# RFID
# HF Reader Module

# User Manual

# 1. Product Outline

## 1.1. Overview

The Mobia H300 is read/write modules that enable reading to and writing from the tag compliant with ISO/IES 15693.

## 1.2. Highlighted Features

- ISO/IEC15693 Standard
- Support ISO/IEC15693（Tag-It HF-I, I-CODE。。。）
- Response time<25ms
- Rang：50~100mm
- 4 GPIO
- Power Voltage : 3.3V ( Scan Mode: < 50mA, Idle Mode: < 5mA, Sleep Mode: < 1mA )

# 2. Interface

## 2.1. Serial Interface

3.3V TTL UART

## 2.2. Antenna Unit

Output Impedance：50 Ohm

## 2.3. PIN Define

| No. | NAME | I/O | Description |
|---|---|---|---|
| 1 | TDO/GPIO1 | O(I/O) | TDO(JTAG) / GPIO |
| 2 | TDI/GPIO2 | I(I/O) | TDI(JTAG) / GPIO |
| 3 | TMS/GPIO3 | I(I/O) | TMS(JTAG) / GPIO |
| 4 | TCK/GPIO4 | I(I/O) | TCK(JTAG) / GPIO |
| 5 | RXD | I | UART RXD |
| 6 | TXD | O | UART TXD |
| 7 | VCC_GND | | |
| 8 | VCC | | |
| 9 | TEST | I | Test(JTAG) |
| 10 | Uload_RX | I | UART RX |
| 11 | Uload_TX | O | UART TX |
| 12 | RST | I | RST(JTAG) |
| 13 | ANT. | | |
| 14 | ANT_GND | | |

# 3. I/O Pin Voltage Level

PIN1~PIN4 as Schmitt-trigger input

| Parameter | Condition | Min | Max | Unit |
|---|---|---|---|---|
| $V_{IT+}$ | VCC=2.2V | 1.1 | 1.3 | V |
| | VCC=3V | 1.5 | 1.8 | |
| $V_{IT-}$ | VCC=2.2V | 0.4 | 0.9 | V |
| | VCC=3V | 0.9 | 1.2 | |
| $V_{hys}$ | VCC=2.2V | 0.3 | 1 | V |
| | VCC=3V | 0.5 | 1.4 | |

PIN1~PIN4 as Schmitt-trigger output

| Parameter | Condition | | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{OH}$ (P1) | $I_{OHMAX}$=1.5mA | VCC=2.2V | VCC-0.25 | VCC | V |
| | $I_{OHMAX}$=6mA | | VCC-0.6 | VCC | |
| | $I_{OHMAX}$=1.5mA | VCC=3V | VCC-0.25 | VCC | |
| | $I_{OHMAX}$=6mA | | VCC-0.6 | VCC | |
| $V_{OH-}$ (P2) | $I_{OHMAX}$=1.5mA | VCC=2.2V | VCC-0.25 | VCC | V |
| | $I_{OHMAX}$=6mA | | VCC-0.6 | VCC | |
| | $I_{OHMAX}$=1.5mA | VCC=3V | VCC-0.25 | VCC | |
| | $I_{OHMAX}$=6mA | | VCC-0.6 | VCC | |
| $V_{Ols}$ (P1&P2) | $I_{OHMAX}$=1.5mA | VCC=2.2V | VSS | VSS+0.25 | V |
| | $I_{OHMAX}$=6mA | | VSS | VSS+0.6 | |
| | $I_{OHMAX}$=1.5mA | VCC=3V | VSS | VSS+0.25 | |
| | $I_{OHMAX}$=6mA | | VSS | VSS+0.6 | |

# 4. Communication Protocol

## 4.1. Data format

☐ **Char define**

| Char | value | Define |
|---|---|---|
| STX | 0x02 | Communication Start |
| ETX | 0x03 | Communication End |

**Host⇒Module**

| STX | Seq. No | Command | Length | Data[0]…Data[m] | BCC | ETX |
|---|---|---|---|---|---|---|
| | INFO(0) | | | | INFO(N) | |

**Module⇒Host**

| STX | Seq. No | Status | Length | Data[0]…Data[m] | BCC | ETX |
|---|---|---|---|---|---|---|
| | INFO(0) | | | | INFO(N) | |

## 4.2. Command Function

### 4.2.1. Command list

| Command | | Parameter | | Explaining |
|---|---|---|---|---|
| Name | Value | Transmitter | Receiver | |
| Inventory | 0x41 | -- | *_UID* | Read ID。 |
| Select | 0x42 | *_UID* | *_Status* | Chose card |
| Read a block | 0x43 | *TagType,*<br>*_BLKnum,*<br>*_UID(op)* | *_Status,*<br>*_Data* | Read data |
| Read Multi block | 0x45 | *TagType ,*<br>*_BLKnum,*<br>*_BLKlen,*<br>*_UID(OP)* | *_Status,*<br>*_Data* | |
| Write a block | 0x46 | *TagType,*<br>*_BLKnum*<br>*_UID(OP),*<br>*_Data,* | *_Status* | Write data |
| Write Multi block | 0x48 | *TagType,*<br>*_BLKnum,*<br>*_BLKlen,*<br>*_UID(OP)*<br>*_Data* | *_Status* | Write data<br>*( even )* |
| Lock a Block | 0x49 | *TagTyp,*<br>*_BLKnum*<br>*_UID(OP)* | *_Status* | Lock data |
| Get multi Security | 0x4A | *_UID ,*<br>*_BLKnum* | Security | Multi lock data |
| Stay quiet | 0x4B | *_UID* | *_Status* | Sleeping |
| Reset to Ready | 0x4C | *_UID(option)* | *_Status* | |
| Write AFI | 0x4D | *TagType*<br>*_UID(option)* | *_Status* | Write AFI |
| Lock AFI | 0x4E | *TagType*<br>*_UID(option)* | *_Status* | Lock AFI |
| Write DSFID | 0x4F | *TagType*<br>*_UID(option)* | *_Status* | Write DSFID |
| Lock DSFID | 0x50 | *TagType*<br>*_UID(option)* | *_Status* | Lock DSFID |
| Get System Info | 0x51 | *_UID(option)* | *_Info* | Read information |
| Change Baud | 0x52 | *_baud* | -- | Change Baud rate |
| Get hardware Ver | 0x53 | -- | _HardwareVer | |
| Get Software Ver | 0x54 | -- | _Software Ver | |
| Set Power Mode | 0x55 | _Mode | *_Status* | |
| Get Power Mode | 0x56 | -- | _Mode | |
| Set Module ID | 0x57 | _ID | *_Status* | Set Module ID |
| Get Module ID | 0x58 | -- | _ID | Read Module ID |

| | | | | |
|---|---|---|---|---|
| Save Configuration | 0x59 | -- | _*Status* | |
| Reboot | 0x5A | -- | -- | |
| Reset Factory Default | 0x5B | -- | _*Status* | |
| Set GPIO Initial | 0x60 | _Mode | _*Status* | |
| Get GPIO Initial | 0x61 | | _Mode | |
| Set Trigger Time | 0x62 | _Time | _*Status* | |
| Get Trigger Time | 0x63 | -- | _Time | |
| Set Trigger Mode | 0x64 | _Mode | _*Status* | |
| Get Trigger Mode | 0x65 | -- | _Mode | |

(OP) as（option）

### 4.2.2. Status List

| Name | Value | Description |
|---|---|---|
| RFID_OK | 0xE0 | Function execution successful |
| RFID_RFU | 0xF0 | RFU |
| RFID_CRCERR | 0xF1 | CRC error |
| RFID_NOTAGERR | 0xF2 | No tag response |
| RFID_UNKNOWN | 0xF3 | Unknown error |
| RFID_UNSUPPORTED | 0x01 | The command is not supported |
| RFID_UNRECOGNISED | 0x02 | The command is not recognized |
| RFID_OP_UNSUPPORTED | 0x03 | The command option is not supported |
| RFID_NO_INFORMATION | 0x0F | Error with no information given |
| RFID_BK_UNAVAILABLE | 0x10 | The specified block is not available |
| RFID_LOCKED_AGAIN | 0x11 | The specified block is already locked |
| RFID_LOCKED_CHANGE | 0x12 | The specified block is locked |
| RFID_PRG_FAILED | 0x13 | The specified block was not successfully programmed |
| RFID_LOCK_FAILED | 0x14 | The specified block was not successfully locked |
| RFID_PRO_DISABLED | 0xA0 | Factory programming disabled |
| RFID_START_BK_ODD | 0xA1 | Start block must be even |
| RFID_BLOCK_LOCKED | 0xA2 | One or both blocks are already locked |
| RFID_TS_UNSUPPORTED | 0xA3 | Test option not supported |
| RFID_CODEERR | 0xEF | BCC Error |
| RFID_LENERR | 0xFF | Data Length exceed Max-length Error |