

**OEM-LF-HF-M1000-USB**  
**Dual HID Mode**

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## Contents

<b>1</b>	<b>HID Modes .....</b>	<b>4</b>
1.1	Important Notes .....	4
1.2	Configuration Software .....	4
<b>2</b>	<b>HID Mode Configuration Command .....</b>	<b>5</b>
2.1	Important Note.....	5
2.2	Telegram from PC to RFID Device.....	5
2.2.1	Overview of the Configuration Telegram (Table 1) .....	5
2.2.2	The Single HID Configuration Byte #6 (Table 2).....	6
2.2.3	Additional Byte #1 (Table 3) .....	7
2.2.4	Additional Byte #2 (Table 4) .....	7
2.2.5	Additional Byte #3 .....	8
2.3	Reply from RFID Device .....	8
2.3.1	In Case of Success.....	8
2.3.2	In Case of Error .....	8
<b>3</b>	<b>Examples.....</b>	<b>9</b>
3.1	Single HID Mode Examples.....	9
3.1.1	Shut OFF the HID Operation Mode.....	9
3.1.2	Factory Preset ISO14443A UID LSB .....	9
3.1.3	Read Data from Mifare RFID Tag.....	9
3.1.4	UID of ISO 15693 only: .....	10
3.2	Dual HID Mode Examples .....	10
3.2.1	LF Read UID LSB of Hitag1/S and Memory Page and UID of ISO14443A MSB.....	10
3.2.2	UID of LF read-only + UID of ISO15693.....	10
<b>4</b>	<b>Using hterm for Configuration.....</b>	<b>12</b>
4.1	Communication Parameters.....	12
4.2	Initial Setting of hterm .....	12
<b>5</b>	<b>Revision History .....</b>	<b>13</b>

## 1 HID Modes

The firmware allows three operation modes:

Operation Mode	Description
Standard read/write mode	The RFID device does nothing on its own. It reacts to commands.
Single HID Mode	The RFID device automatically reads UID or data from a configured RFID tag type.
Dual HID Mode	The RFID device automatically reads UID or data from a configured LF RFID tag type and an HF RFID tag type.

### 1.1 Important Notes

**You cannot use read/writeRFID commands when in HID mode.**

### 1.2 Configuration Software

At the moment there is no easy-to-use configuration software for a PC.

You can use a terminal that is capable of handling hexadecimal data for manual configuration. This is described later in this document.

## 2 HID Mode Configuration Command

This command configures the HID operation modes.

The first parameter after the command code switches the HID mode ON or OFF.

The other Bytes configure what data is read and how the data is converted.

When you switch off the HID mode, only the command byte, the first parameter byte and the checksum byte must be correct.

### 2.1 Important Note

**You cannot use read/writeRFID commands when in HID mode.**

### 2.2 Telegram from PC to RFID Device

The telegram for configuration of the HID Mode is 21 Bytes long.

The following tables describe each Byte in detail

#### 2.2.1 Overview of the Configuration Telegram (Table 1)

Byte#	Value	Description
1	AA	Start of Telegram
2	00	Device Address, 0x00 = all devices react to this address
3	10	Bytes of Payload to follow (Command + Parameters)
4	FD	Command Code
5	C0	Start/Stop HID mode, C0 (1100.0000) = ON, 3F (0011.1111) = OFF
6	00	In Single HID mode: Select tag type and function, please see table below, 0x30 selects Dual HID mode, only in this mode, the 3 Additional Bytes are used.
7	00	Memory Position, Blocks (Mifare) or Pages (Ultralight, ISO15693)
8	FF	Access Key for Mifare Classic memory access
9	FF	Access Key for Mifare Classic memory access
10	FF	Access Key for Mifare Classic memory access
11	FF	Access Key for Mifare Classic memory access
12	FF	Access Key for Mifare Classic memory access
13	FF	Access Key for Mifare Classic memory access
14	10	Data output format, 10 = HEX, 20 = ASCII
15	60	Mifare Classic Access Key A/B selection, 60 = Key A, 61 = Key B
16	00	Left MSB nibble: Data Position/Offset, Right LSB nibble: Data Length
17	00	Additional Byte #1: only active in Dual HID mode
18	00	Additional Byte #2: only active in Dual HID mode
19	00	Additional Byte #3: only active in Dual HID mode
20	5D	Block Check Character
21	BB	End of Telegram

### 2.2.2 The Single HID Configuration Byte #6 (Table 2)

Value	Description
00	HF ISO 14443A LSB
01	HF Ultralight Data
02	HF Mifare Data
03	HF Mifare Data + UID
04	Read UID of HF ISO 15693
05	HF 15693 UID + Data
06	HF 14443A MSB
07	HF 14443A LSB-DEC
08	HF 14443A MSB-DEC
09	HF Reserved for future use
0A	HF Reserved for future use
0B	HF Reserved for future use
0C	HF Reserved for future use
0D	HF Reserved for future use
0E	HF Reserved for future use
0F	HF Reserved for future use
10	LF Read UID LSB of read-only tag type
11	LF Read UID MSB of read-only tag type
12	LF Read UID LSB of Hitag1/S tag type
13	LF Read UID MSB of Hitag1/S tag type
14	LF Read UID LSB-DEC of Hitag1/S tag type
15	LF Read UID MSB-DEC of Hitag1/S tag type
16	LF Read UID LSB and Memory Page from Hitag1/S tag type
17	LF Read UID MSB and Memory Page from Hitag1/S tag type
18	LF Read UID LSB-DEC and Memory Page from Hitag1/S tag type
19	LF Read UID MSB-DEC and Memory Page from Hitag1/S tag type
1A	LF Reserved for future use
1B	LF Reserved for future use
1C	LF Reserved for future use
1D	LF Reserved for future use
1E	LF Reserved for future use
1F	LF Read FDX-B information
20	Legic Read UID
21	Legic Read ISO 15693 UID
22	Legic Read ISO 14443 A
23	Legic Read ISO 14443 B
24	Legic Read INSIDE Secure
25	Legic Read SONY FeliCa subset
<b>30</b>	<b>Additional Bytes for Dual HID Mode valid</b>
40	UHF Read EPC (not implemented so far)

### 2.2.3 Additional Byte #1 (Table 3)

This Byte is only valid, when the single HID configuration Byte #6 has value of 0x30.

Value	Description
00	HF ISO 14443A LSB
01	HF Ultralight Data
02	HF Mifare Data
03	HF Mifare Data + UID
04	Read UID of HF ISO 15693
05	HF 15693 UID + Data
06	HF 14443A MSB
07	HF 14443A LSB-DEC
08	HF 14443A MSB-DEC
09	HF Reserved for future use
0A	HF Reserved for future use
0B	HF Reserved for future use
0C	HF Reserved for future use
0D	HF Reserved for future use
0E	HF Reserved for future use
0F	HF Reserved for future use
20	Legic Read UID
21	Legic Read ISO 15693 UID
22	Legic Read ISO 14443 A
23	Legic Read ISO 14443 B
24	Legic Read INSIDE Secure
25	Legic Read SONY FeliCa subset

### 2.2.4 Additional Byte #2 (Table 4)

This Byte is only valid, when the single HID configuration Byte #6 has value of 0x30.

Value	Description
10	LF Read UID LSB of read-only tag type
11	LF Read UID MSB of read-only tag type
12	LF Read UID LSB of Hitag1/S tag type
13	LF Read UID MSB of Hitag1/S tag type
14	LF Read UID LSB-DEC of Hitag1/S tag type
15	LF Read UID MSB-DEC of Hitag1/S tag type
16	LF Read UID LSB and Memory Page from Hitag1/S tag type
17	LF Read UID MSB and Memory Page from Hitag1/S tag type
18	LF Read UID LSB-DEC and Memory Page from Hitag1/S tag type
19	LF Read UID MSB-DEC and Memory Page from Hitag1/S tag type
1A	LF Reserved for future use
1B	LF Reserved for future use
1C	LF Reserved for future use
1D	LF Reserved for future use
1E	LF Reserved for future use
1F	LF Read FDX-B information

### 2.2.5 Additional Byte #3

This Byte is only valid, when the single HID configuration Byte #6 has value of 0x30.

This Byte gives the memory position (page number) of an LF RFID tag.

## 2.3 Reply from RFID Device

### 2.3.1 In Case of Success

AA 00 02 00 80 82 BB

#### The Bytes in Detail

AA = Start of Telegram  
00 = Device Address  
02 = Bytes of Payload  
00 = Status, 00 = OK  
80 = Status detail, 80 Setting successful  
82 = BCC  
BB = End of Telegram

### 2.3.2 In Case of Error

AA 00 02 01 81 82 BB

#### The Bytes in Detail

AA = Start of Telegram  
00 = Device Address  
02 = Bytes of Payload  
01 = Status, 01 = Error  
81 = Status detail, 81 Setting failed  
82 = BCC  
BB = End of Telegram



### 3 Examples

#### 3.1 Single HID Mode Examples

##### 3.1.1 Shut OFF the HID Operation Mode

AA 00 10 FD 3F 00 00 00 00 00 00 00 00 00 00 00 00 D2 BB

###### The Bytes in Detail

AA = Start of Telegram  
 00 = Device Address  
 10 = Bytes of Payload (Command + Parameters)  
 FD = Command Code  
 3F = 3F (0011.1111) = Switch HID Operation Mode OFF  
 00 = ignored parameter  
 00 = ignored parameter  
 00 00 00 00 00 00 = ignored parameter  
 00 = ignored parameter  
 00 = ignored parameter  
 00 = ignored parameter  
 00 = Additional Byte #1, ignored parameter  
 00 = Additional Byte #2, ignored parameter  
 00 = Additional Byte #3, ignored parameter  
 D2 = BCC  
 BB = End of Telegram

##### 3.1.2 Factory Preset ISO14443A UID LSB

AA 00 10 FD C0 00 00 FF FF FF FF FF FF 10 60 00 00 00 00 5D BB  
 AA 00 10 FD C0 00 00 00 00 00 00 00 00 10 00 00 00 00 00 3D BB (all ignored Parameters set to 0)

###### The Bytes in Detail

AA = Start of Telegram  
 00 = Device Address  
 0D = Bytes of Payload (Command + Parameters)  
 FD = Command Code  
 C0 = C0 = Switch HID Operation Mode ON  
 00 = 00: HF Mifare Data  
 00 = Memory Position, ignored parameter  
 FF FF FF FF FF FF FF = ignored parameter  
 10 = 10: HEX  
 60 = 60: Key A, ignored parameter  
 00 = Data Position and Length, ignored parameter  
 00 = Additional Byte #1, ignored parameter  
 00 = Additional Byte #2, ignored parameter  
 00 = Additional Byte #3, ignored parameter  
 5D = BCC  
 BB = End of Telegram

##### 3.1.3 Read Data from Mifare RFID Tag

AA 00 10 FD C0 02 09 4B FB 5A D0 7C 63 20 60 54 00 00 00 17 BB

###### The Bytes in Detail

AA = Start of Telegram  
 00 = Device Address  
 0D = Bytes of Payload (Command + Parameters)  
 FD = Command Code  
 C0 = C0 (1100.0000) = ON  
 02 = 02: HF Mifare Data  
 09 = Memory Position, Blocks (Mifare) or Pages (Ultralight, ISO15693)  
 4B FB 5A D0 7C 63 = Key A  
 20 = Convert to ASCII

60 = 60: Key A  
 54 = left MSB nibble: Data Position 5<sup>th</sup> Byte, right LSB nibble: Data Length 4 Bytes  
 00 = Additional Byte #1, ignored parameter  
 00 = Additional Byte #2, ignored parameter  
 00 = Additional Byte #3, ignored parameter  
 = BCC  
 BB = End of Telegram

### 3.1.4 UID of ISO 15693 only:

AA 00 10 FD C0 04 00 00 00 00 00 00 10 00 00 00 00 00 39 BB

#### The Bytes in Detail

AA = Start of Telegram  
 00 = Device Address  
 0D = Bytes of Payload (Command + Parameters)  
 FD = Command Code  
 C0 = C0 = Switch HID Operation Mode ON  
 04 = 04: UID of HF ISO 15693  
 00 = Memory Position, ignored parameter  
 00 00 00 00 00 00 = ignored parameter  
 10 = 10: HEX  
 00 = ignored parameter  
 00 = ignored parameter  
 00 = Additional Byte #1, ignored parameter  
 00 = Additional Byte #2, ignored parameter  
 00 = Additional Byte #3, ignored parameter  
 39 = BCC  
 BB = End of Telegram

## 3.2 Dual HID Mode Examples

### 3.2.1 LF Read UID LSB of Hitag1/S and Memory Page and UID of ISO14443A MSB

AA 00 10 FD C0 30 00 FF FF FF FF FF FF 10 60 00 06 16 10 6D BB

#### The Bytes in Detail

AA = Start of Telegram  
 00 = Device Address  
 10 = Bytes of Payload (Command + Parameters)  
 FD = Command Code  
 C0 = C0 = Switch HID Operation Mode ON  
 30 = 3 additional Bytes for HID Mode on Both Technologies  
 00 = Memory Position for HF RFID tag  
 FF FF FF FF FF FF = key for Mifare memory access  
 10 = Output in HEX values  
 60 = Use Key A  
 00 = left MSB nibble: Data Position, right LSB nibble: Data Length  
 06 = HF 14443A MSB (HF-RFID)  
 16 = Read UID LSB and Memory Page from Hitag1/s tag type (LF-RFID)  
 10 = Memory Position for LF RFID tag (LF-RFID)  
 6D = BCC  
 BB = End of Telegram

### 3.2.2 UID of LF read-only + UID of ISO15693

AA 00 10 FD C0 30 00 FF FF FF FF FF FF 10 60 00 04 10 00 79 BB

#### The Bytes in Detail

AA = Start of Telegram  
 00 = Device Address  
 10 = Bytes of Payload (Command + Parameters)  
 FD = Command Code

C0 = C0 = Switch HID Operation Mode ON  
30 = 3 additional Bytes for HID Mode on Both Technologies  
00 = Memory Position for HF RFID tag  
FF FF FF FF FF FF = key for Mifare memory access  
10 = Output in HEX values  
60 = Use Key A  
00 = left MSB nibble: Data Position, right LSB nibble: Data Length  
04 = HF ISO 15693 UID  
10 = LF Read UID LSB of read-only tag type  
00 = Memory Position for LF RFID tag  
79 = BCC  
BB = End of Telegram

## 4 Using hterm for Configuration

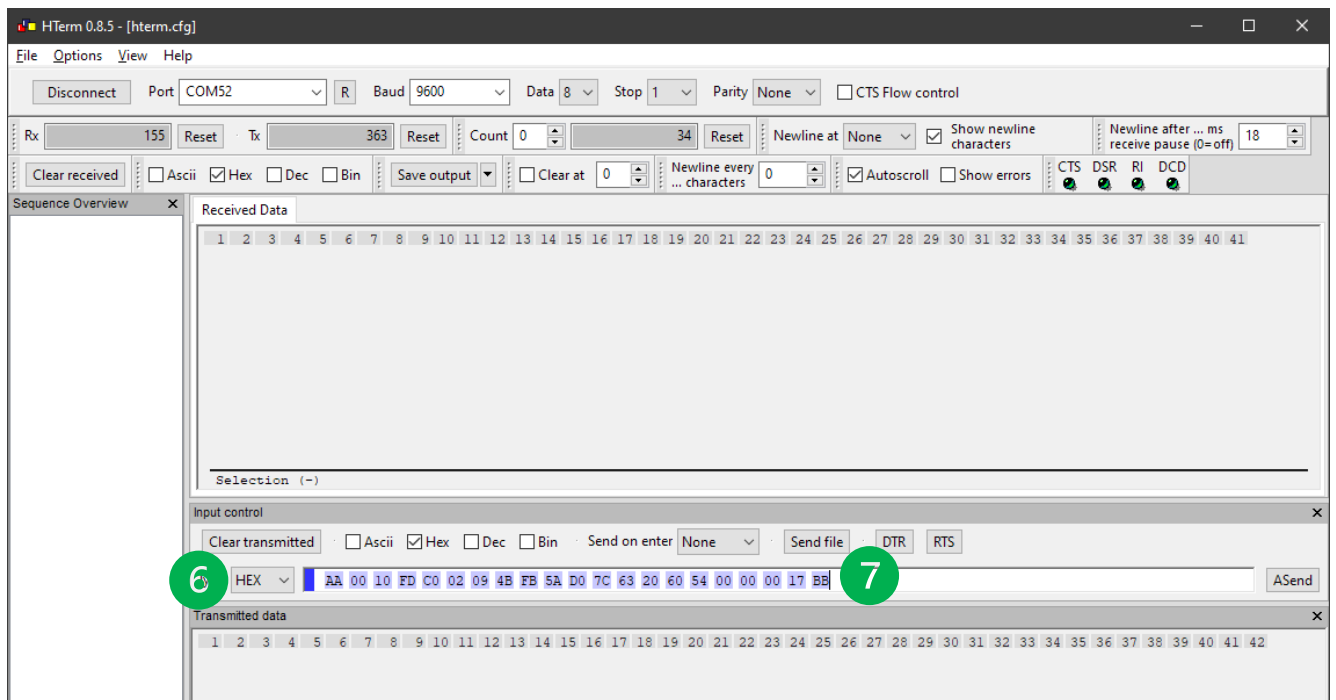
You can download the terminal software “hterm” here for free:

<https://der-hammer.info/pages/terminal.html>

### 4.1 Communication Parameters

- 9600 Baud
- 8 Databits
- 1 Stopbit
- No Parity

### 4.2 Initial Setting of hterm



1. Click on button [ R ]. This will search all available COM ports
2. Select the desired COM port
3. Set the communication parameters
4. Click on [ Connect ] to open the COM port
5. Select data format Hex for the received data
6. Select data format Hex for the transmit data
7. Type in the command to be sent. Then confirm with [ Enter ]

#### Note

The button [ ASend ] is for automatically repeating the transmit data. We do not use this function here.

## 5 Revision History

Version	Date	Notes
0.1	2021-01-21	Initial draft
0.2	2021-05-05	Missing Bytes in examples added, new examples added
0.3	2021-05-29	Details added, more examples added, deprecated information removed, configuration using HTerm included and adapted