Product Specification for

Telink 825x Dual-Mode Keyboard

PS-19100900-E1

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Key Words:

BLE mode; 2.4GHz Mode; Features; Specifications; Reference Design

Brief:

This document is a product specification for the BLE/2.4GHz dual-mode keyboard based on the TLSR825x SoC series of Telink. It introduces the basic features and specifications of the product, the specifications in 2.4GHz mode, the specifications in BLE mode, and the reference design.

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Revision History

Version 0.1 (2019-10-09)

This is the Initial release.

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1. Basic Features

The Telink BLE/2.4GHz dual mode keyboard is a wireless keyboard based on the TLSR825x chip. It supports BLE (Low Power Bluetooth) and normal 2.4GHz wireless mode.

1.1 Number of Channels

The dual-mode keyboard product operates in the 2.4 GHz ISM band with a frequency range of 2400 to 2480 MHz. In 2.4GHz mode, there are 8 channels, as shown in Table 1-1 (unit: MHz):

Table 1-1 Frequency list

2,405	2,413
2,422	2,430
2,440	2,450
2,460	2,470

In BLE mode, standard 40 channels are supported.

1.2 Channel bandwidth

In 2.4GHz mode, the bandwidth is 2MHz.

In BLE mode, the bandwidth is 1MHz.

1.3 System Compatibility

In 2.4GHz mode, dual-mode keyboard products support the following operating systems: WinXP/Win7/Win8/Win 10/Linux/Mac OS.

In BLE mode, dual-mode keyboard products can only be used under operating systems that support BLE keyboards, such as Win7/Win8/Win10/iOS10/Andriod5.0 and above.

1.4 RF Transmit Power

The RF transmit power of the dual-mode keyboard product can reach up to 8dBm without the addition of an RF power amplifier.

2. Basic Specifications

2.1 Operating Voltage

Dual-mode keyboard products support dual-battery (3V) and single-cell (1.5V) power supply according to different hardware circuits. See the reference schematics for details.

2.2 Transmission Distance

The transmission distance supported by the BLE/2.4GHz dual-mode keyboard is related to its current working mode, as shown below:

- ✧ Supports transmission distances up to 25 meters in 2.4GHz mode;
- ✧ BLE mode can support transmission distances up to 18 meters.

2.3 Keyboard Matrix

The current matrix is an 8*18 matrix

2.4 Key Function

The dual mode keyboard uses 106 buttons.

2.5 Mode switching

The keyboard's initial default mode is 2.4GHz mode. Each time when switching mode, the keyboard saves the current mode to Flash and uses the number of times the LED flashes to indicate the current mode. The LED indicator flashes once, indicating that the keyboard has entered 2.4GHz mode; the LED indicator flashes 2 times, indicating that the keyboard has entered BLE mode.

2.6 Pairing Method

In Bluetooth mode, press and hold the FN+F1 button for 2 seconds to enter the pairing. The light flashes and pairs, when the pairing is successful, the light will be off, entering the connection state, when the pairing time is longer than 1 minute, the keyboard will enter sleep state.

In 2.4G mode, the keyboards supports code-free mode. Any keyboard and any dongle can be paired after power-on. Dongle only allows pairing within 1 minute after power-on. After power off, you can recombine the keyboard and dongle, just power up the keyboard and Dongle.

In 2.4G mode, press and hold the FN+W button for 2 seconds to enter the code mode. The light flashes and pairs, when the pairing is successful, the light will be off, entering the connection state, when the pairing time is longer than 1 minute, the keyboard will enter sleep state.

2.7 Low Voltage Alarm Function

The dual mode keyboard supports low voltage alarms. In the case of dual battery operation, the low voltage alarm threshold is set to 2.2V. With single battery, the threshold for the low voltage alarm is set to 1.1V. Customers can modify the threshold according to specific usage requirements.

Regardless of whether the keyboard is in use or at rest, as long as the battery voltage drops below the low voltage alarm threshold, the indicator will flash 3 times at 4 Hz.

2.8 EMI Test Mode

When the dual-mode keyboard is in 2.4GHz mode, you can enter EMI mode for frequency and frequency offset tests.

In 2.4GHz mode, press the E key for 1 second, release all the keys to enter the EMI test mode.

After entering the test mode, the frequency and mode can be switched. The dual-mode keyboard supports three test modes and three test frequency points.

1. Press F1-F4, F5-F8, F9-F12 to switch modes respectively: Carry mode--> Carry + Data (referred to as CD mode)--> RX mode-->TX mode;
2. F1-F4 indicates that the switching mode is performed at 2405 MHz.

   F5-F8 indicates that the switching mode is performed at 2430 MHz.

   F9-F12 indicates that the switching mode is performed at 2470 MHz.

2.9 OTA Function

In BLE mode, the keyboard supports the OTA function, that is, the user can update the keyboard to the latest firmware program (FW) through a series of operations.

2.10 Encryption

Bluetooth mode supports AES encryption of the Bluetooth standard protocol.

2.4G mode supports AES128 encryption. During normal use of the keyboard, the keyboard data is encrypted by AES128. During the production process, the user can burn his own private key to prevent others from monitoring the keyboard data.

3. Power Consumption Parameter

The 2.4GHz keyboard supports a two-level power saving mode as following:

Table 3-1 2.4GHz Mode Power Saving-Mode and Wake-up

Power Saving Mode	Method to Enter Power Saving Mode	Wake up Method
Power Saving	Release all Buttons	Press any button
Deep Sleep	The keyboard enters deep sleep mode after 10 minutes of inactivity	Press any button

When using the reference design and dual-cell dry battery, the typical operating current is shown in the following table.

Table 3-2 Keyboard Current

Working Mode	Normal Work	Quickly press various keys	Press single button	Suspend (mA)	Deepsleep (uA)
BLE Mode	0.9-1.62mA	1.65-1.72mA	0.07-1.14mA	0.06-0.11mA	0.3uA
2.4G Mode	0.7-1.6mA	1.35-2.26mA	0.33-0.36mA	0.08-0.1mA	0.3uA