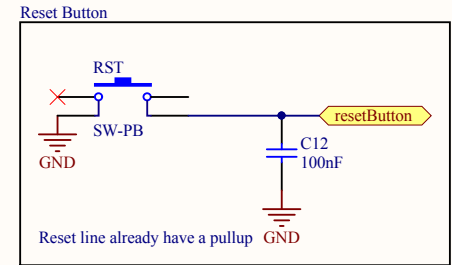


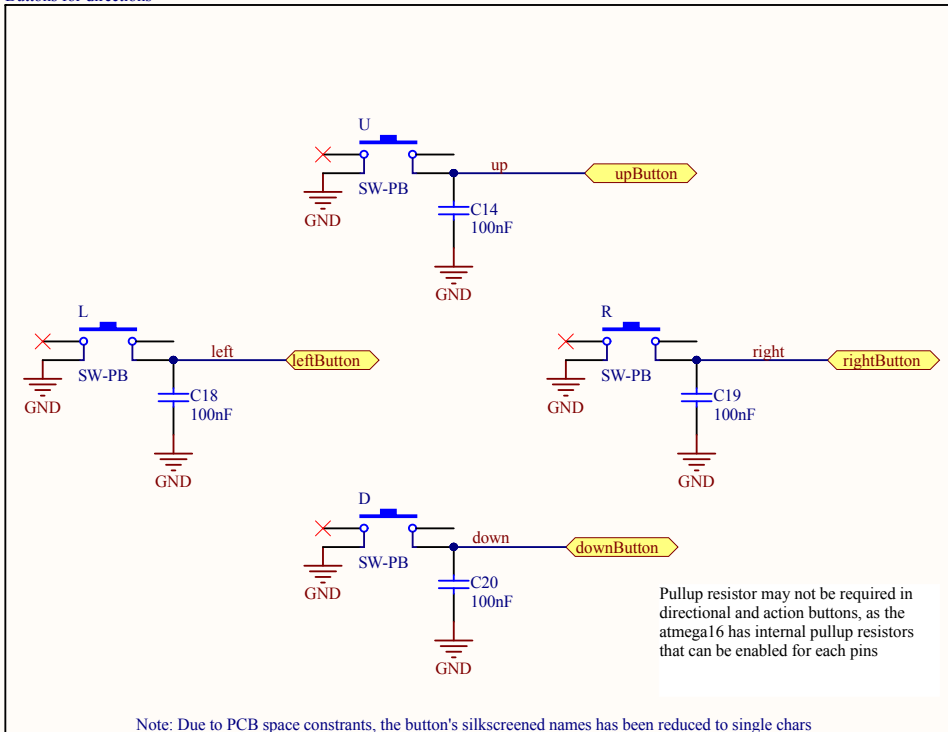
This button and RC network will provide a nominal supply voltage level when unpressed. On press, there will be a sharp drop in voltage to ground (C2 is bypassed, and discharged). On release, there will be a smooth transition back to supply voltage.

I presume that to provide a smooth clocking of the flip flop, a gradual triggering of the CLK input is preferred over a sharp rise.

Pullup resistor not implemented for some buttons that connects to the atmega as the atmega16 can enable pullup resistors in input pins



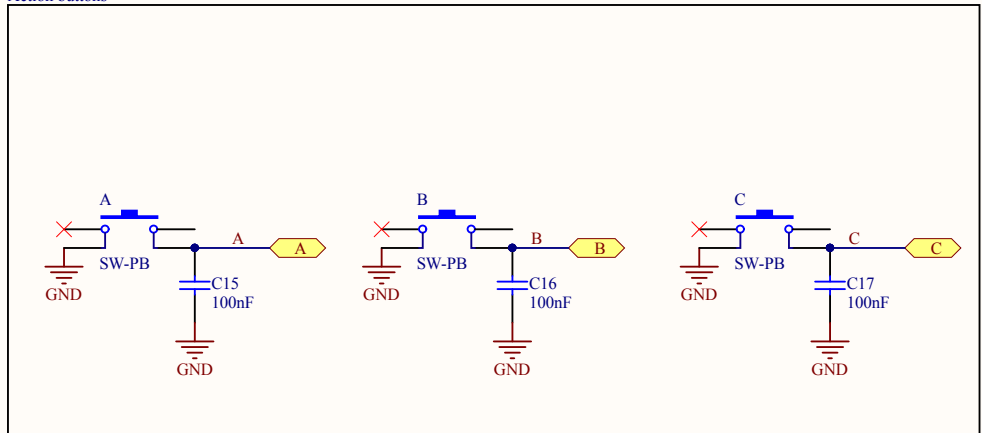
Buttons for directions



Note: Due to PCB space constraints, the button's silkscreened names has been reduced to single chars

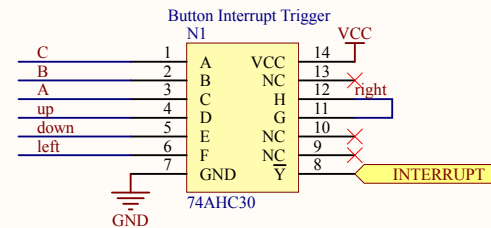
Pullup resistor may not be required in directional and action buttons, as the atmega16 has internal pullup resistors that can be enabled for each pins

Action buttons



NAND Interrupt Logic

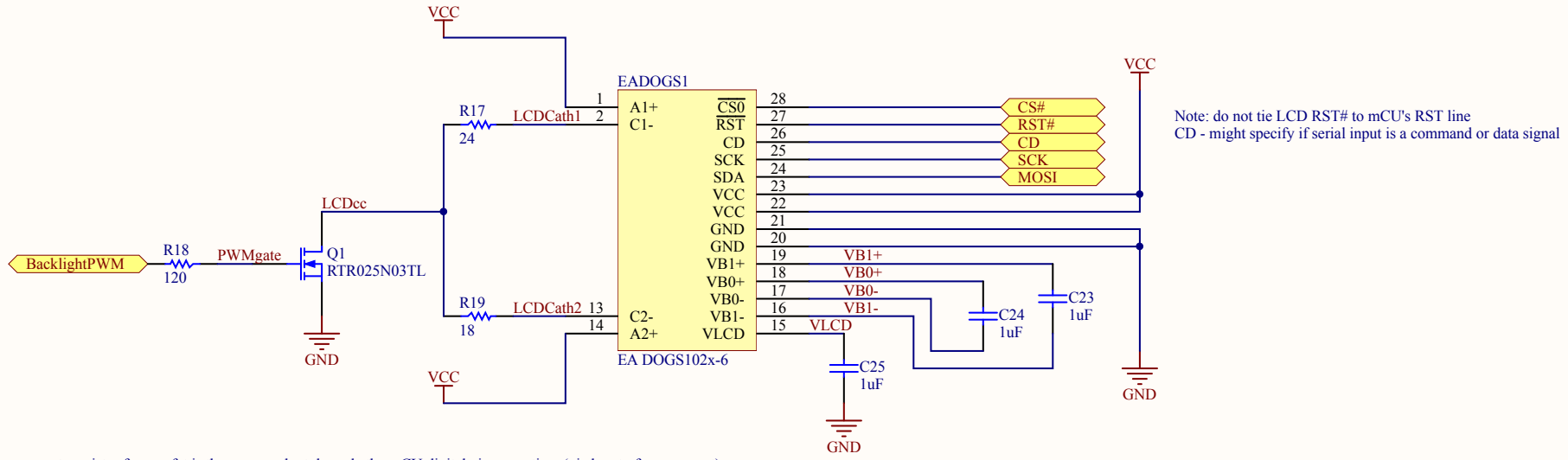
This interrupt trigger circuit, uses a NAND IC that will provide a logic high if any of the inputs to the NAND is logic low. Thus recommend pulling all pins to high before initializing interrupt handler.



note: pin G was prev pulled up, but joining C&G will have same effect (but neater PCB)

Title: Buttons Consol Game		Title	
Client: The University Of Melbourne	Designed By Brian Khuu Stu No #326857	Size A4	Number
Date: 30/09/2013	Time: 2:54:33 AM	Date: 30/09/2013	Revision
Revision: 0.1	Sheet 1 of 6	File: C:\Users\...Game Consol Buttons.SchDoc	Sheet of

Correct resistance values for the backlight is not fully known until i know what backlight i am actually using

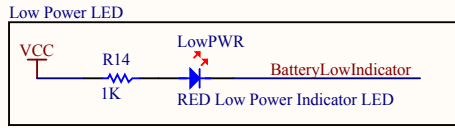


Note: do not tie LCD RST# to mCU's RST line
CD - might specify if serial input is a command or data signal

gate resistor for mosfet is there so we dont degrade the mCU digital pins over time (via burst of overcurrent)
 $R_{mcu_to_gate} = V_{cc} / (I_{pin_max} * (2/3)) = 3.3 / (0.04 * (2/3)) = 123.75ohm = approx 120ohms$

Title: LCD Consol Game		Title	
Client: The University Of Melbourne	Designed By: Brian Khuu Stu No #326857	Size A	Number
Date: 30/09/2013	Time: 2:54:33 AM	Revision	
Revision: 0.1	Sheet 6 of 6	Date: 30/09/2013	Sheet of
File: Game_Consol_LCD.SchDoc		File: C:\Users\...\Game_Consol_LCD.SchDoc	Drawn By:





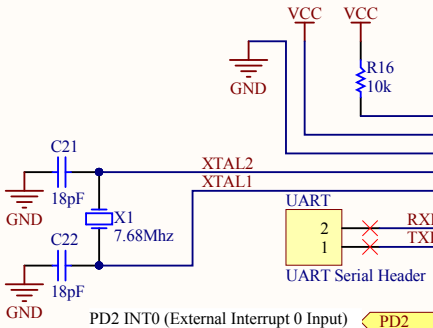
PB0
T0 (Timer/Counter0 External Counter Input)
XCK (USART External Clock Input/Output)

PB1 T1 (Timer/Counter1 External Counter Input)

PB2
AIN0 (Analog Comparator Positive Input)
INT2 (External Interrupt 2 Input)

PB3
AIN1 (Analog Comparator Negative Input)
OC0 (Timer/Counter0 Output Compare Match Output)

PB4 SS (SPI Slave Select Input)



PD2 INT0 (External Interrupt 0 Input)

PD3 INT1 (External Interrupt 1 Input)

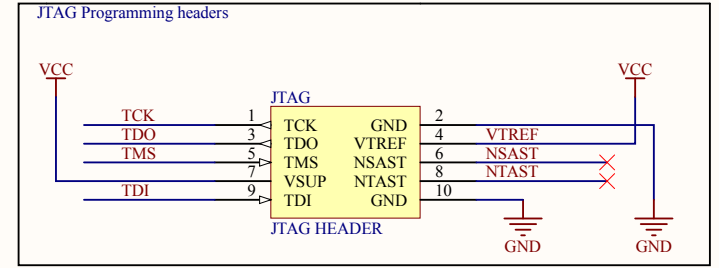
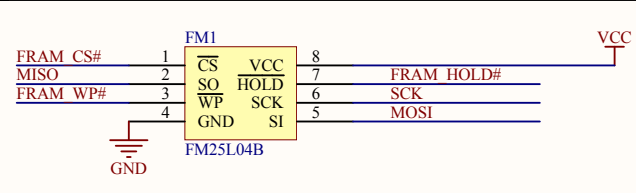
PD4 OC1B (Timer/Counter1 Output Compare B Match Output)

PD5 OC1A (Timer/Counter1 Output Compare A Match Output)

PD6 ICP1 (Timer/Counter1 Input Capture Pin)

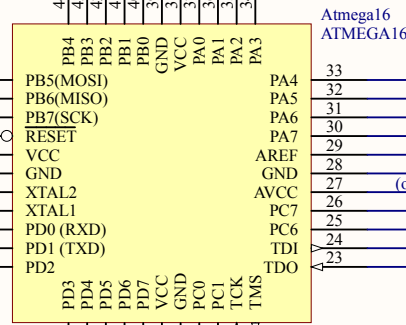
PD7 OC2 (Timer/Counter2 Output Compare Match Output)


Ferroelectric Memory



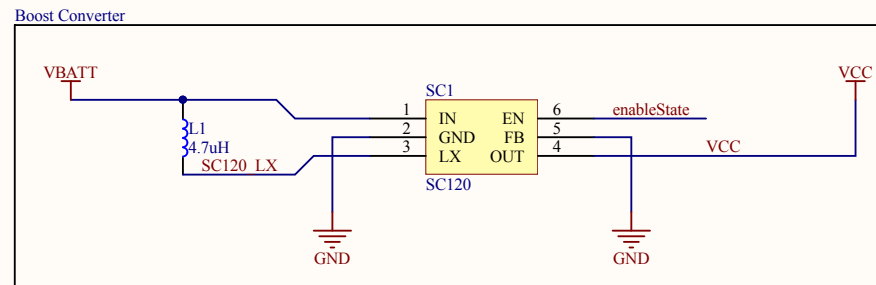
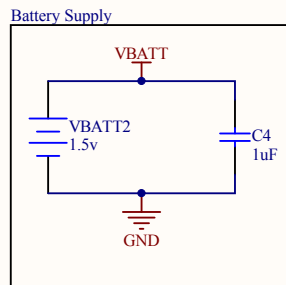
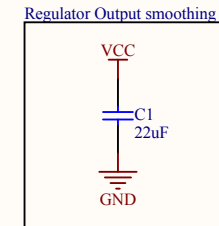
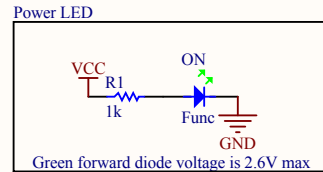
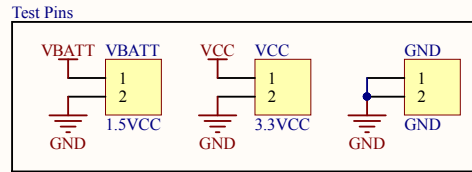
Resistor in series with battery sensing, just in case ADC0 was accidentally used as an output

- ADC0 Battery Level Sense
- ADC1 TouchScreen Left to Right (via bottom)
- ADC2 TouchScreen Top to Bottom (via left)
- ADC3
- ADC4
- ADC5
- ADC6
- ADC7

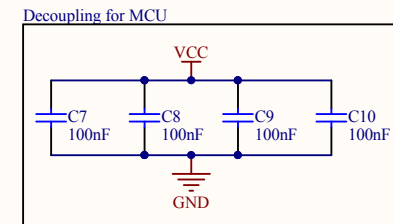
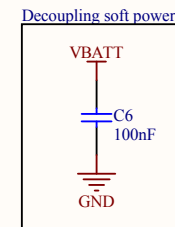
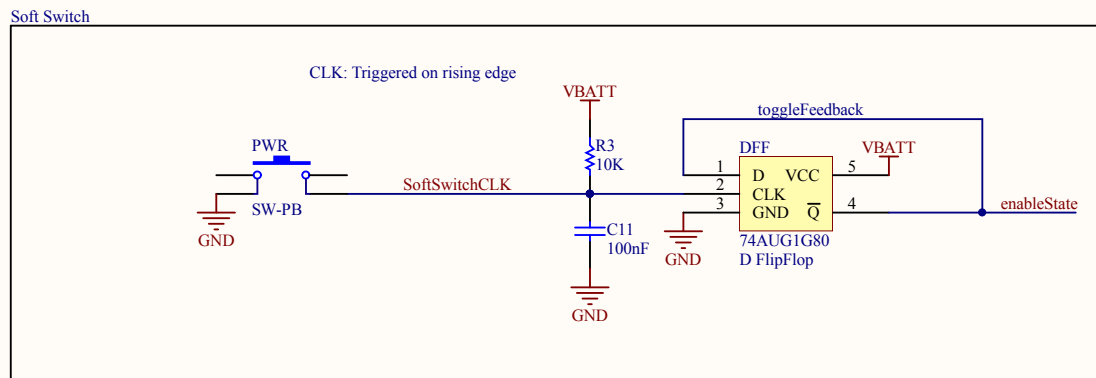
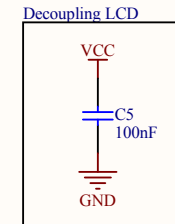
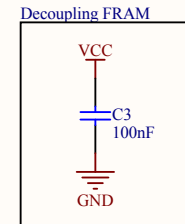
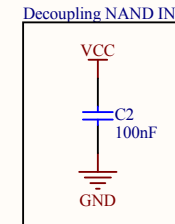


Title: Microprocessor Consol Game		
Client: The University Of Melbourne	Designed By: Brian Khuu	
Date: 30/09/2013	Stu No #326857	
Revision: 0.1	Time: 2:54:34 AM	
File: Game_Consol_Microprocessor.SchDoc		

Title		
Size	Number	Revision
A4		
Date:	30/09/2013	Sheet of
File:	C:\Users\...Game_Consol_Microprocessor.SchDoc	Sheet 5 of 6



enable pin (SC120) was previously tied to GND before, but is now pulled up because of the need to auto turn on if battery is first inserted by default. (and is a 'fail' on state, which is better than fail off)



INPUT : Sense human commands

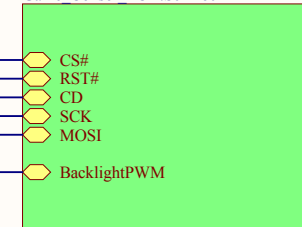
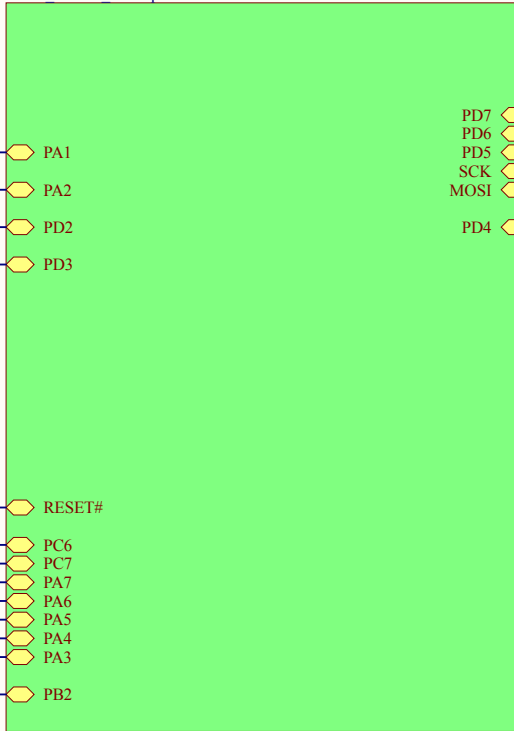
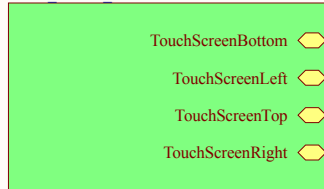
CORE : Processing and logic and support

OUTPUT : Display to human

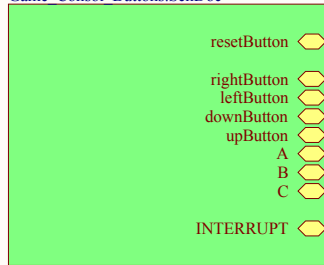
U_Game_Console_Microprocessor
Game_Console_Microprocessor.SchDoc

LCD
Game_Console_LCD.SchDoc

Designator
Game_Console_TouchScreen.SchDoc



U_Game_Console_Buttons
Game_Console_Buttons.SchDoc



SYSTEM POWER: Power regulation and conditioning

U_Game_Console_Power
Game_Console_Power.SchDoc



Note:

* This project uses the "Hierarchical Design" scope. This scoping allows for connections between sheets to ports, as well as making all power ports global. Netnames however is not global between sheets. (Under Project Options -> Options)

* "Nets with multiple names" warning is intentionally not reported due to my preference for port names of different sheets to be based on the pin's actual functionality. (Under Project Options -> Error Reporting)

Title: Game Console Overview	
Client: University of Melbourne	Designed By: Student_#32685 Brian Khuu
Date: 30/09/2013	Time: 2:54:34 AM
Revision: 0.1	Sheet 3 of 6
File: Game_Console_Top.SchDoc	



1

2

3

4

A

A

B

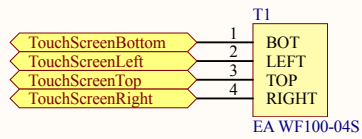
B


C

C

D

D



Title: TouchScreen Consol Game		Title			
Client: The University Of Melbourne	Designed By: Brian Khuu Stu No #326857		Size A4	Number	Revision
Date: 30/09/2013	Time: 2:54:34 AM		Date: 30/09/2013	Sheet of	
Revision: 0.1	Sheet 2 of 6	File: C:\Users\...Game_Consol_TouchScreen.SchDoc	Download By:		

1

2

3

4

Brian Khuu

Game Console 9ms3

326857

VBATT+ UCC+

GND

EAD0661

C4
C2
R1
ON

LowPWR

PWR

JTAG

U

FM1

C1

L

R

Armed1A

IX

B

I2C C20

D

C18

C17

C16

C15

R18

R19

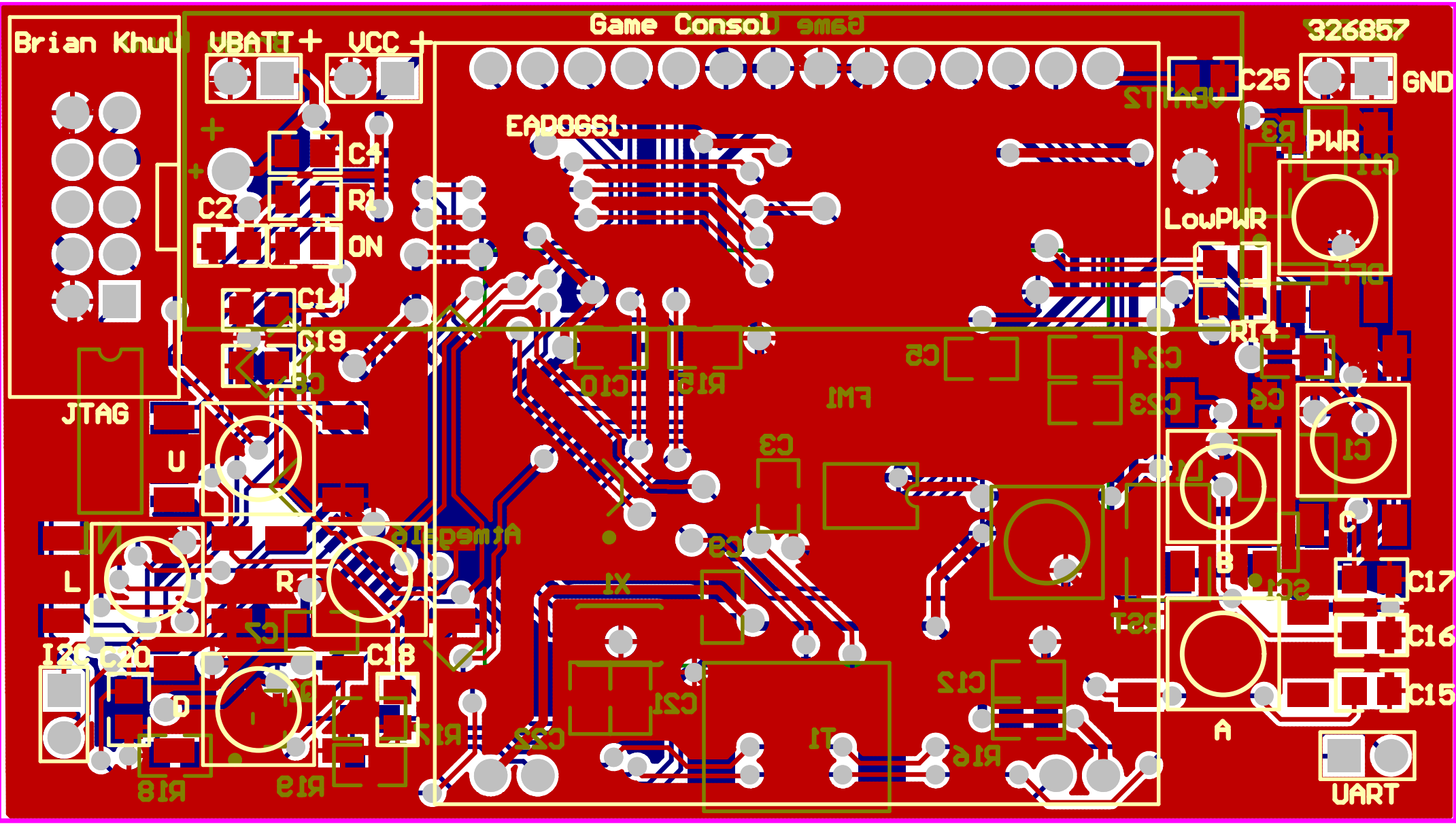
CST

IT

C15

A

UART



Bill of Materials

Bill of Materials For Project [Game_Consol.PrjPCB] (No PCB Document Selected)

Source Data From: Game_Consol.PrjPCB
 Project: Game_Consol.PrjPCB
 Variant: None

Creation Date: 30/09/2013 2:54:41 AM
 Print Date: 41547 41547.12137

Footprint	Comment	LibRef	Designator	Description	Quantity
SPNO_SMD	SW-PB	SW-PB	A, B, C, D, L, PWR, R, RST, U	Push Button Switch	9
QFP-48	ATMEGA16	ATMEGA16	Atmega16	ATMEGA16 Microcontroller	1
1210	22uF	C 0805	C1	Capacitor 100nF	1
0805	100nF	C 0805	C2, C3, C5, C6, C7, C8, C9, C10, C11, C12, C14, C15, C16, C17, C18, C19, C20	Capacitor 100nF	17
0805	1uF	C 0805	C4, C23, C24, C25	Capacitor 100nF	4
0805	18pF	C 0805	C21, C22	Capacitor 100nF	2
SOT23-5	74AUG1G80	74AUG1G80	DFE	Inverted single D flip flop	1
EA	EA DOGS102x-6	EA DOGS102x-6	EADOGS1	LCD 102x64-pixel with backlight	1
DOGS102x					
SOIC-8	FM25L04B	FM25L04B	FM1	FRAM 4Kb Memory	1
HDR1X2	GND	HDR2	GND	2 Pin Header	1
HDR1X2	I2C Header	HDR2	I2C	2 Pin Header	1
BOXEDVERT	JTAG HEADER	JTAG_CON	JTAG	JTAG ATMEL connector	1
10					
1210L	4.7uH	I 1210	L1	Inductor 4.7uH	1
0805D	RED Low Power Indicator LED	LED RED	LowPWR	Light Emitting Diode	1
SOIC-14	74AHC30	74AHC30	N1	1 x 8 Input NAND gate	1
0805D	Func	LED GREEN	ON	Light Emitting Diode	1
SOT23	RTR025N03TL	MOSFET-N	Q1	N-Channel MOSFET	1
0805	1k	R	R1, R14, R15	Resistor	3
0805	10K	R	R3, R16	Resistor	2
0805	24	R	R17	Resistor	1
0805	120	R	R18	Resistor	1
0805	18	R	R19	Resistor	1
SOT23-6	SC120	SC120	SC1	Regulator Low Voltage	1
EA WF100-04S	EA WF100-04S	EA WF100-04S	T1	Touch Screen Connector ZIF 4	1
HDR1X2	UART Serial Header	HDR2	UART	2 Pin Header	1
HDR1X2	1.5VCC	HDR2	VBATT	2 Pin Header	1
BATT_HOLD	1.5v	BAT	VBATT2	Battery Holder AA 1.5v	1
ER					
HDR1X2	3.3VCC	HDR2	VCC	2 Pin Header	1
XTAL_FLAT_SMD	7.68Mhz	XTAL	X1	Crystal Oscillator	1
					60

Approved	Notes

