ELM712
LED Runner

Description

The ELM712 is a handy circuit for controlling up to five LEDs in novelty devices. One pushbutton press is all it takes to initiate about 15 seconds of LED activity, before the circuit reverts back to its very low current standby mode.

All of the logic required for circuit operation is contained wholly within this 8 pin integrated circuit. Normally only a pushbutton, the LEDs, and a battery are all that are needed for a complete circuit. At higher voltages, a single current limiting resistor may be required to limit LED current.

The ELM712 drives each LED output in a sequential fashion, at approximately 10 Hz. By only driving one output at a time, peak current and thus battery requirements are reduced.

Applications

- Campaign buttons
- Battery operated toys
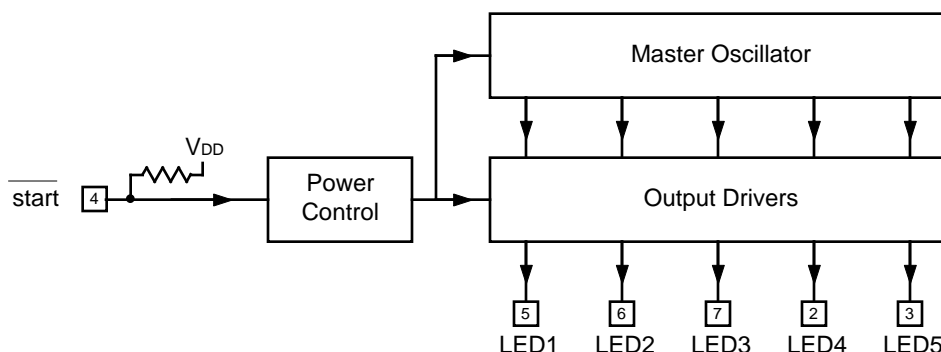- Dress ties
- Signs
- Holiday Ornaments

Features

- Low power CMOS design
- Wide supply range - 3.0 to 5.5 volt operation
- Auto-off mode conserves batteries
- Single push-button to activate
- Direct drive high current outputs
- No external timing components required

Connection Diagram
PDIP and SOIC
(top view)

V_{DD}	1	8	V_{SS}
LED4	2	7	LED3
LED5	3	6	LED2
start	4	5	LED1

elm 712
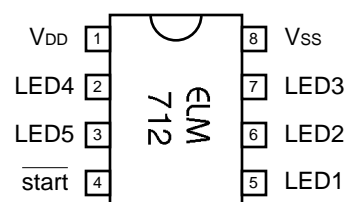
Block Diagram

Pin Descriptions

V$_{DD}$ (pin 1)

This pin is the positive supply pin, and should always be the most positive point in the circuit. Internal circuitry connected to this pin is used to provide power on reset of the microprocessor, so an external reset signal is not required. Refer to the Electrical Characteristics section for further information.

LED1, LED2, LED3, LED4 and LED5 (pins 5, 6, 7, 2 and 3 respectively)

These are the five active high LED drive outputs. They are energized in the order listed for approximately 20msec each, at a rate of 10Hz. Each output is capable of sourcing a maximum of 25mA of current, when the ELM712 is operated at the maximum supply level.

$\overline{\text{start}}$ (pin 4)

Momentarily connecting this pin to V$_{SS}$ will initiate an LED sequence that typically lasts for about 15 seconds. After this time, the circuit will revert back to the low power mode, waiting for another start signal. The circuit automatically senses a 'stuck button' condition as well and powers down the internal circuits, but not the internal pull-up resistor.

V$_{SS}$ (pin 8)

Circuit common is connected to this pin. This is the most negative point in the circuit.

Ordering Information

These integrated circuits are available in either the 300 mil plastic DIP format, or in the 200 mil SOIC surface mount type of package. To order, add the appropriate suffix to the part number:

300 mil Plastic DIP.............................. ELM712P

200 mil SOIC.................................... ELM712SM

Absolute Maximum Ratings

Storage Temperature........................ -65°C to +150°C

Ambient Temperature with
Power Applied.....................................-40°C to +85°C

Voltage on V$_{DD}$ with respect to V$_{SS}$............ 0 to +7.5V

Voltage on any other pin with
respect to V$_{SS}$.......................... -0.6V to (V$_{DD}$ + 0.6V)

Note:

Stresses beyond those listed here will likely damage the device. These values are given as a design guideline only. The ability to operate to these levels is neither inferred nor recommended.

Electrical Characteristics

All values are for operation at 25°C and a 3V supply, unless otherwise noted. For further information, refer to note 1 below.

Characteristic	Minimum	Typical	Maximum	Units	Conditions
Supply Voltage, V_{DD}	3.0	3.0	5.5	V	
V_{DD} rate of rise	0.05			V/ms	see note 2
Average Supply Current, I_{DD}		0.60 0.1	2.0 5	mA µA	During operation In low power (standby) mode
Start pin internal pullup resistance	470	750	1500	K	see note 3
LED Drive Current V_{DD}=3V V_{DD}=5V		9 13		mA mA	No series limiting resistor 200 Ω series limiting resistor
Output Pulse Duration		20		msec	any output

Notes:

1. This integrated circuit is produced with a Microchip Technology Inc.'s PIC12C5XX as the core embedded microcontroller. For further device specifications, and possibly clarification of those given, please refer to the appropriate Microchip documentation.

2. This spec must be met in order to ensure that a correct power on reset occurs. It is quite easily achieved using most common types of supplies, but may be violated if one uses a slowly varying supply voltage, as may be obtained through direct connection to solar cells, or some charge pump circuits.

3. The value of the pullup resistance is both supply and temperature dependent.

Example Application

Using the ELM712 is straightforward, requiring little explanation. Typically it is connected in a circuit as shown at the right. Pressing the start pushbutton once initiates a sequence of LED flashes that last approximately 15 seconds.

The value of the resistor shown depends on the voltage level that the circuit operates at. For the circuit shown, no resistor is normally used, and these points are jumpered out. For 5V operation, a value of about 150 to 300 ohms is generally inserted.