

## Configuration of RF Module & on-line calibration

The user has the ability, while the sketch is running, to change a number of settings relating to the configuration and calibration.

To activate configuration/calibration mode, using the serial monitor part of the Arduino IDE, enter “+++” followed by the [Enter] key. Line ending must be set to “Both NL & CR”. If any other input is received, it is ignored. You will then see:

On-line calibration is now ENABLED - type '?' to list commands.

Those commands are:

```
b<n>      - set r.f. band n = a single numeral: 4 = 433MHz, 8 = 868MHz,
           9 = 915MHz (may require hardware change)
c<n>      - enable voltage, current & power factor values to serial output for
           calibration. n = 0 for OFF, n = 1 for ON,
d<xx.x>   - xx.x = a floating point number for the datalogging period
f<x>      - x = the line frequency in Hz: normally either 50 or 60
g<nnn>    - set Network Group nnn - an integer (OEM default = 210)
k<x> <yy.y> <zz.z>
           - Calibrate an analogue input channel:
             x = a single numeral: 0 = voltage calibration, 1 = ct1 calibration,
             2 = ct2 calibration, etc
             yy.y = a floating point number for the voltage/current calibration
             constant
             zz.z = a floating point number for the phase calibration for this
             c.t. (z is not needed, or ignored if supplied, when x = 0)
             e.g.  k0 256.8
                   k1 90.9 2.00
l          - list the config/calibration values
m<x> <yy> - meter pulse counting:
           x = 0 for OFF, x = 1 for ON, <yy> = an integer for the pulse
           minimum period in ms. (y is not needed, or ignored when x = 0)
n<nn>    - set node ID nn = an integer (standard node ids are 1..30)
p<nn>    - set RF Power nn = an integer, 0 - 31. 0 = -18 dBm, 31 = +13 dBm,
           default = 25 (+7 dBm)
           DO NOT USE a value > 25 unless the correct antenna is fitted.
r         - restore sketch defaults
s         - save config to EEPROM
t0 <y>    - turn temperature measurement on or off:
           y = 0 for OFF, y = 1 for ON
t<x> <yy> <yy> <yy> <yy> <yy> <yy> <yy>
           - change a temperature sensor's address or position:
             x = a single numeral: the position of the sensor in the list (1-
             based)
             yy = 8 hexadecimal bytes representing the sensor's address
             e.g.  28 81 43 31 07 00 00 D9
             N.B. Sensors CANNOT be added beyond max count.
v         - show firmware version
w<n>     - turn RFM Wireless data on or off:
           n = 0 for OFF, n = 1 for ON, n = 2 for ON with whitening
x        - exit & lock the settings
?        - show this text again
```

*Note: The sketch might not make use of all of the options listed here.*

When RFM wireless data is turned off, the serial output in a format suitable for the ESP8266 WiFi module is automatically turned on. On-line calibration & configuration is not available while the module is connected.

The changes take place immediately, the command will be acknowledged and you will see the displayed values change. You will also see confirmation when you save the changes.

Take care that the correct RF frequency is selected to match your hardware. Operating the transmitter at high power on the wrong frequency, or without an effective antenna, can destroy the RFM module.

Option ('s') will save all the changes. If you do not do this, the settings will revert to the previous values at the next restart. After you save ('s') the changes, the new settings will be used forever, or until changed again.

If you restore the sketch default values ('r' during start-up), all the EEPROM data is erased completely and the sketch restarts immediately, using the values set in the sketch. There is then no means of recovering the EEPROM data.

In the extremely unlikely event that the sketch starts and all the calibration values are nonsense, then it is possible that the EEPROM has been used previously and by coincidence the signature check has matched. In that case, enter configuration mode and choose 'r' - this will erase the EEPROM to the manufacturing default values and the sketch will restart using its own set values.

When you have finished, you should always use the "exit and continue" option 'x', which means it is necessary to type "+++ [ENTER]" to re-activate configuration/calibration mode. This should prevent any accidental changes to the settings.