



Quick Start Guide

S12VR64EVB

S12 MagniV Mixed-Signal MCUs



Get to Know the S12VR64EVB

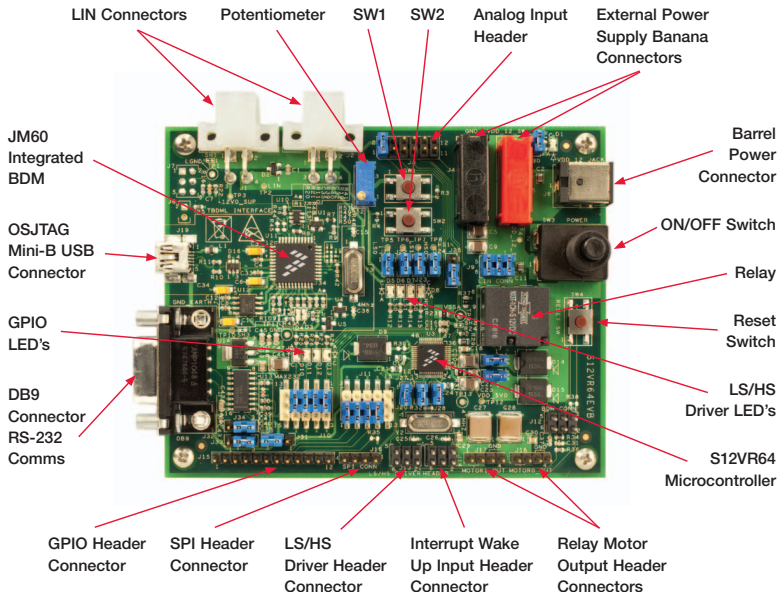


Figure 1: Front Side of S12VR64EVB

Introduction and Default Settings

The S12VR64EVB features the S12VR64, an automotive 16-bit MCU. This family integrates an S12 microcontroller with a LIN physical interface, a 5-volt regulator system to supply the microcontroller and analog blocks to control other elements of the system which operate at vehicle battery level. The S12VR family uses many of the same features found on the S12G family, including error correction code (ECC) on flash memory, EEPROM for diagnostic or data storage, a fast analog-to-digital converter (ADC) and a frequency modulated internal phase locked loop (IPLL) that improves the EMC performance. This guide will show how to quickly connect the board to a host PC and execute a demonstration application preloaded into flash memory. Default jumper positions are for applications loaded on the S12VR64EVB-board and are shown in Figure 2.

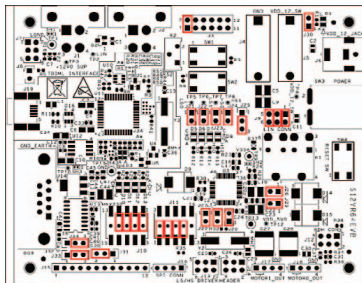


Figure 2 - S12VR64EVB Option Settings

1 Install CodeWarrior Development Studio

The S12VR64EVB board ships with the latest version of CodeWarrior Development Studio for Freescale HCS12(X) Microcontrollers. CodeWarrior Development Studio is a complete Integrated Development Environment (IDE) that provides a highly visual and automated framework to accelerate the development of the most complex embedded applications.

NOTE: CodeWarrior Development Studios must be properly installed before attempting to connect the target board to the host PC. Otherwise, the necessary USB drivers will not be available and the host PC will not recognize the board.

CodeWarrior Development Studio for HCS12(X) V5.1 is included on the DVD provided and can be found on the main screen or on the software tab.

2 Install CodeWarrior Service Pack for S12VR Family Microcontrollers

Double click on the link for the S12VR service pack. This patch contains header files for the S12VR family microcontrollers.

NOTE: CodeWarrior Service Pack for S12VR is included on the DVD provided and can be found on the main screen or on the software tab.

3 Launch the Demo Program

The DVD contains a CodeWarrior project to exercise the BATS module, ADC, high-side drivers, the relay using low-side drivers, Port T and SCI module. Please follow the instructions below to compile and load this code.

NOTE: If you want to connect a load on the relay outputs, you'll need to use a power supply with a higher current output connected to the power supply banana connectors J4 and J5.

1. Open CodeWarrior Development Studio.
2. Unzip the content of the file \files\training\LabExamples.zip located on the training tab of the DVD.
3. Drag the unzipped file “evb demo application.mcp” into CodeWarrior’s Window (the file is located below directory “evb demo application”). This action should open CodeWarrior’s project explorer.
4. Press “F7” key to build the project.
5. Verify the option jumpers are set in default positions. Refer to Figure 1.
6. Connect the included A/B USB cable between an open USB port on the host PC and the USB connector on the target board.
7. Follow the on-screen instructions to install the necessary USB drivers.
8. Connect a serial cable to the COM connector at J32. Open a terminal program and configure for 57600, 8, none, 1, none.
9. Move the ON/OFF Switch 3 to the ON position.
10. While in CodeWarrior’s window press “F5”; this action will attempt to establish a connection between the evaluation board and the PC.
11. Follow the instructions presented to connect to the embedded debugger and download the code recently compiled.
12. While in the debugger screen “True-Time Simulator & Real-Time Debugger”, press “F5” to start the code recently downloaded.
13. The relay will click on base time defined by the potentiometer.
14. Rotate the potentiometer and notice that the relay switching time will change according to the potentiometer.
15. Notice that the LEDs D5, D6, D7 and D8 will flash according to the relay changes.
16. Notice that the terminal program is reporting the status of the system.
17. Program is reporting the status of the VSENSE pin with an 8-bit resolution, the current relay timer configuration on milliseconds and the battery voltage status.
18. Vary the supply voltage below and over the thresholds and check on the terminal program and the battery voltage status during this operation. (The example program is using the VLB12 and VHBI1 thresholds, these thresholds are defined on the 9S12VR RM).
19. While in the Debugger window, you can halt the controller by pressing “F6” and add break points in the code by right clicking on it and selecting the option “Set Break Point”.
20. Press “F1” while in the Debugger window or in CodeWarrior Development Studio to open the included help.

S12VR64EVB Jumper List and Description

Jumper	Setting	Description
J3	pins 1-2 closed	Analog Inputs/Port AD/Keyboard Wake Up
J9	pins 1-2 closed	Jumpers to energize the relay load. It is needed to have all the jumpers installed
	pins 3-4 closed	
	pins 5-6 closed	
J10	pins 1-2 closed	Routing of TIMERO-3, LINPHY and GPIO0 to J15 Header Connector and LEDs D10 to D13
	pins 4-5 closed	
	pins 7-8 closed	
	pins 10-11 closed	
J11	pins 1-2 closed	Routing PWM0 - ETRIG0, PWM1 - ETRIG1, HALL_SENSOR - GPIO1 and IRQ_N - GPIO2 to J15 Header Connector. Also connects IRQ/GPIO2 to a pull up resistor.
	pins 4-5 closed	
	pins 7-8 closed	
	pins 10-11 closed	
J20	closed	MCU 5 Volts Output
J21	closed	Low-Side Driver 0 to LED output
J22	closed	Low-Side Driver 1 to LED output

Table 1 - Default Jumper Positions

J23	closed	High-Side Driver 0 to LED output
J24	closed	High-Side Driver 1 to LED output
J25	pins 2-3 closed	HVIO Input Routing
J26	closed	MCU - High-Side Drivers Power Supply Pin
J27	closed	4 MHz Crystal Jumper
J28	closed	4 MHz Crystal Jumper
J29	closed	VSUP and VSENSE Power supply
J30	closed	Power Supply Connection LED
J31	pins 2-3 closed	RS232 Transceiver Power Supply Jumper
J33	pins 2-3 closed	MCU SCI TXD pin routing
J34	pins 2-3 closed	MCU SCI RXD pin routing

S12VR64EVB Jumper List and Description—*continued...*

Jumper	Description
	Analog Inputs/Port AD/Keyboard Wake Up
	Analog Inputs – The jumpers are used to route the Potentiometer R2 to the ADC's analog inputs
J3	Jumper pins 1-2 closed - AN0 to Potentiometer R2
	Jumper pins 3-4 closed - AN1 to Potentiometer R2
	Jumper pins 5-6 closed - AN2 to Potentiometer R2
	Jumper pins 7-8 closed - AN3 to Potentiometer R2
	Jumper pins 9-10 closed - AN4 to Potentiometer R2
	Jumper pins 11-12 closed - AN5 to Potentiometer R2
	J8
J9	Jumpers to energize the relay load. It is needed to have all the jumpers closed
	Routing of TIMER0-3, LINPHY and GPIO0 to J15 Header Connector and LEDs D10 to D13
J10	Jumper pin 1-2 closed routes TIMER0 GPIO to LED D13
	Jumper pin 2-3 closed routes TIMER0 GPIO to CON_GPIO0 on Header Connector J15
	Jumper pin 4-5 closed routes TIMER1 LINPHY_REG to LED D12
	Jumper pin 5-6 closed routes TIMER1 LINPHY_REG to CON_LINPHY_REG on Header Connector J15
	Jumper pin 7-8 closed routes TIMER2 LINPHY_RXD to LED D11
	Jumper pin 8-9 closed routes TIMER2 LINPHY_RXD to CON_LINPHY_RXD pin 2 on Header Connector J15
	Jumper pin 10-11 closed routes TIMER3 LINPHY_TXD to LED D10
	Jumper pin 11-12 closed routes TIMER3 LINPHY_TXD to CON_LINPHY_TXD pin 3 on Header Connector J15
	Jumper pin 13-14-15 not connected

Jumper	Description
J11	Routing of PWM0-1, ETRIG0-1, HALL_SENSOR, GPIO0-1 and IRQ_N to Header J15.
	Jumper pin 1-2 closed routes PWM0 - ETRIG0 to CON_PWM0 pin 4 on Header J15
	Jumper pin 2-3 closed routes PWM0 - ETRIG0 to CON_ETRIG0 pin 6 on Header J15
	Jumper pin 4-5 closed routes PWM1 - ETRIG1 to CON_PWM1 pin 5 on Header J15
	Jumper pin 5-6 closed routes PWM1 - ETRIG1 to CON_ETRIG1 pin 7 on Header J15
	Jumper pin 7-8 closed routes HALL_SENSOR - GPIO1 to CON_HALL_SENSOR pin 8 on Header J15
	Jumper pin 8-9 closed routes HALL_SENSOR - GPIO1 to CON_GPIO1 pin 11 on Header J15
	Jumper pin 10-11 closed routes IRQ_N - GPIO2 to CON_IRQ_N pin 9 on Header J15 and DNP Pull up resistor
Jumper pin 11-12 closed routes IRQ_N - GPIO2 to CON_GPIO2 pin 12 on Header J15	
J20	MCU 5 Volts Output
	The jumper closed enables to supply the 5 Volts circuitry using the 5 Volts MCU regulated output
J21	Low-Side Driver 0 to LED Output
	Closing the jumper the low-side driver is routed to LED D5
J22	Low-Side Driver 1 to LED Output
	Closing the jumper the low-side driver 1 is routed to LED D6
J23	High-Side Driver 0 to LED Output
	Closing the jumper the high-side driver 0 is routed to LED D7
J24	High-Side Driver 1 to LED Output
	Closing the jumper the high-side driver 0 is routed to LED D8

S12VR64EVB Jumper List and Description—*continued...*

Jumper	Description
J25	HVIO Input Routing
	No jumper closed - HVIO input is floating through the R4 resistor
	Jumper closing 1-2 - HVIO is routed to high-side driver 1 and if HS1 is enabled the HVIO is pulled up by R4 resistor
	Jumper closing 2-3 - HVIO is routed to +12V supply and it is pulled up by R4 resistor
J26	MCU - High-Side Drivers Power Supply Pin
	Closing this jumper the +12V power supply source is connected to the MCU VSUPHS
J27	4 MHz Crystal Jumper
	Closing the jumper the 4 MHz crystal is connected to the XTAL MCU inputs for an external oscillator
	Opening the jumper the 4 MHz crystal is not connected to XTAL MCU inputs
J28	4 MHz Crystal Jumper
	Closing the jumper the 4 MHz crystal is connected to the XTAL MCU inputs for an external oscillator
	Opening the jumper the 4 MHz crystal is not connected to XTAL MCU inputs
J29	VSUP and VSENSE Power Supply
	Closing the jumper the +12 Volts power supply is connected to the VSUP and VSENSE MCU pins
	Opening the jumper the MCU is disconnected from the power supply
J30	Power Supply Connection LED
	Closing this jumper allows you to have a visual indication of a power supply connected by lighting the LED D1

Jumper	Description
J31	RS232 Transceiver Power Supply Jumper
	Jumper pins 1-2 closed connects the Vcc power supply input of the RS232 transceiver to the 5V MCU regulated output
	Jumper pins 2-3 closed connects the Vcc power supply input of the RS232 transceiver to the 5V RS232 voltage regulator circuitry
J33	MCU SCI TXD Pin Routing
	Jumper pins 1-2 closed connects the MCU SCI TXD pin to OSBDM SCI RXD pin for debug purposes
	Jumper pins 2-3 closed connects the MCU SCI TXD pin to the RS232 transceiver T1IN pin to transmit RS232 standard data through the DB9 port
J34	MCU SCI RXD Pin Routing
	Jumper pins 1-2 closed connects the MCU SCI RXD pin to OSBDM SCI TXD pin for debug purposes
	Jumper pins 2-3 closed connects the MCU SCI RXD pin to the RS232 transceiver R1OUT pin to receive RS232 standard data through the DB9 port

S12VR64EVB Headers and Connectors List

Jumper	Description
J1	LIN Connector
	1. GND
	2. GND
	3. +12 V - LIN bus power supply
J2	4. LIN - LIN signal
	LIN Connector
	1. GND
	2. GND
J4	3. +12 V - LIN bus power supply
	4. LIN - LIN Signal
	Banana Black Connector
	High current power supply GND
J5	Banana Red Connector
	High current power supply +12V
J6	Wall Power Supply Connector
J7	External BDM Connector for OSBDM (JM60)
J12	External BDM Connector for S12VR MCU

Jumper	Description
J13	Low-Side and High-Side Driver Header Connector
	1. High-Side Driver 0
	2. High-Side Driver 1
	3. GND
	4. Low-Side Driver 1
	5. Low-Side Driver 0
6. +12V Power Supply	
J14	Interrupt Wake Up Header Connector for Interrupt Wake Up 0 to Interrupt Wake Up 5
	1. Interrupt Wake Up 0
	2. Interrupt Wake Up 5
	3. Interrupt Wake Up 1
	4. Interrupt Wake Up 4
	5. Interrupt Wake Up 2
6. Interrupt Wake Up 3	

S12VR64EVB Headers and Connectors List—continued...

Jumper	Description
	Header Connector for Different Inputs and Outputs
	1. CON_LINPHY_REG
	2. CON_LINPHY_RXD
	3. CON_LINPHY_TXD
	4. CON_PWM0
	5. CON_PWM1
J15	6. CON_ETRIG0
	7. CON_ETRIG1
	8. CON_HALL_SENSOR
	9. CON_IRQ_N
	10. CON_GPIO0
	11. CON_GPIO1
	12. CON_GPIO2
	SPI Header Connector
J16	1. CLK_SPI
	2. SPI_MOSI
	3. SPI_MISO
	4. SPI_SS

Jumper	Description
J17	Supply Connector for 12V, 13A Motor Load - MOTOR1_OUT
J18	Supply Connector for 12V, 13A Motor Load - MOTOR0_OUT
J19	USB Connector for OSBMD to PC Connection
J32	DB9 Connector for Serial PC Communication



For more information about this product,
please visit freescale.com/S12VR64EVB

Freescale, the Freescale logo and CodeWarrior are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. MagniV is a trademark of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners.

© 2011 Freescale Semiconductor, Inc.

Doc Number: S12VR64QSG REV 3

Agile Number: 926-78584 REV D