GCn Effector 12

software for creation of visual effects and electric appliances management.

1 Introduction.

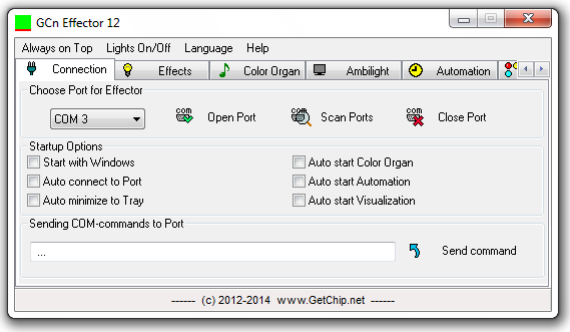
Program **GCn Effector 12** was created to control the electronic Effector device for visual effects. Effector device can operate autonomously, but the connection to the computer greatly expands its capabilities.

Effector device is very simple and it can be made even by people just slightly familiar with electronics. The device can be assembled on the microcontroller ATtiny2313, or Atmega328, or board Arduino. The device has 12 output channels (A to L) for driving LEDs (lamps, loads, etc.).

Initially it was meant to control LEDs as loads, but you can use the board for other purposes, for example, the tab "Automation" allows tasks such as scheduled enable / disable lights, or perform any manipulation of electric loads.

Program **GCn Effector 12** has several tabs that divide functionality of program into separate modules. Tabs can be run in parallel and they not interfere with each other (i.e., the signals for the Effector board can be formed from a variety of sources).

2 Tab «Connection».



Program GCn Effector 12 controls the board through COM-port. This can be a real COM-port or virtual, created by the driver in the case of the converter USB-UART (in Arduino converter is already incorporated into the design).

To connect the program with the Effector board, select the port to which the board is connected (or port that driver created in case of USB-connection) and click the "Open Port". Done. The board is connected.

In the "Startup Options" you can specify the actions to be performed automatically when the program starts:

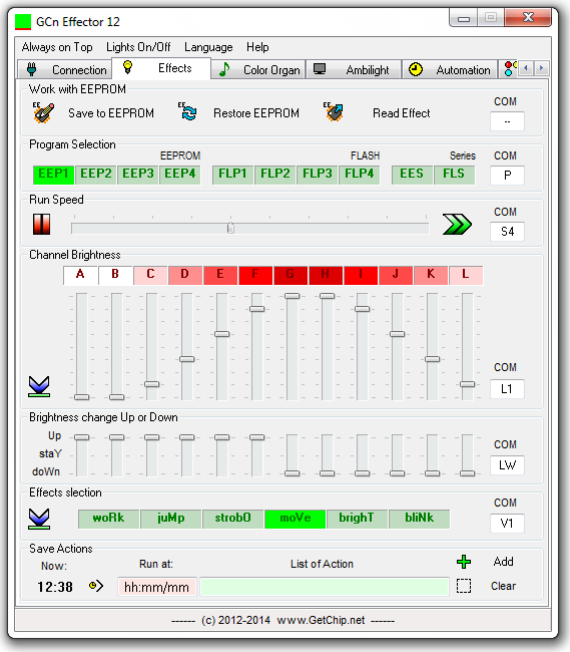
- "**Start with Windows**»;
- "**Auto connect to port**" - when starting program, it will connect to the port itself (port number will be one that was opened by the time of selecting this check-box);
- "**Auto minimize to tray**" - so that the program window is not an distraction on Desktop, it can immediately hide to tray (if later needed to open the window – just click on the tray icon);
- "**Auto start Color Organ**";
- "**Auto start Automation**";
- "**Auto start Visualization**".

Control of Effector is performed by sending specific commands to the port. These commands, in most cases, are a strings in the form like «A3», where the first character indicates **what** to change, and the second number - **how** to change. These commands can be sent to the device without special programs with conventional terminal. In the Effector tab "Connection" there is a field called "Sending COM-commands to Port," which, in essence, is a terminal. In this field, you can try out the actions of COM commands for the device.

List of Effector COM-commands:

Command	Action
Work with EEPROM, effects programs	
Z0	Save current settings in the active effect in EEP (in the EEPROM)
Z1	All 4 programs EEP (EEPROM) restore to initial settings.
Z2	After command, device will give current settings through a UART (31 bytes).
Program selection	
P0	Run program **EEP1** from EEPROM.
P1	Run program **EEP2** from EEPROM.
P2	Run program **EEP3** from EEPROM.
P3	Run program **EEP4** from EEPROM.
P4	Run program **P1** from Flash.
P5	Run program **P2** from Flash.
P6	Run series of programs from EEPROM (4 programs).
P7	Run series of programs from Flash (8 programs).
P8	Run program **P3** from Flash.
P9	Run program **P4** from Flash.
Run Speed	
S 0…9	Speed of running effects. 0 – Full Stop, 4 – Average Speed, 9 –Fast. **Example: S5** – Speed Above Average.
Channel Brightness	
A…L 0…8	Number of channel is set by a letter (A-first, B-second, C-third, etc). Brightness is set by a number (0 – no light, 8 – maximum brightness). **Example: A5** – half brightness for first channel.
Direction of Brightness change	
A…L U	When effect **Work** is active, brightness of channel wil be automaticaly increased, and when maximum is reached – decreased, etc. **Example: BU** - rising brightness for second channel.
A…L Y	When effects **Work**, **Jump or Strobo** are active, brightness of channel remains constant. **Example: CY** – constant brightness for third channel.
A…L W	When effect **Work** is active, brightness of channel wil be automaticaly decreased, and when minimum is reached – increased, etc. When effect **Jump** is active, brightness of channel wil be automaticaly decreased, and when minimum is reached – instantly jump to maximum, etc. **Example: DW** – decreasing brightness for 4-th channel.
Effects selection	
R0 / R1	On / Off effect **Work**. Executing procedure for brightness change for each channel (see: ***Direction of Brightness change***).
M0 / M1	On / Off effect **Jump**. Executing procedure for jump-like brightness change for each channel (see: ***Direction of Brightness change***).
O0 / O1	On / Off effect **Strobo**. Set strobo effect with random frequency and random longevity for all channels.
V0 / V1	On / Off effect **Move**. Shift effect. Random and fluid change of shifting direction and speed.
T0 / T1	On / Off effect **Bright**. Random and fluid change of brightness for all channels.
N0 / N1	On / Off effect **Blink**. Random flickering effect for all channels.
Notes	
The device does not react to control characters, lowercase letters. So, if you want to create a file and send all the settings for effect in one package (all at once), it is allowed to make comments anywhere in the text. **Example:** **A1 – set brightness for first channel** **B0 – second channel is off** **C8 – third channed is at max brightness**	

3 Tab «Effects».



The tab "effect" is replete with lots of buttons and sliders. On this page all the commands of Effector (see table above) are duplicated in a convenient graphical form. Areas of this tab are divided for various functional groups:

– **«Work with EEPROM»**. The buttons allow you to save the settings made in the current (selected) EEP-program, restore all four programs of EEPROM to the initial settings (like on the first start), read the current program from the controller;

– **«Program Selection»**. Choose programs that saved in microcontroller;

– **«Run Speed»**. Speed of effect execution (including a Full Stop);

– **«Channel Brightness»**. Move sliders to change the brightness of each channel separately. "Reset" button resets all channels to zero;

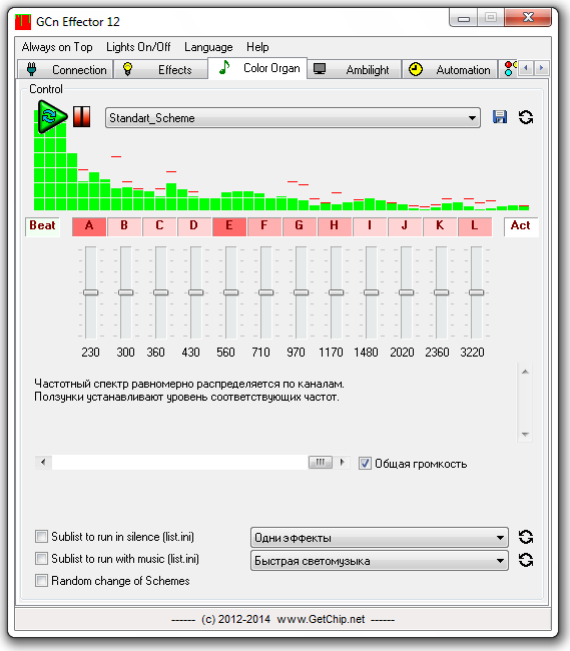
– **«Brightness change Up or Down»**. Set brightness change behavior for each channel separately (effects Work and Jump);

– **«Effects Selection»**. Select a set of effects that will be involved in the current program.

List of effects:

Work – executing procedure for brightness change for each channel separately (see. Brightness change Up or Down);
Jump – executing procedure for jump-like brightness change for each channel separately (see. Brightness change Up or Down);
Strobo – set Strobo effect with random frequency and random longevity for all channels;
Move – shift effect. Random and fluid change of shift speed and direction;
Bright – random and fluid change of brightness for all channels;
Blink – random flickering effect for all channels.

4 Tab «Color Organ».



The tab "Color Organ" (historically formed term for visualizations “Music-to-Light”) can generate signals in the form of autonomous effects, and most important - as direct visualizations for audio tracks played on PC. This tab gives user an opportunity to create different versions (Schemes) of music visualizations and also self-running light effects.

To start Color Organ:

1 press button «Start»;

2 choose sound source from list that appears below (usually - «Stereo Mix», or maybe «Wave», «What U hear»);

3 play some music track on PC (any player program);

4 choose any Scheme from drop-down menu on the top.

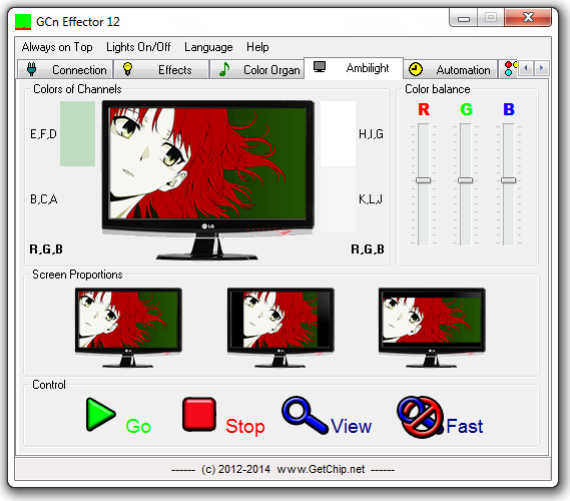
In Windows 7, 8 and 10 selection of audio source is not so simple and is done differently.
Go to "Control Panel”, then “Sound”. In the window that appears, at any place, right click the mouse and see a small menu. Put the check next to 'Show disabled devices" and "Show The disconnected devices". Then go to the tab "Recording". This will take you to the section of sound recording devices of Windows, among other devices, in gray will be one labeled "Stereo Mix". Click right mouse button on it, and select "Enable." Now it is necessary to assign this device as "default". In system tray (lower right corner) if you click left mouse button on the colored speaker and select the tab "stereo mix", you can increase the volume in the mixer or change other settings.

The main element that forms rules for visualization is the Scheme file. All Scheme files are located in Effector program "schemes" sub-folder. Scheme file extension must be .lsc (Light SCheme). After creating and adding a new file, its name will be added to the drop-down list of Schemes (press button “Refresh Schemes List”).

Rules of creation of Schemes are described in the file “light_scheme_rule_build.txt”

Details are described in the working Scheme example “Standart_Scheme.lsc”

5 Tab «Ambilight».



Ambilight tab allows you to create the eponymous effect when viewing video on the PC monitor.

This tab has not a lot control elements:

– At the top is an image of the monitor. On each side of the monitor, while running Ambilight, current color of background lights are displayed;

– More to the right – area of light color corrections sliders, needed to adjust colors of lights as close as possible to the colors on screen (PC monitor);

– Below – select screen proportions – needed so that black areas on the screen are ignored in color calculations for background lights;

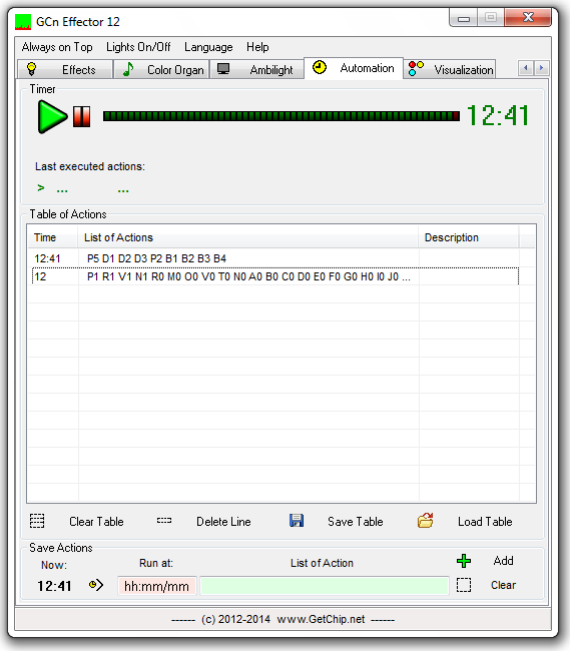
– Bottom area – control buttons. «Go», «Stop», «View», «Fast». View mode shows miniature copy of screen content in Effector tab. It is convenient, but uses a lot of PC resources. Button «Fast» turns off that «View» mode.

A small note on the work of Ambilight. The program does not "see" the overlay. Therefore, when playing the video in the player, you need to disable hardware assisted video rendering. This is done in the video settings of player software.

For example, for VLC player (http://www.videolan.org/vlc/) – go to Preferences (Ctrl+P) and in tab «Video» clear checkbox for «Accelerated video output (Overlay)».

6 Tab «Automation».

If you need to perform any action automatically in specific time, you can do it in the tab "Automation". In this tab, you create a list of commands (schedule) for the Effector, bound by time. The automation can be run manually or automatically by selecting the appropriate check box in the tab "Connect".



Time to execute a command can be set in two ways:

– «**hh:mm**» - action will happen at this specific time (for example, «12:25»);

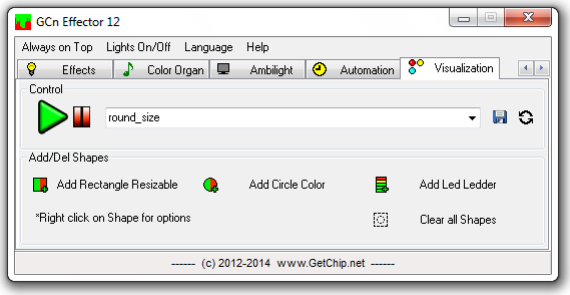
– «**mm**» - action will happen periodicaly after “mm” minutes (example: «25»).

The string of actions to perform contains a sequence of COM-commands for Effector. Separator can be any character or may not be present at all (for example, «A8 D4 P5 S3», or also «A8D4P5S3»).

For ease of data entry into the table there is a field "Save actions." This field is the same in the tab "Effects", and a list of actions there is filled automatically in parallel with performed actions in tab. Thus, in order to quickly create an entry in the table (without manual input of Effector commands), you need to go to the tab "Effects", set there a desired state of the effector (using the buttons and sliders of that tab) while in the "List of actions" a sequence of commands will be formed, then enter the run time and click "Add" (green cross button). After entering data in the table, entry can be edited or modified.

Any recorded data is stored in a table on exit, and loaded automatically at startup. In addition, the table content may be stored in separate files, and those saves can be uploaded them depending on the needs and conditions.

7 Tab «Visualization».



Program GCn Effector 12 is designed for driving LEDs, lamps, light fixtures. However - it is not the only option to visualize effects. Tab "Visualization" allows you to create virtual light fixtures directly on the monitor screen.

Tab allows you to create three types of fixtures:

- **Circle** with an arbitrary binding of Effector channels to the color components of RGB. Additionally, you can bind the channel responsible for the dynamic size of the circle;

- **Rectangle** of arbitrary size (stretched by sides with mouse, hold shift for square proportions). As in the circle, you can tie the any Effector channel to color components;

- **LED column** - displays the audio level bar for the selected channel.

Number of virtual light fixtures is not limited. Those “lamps” can be arranged in an arbitrary position on the screen - just drag it with the mouse. Each fixture properties can be set in menu that is displayed by mouse right-click on fixture.

Tab "visualization" has its own layout schemes of light fixtures. Once you have created your composition - you can save it by specifying the new name in the drop-down list and click save button. On-screen visualization schemes files are located in the Effector program sub-folder «visualization».

8 Additional Information.

Besides tabs described above, Effector program has several additional control elements.

Top menu:

- «Always on Top» - Effector window semi-transparent above all others on desktop;
- «Lights On/Off» - enable/disable channel outputs (both real Effector device outputs and virtual on-screen light fixtures);
- «Language» - choose language of Effector program user interface;
- «Help» – opens this document.

You can make your own version of the localization of the interface. To do this, you need to create (make a copy) localization file in the Effector sub-folder «localization». Replace the appropriate phrases in rows, using your language.

Tray menu.

To access the main functions of the program, the quick menu can be used by mouse right-click on the program icon in the system tray. There is also list of hotkeys, where available. Left click on the tray icon to minimize / restore Effector program window.

Special Thanks.

Program Effector-12, and also effector device, both has evolved to the current state thanks to user feedback through blogs and forums on GetChip.net, for that - Thank You all very much!

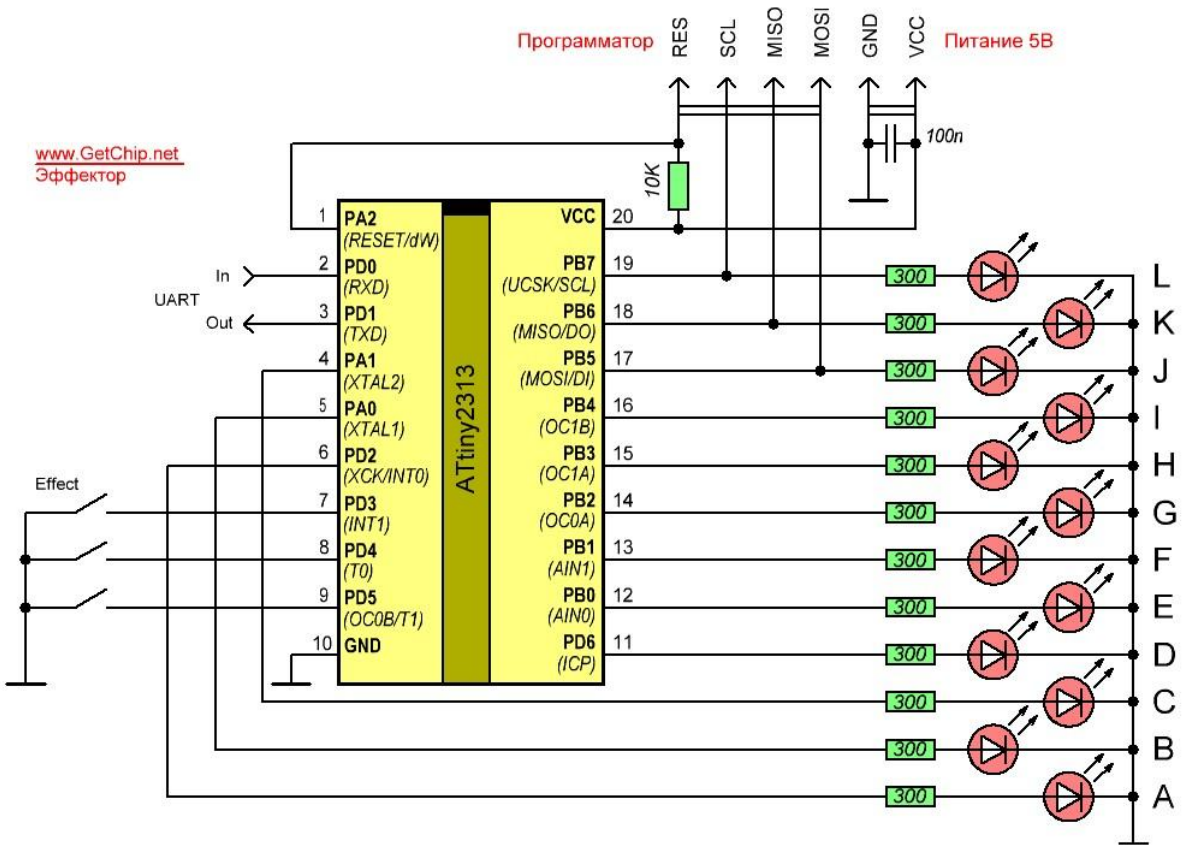
Demand more from me, and the program will become even better;).

Special Thanks to Juris Perkons for a tons of new ideas, testing new program versions, and the English version of the localization.

9 Assembling Effector device.

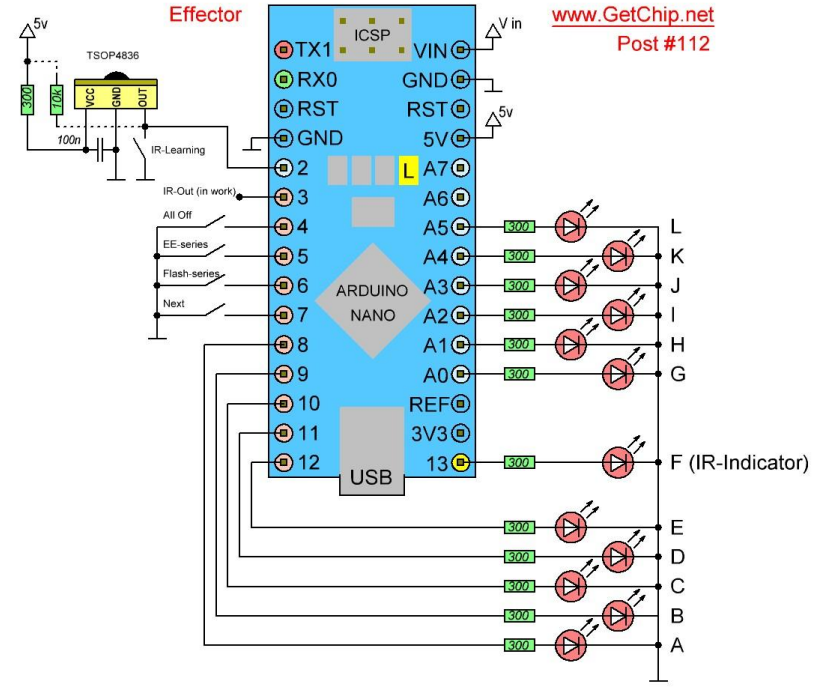
There are several design alternatives of Effector device. All variants are using communication protocol UART. UART communication was chosen deliberately, in order to allow the control of Effector not only using a computer, but also with other devices you created. To communicate with a computer you need a converter USB-UART (or COM-UART, if you plan to connect the Effector to the PC COM port). In the case of construction on the Arduino, a separate converter is not required - it is already built into Arduino design (except some specific very small form-factor Arduinos, like “Pro Mini”).

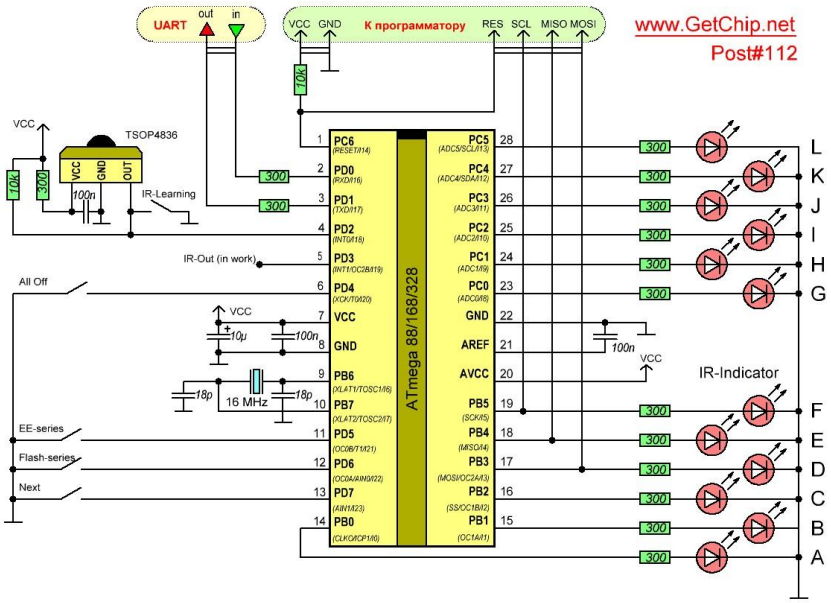
Effector on ATtiny2313.



Device description and files required for assembly:
http://www.getchip.net/posts/063-12-ti-kanalnyjj-generator-ehffektov-na-attiny2313/

Effector on Arduino Nano (Uno) / ATmega328





Device description and files required for assembly:
http://www.getchip.net/posts/112-arduffector-ehffektor-za-5-minut-bez-payalnika-i-programmatora/