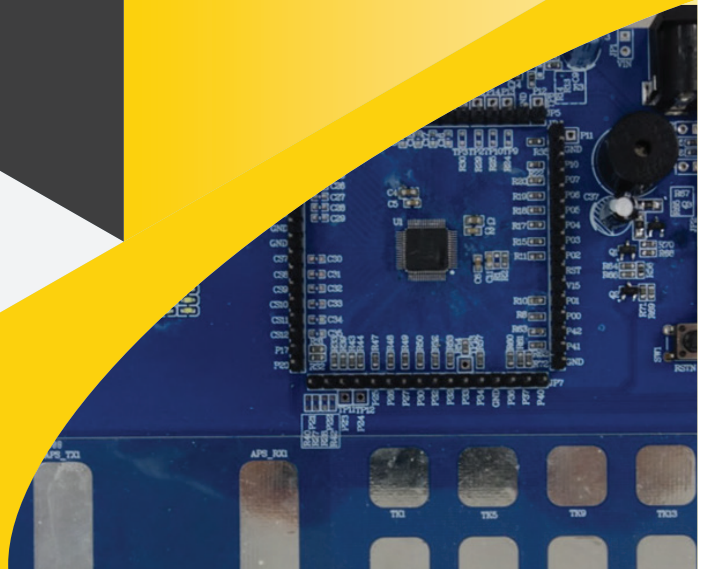




IS31CS9310 & IS32CS9310 Configurable LED Matrix Driver & Touch Sense Controller MCU



PRODUCT DESCRIPTION

Lumissil's IS31CS9310 and IS32CS9310 are intelligent programmable LIN LED matrix drivers with touch key MCU perfect for automotive and industrial/consumer HMI applications where user interface is required. They feature a 32-bit RISC-V processor and 256kB of integrated non-volatile memory to store custom LED patterns for dynamic lighting effects, as well as custom firmware for control applications.

To facilitate communication, both models are equipped with a LIN 2.0/2.2-compatible physical layer front end and controller.

Dynamic lighting effects are generated by an 8 x 12 LED matrix driver, utilizing 8 PMOS switches and 12 built-in current sinks. To mitigate potential EMI caused by high-frequency LED operation, the drivers include spread spectrum frequency modulation, which reduces EMI by distributing the signal's energy over a broad frequency range.

To address LED ghosting or residual light effects, the IS31CS9310 and IS32CS9310 incorporate a de-ghosting circuit that effectively eliminates this artifact. For precise brightness control and uniform illumination, the LED driver employs 12-bit, 80mAPWM-controlled current sinks, allowing each LED to be adjusted across 4096 levels of brightness, or the entire matrix across 256 levels.

To streamline the replacement of traditional mechanical buttons, these models are equipped with a touch controller featuring 16 capacitive touch key sensors. These sensors offer water and dust resistance, ensuring reliable operation in moisture-prone environments.

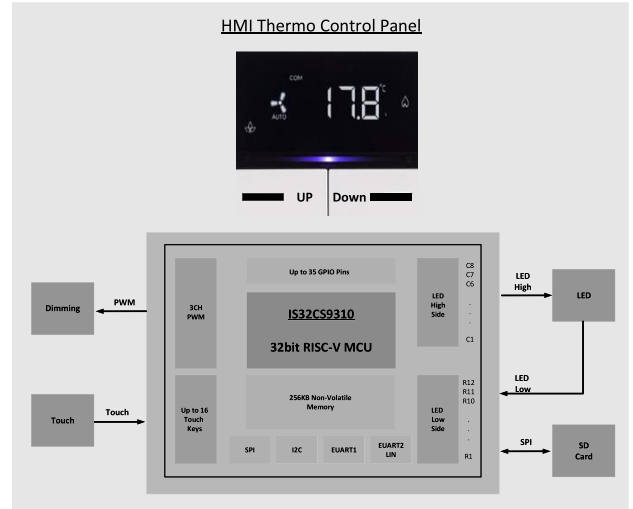
FEATURES

- **MCU and Memory:** 32-bit RISC-V with 256KB e-Flash supports LED customization patterns and command & control firmware.
- **LED Matrix Driver:** 8 X 12 LED matrix driver includes anti-ghost circuitry and spread spectrum.
- **Touch Keys:** Up to 16 water and dust resistant touch sensors, support multiple applications with a single device.
- **Touch Key Calibration:** Supports multiple independent applications with a single device through individual key calibration.
- **Touch Key Calibration Monitoring:** Prevents false triggering.
- **Touch Key Proximity Sense:** Touch keys can be reconfigured as proximity sensors to further extend its use case.
- **Automotive Interface:** LIN Phy and Controller 2.0/2.2 compliant, perfect for automotive communications.
- **Other Interfaces:** Fast 400kHz I2C, SPI, and UART are popular interfaces for communication between one or more touch controllers.
- **Peripherals:** Wide array of analog and digital peripherals includes an ADC/DAC, and PWM controller for flexibility.

APPLICATIONS

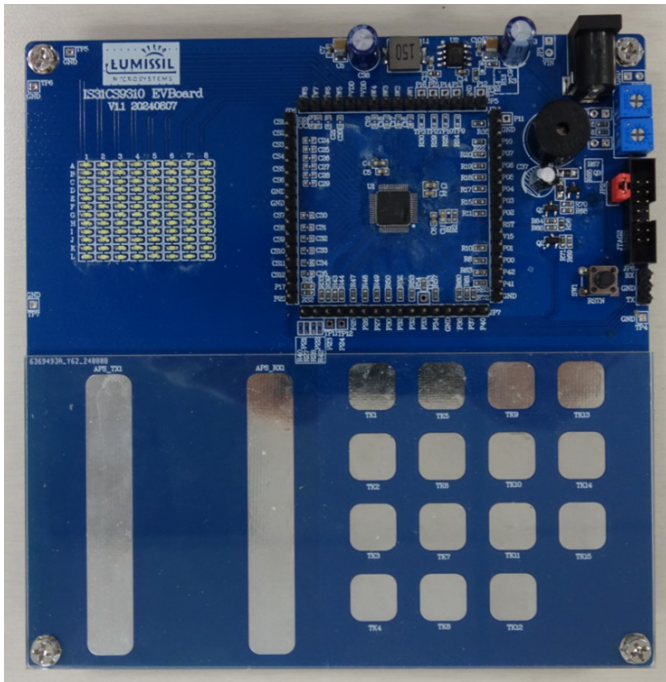
- **HMI Control Panel:** MCU processes touch key commands, drives LED panel, controls LED backlight through PWM while simultaneously processing other miscellaneous functions.
- **White Goods:** MCU processes touch key commands, drives LED displays while processing programmed commands.
- **Security & Access Contro:** MCU manages security systems, including door access controls and alarm systems.
- **Automotive Infotainment Systems:** MCU enables LED displays, processes touch key door functions while interfacing to automobile's LIN bus.

BLOCK DIAGRAM



DEVELOPMENT BOARD

The IS31CS9310 and IS32CS9310 are supplied with a evaluation board and development code that utilizes standard Linux gcc and gdb tools.



IS32CS9310 Evaluation Board

CONFIGURABLE LED MATRIX DRIVER & TOUCH SENSE CONTROLLER MCU FAMILY

	IS31CS9310 Industrial	IS32CS9310 Automotive
Compliance	-	AEC-Q100
Temperature	-40C to +85C	-40C to +125C
MCU	32-bit RISC-V	
Flash	256kB	
SRAM	16kB	
Communications	LIN / EUART EUART / EUART DMA I2C SPI	
LED Matrix	8 x 12 80mA drivers Spread spectrum De-ghosting circuit Open-short detect/protect	
Touch Keys	16	
Lumibus	No	
Analog/Digital	12-bit SAR x4 10-bit DAC x2 Comparator x3	
Status	Sampling	

ORDERING INFORMATION

Part	Package	Quantity/Reel
IS31CS9310-LQLS2-TR	eLQFP-64 7 x 7 mm	2500
IS32CS9310-LQLCA3-TR	eLQFP-64 7 x 7 mm	2500