



**OEM LF1S Devices**  
**LF RFID OEM Module**  
**Communication Protocol**

iDTRONIC GmbH  
Donnersbergweg 1  
67059 Ludwigshafen  
Germany/Deutschland

Phone: +49 621 6690094-0  
Fax: +49 621 6690094-9  
E-Mail: [info@idtronic.de](mailto:info@idtronic.de)  
Web: [idtronic.de](http://idtronic.de)

Issue 5.0  
– 27. March 2018 –

Subject to alteration without prior notice.  
© Copyright iDTRONIC GmbH 2018  
Printed in Germany

## Contents

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>Protocol description .....</b>      | <b>4</b>  |
| 1.1      | Default Baudrate.....                  | 4         |
| 1.2      | Data Package Format .....              | 4         |
| 1.3      | Byte Description in Data Package ..... | 4         |
| 1.4      | Command List .....                     | 5         |
| <b>2</b> | <b>System Commands .....</b>           | <b>6</b>  |
| 2.1      | Get_VersionNum (0x51) .....            | 6         |
| 2.2      | BUZ_control (0x52) .....               | 6         |
| 2.3      | LED_control (0x53) .....               | 6         |
| 2.4      | SET_ANT (0x54).....                    | 7         |
| 2.5      | EM4100/4200_GetUID(0x57) .....         | 7         |
| <b>3</b> | <b>Hitag S Commands .....</b>          | <b>8</b>  |
| 3.1      | HitagS_Request (0x58).....             | 8         |
| 3.2      | HitagS_Select (0x59) .....             | 8         |
| 3.3      | HitagS_Quiet (0x5C).....               | 8         |
| 3.4      | HitagS_ReadPage (0x5A).....            | 9         |
| 3.5      | HitagS_WritePage (0x5B).....           | 9         |
| 3.6      | HitagS_LockPage (0x60).....            | 9         |
| <b>4</b> | <b>Hitag1 Commands .....</b>           | <b>11</b> |
| 4.1      | Hitag 1 UID Request(0x70).....         | 11        |
| 4.2      | Hitag 1 Select(UID) (0x71).....        | 11        |
| 4.3      | Hitag 1 Halt(0x72) .....               | 11        |
| 4.4      | Hitag 1 Read Page(0x75) .....          | 12        |
| 4.5      | Hitag 1 Read Block(0x76) .....         | 12        |
| 4.6      | Hitag 1 Write Page(0x77) .....         | 12        |
| 4.7      | Hitag 1 Write Block (0x78) .....       | 13        |

## 1 Protocol description

### 1.1 Default Baudrate

| Baudrate | Data bit | Start bit | Stop bit | Checksum |
|----------|----------|-----------|----------|----------|
| 9600     | 8        | 1         | 1        | None     |

### 1.2 Data Package Format

Data package format, command package is sent from Host to Reader, response package returned from Reader to Host

#### CMD package format (Host to Reader)

| STX | STATION ID | DATA LENGTH | CMD | DATA [0..N] | BCC | ETX |
|-----|------------|-------------|-----|-------------|-----|-----|
|-----|------------|-------------|-----|-------------|-----|-----|

(BCC) = STATION ID  $\oplus$  DATALENGTH  $\oplus$  CMD  $\oplus$  DATA [0]  $\oplus$  ...  $\oplus$  DATA [n], where  $\oplus$  is the "EOR".

#### Response package format (Reader to Host)

| STX | STATION ID | DATA LENGTH | STATUS | DATA[0..N] | BCC | ETX |
|-----|------------|-------------|--------|------------|-----|-----|
|-----|------------|-------------|--------|------------|-----|-----|

(BCC) = STATION ID  $\oplus$  DATA LENGTH  $\oplus$  STATUS  $\oplus$  DATA [0]  $\oplus$  ...  $\oplus$  DATA [n], where  $\oplus$  is the "EOR".

### 1.3 Byte Description in Data Package

| Field       | Length | Description   | Remark   |
|-------------|--------|---|--|
| STX         | 1      | 0xAA: 'start byte' – standard control byte, means the start of one data package   |  |
| STATION ID  | 1      | Device address, necessary in multiple device communicating, when reader receive data package, it will judge the inner address if match up with itself preset, only response when match up | Address 0x00 is the special address only used under Single mode, reader will response any data package with 0 address(no address judge). |
| DATALLENGTH | 1      | Data byte length in data package, including CMD/STATUS and DATA field, but no BCC. LENGTH= numbers of byte (CMD/STATUS + DATA[0.. N])   |  |
| CMD         | 1      | Command byte: compose with one Cmd byte   | Only used in Send package  |
| STATUS      | 1      | Return status byte: status return from Reader to Host   | Only used in Return package  |
| DATA [0-N]  | 0–241  | This is a data flow related to Length and CMD byte. Some part of commands no need additional data   |  |
| BCC         | 1      | 8bits checksum byte, including all bytes XOR checksum besides STX, ETX  |  |
| ETX         | 1      | 0xBB: ' stop byte' – standard control byte, means end of data package   |  |

## 1.4 Command List

| CMD              | Name                | Description                           |
|------------------|---------------------|---------------------------------------|
| System Commands  |                     |                                       |
| 0x51             | Get_VersionNum      | To get device hardware version number |
| 0x52             | BUZ_control         | Buzzer control                        |
| 0x53             | LED_control         | LED control                           |
| 0x54             | SET_ANT             | To open or close antenna              |
| 0x57             | EM4100/4200_GetUID  | Get UID from read-only tag            |
| Hitag S Commands |                     |                                       |
| 0x58             | HitagS_Request      | Request card                          |
| 0x59             | HitagS_Select       | Select card                           |
| 0x5C             | HitagS_Quiet        | Card quiet                            |
| 0x5A             | HitagS_ReadPage     | Read data per page                    |
| 0x5B             | HitagS_WritePage    | Write data per page                   |
| 0x60             | HitagS_LockPage     | Lock page                             |
| Hitag 1 Commands |                     |                                       |
| 0x70             | Hitag 1 UID Request | Request card                          |
| 0x71             | Hitag 1 Select      | Select card                           |
| 0x72             | Hitag 1 Halt        | Halt card                             |
| 0x75             | Hitag 1 Read Page   | Read data per page                    |
| 0x76             | Hitag 1 Read Block  | Read data in large blocks             |
| 0x77             | Hitag 1 Write Page  | Write data per page                   |
| 0x78             | Hitag 1 Write Block | Write data in large blocks            |

## 2 System Commands

### 2.1 Get\_VersionNum (0x51)

#### Send Data

None

#### Reply with Success

STATUS: 0x00 – OK

DATA[0~5]: VersionNum

#### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

#### Example

Command from PC/PLC to RFID device: AA 00 01 51 50 BB

Reply from RFID device to PC/PLC: AA FF 07 00 48 69 74 61 67 53 F8 BB

Note: 48 69 74 61 67 53 is hardware version number

### 2.2 BUZ\_control (0x52)

#### Send Data

DATA[0]: Buzzer control time, unit as ms 0x00 ... 0xFF

#### Reply with Success

STATUS: 0x00 – OK

DATA: None

#### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

#### Example

Command from PC/PLC to RFID device: AA 00 02 52 64 34 BB (BUZ beeping 100ms )

Reply from RFID device to PC/PLC: AA FF 01 00 FE BB

### 2.3 LED\_control (0x53)

#### Send Data

DATA[0]: LED number 0x00 = LED1

0x01 = LED2

DATA[1]: LED control time, unit as ms 0x00 ... 0xFF

#### Reply with Success

STATUS: 0x00 – OK

DATA: None

#### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

### Example

Command from PC/PLC to RFID device: AA 00 03 53 00 64 34 BB (control LED1 lighting 100 ms)

Reply from RFID device to PC/PLC: AA FF 01 00 FE BB

## 2.4 SET\_ANT (0x54)

### Send Data

DATA[0]: control flag                      0x00 = close antenna  
   0x01 ... 0xFF = open antenna

### Reply with Success

STATUS: 0x00 – OK

DATA: None

### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

### Example

Command from PC/PLC to RFID device: AA 00 02 54 00 56 BB Close antenna

Reply from RFID device to PC/PLC: AA FF 01 00 FE BB

Note: reader default is antenna opened after power up

## 2.5 EM4100/4200\_GetUID(0x57)

### Send Data

None

### Reply with Success

STATUS: 0x00 – OK

DATA[0~4]: 5byte card UID

### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

### Example

Command from PC/PLC to RFID device: AA 00 01 57 56 BB

Reply from RFID device to PC/PLC: AA 00 06 00 01 0F C3 4E 30 B5 BB, among them 01 0F C3 4E 30 is card UID

### 3 Hitag S Commands

#### 3.1 HitagS\_Request (0x58)

##### Send Data

None

##### Reply with Success

STATUS: 0x00 – OK

DATA[0~3]: 4 byte card UID

##### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

##### Example

Command from PC/PLC to RFID device: AA 00 01 58 59 BB

Reply from RFID device to PC/PLC: AA FF 05 00 31 1E 45 72 E2 BB, among them 31 1E 45 72 is card UID

#### 3.2 HitagS\_Select (0x59)

##### Send Data

DATA[0~3]: card UID

##### Reply with Success

STATUS: 0x00 – OK

DATA[0~3]: HitagS configured package data

##### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

##### Example

Command from PC/PLC to RFID device: AA 00 05 59 31 1E 45 72 44 BB

Reply from RFID device to PC/PLC: AA FF 05 00 CA 00 00 AA 9A BB

Note: CA 00 00 AA is card configured package data

#### 3.3 HitagS\_Quiet (0x5C)

##### Send Data

None

##### Reply with Success

STATUS: 0x00 – OK

DATA: None

##### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

**Example**

Command from PC/PLC to RFID device: AA 00 01 5C 5D BB

Reply from RFID device to PC/PLC: AA FF 01 00 FE BB ,make card enter Quiet status

**3.4 HitagS\_ReadPage (0x5A)****Send Data**

DATA[0] : page address

**Reply with Success**

STATUS: 0x00 – OK

DATA[0~3]: 4Byte card data

**Reply in Case of Error**

STATUS: 0x01 – FAIL

DATA: None

**Example**

Command from PC/PLC to RFID device: AA 00 02 5A 00 58 BB to read Page0

Reply from RFID device to PC/PLC: AA FF 05 00 31 1E 45 72 E2 BB

**3.5 HitagS\_WritePage (0x5B)****Send Data**

DATA[0]: Page address

DATA[1~4]: 4Byte data

**Reply with Success**

STATUS: 0x00 – OK

DATA: None

**Reply in Case of Error**

STATUS: 0x01 – FAIL

DATA: None

**Example**

Command from PC/PLC to RFID device: AA 00 06 5B 3F 00 01 02 03 62 BB

Write data of 00 01 02 03 into Page 3F of HitagS 2048 card

Reply from RFID device to PC/PLC: AA FF 01 00 FE BB

**3.6 HitagS\_LockPage (0x60)****Send Data**

|          |                     |  |
|----------|---------------------|--|
| DATA[0]: | Lock page parameter | 0x01 = Lock page 1                             |
|          |                     | 0x02 = Lock page 2, page 3                     |
|          |                     | 0x03 = Lock page 4, page 5                     |
|          |                     | 0x04 = Lock page 6, page 7                     |
|          |                     | 0x05 = Lock page 8, page 9, page 10, page 11   |
|          |                     | 0x06 = Lock page 12, page 13, page 14, page 15 |
|          |                     | 0x07 = Lock pages 16 – 23                      |

0x08 = Lock pages 24 – 31  
0x09 = Lock pages 32 – 47  
0x0A = Lock pages 48 – 63

**Reply with Success**

STATUS: 0x00 – OK  
DATA: None

**Reply in Case of Error**

STATUS: 0x01 – FAIL  
DATA: None

**Example**

Command from PC/PLC to RFID device: AA 00 02 60 01 63 BB, Lock Page 1  
Reply from RFID device to PC/PLC: AA FF 01 00 FE BB

## 4 Hitag1 Commands

### 4.1 Hitag 1 UID Request(0x70)

#### Send Data

None

#### Reply with Success

STATUS: 0x00 – OK

DATA[0~3]: 4 bytes card UID

#### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

#### Example

Command from PC/PLC to RFID device: A 00 01 70 71 BB

Reply from RFID device to PC/PLC: AA 00 05 00 31 1E 45 72 1D BB, among them 31 1E 45 72 is card UID

### 4.2 Hitag 1 Select(UID) (0x71)

#### Send Data

DATA[0~3]: 4bytes card UID

#### Reply with Success

STATUS: 0x00 – OK

DATA[0~3]: Hitag1 configuration page (page1)

#### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

#### Example

Command from PC/PLC to RFID device: AA 00 05 71 31 1E 45 72 6C BB

Reply from RFID device to PC/PLC: AA 00 05 00 CA 00 00 AA 65 BB

Note : CA 00 00 AA is card configuration page (page1)

### 4.3 Hitag 1 Halt(0x72)

#### Send Data

None

#### Reply with Success

STATUS: 0x00 – OK

DATA: None

#### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

**Example**

Command from PC/PLC to RFID device: AA 00 01 72 73 BB

Reply from RFID device to PC/PLC: AA 00 01 00 01 BB, make card enter into Halt status

**4.4 Hitag 1 Read Page(0x75)****Send Data**

DATA[0]: page address, address range from 0x00 ~0x3F

**Reply with Success**

STATUS: 0x00 – OK

DATA[0~3]: 4 Bytes card data

**Reply in Case of Error**

STATUS: 0x01 – FAIL

DATA: None

**Example**

Command from PC/PLC to RFID device: AA 00 02 75 00 77 BB to read Page0

Reply from RFID device to PC/PLC: AA 00 05 00 31 1E 45 72 1D BB

**4.5 Hitag 1 Read Block(0x76)****Send Data**

DATA[0]: Block address, address range from 0x00 ~0x0F

**Reply with Success**

STATUS: 0x00 – OK

DATA[0~15]: 16 Bytes card data

**Reply in Case of Error**

STATUS: 0x01 – FAIL

DATA: None

**Example**

Command from PC/PLC to RFID device: AA 00 02 76 06 72 BB to read Block 6

Reply from RFID device to PC/PLC: AA 00 11 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 01 BB

**4.6 Hitag 1 Write Page(0x77)****Send Data**

DATA[0]: page address, address range from 0x00 ~0x3F

DATA[1~4]: 4 bytes data

**Reply with Success**

STATUS: 0x00 – OK

DATA: None

**Reply in Case of Error**

STATUS: 0x01 – FAIL

DATA: None

### Example

Command from PC/PLC to RFID device: AA 00 06 77 06 AA BB CC DD 77 BB to write page 6

Reply from RFID device to PC/PLC: AA 00 01 00 01 BB

## 4.7 Hitag 1 Write Block (0x78)

### Send Data

DATA[0]: Block address, address range from 0x00 ~0x0F

DATA[1~16]: 16 bytes data

### Reply with Success

STATUS: 0x00 – OK

DATA: None

### Reply in Case of Error

STATUS: 0x01 – FAIL

DATA: None

### Example

Command from PC/PLC to RFID device: AA 00 12 78 06 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 7C BB  
to write Block 6

Reply from RFID device to PC/PLC: AA 00 01 00 01 BB