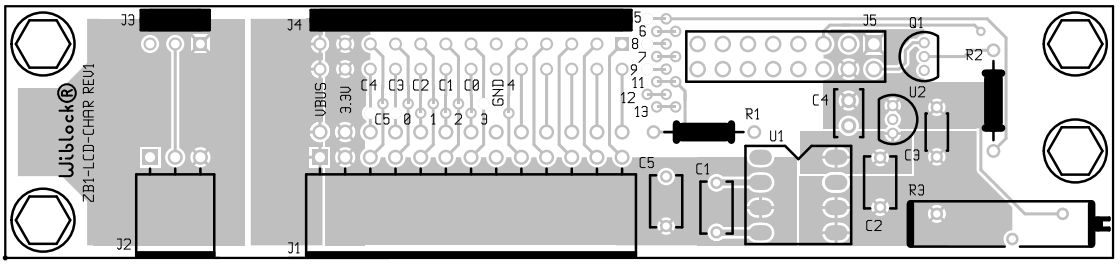

ZB1-LCD-CHAR Description

The ZB1-LCD-CHAR is an interface board for an LCD character display that is compatible with the ZB1 development system.

Features

- Compatible with the ZB1 development system.
- All thru-hole components.
- LCD Interface header that is compatable with most LCD character displays that have a parallel data input.
- 5V boost converter that provides 50mA of output current for driving the the display and the backlight LED

1 Assembling the ZB1-LCD-CHAR

Semiconductors are electrostatic-sensitive devices. Proper ESD handling precautions need to be taken to avoid damage.

The Bill of Materials (BOM) and Component List is in section 3. For full page assembly drawings see **??**

Extra care needs to be taken when soldering the right-angle connector J1. The outer edge of the connector body should be as close to the edge of the board as possible. Slightly over the edge is preferable. The connector body should be flat on the board.

1.1 Assembly

Solder the top side components:

- R1, R2

  The tolerance of R1 and R2 is not critical. Some kits include a 5% resistor others include a 1% resistor. The 5% resistor has four color bands (brown, black, yellow, gold). The 1% resistor has five color bands (brown, black, black, orange, brown).

- R3
- U1 (socket)
- U2
- C1,C2,C5
- C3
- C4
- J5
- Q1
- J1

  The J1 that is included with the ZB1-PB1 Kit is a right angle receptacle for co-planar connection to the ZB1. If your application requires a cable connection then replace J1 with a 13x2 vertical header.

1.2 Mounting Hardware

Space has been provided for four #2 hex standoffs and washers.

2 IO Connectors

J1	13x2 receptacle	I/O connections from the ZB1. See Table 2
J5	13x2 header	I/O connections from the ZB1. See Table 3

Table 1: ZB1-PB1 connectors

2.1 J1 Receptacle

ATmega168 Pins (Arduino Pins)		J1 Pin		ATmega168 Pins (Arduino Pins)	
VBUS		1	2	VBUS	
+3.3V		3	4	+3.3V	
PC5/ADC5/SCL (**A5**)	28	5	6	PC4/ADC4/SDA (**A4**)	27
PD0 (**0**)		7	8	PC3/ADC3 (**A3**)	26
PD1 (**1**)		9	10	PC2/ADC2 (**A2**)	25
PD2 (**2**)	4	11	12	PC1/ADC1 (**A1**)	24
PD3 (**3**)	5	13	14	PC0/ADC0 (**A0**)	23
GND		15	16	GND	
PD4 (**4**)	6	17	18	PB5/SCK (**13**)	19
PD5 (**5**)	11	19	20	PB4/MISO (**12**)	18
PD6/AIN0 (**6**)	12	21	22	PB3/MOSI (**11**)	17
PD7/AIN1 (**7**)	13	23	24	PB2 (**10**)	16
PB0 (**8**)	14	25	26	PB1 (**9**)	15

Table 2: J1 Pinout

2.2 J5 Header

ATmega168 Pin (Arduino Pins)		J5 Pin		ATmega168 Pin (Arduino Pins)	
LED Anode (+5V)		1	2	LED Cathode (Q1 drain)	
GND		3	4	+5V	
VLCD		5	6	RS (PB5) (**13**)	
R/W (PB4) (**12**)		7	8	E (PB3) (**11**)	
DB0 (NC)		9	10	DB1 (NC)	
DB2 (NC)		11	12	DB3 (NC)	
DB4 (PD6) (**6**)		13	14	DB5 (PD7) (**7**)	
DB6 (PB0) (**8**)		15	16	DB7 (PB1) (**9**)	

Table 3: J5 Pinout (Prototype)

3 Assembly Documentation and Schematics

Table 4: Bill of Materials

Kit: ZB1-LCD-CHAR-KIT

Qty	Reference	Part Number	Description
3	C1, C2, C5	CAPR-10U0-10V-X5R-20T-5MM	capacitor, ceramic, 10uF, 20%, 10V, X5R
1	C3	CAPR-1U00-10V-X5R-5MM	capacitor, ceramic, 1uF, 10%, 10V, X5R
1	C4	CAPR-0U10-50V-X7R-100M	capacitor, ceramic, 0.1uF, 10%, 50V, X7R
1	J1	HDRF_RA-13x2-100M	header, female, RA, 13x2, 100mils
1	J5	HDR_BR-8x2-100M	header, 8x2, 100mils
1	Q1	BJT-2N3904	BJT, 2N3904
1	R1	RES-100K-0W25-1T00	resistor, 100K, 1/4W, 1%
1	R2	RES-4K75-0W25-1T00	resistor, 4.75K, 1/4W, 1%
1	R3	POT_TRIM-10K0-0W75-15T	potentiometer, trim, 10K, 3/4W, 15 turn
1	U1	IC_VCONV__ADI_ADM660ANZ	IC, voltage converter, switched capacitor
1	U2	VREG__NSM_LP2950CZ-5.0	voltage regulator, 5V
1		DIP-8P-300M	DIP Socket, 8 Pin, 300mil centers
1		wiblock_ZB1-LCD-CHAR-PCB	

Table 5: Component List

Kit: ZB1-LCD-CHAR-KIT

Reference	Part Number	Description
C1	CAPR-10U0-10V-X5R-20T-5MM	capacitor, ceramic, 10uF, 20%, 10V, X5R
C2	CAPR-10U0-10V-X5R-20T-5MM	capacitor, ceramic, 10uF, 20%, 10V, X5R
C5	CAPR-10U0-10V-X5R-20T-5MM	capacitor, ceramic, 10uF, 20%, 10V, X5R
C3	CAPR-1U00-10V-X5R-5MM	capacitor, ceramic, 1uF, 10%, 10V, X5R
C4	CAPR-0U10-50V-X7R-100M	capacitor, ceramic, 0.1uF, 10%, 50V, X7R
J1	HDRF_RA-13x2-100M	header, female, RA, 13x2, 100mils
J5	HDR_BR-8x2-100M	header, 8x2, 100mils
Q1	BJT-2N3904	BJT, 2N3904
R1	RES-100K-0W25-1T00	resistor, 100K, 1/4W, 1%
R2	RES-4K75-0W25-1T00	resistor, 4.75K, 1/4W, 1%
R3	POT_TRIM-10K0-0W75-15T	potentiometer, trim, 10K, 3/4W, 15 turn
U1	IC_VCONV__ADI_ADM660ANZ	IC, voltage converter, switched capacitor
U2	VREG__NSM_LP2950CZ-5.0	voltage regulator, 5V
	DIP-8P-300M	DIP Socket, 8 Pin, 300mil centers
	wiblock_ZB1-LCD-CHAR-PCB	

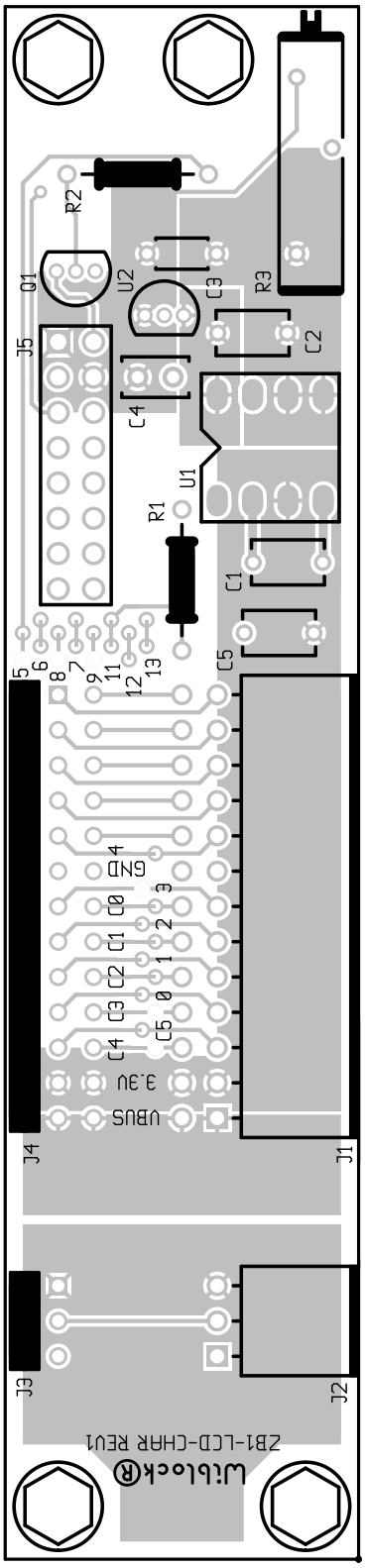

Figure 1: ZB1-LCD-CHAR Top Side Assembly Drawing (Rev 1)

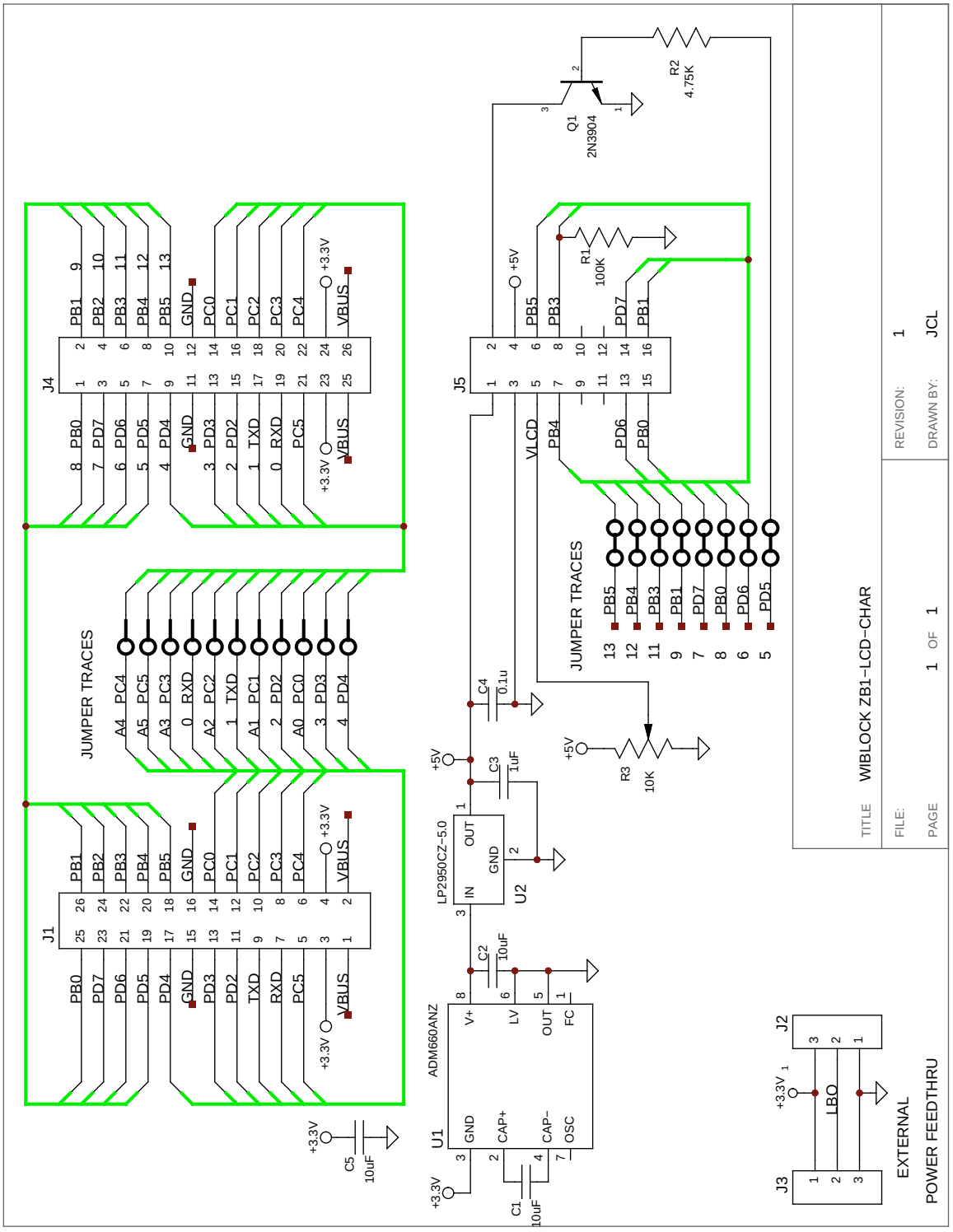

Figure 2: ZB1-LCD-CHAR (Rev 1)