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### Silicon Labs RF-to-USB2 Cymbet EH Demos

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#### Introduction

The Cymbet EnerChip<sup>™</sup> Energy Harvesting Evaluation kits - EVAL-09, EVAL-10, and EVAL-11 are all designed to support connectivity and power to the Silicon Labs RF-to-USB2 RD wireless Reference Design development kit. The combination of Cymbet and Silicon Labs RF-to-USB2 kits enables designers to experiment with the following:

- Simple, low cost battery-free analog data collection and a development platform for battery-free wireless sensing projects using any mode of Energy Harvesting including light, motion/vibration, heat, RF, etc.
- Use solar indoor or outdoor energy to power node boards to communicate with a USB dongle which uploads the data to a Graphical User Interface (GUI) for demonstration purposes.
- This Energy Harvesting kit combination replaces primary batteries with a perpetual self-recharging power source for 15-20+ year applications.

#### Cymbet EVAL-10 and SiLabs RF-to-USB2 RD Demonstration Equipment

- **Cymbet CBC-EVAL-10** EnerChip CC Solar Energy Harvesting evaluation kit . CBC-EVAL-10 Data Sheet and purchasing information can be found here: <http://www.cymbet.com/products/evaluation-kits.php>.
- **Silicon Labs RF-to-USB2 RD kit** with USB dongle and wireless node board. In order to use the SiLabs wireless node board with Energy Harvesting, it must be programmed with Cymbet-specific firmware. If you purchased the RF-to-USB2 kit from SiLabs or Distribution, the Cymbet code is available for download at: <http://www.cymbet.com/products/datasheets-downloads.php>. Please download the code for the appropriate Cymbet Eval Kit - EVAL-09, EVAL-10 or EVAL-11 kit as there are differences in the code.
- **Adapter for easy connection** of CBC-EVAL-10 to RF-to-USB2 RD node. This Adapter is provided free from Cymbet using the Support Form: <http://www.cymbet.com/design-center/support.php>.
- **Watch the EVAL-10/RF-to-USB2 Video** here: <http://www.cymbet.com/products/videos-products.php>

#### Getting Started with the EVAL-10

The EH demonstration with the EVAL-10 and RF-to-USB2 is shown in Figure 1. This section describes the procedure for establishing connectivity to the RF node board after you have installed the Silicon Labs RF to USB

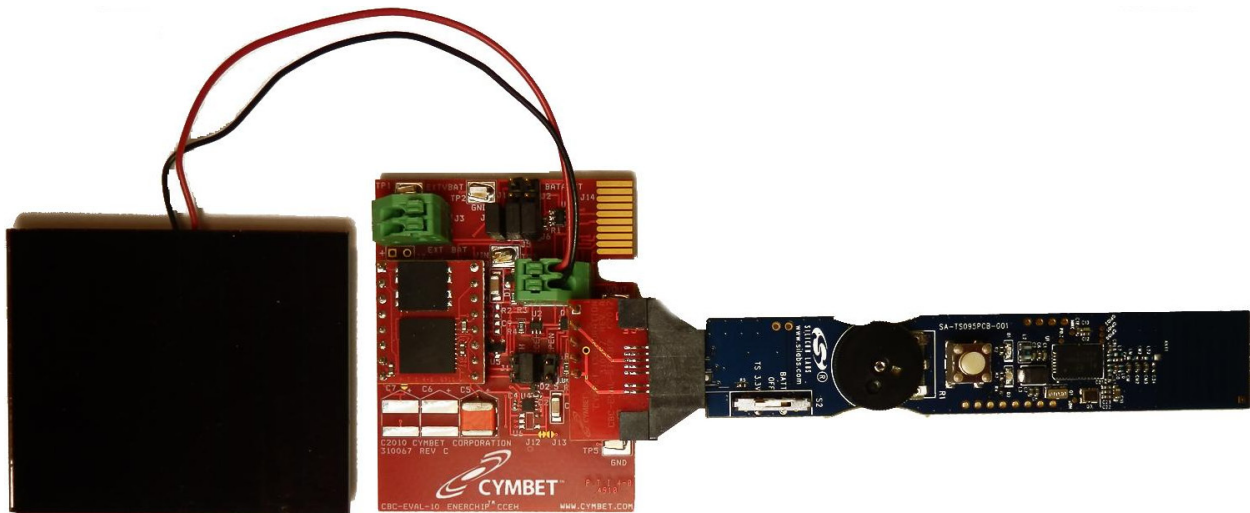
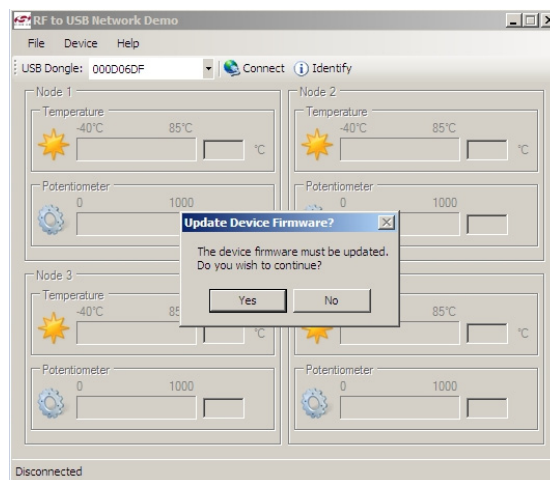


Figure 1: PV Cell Attached to CBC-EVAL-10, which is Connected to the RF-to-USB2 Board via the Adapter

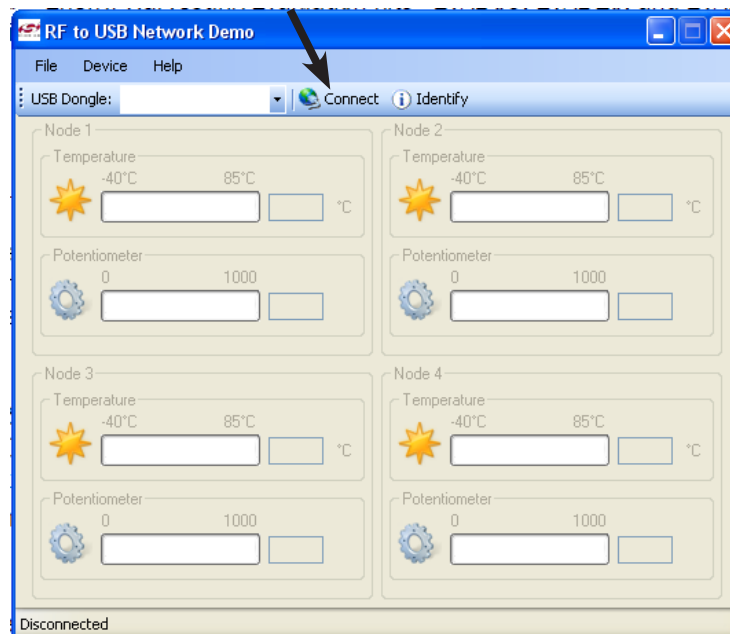
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Reference Design software and followed the SiLabs RF-to-USB2 RD User's Guide, located here: [http://www.silabs.com/Support%20Documents/TechnicalDocs/RF\\_to\\_USB-RD.pdf](http://www.silabs.com/Support%20Documents/TechnicalDocs/RF_to_USB-RD.pdf)

1. Attach PV cell to CBC-EVAL-10 board as described in the EVAL-10 Data Sheet DS-72-20.pdf
2. Attach adapter board to CBC-EVAL-10 and RF-to-USB2 RD board as shown in Figure 1. Measure voltage on Vout of CBC-EVAL-10 board. It should read 2.5V. It can take up to one minute in normal office lighting to charge the CBC-EVAL-10 output to 2.5V. If the voltage is not 2.5 volts, place PV cell in brighter light until the reading is 2.5V
3. On the SiLabs wireless node, make sure slider switch S2 is moved to the TS 3.3V position.
4. a) Plug the SiLabs dongle into a PC USB port. The dongle will install the USB wireless network GUI software and might request an update. If the following window appears, click "Yes".

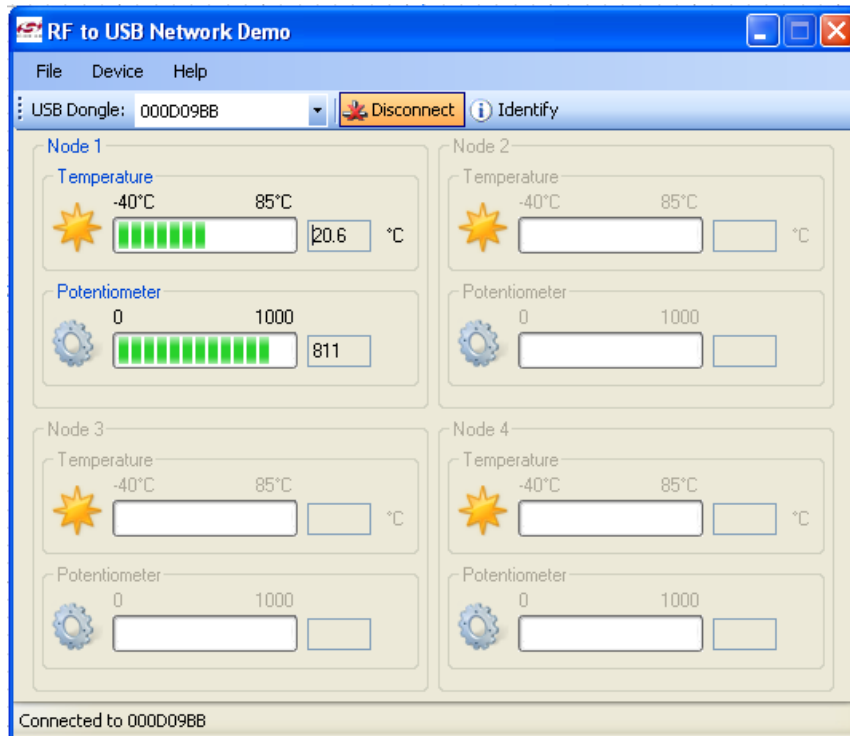


- b) Run the RF-to-USB2 RD Network Demo under the start menu "Silicon Laboratories".
- c) Click "Connect" on GUI to connect the USB dongle with the GUI.



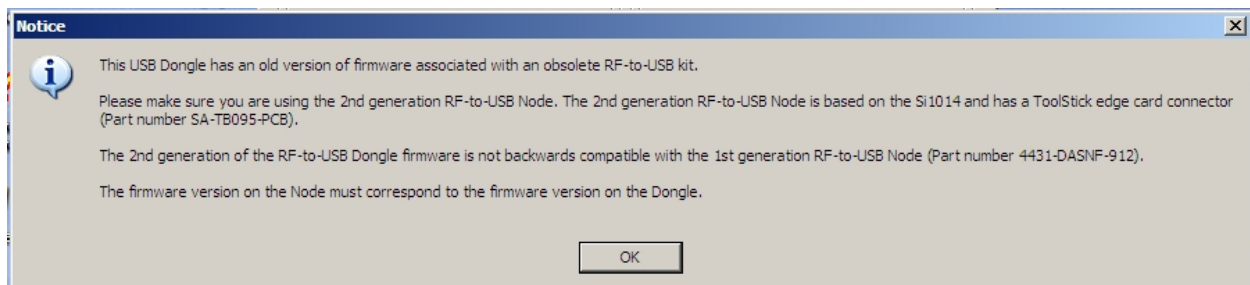
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d) Communication should begin after pressing the white push button SW1 on node board according to the instructions in the Silicon Labs User's Guide. Temperature and Potentiometer Data will be displayed on the GUI as depicted below.



e) To vary the reading of the "Potentiometer" field in the GUI, rotate the black potentiometer wheel on the RF-to-USB2 board. Please note the data is updated only every 10 seconds to work properly with EH power.

Occasionally, the dongle might not install correctly and a warning message will appear. If the following error message appears, contact Silicon Labs technical support.



## AN-1053: SiLabs RF-to-USB2 Cymbet EH Demos

### Cymbet Ordering Information

Cymbet Part Number	Description	Notes
CBC-EVAL-09	EnerChip EP Universal Energy Harvesting Eval Kit	Contains Solar Cell and CBC51100 Module
CBC-EVAL-10	EnerChip CC Solar Energy Harvesting Eval Kit	Contains Solar Cell and CBC51100 Module
CBC-EVAL-11	EnerChip CC RF Induction Charging Eval Kit	Contains RF Charging pad and EnerChip CC Charger

### Silicon Labs Ordering Information

The Silicon Labs RF-to-USB2 RD kit can be ordered from Silicon Laboratories and approved distributors including:

From Silicon Labs: <http://www.silabs.com/products/mcu/Pages/RFtoUSBRD.aspx>

From Digi-Key: [http://search.digikey.com/scripts/DkSearch/dksus.dll?WT.z\\_header=search\\_go&lang=en&site=us&keywords=rf-to-usb2&x=0&y=0](http://search.digikey.com/scripts/DkSearch/dksus.dll?WT.z_header=search_go&lang=en&site=us&keywords=rf-to-usb2&x=0&y=0)

From Mouser: <http://www.mouser.com/ProductDetail/Silicon-Laboratories/RF-TO-USB2-RD/?qs=9IxFXtGvrb10OZnAw%2fFbyg%3d%3d>

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