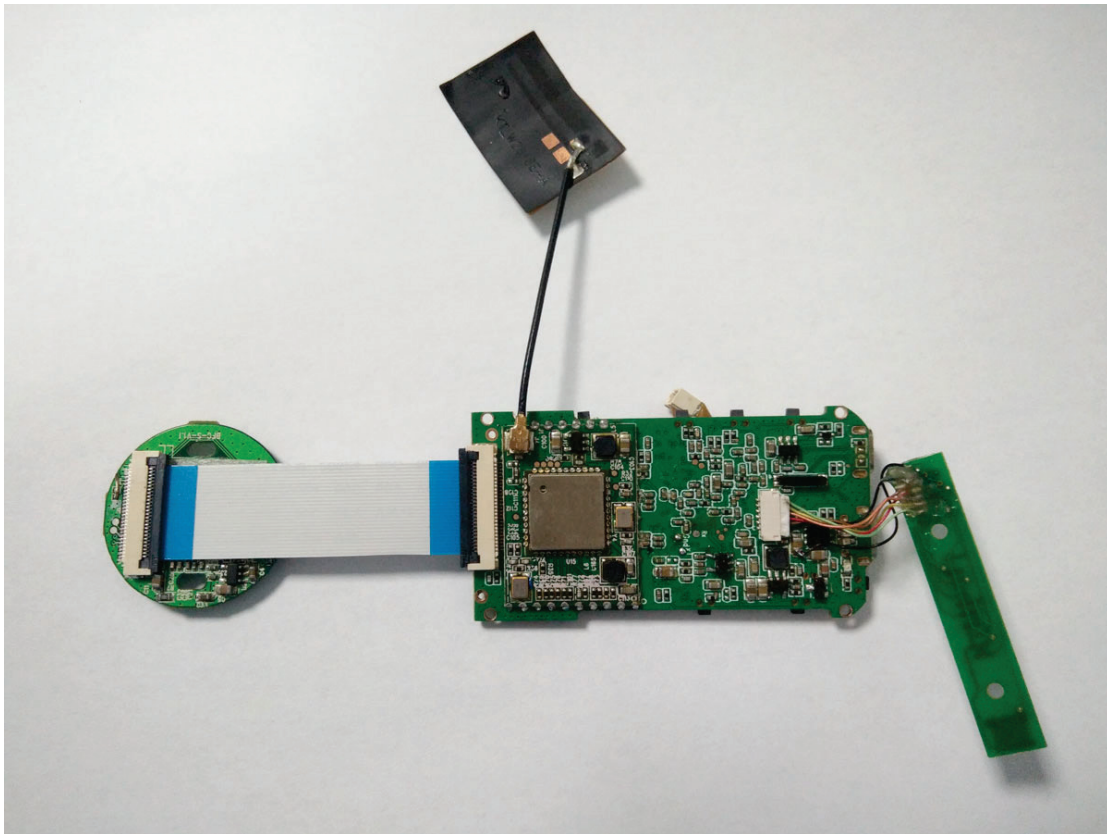




**WIRELESS MODULE**

**FF-MDL-WF-X7X**

**User Manual**



### **THANKS FOR SELECTING A FIREFLY WIRELESS MODULE**

To take full advantage of this product's advanced capabilities,  
and to properly and safely use this product, please read the manual carefully.

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Firefly Global assumes no responsibility for any injury, or for any illegal or improper use of the product, that may result from failure to use this product in accordance with the instructions, cautions, warnings, or indications for use published in this manual.

Software in this product is copyright of Firefly Global and its vendors. All rights are reserved. The software is protected by U.S. and international copyright laws and international treaty provisions applicable worldwide. Under such laws, the licensee is entitled to use the copy of the software incorporated with this instrument as intended in the operation of the product in which it is embedded. The software may not be copied, decompiled, reverse-engineered, disassembled or otherwise reduced to human-perceivable form. This is not a sale of the software or any copy of the software; all rights, title, and ownership of the software remain with Firefly and/or its vendors.

Caution: Changes or modifications not expressly approved by Firefly Global will void the purchaser's authority to operate the equipment and its warranty.

Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

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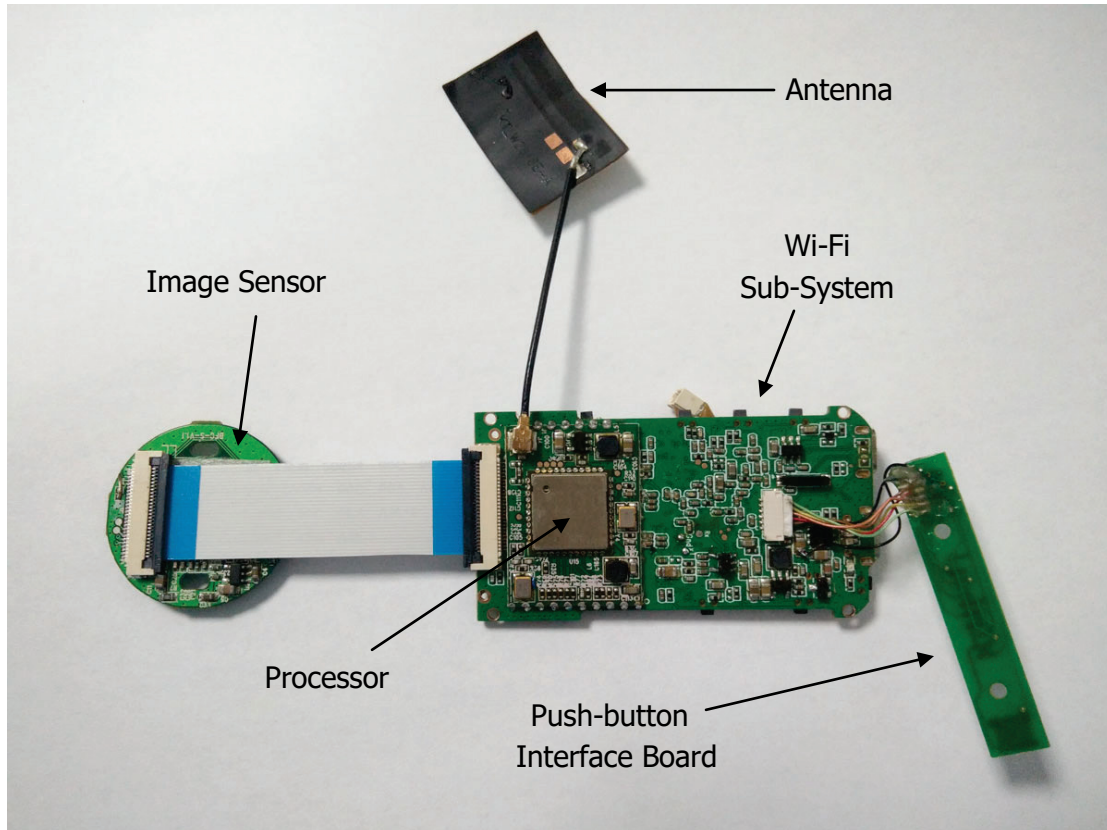
# INTRODUCTION

The Firefly FF-MDL-WF-X7X wireless module is an ideal platform to build medical, scientific, and industrial cameras. The module includes various subsystems listed below:

|                             |                                                                                                                             |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Image Sensor                | Captures images up to 4224x2376 resolution<br>Streams 30fps video up to 720p HD                                             |
| Processor                   | Performs real time imaging and video processing<br>Controls all external user system interfaces<br>Manages system resources |
| Wi-Fi Sub-System            | Handles wireless transmission of images<br>and video to external host                                                       |
| Antenna                     | Improves Range and robustness of Wi-Fi function                                                                             |
| Push-Button Interface Board | Accommodates external user controls                                                                                         |

# NOMENCLATURE

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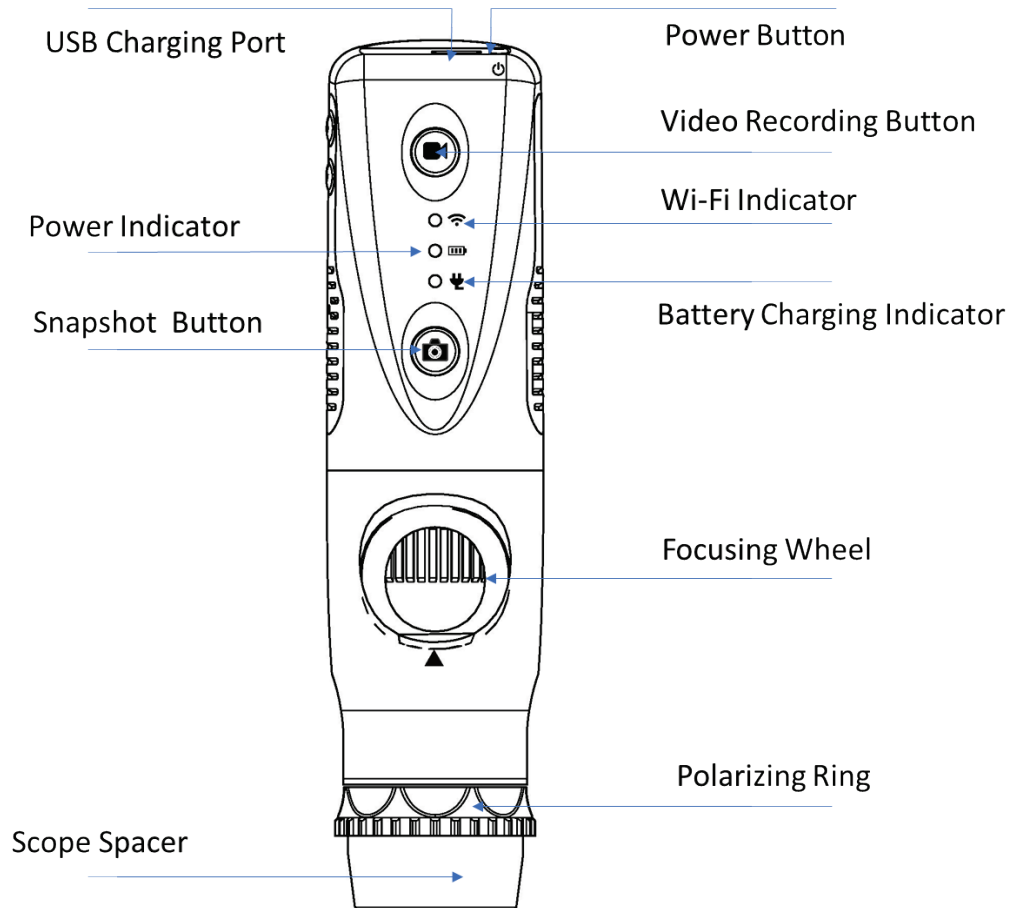
## SYSTEM INTEGRATION

Using the module enables the design and construction of a variety of wireless cameras. The cameras built with the FF-MDL-WF-X7X wireless module will offer several User-Friendly capabilities.

- Image snapshot
- Video streaming
- Manual focus
- Brightness control
- Digital zoom
- Low powered battery-based operation

Detailed electrical and software interfaces for the FF-MDL-WF-X7X wireless module are documented and are available under non-disclosure agreements. To obtain these documents, please contact Firefly Global at [sales@fireflyglobal.com](mailto:sales@fireflyglobal.com).

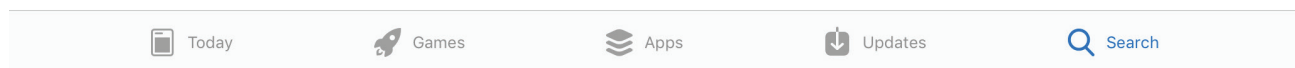
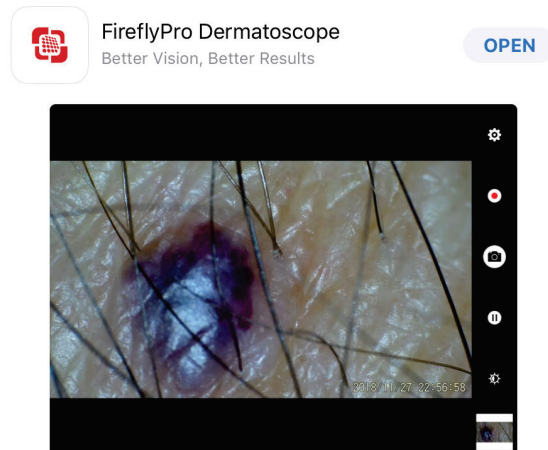
As an example, by leveraging these features, it is possible to build a dermatoscope. The following picture describes Firefly's Wireless DE370 Dermatoscope.



## OPERATION

### Downloading the iOS Application:

To download the application, please visit the Apple App Store and type "Firefly Pro Dermatoscope"



### Launching the Software Application:

After Firefly Pro has been installed, simply open the application by tapping on the Firefly Pro icon once and follow the set-up instructions.



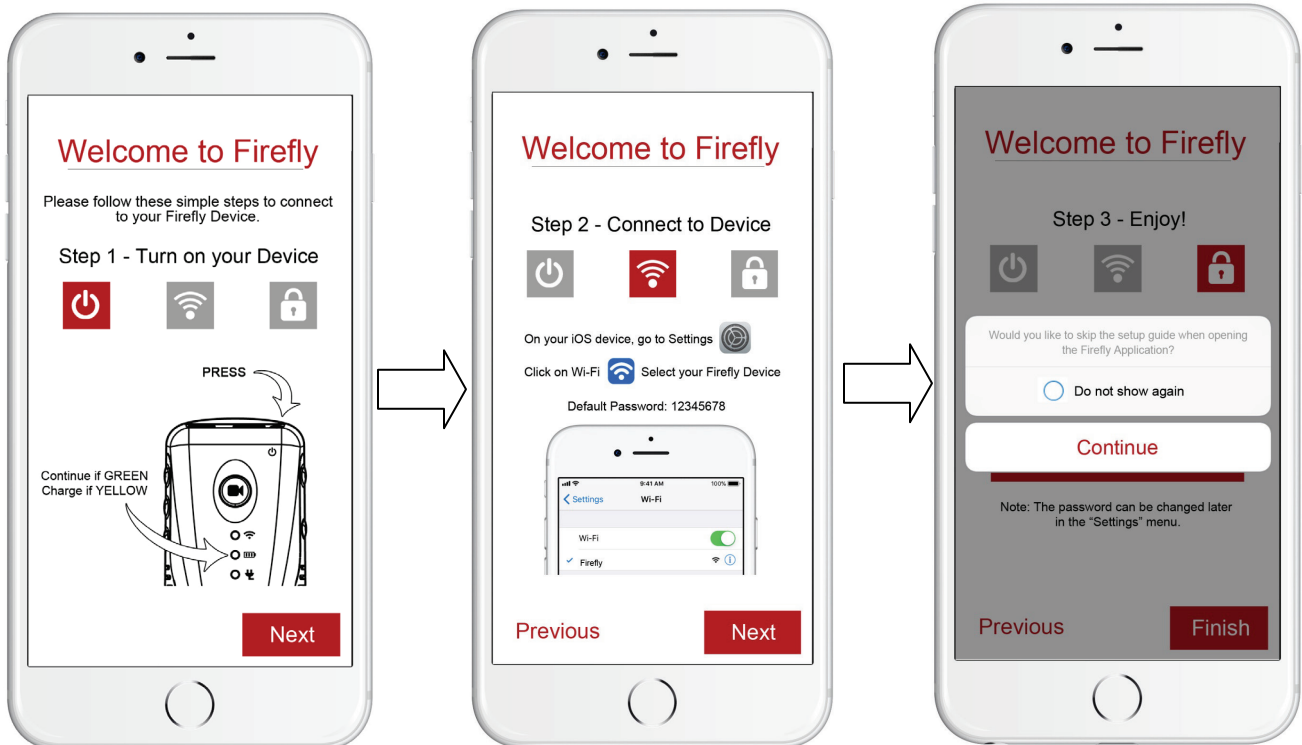
Firefly

The application has the capabilities to take photos and record videos, and is designed to be user friendly and self-explanatory.

# FIREFLY PRO APPLICATION

## Setup Guide:

The FF-MDL-WF-X7X Wireless module will act as a Wi-Fi access point. Follow the steps in the on-screen Setup Guide to allow the FF-MDL-WF-X7X Wireless module to connect to an iOS device.



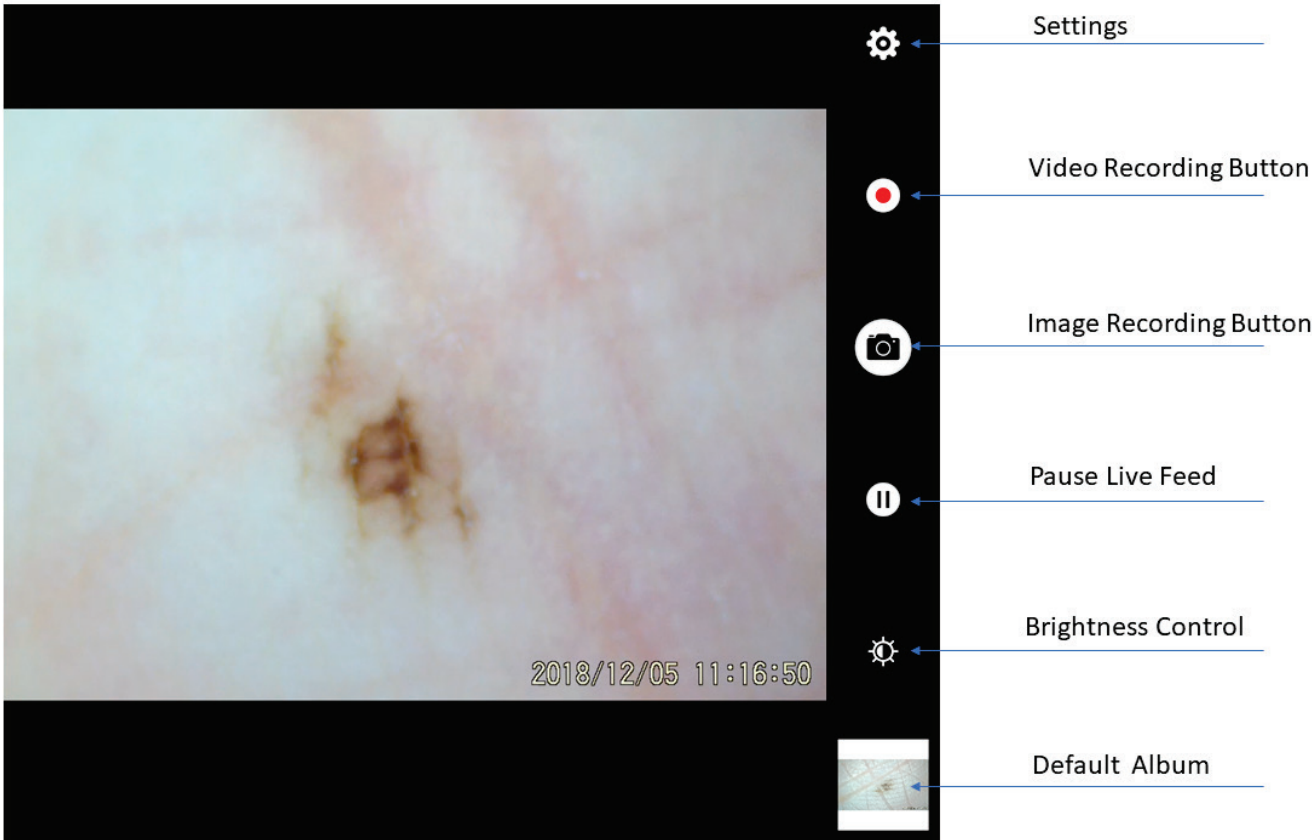
# Establishing a Connection:

Once the FF-MDL-WF-X7X has established a connection to the iOS device, the Firefly Application will display a connection progress bar. Once the progress bar turns completely red, the Live Feed will populate.



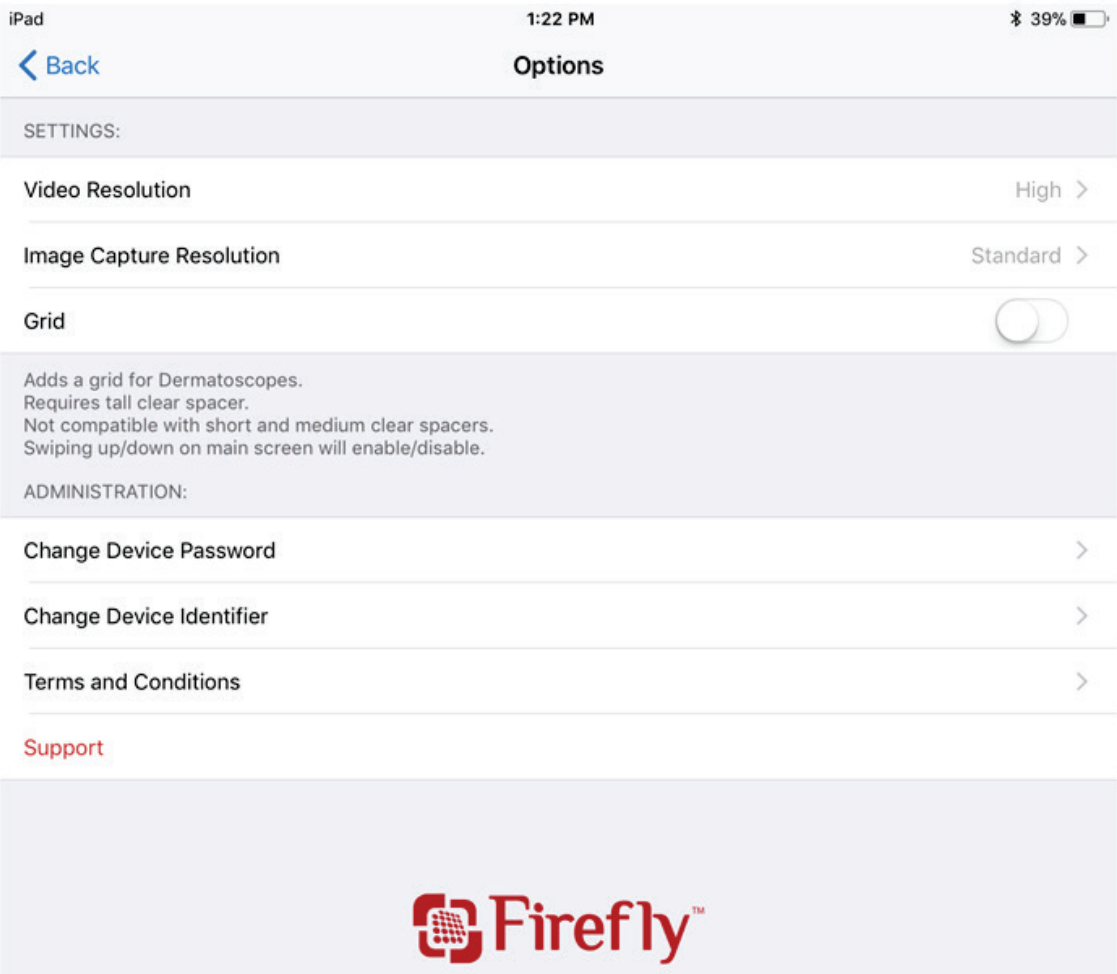
# Live Feed Main Screen:

The Live Feed Main Screen will allow you to view live video, open the settings, record a video, take a snapshot, pause the live feed, and adjust the brightness control.



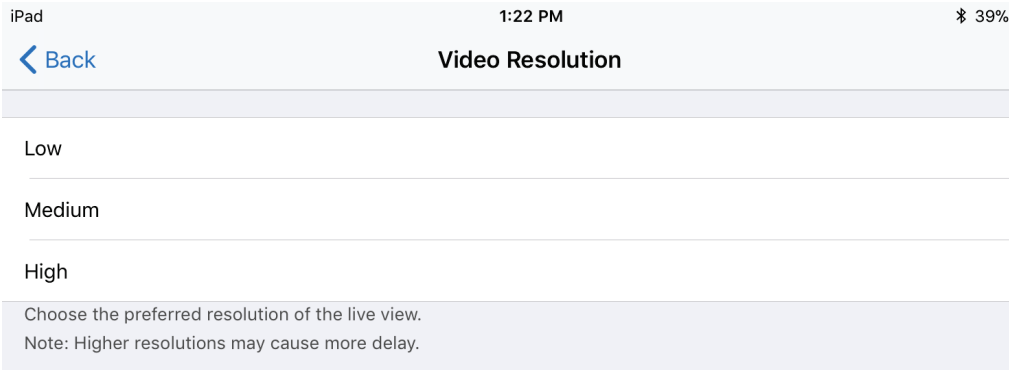
# Settings Options Screen:

The Settings options Screen offers access to the Video Resolution, Image Capture Resolution, Change the Device Password, and Device Identifier options.



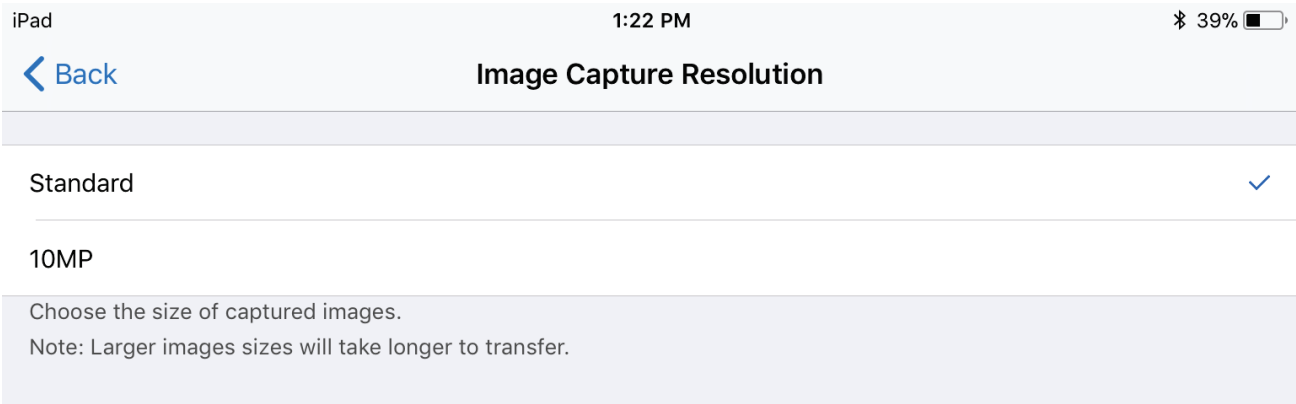
## Video Resolution Screen:

The video resolution screen allows the option to view the live video in Low, Medium, or High resolution.



## Image Capture Resolution Selection:

The image capture resolution will allow the user to capture images in Standard or 10MP resolution.



## MAINTENANCE AND SERVICE

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The Firefly FF-MDL-WF-X7X wireless module is intended to be an embedded module which will be used in medical, scientific, and industrial cameras. As such, care must be taken to provide sufficient ventilation and a dry operational environment. Please refer to the important specifications that are highlighted in the specifications section of this user manual.

### Recycling the System Components



#### **Within the EU**

Do not dispose of this product as unsorted municipal refuse. Submit for separate collection as specified by Directive 2002/96/EC of the European Parliament and the Council of the European Union on Waste Electronic and Electrical Equipment (WEEE).

If this product is contaminated, this directive does not apply. For more specific disposal information contact Customer Service.



#### **Outside the EU**

When the product and its components reach end of life, recycle the product according to national, state, and local regulations.

## SERVICE POLICY

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All repairs on products under warranty must be performed or approved by Firefly or its authorized resellers. Unauthorized repairs will void the warranty. In addition, whether or not covered under warranty, any product repair shall exclusively be performed by Firefly-certified service personnel.

If the product fails to function properly — or if you need assistance, service, or spare parts — contact your Firefly reseller.

Before contacting your reseller, try to duplicate the problem and check all accessories to ensure that they are not causing the problem. When calling, please be prepared to provide:

- Product name and model number and complete description of the problem.
- Serial number of your product (if applicable).
- Complete name, address and phone number of your facility.
- For out-of-warranty repairs or spare parts orders, a purchase order (or credit card) number.
- For parts orders, the required spare or replacement part numbers.

If your product requires warranty, extended warranty, or non-warranty repair service, please contact your Firefly reseller. A customer service representative will assist you in troubleshooting the problem and will make every effort to solve it over the phone, avoiding potential unnecessary returns. In case a return cannot be avoided, the representative will record all necessary information and will provide a Return Authorization number, as well as the appropriate shipping address. The Return Authorization number must be obtained prior to any return.

If you have to return your product for service, follow these recommended packing instructions:

- Disconnect all hoses, cables, sensors, power cords, and ancillary products (as appropriate) before packing, unless you suspect they are associated with the problem.
- Wherever possible use the original shipping carton and packing materials.
- Include a packing list and the Return Authorization number.

It is recommended that all returned goods be insured. Claims for loss or damage to the product are the responsibility of the sender.

# SPECIFICATIONS

| Item                                   | Specification                        |
|----------------------------------------|--------------------------------------|
| <b>Dimensions</b>                      |                                      |
| Antenna                                | 27mm x 19mm                          |
| Images sensor                          | 27mm in Diameter                     |
| Circuit Board                          | 57mm x 30.2mm                        |
| Button interface Board                 | 40mm x 7.4mm                         |
| <b>Power</b>                           |                                      |
|                                        | 3.7V @ 550mA                         |
| <b>Operating conditions</b>            |                                      |
| Temperature                            | +10°C to +40° C (+50°F to +104°F)    |
| Relative humidity                      | 30% to 75% noncondensing             |
| Altitude                               | 700 to 1060 hPa                      |
| <b>Shipping and storage conditions</b> |                                      |
| Temperature                            | -20°C to +49°C (-4°F to +120°F)      |
| Relative humidity                      | 95% noncondensing max.               |
| <b>Radio Specifications</b>            |                                      |
| Modulation                             | WiFi 802.11ac                        |
| Output Power                           | 10dBm to 14 dBm ± 1.5 dB             |
| Sensitivity                            | PER @ -59dBm to -91bBm               |
| Max Input Level                        | -20dBm to -30dBm                     |
| Coverage                               | Over 5 meters (15ft) on open field   |
| <b>Battery</b>                         |                                      |
| Duration                               | More than 1.5 hours continuous usage |
| Capacity                               | 1500mAh (Lithium battery)            |
| <b>Safety Compliance</b>               |                                      |
|                                        | FCC, CE and RoHS compliant           |

## LIMITED WARRANTY

### Limited Hardware Warranty (through distributors & resellers)

Firefly Global hardware products come with a 1-year limited hardware warranty. The warranty is extended through Firefly Global authorized representatives and resellers. If you have a warranty claim, please contact the store, distributor, or website through which the product was purchased.

Register your Firefly device at <http://www.fireflyglobal.com/warranty-registration/> within two weeks of your purchase and maintain your original receipt.

### What is covered by this limited hardware warranty?

This limited hardware warranty covers defects in materials and workmanship in your Firefly Global hardware products.

### What is not covered by this limited hardware warranty?

This limited hardware warranty does not cover:

- Software, including the operating system and software added to or bundled with the Firefly Global hardware products
- Problems that result from:
  - External causes such as accident, abuse, misuse, or problems with electrical power
  - Servicing not authorized by Firefly Global
  - Usage that is not in accordance with product instructions
  - Failure to follow the product instructions
  - Problems caused by using accessories, parts, or components not supplied by Firefly Global
- Products with missing or altered serial numbers
- Products for which Firefly Global or its distributors have not received payment
- Normal wear and tear

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE (OR JURISDICTION TO JURISDICTION). FIREFLY GLOBAL'S RESPONSIBILITY FOR MALFUNCTIONS AND DEFECTS IN HARDWARE IS LIMITED TO REPAIR AND REPLACEMENT AS SET FORTH IN THIS WARRANTY STATEMENT. ALL EXPRESS AND IMPLIED WARRANTIES FOR THE PRODUCT, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN

TIME TO THE TERM OF THE LIMITED WARRANTY PERIOD REFLECTED ON YOUR PACKING SLIP OR INVOICE. NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, WILL APPLY AFTER THE LIMITED WARRANTY PERIOD HAS EXPIRED. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THIS LIMITATION MAY NOT APPLY TO YOU.

WE DO NOT ACCEPT LIABILITY BEYOND THE REMEDIES PROVIDED FOR IN THIS LIMITED HARDWARE WARRANTY OR FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY LIABILITY FOR THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES, FOR PRODUCTS NOT BEING AVAILABLE FOR USE, OR FOR LOST DATA OR LOST SOFTWARE. OUR LIABILITY WILL BE NO MORE THAN THE AMOUNT YOU PAID FOR THE PRODUCT THAT IS THE SUBJECT OF A CLAIM. THIS IS THE MAXIMUM AMOUNT FOR WHICH WE ARE RESPONSIBLE.

### **How long does this limited hardware warranty last?**

The limited hardware warranty on all Firefly Global products begins on the date of the packing slip, invoice, or receipt. The warranty period is not extended if a warranted product or any parts are repaired or replaced. Firefly Global may change the availability of limited hardware warranties, at its discretion, but any changes will not be retroactive.

### **What do I do if I need warranty service?**

Before the warranty expires, please contact the store, distributor, or website through which the product was purchased.

### **What will Firefly Global do?**

Firefly Global or its authorized representative or reseller will repair any Firefly Global hardware products returned that prove to be defective in materials or workmanship. If Firefly Global or its authorized representatives are not able to repair the product, we will replace it with a comparable product that is new or refurbished.

When you contact our authorized representatives or resellers via phone or email, they will issue a Return Material Authorization Number for you to include with your return. You must return the products in their original or equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk if the product is lost or damaged in shipment. The repaired or replacement products will be returned to you. The reseller or authorized representative will pay to ship the repaired or replaced products to you if you use a delivery address in the country where the reseller is located. Otherwise, the product will be shipped to you freight collect.

If it is determined that the problem is not covered under this warranty, you will be notified and informed of service alternatives that are available to you on a fee basis.

**How will you fix my product?**

We use new and refurbished parts made by various manufacturers in performing warranty repairs and in building replacement parts and systems. Refurbished parts and systems are parts or systems that have been returned to Firefly Global, some of which were never used by a customer. All parts and systems are inspected and tested for quality. Replacement parts and systems are covered for the remaining period of the limited hardware warranty for the product you bought. Firefly Global owns all parts removed from repaired products.

**May I transfer the limited hardware warranty?**

Limited hardware warranties are not transferable.

## TROUBLESHOOTING

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Please visit the FAQ section of our website for the latest troubleshooting information and additional support. <http://www.fireflyglobal.com/>

**Thank you for choosing Firefly.**



[www.fireflyglobal.com](http://www.fireflyglobal.com)

## **Federal Communication Commission Statement (FCC, U.S.)**

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 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.

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.

### **FCC Caution:**

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

## **IMPORTANT NOTES**

### **Co-location warning:**

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

### **OEM integration instructions:**

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module.

As long as the conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

### **Validity of using the module certification:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

### **End product labeling:**

The final end product must be labeled in a visible area with the following: "Contains Transmitter Module FCC ID: OXU-FFMDLWFX7X".

**Information that must be placed in the end user manual:**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

**FCC Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.