A few years ago I got a change to encounter a very curious device named “Zummer GSM”. Except many different features associated with remote access, it has several interesting architectural solutions, which is very difficult to guess without looking under the hood.

So, the capabilities of the system are impressive:

* support connection of motion sensors, humidity, opening detectors;
* submission of light or sound signal and sending SMS messages to the user in response to failure of one of the sensors;
* remote listening of what is happening in the room through an external microphone;
* phone line control mode: tracking calls and off-hook, informing them via SMS, the ability to listen to the phone line;
* device control using DTMF or SMS.

Looking under the hood there can be seen a lot of interesting details. The first, I was shocked to see the phone Siemens C45 (1) as a communication module. It may seem a little weird, but its price is quite low for such purposes, although the phone takes a lot of space inside and it is unlikely "Energy Star" logo to be found here.

Other important parts of the system:

* microcontroller PIC18F452 (2) as the core of the device;
* chip MAX712CPE (3) as a battery fast-charge controller;
* MT8870 (4) - integrated DTMF receiver;
* SIM-card holder (5).

My first goal was to connect 1-Wire opening detector to the Zummer. It was easy because it already has such option. The scheme is going to be like this:

It depicts 1-wire addressable switch DS2405 connected to optocoupler 4N35, which is respectively connected to Zummer. When the circuit is closed one receives an sms. All is working perfectly.

My next task was to control light remotely. It was a little bit harder because it has no such output that allows managing something using DTMF. Accordingly, it was necessary to customize the device. As a result I wrote a firmware for the external microcontroller that decodes signal coming from MT8870, then send a command over the network for opening 1-Wire DS2405 key together with optocoupler, that triggers the light lamp. A debugging version of this is shown below:

1. Zummer GSM
2. Debugging board
3. 1-Wire switch
4. The lamp
5. USBASP
6. Serial-USB adapter for debugging purposes

In production stage I’ve used Adruino Nano instead of my debugging board. Sources of the firmware is available as usual.

The demonstration of how it all works may be seen on the video.