RCU Review: Futaba 2.4 GHz FASST Upgrade Module

Introduction

There is no doubt that the advent of Spread Spectrum 2.4 GHz radios has totally changed this hobby. Being able to fly your plane without the worry of getting "hit" if somebody else turns on a radio on the same channel, or being able to fly without having to wait for your frequency to be clear, has many people rushing to purchase radios with this new technology. This can be seen at any big flying event. In fact, at the 2008 IRCHA it was reported that with an approximate 750 pilots in attendance 75%-80% of those were 2.4 GHz radios. However, there is still a large group of pilots that are slow to change over. The main
These pilots now have an alternative. Futaba has released the TM-8 2.4 GHz FASST module for the Futaba 7U, 8U, 9C, and 9U family of radios. These radios all feature a plug-in frequency module in the back of the radio, and the TM-8 is designed to plug in and convert their new radios to this new technology. So now pilots with high end radios can retain their favorite radio, but still fly with the peace of mind that Spread Spectrum radios provides them.

I started using a Futaba 9TCAP radio right before the new Spread Spectrum technology came out. In hindsight I wish I had waited on getting the 9C and picked up a high-end radio that was designed with Spread Spectrum from the start. But I needed a 9 channel radio for the Top Flite B-25 review I was doing so I really didn't have the luxury of waiting. I really like this radio and have been using it quite a bit since that review with no real issues. However I was frustrated with it on a recent review that I did, but not for the reasons that most would think as it had nothing to do with the 2.4 GHz technology. I recently reviewed a small park flyer plane and I really didn't like the long wire antenna from the 72 MHz receiver hanging out of the back of the plane. I told myself that it sure would have been nice to have a FASST (Futaba Advanced Spread Spectrum Technology) receiver so there was no antenna hanging out of the plane. So when I got the chance to review this upgrade module for my radio I didn't hesitate to say yes.

So let's roll up our sleeves and see just what's involved here . . . .
The box for the Futaba TM-8 is about the size of a hardback book and has no information about what's inside printed on it. Opening the box up we find the TM-8 RF module protected by a cardboard shipping insert, the R608FS receiver wrapped in bubble wrap, and a small screwdriver. The antenna on the transmitter module is molded into the module itself with no exposed wires as module upgrades from other manufacturers have. The receiver is fairly small (as can be seen in the photo) with two wire leads extending from it. These are the leads for the 2 antenna elements. However the entire wire is not all antenna. The gray portions of the wire are not part of the antenna, with the antennas being the clear portions at the ends of the gray wire. Care must be taken to avoid bending these portions if at all possible.

Instructions

The included instruction sheet is a 2-fold 8-1/2"x11" document printed in black and white. The documentation does include illustrations that help in clarifying the instructions given in the manual. While short, the manual does cover all of the necessary operations needed to setup and operate the radio with the new module. This includes installing the module, installing the receiver, binding the receiver to the transmitter, operation of the TM-8, selecting area of operation (General or France), selecting 7 or 8 channel operation, setting and operation of the fail safe, range checking the radio, as well as providing a chart of receivers that are compatible with the TM-8. The document is thorough and provides all instructions needed to successfully install and operate the module. In addition to the manual, Futaba provides a FAQ on their website http://2.4gigahertz.com.
Installing The Module

Changing the module from the existing module to the new TM-8 is a very easy and straightforward procedure. Start by turning on the radio, ensuring that the radio is set for PPM modulation for the model you will be using this on, and then turn off the radio. On the back of the radio depress the two finger clips and pull the old module out of the radio. Insert the TM-8 module into the back of the radio, taking care as not to bend the pins in the module bay, and push the module in until the clips snap and lock the module in place. The instructions for the manual state that the radio can be operated with the old antenna in place in the radio. However they do recommend that you do remove it. And that is it. It takes less than a minute to change out the modules in the radio.

Unlike older receivers that will respond to controls from any transmitter on the same frequency the FASST system provides a more secure setup where the receiver will respond to instructions from your transmitter only. In order to accomplish this the receiver needs to be "bound" to the transmitter using the Futaba EasyLink. Each FASST transmitter has a unique code in it and when you bind the receiver to the transmitter the receiver will write this code into it’s memory and from then on will respond to control from only that transmitter. The receiver is bound to the module at the factory and should operate without having to perform the EasyLink procedure. However, if it is not, or you need to re-bind the receiver, it is a very simple procedure. In addition, if you add any additionall receivers to the radio they will have to be bound to that receiver.

To bind a receiver follow this procedure:

- Turn on the transmitter and the green LED on the TM-8 module should begin to blink. If not, turn the radio off, and then back on again.
- With the transmitter on and the green LED blinking turn on the receiver.
- With the receiver on, press and hold the Easy Link button located on the receiver (the button is recessed in the receiver case so use the included mini screwdriver to press it), and hold for two seconds and release it. The linking procedure has started. When the link is complete the LED on the receiver will change to a solid green to indicate that the link is complete and successful.
- And that is it, the receiver should now be bound to the transmitter.

Receiver installation
As I mentioned earlier, the receivers for a FASST system do differ from our older receivers. The most notable difference is in the antennas. We all know these by the approximately 36" of antenna wire that extended from the antenna. This is gone on FASST receivers and is replaced by two small antenna elements placed on the end of approximately 6" of grey coaxial cable. The antenna elements are clear and need to be kept as straight as possible when installed in the aircraft. The two antennas give the radio what Futaba calls DAD, Dual Antenna Diversity. The two antenna elements help the receiver maintain a connection to the transmitter no matter how the aircraft is oriented as well as anything that might block the signal from one of the antenna elements. Items such as the engine, mufflers, or other items may temporarily block one element from receiving signal while in flight.

The receiver itself is mounted in the same manner as older receivers were; securing and padding the receiver in order to isolate it from vibrations in flight. There has been some ongoing discussion concerning the build-up of heat in the receiver while in operation. Many pilots are recommending not wrapping the receiver entirely in foam in order to allow airflow to reach the receiver in order to help it stay cool. A piece of foam between the receiver and the airframe will still isolate the receiver from vibrations. No official word has come from Futaba at the time of this writing on this issue. Until word comes from Futaba it wouldn’t hurt to err on the side of caution and provide airflow to the receiver.

Once the receiver is mounted the antenna elements need to be mounted as well. The recommendations for Futaba are to separate the antenna elements as much as possible, as well as separate them by 90 degrees. I found that the best way to mount the antenna elements is to glue a small piece of antenna tube in location for each element. Then slide each element into these mounting tubes. Shown in the pictures is the Great Planes Escapade that I recently reviewed. Looking at the fuselage I mounted one element on the fuselage side, running parallel to the fuselage length. For the second element I looped it back to the fuselage former and mounted it so that it was crosswise in the fuselage. This gave both a 90 degrees separation in addition to as much physical separation as was possible with the lengths of the elements themselves.
When installing the antenna elements there are several precautions that need to be taken:

- As stated earlier, maintain a 90 degree angle and as much separation as possible.
- If the model includes metal conductive items which may impact the receiver's ability to clearly receive the signal it is suggested that the receiver be mounted so that the antennas exit both sides of the model.
- Ensure that the antennas are at least 1/2" away from any conductive materials such as metal and carbon. Please note: this is not applicable to the coaxial portion of the antenna. It is important, however, to not bend the coax or antenna in a tight radius.
- If the fuselage is made of conductive materials such as metal and carbon, the antennas MUST be positioned so that they exit the fuselage. Additionally, do not attach the antenna itself to this type of fuselage.
- Be careful when handling the receiver antennas. Repeated bending and flexing of the antennas, or excessive force, could weaken or compromise the internal antenna connections.
- Keep the antennas away from the motor, ESC, and other noise sources as much as possible.

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**Area Select and Channel Mode**

The TM-8 module is designed to operate in many different countries. If the module will be operated in any country other than France the Area Select switch needs to be placed in the "General" position.

Located next to the Area Select switch is the Channel Mode switch. This is set to match the number of channels in the receiver being used - either 7 or 8 channels.

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**LED Indicators**

Located on the face of the TM-8 module are two LED indicators that show the status of the module:

<table>
<thead>
<tr>
<th>Green</th>
<th>Red</th>
<th>Status</th>
<th>Fail Safe (F/S)</th>
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<tbody>
<tr>
<td>Solid</td>
<td>Solid</td>
<td>Initializing (When Power Up)</td>
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<tr>
<td>Alternate Blink</td>
<td>Off</td>
<td>Check RF condition nearby</td>
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</tr>
<tr>
<td>Solid</td>
<td>Off</td>
<td>RF power on</td>
<td>Off</td>
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<tr>
<td>Solid</td>
<td>Blink</td>
<td>RF power on (Power reduced to perform the range check function)</td>
<td>Off</td>
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<tr>
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<td>Off</td>
<td>RF power on</td>
<td>On</td>
</tr>
<tr>
<td>Blink</td>
<td>Blink</td>
<td>RF power on (reduced to perform the range check function)</td>
<td>On</td>
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**Range Check the Radio**

It is extremely important to perform a range check on your radio prior to each flying session. This allows you to ensure that the radio is functioning properly and can control the aircraft at the distances possible in
flight. In the days of older radios that have a collapsible antenna it was easy to perform the range check: walk approximately 100’ away from the aircraft, collapse the antenna completely, and operate the radio and observe if the controls on the aircraft still respond. But with the fixed antenna on the TM-8 it’s impossible to lower this antenna in the same manner. The TM-8 module incorporates a system that reduces the power output of the module in order to perform a range check. This is accomplished by:

- Turn on the radio
- After the radio frequency link has been established (as indicated by either a solid green LED or a blinking green LED) press and hold the "F/S, Range" switch located on the rear of the TM-8 module. The power will be reduced while holding in the button, which will be indicated by the blinking red LED.
- Walk away from the aircraft while operating the controls. If necessary have somebody assist in verifying that the controls on the aircraft are completely and correctly operating. Control should be maintained to approximately 30-50 paces away without losing control.
- If everything operates correctly, return to the aircraft. Start the aircraft and perform the range check again with an assistant holding the plane with the engine running at various speeds. This is done as some receiver issues will not become evident until subjected to the vibrations of a running engine.
- If any issues arise such as servos "jittering" or moving inadvertently do not operate the aircraft until the source of difficulty can be determined.

**NOTE:** This information is provided by [Futaba's 2.4 Ghz website](#)

Other 2.4GHz systems hold firm to one or two frequencies, increasing the potential for interference. The frequency of Futaba 2.4GHz FASST shifts every 2 milliseconds, so there are no signal conflicts or interruptions - and no need for a frequency pin!

Patent # 6,141,392
2.4GHz FASST scans incoming data and applies sophisticated error correction techniques - resulting in a system that gives you a solid, impenetrable connection with your model.

Futaba 2.4GHz FASST systems seamlessly select the best reception between two receiver antennas, so there's no loss of signal.

Futaba 2.4GHz FASST system transmitters leave the factory with a unique and permanent ID code. Once linked to the receiver, the code ensures that the receiver will recognize and respond ONLY to that transmitter. The linking process is simple...just push a button on the receiver.
Overall I really liked the TM-8 module for my Futaba 9C radio, but there were a few items that were a bit negative. First of which is the module sticking out of the back of the radio. This wasn't a problem until I put the radio away in my transmitter case. As you can see in the pictures, the module causes the radio to stick up which pushes the control sticks into the lid of the case. While it's not a big deal to remove the module when I'm ready to store the radio, it still can be a bit frustrating. The TM-8 Module is limited to 8 channels only when installed, which will cause the loss of one channel when it's installed in a 9-channel radio. This is a bit frustrating because I won't be able to put my big B-25 on the FASST radio. But I can put the 72 Mhz module back into the radio and still use my existing receiver, so this frustration is minor. My last negative comment is the cost of the FASST receivers. I do understand that these receivers are a new technology and that the cost will come down over time, but this could be prohibitive for those that have many planes to change over. However, since the 72 Mhz module can be placed back into the radio, this is once again minor as the radio can still used with old receivers as new receivers are purchased.

I have to admit that I was tickled to death when I discovered the TM-8 module. My 9TCAP radio has quickly become one of my favorite radios and I was a bit sad that it was out of date being 72 Mhz. But with the TM-8 I can convert the radio over to the latest FASST technology and continue to enjoy the powerful features of my 9C radio and have the peace of mind that 2.4 Spread Spectrum gives. The TM-8 is really an easy upgrade to make, as it simply plugs into the back of the radio. The change of modules can be made in seconds with no tools needed. This ability to change out modules further enhances the value of this module because users can still switch out to their old 72 Mhz modules and continue to use their existing receivers. This makes the upgrade path very painless as it's not necessary to upgrade all of their planes at once.

The TM-8 is easily a winner as it extends the useful life of a very popular and powerful line of radios. For owners of these radios this is definitely a winner as they will be able to continue using the radios that they love.

Comments on RCU Review: Futaba 2.4 GHz FASST Upgrade Module

Posted by: dragonov3 on 04/22/2009
Nice review. But the cost is a bit prohibitive. I will have to wait till the cost comes down. I have about a half dozen airplane. Good to see I can still use my older high end radio.

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Posted by: wildbill-RCU on 04/27/2009
I purchased a Spectrum module $ receiver for $109.95 for my 9C and it works great.

Profile

Has anyone tried this in a Hitec Optic 6 transmitter? I was advised by Hitec that the FASST modules would work in Hitec.

Profile

Good Product...but considering the price...chose to using ASSAN 2.4 module...work flawlessly...no issue

The comments, observations and conclusions made in this review are solely with respect to the particular item the editor reviewed and may not apply generally to similar products by the manufacturer. We cannot be responsible for any manufacturer defects in workmanship or other deficiencies in products like the one featured in the review.

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