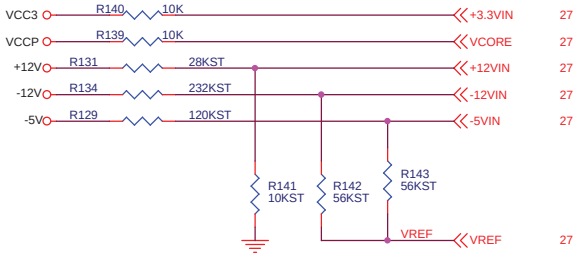
MICRO-STAR INT'L CO.,LTD.		
Title: AUDIO CONNECTOR		
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 26 of 41	



MICRO-STAR INT'L CO.,LTD.	
Title	LPC I/O(W83697HF)
Size	Document Number MS-6535 Rev 20B
Custom	
Date: Friday, January 24, 2003	Sheet 27 of 41

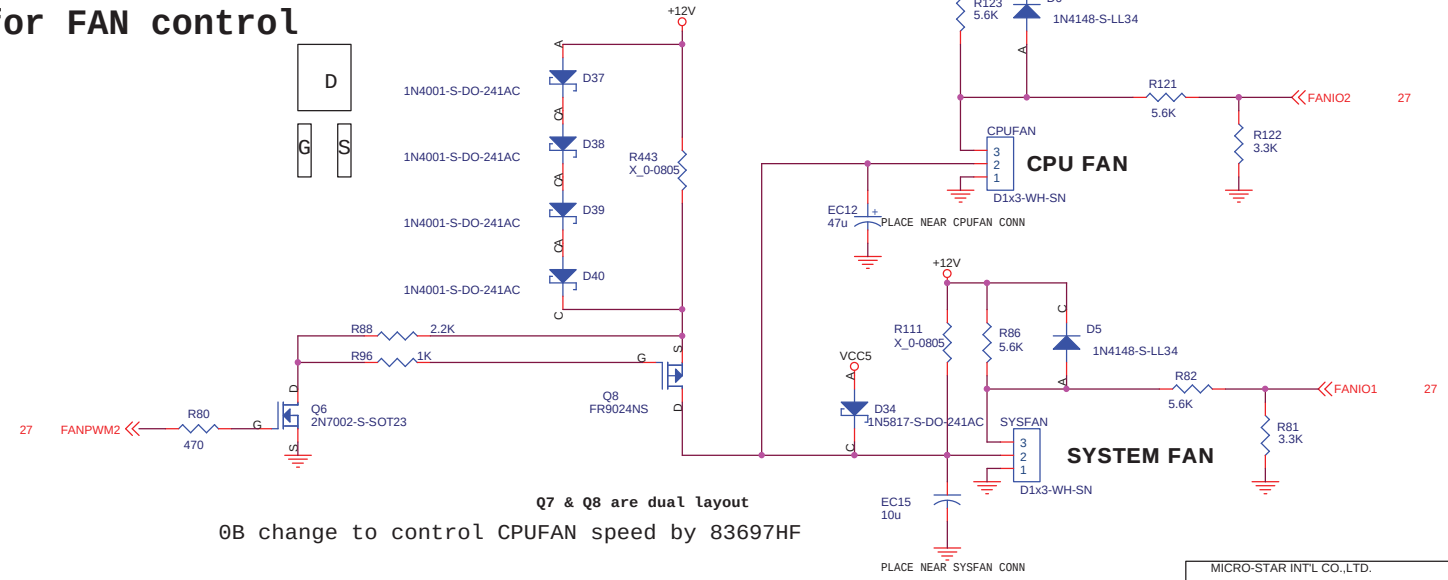
Hardware Monitor





PART	SYSFAN ONLY	SYSFAN & CPUFAN	BOTH NOT (default)
R80	○	○	X
Q6	○	○	X
R96	○	○	X
R88	○	○	X
Q8	X	○	X
Q7	○	X	X
RN22	○	X	○
RN23	X	○	X
R111	X	X	○

Option for FAN control



Q7 & Q8 are dual layout

0B change to control CPUFAN speed by 83697HF

MICRO-STAR INT'L CO.,LTD.			
Title: HARDWARE MONITOR			
Size: Custom	Document Number: MS-6535		Rev: 20B
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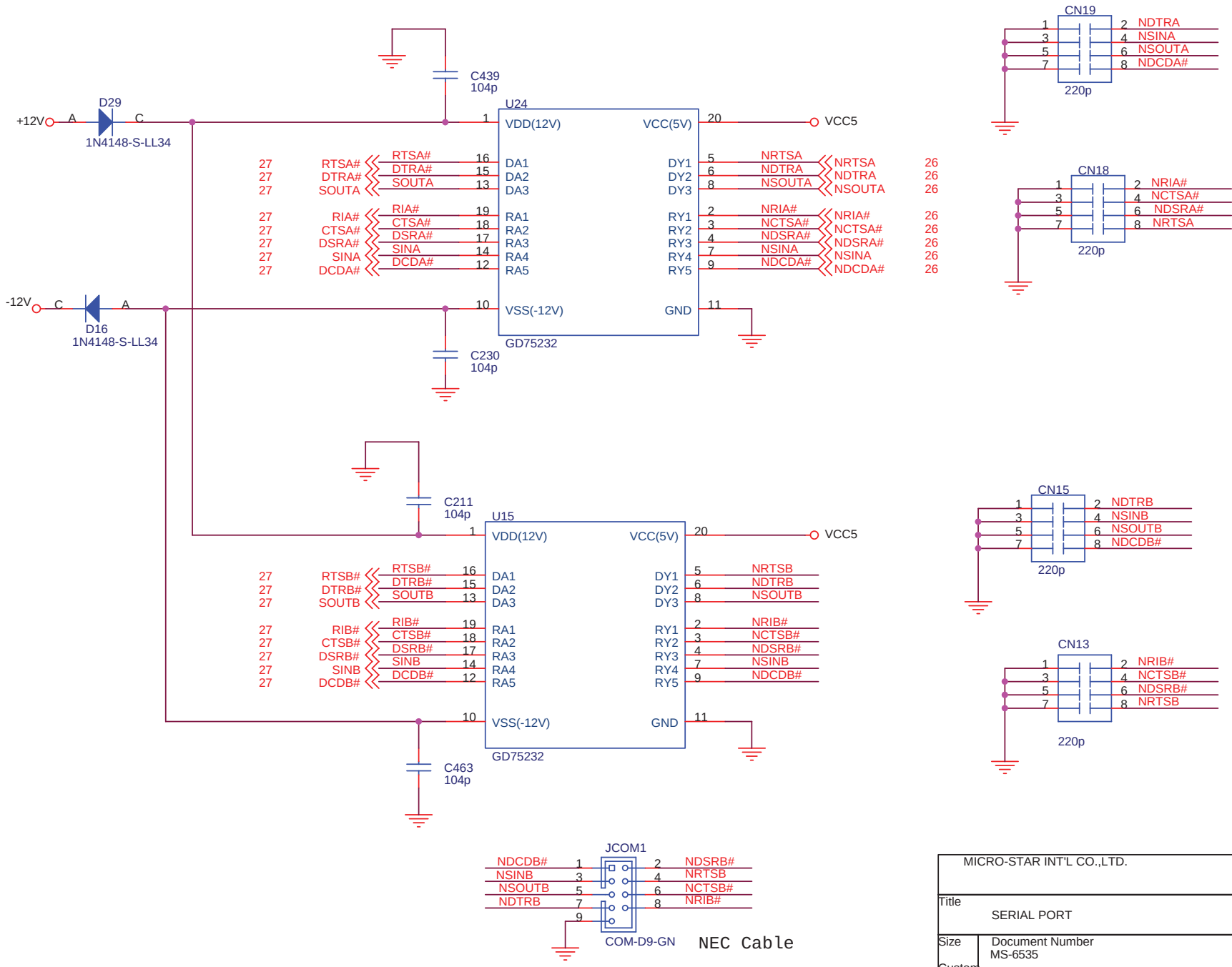
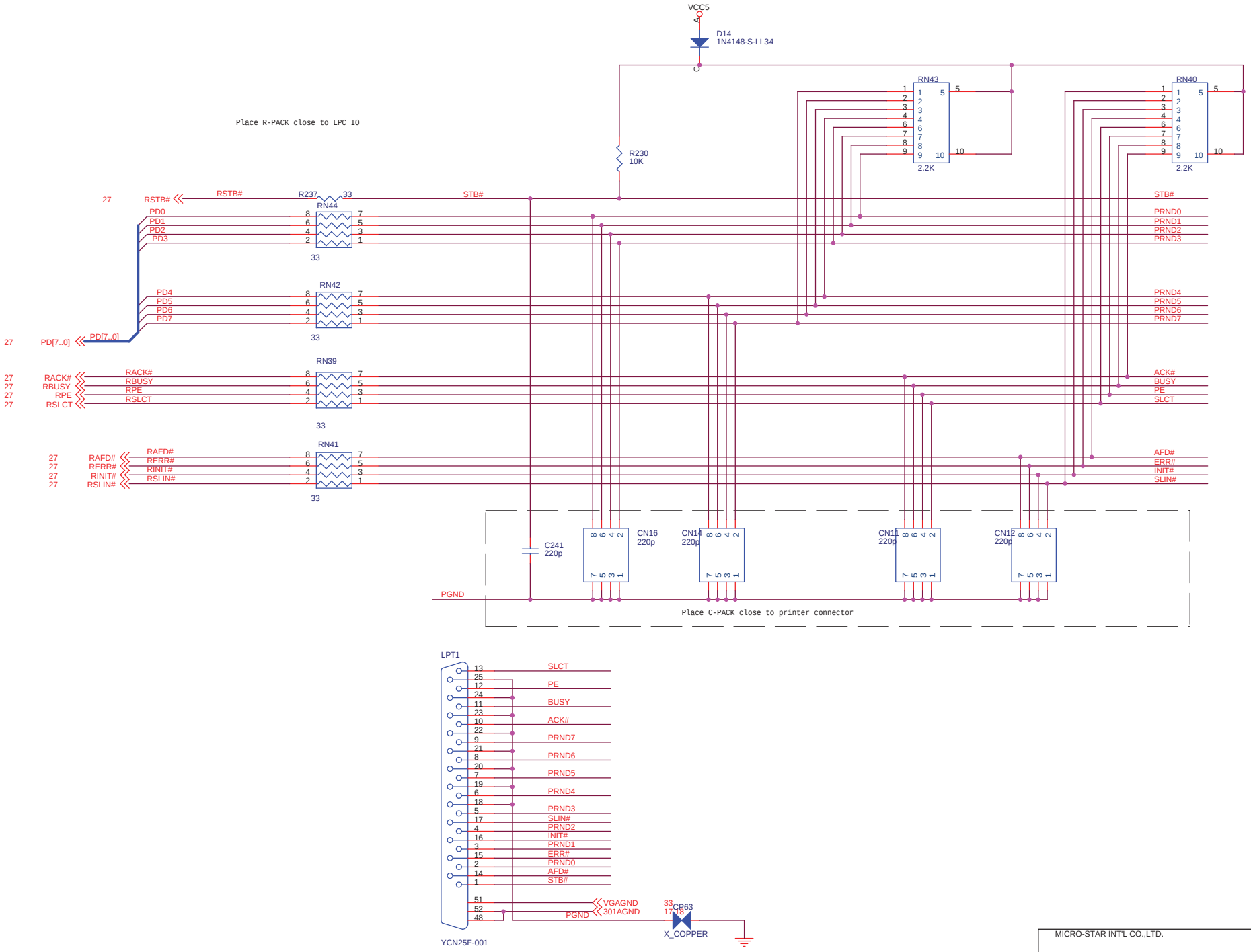


MICRO-STAR INT'L CO.,LTD.		
Title: SERIAL PORT		
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 29 of 41	


VCC5
D14
1N4148-S-LL34
R230
10K
RN43
2.2K
RN40
2.2K
Place R-PACK close to LPC IO
27 RSTB#
RSTB#
R237 33
STB#
RN44
PD0
PD1
PD2
PD3
33
RN42
PD4
PD5
PD6
PD7
27 PD[7..0]
PD[7..0]
33
RN39
27 RACK#
27 RBUSY
27 RPE
27 RSLCT
RACK#
RBUSY
RPE
RSLCT
33
RN41
27 RAFD#
27 RERR#
27 RINIT#
27 RSLIN#
RAFD#
RERR#
RINIT#
RSLIN#
33
STB#
PRND0
PRND1
PRND2
PRND3
PRND4
PRND5
PRND6
PRND7
ACK#
BUSY
PE
SLCT
AFD#
ERR#
INIT#
SLIN#
C241
220p
CN16
220p
CN14
220p
CN11
220p
CN12
220p
PGND
Place C-PACK close to printer connector
LPT1
13 SLCT
25
12 PE
24
11 BUSY
23
10 ACK#
22
9 PRND7
21
8 PRND6
20
7 PRND5
19
6 PRND4
18
5 PRND3
17 SLIN#
4 PRND2
16 INIT#
3 PRND1
15 ERR#
2 PRND0
14 AFD#
1 STB#
51 VGAGND
52 301AGND
48 PGND
33
17,18
CP63
X_COPPER
YCN25F-001
MICRO-STAR INT'L CO.,LTD.
Title
Parallel Port
Size
Custom
Document Number
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20B
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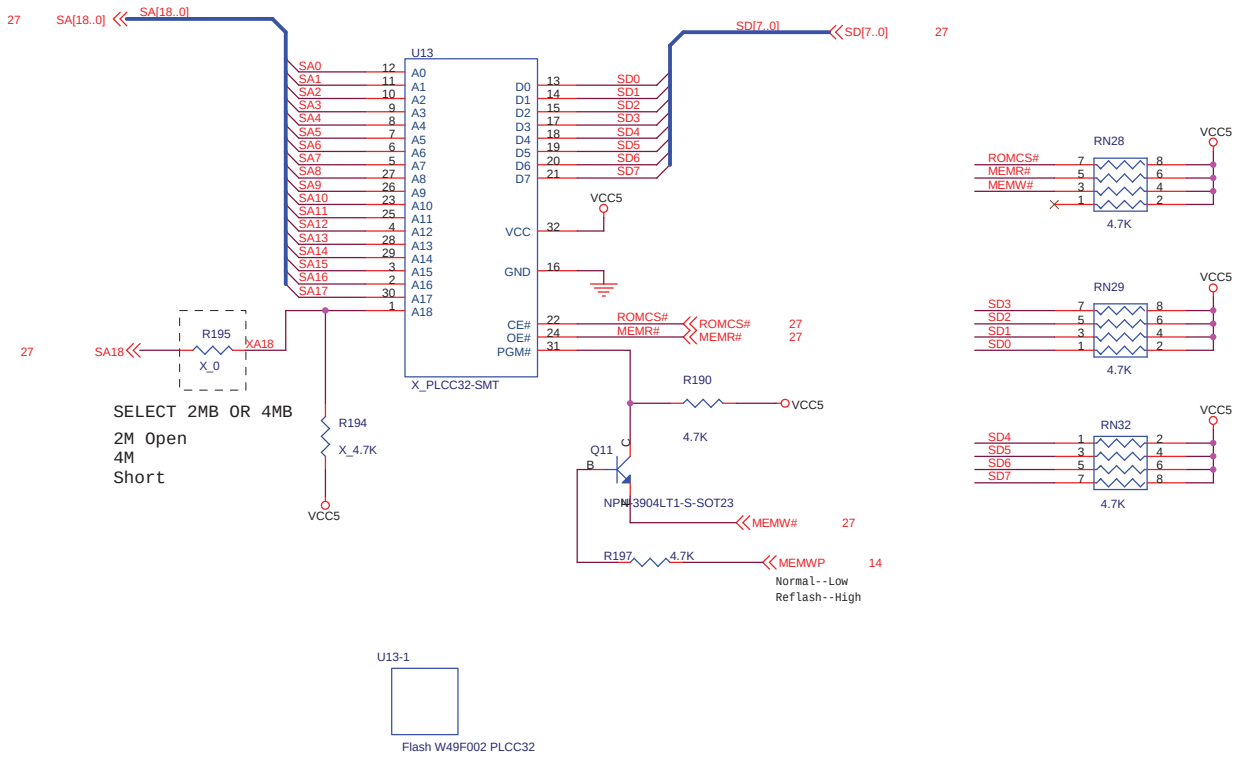

MICRO-STAR INT'L CO.,LTD.		
Title: FLASH MEMORY		
Size: Custom	Document Number: MS-6535	Rev: 20B
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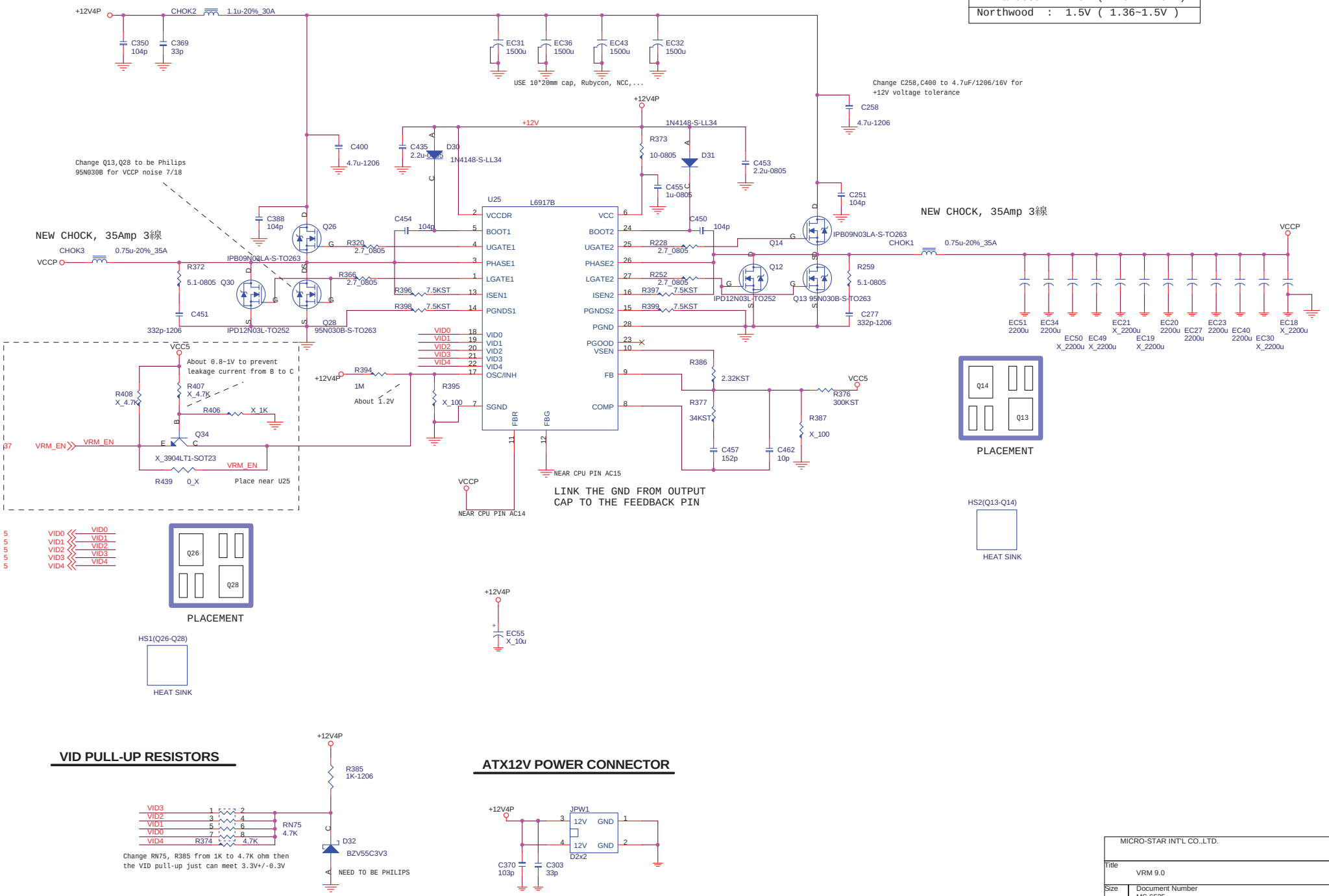
VCCP measurements :
Willamette : 1.75V (1.61~1.75V)
Northwood : 1.5V (1.36~1.5V)



MICRO-STAR INT'L CO.,LTD.			
Title: VRM 9.0			
Size	Document Number: MS-6535		Rev: 20B
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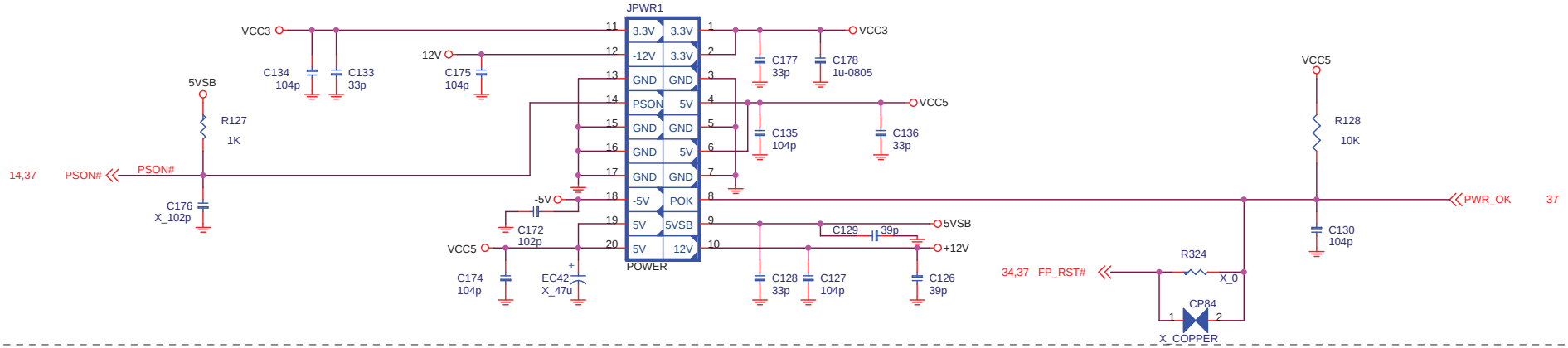
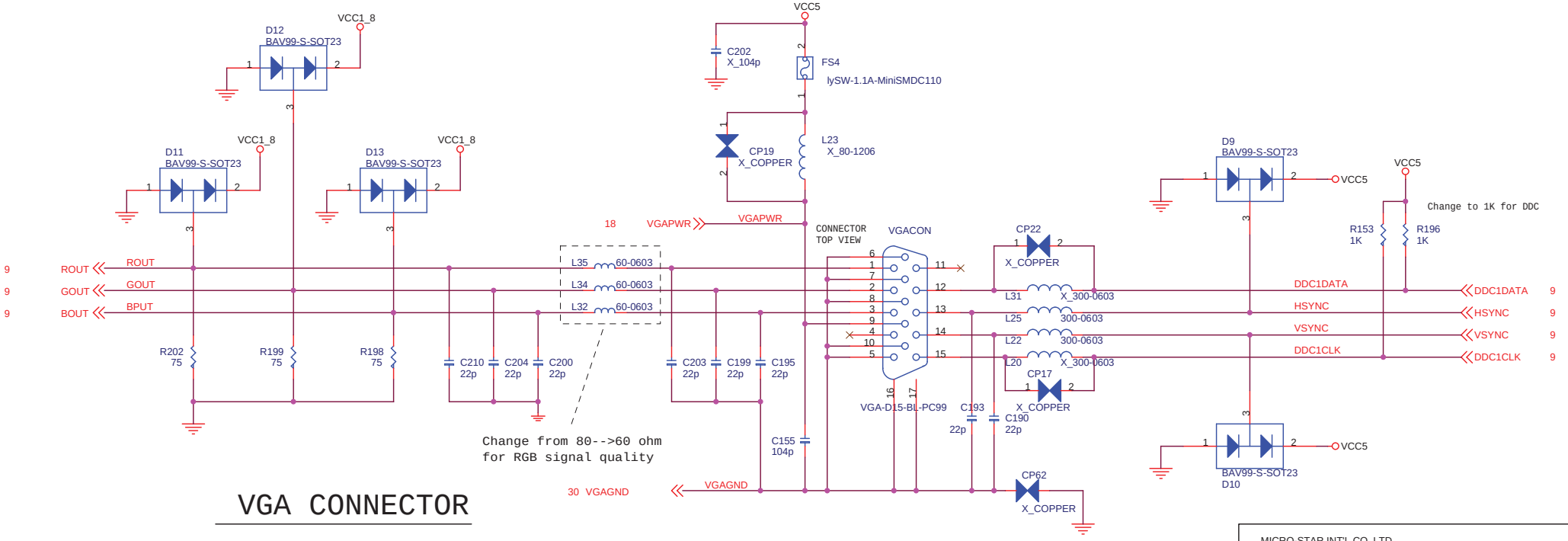
ATX CONNECTOR



VGA CONNECTOR



MICRO-STAR INT'L CO.,LTD.		
Title: ATX Power Conn. & VGA Conn.		
Size: B	Document Number: MS-6535	Rev: 20B
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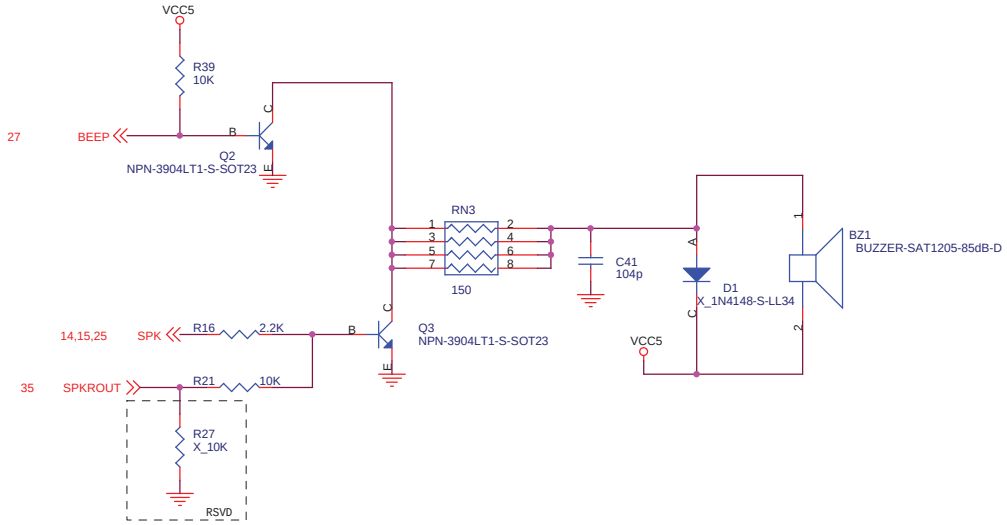
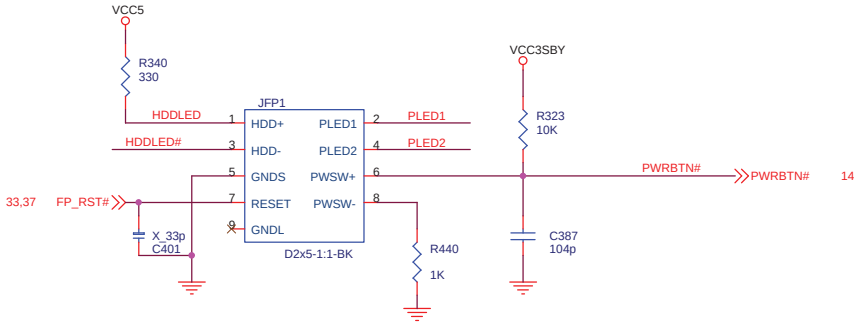
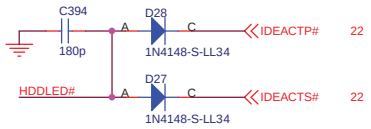
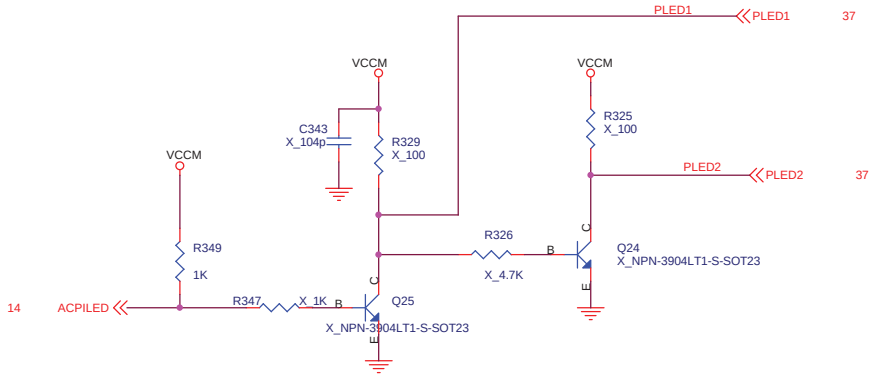






Dual Color LED Block



MICRO-STAR INT'L CO.,LTD.			
Title: FRONT PANEL			
Size: Custom	Document Number: MS-6535		Rev: 20B
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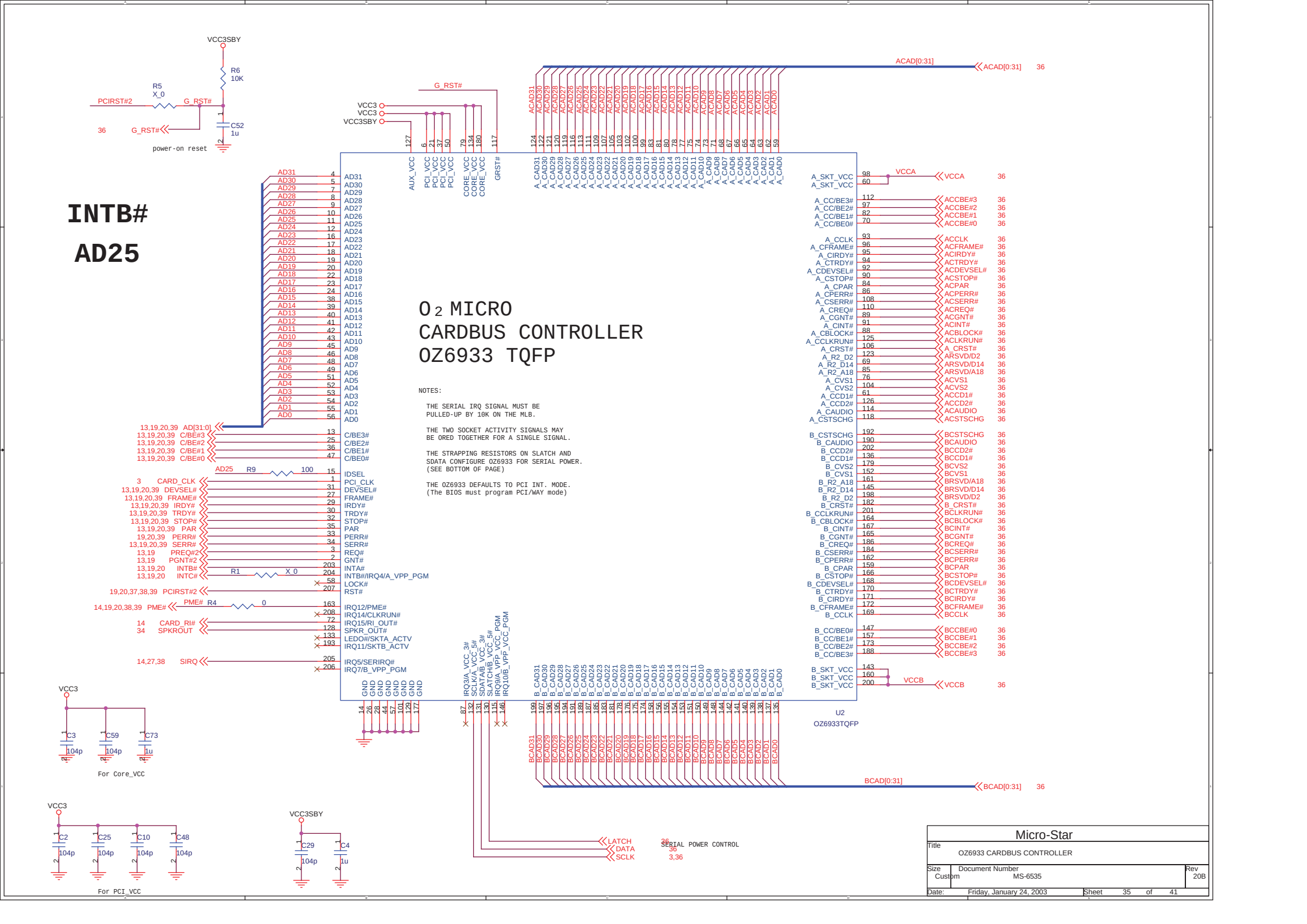

Micro-Star		
Title: OZ6933 CARDBUS CONTROLLER		
Size: Custom	Document Number: MS-6535	Rev: 20B
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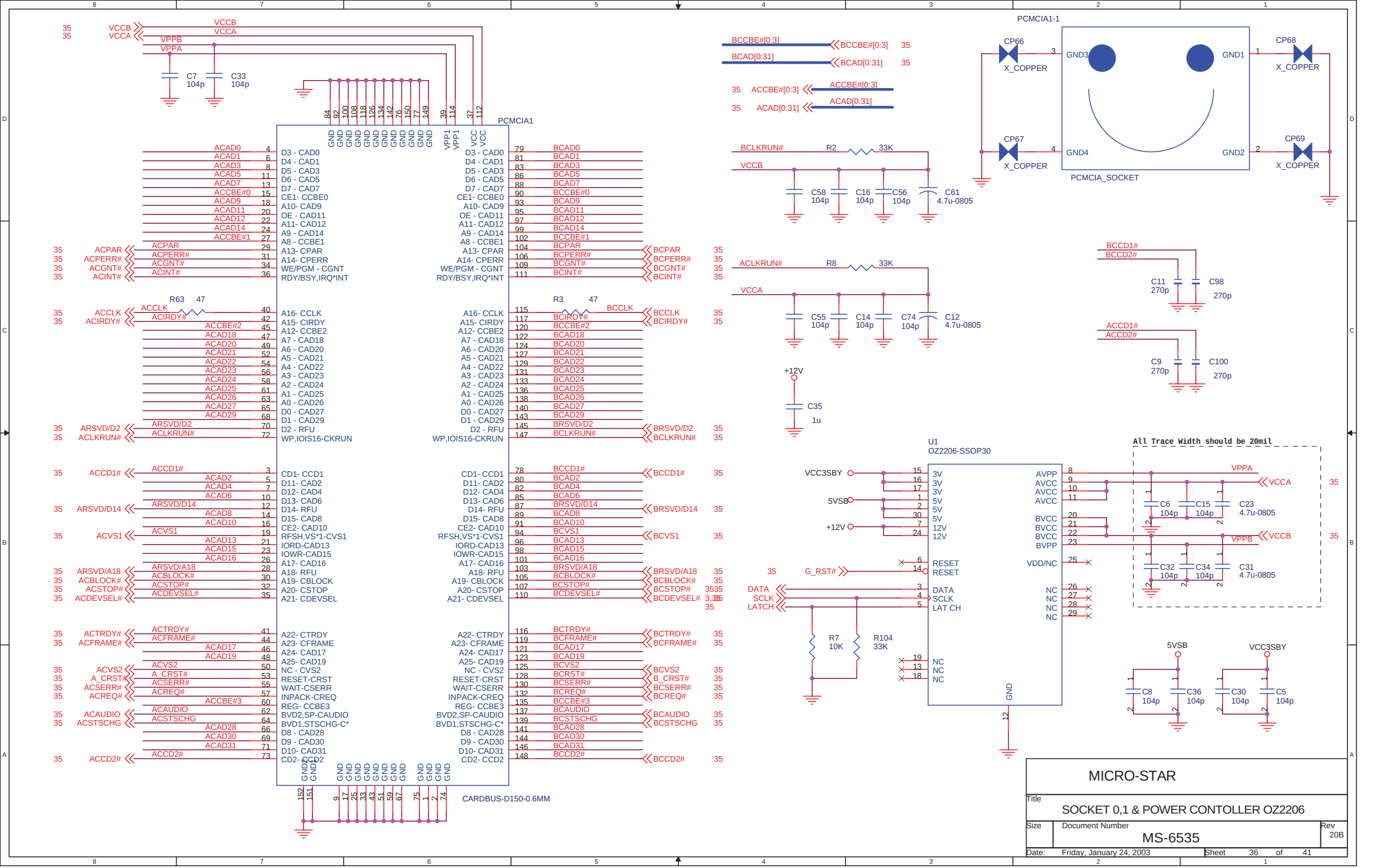
PCMCIA1
CARDBUS-D150-0.6MM
PCMCIA1-1
PCMCIA_SOCKET
U1
OZ2206-SSOP30
All Trace Width should be 20mil
MICRO-STAR
SOCKET 0,1 & POWER CONTOLLER OZ2206
MS-6535
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AUX_OK BLOCK

VCC3SBY — D18 (C, A) — X_1N4148-S-LL34 — R263 1K — AUXOK — AUXOK 9,14

CP85 (1, 2) X_COPPER — R264 X_0 — RSMRST#

R254 X_100K — C257 X_1u

Change R263 & C257 for AUXOK RC delay, and C257 must near SIS961

VCC3SBY — D35 (A, C) — D36 (A, C) — VCC1_8SBY

1N4148-S-LL34 — 1N4148-S-LL34

SEL0	5VUSB
H	2 MOSFET
L	1 MOSFET

5VSB — R285 10K — R289 X_1K

5VUSB USE 2 MOSFET

**S50# pin function(Hi level = 5V)
same as 5VUSB(Hi level = 12V)

5VSB — R261 330 — R256 330 — VCC3 — R262 4.7K — R253 4.7K

SLP_S5#
SLP_S3#
RSMRST#
9,14 PWRGD
33,34 FP_RST#
33 PWR_OK
34 PLED1
34 PLED2

5VSB — NDS351AN-S-SOT23 Q21 — 5VDUAL

Q23 NIKO-45N02-TO252

VCC5 Low RDS ON MOSFET

Q18/Q23 can use :
Philips P/N : D03-45N030B-P03 &
Niko P/N : D03-45N020B-N03

C271 X_102p — C291 X_102p

VCC5 — R274 330 — VCC3 — R275 X_180 — R279 180

U20 MSI-5

PLED1 PLED0 PWR_OK FP_RST#/GPIOB PWR_OK1/GPIOC EXTRA_PWCD/GPIOC CHIP_PWCD/GPIOC CPU_PWCD/GPIOC RSM_RST#/GPIOB SLP_S3# SLP_S5# SSO#/GPIOB/SEL0

1 DGND
2 PCIRST#/GPIOA
3 HDD_RST#/GPIOA
4 SLOT_RST#/GPIOA
5 DEV_RST#/GPIOA
6 I2C_DATA
7 I2C_CLK
8 BT_DRV
9 BT_SEN
10 BT_SINK
11 AGND0
12 SEL1

36 5V_USB
35 5VSB_DRV
34 5V_DRV
33 TYPEDET#
32 VAGP_SEN
31 VAGP_DRV
30 AGND2
29 1.25VREF
28 9VSB
27 C2
26 C1
25 VCC3

13 14 15 16 17 18 19 20 21 22 23 24
VCC VRAMDRV2 VRAMSEN VRAMDRV1 SS AGND1 VRAM_2.5_DEN VRAM_2.5_DRV VSS VRGOOD 1.2V_SEN 1.2V_DRV

13 PCIRST# — 22 HDRST# — 19,20,35,38,39 PCIRST#2 — 9,17,27 PCIRST#1

HDRST# — R428 33
PCIRST#2 — R418 33
PCIRST#1 — R419 33

3,4,11,14 SMBDAT
3,4,11,14 SMBCLK

Q31,Q29 is single source of
Niko--P3055LD :
D03-3055LDB-N03

VCC3 — Q31 NIKO-P3055LD-TO252 — DDR_VTT — EC59 1000u — EC58 1000u — Q29 NIKO-P3055LD-TO252

C438 X_102p — 5VSB — R281 10K

VCC5 — R208 0-0805 — VDDQ — EC22 10u — near SIS650

VREF1_25 CHARGE PUMP VOLTAGE OUTPUT

C319 4.7u-0805 — 1N5817-S-DO-241AC — D26 — D20 X_1N4148-S-LL34 — VCC3 — C302 X_1u — 9VSB

5VSB — +12V

5VSB — EC35 1000u — C340 X_1u — Reserved R292 X_75K_ — C339 474p

VCC5

SEL1	VRAM	VRAM_2.5
H	3.3VDUAL	2.5V
TRI-STATE	3.3VSB	2.5V
L	3.3VSTR	1.25V

VCC3 — 2N7002-S-SOT23 — Q20 VCC_VID — VCC_VID — VCC_VID 6

C344 X_1u — EC41 10u

VRM_EN 32

THIS PIN IS OPEN DRAIN OUTPUT

FOR 3VSB OR 3VSTR
SETTING BY SEL1

VCC3 — Q18 NIKO-45N02-TO252

VCC3SBY — EC39 1000u — C332 X_1u — Q19 NDS337AN-S-SOT23 — 5VSB — C338 102p

FOR 3VDUAL
SETTING BY SEL1

** SETTING 3VSTR THEN VRAM_2.5
BECOME TO 1.25 VREF

Q18/Q23 can use :
Philips P/N : D03-45N030B-P03 &
Niko P/N : D03-45N020B-N03

VCC3SBY — Q22 NIKO-P3055LS-TO263 — VCCM — D25 X_1N4148-S-LL34 — VCC1_8

C407 X_10u-1206 — C371 10u-1206 — EC45 1000u

Place these two cap at the opposite side to EC45

Q22/Q17 can use
Niko P/N : D03-3055LSB-N03 &
Vishay P/N : D03-45N031B-V02 &
Niko P/N : D03-45N021B-N03

HDRST#
PCIRST#2
PCIRST#1
C548 39p — C546 39p — C552 39p

Place near U20 pin 4 & 5, For PCIRST# signal quality

5VSB — R265 10K — SLP_S5# — R255 10K — 5VSB

8 S3AUXSW# — R248 4.7K — Q16 NPN-3904LT1-S-SOT23 — SLP_S3#

14,33 PSON# — R247 4.7K — Q15 NPN-3904LT1-S-SOT23

	S0	S3	S5
S3AUXSW#	1	0	1
PSON#	0	1	1
SLP_S5#	1	1	0
SLP_S3#	1	0	0

2.5V POWER TRANSLATOR

To DDR Clock Buffer

VCC3 — Q27 NDS351AN-S-SOT23 — VCC2.5V

+12V — U16A TI-LM358-SOIC8 — SSS1 — R246 0_X — SSS1 — VREF1_25

R244 100RST — EC47 47u — C411 104p

R245 100RST — C247 X_1u

C242 X_100p

Can use the same VCC3 plane

1.8V POWER TRANSLATOR

change to 1.9V

VCC3 — Q17 NIKO-P3055LS-TO263 — VCC1_8

I = 4Amp

EC24 10u

+12V — U16B TI-LM358-SOIC8 — SSS0 — R270 0_X — SSS0 — VREF1_25

R269 115RST — EC33 1000u — C285 104p

R268 220RST

C275 X_100p

MICRO-STAR INT'L CO.,LTD.		
Title: ACPI-MS5		
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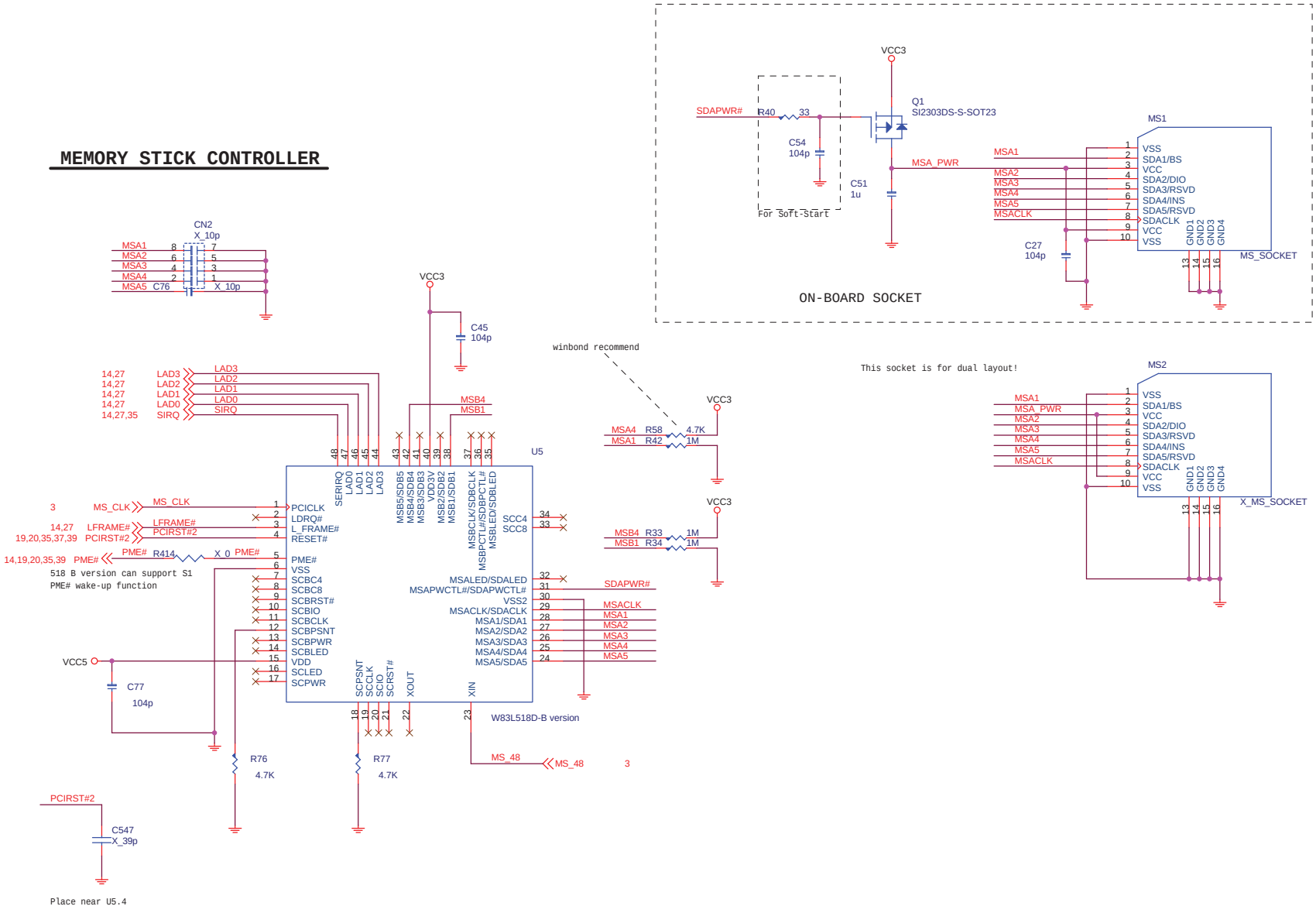
MEMORY STICK CONTROLLER



MICRO-STAR INT'L CO.,LTD.		
Title: MEMORY STICK		
Size: Custom	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 38 of 41	

IEEE-1394

Did not support S3 wake-up

INTD# AD23

NEAR EACH POWER PIN

Layout 直接短路

Layout 直接短路

Connector side

Place near chip side

Connector side

Place near chip side

Front panel 1394 port

Near Pin 116

1394 CON4P

X_COMM_CHOCK

X_COMM_CHOCK

NEC PD72874

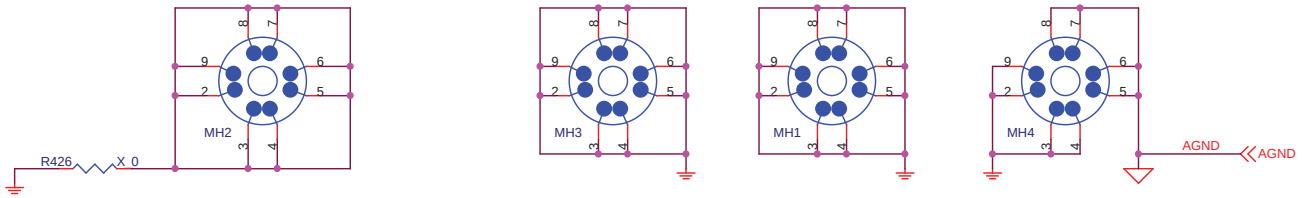
1394-EEPROM 24C02

Title	1394-NEC72874
Size	Document Number MS-6535 Rev 20B
Custom	
Date:	Friday, January 24, 2003 Sheet 39 of 41

MICRO-STAR INT'L CO.,LTD.

PCB OTHER COMPONENT

BS1_X1 BS2_X1 BS3_X1 BS4_X1 BS5_X1

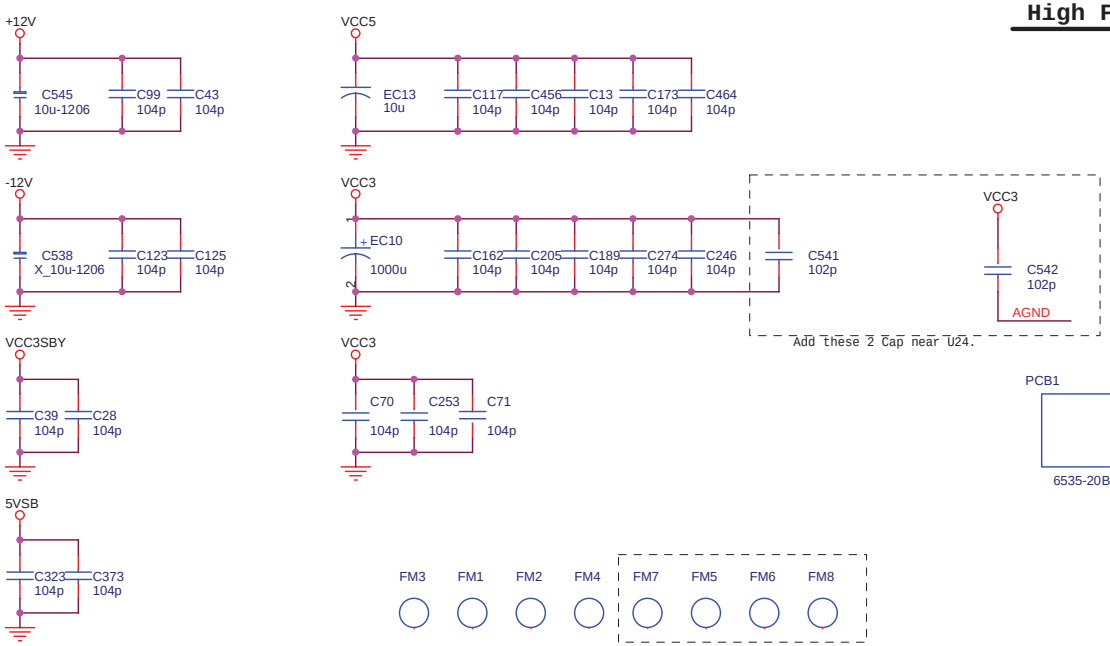


J2 X_PIN1*2 CPU

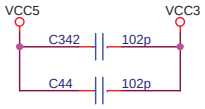
J1 VCC5 X_PIN1*2 AGP

25,26

System Decoupling Capacitors

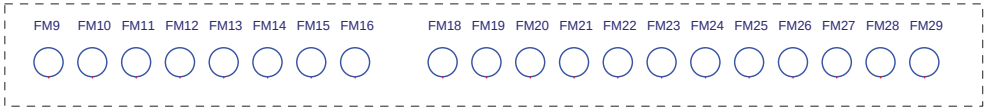


High Freq. return current decoupling



For chip positioning

At solder side



MICRO-STAR INT'L CO.,LTD.		
Title: DECOUPLING CAPACITOR		
Size: B	Document Number: MS-6535	Rev: 20B
Date: Friday, January 24, 2003	Sheet 40 of 41	

MS-6535 0A (Modify from MS-6558)

PAGE	Description
9.SCH	Add R674 at DDC1DATA 100 ohm for SIS recommend
17.SCH	Add R675 R676 at CRT2DDC 100 ohm for SIS recommend
3.SCH	Add R702 at FS0 for ICS/ICW clock gen dual layout
37.SCH	1.Del EC199, EC43, EC5, EC118 & add C701, C702 10u-1206 for VCCM
	2.Connect VDDQ from VCC3 by 0-0805
	3.change AUXOK circuit to 473p and 510K for power sequence delay
38.SCH	Add C704/104p and change R624 to 4.7K for Winbond recommend
11/12	
25.SCH	Delete JAUX conn and the relative component
27.SCH	Delete the IR component and the DLED signals
40.SCH	Delete the DLED components and the signals, del this page
11/19	
32.SCH	Change PWM R54 form 100-->10-0805 for ST recommend
15.SCH	Change C254 to be 474p for RC time constant is 100ms
11/21	Update the New Part Number for each part! to V11
11/29	
35.SCH	Change PCMCIA controller to OZ6933
36.SCH	Change the A,B slot for layout
4.SCH	Swap the DDRCLK for layout
12/10	GERBER OUT

MS-6535 0B (Modify from 0A)

1/31	
3.SCH	Change SIO 48MHz with UCLK48M and change CLK GEN to ICS
	Did not stuff R119 and stuff R120/4.7K for ICS
4.SCH	Change U23 to ICS 93722
8.SCH	Swap DDR pin for DDR signal (MA0~3, SRAS#, MD44)
12.SCH	Add C540 10uF-1206 and change DDR_VTT decoulping cap to 105pF
14.SCH	R151,R152 : 4.7K-->2.2K, change SMBALT# R185 to GND for SMBUS
15.SCH	Del C151 and change C112 to X7R cap
16.SCH	Change C508,C510 to component side and stuff and del C169
20.SCH	Change RTL8100 to RTL8101 and add Modem solution
21.SCH	Do not mount R155, C156, C159, C160, R94, R95
23.SCH	Change RN31, RN35 & RN38 15-->27 ohm for eye pattern
25.SCH	Change CODEC to ALC650 and change the following:
	Change SPDIF signal , remove R361, C436, R364
	Add FR_MICIN, MICIN2, BIAS_CTRL circuit for 6 channel
	Did not stuff R317~R319, R299, R300, R296, R363 and del C418
	Add C539 for FR_MICIN and change R304~ R306 to 1K ohm
26.SCH	Change AGND2 to AGND for Audio Precision SNR THD+N
	Change the MIC ckt for 6 channel line-out
27.SCH	Change FDD to be slim type and change FAN control to FANPWM2
28.SCH	Mount R80, R88, R96, Q8, RN23 and remove RN22, R111
	Change EC12 to 47uF for FAN 12V
32.SCH	Add VRM_EN circuit to U25.17 for leakage current
	Did not mount EC49, EC50, Q12, Q30 for VRM9.0 OK
	change R386 to 1.5K and R376 to 200KST for VRM9.0
33.SCH	Change L32, L34,L35 to 60S-0603 for RGB signal quality
	change R153, R196 to 1K for DDC
34.SCH	Did not stuff R347,Q25,R329,R325,Q24,R326 for 302 to control LED
37.SCH	Change EC45 to 10mm Cap for DDR_VTT and stuff C371
	Change C339 to X7R cap for soft-star & Remove R273
39.SCH	Change 1394 from VIA 6306 to NEC PD72874 for VIA PHY bug
	Did not support S3 wake-up
40.SCH	Add C541 and C542 at VCC3 for EMI

MS-6535 100 (Modify from 0B)

5.SCH	Add R409, R410 at TESTHI1&12 to VCCP for .13u P4 CPU
	Change R231,R331,R221,R225 from 4.7K to 56 ohm as the same
38.SCH	Add R411 for Memory Stick PME# wake-up function

MS-6535 10B (Modify from 1.0A)

5.SCH	Delete R335 and change R336 to be dummy pad
14.SCH	Add C554 at INIT# signal for Auto-reset issue!Remove R334-C
27.SCH	Delete L14 & CP14 and connect C144 direct to VCC5
28.SCH	Add C553 332pF at VTIN2 near 697HF for CPU Temp issue!
	Change RT1 from 0603 to 0805 size to meet the size of L14
	Do not change any paste & ICT test pad for the same as 1.0A

MS-6535 10C (Modify from 1.0B)

32.SCH	Remove +12V trace from JPW1(4 pin) to JPWR1(20 pin)--->Rename page#32 from +12V to +12V4P
33.SCH	Move EC55 from page#33 to page#32 and connect to +12V4P

Title: HISTORY		
Size: Custom	Document Number: MS-6535	Rev: 20B
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