

Automate LIN Slave Message Handling with SLIC Technology

Overview

S08EL and SL 8-bit microcontrollers with embedded slave Local Interconnect Network (LIN) interface controller (SLIC) and EEPROM help to increase LIN slave performance and reduce development time.

Freescale Semiconductor's 8-bit EL and SL families of microcontrollers (MCUs) are designed for LIN slave and general market applications. The EL family is positioned as higher end, offering higher memory and more peripherals, while the SL family is intended for more cost-sensitive applications.

Typical Applications of the EL and SL Families

An application focus area of the EL and SL families is LIN. LIN is a UART-based, single-master, multiple-slave networking architecture originally developed for automotive sensor and actuator networking applications.

Application Segments	Specific Application Examples for LIN Slaves
Roof	Sensor, light sensor, light control, sun roof
Steering Wheel	Cruise control, wiper, turning light, climate control, radio
Seat	Seat position motors, occupancy sensor, control panel
Engine	Sensors, small motors
Climate	Small motors, control panel
Door	Mirror, central ECU, mirror switch, window lift, seat control switch, door lock

Root Part Number	9S08EL32	9S08EL16	9S08SL16	9S08SL8
Family	EL	EL	SL	SL
Flash	32 KB	16 KB	16 KB	8 KB
RAM	1 KB	1 KB	512B	512B
EEPROM	Up to 512B	Up to 512B	Up to 256B	Up to 256B
Analog (ADC)	Up to 16-ch. 10-bit ADC, 2 Comparators	Up to 16-ch. 10-bit ADC, 2 Comparators	Up to 16-ch. 10-bit ADC, 1 Comparator	Up to 16-ch. 10-bit ADC, 1 Comparator
UART	1xSCI	1xSCI	1xSCI	1xSCI
SPI	1	1	1	1
I ² C	1	1	1	1
SLIC	1	1	1	1
Timer	4-ch. + 2-ch.	4-ch. + 2-ch.	2-ch. + 2-ch.	2-ch. + 2-ch.
Clock	ICS	ICS	ICS	ICS
Pin Count	28, 20	28, 20	28, 20	28, 20
Additional Features	LIN Auto-Baud/ Synch, 40 MHz CPU, Watchdog OSC/Timer, COP, LVI, ICE, BDM, POR, KBI, Temp Sensor	LIN Auto-Baud/ Synch, 40 MHz CPU, Watchdog OSC/Timer, COP, LVI, ICE, BDM, POR, KBI, Temp Sensor	LIN Auto-Baud/ Synch, 40 MHz CPU, Watchdog OSC/Timer, COP, LVI, ICE, BDM, POR, KBI, Temp Sensor	LIN Auto-Baud/ Synch, 40 MHz CPU, Watchdog OSC/Timer, COP, LVI, ICE, BDM, POR, KBI, Temp Sensor

Auto Qualified Part Number	Package	Temp Range
S9S08EL32F1MTJ	20 TSSOP	-40°C to +125°C
S9S08EL32F1MTL	28 TSSOP	-40°C to +125°C
S9S08EL16F1MTJ	20 TSSOP	-40°C to +125°C
S9S08EL16F1MTL	28 TSSOP	-40°C to +125°C
S9S08SL16F1MTJ	20 TSSOP	-40°C to +125°C
S9S08SL16F1MTL	28 TSSOP	-40°C to +125°C
S9S08SL8F1MTJ	20 TSSOP	-40°C to +125°C
S9S08SL8F1MTL	28 TSSOP	-40°C to +125°C
S9S08EL32F1VTJ	20 TSSOP	-40°C to +105°C
S9S08EL32F1VTL	28 TSSOP	-40°C to +105°C
S9S08EL16F1VTJ	20 TSSOP	-40°C to +105°C
S9S08EL16F1VTL	28 TSSOP	-40°C to +105°C
S9S08SL16F1VTJ	20 TSSOP	-40°C to +105°C
S9S08SL16F1VTL	28 TSSOP	-40°C to +105°C
S9S08SL8F1VTJ	20 TSSOP	-40°C to +105°C
S9S08SL8F1VTL	28 TSSOP	-40°C to +105°C
S9S08EL32F1CTJ	20 TSSOP	-40°C to +85°C
S9S08EL32F1CTL	28 TSSOP	-40°C to +85°C
S9S08EL16F1CTJ	20 TSSOP	-40°C to +85°C
S9S08EL16F1CTL	28 TSSOP	-40°C to +85°C
S9S08SL16F1CTJ	20 TSSOP	-40°C to +85°C
S9S08SL16F1CTL	28 TSSOP	-40°C to +85°C
S9S08SL8F1CTJ	20 TSSOP	-40°C to +85°C
S9S08SL8F1CTL	28 TSSOP	-40°C to +85°C

For C&I qualified Part Numbers, please substitute "MC" in place of "S" and remove the "F1" fab and maskset indicator.

Development Tools

Demonstration Boards (DEMO9S08EL32):
MSRP \$69

Programming Adapter (PAS08W1628T28—
20 and 28 TSSOP):
MSRP \$149

BDM Multilink (USBMULTILINKBDME):
MSRP \$99

Cyclone Pro (M68CYCLONEPROE):
MSRP \$499

CodeWarrior® (Standard Edition:
CWS-H08-STDED-CX, Professional Edition:
CWS-H08-PROED-CX, Special Edition:
CWX-HXX-SE)

Emulation Support (ICE) (Built-in support
on-chip)

Features

The EL and SL families offer up to 40 MHz of CPU performance using Freescale's 0.25µm flash to push the boundaries of 8-bit into the range of 16-bit MCU performance. The EL and SL families are scalable and offer pin compatibility across packages.

The EL and SL families provide on-chip EEPROM and a unique, embedded SLIC module. SLIC automates message handling to help increase performance, shorten development time and reduce cost.

SLIC Increases Performance

- True auto synchronization and auto bauding finds LIN frames and adjusts baud rate without CPU intervention
- Number of interrupts reduced by up to 83 percent over UART solutions—only two interrupts per LIN message
- Remaining interrupts are serviced much more efficiently due to interrupt handling technology
- Outstanding LIN bus noise suppression to UART—SLIC blocks noise instead of passing it on
- Can use SYNCH data from LIN messages to trim oscillator
- SLIC eliminates many steps normally required by UART solutions (trim oscillator, detect break, measure sync signal, adjust baud rate, calculate and verify checksum, handle individual data bytes, detect LIN errors)

SLIC Shortens Development Time

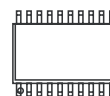
- By eliminating message processing steps, SLIC minimizes and simplifies driver code
- SLIC driver code as small as 120 bytes possible (refer to AN2633)
- Simpler driver code means shortened debug and development time—use your engineering time to debug the application, not LIN communication

SLIC Helps Reduce Cost

- SLIC can handle any LIN speed on any LIN bus with only one software driver required, which allows for:
 - Code reuse for many applications, regardless of LIN bus speed—no reprogramming required to change bus speeds means fewer part numbers to track and stock
 - High-speed (up to 120 kbps), end-of-line programming through LIN allows faster module manufacturing times and field reprogrammability
- Smaller driver code means less flash required for given application—use flash for your application, not LIN communication
- SLIC does not require oscillator trimming, unlike UART or bit-banged LIN solutions, eliminating a manufacturing step

Package Options

20-Lead TSSOP



28-Lead TSSOP



Learn More:

For current information about Freescale products and documentation, please visit www.freescale.com/S08SLIC.