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## XRF Firmware - Temperature: Thermistor



Category: [LLAP Devices - commands and instructions](#)  
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The Thermistor firmware is capable of operating as a permanently powered "polled" device or a cyclic "sleeping" device more suited to battery applications.

The supported commands for the temp firmware are:

### Generic commands

- APVER - LLAP version
- DEVTYPE - Device type
- DEVNAME - Device name
- HELLO - Hello (PING)
- SER - Serial number
- FVER - Firmware version
- CHDEVID - Change device ID
- PANID - Change PANID
- REBOOT - Restart the device
- INTVLxxxx - Sets the interval for reading the temperature - 999S would be 999 seconds - T=ms, S=secs, M=mins, H=hours, D=Days - Once the command is sent the device will begin to send readings at the frequency requested. Whilst you are testing it's useful not to yet issue CYCLE, once asleep it's not an easy task to wake it.
- CYCLE - Activate cyclic sleeping, the device will wake every INTVL - Once this command has been issued the device will remain asleep for the majority of the time. Whilst asleep everything is turned off, that includes the radio.
- WAKE

### Device specific commands

- TMPA - Reply with the temperature
- TEMP - Reply with the temperature
- BVALxxxx sets the B coefficient for the simplified Steinhart equation (default aXXBVAL3977-)
- RNOMxxxx Sets the Thermistor resistance at 25 degrees c (default aXXRNOM10000)
- SRESxxxx Sets the series resistor value (default aXXSRES10000)
- IRxxxxxx Sets the Analog input resistance (default aXXIR185000-) you should not normally change this.

### Battery voltage

In cyclic sleeping mode, the battery voltage is broadcast every 10 readings. The voltage is read at the point of transmission so is always lower than the battery "at rest".

### FAQ

Q.The device is sleeping and wont respond to me?

A.This is normal, it is sleeping

Q.I've set it into a sleep state but want to change the interval?

A. There are 3 ways,

1. Plug the XRF into an FTDI board (or similar) short pins 19&20 at powerup. This will load the default settings (you will probably want the change to be permanent, so issue (via AT commands) "ATWR" to write that config to flash).
2. Ground pin 6 - this will force the device to be awake, you can then issue commands to change to interval or other settings. Note that unless you tell the device to stay awake (axxWAKE----) then it will resume sleep as soon as you remove the ground from pin 6.
3. Issue an "axxWAKE----" or "axxINTVL000x" command within 100ms of the device sending it's battery reading (happens usually every 10th cyclic reading). There's a 100ms window for receiving at that point. If you have no way of creating such a response we have seen customers take a brute force approach and send a "continuous stream" of commands till one is sent within that 100ms window. To send a continuous stream is easiest by using a micro, using XCM

Q. The voltage sent is lower than I see on my multimeter, why is this?

A. The measurement is performed at the point the radio is on and is a true representation of it's voltage under load, measuring the voltage of the cell whilst the radio is off allows the capacitor to recharge and the battery to rest, this depending on manufacturer and cell age can vary significantly and is of no real indication of how good the cell is in actual use.

### Configuring the temp sensor

The >> indicates the 4 messages you need to send to change it's address, set up the interval and then start it cycling.

```
a--STARTED--
a--STARTED--
a--STARTED--
a--STARTED--
a--STARTED--

>>a--CHDEVIDTA
a--CHDEVIDTA

>>a--REBOOT---
a--REBOOT---

aTASTARTED--
aTASTARTED--
aTASTARTED--
aTASTARTED--
aTASTARTED--
aTASTARTED--

>>aTAINTVL060S
aTAINTVL060S

>>aTACYCLE----
aTASLEEPING-
aTATMPA99.08
```