CONTRIBUTION THROUGH LABVIEW SIMULAION TO A DOMOTIC HOUSE AUTOMATION

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***Abstract* – To simulate and remote control a Domotic House (a real house with first and second floor and 175 square meters habitable), we used the virtual LabView software, indicating the main windows of the inner space and the diagrams for their functioning. For a complete automation, was build a control panel to visualise technical alarms and intrusions alarms (burglar) and a different panel to monitories the state of the windows and revolving shutter (open/close). The access gates in to the courtyard for people and vehicles are automated. The intrusion alarm is activated through the magnetic and impact sensors (for windows) and the technical alarms are activated through water, gas and smoke detectors. Optionally those two alarms can alarm acoustical and optical or making phone calls to preset numbers.**

***Keywords*:** *alarm, automation, domotic, LabView.*

1. FOREWORD

Domotics give us the possibility to have a house which is continuously adapting to our lifestyle and our habits. From example, we take off for an entire weekend and before closing the doors we just press a button and all will be switched off (lights, windows, shutters, heating in economic mode) and the alarm is automatically switched on, all this founded on a single control panel for the entire house.

Domotics is suitable with each moment of our life, creating desired ambient, assuring our security, preparing the temperature in the house for our awakening, preparing our coffee and raising the shutters.

The house which will be automated and remote controlled was picked up from the magazine [1], having a 175 square meters build area, with the assembly view showed in the *Figure 1*, first floor and second floor configuration in [2].

For a proper and comfortable living area, the RadioClima Cronotermostate makes possible the ambient full control in the whole house, actuate the central heating and air conditioning. Using the

Figure 1: Genaral view

telephoning module of the alarm, the Cronotermostate can be set through a code send via the mobile phone, and before arriving home the heating system will be on (one of the multiple applications solved by this work).

2. CONTRIBUTIONS WITH LABVIEW SOFTWARE

What we have settled to do and what we succeeded to do with the help of *LabView* software was to simulate the function of the most important equipment used in this work. So, we redraw the plan of the house [2] in *CorelDraw* software, than exporting it in *.jpg* in the frontal panel of the windows *LabView*. Here them were locked (*Look*) and were moved in the background (*Move Backward*), to let us to work on this imported important upper surface, to move and reposition the indicators and the controls whom will be the basic elements of monitoring system for our domotic house.
Next step was to edit the controls and indicators, LabView let this happen through the *Advanced – Customize* option from their main menu. Each equipment was designed to have a shape as similar with the real visual aspect, or we tray it to give them an intuitive shape.
We made two control panels for the events happening in the domotic house shown in the [2] containing:

- *a panel for the command and visualisation of the technical and burglar alarms*. This panel is also containing the day/night and raining detector ;
- *a panel to indicate the state of the windows and shutters* (open/close).
  Here we can also observe the *automation of the gates*:
- *the entry gate for the peoples*. This can be opened through the *Transmyter Key* of *Vimar* alarm (but attention, this will not deactivate the house alarm) or through inner house of the video interphone *V.I.* from the house;
- *the vehicles access gate*. Is controlled by the same remote control who permit the access in to the garage, but in the front of the courtyard entrance, this will open only the vehicles access gate. When the vehicles had passed, the photoelectrical sensor (*D.f.el.1-2*) will detect that and will close the gate.

The alarm [in this paperwork is presented just the intrusions alarms (burglar alarm)] is made by *Vimar*. The protection system is composed from the modular equipments connected between them using a *bus* with only two wires supplied with 29Vcc, which simplifies the installation and make it more flexible, easy to use in to the implementation step and also possible enlargements. The alarm system contains:

- *an control panel* with microprocessor and with an interactive display to navigate in to the menu. Is possible to put a password, it has a history with the last 50 events from the system (on/off, alarms and the unit responsible), indicating the time and the date of this;
- *transponder key* allow to switch on/off the partial and panic alarm through the configurations of the control panel menu and offer 1.000 billions of possible combinations;
- *transmitter key* connected to the communication bus, allow to receive the cods of the alarm and offer 1.000 billions of possible combinations;
- *back unit* housing the battery's who will supply the system when the power shut down;
- *movement detectors* (IR Detector) based by the infrared technology. Has the function of lagging the activation of the sensor and the possibility to adjust his sensibility. Beside its function of activating the intrusion alarm, if the alarm will be deactivated he will fulfil the function of switching off the light where human presence will be no longer noticed;
- *Relay actuator* is use to activate the *telephone dialler.* In case of panic alarm telephone dialler will call the client mobile phone and security company to and in the case of technical alarm, will call only the client phone;
- *Contact interface* are used to connect the bus alarm to:
  - magnetic and impact detectors (for the windows) for activating the *burglar alarm;*
  - the gas, smoke and water detector for activating the *technical alarm;*
- *GSM telephone* dialler is activated by the actuator relay, it can call until 8 numbers in dual band network and a SIM card is needed. It has their own battery to maintain a long time in functions the device, it can register until 6 voce message;
- *Outdoor siren* with powerful buzzers with 100 dB and with illumination signals;
- *Power supply* will supply a stabilize tension of 29Vdc required so that the entire protection system to properly work.

Most of hereinbefore shown elements are simulated with the help of LabView software, but because of the lack of space in this writing, follow-up we will present in *Figure 2* only the intrusions.
The intrusions alarms (burglar alarm) is active and configured in function of needed of the client. In this paperwork, we simulate 2 kinds of alarms:

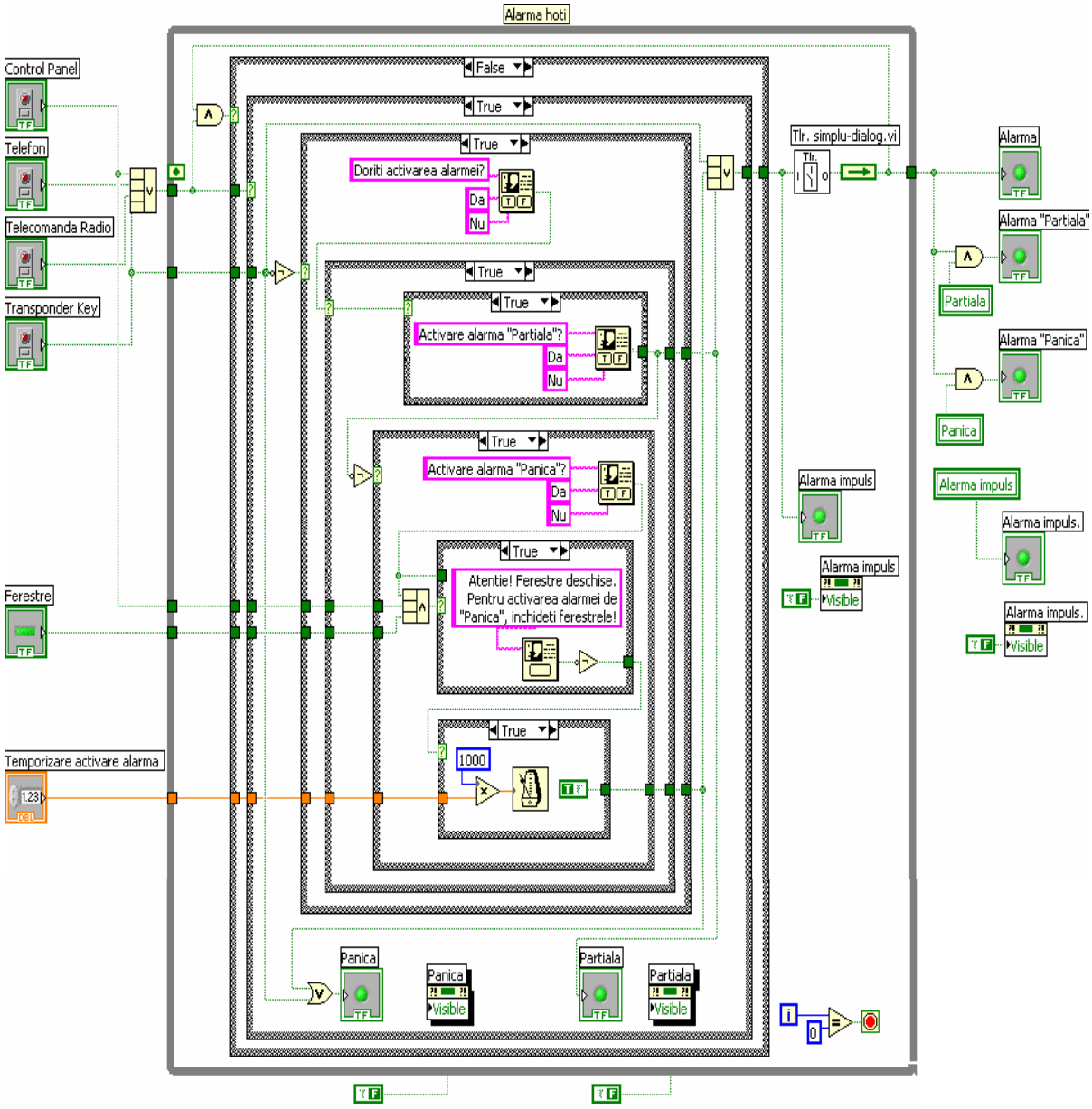
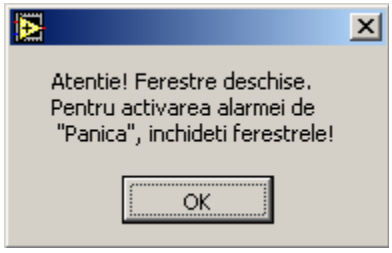


Figure 2: Diagram for intrusions alarms

- *panic alarm* where all the protection equipments will be active: impact, magnetic and movement detectors. This alarm can be switched on when all the people from the house will be out of the building (of course after a preset time, e.g. 1 minute), having in this case the maximum protection of the alarm system;

- *partial alarm* where will be follow up just the impact detectors and some magnetically detectors, better said magnetically detectors from the access door, from veranda and garage. For *Partial alarm* we suppose that the others detectors untaken in consideration, can be activated by the presence of the people inside of the house.

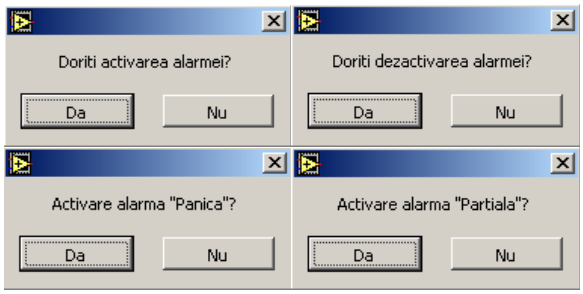
Activation/Deactivation of the alarms can be done with the transponder keys, with the control panel, with radio remote control or with the phone. In this paperwork we simulate the following possibilities for activation of the alarms:



- *Panic alarm* activated from the control panel: will not allow the alarm to be on if a window might be open. It will appear an information message screen on the LCD of the control panel and in our simulation in LabView, it will appear like in the upper window.

- *The alarms activated from the control panel, phone and remote control*: are continually

accompanied with message screens that lead us to choose how to activate the alarms.



In case of intrusions alarms (burglar alarm) this will switch on outdoor siren, the GSM telephone will dial the guard protection team and the client phone. On the control panel screen and in our simulation it will appear the next message:

For the acoustical alarm for intrusions inside the house, we use the below configuration and *Play sound* function from the library of LabView software. In this way, we browse a document with *.wav* extension into the *path* control. A *path* is a type of data from G language which identify the place where are stored the files. The controls and indicators *Path* can be used to load and show the place of the file or folder using the standard syntax, like we can observe into *Figure 3*.

3. CONCLUSIONS

The results obtained after the simulation with LabView are very convincing and proposed method can be adapted to any domotic house in function of its own configuration. We must underline that for the presented house we realise an electrical installation calculus of costs reporting of needed consumptions, after the European norms [5] and an economical cost for materials and equipments needed for automation of the house.

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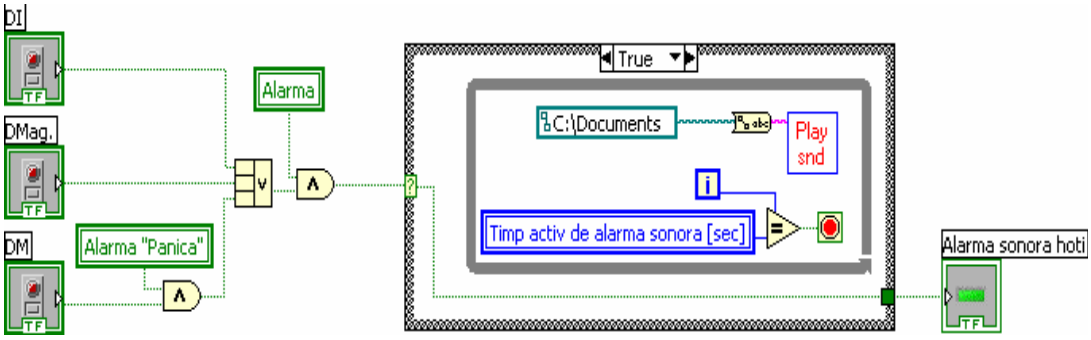

Figure 3: Diagram with acoustical alarm

Impact detectors. Each window (exceptions are just the windows from garage and bathroom because of the small size) is protected with an impact sensor which will detect a possible intrusion by the broking of this window, when the alarm is activated.

Magneticaly detectors are mounted on the windows and on the following doors: access gate, automobile gate, home, veranda and garage. The sensors will give to the control panel the response of the positioning of these: open/close.