

# DSO 068 Oscilloscope DIY Kit Assembly Guide (PCB Version: H)

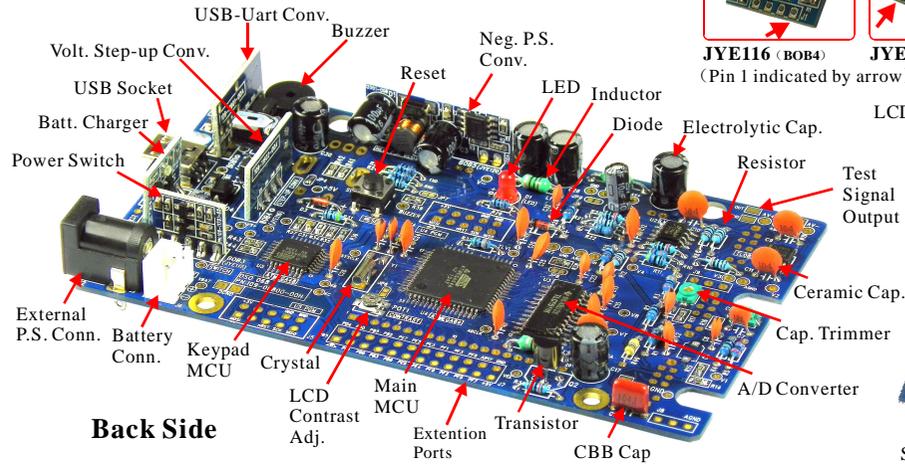
Rev. 03

## Step 1 Assembly the Main Board

1. Complete the steps in "Get Ready" and understand soldering requirements.
2. Install parts by the order of part list. Start from the back side of main board.
3. Pay special attention to part polarity at soldering. Refer to photos to the right.
4. For BOB boards and LCD soldering refer to photos at bottom for details.
5. Perform power-up tests as suggested in the part list.

**TIP:** Resistor values are easily mis-read. Meter checking is strongly suggested.

**TIP:** C3 and R32 are not required.



**TIP:** Do not install J4 if battery is to be mounted on back cover. Insert the pins into programmer header to perform U4 and U5 programming.

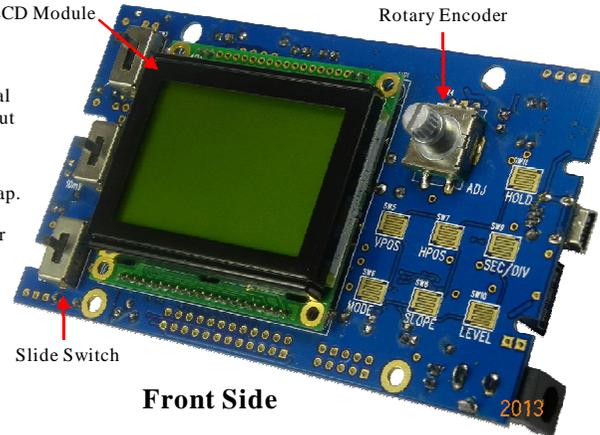
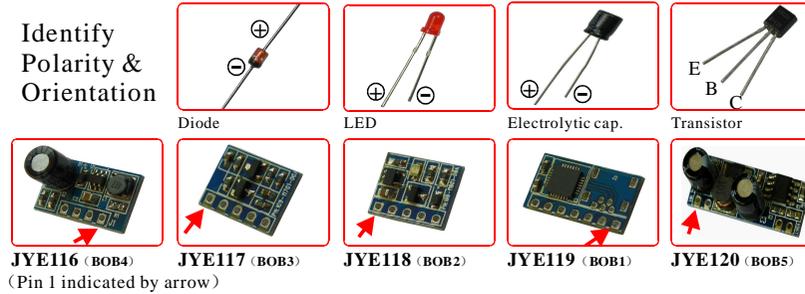
### Tools

- ① Iron (20W)
- ② Solder wire
- ③ Multimeter
- ④ Screw driver
- ⑤ Flush cutter
- ⑥ Tweezers

### Get Ready

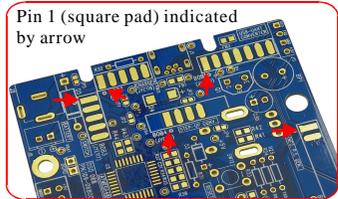
- ① Check part values & quantities against part list
- ② Meter and identify resistor values by ohm meter
- ③ Understand all part polarities and orientations

### Identify Polarity & Orientation

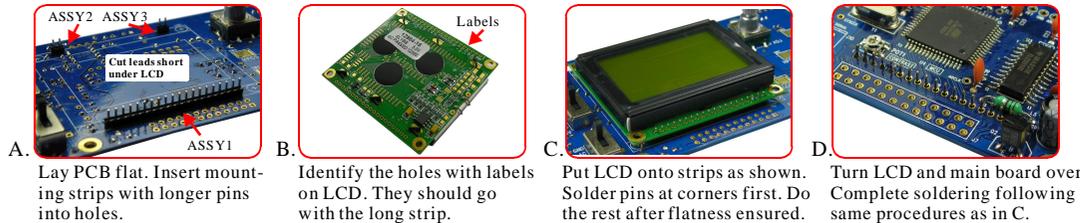


**Important!** Unused leads under LCD must be cut flush to avoid short to LCD module!

### BOB Boards Orientation



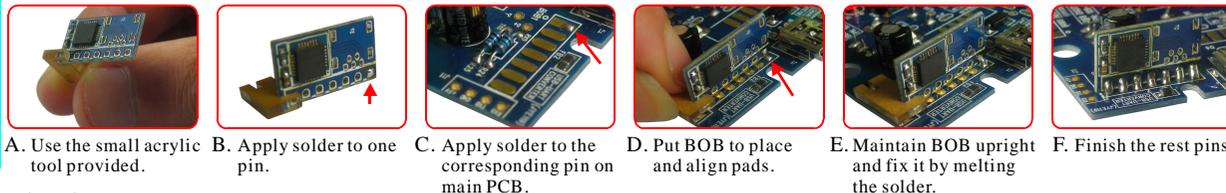
### LCD Installation



### BOBs and Jumpers

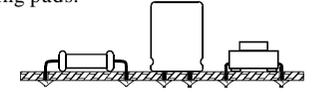
Keep JP1 open if BOB2 is installed. Otherwise close it.  
Keep JP2 open if BOB3 is installed. Otherwise close it.  
More at the reverse page

### BOB Board Installation



### Soldering Skills and Requirements

- ① Put leads through mounting by installation side of PCB. Ensure they evenly touch PCB (picture below).
- ② Solder at the other side of PCB. Solder should fully fill and cover soldering pads. Avoid bridges with neighboring pads.
- ③ Cut unused leads flush with cutter.

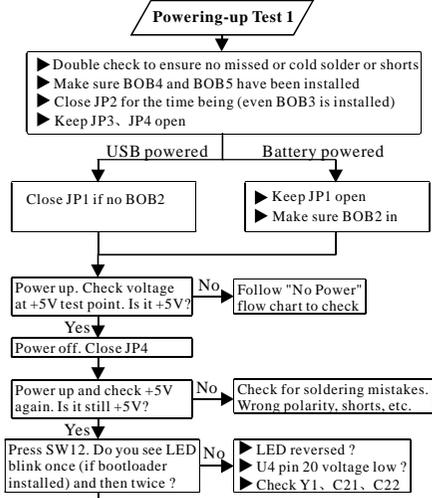


**Note:** Please install by the order given in the Part List below.

### Part List

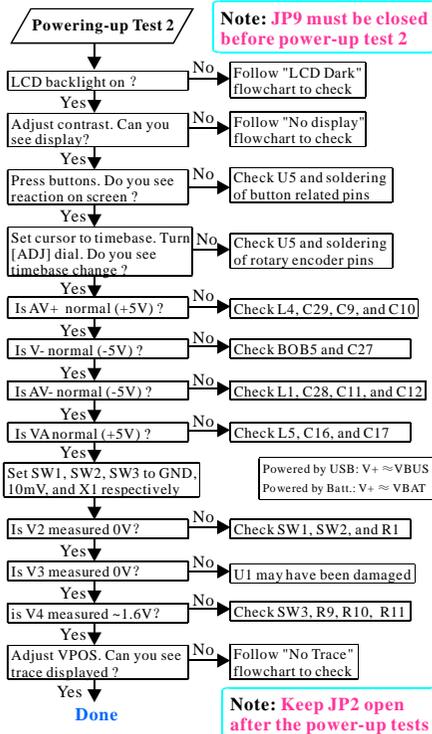
Category	Seq.	Type/Spec	Qty	Designator/Location
Main PCB	1	PCB#: 109-06800-00H	1	
Resistor	2	510K $\Omega$ , 5%, 1/8W	2	R1, R27
	3	200K $\Omega$ , 1%, 1/8W	1	R3
	4	2M $\Omega$ , 1%, 1/8W	2	R2, R4
	5	20K $\Omega$ , 1%, 1/8W	1	R5
	6	300 $\Omega$ , 1%, 1/8W	1	R6
	7	180 $\Omega$ , 1%, 1/8W	1	R7
	8	120 $\Omega$ , 1%, 1/8W	3	R8, R12, R21
	9	3.3K $\Omega$ , 1%, 1/8W	2	R10, R22
	10	470 $\Omega$ , 1%, 1/8W	3	R11, R31, R33
	11	10K $\Omega$ , 1%, 1/8W	3	R9, R20, R30
	12	1K $\Omega$ , 5%, 1/8W	5	R24, R25, R26, R28, R29
	13	10M $\Omega$ , 5%, 1/8W	1	R40
	Jumper	14	Short with solder	1
Diode	15	1N4148, DO-35	2	D2, D3
Inductor	16	100uH, $\phi$ 2.5 X 6mm	3	L1, L4, L5
Crystal	17	20MHz, $\phi$ 2 X 6mm	1	Y1
Connector	18	USB socket, MiNi-B type	1	J1
Switch	19	Tact, 6 X 6 X 5mm	1	SW12
Capacitor	20	300pF, ceramic disk	2	C2, C23
	21	3pF, ceramic disk	1	C4
	22	1pF, ceramic disk	1	C6
	23	120pF, ceramic disk	3	C7, C13, C32
	24	0.1uF, ceramic disk	12	C9, C10, C11, C12, C14, C15, C16, C18, C20, C24, C25, C26
	25	15pF, ceramic disk	2	C21, C22
	26	0.1uF/100V, CBB	1	C1
	Buzzer	27	5V, passive, $\phi$ 9 X 5.5mm	1
Diode	28	LED, $\phi$ 3mm, red	1	D1
Connector	29	2pins, 2.54mm	1	J6
Transistor	30	8550, TO-92 (E-B-C)	2	Q1, Q2
Electro. Capacitor	31	10uF, 16V, $\phi$ 4 X 5mm	1	C19
32	100uF, 16V, $\phi$ 6 X 7mm	5	C17, C27, C28, C29, C30	
Connector	33	DC005, $\phi$ 2.1mm core	1	J2
BOB Board	34	JYE116, step-up converter	1	BOB4
	35	JYE120, neg. P.S. convertor	1	BOB5
	36	JYE117, On/Off switch	1	BOB3 (optional)
	37	JYE118, battery charger	1	BOB2 (optional)
	38	JYE119, UART-USB conv.	1	BOB1 (optional)
<b>Perform power-up test 1 as described on the reverse page. Continue following assembly after the test.</b>				
LCD	39	128X64 graphic, 12864-16	1	LCD1
Pin Strip	40	SIP, 2mm, 20X1	1	
	41	SIP, 2mm, 2X1	2	
Switch	42	Slide switch, SS-23D06	3	SW1, SW2, SW3
Switch	43	Rotary Enc., EC11, 10mm	1	SW4
Pin strip	44	DIP, 2.54mm, 5X2	2	J4, J5 (Do not install)
Enclosure	45	Top(1), bottom(1), stand(1) switch caps(3), dial cap(1)	1 set	
Switch	46	7-key silicone button pad	1	
Connector	47	BNC, BNC-KY	2	
Wire	48	2-core header/wire, 10cm	1	
Screw	49	2.3*8mm, self tapping	4	
Wire	50	Shielding wire, 8cm	1	

## Step 2 Power Up Tests



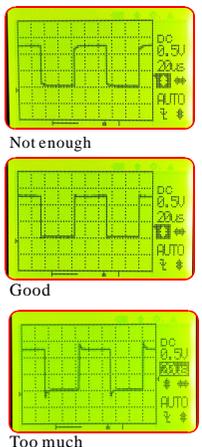
Continue to install parts on the front

**TIP:** Close JP7 to enable buzzer. It beeps as LED blinks



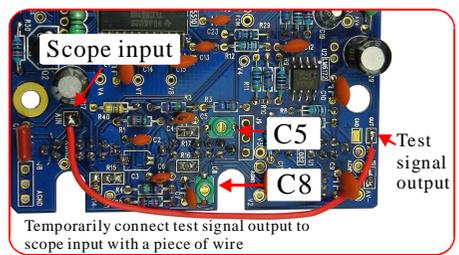
**Note:** Keep JP2 open after the power-up tests

## Step 3 Adjust Compensation Capacitors



Compensation capacitors can be adjusted using the built-in signal generator. Follow steps below:

1. Connect test signal output to scope input (see photo below) and set SW1 to DC.
2. Power up. Set test signal to 10KHz and 5V. Set scope timebase to 20us.
3. Set SW & SW3 to 1V & X2 respectively. Adjust trigger level to make display stable if necessary. Change C8 to obtain waveform as the middle of photos left.
4. Keep signal frequency unchanged and set amplitude to 1V. Set SW2 & SW3 to 0.1V and X5 respectively. Make display stable. Change C5 to obtain waveform as the middle of photos left.
5. Remove connection between test signal output and scope input. Adjustment is done.



**Major Jumpers Explained**

**JP1:** This is by-pass of charger BOB2. If battery is not used (i.e. no BOB2) keep JP1 closed.

**JP2:** This is by-pass of switch BOB3. If BOB3 is not used JP2 should be closed. In order to focus on the main circuit JP2 can be temporarily closed at power-up test even BOB3 is installed. Keep it open after the test.

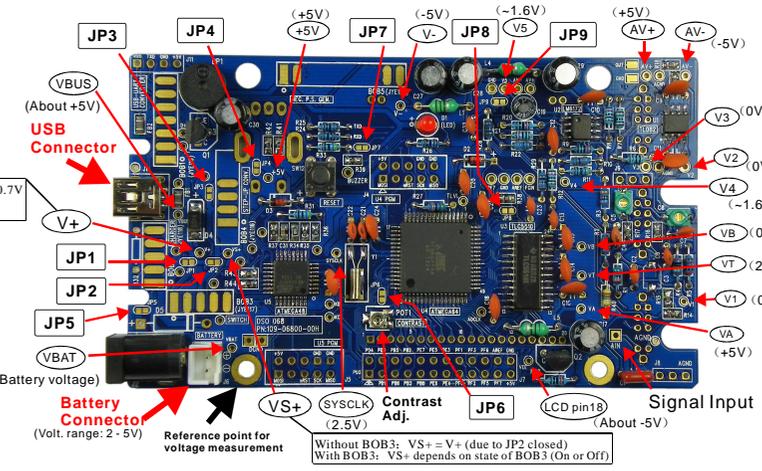
**JP3:** This is by-pass of step-up converter BOB4. Usually JP3 should be kept open.

**JP4:** This is the connecting point of power supply to the rest circuits. For safety JP4 should only be closed after power supply is tested good.

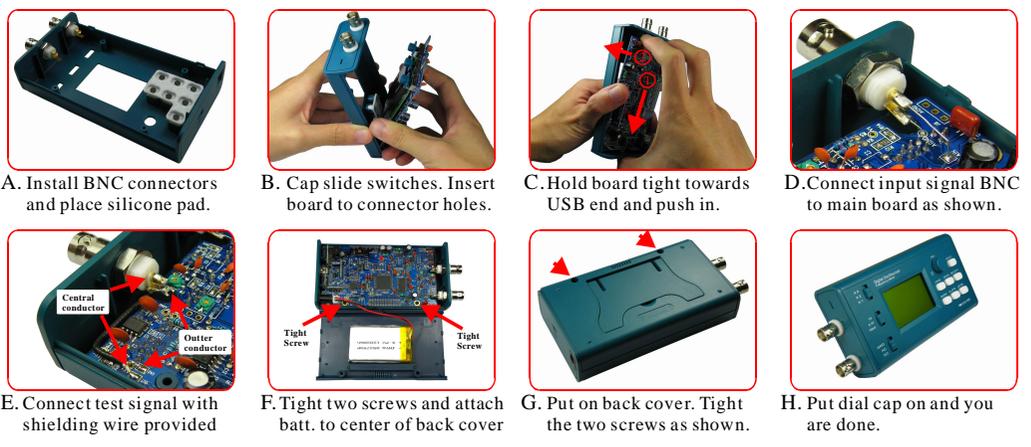
**JP9:** This jumper should always be closed.

## Troubleshooting

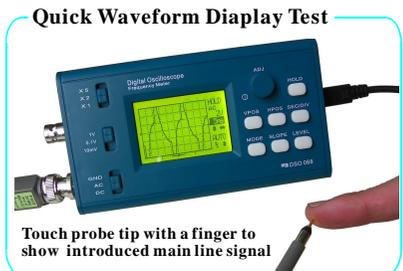
**Notes:** 1. All voltages are measured with volt meter's (-) pole at reference point (indicated in photo below) and (+) pole at points of measurement.  
2. Voltages with \* " are measured when SW1 (couple) is placed at GND position.



## Step 4 Install Batter & Enclosure



Tech Support: [www.jyetechnology.com/forum](http://www.jyetechnology.com/forum)



**Power Supply Options**

Source	BOB2	JP1	Remarks
USB	Yes	Open	
Int. Batt.	No	Close	
Ext. Batt. (J2)	Yes	Open	
Ext. 5V (J2)	Yes	Open	Install D5 (D5 is not provided)
	No	Close	

**Note:** Do not simultaneously connect external and internal batteries.