

# Bluetooth Keyboard Adapter BT-400

## User Manual (Firmware Version 4.0)



Thank you for purchasing our product. This is all new Bluetooth Keyboard Adapter version 4.0 with several enhancements over previous versions:

- Based on Bluetooth 4.0 (Bluetooth Low Energy or BLE) with reduction in power consumption and fast connection time.
- Works with all types of hosts including Mac, iPad, iPhone, Android tablets and smartphones and all versions of Windows, as long as they have Bluetooth 4.0.
- Compatible with all types of USB keyboards including those with a built-in hub (e.g., Happy Hacking, DAS, Apple, Dell) and keyboard/trackball combos (both the keyboard and trackball will work).
  - For keyboards with a built-in hub: there cannot be other devices connected to the hub.
  - Does not work with a keyboard/trackball combo AND a built in hub (e.g., Periboard-505 Plus)
- Compatible with all PS2 keyboards including IBM Model M
- Compatible with all PS2 mice and the majority of USB mice. Scroll wheel currently does not work.
- PS2 port: auto detect keyboard and mouse/ No configuration is necessary. Also supports 4 GPIO switches which can be set up to trigger arbitrary key outputs.
- No keycode pairing: pairing just works without typing in any code.

### 1. LED indicators:

Red LED (for charging and battery status)

If power charger is plugged in: on when battery is charging. Off when battery is fully charged.

If power charger is *not* plugged in: blinks when battery is low (below 3.5V, Settable). Otherwise off.

Blue LED (for Bluetooth connection status)

Blinks slowly (once per 2 seconds) when the adapter is connected to a host.

Blinks fast (once per second) when the adapter is not connected to a host.

Blinks very fast (twice per second) when the adapter is in command mode.

2. The mini USB port is for battery charging only. You can use any wall USB charger or PC to charge the battery.
3. The PS2 and USB ports can be used at the same time. Maximal combined current should not exceed 200mA. Note the PS2 port is *NOT* hot pluggable. You must turn off the adapter before inserting or removing a PS2 keyboard or mouse.
4. If the adapter is not connected to a host, during the first 30 seconds after it is turned on, it will advertise its present and become available for pairing as in the following process.
  - Turn on the adapter with or without a keyboard connected. Blue LED should start flashing fast.
  - On the host, search for Bluetooth devices. The name of the adapter is *ADAPTER\_nnnn* where *nnnn* is the last 4 of its MAC address.
  - When the host finds the adapter, select it and do "pair". If pairing succeeds, the adapter will then be connected to the host and ready to be used.

Pairing is done only once. Next time when the adapter is turned on, it will connect to the paired host if it is available.

If you like to pair the adapter with a different host, you *must* unpair it from the current host first before pairing the new one. Erasing all paired devices in the adapter itself (the `device clear` command) will *not* erase the bonding. If you pair a new host without unpair the old one first, and if both hosts are turned on at the same time, unexpected behavior may happen.

**Command mode:** command mode is used to configure adapter features. To enter command mode, pair the adapter with a host. Open a text app (i.e., Notes, Notepad). Make sure when you type on the keyboard, the text enters into the App. Press and hold the power button for about 2 seconds. The following text will be emitted:

```
BT KB Adapter Firmware v4.0
2017 Handheld Scientific, Inc.
Type help or ?
>
```

Now the adapter is in command mode. Press the power switch again to exit. In command mode, key strokes are interpreted by the adapter as commands. Output is directed to the host. Commands are all lower cases and terminated by Return or Enter. They need to be typed in exactly as shown below. Due to resource constraint, the parser may not give detailed error if it does not under a command. Enter “help” or “?” for a list of commands which may change from one firmware version to another. The following is all available commands in firmware version 2.0.

`show` -- Display useful adapter information such as battery voltage, USB output voltage and settings.

`save` -- Save changes so they will persist across power cycles.

`exit` -- Exit command mode. Same as pressing the power button.

`device clear` -- clear paired devices in the adapter. This will speed up startup re-connection.

`reboot` -- Restart adapter. Same as power cycle.

`set bt name [name]`  
Set the device name to name .

`set keycode [on|off]`  
Display USB key events. For information or debugging purpose. Each key press generates two events: key down and up. Each event is represent by 8-bytes. Press power button to exit key code display and back to command mode.

`set time idle_shutdown [time]`  
Set idle (inactivity) shutdown time. Value 0 disables this feature. Example: `set time idle_shutdown 900` (set idle shutdown time to 900 seconds or 15 minutes)

`set voltage low_bat_shutdown [voltage]`  
Set low battery shutdown voltage. Value 0 disables this feature. Example: `set voltage low_bat_shutdown 3.4` (set voltage to 3.4)

`set map keypad_enter [on|off]`  
Turn on/off mapping of keypad Enter key to normal Enter key. The Enter key in the numeric keypad generates a different key code than the normal Enter key. iOS devices do not interrupt this key code correctly. This configuration fixes the issue.

`keepalive`  
Display keep-alive settings. If keep-alive is enabled (period is non-zero), the adapter will send out key strokes periodically. This is useful in preventing the host from falling into sleep or network from timing out due to inactivity. There are 3 settings related to keep-alive: period and key.

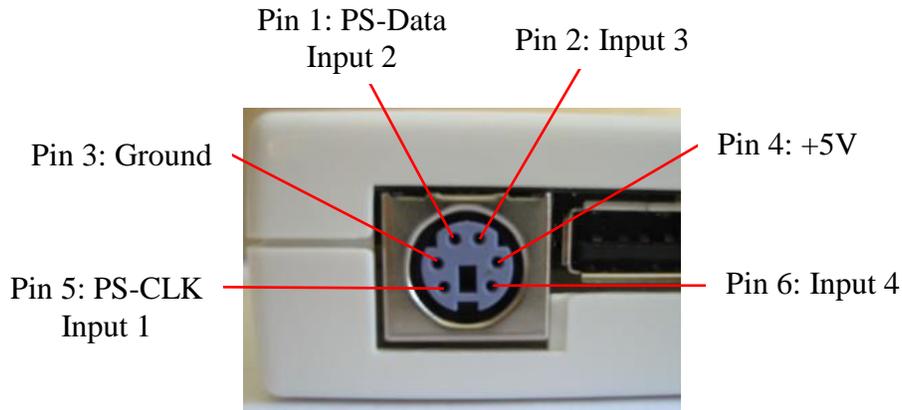
`keepalive period [time]`  
How often keys are sent (in second). Value 0 disables the feature. Example: `keepalive period 60` (set period to 60 seconds)

`keepalive key`  
Set the keys to be sent. After issuing this command, press the key(s) to be sent. Usually one key is enough but you can use up to 4 keys. Each key press will generate two events: key down and key up. Press the power button to end input.

**Restore to factory defaults (applicable to firmware version 2.1):** press and hold the power button for more than 10 seconds (it will enter Command Mode after 2 seconds. Ignore that and continue to hold). The device will eventually turn itself off. Upon next reboot, all configurations will be restored to factory defaults. Paired devices are cleared.

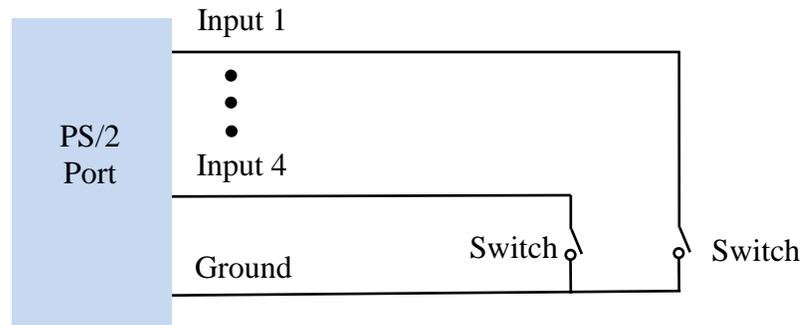
**Turning the PS/2 port into a general input port:**

The PS/2 port can be re-configured as 4 input lines. Each line can trigger a key sequence to be sent to the host. The key sequences are configurable. The following diagram shows the input pinout.



PS/2 port pinout configured as input

To trigger the key sequence, connect a switch from a pin to ground. There is internal pull-up (about 20K) so no external pull-up is necessary. If the cable is long, add a 0.1-1uF capacitor to suppress noise.



PS/2 port connection as input

All PS2 port related commands start with “ps2”.

```
ps2 set mode [kb|input]
```

Set PS/2 port to normal keyboard mode or input mode. Example: ps2 set mode input sets the PS/2 port to input mode. After changing mode, save the change (using the “save command”) and re-start the adapter (turn it off and then on).

```
ps2 show [input1|input2|input3|input4]
```

Show the key event configuration of the respective input. For instance, ps2 show input1 displays the following key events:

```
[00 00 1E 00 00 00 00 00]
[00 00 00 00 00 00 00 00]
```

This will send character "1" to the host when the switch connected to input 1 is pressed. By default, input1-4 is configured to send single character 1,2,3,4, respectively.

```
ps2 set [input1|input2|input3|input4]
```

Set the key events for the specific input line. For instance, if you would like the adapter to send out "start" to the host when the switch connected to input2 is pressed, follow those steps: type in `ps2 set input2`, the adapter responds with:

Key input mode is KB.

Press power button on device to end input.

Now press the keys "start" and the adapter responds:

```
[00 00 16 00 00 00 00 00]
[00 00 00 00 00 00 00 00]
[00 00 17 00 00 00 00 00]
[00 00 00 00 00 00 00 00]
[00 00 04 00 00 00 00 00]
[00 00 00 00 00 00 00 00]
[00 00 15 00 00 00 00 00]
[00 00 00 00 00 00 00 00]
[00 00 17 00 00 00 00 00]
[00 00 00 00 00 00 00 00]
```

Input is done. 10 key events recorded.

Exit command mode. Press the switch connected to input2 and the adapter will send out "start" to the host.

Send us questions and comments: [support@handheldsci.com](mailto:support@handheldsci.com). We love to hear from you!