Matrix II NET network (RS-485) controller
with built-in EM-Marine reader and 2024 keys memory
User Manual

OVERVIEW
Matrix II NET is a combo reader/network controller device, intended for use in Access and Control Systems (ACS) in residential and business locations, logging of entry/exit times and events.
The device can work in standalone mode, or as a part of network.
In standalone mode, Matrix II NET model is equivalent to Matrix II K.
The controller is connected to network with a RS-485 twisted pair cable.
It works with EM-Marine Proximity cards and DS1990A key fobs.
The following equipment can be attached:
- Contactless Proximity card reader simulating iButton (Dallas Touch Memory) key protocol. (Matrix II reader recommended)
- Electromagnetic lock (maglock)
- Electromechanical lock or latch;
- Door release button (normally-open);
- External buzzer, external LED;
- Door sensor (normally-open type);

Matrix II NET works with GUARD Commander and Base Z5R software, available free of charge from our web site at **http://www.ironlogic.me .**

SPECIFICATIONS :
- Lock type selection jumper (electromagnetic/electromechanical):......................Present
- Operation/programming modes indication: ....Audial and visual
- Lock opening time range: ....0.1 … 25.5 s. (factory pre-set at 3.0 s)
- Output: ....ISFET (Insulated Gate Field Effect Transistor)
- Supply voltage: ....12V DC
- Standby mode current: 30mA
Switching current: ....up to 5A

Standalone mode (no network connection) specifications.
Maximum keys number: 2024
- Normal cards for standard access
- Blocking cards for standard access and Blocking Mode activation.
- Master cards exclusively for entering Programming Mode and Blocking Mode deactivation.
Additional operational modes:
- Blocking Mode access granted for Blocking cards only, denied for Normal cards;
- All-Pass Mode no access control in operation, the lock stays open;
- Accept Mode access granted for all cards and any new cards automatically stored into memory. Activated by a Master card.
- Trigger Mode to toggle a managed device (with supply voltage up to 12V and consumption current up to 5A).

Network mode specifications.
- Max. keys number: 2024
- Event log memory: 2048
- Max. controllers number in the network: 255
- RS-485 baud rate: 19200/57600 baud (auto-negotiated)

If a door sensor is connected, "Door Forced" and "Door Held" events become available.

The control software treats a built-in reader within Matrix II NET as configured for exit, and an external Matrix II reader as configured for entry.
Initially, control software detects Matrix II NET as a controller with an iButton (Dallas Touch Memory) connected reader.
To switch the reader into Card mode, please short-circuit LED and GND terminals in Connector 1 with a jumper. In this mode, the software detects Matrix II NET as a controller with a Wiegand-26 connected reader.
Please power the system off before installing and removing the jumper.
If some cards were already stored, after the jumper installation they will no longer be recognised, as Wiegand-26 and TM card code storage formats in memory are different.
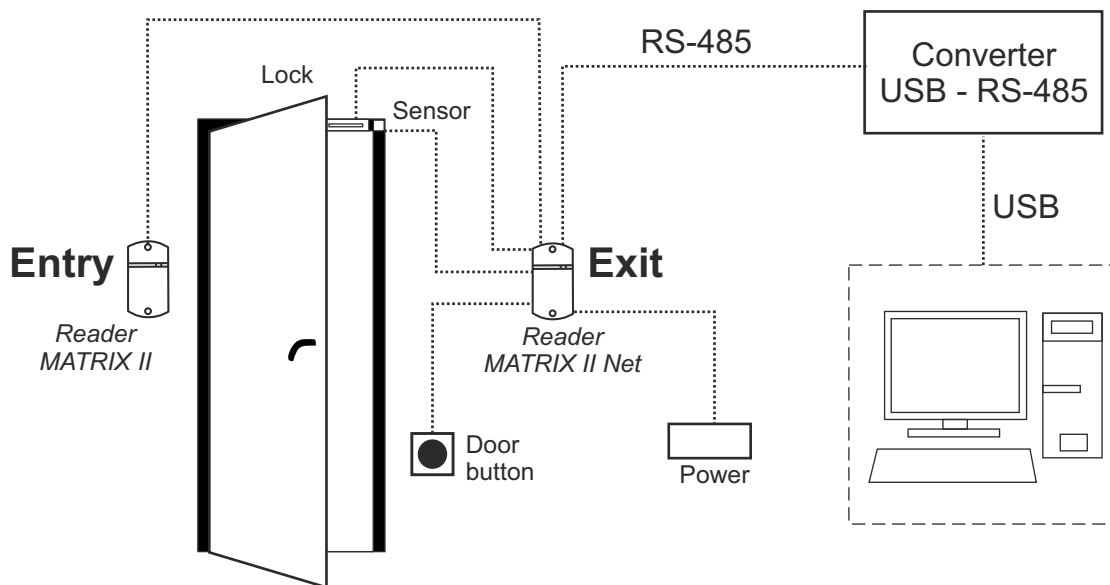

Fig.1 *MATRIX II Net connection .*

2. PROGRAMMING Matrix II NET

2.1 Standalone mode (no network connection) programming.
Initial power-up (no cards in base).
For 16 s the device emits short beeps. This indicates that the memory has been erased and Add Master Card programming mode is active.
While the device is beeping, touch the reader with a card to store it as a Master card. The beeping will stop, acknowledging that the first Master card has been successfully added.

To add more Master cards, keep touching the reader with them, leaving less than 16 s between two successive cards. The reader acknowledges each new card with a short beep.
The Master card programming mode will end automatically when 16 s have elapsed after the last card touch. The end of programming is acknowledged with a series of short beeps.

During further operation, use Master cards for programming. If no Master cards were yet programmed, please repeat this initial power-up sequence.
The Master card programming mode is only entered on power-up if the card database is empty (no Normal, no Master and no Blocking cards).

Table 1. Programming Modes

Mode	Starting sequence	Legend
Programming with Master cards		1...5 - number of touches.
1. Add Normal cards	1 M	
2. Add Blocking cards	1 M	
3. Add Master cards	1 m, 1 M	Card types:
4. Erase single card	2 m, 1 M	M - Master
5. Erase all memory (all cards erased)	3 m, 1 M	B - Blocking
6. Door release time	4 m	N - Normal
7. Blocking Mode	1 B	
8. Accept Mode	5 m	lowercase letter - short touch (less than 1 s)
Programming with Jumpers		
1. Using electromechanical lock	Position 1	
2. Erase all memory	Position 2	UPPERCASE letter - long touch (about 6 s) and yellow LED
3. Add Normal cards without using Master card	Position 3	
4. Normal no effect on system operation.	Position 4	
5. Trigger Mode	Position 5	

PROGRAMMING OVERVIEW

To switch the controller into desired mode, use long (about 6 s) and short (< 1 s) Master card touches.
When ~16 s elapse with no further Master card touches, the programming mode ends and the device switches into normal mode, acknowledged with a series of short beeps.

1. Add Normal Cards Mode (1M)

Please touch and hold a Master card to the Reader for 6 s (Long touch).
The device will beep shortly acknowledging the Master card, and in 6 s will beep again signalling Add Normal Cards mode activation. Take the Master card away from the Reader.

To add Normal cards, keep touching the reader by them one by one, leaving the interval between touches less than 16 s; each new card is acknowledged with a short beep. If a card is already present in the database, two short beeps will follow.

After 16 s since last card touch, or on a Master card touch, this mode is deactivated; a series of short beeps will acknowledge this.

2. Add Blocking Cards Mode (1M)

In Add Normal Cards mode, touch and hold the reader with a card for 9 s. You will first hear a short beep after 6 s have elapsed, then a long beep at 9 s mark. This acknowledges that a card was added as Blocking. If you will not add more cards, the series of short beeps will acknowledge the end of programming mode.

3. Add Master Cards Mode (1m, 1M)

Please shortly touch the Reader with a Master card, for no longer than 1 s ("Short touch"). A short beep will acknowledge the Master card.

After that within 6 s, touch and hold the reader with a Master card ("Long" touch).

The device will emit two short beeps, indicating a second Master card touch and Programming, and after 6 s one more beep to acknowledge the Add Master Cards mode.

Remove the Master card now.

To add Master cards, please keep touching the reader with cards with less than 16 s interval. Each card touch is acknowledged by a short beep. If a card is already present in memory as a Master card, no beeps will sound.

In 16 s after the last card touch, the controller will exit this mode and acknowledge this with five short beeps.

4. Erase Single Card Mode (2m, 1M)

Twice quickly touch the reader with a Master card. ("Double short touch"). On first touch, it will emit a short beep acknowledging the Master card. On second touch, the reader emits a double short beep, to acknowledge entering the programming mode. Within 6 s, touch and hold the reader with the Master card. ("Long touch"). On third touch, the reader emits a triple short beep, and in 6 s, one more beep acknowledging Erase Single Card mode.

Remove the Master card now.

Start touching the reader with the cards to erase, leaving no longer than 16 s between touches.

The reader will acknowledge each erased card with a short beep, if the card was found in memory, or two short beeps if the card was not found.

The device will leave this mode when either 16 s have elapsed after the last card touch, or when touched with a Master card. A series of short beeps will acknowledge the device has left this mode.

5. Erase All Memory (3m, 1M)

Three times quickly touch the reader with a Master card. ("Triple short touch"). On first touch, it will emit a short beep acknowledging the Master card. On second touch, the device emits a double short beep, to acknowledge programming mode. On third touch, the device will acknowledge it with a triple short beep. Within 6 s, touch and hold the reader with the Master card ("Long touch"). On fourth touch, the reader emits four short beeps, and in 6 s, one further series of beeps acknowledging the entire database erasure from memory and the end of programming mode.

Remove the Master card now.

On the next device power-up, it will automatically enter the programming mode (because the key database is now empty).

Note: When erasing all keys database in this mode, the existing door opening time setting persists.

6. Door Release Time Set Mode (4m)

Four times quickly touch the reader with a Master card. On each touch, the device acknowledges the Master card with a number of beeps equal to this touch number. On fourth touch (and four short beeps), the device will activate Door Opening Time Set mode. Within 6 s since the last (fourth) touch, press the door release button for as long as required to open the door. After the button is released, the controller emits a beep and stores the time button was pressed as the new door opening time.

Note: If no door release button is installed, short-circuit terminals 3 and 4 on the Socket 1.

7. Blocking Mode (1B)

In Blocking Mode, access is granted for Blocking cards but denied for Normal cards.

To activate Blocking mode, the door must be closed. Use a Blocking card (see paragraph 2 on how to add one).

Blocking cards are used:

- As Normal cards during reader normal operation mode (when all Normal and Blocking cards stored in the database are granted access).
- To activate the Blocking mode (access only granted to Blocking cards)
- To revert the reader into normal mode from Blocking mode.

A Blocking card opens the door when being taken away from the reader.

To activate the Blocking mode, close the door, then hold the Blocking card at the reader for ~3 s until a long continuous beep starts sounding, acknowledging Blocking mode.

In this mode, Normal cards are blocked. If access is attempted with a Normal card in this mode, door is not open, and a series of short beeps is emitted.

To exit from the Blocking mode to normal operation mode, either hold a Blocking card until a series of short beeps will sound, or touch the reader shortly with a Master card.

Note: If the reader power fails while in Blocking mode when power is back, Blocking mode remains.

8. All-Pass Mode (1B)

A door sensor must be connected to use this mode. In All Pass mode, no access control happens and the lock is always open.

To activate All-Pass mode, open the door and hold a Blocking card at the reader for ~3 s until All-Pass mode is acknowledged by two long beeps.

To deactivate All-Pass Mode, hold a Blocking card at the reader until beeps start sounding.

Note 1: In this mode, electromechanical lock must tolerate long-term power application.
Note 2: This mode is incompatible with Trigger mode.

9. Accept Mode (5m)

Accept mode stores all the EM-Marine cards touching the device into its memory. In this mode, any card touching the reader opens the door, and also gets stored into the database.

The mode is used to restore the user card database without requiring users to muster their cards.

To activate Accept mode, a Master card is required.

Five times quickly touch the reader with a Master card. On each touch, the device acknowledges the Master card with the number of beeps equal to the touch number. On fifth touch (and five short beeps), in a few seconds the device will emit one more long beep acknowledging the Accept mode. To leave the Accept mode, just quickly touch the reader with a Master card. A series of short beeps sounds, acknowledging the exit.

Note: If the controller power fails while in Accept mode when power is back, Accept mode remains.

Jumper Positions on Connector 1

The controller is equipped with one jumper that is used for programming and setting up the electromechanical lock. The jumper has 4 positions.
Position 1 chooses the lock operating logic.
- No jumper electromagnetic lock (closed when voltage supplied)
- Jumper in electromechanical lock (closed when voltage not supplied).
Position 2 CLR - to erase entire controller memory. Power off the controller, install the jumper here and power back on. When memory erase is complete, a series of short beeps sounds.
Note: All cards are erased from the database, AND door release time is reset to factory value (3.0 s)
Position 3 ADD - to add non-Master cards without a Master card. Power off the controller, install the jumper and power back on. After a beep sounds, the controller is in Add Normal Cards mode, and now both Normal and Blocking cards can be added without a Master card.
Position 4 - normal position does not affect the controller operation.
Positon 5 - Trigger Mode.
A controlled device (e.g. a lock) is connected to the Matrix II NET, with supply voltage up to 12 V and consumption current up to 5A.
To activate Trigger mode, power off the controller, install the jumper and power back on.
In this mode, the controller can be either on (lock has power) or off (lock has no power). To switch between these positions, please use a Normal or Blocking Card present in controller database, or use a button. Signals issued on transition:
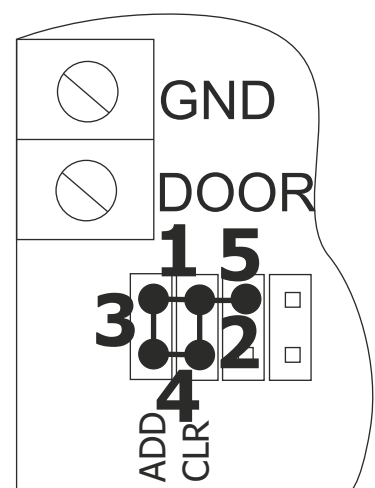- From OFF to ON position, one LONG beep,
- From ON to OFF position, one SHORT beep.
The controlled device (lock) is connected to LOCK and +12V terminals.
If the controller power fails, its position is saved.

Note 1: In this mode, an electromechanical lock must tolerate long-term power application.
Note 2: This mode is incompatible with All-Pass mode

2.2 Network operation (RS-485)

Matrix II NET can be networked via RS-485 interface so they are managed from a computer. Special software allows for programming and managementas well as events log download. However, the access decision is always taken by Matrix II NET itself, regardless of whether it's connected to a PC or not.

Matrix II NET devices are connected via RS-485 sequentially, one after another.
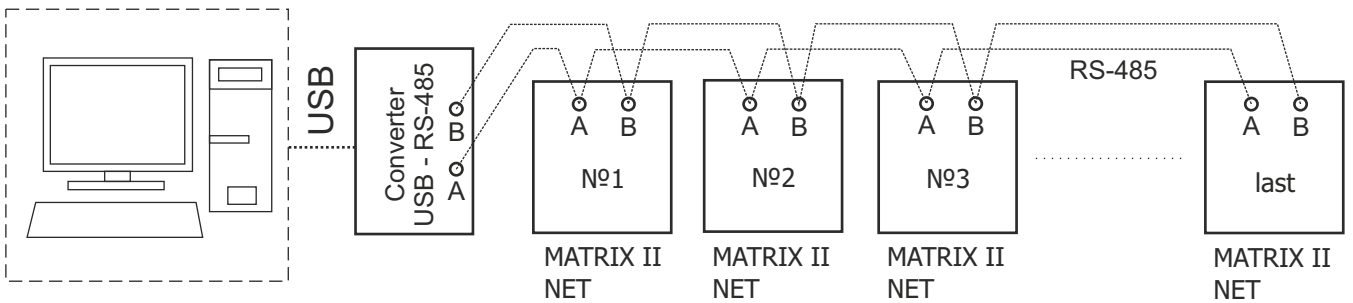
This figure shows a diagram for connecting controllers to PC. The "Last" Matrix II NET means that it is physically the last in the connection line.

The last controller must have a jumper on pin bank 2 (marked "LOAD").
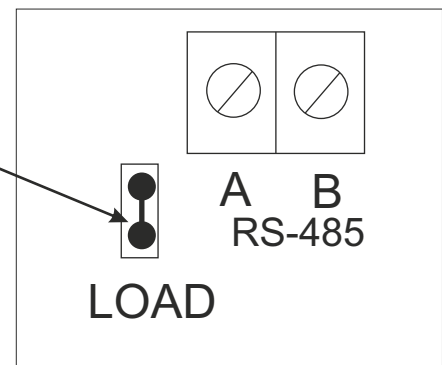
The controller network number is set up via software. Initially all controllers have the network number set to '1'.

INSTALLATION.

The device should be mounted on a flat surface, where free Proximity key card access is possible.

To mount your Matrix II NET, perform the following steps:

- Mark and drill mounting holes of the same size as holes in the device (Fig. 2).
- Connect external devices to the controller according to electrical diagram.
- If lock is electromechanical, put the jumper on pin bank 1 into position "1".
- At the side where controller`s connection cable should go, break out the tab in its casing and lead the cable through the hole.

When the controller is initially powered on, red LED is lit, and device goes into the initial power-up mode (Master card programming mode).

- Fix the device to the wall and secure it with the screws.(Fig. 2)

Use the pads supplied with the device to close the holes in its casing.

Note: When installing multiple controllers, please ensure at least 10 cm is left between any of them.
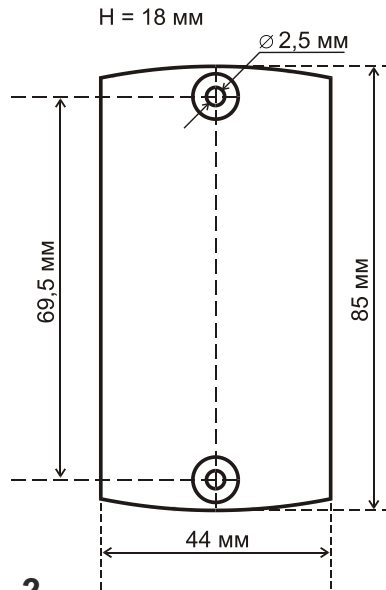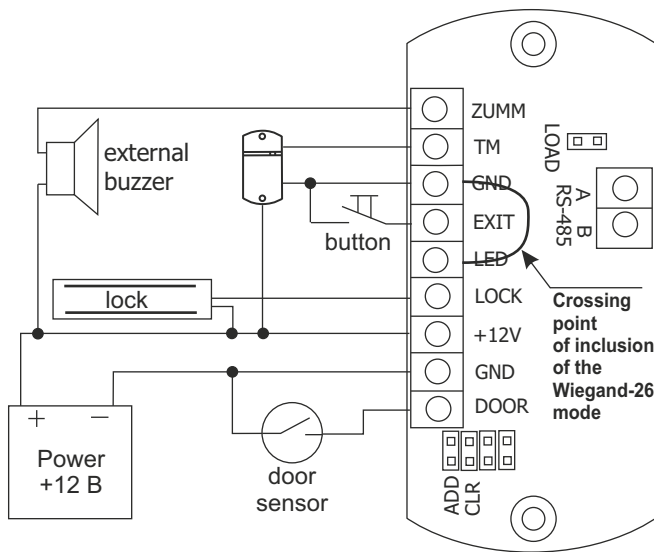
H = 18 мм

∅ 2,5 мм

69,5 мм

85 мм

44 мм

Fig. 2

1. ZUMM External buzzer.
2. TM TM input, central.
3. GND Ground.
4. EXIT Door release button.
5. LED External LED (+).
6. LOCK Lock control.
7. +12V Power +12V
8. GND Ground.
9. DOOR Door sensor (reed switch)

external buzzer

button

lock

Power +12 B

door sensor

ZUMM
TM
GND
EXIT
LED
LOCK
+12V
GND
DOOR

LOAD RS-485 A B

ADD CLR

Crossing point of inclusion of the Wiegand-26 mode

Note 1: When a contactless Matrix II reader is used with the Matrix II NET, the LED and beeper are controlled via TM wire.
Note 2: Optionally can be connected: external buzzer, LED, door sensor.

5. PACKAGE CONTENTS
- Matrix II NET device 1
- Jumper 1
- Pads 2
- Screws 3x30 2
- Wall plugs 2

6. OPERATING CONDITIONS
Ambient temperature: from 5°C to 40°C.
Humidity: Up to 80% at 25°C.

This device should be operated in absence of: atmospheric precipitation, direct sunlight, sand, dust and moisture condensation.
Device specifications may deviate from described in this manual when it is operated under non-recommended conditions.

9. LIMITED WARRANTY.
This Device is covered by limited warranty for 24 months.
The warranty becomes void, if:
- this Manual's guidelines are not followed;
- the device has suffered physical damage;
- the device has visible traces of exposure to moist and/or aggressive chemicals;
- the device circuits have visible traces of tampering by unauthorised parties.
Under this warranty, the Manufacturer shall repair the device or replace any broken parts as required, free of charge, in cases where the fault is caused by a Manufacturer's defect.

10. IRONLOGIC CONTACTS
Headquarters:
RF Enabled ID Limited
34 Ely Place, London, EC1N 6TD, UK
E-mail: marketing@rfenabled.com

Development and production:
AVS LLC
7, Bobruiskaya street, Saint-Petersburg, 195009, Russian Federation
E-mail: marketing@rfenabled.com
Phone: +78122411853; +78125421185
www.ironlogic.ru

Authorized representative in the European Union:
SIA IRONLOGIC
79A, Slokas iela, LV-1007, Riga, Latvia
E-mail: info@ironlogic.lv, headstaff@ironlogic.lv
Phone: +37166181894; +37124422922
www.ironlogic.me

The symbol of crossed-throught waste bin on wheels means that the product must be disposed of at f separate collection point. This also applies to the product and all accessories marked with this symbol. Products labeled as such must not be disposed of with normal household waste, but should be taken to a collection point for recycling electrical and electronic equipment. Recycling helps to reduce the consumption of raw materials, thus protecting the environment.

CE