

DSOShell DIYKit

Инструкция Rev.07

Applicable models: 15001K, 15002K

Applicable firmware version: 113-15001-061 or later

Необходимые инструменты см. на стр. 2

В начале

1. проверьте содержимое комплекта и сравните его с фото справа и перечнем на странице 2 и стр. 3. Сообщите о пропаве запчастей вашему поставщику.
2. Номинал Резистора можно легко прочитать не правильно. Настоятельно рекомендуется перед пайкой проверить, его ом-метром.
3. убедитесь, что вы понимаете полярности и ориентации всех частей.

Важно!!!

Если приобрели 15002K kit (SMD компоненты предварительно не спаяны), необходимо установить все SMD детали перед монтажом в сквозное отверстие платы. Пожалуйста, обратитесь к приведенным ниже инструкциям для установки SMD детали. SMD запчасти устанавливаются только в аналоговом блоке (PCBPN#109-15001-XXX).

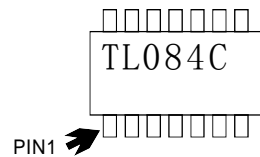


1. Перед пайкой проверьте компоненты в списке деталей, чтобы убедиться, что у вас есть правильные детали.
2. Определить тип и полярности диодов (см. фото).
3. Не держите паяльник на плате слишком долго. Другие компоненты платы могут получить повреждения.

SMD Part List (For PCB109-15001-00F)

Loc/Ref	Qty	Descriptions
U1	1	TL084, SO14
U2	1	74HC4053, SO16
U3	1	74HC4051, SO16
U4	1	78L05, SOT89
U5	1	ICL7660, SO8
U6	1	79L05, SOT89
R19, R20	2	1K, 1%, 0805
R17, R18	2	10K, 1%, 0805
C3, C5	2	Captrimmer, 30pF
C9, C12, C13, C14, C15, C16, C17, C18	8	0.1uF, 50V, 0805

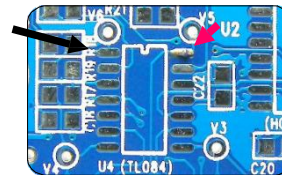
Identify IC orientation



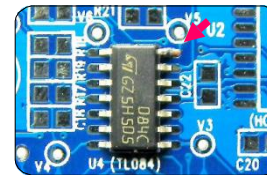
Расположите IC перед вами так, чтобы его маркировка читалась слева направо. Первый пин-код в нижнем левом углу это контакт 1.

Пайка ICs

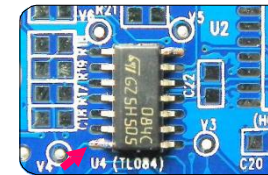
Pin1



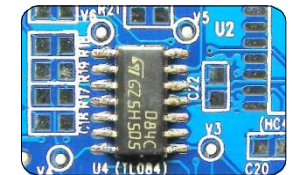
Припаиваем к углу площадки



Припаиваем IC на площадку. Выровнять контакты на колодке

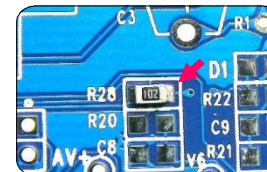
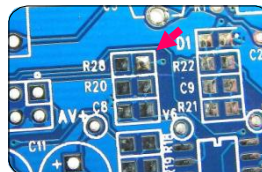


Припаять штифт в противоположный угол



Припаять все оставшиеся контакты один за другим.

Спаять две-терминальные части



Важно:

Фотографии только для иллюстрации. Они могут не совпадать с реальными изделиями

Важно!!!

Если SMD компоненты предварительно не спаяны, необходимо установить все SMD детали перед монтажом в сквозное отверстие платы. Пожалуйста, обратитесь к инструкциям для установки SMD деталей на стр.1.

Tools you need

- ① Паяльник мощностью 20-25Вт для пайки деталей. Для BNC разъем высокой мощности рекомендуется использовать паяльник 50-100Вт
- ② Припой с канифолью (0.8- 1 mm.)
- ③ Мультиметр
- 4 Отвертка (phillips, size#0)
- ⑤ Инструмент для зачистки
- ⑥ Пинцет
- ⑦ Батарейка 9V/200mA или мощнее с и вилка 5.5x2.1mm.
- ⑧ Кусачки
- ④ Миниатюрная отвертка

Подсказки для пайки

- ① Put leads through mounting holes from the side with part outline. Ensure component evenly touch PCB.
- ② Solder leads at the other side. Solders should fully fill and covers old erring pads. Avoid bridges between neighborin g pads.
- ③ Cut unused leads flush with cutter.



Step1 Assembly the Main Board (follow the order as numbered)

1. Check the mainboard

- ① Before mounting any parts to the mainboard connect a 9V power supply (center positive) to J7 on the board to check the display.
- ② You should see the scope boots up to a screen similar to the photo below. D1 (LED) blink twice.

Do not solder any parts to the board if you find a problem. Otherwise warranty will be voided. Report the problem to vendor or JYETech.

① Apply power (DC Jack is 5.5mm dia. with 2.1mm core)

② Check display

4. Slide Switch

SW5 : DPDT

5. Pin-header (male)

J2: 1X4 pin, 0.1" pitch

6. Tact Switches

SW1, SW2: 12x12x7mm
SW3, SW4

7. Remove Resistor R30

Let iron stay on one pad of the resistor until solder on the other pad melts and then remove the part.

Note:
R30 is used to bypass SW5 so as the mainboard can be tested without the power switch. It must be removed for correct functioning of the power switch.

Now apply power again. Test power switch and

2. Test Signal Terminal

J8 : 4.8x 0.8mm terminal

Note:
Before soldering bend the terminal to the shape shown.

3. Power Connector (optional)

J6: 0.1" pitch, right angle

Step2 Assembly the Analog Board (follow the order as numbered)

1. Resistors

Note:
Always meter resistors before soldering. Resistors are all 1/8W.

<input type="checkbox"/> R1 : 510K Ω	<input type="checkbox"/> R7 : 300 Ω
<input type="checkbox"/> R2 : 5.1M Ω	<input type="checkbox"/> R8, R16 : 150 Ω
<input type="checkbox"/> R3 : 1.2M Ω	<input type="checkbox"/> R9 : 91 Ω
<input type="checkbox"/> R4 : 11K Ω	<input type="checkbox"/> R10 : 30 Ω
<input type="checkbox"/> R5, R6, R14: 1K Ω	<input type="checkbox"/> R11, R12 : 15 Ω
	<input type="checkbox"/> R13 : 3K Ω
	<input type="checkbox"/> R15 : 130 Ω

4. Electrolytic capacitors

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

C8, C10: 100 μ F / 16V
C11

3. Slideswitch

SW1 : 2P3T

5. BNC connector

J1 : BNC

The thicker pins need to be heated up longer to get good soldering result.

6. Pin-header (male)

J2 : 2X5 pin, 2mm pitch



Step3 Assembly Front Module

1. Solder Rotary Encoder

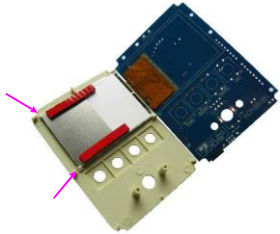


Mount to the small PCB (P/N: 109-15002-00A)

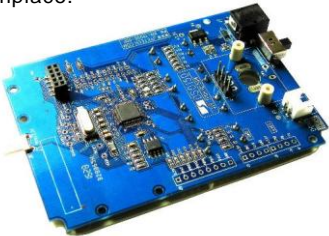
Note: Please pay attention to the orientation of PCB. Use the side without line marking.

2. Assemble Front Module

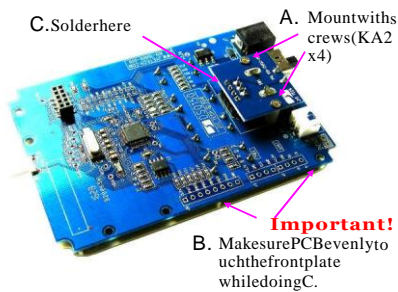
- Fit LCD to front panel as shown below.



- Fold the main board over while keeping LCD in place.



- Mount rotary encoder board to the front plate with screws and solder the board to J2 of the main board.



Step4 Check Voltages

Verify voltages on the analog board

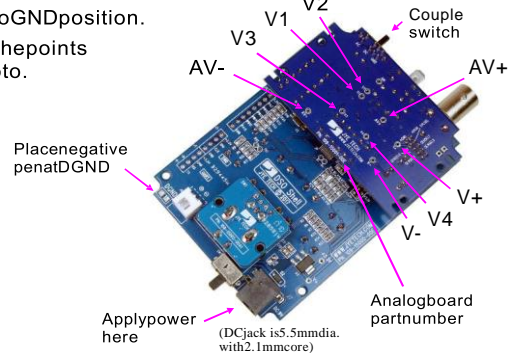
- Attach the analog board to the main board by mating J2 on the analog board to J4 on the main board (see photo).
- Apply 9V DC power supply to J7 (or J6) on the main board.
- Set couple switch to GND position.
- Check voltages at the points as shown in the photo.

Measurements applicable for "E" version PCB (P/N: 109-15001-00E)

References

(*) Input dependent

Input	+9.30V
V+ (*)	+8.35V
AV+	5.0V +/- 2%
V- (*)	-7.86V
AV-	-5.0V +/- 2%
V1	0V
V2	0V
V3	0V
V4	-1.65V

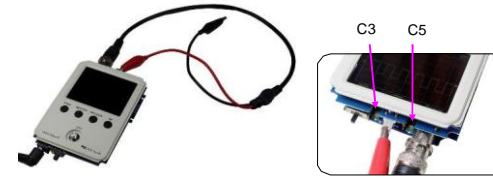
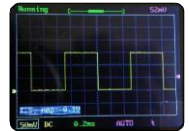
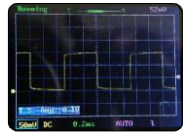


Important!
Always remove power before connecting or disconnecting the analog board.

Step5 Calibration

Adjust trimmers C3 and C5

- Connect the red clip to the test signal terminal and leave the black clip un-connected (see photo at bottom).
- Apply power and boot. Hold down ADJ dial for 3 seconds to bring up Test Signal amplitude display at lower-left corner. Push ADJ to set the amplitude to 0.1V.
- Set sensitivity to 50mV and adjust trigger level so that wave form is stable (see "How to Use" at page 4).
- Tuning C3 so that sharp rectangle (photo B at left) is obtained. The adjustment for C3 is done.
- Similarly, for C5 calibration push ADJ to set test signal to 3.3V. Change sensitivity to 1V. Tuning C5 so that sharp rectangle wave form is obtained. The adjustment is done.



Step6 Put all parts together

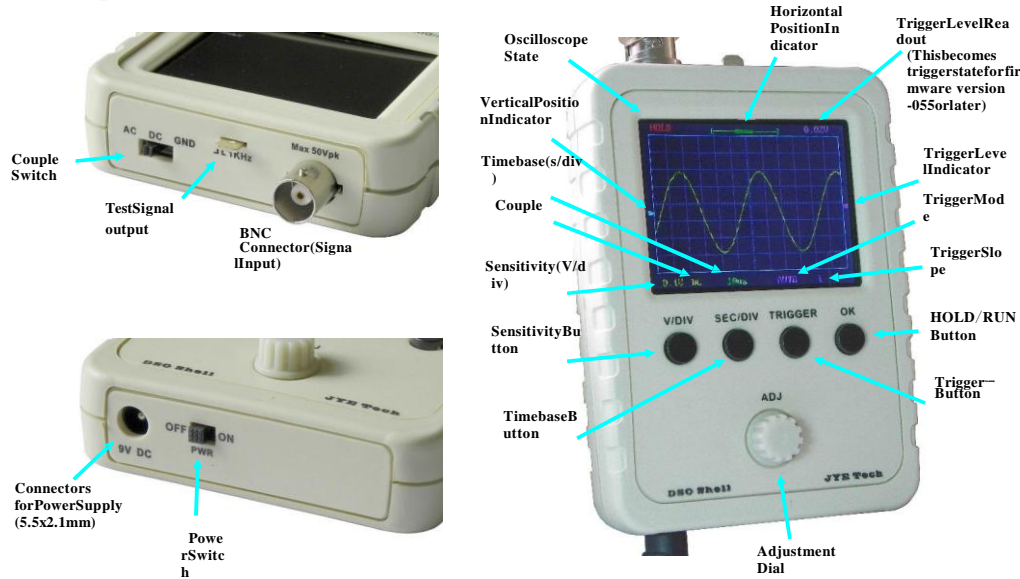
It is strongly recommended to read the article "FAQ, Tips, and Troubleshooting" at www.jytech.com/forum under the sub-forum "DSOShell".

Final assembly

- Screw the analog board to back cover with the top bracket.
Screws KA2x4 (4 positions)
- Combine the front module and the back cover.
Put test signal terminal through the small slot.
- Make sure receptacle (J4) mate with pin-header (J2).
- Attach bottom bracket before holding the two modules together.
Bottom bracket
- Attach the front frame.
Front frame
- Firmly press the frame in.
- Screw up the back.
Screws PA2.3x8 (4 positions)
- Attach knob cap and done!
Knob cap

How to Use

Display and Controls



Connections

Power Supply: Connect 9VDC power supply to the 5.5x2.1mm jack at bottom (center positive). Power supply voltage must be in the range of 8-10V.

Probe: Connect probe to the BNC connector at top.

Attention

1. Power supply voltage must not exceed 10V. Otherwise it may damage the ICs inside.
2. Allowed maximum signal input voltage is 50Vpk (100Vpp) with the clip probe.

Operations

Basic Button Functions

- [V/DIV]:** Selects sensitivity or vertical position. These selected parameter indicator will be highlighted.
- [SEC/DIV]:** Select time base or horizontal position. These selected parameter indicator will be highlighted.
- TRIGGER]:** Select trigger mode, trigger level, and trigger edge. These selected parameter indicator will be highlighted. Enter **HOLD** state (freeze waveform). Press it again will de-freeze.
- OK]:** Adjust the parameters selected (highlighted). Short press toggles *Fast Adjustment* mode.
- Coupleswitch:** Set couple to DC, AC, or GND. When GND is selected the scope input is isolated from input signal and connected to ground (0V input).

Specifications

Max real time sample rate	1MSa/s	Time base range	500s/Div--10us/Div
Analog bandwidth	0--200KHz	Trigger modes	Auto, Normal, and Single
Sensitivity range	5mV/div-20V/div	Trigger position	Center or buffer
Max input voltage	50Vpk (1X probe)	Power supply	9VDC (8-10V)
Input impedance	1Mohm/20pF	Current consumption	~120mA @ 9V
Resolution	12bits	Dimension	105x75 x22mm
Record length	1024points	Weight	100gram (without probe and PS)

More Functions

Functions	Operations
VPos Alignment	Set Couple Switch to GND position. Hold down [V/DIV] button for about 3 seconds.
Measurements ON/OFF	Hold down [OK] button for about 3 seconds. This will turn ON or OFF. On-screen display of measurements including Vmax, Vmin, Vavr, Vpp, Vrms, Freq., Cycle, Pulse width, and Duty.
Save Waveform	Press [ADJ] & [SEC/DIV] buttons simultaneously. The currently displayed waveform will be saved to EEPROM. The existing data in EEPROM will be over-written.
Recall Waveform	Press [ADJ] & [Trigger] buttons simultaneously. Recalled waveform is always displayed in Hold state.
Default Restore	Hold down [SEC/DIV] and [TRIGGER] buttons simultaneously for about 3 seconds.
Center HPos	Hold down [SEC/DIV] button for about 3 seconds. This will make the data at the center of capture buffer displayed.
Center Trigger Level	Hold down [TRIGGER] button for about 3 seconds. This will set the trigger level to the medium value of signal amplitude.
Fast Adjustment	Short press of [ADJ] toggles <i>Fast Adjustment</i> mode on and off. For VPos, HPos, and Trigger Level. A ">>>" sign appearing at top of screen indicates <i>Fast Adjustment</i> .

About Trigger State

The trigger can have three states including Holdoff, Waiting, and Triggered. They are explained below. **Holdoff:** Trigger is disabled until a portion of sample buffer prior to trigger point is filled with raw data. **Waiting:** Trigger is waiting for a valid signal slope.

Triggered: A valid signal slope has been detected and registered.

Rolling Mode

When time base is set to 50ms or lower and trigger mode is set to AUTO the scope will automatically switch to *Rolling Mode* where waveform shifts from right to left constantly. The trigger is disabled under this mode.

Troubleshooting

Problems	Possible Causes
Bad V+	① Connector J7 defective. ② Diode D2 open or damaged.
Bad V-	① Bad C12 and/or C13. ② U5 (7660) bad soldering or defective. Hint: Check with R27 disconnected would let you know the issue is caused by load or source.
Bad AV-	① R27 bad soldering or wrong value. ② Short between AV- and ground.
Bad AV+	① R26 bad soldering or wrong value. ② Short between AV+ and ground.
V1 does not close to 0V	① W1 not set to GND position. ② Bad soldering on R1 and/or R2. ③ Bad soldering on U1.
V2 does not close to 0V	① W1 not set to GND position. ② Bad soldering on R3 and/or R4. ③ Bad soldering on U1.
V3 does not close to 0V	① Bad soldering on U1 and/or U2. ② Bad soldering on R5 and/or R6.
Bad V4	① Bad soldering on R13, R14, and R15.
No Trace	① Incorrect V4. If V4 is correct perform factory default restore as described in ②. ② Make sure trigger mode is AUTO and time base is 1ms. Hold down [SEC/DIV] and [TRIGGER] buttons simultaneously for 3 seconds.