

TOP LEVEL COLOUR CODE:
 PINK: ——— DAUGHTER BOARD SERVICE
 GREEN: ——— USER ACCESSABLE FEATURE
 BLUE: ——— PHYSICAL USER SERVICE
 LIGHT BLUE: ——— HOST SERVICE OR FUNCTION
 RED: ——— PLATFORM SERVICE (BOTH HOST+DB)
BOLD: ——— PLUG ON BOARD

Sheet Title NANOBOARD 2 - HANDHELD		Altium Limited, Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01			
Size: A3	Ass'y: D-820-0017	Revision: .02	
Date: 9/23/2011	Time: 12:03:16 AM	Sheet 1 of 66	
File: NB2HND01.SchDoc			



PSU_1V2
PSU_LTM4604_1V2.SchDoc



1V2 POWER

PSU_1V2
PSU_MAX1556_1V8.SchDoc



1V8 POWER

PSU_1V2
PSU_MAX1556_2V5.SchDoc



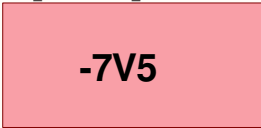
2V5 POWER

PSU_1V2
PSU_LTM4604_3V3.SchDoc



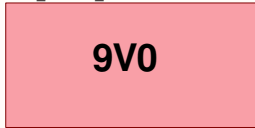
3V3 POWER

PSU_7V5
PSU_BZX84C7V5_-7V5.SchDoc



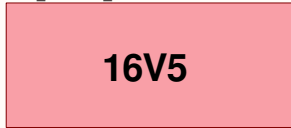
-7V5 POWER

PSU_9V0
PSU_LM317_9V0.SchDoc



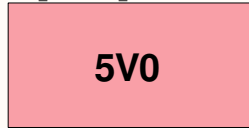
9V0 POWER

PSU_16V5
PSU_LM2704_16V5.SchDoc



16V5 POWER

PSU_5V0
PSU_MAX1709_5V0.SchDoc

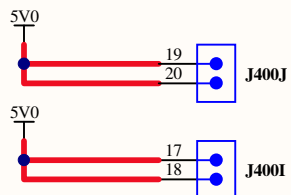
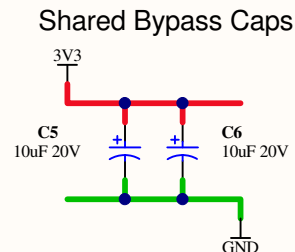
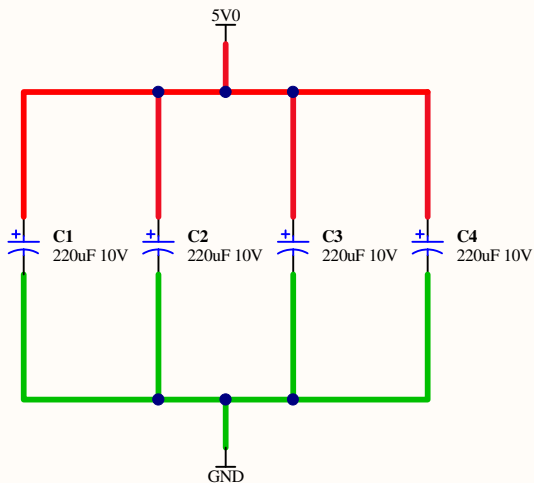


MAIN 5V0 SUPPLY

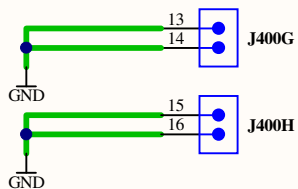
ANALOGUE SUPPLIES
PSU_ANALOGUE.SchDoc



ANALOGUE SUPPLIES



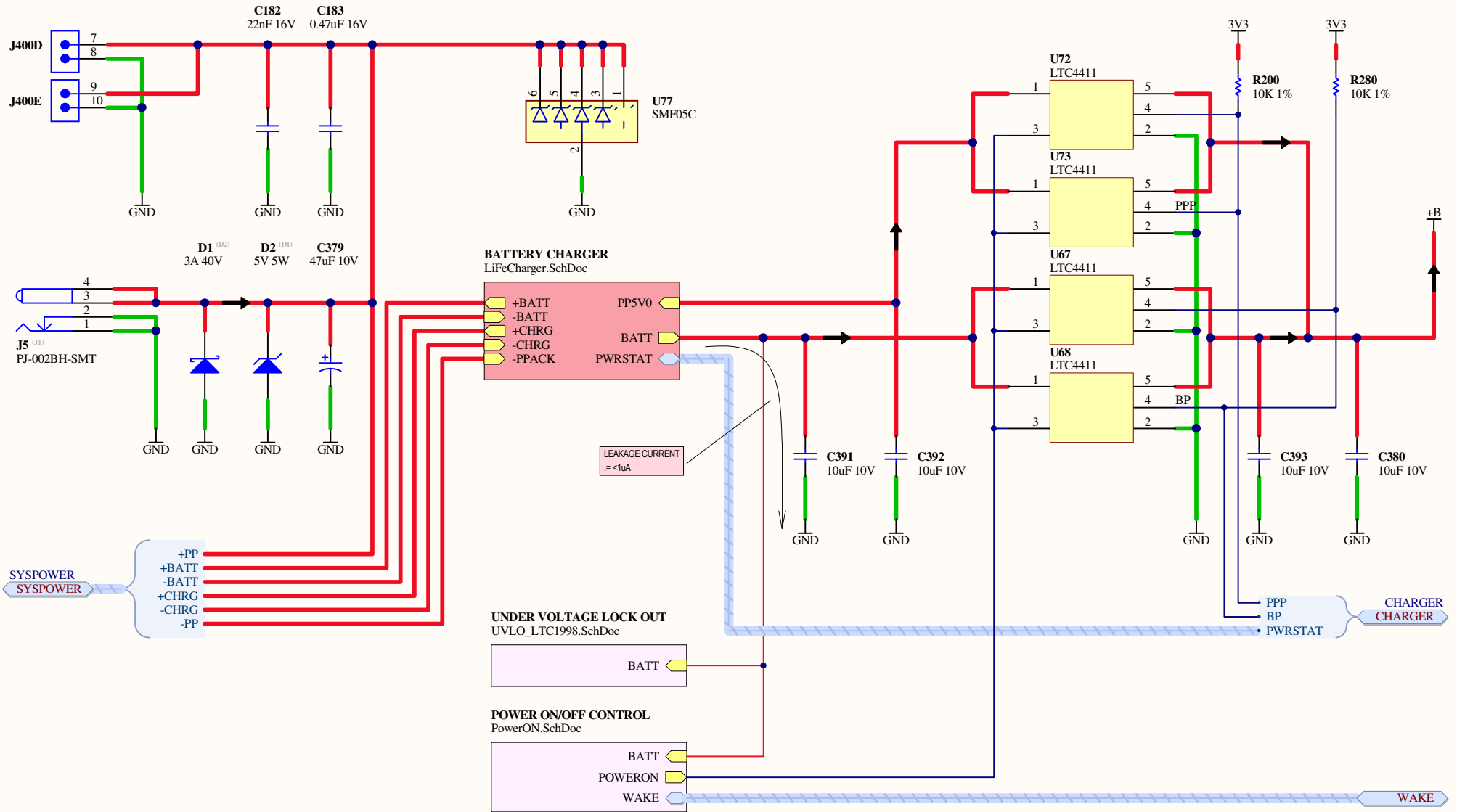
GSM+GPS POWER



Sheet Title NB2HND01 PRIMARY PS		
Project Title NanoBoard NB2DSK01		
Size: A4	Assy: D-810-0007	Revision: 08
Date: 9/23/2011	Time: 12:03:16 AM Sheet 2 of 64	
File: NB2_PSU.SchDoc		

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Frenchs Forest
NSW 2086
AUSTRALIA





Sheet Title **Power Jack & Distribution**

Project Title **NanoBoard NB2DSK01**

Size: A4 Assy: D-810-0007 Revision: 08

Date: 9/23/2011 Time: 12:03:16 AM Sheet 3 of 64

File: PWJACK+SWITCH.SchDoc

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Frenchs Forest
NSW 2086
AUSTRALIA



Standoffs For Single Peripheral Board

Standoffs For Daughter Board

PCB Local Identifiers

PB_MH3 (PB_MH1)
8.5mm spacer, Gold, 2xM3



PB_MH2
8.5mm spacer, Gold, 2xM3



PB_MH1 (PB_MH3)
8.5mm spacer, Gold, 2xM3



DB_MH3 (DB_MH1)
8.5mm spacer, Gold, 2xM3



DB_MH2
8.5mm spacer, Gold, 2xM3



DB_MH1 (DB_MH3)
8.5mm spacer, Gold, 2xM3



Altium Logo Top1
Altium



Altium Logo BOT1
Altium



LOGO2 (LOGO1)
Nanoboard Logo



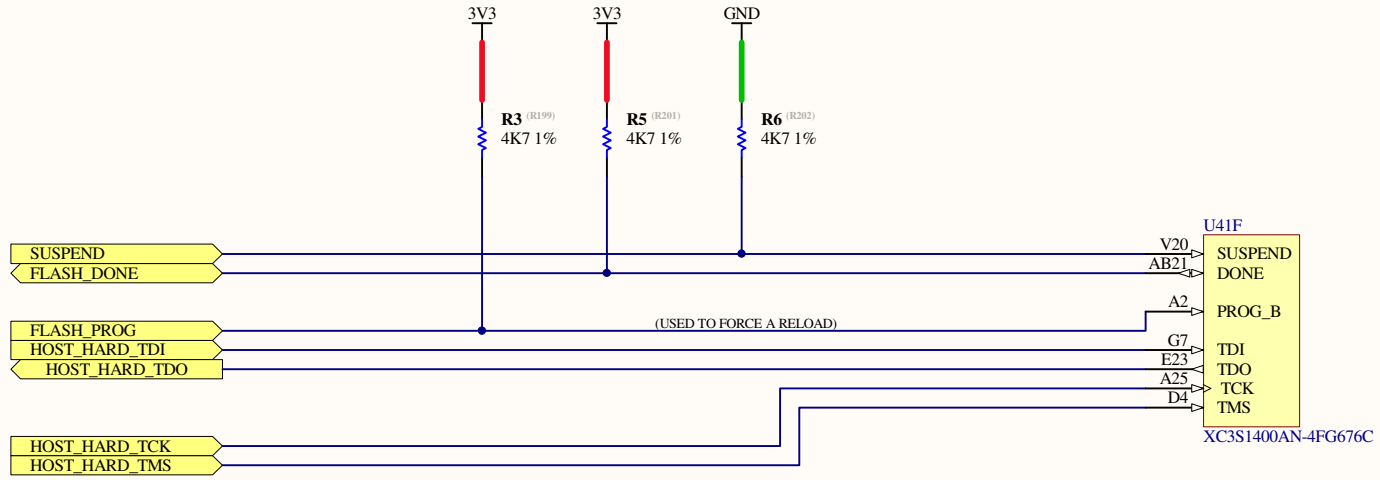
LOGO1 (LOGO2)
Nanoboard Logo



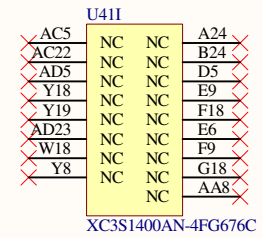
PCB1
NB2HND01 Blank PCB



Sheet Title NB2DSK01 Holes and Graphics		Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA		
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007			Revision: 08
Date: 9/23/2011	Time: 12:03:16 AM			Sheet 5 of 64
File: NB2HND_Mounts.SchDoc				



XC3S1500-4FG676C_CONFIGPWR_1
 XC3S1500-4FG676C_PWRSETUP.SchDoc



Sheet Title XC3S1500-4FG676C Configuration		Project Title NB2HND01		Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Size: A4	Assy: D-820-0017	Revision: .02			
Date: 9/23/2011	Time: 12:03:16 AM	Sheet 6 of 66			
File: FPGA_PRGSETUP.SchDoc					

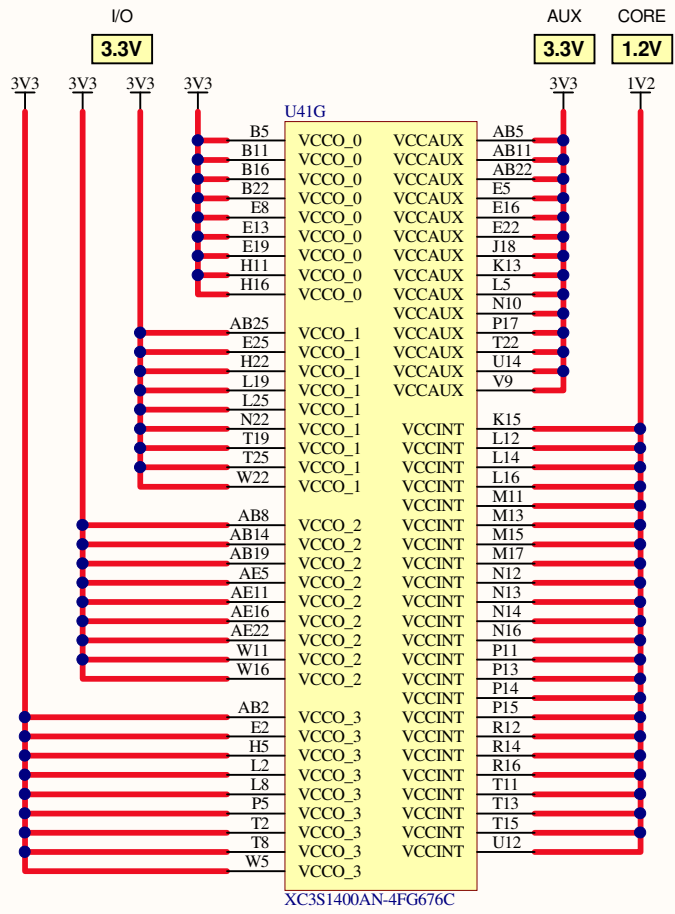
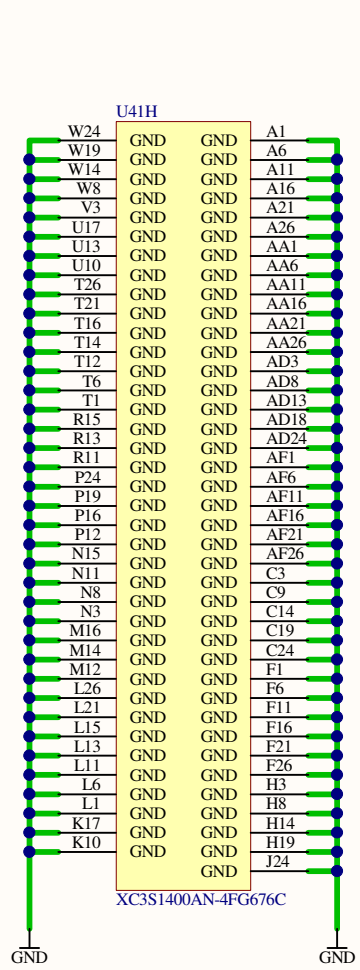
1V2

DECOUPLING_CAPS_1V2_1
FPGA_Bypass_1V2.SCHDOC



3V3

DECOUPLING_CAPS_3V3_1
FPGA_Bypass_3V3.SCHDOC



Sheet Title **XC3S1500-4FG676C POWER**

Project Title **NanoBoard NB2DSK01**

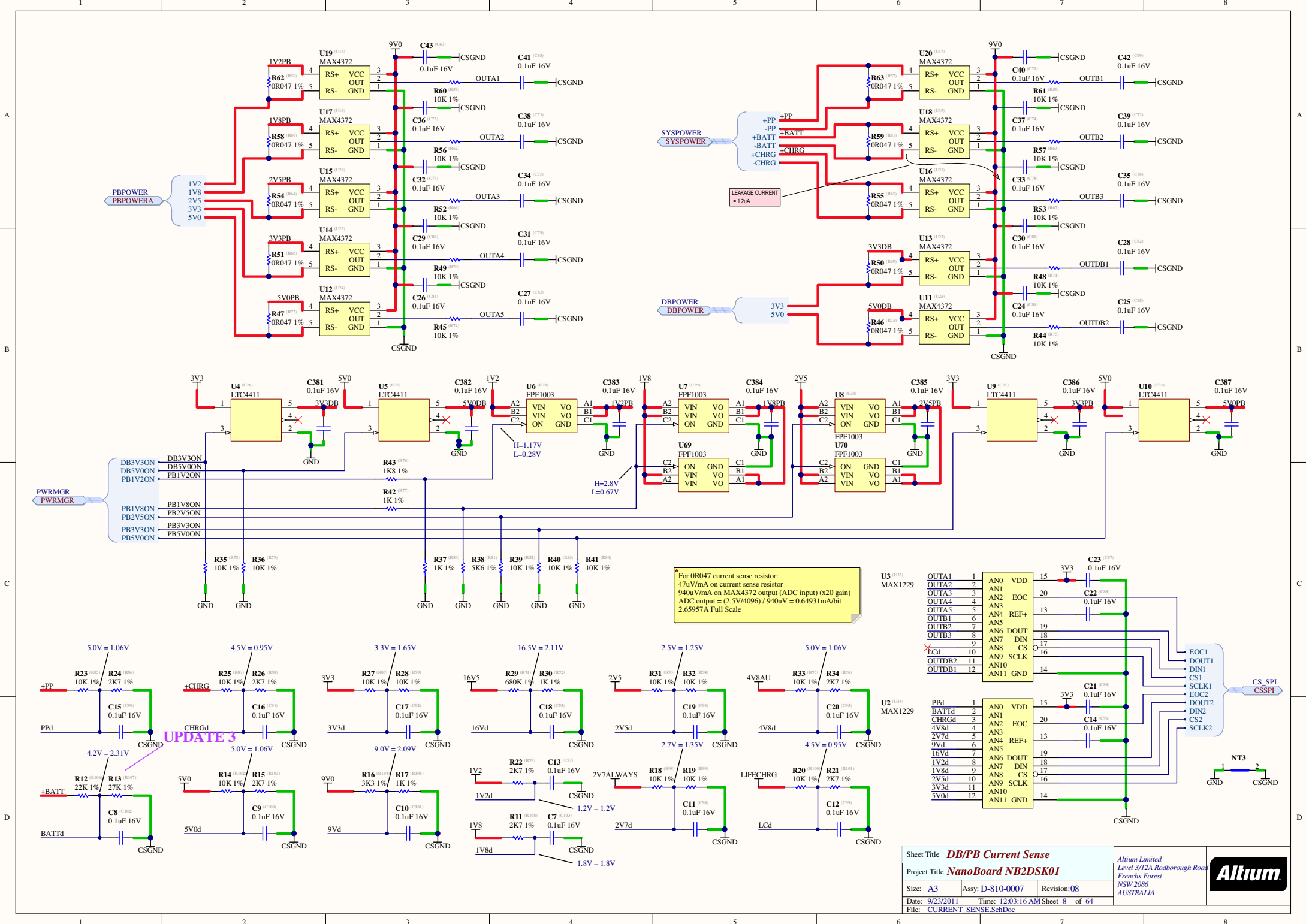
Size: A4 Assy: D-810-0007 Revision: 08

Date: 9/23/2011 Time: 12:03:16 AM Sheet 7 of 64

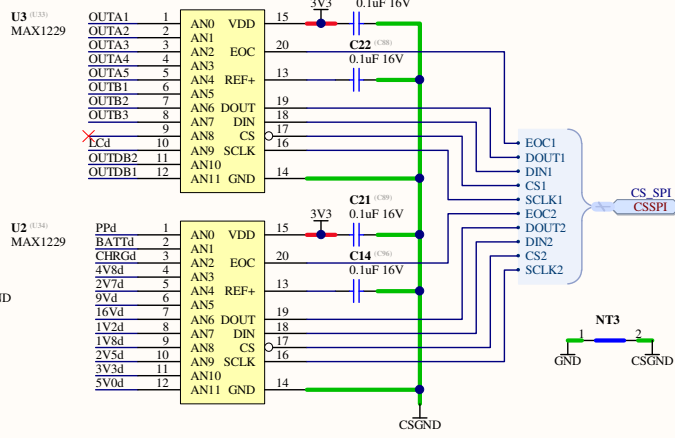
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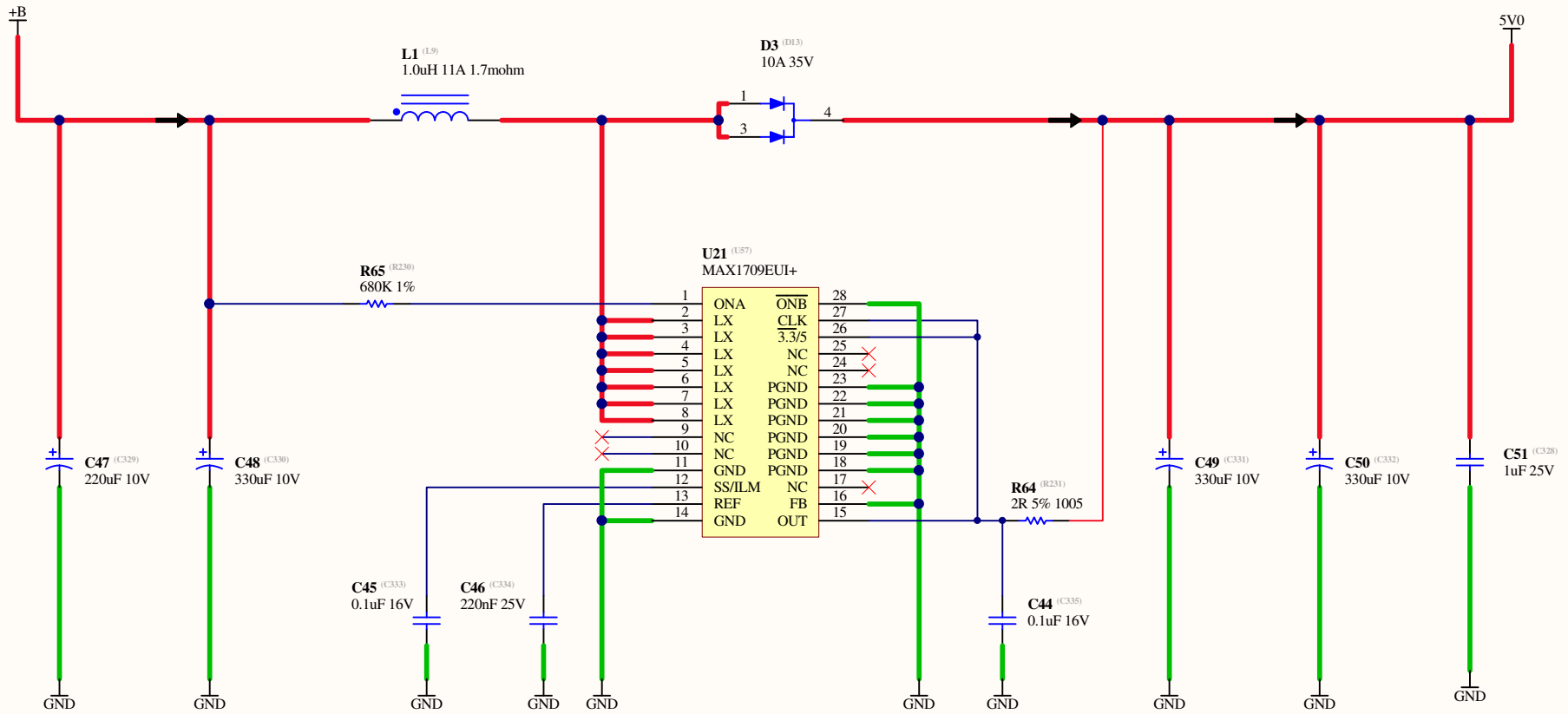
Altium Limited
Level 3/12A Rodborough Road
Frenchs Forest
NSW 2086
AUSTRALIA






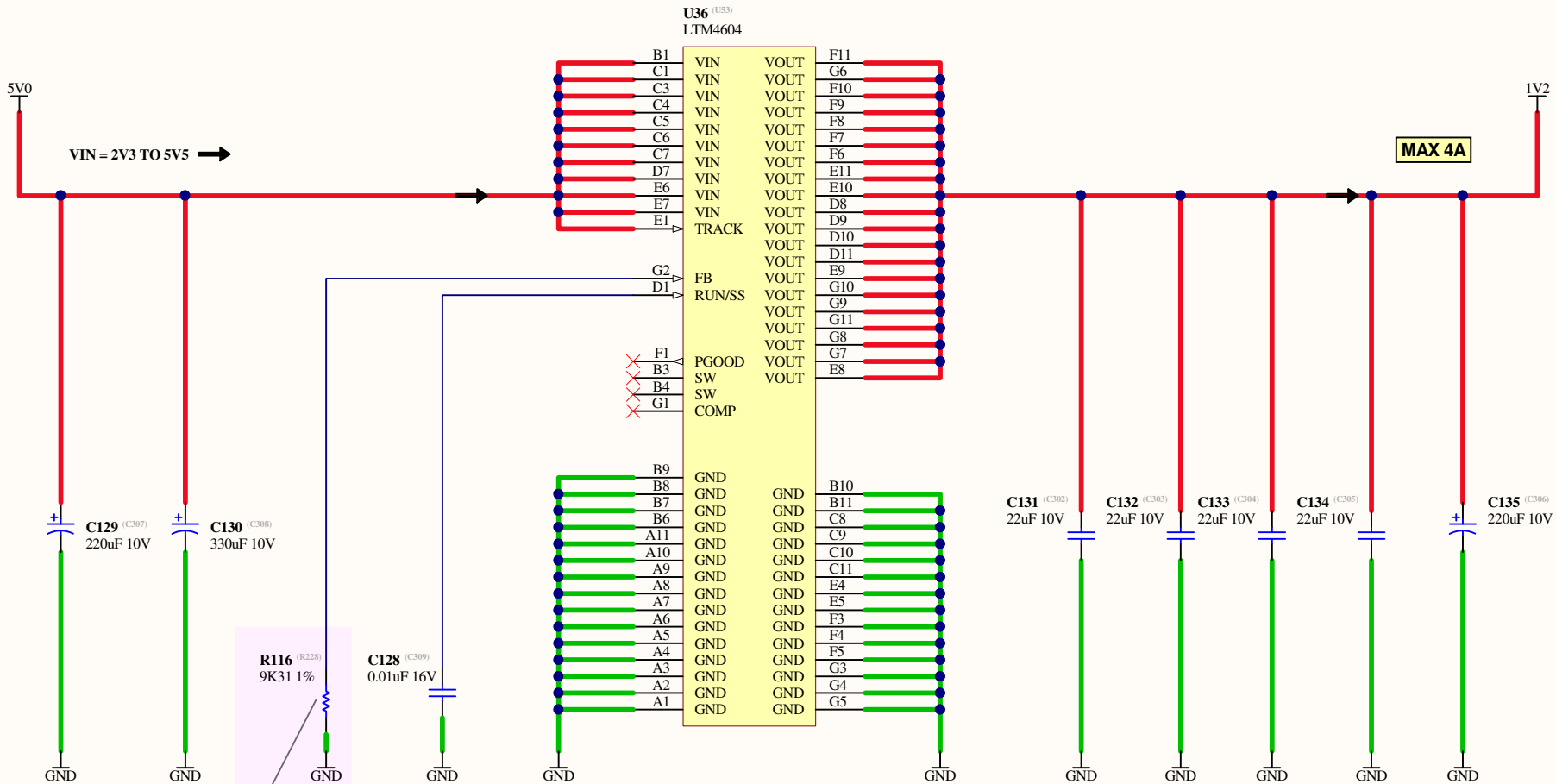
For 0R047 current sense resistor:
 47uV/mA on current sense resistor
 940uV/mA on MAX4372 output (ADC input) (x20 gain)
 ADC output = (2.5V/4096) / 940uV = 0.64931mV/bit
 2.65957A Full Scale





Primary 5.0V Supply

Sheet Title Power Supplt 5.0V			Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01				
Size: A4	Assy: D-820-0017	Revision: .02		
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 9 of 66		
File: PSU_MAX1709_5V0.SchDoc				

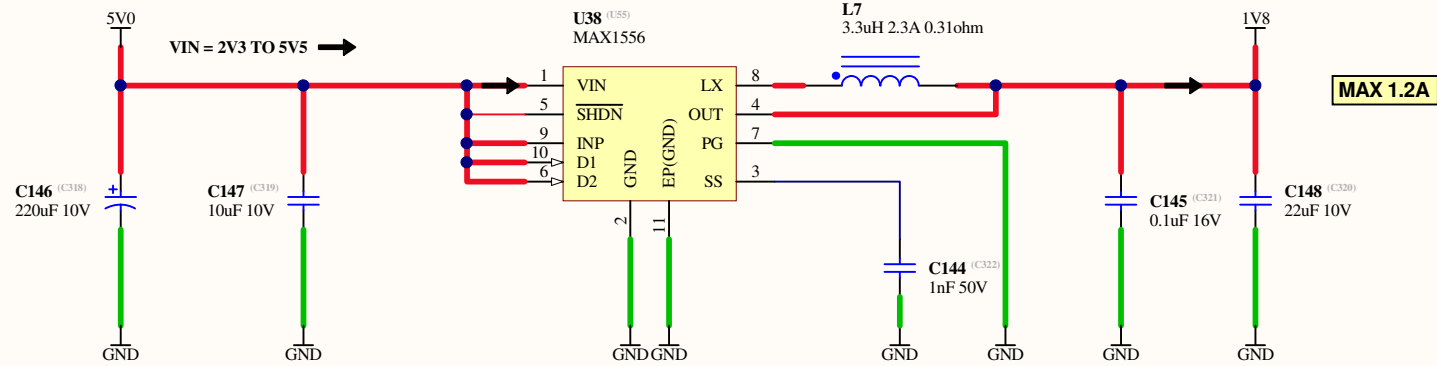


$$V_{out} = 0.8 \times \frac{4.99K + R_{fb}}{R_{fb}}$$

$$V_{out} = 0.8 \times \frac{4990 + 9310}{9310}$$

$$V_{out} = 1.228V$$

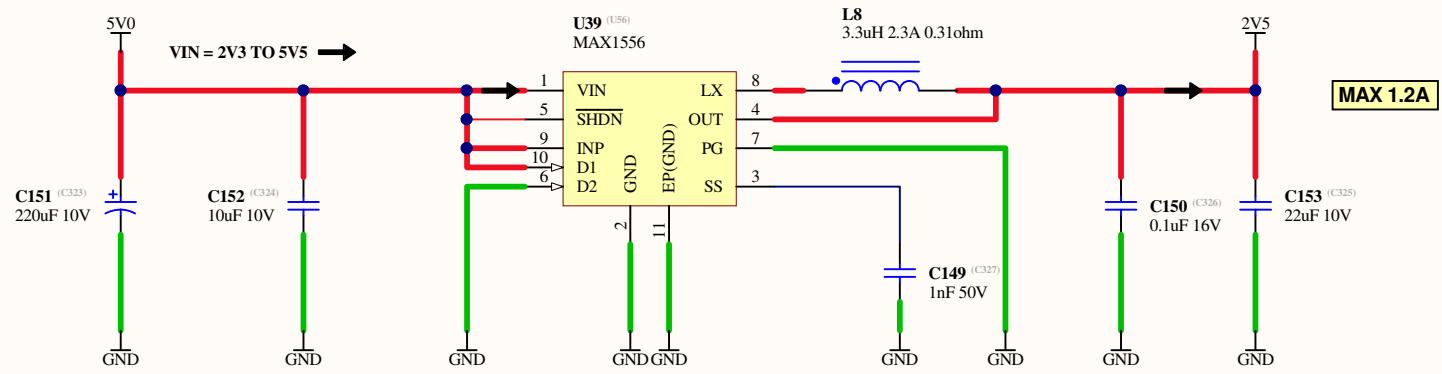
Sheet Title Power Supply 1.2V		Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01			
Size: A4	Assy: D-820-0017	Revision: 02	
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 10 of 66	
File: PSU_LTM4604_1V2.SchDoc			



MAX1556ETB VOLTAGE SELECT PINS

D1	D2	VOLTAGE
0	0	ADJ FROM 0.75V TO VIN
0	1	3.3V
1	0	2.5V
1	1	1.8V

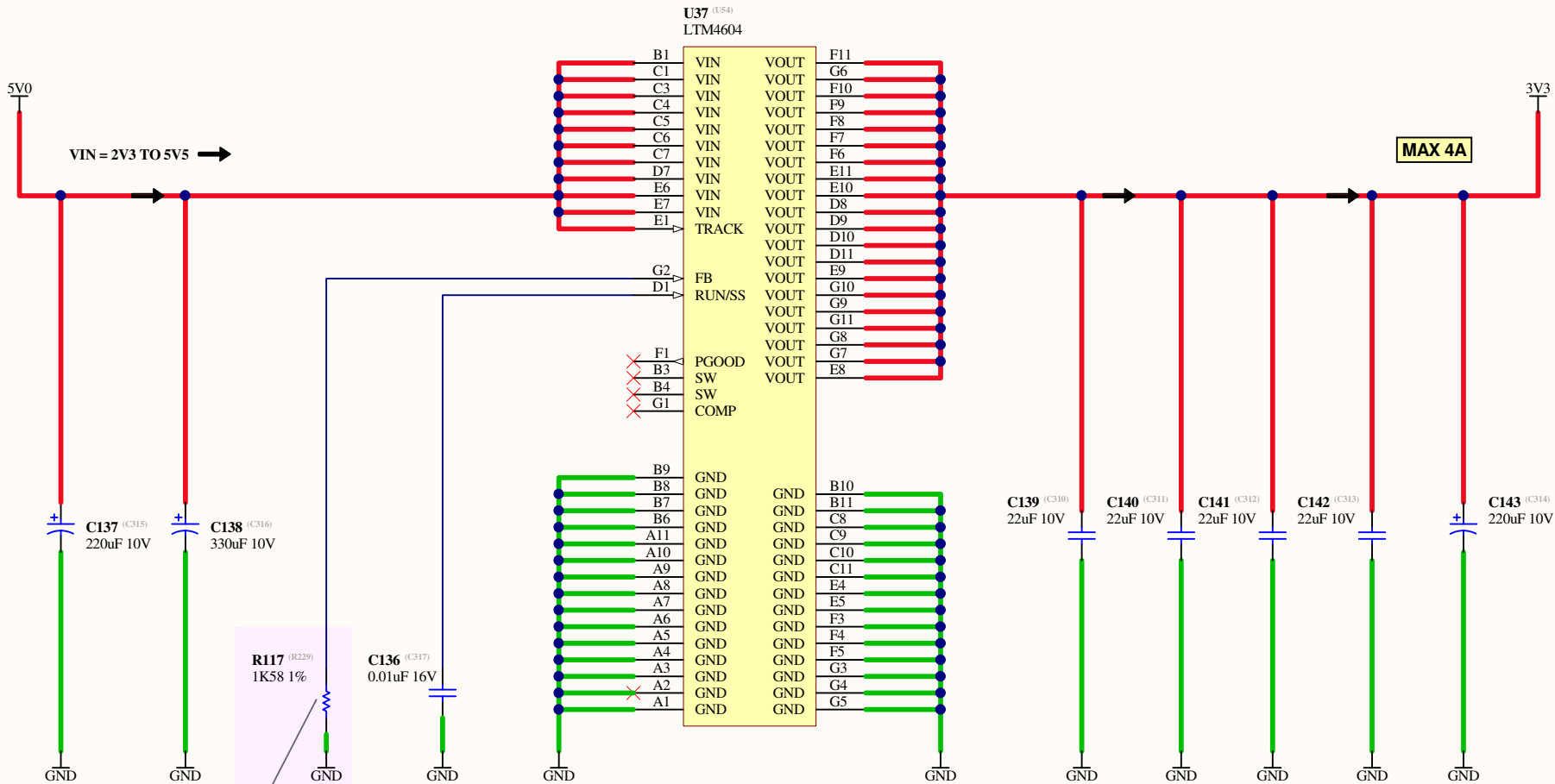
Sheet Title Power Supply - 1.8V		Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01			
Size: A4	Assy: D-820-0017	Revision: 02	
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 11 of 66	
File: PSU_MAX1556_1V8.SchDoc			



MAX1556ETB VOLTAGE SELECT PINS

D1	D2	VOLTAGE
0	0	ADJ FROM 0.75V TO VIN
0	1	3.3V
1	0	2.5V
1	1	1.8V


Sheet Title Power Supply 2.5V		Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01			
Size: A4	Assy: D-820-0017	Revision: .02	
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 12 of 66	
File: PSU_MAX1556_2V5.SchDoc			

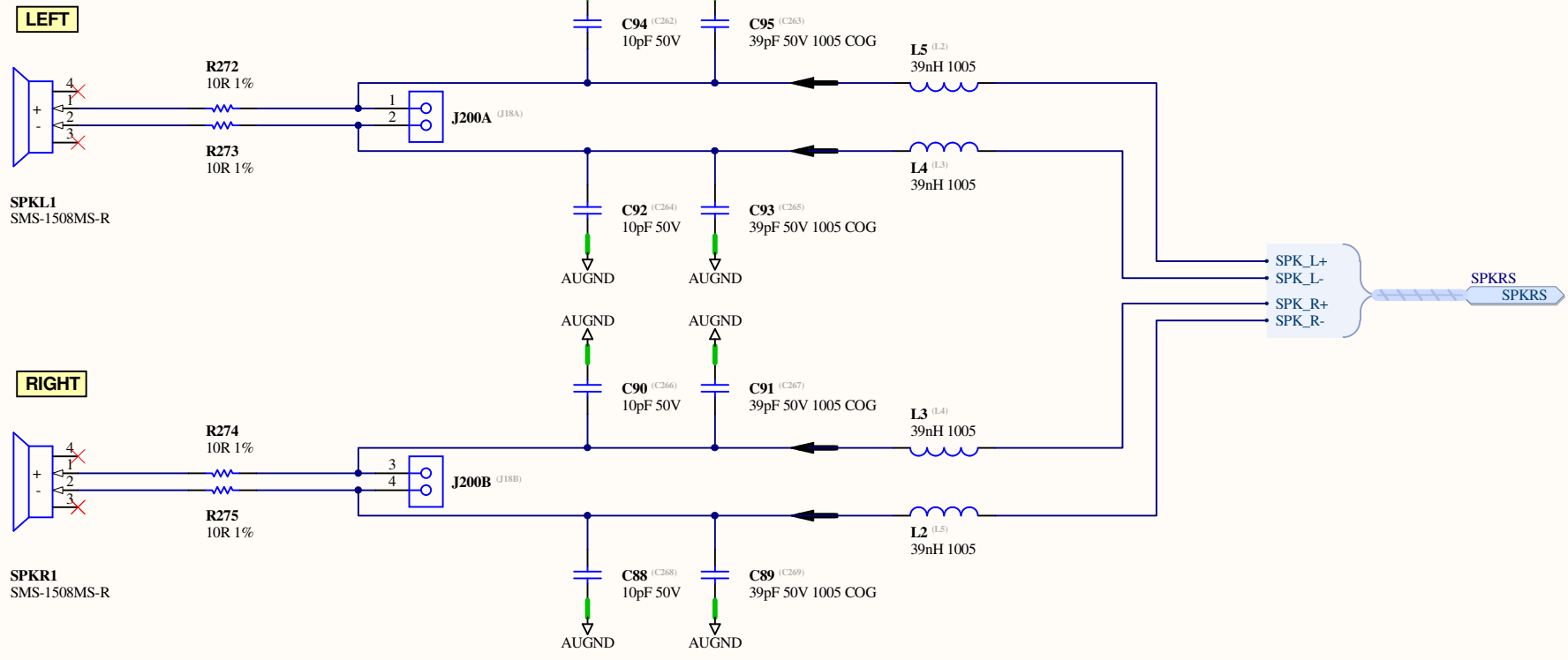


$$V_{out} = 0.8 \times \frac{4.99K + R_{fb}}{R_{fb}}$$

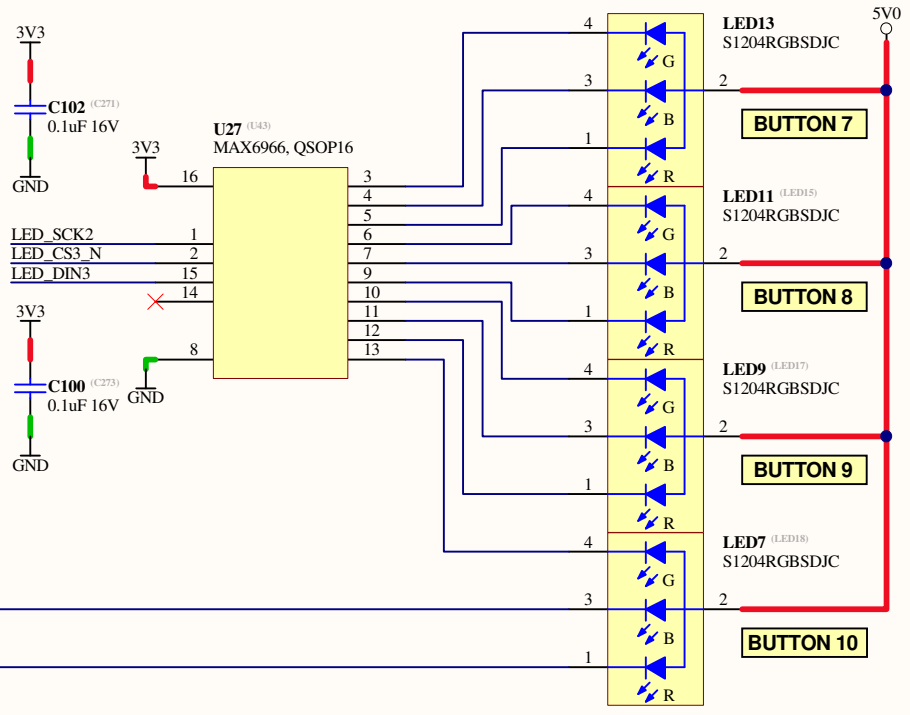
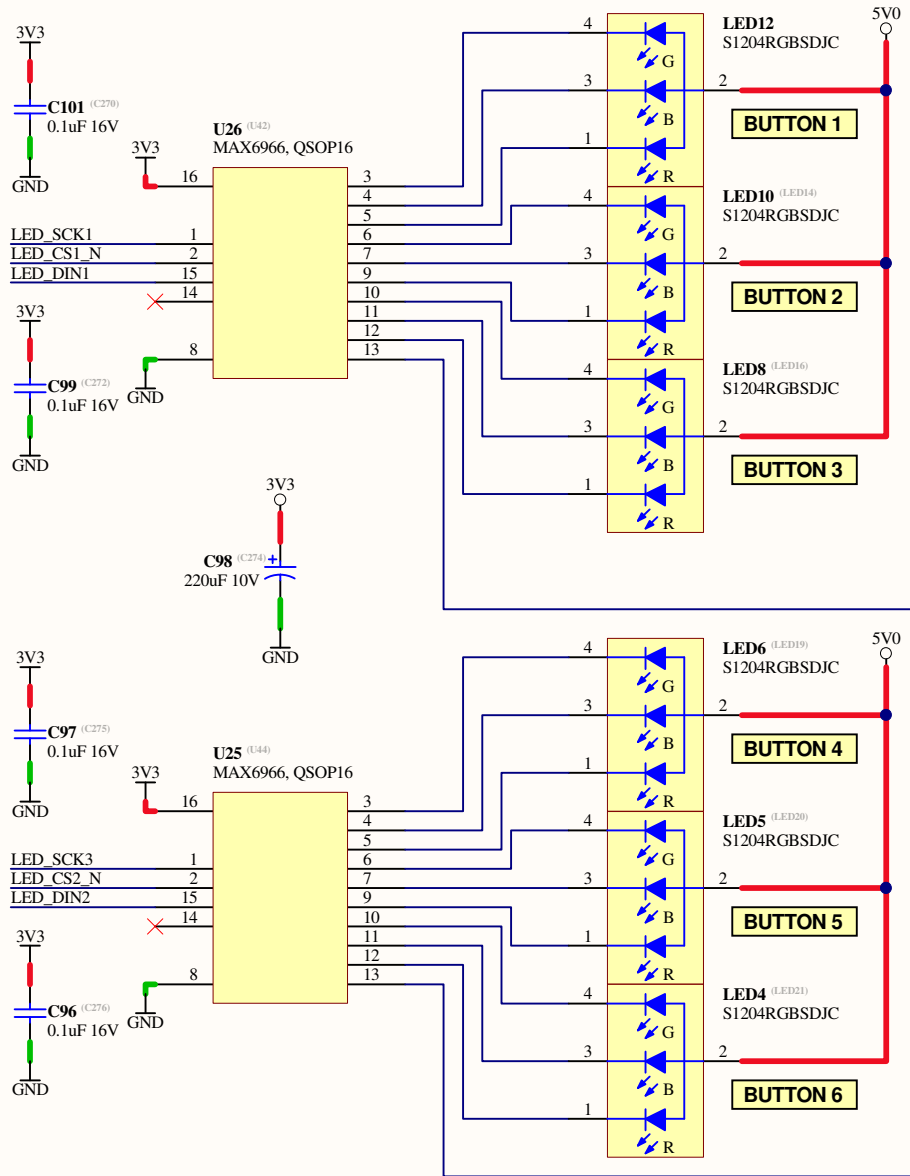
$$V_{out} = 0.8 \times \frac{4990 + 1580}{1580}$$

$$V_{out} = 3.332V$$

Sheet Title Power Supply 3.3V		Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA		
Project Title NB2HND01				
Size: A4	Assy: D-820-0017			Revision: .02
Date: 9/23/2011	Time: 12:03:17 AM			Sheet 13 of 66
File: PSU_LTM4604_3V3.SchDoc				



Sheet Title Internal Speakers			Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01				
Size: A4	Assy: D-820-0017	Revision: .02		
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 14 of 66		
File: INTSPK.SchDoc				



CS1_N	LED_CS1_N
CS2_N	LED_CS2_N
SCK1	LED_SCK1
DIN1	LED_DIN1
DIN2	LED_DIN2
SCK2	LED_SCK2
CS3_N	LED_CS3_N
SCK3	LED_SCK3
DIN3	LED_DIN3

MAX6966 POWER USAGE	
OFF:	3V3 0mA
STANDBY:	3V3 1.7uA
QUIESCENT:	3V3 730uA
ACTIVE:	3V3 4mA

LEDIF
KEYPADLEDS

Sheet Title **RGB LED Keypad Backlighting**

Project Title **NB2HND01**

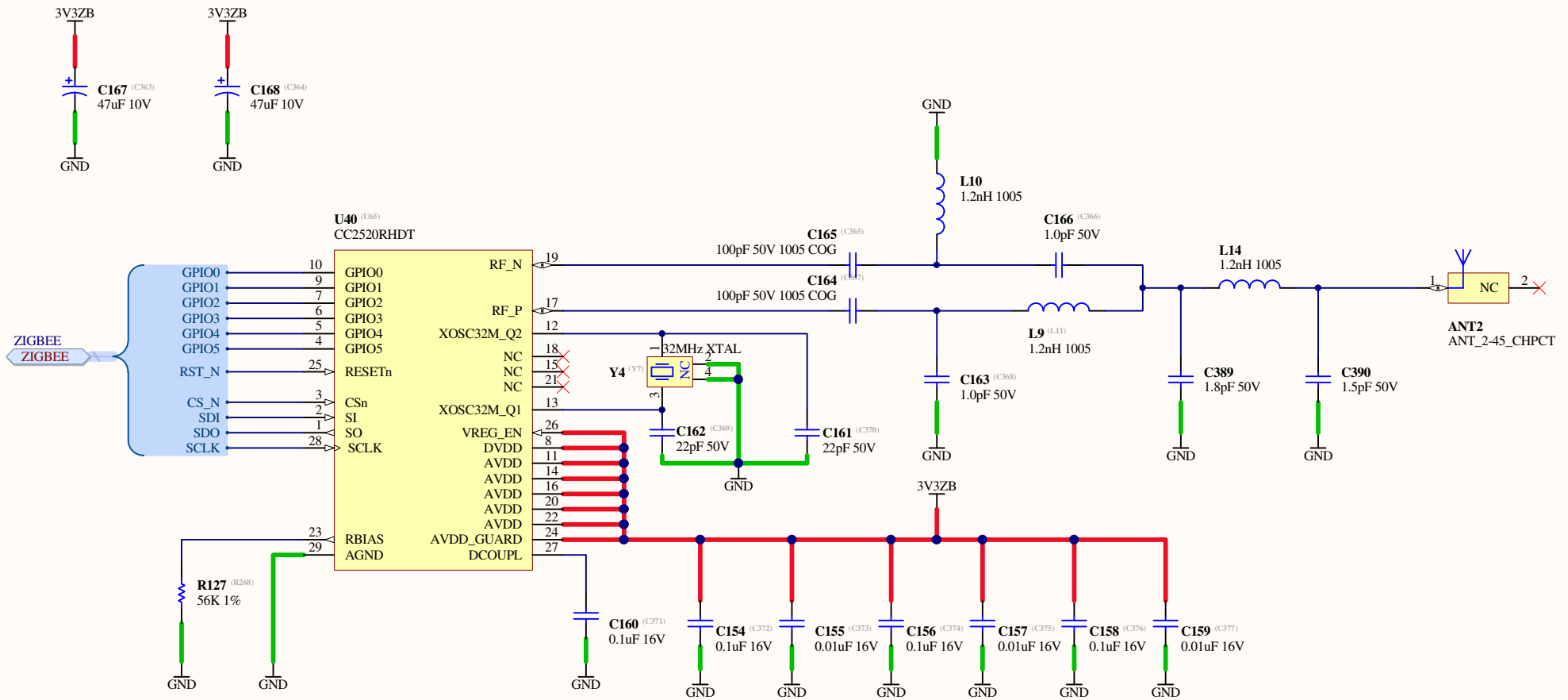
Size: A4 Assy: **D-820-0017** Revision: .02

Date: 9/23/2011 Time: 12:03:17 AM Sheet 15 of 66

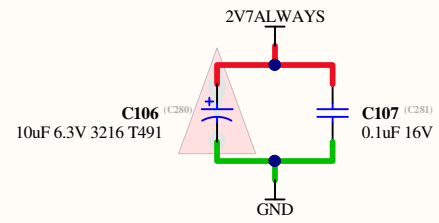
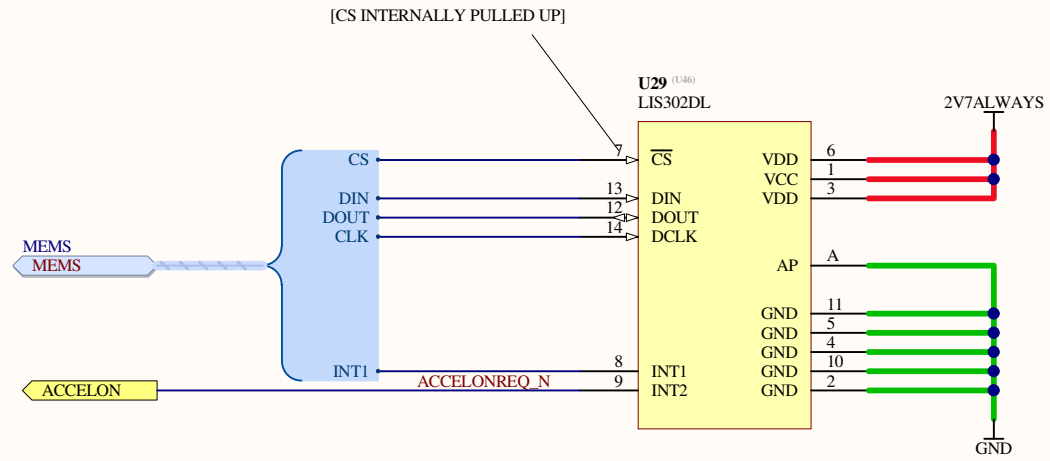
File: **KEYPADLEDS.SchDoc**

Altium Limited.
Level 3, 12a Rodborough Rd
Frenchs Forest 2086
NSW
AUSTRALIA





Sheet Title ZIGBEE RF Transceiver		Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01			
Size: A4	Assy: D-820-0017	Revision: 02	
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 16 of 66	
File: ZIGBEE_CC2520RHDT.SchDoc			




▲ The Accelerometer provides services for the following functionalities:

- Orientation of Handheld platform, and its displays
- "Shake'n'Wake" options
- Speed detection
- "Double click" style tapping functionality

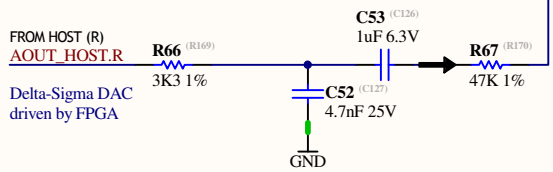
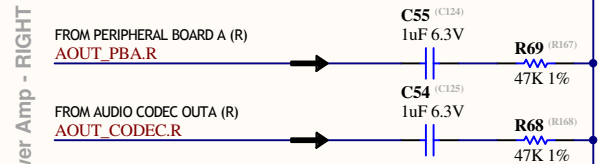
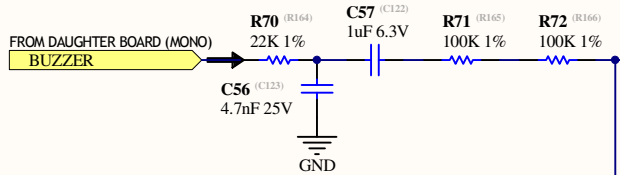
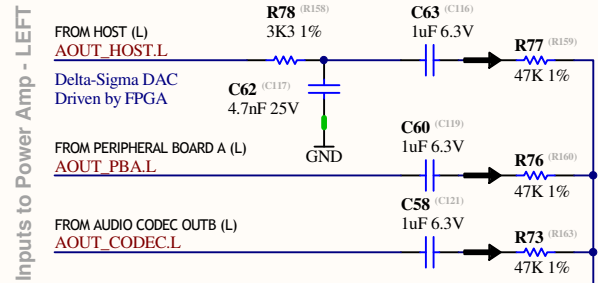
LIS302 POWER USAGE:

OFF:	3V3	0uA
STANDBY:	3V3	5uA
QUIESCENT:	3V3	0.4mA
ACTIVE:	3V3	0.4mA

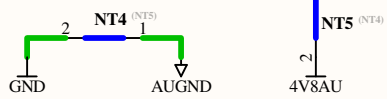
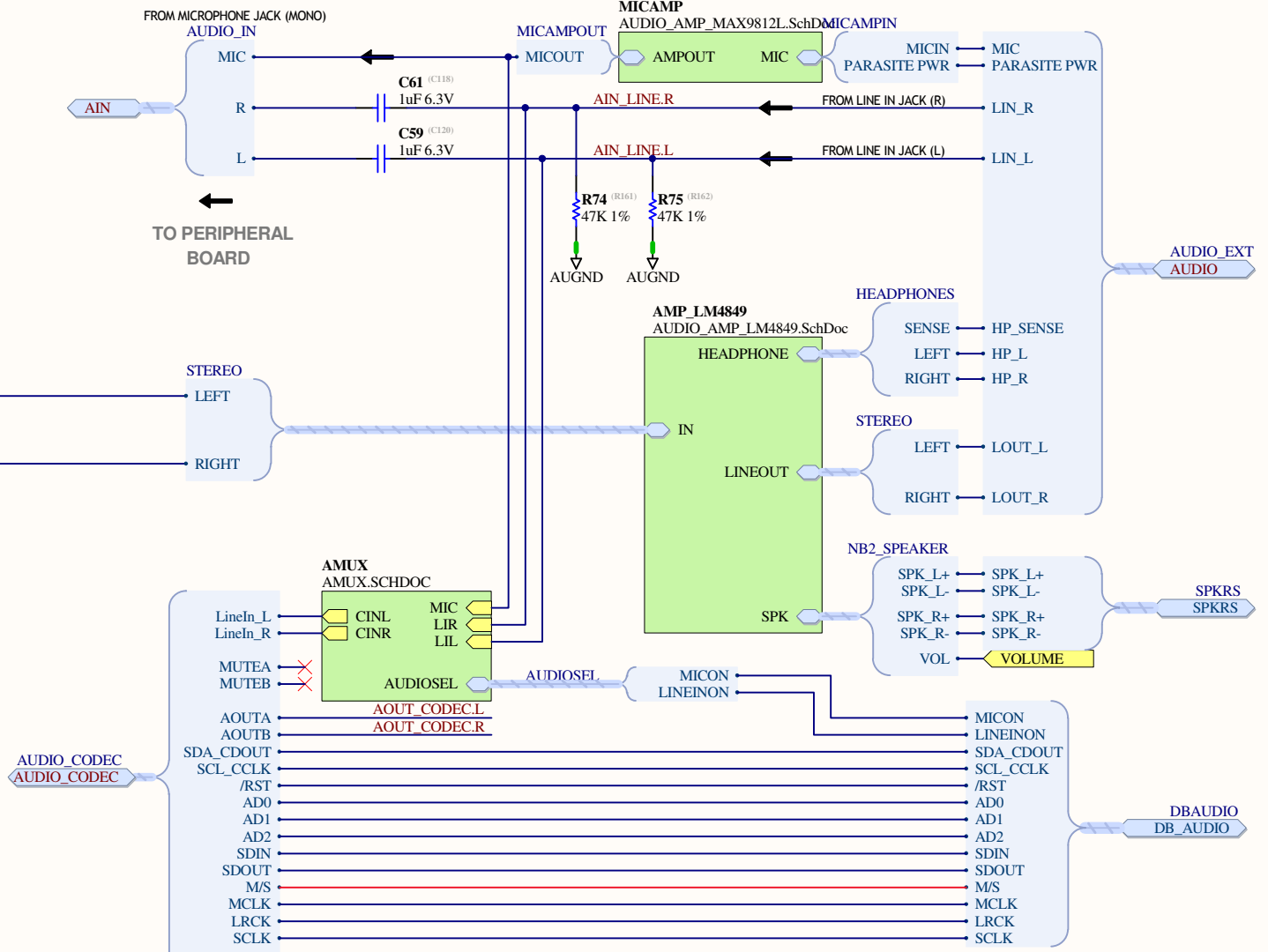
Sheet Title SPI Accelerometer			<i>Altium Limited.</i> Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01				
Size: A4	Assy: D-820-0017	Revision: .02		
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 17 of 66		
File: MEMS_LIS302DL.SCHDOC				

Audio Mixer - Left Channel

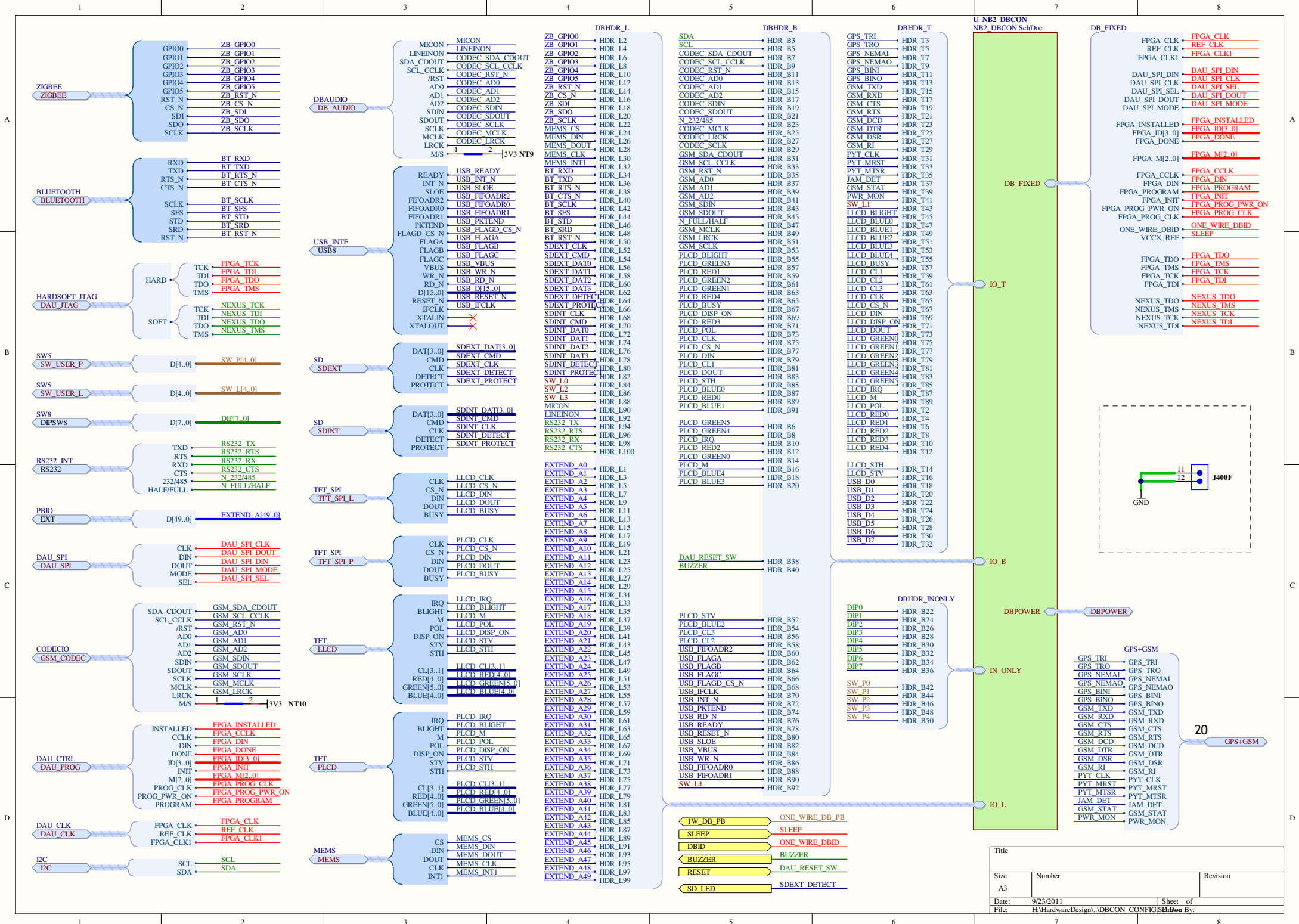
Audio Signal to All Peripheral Boards



Audio Mixer - Right Channel

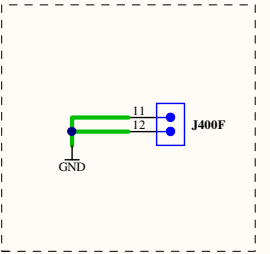


Sheet Title AUDIO SUB-SYSTEM			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:17 AM		Sheet 18 of 64	
File: AUDIO_AMP_NB2A.SchDoc				



DB_FIXED

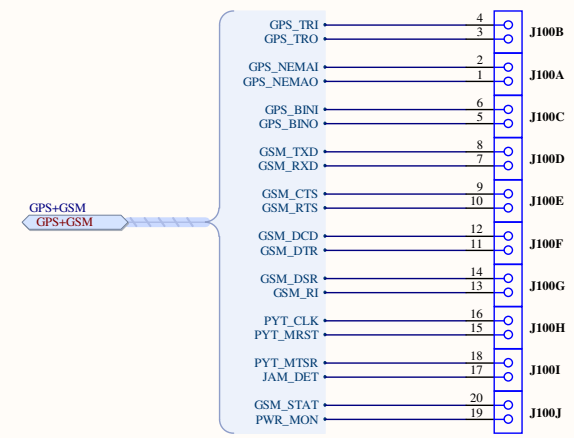
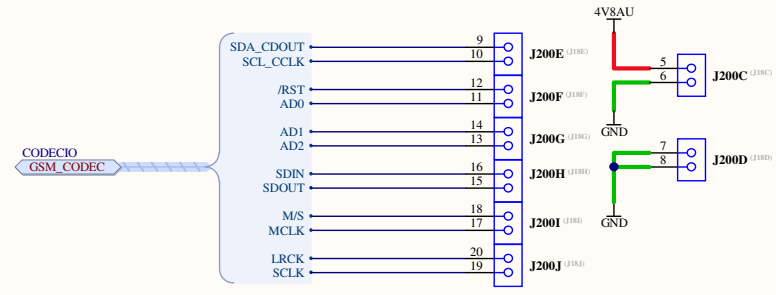
FPGA_CLK	FPGA_CLK
REF_CLK	REF_CLK
FPGA_CLK1	FPGA_CLK1
DAU_SPL_DIN	DAU_SPL_DIN
DAU_SPL_CLK	DAU_SPL_CLK
DAU_SPL_SEL	DAU_SPL_SEL
DAU_SPL_DOUT	DAU_SPL_DOUT
DAU_SPL_MODE	DAU_SPL_MODE
FPGA_INSTALLED	FPGA_INSTALLED
FPGA_ID13_0	FPGA_ID13_0
FPGA_DONE	FPGA_DONE
FPGA_M12_0	FPGA_M12_0
FPGA_CCLK	FPGA_CCLK
FPGA_DIN	FPGA_DIN
FPGA_PROGRAM	FPGA_PROGRAM
FPGA_INIT	FPGA_INIT
FPGA_PROG_PWR_ON	FPGA_PROG_PWR_ON
FPGA_PROG_CLK	FPGA_PROG_CLK
ONE_WIRE_DBID	ONE_WIRE_DBID
VCCX_REF	SLEEP
FPGA_TDO	FPGA_TDO
FPGA_TMS	FPGA_TMS
FPGA_TCK	FPGA_TCK
FPGA_TDI	FPGA_TDI
NEXUS_TDO	NEXUS_TDO
NEXUS_TMS	NEXUS_TMS
NEXUS_TCK	NEXUS_TCK
NEXUS_TDI	NEXUS_TDI



DBPOWER

GPS+GSM	GPS TRI	GPS TRI
GPS+GSM	GPS TRO	GPS TRO
GPS+GSM	GPS NEMAI	GPS NEMAI
GPS+GSM	GPS NEMAO	GPS NEMAO
GPS+GSM	GPS BINI	GPS BINI
GPS+GSM	GPS BINO	GPS BINO
GPS+GSM	GPS TXD	GPS TXD
GPS+GSM	GPS RXD	GPS RXD
GPS+GSM	GPS CTS	GPS CTS
GPS+GSM	GPS RTS	GPS RTS
GPS+GSM	GPS DCD	GPS DCD
GPS+GSM	GPS DTR	GPS DTR
GPS+GSM	GPS DSR	GPS DSR
GPS+GSM	GPS RI	GPS RI
GPS+GSM	PYT_CLK	PYT_CLK
GPS+GSM	PYT_MRST	PYT_MRST
GPS+GSM	PYT_MISR	PYT_MISR
GPS+GSM	JAM_DET	JAM_DET
GPS+GSM	GSM_STAT	GSM_STAT
GPS+GSM	PWR_MON	PWR_MON

Title			
Size	Number	Revision	
A3			
Date:	9/23/2011	Sheet of	
File:	H:\HardwareDesign\U\DBC\CON_CONF\GSD\Doc	By:	



UPDATE 5

1

2

3

4

A

A

B

B

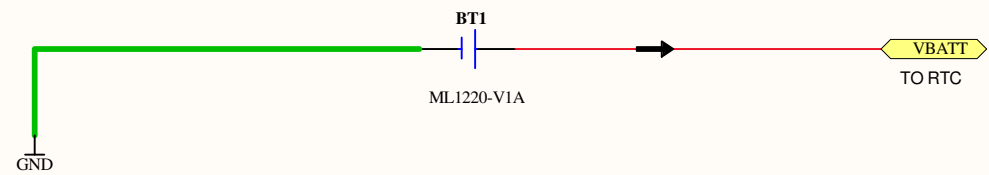
C

C

D

D

ML1220-V1A Manganese Lithium Rechargeable (ML)
 MAX DISCHARGE RATE: 0.03mA
 DISCHARGE DURATION @ 1uA (1000nA): 920 Days
 DS1390U-33 POWER REQUIREMENTS: 1uA (1000nA)
 MAX. CHARGED CAPACITY: 17mAh



MANGANESE DIOXIDE LITHIUM

MAX CHARGE VOLTAGE: 3.2V - 2.6V
 MAX CHARGE CURRENT: Approx 1.2mA OR LESS

ML1220 CHARGE REQUIREMENTS / DS1390U TRICKLE CHARGE SETTINGS:

TCS3	TCS2	TCS1	TCS0	DS1	DS0	ROUT1	ROUT0	
1	0	1	0	1	0	1	0	One diode, 2K Resistor

CALCULATION: (MAX. 1.2mA)

$$I_{MAX} = (3.3V - \text{Diode drop}) / R2$$

$$= 3.3V - 0.7V / 2000$$

$$= 1.3mA$$

Sheet Title Lithium Batter Holder - CR2032		Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01			
Size: A4	Assy: D-810-0007	Revision: 08	
Date: 9/23/2011	Time: 12:03:17 AM Sheet 21 of 64		
File: CON_BATT_COIN.SchDoc			

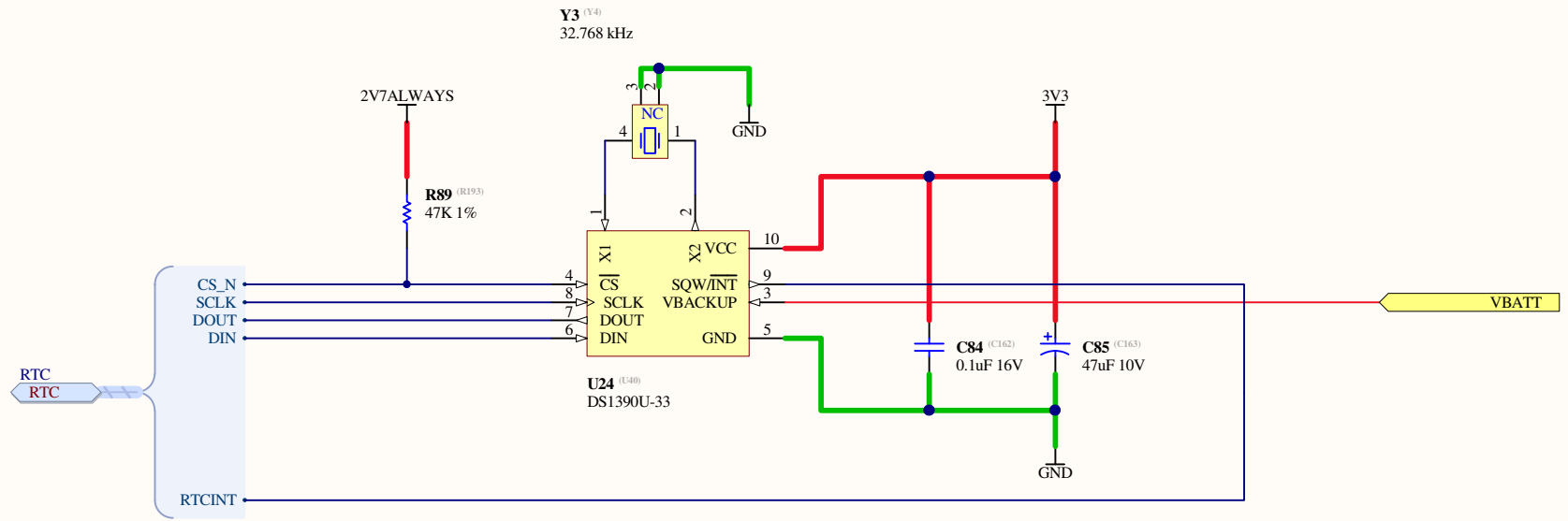
1

2

3

4

DS1390 POWER USAGE		
OFF:	3V3	0mA
STANDBY:	3V3	175uA
QUIESCENT:	3V3	2mA
ACTIVE:	3V3	2mA



REAL TIME CLOCK

This version (DS1390) of the real time clock is capable of waking, and placing the handheld device in a total power off mode. This functionality allows the handheld platform to operate in remote automated autonomous data logging applications, where its power plant will provide up to several years of operation prior to requiring a recharge.

Sheet Title SPI Real Time Clock		Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01			
Size: A4	Assy: D-810-0007	Revision: 08	
Date: 9/23/2011	Time: 12:03:17 AM		Sheet 22 of 64
File: CLK_DS1390U_RTC.SchDoc			

1

2

3

4

A

A

B

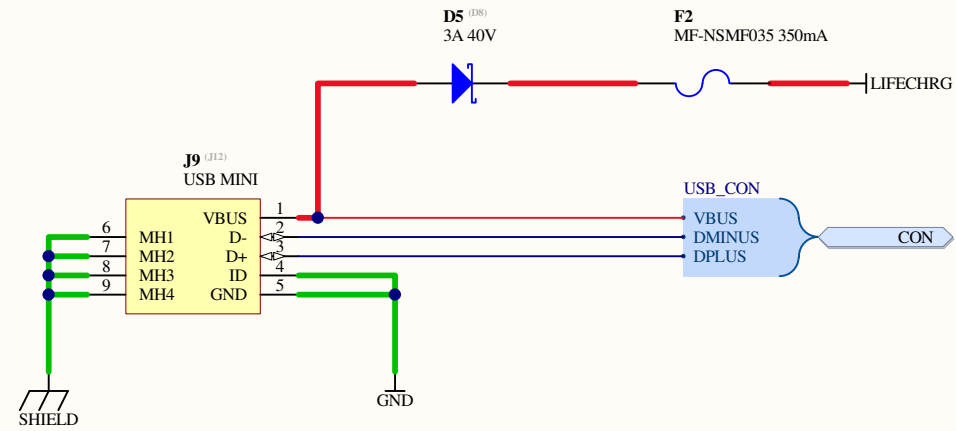
B


C

C

D

D



Sheet Title USB 2.0 Type B Connector			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:17 AM Sheet 23 of 64			
File: CON_USBB_RA.SchDoc				

1

2

3

4

1

2

3

4

A

A

B

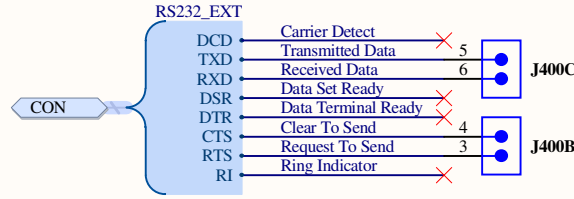
B


C

C

D

D



Sheet Title RS232-DCE DB9			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:17 AM Sheet 24 of 64			
File: CON_RS232DCE_DB9.SchDoc				

1

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A

A

B

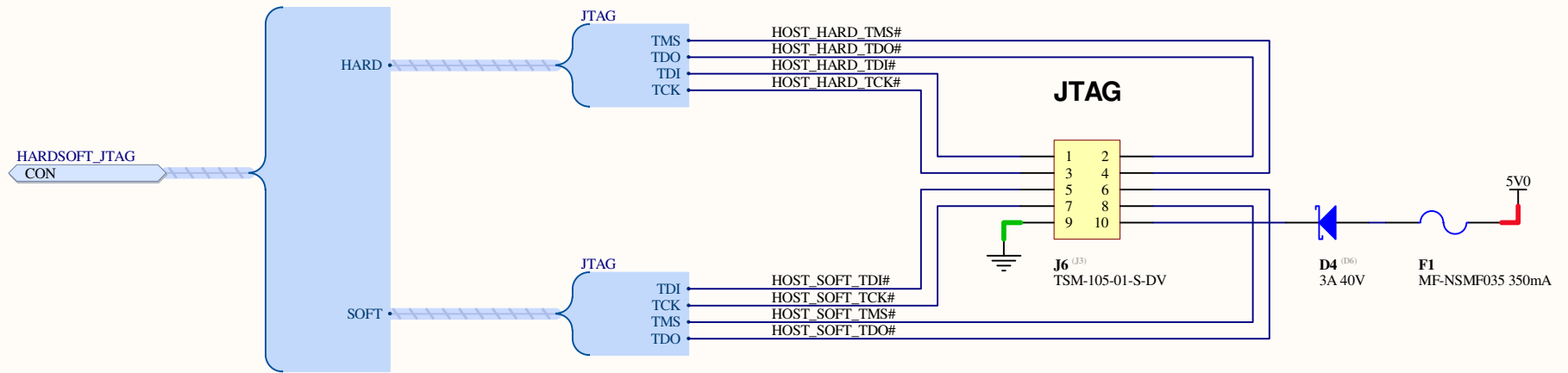
B

C


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D



Dedicated Host Programming Port

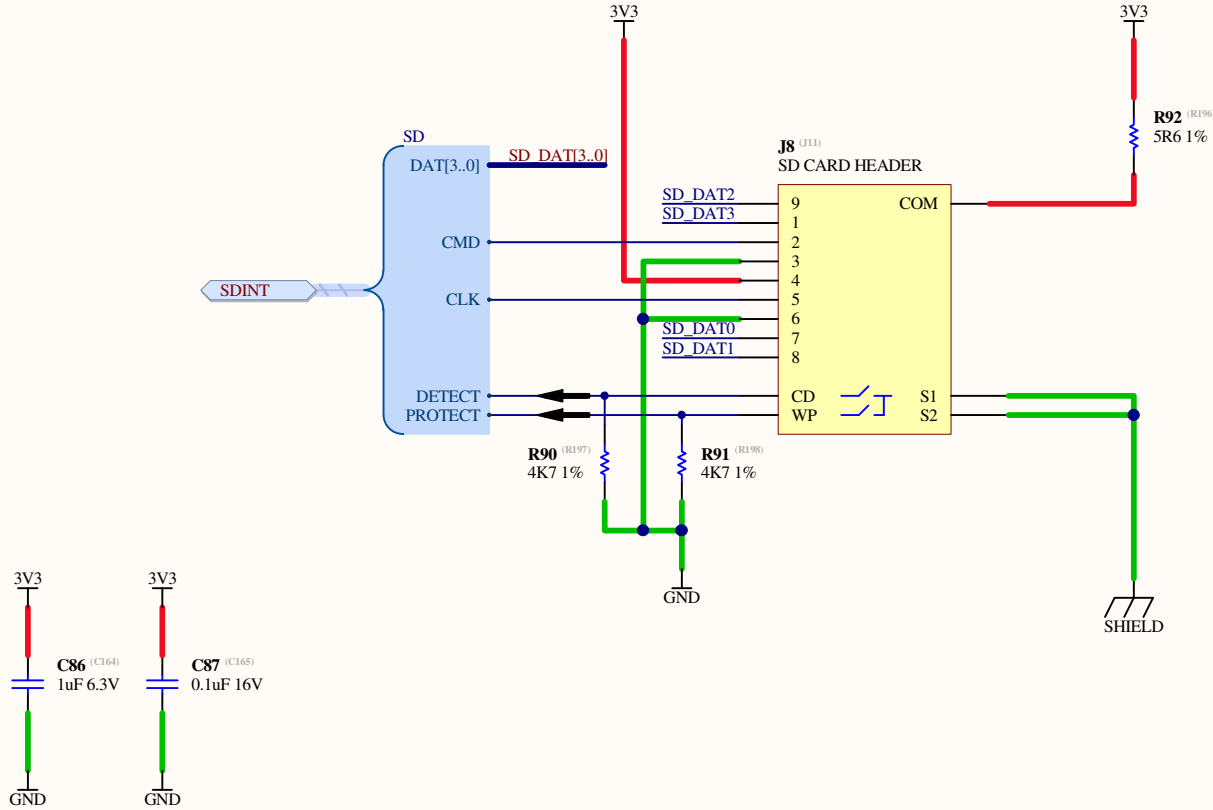
Sheet Title Host JTAG Header			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:17 AM Sheet 25 of 64			
File: CON_HOSTJTAG_10WBOXHDRAM.SchDoc				


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Sheet Title Daughter Board Internal SD Card			Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA	
Project Title NB2HND01				
Size: A4	Assy: D-820-0017	Revision: .02		
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 26 of 66		
File: CON_SD_KINGFONT_SDAMB-012.SchDoc				

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A

A

B

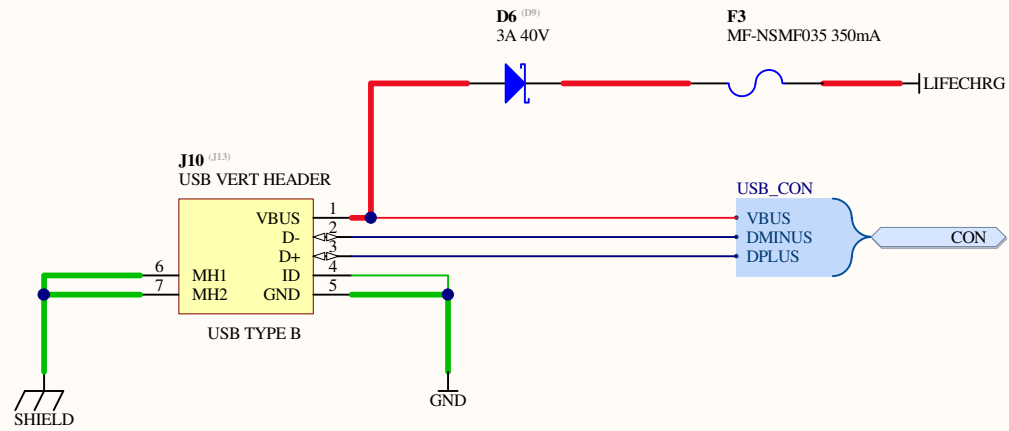
B

C

C

D

D



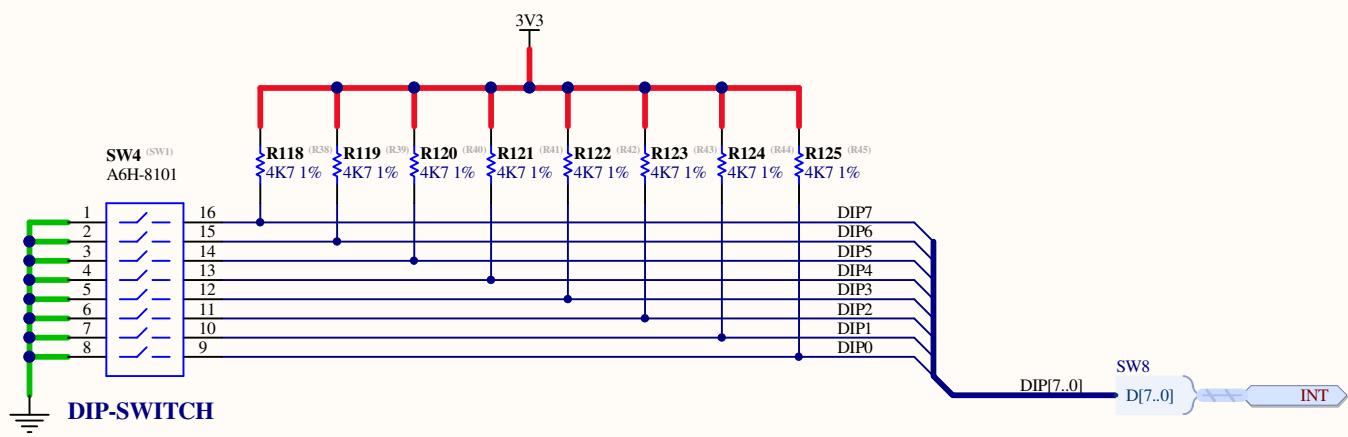
Sheet Title USB 2.0 Type B Connector			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:17 AM		Sheet 27 of 64	
File: CON_USBB_VER.SchDoc				


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Sheet Title 8-Way DIP Switch			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011 Time: 12:03:17 AM Sheet 28 of 64				
File: SW_DIP8.SchDoc				

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A

A

B

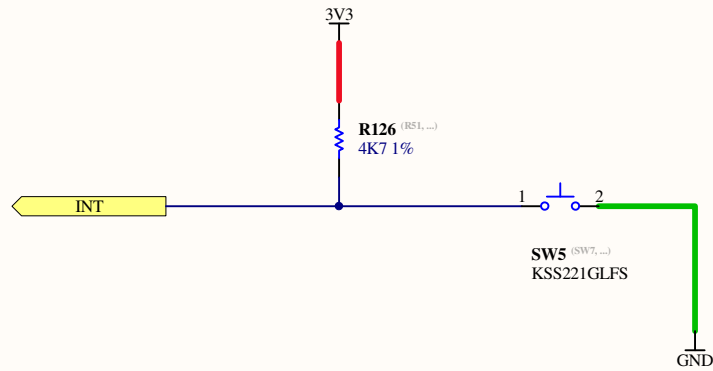
B


C

C

D

D



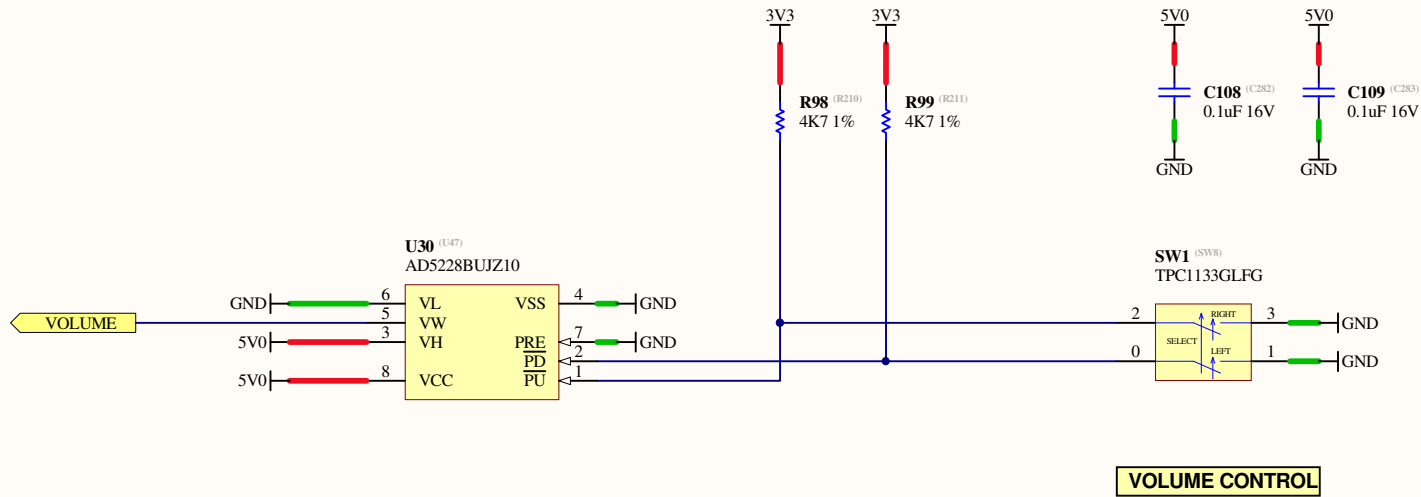
Sheet Title Push Button SPNO Switch		Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA		
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007			Revision: 08
Date: 9/23/2011	Time: 12:03:17 AM Sheet 29 of 64			
File: SW_RESET_SPNO.SCHDOC				

1


2

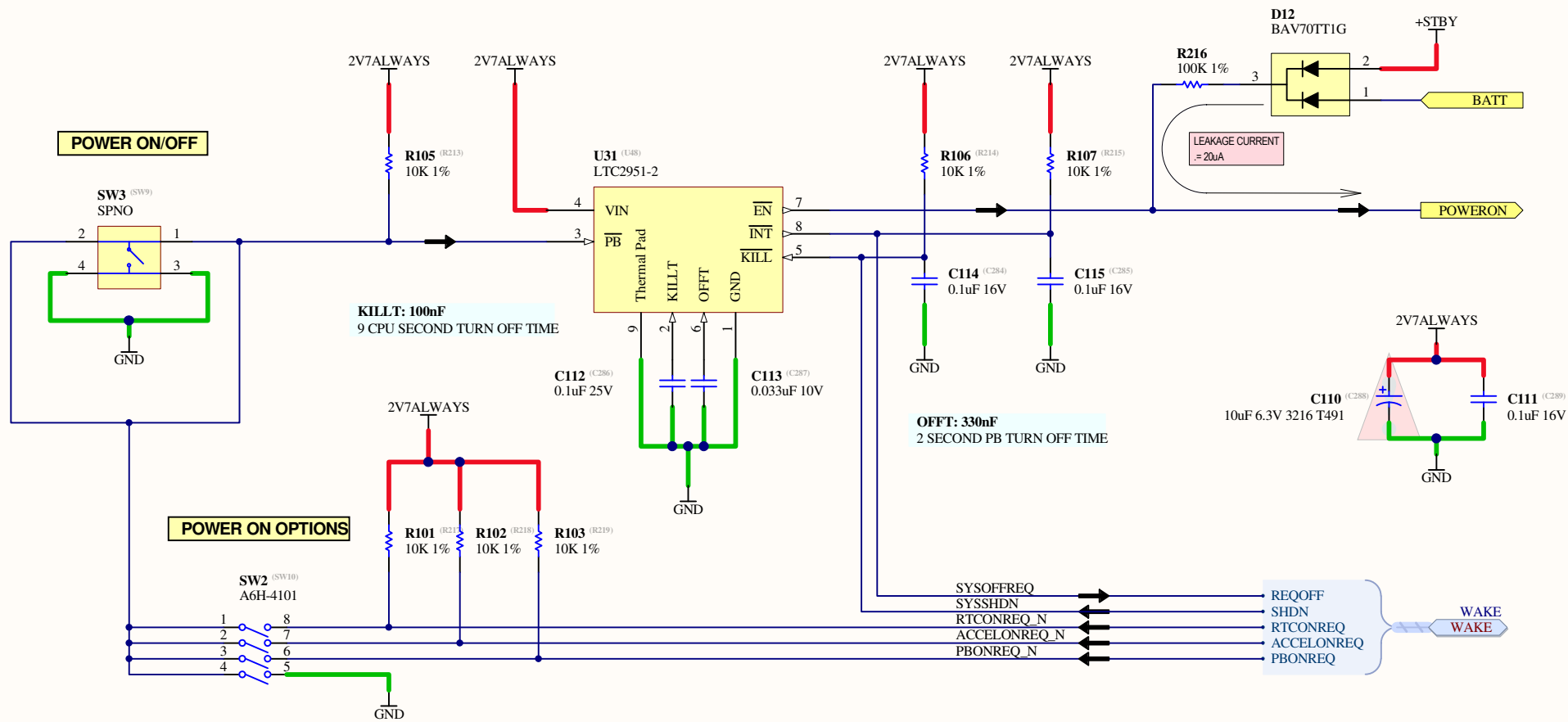
3

4



PRE (Power-On preset)
 Output = 'Midscale' if PRE = GND

Sheet Title Internal Speakers		Altium Limited. Level 3, 12a Rodborough Rd Frenchs Forest 2086 NSW AUSTRALIA		
Project Title NB2HND01				
Size: A4	Assy: D-820-0017			Revision: .02
Date: 9/23/2011	Time: 12:03:17 AM			Sheet 30 of 66
File: POT_AD5228.SchDoc				



POWER ON/OFF

POWER ON OPTIONS

LTC2950 POWER USAGE		
OFF:	2V7	0mA
STANDBY:	2V7	6uA
QUIESCENT:	2V7	6uA
ACTIVE:	2V7	12uA

POWER ON OPTIONS	
SWITCH 1:	REAL TIME CLOCK POWER ON AND OFF CAPABILITY
SWITCH 2:	ACCELERATION ON CAPABILITY
SWITCH 3:	PERIPHERAL BOARD POWER ON
SWITCH 4:	PLATFORM ALWAYS ON

Sheet Title Power On/Off Control		
Project Title NanoBoard NB2DSK01		
Size: A4	Assy: D-810-0007	Revision: 08
Date: 9/23/2011	Time: 12:03:17 AM Sheet 31 of 64	
File: PowerON.SchDoc		

Altium Limited
 Level 3/12A Rodborough Road
 Frenchs Forest
 NSW 2086
 AUSTRALIA



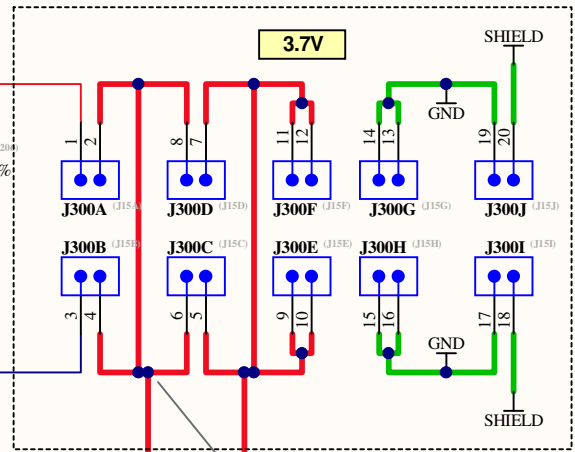
LTC4001EUF THERMAL SHUTDOWN TRIP POINTS

COLD:	≤ 2 DEGREES	3.68V(309780R) OR ABOVE AT NTC	SHUTDOWN
NOM:	≈ 25 DEGREES	2.38V (100000R) AT NTC	OPERATIONAL
HOT:	≥ 43 DEGREES	1.45V (45104R) OR BELOW AT NTC	SHUTDOWN

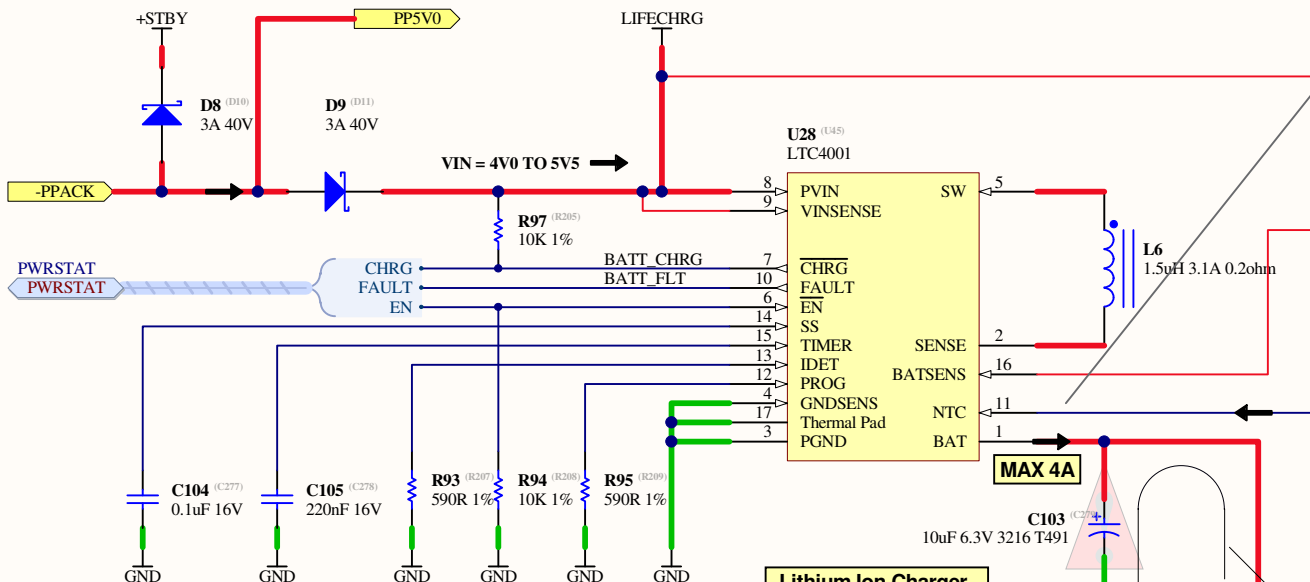
BASED ON VISHAY NTCLE SERIES 100K NTC THERMISTOR WITH 110K BIAS

[THERMISTORS LOCATED ON BATTERY BOARD]

INTERFACE TO Li-Ion BATTERY PACK

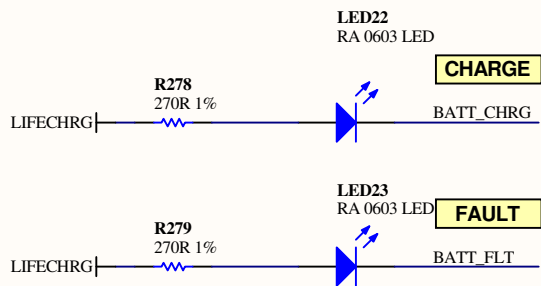
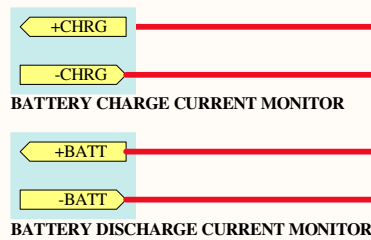


[BATTERIES FUSED ON BATTERY BOARD]



Lithium Ion Charger

LEAKAGE CURRENT = 0.6uA

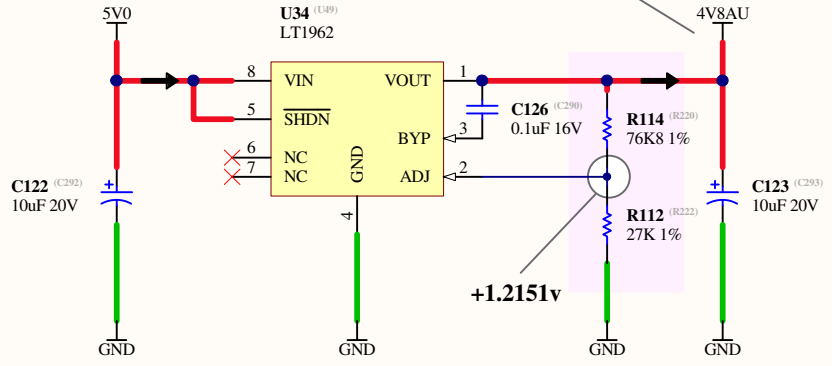


Li-Ion CHARGING SOURCES

- PLUG PACK - BATTERY CHARGING AND PLATFORM OPERATION
- HOST USB - BATTERY CHARGING ONLY (350mA CURRENT LIMITED)
- DB USB - BATTERY CHARGING ONLY (350mA CURRENT LIMITED)

Sheet Title Lithium Ion Battery Charger			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:17 AM	Sheet 32 of 64		
File: LiFeCharger.SchDoc				

AUDIO CODEC



RI NOT TO EXCEED 250K

$$V_{out} = 1.22 \left(1 + \frac{R_2}{R_1}\right) + [(I_{Adj}) (R_2)]$$

$$V_{out} = 1.22 \left(1 + \frac{76,800}{27,000}\right) + [(0.000,000,030) (76,800)]$$

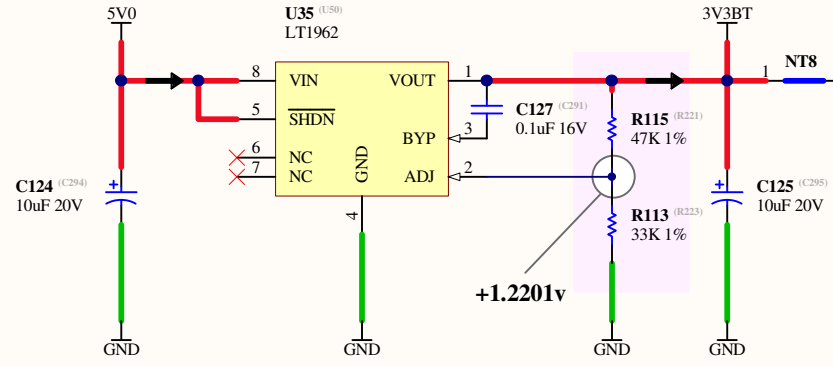
$$V_{out} = (1.22 \times 3.844) + 0.0023$$

$$V_{out} = 4.69 + 0.0023$$

$$V_{out} = 4.69v$$

$I_{Adj} = 30nA$

BLUETOOTH



RI NOT TO EXCEED 250K

$$V_{out} = 1.22 \left(1 + \frac{R_2}{R_1}\right) + [(I_{Adj}) (R_2)]$$

$$V_{out} = 1.22 \left(1 + \frac{47,000}{33,000}\right) + [(0.000,000,030) (27,000)]$$

$$V_{out} = (1.22 \times 2.424) + 0.00081$$

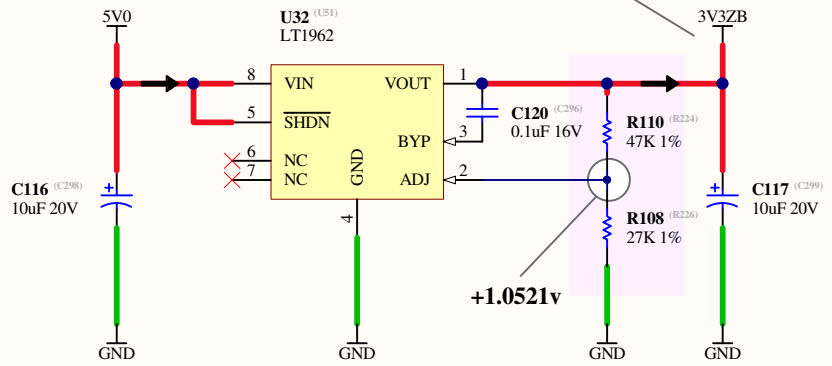
$$V_{out} = 2.95728 + 0.00081$$

$$V_{out} = 2.958v$$

$I_{Adj} = 30nA$

[2.95V]

ZIGBEE



RI NOT TO EXCEED 250K

$$V_{out} = 1.22 \left(1 + \frac{R_2}{R_1}\right) + [(I_{Adj}) (R_2)]$$

$$V_{out} = 1.22 \left(1 + \frac{47,000}{27,000}\right) + [(0.000,000,030) (27,000)]$$

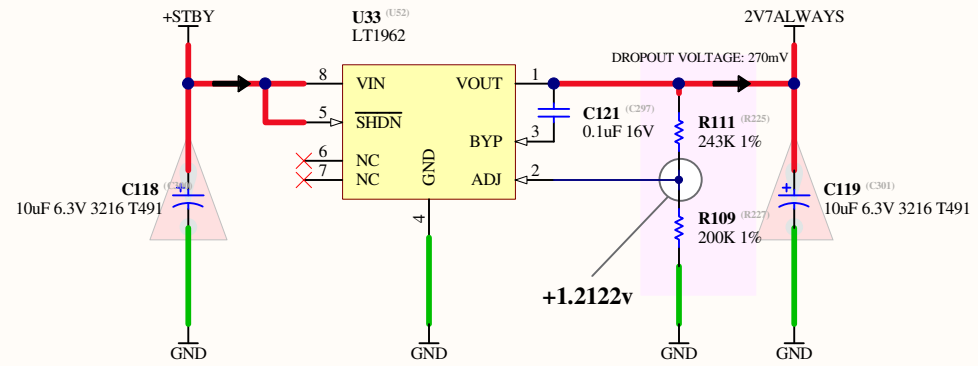
$$V_{out} = (1.22 \times 2.74) + 0.00081$$

$$V_{out} = 3.3428 + 0.00081$$

$$V_{out} = 3.3436v$$

$I_{Adj} = 30nA$

STANDBY SUPPLY



RI NOT TO EXCEED 250K

$$V_{out} = 1.22 \left(1 + \frac{R_2}{R_1}\right) + [(I_{Adj}) (R_2)]$$

$$V_{out} = 1.22 \left(1 + \frac{243,000}{200,000}\right) + [(0.000,000,030) (200,000)]$$

$$V_{out} = (1.22 \times 2.215) + 0.006$$

$$V_{out} = 2.7023 + 0.006$$

$$V_{out} = 2.7083v$$

$I_{Adj} = 30nA$

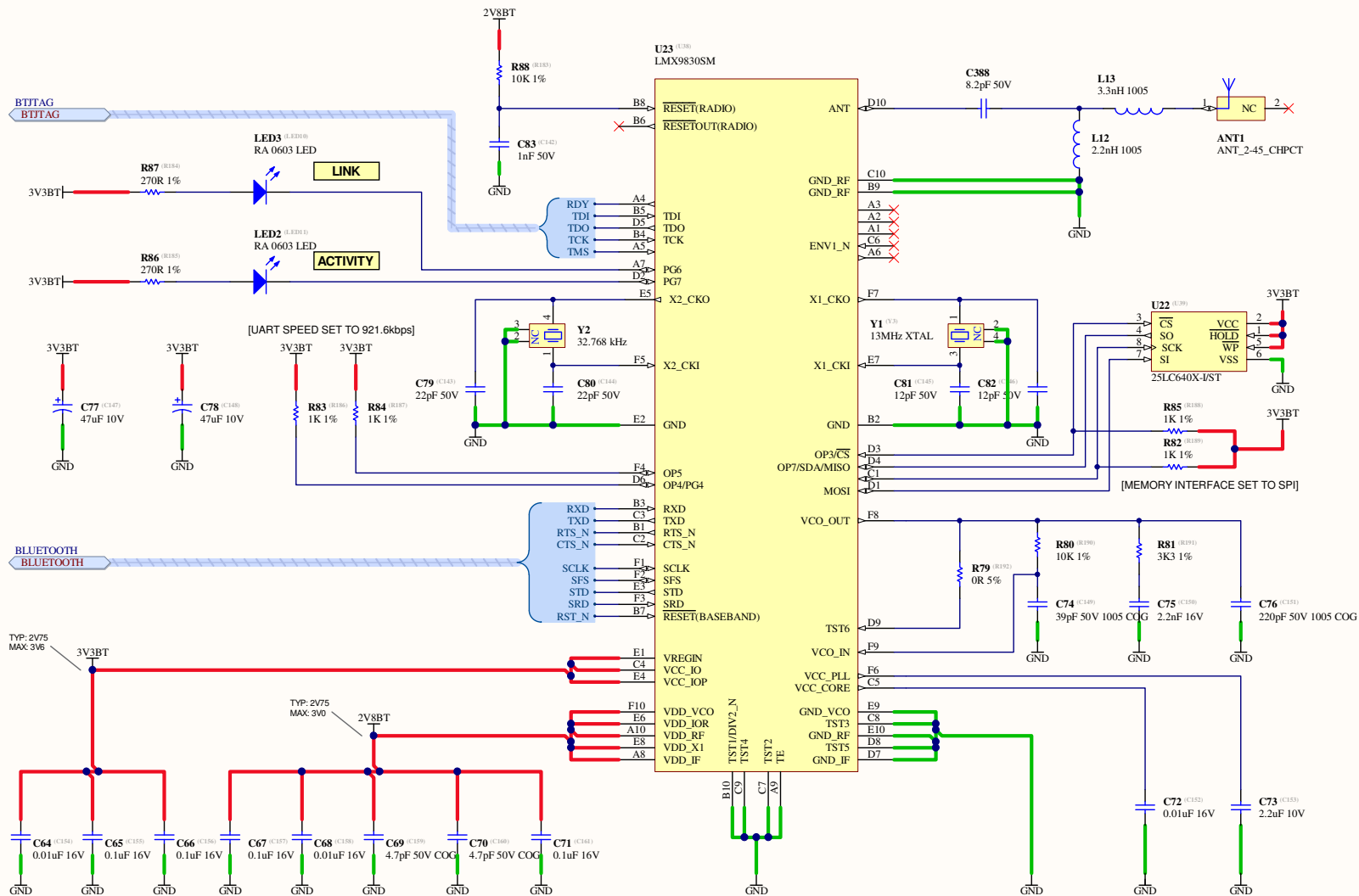
LT1962EMSS LOW NOISE LINEAR REGULATOR (300mA)

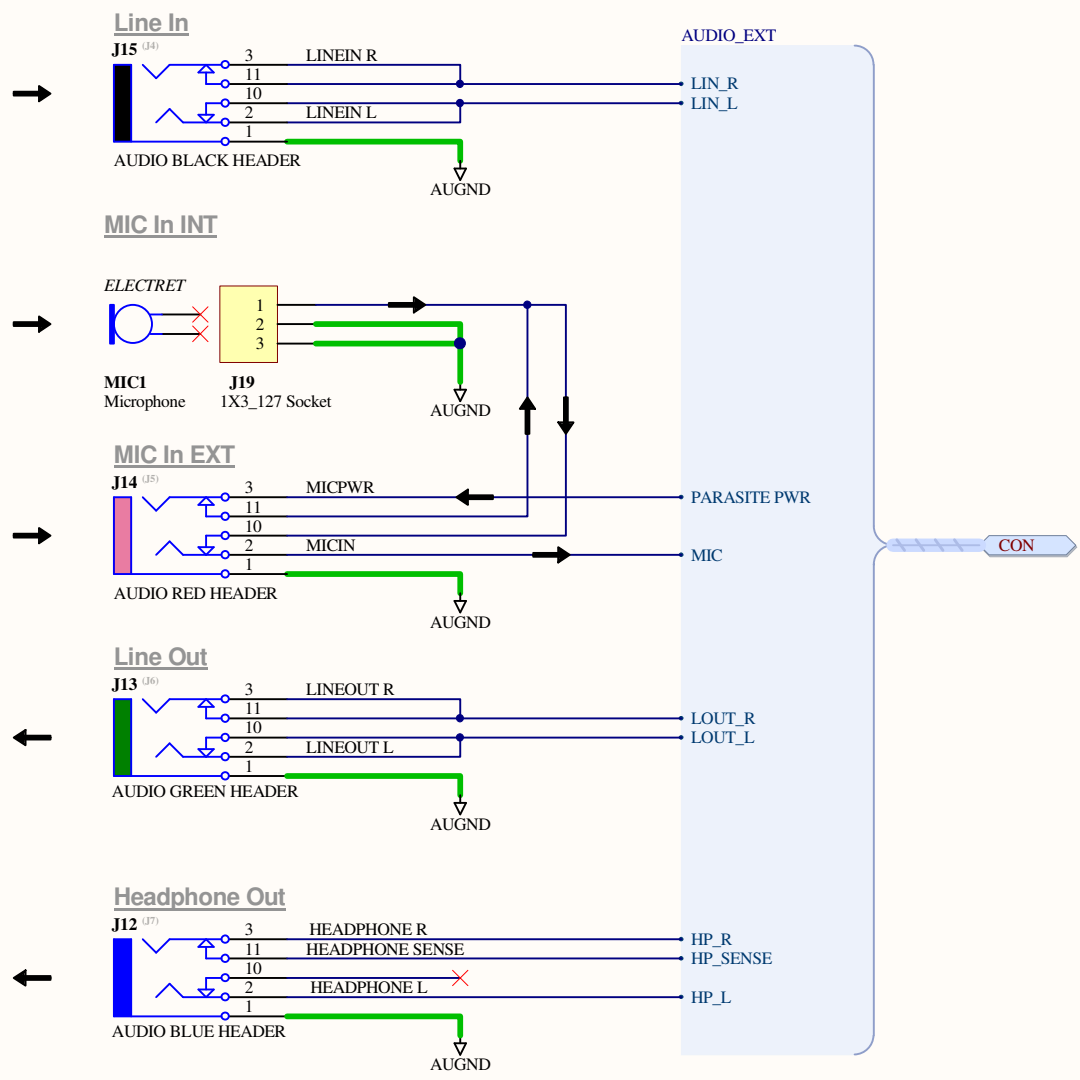
VOLTAGE NOISE: 20mVRMS (10Hz to 100kHz)
 RIPPLE REJECTION (PSRR): 95dB
 DROPOUT VOLTAGE: 270mV

Sheet Title Quiet Analogue Supplies		
Project Title NB2HND01		
Size: A4	Assy: D-820-0017	Revision: 02
Date: 9/23/2011	Time: 12:03:18 AM	Sheet 33 of 66
File: PSU_ANALOGUE.SchDoc		

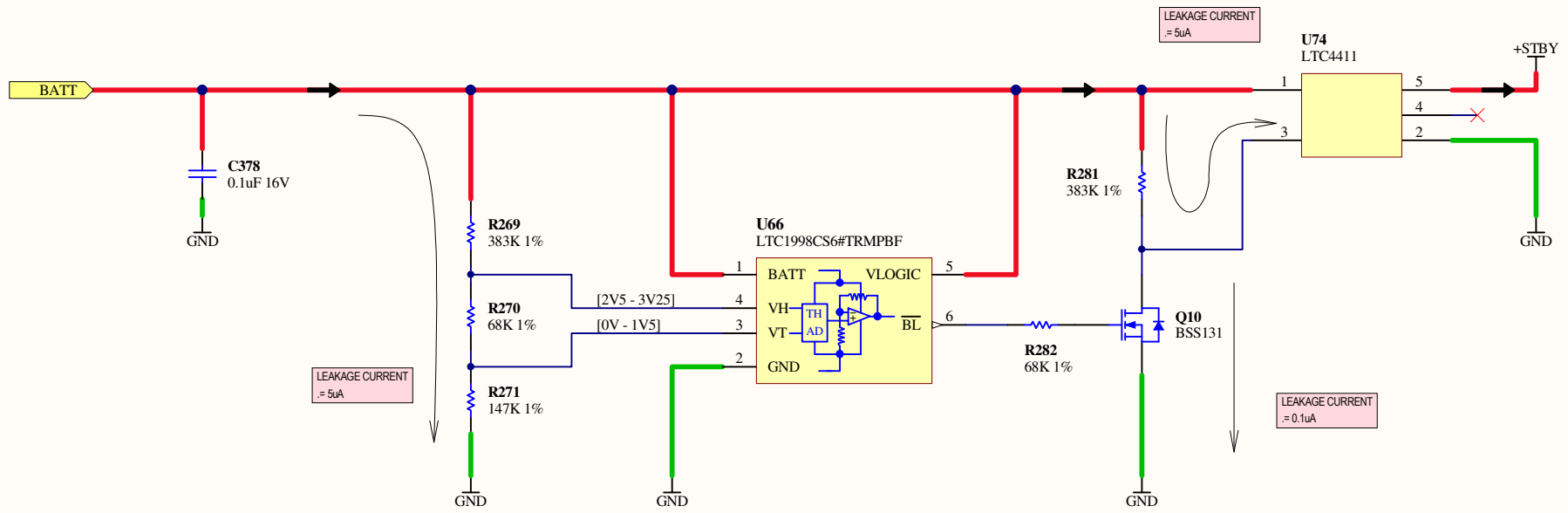
Altium Limited.
 Level 3, 12a Rodborough Rd
 Frenchs Forest 2086
 NSW
 AUSTRALIA







Sheet Title AUDIO AC99 Interface			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM Sheet 35 of 64			
File: CON_AUDIO_AC99.SchDoc				

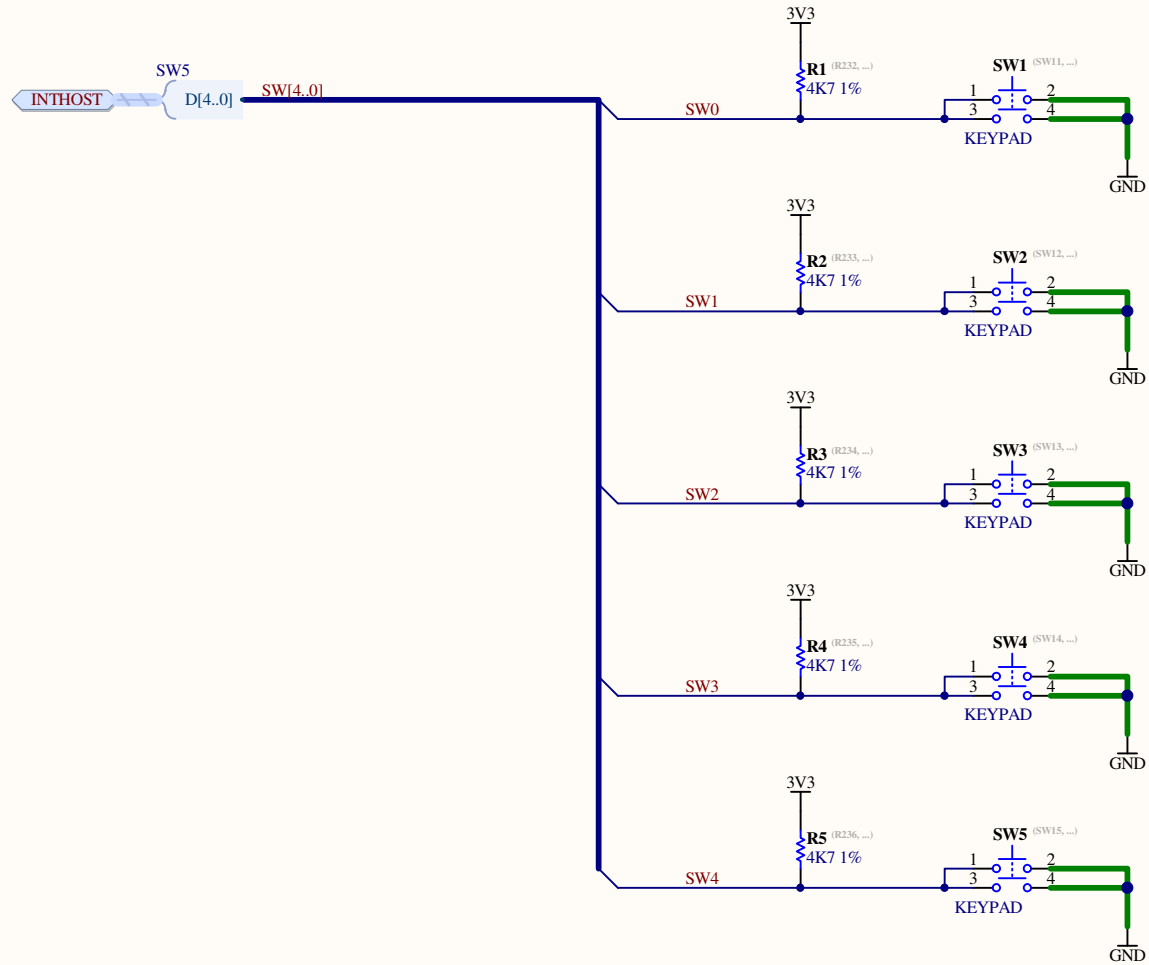


BATT (V)	Vtha (Pin3)	Vha (Pin4)	Vbatt.th	Vth2	Vhyst	BL
4.2	1.032	1.510	3.016	3.255	0.239	1
3.7	0.910	1.330	2.955	3.165	0.210	1
2.86	0.703	1.028	2.852	3.014	0.163	1
2.85	0.701	1.025	2.850	3.012	0.162	0
2.7	0.664	0.971	2.832	2.985	0.154	0

LTC1998 POWER USAGE		
OFF:	3V0	4.5uA
STANDBY:	3V0	4.5uA
QUIESCENT:	3V0	4.5uA

U66 LITHIUM ION BATTERY SHUTDOWN
 LOW THRESHOLD = < 2.85V
 HYSTERESIS = 160mV

Sheet Title Under Voltage Lock Out			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM		Sheet 36 of 64	
File: UVLO_LTC1998.SchDoc				



Sheet Title PDA-Style 5 x DPNO Switch			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM		Sheet 37 of 64	
File: SW_PDA_DPNOx5.SCHDOC				

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A

A

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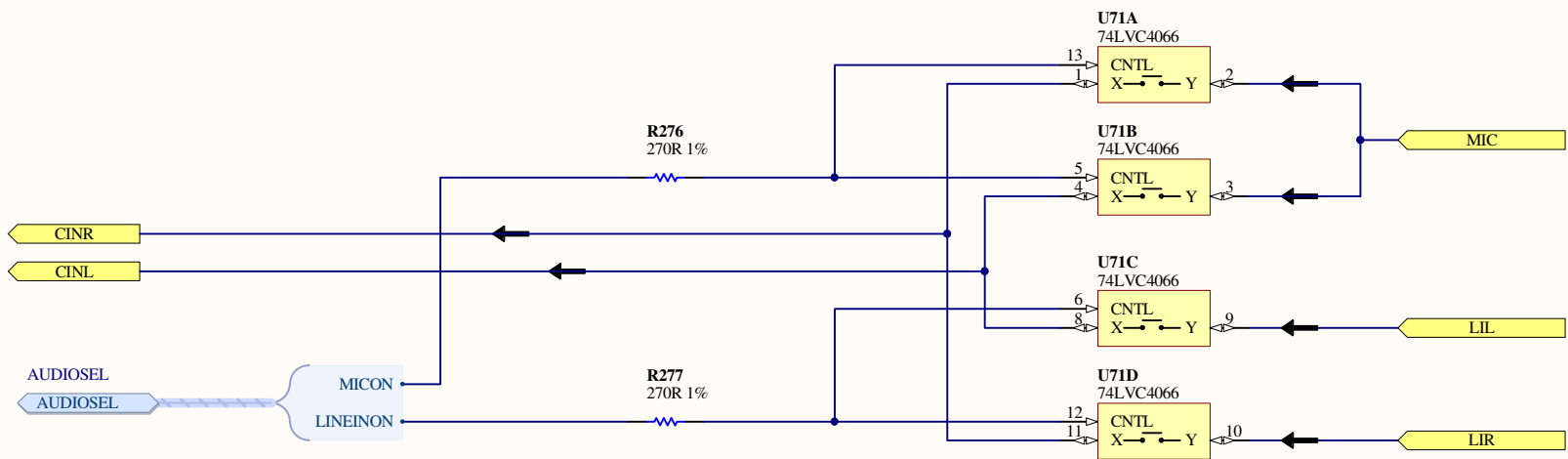
B


C

C

D

D



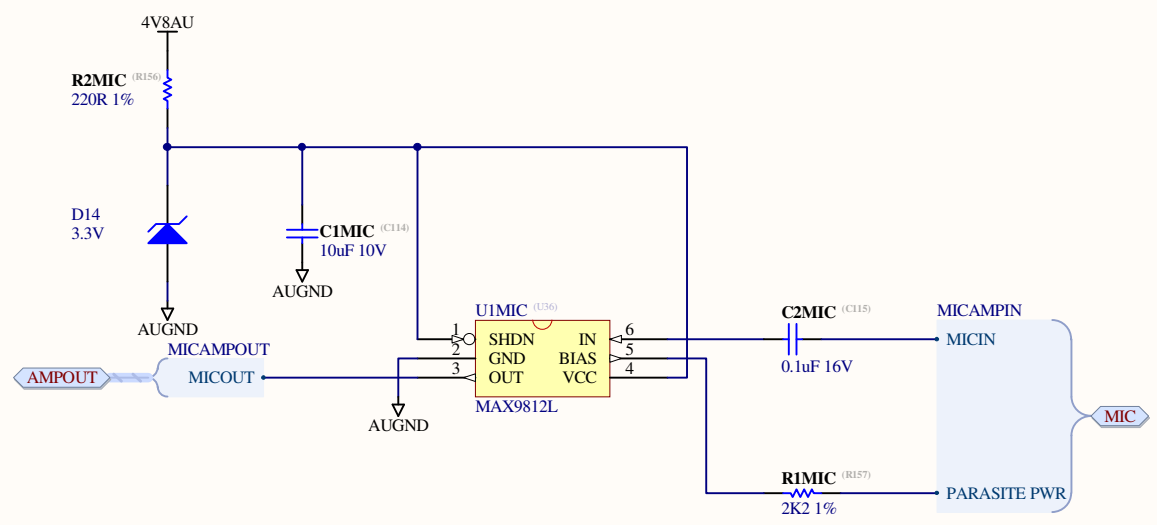
Sheet Title PB07_GSM			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM Sheet 38 of 64			
File: AMUX.SchDoc				

1

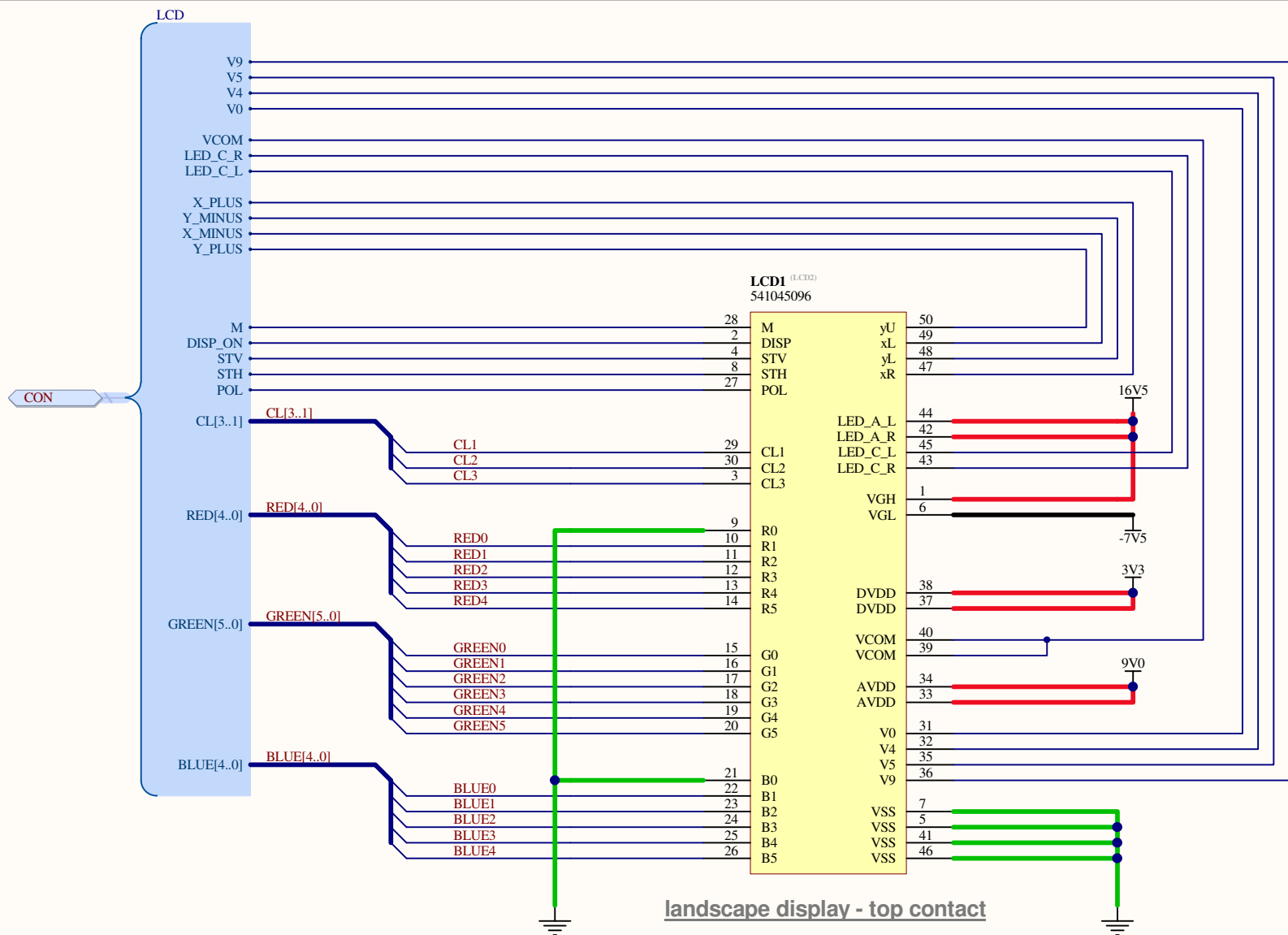
2

3

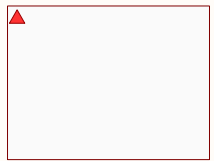
4



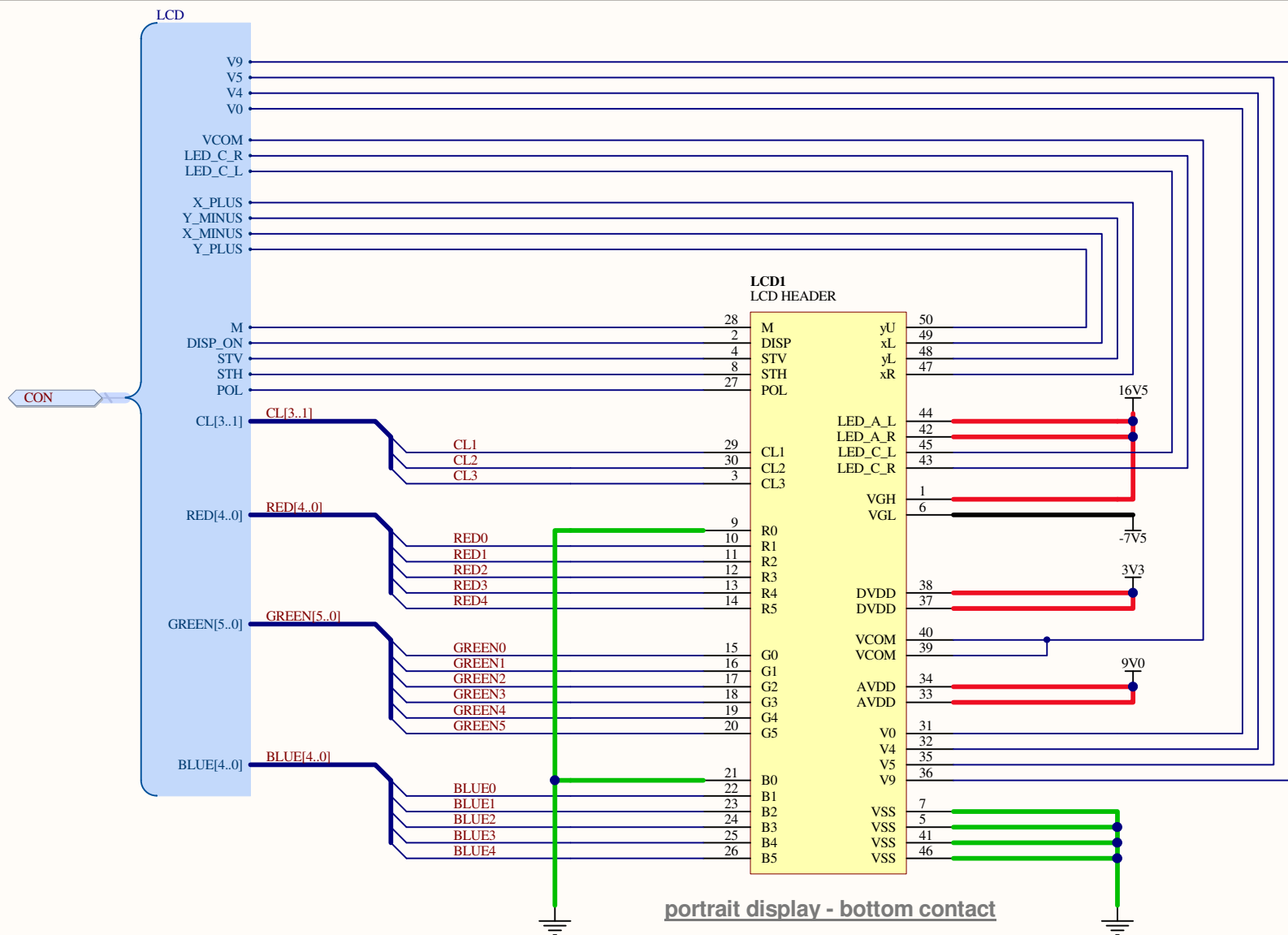
Sheet Title AUDIO AC99 Interface			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM		Sheet 39 of 64	
File: AUDIO_AMP_MAX9812L.SchDoc				



landscape display - top contact
Touch-Screen Connector



Sheet Title TFT LCD Header			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM		Sheet 40 of 64	
File: CON_LCD_541325097.SchDoc				

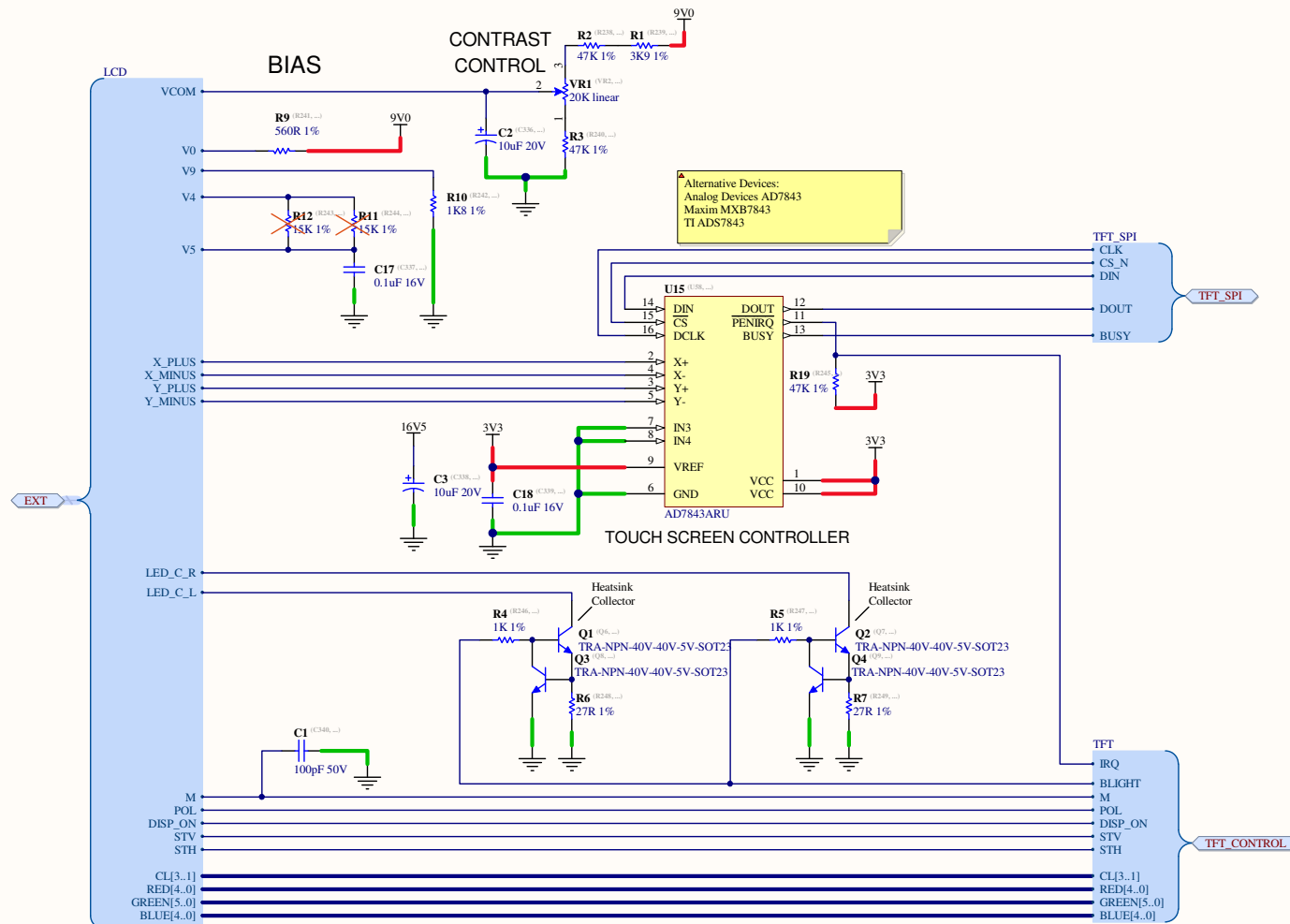


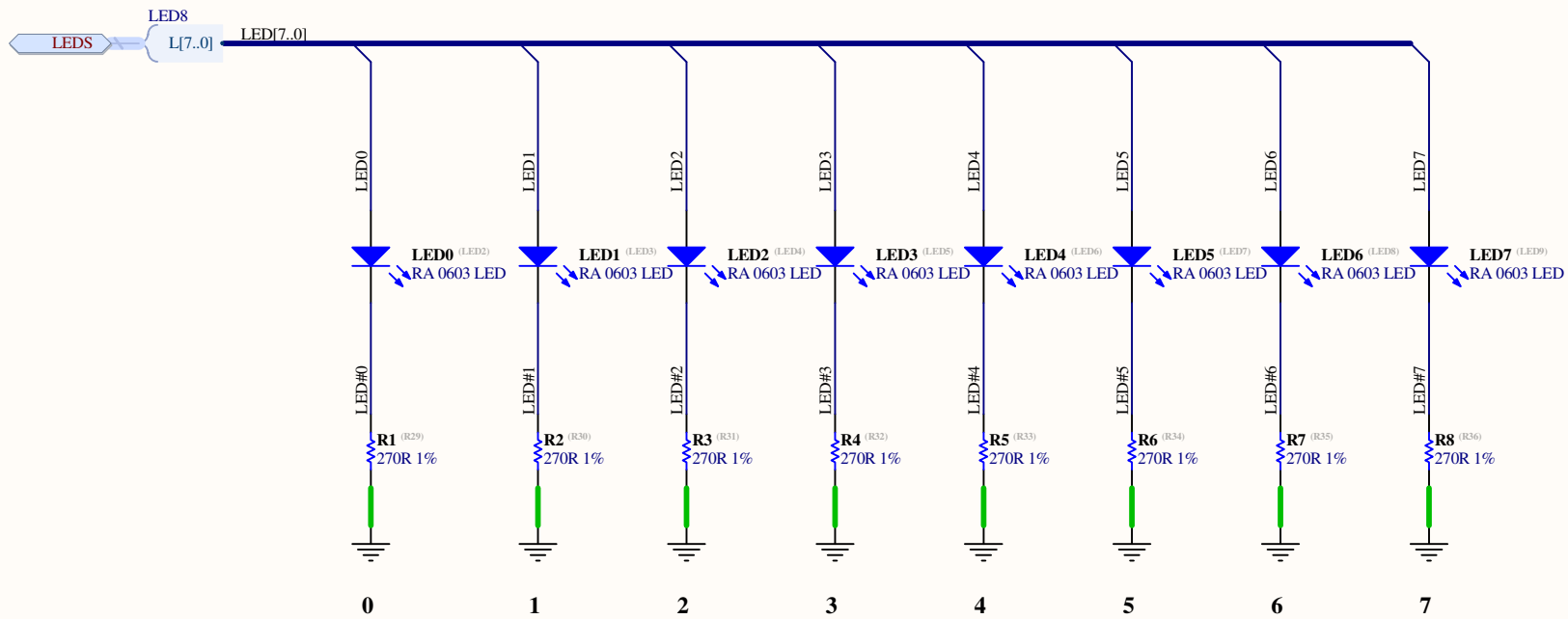
portrait display - bottom contact
Touch-Screen Connector



Sheet Title TFT LCD Header			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM		Sheet 41 of 64	
File: CON_LCD_541045096.SchDoc				

TO
TX09D80VM1CEA





0603 GREEN RIGHT ANGLE LEDS

Sheet Title 8-Way 0603 Red LED Array			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM	Sheet 43 of 64		
File: LED_GREEN_0603Rax8.SCHDOC				

1

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A

A

B

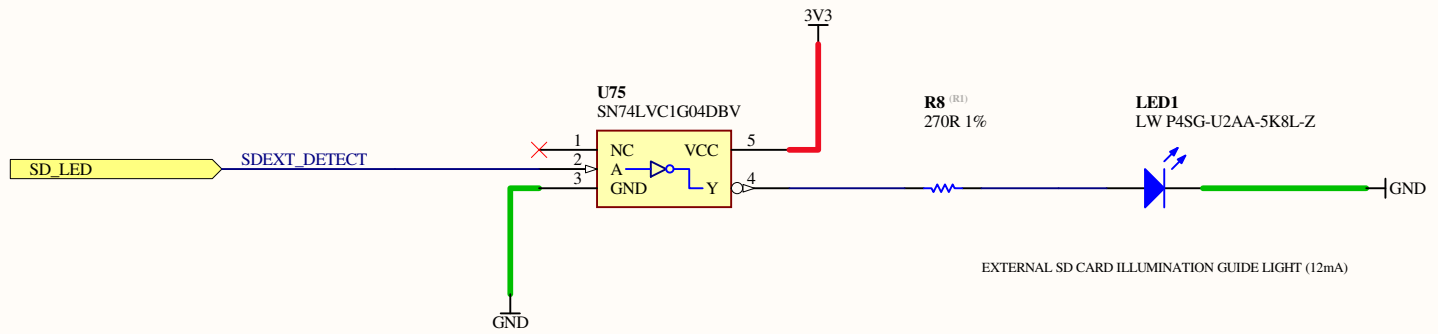
B

C

C

D

D



EXTERNAL SD CARD ILLUMINATION GUIDE LIGHT (12mA)

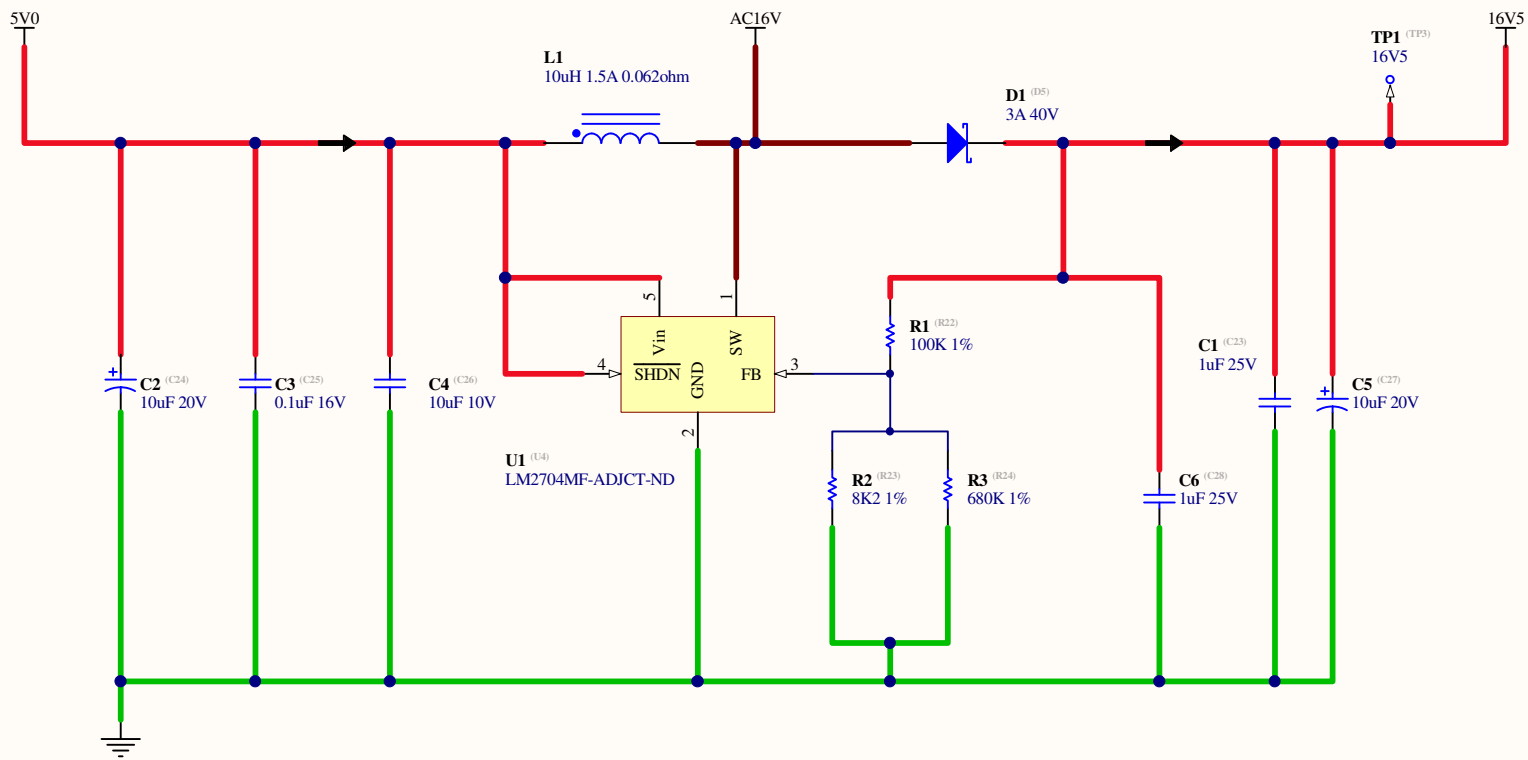
Sheet Title NB2HND01 PRIMARY PS		Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01			
Size: A4	Assy: D-810-0007	Revision: 08	
Date: 9/23/2011	Time: 12:03:18 AM		Sheet 44 of 64
File: SD_ILLUMINATE.SchDoc			

1

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Sheet Title **PSU LM2704 16V5**

Project Title **NanoBoard NB2DSK01**

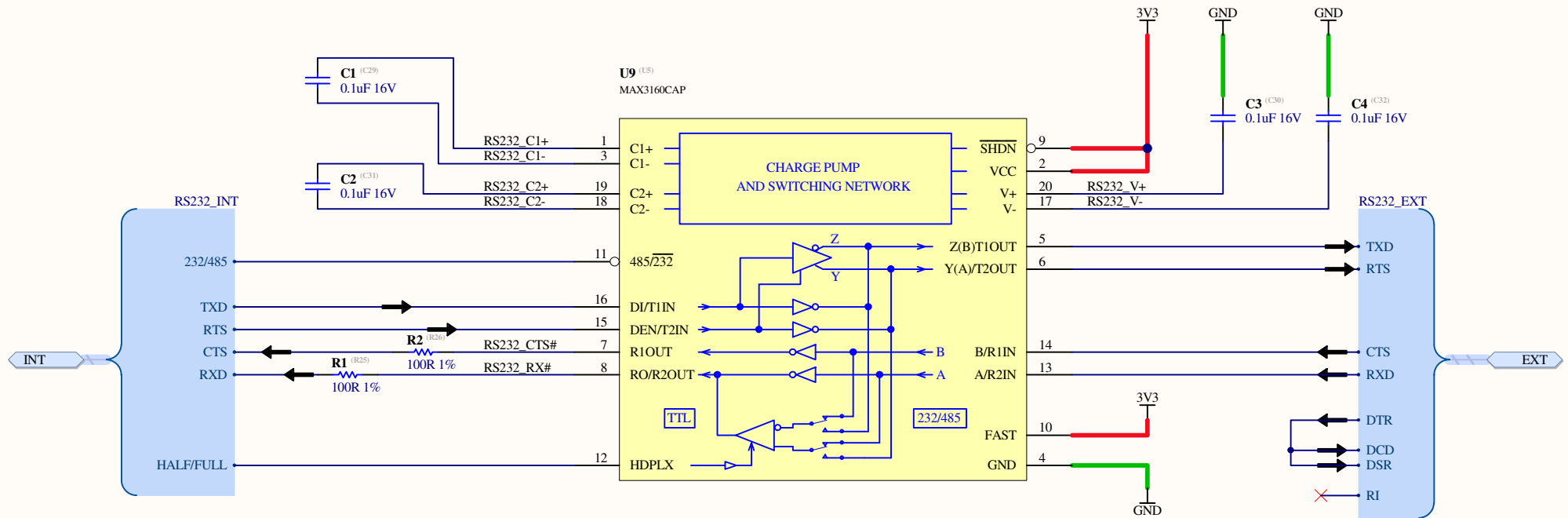
Size: A4 Assy: D-810-0007 Revision: 08

Date: 9/23/2011 Time: 12:03:18 AM Sheet 45 of 64

File: PSU_LM2704_16V5.SchDoc

Altium Limited
Level 3/12A Rodborough Road
Frenchs Forest
NSW 2086
AUSTRALIA



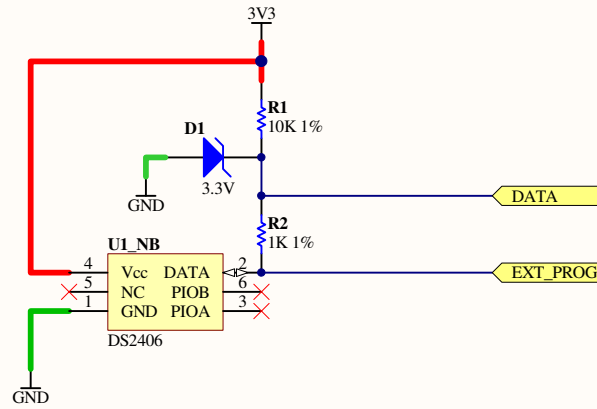



RS232/RS485 SERIAL COMMUNICATIONS TRANSCEIVER

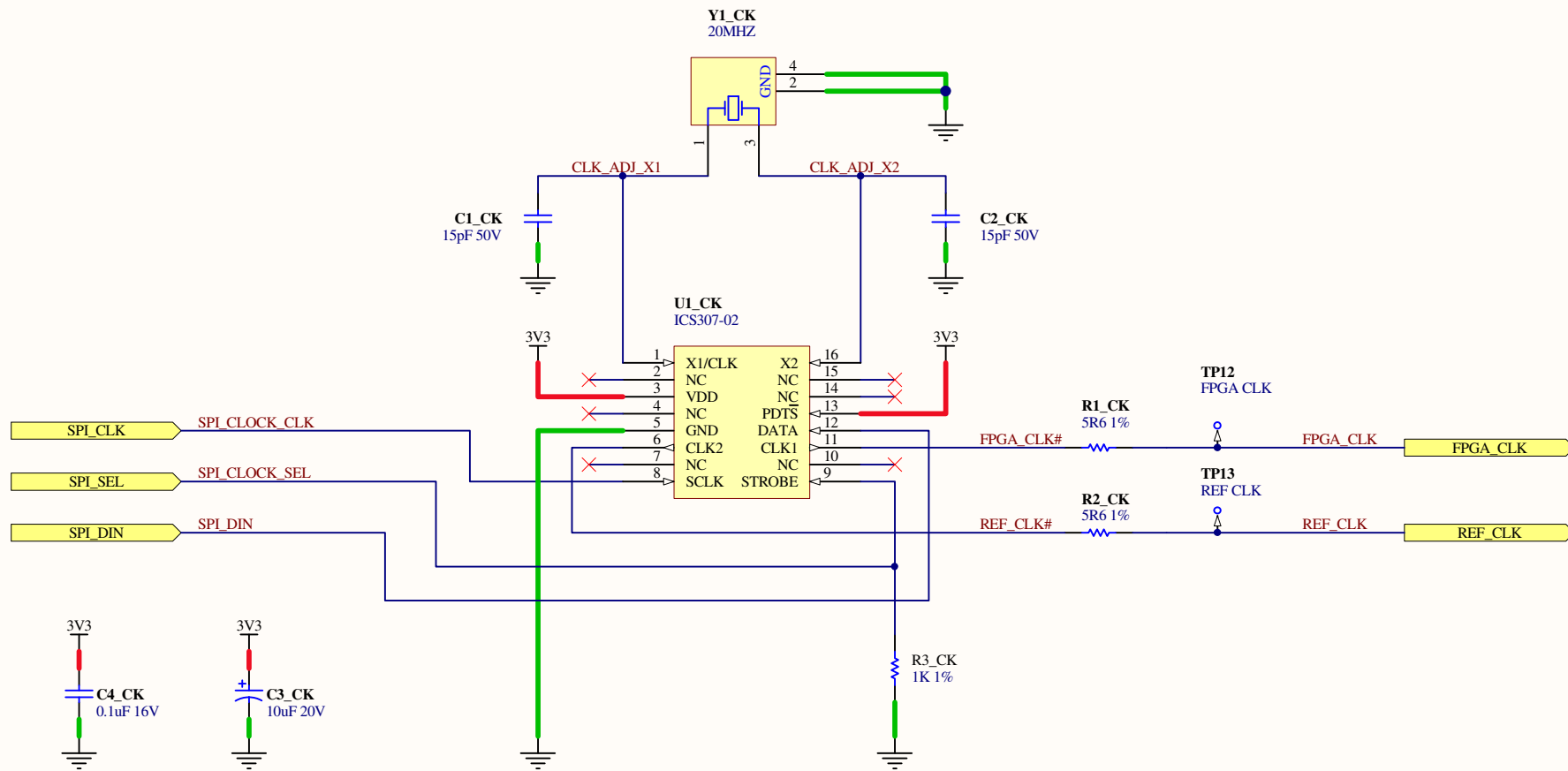
Maxim - MAX3160CAP - +3.0V to +5.5V, 1µA, RS-232-RS-485-422 Multiprotocol Transceiver
 10Mbps RS-485/RS-422 and 1Mbps RS-232 Data Rates


MAX3160 POWER USAGE		
OFF:	5V0	1uA
STANDBY:	5V0	10uA
QUIESCENT:	5V0	5.5mA
ACTIVE:	5V0	5.5mA

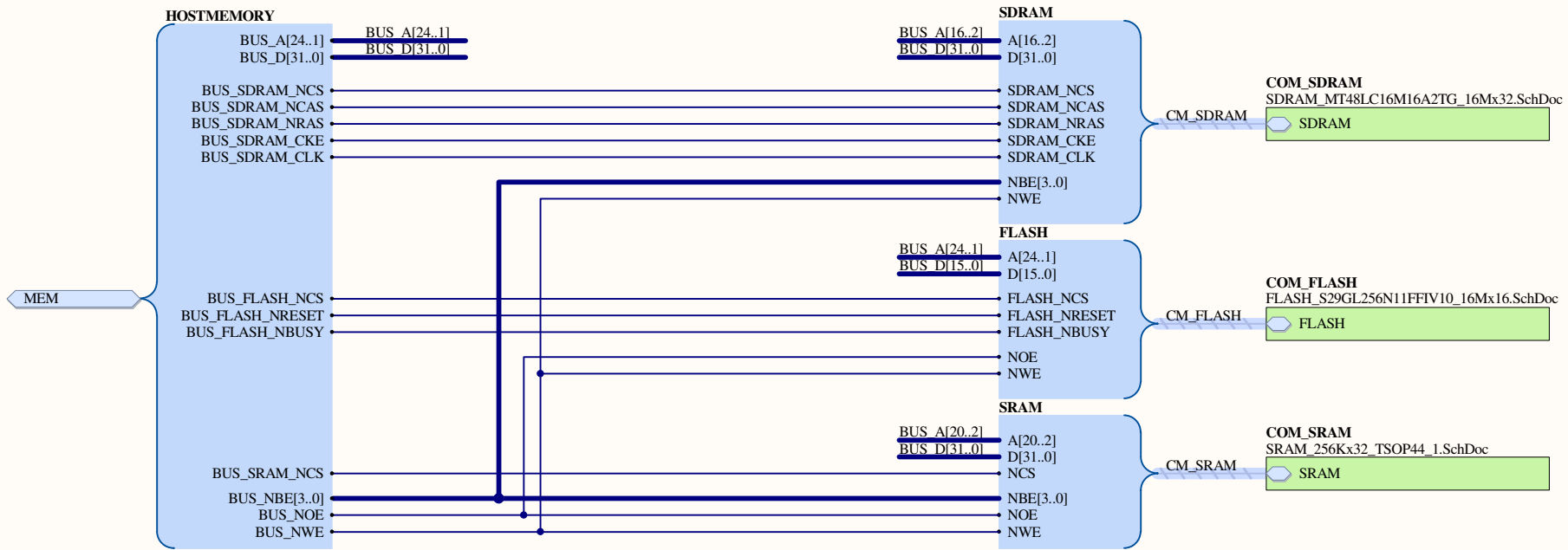
Sheet Title RS232COMMS_1			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA		
Project Title NanoBoard NB2DSK01					
Size: A4	Assy: D-810-0007	Revision: 08			
Date: 9/23/2011	Time: 12:03:18 AM	Sheet 46 of 64			
File: RS232+RS485_MAX3160.SchDoc					




Sheet Title Protected 1-Wire EEPROM			<i>Altium Limited</i> Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM	Sheet 47 of 66		
File: 1WB_DS2406_PROTECTED.SchDoc				

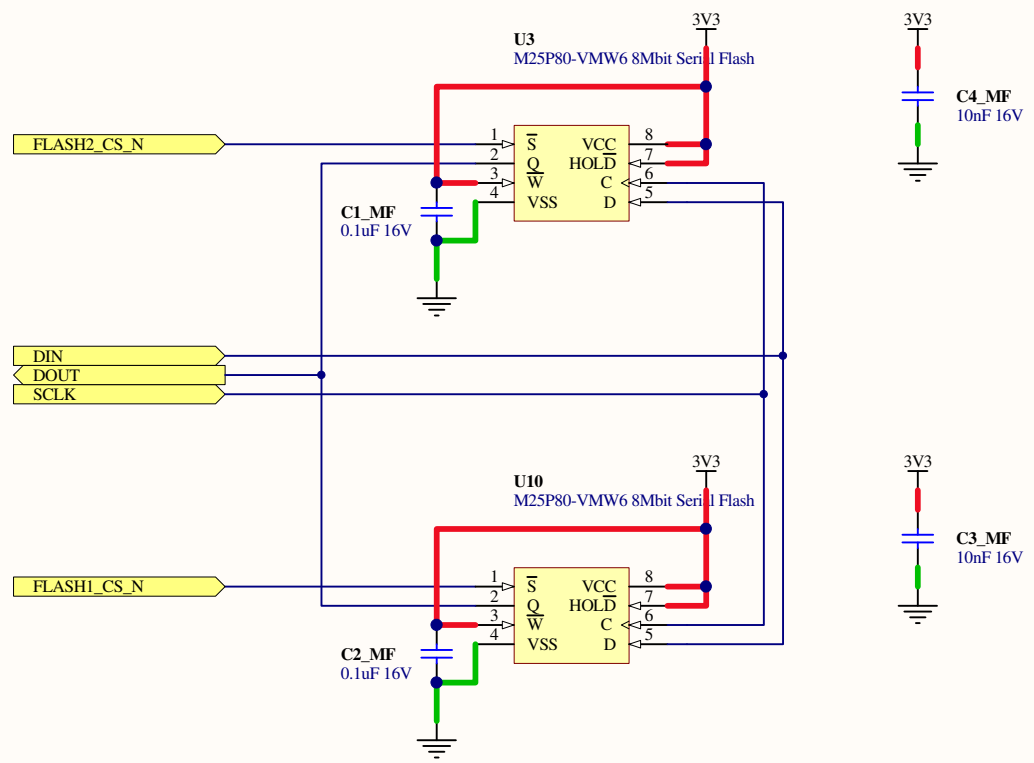



Sheet Title CLK_1			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Number: 48	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM Sheet 48 of 64			
File: CLK_ICS307-02_PLL.SchDoc				



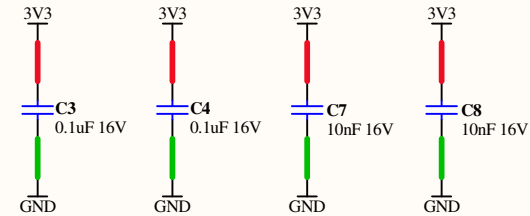
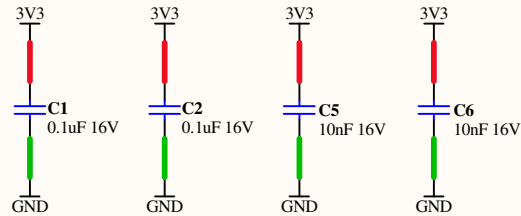
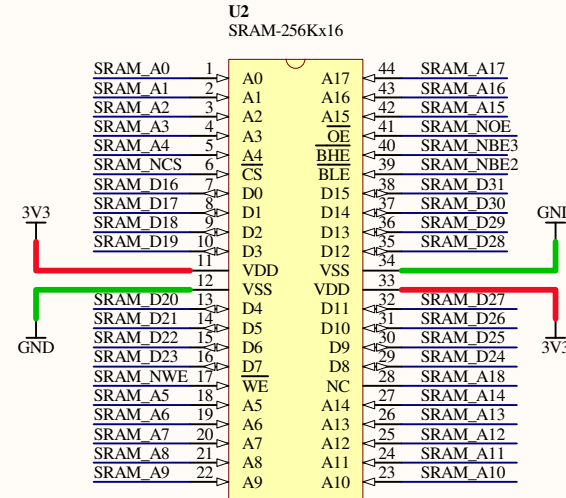
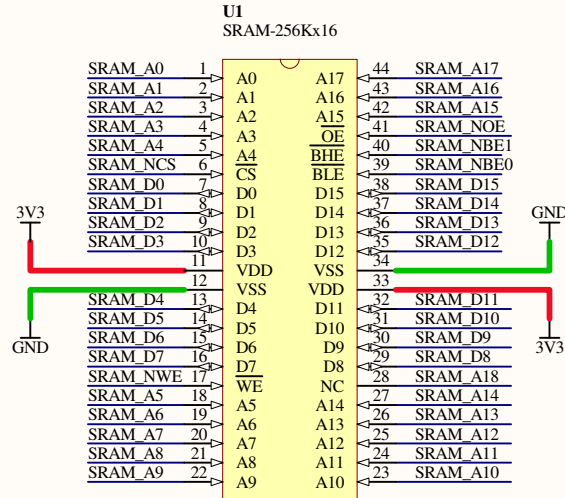
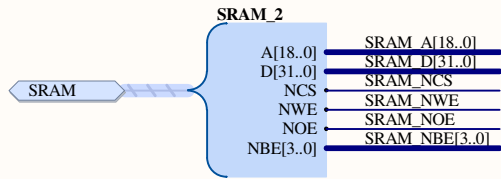
Common-Bus Memory Block
 256K x 32-bit SRAM (1 MByte)
 16M x 32-Bit SDRAM (64 MByte)
 16M x 16-Bit Flash (32 MByte)

Sheet Title Common-Bus Memory Block			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM	Sheet 49 of 66		
File: NB2_CommonMemory.SchDoc				



Sheet Title FLASH_2			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Number: 50	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM Sheet 50 of 64			
File: FLASHSPI_M25PX0.SchDoc				

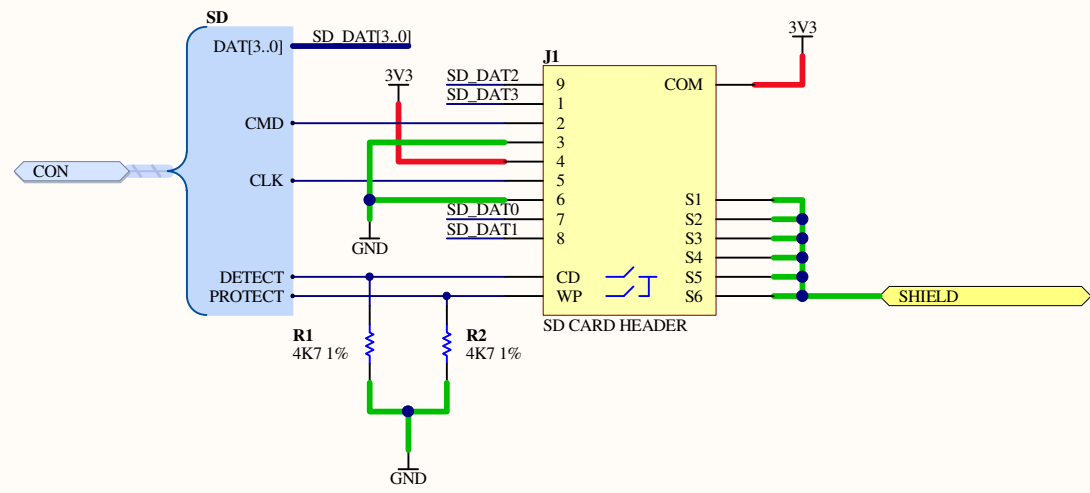
A18 is connected so that 512KBx16 device can be fitted




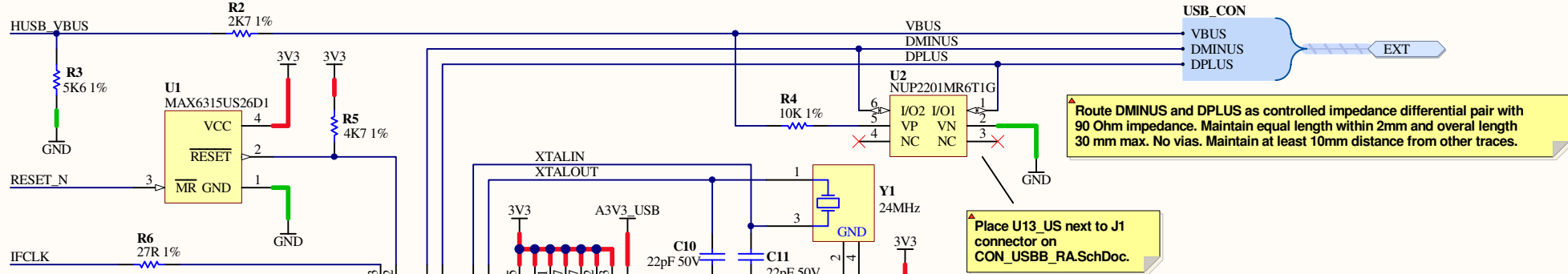
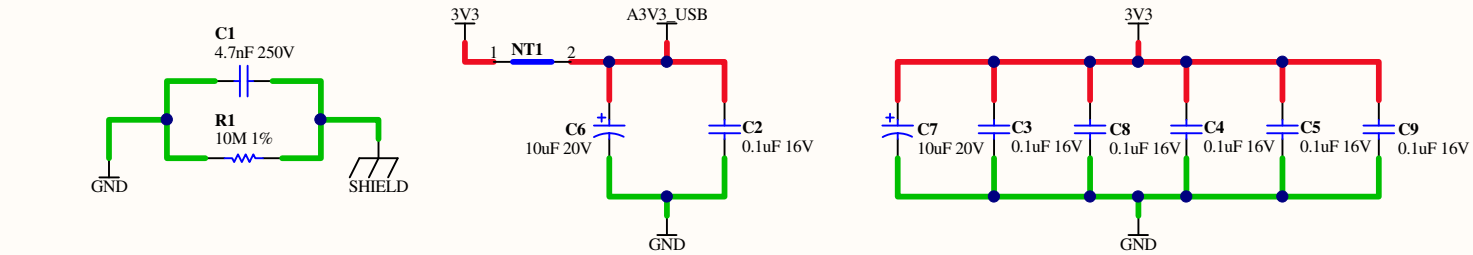
Sheet Title 256K x 32 SRAM - TSOP44 x 2		
Project Title NanoBoard NB2DSK01		
Size: A4	Assy: D-810-0007	Revision: 08
Date: 9/23/2011	Time: 12:03:18 AM	Sheet 51 of 66
File: SRAM_256Kx32_TSOP44_2.SchDoc		

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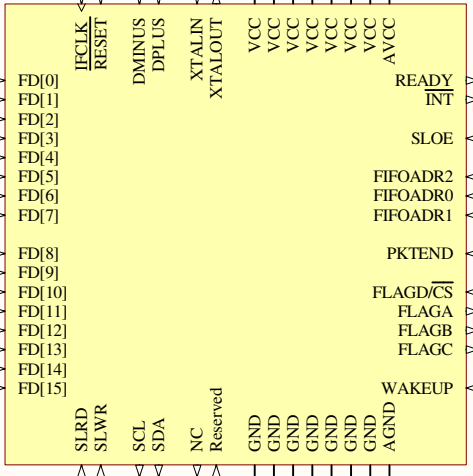
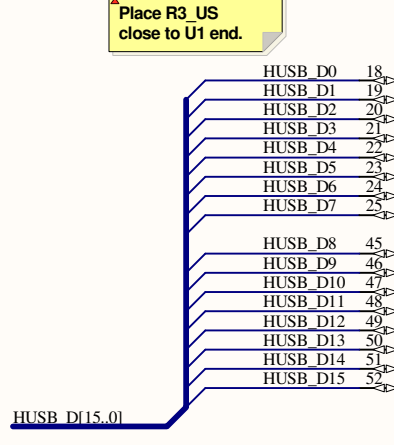


Sheet Title SD-CARD HIROSE 609_0003_5		<i>Altium Limited</i> Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA		
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007			Revision: 08
Date: 9/23/2011	Time: 12:03:18 AM			Sheet 52 of 66
File: CON_SD_HIROSE_609_0003_5.SchDoc				



Place R3_US close to U1 end.

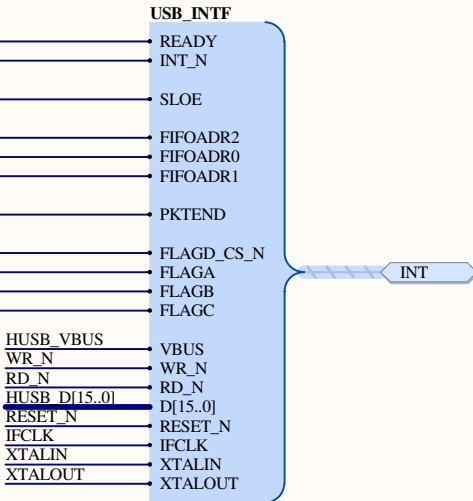
Place U13_US next to J1 connector on CON_USBB_RA.SchDoc.



PCB footprint to implement thermal pad. See CY7C68001 data sheet for details.

Route DMINUS and DPLUS as controlled impedance differential pair with 90 Ohm impedance. Maintain equal length within 2mm and overall length 30 mm max. No vias. Maintain at least 10mm distance from other traces.

Place U13_US next to J1 connector on CON_USBB_RA.SchDoc.



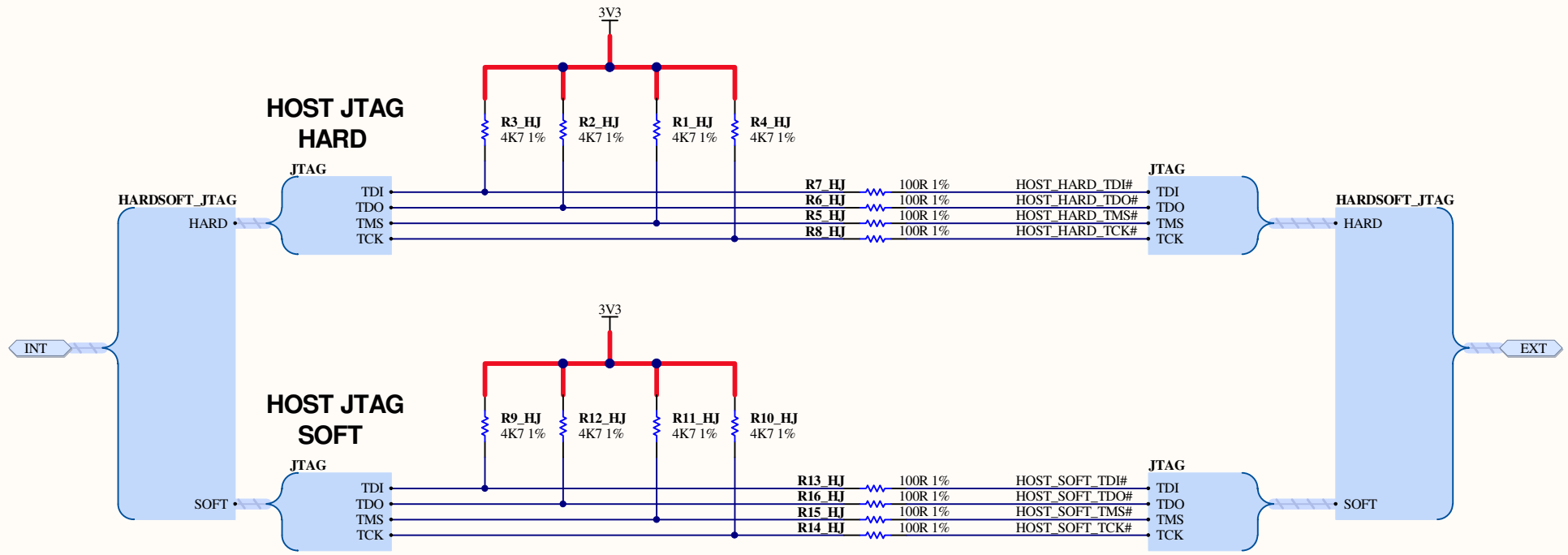
Sheet Title **High-Speed USB 2.0 Controller**


Project Title **NanoBoard NB2DSK01**

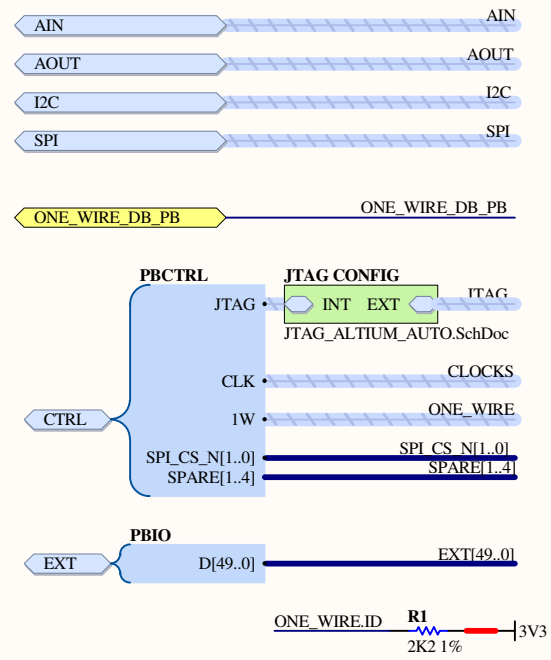
Size: A4 Assy: D-810-0007 Revision: 08
 Date: 9/23/2011 Time: 12:03:18 AM Sheet 53 of 66
 File: USB_CY7C68001-56LFC.SchDoc

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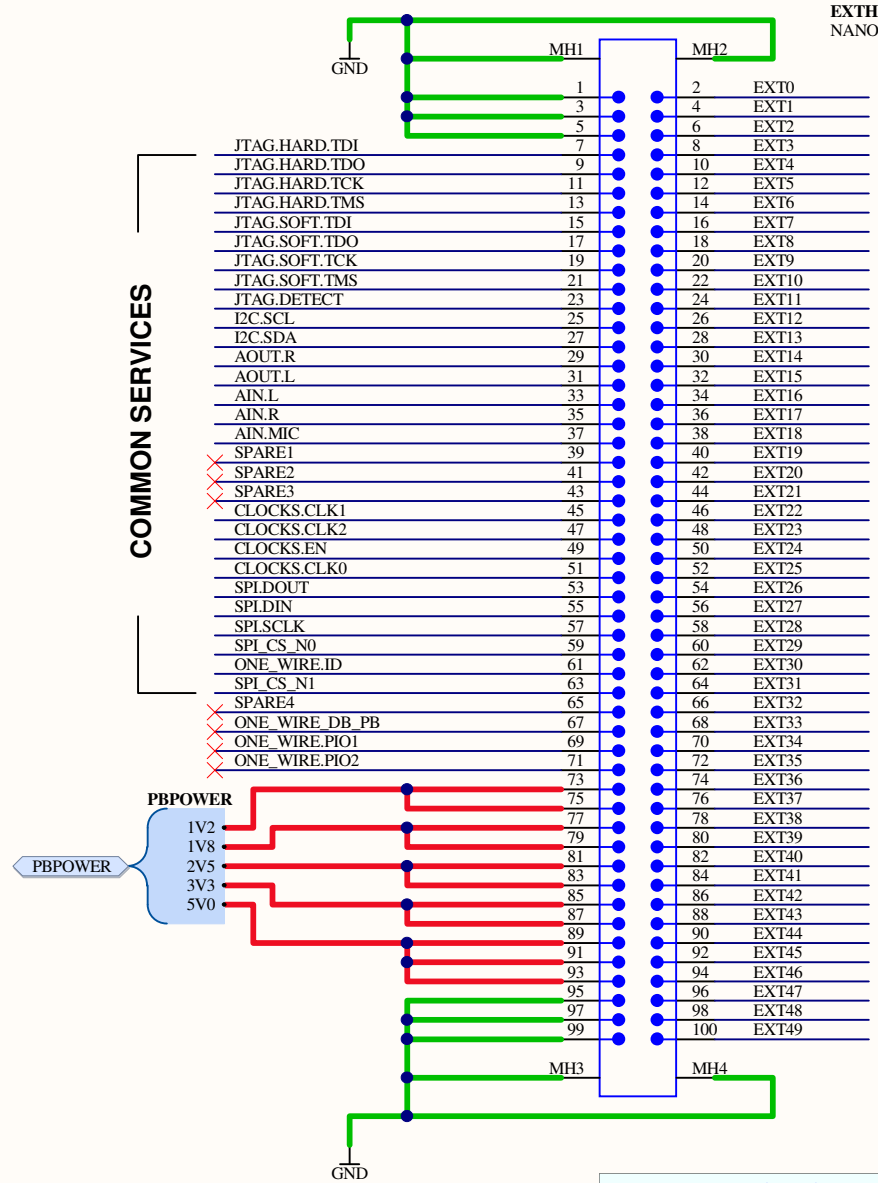




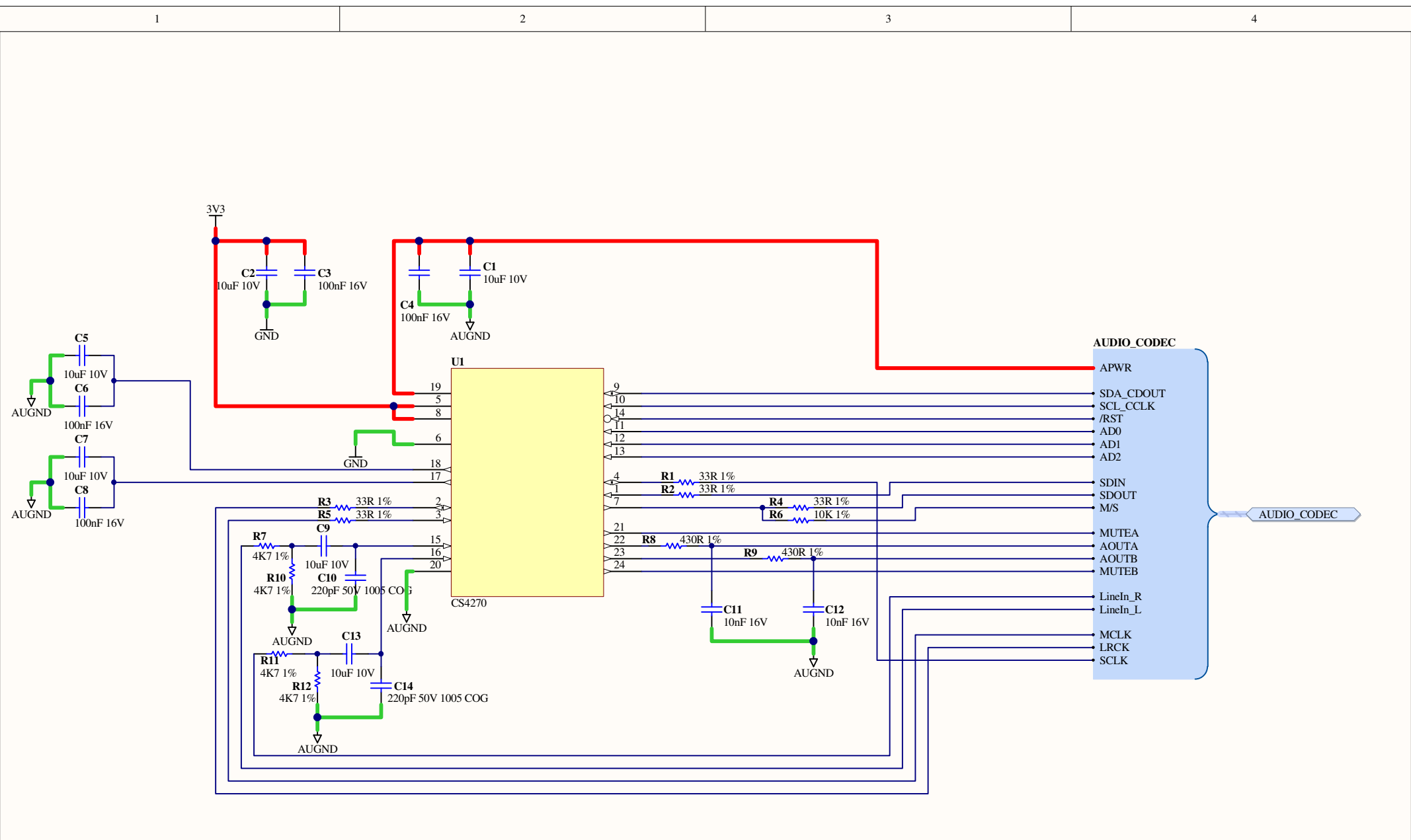
Sheet Title Host JTAG Header		Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA		
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007			Revision: 08
Date: 9/23/2011	Time: 12:03:18 AM			Sheet 54 of 66
File: JTAG_ALTIUM_HOST.SchDoc				




COMMON SERVICES



Sheet Title Peripheral Board Connector			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM	Sheet 55 of 66		
File: NB2_PBCON.schdoc				

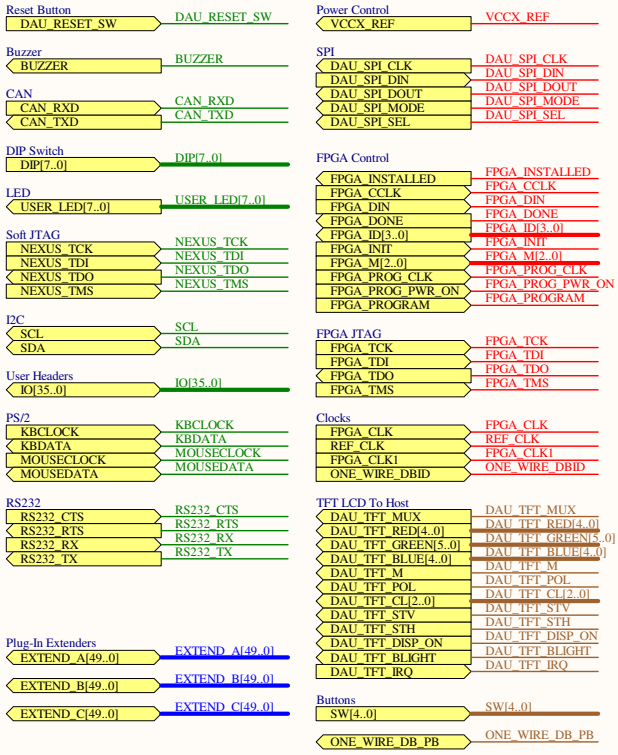


Sheet Title Audio CODEC			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:18 AM	Sheet 56 of 66		
File: AUDIO_CODEC_CS4270.SchDoc				

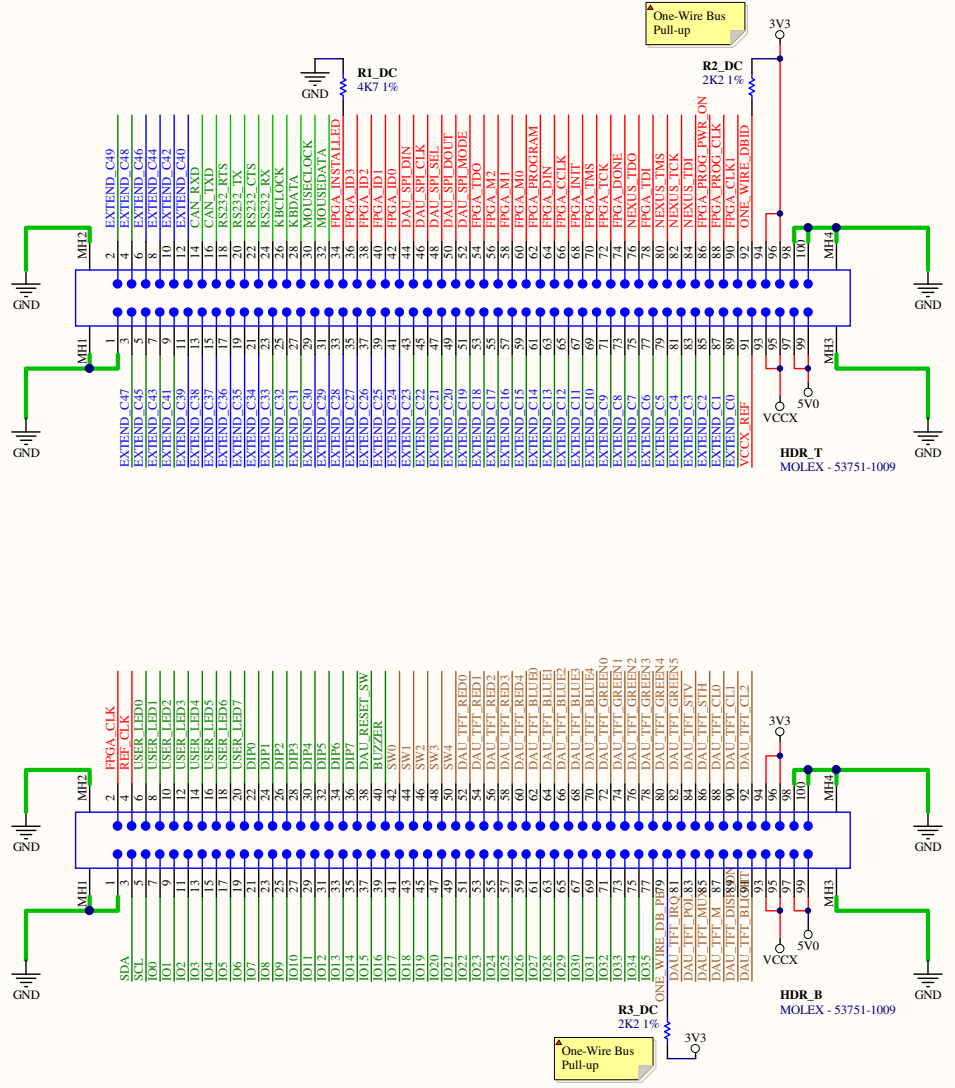
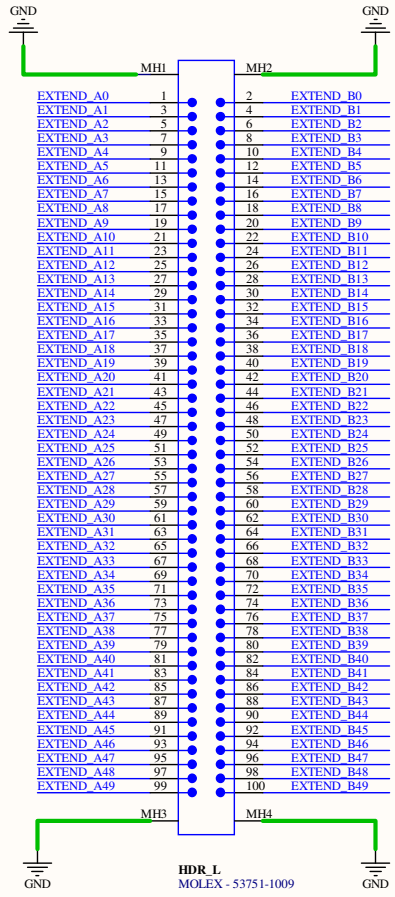
Red Connections are locked for NB1 compatibility. They are hardwired on the NB1 and therefore cannot be changed.

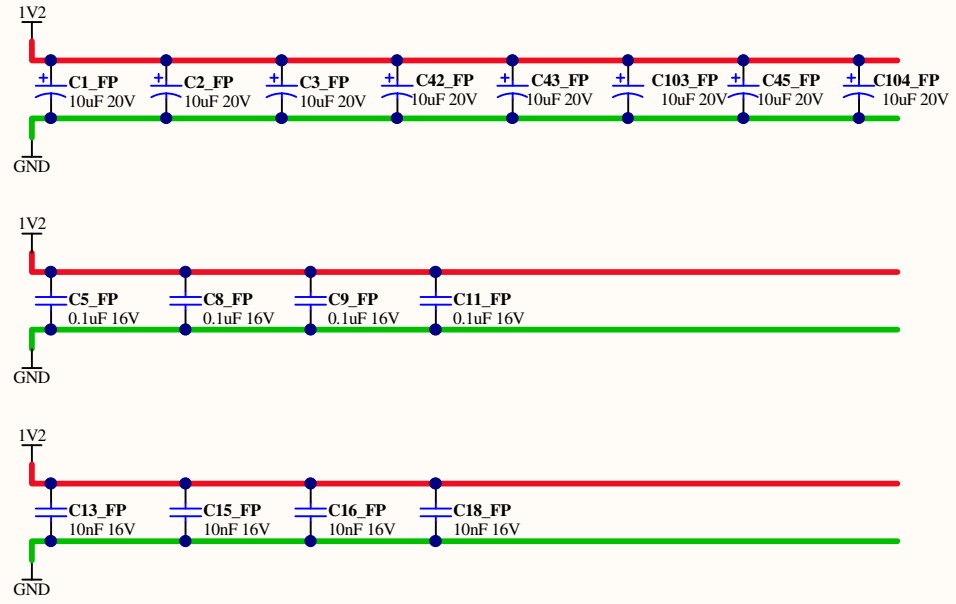
Green connections are I/O pins connected to NB1 compatible PCB resources on the mother board. These can be changed.


Blue connections are connected to the New NB2-DSK1 compatible resources on the motherboard. These can be changed.

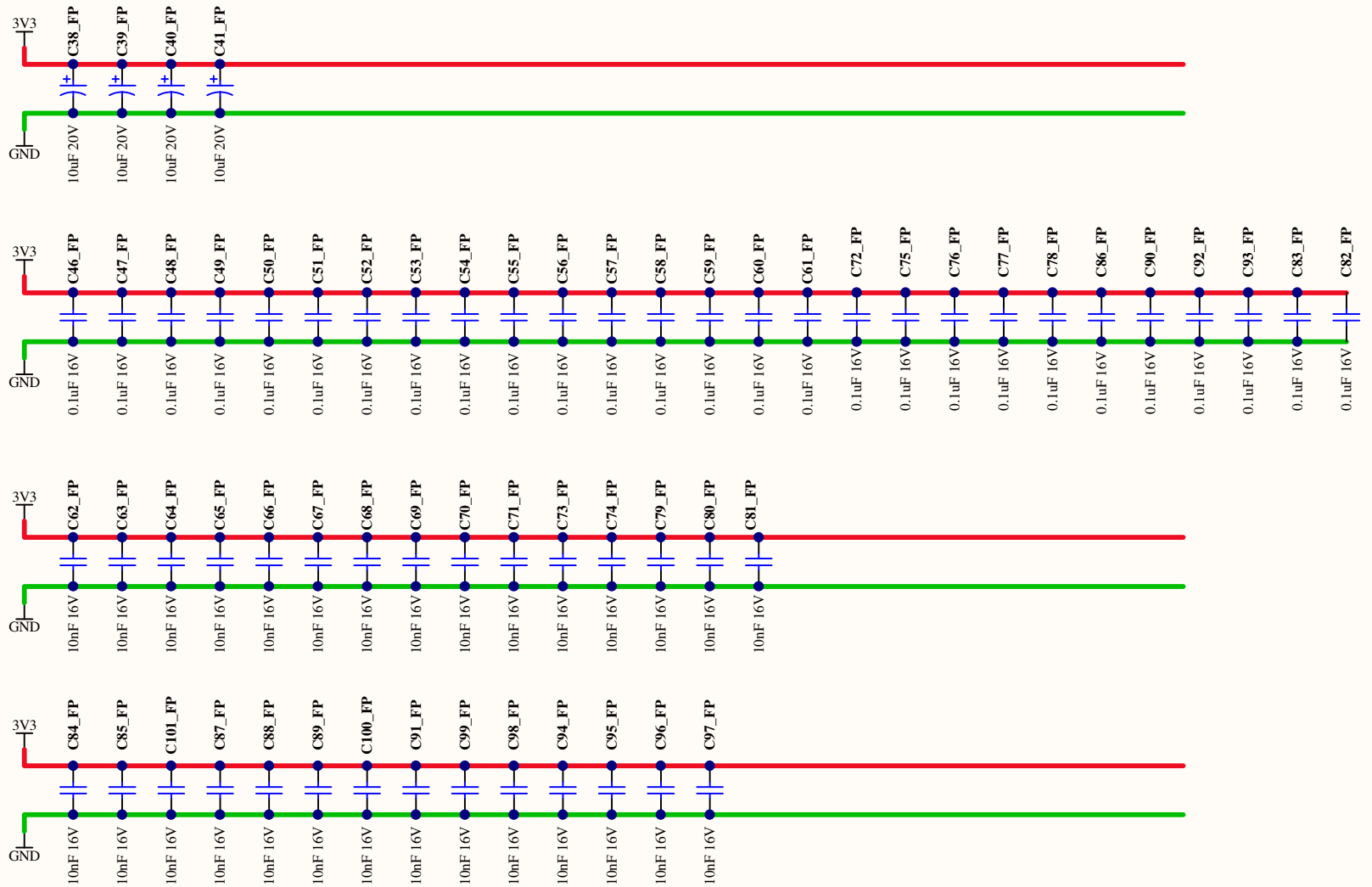


ONE_WIRE_DB_ID was formally FPGA_CLK2. Although this signal was "locked" for previous NB1 compatibility, it was never used, so is now used for the ONE_WIRE bus.




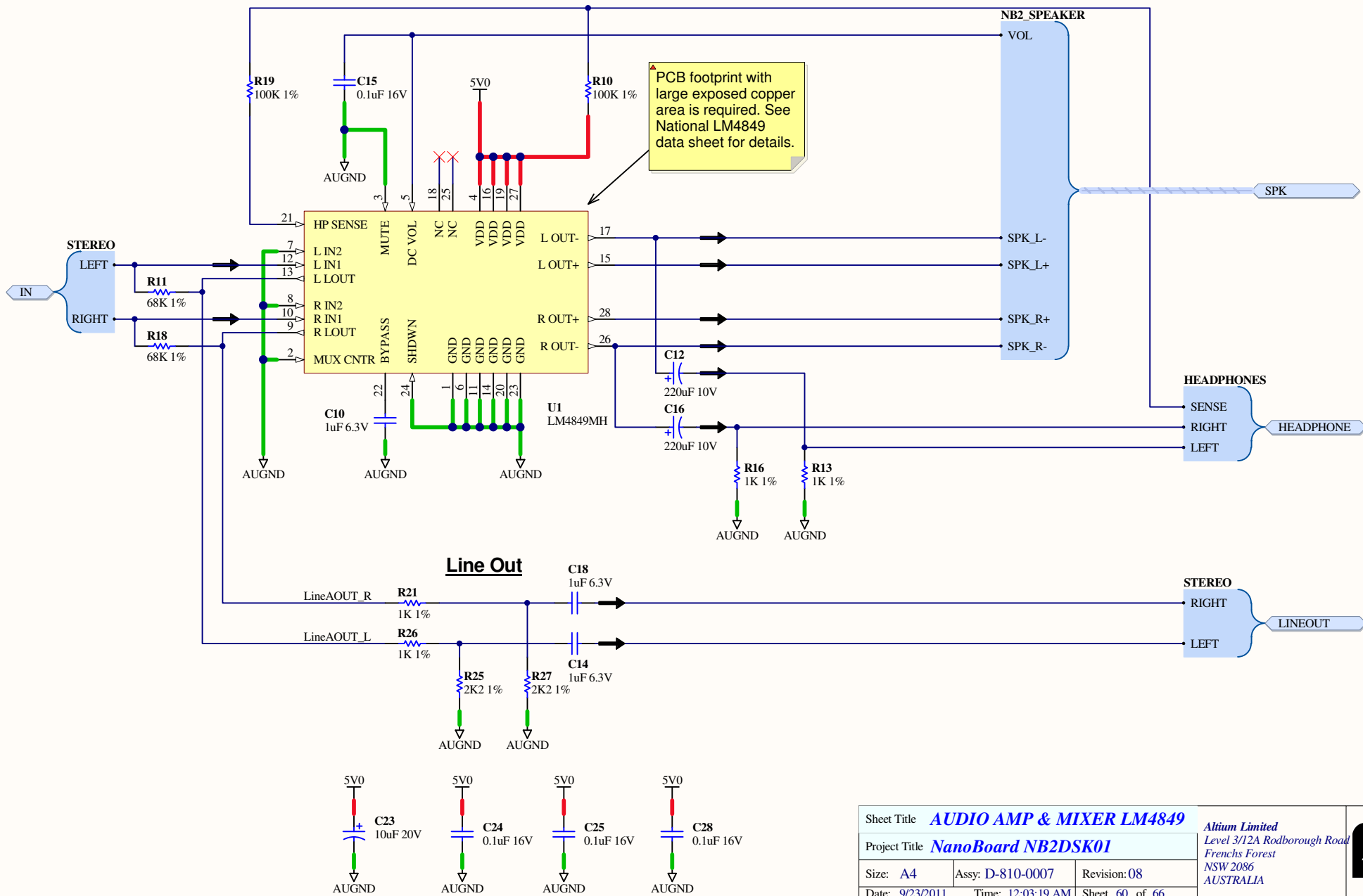


Sheet Title FPGA Bypass 1V2			<i>Altium Limited</i> Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:19 AM	Sheet 58 of 66		
File: FPGA_Bypass_1V2.SCHDOC				



The FPGA bypass capacitors are physically grouped as 10nF and 100nF pairs on all major accessible power pins on the FPGA.

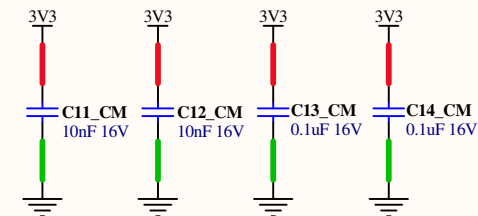
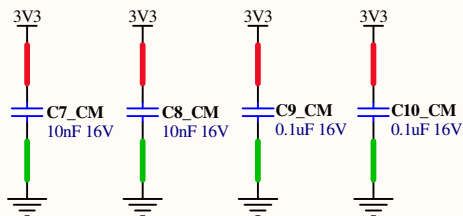
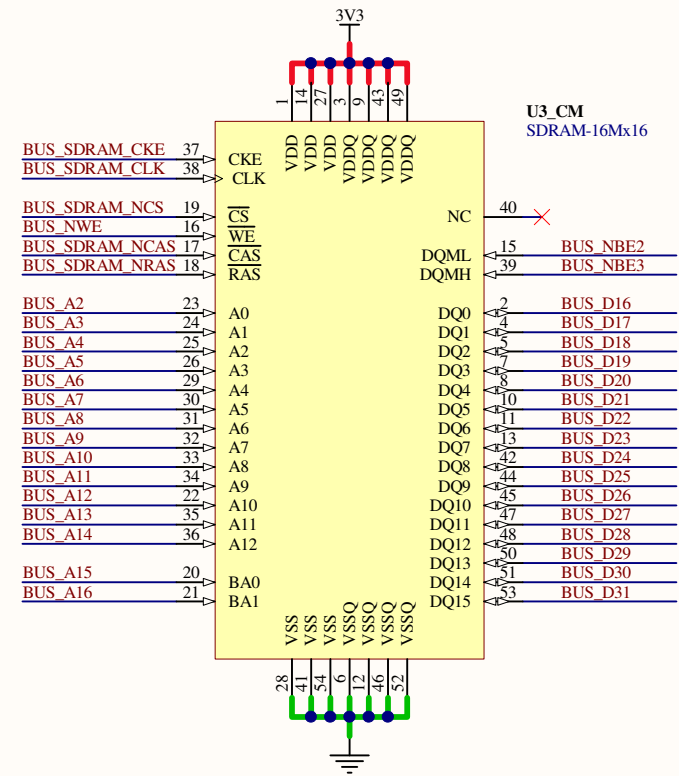
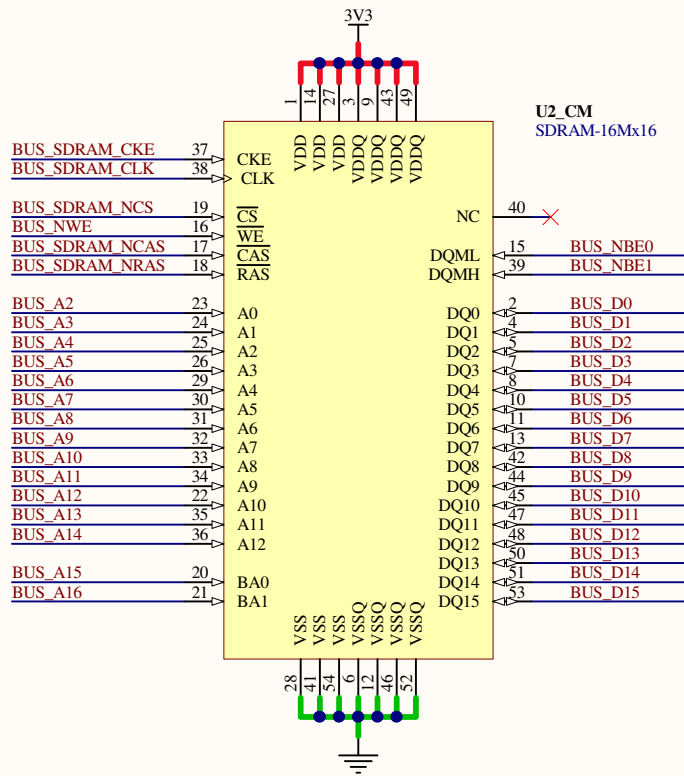
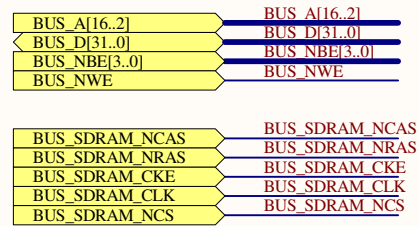
Sheet Title FPGA Bypass 3V3			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:19 AM	Sheet 59 of 66		
File: FPGA_Bypass_3V3.SCHDOC				



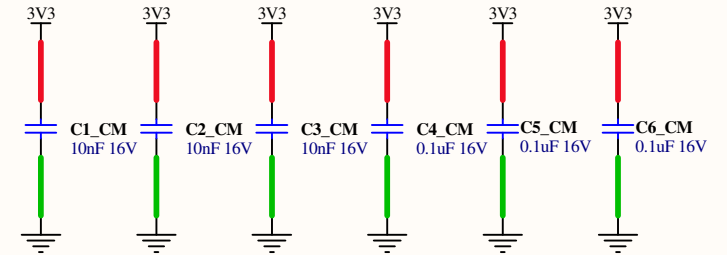
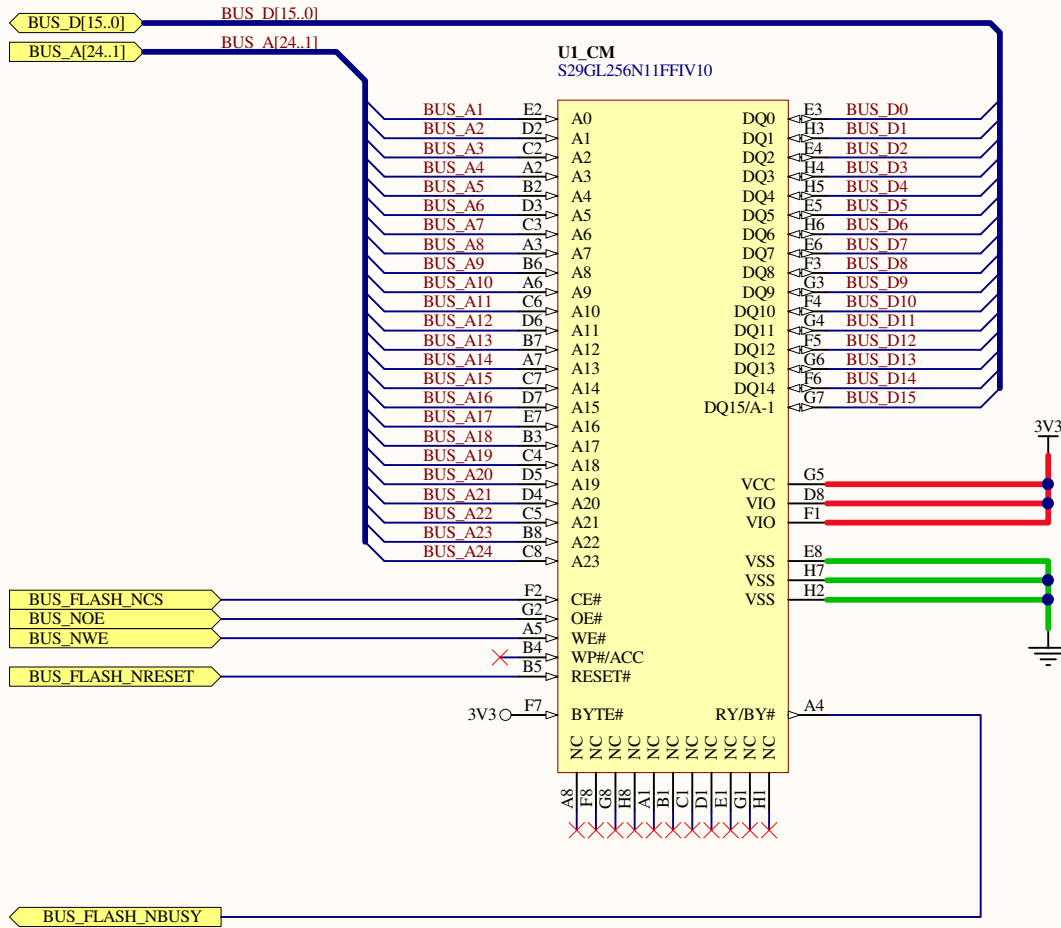
PCB footprint with large exposed copper area is required. See National LM4849 data sheet for details.

Sheet Title AUDIO AMP & MIXER LM4849		
Project Title NanoBoard NB2DSK01		
Size: A4	Assy: D-810-0007	Revision: 08
Date: 9/23/2011	Time: 12:03:19 AM	Sheet 60 of 66
File: AUDIO_AMP_LM4849.SchDoc		

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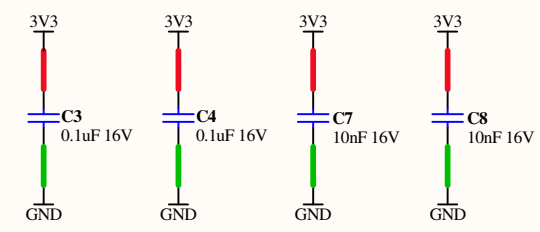
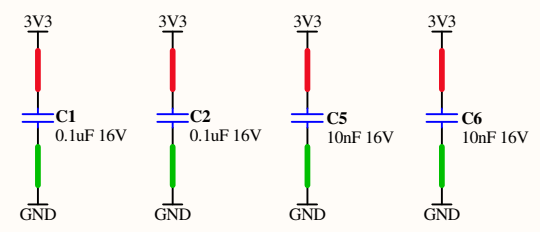
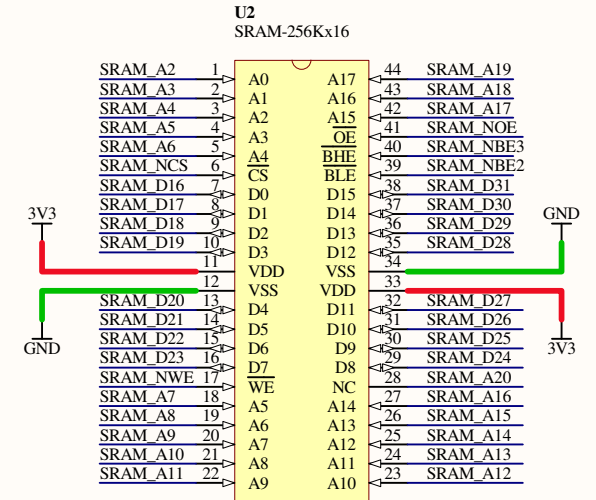
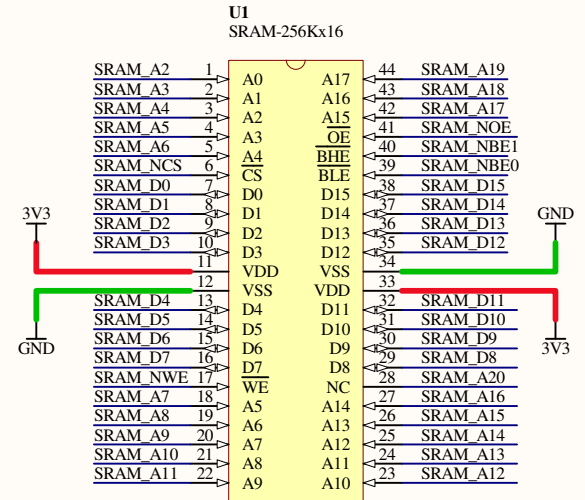
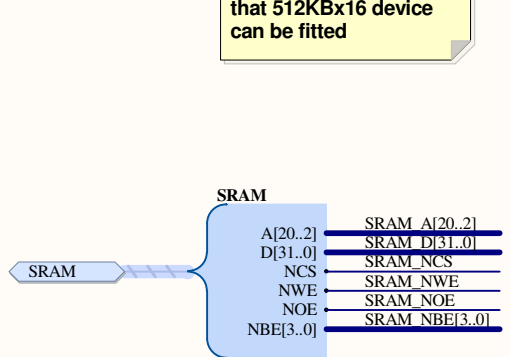


Sheet Title SDRAM_1			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:19 AM Sheet 61 of 64			
File: SDRAM_MT48LC16M16A2TG_16Mx32.SchDoc				

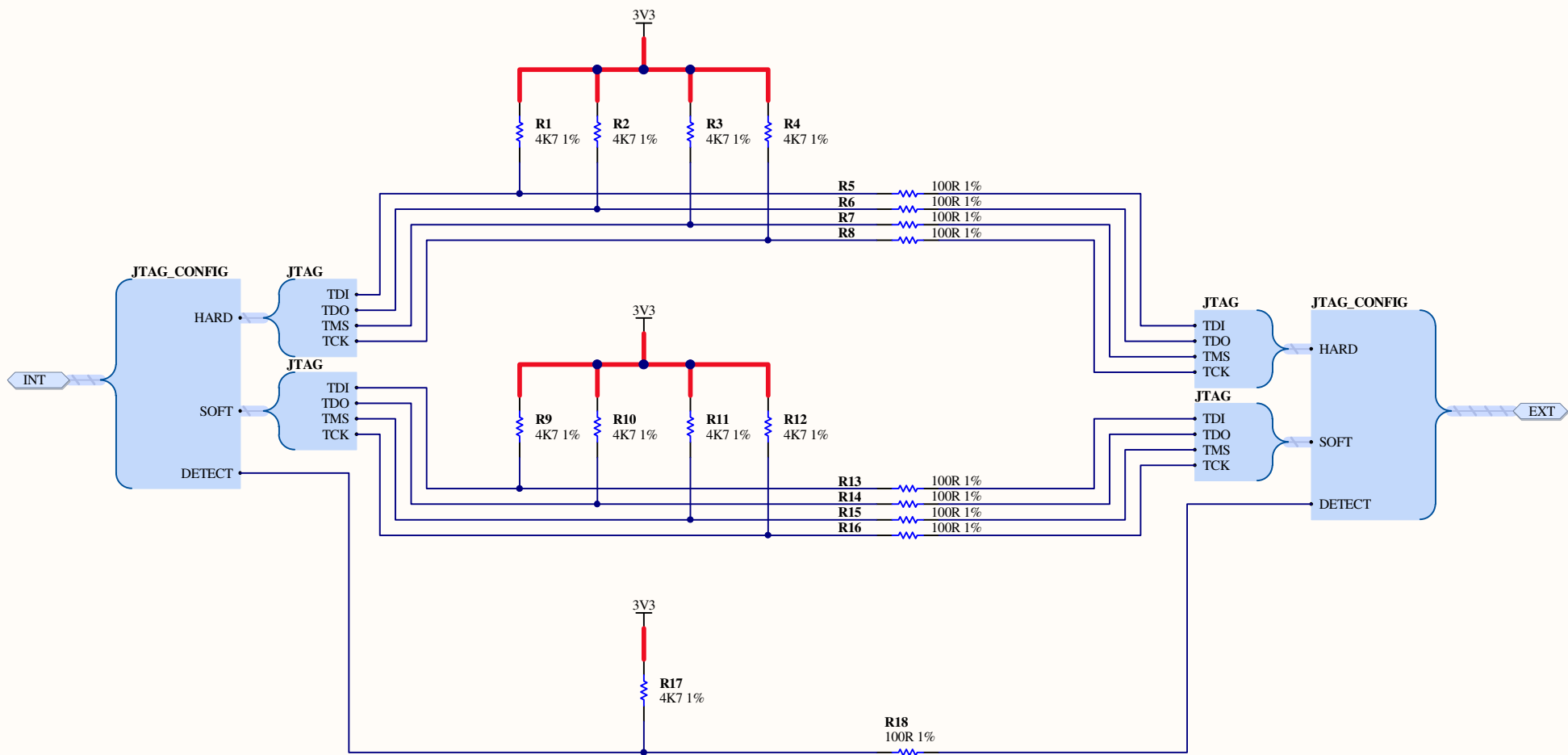



Sheet Title FLASH_1			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011 Time: 12:03:19 AM Sheet 62 of 64				
File: FLASH_S29GL256N11FFIV10_16Mx16.SchDoc				

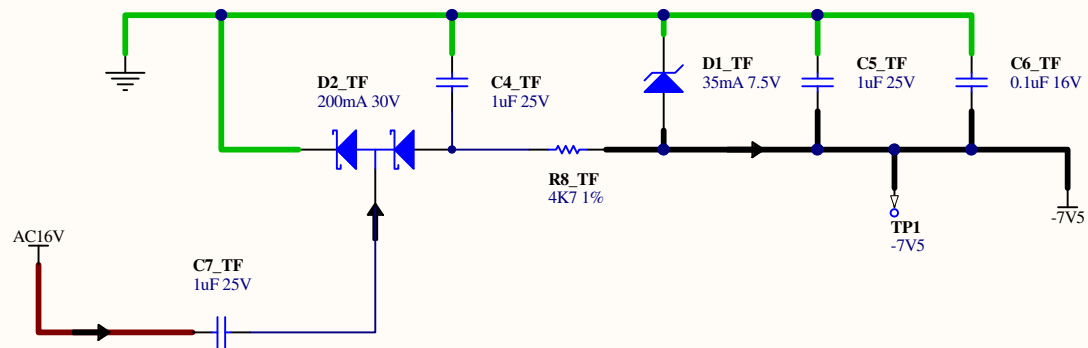
A18 is connected so that 512KBx16 device can be fitted




Sheet Title 256K x 32 SRAM - TSOP44 x 2		Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01			
Size: A4	Assy: D-810-0007	Revision: 08	
Date: 9/23/2011	Time: 12:03:19 AM	Sheet 63 of 66	
File: SRAM_256Kx32_TSOP44_1.SchDoc			



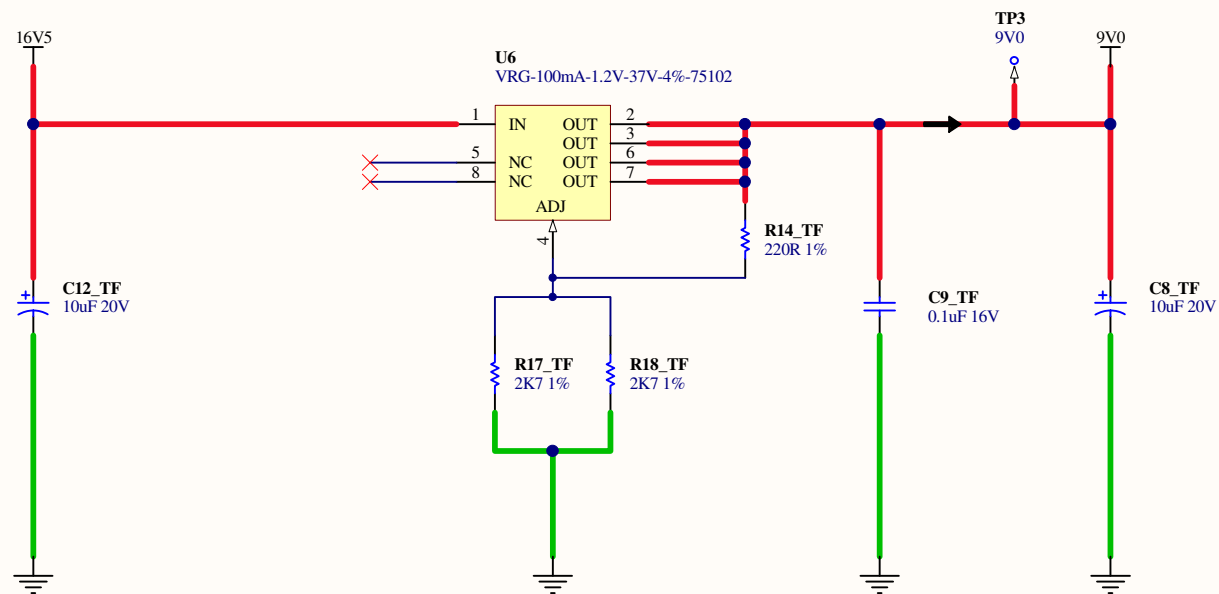
Sheet Title Auto-Detect JTAG Circuit			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Assy: D-810-0007	Revision: 08		
Date: 9/23/2011	Time: 12:03:19 AM	Sheet 64 of 66		
File: JTAG_ALTIUM_AUTO.SchDoc				




-7V5 POWER SUPPLY

Sheet Title LCD_PWR_3			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Number: 65	Revision: 08		
Date: 9/23/2011	Time: 12:03:19 AM Sheet 65 of 64			
File: PSU_BZX84C7V5_-7V5.SchDoc				

9V0 POWER SUPPLY



Sheet Title LCD_PWR_2			Altium Limited Level 3/12A Rodborough Road Frenchs Forest NSW 2086 AUSTRALIA	
Project Title NanoBoard NB2DSK01				
Size: A4	Number: 66	Revision: 08		
Date: 9/23/2011	Time: 12:03:19 AM Sheet 66 of 64			
File: PSU_LM317_9V0.SchDoc				