Reader
Matrix-III mod. I (NFC)

1. GENERAL INFORMATION

The Matrix-III reader (mod. NFC) is used in access control systems (ACS) to transmit to the controller the code of the ISO 14443-A standard identifier (card, key fob, bracelet, NFC of a smartphone, etc.) via the iButton (Dallas Touch Memory) or Wiegand protocols. The reader works with the following cards: Mifare Classic 1K and 4K, Classic EV1 1K and 4K, ID and Mini. Mifare Plus in SE, S, X, EV1, EV2 (1, 2 and 4 KB), Ultra Light (C), Mifare DESFire and PAN. The reader supports cards with a high degree of data protection using the 3DES and AES algorithms.

A distinctive feature of the reader is the support of the "IronLogic protected+" technology (hereinafter referred to as the protected+ mode), which provides reliable protection against card cloning. For more information, see www.ironlogic.ru – Equipment – IronLogic – Rugged Technology.

2. MOUNTINGCONNECTION

The reader is mounted on a flat surface, in a place that allows the IDs to be easily brought to it. For mounting the Matrix III reader (-   mod. NFC), perform the following operations:

1) Place and drill holes for fastening (see Fig. 1).
2) Connect the reader wires in accordance with Table 1 and Fig. 2.
3) Insulate the wire connections.
4) Supply power (the red LED will illuminate).
5) Check the reader's operability by bringing the identifier.
6) Install the reader and secure it with screws.
7) Install the decorative cover and secure it with a screw.

* If the readers are installed less than 10 cm apart, the SYNC (blue) wires of the readers must be connected.

To ensure remote installation of the reader (specified in the specifications), it is necessary to use a UTP cable with a twisted pair cable that complies with the CAT5e standard.
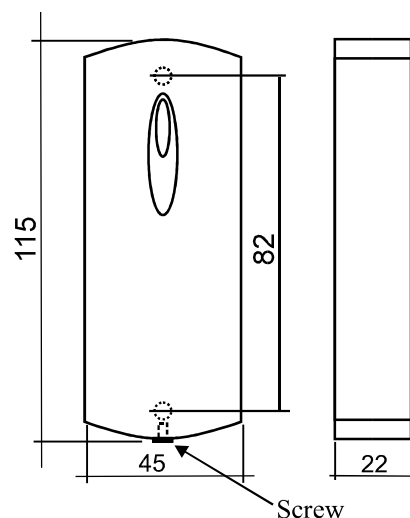
Drawing 1. Appearance and dimensions of the reader.

Table No1. *Function of Wires*

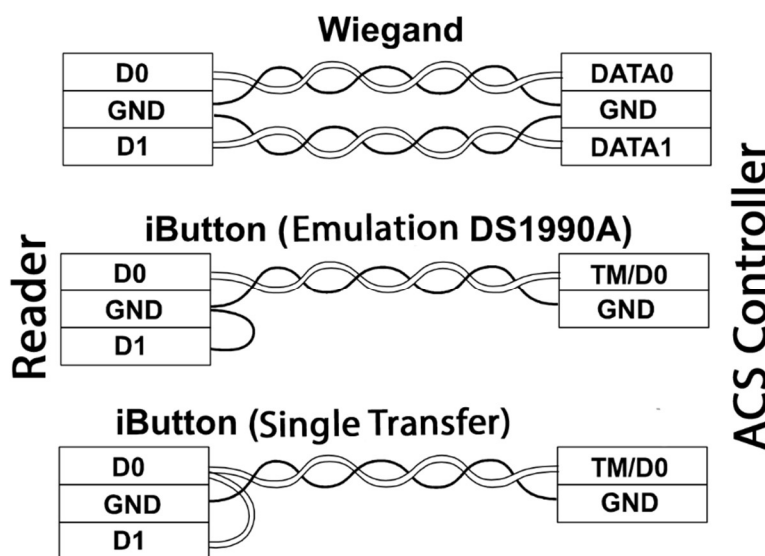| Wire Colour	Wire Function
Red	+12V
Black	GND
Green	DATA0
White	DATA1
Orange	LED Green – External green LED control
Brown	LED Red – External red LED control
Yellow	BEEP – External sound control
Blue	SYNC – Synchronisation of reader
Jumper - Black	Cut to turn off sound

Fig 2. Connecting the reader to the Controller

3. READER OPERATION

By default, internal control is used for light and sound indication.

3.1 Reader Operation Without External Display Control 1. When the power is supplied, when there is no identifier in the reader field, the LED lights up in red.

At the moment of presenting the identifier, its number is read.
The indication of a successfully read identifier is carried out by briefly turning on the green LED, turning off the red LED and a short-term beep.

3.2 When the read identifier is in the reader field, there is no indication.

3.3 Operation of the reader using external display control External control of the sound, red and green colors of the LED is carried out by closing the control contact (BEEP (yellow), LED R (brown), LED G (orange) to the common contact (GND (black)). After the first external control signal is given, the indication switches to external control.

Attention! External display control does not affect the service mode indication and the successful ID reading indication.

4. IRONLOGIC-PROTECTED TECHNOLOGY

The "IronLogic-protected" technology is designed to protect against unauthorized copying of keys and uncoordinated maintenance of ACS. Protection against copying and inconsistent service is based on pre-initializing readers and identifiers with the same passcode. The IronLogic "Object Map" is used as a secret code keeper.

To implement the "IronLogic - Protected" technology, additional equipment is required: a Z-2 reader (mod. MF) with special firmware, an "Object-I IronLogic" card, and Mifare identifiers.

In protected mode, the reader only transmits the UID (serial number) to the controller of identifiers initialized by the same "IronLogic Object" card as the reader itself.

The reader supports simultaneous loading of up to 25 "IronLogic Object Cards." 4.1 Autonomous operation.

For offline operation in protected mode, IronLogic "Object Map(s)", Z-2 reader (mod. MF-I), controller, Mifare identifiers.

4.1.2 Enabling and disabling protected mode When supplied, the reader operates in unprotected mode.

4.1.2.1 Translationprotectedmode

1) On the switched off reader, connect the wires DATA0 (green) and LED R (brown).

2) Feed power to the reader.

3) If the reader flashes a red LED and a beep sounds at the same time, then the reader has already been switched to protected mode.

4) If the red LED is lit, then you need to bring the IronLogic "Object Map".
The reader will react by turning on the green LED and beeping for 1" second. The IronLogic "Object Map" is recorded, which is also a master card. With the Master Map, it is possible to add and remove additional IronLogic "Object Maps".

5) Turn off the power.

6) Connect the controller (see Fig.2).

4.1.2.2 Adding additional "IronLogic Object Maps" (up to 25 pieces) 1) Power is supplied, the device is working.

2)   Bring the master card, the red LED will start flashing. With a break of no more than 16 seconds, we bring additional IronLogic "Object Maps" that need to be recorded. The recording of each new IronLogic "Object Map" is confirmed by turning on the green LED and simultaneously beeping (1 second). If the card has already been written, the reader will flash a red LED and give a sound signal (1 second).

3)   To exit the mode of adding additional IronLogic "Object Maps", you need to wait 16 seconds or bring the master card - the transition will be made to the mode of deleting additional IronLogic "Object Maps". Then you need to bring the master card again. The exit from the IronLogic "Object Maps" add-on mode will be completed.

4.1.2.3 Deleting the "IronLogic Map" (previously recorded under 4.1.2.2) 1) Power is supplied, the device is running.

2) Bring the master card, the red LED will start flashing. The reader will enter the mode of adding additional IronLogic "Object Maps". Then you need to bring the master card again. The reader will switch to the mode of deleting previously written additional

IronLogic "Object Map". Confirmation of entering the IronLogic Object Map deletion mode will be a cyclic flash: two flashes of red and a pause. With a break, there is nomore　16　　Seconds　　Offer　Additional　　　"Maps object" IronLogic,　　that need to be removed.

Deletion of each previously recorded IronLogic "Object Map" will be confirmed by turning on the green LED and simultaneously beeping (1 second). If the card is not recorded, the reader will flash a red LED and give a sound signal (1 second). 3) To exit the mode of deleting additional IronLogic "Object Maps", you need to wait 16 seconds or hold a master card.

4.1.2.4 ExitingProtectedMode

1) On the switched off reader, connect the wires DATA1 (white) and LED R (brown).

2) Feed power to the reader.

3) If the reader flashes a red LED and a beep sounds at the same time, the reader is already in unprotected mode.

4) If the red LED is lit, the master card must be held. The reader will react by turning on the green LED and beeping for 1 second. All IronLogic "Object Maps" written to the reader will be erased and unprotected mode will be activated.

5) Turn off the power.

6) Connect the controller (see Fig.2).

4.2 Working with the Smart Key one online service.

To work with the Smart Key one online service.　　　requires IronLogic "Object Maps",　　Z-2 reader (mod. MF-I), Controller, Mifare identifiers, online service https://smartkey.one/.

Reader in conjunction with Smart Key one online service.
allows you to create a multi-level access system.

5. READER CONFIGURATION

5.1. Configuring the Interface by Wire

The interface for connecting the reader to the controller can be configured regardless of the mode (protected/unprotected). Initially, the Wiegand-26 data transfer protocol is active. The iButton (Dallas Toch Memory) protocol is selected by closing the DATA1 (white) wires to GND (black) (see Fig.2). The iButton (Dallas Toch Memory) is transmitted via DATA0 (green).

5.2. Setting up the interface and the order of data transfer using the program

The reader allows you to configure the data transmission parameters of the identifier and the interface without shorting wires. Configuration is done using the MatrixConfig program and the Z-397 converter (mod. USB Guard).

1) Connect the reader to the RS-485 converter: "A" - DATA0 (green), "B" - DATA1 (white), "G" - GND (black).

2) Feed power to the reader.

3) Run the MatrixConfig program on your PC.

4) Specify the COM port of the converter. 5) Adjust the settings.

You can download the program and detailed instructions for setting up on the website www.ironlogic.ru – Equipment – Readers – Matrix-III (mod. NFC).

The name of the parameters in the Matrix Config program is indicated in quotation marks.

Table #2 List of parameters.

Parameter	Description
1. Wiegand bit width limit and bit width limit TM with "restriction TM" are indicated in parentheses. The drop-down list is "Type protocol".	Wiegand-26 (3 bytes) *
	Wiegand-34 (4 bytes)
	Wiegand-42 (5 bytes)
	Wiegand-50 (6 bytes)
	Wiegand-58 (6 bytes)
2. Limitation of bit width TM - "restriction TM".	TM transfers 6 bytes (if the UID is 4 bytes, then the higher two bytes are filled with zeros)
	TM transfers 6 bytes, the number of significant bytes is given in parameter 1 in parentheses, the remaining bytes are filled with zeros.
3. Encoding 7 byte UIDs 1..7 bytes. "Type code".	iButton(123456)/Wiegand-26(123) * – similar to CP-Z-2 (mod. MF) and Matrix-III (mod. MF K Net)
	iButton(321765)/Wiegand-26(321) – similar to Matrix-III (mod. RD-ALL)
	iButton(234567)/Wiegand-26(234) – transmission without the first byte
	Byte Transfer Order UID Inversion
4. Reverse byte transfer order. "Reverse code".	If reverse is enabled, then reverse affects only the data that is transmitted if reverse is not enabled.
5. Forced inclusion of the protocol. The drop-down list is "Avto, Tm, Wg, Uart".	"Avto" – select the protocol by shorting the wires. *
	"One Tm" is a single TM without short circuits.
	"Wiegand" – to connect via Wiegand to a controller with a 3.3 V supply.
6. Reader in controller mode (only in protected mode) "Data_1 as key management".	"Lock" – if the parameter is set, then if the card is successfully read in protected mode, a pulse with the polarity "Polarity lock" and the duration of "Time open lock" is emitted to the DATA1 pin. A TM is issued on DATA0.
	"Polarity lock" – if not set: the pulse is emitted by a 30 mA zero circuit. If installed: Pulse is delivered by a +5 Volt brace through 10 kΩ.
	"Time open lock" – the pulse time is set in mSec. Multiples of 100 msec.

* - default parameter settings.

6. CHARACTERISTICS

Operating Frequency (MHz):.. 13.56
Compatible Identifiers: .... [Not specified]
Reading Range (cm):... 3-6
Output Protocols: .... Dallas Touch Memory, Wiegand-26/34/42/50/58
Dallas Touch Memory mode:... up to 15m
Wiegand mode:... up to 100m
Card Read Confirmation: .... Buzzer signal, dual-color LED indicator
Indicators:.. Internal and external control
Power Supply (DC Voltage, V): 9-24
Current Consumption in Standby Mode (mA):.................... ≤40
Dimensions (mm):... 115x5x22

7. PACKAGE CONTENTS

RFID Reader (Matrix III NFC): ....1 unit
User Manual: ....1 unit
Screw (3x30 mm): ....2 pcs
Wall Plug: ....2 pcs

8. SERVICE CONDITIONS

Ambient Temperature: ....+4°C to +50°C
Relative Humidity: ....Not more than 98% at 25°C

Operating Conditions: Performance may differ from nominal values under certain conditions.
Environmental Protection: Designed for operation without exposure to precipitation, direct sunlight, sand, dust, or moisture condensation.

9. RULES OF TRANSPORTATION AND STORAGE

A packaged product can be transported in covered vehicles of any type at a temperature from -50°C to +50°C, with its protection from the direct impact of precipitation, solar radiation and mechanical damage, according to the rules for the transportation of goods applicable to the relevant type of transport according to GOST 23088-80. The product must be stored in the conditions of group L according to GOST 15150-69 (temperature from +5 C to +40 C, relative° ° humidity up to 80%). Shelf life is 5 years.

10. IMPLEMENTATION and DISPOSAL

Realization. The sale of the product is carried out through the retail network. At the same time, the seller does not need a license or special Permits to trade in this product. Utilization. End-of-life products should be handed over for environmentally friendly waste recovery. Do not dispose of electronic products in household trash!
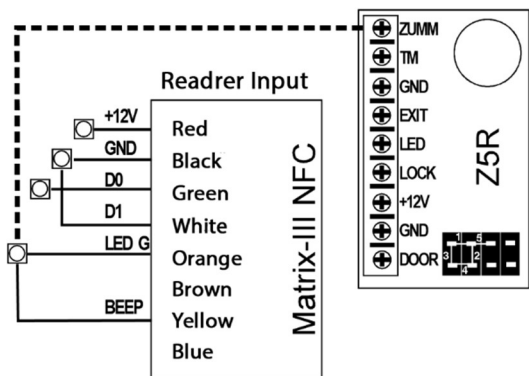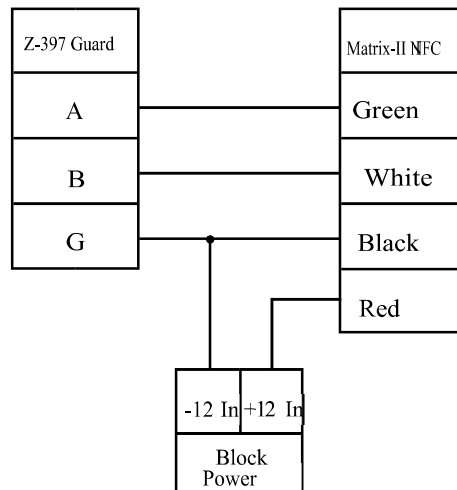
Fig.3   External Display Control Scheme

Fig.4   Connection diagram to the converter