

Introduction

Beginning with the Ver. 1.07 software Aurora transmitters will be fully capable of advanced 2.4G downlink data telemetry.

When using a combination of sensors and Hitecs micro "Sensor Station", all of the following functions can be displayed on the Aurora screen during the flight, and viewed on a PC in real time!

- On-Board Battery Voltage, (this is displayed without the use of sensors when the Auroras SPC function is used).
- Up to four different temperatures
- Measure RPM with either magnetic or optical encoders.
- Monitor liquid fuel usage
- Gather GPS data to see speed, altitude and location information

This installation guide will cover the physical installation of the Sensor Stations and sensors in airplanes and helicopters including the related Aurora software screens and their features.

At the end of this manual is a description of how the HPP-22 PC interface can be used to display in real time, record and play data collected during a flight.

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Available Telemetry Products:

Stock# 55830 Nitro Full Combo:	- Includes Sensor Station, two RPM Sensors (Optical & Magnetic), four Temp. Sensors, GPS and Fuel Sensor
Stock# 55831 Nitro ORPM Combo:	- Includes Sensor Station, Optical-RPM Sensor & two Temp. Sensors
Stock# 55845 Nitro MRPM Combo:	- Includes Sensor Station, Magnetic RPM Sensor & two Temp. Sensors
Stock# 55832 Sensor Station:	- HTS-SS
Stock# 55833 Optical RPM Sensor:	- HTS-ORPM
Stock# 55842 Magnetic RPM Sensor:	- HTS-MRPM
Stock# 55834 Temperature Sensor:	- Includes two Temp Sensors HTS-TEMP
Stock# 55835 Fuel Level Sensor:	- HTS-FUEL
Stock# 55836 GPS Sensor:	- HTS-GPS

1. Are You Updated?

One of the great features of the Aurora transmitter, Spectra 2.4 module and the Optima receivers is their ability to "be up-dated" with new software. The HTS-SS sensor station now joins the product line with its software up-date capability.

To take advantage of the sensor telemetry we need to be sure your equipment has the latest software.

Step 1.

Does your Aurora have Software V 1.07 or greater? Check in the Aurora system menu – info menu screen, for your Aurora software version. If not, You will need to update the Aurora software using the HPP-22 device.

Step 2.

Does your Spectra 2.4 module have Software V 2.00 or greater? If not, You will need to update the module software using the HPP-22 device.

Step 3.

Does your Optima receiver have Software V 2.00 or greater? If not, You will need to update the Aurora software using the HPP-22 device.

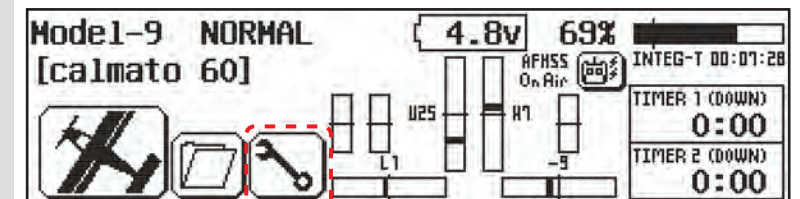
2. On-Board Battery Voltage

A key advantage to electric aircraft pilots is knowing the voltage of their on-board motor battery. This is done by using the Auroras SPC function. When the SPC is connected, the motor battery voltage is shown on the Auroras home screen and in the Cockpit mode.

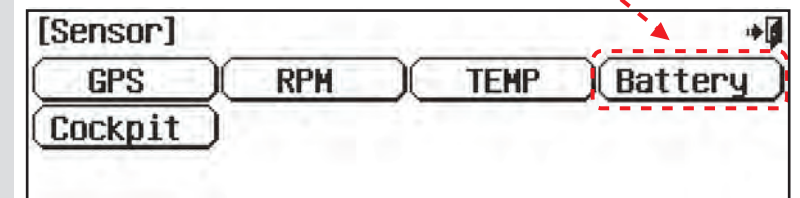
Please note the SPC connection directions as found in the Aurora manual.

The voltage of your on-board battery can be viewed in real time on the Aurora's screen three ways;

1. The first is on the home screen.



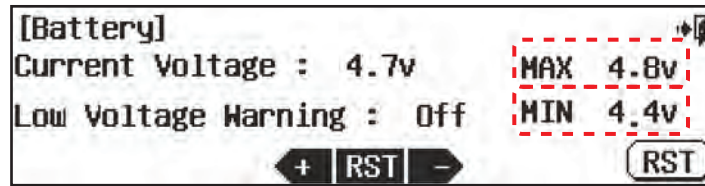
2. The second is to Select the Sensor icon at the System menu and press Battery.



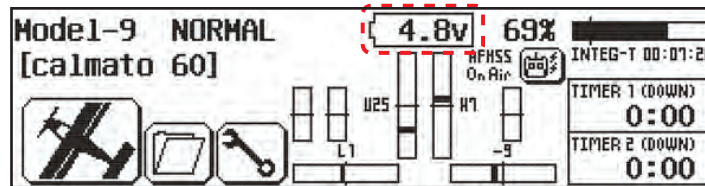
2. On-Board Battery Voltage

3. The adjustable function on this screen is the ability to set a Low Voltage Warning. Depending on the number of cells used in the on-board battery, use the +RST- icon to set a low voltage warning point. It is not good practice to allow each Lipo cell to fall below 3 volts. That's 6 volts for a 2 cell, 9 volts for 3 cell pack etc.

4. Note the **MIN** and **MAX** values of the battery voltage shown on this screen.



5. The third way to view the battery voltage is on the Cockpit screen.



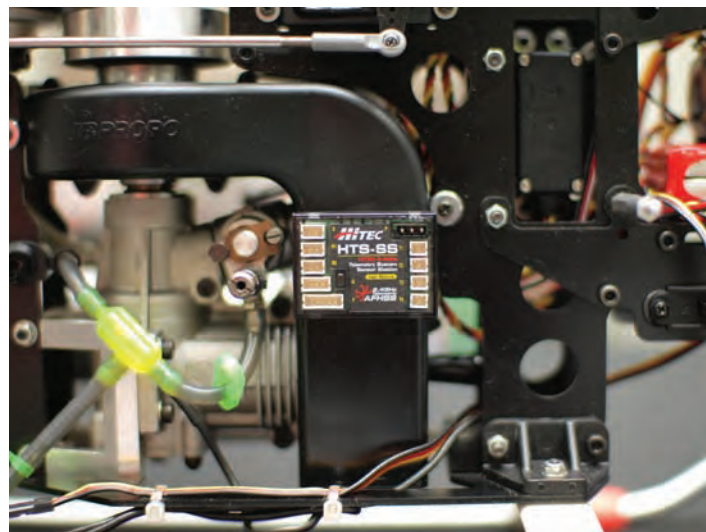
The 3rd method is active even if the Sensor Station is NOT used.

3. Sensor Station

The on-board Sensor Station (HTS-SS) - collects all the data from each sensor, sending it back to your transmitter via the Optima 7 or Optima 9 receivers.

Installation

Don't install the Sensor Station right away. It is best to fit the sensors you will use into the aircraft first. Take the length of the sensor wire leads into consideration before permanently mounting. Then, install the Sensor Station in your model using the supplied double-sided tape.



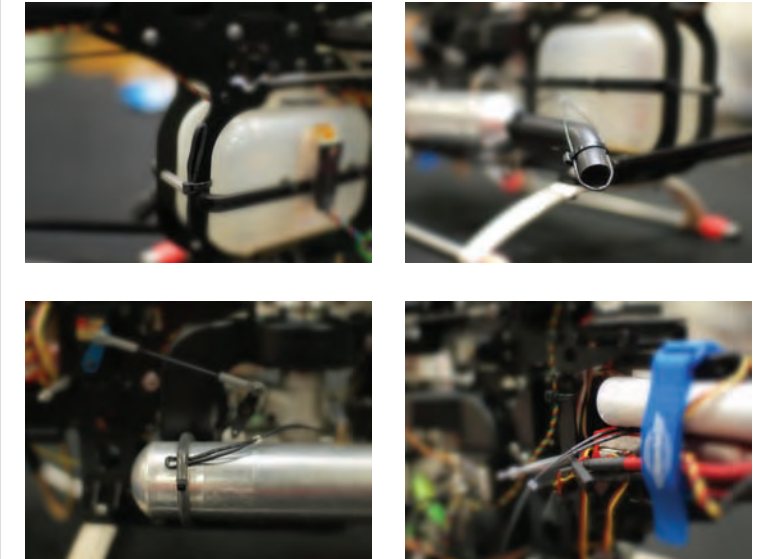
4. Temperature Sensor

The Temperature Sensors (HTS-TEMP) can measure temperatures from -40 to 392 degrees Fahrenheit (-40 to 200 degrees Celsius). Up to four temp sensors can be used. These will most commonly be used in combination to read the temperatures of the following model accessories;

- Electric motor
- ESC
- Glow and Gas engine cylinder head
- Battery
- Muffler
- Voltage regulator
- B.E.C.
- Tailpipe
- Ambient air

Installation

Installation will vary on the different applications. Note it is important to have the loop of the sensor wire held tightly against the device. Consider using zip ties, a piece of tape and/or small dabs of silicone to hold the wire in place.



Aurora transmitter interface

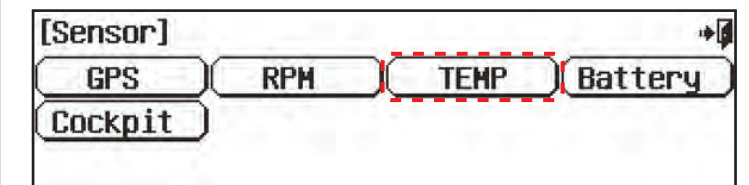
To access the temp screen menu the aircraft must be turned "on" and the temp sensors installed in the Sensor Station properly attached to the receiver.

a. Access the **System menu**



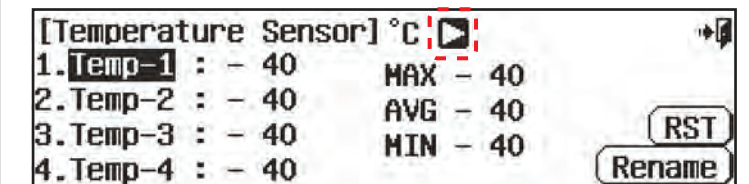
b. **Select "Sensor"**

c. **Press "TEMP"**



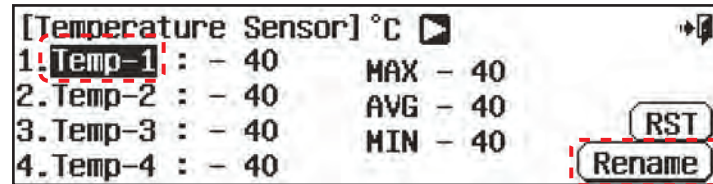
The temp reading for any "unconnected" temp sensor will show -40.

d. Press ► (arrow) to select between F(Fahrenheit) and C (Celsius) readings.

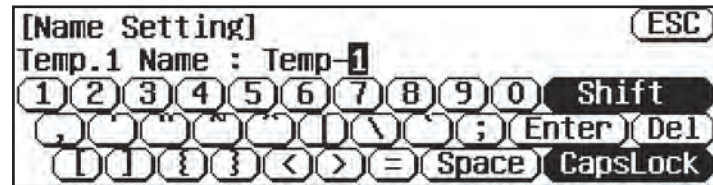


4. Temperature Sensor

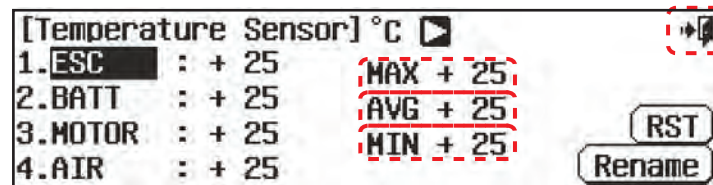
e. To customize the name of the temp sensor, press **Temp-1**, then the **Rename** icon.



f. Use the keyboard to rename the sensor to reflect its purpose. Repeat this process for the other temp sensors used.

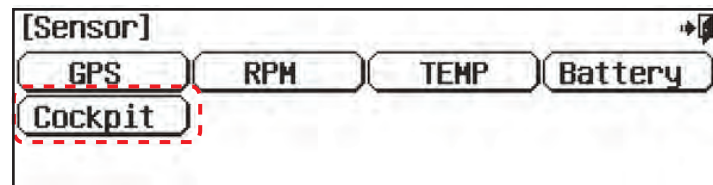


g. To view the **minimum, average and maximum** temp readings for any of your installed temp sensors, note the numbers when any one of the sensors is selected on the screen.



h. Exit this screen using the door icon in the upper left of the screen.

i. To view all the sensor data in real time, press Cockpit



5. RPM Sensor

There are two different RPM sensors available for use on the Hitec telemetry system.

1. Optical RPM Sensor (HTS-ORPM) - provides RPM information using a optic sensor. This is used for outdoor heli head speed and prop plane RPM values.



Indoor lighting and outdoor lighting variations can affect the readings of the optic sensor.

2. Magnetic RPM Sensor (HTS-MRPM) - provides RPM information using a magnetic sensor. This is used for aircraft with propellers, ducted fans, heli tail rotors and main gears.



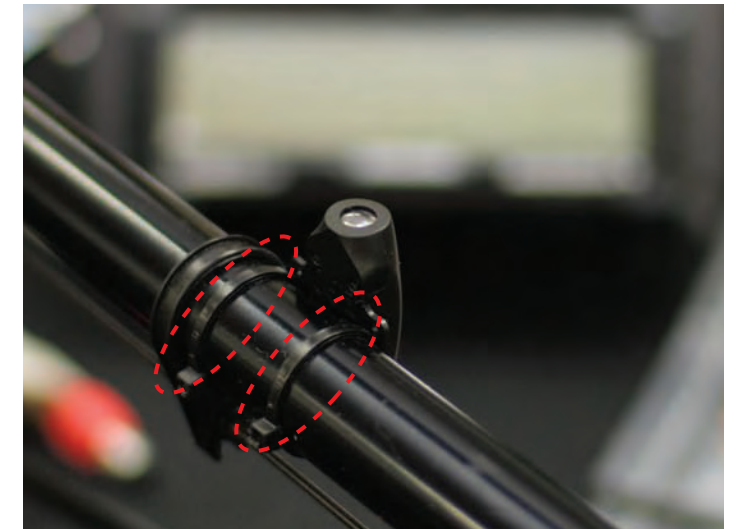
The edit function as described at the end of this document in the HPP-22 data display. To use the Magnetic sensor with heli main gear / head speed ratios

There are two slots in the Sensor Station for RPM sensors. Any combination of optical or magnetic sensors can be used.

5. RPM Sensor

Optic Sensor Installation

A. For heli applications, note the shaped case of the sensor. Install around the tail boom of your heli using the supplied **zip ties**. Point it straight up at the rotor disk avoiding any fly bar paddles that will skew the results.



B. For prop driven aircraft, use double sided tape to attach the sensor in the airframe with the front of the sensor aimed at the revolving propeller.



Magnetic Sensor Installation

A. The magnetic sensor consists of two main parts, the sensor and magnet. Three small magnets are supplied with the unit.

B. The typical installation will have the sensor mounted on the motor mount or airframe, and one magnet attached to the spinner backing plate or prop hub in such a way as to "trigger" a signal every time the rotating magnet passes in front of the stationary sensor.

C. It is suggested a small hole be drilled in the spinner backing plate, or prop hub into which one of the magnets is set flush using hobby CA.

D. Note the tolerances here are very tight, the distance between the sensor and spinning magnet need to be 1mm.

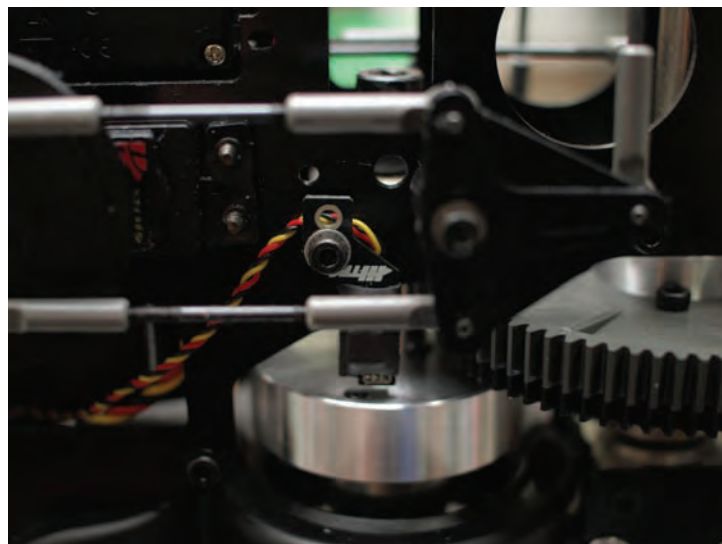


Each magnet has a X mark to identify polarity, please make sure the X mark to be faced out. Otherwise the sensor cannot detect the magnet.

5. RPM Sensor

Aurora transmitter interface

- Access the System menu and select Sensor
- Press RPM to enter the RPM sensor menu
- Press the RPM-1 icon and then RENAME to give the RPM-1 value a custom name. Repeat to change the RPM-2 name.
- When using an optic sensor, you must select the number of prop or heli blades. Select, O / Prop-2 (arrow) to scroll through the choices. When using the magnetic sensor, select the "Prop-M" choice.



(Example of M-RPM sensor installed on Heli.)

6. Fuel Level Sensor

Fuel Level Sensor (HTS-FUEL) - provides an accurate 5-step reading of your remaining fuel level when simply attached to the outside of the fuel tank.

Installation

- Three different sensing film are included for small, medium and large tanks. Select the appropriate film for your tank.



- Confirm the sensor orientation is correct with the sensors four "bars" being "stacked" from top to bottom of the tank and install the sensor into the circuit board by gently lifting the ivory colored tab on each side of the port, inserting either sensor tab, "circuit side" "up" or towards you. Which sensor tab you use is dependent on the circuit board placement, either one will work.

6. Fuel Level Sensor

- Gently press the ivory locking tabs into place securing the sensor in the circuit board.
- Use the double sided tape to attach the circuit board to the tank or other structure.
- Use the re-applied sticky tape on the film to attach the sensor to the tank.

Special use instructions:

- The fuel tank **MUST** be empty at the start of this process for the sensor to accurately read the fuel quantity.
- Turn on transmitter and select transmit
- Power-up the aircraft



If power to the aircraft is lost or interrupted prior to the flight, the fuel meter will not operate accurately. De-fuel and start the fueling process over.



Current version fuel sensor can detect Nitro fuel only.

Aurora transmitter interface

The single display of the fuel level sensor is shown as graphic bars on the "fuel dispenser" icon in the Cockpit display found in the System / Sensor / Cockpit menu.

7. GPS Sensor

GPS Sensor (HTS-GPS) – feeds variable directional information such as: altitude, position and airspeed to the Aurora transmitter. This information is displayed in real time on the Auroras Cockpit screen.

Installation

Install the GPS sensor using the supplied double side tape on any appropriate surface of the airframe.



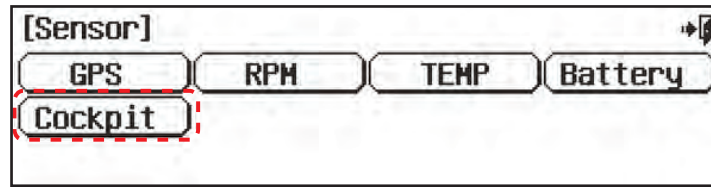
Up right position is recommended as picture shown.



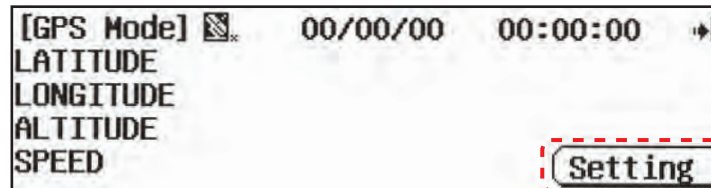
7. GPS Sensor

Aurora transmitter interface

a. As with most all sensor data, the Speed and Altitude information derived from the GPS is shown on the Auroras Cockpit screen. This is reached in the System > Sensor > Cockpit menu.

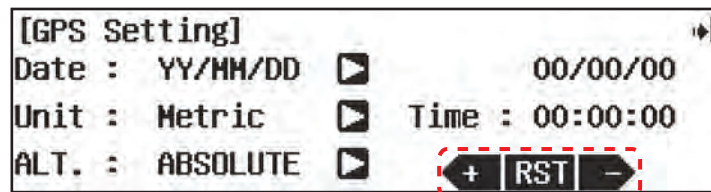


b. The specific Latitude and Longitude position data is only shown in the System > Sensor > GPS menu. Along with this information is other pertinent data, GPS strength bars, date, time, altitude and speed are available.



c. To change the date, Unit of measurement and to select ABSOLUTE, (above-ground-level) or RELATIVE, (above sea level) altitude values, press the Setting icon

d. Pressing the +RST- icon will change the time values. Select the door icon to exit the menu.



Note

1. The first time the system boots during a flying session, the GPS acquisition time will be slower than on subsequent boot-ups during any 4 hour period.
2. GPS signal may be lost during extreme 3D maneuvers.
3. For the most accurate altitude information select the ABSOLUTE setting.

8. HPP-22 PC Interface

The HPP-22 PC interface device is a handy accessory to have. In addition to updating the Aurora, Spectra 2.4 module, Optima receivers and the HTS-SS sensor station, the HPP-22 when ported to the Spectra 2.4 module can display the flight telemetry data on a PC. This flight data can be recorded and played back at a later date.

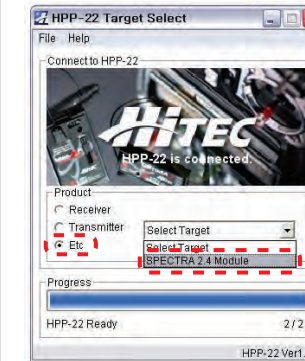
Using the HPP-22 to display, record and playback flight data

1. Install the HPP-22 software from the Hitec website at www.hitecrd.com
2. Plug the device into an empty USB port on your PC.
3. Plug an S connector cable into the HPP-22's P1 port and the other end into the Spectra 2.4 module.
4. Turn on Aurora and select "OK" to transmit.
5. Turn on aircraft with sensors connected

8. HPP-22 PC Interface

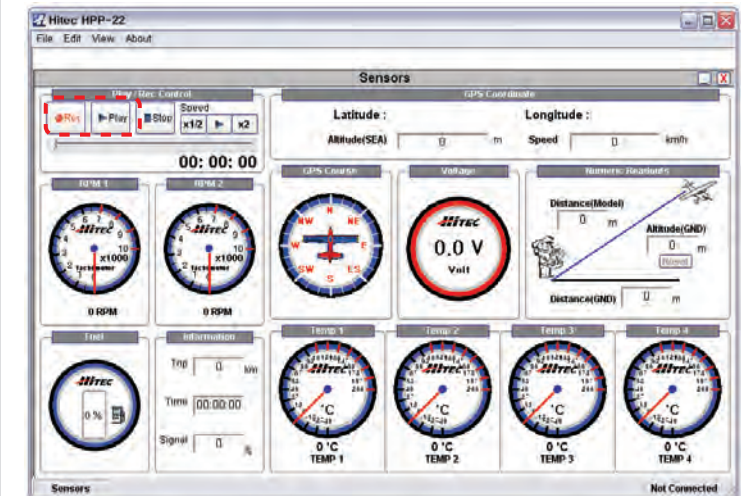
6. Launch the HPP-22 PC program

7. Under the Product menu, select "etc"
8. As the target select SPECTRA 2.4 Module



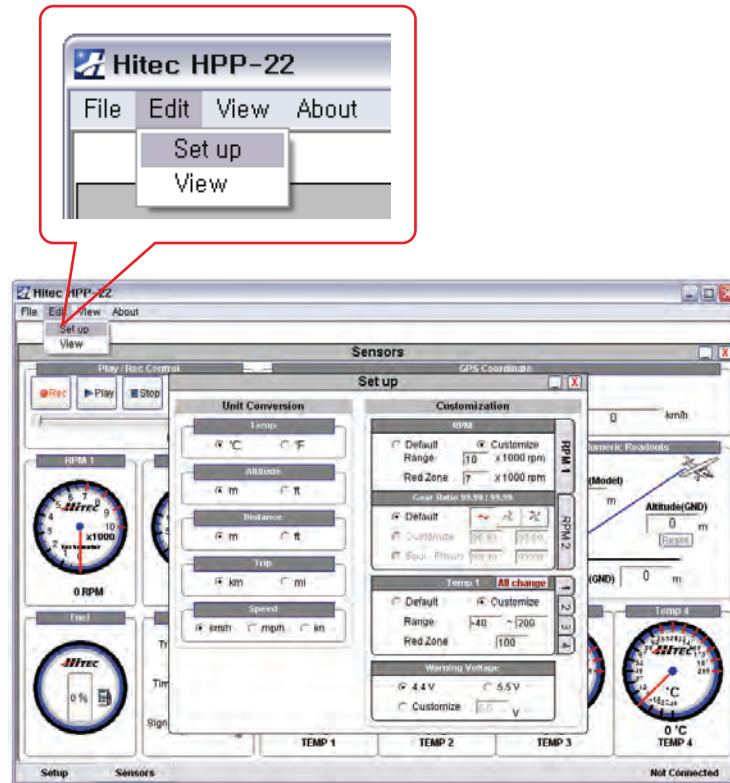
9. Select Yes when prompted for "Sensors data display?"

10. At the sensor display screen note all the information displayed.
11. Use the record and play functions to record flight data.



8. HPP-22 PC Interface

12. Select Edit / Set-up to customize the data formats



13. Note the option in the RPM section allowing the use of a gear ratio capability to derive an RPM value. This is used when the magnetic sensor is employed to measure the heli head speed when mounted on the main gear.

9. Trouble Shooting

They must have the HPP-22 which will tell them their version #.
 If the module is not updated, there will be no battery icon with the telemetry on the screen
 If the RX is not updated the sensor station will not work, but battery will.

10. Product Support

Hitec Customer Service

Help is available from the Hitec office through phone support and e-mail inquiries. The U.S. office is generally open Monday thru Friday, AM 8:00 to PM 4:30 PST. These hours and days may vary by season. Every attempt is made to answer every incoming service call. Should you get voice mail, leave your name and number and a staff member will return your call.

Hitec Web Site

Make plans to visit the Hitec web site on a regular basis, www.hitecrd.com or www.hitecaurora.com. It is full of specs and other information about the entire Hitec product line, and our FAQ pages will eventually hold valuable information about the Aurora.

The On-Line Community

One of the benefits of the extensive R/C online community is the vast wealth of archived knowledge available. Hitec sponsors forums on most of the popular R/C web sites where a Hitec staff member or representative tries to answer all manner of product related questions. Bringing together strangers with common interests is proving to be one of the greatest gifts of the internet. If past history is any guide to the future, we are certain forums will be started about the Aurora and several are sure to stand out as valuable archives of information.

Warranty and Non-Warranty Service

All Hitec products carry a two year from date of purchase warranty against manufactures defects. Our trained and professional service representative will determine if the item will be repaired or replaced. You say the 4 year old kid knocked your Aurora off a table? Hitec has an in-house service department to fix our products quickly.

To provide all the necessary information we need to administrate your repair, visit our web site at, www.hitecrd.com and download the repair form, fill it out and send in your item for repair.

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