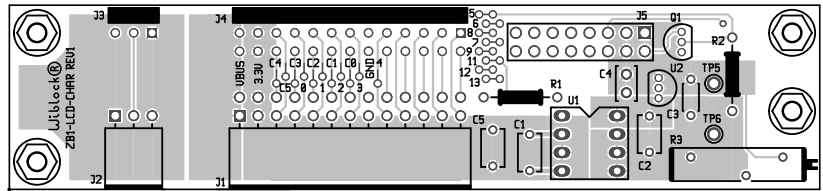


## ZB1-LCD-CHAR Description

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 compatible 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 IO Connectors

J1	13x2 receptacle	I/O connections from the ZB1. See <a href="#">Table 2</a>
J5	13x2 header	I/O connections from the ZB1. See <a href="#">Table 3</a>

Table 1: ZB1-PB1 connectors

### 1.1 J1 Receptacle

ATmega168 Pins (Arduino Pins)		J1 Pin		ATmega168 Pins (Arduino Pins)	
VBUS +3.3V		1 3	2 4	VBUS +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

## 1.2 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)

## 2 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 [Figure 1](#)

 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.

### 2.1 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.*

### 2.2 Mounting Hardware

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

### 3 Assembly Documentation and Schematics

Table 4: Bill of Materials

Qty	Reference	Value	Footprint	Mfg PN	Notes
3	C1, C2, C5	10uF		TDK FK26X5R1A106M	
1	C3	1uF		TDK FK28X5R1A105K	
1	C4	0.1u		Kemet C320C104K5R5TA	
1	J1			Sullins PPPC132LJBN-RC	
1	J5			FCI 68602-116HLF	
1	Q1			On-Semi 2N7000RLRAG	
2	R1, R2	100K		Yageo MFR-25FBF-100K	
1	R3	10K		Bourns 3006P-1-103LF	
1	U1			Analog Devices ADM660ANZ	
1	U2			National Semiconductor LP2950CZ-5.0	
1				3M 4808-3004-CP	
1				wiblock ZB1-LCD-CHAR-PCB	

Table 5: Component List

Reference	Value	Footprint	Mfg PN	Notes
C1	10uF		TDK FK26X5R1A106M	
C2	10uF		TDK FK26X5R1A106M	
C3	1uF		TDK FK28X5R1A105K	
C4	0.1u		Kemet C320C104K5R5TA	
C5	10uF		TDK FK26X5R1A106M	
J1			Sullins PPPC132LJBN-RC	
J5			FCI 68602-116HLF	
Q1			On-Semi 2N7000RLRAG	
R1	100K		Yageo MFR-25FBB-100K	
R2	100K		Yageo MFR-25FBB-100K	
R3	10K		Bourns 3006P-1-103LF	
U1			Analog Devices ADM660ANZ	
U2			National Semiconductor LP2950CZ-5.0 wiblock ZB1-LCD-CHAR-PCB	

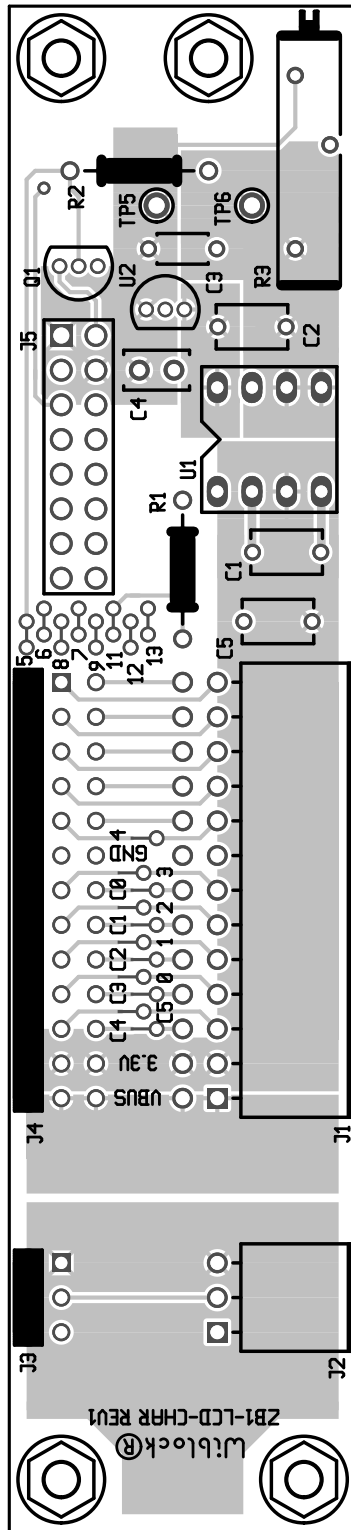


Figure 1: ZB1-LCD-CHAR Top Assembly Drawing

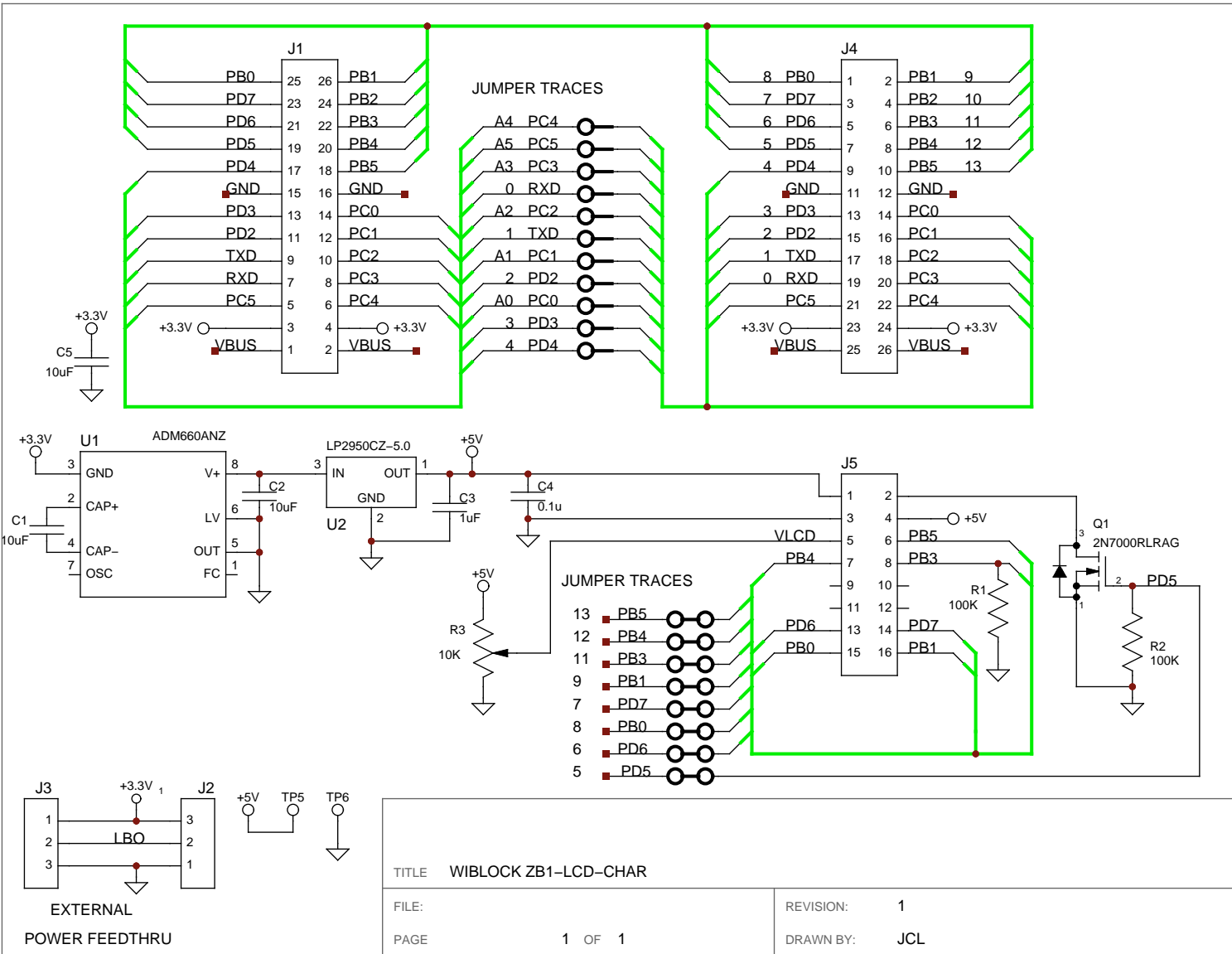


Figure 2: ZB1-LCD-CHAR Top-Level Schematic