DSO 138mini Oscilloscope DIY Kit
User Manual
Rev. 02
Applicable models: 13805K
Applicable firmware: 113-13810-100 or later

Tools you need
1. Iron (20W)  2. Screw driver
3. Solder wire  4. Flush cutter
5. Multimeter  6. Tweezers

Before you start
1. Check values & quantities against parts listed
2. Understand all part polarities and orientations
3. Prepare a USB cable with USB-micro connector

Soldering Hints
1. Put leads through mounting holes from the side with part outline. Ensure component evenly touch PCB.
2. Solder leads at the other side. Solder should fully fill and cover soldering pads. Avoid bridges between neighboring pads.
3. Cut unused leads flush with cutter.

Step 1
Test and Assembly Main Board

1. Check the main board
Before mounting any parts to the main board
Use a USB cable with USB-Micro plug to power the main board through J7.
You should see the scope boots up to a screen similar to the photo below. D1 (LED) should blink three times during the booting.

Apply power

Check display

Attention
Do not solder any parts to the board if you find problem. Otherwise warranty will be voided. Report to your vender or JYE Tech for any problem found.

2. Pin-headers (female)

| J4  | : 1 X 10 pin |
| J8, J9 | : 1 X 2 pin |

Step 2
Assembly Analog Board (follow the order as numbered)

1. Resistors
Note:
Always meter resistor values before soldering because color bands are easy to mis-read.
Resistors are all 1/8W.

| R1, R13 | : 100K Ω |
| R2      | : 1.8M Ω |
| R3, R15 | : 200K Ω |
| R4      | : 2M Ω |

2. Diode
Cathode

| D1     | : Zener, 2.0V |

3. HF-Chokes

| L1, L2 | : 100μ H |

4. Tact Switches

| BTN1, BTN2, 6 X 6 X 5mm BTN3, BTN4 |

5. Capacitor trimmers

| C4, C6 | : 5-30pF |

6. Ceramic Capacitors

| C1, C8, C9 | : 0.1μ F |
| C2          | : 220pF |
| C3          | : 3pF |
| C5          | : 1pF |
| C7          | : 120pF |

7. Pin header

| J1       | : 2 Pin, 2.54mm, rightangled |

Note:
Do not install this pin-header if BNC connector (box 12) is to be used.

8. Electrolytic capacitors

| C10, C11, C12, C13, C14 |

Solder positive pole (the longer lead) to the square pad

9. Slide switches

| SW1, SW2 | : 2P3T |
| SW3      |     |

10. Pin-headers (male)

| J5  | : 1 X 10 pin |
| J2, J3 | : 1 X 2 pin |

11. Test signal ring

1) Make a small ring with a lead cut-off.
2) Solder the ring to the two holes of J4 (as shown in the photo).

12. BNC connector (optional)

| J7  | : BNC |

Note:
The thicker pins need to heat up longer to get good soldering result.

13. Jumpers

JYE Tech Ltd. - www.jyetechno.com -
14. Hook Probes
Put wire through hood cap and sold the wire onto hook terminal as shown. Match wire color with hook color.

Step 3 Test analog board

1. Check voltages and controls

   1. Attach the main board to the analog board. Apply 5V DC power through J7.
   2. Set couple switch [CPL] to GND position.
   3. Check voltages at the points as shown in the photo.
   4. Check slide switches and push-buttons for correct operation.
   5. Calibrate C4 & C6 if everything is fine (see instructions to the right).

2. Connect Probes

   1. Connect the red hook to the test signal terminal J4 and leave the black hook un-connected.
   2. Set [SEN1] switch to 0.1V and [SEN2] switch to X5. Set [CPL] switch to AC or DC.
   3. Adjust timebase to 0.2ms. You should see waveform similar to that shown in photos below. If traces are not stable adjust trigger level (the pink triangle on right screen border) so as you get a stable display.
   4. Turn C4 (capacitor trimmer) with a small screw driver so that the waveform displays sharp rightangle (photo C).
   5. Set [SEN1] switch to 1V and [SEN2] switch to X1 while keep all other settings unchanged. Adjust C6 so that sharp rightangle waveform is displayed.

Display and Controls

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Vertical Position 1</td>
</tr>
<tr>
<td>V2</td>
<td>Vertical Position 2</td>
</tr>
<tr>
<td>V3</td>
<td>Vertical Position 3</td>
</tr>
<tr>
<td>V4</td>
<td>Vertical Position 4</td>
</tr>
<tr>
<td>Power</td>
<td>Power input</td>
</tr>
<tr>
<td>Oscilloscope Mode</td>
<td>Mode</td>
</tr>
<tr>
<td>Vertical Position Indicator</td>
<td>Vertical</td>
</tr>
<tr>
<td>Signal Input</td>
<td>Signal</td>
</tr>
<tr>
<td>[CPL]: Couple Selection</td>
<td>[CPL]</td>
</tr>
<tr>
<td>[SEN1]: Sensitivity Selection 1</td>
<td>[SEN1]</td>
</tr>
<tr>
<td>[SEN2]: Sensitivity Selection 2</td>
<td>[SEN2]</td>
</tr>
<tr>
<td>Trigger State</td>
<td>Trigger</td>
</tr>
<tr>
<td>Short two pads to reset</td>
<td>Short</td>
</tr>
<tr>
<td>Trigger Slope</td>
<td>Trigger</td>
</tr>
<tr>
<td>Timebase (s/div)</td>
<td>Timebase</td>
</tr>
<tr>
<td>[OK]: HOLD/RUN</td>
<td>[OK]</td>
</tr>
<tr>
<td>[+/-]: Parameter Adjustment</td>
<td>[+/-]</td>
</tr>
</tbody>
</table>

Attention

1. Power supply voltage must not exceed 8V.
2. Allowed maximum signal input voltage is 50Vpk (100Vpp).

Specifications

- Max ratings/sampling rate: 10Ms/s
- Analog bandwidth: 5 – 200MHz
- Max input range: 50Vpk (1X probe)
- Resolution: 14-bit
- Trigger modes: Auto, Normal, and Triggle
- Trigger position range: Center
- Power supply: 3.3V – 5V DC
- Current consumption: 120mA @ 5V
- Dimension: 53 x 73 x 15 (mm)
- Weight: 50 gram (without probe)

Other features

- [OK]: HOLD/Run
- [SEL]: Parameter Selection
- [SEL]: Sensitivity
- [SEL]: Mode
- [SEL]: Default Restore
- [SEL]: Recall Waveform
- [SEL]: Center HPos
- [SEL]: Center Trigger Level
- [SEL]: Load/save Waveform Data

Calibrating C4 & C6

1. Set [CPL] switch to GND position.
2. Set [SEN1] switch to 0.1V and [SEN2] switch to X5. Set [CPL] switch to AC or DC.
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Other features

- Functions
- Operations
- Measurements
- ON/OFF
- Save Waveform
- Recall Waveform
- Default Restore
- Center HPos
- Center Trigger Level
- Send Waveform Data

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