

Manufacturer: Huizhou Sanpin Intelligent Manufacturing Co., Ltd.

Model: AK1750W

(German Layout with 7-Character L-Shaped Enter Key)

User manual Version: V1.3

Target Clients: Overseas Brand Distributors, Cross-Border E-Commerce, Offline Peripheral Channels

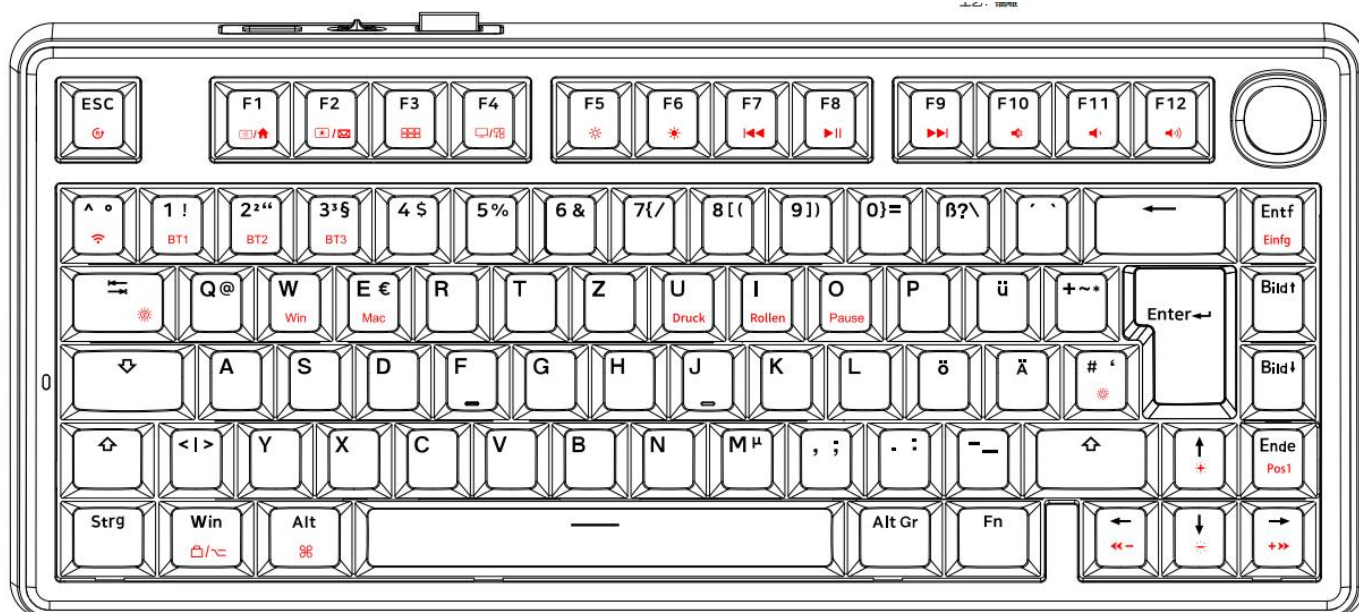
Document Purpose: Business Communication, Product Parameter Verification, Project Implementation Reference

## 1. Product Overview

### 1.1 Product Positioning

AK1750W is a 75% layout 3-mode mechanical keyboard with rotary knob targeted at overseas office users, cross-border retail buyers and global custom keyboard enthusiasts. It features a standard German L-shaped 7-character Enter key layout, pre-installed universal open-source QMK firmware, supporting wired USB, 2.4G wireless and Bluetooth 5.x seamless switching. Equipped with a multi-functional multimedia rotary knob, it natively supports Windows/macOS/Linux operating systems.

Built with authentic German keycaps layout including special German characters ß, ä, ö, ü, it meets office and gaming demands for Germany, Austria and other Central European markets.



### 1.2 Core Advantages

#### 1. Dual-Chip Stable RF Solution

Adopts RDM026R7L 32-bit main control MCU + RDM91680 2-in-1 RF chip, integrating Bluetooth, 2.4G wireless, USB communication and RGB lighting driver. High integration, excellent power consumption control and strong anti-interference performance, effectively solving frequent disconnection and high latency caused by multi-device co-frequency interference.

#### 2. Global Standard Open-Source QMK Firmware

Equipped with universal QMK bottom firmware, compatible with VIA visual key remapping tool at official website USEVIA.APP. No client software required; full keyboard customization

via browser. Uniform operation logic for global peripheral ecosystem with no regional adaptation limitations.

Fully compatible OS: Windows XP/7/8/8.1/10/11 (32/64-bit), all macOS versions, all Linux distributions. Supports full key remapping, multi-layer key layers, custom macros, rotary knob customization and single-key lighting adjustment.

### **3. Seamless 3-Mode Multi-Device Switching**

a. Wired Type-C: Low-latency gaming mode

b. 2.4G Wireless: Zero-latency office mode

c. Bluetooth: Pair up to 3 devices (phones/tablets/computers) simultaneously

One-click channel switch, auto memory of paired devices and automatic reconnection after disconnection.

### **4. Standard German L-Shaped 7-Character Enter Layout**

81-key 75% compact layout with standard German L-shaped large Enter key and dedicated German character keys (ß, ä, ö, ü). Fully compliant with commercial peripheral standards in German-speaking regions for plug-and-play without extra remapping.

### **5. Integrated Multimedia Rotary Knob**

Independent aluminum rotary knob occupying no extra key space. Rotate to adjust system volume; press to play/pause audio/video. Customizable rotation steps and layered functions via QMK firmware on USEVIA.APP.

### **6. Full N-Key Rollover (NKRO)**

Auto switches between 6-key and full NKRO modes. No missing keystrokes during gaming multi-key presses, stable recognition for office shortcut combinations.

### **7. 46 Dynamic RGB Light Effects + 8 Static Backlight Colors**

46 built-in dynamic lighting modes including stream, breath, key trigger, raindrop, ripple, spectrum gradient, etc. 5 adjustable brightness levels and 5 adjustable animation speed levels. Independent single-key RGB customization via USEVIA.APP. Built-in power indicator light and red low-battery warning light.

### **8. Full Parameter Power-Off Memory**

All settings are automatically saved after power off/shutdown: light mode/brightness/speed, system mode, paired Bluetooth devices, VIA custom key layers, macro definitions, Win lock status. All configurations restore automatically on startup.

### **9. Dual-System Hardware Switch Indicators**

One-click Windows/Mac switch with dedicated CAPS lock indicator and Win lock indicator. Independent streamer lights for Bluetooth/wired/2.4G channels for clear operation feedback.

### **10. Complete Overseas Compliance Certifications**

Comes factory-certified with CE, FCC, KCC to meet cross-border sales access requirements for EU, North America and South Korea.

## **1.3 Application Scenarios**

a. Cross-border E-commerce & ODM/OEM Custom Projects for Germany, Austria and Central Europe

b. German Text Office Workers, Designers, Video Editors & Copywriters

c. Lightweight Gaming, Multi-Device Mobile Office (PC/Tablet/Phone)

d. Global QMK Custom Keyboard Enthusiasts, Linux Creators & Peripheral Hobbyists

## 2. Core Hardware Configuration

### 2.1 Main Control & RF Chips

- a. Main MCU: RDM026R7L (natively compatible with global QMK + VIA web driver USEVIA.APP)
- b. RF Chip: RDM91680 (integrated 2.4G wireless + BLE Bluetooth dual-mode RF)

### 2.2 Communication Channel Parameters (Customizable)

- a. Wired USB Mode: Default VID/PID, compatible with USB1.0/1.1/2.0, backward compatible with USB3.0
- b. 2.4G Wireless Mode: Default VID/PID
- c. Bluetooth Device Name: Factory default, brand name customizable on demand

### 2.3 Layout & Key Specifications

- a. Total Keys: 81
- b. Layout: Standard German L-shaped 7-character Enter 75% compact layout
- c. Switch Base: Standard MX mechanical switch socket
- d. Anti-ghosting: Full N-Key Rollover, auto switch between 6-key & full NKRO

### 2.4 Status Indicator Definitions

- 1. CAPS Lock: White steady light on corresponding key
- 2. FN+Win Win Lock: White steady light on Win key (Windows exclusive)
- 3. Channel Streamer Lights:
  - a. Bluetooth Channel 1: Blue | Bluetooth Channel 2: Cyan | Bluetooth Channel 3: Orange
  - b. Wired Mode: White stream light
  - c. 2.4G Wireless Mode: Green stream light

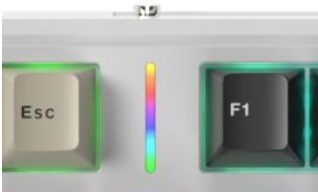
## 3. Appearance & Structure Description

### 3.1 Top-Right Multimedia Rotary Knob



Independent integrated aluminum rotary knob without occupying key space. Global volume/multimedia control; expandable functions customizable via USEVIA.APP.

### 3.2 Front Vertical RGB Ambient Light Strip



Vertical independent RGB light strip between ESC and F1, synchronized with all 46 dynamic light effects for enhanced desktop atmosphere.

## 4. Basic Keyboard Specifications

### 4.1 3-Step Power Switch

- a. Left Gear: Bluetooth Mode (Switch channels via Q/W/E)
- b. Middle Gear: Type-C Wired USB Mode (Simultaneous charging & data transmission)
- c. Right Gear: 2.4G Wireless Receiver Mode

## **4.2 Windows/Mac System Switch Logic (Factory Default: Windows)**

1. Long press FN+A for 3s → Switch to Windows, white light flashes once as confirmation
2. Long press FN+S for 3s → Switch to macOS, white light flashes once as confirmation
3. Memory Rule: System selection retained after power off; factory reset only clears key/light settings without forced system switch

## **4.3 Factory Default Lighting Parameters**

- a. Default Dynamic Effect: Drifting Wave
- b. Base Static Color: Rainbow Cycle
- c. Backlight Brightness: Max Level 5
- d. Animation Speed: Fastest Level 5

## **5. Complete 3-Mode Connection Operation Guide**

### **5.1 Bluetooth Mode (Switch to Left Gear)**

1. Channel Switch: Short press FN+Q (BT1) / FN+W (BT2) / FN+E (BT3), corresponding indicator flashes 1Hz waiting for reconnection
2. Pairing: Long press FN+1/FN+2/FN+3 for 3s, indicator flashes 2Hz to enter pairing state
3. Connection Success: Indicator stays steady for 3s then returns to stream light mode
4. Timeout Rule: Auto sleep if no device connected within 3 mins; light stops flashing after 20s disconnection without reconnection
5. Memory Mechanism: Auto restore last paired Bluetooth device when switching modes, no repeated pairing required

### **5.2 2.4G Wireless Mode (Switch to Right Gear)**

1. Standby: Green indicator flashes 1Hz, light auto-off after 20s inactivity
2. Receiver Re-Pair: Long press FN+R for 3s, green light flashes 2Hz for pairing
3. Connection Success: Green light stays steady for 3s then returns to stream mode
4. Disconnection Reconnect: Green light slow flashes for reconnection attempt; stop flashing after 20s failure

### **5.3 Wired USB Mode (Switch to Middle Gear)**

Insert Type-C cable, white indicator stays steady for 3s and enters low-latency wired mode with battery charging enabled. USEVIA.APP keyboard customization only available under wired connection.

### **5.4 Universal Wireless Sleep Rules**

Under Bluetooth/2.4G wireless mode, keyboard enters standby with all backlights and indicators off after 3 mins of idle; press any key to wake lighting and wireless connection instantly.

## **6. Rotary Knob Function Definition**

Rotary knob at top-right corner with unified logic for Windows/Mac/Linux:

1. Clockwise Rotate: Increase system volume
2. Counterclockwise Rotate: Decrease system volume
3. Short Press Knob: Play / Pause audio/video

Expandable functions: Customize rotation steps, independent layered knob functions and logic via USEVIA.APP web driver.

## **7. FN Combination Shortcut Full Reference Table**

## 7.1 Multimedia Shortcuts

| Combination | Windows Function  | macOS Function               |
|-------------|-------------------|------------------------------|
| Fn+F1       | Open Media Player | Decrease Screen Brightness   |
| Fn+F2       | Volume Down       | Increase Screen Brightness   |
| Fn+F3       | Volume Up         | Mission Control (Control+ ↑) |
| Fn+F4       | System Mute       | Launchpad (Alt + Space)      |
| Fn+F5       | Stop Playback     | Reserved Unassigned          |
| Fn+F6       | Previous Track    | Reserved Unassigned          |
| Fn+F7       | Play / Pause      | Previous Track               |
| Fn+F8       | Next Track        | Play / Pause                 |
| Fn+F9       | Open Mail Client  | Next Track                   |
| Fn+F10      | Browser Homepage  | Mute Audio                   |
| Fn+F11      | This PC           | Volume Down                  |
| Fn+F12      | Calculator        | Volume Up                    |

## 7.2 Wireless Device Management Shortcuts

| Combination | Function Description                                         |
|-------------|--------------------------------------------------------------|
| Fn+Q        | Short press to switch Bluetooth Channel 1 (Blue Indicator)   |
| Fn+W        | Short press to switch Bluetooth Channel 2 (Cyan Indicator)   |
| Fn+E        | Short press to switch Bluetooth Channel 3 (Orange Indicator) |
| Fn+R        | Long press 3s to re-pair 2.4G receiver                       |

## 7.3 System Lock & Battery Check

| Combination                  | Function Description                                            | Compatible OS                           |
|------------------------------|-----------------------------------------------------------------|-----------------------------------------|
| Fn+Win                       | Toggle Win key lock/unlock; light on = locked                   | Windows only, auto unlock after restart |
| Long press Fn + Space for 3s | Factory reset, clear all QMK custom key layers, lights & macros | Windows/macOS/Linux Universal           |
| Fn+Backspace                 | Check remaining battery under                                   | All OS Universal                        |

| Combination | Function Description | Compatible OS |
|-------------|----------------------|---------------|
|             | wireless mode        |               |

#### 7.4 RGB Backlight Control (All Modes Universal)

| Combination | Function Description                        | Adjustable Parameters                                       |
|-------------|---------------------------------------------|-------------------------------------------------------------|
| Fn+Entf     | Cycle through 46 dynamic backlight effects  | Factory default: Drifting Wave                              |
| Fn+Einfo    | Cycle static backlight colors               | 8 colors:<br>Red→Orange→Yellow→Green→Cyan→Blue→Purple→White |
| Fn+~        | Master backlight toggle (On/Off all lights) | No gear adjustment                                          |
| Fn+↑        | Increase backlight brightness               | 5 levels (1 lowest / 5 brightest)                           |
| Fn+↓        | Decrease backlight brightness               | 5 levels (1 lowest / 5 brightest)                           |
| Fn+←        | Slow down dynamic light animation speed     | 5 levels (1 slowest / 5 fastest)                            |
| Fn+→        | Speed up dynamic light animation speed      | 5 levels (1 slowest / 5 fastest)                            |

### 8. RGB Backlight Control System

#### 8.1 Light Effect Specifications

46 built-in dynamic RGB effects covering office static, gaming dynamic, showcase stream and key trigger scenes, including drifting wave, spectrum gradient, multi-layer breath, raindrop diffusion, ring ripple, neon flow, wave rhythm, etc.

#### 8.2 Adjustable Lighting Parameters

1. Dynamic Effects: Cycle through 46 modes
2. Static Single Color: 8 colors + White (Red, Orange, Yellow, Green, Cyan, Blue, Purple, White)
3. Backlight Brightness: 5 adjustable levels
4. Animation Speed: 5 adjustable levels
5. Expansion: Visually set single-key RGB lights and independent layered effects via

USEVIA.APP. All lighting parameters auto-saved after power off.

## **9. Battery, Charging & Low-Voltage Warning Mechanism**

### **9.1 Battery Voltage Warning Standard**

1.Low Battery Threshold: Battery voltage <3.2V, Spacebar red light slow flashes to prompt charging

2.Charging Status: Spacebar red light steady on when Type-C charging cable connected

3.Fully Charged: Spacebar light syncs with global RGB backlight after full charge

### **9.2 Battery Level Indicator Logic (Wireless Mode Only)**

Press Fn+Backspace to temporarily turn off all backlights; numeric keys 1~0 light up segmentally to display remaining battery:

a. Only 1 lit = 10%; 1+2 lit = 20%; up to all 1~0 lit = 100% Color grading rules:

b.  $\leq 30\%$ : Red light

c.  $31\% \sim 50\%$ : Yellow light

d.  $51\% \sim 100\%$ : Green light

## **10. Power Management, Sleep & Memory Logic**

### **1.Full Parameter Power-Off Memory**

All settings saved automatically after power off/shutdown: lighting parameters, system mode, paired Bluetooth devices, USEVIA.APP custom key layers, macros, Win lock status. All configurations restore on startup.

### **2.Host Linked Sleep**

Keyboard sleep synchronizes with computer system; wake keyboard automatically when PC wakes up.

### **3.Auto Wireless Standby**

Bluetooth/2.4G enters light-off standby after 3 mins idle; wake instantly with any key press.

### **4.Channel Device Memory**

Auto restore last successfully connected wireless device when switching between Bluetooth/2.4G gears, no repeated pairing needed.

## **11. Electrical Protection, Safety & OS Compatibility**

### **11.1 OVP Overvoltage Hardware Protection**

1.Normal Operating Voltage: USB input  $4.2V \sim 5.5V$  for stable operation

2.Overvoltage Protection Range: Input  $5.6V \sim 30V$ , keyboard auto cuts power to hardware protection state

3.Permanent Damage Threshold: Input voltage  $>30V$  will permanently damage post-stage circuit; overvoltage power supply prohibited

### **11.2 Fully Compatible Operating Systems**

Windows XP/7/8/8.1/10/11 (32/64-bit), all macOS versions, all Linux distributions. All OS browsers support USEVIA.APP web driver for remapping, lighting, macro and rotary customization.

### **11.3 Global Unified QMK+VIA Web Driver**

1.No PC client software download required; official online configuration site: USEVIA.APP

2.Operation Prerequisite: Keyboard wired to PC, open website via Chrome/Edge browser for automatic device recognition

3. Supported Functions: Multi-layer key mapping, custom macros, Tap Dance, Mod-Tap, rotary knob customization, independent single-key RGB adjustment, 46 light effect preview
4. Open-Source QMK Bottom Firmware: Base firmware source code available from manufacturer; customizable Bluetooth name, PID/VID, factory default key layers & light effects
5. Global unified UI without regional limitations, suitable for worldwide custom keyboard market

11.4 Interface Standard

USB Type-C reversible plug, compatible with USB2.0 full-speed transmission; charging, data transfer and VIA configuration all via single cable.

12. Electrical Performance Parameters (Mass Production Tested Current)

12.1 Basic Electrical Specifications

| Item                        | Standard Spec    | Remarks                                          |
|-----------------------------|------------------|--------------------------------------------------|
| Rated Operating Voltage     | DC 5V $\pm$ 0.5V | Standard USB Power Supply                        |
| Operating Temperature Range | -10℃ ~ 60℃       | Standard indoor office environment               |
| Wired USB Polling Rate      | 1000Hz           | Low-latency gaming, configurable via USEVIA. APP |

12.2 Tested Operating Current for 3 Modes

Wired USB Mode

| Working State                        | Tested Current |
|--------------------------------------|----------------|
| Full White Backlight Max Brightness  | 172mA          |
| Regular Dynamic Light Effect Enabled | 110mA          |
| All Backlights Off                   | 13mA           |

Bluetooth Wireless Mode

| Working State                        | Tested Current |
|--------------------------------------|----------------|
| Full White Backlight Max Brightness  | 208mA          |
| Regular Dynamic Light Effect Enabled | 125mA          |
| All Backlights Off                   | 15mA           |

2.4G Wireless Mode

| Working State | Tested Current |
|---------------|----------------|
|---------------|----------------|

| Working State                        | Tested Current |
|--------------------------------------|----------------|
| Full White Backlight Max Brightness  | 205mA          |
| Regular Dynamic Light Effect Enabled | 124mA          |
| All Backlights Off                   | 15mA           |

### 13. Development Cycle, Delivery & Supporting Services

- 1.PCB Layout Design: 7 working days
- 2.Global Standard QMK+VIA Firmware Adaptation & Debugging (Compatible with USEVIA.APP): 7 working days
- 3.Full German L-shaped Enter Layout Keyboard Development Cycle (Excluding Shell & Keycap Molding): 7 working days
- 4.Customizable Content: Bluetooth device name, PID/VID, default light effects, factory German key mapping, QMK base preset parameters, VIA preset UI
- 5.Value-Added Customization: Keycap silk printing, shell structure, hot-swappable socket solutions with separate development cycle evaluation

### 14. Reliability, Test Standards & Compliance Certifications

#### 14.1 Reliability Test Items

Full industry-standard peripheral reliability testing: Key stroke life test, 72-hour RGB light aging test, 72-hour continuous wireless connection test, high-low temperature cycle test, Type-C plug durability test, German Enter key structure durability test, full functional test of USEVIA.APP online configuration.

#### 14.2 Safety & Compatibility Certifications

- 1.Standard Mandatory Certifications: CE, FCC, KCC to meet cross-border sales requirements for EU, North America and South Korea
- 2.Optional Value-Added Tests: USB-IF, WHQL, macOS compatibility dedicated testing

### 15. Warranty Policy

- 1.Standard 12-month full keyboard warranty
- 2.Warranty Coverage: Original hardware failures of main MCU, RF radio, RGB lighting, charging circuit and German Enter key structure
- 3.Non-Warranty Items: Water damage, high voltage burnout, forced disassembly, scratched/damaged shell & keycaps caused by human factors
- 4.Software Support: Lifetime free USEVIA.APP web tool update adaptation, free firmware minor adjustment service

### 16 Usage Precautions

- 1.To customize keys, lighting or rotary functions, switch keyboard to wired USB mode and access the website via browser.
- 2.Do not use adapters with output voltage over 5.5V for charging to avoid overvoltage protection trigger; input voltage >30V will permanently damage keyboard circuits.
- 3.Toggle wireless switch off for long-term idle storage to reduce battery consumption.
- 4.Slow flashing red spacebar light indicates low battery; charge promptly to prevent deep discharge and shorten battery lifespan.

5. USEVIA. APP configuration unavailable under wireless modes; customization only supported with wired connection.
6. Long press Fn + Space for 3s to factory reset will clear all USEVIA. APP custom key layers, macros and lighting parameters; confirm configuration backup before operation.
7. Keep keyboard away from high-power RF devices such as routers and Bluetooth speakers during wireless use to reduce signal interference.

#### FCC WARNING

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.