Xtreme Power Systems

XtremeLink™

MC4000/3030 VERSION

Installation And Usage Manual

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Firmware v2.3

Manual v1.0

Revision Date: September 24, 2007

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. If after reading through this manual, you believe 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, crash damage, 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

SECTION 1 – INSTALLATION

Step 1 – Removing the stock RF module

Lay your transmitter face down on a towel or something similar to protect it. Press the two latch buttons on the top of the transmitter and remove the back of the case. Set the back aside. Locate the stock RF module and remove it. Save the module in case you need it in the future (returning your system back to the stock configuration). It will not be re-installed with this upgrade. See Figure 1. Cut a hole in the warning label. This is necessary so that the antenna wire can pass through the housing. See Figure 2 for details.

Step 2 – Disassembling the stock antenna block

Remove the stock antenna block by removing the 4 black screws using a Philips screwdriver. See Figure 3 for details.

Remove the single remain screw using a flat tipped screw driver. This screw is the ball tensioner. Remove the tensioner arm and separate the antenna base from the antenna block. See Figures 4 and 5 for details.

Remove the metal ball from the antenna block. Save the ball if you need it in the future (returning your system back to the stock configuration). The ball will not be re-installed with this upgrade.

Place the supplied plastic ball in the antenna block, so that the antenna connection is facing upwards. See Figures 6 and 7 for details. Screw the antenna on the connector completely (several turns). Pull the ball through the antenna block using the antenna. The ball will eventually stop and can not be pulled any further. See Figure 8 for details. Unscrew and remove the antenna.

Reassemble the antenna block by placing the tensioner arm in place and tighten it as shown in Figure 9. You can leave out the spring if you like as the ball will not actually be held in place and tension will not occur with this setup. Reassembly is not necessary; it just serves as a way to keep all of the original parts without losing them.

The antenna base must be insulated from any electronics. We recommend large shrink tubing or Blemderm™ tape, as shown in Figure 10. Tuck the antenna base inside of the transmitter, out of the way. See Figure 11.

Attach the antenna block to the transmitter case using the original 4 black screws. The final antenna installation is shown in Figure 12.

Step 3 – Installing the XtremeLink™ RF Module

Included with your package you will find matching Velcro pairs. Attach the "fuzzy" side of the Velcro to the XtremeLink™ RF module. Attach the other (hooked) piece of Velcro to the place where the RF module will be mounted. See Figures 13 for details.

This next step is the most critical in the installation of this product and will either mean success or failure of the operation of this product. You must attach the antenna's cable connector to the u.FL connector on the XtremeLink™ RF module. To do this, place the cable connector directly above the round connector the board and press down firmly. Any amount of angle can destroy the cable connector, so it is important that you press straight down, and not at an angle. In most all cases, you will hear a definitely "click" sound as the cable connector is snapped in place. Refer to Figure 14, and note the direction of the cable in reference to the board. The cable must exit the left side of the board as shown in Figure 14.

Position the XtremeLink™ RF module over the original RF module location. Insert the white connector into the original RF port connector, and press firmly, rocking the connector back and forth until it is seated fully. Refer to Figure 15, noting the color of the wires and positions of antenna cable and the XtremeLink™ RF module. Now, carefully press the module into place (on to the receiving Velcro). You can wiggle the module to make sure it is seated properly and will not detach during normal use. See Figure 16 for details.

Note: If you switch back to a stock RF module, remember to re-install the antenna or damage may result to the transmitter! You do not need to remove the Velcro to re-install the stock RF module.

Attach the included FCC/IC/ETSI sticker to the back of your transmitter. Australian customers should also attach the C-tick sticker.

Installation is now complete.

Turning on the power to your Profi radio now should cause the LED on the XtremeLink™ RF module to light up briefly orange, and then begin flashing red.

If this does not occur, turn off the radio and make sure that you do not have the connector installed backwards! No damage will be done if you did, just reverse it and try powering on again. If the LED does not light up at all, contact Xtreme Power Systems' technical support for more information.

All programming must be done with the back of the transmitter off due to the location of the push button switch and LED on the XtremeLink™ RF module.

Please note that care must be taken when removing the antenna for range testing. The ball is not held firmly in place and can rotate, destroying the cable connector!

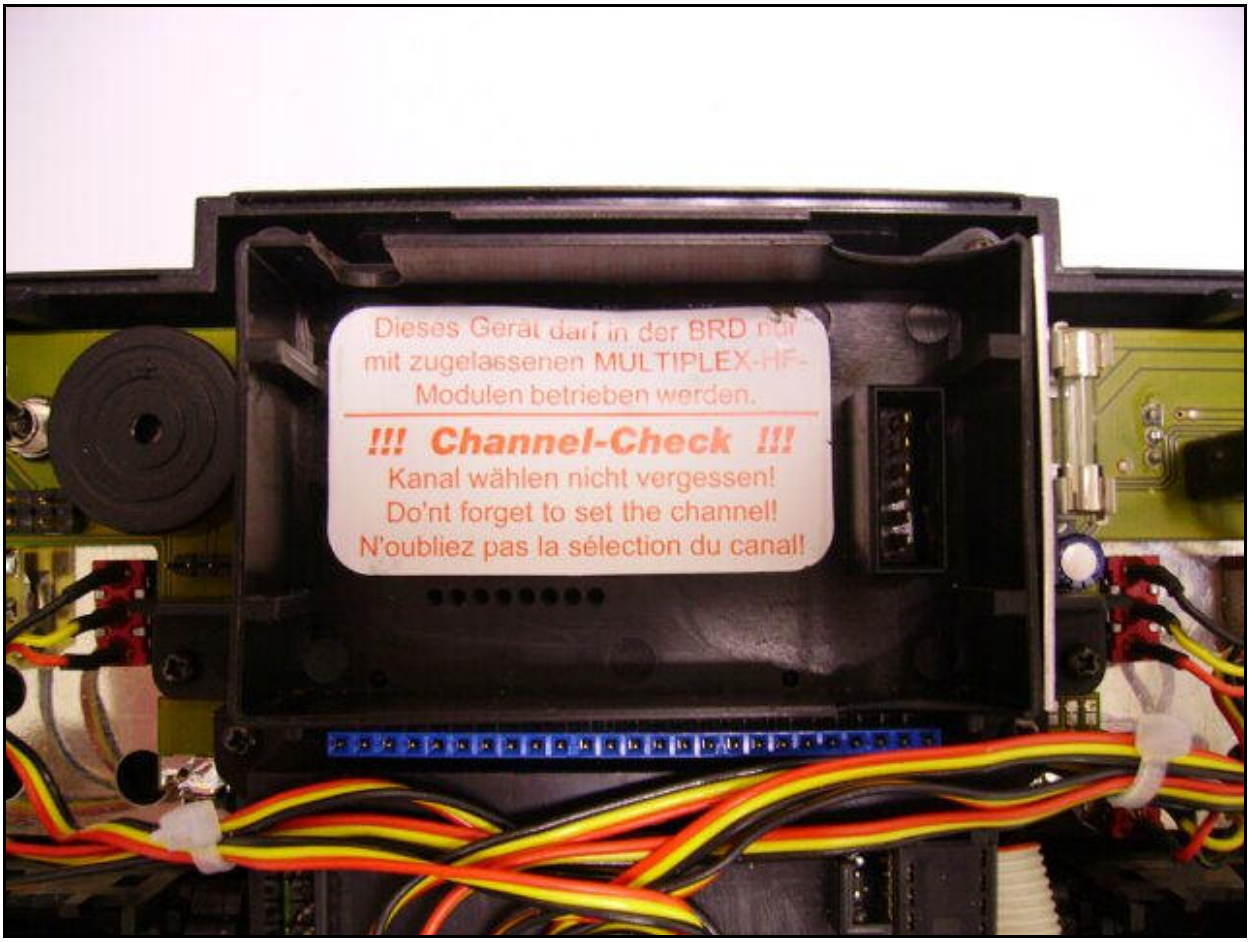

Figure 1 – Stock RF module location (module removed)

Figure 2 – Warning label cut away to expose antenna access

Figure 3 – Antenna block with screws removed

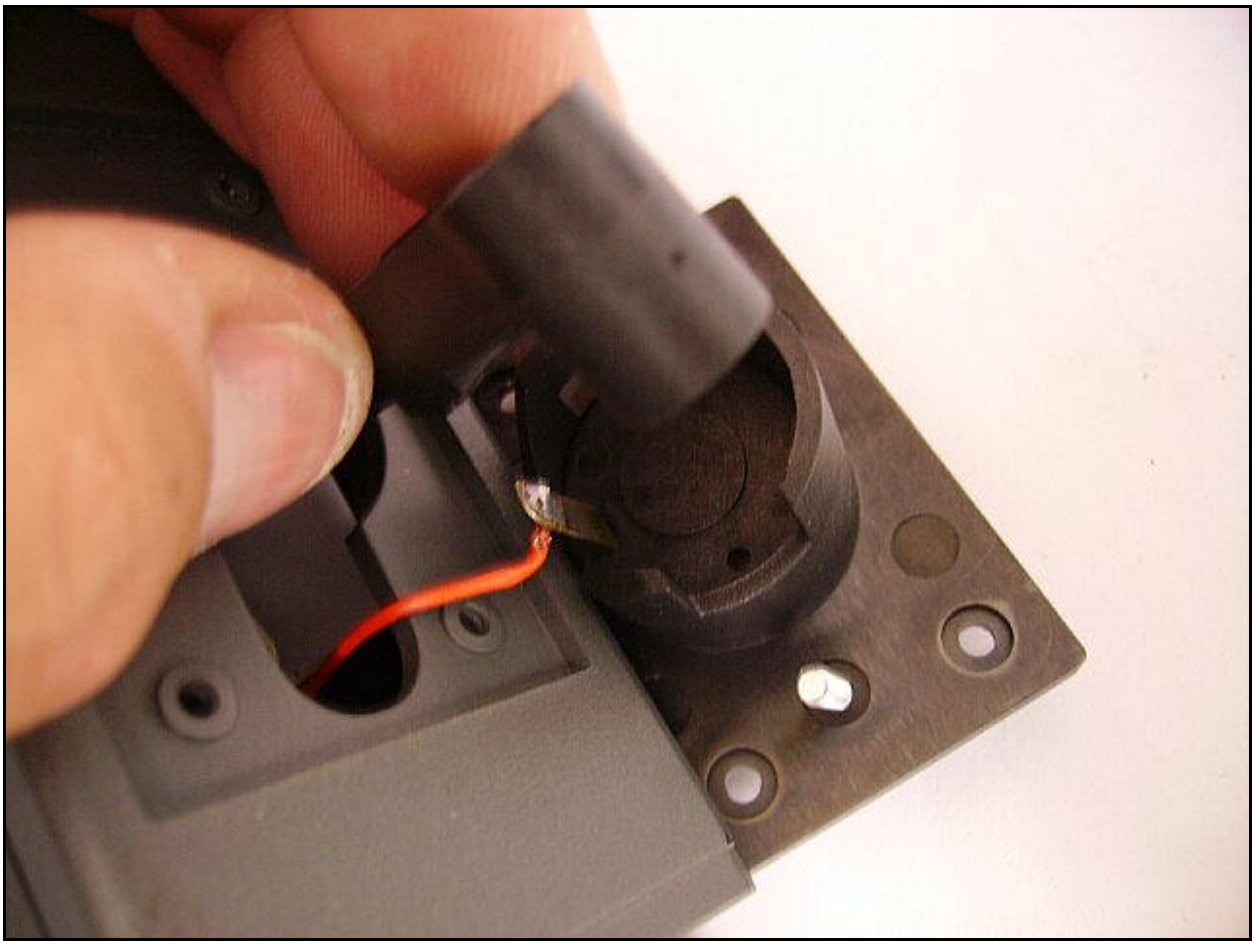

Figure 4 – Disassembling the antenna block

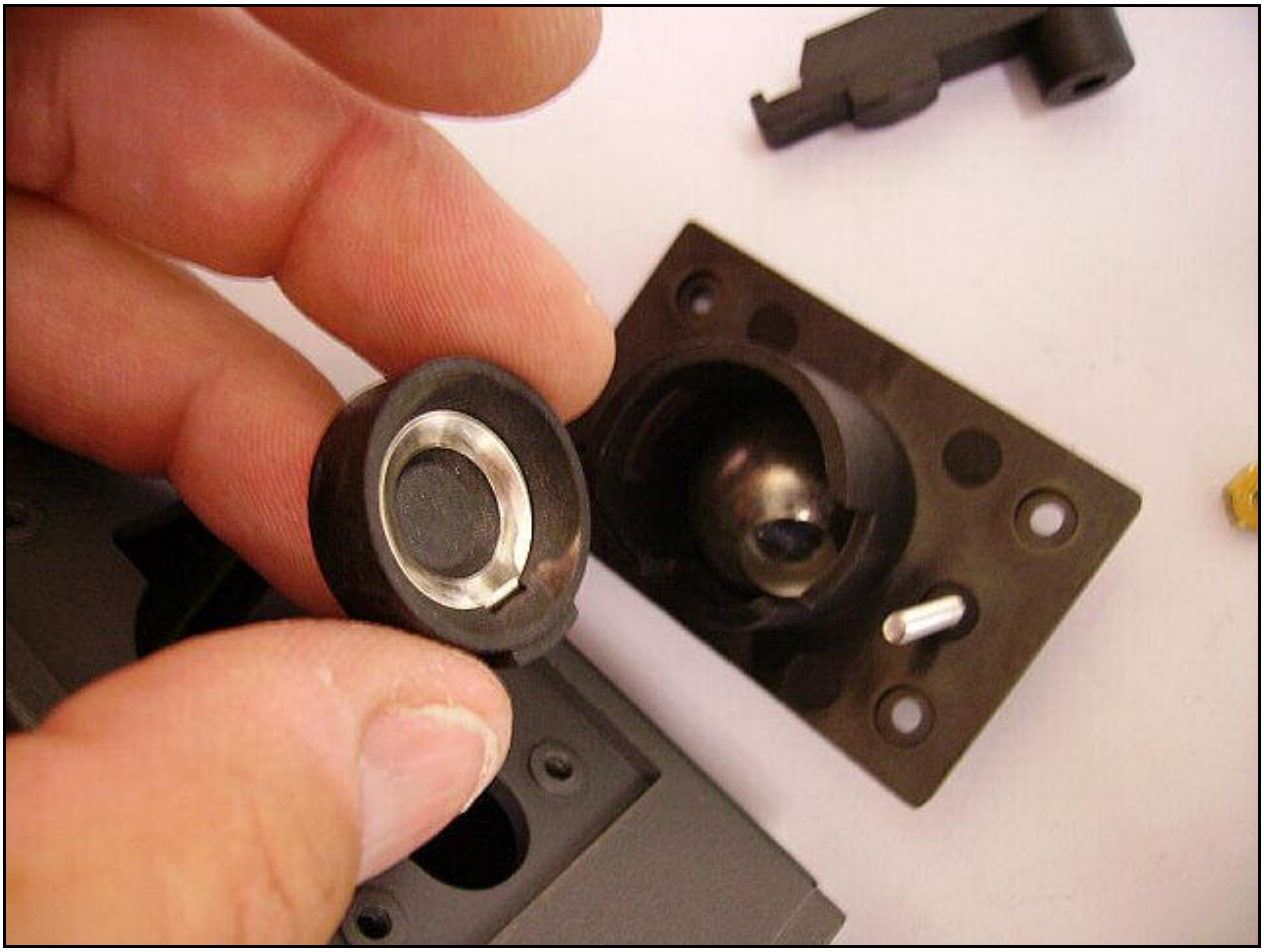

Figure 5 – Separating antenna base

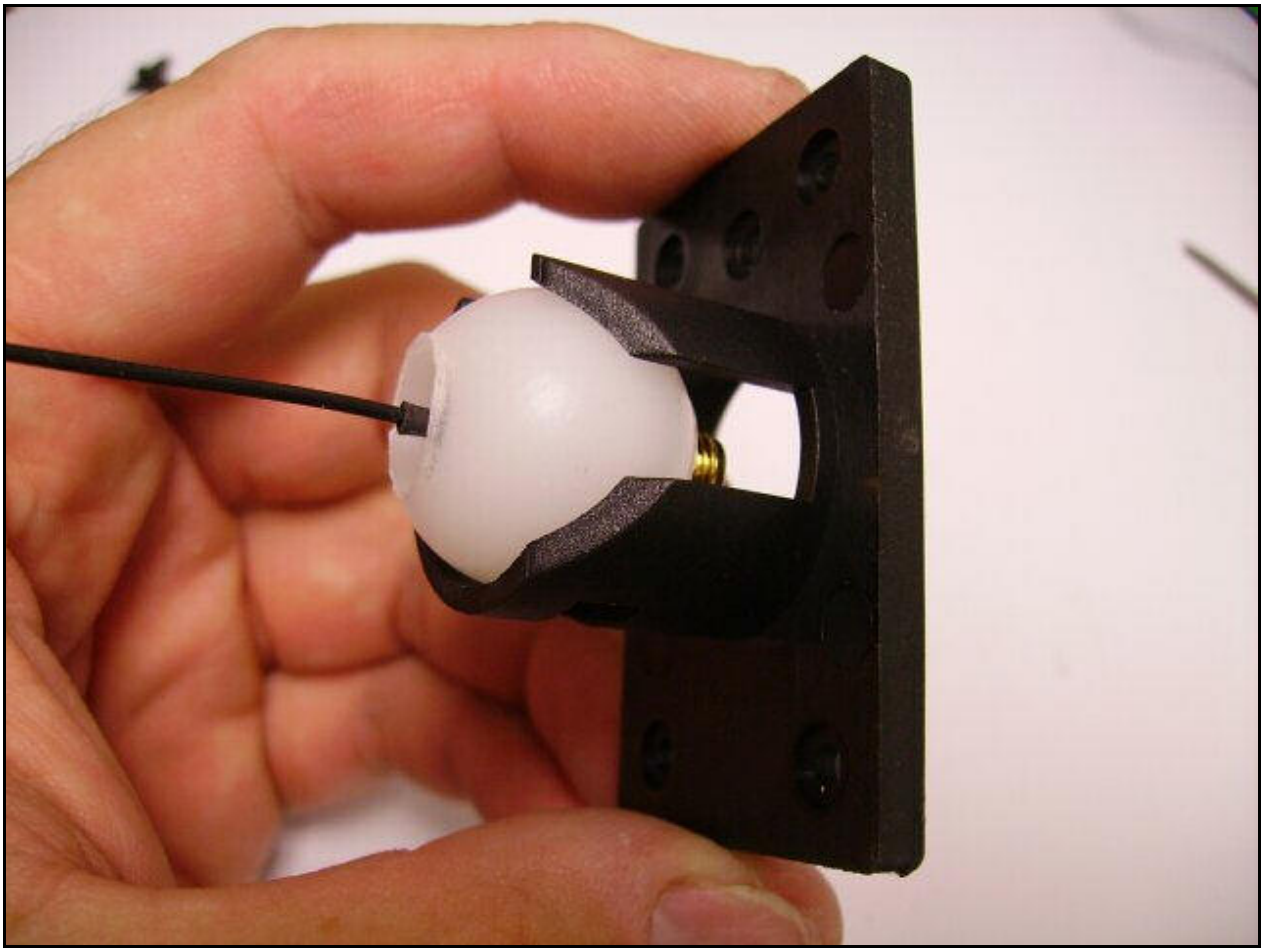

Figure 6 – Inserting new ball into antenna block

Figure 7 – Front side view of antenna block with ball inserted

Figure 8 – Ball pulled through using antenna

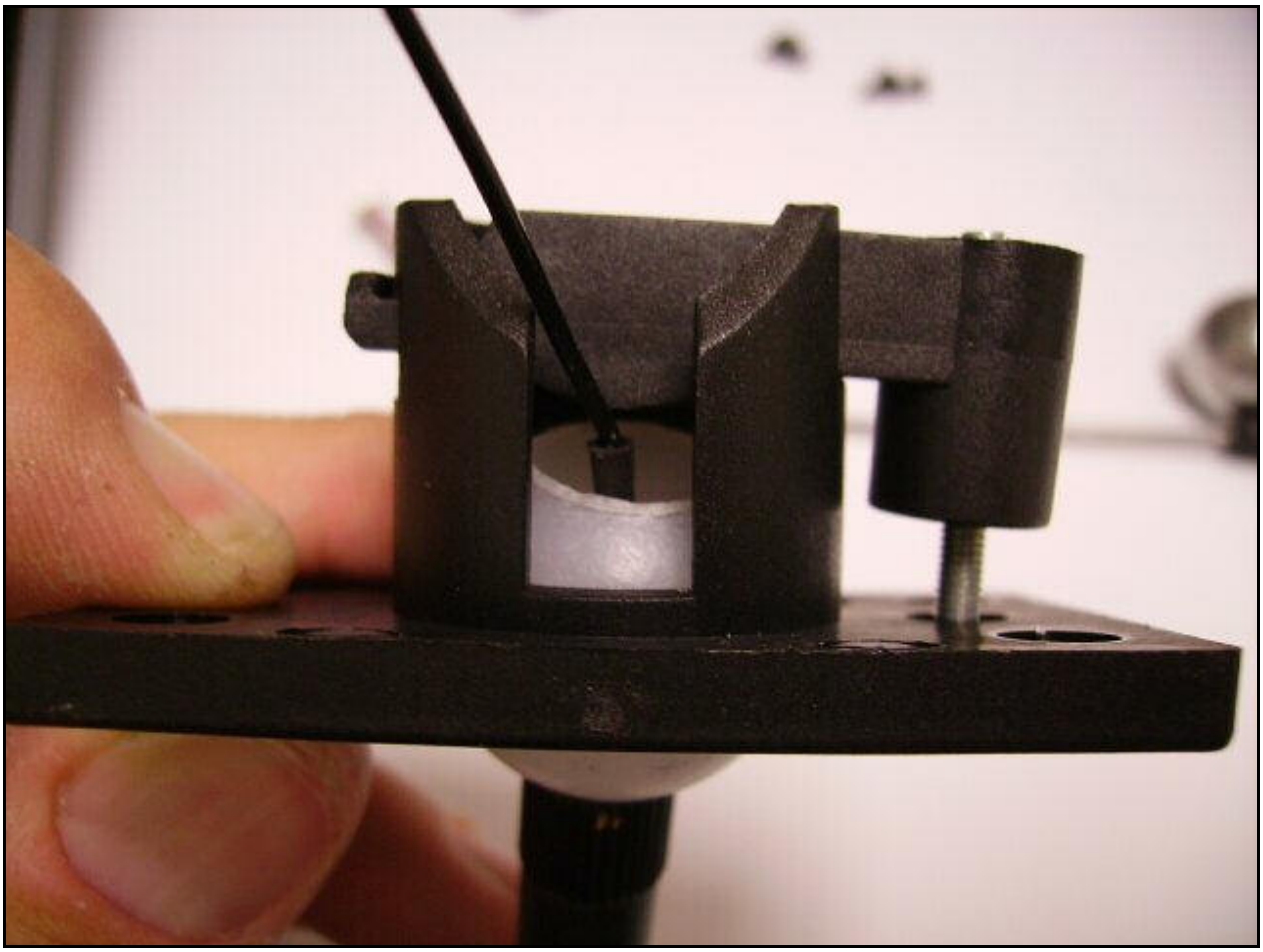

Figure 9 – Antenna block reassembly

Figure 10 – Antenna base taped

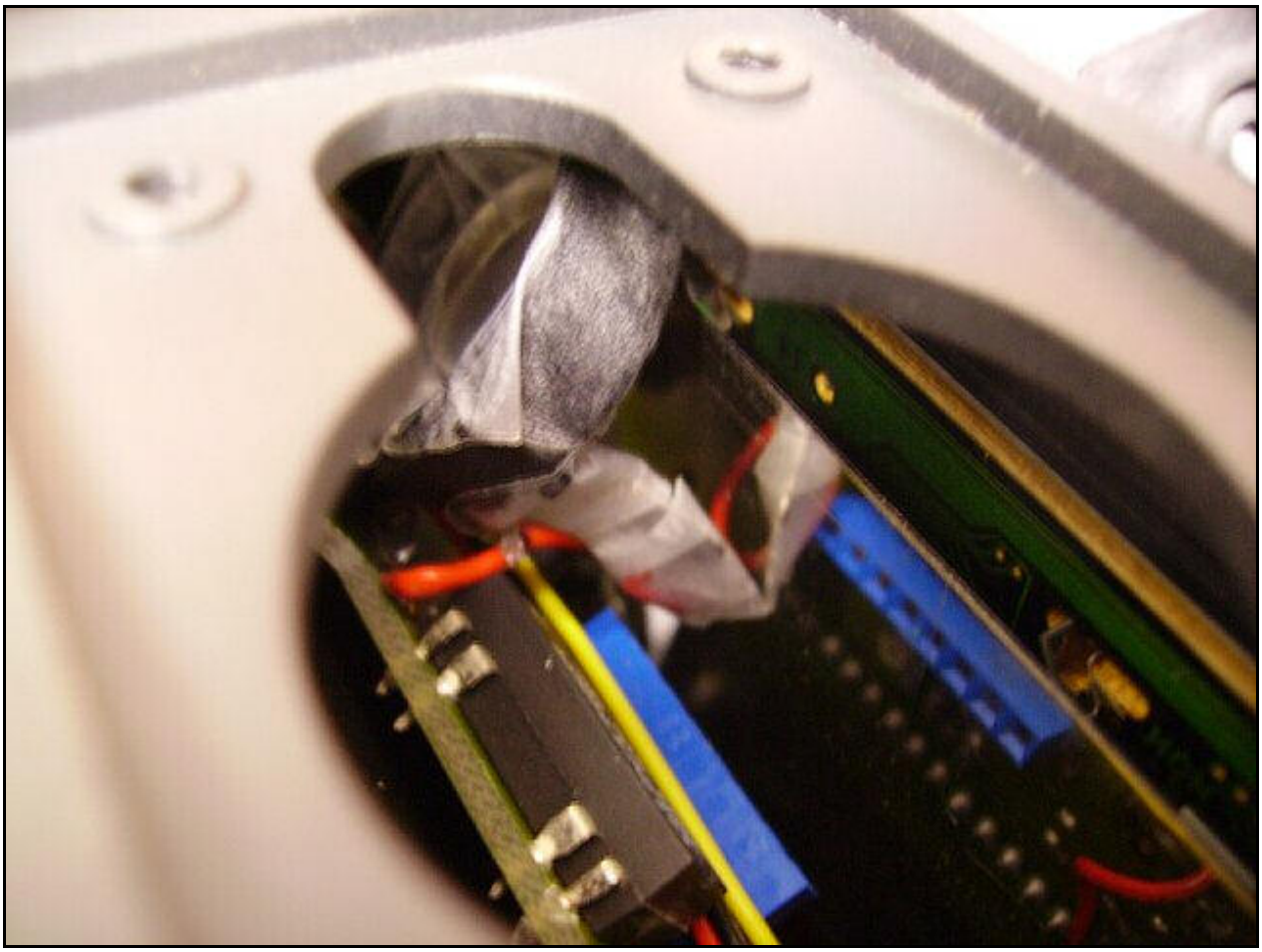

Figure 11 – Antenna based tucked away inside

Figure 12 – Completed antenna block

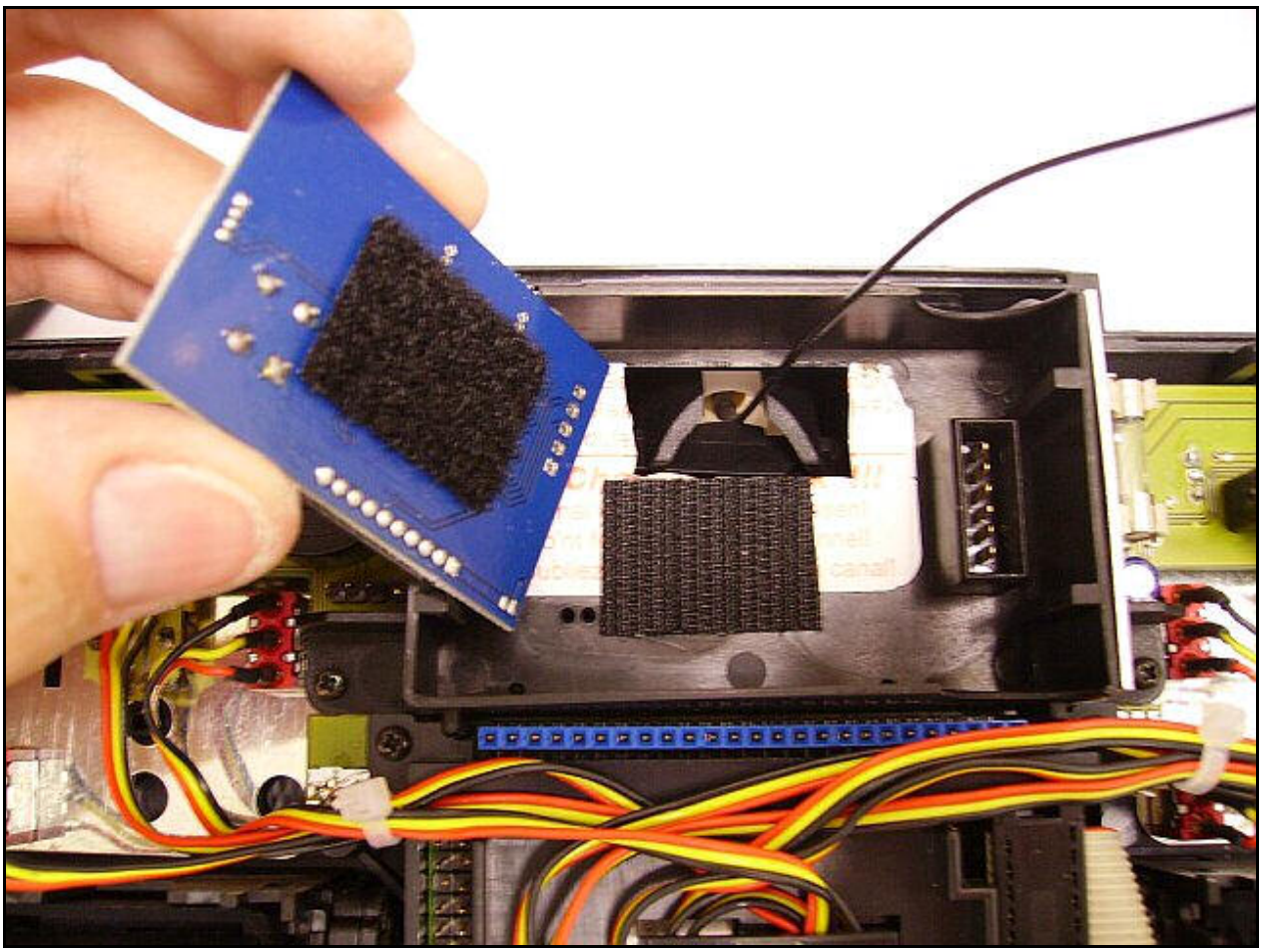

Figure 13 – XtremeLink™ RF module with Velcro™ attached

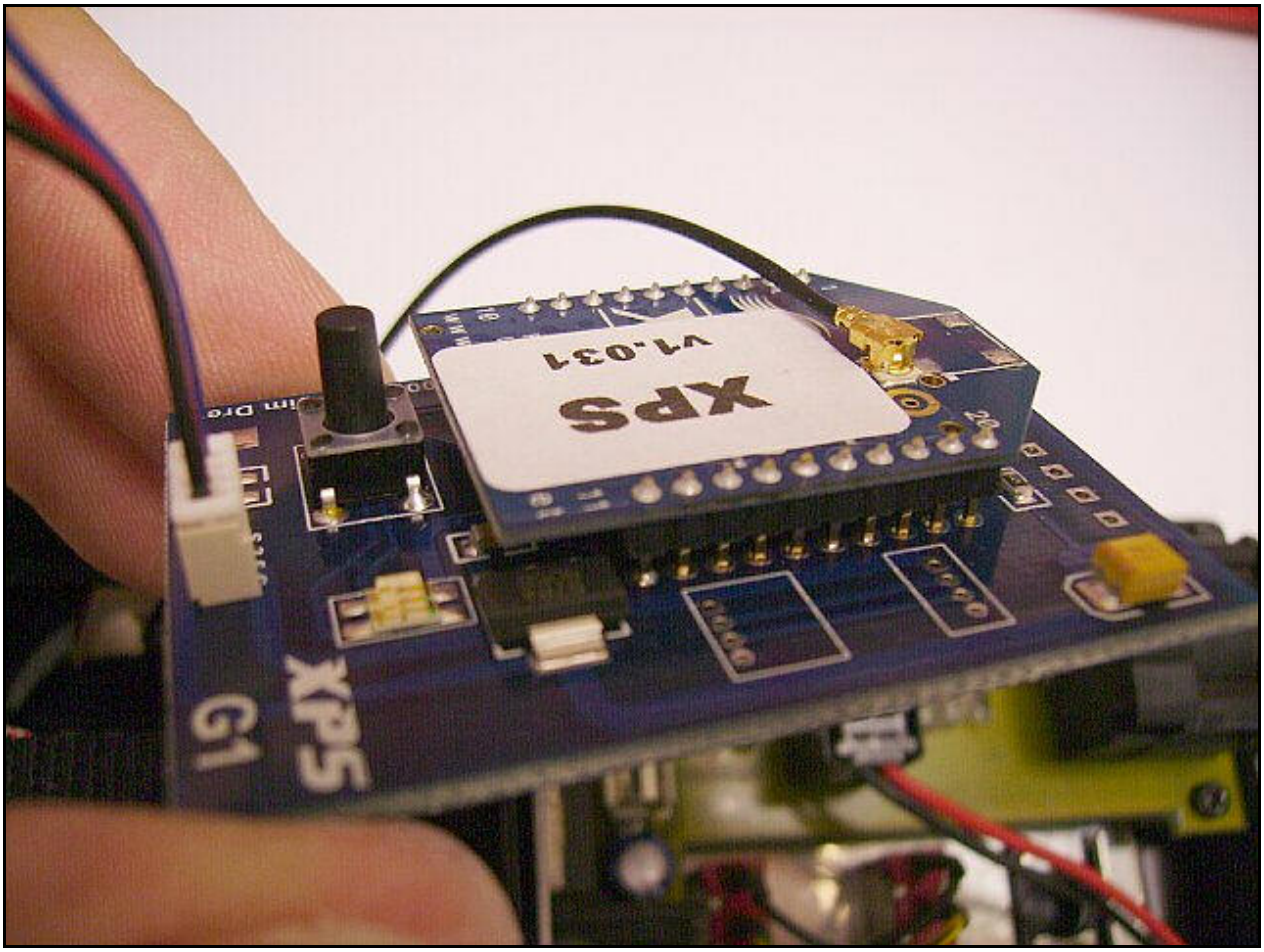

Figure 14 –Antenna connector installed

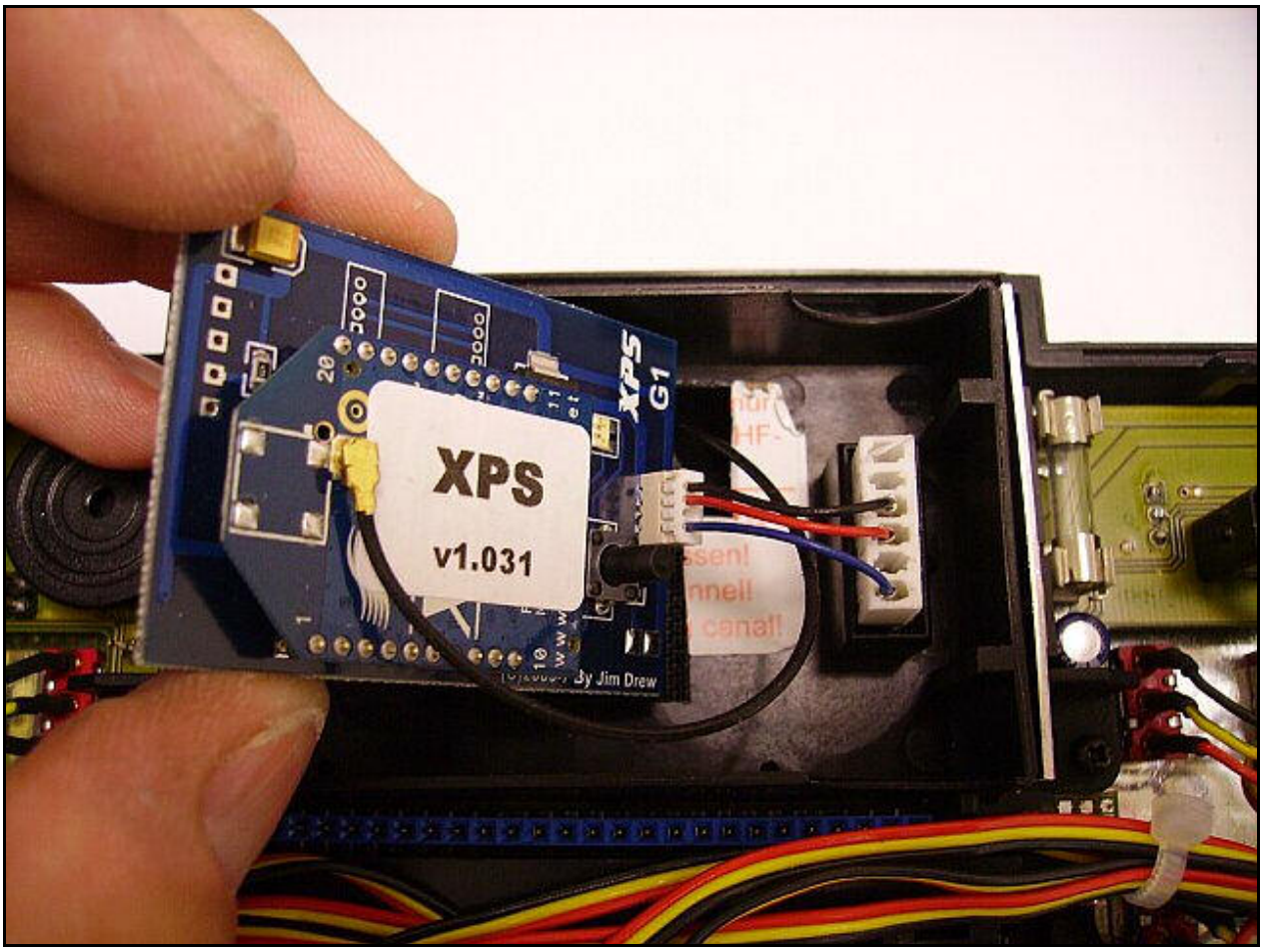

Figure 15 – XtremeLink™ module plugged in

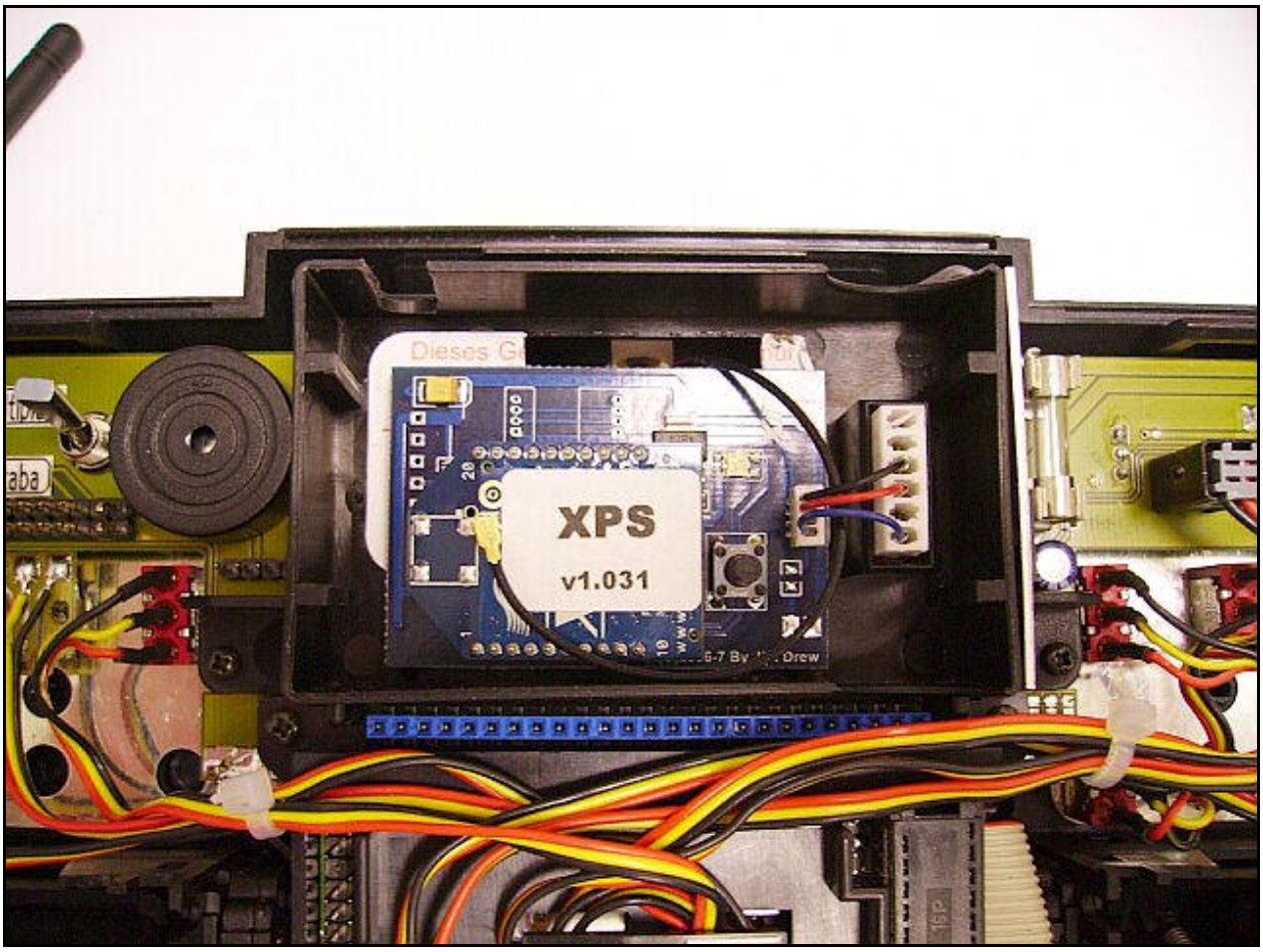

Figure 16 – XtremeLink™ module installed

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 anything that is metallic. This includes steel, carbon fiber, servos, fuel pumps, any type of wiring, etc. The best method of mounting is to show it off! Keep the receiver separated from anything else, and mount it out in the open so you can easily see it and get access to it (see Figures 17 & 18 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 antenna area.**

Antenna orientation does not matter, so you are free to mount the receiver at any angle you like as long as you keep the antenna separated from anything metallic. We have found that the antenna pointing upwards gives the best results when making approaches from far away.

Figure 17 – XtremeLink™ 8 channel receiver installation

Figure 18 – XtremeLink™ 10 channel receiver installation

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.

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.

WARNING: DO NOT ACCIDENTALLY INSTALL A BATTERY CONNECTION BACKWARDS IN THE "B/T" PORT. ALTHOUGH THIS PLUGGING POWER IN BACKWARDS WILL POWER UP THE RECEIVER, IT WILL NOT FUNCTION PROPERLY!

SECTION 2 – TRANSMITTER MODULE

After turning on your transmitter, the STATUS LED on the XtremeLink™ RF module will light orange, followed by solid red for one second, and then begin flashing red. Flashing red means that there is no connection to an XtremeLink™ receiver.

When a connection is established, the STATUS LED will light solid green. If there are telemetry sensors attached to the receiver, the STATUS LED will flash orange every time telemetry data is received.

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 or you will not be able to enter programming mode.

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 6 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 Modulation
Solid Orange	Set Power-up Delay

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 only**
Europe	**Varies, consult local laws**

NOTE - The XtremeLink™ receiver's STATUS LED will be green during normal operation when the power level is set higher than 1 and red when the power level is set to 1.

SET MODULATION

Range: N/A

This function is not currently supported. It will be supported in future versions to allow using HRS, PCM, SPCM, APCM, PCM1024, PCM2048, etc. modulation types.

SET POWER-UP DELAY

Range: 1-9

With the STATUS LED solid orange, 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-up delay setting. For example, the default power-up delay is 1, so the STATUS LED will flash one time.

After the flashing stops you have five seconds to change the power-up delay time. To change the power-up delay, press and release the PROG button one time for each ½ second of delay you would like. For example, if you wanted the power-up delay to be the quickest possible, you would press and release the PROG button just once. If you wanted the power-up delay to be 1 ½ seconds, 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).

The purpose of the power-up delay is for transmitters that change their PPM data after powering on. The Profi 4000 is a good example. During the first 1 ½ seconds, the PPM output is only 9 channels. If the number of channels is actually suppose to be 10 or more, without this delay it would not be possible to recognize those channels.

SECTION 3 – RECEIVER

After powering on your XtremeLink™ receiver, the STATUS LED will light red for approximately 3 seconds and then begin to flash red. Flashing red means that there is no connection to an XtremeLink™ RF module (plugged into your transmitter).

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 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 19 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 - Set Output Mode
Blinking Red	4 - Set Failsafe Map
Blinking Green	5 - Set Failsafe Time
Blinking Orange	6 - Telemetry Setup

Figure 19 – XtremeLink™ receiver programming button location

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.

SET COUNTRY

Range: 1 to 3

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.

Below is a table of required settings.

Country	Setting
All Countries except France	**1 (2405GHz-2485Ghz)**
France (low power only)	**2 (2455GHz-2483GHz)**
Europe	**3 (2405GHz-2454GHz)**

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 to allow different servo output modes such as sequential, grouped (for CCPM), TruDigital™, etc.

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.

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.

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, get into the advanced programming mode.

Now, press and HOLD the programming button for approximately 7 full seconds. During this time, the STATUS LED will turn off, and then I will start flashing red. When it 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 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.

Binding the XtremeLink™ System

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 the XtremeLink™ RF module while powering on the transmitter. Hold the button until the STATUS LED changes from off to green and then release the PROG button. The STATUS LED will begin flashing orange. This indicates that the transmitter is waiting for an XtremeLink™ receiver to bind to.

Receiver – Power on your XtremeLink™ receiver. After three seconds the STATUS LED will begin flashing red. Press and hold the programming button (located inside of the receiver, next to the antenna) using a 3/32nd or equivalent blunt object (note: screwdriver tips will damage the receiver) until the STATUS LED changes from off to green, and release the button.

Once the button is released, the units should bind. Both STATUS LEDs will turn green when a successful bind has occurred. If either STATUS LED does not turn green, repeat this procedure.

Power off your transmitter and receiver after binding. Your XtremeLink™ system is now ready for use!

Range Testing

To perform a range test of the XtremeLink system using the transmitter module that has the removable antenna, follow the instructions below. Have someone help you if there is any possibility of the R/C device moving from a stationary location.

1. Install the receiver in the R/C device as it will be used.
2. Remove the antenna from the transmitter module.
3. Turn on the radio system so servo movement can be observed.
4. 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.
5. Hold your transmitter waist high, away from your body.
6. Press and **hold** the PROG button on the transmitter module.
7. Walk around the R/C device completely (360 degrees) at a distance of at least 50 feet, making sure that the transmitter antenna connector is pointed at the R/C device. 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.
8. With the PROG button still pressed down, walk away from the plane until there is intermittent operation.
9. Turn the transmitter away from the plane so that your body is between the transmitter and the plane. The plane should stop responding completely.
10. Without changing your positions, re-install the antenna on your transmitter module (do not release the PROG button). The plane should now respond, even with your body in the way. If it does not respond fully, **do not fly**!
9. Test complete.

Testing the original antenna design is the same as above but the range requirement is 300 feet instead of 50 feet.

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.

You can program the failsafe condition for each channel as described above. Once you have set the failsafe map, 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. The STATUS LED will begin alternately flashing red and green for about 8 seconds. During this time, move your sticks and switches to where you would like them during a failsafe condition. NOTE - Only those channels programmed in the failsafe map as USER DEFINED will be changed 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 20 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.

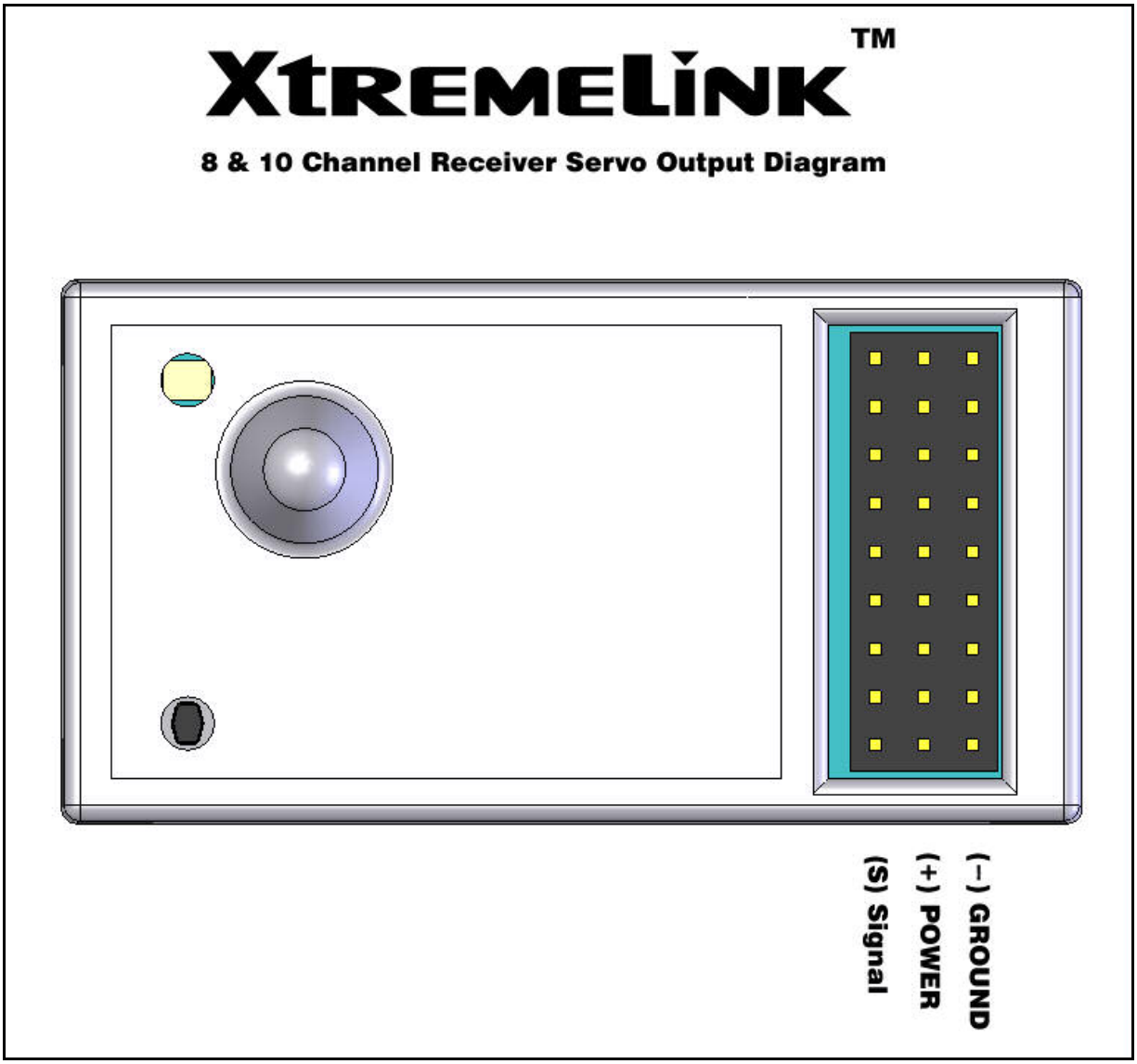

Figure 20 – XtremeLink™ receiver servo output polarity

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.