# 648-M7
# 648FX-M7
# 661FX-M7 Rev: 3.0

## Revision History :

1. Ver A: Initial for 661FX/648FX for LGA775
2. Ver 1.0:
   - I. modify CPU pull-high
   - II. add FSB1066 select CKTs
   - III. modify Common-Choke and R0603 co-lay
   - IV. add 1394A3 header
   - V. AD1888 and ALC655 co-lay
   - VI. modify FAN CTRL CKTs
   - VII. modify VRDGD
   - VIII. add PANEL2
3. Ver 1.1:
   - I. modify for EE CPU supporting
   - II. modify SmartFAN clamp up circuit
4. Ver 1.1A:
   - I. modify for CPU 3pin SmartFAN supporting
   - II. Add SLVU2.8-4 Surge Protect IC
5. Ver 1.2:
   - I. move CPU socket location
6. Ver 3.0:
   - I. add CNR solt
   - II. remove AD1888 co-lay

## Page Index



| | SIGNATURE | DATE |
|---|---|---|
| DESIGNER | LukeLin | |
| LAYOUT | ECS Layout team | |
| CHECK | LukeLin | |
| APPROVAL | | |

Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: Cover Sheet 3.0

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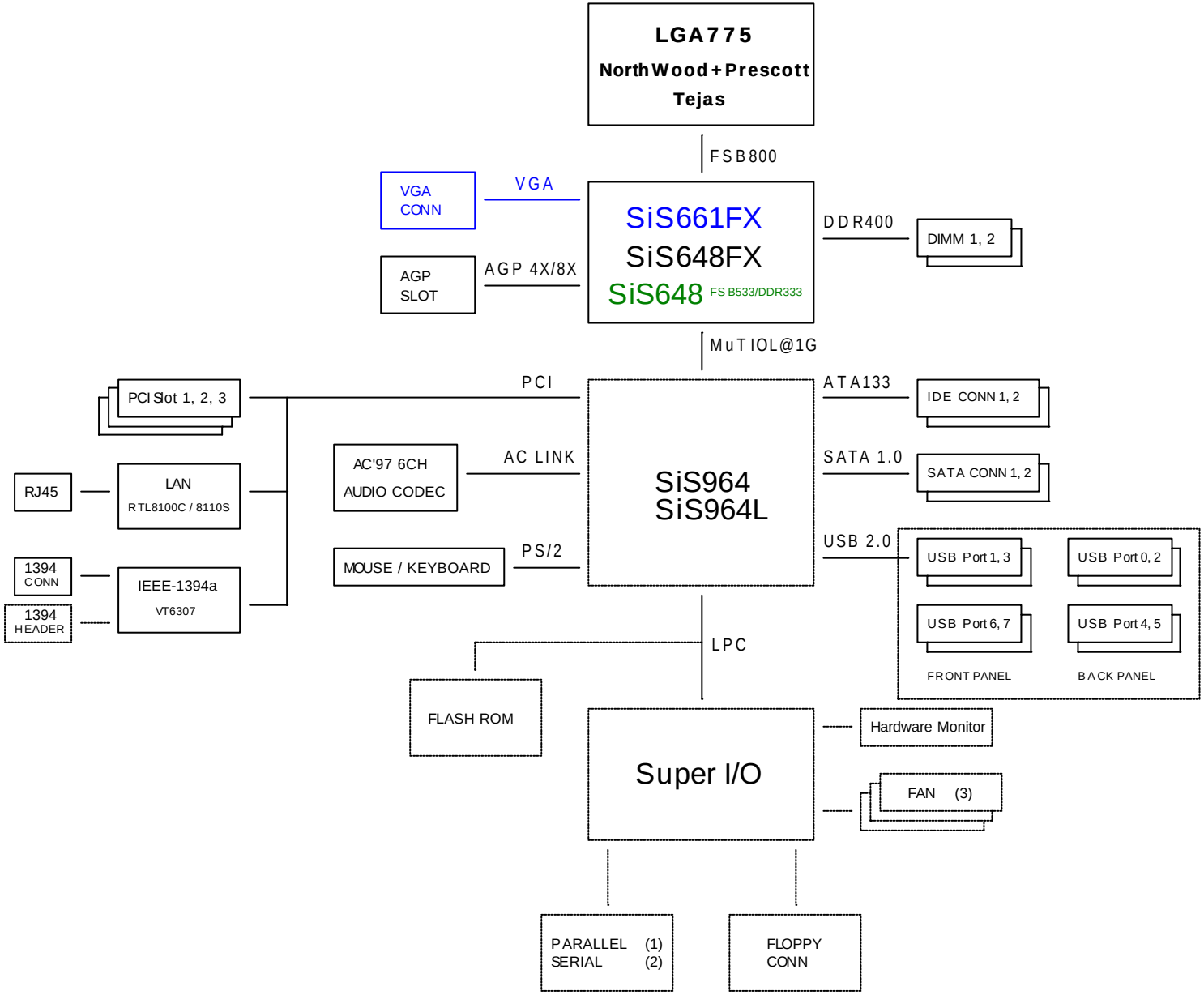


Elitegroup Computer Systems

Title: 648/661FX-M7

Size: Custom | Document Number: Block Diagram | Rev: 3.0

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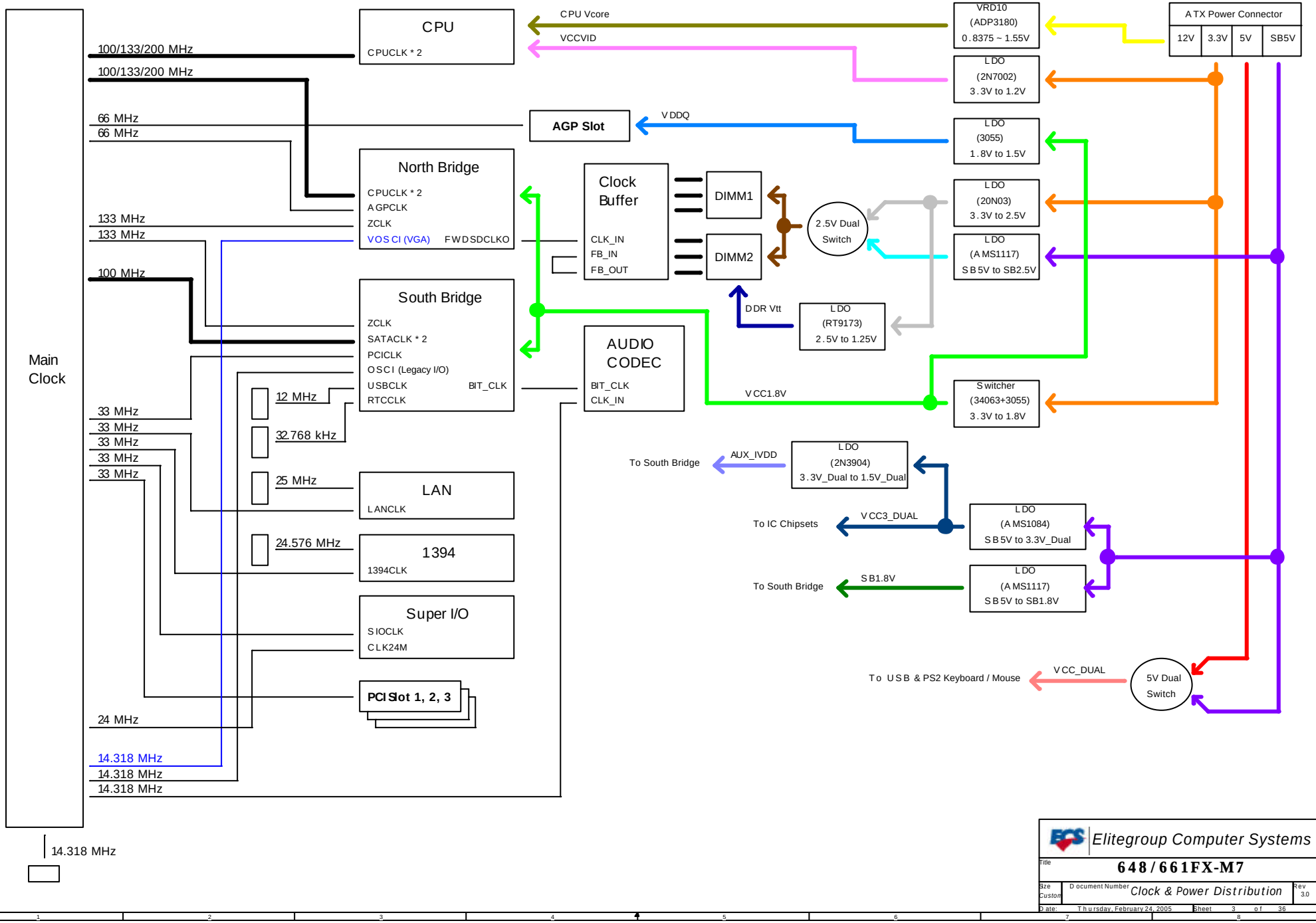
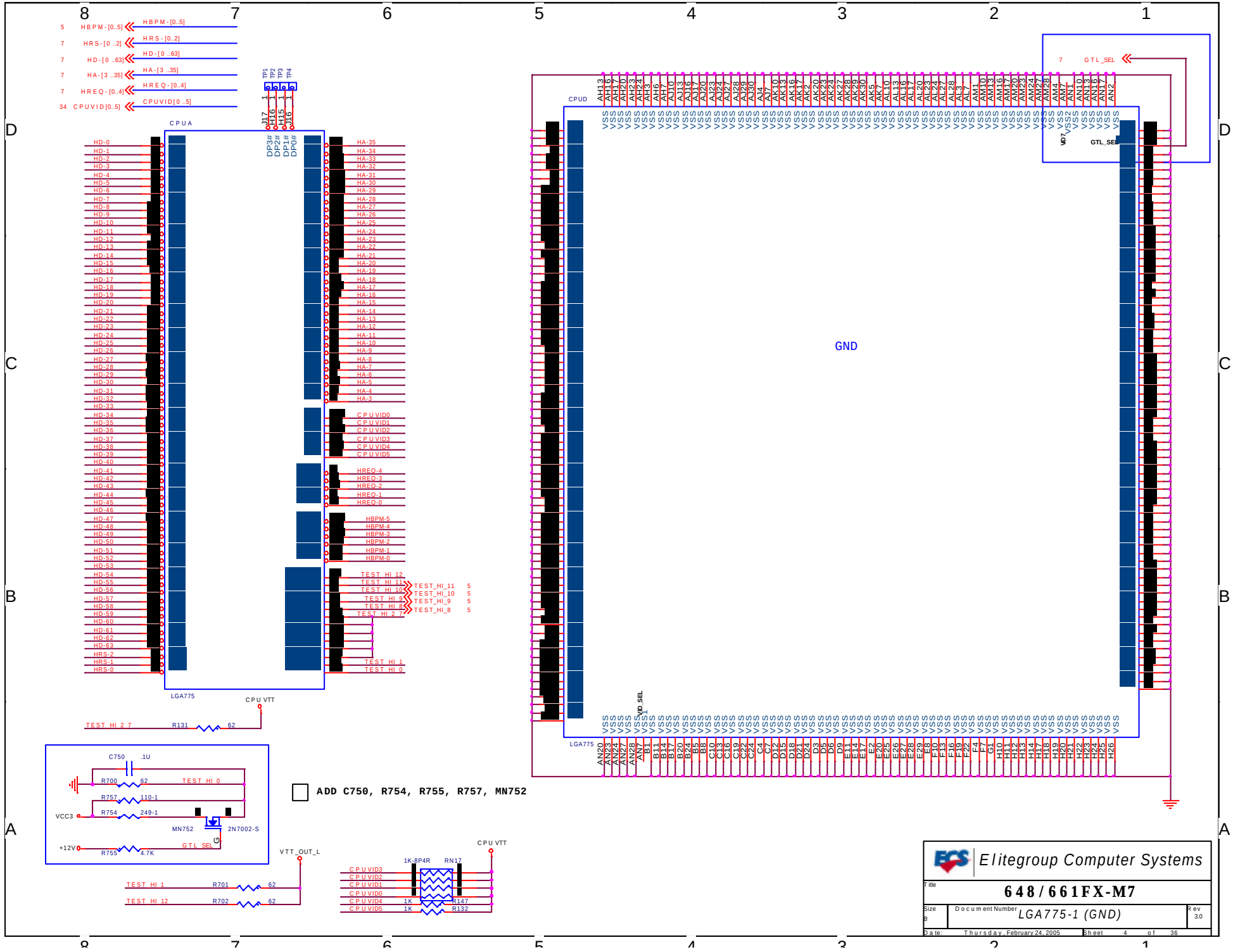


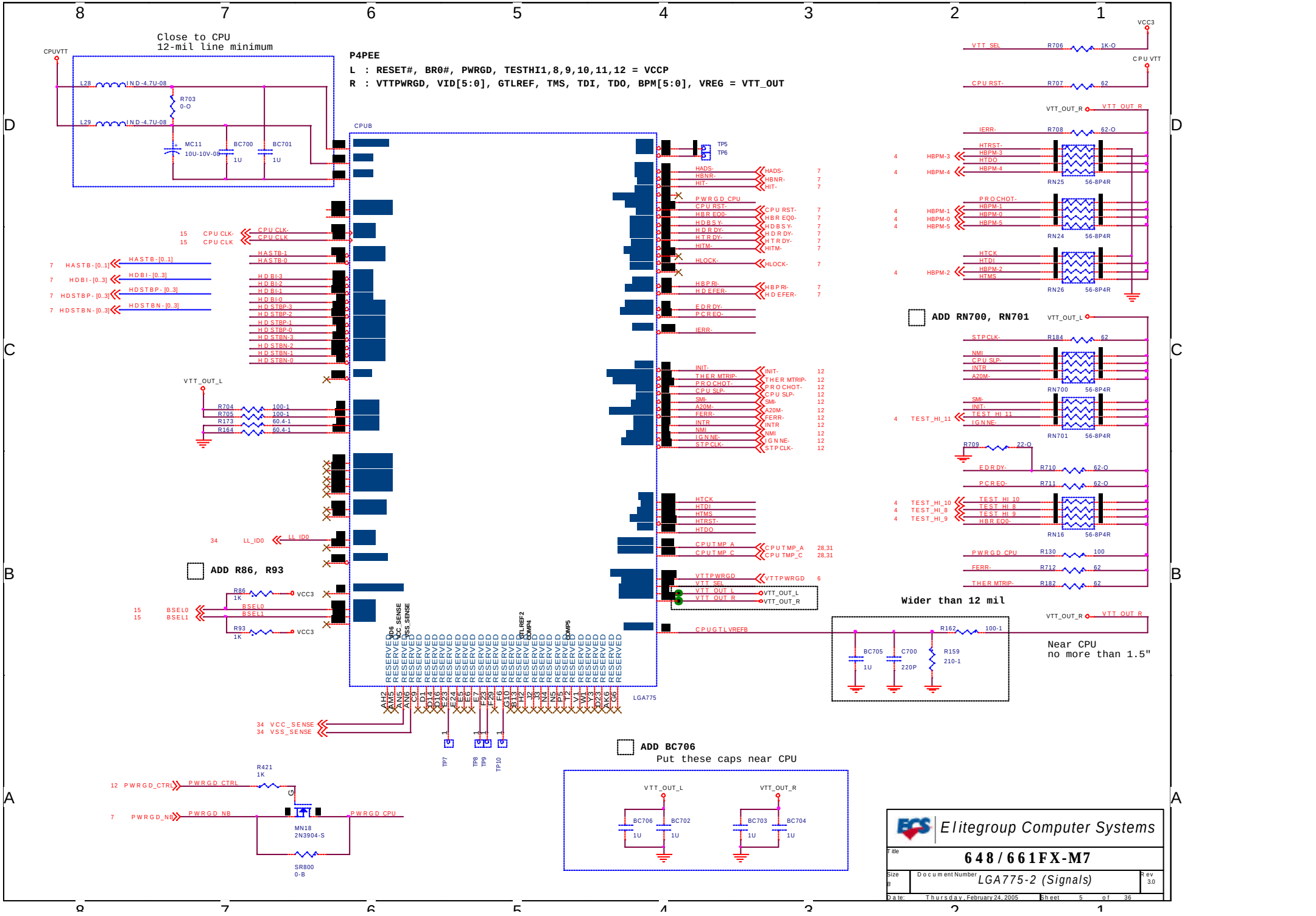

Elitegroup Computer Systems

Title: 648/661FX-M7

Size: Custom | Document Number: Clock & Power Distribution | Rev: 3.0

Date: Thursday, February 24, 2005 | Sheet 3 of 36


HBPM-[0..5]
HRS-[0..2]
HD-[0..63]
HA-[3..35]
HREQ-[0..4]
CPUVID[0..5]
CPUA
LGA775
CPUD
LGA775
GND
GTL_SEL
CPU VTT
TEST_HI_2_7
R131
62
C750
.1U
R700
62
TEST_HI_0
R757
110-1
R754
249-1
VCC3
MN752
2N7002-S
+12V
R755
4.7K
GTL_SEL
ADD C750, R754, R755, R757, MN752
VTT_OUT_L
TEST_HI_1
R701
62
TEST_HI_12
R702
62
1K-8P4R
RN17
R147
1K
R132
1K
Elitegroup Computer Systems
648/661FX-M7
LGA775-1 (GND)
Thursday, February 24, 2005


Close to CPU
12-mil line minimum
P4PEE
L : RESET#, BR0#, PWRGD, TESTHI1,8,9,10,11,12 = VCCP
R : VTTPWRGD, VID[5:0], GTLREF, TMS, TDI, TDO, BPM[5:0], VREG = VTT_OUT
CPUVTT
L28
L29
IND-4.7U-08
R703
0-O
MC11
10U-10V-08
BC700
1U
BC701
1U
CPUB
TP5
TP6
HADS-
HBNR-
HIT-
PWRGD_CPU
CPU RST-
HBR EQ0-
HDBSY-
HDRDY-
HTRDY-
HITM-
HLOCK-
HBPRI-
HDEFER-
EDRDY-
PCREQ-
IERR-
INIT-
THERMTRIP-
PROCHOT-
CPU SLP-
SMI-
A20M-
FERR-
INTR
NMI
IGNNE-
STPCLK-
HTCK
HTDI
HTMS
HTRST-
HTDO
CPUTMP_A
CPUTMP_C
VTTPWRGD
VTT_SEL
VTT_OUT_L
VTT_OUT_R
CPUGTLVREFB
CPU CLK-
CPU CLK
HASTB-[0..1]
HDBI-[0..3]
HDSTBP-[0..3]
HDSTBN-[0..3]
LL_ID0
VTT_OUT_L
R704
R705
R173
R164
100-1
60.4-1
ADD R86, R93
R86
R93
1K
VCC3
BSEL0
BSEL1
VCC_SENSE
VSS_SENSE
LGA775
ADD BC706
Put these caps near CPU
BC706
BC702
BC703
BC704
1U
R421
1K
PWRGD_CTRL
PWRGD_NB
MN18
2N3904-S
SR800
0-B
VCC3
CPU VTT
VTT_SEL
R706
1K-O
CPU RST-
R707
62
VTT_OUT_R
IERR-
R708
62-O
HTRST-
HPBM-3
HTDO
HPBM-4
RN25
56-8P4R
PROCHOT-
HPBM-1
HPBM-0
HPBM-5
RN24
HTCK
HTDI
HPBM-2
HTMS
RN26
ADD RN700, RN701
STPCLK-
R184
62
NMI
CPU SLP-
INTR
A20M-
RN700
SMI-
INIT-
TEST_HI_11
IGNNE-
RN701
R709
22-O
EDRDY-
R710
62-O
PCREQ-
R711
62-O
TEST_HI_10
TEST_HI_8
TEST_HI_9
HBR EQ0-
RN16
PWRGD_CPU
R130
100
FERR-
R712
62
THERMTRIP-
R182
62
Wider than 12 mil
R162
100-1
BC705
C700
220P
R159
210-1
Near CPU
no more than 1.5"
Elitegroup Computer Systems
Title
648/661FX-M7
Size
B
Document Number
LGA775-2 (Signals)
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3.0
Date:
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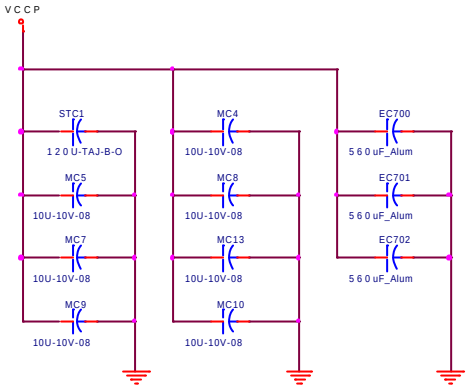
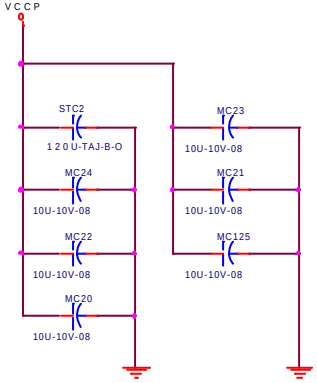
36

P.S. Choose X5R components instead of Y5V for all 22uF_1206 capacitors on this page.

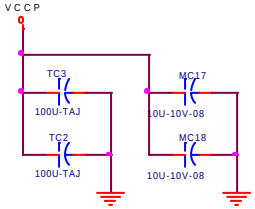
**Put these capacitors at processor TOP SIDE**

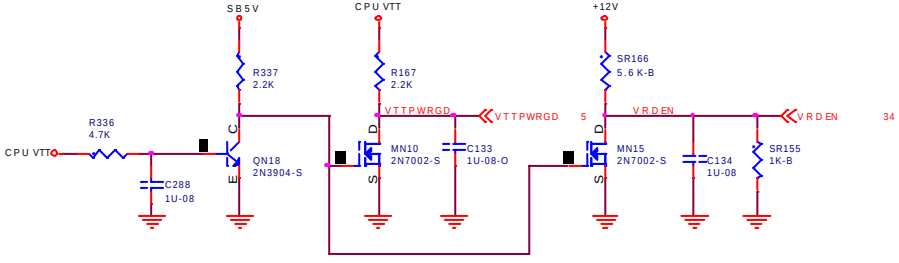


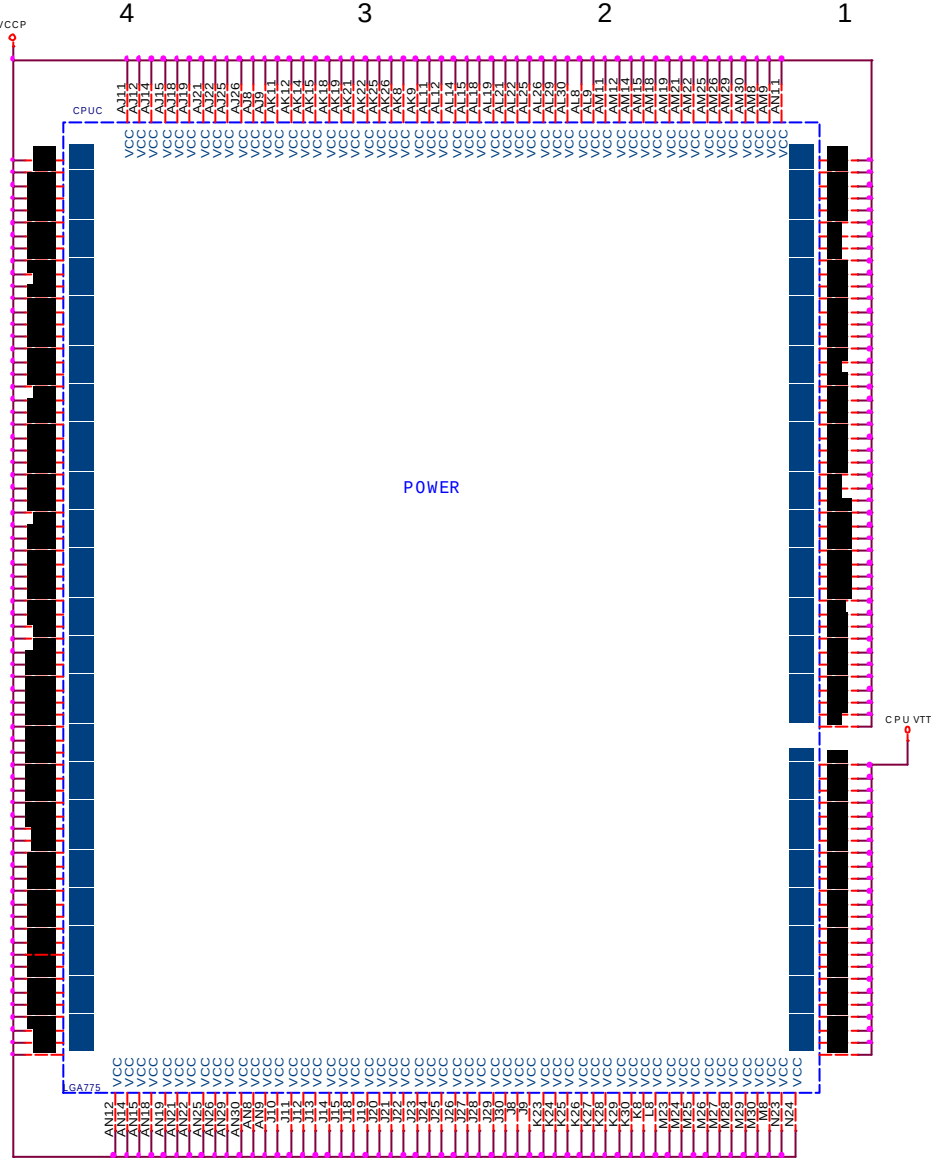

**Put these capacitors at processor LEFT SIDE**




**Put these capacitors INSIDE PROCESSOR CAVITY**




| | |
|---|---|
| Elitegroup Computer Systems | |
| Title | 648/661FX-M7 |
| Size: B | Document Number: LGA755-3 (Power) — Rev: 3.0 |
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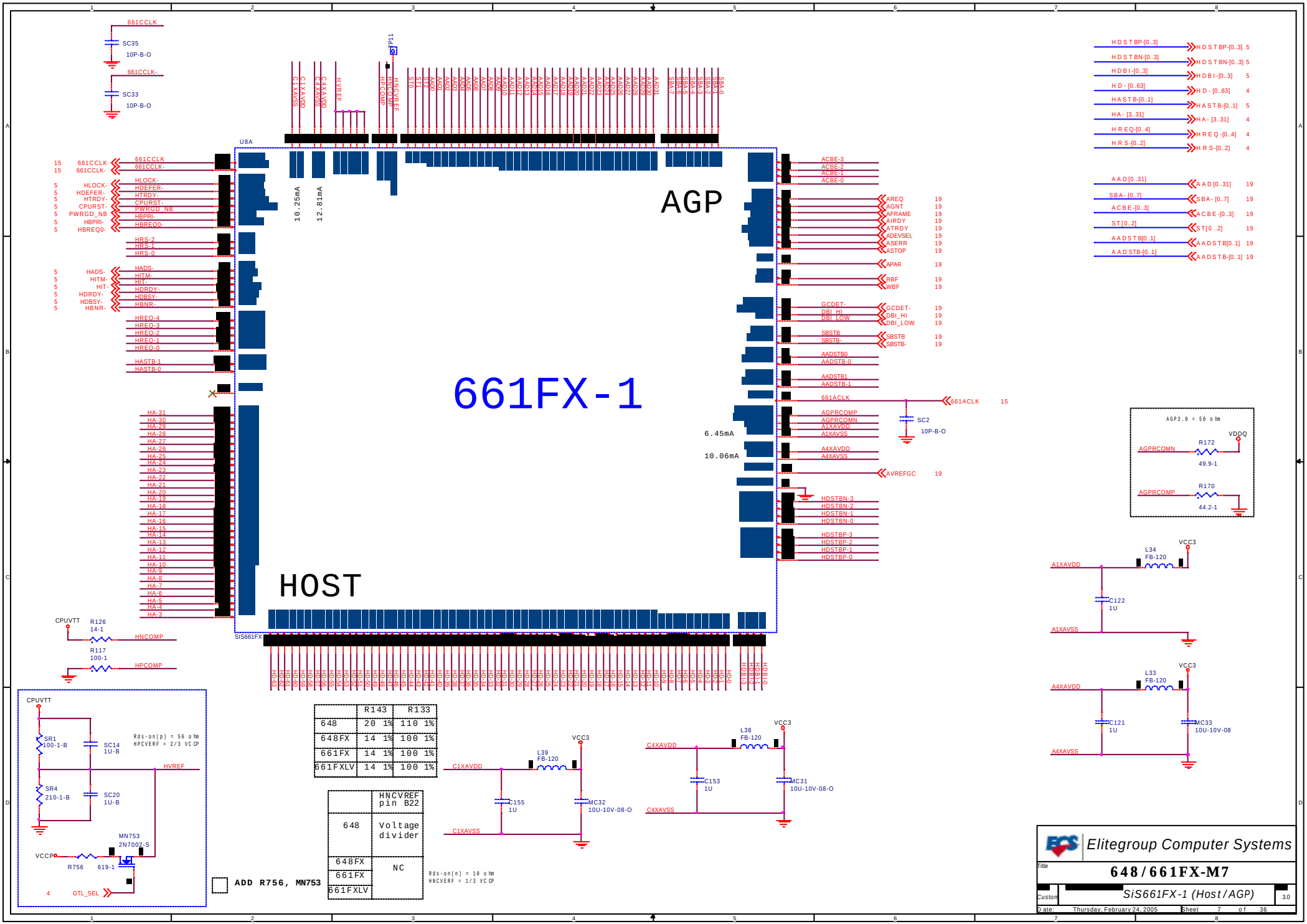
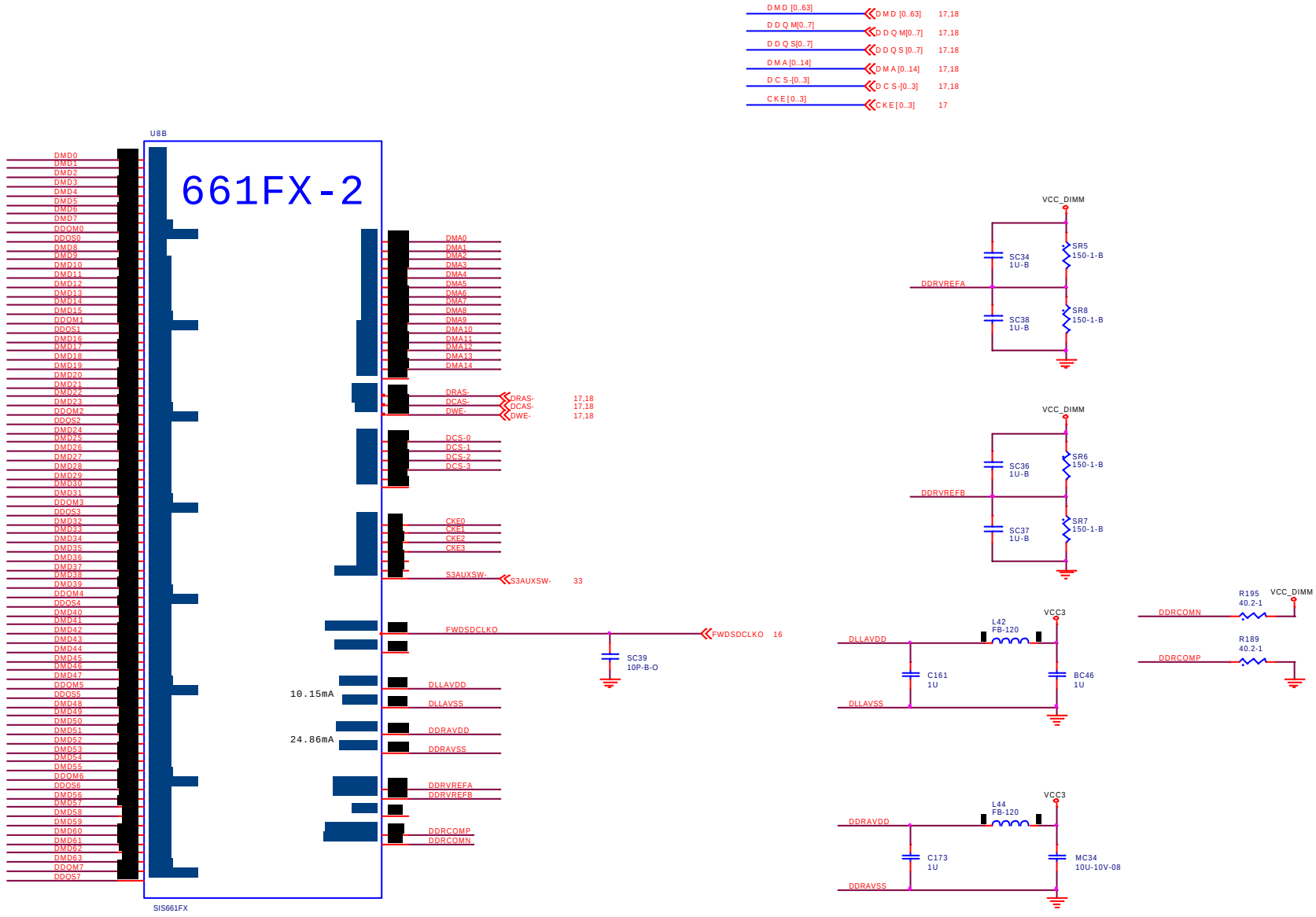



| | R143 | R133 |
|---|---|---|
| 648 | 20 1% | 110 1% |
| 648FX | 14 1% | 100 1% |
| 661FX | 14 1% | 100 1% |
| 661FXLV | 14 1% | 100 1% |

| | HNCVREF pin B22 |
|---|---|
| 648 | Voltage divider |
| 648FX<br>661FX<br>661FXLV | NC |




| | | | |
|---|---|---|---|
| DMD [0..63] | DMD [0..63] | 17,18 | |
| DDQM[0..7] | DDQM[0..7] | 17,18 | |
| DDQS[0..7] | DDQS [0..7] | 17,18 | |
| DMA[0..14] | DMA[0..14] | 17,18 | |
| DCS-[0..3] | DCS-[0..3] | 17,18 | |
| CKE[0..3] | CKE[0..3] | 17 | |

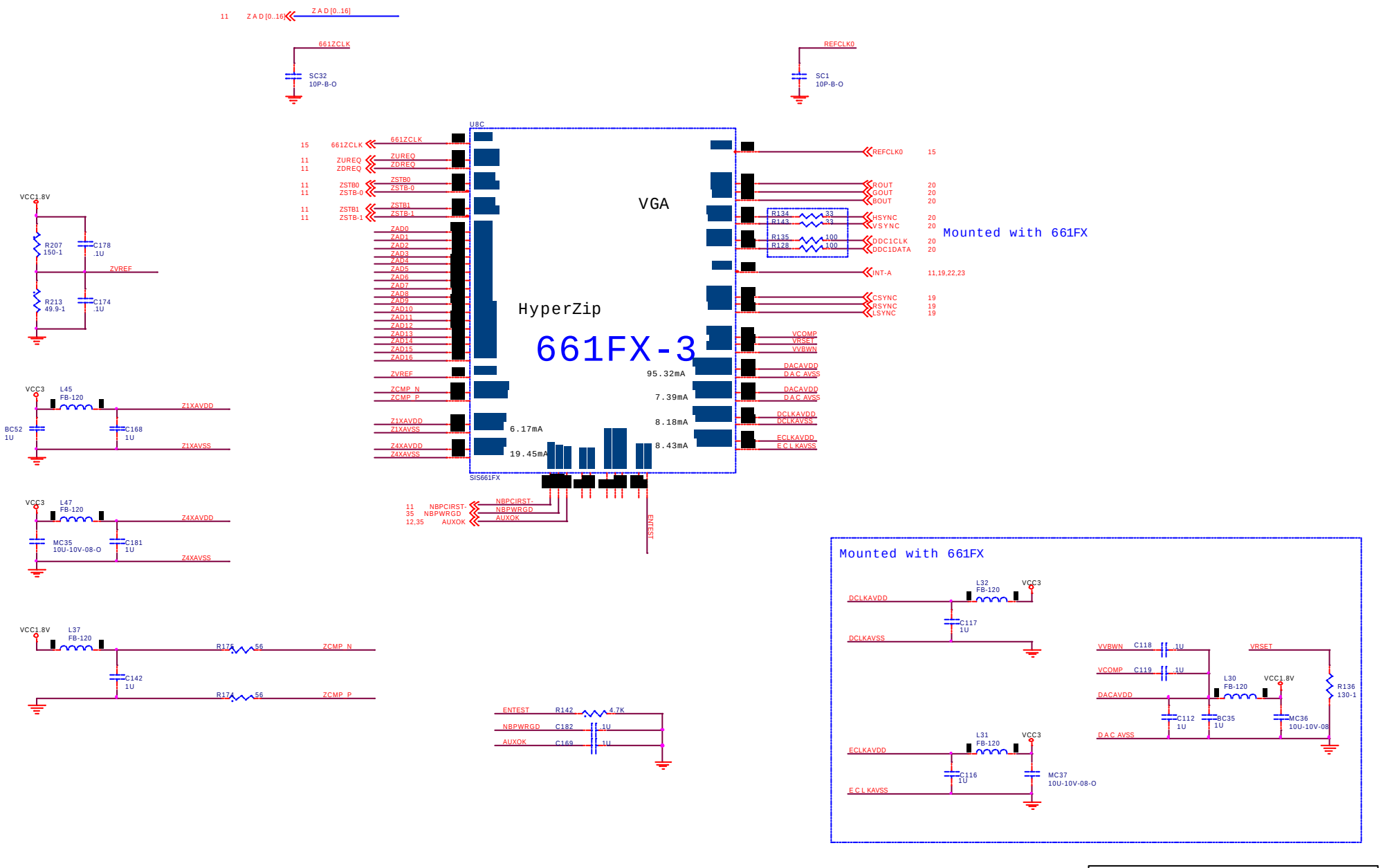
| | | |
|---|---|---|
| DRAS- | DRAS- | 17,18 |
| DCAS- | DCAS- | 17,18 |
| DWE- | DWE- | 17,18 |
| S3AUXSW- | S3AUXSW- | 33 |
| FWDSDCLKO | FWDSDCLKO | 16 |

Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: SiS661FX-2 (Memory) 3.0

Date: Thursday, February 24, 2005 Sheet 8 of 36

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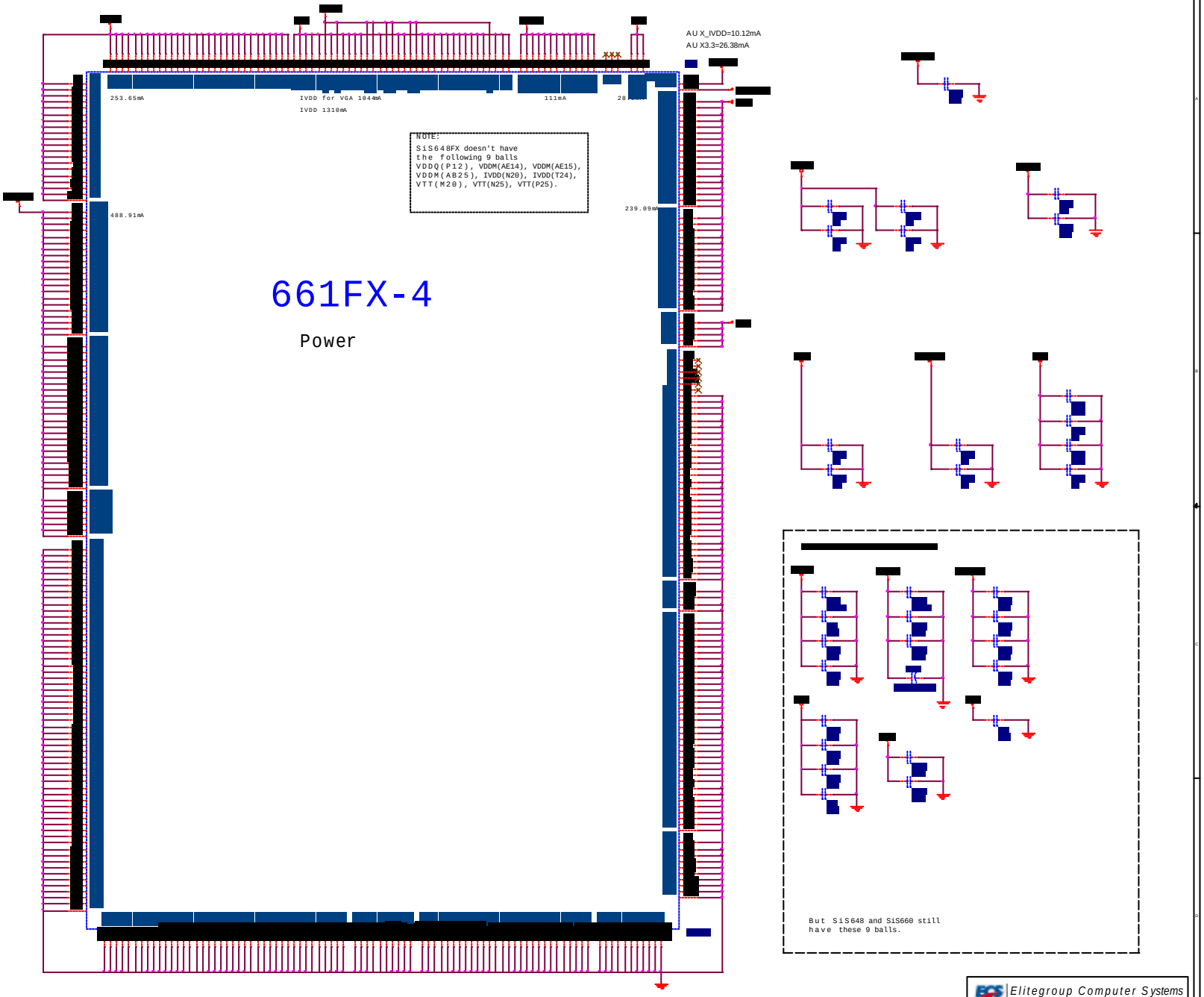
| | | | |
|---|---|---|---|
| Title | 648/661FX-M7 | | |
| Size: Custom | Document Number: SiS661FX-3 (HyperZip) | | Rev: 3.0 |
| Date: Thursday, February 24, 2005 | | Sheet 9 of 36 | |

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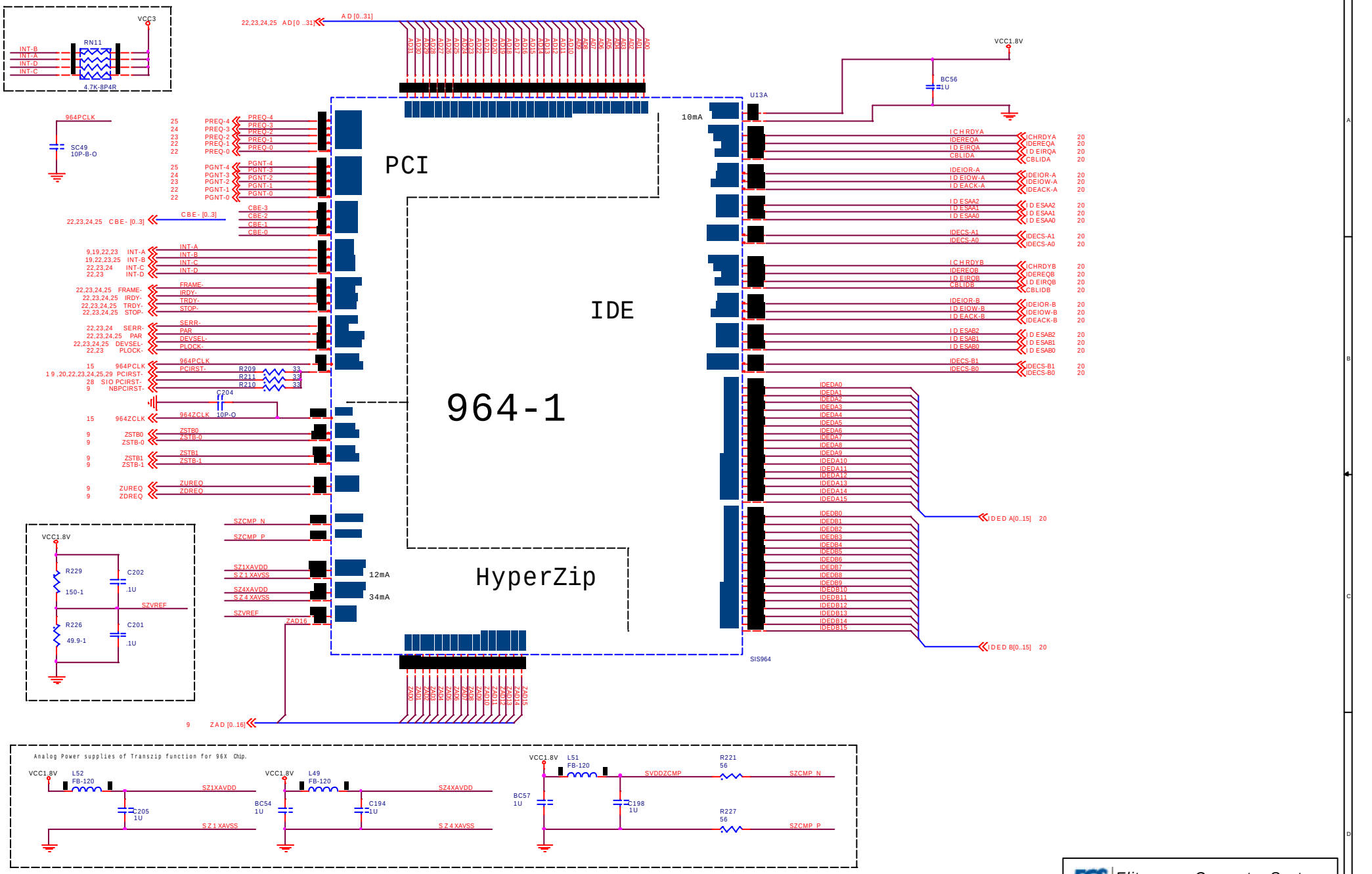
**648/661FX-M7**

SiS661FX-4 (Power)


PCI
IDE
964-1
HyperZip
SIS964
VCC3
RN11
4.7K-8P4R
964PCLK
SC49
10P-B-O
C204
10P-O
BC56
1U
VCC1.8V
U13A
10mA
12mA
34mA
R209
R211
R210
33
R229
150-1
R226
49.9-1
C202
C201
.1U
SZVREF
Analog Power supplies of Transzip function for 96X Chip.
L52
L49
L51
FB-120
SZ1XAVDD
SZ4XAVDD
SZ1XAVSS
SZ4XAVSS
SVDDZCMP
BC54
BC57
C205
C194
C198
R221
R227
56
SZCMP_N
SZCMP_P
ZAD16
IDED A[0..15]
IDED B[0..15]
Elitegroup Computer Systems
648/661FX-M7
SiS964-1 (PCI/IDE/Link)
Custom
3.0
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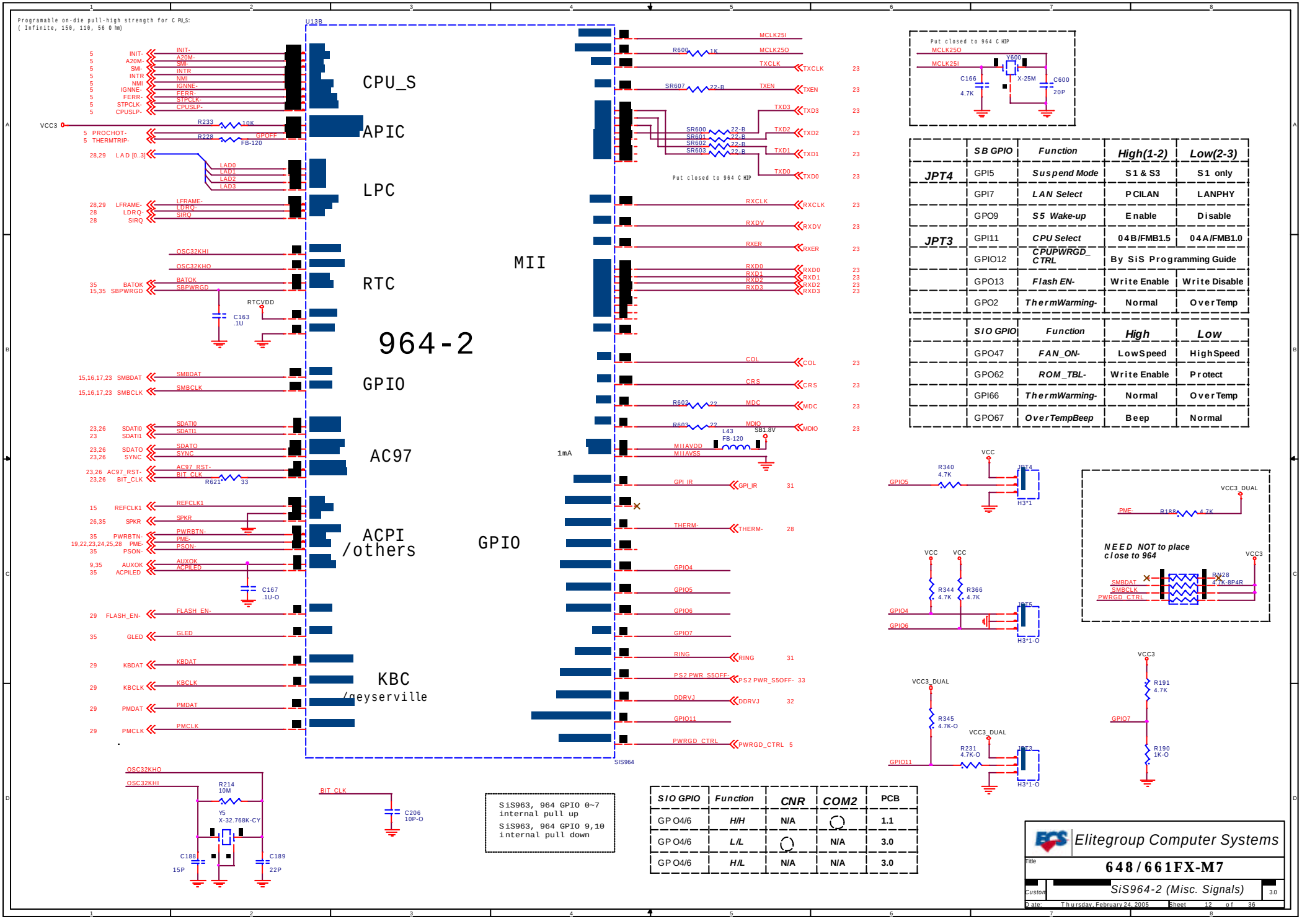


| | SB GPIO | Function | High(1-2) | Low(2-3) |
|---|---|---|---|---|
| JPT4 | GPI5 | Suspend Mode | S1 & S3 | S1 only |
| | GPI7 | LAN Select | PCILAN | LANPHY |
| | GPO9 | S5 Wake-up | Enable | Disable |
| JPT3 | GPI11 | CPU Select | 04B/FMB1.5 | 04A/FMB1.0 |
| | GPIO12 | CPUPWRGD_CTRL | By SiS Programming Guide | |
| | GPO13 | Flash EN- | Write Enable | Write Disable |
| | GPO2 | ThermWarming- | Normal | OverTemp |

| | SIO GPIO | Function | High | Low |
|---|---|---|---|---|
| | GPO47 | FAN_ON- | LowSpeed | HighSpeed |
| | GPO62 | ROM_TBL- | Write Enable | Protect |
| | GPI66 | ThermWarming- | Normal | OverTemp |
| | GPO67 | OverTempBeep | Beep | Normal |

| SIO GPIO | Function | CNR | COM2 | PCB |
|---|---|---|---|---|
| GPO4/6 | H/H | N/A | ◯ | 1.1 |
| GPO4/6 | L/L | ◯ | N/A | 3.0 |
| GPO4/6 | H/L | N/A | N/A | 3.0 |

Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: SiS964-2 (Misc. Signals) 3.0

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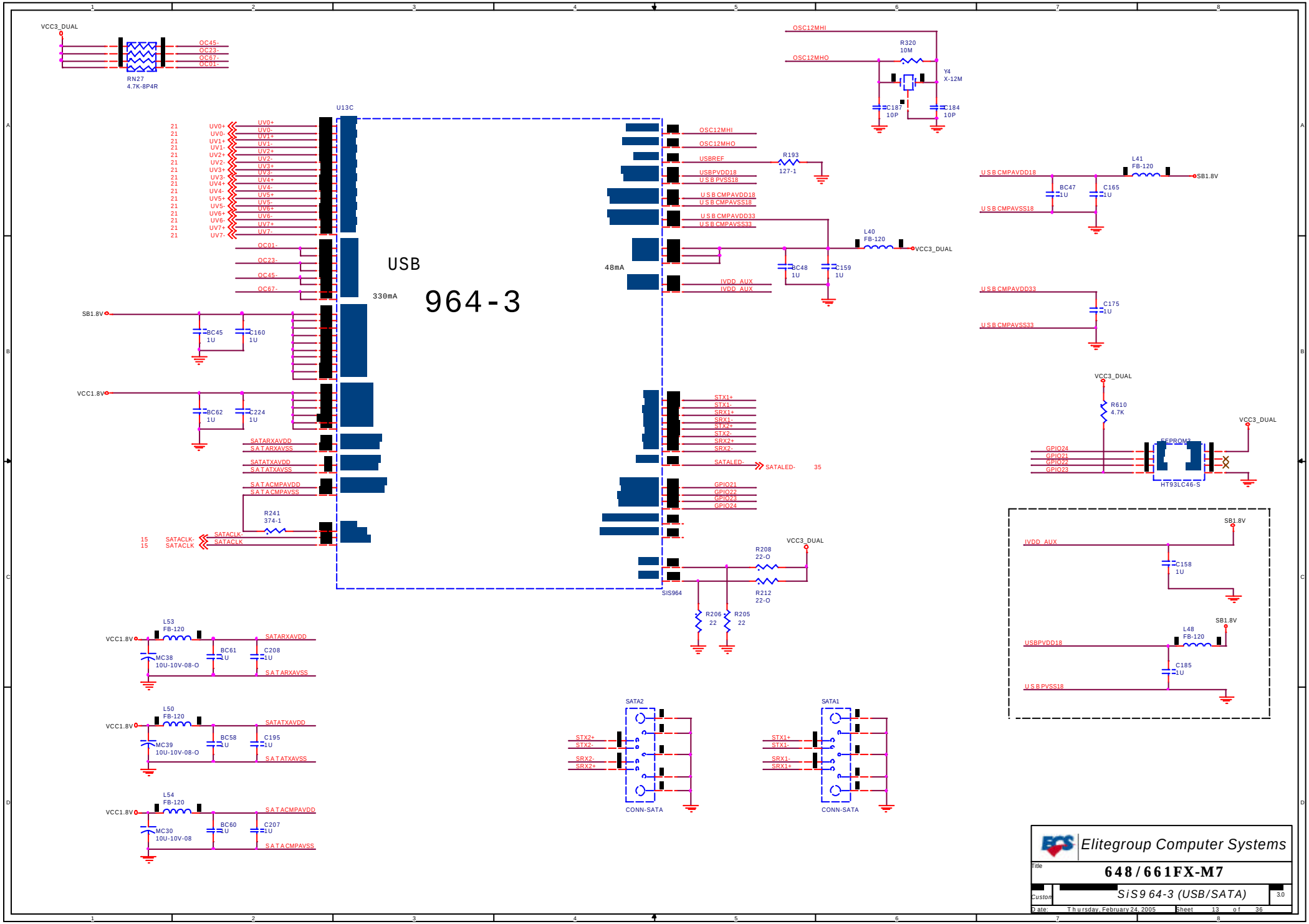


Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: SiS964-3 (USB/SATA) 3.0

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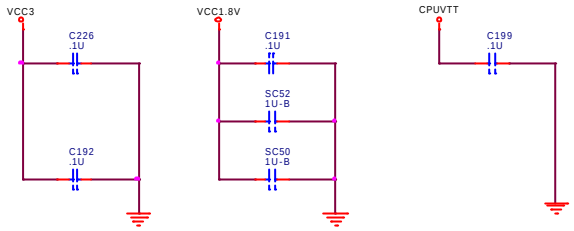
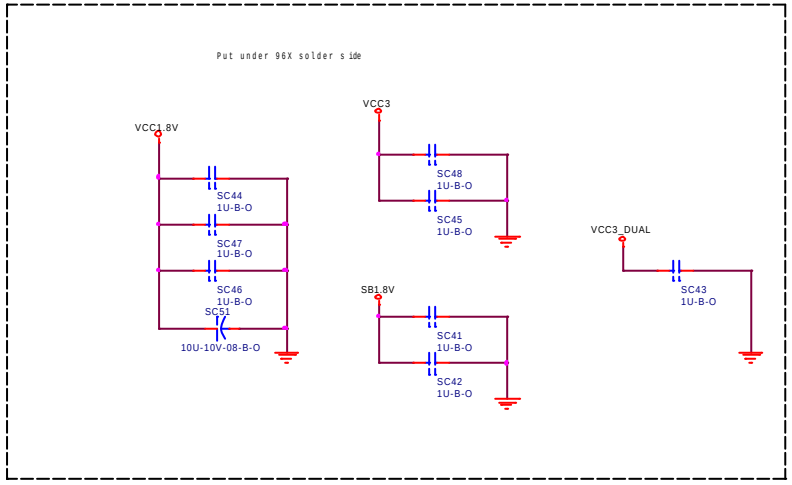
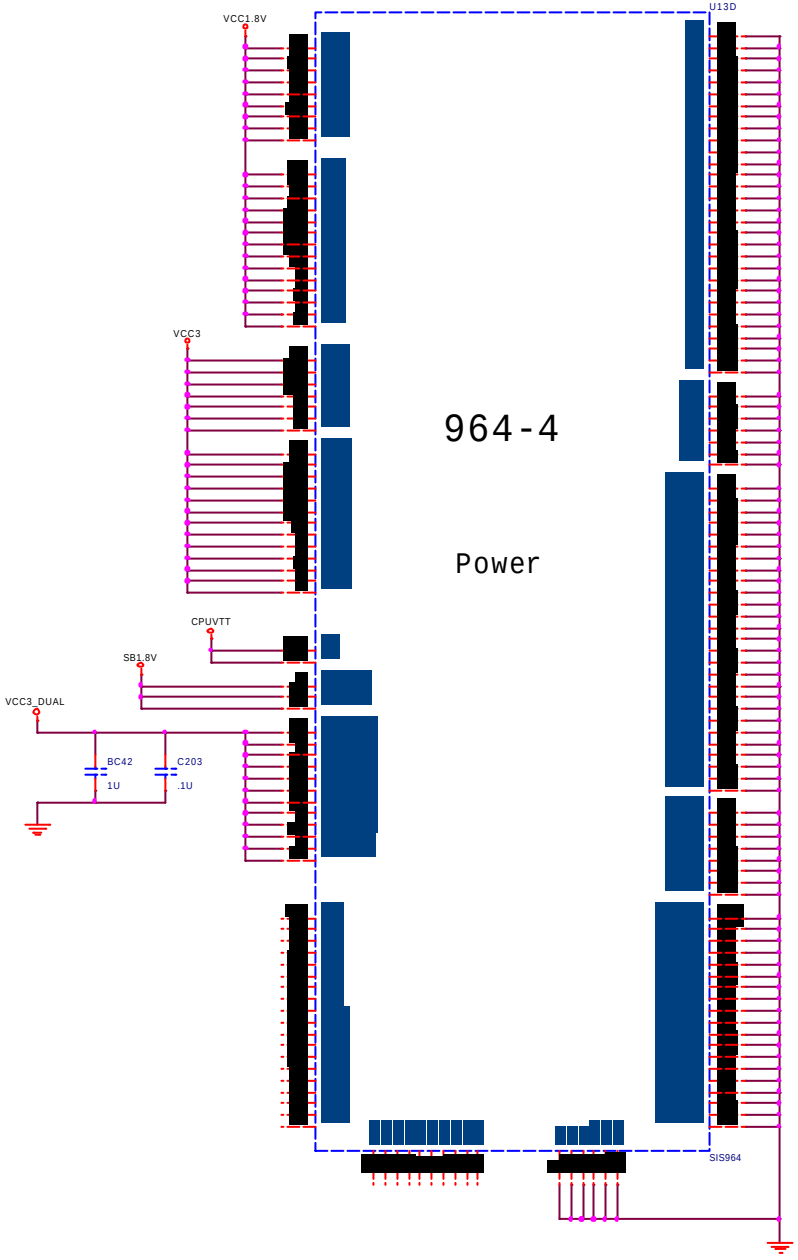


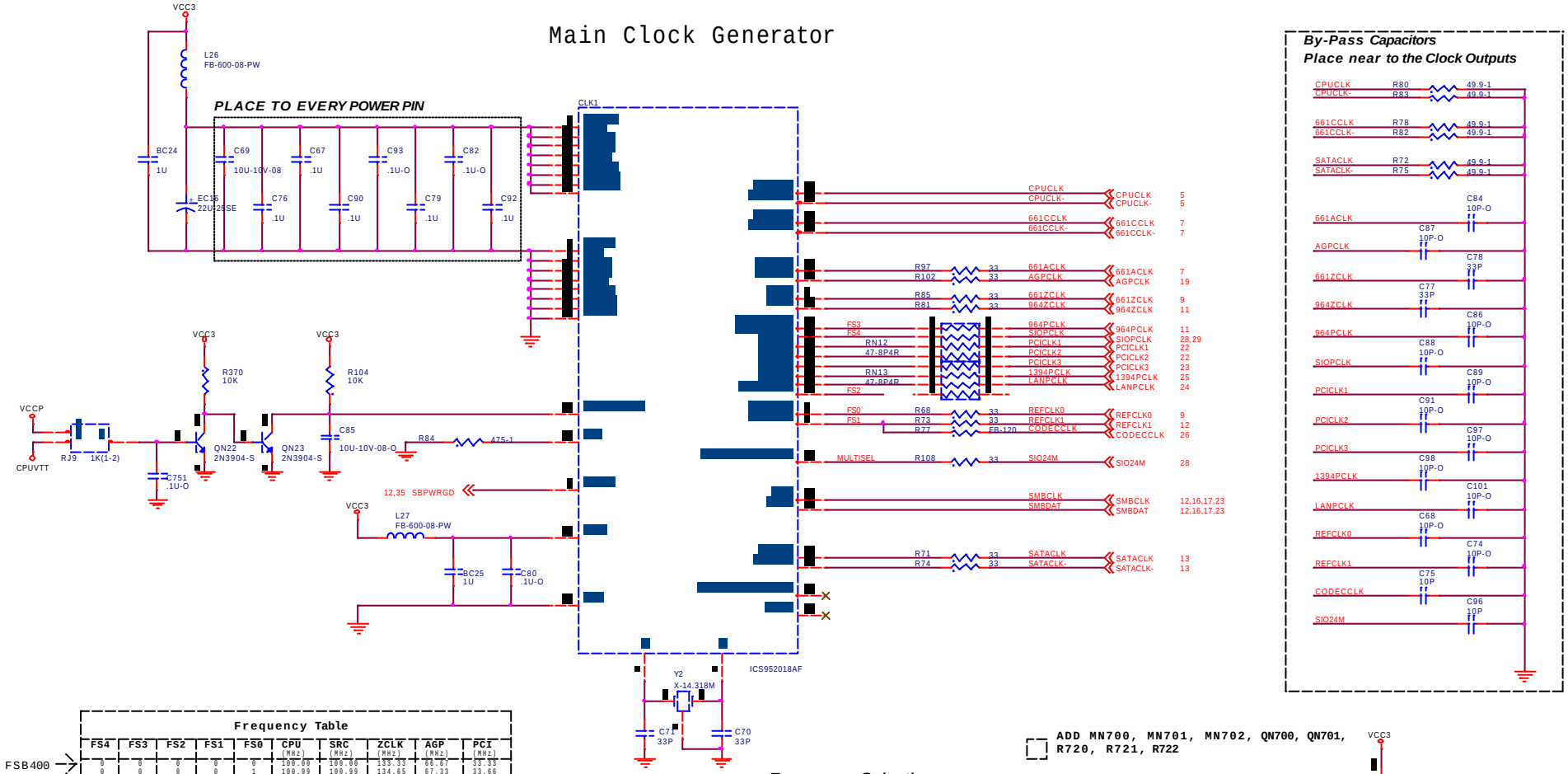

Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: SiS964-4 (Power) 3.0

Date: Thursday, February 24, 2005 Sheet 14 of 36

# Main Clock Generator




## Frequency Table

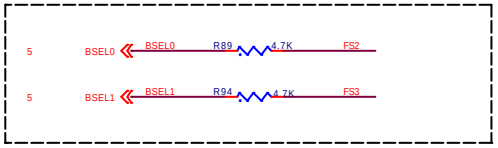
| FS4 | FS3 | FS2 | FS1 | FS0 | CPU (MHz) | SRC (MHz) | ZCLK (MHz) | AGP (MHz) | PCI (MHz) | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 100.00 | 100.00 | 133.33 | 66.67 | 33.33 | FSB400 |
| 0 | 0 | 0 | 0 | 1 | 100.99 | 100.99 | 134.65 | 67.33 | 33.66 | |
| 0 | 0 | 0 | 1 | 0 | 103.00 | 103.00 | 137.33 | 68.67 | 34.33 | |
| 0 | 0 | 0 | 1 | 1 | 100.00 | 100.00 | 133.33 | 66.67 | 33.33 | |
| 0 | 0 | 1 | 0 | 0 | 133.33 | 100.00 | 133.33 | 66.66 | 33.33 | FSB533 |
| 0 | 0 | 1 | 0 | 1 | 134.65 | 100.99 | 134.65 | 67.33 | 33.66 | |
| 0 | 0 | 1 | 1 | 0 | 137.33 | 103.00 | 137.33 | 68.66 | 34.33 | |
| 0 | 0 | 1 | 1 | 1 | 133.33 | 100.00 | 133.33 | 66.67 | 33.33 | |
| 0 | 1 | 0 | 0 | 0 | 200.00 | 100.00 | 133.33 | 66.67 | 33.33 | FSB800 |
| 0 | 1 | 0 | 0 | 1 | 201.98 | 100.99 | 134.65 | 67.33 | 33.66 | |
| 0 | 1 | 0 | 1 | 0 | 206.00 | 103.00 | 137.33 | 68.67 | 34.33 | |
| 0 | 1 | 0 | 1 | 1 | 200.00 | 100.00 | 133.33 | 66.67 | 33.33 | |
| 0 | 1 | 1 | 0 | 0 | 166.66 | 125.00 | 125.00 | 66.66 | 33.33 | |
| 0 | 1 | 1 | 0 | 1 | 168.31 | 126.23 | 126.23 | 67.32 | 33.66 | |
| 0 | 1 | 1 | 1 | 0 | 171.66 | 128.74 | 128.74 | 68.66 | 34.33 | |
| 0 | 1 | 1 | 1 | 1 | 166.66 | 125.00 | 125.00 | 66.66 | 33.33 | |

## Frequency Table

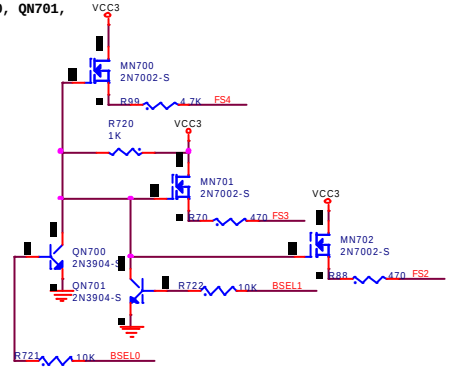
| FS4 | FS3 | FS2 | FS1 | FS0 | CPU (MHz) | SRC (MHz) | ZCLK (MHz) | AGP (MHz) | PCI (MHz) | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 105.00 | 105.00 | 140.00 | 70.00 | 35.00 | |
| 1 | 0 | 0 | 0 | 1 | 107.00 | 107.00 | 142.67 | 71.33 | 35.67 | |
| 1 | 0 | 0 | 1 | 0 | 109.00 | 109.00 | 145.33 | 72.67 | 36.33 | |
| 1 | 0 | 0 | 1 | 1 | 110.00 | 110.00 | 146.67 | 73.33 | 36.67 | |
| 1 | 0 | 1 | 0 | 0 | 140.00 | 105.00 | 140.00 | 70.00 | 35.00 | |
| 1 | 0 | 1 | 0 | 1 | 142.66 | 107.00 | 142.67 | 71.33 | 35.67 | |
| 1 | 0 | 1 | 1 | 0 | 145.33 | 109.00 | 145.33 | 72.66 | 36.33 | |
| 1 | 0 | 1 | 1 | 1 | 146.66 | 110.00 | 146.66 | 73.33 | 36.67 | |
| 1 | 1 | 0 | 0 | 0 | 210.00 | 105.00 | 140.00 | 70.00 | 35.00 | FSB1066 |
| 1 | 1 | 0 | 0 | 1 | 214.00 | 107.00 | 142.67 | 71.33 | 35.67 | |
| 1 | 1 | 0 | 1 | 0 | 218.00 | 109.00 | 145.33 | 72.67 | 36.33 | |
| 1 | 1 | 0 | 1 | 1 | 220.00 | 110.00 | 146.67 | 73.33 | 36.67 | |
| 1 | 1 | 1 | 0 | 0 | 266.66 | 100.00 | 133.33 | 66.67 | 33.33 | |
| 1 | 1 | 1 | 0 | 1 | 269.33 | 101.00 | 134.67 | 67.33 | 33.67 | |
| 1 | 1 | 1 | 1 | 0 | 274.66 | 103.00 | 137.33 | 68.67 | 34.33 | |
| 1 | 1 | 1 | 1 | 1 | 266.66 | 100.00 | 133.33 | 66.67 | 33.33 | |

ADD MN700, MN701, MN702, QN700, QN701, R720, R721, R722

## Frequency Selection




| Clock Generator Table / Hardware Traping | FS4 Low | FS3 Low | FS2 BSEL2 | FS1 BSEL1 | FS0 BSEL0 |
|---|---|---|---|---|---|
| CPU=100 (BSEL[2:0]=101) | | | | | |
| CPU=133 (BSEL[2:0]=001) | 0 | 0 | 1 | 0 | 0 |
| CPU=166 (BSEL[2:0]=011) | 0 | 1 | 1 | 0 | 0 |
| CPU=200 (BSEL[2:0]=010) | 0 | 1 | 0 | 0 | 0 |
| CPU=266 (BSEL[2:0]=000) | 1 | 1 | 1 | 0 | 0 |




Elitegroup Computer Systems

Title: 648/661FX-M7

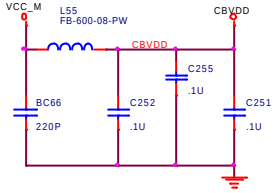
Custom: Main Clock 3.0

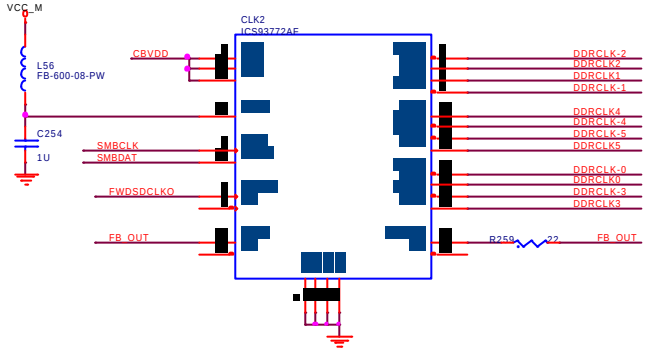
Date: Thursday, February 24, 2005 Sheet 15 of 36

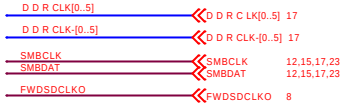
# Clock Buffer (DDR)

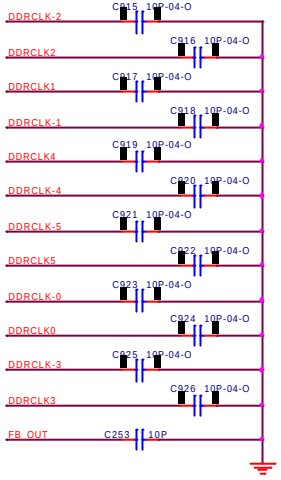
(5 OPTIONS)
1: (ICS) ICS93716
2: (Winbond)
3: (ICWorks)
4: (IMI)
5: (AMI)

By-Pass Capacitors
Place near to the Clock Buffer



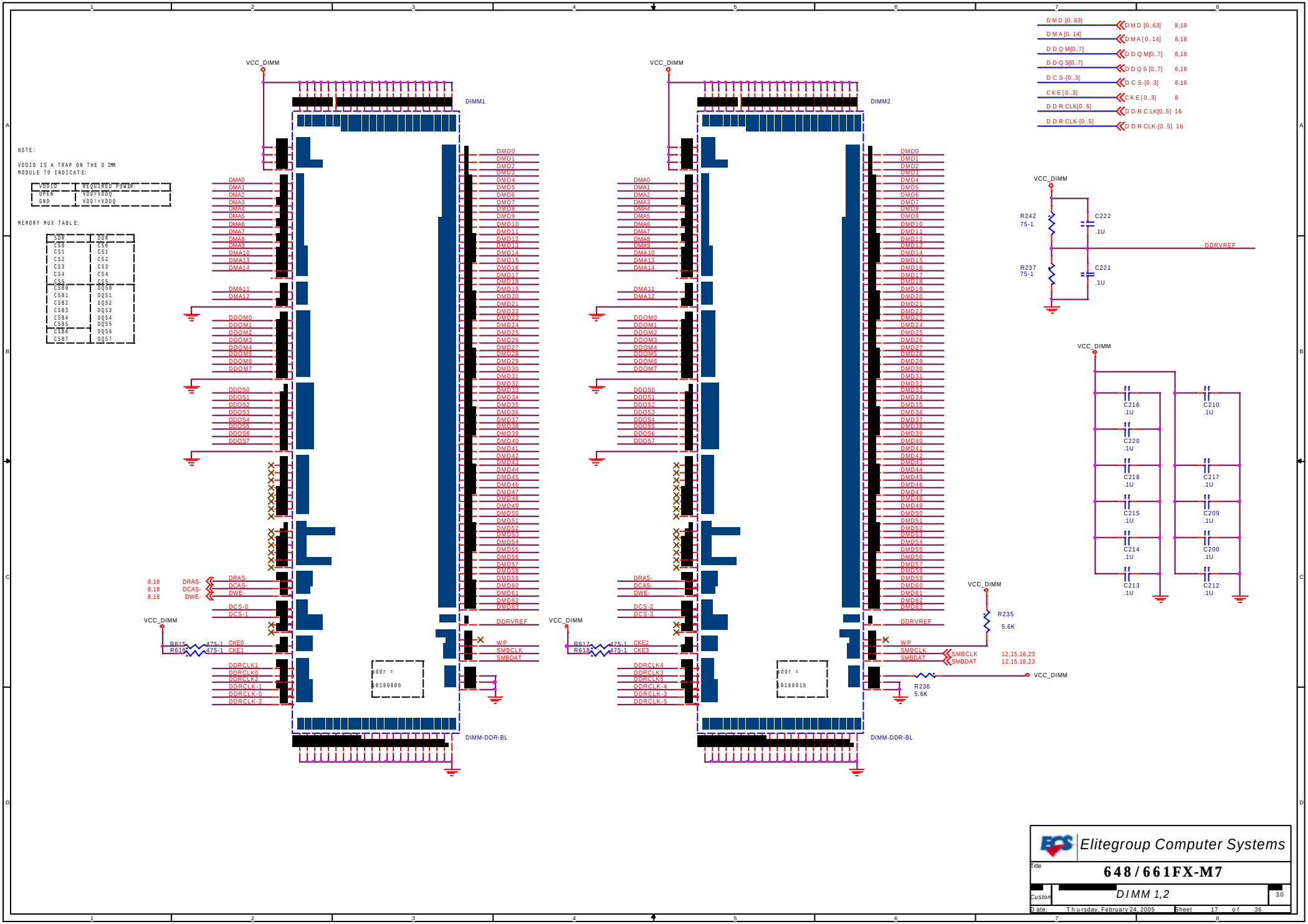




Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: Clock Buffer 3.0

Date: Thursday, February 24, 2005 Sheet 16 of 36


NOTE:
VDDID IS A TRAP ON THE D IMM 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
VCC_DIMM
DIMM1
DIMM2
DIMM-DDR-BL
DMD [0..63]
DMA [0..14]
DDQM[0..7]
DDQS[0..7]
DCS-[0..3]
CKE[0..3]
DDRCLK[0..5]
DDRCLK-[0..5]
DMD [0..63] 8,18
DMA [0..14] 8,18
DDQM[0..7] 8,18
DDQS[0..7] 8,18
DCS-[0..3] 8,18
CKE[0..3] 8
DDRCLK[0..5] 16
DDRCLK-[0..5] 16
DRAS-
DCAS-
DWE-
DCS-0
DCS-1
DCS-2
DCS-3
CKE0
CKE1
CKE2
CKE3
DDRCLK0
DDRCLK1
DDRCLK2
DDRCLK-0
DDRCLK-1
DDRCLK-2
DDRCLK3
DDRCLK4
DDRCLK5
DDRCLK-3
DDRCLK-4
DDRCLK-5
DDRVREF
WP
SMBCLK
SMBDAT
addr = 1010000b
addr = 1010001b
R615 475-1
R618 475-1
R617 475-1
R235 5.6K
R236 5.6K
R242 75-1
R237 75-1
C222 .1U
C221 .1U
C216 .1U
C220 .1U
C218 .1U
C215 .1U
C214 .1U
C213 .1U
C210 .1U
C217 .1U
C209 .1U
C200 .1U
C212 .1U
12,15,16,23
Elitegroup Computer Systems
Title
648/661FX-M7
Custom
DIMM 1,2
3.0
Date: Thursday, February 24, 2005
Sheet 17 of 36

# SSTL-2 Termination Resistors

| SDR | | | DDR | | |
|---|---|---|---|---|---|
| MD/DQM(/DQS) | LV-CMOS | 5 | SSTL-2 | 40 | 63 |
| MA/Control | LV-CMOS | 10 | SSTL-2 | 0 | 53 |
| CS | LV-CMOS | 0 | SSTL-2 | 0 | 07 |
| CKE | LV 3.3V | | SD 2.5V | | |

DMD [0..63] — DMD [0..63] 8,17
DMA [0..14] — DMA [0..14] 8,17
DDQM[0..7] — DDQM[0..7] 8,17
DDQS[0..7] — DDQS[0..7] 8,17
DCS-[0..3] — DCS-[0..3] 8,17

DDR_VTT

DMD1 DMD5 DMD0 DMD4 — RN30 56-8P4R
DMD6 DMD2 DDQS0 DDQM0 — RN29 56-8P4R
DMD9 DMD8 DMD3 DMD7 — RN42 56-8P4R
DDQM1 DDQS1 DMD13 DMD12 — RN41 56-8P4R
DMD11 DMD10 DMD15 DMD14 — RN40 56-8P4R
DMA7 DMD22 DMD18 DMA9 — RN37 56-8P4R
DMD17 DMA14 DMD16 DMD20 — RN39 56-8P4R
DMA5 DMD19 DMD23 DMA8 — RN36 56-8P4R
DMD26 DMD27 DMD30 DMA3 — RN33 56-8P4R
DDQM3 DMA4 DDQS3 DMD25 — RN34 56-8P4R

DMD34 DMD37 DDQS4 DMD33 — RN52 56-8P4R
DMD39 DMA11 DMD38 DDQM4 — RN51 56-8P4R
8,17 DRAS- — DRAS- DMD44 DMD40 DMD35 — RN50 56-8P4R
DMD42 DMD46 DDQS5 DDQM5 — RN46 56-8P4R
DCS-0 DMD41 DMD45 — RN49 56-8P4R
8,17 DWE- — DWE-
DMD52 DMD48 DMD47 DMD43 — RN45 56-8P4R
DMD50 DDQS6 DMD54 DDQM6 — RN44 56-8P4R
DMD56 DMD60 DMD51 DMD55 — RN48 56-8P4R
DMD62 DDQM7 DMD57 DMD61 — RN43 56-8P4R
DMD59 DMD63 DMD58 DDQS7 — RN53 56-8P4R
DCS-3 DCS-1 DCS-2 — RN47 56-8P4R
8,17 DCAS- — DCAS-

DDR_VTT

DMD0 DMA1 DMD31 DMA2 — RN32 56-8P4R
DMD29 DMD28 DMA6 DMD24 — RN35 56-8P4R
DMD36 DMD32 DMA12 DMA10 — RN31 56-8P4R
DDQM2 DMA13 DMD21 DDQS2 — RN38 56-8P4R
DMD49 — R250 56
DMD53 — R249 56

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

DDR_VTT

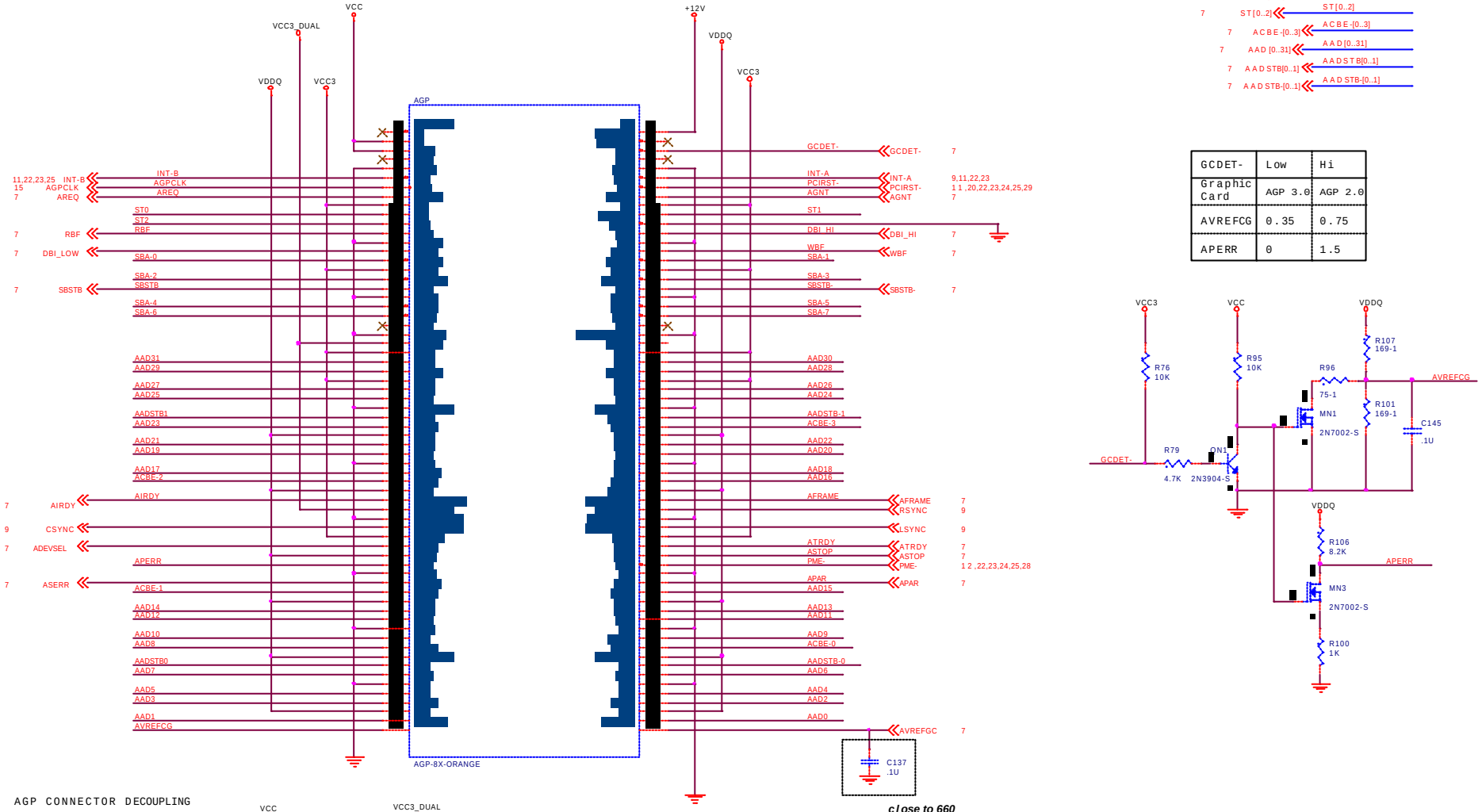
C248 C247 C246 C245 — .1U
C244 C243 C242 C241 — .1U
C240 C239 C238 C237 — .1U
C236 C235 C234 C233 — .1U

Elitegroup Computer Systems

Title: 648/661FX-M7

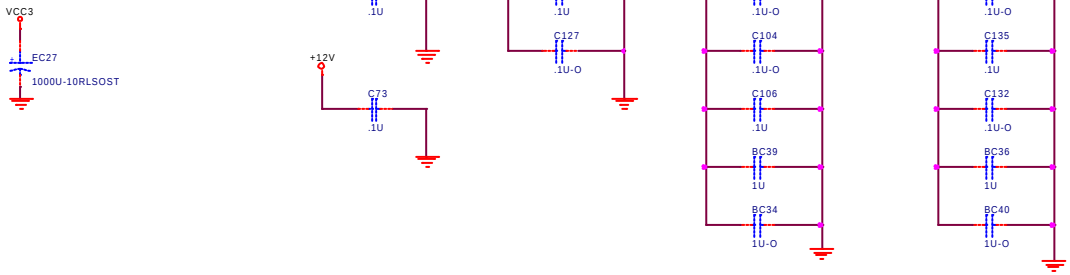
Custom: DDR Termination 3.0

Date: Thursday, February 24, 2005 Sheet 18 of 36




AGP CONNECTOR DECOUPLING

*put CAP close to AGP slot each POWER PIN*







| GCDET- | Low | Hi |
|---|---|---|
| Graphic Card | AGP 3.0 | AGP 2.0 |
| AVREFCG | 0.35 | 0.75 |
| APERR | 0 | 1.5 |

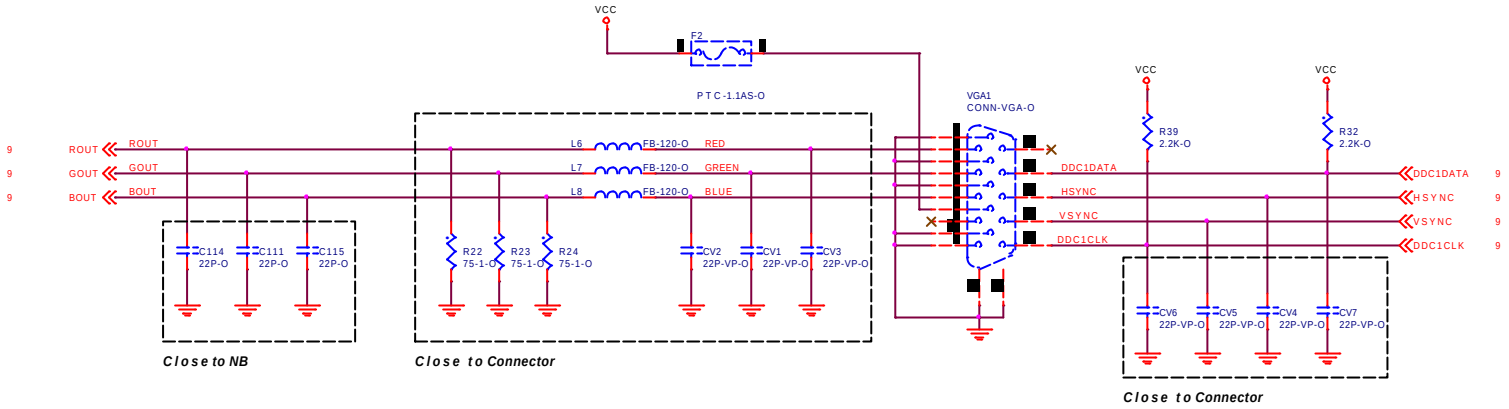


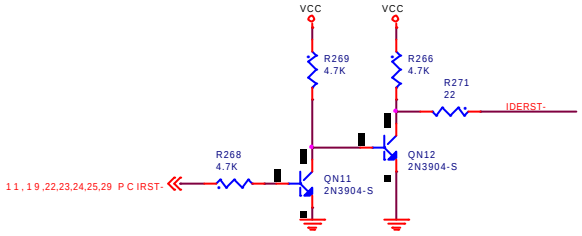

Elitegroup Computer Systems

Title: 648/661FX-M7

Size: Custom | Document Number: AGP Slot | Rev: 3.0

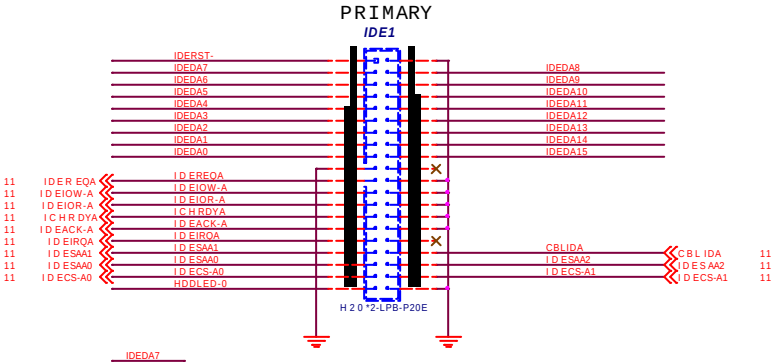
Date: Thursday, February 24, 2005 | Sheet 19 of 36

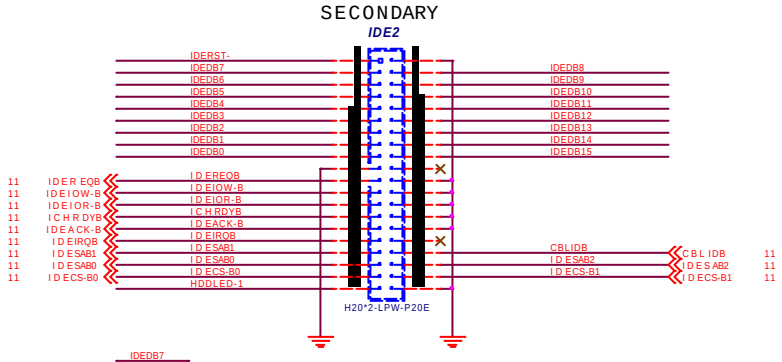


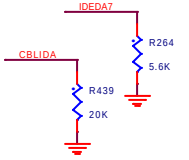



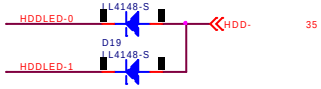

11 IDEDA[0..15] IDEDA[0..15]

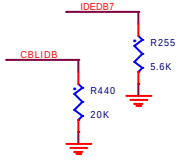
11 IDEDB[0..15] IDEDB[0..15]




Elitegroup Computer Systems

Title: 648/661FX-M7

Size: Custom | Document Number: VGA / IDE | Rev: 3.0

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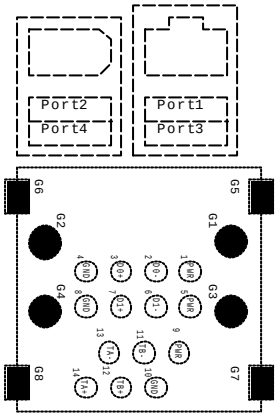
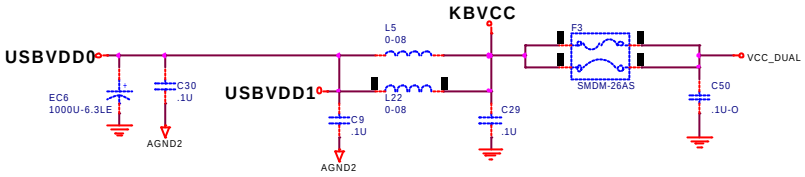
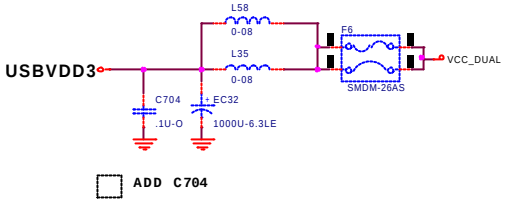
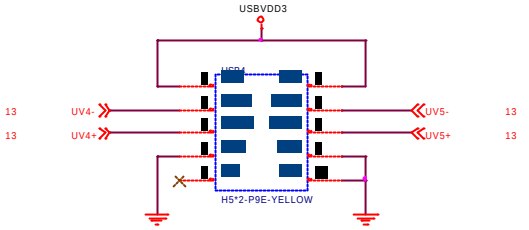
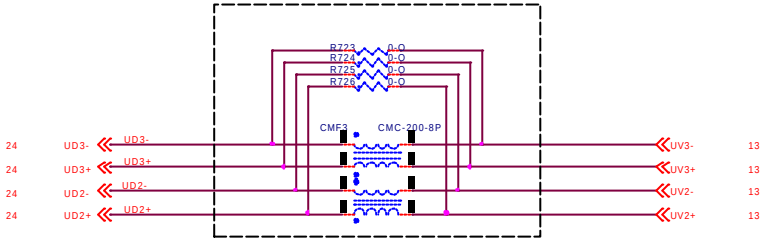


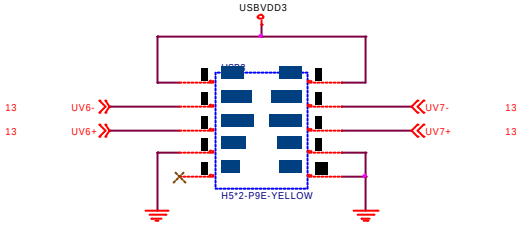



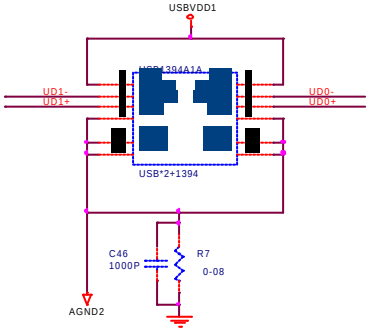

ADD C704

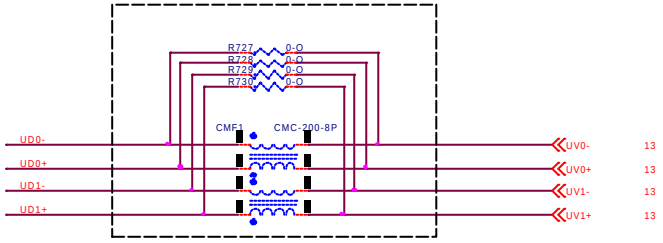



Close to USBLAN1 connector



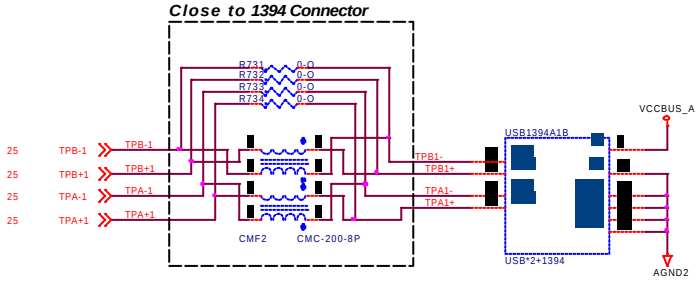



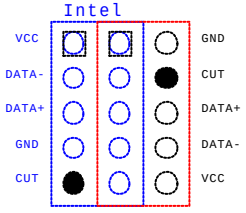



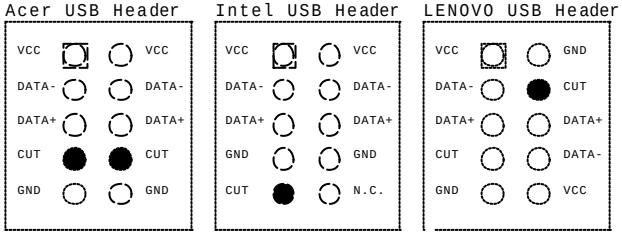

Close to USB1394A_J1 connector

| | USB port |
|---|---|
| Control 0 | 0, 3, 6 |
| Control 1 | 1, 4, 7 |
| Control 2 | 2, 5 |

*Close to 1394 Connector*




Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: USB Connector 3.0

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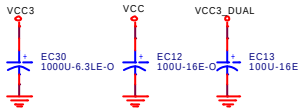
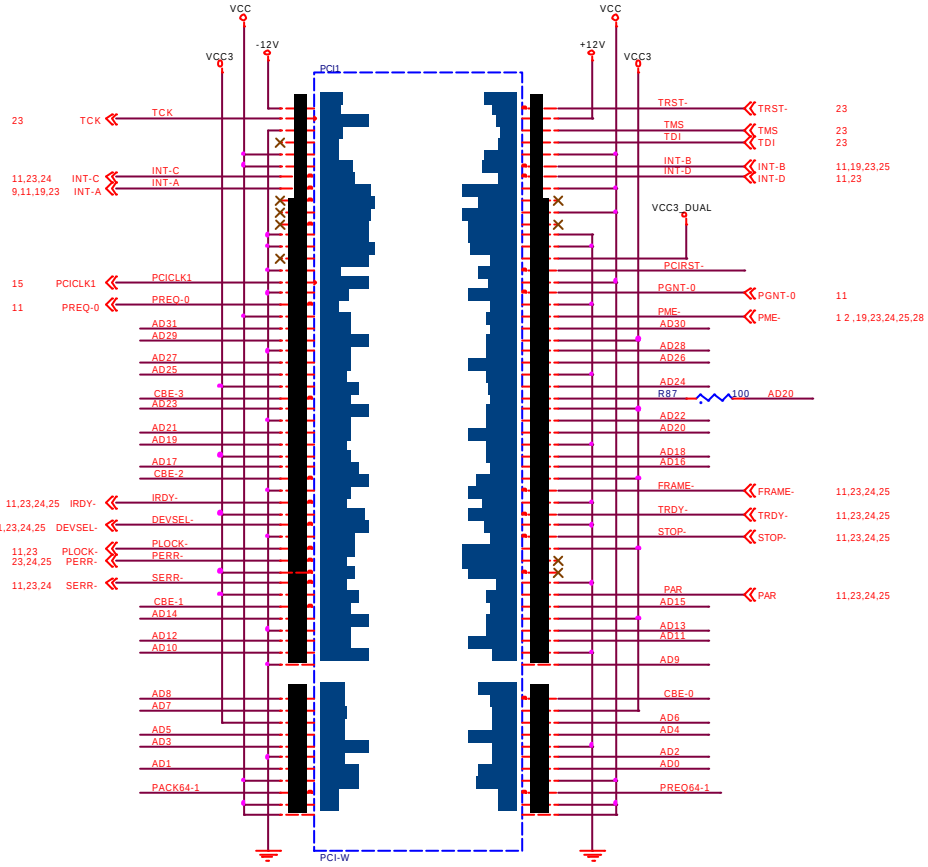
# PCI Slot 1 & 2

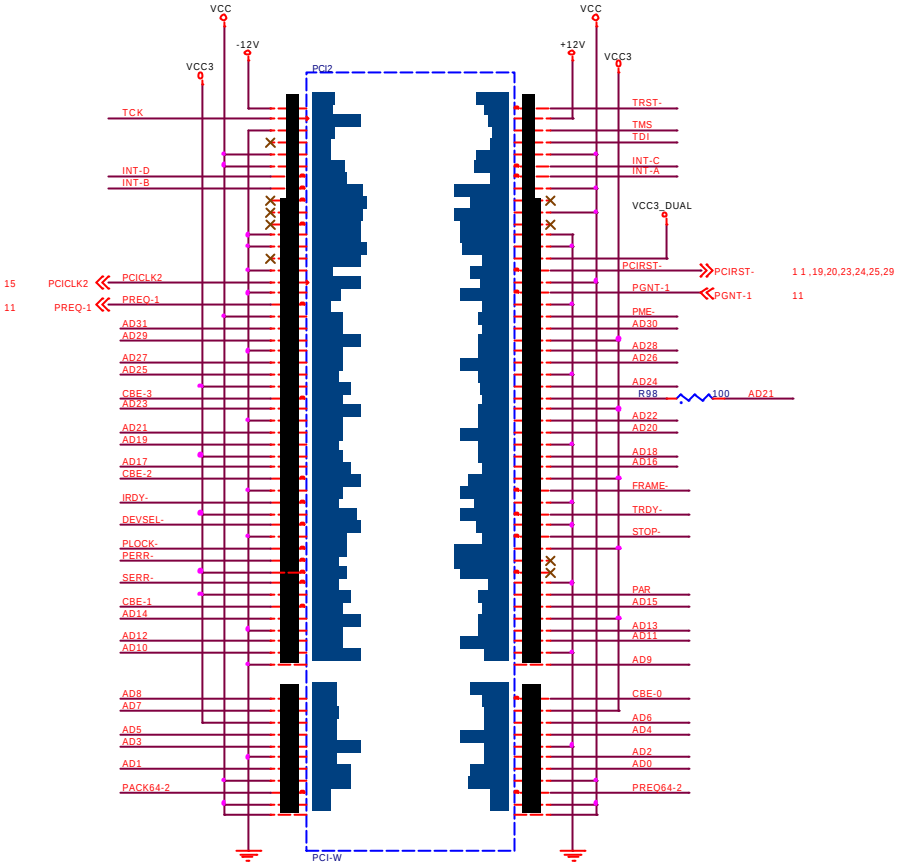



11,23,24,25 CBE-[0..3]
11,23,24,25 AD[0..31]

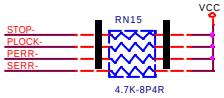
CBE-[0..3]
AD[0..31]

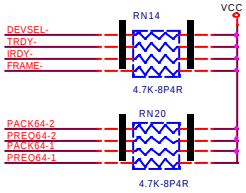


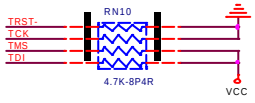

**IDSEL=AD20**
**INT[B,C,D,A]**

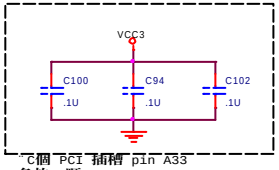



**IDSEL=AD21**
**INT[C,D,A,B]**

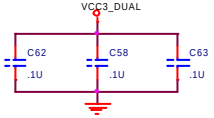



C個 PCI 插槽 pin A33
各放一顆

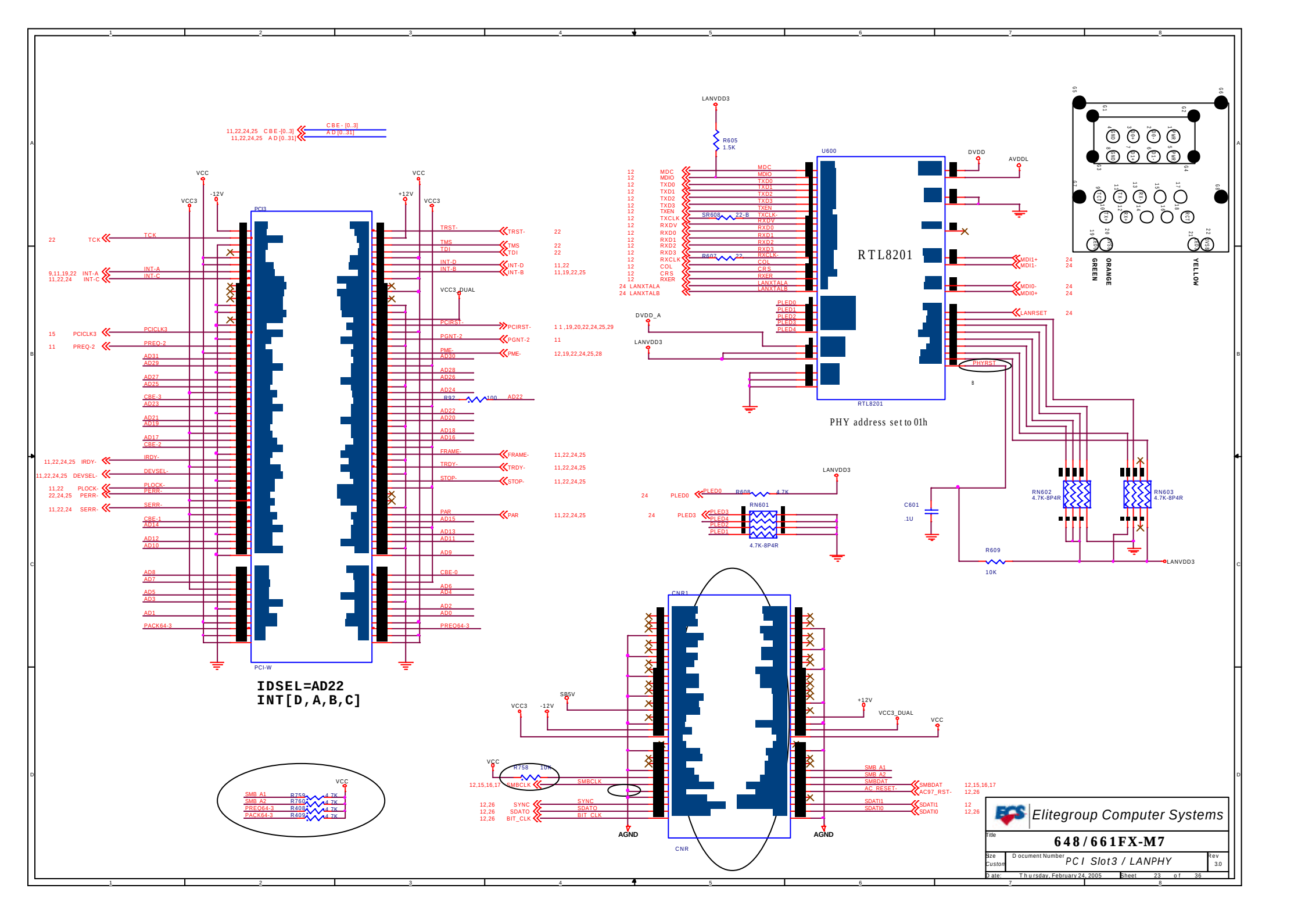


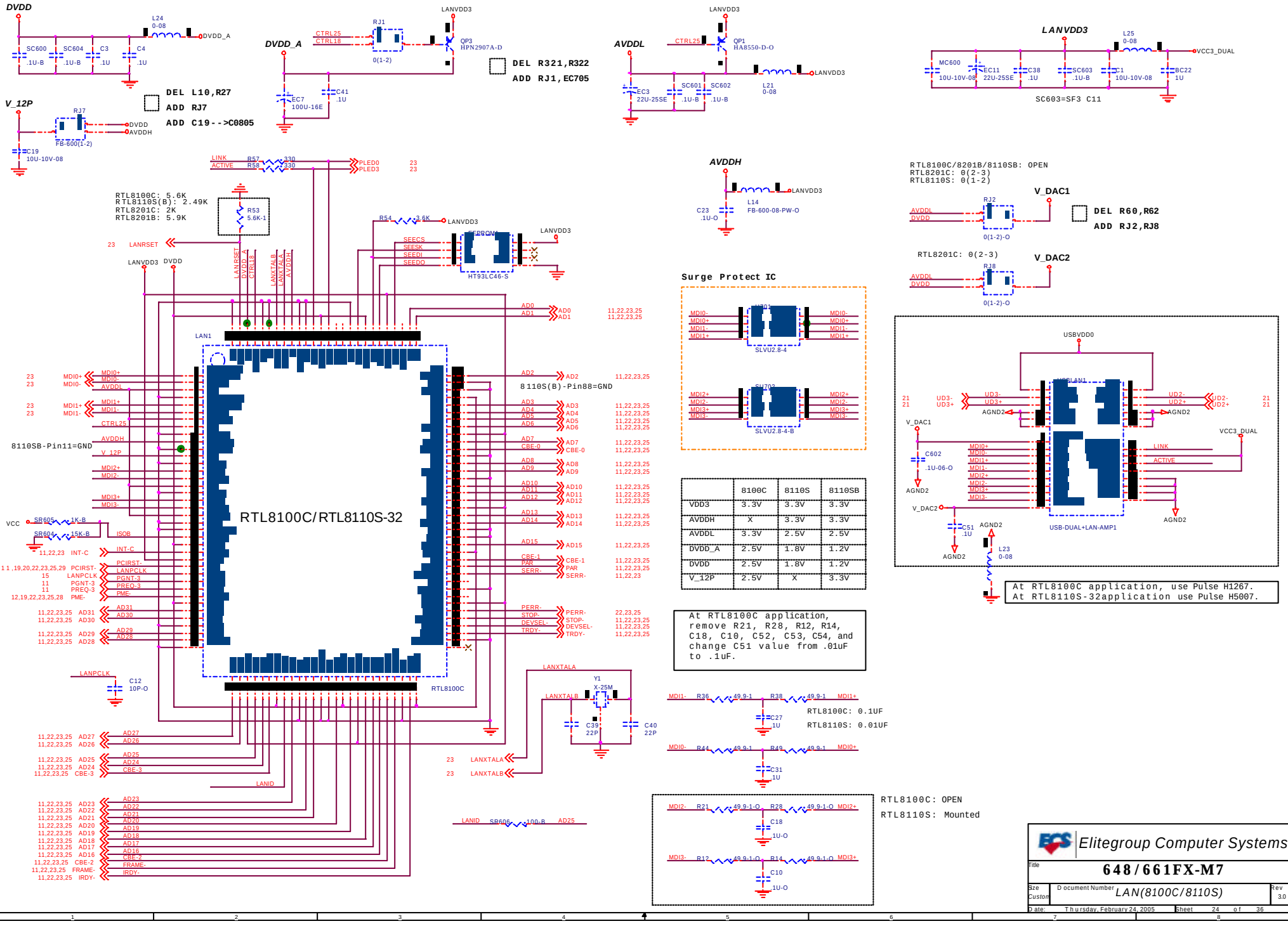

Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: PCI Slot1,2 — 3.0

Date: Thursday, February 24, 2005 — Sheet 22 of 36

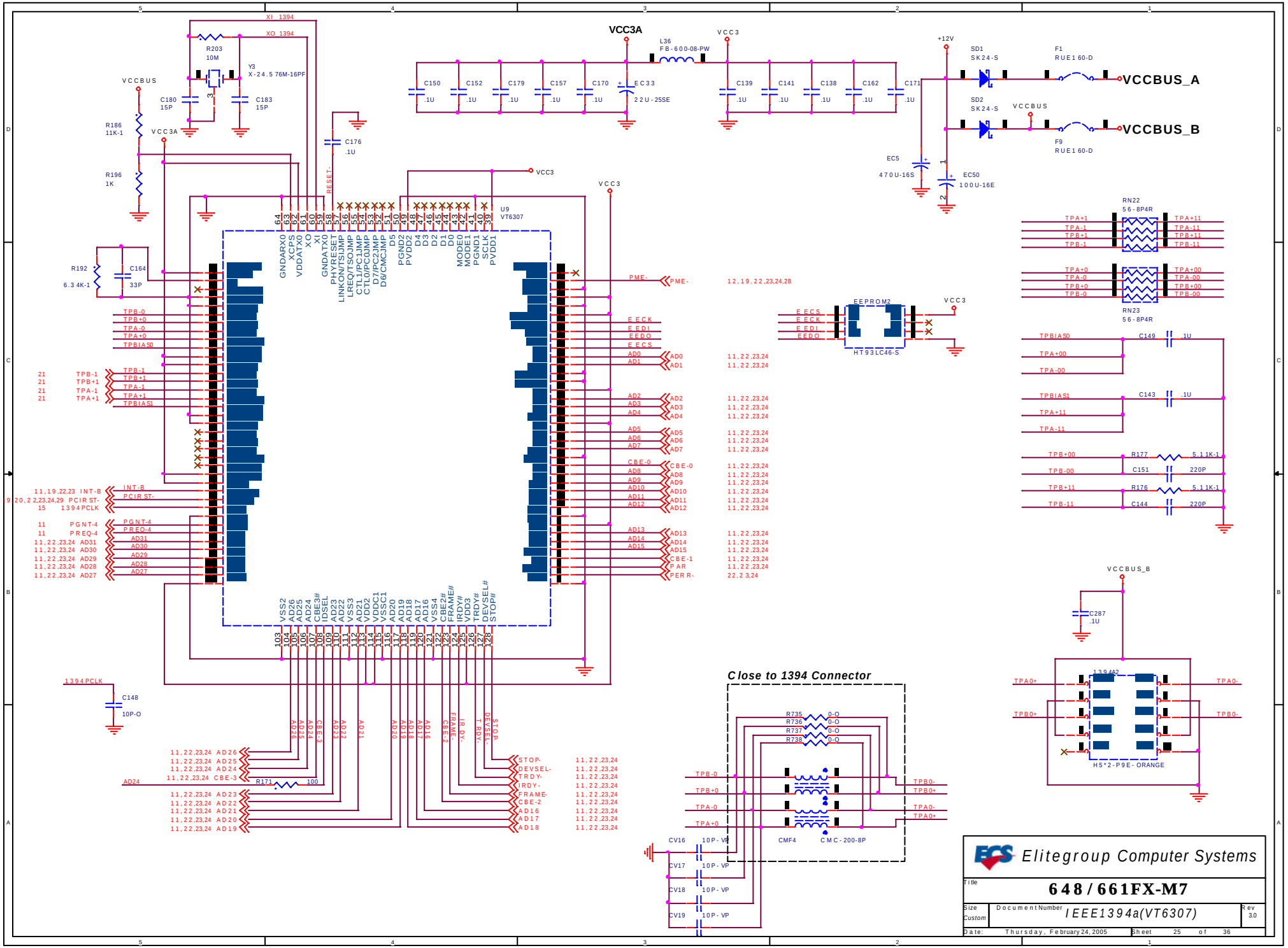

PCI3
PCI-W
IDSEL=AD22
INT[D,A,B,C]
RTL8201
U600
PHY address set to 01h
LANVDD3
VCC3_DUAL
CNR1
CNR
AGND
SB5V
GREEN
ORANGE
YELLOW
Elitegroup Computer Systems
648/661FX-M7
PCI Slot3 / LANPHY
Thursday, February 24, 2005




| | 8100C | 8110S | 8110SB |
|---|---|---|---|
| VDD3 | 3.3V | 3.3V | 3.3V |
| AVDDH | X | 3.3V | 3.3V |
| AVDDL | 3.3V | 2.5V | 2.5V |
| DVDD_A | 2.5V | 1.8V | 1.2V |
| DVDD | 2.5V | 1.8V | 1.2V |
| V_12P | 2.5V | X | 3.3V |

Elitegroup Computer Systems

| | | |
|---|---|---|
| Title | 648/661FX-M7 | |
| Size: Custom | Document Number: LAN(8100C/8110S) | Rev: 3.0 |
| Date: Thursday, February 24, 2005 | Sheet 24 of 36 | |




Elitegroup Computer Systems

Title: 648/661FX-M7

| Size | Document Number | Rev |
|---|---|---|
| Custom | IEEE1394a(VT6307) | 3.0 |

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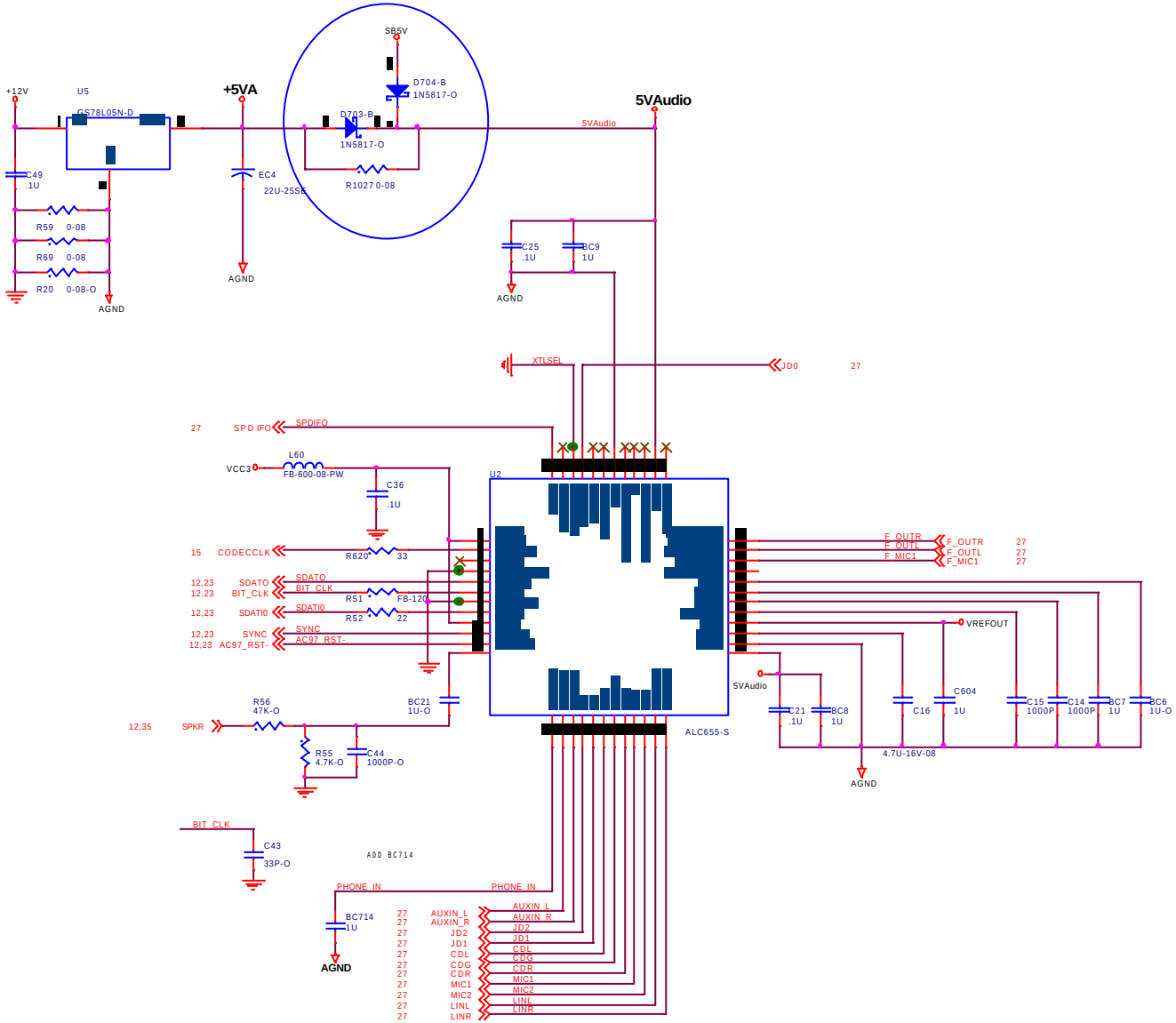
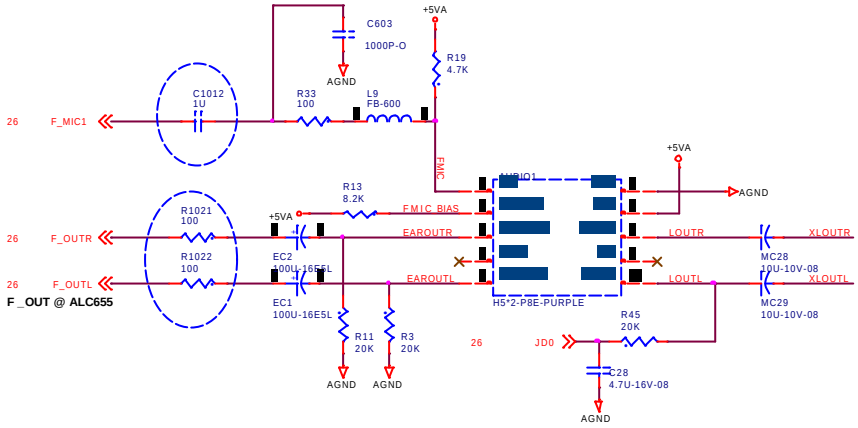
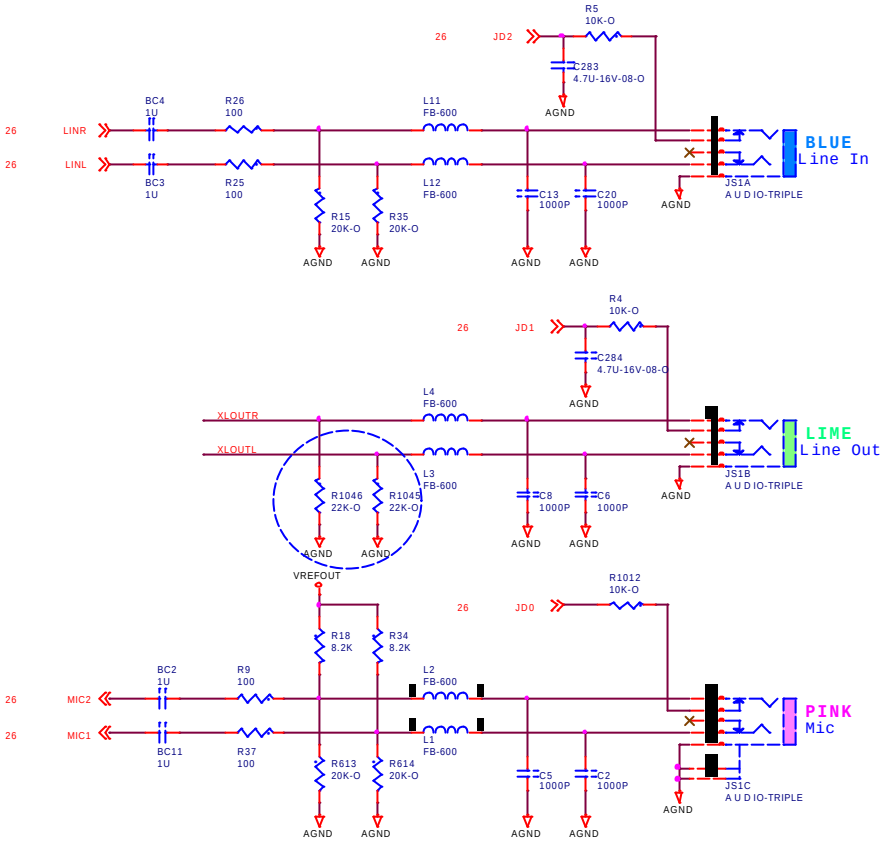
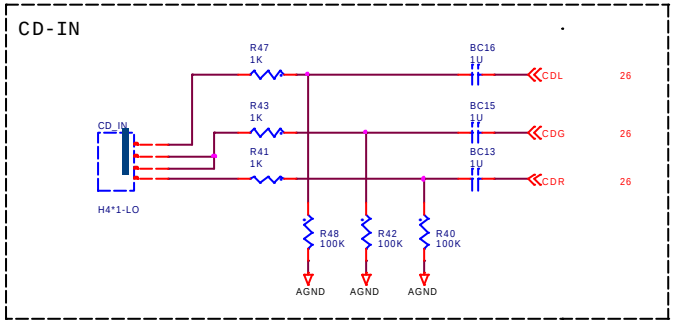
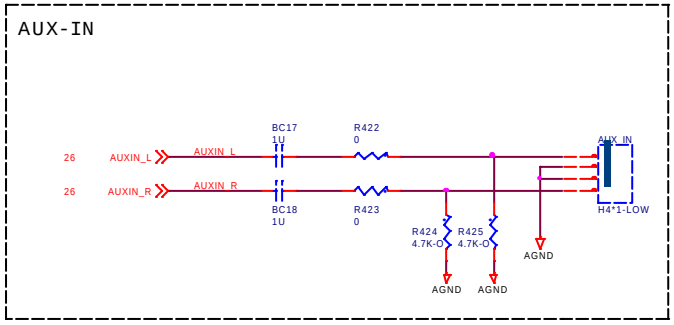



| | |
|---|---|
| Elitegroup Computer Systems | |
| Title | 648/661FX-M7 |
| Custom | Audio Codec 3.0 |
| Date: Thursday, February 24, 2005 | Sheet 26 of 36 |

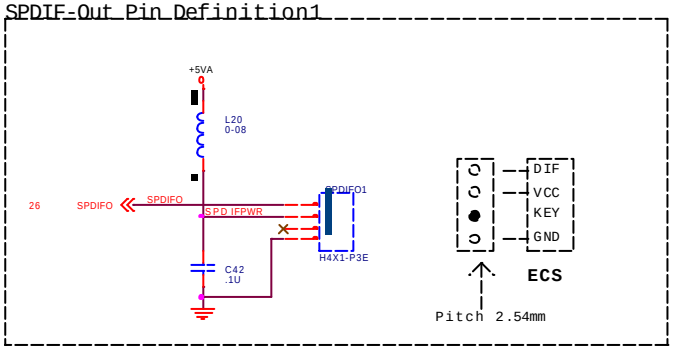


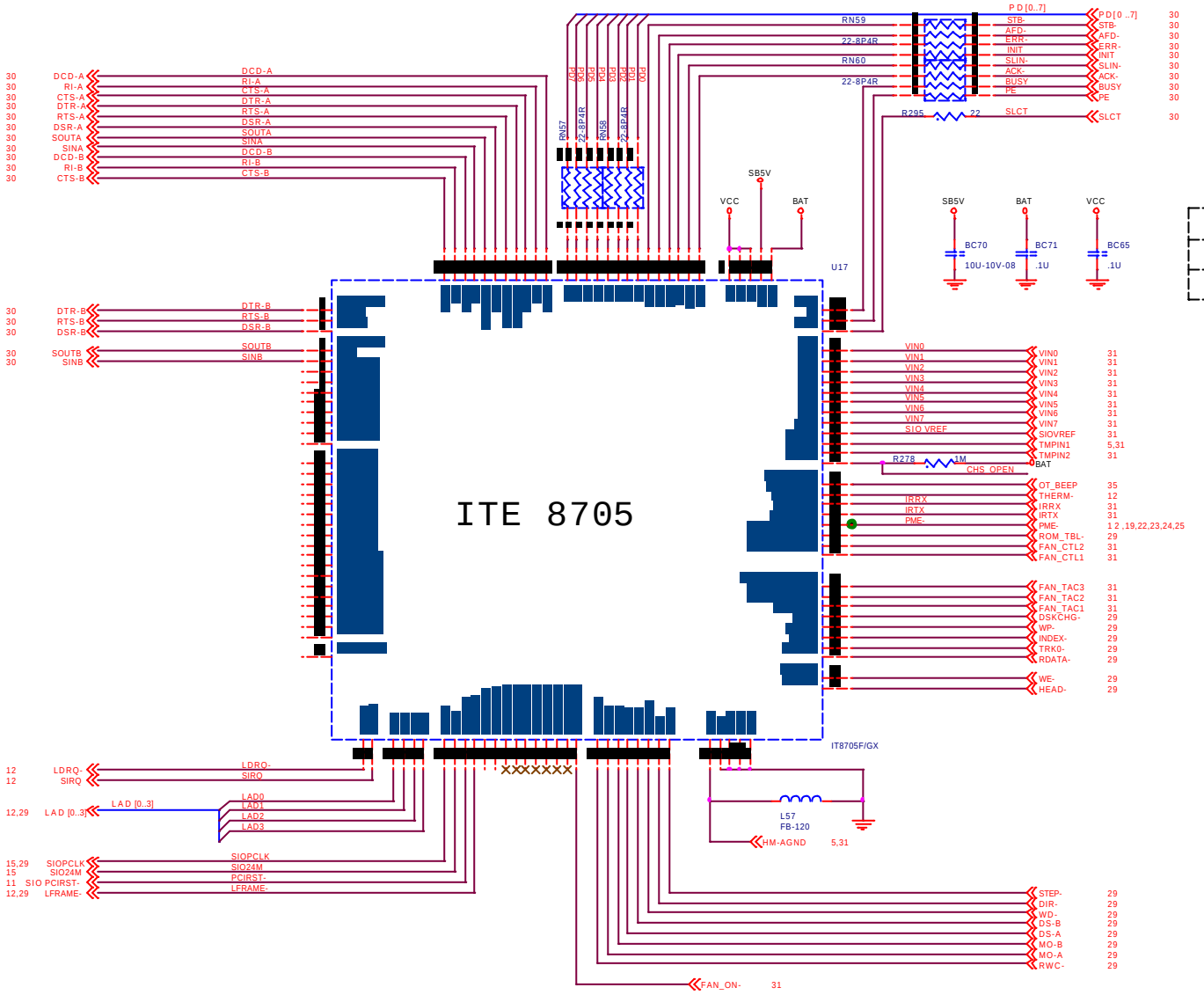




SPDIF-Out Pin Definition1

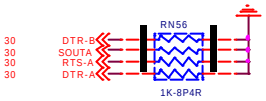



| | | | |
|---|---|---|---|
| ECS Elitegroup Computer Systems | | | |
| Title | 648/661FX-M7 | | |
| Custom | Audio Interface | | 3.0 |
| Date: Thursday, February 24, 2005 | | Sheet 27 of 36 | |

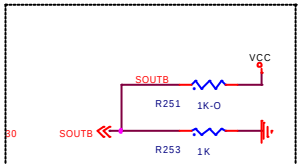



| | | High | Low |
|---|---|---|---|
| GPIO62 | BootBlockProtect | Disable | Enable |

ITE 8705 POWER ON TRAPS

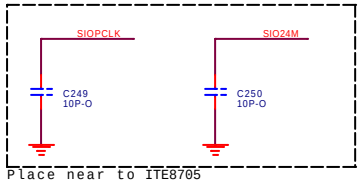



1. If use LPC ROM, pull down DTR#A RTS#A SOUTA DTR#B
2. If use Legacy 2MB flash rom, pull high DTR#A RTS#A SOUTA DTR#B
3. If use Legacy 4MB flash rom, pull high DTR#A RTS#A SOUTA DTR#B SOUTB




POWER ON TRAP

| SOUTB |
|---|
| HIGH: 4M FLASH ROM ENABLE (PIN 75 IS FA18) |
| LOW : PIN 75 IS FAN_TAC3 |



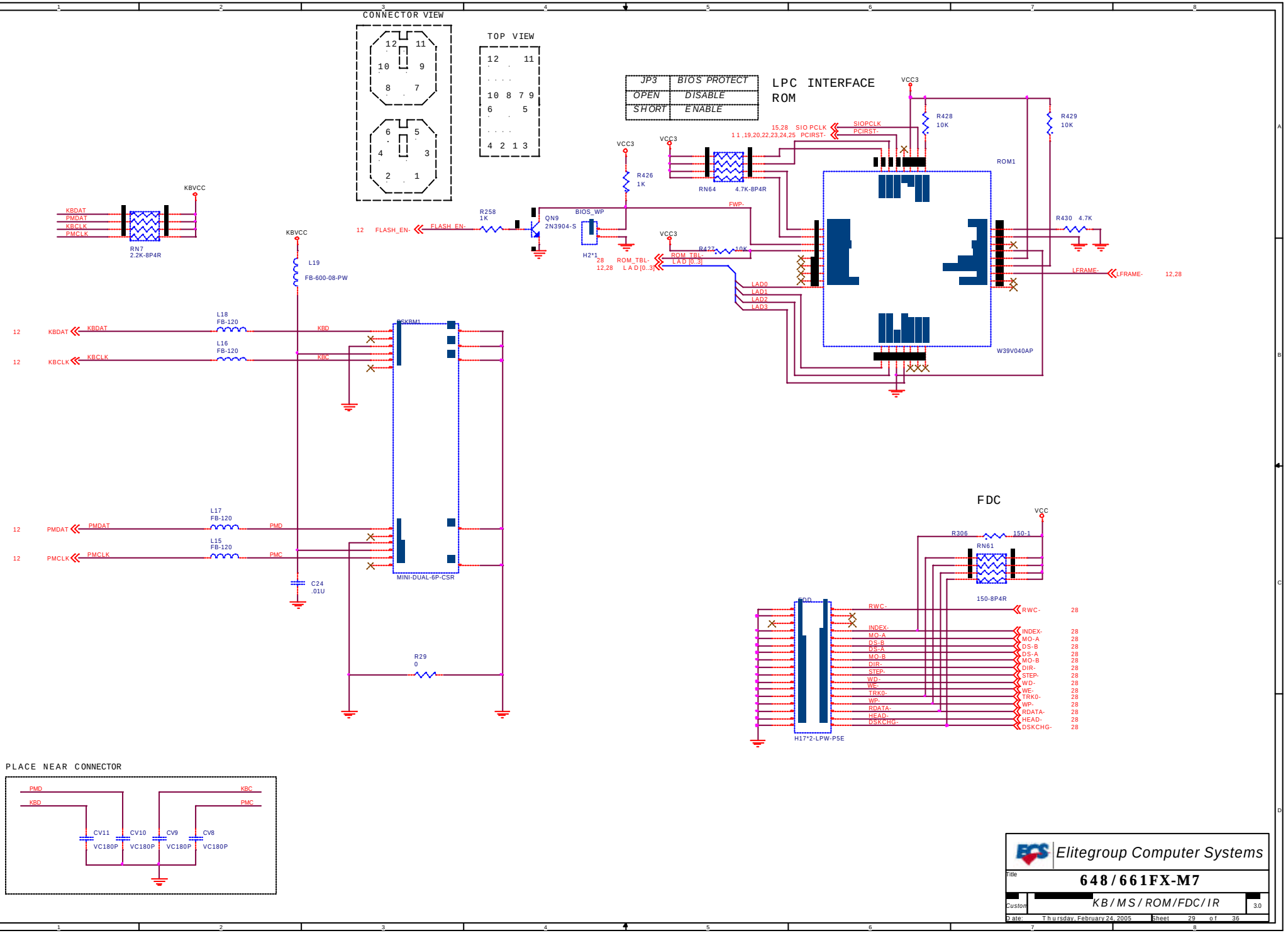

Place near to ITE8705

Elitegroup Computer Systems

Title: 648/661FX-M7

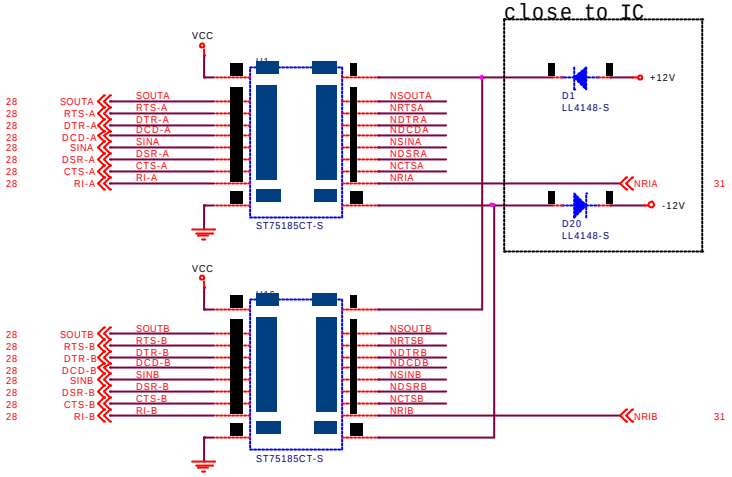
Custom: Super I/O 3.0

Date: Thursday, February 24, 2005 Sheet 28 of 36

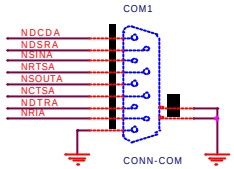

CONNECTOR VIEW
TOP VIEW
JP3 BIOS PROTECT
OPEN DISABLE
SHORT ENABLE
LPC INTERFACE ROM
FDC
PLACE NEAR CONNECTOR
KBVCC
KBDAT
PMDAT
KBCLK
PMCLK
RN7 2.2K-8P4R
L19 FB-600-08-PW
L18 FB-120
L16 FB-120
L17 FB-120
L15 FB-120
C24 .01U
DSKBM1
MINI-DUAL-6P-CSR
KBD
KBC
PMD
PMC
R29 0
FLASH_EN-
R258 1K
QN9 2N3904-S
BIOS_WP
H2*1
R426 1K
VCC3
RN64 4.7K-8P4R
FWP-
R427 10K
ROM_TBL-
LAD [0..3]
ROM1
W39V040AP
LAD0
LAD1
LAD2
LAD3
R428 10K
R429 10K
R430 4.7K
SIO PCLK
PCIRST-
SIOPCLK
LFRAME-
CV11 VC180P
CV10 VC180P
CV9 VC180P
CV8 VC180P
R306 150-1
RN61 150-8P4R
VCC
RWC-
INDEX-
MO-A
DS-B
DS-A
MO-B
DIR-
STEP-
WD-
WE-
TRK0-
WP-
RDATA-
HEAD-
DSKCHG-
H17*2-LPW-P5E
Elitegroup Computer Systems
Title
648/661FX-M7
Custom
KB/MS/ROM/FDC/IR
3.0
Date: Thursday, February 24, 2005
Sheet 29 of 36

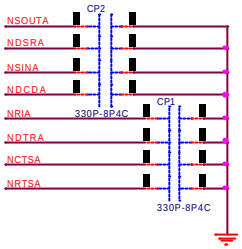
## COM

close to IC

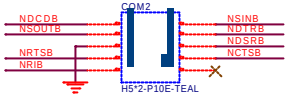


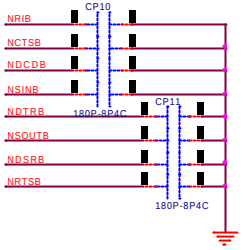

### COM1 USE CONNECTOR



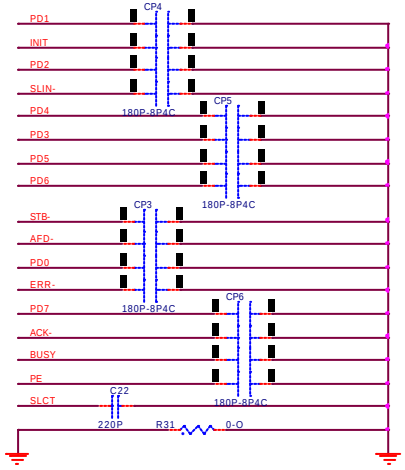

### COM2 USE HEADER

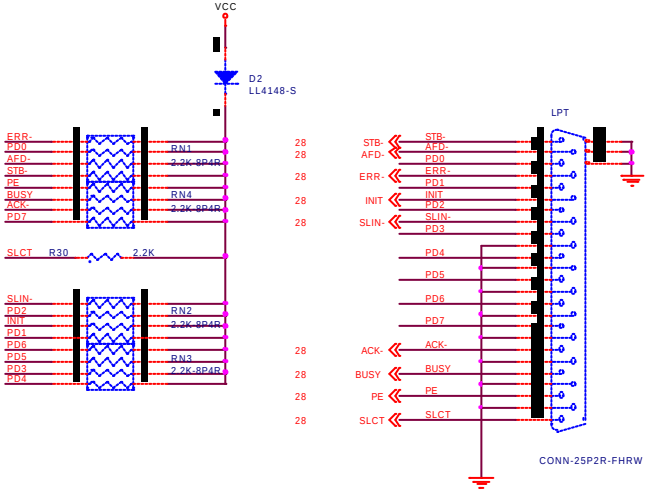


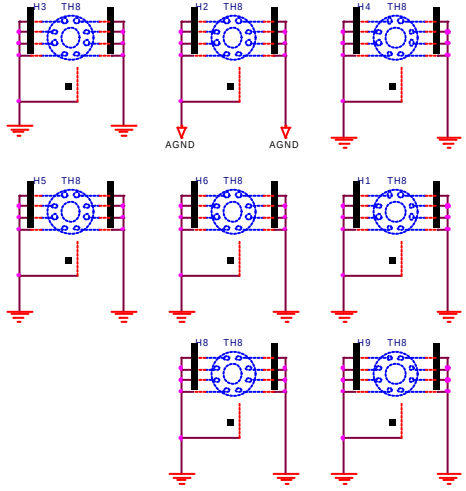




下IO的地

## PRT




Elitegroup Computer Systems

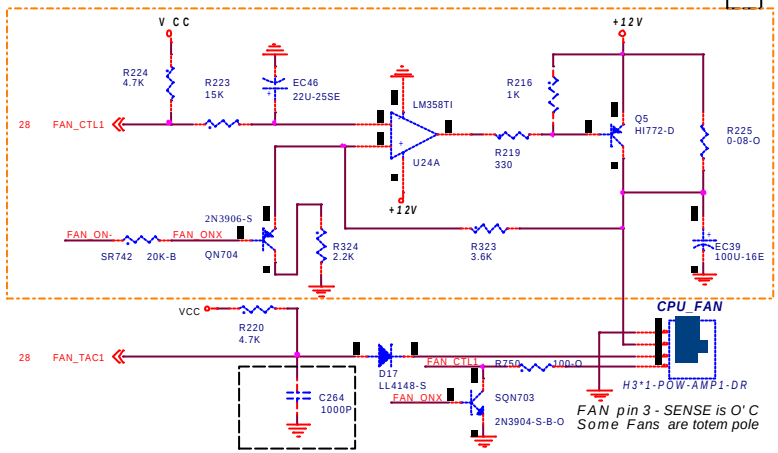
Title: 648/661FX-M7

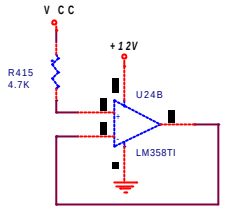
Custom: COM 1,2 / LPT 3.0

Date: Thursday, February 24, 2005 Sheet 30 of 36

*Layout :*
*Power Signals : CPUFAN, CASEFAN, PWRFAN trace width should > 20 mil with current 200 mA .*

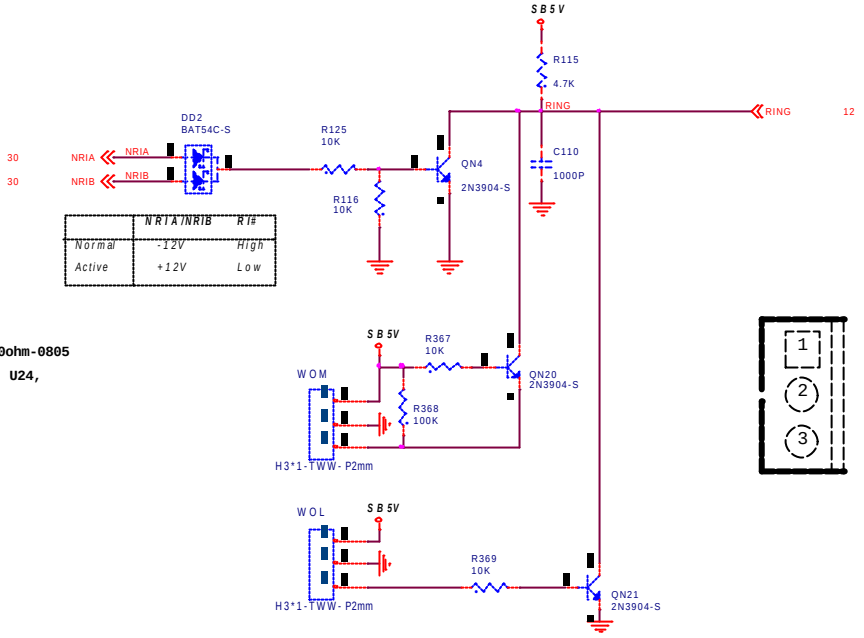
ADD R223, EC46, R323, R324, R219, R216, R225, Q5, QN704, U24, R415



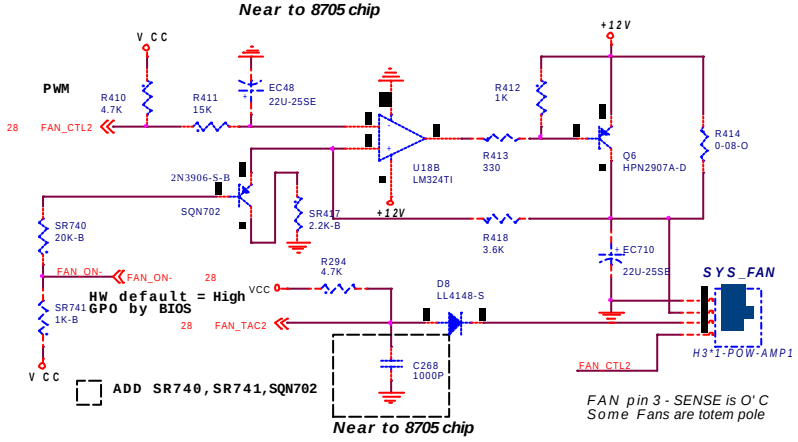

4pin header: SQN703, R750=100ohm, R225=0ohm-0805

3pin header: R223, EC46, R216, R219, Q5, U24, R415, R324, QN704, R323





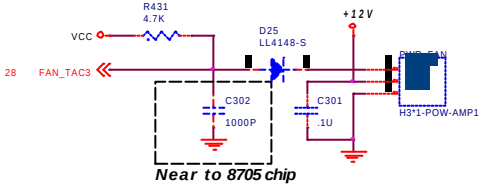


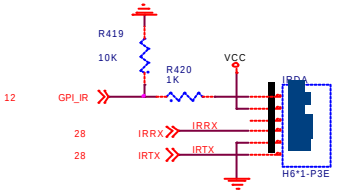



ADD SR740,SR741,SQN702

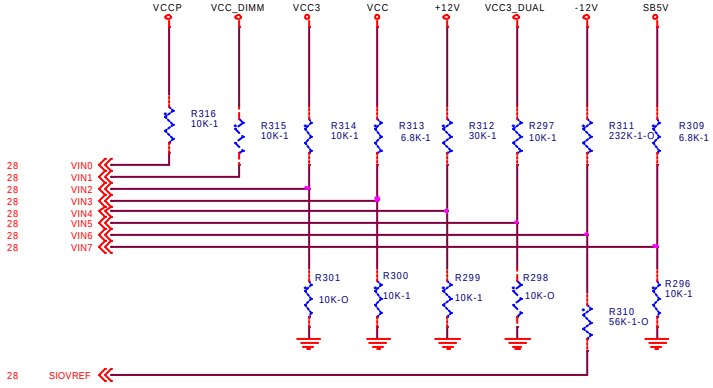
DEL D700

modify SQN702, SR740,SR741,SR742, R417-->SR417



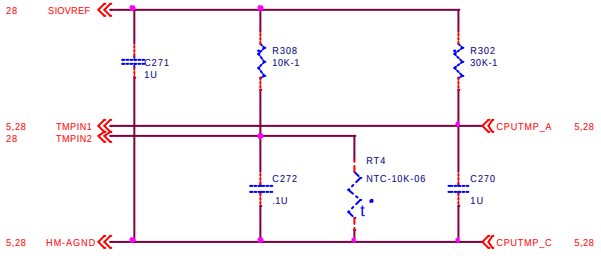




## Voltage Monitor




## Temperature Monitor

Choosing method of measuring temperature by either thermistor or diode

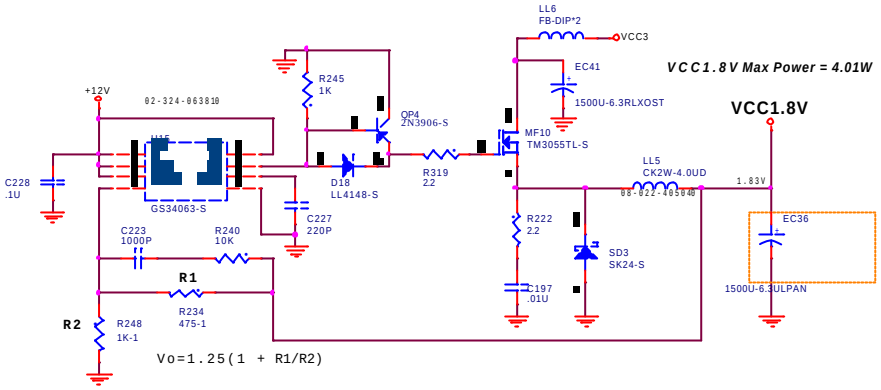


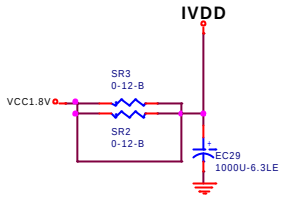

Elitegroup Computer Systems

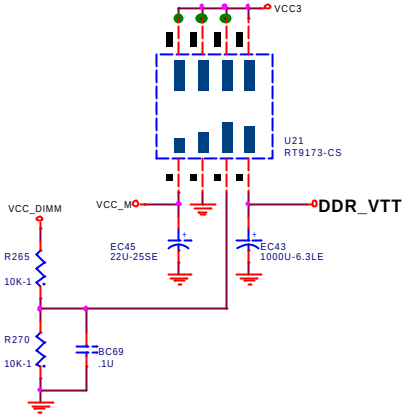
Title: 648/661FX-M7

Custom: HM / FAN / RING 3.0

Date: Thursday, February 24, 2005 Sheet 31 of 36

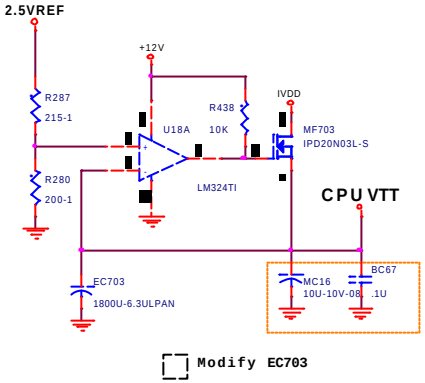


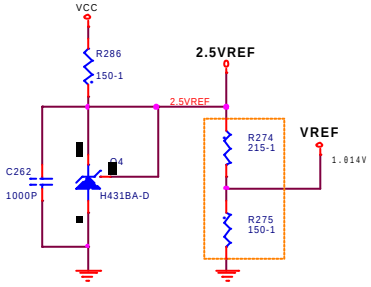



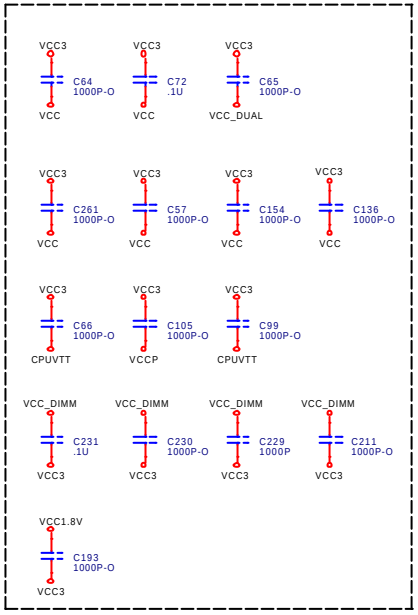




| | IVDD | VCC1.8V | |
|---|---|---|---|
| 648 | 1.8V | 1.8V | short two power plane, one regulator |
| 648FX | 1.9V | 1.9V | short two power plane, one regulator |
| 661FX | 1.8V | 1.8V | short two power plane, one regulator or two regulator |

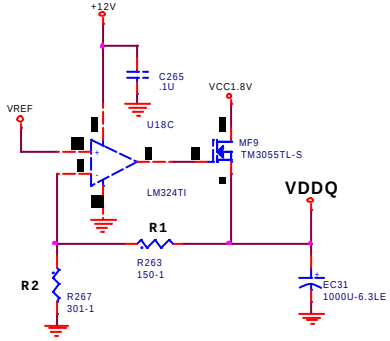
| | AUX_IVDD | SB1.8V | |
|---|---|---|---|
| 648 | 1.8V | 1.8V | short two power plane, one regulator |
| 648FX | 1.9V | 1.9V | short two power plane, one regulator |
| 661FX | 1.8V | 1.8V | short two power plane, one regulator |

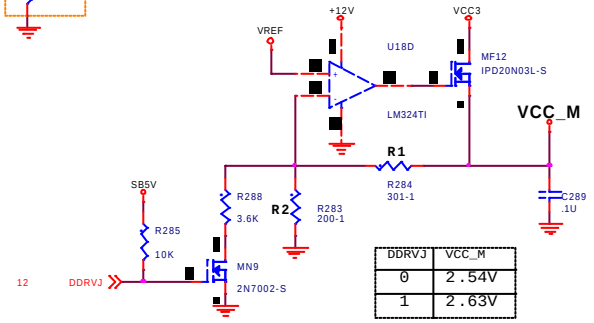



VCC1.5V Max Power = 0.3*(0.289+2.35)=0.7917W




| DDRVJ | VCC_M |
|---|---|
| 0 | 2.54V |
| 1 | 2.63V |

平均分佈在POWER PLAN 和 PLAN 之間

Elitegroup Computer Systems

Title: 648/661FX-M7

Custom: Voltage Regulator 3.0

Date: Thursday, February 24, 2005 Sheet 32 of 36

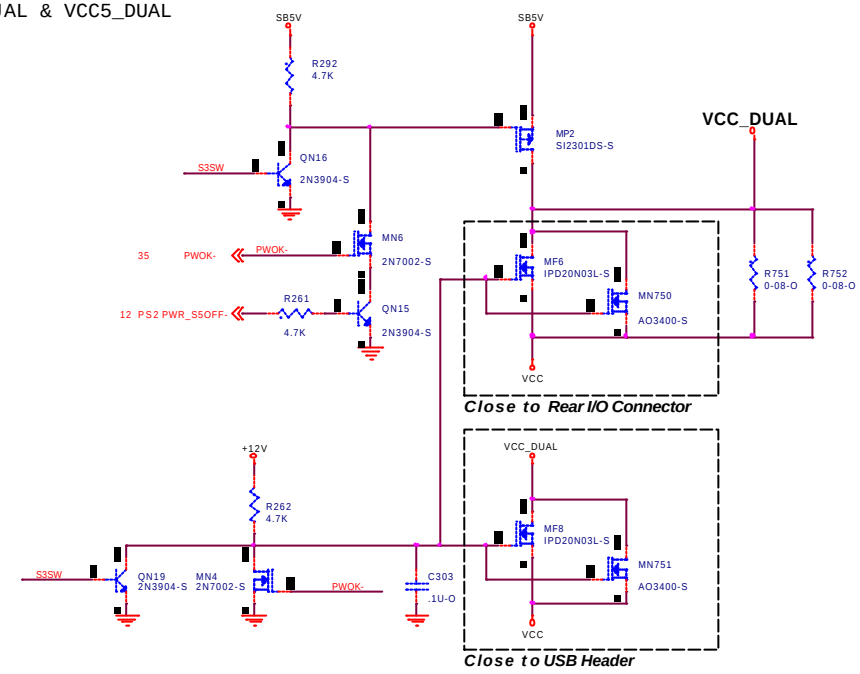
AUTO VOLTAGE SWITCH FOR ACPI STATE 3

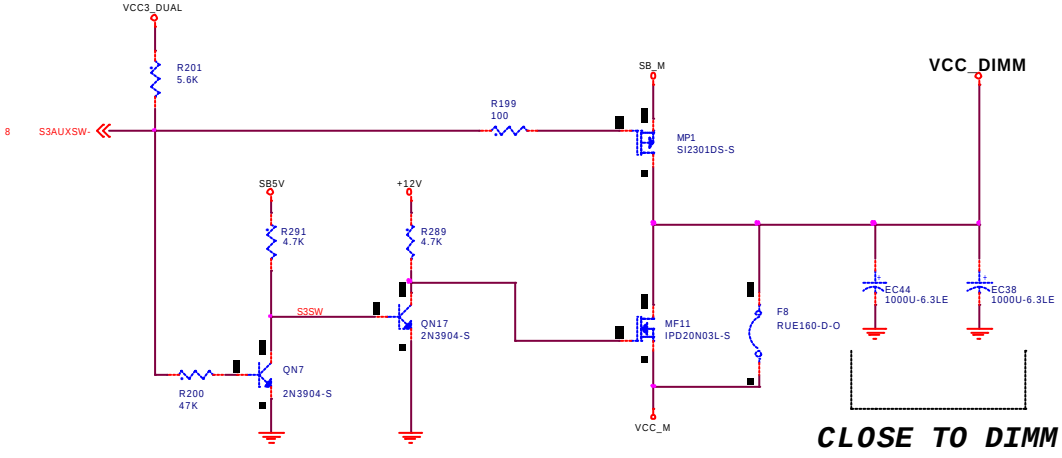
1.IN S0,S1
THIS CIRCUIT PASSES THE NORMAL POWER

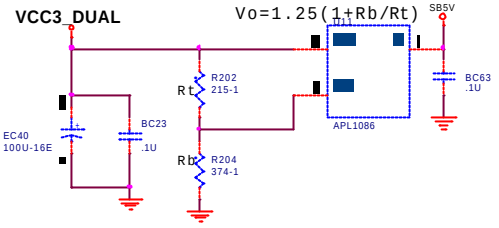
2.IN S3,S4,S5
THIS CIRCUIT PASSES THE STANDBY POWER

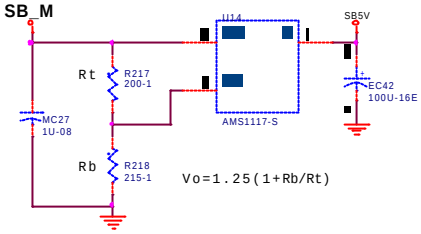
NOTE:
BECAUSE OF THE MAXIMUM CURRENT FROM POWER SUPPLY IS ONLY ABOUT 750~1000mA SO IF YOU WANT TO SUPPORT WAKE UP FROM S3 BY USB, YOU MUST HAVE A POWER SUPPLY WITH LARGER POWER.(ADDITIONAL 500mA PER USB PORT)

## VCC3_DUAL & VCC5_DUAL

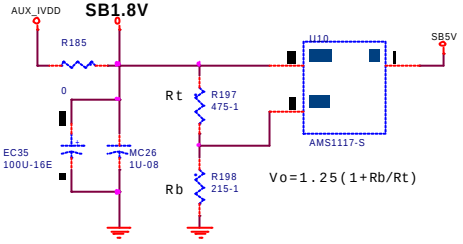


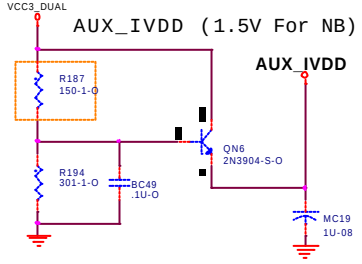



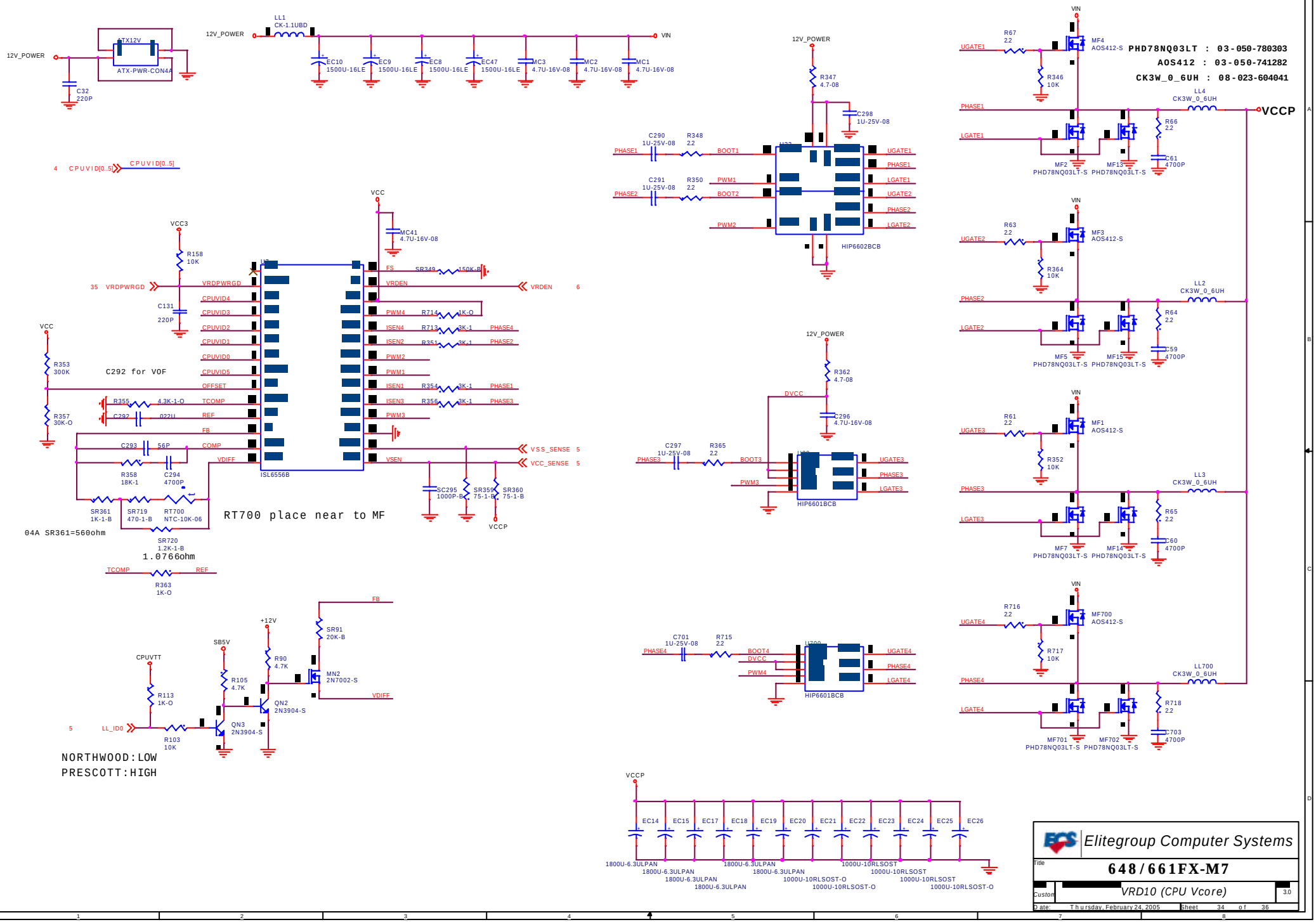

SB1.8V (For SB) 450mA




AUX_IVDD (1.5V For NB) 10mA

| | | | |
|---|---|---|---|
| Elitegroup Computer Systems | | | |
| Title | 648/661FX-M7 | | |
| Custom | Dual 5V&3V, STR | | 3.0 |
| Date: Thursday, February 24, 2005 | | Sheet 33 of 36 | |


12V_POWER
ATX12V
ATX-PWR-CON4A
C32 220P
LL1 CK-1.1UBD
EC10 1500U-16LE
EC9 1500U-16LE
EC8 1500U-16LE
EC47 1500U-16LE
MC3 4.7U-16V-08
MC2 4.7U-16V-08
MC1 4.7U-16V-08
VIN
CPUVID[0..5]
VCC
VCC3
R158 10K
MC41 4.7U-16V-08
VRDPWRGD
C131 220P
R353 300K
R357 30K-O
C292 for VOF
R355 4.3K-1-O
C292 022U
C293 56P
R358 18K-1
C294 4700P
SR361 1K-1-B
SR719 470-1-B
RT700 NTC-10K-06
SR720 1.2K-1-B
1.07660hm
04A SR361=560ohm
RT700 place near to MF
ISL6556B
FS
SR349 150K-B
VRDEN
PWM4
PWM2
PWM1
PWM3
ISEN4
ISEN2
ISEN1
ISEN3
R714 1K-O
R713 3K-1
R351 3K-1
R354 3K-1
R356 3K-1
PHASE4
PHASE2
PHASE1
PHASE3
VSS_SENSE
VCC_SENSE
VSEN
SC295 1000P-B
SR359 75-1-B
SR360 75-1-B
VCCP
TCOMP
REF
R363 1K-O
FB
SR91 20K-B
+12V
SB5V
CPUVTT
R90 4.7K
R105 4.7K
R113 1K-O
R103 10K
MN2 2N7002-S
QN2 2N3904-S
QN3 2N3904-S
LL_ID0
VDIFF
NORTHWOOD:LOW
PRESCOTT:HIGH
R347 4.7-08
C298 1U-25V-08
C290 1U-25V-08
R348 2.2
C291 1U-25V-08
R350 2.2
BOOT1
BOOT2
UGATE1
UGATE2
LGATE1
LGATE2
HIP6602BCB
R362 4.7-08
DVCC
C296 4.7U-16V-08
C297 1U-25V-08
R365 2.2
BOOT3
UGATE3
PHASE3
LGATE3
HIP6601BCB
C701 1U-25V-08
R715 2.2
BOOT4
UGATE4
PHASE4
LGATE4
PWM4
R67 2.2
R346 10K
MF4 AOS412-S
PHD78NQ03LT : 03-050-780303
AOS412 : 03-050-741282
CK3W_0_6UH : 08-023-604041
LL4 CK3W_0_6UH
R66 2.2
C61 4700P
MF2 PHD78NQ03LT-S
MF15 PHD78NQ03LT-S
R63 2.2
R364 10K
MF3 AOS412-S
LL2 CK3W_0_6UH
R64 2.2
C59 4700P
MF5 PHD78NQ03LT-S
R61 2.2
R352 10K
MF1 AOS412-S
LL3 CK3W_0_6UH
R65 2.2
C60 4700P
MF7 PHD78NQ03LT-S
R716 2.2
R717 10K
MF700 AOS412-S
LL700 CK3W_0_6UH
R718 2.2
C703 4700P
MF701 PHD78NQ03LT-S
MF702 PHD78NQ03LT-S
VCCP
EC14 EC15 EC17 EC18 EC19 EC20 EC21 EC22 EC23 EC24 EC25 EC26
1800U-6.3ULPAN
1800U-6.3ULPAN
1800U-6.3ULPAN
1800U-6.3ULPAN
1800U-6.3ULPAN
1800U-6.3ULPAN
1000U-10RLSOST
1000U-10RLSOST
1000U-10RLSOST-O
1000U-10RLSOST-O
1000U-10RLSOST
1000U-10RLSOST-O
Elitegroup Computer Systems
Title
648/661FX-M7
Custom
VRD10 (CPU Vcore)
3.0
Date: Thursday, February 24, 2005
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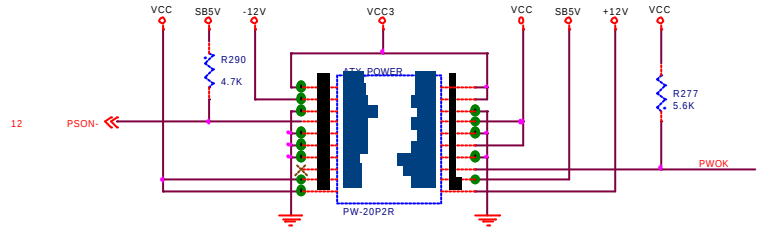
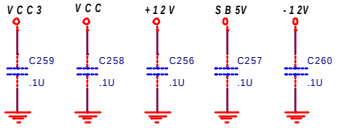
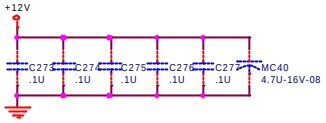
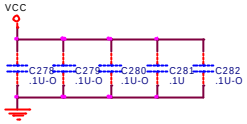


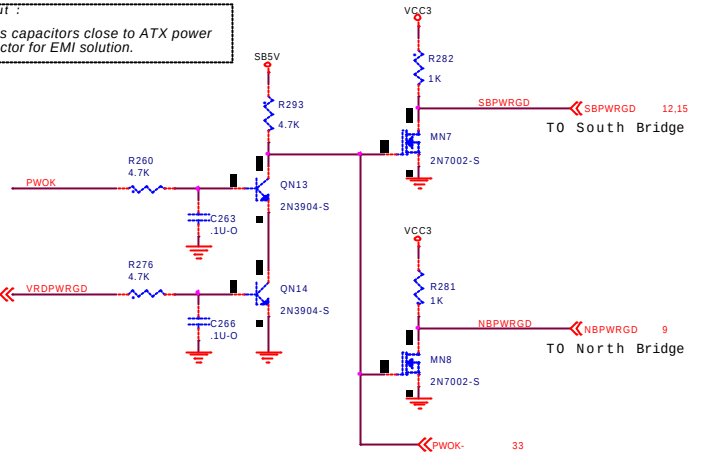




Layout :

*Bypass capacitors close to ATX power connector for EMI solution.*

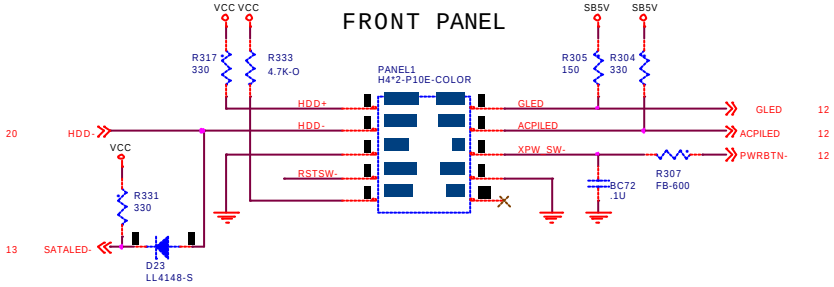


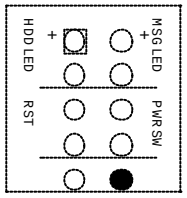



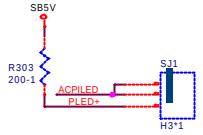


Hardware Reset Circuit

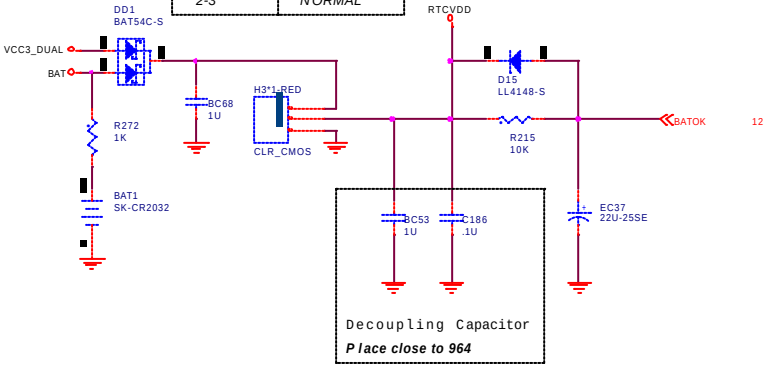


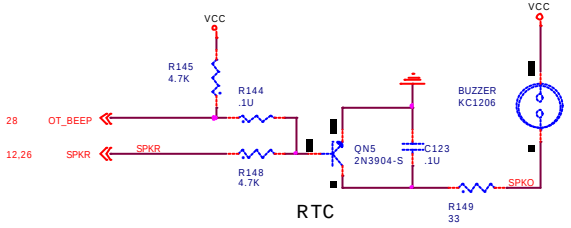

Intel Front Panel



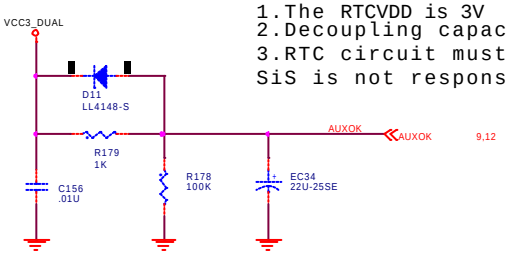




| CLR_CMOS | CLEAR CMOS |
|---|---|
| 1-2 | CLEAR |
| 2-3 | NORMAL |




NOTE!
1.The RTCVDD is 3V
2.Decoupling capacitor must be close to 635 RTCVDD pin.
3.RTC circuit must strictly follow SiS's recommended design
SiS is not responsible for RTC problems from foreign designs.




| | | |
|---|---|---|
| Elitegroup Computer Systems | | |
| Title: 648/661FX-M7 | | |
| Size: Custom | Document Number: ATX / Panel / RTC | Rev: 3.0 |
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# 1. BOM Attention

## (1) South Bridge

| Components \ Option | SIS964 | SIS964L |
|---|---|---|
| U13 | 964 964142 | 964L 964162 |
| R241 | 374 374010 | X |
| R71, R74 | 33 330000 | X |
| R72, R75 | 49.9 499010 | X |
| R331 | 330 330001 | X |
| D23 | 1N4148 03-021-214890 | X |
| SATA1, SATA2 | 10-020-007690 | X |

## (2) On-Board VGA

| Components \ Option | Support | No Support |
|---|---|---|
| U8 | 661FX 661141 | 648FX 648161 |
| L30, L31, L32, L6, L7, L8 | FB-120 | X |
| C112, C116, C117, BC35 | 1U | X |
| C118, C119 | .1U | X |
| MC36, MC37 | 10U | X |
| R136 | 130 130011 | X |
| R134, R143 | 33 | X |
| R128, R135 | 100 | X |
| VGA1 | 10-717-015010 | X |
| C111, C114, C115 | 22P | X |
| R22, R23, R24 | 75 | X |
| R32, R39 | 2.2K | X |
| CV1~7 | 22P-VP 04-130-220003 | X |
| F2 | O | X |

## (3) 661FX A1&B1

| Components \ Option | A1 | B1 |
|---|---|---|
| U8 | A1 661141 | B1 964145 |
| R159, SR4 | 210 210011 | 169 169011 |
| MN18@ rev1.1<br>MN18@ rev1.2 | 2N3904 | 0-08(D-S)<br>X |
| R126 | 14 140010 | 10 100010 |
| SR800@ rev1.2 | X | 0 |
| JPT3@ Standard | Open or (2-3) | (1-2) |
| JPT3@ Lenovo&TG | (1-2) | (2-3) |

## (4) LAN

| Components \ Option | 8100C 10/100 Mbps | 8110S 1Gbps | 8110SB 1Gbps | 8201BL 10/100 Mbps | 8201CL 10/100 Mbps |
|---|---|---|---|---|---|
| LAN1 | RTL8100C 01-230-100351 | RTL8110S 01-230-110350 | RTL8110SB | RTL8201BL 02-448-201861 | RTL8201CL 02-462-201860 |
| R53 | 5.6K-1 | 2.49K-1 | 2.49K-1 | 5.9K-1 | 2K-1 |
| R12, R14, R21, R28 | X | 49.9 | X | X | X |
| C10, C18 | X | 0.1u | X | X | X |
| C52, C53, C54 | X | 0.01u | X | X | X |
| C51 | 0.1u | 0.01u | 0.01u | X | 0.1u |
| RJ2 | X | (1-2) 0 ohm | X | X | (2-3) 0 ohm |
| R604 | X | X | X | X | 0 ohm |
| C601 | X | X | X | X | 0.1u |
| L14/ C23 | X | 0 ohm/ 0.1u | 0 ohm/ 0.1u | X | X |
| RJ7/ C19 | (1-2)FB-600 /10u-08 | X | (2-3)FB-600 /10u-08 | X | X |
| L21 | 0 ohm | X | X | 0 ohm | 0 ohm |
| QP1 | X | HA8550 | HA8550 | X | X |
| RJ1 | (1-2) 0 ohm | (2-3) 0 ohm | (2-3) 0 ohm | X | X |
| RJ8 | X | X | X | X | (2-3) 0 ohm |
| QP3 | HPN2907A | HA8550 | HA8550 | X | X |
| RN601, RN602, RN603 | X | X | X | 4.7K-8P4R | 4.7K-8P4R |
| C601 | X | X | X | 0.1u | 0.1u |
| R608/ R609 | X | X | X | 4.7K/ 10K ohm | 4.7K/ 10K ohm |
| R605 | X | X | X | 1.5K ohm | 1.5K ohm |
| R602, R603, R607 | X | X | X | 22 ohm | 22 ohm |
| SR600/ SR601/ SR602/ SR603/ SR607/ SR608 | X | X | X | 22 ohm-B | 22 ohm-B |
| SR606 | 150 ohm-B | 150 ohm-B | 150 ohm-B | X | X |
| SR604/ SR605 | 15K/ 1K ohm-B | 15K/ 1K ohm-B | 15K/ 1K ohm-B | X | X |
| Y600/ R600 | X | X | X | Y-25M/ 0 ohm | Y-25M/ 0 ohm |
| C166/ C600 | 4.7K ohm/ X | 4.7K ohm/ X | 4.7K ohm/ X | 22P | 22P |
| R190/ R191 | X / 1K ohm | X / 1K ohm | X / 1K ohm | 1K ohm/ X | 1K ohm/ X |
| EEPROM1/ EEPROM3 | O / X | O / X | O / X | X / O | X / O |
| R54/ R610 | 3.6K ohm/ X | 3.6K ohm/ X | 3.6K ohm/ X | X / 4.7K ohm | X / 4.7K ohm |

# 2. GPIO Function

| GPIO \ Status | | 0 | 1 | Jumper |
|---|---|---|---|---|
| GPIO5 | * RESERVED | RESERVED | RESERVED | JP4 |
| GPIO6 | * RESERVED | RESERVED | RESERVED | JP5 |
| GPIO7 | * LAN Selection | LANPHY | PCILAN | N/A |
| GPIO9 | USB, PS/2 S4/S5 Wake Up | Disable | Enable | N/A |
| GPIO10 | DDR Voltage | 2.54V | 2.63V | N/A |
| GPIO11 | * WHQL | No Support | Support | JPT3 |
| GPIO13 | Flash Write Protect | Un-Protect | Protect | |

(1) "*" means that the function is selective and ECS may make changes at any time, without notice in this page.

(2) Jumper Setting (Header 3*1):

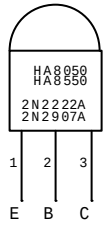
1: (1-2)

0: (2-3)

(3) Please see Page.12 for more detail jumper function.

| JPT3 | | 1-2 | 2-3 |
|---|---|---|---|
| GPIO11 | | 1 | 0 |
| HP | Clear CMOS | Normal | Clear |
| TRIGEM | Suspen Mode | S1 & S3 | S1 |

| JPT4 | | 1-2 | 2-3 |
|---|---|---|---|
| GPIO5 | | 1 | 0 |
| HP | Clear Password | Normal | Clear |
| TRIGEM | BIOS Logo | TG | Commaeul |




Elitegroup Computer Systems

Title: 648/661FX-M7

Size: Custom | Document Number: BOM Attention & GPIO Distribution | Rev: 3.0

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