

Mbed RC oscillator configuration for nRF5 open CPU modules

Bluetooth Low Energy
Application note



Abstract

The ANNA-B1, ANNA-B4, NINA-B4, and BMD-3xx modules are not supplied with a low frequency crystal. This document describes how to enable the internal RC oscillator for the Arm® Mbed™ OS.

Document information

Title	Mbed RC oscillator configuration for nRF5 open CPU modules	
Subtitle	Bluetooth Low Energy	
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Disclosure restriction		

This document applies to the following products:

Product name
ANNA-B112
ANNA-B402
BMD-300
BMD-301
BMD-340
BMD-341
BMD-345
BMD-350
BMD-360
BMD-380
NINA-B400
NINA-B401
NINA-B406

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1 Mbed configuration changes

u-blox standalone module series ANNA-B1, ANNA-B4, BMD-3xx, and NINA-B4 are not supplied with a low frequency crystal. A low frequency crystal can be physically added to the host PCB, or the internal RC oscillator in the module can be used.

To use the module with the internal RC oscillator in an Arm® Mbed™ configuration, the clock source `NRF_LF_SRC_RC` needs to be selected and the clock parameters `lf_clock_rc_calib_timer_interval`, `lf_clock_rc_calib_mode_config`, and `lf_clock_xtal_accuracy`, must all be updated in the JSON configuration file, `mbed_app.json`, like this:

```
...
lf_clock_rc_calib_timer_interval
{
  "target_overrides": {
    "**": {
      "target.lf_clock_src": "NRF_LF_SRC_RC"
    }
  }
}
{
  "config": {
    "lf_clock_rc_calib_timer_interval": {
      "value": 16,
      "macro_name": "MBED_CONF_NORDIC_NRF_LF_CLOCK_CALIB_TIMER_INTERVAL"
    },
    "lf_clock_rc_calib_mode_config": {
      "value": 2,
      "macro_name": "MBED_CONF_NORDIC_NRF_LF_CLOCK_CALIB_MODE_CONFIG"
    }
  }
}
}
```


The clock accuracy value also needs to be set:

```
...
{
  "config": {
    "lf_clock_xtal_accuracy": {
      "value": "NRF_CLOCK_LF_XTAL_ACCURACY_250_PPM",
      "macro_name": "MBED_CONF_NORDIC_LF_CLOCK_XTAL_ACCURACY"
    }
  }
}
}
```

If a later version of the software protocol stack is used for these modules (all based on nRF52 chips), especially the BMD-34 and BMD-38 series (based on nRF52840) and NINA-B4 and ANNA-B4 (based on nRF52833), then this value might need to be set to `NRF_CLOCK_LF_XTAL_ACCURACY_500_PPM`.

Related documents

[1] [Mbed website](#)

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Revision history

Revision	Date	Name	Comments
R01	18-mar-2020	brec	Initial release
R02	15-Dec-2022	mape	Added ANNA-B4 to document scope

Contact

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