

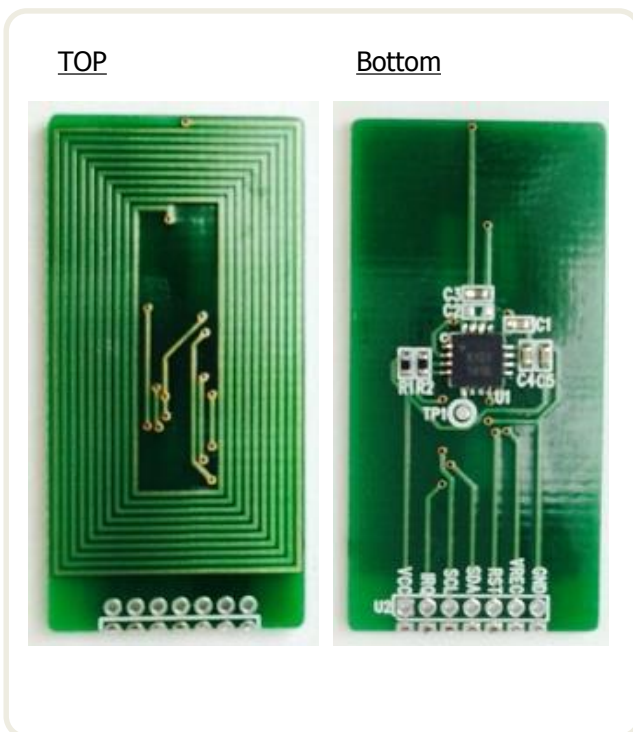
Key Feature

Frequency	13.56MHz	
Protocol	ISO/IEC 18092 (JIS 6319-4)	
Operating Temperature	-40 ~ 85°C	
Power	1.6 ~ 3.6V	
Host interface	I2C (up to 400kHz)	
Board	PCB - FR4, 1.0T 15mm X 30mm X 1.8mm	
Antenna Size	10 turn, 14mm X 26mm L = 2.25μH	
NFC mode	Type 3 tag emulation *NFCIP-1 passive target	
Modulation	Load modulation	
Memory	Type	SRAM / FIFO
	Size	256bytes
Data rate	212 / 424kbps (Selective data rate)	
Special feature	Host Wake-up interrupt by External RF field *VREC Port - Analog RF field detection - Energy Harvesting	

Key Application

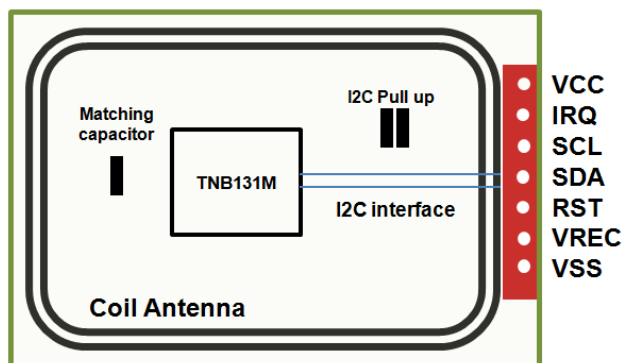
- Making connection (BT pairing, Wi-Fi setup)
- NFC Bridge Solution
(Providing RF interface to RF communicate between NFC Device and Target Device)
 - Embedded target device system
- NFC Energy Harvesting
 - Battery-less sensor, toy, ESL, ... etc
- NFC Firmware upgrade system
- Smart home appliances (Display-less)
or other applications with built-in microcontroller
- NFC Application (NFC Forum SIGs)
 - Health-care
 - Consumer electronics
- NBM-100N Target Application (Recommended)
 - ☞ Small appliances / device
 - : BT pairing & Wi-Fi setup

Exterior

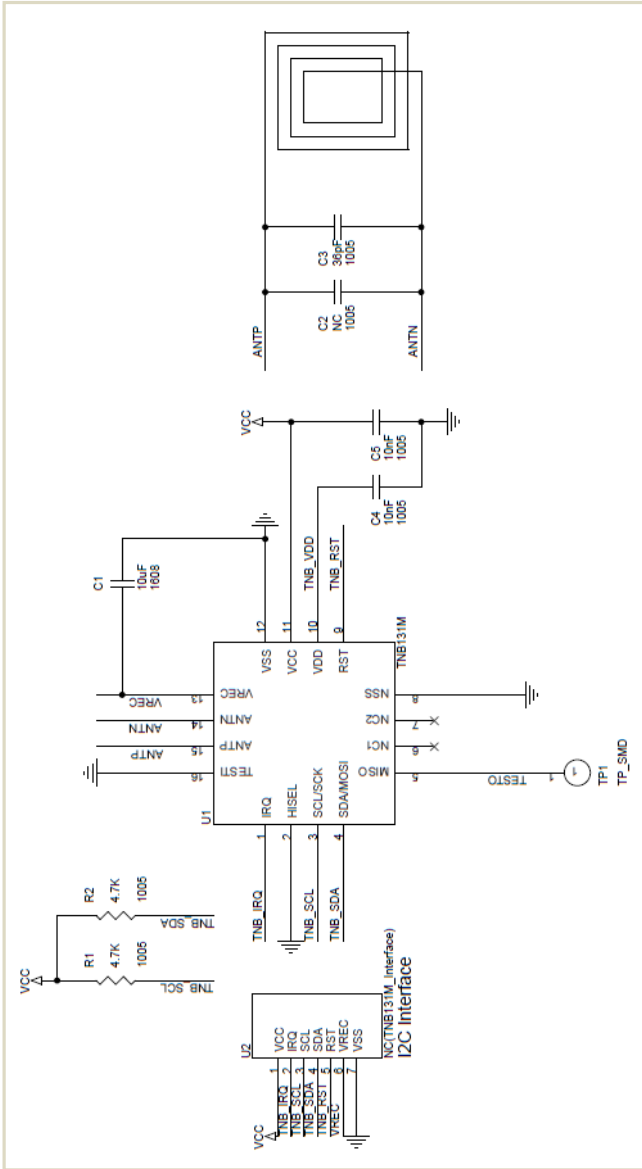


Block Diagram / Interface

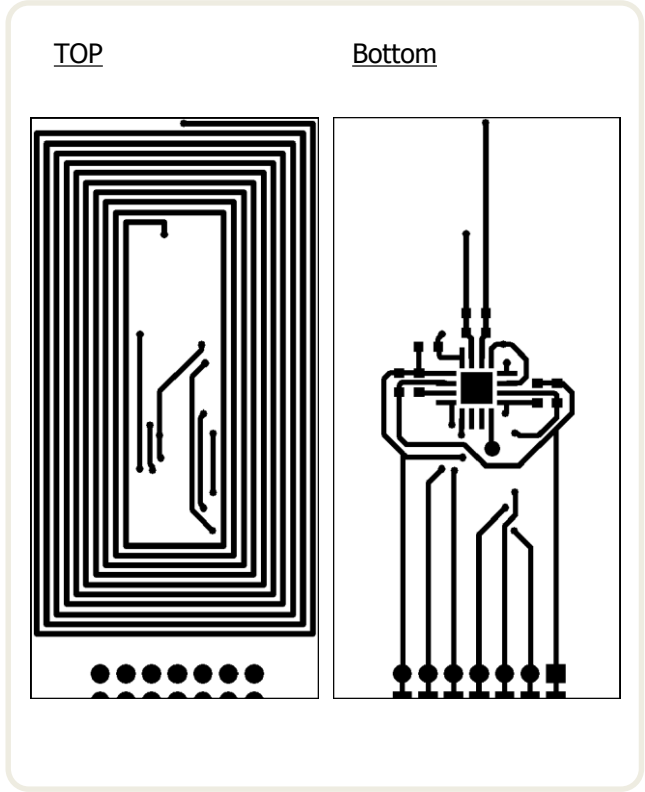
Please see below block diagram for detailed information.



Schematic

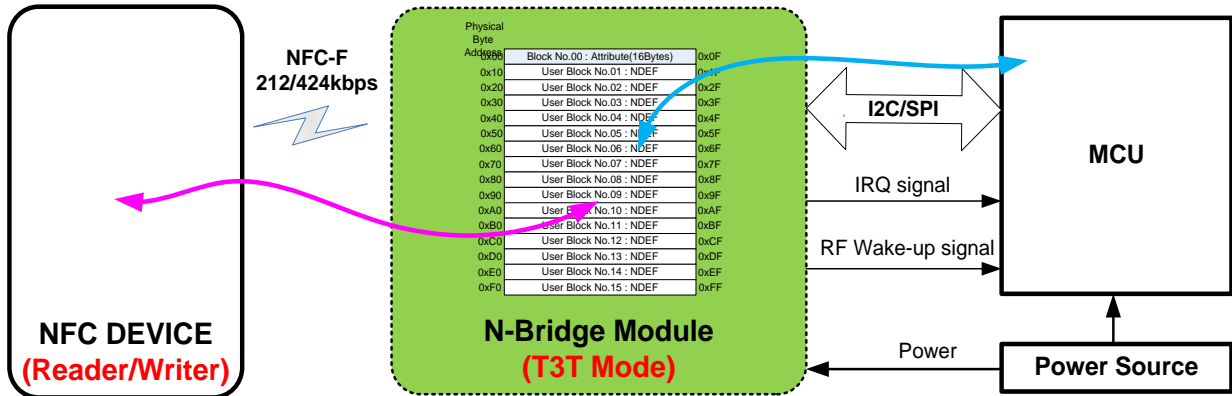


Gerber

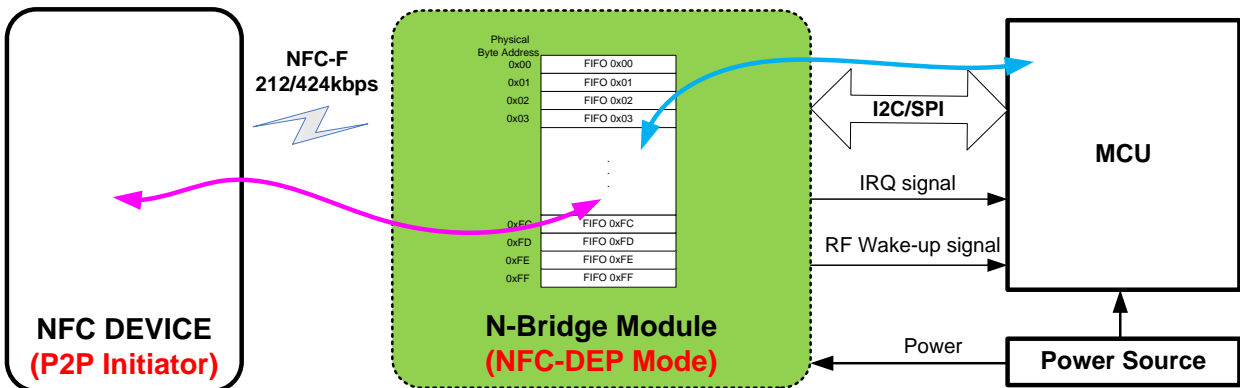


TNB131M NFC Bridge Operating mode Architecture

T3T (Type 3 TAG mode) – Basic operation mode



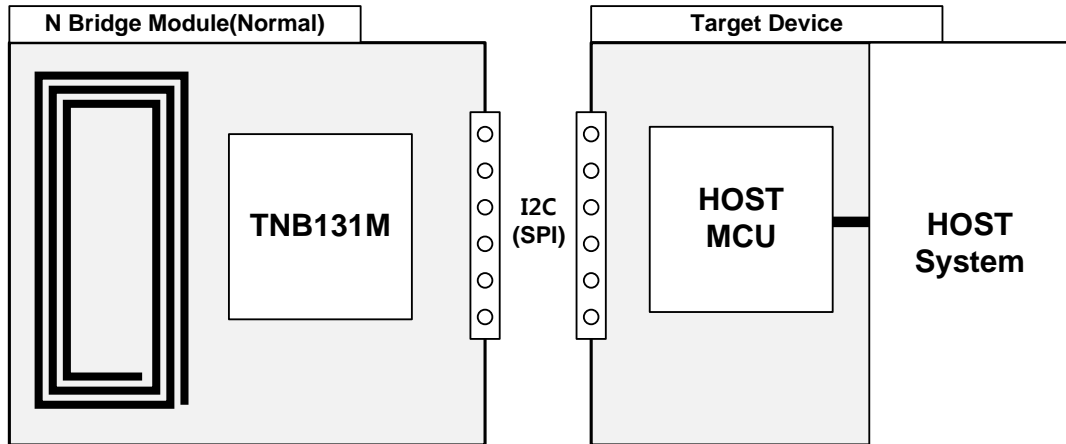
NFC-DEP (NFC Data Exchange Protocol mode) – Optional mode



- NFC Bridge Module은 Passive 동작으로 외부 NFC Device에 의해 동작된다.
(Master – NFC Device / Slave – N Bridge System)
- NFC device와 통신 하기 위해서는 반드시 N Bridge IC(TNB131M)를 제어하기 위한 MCU가 필요하다.
- N Bridge Solution에서 기본동작은 NFC Device는 NFC R/W, N-Bridge module은 TAG 로 동작된다.

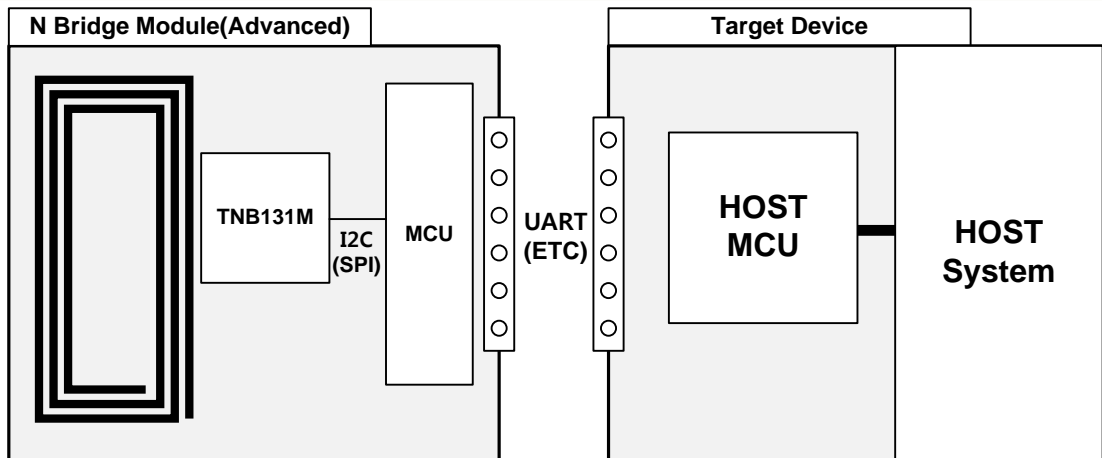
TNB131M NFC Bridge Module H/W Architecture

MBM-100N



• TNB131M Control Command – HOST Processor

MBM-100A



• TNB131M Control Command – Module MCU

• TNB131M Module H/W 선택 조건

- Host device MCU Spec.
- Host device Interface
- N Bridge module Program Size
- N Bridge data storage Size
- Antenna Size/Placement
- ETC

* Case by Case로 Program/data size는 유동적
(다양한 동작 scenario 및 target application 별로)

• Example 1 (I2C support MCU)

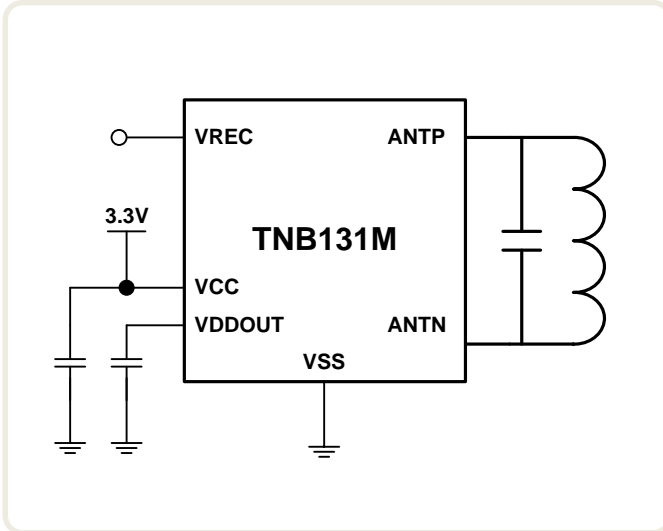
- ☞ BT Simple pairing / Wi-Fi setup
Program size
: about 256Byte

• Example 2

- ☞ Display-less device control
Program size
: about 2KByte ~ 8KByte

TNB131M Power mode Configuration

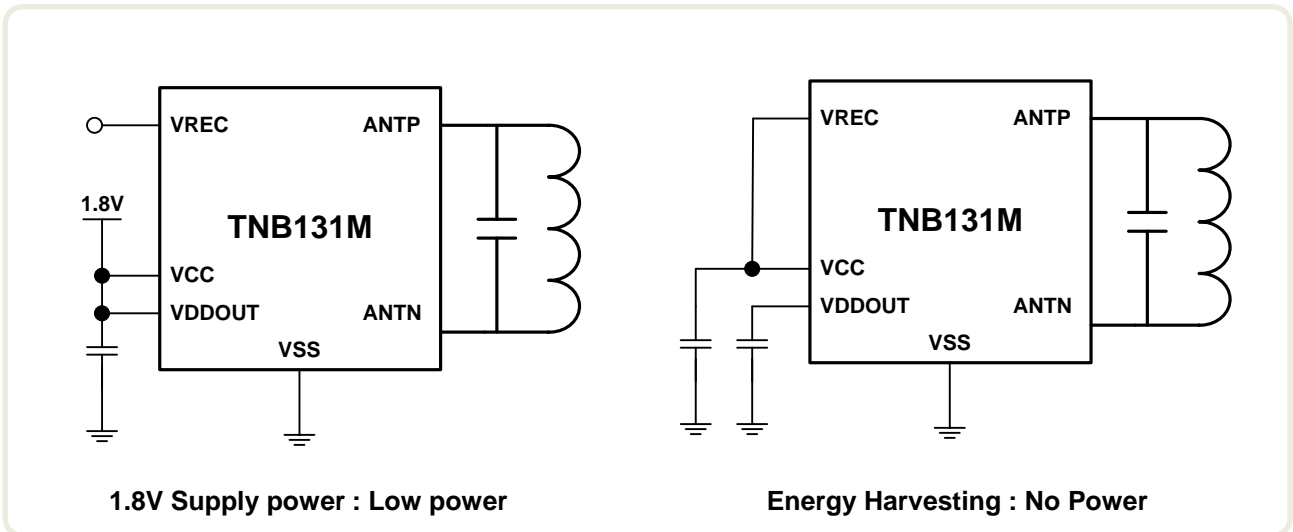
Normal Power mode



Minimum interface (I2C : HISEL Connect to VSS)		
#	Name	Dir.
1	IRQ	O
3	SCL	I
4	SDA	I/O
9	RST	I
11	VCC	PWR(IO PWR)
12	VSS	GND
13	VREC	Harvesting Power

- VREC - normal power : floating
bypass capacitor connect

Power Save mode



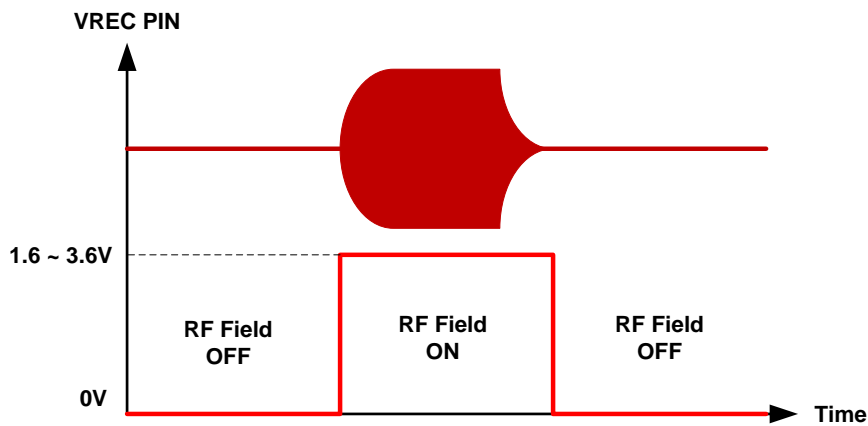
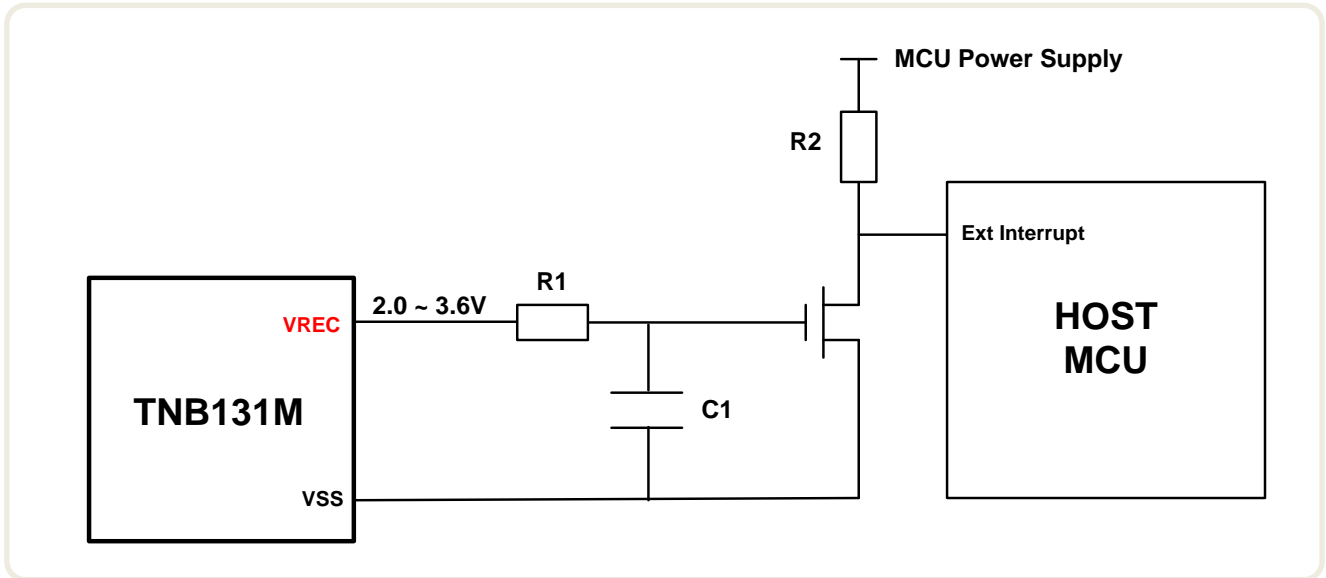
1.8V Supply power : Low power

Energy Harvesting : No Power

- Power Save mode Application
 - Portable device / Heath-care device
 - Low Power system
 - 1.8V Power system (1.8V I/O interface)

N-Bridge Wake up System

Used RF Detection (VREC PIN) - Analog



Used IRQ PIN - Digital

- IRQ output to advise tag status monitoring
- Interrupt Request – Active High
 - : Initial RF Field detection

Electrical Specification

Operating condition range

Symbol	Parameter	MIN	TYP	MAX	UNIT
T_{op}	Operating temperature range	-40	+25	+85	°C
VCC	Main Power Supply / IO Power	1.62	3.3	3.6	V

Current consumption

Symbol	Parameter	TEST Conditions	MIN	TYP	MAX	UNIT
$I_{PWR-1.8V}$	Power Supply Current, VCC = 1.8V	Idle mode, T=25°C RF disable/Power on	45	50	60	µA
		Active mode, T=25°C RF field present Data Communication	I2C	145	165	240
$I_{PWR-2.5V}$	Power Supply Current, VCC = 2.5V	Idle mode, T=25°C RF disable/Power on	70	75	90	µA
		Active mode, T=25°C RF field present Data Communication	I2C	265	285	315
$I_{PWR-3.3V}$	Power Supply Current, VCC = 3.3V	Idle mode, T=25°C RF disable/Power on	100	110	125	µA
		Active mode, T=25°C RF field present Data Communication	I2C	335	370	405

Standard I/O Pin DC characteristics (3.3 VCC)

SYMBOL	PARAMETER	MIN	MAX	Conditions	
				VCC	Remark
VIL	Low level input voltage	-0.5V	0.3 X VCC	2.7V to 3.6V	Guaranteed Input Low Voltage
VIH	High level input voltage	0.7 X VCC	VCC + 0.5V	2.7V to 3.6V	Guaranteed Input High Voltage
VOL	Low level output voltage		VSS + 0.1V	2.7V	
VOH	High level output voltage	VDD – 0.1V		2.7V	

Document Control

Revision History

Date	Version	CR	HW version	Description
2014.04.18	0.1	01	0.1	0.1 version
2014.04.28	0.2	02	0.2	Modify - misprint
2015.01.24	1.0	03	1.0	Add – Power save mode / Wake up system
2015.02.14	1.0a	04	1.0a	Modify - Block Diagram interface / C1 Value Board Height 1.75mm → 1.8mm

Technical Support

- Protocol information
 - Datasheet TNB131M v1.1
 - User Manual N-Bridge v1.0
- Firmware code design (Case by Case)
 - Support Firmware example source code
- Android Application design (Case by Case)
 - * Demonstration Android Application
 - AnyRead NFC Tag Writer
- Customization Business
 - HW, FW&SW, Android App. Modification & Development

Legal Disclaimer

3ALogics shall not be liable for the incidental or consequential losses of damage to tangible property and injury in connection with the use of this device. Although the examples in this guide have been tested with care, they may contain errors and they are not guaranteed for any particular purpose. 3ALogics reserves rights to change any contents to this documents at anytime without any prior notice.

Contact

3ALogics Inc.
7th Fl., Hyundai-office Bldg.,9-4, Sunae-dong
Bundang-gu, Seongnam-si, Gyeonggi-do,
463-783 Korea

TEL : (82)-(31)-715-7117
FAX : (82)-(31)-719-7551
E-mail : rfid@3ALogics.com
Homepage: <http://www.3ALogics.com>

Printed in the Republic of Korea.



3ALogics