# Auto Encode User Manual

2020/11/13

Version:1.0

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# Contents

# 1. Installation

## 1.1. System Requirements

- Windows XP/7/10
- .NET Framework 4.0

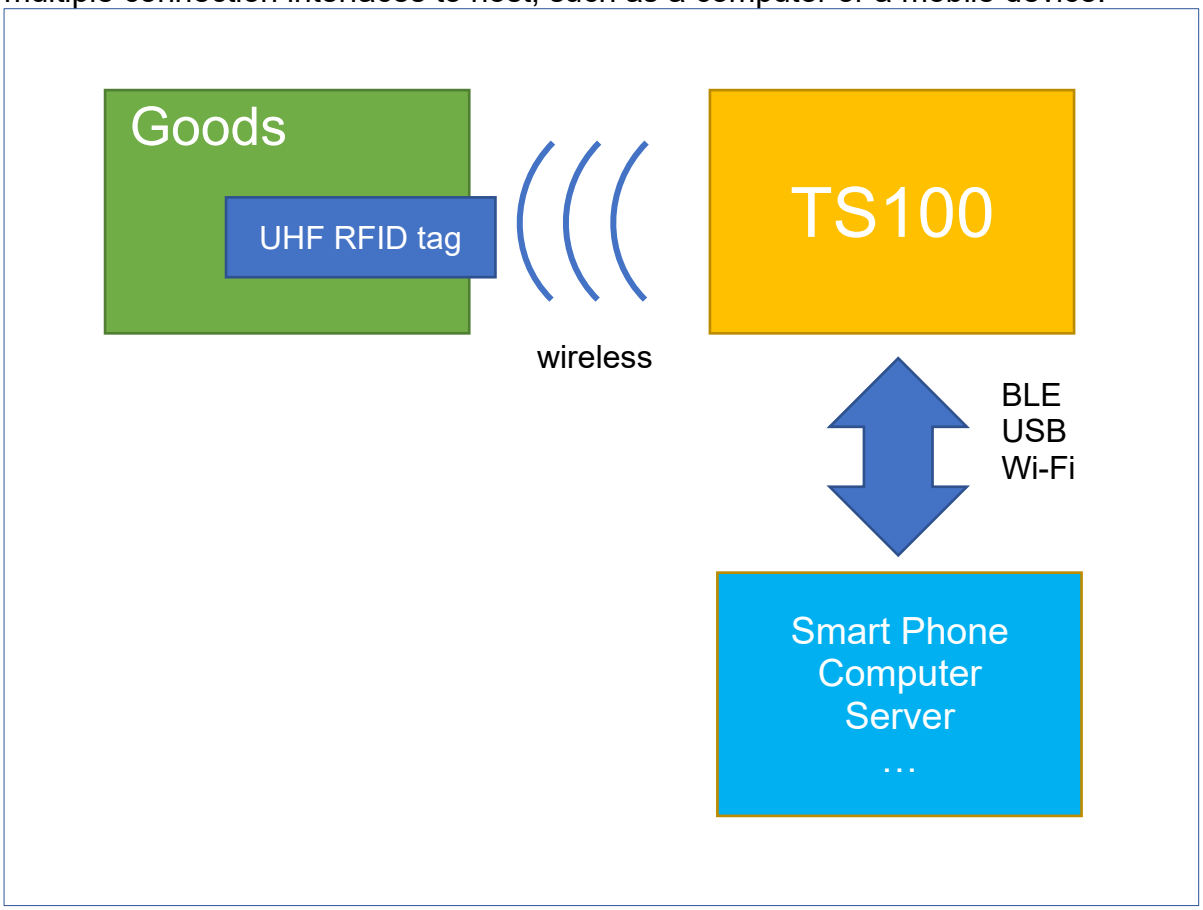
## 1.2. Install Auto Encode

1. Download installer from Disk5472.
2. Execute Setup.msi to install the application on your computer.
3. Double-click Auto Encode shortcut icon on desktop to execute the application.

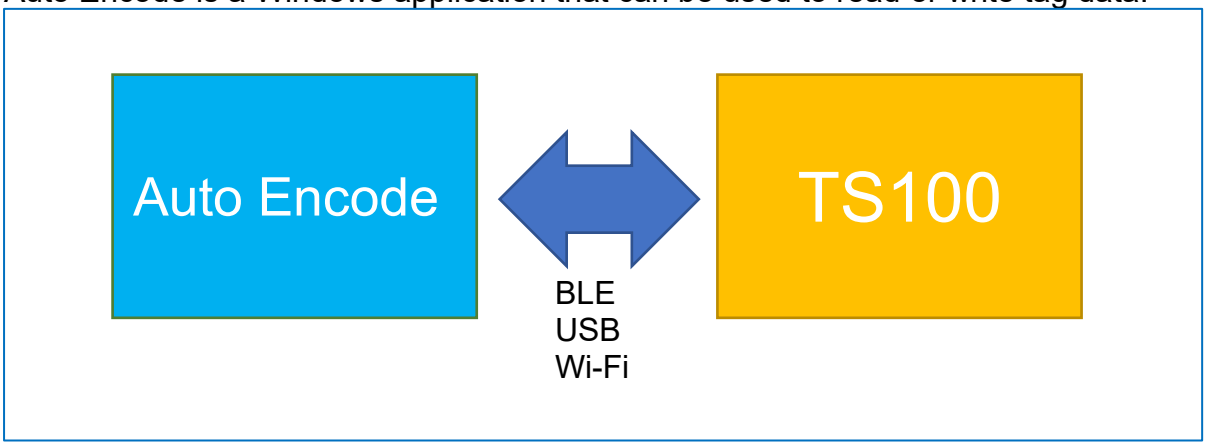
# 2. Getting started

## 2.1. Communication

TS100 is an UHF RFID reader that can read or write tags. Read tag data can be sent via multiple connection interfaces to host, such as a computer or a mobile device.




Auto Encode is a Windows application that can be used to read or write tag data.




## 2.2. Terminologies

**UHF**

Ultra high Frequency RFID that communications at 860 MHz – 960 MHz.

**RFID**

Radio-frequency identification that can be used to track tags attached to goods.

**Reader**

A reader transmits information to a tag by an RF signal. The tag receives both information and operating energy from this RF signal.

**Tag**

An RFID tag is a small circuit that can attach to goods so RFID readers can inventory them. Tags are passive, meaning that they receive all their operating energy from the Interrogator's RF signal.

**Inventory**

The process of a RFID reader scan and identify a tag.

**Tag Memory Bank**

Tag memory shall be logically separated into the four distinct memory banks shown as following, each of which may comprise zero or more memory words. There are 4 memory banks: Reserved memory, EPC memory, TID memory and User memory.

**Reserved Memory**

The reserved memory contains kill password and access password.

**Kill Password**

The two-word password is used to kill the tag. Located at Reserved Bank word address 0x00.

**Access Password**

The two-word password is used to access the tag. Tag will enter secured state with a correct access password. Located at Reserved Bank word address 0x02.

**EPC memory**

Electronic Product Code, part of the tag memory. Note the EPC start from EPC memory word address 0x02.

**TID memory**

Tag-identification, part of the tag memory.

**User memory**

Part of the tag memory. It is optional. If a tag implements User memory then it may partition the User memory into one or more files. If the Tag implements a single file, then that file is File_0.

**Lock**

The lock status of a tag will affect whether each memory area can be read or write. TS100 may issue a Lock command to lock, permanently lock, unlock, or permanently unlock the kill password, access password, EPC memory bank, TID memory bank, or File_0 of User memory.

| | **No Access Password (Open State)** | | | | **With Access Password (Secured State)** | | | |
|---|---|---|---|---|---|---|---|---|
| Tag Lock State | Unlocked | Permanently Unlocked | Locked | Permanently Locked | Unlocked | Permanently Unlocked | Locked | Permanently Locked |
| **Kill Password** | Read/Write | Read/Write | | | Read/Write | Read/Write | Read/Write | |
| **Access Password** | Read/Write | Read/Write | | | Read/Write | Read/Write | Read/Write | |
| **EPC** | Read/Write | Read/Write | Read | Read | Read/Write | Read/Write | Read/Write | Read |
| **TID** | Read/Write | Read/Write | Read | Read | Read/Write | Read/Write | Read/Write | Read |
| **File_0** | Read/Write | Read/Write | Read | Read | Read/Write | Read/Write | Read/Write | Read |

**Word**

2 bytes.

**TS100**

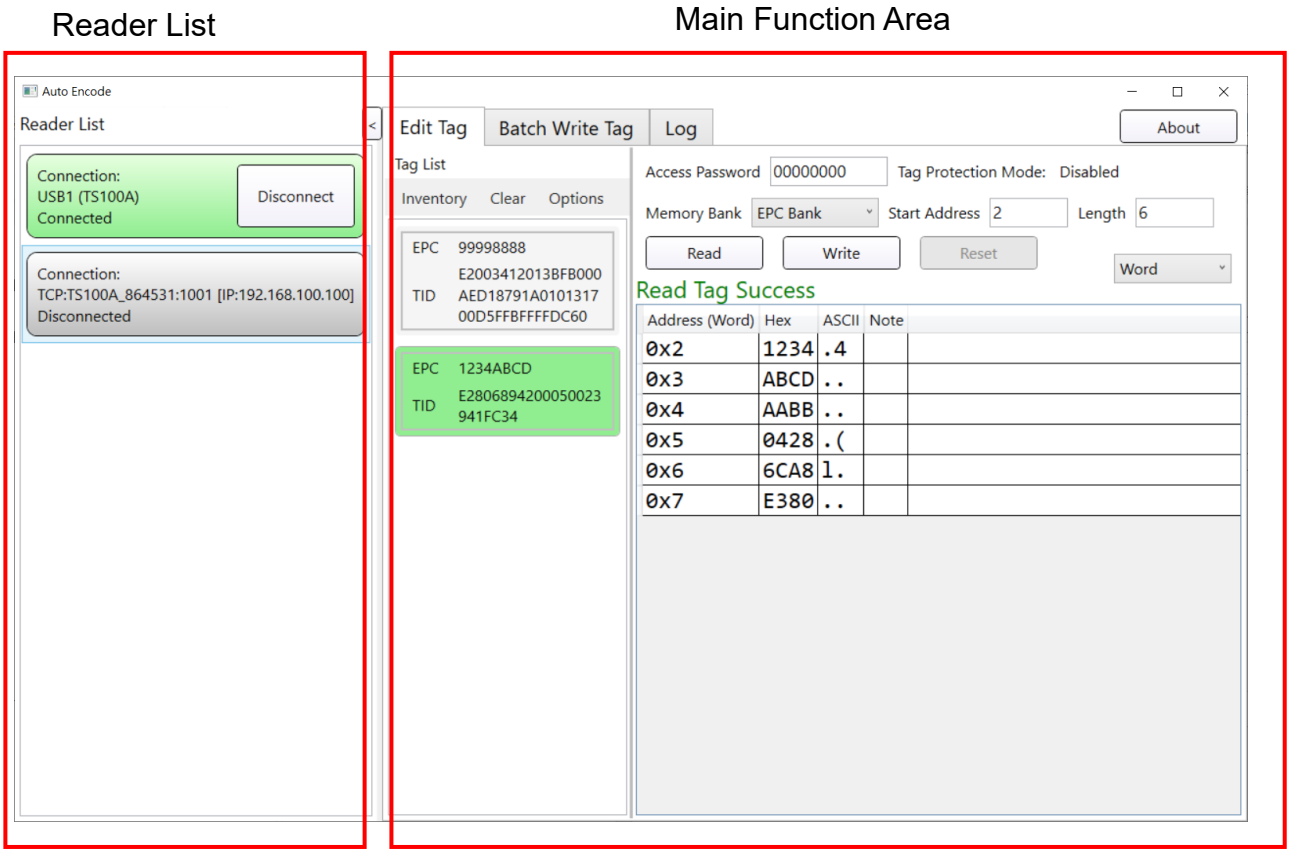
A UHF RFID reader.

**TS100 Utility**

A software used to configure TS100.

# 3. Auto Encode Interface

## 3.1. Layout Overview



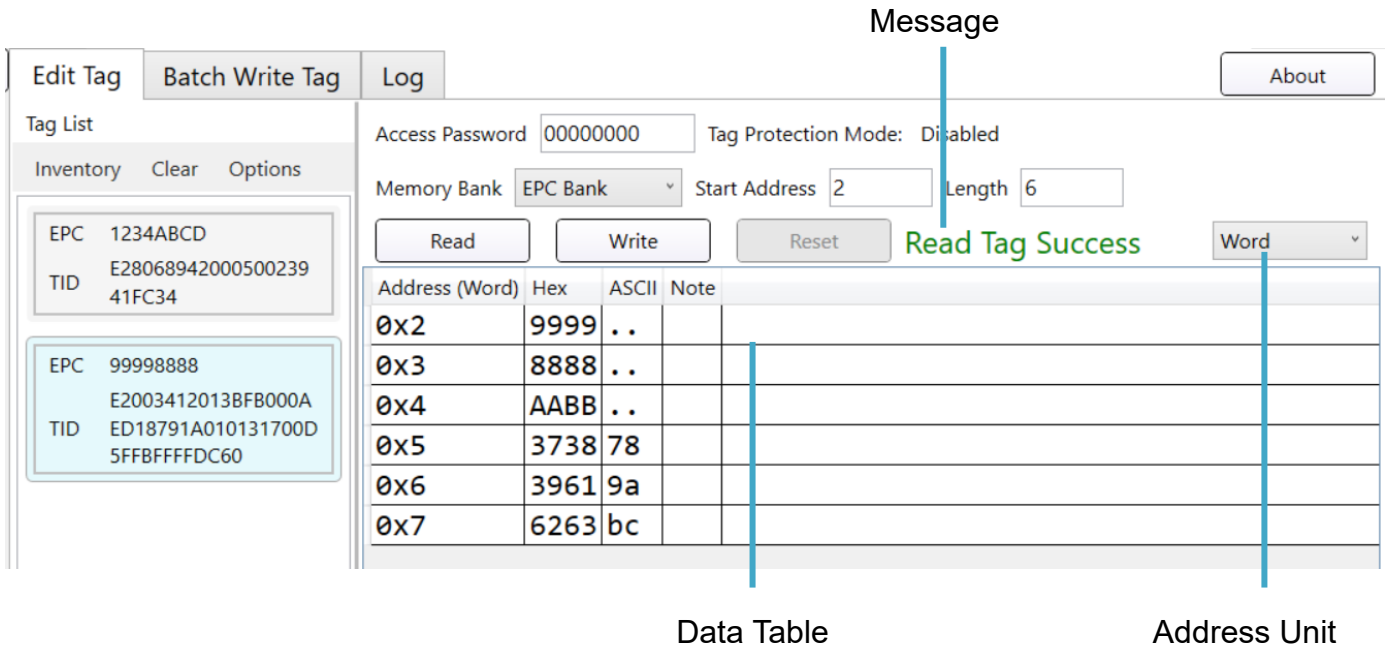

**Reader List**

Detected readers will automatically appear in the list.

**Main Function Area**

Including **Edit Tag**, **Batch Write Tag**, **Log**.

## 3.2. Edit Tag




### 3.2.1. Tag List

Inventoried tags will be displayed here.

**Inventory:**
Inventory tags.

**Clear:**
Clear **Tag List**.

**Options:**

**Include TID**

**Selected:**
Inventory tag's EPC and TID. Tags with random TID might appear in the list multiple times but make it possible to distinguish tags of the same EPC.

**Cleared:**
Inventory only tag's EPC. Tags with random TID will appear in the list only once but make it impossible to distinguish tags of the same EPC.

### 3.2.2. Access Password

Target tag's current access password.

> **Note**
> Tag's access password will be changed to password saved inside TS100 or hashed password (**NOT** the **Access Password** on the interface) if TS100 **Tag Protection Mode** is not **Disabled.**

### 3.2.3. Tag Protection Mode

Tag Protection Mode Settings in TS100. This setting will affect whether TS100 automatically locks the tag after writing and changes its access password.

| | |
|---|---|
| **Disabled** | After any write tag operation:<br>The lock state and access password of the tag remains unchanged. |
| **Specific Password** | After any write tag operation:<br>1. Tag EPC and access password will be locked.<br>2. Tag access password will be changed to Password saved in TS100 (**NOT** the Access Password on the interface). |
| **Dynamic Password** | After any write tag operation:<br>1. Tag EPC and access password will be locked.<br>2. Tag access password will be changed to hashed password computed with TID (**NOT** the Access Password on the interface). |

### 3.2.4. Memory Bank

Target memory bank to read/write.

### 3.2.5. Start Address

Target address to read/write. The unit is determined by **Address Unit**. Must be even number if **Address Unit** is **Byte**.

### 3.2.6. Length

Target length to read/write. The unit is determined by **Address Unit**. Must be even number if **Address Unit** is **Byte**. Reader will try to read all the data if set to 0.

### 3.2.7. Read

Read tag data and display on **Data Table**.

### 3.2.8. Write

Write tag with **Data Table**.

### 3.2.9. Reset

Reset data to last successful read or write data.

### 3.2.10. Message

Show whether the operation result is successful.

### 3.2.11. Address Unit

The unit of **Start Address** and **Length**. Note for the minimum unit for a tag operation is word (2 bytes), so **Start Address** and **Length** must be even numbers if **Address Unit** is set to **Byte**.

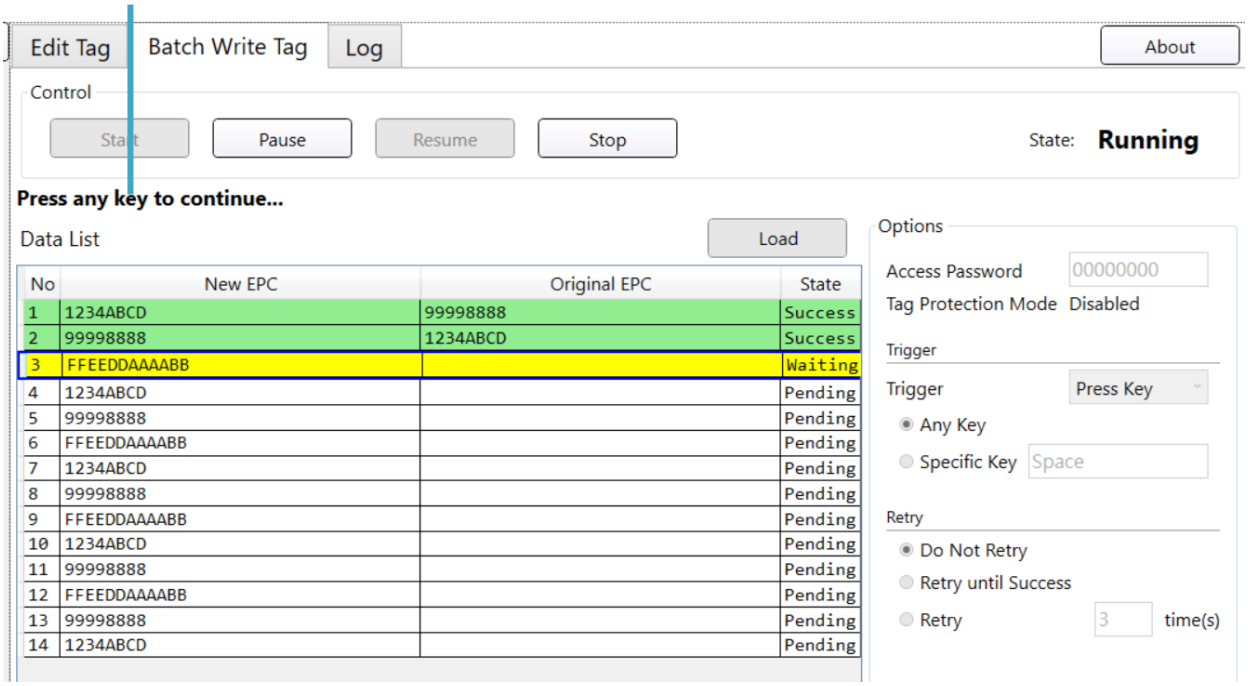
### 3.2.12. Data Table

Read/Write tag data will be displayed here.

## 3.3. Batch Write Tag

Write tags in a batch with an EPC list file (txt, csv).

Message




### 3.3.1. Control

Control batch write tag process.

**Start/Stop**

Start or stop write tag in batch process. A tag will be written when the trigger condition is met in the process.

**Pause/Resume**

Pause or resume the process.

**State**

Batch write process states, include Running, Paused, Stopped.

### 3.3.2. Message

Process indication message.

### 3.3.3. Data List

**Load**

Open txt or csv EPC list file. Each line represents an EPC waiting to be written. Only hexadecimal characters (0-9, A-F) are allowed. Length of each line must be a multiple of 4.

```
1234ABCD
99998888
FFEEDDAAAABB
```

**Data Table**

Loaded EPC list.

### 3.3.4. Options

**Access Password**
Target tag's current access password.

**Tag Protection Mode**
See "Tag Protection Mode".

**Trigger**
The condition to write next tag.

**Press Key**
Start writing next tag when the user press any or specific keyboard key.

**Time Interval**
Start writing next tag every N millisecond(s).

**Retry**
What to do if write tag fails.

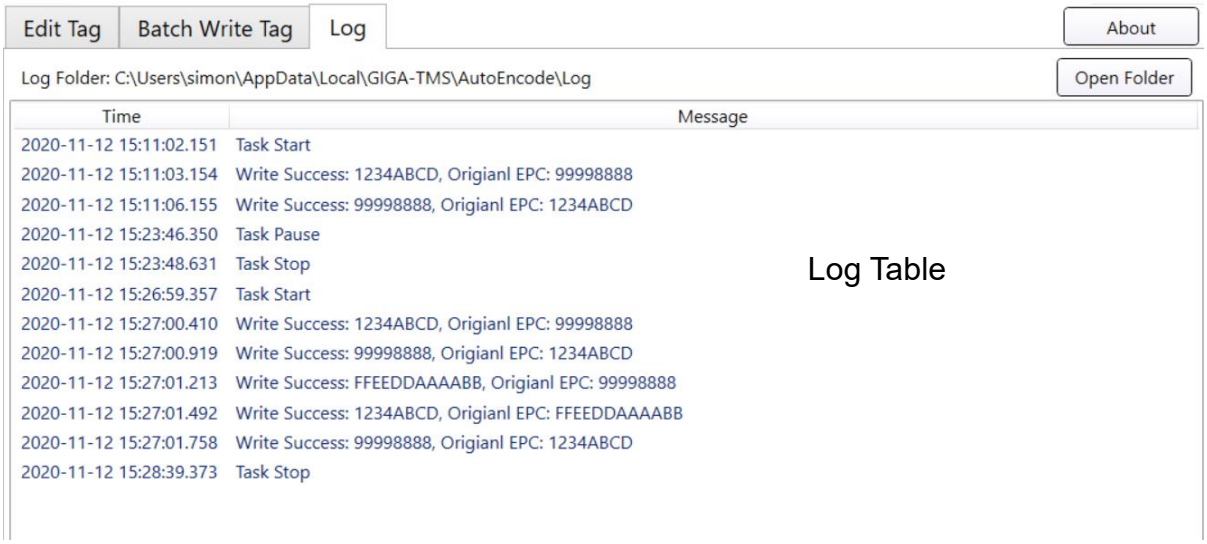
**Do Not Retry**
The batch writing is consider failed and the state will become stopped.

**Retry until Success**
The batch writing will continue until success or user stop the process.

**Retry N time(s)**
The batch writing will consider failed after N times unsuccessful retry.

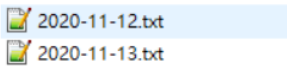
## 3.4. Log

Batch Write result logs will be saved automatically. The log file name is based on date.




**Log Folder**
Where the log files are stored.

**Open Folder**
Open the log folder with Windows Explorer.




**Log Table**
Each line is a log entry which includes what happened and when.

# 4. Tutorials

## 4.1. To connect a reader

1. For USB connection, plug reader into your computer USB port.
2. For Wi-Fi connection, use TS100 Utility to configure TS100 to connect a Wi-Fi access point which is in the same local network of your computer.
3. For BLE connection, turn on your computer's Bluetooth.
4. On **Reader List**, click your reader to connect.

## 4.2. To modify Tag's Access Password

1. Connect a reader with steps "To connect a reader".
2. Select **Edit Tag** tab.
3. If **Tag Protection Mode** is NOT **Disabled**, open TS100 Utility and set it to **Disabled**.
4. On **Tag List**, click **Inventory**.
5. On **Tag List**, click target tag.
6. On **Access Password**, enter tag's current access password.
7. On **Memory Bank**, select **Reserved Bank**.
8. On **Address Unit**, select **4 Bytes**.
9. On **Start Address**, enter 1.
10. On **Length**, enter 1.
11. Click **Read**.
12. Modify **Hex** values with valid hexadecimal numbers.
13. Click **Write**.

## 4.3. To modify Tag's EPC (same length)

1. Connect a reader with steps "To connect a reader".
2. Select **Edit Tag** tab.
3. If **Tag Protection Mode** is NOT **Disabled**, open TS100 Utility and set it to **Disabled**.
4. On **Tag List**, click **Inventory**.
5. On **Tag List**, click target tag.
6. On **Access Password**, enter tag's current access password.
7. On **Memory Bank**, select **EPC Bank**.
8. On **Address Unit**, select **Word**.
9. On **Start Address**, enter 2.
10. On **Length**, enter 0.
11. Click **Read**.
12. Modify **Hex** values with valid hexadecimal numbers.
13. Click **Write**.

## 4.4. To modify Tag's EPC (different length)

Follow the steps of "To Write Tag EPC in a batch".

## 4.5. To Write Tag EPC in a batch

1. Open notepad or any text editor, create a txt file.
2. For each line, enter hexadecimal numbers with a multiple of 4 digits. For example:1234ABCD.
3. Save the txt file.
4. Connect a reader with steps "To connect a reader".
5. Select **Batch Write Tag** tab.
6. Click **Load**, select the txt file you have created.
7. On **Options**, enter tag's current access password.
8. If **Tag Protection Mode** is NOT **Disabled**, open TS100 Utility and set it to **Disabled**.

9. On **Control**, click **Start**.
10. Place a tag on the reader.
11. Press keyboard Space Key.
12. On **Data List**, wait until the **State** of the line become **Success**.
13. Remove current tag.
14. Place next tag and repeat the above steps until all tags are written.

# 5. Troubleshooting

## 5.1. My reader does not appear in the reader list

For each type of connection:

**USB**
- The USB port is not plugged in properly.
- Your reader is connected by other application

**Wi-Fi**
- Your computer and reader are not in the same local network.
- Your reader is connected by other application.

**BLE**
- Bluetooth is off on your computer.
- Your reader is too far away from your computer.
- Your reader is connected by other application.

## 5.2. Connect reader failed

- Your reader is connected by other application
- Connection might fail if your TS100 is inventorying with keyboard output. Remove tags or use TS100 Utility to disable keyboard output.

## 5.3. My tag does not appear in the tag list

- On **Tag List,** Click **Inventory**.
- The **Tag List** will not display duplicate tags. Only one of them will appear in the list if there are multiple tags with the same EPC but different TIDs

  To include TID as part of the tag:
  1. On **Tag List**, click **Options**.
  2. Select **Include TID**.
  3. On **Tag List**, Click **Inventory.**

- RF communication failed, refer to “What are the possible causes of RF communication error?”.

## 5.4. My tag appears multiple times in the tag list

- Some tags include a random part in their TID and might change in each inventory round. Exclude TID as part of the tag if you are sure that there are no tags with duplicate EPC.
  1. On **Tag List,** click **Options**.
  2. Clear **Include TID**.
  3. On **Tag List**, Click **Inventory.**

## 5.5. Read/Write tag failed

- The tag memory is locked, and your access password is wrong.
- If tag’s Access Password or Kill Password is permanently locked, there is no way to read or write these memories. See “Lock”.
- Some tag does not have user memory.
- TS100 Tag Protection Mode is Specific and the access password saved inside TS100 is not match with current tag’s access password.
  1. Open TS100 Utility and modify the Tag Protection settings to disabled.
  2. If you want to keep the Tag Protection setting to Specific Password and know the tag’s access password, use TS100 Utility to set the saved access password inside TS100.

- TS100 Tag Protection Mode is Dynamic the access password computed by TS100 is not match with current tag's access password.
- RF communication failed, refer to "What are the possible causes of RF communication error?".

## 5.6. What are the possible causes of RF communication error?

- The RF Power settings of TS100 is too low.
- The power supply current might not be enough (Laptop or desktop).
- The tag is too far away.
- The tag is blocked by other objects.

# 6. Revision History

- 2020/11/13

  Version: 1.0