Quick Start Guide

Computer System Requirements

Supported Systems
- Operating System: Windows 7/8/10
- USB: USB 2.0 and later

Minimum Requirements
- Processor: Core i5 at 2.7 GHz
- RAM: 4 GB
- Free Hard Disk Space on C: drive: 20 GB

Install Software
- From Download: Download the latest ComProbe installer from FTE.com. Once downloaded, double-click the installer and follow the directions.
  http://www.fte.com/nfc-soft

1. Connect Hardware and Apply Power

To assemble Frontline NFC hardware, perform the following steps:

a. Attach the antenna to the SMA connector at the top of the unit.
b. Insert the smaller end of the USB cable into the NFC USB port at the end of the enclosure opposite the antenna.
c. Plug larger end of the USB cable into an available USB port of your PC.

When completed, your configuration should resemble the figure.
Power is supplied via the USB connection.

2. Select Data Capture Method

Now that NFC hardware is connected, the next step is to run the Frontline software and select the data capture method.

Open (double click on) "Frontline ComProbe Protocol Analysis System" from the Start menu or from the “Frontline (version #)” desktop folder.

Select NFC.
Select Run.

Frontline software will open with the Control window.
3. I/O Settings

From the Control window, select Hardware Settings from the Options menu to confirm that the correct NFC unit is selected.

Then select I/O Settings from the Options menu where capture parameters are set. The default capture settings give the best capture performance in most settings.

**Hardware Trigger:** Enables or disables the hardware trigger input. By default the hardware trigger input is Not Used and capture starts immediately upon clicking the Start Capture icon in the Control window. When enabled capture will begin on rising or falling edge. The triggering event receives a timestamp of 0.

**Filter Range:** This setting allows selection of the frequency range used when capturing NFC signals. The default value is Automatic which automatically adjusts the filter settings according to the protocols selected for capture. In most cases Automatic provides the best performance.

**Protocols Enabled:** By default, ComProbe NFC analyzer capture all protocols.

**Automatic Gain Control:** By default Automatic Gain Control is enabled reducing capture sensitivity if the received signal is too strong.

**Automatic Gain Control Reduction:** The default is 15 dB, the amount by which the gain is reduced when the received signal exceeds the Automatic Gain Control Level.

**Automatic Gain Control Level:** By default, gain reduction is not enabled until the received signal is more than 5 Times (5X) an internal reference value.

**Gain Control Time:** By default Automatic Gain Control is active only at the start of a message, and once the gain has been adjusted Automatic Gain

**Type 1 Tag Platform:** By default aggregation of bytes into a single frame is enabled with a maximum byte delay of 150 microseconds. When reading Type 1 tag, the reading device inserts a delay between each byte sent to the tag. This delay time varies from reader to reader. Enabling the frame aggregation option causes these bytes to be collected into a single frame as long as they are separated by less than the Maximum delay allowed between bytes.

**Mifare Classic:** Enabled by default. When enabled, the software will attempt to recognize and decrypt the contents of Mifare Classic tags. Only Mifare Classic tags that use the well-known encryption key published by NXP Semiconductor are currently supported.

4. Start Capture

To start capture, click on the Start Capture button on the Control window toolbar.

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Frontline Technical Support: Phone +1-434-984-4500 or email tech_support@fte.com
5. Analyze Data

From the **Control** window toolbar select the following icons to view and analyze the captured data.

- ![Event Display](image) **Event Display** - for framed data, used to conduct byte-level analysis.
- ![Frame Display](image) **Frame Display** - for framed data, used to conduct protocol-level analysis.

6. Capture Tips

NFC can be a tricky protocol to capture reliably. NFC operates over a range of a few inches at most and it is often difficult to know where to place the antenna to get the best result. The location of the antenna in NFC devices varies from device to device making it even more difficult to find the proper location. In this section, we present a few tips to help you more reliably capture NFC data.

The following image illustrates good antenna positioning.

![Antenna Positioning](image) - Good

The device, Frontline NFC unit antenna, and tag are within an inch or two of each other and all are oriented parallel to each other. This ensures all devices are within NFC’s read range and that the maximum signal is available to all devices.

In the following image, the devices are too far apart for reliable operation.
In the following image, the analyzer antenna is not parallel to the device and tag. This reduces its ability to reliably capture data.

In most cases, placing the antenna between the device and the tag gives the best results. However, for some combinations of device and tag, performance may be improved by placing the antenna directly behind or next to the tag as in the image below.
Antenna Positioning - Behind or Next To Tag

Often, a device will only be able to read NFC tags in the area immediately surrounding the device’s internal antenna. Often times, you’ll need to experiment with the reading device in order to locate its antenna and determine the best location for the antenna and the tag. In the following image, the antenna of the device on the left is in the lower portion of its enclosure but the device is incorrectly positioned so the upper portion of the enclosure is near the analyzer’s antenna. This reduces the quality of the capture.

Antenna Positioning - Adjust for Internal Device Antenna

This quick start guide provides sufficient information to begin the data capture. Detailed hardware and software information is contained in the Frontline NFC User Manual. The manual is available on FTE.com.

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