MIFARE/Optical Key Reader Module

GKMR1000-4001

User Manual
Rev. 2

IMPORTANT SAFETY INSTRUCTIONS

READ THROUGH THESE INSTRUCTIONS PRIOR TO USING
THE PRODUCT.

CAREFULLY FOLLOW THESE INSTRUCTIONS WHEN USING
THE PRODUCT.

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE

Compliance Statements

This device complies with Part 15B of the FCC Rules.
Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received,
including interference that may cause undesired
operation.

This device complies with Part 15C of the FCC Rules.
FCC ID: 2AOGK-MR1000-4001

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Introduction

This manual describes the Guestkey Mifare Optical Key Reader Module, (Reader Module) its normal operation, maintenance and how to deal with problem situations which may arise.

The Reader Module is an integrated key reading device compatible with Guestkey computerized locking systems.

This manual is a description of the capabilities of the Reader Module, all of which may or may not be utilised in any particular assembly.

General Description

The Reader Module may be used as part of an access control system. A complete system may consist of a Reader Module and a door release system together with a Windows® platform application for system control, depending upon the system configuration.

The Reader Module can read a pre-coded Guestkey Optical Key. The keys are manufactured using precision injection moulding methods to achieve extremely high durability. Within each key is a laser cut code which has been generated during manufacture.

Keys are also available with integrated RFID tags which can also be read by the Reader Module.

The Reader Module's NFC front end transmitter also supports standard MIFARE Classic 1K, MIFARE Classic 4K, MIFARE Ultralight, MIFARE Ultralight C, MIFARE PLUS and MIFARE DESFire products.

The Reader Module supports MIFARE Classic encryption by hardware in read/write mode and allows reading MIFARE Ultralight, MIFARE Classic 1K, MIFARE Classic 4K, MIFARE, DESFire EV1, MIFARE DESfireEV2 and MIFARE Plus cards

Data is exchanged with a controlling module using an RS485 electrical interface operating in half duplex mode over two wires.

The Reader Module is simple to use and indicator lights visible on both the key and on the reader give feedback on the verification process.

Protection from unauthorized removal is given by a built-in tamper detection switch.

The Reader Module is powered by a low voltage internal battery which is re-charged by voltage supplied to the units RJ45 connector.

The battery is continuously charged from an external DC supply. The battery can continue to maintain the operation of the Reader Module if the supply is temporarily removed. Charge control for the battery forms part of the Reader Module's electronics.

Specifications

Autonomous Operation Mode
Memory capacity:
-36K SRAM
-256KB FLASH
- 4 KB EEPROM

Supported RFID standards
Read/write mode supporting:
-ISO/IEC 14443A/MIFARE
-ISO/IEC 14443B
-JIS X 6319-4 comparable with FeliCa
-ISO/IEC 15693
-ICODE EPC UID/ EPC OTP
-ISO/IEC 18000-3 mode 3/EPC Class-1HF
Passive initiator mode according to ISO/IEC 18092

Status
-Multi-colour LED status indication (1 RGB, 3 Red, 1 Green, 1 Orange)

Mounting
-Indoors

Connections
-All connections are made with 8P8C (RJ45) plug.
-Maximum terminal load: 0.5A

RS-485 Autonomous Bus (1)
-1 Channel half duplex
-Not galvanically isolated, differential.
-8 data bits, even parity, 1 stop bit
-Terminating resistor for bus or star wiring (jumper)

RS-485 System Bus (2)
-1 channel half duplex
-Not galvanically isolated, differential.
-8 data bits, even parity, 1 stop bit
-Terminating resistor for bus or star wiring (jumper)

Power supply
-17-26VDC, absolute max.4.8W
-Without power supply, the clock continues to run for up to 240 hours.

Battery
- 3.6V 350mAh NiMH (Rechargeable Nickel Metal Hydride)
-Battery type EMMERICH NIMH AKKU 1/2 AAA 280 MAH FT-1Z (Part no. 255008) or Vapex Tech NiMH 3.6V Battery Pack
- Maintains autonomous operation during power-loss for up to 8 hours

Tamper Switch
-Detects removal of cover plate

Mechanical
-Dimensions: 69.8 x 48.3mm (w x h), Min. wall depth 42.3mm
-Housing: V0 Flame retardant clear polycarbonate with label
-Connector type 8P8C (RJ45 V0 housing)
-CAT5e/CAT5 cable, maximum length 100m
-Weight with battery Approximately 75 grams

Environmental
-Operating temperature: -30 to +85 C
-Storage temperature: -30 to +85 C
-Relative humidity: 0 to 95%
  Non-condensing
-Protection type: IP20

Standards and directives
-FCC CFR 47 Part 15B, 15C:2016
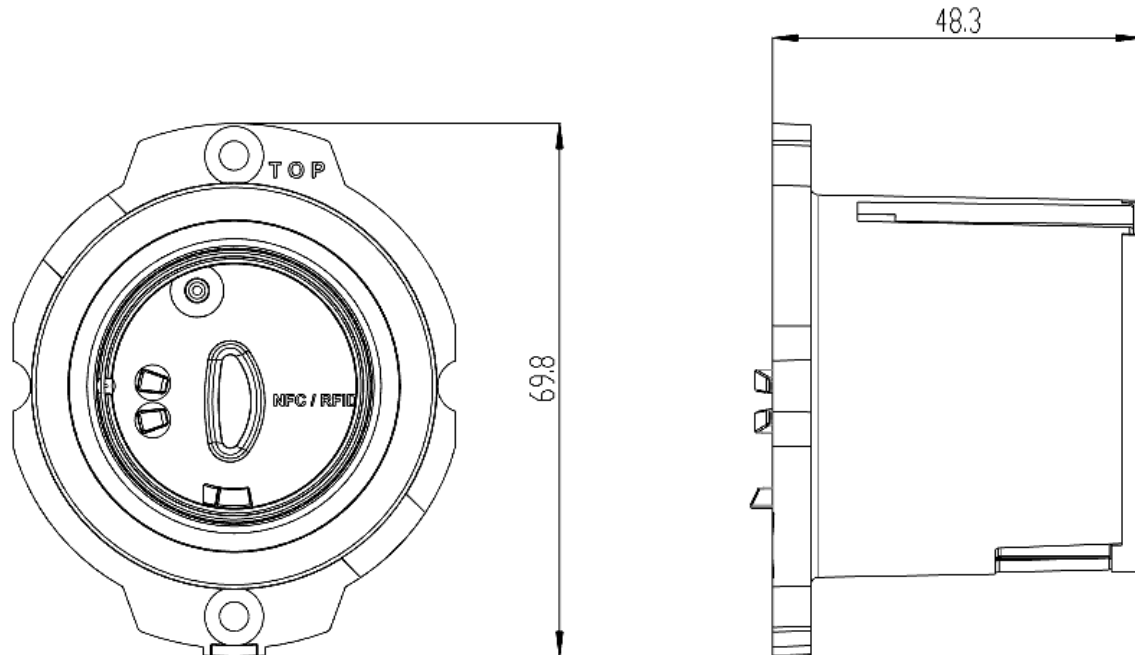-FCC CFR 47 Part 2.1093

Part number
-GKMR1000-4001

This product is not restricted by IATA Dangerous Goods Regulations as is contains "Dry Batteries" in the sense of IATA DGR 4.2 "Table of Dangerous Goods"

Enclosure

Configuration with mounting lugs

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TOP

NFC / RFID

Operation

This part of the manual does not cover the operations which are normally achieved using a system control computer. These are described in a separate manual.

System Failure

When the Reader Module has not detected communications from its host for more than 10 seconds it enters offline mode. In this mode the steady blue light turns to white.

If the host or its communications link fails, no data can be transferred between it and the Reader Module. Thus, it will not be possible to program the reader Module or to receive an indication of tamper alarms.

Power Failure

The Reader Module is powered by a rechargeable battery within the barrel housing. It is normally recharged continuously from the DC supply.

If the DC supply fails (i.e. the voltage falls below 15 V), the Reader Module enters its standby mode. In this mode it shuts down many of its operations to save power - in particular it does not respond to communications requests and commands from the host computer such.

The steady blue or white light which can, in normal mode, be seen deep within the keyhole begins to flash.

The battery maintains the key memory and, when fully charged, can sustain the Reader Module in this mode for up to 8 hours. However, these figures may be lower if optional accessories are powered from the the Reader Module.

The Reader Module can be temporarily restored to its normal mode by inserting a key.

Normal mode is also temporarily restored by the tamper switch so that security is not compromised.

If power is off for a more extended period the battery will become totally exhausted and no operations will be possible while in this condition.

Maintenance

CAUTION some of the operations described in this section require particular electrical or mechanical skills. Be sure that you do not attempt any actions that are not well within your own level of competence.

If the information in this section does not resolve problems fully, contact your supplier.

Care and Cleaning

No special cleaning is required on a routine basis. The Key Reader optics are self-calibrating and will withstand normal dust accretion. If dirt builds up beyond the self-calibration limits a message can be sent to the host computer.

If this happens rub the key slot interior gently with a pipe cleaner which has been shaped to reach the optical faces. Note that these are recessed immediately behind and on each side of the key entry point.

To prevent contamination of the Reader Module do not allow any cleaning or polishing agents to be applied in the immediate vicinity of the unit.

Guestkey Optical keys are robust mouldings but they should be kept free from excessive surface contamination. If necessary they may be cleaned with a damp cloth and then wiped dry. Do not use any solvents.

Battery

The performance of any battery will be affected if it is subjected to extremes of temperature.

The Reader Module contains a battery temperature monitoring circuit. This feature monitors ambient temperature using a thermistor during the charging cycle. If the ambient temperature moves outside a safe charging range of 0°C to 40°C, the unit suspends charging and signals a fault condition with a red light until the temperature returns to the safe charging range.

CAUTION: A battery must always be installed before the Reader Module is connected to the DC power supply or damage may occur to the electronics.

Always use the correct sealed re-chargeable Nickel Metal Hydride battery pack supplied with the Reader Module.

Batteries tested and approved for use with the Reader Module in portable equipment include:

1. GP Batteries 17AAAH IEC62133 170mAh Ni-MH

Batteries tested and approved for use with the Reader Module in fixed equipment include:

1. Emmerich AAKKU 1/2 AAAA FT1Z (255008) 280mAh Ni-MH

2. VapexTech VTE250AAAS 250mAh Ni-MH

Trouble Shooting

Battery Low

- If a battery low warning has been received by the host computer it is possible that the battery has become discharged.

- If more than one Reader is affected first check the DC power supply source.

- If the DC supply source is correct fit a new battery pack.

Note: If a Reader Module does not respond to any keys or operations, first try resetting it as described on page 13 before returning it as faulty.

Tampering

- If a tamper alarm has been received by the host computer or if there are visible signs of interference at or around the Key hole, it is likely that an attempt at unauthorised entry has been made. Consult your management before making any repair.

- Tamper alarms may be generated if the Reader Modules cover is removed

Dismantling

The following operations should only be carried out by competent persons. No special tools are required.

The anticipated battery life of the Reader Module is approximately 3 years.

Take care not to use undue force in any of these operations. If components are not readily removed check that you are following the instructions correctly.

Moulded Face Plate (if present)

1.   Prise away the moulded face plate. A slot may be present at the bottom of the face plate to insert a thin bladed screwdriver.

2.   This action will operate the tamper detection switch in the Reader Module and may generate an alarm.

Reader Module Barrel

1.   Having removed any face-plate the Reader Module's barrel and
     bracket are accessible.

2.   To remove the Key Reader barrel, use your fingers to grip it at
     the barrel release points on the bracket and prise it forward until
     it can be grasped with the hand.

3.   Pull the barrel out of the bracket so that it disengages from the
     rear connector pcb and withdraw it fully from the bracket.

4.   Hold the barrel sleeve firmly in one hand and, by prising the
     flange of the barrel cap away from the sleeve, release and
     withdraw the electronics assembly, together with the cap, from
     the sleeve.

5.   Separate the battery pack from the electronics PCB by detaching
     its connector from the circuit board.
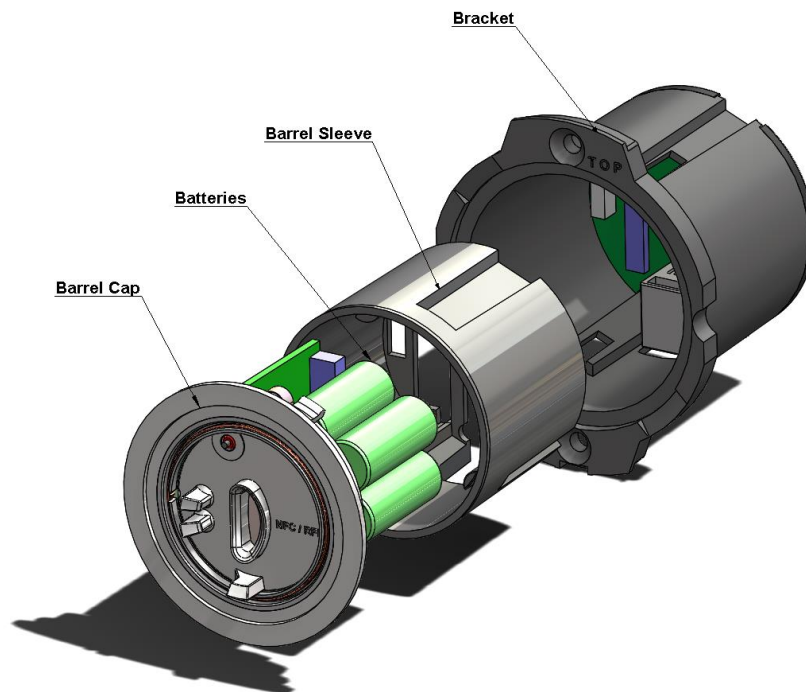
Refitting Parts

The lock is to be re-installed by following the reverse procedure to dismantling, taking care to observe the following:

When re-assembling the barrel in its sleeve:

- Ensure that the battery connector is securely fitted to its socket.

- Place the battery in its recess in the barrel sleeve.

- Carefully align the electronics assembly pcb with the guides in the barrel sleeve and slide it into place. Take care that the wires from the battery do not become trapped between the barrel sleeve and the O-ring seal around the barrel cap

- The barrel must be pushed firmly into the bracket so that the O-ring seal around the barrel cap is compressed into the recess in the bracket.

- Ensure that all cable connectors are properly seated in their mating sockets.

- Ensure that the barrel is aligned in the bracket so that the tamper micro-switch is towards the top.

- Ensure that the cut-outs in the face plate are positioned to correspond with the light guides on the front of the barrel.

- If the battery has been removed and reconnected the electronics will be reset. After battery reconnection the lock will at first operate in standalone mode, but when communication with a host computer is restored it will enter normal mode after about five seconds.

Preparing the lock for long term storage

To prepare the lock for long term storage remove the battery:

1. Dismantle as described above and disconnect the battery.
2. Reassemble the lock.
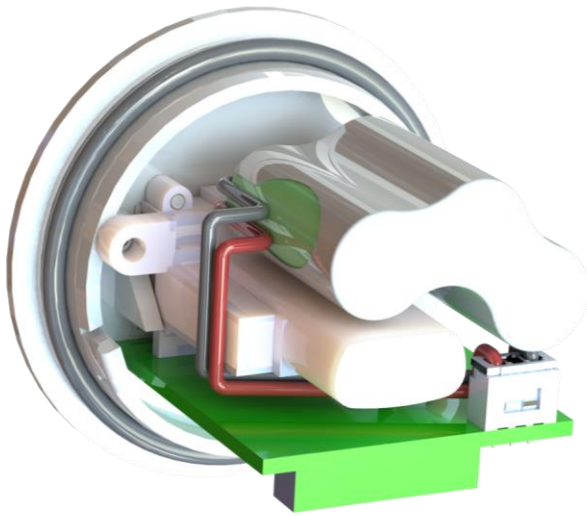
Battery Replacement/Disposal

The Guestkey Mifare/Optical Reader is supplied with a 3.6V re-chargeable NiMH battery pack.

Please refer to the battery safety data sheet is supplied with this user guide for information on safe storage and disposal of the battery pack.

Connection Details

Use CATEGORY 5 or 5E UTP Cable for external connections

RJ45 Socket Pin Designations:

Pin 1. System Bus +
Pin 2. System Bus -
Pin 3. Autonomous Bus +
Pin 4. Programmable Output
Pin 5. +24 VDC
Pin 6. Autonomous Bus -
Pin 7. 0V
Pin 8.0V

Note. System and Autonoumous bus signals must conform to the RS485 electrical interface specification.

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