

nRF Repeater Project Notes

Overview:

There are multiple remote sensors. Basically, the sensors all send their signal through a repeater, and the repeater relays those signals to the main receiver, which displays the data.

Here is the type of data that can be relayed from each of the sensor modules:

sensorID Ordinal name of the sensor from the SensorID enum
dataType Bit-string describing the type of data included in this packet as follows.

HB	Heartbeat to be sent regularly when a signal has not been otherwise triggered.
PING	Indicates a presence was detected, either by an ultrasonic sensor or a PIR sensor.
TEMP	Temperature reading at the sensor location
HUMID	Humidity reading at the sensor location
MOIST	Soil moisture reading
SBATLOW	Indicates that the battery in the sensor module is low and should be changed, etc.
RBATLOW	Indicates that the battery in the repeater module is low and should be changed, etc.

sensorTemp	Temperature at this sensor
sensorHumid	Humidity at this sensor
sensorMoist	Soil moisture reading for this sensor
sensorBatV	Current voltage (VCC) of this sensor
repeaterBatV	Current voltage (VCC) of the repeater

Module Functionality:

Sensor Modules:

Sensor modules measure current environment and detect periodic events (PING). They will send a data packet whenever a PING event occurs, or at regular intervals even when no PING event occurs. The packet information will include the above mentioned environment measurements and PING event when it occurs. Also, the current battery voltage will be sent, and the SBATLOW bit in "dataType" will be set if the module has self-determined that the battery voltage is getting low. The data packet will be sent to either a repeater module or directly to the receiver module.

Potential sensor modules include PIR or ultrasound activated presence detection sensors, pure environmental sensors for temperature and humidity, soil moisture, etc.

Repeater Module:

Repeater modules might or might not take local environmental measurements depending on the location. These will listen for data packets sent from connected sensor modules and relay those packets back to the receiver. In addition to the sensor module information, the current repeater battery voltage will be sent and, if the battery is considered low, the RBATLOW bit in dataType will be set. The repeater will also send a heartbeat signal (including battery information) to the receiver at regular intervals even when there is no activity from connected sensor modules.

Receiver Module:

The receiver module will gather data packets from remove sensor modules either directly or via a repeater. The receiver module will then display all environmental and "PING" information on the display. In addition to received information, local environmental information will also be displayed, to be updated at regular intervals. In addition to the display, 3 LEDs will be used as further indications of PING events or undervoltage conditions of any of the modules. There are also two buttons, one of which is used to turn on the display backlight, and the other to switch between normal and battery-voltage display modes.