

BITKIT2

Setup Guide

Updated December 2023
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<http://craftymech.com>

About

This guide will help you set-up and start enjoying your BITKIT2 FPGA game board. The guide is split into two parts:

- Setting up the BitKit2 connection for Windows, Mac, and Android devices.
- Introduction to the BitKit2 app, including adding games, and updating firmware/bios.

REQUIRMENTS

- Windows 10/11
- Mac OS 10.15 (Catalina) or higher
- Android 10 or higher

The BitKit2 has Bluetooth, WiFi, and USB capability (with optional USB-Serial cable). The table below lists the connection options by operating system.

	WiFi	Bluetooth	USB
Windows 10/11	YES	--	YES
Mac OS 10.15+	YES	YES	YES
Android 10+	YES	YES	--

If by rare chance your computer does not support WiFi, it can be added by purchasing a \$10 USB dongle from Amazon.com:

<https://www.amazon.com/dp/B008IFXQFU>



Are all BitKit2 boards WiFi ready?

BitKit2 boards sold from May 2023 onward are WiFi ready (serial # 1291 or higher). Older BitKit2 boards will need to be updated first for WiFi support using the older *BitKit2 Manager v4.6* software. The *BitKit2 Manager* was the original software used to manage the BitKit2 (via Bluetooth), and has been phased out.

What is the WiFi password for the BitKit2 WiFi? bitkittwo

What is the fastest connection type?

WiFi will have the fastest upload speed to the BitKit2, with USB a close second. Mac Bluetooth is about 50% slower than WiFi, while Android Bluetooth is the slowest method (1/3rd the speed of WiFi).

Can I use a mobile device w/ Bluetooth to connect to the BitKit2?

You can use an Android device to fully manage your BitKit2. An iOS version is planned, but will not include the ability to upload games. This is due to Apple's stance that apps that support emulation are not allowed on the Apple app store.

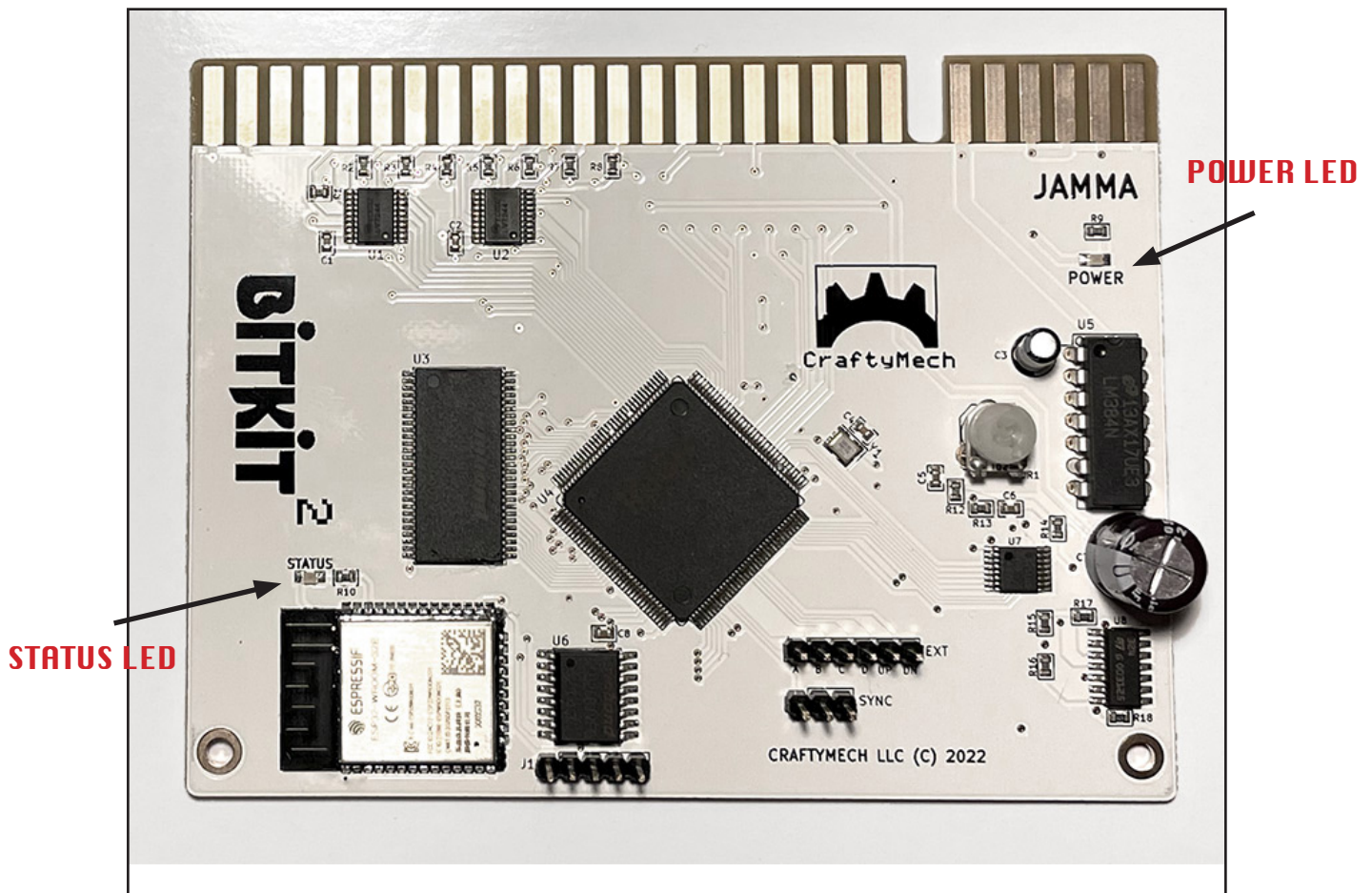
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1: First Step

Before you can setup the BitKit2 wireless connection on your computer, the pcb needs to be powered in your cabinet via the Jamma harness.

Make sure the POWER LED in the upper-right corner of the pcb is illuminated.



The STATUS LED in the lower left will be solid green when ready to accept a connection. The square silver module underneath the LED is the ESP32 Bluetooth/WiFi module.

IMPORTANT!

The BitKit2 has low power requirements, needing only ~500ma for stable operation. The standard arcade switching power supply (pictured below) is more than adequate.

Late-era Jamma cabinets often had larger power supplies capable of 150+ watts. To use the BitKit2 with a larger power supply, verify the 5V rail of the supply does not have a minimum load requirement (often 1amp or greater). Otherwise, BitKit2 operation may be unstable and result in boot failure (blank screen), or audio problems.



2: Read This!

If you will be using Windows to connect to the BitKit2, **READ THIS PAGE.**

If you are using Android/Mac, skip ahead to page 7.

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Check the back side of your BitKit2 pcb for the serial number (small white label). If the serial number is *BK-1291* or higher then your BitKit2 is WiFi/USB ready, and there is no need to update, so skip to page 7.

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If you bought a used BitKit2 board, it may already have been updated to support WiFi/USB. You can check in the BitKit2 *Options->System* menu. If there is a *BITKIT APP* setting, then you can skip to page 7.

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Still here? You have an older BitKit2, or you bought your BitKit2 during the transition between the original *BitKit2 Manager* software, and the new **BitKit2 app**.

To use the new **BitKit2 app** for Windows (WiFi,USB), you will first use the *BitKit2 Manager* software to update the BitKit2 bios & firmware via Bluetooth.

Go now to **Appendix: BitKit2 Manager** (page 24).

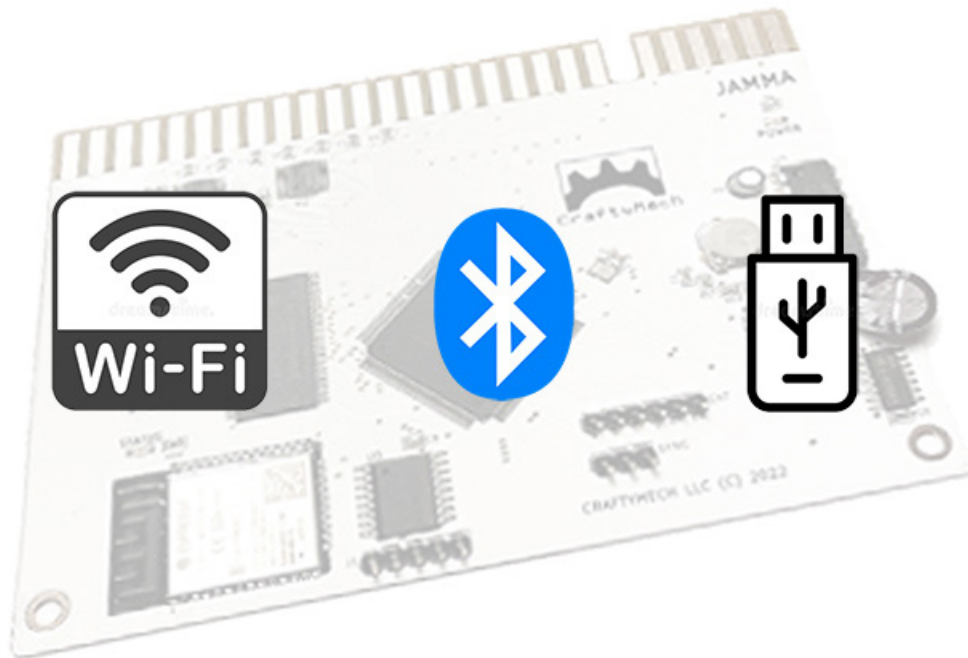
3: Connection Setup

There are three options for connecting to the BitKit2: *Bluetooth*, *WiFi*, or *USB*.

Mac & Android users have a choice of Bluetooth or WiFi. If your BitKit2 serial number is *BK-1291* or above (white label on back of pcb), then you are ready to use WiFi. For earlier serial numbers, follow the Bluetooth setup in this section, and then update the bios and firmware for WiFi support.

Windows & Mac users may also use a wired connection with an optional USB-Serial cable.

Regardless of what method you choose, the first step will be configuring the BitKit2 for the right connection type.

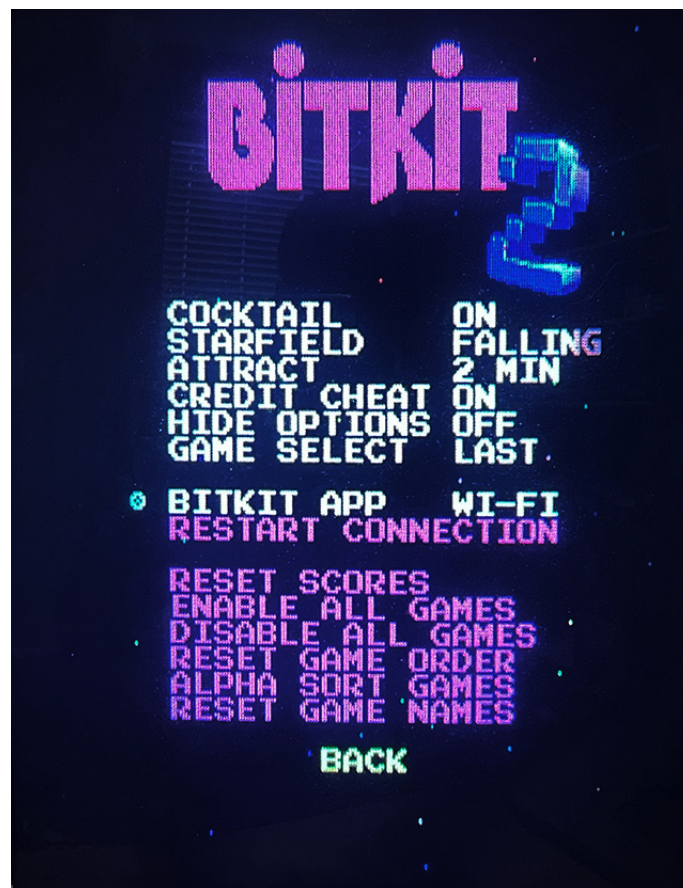


Power up the BitKit2 in your cabinet, and use the *P2 Start* button to access the BitKit2 Menu. The first option under settings is **SYSTEM**, select this option w/ the *P1 Start* button.

Use the joystick to navigate down to the *BITKIT APP* option, and Press *P1 Start* to toggle between connection types.

Select your preferred connection type, and then choose “**RESTART CONNECTION**” to reboot the BitKit2 and apply your choice.



There is no additional setup for WiFi, so if that is your connection type, skip ahead to page 16!

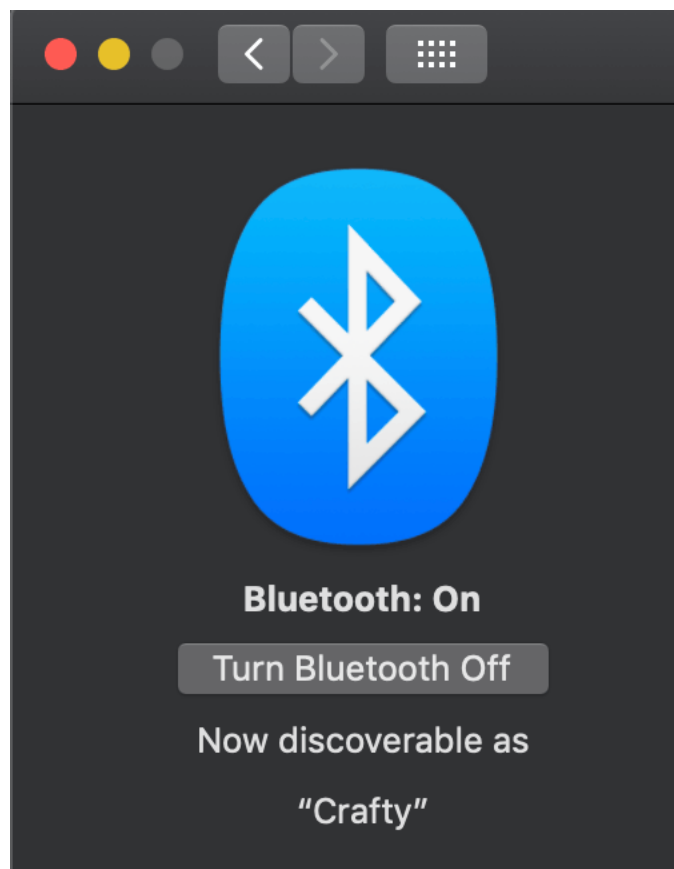


BLUETOOTH

The only setup required for Bluetooth is to ensure Bluetooth is enabled on your computer or device.

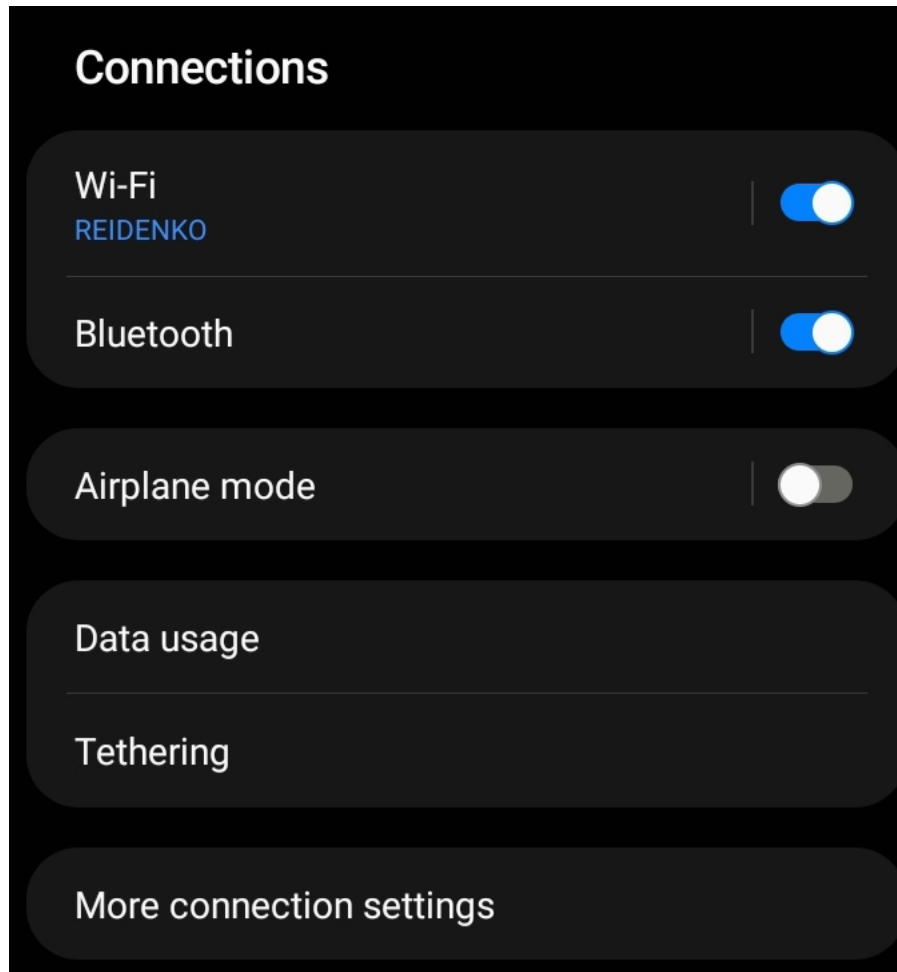
Mac OS

Click the Bluetooth icon in the menu bar (), and choose “**Open Bluetooth Preferences**”. Or from the Apple menu () choose “**System Preferences**”, and then click the “**Bluetooth**” icon in the Preferences window.



Android

Check if Bluetooth is enabled under Settings -> Connections.



Important!

Do not “*pair*” your computer or device with the BitKit2.

The connection between the BitKit2 and your computer or device will be established using Bluetooth LE, which does not require pairing the BitKit2 Bluetooth device in advance.

USB

USB-Serial cables have a built-in chip that converts USB to serial data, and typically have a non-standard end that breaks out individual signal connections.

For the BitKit2, a specific USB-Serial cable is recommended, and can be purchased from Amazon for ~ \$16 using this link:

<https://www.amazon.com/gp/product/B07RBKCW3S>

*Note: If you choose to substitute another USB-Serial cable, it must use the FT232RL chipset, and have 3.3v Rx,Tx signal levels. **5v signal levels will damage the BitKit2 ESP32 microcontroller!***



Windows users will need to install a driver in order to use the USB-Serial cable with the BitKit2 app. Mac OS users do not need to install a driver, and can skip directly to page 15.

Windows Driver

Before you connect the USB-Serial cable to your Windows PC, you will need to install the FTDI USB VCP driver found here:

https://ftdichip.com/wp-content/uploads/2021/08/CDM212364_Setup.zip

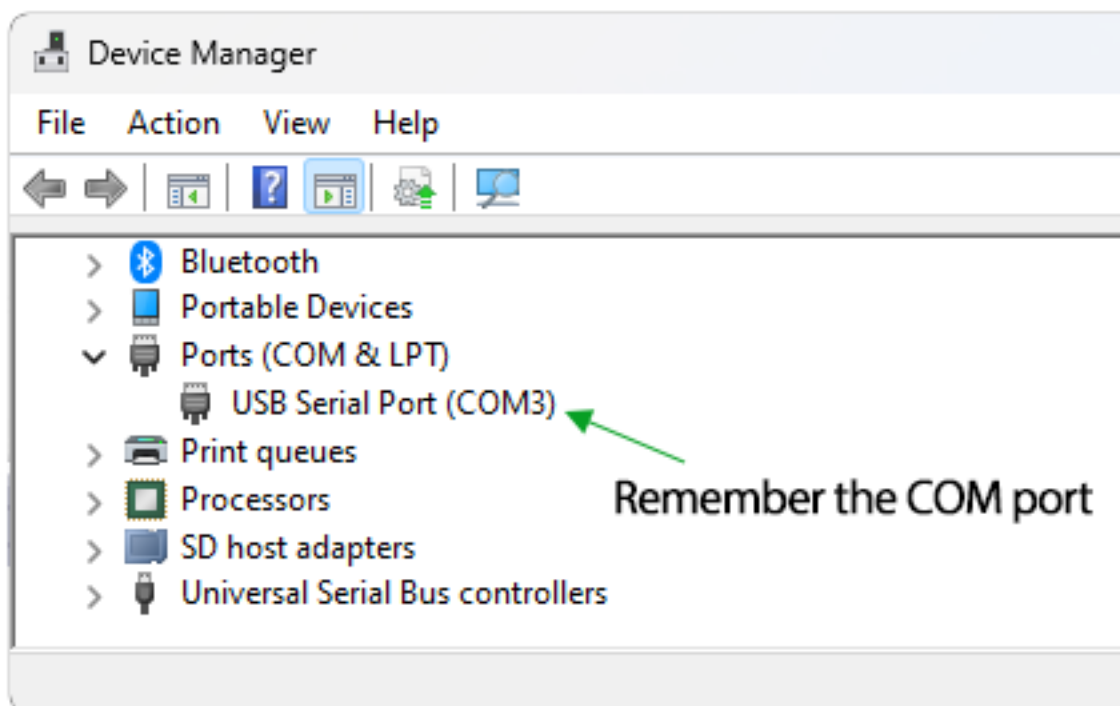
If the above link does not work, go to <https://ftdichip.com/drivers/vcp-drivers> and click the link for Windows “VCP” (Virtual Com Port) drivers.

After downloading and installing the driver, restart your Windows PC.

Connecting the Cable

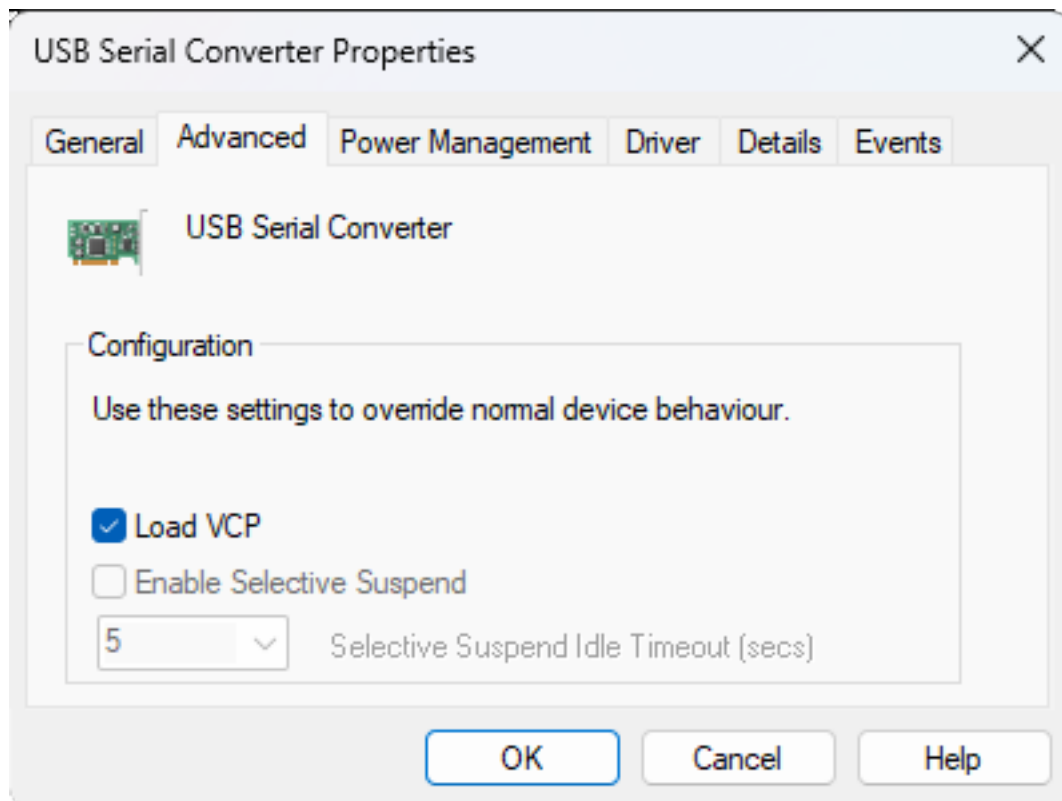
First connect the USB-Serial cable to your Windows PC (do not connect the cable to the BitKit2 yet). Next verify that the cable is recognized by Windows. You can do this by typing “*Device Manager*” into the Search box on the Taskbar.

In the Device Manager, look for the “*Ports*” entry, and note the COM port



If the “*USB Serial Port*” COM port is not listed, then scroll down to the bottom of the Device Manager, and expand “*Universal Serial Bus controllers*”. Then right-click on “*USB Serial Converter*” and choose “*Properties*”.

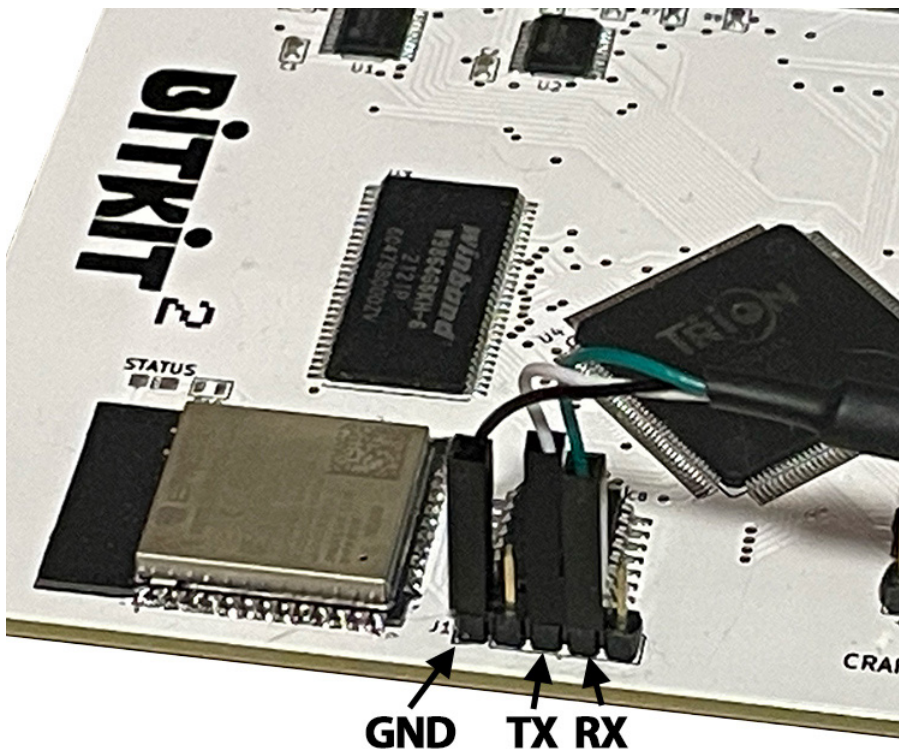
Click the Advanced tab, and make sure “*Load VCP*” is checked. Replug the USB cable to your Windows PC, and the COM port should appear in Device Manager.



Now that the USB-Serial cable is connected to your computer and properly configured, it is time to connect the signal wires to the BitKit2.

The breakout end of the USB-Serial cable has 3 signal wires. Make sure the BitKit2/cabinet is powered **OFF**, then use the table & photo below to connect the signal wires to the J1 header.

Note: Always connect the cable to your computer with the BitKit2/cabinet powered **OFF**. This will protect against static discharge that might damage the BitKit2. You can leave the cable connected to your BitKit2 for future use, but always make sure you connect the cable to your PC before powering on the cabinet.



BLACK	GND
WHITE	TX
GREEN	RX

If your USB-Serial cable has a red signal wire, leave that wire disconnected!

Now that the USB-Serial cable is connected to both your Windows PC and the BitKit2, you are ready to use the BitKit2 app!

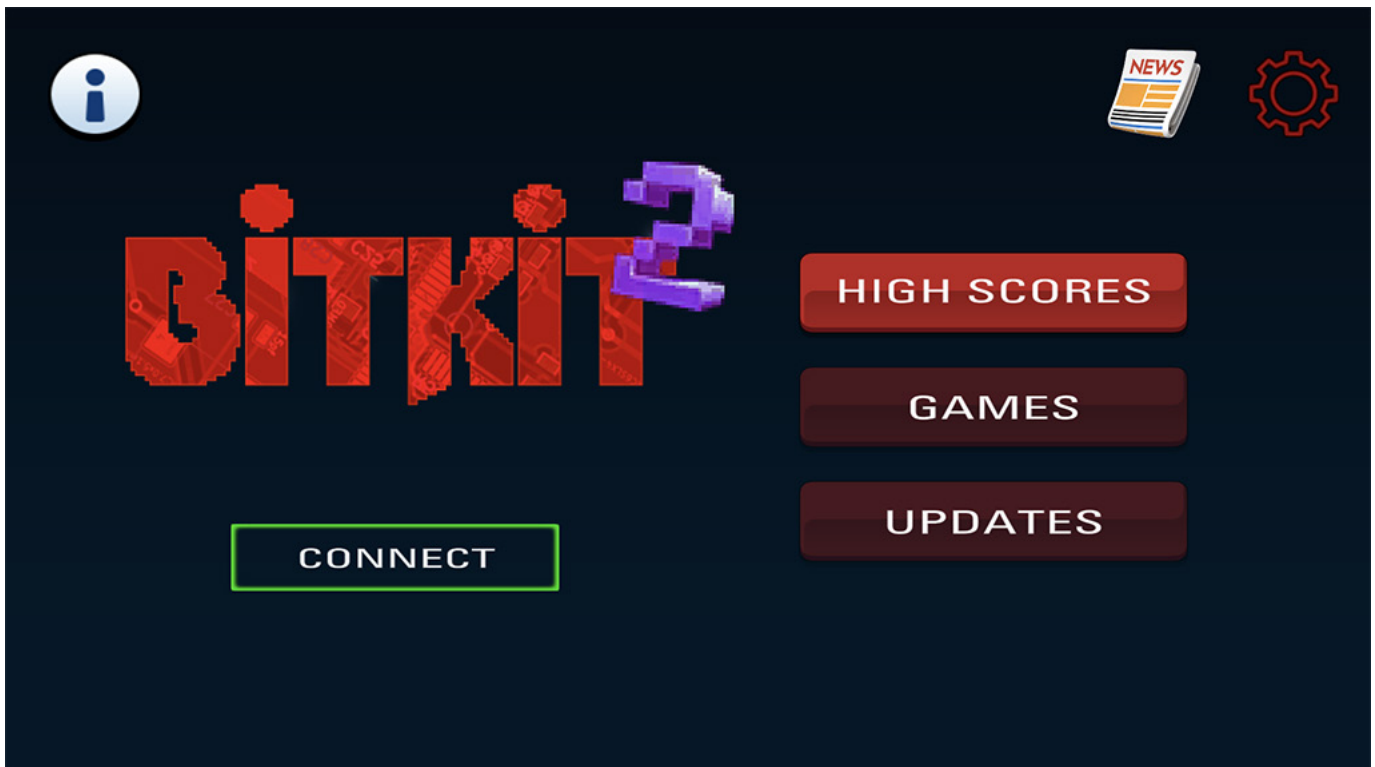
Please see the next section, “Connecting” on page 16.

4 : Connecting

The *BitKit2* app is used to manage & configure the BITKIT2. You can update firmware, upload games, and track your high scores.

The latest version of the *BitKit2* app can be found here:
<http://craftymech.com/downloads>

The main Menu screen is shown below. There are three icons across the top row of the BitKit2 app.



News is where to find the latest update information and release notes.

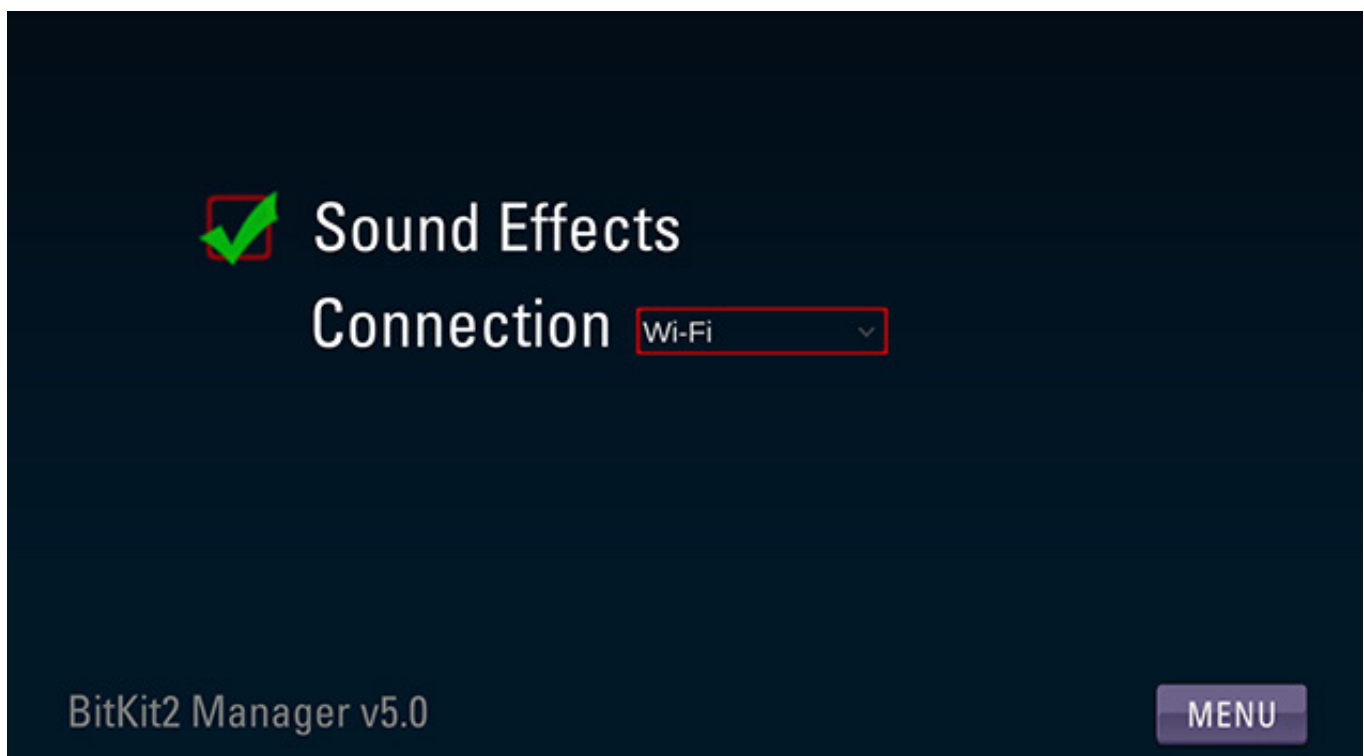
The **Gear** icon will display the app *Settings* screen.

The information **(i)** icon displays OS specific tips for connecting to the BitKit2.

Click the **Gear** icon to open the app *Settings* screen.

Depending on your operating system, different options will be available in the *Connection* dropdown.

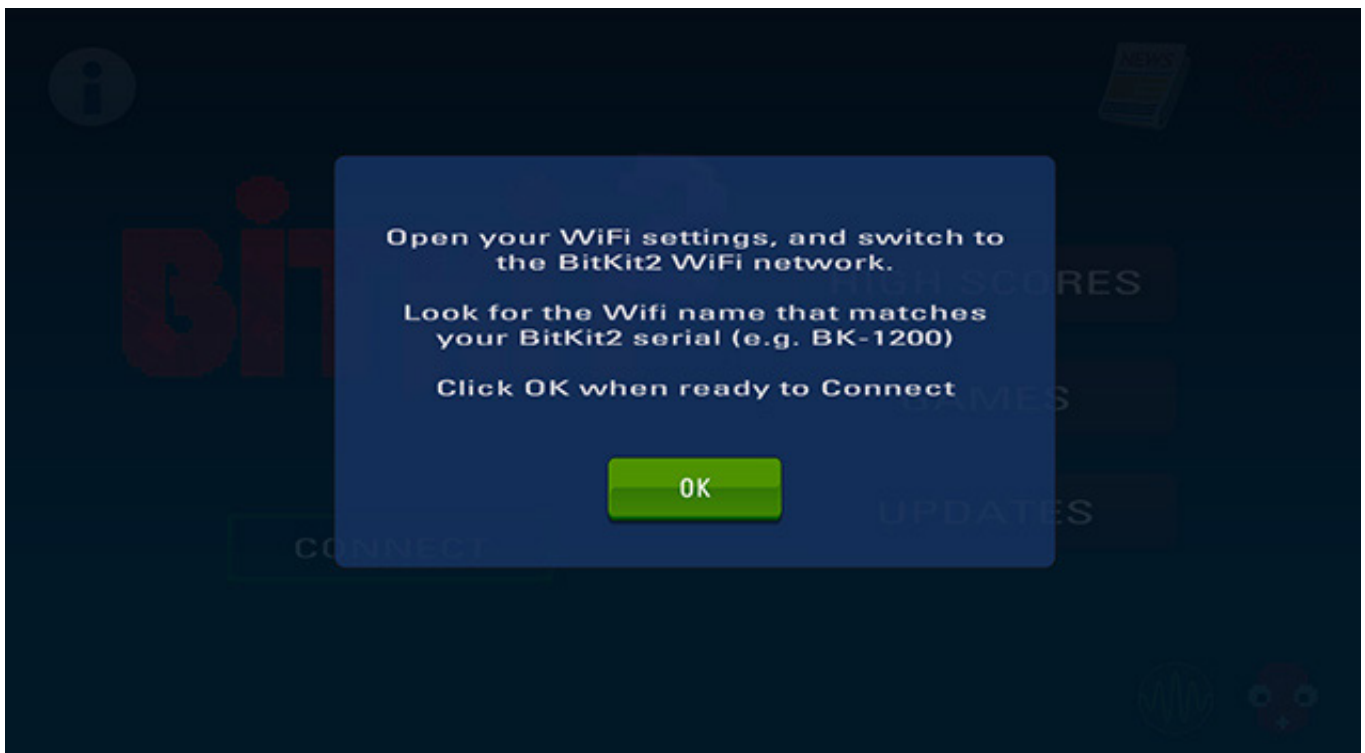
Choose the option that matches what you selected in the BitKit2 Options menu for the *System->BitKit App* setting.



Connecting to the BITKIT2 (WiFi)

After clicking the **CONNECT** button, a dialog will open asking you to connect to the BitKit2 WiFi.

Open your WiFi networks list, and look for the network name that matches the serial number on the backside of your BitKit2 pcb (e.g. BK-1200). Select the BitKit2 WiFi and when prompted enter *bitkittwo* for the password. Wait for your computer or device to connect (it may take several seconds).



Click the **OK** button once you have switched to BitKit WiFi. Remember that once connected, you will not have Internet access until you re-connect to your home WiFi network.

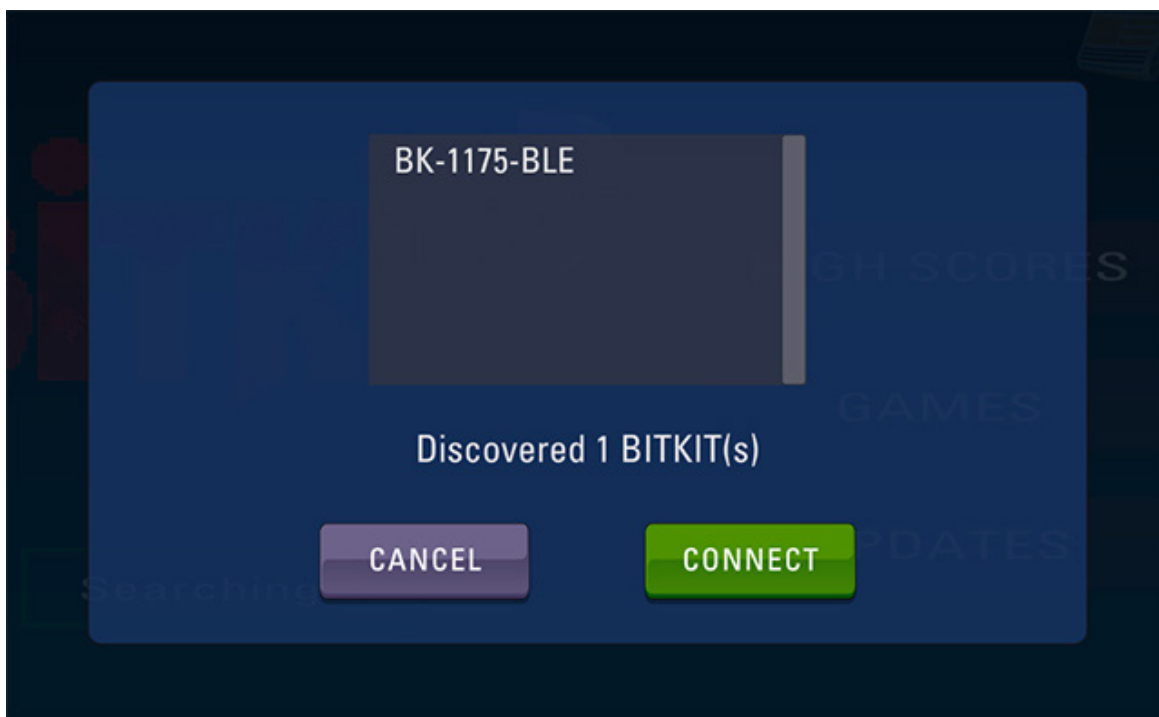
Important! Make sure to only connect to the BitKit2 WiFi when prompted. The BitKit2 app needs to download files from the Internet when it is first launched, and will not work properly without them.

Connecting to the BITKIT2 (Bluetooth)

After clicking the **CONNECT** button, the app will scan for the BitKit2 Bluetooth device.

After a few seconds, a device name with the format *BK-xxxx-BLE* will be displayed. Select this device, and then click the **CONNECT** button again.

If the BitKit2 is not listed, try moving your computer or device closer.



Solid building materials like concrete, brick, and metal, can block or interfere with the Bluetooth signal. This may include the arcade cabinet itself, so try opening the coin door or back door and establish line of sight with the BitKit2.

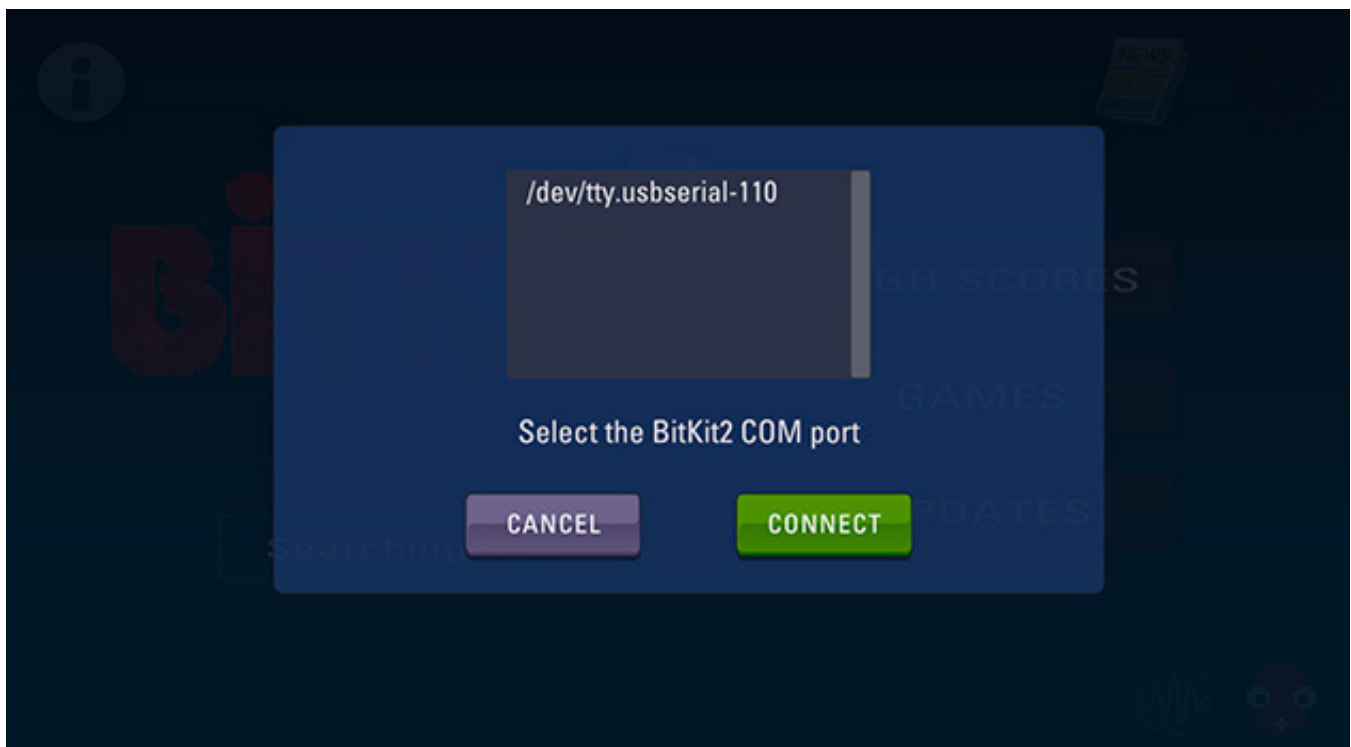
Connecting to the BITKIT2 (USB)

After clicking the **CONNECT** button, the app will display a list of serial ports found on your system. Unfortunately, these ports are rarely given descriptive names.

Windows computers will list serial ports as “COM1”, “COM2”, etc.

Mac computers use a different format, shown in the picture below.

If multiple serial ports are listed, click the *CANCEL* button to exit the dialog. Unplug the USB cable from your computer, then click **CONNECT** again and note the serial port is no longer listed.

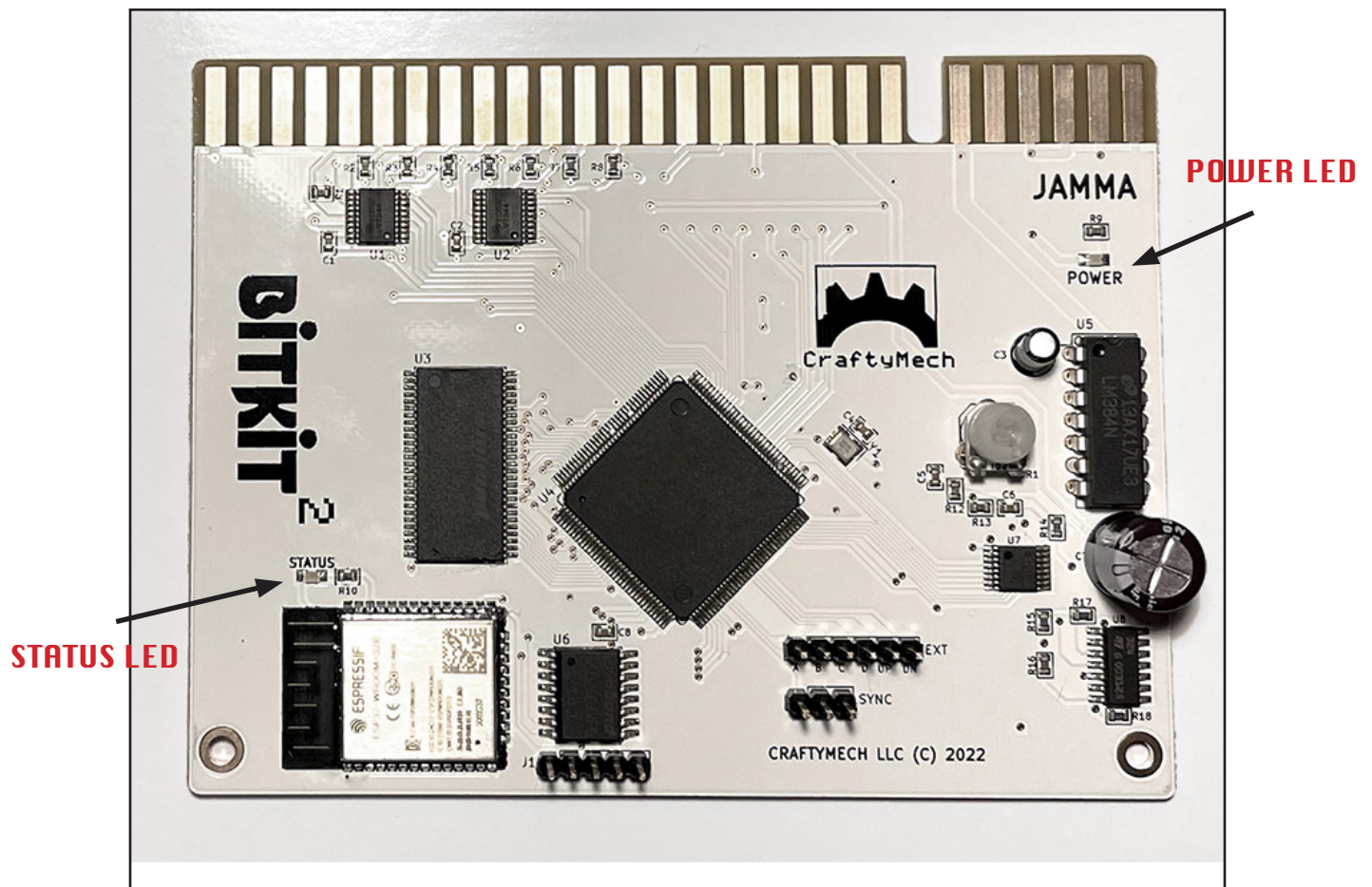


5: Troubleshooting

Solutions to common Bluetooth/WiFi connection issues are listed in this section.

Before reading further, make sure the **BITKIT2 is powered** by the JAMMA harness in your cabinet. The POWER LED should be lit, and the STATUS LED should be solid green.

If you are using Bluetooth, make sure **Bluetooth is enabled** on your computer or device. Refer to the *Connecting* section of this guide for your operating system (Mac/Android).



The BITKIT2 is not detected as a Bluetooth / WiFi device by your operating system.

Bluetooth and WiFi operate on the same wireless spectrum, so these tips apply to both connection types:

- Try moving your computer or device closer. Solid building materials like concrete, brick, and metal, can block or interfere with the Bluetooth signal. This may include the arcade cabinet itself, so try opening the coin door or back door and establish line of sight with the BitKit2.
- Move other Bluetooth/WiFi enabled devices (phones, tablets, etc.) to another room temporarily.
- Bluetooth/WiFi operate at 2.4GHz, which is also used by WiFi routers. If there is a WiFi router in the same proximity as the BITKIT2, try changing the broadcast channel on the router.
- If your computer/BITKIT2 is near fluorescent lighting, turn that light source off and try again.

Appendix: BitKit2 Manager

The *BitKit2 Manager* is the original software used to manage the BitKit2 (released April 2022).

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Windows users who need to update your BitKit2 for WiFi, you have come to the right place.

Android or Mac user? Go back to page 7, you do not need to use the *BitKit2 Manager* software.

Does your BitKit2 have a serial number of *BK-1291* or higher? Your BitKit2 already supports WiFi, go back to page 7.

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The following section will explain how to setup the Bluetooth connection with the BitKit2, and then update the bios & firmware.

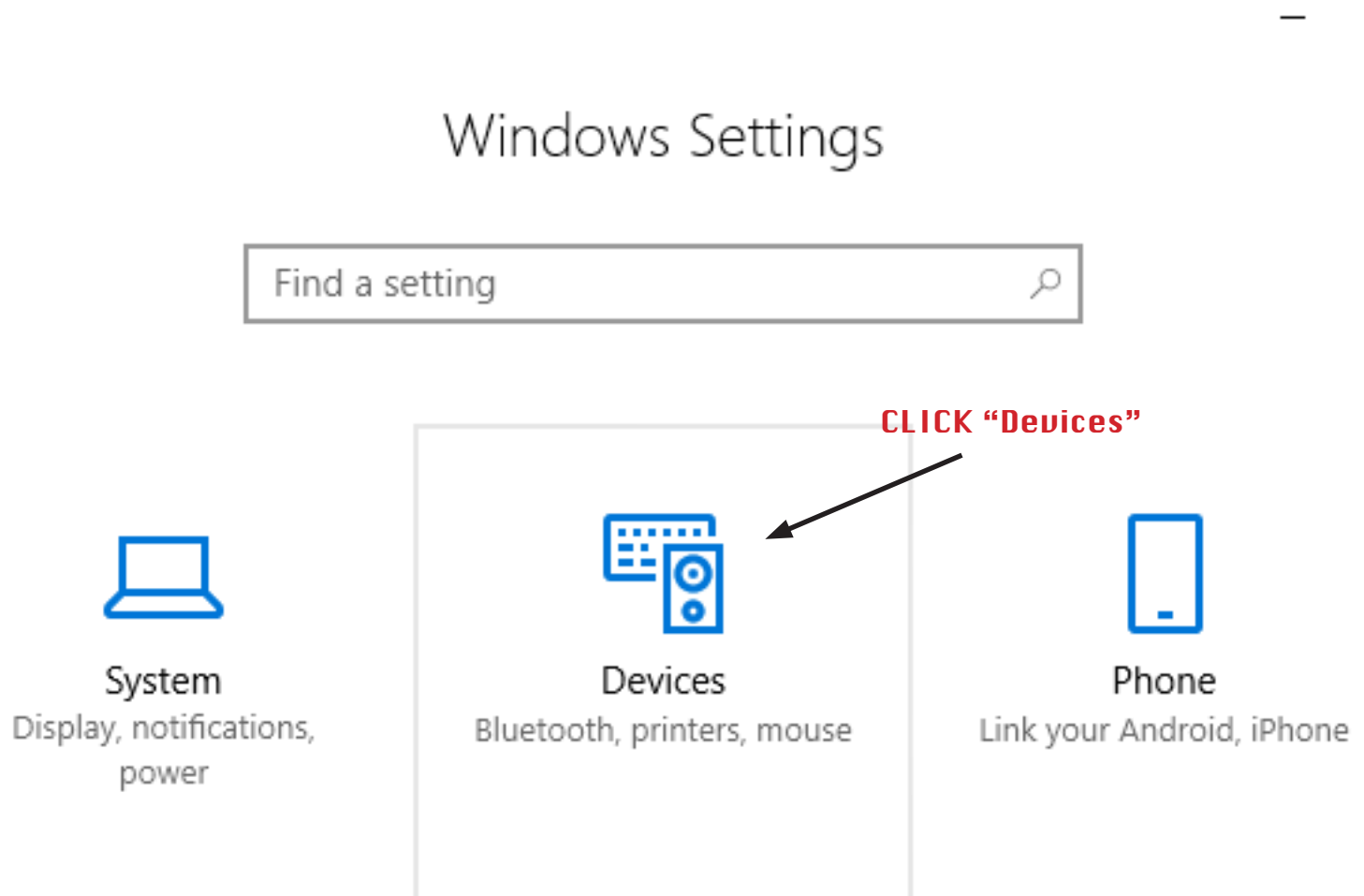
You can download the *BitKit2 Manager* for Windows here: <http://craftymech.com/downloads>

1: Windows Setup

Bluetooth is supported by Windows 10 without any additional drivers or software. Earlier Windows versions also support Bluetooth, but the appearance of dialogs or prompts may be different.

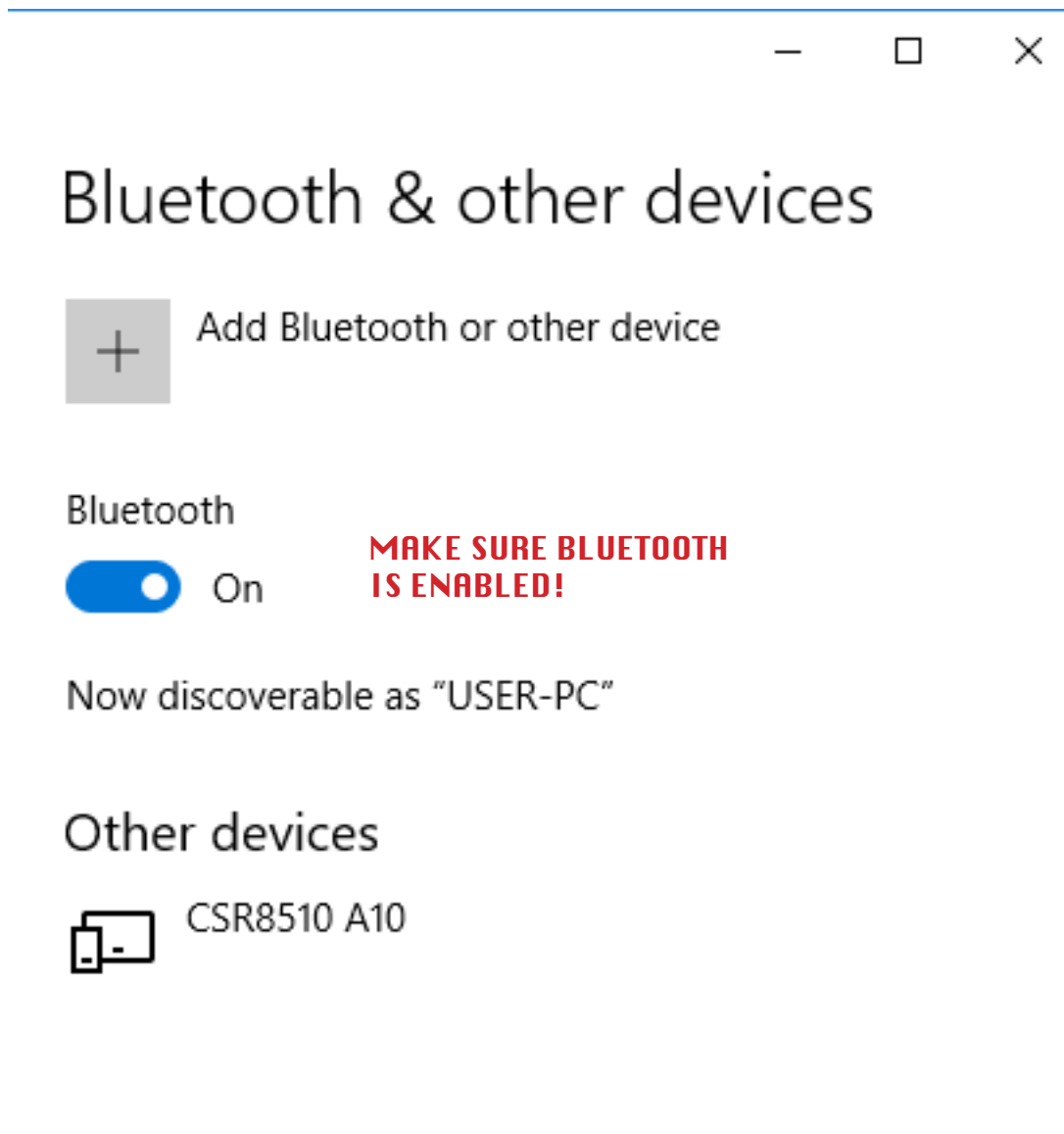
To get started, press the **Windows key + I** ( Win + ) or from the Start Menu choose “**Settings**”.

Select “**Devices**” as seen in the Settings window below.



From the Bluetooth Settings window, first make sure that Bluetooth is enabled.

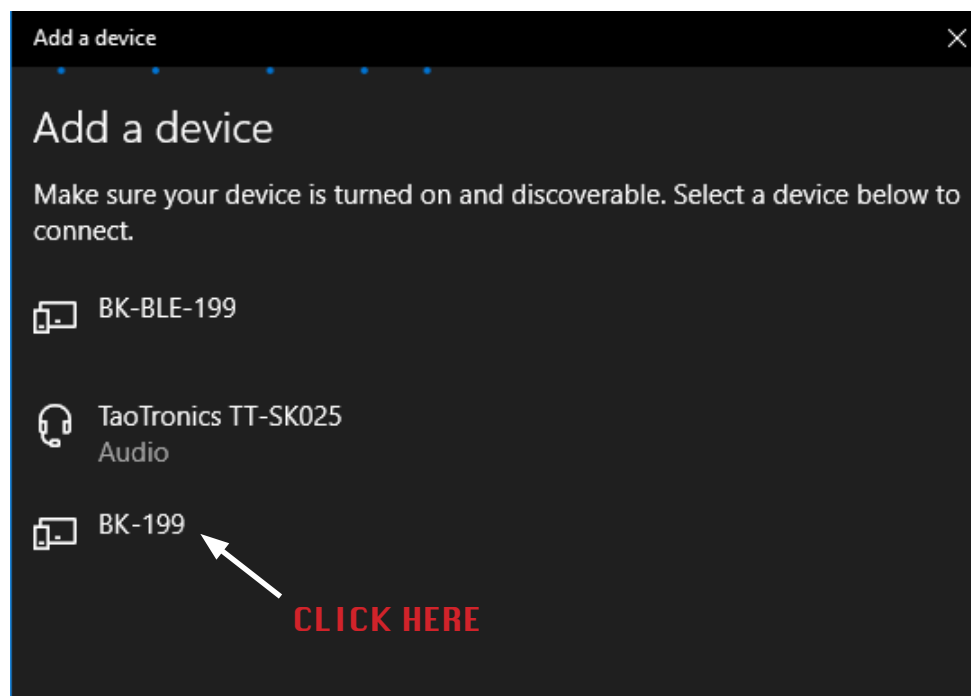
Now click the  sign to **“Add Bluetooth or other device”**.



The “**Add a device**” dialog window will open. Wait for up to 30 seconds for Windows to scan for Bluetooth devices. Please note that the exact name will vary as each BitKit2 has a unique device ID.

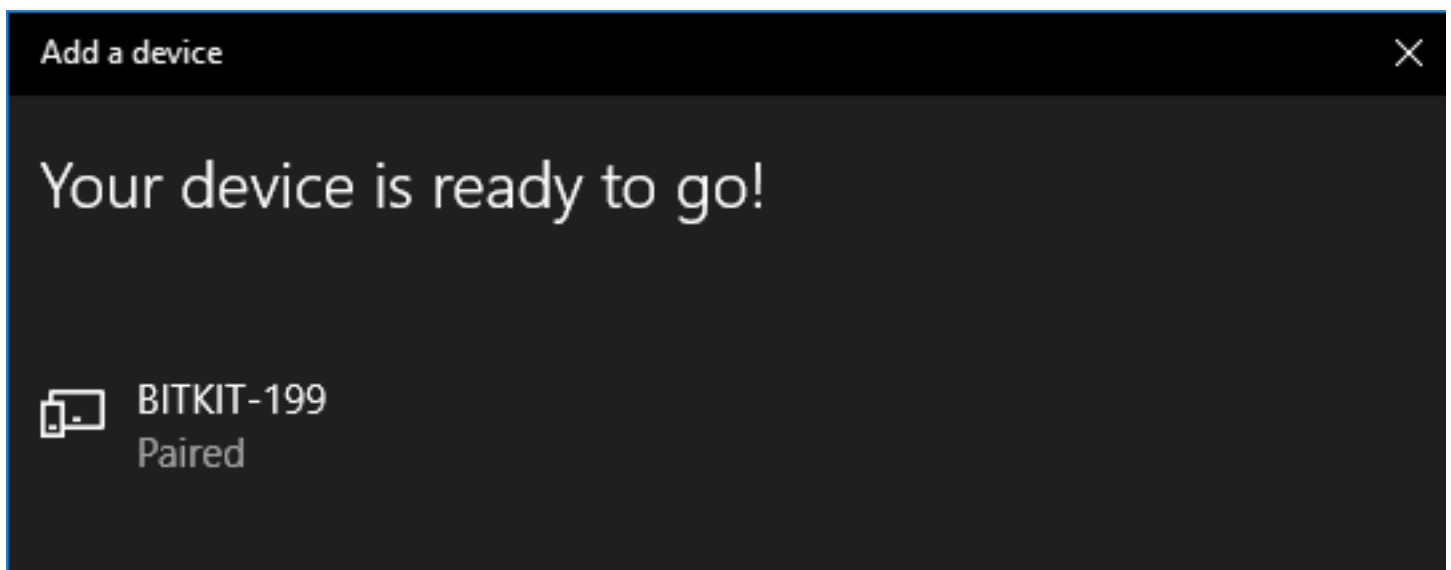
Look for the device labeled “**BK-xxx**” and click “**Connect**”.

If the BitKit2 is not found, make sure the BitKit2 is powered in your cabinet, and the POWER LED is green.



Windows will connect to the BitKit2, and then finish setting up the Bluetooth connection. When finished, a new dialog will be shown indicating that the BitKit2 is paired with your computer.

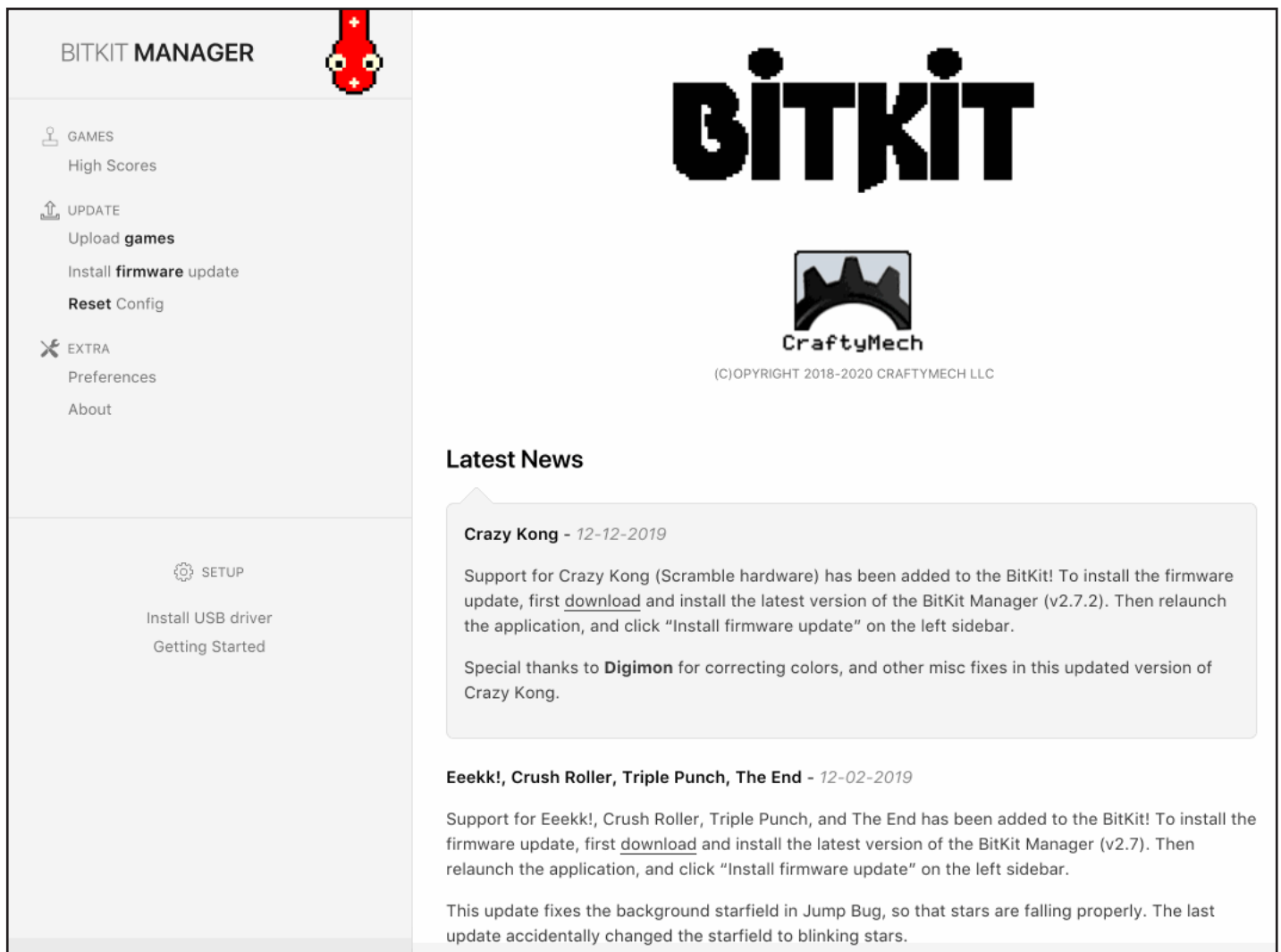
All done! Now you are ready to use the *BitKit2 Manager* software to update the BitKit2 bios and firmware.



2: BitKit2 Manager

The *BitKit2 Manager* software is used to manage & configure the BitKit2. This section will cover connecting to your BitKit2, and updating the bios and firmware.

The latest version of the *BitKit2 Manager* can be found here:
<http://craftymech.com/downloads>



Connecting to the BITKIT2

Click the **Bios Update** link in the left-hand navigation.

A drop-down will list COM ports that are available, and the BitKit Manager should auto-detect and select the correct port.

If multiple COM ports are listed, but the BitKit2 was not auto-detected, see the *COM Ports* section for instructions on identifying the correct port.

Update Bios

Install a Bios update to the BitKit

The "Bios" is the software installed on the BitKit that communicates with the BitKit Manager. Occasionally, an update may be available, that adds new functionality and/or fixes issues.

 BK-1175 (BITKIT)   ← **CLICK HERE**

Select the proper device (com port), and connect to the BitKit. **In most cases, the correct device should already be selected.** *The BitKit must be powered via the JAMMA harness.* Once connected to the BitKit, a green icon will appear next to the connect button.

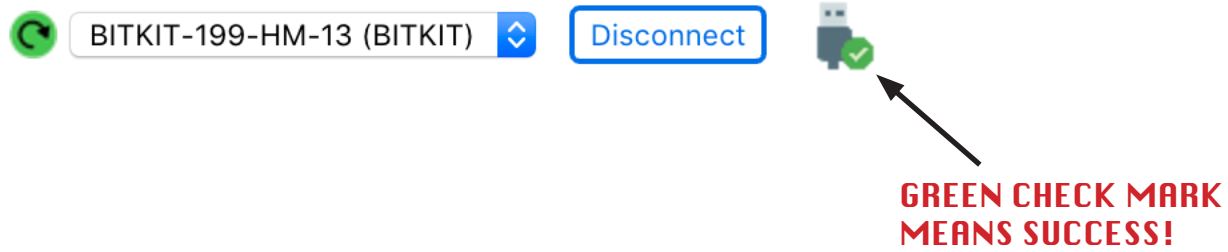
After the Bios update is installed, the BitKit will reboot, and the Bluetooth connection will be reset.



Install Bios Update

After clicking the “**Connect**” button, the *BitKit2 Manager* will attempt to establish the connection with the BitKit2.

You should see the interface update after a few seconds to indicate a successful connection.



If you receive an error message, first verify that the BitKit2 is powered by the JAMMA harness. Move your computer closer to the BitKit2, and try again. If you can still not connect, see page 18 for connection tips. If nothing works, send an email to support@craftymech.com for help.



Unable to connect to the BitKit. Move your computer closer to the BitKit. If you still receive this error, refer to the Troubleshooting section of the Blue Book.

Select the proper device (com port), and connect to the BitKit. **In most cases, the correct device should already be selected.** *The BitKit must be powered via the JAMMA harness.* When the BitKit is connected to the BitKit, a green icon will appear next to the connect button.

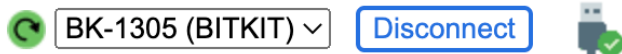
Updating Bios

Once you are connected, the *BitKit2 Manager* will display a dialog letting you know there is a bios upgrade available. Click OK to dismiss the dialog.

Click the *Install Bios Update* button. The update will take a few minutes to complete. Watch the % complete, if it stalls for more then 30 seconds, then you will need to restart the bios update.

To restart the bios update, power cycle the BitKit2, and exit and restart the *BitKit2 Manager* software. Then repeat the connection steps, and you will be taken back to the *Update Bios* page to try again.

Once the bios update is complete the BitKit2 will restart, and you will be disconnected. To update the firmware, you will need to re-connect to the BitKit2.



After the Bios update is installed, the BitKit will reboot, and the Bluetooth connection will be reset.



Bios Update 07.7

Install Bios Update

Updating Firmware

To install the firmware update, click the *Update Firmware* link in the left-hand navigation, and then click the *Install Firmware* button to begin the update.

The firmware update will take 13-15 minutes to complete, so make sure your computer does not go to sleep during this time.

During the update the % complete will count up to 100 several times as different files are uploaded. If the % stalls for more than 30 seconds, the update has stalled and will need to be restarted.

To restart the firmware update, power cycle the BitKit2, and exit and restart the *BitKit2 Manager* software. Then repeat the connection steps, and attempt the firmware update again.

Once the update is complete you are ready to start using the new BitKit2 app w/ WiFi (go to page 7).



Install firmware update

Install a firmware update to the BitKit

If a firmware update is available, it will be listed below. To install an update, first connect to the BitKit.



/dev/tty.BITKIT-5387-HM-13-1



Connect

Select the proper device (com port), and connect to the BitKit. **In most cases, the correct device should already be selected.** *The BitKit must be powered via the JAMMA harness.* Once connected to the BitKit, a green icon will appear next to the connect button.

3: COM Ports

The BitKit Manager didn't auto-detect the COM port that was added during setup.


The correct COM port should be labeled by the *BitKit2 Manager*, as seen in the screenshot below.

If the choices in the connection drop-down are only labeled as *COM3*, *COM4*, etc., then use the following instructions to determine which COM port to use.



Select the proper device (com port), and connect to the BitKit. **COM4 should already be selected.** The BitKit must be powered via the BitKit, a green icon will appear next to the connect button.

First, bring up the Bluetooth settings dialog window.

*Reminder: You can bring up the Bluetooth settings dialog in Windows by pressing the **Windows key + I** ( Win + I) or from the Start Menu choose “**Settings**”. Then select “**Devices**” from the Settings dialog.*

From the Bluetooth settings dialog, scroll to the bottom of the window and click **More Bluetooth Options**.

Select the **COM Ports** tab. Make a mental note of the COM port name for the **outgoing** direction. In the example below, *COM6* would be the correct port. Now try connecting with the *BitKit2 Manager*, using the COM port you noted.

