5 V Input
POWER SUPPLY
(3.3V)

MIC	AUDIO In (ADC)
PHONE JACK	AUDIO Out (DAC)
POT	ADC/ DAC

Sheet 6

POWER

PIO A, B, C

QTOUCH

LCD INTERFACE
2.8"
240x320
TFT

TOUCH SCREEN

Sheet 5

Board Configuration
Sheet

Sheet 2

ATMEL
Cortex-M4 ARM Processor
SAM4S (LQFP100)

Sheet 3

PIO A, B, C

NAND FLASH	
HSMCI	Micro SD
UART0	RS232
USART1	
USART1	RS485
ICE	HE 10

Sheet 4

FS DEVICE	USB
ZIGBEE INTERFACE	HE 10
LEDs, Buttons	
PIO A, B, C Extension	HE 14

Sheet 7

ATMEL ROUSSET

REV.	MODIF.	DES.	DATE	VER.	DATE
B	INIT EDIT	JH	08-Mar-12	XXX	XX-XXX-XX

SAM4S-EK

Block Diagram

SCALE 1/1

REV. B

SHEET 1/7

REVISION HISTORY

REV	DATA	NOTE
A	2011.03	ORIGINAL RELEASED
B	2012.03	SECOND RELEASED

SCHEMATICS CONVENTIONS

(1) Resistance Unit: "K" is "Kohm", "R" is "Ohm?
(2) "nm" means the component is not populated by default

TABLE OF CONTENTS

TEST POINT

PAGE	REFERENCE	FUNCTION
3	TP1, TP2, TP3, TP4	GND
4	TP5 TP6	UART TXD UART RXD
5	TP7 TP8, TP9	LCD backlight driver anode Aux ADC input for TSC
6	TP12	Optional audio PA input

JUMPER and SOLDERDROP

PAGE	REFERENCE	DEFAULT	FUNCTION
3	JP1	OPEN	Close to select JTAG boundary scan
	JP2	1-2	Analog reference voltage selection between 3.3V and 3.0V
	JP3	OPEN	Close to reinitialize the Flash contents and some of its NVM bits
	JP4	OPEN	Close for manufacturing test or fast programming mode
	JP5, JP6, JP7, JP8	CLOSE	Access for current measurement on each power rail
4	JP9	CLOSE	Nand Flash chip select enable
	JP11	CLOSE	RS485 bus termination enable
	JP10, JP12	OPEN	RS485 pull resistor selectors
	JP28	OPEN	Option for software test
	JP31	1-2	RS232 USART and RS485 selection
5	JP13	CLOSE	LCD chip select enable
	JP32	CLOSE	LCD touch screen SPI chip select enable
6	JP14, JP15	OPEN	Sync close to degrade gain stage on microphone input
	JP17, JP19	OPEN	Close to mux RIN/LIN into MONO-IN path within audio PA
	JP16, JP21	OPEN	Close for impedance matching on AD/DA BNC port
	JP18	1-2	ADC input selection between BNC port and potentiometer
	JP20	OPEN	Close to fix in mono speaker mode, no matter stereo plug state
	JP29	2-3	AUDIO Amplifier power select between VCC33 and +5V
	JP30	1-2	DAC output between AUDIO left channel and BNC connector
7	JP22, JP23, JP24	1-2	DC voltage selection between 3.3V and 5V on PIO expansion ports
	JP25	CLOSE	Button BP2 disable
	JP26	CLOSE	Button BP3 disable
	JP27	CLOSE	Power consumption measure for ZigBEE module

PIO MUXING

PIOA	USAGE	PIOA	USAGE	PIOB	USAGE	PIOC	USAGE	PIOC	USAGE
PA0	TSLIDR_SL_SNS	PA16	TSC_IRQ/ZB_IRQ0	PB0	MIC INPUT	PC0	D0	PC16	NAND_ALE
PA1	TSLIDR_SL_SNSK	PA17	TSC_BUSY/ZB_IRQ1	PB1	ANA INPUT	PC1	D1	PC17	NAND_CLE
PA2	TSLIDR_SM_SNS	PA18	ZB_RSTN	PB2	ZB_NPCS2	PC2	D2	PC18	NAND_RDYBSY
PA3	TSLIDR_SM_SNSK	PA19	LED_BLUE	PB3	USER_PB1	PC3	D3	PC19	REGSEL_LCD
PA4	TSLIDR_SR_SNS	PA20	LED_GREEN	PB4	JTAG	PC4	D4	PC20	LED_RED(POWER)
PA5	TSLIDR_SR_SNSK	PA21	RXD1	PB5	JTAG	PC5	D5	PC21	USB_CNX
PA6	MCI_CD	PA22	TXD1	PB6	JTAG	PC6	D6	PC22	TVALID_SNS
PA7	CLK_32K	PA23	COM1EN	PB7	JTAG	PC7	D7	PC23	TVALID_SNSK
PA8	CLK_32K	PA24	RTS1	PB8	CLK_12M	PC8	WR_LCD	PC24	TUP_SNS
PA9	RX_UART0	PA25	CTS1	PB9	CLK_12M	PC9	NAND_OE	PC25	TUP_SNSK
PA10	TX_UART0	PA26	MCI	PB10	USB_DDM	PC10	NAND_WE	PC26	TDWN_SNS
PA11	TSC_CS	PA27	MCI	PB11	USB_DDP	PC11	RD_LCD	PC27	TDWN_SNSK
PA12	MISO	PA28	MCI	PB12	ERASE	PC12	USER_PB2	PC28	TLEFT_SNS
PA13	MOSI	PA29	MCI	PB13	AUDIO OUT R	PC13	EN_LCD	PC29	TLEFT_SNSK
PA14	SPCK	PA30	MCI	PB14	AUDIO OUT L	PC14	NAND_NCS0	PC30	TRIGHT_SNS
PA15	ZB_SLPTR	PA31	MCI			PC15	NSC1_LCD	PC31	TRIGHT_SNSK

DEFAULT NO POPULATE PARTS

PAGE	REFERENCE	FUNCTION
3	J1, R1	External clock resource input
	Y1, R3, R7	Backup 12MHz crystal
	R6, R8	Isolation between 12MHz clock source and GPIO line
	R9, R10	Isolation between 32KHz clock source and GPIO line
	J2 / JP1 / JP4	QFP100 Socket / JTAGSEL / TEST - optinal usage
	C13	Optional 4.7uF decoupling capacitor for VDDCORE
4	R22	Optional write protection on NAND flash
	JP28	Option for software test
	R24, R30	Differential impedance matching for RS485 cable
5	D1	Optional ESD protection for LCD touch panel
	R61, R63, RA2, RA3	Optional databus termination for LCD controller
7	R122 R123	Optional TWI signals pull up resistors

ATMEL ROUSSET

REV.	MODIF.	DES.	DATE	VER.	DATE
B	INIT EDIT	JH	08-Mar-12	XXX	XX-XXX-XX

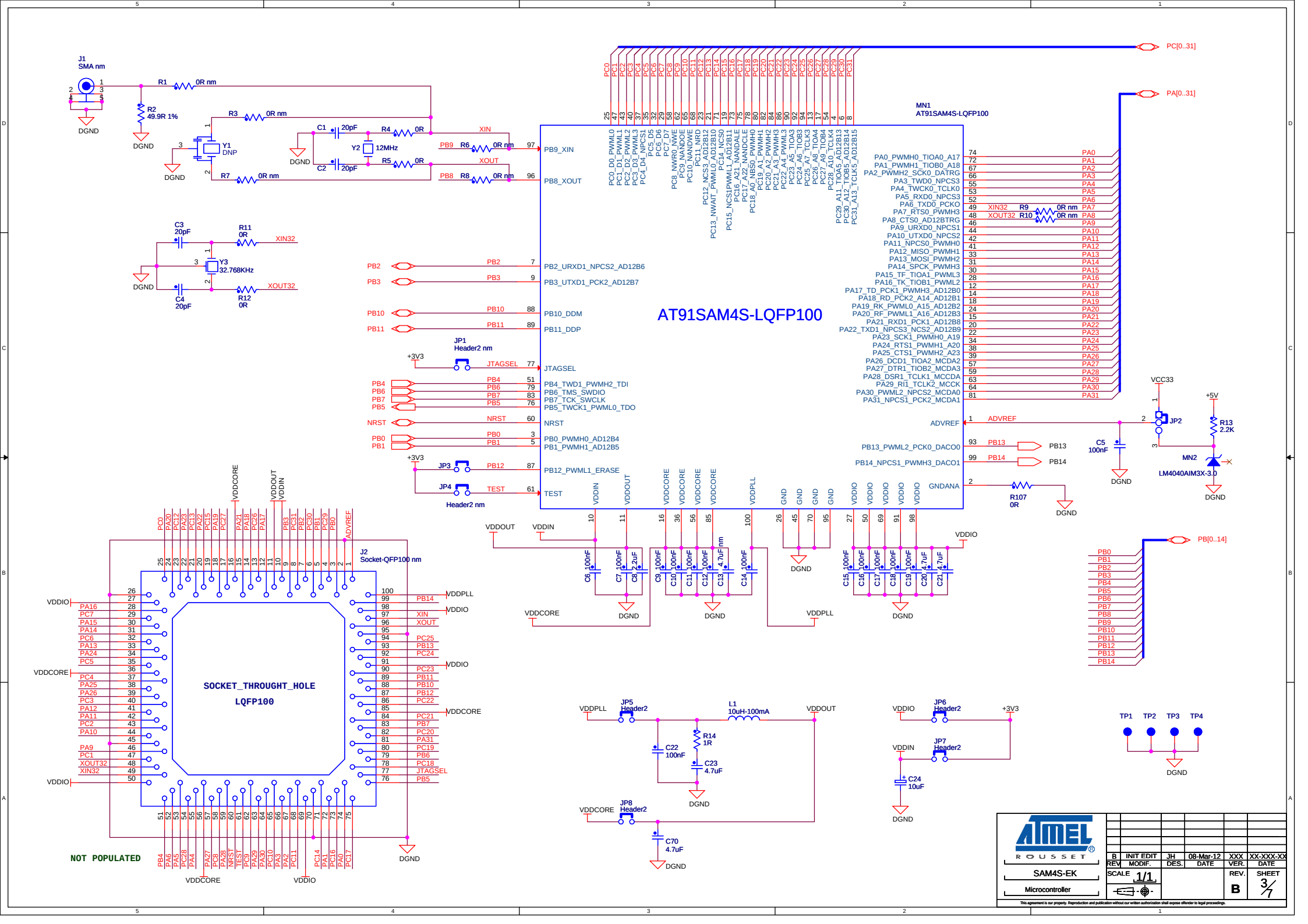
SAM4S-EK

Board Configuration

SCALE 1/1

REV. B

SHEET 2/7

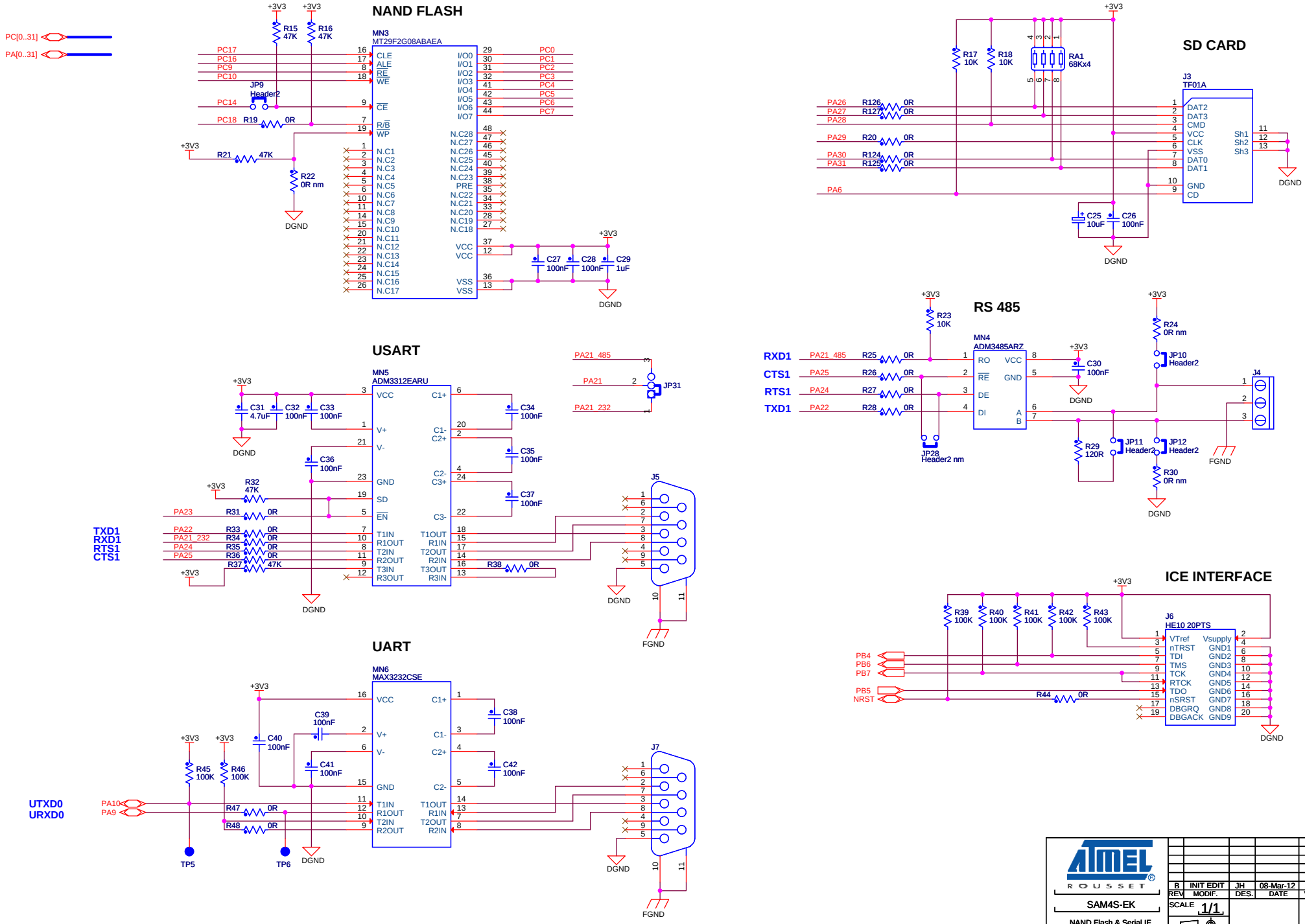


B	INIT EDIT	JH	08-Mar-12	XXX	XX-XXX-XX	
REV.	MODIF.	DES.	DATE	VER.	DATE	
SCALE 1/1				REV. B	SHEET 3/7	

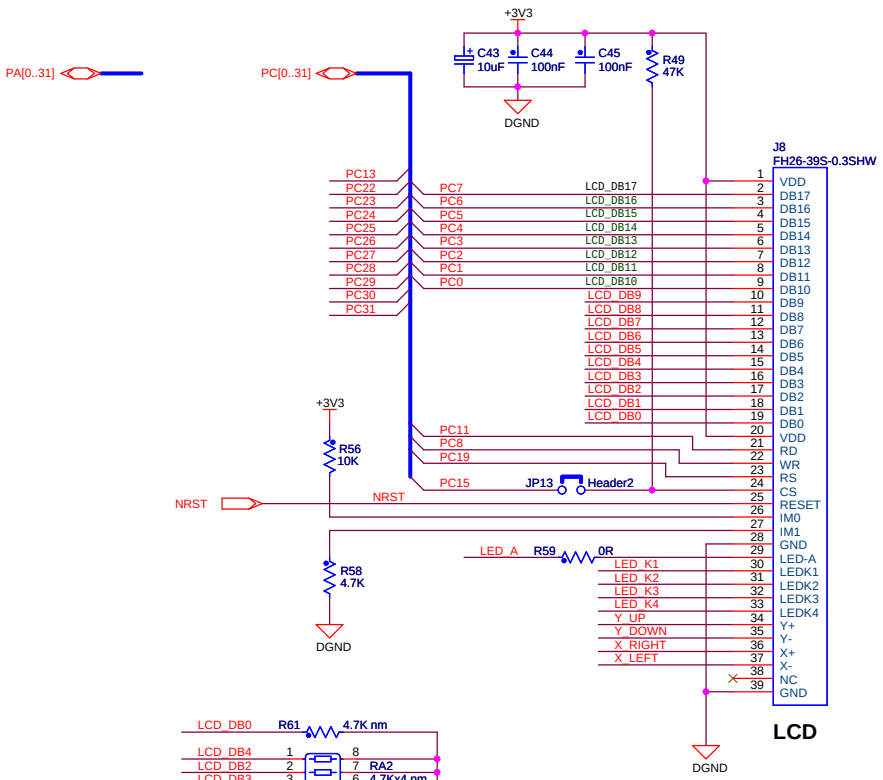
ATMEL ROUSSET

SAM4S-EK

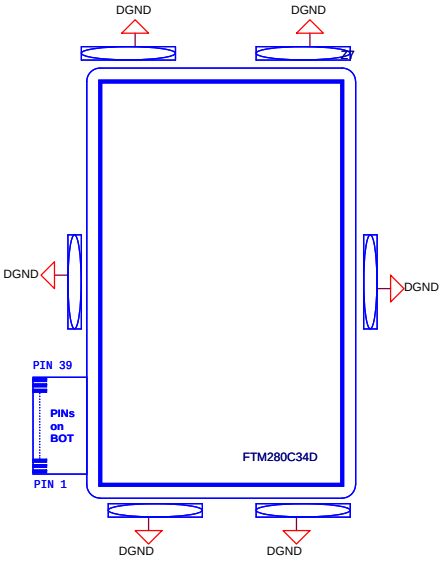
Microcontroller



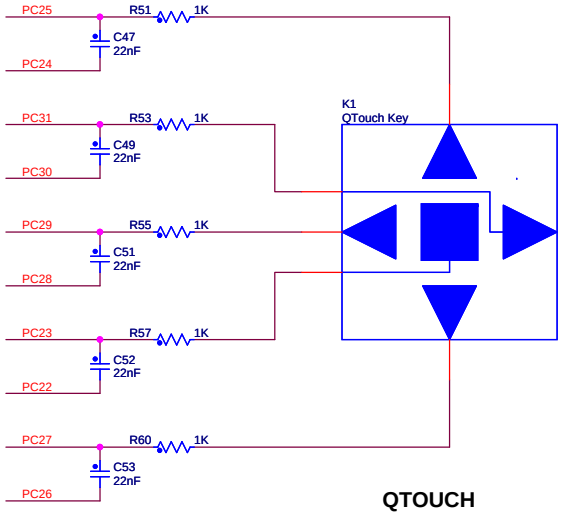
B	INIT EDIT	JH	08-Mar-12	XXX	XX-XXX-XX	
REV.	MODIF.	DES.	DATE	VER.	DATE	
SAM4S-EK						
NAND Flash & Serial IF	SCALE 1/1			REV. B	SHEET 4/7	



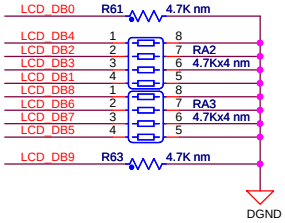
LCD

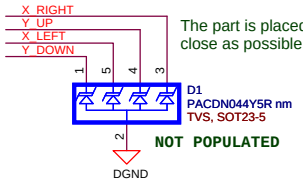


Six slots on PCB for LCD shield

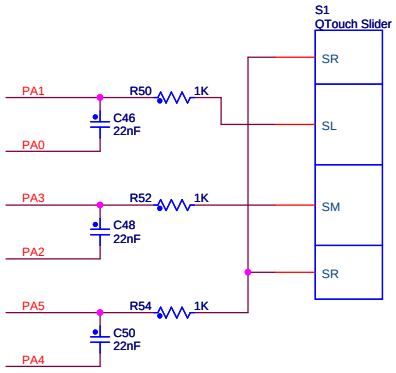


QTOUCH

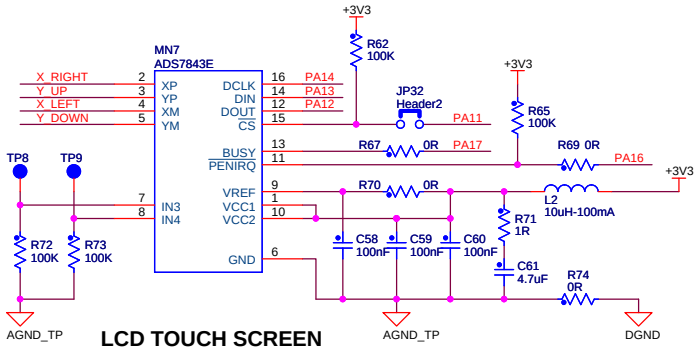




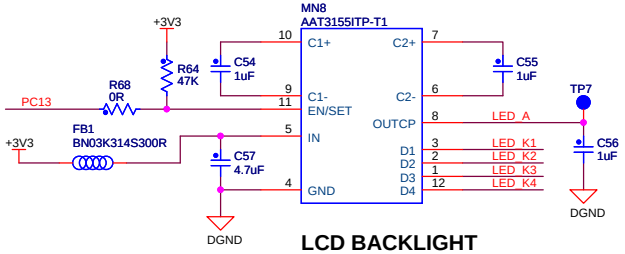
The part is placed as close as possible to J8



22nF use X7R



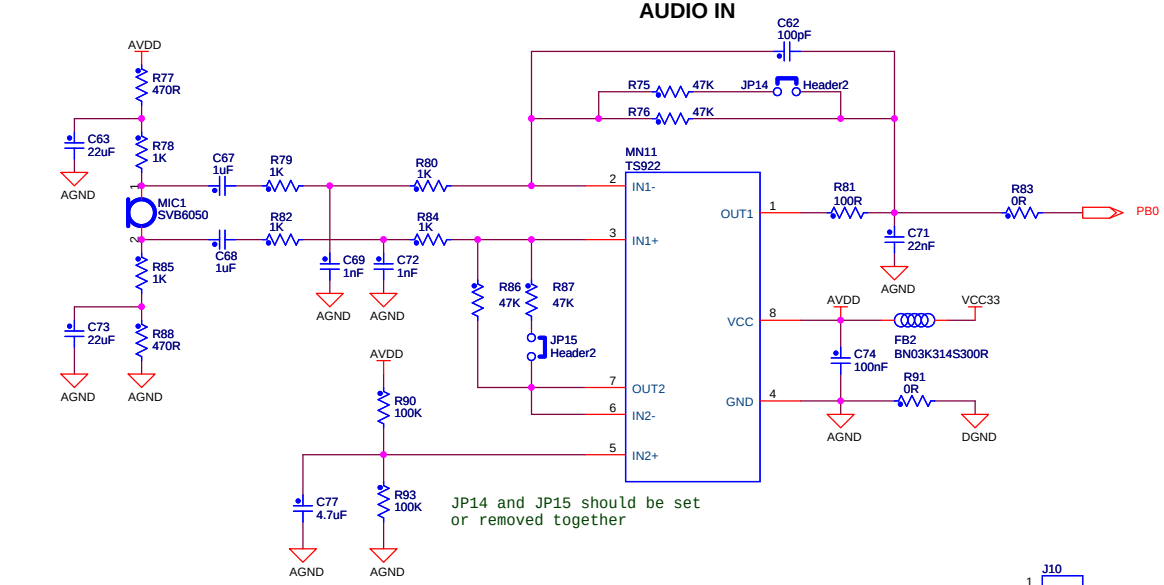
LCD TOUCH SCREEN

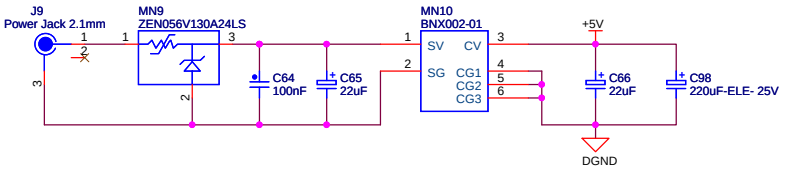


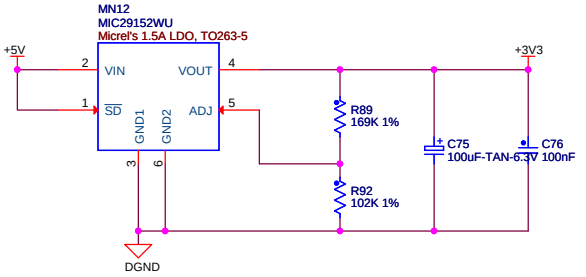
LCD BACKLIGHT

B	INIT EDIT	JH	08-Mar-12	XXX	XX-XXX-XX	
REV.	MODIF.	DES.	DATE	VER.	DATE	
SAM4S-EK						
SCALE 1/1				REV.	SHEET	
TFT-LCD & QTouch				B	5/7	

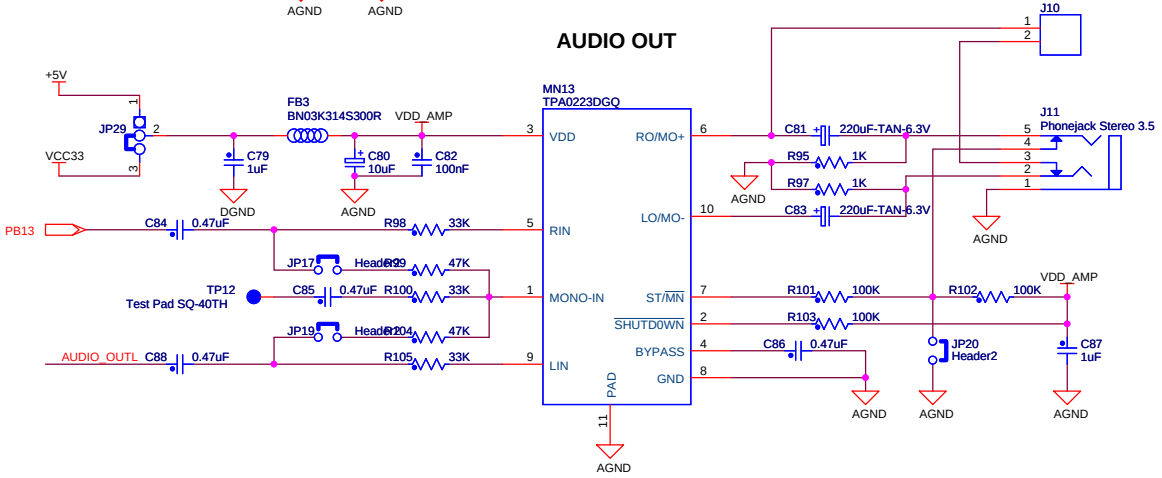
AUDIO IN

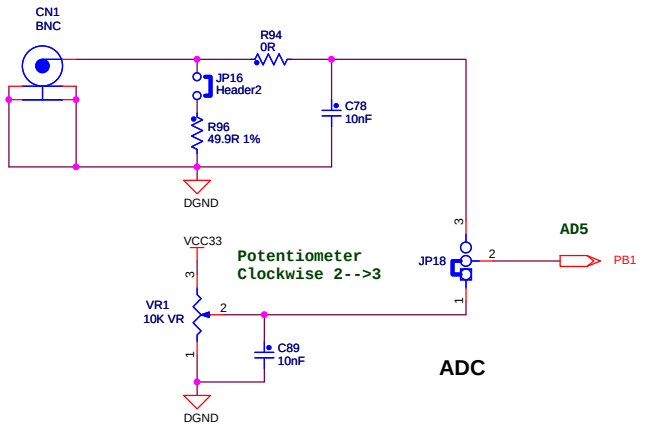


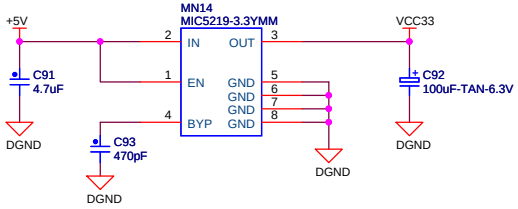


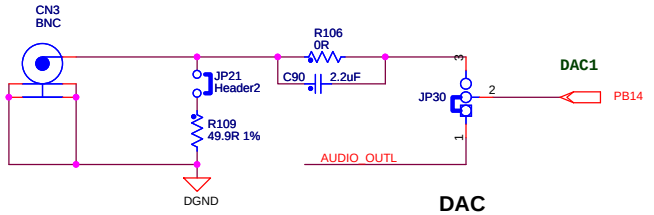


AUDIO OUT









B	INIT EDIT	JH	08-Mar-12	XXX	XX-XXX-XX
REV.	MODIF.	DES.	DATE	VER.	DATE

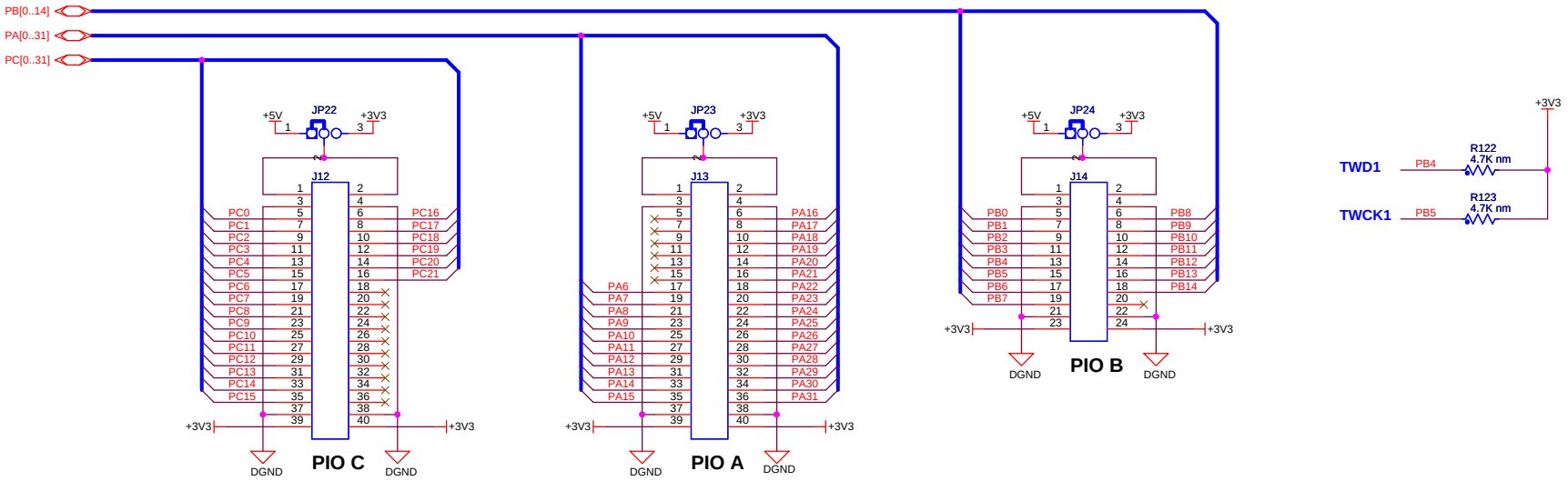
SAM4S-EK

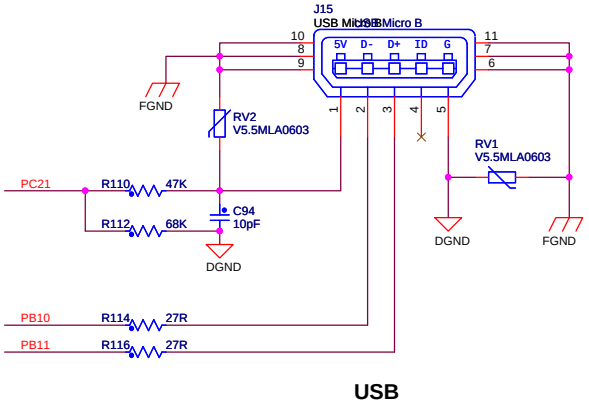
Audio & Power supply

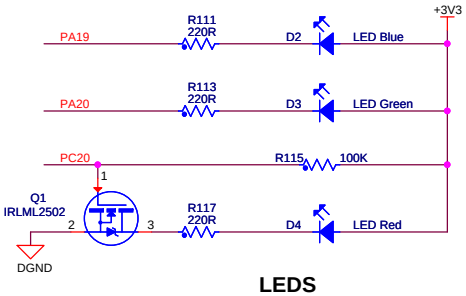
SCALE 1/1

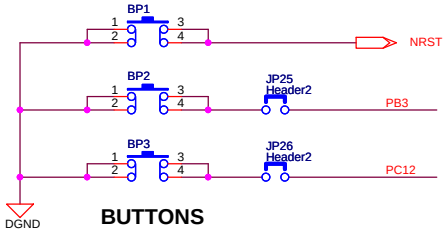
REV. B

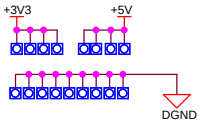
SHEET 6/7

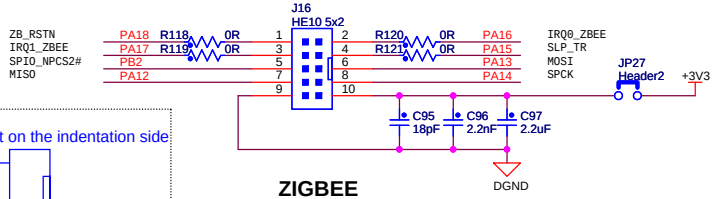




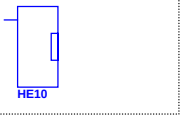








Note:
Pin1 is not on the indentation side



PROTOTYPE AREA
Pitch = 2.54MM

B	INIT EDIT	JH	08-Mar-12	XXX	XX-XXX-XX
REV.	MODIF.	DES.	DATE	VER.	DATE

SAM4S-EK

User IF & ZigBee

SCALE 1/1

REV. B

SHEET 7/7