



AK | TS5 - 5 port Temperature Module

User Guide



Intro

Thank you for choosing the AeroKore-TS 5-Port Temperature Module. This device is designed to provide RC pilots and builders with a comprehensive thermal profile of their aircraft's most critical systems. By utilizing standard 10K thermistors, this module transmits precise data from up to five sources simultaneously. Integrate **RPM tracking** with our AK-RS to maintain peak engine health.

This module is compatible with multiple telemetry protocols, including Spektrum™, Jeti, FrSky, and Futaba. For maximum versatility, the module features a configurable output: you can utilize the standard Spektrum "Multi-Cylinder" telemetry screen for a factory look, or select our custom AeroKore-TS configuration for a specialized data layout, or build your own based on your manufacturer's capabilities. Whether you are tuning a five-cylinder radial, balancing the cylinder temperatures on a twin boxer engine, or utilizing multiple probes to track heat distribution inside a tightly cowled engine, this module provides the real-time feedback necessary for safe and informed operation.

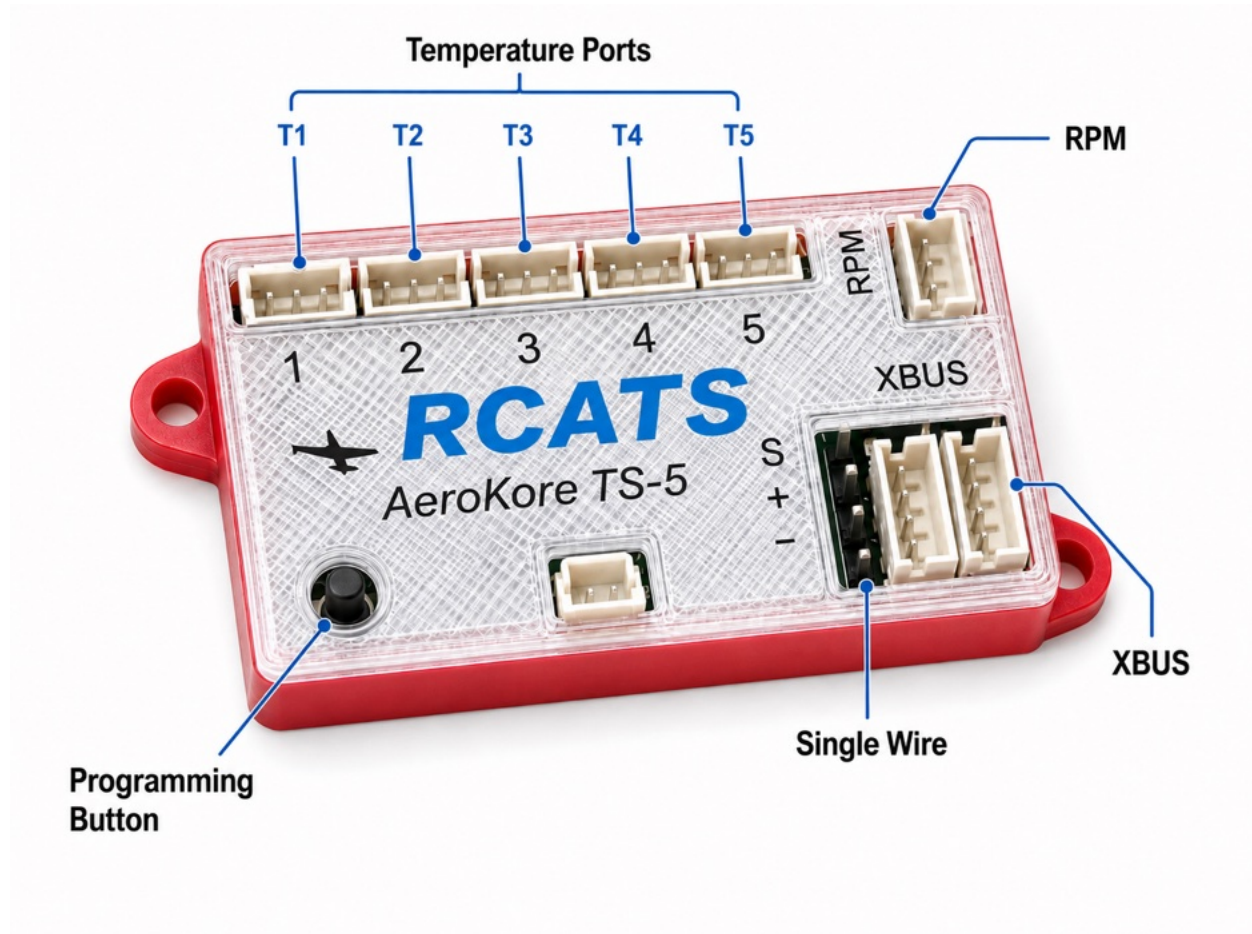
It is designed to work with any 10K Thermistor with a Beta value of approximately 3950, providing a wide range of probe options for specialized installations.

Please refer to our website for the most up-to-date specs: www.rcatsystems.com

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Unit Overview



Installing and Configuring the Display

Preparation

- **Required items:**
 - XBUS cable or single-wire connectors (required for FrSky, Jeti, and Futaba).
 - Temperature Sensor(s)
- **Optional & purchased separately:** RPM Sensor (AK-RS) with compatible ignition module.



Part 1: Wiring & Setup

- **Connect the Telemetry Unit:** Plug the unit into either Spektrum XBUS port; both are interchangeable and allow for daisy-chaining devices. For single-wire connections, use the three-pin servo connector. Always verify correct polarity, ensuring the signal side faces toward the XBUS ports.
- **Connect your Thermistors:** Plug each connector into one of the 5 ports. See section “Connecting Sensors”
- **Connect your RPM Sensor (Optional):** Plug in the AeroKore AK-RS RPM sensor into the “RPM” port.



Part 2: Selecting the correct Protocol

- Ensure you can access the programming button.
- See section [Selecting protocols and screens](#)

Part 3: Secure the Unit

- Mount the unit securely within your aircraft using the two provided mounting tabs (compatible with standard servo screws), double-sided tape, velcro, or another preferred method.

Part 4: Configuring your display

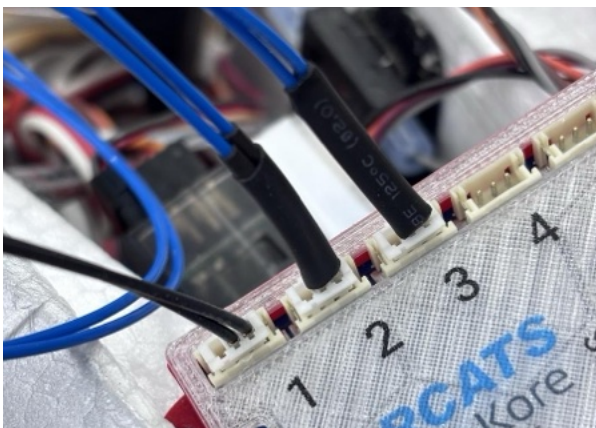
- See section [Configuring Sensors displays for your radio system](#)

NOTE: Programming occurs at boot, and you'll need to power cycle the TX and RX after changing them.

Connecting Sensors

When connecting the probes, handle the wiring with care and always pull by the plastic connector housing rather than the wires themselves to prevent damaging the internal crimps. The module features versatile 3-pin headers that accommodate both middle-pin and outside-pin signal configurations, allowing for flexible installation. You can connect anywhere from 1 to 5 probes, and they do not need to be plugged in sequentially. The unit will always read and display the data for the exact slot the probe occupies, matching slots 1 through 5 from left to right. For optimal reliability, route the wires away from high-heat areas or moving parts, and secure them with a small amount of slack to absorb engine vibration.

Sensors connected to the unit in slots 1-3.



Sensor connector:



Selecting protocols and screens

Button Press Types

After you release the button and the quick entry flash finishes:

- A short tap changes to the next mode
 - Think of a short tap as a quick button click
 - The program LED then blinks the selected mode number
- A longer hold saves the currently selected mode
 - The program LED flashes quickly

LED Feedback

- On entry to programming mode, both LEDs flash quickly two times.
- After each valid short tap, the program LED blinks the selected mode number.
- When a save is accepted, both LEDs flash quickly two times again.
- The unit then waits for you to release the button and reboots into the saved mode.

Enter Programming Mode

1. Locate the programming button on the top of the unit.



2. Press and hold the programming button.
3. While still holding the button, power the unit on or reset it.
4. Wait for the red LED and program LED to flash quickly two times.
5. Release the button after the quick flash confirmation.

When programming mode starts, the selector always resets to Mode 1 first. The saved mode is not shown automatically loaded upon programming mode entry.

Example to set "Mode 3"

1. Hold the button during power-up or reset.
2. Release after the two quick confirmation flashes.
3. The selector is now at Mode 1.
4. Tap once to move to Mode 2. The program LED blinks twice.
5. Tap again to move to Mode 3. The program LED blinks three times.
6. Long Hold the button.
7. After the two quick save flashes, release the button.
8. The unit reboots and will now use Mode 3.

Displayed Measurements

This sensor integrates with multiple ecosystems, including Spektrum, Jeti, FrSky, and Futaba. While the hardware provides the data, the user interface and display configuration are determined by your specific radio system manufacturer. We do our best to test against as many different radio versions as possible with all manufacturers. Jeti and FrSky are much more flexible with their displays and we also offer free LUA scripts on our website to help optimize your display.

Alerts

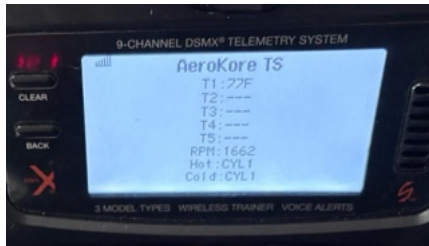
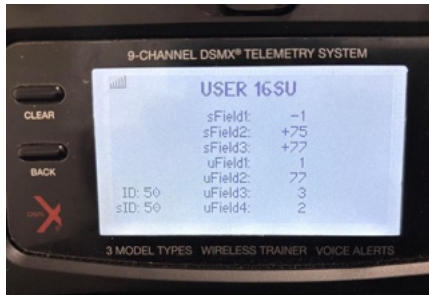
Consult Your Radio Manual: For detailed, step-by-step instructions on navigating the telemetry alarm menus, please refer to the instruction manual for your specific transmitter brand (Spektrum, Jeti, FrSky, or Futaba).

Display Examples & Programming Modes

Modes are read and stored upon bootup, and the unit will remain in that mode until it is powered down and the configuration is changed. You cannot 'hotswap' modes while the unit is active to change screens. Note that upon entering program mode, it defaults back to Mode 1.

Mode	Protocol	Screen Description	LED Flashes
1	Spektrum	AeroKore TextGen Screen	1
2	Spektrum	Multi-Cylinder Screen	2
3	Spektrum	userDef Screen for DX/NX	3
4	Spektrum	userDef Screen for IX Series	4
5	FrSky	Configurable at radio level	5
6	Jeti	Configurable at radio level	6
7	Futaba	Configurable at radio level	7
8	JR	Future	8

To change modes, you must power down the unit/RX first. It is also advisable to shut down or restart your transmitter after changing modes.

Platform	Screen Type	Screen Example	Mode
Spektrum IX	UserText / AeroKore TS Tab		1
Spektrum DX/NX	UserText / AeroKore TS Tab		1
Spektrum DX/NX	Multi-Cylinder		2
Spektrum DX/NX	userDef		3

Spektrum IX	userDef		4
FRSKy s.Port	Lua Script		5
Jeti EX Bus	Standard Screen mapping of values		6
Jeti EX Bus	Lua Script		6

Futaba	Standard Screen	 The screenshot shows a telemetry screen with the following data: - Telemetry: 7.3V, 1/4 - Temp-F1713: 75F - rpm sensor: 4800rpm - Rotation: 75F - Temp-F1713: 73F	7
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Spektrum Specific Screen Details

Platform	Screen Type	Definitions & Notes	Logged*
IX	UserText / AeroKore TS Tab	T1-5 displayed Hottest and Coldest shown at the bottom.	Yes
IX	userDef	sField1: Temperature 1 value sField2: Temperature 2 value sField3: Temperature 3 value uField1: Temperature 4 value uField2: Temperature 5 value uField3: Hottest Cylinder number uField4: Coldest Cylinder number	Yes
DX/NX	UserText / AeroKore TS Tab	T1-5 displayed Hottest and Coldest shown at the bottom.	Yes
DX/NX	Multi-Cylinder	The minimum temperature displayed is 86F	Yes
DX/NX	userDef	sField1: Temperature 1 value sField2: Temperature 2 value sField3: Temperature 3 value uField1: Temperature 4 value uField2: Temperature 5 value uField3: Hottest Cylinder number uField4: Coldest Cylinder number	Yes

*Logging must be enabled in your Transmitter settings. See Spektrum guides for more information.

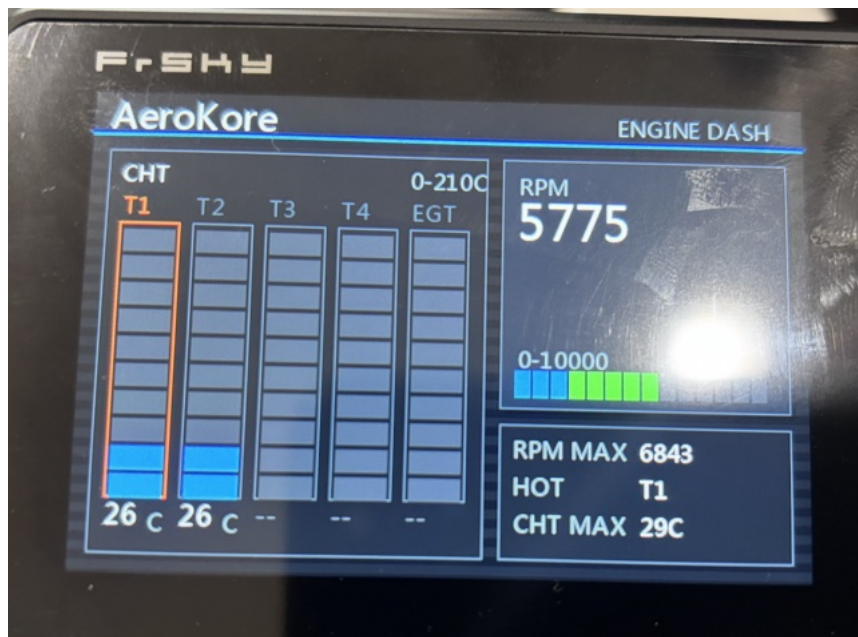
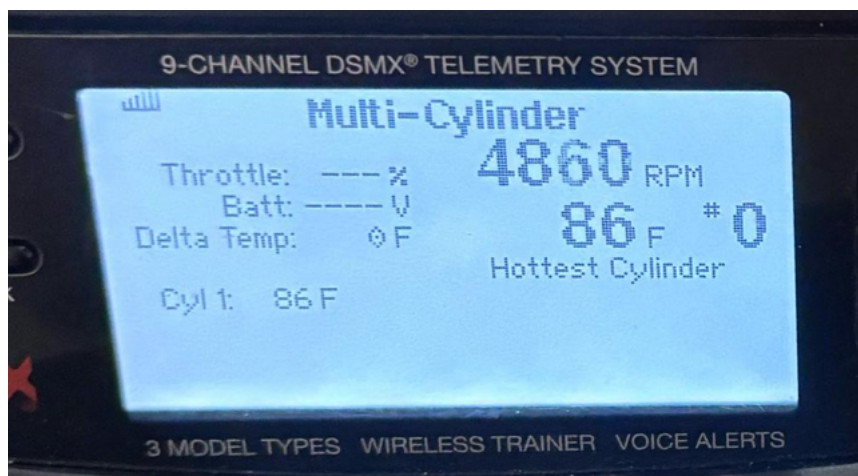
Telemetry Screen Options	Airware/IX	DX Radios	Notes/ Recommendation	Alerts Capable	Logging Capable
Text Screen	Compatible	Compatible	Best for IX radios where you want an easy view of all temperatures. Cannot be added to a dashboard and cannot use alerts.	No	Yes
Multi-Cylinder	Not Compatible	Compatible	IX Radios do not support this mode. Best for DX Radios, but note the “floor” temp will be 86F.	Yes	Yes/No
User Defined	Compatible	Compatible	If you want a text based screen, the ability to add a single value to your dashboard. The display is not the most elegant and non-connected thermistors will show -1 or 1. uField3 shows the number of the HOTTEST cylinder, while uField4 shows the number of the COLDEST cylinder.	Yes	Yes

RPM Display

To display RPM on any of the screens, a separate module is required, such as the AK-RS RPM Module. Once plugged into the RPM port, it will automatically be integrated into any of the AK-TS screens or Sensor data.

For Spektrum, note that it does not automatically port over to the “Standard” RPM display like it would if you plugged it into a Spektrum RX with the standard “RPM” Port.

Jeti and FrSky will show “RPM” as a telemetry value even if you do not have the RPM module plugged in.



Configuring sensors displays for your radio system

This is a basic overview for how to get your sensors to display in your specific radio system. Please follow manufacturer's official instructions for a more detailed setup.

Spektrum DX and NX Series

Prerequisites: Ensure the transmitter and receiver are bound. The receiver and all connected telemetry sensors must be powered on before starting this process.

- From the main transmitter screen, press the scroll wheel to access the Function List.
- Scroll down and select Telemetry.
- Select Auto-Config.
- Note: On older DX firmware versions, you may need to scroll down to Settings first, and then select Auto-Config.
- The screen will briefly flash "Configuring..." for a few seconds while the transmitter pings the receiver.
- Once the scan is complete, your active sensors will automatically populate in the telemetry list.

Spektrum iX Series (iX12, iX14, iX20)

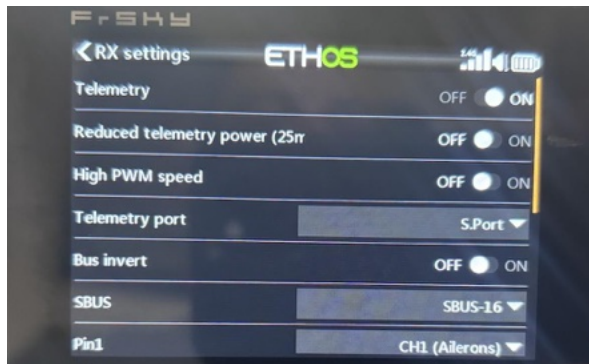
Prerequisites: Ensure the transmitter and receiver are bound. The receiver and all connected telemetry sensors must be powered on before starting this process.

- From the main Spektrum AirWare dashboard, tap on Model Setup.
- Tap on Telemetry.
- Tap the Auto-Config button.
- The system will scan for active sensors and automatically populate them into your telemetry list.

FrSky:

Prerequisites: Ensure the transmitter and receiver are bound. The receiver and all connected telemetry sensors should be powered on before starting this process.

The telemetry module must be connected to the S.Port of your FrSky RX and the RX's telemetry port must be configured as "S.Port"

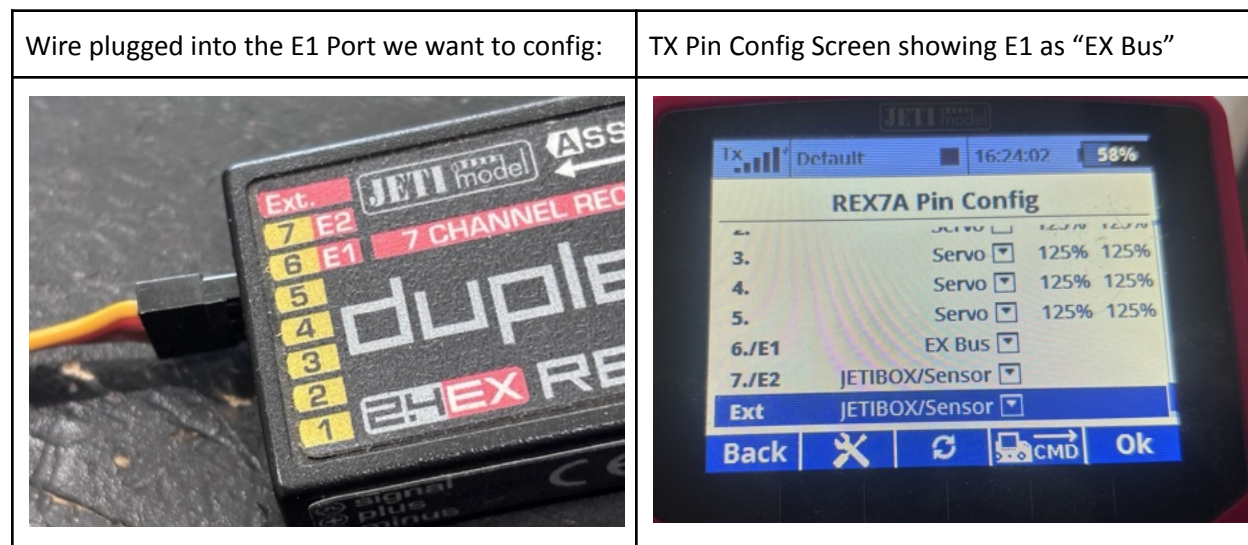
Wire plugged into S.Port:	RX Telemetry Port setting as "S.Port"
	

- Go to Model Setup
- Telemetry
- Discover new sensors
- The following new sensors will show up:
 - RPM
 - Temp1
 - Temp2
- Temp 3-5 need to be mapped by using the following process and can only be mapped if they are plugged in:
 - Select Create DIY Sensor
 - Select Auto Detect and you'll see the following values that can be mapped to ports:
 - 5100 - Temp3
 - 5101 - Temp4
 - 5102 - Temp5
 - Once selected, Change the name and set the units
 - Protocol Decimals / unit: Select "C" for celsius
 - Protocol Decimals / unit: Select the correct unit value such as C or F for what you want it to be displayed as on your screen.
 - Repeat the process for each remaining sensor.
- The sensors are now ready to be mapped to your configured screens.

Jeti:

Prerequisites: Ensure the transmitter and receiver are bound. The receiver and all connected telemetry sensors must be powered on before starting this process.

The telemetry module must be connected to an “Ex” configured port, and the transmitter must be configured as well. See images below as examples:



- Go to Menu and then Timers/Sensors
- Select “Sensors/Logging Setup”
 - All relevant sensors from the AeroKore TS module will be shown. Configure the display and select the units you want to display “C” or “F”
- Once completed, go to Displayed Telemetry
 - Click “+” and select “Telemetry”
 - Select each AeroKore TS: Temp[x] [unit] you want to be displayed. Repeat this for each value.
- To use a custom LUA script
 - Follow Jeti’s instructions on loading scripts onto your radio.
 - Applications → User Applications → +
 - Select the AEROK~X file and click “OK”.

Futaba:

Prerequisites: Ensure the transmitter and receiver are bound. The receiver and all connected telemetry sensors must be powered on before starting this process.

Note: These instructions below are setting Futaba T16IZ as the example Transmitter.

Wire plugged into an SB2 Port:	TX Telemetry Screen setup - Slot 1 and 2
	

- Go to Linkage Menu and then Sensor
- Setting Temp 1:
 - Scroll to the page where you find box “1”
 - Select “Temp-F1713” and set the “ID” to “1” as well.
- Setting Temp 2:
 - Scroll to the page where you find box “3”
 - Select “Temp-F1713” and set the “ID” to “3” as well.
- Setting Temp 3:
 - Scroll to the page where you find box “4”
 - Select “Temp-F1713” and set the “ID” to “4” as well.
- Setting Temp 4:
 - Scroll to the page where you find box “5”
 - Select “Temp-F1713” and set the “ID” to “5” as well.
- Setting Temp 5:
 - Scroll to the page where you find box “6”
 - Select “Temp-F1713” and set the “ID” to “6” as well.
- Setting RPM:
 - Scroll to the page where you find box “2”
 - Select “rpm sensor” and set the “ID” to “2” as well.
- Once completed, go back to “Linkage menu” and “Telemetry” to confirm the value is showing.
 - This also allows you to set alerts/limits.

NOTE: Contact us if you need custom Futaba telemetry slot IDs

Safety, Installation Warnings, & Limitation of Liability

Any addition to your radio system—including telemetry modules, electronic valves, or extended wire leads—can introduce new variables to your RF environment. To ensure the highest level of safety and performance, please observe the following guidelines. **Note that the user assumes full and sole responsibility for the safe operation of their aircraft and all actions taken during use.**

Installation Guidelines

- **RF Interference & Long Leads:** The addition of long servo extensions or telemetry leads can occasionally act as antennas, potentially picking up or radiating interference. Always route your wiring away from your receiver antennas and ignition systems to minimize signal noise. When power and signal lines are located in close proximity, crossing these leads at 90 degree angles is best practice to help prevent interference.
- **System Integrity & Power:** Ensure your power system is capable of handling the additional load of any connected telemetry modules.
- **Mandatory Range Testing:** You should always perform a comprehensive ground range test after installing any new hardware or changing your aircraft's wiring configuration. Verify that the system operates correctly with the engine/motor both off and running.

Assumption of Risk & Liability

Failure to verify the integrity of your radio link and power system after installation could result in a loss of control or unexpected failsafe activation. By using the AeroKore PS, you agree to the following:

1. **User Responsibility:** The operator is exclusively responsible for the airworthiness of the aircraft and the safety of the flight environment.
2. **Limit of Liability:** In no event shall **RCAT Systems** be liable for any direct, indirect, or consequential damages arising from the use of this product. **RCAT Systems** is not responsible for any crashes, collisions, or damages to the aircraft, surrounding property, or persons, regardless of the cause. This includes, but is not limited to, operator error, hardware failure, or environmental interference.

Always prioritize a "safety-first" approach by confirming system behavior on the ground before flight. Use of this product constitutes acceptance of these terms.

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FAQ

- How do I change which screen the telemetry is displayed on?
 - Check the section "Configuring your Telemetry Screen"
- What do the LED indications on the unit mean?
 - Red:
 - Blinking: Sending data to your RX when connected to XBUS
 - Solid: Communicating with TX when connected to Jeti, FrSky, Futaba
 - Blue:
 - Solid: Communicating with TX when connected to Jeti, FrSky, Futaba
 - Green:
 - Solid: Board is powered on
- What if I wanted to make my own temperature sensors/probes?
 - If your installation requires specific wire lengths, routing, or high-temperature insulation, you can assemble your own custom probes. However, to ensure accurate readings and prevent damage to the module, you must strictly adhere to the following hardware and electronic specifications. The module is calibrated specifically for a 3950 curve. Using a different Beta value will cause the temperature readings to become inaccurate. For reliability, use high-temp wire and add strain relief at the connector to handle engine vibration.
 - **Connector:** JST-ZH 1.5mm 3-pin.
 - **Pinout:** The thermistor only uses 2 wires. One wire **must go to the middle pin**, and the second wire can go to **either outside pin**.
 - **Resistance:** 10K Ohm NTC.
 - **Beta Value:** 3950 is highly preferred.
- What is the max temperature it will measure?
 - While using the standard Spektrum "Multi-cylinder Screen", around 543 degrees Fahrenheit is the max supported value.
- Where is the best place to mount the sensors?
 - See <https://www.rcatsystems.com/support> for more info