



eHouse for Ethernet

- Electronic House
- Home Automation
- Smart Home
- Building Management System
- Facility Management
- Intelligent House
- Advanced Remote Control
- Boat, House Boat, Yacht Automation
- Camper Automation

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<http://www.isys.pl/download/Ethernet-ehouseEN.pdf>

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1. Introduction.

"Intelligent house", "Smart Home" terms mean all sort of home automation systems for controlling, driving of independent systems and installations incorporated in the building. Home automation systems can manage many different building types: house, flat, apartments, offices, hotels, etc.

Home automation systems currently are most important system for trimming and equipping of the house. Along with more and more expensive energy prices, ecology restrictions for new buildings, adjusting to investment expectations these system are practically inestimable.

Flexibility of some home automation systems allow to reconfigure it together with changes of expectations during usage of the building, without necessity of changing traditional electric installations together with drastic renovation of the house.

Home automation systems allow increase comfort of living, security, economy, save energy, reduce price of living in the house or flat.

1.1. Ease, comfort, automation.

eHouse system usage enables complex, local and remote controlling of light, temperature, electric and electronic devices in the house, flat, office, hotel, etc. It creates possibility of controlling Audio - Video, HiFi systems by emulating infrared remote controller signals which can be learn and executed by eHouse system. There is possibility of managing very advanced boiler room installation: heating, cooling, recuperation, ventilation, solar, boiler, heat buffer, bonfire with water jacket and hot air distribution system.

eHouse enables controlling system by common switches, IR remote controller, GSM mobile phone, PC, PDA, PADs, Smartphones, graphic touch panels working based on Android, Windows XP, Windows Vista, Windows 7, Windows Mobile 6 and their successors, Java Enabled Systems, internet browser, Windows explorer, ftp client application.

eHouse system graphics control panel are realized on standard PDA, Smartphones, PADs or PC with supplied software. Visualization images can be created individually for any end user installation.

eHouse Controllers consist of large, advanced scheduler which can be programmed to run service, frequent, postponed and season task automatically. PC support enables creating own software, which works together with eHouse package, performing logs and run advanced users algorithms which can be necessary or appear in the future. Programing libraries are also available for developers to improve functionality and create dedicate panels.

1.2. Security.

House is much more endangered then flat, due to large distance to the neighbors and has also much more weak points. It concerns possibility of burglary, attack, theft, fire, flood, sabotage. In case of weak or lack of efficient security system and alarm sensors monitoring any possible events in the house and premisses, counting on neighbors a few dozen meters from us or police reaction is rather too optimistic.

Usage of eHouse system increases security of house and building, because it incorporates build-in security system with GSM/SMS notification of events. It enables connecting any kind of alarm sensors (movement, wet, cold, heat, fire, wind, gas, switches for confirmation of closed doors, windows, rollers, gates, etc.). Security system is activated outside secured zone, which do not give additional time for action to intruders. eHouse gives opportunity to perform automatic task on sensor activation, programed in the system.

eHouse integrates automatic multi-channel driving rollers, gates, doors, shadow awnings etc.

eHouse system enables imitating presence of human in the house by running scheduled events, eg. changing TV channels, which can discourage intruders watching the house from break-in.

1.3. Economy, energy savings.

eHouse system incorporates advanced controller to manage heat, cool, ventilation, recuperation, boiler room, solar system, heat buffer, bonfire with water jacket and hot air distribution, which saves a lot of energy by buffering and using free (solar) or cheapest energy sources (wood, solid fuels). It can be programmed to run fully automatically without human interaction. It enables possibility to limit expenses of heating, cooling, ventilation a few times depending on prices of used fuels.

Individual control of rooms temperatures and maintain them independently, generates additional savings of about several dozens percents, and efficient usage of energy. In this case all temperatures in controlled rooms are maintained automatically on programmed level, without overheating some rooms to keep requested temperature in other one. The weather, sun, wind, climatic events, time and season, architecture issues, window size and locations do not have such huge influence, as it is on central heating systems. There is not big gradient between the rooms which changes due to weather conditions, solar heating, wind direction, and many other unpredictable issues.

Additional savings can be achieved by automatic switching off light by setting them to turn off automatically after some time or turn them on, for a period of time as the result of movement detection.

Using multi-point small power light lamps can gain also lot off energy savings, comparing to high power central light.

This possibilities of eHouse system gives opportunity to refund costs of installation during 1-3 years (depending on costs of used fuels).

2. eHouse system versions.

eHouse System is advanced solution of home automation which enable controlling and integration many devices of different type. eHouse enables monitoring and control temperature, light level, heating, cooling, humidity.

eHouse System can be installed in flats, houses, public buildings, offices, hotels and can be used as access control system.

eHouse system installation can be economic, comfort or maximal.

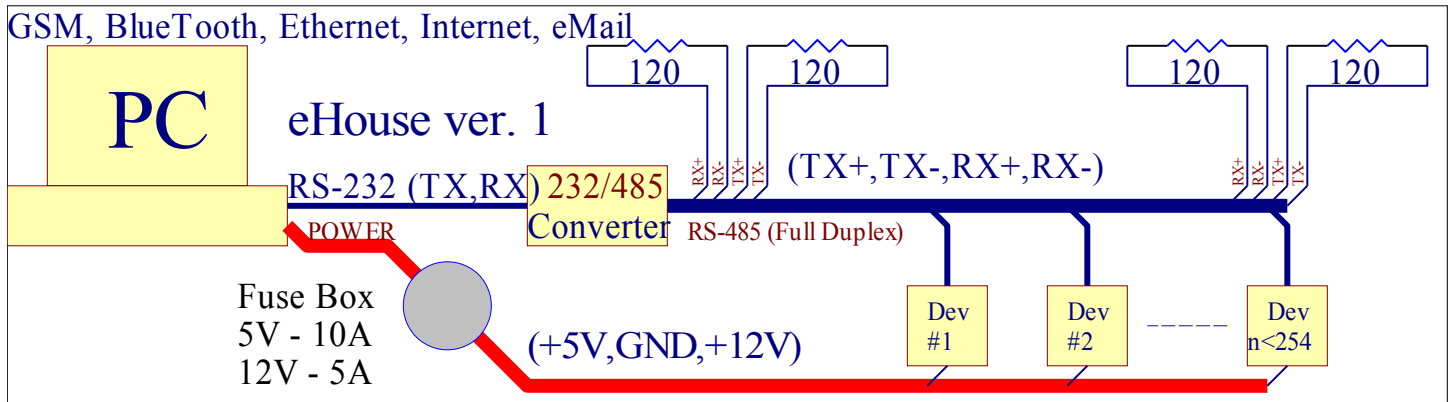
Many configuration variants of eHouse system creates possibility of decentralized, centralized, managed by PC or independent installation.

eHouse is modular system which gives opportunity to resign from not used parts and trim application directly to end user needs (e.g. HeatManager can be dropped in flat installation).

eHouse installation can be designed as centralized and one controller per level (LevelManager) or decentralized with many controllers spread over the rooms. In second case there are much less 230V cabling and their total length are a few times shorter and makes installation much cheaper, which partially make up for larger costs of controllers.

2.1 eHouse 1 under PC supervision.

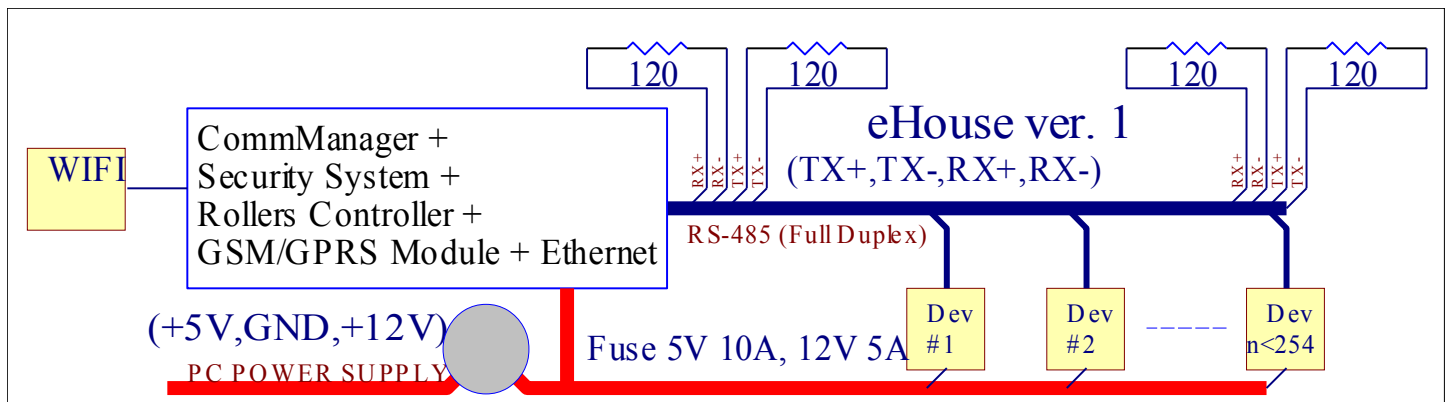
All eHouse 1 devices are working on data bus (RS-485 Full Duplex).



This version was explained at: <http://www.isys.pl/download/eHouseEN.pdf>

2.2. eHouse 1 under CommManager supervision.

In this configuration CommManager replaces PC, RS232 / RS485 Converter, ExternalManager, InputExtenders, Expander. Ehouse 1 version is explained at: <http://www.isys.pl/download/eHouseEN.pdf>



2.3. eHouse.PRO (Professional) for centralized installation in main switch-board and hybrid installations

Ehouse.PRO system version based on ARM Linux microcomputer board:

- build in intelligent I/O modules up to 256 inputs working as normal or alarm inputs
- up to 256 intelligent outputs which can work as single (on/off), double - driving servomotor, cut-off etc, (close/open/stop)
- Implementing also intelligent security system/alarm with GSM notification and control
- Alarm outputs: Horn, Warning, Monitoring, Silent, Early Warning
- build-in Web browser control, management, visualization
- Integrates all other eHouse versions (RS-485, LAN, CAN)

More info can be found in dedicated documentation.

2.4. eHouse4CAN (eHouse for Controller Area Network)

eHouse for CAN is low budget system for smaller building and installation based on small controllers incorporating relays on PCB, mounted in electric socket cans.

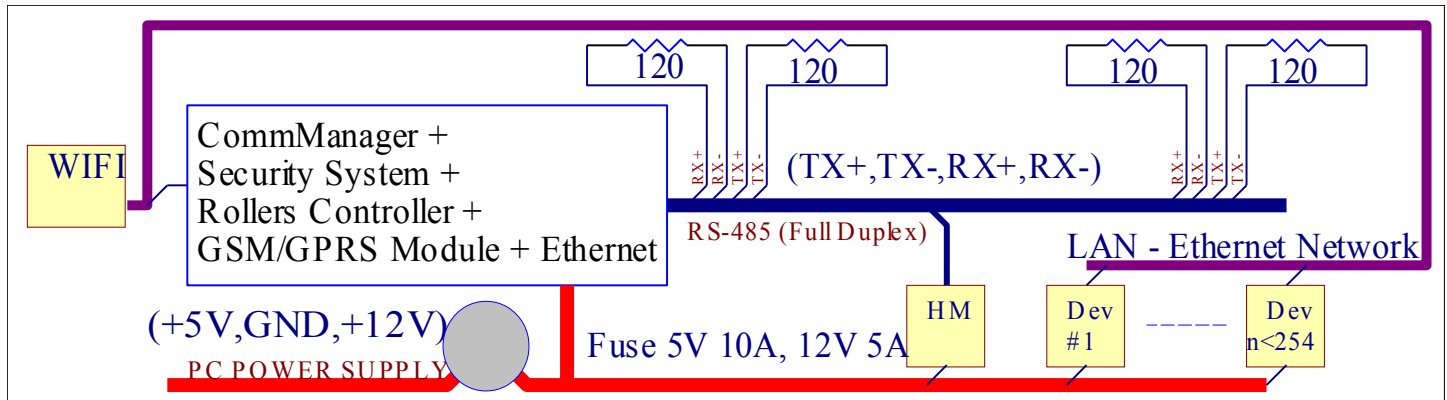
Controllers are connected using CAN serial communication interface.

eHouse CAN controllers works under eHouse.PRO server software supervision, controlled, managed, configured from web browser only.

More info can be found in dedicated documentation.

2.5. Ethernet eHouse (eHouse for Ethernet) = eHouse LAN

This variant of installation works under TCP/IP Ethernet (10Mbit) infrastructure. Only one exception is HeatManager which is still connected via RS-485 through crossing cable. CommManager cooperates with LevelManagers, EthernetRoomManager's, TCP/IP panels (Windows XP, Windows Mobile 6.0, Android, Java) using eHouse protocol with challenge-response authentication for security reasons. Third party applications can use simpler authentication methods if it is enabled in the controller configuration.



eHouse System enables control practically every device, which can be controlled electrically or electronically, constantly developed and opened on news on the market.

eHouse can be controlled by IR remote controller (SONY standard), PC, PDA, Smartphones, Pads, Mobile Phones (Windows Mobile 6.0, Android or Java MIDP 2.0), Touch panels based on (Windows mobile 6.0, Windows XP, Windows Vista, Windows 7 and successors), Android, Java equipped systems, or by common wall mounted switches. Control can be achieved via Infra-Red (IR), Ethernet, WiFi, Internet, eMail, SMS, ftp, file copy.

eHouse use common devices (switched on/off by relays eg. lamps, pumps, cutouts, heaters), without internal logic control and do not require expensive and dedicated devices (eg. graphic panels, switch panels).

eHouse cooperates and can be managed by PC, PADs, PDAs which gives opportunity to create own software overlays for implementation advanced and individual algorithms by analyzing controllers state and signals parameters and performing data in desired way and send desired eHouse events.

eHouse4Ethernet system consists of :

- EthernetRoomManager (ERM) - Controlling one or more rooms,
- LevelManager (CM/LM) - Controlling whole flat, apartment or house storey,
- EthernetHeatManager (EHM) - Controlling central heat system, ventilation, recuperation, boiler room, bonfire with water jacket and hot air distribution, solar, heat buffer, etc,
- CommManager (CM) Ethernet, GSM - Integrated security system, Rollers controller,

- Relay Module (MP) - Consist all relays for controller and PWM dimmers (optional),

Modular character of eHouse system enables choosing individual variant of installation which would be most efficient, desired by owner, and cost effective.

E.g. persons who creates eHouse installation in flat or apartment do not need EthernetHeatManager controller, Roller controller. They generally need LevelManager or CommManager to directly control flat, or EthernetRoomManagers for individual controlling heat, lights in the rooms and Audio/Video systems.

eHouse system enables:

- Integrated control of electric and electronic devices (on / off) (ERM).
- Controlling Audio / Video, HiFi system (via IR remote controller emulation) (ERM).
- Measurement and control of light level (ERM, LM).
- Measurement and control of temperature (ERM, EHM, LM).
- Multi-point and individual heat control (ERM, LM).
- Integrated control of boiler room (EHM).
- Management of ventilation, recuperation, heat exchangers, air handling units (EHM).
- Boiler control (EHM).
- Bonfire control with water jacket and / or hot air distribution (EHM).
- Solar system control (EHM).
- Heat buffer control (EHM).
- Security system with GSM notification activated outside monitored zone (CM).
- Graphical Visualization (individually created for end user installation in CorelDraw) (PC, PDA, PADs, Smartphones - Windows Mobile 6, Windows XP, 7, Vista, Android, Java Enabled Operating Systems).
- Rollers, gates, doors, shade awnings control (CM).
- Creating logs in eHouse system (PC).
- Usage of third party components and executive devices (without any build-in logic to control), sensors, switches, pumps, motors, cutouts, rollers drivers etc.
- Usage of analog sensors from the market (<0;3.3V) measurement range.
- IR Remote Control of system (Sony standard SIRC) (ERM).
- Remote control via internet and Ethernet (ERM, CM, LM, EHM).

- Local control by graphics panels Android, Java Enabled, Windows Mobile 6.0 (and successors), or PC compatible with touch screen Windows XP, Vista, 7 (and successors).
- Remote control by mobile phones, PDA, PADs, Smartphones with touch screen (Android, Windows Mobile 6.0 application controlling system via WiFi, SMS or eMail).
- SMS notification of security violations, zone changes, deactivation (to defined report groups) (CM).
- eHouse has implemented functions of self control, logging, to maintain continuous and efficient work.

3. eHouse4Ethernet System Controllers.

3.1 EthernetRoomManager (ERM).

EthernetRoomManager (ERM) is self contained Microcontroller with build in peripherals for managing electric, electronic devices in the room. Comfort and maximal installations uses 1 ERM per major room (defined by user which room is important). In low budget installation 1 LM or ERM per storey is required. This solution put some restriction on Infrared Control and program sets.

Main Functions of EthernetRoomManager:

- 24 (32) digital programmable outputs (directly for driving external Relays build on MP) for turning on / off external devices powered up to 230V-AC/10A (maximal values for current and voltage of resistive load).
- 12 digital inputs for connecting sensors, switches, etc. Events are defined for changing state from 1->0 or 0->1. Assignment of desired events can be performed in “CommManagerCfg” application.
- 8 analog inputs (10bit resolution) with individually programmed levels (min,max). Two events are defined for changing from one level to another $x < \min$, $x > \max$.
- 3 PWM (Pulse width modulation) outputs for controlling light level (DC dimmer) can be used separately or together for combined RGB Control. EthernetRoomManager's PWM output is capable to drive single LED (for opto-isolator) and need power driver. External PWM power drivers can be installed or used FrontPanel module. PWM power drivers can be optionally installed on ERM board with or without optoisolation
- Programmable clock and scheduler (128 positions) for running events stored in flash memory of ERM.
- IR infra red receiver compatible with Sony (SIRC) system for controlling EthernetRoomManager's by Sony or universal remote controllers.
- IR Infra red transmitter for controlling Audio / Video / HiFi systems by remote controller signal emulation.
- Up to 250 ERM can be installed in single eHouse System segment.

EthernetRoomManager can be configured and managed by PC with installed “CommManagerCfg.exe” application, which enables programming all functions and options controller to become self contained independent module and all local functions can be performed internally without attendance of PC, control panels, server software, PADs etc. Remote control (sending event) of other eHouse Ethernet Controller can also be directly performed.

EthernetRoomManager consists of a few different signal types (which are inputs or outputs). Each signal contains a few individual events and options associated to it, based on type of signal.

Input signals are:

- All analog inputs,
- All digital inputs,
- IR receiver (for remote control).

Output signals are:

- All digital outputs,
- All PWM outputs,
- IR transmitter (for controlling external devices).

3.1.1. Signals Description.

3.1.1.1. Analog Inputs (ADC).

Each analog input has working range $<0; 3.3V$) with 10 bit resolution. It has individually assigned voltage levels minimal and maximal (which gives 3 ranges of ADC operation). Crossing this levels will initiate automatic event execution defined and programmed by "CommManagerCfg.exe" application. These levels are individual for each ADC channel and each program of EthernetRoomManager.

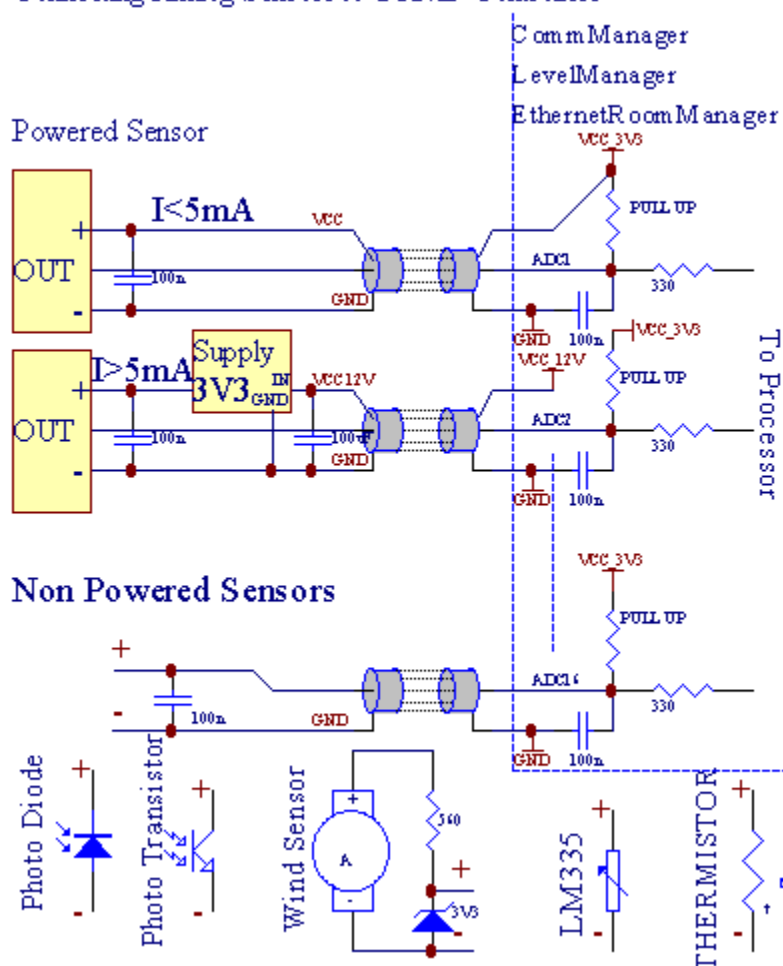
Two events are associated to each ADC for crossing levels by measured values:

- If $U_x < \text{"Min Value"} *$ programmed in application for current program, event assigned in "Event Min" * field in CommManagerCfg application is launched.
- If $U_x > \text{"Max Value"} *$ programmed in application for current program, event assigned in "Event Max" * field in CommManagerCfg application is launched.

Some ADC inputs can be allocated internally depending on hardware versions.

(*) Naming convention from "CommManagerCfg.exe" application.

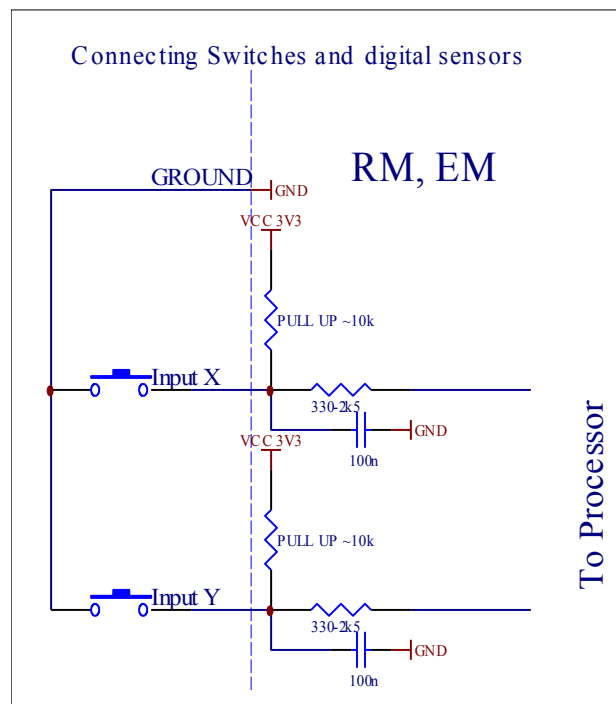
Connecting Analog Sensors to TCP/IP Controllers

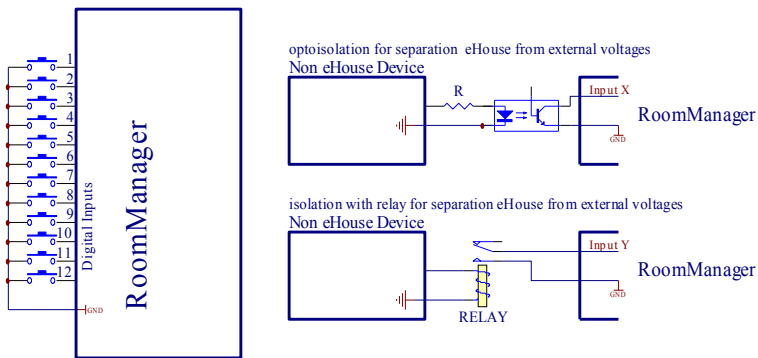


3.1.1.2. Digital Inputs.

Digital inputs detect two logic levels (1 and 0). In order to assure proper error margin inputs has about 1V hysteresis. Inputs are Pull Up to 3V3 power supply, and shorting input to controller ground signal activate current input. Electronic sensors and any kind of switches must assure this levels over the long lines and the best solution is when devices has build in relay with not connected contacts to external potentials (which are connected to Controller Inputs as common switch). This situation assures proper voltage levels and separate devices which could be powered from other supplies securely. Otherwise, supply value difference or sensor malfunction may cause permanent damage of input or whole controller.

There are one event defined for each input upon changing state from 1, 0 set in “CommManagerCfg.exe” application. Inverted action can be defined when “Inverted” flag is set up for current input. In this case input launch when it is disconnected from GND.





Inputs must be separated from any voltages. Only short to the ground (GND) of current controller is accepted.

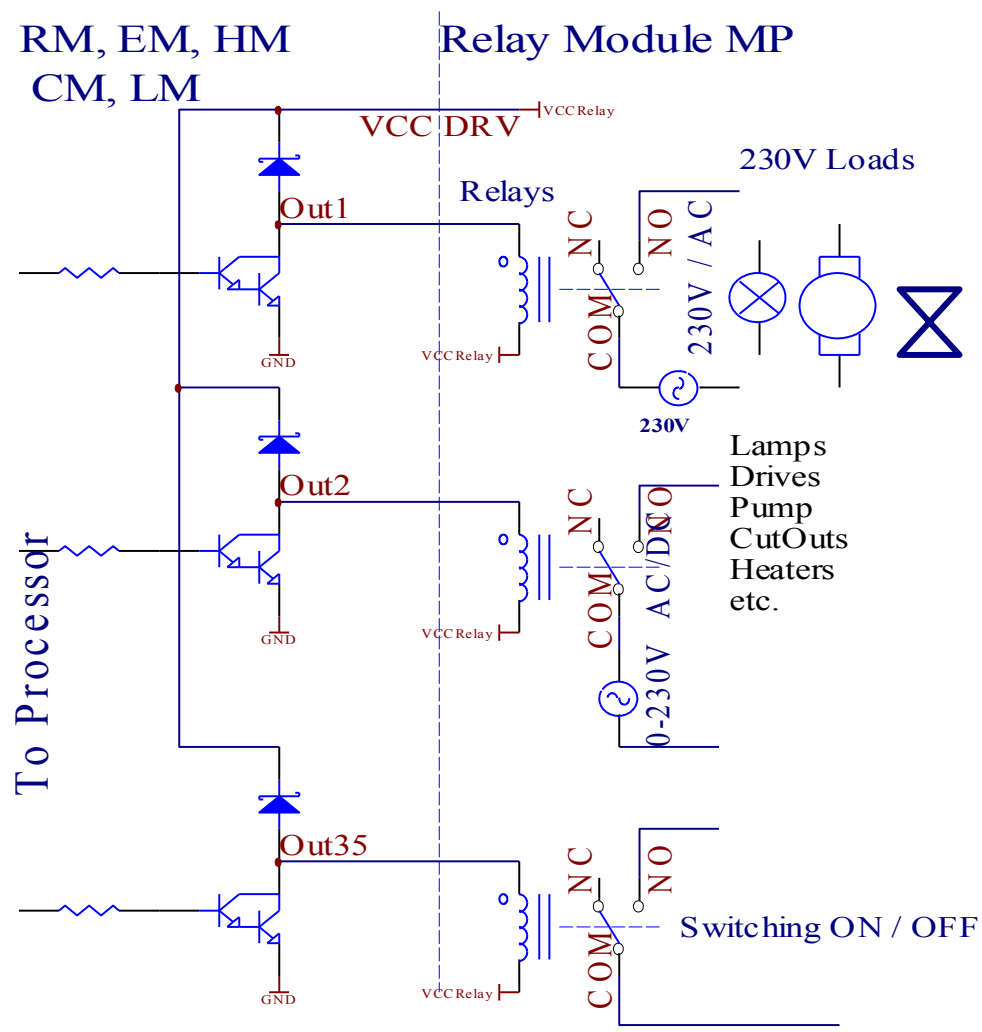
3.1.1.3. Digital Outputs

Digital outputs can directly drive Relays (Single or on Relay Module) and can be set to logical states 0 and 1 (turn off and on relay contacts). Event assigned to outputs are:

- ON,
- OFF,
- Toggle,
- ON (for programmed time),

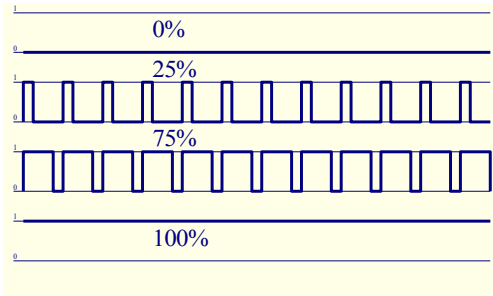
It can be run as:

- an event of ADC level cross,
- input change event,
- scheduler event,
- manual event.



3.1.1.5. PWM (Pulse Width Modulated) Outputs.

PWM Output are DC dimmers, which have variable duty cycle (with 8 bits resolution).



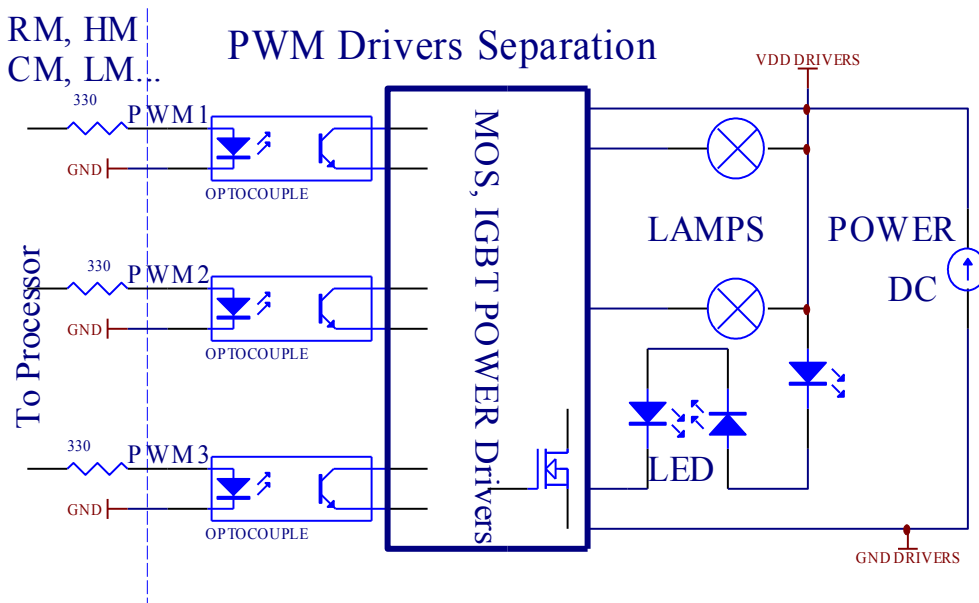
PWM outputs along to Power drivers installed optionally (with or without optoisolation for protection) on:

- Relay Module
- optional FrontPanel
- ERM itself
- LED power supply

can regulate fluently (255 positions) light level of lamps powered 12V/DC - 30W. Eventually external power drivers with opto-isolation on input, can be used to drive high power and inductive loads (e.g. DC motors, ventilators, pumps).

PWM output of LM, ERM, EHM is capable to drive 1 LED connected directly as an element of opto-isolator. Opto-isolator is a must to protect Controller from permanent damages of whole system caused by breakdowns.

Connection example of external PWM power drivers to eHouse System.



Connection should be realized as short as possible due to large currents and short pulses of controlled signal.

3.1.1.6. IR Remote Control of EthernetRoomManager.

Each EthernetRoomManager can be controlled by standard IR Sony remote controller (SIRC). Remote Controller enables:

- change outputs states,
- change temperature levels,
- change ADC levels,
- change light levels,
- reset EthernetRoomManager,
- Control Winamp application installed on PC eHouse server (*).

assign of direct local event to Remote Controller buttons can be performed individually.

Default Remote Controller type is SONY RMT-V260A (uses VIDEO 2 setting).

Considering huge number of function in the system, remote controller should have as many buttons as possible (with internal switch for changing devices).

Default remote controller button functions (pre-configured setting VIDEO 2).

Button	Functions
Clear	Cancel
0-9	0-9 choosing nr of input, output, ADC channel, PWM channel
Play	ON
Stop	OFF
wheel +	+
wheel -	-
TV/Video	Temperature (levels)
Display	Light (levels)
Input Select	Digital Outs
Audio Monitor	Analog Input (Levels)
Rec	Reset current RoomManager (require pressing OK as well)
OK	Confirmation of reset and changing program
Power	Toggle (Switch to other level)
Smart File	Program Selection (global definition for current RM max 24 programs)
Menu	Controlling other EthernetRoomManager (only output can be changed) ["Menu" +
Nr_of_RoomManager	+ "OK" + "Input Select" + OutputNr + ON / OFF / Toggle] (*)
Pause	Winamp (Play) (*)
SAT	Winamp (Stop) (*)
Index Next	Winamp (Next Track) (*)
Index Previous	Winamp (Previous Track) (*)
SP/LP	Winamp (Shuffle) (*)
Wide	Winamp (Repeat) (*)
Vol+	Winamp (Volume+) (*)
Vol-	Winamp (Volume-) (*)

Remote Controller usage enables execution of any event, except changing configuration and scheduler edition.

Steps for IR control:

1. Choosing Mode:

- Temperature,
- Light,
- Digital Output,
- Analog Input (ADC),
- Program.

2. Choosing channel nr:

0..max

3. Value Change

- +,
- -,
- On,
- Off,
- Toggle.

(e.g. Light Level, channel 1, +, +, +)

EthernetRoomManager ignores long pressing of button so + must be pressed multiple times to switch to expected level.

There is possibility of usage universal IR remote controllers (with built-in SONY standard support - SIRC), with LCD touch panel (e.g. Genius, Logitech {Harmony}) and create desired configuration and descriptions in remote controller to create IR Control Panel for eHouse Management.

Besides dedicated buttons for control, there is possibility to assign any local RoomManager event to free buttons available on Remote Controller (max 200). There is possibility to control various Audio / Video, HiFi system via Single Sony Remote controller, and assigning many functions to buttons.

Changing output state (ON / OFF).

1. Press (Input Select) button on remote controller

2. Press nr 0..24

3. Select desired state

- (POWER) Toggle (ON->OFF or OFF->ON),
- (Play) – ON,
- (Stop) - OFF.

Examples:

(Input Select) -> (1) -> (3) -> (Play) = Output 13 ON

(Input Select) -> (7) -> (Stop) = Output 7 OFF

(Input Select) -> (1) -> (7) -> (Power) = Output 17 Change State

Change RoomManager Program.

1. Press (Smart File)

2. Select NR 1..24

3. Press (OK)

Examples:

- (Smart File) -> (1) -> (3) -> (OK) = Select Program 13
- (Smart File) -> (7) -> (OK) = Select Program 7
- (Smart File) -> (1) -> (7) -> (OK) = Select Program 17

Shifting ADC Levels.

1. Press (Audio Monitor)
2. Select channel 1..8
3. Turn wheel (+) or (-) (1 pulse = shift approx 3.3mV for voltage, for temp approx 0.8 degree for LM335).

Example increase heating about 2 degree, controlled by ADC channel 2

1. (Audio monitor) -> (2) -> (Wheel +) -> (Wheel +) -> (Wheel +)

Light Level Control.

1. Press (Display)
2. Chose Dimmer channel:
 - 1-n -> For PWM dimmers (1..3),
 - 0 -> for turning on / off successive outputs (light groups if used)
3. Choose mode,
 - OFF (Stop),
 - ON (Play),
 - Toggle (Power),
 - "+" (wheel),
 - "-" (wheel).

4. (OFF).

For Dimmer number:

- 1-n -> PWM Dimmers (to stop dimmer change) if dimmer currently increases or decreases , if Dimmer is stopped pressing this button initiate dimming (until stop or off).

For Dimmer Number:

- 1-n -> if Light Level is 0 start brightening selected dimmer otherwise initiate dimming.

4 (ON).

For Dimmer Number:

- 1-n -> Start brightening selected PWM Dimmer (up to Max Value or manual stop),

4 (-).

For Dimmer Number:

- 0 -> switch off last output (light group),
- 1-n -> start dimming of selected PWM Dimmer (down to Min Value or manual stop),

4. (+).

For Dimmer Number:

- 0 -> switch on next output (light group),
- 1-n -> start brightening of selected PWM Dimmer (up to Max Value or manual stop),

Examples:

(Display) -> (1) -> (+) ->.....(delay e.g. 10s)....-> (Stop) - Start brightening PWM Dimmer 1 and stop after 10s
 (Display) -> (+) - Turn on next output nr (next light group)
 (Display) -> (-) - Turn off current output nr (current light group)

Controlling other EthernetRoomManager outputs (*).

1. Press (Menu),
2. Choose (Address Low) of desired RoomManager,
3. Press (OK),
4. Perform steps as for local RoomManager
 (Input Select -> (Output NR) - (Power or Play or Stop)
5. Control for local RM will be restored after 2 minutes inactivity of remote controller or manual selection of RoomManager nr 0.

Examples

(Menu) -> (2) -> (OK) Selecting EthernetRoomManager (with address = 0,202)
 (Input Select) -> (1) -> (2) -> (Power) Change state for Output 12 of selected ERM
 (Input Select) -> (1) -> (0) -> (Play) Turn On Output 10 of selected ERM
 (Input Select) -> (4) -> (Stop) Turn Off Output 4 of selected ERM
 (Menu) -> (OK) Restoring local RM selection.

During changing function, No. of out, input, program, etc is always reset to 0, so it is not necessary selecting 0 like these (Menu)- > (0) -> (OK)

Managing Winamp Application (*).

Winamp application must be installed and running on eHouse PC Server. Winamp is controlled via IR (Sony remote controller) through EthernetRoomManager.

Predefined remote controller buttons and their functions:

RC button	Function
Pause	Winamp (Play) or repeat current track,
SAT	Winamp (Stop) fade out and stop,
Index Next	Winamp (Next Track),
Index Previous	Winamp (Previous Track)
>>	Winamp (FF) Forward few seconds
<<	Winamp (Rewind) Rewind few seconds
SP/LP	Winamp (Shuffle) Toggle Shuffle mode
Wide	Winamp (Repeat) Toggle Repeat

Vol+ Winamp (Volume+) Increase Volume 1%
Vol- Winamp (Volume-) Decrease Volume 1%

2. Assigning events of local EthernetRoomManager to Remote Controller Buttons.

EthernetRoomManager has build in function for execution local event upon pressing programmed button of remote controller (max. 200 events to buttons assignment is possible).

To create definitions of remote controller buttons:

- run “CommManagerCfg” for desired EthernetRoomManager eg. „**CommManagerCfg.exe /a:000201**”.
- Press button “Infra red settings” on “General” * Tab
- Proper position should be chosen from combo-box control „User Programmable IR Functions” *.
- Name can be changed in name field
- Event should be selected after pressing label with current event or “N/A”. Event creator Window appears – after selection event “Accept” should be pressed.
- “Capture IR” * button should be pressed
- Press Remote Control Button directed to selected EthernetRoomManager.
- IR code should be displayed on face of button "Capture IR" *.
- Press “Add” button
- After assignment all desired remote controller buttons to events press button "Update Codes" *
- Finally “Save settings” button need to be pressed for download configuration to the controller.

Controlling of external devices (Audio / Video / HiFi) via IR Remote controller code emulation.

EthernetRoomManager contain IR transmitter and build in logic for transmitting IR signals in many manufacturers standards.

They can be captured, learned and play (up to 255 codes per each ERM). After IR code capture, eHouse events are created to integrate with the system. This events could be executed by many ways.

3. Defining Remote codes, controlling external devices.

In order to create and add IR Remote Controller code for management of external devices (TV, HiFi, Video, DVD etc) under supervision of selected EthernetRoomManager, following steps should be performed:

- Run “CommManagerCfg” for desired EthernetRoomManager eg. „**CommManagerCfg.exe /a:000201**”.
- Press button “Infra red settings” on “General” * Tab
- Open “Remote Control” * Tab, and go to “Defining IR Control Signals”.
- Put unique, short and descriptive name. (e.g. TV ON/OFF).
- Press "Capture IR Signal" * and then button of remote controller for external device (directed to selected RoomManager).
- IR Code should appear on a face of button in eHouse application.
- Result are displayed in output window
- Code can be added to eHouse system by pressing "Add" * button.
- After programming all needed IR Codes press button Update Codes.

4. Creating macros - subsequent 1 to 4 remote codes executions.

supervision of selected EthernetRoomManager, following steps should be performed:

- Select desired EthernetRoomManager name in "General" * Tab.
- Open "Remote Control" * Tab, and go to "Defining IR Macros" *.
- Press "Add" * button and go to the end of list (if you need to add new item) or choose item from list to replace.
- In 1, 2, 3, 4 * Combo-boxes choose sequentially IR Events defined in "IR Control Signals" * group.
- IR signals will be launched from 1 to last one by RoomManager after loading configuration.
- After programming all needed macros press button "Update Codes" *.
- Finally in "General" * tab Press button "Save Settings" to create IR Events.

Few dozen standards IR Remote Controllers type are supported by EthernetRoomManager (should be verified by testing device and remote controller). Verified standards are (Sony, Mitsubishi, AIWA, Samsung, Daewoo, Panasonic, Matsumi, LG and many more). Best way is to decide on one Manufacturer of Audio/Video devices. Some manufacturers do not always use one Remote Controller System, then capture and play code should be checked.

3.1.1.7. Controlling by sub-miniature IR/RF remote controller (electronic key)

eHouse system supports also electronic keys (IR Infra-Red and radio Frequency RF), containing 4 buttons. Pressing down buttons will launch IR code for changing program of current EthernetRoomManager (equal to pressing sequence of buttons in Sony RC (SmartFile > ProgramNR +1 > OK). Profiles must be created in RoomManager or "CommManagerCfg.exe" application.

3.1.2. Extension modules for EthernetRoomManager.

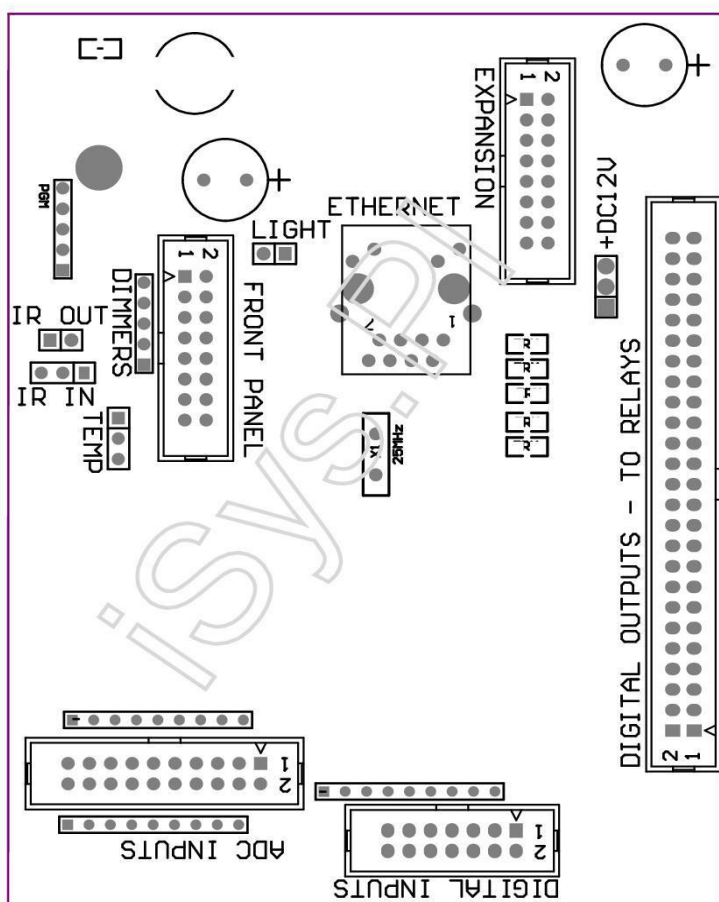
3.1.2.1 Optional Extension Modules (*).

EthernetRoomManager is equipped with

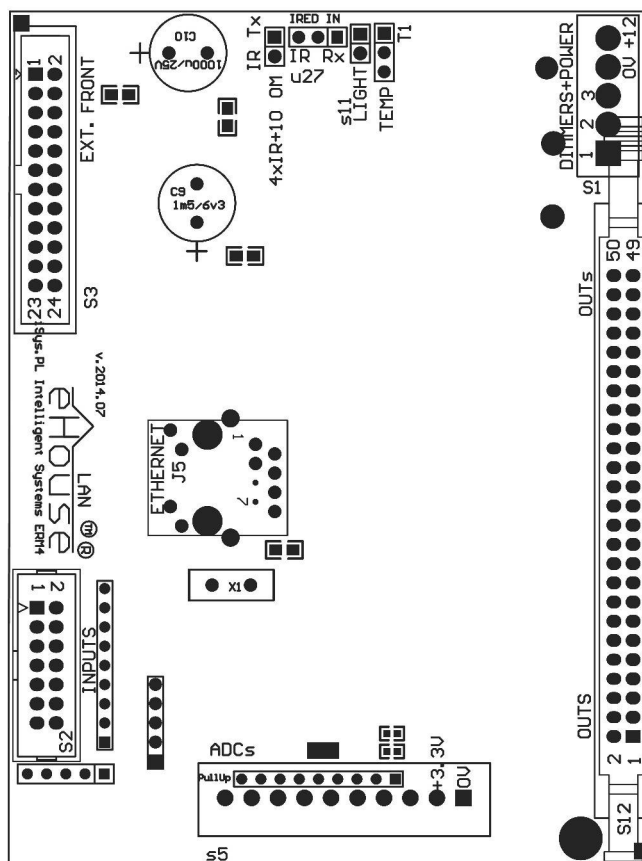
- 2* RS-232(TTL) UART
- 2* SPI
- 2* I2C

Ports which can be used in dedicated versions of controllers or special applications.

ERM - EthernetRoomManager Rev. 1



ERM - EthernetRoomManager Rev. 2,3,4



3.1.3. Installation instructions, Connectors and signal descriptions of EthernetRoomManager, EthernetHeatManager and other medium controllers based on EthernetRoomManager PCB.

Most of eHouse controllers uses two row IDC sockets which enable very fast installation, deinstallation and service. Usage flat cables which is 1,27mm in width, do not require making wholes for cables.

Pin no. 1. has rectangular shape on PCB and additionally arrow on socket cover.

Pins are numbered with row priority:

2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	
1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	
^																									

ADC – Analog/Digital Converter Inputs (ADC INPUTS) <0;3,3V> - Do not connect external potentials (IDC-20 – ERM REV.1)

- 1 - GND / Ground (0V)
- 2 - GND / Ground (0V)
- 3 - ADC IN 2
- 4 - ADC IN 10
- 5 - ADC IN 3
- 6 - ADC IN 11 / DIGITAL INPUT 12 *
- 7 - ADC IN 4
- 8 - ADC IN 12 / DIGITAL INPUT 11 *
- 9 - ADC IN 5
- 10 - ADC IN 13 / DIGITAL INPUT 10 *
- 11 - ADC IN 6
- 12 - ADC IN 14 / DIGITAL INPUT 9 *
- 13 - ADC IN 7
- 14 - ADC IN 15 / DIGITAL INPUT 8 *
- 15 - ADC IN 8 (optional temperature sensor on ERM board or external front panel)
- 16 - ADC IN 0
- 17 - ADC IN 9 (optional light level sensor (phototransistor +) on ERM board or external front panel)
- 18 - ADC IN 1
- 19 - VDD (+3,3V) – build in resistor on ERM board limiting current / powering temperature sensors (Resistor 100 OM)
- 20 - VDD (+3,3V) - build in resistor on ERM board limiting current / powering temperature sensors (Resistor 100 OM)

ADC – Analog/Digital Converter Inputs (ADC INPUTS) <0;3,3V> - Do not connect external potentials (10 pin socket – ERM REV. 2,3,4,5)

- 1 - GND / Ground (0V)
- 2 - VDD (+3,3V) – with resistor current / limited resistor for powering temperature sensors (Resistor 100 OM)
- 3 - ADC IN 2
- 4 - ADC IN 4
- 5 - ADC IN 5
- 6 - ADC IN 6
- 7 - ADC IN 7
- 8 - ADC IN 10
- 9 - ADC IN 0
- 10 - ADC IN 1

DIGITAL INPUTS - (On/Off) connect / disconnect to ground (do not connect any external potentials)

(IDC-14)

- 1 - Gnd / Ground (0V)
- 2 - Gnd / Ground (0V)
- 3 - Digital Input 1
- 4 - Digital Input 2
- 5 - Digital Input 3
- 6 - Digital Input 4
- 7 - Digital Input 5
- 8 - Digital Input 6
- 9 - Digital Input 7
- 10 - Digital Input 8 *
- 11 - Digital Input 9 *
- 12 - Digital Input 10 *
- 13 - Digital Input 11 *
- 14 - Digital Input 12 *

* Shared with analog/digital converter inputs

DIGITAL OUTPUTS – programmable outputs with relay drivers (IDC-40 lub IDC-50 MALE socket on PCB) Rev. 1,2,3,4

- 1 - VCCDRV – Clamping protection diode VCCrelay (+12V)
- 2 - VCCDRV - Clamping protection diode VCCrelay (+12V)
- 3 – Digital Outputs for direct drive relay inductor (12V/20mA) no. 1
- 4 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 2
- 5 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 3
- 6 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 4
- 7 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 5
- 8 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 6
- 9 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 7
- 10 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 8
- 11 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 9
- 12 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 10
- 13 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 11
- 14 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 12
- 15 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 13
- 16 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 14
- 17 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 15
- 18 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 16
- 19 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 17
- 20 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 18
- 21 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 19
- 22 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 20
- 23 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 21
- 24 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 22
- 25 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 23
- 26 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 24
- 27 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 25 (dedicated functions)
- 28 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 26 (dedicated functions)
- 29 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 27 (dedicated functions)
- 30 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 28 (dedicated functions)
- 31 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 29 (dedicated functions)
- 32 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 30 (dedicated functions)
- 33 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 31 (dedicated functions)
- 34 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 32 (dedicated functions)

- 35 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 33 (dedicated functions)
- 36 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 34 (dedicated functions)
- 37 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 35 (dedicated functions)
- 38 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 39 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 40 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 41 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 42 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 43 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 44 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 45 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 46 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 47 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 48 - GND / Ground 0V (Alternative Grounding for powering controller for flat cable length less then 40cm)
- 49 - +12V power supply for controller (Alternative for powering Controller for flat cable length less then 100cm)
- 50 - +12V power supply for controller (Alternative for powering Controller for flat cable length less then 100cm)

DIGITAL OUTPUTS – programmable outputs with relay drivers (IDC-40 lub IDC-50 FEMALE socket on PCB) Rev. 5 (ERMMINI) CONNECT ONLY TO MP-18 DIRECTLY (Relay Module) without any cables – for information only

- 1 - VCCDRV – Clamping protection diode VCCrelay (+12V)
- 2 - VCCDRV - Clamping protection diode VCCrelay (+12V)
- 3 – Digital Outputs for direct drive relay inductor (12V/20mA) no. 1
- 4 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 2
- 5 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 3
- 6 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 4
- 7 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 5
- 8 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 6
- 9 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 7
- 10 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 8
- 11 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 9
- 12 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 10
- 13 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 11
- 14 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 12
- 15 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 13
- 16 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 14
- 17 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 15
- 18 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 16
- 19 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 17
- 20 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 18
- 21 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 19
- 22 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 20
- 23 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 21
- 24 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 22
- 25 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 23
- 26 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 24
- 27 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 25 (dedicated functions)
- 28 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 26 (dedicated functions)
- 29 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 27 (dedicated functions)
- 30 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 28 (dedicated functions)
- 31 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 29 (dedicated functions)
- 32 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 30 (dedicated functions)
- 33 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 31 (dedicated functions)
- 34 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 32 (dedicated functions)

- 35 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 33 (dedicated functions)
- 36 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 34 (dedicated functions)
- 37 - Digital Outputs for direct drive relay inductor (12V/20mA) no. 35 (dedicated functions)
- 38 - GND / Ground 0V (Grounding for powering controller direct connection to MP-18)
- 39 - GND / Ground 0V (Grounding for powering controller direct connection to MP-18)
- 40 - GND / Ground 0V (Grounding for powering controller direct connection to MP-18)
- 41 - GND / Ground 0V (Grounding for powering controller direct connection to MP-18)
- 42 - GND / Ground 0V (Grounding for powering controller direct connection to MP-18)
- 43 - dimmer 3/ BLUE 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 44 - dimmer 3/ BLUE 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 45 - dimmer 2/ GREEN 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 46 - dimmer 2/ GREEN 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 47 - dimmer 1/ RED 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 48 - dimmer 1/ RED 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 49 - +12V power supply for controller
- 50 - +12V power supply for controller

POWER DC +12V (3-PIN Socket) (Rev. 1)

- 1 - GND / Ground /0V
- 2 - GND / Ground /0V
- 3 – Power supply +12V/0.5A (Input) UPS

POWER DC +12V + DIMMERS (5-PIN Socket) (Rev. 2,3,4)

- 1 – dimmer 1/ RED 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 2 - dimmer 2/ GREEN 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 3 - dimmer 3/ BLUE 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs)
- 4 - GND / Ground /0V
- 5 – Power supply +12V/0.5A (Input) UPS only for ERM

FRONT PANEL – Extension panel socket (IDC-16/IDC-24) - only for eHouse system expansion modules connection

- 1 - +12VDC power supply (Input/Output max 100mA) *
- 2 - +12VDC power supply (Input/Output max 100mA) *
- 3 – Digital Output no. 34 (without any driver)
- 4 - VCC +3.3V power supply (internal stabilizer output for powering panel)
- 5 - IR IN (Infra Red sensor input – for connection IR receiver on panel)
- 6 - ADC IN 8 (optional temperature sensor on ERM board or external front panel)
- 7 - TX1 (RS232 TTL transmit) or other functions of panel
- 8 - RX1 (RS232 TTL receive) or other functions of panel
- 9 - ADC IN 9 (optional light level sensor (phototransistor +) on ERM board or external front panel)
- 10 - PWM 1 (PWM dimmer 1 or (Red for RGB) TTL – without power driver) 3.3V/10mA (for direct drive LED of Power Driver opto-isolator)
- 11 - PWM 2 (PWM dimmer 2 or (Green for RGB) TTL – without power driver) 3.3V/10mA (for direct drive LED of Power Driver opto-isolator)
- 12 - PWM 3 (PWM dimmer 3 or (Blue for RGB) TTL – without power driver) 3.3V/10mA (for direct drive LED of Power Driver opto-isolator)
- 13 - IR OUT – InfraRed Transmitter output (for IR transmitter + resistor 12V/100mA)
- 14 - RESET – Controller reset (When shorten to GND)
- 15 - GND / Ground / 0V *
- 16 - GND / Ground / 0V *

* for powering EthernetRoomManager from Front Panel (disconnect other power supply connections (+12VDC) and assure very good grounding of each devices especially Ethernet Router

ETHERNET - RJ45 socket - LAN (10MBs)

standard LAN socket rj45 with UTP-8 cable.

LIGHT – Light Sensor (2 pin) – optional light level sensor alternatively with external Front Panel

(Rev. 1,2,3,4)

1 - GND / Ground / 0V

2 – Photo Transistor + (or other light sensitive sensor Photo Diode, Photo Resistor) ADC IN 9 (optional sensor on ERM board or external Front Panel)

TEMP – Temperature Sensor (3 pin) – optional temperature sensor alternatively with external Front Panel (MCP9701,MCP9700) (Rev. 1,2,3,4)

1 - +3,3V temperature sensor power supply

2 - ADC IN 8 (optional temperature sensor on ERM board or external Front Panel)

3 - GND / Ground / 0V

DIMMERS - outputs PWM (5 pin) for direct drive opto-couples (3.3V/10mA) of Power Drivers (Rev. 1,2,3,4)

1 - PWM 1 (PWM dimmer no. 1 or Red for RGB dimmers in TTL standard) 3.3V/10mA (for direct connection transmitting diode of opto-isolator - ANODE)

2 - PWM 2 (PWM dimmer no. 2 or Green for RGB dimmers in TTL standard) 3.3V/10mA (for direct connection transmitting diode of opto-isolator - ANODE)

3 - PWM 3 (PWM dimmer no. 3 or Blue for RGB dimmers in TTL standard) 3.3V/10mA (for direct connection transmitting diode of opto-isolator - ANODE)

4 - GND / Ground / 0V - Cathodes of transmitting diodes of optoisolators for power drivers *

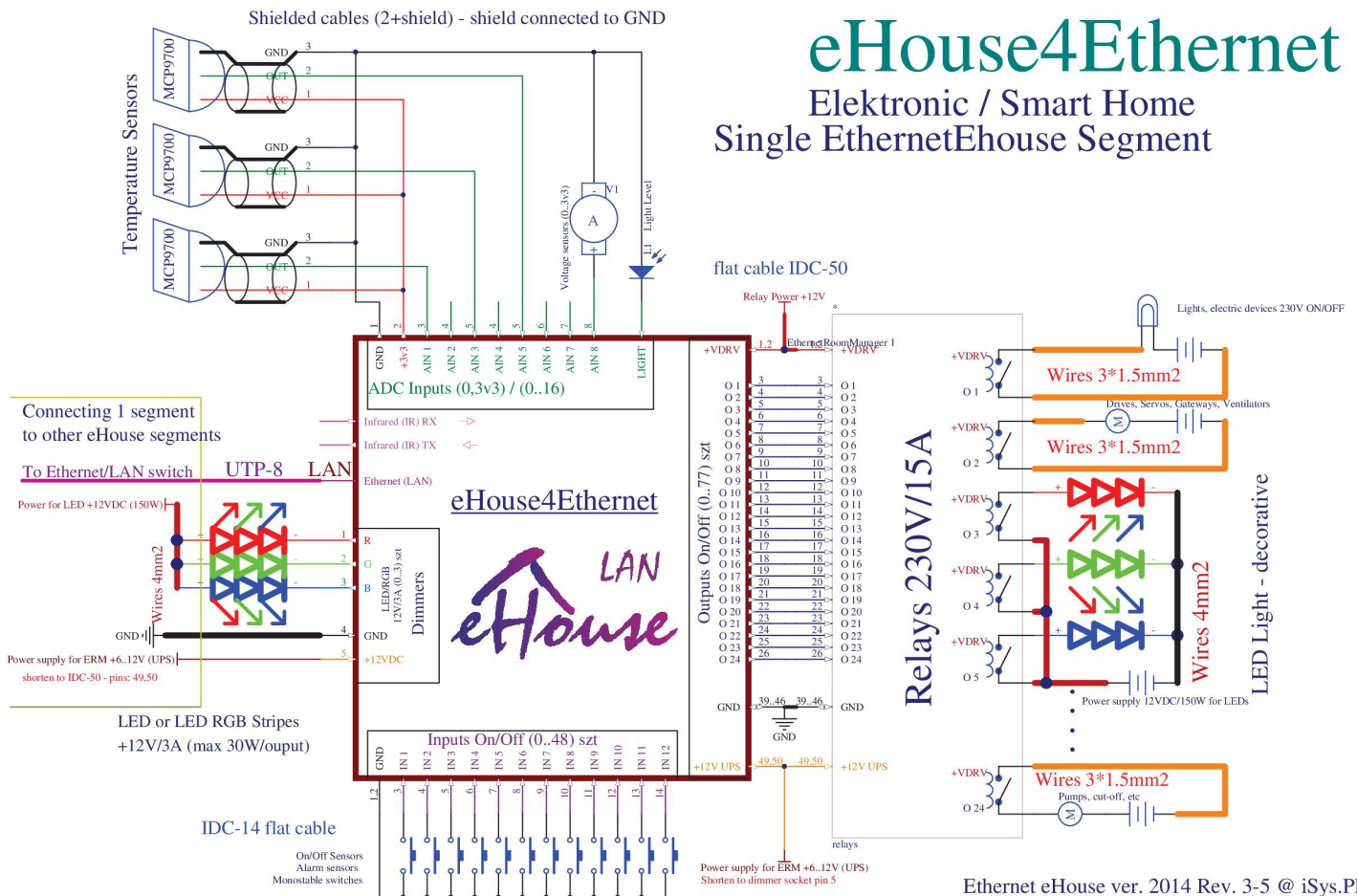
5 - +12VDC power supply (Input/Output 100mA) *

* Powering EthernetRoomManager from Dimmer Power Drivers (disconnect other power supply connections (+12VDC) assure very good grounding of each devices especially with Ethernet Router .

EXPANSION SLOT – Do not connect devices

eHouse4Ethernet

Elektronik / Smart Home Single EthernetEhouse Segment



3.2. EthernetHeatManager - Boiler Room and Central Heat controller

For new installations please use HeatManager (eHouse1 - RS-485) under CommManager or eHouse.PRO server supervision for most effective control of Central Heating system.

3.3. Relay Modules: MP-12, MP-18

Relays Module enables easy installation of eHouse LAN, eHouse 1, eHouse.PRO segments. It completely replace all wires on low voltage side and COM contacts rail (connection). It assures secure, fast, professional, free from errors, and many cables installation. It incorporates relays with socket for DIN rail.

Relay Module enables direct switch on / off executive devices with build in relays (with isolated contacts 230V / 16A). Inductive load can't be connected to contacts except low power pumps, fans. Maximal amount of installed relays is 36 (2*MP-18 or 3*MP-12). Final count depends of module type.

<u>Controller</u>	<u>Used count of relays</u>
EthernetRoomManager	24-32
CommManager	77

230V or other high power cables should be connected and screwed precisely (to contacts of relays) in order to assure long lasting and proper work of system, free from sparking, small resistance of contacts. In Relays Module may contain optional power drivers of PWM (Pulse Width Modulated) Dimmers (up to 3), supplied from +12 VDC and minimal power 24W per output. It can be used only for LED/LED RGB dimming. Assuring good ventilation of module is a must when using dimmers. In case of not sufficient ventilation, fan must be installed to force air flow.

This construction of dimmer allows avoiding discomfort of flashing and hum which appears in triac or thyristor dimmers under 230V/AC.

Drivers of dimmers can only be connected to LEDs. Other application may cause permanent damage of system including fire. It is especially concerning to Inductive loads e.g. motors , high power fans, halogen lamps.

When higher current, inductive load or three phase control is required, other 12V relay should be used and connected to controller (coil)

Using external relays with insufficient current/power parameters or improperly connected may cause fire, electrical shock, transient mains voltages to electronic and cause permanent damage of the system.

MP-18 RELAY COILS – (IDC-40 / IDC-50 FEMALE socket on PCB) Rev. 5 **CONNECT DIRECTLY to ERMMini without any cables. For Other eHouse Controllers connect with IDC-40/IDC-50 flat cables.**

- 1 - VCCDRV – Clamping protection diode VCCrelay (+12V)
- 2 - VCCDRV - Clamping protection diode VCCrelay (+12V)
- 3 – Relay coil (12V/20mA) # 1
- 4 – Relay coil (12V/20mA) # 2
- 5 – Relay coil (12V/20mA) # 3
- 6 – Relay coil (12V/20mA) # 4
- 7 – Relay coil (12V/20mA) # 5
- 8 – Relay coil (12V/20mA) # 6
- 9 – Relay coil (12V/20mA) # 7
- 10 – Relay coil (12V/20mA) # 8
- 11 – Relay coil (12V/20mA) # 9
- 12 – Relay coil (12V/20mA) # 10
- 13 – Relay coil (12V/20mA) # 11
- 14 – Relay coil (12V/20mA) # 12
- 15 – Relay coil (12V/20mA) # 13
- 16 – Relay coil (12V/20mA) # 14
- 17 – Relay coil (12V/20mA) # 15
- 18 – Relay coil (12V/20mA) # 16
- 19 – Relay coil (12V/20mA) # 17
- 20 – Relay coil (12V/20mA) # 18
- 21 – Relay coil (12V/20mA) # 19 on second MP-18 module
- 22 – Relay coil (12V/20mA) # 20 on second MP-18 module
- 23 – Relay coil (12V/20mA) # 21 on second MP-18 module
- 24 – Relay coil (12V/20mA) # 22 on second MP-18 module
- 25 – Relay coil (12V/20mA) # 23 on second MP-18 module
- 26 – Relay coil (12V/20mA) # 24 on second MP-18 module
- 27 – Relay coil (12V/20mA) # 25 on second MP-18 module
- 28 – Relay coil (12V/20mA) # 26 on second MP-18 module
- 29 – Relay coil (12V/20mA) # 27 on second MP-18 module
- 30 – Relay coil (12V/20mA) # 28 on second MP-18 module
- 31 – Relay coil (12V/20mA) # 29 on second MP-18 module
- 32 – Relay coil (12V/20mA) # 30 on second MP-18 module
- 33 – Relay coil (12V/20mA) # 31 on second MP-18 module
- 34 – Relay coil (12V/20mA) # 32 on second MP-18 module
- 35 – Relay coil (12V/20mA) # 33 on second MP-18 module
- 36 – Relay coil (12V/20mA) # 34 on second MP-18 module
- 37 – Relay coil (12V/20mA) # 35 on second MP-18 module
- 38 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 39 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 40 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 41 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 42 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 43 - dimmer 3/ BLUE 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs) only for ERMMini connection
- 44 - dimmer 3/ BLUE 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs) only for ERMMini connection
- 45 - dimmer 2/ GREEN 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs) only for ERMMini connection
- 46 - dimmer 2/ GREEN 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs) only for ERMMini connection
- 47 - dimmer 1/ RED 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs) only for ERMMini connection
- 48 - dimmer 1/ RED 12V/3A output (Open Drain) with fuse (Catodes “-” of LEDs) only for ERMMini connection
- 49 - +12VDC power supply for controller
- 50 - +12VDC power supply for controller

MP-12 RELAY COILS – (IDC-40 / IDC-50 FEMALE socket on PCB) Connect with IDC-40/IDC-50 flat cables (1:1).

- 1 - VCCDRV – Clamping protection diode VCCrelay (+12V)
- 2 - VCCDRV - Clamping protection diode VCCrelay (+12V)
- 3 – Relay coil (12V/20mA) # 1
- 4 – Relay coil (12V/20mA) # 2
- 5 – Relay coil (12V/20mA) # 3
- 6 – Relay coil (12V/20mA) # 4
- 7 – Relay coil (12V/20mA) # 5
- 8 – Relay coil (12V/20mA) # 6
- 9 – Relay coil (12V/20mA) # 7
- 10 – Relay coil (12V/20mA) # 8
- 11 – Relay coil (12V/20mA) # 9
- 12 – Relay coil (12V/20mA) # 10
- 13 – Relay coil (12V/20mA) # 11
- 14 – Relay coil (12V/20mA) # 12
- 15 – Relay coil (12V/20mA) # 13 on second MP-12 module
- 16 – Relay coil (12V/20mA) # 14 on second MP-12 module
- 17 – Relay coil (12V/20mA) # 15 on second MP-12 module
- 18 – Relay coil (12V/20mA) # 16 on second MP-12 module
- 19 – Relay coil (12V/20mA) # 17 on second MP-12 module
- 20 – Relay coil (12V/20mA) # 18 on second MP-12 module
- 21 – Relay coil (12V/20mA) # 19 on second MP-12 module
- 22 – Relay coil (12V/20mA) # 20 on second MP-12 module
- 23 – Relay coil (12V/20mA) # 21 on second MP-12 module
- 24 – Relay coil (12V/20mA) # 22 on second MP-12 module
- 25 – Relay coil (12V/20mA) # 23 on second MP-12 module
- 26 – Relay coil (12V/20mA) # 24 on second MP-12 module
- 27 – Relay coil (12V/20mA) # 25 on third MP-12 module
- 28 – Relay coil (12V/20mA) # 26 on third MP-12 module
- 29 – Relay coil (12V/20mA) # 27 on third MP-12 module
- 30 – Relay coil (12V/20mA) # 28 on third MP-12 module
- 31 – Relay coil (12V/20mA) # 29 on third MP-12 module
- 32 – Relay coil (12V/20mA) # 30 on third MP-12 module
- 33 – Relay coil (12V/20mA) # 31 on third MP-12 module
- 34 – Relay coil (12V/20mA) # 32 on third MP-12 module
- 35 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 36 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 37 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 38 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 39 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 40 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 41 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 42 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 43 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 44 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 45 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 46 - GND / Ground - 0V (Grounding for powering controller direct connection to MP-18)
- 47 – Do not connect
- 48 – Do not connect
- 49 - +12VDC power supply for controller
- 50 - +12VDC power supply for controller

MP-18 RELAY COILS Expansion – (IDC-20 FEMALE socket on PCB).

For second MP-18 /MP-12 connection to IDC-50/IDC-40 socket.

- 1 – VCCDRV – Clamping protection diode VCCrelay (+12VDC)
- 2 – VCCDRV - Clamping protection diode VCCrelay (+12VDC)
- 3 – Relay coil (12V/20mA) # 19 on second MP-18 module
- 4 – Relay coil (12V/20mA) # 20 on second MP-18 module
- 5 – Relay coil (12V/20mA) # 21 on second MP-18 module
- 6 – Relay coil (12V/20mA) # 22 on second MP-18 module
- 7 – Relay coil (12V/20mA) # 23 on second MP-18 module
- 8 – Relay coil (12V/20mA) # 24 on second MP-18 module
- 9 – Relay coil (12V/20mA) # 25 on second MP-18 module
- 10 – Relay coil (12V/20mA) # 26 on second MP-18 module
- 11 – Relay coil (12V/20mA) # 27 on second MP-18 module
- 12 – Relay coil (12V/20mA) # 28 on second MP-18 module
- 13 – Relay coil (12V/20mA) # 29 on second MP-18 module
- 14 – Relay coil (12V/20mA) # 30 on second MP-18 module
- 15 – Relay coil (12V/20mA) # 31 on second MP-18 module
- 16 – Relay coil (12V/20mA) # 32 on second MP-18 module
- 17 – Relay coil (12V/20mA) # 33 on second MP-18 module
- 18 – Relay coil (12V/20mA) # 34 on second MP-18 module
- 19 – Relay coil (12V/20mA) # 35 on second MP-18 module
- 20 – Relay coil (12V/20mA) # 36 on second MP-18 module

MP-12 RELAY COILS Expansion – (IDC-14 FEMALE socket on PCB).

For second/(third) MP-12 connection to IDC-50/IDC-40 socket.

- 1 – VCCDRV – Clamping protection diode VCCrelay (+12VDC)
- 2 – VCCDRV – Clamping protection diode VCCrelay (+12VDC)
- 3 – Relay coil (12V/20mA) # 19/(13)/(25) on second MP-18/12 module
- 4 – Relay coil (12V/20mA) # 20/(14)/(26) on second MP-18/12 module
- 5 – Relay coil (12V/20mA) # 21/(15)/(27) on second MP-18/12 module
- 6 – Relay coil (12V/20mA) # 22/(16)/(28) on second MP-18/12 module
- 7 – Relay coil (12V/20mA) # 23/(17)/(29) on second MP-18/12 module
- 8 – Relay coil (12V/20mA) # 24/(18)/(30) on second MP-18/12 module
- 9 – Relay coil (12V/20mA) # 25/(19)/(31) on second MP-18/12 module
- 10 – Relay coil (12V/20mA) # 26/(20)/(32) on second MP-18/12 module
- 11 – Relay coil (12V/20mA) # 27/(21)/(33) on second MP-18/12 module
- 12 – Relay coil (12V/20mA) # 28/(22)/(34) on second MP-18/12 module
- 13 – Relay coil (12V/20mA) # 29/(23)/(35) on second MP-18/12 module
- 14 – Relay coil (12V/20mA) # 30/(24) on second MP-18/12 module

#xx/(yy)/(zz)

xx – connection second MP-12 to MP-18 as first relay module (IDC-20 ->IDC-50)

yy – connection second MP-12 to MP-12 as first relay module (IDC-14 ->IDC-50)

zz – connection third MP-12 to MP-12 relay module (Three MP-12 relay module) (IDC-14 ->IDC-50)

MP-12 3 PIN - Power Socket (First Pin (1) – rectangular pad on PCB)

- 1) VCCups +12VDC/500mA powering eHouse Controller only – can be UPSed
- 2) GND / 0V - powering eHouse controller + relays
- 3) VCCrelays +12VDC/1A for relays only

MP-12 6 PIN - Power Socket (First Pin (1) – rectangular pad on PCB)

- 1) LED 1 (RED) Cathode (2A/channel) {+12VDC/8A for LED Dimmers connected to Anodes}
- 2) LED 2 (GREEN) Cathode (2A/channel) {+12VDC/8A for LED Dimmers connected to Anodes}
- 3) LED 3 (BLUE) Cathode (2A/channel) {+12VDC/8A for LED Dimmers connected to Anodes}
- 4) GND / OV for powering the MP and eHouse controller
- 5) VCCups +12VDC/500mA powering eHouse Controller only – can be UPSed
- 6) VCCrelays +12VDC/1A for relays only

3.4. CommManager/(LevelManager) - Integrated communication module, GSM, security system, roller manager, eHouse 1 server.

For new applications please consider eHouse.PRO with much greater functionality and possibility of integration and control.

CommManager is self contained security system with GSM (SMS) notification and control. It also contains built-in Drives, Servos, Gates Manager. CommManager contains GSM module for direct control via SMS, eMail. Additionally it contains Ethernet interface for direct TCP/IP control (over LAN, WiFi or WAN). This enables multi-channel independent communication for most important subsystem in the house - Security System. GSM/SMS is not liable on sabotage eg. cutting telephone lines of dialer for monitoring purposes. GSM signal is much harder to disturb then monitoring radio-lines, working on amateur frequencies easy to distort by large power transmitters turned on during break in.

3.4.1. Main features of CommManager/LevelManager

- Self contained security system with GSM / SMS notifications, controlled outside monitoring zone, managing by SMS, Ethernet, Internet (*), WiFi (*)
- Allows connection alarm sensors (up to 48)
- Incorporates build in roller, gates, shadow awnings, doors drives controller max 35 (27*) independent servomotors. Each roller device is controlled by 2 lines and works in Somfy standard as default. Alternatively direct servomotor drive (containing full protections) can be controlled.
- Contains RS485 interface for direct connection to eHouse 1 data bus or other purposes.
- Incorporates Ethernet interface for direct control (over LAN, WiFi (*), WAN (*), Internet (*)).
- Contains GSM module for Security system notification and controlling system via SMS.
- Incorporates eMail Client POP3 (over GSM / GPRS dial up network), for controlling system via eMail.
- Do not require stand alone link to internet and works wherever is sufficient GSM / GPRS signal level.
- Enables direct connection of Alarm Horn, Alarm Lamp, Alarm Monitoring device.
- Allows programmable servos, gates, doors working parameters: control time, full movement time (maximal of all rollers), delay time (for changing direction).
- Enables alternative usage of outputs as a single, standard (Compatible with RoomManager), if rollers system are not required (LevelManager mode).
- Contains RTC (Real Time Clock) for devices synchronization and valid scheduler usage.
- Contains Advanced Scheduler for frequent, automatic, service, unattended, programmed in time events execution,
- Incorporates TCP/IP server for controlling system with 5 concurrent connections accepted. Connections has equal priority and enables: receiving events from TCP/IP devices compliant to eHouse system, continuous transmitting logs to PC system, sending eHouse 1 devices status to TCP/IP panels for monitoring states and visualization purposes, achieve transparent TCP/IP to RS-485 interface, for loading configuration and serious problem detection.
- Contains TCP/IP client to control eHouseEthernet (eHouse LAN) devices directly via TCP/IP network.
- Servers and client uses secure logging and authentication between TCP/IP eHouse system devices.
- Regularly sends UDP Broadcast status for all panels notification without server connection
- Enables eHouse 1 system devices control and distributing data among them.
- Enables setting required logging level (information, warning, errors) for solving any problems in the

system.

- Contains software and hardware WDT (Watch Dog Timer) to reset device in case of hang up, or serious errors.
- Contains 3 groups of SMS notification from Security System:
 - 1) Change Zone notification group,
 - 2) Active sensor notification group,
 - 3) Alarm Deactivation notification group.
- Any Alarm signal timing can be individually programmed (Alarm horn, Warning light, monitoring, EarlyWarning).
- Supports 21 security zones.
- Supports 4 level mask individually defined for each activated Alarm Sensor and each security zone.
 - 1) Alarm Horn turn on (A),
 - 2) Alarm Light turn on (W),
 - 3) Monitoring Output turn on (M),
 - 4) Launch event associated with Alarm Sensor (E).
- Contains 16 channel Analog to Digital Converter (resolution 10b) for measurement analog signals (Voltage, Temperature, light, wind power, humidity value, Sabotage Alarm Sensors. Two threshold are defined Min and Max. Crossing this threshold by sensor for each channel can launch eHouse event assigned to it). Thresholds are individually defined in each ADC Program to maintain automatic adjustments and regulation. ADC contains (can be enabled) 16 outputs for direct control by ACD without event assigned to threshold.
- CommManager contains 12 ADC programs for individual thresholds definitions for each channel.
- CommManager contains 24 Rollers Program Definition (each rollers, gates, doors control together with security zone selection).
- Contains 50 position queue of events to run locally or send to other devices.

3.4.2. CommManager/LevelManager Description

GSM / GPRS Module.

CommManager (CM) contains built in GSM / GPRS module enabling wireless remote control of eHouse 1 or EthernetHouse system via SMS and eMail reception. E-Mail client assures cyclic checking of POP3 post office dedicated for eHouse system using GSM / GPRS dial-up service. Control range is practically unlimited and can be done from any place where is sufficient GSM signal level.

This solution enables secure control of eHouse system and receiving notification from security system.

Dedicated link to internet, telephone lines are not required and is hard to acquire in new built houses, especially far from the city.

Security is much bigger due to wireless connection and there is no possibility to damage or sabotage link (as for telephones, dialers, internet access, etc). Damages of communication lines can be random (wind, weather condition, theft) or purpose (sabotage to disable control of the system, and notification of security system to monitoring, security agency, police, owner of a house).

Repairing of lines can take lot of time, which makes security system much more vulnerable to attacks and disable sending notifications to anybody about break in. Monitoring radio-lines works on amateur frequencies and

specialized thieves can disturb them with more powerful transmitters during break in, to gain additional time. GSM is much more difficult to disable and enables installation far from cities, practically at any time (before getting address of house, making telephone or other connection to new built house). Only sufficient GSM signal level is required to install this systems.

GSM module contains external antenna which can be installed in place, where GSM signal is strongest (e.g. on the roof). In this case GSM module can minimize transmission power during normal work to accomplish connection. Power margin is sufficient for counteracting of limited propagation micro-waves: bad weather condition, rain, snow, mist, leaves on the trees etc. GSM signal level can change in years due to new building arises, growing trees etc. On the other hand the bigger is signal level the less are distortion generated by GSM module and antenna. It is especially important for built-in ADC converter, because in worst cases measurement can be crippled with few dozen percent errors, which makes them unusable. Antenna installation outside the building in direction to nearest GSM base station can increase signal level hundreds times what proportionally increases power margin for GSM transmission, limits emitting power of GSM transmission and distortions (errors) of built-in ADC measurement (and analog sensors located near the antenna).

GSM module require active SIM card installation and checking, if it not expired or empty (in case of prepaid activations). If card is expired or empty, various issues can appear:

- problems with sending SMS (especially for other operators),
- unable to connect GPRS sessions, etc.
- hanging up GSM modules,
- and can change in time and depend on operators options, tariffs).

Sending SMS or receiving eMail via GSM / GPRS module is very long (6-30 sec) and continuous failed retries (caused by inactive GPRS service or lack of resources on SIM card), brings on large CPU usage of CommManager, efficiency drops for any other functions and decreases stability of whole security system.

GSM configuration is performed by "CommManagerCfg.exe" application, which allows intuitive setting every option and parameters for this module. GSM Module options are in first three tabs.

- 1) General,
- 2) SMS Settings,
- 3) eMail Settings.

Report Level lets to chose level of logging sending to log grabber application (TCPLogger.exe) or to RS-485. It inform CommManager which log info should be send (info, warnings, errors). It is useful for detection and solving problems (eg. no resources on SIM Card, No GSM Signal, etc and take some action to repair it). For Report Level=1 anything is sent to log grabber. This option should only be use to detect serious, unknown problems on the system. this option seriously utilize CommManager CPU and affect stability and system efficiency.

The bigger number in Report Level field, the less information will be send (only with higher priority than report Level).

In case we don not need generating logs 0 should be chosen here.

eHouse 1 Devices Count – number of eHouse1 devices under CommManager supervision for resending status query delay (about 1 second per device). If no eHouse 1 controllers are connected set it to 0.

Disable UART Logging. This option disable sending logs to RS-485 UART. When this option is turned on only TCP/IP logging can be send, after connection TCP/IP Log grabber application (TCPLogger.exe) to CommManager. However in case of CommManager reset TCPLogger.exe is disconnected and log information to the next connection of log grabber to CommManager will be lost.

Enabling UART logging gives opportunity to log all information including this part which normally would be lost by TCPLogger.

This logging mode should only be use to solve very serious problem (which appear at very beginning of firmware execution) and TCP/IP communication problem.

Main disadvantage of UART logging is continuous sending to RS-485 and utilizing system resources, no matter if log grabber is connected or not (for TCP/IP logging logs information are sent only when TCPLogger is connected to Server).

The other problem is that UART logs are send to eHouse 1 Data Bus, utilize this connection and generate some traffic, sending information incompatible to eHouse 1 device framing and can disturb devices to work properly. In other to use this logging mode all eHouse 1 devices must be disconnected, by removing RS-485 crossing cable and connect via non crossing (1 to 1) to RS232-485 Converter. RS232-485 Converter must be connected to any terminal application as hyper terminal working on 115200, even parity, 1 stop bit, no flow control. In case of connection TCPLogger RS-485 logging is dropped and is directed to TCP/IP grabber.

Disable GSM Module. This option enables permanent disable of all functions of GSM / GPRS module if it is not installed.

However the time for CommManager and all eHouse devices is taken from GSM Module, so it could loose some functionality as usage schedules (due to invalid date and time in the system). Theoretically time can be externally programmed by CommManagerCfg.exe application, but it will be reset together with Reset of CommManager from any reason.

GSM Module phone number field must consists valid mobile phone number (e.g. +48501987654), which is used by GSM module. This number is used for authorization and cryptography calculation purposes, and changing this number will disable possibility of authorization TCP/IP devices to each other. Configured in "ConfigAux.exe" application.

Pin Code. This field must consists valid PIN number (assigned to SIM card). In case of putting wrong number, CommManager automatically disables SIM card, by multiple retries to establish connection. Due to stationary system installation it is strongly recommended to disable pin checking, which gain in speed up time of turning on GSM module and logging to GSM network.

Hashing Numbers. This field consists additional information for cryptographic calculations and authorization and expects 18 hex digit (0,1,2,3,4,5,6,7,8,9,a,b,c,d,e,f) one by one without any separators. After change this number configuration should be load to each EthernetHouse devices and TCP/IP panels. Usage of GSM phone number, together with hashing numbers as a part of cryptographic function arguments assures individual encryption / decryption algorithms for each eHouse installation. Additionally can be changed if it is necessary for all devices. Configured in "ConfigAux.exe" application

Authorized GSM Numbers. This field - consists GSM phone numbers for system management by SMS. Any SMS from other numbers are automatically ignored and deleted.
e.g.: "+48504111111,+48504222222" - comma separated.

Zone Change - SMS Notification Numbers. This field - consists GSM phone numbers for sending SMS notification about changing security zone together with zone name.
e.g.: "+4850411111,+4850422222" - comma separated.

Sensors Activation - SMS Notification Numbers. This field - consists GSM phone numbers for sending SMS notification about active security sensors by name (which violate alarm, warning or monitoring in current zone).
e.g.: "+4850411111,+4850422222" comma separated.

Deactivation - SMS Notification Numbers. This field - consists GSM phone numbers for sending SMS notification about alarm signals deactivation by authorized users (by changing security zone).
e.g.: "+4850411111,+4850422222" comma separated.

Zone Change Suffix. This field - consists suffix added to zone name in SMS message for zone change notification group.

Alarm Prefix. This field - consists prefix in SMS message added before active alarm sensor names for Sensor activation notification group.

Deactivation Alarm. This field – contains text sent to deactivation notification group.

Disable SMS Send. This option disables sending all SMS notification from security system.

Disable SMS Receive. This option disables SMS checking and reception for controlling eHouse system.

Security System.

Security System incorporated in CommManager is self contained and requires:

- Connection security sensors,
- Alarm horn,
- Alarm light,
- Early Warning horn,
- Notification device from monitoring or security agency (if required).
- Integrate ExternalManager and InputExtenders in one device.

RF control by electronic key was replaced by direct, unlimited management from Mobile Phones, PDA, SmartPhones, PADs, wireless TCP/IP Panels via SMS, LAN, WiFi, WAN, Internet. It can be controlled outside protected and monitored area and alarm notification are immediate after sensor activation (no latency time is used as in security systems controlled by internal keyboards).

Up to 24 zones can be defined. Each zone consist 4 level mask for each sensor connected to security system. For each security sensor inputs, 4 options are defined, in case of activation alarm sensor (if option is enabled in current zone):

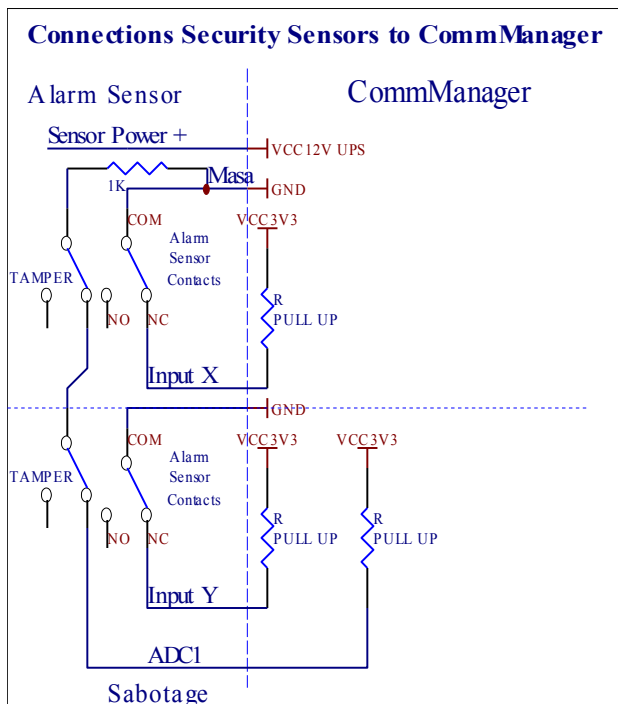
- Alarm horn on (**A * - Alarm**),
- Alarm light on (**W * - Warning**),
- Monitoring Notification on (for notification device of monitoring or security agency if required) (**M * - Monitoring**),
- Event execution assigned to Security Input (**E * - Event**).

*** field name in "CommManagerCfg.exe" application**

Alarm, warning, monitoring outputs are activate with programed delay set in field (“**Zone Change Delay**” *) from zone change initialize (if sensor activity was detected for new zone), giving chance to remove reason of alarm. Only “**Early Warning**” output is activated immediately. Outputs are turn off automatically after deactivation of all sensors which violate current security zone and delay set in fields: “**Alarm Time**” *, “**Warning Time**” *, “**Monitoring Time**” *, “**Early Warning Time**” *. All signals except “**Early Warning Time**” * are in minutes, “**Early Warning Time**” is in seconds.

Up to 48 security sensors can be connected to CommManager. Sensor must have contacts isolated from any voltage (relay or switch connectors). Contact should be normally closed (NC) and opened due to sensor activation. Otherwise “**Invert**” option must be set for input.

One alarm sensor contact must be connected to sensor input of CommManager another to GND.



For best and professional solution 48 inputs expansion board for Alarm inputs should be considered for sensor connection.

Apparently from setting hardware outputs (Alarm, Monitoring, Warning, Early Warning), CommManager sends SMS notification to 3 groups described above.

In case of violation alarm, warning or monitoring notification are send to group defined in field (**Sensors Activations - SMS Notification Numbers** *) including active alarm sensors names.

In case of zone change CommManager notify group defined in field (**Zone Change - SMS Notification Numbers** *) sending zone name.

In this case if alarm, warning or monitoring was active CommManager also notify group defined in field (**Deactivation - SMS Notification Numbers** *).

External Devices Manager (Rollers, gates, doors, windows, servos, shade awnings).

CommManager has implemented roller controller which is extended version of ExternalManager and allow controlling 27 (35**) independent rollers, gates, doors system.

** in case of disabling direct ADC outputs (described in Analog To Digital Converter chapter) 35 independent rollers (option should be unchecked {Use Direct Controlling (limit rollers to 27) - no Events definition Necessary * } - in tab “Analog to Digital Converter Settings” of CommManagerCfg.exe application).

There are 2 ways of driving servos: SOMFY mode or direct servomotor mode. Only driving using Somfy standard is secured and authorized because in this system rollers are equipped in controlling and protection module for rollers against overload, block, driving in both direction simultaneously, assuring proper delay time before changing direction.

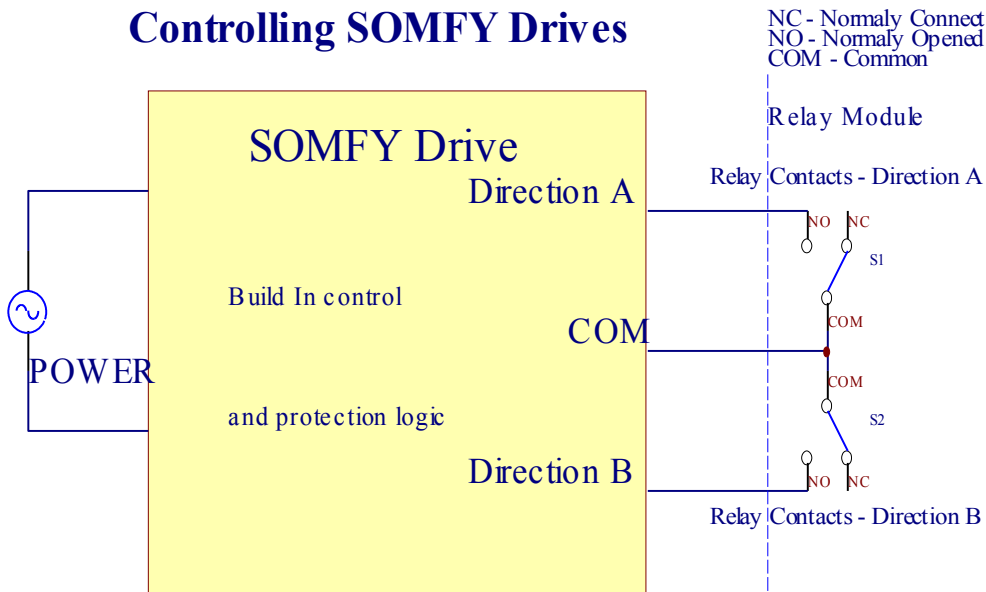
Rollers, gates, doors drives outputs.

These outputs are pairs of outputs for driving rollers, gates, doors drives in SOMFY standard (default setting) or direct servos.

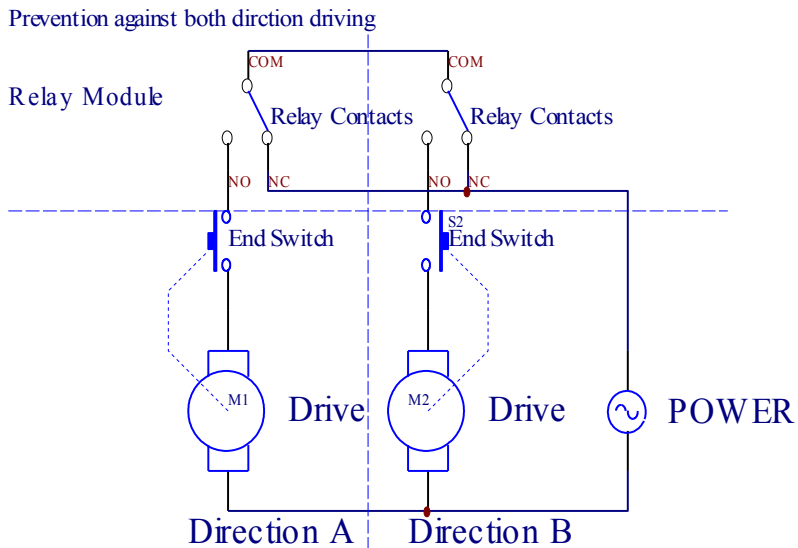
Each roller channel in SOMFY standard = roller open (1 sec pulse on A output), roller close (1 sec pulse on B output), stop (1 sec pulse on both A and B outputs}.

Otherwise outputs can be used for direct controlling of motor drives (driving line A for moving in one direction, driving line B for moving in the other direction). **Drives must have own build in protection against turning on both directions, block rollers, end switches, accelerate protection etc. Otherwise in case of malfunction of relay, wrong configuration of module, blocking drive by frost or sabotage, it is possible to damage drive. CommManager has build in software protection against moving on both direction, but can't check if drive reaches end or wasn't blocked and isn't sufficient to protect rollers from all events. This mode can only be used on own risk and iSys company is not responsible for any damages, malfunction of drives, etc. Only Somfy system can be used securely because it incorporates own protection of drives.**

Controlling SOMFY Drives



Direct Control of Drives



Rollers mode can be set in “Rollers Settings” tab of CommManagerCfg.exe application.

One of free position can be select: Somfy (“Somfy System” *), Direct servomotor drive (“Direct Motors” *), Common Outputs (“Normal Outs” *- single outputs compatible with RoomManager's).

Additionally following parameters and options can be defined to adjust rollers settings:

- Delay for changing direction from one to another (“Delay on Change Direction” *) - software protection from immediate changing direction which could damage drives.
- Maximal Rollers full movement time (“Rollers Movement Time” *) - after this time (in seconds) system treat all rollers rollover to other direction (if it wasn't stop manually during movement). This time is also used for delay of zone change in case of Security Program execution (together with zone change). Main reason is not generating security alarm if rollers confirmation switches are installed. In case of rollers

lack this option should be set to 0.

•Rollers control init time for initialize rollers movement on controlling input (Rollers Drive Time *) - (in second). **This parameter is directly used in CommManager for choosing Rollers work mode (SOMFY / Direct). It should be set to real values (if time is less then 10 it is automatically selected Somfy mode, otherwise CommManager works in direct mode). If Somfy mode are chosen and direct servomotors are connected servomotors can be destroyed for Somfy value should be set to 2-4 sec. For direct control this time should be greater several seconds from slowest roller full movement.**

Each Roller has following events:

- Close,
- Open,
- Stop,
- Don't Change (N/A).

Closing and Opening roller will continue until stop in end position.

To stop roller in different position manual stop must be initiated during movement.

("Additional Rollers" *) flag allows double count of rollers by connection extension module. **In case of lack extension module this option must be disabled. Otherwise CommManager will not work properly - internal protections will restart CommManager cyclically. For larger amount of rollers or security sensors eHouse.Pro must be used which supports up to 128 drives and up to 256 security sensors.**

Each roller, door, gate, shade awning can be named in CommManagerCfg application.

The names are taken for generating eHouse events.

Normal outputs mode.

In case of lack of rollers, gates, doors, etc, it is possible use CommManager's outputs as standard single output compatible with RoomManager (LevelManager mode). This enables to assign this outputs locally to Security Sensors activations or Analog to Digital Converter levels.

List of Events associated with normal digital outputs:

- Turn On,
- Toggle,
- Turn Off,
- Turn On for programmed time (later off),
- Toggle (if it turn on - programmed time, later off),
- Turn On after programed latency,
- Turn Off after programed latency,
- Toggle after programed latency,
- Turn On after programed latency for programmed time (later off),
- Toggle after programed latency {if turning on for programmed time (later off)}.

Each Output has individual timer. Timers can count seconds or minutes depending on option set in CommManagerCfg.exe application ("Minutes Time Out" * - in "Additional Outputs" * tab set globally for all of outputs).

Each roller, door, gate, shade awning can be named in CommManagerCfg.exe application.
The names are taken for generating eHouse events.

Security Programs

Security programs allow grouping all rollers settings and security zone in one event.

Up to 24 Security programs can be defined for CommManager

In security programs for each rollers following events are possible :

- Close,
- Open,
- Stop,
- Do not change (N/A).

Additionally together with rollers settings needed zone can be selected.

Each security program can be named in CommManagerCfg.exe application.

The names are taken for generating eHouse events.

Zone change is activated with latency equal to maximal full rollers movement time (“Rollers Movement Time” *).

This latency is necessary, to assure that all rollers reach the end, before initiating zone change (otherwise switches confirming rollers closure may generate alarms).

To change Security Program settings:

- Select Security Program from list,
- Name can be change i field Change Security Program Name *),
- Change all rollers setting to desired values,
- Select zone if needed (Security Zone Assigned *),
- Press button (Update Security Program *),
- Repeat All steps for all needed Security Programs.

16 channel Analog To Digital Converter.

CommManager is equipped in 16 ADC input with resolution 10b (scale <0; 1023>), and voltage range <0; 3.3V>).

Any analog sensor, powered from 3.3V can be connected to ADC inputs. It can be any of: temperature, light level, humidity, pressure, gas, wind, etc.

System can be scaled for sensors with linear scale ($y=a*x+b$), which enables exact measure from analog sensors e.g. LM335, LM35, Voltage, percent %, percent inverted scale %, are automatically created in system.

Other sensors can be defined entering equation values in configuration file for sensor type. Nonlinear scale sensors can be described in table of conversion (between real value and percent value) consisting 1024 points e.g. generated from math applications.

Analog sensor must have small current of work and be supplied from 3.3V of CommManager. Some sensors do not require power supply e.g. LM335, photo diodes, photo transistors, photo resistors, thermistors, because are powered by Pull-Up resistors (4.7K), to power supply 3.3V.

To obtain maximal accuracy of sensors connection cable:

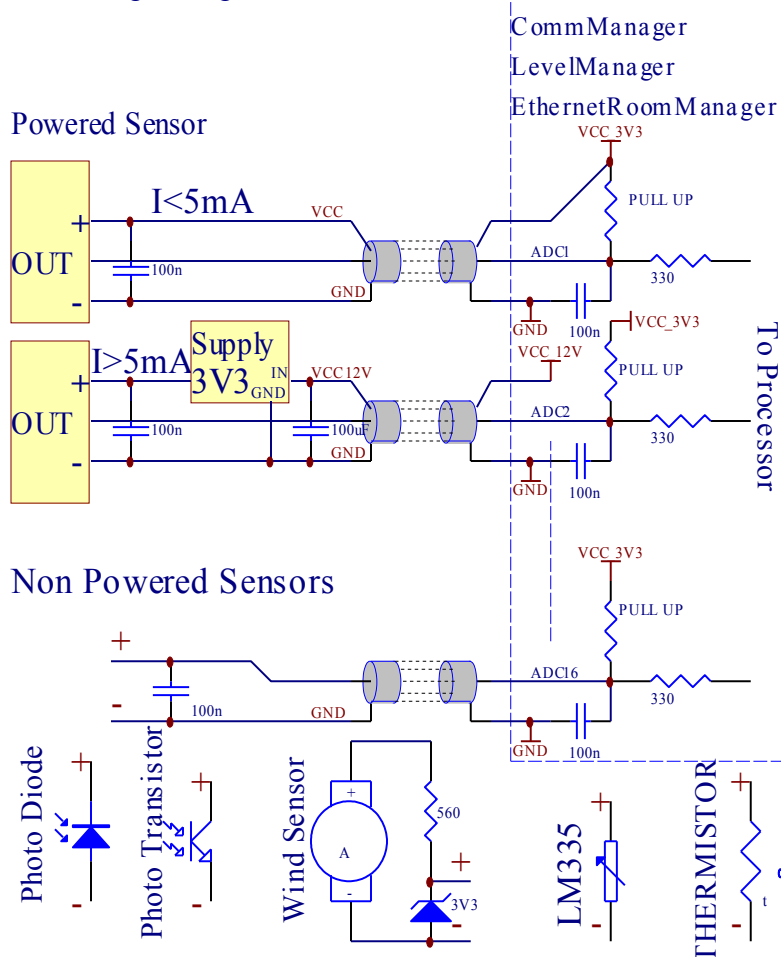
- must be shielded,
- as short as possible,
- far from distortion sources (GSM antennas, Monitoring radio notification, high power lines, etc).

CommManager contains GSM Module, which also can seriously distort proper measurement of analog sensors values increasing their errors.

Antenna of GSM module or whole CommManager should be installed in location where strong GSM signal was measured.

Best way is to check distortions level before plaster the building with active GSM module sending SMS.

Connecting Analog Sensors to TCP/IP Controllers



Each channel configuration of Analog to Digital Converter is realized in CommManagerCfg.exe application in "Analog to Digital Converter Settings" * tabs.

To change ADC parameter ("Modification Enabled" *) on General * tab should be selected.

Most important option is global setting for direct output control ("Use Direct Controlling (limit rollers to 27) - no Events definition Necessary" *) assigned for each channel This flag enables automatic switching on output dedicated to ADC channel and dropping below (Min Value *). Output will be switched off after overstep (Max Value *). This levels are individually defined for each ADC Program and each ADC channel.

Turning on this option allocates last 8 rollers system (remaining available 27) or 16 output in normal mode, which are dedicated to direct control of this output as ADC outputs. Choosing this option frees from assigning events to ADC levels, and ADC outputs are controlled on local device (without executing event of local controller or other one). In Rollers Output mode there is not other way to get local control of ADC outputs.

Each ADC channel has following parameters and options:

Sensor Name: can be change in field “Change Adc Input Name” *.

Sensor Type: Standard types are LM335, LM35, Voltage, %, % Inverted (% Inv). User can add new sensor type, by adding new name to file ADCSensorTypes.txt. Additionally files must be created with same name as sensor type name, then space and 1 to 16 and extension ".txt". In this file 1024 subsequent level must exists. Text doesn't matter for CommManager, only index are stored and loaded to controller.

Minimal Value (**“Min Value” ***) - Dropping below this value (once during crossing) - Event stored in (**“Under Event” ***) field will be launched and corresponding output will be set (in Direct Output mode for ADC).

Maximal Value (**“Max Value” ***) - overstep above this value (once during crossing) - Event stored in (**“Over Event” ***) field will be launched and corresponding output will be cleared (in Direct Output mode for ADC).

Event Min (**“Under Event” ***) - Event to run, if dropping below programed minimum value (once during crossing) for current ADC program.

Event Max (**“Over Event” ***) - Event to run, if overstep above programed maximum value (once during crossing) for current ADC program.

Analog to Digital Converter Programs.

ADC program consists all levels for each ADC channel. Up to 12 ADC programs can be created for CommManager.

It allows immediate change of all ADC channels levels, defined as ADC program (e.g. for individual heating in the house) by running event.

To modify ADC program:

- Choose program from list.
- name can be changed in field (**“Change Program Name” ***).
- Set all ADC levels (min, max) for current program.
- Press button (**“Update Program” ***).
- Repeat these steps for all Programs.

3.4.3. Sockets and PCB Layout of CommManager, LevelManager and other large Ethernet Controllers

Most of eHouse controllers uses two row IDC sockets which enable very fast installation, deinstallation and service. Usage flat cables which is 1mm in width, do not require making wholes for cables.

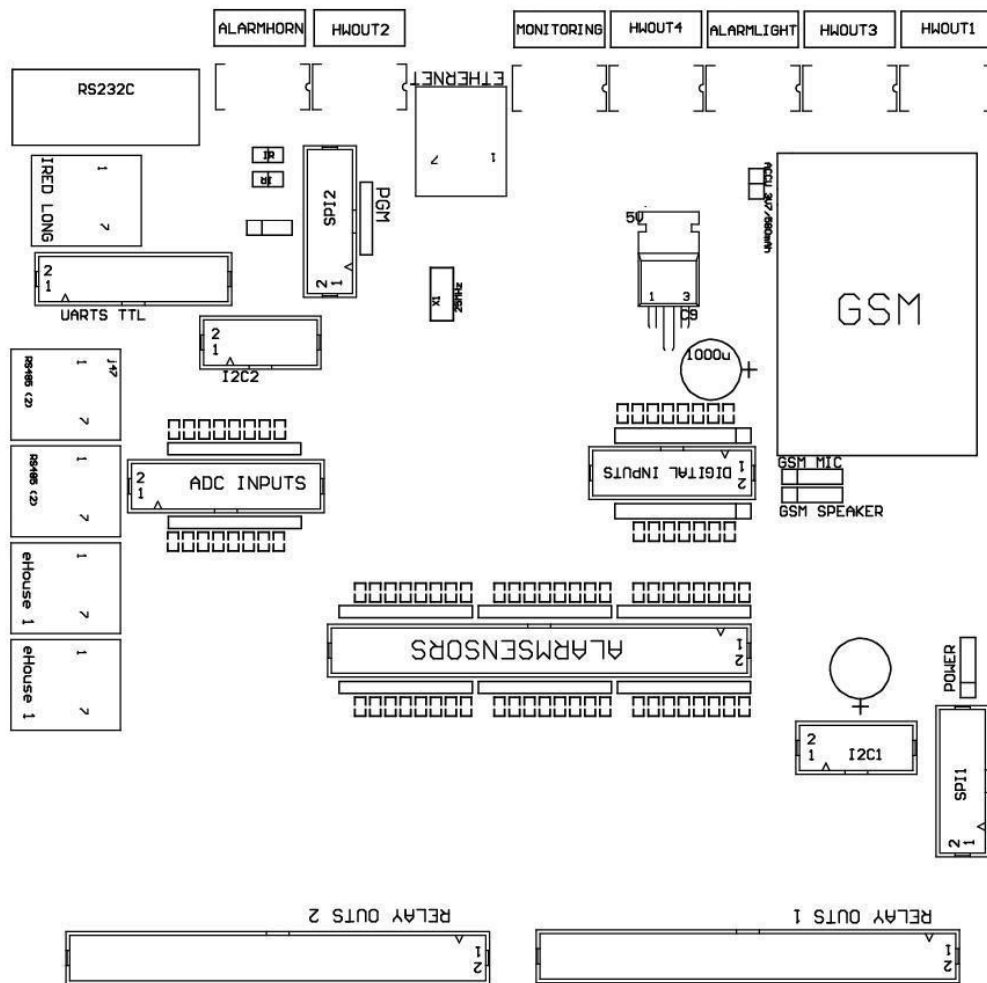
Pin no. 1. has rectangular shape on PCB and additionally arrow on socket cover.

Pins are numbered with row priority:

2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49
V _____																								

ADC INPUTS – Analog-to-digital converter (ADC INPUTS) (0;3,3V) in reference to GND – Do not connect any external potentials (IDC-20)

- | | |
|----------------------|--|
| 1 - Gnd / Groud (0V) | 2 - Gnd / Ground (0V) |
| 3 - ADC IN 0 | 4 - ADC IN 8 |
| 5 - ADC IN 1 | 6 - ADC IN 9 |
| 7 - ADC IN 2 | 8 - ADC IN 10 |
| 9 - ADC IN 3 | 10 - ADC IN 11 |
| 11 - ADC IN 4 | 12 - ADC IN 12 |
| 13 - ADC IN 5 | 14 - ADC IN 13 |
| 15 - ADC IN 6 | 16 - ADC IN 14 |
| 17 - ADC IN 7 | 18 - ADC IN 15 |
| 19 - VDD (+3,3V) | 20 - VDD (+3,3V) - Requires installation of Resistor 100 OM for current limitation for powering Analog sensors |



- | | |
|-------------------------|-------------------------|
| 1 - Digital Input 1 * | 2 - Digital Input 2 * |
| 3 - Digital Input 3 * | 4 - Digital Input 4 * |
| 5 - Digital Input 5 * | 6 - Digital Input 6 * |
| 7 - Digital Input 7 * | 8 - Digital Input 8 * |
| 9 - Digital Input 9 * | 10 - Digital Input 10 * |
| 11 - Digital Input 11 * | 12 - Digital Input 12 * |
| 13 - Digital Input 13 * | 14 - Digital Input 14 * |
| 15 - Digital Input 15 * | 16 - GND |

Input can be allocated internally depending on type of hardware or controller. Do not connect. Could cause Permanent destroy of the controller.

DIGITAL INPUTS EXTENDED - (0;3.3V) - (On/Off) short or disconnect to the ground of controller (Do not connect any external potentials (IDC-50PIN) (Rev. 2)

- | | |
|-----------------------|---|
| 1 - Digital Input 1 | 2 - Digital Input 2 |
| 3 - Digital Input 3 | 4 - Digital Input 4 |
| 5 - Digital Input 5 | 6 - Digital Input 6 |
| 7 - Digital Input 7 | 8 - Digital Input 8 |
| 9 - Digital Input 9 | 10 - Digital Input 10 |
| 11 - Digital Input 11 | 12 - Digital Input 12 |
| 13 - Digital Input 13 | 14 - Digital Input 14 |
| 15 - Digital Input 15 | 16 - Digital Input 16 |
| 17 - Digital Input 17 | 18 - Digital Input 18 |
| 19 - Digital Input 19 | 20 - Digital Input 20 |
| 21 - Digital Input 21 | 22 - Digital Input 22 |
| 23 - Digital Input 23 | 24 - Digital Input 24 |
| 25 - Digital Input 25 | 26 - Digital Input 26 |
| 27 - Digital Input 27 | 28 - Digital Input 28 |
| 29 - Digital Input 29 | 30 - Digital Input 30 |
| 31 - Digital Input 31 | 32 - Digital Input 32 |
| 33 - Digital Input 33 | 34 - Digital Input 34 |
| 35 - Digital Input 35 | 36 - Digital Input 36 |
| 37 - Digital Input 37 | 38 - Digital Input 38 |
| 39 - Digital Input 39 | 40 - Digital Input 40 |
| 41 - Digital Input 41 | 42 - Digital Input 42 |
| 43 - Digital Input 43 | 44 - Digital Input 44 |
| 45 - Digital Input 45 | 46 - Digital Input 46 |
| 47 - Digital Input 47 | 48 - Digital Input 48 |
| 49 - GND | 50 - GND - (for connecting / shortening inputs) |

Some version of Controllers can be equipped with 6 IDC-10 sockets (Rev. 1) instead IDC-50 .

DIGITAL INPUTS EXTENDED - (0;3.3V) - (On/Off) short or disconnect to the ground of controller (Do not connect any external potentials (IDC-10PIN)

- | |
|---------------------------|
| 1 - Digital Input (n*8)+1 |
| 2 - Digital Input (n*8)+2 |
| 3 - Digital Input (n*8)+3 |
| 4 - Digital Input (n*8)+4 |
| 5 - Digital Input (n*8)+5 |
| 6 - Digital Input (n*8)+6 |

- 7 - Digital Input (n*8)+7
 - 8 - Digital Input (n*8)+8
 - 9 - GND controller ground
 - 10 - GND controller ground – for connecting / shortening inputs
- for each n <0,7>**

DIGITAL OUTPUTS 1 (RELAYS OUTS 1) – outputs with relay drivers for direct connection of relay inductor (IDC-50)

- 1 - VCCDRV – Relay Inductor power supply (+12V non UPS) (clamping diode for protecting drivers against high voltage induction)
- 2 - VCCDRV - Relay Inductor power supply (+12V non UPS) (clamping diode for protecting drivers against high voltage induction)
- 3 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 1 - Drive/Servo 1 direction A (CM)
- 4 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 2 - Drive/Servo 1 direction B (CM)
- 5 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 3 - Drive/Servo 2 direction A (CM)
- 6 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 4 - Drive/Servo 2 direction B (CM)
- 7 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 5 - Drive/Servo 3 direction A (CM)
- 8 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 6 - Drive/Servo 3 direction B (CM)
- 9 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 7 - Drive/Servo 4 direction A (CM)
- 10 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 8 - Drive/Servo 4 direction B (CM)
- 11 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 9 - Drive/Servo 5 direction A (CM)
- 12 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 10 - Drive/Servo 5 direction B (CM)
- 13 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 11 - Drive/Servo 6 direction A (CM)
- 14 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 12 - Drive/Servo 6 direction B (CM)
- 15 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 13 - Drive/Servo 7 direction A (CM)
- 16 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 14 - Drive/Servo 7 direction B (CM)
- 17 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 15 - Drive/Servo 8 direction A (CM)
- 18 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 16 - Drive/Servo 8 direction B (CM)
- 19 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 17 - Drive/Servo 9 direction A (CM)
- 20 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 18 - Drive/Servo 9 direction B (CM)
- 21 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 19 - Drive/Servo 10 direction A (CM)
- 22 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 20 - Drive/Servo 10 direction B (CM)
- 23 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 21 - Drive/Servo 11 direction A (CM)
- 24 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 22 - Drive/Servo 11 direction B (CM)
- 25 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 23 - Drive/Servo 12 direction A (CM)
- 26 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 24 - Drive/Servo 12 direction B (CM)
- 27 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 25 - Drive/Servo 13 direction A (CM)
- 28 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 26 - Drive/Servo 13 direction B (CM)
- 29 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 27 - Drive/Servo 14 direction A (CM)
- 30 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 28 - Drive/Servo 14 direction B (CM)
- 31 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 29 - Drive/Servo 15 direction A (CM)
- 32 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 30 - Drive/Servo 15 direction B (CM)
- 33 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 31 - Drive/Servo 16 direction A (CM)
- 34 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 32 - Drive/Servo 16 direction B (CM)
- 35 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 33 - Drive/Servo 17 direction A (CM)
- 36 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 34 - Drive/Servo 17 direction B (CM)
- 37 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 35 - Drive/Servo 18 direction A (CM)
- 38 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 36 - Drive/Servo 18 direction B (CM)
- 39 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 37 - Drive/Servo 19 direction A (CM)
- 40 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 38 - Drive/Servo 19 direction B (CM)
- 41 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 39 - Drive/Servo 20 direction A (CM)
- 42 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 40 - Drive/Servo 20 direction B (CM)
- 43 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 41 - Drive/Servo 21 direction A (CM)
- 44 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 42 - Drive/Servo 21 direction B (CM)
- 45 - GND / Ground 0V of the controller
- 46 - GND / Ground 0V

47 - GND / Ground 0V

48 - PWM 1 (PWM Dimmer no 1 or Red color for RGB TTL – without power driver) 3.3V/10mA (for direct control of led diode of Power Driver opto-isolator)

49 - PWM 2 (PWM Dimmer no 2 or Green color for RGB TTL – without power driver) 3.3V/10mA (for direct control of led diode of Power Driver opto-isolator)

50 - PWM 3 (PWM Dimmer no 3 or Blue color for RGB TTL – without power driver) 3.3V/10mA (for direct control of led diode of Power Driver opto-isolator)

DIGITAL OUTPUTS 2 (RELAYS OUTS 2) – outputs with relay drivers for direct connection of relay inductor (IDC-50) Rev. 1,2

1 - VCCDRV – Relay Inductor power supply (+12V non UPS) (clamping diode protecting drivers against high voltage induction)

2 - VCCDRV - Relay Inductor power supply (+12V non UPS) (clamping diode protecting drivers against high voltage induction)

3 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 43 - Drive/Servo 22 direction A (CM)

4 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 44 - Drive/Servo 22 direction B (CM)

5 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 45 - Drive/Servo 23 direction A (CM)

6 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 46 - Drive/Servo 23 direction B (CM)

7 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 47 - Drive/Servo 24 direction A (CM)

8 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 48 - Drive/Servo 24 direction B (CM)

9 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 49 - Drive/Servo 25 direction A (CM)

10 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 50 - Drive/Servo 25 direction B (CM)

11 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 51 - Drive/Servo 26 direction A (CM)

12 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 52 - Drive/Servo 26 direction B (CM)

13 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 53 - Drive/Servo 27 direction A (CM)

14 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 54 - Drive/Servo 27 direction B (CM)

15 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 55 - Drive/Servo 28 direction A (CM)

16 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 56 - Drive/Servo 28 direction B (CM)

17 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 57 - Drive/Servo 29 direction A (CM)

18 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 58 - Drive/Servo 29 direction B (CM)

19 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 59 - Drive/Servo 30 direction A (CM)

20 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 60 - Drive/Servo 30 direction B (CM)

21 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 61 - Drive/Servo 31 direction A (CM)

22 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 62 - Drive/Servo 31 direction B (CM)

23 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 63 - Drive/Servo 32 direction A (CM)

24 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 64 - Drive/Servo 32 direction B (CM)

25 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 65 - Drive/Servo 33 direction A (CM)

26 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 66 - Drive/Servo 33 direction B (CM)

27 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 67 - Drive/Servo 34 direction A (CM)

28 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 68 - Drive/Servo 34 direction B (CM)

29 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 69 - Drive/Servo 35 direction A (CM)

30 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 70 - Drive/Servo 35 direction B (CM)

31 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 71 - Drive/Servo 36 direction A (CM)

32 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 72 - Drive/Servo 36 direction B (CM)

33 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 73 - Drive/Servo 37 direction A (CM)

34 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 74 - Drive/Servo 37 direction B (CM)

35 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 75 - Drive/Servo 38 direction A (CM)

36 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 76 - Drive/Servo 38 direction B (CM)

37 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 77 - Drive/Servo 39 direction A (CM)

38 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 78 - Drive/Servo 39 direction B (CM)

39 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 79 - Drive/Servo 40 direction A (CM)

40 - Digital output with relay driver for direct connection relay inductor (12V/20mA) no. 80 - Drive/Servo 40 direction B (CM)

41 - GND / Ground 0V of controller

42 - GND / Ground 0V of controller

43 - GND / Ground 0V of controller

44 - GND / Ground 0V of controller

45 - PWM 1 (Internal power driver of PWM no 1 or Red for RGB 12v/1A) – **Not Compatible with Relay Modules must be cut off**

- 46 - PWM 1 (Internal power driver of PWM no 1 or Red for RGB 12v/1A) – Not Compatible with Relay Modules must be cut off
- 47 - PWM 2 (Internal power driver of PWM no 2 or Green for RGB 12v/1A) – Not Compatible with Relay Modules must be cut off
- 48 - PWM 2 (Internal power driver of PWM no 2 or Green for RGB 12v/1A) – Not Compatible with Relay Modules must be cut off
- 49 - PWM 3 (Internal power driver of PWM no 3 or Blue for RGB 12v/1A) – Not Compatible with Relay Modules must be cut off
- 50 - PWM 3 (Internal power driver of PWM no 3 or Blue for RGB 12v/1A) – Not Compatible with Relay Modules must be cut off

POWER DC (4-PIN Socket) Power Supply

- 1 - Input (+5V/2A powering GSM Module)
- 2 - GND / Ground /0V
- 3 - GND / Ground /0V
- 4 - Input (+5 do +12V)/0.5A powering controller with UPS – uninterrupted power supply

ETHERNET - socket RJ45 connection to LAN (10MBs) network**ACCU - Accumulator (3.7V/600mAH) for GSM module**

- 1 GSM power +VCC (4.5V/2A) – for connection 48 inputs Expansion Module for CM
- 2 – GND / 0V

eHouse 1 - (RJ45) Socket for connection to eHouse 1 (RS-485) data bus in hybrid installation (only CM)

- 1, 2 - GND / Ground (0V)
- 3, 4 - VCC +12V , connected to power supply (+12V on POWER DC socket) do not connect.
- 5 - TX+ (Transmitting output positive) differential
- 6 - TX- (Transmitting output negative) differential
- 7 - RX- (Reception output negative) differential
- 8 - RX+ (Reception output positive) differential

Socket comply with RoomManager, ExternalManager, HeatManager standard not rs-232/485 converter, though crossing cable is required to connect to eHouse1 system.

TX+ < -> RX+
TX- < -> RX-
RX+ < -> TX+
RX- < -> TX-

HWOUT1, HWOUT2, HWOUT3, HWOUT4, ALARMLIGHT, ALARMMONITORING, ALARMHORN

– Build-in relay switches (Normally Closed, Common, Normally open) (for CM)

ALARMLIGHT – Warning light from security system of CM

ALARMHORN - Alarm Horn from security system of CM

ALARMMONITORING – Monitoring Alarm for alarm notification to security agency CM (radio-line activation)

HWOUTx – Hardware outputs dedicated controllers (future purposes)

Connectors numbered from left to right side

- 1 - NC Normally closed/connected (to COM without powering relay), disconnected when relay is powered

2 - COM /Common,

3 - NO Normally Opened (to COM without powering relay) connected to COM when relay is powered.

I2C1, I2C2, SPI1, SPI2, UARTS TTL, PGM – Expansion slots of serial interfaces

Do not connect external devices outside dedicated eHouse extensions devices. Communication interfaces of different variants of eHouse controllers. Pins can be connected to Digital Inputs, Outputs, ADC Inputs directly to microcontroller signals without any protection. Connection to other signals/voltages can cause permanent controller destroy.

3.5. Other and Dedicated Ethernet Controllers.

Architecture and design of Ethernet controllers is based on microcontroller (microprocessor). They have a very large amount of hardware resources, interfaces, digital and analog I/O to be able to perform any desired functions for permanent control rooms, special permits or electrical equipment. Basically, there are two main types of controllers (hardware based on PCB):

Average controllers based on the construction of EthernetRoomManager, EthernetHeatManager, EthernetSolarManager:

- Up to 32 digital outputs
- Up to 12 digital inputs
- Up to 16 measuring inputs - Analog-to-digital (0,3.3 V)
- Up to 3 dimmers PWM / DC or 1 RGB
- Infrared Receiver and Transmitter
- The two serial ports, RS-232 TTL
- Serial interfaces I2C, SPI for system expansion

Large controllers based on the construction of CommManager/(LevelManager)

- Up to 77 digital outputs
- Up to 48 digital inputs
- Up to 3 dimmers PWM / DC or 1 RGB
- RS-232 TTL, RS-485 Full Duplex
- GSM / SMS
- Up to 8 digital outputs with built in relays
- Serial interfaces I2C, SPI for system expansion

All eHouse controllers has built-in bootloader (it is possible to upload any dedicated firmware (developed by iSys.Pl company) to the controller within the same hardware / equipment) from CommManagerCfg application. The firmware can be individually written / modify or adjusted (based on standard eHouse controllers template – serial version of controllers ERM, LM, CM, EHM, ESM). Firmware is encrypted and reverse engineering is rather not commercially justified. **Implementing wrong firmware version between controllers, or third parties will cause permanent damage of controller.**

For larger orders it is possible to create a dedicated firmware based on the existing hardware controllers. Firmware can be upload locally using the included PC software (CommManagerCfg.Exe) . This also gives opportunity for releasing updates or fix detected bugs and easy upload to controllers.

4. eHouse LAN - PC Package (eHouse for Ethernet)

Additionally to electronics modules eHouse system is equipped in auxiliary software working under Windows XP system and successors.

4.1. eHouse Application (eHouse.exe)

This application is dedicated for “eHouse 1” system. However in “eHouse For Ethernet” system version this application can be used for synchronizing data, logs from Ethernet Controllers as well. In this case it should be run with parameter “ehouse.exe /viaUdp” to capture controllers status. Only one application can receive UDP broadcast on the same port and the same machine so it automatically disable other Control Panel applications eg. Ehouse4Java.

4.2. WDT for eHouse (KillEhouse.exe)

Watch Dog Timer is monitoring application for eHouse system for running and checking eHouse.exe application for continuous work. In case of hang up, failures, communication lack between controllers and eHouse application, KillEhouse.exe closes application and restart again.

Configuration files are stored in "**killexec**" directory.

WDT for eHouse is configured during installation of eHouse system and is unattended if default settings is valid.

For eHouse.exe application by default age of "**logs\external.stp**" file is checked, which is marker of recent status received from ExternalManager, because this is most important and critical Controller in the system. In case of ExternalManager lack, HeatManager name (e.g. "logs\HeatManagerName.txt") log file should be used or RoomManager (e.g. "logs\Salon.txt"). In other case, WDT will reset eHouse.exe cyclically, looking for log of non existing controller.

Example for eHouse.exe with RoomManager's only and one of them has name Salon:

e-House Manager

ehouse.exe

/ne /nr /nt /nd

100000

120

c:\e-House\logs\Salon.txt

Subsequent lines parameters of *.runs file:

- 1 Application name in windows
- 2 executable file in "bin\" directory of eHouse system
- 3 executable parameters
- 4 maximal time of working for application [s]
- 5 maximal time of inactivity [s]
- 6 file name, to check the age from creation / modification.

Files "**.runs**" for eHouse application stored in "**exec**" directory have the same structure.

Other application can be maintained by WDT by putting configuration files to this directory.

4.3. Application ConfigAux (ConfigAux.exe)

This application is used for:

- initial system configuration
- eHouse software panels on all hardware/software platforms
- auxiliary applications that require simple setup
- defines the most important parameters for the eHouse installation.

To perform a full configuration, run with the parameters "ConfigAux.exe /ChangeHashKey".

Parameters:

Mobile Phone Number – Number of SMS gateway (for CommManager) (It is necessary to load the configuration for all controllers and control panels)

Hash Table - hashing code for authentication algorithm to controllers and panels (in hexadecimal code) (After changing the configuration, it is necessary to load new settings to all the controllers and control panels)

Remote Controller E-Mail Address - The email address for all applications, panels – Broadcasting (*)

Reception eMailGate Address - The email address for all applications, panels – for reception (*)

SMTP User Name (eMailGate) - SMTP user for eMailGate application also used by the control panels for different platforms (*)

POP3 User Name (eMailGate) - POP3 user for eMailGate application also used by the control panels for different platforms (*)

Iterations after Resent Logs - do not use (*)

Local Host Name - the name of the local host for SMTP client (*)

Login type - Use only plain for CM (*)

Password SMTP, POP3 Password - password for the SMTP client, POP3 (*)

SMTP Server Address, POP3 Server Address - SMTP and POP3 address - enter the IP address if possible (*)

SMTP Port , POP3 port - SMTP and POP3 servers ports (*)

Subject - Message Title (No change) (*)

CommManager IP Address - IP address of CommManager

CommManager TCP Port - TCP port of CommManager

Internet Side Address - Public TCP / IP or DDNS dynamic (service must be set on internet router)

Internet Side Port - TCP port from Internet side

FTP Server, FTP Directory, User, Password - the application's parameters for synchronization Logs to an FTP server (FTPGateway.exe).

Email Encryption - do not use, it is not supported by CommManager (*)

(*) - obsolete solution used mostly by eMailGateway.exe - do not change.

Auxiliary Software Configuration

Remote Controller eMail Address

eMailGate Reception Address

SMTP User Name (eMailGate)

Pop3 User Name (eMailGate)

☐ EmailEncryption

CommManager IP Address

Ftp Server

Internet Side Address

Mobile Phone Nr

Resend Logs after Iterations

SMTP Password (eMailGate)

POP3 Password (eMailGate)

CommManager Port

Ftp Directory

Internet Side Port

Hash Table

Local Host Name

SMTP Port

POP3 Port

Subject

Debug

User

Sending Log Issues From Last Days

Authorisation Type

SMTP Server Address

Pop3 Server Address

Certificate File

Windows charset

Password

Save Configuration

4.4. CommManagerCfg - Configure Ethernet controllers.

CommManagerCfg.exe application is used to:

- perform complete configuration of eHouse4Ethernet controllers
- manually send events to eHouse Controllers
- automatic sending event from the queue (PC Windows directory captured by auxiliary gateways)
- running transparent mode between Ethernet and serial interfaces to configure the extension modules and detect problems
- Generate software configuration of all control panels, PADs, smartphones, Web Browser and any hardware platform

For configuration of any Ethernet Controller, Application must be run in following way

"CommManagerCfg.exe / a:000201", with the IP address of the controller parameter (6 characters - filled with zeros). In the absence of default parameter opens for CommManager configuration (address 000254).

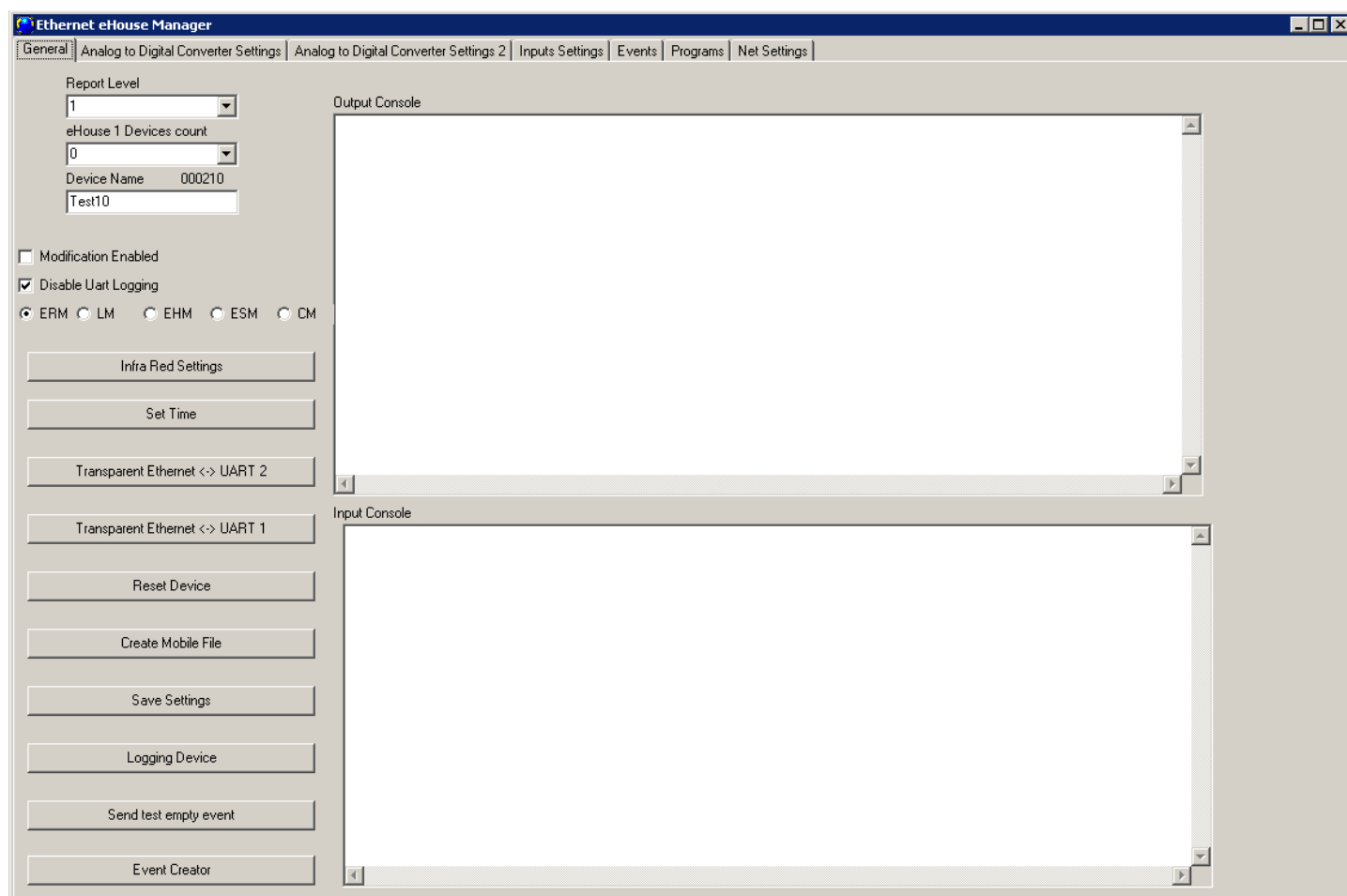
Configuring CommManager with CommManagerCfg application, was discussed in CommManager description. Current description is limited for EthernetRoomManager configuration.

The application has a number of tabs that group the settings and are enabled or not, what depends on type of Ethernet Controller.

4.4.1 General Tab – General Settings.

The General tab contains the following elements.

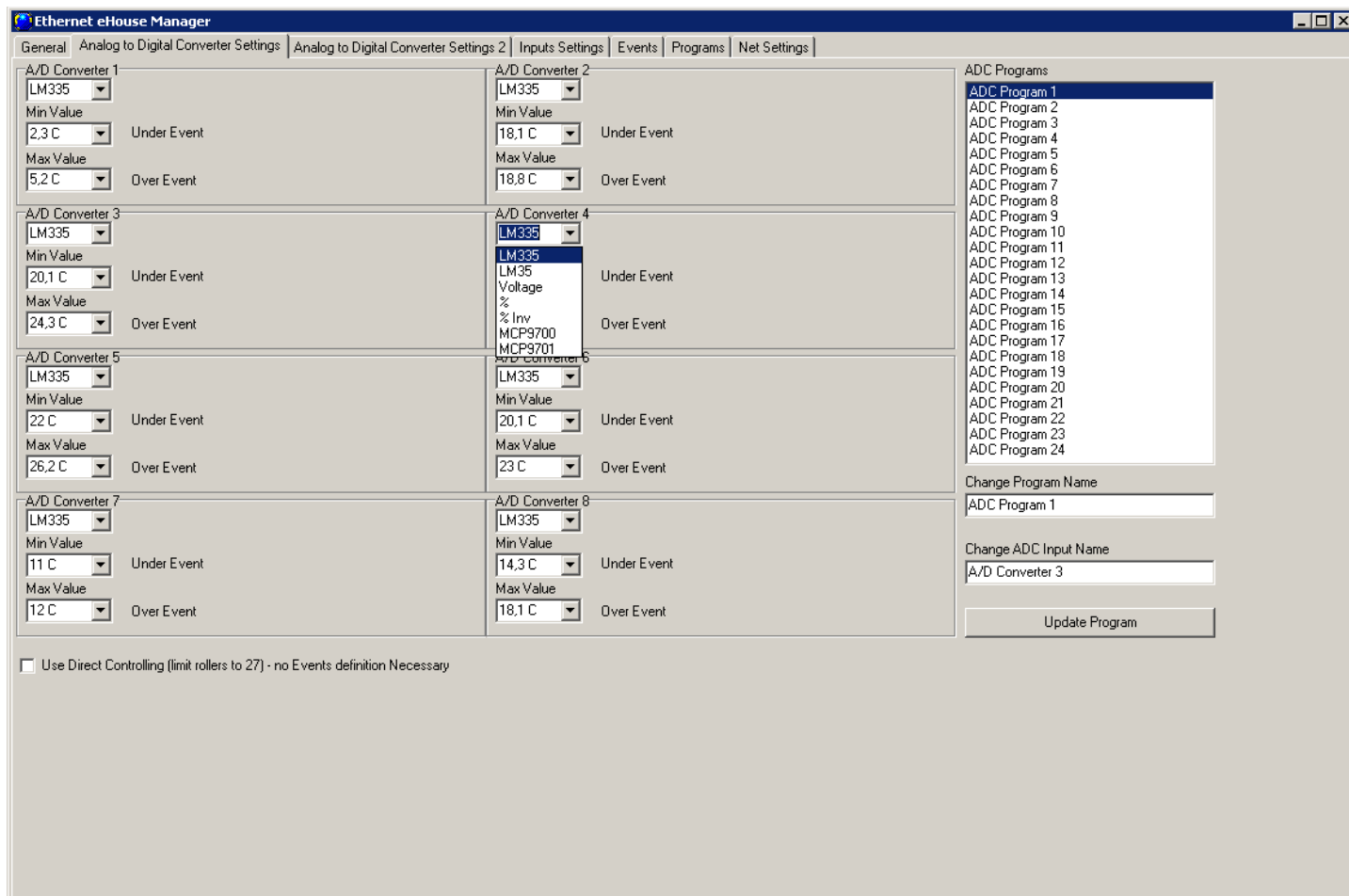
- **Report Level** - Level Reporting Logs 0 - no, 1 – all, then (the higher the number, the less displayed information).
- **Devs eHouse 1 Count** - Number of RM (for CommManager cooperation in hybrid mode of eHouse (eHouse 1 under CommManager supervision) . Select 0 for ERMs.
- **Device Name** - The name of the Ethernet Controller
- **Modification Enabled** - Allows you to change the names and the most important settings
- **Logging UART Disabled** - Disables send logs via RS-232 (the flag must be checked for normal operation)
- **ERM** - select the type of controller (radio button) – EthernetRoomManager
- **Infrared Settings** - Infrared Transmission/Reception Settings for ERM
- **Set Time** - Set the time of current Controller
- **Transparent Ethernet / UART 1** - transparent mode between the Ethernet and serial port 1 To validate the configuration and proper operation of peripheral devices
- **Transparent Ethernet / UART 2** - transparent mode between the Ethernet and serial port 2 To validate the configuration and proper operation of peripheral devices
- **Reset Device** - Force reset controller
- **Create Mobile File** - Generate configuration files for control panels
- **Save and Update Settings** - write configuration, settings and load to the controller.
- **Logging Device** - Launching TCPLogger.exe application to check the controller logs in case of problems.
- **Send Empty Test Event** - Test Sends an event to the controller for checking connection, authorisation, etc.
- **Event Creator** - Edit and run system events.
- **Disable Scheduler** – disable calendar/scheduler for smaller CPU utilization
- **Advanced Configuration** – Enables more advanced features.
- The first message window is used to display text logs
- The second text box is used for transparent mode putting text to be sent to the controller. Pressing “Enter” Sends data to the controller. For ASCII text only.



Description/text of button may change during software update or language versions.
Language versions can be edit in “%eHouse%/lang/” directory for each windows code page and application revision individually.

4.4.2. Analog-to-digital converters - Settings

Form "Analog to Digital Converter settings" (ADC) refers to the configuration and parametrization of measuring inputs and the definitions of ADC programs. Configuration of each input is the same.



The screenshot shows the 'Ethernet eHouse Manager' window with the 'Analog to Digital Converter Settings' tab selected. The interface is organized into two main columns.

A/D Converter Settings: This section contains eight sub-panels, each for an A/D Converter (1 through 8). Each panel includes a dropdown menu for the converter type (all set to 'LM335'), a 'Min Value' field with a unit (e.g., '2,3 C'), and a 'Max Value' field with a unit (e.g., '5,2 C'). Below these fields are two radio buttons: 'Under Event' and 'Over Event'.

ADC Programs: This section on the right contains a list of 24 ADC programs, from 'ADC Program 1' to 'ADC Program 24'. Below the list are two text input fields: 'Change Program Name' (containing 'ADC Program 1') and 'Change ADC Input Name' (containing 'A/D Converter 3'). At the bottom of this section is an 'Update Program' button.

At the bottom of the main settings area, there is a checkbox labeled 'Use Direct Controlling (limit rollers to 27) - no Events definition Necessary'.

To Change main settings, it is necessary to check activation flag "Advanced Configuration" from "General" Form.

- At the beginning name of the sensor should be edited (by clicking on the group box and changing the name in the "Change ADC input name"
- Another critical factor is the choice of the measuring detector type:
 LM335 - temperature sensor (-40C, 56C) with a limited range (10mV / C),
 LM35 - temperature sensor,
 Voltage - voltage measurement <0,3.3 V)
 % - The measurement of the percentage in relation to the voltage 3.3V
 % Inv - measuring the value of the reverse rate (100% - x%) such as the photo-transistor (negative scale mapping)
 MCP9700 - Temperature sensor (powered) - full temperature range (10mV / C)
 MCP9701 - Temperature sensor (powered) - full range of temperatures (19.5mV / C)
- Then events can be assigned to the upper and lower thresholds of the relevant system events, eg. (adjustment of physical value or signaling the exceeded limit). This is done by clicking on the label "Under Event" - wizard, selecting from a list of events and the corresponding event by clicking "Accept". The upper threshold is set by clicking "Over event" label, by selecting desired event and clicking "Accept".
- After these steps, it is necessary to press the "Save Settings" on "General" Form and close / reopen application is required to update names, events, choice list values.
- The next step is to give the names of the programs ADC.
 Similarly, it is necessary to flag "Advanced Configuration" is enabled. It is not save, and each time is deactivated to prevent accidental modification of vital devices settings.
- Select the program from the list and in the "Change Program Name" field set desired value.
- Then ADC program edition - define thresholds (min, max) of all ADC input for each program.
- When you enter a value of thresholds in selectable data field, be sure to press the down arrow to select the closest value from the list.

Number of measuring inputs which are available depends on the type of driver, hardware version, connected to the internal sensors and the controller firmware. It may therefore happen that a part of the input is occupied and can not all be used. For busy inputs must not be connected in parallel or shorted sensors as this may skew the measurements or damage the controller.

After setting upper and lower limits for the program, press the "Update Program / Update Program". Once you have created all the programs required to load the drivers by pressing the "Save Settings / Save Settings".

4.4.2.1. Calibration of ADC inputs

The values listed are calculated on the basis of the characteristics of the sensor and the measured voltage comparing to power supply or reference voltage, which allows them to be calibrated by changing the value of a text file "%eHouse%\xxxxxx\VCC.CFG" for the power supply (where xxxxxx - is the address of the controller). A more accurate calibration is possible by editing the "*.Cfg" file in the directory: "%eHouse%\xxxxxx\ADCS\" for the number of the sensor.

The meaning of each line in the file is as follows (includes only integers without a decimal point).

These data are calculated based on the conversion of the scale of the sensor (with respect to the supply voltage or

reference - normalized) by analyzing the equation $\text{Factor} * x + \text{Offset}$ (where x is the measured value for ADC input $<0..1023>$).

- 1) (VCC or Vref) * 10000000000 - measured voltage power failure or voltage reference depending on reference voltage source.
- 2) Offset * 10000000000 - DC offset value (for example, at the point 0)
- 3) Factor * 10000000000 - factor / scale
- 4) Precision - precision / number of digits displayed after the decimal point
- 3) Option - the number of options (type of sensor - choice field, starting from 0)
- 4) Suffix – additional text to calculated value to be placed in the logs or panels (eg. %, C, K)

Deleting sensors files in the "%eHouse%\xxxxxx\ADCS\" causes the automatic recreation and calculation of the values.

This calibration do not reflect all eHouse system application.

4.4.3. Digital Input Settings

- The names of the digital inputs can be enter or change after activation of "Advanced Configuration" option on General Form. Tabs "Input Names" or "Zone Settings" (for CommManager) Appears.
- The names shall be selected by clicking on a label with the name and editing it in "Sensor Name Change" field.
- Further “security settings” shall be in the same tab for CommManager.
- Enter additional settings on "Input Settings” form.
- Here you can set the input type (normal / invert), changing the flag Invert (Inv).
- In the case of normal inputs controller react for short input to ground. Inverted input react for disconnecting input from the ground.
CommManager behavior is opposite to EthernetRoomManager settings of Inversion. Because alarm sensors generally operate "on opening the contact" relay.
- Then you can assign any event eHouse system to each input.
- This is done by clicking on the labels marked as 'N/A' (not programmed for input), and select from the list of events on corresponding wizard, and press the "Accept".
- When all changes are made press "Save Settings" button on "General" form, to save the configuration and upload it to controller.

Ethernet eHouse Manager

General
Input Names
Analog to Digital Converter Settings
Analog to Digital Converter Settings 2
Inputs Settings
Events
Programs
Net Settings

E	M	W	A		E	M	W	A		E	M	W	A		E	M	W	A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Salon Wt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 49	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 73
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Kuchnia Wt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 74
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sensor 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 51	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 75
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 28	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 52	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 76
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 29	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 53	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 77
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 54	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 78
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 31	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 55	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 79
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 32	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 56	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 80
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 33	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 57	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 81
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 34	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 58	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 82
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 35	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 59	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 83
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 36	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 60	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 84
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 37	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 61	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 85
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 38	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 62	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 86
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 39	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 63	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 87
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 40	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 64	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 88
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 41	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 65	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 89
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 42	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 66	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 90
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 43	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 67	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 91
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 44	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 68	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 92
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 45	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 69	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 93
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 46	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 94
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 23	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 47	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 71	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 95
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 48	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 72	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sensor 96

Change Sensor Name

☐ AdditionalSensors

Update

The number of available inputs depend on the type of controller, hardware version, firmware, etc. User has to realize how many inputs are available for current type of controller and do not try to program more than the available quantity as it can lead to resource conflicts with other inputs or on-board sensors or resources.

Ethernet eHouse Manager

General
Analog to Digital Converter Settings
Analog to Digital Converter Settings 2
Inputs Settings
Events
Programs
Net Settings

Event	Inv	Event	Inv	Event	Inv	Event	Inv
N/A	<input type="checkbox"/> Sensor 1	N/A	<input type="checkbox"/> Sensor 25	N/A	<input type="checkbox"/> Sensor 49	N/A	<input type="checkbox"/> Sensor 73
N/A	<input type="checkbox"/> Sensor 2	N/A	<input type="checkbox"/> Sensor 26	N/A	<input type="checkbox"/> Sensor 50	N/A	<input type="checkbox"/> Sensor 74
N/A	<input type="checkbox"/> Sensor 3	N/A	<input type="checkbox"/> Sensor 27	N/A	<input type="checkbox"/> Sensor 51	N/A	<input type="checkbox"/> Sensor 75
N/A	<input type="checkbox"/> Sensor 4	N/A	<input type="checkbox"/> Sensor 28	N/A	<input type="checkbox"/> Sensor 52	N/A	<input type="checkbox"/> Sensor 76
N/A	<input type="checkbox"/> Sensor 5	N/A	<input type="checkbox"/> Sensor 29	N/A	<input type="checkbox"/> Sensor 53	N/A	<input type="checkbox"/> Sensor 77
N/A	<input type="checkbox"/> Sensor 6	N/A	<input type="checkbox"/> Sensor 30	N/A	<input type="checkbox"/> Sensor 54	N/A	<input type="checkbox"/> Sensor 78
N/A	<input type="checkbox"/> Sensor 7	N/A	<input type="checkbox"/> Sensor 31	N/A	<input type="checkbox"/> Sensor 55	N/A	<input type="checkbox"/> Sensor 79
N/A	<input type="checkbox"/> Sensor 8	N/A	<input type="checkbox"/> Sensor 32	N/A	<input type="checkbox"/> Sensor 56	N/A	<input type="checkbox"/> Sensor 80
N/A	<input type="checkbox"/> Sensor 9	N/A	<input type="checkbox"/> Sensor 33	N/A	<input type="checkbox"/> Sensor 57	N/A	<input type="checkbox"/> Sensor 81
N/A	<input type="checkbox"/> Sensor 10	N/A	<input type="checkbox"/> Sensor 34	N/A	<input type="checkbox"/> Sensor 58	N/A	<input type="checkbox"/> Sensor 82
N/A	<input type="checkbox"/> Sensor 11	N/A	<input type="checkbox"/> Sensor 35	N/A	<input type="checkbox"/> Sensor 59	N/A	<input type="checkbox"/> Sensor 83
N/A	<input type="checkbox"/> Sensor 12	N/A	<input type="checkbox"/> Sensor 36	N/A	<input type="checkbox"/> Sensor 60	N/A	<input type="checkbox"/> Sensor 84
N/A	<input type="checkbox"/> Sensor 13	N/A	<input type="checkbox"/> Sensor 37	N/A	<input type="checkbox"/> Sensor 61	N/A	<input type="checkbox"/> Sensor 85
N/A	<input type="checkbox"/> Sensor 14	N/A	<input type="checkbox"/> Sensor 38	N/A	<input type="checkbox"/> Sensor 62	N/A	<input type="checkbox"/> Sensor 86
N/A	<input type="checkbox"/> Sensor 15	N/A	<input type="checkbox"/> Sensor 39	N/A	<input type="checkbox"/> Sensor 63	N/A	<input type="checkbox"/> Sensor 87
N/A	<input type="checkbox"/> Sensor 16	N/A	<input type="checkbox"/> Sensor 40	N/A	<input type="checkbox"/> Sensor 64	N/A	<input type="checkbox"/> Sensor 88
N/A	<input type="checkbox"/> Sensor 17	N/A	<input type="checkbox"/> Sensor 41	N/A	<input type="checkbox"/> Sensor 65	N/A	<input type="checkbox"/> Sensor 89
N/A	<input type="checkbox"/> Sensor 18	N/A	<input type="checkbox"/> Sensor 42	N/A	<input type="checkbox"/> Sensor 66	N/A	<input type="checkbox"/> Sensor 90
N/A	<input type="checkbox"/> Sensor 19	N/A	<input type="checkbox"/> Sensor 43	N/A	<input type="checkbox"/> Sensor 67	N/A	<input type="checkbox"/> Sensor 91
N/A	<input type="checkbox"/> Sensor 20	N/A	<input type="checkbox"/> Sensor 44	N/A	<input type="checkbox"/> Sensor 68	N/A	<input type="checkbox"/> Sensor 92
N/A	<input type="checkbox"/> Sensor 21	N/A	<input type="checkbox"/> Sensor 45	N/A	<input type="checkbox"/> Sensor 69	N/A	<input type="checkbox"/> Sensor 93
N/A	<input type="checkbox"/> Sensor 22	N/A	<input type="checkbox"/> Sensor 46	N/A	<input type="checkbox"/> Sensor 70	N/A	<input type="checkbox"/> Sensor 94
N/A	<input type="checkbox"/> Sensor 23	N/A	<input type="checkbox"/> Sensor 47	N/A	<input type="checkbox"/> Sensor 71	N/A	<input type="checkbox"/> Sensor 95
N/A	<input type="checkbox"/> Sensor 24	N/A	<input type="checkbox"/> Sensor 48	N/A	<input type="checkbox"/> Sensor 72	N/A	<input type="checkbox"/> Sensor 96

4.4.4. Programming Scheduler / Calendar of eHouse4Ethernet controllers

[illegible]

Tab "Events" is used to program Scheduler/Calendar items for current controller .

- When you right-click on the desired row (full or empty), menu appears containing the "Edit" item. After choosing Edit, Event wizard appears.
- For scheduler/calendar manager, only the same device (local) can be added ("Device Name").
- In the "Event To Run", choose the appropriate event.
- Then execution type must be select :
 - "Execute Once" - to select a specific calendar date and time.
 - "Multiple Executions" - select the advanced scheduler - calendar with the possibility of any repetition of the parameters (year, month, day, hour, minute, day of the week).
 - "N / A - No start-up"
- After selecting an event and required time to run, "Add to scheduler" must be pressed.
- After adding all the events planned, press the right mouse button and select "Update data".
- Finally, press the "Save Settings" on "General" tab.

Event Creator for eHouse

Device Name

Test10

Address:

000210

☐ Execute Once
 ☒ Multiple Executions
 ☐ N/A

Multi Execution

Day Of Month

Any

Day Of Week

Any

Month

Any

Year

Any

Hour

0

Minutes

0

Event To Run

Output 2 (on)

Command Type

Cmd

Arg1Cap

Arg2Cap

Arg3Cap

Arg4Cap

Arg5Cap

Arg6Cap

Arg7Cap

New Event Name

NewEvent

Create Event

Add To Scheduler

Run Now

NewMacro

Add Macro

Macro

Add To Macro

Remove Macro

User Event

00D22101010000000000

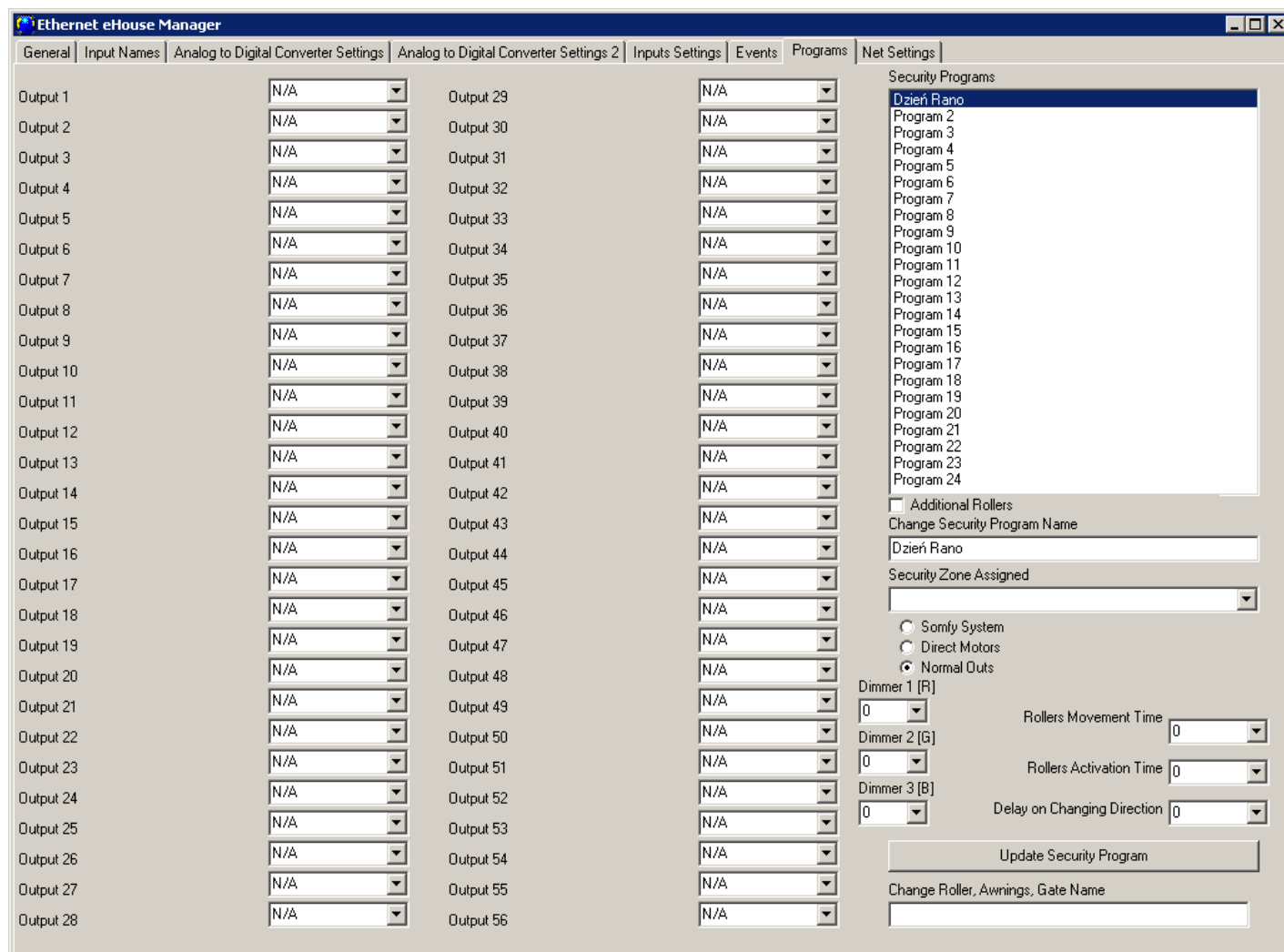
Test10 ; ADC Program 5 00D26104000000000000

4.4.5. Defining Outputs Programs.

The programs cover a range of outputs, both digital outputs and dimmers. Programs are defined in the "Programs".

To change the names of the programs include:

- Set the flag "Advanced Configuration" on "General" form
- Choose from the list of program
- In the "Change Program Name" field name of program can be modified.
- After changing program names, each used program can be defined
- Select from the list the program
- Set the combination of the outputs selecting individual settings for each output
 - N / A - does not change the output
 - ON - Enable
 - OFF - Turn off
 - Temp On - Temporarily turn on
- Set the dimmer levels <0.255>
- Press the "Update Program"
- Repeat for all the required programs



At the end press "Save Settings" on "General" tab, to save and upload the configuration to the controller

4.4.6. Network Settings

In the "Net Settings" you can also define a controller configuration valid options.

IP Address - (not recommended to change - it must be the same as the address of the driver configuration) must be in network address 192.168.x.x

IP Mask (not recommended to change should be as low as possible: 255.255.255.0)

IP Gateway (gateway for Internet access)

SNTP Server IP - IP address of the time server SNTP services

GMT Shift - Time Offset from GMT / time zone

Season Daily Savings - Activate seasonal time changes

SNTP IP – Use IP of SNTP server address instead of the DNS name. For best results use local (inside LAN) SNTP server.

MAC Address - Do not change (Mac address is assigned automatically - the last byte taken from the youngest byte of IP address)

Host Name - not used

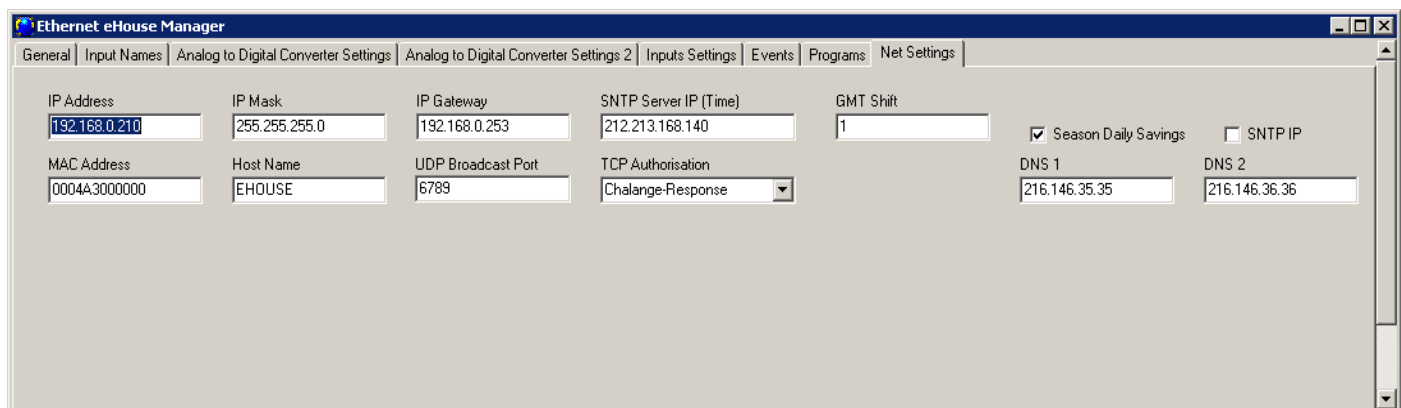
Broadcast UDP Port - Port for distribute data from the controller status via UDP (0 blocks UDP Broadcasting)

TCP Authorization – Minimal Method of Logging to the server TCP/IP of controllers (for further entries from the list imply earlier, safer ways). Useful for third party applications including eHouse4Java, eHouseAndroid, eHouse4WindowsMobile

DNS 1, DNS 2 - DNS server addresses

Propagate local Time – definition of one controller to propagate its time to other controllers

Change IP Address – change local ip address for ERM. Do it only once on start up initialization and configuration of controllers, otherwise it will mess up installation and controllers configuration.



Field	Value
IP Address	192.168.0.210
IP Mask	255.255.255.0
IP Gateway	192.168.0.253
SNTP Server IP (Time)	212.213.168.140
GMT Shift	1
Season Daily Savings	<input checked="" type="checkbox"/>
SNTP IP	<input type="checkbox"/>
MAC Address	0004A3000000
Host Name	EHOUSE
UDP Broadcast Port	6789
TCP Authorisation	Challenge-Response
DNS 1	216.146.35.35
DNS 2	216.146.36.36

4.5. TCPLLogger.exe Application.

This application is used to collect logs from the controller which can be transmitted via TCP / IP (direct connection to the server). As a parameter IP address of the controller must be specified , eg. "TCPLLogger.exe 192.168.0.254". Depending on the parameter settings Report Level Controller different amount of information is displayed. For 0 Logs are blocked. For 1 is the maximum amount of information. With the increasing level, decreases Report amount of information logged.

TCPLLogger application maintains continuous TCP / IP Server controller and utilize processor efficiency, so it should only be used for problems detection, not continuous operation.

4.6. eHouse4Android Application and libraries

eHouse4Android is a software application that allows control of eHouse system from touch screen graphic panels, mobile phones, PDAs, smartphones, PADs running on Android operating system (4.0 or higher). It Provides a graphical control with simultaneous visualization of the controllers state and actual work parameters. Each view can be individually created in the CoreIDRW application after generating the names of objects and events from eHouse system package.

In the empty file "*.Cdr" template file for eHouse, there are useful macros, to import data from eHouse system application and export to any visualization panel system. Create views will be discussed later in this documentation.

EHouse4Android application enables on-line reading controllers status and perform graphical visualization of objects, when connected to a TCP / IP server running on the communication module or eHouse application for PC supervision. It is possible to control the system via WiFi or Internet (on-line), SMS, or e-mail.

Ehouse4Android can receive broadcast status from controllers via UDP (without permanent connection to TCP/IP server).

The application also allows you to control the system with human speaking using "speech recognition".

For third-party developers and software libraries are available (templates) for Android:

- supports direct communication with controllers
- automatic and personalized visualization
- continuous status updates and online visualization
- direct graphical control of controllers or from intuitive form
- allows you to create your own graphic software control panels
- supports "speech recognition"
- supports "speech synthesis"

4.7. Visualization and Graphical Control - Views and objects creation.

eHouse smart home graphical visualization and control. Creating visualization in Corel Draw with eHouse Scripts. It is very important to complete configuration of all controllers, names, signals before starting with creation individual visualization views. Otherwise names will have to be performed manually which is very time consuming and uncomfortable.

After final configuration of all devices in eHouse application: Naming devices, Signals (analog sensors, digital inputs, outputs, programs, alarm sensors, and creation event, eHouse.exe should be executed with “/cdr” parameter for extracting all names and events for Corel Draw Macro, to import it to the empty view file. Views with proper name should be created (in case of usage visualization or graphical control - by copying empty file “empty.cdr” to new one named as future View Name). Views can be created in Corel Draw application (ver. 12 or greater) (may be evaluation or demo version).

Afterwards file should be opened by Corel Draw application, by double click the file from "File Explorer" and chose macro (tools->visual basic->play chose from list eHouse and finally Visualization.createform). X,Y sizes in meters should be entered then press Create Document button. This will create Page with specified size and layers for each device and each event. One layer will be created with name {device name (event name)} . Then script should be closed and sizes are correct and unit is meter. Views edition can be achieved in two ways: manual drawing directly on created, empty canvas or automatic via auxiliary macro function.

4.7.1. Automatic drawing with support of Macro Function.

This mode is especially helpful when we need precise dimension and locations e.g. draw plan of the building. It also assures compatibility with any available visualization or graphical control method in eHouse system. This method actually put specified object with precisely defined parameters on selected layer.

For automatic drawing objects open (tools->visual basic->play choose from list eHouse and finally Visualization.NewObject).

- Set offsetx, offsety parameters which is movement from point (0,0) defined globally.
- Chose from list Device name and event (Layer) and then "Create/Activate Device".
- Chose object from list to draw (ellipse, poly-line, rectangle, round-rectangle, label).
- Set requested parameters (x1, y1, x2, y2, width ,color, fill color, roundness).
- Press "Place Object" button.
- In case of undesired result "Undo" can be executed.
- Repeat these steps for every object and each layer.
- After creation all objects "Generate Files" should be pressed, and other views creation methods, which will create files for many different visualization types (Visual.exe, eHouseMobile, SVG, XML+SVG, HTML+maps).

4.7.2. Manual drawing of objects.

Objects are created manually on canvas of view, using Corel methods of drawing. Due to system consistency unknown figures and parameters are ignored and only known figures can be draw.

To achieve good imagery only following object can be draw:

Drawing Ellipsis put in rectangle coordinates diagonal (X1, Y1) (X2, Y2). Accepted parameters are:

- Outline width,
- Outline color,
- Fill Color.

Drawing Rectangle with coordinates diagonal (X1, Y1) (X2, Y2). Accepted parameters are:

- Outline Width,
- Outline Color,
- Fill Color.

Drawing line between 2 points (X1,Y1) (X2,Y2). Accepted parameters are:

- Outline Width,
- Outline Color,
- Fill Color.

Drawing Rounded Rectangle (X1,Y1) (X2,Y2). Accepted parameters are:

- Outline Width,
- Outline Color,
- Fill Color.
- Radius - in % (must be equal for all corners)

Placing Label (X1,Y1)

- Outline Width,
- Outline Color,
- Fill Color,
- Text,
- {Type and size of font can be changed, but it should be verified on other computer without Corel Draw and TCP panels (Windows mobile) Common fonts should be used as Arial, times new roman etc to ensure proper work on many platforms (Windows XP, Windows Mobile, Many Web Browsers on different operating systems)}

Drawing filled Polygons – closed path filled with color

- Outline width,
- Outline color,
- Fill Color.

Object should be created on required layer assigned to the state of device.

All Colors must be RGB colors, otherwise it will be converted to RGB if it possible. If Conversion is not possible they will be set to default color (fill black, outline Red). It could be then replaced by valid colors from RGB palette

For usage Internet Browser graphic control or visualization, browser safe colors should be used.

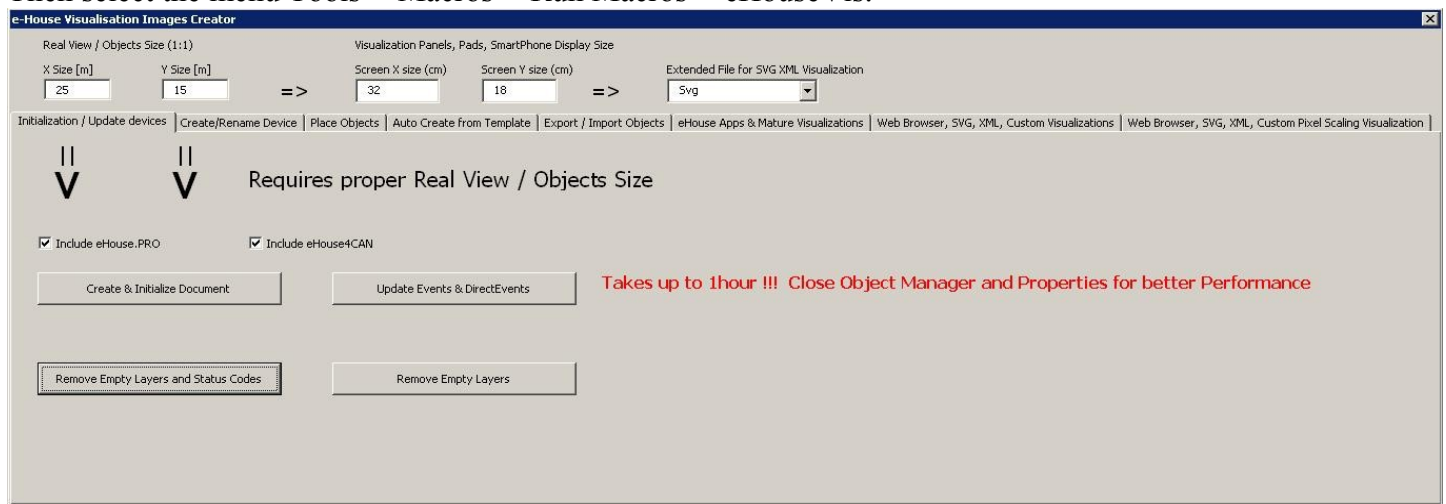
In the most current version of script capabilities to create individual graphic visualization and control it includes:

- Automatic import of names: devices, events, signals of eHouse variants: eHouse.Pro, Ethernet eHouse (LAN), eHouse 1 (RS-485) eHouse4CAN (into independent layers)
- Automatic update of changes - names, events, system events
- Automatic cleaning of empty layers - without visualization objects

- Manually add new devices, layers, or a change in case of change of name
- Precision manual creation of graphical objects (by entering the coordinates and parameters)
- Create template images, export, import options for creating views, the outline of the building, repeating objects, etc.
- Automatic creation views of objects from image templates for inputs, outputs, alarms
- Support shapes: line, circle, ellipse, polygon, rectangle, rounded rectangle
- Create a visualization to control applications on any eHouse platform (Android, Java, Windows, Linux)
- Create multiple variants of graphical visualization and control for web browsers allowing usage of any browser on any operating systems and devices: SVG, XML, HTML, SVG + JavaScript, Maps HTML, HTML Form, Custom (individually created based on templates created their own)
- Create a visualization dedicated to any hardware panels - any screen size (which is a parameter in centimeters)
- Create a visualization dedicated to any hardware panels - any screen size (which is a parameter in pixels)

In order to utilize the functionality of macros, open a blank template file "*.CDR" and select "Enable Macro" allowing usage VBA scripting.

Then select the menu Tools-> Macros-> Run Macros-> eHouseVis.



4.7.3. Creating Visualization - Initialization

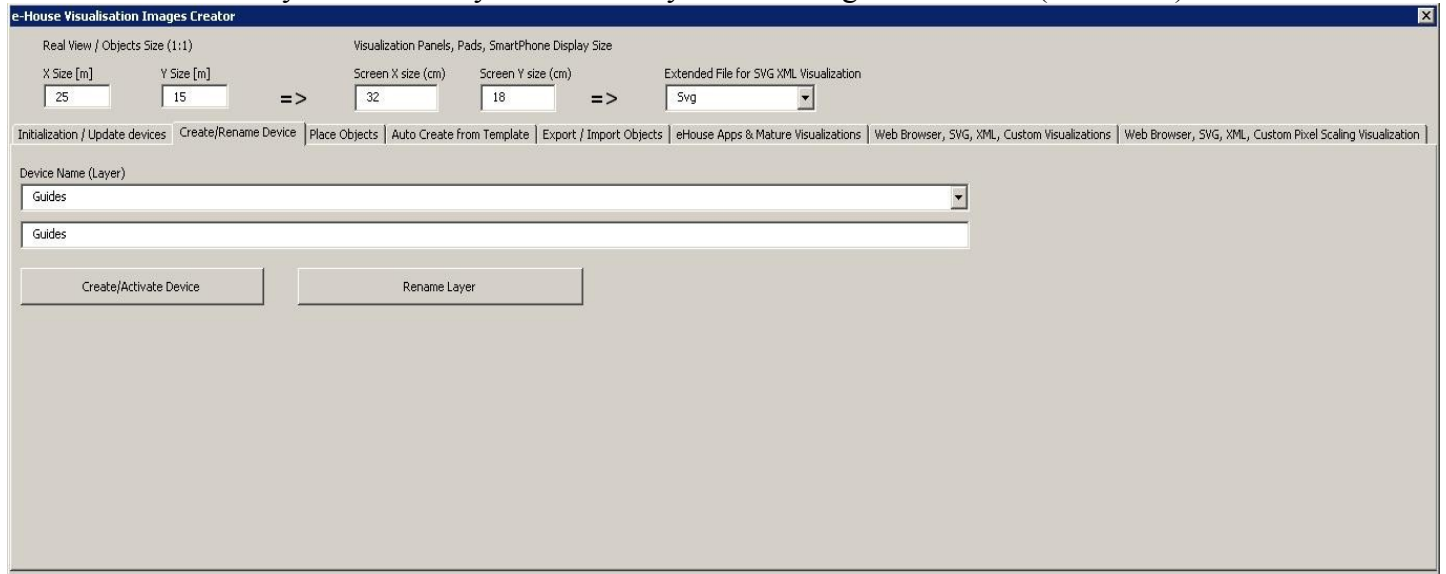
- To create and initialize objects "Object Manager" must be completely closed which will accelerate the formation of thousands layers, objects
- In "X Size [m]", "Y Size [m]", enter the actual dimensions of the view in meters.
- setting "Include eHouse.PRO" flag allows you to add eHouse.PRO intelligent home system configuration for visualization
- setting "Include eHouse4CAN" flag allows you to add eHouse4CAN smart home system configuration for visualization
- Then press the "Create & Initialize Document" which will automatically create all the objects eHouse system. This can take up to one hour because the system can have many thousands of objects

On this form there are also buttons:

- **"Remove Empty Layers"** - remove empty layers without graphical objects
- **"Remove Empty Layers and Status Codes"** - remove empty layers without any graphics and event codes of eHouse system
- **"Update Events & DirectEvents"** - update eHouse control codes for all graphic objects created. Upon completion of visualization

4.7.4. Manually creating visualization objects

Another form allows you to manually create new layers and change their names (for events):



-
- **"Create / Activate device"** - creating a new layer. The name entered in the edit box, and then presses the button above
- **"Rename Layer"** - Change the name of the layer. In the **"Device Name (Layer)"** to select the layer. Then, in the edit box and then change the description presses the button above

4.7.5. Automatic creation of graphical objects from templates

Repetitive graphical objects can be created from pre-defined templates for layers with names containing 'TEMPLATE_'.

Individual templates are on layers with the addition of:

For each alarm entry (on/off)

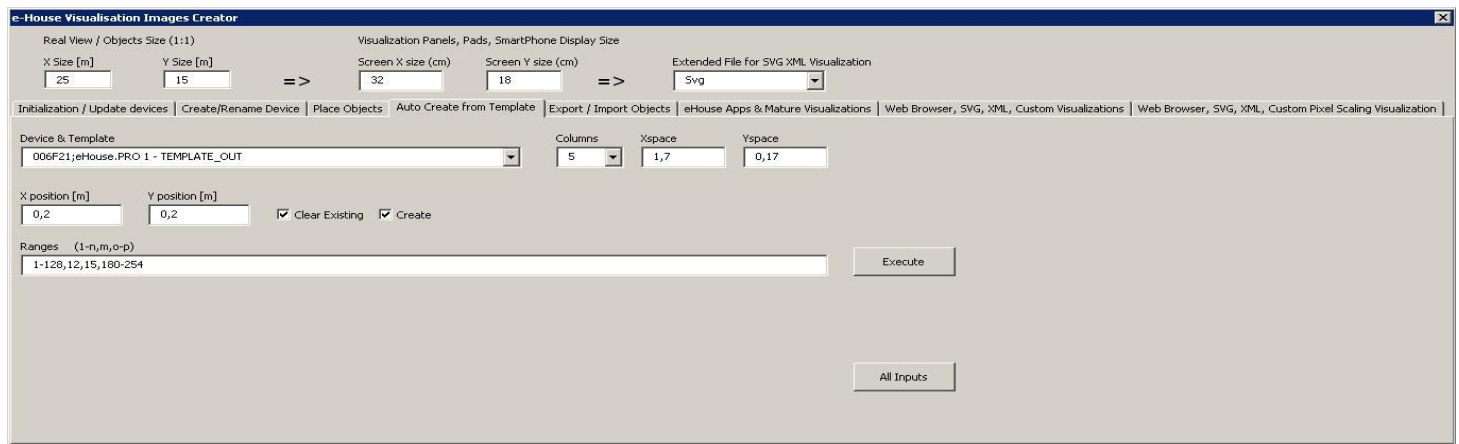
- **"TEMPLATE_Active"** - for active inputs
- **"TEMPLATE_Alarm"** - for alarm signal
- **"TEMPLATE_Warning"** - for warning signals
- **"TEMPLATE_Monitoring"** - for signal monitoring
- **"TEMPLATE_Horn"** - for siren signals
- **"TEMPLATE_Silent"** - for silent alarm signals
- **"TEMPLATE_Early"** - for early warning

- "TEMPLATE_SMS" - for signals SMS
- "TEMPLATE_Input" - for input signals

For other signals:

- "TEMPLATE_OUT" - for digital outputs
- "TEMPLATE_PROGRAM" - for outputs programs
- "TEMPLATE_ZONES" - for security zones
- "TEMPLATE_SECUPROGRAMS" - for security programs/drives
- "TEMPLATE_ADCPROGRAMS" - for programs regulating/measurement

Form "Auto Create from Template" contains the necessary elements for the automatic creation of graphical objects such as inputs/alarms, outputs, buttons, programs, etc.

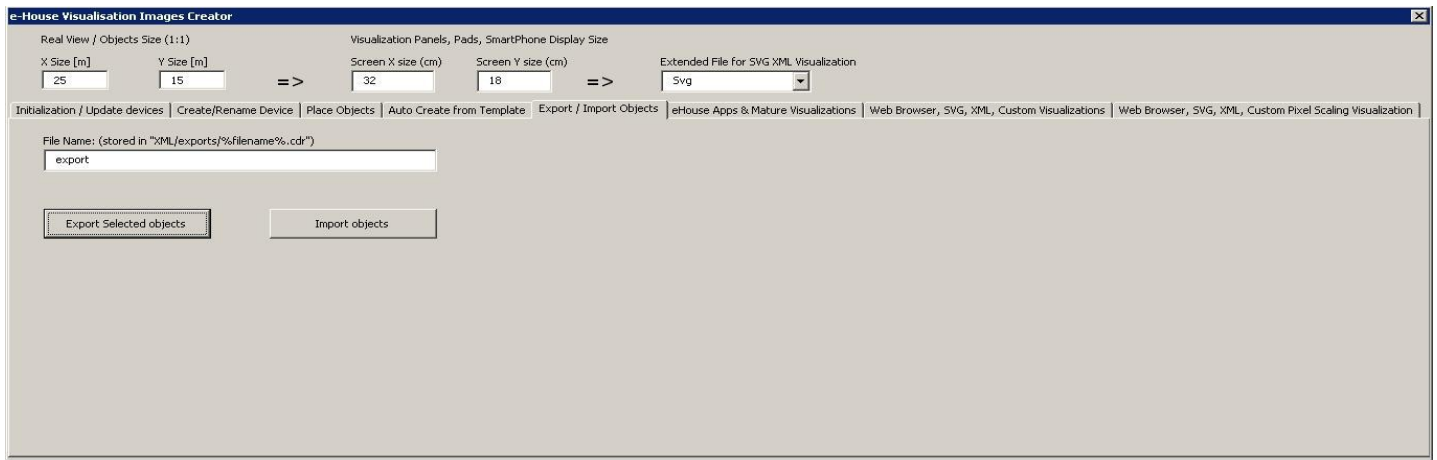


- in the "Device & Template" field - select the appropriate template
- in the "Column" field - is the number of objects in each row
- in the "X space" field - is located in the X-axis spacing between successive objects
- in the "Y space" field - is located in the Y-axis interval between successive rows
- "Clear Existing" - allows the removal of layers of graphics in which the templates are copied
- "Create" - allows you to create graphic elements of the template
- Edit box "Ranges" - contains a list of items that will be processed during the creation, deletion of graphical objects. It is permissible to calculate the elements separated by a comma "," or ranges separated by a semicolon "-" eg "1-12,15,17,21-32,38-45"
- "Execute" - start the creation of graphical objects for the selected template from the list of "Device & Template"
- "All Inputs" - launches the creation of facilities for all input signals / alarms

4.7.5. Exporting/Importing graphics objects

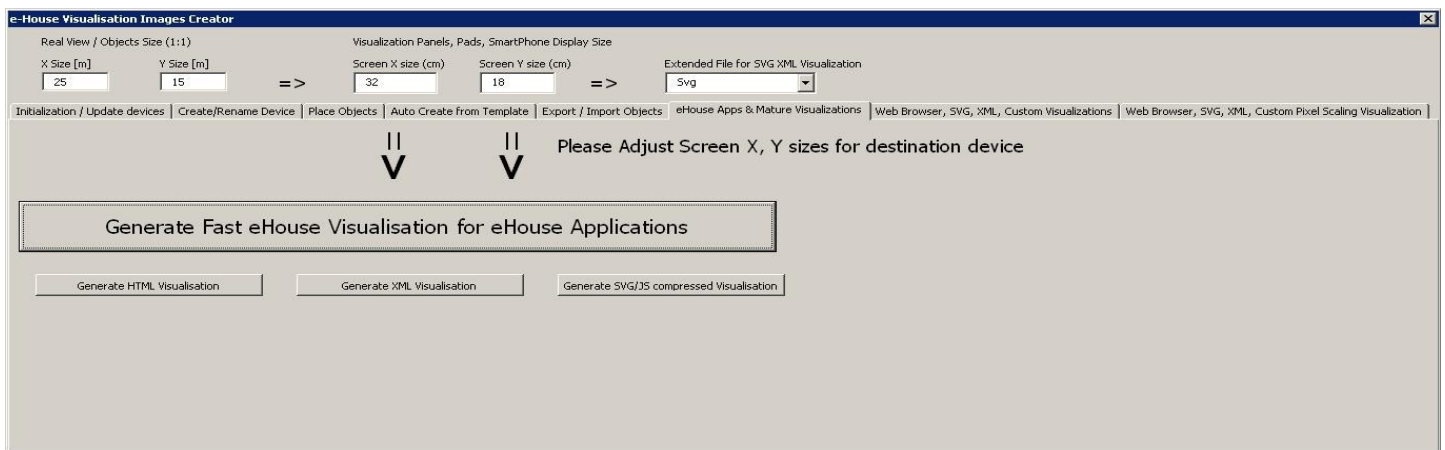
Export/Import allows you to easily and quickly copy portions of visualization to create different variants, views, such as a separate for children by limiting their functionality. Export/import fully copies the graphic objects with

layers and their location. To perform the export should be noted in the image (choose - "Select" button while holding down the Shift to add more or select all and copy then delete unwanted) objects to copy. Then, in the "File name" enter the name of the export file that will be created in the "XML/exports/" with the extension ".CDR" and will be in "Corel Draw" format.



- **"File Name"** - the name of the file export/import without extension
- **"Export Selected Objects"** - export selected graphic elements and layers
- **"Import Objects"** - import graphic elements and layers of exports

4.7.6. Creating Application Visualization for eHouse System panels



This form allows you to generate a file ready for eHouse visualization and control native applications for:

- Java - Any platforms and operating systems with the Java virtual machine
- Android - any hardware running android smartphones, PADs, SmartTV
- Windows mobile, phone, .Net, .Net CF

To generate a visualization for any eHouse panels:

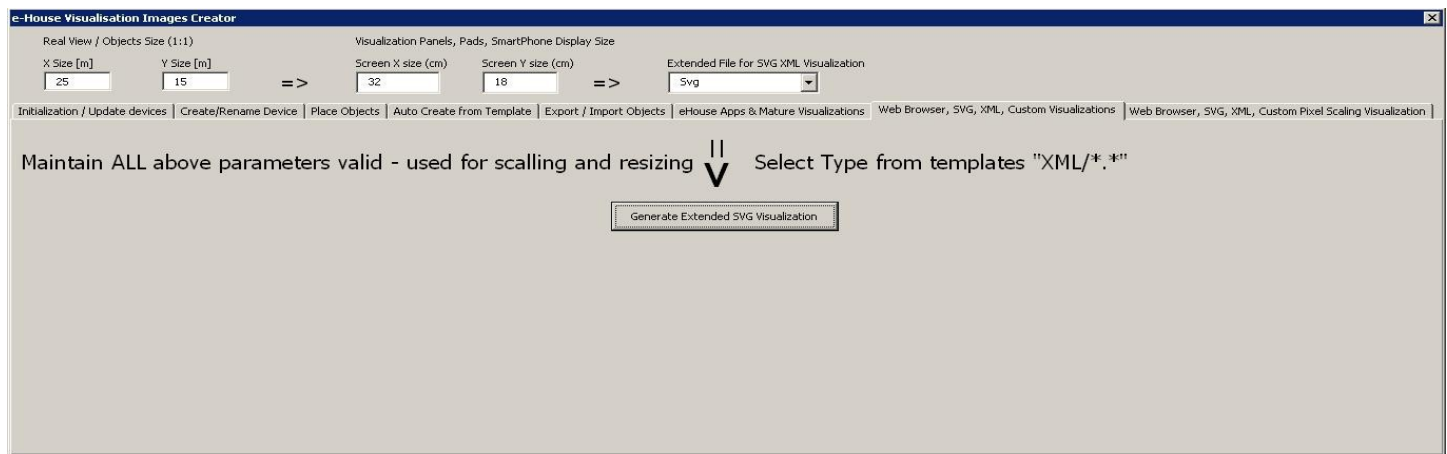
- enter the dimensions of the display panel in centimeters in the fields: "X Screen size", "Y Screen size"
- Press "Generate fast eHouse Visualization for eHouse Applications"
- For the older methods of controlling the graphics for web browsers can generate images
- Maps HTML - "Generate HTML Visualization"
- XML/SVG - "Generate XML Visualization"
- SVG compressed with Javascript - "Generate SVG/JS compressed Visualization"

For different panels/displays/screens sizes to be generated independently by changing the size (scale to fill up screen) of the visualization screens and pressing the creation of visualization. After generating the views of data must be moved to another location or change the name that has not been overwritten with new settings, because the visualization is always created with the same name as corel draw (.cdr) file name.

Visualization files: html form, svg, xml is stored in the "XML/" with the appropriate extension.

Visualization files for eHouse application form root directory where the current file CDR

4.7.7. Creating graphical visualization and control of Web browsers for panels with programmable screen size in centimeters



This form allows you to generate complete files, exports for graphical visualization and control for Web browsers, third party applications:

- SVG/JS - Visualization and graphic control + JS compression
- XML/SVG - Visualization and graphic control without compression JS
- Custom format export - based on individually created template
- Ability to add new individual export formats of visualization objects

To generate a visualization for any eHouse panels include:

- check the dimensions in meters in the fields: "X Size [m]", "Y Size [m]"
- enter the dimensions of the display panel in centimeters in the fields: "X Screen size", "Y Screen size"
- Select the export format in the "Extended SVG XML Visualization"
- XML – SVG/XML
- SVG - SVG compression JavaScript

- Custom format
- You can add your own files to create the templates in the "XML /"
- Press "Generate Extended SVG Visualization"

For different panels/displays/screens to be generated independently by changing the size (scaling for optimal fill up of screen) of the visualization screens and pressing "create visualization". After generating data, views file must be immediately moved to another location or change the name that has not been overwritten with new settings, because the visualization is always created with the same name as corel draw file name. Visualization files form html, svg, xml in the "XML/" with the appropriate extension.

Creating graphical visualization and control for Web browsers based panels with programmable screen size in pixels

This form allows you to generate the finished files for graphical visualization and control for Web browsers:

- SVG / JS - Visualization and graphic control + JS compression
- XML / SVG - Visualization and graphic control without compression JS
- Custom format - individually created template
- Ability to add new individual export formats of visualization objects

To generate a visualization for any eHouse panels:

- check the dimensions in meters in the fields: "X Size [m]", "Y Size [m]"
- Select the resolution in pixels of the display panel in the "Display Screen Resolution"
- Optional screen making it possible to reduce the margin in the fields: "X deviation", "Y deviation" for both axis
- Select the export format in the "Extended SVG XML Visualization"
- XML – SVG/XML
- SVG - SVG compression JavaScript
- Custom Format
- You can add your own configuration files to create the templates in the "XML/"

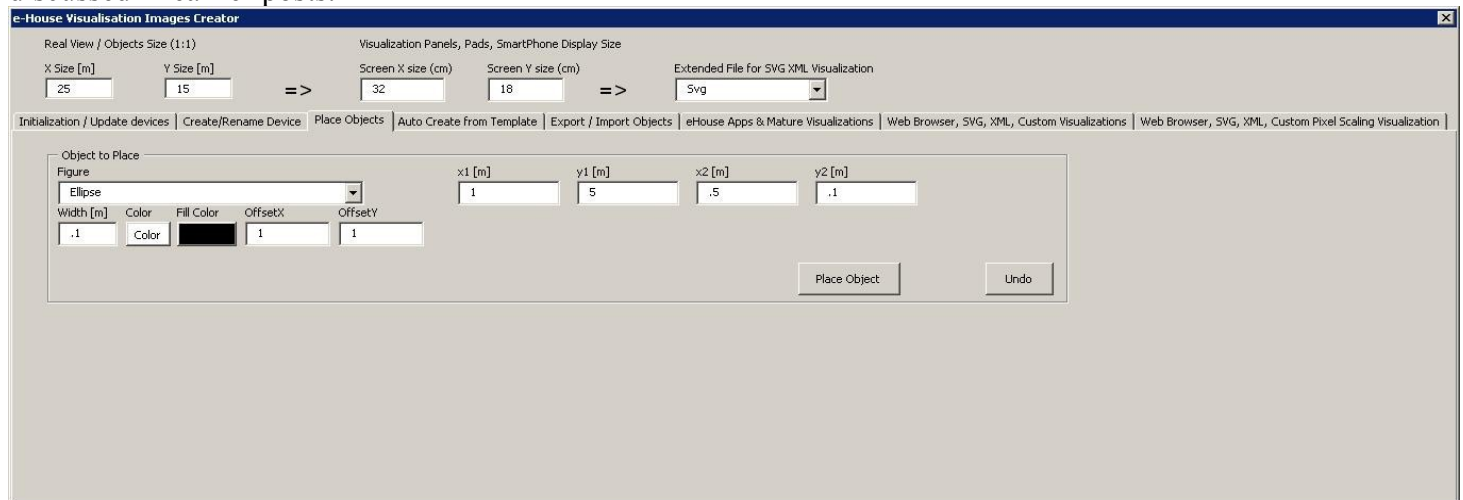
- Press the "Generate Extended SVG Visualization"

For different panels/displays/screens, generate visualization, regardless changing the size of the screen and pressing the creation of visualization. After generating the views of data must be moved to another location or change the name that has not been overwritten with new settings, because the visualization is always created with the same name as the file name corel draw.

Visualization files: html , svg, xml in the "XML/" with the appropriate extension.

4.7.8. Manual, Precision creation of graphical objects

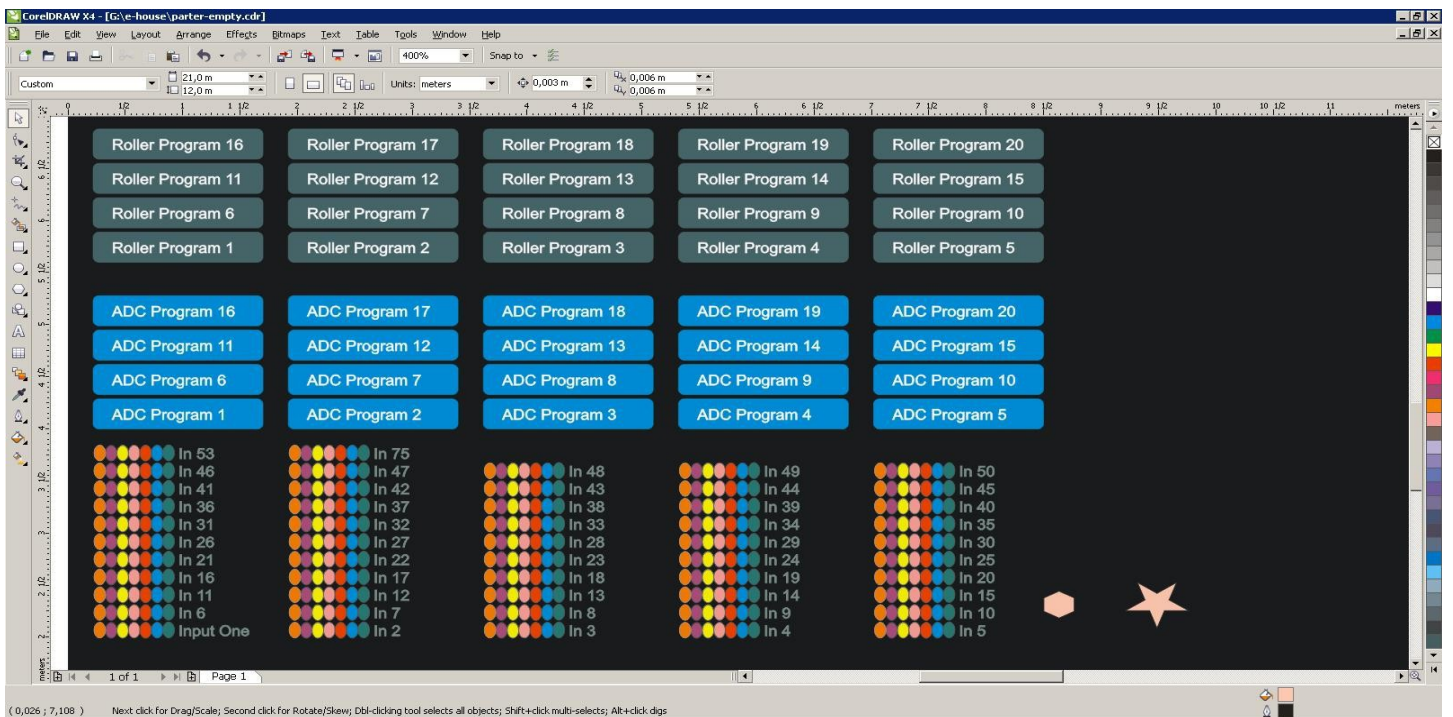
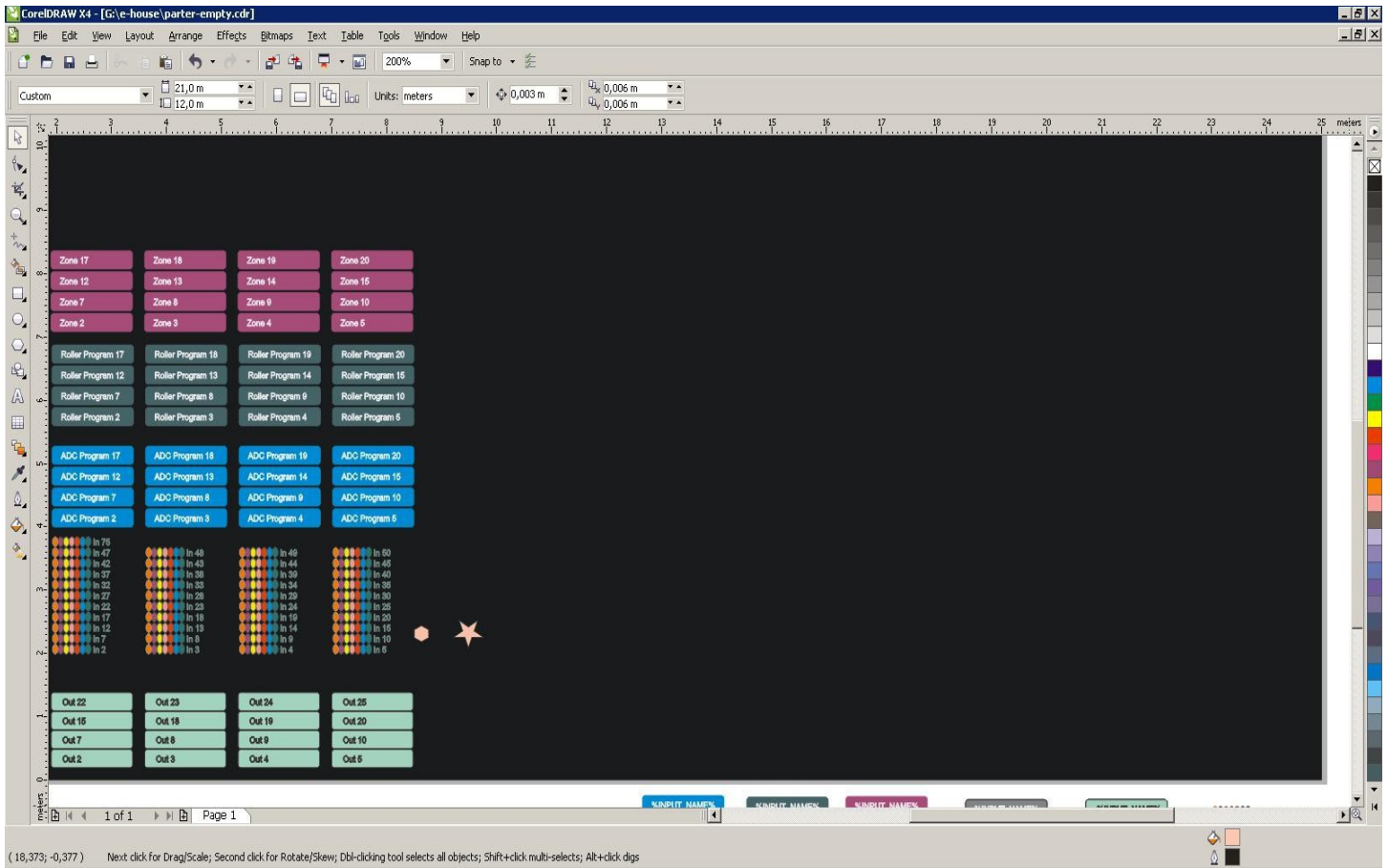
It is possible to precisely draw simple figures available and accepted by eHouse software, which was specifically discussed in earlier posts.



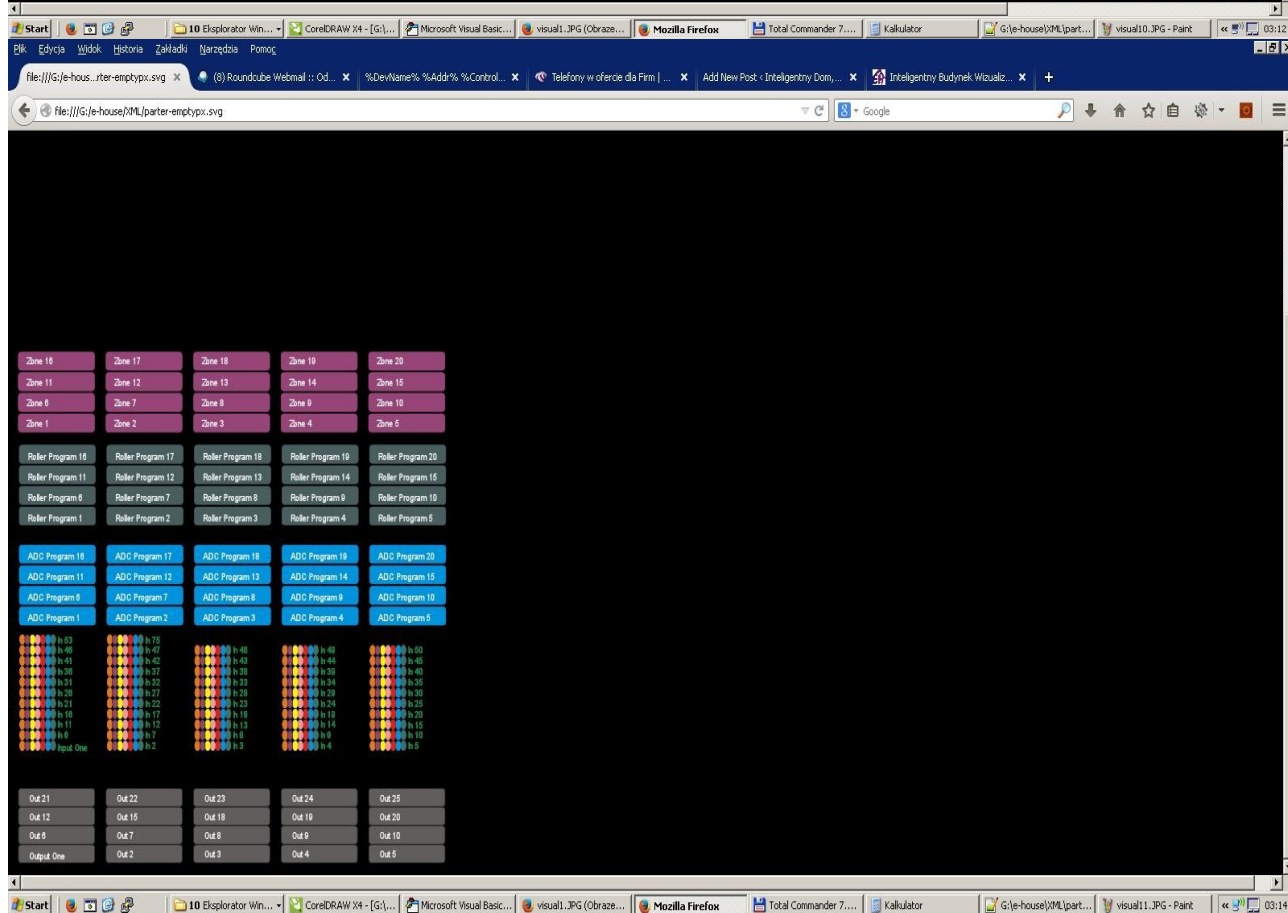
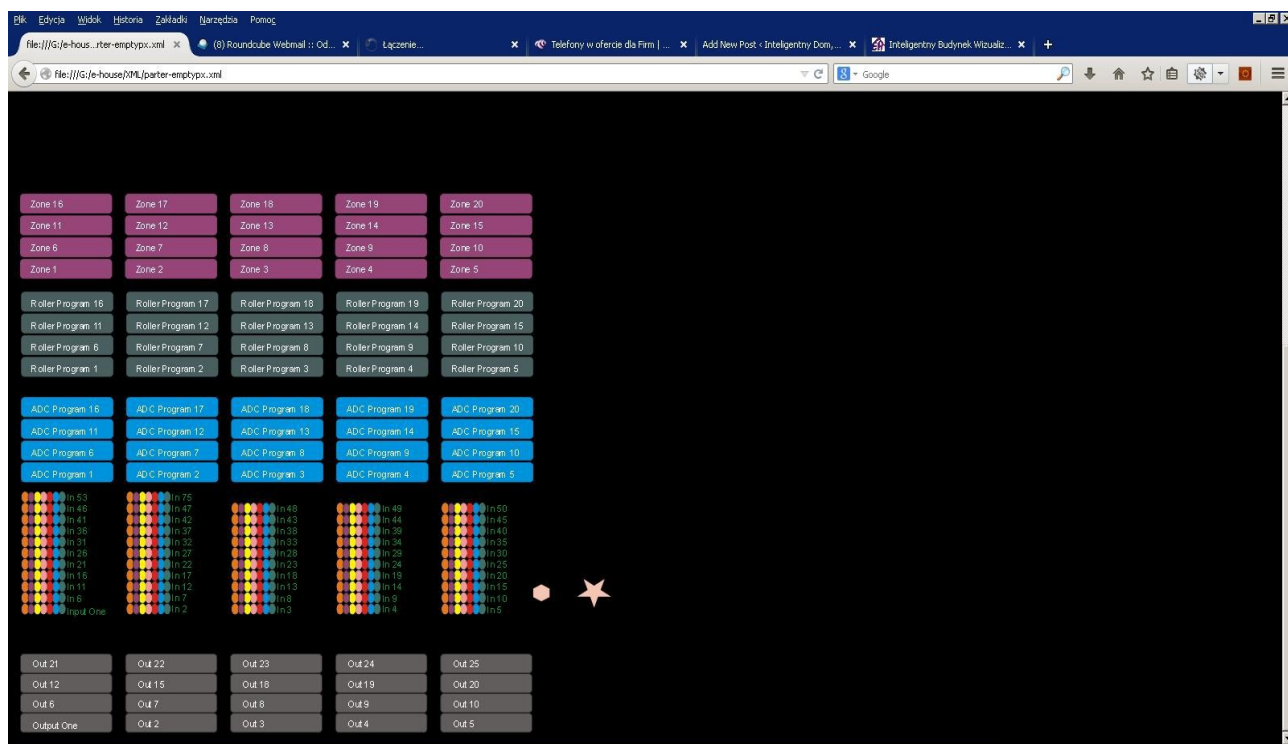
To create a figure on the current layer (active) to:

- Select the figure (shape) in the field: "Figure"
- enter the points (x1, y1), (x2, y2) coordinates
- select the thickness of the line - "Width [m]"
- Select the color of the line – "Color"
- Select the fill color - "Fill Color"
- enter "X Offset", "Y Offset" for each axis
- Press "Place Object"
- In the case of wrong place, you can press the "Undo"

Automatically generated visualization of objects based on templates:



Effects in Firefox browser:



4.8. eHouse4WindowsMobile application (Windows Mobile 6.x, Phone)

Mature application (2008) available as source code library for further third party development. For standard control and visualization please consider eHouse4Java, eHouse4Android or WWW for different platforms. Currently practically only Nokia mobile devices, smartphones, PADs implements Windows Phone.

eHouse4WindowsMobile is a software application that allows control of eHouse system with touch screen, graphic panels, mobile phones, PDAs, smartphones, running under Windows Mobile 6.0 or higher. Provides a graphical control with simultaneous visualization of devices and actual work parameters. Each view can be individually created in CorelDRW application, after generating the names of objects and events from eHouse application.

In the empty file "*. Cdr" template file for eHouse there are useful macros, to import data from eHouse system application and export to any visualization panel system. Create views will be discussed later in this documentation.

eHouse4WindowsMobile application enables on-line reading controllers status and perform graphical visualization of objects, when connected to a TCP / IP server running on the communication module or eHouse application for PC supervision. It is possible to control the system via WiFi or Internet (on-line), SMS, or e-mail.

For third-party developers and software libraries and templates are available for Windows Mobile system written in C#:

- supports direct communication with controllers
- automatic and personalized visualization
- status updates and online visualization
- direct graphical control of the controllers or from simple intuitive form
- allows you to create your own graphic software control panels

4.9. eHouse4JavaMobile application (MIDP 2.0, CLDC 1.1).

Mature application (2004) available as source code library for development.

For standard controll and visualization please consider eHouse4Java, eHouse4Android for different platforms. Currently practically none mobile device, smartphones, PADs incorporates JavaMIDP support.

eHouse4JavaMobile is Java application (MIDP 2.0, CLDC 1.1), for mobile phone and it should be installed on Smart Phone or PDA for local (via BlueTooth link) and remote (SMS, eMail) control of eHouse system. It enables sending events to eHouse system and receiving system logs via email. It enables control by selecting device and event from the lists, add to the queue and finally send to eHouse System.

Choosing and checking Mobile Phone for eHouse system usage.

For eHouse system control PDA or Smart phones are recommended with build in BlueTooth transceiver, which increase comfort and enable free local control instead of paying for SMS or eMail. Mobile Phones working on operating systems like Symbian, Windows Mobile, etc, are much more comfortable, because application can work all the time in background and can be easily and fast accessed, due to multitasking of operation system.

Conditions for Mobile phone for comfortable usage and full functionality of Mobile Remote Manager application:

- Compatibility with Java (MIDP 2.0, CLDC 1.1),
- Build in BlueTooth device with full Java support (Class 2 or Class 1),
- Build in File System,
- Possibility of install security certificates for signing JAVA application,
- Mobile Phone - based on operating system (Symbian, Windows Mobile, etc).
- Qwerty keyboard is an advantage.

Before buying mobile phone for eHouse system test certificate and test version should be installed on desired device because many manufacturers limits some functionality of java support making usage of Mobile Remote Manager uncomfortable or even impossible. The other things is operator limitations as disabling installation of certificates, disabling installation of new applications, limit functionality of phone. The same mobile phone model purchased in shop without operator restriction may work correctly under eHouse application, and may not work in some operator due to restriction of operator (eg. simlock, signing certificates, application installation). Limitations of the same model may be different from other operators.

Software was tested for instance on Nokia 9300 PDA.

Steps for checking Mobile Phone for eHouse usage:

1. Put SIM card and set date to 01 February 2008 (trial certificate validity).
2. Checking of sending SMS and eMail from mobile phone.
3. Installing test certificate to module.

Certificate should be copy to mobile phone and then add in Certificate Manager for Java application signing. In access rights for certificate following actions should be allowed (application installation, Java installation, secure network). Checking certificate online should be disabled.

If certificate can't be installed other model of telephone should be used.

4. Installing test application on mobile phone.

Copy installation files *.jar and *.jad to mobile phone with suffix "bt-signed" - for model with BlueTooth and installed certificate or "signed" - without BlueTooth and with certificate installed Install requested application. After installation enter Application Manager and set security settings for applications to highest available to eliminate continuous question of operating system. Settings names and rights can be different depending on telephone model and operating system.

Following access rights used by Mobile Remote Manager:

- Access to internet: Session or once (for sending eMails),
- Messages: session or once (for sending SMS),
- Automatic running application (Session or once),
- Local Connection: Always (for BlueTooth),
- Access with data reading : Always (reading files from file system),
- Access with data writing: Always (writing files to file system).

5. Application configuration.

In isys directory supplied with test installation change destination telephone number for SMS sending in SMS.cfg file (leave empty line the end of file).

In "bluetooth.cfg" file change device address for reception BlueTooth command (if device should send commands by BlueTooth). BT Device with this address must be connected to PC with installed and configured BlueGate.exe application. Mobile phone must be paired to destination BlueTooth device.

Copy "isys" directory contents, to one of the following places:

"D:/isys/", "C:/isys/", "isys/", "Galeria/isys/", "Gallery/isys/", "predefgallery/isys/", "Moje Pliki/isys/", "My files/isys/".

6. Test of application working.

Run TestEhouse Application .

- Window with choice fields Device, Event with contents should appear (if fields are empty - application can't read files from "isys" directory and files should be copied to other location due to limitation of access. If in choose fields regional chars are not displayed code page should be set to Unicode, geographical region, language to requested value. If it doesn't help - telephone do not support language or code page.
- So far application shouldn't ask any question (if rights was defined as specified as described above). Other ways it means access rights wasn't activated for application, what means seriously limitation of system.

- Verifying email reception. Configuration of internet connection must be configured in the phone.

In menu choose option "Receive Files via eMail". 3 pluses should appear on screen and after 3 or 4 minutes "View Log" should be select from menu and check the contest of log.

It should looks like:

+OK Hello there

USER

+OK Password required.

PASS *****

+OK logged in

STAT

+OK

QUIT

This means email reception was successfully completed and log could be closed ("Close Log"). Otherwise internet connection should be verified, It could be reason of activation GPRS settings.

-Verifying email sending.

- Chose "Add Event" from menu, to add event to queue.
- Choose "Send via eMail" from menu.
- System asks for acceptance and User should confirm.
- "Sending Email" info appears and after any successive step + char appears and finally "eMail Sent OK".
- After completion log should be observed:

.....
>EHLO there

<250-***** Hello There [12.34.56.78]

....

....

...

...

AUTH PLAIN *****

<235 Authentication succeeded

>Mail FROM: 123@123.pl

<250 OK

>RCPT TO: 1312312@123.pl

<250 Accepted

>DATA

<354 end data with <CR><LF>.<CR><LF>

>Sending headers and message body

<250 OK id=*****

>QUIT

<221 ***** closing connection

In case of problems mobile phone signal should be verified. Several trials should be performed.

-Verification of sending SMS:

- Chose from main menu "Add Event", to add event to queue.
- Choose "Send via SMS" from menu.
- System asks for acceptance and User should confirm.
- "SMS Sent OK" info should appears on display, and message should be received on GSM mobile phone of programmed number.

-Verification of sending event via BlueTooth:

- In other to test BlueTooth transmission, device defined in file bluetooth.cfg must be near the phone.
- BlueGate.exe application must be running, which sends confirmation.

- BlueTooth devices must be paired.
- BlueGate must be configured as described for this application.
- Both devices must be switch on.
- Chose from main menu "Add Event", to add event to queue.
- Select from menu "Send via BlueTooth".
- After short time (up to 1 minute) message "Sent via BlueTooth OK" means everything was OK.
- Otherwise log should be examined ("View Log").

BlueTooth Log should looks like following:

```
Inquiry in Progress          (a)
Device Found: *****
Host ***** (***** ) In Range
Searching for eHouse Service
eHouse Service Found
Connected to eHouse Service
Reading Response from Server (b)
Data performed Successfully by Server
```

If only part of log is displayed to point (a), this means device from list in bluetooth.cfg file wasn't founded, is turned off or is not in the range.

If part of log displayed end before point (b), this means is not authorized or not configured properly. Devices should be paired permanently, so any connection could be established, without any queries for confirmation.

If logs was displayed up to point (b), this means BlueGate do not running or is connected to wrong port.

Java software installation on PDA.

Several steps need to be performed manually to install application.

Certificate should be copy to mobile phone and then add in Certificate Manager for Java application signing. In access rights for certificate following actions should be allowed (application installation, Java installation, secure network), certificate online checking should be disabled.

If certificate can't be installed other model of telephone should be used.

4. Installing application on mobile phone.

Copy installation files *.jar and *.jad to mobile phone with suffix "bt-signed" - for model with BlueTooth and installed certificate or "signed" - without BlueTooth and with certificate installed Install requested application. After installation enter Application Manager and set security settings for applications to highest available to eliminate continuous question of operating system. Settings names and rights can be different depending on telephone model and operating system.

Following access rights used by Mobile Remote Manager:

- Access to internet: Session or once (for sending eMails).
- Messages: session or once (for sending SMS).
- Automatic running application (Session or once)
- Local Connection: Always (for BlueTooth)
- Access with data reading : Always (reading files from file system)
- Access with data writing: Always (writing files to file system)

If certificate can't be installed, installation version with suffix "notsigned" should be performed. However this application is unrecommended because System will ask user many times for acceptance before completion of any operations described above.

5. Application configuration.

- In **isys** directory supplied with the installation, change destination telephone number for SMS sending in SMS.cfg file (leave empty line the end of file).
- In "bluetooth.cfg" file change device address for reception BlueTooth command (if device should send commands by BlueTooth). BT Device with this address must be connected to PC with installed and configured BlueGate.exe application. Mobile phone must be paired to destination BlueTooth device.
- Copy "isys" directory contents, to one of the following places:
"D:/isys/", "C:/isys/", "isys/", "Galeria/isys/", "Gallery/isys/", "predefgallery/isys/", "Moje Pliki/isys/", "My files/isys".

BlueTooth configuration.

BT link configuration "bluetooth.cfg" file contains addresses of associated BlueTooth devices supporting eHouse system each address on one line (up to 10 addresses are accepted). Application before trial of BlueTooth transmission, run discovery function, and then sends events to first found device from list. BlueTooth devices other then compatible with eHouse system cant be add to configuration file because BlueTooth transmission requires confirmation from host. Mobile phone must be paired together with all devices from the list in "bluetooth.cfg" file (for automatic connection without any queries (transparent mode). The same is required from side of BlueTooth devices, which should be paired to mobile phone for automatic connection.

For each BlueTooth Devices the same passkey should be assigned, and AUTHENTICATE+ENCRYPT option should be used.

Due to limited range of BlueTooth (especially for mobile phones with BT Class II - maximal range is about 10 meters on free air). In places where in direct line between Mobile phone and BlueTooth device thick wall exists, chimney, floor breaking connection may be observed due to disturbances from other systems WiFi, GSM, etc. Count of BlueTooth module should be increased to achieve expected range of control in the house and outside. One BT device can be installed on PC (eHouse server), rest can be connected to RoomManager's extension slot. Data transfer via BlueTooth is free and only local.

BlueTooth consideration.

BlueTooth must be manually turn on in Mobile Phone before initialize connection. Other application utilized BlueTooth shouldn't be configured for automatic connection to mobile phone, which often allocates all BlueTooth channels available on the phone (e.g. Nokia PC Suite, Dial Up over BlueTooth link, File Manager like BlueSoleil).

Example of bluetooth.cfg file

```
01078083035F
010780836B15
0011171E1167
```

SMS Configuration.

One file "SMS.cfg" need to be set up for SMS configuration. This file must contains valid mobile Phone number for SMS reception via eHouse system.

SMSGate on PC must be installed and configured properly, and cyclically run. Other solution is reception by CommManager, which incorporates GSM Module.

Example of SMS.cfg file
+48511129184

eMail Configuration.

Configuration of eMail POP3 and SMTP clients is stored in "email.cfg" file.

each subsequent line consist following setting:

<i>Line No.</i>	<i>parameter</i>	<i>example value</i>
1	SMTP email address (sender)	tremotemanager@isys.pl
2	POP3 email address (receiver)	tehouse@isys.pl
3	host name for SMTP	there
4	IP address of POP3 server (faster then DNS):portnr	mail.isys.pl:110
5	POP3 User name	tremotemanager+isys.pl
6	password for POP3 User	123456
7	IP address of SMTP server (faster than DNS):portnr	mail.isys.pl:26
8	User name for SMTP server	tremotemanager+isys.pl
9	User password for SMTP server	123456
10	Message subject	eHouse Controll
11	Authorization for SMTP	y,Y,1 (if yes) ; n,N,0 (if no)
12	empty line	

This configuration enables sending commands to eHouse system, via eMail. GPRS service must be enabled by GSM operator and internet connection should be configured for automatic connection. Additionally EmailGate must be configured and run cyclically for checking eHouse dedicated post office and sending logs. Sending and receiving eMail is payable and costs depend from operator.

Mobile Remote Manager Usage.

Application has easy and intuitive user interface, to assure efficient and comfortable work on as many phones as possible. Due to many different display sizes and proportion, names and options are minimized, to be visible on any phones.

Data for Java application are recreated each time when eHouse application is executed with /mobile switch and must be recreated after name changes, new programs creation, etc, and copied to mobile phone (isys) directory.

Devices names are stored in devices.txt file and can be individually and manually sorted by user. In one line one device name must be contained , on the end of file.

Events names are located in files with the same name as stored in devices.txt file with changed polish regional chars to standard ASCII letters (and extension ".txt", to avoid problems with file creation on many operational systems on mobile phone. File contents can be sorted in desired way (1 line contains 1 event), one empty line at the end of file.

All configuration files are created on PC by eHouse.exe application with default windows code page (windows ...) and it shouldn't be changed. eg. (usage other operating system). In other case regional chars will be replaced by other chars "hashes" or application will generate more serious errors.

3 Choice fields are available:

- Device,
- Event,
- Mode.

Following menu items available:

- Add Event,
- Send via BlueTooth,
- Send via SMS,
- Send via eMail,
- Receive files via eMail,
- Cancel Operation,
- Kill Application,
- View Log,
- Close Log,
- Exit.

Sending events to eHouse System.

- Device and Event must be select, and required mode then Add Event from menu must be executed.
- This step should be repeated for each desired event.
- From menu transmission mode should be executed: "Send via BlueTooth", "Send via SMS", "Send via eMail". Events in internal queue are automatically deleted after successful transmission

Receiving system logs via eMail.

If sending logs from eHouse via eMail is enabled, this logs can be received from mobile phone for checking device states, output and input activated, analogue channels values.

Menu Item should be execute "Receive files via eMail", Mobile phone download most recent logs, converting and store them as files in "isys/logs/" directory.

Canceling Current Transmission

Due to mobile features of mobile phone and possible problems with range, broken transmission, GSM system failures, additional safety mechanism is issued for canceling transmission. If transmission lasts too long or displayed shows problems, this function can be used for drop and finalize any connections by execution - "Cancel Operation" from main menu.

To resend events after failure new event must be add to enable it.

Application Log

Each current transmission is logged and in case of doubt if everything goes OK, this log can be checked by selecting

"View Log" from menu. Afterwards "Close Log" should be execute.

5. Notes:



6. Documentation / Do It Yourself – English Version

Most current documentation in English are located at producer home page:

http://home-automation.isys.pl/ehouse_doc.intelligent_house_building_doc.htm

Source code examples, templates, libraries: <http://isys.pl/download/>

Do It Yourself information: <http://smart.ehouse.pro/> - eHouse Blog

Details DIY, Programming, Designing, Instalation, Configuration, Articles, tips & tricks:

<http://smart.ehouse.pro/category/applications/> - eHouse applications

<http://smart.ehouse.pro/category/boilerroom/> - Boiler Room & Central Heating

<http://smart.ehouse.pro/category/building-management/> - Building Management General Info

<http://smart.ehouse.pro/category/design/> - eHouse Design, solutions, demos

<http://smart.ehouse.pro/category/ehouse4can/> - eHouse4CAN – Installation, Configuration

<http://smart.ehouse.pro/category/ehouse-lan/> - eHouse Ethernet – Installation, Configuration

<http://smart.ehouse.pro/category/ehouse-rs-485/> eHouse 1 – Installation, Configuration

<http://smart.ehouse.pro/category/ehouse-pro/> - eHouse.PRO – Installation, Configuration

<http://smart.ehouse.pro/category/renewableenergy/> - free and renewable energy usage

<http://smart.ehouse.pro/category/general/> - eHouse general info

<http://smart.ehouse.pro/category/integrationcontrol/> - Integration to other systems, devices, A/V

<http://smart.ehouse.pro/category/openremote/> - Integration with OpenRemote.ORG

<http://smart.ehouse.pro/category/os/linux/> - Linux programming for eHouse - „C”

<http://smart.ehouse.pro/category/os/windows/> - Windows programming

<http://smart.ehouse.pro/category/programming/android/> - Mobile Devices PADs, SmartPhone, SmartTV, Android programming , screenshots for eHouse

<http://smart.ehouse.pro/category/programming/apache/> - Apache integration to eHouse.PRO server

<http://smart.ehouse.pro/category/programming/csharp/> - C#, .Net, .Net CF programming

<http://smart.ehouse.pro/category/programming/c/> - C programming for Linux

<http://smart.ehouse.pro/category/programming/delphi/> - Delphi, Pascal programming for Windows

<http://smart.ehouse.pro/category/programming/java/> - Multiplatform Java programming, screenshots

<http://smart.ehouse.pro/category/programming/windows-phone/> - Windows Mobile, Phone programming

<http://smart.ehouse.pro/category/programming/www/> - Web browser support for eHouse

<http://smart.ehouse.pro/category/visualization/> - Creating individual visualization and graphical control views

7. Contact / Cooperation

iSys – Intelligent Systems

Wygoda 14, 05-480 Karczew

Poland

tel: +48504057165

email: is@isys.pl

GPS: (N:52 st 2min 44.3s; E:21st 15min 49.19s)

[Map](#)

Producer, manufacturer, developer home page in English:

<http://home-automation.isys.pl/> - Producer homepage

<http://smart.ehouse.pro/> - Do It Yourself, designing, development, examples, applications

<http://eHouse.Biz/> - eHouse smart home producer online shop

http://www.isys.pl/?home_automation - Other Languages (for information only not for reference)

Serwisy eHouse w języku polskim:

<http://inteligentny-dom.ehouse.pro/> Zrób to sam, programowanie, przykłady, projektowanie, zastosowania

<http://www.isys.pl/> - strona WWW producenta

<http://www.ehouse.pro/> - Automatyka domu, budynku, hoteli, pensjonatów