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7 Segment Teaching Mode

Reactive Light with 7 Segment Display and Teaching Mode

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Teil I.
The circuit

1. Functional description

This circuit is an extension of the basic version of the reactive lights. It is easy to make with just a few elements.

The measurement of brightness is done by a photo resistor (LDR). During daylight the circuit goes into a standby mode and is inactive. It just measures periodically the

brightness to detect the beginning of the night and set the circuit into an active mode. If in this mode the LDR is lit, the circuit will return a predefined sequence of numbers and decimal points using the 7 segment LED-display and wait for the next activation. If no or just an empty sequence is stored, one segment running in a circle is shown.

The sequence can contain maximum 127 digits. The stored sequence will be available even after the microcontroller is switched off and on again.

To start teaching a sequence, the magnetic switch is used. That means teaching is also possible after the circuit is packed waterproof or grouted. After closing the switch by a magnet a segment running in a circle is shown. Afterwards the first digit of the last taught sequence is displayed. It can be incremented using the magnetic switch. The numbers are shown in the order 0 -> 1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7 -> 8 -> 9 -> dot -> three horizontal segments (Figure 1). If for several seconds no input is done, the shown number will be stored and the teaching sequence continues with the next digit. To finish teaching the three horizontal segments have to be chosen. The end is confirmed by a segment running in a circle.

Abbildung 1: Sequence of the numbers

Because of the very small power consumption the circuit can be run for years with just a set of batteries.

The source code is not published and is just available as a completely programmed microcontroller at www.reaktivlicht.de.

Teil II.
Frequently asked questions and known problems

2. Two segments of the display do not work.

During soldering probably a short-circuit between the pins of these two segments arose. It must be removed.

3. The device does not work and the microcontroller becomes very hot.

Either the microcontroller is placed incorrect ot the power supply is reverse poled.

4. The teaching of a sequence does not work.

The glass tube of the magnetic switch is fragile. Please check first if it is demaged.

If the device is in standby mode, the magnetich switch is evaluated just every 8 seconds. The switch has to be closed for a longer time or teaching must be done in a darker room.

Teaching can also be started by connecting the third pin from the bottom of the right side of the microcontroller (pin 3) to the positive pole of the power supply by a cable. The standby mode has to be considered, too. If the teaching works now, the soldering points of the magnetic switch have to be checked.

5. After switching on the reactive light immediately starts the teaching without the magnetic switch being closed.

The glass tube of the magnetic switch is fragile. Please check first if it is demaged.