

BLDC Shield for Arduino with TLE9879QXA40 Getting Started

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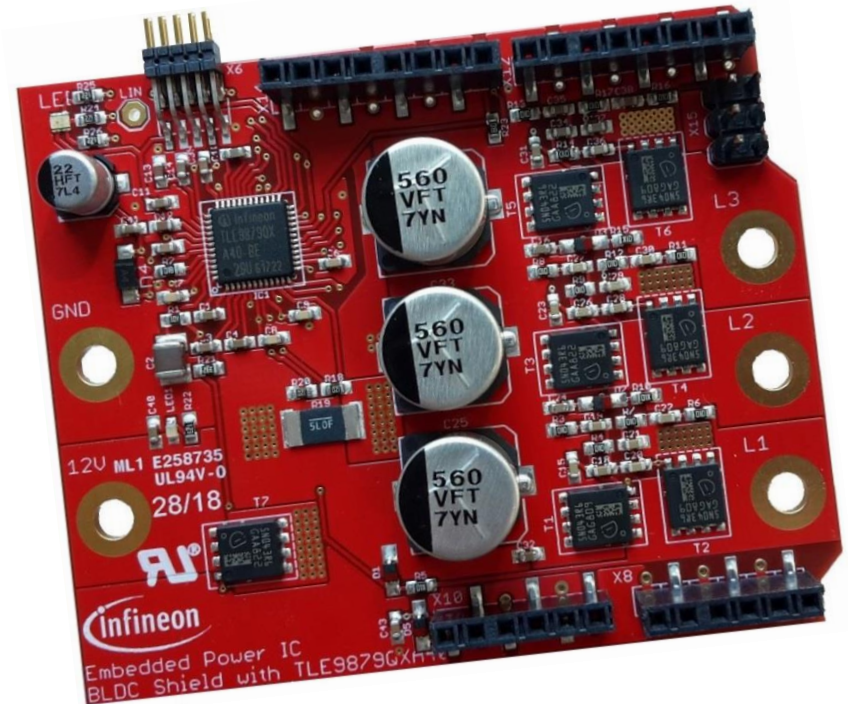
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Getting started

BLDC Shield with TLE9879QXA40 for Arduino

BLDC Shield with TLE9879QXA40 for Arduino

- › Voltage supply: typ. 12V
- › Infineon® 3-phase MOSFET driver IC (ARM® Cortex® M3 MCU)
- › SWD interface for debugging
- › LIN Transceiver
- › Hall sensor interface
- › BLDC_SHIELD_TLE9879: **SP003549500**



BLDC Shield with TLE9879QXA40 for Arduino

- › The BLDC Shield with TLE9879QXA40 for Arduino is part of Infineon Embedded Power system-on-chip solutions and offer an unmatched level of integration of all functions required to control and actuate a brushless DC motor. The four layers PCB is space and cost optimized to demonstrate an application near solution.
- › Target Applications: BLDC motor applications in general
- › Summary of Features:
 - Automotive qualified 3-phase MOSFET driver IC (TLE9879QXA40)
 - SPI interface with an Arduino baseboard
 - SWD interface for debugging, Hall sensor interface
 - Possibility to stack up to four shields

BLDC Shield with TLE9879QXA40 for Arduino

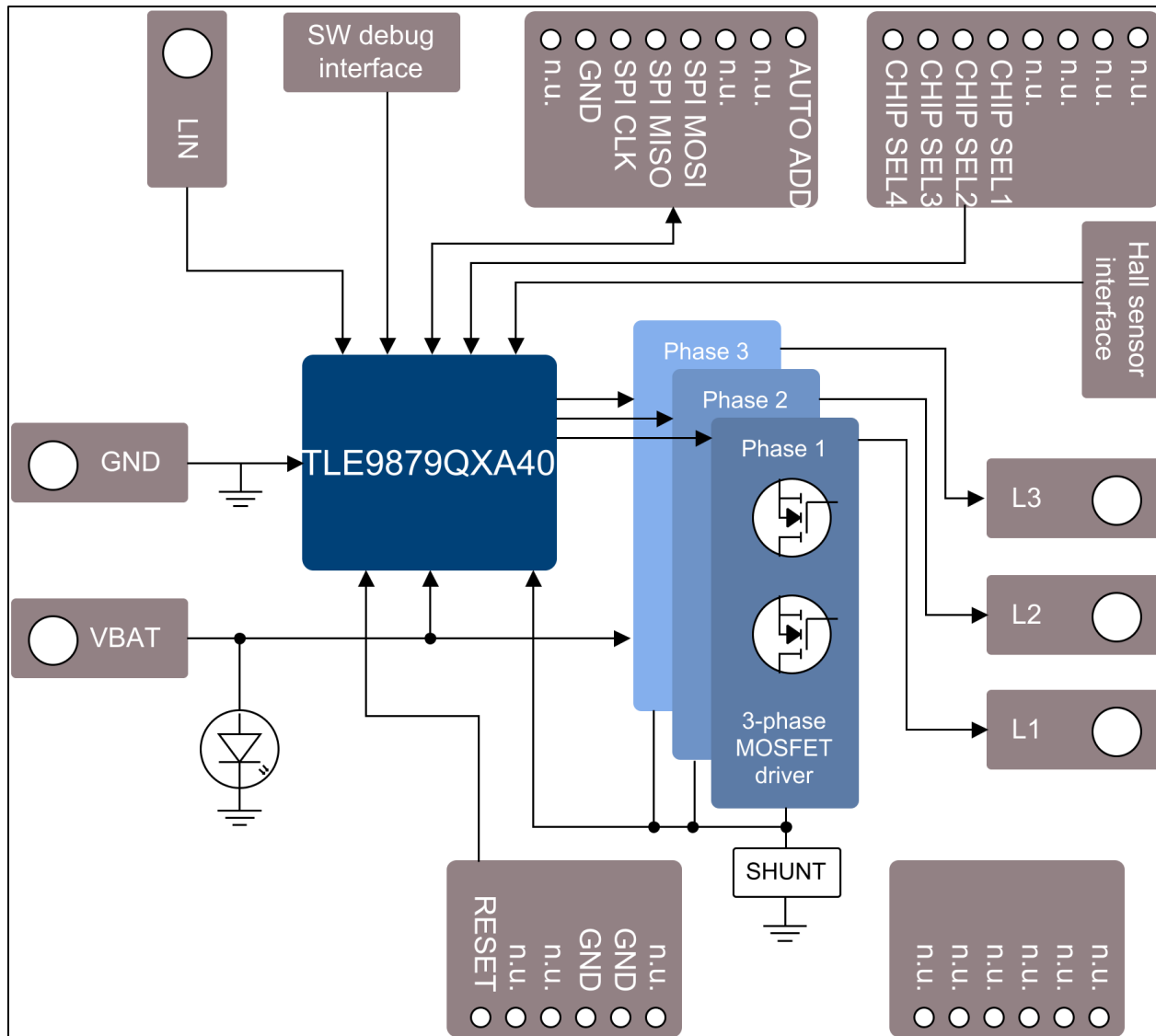


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Support for BLDC Shield with TLE9879QXA40 for Arduino



Product Page

- > Product page of BLDC_SHIELD_TLE9879

- > [Link to Product Page](#)

Technical Material

- > Datasheets
- > Product Brief
- > Getting started
- > Application Notes
- > User Manuals

- > [Link to Documents](#)

Design Support

- > PCB Design Data
- > Embedded Software

- > [Link to Design Support](#)

Software & Tools

- > IFXConfigWizard
- > Keil μ Vision5
- > Software Examples

- > [Link to IFXConfigWizard](#)
- > [Link to Software & Tools](#)

Videos

- > Technical Videos

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BLDC Shield with TLE9879QXA40 for Arduino: Embedded Software

› There are two parts of the BLDC Shield Embedded Software:

1. Shield Software

- i. batch_flashing_shield_software
 - Factory Reset Script (TLE9879_Shield_Flash.bat)
- ii. uVision_project_files
 - BEMF
 - Bootloader
 - FOC
 - HALL

2. Arduino Library

- i. Library files
- ii. Example files
 - Blinky Test (bldc_shield_blinky_test)
 - Single Motor Test (bldc_shield_single_motor_test)
 - Multiple Motor Test (bldc_shield_multiple_motor_test)

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Getting started with the Arduino library

The following guide uses the official Arduino Desktop IDE to create and run Arduino projects. This guide is not intended to be a beginner guide for developing for Arduino!

This guide covers the following topics:


1. Install the Arduino Desktop IDE 1.8.7 or later
2. Add the BLDC Shield library to the IDE
3. Code examples with explanations

The guide was written with the Arduino IDE version 1.8.7

Install the Arduino Desktop IDE

- › Go to <https://www.arduino.cc/en/Main/Software> and download the latest version of the Arduino Desktop IDE for your specific OS
- › Install the IDE
- › See <https://www.arduino.cc/en/Guide/HomePage> for help with developing code for Arduino in general

Download the Arduino IDE




ARDUINO 1.8.7

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

This software can be used with any Arduino board. Refer to the [Getting Started](#) page for Installation instructions.

Windows Installer, for Windows XP and up
Windows ZIP file for non admin install

Windows app Requires Win 8.1 or 10
[Get](#) 

Mac OS X 10.8 Mountain Lion or newer

Linux 32 bits
Linux 64 bits
Linux ARM

[Release Notes](#)
[Source Code](#)
[Checksums \(sha512\)](#)

Add the BLDC Shield library to the IDE

- › The Arduino website offers an extensive guide on how to add libraries in general (<https://www.arduino.cc/en/Guide/Libraries>)
- › In the following the steps for adding a .zip library are shown:

1. Open the Arduino IDE
2. Go to Sketch -> Include Library -> Add .ZIP Library
...
3. Go to the downloaded Arduino library and select the archive
'BLDC_Arduino_library.zip'
4. The library is now available in your IDE

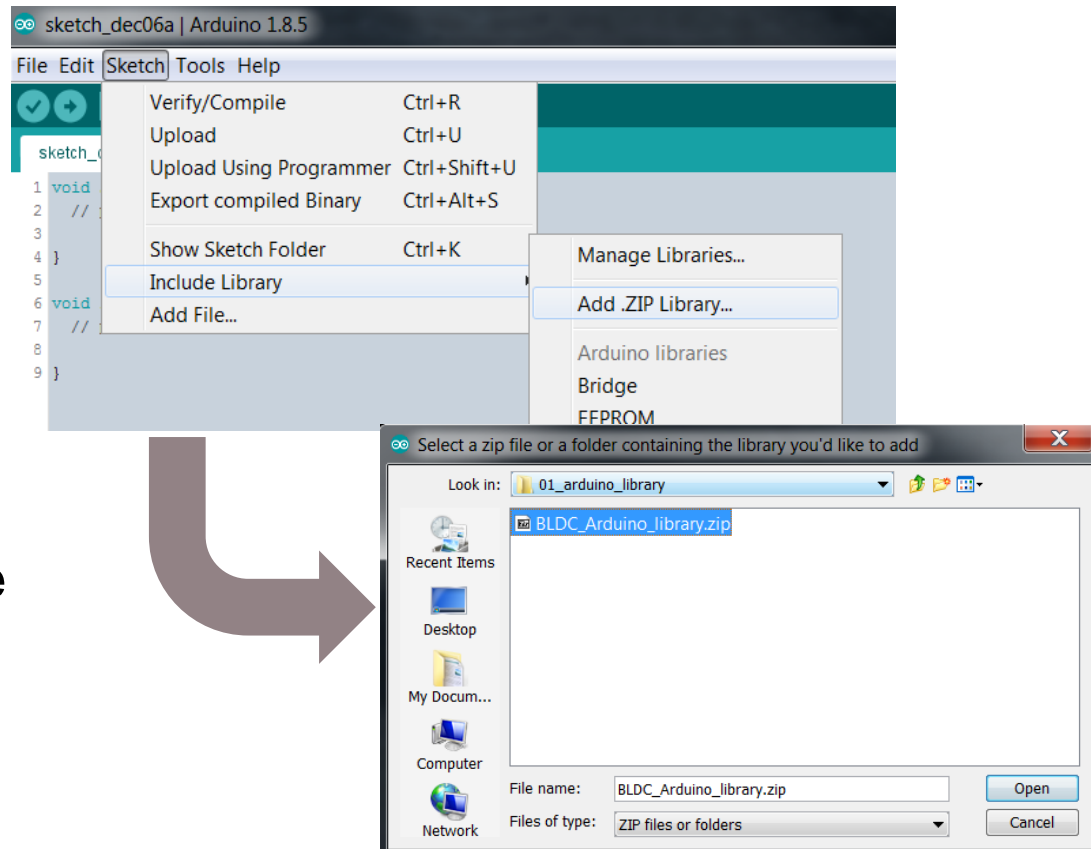


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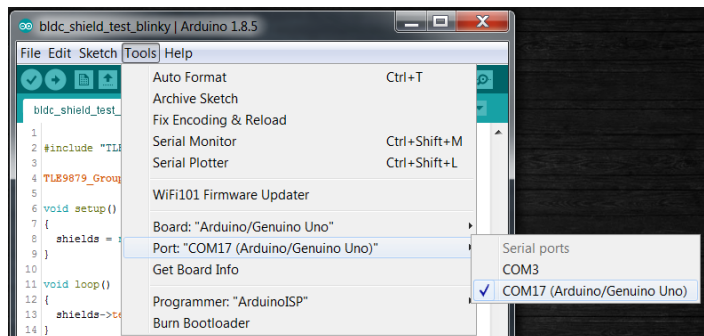
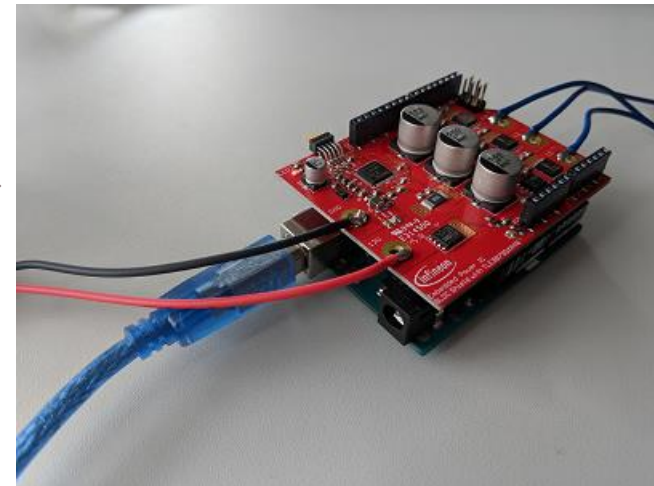
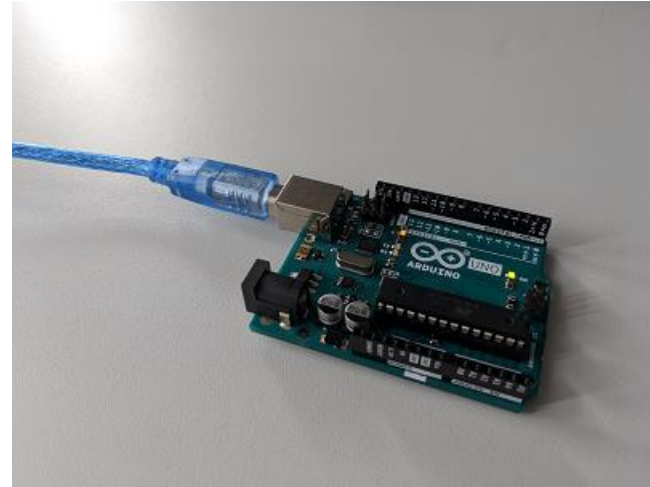
Getting started

Getting Started with the BLDC Shield

- › The following slides show how to run your first code with the BLDC Shield
 1. Connect the hardware to your PC and supply it with power
 2. Write Blinky test project, compile it and upload it to the Arduino
 3. More example code for running motors
 - Driving a single motor with a single Shield
 - Using multiple Shields to drive multiple motors independently

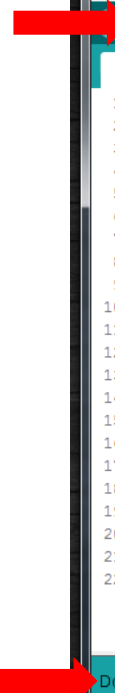
Hardware setup

1. Connect the Arduino via USB to your computer
2. Attach the BLDC Shield via the pin connections
3. Connect the Shield with a 12V power supply
4. In the Arduino IDE go to Tools -> Port and select the USB port the Arduino is connected to



Test Shield with blinky application

1. Copy the example code to the right
2. Press the 'Upload' button in the upper left of the Arduino IDE (compiles and uploads the sketch)
3. Wait for the Arduino IDE to finish uploading the sketch
4. The LED of the BLDC Shield should now change its color every second



```

bldc_shield_test_blinky | Arduino 1.8.5
File Edit Sketch Tools Help

bldc_shield_test_blinky
1
2 // Include the shield library in your Arduino project
3 #include "TLE9879_Group.h"
4
5 // Create shield group object
6 TLE9879_Group *shields;
7
8 void setup()
9 {
10 // Initialize the shield group object with the number
11 // shields in the stack
12 shields = new TLE9879_Group(1);
13 }
14
15 void loop()
16 {
17 // Call the testBlinky() method in the loop of the
18 // Arduino proctect -> the LED should change its
19 // color every second
20 shields->testBlinky();
21 }
22
Done uploading.

Sketch uses 5888 bytes (18%) of program storage space. Maximum is 32256 bytes.
Global variables use 238 bytes (11%) of dynamic memory, leaving 1810 bytes for
19 Arduino/Genuino Uno on COM17
  
```

Test a single motor with the Shield

- › Example code
bldc_shield_single_motor_test
- › Stack consists of one Shield
- › Runs the motor once for 5 seconds, then stops it
- › If the motor does not run properly, the motor parameters should be adjusted.

bldc_shield_single_motor_test

```

1
2 // Include the Shield library to your Arduino project
3 #include "TLE9879_Group.h"
4
5 // Declare Shield group object
6 TLE9879_Group *shields;
7
8 void setup()
9 {
10 // Initialize the Shield group object with the
11 // number of Shields in the stack
12 shields = new TLE9879_Group(1);
13
14 // Set the desired mode (FOC, HALL, BEMF)
15 shields->setMode(FOC);
16
17 // Set the desired motor speed (RPM)
18 shields->setMotorSpeed(1000);
19
20 /*
21 You might have to adjust the motor parameters,
22 in case the motor does not run properly.
23 */
24
25 // Start the motor and let it run for 5 seconds,
26 // then stop the motor
27 shields->setMotorMode(START_MOTOR);
28 delay(5000);
29 shields->setMotorMode(STOP_MOTOR);
30 }
31
32 void loop()
33 {
34 }

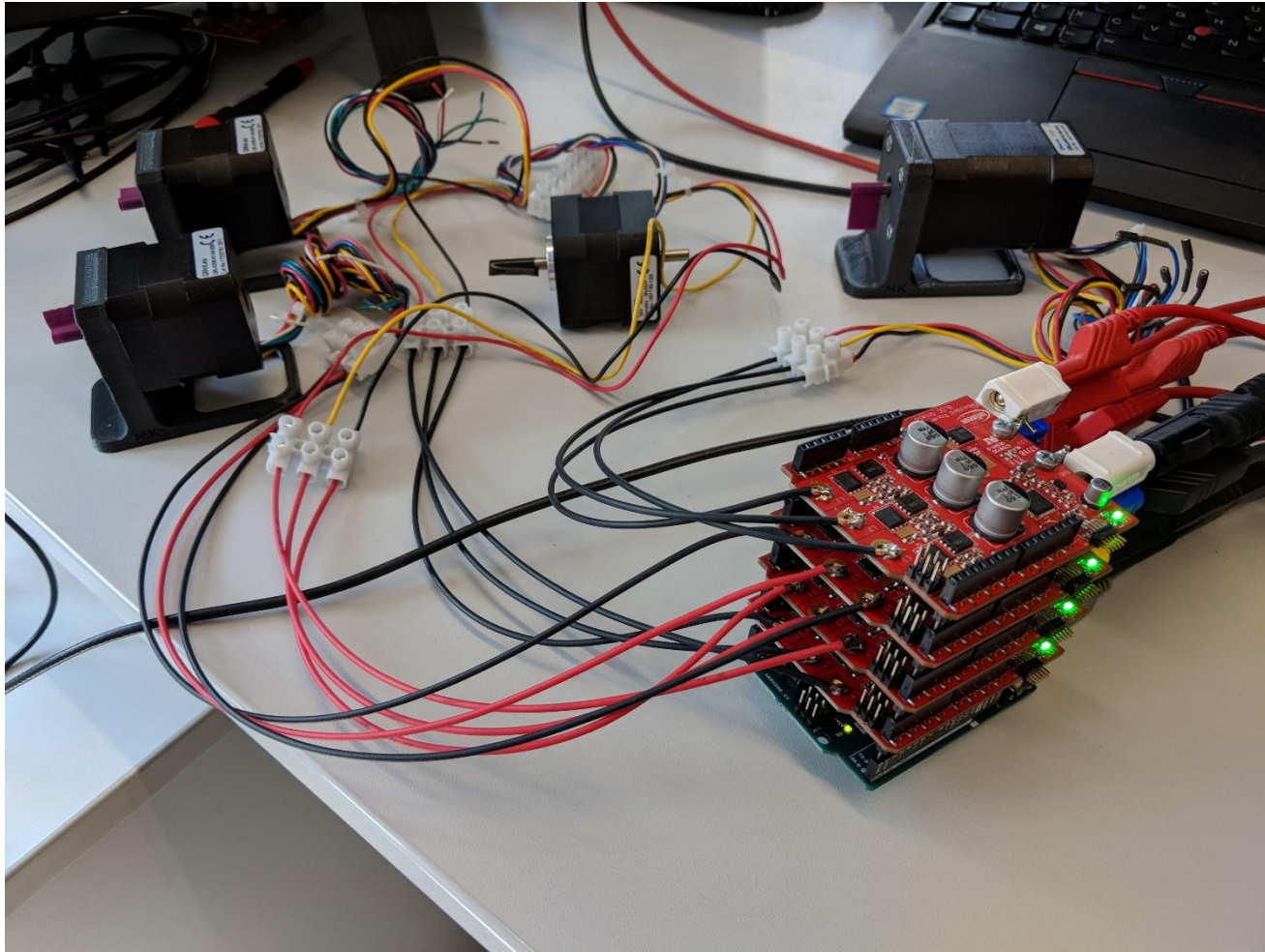
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Test multiple motors with the Shield

- › Example code
bldc_shield_multiple_motor_test
- › Stack consists of two Shields
- › Motors run with different RPM and different motor algorithms (FOC and Hall)
- › Make sure the Hall connectors of the motor are connected properly to the Shield
- › If the motor does not run properly, the motor parameters should be adjusted.

```
bldc_shield_multiple_motor_test
1
2 // Include the Shield library to your Arduino project
3 #include "TLE9879_Group.h"
4
5 // Declare Shield group object
6 TLE9879_Group *shields;
7
8 void setup()
9 {
10     shields = new TLE9879_Group(2);
11
12     // Most of the methods in the TLE9879_Group class
13     // have an optional 'boardnr' parameter, to specify
14     // a single Shield to send the command to.
15     shields->setMode(HALL, BOARD1);
16     shields->setMode(FOC, BOARD1);
17
18     shields->setMotorSpeed(500, BOARD1);
19     shields->setMotorSpeed(2000, BOARD2);
20
21     /*
22     You might have to adjust the motor parameters,
23     in case the motor does not run properly.
24     */
25 }
26
27 void loop()
28 {
29     shields->setMotorMode(START_MOTOR, BOARD1);
30     delay(5000);
31     shields->setMotorMode(START_MOTOR, BOARD2);
32     delay(5000);
33     shields->setMotorMode(STOP_MOTOR, BOARD1);
34     delay(5000);
35     shields->setMotorMode(STOP_MOTOR, BOARD2);
36     delay(5000);
37 }
```

Test multiple motors with a stack of Shields





Part of your life. Part of tomorrow.