



Long-term Support
World Class Quality

Cluster

The instrument cluster is arguably one of the most important electronics systems in the vehicle. They continue to evolve into more sophisticated systems, providing more useful real-time information to the driver. The driver needs to be able to see and judge the information very quickly. Basic but critical vehicle data, such as engine temperature, battery voltage, tachometer/speedometer, fuel level, and seat belt and door notifications and more need to be displayed well, each with a big, easy-to-read visual layout. The newest clusters tend to include an LCD screen, and some keep adjacent mechanical gauges, while others show simulated gauges on the screen. A wide variety of automotive embedded chipsets are offered for instrument clusters. An example block diagram is shown below. Sensor data are input into the MPU, along with CAN and/or LIN transceivers. The MPU needs to reliably fulfill its role. With the example block diagram, the other components are highlighted:

- Flash: A SPI (Serial Peripheral Interface) Flash, or Parallel Flash, or e.MMC Flash is needed to store the instrument cluster firmware, and any needed driver customization, or system data logging. The range of flash options available from ISSI makes the selection flexible in order to support the density, speed, and package needed for the cluster requirements. In the quest for lower cost and decreased start-up latency, serial interfaces such as the QPI and Octal bus will be widely used in the future.
- DRAM: A DDR2 DRAM, DDR3 DRAM, or Async SRAM is needed to enable the fast access display buffer, and sometimes for data processing for algorithms. The density and topology of the DRAM depends on the size of the LCD, pixel density, color depth, and graphics complexity.
- Audio Amplifier: This powers the speaker to provide important audio chimes, buzzes, bells, or other signals to the driver.
- DC/DC Converter: This converts voltages from those available in the vehicle to specific level(s) needed for the cluster system.
- FxLED Series (Matrix LED): Color LEDs and colored automotive warning/notification icons can be controlled independently from the LCD display. This provides redundancy and a higher impact for immediacy of the alert.
- Display Backlighting: To be viewed properly, the LCD screen often needs a backlight in daytime or bright viewing conditions.

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