Xtreme Power Systems

XtremeLink®

Installation And Usage Manual

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Firmware v3.0-v3.8

Manual v2.5

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Introduction

Thank you for purchasing the XtremeLink® system. This system is a direct replacement for your stock RF module and receiver.

Please read through this **entire** manual **before** you attempt the installation and usage of your XtremeLink® system!

Installation Requirements

The installation of the XtremeLink® RF module is not difficult. However, if after reading through this manual you believe that you cannot perform the installation, please seek someone who can assist you.

This manual should provide ample information and clarity to install and use this product.

Warranty Information

The XtremeLink® system carries a limited lifetime warranty. Units subject to improper installation, misuse, abuse, or modifications will not be covered under this warranty.

Xtreme Power Systems may at its discretion either repair or replace the unit covered under warranty. The customer will pay all freight charges to and from Xtreme Power Systems. Xtreme Power Systems must be contacted to obtain a return authorization. Any product returned without authorization will be returned without repair or replacement.

Liability

By using this product, you agree to hold Xtreme Power Systems free from any type of liability either directly or indirectly while using this product.

Legal Information

The 'look and feel' and functionality of this product are protected by U.S. copyright laws. Various terminology and feature names are protected under U.S. trademark laws.

- NOTICE -

THIS SYSTEM REQUIRES PROPER POWER!

PLEASE READ SECTION 5 FOR INFORMATION ON THE RECOMMENDED POWER SETUP AND HOW TO IDENTIFY IF YOU ARE HAVING A POWER PROBLEM.

SECTION 1 – INSTALLATION

Step 1 – Removing the stock RF module

Futaba, JR, and Hitec RF modules have tabs either on each side or top and bottom. Carefully squeeze these tabs and pull the RF module from the transmitter. Sometimes each side or each end will need to be wiggled for the module to come loose and removed. See Figures 1 and 2 for reference.

Figure 1 – Futaba RF module removal

Figure 2 – JR RF module removal

Step 2 – Installing the XtremeLink® RF Module

Position the XtremeLink® RF module over the original RF module location, and slowly press the module into the transmitter case. There should be no excessive force required to install the module. When the module is properly installed, it will "snap" into place and sit flush with the back of the transmitter case.

See figures 3 and 4 for reference.

Locate the included removable antenna and screw it into the connector on the back of the XtremeLink® RF module. **Finger tighten only!**

The stock metal transmitter antenna MUST be removed. Nearly all transmitter antennas simply unscrew. If your transmitter has a pivot ball on top that the antenna normally screws into, do not screw in the antenna when the XtremeLink® RF module is installed.

If you switch back to a stock RF module, remember to re-install the antenna or damage may result to the transmitter!

When using the XtremeLink® RF module, the transmitter's modulation output **must** be set to PPM, MPLX, PPM18, or PPM24. PCM, APCM, SPCM, PCM1024, PCM2048, or any other method of modulation is not currently supported. This may change in the future. You will know if the modulation output is correct or not by looking at the STATUS LED when the power is turned on. If the STATUS LED lights up orange and does not change, the transmitter modulation is not set correctly. If the STATUS LED flashes red, then the transmitter modulation is set correctly.

**Figure 3 – Futaba XtremeLink® module installation**

Figure 4 – JR XtremeLink® module installation

Step 3 – Mounting the receiver

No matter which XtremeLink® receiver you use, the mounting procedure is the same. The most important thing to remember is that you must keep the antenna portion of receiver no less than 2 inches from any type of large metal or wiring that is not directly coming out of the receiver. This includes steel, carbon fiber, servos, fuel pumps, any type of wiring, etc. The best method of mounting is to show it off! Mount the receiver as high and out in the open as possible so you can easily see it and get access to it (see Figures 5 & 6 for examples). Under no circumstance can you wrap or pass servo wires around the antenna! **Remember that wires can move under g-force, so make sure that wires can not move *at all* around the receiver. Moving wires can cause intermittent radio control.** See figures 5 and 6 for reference.

We have found the best receiver orientation to be with the antenna pointing upwards, which gives the best results when making approaches from far away.
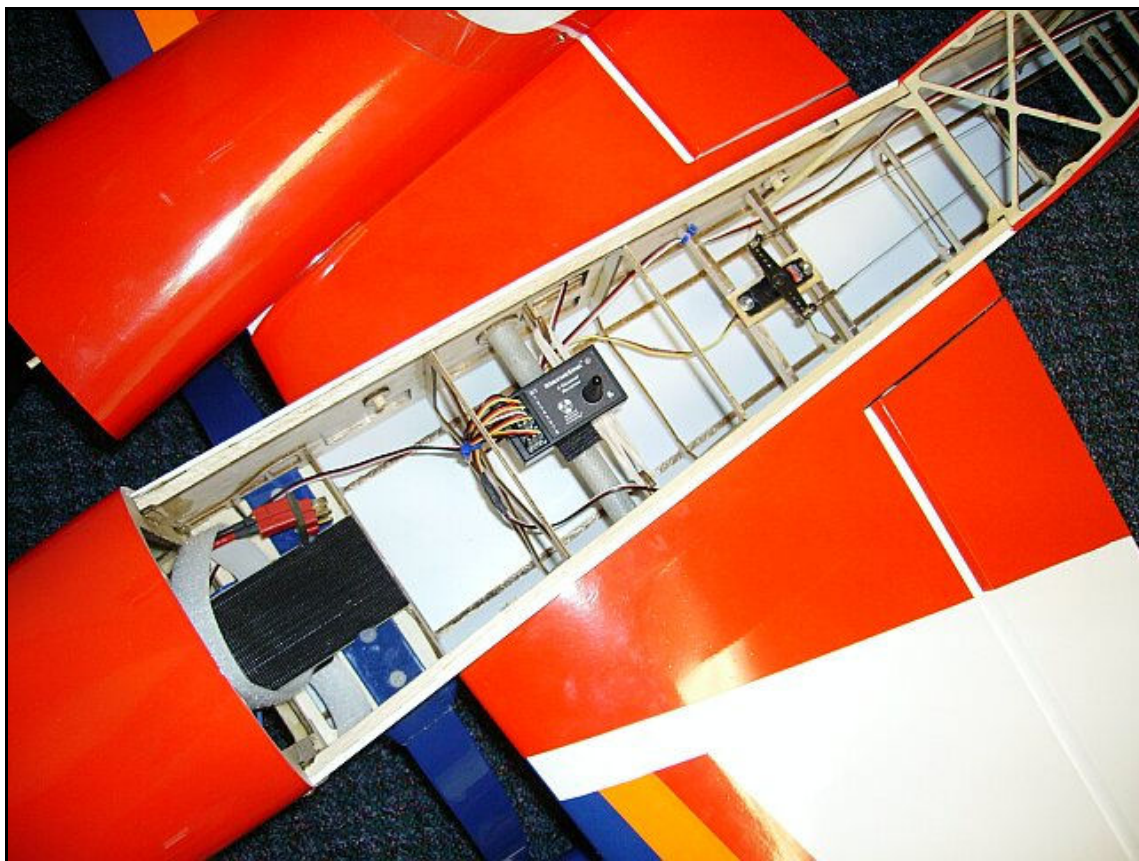
Figure 5 – XtremeLink® 8 channel receiver installation

Figure 6 – XtremeLink® 10 channel receiver installation in a Composite ARF Flash jet.

The servo connection slots on the XtremeLink® receivers are numbered. There is a slot that is labeled "B/T". This is for a battery connection, and can also be used for the telemetry sensor data port. **Do not plug the power into this port backwards!** The receiver will power up and appear to work, but it **will not** function properly powered this way!

Power and ground are available on every numbered slot. "Signal" is the pin nearest the number. The function for each channel is determined by the transmitter in use, and not the receiver itself. For example, throttle control with most JR radios is on channel 1, while throttle control on most Futaba radios is on channel 3. Throttle output would be determined by the radio and will change with brands. Keep this mind when setting up a different transmitter.

SECTION 2 – TRANSMITTER MODULE

After turning on your transmitter, the STATUS LED on the XtremeLink® RF module will light orange briefly followed by either flashing red, if using Hopping mode 1, or rapidly flashing red if using any of the other hopping modes. Red indicates there is no connection with an XtremeLink® receiver.

When a connection is established, the STATUS LED will light solid green if using Hopping mode 1, or rapidly flashing green if using any of the other hopping modes.

Advanced Programming Features

Advanced programming mode allows various features to be changed.

NOTE - Any XtremeLink® receiver that has been "bound" to the XtremeLink® RF module must be turned off prior to powering on the transmitter.

To enter advanced programming mode, press and hold the PROG button and then turn on the power to the transmitter. Hold the button until the STATUS LED changes from off, to green, and then finally to red.   This process will take approximately 7 seconds.

Once you are in programming mode, each time you press and release the PROG button, the STATUS LED color will change. Below is a table of STATUS LED colors and their meanings:

STATUS LED	FUNCTION
Solid Red	Set Power Level
Solid Green	Set Hopping Mode

If you press and hold the PROG button while the STATUS LED is any one of these colors, you will enter the programming for that function.

Additional features will be added in the future.

SET POWER LEVEL

Range: 1 to 5

With the STATUS LED solid red, press and hold the PROG button until the STATUS LED turns off. The STATUS LED will now slowly flash green the number of times equal to the current power setting. For example, the default power level is 5, so the STATUS LED will flash green five times.

After the flashing stops you have five seconds to change the power level. To change the power level, press and release the PROG button one time for each level of power you would like. For example, if you wanted the power level to be the lowest possible value, you would press and release the PROG button just once. If you wanted the power level to be 3, you would press and release the button three times.

If you do not press the PROG button within five seconds, or if the value you enter exceeds what is allowed, the STATUS LED will alternately flash red and green (error condition occurred) and no change will be made. At this point, you are back at the programming mode start (where you can select a programming option).

If you do make a change, the STATUS LED will blink green/red/orange in rapid succession to let you know that the change was successful.

Below is a table of required power levels for various countries.

Country	Allowable setting
North America	**1-5**
Australia & U.K.	**1-5**
Japan & France	**1-2 Hop Mode 1, otherwise 1-5**
Europe	**1-2 Hop Mode 1, otherwise 1-5**

SET HOPPING MODE

Range: 1 to 5

With the STATUS LED solid green, press and hold the PROG button until the STATUS LED turns off. The STATUS LED will now slowly flash green the number of times equal to the current hopping mode setting. For example, if hopping mode is currently set to 3, the STATUS LED will flash green three times.

After the flashing stops you have five seconds to change the hopping mode. To change the hopping mode, press and release the PROG button as many times as necessary to equal the hopping mode you would like. For example, if you wanted the hopping mode to be 3, you would press and release the button three times.

If you do not press the PROG button within five seconds, or if the value you enter exceeds what is allowed, the STATUS LED will alternately flash red and green (error condition occurred) and no change will be made. At this point, you are back at the programming mode start (where you can select a programming option).

If you do make a change, the STATUS LED will blink green/red/orange in rapid succession to let you know that the change was successful.

Below is a table of available hopping modes.

Hopping Mode	Setting
Single frequency w/predictive	1
FCC Full Time	2
FCC Full Time w/adaptive	3
ETSI Full Time	4
ETSI Full Time w/adaptive	5

The difference between the FCC and ETSI hopping schemes is the number of frequencies used. Until this product is re-certified to use more frequencies (like what has already been done with ETSI testing in Europe), the frequencies for the U.S. and other FCC compliant countries are same as the Single frequency w/predictive hopping mode. ETSI hopping increases the number of frequencies used in hopping sequence.

Note: adaptive mode is still in development and subject to change.

SECTION 3 – RECEIVER

After powering on your XtremeLink® receiver, the STATUS LED will light solid red for up to 3 seconds and then begin flashing red. Flashing red means that there is no connection to an XtremeLink® transmitter module.

When a connection is established, the STATUS LED will light solid green.

Advanced Programming Features

Advanced programming mode allows various features to be changed.

NOTE - Any transmitter with an XtremeLink® RF module that has been "bound" to the XtremeLink® receiver must be turned off prior to powering on the receiver. Power up your XtremeLink® receiver and wait for the STATUS LED to begin flashing red.

To enter advanced programming mode, press and hold the programming button on the XtremeLink® receiver until the STATUS LED changes from off to green, and then finally red. This process will take approximately 7 seconds.

NOTE - The receiver's programming button is located on the circuit board itself and can be depressed using our radio tool (available from our online store) or by using a 3/32 Allen key or similar BLUNT object. DO NOT USE ANY TYPE OF SCREWDRIVER to press the button or damage will result! See Figure 7 for whole location.

Once you have entered programming mode, the STATUS LED will be solid red (the first programming option). Each time you press and release the programming button, the STATUS LED will change colors, indicating a different programming function. Below is a table of STATUS LED colors and their meanings, followed by a detailed description of each programming option.

STATUS LED	FUNCTION
Solid Red	1 - Set Channel Map
Solid Green	2 - Set Country
Solid Orange	3 - Not Used
Blinking Red	4 - Set Failsafe Map
Blinking Green	5 - Set Failsafe Time
Blinking Orange	6 - Telemetry Setup

Figure 7 – XtremeLink® receiver programming button location

FUNCTION 1 - SET CHANNEL MAPPING

Range: 1 to number of receiver channels

Channel mapping is a handy feature when you have a transmitter with limited functionality or you just want assign channels to different output pins. The default channel map is 1:1. This means that the transmitter's channel 1 is mapped to the XtremeLink® receiver's output channel 1. One common use for this feature is assigning two throttle outputs. Instead of using a "Y-cable" to tie the servo outputs together, you can just assign a second output. You could use the normal throttle channel output (channel 1 for most JR), and assign it also to be a channel 10 output (providing you had a 10 channel XtremeLink® receiver). The outputs occur at the exact same time, completely eliminating any type of "lag" that is common when using individual channels for duplicating outputs.

With the STATUS LED solid red, press and hold the programming button until the STATUS LED turns off. The STATUS LED will now flash orange the number of times equal to the current receiver servo output position, followed by a one second pause. When you first enter the channel map programming (output 1), the STATUS LED will flash once, followed by a one second pause.

Every time you press and release the programming button, the channel map position will advance by one. The channel map position begins at output 1 (one flash) and ends with the number of channels that your receiver has. So, the 8 channel XtremeLink® has eight possible channel map positions, while the 10 channel XtremeLink® receiver has ten possible channel map positions.

To change the channel map output, press and hold the programming button until the STATUS LED turns off, and begins flashing green. The STATUS LED will begin flashing green the number of times equal to the current transmitter channel number for that servo output position. For example, the default value of the channel map 1 would flash just once, indicating the throttle channel (for JR radios). After the STATUS LED is done flashing green, you have five seconds to enter a new channel number value. You do this by pressing and releasing the programming button the number of times equal to the new channel number. NOTE - It is possible to set the channel number to be any value from 1 to 16. This allows you to assign a channel number higher than what you receiver normally has for outputs. An example of this would be using a 6 channel XtremeLink® receiver with channel 7 assigned to servo output position 5 (which might be a proportional control for a variable pitch propeller).

If you do not press the programming button within five seconds, or if the value you enter exceeds what is allowed, the STATUS LED will alternately flash red and green (error condition occurred) and no change will be made. At this point, you are back at the channel map position where you can advance to the next channel. There is no way to get back to the programming mode start with this feature other than by powering off the receiver and re-entering the advanced programming mode.

If you do make a change, the STATUS LED will blink green/red/orange in rapid succession to let you know that the change was successful.

FUNCTION 2 - SET COUNTRY

Range: 1 to 4

With the STATUS LED solid green, press and hold the programming button until the STATUS LED turns off. The LED STATUS will now slowly flash green the number of times equal to the current country setting. For example, the default country level is 1, so the STATUS LED will flash just once.

After the flashing stops you have five seconds to change the country. To change the country, press and release the programming button the number of times necessary to equal the country from the list below. For example, if you wanted to set the country to France, you would press and release the programming button two times.

If you do not press the programming button within five seconds, or if the value you enter exceeds what is allowed, the STATUS LED will alternately flash red and green (error condition occurred) and no change will be made. At this point, you are back at the programming mode start where you can select another programming option.

If you do make a change, the STATUS LED will blink green/red/orange in rapid succession to let you know that the change was successful.

The country selection is necessary to meet various FCC, ETSI, IC, and other guidelines.

NOTE: This setting only applies to Hopping Mode 1, and is ignored for all other hopping modes.

Below is a table of allowable settings:

Country	Setting
All Countries except France	**1**
France	**2**

FUNCTION 3 - SET OUTPUT MODE

Range: N/A

This function is not currently supported. The STATUS LED will be solid orange. It will be supported in future versions for a new function.

FUNCTION 4 - SET FAILSAFE MAP

Range: 1 to number of receiver channels

It is possible to set the failsafe control for each channel output individually. You can set each channel to either hold last position, or to use the user defined position (discussed in section 4). NOTE - The default for ALL outputs is hold last position.

With the STATUS LED blinking red, press and hold the programming button until the STATUS LED turns off. The STATUS LED will now flash orange the number of times equal to the current channel output, followed by a one second pause. When you first enter the failsafe map programming (channel 1), the STATUS LED will flash once, followed by a one second pause.

Every time you press and release the programming button, the channel position will advance by one. The failsafe map position begins at channel 1 (one flash) and ends with the number of channels that your receiver has. So, the 8 channel XtremeLink® has eight possible channel output positions, while the 10 channel XtremeLink® receiver has ten possible channel output positions.

To change the failsafe control for that channel output, press and hold the programming button until the STATUS LED turns off and begins to flash green. The STATUS LED will flash either one time (failsafe hold) or flash two times (failsafe is user defined). After the STATUS LED is done flashing green, you have five seconds to enter a new failsafe control value. You do this by pressing and releasing the programming button either one time for **hold last position** or two times for **user defined position**.

If you do not press the programming button within five seconds, or if the value you enter exceeds what is allowed, the STATUS LED will alternately flash red and green (error condition occurred) and no change will be made. At this point, you are back at the failsafe map position where you can advance to the next channel.   There is no way to get back to the programming mode start with this feature other than by powering off the receiver and re-entering the advanced programming mode.

If you do make a change, the STATUS LED will blink green/red/orange in rapid succession to let you know that the change was successful.

If you wanted a low throttle condition and all other outputs to hold their last position with a JR radio setup, you would set the failsafe map so that channel 1 was two flashes (failsafe is user defined), and all other outputs to one flash (hold position).   You would then need to set the failsafe as described in section 4 to obtain your low throttle position.

FUNCTION 5 - SET FAILSAFE TIME

Range: 1 to 5 seconds

A failsafe condition occurs when data received by the XtremeLink® receiver is not valid for some period of time. This time can be set from one to five seconds.

With the STATUS LED flashing green, press and hold the programming button until the STATUS LED turns off. The STATUS LED will now slowly flash green the number of times equal to the current failsafe time (in seconds). For example, if the failsafe time is set to two, so the LED will flash two times, indicating a failsafe period of two seconds.

After the flashing stops you have five seconds to change the failsafe time. To change the failsafe time, press and release the programming button one time for each additional second you would like the failsafe time to be. For example, if you wanted the failsafe time to be 1 second, you would press and release the programming button once. If you wanted the failsafe time to be 3 seconds, you would press and release the button 3 times.

If you do not press the programming button within 5 seconds, or if the value you enter exceeds what is allowed, the LED will alternately flash red and green (error condition occurred) and no change will be made. At this point, you are back at the programming mode start.

If you do make a change, the LED will blink green/red/orange in rapid succession to let you know that the change was successful.

FUNCTION 6 – TELEMETRY SETUP

With the STATUS LED flashing orange, press and hold the programming button until the STATUS LED turns off and then release the button. Press the button on each telemetry device in the order of importance (satellite receivers should be first). Telemetry must be enabled using the XDP software for any sensors that are connected, with the exception of satellite receivers which do not require the telemetry system to be enabled.

XDP (COMPUTER) INTERFACE

To put the receiver into computer programming mode, press and hold the programming button and then apply power to the receiver. The STATUS LED will be solid orange, indicating it is ready for computer programming.

RESET TO DEFAULTS

It is possible to reset all of the settings to the factory defaults. When a reset is performed, ALL settings, including the binding information will be reset. This means that the receiver will have to be bound again to the XtremeLink® transmitter module. To perform a RESET, press and hold the programming button and then apply power to the receiver. Do not release the programming button until the STATUS LED turns from orange to flashing red. When the STATUS LED begins flashing red, you can release the programming button. The RESET is now complete.

SECTION 4 – USING THE SYSTEM

Before the XtremeLink® system can be used, the XtremeLink® receiver(s) must be instructed to communicate only with a single XtremeLink® RF module (transmitter). This process, known as "binding", is required only once for each new XtremeLink® receiver.

Note: when binding your system you must put your receiver(s) in binding mode BEFORE putting the transmitter in binding mode.

Starting with firmware version 3.0, you can have as many slave receivers and a single master receiver bound together. If you are not using slave receivers, please skip the "Slave Receiver" binding information below and start with the "Master Receiver" section.

Binding the XtremeLink® System

Slave Receiver(s) – Power on your XtremeLink® receiver and wait for the STATUS LED to begin flashing red. Press and hold the programming button (located inside of the receiver, next to the antenna) using the XPS radio tool, a 3/32nd Allen wrench, or equivalent blunt object (note: screwdriver tips will damage the receiver) until the STATUS LED changes from off to green, and release the button. The STATUS LED will begin flashing orange. Now, press and hold the programming button until the LED changes from flashing orange to solid orange. This indicates that the receiver is set to be a slave receiver. Repeat this process for as many slave receivers as you intend to use. You must always have one master receiver, which is put into binding mode last.

Master Receiver – Power on your XtremeLink® receiver and wait for the STATUS LED to begin flashing red. Press and hold the programming button (located inside of the receiver, next to the antenna) using the XPS radio tool, a 3/32nd Allen wrench, or equivalent blunt object (note: screwdriver tips will damage the receiver) until the STATUS LED changes from off to green, and release the button. The STATUS LED will begin flashing orange. This indicates that the receiver is waiting for an XtremeLink® transmitter to bind to.

Transmitter – The transmitter modulation **must** be set to PPM, MPX, PPM18 or PPM24 prior to using this product. Switch to one of these modes before any use**.** Press and hold the PROG button on the XtremeLink® RF module while powering on the transmitter. Wait until the STATUS LED changes from off to green, and then release the button.

Once the button has been released, the units should bind. All STATUS LEDs will turn green when a successful bind has occurred. If any STATUS LED does not turn green, repeat the binding procedure.

YOU MUST power off your transmitter and receiver(s) after binding! Your XtremeLink® system is now ready for use!

NOTES - The XtremeLink® receiver's STATUS LED will be green during normal operation if the power level of the transmitter module is set higher than 1, and red when the power level is set to 1.

YOU MUST SET THE HOPPING MODE PRIOR TO BINDING. THE HOPPING INFORMATION IS TRANSFERRED DURING THE BINDING PROCESS. IF YOU CHANGE HOPPING MODES, YOU MUST REBIND ALL RECEIVERS.

MULTIPLE RECEIVER SUPPORT IS NOT AVAILABLE IN HOPPING MODE 1. ONLY MODES 2-5 SUPPORT MULTIPLE SLAVE RECEIVERS!

*** HOPPING MODES 2-5 WARNING! ***

IF TWO OR MORE RECEIVERS ARE TURNED ON AT THE SAME TIME, AND THE TRANSMITTER IS THEN TURNED ON, *ANY* OF THE RECEIVERS MAY LOCK ON TO THE TRANSMITTER. THE OTHER RECEIVERS WILL NOT LOCK (UNLESS SET AS A SLAVE).

TURNING ON AND OFF YOUR TRANSMITTER WILL CAUSE RECEIVERS TO LOCK AND UNLOCK! FOR THIS REASON, PLEASE MAKE SURE THAT YOUR LAST MODEL IS TURNED OFF BEFORE FLYING THE NEXT MODEL! ALTHOUGH THIS IS THE SAME BEHAIVOR AS 35MHz/72MHz AND SOME OTHER 2.4GHz SYSTEMS, WE ARE LOOKING INTO SOLUTIONS TO ELIMINATE THIS POSSIBILITY.

NOTE: The range with the antenna off and PROG button pressed when using the v3.0 and later firmware will be noticeably less than previous versions. This is due to the fact that the power level is now 25 times lower than previous versions when pressing the PROG button.

Range Testing

To perform a range test of the XtremeLink® system, follow the instructions below. Have someone help you during this procedure.

Range test for full range receivers:

1. Install the receiver in the R/C device as it will be used.
2. Turn on the radio system so servo movement can be observed.
3. Using flat ground (pavement, low cut grass, or dirt) place the R/C device so that the receiver antenna is no less than 6" from the ground. This might require you elevating the R/C device during the testing.
4. Hold your transmitter waist high, away from your body.
5. Press and **hold** the PROG button on the transmitter module.
6. Walk to a distance of at least 125 feet. If at any time you experience a pause in controls, try to reproduce it again and release the button to see if the pause no longer occurs. If the problem does not occur now, check to make sure that your receiver is at least 6" from the ground while testing.
7. With the PROG button still pressed down, walk away from the R/C device while moving the sticks until there is intermittent control. Releasing the PROG button should restore 100% control. If it does not, **do not use the system and contact Xtreme Power Systems for assistance!**
8. Test complete.

Range test for surface or park flyer receivers:

Follow the instructions of above. The range test will be limited to approximately 35 feet instead of at least 125 feet for full range receivers.

WARNING! DO NOT PRESS AND HOLD THE PROG BUTTON DURING THE NORMAL OPERATION (FLYING, DRIVING, ETC.) OF YOUR R/C DEVICE!

Setting the Failsafe

If no failsafe is programmed, the servos will hold their last known valid state when a failsafe condition occurs. The default failsafe time is 2 seconds.

You can program the failsafe condition for each channel as described above. Once you have set the failsafe map conditions, you can then set the user defined channels. To do this, turn on the XtremeLink® system so that servos can be moved.   Now, press and hold the programming button on the XtremeLink® receiver until the STATUS LED goes out, and release the button. The STATUS LED will begin alternately flashing red and green for about 8 seconds. During this time, move your sticks and switches to the where you would like them during a failsafe condition. NOTE - Only those channels programmed in the failsafe map will change to a user defined position.   All other channels will hold their last positions when a failsafe occurs.

Servo Outputs

The 8 and 10 channel receivers do not have markings for the servo connector polarity. The servos and any battery connections can be safely plugged in either way, however, the receiver and servos will only work if the proper polarity is used. See Figure 8 for the servo output diagram.

WARNING!

PLUGGING A BATTERY INTO THE PORT LABELED 'B/T' WITH THE POLARITY REVERSED WILL RESULT IN UNPREDICTABLE OPERATION! THE RECEIVER WILL POWER UP, BUT SERVO CONTROLS WILL NOT FUNCTION PROPERLY. TWITCHING SERVOS, BLINKING RECEIVER LED AND OTHER ODDITIES WILL BE SEEN. RANGE WILL BE UNUSABLE, EVEN IF A RANGE CHECK SHOWS RANGE TO BE NORMAL.

SECTION 5 – POWERING THE SYSTEM

The XtremeLink® system is a computer controlled device. Just like your home PC, power is the most critical link to success or failure.

XtremeLink® transmitter modules can use the standard transmitter battery. Nothing else is required.

XtremeLink® receivers must be powered properly! With today's high torque digital servos, the load on the flight battery can be extreme. It is not uncommon to see many amps of current draw during flight. You must use a power source that can provide the proper voltage when there is a heavy load. Even small servos like the Hitec HS-55 can draw up to ¾ of an amp when stalled. Four of these servos in a "foamie" can technically draw 3 amps of current, not including the current required for the receiver. For years people have been claiming radio "failures" or "hits" with their 35MHz/36MHz/72MHz/75MHz systems that have actually been power related and not due to signal loss. The difference now is that computerized receivers require at least 3.5 volts or they will reboot. By comparison, non-computerized receivers will work on just fractions of a volt and never reboot.

Recommend Power Setups for XtremeLink® Receivers

<u>4 cell packs.</u> 4 cell packs will work fine with XtremeLink® receivers providing you have adequate capacity. The rule that we use is no less than 350mAh for each analog servo and no less than 500mAh for each digital servo. So, in a typical 4 servo analog setup, a 1400mAh 4 cell flight pack would be the absolute minimum we would recommend. Yes, you could probably get by with a lower capacity pack, but then you have to ask yourself "what is my model worth to me, and am I willing to take a chance with an improper power setup?"

<u>5 cell packs.</u> 5 cell packs offer additional voltage headroom. These are a better choice than a 4 cell pack. Note that some servos will not handle the voltage of a 5 cell pack. Please consult the specifications of your servos before using a 5 cell pack.

<u>A123 flight packs.</u> These are the best choice. They provide a voltage higher than a 4 cell pack, but less than a 5 cell pack. The current capabilities of these batteries exceed what any 4 or 5 cell Nimh or Nicad pack can provide.

2 cell Lipo packs. Newer high voltage servos can use a 2 cell Lipo pack. This works fine as the XtremeLink® receivers can handle voltage up to 30 volts. Just please note that the input voltage to the XtremeLink® receiver is not regulated, so the full input voltage is passed to the servos.

Receiver STATUS LED Turns Solid Orange, What Does This Mean?

If you ever see a XtremeLink® receiver's STATUS LED turn solid orange, it means that you have a voltage (and thus current) issue! When voltage going to the XtremeLink® receiver drops below 4.4v, the STATUS LED will turn solid orange. This is due to the lack of current capacity from the power source, which causes the pack voltage to drop. Please note that this is a WARNING indicator, and it does not lie! If the STATUS LED turns solid orange, there is in fact a problem… **do not ignore it!**

Sometimes a bad servo can cause the voltage to drop and the STATUS LED to turn solid orange. A simple way to determine if a servo is drawing excessive current is by unplugging all of the servos from the XtremeLink® receiver, power on the system so the STAUS LED is green, and then plug each servo into the XtremeLink® receiver one by one observing the STATUS LED. If the STATUS LED doesn't turn solid orange until you start moving the controls, then your input voltage is not adequate.

Please remember that wall chargers included with most radio systems are designed only for 4 cell packs. These chargers are typically 50ma, meaning that 50mAh of current is put back into the pack every hour. A 2000mAh pack would require 40 hours to charge from a completely drained state and 20 hours if the pack was half way discharged. An overnight charge would not work in either of these cases!

Receiver STATUS LED Flashes Orange, What Does This Mean?

If you ever see a XtremeLink® receiver's STATUS LED flash orange, it means that power was lost to the receiver and restored after a connection has occurred (a reboot). So, if you deliberately unplug the power to the receiver after connection is made, the STATUS LED will flash orange. Note: This feature was added with v3.8 firmware. Earlier versions do not have this feature.

Load Testing, BECs, and Switches

We recommend that you always load test your power system using at least a 1.5amp load before every flight. Several companies make inexpensive load and voltage testing devices. These will determine if your battery pack has the capacity required to fly your setup. The XtremeLink® receiver's STATUS LED should remain solid green during such a load test. If you find that the STATUS LED is turning solid orange during a load test, try removing the switch from the system and see if that corrects the problem. If so, replace the switch and try the test again.

Battery Eliminator Circuits (BECs) are great for small aircraft where loads are very light. However, beware of ANY "linear" regulators, even the so called "high current" versions. "Switching" regulators are far more reliable and generally do not get hot or change output voltages with heat or load. BECs built into Electronic Speed Controllers (ESCs) must have enough current capacity to properly power the XtremeLink® receiver. We have seen many controllers that will not work. These are easy to spot as the XtremeLink® receiver's STATUS LED will immediately turn solid orange, or in worst case conditions, cause the receiver to reboot over and over again.

Although switches make it convenient to turn our R/C systems on and off, they can be the cause of system failures. Even heavy duty switches typically have a .2 volt drop across them when brand new. As switches age they oxidize, and constant vibration wears the metal contact plates. We have seen ¾ volt drop with a heavy duty switch after one season of flying.

Charge, Charge, Charge!

You can never have a flight pack that is too full. We recommend "topping off" your flight packs between flights. Often times you don't fly back to back flights and there is ample time to do this, especially when using A123 flight packs where a "top off" could literally be just a few minutes.

Keep Your Setups Simple

Although modelers love to have the latest and greatest toys, there are some products that can introduce new potential failure points when installed. For this reason, we recommend that you keep your setups as simple as possible. Instead of using "power expansion" type devices, we recommend using power inputs to both ends of the XtremeLink® receiver's servo connection bus. For example, when using an XtremeLink® 10 channel receiver, power should be connected to the B/T port and channel 10 (even if a Y-cable is required). Using two separate flight packs on each end of the servo bus will give you double the current capacity and a functioning system if one pack were to fail.

PLEASE NOTE THAT THE 6 CHANNEL PARK FLYER RECEIVERS DO NOT HAVE A LOW VOLTAGE WARNING INDICATOR, SO THE STATUS LED WILL NEVER TURN SOLID ORANGE UNDER A LOW VOLTAGE CONDITION! PLEASE LOAD TEST THESE SETUPS TO DETERMINE PROPER VOLTAGE!
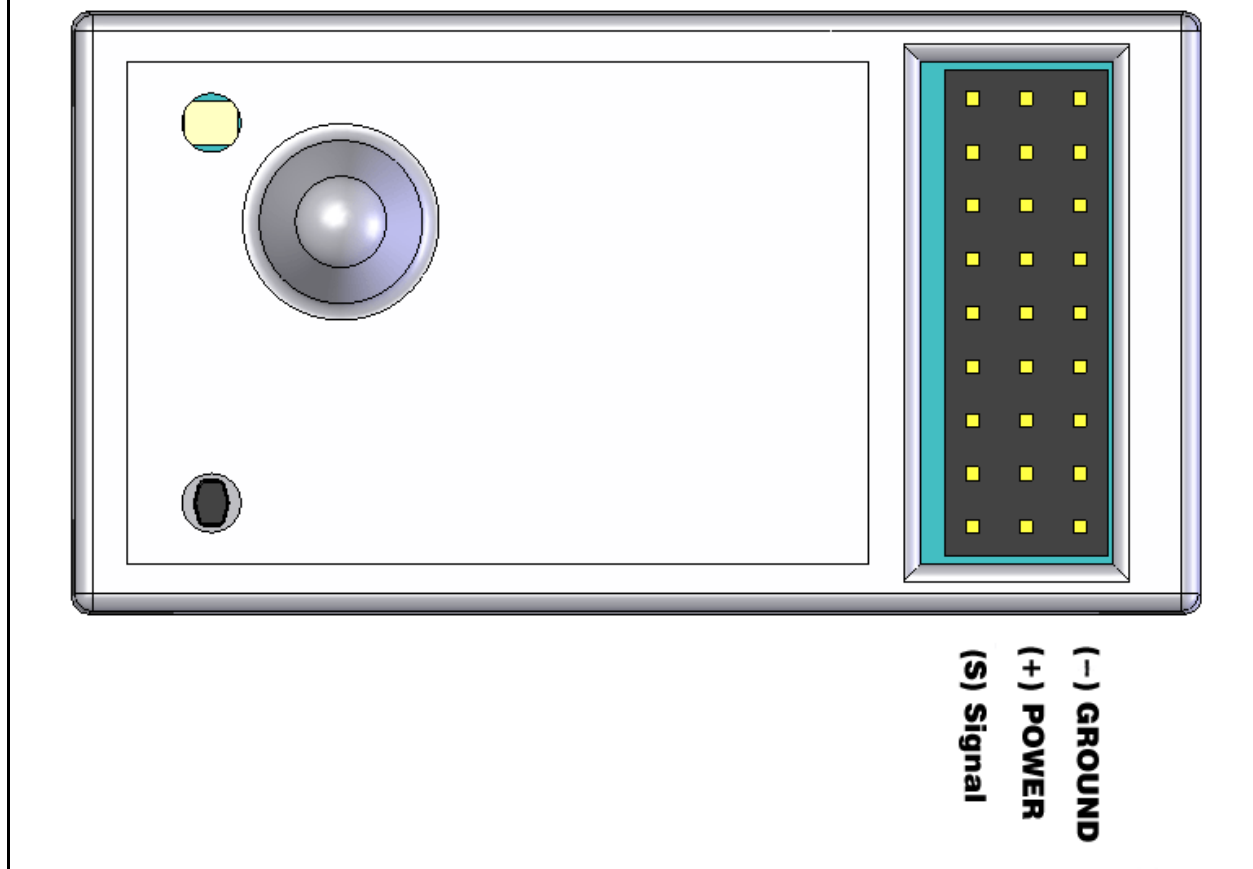
Figure 8 – XtremeLink® receiver servo output polarity

Contains FCC ID: OUR-XBEE / OUR-XBEEPRO * The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (*i.*) this device may not cause harmful interference and (*ii.*) this device must accept any interference received, including interference that may cause undesired operation.

WARNING: To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.