

TOWER HOBBIES®

SYSTEM 3000™

6FM 6-CHANNEL FM RADIO CONTROL SYSTEM INSTRUCTION MANUAL FOR R/C AIRCRAFT USE

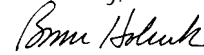
Congratulations on your purchase - and thank you for choosing our Tower Hobbies® System 3000™ 6FM radio! I'm sure you'll enjoy many hours of trouble-free flying because this radio includes many features I knew you would want in a complete, sensible flight system.

The 6FM offers six-channel control, enough for many sport and even competition planes. As an FM narrow-band system, it's far less vulnerable to interference than AM radios. The narrow-band transmitter and dual-conversion receiver enhance strong control by filtering and boosting the signal. Combined, they'll provide you with smooth, glitch-free control even in today's "noisiest" radio environments.

Those are big pluses, but we went even further to make the 6FM the most complete radio we've ever offered. The case is ergonomically designed for the best, most comfortable fit for your hands. Add to that one switchable auxiliary channel which can be used for landing gear and an additional proportional channel - great for use with flaps! Adjustable sticks, complete trainer system, dual-rates, reversing switches for all channels, a full set of NiCd batteries with charger and more, help round out this superbly designed system.

Packed with easy-to-use features and complete with a 1-year limited warranty, the 6FM is a valuable investment. Congratulations on your purchase and happy flying!

Sincerely,

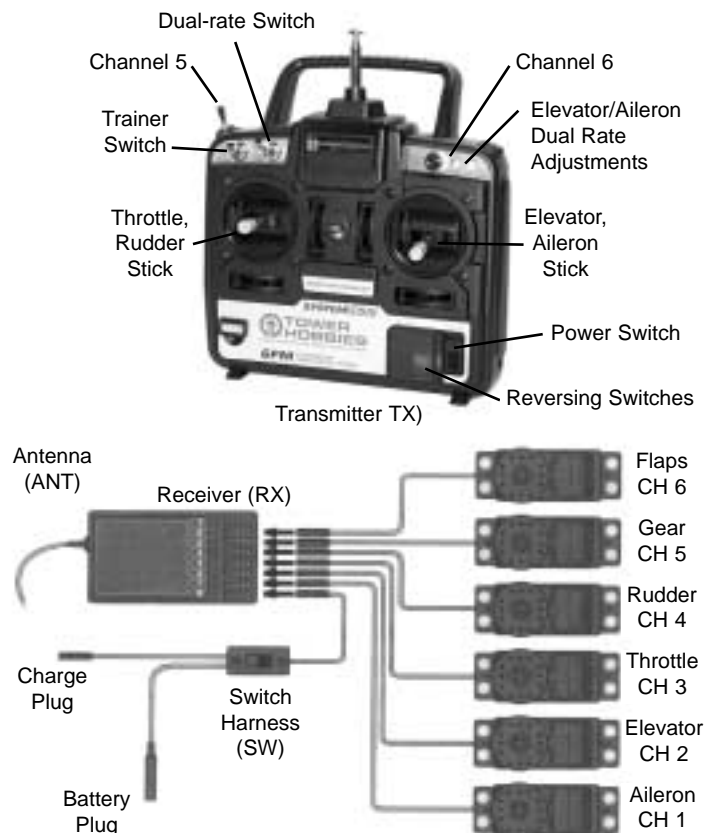


Bruce R. Holecek
Founder and Chief Executive Officer,
Tower Hobbies

QUICK REFERENCE GUIDE

Note: This Quick Reference Guide is a condensed version of all information given in this manual. It is strongly recommended you read this entire manual before operating your 6FM system or your model.

1. Charge the transmitter and receiver batteries for 15 hours with the included charger.
2. Connect servos, 4-cell battery pack and switch harness as shown at right.
3. Turn on transmitter, turn on receiver switch harness.
4. Center all four transmitter trim levers. Make sure all servos operate according to transmitter stick movements.
5. Turn off the system, receiver first, then transmitter.
6. Wrap the receiver and receiver battery in foam rubber (HCAQ1000 or HCAQ1050) for protection.
7. Install the entire radio system into the model as shown in the model's instruction manual.
8. To reverse the direction in which a servo rotates (if necessary), locate the reversing switch for that channel on the bottom front of the transmitter and slide it to the "REV" position.
9. Range test the radio system prior to flight. With the transmitter antenna collapsed, you should be able to smoothly control movement of all control surfaces on your model from at least 100ft on the ground.



Please read this entire manual carefully and use your radio system safely. Pay special attention to all precautions and warnings to ensure the safest operation.

WARNINGS

- Do not fly simultaneously on a frequency that is already being used in your area. Doing so could cause unwanted interference, a crash and possibly bodily harm.
- Always attach the proper frequency flag to the Tx's antenna when flying. This alerts others at the flying field as to which frequency you are using.
- Do not fly in the rain or at night. Water can permanently damage many of the components in the radio system, possibly causing loss of control and a crash.
- Only fly at designated R/C flying fields. Fly at safe distances away from other people, objects in the air, buildings, electrical lines, or any other object which could possibly impede safe flying. Failure to do so could cause a crash and possibly bodily harm, and physical damage to other property.
- Extend the Tx and Rx antennas to maximum length when flying. Make sure the Tx antenna is threaded into the Tx tightly. Always test the radio system before use. Make sure the operation of each channel in the radio is in the proper direction. If a channel does not accurately respond according to Tx stick input, do NOT fly the plane. Check for, and correct improperly functioning equipment before use. Failure to ensure proper radio operation before flight could result in a crash.
- During flight preparations, be certain to place the Tx on its back when on the ground, to prevent it from accidentally falling over and inadvertently moving the throttle stick to high speed.
- Do not allow fuel or oil on the plastic parts. Some plastics may melt when exposed to such materials.
- BEFORE turning the Tx's power switch "ON", adjust the throttle stick to minimum speed position. After stopping the engine turn "OFF" the Rx's power switch, then turn "OFF" the Tx power switch. Failure to follow this order could cause the engine to go to full throttle and cause an injury.
- Do not make adjustments to the radio system while the engine is running unless absolutely necessary. Failure to do so could cause the engine to accidentally go to high speed and cause an injury.
- Always fully charge the Tx and Rx NiCd batteries before each flight. Failure to do so could cause an inadvertent power failure and a crash. Use the charger supplied with this system. If using another charger, do not overcharge the battery, as it could cause burns, fire, injury or other equipment damage. Do not short circuit the NiCd battery terminals, as arcing, overheating or fire could result.
- Do not leave the radio system, batteries, model airplane or other modeling equipment within the reach of children.
- Do not overheat or throw the NiCd batteries into a fire. Leaking electrolyte from the battery could cause injury, such as burns or blindness. IN CASE OF EMERGENCY, IMMEDIATELY FLUSH YOUR EYES, SKIN OR CLOTHES WITH PLENTY OF WATER AND SEE A DOCTOR. Recycle the battery when no longer in usable condition.
- Store the radio with all NiCd batteries in the discharged state and be certain to fully charge the batteries just prior to use.
- Do not store the radio system in extreme heat (exceeding 104°F) or cold (below -14°F), in direct sunlight, in high humidity, in high vibration environments or in dusty areas.

BEFORE INSTALLATION

The rechargeable batteries inside the Tx and the Rx pack must be fully charged prior to use. Plug the charger into a 110V AC wall outlet. Connect the charger's output leads to the Rx battery pack and the charge jack located on the side of the Tx. The corresponding LEDs will illuminate on the charger when a good electrical connection is made with each battery. Charge each battery for 15 hours. The batteries may become warm as they charge. This is normal. When charging is complete, disconnect the charge leads from the batteries and disconnect the charger from the wall.

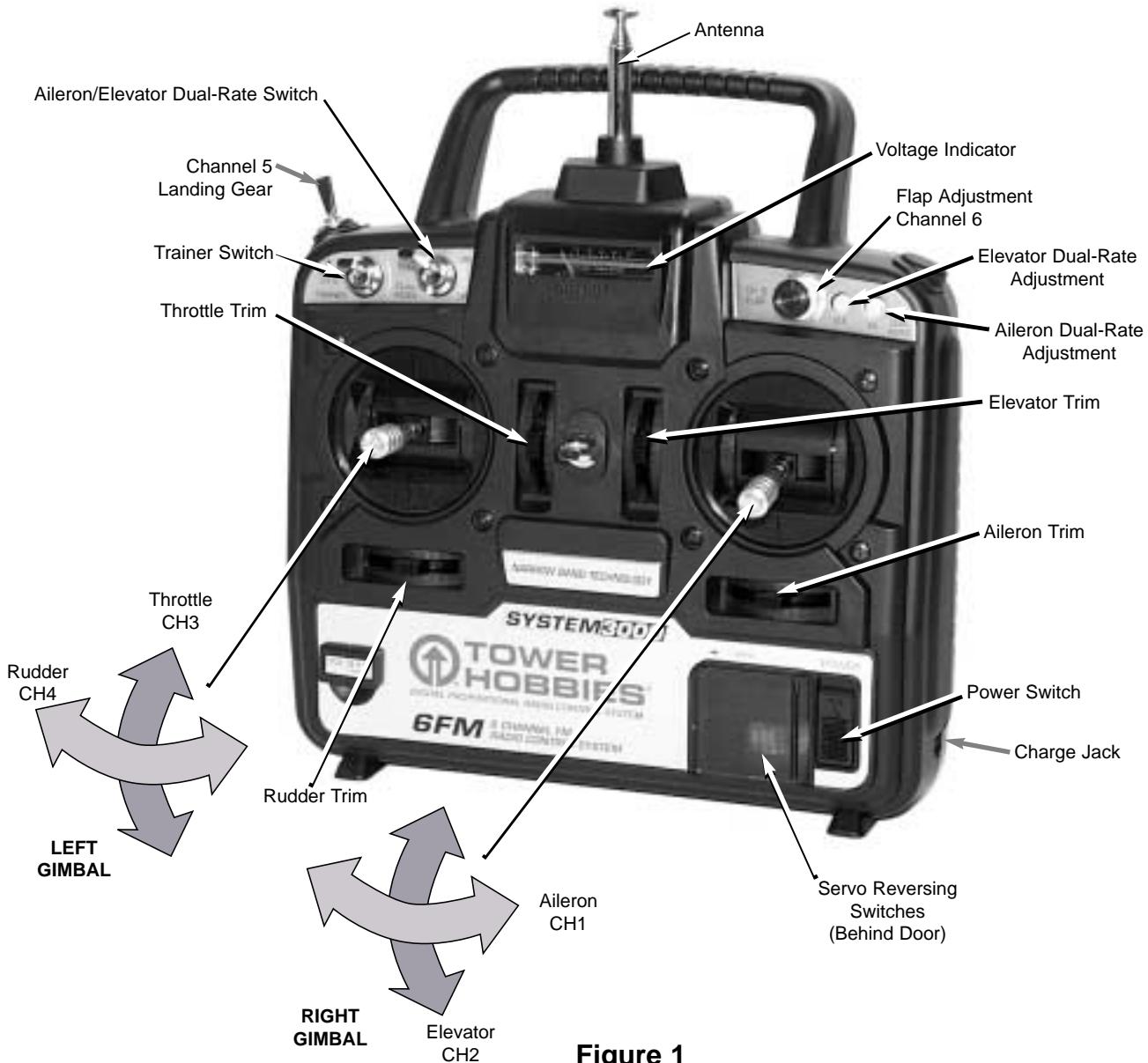


Figure 1

The 6FM transmitter (Tx) is designed for mode II operation. Mode II is most commonly used throughout the U.S., where the aileron and elevator are controlled by the right stick, and throttle and rudder are controlled by the left stick. When moving the aileron stick to the right, the airplane's right aileron is raised, the left aileron is lowered and the plane turns to the right, and vice versa. When the elevator stick is pulled back, the plane's elevator is raised and the tail of the airplane moves downwards, causing the nose of the airplane to rise and the plane to climb, and vice versa. When the throttle stick is pushed forwards, the engine throttle lever arm moves to the high speed direction, and vice versa. When the rudder stick is moved to the left, the rudder moves to the left and the nose of the plane points to the left, and vice versa.

Channel 5 is only a switchable channel, not proportional, providing only two control positions. It's perfect for landing gear. Channel 6 is a fully proportional auxiliary channel, controlled only by the rotary dial and great for flaps.

During normal conditions, the range, or safe operating distance from the Tx to the receiver (Rx) is "line of sight". This means the 6FM should maintain complete control any time you can see the model. The 6FM operates on the 72MHz frequency band, in which there are 50 different channels ranging from 72.010MHz (Ch11) through 72.990MHz (Ch60). For safety reasons, you must always be aware of what channel you are using so no two radios in the same area are ever operating on the same frequency.

Mount all servos into the model per the airplane's instruction manual. When mounting servos, make certain when the Tx sticks are moved to maximum positions, that the pushrods in the airplane do not bind or are too loose. Binding can cause damage to the servo and loose linkages could result in poor control of the aircraft.

Use the rubber grommets, screws and brass eyelets supplied when mounting your servos in the airplane (see figure 2). Install a rubber grommet to each mounting lug on the servo. Insert a brass eyelet into the bottom of each grommet. Insert a screw down through the hole in each rubber grommet and into the mounting surface. Do not over-tighten the mounting screws. Servos should be allowed to move slightly to dampen the vibrations within the model. Use a servo horn which is long enough to produce the desired range of movement for that particular control.

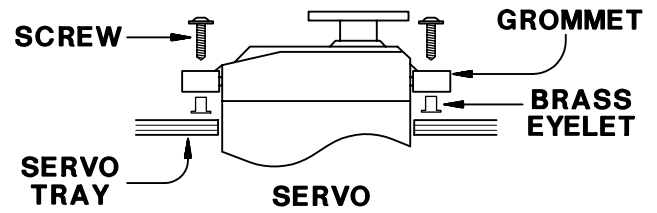


Figure 2

RECEIVER, SWITCH HARNESS & RECEIVER BATTERY INSTALLATION

Connect each servo to the Rx per the diagram in Figure 3. Always insert the servo and battery or switch harness connectors into the Rx firmly, to ensure solid physical and electrical connections are made.

Cut a small rectangular hole in the side of the fuselage on the airplane for placement of the switch harness. Make sure the hole is long enough to move the switch lever completely to each side. Install the switch in a location as free as possible from exposure to contaminants, such as engine oil, dirt, dust and so on. Usually keeping the switch on the fuselage side opposite the muffler is best. Plug the red connector on the switch harness into the Rx channel marked with a "B". Connect the Rx battery to the female lead on the opposite end of the switch harness. The remaining lead on the switch harness is for connection of the charger, so the Rx battery can be charged directly through the switch harness for convenience.

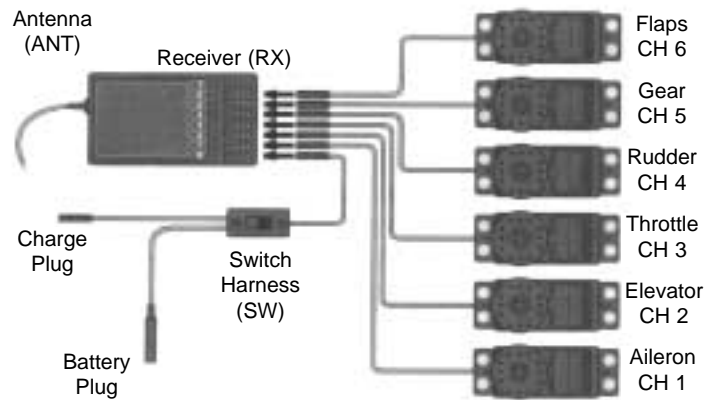


Figure 3

Make sure all reversing switches, located on the front bottom of the Tx, are in the normal (NOR) position. Set the dual-rate adjustment knobs for the aileron and elevator channel to the minimum positions (counter-clockwise) as well. These are located on the top-right of the Tx.

Do not cut or bundle the Rx antenna in any way. It is important that the antenna is extended to its maximum length before use to maximize operational distance or "range". It's also helpful to route the antenna as far away from servo and battery leads as possible, to help prevent interception of unwanted stray signals. For most aircraft, the antenna is routed down the length of the plane to the tail, making sure not to allow any antenna wire to drag the ground at any time as it could cause interference in the radio and cause a crash.

After all servos, the switch harness and battery are properly connected to the Rx per figure 3, turn "ON" the power switch on the Tx, then the power switch on the Rx. Center all trim levers and make sure all servos operate in the proper directions according to the movement of the Tx stick. When the Tx stick is at center position, the servo horn should be perpendicular to the servo itself. When connected to the airplane's control surface, it should be at neutral position when the stick is at center. If the neutral position of the control surface has been changed, even though the stick is still at center, change the length of the pushrod by adjusting the clevis on the end of the rod. Make sure each control surface is set per the instructions of your airplane. For the engine throttle, make the servo horn position such that the throttle is opened fully when the Tx throttle stick is at maximum (up), and is closed fully when the Tx throttle stick and trim are at minimum (down).

Once all linkages have been connected, servo directions are correct, servo neutrals are confirmed and no binding or loose linkages exist, it is time to range test the radio. With the Tx antenna collapsed, you should be able to smoothly control movement of all control surfaces on your model from at least 100ft. away on the ground. If not, refer to the Troubleshooting Guide at the end of this manual before proceeding. It is important to range-check your system prior to every flight. Wrapping the Rx in foam rubber can greatly help protect the Rx from excess vibration. Enclosing the Rx in a plastic bag can also help prevent moisture from penetrating the Rx and damaging the circuitry.

Ⓢ TRANSMITTER STICK TENSIONS

The tension on the sticks can be adjusted from inside the Tx. This allows you to customize the feel of the sticks to your hands. Be careful when removing and replacing the Tx backplate. Do not pinch or pull wiring harnesses or drop objects onto the PC board. Electrical short circuits may permanently damage the radio and void your warranty. Remove the four screws on the rear of the Tx. The tension adjustment screws are shown in figure 4 and can be easily adjusted with a screwdriver.

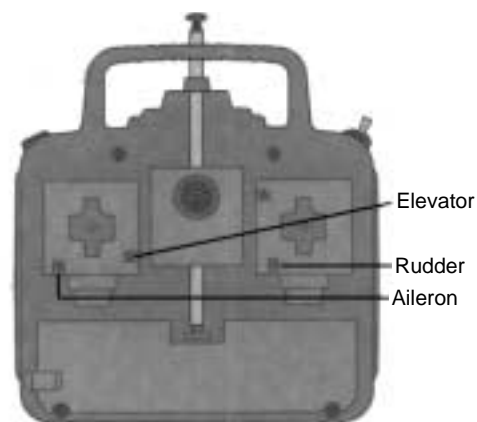


Figure 4

Ⓢ DUAL-RATE ADJUSTMENTS

The 6FM utilizes a single dual-rate selector switch to control dual-rates for the aileron and the elevator channels. There is one rate adjustment dial for the aileron channel and one for the elevator channel. These dials are easily adjustable with a small screwdriver and are located on the top-right corner of the front of the Tx.

When the D/R switch is in the "ON" position, the travel of each servo can be narrowed or widened by adjusting each respective adjustment dial. Each dial can change the adjustment range anywhere from 30-100% of maximum travel. Dual rates are used to set different control surface throw rates for flight maneuvers. When the switch is in the "ON" position, the basic throw rates are maintained. When the switch is in the "OFF" position, easy take-offs and landings are possible.

Ⓢ STICK LEVER LENGTH ADJUSTMENTS

The stick lengths can be adjusted also. Referring to figure 5, turn the stick head (A) counter-clockwise and stick head (B) clockwise to unlock. Adjust the length to your preference and lock in reverse order.

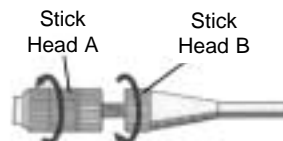


Figure 5

Ⓢ FREQUENCY FLAGS

Use the frequency flags supplied with this radio system so other modelers at the flying field can easily identify your channel number. Apply the frequency number sticker to the plastic board as shown in figure 6. Attach the board to the antenna by passing it over the small part of the antenna and slide it to the large part.

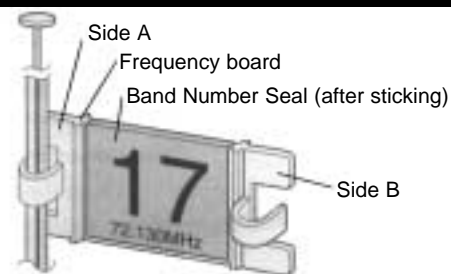


Figure 6

The 6FM includes a trainer system, a great tool for training students how to fly. A Tower Hobbies® System 3000™ Trainer Cord (TOWM6080) and Student Trainer Tx Box (TOWM6200) are necessary in order to use the trainer system (not included). The 6FM's trainer system is totally compatible with the Tower Hobbies® 4FM radio system and all Futaba® brand FM radios (not compatible with AM or PCM-only systems).

CAUTION: Only train with an experienced pilot controlling the teacher's transmitter. Failure to do so could put yourself and others in the area at risk of injury or damage to property. To make your R/C modeling experience more enjoyable, it is recommended to get experienced, knowledgeable help during your first flights. You'll learn faster and avoid risking your model before you're truly ready to solo. You can contact the national Academy of Model Aeronautics (AMA), which has more than 2,500 chartered clubs across the country. Most of the clubs provide instructor training programs and insured newcomer training. Contact the AMA at:

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302-9252
Tel: (800) 435-9262 Fax: (765) 741-0057
<http://www.modelaircraft.org/>

Before training, follow these important preflight checks:

1. Connect the trainer cord to the trainer cord jack on the rear of both transmitters.
2. Turn on the teacher's Tx and the Rx switch harness in the model. Do not turn on the student's transmitter (it will be powered by the teacher's radio).
3. Set the trims and reversing switches on the student's Tx to match the teacher's Tx.
4. Press and hold the trainer switch on the teacher's Tx. Control of the aircraft should now be passed on to the student's Tx.
5. Release the trainer switch to allow the teacher to confirm complete control of the model has been regained by the teacher from the student.
6. You are ready to begin training!

↑ FCC STATEMENT

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

↑ RECYCLING OF NICKEL-CADMIUM BATTERIES

The Tower Hobbies 6FM Radio contains nickel-cadmium (Ni-Cd) batteries in the Tx and a pack is included to supply power for the Rx. The EPA certified RBRC® Battery Recycling Seal on the nickel-cadmium (Ni-Cd) battery indicates Tower Hobbies® is voluntarily participating in an industry program to collect and recycle these batteries at the end of their useful life, when taken out of service in the United States or Canada. The RBRC® program provides a convenient alternative to placing used Ni-Cd batteries into the trash or the municipal waste system, which may be illegal in your area.

Please call 1-800-8-BATTERY™ for information on Ni-Cd battery recycling and disposal bans/restrictions in your area. Tower Hobbies® involvement in this program is part of our commitment to preserving our environment and conserving our natural resources.



TRANSMITTER

Channels: 6-channel
 Transmitting frequencies: 72MHz band
 Modulation type: FM, narrow-band
 Current drain: 180mA
 Input power: 9.6V NiCd battery
 Output power: < 0.75W

RECEIVER

Channels: 7-channel
 Receiving frequencies:
 72MHz FM dual-conversion narrow-band
 Intermediate frequencies: 10.7MHz 1st IF, 455kHz 2nd IF
 Receiving range: 500 yards ground, 1000 yards air
 Avg. Current drain: 10mA, approx. 250mA w/4 servos
 Input power: 4.8V or 6.0V NiCd battery
 Dimensions: 2.5 x 1.38 x 0.88" Weight: 1.4 oz

The 6FM is available on any channel in the 72MHz frequency band, which extends from channel 11 (72.010MHz) to channel 60 (72.990MHz).

TROUBLESHOOTING GUIDE

| Problem | Possible causes | Solution |
|--|--|--|
| Short range | Collapsed or loose Tx antenna | Fully extend the antenna and make sure it is securely seated |
| | Interference. | Check frequencies in area and check Rx installation |
| | Rx antenna poorly routed | Reroute antenna away from other wiring |
| | Severed Rx antenna. | Send to Hobby Services for new antenna |
| | Tx or Rx battery not fully charged | Fully charge batteries prior to use |
| | Rx or Tx out of tune | Send to Hobby Services for retuning |
| | Crash damage. | Send to Hobby Services for inspection and repair |
| Short run time | Faulty Rx or Tx crystal | Install new crystal and perform range check |
| | Low Tx or Rx batteries | Fully charge batteries prior to use, may need cycling (you must remove the batteries from the TX to cycle) |
| | Binding servos causing excess battery drain. | Check pushrods to free binding |
| Tx meter low | Too many servos | Use fewer servos if possible, or use a higher capacity battery pack |
| | Tx batteries are drained | Fully charge batteries prior to use |
| Tx meter beyond red zone but servos do not function | Rx batteries are drained | Fully charge batteries prior to use |
| | No power to receiver | Move Rx switch harness to "ON" position |
| | Switch harness connected incorrectly. | Make sure all leads are in the proper positions |
| | Reversing switch stuck in-between positions. | Move switch fully to one side or the other |
| Interference or servos glitching | Another Tx is on your channel | Do not operate your system until other user is finished |
| | Outside interference | Check local R/C club to learn of dangerous frequencies in your area |
| | Engine or motor noise | Reroute antenna or servo leads as far away from engine as possible |
| One glitching servo | Malfunctioning servo. | Replace servo and try again |
| | Outside interference | Check quality and installation of servo lead or extension |

WARRANTY

1-YEAR LIMITED WARRANTY (U.S.A. and Canada Only)

Tower Hobbies® warrants this product to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase. During that period, Tower Hobbies® will, at its option, repair or replace without service charge only product deemed defective due to those causes. You will be required to provide proof of purchase (invoice or receipt) for warranty service. This warranty does not cover damage caused by abuse, misuse, alteration or accident. If there is damage stemming from these causes within the stated warranty period, Tower Hobbies® will, at its option, repair or replace it for a service charge not greater than 50% of its then current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty gives you specific rights. You may have other rights, which vary from state to state. Tower Hobbies will not be responsible for incidental damage to other equipment as a result of using this radio system.

For service on your Tower Hobbies® product, warranty or non-warranty, send it post-paid and insured to:

Hobby Services
1610 Interstate Drive
Champaign, IL 61822
Phone: (217) 398-0007

CONTACTING TOWER HOBBIES

Via phone:

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Outside the US and Canada: 217-398-3636

Toll-Free FAX in the US and Canada: 800-637-7303

FAX Outside the US and Canada: 217-356-6608

Via the Internet:

World Wide Web: <http://www.towerhobbies.com>

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