eHouse Building Automation/Smart Home/BMS Development since 2000

eHouse PRO

eHouse LAN

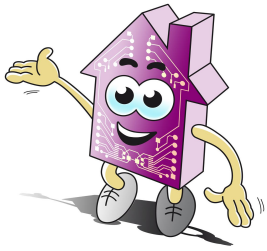
eHouse WiFi

eHouse RF

eHouse CAN

eHouse RS-485

- **Rural Development**
- **Increase living standards and conditions**
- **Renewable and grid energy saving and optimization**
- **Low Voltage, Battery Powered, “Zero Energy” Installations**
- **Autonomous work, systems integrations and workload minimization**
- **Remote monitoring, measurement, regulation, control, automation**
- **Security, safety**
- **IoT, Smart City, Smart Village, Metering, Lighting, Heating**



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1. eHouse System applications

The eHouse system performs the following functions and can be applied to the broadly defined automation, control, monitoring, and regulation:

- IoT (Internet of Things)
- IIoT (Industrial IoT)
- BIM (Building Information Modeling)
- BAS (Building Automation System)
- BMS (Building Management system)
- Smart City
- Smart Lighting
- Smart Metering
- Intelligent House, Building, Apartment (IB)
- Automation of hotels, guesthouses, apartments
- Automation of offices, offices, public facilities
- Automation of boats, yachts, houseboats
- Automation of movable-homes, caravans, cottages and recreational plots
- Automation of greenhouses, farms, warehouses
- Remote control of Audio-Video equipment, media-rooms
- Control of the house, building, apartment, office
- Lighting control On/Off, Dali, DMX, PWM, 0..10V
- Access control with RFID proximity cards
- Security system with SMS notification
- Control of blinds, drives, servomotors, servos, solenoid valves
- Measurement and regulation of temperature, lighting and other physical parameters
- Remote control via infrared, SMS, eMail, WiFi, LAN, Internet, WWW
- Control of the boiler room, fireplace, solar collectors
- Measurement and monitoring of various physical parameters (temperature, light level, humidity, vibration, gas concentration, current, etc.)
- Device status monitoring
- OEM/DIY controllers (for installation in external devices, eg lighting, drives, etc.)
- Integration of external IT systems, IB More

2. Installation Variants of eHouse system

eHouse BAS/BMS system contains various variants depending on communication, installation and budget assuring complete spectrum of market needs:

- wired (LAN, RS-485, CAN, PRO)
- wireless/radio (RF 863, 902/915MHz, WiFi)
- OEM/DIY to socket cans (RF 863, 902/915MHz, WiFi, CAN)
- central switchboard installation (PRO, RS-485, LAN)
- room switchboard installation (RS-485, LAN)

3.Main Features

eHouse Building Automation advantages above competitive products:

- The cheapest building automation system with a large number of: control, measurement and executive points (comfort, VIP)
- It does not impose a way to finish the house, interior decoration, switches, control panels
- It does not require any expensive and dedicated devices with its own logic and communication interfaces (wall panels, wireless, boilers, A/V equipment, executive devices, etc.), enabling the use of any components available on the market
- The system can be controlled from any device: smartphones, PADs, Smart TV, PC or other devices with a web browser
- The system can be controlled from the infrared remote controller
- The system can control external Audio/Video equipment via infrared (learning and reproducing infrared codes)
- controllers do not overheat and use non-aging technologies that allow stable and uninterrupted work over 10 years
- Wireless versions (WiFi, RF) allow you to expand the eHouse system and create a hybrid installation (wired/wireless)
- All versions of the eHouse system are integrated by the eHouse.PRO server software, which allows minimizing costs and maximizing the automation functionality
- Installation in mini-switchboards/central switchboards facilitates service, ensures proper cooling, professional installation and extending live cycle. It does not require getting into electrical boxes with switches or sockets that we control.
- The mini/midi/central switchboard systems use professional industrial relays for DIN rail with sockets with a 230V voltage (mains) distance from minimum 4.5cm electronics and minimize possibility of breaking the voltage due to insects, rodents or moisture getting into the electronics.
- eHouse LAN, PRO, CAN, RF, WiFi, RS-485 are low-voltage (5-15V power supply) and do not create risk even when installed in places exposed to moisture.
- eHouse LAN, PRO, WiFi electronic controllers are galvanically separated from each other as opposed to other building automation products based on a serial communication bus, so that damage to one segment does not destroy the entire system
- eHouse LAN, PRO, RS-485 systems are wired and do not depend on interference, construction technology (eg reinforced concrete walls, ceilings) of the house, they can not be sabotaged and disturbed from outside (more powerful transmitters) as purely wireless systems.

- In case of the need to implement "plans B" after plastering the building, finishing the house, or placing automation where it is not rational laying of wires (eg plots, gazebos, etc.) it is possible to use eHouse WiFi controllers integrated with other eHouse products.
- The eHouse system is also sold to amateurs/hobbyists, thanks to which we provide a set of software for configuration, system design for investors, installers, and residents. Documentation regarding design, installation, and programming is available on the http://smart.ehouse.pro/ DIY system blog.
- The eHouse system has programs/lighting scenes enabling comprehensive changes of lighting scenes (on/off and dimmers)
- eHouse has drive programs for comprehensive control of roller shutter systems, awnings, gates, actuators
- eHouse allows you to create a database of infrared codes to control external equipment with possibility of infrared remote control
- Allows creating a database of infrared codes to control the eHouse LAN, RS-485 system
- It has an integrated alarm system with GSM/SMS notification
- You can connect any switches, motion detectors, alarm detectors available on the market (without built-in own logic and communication interfaces) to the on/off inputs
- you can connect any electrical devices available on the market (without built-in own logic for control and communication interfaces) to the on/off outputs with relays,
- Integrates external Satel alarm systems (Integra)
- It has its own security system with SMS notification and SMS control
- Allows you to control external Audio/Video equipment via Ethernet (Onkyo)
- The controllers have a built-in Bootloader to update the firmware (embedded software) via the main communication interface.
- It is possible to connect directly to the system via the Internet (Fixed IP or DDNS) or work through the eHouse cloud.
- Programming libraries, open source code is supplied for system integration.

4. Communication Variants

eHouse System is available in 6 variants:

- **eHouse LAN (Ethernet)** for mini/midi switchboard (based on RoomManagers). Up to 49-120 smart points of different types: binary I/O, LED dimmers, infrared RX/TX I/O, measurement inputs
- **eHouse RS-485/422** (Industrial serial bus) for mini/midi switchboard (based on RoomManagers). Up to 55 smart points of different types: binary I/O, LED dimmers, infrared RX/TX I/O, measurement inputs, access control
- **eHouse WiFi (2.4GHz b/g/n)** for socket cans/OEM/DIY. Up to 12 smart points of different types: binary I/O, LED dimmers, infrared RX/TX I/O, measurement input (Temperature)
- **eHouse CAN** (wired) socket cans/OEM/DIY. Up to 16 smart points of different types: binary I/O, LED dimmers, infrared RX/TX I/O, measurement inputs
- **eHouse RF** (wireless 862, 902/915MHz) for socket cans/OEM/DIY. Up to 49-120 smart points of different types: binary I/O, LED dimmers, infrared RX/TX I/O, measurement inputs
- **eHouse PRO (LAN/ Ethernet)** for central switchboards. Up to 510 I/O control points:

alarm functionality, 5 alarm outputs, SMS notification
- **eHouse HYBRID (LAN/Ethernet/CAN/RF/WIFI/RS-485)** wired/wireless for hybrid installation based on eHouse.PRO server.

eHouse covers the whole spectrum of market demands for automation and control starting from DIY/OEM through professional and industrial elements to the entire automation switchboards. It also allows obtaining many budget variants for each group of recipients.

5.Business Model and Market for eHouse system – examples

5.1. Improvement of living conditions and quality of life

- rural development
- facilities for the disabled (remote and voice control with speech recognition)
- automation for objects powered by sources with high failure frequency and powered from renewable energy (photovoltaic, wind energy, solar collectors)
- houses without access to the electricity grid automation and optimization

5.2. Hotels, Guest Houses, ApartHotels, CondoHotels, Apartments for rent

- allows for a significant reduction of operating costs (energy consumption, automatic heating/cooling regulation, object monitoring)
- restriction of access to the facility (access control) and functions limitation
- measuring the consumption of electricity, water, gas, heat and other media
- simplification and reduction of installation costs thanks to eHouse LAN (separate rooms)
- full supervision and ensuring the security of the facility and top-level system management

5.3. Offices, coworking, workplace management

- measurement and maintaining optimal conditions for rooms (temperature, lighting, air quality, humidity)
- access control and limiting functions for employees
- job management in cooworking offices (temporary activation of services and resources)

5.4. Agriculture, processing, storage, cultivation (LAN, WiFi)

- maintaining optimal conditions for storage, cultivation and breeding (temperature, lighting, humidity, etc.)
- minimization of energy and labor costs
- autonomous work
- using the calendar to automatically perform activities defined in time

5.5. Greenhouses + backyard pools (LAN)

- maximum energy gain (solar collectors)
- control of window drives, curtains, blinds curtains to regulate the temperature and ventilation
- hot water storage and optimal use of it

5.6. Campers, mobile homes, yachts, boats, recreational plots (LAN)

- Low voltage installations (5-15VDC) and battery supply
- Optimization and Minimization of energy used for lighting, heating, cooling
- Maintaining thermal comfort

5.7. Classic Building Automation (Smart Home/Building)

- Comfort
- Energy saving
- Remote control
- Regulations
- Autonomous work
- Security, remote home monitoring, etc.

5.8. Control of street lighting (RF/Mesh):

- Automatic control of street lighting (twilight sensor)
- Monitoring the operation of lighting, system and sending regular statuses
- Environmental measurements (temperature, pollution, noise)

6. The main variants of the eHouse system

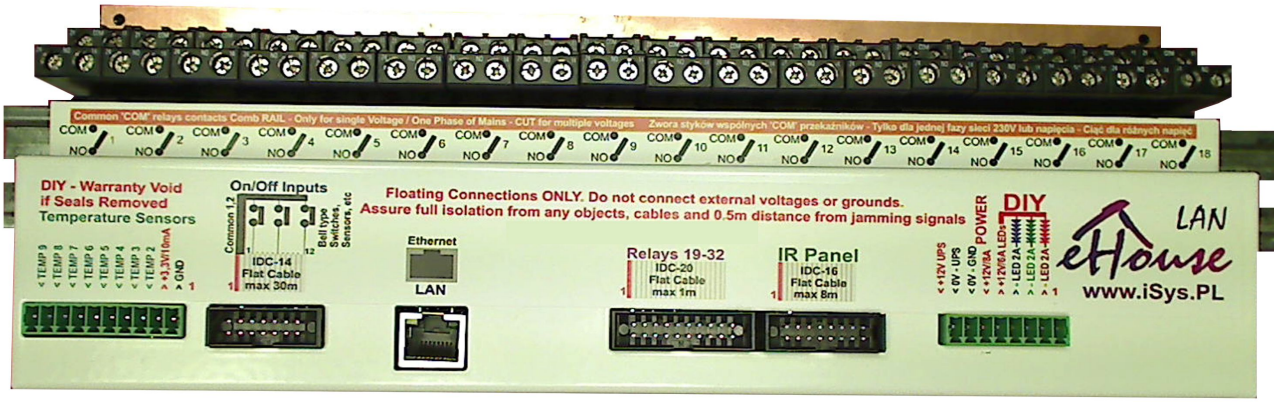
6.1. eHouse LAN (Ethernet)

Wired architecture (Ethernet) based on room controllers (up to 59 intelligent control points of various types I/O/ADC/IR/Dimm - Temperature control and regulation, lighting, drive control, infrared remote control, A/V equipment control).

6.1.1. Business Model:

6.1.1.1. Switchboards

- offices, cooworking, job management
- shops, supermarkets, shopping malls
- apartments for rent, hotels, apart-hotels, condo-hotels
- buildings, houses, swimming pools
- warehouses, storehouses, studs
- individual heating in rooms
- metering and monitoring of facilities (BIM) **http://en.isys.pl/?bim**
- apartments for the disabled
- passive houses
- control of any lighting systems



6.1.1.2. OEM/PCB Controllers

- low voltage installations 5..15V, “zero energy”, no electrical grid
- mobile homes, campers, caravans
- boats, yachts, house-boats
- low budget, DIY

6.1.2. EthernetRoomManager LAN

Hardware resources:

- up to 18/32 programmable on/off outputs with external relays
- up to 12/20 programmable on/off inputs
- up to 8 measuring inputs (temperature, lighting, voltage, etc.)
- up to 3 dimmers LED or one LED RGB 12VDC
- an infrared transmitter for controlling external Audio-Video equipment
- infrared receiver for controlling the eHouse building automation system

ERM Controller/Switchboard enables:

- complex room control (comfort version)
- individual heating control (max 8 segments)
- controlling the entire flat/floor of the house (low-budget version)
- for boat, yacht, house-boat, mobile-homes, recreational house, etc.

6.1.2.1. eHouse LAN documentation

WWW + Images:
http://en.isys.pl/ehouse,inteligentny_dom_budynek_sterownik_pokojowy_ethernet.htm
DOC: **http://www.isys.pl/download/Ethernet-ehouseEN.pdf**
DIY: **http://smart-home.ehouse.pro/category/ehouse-lan/**
Installation DIY: http://smart-home.ehouse.pro/ehouse-lan/ehouse-lan-home-automation-mini-midi-switchboard-installation/

6.2. eHouse WiFi

„All-in-one” Wireless Smart Home Controllers - **eHouse WiFi**.

6.2.1. Business Model (WiFi)

- Smart Home/Building
- IoT, IIoT
- Automation for apartments of the disabled persons
- BIM, metering, monitoring of devices, systems, installations

6.2.2. Typical applications

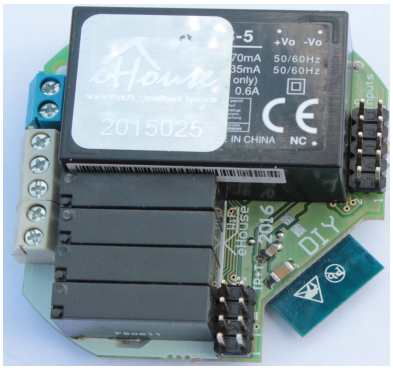
eHouse WiFi is especially recommended in cases:

- Implementation of "B plans"
- restriction of wires outside the building (gazebos, sensors, outdoor lighting)
- automation distributed at distant points
- increasing the amount of LED/RGB dimmers
- dispersed roller shutter controllers, drives
- temperature measurement and regulation
- infrared remote control of eHouse system
- infrared remote control of external Audio/Video equipment from eHouse

6.2.3 Functionality

eHouse WiFi controller functionality:

- 4 outputs ON/OFF (230V/5A) - with drive control function
- 3 dimmers LED/RGB 12V/3A
- power supply 230V => 5V (optional)
- temperature sensor input (-50,+50C)
- an infrared receiver input for control the eHouse system
- an infrared transmitter output for controlling external Audio/Video equipment
- 2 ON/OFF inputs
- support for up to 3 different WiFi networks 2.4GHz b/g/n (SSID)
- miniature dimensions fi 58mm, height 21mm (for electrical boxes)



WWW: **http://en.isys.pl/ehouse,inteligentny_dom_budynek_ehouse4wifi.htm**
DOC: **http://www.isys.pl/download/eHouseWiFiEN.pdf**
DIY: http://smart-home.ehouse.pro/category/ehouse-wifi/

6.3. eHouse PRO/Hybrid/BMS

eHouse PRO/BMS system version for central switchboards for houses, buildings, offices, hotels. It integrates all variants of the eHouse system and allows integration with external BMS/BAS systems. Includes a miniature Linux server with eHouse PRO/BMS software for integration and communication.

6.3.1. Business Model

- Automation for central switchboards, BMS.
- Dedicated BMS/BIM software.
- Dedicated Systems
- Integration of BAS/BMS/HVAC/IT systems. (Read more)
- Facilities: Business, Offices, Houses.

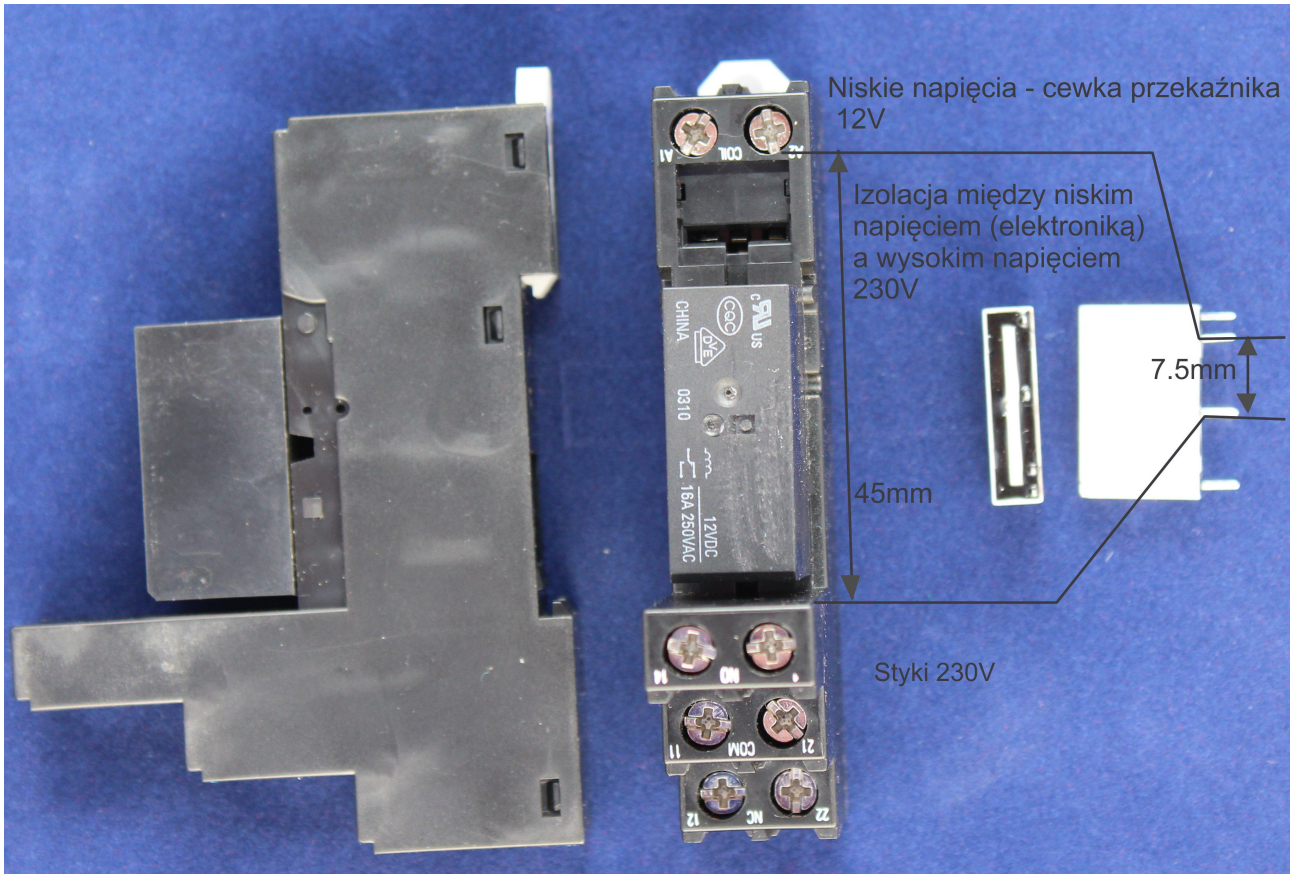
6.3.2. Functionality

- LAN communication (Ethernet), WiFi
- Binary inputs (on/off) with alarm functions with RJ-12 telephone sockets - for professional assembly/service/revision
- Binary outputs (on/off) with control possibility of: drives, roller shutters, gates, awnings, windows, three-way solenoid valves, etc.
- includes 5 alarm outputs (siren, warning light, monitoring radio-line, early warning, silent alarm)
- has a built-in alarm system with SMS/GSM notification
- allows you to integrate all communication variants eHouse (LAN, WiFi, RS-485, CAN, RF).
- It enables integration with Integra 128+ (Satel) security system with an Ethernet module
- Enables eHouse RFID an access control system with proximity card readers (up to 100 floors and 64 readers each) - office and hotel applications
- includes a web server and allows control and configuration via the WWW
- allows you to create VIP software and integrate with external systems
- enables creation of dedicated images of graphical visualization and graphic control
- enables cooperation with the Domoticz BAS software
- Integrations: Client/Server TCPIP + UDP, Modbus TCP, BACNet IP, HTML Request/REST (WWW)

eHouse PRO Documentation
WWW: http://en.isys.pl/ehouse,automatyka_budynkowa_bms.htm
DOC: http://www.isys.pl/download/ehouse-pro-catalog-doc-en.pdf

7. Additional and installation information

We use the following relays in the mini/midi/central switchboards of eHouse LAN, RS-485, PRO, HYBRID, BMS:



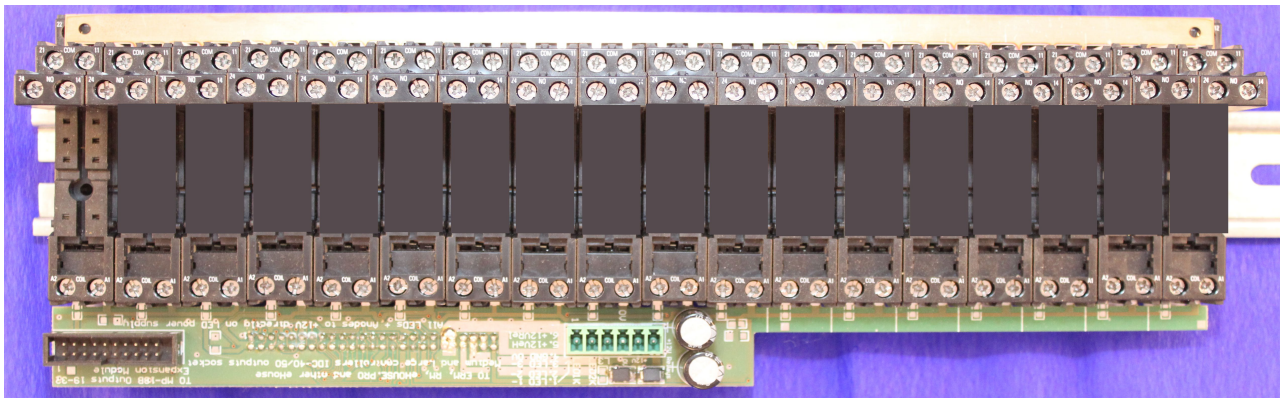
The use of professional/industrial relays with DIN/TH rail ensures insulation between electronics and 230V above 4.5cm. This prevents damage to the system as a result of insects and rodents getting into electronics or excessive moisture or dew. In case of special applications Polish or German equivalents might be used.

For comparison, a miniature relay is shown, typically used in smart home controllers for electrical socket cans with a 7.5mm insulation, in accordance with CE standards.

In our solution, in case of damage, it is possible to replace the damaged relay in the socket or the entire socket without the need to replace the entire controller (with built-in relays). It do not require re-programming of controllers and reconfigure whole system.

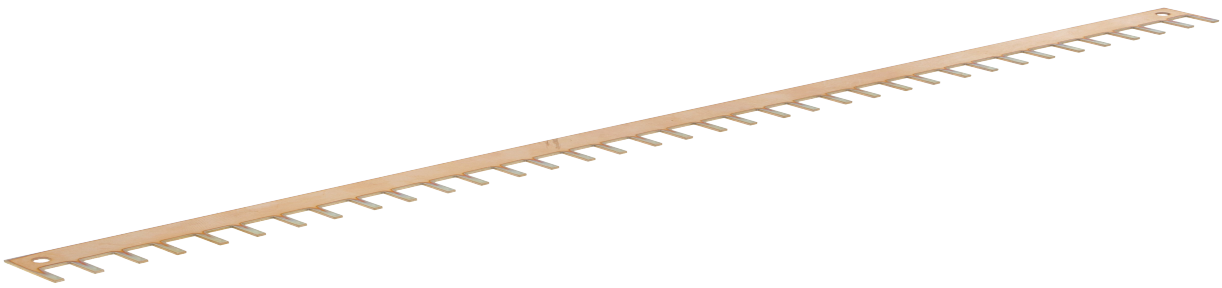
Professional relay module MP-18 for eHouse LAN/PRO
Industrial relays 230V/16A+with DIN sockets + PCB bases
To reduce the workload on the installation, facilitate the service and make it more professional we use relay modules, implementing a set of low-voltage connections for relay coils to eliminate the

use of cross-connections (36 wires). The connection to the controller is made with the IDC-50 flat cable.



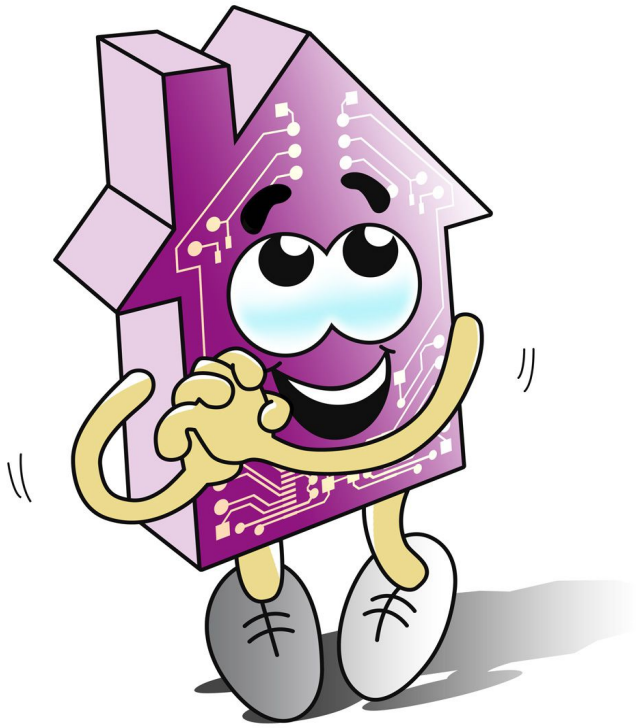
DIN MP-18 Relay module for eHouse LAN/PRO/RS-485

In the case of using a common phase for powering electrical devices from the relays, a copper shorting contact (comb) was used to short-circuit the common relay contacts (COM). This saves another 36 wires. It can be cut into sections depending on the number of devices operating at the same supply voltage.



Links:

Shop: http://ehouse.biz/
WWW: http://en.isys.pl/
DIY Blog: http://smart.ehouse.pro/



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