Freedom-KL25Z Shield1 V2 Manual (v0.9)

Contents

User's Guide

Overview

	A	B	C	D	E
0		*VSense ADC0_SE8/*Debug 0			
1		Debug 1		Blue LED	SD-SPI1_MOSI
2		Debug 2			SD-SPI1_SCK
3		Debug 3	LCD-DB8		SD-SPI1_MISO
4			LCD-DB9		SD-SPI1_PCSO
5			LCD-DB10		*Buck-SwR-Ctl*
6			LCD-DB11		
7			LCD-DB12		
8			LCD-DB13		
9			LCD-DB14		
10			LCD-DB15		
11					
12	LCD-BL-PWM TPM1_CH0		LCD-D_NC		
13			LCD-NWR		
14	INT1_ACCEL				
15	INT2_ACCEL				
16		TSI	LCD-NRD		
17		TSI	LCD-NRST		
18		Red LED			
19		Green LED			
20					LCD-TS-YD ADC_SE0
21					LCD-TS-XL ADC_SE4
22					LCD-TS-YU ADC_SE3
23					LCD-TS-XR ADC_SE7
24					
25					
26					
27					
28					
29					Audio Amp Enable
30					Audio out DAC0_OUT
31					*Q Drive TPM0_CH3*

Signals available on FRDM-KL25Z Headers

TFT Liquid Crystal Display

Name	I/O Port	Direction	Description
LCD-DB8	Port C Bit		
LCD-DB9	Port C Bit		
LCD-DB10	Port C Bit	Input/Output	Data bus bits to LCD
LCD-DB11	Port C Bit		
LCD-DB12	Port C Bit		
LCD-DB13	Port C Bit		

LCD-DB14	Port C Bit		
LCD-DB15	Port C Bit		
LCD-D_NC	Port C Bit	Output	Data/~Control
LCD-NWR	Port C Bit	Output	~Write
LCD-NRD	Port C Bit	Output	~Read
LCD-NRST	Port C Bit	Output	~Reset

LED Backlight Driver

Name	I/O Port	Direction	Description
LEDBLDRV	Port A bit 12	Output	TFT LCD LED backlight drive (active high)

CIRCUIT DIAGRAM
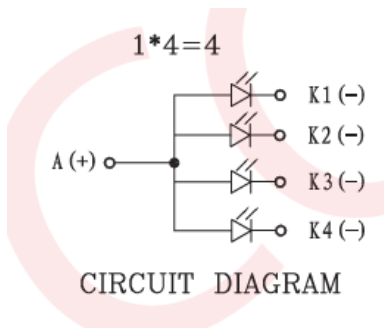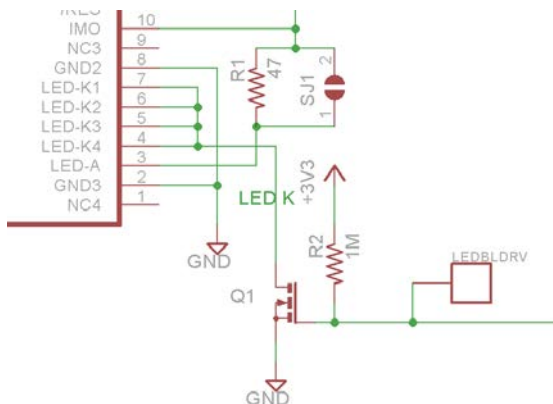
Resistive Touch Screen

Name	I/O Port	Direction	Description
LCD-TS-YD ADC_SE0	Port E bit 20	Input/Output	Bottom terminal
LCD-TS-XL ADC_SE4	Port E bit 21	Input/Output	Left terminal
LCD-TS-YU ADC_SE3	Port E bit 22	Input/Output	Top terminal
LCD-TS-XR ADC_SE7	Port E bit 23	Input/Output	Right terminal

Analog Audio Output

Name	I/O Port	Direction	Description
Audio Amp Enable	Port E bit 29	Out	When 1, audio amp is enabled
Audio Out	Port E bit 30	Out	DAC 0 Output
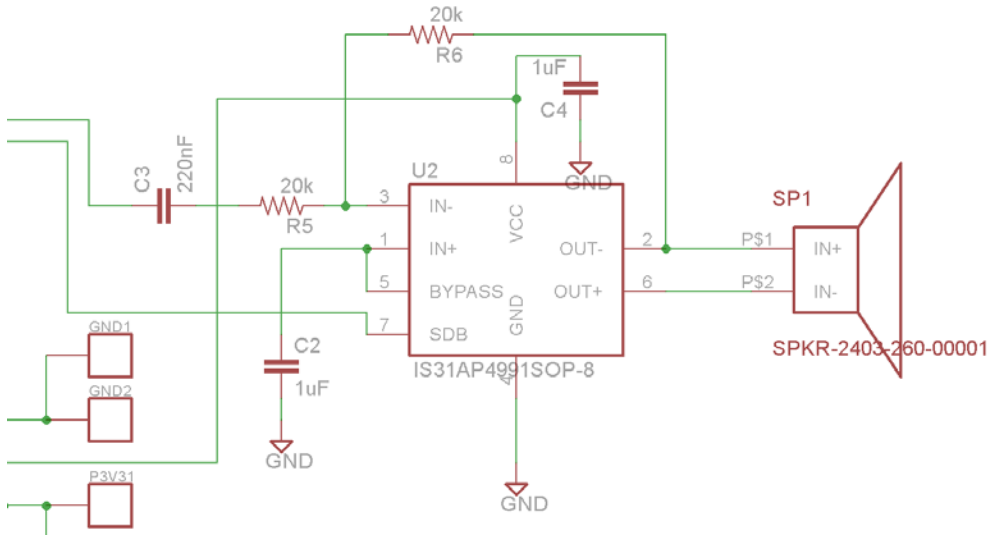
Asynchronous Buck Converter

| Name	I/O Port	Direction	Description
/QDRV		Input	Drive signal for buck converter (active low)
QDRV		Internal/Output	Inverted drive signal for buck converter (active high)
SWRDRV		Input	Drive signal for switched load resistor on buck converter (active high)
SWR		Internal/Output	Switched load resistor connection
VSNS		Output	Feedback sense voltage from buck converter ($V_{out}/2$)
BUCKVIN		Input	Input supply voltage to buck converter

MicroSD Card

| Name	I/O Port	Direction	Description
SPICLK		Output	SPI Clock
SPICS		Output	SPI Chip Select
SPIDI		Input	SPI Data in (to MCU)
SPIDO		Output	SPI Data out (from MCU)

Ultracapacitor

Test Points

Subsystem	Name	Direction (per MCU)	Description
Power	GND1, GND2		Ground
	P3V31, P3V32		P3V3 power supply rail
	P5VUSB		P5VUSB power supply rail
SPI/MicroSD	SPICLK	Output	SPI Clock
	SPICS	Output	SPI Chip Select
	SPIDI	Input	SPI Data in (to MCU)
	SPIDO	Output	SPI Data out (from MCU)
Buck Converter	/QDRV	Input	Drive signal for buck converter (active low)
	QDRV	Internal/Output	Inverted drive signal for buck converter (active high)
	SWRDRV	Input	Drive signal for switched load resistor on buck converter (active high)
	SWR	Internal/Output	Switched load resistor connection
	VSNS	Output	Feedback sense voltage from buck converter ($V_{out}/2$)
	BUCKVIN	Input	Input supply voltage to buck converter
LCD	LEDBLDRV	Input	TFT LCD LED backlight drive (active high)

Circuit Overview
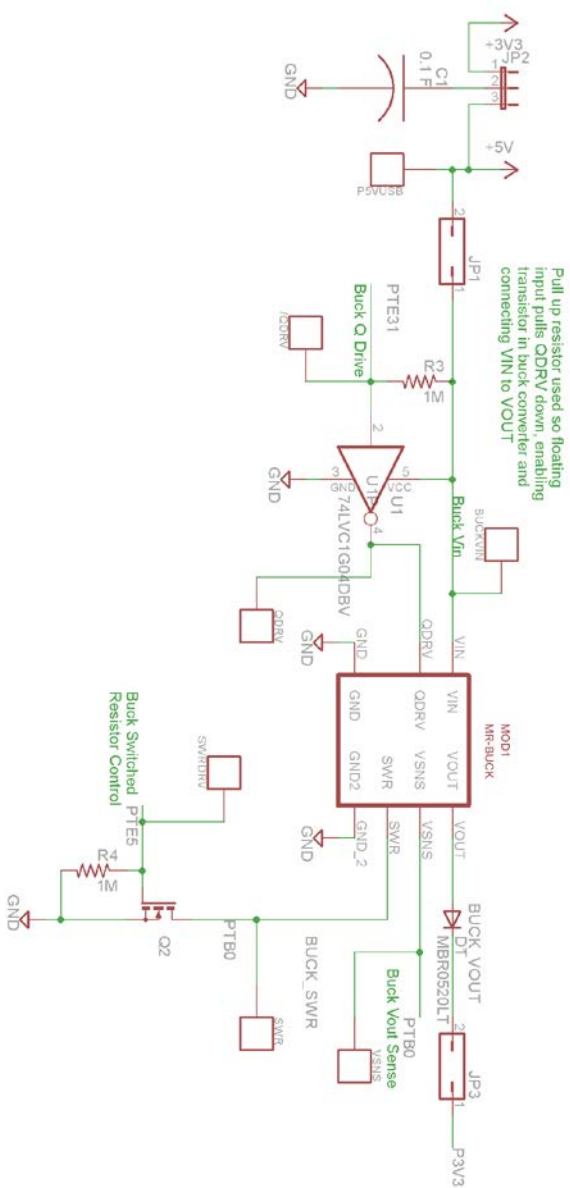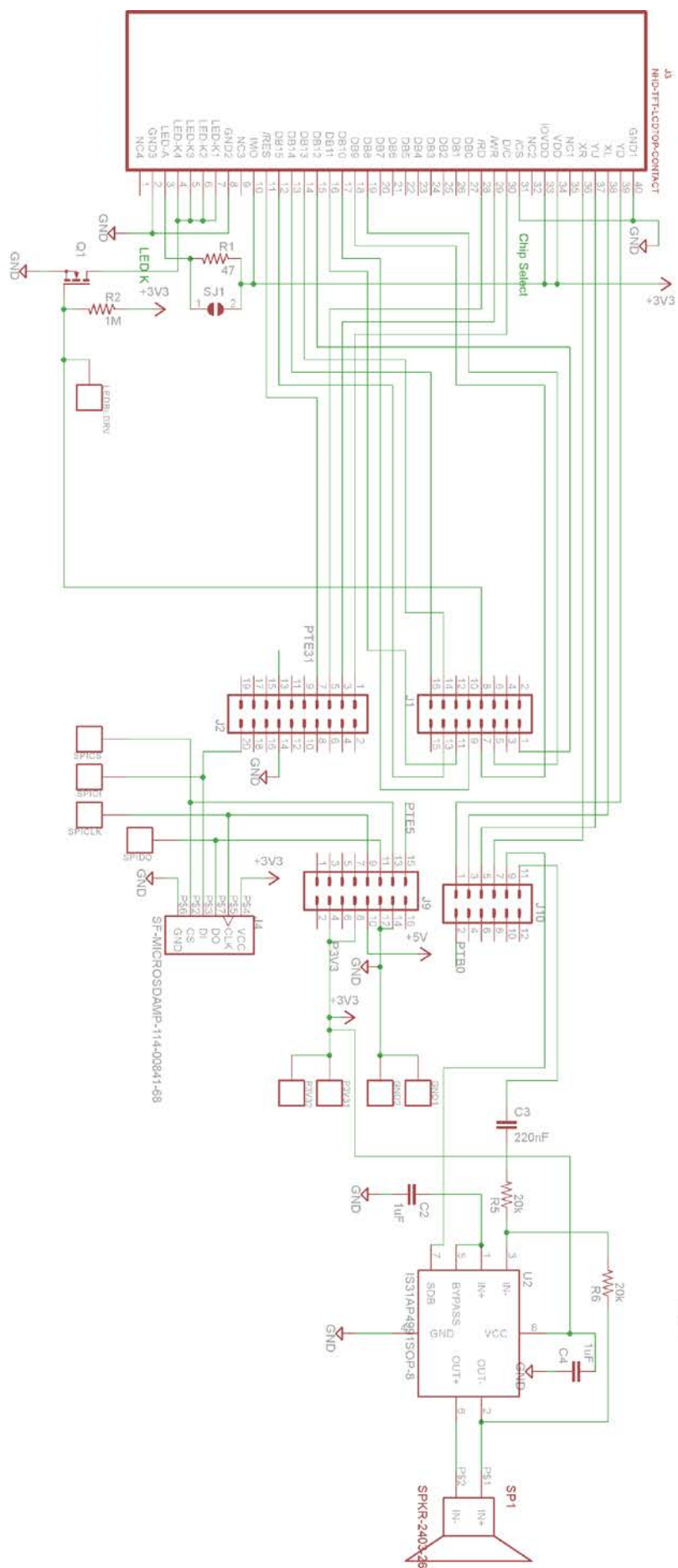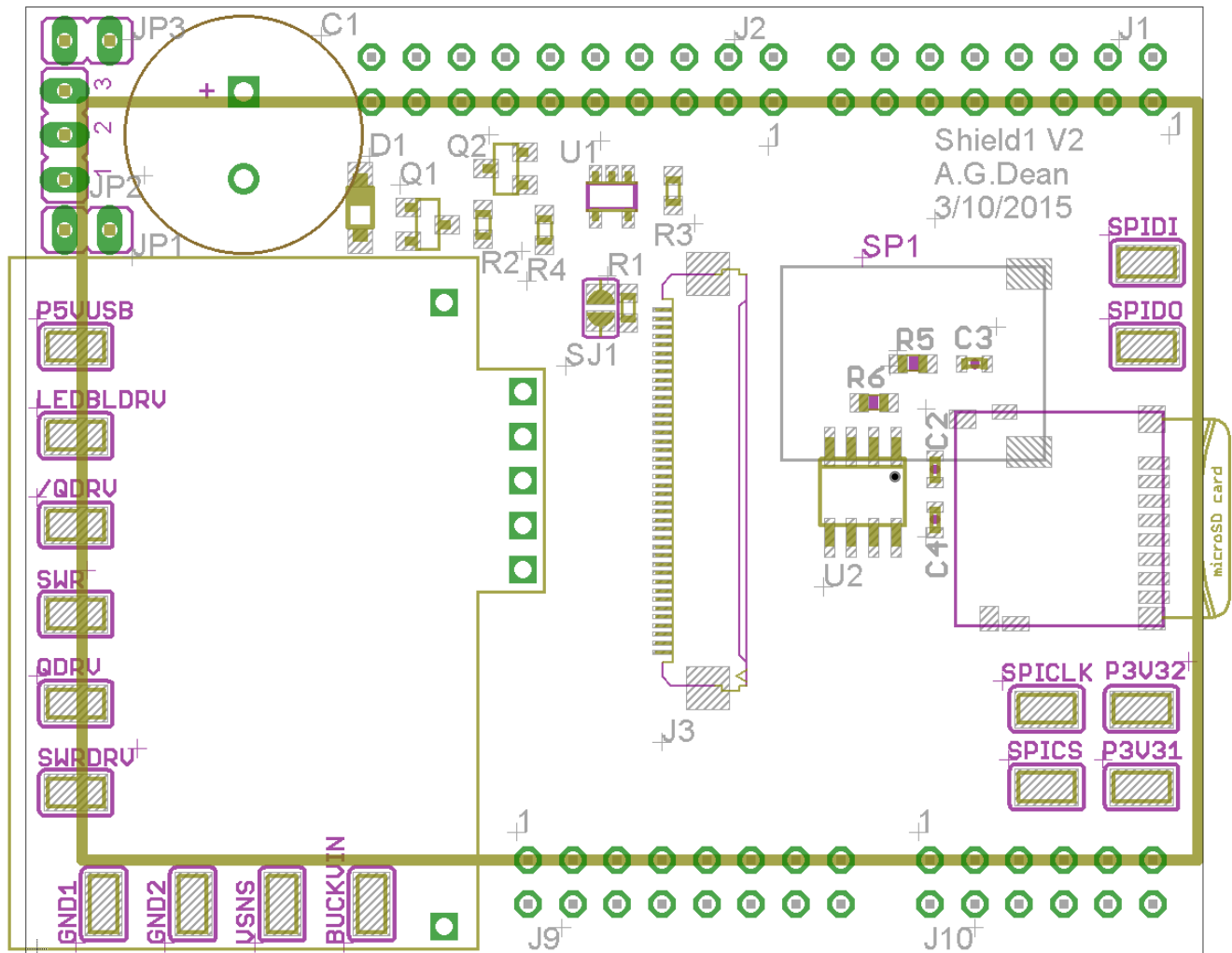
Components

Part	Value	Comments
C1	0.1 F	Do not populate
C2	1uF	
C3	220nF	
C4	1uF	
D1	MBR0520LT	Do not populate
J1	Header 2x8	
J2	Header 2x10	
J3	NHD-TFT-LCDTOP-CONTACT	Already populated
J4	SF-MICROSDAMP-114-00841-68	Do not populate
J9	Header 2x8	
J10	Header 2x6	
JP1	Header 1x2	Do not populate
JP2	Header 1x3	Do not populate
JP3	Header 1x2	Do not populate

MOD1	MR-BUCK	Do not populate
Q1	AO3416	
Q2	AO3416	Do not populate
R1	47	Do not populate
R2	1M	
R3	1M	Do not populate
R4	1M	Do not populate
R5	20k	
R6	20k	
SJ1	Solder Jumper	Short jumper pads with solder
SP1	SPKR-2403-260-00001	See below.
U1	74LVC1G04DBV	Do not populate
U2	IS31AP4991SOP-8	See below. Rotated 180°

Assembly Instructions

TFT Liquid Crystal Display

The connector is already mounted. Slide the connector out carefully by pulling on the ears with your fingernails.

Diode D1

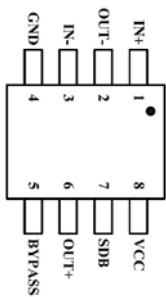The cathode of the diode is marked with a stripe on the package, and it goes toward the outside of the board.

LED Backlight Driver

Short out jumper SJ1 with a blob of solder. Leave R1 unpopulated.

Analog Audio Output

IC U2 is rotated 180° so that pin 1 of U2 is next to C2 – at the 1:30 position.

Speaker

Mount the speaker after mounting all surface mount components on top of PCB.

First tin the speaker pads on the PCB. Then place the speaker contacts against the pads and heat the pads to reflow the solder. Attach the speaker to the PCB with hot-melt glue.

Asynchronous Buck Converter

Do not populate.

MicroSD Card

Ultracapacitor

Do not populate