RACS 5

Guide
v5.3

roger
Intelligence for Building

RACS 5

roger

Scalable Access Control, Security and Automation System of *Enterprise* Class

System workstations

- system management on multiple workstations
- operator authentication through Active Directory
- landlord-tenant partitions
- live event monitoring
- remote control commands
- system operators' event log
- user management while system is running

ONVIF cameras

- ONVIF compatible cameras live view

NVR/DVR

- HIKVISION recorders
- DAHUA recorders
- live view from CCTV cameras
- playback of video and photo stored on recorders

Database

- MS SQL Server database
- MS SQL Server Compact database

Communication server

- operates as Windows service
- provides communication with system controllers
- automatic event download
- remote commands execution
- encrypted communication

Integration server

- operates as Windows service
- communication based on WCF
- database API
- remote commands API
- user management API

NVR/DVR

LAN/WAN

LAN/WAN

MC16-PAC
Physical Access and Automation Controller

MC16-BAC
Building Automation Controller

MC16-LRC
Locker and Cabinet Access Controller

MC16-EVC
Classic Elevator Access Controller

MC16-EVK
KGC (KONE) Elevator Access Controller

Fire Alarm System

Intruder Alarm System
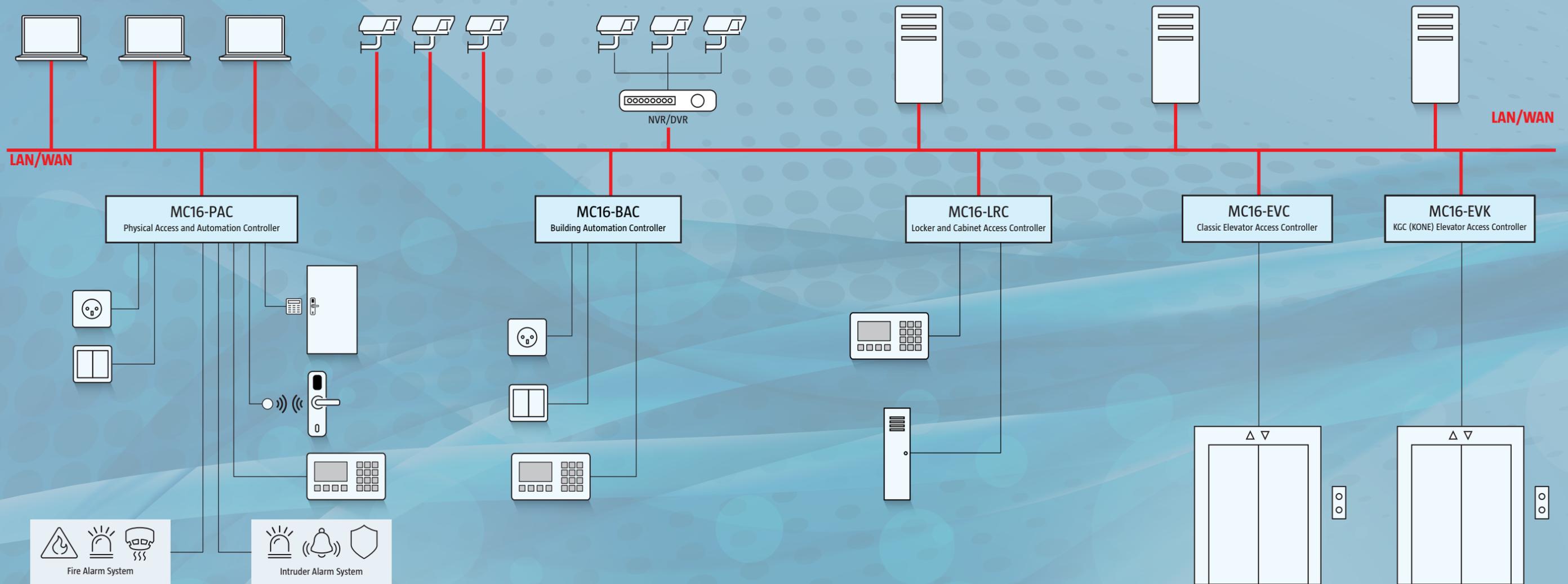
Access control and building automation

- wired access control
- wireless access control RACS 5 AIR (ROGER)
- wireless access control APERIO (ASSA ABLOY)
- T&A event recording
- automation status reporting
- automation control from access terminals
- optional user authorization for any action in the system
- light scenes
- wireless power outputs
- optoisolated wireless inputs
- hardware integration with intruder alarm systems

- alarm system status presentation on access points
- intruder alarm system control from access points
- hardware integration with fire alarm systems
- multifunction parametric (EOL) inputs including Dual Wiring
- multifunction outputs with action priority and signal modulation
- programmable global actions in response to selected events
- electric equipment control using reader with card holder

Building automation control

- automation status reporting
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Locker and cabinet access control

- locker and cabinet access control
- wired locks
- individual locker or group of lockers controlled from single access point

Classic elevator access control

- up to 64 floors
- access terminal installed inside elevator cabin
- access schedules
- access exception schedules

KONE elevator access control

- up to 128 floors
- various call types
- access terminals installed on floors
- access terminal installed inside elevator cabin
- access schedules

VISO ST
Standard, freeware software for configuration and management of RACS 5 system

VISO EX
Extended, licensed software for configuration and management of RACS 5 system

VISO WEB
Web application for management of RACS 5 system

VISO MOBILE
Mobile application for management of RACS 5 system

Introduction

This document describes major functionalities offered by the RACS 5 system, presents some of its hardware components and finally explains a few of the most popular practical application scenarios. The system functionalities depend on software version and license as well as type and number of installed devices. The content of this document has an informative character and due to its limited size it includes some simplifications. In case of any doubts regarding system features or performance, it is recommended to contact the Roger technical support centre and optionally perform practical tests using demonstration equipment.
This document is dedicated to professional installers, low voltage system designers and system sellers.

General Concept

The main element of the RACS 5 system is MC16 multi-door zone access controller. Using its on-board hardware resources, this device can provide read-in/read-out access control for two doors. After connection of additional external modules and power supplies, the MC16 can manage up to 16 read-in/read-out doors. The external modules are connected to the MC16 through the RS485 bus. The bus can be formed in star topology and the maximal bus length between controller and the furthest external device equals to 1200 m. The controller can also communicate with external devices through LAN using MCX16-RS expander/interface.
The synchronisation of controller settings is done in the background and it does not stop the operation of the system. The configuration takes less than one minute per one thousand active access credentials (cards, PINs etc.). Once controller's settings are synchronised, the controller reloads data and after a few seconds resumes its normal operation. Optionally, system settings can be synchronised automatically at the programmed time, usually at night.
Users in the system can be managed using on-line method, which instantly uploads new settings to controller when user data is changed in the database. This operation usually takes 1-2 s and does not affect operation of the system at all.
The events which occur in the system are continuously transferred from controllers to the system database. The event transfer is provided by communication server and does not require managing software (VISO) to be started on any workstation. When event transfer is not possible, controllers store events on their internal memory cards.
Hardware resources of the MC16 access controllers can be expanded by connection of external modules and devices. These external resources can be used in the same way as internal ones located on MC16 board. The location of physical object (input, output, reader, etc.) and its type do not limit the assignment of logic function to such object.
Any type of action done by user in the system (physical access, alarm control, automation control etc.) can be configured to require adequate authorisation.

Security

The RACS 5 offers high, multilevel security, which consists of:

- MIFARE® proximity cards with programmable numbers stored in encrypted sectors (SSN – Secure Sector Number)
- Support for the most secure MIFARE® DESFire® EV1 and MIFARE Plus® proximity cards
- Multi level Authentication policies which require combination of Access Credentials (e.g. Card + PIN)
- LAN/WAN encrypted communication with controllers using AES128 and CBC operation mode
- RS485 bus encrypted communication with access terminals and expanders
- Operator login based on Active Directory service
- Fully integrated operation with RFT1000 fingerprint readers

System Software

The RACS 5 system comprises following programs:

- RogerVDM
- VISO ST and VISO EX
- VISO Web
- VISO Mobile
- RCP Master 3
- RogerSVC

RogerVDM

RogerVDM is a utility program used during the installation phase of the system and it is intended to configure low level parameters of the module or device in order to adapt it to specific installation requirements.

VISO

VISO program is the management software which enables configuration of the access control system logic and its day-to-day usage. The VISO program is offered in free standard version (VISO ST) and licensed extended version (VISO EX). The VISO EX version offers a range of advanced features which are usually required in large or complex installations. VISO EX functionalities are limited by license file.
VISO EX version additionally offers:

- System division into logical Partitions managed by independent operators
- Integration with KGC KONE elevator system
- Integration server with SDK/API interface to third party systems

Database

The system can operate with two types of databases:

- Centralized type MS SQL Server (Express, Business, Enterprise)
- Local type MS SQL Server Compact

Local type database can be created by the VISO software and it does not require further administration. It is especially beneficial and convenient in case of small installations where advanced database administration could be an essential obstacle in system installation and use.
VISO program enables events erasing in order to prevent system slowdown due to large amount of data.

Multiple Workstations

The RACS 5 system can be operated with multiple workstations in client-server architecture if the centralized server type database is applied. The maximal number of workstations is not limited.

Communication Server

The communication with access controllers is ensured by Communication Server. The server is a Windows service operating independently from VISO software. Additionally the server is used for advanced global functionalities (e.g. Perimeter Zones, communication functions invoked by the Integration Server, automatic synchronization at configurable time of day, etc.)

Access Points
doors, elevators, floors

Automation Nodes
building automation

Alarm Zones
alarm system control

Access Credentials
various authentication factors

Partitions
system division to landlord-tenant partitions

CCTV
integration with DVR/NVR

Maps
online monitoring on graphical background

Attendance Zones
time and attendance

System Operators
The system can be managed by multiple operators and it is possible to make detailed configuration of operator rights in regard of the majority of VISO functionalities. The operator can access VISO with login and password or with Active Directory service. The configuration of operator rights can be facilitated by their grouping and assigning to standard Roles. All operator actions are registered in dedicated log so they can be later verified and reviewed.

VISO Start Page
The VISO start page includes predefined tiles which offer quick access to frequently used functions. It is also possible to define your own tiles according to individual requirements in order to facilitate and improve management of the system by operators.

VISO Web
VISO Web is an application dedicated to the RACS 5 system management with web browser. It enables user management, remote commands, event online monitoring and event log review. Generally, the VISO Web application is dedicated to persons who work in HR and security departments of the building with the RACS 5 system.

VISO Mobile
VISO Mobile is an application dedicated to remote management of the RACS 5 system from the Android and iOS mobile devices. It enables user and visitor management, remote commands, user attendance and location monitoring and event log reviewing. Generally, VISO Mobile application is dedicated to persons who work in HR and security departments of the building with the RACS 5 system.

Software Integration
The system enables software integration using the Roger Integration Server (RIS). The server operates as a Windows service and is based on WCF technology which enables significant reduction of work related to integration programming. The server can be used for database access, system remote control and user management.

RCP Master 3 Software
RCP Master 3 is a dedicated Time & Attendance software operated in client-server architecture. The software offers many advanced functions for use in HR departments including data export to such accountancy programs as GRATYFIKANT, OPTI-MA, SYMFONIA, WF-GANG and TETA. Each Access Point (reader) of the system can be used both for access control and T&A. It is recommended to use access terminals equipped with display and functions keys for selection of T&A Mode (MCT68ME, MCT88M-IO and MD70). Additionally MD70 terminal with built-in camera can take pictures of users when they register their T&A Mode.
T&A data (e.g. events, users, groups) are automatically collected from the VISO database and such import does not require any manual action by the operator.
RCP Master 3 can be used beyond RACS 5 system and in such case T&A data must be manually imported to the software. The software can be managed by multiple operators with varied rights and access to particular employee groups.

RCP Master 3 Time & Attendance Software

RACS 5 Functionalities

Door Access Control
The main task of the RACS 5 system is to provide physical access control in premises. The system is scalable and it enables the control of unlimited doors both as read-in and read-in/read-out. The total number of users in the system is not limited, however the number of users in single MC16 controller is limited to 8000. VISO uploads only these users to controller who are assigned with access rights at such controller.

Universal Elevator Access Control
The system enables access control in elevators where floors are selected with electrically wired buttons on the control panel. This functionality is provided by MC16-EVC access controller which can manage single elevator.

KONE Elevator Access Control
The system enables access control for elevators operated by the KONE Group Controller (KGC). Access readers can be installed inside and outside elevator cabin. The functionality is provided by MC16-EVK access controller connected to MCI16-EVK communication interface.

Locker Access Control
The system enables access control to lockers, cabinets, etc. Dedicated MC16-LRC controller can operate with up to 64 lockers. The access to lockers can be provided with single reader or lockers can be divided into groups, each with dedicated reader. Standard wired electric locks can be applied.

Building Automation
The system enables control of electrical equipment by means of system outputs activated from access terminals, input lines, function keys and remote commands. An output connected to the electrical load can be switched for adjustable or infinite time. Multiple outputs can be triggered at once and each output in individual way. Such triggering may be configured to require user authentication and authorisation.
The system enables monitoring of detectors connected to input lines. Events related to input signals are configurable by administrator (e.g. low oil level, compressor power supply failure, etc.). Any input signal can be monitored and registered with individually defined system event. Such event can be later used to trigger some system action which may occur on multiple controllers and in individually defined way.
Automation control functions are offered by selected types of MC16 controllers. The MC16-BAC controller is solely dedicated for building automation and cannot be used for physical access control in premises. Readers which are connected to MC16-BAC can be used for automation control. Such control may require assignment of adequate authorisations to users.

Time & Attendance Reporting
The system registers events related to user movements in premises. Such events can be used for monitoring of user attendance in areas of controlled premises. The VISO software enables to determine time of user attendance in freely

configurable Attendance Areas within given time period. Such reporting of attendance time can be based on a sum of fractional attendances or as a time elapsed from the first entrance to the latest exit within the same day.

T&A Events Registration
In the RACS 5 system, every access point (reader) can be at the same time used as a Time & Attendance registration point. T&A events can be registered simultaneously whenever access is granted or independently as a result of user action. Every access point in the system may have its default T&A mode which can be changed by any available method i.e. schedule, input, function key or remote command. The change of T&A Mode can be temporary for the purpose of single registration or indefinite. Predefined T&A Modes are available in the system (entry, exit, on-duty exit) and it is possible to define own modes. Access terminals with display and functions keys (MCT68ME, MCT88M-IO, MD70) are recommended for T&A applications. The MD70 terminal is equipped with a graphic touch panel and camera which can take pictures of users who register their T&A Mode to prevent violation of T&A rules by users. The current time and T&A Mode, which are key factors for T&A, can be presented on the terminal display.

Integration with External T&A Software
Events registered in the RACS 5 system can be exported to external T&A software in universal CSV format file. In case of RCP Master 3 software (Roger), events registered in access system are transferred automatically to T&A software without any action on the operator side. This is especially beneficial because it helps to avoid possible synchronization problems between the access control system and T&A software.

Integration with CCTV
VISO software enables downloading and displaying of video clips and photos recorded by the camera previously associated with the event type and door. Optionally, video clips or photos can be saved in the VISO database. Camera live stream can be viewed in a separate window located on the additional monitor screen. VISO can automatically switch to a camera linked with the latest event which occurred in a given area and display a video stream from such camera. The RACS 5 software can operate with Hikvision and Dahua CCTV recorders as well as ONVIF cameras. Additionally VISO also offers live view and photo downloading from the camera of the MD70 terminal.

Integration with Intruder Alarm System
The integration with intruder alarm system is based on hardwired IO connections and can encompass multiple alarm zones. The integration enables displaying of alarm zone status on access terminal LEDs and control of alarm zone status straight from access terminals. Alarm zones can be configured as hierarchical structures and then particular zone cannot be armed if all subordinate zones are not armed. Additionally, in such situation the system automatically attempts to arm subordinate zones. Arming and disarming can be controlled by schedule. The RACS 5 system warns of incoming scheduled arming and enables postponing of such arming. When a zone is armed then all readers belonging to the zone can be configured to

deny access until the zone is disarmed. The integration enables control of alarm zones both from access terminals and alarm system keypads.
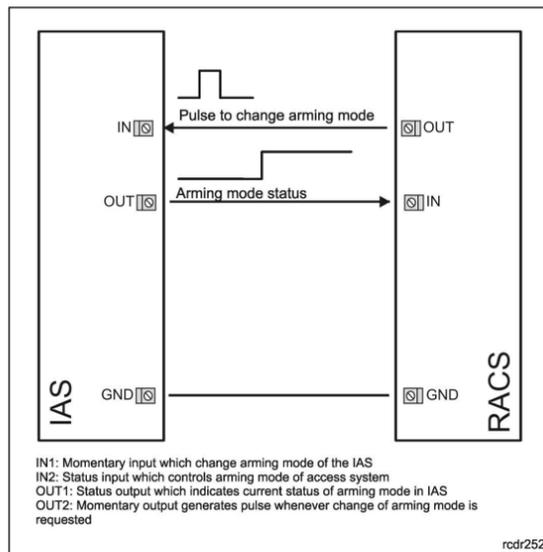
Integration with intruder alarm system

Emergency Door Control
The system enables locking and unlocking of particular group of doors in emergency mode. Such mode has the highest priority and it cannot be overridden by any other RACS 5 door control mechanism. Emergency mode can be cleared only with a dedicated emergency function. Emergency door control can be executed locally from system devices and remotely from VISO software.

Events Registration
Events which occur in the system are automatically transferred to the system database. This operation is ensured by the Communication Server which operates as a Windows service and does not require started VISO software. If the connection with the controller is not available then all events are stored in controller memory for further automatic upload to the database when the communication is restored.

Events Notification
The system enables configuration of notifications in response to individual events. Such notifications can be displayed as alerts by VISO software, sent by email or sent as TCP data packet to configurable IP address. Based on the implemented event filter it is possible to restrict notifications to events fulfilling specific filtering conditions (e.g. time, source). TCP notifications can be used in integration with third party software (e.g. BMS).

Event Monitoring
Events occurring in the system can be promptly displayed in Event online monitoring windows. Each window can be displayed on an individual monitor screen and can be configured to filter and display certain groups of events.

Attendance Monitoring
The system enables to monitor the attendance of users in any arbitrary, configurable areas called Attendance Zones. Multiple zones can be monitored concurrently. The Attendance monitor can also be used as an evacuation monitor to register and display system users who successfully left the evacuation area.

Door Monitoring
The system enables monitoring of selected doors and related events. When such an event occurs, then VISO can automatically display user details including a photo or video stream from the associated camera.

T&A Status Monitoring
The system can display a list of users in particular area including information on their T&A statuses which indicate their attendance types.

Maps
RACS 5 system enables defining of maps by selection of a graphic background/floor plan and applying interactive symbols representing system objects (e.g. Doors, Access Points, CCTV devices). On the level of map monitoring, the operator can execute remote commands and display video from available cameras.

Zone Occupancy Control
The system enables to control the number of users in Access Zone and additionally to define lower and upper limits in order to limit minimal and maximal number of users in such Access Zone. This functionality is usually applied at car parks.

Anti-passback
In general perspective Anti-passback (APB) prevents users from entering particular Access Zone again until they exit such zone thus preventing use of the same Access Credential by more than one user. APB functionality can cover single rooms with read-in/out access control or areas with multiple read-in/out access doors. When user violates Anti-passback rules, then access is denied (Hard APB) or only the APB violation event is registered (Soft APB). Optionally, the user can be allowed to re-enter room/zone after predefined time (Timed APB). Timed APB can be also applied at read-in only doors. In most cases, especially in T&A application, the Timed APB functionality is enough to prevent access attempts by users who pass their Access Credentials to other users. Contrary to standard APB, Timed APB does not require installation of reader at exit from room or zone and it facilitates system functioning in case of occasional violation of APB rules as delayed entry is still possible without registered exit.

Confirmed Entry/Exit
By default, users locations within the system are determined by their access granted events. Optionally, when the Confirmed access option is set, the system requires an access granted event to be followed by door opening. In case of access granting without physical door opening system will assume that user location is not changed.

User Restricted Routes
The system enables blocking of user movement between zones which are not adjacent to each other. The purpose of such functionality is to prevent users from taking shortcuts and avoiding certain Access Points on their route.

Door Interlocking
The system enables creating areas controlled by multiple doors where only one door can be opened at the same time.

Read-in/Read-out Doors
The system enables configuration of read-in and read-out doors where it is necessary to distinguish user movement direction. The functionality is mainly used for turnstiles.

Random Personal Check
The system enables random selection of users at door for inspection. The intensity of such selection is configurable.

Remote Authorization
The system enables to condition access granting at particular access point on external decision. Such decision can be made remotely by operator of the system or locally at dedicated access point (reader).

Schedules
Schedules enable specifying of system behaviour depending on the day of week and time. Schedules can be used for various functions in the system, particularly for access authorizations. The state of schedule can be presented by output line and used to control the operation of system and devices.

Calendars
Calendars are used for defining exceptions in a functioning of the system during holidays – particularly in case of access rights. Calendars can be specified for many years in advance. The state of calendar can be presented by output line and used to control the operation of system and devices.

Daylight Saving Time Adjustment
Access controllers can automatically adjust their clocks based on daylight saving time regulations in European Union.

Clock Synchronization
Access controllers can automatically adjust and synchronize their internal clocks with time server (NTP).

Authorizations
Execution of action or function in RACS 5 may depend on assignment of Authorization. Such Authorization defines when and where an action (function) may be executed. Authorizations can be assigned directly to the Access Credential, User or User Group. Authorizations assigned to User Group are inherited by all users belonging to the group. Authorizations assigned to Access Credential automatically belong to its owner (user).

Access Authorizations
In small installations it is more convenient to define Authorizations for each Access Point. In bigger installations it is more convenient to define Authorizations for Access Zones including multiple Access Points. Both methods are available in the RACS 5 system.

Access Zones
Access Zones are used to divide the system into areas with multiple doors. In bigger installations such approach makes management of Authorizations more convenient. Additionally Access Zones enables to control the number of users in the zone and to apply Anti-passback functionality.

Perimeter Zones
The system enables to define areas called Perimeter Zones, where users can move only if they were previously authorized on designated control point(s). Generally such control points are readers at the entry of the building while readers inside the building are called internal points. The functionality of Perimeter Zones is ensured by the RACS 5 Communication Service. Perimeter Zones can be configured as areas covered by multiple access controllers.

Thread Levels
Thread Level is a parameter which can be set for Access Point and Access Credential. Access can be granted only if the Thread Level of the Access Credential is equal to or higher than the Thread Level of the Access Point. Thread Levels can be used for additional logic of access rights. In simple access control installations Thread Levels can be even used instead of Access Authorizations.

Card Holders
The system enables definition of function(s) which will be executed when card is inserted into the reader holder as well as function(s) which will be executed when card is removed from the holder. Functions may require Authorizations assigned to the card. Usually card holder functionality is used to control the power supply in a hotel room or to a device/machine.

MCT82M-IO-CH Terminal

Partitions

The system can be divided logically into smaller logical sections called Partitions and managed by individual operators. The Operator who manages a given Partition has access only to these configuration parameters (including users) which belong to the Partition. Different partitions can share some common parts of the system (e.g. building main entrance). Partitions are mainly applied in buildings where space is rented by different tenants who can independently manage their part of the system.

Users

Following types of Users are distinguished in the system:

- Persons
- Visitors
- Assets
- User Groups

Every User can have one or more Access Credentials (cards, PINs, fingerprints, etc.). The VISO uploads only these users to controller who are assigned with access rights at such controller. The number of Users managed by VISO is not limited. Information on deleted Users is not removed from the system database and can be viewed whenever necessary.

Persons

Persons are Users whose time validity is not limited in the system. VISO allows for entering various personal information (e.g. address, profession, birth date, etc.) as well as specific custom fields to make the user description even more detailed. The system conforms with requirements concerning personal data protection. Persons can be assigned to hierarchical User Groups. Person's authorizations are sum of authorizations assigned on the level of Person, User Group and Access Credential.

Visitors

Visitors are Users created for the purpose of visit and they can be assigned with accompanying Person. The system automatically denies access to Visitors beyond their visit time specified by start and end date.
Visitors can be monitored in dedicated event monitor window by filtering events related to them.

Assets

Assets are impersonal Users i.e. objects requiring control and registration of their movement. The examples of Assets are cars, mechanical keys, valuables, laptops etc. The Asset can be assigned with Access Credentials, Authorizations and Persons.

User Groups

The system enables to define groups consisting of all type of Users. Groups can be assigned with Authorizations. Users belonging to Group inherit its Authorizations.

Access Credentials

The system can operate with various types of Access Credentials (EM cards, MIFARE cards, PINs, passwords, fingerprints etc.). Each User can be assigned with multiple Access Credentials of different types. Proximity cards can be enrolled using a dedicated administrator reader (e.g. RUD-2, RUD-3, RUD-4) connected to a computer USB port or any reader installed in the system. Cards can also be enrolled in advance and stored in the Card Box of VISO software. In case of MIFARE cards it is possible to program their numbers during their enrolment into system.

Card Programming

The system enables programming of MIFARE proximity cards using RUD-3 or RUD-4 administrator readers.

Serial Enrolment of Cards

The system enables to enrol series of proximity cards. In such case it is required to enter the starting card number and number of cards to be programmed in sequence. Successive cards shall be automatically added with numbers incremented by one.

User Custom Fields

Apart from standard user information fields (first and last name, phone, email, etc.), VISO software enables the creation of custom fields. Such fields can be text, drop down list or checkbox type.

Function Activation

The system offers a few dozen different functions which define system reaction in certain situations. Functions can be triggered by following methods:

- Input line
- Function key
- User login (e.g. with card) at reader
- Remotely with VISO software

Depending on the system configuration, the execution of certain functions may require authentication and authorisation of the user who wants to trigger particular function.

Function Activation by Login

The execution of a particular function can be triggered automatically by user login. The system enables following types of user login:

- Normal login (e.g. normal reading of card)
- Special login (e.g. long reading of card)
- Double login (e.g. double reading of card)
- Card inserted into holder
- Card removed from holder

Each login type may trigger a different function. Login types can be configured individually for each Access Point. Usually Normal Login is used for requesting access while Special Login is used for alarm system arming/disarming or building automation control.

Remote Commands

The VISO software enables remote triggering of functions which may affect various parts of the system. Operator who wants to use remote command must be a valid system user and must be assigned with adequate Authorisation(s) for the requested functions. Remote Commands can be started from the VISO navigation tree (Access Doors, Access Zones, Alarm Zone, etc.) or from the Map.

Global Commands

The VISO software enables the definition of Global Commands which consist of one or more functions which can be executed in various parts of the system. Global Commands can be triggered manually by the system operator, automatically according to defined schedule, automatically when certain event occurs in the system or from the level of Integration Server. As an example, a Global Command can be triggered by one of buttons connected to any inputs to open all doors in the system in case of emergency. Global Commands are executed by the Communication Server.

Multifunction Inputs

Except for inputs used for Wiegand reader transmission, all other input lines can be configured to any function regardless of their physical location (device). Furthermore, each input can be assigned with multiple functions at the same time to trigger actions in various parts of the system. Typical application of multifunction input is emergency opening of multiple doors using single button connected to any available input line.

Multifunction Outputs

Any output line can be configured with any function regardless of its physical location (device). Each output can be assigned with multiple functions at the same time. When two or more functions attempt to control an output at the same time then the output is controlled by function with the highest priority. Output pattern can be individually defined for each function. When triggered, the output can produce a steady or modulated signal. The modulation signal can be defined by the user.

Dual Wiring Inputs

Most of system devices offer parametric input lines which can be configured as Dual Wiring type. Such inputs can be connected to two sources of signals (e.g. buttons). Then the current source of signal is recognized by measurement of resistance connected to the input.

Authentication Factors

Various types of Authentication Factors can be simultaneously used in the RACS 5. The user can have multiple Authentication Factors like various RFID cards (e.g. EM, MIFARE), mobile device factors (BLE, NFC), biometric factors (fingerprints, iris scanners, face recognition etc.), alphanumeric factors and other. Each authentication factor can be used on a separate reader but all such readers can be assigned to single logical reader (Access Point) and trigger the same functions.

System Hardware

Following devices are available in the RACS 5 system:

- MC series controllers
- MCX series expanders
- MCI series interfaces
- MCT series access terminals
- RUD series administrator readers
- Accessories

MC16 Access Controllers

All versions of the MC16 controller utilize the same hardware module which offers:

- 8 EOL inputs
- 6 transistor outputs
- 2 relay outputs
- RACS CLK/DTA interface for PRT readers
- Wiegand interface
- RS485 interface
- Ethernet interface
- 12 V/1.0 A power supply output
- 12 V/0.2 A power supply output
- 18 VAC/40 VA power supply input
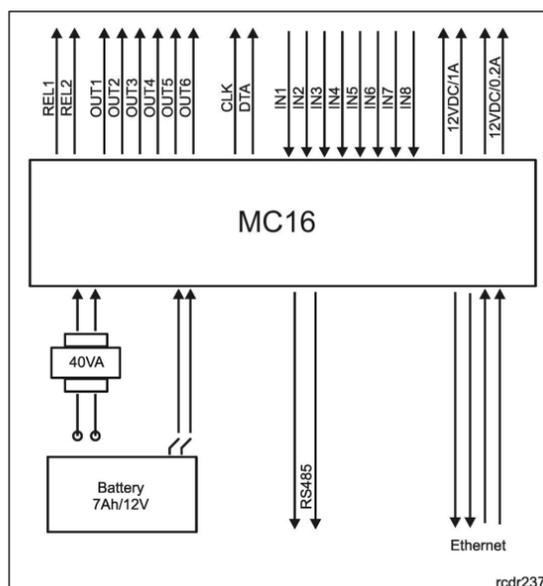
Hardware resources of the MC16 main board

The electronic module of the MC16 controller

MC16 Software Features

The software capabilities of the MC16 controller depend on its firmware and accompanying license. The full functionality of MC16 board requires connection of external equipment and it offers:

- 16 Doors
- 32 Access Points
- 64 Access Terminals
- 32 Access Zones
- 32 Alarm Zones
- 32 Automation Nodes
- 32 Local Commands
- 64 Inputs
- 64 Outputs
- 64 Function keys
- 32 Power supply units
- 32 Displays

MC16 Controller Types

The MC16 controller is offered in multiple variants with different software capabilities and for various fields of application. Depending on the application, the following types of the MC16 controller are available:

- MC16-PAC: Door Controller
- MC16-LRC: Locker Controller
- MC16-EVC: Universal Elevator Controller
- MC16-EVK: KONE Elevator Controller
- MC16-BAC: Building Automation Controller

Each type includes a range of sub-versions resulting from the accompanying license. For example, the following sub-versions of the MC16-PAC door controller are available:

- MC16-PAC-1: single door controller
- MC16-PAC-2: two door controller
- MC16-PAC-3: three door controller
- MC16-PAC-4: four door controller
- MC16-PAC-N: N door controller

The software capabilities of the particular controller are defined by its license file which is factory saved on the controller's memory card. Licenses can be upgraded to higher versions.

MC16-RAW Module

The MC16-RAW module utilizes the same hardware as MC16 module but it is not factory equipped with any license. Once the adequate firmware and/or license are uploaded then it can be used as any type of MC16 controller, MCX16 expander or MCI16 interface.

MC16-PAC Physical Access Controller

- 16 access doors
- Wired door access control
- RACS 5 AIR (Roger) wireless door access control
- APERIO (ASSA ABLOY) wireless door access control
- SALLIS (SALTO) wireless door access control
- T&A registration and data export
- Building automation reporting
- Building automation control from access terminals
- Building automation authorizations
- Light scenes
- Wireless power outputs (RACS 5 AIR)
- Wireless signal inputs (RACS 5 AIR)
- Hardwire integration with intruder alarm system
- Intruder zone status presented on access terminals
- Intruder zone control from access terminals
- Hardwire integration with fire system
- Multifunction EOL inputs including Dual Wiring
- Multifunction outputs with modulation and priority
- Weekly access schedules
- Long-term holiday calendars
- VISO configuration and management software
- Integration server for third party systems
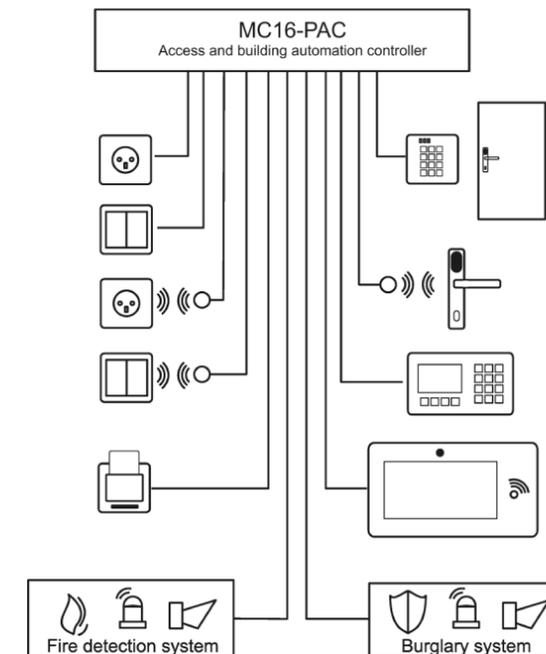
Versions of MC16-PAC Controller					
Parameter	MC16-PAC-1	MC16-PAC-2	MC16-PAC-4	MC16-PAC-8	MC16-PAC-16
Access Doors	1	2	4	8	16
Access Points	2	4	8	16	32
Access Terminals	4	8	16	32	64
Access Zones	2	4	8	16	32
Alarm Zones	2	4	8	16	32
Automation Nodes	2	4	8	16	32
Local Commands	2	4	8	16	32
Inputs	8	8	16	32	64
Outputs	8	8	16	32	64
Function Keys	4	8	16	32	64
Power Supplies	2	4	8	16	32
Displays	2	4	8	16	32

v5.3

v5.3

MC16-EVK KONE KGC Elevator Controller

- Elevator system control with KGC controller (KONE)
- Communication with KGC controller via MCI16-EVK interface
- Multiple MC16-EVK controllers operated within elevator system including KGC controller
- Elevator call types support
- Access terminal installed in cabin (COP)
- Access terminals installed on floors (DOP)
- Weekly access schedules
- Long-term holiday calendars
- VISO configuration and management software
- Integration server for third party systems

KGC KONE
Elevator access controllers

Interface to
KGC elevator system

KONE
group controller

LAN/WAN

MC16-EVK

MCI16-EVK

KGC

DOP
terminal

COP
terminal
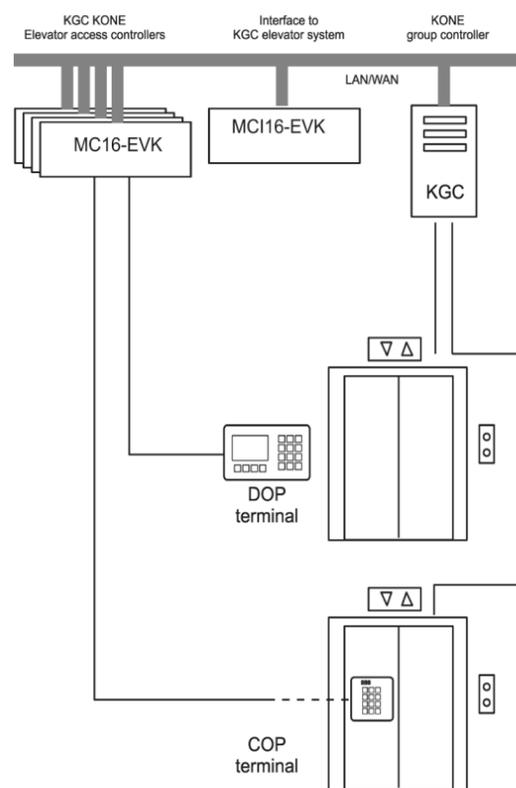
MC16-LRC Locker Access Controller

- Locker and cabinet access control from access terminals
- One access terminal per one lock scenario
- One access terminal per multiple locks scenario
- Wired locks control via IO expanders
- Weekly access schedules
- Long-term holiday calendars
- VISO configuration and management software
- Integration server for third party systems

Versions of MC16-LRC Controller			
Parameter	MC16-LRC-16	MC16-LRC-32	MC16-LRC-64
Access Doors	16	32	64
Access Points	4	8	16
Access Terminals	16	32	64
Access Zones	0	0	0
Alarm Zones	0	0	0
Automation Nodes	2	2	2
Local Commands	4	4	4
Inputs	32	64	128
Outputs	32	64	128
Function Keys	8	8	8
Power Supplies	4	8	16
Displays	4	8	16

LAN/WAN

MC16-LRC
Locker and cabinet
access controller

RS485

www.roger.pl
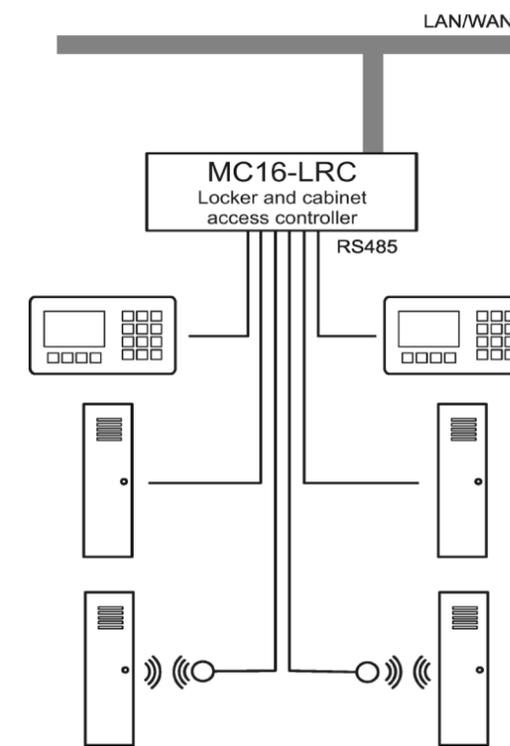
MC16-EVC Universal Elevator Controller

- Access terminal installed in cabin
- IO expander installed inside control panel
- Floor button controlled by isolated NO/NC contact
- Single elevator per controller, up to 64 floors
- Weekly access schedules
- Long-term holiday calendars
- VISO configuration and management software
- Integration server for third party systems

Versions of MC16-EVC Controller				
Parameter	**MC16-EVC-8**	**MC16-EVC-16**	**MC16-EVC-32**	**MC16-EVC-64**
Floors	8	16	32	64
Access Points	1	1	1	1
Access Terminals	4	4	4	4
Access Zones	0	0	0	0
Alarm Zones	0	0	0	0
Automation Nodes	2	2	2	2
Local Commands	4	4	4	4
Inputs	8	8	8	8
Outputs	16	32	64	128
Function Keys	8	8	8	8
Power Supplies	2	4	8	16
Displays	2	4	8	16
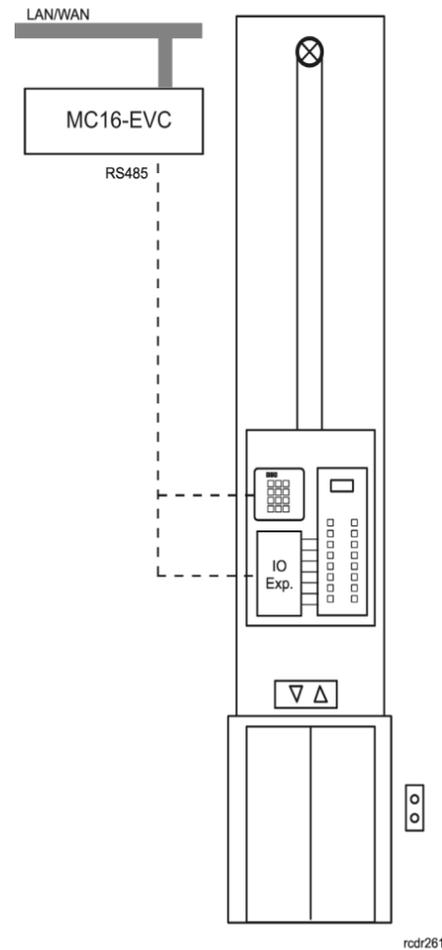
Expansion of the MC16 Hardware Resources through the RS485 Bus

The hardware resources of MC16 access controller can be expanded in a few ways. The primary one consists in connection of external devices through RS485 bus. Controller resources can also be expanded through LAN if additional MCX16-RS interface is installed.

Up to 16 devices can be connected to controller's RS485 bus. Each device must have an individual address in the range from 100 to 115. The RS485 address is programmed prior to installation within low level configuration (RogerVDM). Alternatively the address of MCT terminals can be programmed manually without RogerVDM.

The RS485 bus can be laid down using any signal cable, however the popular UTP cable is recommended for this purpose. The maximal distance between the controller and the furthest device is limited to 1200 m. The RS485 cables can form star topology.
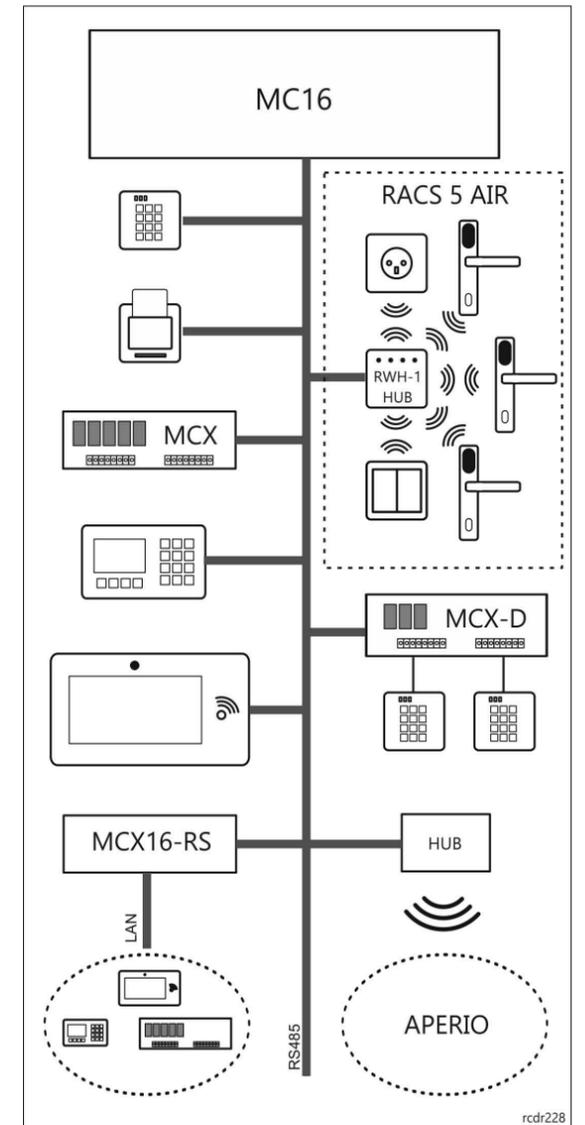
Extension of the MC16 hardware resources through the RS485 bus

Expansion of the MC16 Hardware Resources through LAN

The hardware resources of MC16 access controller can be expanded by connection of devices through LAN. Such devices are connected to the controller via MCX16-RS expander. The expander enables connection of up to 8 devices in LAN. The MC16 can operate with multiple MCX16-RS expanders. Devices in LAN, devices on RS485 bus and wireless devices can work with the same MC16 concurrently.
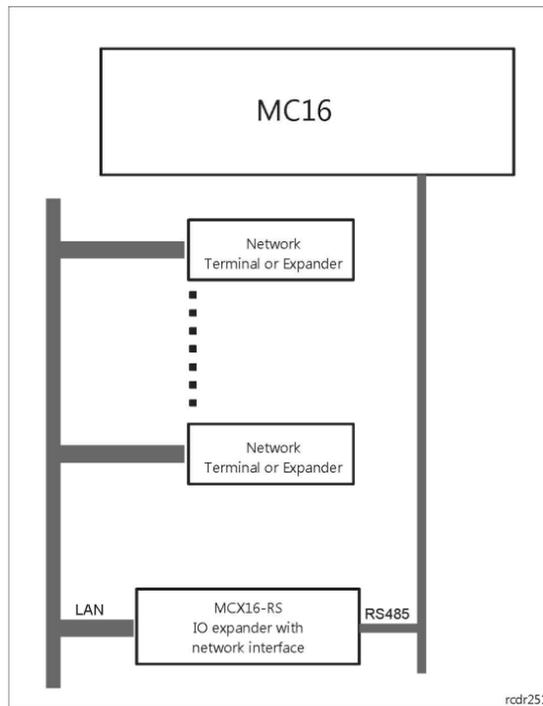
Connection of the network devices to the MC16 controller

Connection of RACS 5 AIR Devices to MC16 Controller

The hardware resources of the MC16 controller can be expanded by means of RACS 5 AIR wireless locks and expanders. Wireless devices are connected to the RS485 bus through the RWH-1 HUB which enables operation with up to 8 wireless devices installed in a distance of up to 10 m. The MC16 can operate with multiple RWH-1 hubs and concurrently with wired and wireless devices.
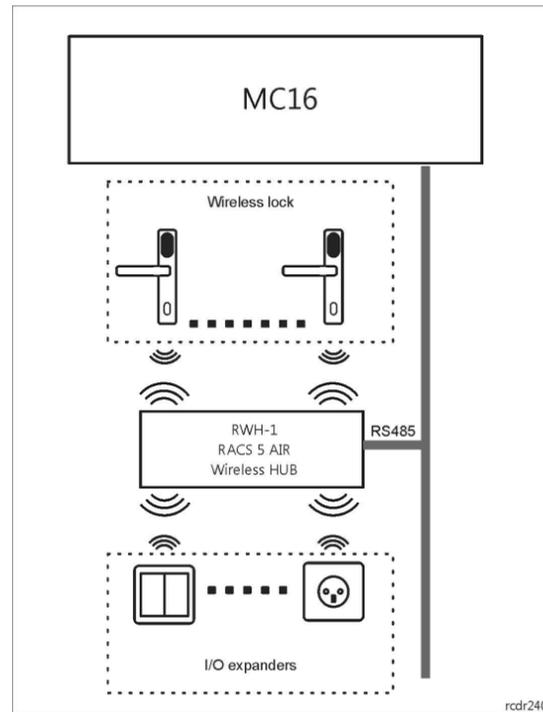
Connection of the RACS 5 AIR wireless devices to the MC16 controller

Connection of APERIO Locks to MC16 Controller

The hardware resources of the MC16 controller can be expanded by means of APERIO (ASSA ABLOY) wireless locks which are connected to the controller via MCX16-AP expander. The expander can operate with two APERIO hubs, each with up to 8 locks. The MC16 can operate concurrently with APERIO locks and other devices.
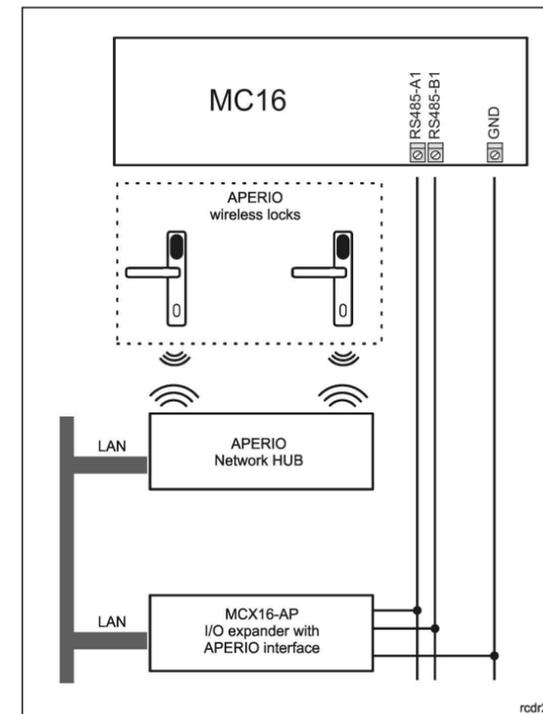
Connection of the APERIO wireless locks to the MC16 controller

Expansion of the MC16 Hardware Resources by SALLIS Locks

Up to 16 SALLIS (SALTO) locks can be connected to the MC16 controller by means of an MCX16-SL expander. The single MCX16-SL module can operate with two networked SALLIS hubs. The MC16 can operate with multiple MCX16-SL hubs.
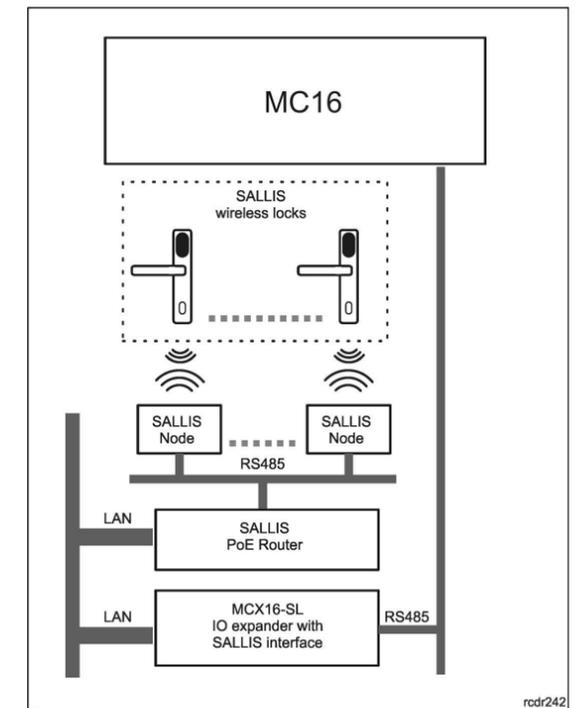
Connection of the SALLIS wireless locks to the MC16 controller

Connection of PRT Series Readers to MC16 Controller

Four PRT series readers can be connected directly to the MC16 board (RACS CLK/DTA interface). All readers must be addressed in range of 0-3 and connected to the same bus.

Alternatively PRT readers can be connected to the controller via MCX402 and MCX102 expanders.

PRT series readers can be connected to the controller/expander by means of any signal cables up to 150 m long but UTP cable is recommended.

Any cable topology for RACS CLK/DTA bus is acceptable except for loop.

Controllers and expander must be configured for operation with PRT readers within low level configuration (RogerVDM).
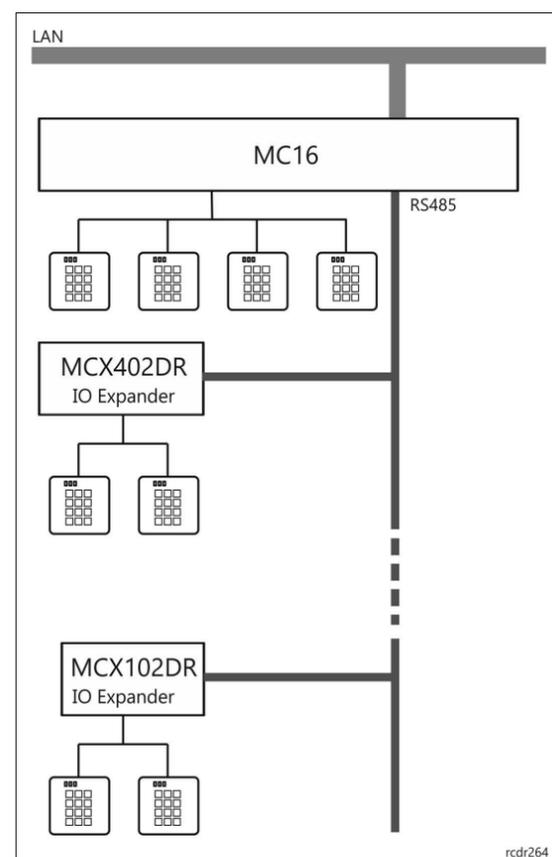
Connection of the PRT series readers to the MC16 controller

Connection of Wiegand Readers to MC16 Controller

Four Wiegand interface readers can be connected directly to the MC16 board. Each reader occupies two inputs and optionally two outputs on MC16 board.

Alternatively Wiegand interface readers can be connected to the controller via MCX402 and MCX102 expanders.

Wiegand interface readers can be connected to the controller/expander by means of any signal cables up to 150 m long but UTP cable is recommended.

Controllers and expander must be configured for operation with Wiegand interface readers within low level configuration (RogerVDM).
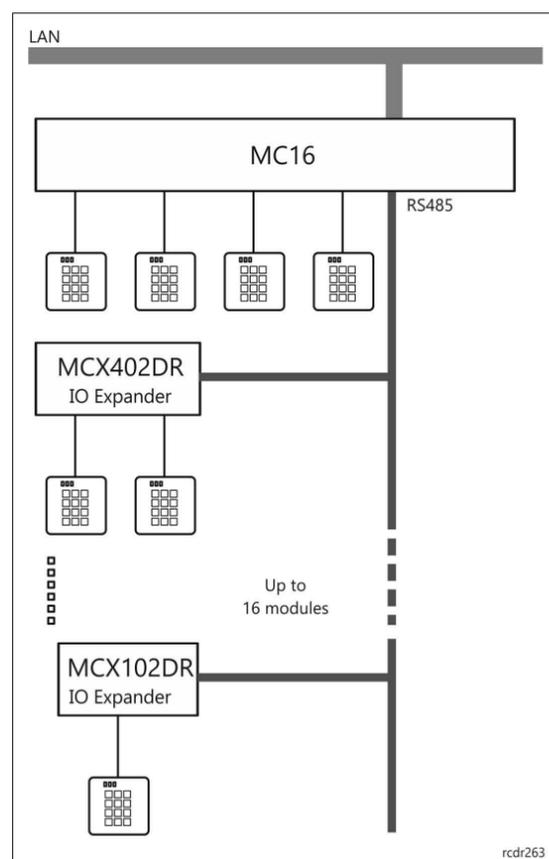
Connection of the Wiegand readers to the MC16 controller

Access Terminals

Access terminals enable users to request access and to control system functions (T&A registration, intruder alarm system arming/disarming, building automation control, etc.). Both EM proximity cards terminals (MCT-E series) and MIFARE proximity cards terminals (MCT-M) including DESFire and Plus are available.

MCT Series Terminals

MCT terminals are not equipped with inputs and outputs. The communication with controller is provided via RS485 bus.

- EM 125 kHz cards
- MIFARE Ultralight, Classic, Plus and DESFire cards
- CSN and SSN reading
- Keypad (selected models)
- 2 function keys (selected models)
- RS485 interface
- 12 VDC supply

MCT-IO Series Terminals

MCT-IO terminals are equipped with 3 inputs, 2 transistor outputs and 1 relay output. Due to available IOs, the MCT-IO enables door control without any additional IO expander. Additional MCT series reader can be used to provide read-in/out door control. MCT-IO terminals are mainly used at internal doors where security is not critical.

- EM 125 kHz cards
- MIFARE Ultralight, Classic, Plus and DESFire cards
- CSN and SSN reading
- Keypad (selected models)
- 2 function keys (selected models)
- 3 inputs
- 2 transistor outputs
- 1 relay output
- RS485 interface
- 12 VDC supply
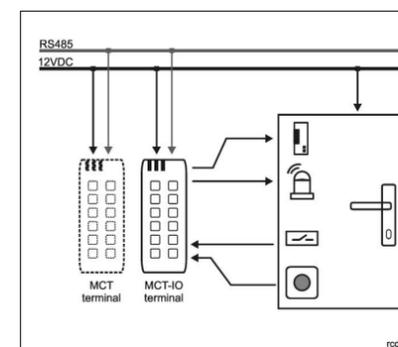
1-door control based on the MCT-IO access terminal

MCT68ME-IO Terminal

The terminal is equipped with a LCD display and four function keys which make it especially suitable for T&A application. The communication with controller is provided via RS485 bus.

- EM 125 kHz cards
- MIFARE Ultralight, Classic, Plus and DESFire cards
- CSN reading
- LCD
- Keypad
- 4 function keys
- 3 NO/NC inputs
- 2 transistor outputs
- 1 relay output
- RS485 interface
- 12 VDC supply

The terminal is available in outdoor version (MCT68ME-IO-O) which includes additional metal protection enclosure.

MCT68ME-IO-O Terminal

MCT88M-IO Terminal

The terminal is mainly used in T&A applications and building automation control. The communication with controller is provided via RS485 bus or Ethernet.

• MIFARE Ultralight, Classic, DESFire and Plus cards
• Identification with mobile device (NFC/Bluetooth)
• Graphic colour display
• Touch keypad
• 4 function keys
• 3 NO/NC inputs
• 2 transistor outputs
• 1 relay output
• RS485 interface
• Ethernet
• 12 VDC supply

MCT88M-IO Terminal

MD70 Terminal

The terminal is mainly used in T&A applications and building automation control. The device offers up to 255 function keys and 16 virtual IOs. Built-in camera can take pictures of users who identify at the terminal to reduce attempts of bypassing T&A rules by users. Video stream from the camera is recorded by the terminal and additionally it can be live viewed on system monitors. Additional software can be installed by administrator on the terminal which has Android operating system to extend the functionality of the terminal beyond access control. The MD70 enables user identification with mobile device via NFC. The communication with controller is provided via RS485 bus or LAN (Ethernet or Wi-Fi).

• 7" graphic touch panel
• 2 Mpx camera
• MIFARE Ultralight, Classic, DESFire and Plus cards
• Identification with mobile device (NFC)
• RS485
• Ethernet
• 12 VDC supply

MD70 Terminal

RFT1000 Biometric Terminal

The RF1000 terminal enables identification of users by means of fingerprints. Fingerprint templates can be stored in the RFT1000 memory (1:N mode) or on the MIFARE card (1:1 mode). The terminal is fully integrated in VISO software and no additional software is required for the management of user fingerprints. The RFT1000 is mainly used for high security door control and T&A applications. The communication with controller is provided via RS485 bus and Ethernet.

• MIFARE Ultralight, Classic, DESFire and Plus cards
• RS485
• Ethernet
• 12 VDC supply

RFT1000 Biometric Terminal

## IO Expanders

Expanders enable to increase the number of inputs and outputs available for the controller. Some expanders can also operate as communication interfaces for connection of additional readers and other modules. Depending on expander type the communication with controller is provided via RS485 bus or Ethernet.

MCX2D Expander

The MCX2D is an IO expander designed for 2 read-in/read-out doors equipped with RS485 (MCT series) readers. For each controlled door it offers 2 parametric inputs, 2 transistor outputs, terminal power supply output (0.2 A) and general power supply output (1.0 A). All outputs are electronically protected and in case of overload do not affect each other. The MCX2D charges backup battery and can disconnect it from the system in order to avoid deep discharge. On-board IOs are designated for door control but they can be programmed for any other functions if required. The expander is supplied from 13.8 VDC/3.5 A power source (e.g. PS2D).

• 4 EOL inputs
• 4 transistor outputs (1.0 A)
• 2 power supply outputs (1.0 A)
• 2 power supply outputs (0.2 A)
• RS485 interface
• 13.8 VDC/3.5 A supply
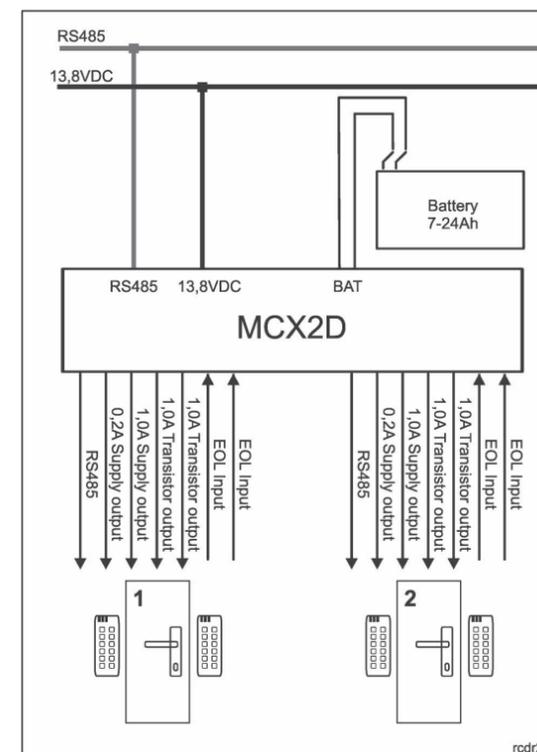
Door control based on the MCX2D expander and MCT readers

MCX4D Expander

The MCX4D is an IO expander designed for 4 read-in/read-out doors equipped with RS485 (MCT series) readers. For each controlled door it offers 2 parametric inputs, 2 transistor outputs, terminal power supply output (0.2 A) and general power supply output (1.0 A). All outputs are electronically protected and in case of overload do not affect each other. The MCX4D charges backup battery and can disconnect it from the system in order to avoid deep discharge. On-board IOs are designated for door control but they can be programmed for any other functions if required. The expander is supplied from 13.8 VDC/5.0 A power source (e.g. PS4D).

• 8 EOL inputs
• 8 transistor outputs (1.0A)
• 4 power supply outputs (1.0A)
• 4 power supply outputs (0.2A)
• RS485 interface
• 13.8 VDC/5.0 A supply
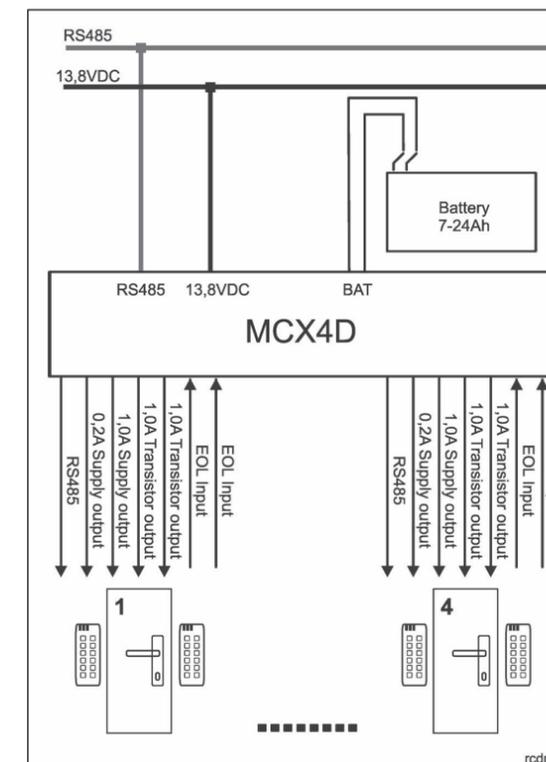
Door control based on the MCX4D expander and MCT readers

MCX2 Expander

The MCX2 is a general purpose IO expander which provides 2 EOL inputs and 2 relay outputs. The expander can be used for any purpose e.g. for building automation.

• 2 EOL inputs
• 2 relay outputs
• RS485 interface
• 12 VDC supply
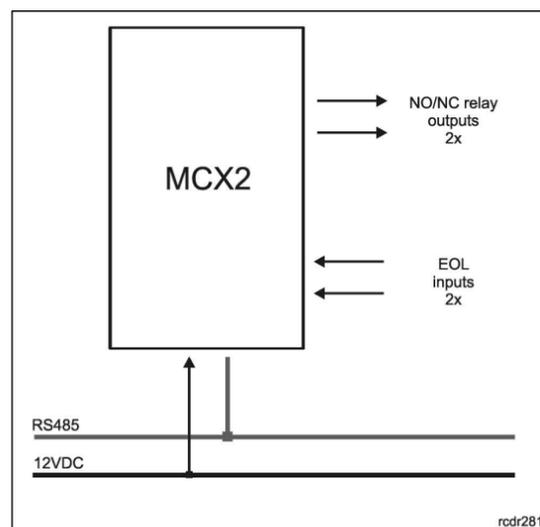
MCX8 Expander

The MCX8 is a general purpose IO expander which provides 8 EOL inputs and 8 relay outputs. The expander can be used for any purpose e.g. for building automation.

• 8 EOL inputs
• 8 relay outputs
• RS485 interface
• 12 VDC supply
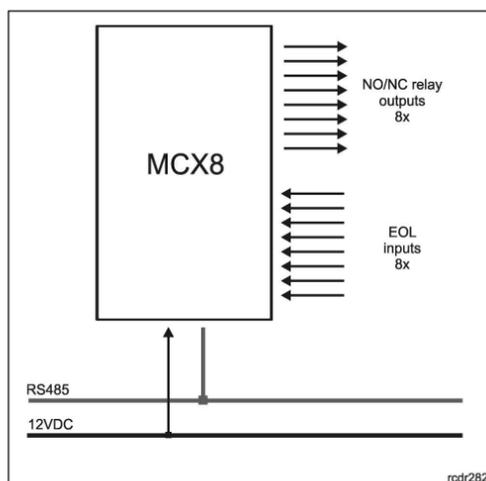
MCX402 Expander

The MCX402 is an IO expander designed for read-in/read-out door equipped with PRT or Wiegand readers. If equipped with PS1A-LCK module and 60 VA transformer it can be supply and control 2 read-in doors. Unused IOs of the expander can be used for any purpose. Each Wiegand reader connected to the expander occupies two inputs and optionally one or two outputs.

• 8 NO/NC inputs
• 2 transistor outputs
• 2 relay outputs
• PRT readers interface (RACS CLK/DTA)
• Wiegand readers interface
• RS485 interface
• power supply output (1.0 A)
• power supply output (0.2 A)
• 18 VAC/40 VA supply
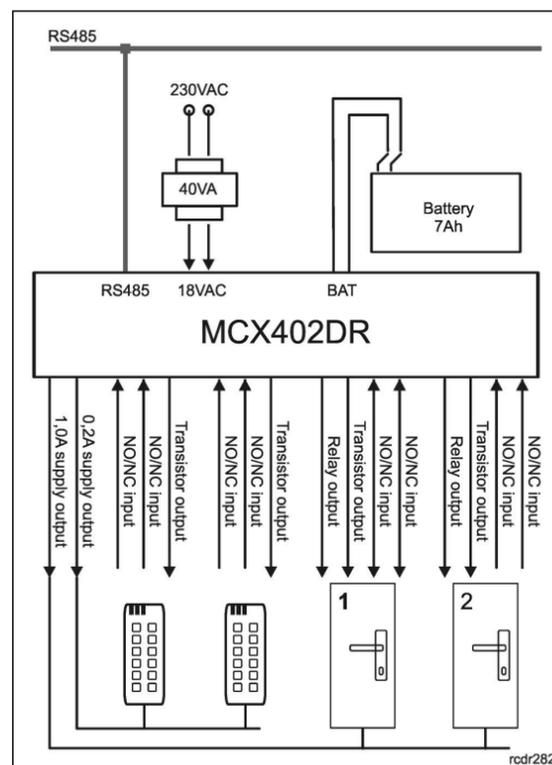
Read-in/out door control based on the MCX402 expander and Wiegand readers

MCX102 Expander

The MCX102 is an IO expander supplied from 12 VDC. The expander can be connected with two PRT readers or single Wiegand reader which occupies two inputs and optionally one transistor output.

• 2 NO/NC inputs
• 1 transistor output
• 1 relay output
• 2 transistor outputs (CLK and DTA)
• PRT readers interface (RACS CLK/DTA)
• Wiegand readers interface
• RS485 interface
• 12 VDC supply
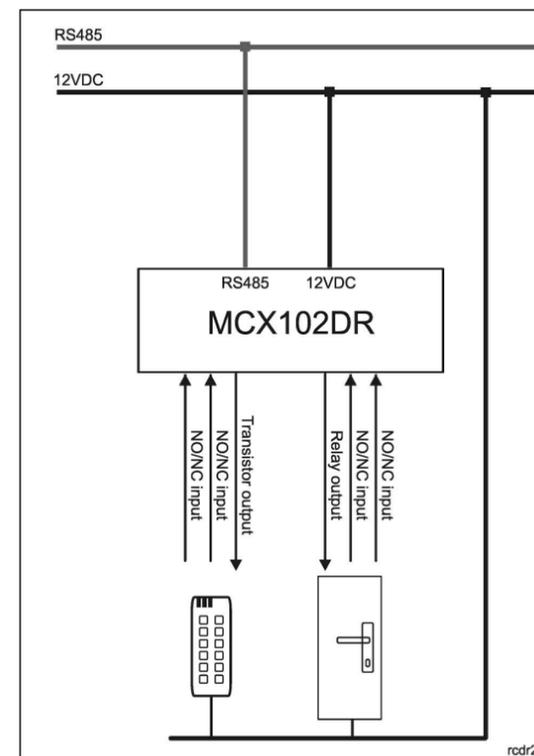
*Read-in door control based on the MCX102 expander and Wiegand reader*

MCX16-RS Expander

The expander is based on the same hardware as MC16 controller and it offers some of resources available on the MC16 board (inputs, outputs).The expander operates as communication interface for connection of network devices (MCT88M-IO, MD70, MCX16-NT) to MC16 controller.

MCX16-NT Expander

The expander is based on the same hardware as MC16 controller and it offers all resources available on the MC16 board (inputs, outputs, RACS CLK/DTA and Wiegand interfaces). The expander is connected to the LAN and communicates with the controller via MCX16-RS expander.

• 8 EOL inputs
• 8 transistor outputs
• 2 relay outputs
• PRT readers interface (RACS CLK/DTA)
• Wiegand readers interface
• RS485 interface
• Ethernet
• power supply output (1.0 A)
• power supply output (0.2 A)
• 18 V/40 VA supply
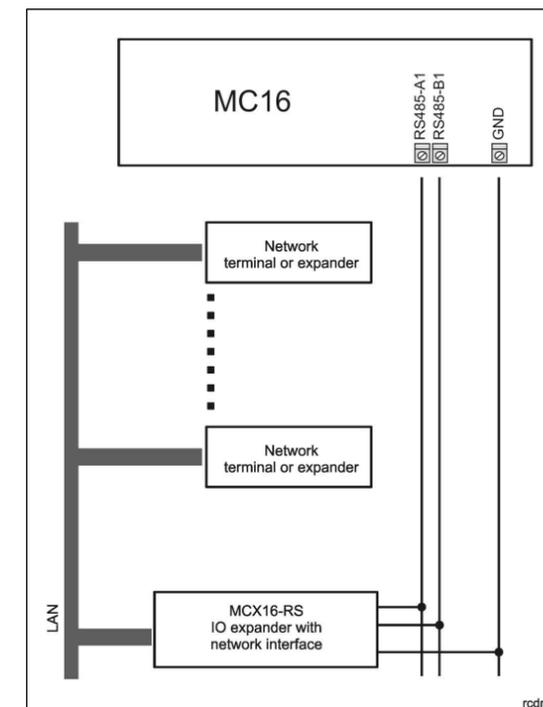
Connection of network devices to MC16 controller

MCX16-AP Expander

The expander is based on the same hardware as the MC16 controller and it offers some of resources available on the MC16 board (inputs, outputs).The expander operates as a communication interface for up to 16 APERIO (ASSA ABLOY) wireless door locks.
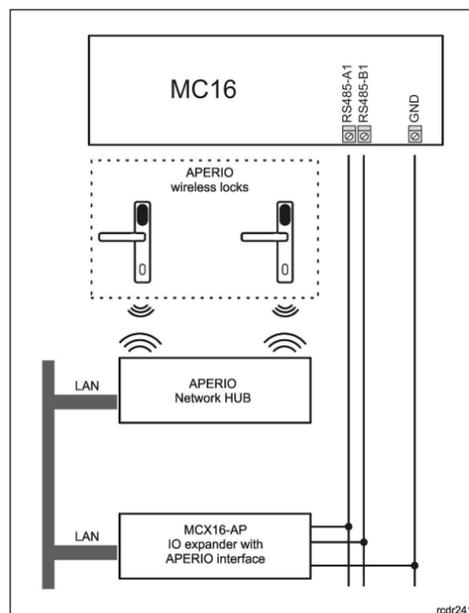
Connection of APERIO wireless locks to MC16 controller

MCX16-SL Expander

The expander is based on the same hardware as the MC16 controller and it operates as a communication interface for up to 16 SALLIS (SALTO) wireless door locks. Inputs and outputs of the expander can be used as general purpose NO/NC IOs.
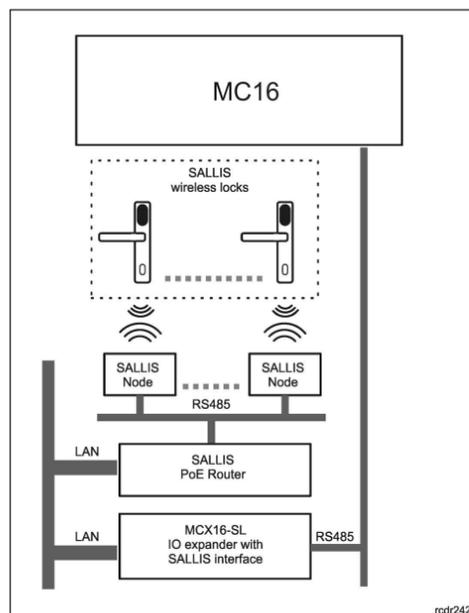
Connection of SALLIS wireless locks to MC16 controller

Interfaces

Interface enables integration/connection of the RACS 5 system with other systems and devices.

MCI16-EVK Interface

The MCI16-EVK operates as a communication interface between the MC16-EVK elevator controller and the KONE elevator group controller (KGC). KONE elevator system requires single MC16-EVK interface regardless of the number of MC16-EVK elevator controllers working in the system.

Power Supplies

PS2D Power Supply

The PS2D is based on Mean Well LRS-35-12 switched power supply and it is factory adjusted to 13.8 V output voltage. The device delivers 2.5 A direct current. Nominally the PS2D is dedicated to supply two doors with MCX2D expander.

PS4D Power Supply

The PS4D is based on Mean Well LRS-75-12 switched power supply and it is factory adjusted to 13.8 V output voltage. The device delivers 5.4 A direct current. Nominally the PS4D is dedicated to supply four doors with MCX4D expander.

PS8D Power Supply

The PS8D is based on Mean Well LRS-150-12 switched power supply and it is factory adjusted to 13.8 V output voltage. The device delivers 10.8 A direct current. Nominally the PS8D is dedicated to supply eight doors with two MCX4D expanders.

PSD4D Power Supply Distributor

The PSD4D distributes power supply and RS485 communication bus to 4 access doors in RACS 5 system. For each door, it offers main 1.0 A supply output, auxiliary 0.2 A supply output and communication interface to readers. The electronic circuits for each door are electrically separated and failure or sabotage at one door does not affect remaining doors. The PSD4D is supplied from the external 13.8 VDC power supply which provides energy for door locks, readers and other door equipment. In case of main supply failure, the system is supplied from the backup battery which is connected to the PSD4D module and charged with configurable 0.3-0.9 A current. The electronic module is equipped with removable screw terminals which simplify installation and replacement of the module. The PSD4D is generally dedicated to access control systems based on the MCT-IO series (e.g. MCT82M-IO) readers which utilize their on-board IO lines to control lock and other elements of the door.

- Communication bus and power supply distribution to 4 doors
- 4 supply outputs 12 V/1.0 A
- 4 supply outputs 12 V/0.2 A
- Protection against battery deep discharge
- Backup battery charging with 0.3-0.9 current
- 13.8 VDC supply
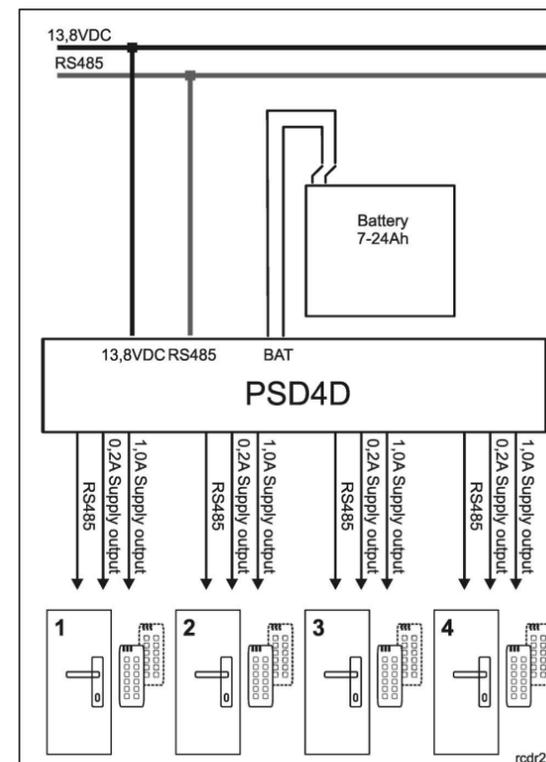
Distribution of RS485 bus and power supply to 4 doors

PS1A-LCK Power Supply Module

The PS1A-LCK module is supplied from 18 VAC voltage and it offers 13.8 VDC voltage at its 2 supply outputs. The 1.0 A rated output is dedicated to supply door lock and can be switched ON/OFF by external signal applied to the dedicated input. Optionally when switched on permanently , it can supply door lock and other door equipment e.g. signalling device. The 0.2 A rated output is dedicated to supply access readers and is always activated. The PS1A-LCK offers input for backup battery connection. Lack of AC voltage is signalled on dedicated transistor output. All outputs are protected against overload protection The PS1A-LCK is mainly used when built-in power supply on the main module board is not capable to supply required equipment (e.g. second lock) and the auxiliary power source is necessary.

- 18 VAC/20 VA supply
- 12 VDC backup supply
- Main 1.0 A supply output (LCK)
- Auxiliary 0.2 A supply output (TML)
- Main output ON/OFF control input
- AC lost output
- Overload protection
- Mounted on DIN rail or flat surface
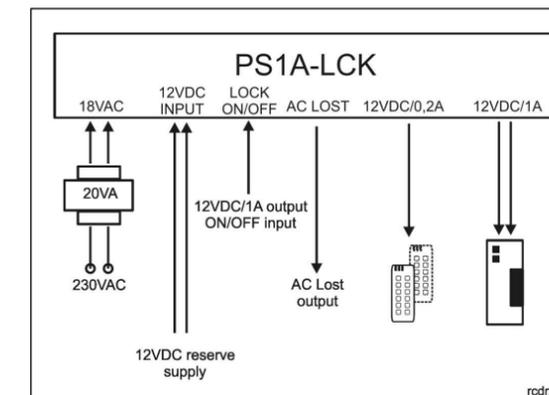
PS1A-LCK Power Supply Module

RACS 5 AIR System

RACS 5 AIR system includes wireless devices which can be connected to the MC16 controller via a RWH-1 hub and configured in the same way as wired devices. The RACS 5 AIR locks work with MIFARE Ultralight, Classic, Plus and DESFire cards. The MC16 controller can simultaneously operate with wired and wireless devices.
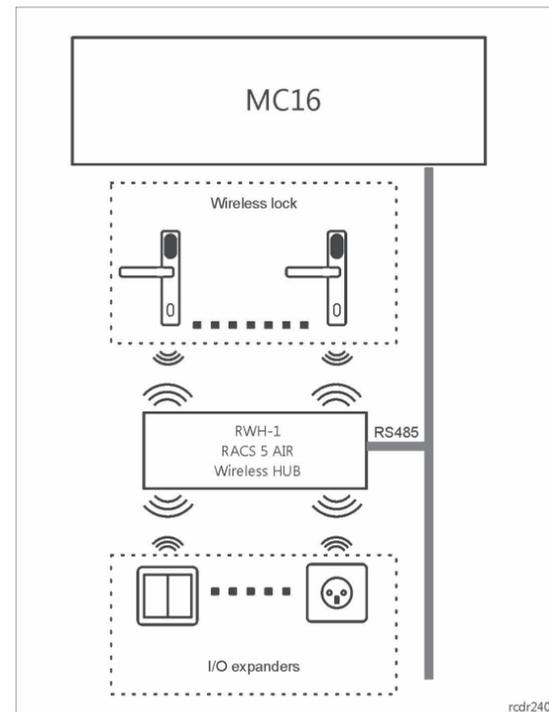
Connection of RACS 5 AIR wireless devices to MC16 controller

RWL Locks

RWL series wireless locks are battery supplied devices which can operate in online or offline mode. In the Online mode the wirelessly connected MC16 controller decides if access is granted. In the Offline mode, the lock decides autonomously if access is granted based on the card numbers stored in its memory. The lock can operate with up to 100 users, each with single card or up to 50 users, each with main card and backup card. Backup card can be used for selective erasing of main card from lock. Card enrolment and deleting in offline mode can be done with programming cards without connection of the lock to computer.

RWL-1 Wireless Lock

The RWL-1 consists of an internal door lock and two escutcheons with handles. The reader is located in the external escutcheon while batteries are located in the internal one. The door unlocking servomechanism is located inside the lock case.

RWL-1 Wireless Lock

RWL-2 Escutcheon

The RWL-2 consists of two escutcheons with handles. The reader is located in the external escutcheon while batteries and the handle locking servomechanism are located in the internal escutcheon. The RWL-2 is mounted on already installed mortise lock.

RWL-2 Escutcheon

RWH-1 Interface

The RWH-1 operates as an interface between RACS 5 AIR wireless device (lock, expander) and the MC16 access controller. The RWH-1 is connected to controller through the RS485 bus and can operate with up to 8 wireless devices in a range of 10 meters.

RWH-1 Interface

Terminal enclosures

ME-8 Enclosure

The metal enclosure with cover flap dedicated to the RFT1000 fingerprint terminal. ME-8 is made of stainless metal sheet with powder coating.

ME-8 Enclosure
Reader shown in the photo is not included in the ME-8 enclosure

ME-9 Enclosure

The metal enclosure dedicated to MCT82M, MCT64E and MCT66E terminals. ME-9 is made of stainless metal sheet with powder coating.

ME-9 Enclosure
Reader shown in the photo is not included in the ME-9 enclosure

ME-10 Enclosure

The metal enclosure dedicated to the MCT84M terminal. ME-10 is made of stainless metal sheet with powder coating.

ME-10 Enclosure
Reader shown in the photo is not included in the ME-10 enclosure

ME-12 Holder

The ME-12 is a holder dedicated to ergonomic installation of MD70 graphical control terminal. Adequate orientation of the terminal is essential if on-board camera is required to make photos of users, particularly in T&A applications. The holder is made of stainless metal sheet with powder coating.

Installation Enclosures

ME-14-40VA Enclosure
The ME-14-40VA enclosure is dedicated to RACS 5 modules and devices which require installation on DIN rail and operate with 7 Ah battery. The enclosure is equipped with single DIN rail, mains transformer and tamper contact. Access to the internal space of the enclosure is protected by a door fixed by screws to the bottom part of the enclosure. The ME-14-40VA is made of metal sheet with white powder coating.

- Metal enclosure for RACS 5 modules and devices
- DIN rail 250 mm
- 18 V/40 VA mains transformer
- Tamper contact
- Space for 7 Ah battery
- 0.8 mm metal sheet
- White colour powder coating
- Dimensions: 250.0 x 250.0 x 80.0 mm

ME-14-60VA Enclosure
The ME-14-60VA enclosure is dedicated to RACS 5 modules and devices which require installation on DIN rail and operate with 7 Ah battery. The enclosure is equipped with single DIN rail, mains transformer and tamper contact. Access to the internal space of the enclosure is protected by a door fixed by screws to the bottom part of the enclosure. The ME-14-60VA is made of metal sheet with white powder coating.

- Metal enclosure for RACS 5 modules and devices
- DIN rail 250 mm
- 18 V/60 VA mains transformer
- Tamper contact
- Space for 7 Ah battery
- 0.8 mm metal sheet
- White colour powder coating
- Dimensions: 250.0 x 250.0 x 80.0 mm

ME-15 Enclosure
The ME-15 enclosure is dedicated to RACS 5 modules and devices which require installation on DIN rail and operate with 7 Ah battery. The enclosure is equipped with single DIN rail and tamper contact. Access to the internal space of the enclosure is protected by a door fixed by screws to the bottom part of the enclosure. The ME-15 is made of metal sheet with white powder coating.

- Metal enclosure for RACS 5 modules and devices
- DIN rail 280 mm
- Tamper contact
- Space for 7 Ah battery
- 0.8 mm metal sheet
- White colour powder coating
- Dimensions: 280.0 x 290.0 x 80.0 mm

ME-15 Enclosure

ME-16 Enclosure
The ME-16 enclosure is dedicated to RACS 5 modules and devices which require installation on DIN rail and operate with 17 Ah battery. The enclosure is equipped with single DIN rail and tamper contact. Access to the internal space of the enclosure is protected by a door fixed by screws to the bottom part of the enclosure. The ME-16 is made of metal sheet with white powder coating.

- Metal enclosure for RACS 5 modules and devices
- DIN rail 320 mm
- Tamper contact
- Space for 17 Ah battery
- 0.8 mm metal sheet
- White colour powder coating
- Dimensions: 300.0 x 320.0 x 90.0 mm

ME-17 Enclosure
The ME-17 enclosure is dedicated to RACS 5 modules and devices which require installation on DIN rail and operate with 17 Ah battery. The enclosure is equipped with two DIN rails and tamper contact. Access to the internal space of the enclosure is protected by a door fixed by screws to the bottom part of the enclosure. The ME-17 is made of metal sheet with white powder coating.

- Metal enclosure for RACS 5 modules and devices
- Two DIN rails 395 mm
- Tamper contact
- Space for 17 Ah battery
- 0.8 mm metal sheet
- White colour powder coating
- Dimensions: 395.0 x 320.0 x 90.0 mm

Administrator Readers

RUD-2
The reader is connected to USB port of computer with Windows OS and it enables EM 125 kHz cards reading and enrolment into RACS 5 system.

RUD-3
The reader is connected to USB port of computer with Windows OS and it enables MIFARE Ultralight/Classic cards reading, programming and enrolment into RACS 5 system.

RUD-3-DES
The reader is connected to USB port of computer with Windows OS and it enables MIFARE Ultralight/Classic/Plus/DESFire cards reading, programming and enrolment into RACS 5 system.

RUD-2/RUD-3 Administrator Reader

RUD-4
The reader is connected to USB port of computer with Windows OS and it enables MIFARE Ultralight/Classic/Plus/DESFire cards reading, programming and enrolment into RACS 5 system. RUD-4 is installed in enclosure with card holder and stable metal base.

RUD-4 Administrator Reader

Access Control Kits
Roger offers factory assembled access control kits for 1 to 4 doors and door expander kits. The RACS 5 kits were designed assuming that every door requires at least two inputs (door contact and exit button), single relay output (door lock) and min. 1.0 A supply.

MC16-PAC-1-KIT
Access control kit for one door. The kit consists of metal enclosure with transformer and MC16 access controller. The controlled door can be managed on both, read-in and read-out sides by RS485 (MCT series readers), RACS CLK/DTA (PRT series readers) or Wiegand readers. Door lock and readers are supplied from the controller's onboard supply outputs capable to deliver respectively 1.0 A and 0.2 A. The kit is supplied from the mains transformer included in the kit.

- Access control kit for one door
- Read-in/read-out door control
- MC16-PAC-1 access controller
- Interface for 4 PRT readers (RACS CLK/DTA)
- Interface for 4 Wiegand readers
- Supply output 0.2 A
- Supply output 1.0 A
- Battery charging 0.3 A
- Protection against battery deep discharge
- 18 V/40 VA transformer
- Space for 7 Ah battery
- Tamper contact
- Metal enclosure 250.0 x 250.0 x 80.0 mm

MC16-PAC-1-KIT

MC16-PAC-2-KIT

Access control kit for two doors. The kit consists of metal enclosure with power supply, MC16 access controller and IO expander. The controlled doors can be managed on both, read-in and read-out side by RS485 (MCT series readers), RACS CLK/DTA (PRT series readers) or Wiegand readers. Each controlled door has separate 0.2 A supply output for readers and 1.0 A supply output for lock and other door equipment. The backup battery charging current can be set to 0.3 A, 0.6 A or 0.9 A. The kit is supplied from the power supply included in the kit.

- Access control kit for two doors
- Read-in/read-out door control
- MC16-PAC-2 access controller
- MCX2D IO expander
- Interface for 4 PRT readers (RACS CLK/DTA)
- Interface for 4 Wiegand readers
- 2 supply outputs 0.2 A
- 2 supply outputs 1.0 A
- Battery charging 0.3 A/0.6 A/0.9 A
- Protection against battery deep discharge
- PS2D power supply (13.8 V/2.5 A)
- Space for 7 Ah battery
- Tamper contact
- Metal enclosure 280.0 x 290.0 x 80.0 mm

MC16-PAC-2-KIT

MC16-PAC-3-KIT

Access control kit for three doors. The kit consists of metal enclosure with power supply, MC16 access controller and IO expander. The controlled doors can be managed on both, read-in and read-out side by RS485 (MCT series readers). In case of RACS CLK/DTA (PRT series) and Wiegand readers one of controlled doors can be managed on both, read-in and read-out side while two remaining doors can be managed on read-in side only. Each controlled door has separate 0.2 A supply output for readers and 1.0 A supply output for lock and other door equipment. The backup battery charging current can be set to 0.3 A, 0.6 A or 0.9 A. The kit is supplied from the power supply included in the kit.

- Access control kit for three doors
- Read-in/read-out door control
- MC16-PAC-3 access controller
- MCX4D IO expander
- Interface for 4 PRT readers (RACS CLK/DTA)
- Interface for 4 Wiegand readers
- 4 supply outputs 0.2 A
- 4 supply outputs 1.0 A
- Battery charging 0.3 A/0.6 A/0.9 A
- Protection against battery deep discharge
- PS4D power supply (13.8 V/5.4 A)
- Space for 17 Ah battery
- Tamper contact
- Metal enclosure 300.0 x 320.0 x 90.0 mm

MC16-PAC-4-KIT

Access control kit for four doors. The kit consists of metal enclosure with power supply, MC16 access controller and IO expander. The controlled doors can be managed on both, read-in and read-out side by RS485 (MCT series readers). In case of RACS CLK/DTA (PRT series) and Wiegand readers all controlled doors can be managed on read-in side only. Each controlled door has separate 0.2 A supply output for readers and 1.0 A supply output for lock and other door equipment. The backup battery charging current can be set to 0.3 A, 0.6 A or 0.9 A. The kit is supplied from the power supply included in the kit.

- Access control kit for four doors
- Read-in/read-out door control
- MC16-PAC-4 access controller
- MCX4D IO expander
- Interface for 4 PRT readers (RACS CLK/DTA)
- Interface for 4 Wiegand readers
- 4 supply outputs 0.2 A
- 4 supply outputs 1.0 A
- Battery charging 0.3 A/0.6 A/0.9 A
- Protection against battery deep discharge
- PS4D power supply (13.8 V/5.4 A)
- Space for 17 Ah battery
- Tamper contact
- Metal enclosure 300.0 x 320.0 x 90.0 mm

MC16-PAC-4-KIT

MCX402-1-KIT

Door expander kit for one door. The kit consists of metal enclosure with transformer, auxiliary power supply module and IO expander. The controlled door can be managed on read-in/out side by Wiegand or RACS CLK/DTA (PRT series readers) readers. Readers and door lock are supplied respectively from 0.2 A and 1.0 A outputs of the expander. The kit is supplied from the mains 18 V/40 VA transformer included in the kit. The door expander is connected with the access controller through the RS485 bus.

- Access expander kit for one door
- Read-in/read-out door control
- MCX402-BRD IO expander
- Interface for 2 PRT readers (RACS CLK/DTA)
- Interface for 2 Wiegand readers
- Supply output 0.2 A
- Supply output 1.0 A
- Battery charging 0.3 A
- Protection against battery deep discharge
- 18 V/40 VA transformer
- Space for 7 Ah battery
- Tamper contact
- Metal enclosure 250.0 x 250.0 x 80.0 mm

MCX402-1-KIT

MCX402-2-KIT

Door expander kit for two doors. The kit consists of metal enclosure with transformer, auxiliary power supply module and IO expander. The controlled doors can be managed on read-in side only by Wiegand or RACS CLK/DTA (PRT series readers) readers. The kit is supplied from the mains 18 V/60 VA transformer included in the kit. The door expander is connected with the access controller through the RS485 bus.

- Access expander kit for two door
- Read-in door control
- MCX402-BRD IO expander
- Interface for 2 PRT readers (RACS CLK/DTA)
- Interface for 2 Wiegand readers
- Supply output 0.2 A
- Supply output 1.0 A
- PS1A-LCK supply module
- Battery charging 0.3 A
- Protection against battery deep discharge
- 18 V/60 VA transformer
- Space for 7 Ah battery
- Tamper contact
- Metal enclosure 250.0 x 250.0 x 80.0 mm

MCX402-2-KIT

MC16-RAW-KIT

Access control kit. The kit consists of metal enclosure with transformer and MC16-RAW electronic module. With adequate license file MC16-RAW can be converted into any type of MC16 series access controller (MC16-PAC, MC16-LRC, MC16-BAC, MC16-EVK, MC16-EVC). Optionally, the MC16-RAW can be reprogrammed with any type of firmware compatible with MC16 hardware and used as MCX16-NT, MCX16-RS, MCX16-AP, MCX16-SL or MCI16-EVK device.

- Access control kit
- MC16-RAW electronic module
- 18 V/40 VA transformer
- Space for 7 Ah battery
- Tamper contact
- Metal enclosure 250.0 x 250.0 x 80.0 mm

Typical Installation Scenarios of the MC16 Access Controller

In the installation scenarios proposed below it is assumed that a typical door requires:

- Relay output line to control door lock
- Transistor or relay output line to control door bell and alarming device
- Input line for door open contact
- Input line for exit button
- 1.0 A power supply

The scenarios are demonstrative and they represent some of possible installations of MC16 access controller and its devices.

1-door System

In this scenario, the MC16 controller supervises 1 door. The read-in/out door can be controlled by MCT (RS485) or Wiegand readers. Wiegand D0/D1 lines are connected directly to MC16 controller. Each Wiegand readers occupies two inputs and optionally one or two outputs. The door control equipment including door lock and access readers is supplied from transformer via MC16 on-board supply outputs. Such approach is applied in MC16-PAC-1-KIT.
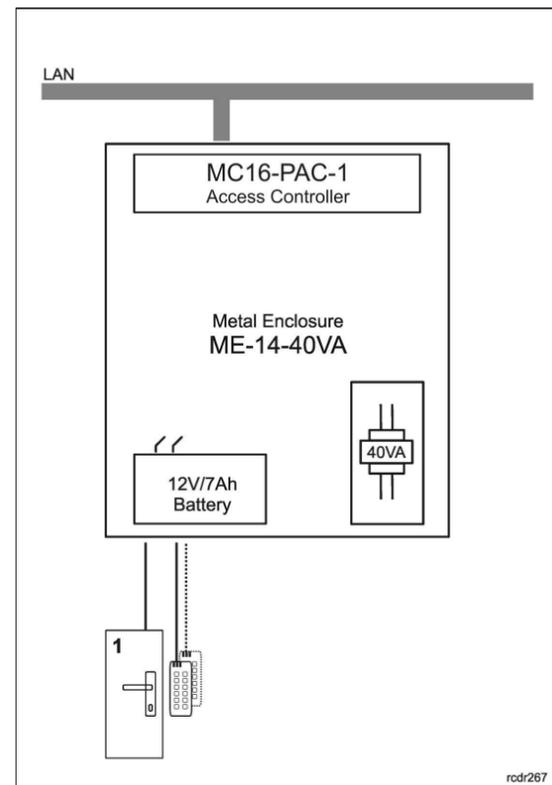
1-door access control system with MC16-PAC-1-KIT

2-door System

In this scenario, the MC16 controller supervises 2 doors. The read-in/out doors can be controlled by MCT (RS485) or Wiegand readers. Wiegand D0/D1 lines are connected directly to MC16 controller. Each Wiegand readers occupies two inputs and optionally one or two outputs. The door control equipment including door locks and access terminals is supplied from the PS2D power supply via MCX2D expander. Such approach is applied in MC16-PAC-2-KIT.
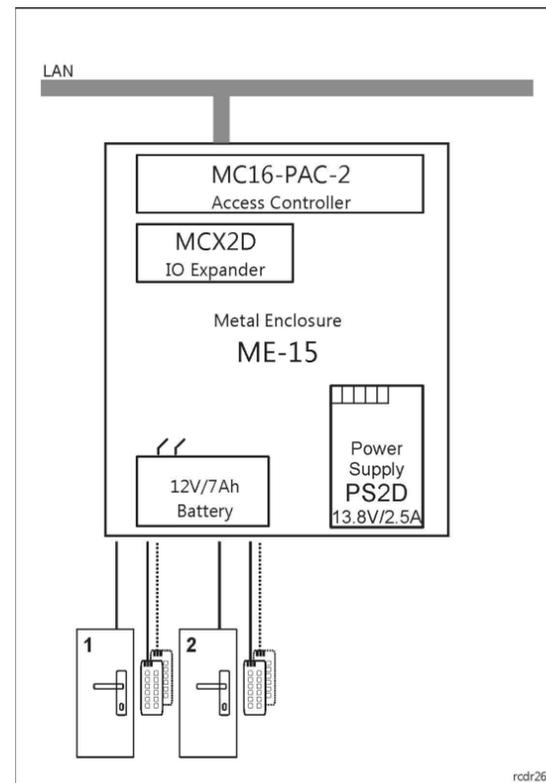
*2-door access control system with MC16-PAC-2-KIT*

3-door System

In this scenario, the MC16 controller supervises 3 doors. In case of MCT (RS485) readers all three doors can be read-in/out while in case Wiegand readers one door can be read-in/out while remaining two doors can be read-in only. Wiegand D0/D1 lines are connected directly to MC16 controller. Each Wiegand readers occupies two inputs and optionally one or two outputs. The door control equipment including door locks and access readers is supplied from PS4D power supply via MCX4D expander. Such approach is applied in MC16-PAC-3-KIT.
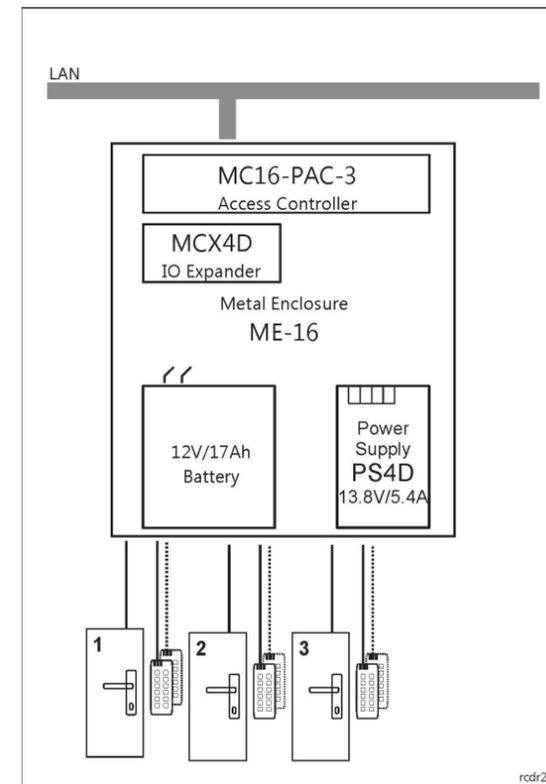
*3-door access control system with MC16-PAC-3-KIT*

4-door System

In this scenario, the MC16 controller supervises 4 doors. In case of MCT (RS485) readers all four doors can be read-in/out while in case of PRT and Wiegand readers all door can be read-in only. Wiegand D0/D1 lines are connected directly to MC16 controller. Each Wiegand readers occupies two inputs and optionally one or two outputs. The door control equipment including door locks and access readers is supplied from PS4D power supply via MCX4D expander. Such approach is applied in MC16-PAC-4-KIT.
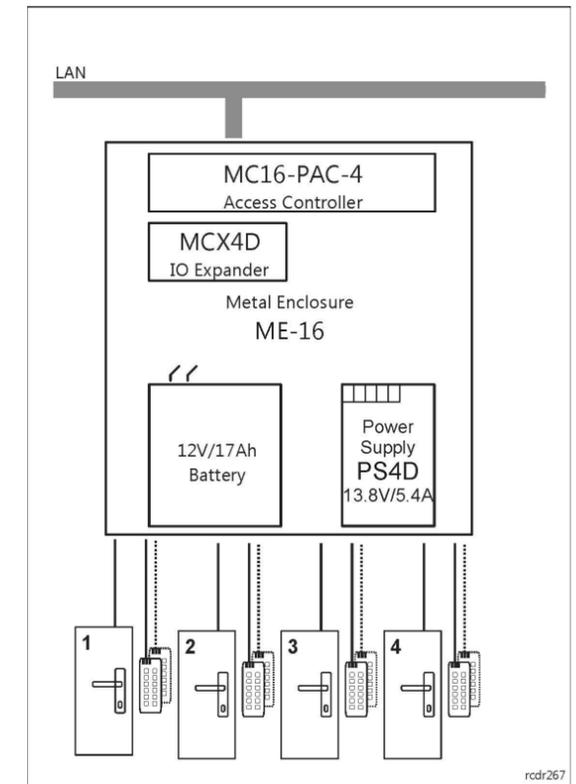
4-door access control system with MC16-PAC-4-KIT

Expansion by 2 Doors with RS485 Readers

In this scenario, the MCX2D expander enables the control of 2 additional doors with MCT readers. Both doors can be controlled on read-in and read-out sides. The door control equipment including door locks and access terminals is supplied from the PS2D power supply via the expander. The MCX2D expander is connected to RS485 bus of MC16 access controller equipped with adequate license.
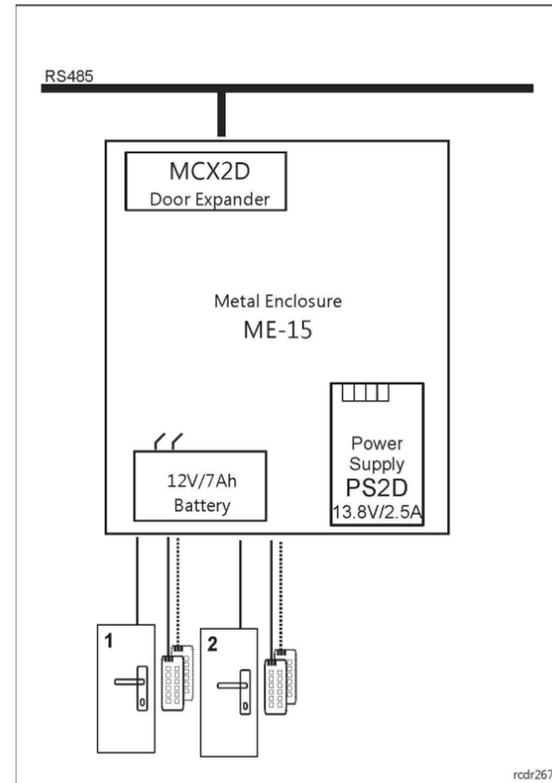
2-door expansion with RS485 readers and MCX2D IO expander

Expansion by 4 Doors with RS485 Readers

In this scenario, the MCX4D expander enables the control of 4 additional doors with MCT readers. All doors can be controlled on read-in and read-out sides. The entire door control equipment including door locks and access terminals is supplied from the PS4D power supply via the expander. The MCX4D expander is connected to RS485 bus of MC16 access controller equipped with adequate license.
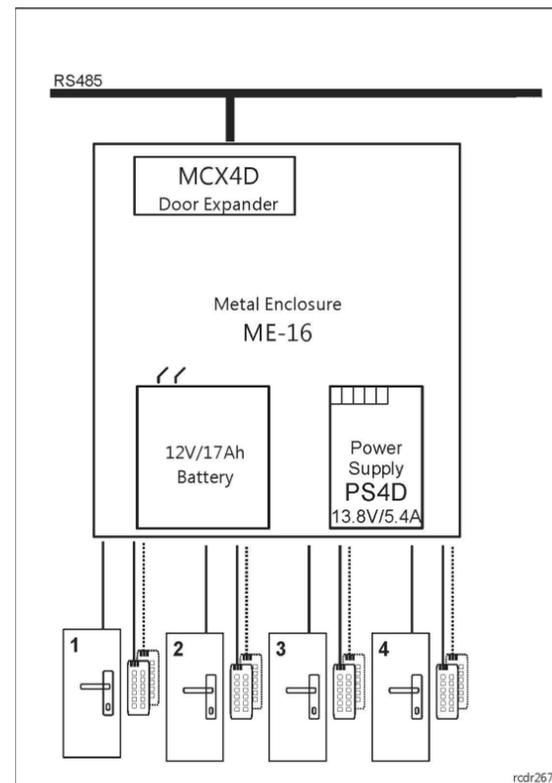
4-door expansion with RS485 readers and MCX4D IO expander

Expansion by 1 Door with Wiegand Readers

In this scenario, the MCX402 expander enables the control of 1 additional read-in/out door with Wiegand readers. Each Wiegand readers occupies two inputs and optionally one or two outputs. The kit is supplied from 18 V/40 VA main transformer. The MCX402 expander is connected to RS485 bus of MC16 access controller equipped with adequate license. Such scenario is applied in MCX402-1-KIT.
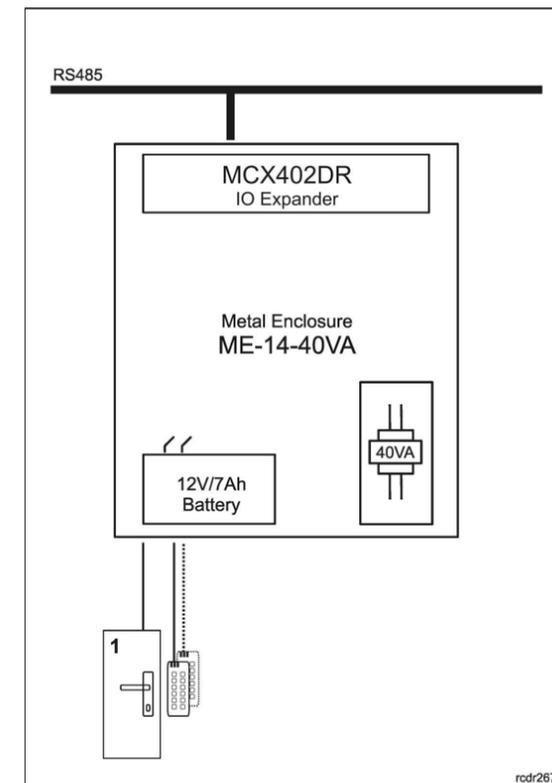

Expansion by 1 door with Wiegand readers and MCX402 IO expander

Expansion by 2 Doors with Wiegand Readers

In this scenario, the MCX402 expander enables the control of 2 additional read-in doors with Wiegand readers. Each Wiegand readers occupies two inputs and optionally one or two outputs. The kit is supplied from 18 V/60 VA main transformer. The second door lock is connected to PS1A-LCK module. The MCX402 expander is connected to RS485 bus of MC16 access controller equipped with adequate license. Such scenario is applied in MCX402-2-KIT.
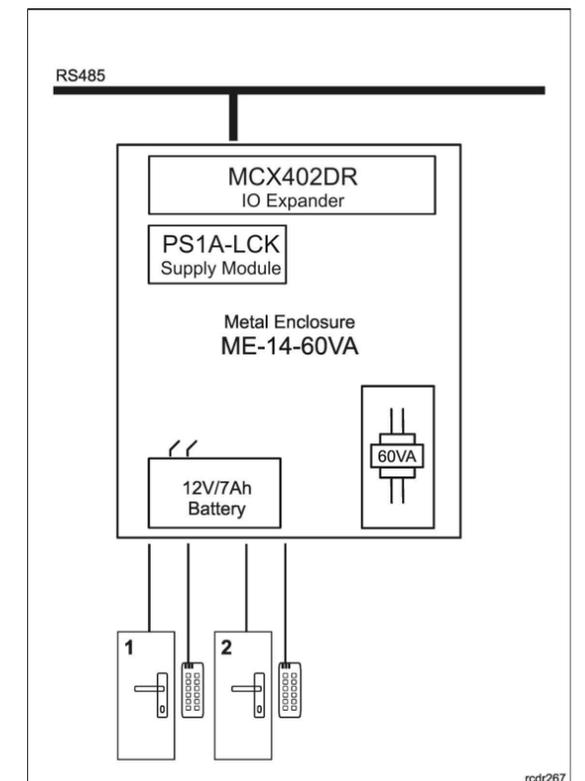
Expansion by 2 doors with Wiegand readers and MCX402 IO expander

## Expansion by 4 Doors with MCT-IO Readers
In this scenario, all doors are controlled by MCT-IO series readers and their IOs. The set is supplied from PS4D power supply and connected to RS485 bus of MC16 access controller equipped with adequate license. Readers and all door equipment are supplied from PSD4D module which also charges backup battery and protects it against deep discharge. For each read-in/out door additional MCT reader must be connected to RS485 bus.
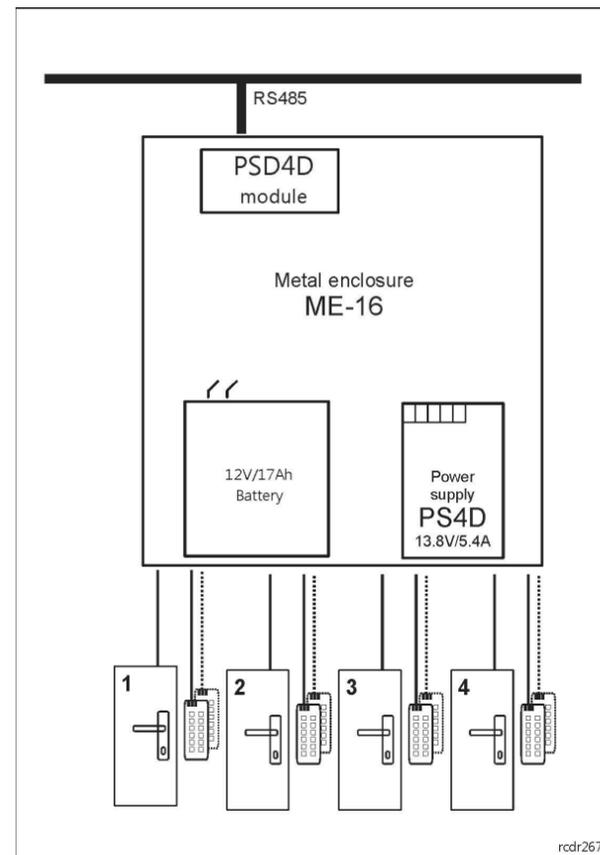
Expansion by 4 doors with MCT-IO readers

Expansion by 8 Doors with MCT-IO Readers
In this scenario, all doors are controlled by MCT-IO series readers and their IOs. The set is supplied from PS8D power supply and connected to RS485 bus of MC16 access controller equipped with adequate license. Readers and all door equipment are supplied from PSD4D modules which also charge backup batteries and protect them against deep discharge. For each read-in/out door additional MCT reader must be connected to RS485 bus.
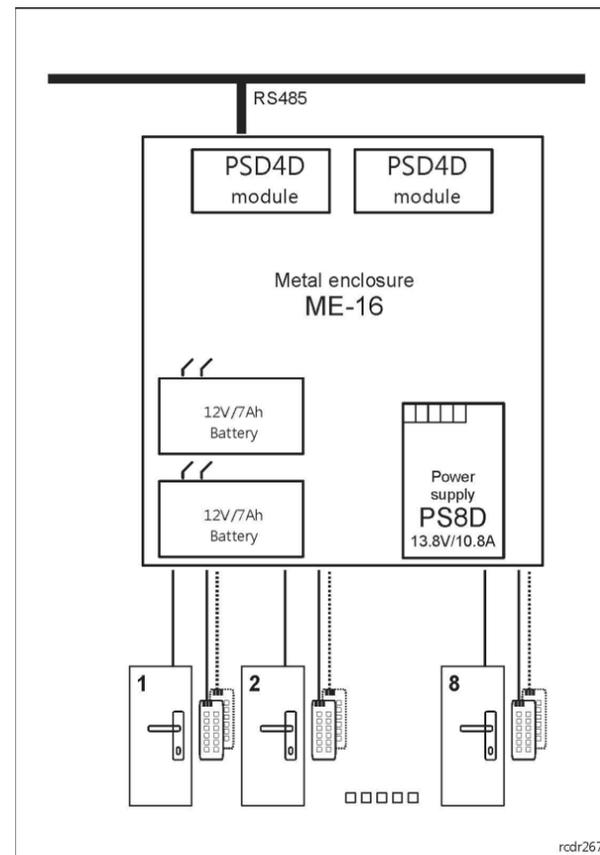
Expansion by 8 doors with MCT-IO readers

Technical and Marketing Support
DB-6A Demo Board
The board includes such devices as MC16-PAC-8 access controller, six readers, IO expander and administrator reader. All devices are electrically connected and installed on the board. The Demo configuration which is provided with the DB-6A enables practical testing and evaluation of RACS 5 features. The board can also be used for presentation at a meeting with investors. Additional DB-6B board, including more RACS 5 devices such as MD70, MCT88M-IO and MCT68ME terminals can be connected to the DB-6A.

DB-6A Demo Board
The stand shown in the photo is not included in the DB-6A

PDK-2 Portable Demo Kit
The kit includes such devices as MC16-PAC-4 access controller, six readers, IO expander and administrator reader. All devices are installed on two boards which are packed in a metal suitcase. The PDK-2 is dedicated to installers who would like to get acquainted practically with the RACS 5 features. The kit can be rented free of charge from Roger.

PDK-2 Portable Demo Kit

Free of Charge Helpline
Roger offers technical support helpline with multiple operators working in office hours. Support by TeamViewer is offered if it's technically possible and justified. In such a case, Roger technician can remotely connect with customer's computer in order to verify and correct the reported issue. Third party TeamViewer software is distributed within the RACS 5 software package.

Workshop Training
Regular and free of charge workshop trainings on RACS 5 and RCP Master 3 are offered within the Roger Academy. It is also possible to order paid training in customer's premises.

USR-1 System Start-Up Service
Roger offers delegation of technician to support installer for 8 h in regard of system configuration and troubleshooting. The technician can also provide training in system configuration and management. The cost of service is calculated individually.

USR-2 Training Service
Roger offers training in regard of RACS 5 management and servicing. The 8 h training is made in Roger premises. The number of participants is limited to 3 persons.

Free of Charge Presentation
Roger offers free of charge presentation for investor interested in RACS 5 system. The Roger representative shows RACS 5 features and functionalities as well as advises in regard of selection of devices and software.

Notes

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