
# RFID HF-3600E-RS232 13.56 MHz High Frequency Reader Instruction Manual



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## RFID HF-3600E-RS232 13.56 MHz High Frequency Reader


**Specifications**

- **Mechanical:** 80 x 40 x 84.5mm
- **Material:** PBT
- **Weight:** 122 grams
- **LED's:** Solid Green = Power On, Tag Present = Yellow On
- **RF:** ISO 15693 & 14443, 13.56 MHz, 9 to 28vdc @ 150mA typical, Up to 115.2k baud, M12 Male 8-pin RS232 w/Tag Present Option
- **Environmental:** IP67
- **Read Ranges:** Varies based on Tag size and chip type

## Product Usage Instructions

### Installation

1. Connect the Model HF-3600E-RS232 13.56 MHz RFID Reader to a power source using the provided PS12PJ Regulated AC power supply.
2. Ensure the reader is securely mounted in a suitable location for optimal performance.
3. Connect the Model CAB-8P-PWR-9P-2m Cable to the reader for data communication.

### Operation

1. Power on the reader by observing the Solid Green LED indicator.

2. Present RFID tags within the specified read range of the reader to trigger the Tag Present Yellow LED indicator.
3. Utilize a terminal program to send and receive commands in standard human-readable ASCII format.

**FAQ**

- Q: How can I extend the read range of the RFID reader?
  A: To extend the read range, consider using ISO 15693 chips which generally have a farther read range compared to ISO 14443 chips. Ensure that the RFID tags are within the specified read0 range of the reader for optimal performance.
- Q: Is there software available for configuration and applications?
  A: Yes, a Windows-based Configuration and Applications software program is available for use with the RFID reader. Additionally, an SDK is also provided for further customization.

**Model HF-3600E-RS232**
13.56 MHz Passive Reader/Writer

**How To Contact Us**

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- **Not Happy?** Need Immediate Results: Contact our President james@rfidinc.com 303-378-9500 cell 7am to 9pm CST

## Product Part Numbers & Accessories

| Part Number | Description |
|---|---|
| 830-8030-00M128P | Model HF-3600E-RS232 13.56 MHz HF RFID Reader w/on Board Serial Processo r & internal Antenna, 8pin M12 connector, both ISO 15693 & ISO |
| 730-0103-8P-PWR9P-2m | Model CAB-8P-PWR-9P-2m Cable, 2meters, M12 8pin connection to Model HF-36 00E Reader with quick connect power jack & 9pin female serial on opposite end |
| 720-0004-06 | Model PS12PJ Regulated AC power supply w/power jack plug, 12 vdc 750 mA |

**Specifications**

| | | | |
|---|---|---|---|
| **Mechanical:** | Measurements: | 80 x 40 x 84.5mm | 3.15” x 1.57” x 3.33” |
| | Material: | PBT | |
| | Weight: | 4.3 ounces | 122 grams |
| | LED’s: | Solid Green = Power On | Tag Present = Yellow On |
| **Certs/Compliance:** | RoHS III | REACH | CE |
| | FCC Part 15 & ETSI | SIL2 | Free of BBP, DEHP, DBP, DIBP |
| | EN 60068-2-27 Shock | EN 60068-2-32 Drop | EN 60068-2-6 Vibration |

| | | | |
|---|---|---|---|
| **RF:** | Standard: | ISO 15693 & 14443 | Reader & Tag Writer |
| | Frequency: | 13.56 MHz | HF (high frequency) |
| **Operation:** | Power/Connector: | 9 to 28vdc @ 150mA typical | M12 Male 8-pin |
| | Baud & Communications: | Up to 115.2k baud | RS232 w/Tag Present Option |

| | | | |
|---|---|---|---|
| **Environmental:** | Storage Temp: | -13°F to +185°F | -25°C to +85°C |
| | Temp, Operating: | -13°F to +185°F | -25°C to +85°C |
| | Life: | 40 Year Shelf Life | |
| | Ingress Protection: | IP67 | |

**Read Ranges**
Read ranges are dependent upon Tag size and chip. Generally, an ISO 15693 chip will read farther than an ISO 14443 chip by an average of 30%. Here is a sampling, measurements in inches. It should be noted this Model HF-3600E Reader is one of the most advanced and most powerful on the market. Similar read ranges may not be obtained with competing Readers.

| Tag Size↓ Tag Chip→ | 15693 | 14443 | % Less |
|---|---|---|---|
| 10mm diameter epoxy | 1.25 | 1 | 20% |
| 22mm diameter potted | 1.75 | 1.25 | 29% |
| 30mm diameter ABS | 2.25 | 1.5 | 33% |
| 35mm diameter ABS | 3 | 2.25 | 25% |
| 45mm Square Inlay | 3.75 | 2.25 | 40% |
| 50mm diameter potted | 3.25 | 2.5 | 23% |
| ISO Card | 4.25 | 3 | 29% |
| 86x54mm Inlay | 5 | 3.5 | 30% |

## General Information

- This manual provides information about the installation and operation of the Model HF-3600E-RS232 13.56 MHz Reader. This series of Readers are a single-piece solution Reader + an internal Antenna with an integrated processor in the enclosure. This Reader is unique in that it can operate with four different types of RFID Tag chips, ISO 15693, ISO 14443A, ISO 14443B, and NXP's original Icode1 (the latter not being an ISO standard). Under these standards there are varying amounts of Tag memory, all of which include a non-alterable ROM UID (unique identification) section that acts as a RO (read-only) random identifier, guaranteed unique.
- This Reader and the RFID Tags can also be provided as a proprietary product for brand protection applications. This Reader is simple to use, plug & play, in that all commands and reports are represented in standard human-readable ASCII when used through a terminal program. It is not necessary to convert commands to hex nor translate the outputs from hex as this work is done in our processor. A Windows-based Configuration and Applications software program is also available, as well as an SDK.
- The Reader operates as both a transmitter and receiver, providing a high-frequency electromagnetic field at 13.56 MHz to energize and activate an electronic transponder (RFID Tag). Once the Tag is energized it modulates its data back to the Reader which in turn detects and demodulates this data for delivery to the serial port.

| **Description** | **Min** | **Typ** | **Max** | **Units** |
|---|---|---|---|---|
| Input Voltage | 8 | – | 24 | Volts DC |
| Input Current | 250 | 350 | 500 | mA |
| Cabling distance | – | – | 50 | Feet |
| Temperature range | 0 | – | 85 | Celsius |

| **Serial Communications** | | | **J3 Pin out** | |
|---|---|---|---|---|
| Baud Rate | 115200bps | | 1 | +VDC Input |
| Data Bits | 8 | | 2 | 0VDC, Ground |
| Parity | None | | 3 | GROUND In |
| Stop Bits | 1 | | 4 | RS232 TX (Out) |
| Flow Control | None | | 5 | RS232 RX (In) |

| | | | |
|---|---|---|---|
| Data Storage: | None | | |
| Error Rate: | Less than 1 in 10 to the 14th readings | | |
| Serial Connectors: | 9 pin D-SUB Female | Twisted pair pigtails | |
| Power Connectors: | Quick Connect Single Male Pole | Twisted pair pigtails | |
| Cabling distance: | 50’ (RS232) | | |
| Power Requirements: | Min = 7vdc<br>Current Min = 250mA | Typical = 24V Current Typ = 300mA | Max = 28vdc<br>Current Max = 500mA |
| Temperature range: | Operating 0C to 70C | Non-Operating -20C to 125C | |

**Wire Specifications**

Shielded co-axial cable with an 8-pin M12 connector. RS232 has a maximum effective distance of 50’, use RS232 to RS422 converters if distance up to 2k’ is necessary. If you are not using a concentration block and prefer a direct connection, we do offer an accessory cable with 8pin M12 for connection to the Reader which splits to a 9-pin D-sub serial connector and quick connect power connector. The 9pin serial connector is pre-wired to act as a null modem with pins 2 and 3 being crossed.

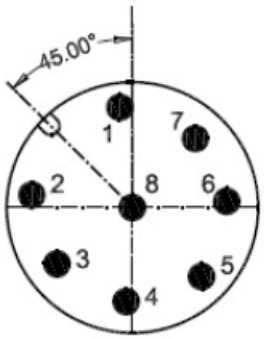
**Power & Communication Connection**

Regulated power supplies are preferred, linear power supplies are acceptable, switching power supplies should never be used as they affect the Reader’s read range performance. Take care that while some supplies are labeled

as regulated, they are actually switching. Contact the source of your supply or contact RFID, Inc. technical support with the make and model number of your supply. RFID, Inc. can provide an AC adaptable power supply suitable for use with this Reader.


### 8pin M12 Connection

INSERT 8pin WIRING DIAGRAM HERE




M12 Connector Male
Front View

**NOTES:** For PN 830-8030-00M128P
PINOUT SIGNAL NAME

1. = +24VDC I/O TP (Tag Present)
2. = TD, R$232
3. = RD, RS232
4. = NC (No connection)
5. = RTS -TP (Hand Shake)
6. = 0VDC, Power In VDC Return
7. = + 9VDC to + 28VDC Power Supply Input
8. = Ground, R$232

**Drawing**

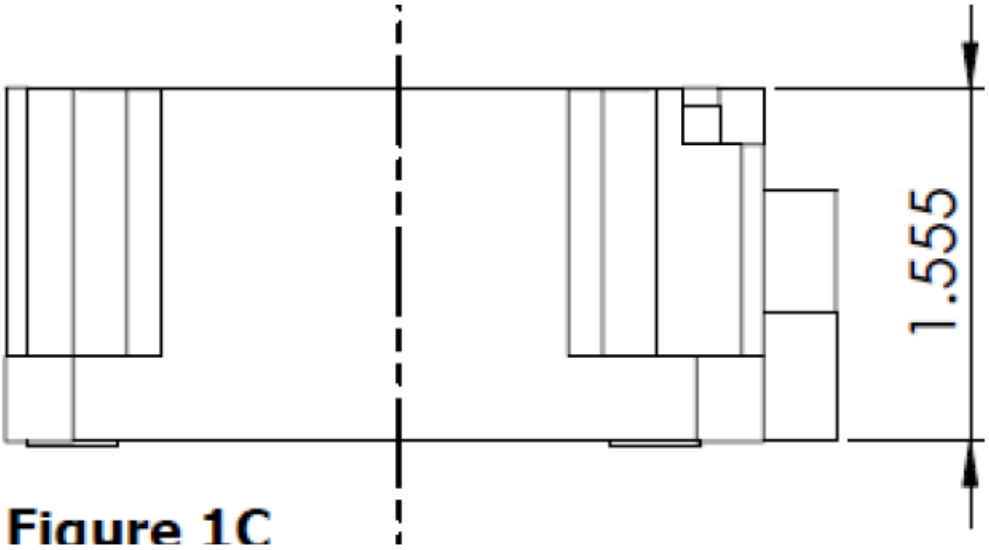



Figure 1C

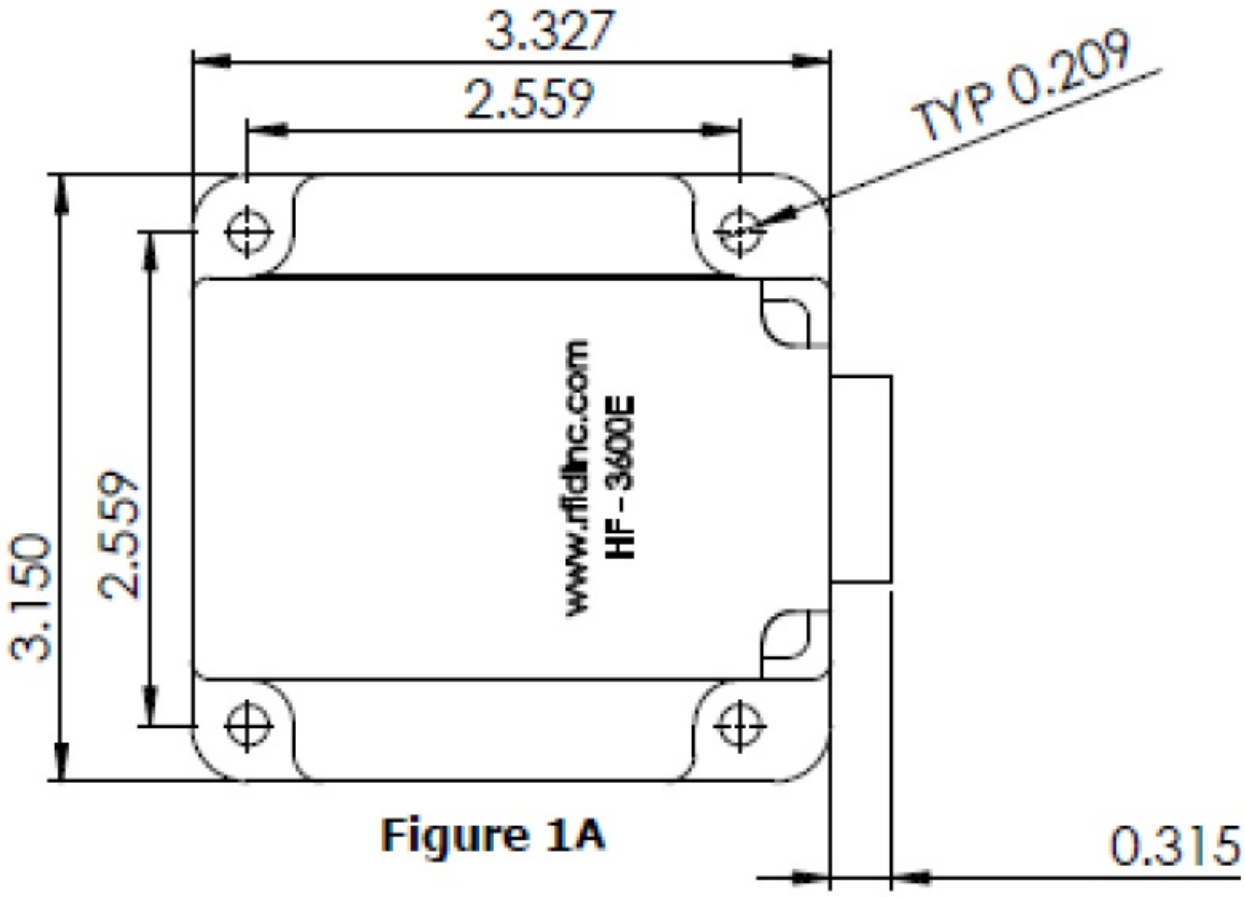
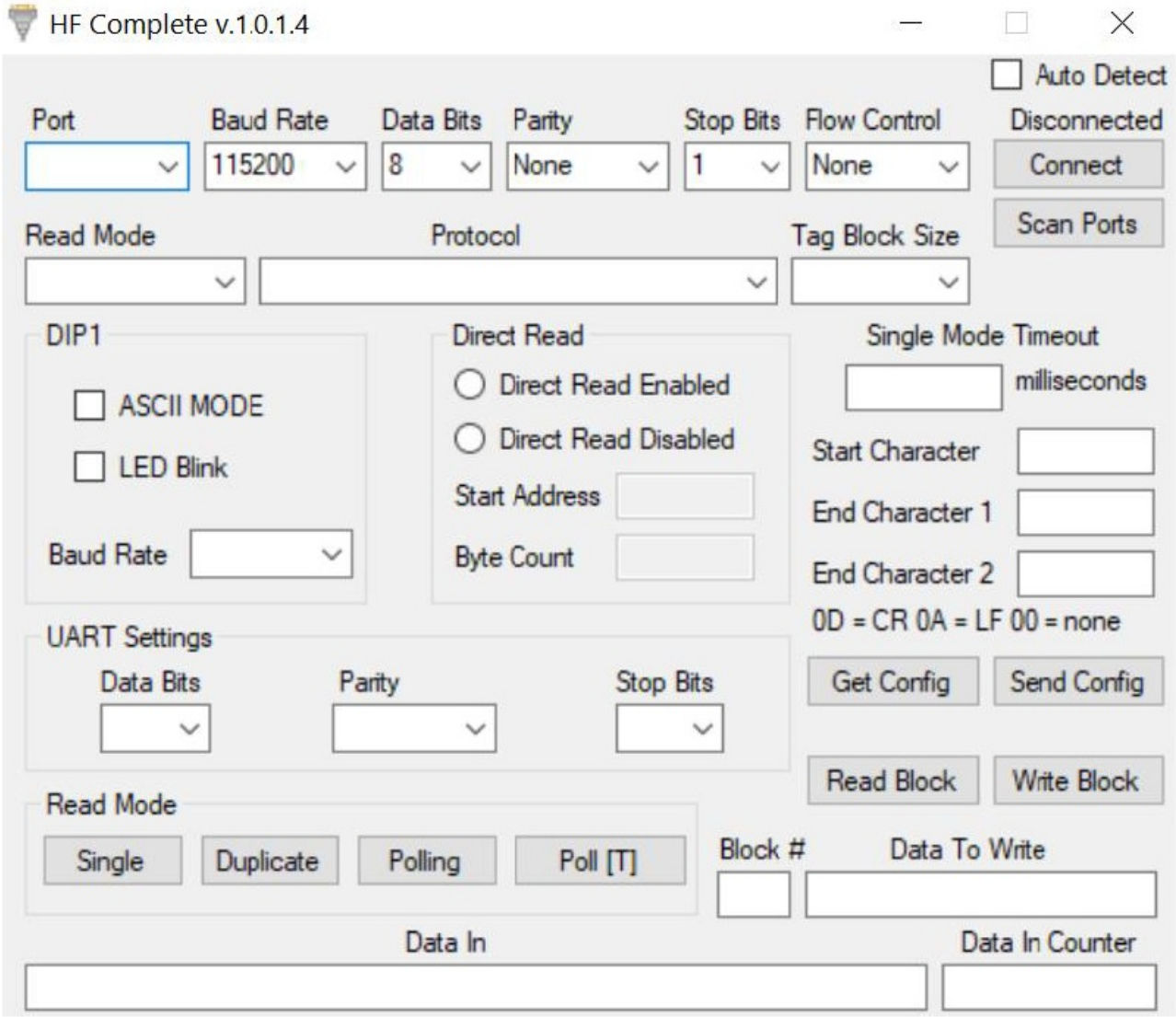



Figure 1A

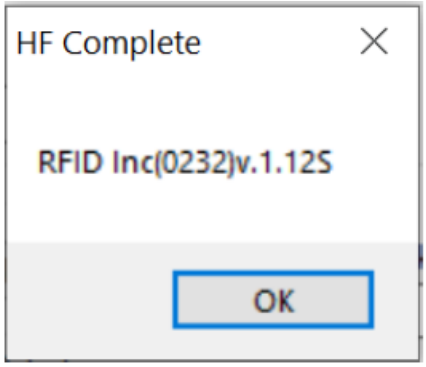
**Quick Start Installation Guide**

**Software**

Go to **https://www.rfidinc.com/resource-center/** and choose the HF Complete option. Download the zip file. Therein is contained an executable file for the program depicted below, as well as video tutorial. Save those files to a folder on your PC and create a shortcut on your desktop. Open the HF Complete file. You may have to temporarily turn off your firewall especially if you have Norton. The file is safe, do not worry. Once opened you should see this screen:



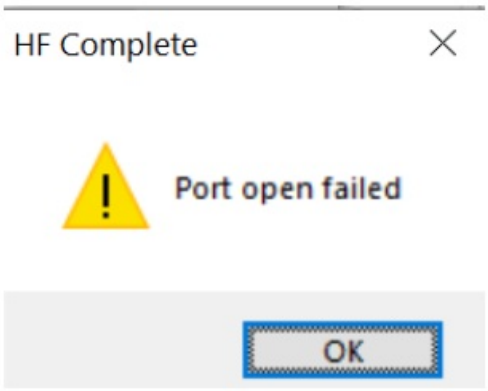

- Connect the Reader to your Windows based PC or laptop via the USB cable. If your PC or laptop does not have a 9pin serial port, use a Serial to USB adaptor. These can be sourced for about $10. You should now see a green LED at one corner of the Reader.
- In the program, you can check “Auto Detect” and the settings of Baud Rate, etc. on your PC will be detected once you select “Scan Ports.” In the off chance the Baud Rate does not automatically detect, yet continues to cycle, you should uncheck “Auto Detect.” Either way, follow these procedures. Select “Scan Ports” in the upper right. At upper left use the pulldown menu under “Port” and choose the port shown. Now choose “Connect” in the upper right. You should now see this pop up.




- This indicates the Reader is now connected. The settings at the top of the HF Complete program of Baud Rate, Data Bits, etc. are the settings on your PC. All other same settings further down in the HF Complete program

are the settings of the Reader and will fill in once you select OK in this pop up. Defaults are 115200 baud, 8 data bits, none parity, 1 stop bis and none Flow Control, ASCII Mode, Direct Read Enabled, Single Read Mode to read UID memory section of Tag.

- If at any time you see this pop up, re-power the Reader.




**About the HF Complete Program**

- It should be understood this program offers both the features of a Configuration App (Config) and Operations App (Run) in a single program.
- **Configuration App (Config)** – Think of Configuration options as the settings you'd prefer for your Reader. Selections that are considered as Config are generally white, like Port, Baud Rate, Data Bits, Parity, Stop Bits, Flow Control, Read Mode, Protocol, Tag Block Size, DIP1, Direct Read, Single Mode Timeout, Start and End Characters, UART Settings. Any changes to these sections that are a part of the Config App require the icon "Send Config" to be pressed and the Reader to be re-powered.
- **Operations App (Run)** – and Run options are what operate the Reader, Connect, Disconnect, Scan Ports, Get Config, Send Config, Read Block, Write Block, GroupBox 1, Block Number, Data to Write, Data In and Data Counter, although the latter 4 are white in color. You can make changes to any of the Run App selections, but they will not be held in non-volatile memory. For example, if you have the Read Mode (Config) set to Single and you change the GroupBox 1 (Run) to Duplicate Read Mode, this latter setting will not be held in non-volatile memory, meaning if you re-power the Reader it will revert to the setting of the Config, that being Single Read Mode.

**DIP1 Section (Config)**

- Left unchecked, the ASCII box will leave the Reader operating in hexadecimal values, offering only characters of 0-9 and A-F. When checked, you will be able to program and read Tags in ASCII, for example with the data John Q. Smith. It should be noted, that if you change from hexadecimal to ASCII or vice versa, a Tag will have to be re-programmed in order to be read. Also note that in ASCII you will have half the characters available, 8 characters per block versus 16 characters when using hexadecimal.
- The LED Blink option allows for the change to blinking LED's on the Reader when a Tag is presented. Left unchecked, the LED's will remain solid.

**Direct Read Section (Config)**

Default is for Direct Read Disabled, which enables the Reader to read only the UID section of Tag memory. Set the

selection to Direct Read in order to read a specific block or blocks of data in extended memory by default. You could further choose Start Address as 01 and Byte Count to 8 to read the first block of data, or Byte Count to 16 to read the read the first two blocks of data. However, you can always manually read a single block by entering the Block# located at bottom right of program and selecting “Read Block.”

**Single Mode Timeout (Config)**

This setting determines the amount of time a Tag must be absent from the Reader before being able to be read and reported again. A setting of 2000 = 2 seconds. If you read a Tag and remove it from the Reader for 1 second and re-present the Tag, it will not read again although the yellow LED will become active. If you remove the Tag and re-present after 2 seconds, it will read and report again. The minimum allowable setting is 100ms.

**Start and End Characters (Config)**

These are settings for the structure of Reader outputs of messages or Tag data. Normally we use LF as start and CR as end of message. These can be turned off by setting to 00, or changed to
Data+CRLF by setting start to 00 and End 1 to CR and End 2 to LF, or changed to DATA+CR by setting Start to 00 and End 1 to CR and End 2 to 00. The default is Start = LF, End 1 = CR, End 2 = 00 equating to an output of <LF>DATA<CR>.

**UART Settings (Config)**

Obviously these are the Data Bits, Parity and Stop Bits settings.

**Reading Modes**

- In addition to the green LED on the Reader indicating power is applied, a yellow LED will appear while a Tag is present to the Reader. You can change the Read Mode by selecting Single, Duplicate or Polling. Notice that as you do so, the message OK will fill into Data In field.
- Single Read Mode – will read a Tag one time upon presentation to the Reader and will timeout based on the Single Mode Timeout setting. That timeout sequence begins only after a Tag is removed from the Reader, meaning if a Tag is set upon the Reader for an indefinite period of time, it will never be read a second time. Presentation of a second Tag would be immediately reported and the timeout sequence begun anew.
- Duplicate Read Mode – will continually read and report a Tag, a nice tool for read range and read window testing. The number of times a Tag is read will be shown in the Data In Counter field.
- Polling Read Mode – will read and report a Tag only when commanded using the “Poll [T]” option, although the yellow LED will still illuminate as long as a Tag is present to the Reader.

**Get Config**

When you select Get Config this will show all the Reader’s current settings in the Data In field. Some may be unintelligible to the user, but here is an example.

- S,07,ALL PROTOCOLS,08,0,8,FF,00,0A,0D,00,2000
- S = Read Mode
- 07 = DIP1 (115200 Baud Rate)
- ALL PROTOCOLS = Tag chips able to be read
- 08 = Block Size

- 0 = Start Address
- 8 = Number of bytes
- FF = Direct USER memory Read Disabled (55=Enabled)
- 00 = UART Bits (Parity, data bits, etc.)
- 0A = Start char
- 0D = End char 1
- 00 = End char 2
- 2000 = Single mode timeout

**Tutorial Video**

All features discussed thus far can be viewed in tutorial video located here **https://www.rfidinc.com/resource-center/**

**SDK's**

Please visit **https://www.rfidinc.com/resource-center/**

**Using a Terminal Program & ASCII commands**

- If you prefer, any common terminal emulation program can be used, for example HyperTerminal, ProComm, Teraterm, Putty, etc. If you have already interfaced the Reader to a terminal program or your own software, upon powering the Reader you will see a power up message. You can then use the ASCII Reader commands shown in Section 3 Operating the Reader.
- RFID, Inc.'s free of charge Terminal Program – RFID, Inc. provides a free software demo program called "RFID Demo Terminal Program" downloadable here **https://www.rfidinc.com/resource-center/**. It may appear in your Programs menu as RFIDIncUHFTerm. It is important to follow these steps in order for the program to scan and identify the ports available on your computer.
    - Plug the RS232 9 pin connector into your computer (use an RS232 to USB converter if no 9 pin connector is available on your computer).
    - Power the Reader.
    - Execute the RFIDIncUHFTerm Program. Select "Scan Ports" found upper right. This allows the program to scan which port address is connected to the Reader. In the upper left, under "Ports" use the pulldown menu to choose the port discovered.
    - Set the baud rate and remaining communication settings, default is 115200 baud, 8 data bits, None Parity, 1 stop bit and None Flow Control (115200, 8, N, 1, N). You can also view which port is connected by going to your Desktop, right click on My Computer, choose Properties, Hardware and Device Manager, then open the Ports directory tree.
    - Select "Connect." Presenting a Tag to the Antenna should now bring that Tag data onto the main screen and the lower body of the screen as well.

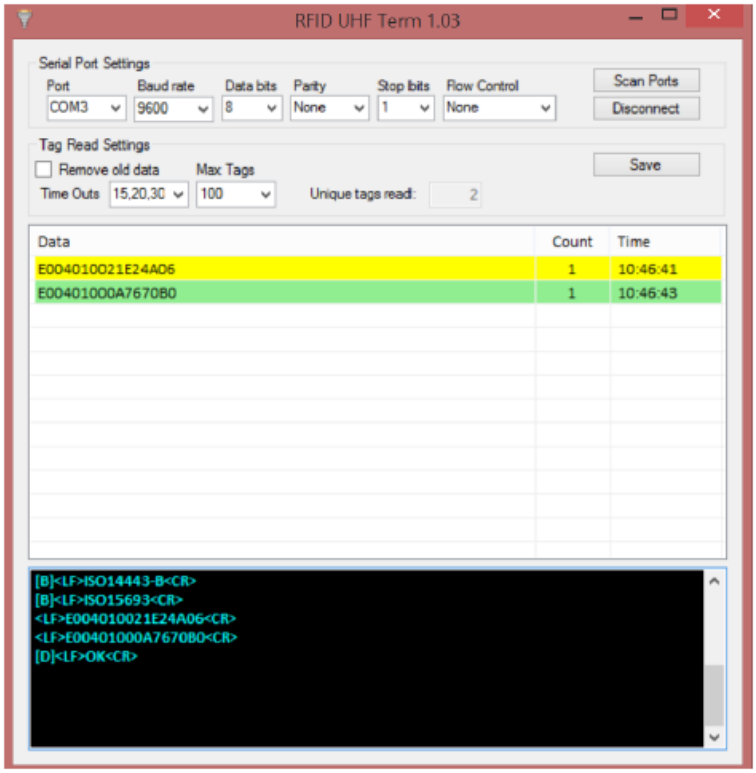
**Remove Old Data**
This program also offers the ability to "Remove Old Data" by checking this box under "Tag Read Settings," a process of deleting Tag reads from the screen set to the timeouts you choose in the pull down menu. For example if you choose 5,10,15 Timeout, Tag data will begin highlighted in green for the first 5 seconds, then become highlighted in yellow at 5 seconds time, then turn to red at 10 seconds, and finally be deleted at 15 seconds.

**Maximum Tags**
An option rarely used for HF Tags. This program also offers the ability to time how long it takes to read the amount of Tags you wish to test by choosing the number of Tags under the “Max Tags” setting. You will see the data field to the right increment as the Reader counts how many unique Tags have been read. If you choose 100 as your Max Tags setting, once the Reader has read 100 unique Tags a pop up box will appear advising you the amount of time this procedure took.

**Save**
This box will prompt you to save Tag data to a text file with time and date stamp. The main screen area (white) is solely used for display of Tag data. The lower screen area (black) will display Tag data and also allow you to enter commands to the Reader. Note – All commands must be issued in CAPS, preceded by an open square bracket and ended with a closed square bracket [B] for example. There is more in depth information on how to read and write specific portions of Tag memory under the Commands section of this product manual.

**Single Report Tag Read Mode**
Place your cursor in the lower screen area and type [S]. This will initiate the Single Report Tag Read Mode and the Reader will respond with “OK.”

**Duplicate Report Tag Read Mode**
Place your cursor in the lower screen area and type [D]. This will initiate the Duplicate Report Tag Read Mode and the Reader will respond with “OK.”




## Operating the Reader

This section explains operational commands and input received back from the Reader, commands, operating modes, and responses.

**Note:**

- All commands are issued in ASCII CAPITAL letters, and they are preceded by an open square bracket and ended with a closed square bracket. Some symbols and all numbers are permitted. No spaces are permitted.
- Commands are held in non-volatile memory, meaning that if power is taken away from the Smart Antenna the last command or settings will be retained when re-powered.

**General Commands & Responses (ISO protocol independent)**

**Tag Data Delivery**
Tag data will be sent to the serial port in the following format.
<LF>XXXXXXXX<CR> Where: <LF> = Line Feed XXXXXXXX = Tag data <CR> = Carriage Return

**Single Mode Command – [S]**
This command causes the reader to enter SINGLE MODE. In this mode the reader will only report the Tag ID once when it arrives within antenna range. The Reader continues to read the ID but does not report it again. As long as a Tag is continually present to the Reader only 1 read will be reported however if the Tag leaves the Reader's RF field briefly and is re-presented the read will be re-reported.

- Host: [S] Where: S = command
- Reader Response: <LF>OK<CR>
  Where: <LF> = Line Feed
  OK = Response <CR> = Carriage Return

**Duplicate Mode Command – [D]**
This command causes the reader to enter DUPLICATE MODE. In this mode the Reader will continually report any Tag ID present to the Reader. This mode is mostly used as a test or demonstration mode to visually measure read range

- Host: [D] Where: D = command
- Reader Response: <LF>OK<CR>
  Where: <LF> = Line Feed
  OK = Response <CR> = Carriage Return

**Polling Mode Command – [P]**
This command causes the transponder to enter POLLING MODE. In this mode the Reader does not capture Tag IDs automatically; the user must use the 'T' Transfer command to request an ID to be captured.

- Host: [P] Where: P = command
- Reader Response: <LF>OK<CR>
  Where: <LF> = Line Feed
  OK = Response <CR> = Carriage Return

**Transponder ID Transfer Command (polling mode only) – [T]** This command can only be used in POLLING MODE, it causes the reader to attempt an ID read.

- Host: [T] Where: T = command
- Reader Response: <LF>Tag Data<CR>
  Where: <LF> = Line Feed
  Tag Data = Response
  <CR> = Carriage Return or
- Reader Response: <LF>e<CR>
  Where: <LF> = Line Feed

e = Response indicating no Tag is present <CR> = Carriage Return

**[Rbb] – Read Block**
Read Block, bb = block address in hex.

**[Rbbnn] – Read Multiple Blocks**
Read multiple blocks, bb = block address, nn = block count, both in hex, max number of blocks = 16.

**[Wbbdata…] – Write Block**
Write block command, read and understand your tag before using. It is affected by the [7x] format command.

- bb = block to write.

  Examples: ASCII format enabled.
- [W001234] Write block 00, a 4-byte block with 1234 (it writes 31323334)
- [W0187654321] Write block 01, an 8-byte block (Fujitsu) with 87654321 (writes 3837363534333231).

  Examples ASCII format disabled: (the format we always used before)
- [W0031323334] Writes 31323334 to block 00.
- [W013132333435363738] writes 3132333435363738 to block 01.

**[1xxxx] – Start Address**
Sets the START ADDRESS for the automatic user memory read. xxxx is a 4-character decimal number. Min = 0000 Max = 1024.

**[2xxxx] – Byte Count**
Sets the BYTE COUNT for the automatic user memory read. xxxx is a 4-character decimal number. Min = 0000 Max = 1024.

**[3x] – Block Size**
Sets the BLOCK SIZE for the automatic user memory read. x = 4 or 8. NOTE: BLOCK SIZE has to be 4 or 8 and BYTE COUNT has to be a multiple of BLOCK SIZE

**[4x] – Memory to Read Setting**
Select read user memory direct on or off. x = 1 or 0. 1 = ON Read User memory instead of UID. 0 = OFF.

**[5bps] – UART Settings**
b = Data bits 7 or 8 bits
p = Parity Even Odd or None
s = Stop bits 1 or 2
**Example**
[58E1] sets 8 data bits, even parity, 1 stop bits.

**[6sbehel] – Start and End Settings**
sb = start byte
eh = End byte High or first end byte
el = End byte low or second end byte
**Examples:**
[6000D0A] Start disabled. END 1 = CR END 2 = LF. tag data in this format: 12345678CRLF
[60A0D00] Start = LF, END 1 = CR, END 2 = disabled. Tag data in this format: LF12345678CR
[6000D00] Start disabled, END 1 = CR, END 2 disabled. Tag data in this format: 12345678CR

**[7x] – Select Hexadecimal or ASCII Format**
Select hex (raw) or ASCII format.

1 = ASCII
0 = hex (RAW)
Let's assume a tag block of 4 bytes is programed like this.
Byte 1 = 0x30, byte 2 = 0x31, byte 3 = 0x32, byte 4 = 0x33
If ASCII is enabled [71] Tag will be reported as 0123 (Humana uses ASCII)
If RAW is enabled [70] Tag will be reported as 30313233

**[B] – Change Tag ISO Protocol**
Change tag protocol, every time you enter [B] you advance to the next protocol, or command directly using [Bx].

**[Bx] – Change Tag ISO Protocol Directly or View Current Setting**
[B?] Returns current protocol
[B1] NFC-A ISO14443A
[B2] NFC-B ISO14443B
[B3] NFC-F FeliCa
[B4] NFC-V ISO15693
[B5] ST25TB04K

**[ERS] – Reset to Factory Defaults**
Erases all EEPROM returning reader to factory defaults

**[I] – View Reader Firmware Version**
[DIP1xx] – Virtual Dipswitch Settings
xx = a hexadecimal value to write to the deep-switch EEPROM byte

| BIT7 | BIT6 | BIT5 | BIT4 | BIT3 | BIT2 | BIT1 | BIT0 |
|---|---|---|---|---|---|---|---|
| Future use | ASCII EN | BLINK EN | Future use | Future use | BAUD2 | BAUD1 | BAUD0 |

- Bit 7 NOT USED – Leave as 0
- Bit 6 ASCII EN – It is set or cleared by the command [7x] 1 = ASCII MODE enabled
  0 = ASCII MODE disabled
- Bit 5 BLINK EN – Set or cleared by the command [LEDx] 1 = SYSTEM LED BLINK on read enabled
  0 = SYSTEM LED BLINK on read disabled
- Bit 4 NOT USED – Leave as 0
- Bit 3 NOT USED – Leave as 0
- Bits 2 to 0 – Baud Rate settings

| BIT2 | BIT1 | BIT0 | Baud rate |
|---|---|---|---|
| 0 | 0 | 0 | 1200 |
| 0 | 0 | 1 | 2400 |
| 0 | 1 | 0 | 4800 |
| 0 | 1 | 1 | 9600 |
| 1 | 0 | 0 | 19200 |
| 1 | 0 | 1 | 38400 |
| 1 | 1 | 0 | 57600 |
| 1 | 1 | 1 | 115200 |

**[V] – View Current Settings**
Returns current settings. Protocol, Read Mode, Virtual DIP Switches.

**Error Messages**

- ? – Invalid Command
- e –no read or Tag present
- FAILED – Write fail

These messages follow the same formatting as tag data. The '?' – Invalid command message indicates that the device detected a problem with the last command issued. The invalid command message is issued upon reception of the end of message delimiter when one of the following errors has been detected:
No command between delimiters – the receipt of a start and end delimiters without a command. Illegal command between delimiters – the receipt of a message not contained within this specification.
Legal but invalid command received – i.e. the receipt of [T] Transfer/read request while not in MODE Polling.

**Tag Memory**
Generally, HF RFID passive Tag chips, containing a EEPROM with encoded data, have no finite life for read only operations and a finite life of 100k writes. There exists a plethora of HF Tag chips available on the market, thus Tag memory is not discussed in detail herein. RFID, Inc. can provide a specific memory organization map dependent upon the chip and size of memory you intend to use.

**ISO15693**

The Tag UID is 64 bits long (8 bytes), represented by 16 hexadecimal characters. Example <LF>E0078077CDCD153E<CR>.
Most ISO15693 transponders are divided in blocks of 4 bytes (32 bits) represented by 8 hexadecimal characters. Example <LF>05 00000578<CR>.
In some very rare cases an ISO15693 transponder will be divided in blocks of 64 bits. The reader automatically recognizes these types of Tags and adjusts its data size accordingly. If you are not familiar with the block size of the Tag in use, it is recommended to read a block from it to discover the block size.

**ISO14443-B**

The Transponder ID is 32 bits long (4 bytes). Example <LF>008B78B5<CR>
Tag memory is divided in pages of 8 bytes (64 bits) represented by 16 hexadecimal characters. When reading a page the reader first sends the two digit page number followed by a space and the 16 characters of data. Example

<LF>05 0000000000000056<CR>.
Here are some examples of memory sizes available. With new chips being added to the market from time to time, this list may not be up to date.

| ISO 15693 | ISO 14443A | ISO 14443B |
|---|---|---|
| 256 bits | 512 bits | 1k bits |
| 512 bits | 320 Bytes | 2k bits |
| 576 bits | 1k bits | 4k bits |
| 1k bits | 4k Bytes | 8k bits |
| 2k bits | 8k bits | 16k bits |
| 2k Bytes | | 32k bits |
| 10k bits | | 64k bits |

Here is an example of a memory map for a 1k bit (1024 bits) Tag:

| **-4** | **UID0** | **UID1** | **UID2** | **UID3** |
|---|---|---|---|---|
| **-3** | **UID4** | **UID5** | **UID6** | **UID7** |

| -2 | Reserved for Control Bytes |
|---|---|
| -1 | Reserved for Write Access |
| 0 | 32 bit data, 8 bytes |
| 1 | 32 bit data, 8 bytes |
| 2 | 32 bit data, 8 bytes |
| 3 | 32 bit data, 8 bytes |
| 4 | 32 bit data, 8 bytes |
| ……. | …….. |
| 24 | 32 bit data, 8 bytes |
| 25 | 32 bit data, 8 bytes |
| 26 | 32 bit data, 8 bytes |
| 27 | 32 bit data, 8 bytes |

## Troubleshooting

**My Reader is not responding.**
Re-power the unit. Ensure the LED is on indicating power is applied? If not, check the source of your supply (change AC outlets or power supplies).

**The LED is on but does not blink when a Tag is presented.**
Ensure the Reader is in the correct Tag Mode specific to your specific ISO Tags, for example 15693. Change the

Tag Mode using the [B] command.

**The LED is comes solid or blinks when a Tag is presented but I see no data on my PC.**
Ensure communications are established by re-powering the Reader (RS232 only) and looking for a startup message or enter an invalid command which should bring the response of a question mark (?). If you do not see these occur, there is an issue with communications not be properly established. Ensure your COM port is addressed correctly if using HyperTerminal.

**The Reader returns a question mark (?)**
The command you are attempting is not being entered correctly. Ensure you use open square bracket, capital letters, and close square bracket.

## FCC Statement

### FCC Info for FCC Part 15 Devices

- Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.
- This product meets the applicable FCC Part 15 rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
- To limit RF exposure, please ensure 8 inches (20 cm) of separation from the device at all times.

## WARRANTY

- RFID, Inc. products are warranted against defects in materials and workmanship for one (1) year from date of shipment. RFID, Inc. shall, at its option, either repair or replace products that prove to be defective and are returned with freight prepaid to RFID, Inc.'s plant within the warranty period. The foregoing warranty shall not apply to defects resulting from abuse, misuse, accident, alteration, neglect or unauthorized repair or installation. RFID, Inc. shall have the right of final determination as to the existence and cause of the defect.
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- The remedies provided herein are Buyer's sole and exclusive remedies. In no event shall RFID, Inc. be liable for direct, indirect, special, incidental or consequential damages, (including loss of profits) whether based on contract, tort, or any other legal theory.

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## Documents / Resources

| | |
|---|---|
|  | **RFID HF-3600E-RS232 13.56 MHz High Frequency Reader** [pdf] Instruction Manual<br>HF-3600E-RS232, HF-3600E-RS232 13.56 MHz High Frequency Reader, 13.56 MHz High Frequency Reader, High Frequency Reader, Frequency Reader, Reader |

## References

- **User Manual**