

Mini DOS LCD Oscilloscope Kit Instruction (TJ-56-646)

- Operating voltage: DC 5V power supply
- Voltage range: 0-30V (need to adjust the LSB)
- Sampling level: 10kHz @100us/div
- Waveform generator: PWM (PWM generator) and SIN (sine wave generator), adjust RP1, RP2 to change the amplitude respectively.

I. Interface Description

- ✓ Frequency per grid: 500ms, 200ms, 100ms, 50ms, 20ms, 10ms, 5ms, 2ms, 1ms, 500us, 200us, 100us.
- ✓ Trigger level: trigger voltage level.
- ✓ Trigger slope: ↑ - rising edge, ↓ - falling edge trigger.
- ✓ Trigger mode: A-automatic mode, N-normal mode, S-single mode.
- ✓ "Run": Sample run. "Stop": Sample stop.
- ✓ "Fail": Exceeds the trigger level of the waveform in auto-trigger mode.
- ✓ PMode: Display waveforms as vectors or dots.
- ✓ LSB: Input voltage division coefficient of sampling terminal, 100 times voltage division coefficient. By adjusting the voltage division coefficient to measure the signal of different voltage bands from 0 to 30V.
- ✓ BRT (Brightness): Adjust OLED brightness (25 levels).
- ✓ Quit: Save and exit.

II. Operating Instruction

All operations are performed by the EC11 encoder. Inputs include clicking, rotating, and long pressing to rotate.

Single clicking encoder: Run/stop sampling.

Rotating encoder: Adjusting the parameters.

Rotating encoder and pressing simultaneously: Switching between toggle options.

Triggering level: For repeated signals, the trigger level stabilizes the display. For single signals, the trigger stage can capture.

Triggering Slope: The trigger slope determines whether the trigger point is on the rising edge or falling edge of the signal.

Triggering mode:

(1) Automatic mode: Continuous scanning. Click the encoder to stop or run sampling. If triggered, the waveform will be displayed on the display, and the trigger position will be placed in the center of the chart. Otherwise, the waveform will scroll irregularly, displaying "Fail".

(2) Normal mode: After the pre-sampling is completed, the signal can be input. If triggered, the waveform is displayed on the display, waiting for a new trigger. If there is no new trigger, the waveform will be retained.

(3) Single mode: After the pre-sampling is completed, the signal can be input. If triggered, the waveform is displayed and the sampling is stopped. The user needs a single-click encoder to start the next sampling.

In normal mode and single mode, confirm that the trigger level has been adjusted correctly, otherwise the waveform will not be displayed on the monitor.

Indicating light: Usually the indicator light is on to indicate that the sampling is running.

Saving settings: When exiting the settings interface, all parameters of the settings interface and the main interface will be saved in the EEPROM.

III. Open the link or scan the QR code to download more information about the product

- Soldering and assembly tutorial download link (with pictures):

<https://www.56dz.com/p/3672.html>

- Download password: DFRE

- Soldering and using tutorial video link:

<https://www.56dz.com/p/3742.html>



Password: DFRE

IV. Components List

NO.	Component Name	PCB Marking	Parameter	Quantity
1	1206 SMD capacitor	C1	10uF	1
2	0805 SMD capacitor	C2	103	1
3	0805 SMD capacitor	C3	22nF (223)	1
4	Encoder	EC11	EC11	1
5	Wiring terminal	INPUT	2P / Blue	1
6	SMD power inductor	L1	1mH (102)	1
7	0805 LED	LED	Red	1
8	OLED screen	OLED	0.96-OLED 7P	1
9	0805 SMD resistor	R1, R3, R5	2K (202)	3
10	0805 SMD resistor	R2	10K (103)	1
11	2512 SMD resistor	R4	1W / 10K	1
12	3296 Adjustable potentiometer	RP1	200K (204)	1
13	3296 Adjustable potentiometer	RP2	500R (501)	1
14	Toggle switch	S1	R-SW-SPDT	1
15	Test ring	SIN, PWM		2
16	Microcontroller	U1	STC8A8K64S4A12	1
17	Curved pin header 4P	UART	2.54 1*4	1
18	MICRO socket	USB	MICRO-USB-BF-5P	1

5 power inductance welding



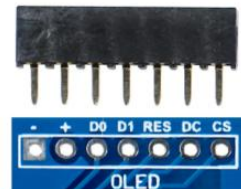
The inductor does not distinguish polarity, and the installation position L1. During soldering, tin is hung on both pads first, then the two solder joints at the bottom of the inductor are respectively aligned with one pad for installation, and finally the solder on the pad is melted again with a soldering iron on the outside, so that the inductor is fixed by solder.

7 Toggle switch welding



Install the toggle switch paddle outward to the S1 position, preheat when soldering its housing pins, and use more solder to solder it firmly.

9 Single row Pin welding



A single row of pins is mounted to the OLED position, and the single row of pins is used to insert the OLED LCD screen.

11 Terminal Welding



The terminal block port is installed at the INPUT position facing outward. When soldering, it is necessary to preheat its pins and then solder them firmly with more solder.

13 Encoder welding



When the encoder is installed in EC11 position, it needs to be preheated when soldering its housing pins, and it needs to be soldered firmly with more solder.

6 USB base soldering



The socket of the microUSB base is installed outward to the USB position. When soldering such large-volume metal components, it is necessary to preheat the metal shell pins with a soldering iron, and then use more soldering tin to solder them firmly.

8 TEST RING WELDING



The test ring is installed in the PWM and SIN positions, and the finished product will output waveform signals from these two positions for testing the oscilloscope function.

10 Bent pin welding



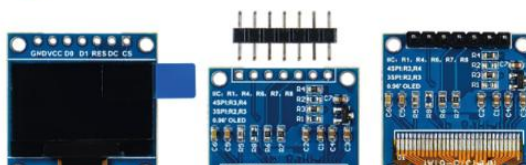
The long leg of the curved row pin is installed to the UART position. The pin can modify the single chip microcomputer program with USB to TTL downloader. The wiring is RX (receiving) to connect TX (sending) of the downloader, i.e. RX and TX are cross-connected.

12 Potentiometer welding



The potentiometer is installed according to the silk screen shape direction. Installation position: 204 -> RP1; 501 -> RP2;

14 OLED LCD Screen Assembly

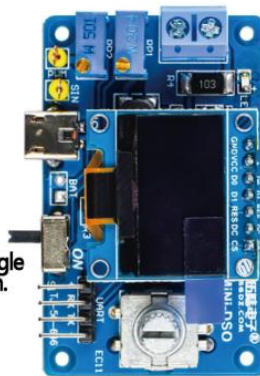


The single-row needle in the LCD screen electrostatic bag is discarded. Install the short-leg single-row needle in the kit to the back of the LCD screen, and then weld it firmly.

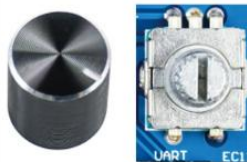
15 LCD Installation



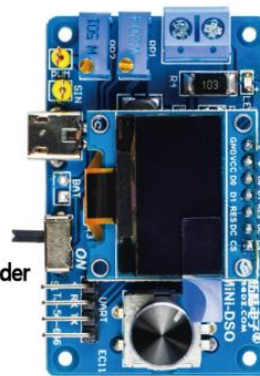
Mount the OLED LCD to the single row of pins in the OLED position.



16 Knob Cap Installation



Install the knob cap on the encoder screw at EC11.



17 Power-on test



Use the matching microUSB power cord to connect the mobile phone charging head to supply power to the circuit board. When the toggle switch is turned to the ON position, the LED will light up and the LCD screen will display the picture.



18 Clean the shell protective film



19 Rear housing screw mounting

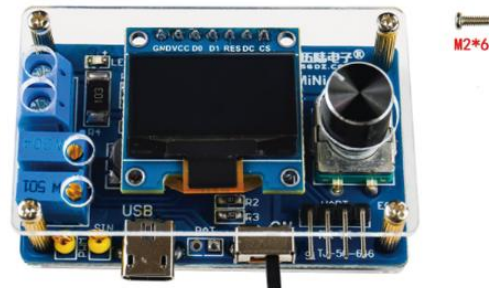


Secure the M2 * 8 screw to the rear housing with the M2 nut.

21 Knurled copper column installation



22 Front Shell Installation

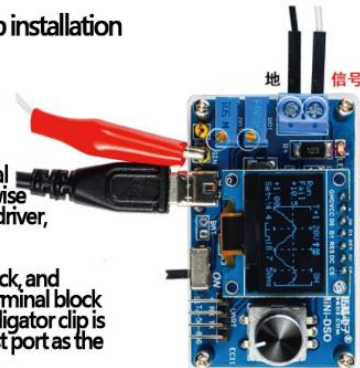


23 Alligator clip welding



24 Alligator clip installation

Unscrew the terminal block counterclockwise with a Phillips screwdriver, insert the alligator clip into the terminal block, and finally tighten the terminal block clockwise. The red alligator clip is connected to the first port as the signal input port.



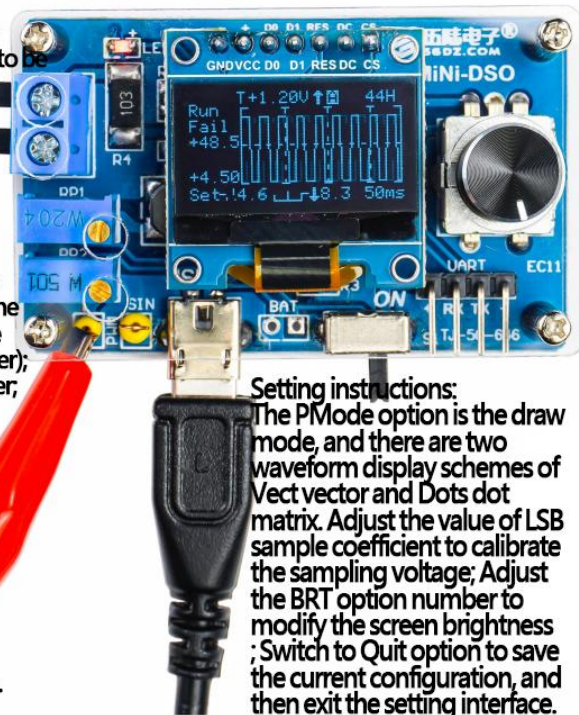
The red alligator clip of the oscilloscope is connected to the positive pole of the signal source, and the black alligator clip is connected to the negative pole of the signal source. The voltage range that the oscilloscope can test is 0-30V. The LSB sampling coefficient needs to be adjusted on the set interface. The highest frequency that can be tested is 10kHz. The waveform displayed will be distorted when approaching the highest frequency.

Interface description:

The inscribed font on the interface represents the current focus position, for example, the current focus is at position A; Set in the lower left corner is the setting menu; 50ms in the lower right corner is the time interval; A at the top of the screen is the trigger mode (A automatic trigger | N normal trigger | S single trigger); The ↑ at the top of the screen is the rising edge trigger; T 1.20V at the top of the screen is the trigger value; Run on the left side of the screen.

Operating instructions:

After the oscilloscope is started, the focus is at the time interval position, and the rotary encoder can modify its value. When pressing, the rotary encoder can switch between options. Short press the encoder to pause scanning, and Run on the left side of the screen changes to Sotp; Switch the focus to the Set option, and the rotary encoder will enter the setting interface.



Setting instructions:

The PMode option is the draw mode, and there are two waveform display schemes of Vect vector and Dots dot matrix. Adjust the value of LSB sample coefficient to calibrate the sampling voltage; Adjust the BRT option number to modify the screen brightness; Switch to Quit option to save the current configuration, and then exit the setting interface.

