


Gateway device setup

Open Arduino IDE and load next sketch:

~/projects/scripps/solar-tracker-gateway/arduino/sketches/tiny0_gateway/tiny0_gateway.ino

Choose “TinyZero” in “Tools/Board” menu and “Internal 32KHz Oscillator” in “Tools/Build Option” menu. Now upload sketch.



```
tiny0_gateway
#include <Wire.h>
#include <SPI.h>
#include "RH_RF22.h"

RH_RF22 g_rf22(7, 3);
uint8_t g_bufferRadio[RH_RF22_MAX_MESSAGE_LEN];
uint8_t g_length;
uint32_t g_alive = 0;
String g_bufferSerial;

String encode(const String& line) {
    long xored;
    String result;

    xored = 0;
    for (int i = 0, m = line.length(); i < m; ++i) {
        xored = xored ^ line[i];
    }
    result = String(xored, HEX);
    result.toUpperCase();
    if (result.length() < 2) {
        result = "0" + result;
    }
    return String("$") + line + "*" + result;
}

void setup() {
    SerialUSB.begin(9600);
    while (!SerialUSB);
    if (!g_rf22.init()) {
        SerialUSB.println(encode("LOG|fail"));
        while (true);
    }
    g_rf22.setTxPower(RH_RF22_TXPOW_20DBM);
    g_rf22.setModemConfig(RH_RF22::GFSK_Rb125Fd125);
    SerialUSB.println(encode("LOG|start"));
}

void loop() {
```

TinyZero, Internal 32KHz Oscillator on COM1

GPS device setup

Open Arduino IDE and load next sketch:

~/projects/scripps/solar-tracker-gateway/arduino/sketches/tiny0_gps/tiny0_gps.ino

Choose "TinyZero" in "Tools/Board" menu and "Internal 32KHz Oscillator" in "Tools/Build Option" menu. Now upload sketch.



```
tiny0_gps | Arduino 1.8.3
tiny0_gps TinyGPS.cpp TinyGPS.h
#include <Wire.h>
#include <SPI.h>
#include <SD.h>
#include <SoftwareSerial.h>
#include "TinyGPS.h"
#include "RH_RF22.h"

#define SD_CS 10
#define GPS_RX A0
#define GPS_TX A1
#define SYS_ON A2
#define ON_OFF A3

RH_RF22 g_rf22(7, 3);
char g_name[3] = "ZZ";
byte g_interval = 15;
bool g_ok = false;
float g_latitude = TinyGPS::GPS_INVALID_F_ANGLE;
float g_longitude = TinyGPS::GPS_INVALID_F_ANGLE;
float g_distance = 0.0;
unsigned int g_sleep = 300;
SoftwareSerial g_serial(GPS_TX, GPS_RX);
unsigned long g_wake = 0;
boolean g_started = false;
TinyGPS g_gps;
bool g_flag2 = false;
bool g_flag1 = false;
byte g_year = 0;
byte g_month = 0;
byte g_day = 0;
byte g_second;
byte g_minute;
byte g_hour;
float g_fixLatitude;
float g_fixLongitude;
float g_altitude;
float g_speed;
float g_course;

TinyZero, Internal 32KHz Oscillator on COM1
```

GPS device need a configuration file inside micro SD card, named "settings.ini". This file contains:

- name. Two characters used to identify a specific device. Characters and numbers can be used.
- interval. Number of seconds between tracking position acquirements.
- latitude. Latitude where Gateway computer is, to send information once GPS device detects is near.
- longitude. Longitude where Gateway computer is, to send information once GPS device detects is near.
- distance. Distance in meters to Gateway computer to start sending data.
- sleep. Once around a Gateway computer, GPS device can sleep to save energy. This variable specifies number of seconds the nap will take.

An example of a settings.ini file contents:

```
name=00
interval=15
latitude=32.715736
longitude=-117.161087
distance=50
sleep=60
```

GPS device will be identified as "00", position will be taken every 15 seconds, if distance to a Gateway computer in 32.715736, -117.161087 (lat / long) is less than 50 meters, GPS device will send data, and sleep 60 seconds, to wake up and check again if needs to take a nap or keep getting new data.