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NFC-USB Gateway Module

User Manual and technical information v1.0

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HEALTH, SAFETY AND GENERAL USE PRECAUTIONS

- Read this User's Manual carefully, and follow the correct procedure when setting up the device.
- Never expose your module to rain or use it near water or in damp or wet conditions. Never place containers on it containing liquids that may spill into its openings. Doing so increases the risk of electrical shock, short-circuiting, fire or personal injury.
- Do not expose the drive to temperatures outside the range of 5° C to 40° C (41° F to 104° F) during operation. Doing so may damage the drive or disfigure its casing. Avoid placing your drive near a source of heat or exposing it to sunlight (even through a window). Inversely, placing your drive in an environment that is too cold or humid may damage the unit.
- Always unplug the drive if there is a risk of lightning or if it will not be used for an extended period of time. Otherwise, there is an increased risk of electrical shock, short-circuiting or fire.
- Do not place heavy objects on top of the drive or use excessive force on its buttons, connectors and tray. Doing so increases the risk of damage to the device.
- Whatever you're planning to do with your Gateway module, make sure you give it the respect it deserves. It may be small, but it is just as prone to damage from static electricity and knocks and blows – not to mention extremes of temperature – as any other computer.
- As such, you should remove all jewelry and static-attracting garments (nylon and other manufactured fibers, as well as wool), handle the device in a clean, dust-free area with a solid, non-carpeted floor and make sure that you have clean hands and have earthed yourself.

1. DESCRIPTION

The NFC-USB Gateway module is a highly integrated NFC(Near Field Communications) electronic module able to perform P2P (Peer to Peer) communications with NFC devices.

This module is connected via microUSB to other devices for control, transmission and reception of information. Also the module is powered via USB connector.

Another device, in general a computer, smart phone or any other device with NFC or USB capabilities controls all the functionalities of the Gateway module.

2. USER INTERFACE

2.1. POWER

The device is USB powered.

2.2. LED INDICATIONS

The Gateway has four LEDs to show the status of the device:

LED COLOUR	FUNCTIONALITY	ACTION
WHITE	Power ON: Gateway active	Light on
ORANGE	NFC P2P operation being performed	Light on
GREEN	NFC operation finished correctly	Light on
RED	NFC operation finished with errors	Light on

Table 1. LED Indications

2.3. FW UPGRADE

FW upgrade is performed through the microUSB connector. The host controller sends one command to set the NFC device into the *FW Upgrade Mode*. The following process shall be performed:

1. Launch the FW upgrade application and connect the PC and the Gateway using a USB-microUSB cable.
2. Send a *Set FW Upgrade Mode* command. The application will detect that the device is in FW Upgrade Mode and will allow the upgrade.
3. In the FW upgrade application, select the FW file and upgrade the FW.

After a firmware upgrade, all registers are set to their default values.

3. HOST CONTROLLER INTERFACE

The system host controller can communicate with the Gateway through a USB interface, allowing data communication to send commands and download stored information.

4. COMMANDS SUPPORTED

The following commands could be used by the host or the NFC device to start the different functionalities: description of the command details:

Command	Command Code
Get Unique ID	0xA6
Get Firmware	0xB0
Set FW Upgrade Mode	*0xB2*
Device Test	*0xB4*
Write Register	*0xE0*
Read Register	*0xE2*
Set Register Default Values	*0xE4*
P2P NFC device Setup	*0xC0*
P2P Download NFC device memory	*0xC2*
P2P NFC device Write Register	*0xC4*
P2P NFC device Read Register	*0xC6*
P2P NFC device Set Register Default Values	*0xC8*
P2P NFC device Get FW	*0xCA*
P2P NFC device Memory Status	*0xCC*
P2P NFC device Lighting Animation	*0xCE*
P2P NFC device Set FW Upgrade Mode	*0xF0*

Table 2. API Commands

4.1. CONFIGURATION AND CONTROL COMMANDS

The configuration and control commands are used to read and write configuration information of the Gateway, check the correct operation of the device and perform FW upgrades.

An ACK frame that ensures that the command has been correctly received by the Gateway always precedes the Configuration and Control commands response.

4.2. P2P COMMANDS

P2P commands are used to control and manage NFC devices.

A P2P communication starts with the device identification. The Gateway and the NFC device exchange their device IDs. Received IDs are checked by both devices and, if correct, the P2P command is processed.

Each ID is composed of 10 bytes: 6 fixed bytes identifying the type of device and 2 bytes with a configured value coming from a configuration register. In the case of the Gateway, the 2 bytes ID sent to the NFC device is read from the Unit ID configuration register.

5. ERRORS DESCRIPTION

The Gateway informs the host about any error sending an error frame if an error is detected during or after the reception of a frame sent by the host.

The User error indicates that the command or some of the arguments sent by the user are incorrect although the frame was correctly received.

FCC INFORMATION (USA) FCC STATEMENT

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operation.
CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct theinterference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

OEM INTEGRATION INSTRUCTIONS:

The module was tested under the FCC rules for a Modular Approval and therefore the following shall apply:

- Provided that the antenna, antenna to module cable and tuning network have not been changed in any way, The final end product must be labeled in a visible area with the following:
  “Contains FCC ID: 2AAHG-SGW101020”.
- The End User/ Manufacturer, will not need to repeat the intentional emissions testing (actual radio certification), however the un-intentional emissions testing will need to meet the FCC requirements with the module installed into the final assembly or product.

- However, in many cases, the module may need to be retuned, due to the affects of the product enclosure and assemblies within this enclosure, and the de-tuning affect that this may have on the radio circuitry. In this case and if other radio exist, C2PC is required.
- In the event that the OEM modules Kit is modified in any way, the radio transmitter is integrated into the OEM's final product, Radio Certification is required for the final product.
- The software provided for firmware upgrade will not be capable to affect any RF parameters as certified for the FCC for this module, in order to prevent compliance issues.