

# FALCON2M

(Modified from CastorV6)

Project Code: 91.40R01.001

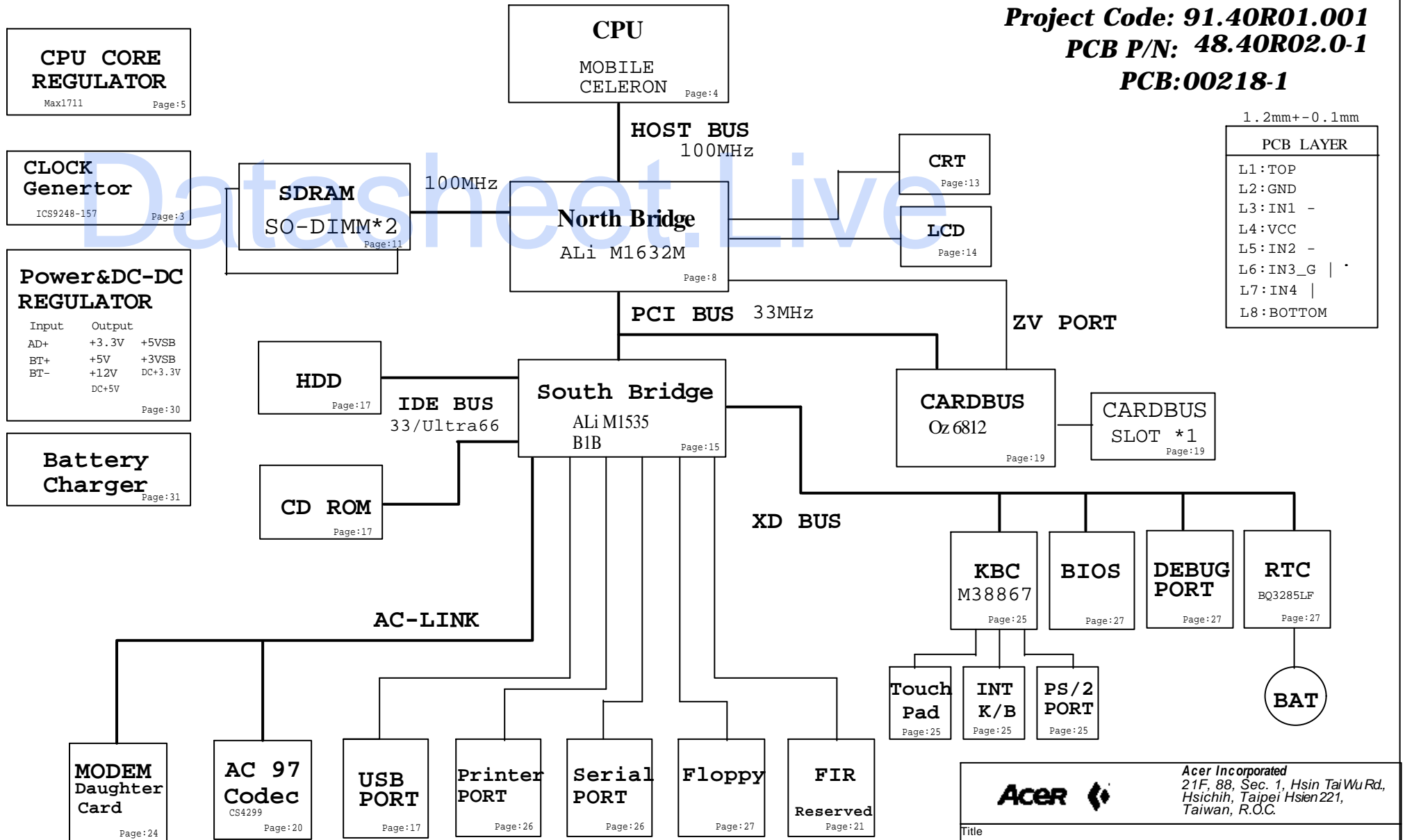
PCB P/N: 48.40R02.0-1

PCB:00218-1

1.2mm+-0.1mm

PCB LAYER

- L1: TOP
- L2: GND
- L3: IN1 -
- L4: VCC
- L5: IN2 -
- L6: IN3\_G |
- L7: IN4 |
- L8: BOTTOM



**CPU CORE REGULATOR**  
Max1711 Page:5

**CLOCK Generator**  
ICS9248-157 Page:3

**Power&DC-DC REGULATOR**

| Input | Output       |
|-------|--------------|
| AD+   | +3.3V +5VSB  |
| BT+   | +5V +3VSB    |
| BT-   | +12V DC+3.3V |
|       | DC+5V        |

Page:30

**Battery Charger**  
Page:31

**MODEM Daughter Card**  
Page:24

**AC 97 Codec**  
CS4299 Page:20

**USB PORT**  
Page:17

**Printer PORT**  
Page:26

**Serial PORT**  
Page:26

**Floppy**  
Page:27

**FIR Reserved**  
Page:21



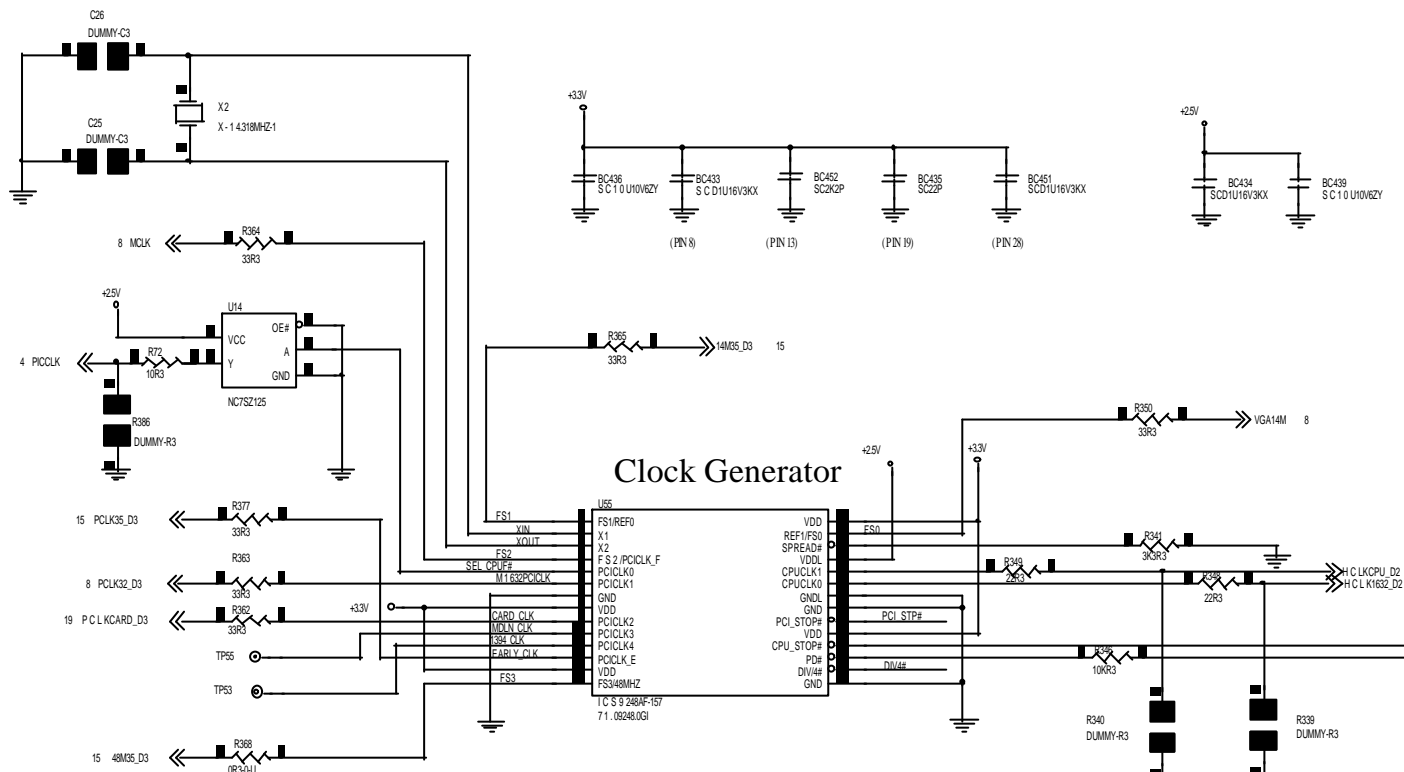
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Hsichih, Taipei Hsien 221,  
Taiwan, R.O.C.

|       |                        |       |               |    |    |
|-------|------------------------|-------|---------------|----|----|
| Title |                        |       | Block Diagram |    |    |
| Size  | Document Number        |       | Rev           |    |    |
| A4    | FALCON2M               |       | -1            |    |    |
| Date: | Monday, March 05, 2001 | Sheet | 1             | of | 33 |

SA

SB

1. Modify Net error
  - a.CPU I/O deculping cap.
  - b.COM\_RI#\_5RSM & PME#\_5RSM
  - c.AC\_SDATA\_IN1 & ENSN#\_3RSM
  - d.SB +3VSB
  - e.HDD PID13,14
- 2.Add U34
- 3.Change CardBus controllor from Ti 1410 to Oz 6812  
Dummy R88
- 4.TC23 100uF/TC7 150uF
- 5.Del U24
- 6.Del CPU & DC/DC Gaps
7. Add XC? for IBM HDD -0.3V undershut voltage
- 8.Modify the USB circuit for cost-down
- 9.Change BC437 from 560 to 3300 pF for CRT  
jitter
- 10.Reserve TXC1 for CD-ROM undershut
11. SB for CD\_ROM pop  
noise
- 12.SB Del remainder BLL circuits

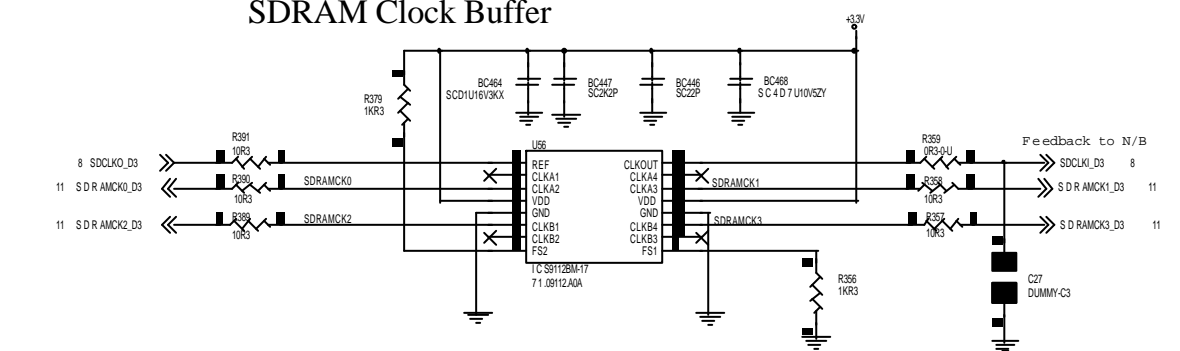


For ICS9248-130 only

| FS3 | FS2 | FS1 | FS0 | CPU    | PCI   |
|-----|-----|-----|-----|--------|-------|
| 0   | 0   | 0   | 0   | 33.33  | 16.66 |
| 0   | 0   | 0   | 1   | 63.33  | 31.66 |
| 0   | 0   | 1   | 0   | 69.99  | 35.00 |
| 0   | 0   | 1   | 1   | 66.66  | 33.33 |
| 0   | 1   | 0   | 0   | 97.00  | 32.33 |
| 0   | 1   | 0   | 1   | 96.22  | 32.07 |
| 0   | 1   | 1   | 0   | 91.50  | 30.50 |
| 0   | 1   | 1   | 1   | 83.33  | 27.77 |
| 1   | 0   | 0   | 0   | 50.00  | 16.66 |
| 1   | 0   | 0   | 1   | 95.25  | 31.75 |
| 1   | 0   | 1   | 0   | 105.00 | 35.00 |
| 1   | 0   | 1   | 1   | 100.00 | 33.33 |
| 1   | 1   | 0   | 0   | 66.66  | 16.66 |
| 1   | 1   | 0   | 1   | 126.35 | 31.66 |
| 1   | 1   | 1   | 0   | 139.65 | 35.00 |
| 1   | 1   | 1   | 1   | 133.33 | 33.33 |

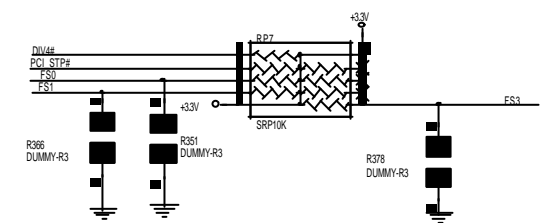
### Clock Generator

### SDRAM Clock Buffer



Hardware setting for NB free running

H : Stop CPU & NB CLK  
L : Stop CPU CLK only



Skew Requirement:  
 CPU-CPU: 200ps max.  
 SDRAM-SDRAM: 500ps max.  
 PCI-PCI: 500ps max.  
 CPU-NB: In Phase  
 DRAM-NB: In Phase  
 CPU/NB-PCI: 1-4ns, 2.5ns typical  
 NB-SB: In Phase  
 NB-NB/PCI: 1-4ns, 2.5ns typical

Jitter Requirement:  
 CPU: 250ps max.  
 PCI: 500ps max.

Duty Cycle Requirement:  
 45%-55% for all clock

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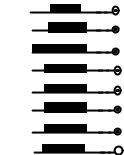
Rev  
**Clock Generator & SDRAM Clock Buffer**  
 Document Number  
**FALCON2M**  
 -1

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# MOBILE PENTIUM III COPPERMINE

$VCC\_CORE\_CPU = 1.35V \sim 1.6V$   
 $VCC\_IO\_CPU = 1.5V$   
 $CLK\_VCC = 2.5V$   
 $CLK\_VREF = 1.25V = 2.5V * (2K / (2K + 2K))$   
 $CMOS\_VREF = 1V = 2.5V * (2K / (2K + 3K))$   
 $GTL\_VREF\_CPU = 1V = VCC\_IO\_CPU * (2K / (1K + 2K))$


CPU BOTTOM



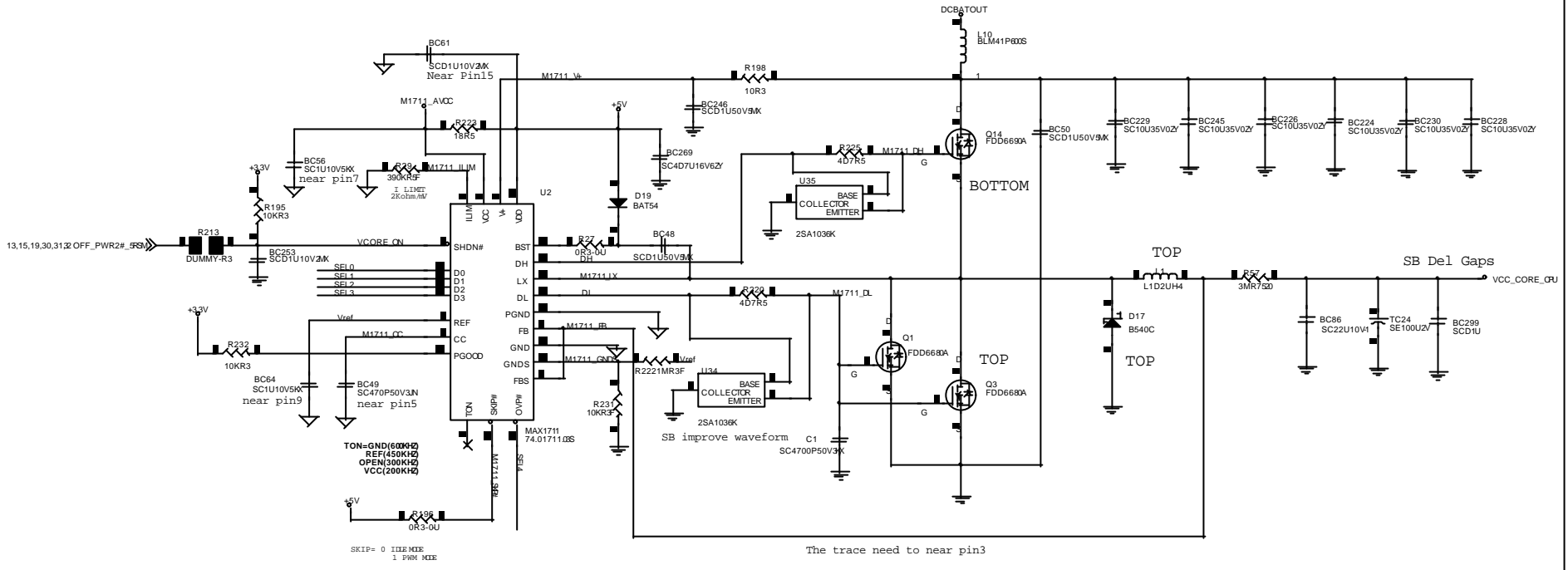
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|  |  |  |

CELERON 700

SB NET error


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CPU-CELERON  
 FALCON2M



SKIP= 0 IIR MDE  
1 PWM MDE

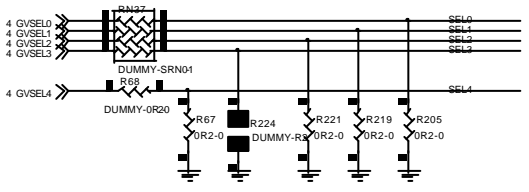
The trace need to near pin3



| SEL | 4 | 3 | 2 | 1 | 0 | VOUT   |
|-----|---|---|---|---|---|--------|
| 0   | X | X | O | O |   | 1.800V |
| 0   | X | X | O | X |   | 1.750V |
| 0   | X | X | O | X | X | 1.700V |
| 0   | X | X | X | X |   | 1.650V |
| 0   | X | O | O | O |   | 1.600V |
| 0   | X | O | X | X |   | 1.550V |
| 0   | X | O | X | O |   | 1.500V |
| 0   | X | O | X | X |   | 1.450V |
| 0   | X | X | O | O |   | 1.400V |
| 0   | X | X | O | X |   | 1.350V |
| 0   | X | X | X | O |   | 1.300V |
| X   | O | O | O | O |   | 1.275V |
| X   | O | O | X | O |   | 1.250V |
| X   | O | O | X | X |   | 1.225V |
| X   | O | O | X | X | X | 1.200V |

0: POPULATE RESISTOR (LOGIC LOW)  
X: REMOVE RESISTOR (LOGIC HIGH)

|                             | R505 | R518 | R520 | R524 | R523 |
|-----------------------------|------|------|------|------|------|
| <b>Celeron</b><br>500MHz    | 0    | X    | 0    | 0    | 0    |
| 800MHz                      |      |      |      |      |      |
| <b>Coppermine</b><br>600MHz | 0    | X    | X    | 0    | X    |
| 850MHz                      |      |      |      |      |      |



reserve for external voltage setting

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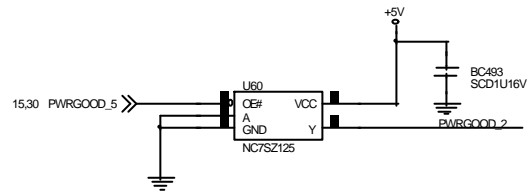
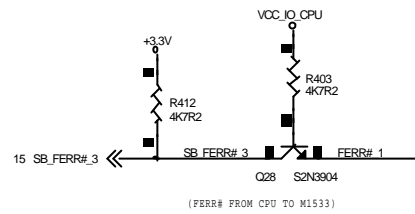
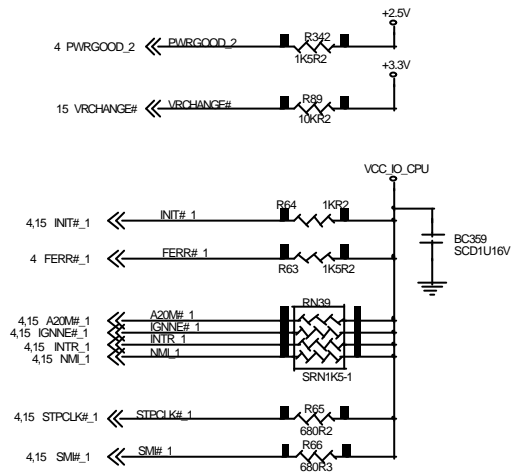
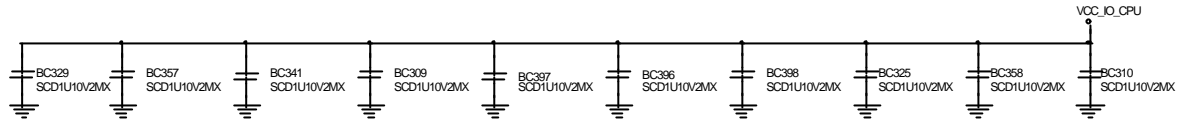
Title: CPU CORE/IO POWER & VRM

Doc Number: FALCON2M

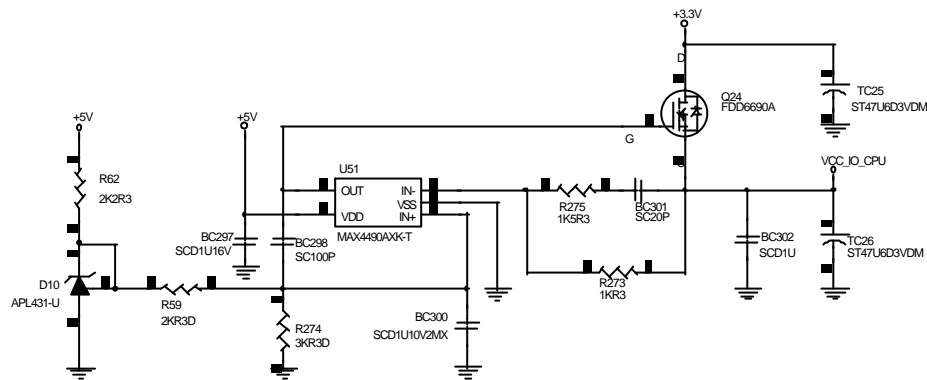
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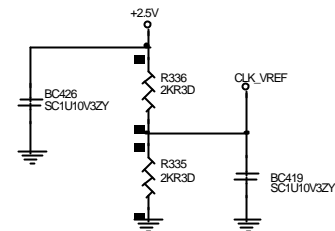


### Generate VCC\_IO\_CPU (1.5V)

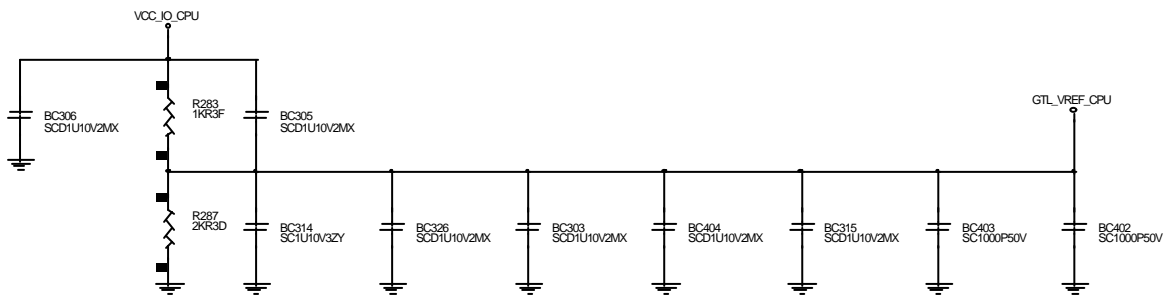


$$VCC\_IO\_CPU = 2.5V[R274/(R59+R274)]$$

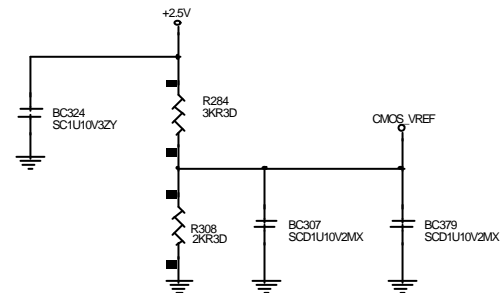
### Generate CLK\_VREF (1.25V)



### Generate GTL\_VREF\_CPU (1V)



### Generate CMOS\_VREF (1V)



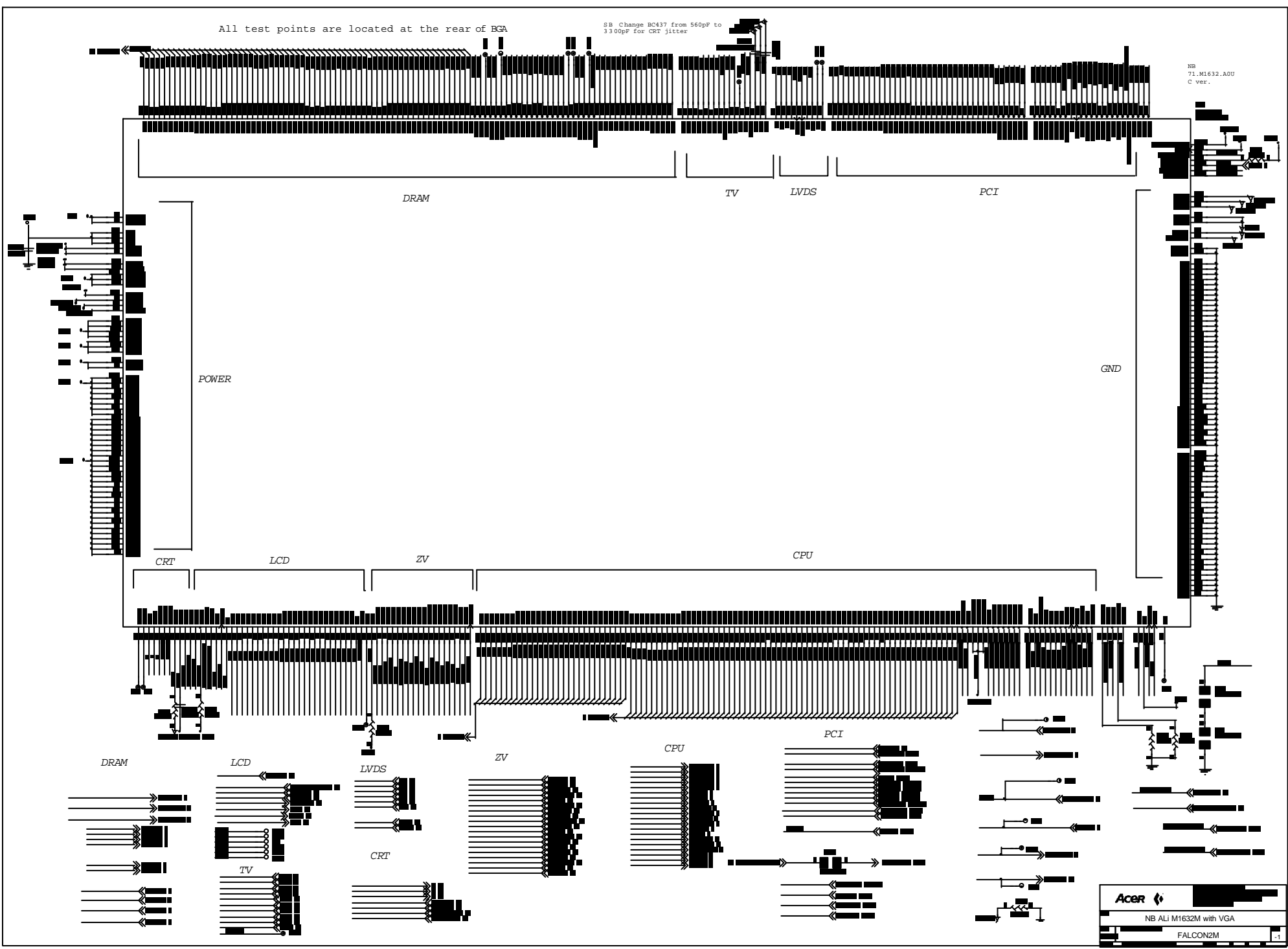
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|       |                         |       |                         |
|-------|-------------------------|-------|-------------------------|
| Title |                         |       | CPU CORE/IO POWER & VRM |
| Size  | Document Number         | Rev   |                         |
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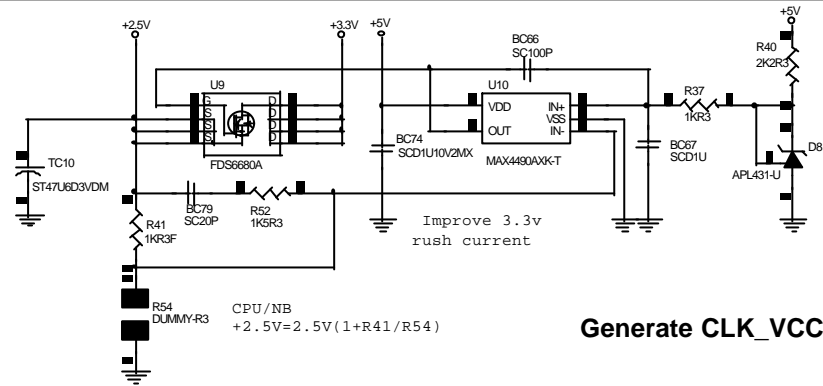
All test points are located at the rear of BGA

SB Change BC437 from 560pF to 330pF for CRT jitter

NB  
71.M1632.A0U  
C ver.

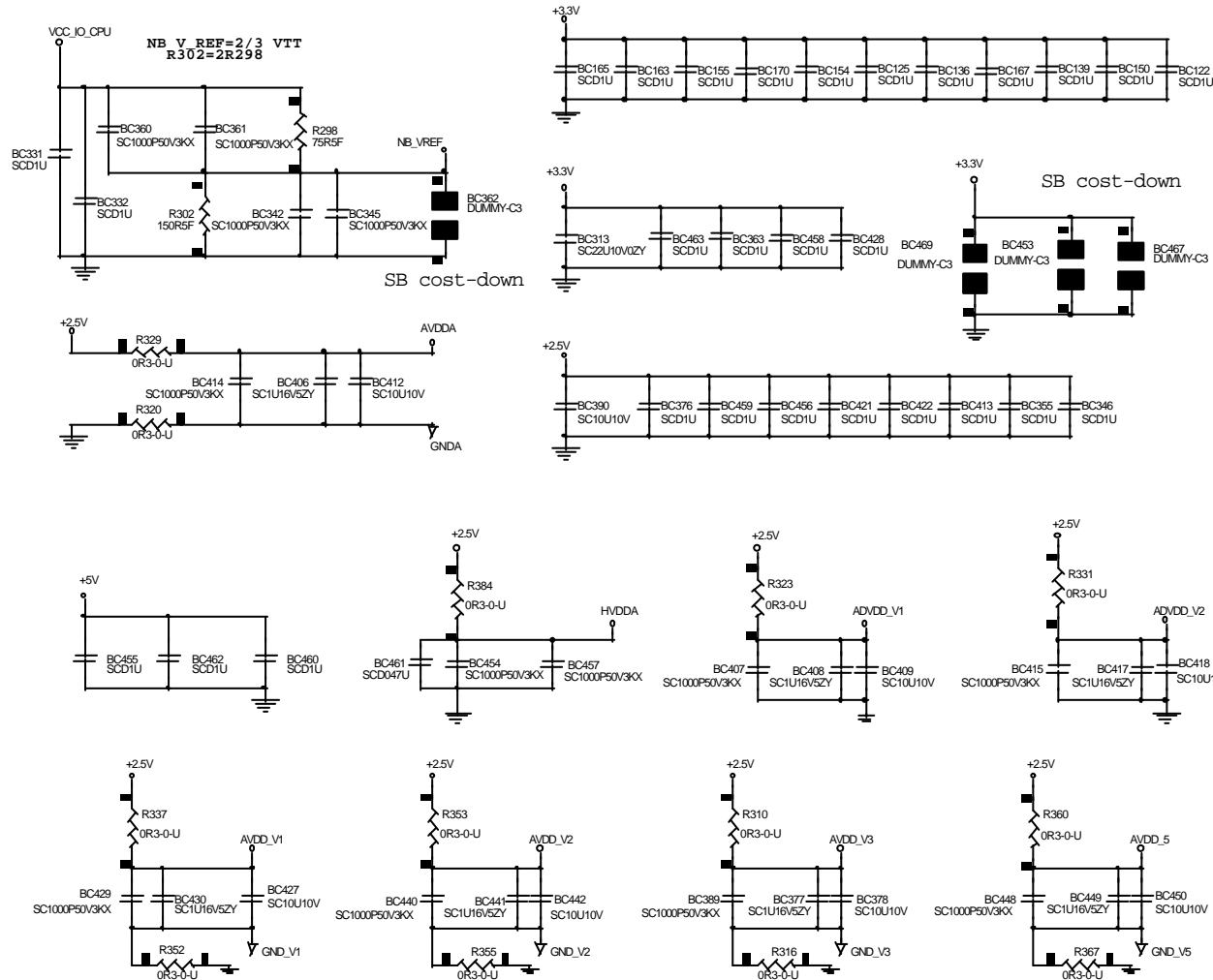
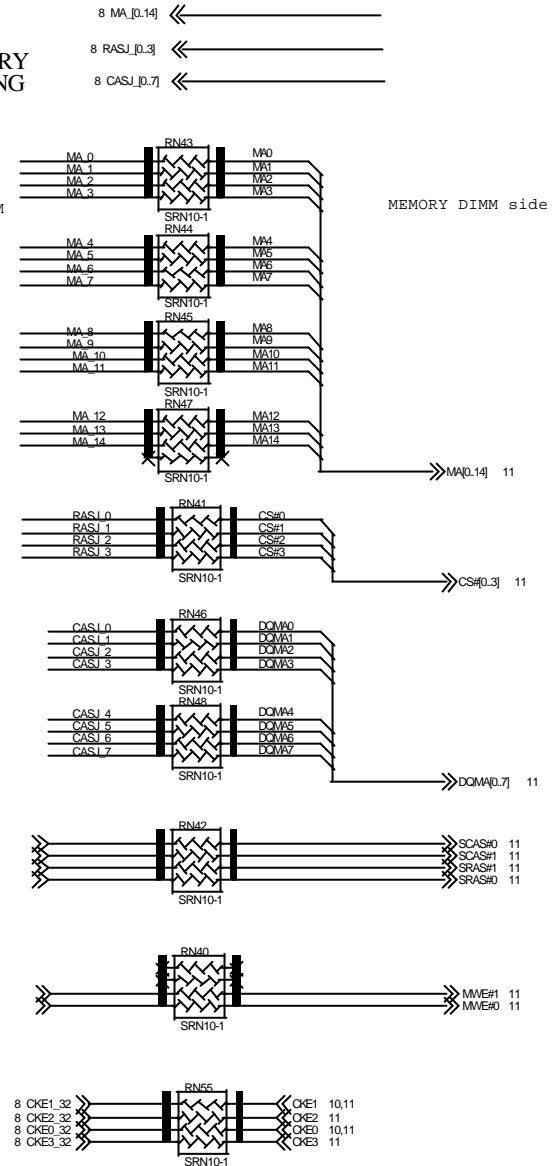


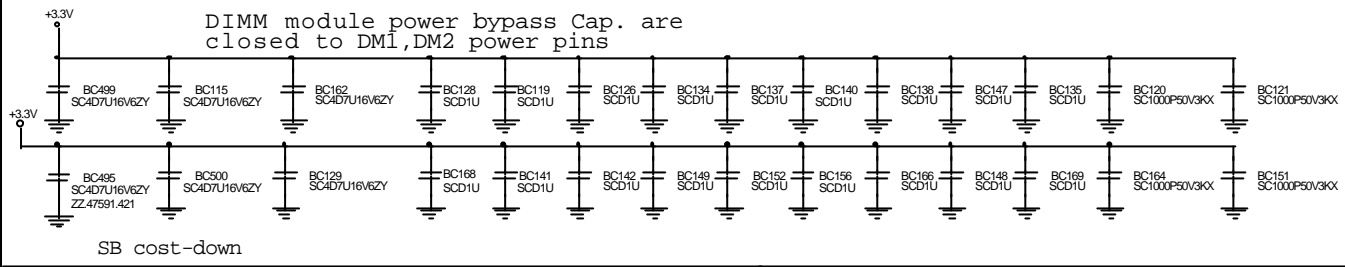




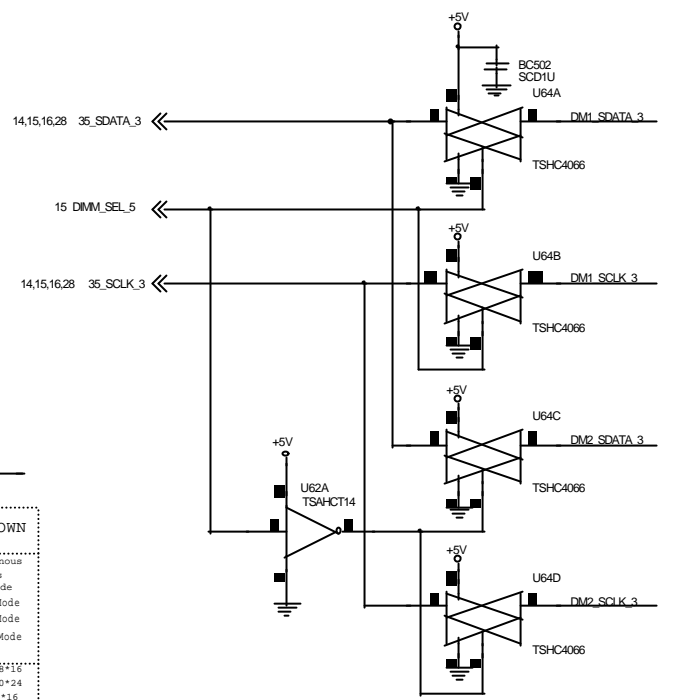
### MEMORY DAMPING RES.

Near M1632 Output  
NB M1632M side

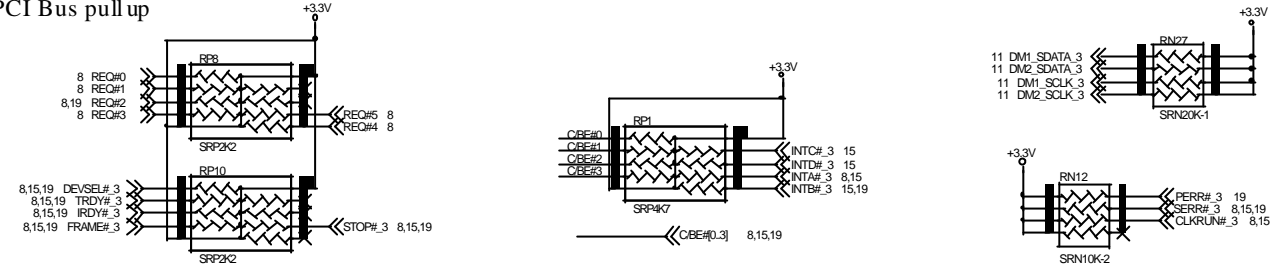




DIMM SMBUS EEPROM SELECTOR



PCI Bus pull up

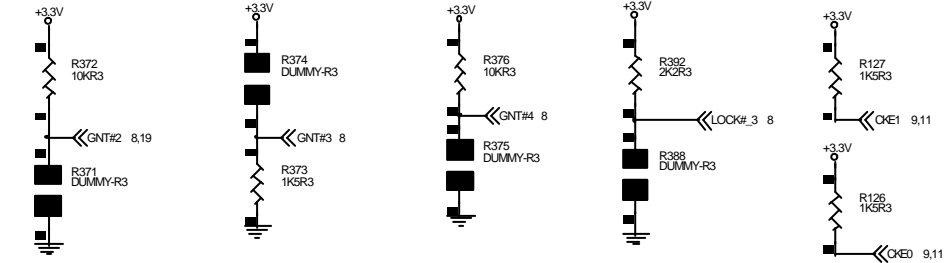


|       | Description         | PULL UP                          | PULL DOWN                        |
|-------|---------------------|----------------------------------|----------------------------------|
| GNT#5 | Internal HOST Clock | LEAD                             | LAG                              |
| GNT#4 | HSEL_2              | GNT# [4:2]                       | 111=0stage 110=1stage 101=2stage |
| GNT#3 | HSEL_1              | 100=3stage 011=4stage 010=5stage |                                  |
| GNT#2 | HSEL_0              | 001=6stage 000=7stage            |                                  |
| GNT#1 | HFRQ1               | GNT# [1:0]                       | 00=2XPCLK 01=3XPCLK              |
| GNT#0 | HFRQ0               | 10=Reserved 11=32HCLK            |                                  |

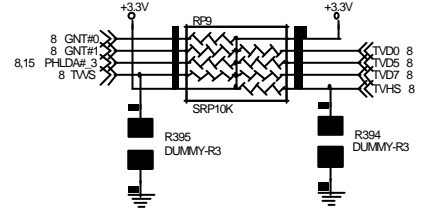
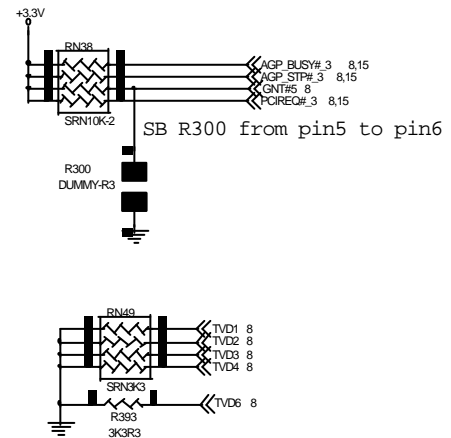
|         | Description        | PULL UP               | PULL DOWN           |
|---------|--------------------|-----------------------|---------------------|
| MFRQ1   | MFRQ1              | MFRQ [1:0]            | 00=2XPCLK 01=3XPCLK |
| MFRQ0   | MFRQ0              | 10=Reserved 11=32HCLK |                     |
| CKE1    | AGP PLL            | Enable                | Disable             |
| PCIREQ# | HOST PLL           | Enable                | Disable             |
| PHLDA#  | MEM PLL            | Enable                | Disable             |
| PLDCK#  | GTL pad delay line | Enable                | Disable             |
| CKE0    | UMA enable         | Enable                | Disable             |

|      | Description           | PULL UP     | PULL DOWN        |
|------|-----------------------|-------------|------------------|
| TVHS | SYNC_MODE             | Synchronous | Asynchronous     |
| TVS5 | X2_MODE-EN            | 4bits       | 32bits           |
| TVD0 | Graphics Test Mode    | Normal Mode | Test Mode        |
| TVD1 | High Bridge Test      | Test Mode   | Normal Mode      |
| TVD2 | Graphics Clock Select | Test Mode   | Normal Mode      |
| TVD3 | Graphics Clock Select | Test Mode   | Normal Mode      |
| TVD7 | LCD Output            | ON          | OFF              |
| TVD4 | 000 TTF 1024*768*18   | 100         | DSTN 1024*768*18 |
| TVD5 | 001 TTF 1280*1024*18  | 101         | DSTN 1024*600*24 |
| TVD5 | 010 TTF 800*600*18    | 110         | DSTN 800*600*16  |
| TVD6 | 011 TTF 1024*600*18   | 111         | DSTN 1024*768*24 |

M1632 HARDWARE SETTING



SB GNT#2 changed to "H" for improving timing

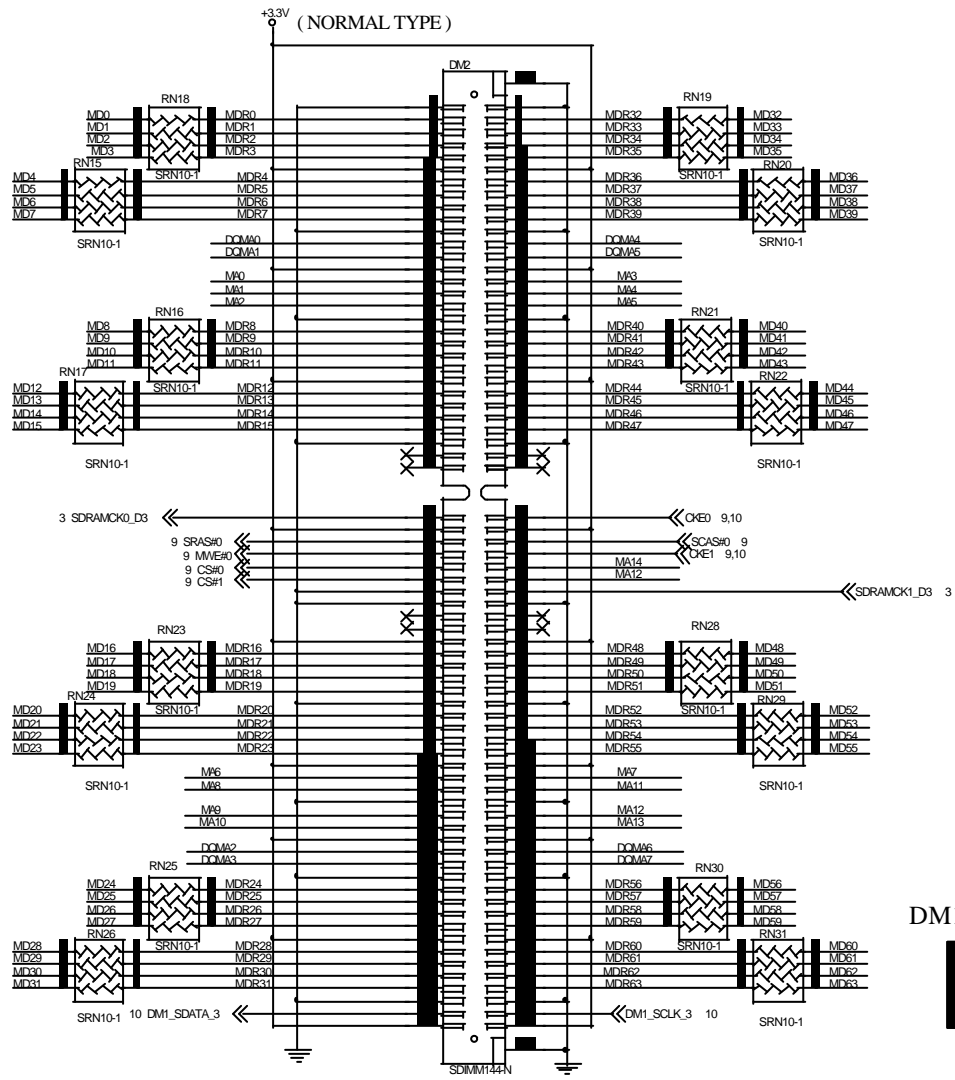


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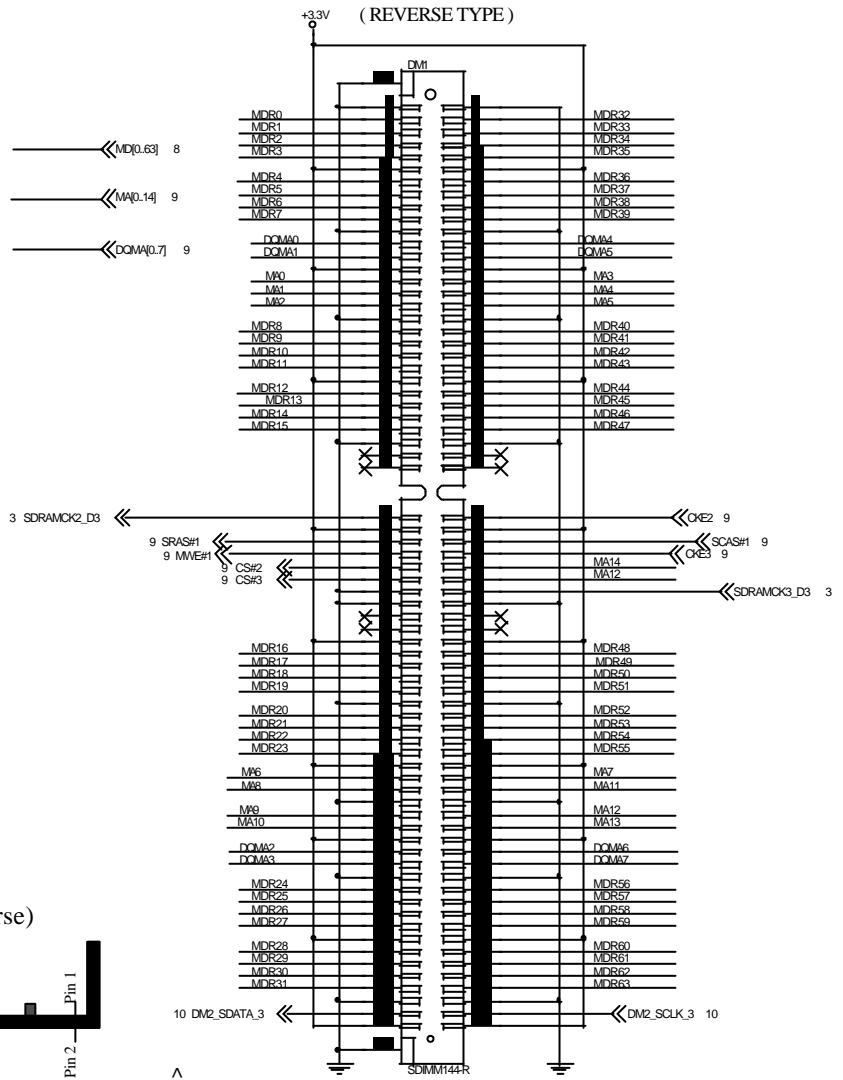
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Size: A3 Document Number: FALCON2M Rev: -1

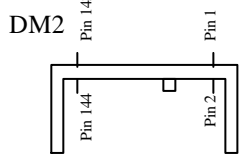
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Change to AMP




DM1(Reverse)

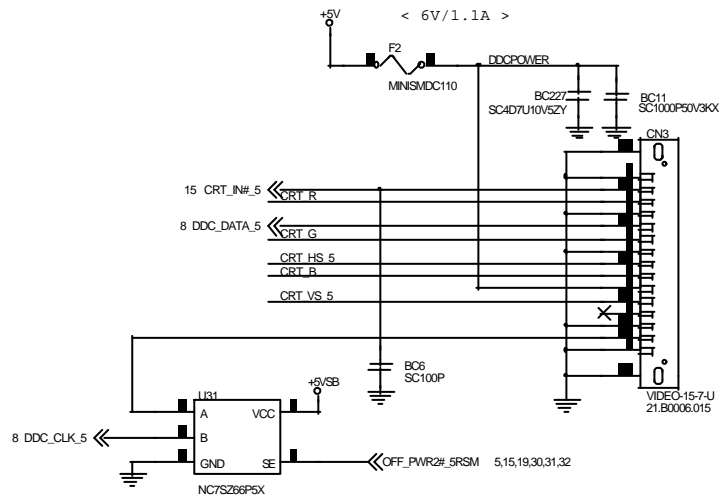
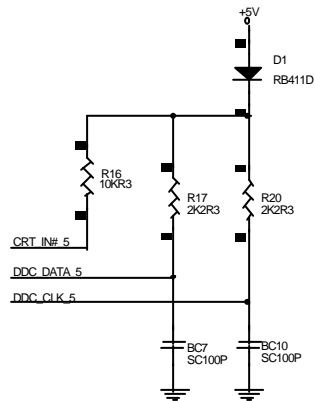
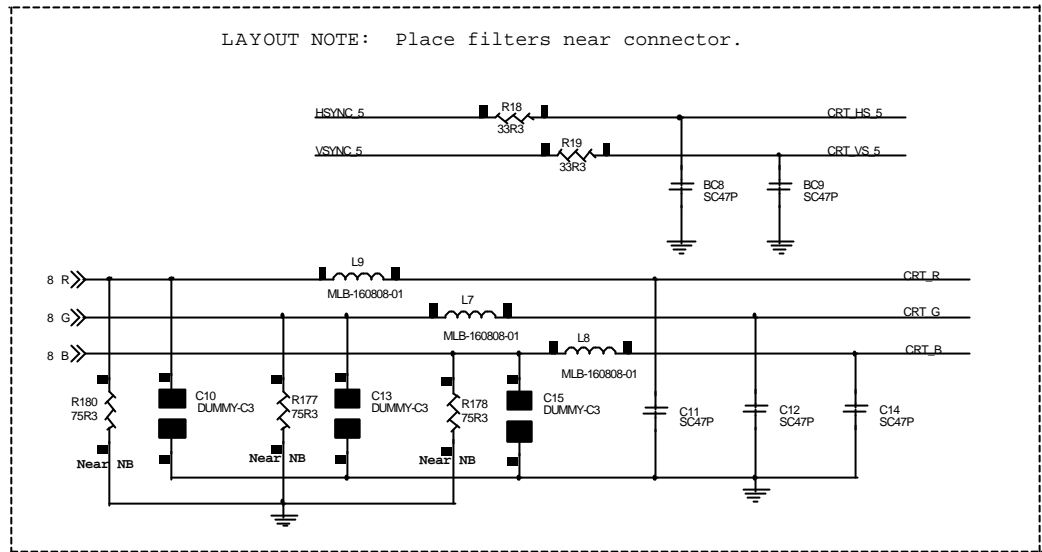
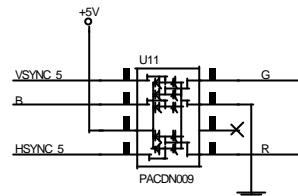
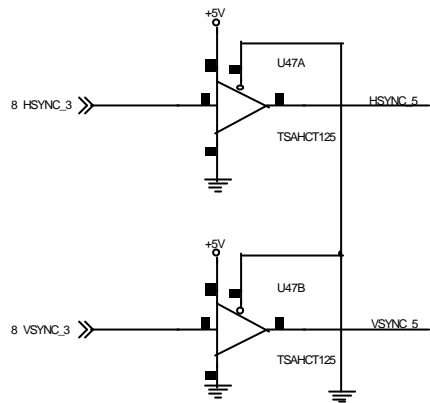


UP  
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BOTTOM SIDE

|  |                           |         |
|--|---------------------------|---------|
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| Title: DIMM Sockets  |                           |         |
| Size: A3   | Document Number: FALCON2M | Rev: -1 |
| Date: Tuesday, March 06, 2001  | Sheet: 11                 | of 33   |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
|   | A | B | C | D | E |
| 4 |   |   |   |   |   |
| 3 |   |   |   |   |   |
| 2 |   |   |   |   |   |
| 1 |   |   |   |   |   |
|   | A | B | C | D | E |

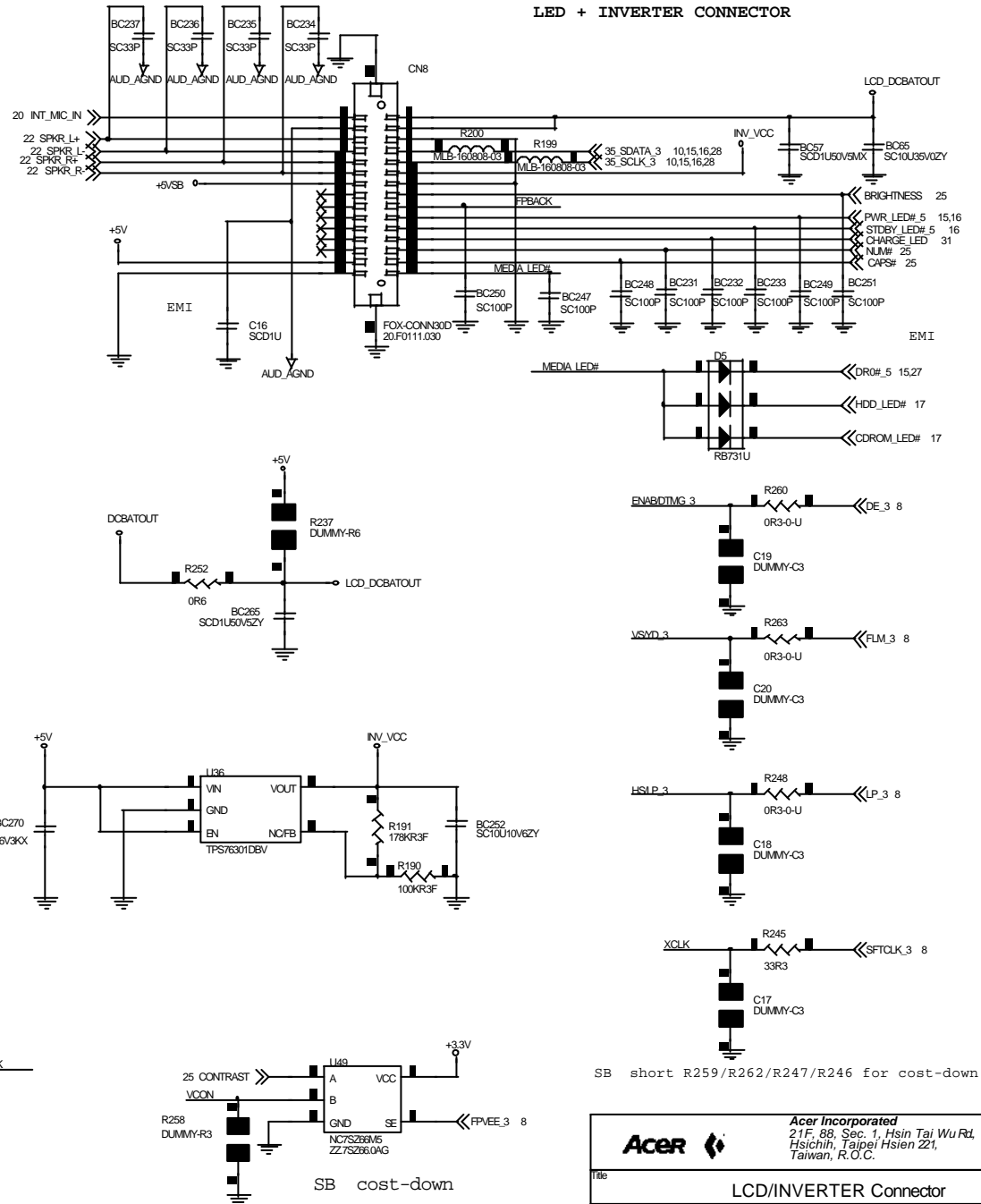
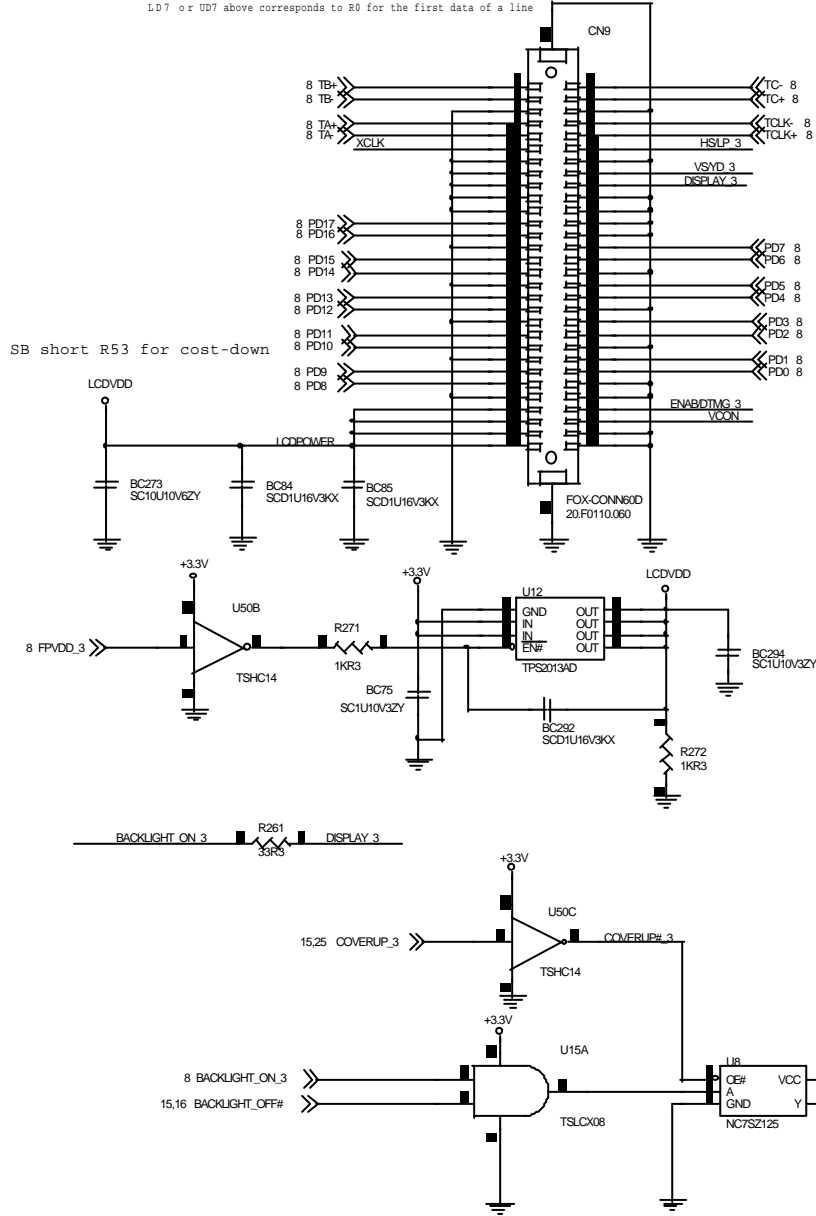
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|  |                        | <b>Acer Incorporated</b><br>21F, 88, Sec. 1, Hsin Tai Wu Rd.<br>Hsichih, Taipei Hsien 221,<br>Taiwan, R.O.C. |           |
| Title   |                        | Without TV Function  |           |
| Size<br>A3  | Document Number        | FALCON2M   | Rev<br>-1 |
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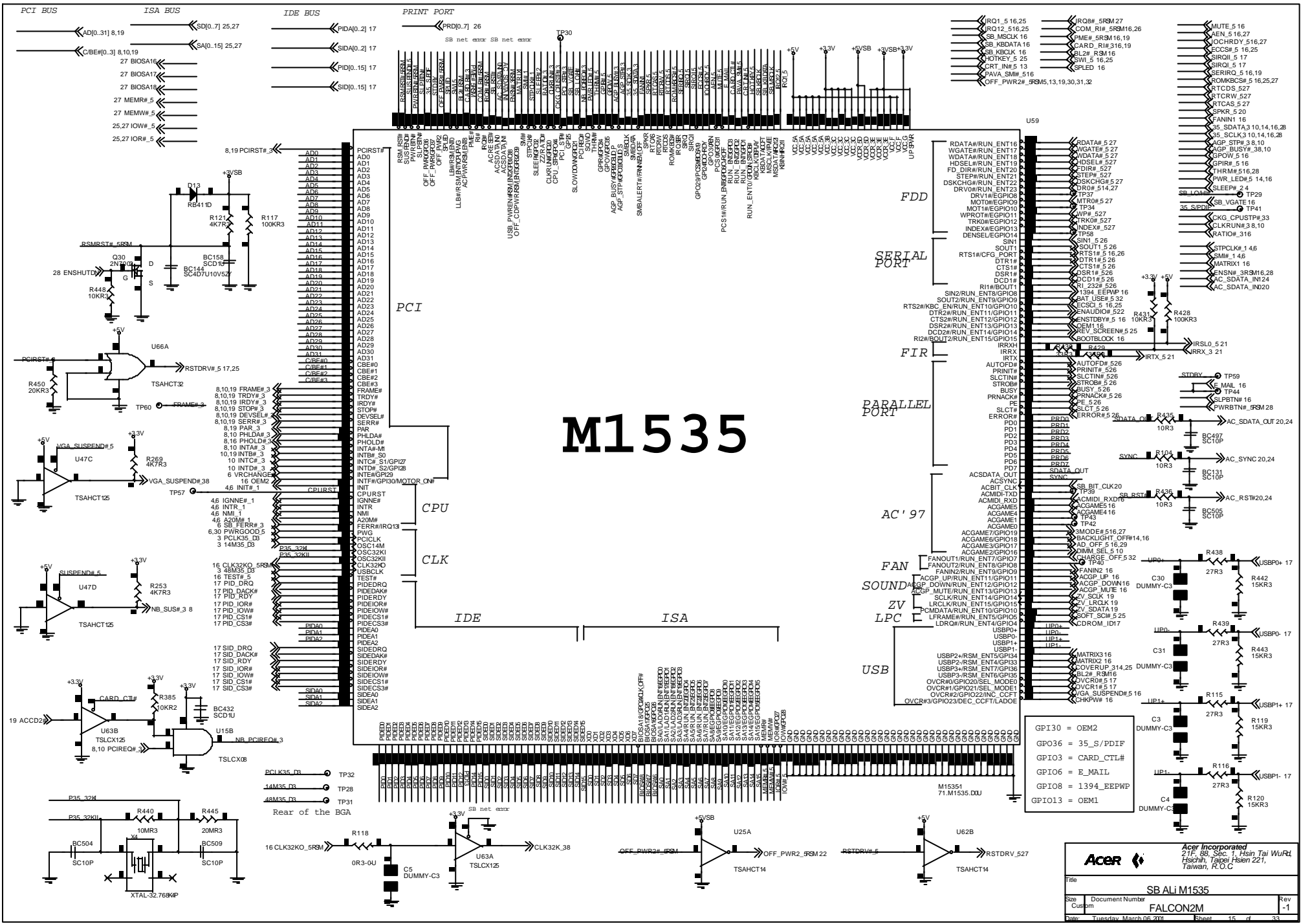
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| Title<br><b>CRT</b>   |                                    |           |
| Size<br>A3  | Document Number<br><b>FALCON2M</b> | Rev<br>-1 |
| Date:<br>Tuesday, March 06, 2001  | Sheet<br>13                        | of<br>33  |

|      |     |     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
|      | PD0 | PD1 | PD2 | PD3 | PD4 | PD5 | PD6 | PD7 | PD8 | PD9 | PD10 | PD11 | PD12 | PD13 | PD14 | PD15 | PD16 | PD17 |
| TPP  | R5  | R4  | R3  | R2  | G5  | G4  | G3  | G2  | B5  | B4  | B3   | B2   | R1   | R0   | G1   | G0   | B1   | B0   |
| DSIN | L00 | L01 | L02 | L03 | L04 | L05 | L06 | L07 | UD0 | UD1 | UD2  | UD3  | UD4  | UD5  | UD6  | UD7  |      |      |

L07 or UD7 above corresponds to R0 for the first data of a line



|  |                          |        |
|--|--------------------------|--------|
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| Title LCD/INVERTER Connector   |                          |        |
| Size A3  | Document Number FALCON2M | Rev -1 |
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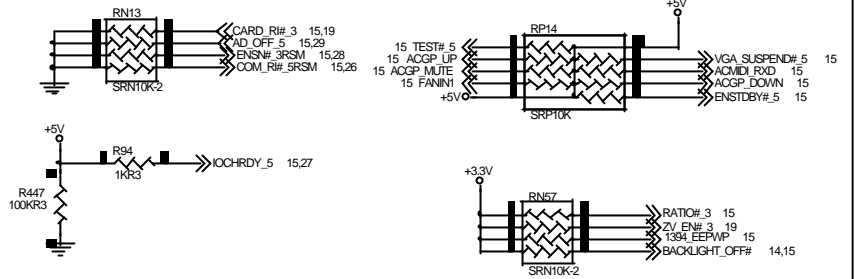
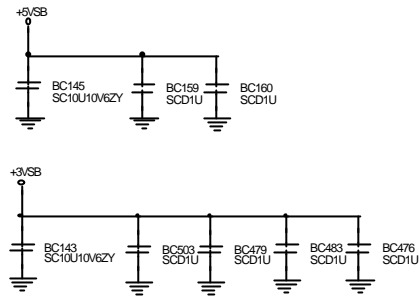
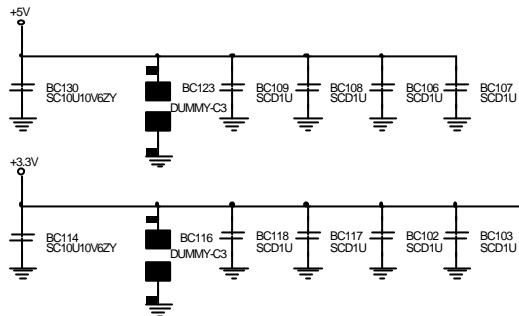
# M1535

- GPIO30 = OEM2
- GPO36 = 35\_S/PDIF
- GPIO3 = CARD\_CTL#
- GPIO6 = E\_MAIL
- GPIO8 = 1394\_BEEPW
- GPIO13 = OEM1

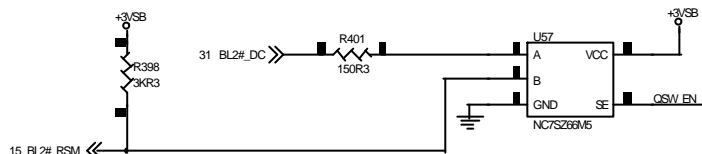
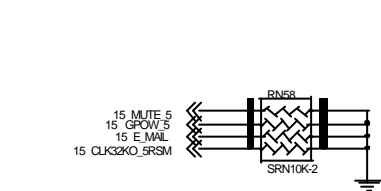
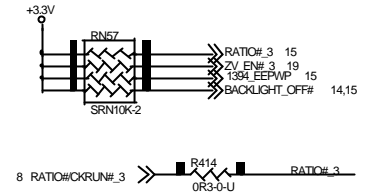
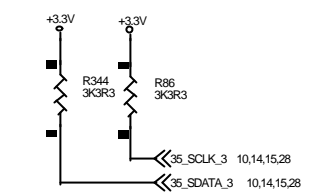
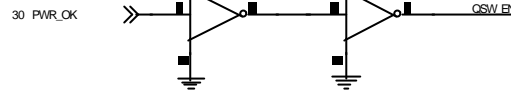
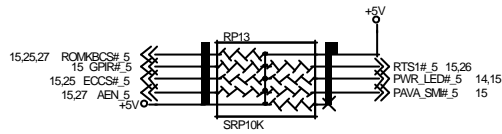
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**SB ALI M1535**

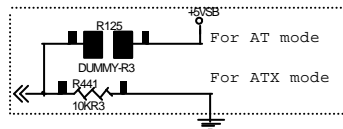
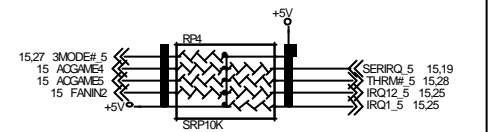
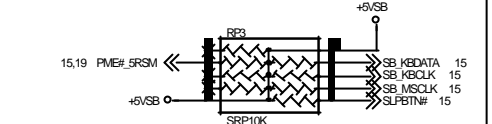
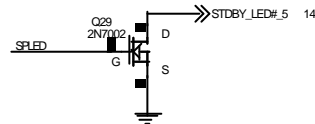
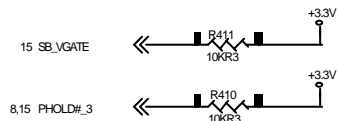
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 Ssp: Document Number: FALCON2M  
 Cuspm: Rev: -1  
 Date: Tuesday, March 06, 2001  
 ESheet: 15 / 4 / 33



SB cost-down

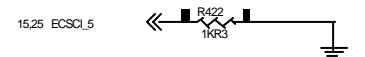
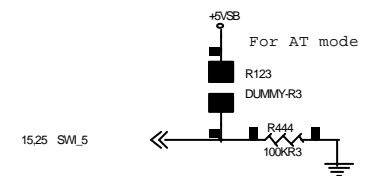


SB Del remainder BLL circuits



SB HARDWARE SETTING

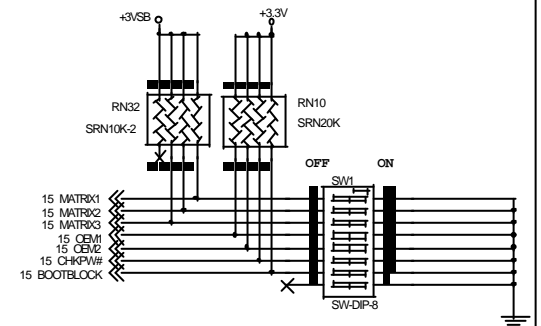
|            |           |   |
|------------|-----------|---|
| GPIR#      | PULL HIGH | NORMAL OPERATION                              |
| ROMKBCS#_5 | PULL HIGH | NORMAL OPERATION                              |
| GPO35      | PULL LOW  | NORMAL OPERATION                              |
| PHOLD#_3   | PULL HIGH | NORMAL OPERATION                              |
| PCS0J      | PULL LOW  | Enable 4Mb Flash Rom Size Function            |
| PCS1J      | PULL LOW  | FOR IOCHRDY DEFAULT                           |
| GPO29      | PULL HIGH | NORMAL OPERATION                              |
| GPO30      | PULL HIGH | NORMAL OPERATION                              |
| SQW0       | PULL HIGH | Pentium II CPU -> CPURST Low Active Reset     |
| SFLED      | PULL LOW  | ATX Mode                                      |
| CLK32KO    | PULL LOW  | NORMAL OPERATION                              |
| RTS1J      | PULL HIGH | Base Address of Configuration for SIO: 0x3F0h |
| RTS2J      | PULL LOW  | Disable Internal Keyboard Controller          |
| LBJ        | PULL LOW  | OFF_PWR2 Low Active to Power Off Power Source |



|     | English | Japan | Europe |
|-----|---------|-------|--------|
| SW1 | OFF     | ON    | OFF    |
| SW2 | OFF     | OFF   | ON     |
| SW3 | OFF     | OFF   | OFF    |

|     | Acer | Hitachi | OEM2 | OEM3 |
|-----|------|---------|------|------|
| SW4 | OFF  | ON      | OFF  | ON   |
| SW5 | OFF  | OFF     | ON   | ON   |

|     | Check Password | BootBlock |
|-----|----------------|-----------|
| SW6 | OFF            | -----     |
| SW7 | -----          | OFF       |

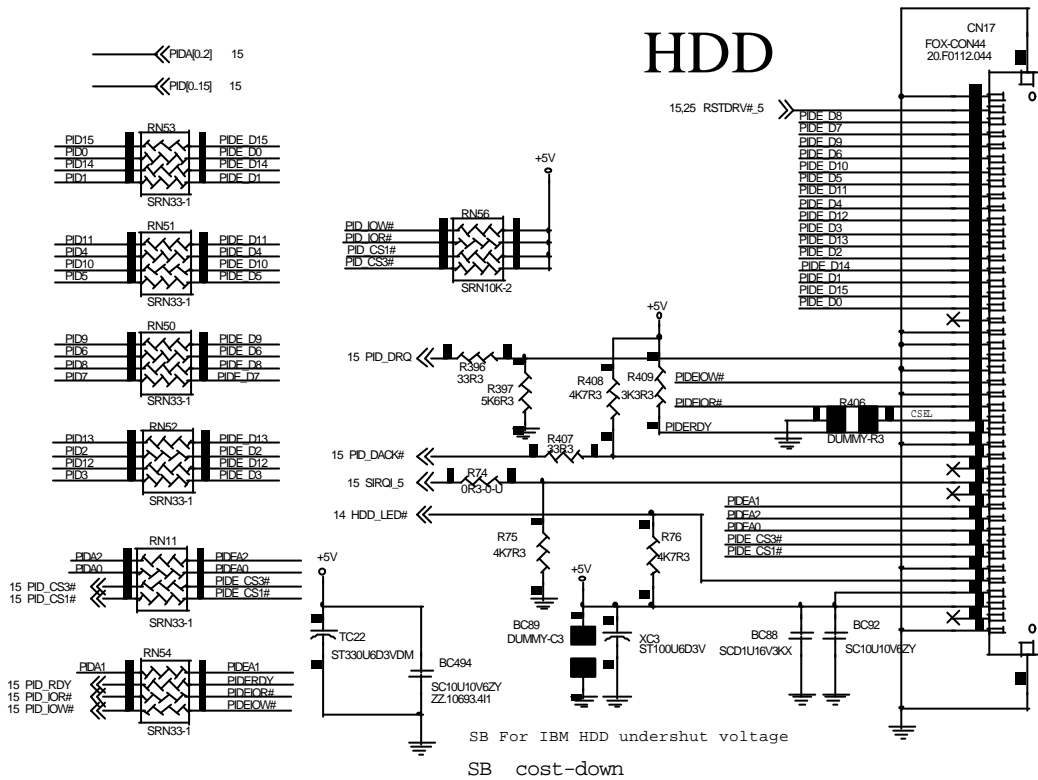


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 Taiwan, R.O.C.

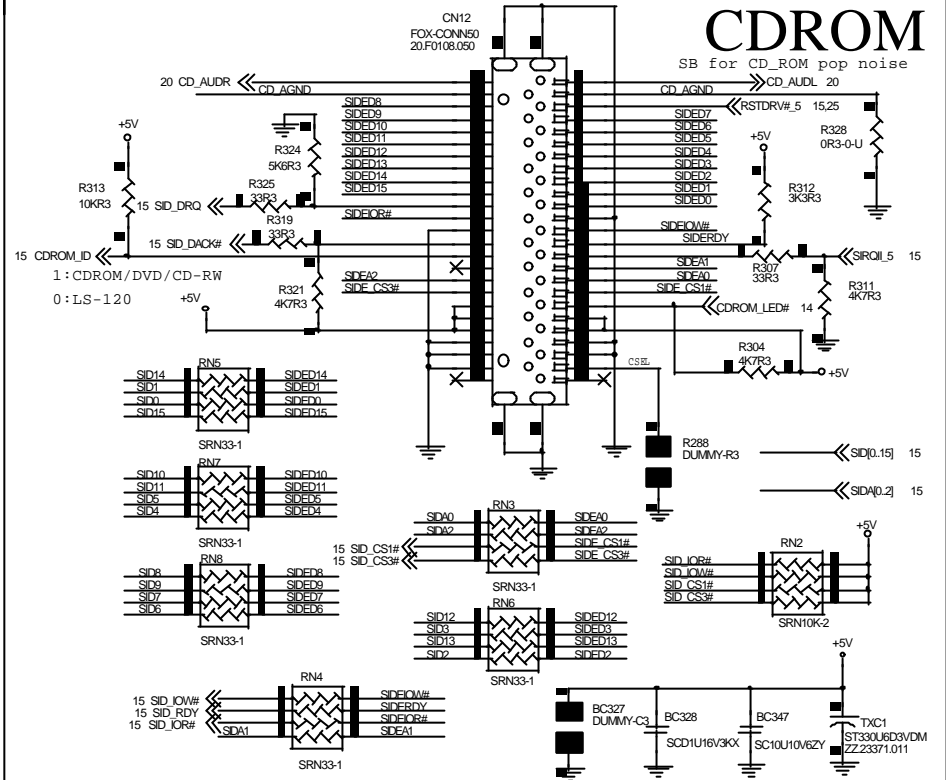
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 Size: A3 Document Number: FALCON2M Rev: -1  
 Date: Tuesday, March 06, 2001 Sheet: 16 of 33



# HDD



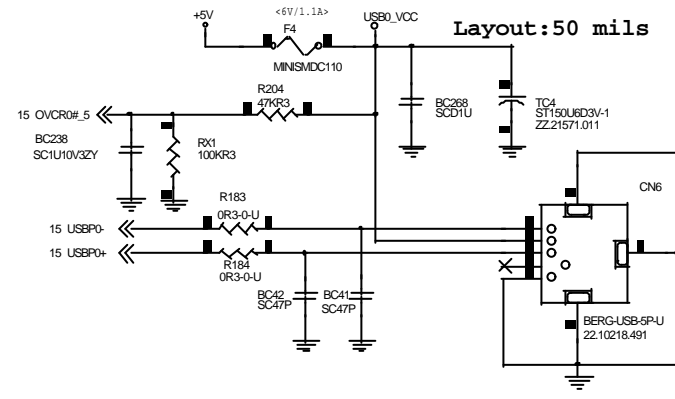
# CDROM



SB cost-down SB Reserve for undershut

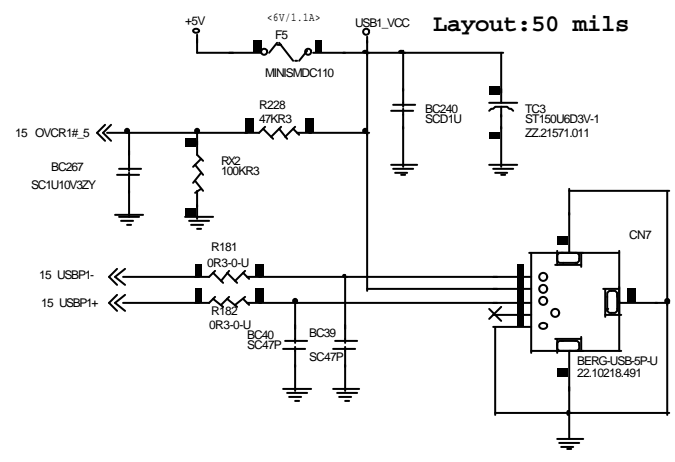
# USB0

SB Cost-down USB circuit



USBP00/USBP01 USB Differential Signal layout rule : width 9mils and 2W\_space

# USB1



|  |                           |         |
|--|---------------------------|---------|
| <b>Acer Incorporated</b><br>21F, 8B, Sec. 1, Hsin Tai Wu Rd,<br>Hsichih, Taipei Hsien 221,<br>Taiwan, R.O.C. |                           |         |
| Title: HDD, CDROM, USB   |                           |         |
| Size: A3   | Document Number: FALCON2M | Rev: -1 |
| Date: Tuesday, March 06, 2001  | Sheet: 17 of 33           |         |

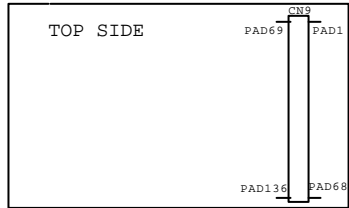
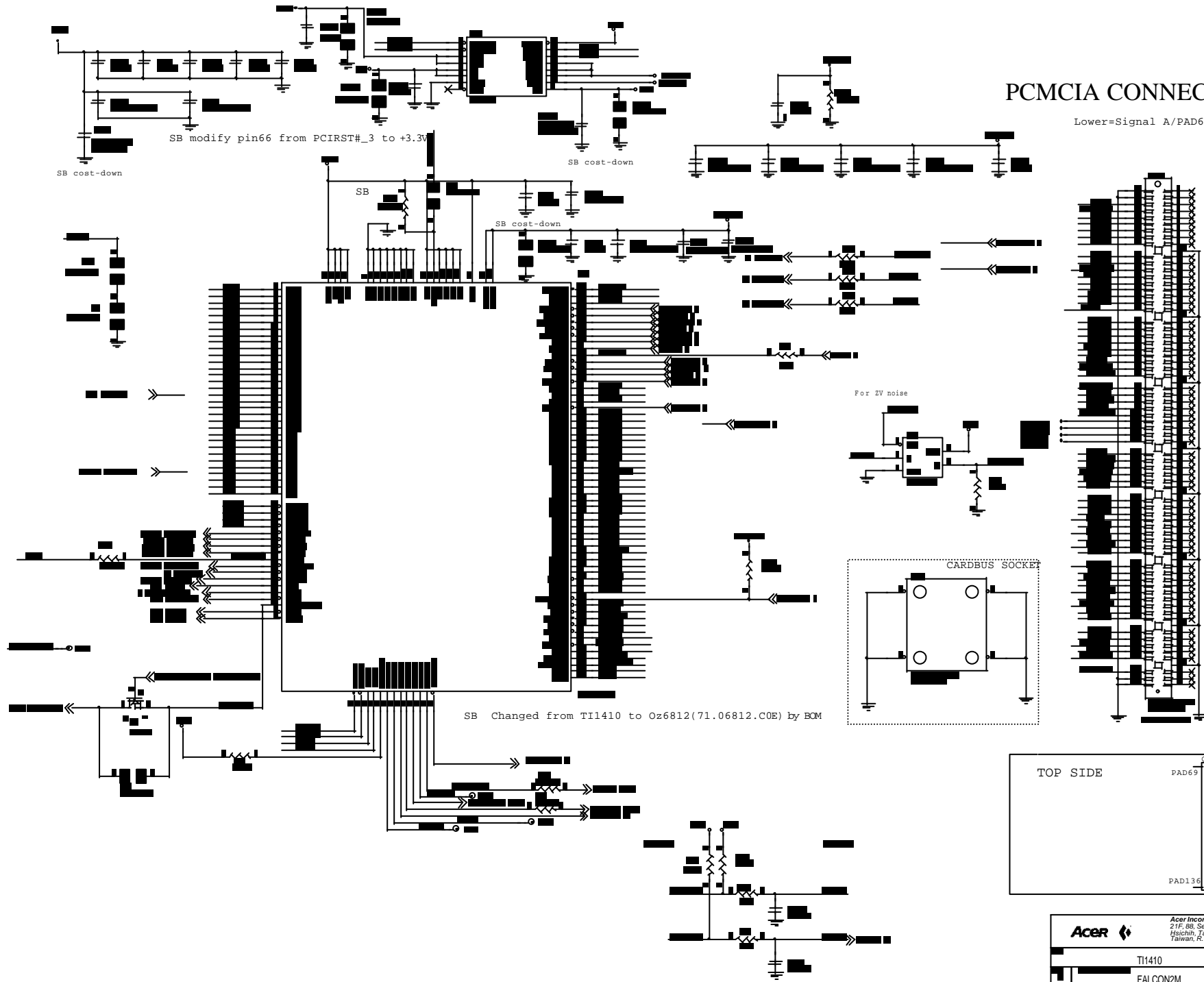


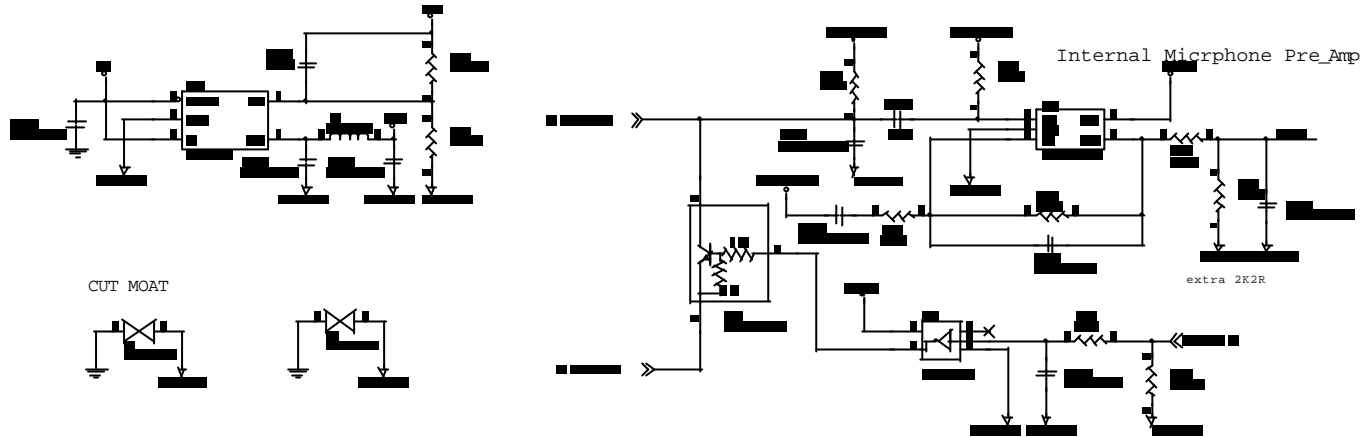
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|                            |                        |                |
|----------------------------|------------------------|----------------|
| Title                      |                        |                |
| Without CD-Player Function |                        |                |
| Size                       | Document Number        | Rev            |
| A3                         | FALCON2M               | -1             |
| Date:                      | Monday, March 05, 2001 | Sheet 18 of 33 |

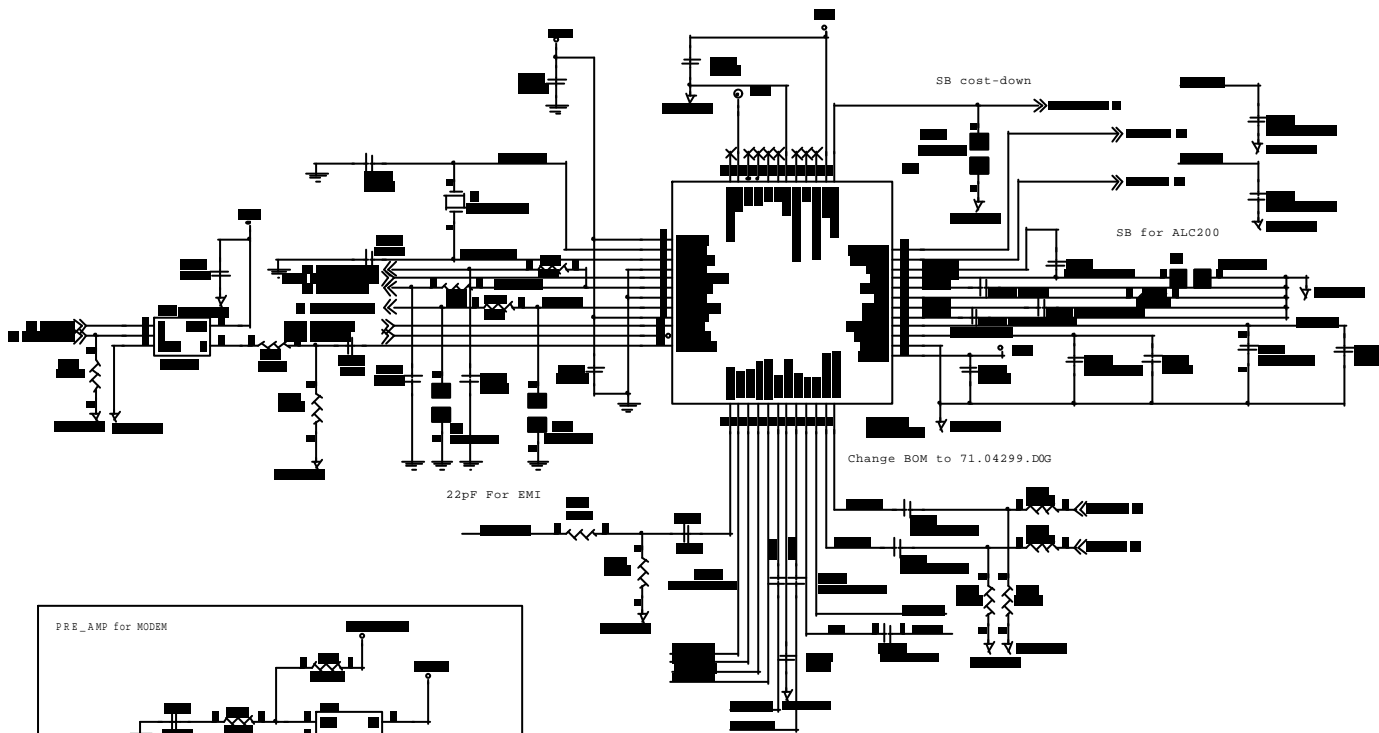
# PCMCIA CONNECTOR

Lower=Signal A/PAD69-136



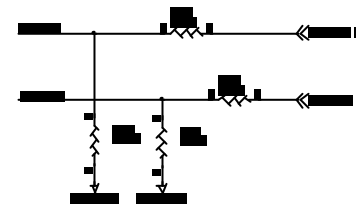
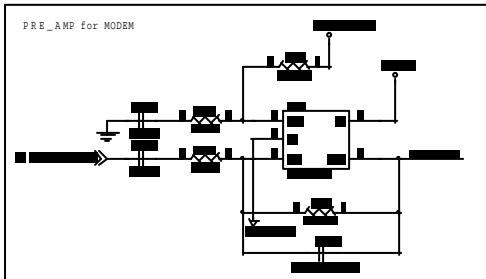


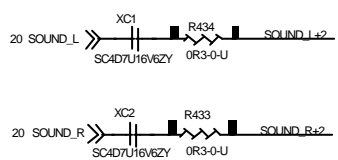
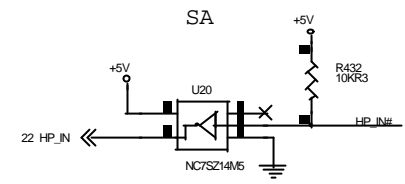
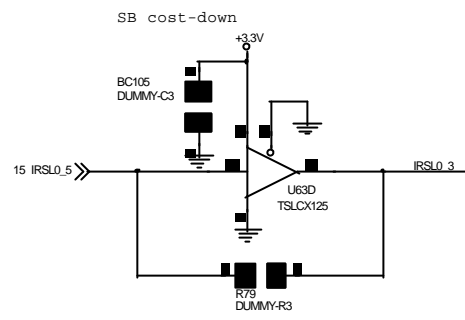
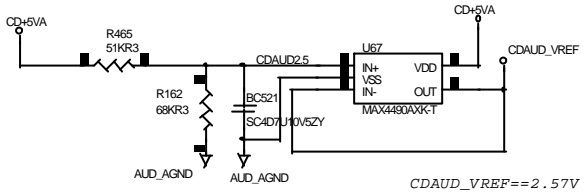
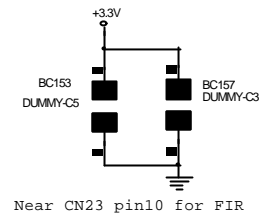
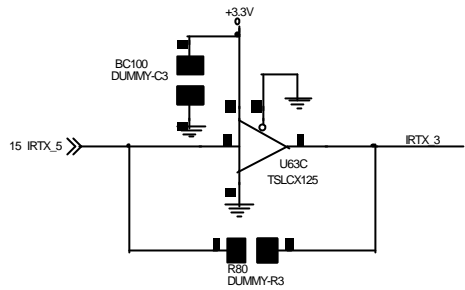
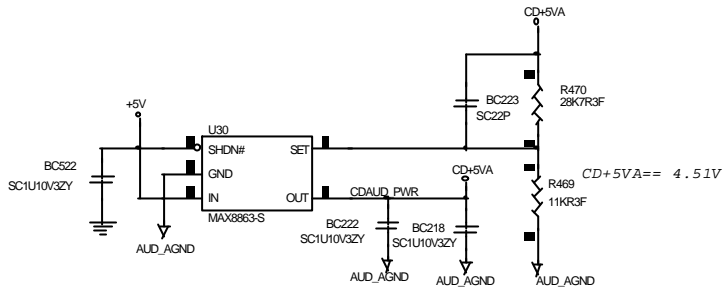
CUT MOAT



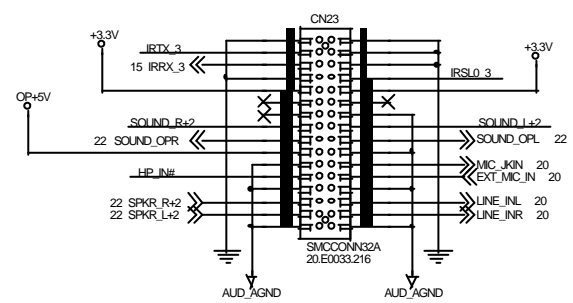
|     | CS4299 | ALC200 |
|-----|--------|--------|
| P31 | NC     | 1U     |
| P32 | D1U    | 1U     |
| P33 | NC     | 1U     |
| P34 | 1N     | NC     |

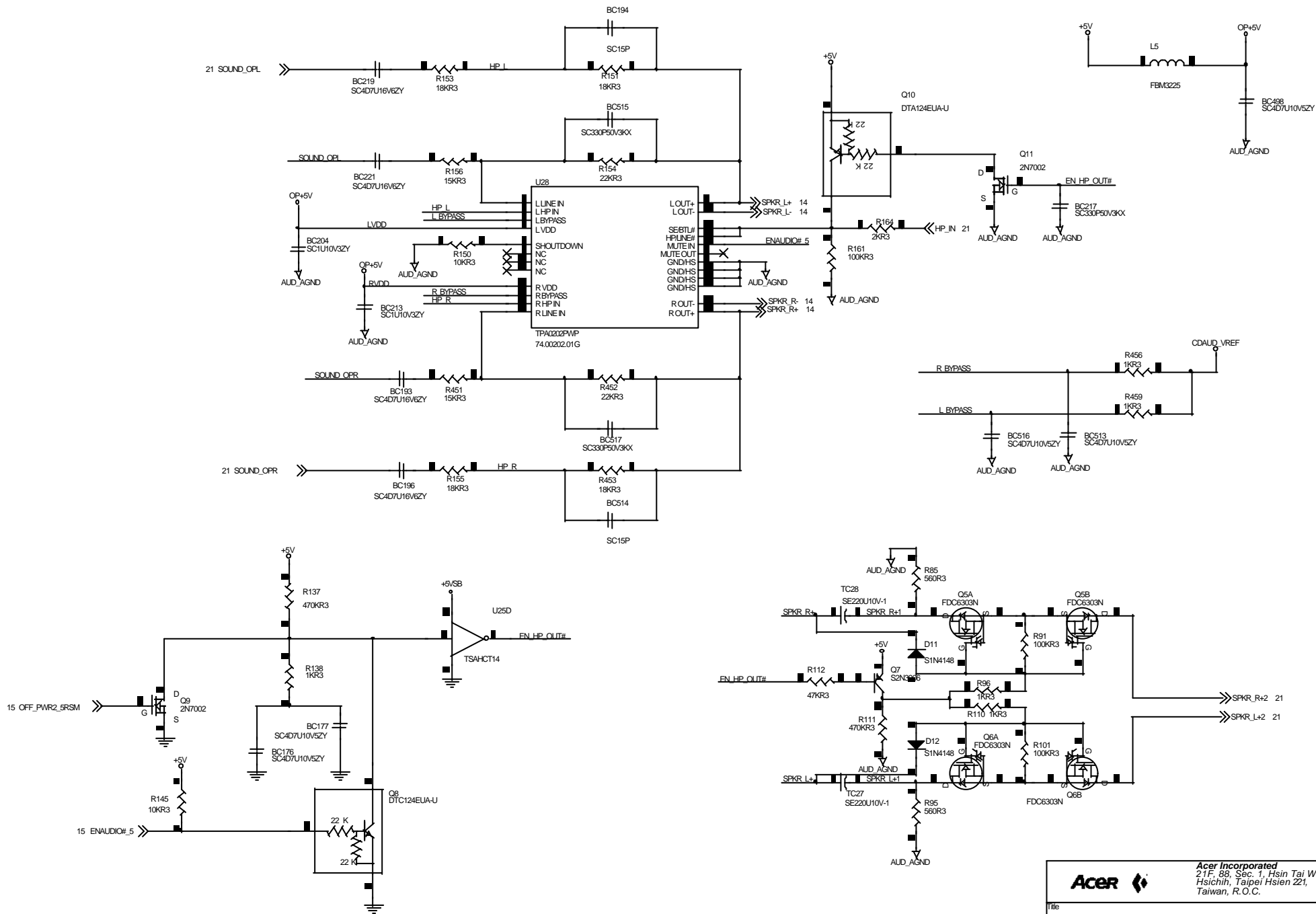
PRE\_AMP for MODEM





SA  
AUDIO BD CONN.






A B C D E

4  
3  
2  
1

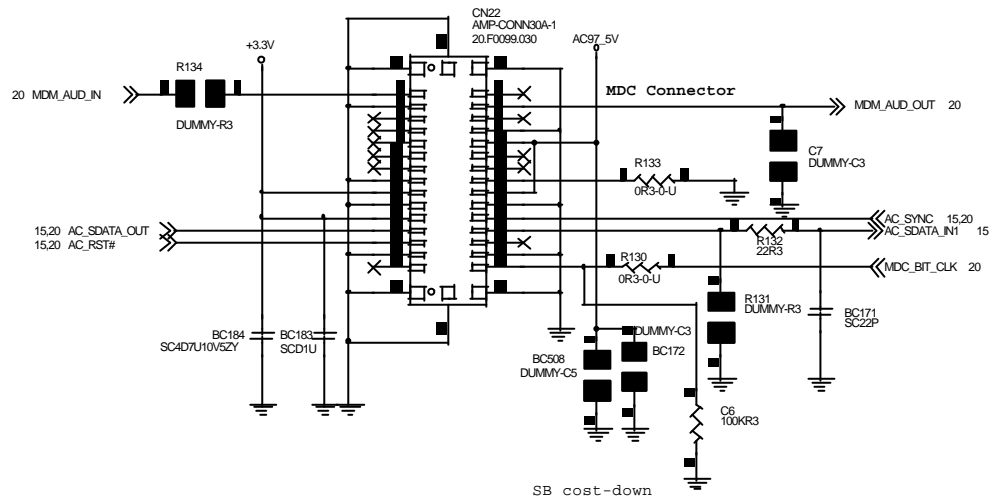
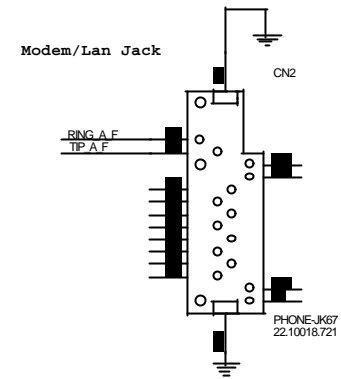
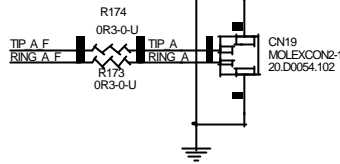
4  
3  
2  
1

|   |                             |  |  |
|---|-----------------------------|--|--|
|  |                             | <i>Acer Incorporated</i><br>21F, 88, Sec. 1, Hsin Tai Wu Rd,<br>Hsichih, Taipei Hsien 221,<br>Taiwan, R.O.C. |  |
| Title<br>Without TI 1394 Function   |                             |  |  |
| Size<br>A3  | Document Number<br>FALCON2M | Rev<br>-1  |  |
| Date<br>Monday, March 05, 2001  | Sheet 23 of 33              |  |  |

A B C D E

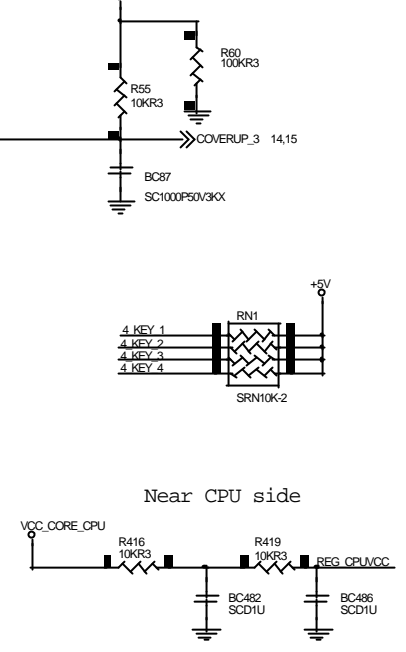
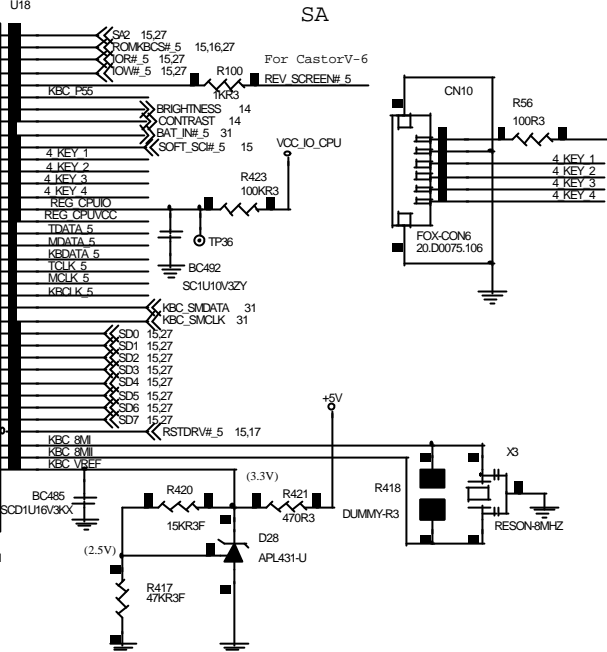
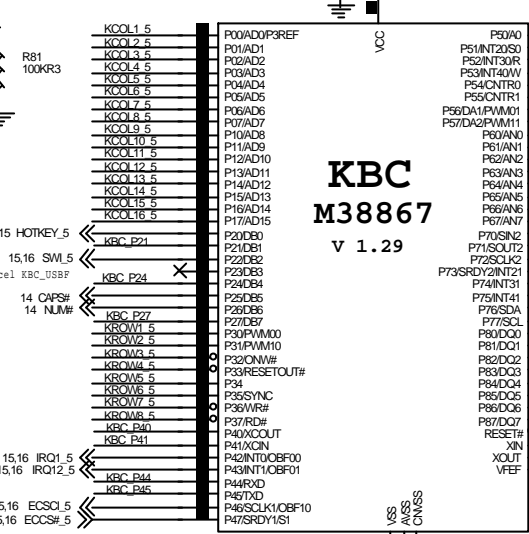
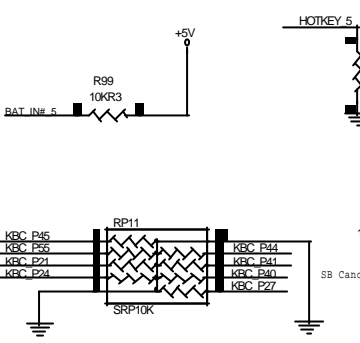


EMI  
SB Change R173/174 from bead to 0R3 by BOM

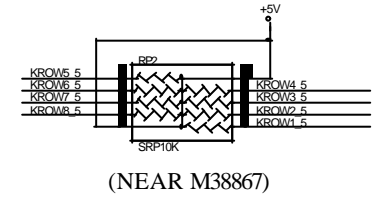
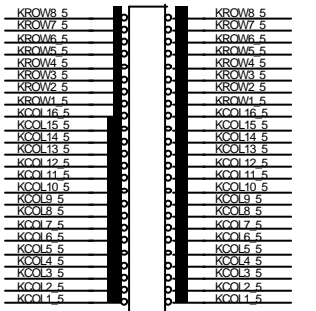


|                               |  |  |  |
|-------------------------------|--|--|--|
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|                               |  | Title  |  |
| Size A3                       |  | MDC  |  |
| Date: Tuesday, March 06, 2001 |  | Document Number: FALCON2M  |  |
|                               |  | Rev: -1  |  |
|                               |  | Sheet 24 of 33   |  |

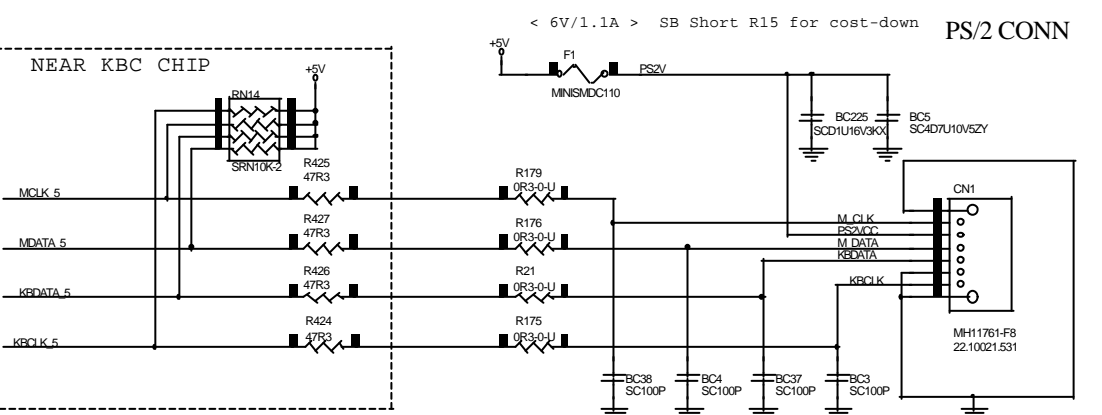
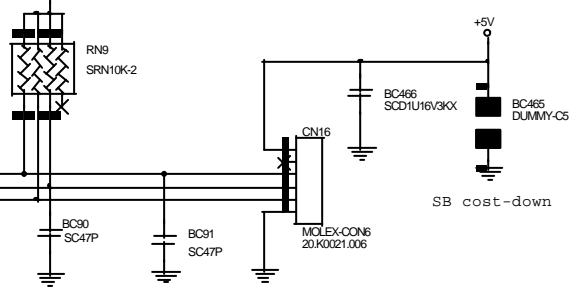




Internal Keyboard Connector



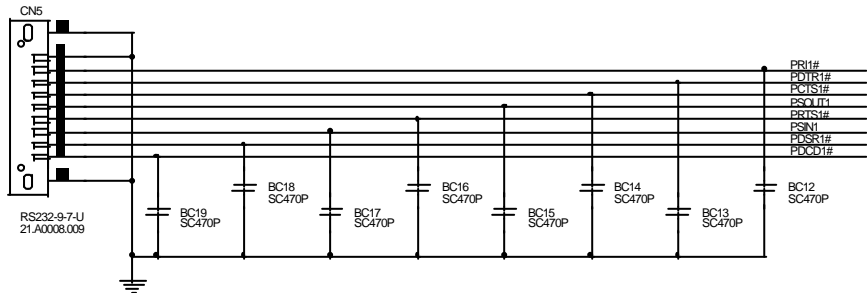
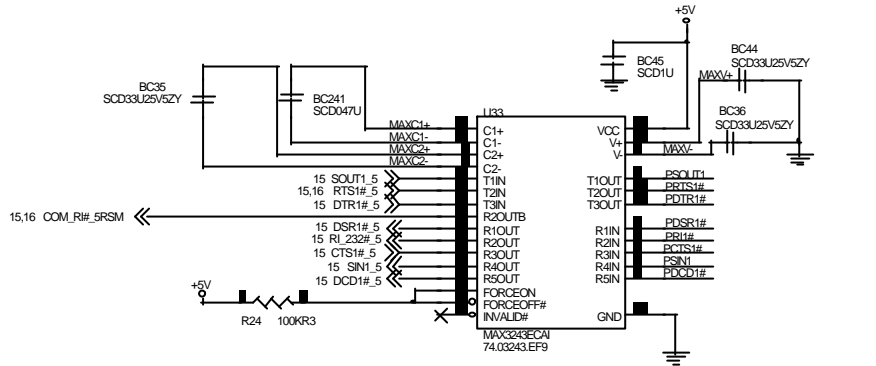
TouchPad Connector



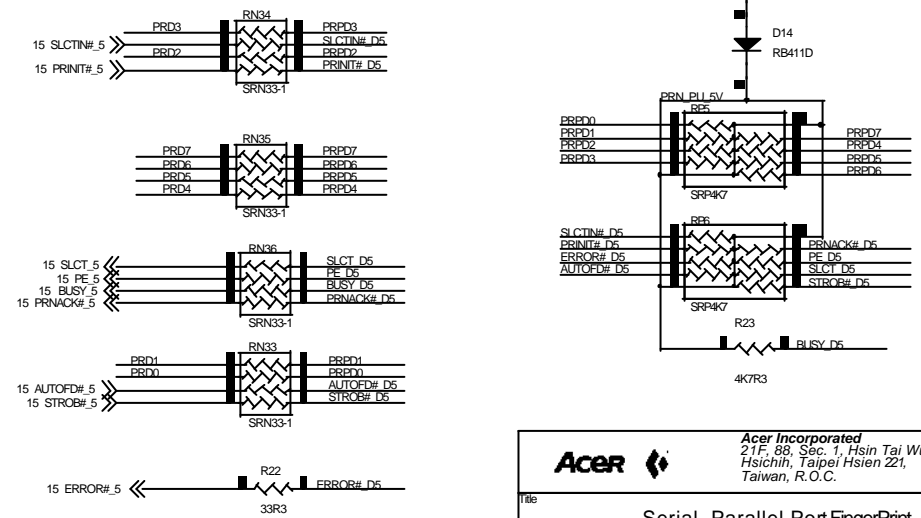
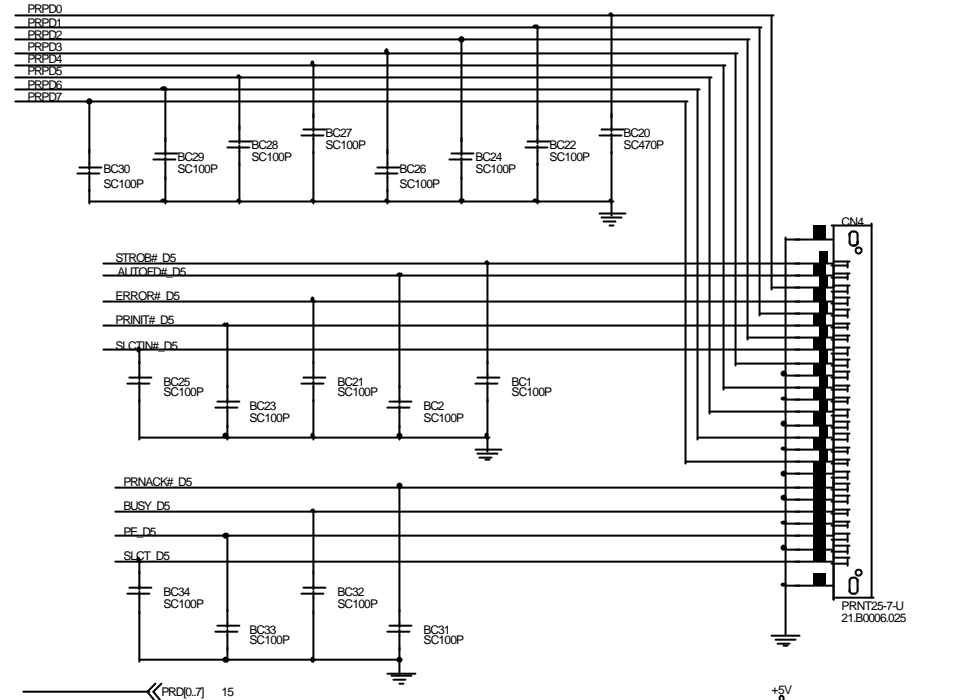
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Title: K/B, T/P and PS/2 Connectors, KBC  
Size: A3 Document Number: FALCON2M Rev: -1  
Date: Tuesday, March 06, 2001 Sheet: 25 of 33

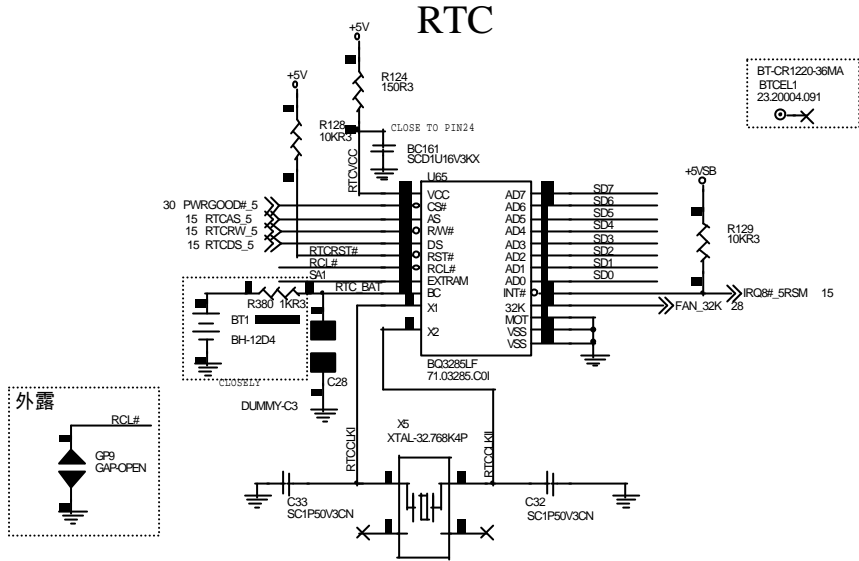
# SERIAL PORT



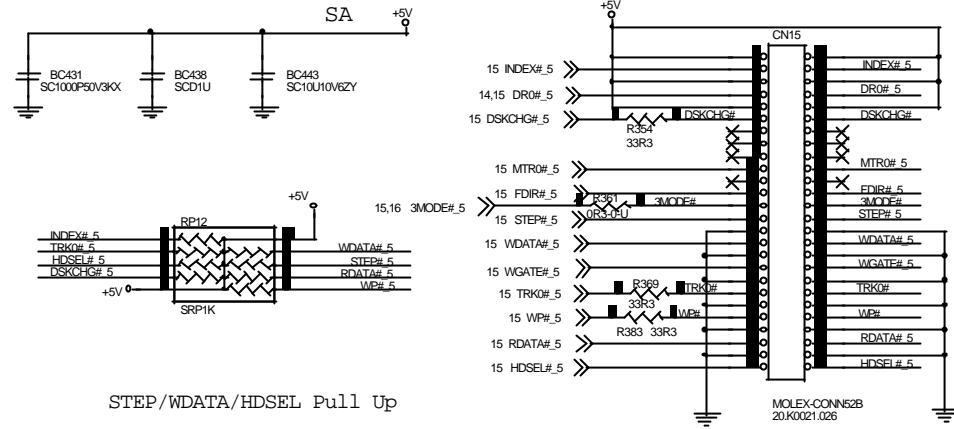
# PRINTER PORT



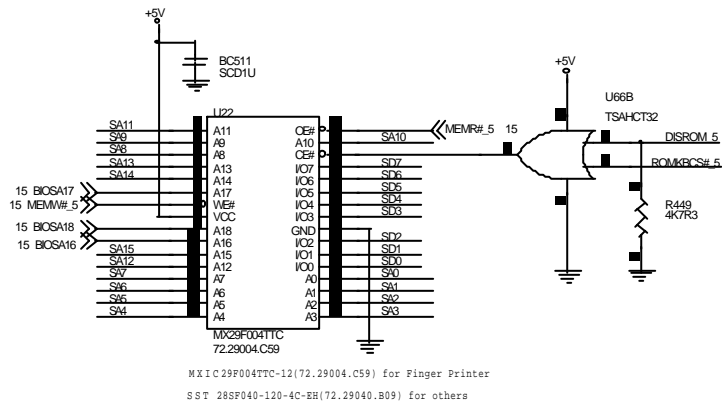
## RTC



## FDD CONNECTOR

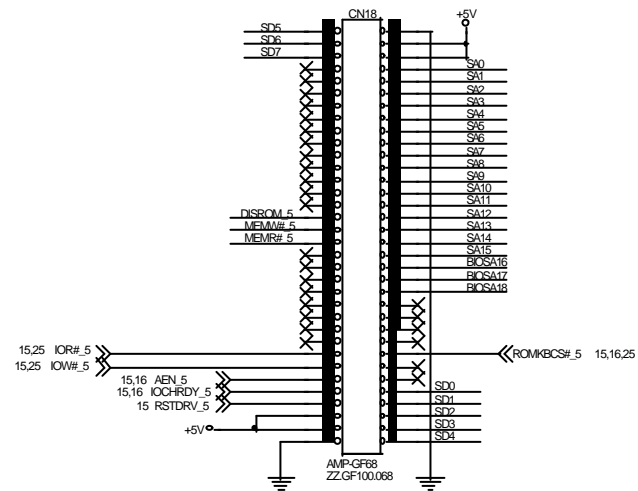
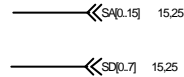


## FLASH ROM



Change to 72.29004.C09 (B0N)  
not ready

## GOLDEN FINGER

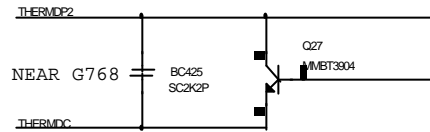
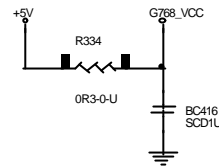
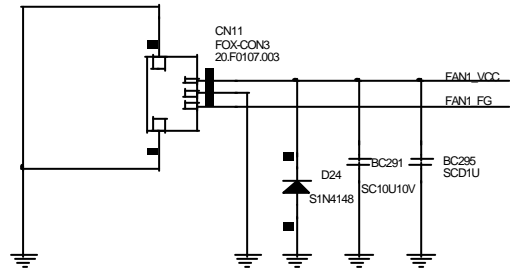
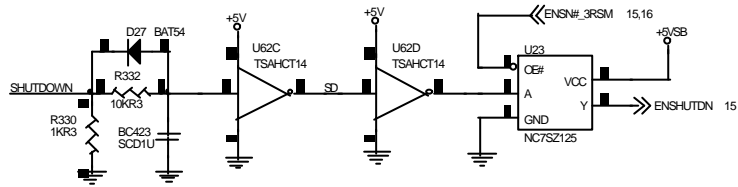
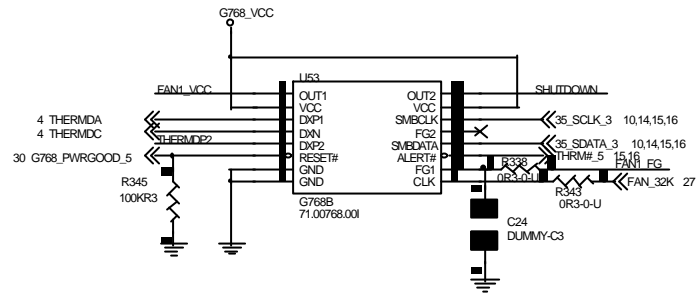


be change to AMP-GF68-A

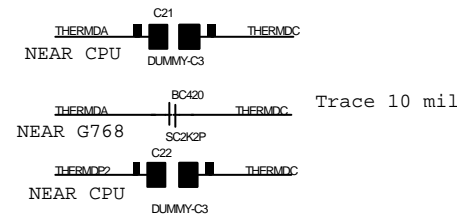
|                                 |                             |   |  |
|---------------------------------|-----------------------------|---|--|
|                                 |                             | Acer Incorporated<br>21F, 8B, Sec. 1, Hsin Tai Wu Rd,<br>Hsichih, Taipei Hsien 221,<br>Taiwan, R.O.C. |  |
|                                 |                             | Title<br>BIOS,FDD,RTC, GOLDEN FINGER  |  |
| Size<br>A3                      | Document Number<br>FALCON2M | Rev<br>-1   |  |
| Date<br>Tuesday, March 06, 2001 | Sheet<br>27                 | of<br>33  |  |

# FAN SPEED CONTROLOR

G768B

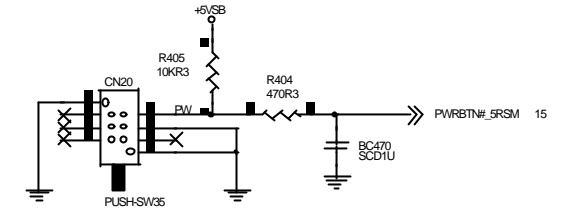


NEAR CPU BOTTM



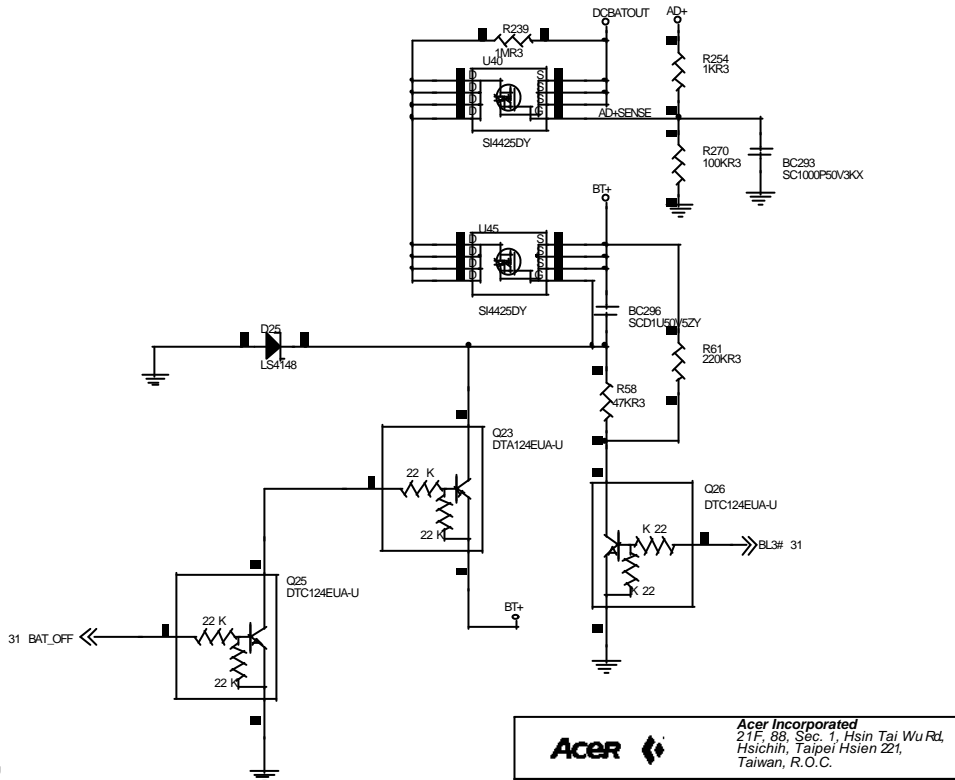
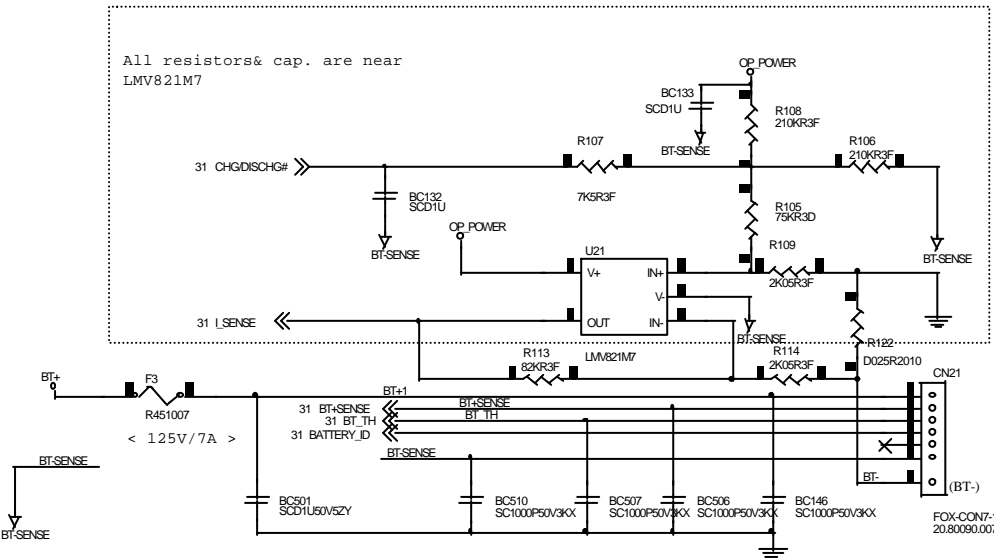
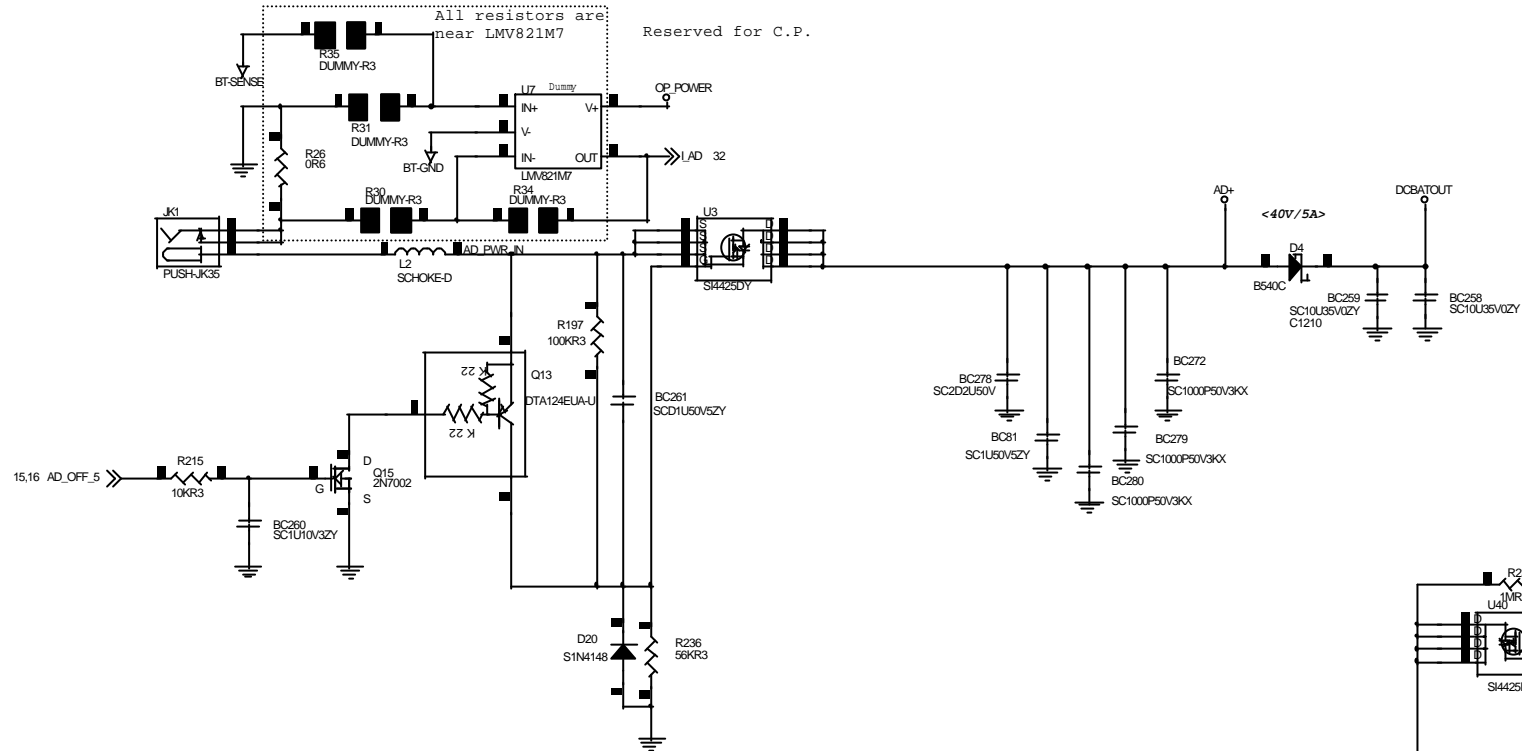
Trace 10 mil

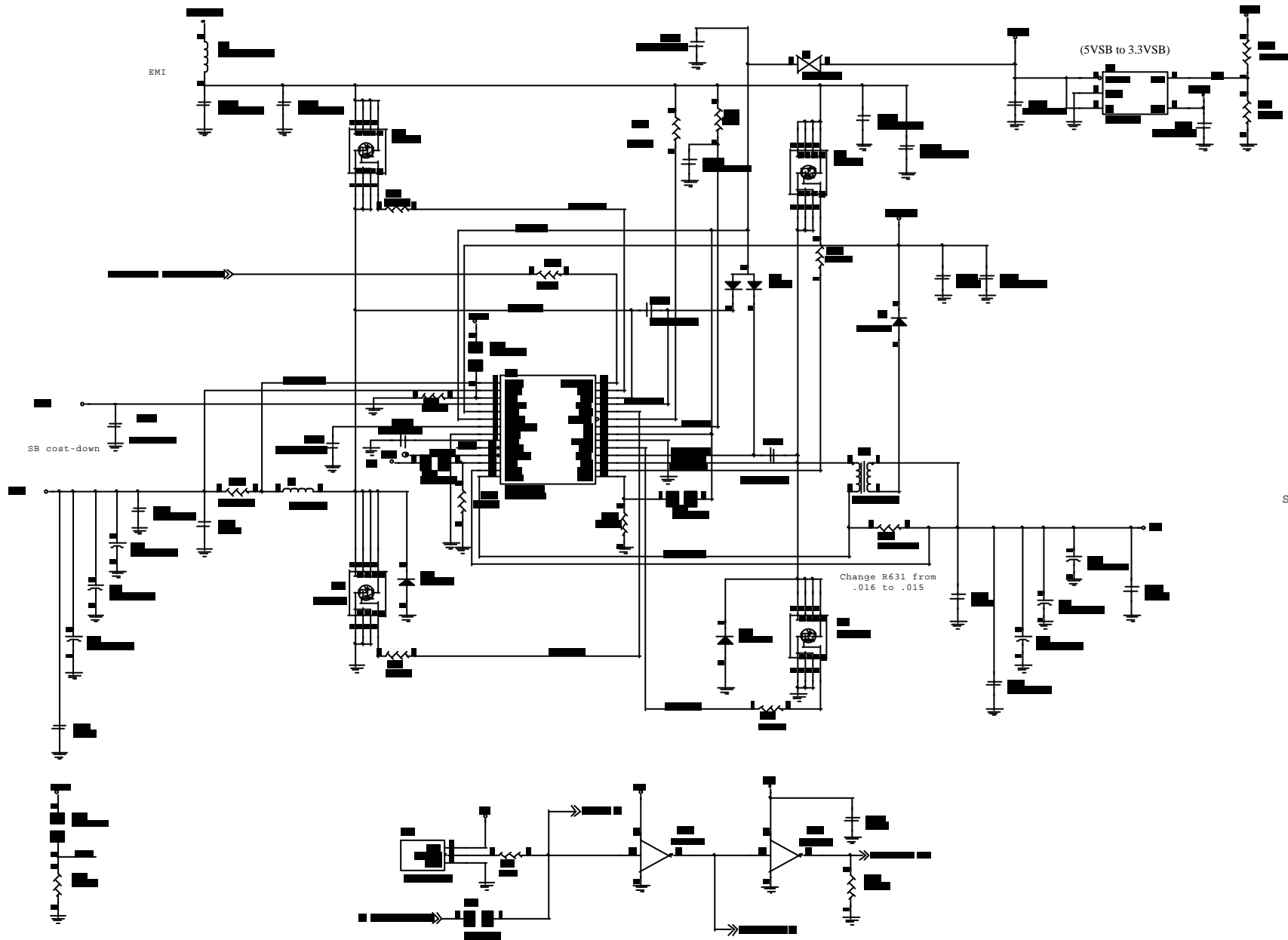
# POWER SWITCH

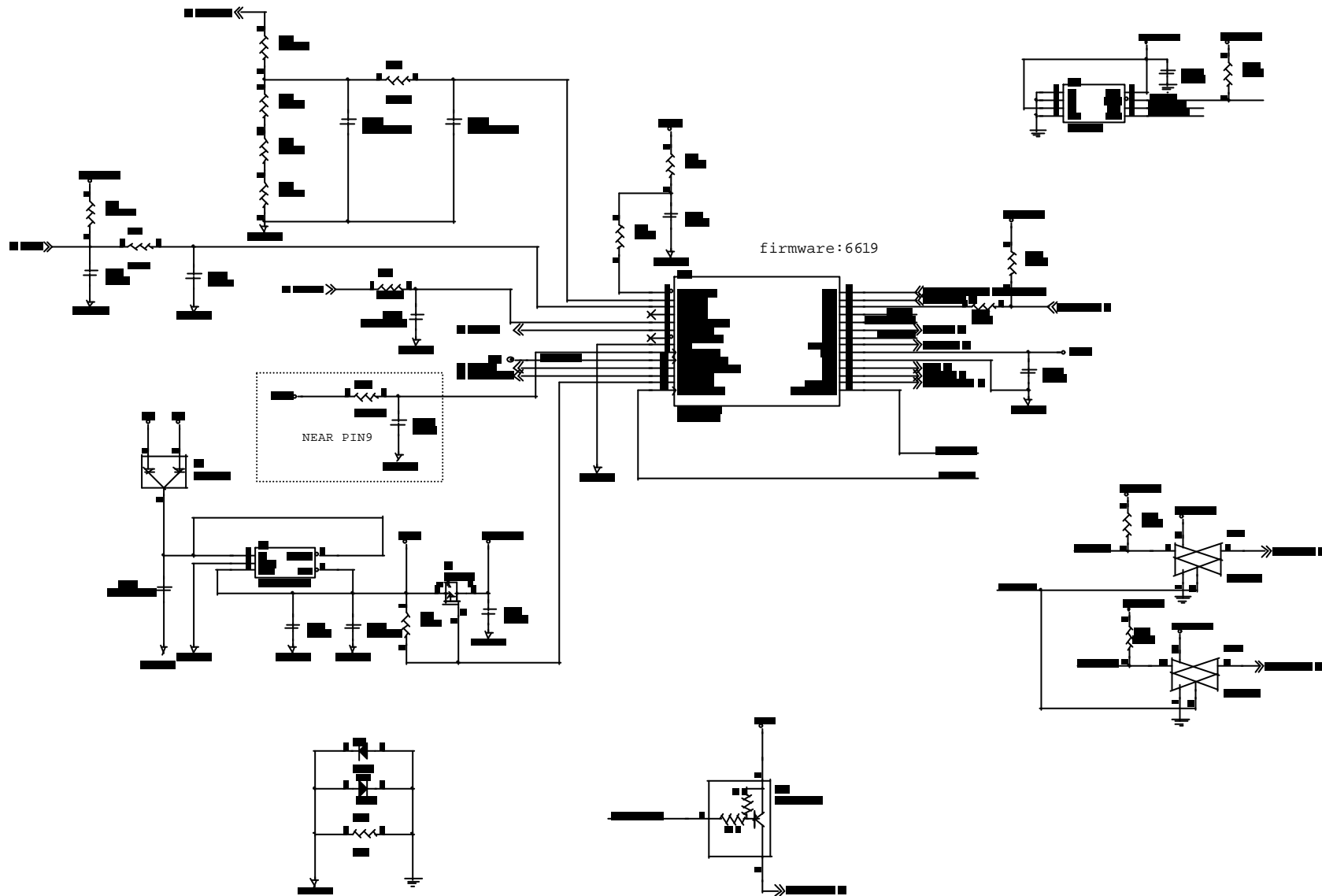


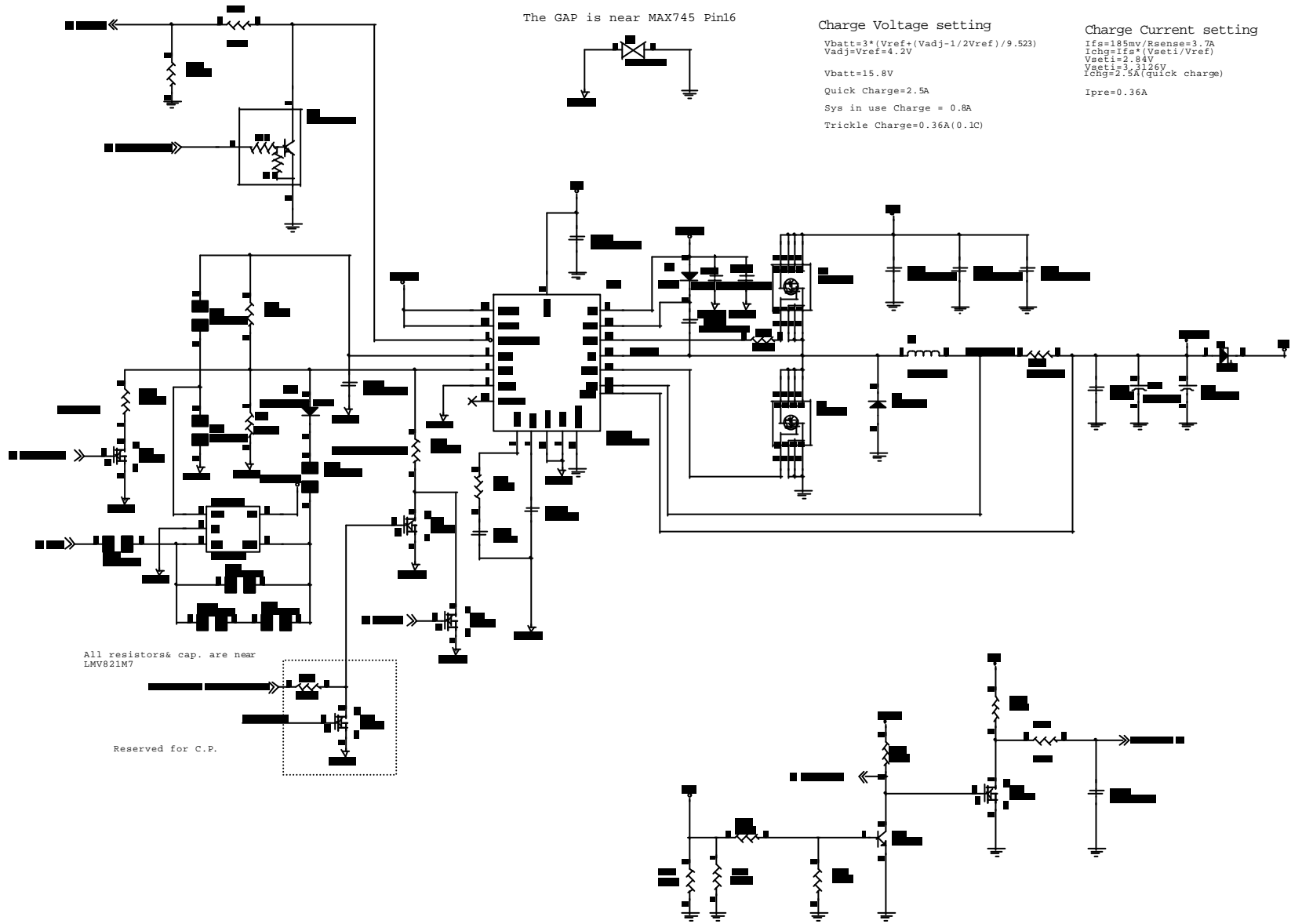
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Hsichih, Taipei Hsien 221,  
Taiwan, R.O.C.

|       |                         |       |          |
|-------|-------------------------|-------|----------|
| Title |                         |       | POWER1   |
| Size  | Document Number         | Rev   |          |
| A3    | FALCON2M                | -1    |          |
| Date: | Tuesday, March 06, 2001 | Sheet | 28 of 33 |









The GAP is near MAX745 Pin6

**Charge Voltage setting**  
 $V_{batt} = 3 * (V_{ref} + (V_{adj} - 1/2 V_{ref}) / 9.523)$   
 $V_{adj} = V_{ref} = 4.2V$   
 $V_{batt} = 15.8V$   
 Quick Charge = 2.5A  
 Sys in use Charge = 0.8A  
 Trickle Charge = 0.36A(0.1C)

**Charge Current setting**  
 $I_{fs} = 185mV / R_{sense} = 3.7A$   
 $I_{chg} = I_{fs} * (V_{seti} / V_{ref})$   
 $V_{seti} = 2.84V$   
 $V_{seti} = 3.226V$   
 $I_{chg} = 2.5A$  (quick charge)  
 $I_{pre} = 0.36A$

All resistors & cap. are near LMV821M7

Reserved for C.P.

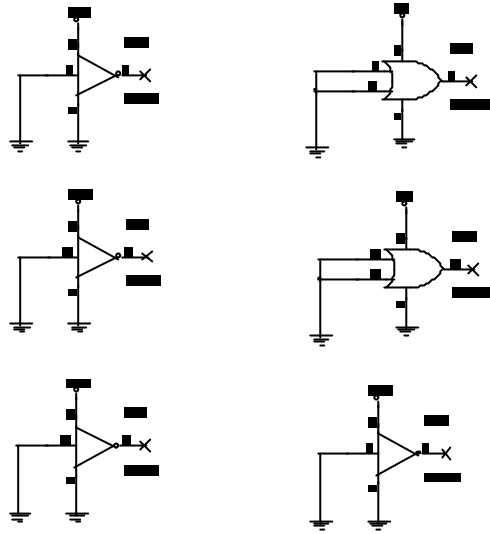
**Acer** Incorporated  
 2/F, 88, Sec. 1, Hsin Tai Wu Rd.,  
 Hsichih, Taipei Hsien 221,  
 Taiwan, R.O.C.

CHARGER2  
 FALCON2M

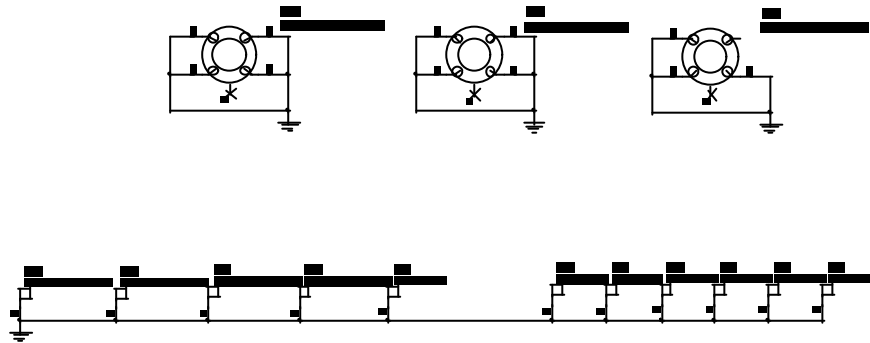
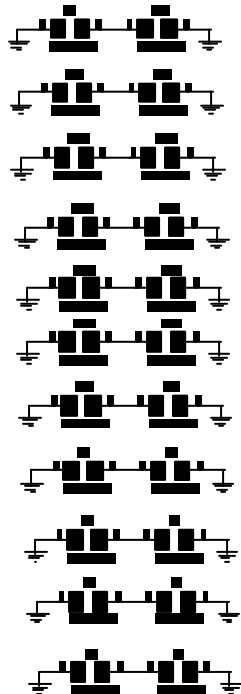


Signal Voltage Level Label Name Rule

| VOLTAGE | SIGNAL LABEL  | EXPLANATION   |
|---------|---|---|
| +1.6V   | XXX_G<br>HA[3..31]<br>HD[0..63]   | CPU GTL<br>CPU ADDRESS<br>CPU DATA  |
| +2.5V   | XXX_2   | CPU I/O   |
| +3.3V   | XXX_3<br>MA[0..13]<br>MD [0..63]<br>AD[0..31]<br>GAD[0..31]<br>PDATA[0..23] | PCI CONTROL , etc.<br>MEMORY ADDRESS<br>MEMORY DATA<br>PCI AD BUS<br>AGP AD BUS<br>LCD LOGIC DATA |
| +5V     | XXX_5<br>SA[0..19]<br>SD[0..15]   | ISA CONTROL , etc.<br>ISA ADDRESS<br>ISA DATA   |
| +5VSB   | LA[17..23]  | RESUME WELL SIGNAL  |
|         | XXX_RSM<br>XXX_DX   | AFTER DAMPING<br>RESISTER   |



Test line for impedance measurement



modify HUV2 as HUV1 and HUV3

