

CamCrusher CCV-01 are powerful, highly flexible, ultra low power Bluetooth Low Energy (BLE) modules using Nordic nRF52 SoC. With an ARM Cortex M4(F) MCU, up to 512KB flash 128KB RAM, embedded 2.4GHz multi-protocol transceiver, and an integrated PCB trace antenna or an u.FL for external antenna. It allows faster time to market with reduced development cost.

### CCV-01 Specifications:

- Nordic nRF52811 with ARM Cortex M4 at 64 MHz.
- Supported data rate:
  - ◆ BLE 5.1: 2Mbps, 1Mbps, 500kbps, 125kbps
  - ◆ Proprietary 2.4 GHz: 2 Mbps, 1Mbps
  - ◆ RSSI, 1 dB resolution
- Serial Wire Debug (SWD)
- Nordic SoftDevice Ready
- Over-the-Air (OTA) firmware update
- Flash/RAM: 192KB/24KB
- 32 General purpose I/O pins
- 12 bit/200KSPS ADC, 8 configurable channels with programmable gain.
- 2X SPI Master/Slave (8Mbps)
- 4-channel pulse width modulator (PWM)
- Low power comparator
- 
- 2-wire Master/Slave (I<sup>2</sup>C compatible)
- Digital microphone interface (PDM)
- UART (with CTS/RTS and DMA)
- 4-channel pulse width modulator (PWM)
- Low power comparator
- 2-wire Master/Slave (I<sup>2</sup>C compatible)
- Digital microphone interface (PDM)
- UART (with CTS/RTS and DMA)
- 20 channel CPU independent Programmable Peripheral Interconnect (PPI).
- Quadrature Demodulator (QDEC)
- AES HW encryption
- 3 x 32 bit timer with counter mode
- 2x realtime counter
- SoC receiver Sensitivity: -97 dBm at 1Mbps; -104 dBm at 125 kbps
- SoC TX power: +/- 0 dBm; programmable 4 dBm to -20dBm in 4 dB steps.
- Operation voltage: 1.7V to 3.6V
- 4.6 mA peak current at RX or +0dBm TX.
- Integrated DC-DC converter.
- Embedded inductors for DC-DC converter

---

# Introduction

CamCrusher LLC CCV-01 are powerful, highly flexible, ultra low power Bluetooth Low Energy (BLE) modules using Nordic nRF52 SoC. With an ARM Cortex™ M4(F) MCU, up to 512KB flash, 128KB RAM, embedded 2.4GHz multi-protocol transceiver, and an integrated PCB trace antenna or an u.FL for external antenna. It allows faster time to market with reduced development cost.

## Model Summaries

module	CCV-01
SoC	nRF52811-QFAA
Flash/RAM	192KB/24KB
Size	50.38x14.80x59.34mm
GPIO	32
Operating temp.	-40°C to +85°C
Max. TX, FCC	0.47dBm
Antenna	PCB trace
Est. BLE Range	680M at 125Kbps
FCC ID	2BDCE-CCV-01
QDID	D065041

FCC regulatory conformance:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

**NOTE:** This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

**NOTE:** The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

## RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

---

## 2. Codes Development Using Nordic Tools

Development tools by Nordic and other third party development tools recommended by Nordic should be used .

### Easy, fast and safe code development

Nordic development environment for nRF52 offers a clean separation between application code development and embedded protocol stacks. This means compile, link and run time dependencies with the embedded stack and associated debugging challenges are removed. The Bluetooth low energy and ANT stack is a pre-compiled binary, leaving application code to be compiled stand-alone. The embedded stack interface uses an asynchronous and event driven model removing the need for RTOS frameworks.

### Over-The-Air DFU

The nRF52 SoC is supported by an Over-The-Air Device Firmware Upgrade (OTA DFU) feature. This allows for in the field updates of application software and SoftDevice.

### SoftDevices

The Nordic protocol stacks are known as SoftDevices and complement the nRF52 Series SoCs. All nRF52 Series are programmable with software stacks from Nordic. This bring maximum flexibility to application development and allows the latest stack version to be programmed into the SoC.

SoftDevices available from Nordic:

- **S113 SoftDevice**

The S113 SoftDevice is a *Bluetooth*® Low Energy peripheral protocol stack solution. It supports up to four peripheral connections with an additional broadcaster role running concurrently. The S113 SoftDevice integrates a Bluetooth Low Energy Controller and Host, and provides a full and flexible API for building Bluetooth Low Energy nRF52 System on Chip solutions.

- **S140 SoftDevice**

The S140 SoftDevice is a *Bluetooth*® Low Energy Central and Peripheral protocol stack solution. The S140 SoftDevice supports running up to twenty connections concurrently, with an additional observer role and broadcaster role. The S140 SoftDevice integrates a Bluetooth Low Energy Controller and Host, and provides a full and flexible API for building Bluetooth Low Energy nRF52 System on Chip solutions.

### Development Tools

Nordic Semiconductor provides a complete range of hardware and software development tools for the nRF52 Series devices. nRF52840 DK board is recommended for firmware development.

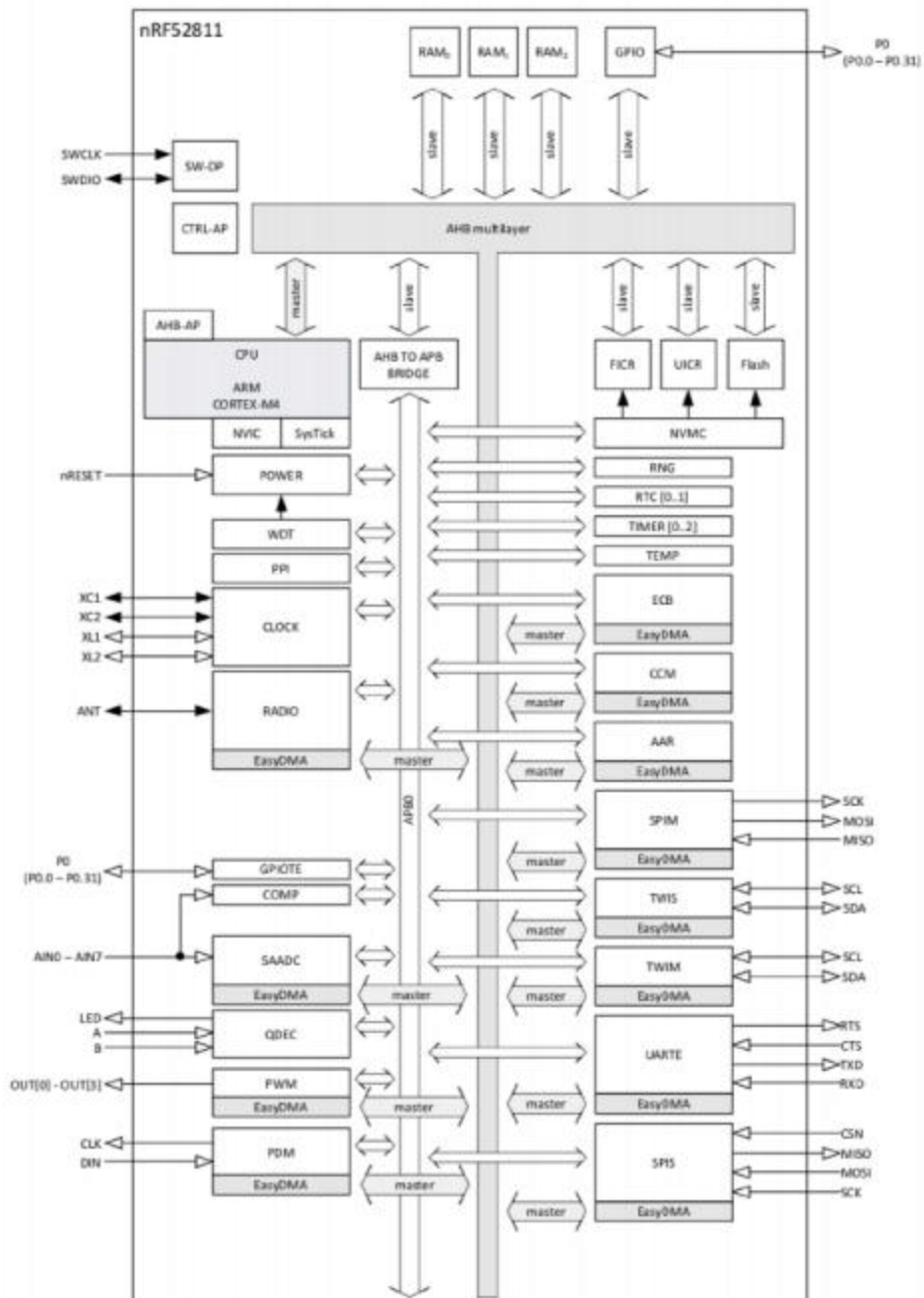
### 3. Product Overview

#### Nordic nRF52811 SoC

For full description of the SoC, please download data sheets from Nordic Semiconductor website.

<https://www.nordicsemi.com/eng/Products/Bluetooth-low-energy>

The following is a block diagram of Nordic nRF52811 Bluetooth Low Energy (BLE) SoC.



---

The 32 bit ARM Cortex M4F MCU with hardware supports for DSP instructions and floating point operations, code density and execution speed are higher than other Cortex M MCU. The Programmable Peripheral Interconnect (PPI) system provides a 20-channel bus for direct and autonomous system peripheral communication without CPU intervention. This brings predictable latency times for peripheral to peripheral interaction and power saving benefits associated with leaving CPU idle. The device has 2 global power modes ON/OFF, but all system blocks and peripherals have individual power management control which allows for an automatic switching RUN/IDLE for system blocks based only on those required/not required to achieve particular tasks.

The radio supports Bluetooth low energy, Output power is scalable from a maximum of +4dBm down to -20 dBm in 4dB steps. BLE Sensitivity is increased to -97 dBm at 1Mbps and -104 dBm at 125 kbps with CODED PHY..

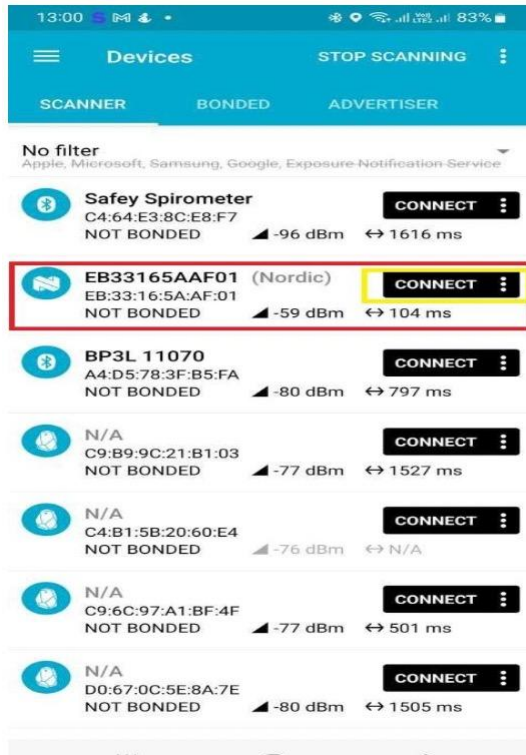
The NFC block supports NFC-A tags with proximity detection and Wake-on-field from low power mode. The NFC enables Out-Of-Band (OOB) Bluetooth pairing of devices and thus greatly simplifying dep

**NrfConnect App Link:**

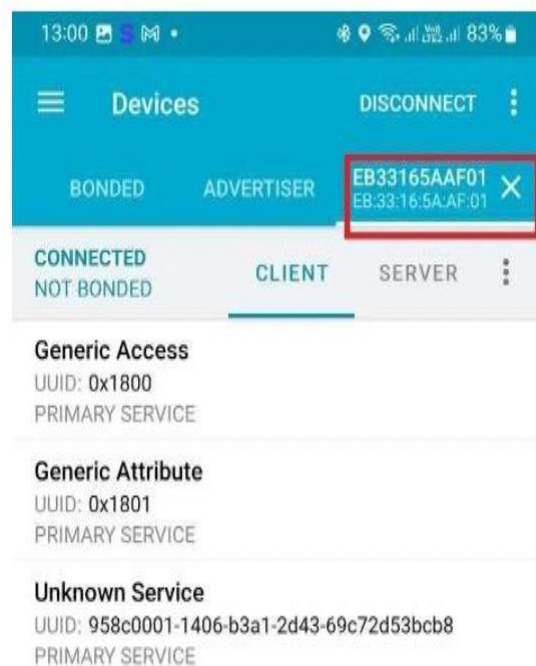
1. Play store (Android):

<https://play.google.com/store/apps/details?id=no.nordicsemi.android.mcp&hl=en&gl=US>

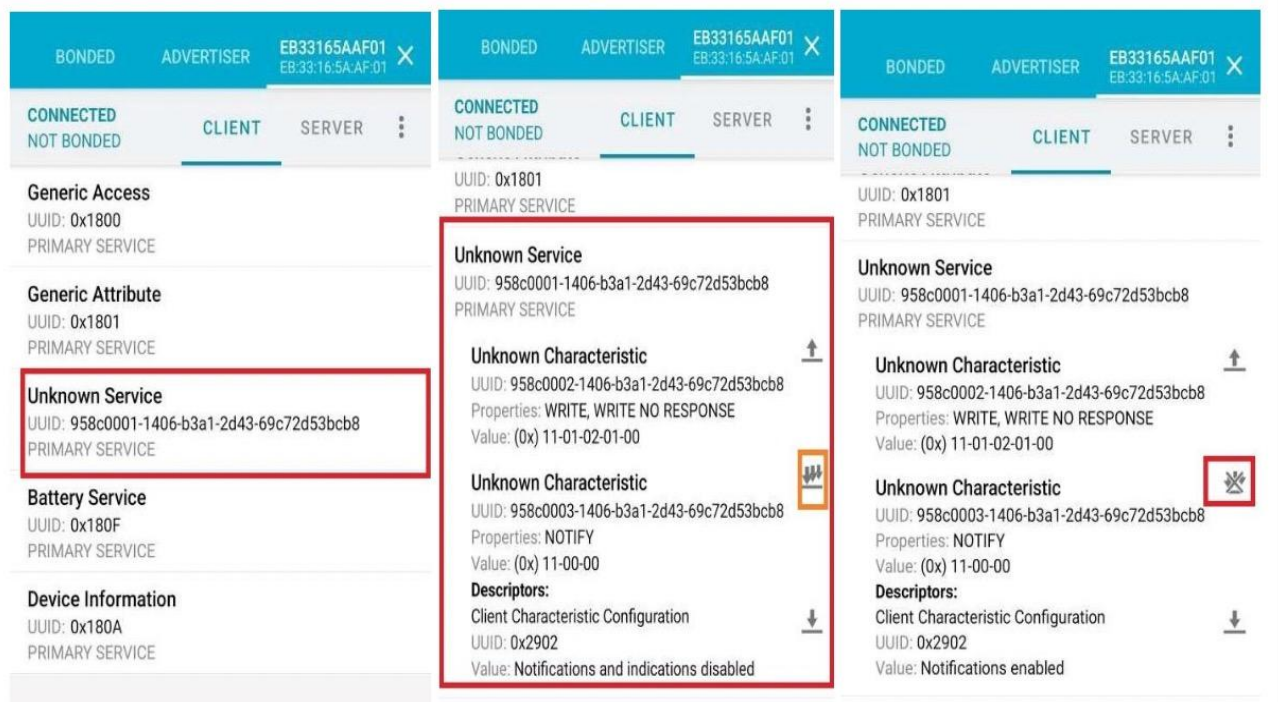
**Step 1 - Open NrfConnect and connect the device.**



**Step 2 - After the device is connected, open the Device tab as shown in the below figure.**

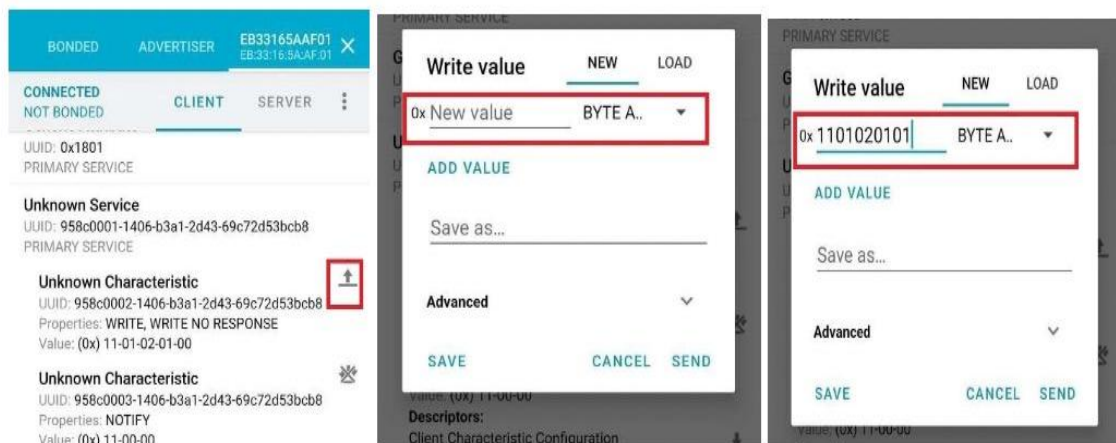


**Step 3 - Expand the service layout and Enabled notify function as below.**



**Step:4 - As shown in the figure, click the icon of write characteristic service and type the command to test the device functionality**

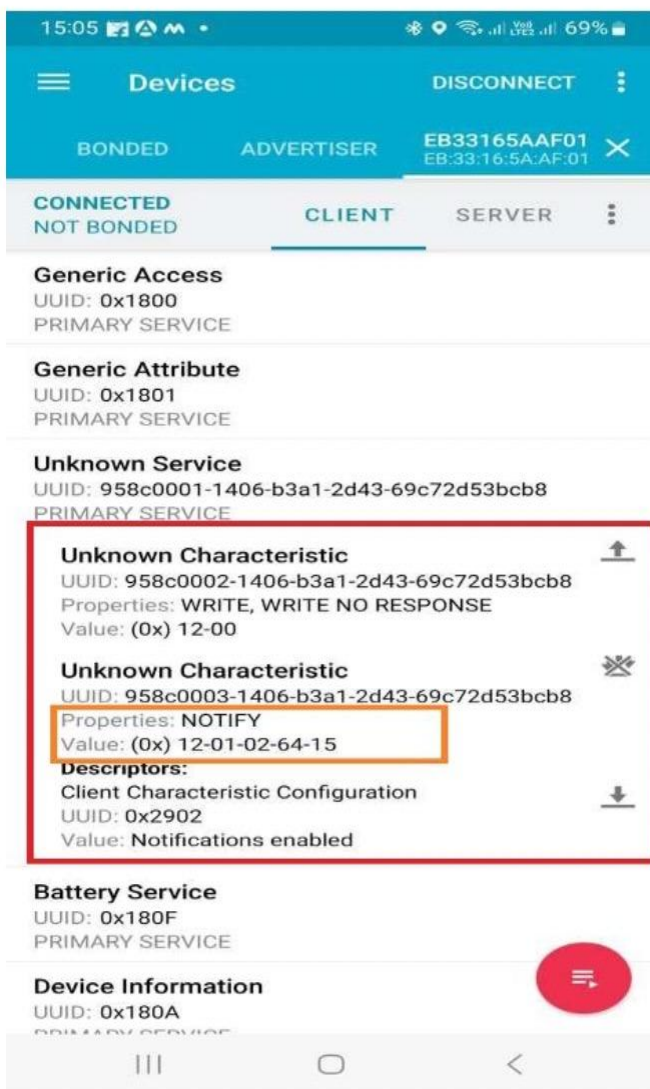
- Light ON Command: 1101020101



Same for other Commands.

## List of command

1. Day Light ON command: 1101020001
2. Day Light OFF command: 1101020000
3. Night Light ON command: 1101020101
4. Night Light OFF command:1101020100
5. Write Brightness Command: 1100024b19 (Enter hex value of a number of brightness i.e. 75 hex is 4b & It stands for Daylight brightness and 25 hex is 19 & it stands for Night light brightness, DayLightValue NightLightValue)
6. Read Brightness Command: 1200 ( when we send this command we get the response from the device in notify service as
7. shown in the below figure.)



So the 12-01-02-64-15 is the response from the device, 64 hex of 100 & shows the Day Light Brightness value, and 15 hex of 21 & shows the Night Light Brightness value.