

Voice-Controlled LED Music Spectrum Kit (HU-052) Assembly and Operating Manual

Introduction

This is a DIY electronic kit designed for **soldering practice** and to create a functional **voice-controlled LED music spectrum display**. The device picks up ambient music via a built-in microphone/vibration pickup, analyzes its spectrum, and displays the audio visualization using a vibrant LED matrix.

1. Kit Overview and Components

The kit consists of a Printed Circuit Board (PCB), various electronic components (resistors, LEDs, integrated circuits, capacitors, microphone, buttons, and a potentiometer), and a clear acrylic case. The main components on the board include a single-chip microcomputer, a vibration pickup/microphone, and an array of LEDs.

2. Assembly Instructions (Soldering)

Tools Required: Electric Soldering Iron, Solder Wire, Pliers/Cutters, Multimeter (Recommended), Safety Goggles.

Assembly Note: Install components from shortest to tallest, following the provided **Circuit Principle and Component Distribution Diagram**. The component outlines are printed directly on the PCB.

- Solder Low-Profile Components:** Solder the smaller components first:
 - Resistors:** Place and solder all resistors (R1-R13) in their designated locations. *Note: Check the resistance values against the circuit diagram to ensure they are in the correct place.*
 - Diodes/Capacitors:** Solder the small ceramic capacitors (C1-C4). Pay attention to the polarity of any electrolytic capacitors (e.g., C470uF) if present—the long lead is usually positive (+).
- Solder the Integrated Circuit (IC) Socket:** Solder the socket for the main chip (STC15F2K60S4AA) to the PCB. *Note: Ensure the notch on the socket aligns with the notch marked on the PCB.*
- Solder the LEDs:** This is the most time-consuming step. Solder all **direct plug LEDs** in their respective matrix positions. *Crucial: LEDs are polarized. The longer lead is the anode (+) and the shorter lead is the cathode (-). Match the flat side/shorter lead to the corresponding marking on the PCB.*
- Solder Control Components:**
 - Potentiometer (RP1):** Solder the variable resistor RP1 (for pickup sensitivity) in its location.
 - Microphone:** Solder the **High Sensitivity Microphone (MCL1)**.

- **SW1 Key:** Solder the tactile switch (SW1 key).
 - **Power Interface:** Solder the USB power interface (P1).
5. **Install the Integrated Circuit (IC):** Carefully insert the main IC chip into its soldered socket. *Ensure the notch on the chip aligns perfectly with the notch on the socket/PCB.*
 6. **Case Assembly:** Once soldering is complete and you've visually inspected all joints, assemble the clear acrylic shell around the PCB using the provided hardware (spacers, screws).

3. Operating Instructions

1. **Power On:** Insert the USB cable into the device; it will be powered on and enter the working state.
2. **Adjust Initial Sensitivity:** Adjust the **pickup sensitivity** for the microphone using the **RP1 knob**.
3. **Access Settings:** The SW1 key is used to adjust the display's parameters.
 - **Long press SW1** to switch the setting item (e.g., Channel Selection, Display Refresh Rate, Sensitivity Settings, Sampling Frequency Setting).
 - **Short press SW1** to select the parameter/value within the current setting item.

4. Setting Options and Parameters

Operating Mode	Screen Display	Parameter	Function Setting Description	Factory Value
Channel Selection	Voice	1	Mono	2
		2	Dual Channel	Dual-Channel
Port Input Location	Left	1	Left and right-channel display in mono mode, audio signal from left channel	1 Left and Right Position
		2	Right and left-channel display in dual-channel mode, right side shows right channel, left side shows left channel	
Display Refresh Rate	Show	1	Display refresh rate is the fastest	2 Faster Speed
		2	Display refresh rate is faster	

		3	Display refresh rate is slower	
		4	Display refresh rate is the slowest	
Sensitivity Settings	Spirit	1	The least sensitive to audio response	2 Medium Sensitivity
		2	Medium sensitivity	
		3	The most sensitive to audio response	
Sampling Frequency Setting	Pick	1	Lower frequency sampling	1 Low Frequency Sampling
		2	Higher frequency sampling	

Important Note on Mono/Dual Channel: In Mono mode, the chip detects only one input signal. To accommodate the audio input, the spectrum display needs to be changed so the chip can detect the signal if the screen does not display the spectrum when the signal is mono.