



NFC Board Manual

(F803-0049 Series)

Features

■ Operating modes supported:

- Reader/Writer

■ Hardware features

- Dedicated internal frame controller
- Highly integrated Analog Front End (AFE)
for RF communications
- Transmission and reception modes
- Optimized power management
- Tag Detection modes



■ RF communication @13.56 MHz

- ISO/IEC 14443 A and B
- ISO/IEC 15693
- ISO/IEC 18092

■ Communication interfaces with a Host Controller

- Serial peripheral interface (SPI) Slave interface
- Connector : SMAW200-08 (YEONHO)

Description

The F803-0049 is an integrated transceiver IC for contactless applications.

The F803-0049 manages the frame coding and decoding in Reader mode for standard applications such as NFC, proximity and vicinity standards.

The F803-0049 embeds the Analog Front End for 13.56 MHz Air Interface.

The F803-0049 supports ISO/IEC 14443 A and B, ISO/IEC 15693 (single or double subcarrier) and ISO/IEC 18092 protocols.

Figure1. F803-0049 application overview

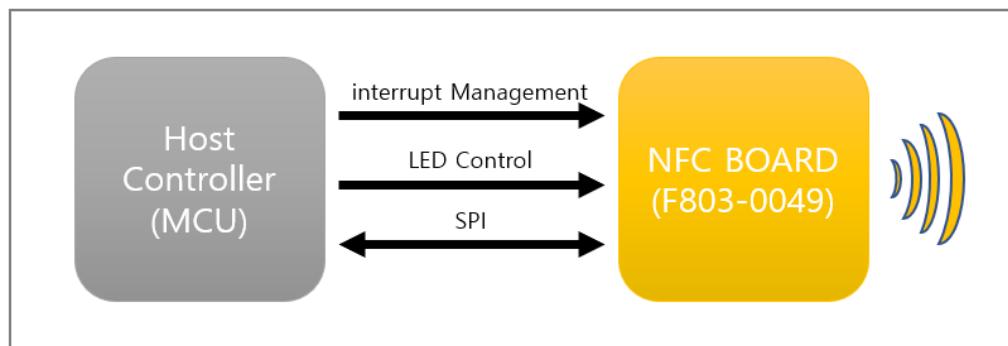


Table1. F803-0049 Connection Pin Map

SMAW200-08	
Pin Number	Signal Name
1	nSPI_SS
2	SPI_MISO
3	SPI_MOSI
4	SPI_SCK
5	nIRQ_IN
6	Detect_TAG
7	VCC
8	GND

Commands

Command format

Fields <Cmd>, <RespCode> and <Len> are always 1 byte long.

<Data> can be from 0 to 255 bytes.

- Direction: MCU to F803-0049

<CMD><Len><Data>

- Direction: F803-0049 to MCU

<RespCode><Len><Data>

Note: EchoCode is an exception as it has only one byte (0x55).

List of commands

Table2 lists the command set available for standard use.

Table 2. List of commands

Code	Command	Description
01	IDN	Requests short information about F803-0049 and its firmware version.
02	Protocol Select	Select communication protocol and specify some protocol-related parameters.
04	SendRecv	Sends data using previously selected protocol and receives the tag response.
07	Idle	Switches the F803-0049 into TagDetect or Hibernate state and specifies under which condition to exit from these states.
08	RdReg	Reads wakeup flags.
0A	BaudRate	Sets UART baud rate.
55	EchoCode	Performs a serial interface echo.
Other codes	Reserved	

Operating modes

The F803-0049 has 2 operating modes: Idle and Active. In Active mode, the F803-0049 communicates actively with a tag or an external MCU. Idle mode includes two low consumption states:

Hibernate and Tag Detector. The F803-0049 can switch from one mode to another.

Table 3. Operating modes

Mode	State	Description
Idle	Hibernate	Lowest power consumption. F803-0049 has to be waken-up in order to communicate. Low level on nIRQ_IN pin is the only wakeup source.
Tag Detector	Low power consumption, Tag detection. Wakeup source is configurable: – Timer – nIRQ_IN pin – nSPI_SS pin – Tag detector LFO (low-frequency oscillator) is running in this state.	
Active	Standby or Reader	Main communication mode. HFO (high-frequency oscillator) is running, F803-0049 is able to decode and execute commands from external MCU. It can switch the reader ON and OFF and communicate with a tag or an external MCU.

Hibernate and Tag-Detector states can only be activated by a command from the external MCU. As soon as Application environment any of these states are activated, the F803-0049 can no longer communicate with the external MCU. It can only be woken up.

The behavior of the F803-0049 in 'Tag-Detector' state is defined by the Idle command.

Electrical characteristics

Absolute maximum ratings

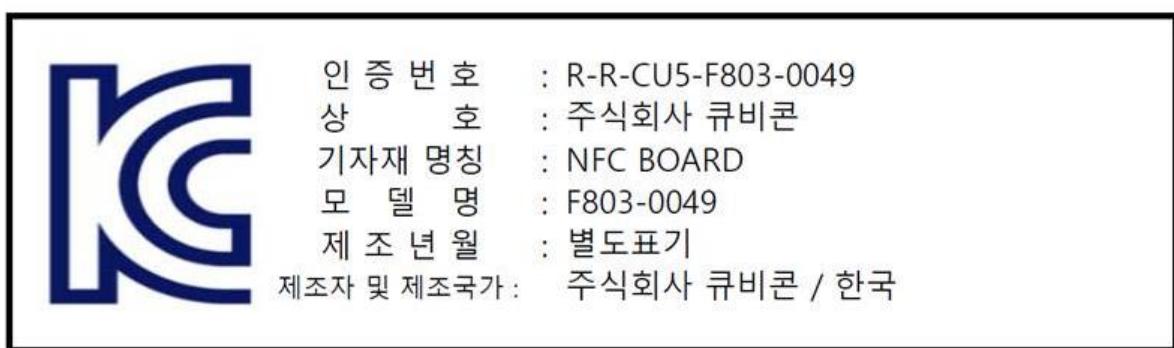
Table 4. Absolute maximum ratings

Parameter	Value	Unit
Supply Voltage (VCC to GND)	5.5	V
Input or Output voltage relative to Ground	3.0 ± 0.3	V
Ambient operating temperature	-25 to +85	°C
Ambient operating temperature (RF mode)	-25 to +85	°C
Storage temperature	-25 to +85	°C

Note: Stresses listed above may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specification is not implied.

Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Product Certification Information



CE statement

This device can be operated in at least one Member State without infringing applicable requirements on the use of radio spectrum."

- RF Range: 13.56MHz (RFID)

FCC statement

Certification and Safety Approvals FCC Compliance Statement

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, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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 on and off, the user is encouraged to try to correct the interference by one or more of the following measures: -Reorient or relocate the receiving antennae -Increase the separation between the equipment and the 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.

FCC RF Exposure Statement This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. The antenna used for this transmitter must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures

FCC statement

FCC Modular Usage Statement

Note 1: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user shall have no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 2: Host product manufacturers must provide in their user manual the required RF exposure information for usage of this module. Host product manufacturers must use the following RF exposure statement in their user manual "This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. The antenna used for this transmitter must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures"

Note 3: Additional testing and certification may be necessary when multiple modules are used.

Note 4: The module may be operated only with the integral PCB pattern antenna with which it is authorized.

Note 5: To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, the manufacturer shall provide guidance to the host manufacturer for compliance with the part 15B requirements.

Note 6: The FCC ID label on the final system must be labeled with "Contains FCC ID: 2AYSO-F803-0049"

Note 7: The FCC rule/s for this module are CFR 47 Part 15 Subpart C 15.225.

Note 8: This modular transmitter is only FCC authorized for the specific rule parts listed on its grant. The host product manufacturer is responsible to any other FCC rules that apply to the host not covered by the modular.

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