

# Femto.io

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# FemtoBeacon SAM R21 (ATSAMR21E18A)

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## Product Overview

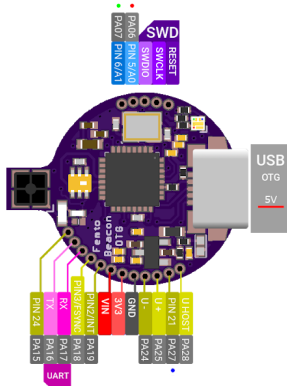
This is an LWMesh wireless coin based on the Microchip ATSAMR21E18A ARM Cortex M0+ microcontroller. It has an MPU-9250 9DoF IMU, an MS561101BA03-50 altimeter, RGB LED, USB Host support, LDO Voltage regulator, and u.FL/Chip antenna switching.

## Setup

You will need a quality USB Micro-B cable, and the latest Arduino IDE.

### Voltage Pins

The USB Voltage pin feeds the on-board LDO Regulator (5.5V max), which supplies 3.3V to the 3.3V line. Pins are NOT 5V tolerant! Be careful not to cause a short circuit or exceed 3.3V on the 3V3 line, as doing so will result in permanent damage to your board..



## Details

- 100% Arduino compatible. Sketch upload via USB, or Atmel ICE (SWD Pins).
- Accepts up to 5.5 via USB Port, or VIN pin. Outputs 3.3V on 3V3 line.
- Integrated High Speed USB, supports USB Host mode.
- Precision Altimeter (MS561101BA03-50) on I2C.
- 9 Axis IMU (MPU-9250) on I2C.
- Uses FreeIMU library from <https://github.com/femtoarduino/FreeIMU-Updates>
- 2.4 GHz LWMesh. Onboard switching between u.FL or SMD antenna.
- Can also generate an internal 96MHz Fractional Digital Phased Locked Loop (FDPLL)!
- Has RTC, Sleep/Wake functionality.
- RGB LED. Arduino pins:
  - Red= Pin 5 (PWM)
  - Green = Pin 6 (PWM)
  - Blue = Pin 21(Non-PWM)

## Arduino IDE

You will need to install the Arduino Board Package for the SAM D21E/R21E. The source code is available at <https://github.com/femtoarduino/ArduinoCore-atsamd21e18a>

Add the following to **Preferences > Additional Boards Manager URLs**.

[https://downloads.femtoarduino.com/ArduinoCore-atsamd21e18a/package\\_atsamd21e18a-release-build\\_index.json](https://downloads.femtoarduino.com/ArduinoCore-atsamd21e18a/package_atsamd21e18a-release-build_index.json)

Now open **Tools > Board > Boards Manager**, and select "Atmel SAMD21E/R21E core" by FemtoDuino. Install it, then close the Boards Manager.

Go to **Tools > Board** and select “FemtoBeacon PRO - SAM R21 E (Native Port)” when uploading via USB. If using an ATMEL ICE debugger, you will use “Atmel SAMR21E (Programming Port)”.

Open **File > Examples > FemtoBeacon\_Rf > FemtoCore\_r2.0.7**

The FemtoCore sketch allows you to run commands over Serial or wirelessly. Please review the comments, as they explain what each setting does.

See COMMANDS.md for details:

<https://github.com/femtoarduino/ArduinoCore-atsamd21e18a/blob/master/COMMANDS.md>

Note: You will need to edit the libraries/FemtoCore/FemtoCore.h header. It has two very important flags:

```
#define ENABLE_SERIAL // We want serial USB output.  
#define DEBUG // We also want to see debug serial output.
```

The **ENABLE\_SERIAL** flag enables USB Serial communications on your device. Usually, this is only needed on the Dongle, not the coin. Comment this out when uploading to the coin.

The **DEBUG** flag enables debug output to serial, and may only be used in conjunction with the **ENABLE\_SERIAL** flag.

When uploading to the Dongle, **ENABLE\_SERIAL** should be uncommented. You may comment out **DEBUG**.

When uploading to the Coin, **ENABLE\_SERIAL** and **DEBUG** should be commented out.

