

STLED316S

LED front panel controller with key-scan capability



The STLED316S provides a cost-efficient and simplified design for LED front panels by integrating a constant-current LED driver and key-scan with a serial interface to the main MCU.

The STLED316S has very low power consumption and requires only a minimum number of peripheral components. It provides an ideal solution for platforms with a limited number of I/Os and simple PCB routing.

Key features

- Drives 14 outputs (6 grids and 8 segments)
- Drive capability of up to 40 mA per output
- Continuous key-scanning up to 16 keys
- 3-wire serial SPI interface to MCU
- 8-step dimming capability for each digit
- Drives additional 8 LEDs with dimming control
- Interrupt output to main CPU upon key-press, does not need the CPU to poll the device continuously
- Low power consumption during standby
- Flexibility of devices, can be connected in parallel when more digits/segments are needed
- Minimizes the peripheral component count
- Available in pin-count optimized SO-24 package

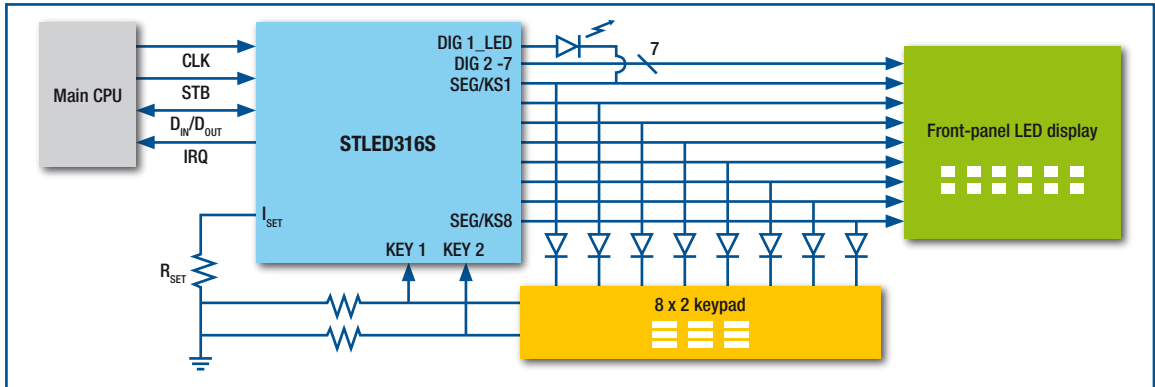
Main applications

- White goods: washing machines, dryers, microwave ovens and refrigerators
- DVD recorders/players
- Set-top boxes
- Industrial equipment and instrument

The STLED316S is a common-anode LED driver capable of directly driving red, green or blue LEDs. It is designed to work with minimum peripheral components, reducing the total BOM cost.

A typical front panel consists of a keypad, a LED display panel and various discrete LEDs. The most popular solution today is to use a sub-MCU with crystal and darlington array ICs to drive the LEDs. However, this solution increases the total BOM cost and complicates PCB routing compared to the STLED316S solution.

STLED316S application diagram



The STLED316S does not require a crystal. Configuration and display data from the main CPU is clocked on the rising edge of CLK when the STLED316S is in standby mode. In this mode (during device power-up, when the device has not been configured or is idling) the IC typically consumes below 1 mA. The STLED316S provides flexibility to the design as more than one IC can be connected in parallel for multi-digit/segment front panels. A single STLED316S drives up to 6 digits and 8 segments (7 segments + 1 decimal point), as well as up to eight independent discrete LEDs which can be used as indicators, adequate for most standard LED front panels.

Another advantage of the STLED316S over an MCU is its current-driving capability. It is able to drive up to 40 mA constant-current per output segment. This ensures uniform brightness of the display, irrespective of the manufacturing, aging and temperature variations of LEDs. The maximum current is easily set through one external resistor, so ensuring that the LED specifications are not exceeded. Furthermore, the brightness of each individual digit and discrete LED can be adjusted by means of the software.

The STLED316S includes an 8 x 2 key-scan matrix, so that up to 16 keys can be scanned automatically and continuously. Whenever a key is pressed, it is detected and its corresponding data is latched into the key-data memory block, and an interrupt request is sent to the main CPU. This feature allows CPU to go into sleep mode while the STLED316S continuously detects any key-press at low current consumption. For an even lower cost option, the STLED314S can be used. This device supports 4 digit display panels with an 8 key-scan and no interrupt output. It is available in an SO-20 package.

ST's LED front panel controller portfolio

Features	STLED314S	STLED316S
Number of keys	8	16
Package	SO-20	SO-24
Number of digits/segments	4 digits/8 segments	6 digits/8 segments
Interrupt output	No	Yes



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