Roger Access Control System

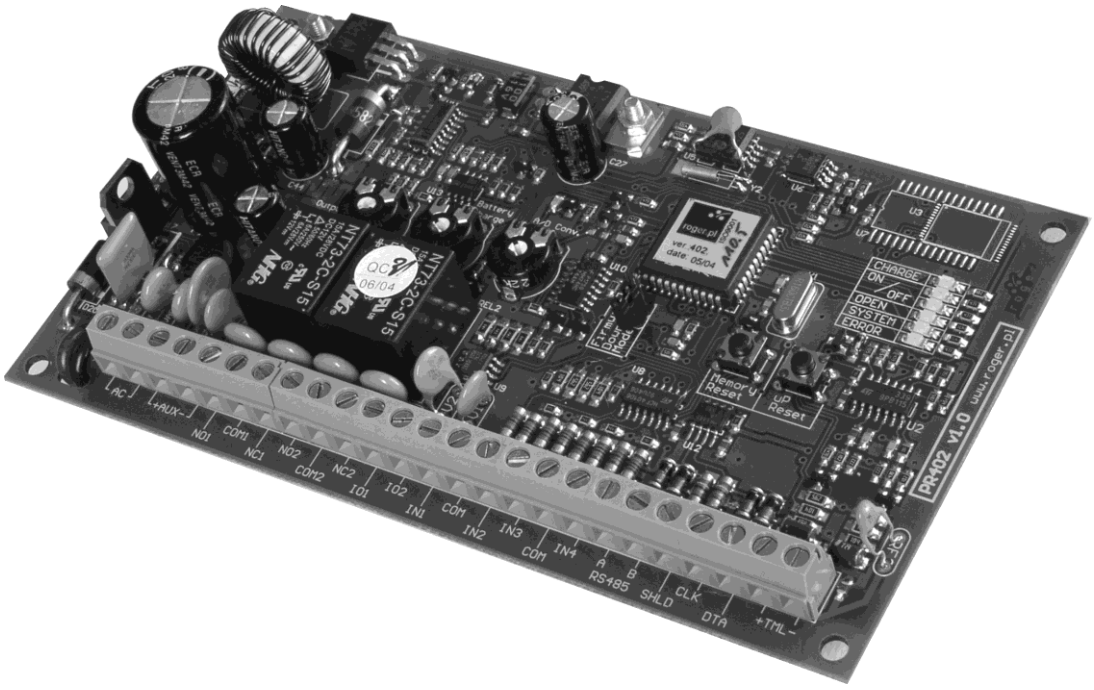
User manual for CPR32-SE v2.0 network controller

Firmware version: 2.8.5071 or newer

Hardware version: 2.0

Document version: Rev. F

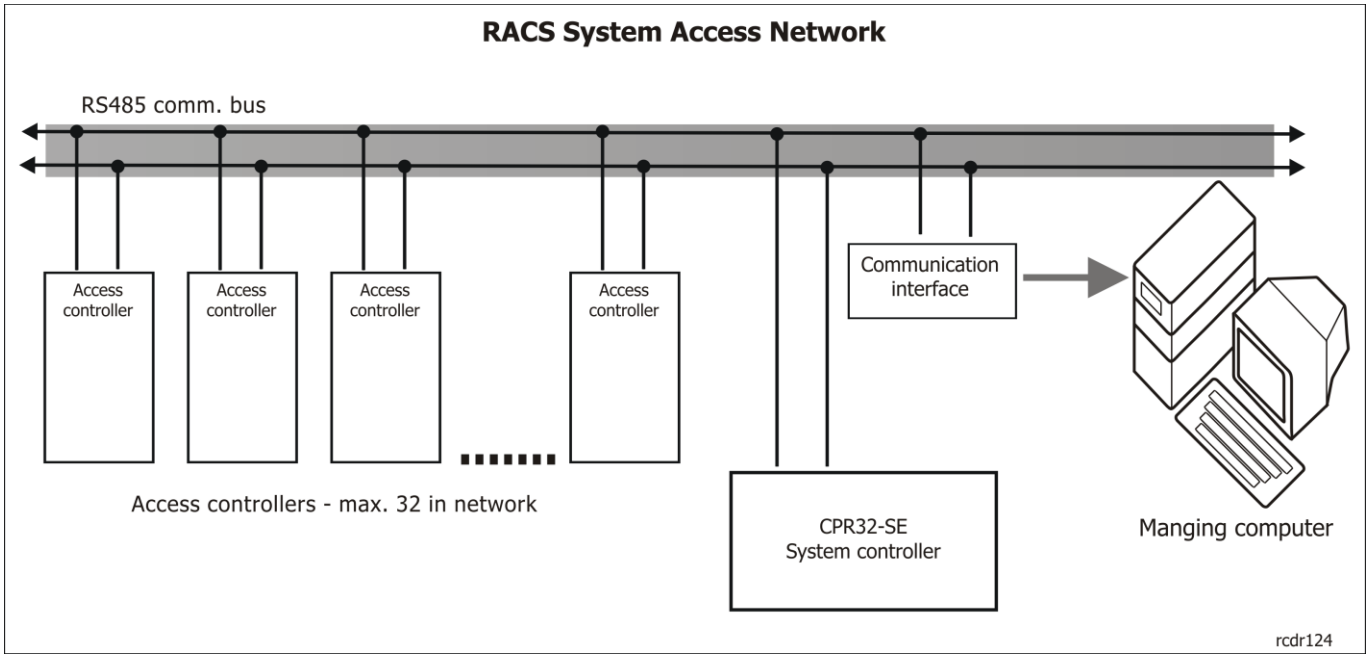
CE



Introduction

This document contents minimum information required for electrical connections, installation and initial tests of CPR32-SE access network controller.

CPR32-SE is a module which can be used in RACS systems equipped either with PRxx1 or PRxx2 series controllers. The structure which consist of CPR32-SE, communication interface and up to 32 access controllers is called Access Network (Subsystem).



Generally, CPR32-SE works as centralized event buffer (250.000 events) and centralized clock for the entire access network. Also, it controls exchange of data between access controllers located within single access network which is necessary for so called "global functions" (e.g. APB Zones, Alarm Zones).

Operation with PRxx1 controllers

Because PRxx1 controllers are not equipped with internal buffer and clock, CPR32-SE is an obligatory component for these systems. In case of CPR32-SE failure PRxx1 controllers continue to work with all time settings as they were in time of failure however all events which occurred during period of failure will be lost. Once the CPR operation is restored controllers will refresh their time settings and will restore full functionality.

Note: Theoretically PRxx1 controllers can be used without CPR32-SE, however in this case access system will not provide neither event history nor clock/calendar related functions. Also, it would not be possible to divide system users into different access groups and assign them multi-period time dependant access rights. As a result in PRxx1 based access systems which are not equipped with CPR32-SE, all users may have access rights according to two access schedules: Always or Never. Setting schedule Always makes specific Group of user will have 24h access while selecting Never schedule will totally forbid access authorisation for specific Group of users .

Operation with PRxx2 controllers

In systems equipped with PRxx2 controllers, internal buffer and clock on CPR32-SE replaces local buffers and clocks on controllers. In case of CPR32-SE failure controllers switch automatically to standalone operation and continue work using internal buffers and clocks. Events stored during time of failure can be later downloaded to the RACS system database. The only one effect of CPR32-SE failure will be lack of global type functions in the given system.

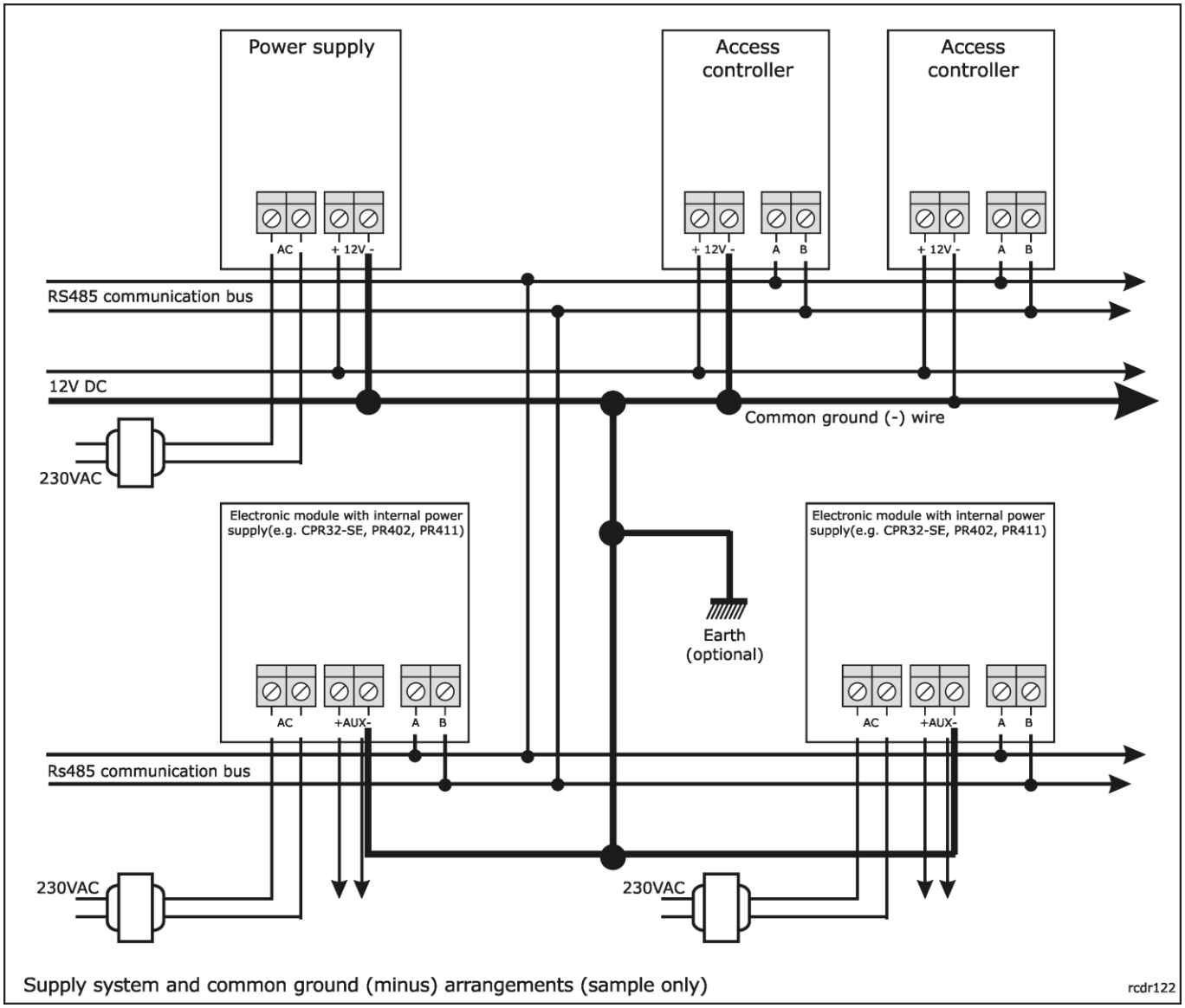
Note: If there is no evident need for global type functions in the PRxx2 based system, it is recommended not to install CPR32-SE.

Installation

The CPR32-SE module can be installed in any metal or plastic enclosure which guarantees adequate protection from dust, water and moisture. Also, enclosure should assure required temperature, ingress protection and security. All wirings must be made before module will be powered on.

Note: CPR32-SE will not start operation from battery itself. It is necessary to provide AC supply to start module's operation.

All devices working in access network and connected to the same RS485 communication bus should share common minus (common ground). In order to assure this condition use separate wire (it can be a signal type one) and connect all minuses of all powers sources in the system. If required system supply minus can be earthed in one, arbitrary selected point.



Note: It is forbidden to short positive (+) supply outputs from various devices working in the system.

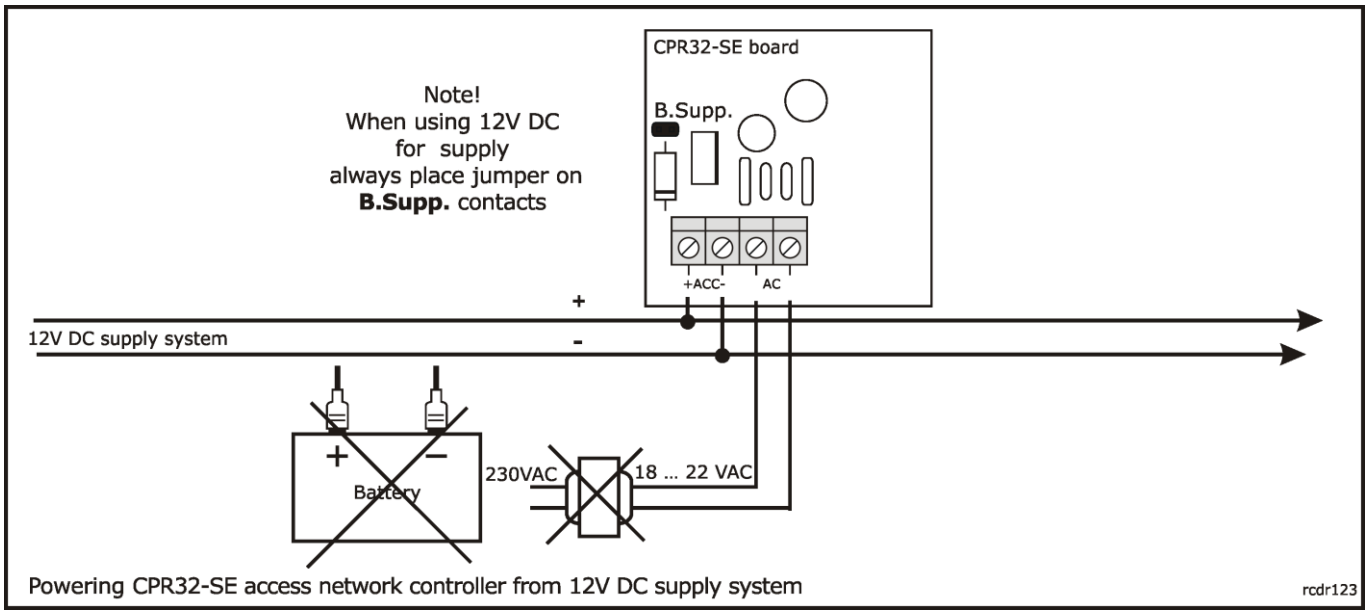
Power supply

Controller can be powered from AC source which delivers 18-22VAC/30VA power; it can be ME-1 metal enclosure (from Roger) with built-in 40VA transformer or another AC source which provides required voltage and power.

Optionally, CPR32-SE can be supplied directly from 12V DC, in this case 12V DV supply voltage should be connected to +ACC- terminals which are normally used for backup battery (for details see

wiring diagram below). Additionally, when supplied from 12V, **B.Supp**. programming jumper (on CPR32-SE board) should be closed (jumper on). When powered from 12V DC, CPR32-SE must not be connected to any AC supply nor operate with backup battery - reserve power supply should be assured by 12V DC system rail used to supply module.

Note: Always carefully calculate wire gauge used to power modules from 12V DC. Note, that amount of current required by CPR32-SE module can be as high as 2A and depends on total current sourced from AUX and TML terminals. The CPR32-SE board itself consumes less than 100mA.



Backup battery

CPR32-SE is capable to operate with backup battery however presence of battery is not obligatory. When installed, battery provides two important features:

- Delivers power supply in case of AC network failure
- Provides an extra current in periods when total current consumption exceeds capability of internal AC supply circuit (1.5A)

CPR32-SE was originally designed for operation with 12V/7Ah battery nevertheless it can work with other batteries with higher or lower capacitance as well. When in standby, backup battery is charged with constant 300mA current until it reaches 13.8V level which indicates that battery is fully charged. During battery charging, DC output voltage (available on AUX and TML terminals) may vary from 11.5-13.8V and depends on battery charging phase. CPR32-SE checks periodically battery level and when it drops below 12V indicates **Low Battery** or when drops below 11.5V indicates **Battery Failure**. In case when system runs on backup battery (when AC supply is lost) and battery level drops below 10V, battery is automatically disconnected from the system; it will be automatically re-connected when AC supply returns. The maximum current which can be delivered by battery is electronically limited to 2.5A.

Note: It is not possible to start module on battery itself (without AC supply) - to start operation CPR32-SE requires AC supply however once started it can later run on battery itself.

Charging current adjustment

When required, battery charging current can be adjusted in 100-500mA range. In order to set required charging current connect battery (which is partly discharged) to CPR32-SE and then using screwdriver rotate POT1 potentiometer and observe current which flow into battery. Charging current should be observed using multimeter connected in series with battery plus or minus.

Note: It is forbidden to set battery charging current below 100mA level because in this case charging current is not guaranteed.

RS485 communication bus

The RS485 serial communications interface in CPR32-SE consist of three terminals: A, B and SHLD. The A and B are signal line while SHLD is used to connect cable's shield (if used). Electrically, communication bus standard represents RS485 however there are two important modification in respect to typical RS485:

- Daisy chain structure is not obligatory (free topology is allowed)
- Terminating resistors on both ends of bus are not required
- Any type of signal cable is accepted

Generally, free topology of communication bus is allowed, comm. bus cables can form "three'', "star" or any combination of them however closed loops are forbidden. It is recommended to use UTP cable for A and B lines nevertheless any type of signal cables is accepted as well. The use of shielded cables should be limited to these installation where strong electrical interferences are expected.

The maximum distance of communication must assure two conditions:

- The max. cable run between CPR32-SE module and any access controller or communication interface must not exceed 1200m
- The max. cable run between communication interface and any access controller or CPR32-SE module communication interface must not exceed 1200m

For longer communication distances it is possible to use UT-3 or UT-4 interfaces. Using two UT-3 units communication distances can be extended by next 1200m, while for UT-4 distance is not limited because it uses computer network.

Inputs

CPR32-SE offers four programmable inputs (IN1, IN2, IN3 and IN4). All of them have the same electric structure and can be configured as NO or NC. Each input is internally biased to supply plus (+12V) through 5.6kΩ resistor, this makes that +12V is observed on the not connected (floating) input.

The NO type input goes active when shorted to supply minus (GND), if input is left unconnected or shorted to +12V it represents passive (normal) state.

The NC line in passive (normal) state should be connected to supply minus (GND), it becomes active (triggered) when connection with GND is discontinued. If input is left unconnected or shorted to +12V it is in active (triggered) state.

Note: If required, inputs can be connected together - still they can be programmed to different functions.

Relay outputs

CPR32-SE has two, programmable, relay outputs (REL1 and REL2). Each of them offers one NO/NC/COM contact rated 24V/1.5A with built-in voltage surge protection.

Note: Application of voltages above 30V to REL1/REL2 terminals will damage electronic components used to protect relays' contacts and this will corrupt functionality of relay output.

In normal state NC terminal is shorted to COM while NO remains isolated. When active, NO is shorted to COM while NC is isolated. When controller is not supplied or supplied with voltage below its minimum level, relay outputs remain not active.

IO1 and IO2 transistor outputs

There are two programmable, transistor outputs IO1 and IO2 available on CPR32-SE controller, both have identical electrical structure. Each output can sink max. 1A DC to GND; switched voltage must be 15V DC or less. The IO1 and IO2 are internally protected from currents above 1A and can be configured as Normal or Inverted. When configured as Normal they normally remain in high resistance state while when set to Inverted they normally are shorted to ground.

CLK and DTA lines

These lines can be used either as inputs or outputs and can be programmed to several input/output functions. Once the function for the line is selected system will reconfigure it to work as input or output. Electrically, both lines have identical electrical structure. When operated as outputs they can sink max. 150mA DC however applied voltage must not exceed 15V DC.

Input and output functions

Name	Type	Description
[00]: None	None	No function assigned to line.
[01]: Clear all alarms in CPR	Input	Triggering this input clears all alarms on CPR module.
[02]: Tamper alarm	Input	Triggering this input starts Tamper alarm which can be signalled on outputs: [67], [71], [73], [81]
[08]: Set all doors to Normal mode	Input	Triggering this input switches all controllers within network to Normal door mode.
[09]: Set all doors to Unlocked mode	Input	Triggering this input switches all controllers within network to Unlocked door mode.
[10]: Set all doors to Cond. Unlocked mode	Input	Triggering this input switches all controllers within network to Conditional Unlocked door mode.
[11]: Set all doors to Locked mode	Input	Triggering this input switches all controllers within network to Locked door mode.
[12]: Clear all alarms in subsystem	Input	Triggering this input cancels all valid Door Alarms on controllers and CPR module itself. Note: Door Alarm is a composite state which consists of at least one of following alerts: Forced Entry, Prealarm or Door Ajar.
[13]: Clear alarms in all controllers	Input	Triggering this input cancels all valid Door Alarms on controllers in network (subsystem).
[14]: Reset APB	Input	Triggering this input clears APB Register on CPR and all APB Registers on controllers in the network as well. Note: When APB Register is cleared every user can login first time either on entry or exit to room/zone however later APB rules must be strictly followed.
[15]: Set Armed Mode	Input	Triggering this input switches all controllers in the network to Armed mode.
[16]: Set Disarmed Mode	Input	Triggering this input switches all controllers in the network to Disarmed mode.
[17]: Set all door to Unlocked mode (momentary)	Input	As long as the input is activated, Unlocked Door Mode is activated at all controllers (doors) within subsystem (network). When the input is deactivated then Normal Door Mode is restored at all controller (doors) within subsystem.
[65]: External buzzer	Output	Optional acoustic signalling of alarms on external sounder.
[66]: Data transmitted	Output	Output switches to active state whenever data is transmitted by CPR. Typically, this line can be used as driver for external LED (or other indicator) which is intended to signal data transmitted by CPR. Note: When connecting LED to this output, it is necessary to limit current flown to LED via an additional resistor connected in series with LED.

		Usually, 1K resistor is enough.
[67]: Alarm in CPR - modulated	Output	Line starts pulsing (pattern: 1s ON/1s OFF) when CPR detects either Tamper alarm or technical problem. Output remains active for 180s or can be cleared earlier from input [01] or [12].
[71]: Alarm in subsystem	Output	Line is activated when either Tamper alarm or technical problem is detected. Also, it is triggered when Door Alarm arose on any controller in the network. Output remains active for 180s or can be cleared earlier from input [01] or [12]. Note: Door Alarm is a composite state which consists of at least one of following alerts: Door Forced, Prealarm and Door Ajar.
[72]: Alarm in controllers	Output	Line is activated when Door, Tamper or Intruder alarm is raised on controller(s) in the network. Output remains active for 180s or can be cleared earlier from input [01] or [12].
[73]: Alarm in CPR	Output	Same as [67] but without modulation.
[74]: Low battery	Output	Line indicates low battery level; output remains active as long as corresponding state exists. Note: Low battery level is signalled when module is under AC supply and voltage level on battery drops below ~12V.
[75]: 18VAC supply lost	Output	Line indicates lack of AC supply; output remains active as long as corresponding state exists. Note: AC lost signalling must last for minimum ~8 min. To be signalled.
[76]: Battery failure	Output	Line indicates battery failure; output remains active as long as corresponding state exists. Note: Battery failure is signalled when module is under AC supply and voltage level on battery drops below ~11.5V.
[77]: CPR on	Output	Active when CPR is operating.
[78]: CPR off	Output	Active when CPR is disabled (switched OFF by managing program).
[79]: Internal failure	Output	Line indicates an internal problem of CPR module (clock unset, configuration data error, event memory error); output remains active as long as corresponding state exists.
[80]: Buffer alarm - modulated	Output	Line is pulsing when event buffer is occupied in more than 75%; output is active steady (without modulation) when buffer is nearly 100% occupied; output remains active as long as corresponding state exists. Info: When buffer is full, the newly coming events erase the oldest ones.
[81]: Tamper alarm	Output	Line indicates Tamper alarm; it remains active for 180s or can be cleared earlier from input [01] or [12].
[82]: Power supply alarm	Output	Line indicates supply problem (low battery level, battery failure or lack of AC supply); output remains active for 180s or can be cleared earlier from input [01] or [12].

[83]: Communication lost	Output	Line indicates lack of communication with any of controllers in system; output returns when communication with all controllers is restored.
[84]: Buffer alarm	Output	Line indicates that event buffer in fully occupied; output remains active as long as the state exists. Info: When buffer is full, the newly coming events erase the oldest ones.
[85]: Buffer prealarm	Output	Line indicates event buffer in occupied in more than 75%; output remains active as long as mentioned state exists.
[86]: Internal failure (3 min)	Output	Same as [79] however it returns automatically after 180s or can be cleared earlier from input [01] or [12].
[87]: Communication lost (3 min)	Output	Same as [83] however it returns automatically after 180s or can be cleared earlier from input [01] or [12].
[88]: Buffer alarm (3 min)	Output	Same as [84] however it returns automatically after 180s or can be cleared earlier from input [01] or [12].
[89]: Buffer prealarm (3 min)	Output	Same as [85] however it returns automatically after 180s or can be cleared earlier from input [01] or [12].
[90]: Low battery (3 min)	Output	Same as [74] however it returns automatically after 180s or can be cleared earlier from input [01] or [12].
[91]: 18VAC supply lost (3 min)	Output	Same as [75] however it returns automatically after 180s or can be cleared earlier from input [01] or [12].
[92]: Battery failure (3 min)	Output	Same as [76] however it returns automatically after 180s or can be cleared earlier from input [01] or [12].

Memory Reset

Memory Reset procedure clears all existing data in module's memory and restores factory defaults.

Memory Reset procedure:

- Press Memory Reset button and keep it pressed
- Press uP Reset button for a moment
- Release Memory Reset button
- Automatically, after last step CPR32-SE resumes normal work with factory defaults settings

Once the CPR32-SE is initialized through Memory Reset procedure it is necessary to update its settings from the managing program.

Firmware upgrade

During manufacturing process, CPR32-SE is programmed with latest version of firmware, nevertheless it can be later upgraded with newer versions as they are released. Roger design team continuously work on enhancements and publish them on company web site (www.roger.pl). Roger customers are advised to register at web site so company will let inform when new versions are ready for download. The new firmware can be downloaded without removal of the controller from it original place of installation. New firmware can be uploaded to CPR-32SE through RS485 communication bus by means of dedicated RogerISP software and communication interface (UT-2USB, RUD-1, etc.). Firmware upgrade procedure:

- Connect power supply to the device
- Place jumper on FDM contacts
- Reset the device (press uP RESET button or switch power off/on)
- Start RogerISP software and select communication port (in case of RUD-1 select RS-485).
- In Firmware window select firmware file (can be downloaded from www.roger.pl) and then select Program option.
- After firmware upload, remove jumper from FDM contacts and reset the device (press uP RESET button or switch power off/on).

Note: Whenever you upgrade firmware it is necessary to upgrade **PR Master** program as well. For most update firmware/software visit www.roger.pl

Problem with erratic jumps of mouse cursor in Windows XP / Windows 7

Occasionally, when Roger Access Control System is equipped with CPR32-SE network controller connected to PC, Microsoft Serial Ball Point device is erroneously detected by Windows XP/ Windows 7 regardless of applied communication interface (UT-2, UT-2USB, UT-4 with virtual serial port). As a result of this erroneous detection, mouse cursor goes crazy (erratically jumps around screen) and PR Master software reports serial port error.

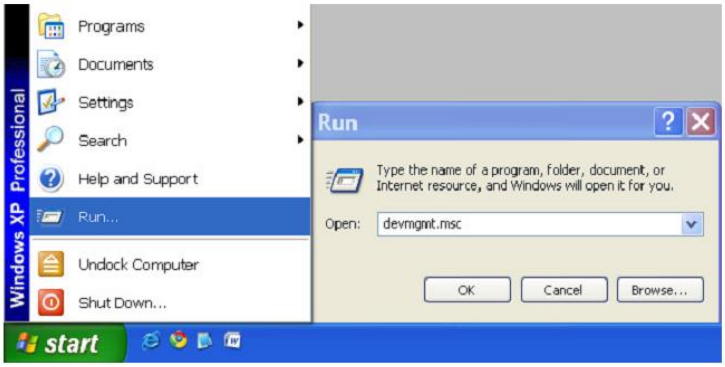
Note: The problem, which is described above is not caused by CPR32-SE but it results from commonly known Windows fault and it cannot be removed by Roger engineers.

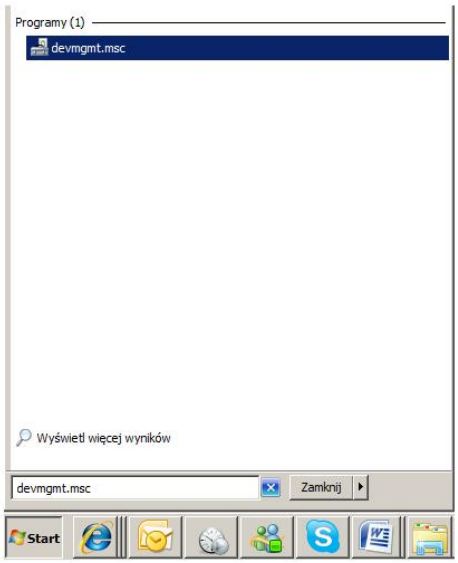
Following methods can be applied to solve the problem:

Manual disabling of detected device in Device Manager

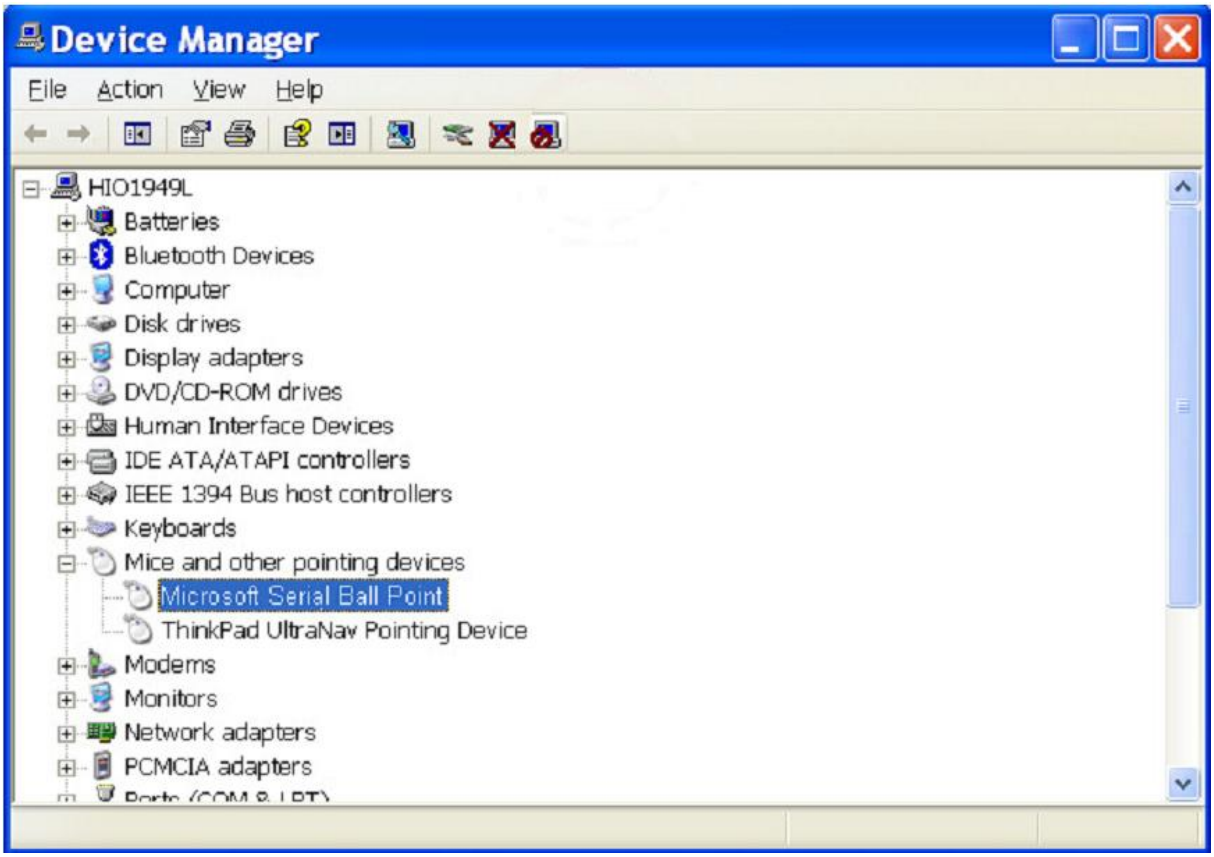
1. After Windows loading and occurrence of problem with mouse cursor, turn the CPR32-SE off.

2. Open Device Manager in Windows operating system, typing devmgmt.msc after selecting Start menu and then Run (Windows XP) or searching field of Start menu (Windows 7) – see figure below.





3. In the Device Manager click + at Mice and other pointing devices – see figure below.



4. Right click Microsoft Serial Ball Point and select Disable from menu.

5. Close Device Manager.

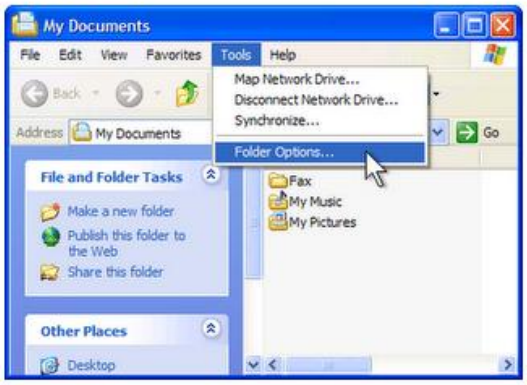
6. Turn CPR32-SE on.

The method does not solve problem permanently. Unfortunately after computer restarting it may occur again and mentioned above procedure would have to be repeated.

Disabling of serial mouse in boot.ini file (only Windows XP)

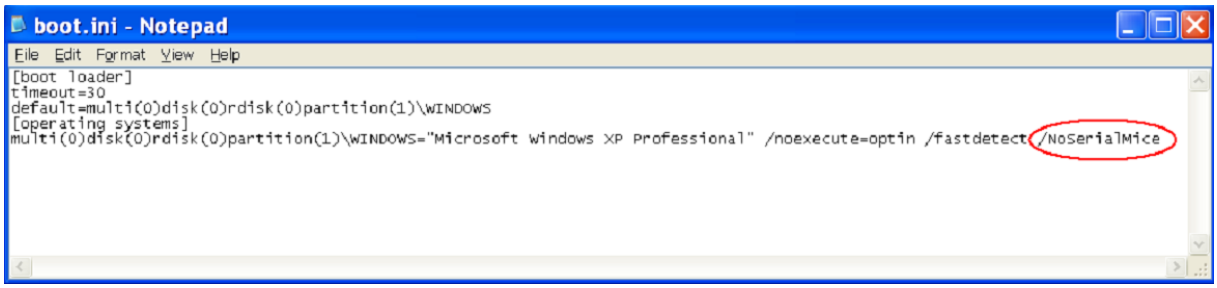
1. After Windows loading and occurrence of problem with mouse cursor, turn the CPR32-SE off.

2. Find boot.ini file, which is located at hard drive partition, where Windows XP is installed i.e. usually C:/ . The file might have hidden attribute. In such case open My Computer, in top menu select Tools and then Folder Options. In the opened windows select View tab and then select Show hidden files and folders and deselect Hide protected operating system files (recommended) – see figure below.



3. Right click boot.ini file and select Properties, then deselect Read only attribute.

4. Add the /NoSerialMice option to the end of each entry in the [operating systems] section of Boot.ini in order to disable detection of devices at all COM serial ports or enter /NoSerialMice:COMx, where x denotes COM port number to disable detection of device (CPR32-SE) at particular COM port – see figure below.



5. Save boot.ini file and quit Notepad.

6. Shutdown and restart Windows, turn CPR32-SE on.

This solution is intended to be permanent and no further actions should be required.

Connection terminals	
Terminal	**Function**
+ACC-	Backup battery.
AC	AC supply input, 18-22V/30VA.
+AUX-	Supply output 12VDC/1A, AUX- internally shorted with GND, output current internally limited.
REL1-NO	REL1 output, normally open contact, 30V/1.5A.
REL1-COM	REL1 output, common contact, 30V/1.5A.
REL1-NC	REL1 output, normally closed contact, 30V/1.5A.
REL2-NO	REL2 output, normally open contact, 30V/1.5A.
REL2-COM	REL2 output, common contact, 30V/1.5A.
REL2-NC	REL2 output, normally closed contact, 30V/1.5A.
IN1	IN1 input, internally pulled up to supply plus through 5.6kΩ resistor.
COM	Input common, internally shorted with supply minus (GND).
IN2	IN2 input, internally pulled up to supply plus through 5.6kΩ resistor.
IN3	IN3 input, internally pulled up to supply plus through 5.6kΩ resistor.
COM	Input common, internally shorted with supply minus (GND).
IN4	IN4 input, internally pulled up to supply plus through 5.6kΩ resistor.
IO1	IO1 transistor output, 15V DC/1.0A.
IO2	IO2 transistor output, 15V DC/1.0A.
RS485 A	RS485 communication bus, line A.
RS485 B	RS485 communication bus, line B.
SHLD	RS485 cable shield.
CLK	I/O line, can be used as NO/NC input or 150mA transistor output.
DTA	I/O line, can be used as NO/NC input or 150mA transistor output.
+TML-	Supply output 12VDC/200mA dedicated to supply auxiliary equipment, TML- internally shorted with GND, output current internally limited.

Technical specification	
Parameter	**Value**
Supply voltage	18-22V AC
Power consumption	30VA
Distances	Between controller and reader or extension module: max. 150 m Between controller and communications interface or CPR32-SE network controller: 1200m
Environmental class (according to EN 50131-1)	Class I, Indoor-General, temperature: 5°C- +40°C, relative humidity: 10 to 95% (non-condensing)
Dimensions	151 X 87 mm
Weight	~ 100g
Approvals	CE

Ordering information	
ME-1	Standard metal enclosure with 40VA transformer, one CPR32-SE/PR402 size module can be installed in this enclosure.
ME-2	Large metal enclosure with 80VA transformer, when used together with ZMPR-1 kit up to four CPR32-SE/PR402 size modules can be installed in this enclosure.
ME-2-S	Large metal enclosure with 80VA transformer and factory equipped with ZMPR-1 accessories; up to four CPR32-SE/PR402 size modules can be installed in this enclosure.
ZMPR-1	Assembly kit for ME-2 enclosure, allows for assembly of up to four PR402 boards into single ME-2 enclosure, also suitable for extension modules and CPR32-SE.
RM-2	Relay module with plastic enclosure, the RM-2 offers two relays with one NO/NC contact 1.5A/24V rated, relay contacts are protected by surge arresters, each relay can be triggered by applying supply plus or minus, the maximum amount of current required to trigger relay is less then 5mA, two LEDs to indicate triggering of relevant relay.
UT-2	RS232-RS485 communication interface.
UT-2USB	USB-RS485 communication interface.
UT-4	Ethernet-RS485/RS232 communication interface.
RUD-1	USB-RS485 communication interface, built-in 12VDC/150mA output to supply programmed device.

Contact:
Roger sp. z o.o. sp.k.
82-400 Sztum
Gościszewo 59
Tel.: +48 55 272 0132
Fax: +48 55 272 0133
Tech. support: +48 55 267 0126
E-mail: support@roger.pl
Web: www.roger.pl