DragonLink User Guide

Chris Seto, 2012
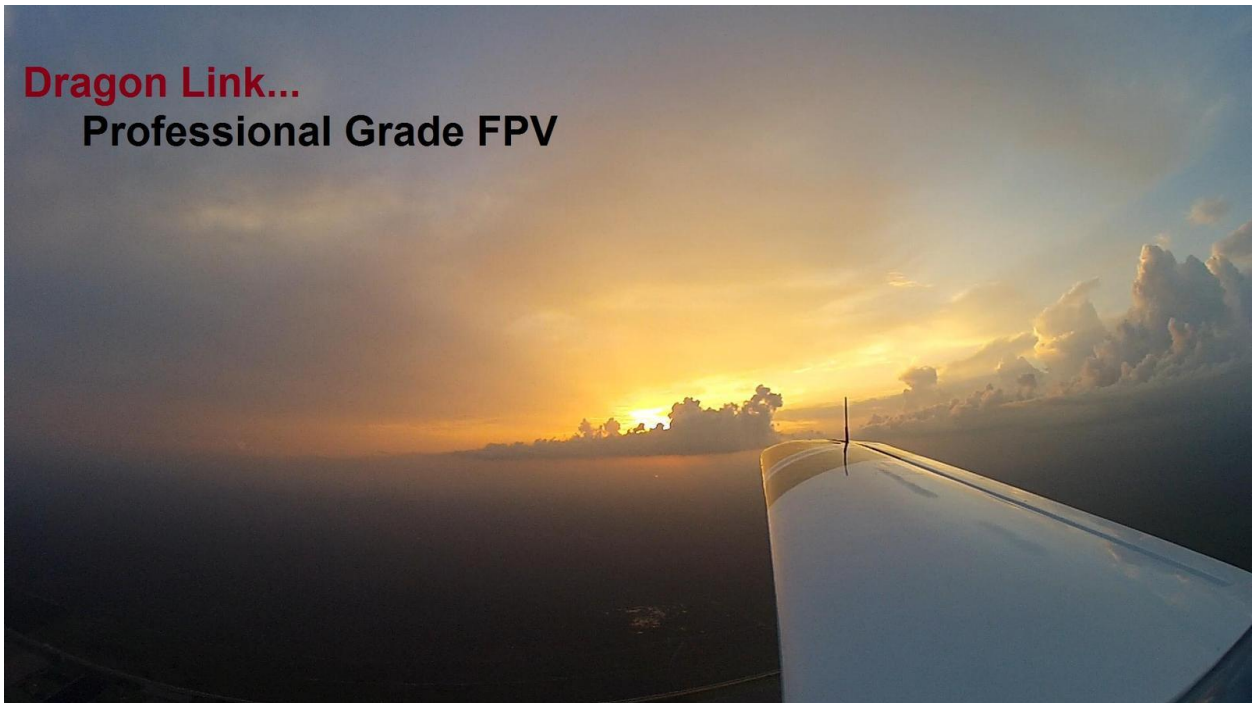
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This document is in beta status.

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Professional Grade FPV

Quick Start Checklist

The following steps will get your DragonLink setup and ready for flight. Please be sure to review the warnings in **bold**, and it is recommended that you read this list once over before performing it, in order to familiarize yourself with the setup process. Some of these steps are explained more in depth in later parts of this guide; A more expansive explanation of these setup procedures is available by simply skipping this section and following the chapters in order starting with the section titled "PPM".

1. Connect the DragonLink Transmitter to your RC transmitter. Power, PPM and Ground must all be connected to their respective pins, as shown in the section titled "*PPM*".
2. If you have a headtracker, connect it in the same way you did with the transmitter. Please see the section titled "*Headtracker Configuration*" for more information.
3. If applicable, set your RC transmitter to output in "PPM mode" or activate your trainer port. Not all radios have these options, so you may need to check your RC transmitter's manual.
4. Connect an SMA antenna to the DragonLink Transmitter. ***Do not operate the DragonLink transmitter without either a properly tuned (70cm band) or dummy load attached to the antenna port! Failure to comply with this warning can or will result in the RF frontend of the transmitter burning out.***
5. Turn on your RC transmitter as well as the DragonLink. You should see a solid GREEN light. ***If you get anything other than a solid GREEN light, you <u>must</u> stop here and troubleshoot why your DragonLink is not getting a PPM signal.***
6. Connect the DragonLink receiver to your power supply. 5-6 volts is recommended for input power. ***Using voltages higher than 5-6 volts may damage your servos or other attached equipment!***
7. Attach the servos/ESCs/other devices to the DragonLink's servo ports. If you need to, you can connect PPM and/or RSSI at this time.
8. Install the SMA antenna on the DragonLink receiver.
9. Install the SMA antenna on the DragonLink transmitter.
10. Calibrate the DragonLink with the following steps. See the section titled "*Calibration*" for more information.
    a. Hold down the bind/menu button on the DragonLink transmitter. Do not release
    b. Turn on your DragonLink transmitter and RC transmitter.
    c. Hold down the LED for about 10 seconds, or until it turns RED

d. The LED should now be flashing from RED to GREEN slowly. This means the transmitter is in calibration mode.

e. If the LED is not flashing RED and GREEN, start from step "a" again and repeat until you have the LED flashing from RED to GREEN

f. Leave the transmitter running like this, and put a jumper across the signal pins of the receiver's channels 5 and 6.

g. Power on the receiver. You must see the RED, GREEN and BLUE LEDs lit. If you do not, please check that the jumper is in the correct position

h. Leave the DragonLink pair for a full 15 minutes to calibrate. After 15 minutes has elapsed, power everything off.

11. Change the ID of the transmitter with the following steps. See the section titled "*ID Change*" for more information.

a. Start with the DragonLink TX powered off

b. Press and hold the bind/menu button on the top of the DragonLink TX

c. Apply power to the DragonLink TX.

d. Wait. The LED will flash several sequences of colors. Continue to hold the button down.

e. After around 15 seconds, the LED will go completely dark.

f. If the LED has not gone completely dark after 30 seconds, start from step "a" again.

g. Release the button, and power cycle the DragonLink TX.

12. Bind the DragonLink pair with the following steps. See the section titled "*Binding*" for more information.

a. Start with both the DragonLink TX and RX powered off.

b. Press and hold the bind/menu button on the DragonLink TX.

c. While holding the button, turn the DragonLink TX on.

d. Hold the button for about 5 seconds or until the LED turns YELLOW.

e. The DragonLink's LED should now be flashing YELLOW. If it isn't, restart the process from step 1.

f. Power on the DragonLink RX.

g. The DragonLink RX's "status" LED will come on.

h. Power cycle the DragonLink TX.

i. As soon as the DragonLink TX comes on, the DragonLink RX's "status" LED should go dark.

j. Power cycle the DragonLink RX.

13. At this point, you should have RC control of the servos and/or other equipment attached to your DragonLink. Verify again that you have both a green light on

TX and a blue link light on the RX. You must have both of these before continuing.

14. Now, set the failsafe on the DragonLink RX. See the section titled "*Setting the Failsafe*" for more information.

    a. Start with the DragonLink TX and RX on, as well as the RC transmitter. You must have a green light on the DragonLink TX, and a blue light on the DragonLink RX indicating a link before proceeding.

    b. Put the sticks and switches into the configuration they must be in during a failsafe condition.

    c. Press and hold the failsafe/menu button on the DragonLink TX for at least 5 seconds.

15. Perform the preflight and range check. See the section titled "*Preflight and Range Check*" for more information.

    a. Check all cables and interconnects.

        i. All connectors should be snug

        ii. The SMA antenna connectors should be smug, but not over tightened.

        iii. Cables should be free from fraying, exposed conductors

        iv. Verify all wires follow the connectors into their housing and there are no wires on the verge of removing themselves from secure crimps

    b. Check that the antennas are connected on both the DragonLink TX and RX

    c. Power the DragonLink on in MicroPower Mode (See the section titled "*RF Output Power Levels*"). Verify slow flashing green light on the TX and blue light on the RX.

    d. Walk off between 20 and 30ft holding the DragonLink transmitter as you go. If the aircraft is placed on a table, you should start to see a failsafe around 20-30ft. If the range before failsafe is much shorter than this, you have a problem with your configuration and you must check this before flight.

    e. If you surpass this distance without a consistent failsafe, you are OK for flight.

16. This concludes the DragonLink setup process.

DragonLink Versions

Over the years, several different versions of the DragonLink Transmitter have been produced and sold. These versions can usually be identified by their look or their date of purchase and can be separated into 2 versions, DragonLink V1 and DragonLink V2.

DragonLink V1 was the first ever DragonLink produced and sold by John Lee. The project was later given to Mike Bigelow, who continued to expand and develop both the company and the product, during which time DragonLink V2 was developed.

Besides a large software overhaul and a total redesign of the hardware, the DragonLink V2 has several important physical changes:

- The addition of the serial and headtracker port
- The fully rectangular case design with the silkscreen dragon logo and connector labels
- RF high/low power switch

In order to tell the difference between a DragonLink V1 and V2 board, notice that one side of the case of the DragonLink V1 is rounded. On the V2, all sides are 90 degree with no such rounding.

Receiver

Like the DragonLink TX, the DragonLink receivers have changed over the years as well. Although parts of the receiver have changed, many features stay the same. All DragonLink receivers have PPM, RSSI and SMA antenna ports.

- 9 channel
  - These can be identified by their blue PCB and set of 9 servo output channels.
- 12 channel a/b/c
  - These can be identified by their red PCB and 12 servo output channels.
- 12 channel V2
  - These are the most current receivers sold with the DragonLink
  - These can be identified with their black PCB, and three LED indicators.
  - Please note, on some of these receivers, the servo outputs are labeled backwards on one side. Although the pinout is consistent (gnd, positive, signal) , the servo outputs are reversed such that channel 8 is actually channel 1, and channel 1 is channel 8.

Getting to know the DragonLink Hardware

Transmitter (TX)

The DragonLink transmitter is the black box in your kit with the DragonLink logo on it.

The top of the transmitter includes (from left to right):

1. The bind/menu button
2. The multicolor GREEN/RED/YELLOW LED
3. The SMA 70cm band antenna port
4. The RF power level switch

[Picture of the top of the DragonLink TX here, with labels]

The bottom of the DragonLink includes (from left to right):

1. The transmitter PPM and power connection
2. The headtracker PPM and power connection
3. The firmware upgrade serial port

[Picture of the bottom of the DragonLink TX here]

Receiver (RX)

The DragonLink receiver is the long, slender heatshrunk wrapped device that comes with your DragonLink kit.

The DragonLink receiver contains all the ports and pins required to connect to your RC equipment. On newer receivers, the pins are brought out at a 90 degree angle with the closest pin to the bottom of the receiver (the bottom PCB is the side of the device that is on the opposite side of the SMA antenna connector) ground, with the next pin up 5V, and the final pin on the side of the SMA connector being signal (whether that might be RSSI, servo or PPM).

[Picture of the right side of DragonLink RX here]
[picture of the left side of the DragonLink RX here]

Bind/Menu Button

On the top of the DragonLink, you will find the Bind/Menu button. This button serves a number of purposes:

- Accessing LED menu features:
    - MicroPower Mode
    - Bind
    - Calibrate
    - ID Change
- Putting the DragonLink RX into failsafe mode

The LED menu uses the LED to signal the selection of a particular menu option after the menu button has been held while the DragonLink was powering up. These menu options change every 5 additional seconds the button is held, and the changing of a selected menu option is signaled by the LED changing color. In order to enter a particular mode, hold the button, turn the DragonLink on, and keep holding the button until the LED glows the color associated with the menu option you wish to activate. Release the button and the DragonLink will perform the action or enter the mode currently indicated by the LED.

The following list explains what color to release the button on for a given menu option, as well as the pattern the LED will flash when the DragonLink has entered that menu option.

- MicroPower (Hold the button for at least 2 seconds, or until the LED turns GREEN almost immediately after powerup)
    - Slow flashing between GREEN and OFF
    - *See the "MicroPower" section for more details*
- Bind (Hold the button down for at least 5 seconds, or until the LED turns YELLOW)
    - Fast flashing between YELLOW and OFF
    - See the "Binding and Failsafe" section for more details.
- Calibrate (Hold the button at least 10 seconds, or until the LED turns RED)
    - Fast flashing between RED and GREEN
    - *See the "Calibration" section for more details*
- ID Change (Hold the button until the LED goes completely dark after roughly 15 seconds)
    - LED will remain completely dark.
    - *See the "ID Change" section for more details*

During normal operation, the bind/menu button may also be used to set the failsafe on the DragonLink RX. See the section titled "*Setting the Failsafe*" for more information.

PPM

PPM is one of the most important technical concepts behind the DragonLink and RC devices in general. PPM is a way of representing any number of servo or ESC channels on a single wire using timing variations to represent individual servo positions. PPM is sometimes referred to as "channel sum" or "servo sum". The reason for this is due to the fact that a PPM signal looks like several individual servo signals pushed together into one. In the old days of RC, primitive receivers would split each individual servo signal off from the PPM "sum". Modern RC radio equipment no longer send this PPM signal over the air, and instead send digital "packets" of information which can be checked for errors on the RX end. Though the concept is many years old, PPM remains the primary way to transmit multiple servo positions over a wire link. One example of this is the trainer port on your RC transmitter, which can input or output PPM depending on if it's being used in a "buddy box" configuration, or if it's being connected to the DragonLink.

The first step to your DragonLink setup is to obtain the PPM signal from your RC transmitter. As mentioned, this can be commonly found coming from the trainer port on your radio. Depending on the manufacturer of your radio, getting the PPM signal will differ slightly.

To complete this step, please see the online guide at the following URL: http://www.dragonlinkstore.com/v2/node/9

Headtracker (HT) Configuration

The headtracker is a device designed to solve the problem of not being able to pan and tilt the camera on an FPV aircraft intuitively. Instead of using a spare set of channels on the RC transmitter, the pilot can use a set of video goggles and a headtracker to simply allow the airborne camera to pan or tilt whichever direction he or she looks. Headtrackers work by using a combination of a digital gyro and several other sensors to detect when a user has moved their head. Headtrackers are typically small boxes (or in some cases, exposed printed circuit boards) that are mounted on top of a hat or video goggles. Much like an RC transmitter, headtrackers output a similar PPM signal that the DragonLink can also process.

If you have a headtracker, the first thing you will want to do is connect it to the DragonLink **before** binding. The DragonLink does include the number of channels in the binding process to the RX, and it will add an extra two channels to the count of the RC transmitter if the headtracker is present. Thus, the headtracker must be connected before binding.

To electrically connect the headtracker, you will first need to attach power and ground. Depending on the model of the device, it may have a separate power jack, or power may be built into the main cable. The DragonLink does have a power output port on the headtracker power which can be used to forward the DragonLink's power supply to the headtracker as well. You will of course also need to connect the headtracker's ground to the DragonLink's ground. Finally, connect the signal wire to the signal pin on the DragonLink headtracker port.

The DragonLink is set up to detect the headtracker's pan and tilt output on the last two channels of the headtracker's PPM output. This means that if your HT has 8 channels, you will want to set it up so that it outputs pan and tilt on channels 7 and 8.

Once the headtracker is connected and the DragonLink is bound, the pan and tilt channels will be available on the two channels immediately following those belonging to the RC transmitter. EG; on a 6 channel transmitter, pan and tilt will be on channels 7 and 8 of the DragonLink RX.

The following HTs are tested with the DragonLink and known to work well, although in theory any headtracker that allows output on channels 6 and 7 should work fine:

- FatShark MIG (http://www.fatshark.com/migext.html)

Initial Power Up and LED Codes

Finally, this is the section where the DragonLink transmitter will be turned on and configured. First of all, you must double check all wiring. Make sure power and ground connections go where they need to be. If all looks correct, connect your choice of included antenna to the SMA port on the DragonLink. ***Do not power the DragonLink transmitter up without an antenna! This can cause permanent damage to your DragonLink TX.***

Once the antenna is attached, power on the headtracker, power on the RC transmitter and finally, power on the DragonLink transmitter. The DL TX will boot up, and in the process you will see several sequences of LED flashes followed by a solid RED or GREEN LED.

If you get a GREEN LED, you have successfully performed the electrical setup of your DragonLink! Proceed to the next chapter in this guide.

If you do not get a GREEN LED, you may get one of the following:

- A fast flashing RED LED:
  - o A fast flashing RED LED indicates the DragonLink did start up and got power, however it was never able to obtain even an initial PPM frame from the RC transmitter.
  - o Check your wiring. Make sure all wires are connected properly
  - o Make sure your RC transmitter is in "PPM mode".
  - o If applicable, you may need to check that your PPM frame size is "22ms"
- A slow flashing RED LED:
  - o A slow flashing LED indicates that the DragonLink did, at one time, obtain na valid PPM frame, however the PPM stream was eventually lost.
  - o Check your wiring. Since the DragonLink did get a valid PPM stream at one time, a wire may be loose.
- No lights at all
  - o If you get no light at all, the DragonLink is not getting power. Remember to ground the battery or power source to the correct pin on the DragonLink. If the DragonLink doesn't give you some kind of LED indication immediately after powerup, disconnect it and review your connections. ***Do not leave the power source connected if you do not get an LED almost immediately. You could increase your risk of letting a short circuit stay connected. Lipo batteries especially can catch fire under these circumstances.***

Calibration

In this section, we will power up the DragonLink RX and calibrate it to the exact frequency offset of the transmitter. Because no two radio modules have exactly the same transmit properties out of the box, a calibration between the RX and TX is necessary so that the RX is capable of tuning itself to the exact frequency that the transmitter is outputting. The following steps can be used to calibrate the RX to the TX.

1. Connect an antenna to the DragonLink TX (not a dummy load).
2. Connect a dummy load to the DragonLink RX.
3. Press and hold the bind/menu button on the DragonLink TX. While holding it, turn the DragonLink TX on and keep holding the button.
4. Hold down the button for about 10 seconds, or until the LED turns RED
5. The LED should be alternating between RED and GREEN.
6. Start with an unpowered DragonLink RX. Use a jumper wire to connect the signal pins of channels 5 and 6.
7. Connect the DragonLink RX to a power source. Make sure there are no other servos connected to the RX, however if your power source is the BEC part of an ESC, this is fine.
8. Let the system run like this for a full 15 minutes.
9. Remove the jumper and power cycle both the TX and RX.

The calibration procedure is now finished. Calibration should be done once a year, after a major temperature shift, or when the unit is brand new.

ID Change

The DragonLink uses a special ID to define the unique order in which it hops frequencies. This ID is shared between the transmitter and receiver and is programmed into the receiver during the binding process. The DragonLink transmitter has a built in function to update the ID with one that is randomly obtained. The following steps must be performed to activate this function:

1. Start with the DragonLink TX powered off.
2. Press and hold the bind/menu button on the top of the DragonLink TX.
3. Apply power to the DragonLink TX.
4. Wait. The LED will flash several sequences of colors. Continue holding the button down.
5. After around 20 seconds, the LED will turn totally dark.
6. Release the button, and power cycle the DragonLink TX.

If you were able to complete the steps listed above to obtain a dark LED, you have successfully changed the ID. Please note that after this process, the DragonLink must be power cycled and re-bound to the DragonLink receiver.

Binding

In this section, we will bind the RX to the TX. This process programs the RX so that it knows the ID of the TX it is intended to work with.

The following steps will **bind** the DragonLink TX and RX:

1. Start with both the DragonLink TX and RX powered off.
2. Press and hold the bind/menu button on the DragonLink TX.
3. While holding the button, turn the DragonLink TX on.
4. Wait at least 5 seconds, or until the LED turns YELLOW and then release the button.
5. The DragonLink's LED should now be flashing YELLOW. If it isn't, restart the process from step 1.
6. Power on the DragonLink RX.
7. The DragonLink RX's "status" LED will come on.
8. Power cycle the DragonLink TX.
9. As soon as the DragonLink TX comes on, the DragonLink RX's "status" LED should go dark.
10. Power cycle the DragonLink RX.

After power cycling the DragonLink pair, you should have RC control over the receiver. This can be tested by putting a servo on channel 1 of the DragonLink RX. On most RC transmitters, this will map to the throttle stick, which can be moved up and down to set the servo's position.

Setting the Failsafe

This process will set the DragonLink RX's failsafe servo positions. The failsafe is a function of the RX that allows the servos to go to preset positions in the case of a signal failure.

Failsafe may be useful if you would like an autopilot (Return to home) or perhaps a lost aircraft beeper to activate during a signal loss. In order to do this, you must attach these devices to channels on the DragonLink that map to switches on the RC transmitter.

In addition to activating external electronics, you must also set the main flight control sticks to their failsafe positions. In the absence of an RTH (return to home) capable autopilot, you may want to set the sticks to a configuration where the throttle is pulled fully out, and the elevator stick is slightly forward in order to allow the aircraft to follow a rough glideslope to the ground in the case of a failsafe.

Failsafe stick/switch position data is stored on the DragonLink RX, not the TX. If the TX is powered off, it will take the DragonLink RX less than a single second to assume the failsafe positions.

The following steps will **set the failsafe** on the DragonLink RX:

1. Start with the DragonLink TX and RX on, as well as the RC transmitter. You must have a green light on the DragonLink TX, and a blue light on the DragonLink RX indicating a link before proceeding.
2. Put the sticks and switches into the configuration they must be in during a failsafe condition.
3. Press and hold the failsafe/menu button on the DragonLink TX for at least 5 seconds.

RF Output Power Levels

The DragonLink allows for three different RF power output modes:

- High power *(500mW)*
- Mid power *(250mW)*
- MicroPower *(Lowest power possible)*

The high power and mid power modes may be toggled using the switch on the top of the DragonLink case during normal flight operations. The intended purpose of switching RF power levels in flight is to allow the use of low power mode as a sort of safety net if you do not have access to the RSSI reading from the DragonLink. If, during flight, you begin to lose control of the aircraft, turn the switch the high power mode. You will regain control of the aircraft immediately, and you will now have an idea of the maximum distance that can be flown in this lower power mode. Please note that although the RF power output in low power mode is exactly half of the full output power, this does not mean that the range of the DragonLink will be halved in this mode.

The MicoPower mode is available as a replacement for the old method of range testing using dummy loads. With this mode running, the DragonLink may be range tested with all antennas attached as they would be under normal flight operations. In order to start the DragonLink in MicroPower mode, follow the following steps:

1. Start with the DragonLink TX powered off
2. Press and hold the bind/menu button on the top of the DragonLink TX
3. Apply power to the DragonLink TX
4. Hold the button for about 2 seconds, or until the LED turns GREEN almost immediately after bootup
5. The DragonLink TX is now running in MicroPower mode if the LED is slow flashing between GREEN and OFF
6. This mode will cause a failsafe on the receiver when it is positioned between 20 and 30ft from the transmitter.
7. ***DO NOT ATTEMPT TO FLY IN THIS MODE***. To exit MicroPower mode, power cycle the DragonLink TX.

Receiver PPM Configuration

Though the DragonLink RX outputs PPM on channel 12 out of the box by default, it is possible to modify this behavior so that instead of PPM, the channel 12 servo signal is output on this port instead. The following steps will allow you to toggle the PPM output either on or off.

1. Start with the DragonLink RX powered off
2. Use the included jumper, or any hookup wire to bridge the signal pins of channels 11 and 12
3. Apply power to the DragonLink RX
4. Watch the LEDs.
   a. If the LEDs blink apart, this means PPM is now "disconnected". In this mode, the servo signal for channel 12 will be output just as any other servo signal on the DragonLink RX would be.
   b. If the LEDs blink together, this means PPM is now "connected". In this mode, PPM is output on channel 12. The only way to access the servo reading for channel 12 would be to decode the PPM signal
5. If the PPM mode is not configured as you would like, start from step 1 again.
6. Otherwise, if you would like to keep PPM in the mode that the LEDs indicated, remove power, remove the jumper and then power up the DragonLink RX as normal.

Preflight and Range Check

Before flight, the DragonLink pair must be tested for proper communication at a reduced power level. This allows for the pilot to not only validate proper function of the DragonLink, but also for proper placing of the antenna. Either of these things can prove to be a critical factor in a crash if they are not properly checked before takeoff.

Although there is nothing that prevents the DragonLink from working consistently well across multiple flights, it is recommended that the DragonLink be preflight and range checked before all long range flight operations, as well as when the DragonLink is brand new, freshly installed in a new airplane or after the DragonLink has not flown for a prolonged period.

The following steps will preflight and range check the DragonLink

1. Check all cables and interconnects.
   a. All connectors should be snug
   b. The SMA antenna connectors should be smug, but not over tightened.
   c. Cables should be free from fraying, exposed conductors
   d. Verify all wires follow the connectors into their housing and there are no wires on the verge of removing themselves from secure crimps
2. Check that the antennas are connected on both the DragonLink TX and RX
3. Power the DragonLink on in *MicroPower Mode* (See previous section). Verify slow flashing green light on the TX and blue light on the RX.
4. Walk off between 20 and 30ft holding the DragonLink transmitter as you go. If the aircraft is placed on a table, you should start to see a failsafe around 20-30ft. If the range before failsafe is much shorter than this, you have a problem with your configuration and you must check this before flight.
5. If you surpass this distance without a consistent failsafe, you are OK for flight.

Firmware Upgrades

Periodically, updates may be available for your DragonLink to improve performance or add features. While all DragonLink V1 units were required to be sent in for upgrades, the DragonLink V2 includes a secure, encrypted bootloader which allows for infield updates to be performed by the user using the DragonLink Serial Adapter and the DragonLink Updater Application.
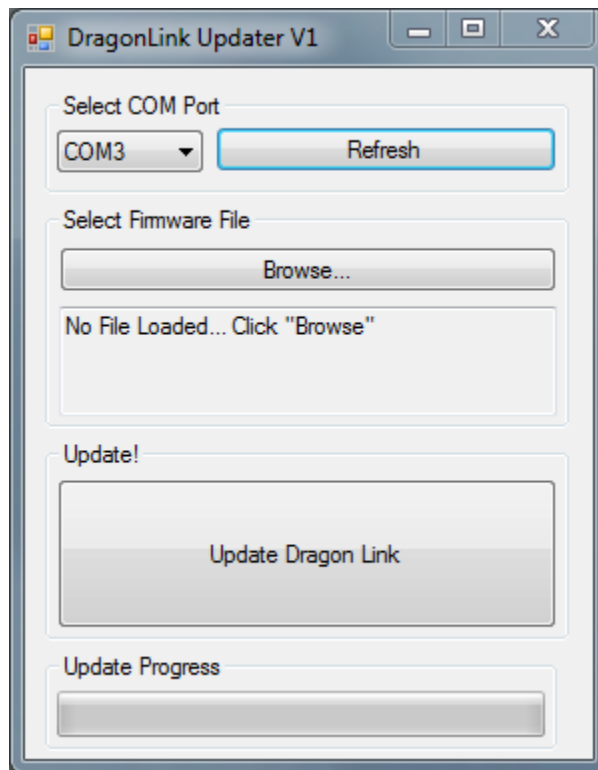
The steps below will illustrate how to perform a firmware upgrade on the DragonLink using Windows XP/7. These steps will work for the both the transmitter and receiver, however the transmitter and receiver will both use different cables, both included with the DragonLink Serial Adapter. Also note that there is a transmitter and receiver version for each flavor of firmware.

Before you begin, please download the DragonLink Update utility from [URL here], and have the version of firmware you intend to load, as well as the DragonLink Serial Adapter handy. When you have these items ready, please proceed to the directions below.

- Attach the DragonLink Serial Adapter to your computer
- Connect the included cable from the serial adapter to your DragonLink
- Power up the DragonLink

- From the zip file you downloaded containing the DragonLink Updater Utility, launch *DragonLinkUpdater.exe*
- Using the drop down menu in the Updater Utility, select the COM port which has been assigned to your DragonLink Serial Adapter
- Click on the "browse" button, and select the firmware file you would like to flash to the DragonLink. **Please note, there will be a different version of the firmware (ending in TX or RX) for the DragonLink TX and RX.**
- Click "Update". The progress bar will slowly advance and the upgrade will be finished within 10-20 seconds.
- Disconnect the DragonLink and power cycle it. **You must keep the exact same version number of firmware on both your DragonLink TX as is on the RX, so you may need to update the other half of your DragonLink pair if you have not already done so**

Updating your firmware with a 3rd party FTDI cable

It is possible to update your DragonLink V2 with a 3rd party FTDI board. Before attempting to use a 3rd party adapter, you must first make sure that the adapter is capable of being used with the DragonLink. The following requirements must be met:

- Either 3.3V or 5V logic level serial adapters will work. The DragonLink is 3.3V Vcc, however it is 5V tolerant.
- The FTDI board must have a DTR or RESET pin. This is vital, and without it the FTDI board will not work with the DragonLink as this pin is used to reset the DragonLink into update mode.

The pinout for the DragonLink V2 is as follows (starting at the pin nearest to the "S" in serial on the label):

- Gnd
- TX
- RX
- RESET*

For Gnd and RESET*, the connection to the FTDI board will be directly from one label to another. Thus, Gnd will connect to Gnd and RESET* will connect to the pin labeled DTR, RESET* or such. For the RX and TX lines, a cross over must occur so that the FTDI board transmits to the receive pin on the DragonLink. Thus, RX connects to TX and TX connects to RX.