# HARDWARE USER MANUAL
# S12ZVMBEVB

General Purpose S12 MagniV 16bit MCU with 5V and 3.3V voltage regulator with LIN-physical layer

2016

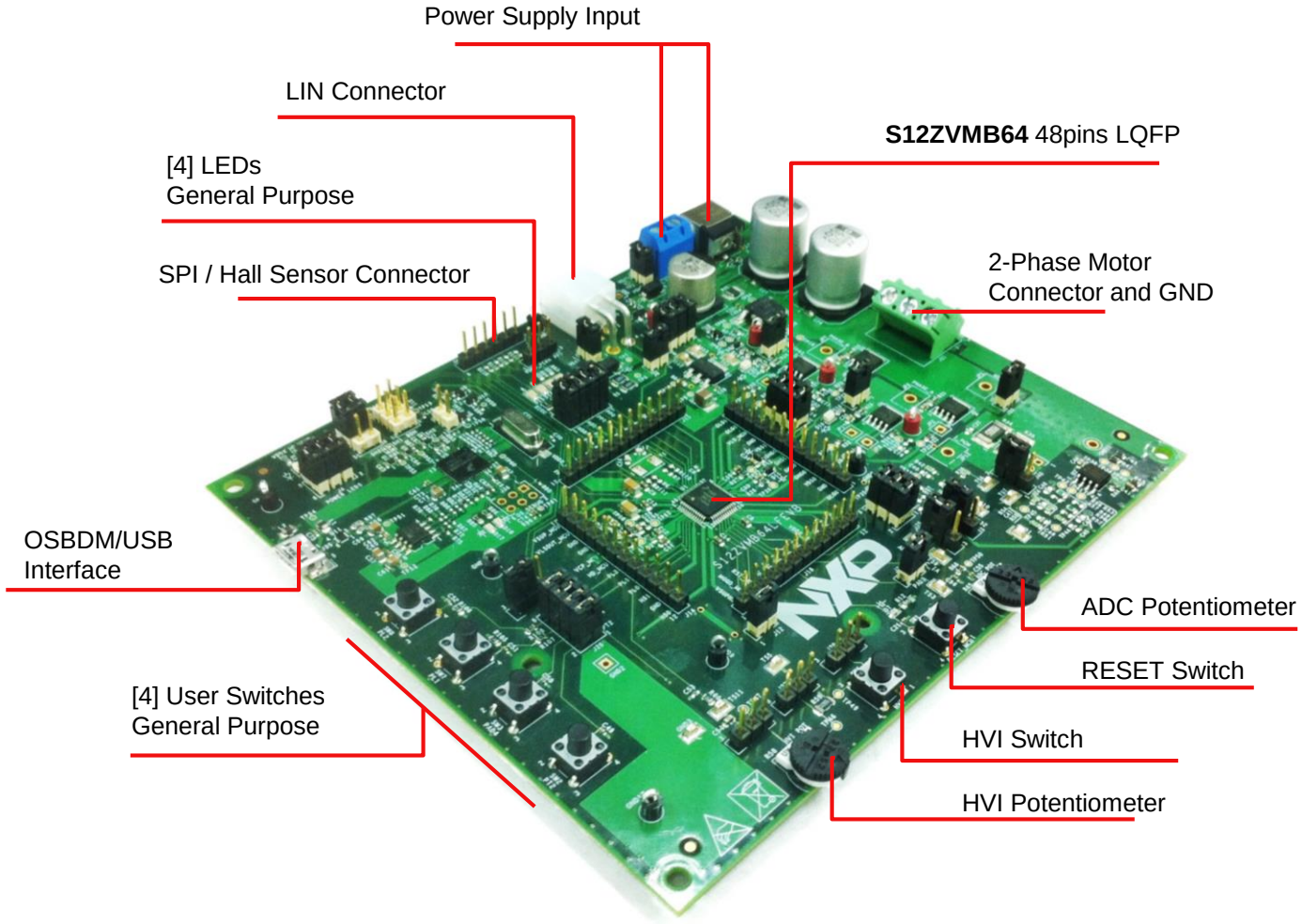


SECURE CONNECTIONS FOR A SMARTER WORLD

# Get to know the **S12ZVMB64LFEVB**

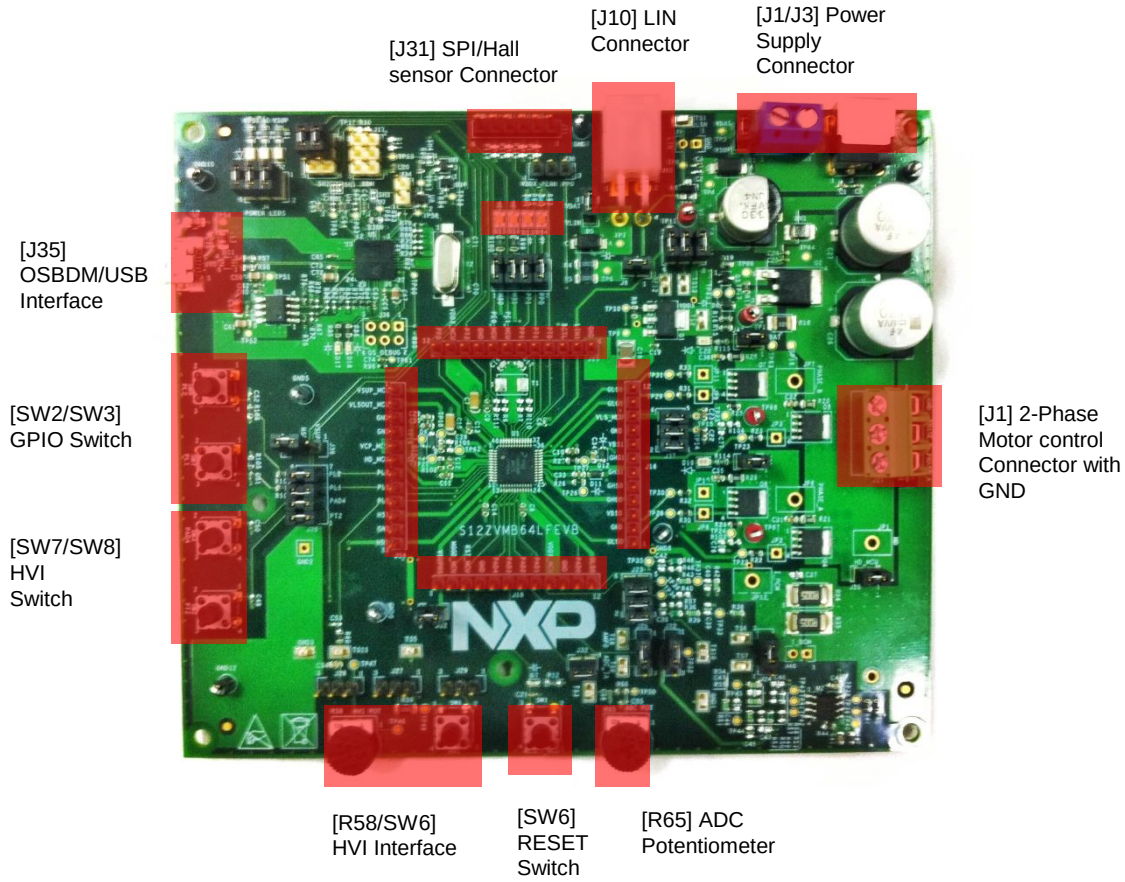
The **S12ZVMBEVB** is a development board for the MagniV S12ZVMB64  Mixed Signal MCU and provides rapid and fully integrated single chip solution to drive external power MOSFETs for 2Phase DC Motor drive applications.

The particular differentiating features of this family are the enhanced S12Z core, the combination of an ADC synchronized to PWM signals using a Programmable Trigger Unit (PTU) and the integration of “high-voltage” analog modules, including the voltage regulator (VREG), Gate Drive Unit (GDU) and a Local Interconnect Network (LIN) physical layer.



# S12ZVMBEVB Peripheral List

| Interface | ID | Description |
|---|---|---|
| Power Supply and protection | J1 | Power supply Connector [+12V] |
| | J3 | Power supply Connector [+12V] |
| | D2 | Power LED indicator, ON when VBAT [+12V ]is connected to the board |
| | D3 | Power LED indicator, ON when HD [+12V] is connected to the Motor control interface |
| | D4 | MCU Power LED Indicator. ON when VDDX is regulating to +5V |
| User Peripherals | SW2 | User switch (Active high) |
| | SW3 | User switch (Active high) |
| | SW7 | User HVI switch (Active low) |
| | SW8 | User HVI switch (Active low) |
| | SW6 | HVI Switch connected to VSUP/GND |
| | SW1 | RESET Switch |
| | R58 | Potentiometer connected to HVI |
| | R65 | Potentiometer connected to ADC port AN3 |
| | D13 | UserLED - Green |
| | D14 | UserLED - Green |
| | D15 | UserLED - Green |
| | D16 | UserLED - Green |
| Motor Control | J21 | 2-Phase Motor control Connector with GND |
| Communication and Programming Interfaces | J35 | OSBDM/USB Connector |
| | D17 | OSBDM PWR LED, ON when OSBDM is successfully enumerated as USB device. |
| | D18 | OSBDM STATUS LED. ON when OSBDM is successfully transmitting as USB device. |
| | J10/J9 | LIN Interface |
| | J6 | LIN Master Enable |
| | J33 | Header selector for OSBDM_RXD/TXD |
| | J31 | SPI/Hall sensor lines with 5.0V and GND |



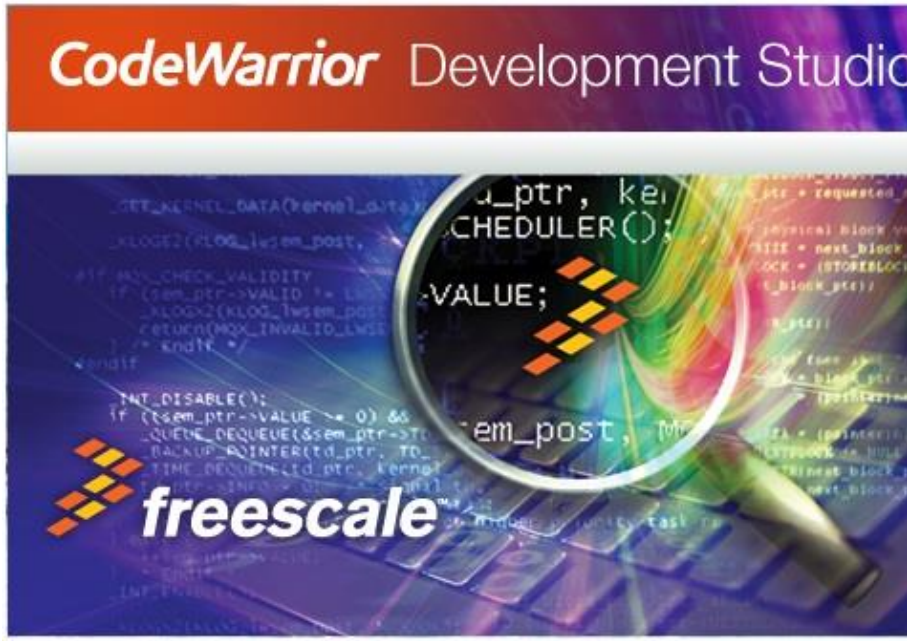
# **Software Tools** Installation

Download Software and Tools Install Code Warrior Development Studio for Microcontrollers 10.6.4 (Eclipse). Download it from **www.nxp.com/codewarrior**.

**The new S12ZVMB service pack is needed** that just the **CW10.6.4** version supports.
[http://compass.freescale.net/livelink/livelink/234769869/com.freescale.mcu10_6.HCS12Z_S12ZVMB.win.alpha.sp.v1.0.0.zip?func=doc.Fetch&nodeid=234769869]

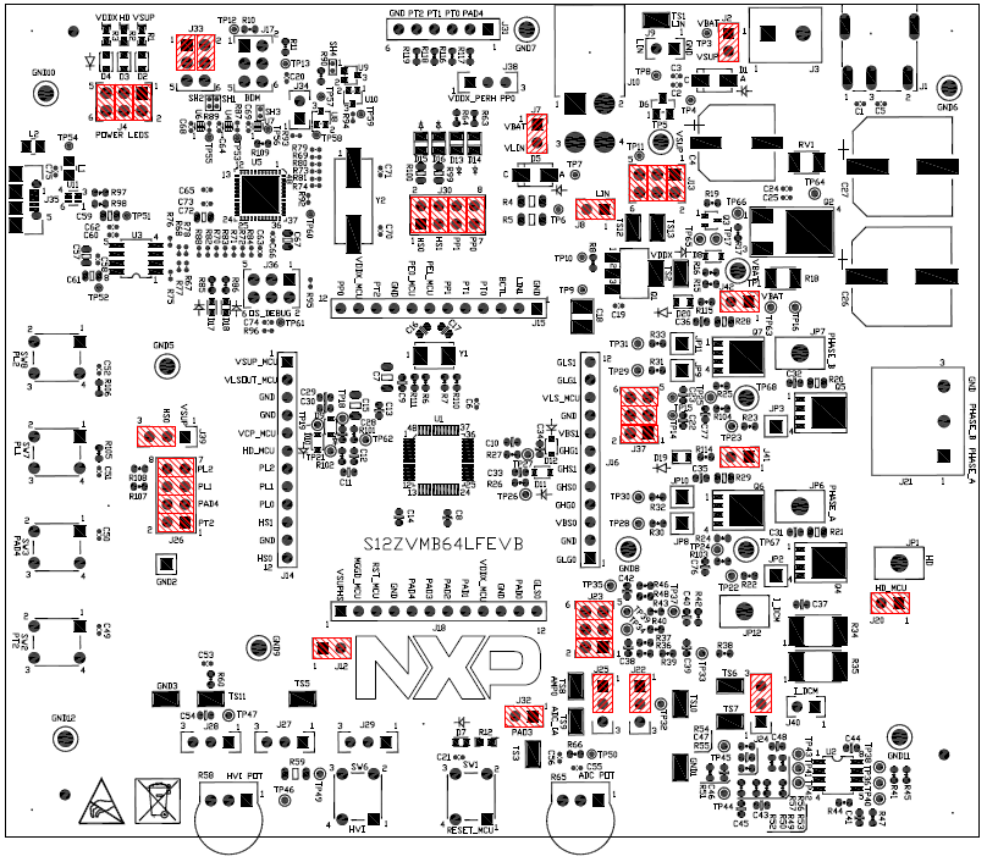
Launch the demo program. The **S12ZVMB64LFEVB** board comes preprogrammed with a small demonstration application that exercises the different modules of the S12ZVMB MCU. To see this demonstration:

- Connect a 2-Phase DCMotor and +12V power source to the EVB.
- Connect a USB cable to the Micro USB type AB connector.
- Press the user-switches **SW7** and **SW8** in order to change the direction motor and stop it (using both switches), also the User-LEDs [D14 and D13 ] will change according the motor direction .



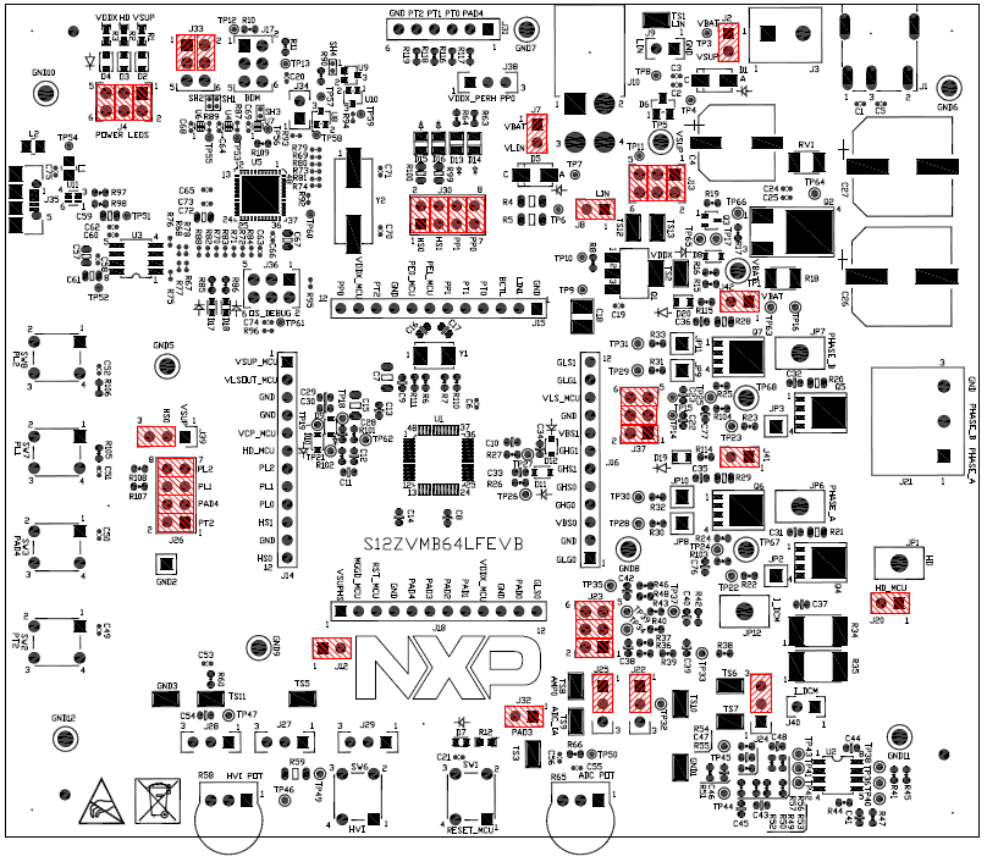
# **Jumper Default** Configuration

| JUMPER | SETTING | DESCRIPTION |
|---|---|---|
| J2 | 1-2 | +12V Input voltage is routed to VSUP |
| J7 | 1-2 | VLIN is routed to VBAT |
| J8 | 1-2 | LIN Master Mode pullup enabled |
| J12 | 1-2 | VSUP is routed to VSUPHS |
| J20 | 1-2 | HD is routed to HD_MCU |
| J24 | 2-3 | I_DCM is routed to internal current sensing interface |
| J41 | 1-2 | PHASEA is routed to D14 LED indicator |
| J42 | 1-2 | PHASEB is routed to D20 LED indicator |
| J22 | 1-2 | The 2.5V Reference is routed to the pullup resistor for the internal current sensing interface |
| J25 | 1-2 | Internal current sensing interface is routed to PAD2 |
| J32 | 1-2 | ADC potentiometer is routed to PAD3 |
| J33 | 1-2 | ORSBDM_TX lines are routed to PT0 |
| | 3-4 | ORSBDM_RX lines are routed to PT1 |
| J4 | 1-2 | Power LED indicator [D2], ON when VBAT [+12V ]is connected to the board |
| | 3-4 | Power LED indicator [D3], ON when HD [+12V] is connected to the Motor control interface |
| | 5-6 | MCU Power LED Indicator [D4], ON when VDDX is regulating to +5V |



# **Jumper Default** Configuration **[Continuation]**

| JUMPER | SETTING | DESCRIPTION |
|---|---|---|
| J13 | 1-2 | VSUP is routed to VSUP_BALLAST |
| | 3-4 | VDDX is routed to VDDX_MCU |
| | 5-6 | VDDX is routed to VDDX_PERH |
| J37 | 1-2 | VLSOUT_MCU is routed to VLS_MCU |
| | 3-4 | VLS0 is routed to VLS_MCU |
| | 5-6 | VLS1 is routed to VLS_MCU |
| J23 | 1-2 | VDDX_PERH is routed to VDDX_5VREF |
| | 3-4 | AMPP0 is routed to PAD0 |
| | 5-6 | AMPM0 is routed to PAD1 |
| J30 | 1-2 | LED-D15 is routed to HS0 |
| | 3-4 | LED-D16 is routed to HS1 |
| | 5-6 | LED-D13 is routed to PP1 |
| | 7-8 | LED-D14 is routed to PP0 |
| J26 | 1-2 | SW2 is routed to PT2 |
| | 3-4 | SW3 is routed to PAD4 |
| | 5-6 | SW7 is routed to PL1 |
| | 7-8 | SW8 is routed to PL2 |
| J39 | 2-3 | HS0 is routed to Pullup resistors in the User-HVI switches (Active low) |
| *** For **S12ZVMB64LFEVB** [prototype RevA-29131] **J4.pin1** must be routed/connected to **J39.pin1** | | |



# Cautionary Notes

- Electrostatic Discharge (**ESD**) prevention measures should be used when handling this product. **ESD damage is not a warranty repair item**.
- NXP Semiconductors does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under patent rights or the rights of others.
- EMC Information on the **S12ZVMB64LFEVB** board:
  - This product is designed and intended for use as a **development platform for hardware or software in an educational or professional laboratory.**
  - Attaching additional wiring to this product or modifying the products operation from the factory default as shipped may effect its performance.

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