

## Page 2

LPC4088 pin usage

## Page 3

LPC4088 QuickStart Board connector and Expansion connectors

## Page 4

uSD interface, UART cable interface

## Page 5

Joystick, RGB-LED, reset, LCD

## Page 6

Accelerometer, temperature sensor, trimming pot.

## Page 7

Audio codec

## Page 8


Power supply, VBAT handling

## Page 9

Graphical LCD interface

UL = UnLoaded = normally not mounted component.

Default jumper settings are indicated in the schematic.  
However, always check jumper positions on actual boards  
since there is no guarantee that all jumpers are in default place.

Rev A
Minor layout adjustments
Rev PA1
First prototype
 Embedded Artists
(C) Embedded Artists AB
TITLE: LPC4088 Experiment Base Board rev A
Document Number:
Date: 2014-09-03 20:19:42
Sheet: 1/9

## LPC4088 Pin Usage on Base Board

LPC4088 pin	LPC4088 mbed	UART I/F	Joystick	RGB-LED AIN Button	Character LCD I/F	uSD I/F	Audio Codec I2S I/F	Serial Exp.	Arduino Exp.
P1.24	P5: SSP0_MOSI				SPI_MOSI	SPI_MOSI			
P1.23	P6: SSP0_MISO					SPI_MISO			
P1.20	P7: SSP0_SCK				SPI_SCK	SPI_SCK			
P0.21	P8: U4_OE / U4_CLK					SPI_SSEL			D2
P0.0	P9: CAN_RD_1 / U3_TXD / I2C1_SDA / U0_TXD	UART_TXD						UART_TXD	D1
P0.1	P10: CAN_TD_1 / U3_RXD / I2C1_SCL / U0_RXD	UART_RXD						UART_RXD	D0
P0.9	P11: I2S_TX_SDA / SSP1_MOSI						I2S_TX_SDA	SPI_MOSI	D11
P0.8	P12: I2S_TX_WS / SSP1_MISO						I2S_TX_WS	SPI_MISO	D12
P0.7	P13: I2S_TX_SCK / SSP1_SCK						I2S_TX_SCK	SSP_SCK	D13
P0.6	P14: I2S_RX_SDA / SSP1_SSEL						I2S_RX_SDA	SSP_SSEL	D10
P0.23	P15: ADC0_IN[0] / I2S_RX_SCK			TRIM. POT.					A0
P0.24	P16: ADC0_IN[1] / I2S_RX_WS				LCD-RST				A1
P0.25	P17: ADC0_IN[2] / I2S_RX_SDA / U3_TXD				LCD-A0			AIN/GPIO	A2
P0.26	P18: ADC0_IN[3] / DAC_OUT / U3_RXD							AIN/AOUT/GPIO	A3
P1.30	P19: USB_PWRD2 / USB_VBUS / ADC0_IN[4] / I2C0_SDA <small>(Note: used by USB2 Device interface)</small>							I2C_SDA	A4 SDA
P1.31	P20: USB_OVRCLR2n / ADC0_IN[5] / I2C0_SCL							I2C_SCL	A5 SCL
P0.2	P42: HDK_MBED_TX (U0_TXD / U3_TXD)								
P0.3	P41: HDK_MBED_RX (U0_RXD / U3_RXD)								
P5.0	P39: SSP2_MOSI		JOY_LEFT						D5
P5.1	P38: SSP2_MISO		JOY_DOWN					GPIO	D6
P5.4	P37: U0_OE / U4_TXD		JOY_RIGHT					GPIO	D9
USB2-DM	P36: EXT-USB2-DM								
USB2-DP	P35: EXT-USB2-DP								
P0.4	P34: I2S_RX_SCK / CAN_RD_2						I2S_RX_SCK		D7
P0.5	P33: I2S_RX_WS / CAN_TD_2						I2S_RX_WS		D4
P5.2	P32: SSP2_SCK / I2C0_SDA		JOY_UP						D3
P5.3	P31: SSP2_SSEL / U4_RXD / I2C0_SCL		JOY_CENTER						D8
P1.2	P30: SD_CLK / PWM0_1				SPI_SSEL	SDCLK			
P1.3	P29: SD_CMD / PWM0_2					SDCMD			
P1.5	P28: SD_PWR / PWM0_3			PWM3-GREEN					
P1.6	P27: SD_DAT_0 / PWM0_4					SDDAT0			
P1.7	P26: SD_DAT_1 / PWM0_5					SDDAT1			
P1.11	P25: SD_DAT_2 / PWM0_6					SDDAT2			
P1.12	P24: SD_DAT_3					SDDAT3			
P2.10	P23: ISP_EN / EINT_0 / NMI			Push-button on LPC4088 QSB					
P2.1	Via FPC				BL_CTRL				
P4.29	Via FPC U3_RXD	U3_RXD							
P4.28	Via FPC U3_TXD	U3_TXD							
P2.27	Via FPC						P2.27-ALT_12MHZ		

LPC4088 pin

Via FPC

Graphical LCD I/F

P2.6-LCD\_VD4  
P0.10-LCD\_VD5  
P2.8-LCD\_VD6  
P2.9-LCD\_VD7

P0.11-LCD\_VD10  
P1.21-LCD\_VD11  
P1.22-LCD\_VD12  
P0.19-LCD\_VD13  
P0.20-LCD\_VD14  
P1.25-LCD\_VD15

P2.12-LCD\_VD18  
P2.13-LCD\_VD19  
P1.26-LCD\_VD20  
P1.27-LCD\_VD21  
P1.28-LCD\_VD22  
P1.29-LCD\_VD23

P2.11  
P2.2-LCD\_DCLK  
P2.4-LCD\_ENA  
P2.0-LCD\_PWR  
P2.3-LCD\_FP  
P2.5-LCD\_LP  
P2.21  
P2.1  
P2.22  
P2.23  
P2.25

TFT 5:6:5 mode

RED1  
RED2  
RED3  
RED4

GREEN0  
GREEN1  
GREEN2  
GREEN3  
GREEN4  
GREEN5

RED0  
BLUE0  
BLUE1  
BLUE2  
BLUE3  
BLUE4

LCD\_DISP  
LCD\_DCLK  
LCD\_ENAB  
LCD\_PWR  
LCD\_FP  
LCD\_LP  
LCD\_BL\_PWR  
LCD\_BL\_CTRL  
TP\_XL  
TP\_YU  
TP\_IRQ

I2C0 (P0.27/28 or P1.30/31) Devices on Base Board:

LM75 Temp sensor, 8-bit I2C address (0x92/0x93): 1.0.0.1.0.0.1.RW  
MMA7455 Accelerometer, 8-bit I2C address (0x3A/3B): 0.0.1.1.1.0.1.RW  
WM8731 Audio Codec, 8-bit I2C address (0x34/0x35): 0.0.1.1.0.1.0.RW  
AR1021 Touch screen I/F, 8-bit I2C address (0x9A/0x9B): 1.0.0.1.1.0.1.RW

I2C0 (P0.27/28) Devices on LPC4088 QuickStart Board:

24AA02E48T MAC address, 8-bit I2C address (0xA0/0xA1): 1.0.1.0.0.0.0.RW



(C) Embedded Artists AB

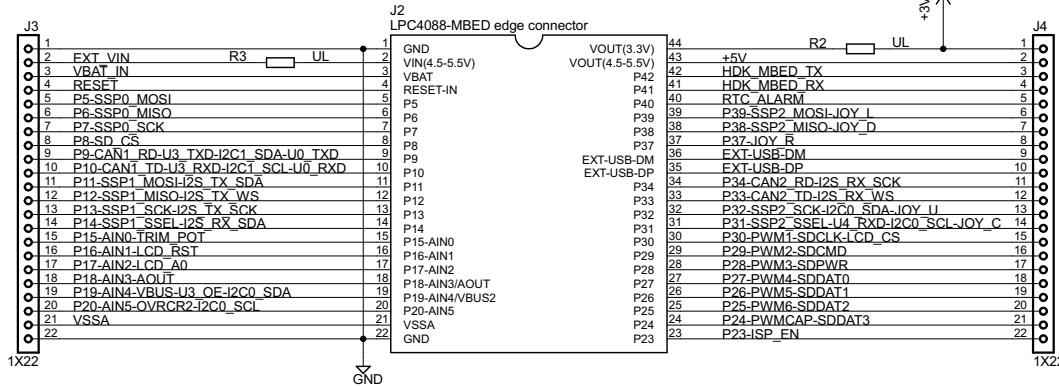
TITLE: LPC4088 Experiment Base Board rev A

Document Number:

Date: 2014-09-03 20:19:42

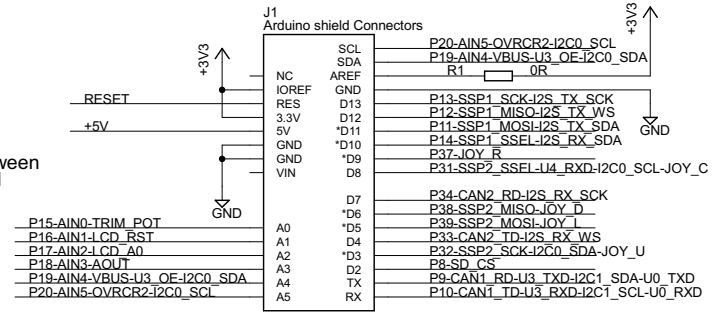
Sheet: 2/9

## Expansion connectors



Power sharing between  
LPC4088 QSB and  
this board via +5V

## Arduino™ UNO R3 Compatible Pinning



### Arduino pin functionalities

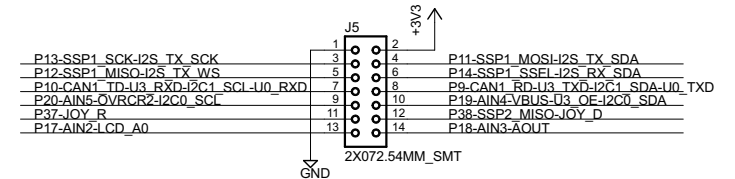
A0: GPIO/AIN	D13: GPIO/SPI-SCK
A1: GPIO/AIN	D12: GPIO/SPI-MISO
A2: GPIO/AIN	D11: GPIO/PWM/SPI-MOSI
A3: GPIO/AIN	D10: GPIO/PWM/SPI-SSEL
A4: GPIO/AIN/I2C-SDA	D9: GPIO/PWM
A5: GPIO/AIN/I2C-SCL	D8: GPIO
	D7: GPIO
	D6: GPIO/PWM
	D5: GPIO/PWM
	D4: GPIO
	D3: GPIO/PWM
	D2: GPIO
	D1: GPIO/UART-TXD
	D0: GPIO/UART-RXD

LPC4088 pin	LPC4088 mbed
	GND
	VIN (4.5-5.5V)
	VBAT
	RESET
P1.24	P5: SSP0_MOSI
P1.23	P6: SSP0_MISO
P1.20	P7: SSP0_SCK
P0.21	P8: U4_OE / U4_CLK
P0.0	P9: CAN_RD_1 / U3_TXD / I2C1_SDA / U0_TXD
P0.1	P10: CAN_TD_1 / U3_RXD / I2C1_SCL / U0_RXD
P0.9	P11: I2S_TX_SDA / SSP1_MOSI / T2_MAT_3 / RTC_EV2 / CMP1_IN2
P0.8	P12: I2S_TX_WS / SSP1_MISO / T2_MAT_2 / RTC_EV1 / CMP1_IN3
P0.7	P13: I2S_TX_SCK / SSP1_SCK / T2_MAT_1 / RTC_EV0 / CMP_VREF
P0.6	P14: I2S_RX_SDA / SSP1_SSEL / T2_MAT_0 / U1_RTS / CMP_ROSC
P0.23	P15: ADC0_IN[0] / I2S_RX_SCK / T3_CAP_0
P0.24	P16: ADC0_IN[1] / I2S_RX_WS / T3_CAP_1
P0.25	P17: ADC0_IN[2] / I2S_RX_SDA / U3_TXD
P0.26	P18: ADC0_IN[3] / DAC_OUT / U3_RXD
P1.30	P19: USB_PWRD2 / USB_VBUS / ADC0_IN[4] / I2C0_SDA / U3_OE (Note: used by USB2 Device interface)
P1.31	P20: USB_OVRCR2n / ADC0_IN[5] / I2C0_SCL
	VSSA
	GND

LPC4088 pin	LPC4088 mbed
VOUT 3.3V	VOUT 3.3V
VOUT 5V	VOUT 5V Note: not current limited!
P0.2	U0_TXD / U3_TXD
P0.3	U0_RXD / U3_RXD
RTC-ALARM	RTC ALARM
P5.0	P39: SSP2_MOSI / T2_MAT_2
P5.1	P38: SSP2_MISO / T2_MAT_3
P5.4	P37: U0_OE / T3_MAT_3 / U4_TXD
USB2-DM	P36: EXT-USB2-DM
USB2-DP	P35: EXT-USB2-DP
P0.4	P34: I2S_RX_SCK / CAN_RD_2 / T2_CAP_0 / CMP_ROSC
P0.5	P33: I2S_RX_WS / CAN_TD_2 / T2_CAP_1 / CMP_RESET
P5.2	P32: SSP2_SCK / T3_MAT_2 / I2C0_SDA
P5.3	P31: SSP2_SSEL / U4_RXD / I2C0_SCL
P1.2	P30: SD_CLK / PWM0_1
P1.3	P29: SD_CMD / PWM0_2
P1.5	P28: SD_PWR / PWM0_3 / CMP1_IN1
P1.6	P27: SD_DAT_0 / PWM0_4 / CMP1_IN3
P1.7	P26: SD_DAT_1 / PWM0_5 / CMP1_IN0
P1.11	P25: SD_DAT_2 / PWM0_6
P1.12	P24: SD_DAT_3 / PWM0_CAP_0 / CMP1_OUT
P2.10	P23: ISP_EN / EINT_0 / NMI

## Serial Expansion Connector (SPI, UART, I2C)

1: GND	2: VCC (3.3V, max 250mA)
3: SPI-SCK	4: SPI-MOSI
5: SPI-MISO	6: SPI-SSEL
7: UART-RX/GPIO	8: UART-TX/GPIO
9: I2C-SCL	10: I2C-SDA
11: GPIO	12: GPIO
13: AIN0/GPIO	14: AIN3/AOUT/GPIO



(C) Embedded Artists AB

TITLE: LPC4088 Experiment Base Board rev A

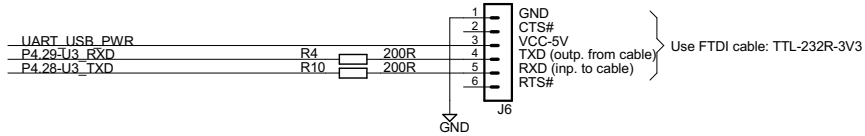
Document Number:

Date: 2014-09-03 20:19:42

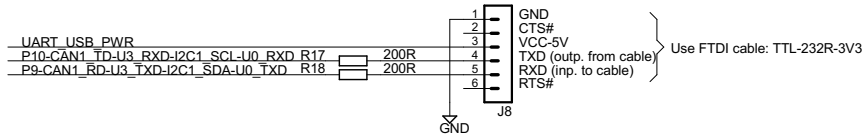
Sheet: 3/9

# uSD Interface and UART interface

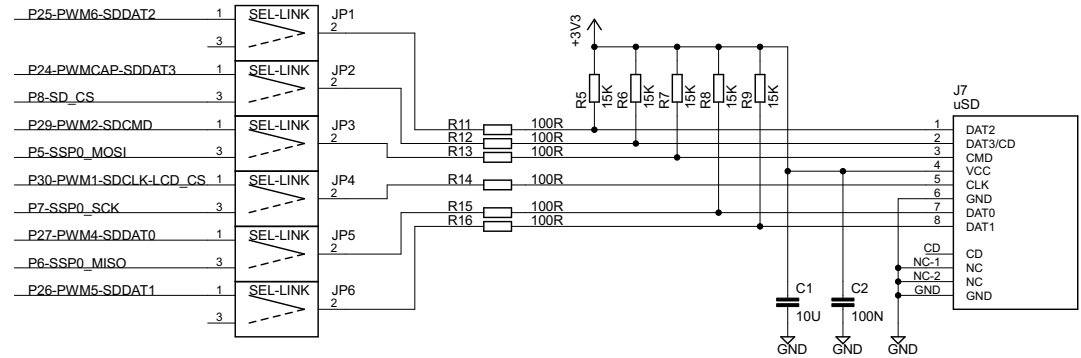
UART header for FTDI cable  
UART3 via P4.28/P4.29



UART header for FTDI cable  
UART0 or UART3 via P0.0/P0.1

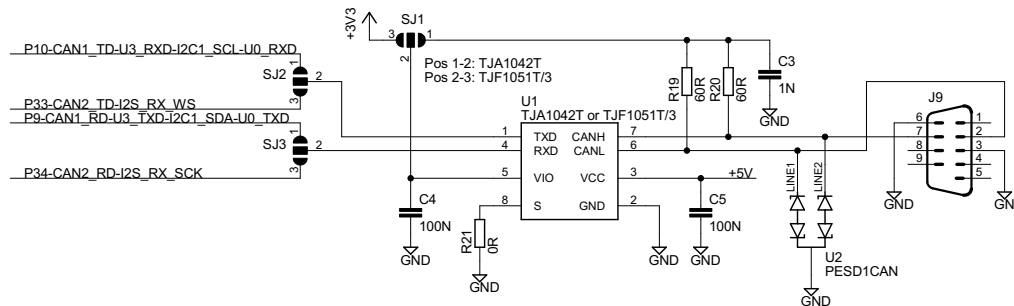


Pos 1-2: MCI interface  
Pos 2-3: SPI interface



Not mounted

CAN interface



(C) Embedded Artists AB

TITLE: LPC4088 Experiment Base Board rev A

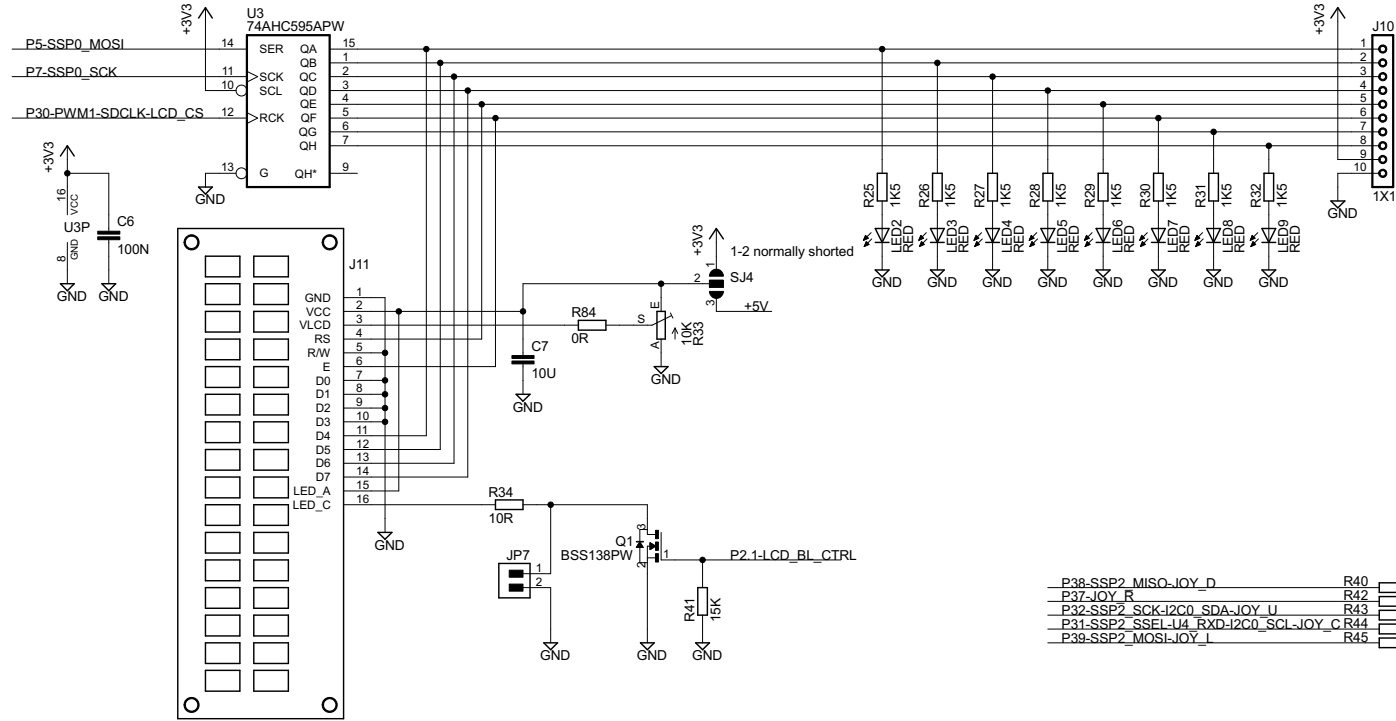
Document Number:

Date: 2014-09-03 20:19:42

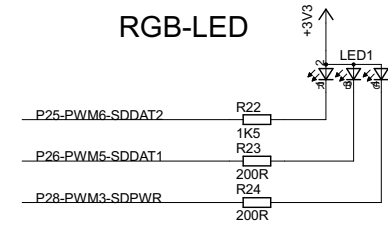
Sheet: 4/9

# Character LCD, LEDs, RGB-LED and Joystick

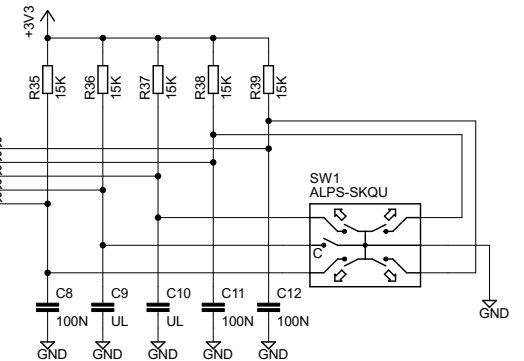
SPI-interface to generic 3.3V powered character LCD + controlling 8 LEDs via SPI (shiftregister)



## RGB-LED

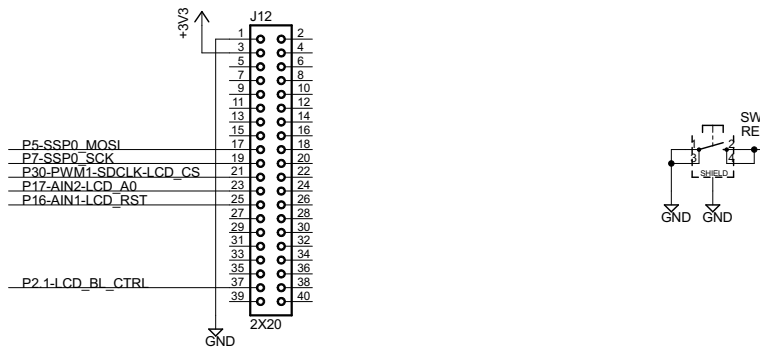


## 5-key Joystick Switch

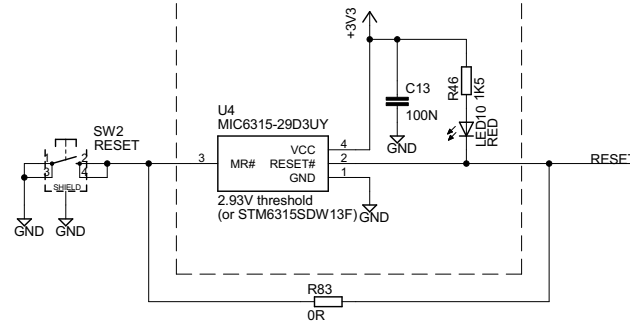


Note: C9/C10 not mounted since P5.2/P5.3 are open-drain outputs with 1500 ohm pull-ups. Capacitive loading in the nets will severely limit highest frequency the net can carry.

1.77" TFT LCD (128x160 pixels)  
DM-TFT18-101  
from [www.DisplayModule.com](http://www.DisplayModule.com)



## Reset generator



(C) Embedded Artists AB

TITLE: LPC4088 Experiment Base Board rev A

Document Number:

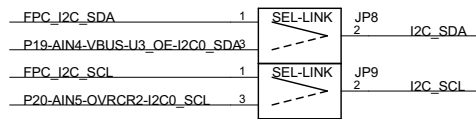
Date: 2014-09-03 20:19:42

Sheet: 5/9

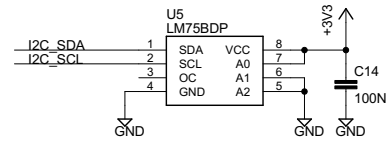
# Sensors

## I2C0 pin selection

Pos 1-2: P0.27/P0.28  
Pos 2-3: P1.30/P1.31

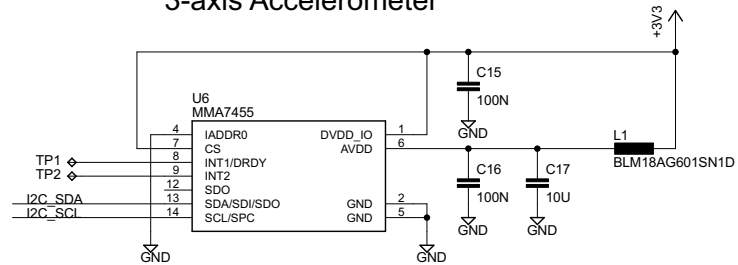


## LM75 I2C Temperature Sensor



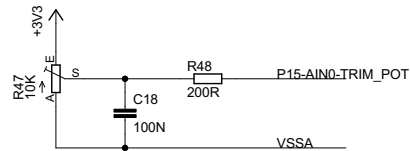
8-bit I2C address (0x92/0x93): 1.0.0.1.0.0.1.RW  
7-bit I2C address (0x49): 1.0.0.1.0.0.1

## 3-axis Accelerometer



8-bit I2C address (0x3A/3B): 0.0.1.1.1.0.1.RW  
7-bit I2C address (0x1D): 0.0.1.1.1.0.1

## Analog Input



(C) Embedded Artists AB

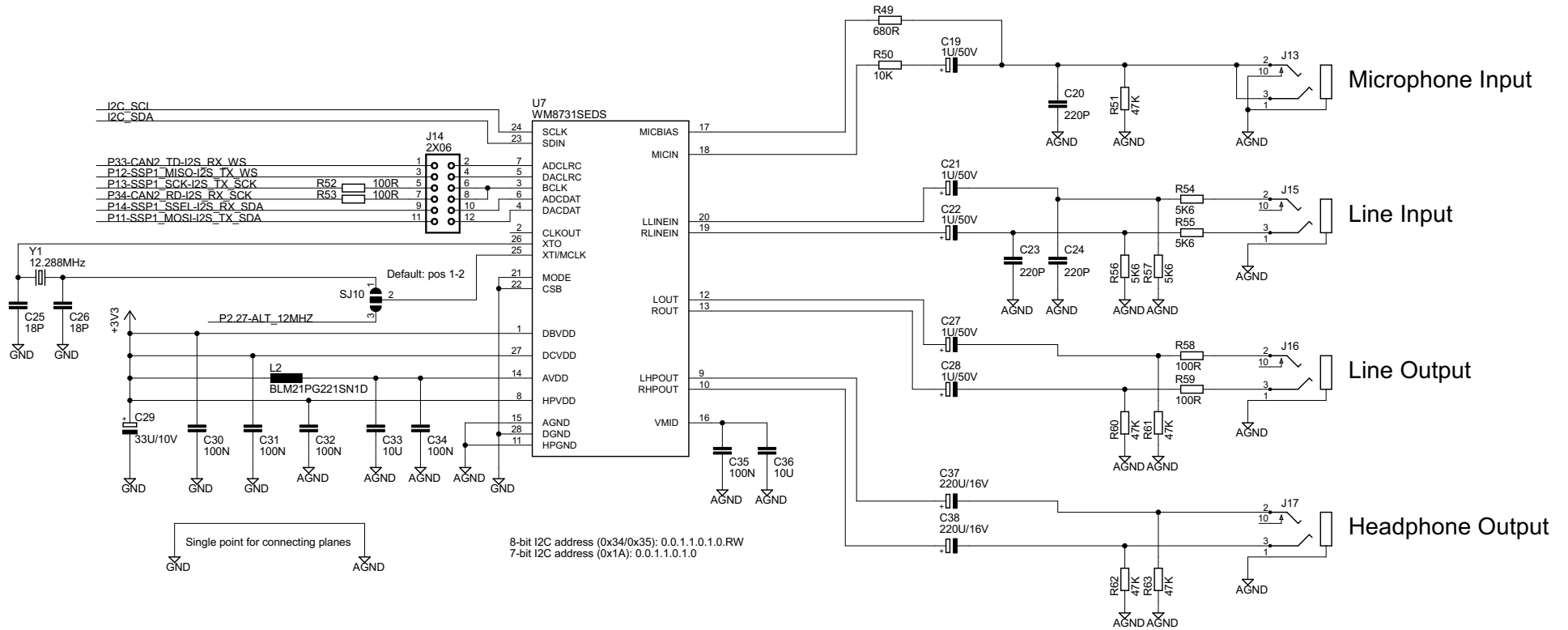
TITLE: LPC4088 Experiment Base Board rev A

Document Number:

Date: 2014-09-03 20:19:42

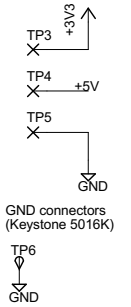
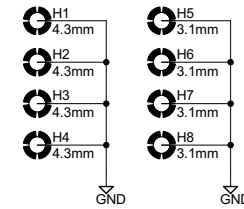
Sheet: 6/9

# WM8731 Codec

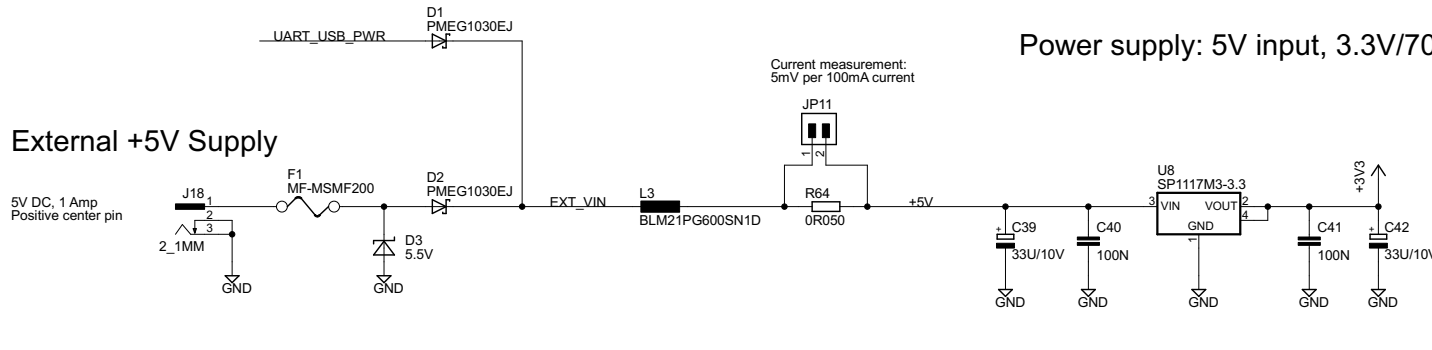


# Power supplies

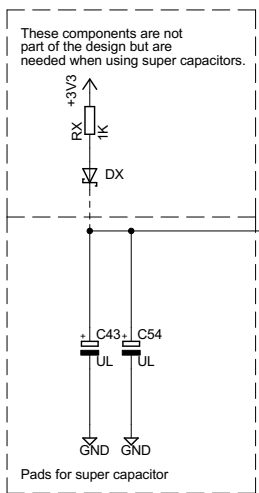
# Mounting Holes



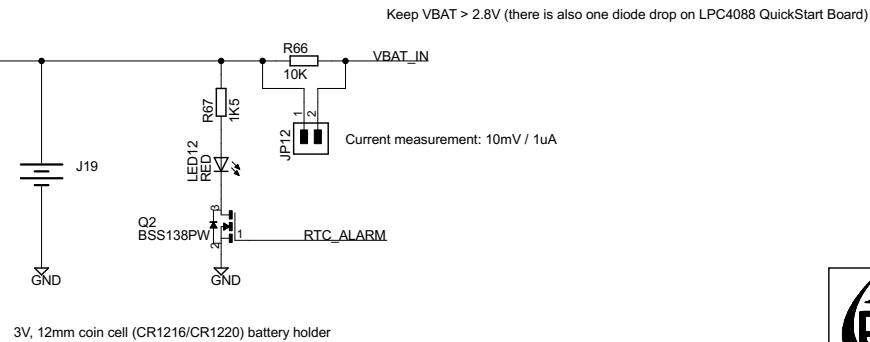
## External +5V Supply



## Power supply: 5V input, 3.3V/700mA output



## VBAT and Alarm Handling



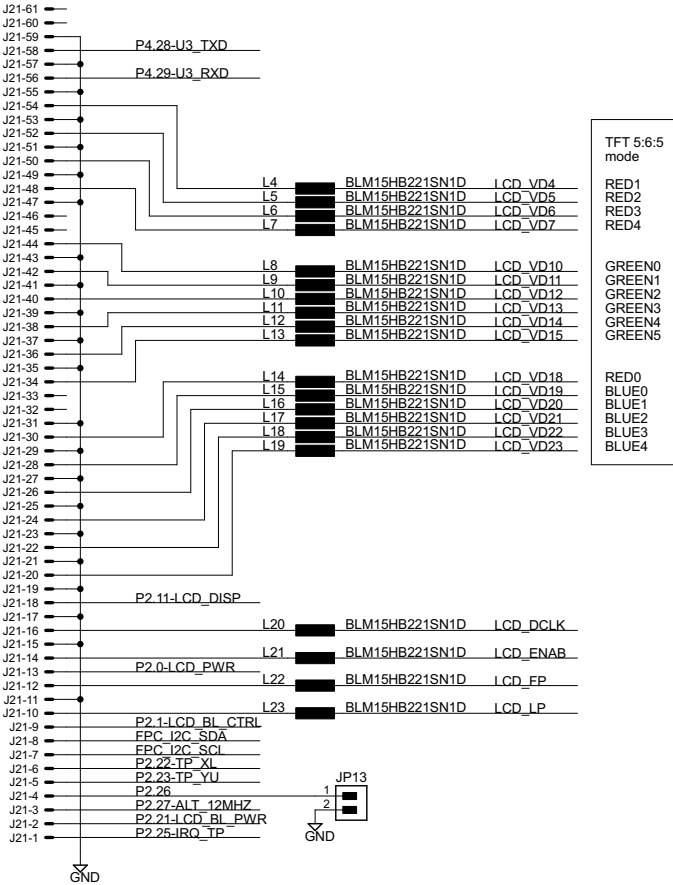
(C) Embedded Artists AB  
 TITLE: LPC4088 Experiment Base Board rev A  
 Document Number:  
 Date: 2014-09-03 20:19:42 | Sheet: 8/9



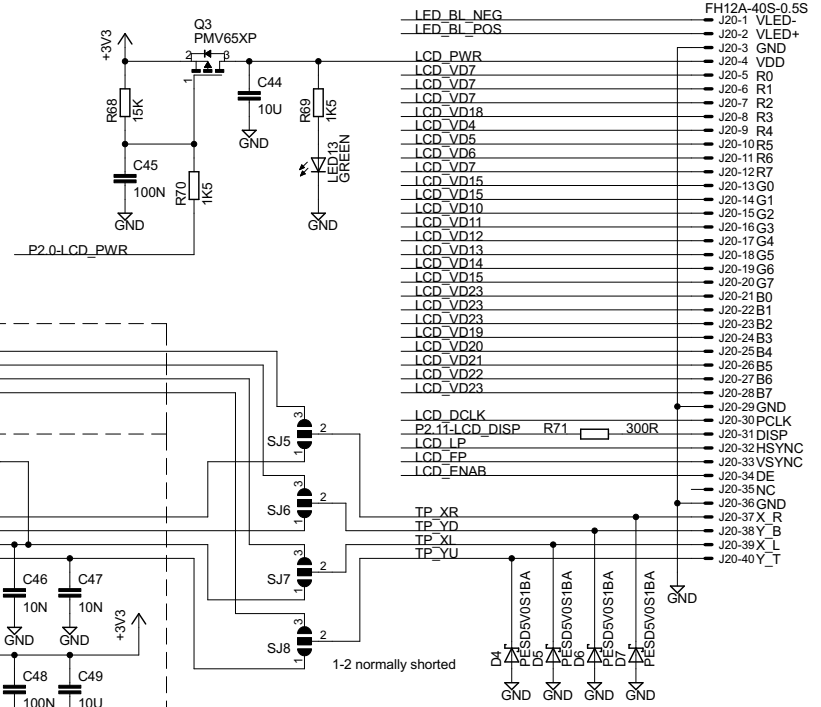
4.3"480x272 pixel LCD  
5.0"800x480 pixel LCD

### Display Interface from LPC4088 QuickStart Board

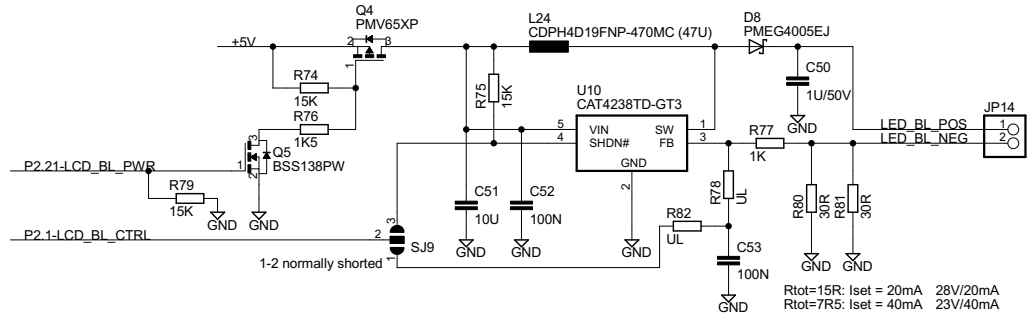
FH26-61S-0.35HW(05) or 5034256191



FPC connector, 0.5mm pitch, top contacts



### Backlight Voltage Generator



(C) Embedded Artists AB

TITLE: LPC4088 Experiment Base Board rev A

Document Number:

Date: 2014-09-03 20:19:42 | Sheet: 9/9