

Roger Access Control System

MCT82M and MCT84M Operating Manual

Product version: 1.0

Firmware version: 1.1.18 or newer

Document version: Rev. C



roger

1. DESIGN AND APPLICATION

MCT82M and MCT84M are series of access terminals dedicated to RACS 5 system. Depending on their versions, devices enable identification of users by PINs and/or 13.56 MHz MIFARE® Ultralight/Classic proximity cards.

Both MCT82M and MCT84M are connected to access controller through RS485 interface.

Version	MCT82M	MCT82M-BK	MCT82M-IO	MCT82M-BK-IO	MCT84M	MCT84M-BK
Keypad	Yes	-	Yes	-	Yes	-
Function keys	-	-	-	-	Yes	Yes
Inputs	-	-	3	3	3	3
Relay output	-	-	1	1	1	1
Transistor outputs	-	-	2	2	2	2

Roger offers also MCT82M-IO-CH and MCT82M-IO-HR terminals which are mainly dedicated to hotel applications and they are covered in separate manuals.

Characteristics

- RACS 5 system access terminals
- 13.56 MHz MIFARE Ultralight/Classic proximity cards
- 3 LED indicators
- Buzzer
- Touch keypad with backlight*
- 2 function keys**
- 3 parametric (EOL) inputs***
- 2 transistor outputs***
- 1 relay output***
- RS485 interface
- Tamper protection
- Screw terminals

* not in –BK versions

** only MCT84M series

*** only –IO versions

Power supply

The terminal requires power supply voltage in range of 11-15VDC. It can be supplied from MCX2D/MCX4D expander of MC16-PAC-KIT, from MC16 access controller (e.g. TML output) or from dedicated power supply unit. The supply wire diameter must be selected in such way that the voltage drop between supply output and the device would be lower than 1V. The proper wire diameter is especially critical when device is located in long distance from the supply source. In such a case the use of dedicated power supply unit located close to the device should be considered. When separate power supply unit is used then its minus should be connected to controller's GND by means of signal wire with any diameter. It is recommended to use UTP cable for connection of device to controller. The table below shows maximal UTP cable lengths in relation to the number of wires used for power supply.

Number of UTP wire pairs for power supply	Maximal length of power supply cable
1	150m
2	300m

3	450m
4	600m

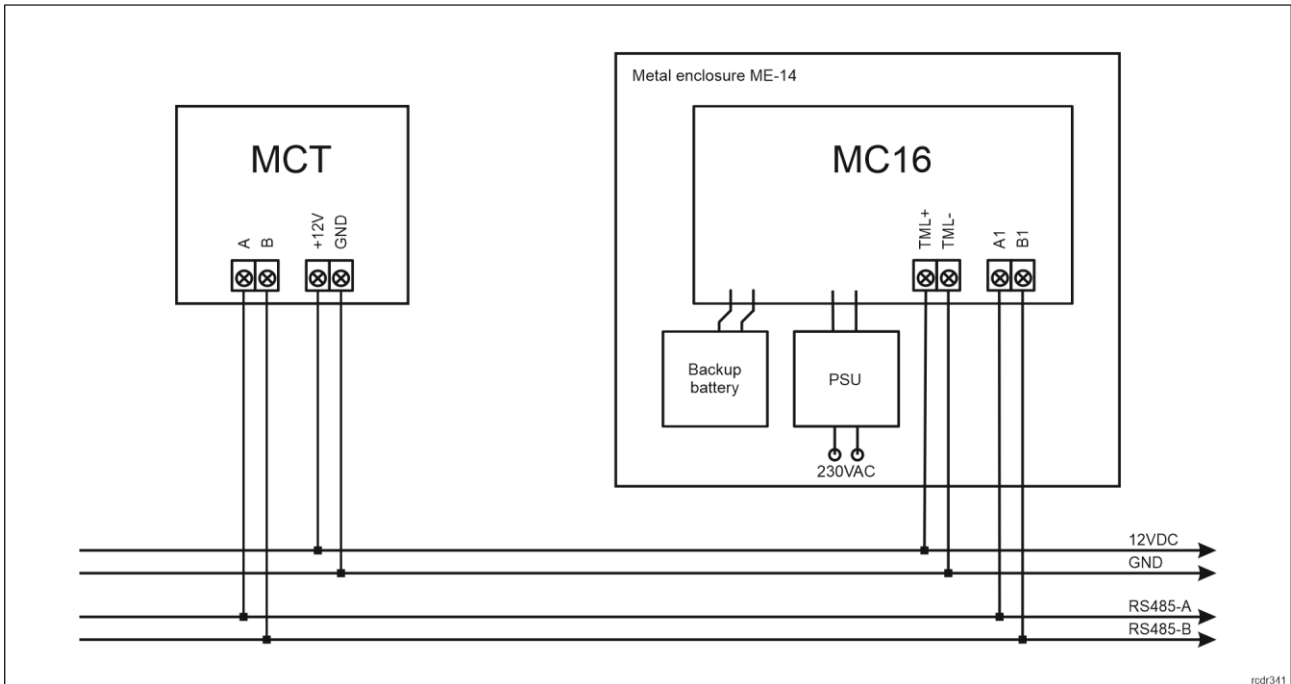


Fig. 1 MCT supply from MC16 access controller

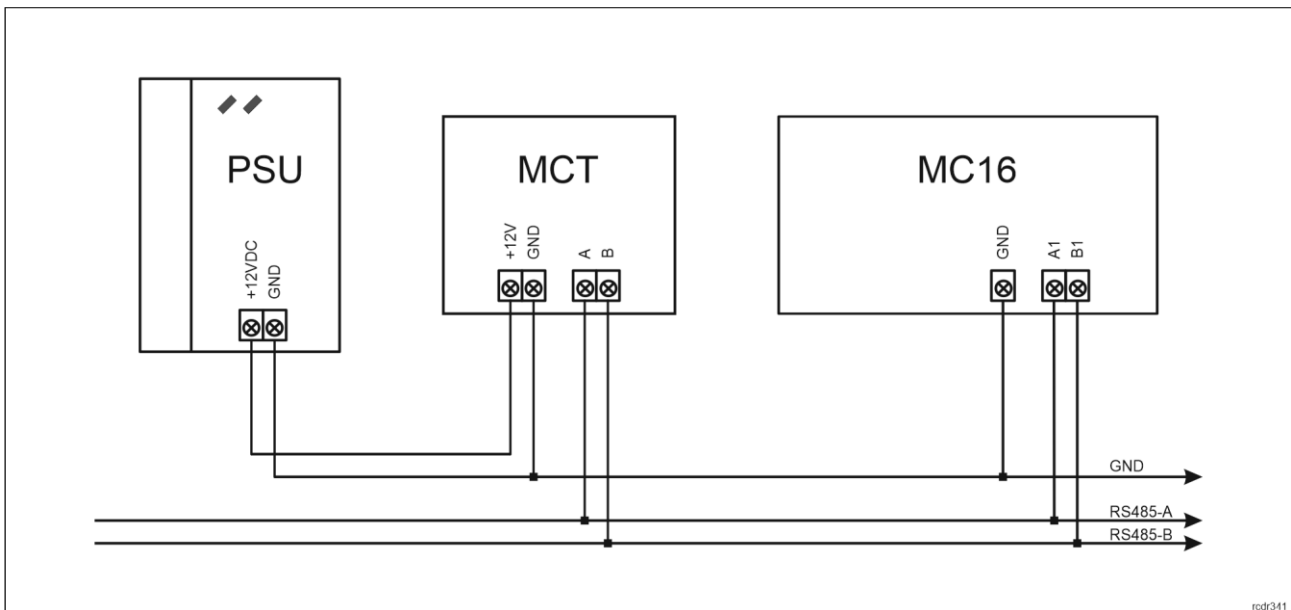


Fig. 2 MCT supply from dedicated power supply unit

RS485 bus

The communication method with MC16 access controller is provided with RS485 bus which can encompass up to 16 devices of RACS 5 system, each with unique address in range of 100-115. The bus topology can be freely arranged as star, tree or any combination of them except for loop. The matching resistors (terminators) connected at the ends of transmitting lines are not required. In most cases communication works with any cable type (standard telephone cable, shielded or unshielded twisted pair etc.) but the recommended cable is unshielded twisted pair (U/UTP cat.5). Shielded cables should be limited to installations subject to strong electromagnetic interferences. The RS485 communication standard used in



the RACS 5 system guarantees proper communication in a distance of up to 1200 meters as well as high resistance to interferences.

Note: Do not use more than single pair in UTP cable for RS485 communication bus.

Keypad

Except for –BK versions, terminals are equipped with numeric keypad and backlight. The keypad can be used for user identification with PIN and for various keypad commands. By default, the key [#] is used for PIN confirming.

Function keys

MCT84M terminal is equipped with two function keys  and . Various functions can be assigned to these keys within high level configuration (VISO) e.g. door bell, Set T&A Mode, Register Guard Tour Event, Set Automation Node On, etc. Within low level configuration (RogerVDM) of the terminal it is possible configure if terminal distinguishes short and long key pressings. Consequently each types of key press can be assigned with different function.

Numeric keypad includes [*] and [#] keys which can be configured as function keys.

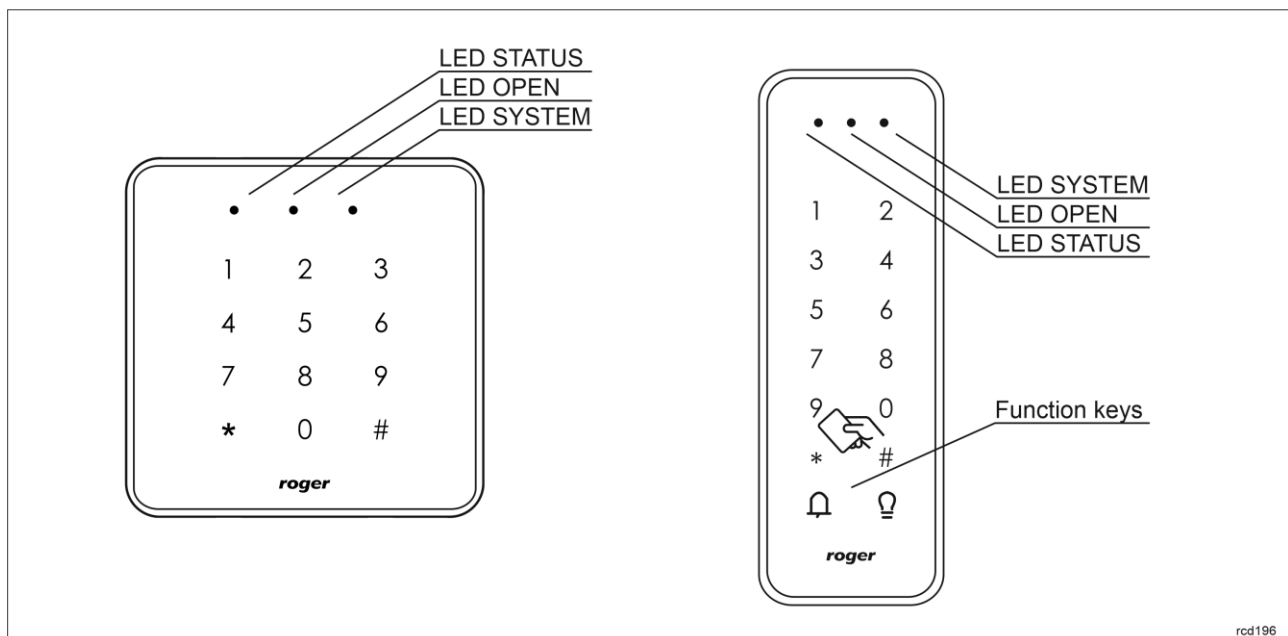


Fig. 3 LED indicators and function keys

LED indicators

Terminals are equipped with three LED indicators which are used to signal integral functions and they can be additionally programmed with other available functions within high level configuration (VISO).

Table 3. LED indicators		
Indicator	Colour	Integral functions
LED STATUS	Red/green	Default colour of the indicator is red. If the terminal is assigned to Alarm Zone then the LED indicates zone arming (red) or disarming (green).
LED OPEN	Green	LED indicates access granting.
LED SYSTEM	Orange	LED indicates card reading and can signal other system functions including device malfunction.

Note: Synchronic pulsing of LED indicators signifies lost communication with MC16 controller.

Buzzer

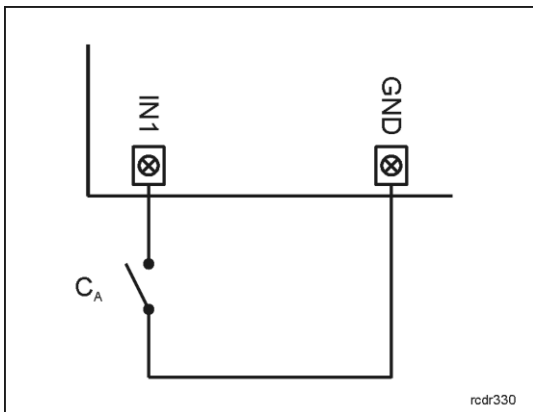
Terminals are equipped with buzzer which is used to signal integral functions and it can be additionally programmed with other available functions within high level configuration (VISO).

Inputs

Terminals in -IO version e.g. MCT82M-IO offer 3 general purpose parametric inputs of NO, NC, 3EOL/DW/NO and 3EOL/DW/NC type and 1 input internally connected to tamper contact. Input types and electric parameters such as response time and parametric resistors are defined within low level configuration (RogerVDM). Input functions are assigned within high level configuration (VISO). Multiple functions can be assigned to the same input at the same time.

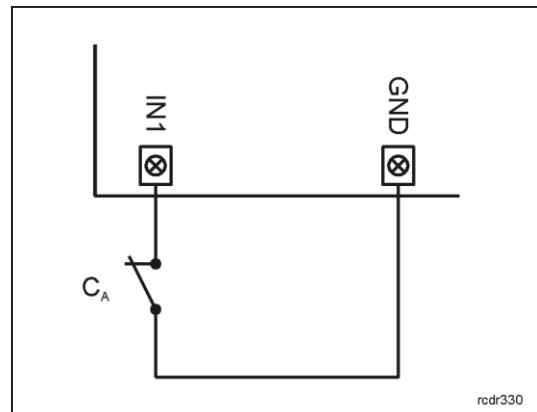
Table 1. Input types

NO input



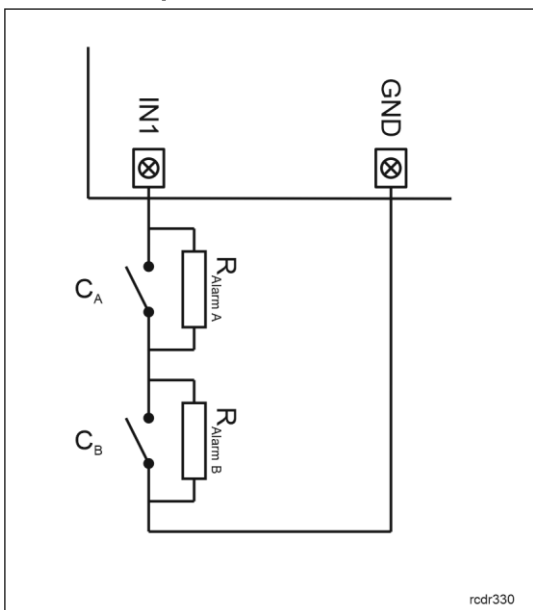
NO input can be in normal or in triggered state. In normal state C_A contacts are opened. Input triggering is caused by C_A contacts closing.

NC input

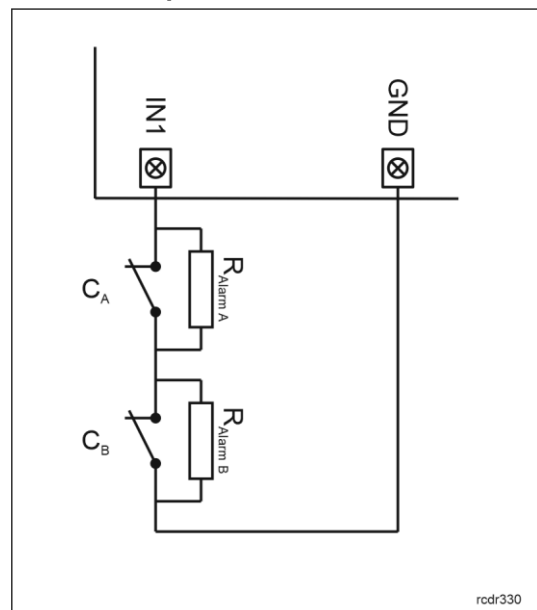


NC input can be in normal or in triggered state. In normal state C_A contacts are closed. Input triggering is caused by C_A contacts opening.

3EOL/DW/NO input



3EOL/DW/NC input



3EOL/DW/NO input is operated in such way that C_A contacts closing is interpreted as triggering of the first input while C_B closing is interpreted as triggering of the second input. In VISO software DW input type is represented by two independent inputs. Each can be used for different purpose and assigned with different function.

3EOL/DW/NC input is operated in such way that C_A contacts opening is interpreted as triggering of the first input while C_B opening is interpreted as triggering of the second input. In VISO software DW input type is represented by two independent inputs. Each can be used for different purpose and assigned with different function.

Parametric resistors

The same values of parametric resistors are used for all inputs i.e. 1k Ω ; 1,2k Ω ; 1,5k Ω ; 1,8k Ω ; 2,2k Ω ; 2,7k Ω ; 3,3k Ω ; 3,9k Ω ; 4,7k Ω ; 5,6k Ω ; 6,8k Ω ; 8,2k Ω ; 10k Ω ; 12k Ω . In case of 3EOL/DW (Double Wiring) input type, Alarm A resistor defines a value of resistor used to detect triggering of the first input while Alarm B resistor defines a value of resistor used to detect triggering of the second input. Alarm A resistor value must differ from value of Alarm B resistor at least by three positions in the list above. Total resistance of wire used to connect contacts to input should not exceed 100 Ω . Default values of parametric resistors:

- Alarm A = 2,2 k Ω
- Alarm B = 5,6 k Ω

Response time

Response time parameter defines minimal impulse time on the input which triggers the input. Each input can be configured individually in range of 50 to 5000 ms within low level configuration (RogerVDM).

Tamper detector

Built-in tamper (sabotage) detector enables detection of unauthorized opening of device's enclosure as well as detachment of the enclosure from wall. The detector is internally connected to the terminal's input. It does not require low level configuration (RogerVDM) or any additional installation arrangements but it is essential to mount front panel in such way as the tamper detector (fig. 4) would firmly press the back panel. The detector requires high level configuration which consists in assignment of the function [133] *Tamper Toggle* on the level of a *Main Board* of a controller in VISO software navigation tree.

Outputs

Terminals in –IO version e.g. MCT82M-IO offer 2 transistor open collector type outputs (15V/150mA rated) and 1 relay output with NO/NC contacts (30V/1.5A DC/AC rated). Electric parameters such as polarity are configured within low level configuration (RogerVDM). Function are assigned to outputs within high level configuration (VISO). Multiple functions with different priorities can be assigned to the same output at the same time.

Identification

Depending on the version, following user identification methods are offered by terminals:

- MIFARE Ultralight/Classic proximity cards
- PINs

MIFARE cards

By default the terminal reads serial numbers (CSN) of MIFARE cards but it is possible to program cards with own numbers (PCN) in selected and encrypted sectors of card memory. The use of PCN prevents card cloning and consequently it significantly increases security in the system. More information on MIFARE card programming is given in AN024 application note which is available at www.roger.pl.

The technical characteristics of the device are guaranteed for RFID cards supplied by Roger. Cards from other sources may be used, but they are not covered by the manufactures warranty. Before deciding to use specific Roger products with third-party contactless cards, it is recommended to conduct tests that will confirm satisfactory operation with the specific Roger device and software in which it operates.

PINs

Except for –BK versions, terminals accept variable length PINs (by default 4-8 digits concluded with [#] key).

2. INSTALLATION

Table 5. Screw terminals	
Name	Description
12V	12VDC power supply
GND	Ground
A	RS485 bus, line A
B	RS485 bus, line B
IN1	IN1 input line
IN2	IN2 input line
IN3	IN3 input line
IO1	IO1 output line
IO2	IO2 output line
NC	REL1 relay normally closed contact
COM	REL1 relay common contact
NO	REL1 relay normally opened contact

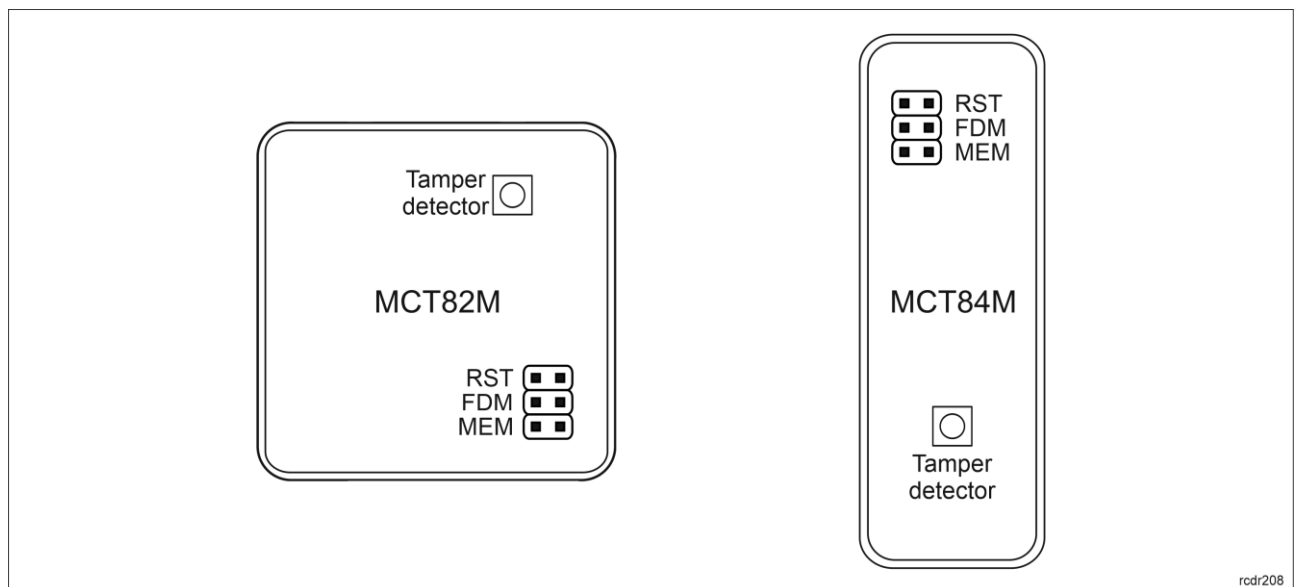


Fig. 4 Programming jumpers

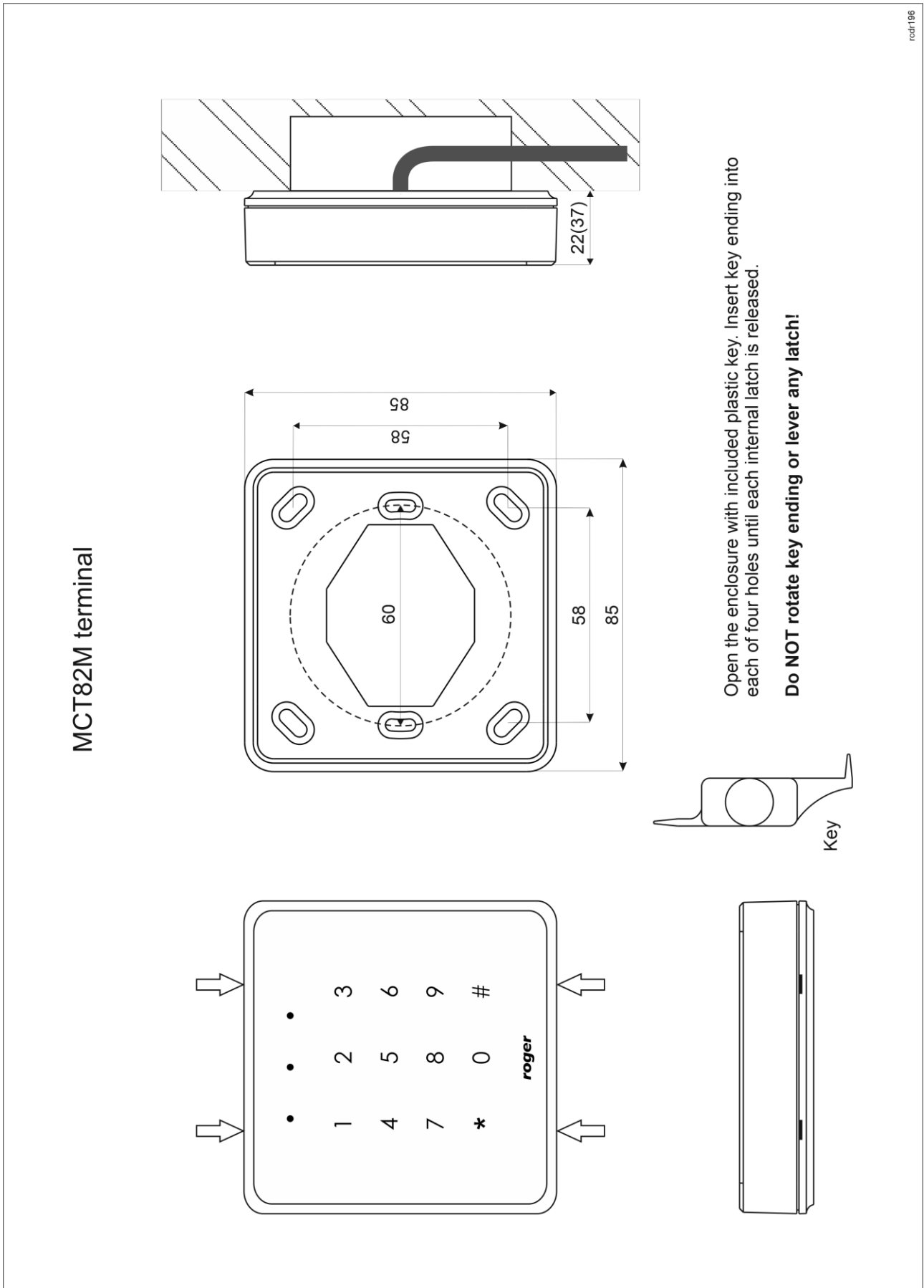
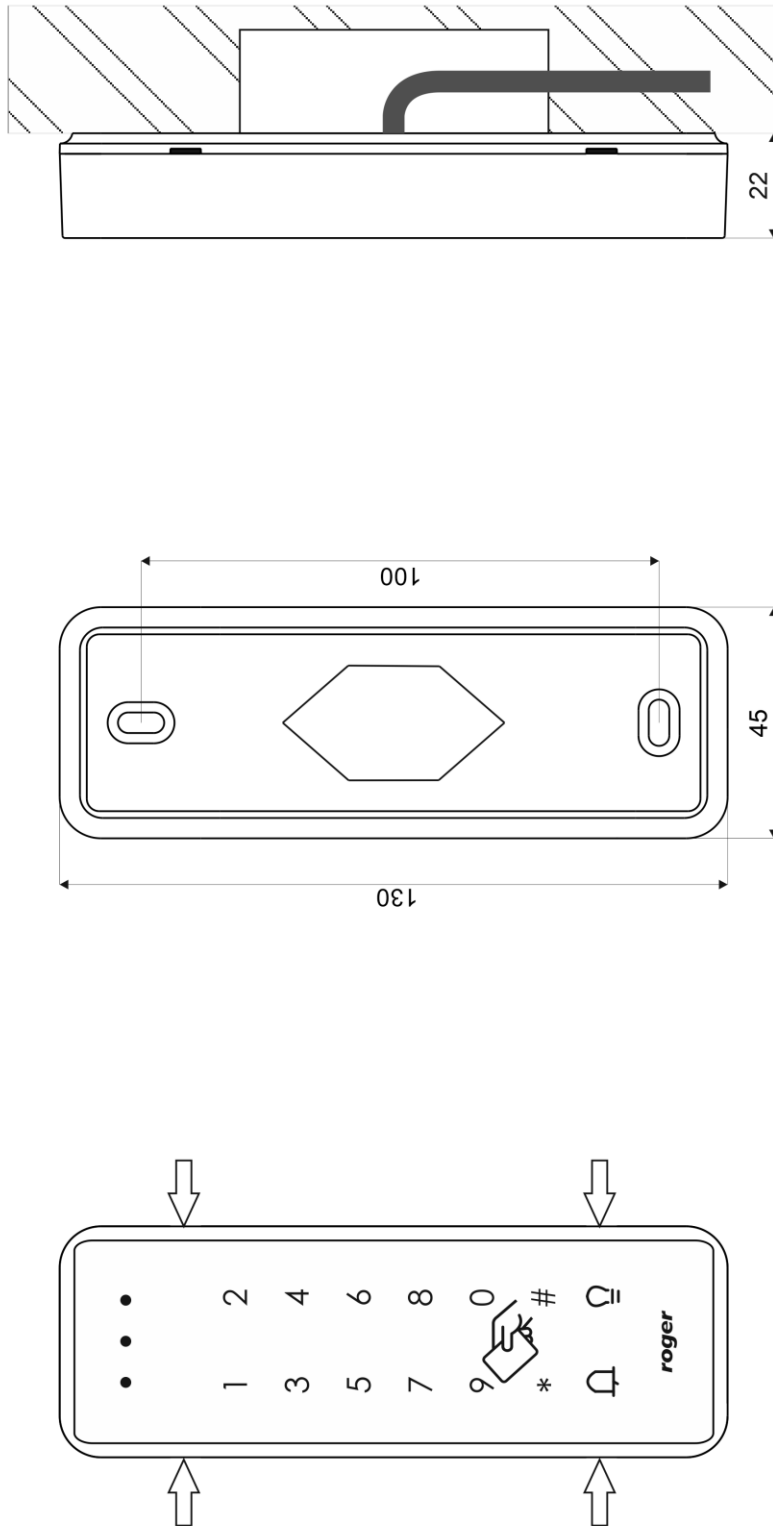


Fig. 5 MCT82M installation

MCT84M terminal



Open the enclosure with included plastic key. Insert key ending into each of four holes until each internal latch is released.

Do NOT rotate key ending or lever any latch!

Fig. 6 MCT84M installation

Note: MCT82M enclosure consists of front panel and back panel. New device is assembled with a standard back panel, but additional free of charge, extended back panel is included. This panel can be used when connection cable has to be hidden and no flush mounting box is available.

Installation guidelines

- The terminal should be mounted on a vertical structure (wall) away from sources of heat and moisture.
- Front panel should be attached in such way as the tamper detector (fig. 4) would firmly press the back panel.
- All electrical connections should be done with disconnected power supply.
- If the terminal and controller are not supplied from the same PSU then GND terminals of both devices must be connected with any wire.
- Clean front panel regularly by means of wet cloth and mild detergent. Do not clean by means of abrasive materials and strong cleaners like alcohols, solvents, etc. Damages to screen surface are beyond the scope of warranty.

3. OPERATION SCENARIOS

The terminal when connected to MC16 access controller can be at the same time used for access control and Time&Attendance. The example of connection diagram for such scenario is shown in fig. 7 where inputs and outputs from MC16 board are used and in fig. 8 where inputs and outputs from –IO version terminal are used. The terminal can also operate with MC16 controller using MCX2D/MCX4D expanders as in case of M16-PAC-KIT series. Various scenarios of operation with MC16 controllers are presented in AN002 application note.

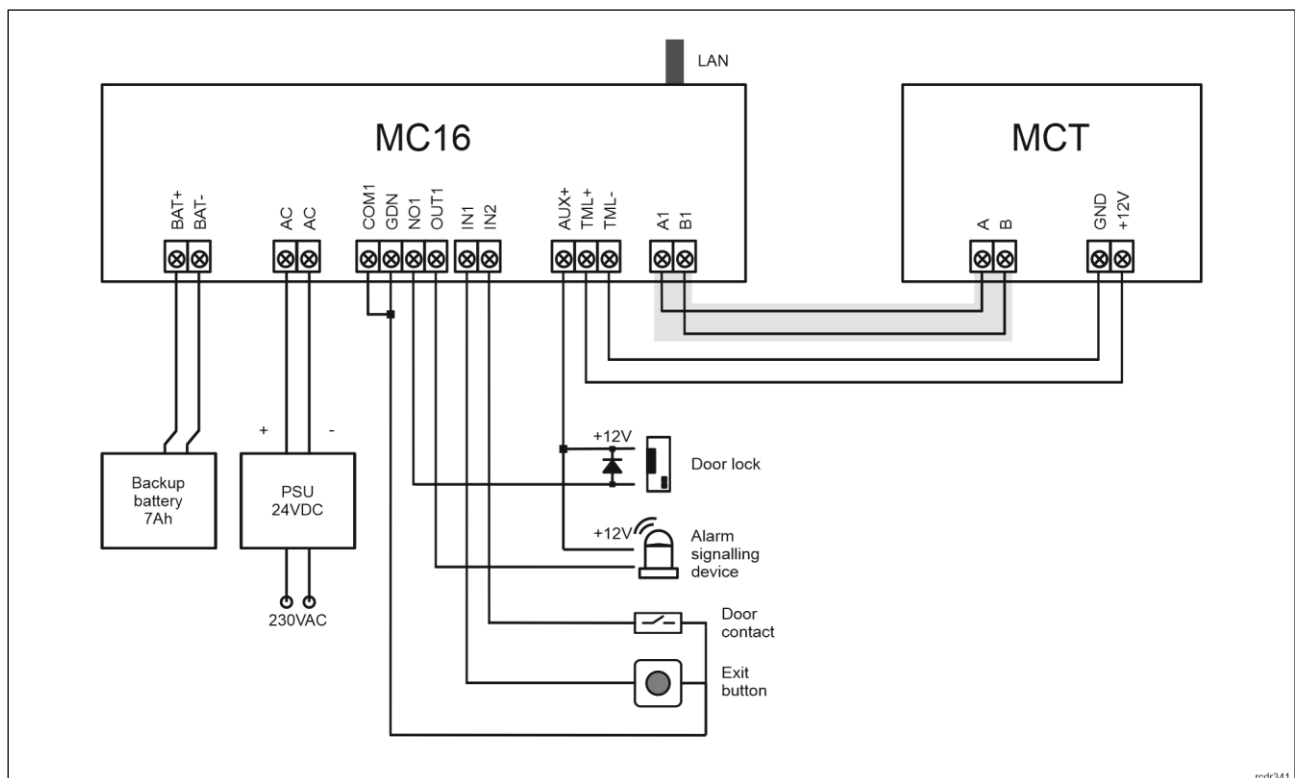


Fig. 7 Typical connection diagram for the terminal and MC16 access controller

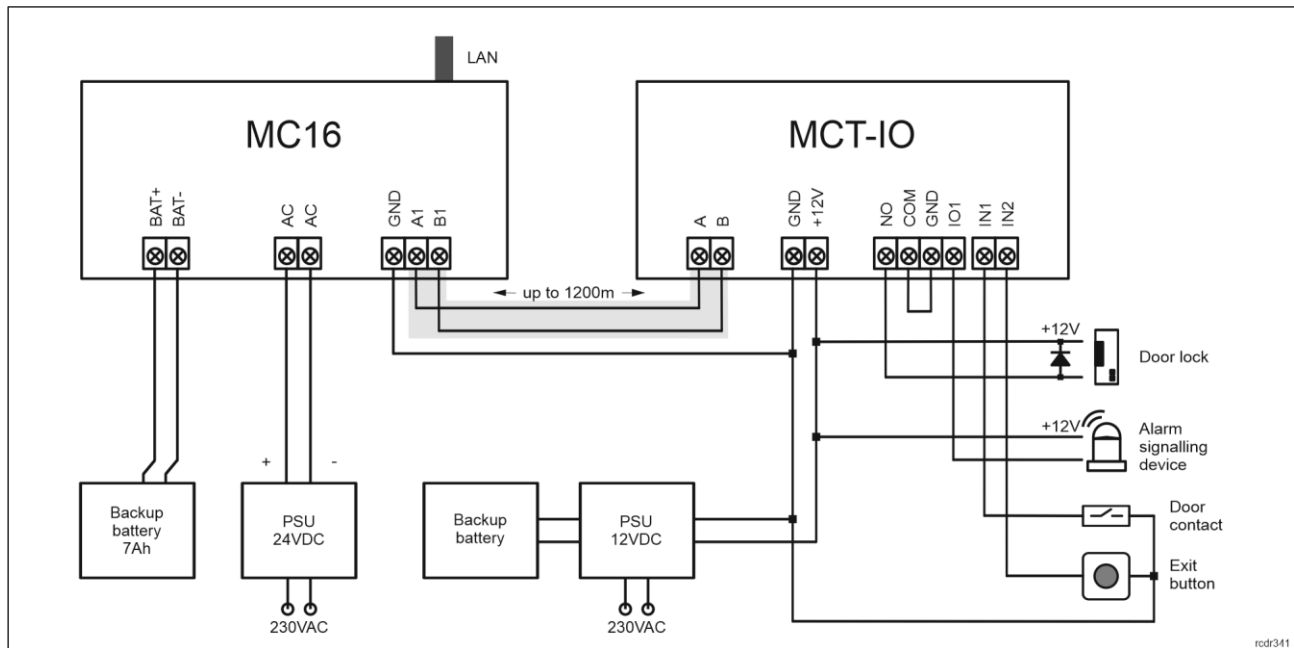


Fig. 8 Typical connection diagram for the -IO version terminal and MC16 access controller

4. CONFIGURATION

Low level configuration (RogerVDM)

The purpose of low level configuration is to prepare device for operation in RACS 5 system.

Programming procedure with RogerVDM software:

1. Connect the reader to RUD-1 interface (fig. 9) and connect the RUD-1 to computer's USB port.
2. Place jumper on MEM contacts (fig. 4).
3. Restart the reader (switch power supply off and on or short RST contacts for a moment) and orange LED SYSTEM will pulsate.
4. Start RogerVDM program, select *MCT* device, firmware version, *RS485* communication channel and serial port with RUD-1 interface.
5. Click *Connect*, the program will establish connection and will automatically display *Configuration* tab.
6. Enter unoccupied RS485 address in range of 100-115 and other settings according to requirements of specific installation.
7. Click *Send to Device* to update the configuration of reader.
8. Optionally make a backup by clicking *Send to File...* and saving settings to file on disk.
9. Remove jumper from MEM contacts and disconnect reader from RUD-1 interface.

Note: Do not read any cards nor press keypad when reader is configured with RogerVDM.

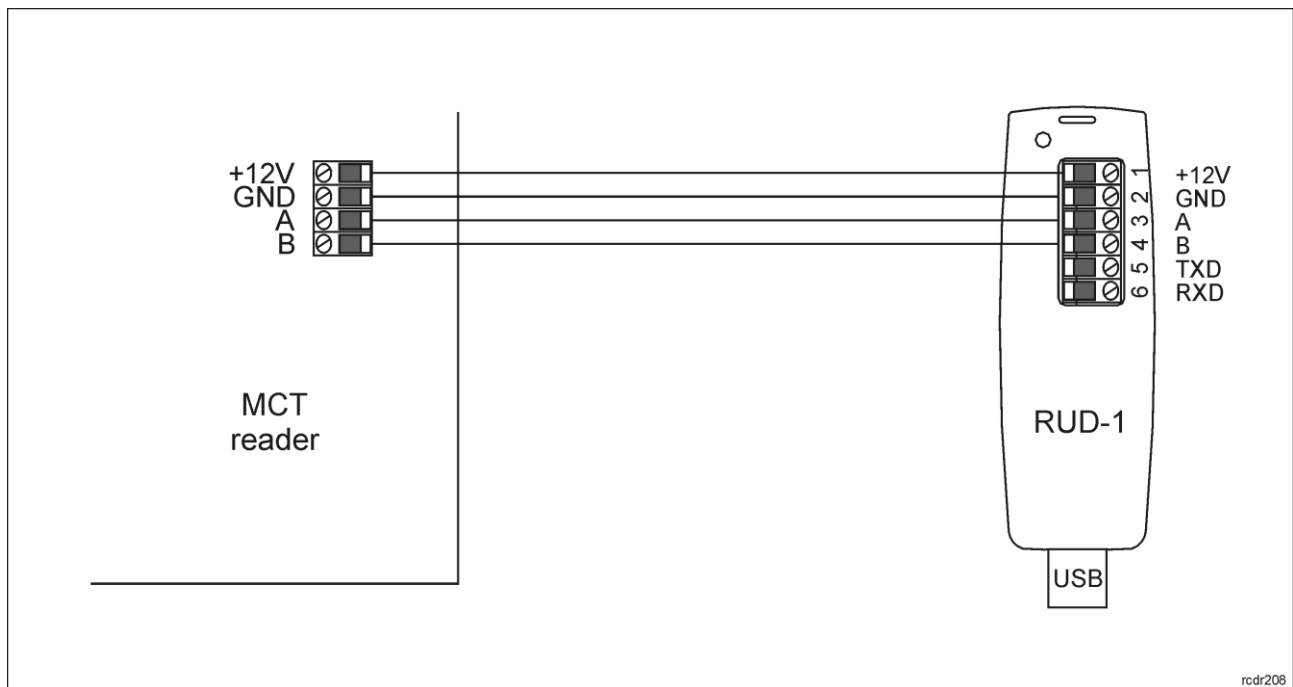


Fig. 9 Connection to RUD-1 interface (low level configuration)

Table 6. List of low level parameters	
Communication settings	
RS485 address	Parameter defines device address on RS485 bus. Range: 100-115. Default value: 100.
RS485 communication timeout [s]	Parameter defines delay after which device will signal lost communication with controller. When set to 0 then signaling is disabled. Range: 0-64s. Default value: 20s.
RS485 encryption	Parameter enables encryption at RS485 bus. Range: [0]: No, [1]: Yes. Default value: [0]: No.
RS485 encryption key	Parameter defines key for encryption of communication at RS485 bus. Range: 4-16 ASCII characters.
Optical signalisation	
LED SYSTEM pulsing when card near reader	Parameter enables LED SYSTEM (orange) pulsing when card is close to the device. Range: [0]: No, [1]: Yes. Default value: [0]: No.
Backlight level [%]	Parameter defines backlight level. When set to 0 then backlight is disabled. Range: 0-100. Default value: 100.
Backlight switching off when no activity	Parameter enables backlight switching off after 20 s from the latest card reading or key pressing. The backlight is restored again when card or key is used. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.
Backlight dimming when card/key used	Parameter enables temporary backlight dimming whenever card is read or key is pressed. Range: [0]: No, [1]: Yes. Default value: [0]: No.
LED SYSTEM flash after card read	Parameter enables short flash of LED SYSTEM (orange) when card is read. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.
LED SYSTEM flash after key press	Parameter enables short flash of LED SYSTEM (orange) when key is pressed. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.
Acoustic signalisation	
Buzzer loudness level [%]	Parameter defines buzzer loudness level. When set to 0 then buzzer is

	disabled Range: 0-100. Default value: 100.
Short sound after card read	Parameter enables short sound (beep) generating by buzzer when card is read. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.
Short sound after key press	Parameter enables short sound (beep) generating by buzzer when key is pressed. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.
Keypad settings	
Keypad activated	Parameter enables deactivation of keypad. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.
Time between keys in PIN [s]	Parameter defines max. time between two consecutive key pressings. Range: 0-64. Default value: 10.
Single key press	Parameter enables separate transmission of each pressed key to controller. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.
PIN followed by [#] key	Parameter enables use of PINs with variable length. In such scenario PIN is concluded with [#] key. Range: [0]: No, [1]: Yes. Default value: [1]: Yes.
Min. length of PIN	Parameter defines the minimal number of digits for PIN entered with keypad. If the number of entered digits is lower than this parameter then it cannot be sent to controller when concluded with [#] key. When set to 0 then PINs are disabled. Range: 4-8. Default value: 4.
Max. length of PIN	Parameter defines the maximal number of digits for PIN entered with keypad. If the number of entered digits reaches this parameter then PIN is automatically sent to controller and [#] key pressing is not necessary. When set to 0 then automatic PIN transmission is disabled. Range: 0-8. Default value: 8.
[*] key press allowed before PIN	The parameter enables use of [*] key before PIN is entered. The key can be used for additional functionalities. Range: [0]: No, [1]: Yes. Default value: [0]: No.
[*], [#], [F1], [F2] key press options	Parameter defines key press type for [*], [#], [F1], [F2] keys. Range: [1]: Short press only, [2]: Long press only, [3]: Short and long press. Default value: [1]: Short press only.
Advanced settings	
Stop card/PIN reading when buffer full	Parameter enables to reject card/PIN reading by device till previous card/PIN is transmitted to controller. Range: [0]: No, [1]: Yes. Default value: [0]: No.
Card/PIN buffer timeout [s]	Parameter defines time for card/PIN storing in device buffer. When the time elapses the buffer is cleared even if card/PIN is not transmitted to controller. Range: 1-64. Default value: 10.
Buffer overflow signalisation	Parameter enables LED SYSTEM (orange) switching on when card/PIN buffer is full. Range: [0]: No, [1]: Yes. Default value: [0]: No.
Card/PIN encryption	Parameter enables encryption of card number and PIN when transmitted by RS485.
AF type	Parameter defines authentication factor type returned by terminal. Default value: [0010]: Number 40bits.
Long card read time [s]	Parameter defines long card read time. When set to 0 then long read is disabled. Range: 0-64. Default value: 0.
Long key press time [s]	Parameter defines long press time for such key types as [*], [#] and [F1] - [F4]. When set to 0 then long press is disabled. Range: 0-64. Default value: 2.
Input types	

IN1, IN2, IN3	Parameter defines input type. Range: [1]: NO, [2]: NC, [3]: EOL/NO, [4]: EOL/NC, [5]: 2EOL/NO, [6]: 2EOL/NC, [7]: 3EOL/NO, [8]: 3EOL/NC, [9]: 3EOL/DW/NO, [10]: 3EOL/DW/NC. Default value: [1]: NO.
Input response times	
IN1, IN2, IN3 [ms]	Parameter defines minimal duration of pulse which is required to trigger the input. Range: 50-5000. Default value: 50.
Parametric (EOL) input resistances	
Tamper, Alarm A, Alarm B [Ohm]	Parameter defines resistor for parametric (EOL) inputs.
Output polarity	
OUT1, OUT2, REL1	Parameter defines polarity of output. Normal polarity means that the output by default is switched off while Reversed polarity means that the output by default is switched on. Range: [0]: Normal polarity, [1]: Reversed polarity. Default value: [0]: Normal polarity.
Comments	
DEV, KBD1, CDI1, IN1, IN2, IN3, IN4 (Tamper), OUT1, OUT2, REL1,	Parameter defines any text or comment which corresponds to the device/object. It is later displayed in VISO program.
Serial card number (CSN) settings	
Serial number length (CSNL) [B]	Parameter defines the number of bytes from serial card number (CSN) which will be used to generate returned card number (RCN). RCN is the actual card number read by reader and it is created as sum of serial card number (CSN) and programmable card number (PCN).
Programmable card number (PCN) settings for Mifare Classic	
Sector type	Parameter defines sector type with programmable number (PCN). If the option [0]:None is selected then card returned number (RCN) will include only CSN and PCN will be discarded. Range: [0]: None, [1]: SSN, [2]: MAD. Default value: [0]: None.
Format	Parameter defines format of PCN. Range: [0]: BIN, [1]: ASCII HEX. Default value: [0]: BIN.
First byte position (FBP)	Parameter defines the position of the first byte for PCN in data block on card. Range: 0-15. Default value: 0.
Last byte position (LBP)	Parameter defines the position of the last byte for PCN in data block on card. Range: 0-15. Default value: 7.
Sector ID	Parameter defines sector number where PCN is stored. Range: 0-39. Default value: 1.
Application ID (AID)	Parameter defines application ID number (AID) which indicates sector where PCN number is stored. Range: 0-9999. Default value: 5156.
Block ID	Parameter defines block number where PCN is stored. Range: 0-2 to for sectors 0-31 and 0-14 for sectors 32-39. Default value: 0.
Key type	Parameter defines key type used to access sector with PCN. Range: [0]: A, [1]: B, [2]: Roger. Default value: [0]: A.
Key	Parameter defines 6 bytes (12 HEX digits) key for accessing sector where PCN is stored.

Note: Table 6 includes summary of parameters for all versions of MCT82M and MCT84M terminals. For instance keypad settings are not available for –BK version of terminals i.e. terminals without keypad.

Manual addressing

Manual addressing procedure enables configuration of new RS485 address with all other settings unchanged.

Manual addressing procedure:

1. Remove all connections from A and B lines.
2. Place jumper on MEM contacts (fig. 4).
3. Restart the device (switch power supply off and on or short RST contacts for a moment) and orange LED SYSTEM will pulsate.
4. Enter 3 digits of RS485 address in range of 100-115 with reader keypad or with any MIFARE card.
5. Remove jumper from MEM contacts and restart the reader.

Terminals without keypad can be addressed with multiple card readings where the N number of readings emulates digit of the address. Three series of readings with any MIFARE proximity card are necessary to set the address. After each series wait for two beeps and proceed with the next digit. Zero digit is emulated with 10 readings.

Example:

Programming of ID=101 address with card readings:

1. Read card 1 time and wait for two beeps.
2. Read card 10 times and wait for two beeps.
3. Read card 1 time and wait for two beeps.

Memory reset procedure

Memory reset procedure resets all settings to factory default ones including ID=100 address.

Memory reset procedure:

1. Remove all connections from A and B lines.
2. Place jumper on MEM contacts (fig. 4).
3. Restart the reader (switch power supply off and on or short RST contacts for a moment) and orange LED SYSTEM will pulsate.
4. Press [*] or read any MIFARE card 11 times.
5. Wait till reader confirms reset with long acoustic signal.
6. Remove jumper from MEM contacts and restart the reader.

High level configuration (VISO)

The purpose of high level configuration is to define logical functioning of the terminal which communicates with the MC16 access controller and it depends on applied scenario of operation. The example of access control system configuration is given in AN006 application note which is available at www.roger.pl.

5. FIRMWARE UPDATE

The update requires connection of device to computer with RUD-1 interface (fig. 10) and starting RogerVDM software. The latest firmware file is available at www.roger.pl.

Firmware update procedure:

1. Connect the reader to RUD-1 interface (fig. 10) and connect the RUD-1 to computer's USB port.
2. Place jumper on FDM contacts (fig. 4).
3. Restart the reader (switch power supply off and on or short RST contacts for a moment).
4. Start RogerVDM program and in the top menu select *Tools* and then *Update firmware*.
5. In the opened window select device type, serial port with RUD-1 interface and path to firmware file (*.hex).
6. Click *Update* to start firmware upload with progress bar in the bottom.
7. When the update is finished, remove jumper from FDM contacts and restart the reader.

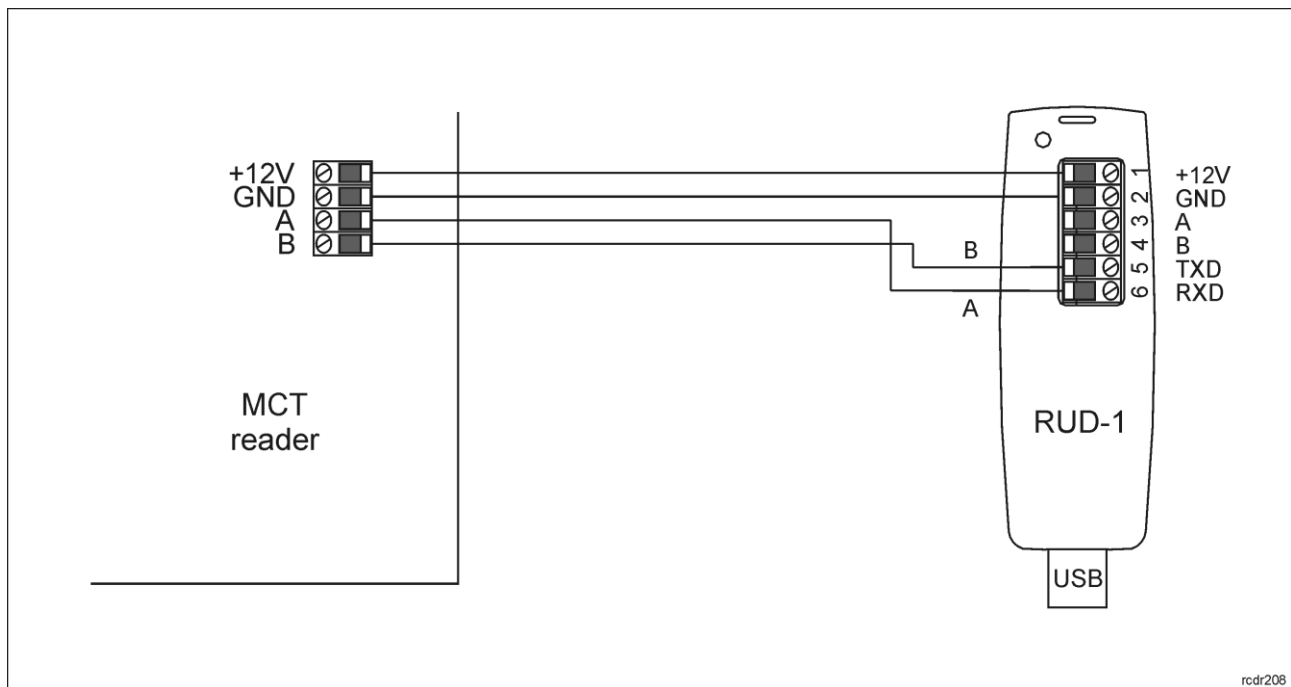


Fig. 10 Connection to RUD-1 interface (firmware update).

6. SPECIFICATION

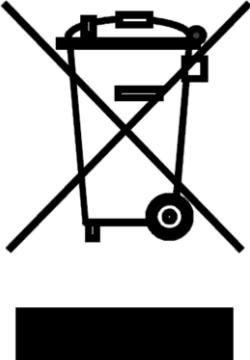
Table 7. Specification	
Supply voltage	Nominal 12VDC, min./max. range 10-15VDC
Current consumption (average)	MCT82M/MCT82M-IO: ~60 mA MCT82M-BK/MCT82M-BK-IO: ~45 mA MCT84M: ~65 mA MCT84M-BK: ~50 mA
Inputs	Three parametric inputs (IN1..IN3) internally connected to the power supply plus through a 5.6kΩ resistor. Approx. 3.5V triggering level for NO and NC inputs.
Relay output	Relay output (REL1) with single NO/NC contact, 30V/1.5A DC/AC max. load
Transistor outputs	Two (IO1, IO2) open collector outputs, 15VDC/150mA max. load
Tamper protection	Enclosure opening reported to access controller
Proximity cards	13.56MHz MIFARE Ultralight, Classic
Reading range	Up to 7 cm
Distance	1200m maximal cable length for RS485 bus between controller and reader
IP Code	IP41
Environmental class (according to EN 50133-1)	Class II, indoor general conditions, temperature: -10°C to +50°C, relative humidity: 10 to 95% (no condensation)
Dimensions H x W x D	MCT82M series: 85 x 85 x 22(37) mm MCT84M series: 130 x 45 x 22 mm
Weight	MCT82M series: ~100g MCT84M series: ~100g
Certificates	CE

7. ORDERING INFORMATION

MCT82M-BK	MIFARE Classic access terminal
MCT82M-BK-IO	MIFARE Classic access terminal; on-board I/Os
MCT82M	MIFARE Classic access terminal with keypad
MCT82M-IO	MIFARE Classic access terminal with keypad; on-board I/Os
MCT84M-BK	MIFARE Classic access terminal
MCT84M	MIFARE Classic access terminal with keypad
RUD-1	Portable USB-RS485 communication interface dedicated to ROGER access control devices

8. PRODUCT HISTORY

Version	Date	Description
MCT82M v1.0	03/2015	The first commercial version of product
MCT84M v1.0	03/2015	The first commercial version of product

	<p>This symbol placed on a product or packaging indicates that the product should not be disposed of with other wastes as this may have a negative impact on the environment and health. The user is obliged to deliver equipment to the designated collection points of electric and electronic waste. For detailed information on recycling, contact your local authorities, waste disposal company or point of purchase. Separate collection and recycling of this type of waste contributes to the protection of the natural resources and is safe to health and the environment. Weight of the equipment is specified in the document.</p>
---	---

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: biuro@roger.pl
Web: www.roger.pl