Users' Manual

Product:

Mifare USB Reader

Model:

MD-150M

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

INFORMATION TO USER
To assure continued compliance, (example - use only shielded interface cables when connecting to computer or peripheral devices) any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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I. MD-150 M Reader Specification

1. Reader Specification

Part Number	MD-150M
RF Transmit Frequency	13.56 MHz
Supported Transponder	Mifare_UltraLight Mifare_One(S50) Mifare_One(S70) Mifare_Pro(X) Mifare_DESFire
Maximum Reading Range＊	25~30 mm
Reading Times	150 ms
Power Supply	DC 5V/ 500mA Regulated
Power Consumption	68mA in operation
Communications Parameters	9600 baud, 8 data bits, no parity, 1 start bit, 1 stop bit
Operating Temperature	0°C ~ 55°C
Storage Temperature	-25°C ~ 85°C
Storage Humidity	5 ~ 95%RH non-condensing
Communications Interface	Mini USB
Dimension (L × W × H)	MD-150M (PCBA) : 70mm × 30mm × 6.5mm
Other	1 Status indicators 1 Buzzer Antenna On board or external (option)

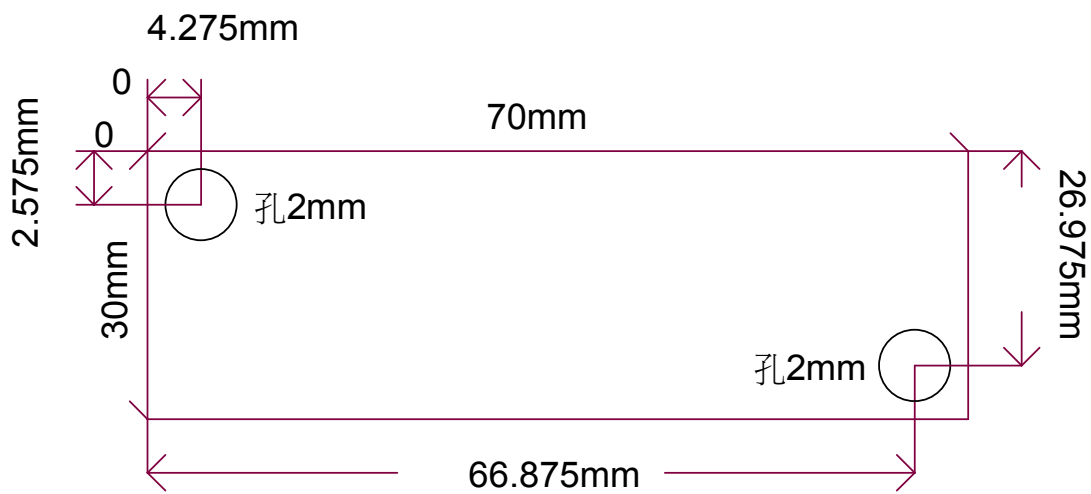* Reading range may vary in depend on different transponder type.

2. Antenna Specification

58.81mm

5.26mm
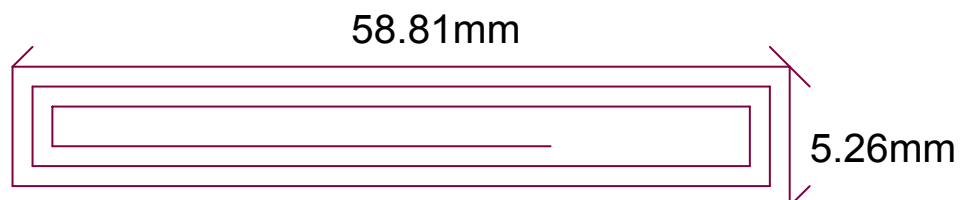
Wire Diameter：0.3mm
Wire-wire distance：0.5mm

3. Dimension

4.275mm

0

0

2.575mm

30mm

70mm

孔2mm

孔2mm

26.975mm

66.875mm

II. Communication protocol

This machine passes USB interface and computer end line homework in order to use a USB connecting wire, USB of the homework is transfered to the driver of Serial Port through can offer by institute of our company under the environment of Microsoft Windows XP/2000 **(#1)** Succeed RS-232 signal USB signal simulation; So user meet device in operating system is it increase one group communication mound newly to find on the administrator after the last copies of machine on installation driver (COM PORT) ; Procedure of user can is it communicate to go on through this communication between mound and copies of machine.

MD-150M are using t he international S tandard **UART** communication for mat, and support **RS-232 interface** with communication parameters set to **9600.N.8.1.**

DA   TA format are as follows:

HEADER						DATA			CHECK
SOH	PT	ID1	ID2	FC1	FC2	STX	DATA	ETX	BCC
01H	Identify	Reader ID		Function Code		02H	Data	03H	Checksum

Description:

1. SOH, STX and ET X are all cont ained with one byte and used f or control byte, the definition is:

    SOH=01H,   STX=02H, ETX=03H

      Note: The "SOH" is the start byte for current command set
            The "STX" is the start byte for "Data"
            The "ETX" is the end byte for "Data"
            You will need these to judge the data length you transmitted or received; the data length will vary in depend on different command you given

2. PT (Packet T ype) is used to identify w here is the message come s from; "S" means it comes from PC and "s" means from the reader.

3. ID1, ID2 are the ID codes of reader, the value is always "01".

4. FC1 and F C2 are function codes, and relat ed to the DA TA, the relative dat a please refers to the next page.

5. BCC is checksum，from SOH to ETX one byte do "xor"，then do "or" 20H.

    Ex. Reader responds:

SOH	"S"	"01"	"A1"	STX	"010"	ETX	BCC

BCC = _**01H**_ xor 53H xor 30H xor 31H xor 41H xor 31H xor _**02H**_
Xor 30H xor 31H xor 30H xor _**03H**_ or 20H =33H

(#1) : Driver please to our com pany website download, procedure this by Prolific Technology Inc. Offer.

III. USB Reader Command list

Function	Code	Description	Page
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2	"A1"	Read card and acquire card ID	8
3	"E1"	Acquire model name and firmware version	9
4	"E2"	Reset reader	10
5	"K0"	Read data in specified page/block	11
6	"K1"	Write data into specified page/block	12
7	"K2"	Lock specified page/block	13
8	"K3"	Set A,B Key value of 32 Sector groups	14

IV. USB Reader command description

1. "A0" (Switch to Stand-Alone Operation)

Controller send：

SOH	"S"	ID1	ID2	"A"	"0"	STX	ETX	BCC

USB Reader responds：

SOH	"s"	ID1	ID2	"A"	"0"	STX	data	ETX	BCC

Function description:
(1) This function code is able to switch the reader to the "Stand-Alone Operation".
(2) Data response value is "Y" means successful, "N" means failure, duplicate, or no data.

Example：
Controller send：
SOH + "S01A0" + STX + ETX + BCC

USB Reader responds：
SOH + "s01A0" + STX + " Y " + ETX + BCC ("Y" means Successful)

2. "A1" (Read card and acquire card ID)

Controller send：

SOH	**"S"**	ID1	ID2	**"A"**	**"1"**	STX	ETX	BCC

USB Reader responds：

SOH	**"s"**	ID1	ID2	**"A"**	**"1"**	STX	**data**	ETX	BCC

Data description:
(1) The format of "data" will be: Card type (1 byte) + Card ID (16 byte).
(2) Card number is "0" ～ "9"，"A" ～ "F"。ex. "00000000003EA88F"。

Function description:
(1) Use this function to acquire card ID number through reader.
(2) The "data" will be "N" if no card presented or failed reading; Such as: STX + " N " + ETX。

Example：
Controller send：
SOH + "S01A1" + STX + ETX + BCC

USB Reader responds：
SOH + "s01A1" + STX + " **N** " + ETX + BCC ("N" means no card been read or failed reading)
SOH + "s01A1" + STX + "ME007000000123456" + ETX + BCC

Description：
1. The "data" responded by USB Reader is;
   Card type is Multi-Page Typ.
   Card ID is "E007000000123456".

3. "E1" (Acquire model name and firmware version)

Controller send：

SOH	"S"	ID1	ID2	"E"	"1"	STX	ETX	BCC

USB Reader responds：

SOH	"s"	ID1	ID2	"E"	"1"	STX	date	ETX	BCC

Data description：
(1) The value of "data" will include current firmware version and model name.

Function description：
(1) Use this function to get model name and firmware version for current reader.

Example：
Controller send：
SOH + "S07E1" + STX + ETX + BCC

USB Reader responds：
SOH + "s07E1" + STX + "V1.01 USB Reader" + ETX + BCC

Description：
1. The current firmware version is: V1.01and the model name is: USB Reader.
2. Sunion reserved the right to update firmware at any time without prior notice.

4. "E2" (Reset reader)

Controller send：

SOH	**"S"**	ID1	ID2	**"E"**	**"2"**	STX	ETX	BCC

USB Reader responds：

SOH	**"s"**	ID1	ID2	**"E"**	**"2"**	STX	**data**	ETX	BCC

Function description:
1. Use this function to reset USB Reader.
2. If "data" value responded is "Y" means the set up is successful, "N" means failed, repeated or no data.
3. CF Card will respond "Y" first then commence reset.

Example：
Controller send：
SOH + "S01E2" + STX + ETX + BCC

USB Reader responds：
SOH + "s01E2" + STX + **"Y"** + ETX + BCC ("Y" means the set up is successful)

5. "K0"(Read data in specified page/block)

Controller send：

SOH	"S"	ID1	ID2	"K"	"0"	STX	DATA	ETX	BCC

USB Reader responds：

SOH	"s"	ID1	ID2	"K"	"0"	STX	data	ETX	BCC

Data description：
1. "DATA" should be entered as: Card type **(1 bytes)** + Page/Block number **(2 bytes).**
2. When Read Mifare Card, Card type is "M" + Page/Block number；The page/block number is fixed to 2 bytes. Number is "00" ～ "3F"(HEX)，64 Blocks (0 Block is first)。

Sector 0	Block0	Block1	Block2	Block3
Sector 1	Block4	Block5	Block6	Block7
				AB Key
Sector 14	Block56	Block57	Block58	Block59
Sector 15	Block60	Block61	Block62	Block63

Function description:
1. Use this function to Read Mifare Card Block DATA.
2. Every Sector last Block is A,B Key values.
3. Read Every Sector A Key is always "0".

Example：
Controller send：
SOH + "S01K0" + STX + "M0E" + ETX + BCC

USB Reader responds：
SOH + "s01K0" + STX + "M00E0000456789ABCDEF1234567898765432" + ETX + BCC

Description：
1. USB Reader responded:
   "0E" — The information is from page/block NO.0E.
   "0000456789ABCDEF1234567898765432" — The dat a ins ide the p age/block NO.0E.

6. "K1" (Write data into specified page/block)

Controller send：

SOH	"S"	ID1	ID2	"K"	"1"	STX	DATA	ETX	BCC

USB Reader responds：

SOH	"s"	ID1	ID2	"K"	"1"	STX	data	ETX	BCC

Data description：
1.   DATA should be entered as cars type, page/block number and the information you want to input, just as follow:
     Card type (1 byte) + Page/block number (2 bytes) + Information (16 bytes).
2.   When Write Mifare Card, Card type is "M " + Page/Block number；The page/block number is "01" ～ "3F"(HEX) ，63 Blocks。
3.   Responded "data" value will be as following:

     a. If "data" is **"Y"** means writing is successful.

     b. If "data" is **"N"** means failed or no data.
4.   When Write data into specified page/block Sector A,B Key, please attend to "DATA" value. Because If Responded "data" is **"Y"** means writing is successful, Sector A,B Key was written and you can't read this "DATA" value.

Function description：
1. Use this function to write information into desired block/Page of a card.
2. Use this function to write information into desired A,B Key of a Sector.

Example：
Controller send：
SOH + "S01K1" + STX + "M060000456789ABCDEF1234567898765432" + ETX + BCC

USB Reader responds：
SOH + "s01K1" + STX + **"Y"** + ETX + BCC
("Y" means the set up is successful)

USB Reader responds：
SOH + "s01K1" + STX + **"N"** + ETX + BCC
("N" means writing is failed or no data)

7. "K2" (Choose want to use Key)

Controller send：

SOH	**"S"**	ID1	ID2	**"K"**	**"2"**	STX	**DATA**	ETX	BCC

USB Reader responds：

SOH	**"s"**	ID1	ID2	**"K"**	**"2"**	STX	**data**	ETX	BCC

Data description：

1. "DATA" should be compare with A,B Key, sector number you want to lock, just as follow: Card type (1 byte) + Page/block number (2 bytes)
2. Card type should be entered as: "M" for Multi-Page.
3. The range of page/block number is different in different card type.
4. "K2" function can't lock a block of EM4135 tag. (Must use "K9")
5. Responded "data" value will be as following:

    If "data" is **"Y"** means page/block is successfully locked.
    If "data" is **"N"** means failed.

Function description：

1. Use this function to lock the data in specified page/block.
2. **Warning!** This action is not recoverable, no any unlock maybe perform, use with extreme care!!!

Example：
Controller send：
SOH + "S01K2" + STX + "M07" + ETX + BCC

USB Reader responds：
SOH + "s01K2" + STX + "Y" + ETX + BCC
(**"Y"** means page/block is successfully locked)

USB Reader responds：
SOH + "s01K2" + STX + "N" + ETX + BCC
(**"N"** means failed)

8. "K3" (Set A,B Key value of 32 Sector groups)

Controller send：

SOH	"S"	ID1	ID2	"K"	"3"	STX	DATA	ETX	BCC

USB Reader responds：

SOH	"s"	ID1	ID2	"K"	"3"	STX	data	ETX	BCC

Data description：
1. DATA should be entered as cars type, Sector group and the information you want to input, just as follow:Card type (1 byte) +〔Sector group(2 bytes)〕+ Information (12 bytes).
2. The range of Sector group of Reader is "01"- "20"(HEX) 32 groups altogether.
   "01": Sector 0
   "02": Sector 1
   "03": Sector 2

   "10": Sector 15
   All groups of Sector picture of the Reader to reaching every group Sector of Mifare card.
3. Responded "data" value will be as following:

   If "data" is **"Y"** means page/block is successfully locked.
   If "data" is **"N"** means failed.
4. The content of the Reader is while wanting to write into Key value of each one Sector : " 123456789ABC " (12 yards of A , B Key value).

Function description：
1. Use this function to Set A,B Key value of 32 Sector groups.
2. Can just use K0 to need K2 movements effectively after needing to use this function.
3. **As want to revise within Mifare card , must establish Key of this Sector to the mould group first , Then choose to want Key of authentication , could read and write the materials within Mifare card in this way.**

Example：
Controller send：
SOH + "S01K3" + STX + " M01123456789ABC " + ETX + BCC

USB Reader responds：
SOH + "s01K3" + STX + "Y" + ETX + BCC
(**"Y"** means page/block is successfully locked)

Description：
1. USB Reader responded:
   "M01" — Write into the first group.
   "123456789ABC " — The first group A,B Key Sector 0.