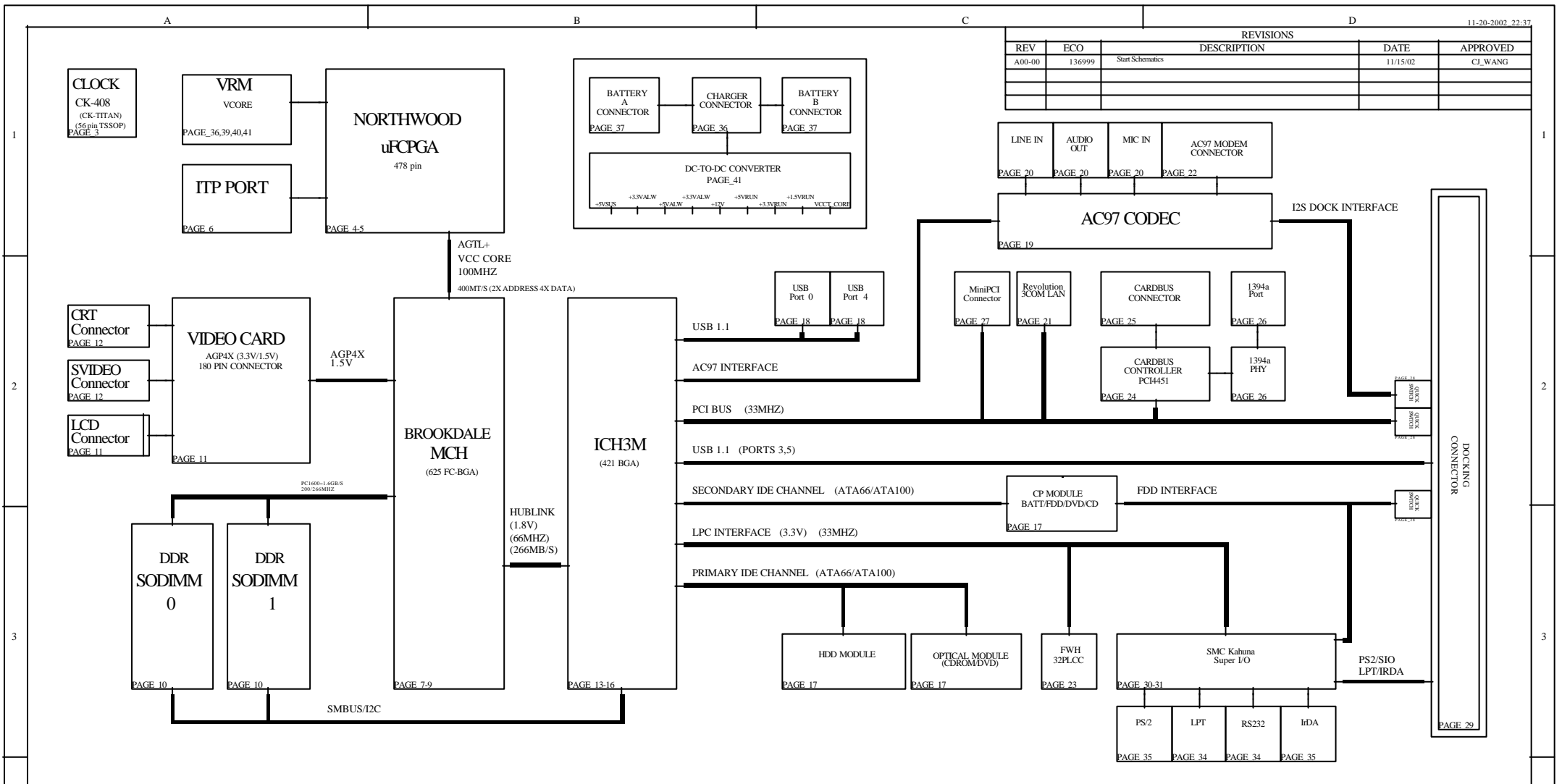


REVISIONS				
REV	ECO	DESCRIPTION	DATE	APPROVED
A00-00	136999	Start Schematics	11/15/02	CJ_WANG



PARTS

- ASSY.PWA.MN.NV28.M50 (9Y422)
- └ PWA.PLN.MN.NV28.M50 (9Y422)
 - └ ASSEMBLY BARCODE LABEL (XXXXXX)
 - └ ASSEMBLY REVISION LABEL (XXXXXX)
 - └ ASSY.DWG.PLN.MN.NV28.M50 (XXXXXX)
 - └ PWB.PLN.MN.CABN (1Y802)
 - └ SCHEM.PLN.MN.NV28.M50 (C0370)

BOM ADDS APPEAR ON PAGE 42.

- This design requires a font mapping of Fixed to scalable Arial with a scaling factor of 1.0
- Please remember when copying project files that you must include both the symbols and the schematics

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DELL COMPUTER CORPORATION AUSTIN, TEXAS

TITLE: SCHEMATIC, M/B LA-1221

DWG NO: 40195 REV: 4A

DATE: 11/15/02 SHEET: 52 OF 102

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42. Mounting Holes and EMI Clips
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45. SMBUS Diagram
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NEEDS TO BE UPDATED

POWER MODES

Power Mode	Voltage	Page	Source	ON	OFF
RBAT	7.2V	32, 36		Always	
PBATT+	1.7V-13V	36, 37, CB - 3		Always	
SBATT+	1.7V-13V	36, 37, CB - 3		Always	
DOCK_DC_IN	20V	29, 36		Always	
DC_IN	20V	29, 36, CB - 2, 3		Always	
SDC_IN	20V	CB - 2, 3		Always	
V_CHG	15V-17.5V	CB - 2		Note 1	
PWR_SRC	7.2V-20V	8, 11, 29, 36, 38, 39, 40, 41		Always	
RTC_SRC	7.2V-20V	36, 39		Always	
3VSUS	3.3V	4, 6, 10-16, 18, 21-25, 27, 30-31, 35, 38-41		S1-S3	S4-S5
RTC_PWR	5V	36, 38, 39, 41, 42		Always	
5VSUS	5V	8, 11, 16, 18-19, 22, 25, 29, 33-35, 38-42		S1-S3	S4-S5
2.5VSUS	2.5V	8, 10, 39		S1-S3	S4-S5
VCC_CORE	0.6V-1.75V	4, 5, 9, 16, 23, 38, 40		S1-S2	S3-S5
12V	12V	3, 11, 25, 29, 33, 36, 38, 41		S1-S2	S3-S5
DOCK_PWR_SRC	13V-20V	29	Docked ALW		
3VRUN	3.3V	3, 4, 6, 11, 13-14, 16-17, 19, 21-23, 26-28, 30-31, 33, 35, 38		S1-S2	S3-S5
VAUX	3.3V	27	Note 2	Note 2	
1.8VSUS	1.8V	16, 38, 39		S1-S3	S4-S5
1.8VRUN	1.8V	7, 8, 9, 13, 16, 38		S1-S2	S3-S5
5VRUN	5V	6, 11-12, 16-17, 20, 27-28, 30, 32-35, 38, 42		S1-S2	S3-S5
5VHDD	5V	17, 38		S1-S2	S3-S5
5VMOD	5V	17, 38		S1-S2	S3-S5
1.5VRUN	1.5V	7, 9, 11, 38, 39		S1-S2	S3-S5
STRB_5V	5V	29, 34, 38		S1-S2	S3-S5
VBEHCG	0.7V	11		S1-S2	S3-S5
V_IP2SV_DDR_VTT	1.25V	8, 10, 11, 38, 39		S1-S2	S3-S5
CRF_VCC	5V	12		S1-S2	S3-S5
SV_ODOCK	5V	28, 30		S1-S2	S3-S5
5VEDDPP	5V	17, 31, 38		S1-S2	S3-S5
5VSUS_DOCKED	5V	29	Docked S1-S3	Docked S4-S5	
USB_PWR_04	5V			S1-S2	S3-S5
VDDA	4.65V	19, 20		S1-S2	S3-S5
VDDA2	2.5V	19, 20		S1-S2	S3-S5
1.2V_VCCVID	1.2V	4, 40		S1-S3	S4-S5
5VALW	5V	11, 29, 30-32, 35-37, 39, 41		Note 4	Note 4
3VVRTC	3.3V	16, 31, 36, 39, 41		Always	
3VALW	3.3V	6, 17, 30, 32, 35, 36, 39, 41		Note 4	Note 4
VCC_RTC	3.3V	14, 16		Always	
ICH_VBIAS	3.3V	14, 16		S1-S2	S3-S5
3VPHYD	3.3V	26		S1-S2	S3-S5
3VPHYA	3.3V	26		S1-S2	S3-S5
CK_VDD_MAIN	3.3V	3		S1-S2	S3-S5
CK_VDD_CORE	3.3V	3		S1-S2	S3-S5
V_3P3_LAN	3.3V	21, 22		S1-S3	S4-S5
V_3P3_LAN_VDDTX	3.3V	21		S1-S3	S4-S5
V_3P3_LAN_VDDRX	3.3V	21		S1-S3	S4-S5
V_MCH_GTLREF	0.675VCC_CORE	8		S1-S2	S3-S5
S1_VPP	0V-12V _{Note A}	25		S1-S3	S4-S5
S2_VPP	0V-12V _{Note A}	25		S1-S3	S4-S5
S1_VCC	0V-5V _{Note A}	24, 25		S1-S3	S4-S5
S2_VCC	0V-5V _{Note A}	24, 25		S1-S3	S4-S5
S1_VCCF	0V-5V _{Note A}	24, 25		S1-S3	S4-S5
S2_VCCF	0V-5V _{Note A}	24, 25		S1-S3	S4-S5
HL_REF	0.9V	8, 13		S1-S2	S3-S5
H_VCCA	1.2V	4		S1-S3	S4-S5
H_VCCIOPLL	1.2V	4		S1-S3	S4-S5
H_GTLREF	0.675VCC_CORE	4		S1-S2	S3-S5
H_VSSA	1.2V	4		S1-S3	S4-S5
V_DDR_MCH_REF	1.25V	8, 10, 39		S1-S3	S4-S5

Note A Voltage delivered to these pins is determined from the type card inserted to the PCMCIA controller.

Note 1 Rail is available anytime AC and BATTERY are both present, and the BIOS is not inhibiting charge

Note 2	NB powered by AC	VAUX	S1-S3	S4-S5
	NB powered by BATT	VAUX	S1-S2	S3-S5

Note 3 Rail is available anytime the HEADPHONE Jack is occupied

Note 4	NB powered by AC	3VALW	Always	
	NB powered by BATT	3VALW	S1-S3	S4-S5
	NB powered by AC	5VALW	Always	
	NB powered by BATT	5VALW	S1-S3	S4-S5

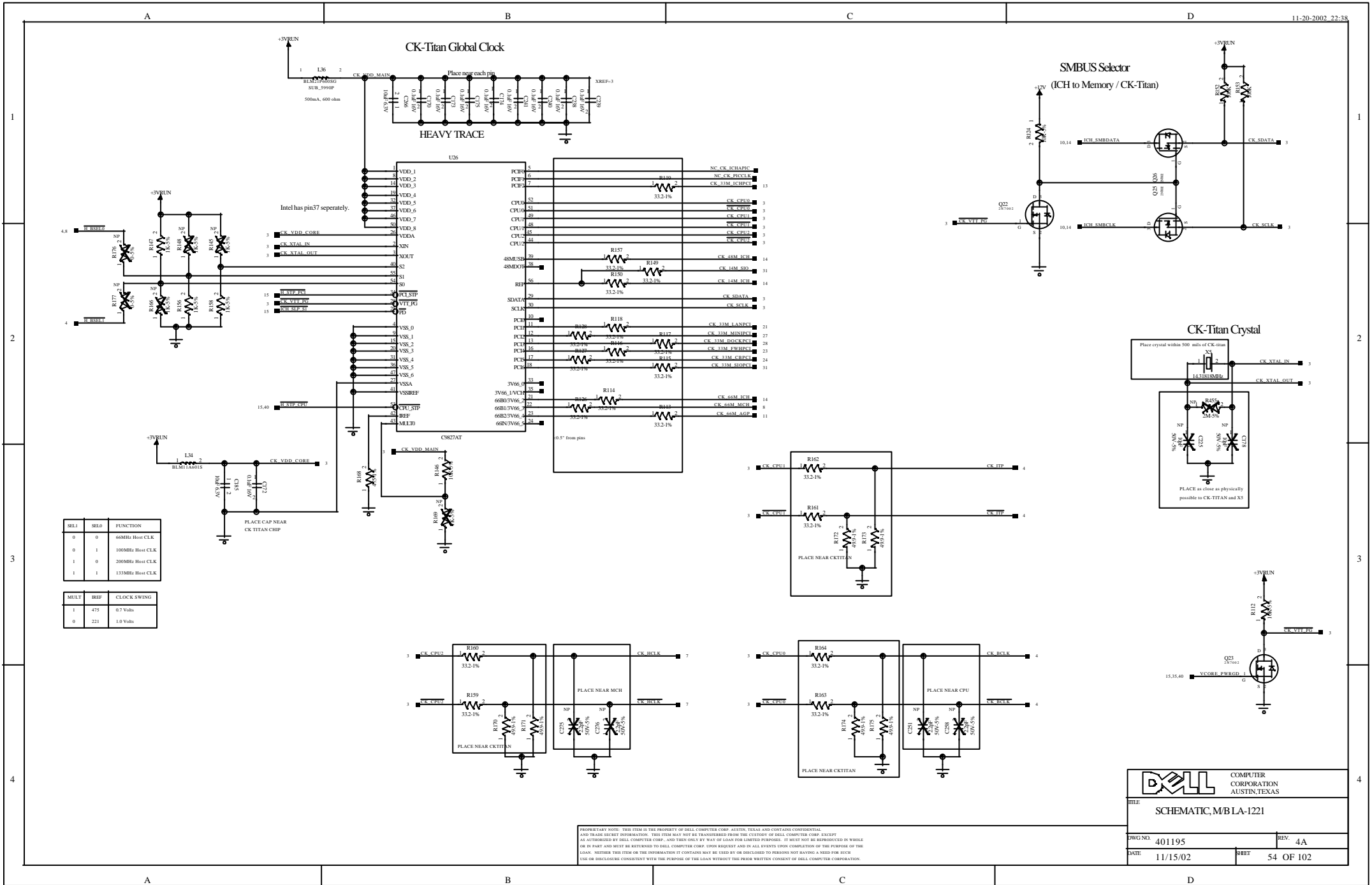
PCI TABLE

DEVICE	IDSEL	IRQ	REQ/GNT	DREQ/DGNT
DOCK	AD24	PIRQC*		REQ0*/GNT0*
3COM	AD16	PIRQC*		REQ4*/GNT4*
VIDEO	IDSEL	PIRQA* PIRQB*		
PCI4451	AD17	PIRQD*	REQB*/GNTB*	REQ1*/GNT1*
Msi	AD18	PIRQA*	REQA*/GNTA*	REQ2*/GNT2*
MINIPCI	AD19	PIRQB* PIRQD*		REQ3*/GNT3*

BOM BUILD OPTIONS	
Option	Description
0	Base Build
1	FDD_PP

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PWG NO.	401195	REV.	4A
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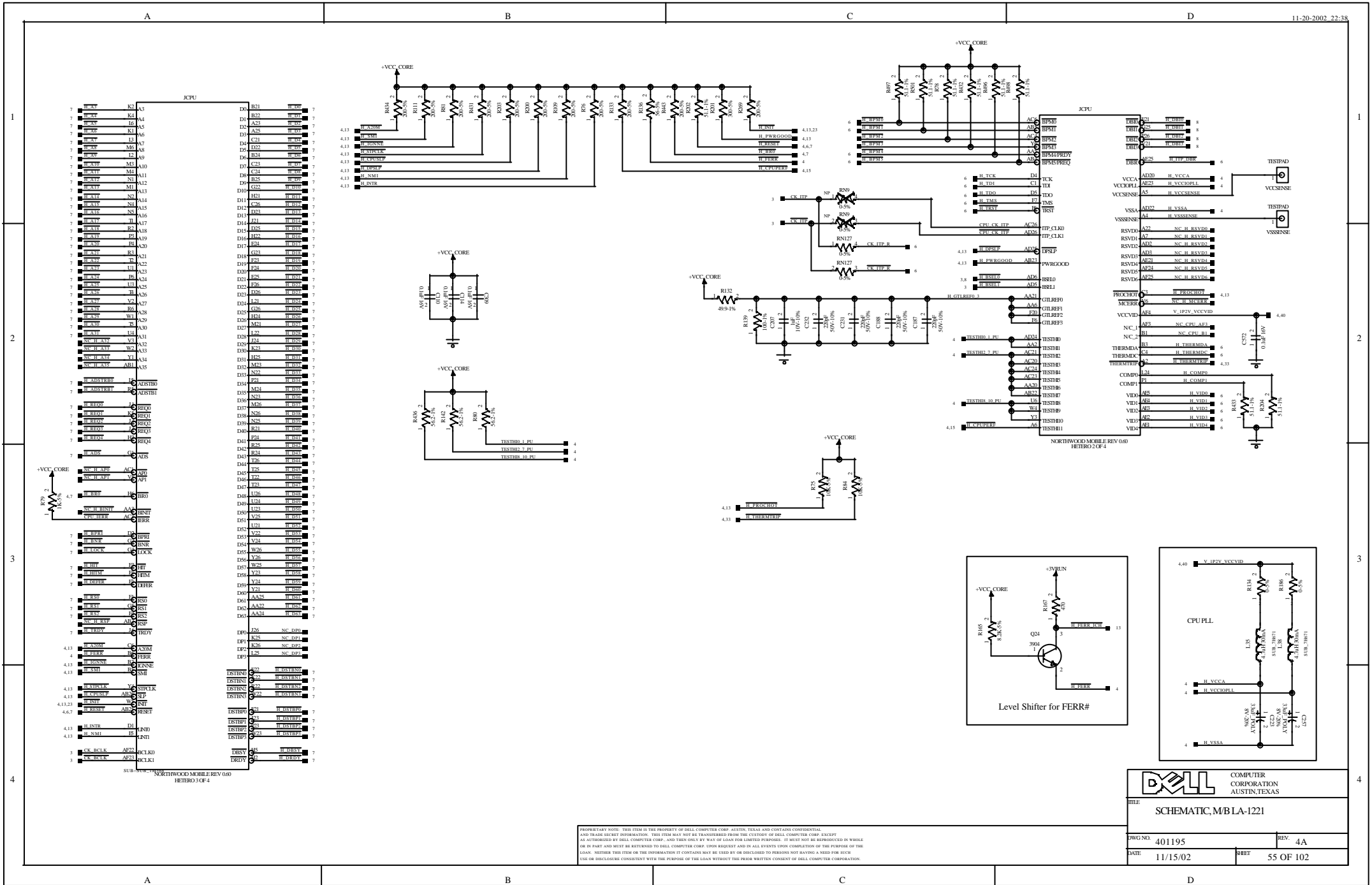


SEL0	SEL1	FUNCTION
0	0	66MHz Host CLK
0	1	100MHz Host CLK
1	0	200MHz Host CLK
1	1	133MHz Host CLK

MULT	DIVF	CLOCK SWING
1	475	0.7 Volts
0	221	1.0 Volts

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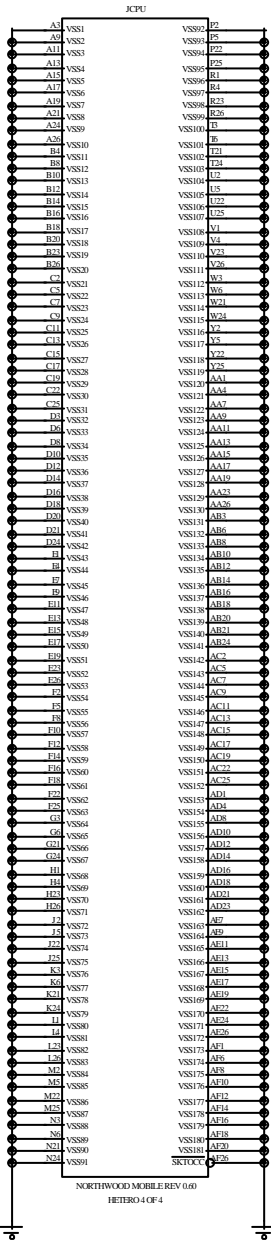
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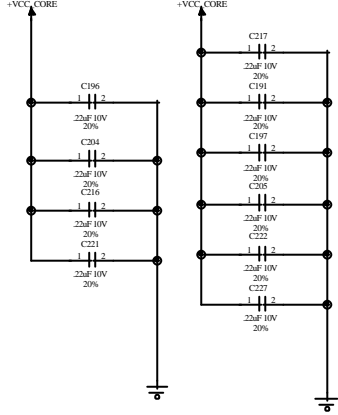
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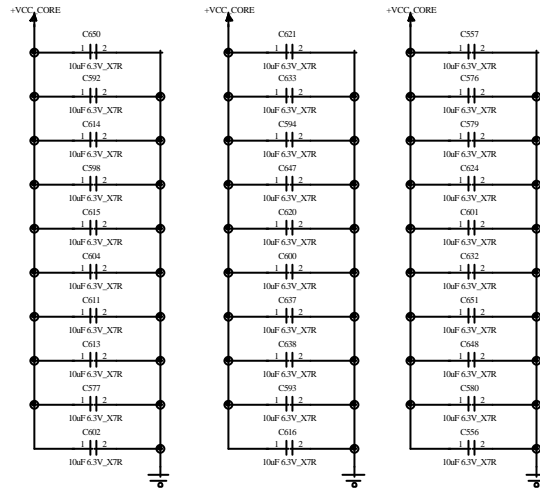
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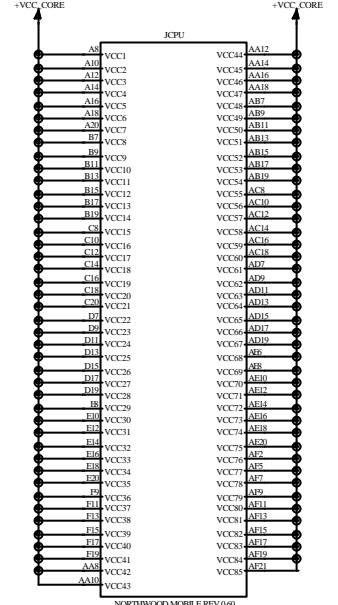
CPU High Frequency Decoupling



CPU Bulk Decoupling



Place caps close to JCPU
 ALL CAPS NEED TO BE PLACED
 DIRECTLY UNDER JCPU WHEN
 POSSIBLE USE TWO VIAS/PAD



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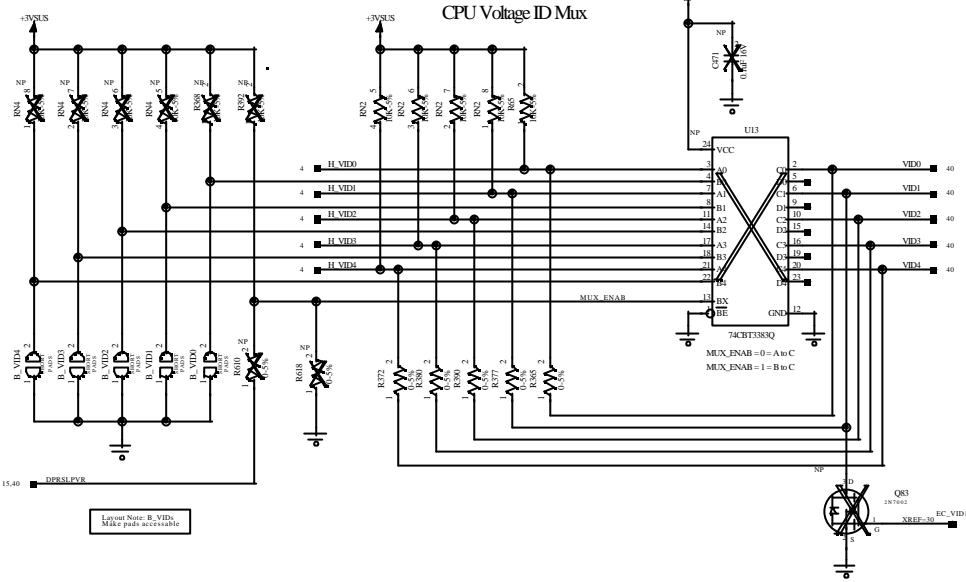
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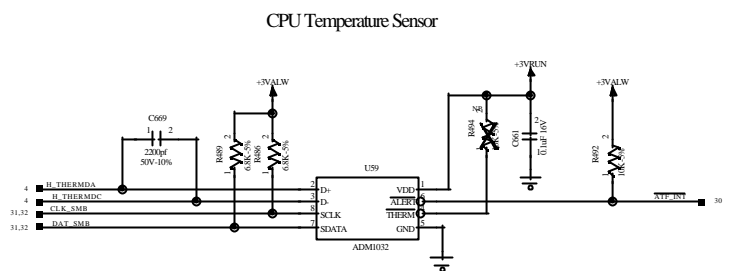
4

O = pads open
S = pads shorted

B_VID Settings				B_VID Settings					
4	2	1	0	VCC_CORE	4	2	1	0	VCC_CORE
S	S	S	S	1.750V	O	S	S	S	0.9750V
S	S	S	S	1.700V	O	S	S	S	0.950V
S	S	S	S	1.650V	O	S	S	S	0.925V
S	S	S	S	1.600V	O	S	S	S	0.900V
S	S	S	S	1.550V	O	S	S	S	0.875V
S	S	S	S	1.500V	O	S	S	S	0.850V
S	S	S	S	1.450V	O	S	S	S	0.825V
S	S	S	S	1.400V	O	S	S	S	0.800V
S	S	S	S	1.350V	O	S	S	S	0.775V
S	S	S	S	1.300V	O	S	S	S	0.750V
S	S	S	S	1.250V	O	S	S	S	0.725V
S	S	S	S	1.200V	O	S	S	S	0.700V
S	S	S	S	1.150V	O	S	S	S	0.675V
S	S	S	S	1.100V	O	S	S	S	0.650V
S	S	S	S	1.050V	O	S	S	S	0.625V
S	S	S	S	1.000V	O	S	S	S	0.600V



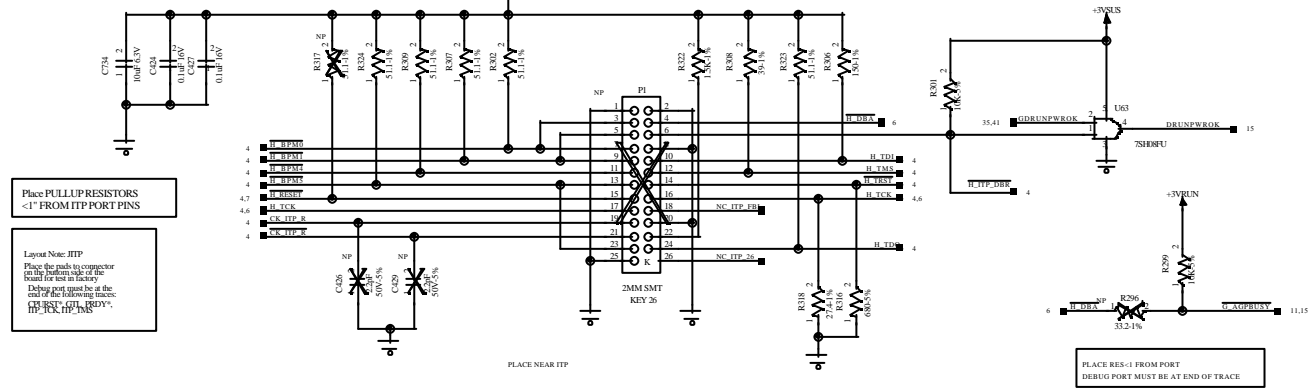
Layout Note: B_VID, MUX pads accessible



Layout Note: CPU Temperature Sensor
Place this circuit on the bottom side of the mainboard

Circuit Not Complete. Pending input from Intel.

ITP Debug Connector



Place PULL-UP RESISTORS <1> FROM ITP PORT PINS

Layout Note: ITP
Place the pads to connector on the bottom side of the board for test in factory.
Delivery open to the end of the following traces:
Destructive CPU operation:
ITP_RX, ITP_TX

PLACE NEAR ITP

PLACE RES-1 FROM DEBUG PORT MUST BE AT END OF TRACE

ITP Population Matrix

Ref. Des.	ITP Used	ITP Not Used
R264	510 ohms	1.5k
R255	pop	no pop
R257	pop	no pop
R265	no pop	1k pull-down
R258	pop	no pop
R140 (p.7)	pop	no pop
R249	pop	no pop
R248	pop	no pop
R280	no pop	no pop
R281	pop	no pop
R279	pop	no pop
R278	pop	no pop
R283	pop	no pop
R275	pop	no pop
R273	pop	no pop
R256	39 ohms	1k
R251	no pop	pop
R271	pop	no pop
R263	pop	no pop
R272	pop	pop

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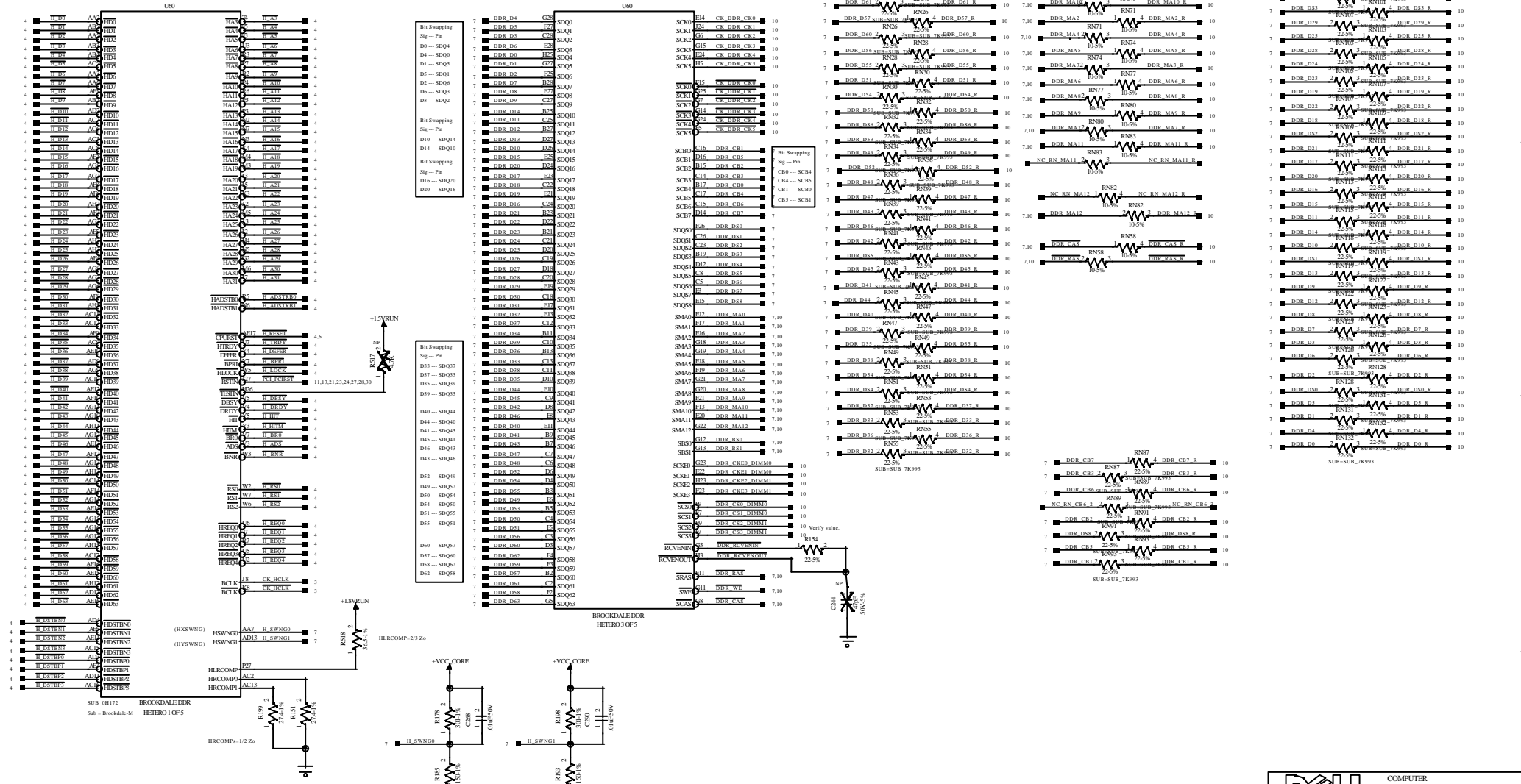
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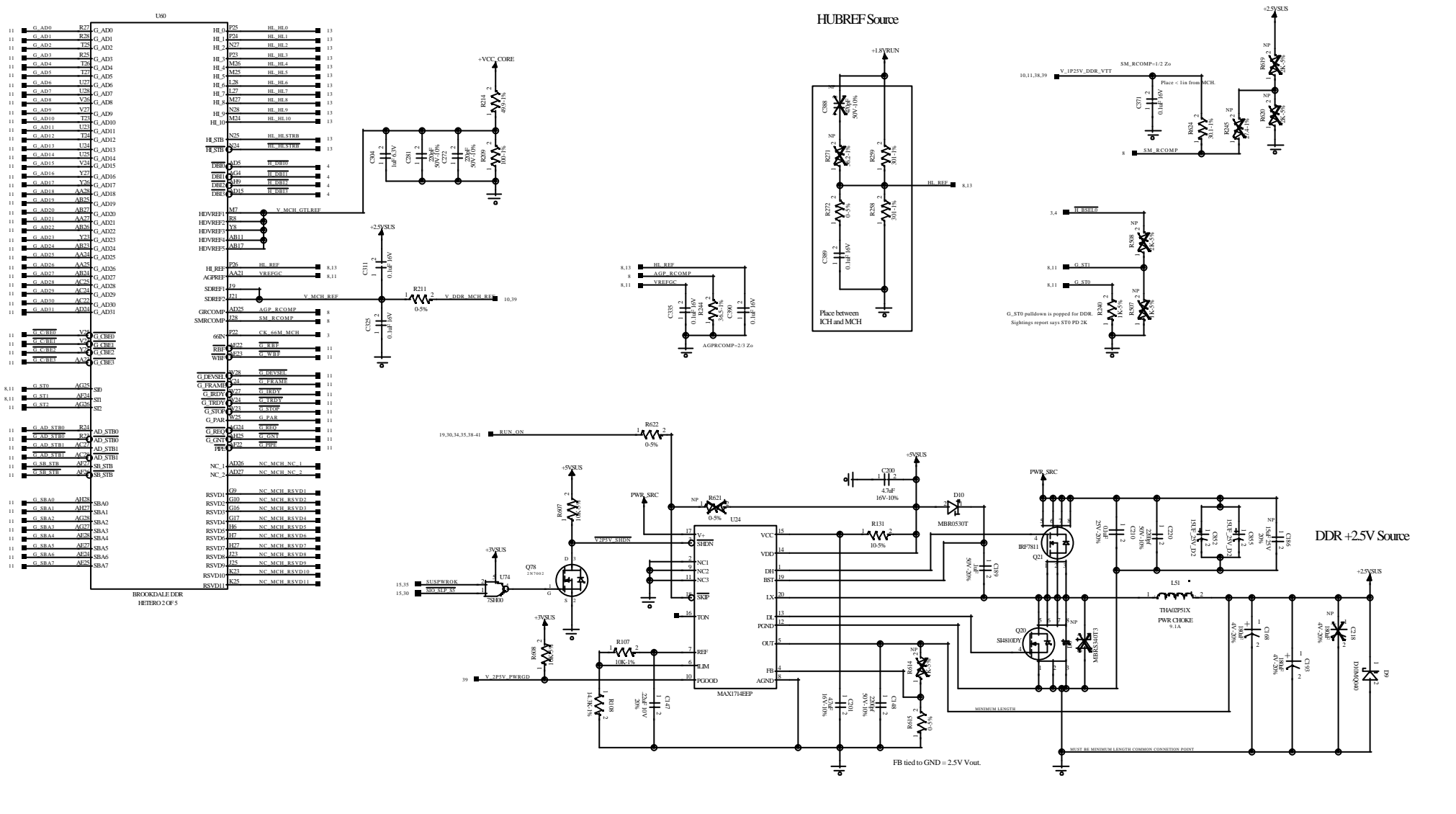
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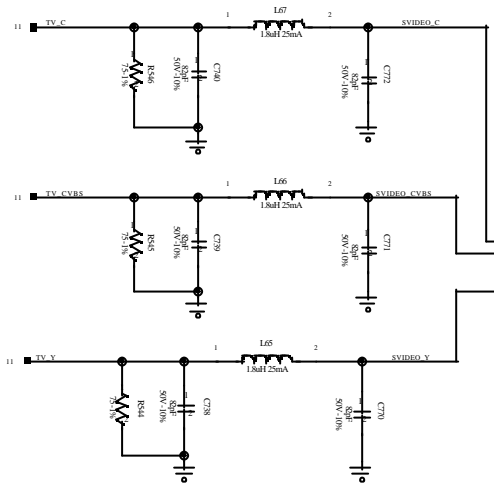
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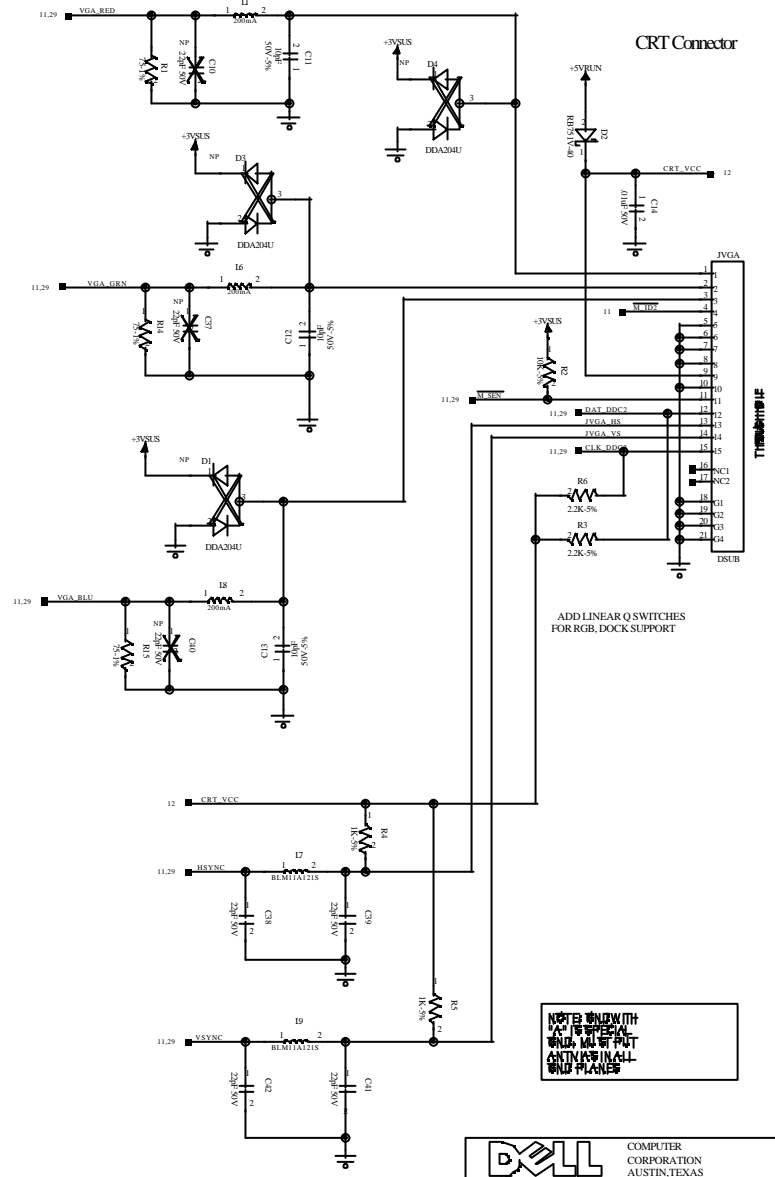
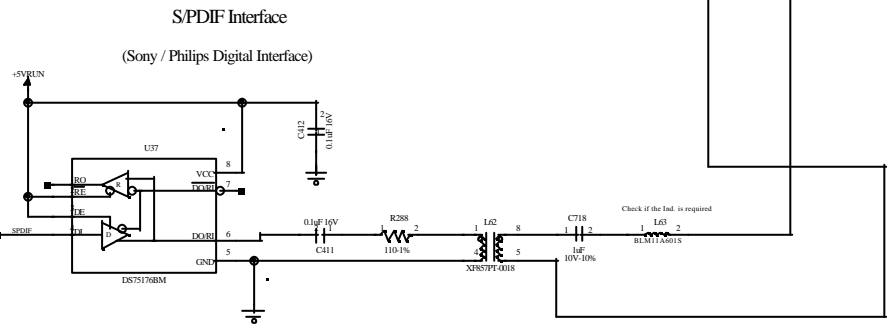
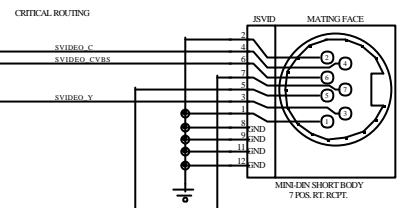


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S-Video Connector

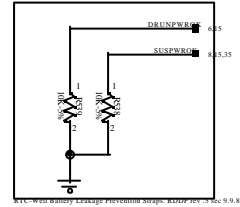
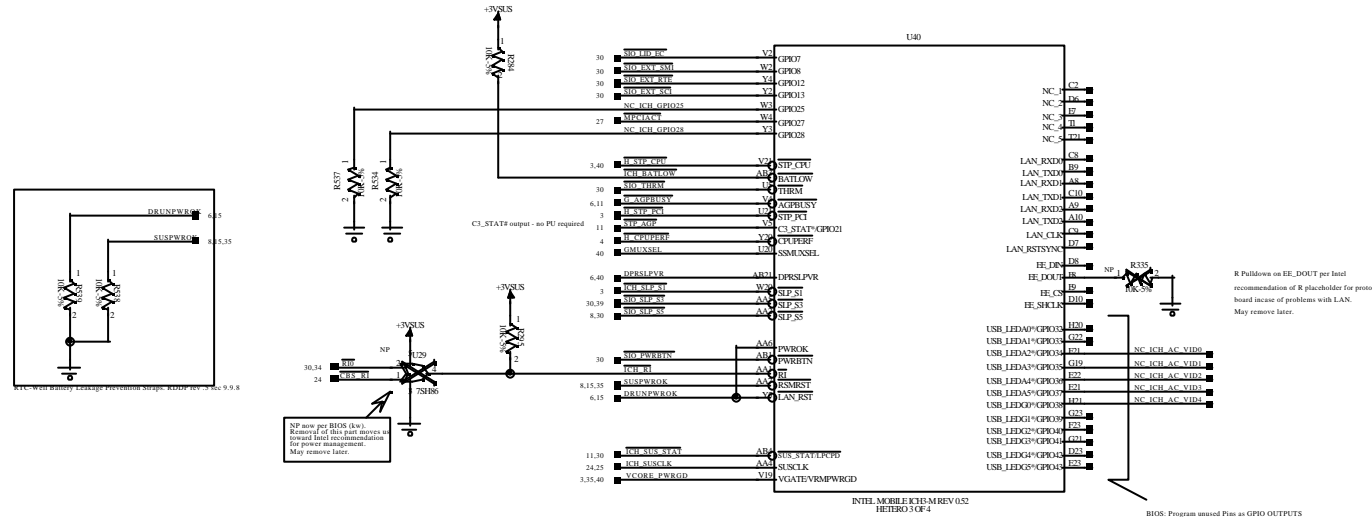


NOTE: ONLY WITH
 15" OR SPECIAL
 17" MONITORS
 CAN BE INSTALLED
 AND PLACES

DELL		COMPUTER CORPORATION AUSTIN, TEXAS	
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ICH3-M (3/4) PWR MGMT / LAN / USBLED Interface



11-11-2002 11:45:00 AM Rev 9.9.8

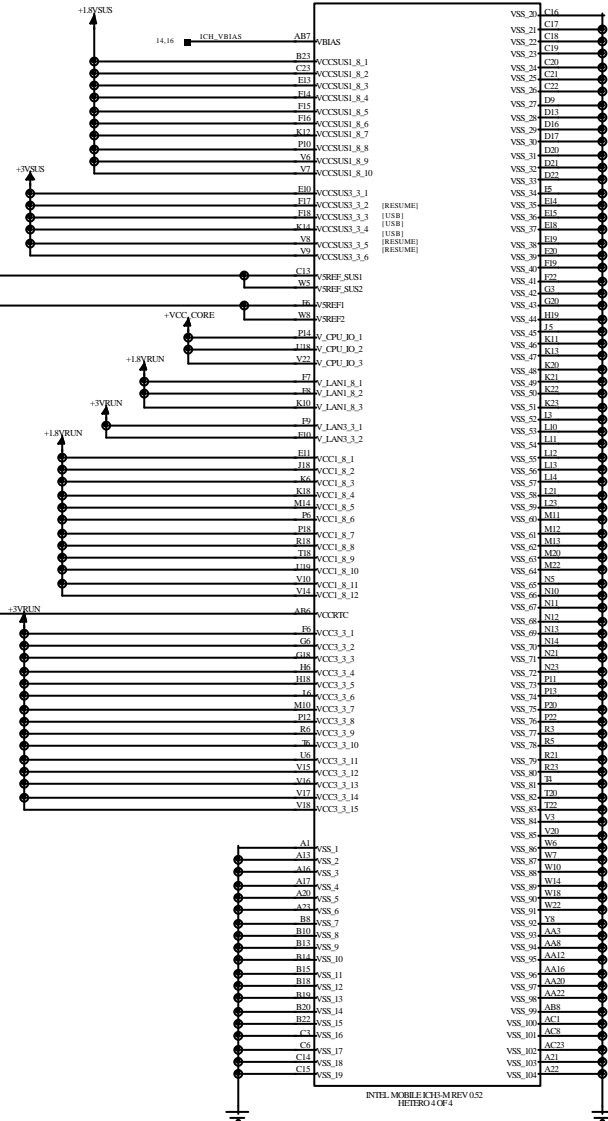
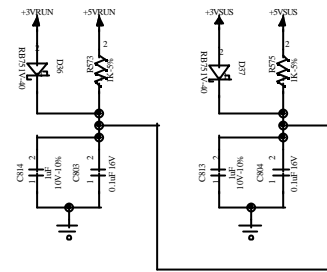
PROPRIETARY NOTE: THIS ITEM IS THE PROPERTY OF DELL COMPUTER CORP. AUSTIN, TEXAS AND CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION. THIS ITEM MAY NOT BE TRANSFERRED FROM THE CUSTODY OF DELL COMPUTER CORP. EXCEPT AS AUTHORIZED BY DELL COMPUTER CORP. AND THIS ONLY BY WAY OF LEAN FOR LIMITED PURPOSES. IF NOT TO BE REPRODUCED IN WHOLE OR IN PART AND MUST BE RETURNED TO DELL COMPUTER CORP. UPON REQUEST AND IN ALL EVENTS UPON COMPLETION OF THE PURPOSE OF THE LEAN. NEITHER THIS ITEM OR THE INFORMATION IT CONTAINS MAY BE USED BY OR DISCLOSED TO PERSONS NOT HAVING A NEED FOR SUCH USE OR DISCLOSURE CONSISTENT WITH THE PURPOSE OF THE LEAN WITHOUT THE PRIOR WRITTEN CONSENT OF DELL COMPUTER CORPORATION.

DELL COMPUTER CORPORATION AUSTIN, TEXAS	
TITLE: SCHEMATIC, M/B LA-1221	
DWG NO. 401195	REV. 4A
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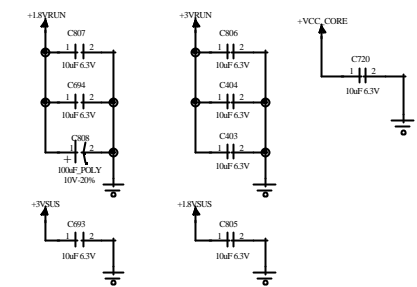
ICH3-M (44) Power and Ground

U40

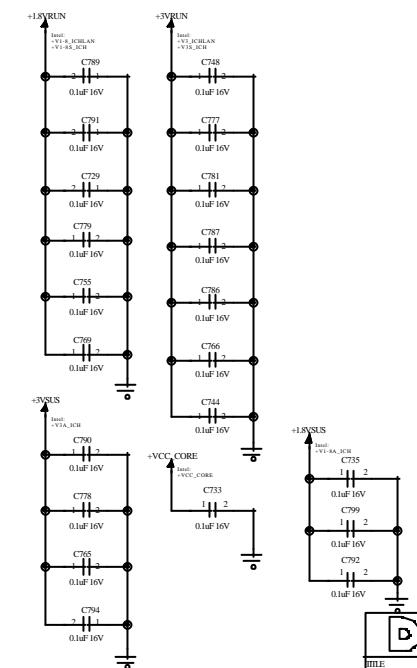
V5REF/VCC3_3 Sequencing Circuits



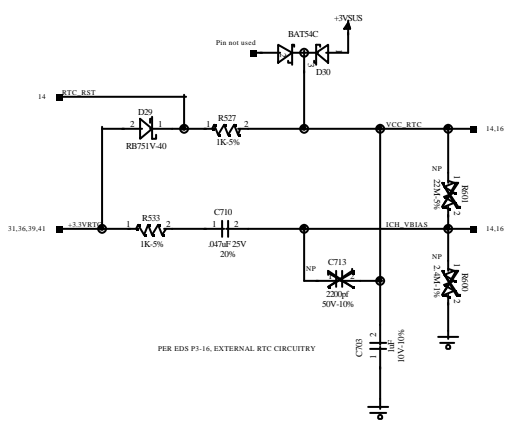
ICH3 Bulk Capacitance



ICH3 Decoupling Capacitance



External RTC Circuitry

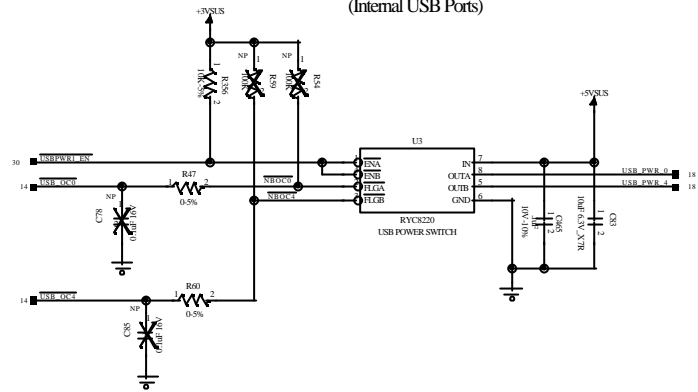


INTEL MOBILE ICH3-M REV 0.52
HETERO 4 OF 4

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Overcurrent Detection (Internal USB Ports)

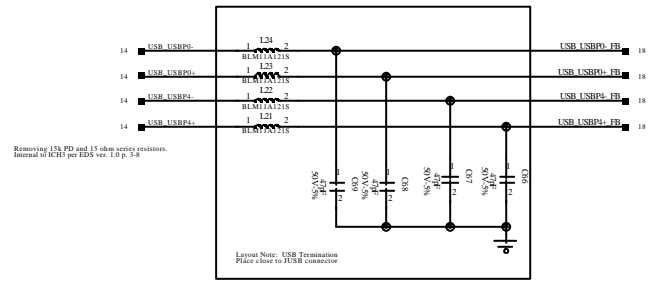


Layout Note: C72
Place a "+" character silkscreen on the board near the non-ground side of this capacitor.

C72 can be populated with either a ceramic (PN 2832P) or tantalum (PN 1033E) type capacitor

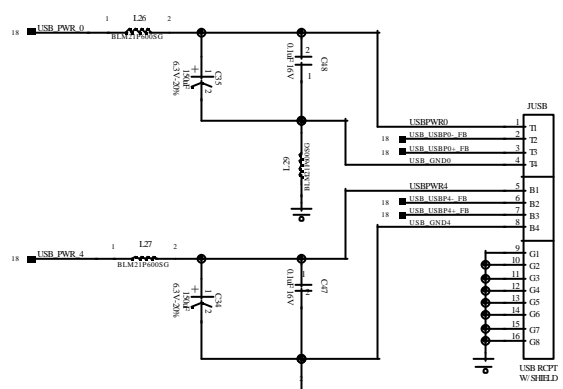
Layout Note: USB1.1
Follow RDDP's routing recommendations
INTEL USB GUIDELINE APPLIES

USB1.1 To System



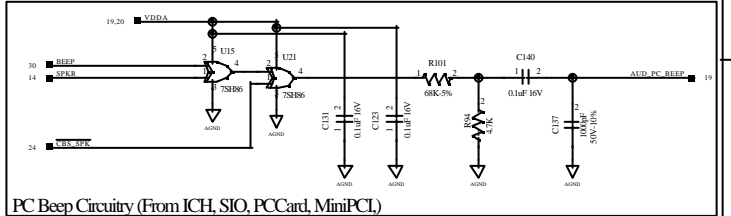
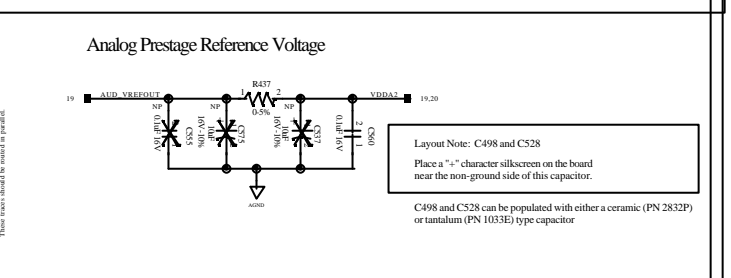
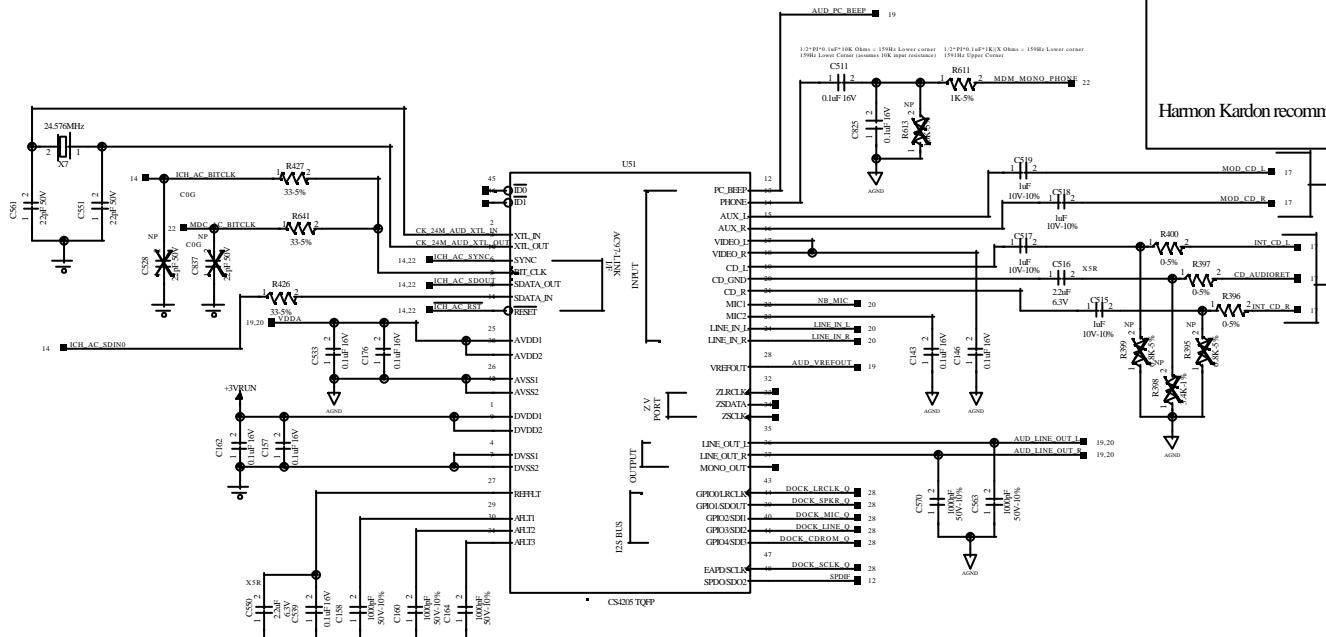
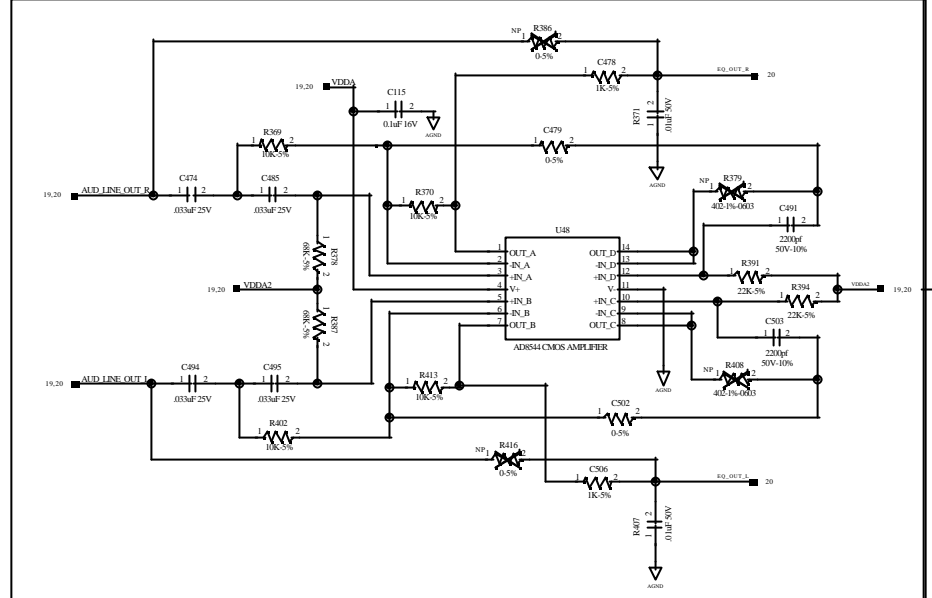
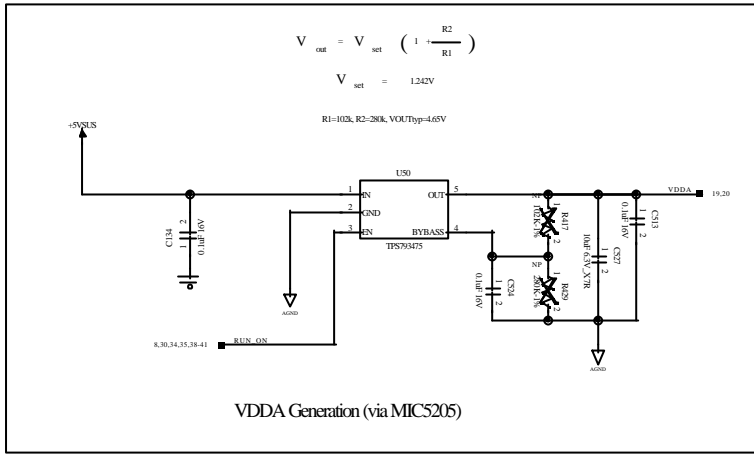
Layout Note: USB Termination
Place close to USB connector

USB1.1 To System System Board USB Connectors



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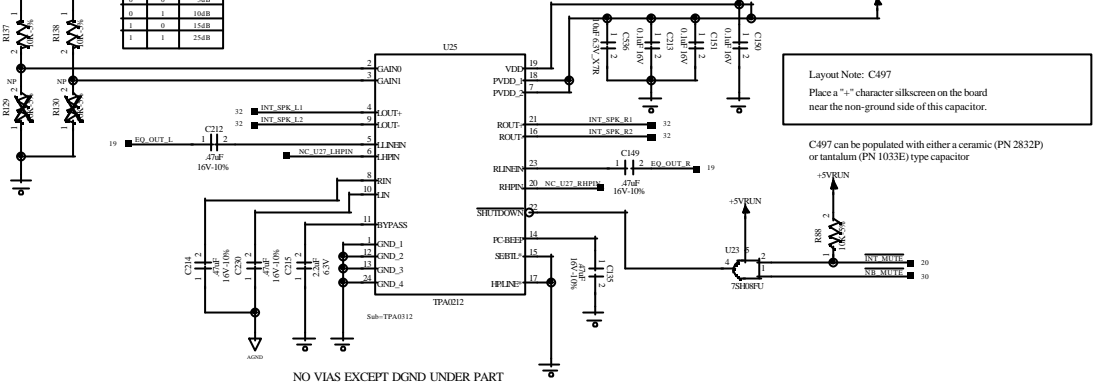
NOTE: ECAD MUST CONNECT AGND TO GND (VIA DRAWBRIDGE)!! 60 MIL TRACE AT ONE POINT ONLY UNDER THE CODEC

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Gain Register Settings		
LINE	SPK	THRU
0	0	3dB
0	1	10dB
1	0	15dB
1	1	25dB

Internal Speaker Amplifier



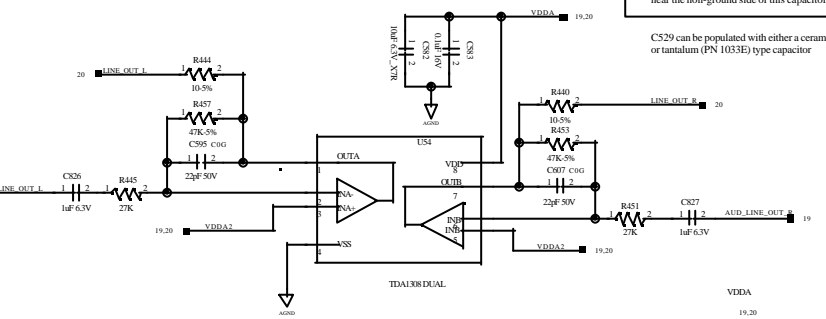
Layout Note: C497
Place a "+" character silkscreen on the board near the non-ground side of this capacitor.

C497 can be populated with either a ceramic (PN 2832P) or tantalum (PN 1033E) type capacitor

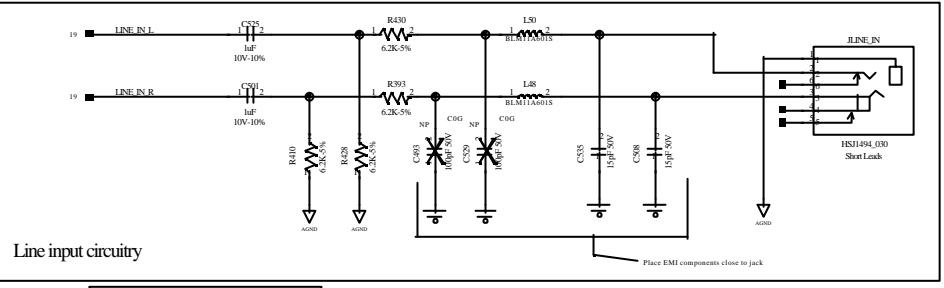
Headphone/Line Out Amplifier

Layout Note: C529
Place a "+" character silkscreen on the board near the non-ground side of this capacitor.

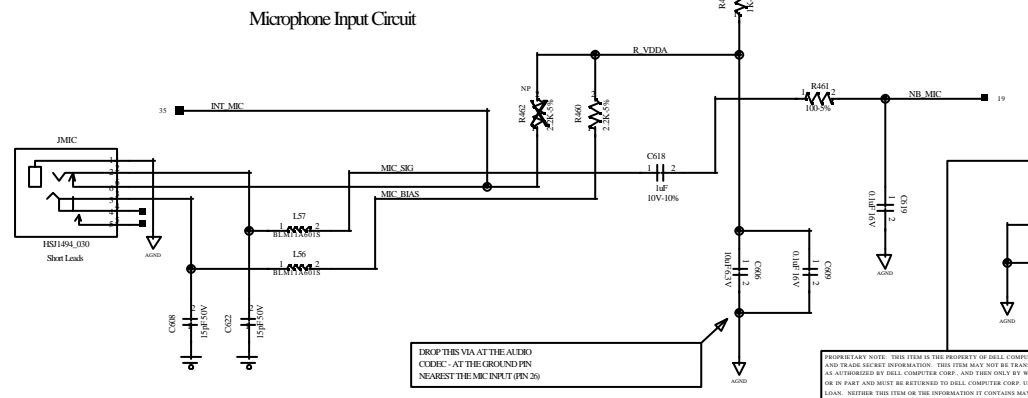
C529 can be populated with either a ceramic (PN 2832P) or tantalum (PN 1033E) type capacitor



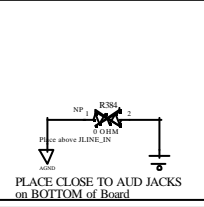
Line output circuitry



Line input circuitry



NOTE: ECAD MUST CONNECT AGND TO GND (VIA DRAWBRIDGE)!! 60 MIL TRACE AT ONE POINT ONLY UNDER THE CODEC



DELL COMPUTER CORPORATION AUSTIN, TEXAS

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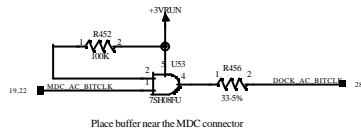
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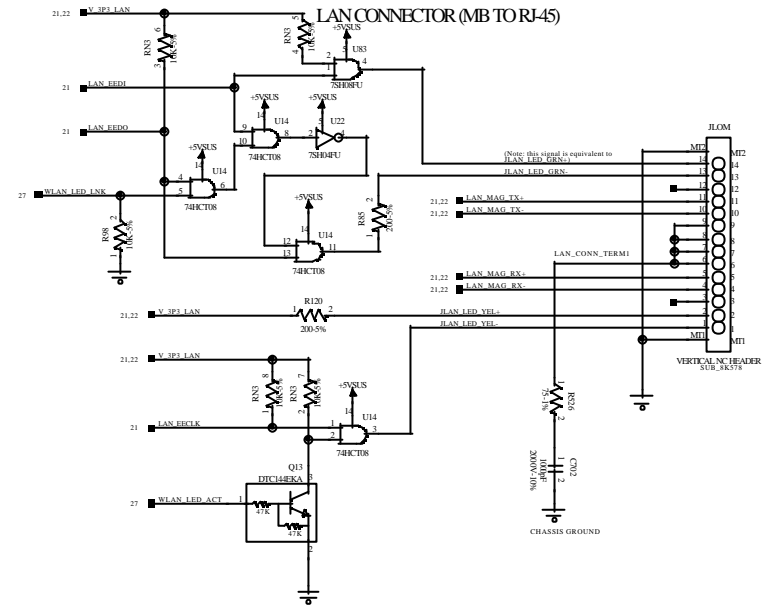
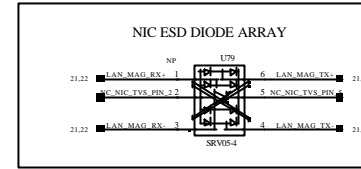
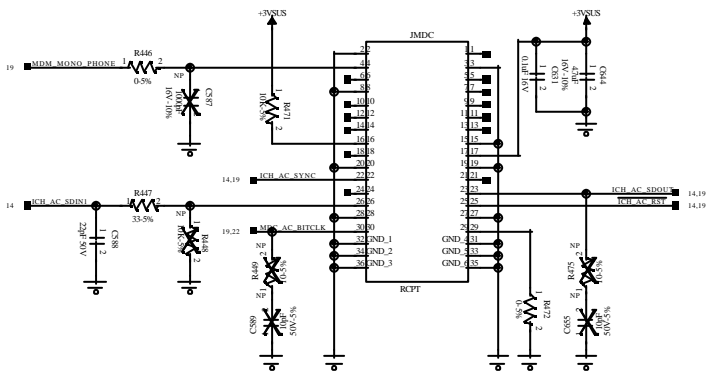
C

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AC97 Bit Clock Buffer



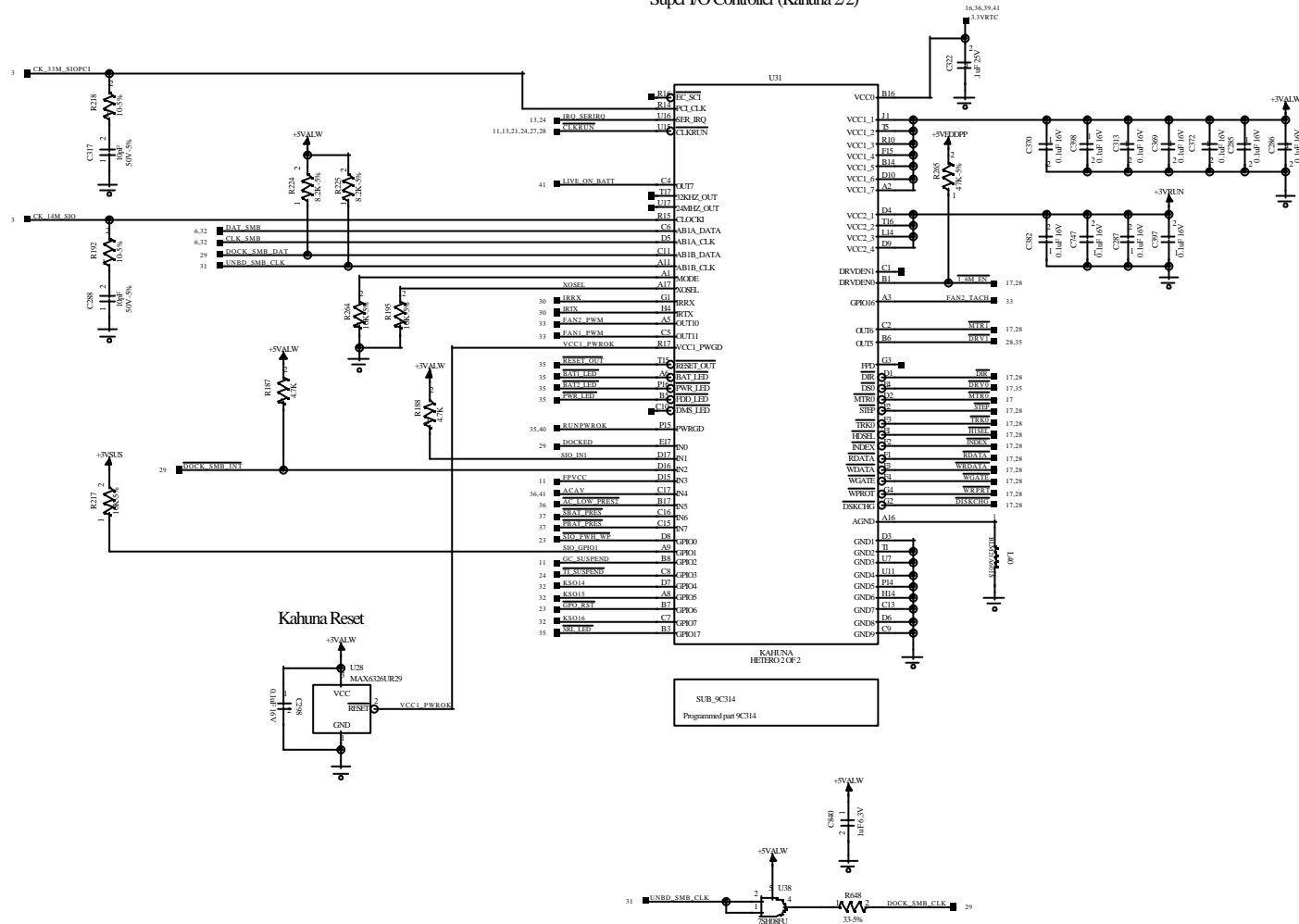
Soft Modem MDC Connector



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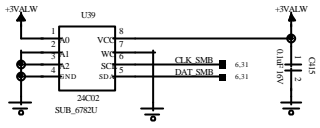
Super I/O Controller (Kahuna 2/2)



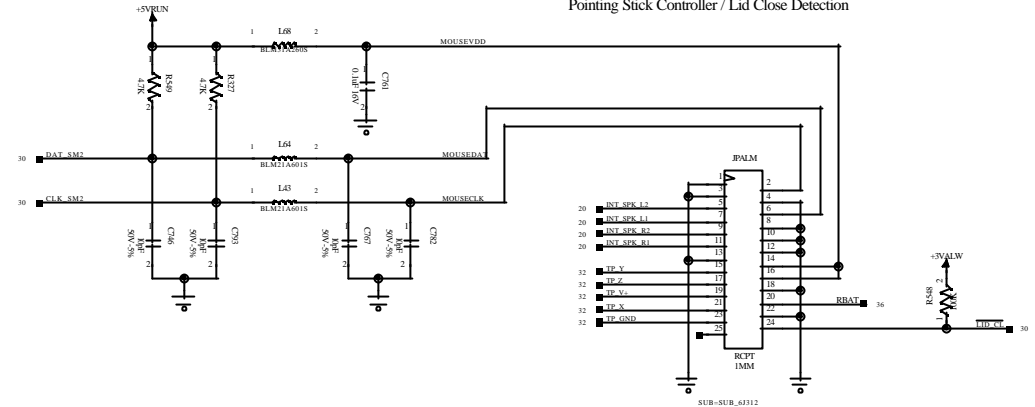
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EEPROM (Service/Asset Tag, etc.)

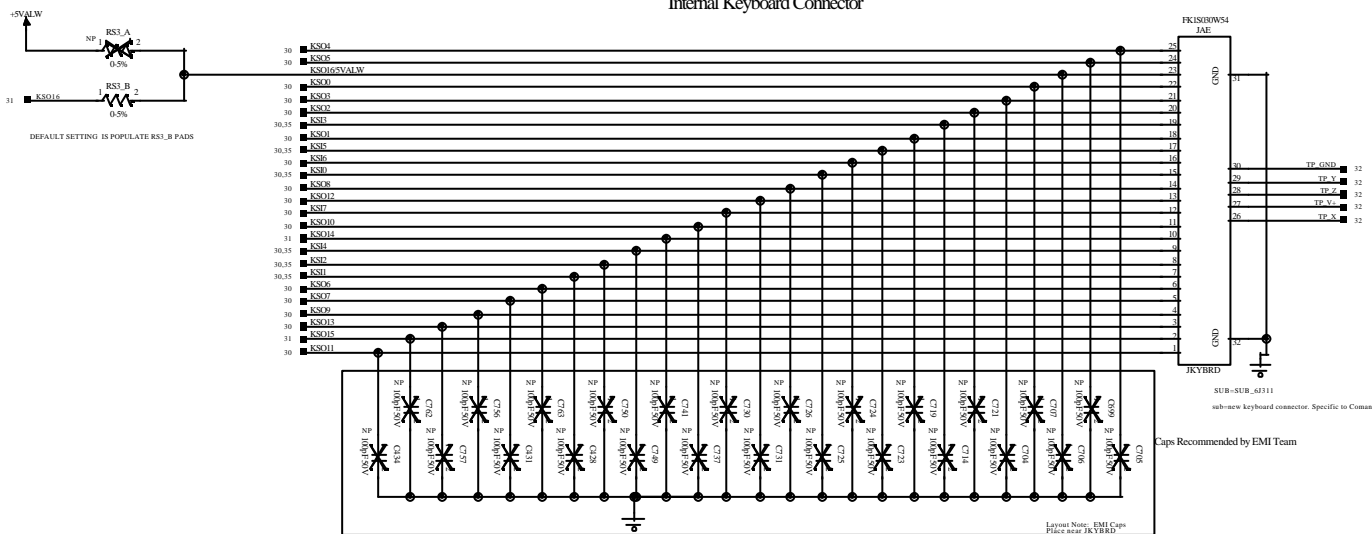


Palm Rest Connector
Rbat / Speakers / Touch Pad /
Pointing Stick Controller / Lid Close Detection



SUB-SUB_63112
Sub- Swapped Connector between Palm rest and Connector originally on MB

Internal Keyboard Connector



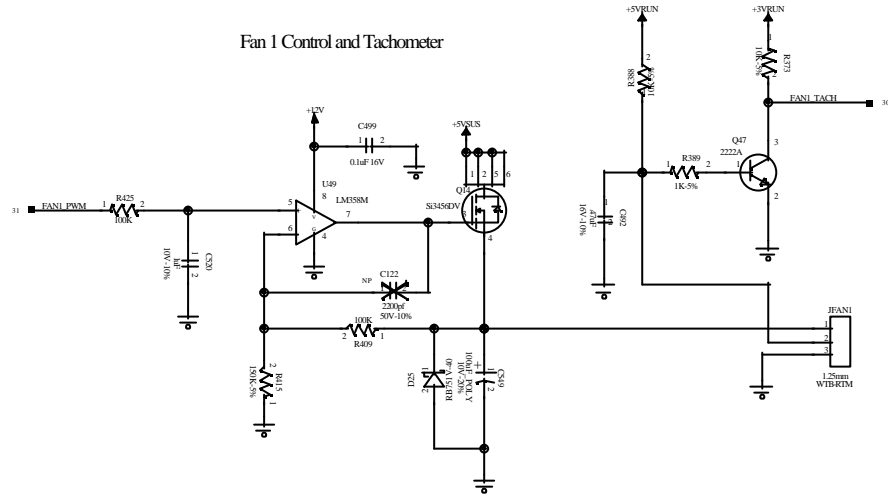
SUB-SUB_63111
sub-new keyboard connector. Specific to Comaneci.

		COMPUTER CORPORATION AUSTIN, TEXAS	
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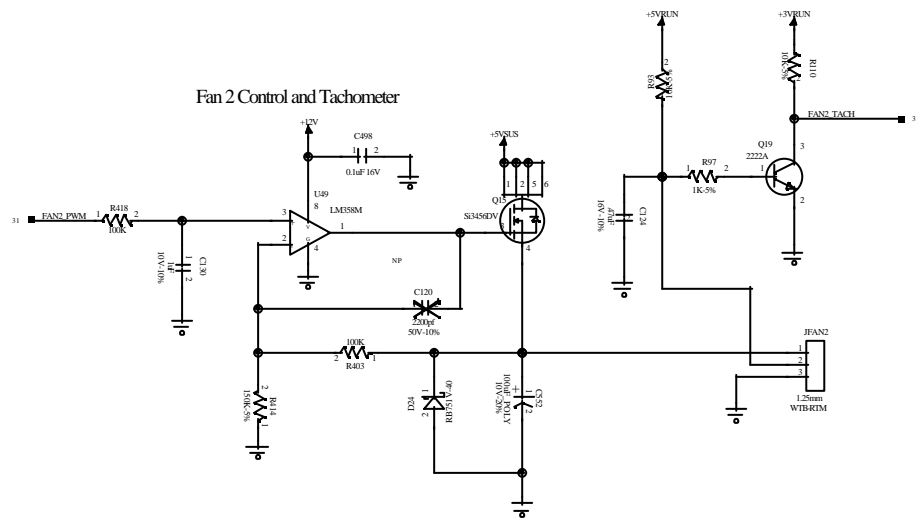
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Fan Control Circuit

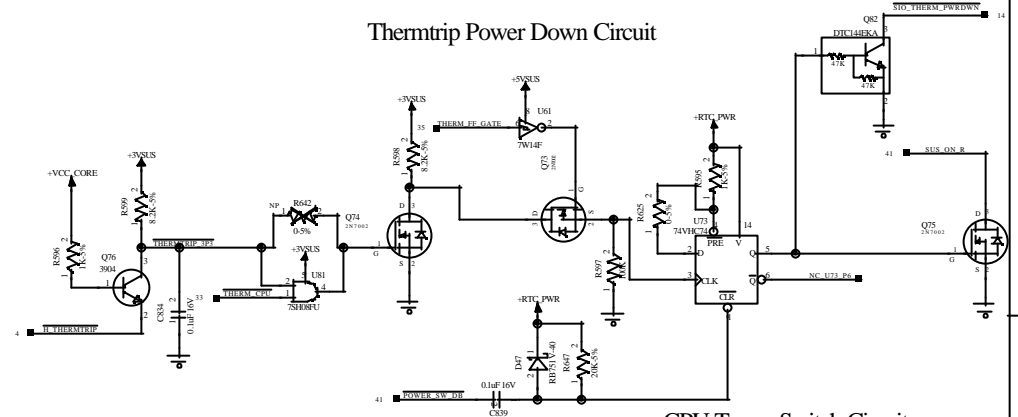
Fan 1 Control and Tachometer



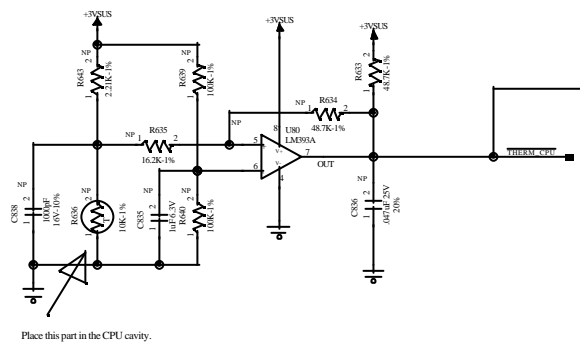
Fan 2 Control and Tachometer



Thermtrip Power Down Circuit

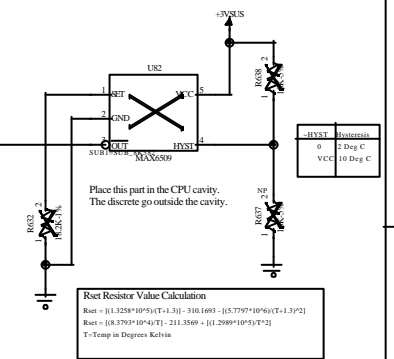


CPU Thermistor Circuit



Place this part in the CPU cavity.

CPU Temp. Switch Circuit



Place this part in the CPU cavity.
The discrete go outside the cavity.

Resistor Value Calculation
 $R_{set} = (1.228 \times 10^5) \times (T - T_0) + 310.1493 - (5.797 \times 10^6) \times (T - T_0)^2$
 $R_{set} = (8.3793 \times 10^4 T) - 211.3569 - (1.2989 \times 10^5) T^2$
 T = Temp in Degrees Kelvin

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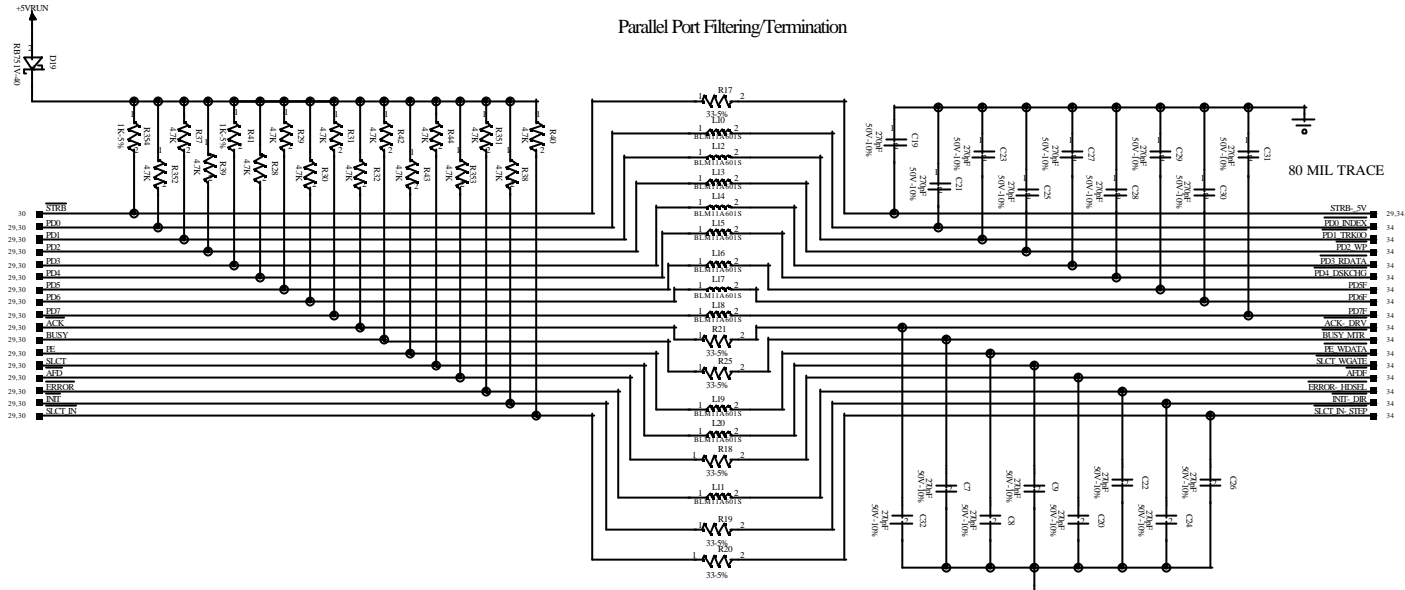
C

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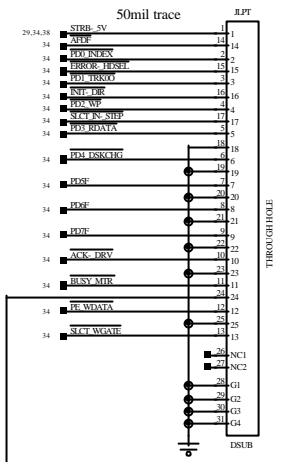
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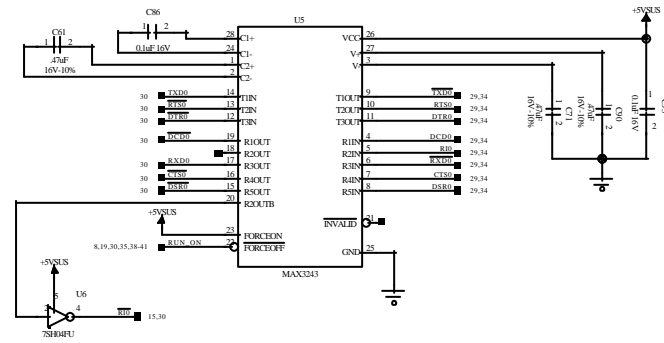
Parallel Port Filtering/Termination



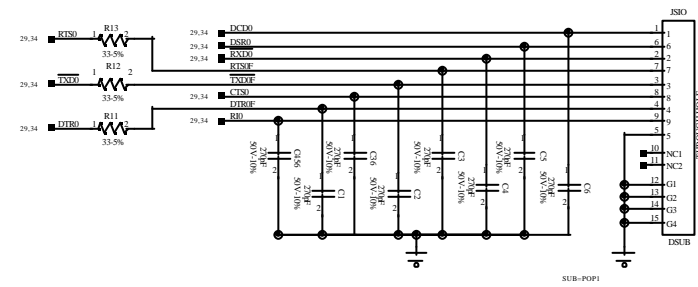
Parallel Port Connector



Serial Port Transceiver

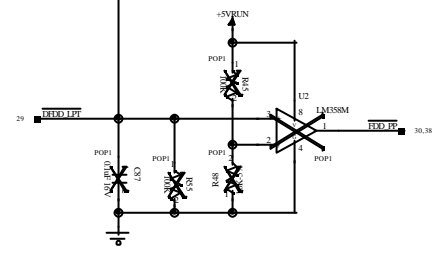


Serial Port Connector



REMOVE THIS

Parallel Port Floppy Detection



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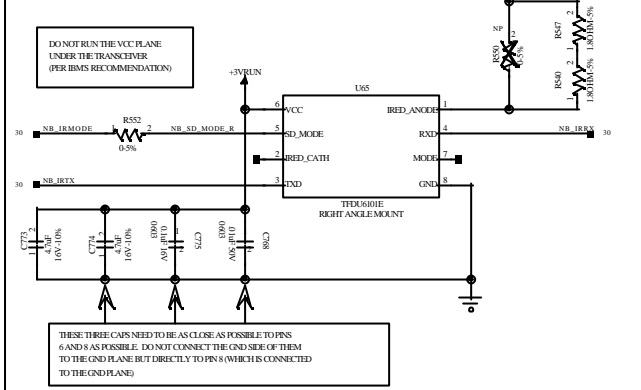
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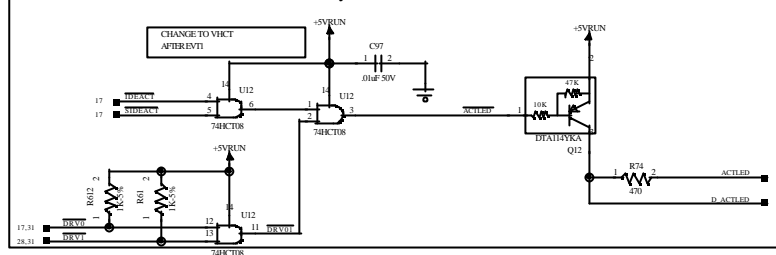
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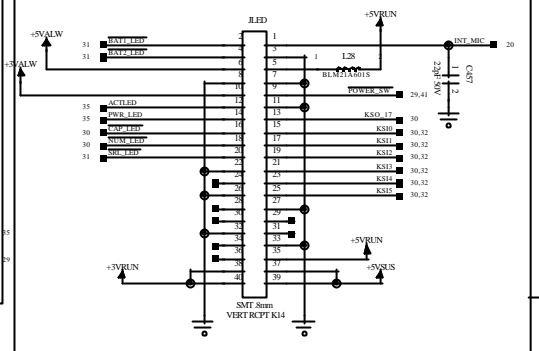
On-board IR Transceiver



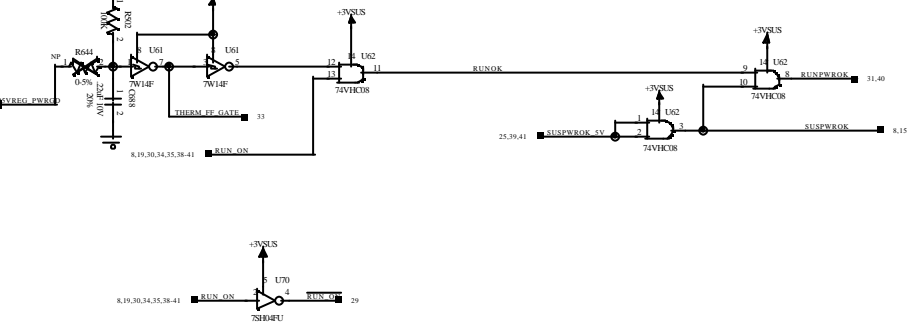
Activity LED Driver for Internal Drives



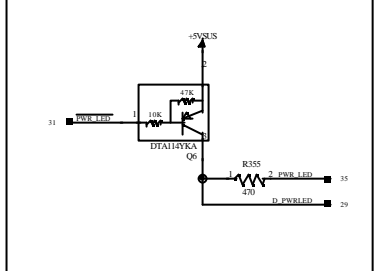
LED Board Connector



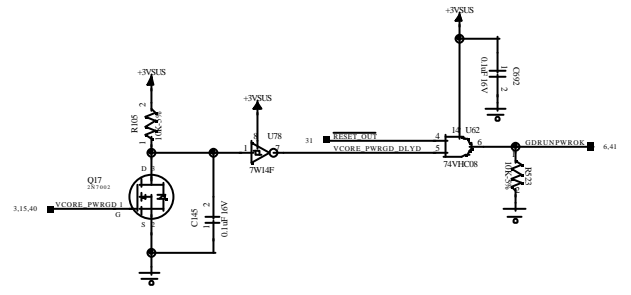
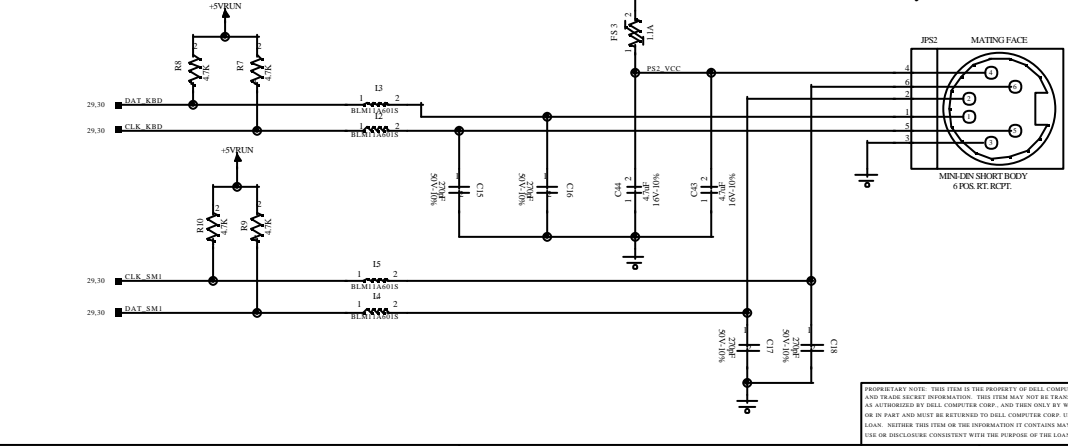
Power Sequencing Logic



Power LED Driver



External Keyboard Connector



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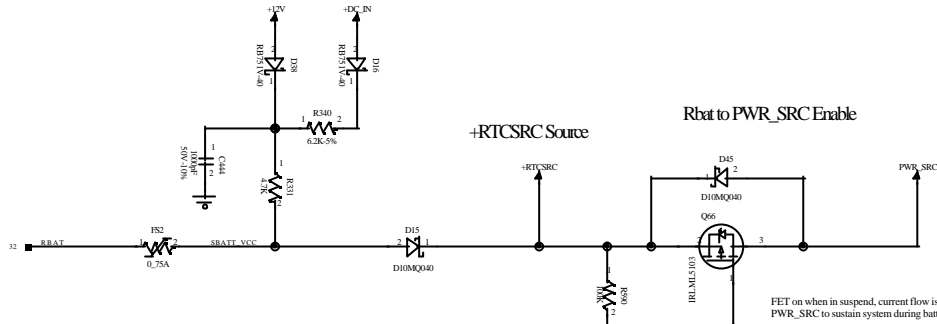
A

B

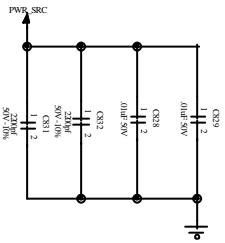
C

D

Rbat Charger

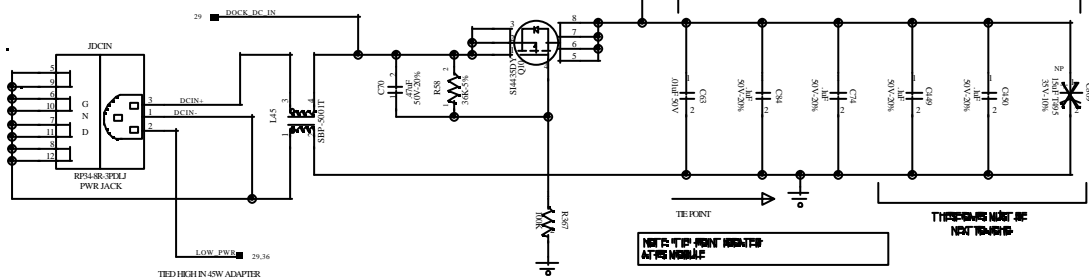


USE MULTIPLE VIAS FOR TRANSIENTS



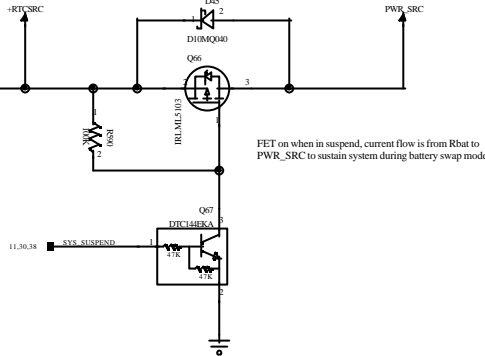
SAFETY WARNING
FOR REMOVAL OF THE FUSE

AC Adaptor Connector

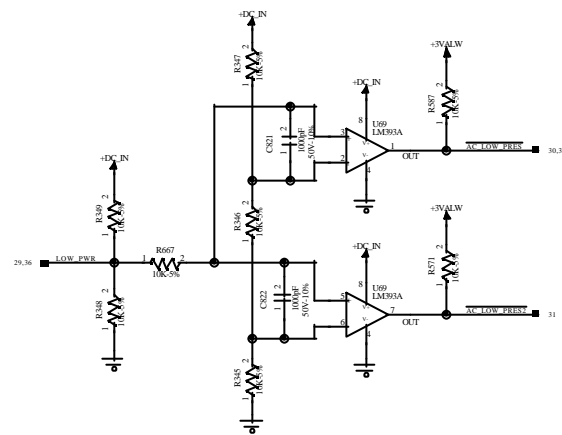


THIS IS NOT A POINT MOUNTED AT THE BOARD

Rbat to PWR_SRC Enable

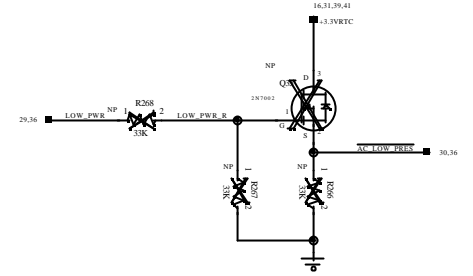


FET on when in suspend, current flow is from Rbat to PWR_SRC to sustain system during battery swap mode

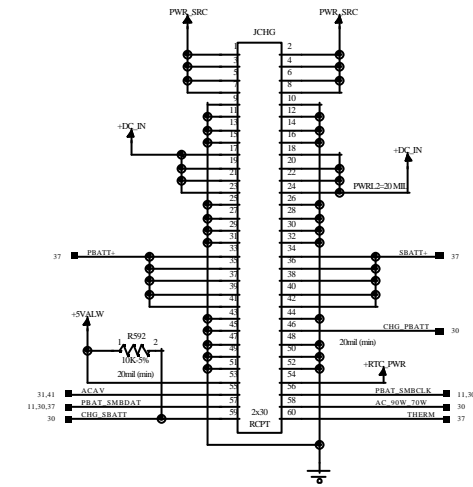


LOW_PWR	AC_LOW_PRES#	AC_LOW_PRESM
0V	0	0
FLOAT	0	1
20V	1	1

Low-Power Adapter Detection



Charger Board Connector



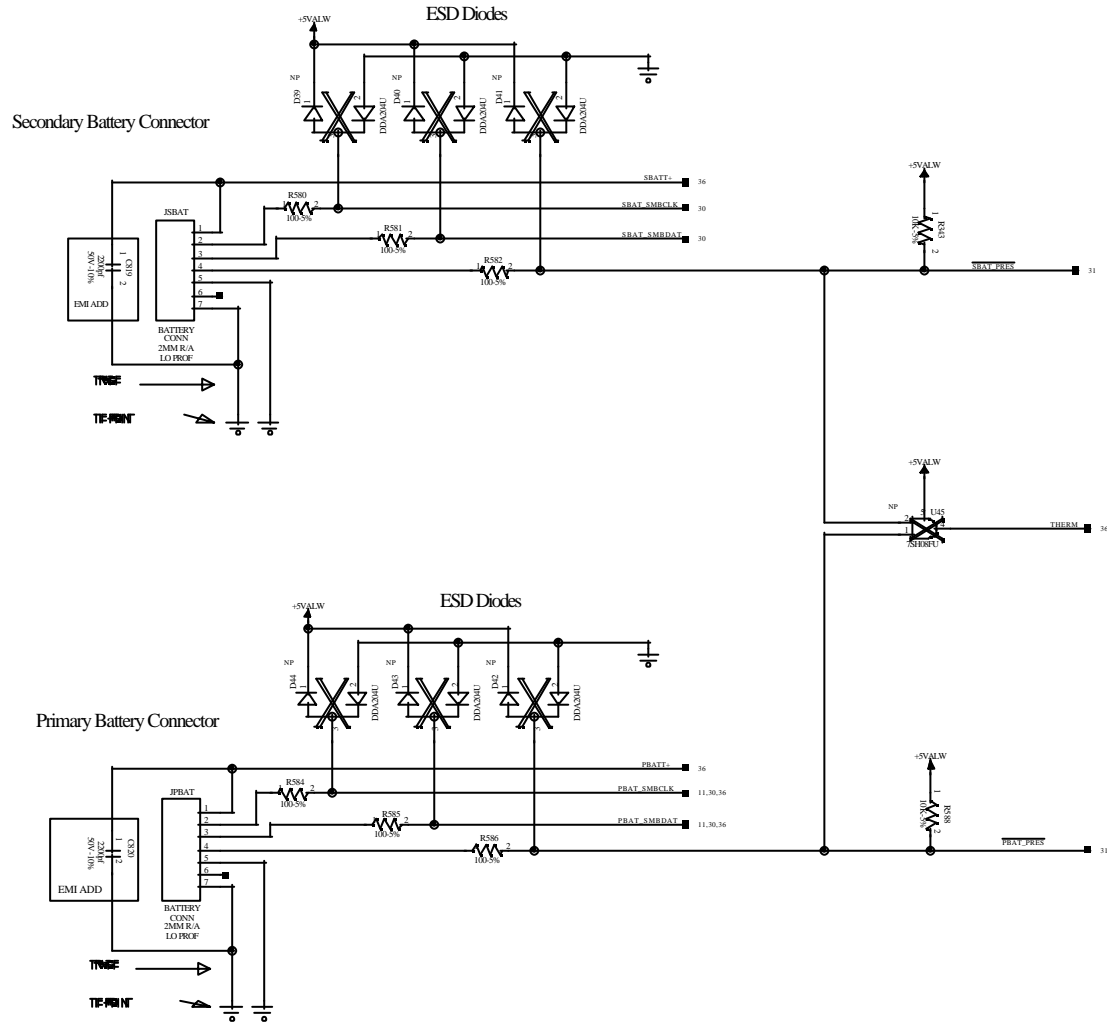
DELL COMPUTER CORPORATION AUSTIN, TEXAS

TITLE: SCHEMATIC, M/B LA-1221

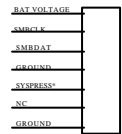
PWG NO: 401195 REV: 401195

DATE: 11/15/02 SHEET: 87 OF 102

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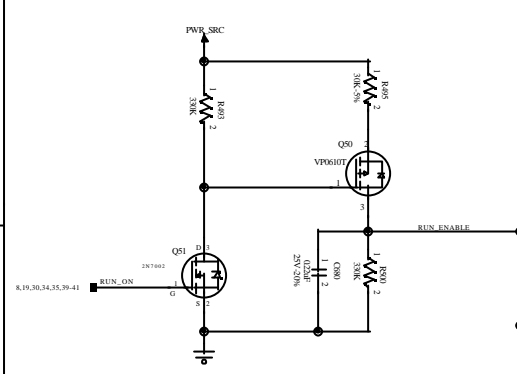
Li-Ion Battery Pinout



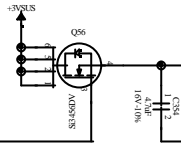
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DELL COMPUTER CORPORATION AUSTIN, TEXAS	
TITLE SCHEMATIC, M/B LA-1221	
PWG NO. 401195	REV. 4A
DATE 11/15/02	SHEET 88 OF 102

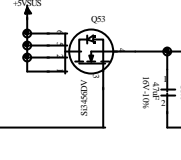
Run Planes Enable



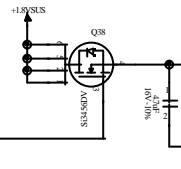
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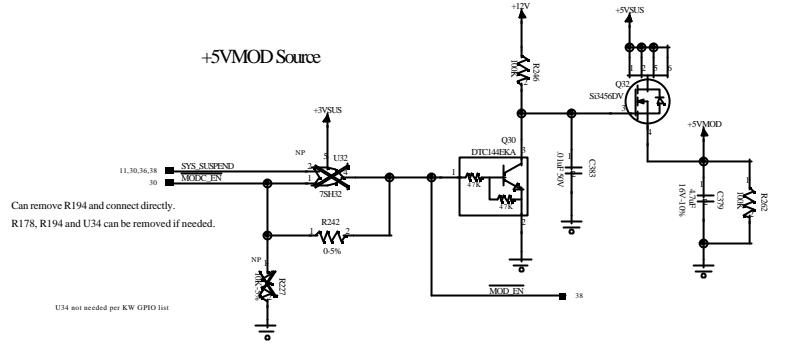
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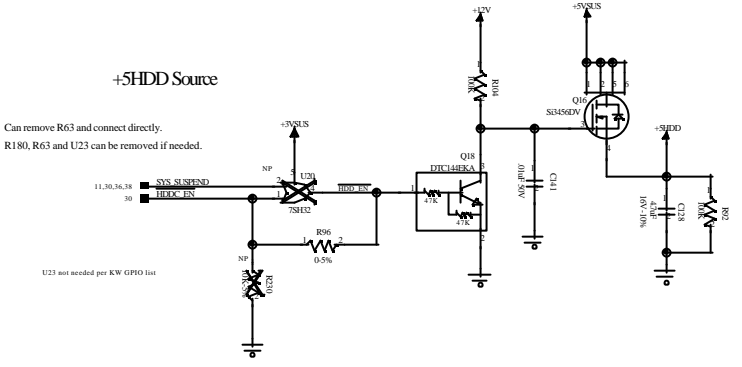
+1.8VRUN Source



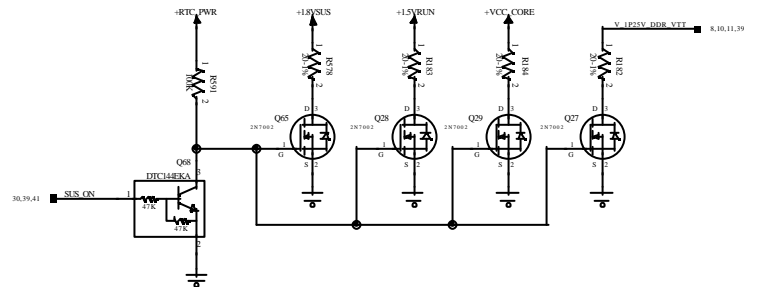
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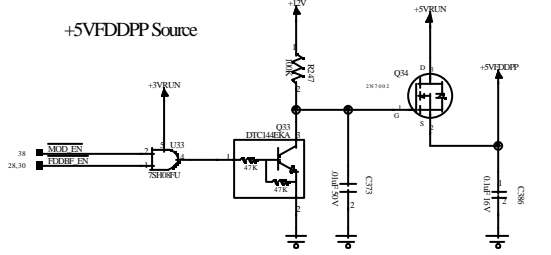
+5HDD Source



Voltage Rail Drains

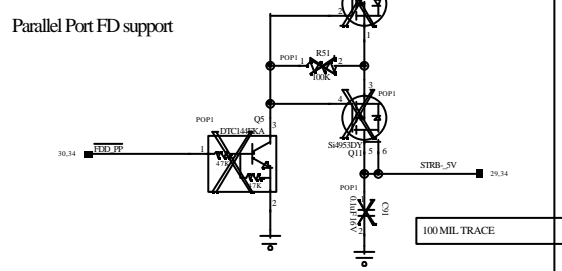


+5VFDDPP Source



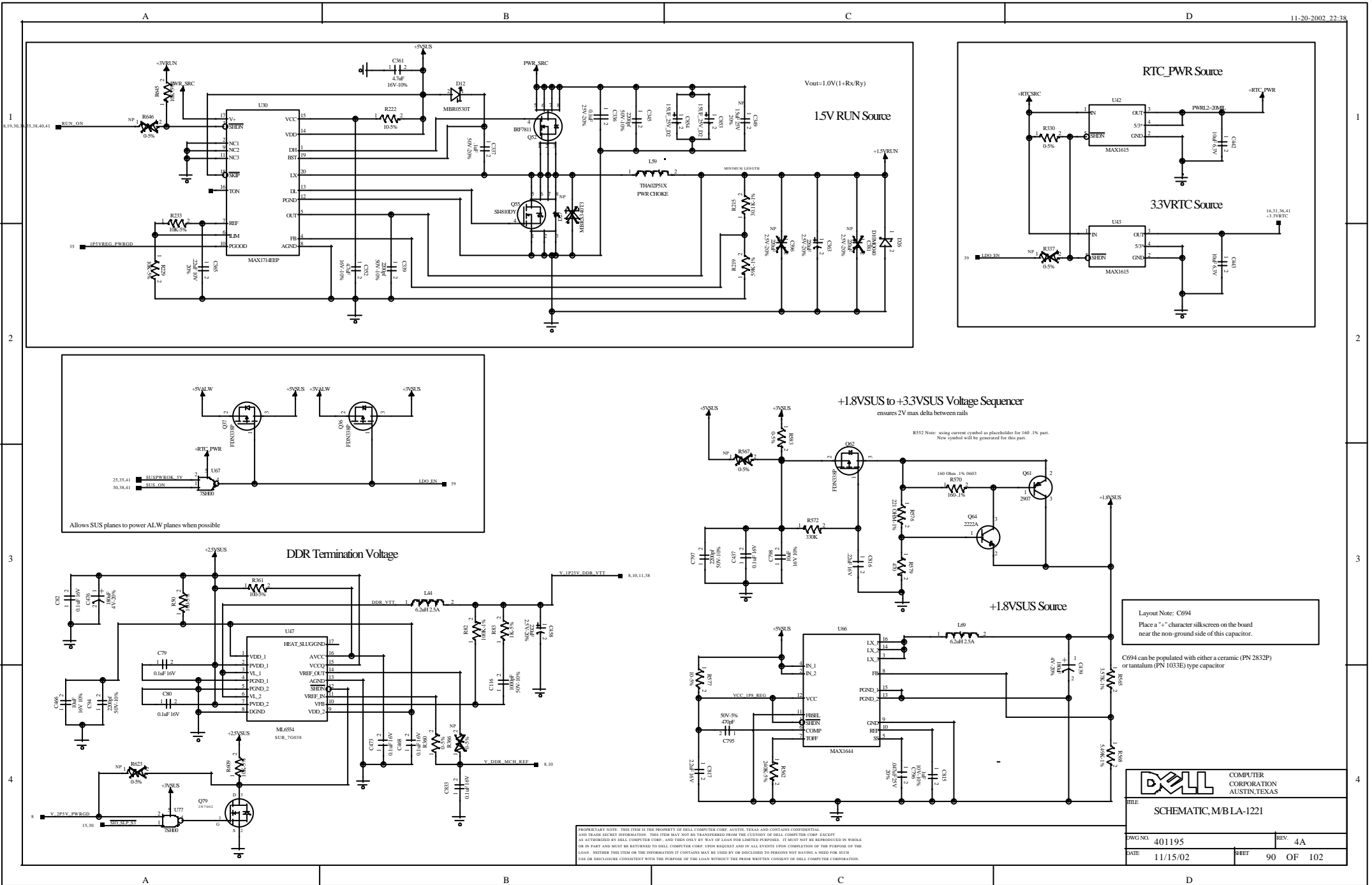
REMOVE THIS

STRB_5V Source



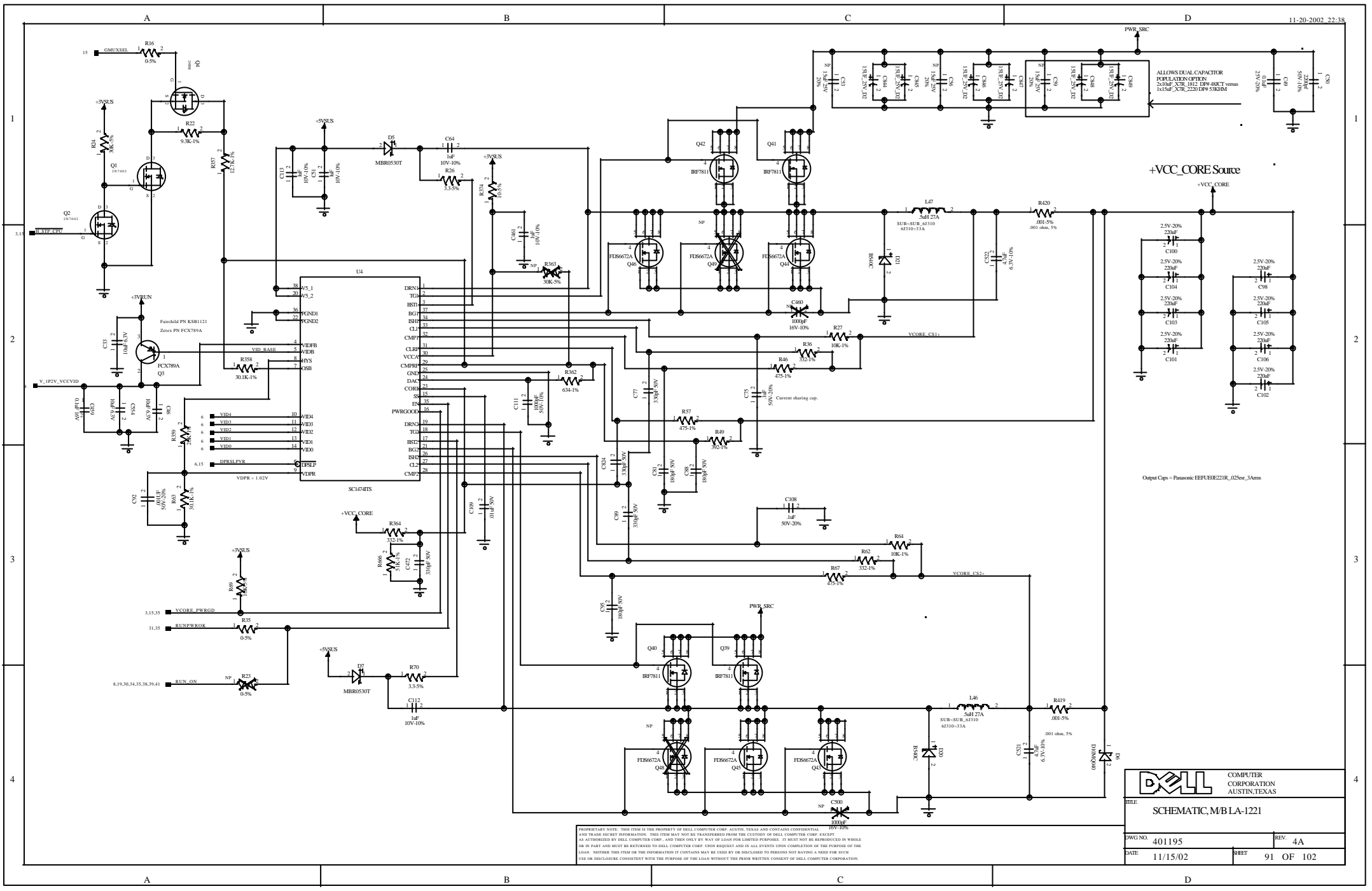
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DELL		COMPUTER CORPORATION AUSTIN, TEXAS	
TITLE SCHEMATIC, M/B LA-1221			
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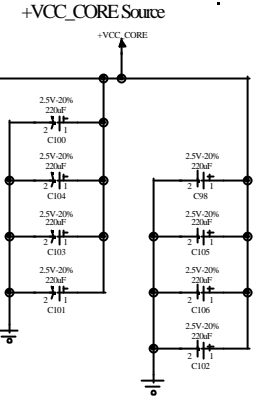


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ALLOWS DUAL CAPACITOR POPULATION OPTION
 2x10µF SCR 1812 DPO ASCT versus
 1x10µF SCR 2221 DPO S30UM

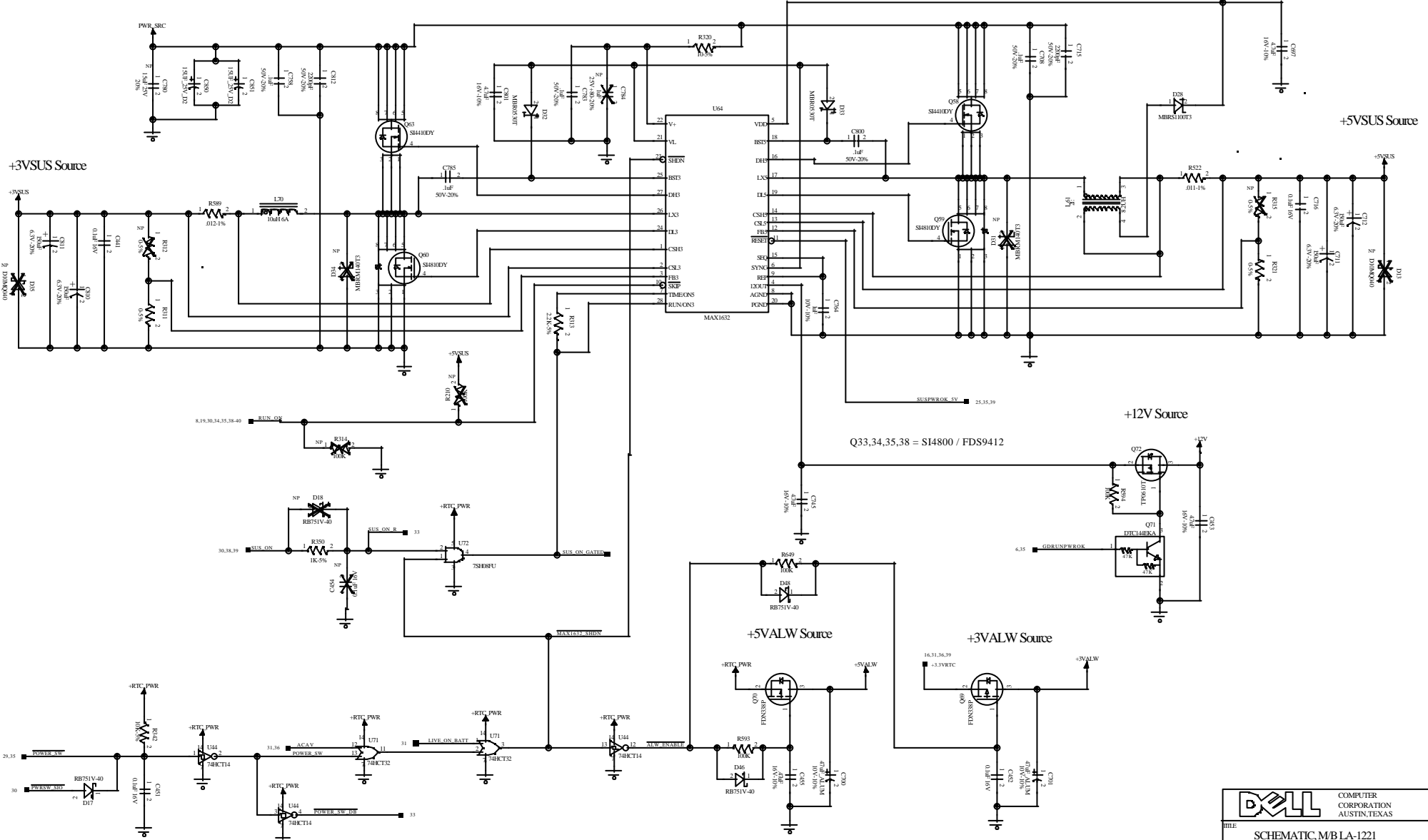


Output Caps = Panasonic EEFUEE221R_025er_3Ams

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TITLE SCHEMATIC, M/B LA-1221			
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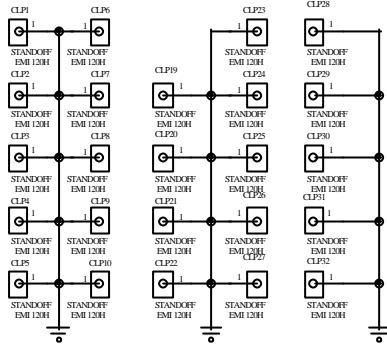
+5VSUS/+3VSUS PWM Controller



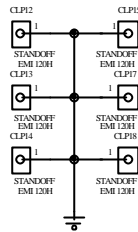
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DELL		COMPUTER CORPORATION AUSTIN, TEXAS	
TITLE SCHEMATIC, M/B LA-1221			
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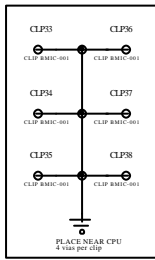
Memory Door EMI Clips



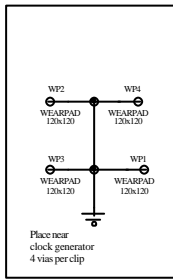
Mini-PCI Door EMI Clips



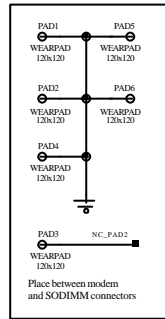
CPU EMI Clips



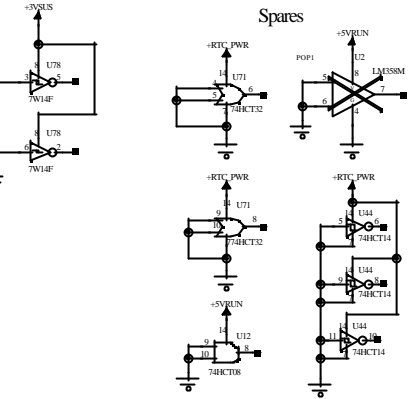
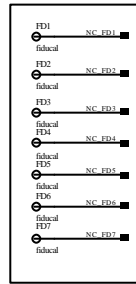
Clock Generator EMI Clips



Modem Fence Pads



Fiducial mark



1

2

3

1

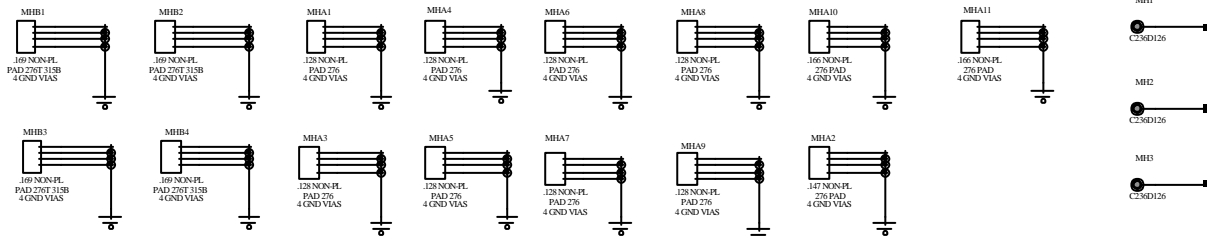
2

3

4

4

Mounting Holes



Xibom requires ADD attributes to be attached to an instance of a symbol (prefix I in the wire file). You may "nop" rename the attributes. The required order is: ADD, ADD1, ADD2, ...

ADD=ADD_3F195_PWB
 ADD1=ADD_1F475_SCHBEM
 ADD2=ADD_0F481_ASSYDVG
 ADD3=ADD_42753_BARCODE_REVLEVEL
 ADD4=ADD_12410_BARCODE_IDLABEL Label: LBL_ID, BARCODE.PWA
 PWA 2F219

DELL COMPUTER CORPORATION AUSTIN, TEXAS	
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A

B

C

D

A

B

C

D

Schematic Change List

1

1

2

2


3

3

4

4

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TITLE SCHEMATIC, M/B LA-1221		
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A

B

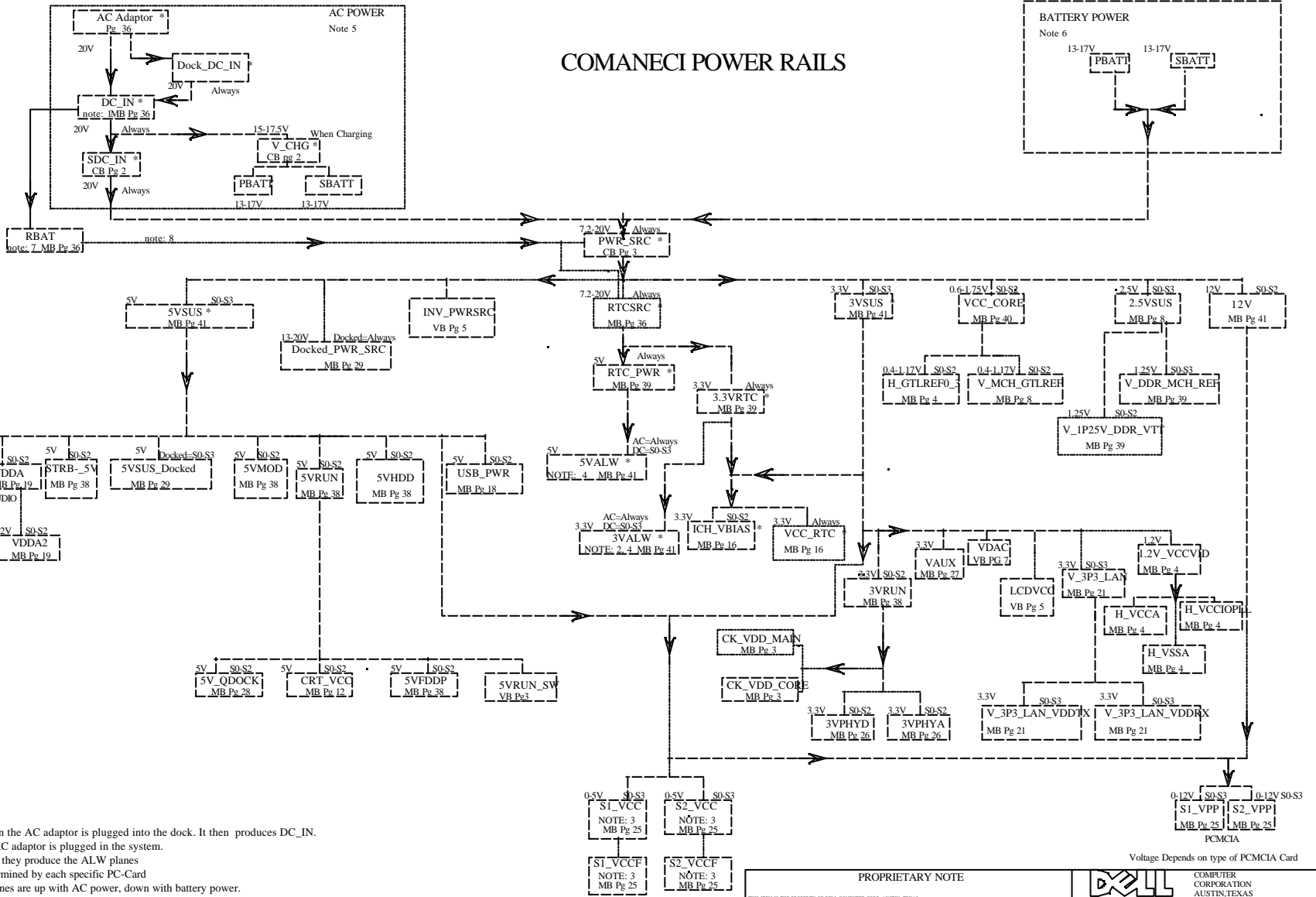
C

D

COMANECI POWER RAILS

LEGEND

CB = Charger Board X02
 MB = Mother Board X00
 VB = Video Board X04
 * = On in suspend



- Note 1 Dock_DC_IN is produced when the AC adaptor is plugged into the dock. It then produces DC_IN.
- DC_IN is produced when the AC adaptor is plugged in the system.
- Note 2 When SUS planes are available they produce the ALW planes
- Note 3 S1_VCC and S2_VCC are determined by each specific PC-Card
- Note 4 When System is off Always planes are up with AC power, down with battery power.
- Note 5 Track when AC is plugged into system
- Note 6 Track when System is battery power
- Note 7 Charged by 12V when on battery
- Note 8 Enables PWR_SRC during battery swap

PCMCIA
Voltage Depends on type of PCMCIA Card

Voltage Depends on type of PCMCIA Card

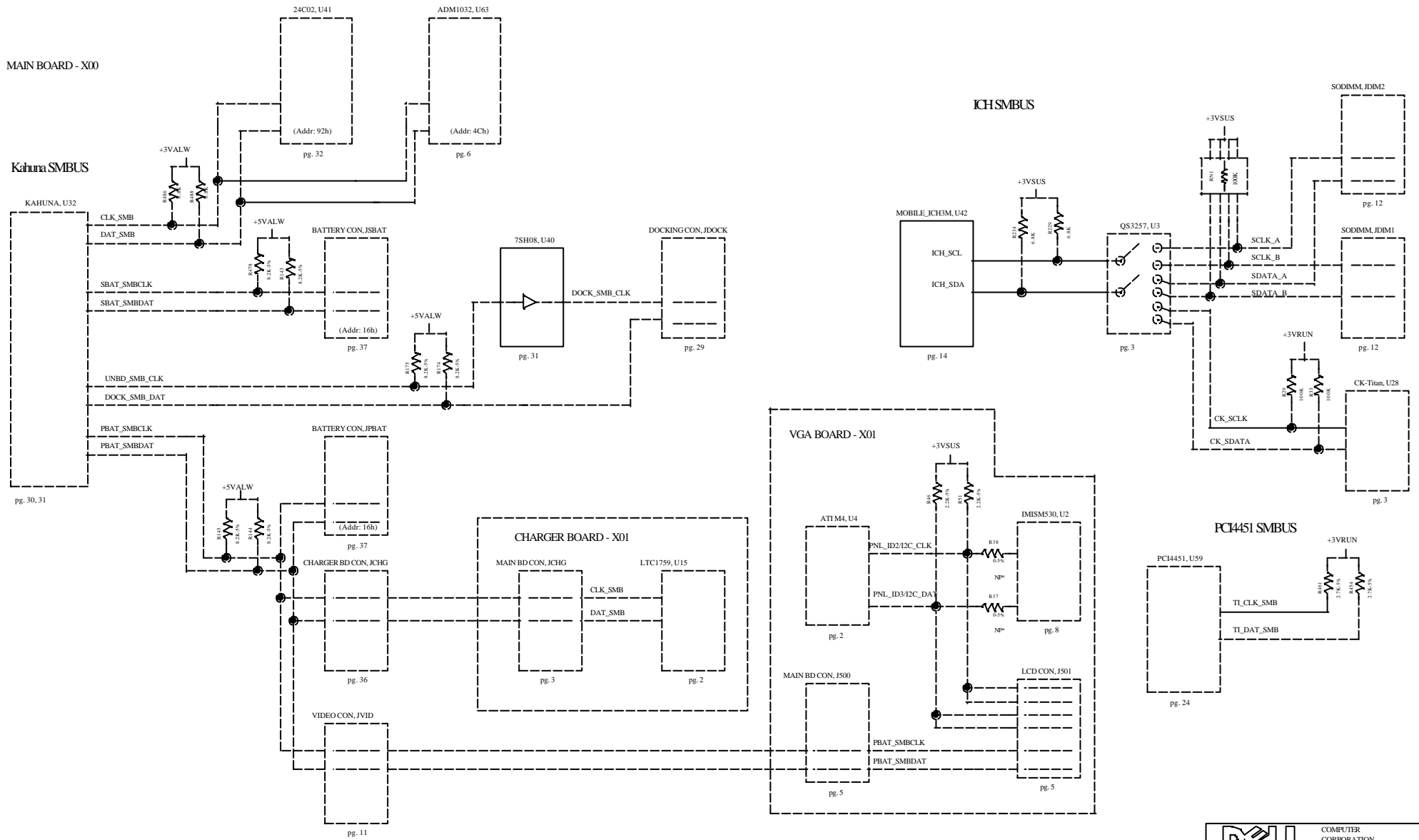
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	COMPUTER CORPORATION AUSTIN, TEXAS
SCHEMATIC, M/B LA-1221	
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MAIN BOARD - X00

Kahuna SMBUS

ICH SMBUS

PCI4451 SMBUS



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DELL		COMPUTER CORPORATION AUSTIN, TEXAS	
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REFDES PAGE

REFDES PAGE

REFDES PAGE

REFDES PAGE

REFDES PAGE

REFDES PAGE

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