LineLogix Standalone
For NFC Encoding
Quick Start Guide
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1. Introduction

Using this Quick Start Guide, you will learn how to setup and use LineLogixPC to encode NFC data to ISO14443A Mifare UltraLight and Classic tags, and to ISO15693 tags. This Guide is a supplement to the LineLogixPC Reference, which contains full information about your system.

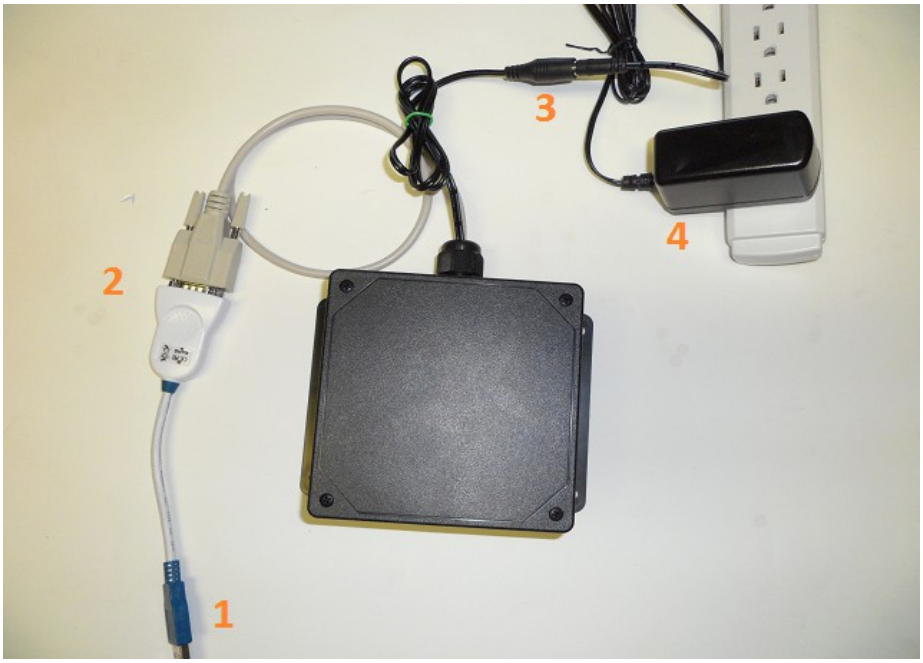
1.1. Revision History

Rev A, 18Jan2012: Original. Author Ryan Corbin
Rev B, 20Jun2012: Added Tag Seek Section. Author Ryan Corbin
Rev C, 21May2015: Added CSV, Barcode, vCard, Eclipse file import
Rev D, 22Aug2019: Documented Readback mode

2. Quick Start

2.1. Connect the Hardware

The numbers in this photo go with steps on the next page.



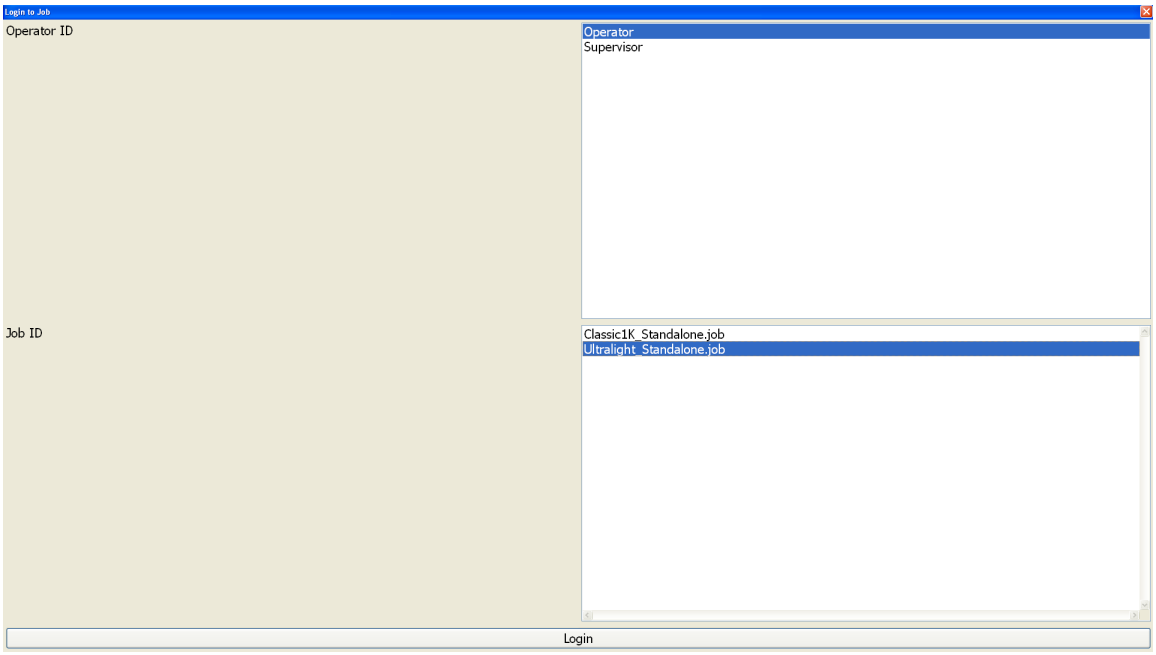
1. Connect USB → Serial Adapter to PC's USB Port.
2. Connect Feig Reader Serial Connector to USB → Serial Adapter.
3. Connect Feig Reader Power Plug to Power Supply Plug.
4. Connect Power Supply To Power Outlet Strip (Not Included).

2.2. Start the LineLogixPC Software

Locate the LineLogixPC icon on the desktop of your computer and double click.

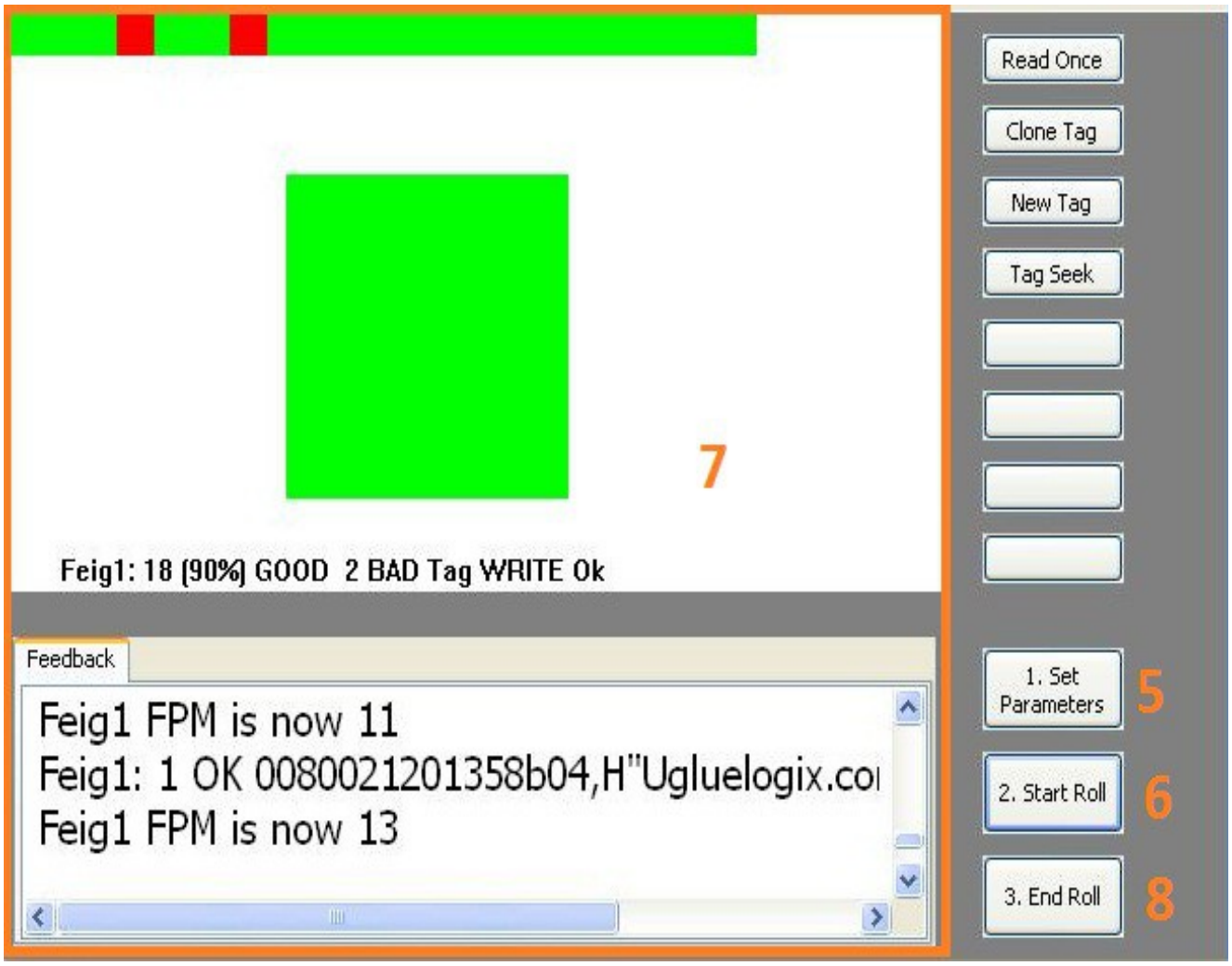
2.3. Choose Operator and Job

Next, you are asked to select an operator and job. Select “Operator” as the Operator ID and “Ultralight_Standalone” as the Job ID. Click “Login”.



2.4. The Main Screen

The numbers in this screen shot go with steps in the next few sections.



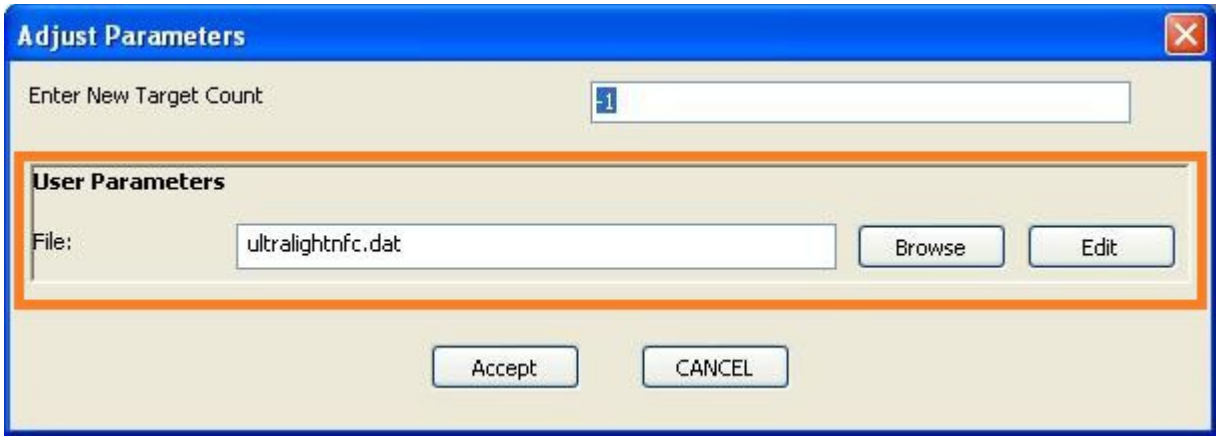
This screen shot will be important in later sections where the New Tag and Clone Tag buttons are explained.

2.5. Set User Memory File

The user memory file contains the data that will be encoded onto the tags. The NDEF Editor and Clone Tag Wizard sections explain how to create these files using LineLogixPC.

The user memory file is set in the Adjust Parameters dialog. Click on the button labeled '1. Set Parameters' to access this dialog. This button is marked **5** in the screen shot of Step 4 above.

The picture below shows the user memory file setting. Click 'Browse' and select the “ultralightnfc.dat” user memory file. Once you have selected the correct user memory file click 'Accept'.



Note: the User Memory File is called a “Sector File” in the software and other documentation. GlueLogix support may use this term to describe this file.

2.6. Start The Roll

Starting the roll configures the reader to write to a group of tags. Click on the button labeled '2. Start Roll' to initiate the job. This button is marked **6** in the screen shot of Step 4 above.

After a brief setup period, the reader will be able to write data to tags.

2.7. Place a Tag on Top of the Reader

The reader will automatically detect the tag and begin to write data to it. During the job, watch the status of the system by looking at the area marked **7** in the screen shot of Step 4.

- You can see the status of the write cycle by observing the color of the Current Tag Status square.

Yellow		The reader is currently writing data to the tag.
Green		The reader successfully wrote data to the tag.
Red		The reader failed to write data to the tag.

- The Good/Bad History bar at the top of the notification area shows the status of the last 20 write cycles.
- The Feedback tab displays messages about the status of the system.
- The Feedback tab shows you the tag IDs that you are programming and the NFC data that you are programming onto them. That same information is saved to a log file.

Pull the tag off and place it aside once you see Green status.

2.8. End The Roll

Ending the roll stops the reader from encoding tags. Click on the button labeled '3. End Roll' to end the job. This button is marked **8** in the screen shot of Step 4 above.

You will be prompted for a roll id. Type in a roll id, and click the 'OK' button.

3. NDEF Editor

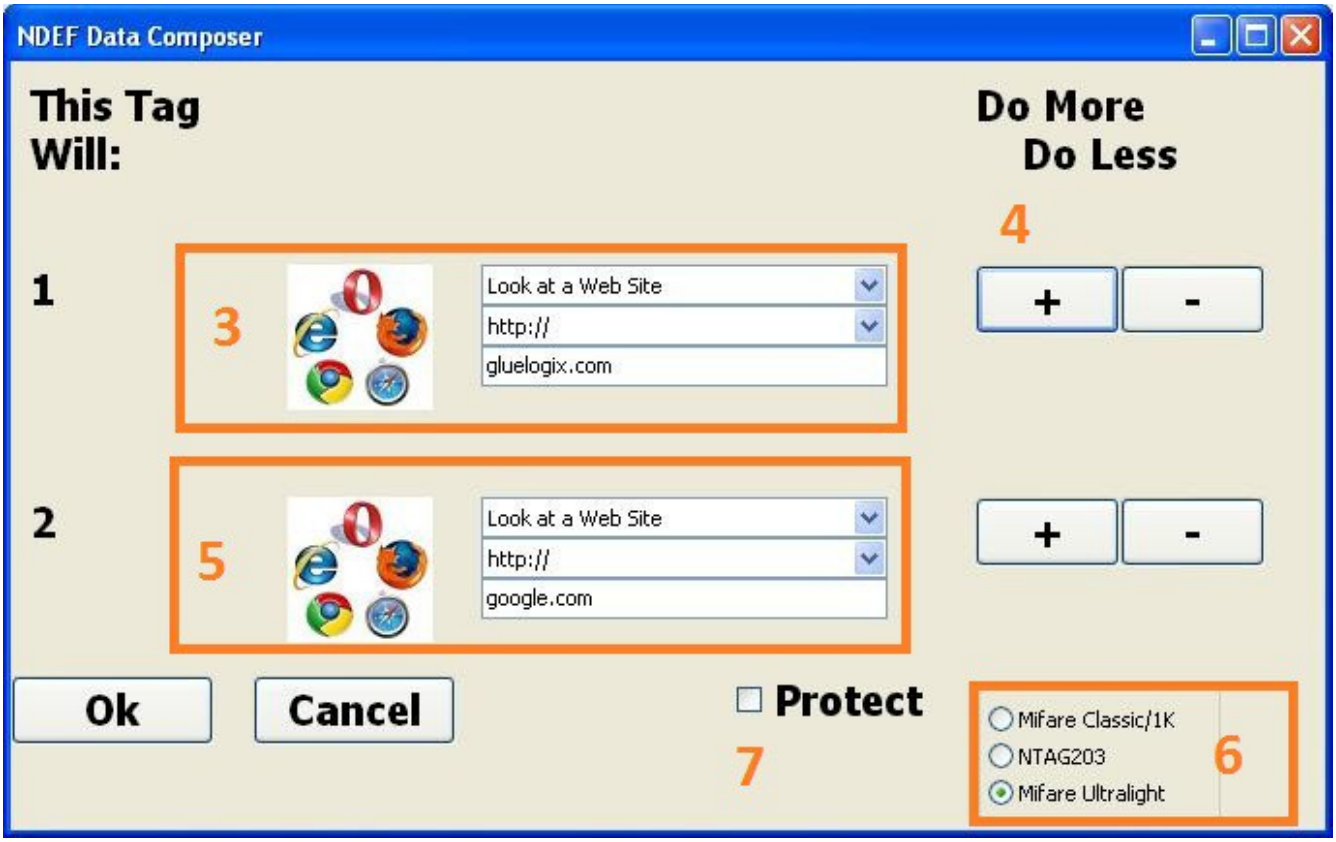
In this section, you will learn how to use the LineLogixPC NDEF Editor to edit and save NFC data.

3.1. Launch NDEF Editor

From the LineLogixPC main screen, click on the button labeled 'New Tag'. This will launch the NDEF Editor and start the NDEF Data Composer dialog. You can see this button at the top right of the screen shot of step 4 in the Quick Start section.

3.2. The NDEF Data Composer Dialog

The NDEF Data Composer dialog will allow you to choose what NFC data you want displayed on the tag. The numbers in this screen shot go with steps in the next few sections.



3.3. Create 1st NDEF Record

The next step is to create the data that you want to appear on the tag. For this guide, you will create a tag that points to http://gluelogix.com and to http://google.com. Refer to Appendix A for a description of the available NDEF Record Types.

Create an NDEF Record so that it matches the one below.

3.4. Add Another Record

Click the '+' button to add an additional record. This button is labeled **4** on the screen shot in step 2.

3.5. Create 2nd NDEF Record

Edit the new record so that it matches the one below.

3.6. Select Mifare Ultralight Tag Type

This control is labeled **6** on the screen shot in step 2.

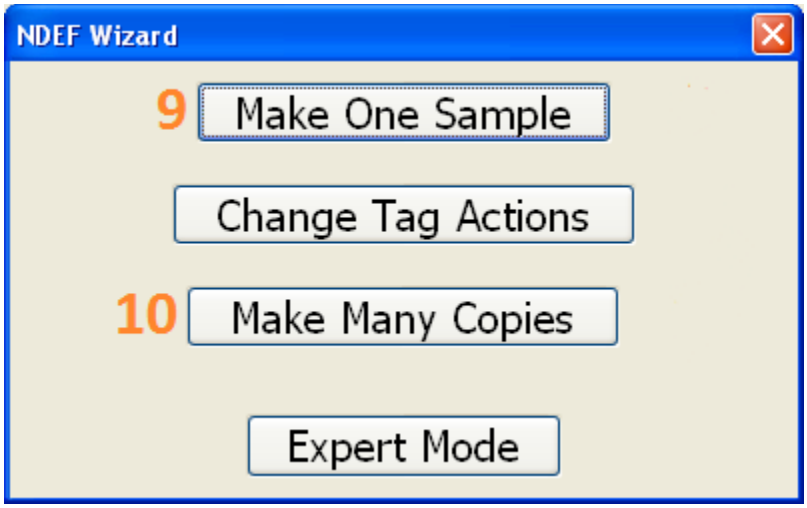
3.7. Deselect Protect Box

While you are starting out, you probably do not want to lock any tags. Make sure the box labeled **7** on the screen shot in step 2 is not checked.

Later on, when a customer orders Protected tags, you will check this box to make that happen.

3.8. Confirm NDEF Data

Confirm that the NDEF records are correct and click 'OK'. This will close the NDEF Composer dialog and take you to the NDEF Wizard. The numbers in this screen shot go with steps in the next few sections.



3.9. Write and Verify Tag

Place a tag onto the reader. The picture in step 7 of the Quick Start section shows the correct tag placement. Click the 'Make One Sample' button, labeled **9** in the screen shot above. Using an NFC device, such as an NFC enabled smart phone, verify the tag contains the correct information.

3.10. Save User Memory File

Click the 'Make Many Copies' button, labeled **10** in the screen shot above. This will save the user memory file to “default.dat”. This user memory file can be used in a LineLogixPC job.

4. Clone Tag Wizard

In this section, you will learn how to use the LineLogixPC Tag Editor to copy an existing tag.

4.1. Place Tag on Top of Reader

The picture in step 7 of the Quick Start section shows the correct tag placement.

4.2. Launch Clone Tag Wizard

From the LineLogixPC main screen, click on the button labeled 'Clone Tag'. This will launch the Tag Editor in clone tag mode. You can see this button at the top right of the screen shot of step 4 in the Quick Start section.

4.3. Wait for Clone Tag to Read Tag

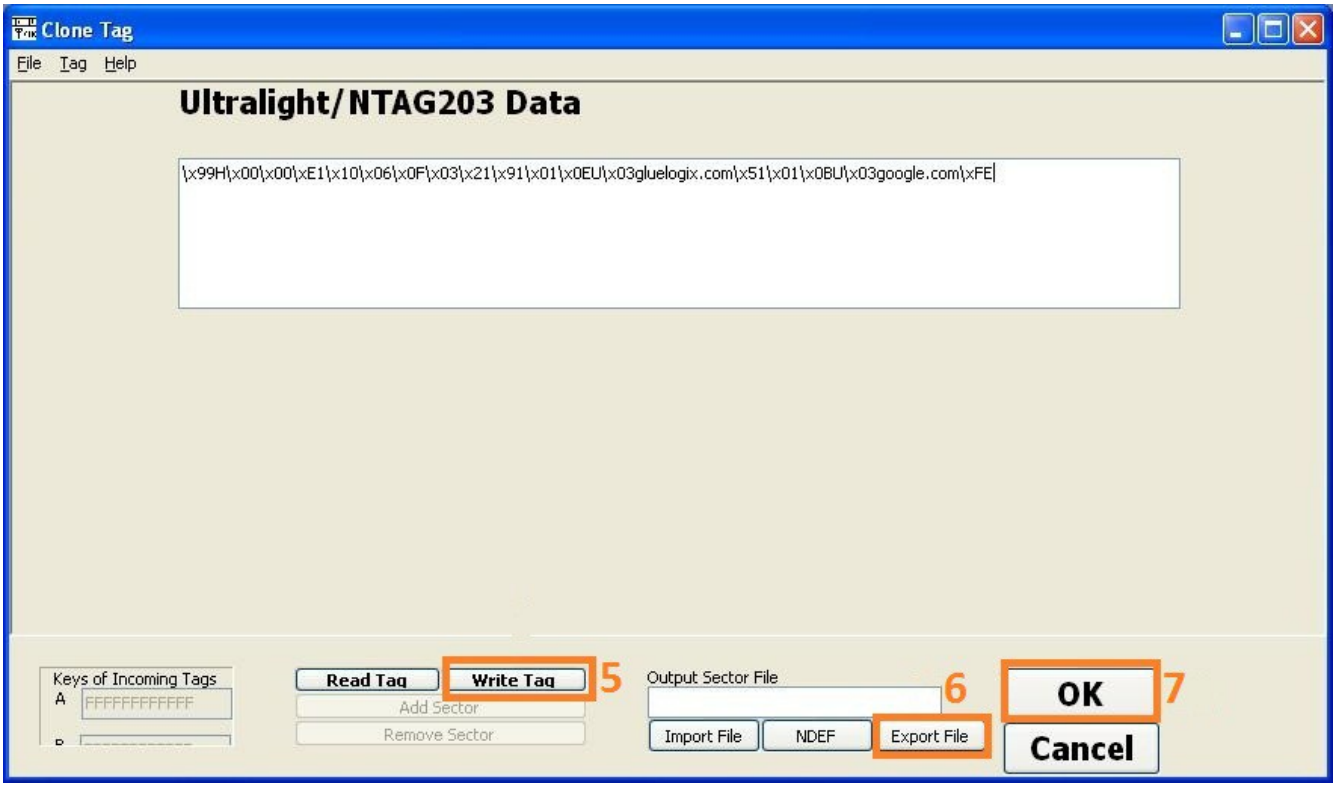
A message will appear that will tell you if the clone was successful. This message will also tell you the tag type of the cloned tag.

4.4. Confirm Data

The NDEF Data Composer dialog will launch, showing the existing NDEF data. Click 'OK' if the tag contains the correct NDEF data. This will close the NDEF Data Composer and bring you to the Tag Editor. If the tag you cloned is a Mifare Classic/1K, the Tag Editor screen might look different then the screen shot shown below. Refer to Appendix B for a description on how to use the Tag Editor with Mifare Classic/1K tags.

4.5. Write and Verify Tag

Place a tag on top of the reader and press the 'Write Tag' button to encode a tag. This button is labeled **5** in the screen shot below. Using an NFC device, such as an NFC enabled smart phone, verify the tag contains the correct information.



4.6. Save User Memory File

Click the 'Export File' button. This button is marked **6** in the screen shot above. Select the location where you would like to save the file.

4.7. Exit Tag Editor

Click the 'OK' button, marked **7** in the screen shot above, to exit the Tag Editor. The user memory file can now be used in a LineLogixPC job.

5. Tag Seek Feature

The Tag Seek feature identifies the chip type and memory size of all tags on the antenna. As of June 2016 it is implemented for the following tags:

- ISO15693
- ISO14443-A Mifare Ultralight, NTAG and variants
- ISO14443-A Mifare Classic

In this section, you will learn how to use the Tag Seek feature to identify and configure tag type and size.

5.1. Place Tag on Top of Reader

The picture in step 7 of the Quick Start section shows the correct tag placement.

5.2. Start Tag Seek

From the LineLogixPC main screen, click on the button labeled 'Tag Seek'. This will start the Tag Seek operation. You can see this button at the top right of the screen shot of step 4 in the Quick Start section.

5.3. Inspect Tag Seek Output

The Tag Seek feature will display information about all of the tags that the reader sees. The reader can only see a maximum of 4 tags at one time.

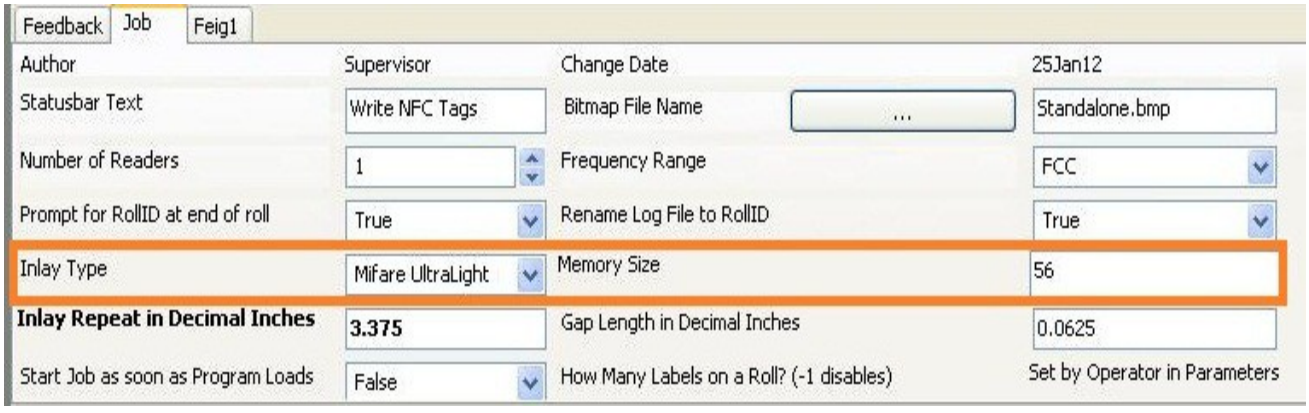
The screen shot below shows the result of a Tag Seek operation. During this tag seek, there was only one tag in front of the reader. The Unique ID of the tag is 0080021209827204, the tag type is Mifare Ultralight, and it has 56 bytes of user memory.

5.4. User Memory Size Configuration

If the Tag Seek operation returns only one tag, LineLogixPC will use the information gained from the tag to configure the current job's tag type and memory size.

If the Tag Seek operation finds more than one tag, the job's tag type and memory size will not be changed. The simplest thing to do in this situation is to remove the extra tags from on top of the reader, and run Tag Seek again.

Alternatively, if you are logged in as a supervisor, you can manually configure the job's tag type and memory size. These settings are located in the 'Job' tab. The highlighted area in the screen shot below shows the location of the tag type and memory settings.

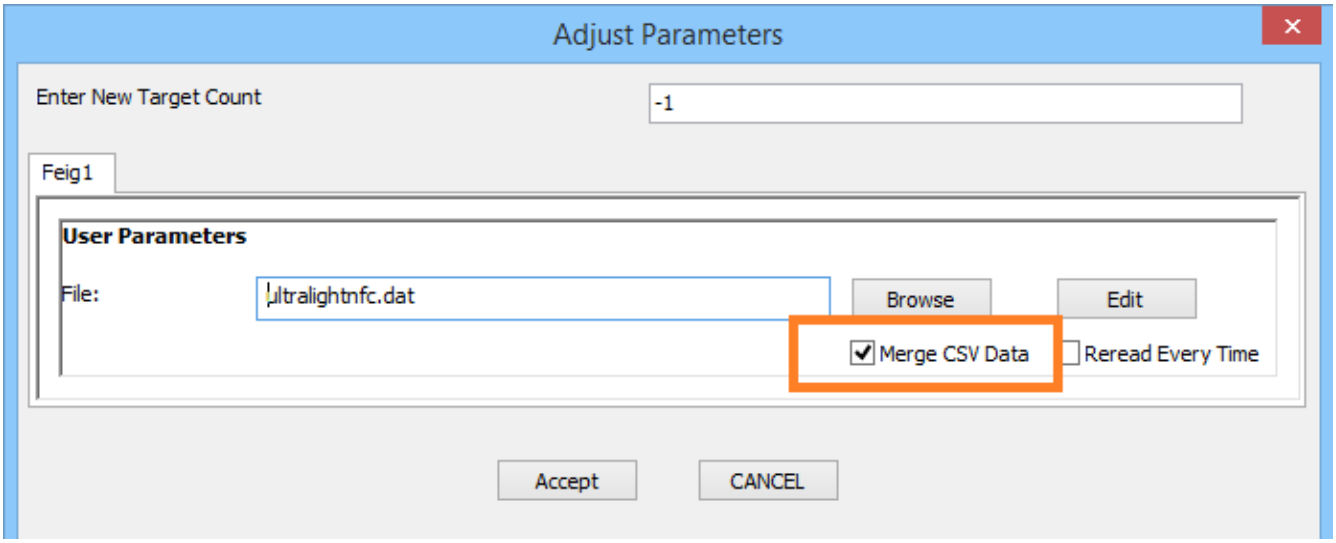


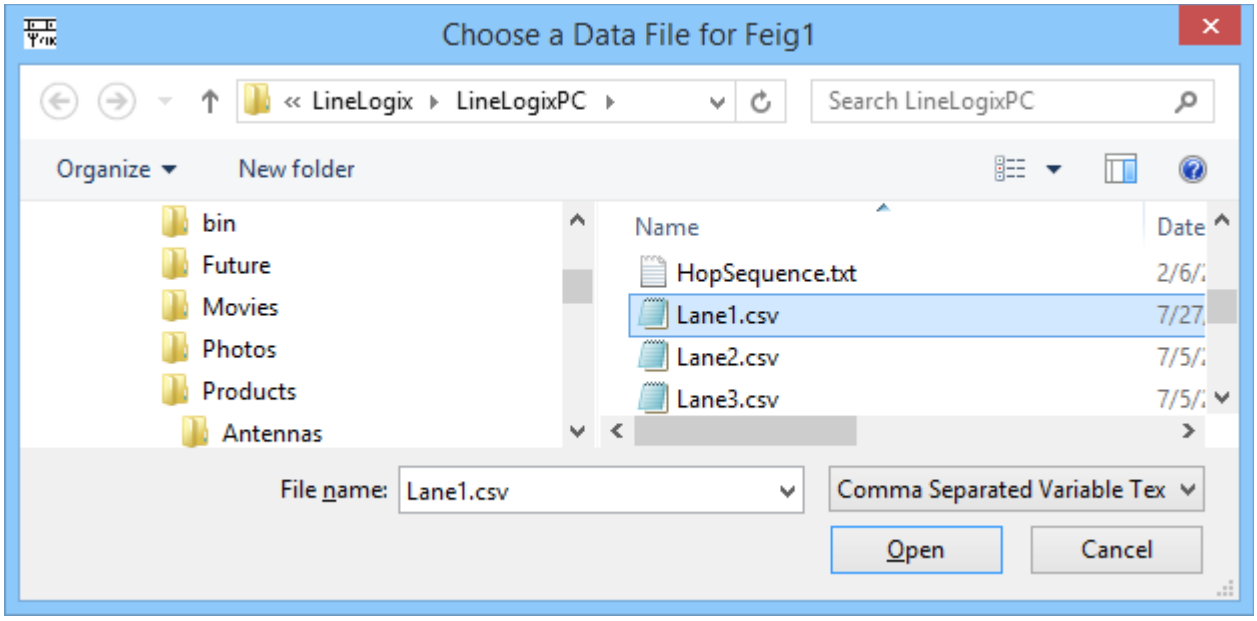
6. CSV

CSV stands for Comma Separated Value, and is a common standard for spreadsheets. If you want to encode values from a spreadsheet, you can, as long as you save it to a CSV.

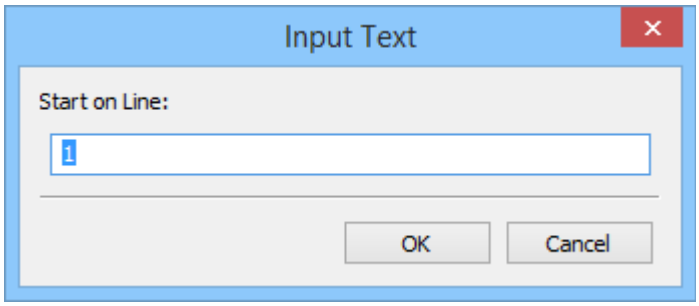
For HF, the CSV fields are plugged into your NFC Sector File. Every fillable field of the NDEF Editor can be filed in by a column of your CSV. This simple example shows a sector file with one NDEF field being merged with a CSV containing one column of data, and the tag writes that result.

In the Parameters dialog use the new checkbox “Merge CSV Data” (not shown above). When you Start Roll, you will get a dialog that lets you choose a CSV file to merge:





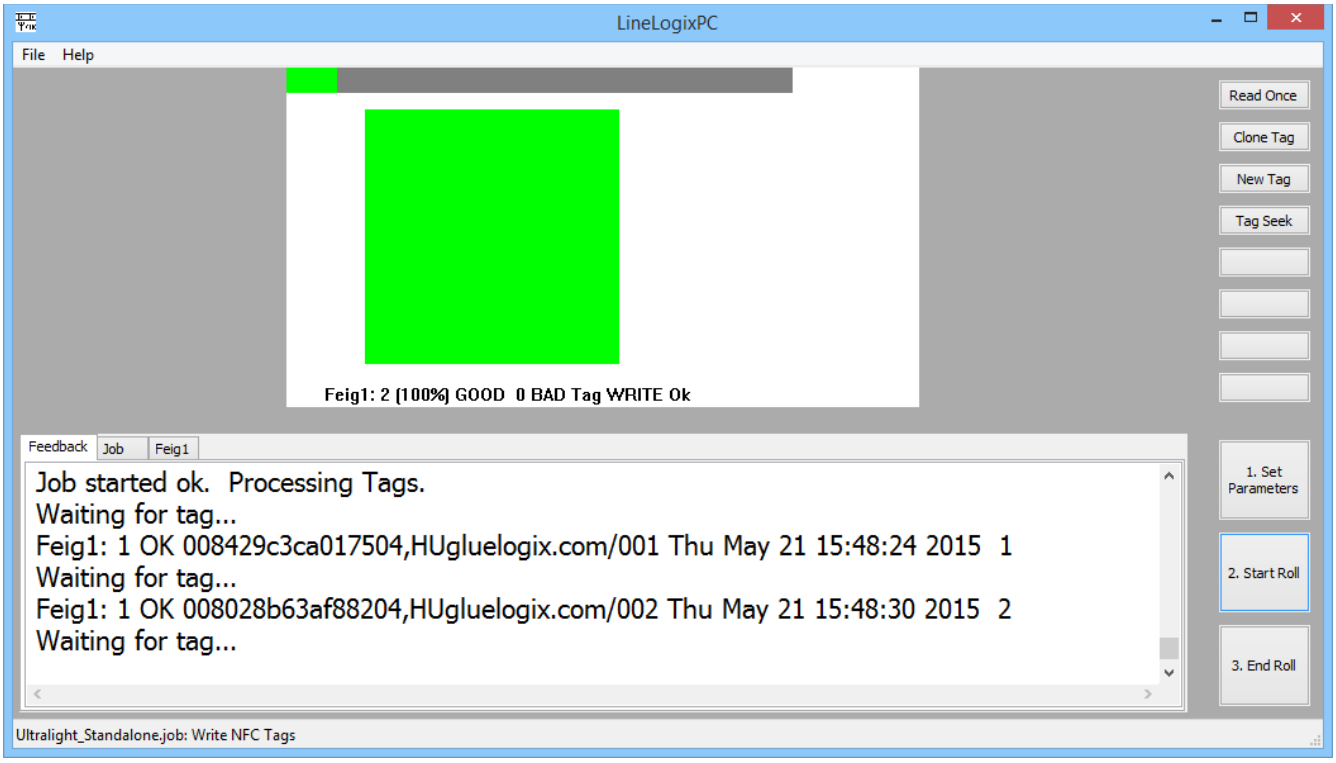
You will also see a dialog asking what line to start on. This is useful if you had to stop an encoding run and restart it later:



If `ultralightnfc.dat` and `Lane1.csv` look like this:

`[tagname NXP NTag203]`
`[lockbytes 00 00]`
`\x99H\x00\x00\xE1\x10\x12\x0F\x03\x12`
`\xD1\x01\x0EU\x03gluelogix.com\xFE`
	`gluelogix.com/001`
	`gluelogix.com/002`
	`gluelogix.com/003`
	`gluelogix.com/004`
	`gluelogix.com/005`
	`gluelogix.com/006`

Then tags will be encoded like this:



For UHF, CSV fields map directly to Gen2 memory banks. So a CSV line like this:

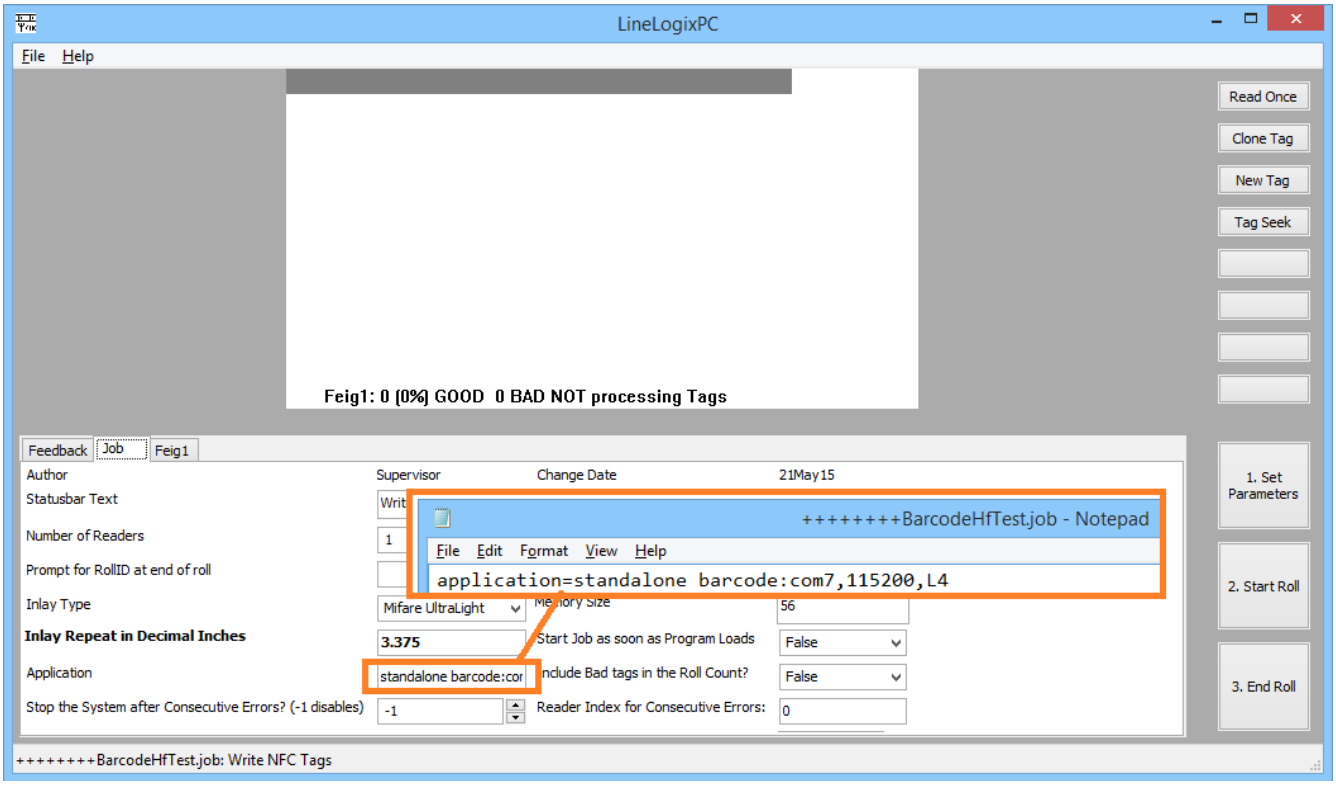
```
12345678,112233445566778899aabbcc,a5a5,0000
```

Will encode a tag as follows:

- User data 0x1234, 0x5678
- EPC 0x 112233445566778899aabbcc
- Access password 0xA5A5
- Kill password 0x0000

7. Barcode

In LineLogix Standalone systems, barcode input is configured by the Application string. This string is in the header of the Job file, and is visible on the Job tab:



For all the applications in this document so far, this setting is just "standalone" To add barcode functionality, we set up the barcode data channel, length and optionally the baud rate in this string:

- application=standalone barcode:com7,115200,L4

  Collect barcode data from COM7 at 115200 baud (the other parameters are always 8N1) until 4

digits are received

- application=standalone barcode:USB,L4

  Show a dialog where a USB connected barcode reader can insert barcode digits

If the barcodes are terminated with an Enter character (0x0d and/or 0x0a), the length can be unspecified. (e.g. “barcode:usb”)

In barcode operations, a CSV must be provided. The first column of the CSV is a lookup key. Barcode data is matched to that key, and the rest of the CSV line is used as described above:

`[tagname NXP NTag203]`
`[lockbytes 00 00]`
`\x99H\x00\x00\xE1\x10\x12\x0F\x03\x12`
`\xD1\x01\x0EU\x03gluelogix.com\xFE`
	`AAAA,gluelogix.com/001`
	`BBBB,gluelogix.com/002`
	`CCCC,gluelogix.com/003`
	`DDDD,gluelogix.com/004`
	`EEEE,gluelogix.com/005`
	`FFFF,gluelogix.com/006`

If barcode DDDD is scanned, the NFC payload “`gluelogix.com/004`” will be plugged into the Sector File data, lengths adjusted, and the result written to the next tag to cross the antenna.

8. Readback

In most NFC encoding jobs, a Readback mode can be enabled by adding “`readback`” to the Application string as shown in the last section. The job then runs as normal, but the Encode step is skipped and the software goes straight to readback and verify.

CSV jobs may be hard to synchronize. Read the full data from the chip on the antenna, maybe using Feig CPR Start, and then start the CSV on the corresponding line when you start the LineLogixPC job.

Hint: If comparisons fail when it seems like they should work, enable the special verbose mode for data comparison by changing this line in the job file:

`debugstr=s_ilent,c_onstant,d_atatest,n_oreadback,s_howcmp,forgetuid`

To:

`debugstr=s_ilent,c_onstant,d_atatest,n_oreadback,showcmp,forgetuid`

That is, add “`showcmp`” to the job's `debustr`.

9. Appendix A: NDEF Record Types

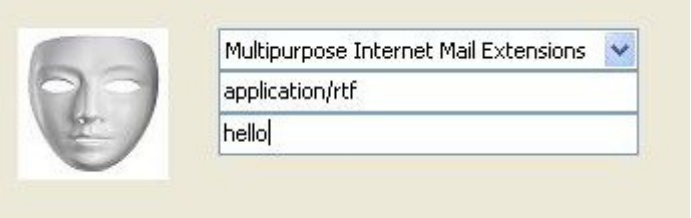
Look At A Web Site

The 'Look at a Web Site' (URL) record type creates a tag that points to a particular web site.

Add some free form text

The 'Add some free form text' (TEXT) record type creates a tag that displays plain text.

Multipurpose Internet Mail Extensions



The 'Multipurpose Internet Mail Extensions' (MIME) record type creates a tag that holds a wide range of information. In this example, the mime type (application/rtf), states that the data (hello) is in the rich text format.

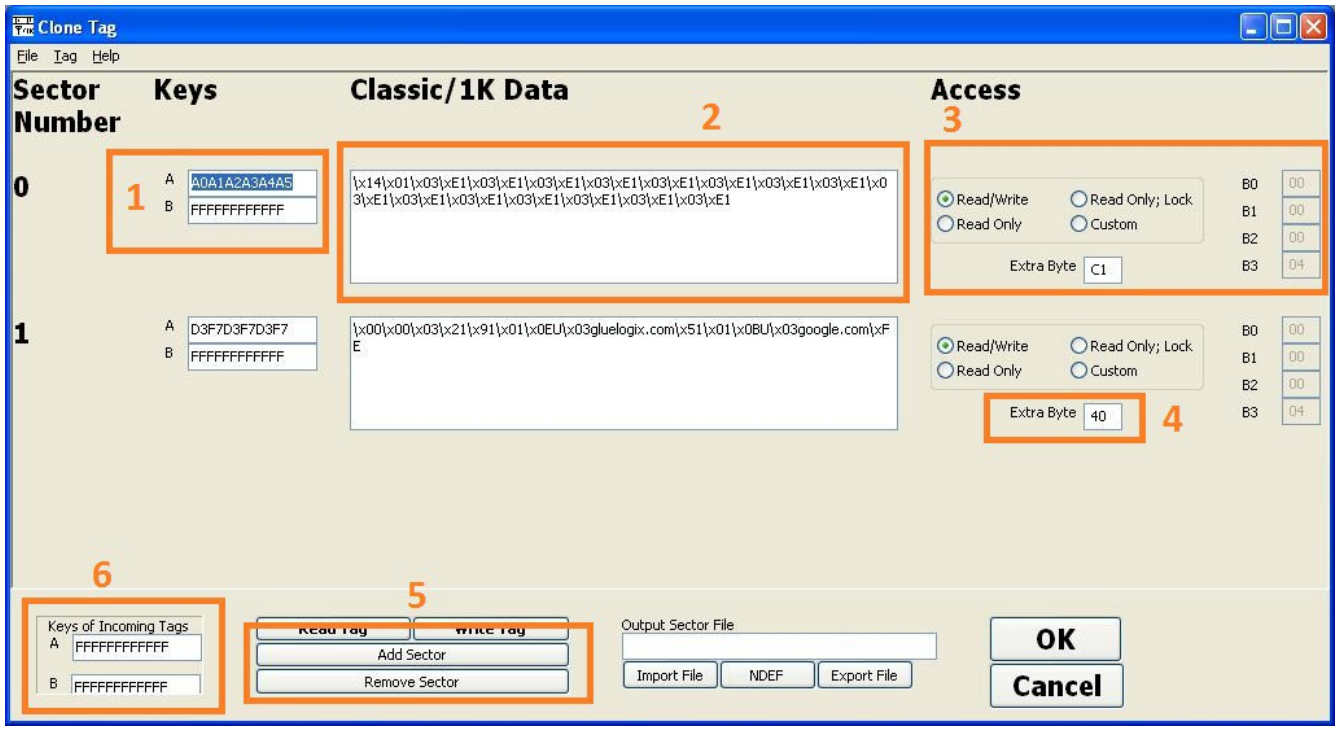
Find Something on the Internet

The 'Find Something on the Internet' (URI) record type creates a tag that points to a resource on the internet. This could be a video, a music file, or like in this example, a picture.

10. Appendix B: Mifare Classic/1K in Tag Editor

The main differences between Mifare Classic/1K tags and Mifare Ultralight is the physical structure of the tag memory and security. The memory in a Mifare Classic/1K tag is split into 16 sectors. Each sector, except for the first, contains 48 bytes of writable memory. The first sector contains the Unique ID serial number, which takes 16 bytes to store; this leaves 32 bytes of writable memory.

Mifare Classic/1K tags also have enhanced security. In order to gain read/write access to a memory sector, the reader must first supply the key for that sector. The key and read/write access scheme for each sector are configurable in the LineLogixPC Tag Editor.



1 → Sector Key
These values determine the keys that will be encoded to the tag for each sector.

2 → Sector Data
The raw representation of the data that will be encoded to each sector of the tag.

3 → Access Scheme
The access scheme for each sector can be configured here.

- Read/Write – This sector can be read and written to by any reader supplying the correct key.
- Read Only – This sector can only be read by a reader supplying the correct key.

- Read Only; Lock – This sector can only be read by a reader supplying the correct key. After encoding, this access scheme can not be changed.

- Custom – If the standard access schemes are inadequate, selecting this button will allow you to define a custom access scheme.

4 → Extra Byte
The Mifare Classic/1K tag has an extra byte in the access scheme storage area. This byte can be used for data storage.

5 → Add/Remove Sector
Use these buttons to add or remove sectors from the tag.

6 → Keys of Incoming Tags
These values are used to gain write access to the blank tag before encoding can begin.