

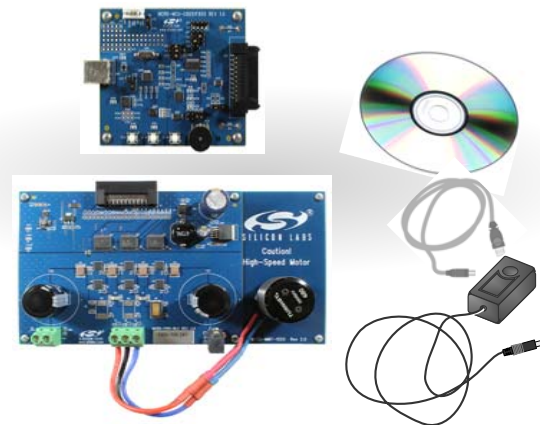


# C8051F850 BLDC MOTOR REFERENCE DESIGN QUICK-START GUIDE

The C8051F850 BLDC Motor Reference Design comes with an MCU board, Powertrain Board, BLDC motor, and all cables and power supplies needed to evaluate the reference design and develop code.

### Development Kit

- MCU Board: MCRD-MCU-C8051F850 with the motor control firmware preprogrammed into the MCU
- Powertrain Board: MCRD-PWR-NLV-F85X
- BLDC Motor: Turnigy 450 Series 3800 kV Brushless Outrunner Helicopter Motor
- Motor Mount Board
- 8-bit MCU Kit CD
- 12 V, 5 A Universal Input Power Adapter



**Note:** This Development Kit includes a **Product Serial Number** that expands the 2 kB code-limited evaluation version of the Keil tools to a full version with no code limit. Registration instructions can be found in “AN104: Integrating Keil 8051 Tools into the Silicon Labs IDE”. This Keil tools upgrade process is not required to complete the steps listed in this document.

### EVALUATION BOARD/KIT IMPORTANT NOTICE

Silicon Laboratories Inc. and its affiliated companies (“Silicon Labs”) provides the enclosed evaluation board/kit to the user (“User”) under the following conditions:

This evaluation board/kit (“EVB/Kit”) is intended for use for ENGINEERING DEVELOPMENT, TESTING, DEMONSTRATION, OR EVALUATION PURPOSES ONLY and is not a finished end-product fit for general consumer use. ANY OTHER USE, RESALE, OR REDISTRIBUTION FOR ANY OTHER PURPOSE IS STRICTLY PROHIBITED. This EVB/Kit is not intended to be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety and environmental measures typically found in end products that incorporate such semiconductor components or circuit boards. As such, persons handling this EVB/Kit must have electronics training and observe good engineering practice standards. As a prototype not available for commercial reasons, this EVB/Kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and therefore may not meet the technical requirements of these directives or other related directives.

Should this EVB/Kit not meet the specifications indicated in the User’s Guide, the EVB/Kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SILICON LABS TO USER, IS USER’S SOLE REMEDY, AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT, DESIGN, WORKMANSHIP, OR FITNESS FOR ANY PARTICULAR PURPOSE.

User assumes all responsibility and liability for proper and safe handling of the EVB/Kit. Further, User indemnifies Silicon Labs from all claims arising from User’s handling or use of the EVB/Kit. Due to the open construction of the EVB/Kit, it is User’s responsibility to take any and all appropriate precautions with regard to electrostatic discharge.

EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Neither Silicon Labs nor User is obligated to perform any activities or conduct any business as a consequence of using the EVB/Kit, and neither party is entitled to any form of exclusivity with respect to the EVB/Kit.

Silicon Labs assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein.

Please read the User’s Guide and, specifically, the Warnings and Restrictions notice in the User’s Guide prior to handling the EVB/Kit. This notice contains important safety information about temperatures and voltages. For additional environmental and/or safety information, please contact a Silicon Labs application engineer or visit [www.silabs.com/support/quality](http://www.silabs.com/support/quality).

No license is granted under any patent right or other intellectual property right of Silicon Labs covering or relating to any machine, process, or combination in which the EVB/Kit or any of its components might be or are used.

User’s use of this EVB/Kit is conditioned upon acceptance of the foregoing conditions. If User is unwilling to accept these conditions, User may request a refund and return the EVB/Kit to Silicon Labs in its original condition, unopened, with the original packaging and all documentation to:

Mailing Address:  
400 W. Cesar Chavez  
Austin, TX 78701

## A. Install Software

**1** Insert the CD included in the kit to start installing the F850 BLDC Reference Design Kit software. The latest version of the installer can also be found on the Silicon Labs web site: <http://www.silabs.com/8bit-software>



**OR**



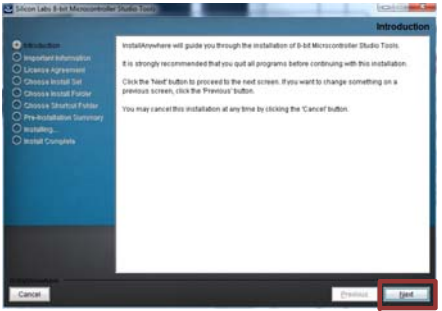
**4** Select “Kit Specific Installation” to activate the Kit Selection installation dialog.



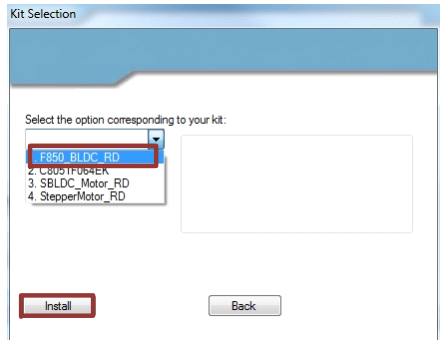
**2** Select “Install Development Tools” from the introduction window to install the development tools required for the F850 BLDC Reference Design kit.



**3** Click “Next” and follow the installation steps to install all the software, drivers, and documentation.



**5** Select the “F850\_BLDC\_RD” kit option and click “Install” to install the Spinner application, BLDC motor firmware, and BLDC hardware design guide tool.



**6** Go to the Silicon Labs web site to register the compiler toolchain (an unlimited version of the Keil PK51 Professional Developer’s Kit).

**NEW**  
Now includes an unlimited Keil® PK51 Professional Developer’s Kit! Register your product and receive the key to unlock your PK51 tools.

[Register Now!](#)



## B. Stand-Alone Operation

**1 Identify the boards.**

MCU Board  
Motor Mount board  
Powertrain Board

**2 Connect the AC/DC Adapter to the Powertrain board, and power up the board.**

**3 Find the POT on the MCU board and rotate it fully counterclockwise to prepare to spin the motor at minimum speed.**

**4 Press the Start/Stop Button to start spinning the motor.**

**5 Adjust the POT to control motor speed.**

**6 Press the Start/Stop Button to stop spinning the motor.**

**7 Important: The MCU Reset button can also be used to stop the motor at any time.**

## C. PC Controlled Operation

**1 Connect the USB cable between the PC and the MCU board. IMPORTANT: Connect the USB directly to the PC or through a powered USB hub. Do not use a bus-powered hub.**

**2 Connect the AC/DC Adapter to the Powertrain board and power up the board.**

**3 Use the Device manager to identify the COM Port "Silicon Labs CP210x USB to UART Bridge". This is COM24 in the example below.**

**4 Run the Silicon Labs Spinner application.**

**5 Select the COM port of the BLDC Kit (found in Step 3 earlier). Then press the Connect button.**

**6 Select the motor spin direction.**

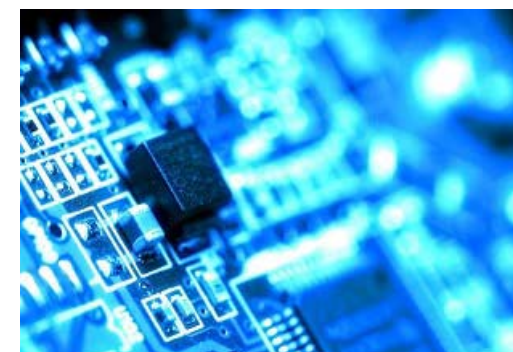
Set the motor target speed.

**7 Click the "Start Motor" button to spin the motor.**

**8 Change the motor speed while it is spinning.**

**9 Click the "Stop Motor" button to stop the motor. OR The Start/Stop hardware button can also be used to stop the motor.**

## D. Additional Support



### Where to Find Support

- Application Notes:  
[www.silabs.com/8bit-appnotes](http://www.silabs.com/8bit-appnotes)
- MCU KnowledgeBase:  
[www.silabs.com/Support/Knowledge Base](http://www.silabs.com/Support/Knowledge Base)
- User's Forums:  
[forum.silabs.com](http://forum.silabs.com)
- Contact an Applications Engineer:  
[www.silabs.com/Support/Contact Technical Support](http://www.silabs.com/Support/Contact Technical Support)