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PSoC Development Tools Selector Guide

In the PSoC Application Notes section, search for [AN2402](#)—The PSoC Development Tools Selector Guide. This is a complete catalog and description of all the development tools that support PSoC devices and when to use them in your design cycle—from concept to production.

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CY3253-BLDC Demonstration Kit Quick Start

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Getting Started

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Welcome to the CY3253 BLDC Control Demonstration Kit. This kit is dedicated to showcase PSoC device in BLDC motor sensor and sensorless control. The BLDC sensor control algorithm is using hall effect sensor for rotor position detection, and the sensorless control uses Back Electric Force(BEMF) for rotor position detection.

The kit is targeted to be a cost effective, turnkey solution for BLDC market. It also serves as a development platform. Source code can be easily re-used to develop your BLDC control application.

The demonstration kit uses Lithium-II (CY8C24533) chip as the micro-controller, but other PSoC devices can also be applied to the demonstration board.

1. Review Kit Contents


Each CY3253-BLDC Demonstration Kit contains:

- CY3253-BLDC Control Main Board
- Two Lithium-II Daughter Board
- LCD Module
- DC power supply
- 3-Phase BLDC motor
- CY3253-BLDC Kit CD-ROM
- Quick Start

6. Additional Cypress Resources

PSoC Data Sheets, Application Notes and Technical Articles

Cypress provides a wealth of information about CapSense Express, and more is frequently added. Many sample documents, schematics, layouts, guidelines, and other CapSense Express documents are available on the CD and at www.cypress.com (except where indicated). To find documentation online:

- a. Go to www.cypress.com.
- b. Click on the **Documentation** link.
- c. Select the type of documentation you are looking for from the **Resource Types** list.
- d. Type the part number or document number into the **Search in Design Resources** field.
- e. Click the **Search** button .

5. Documentation Index

A brief description of the document follows:

- **CY3253 Demo Kit Quick Start:** Introduces to the demo kit contents (this document)
- **Cypress software License Agreement:** This document provides the standard Cypress license for use of materials supplied in the demo kit.
- **CY3253 Demo Kit User's Guide:** This is a detailed reference that describes the kit.
- **AN42102 - BLDC Closed-Loop Speed Control Based on CY8C24533:** This application note describes the application of BLDC speed close loop control based on hall position sensor.
- **CY3253 Design Note:** This is detailed design note that mainly describes the implementation of sensorless BLDC speed close loop control.
- **CY24533 Technical Reference Manual:** Technical reference manual for CY24533 device.
- **CY3253 Demo Kit Release Notes:** The release notes of CY3253. It covers any last minute information that relates to deviations.

Following tools are optional: These tools are not included in CY3253, but can be found in other CY kit.

- CY3240-I2CUSB Bridge
- CY3210-MiniProg1
- CY3215-ICE
- CY3250-24X33 POD
- CY3250-28PDIP-FK

For more information, visit the website: <http://www.onfulfillment.com/cypressstore/Category.aspx?d=30&sid=205&sm=d30>

2. CD-ROM Directory Structure

The following list describes the higher-level directory structures in CY3253-BLDC Kit CD-ROM and does not completely explore the lower level directories.

```
|---Docs          'Docs' contains the kit documentation in PDF form
|
|---Hardware      'Hardware ' contains the design file used in development of the Kit
|   |---Schematic
|   |---BOM
|   |---SilkScreen
|   |---Gerber
|
|---Firmware      'Firmware' contains the firmware related files
|   |--Sensed control
|       |---Source Code
|       |---Header
|       |---lib
|   |--Sensorless control
|       |---Source Code
|       |---Header
|       |---lib
|
|---Software      'Software' contains PC software tools
|   |---PSoC Tools
|   |---I2CUSB command
```

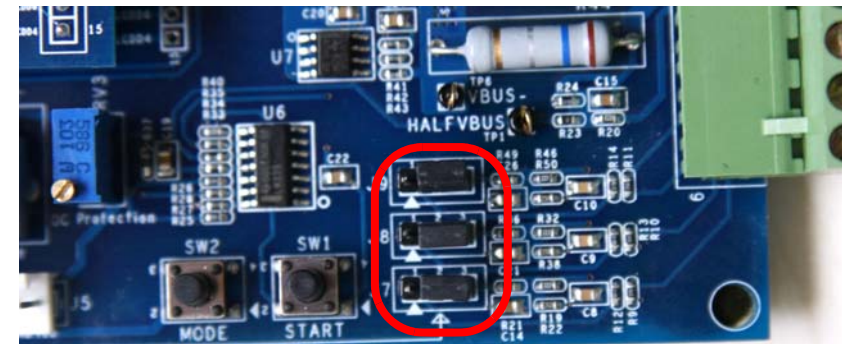
3. CY3253 Board Features

1. Support both sensor and sensorless control
2. Sensorless control based on comparators to detect the zero-crossing of BEMF
3. Discrete power devices (IGBT or MOSFET) with integrate device drivers (IR2101)
4. LED show run state and PWM state
5. Over current protection
6. Speed PI close loop
7. LCD panel for motor speed display
8. HALL sensor inputs for rotor position sensing
9. 24V external power supply
10. Debug and Programming I/F
11. I2C bridge tools for motor speed showing and present motor speed command
12. Keys to start/stop and switch motor rotate direction

4.2 Run with Sensor-Less Control

- 4.2 1. Plug CY24533 daughter board onto the main demo board via J10, J11 Connectors.
- 4.2 2. Program example code project of BLDC sensor-less control (CY3253_BLDC_NoHall) into CY24533 chip by MiniProg.
- 4.2 3. Connect motor phase wires to the board.
- 4.2 4. The HALL sensor jumpers (J7,J8,J9) must be set as per the following figure.

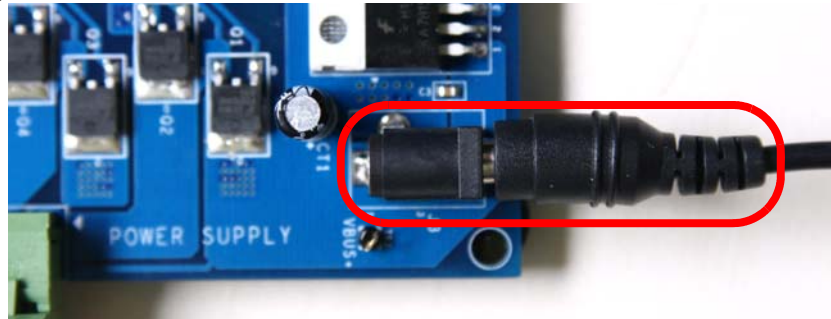
Figure 7 Select Jumpers for No-Hall Mode



- 4.2 5. Plug external +24V Power supply onto board J3. When connected, the red LED D9 is lit.
- 4.2 6. Press START button, motor begins to spin. Press the button again will stop the motor. LED D8 indicates this status.

4.1 5.Plug external +24V Power supply onto board J3 interface.

Figure 5 Power the Board

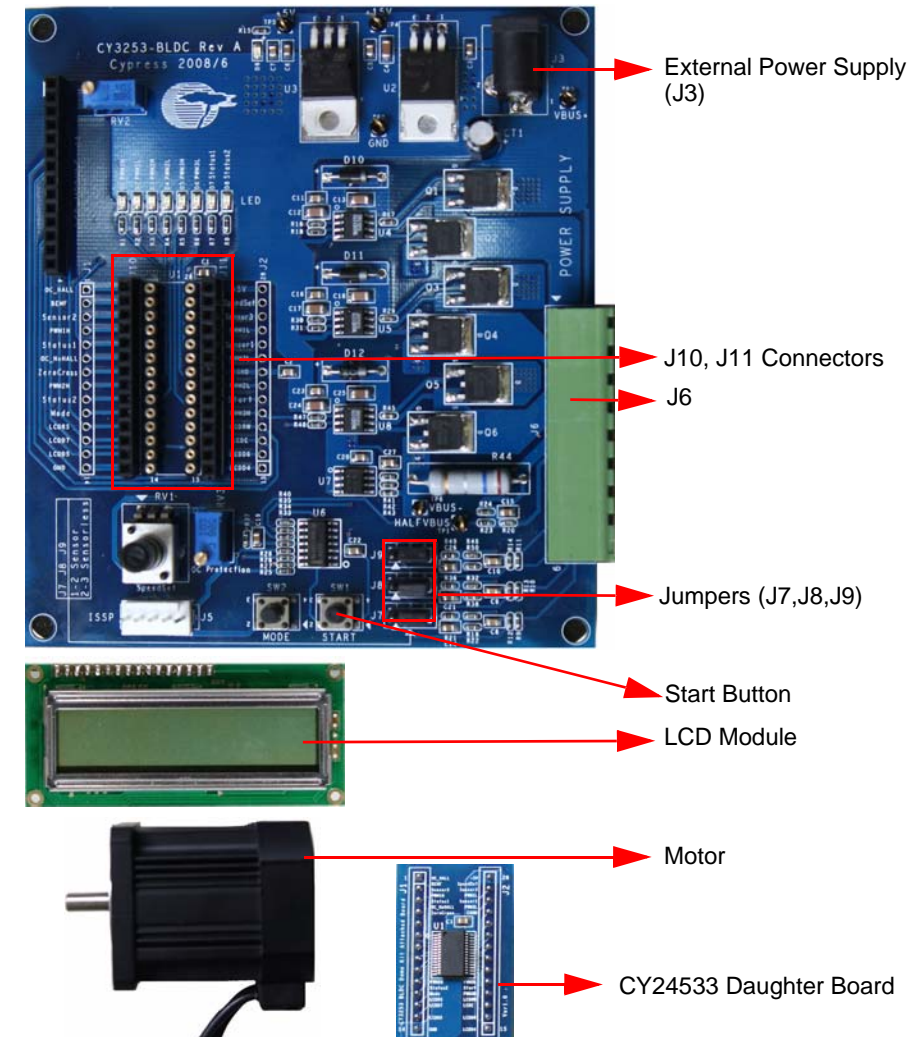


4.1 6.Press START button, motor begins to spin. Press the button again to stop the motor. LED D8 indicates this status.

Figure 6 Press Start Button to Start the Motor



Figure 1 CY3253-BLDC Kit

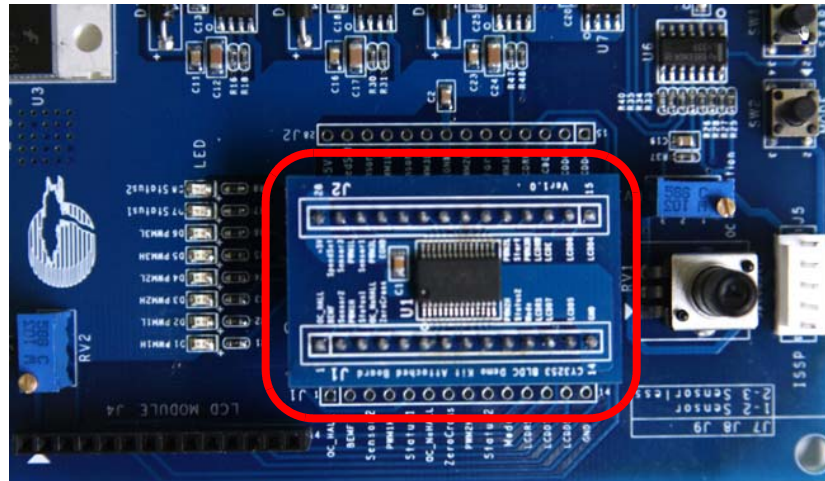


4 Connecting and Starting the Motor

4.1 Run with HALL Effect Sensor Control

4.1 1.Plug CY24533 daughter board onto the main demo board via J10, J11 Connectors.

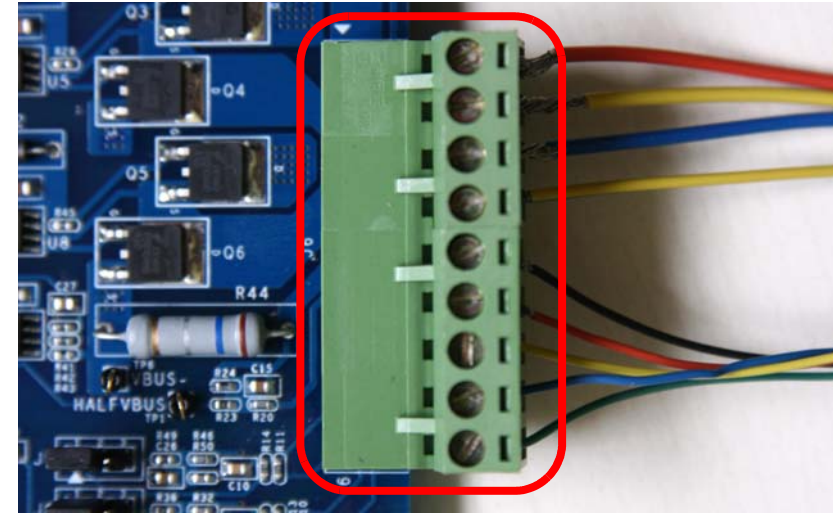
Figure 2 Plug in CY24533 Daughter Board



4.1 2.Program example code project of BLDC control with HALL effect sensor (CY3253_BLDC_HALL) into CY24533 chip by MiniProg via ISSP interface.

4.1 3.Connect motor phase wires and HALL wires to the board as per the following figure.

Figure 3 Connect Motor to the Board



4.1 4.The HALL sensor jumpers (J7,J8,J9) must be selected as per the following figure.

Figure 4 Verify Position of Hall Jumpers

