



During the holiday season, when we are away for a few days or even weeks, some problems arise: what about watering the flowers or feeding the fish, as well as concerns about whether your home where nothing happens for a few days will become a target for burglars.

The circuit presented here is a timer operating in a weekly cycle programmed with an accuracy of 1 second. It is perfect for building an automatic watering can or feeder, it will work well as a simulator of the presence of householders or automatic heating switch. There are indeed many ideas for its use.

Features

- 30 independent time programs
- program settings including day of the week and time with an accuracy of 1 second
- executive component: relay 230 VAC / 8 A
- power supply 9-15 VDC or 7-12 VAC
- current consumption up to 100mA
- clock backup after power failure

Circuit description

Schematic diagram of the circuit is shown in Figure 1. It is built on an ATmega8 microcontroller with an attached 2x16 character display and 4 buttons. A PCF8563-type integrated circuit was used as the real-time clock.

Communication with the chip is via the I²C interface. Information about the current time and day of the week is taken only when the controller is switched on, and then the time is measured by the processor alone. In order to make the countdown precise, the TIMER2 processor's internal counter operates asynchronously and is clocked by a 32.768 kHz waveform provided by a generator built into the RTC. The resistor used to feed the clock signal from the

clock to the processor has a high resistance (1 MΩ), so it does not interfere with or block the clock in the absence of power. The controller is designed to be supplied with AC voltage (directly from a transformer) or DC voltage (from an off-the-shelf power supply unit). Its transformer should be approximately 9 VAC and should be connected to CON7, while the power supply with a voltage of approx. 12 VDC is connected to CON6.

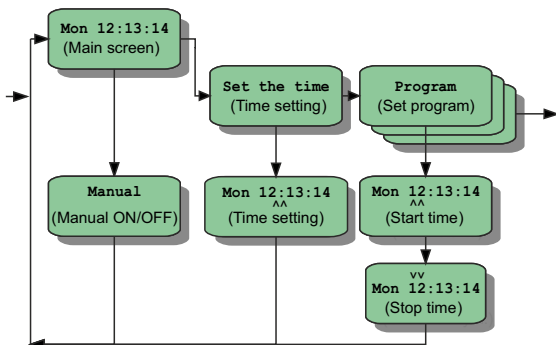


Fig. 2. Menu structure

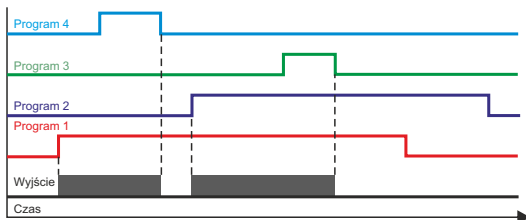


Fig. 5. Result of programs overlap

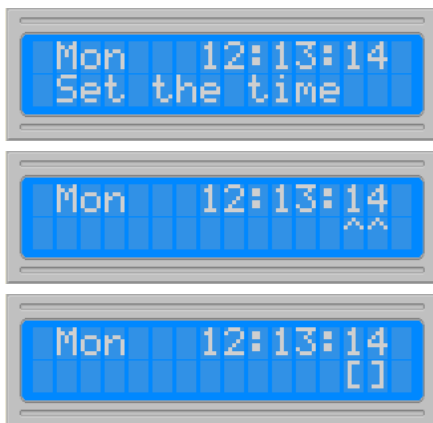


Fig. 3. Time setting



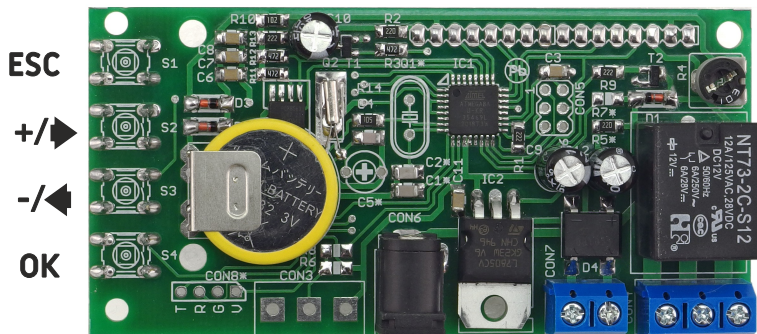
Fig. 4. Setting the program

Assembly and mounting

Mount the parts according to general principles. Just remember that you mount the buttons and display from the bottom (soldering) side. It is recommended not to install batteries and the display right away, as this will block access to certain components in the event of start-up problems. The display only needs to be slid onto the goldpins and tilted slightly so that the pins connect to the vias in the display connector. To such prepared circuit, connect supply, and the adjust display contrast with potentiometer R4. If a screen with a 'ticking' clock appears then everything can be considered OK, and first solder on the battery and then the display. Caution - do not press the display onto the board itself as it may short-circuit the

soldering points on the board. It should be lifted about 5mm from the board and then soldered. The executive relay may have a 5V coil in which case only R7 is mounted - do not mount R5. In the case of a 12 V relay, mount only R5. There are several additional components on the board (CON8, CON3) which are not used in this layout.

A front panel has been designed for the device, to be printed by yourself, Figure 7. Such a bezel will make it easier to mount the circuit in any enclosure.



Wykaz elementów

Resistors:

R1, R9, R13:2,2 k Ω (SMD 1206)
 R2, R5:22 Ω (SMD 1206)
 R3, R11, R12:4,7 k Ω (SMD 1206)
 R4:10 k Ω (mounting potentiometer)
 R10:1 k Ω (SMD 1206)
 R14:1 M Ω (SMD 1206)
 R6-R8:do not mount

Capacitors:

C3, C6-C8, C11:100 nF (SMD 1206)
 C9-C11:100 μ F
 C4:10 pF (SMD 1206)
 C1, C2:22 pF (SMD 1206)
 C5:nie montować

Semiconductors:

D1-D3:BAS85 lub podobna
 T1, T2:BC847
 D4:mostek prostowniczy
 IC1:ATmega8 (SMD)
 IC2:7805
 IC3:PCF8563 (SMD)

Other:

Q1:do not mount
 Q2:watch quartz 32768 Hz
 BAT:battery e.g. CR2032 for printing
 REL1:QC3FF relay with 12V coil
 SW1-SW4:mikroswitch high
 CON1, CON2:LCD 2 \times 16 + goldpin
 CON4:ARK3/500
 CON6:goldpin socket 2.1/5.5
 CON7:ARK2/500
 CON3, CON5 CON8:do not mount



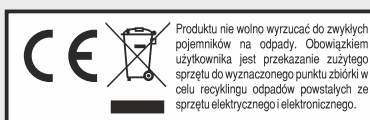
Fig. 7. Printable PDF file <https://bit.ly/3pKqzdT>



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AVT SPV zastrzega sobie prawo do wprowadzania zmian bez uprzedniego powiadomienia.

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Zestawy do samodzielnego montażu są przeznaczone wyłącznie do celów edukacyjnych i demonstracyjnych. Nie są przeznaczone do użytku w zastosowaniach komercyjnych. Jeśli są one używane w takich zastosowaniach, nabywca przyjmuje całą odpowiedzialność za zapewnienie zgodności ze wszystkimi przepisami.