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LV8548MCSLDGEVB

Brush DC Motor Driver Module Solution Kit
Quick Start Guide

ON Semiconductor®

www.onsemi.com

Overview

The LV8548MCSLDGEVB is an **ON Semiconductor** motor driver module featuring the **LV8548MC**. This module is capable of easily driving **2 brushed DC motors**.

Motor driving is made easy with Arduino Micro[1] compatibility. The LV8548MCSLDGEVB comes with a Baseboard for facilitated plug-and-play connectivity with an Arduino Micro. GUI and Open-source API Functions are available for custom, user-specific motor driving programs.

LV8548MCSLDGEVB Board

Features:

• VCC_{max} = 20 V, IO_{max} =1.0 A[2] （Through OUT_A-B and OUT_C-D）
• **6〜12 V System Applications** Recommended （VCC = 4〜16V Max）
• **Standby current consumption = 0**
• Pulse Width Modulation (PWM) control, adjustable motor torque and speed
• Forward rotation, reverse rotation, and built in brake function
• Typical Applications: In-Home Appliances, Consumer Products, Industrial Products

For further product information, please visit:
http://www.onsemi.com/PowerSolutions/product.do?id=LV8548MC

What you need

• PC (Windows 7, 64bit)
    Arduino IDE 1.8.4 [3] Installed
    User with an Administrator permission
• Power Supply
  AC Adapter   Output voltage：4〜16V
                 Output current：〜2A
                 Connector specification
                   Polarization：Positive Center
                   Inner diameter＝2.1mm、outer diameter＝5.5mm
                 Recommended：WSU075-1000（Triad Magnetics）
  or stabilized DC power supply, dry cell battery, etc.

ONBB4AMGEVB Board with Arduino Micro and LV8548MCSLDGEVB Board

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1) Arduino / Genuino is Arduino AG are registered trademarks.
2) Stress exceeding this voltage or current may risk damage to the device. Functionality and reliability may be hindered if the device exceeds these values. The maximum current value, IOmax, does not guarantee the module can handle that much current. If the device overheats, thermal shutdown will occur.
3) Contents of kit may not be compatible with different versions. Please see the Appendix attached if specified version is not installed.
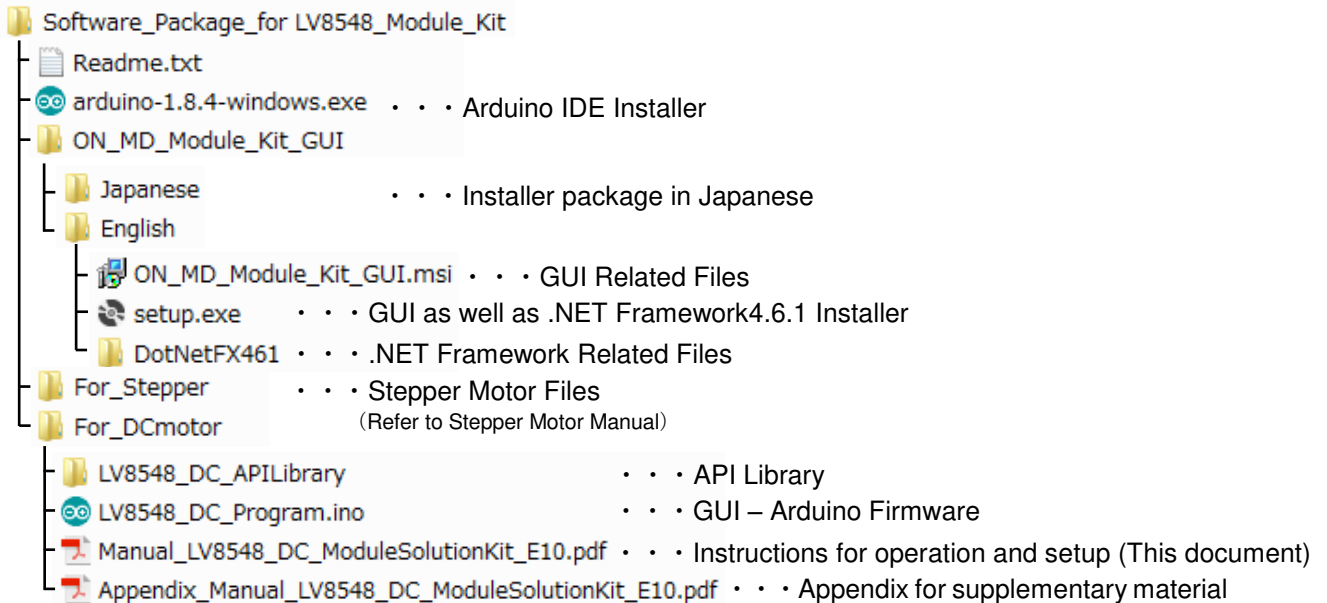
Contents of the Kit
Hardware
• LV8548MCSLDGEVB : Motor driver module
• ONBB4AMGEVB : Baseboard
• Arduino Micro
• USB Cable (Micro B-A)
• USB Thumb Drive
• Flat-tip Screw Driver
• Brush DC Motor - RC-260RA-18130 (MABUCHI motor) 1pc
 (Stepper motor 1pc)

Software(Included in USB Thumb Drive)

📁 Software_Package_for LV8548_Module_Kit
　📄 Readme.txt
　🔵 arduino-1.8.4-windows.exe ・・・ Arduino IDE Installer
　📁 ON_MD_Module_Kit_GUI
　　📁 Japanese ・・・ Installer package in Japanese
　　📁 English
　　　🔲 ON_MD_Module_Kit_GUI.msi ・・・ GUI Related Files
　　　🌐 setup.exe ・・・ GUI as well as .NET Framework4.6.1 Installer
　　　📁 DotNetFX461 ・・・ .NET Framework Related Files
　📁 For_Stepper ・・・ Stepper Motor Files
　📁 For_DCmotor 　（Refer to Stepper Motor Manual）
　　📁 LV8548_DC_APILibrary ・・・ API Library
　　🔵 LV8548_DC_Program.ino ・・・ GUI – Arduino Firmware
　　📕 Manual_LV8548_DC_ModuleSolutionKit_E10.pdf ・・・ Instructions for operation and setup (This document)
　　📕 Appendix_Manual_LV8548_DC_ModuleSolutionKit_E10.pdf ・・・ Appendix for supplementary material

Software Setup

Please download
📁 Software_Package_for LV8548_Module_Kit
found on the provided USB flash drive to any preferred directory.
(E.g. Libraries\Documents or Desktop)
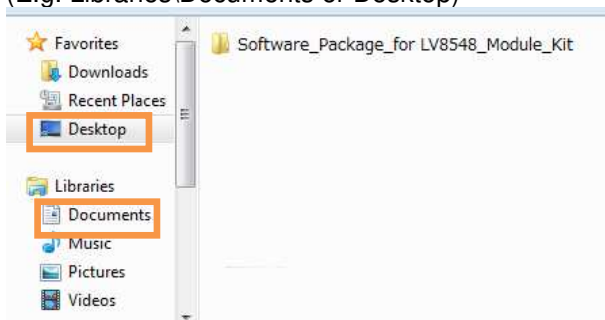
The IDE will display the following message when the LV8548_DC_Program.ino file is opened for the first time. Click "OK" to continue.
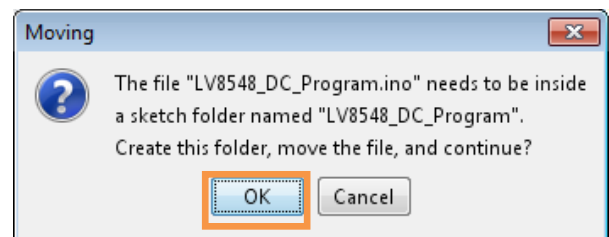
This message will be displayed if the .ino file is not inside of a folder with the same name. (E.g. Sketch12345.ino must be in the Sketch12345 folder).
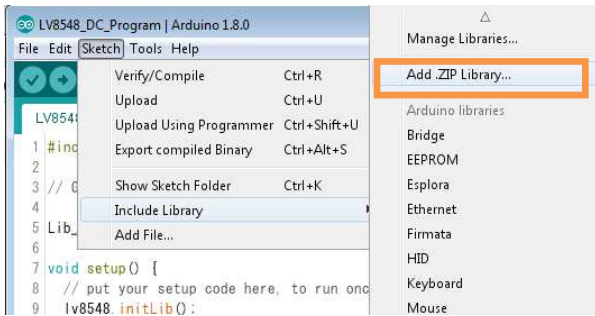
API Library
Following process should be operated with **the Arduino Micro disconnected.**

① Double click on the Arduino sketch
🔵 LV8548_DC_Program.ino
This will launch the Arduino IDE.
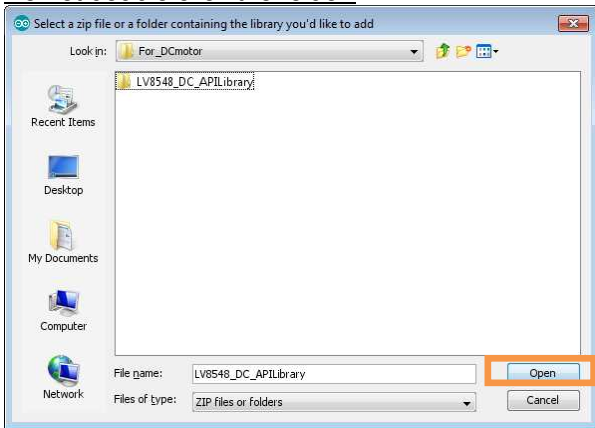(Check the Appendix if the Arduino IDE is not installed)

② Include the API Library
As shown below, navigate to Sketch→Include Library→Add .Zip Library

The following window will appear. Select the "LV8548_DC_APILibrary" folder, and open this folder as shown below.
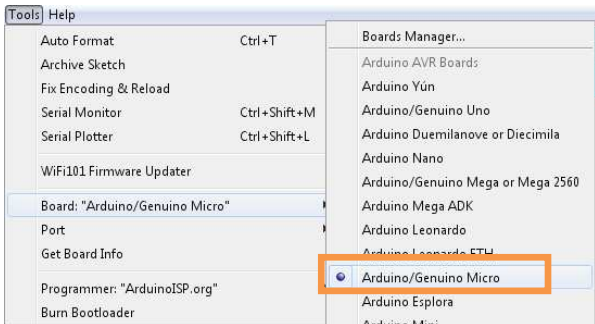
<u>Click the folder only once and push "Open" button. Do not double click the folder.</u>

Unless updating the function library, including the API function library only needs to be done once.
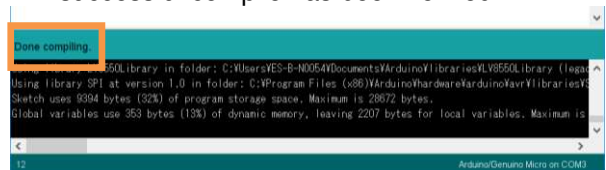
Writing and Compiling with the Arduino IDE
① Select the Arduino board to upload to by navigating to
"Tools→Board→Arduino/Genuino **Micro**"

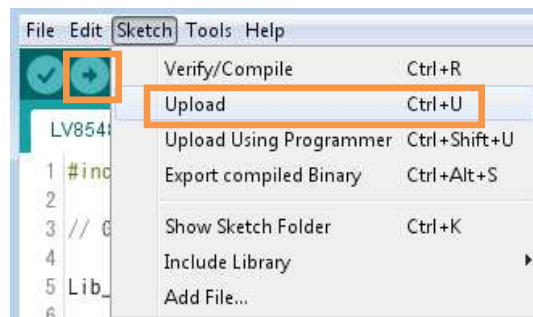② Write an Arduino sketch and navigate to "Sketch→Verify/Compile" when finished writing
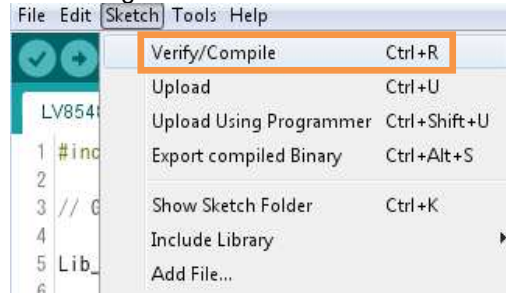
The IDE will display "Done compiling" after a successful compile has been verified.

③ **Connect the PC to the Arduino Micro via USB** and select the corresponding COM port
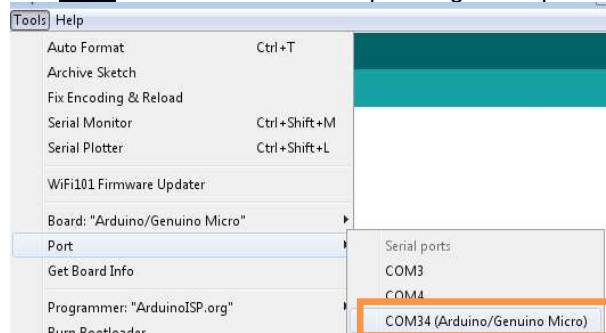
④ Upload the sketch by clicking "Sketch→Upload" or by pressing the ⊖ button

The IDE will display "Done uploading" after a successful upload to the Arduino

Sketches written to the Arduino will not be erased unless rewritten.

If the uploading of the program fails confirm the details in step ① check board name and step ③ check serial port connection.

Rewrite the Arduino Program

In the case of ① or ② below, please rewrite the program to the Arduino

① When updating the API Function library
   1) Delete the existing API function library by navigating to Documents\Arduino\libraries and deleting the LV8548_DC_APILibrary folder.
   2) Include the latest API function library. Please save the latest API function library in your preferred directory on your PC. (See Page 2, "Software Setup")

   Include the latest API function library. (See Page 2 "API Library")
   3) Compile and write the program to the Arduino (See Page 3, "Writing and Compiling with the Arduino IDE")

② When evaluating the LV8548 Stepper and other motor driver modules
   (Assuming other motor driver module libraries have already been included)
   1) Compile and write the program to the Arduino (See Page 3, "Writing and Compiling with the Arduino IDE")

   If you are testing the LV8548 Stepper module library or any other motor driver module library for the first time, please operate according to their corresponding manual.
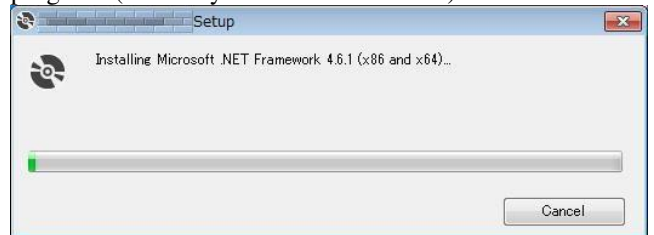
GUI Installation
① In the ON_MD Module Kit_GUI folder, double click and run setup.exe installation file.

*If a previous version of ON_MD_Module_Kit_GUI has already been installed, please uninstall and reinstall the GUI

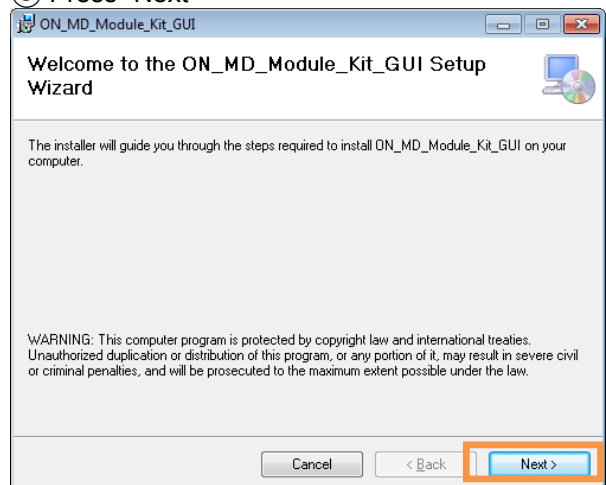② If .NET Framework4.6.1 is not installed, click Accept to install.
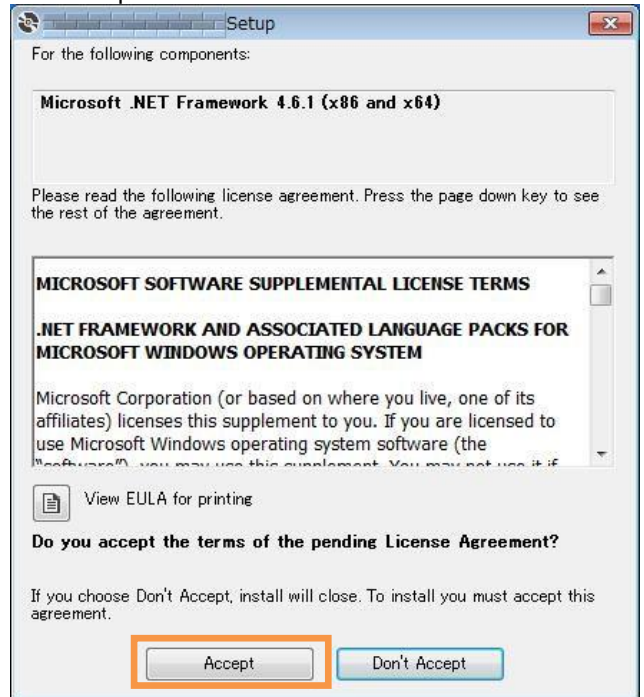
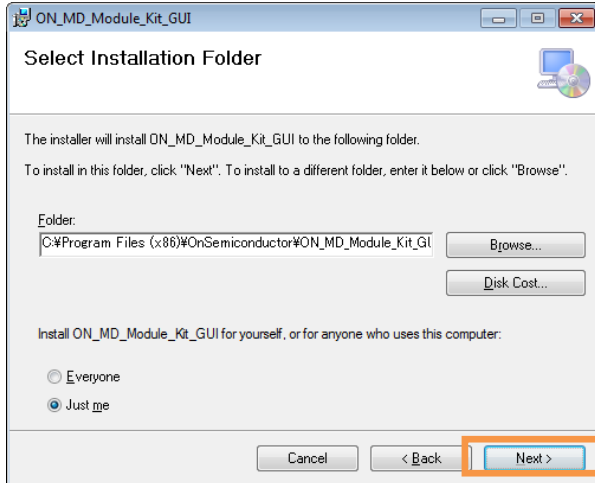The following window shows the installation in progress. (This may take several minutes)

If the installation requires a reboot to complete, a message will appear on the screen. Please press "Yes" to reboot.
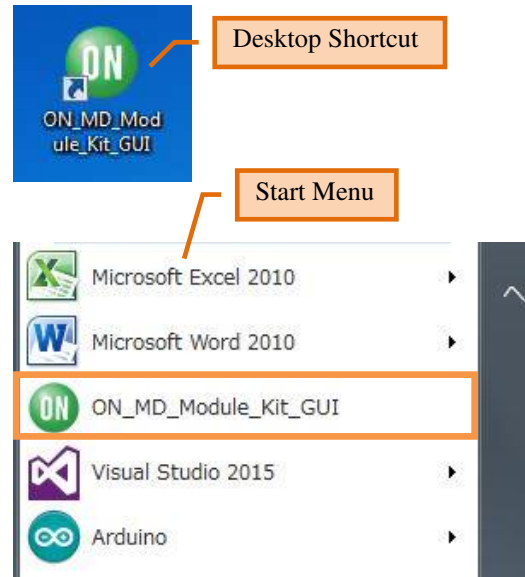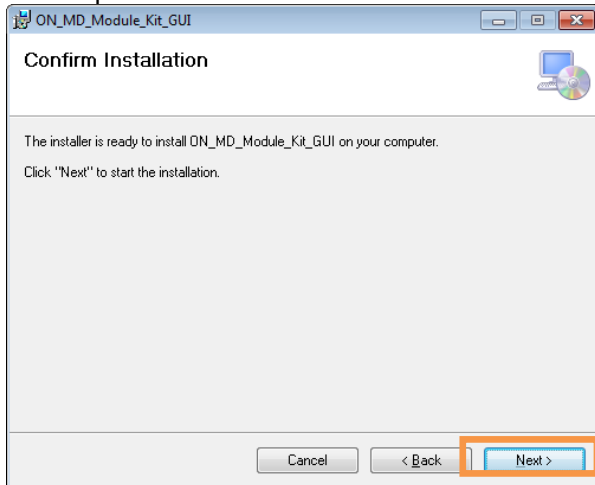Once rebooted, run setup.exe installation file again.

③ Press "Next"

④ Specify installation folder, or just click "next" to continue with the installation

Please press "next".

If a User Account Control dialog box appears, please select "Yes."

The following screen will be displayed after a successful installation.

Make sure the GUI shortcut icon is created on the desktop as shown below and that the program has been added to the Windows start menu.
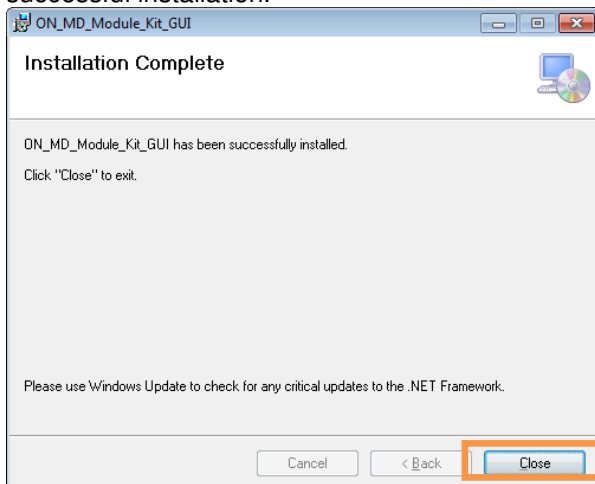

Desktop Shortcut

Start Menu

Hardware Setup

① Connect the LV8548MCSLDGEVB（Motor Driver Module）to the ONBB4AMGEVB（Motor Driver Baseboard）. Insert the module into the baseboard, while being careful not to bend the header pins

② Connect the Arduino/Genuino Micro to the baseboard, as seen in the figure below. The USB connection port should be labeled on the baseboard "←USB" to dictate the orientation of the Arduino
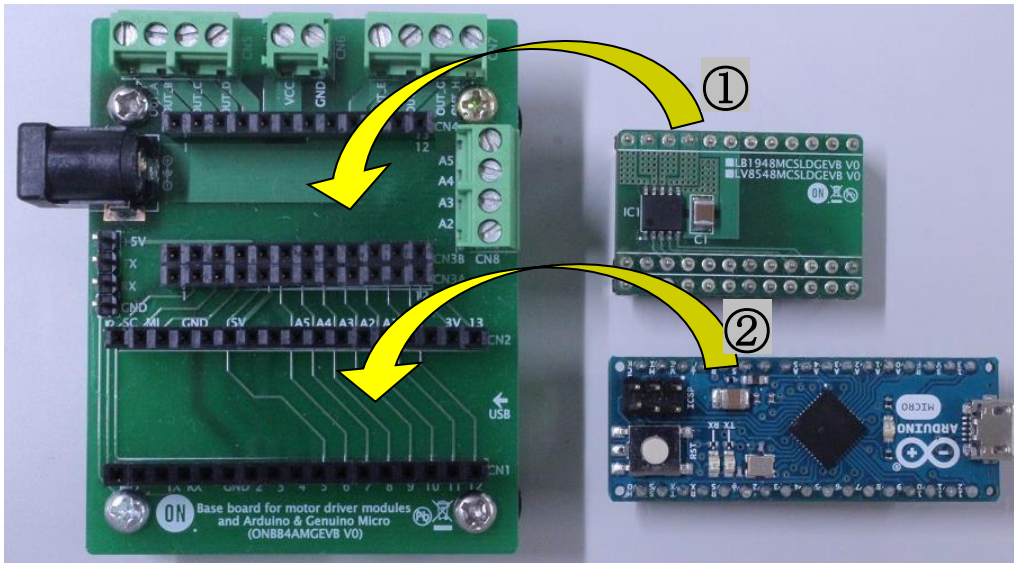

③ Plug in the motor wires (Insulation between 5mm – 10mm) into the output terminals on the baseboard – OUT_A/B/C/D. Refer to the table below for motor connectivity:

OUT_A	Motor1＋
OUT_B	Motor1－
OUT_C	Motor2＋
OUT_D	Motor2－

（Double check the motor wires, + and -, to ensure correct rotation direction）

④ Connect the Arduino to a PC using a USB cable.

⑤ Insert the AC Power adapter into the DC Jack on the baseboard. Be sure that a **Center positive type** adapter is being used with an **output voltage of 4-16V.**
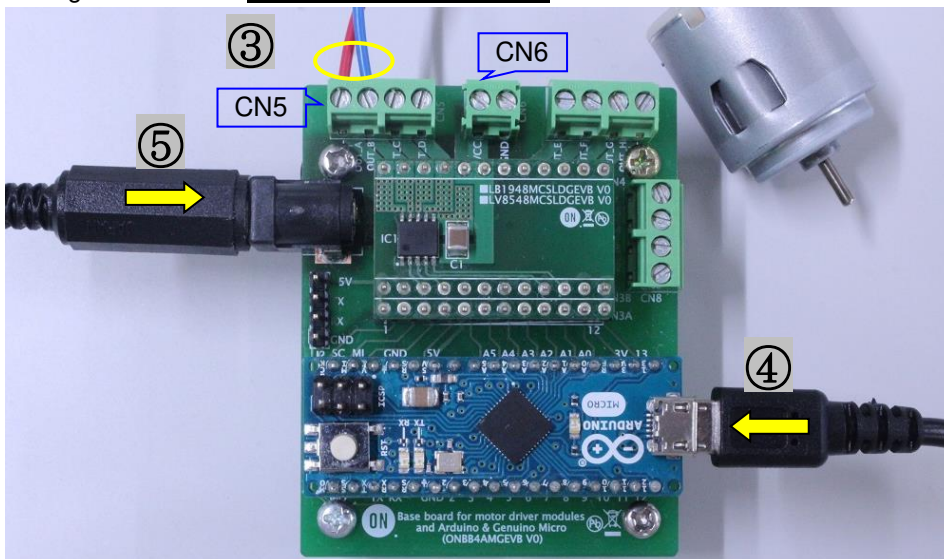
If using power supply cables, please connect the positive terminal to VCC and the negative terminal to GND in the CN6 connector. **The power supply terminals +/- at CN6 are polarity sensitive**.(VCC=+, GND=-)

How to use the GUI
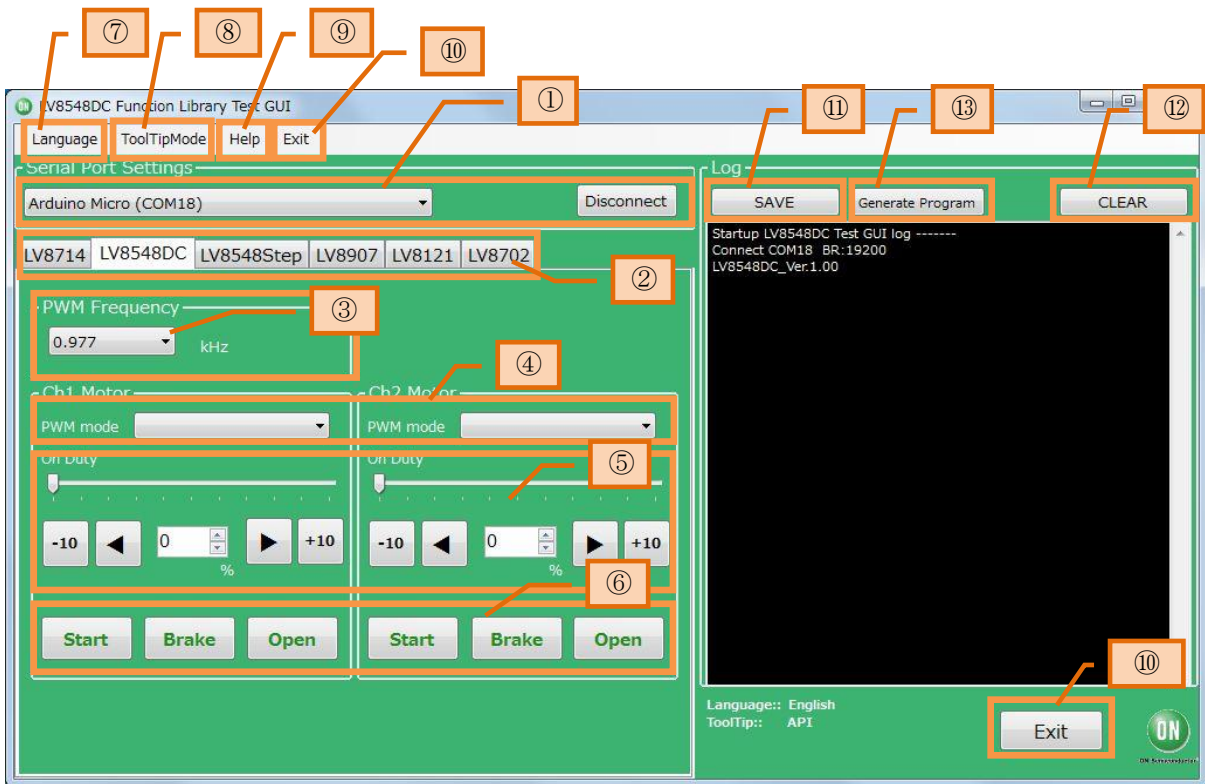
① Double-click the GUI shortcut and connect the COM serial port.

Available COM ports will appear in the drop-down box.
If the Arduino is connected correctly to the PC, an option for "Arduino Micro (COMx)" will be available (where x is the number associated with the port); select that COM port and click "Connect".

② The GUI will automatically navigate to the LV8548DC tab after the Arduino installed the firmware is connected.
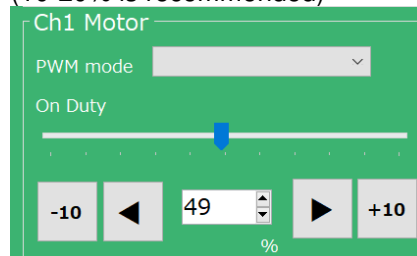
③ Specify the desired frequency for PWM
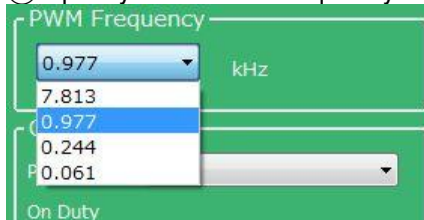
④ Set the PWM mode for each motor (Ch1 & Ch2)
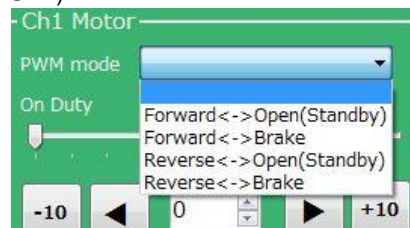
If the motor is running, it is recommended to press the "Brake" or "Open" button before switching the direction of rotation.

Please see the Appendix for characteristics regarding the PWM frequency and PWM mode.

⑤ Change the On Duty ratio for each motor (10-20% is recommended)

⑥ Press the "Start" button to begin motor function

Adjusting the duty ratio while the motors are rotating is recommended
Be sure to adjust the duty ratio gradually. For safety reasons, please initiate the motors at a lower duty ratio and increase gradually.

The Brake function sets the potential at both leads of the motor to ground and instantly stops the motor.
The Open function sets both leads of the motor to an open circuit, which decelerates the motor to a complete stop.

For additional details, please see the attached Appendix.

For more details on the following features, please refer to the attached Appendix:
⑦ GUI Language configuration
⑧ GUI Tool Tip display
⑨ Help function

When finished, exit the GUI by pressing the "Exit" button at the bottom right of the screen or by clicking "Exit" item at the top menu bar.
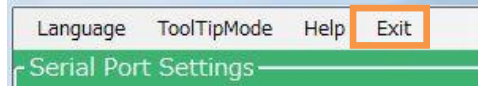
The following popup message will be displayed when exiting the GUI.
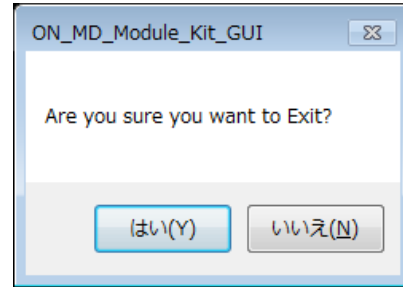
Select "Yes" to quit the GUI.
Select "No" to cancel the exit and return to the main screen.

If the GUI is closed while the motor is still running, the motor will be stopped and the window will close.
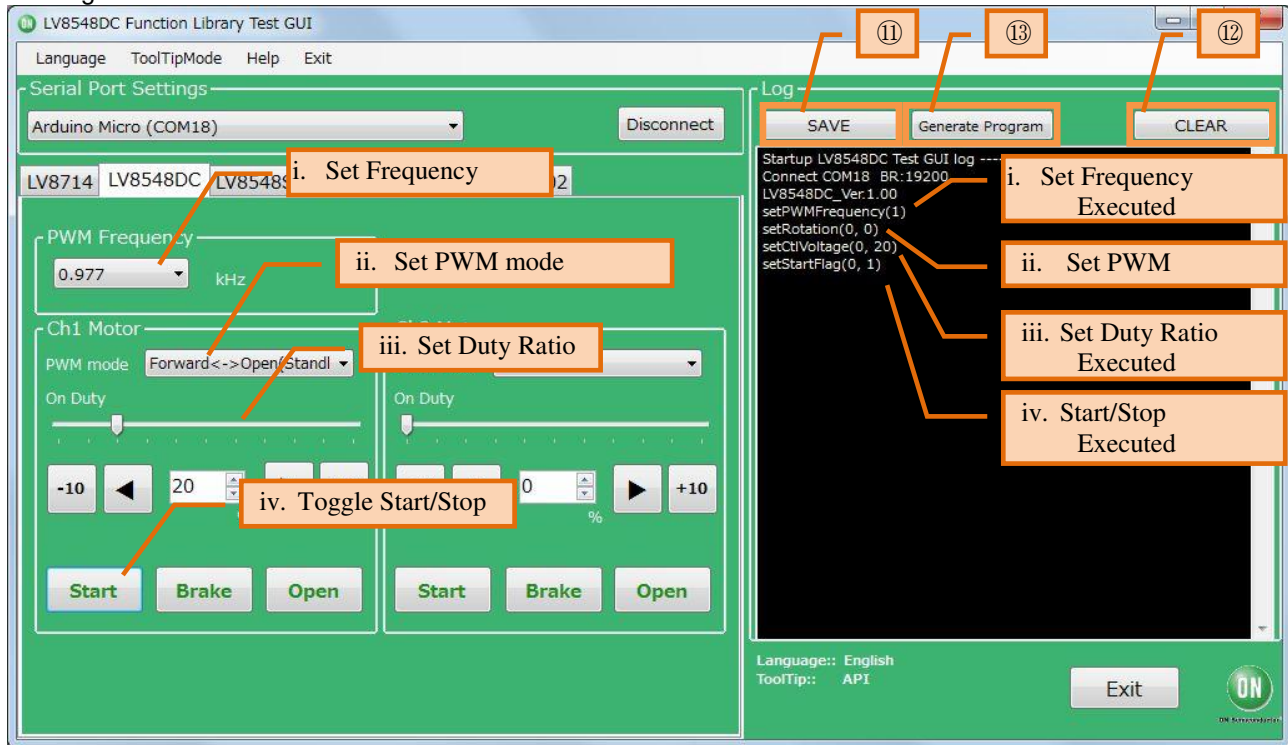
For more details on the following features, refer to the next section on How to use the GUI Log:
⑪ Saving the GUI log
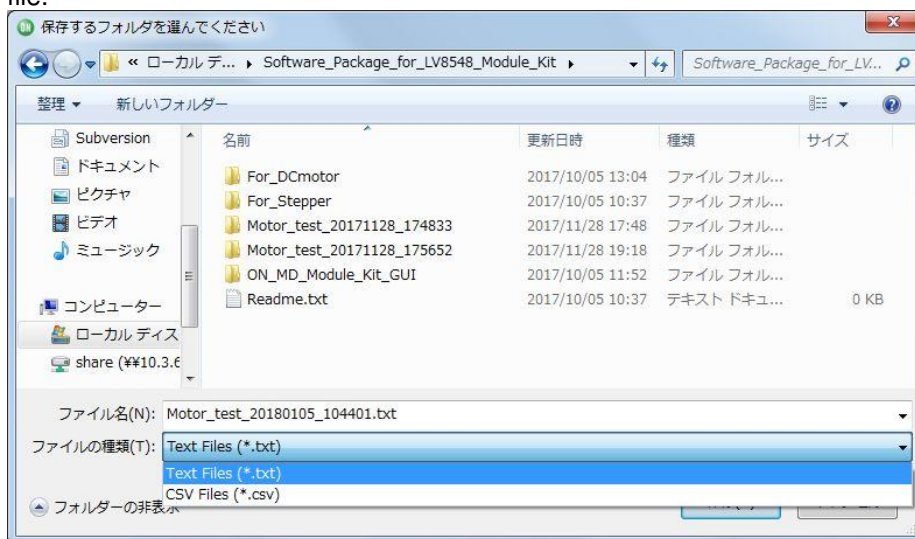⑫ Clear the GUI log
⑬ Program generation

⑩ Closing the GUI

How to use the GUI Log

The log screen in the GUI shows the serial data sent to Arduino to control its API functions.

⑪ Saving the GUI Log

By pressing the "SAVE" button, the content displayed on the work log can be saved as a .txt file or a .csv file.

⑫ Clear GUI Log

By pressing the "CLEAR" button, the content displayed on the work log will be erased.

⑬ Program Generation

Pressing the "Generate Program" will output the executed API functions on the work log into a .ino program file that can be uploaded directly with Arduino. By writing the output of the .ino file to Arduino, motor control can be executed automatically through standalone operation according to the procedure generated through the GUI Log.

For more details regarding the Arduino program generation function, refer to the attached Appendix under ⑬ Arduino Program Automatic Generation.