

NATIONAL CONTROL DEVICES

KFX Series Quick Start Guide



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Notice: Portions of this manual require internet access.

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Introduction

Our new generation of Key Fob control; the KFX Series, allows users to control any device from a hand-held remote. The KFX receiver module can be added to any board with an XBee socket to add key fob functionality. The KFX Series opens up numerous possibilities, including relay control, time delays, toggle functions, relay flashing on/off, and much more. Key Fobs may be used to trigger complex actions or notify servers for data logging or extended remote operation through an internet connection.

With a single KFX receiver module, users may associate up to 40 key fobs, including 1, 2, 3, 4, 5 and 8-Button remotes. KFX modules reach working distances of up to 750 feet, with superior responsiveness over previous generations of Key Fob receivers. Every Key Fob paired with a KFX Receiver will perform the exact same function as another Key Fob paired with the same KFX Receiver. It is not possible for each remote to be separately identified and generate different data for. Put simply, every remote does exactly the same thing when paired with the same KFX Receiver.

The KFX Receiver Module is configured using our Base Station Software, and must be plugged into the ZIGMO only during configuration. Only one ZIGMO is needed regardless of the number of KFX Receivers you intend to use. The ZIGMO acts as an interface between your computer and the KFX Receiver, allowing you to define the Baud Rate, and Data Bytes that are transmitted for each Key Fob button Press.

When a button is pressed on the Key Fob, the KFX Receiver will send up to 9 bytes of data to the target XBee device. The KFX Receiver can be configured for button press and button release events. If you intend to use smaller key fobs with less than 8 buttons, it is possible to use the extra KFX memory to send more than 9 bytes when buttons are pressed and released.

Note: We do advise that if you are pairing numerous key fobs to a given KFX receiver module that the button number on each Key Fob is the same for all key fobs, however, this is not absolutely required, but it may make using the KFX easier.

Getting Started Requirements

- A computer running Windows XP, Windows Vista, Windows 7 or 8
- KFX 418MHz Receiver Module and any MS Series 418 MHz Key Fob
- KFX Integration Kit (NCD Part Number: ZIGMO)
- NCD Base Station Software (www.IORelay/start)
- Antenna (included with KFX Receiver)
- Unfolded Paper Clip for Pairing

Optional Accessories

- RPSMAMF1 1-Meter Antenna Extension
- RPSMAMF3 3-Meter Antenna Extension
- RPSMAMF6 6-Meter Antenna Extension
- RPSMAMF9 9-Meter Antenna Extension
- OTX-418-HH-KF1-MS 1-Button 418MHz MS Series Key Fob
- OTX-418-HH-KF2-MS 2-Button 418MHz MS Series Key Fob
- OTX-418-HH-KF3-MS 3-Button 418MHz MS Series Key Fob
- OTX-418-HH-KF4-MS 4-Button 418MHz MS Series Key Fob
- OTX-418-HH-KF5-MS 5-Button 418MHz MS Series Key Fob
- OTX-418-HH-CP8-MS 8-Button 418MHz MS Series Key Fob
- OTX-418-HH-LR8-MS 8-Button 418MHz MS Key Fob with Antenna

Getting Started

Step 1: Configuring Buttons

Please note, that pairing of Key Fobs is easy, but not obvious. It is necessary to follow these directions carefully as any mistake in these directions may result in some buttons not functioning properly.

Before you can pair the Key Fob to the KFX Receiver, it is necessary to tell the Key Fob exactly which buttons you intend to use. Follow these steps to configure the Key Fob BEFORE pairing with the KFX Receiver.

Step 1: On the back of the key fob, press the button labeled ADD with an unfolded paper clip. A faint blue light will flash next to the ADD pin hole. This blue LED will only flash for 15 seconds, so it is important to complete the next step before the blue LED stops flashing.

Step 2: Push each button on the Key Fob that you wish to use. You do not have to use all of the buttons that are available on your key fob.

Step 3: Press the ADD button again to stop the flashing blue LED and save your button selections. Optionally, you may wait for the Blue LED to stop flashing.



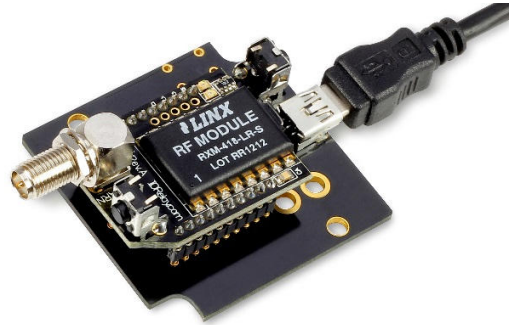
Repeat the previous steps for each key fob you wish to use.

Note: You should complete this step before pairing the Key Fob to the KFX Receiver.

Note: If the blue LED does not flash when pressed, pry the sides of the enclosure with a small flat-blade screwdriver or remove the single screw on the back of 8-button remotes. Replace the battery with a CR2032 as necessary.

Step 2: Connecting to a Computer

The KFX receiver module needs a power source in order to pair a Key Fob with the KFX receiver. Additionally, connecting the KFX to a computer allows you to configure the KFX receiver for your specific applications. A ZIGMO USB module (photo right) is used to provide power for Pairing and Configuration of the KFX Receiver.



By default, the KFX receiver is shipped with momentary operation of 8 relays from an 8-button key fob. The KFX is also pre-configured to talk to any NCD device that supports API communications at 115.2K Baud. If your controller is not configured for 115.2K baud, you may change the baud rate settings of the controller or the KFX receiver. It is important that both the XBee target device (such as an NCD relay board) and the KFX receiver are operating at the same baud rate. Base Station software will allow you change the settings of your controller or the KFX receiver. Base Station will be discussed later, but for now, we will focus on pairing the KFX receiver with your Key Fob.

The first step towards using your KFX series receiver and Key Fob is pairing your key fobs to a KFX receiver module. Each KFX Receiver can be paired with up to 40 key fobs. Please note that every Key Fob will perform the exact same function, as it is not possible for each Key Fob to send different data.

Step 3: Pairing Key Fob with KFX Receiver

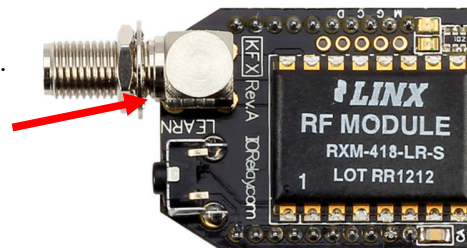
Each KFX Receiver can be paired with up to 40 key fobs. Please note that every Key Fob will perform the exact same function, as it is not possible for each Key Fob to send different data.

This process is outlined below:

Step 1: On the KFX module, push the button labeled LEARN. A Red LED will flash for 15 seconds. The following step must be completed before the LED stops flashing.

Step 2: Press Every Button on the Key Fob that you want the KFX module to use.

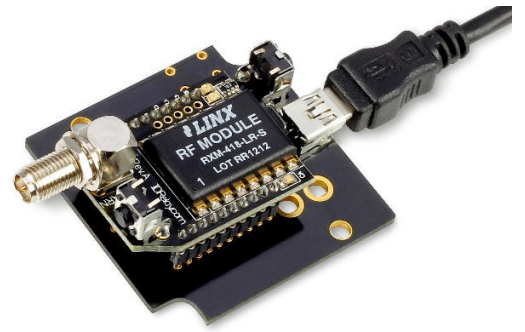
Step 3: Press the LEARN button again to store your settings, or wait for the LED to stop flashing.

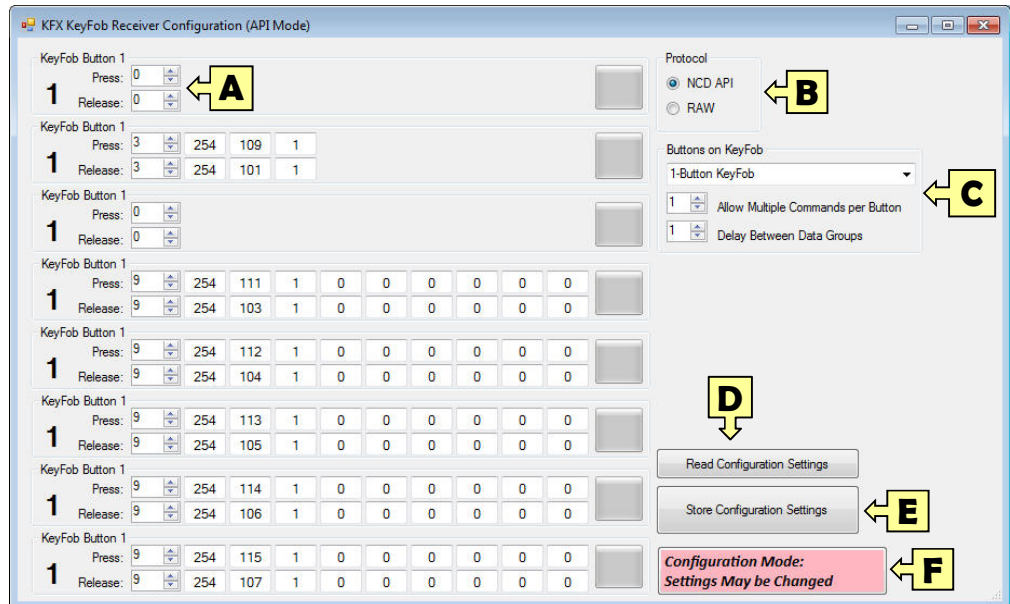


Hint: Hold Down the LEARN button on the KFX module for 10 seconds to erase all paired Key Fobs from memory.

Step 4: Module Setup

1. Connect the KFX module to a Windows based computer using the ZIGMO USB adapter (shown right). After the ZIGMO has been connected to the computer the USB LED on the bottom of the ZIGMO should turn on solid. If you do not see the USB LED turn on solid after a few seconds see troubleshooting section 1 on page 17.
2. Download, install, and launch Base Station software:
<http://assets.controlanything.com/Software/NCDBaseStation.zip>
3. When the “Select Connection” window opens, choose the COM port associated with the ZIGMO which should be listed as a USB Serial Port.
4. Press “OK” when finished.
5. In the next window, under the command sets offered, select “KFX Series Configuration Control Panel”. This should open the Key Fob Receiver Configuration window. From here users are able to customize command sets to fit their application needs.





Introduction to the KFX Module Operation

The KFX Key Fob Receiver Configuration window is used to configure the settings of the KFX Receiver module. The KFX receiver is designed to send bytes of data when Key Fob buttons are pressed or released. These data bytes will be sent to the target device (such as a NCD relay controller) or any other device with an XBee socket. This allows the KFX module to be used in many types of devices provided there is an XBee socket on-board. The KFX comes preconfigured to operate with NCD relay controllers.

When a Key Fob button is pressed, the “Press” bytes are sent to the target device. When a Key Fob button is released, the “Release” bytes are sent to the target device. Note data shown in this control panel are in decimal values. If your application requires HEX values, then simply convert HEX to Decimal using the following online tool: <http://www.binaryhexconverter.com/hex-to-decimal-converter>

The first number in every row identifies how many bytes will be sent. The following number boxes indicate the data to be sent. Note that changes MUST be stored to the KFX module prior to use. Also note, this is a “LIVE” window. Pressing buttons on the Key Fob should make the associated squares shown in the control panel turn green.

- A. This setting indicates how many bytes will be sent when a Key Fob button is pressed or released.
- B. This setting controls the formatting. NCD API will automatically add the API Header and Footer to the data packet for use with NCD devices. RAW will send actual bytes of data shown in the configuration. API is required for Fusion controllers and highly recommended for ProXR/ProXR Lite controllers.
- C. Choose the number of buttons you intend to use on the Key Fob. It is possible to use Key Fobs with different numbers of buttons. In this case, you may want to set the drop down box to match the maximum number of buttons used on your Key Fob. “Allow Multiple Commands per Button” is available if you are using Key Fobs with less than 8 buttons. Turn this setting one to expand the number of bytes sent by the Key Fob. This setting will enable more data groups, check the large numbers at the far left of the screen shot to see which buttons are associated with the different data groups. “Delay Between Data Groups” configures a delay between data groups, this allows time for multiple commands to process before the next data group is sent. A value of 25 to 50 is recommended if you intend to process multiple commands with a single button press when working with NCD relay controllers.
- D. This button read the current settings from the KFX module. This operation is automatically performed when the control panel is loaded.
- E. This button stores the current settings into the KFX module.
- F. This button indicates the mode of operation of the KFX module. This setting is generally not used by customers, as this function is automatically controlled by Base Station Software.

Key Fob Range

The absolute maximum rated range of the MS series Key Fobs is 750 feet. The MS 8-Button Key Fob with an external antenna is rated at 1,000 feet (maximum). Key Fob range can depend on many factors. The maximum ratings are achieved in an outdoor environment with clear line-of-sight and minimal radio interference (in the country). The ranges provided are in absolute best possible conditions for radio communications.

Customers are strongly advised to test in the environment intended for your application, as absolute best possible conditions do not typically favor real-world applications.

Communicating through walls can severely limit the rated range, particularly in large building with concrete and steel structures. Trees and hills will also impact range considerably. An antenna extension cable is offered to help users position an antenna within a suitable view of the Key Fob. Positioning the antenna in close proximity to metal buildings can benefit or inhibit the operation of the Key Fob depending on actual mounting position. Experimentation is recommended for best results.

Common Commands

The following commands serve as a quick reference for controlling relays on ProXR series controllers using the KFX module. These command may be entered into the KFX module to help get you running quickly. Note that NCD API should be selected for faster response times and should be compatible with older devices. Also note the first number on each line below indicates the number of bytes to send, which is not part of the actual command.

3, 254, 100, 1	Turn Off Relay 1 Bank 1
3, 254, 101, 1	Turn Off Relay 2 Bank 1
3, 254, 102, 1	Turn Off Relay 3 Bank 1
3, 254, 103, 1	Turn Off Relay 4 Bank 1
3, 254, 104, 1	Turn Off Relay 5 Bank 1
3, 254, 105, 1	Turn Off Relay 6 Bank 1
3, 254, 106, 1	Turn Off Relay 7 Bank 1
3, 254, 107, 1	Turn Off Relay 8 Bank 1
3, 254, 108, 1	Turn On Relay 1 Bank 1
3, 254, 109, 1	Turn On Relay 2 Bank 1
3, 254, 110, 1	Turn On Relay 3 Bank 1
3, 254, 111, 1	Turn On Relay 4 Bank 1
3, 254, 112, 1	Turn On Relay 5 Bank 1
3, 254, 113, 1	Turn On Relay 6 Bank 1
3, 254, 114, 1	Turn On Relay 7 Bank 1
3, 254, 115, 1	Turn On Relay 8 Bank 1
3, 254, 130, 1	Turn On All Relays Bank 1
3, 254, 129, 1	Turn Off All Relays Bank 1
3, 254, 131, 1	Invert the Status of All Relays in Bank 1
3, 254, 132, 1	Reverse the Status of Relays in Bank 1

5, 254, 147, 0, 0, 1	Toggle Relay 1	Fusion ONLY!
5, 254, 147, 1, 0, 1	Toggle Relay 2	Fusion ONLY!
5, 254, 147, 2, 0, 1	Toggle Relay 3	Fusion ONLY!
5, 254, 147, 3, 0, 1	Toggle Relay 4	Fusion ONLY!
5, 254, 147, 4, 0, 1	Toggle Relay 5	Fusion ONLY!
5, 254, 147, 5, 0, 1	Toggle Relay 6	Fusion ONLY!
5, 254, 147, 6, 0, 1	Toggle Relay 7	Fusion ONLY!
5, 254, 147, 7, 0, 1	Toggle Relay 8	Fusion ONLY!
5, 254, 47, 0, 0, 1	Toggle Relay 1	ProXR V3.9 or Later ONLY!
5, 254, 47, 1, 0, 1	Toggle Relay 2	ProXR V3.9 or Later ONLY!
5, 254, 47, 2, 0, 1	Toggle Relay 3	ProXR V3.9 or Later ONLY!
5, 254, 47, 3, 0, 1	Toggle Relay 4	ProXR V3.9 or Later ONLY!
5, 254, 47, 4, 0, 1	Toggle Relay 5	ProXR V3.9 or Later ONLY!
5, 254, 47, 5, 0, 1	Toggle Relay 6	ProXR V3.9 or Later ONLY!
5, 254, 47, 6, 0, 1	Toggle Relay 7	ProXR V3.9 or Later ONLY!
5, 254, 47, 7, 0, 1	Toggle Relay 8	ProXR V3.9 or Later ONLY!
5, 254, 148, 0, 0, 1	Pulse Relay 1	
5, 254, 148, 1, 0, 1	Pulse Relay 2	
5, 254, 148, 2, 0, 1	Pulse Relay 3	
5, 254, 148, 3, 0, 1	Pulse Relay 4	
5, 254, 148, 4, 0, 1	Pulse Relay 5	
5, 254, 148, 5, 0, 1	Pulse Relay 6	
5, 254, 148, 6, 0, 1	Pulse Relay 7	
5, 254, 148, 7, 0, 1	Pulse Relay 8	
4, 254, 146, 0, 0	Turn Off All Relays Then Turn On Relay 1	
4, 254, 146, 1, 0	Turn Off All Relays Then Turn On Relay 2	
4, 254, 146, 2, 0	Turn Off All Relays Then Turn On Relay 3	
4, 254, 146, 3, 0	Turn Off All Relays Then Turn On Relay 4	
4, 254, 146, 4, 0	Turn Off All Relays Then Turn On Relay 5	
4, 254, 146, 5, 0	Turn Off All Relays Then Turn On Relay 6	
4, 254, 146, 6, 0	Turn Off All Relays Then Turn On Relay 7	
4, 254, 146, 7, 0	Turn Off All Relays Then Turn On Relay 8	

Relay Grouping: Controlling Multiple Relays Together

Change the 100 value below to any value from 100-115 to control the starting relay. Values 100-107 turn off relays, values from 108-115 turn on relays. Example shown for Bank 1, change the 1 to any bank value supported by your controller.

- | | |
|-------------------|--|
| 4, 254, 100, 1, 1 | Turn Off Relays 1 and 2 as a Group |
| 4, 254, 100, 1, 2 | Turn Off Relays 1, 2 and 3 as a Group |
| 4, 254, 100, 1, 3 | Turn Off Relays 1, 2, 3 and 4 as a Group |
| 4, 254, 100, 1, 4 | Turn Off Relays 1, 2, 3, 4 and 5 as a Group |
| 4, 254, 100, 1, 5 | Turn Off Relays 1, 2, 3, 4, 5 and 6 as a Group |
| 4, 254, 100, 1, 6 | Turn Off Relays 1, 2, 3, 4, 5, 6 and 7 as a Group |
| 4, 254, 100, 1, 7 | Turn Off Relays 1, 2, 3, 4, 5, 6, 7 and 8 as a Group |
| 4, 254, 108, 1, 1 | Turn On Relays 1 and 2 as a Group |
| 4, 254, 108, 1, 2 | Turn On Relays 1, 2 and 3 as a Group |
| 4, 254, 108, 1, 3 | Turn On Relays 1, 2, 3 and 4 as a Group |
| 4, 254, 108, 1, 4 | Turn On Relays 1, 2, 3, 4 and 5 as a Group |
| 4, 254, 108, 1, 5 | Turn On Relays 1, 2, 3, 4, 5 and 6 as a Group |
| 4, 254, 108, 1, 6 | Turn On Relays 1, 2, 3, 4, 5, 6 and 7 as a Group |
| 4, 254, 108, 1, 7 | Turn On Relays 1, 2, 3, 4, 5, 6, 7 and 8 as a Group |

Relay Flashing

4, 254, 145, 1, 0	Turn Off Relay 1 Flashing
4, 254, 145, 2, 0	Turn Off Relay 2 Flashing
4, 254, 145, 3, 0	Turn Off Relay 3 Flashing
4, 254, 145, 4, 0	Turn Off Relay 4 Flashing
4, 254, 145, 5, 0	Turn Off Relay 5 Flashing
4, 254, 145, 6, 0	Turn Off Relay 6 Flashing
4, 254, 145, 7, 0	Turn Off Relay 7 Flashing
4, 254, 145, 8, 0	Turn Off Relay 8 Flashing
4, 254, 145, 9, 0	Turn Off Relay 9 Flashing
4, 254, 145, 10, 0	Turn Off Relay 10 Flashing
4, 254, 145, 11, 0	Turn Off Relay 11 Flashing
4, 254, 145, 12, 0	Turn Off Relay 12 Flashing
4, 254, 145, 13, 0	Turn Off Relay 13 Flashing
4, 254, 145, 14, 0	Turn Off Relay 14 Flashing
4, 254, 145, 15, 0	Turn Off Relay 15 Flashing
4, 254, 145, 16, 0	Turn Off Relay 16 Flashing

4, 254, 145, 1, 1	Turn On Relay 1 Flashing
4, 254, 145, 2, 1	Turn On Relay 2 Flashing
4, 254, 145, 3, 1	Turn On Relay 3 Flashing
4, 254, 145, 4, 1	Turn On Relay 4 Flashing
4, 254, 145, 5, 1	Turn On Relay 5 Flashing
4, 254, 145, 6, 1	Turn On Relay 6 Flashing
4, 254, 145, 7, 1	Turn On Relay 7 Flashing
4, 254, 145, 8, 1	Turn On Relay 8 Flashing
4, 254, 145, 9, 1	Turn On Relay 9 Flashing
4, 254, 145, 10, 1	Turn On Relay 10 Flashing
4, 254, 145, 11, 1	Turn On Relay 11 Flashing
4, 254, 145, 12, 1	Turn On Relay 12 Flashing
4, 254, 145, 13, 1	Turn On Relay 13 Flashing
4, 254, 145, 14, 1	Turn On Relay 14 Flashing
4, 254, 145, 15, 1	Turn On Relay 15 Flashing
4, 254, 145, 16, 1	Turn On Relay 16 Flashing

Relay Timers

The following command samples show you how to trigger relays for a duration of time. When the timer expires, the relay will turn off.

There are many parameters for this command, so the command parameters will be outlined briefly in this document:

7	Total Number of Bytes
254	Byte 1, Header Byte
50	Byte 2, Timer Series Commands
50-65	Byte 3, Timer 1 to 16, Use a separate timer for each relay
0-255	Byte 4, Hours of Duration Timer
0-255	Byte 5, Minutes of Duration Timer
0-255	Byte 6, Seconds of Duration Timer
0-255	Byte 7, Relay Controlled by this Timer

Technical Support

Technical support is available through our website, controlanything.com. **AccessNCD** is the way we connect NCD engineers to our customers.



*Click on the **AccessNCD** button located on the top right of the header of each page of our website.*

For technical support and application information, contact Travis Elliott, our technical engineer. If you feel that you have discovered a bug in the firmware of our controllers, contact Ryan Sheldon, our hardware developer. If you have programming-related questions or have discovered a bug in our software, please contact Shirui Xu, our software engineer.

The screenshot shows the top portion of the AccessNCD website. At the top left is the NCD logo. To its right is the text 'AccessNCD' and 'Connecting Customers to NCD Developers, Staff and Each Other'. Below this is a navigation bar with tabs for 'Main', 'My Page', 'Tech Support Staff', 'Photos', 'Videos', 'Forum', 'Blogs', and 'Store'. The 'Tech Support Staff' tab is selected. Below the navigation bar is a 'Featured Members' section with three profile pictures and their names and roles: Shirui Xu - Software Developer, TravisE NCD Technical Engineer, and RyanS - NCD Hardware Developer. To the right of the featured members is a box with the text 'Welcome to AccessNCD' and 'Sign Up or Sign In'.

Click the 'Tech Support Staff' tab and click on the appropriate engineer link for assistance. Click on our 'Forum' tab if you would like to post publicly or review problems that other customers have had and our recommended solutions.



Our engineers monitor questions and respond continually throughout the day. Before requesting telephone technical support, we ask that customers please try to resolve their problems through **AccessNCD** first. However, for persistent problems, NCD technical support engineers will schedule a phone consultation.

Contact Information

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PO Box 455
Osceola, MO 64776
417-646-5644 phone
866-562-0406 fax
Open 9 a.m. - 4 p.m. CST

All orders *must* be placed online at our website, www.controlanything.com

Notice:

The only authorized resellers of NCD products are

- www.controlanything.com
- www.relaycontrollers.com
- www.relaypros.com
- www.amazon.com

All other websites are not authorized dealers; we have noticed some retailers offering our products fraudulently.

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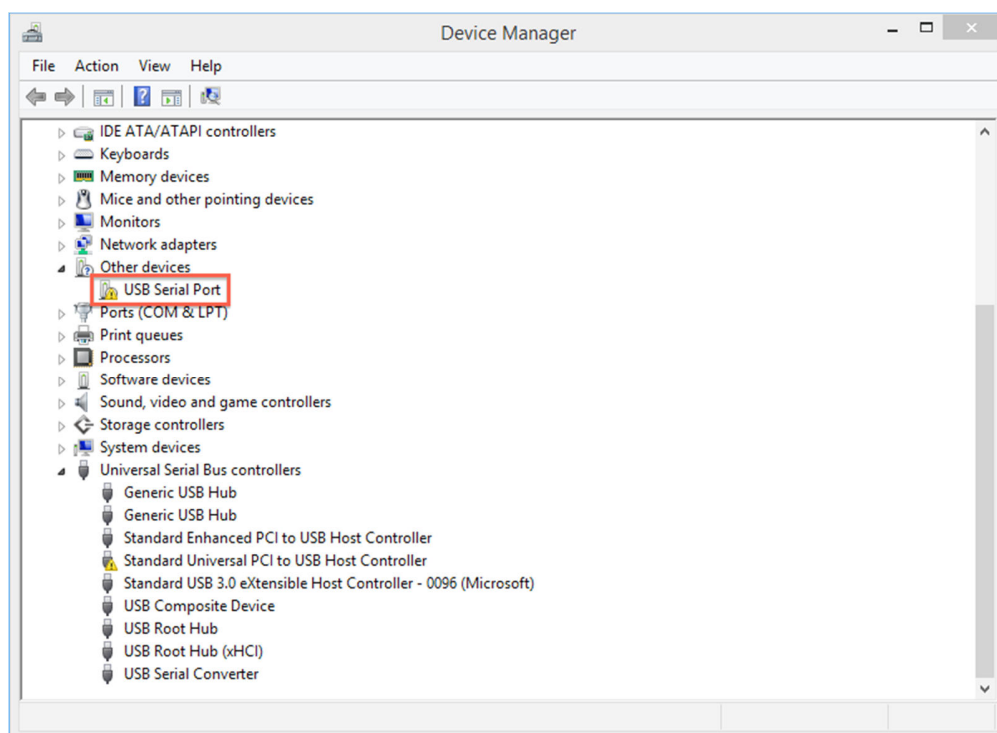
Troubleshooting

Section 1:

If the USB LED on the bottom of your ZIGMO does not light up after the ZIGMO has been connected to your Windows computer for a few seconds check to see if Windows is having trouble with the driver by checking your device manager. Windows Device Manager can be accessed through:

Control Panel/System and Security/System/Device Manager

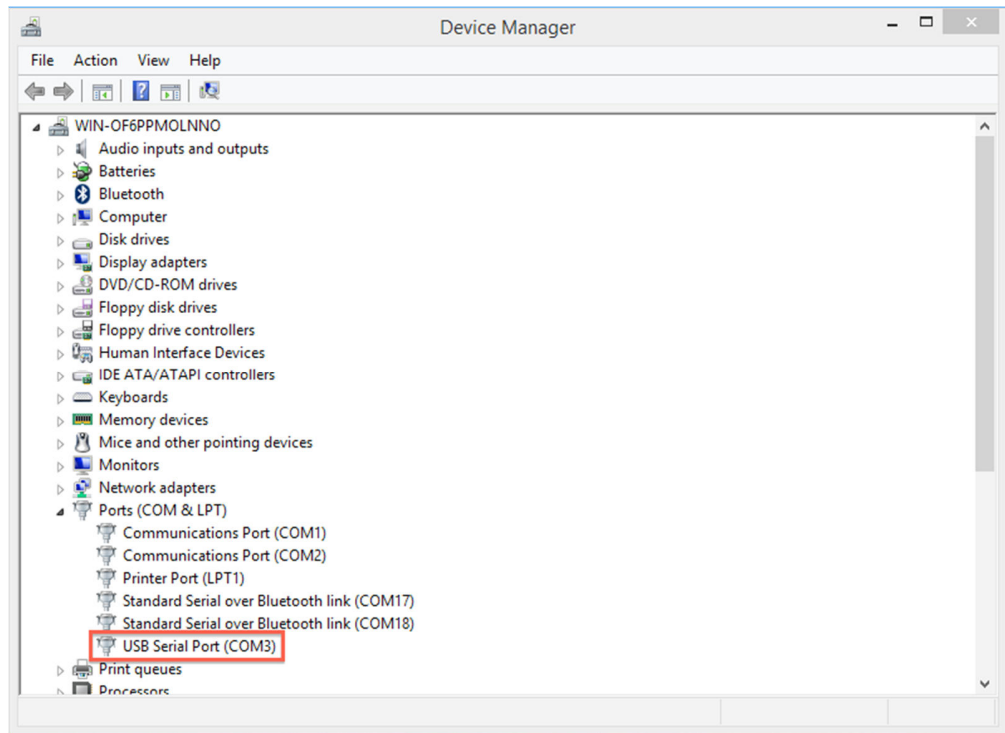
Check for things listed here with a Warning sign. Most likely if the ZIGMO is not recognized it will be listed under Other devices as shown in the picture below:



If this is the case download and install this driver:

<http://www.ftdichip.com/Drivers/CDM/CDM%20v2.10.00%20WHQL%20Certified.exe>

After this driver has been installed disconnect, then reconnect the ZIGMO with the computer. The USB LED should now turn on and you will see it listed in your Device manager under Ports COM & LPT as shown in the picture below:



If you see the USB Serial Port listed and the USB LED on your ZIGMO is on then everything is working properly and you may proceed.