

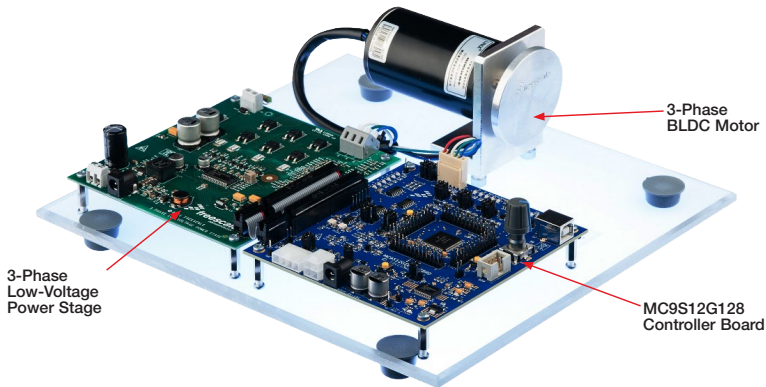


Quick Start Guide

3-Phase Sensorless BLDC
Motor Control Development Kit
with MC9S12G128 MCU



3-Phase Sensorless BLDC Motor Control Development Kit with MC9S12G128 MCU

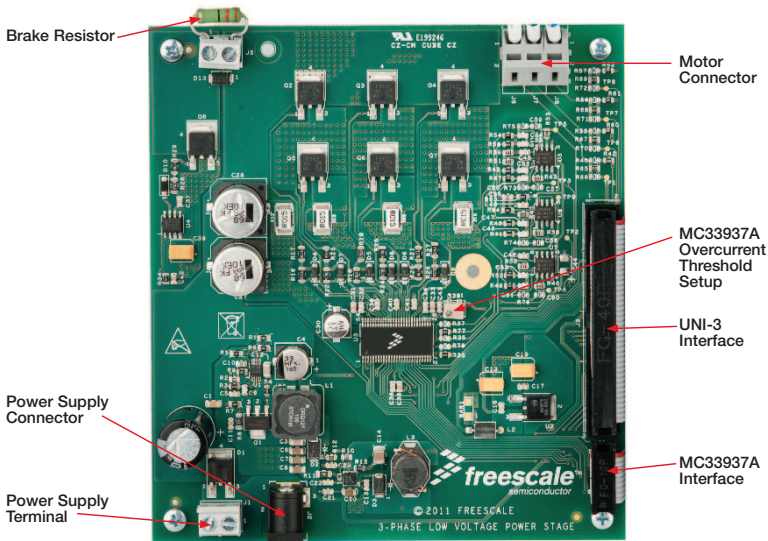




3-Phase Sensorless BLDC Motor Control Development Kit Features

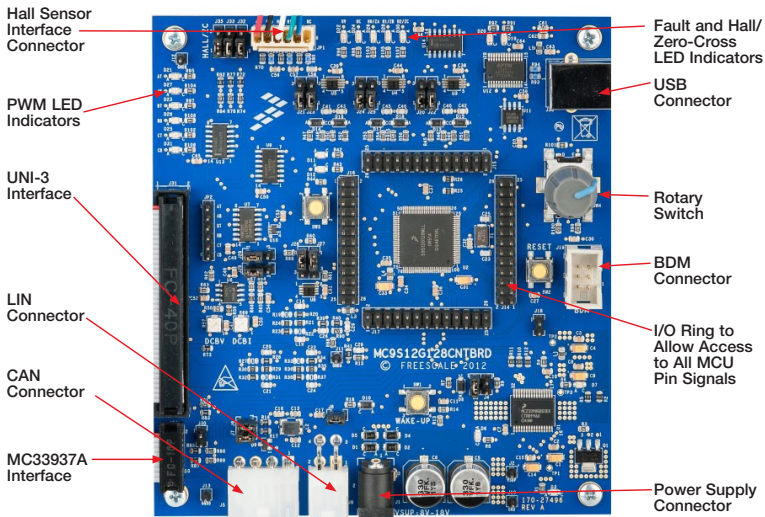
- MC9S12G128 MCU (100-pin LQFP)
- MC33905S system basis chip
- MC33937A FET pre-driver
- Sensorless BLDC motor control support
- Hardware support for Hall sensor-based motor control
- DC-bus overvoltage, overcurrent and undervoltage detection
- FreeMASTER instrumentation/visualization

3-Phase Low-Voltage Power Stage





MC9S12G128 Controller Board



Step-by-Step Installation Instructions

Learn how to set up and use the development kit with the FreeMASTER tool.

1 Install Tools and Drivers

- Install FreeMASTER runtime debugging tool
- Install FTDI virtual COM port driver

The FTDI virtual COM port driver installation file is available in the “Downloads” section at freescale.com/automcdevkits.

For FreeMASTER application download, please visit freescale.com/freemaster.

2 Connect the USB Cable

Connect the MC9S12G128 controller board to the PC using the USB cable. Allow the PC to automatically configure the USB drivers if needed.

3 Connect the Power Supply

Connect 24 V/3 A power supply to the power connector on the 3-phase low-voltage power stage.

Power supply operation range is 8 to 24 V. The BLDC motor used is designed for 24 V phase voltage.

4 Using the FreeMASTER Project

- Download and unzip the application software for the MTRCKTSBNG128 available at freescale.com/automcdevkits.
- Open the FreeMASTER project **MTRCKTSBNG128/SW/MC9S12G128_BLDC_Sensorless/MC9S12G128_BLDC_Sensorless.pmp**.
- Set up the RS232 communication port and speed in the menu **Project/Options**. Set the communication speed to 19200 Bd.

The COM port number can be found using Windows Device Manager under “Ports (COM & LPT)” section as “USB Serial Port (COMn).”

- Press the red **STOP** button in the FreeMASTER toolbar to enable the communication.

Successful communication is signaled in the status bar.

- To start the motor, set the **ON/OFF** flip-flop switch ON or short press the rotary switch on the MC9S12G128 controller board.
- Enter the required speed by changing the value of the “requiredSpeed” variable in the variables watch window, by double clicking the speed gauge, or by rotating rotary switch clockwise (speed up) or counterclockwise (speed down) on the MC9S12G128 controller board. The variable value is in revolutions per minute.
- To stop the motor, set the **ON/OFF** flip-flop OFF or short press the rotary switch on the MC9S12G128 controller board.
- To clear pending faults, click the green **Fault Clear** button or long press the rotary switch on the MC9S12G128 controller board.

Faults present in the system are signaled by the fault indicators, pending faults by small red LED-like indicator next to the respective fault indicator.



MC33905 | 2G128 MCU Controller Board

Jumper Options

The following is a list of all jumper options. The default jumper settings are shown in white text within blue boxes.

Jumper	Selector	Functions	Connections
J3	SBC Debug Mode Enable	MC33905S Debug mode enabled	On
		MC33905S Debug mode disabled	Off
J4	SBC Fail-Safe Mode Enable	MC33905S Fail-safe mode enabled	On
		MC33905S Fail-safe mode disabled	Off
J6	CAN - L Termination	CAN - L termination	On
		No CAN - L termination	Off
J7	CAN - H Termination	CAN - H termination	On
		No CAN - H termination	Off
J8	LIN Master Termination	LIN Master Mode	On
		LIN Slave Mode	Off
J18	Reset Interconnection	MCU and SBC resets are connected	On
		MCU and SBC resets are not connected	Off
J20, J22	Phase A Dead Time Insertion	Phase A dead time controlled by MC33937A	1-2
		~2 μ s phase A dead time generated by on-board HW	2-3



MC33937A 12G128 Controller Board Jumper Options (continued)

Jumper	Selector	Functions	Connections
J21, J23	Phase C Dead Time Insertion	Phase C dead time controlled by MC33937A	1-2
		~2 μ s phase C dead time generated by onboard HW	2-3
J24, J25	Phase B Dead Time Insertion	Phase B dead time controlled by MC33937A	1-2
		~2 μ s phase B dead time generated by onboard HW	2-3
J26	Fault Processing Select 0	Faults processed by onboard HW	1-2
		Faults processed by MCU software (IRQ)	2-3
J27	Fault Action Select	Onboard flip-flops disable PWM driving signals	1-2
		Onboard HW drives MC33937A EN pin low	2-3
		Faults processed by MCU software	Off
J28	Fault Processing Select 1	Faults processed by onboard HW	1-2
		Faults processed by MCU software (IRQ)	Off
J29	Overcurrent Detection Select	Overcurrent detected by onboard comparator	1-2
		Overcurrent detected by MC33937A int. comparator	2-3
J32, J33, J35	Control Signal Selection	Hall sensor signals	1-2
		MC33937A zero cross signals	2-3



Support

Visit **freescale.com/support** for a list of phone numbers within your region.

Warranty

Visit **freescale.com/warranty** for complete warranty information.

For more information, visit
freescale.com/automcdevkits

Freescale and the Freescale logo are trademarks of Freescale semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. All other product or service names are the property of their respective owners.

© 2012 Freescale Semiconductor, Inc.

