

## FG085 Function Generator

# Assembly Guide


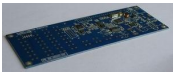

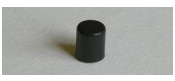
Applicable Models: 08501K

### Important Notes

1. Some components shown in the schematic and PCB layout are for options or adjustments. They do not necessarily need to be installed. Components to be installed are listed in the part list. Please ignore those components that appear in the schematic but not in the part list.
2. Component values in the part list may be different from that labeled in the schematic. Please only use component values as specified in the part list.
3. Users should pay special attention to polarity and orientation for some components. These components include diodes, transistors, electrolytic capacitors, ICs, connectors, etc. Incorrect installation of such components may result in damage of parts and malfunction of the board.

### Part List

Inst. Order	Descriptions	Designator	Qty	Photo	Remarks
1	Crystal, 20MHz	Y1	1		
2	Connector, USB mini-B	J10	1		
3	Electrolytic capacitor, 100uF/16V, aluminum	C5, C9, C10	3		
4	Electrolytic capacitor, 470uF/25V, aluminum	C3, C4	2		
5	Connector, DC005	J1	1		
6	Connector, BNC right-angle	J5	1		
7	Pin header, 5 X 2, 2.54mm	J6, J8	2		
8	Switch, tact, 6 X 6 X 9	SW2 – SW21	20		
9	Switch, lockable, DPDT	SW1	1		See text for orientation
10	Pin header, 16 X 1, 2.54mm		1		See text for installation warning
	LCD, 1602A, blue	LCD1	1		

11	Switch, rotary encoder, w/ pushbutton	SW22	1		
	PCB, SMD parts pre-soldered		1		
	Power adapter, AC/DC, 15V0.5A		1		
	Switch cap		1		

### Tools You Need

- Ø A good quality soldering iron (20 – 25W).
- Ø Thin rosin-core solder of ideally 0.8mm diameter.
- Ø A diagonal flush cutter.

### Assembly Steps

The whole assembly process is divided into 11 steps, starting with components at the back side (see Fig. 1). Please follow the installation order as listed below.

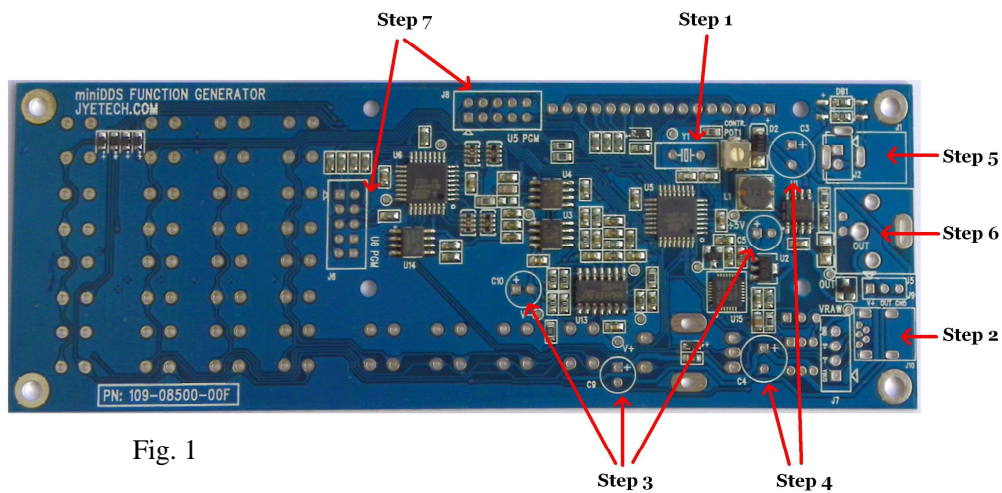


Fig. 1

#### **Step 1. Install crystal Y1**

It is likely that when you get the kit the crystal Y1 has been soldered on PCB because programming of the MCUs needs it in place. If not install it at the position indicated in Fig. 1 and cut its legs flush at back.

#### **Step 2. Install USB connector J10**

Solder J10 to position indicated in Fig. 1. Make sure it sits properly on PCB.

#### **Step 3. Install electrolytic capacitors C5, C9, and C10**

Electrolytic capacitor is a polarized component. C5, C9, and C10 are aluminum electrolytic capacitors. Usually their longer leads (if have not been cut before) denote positive pole. The white strip on their body denotes negative pole. Insert the positive pole into the hole with square pad (also marked by “+” sign). Solder and cut legs flush at back side.

**Step 4. Install electrolytic capacitors C3 and C4**

Follow the same procedures as stated in Step 3 to install C3 and C4.

**Step 5. Install power connector J1**

Solder J1 to position indicated in Fig. 1. Make sure it sits properly on PCB.

**Step 6. Install BNC connector J5**

Solder J5 to position indicated in Fig. 1. Make sure it sits properly on PCB.

**Step 7. Install programming header J6 and J8**

J6 and J8 are pin headers for programming of MCUs. Their short ends should go into PCB holes while the long ends point out from PCB (Fig. 2). At soldering it is recommended to do one pin first. Then tweak it to proper position and solder the rest pins.

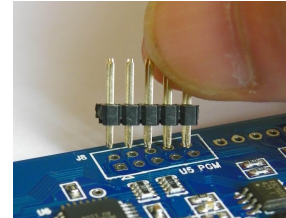


Fig. 2

Now you have finished the components at the back side. You can continue to install parts at the front side (see Fig. 3).

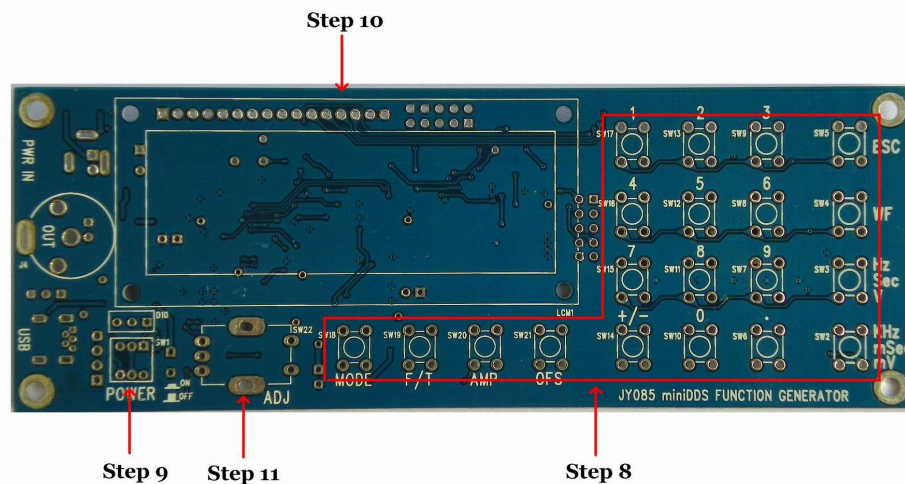


Fig. 3

**Step 8. Install tactile switches SW2 – SW21**

It is important to install all tact switches so that they are upright and evenly sit on PCB. When doing soldering it is strongly recommend that you solder two across pins first. Then tweak it by touching the soldered legs with iron while pushing by hand on the other side. After you satisfy yourself with switch positions solder all the rest pins.

**Step 9. Install power switch SW1**

Special attention to orientation is asked at installing SW1. You need to make sure the switch is closed (power is ON) when it is pushed down. Because there is no indicator on the switch you need to identify correct orientation with a multi-meter. To do this push the switch to DOWN position (ON state). Find out two pins that are shorted and mark the corner where they are with an oil pen (Fig. 4). (**Note:** there are two pairs of such pins. They are at the same side so either one will do). Insert switch into PCB so that the marked corner is close to the USB connector (Fig. 5). Solder it.

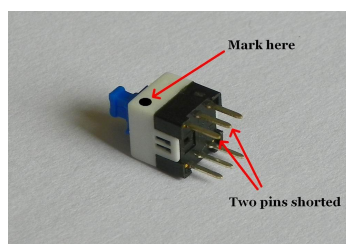


Fig. 4

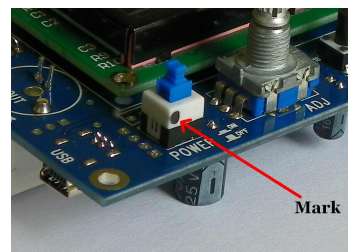


Fig. 5

### Step 10. Install LCD module

**Warning:** You must install components on the back side before soldering the LCD module. Otherwise it will block installation of some components.

Recommended installation procedures:

- 1) Insert the 16x1 pin header into main PCB with its long ends go into PCB holes. (See Fig. 6)
- 2) Place LCD module on the PCB and align to the pin header. Ensure it sits flat. (See Fig. 7)
- 3) Solder the top pins one by one while keeping LCD flat.
- 4) Turn over both the main PCB and the LCD module (Fig. 8). Solder the two end pins first. Tweak and make sure LCD evenly and closely touches the main PCB. Solder the rest pins.

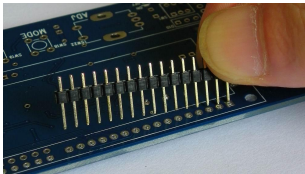


Fig. 6

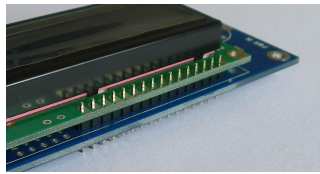


Fig. 7

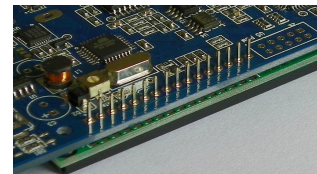


Fig. 8

### Step 11. Install rotary encoder SW22

Solder SW22 to position indicated in Fig. 3. Make sure it sits properly on PCB.

### Powering Up the First Time

Now you have finished installation of all components. Before powering up the first time please double check the soldering. Clear any solder left-over and lead cut-offs. Follow the steps below to power up the board.

- 1) Put the power switch (SW1) at UP position (OFF state).
- 2) Connect power adapter to J1 and plug the other end to AC outlet.
- 3) Push down SW1 to turn the board ON. You should see LCD backlight lights up. Observe to make sure there are no abnormalities such as over-heat, burn smell, or smoke.
- 4) At the moment you may find nothing displayed on LCD. Don't be disappointed. You need to set correct contrast for the LCD. Get a small flat screw driver and tune POT1 until clear display is obtained (Fig. 9).
- 5) Try the buttons and rotary encoder to see if they are all working.
- 6) Now if you have an oscilloscope you can check waveforms at the output.

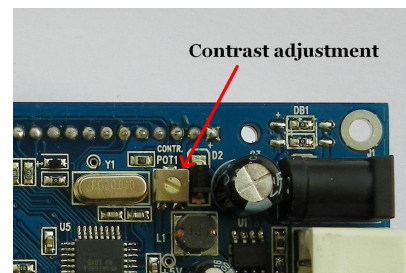


Fig. 9

If all are normal **congratulations! You have your work done!** You can start to use the instrument for your experiments.

### In Case You Have Problem

If you encounter problems during assembling the kit you can ask for assistance by writing email to [support@jyotech.com](mailto:support@jyotech.com), or to get help by posting your problems to appropriate forums at <http://forum.jyotech.com>.

**Revision History**

<b>Version</b>	<b>Date</b>	<b>Summary</b>
v01	2011.05.24	First created
v02	2012.02.02	Corrected typo error at top of first page. Thank you Kevin ( <a href="http://www.ve3syb.ca/">http://www.ve3syb.ca/</a> ) from Canada for pointing out that.