



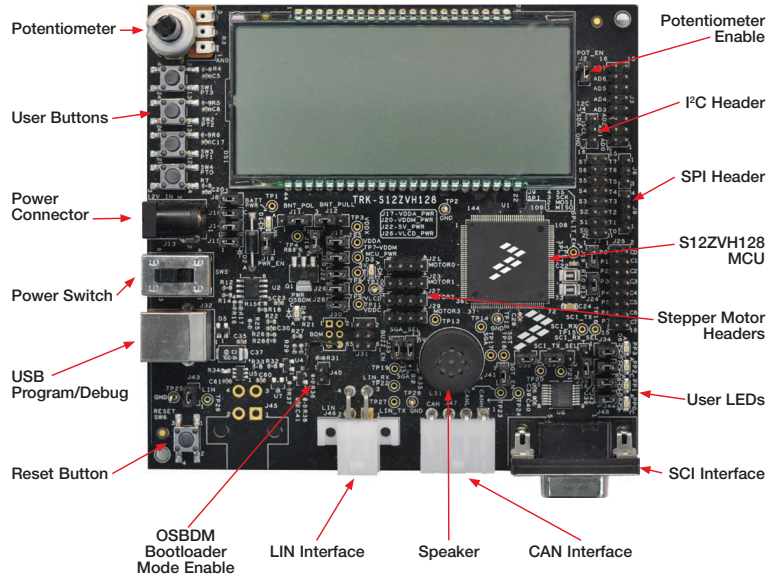
# Quick Start Guide

**TRK-S12ZVH128**

S12 MagniV MCU for Automotive  
Instrument Cluster Applications



# Get to Know the TRK-S12ZVH128

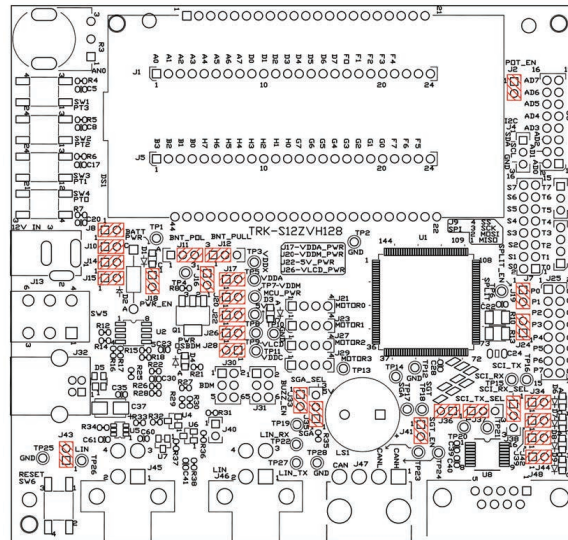


## Introduction and Default Settings

The TRK-S12ZVH128 features the S12ZVH128 MCU, an automotive 16-bit MCU for instrument cluster applications. The S12ZVH128 MCU integrates an S12Z CPU, a CAN physical interface, a 5 V regulator system to supply the MCU, four low-power stepper motor drivers and an LCD controller on-chip.

The TRK-S12ZVH128 board includes an on-board OSBDM programmer, a custom 160-segment LCD, CAN connector (attached to the internal CAN transceiver), a LIN physical transceiver as well as an SCI physical transceiver. The board also features a speaker and dedicated headers for four low-power stepper motors.

This guide will show how to quickly connect the board to a host PC and execute a demonstration application preloaded in to the flash memory. Default jumper positions of the TRK-S12ZVH128 board are shown in the figure.



## Software Tools Installation

### 1 Install CodeWarrior Development Studio

Freescale's CodeWarrior for MCUs integrates the development tools for several architectures, including the S12Z architecture, into a single product based on the Eclipse open development platform. Eclipse offers an excellent framework for building software development environments and is a standard framework used by many embedded software vendors.

The latest version of CodeWarrior for MCUs (Eclipse IDE) can be downloaded from [freescale.com/CodeWarrior](http://freescale.com/CodeWarrior).

### 2 Launch the Demo Program

The DVD contains a CodeWarrior project to exercise the different modules of the S12ZVH MCU family, including the ADC, TIM, LCD, key interrupts, SCI and CAN modules.

## Jumper Default Configuration

Jumper	Setting	Description
J2	1-2	Potentiometer enabled
J8	1-2	Switch 1 enabled
J10	1-2	Switch 2 enabled
J11	2-3	Switch signals high when pressed (5 V)
J12	1-2	Switch signals pulled down
J14	1-2	Switch 3 enabled
J15	1-2	Switch 4 enabled
J16	1-2	Connect VDDX to its ballast transistor output
J17	1-2	Connect VDDX to VDDA
J18	1-2	Connect VSUP to VBATT
J19	1-2	Connect the SPLIT pin to the CAN bus
J20	1-2	Connect VDDX to VDDM
J22	1-2	Connect VDDX to VDD5V (5 V supply for the rest of the board peripherals)
J24	1-2	Connect the CAN termination resistors to the CAN bus
J26	1-2	Connect VDDX to VLCD
J28	1-2	Connect VDDC to its ballast transistor output
J33	1-2	Power the speaker amplification circuit
J34	1-2	LED PP3 enabled
J35	2-3	Speaker amplitude controlled by SGT pin
J36	1-2	SCI physical transceiver enable
J37	2-3	MCU SCI module connected to SCI transceiver
J38	1-2	MCU SCI module connected to SCI transceiver
J39	1-2	LED PP2 enabled
J41	1-2	Speaker tone control enabled
J42	1-2	LED PP1 enabled
J43	1-2	LIN transceiver enabled
J44	1-2	LED PP0 enabled

## Jumper List and Description

Jumper	Description
J2	<b>Potentiometer enable</b> Closing this jumper connects the potentiometer signal to an ADC channel
J8	<b>Switch 1 enable</b> Closing this jumper connects the SW to the MCU
J10	<b>Switch 2 enable</b> Closing this jumper connects the SW to the MCU
J11	<b>Switch supply selector</b> Pins 1-2 closed: Switches connect to GND when pressed Pins 2-3 closed: Switches connect to 5 V when pressed
J12	<b>Switch pull direction selector</b> Pins 1-2 closed: Switches have pull-down resistors Pins 2-3 closed: Switches have pull-up resistors
J14	<b>Switch 3 enable</b> Closing this jumper connects the SW to the MCU
J15	<b>Switch 4 enable</b> Closing this jumper connects the SW to the MCU
J16	<b>VDDX ballast transistor to VDDX</b> Closing this jumper connects the VDDX ballast transistor output to the VDDX power bus
J17	<b>Connect VDDX to VDDA</b> Closing this jumper connects VDDX to VDDA
J18	<b>Connect VSUP to VBATT</b> Closing this jumper connects the 12 V input (VBATT) to the MCU (VSUP)
J19	<b>SPLIT</b> Closing this jumper connects the SPLIT pin to the CAN bus
J20	<b>Connect VDDX to VDDM</b> Closing this jumper connects VDDX to VDDM
J22	<b>Connect VDDX to VDD5V</b> Closing this jumper connects VDDX to VDD5V (5 V power supply to other on-board peripherals)
J24	<b>CAN termination</b> Closing this jumper connects the CAN termination resistors to the CAN bus

## Jumper List and Description, cont.

Jumper	Description
J26	<b>Connect VDDX to VLCD</b> Closing this jumper connects VDDX to VLCD
J28	<b>VDDC ballast transistor to VDDC</b> Closing this jumper connects the VDDC ballast transistor output to the VDDC power bus
J33	<b>Speaker power</b> Closing this jumper powers the speaker amplification circuit
J34	<b>LED PP3 enable</b> Closing this jumper connects the LED to the MCU
J35	<b>Speaker amplitude control selector</b> Pins 1-2 closed: Speaker amplitude controlled by SGA pin Pins 2-3 closed: Speaker amplitude is fixed to 5 V (volume is controlled by SGT pin)
J36	<b>SCI transceiver power</b> Closing this jumper powers the SCI transceiver circuit
J37	<b>SCI TX Selector</b> Pins 1-2 closed: MCU SCI TX pin is connected to the virtual SCI module (via OSBDM) Pins 2-3 closed: MCU SCI TX pin is connected to SCI transceiver
J38	<b>SCI RX Selector</b> Pins 1-2 closed: MCU SCI RX pin is connected to SCI transceiver Pins 2-3 closed: MCU SCI RX pin is connected to the virtual SCI module (via OSBDM)
J39	<b>LED PP2 enable</b> Closing this jumper connects the LED to the MCU
J40	<b>OSBDM operating mode selector</b> Pins 1-2 open: OSBDM in normal mode, programming and debugging capable Pins 1-2 closed: OSBDM on bootloader mode, only used for firmware update
J41	<b>Speaker tone control enable</b> Closing this jumper connects speaker amplifier to the MCU
J42	<b>LED PP1 enable</b> Closing this jumper connects the LED to the MCU
J43	<b>LIN transceiver power</b> Closing this jumper powers the LIN transceiver
J44	<b>LED PP0 enable</b> Closing this jumper connects the LED to the MCU

## Headers and Connectors List

Header/ Connector	Description
J1	GPIO header (LCD replacement option), ports A, D and F
J3	GPIO header, port AD
J4	I <sup>2</sup> C header
J5	GPIO header (LCD replacement option), ports B, H, G and F
J6	Extended debug lines
J7	GPIO header, ports T and S
J9	SPI header
J13	Main power barrel connector (up to 18 V)
J21	Stepper motor 0 header
J23	Stepper motor 1 header
J25	GPIO header, ports P and C
J27	Stepper motor 2 header
J29	Stepper motor 3 header
J30	S12ZVH128 BDM port (external program and debug interface)—Main MCU
J31	S08JM60 BDM port (external program and debug interface)—OSBDM MCU
J32	OSBDM USB port for programming and debugging the main MCU
J45	LIN connector (not populated)
J46	LIN connector
J47	CAN connector
J48	SCI connector

## Peripheral List

Peripheral	ID	MCU Port	Description
Potentiometer	R3	AD0	Potentiometer connected to ADC channel 0
	D9	P0	Blue LED connected to port P0
LED	D8	P1	Blue LED connected to port P1
	D7	P2	Blue LED connected to port P2
	D6	P3	Blue LED connected to port P3
	D1	-	VBATT LED, ON when voltage is applied to the board
	D3	-	MCU PWR LED, ON when the MCU is regulating the input voltage to 5 V
	D4	-	OSBDM PWR LED, ON when OSBDM is successfully enumerated as USB device
Button	SW1	T3	Switch connected to port T3
	SW2	T2	Switch connected to port T2
	SW3	T1	Switch connected to port T1
	SW4	T0	Switch connected to port T0
	SW6	-	Reset switch

## 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/TRK-S12ZVH128**

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