User's Manual
TR3XM-C106-A3540

TAKAYA

Introduction

Thank you for purchasing a TR3XM-C106-A3540 RFID READER/WRITER module.

Be sure to read this manual before using the product.
After reading it, store the manual in a convenient place for future reference.

Regulations and Standards

FCC(※1)(※2)

This product is conformed to the FCC standards.
    FCC Rules (Federal Communications Commission)
    This product complies with Part 15 Subpart C of the FCC Rules.
    FCC ID: MK4C106-A3540

FCC NOTICE
    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.

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

RF Exposure compliance statement
    This Module complies with FCC radiation exposure limits set forth for an uncontrolled environment.
    This equipment should be installed and operated with a minimum distance of 20cm between the radiator
    and your body. This transmitter must not be co-located or operating in conjunction with any other
    antenna or transmitter.

Antenna Type: PCB

The following sentence must be displayed on the outside of the device in which the transmitter module
is installed: "Contains FCC ID: MK4C106-A3540"

ISED

ISED ID: 31742-C106A3540

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and
Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two
conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of
the device.

ISED Radiation Exposure statement
    This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled
    environment. This equipment should be installed and operated with minimum distance 20cm between
    the radiator and your body.

End Device Labelling
    Please notice that if the IC identification number is not visible when the module is installed inside
    another device, then the outside of the device into which the module is installed must also display a
    label referring to the enclosed module. This exterior label can use wording such as the following:
    "Contains IC: 31742-C106A3540" any similar wording that expresses the same meaning may be used.

Japan Radio Law

Equipment using high frequencies: Inductive Reading/Writing Communications Equipment
Conforming standards: Inductive Reading/Writing Communications Equipment.
Standard: ARIB STD-T82

※1
This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.
Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.
Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in §15.105 Information to the user or such similar statement and place it in a prominent location in the text of host product manual. Original texts as following:

For Class B
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 the interference 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.

For Class A
Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

※2
If Host manufacturer desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by Takaya, or host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Tags

This product can communicate the standard tags of ISO/IEC15693, ISO/IEC18000-3(Mode1), ISO/IEC14443 TypeA, ISO/IEC14443 TypeB and ISO/IEC18092(212kbps, Passive Mode).

【TR3XM-C106-A3540】

standards	supports
ISO/IEC15693 ISO/IEC18000-3(Mode1)	・Tag-it HF-I（Plus、Standard、Pro） ・ICODE SLI（SLI、SLI-S、SLI-L、SLIX、SLIX-S、SLIX-L、SLIX2） ・my-d02p、my-d10p ・MB89R118C、MB89R119B、MB89R112 ・M24LR04E-R、M24LR16E-R、M24LR64E-R ・ST25DV04K、ST25DV16K、ST25DV64K ・NTAG5
ISO/IEC14443 TypeA (MIFARE Classic is not supported)	・MIFARE Ultralight ・MIFARE Ultralight EV1 ・my-d move ・NTAG203、NTAG213/215/216、NTAG213TT ・SIC43NT ・NFC Forum Type2 Tag
ISO/IEC14443 TypeB	・"ISO/IEC14443 TypeB CARD SIZE" manufactured by SHARP
ISO/IEC18092 (212kbps, Passive Mode)	・FeliCa(※) ・FeliCa Lite ・FeliCa Lite-S ・NFC Forum Type3 Tag(※)

※Security function is not checked

【TR3XM-C106-A4247-MFC】

standards	supports
ISO/IEC15693 ISO/IEC18000-3(Mode1)	・Tag-it HF-I（Plus、Standard、Pro） ・ICODE SLI（SLI、SLI-S、SLI-L、SLIX、SLIX-S、SLIX-L、SLIX2） ・my-d02p、my-d10p ・MB89R118C、MB89R119B、MB89R112 ・M24LR04E-R、M24LR16E-R、M24LR64E-R ・ST25DV04K、ST25DV16K、ST25DV64K ・NTAG5
ISO/IEC14443 TypeA (MIFARE Classic is supported)	・MIFARE Ultralight ・MIFARE Ultralight EV1 ・MIFARE Classic ・MIFARE DESFire ・my-d move ・NTAG203、NTAG213/215/216、NTAG213TT ・SIC43NT ・NFC Forum Type2 Tag

※Security function is not checked

【TR3XM-C106-A4247-ILT】

standards	supports
ISO/IEC15693 ISO/IEC18000-3(Mode1)	・Tag-it HF-I（Plus、Standard、Pro） ・ICODE SLI（SLI、SLI-S、SLI-L、SLIX、SLIX-S、SLIX-L、SLIX2） ・my-d02p、my-d10p ・MB89R118C、MB89R119B、MB89R112 ・M24LR04E-R、M24LR16E-R、M24LR64E-R ・ST25DV04K、ST25DV16K、ST25DV64K ・NTAG5
ISO/IEC18000-3 (Mode3)	・ICODE ILT-M

※Security function is not checked

RoHS is support

Restriction **o**f **H**azardous **S**ubstances

Waste

Dispose of the Products as industrial waste.

Safety Precautions

The following symbols are used in this manual to indicate precautions that must be observed to ensure safe use of this product. The precautions provided here contain important safety information. Be sure to observe these precautions.

The following signal words are used in this manual.

⚠ WARNING	Failure to comply with a WARNING may result in serious injury or death.
⚠ CAUTION	Failure to comply with a CAUTION may result in injury to the operator, or damage to the items involved.

⚠ WARNING

Be sure to observe the following precautions to ensure safe use of the Products.

Decomposition of this product and cable, repair, remodeling, please strictly prohibited. There is the possibility of fire or electric shock injuries.

This product is using the RFID reader/writer radio equipment. Therefore, depending on where the applications you use may affect medical equipment. To minimize the impact of medical equipment for use, please observe the following countermeasure. The Japan Automatic Identification Systems Association (JAISA) guidelines are as follows: RFID antennas from implanted cardiac pacemakers or other medical devices please 22cm apart. We recommend that you paste "RFID sticker" at equipment.

← RFID Sticker

⚠ CAUTION

Be sure to observe the following precautions to ensure safe use of the Products.

Installation and storage environment
1. Do not use the Products in sunlight.
2. Do not use the Products in environment of spray of water, oil or chemicals.
3. Do not use the Products in environments with flammable, explosive, or corrosive gasses.
4. Do not use the Products in environment of hot humid.
5. Do not use the Products in environment of vibration or shock.
6. Do not use the Products in environment of condensation.
7. Do not use the Products in environment of around the metal is covered.
8. Do not use the Products in environment of high temperature.
9. Do not use the Products in environment that has a device that generates magnetic field and shock voltage.
10. Do not use the Products in unstable place.
11. If there is failure, discontinue use immediately, please contact us or the distributor.

Installation
1. Turn off the power before installation or removing.
2. The following effects may not work correctly.
   ・ Near 13.56MHz radio device
   ・ Near speakers , Inverter, motor and Plasma Display
3. The communication range may vary due to environment and conditions.

Contents

1 Product Overview

1.1 Features

This product uses the 13.56MHz frequency. This product is the electromagnetic induction type non-contact IC can read and write RFID tag data.
This Product is designed to be embedded and integrated within OEM devices and finished products such as label printers, cashless payment terminals or any other device that can benefit from integrated RFID capabilities.
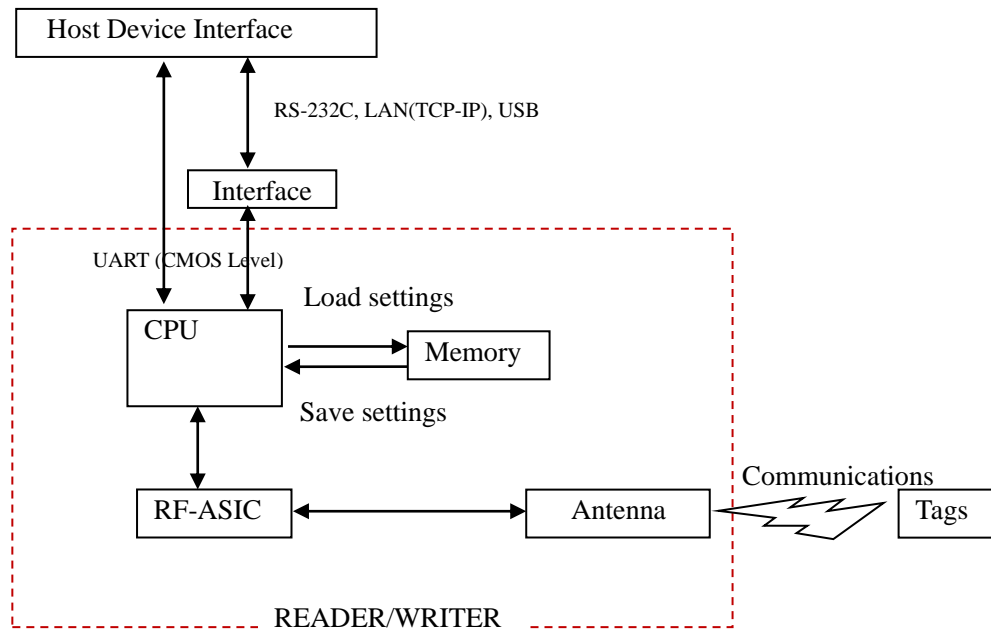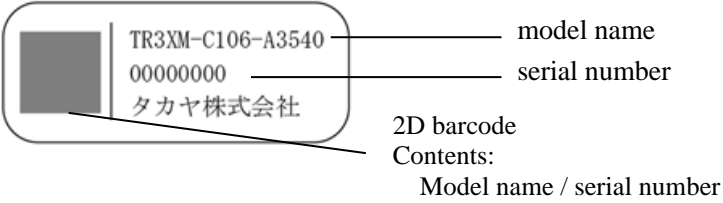

■ Conform to international standards
ISO/IEC15693 and ISO/IEC18000-3(Mode1), ISO/IEC14443 TypeA, ISO/IEC14443 TypeB, ISO/IEC18092(212kbps, Passive Mode), and ISO/IEC18000-3(Mode3) is supports.

■ Software
  □ TR3-series common communication protocol
  □ Software Development Kit

■ Useful
  □ Continuous inventory mode
     UID of the tag automatically sends Host Device.
  □ RDLoop mode
     UID or User Data of the tag automatically sends Host Device.
For more information, please refer to the TR3-PROTOCOL manual.

■ Environmentally
EU RoHS(2002/95/EC) Support.
And 10 substances prohibited by (EU) 2015/863 are below the standard value.

2 Names of Parts and Functions

2.1 TR3XM-C106-A3540

③

TR3XM-C106-A3540
00000000
タカヤ株式会社

検 ④

⑥

FCC ID：MK4C106-A3540
TAKAYA Corporation

⑤

①

②

⑦
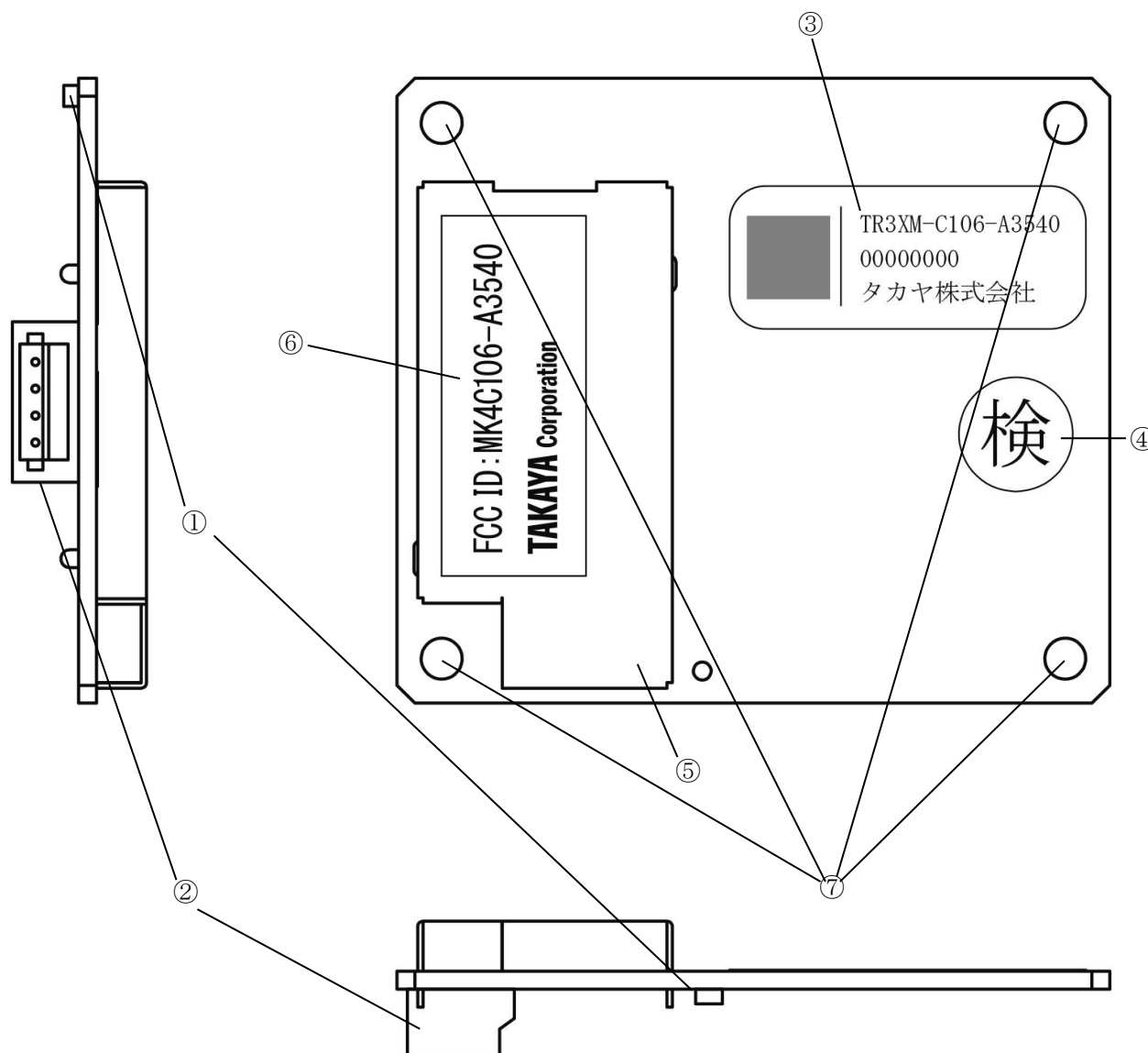
| No	Name	Feature Description
①	LED	This LED has three colors, RED, GREEN and ORANGE to display reading status.
②	Terminal block	Terminal block connecting to host device or interface board.
③	Serial number label	The serial number will be an 8-digit serial number. TR3XM-C106-A3540 ——— model name 00000000 ——— serial number タカヤ株式会社 2D barcode Contents: Model name / serial number
④	Inspected seal	Showing this RW module has been inspected.
⑤	Shield case	Preventing RF circuit from touching.
⑥	FCC Label	Showing FCC ID.
⑦	Screw holes	M2 holes.

3 Setting and connection

This RFID READER/WRITER product is to be professionally installed by authorized, qualified and service-trained installation personnel only.

3.1 Setting

3.1.1 installation

Please prepare four M2-screws (any length) and install READER/WRITER module.
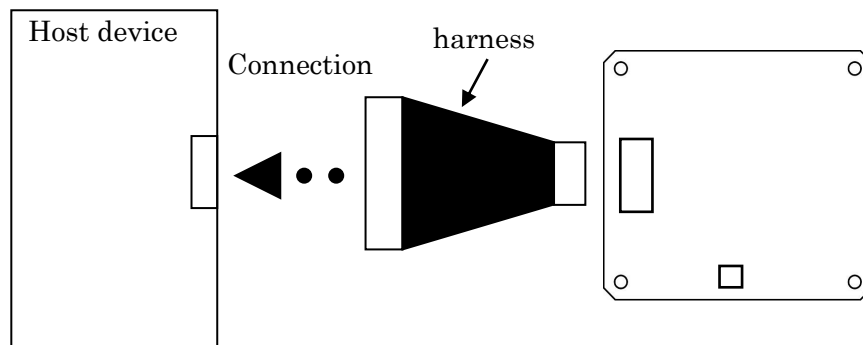
M2 Screw
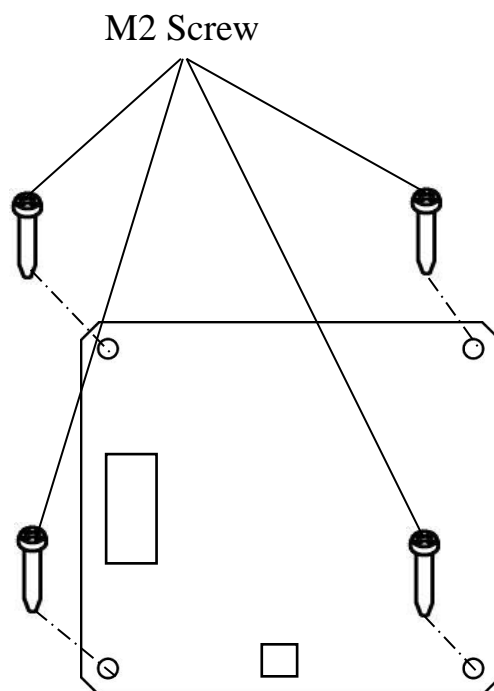
3.2 Connection

This product is used connecting to host device.
You can connect directly or using our interface board products.

3.2.1   Direct connection to the Host Device Interface

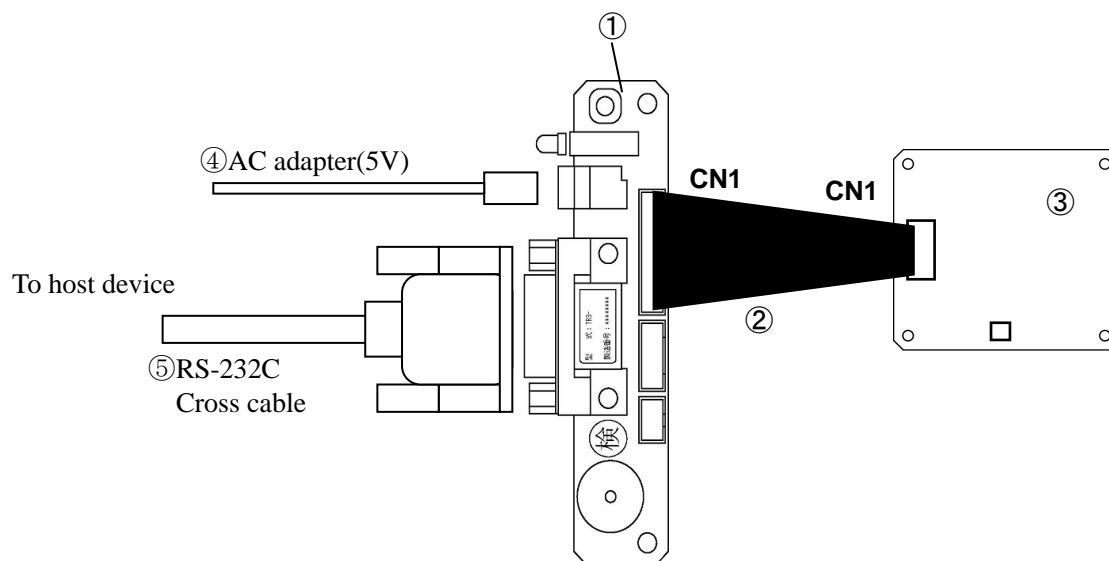Directly connecting to host device. Please prepare harness to connect.

3.2.2   In case of the connection with Interface Board TR3-IF-1C

●Connect configuration

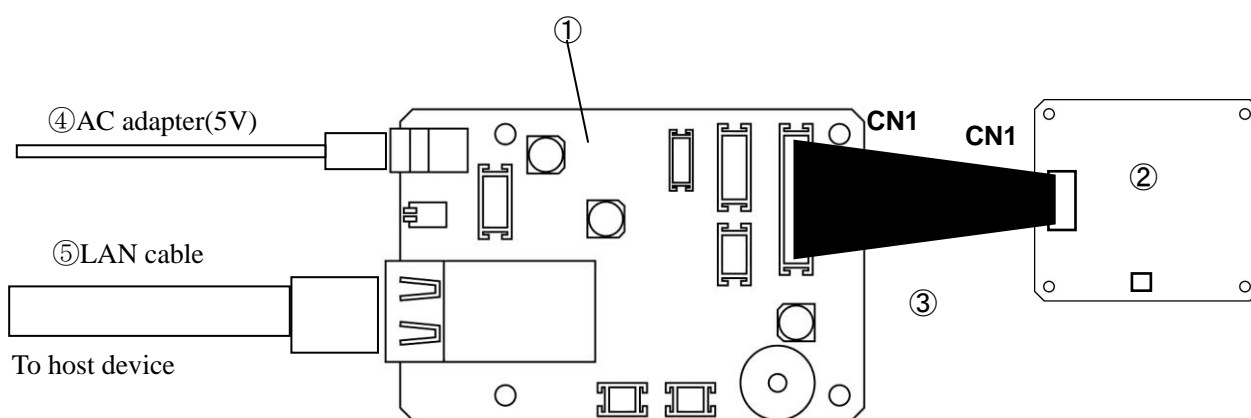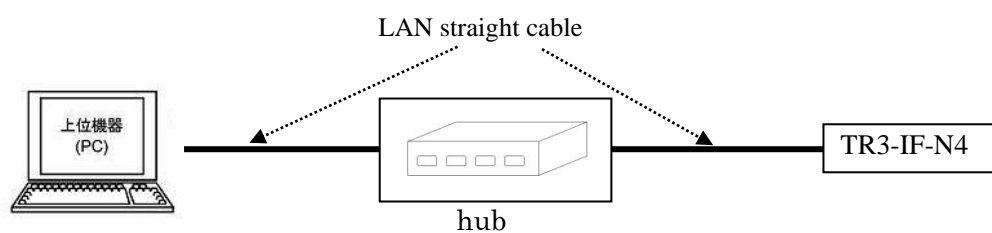| Figure number	Name	Quantity	Product model	Note
①	Interface board	1	TR3-IF-1C	RS-232C connection
②	Interface board connection cable	1	WIR43602E	10cm (optional item)
③	READER/WRITER module	1	TR3XM-C106-A3540	
④	AC adapter	1	TR3-PWR-5V-1	Approx. 1.8m (optional item)
⑤	RS-232C cross cable	1	-	Ready made goods Our RS-232C cross cable (model name：CB-232C-2)

●Connection(TR3-IF-1C + TR3XM-C106-A3540)

3.2.3   In case of the connection with Interface Board TR3-IF-N4

●Connect configuration

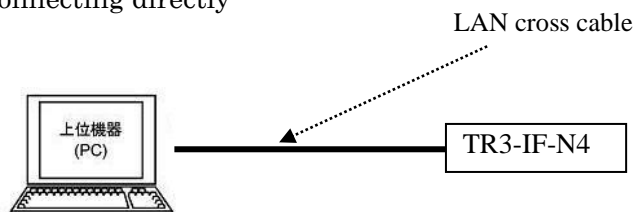| Figure number	Name	Quantity	Product model	Note
①	Interface board	1	TR3-IF-N4	TCP/IP connection
②	Interface board connection cable	1	WIR43602E	10cm (optional item)
③	READER/WRITER module	1	TR3XM-C106-A3540	
④	AC adapter	1	TR3-PWR-5V-1	Approx. 1.8m (optional item)
⑤	LAN straight cable	2	-	Ready made goods When connecting Via hub
	LAN cross cable	1	-	Ready made goods When connecting directly

●Connection

□Via hub

□Connecting directly

3.2.4   In case of the connection with Interface Board TR3-IF-U1A

●Connect configuration

Figure number	Name	Quantity	Product model	Note
①	Interface board	1	TR3-IF-U1A	USB connection
②	Interface board connection cable	1	WIR43602E	10cm (optional item)
③	READER/WRITER module	1	TR3XM-C106-A3540	
④	USB cable (type A or type B)	1	-	Ready made goods Our USB cable (model name：CB-USB-1)

●Connection
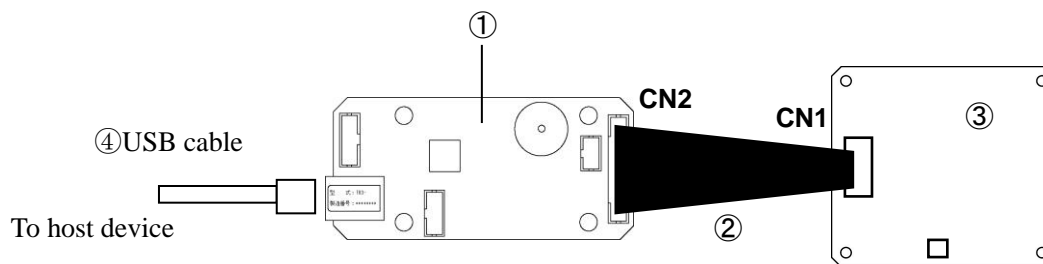
4 Specifications

4.1 TR3XM-C106-A3540

Specification	Item	Contents

Conformity standard	Japan Radio Law (※1)	Standard number:
		    ARIB STD-T82
		Standard name:
		    Inductive read / write communication equipment
		    (Wireless card system, etc.)
		Model designation number:
		    FC-23003
		    (model name: TR3XM-C106-A3540)

	FCC (※2)(※3)	FCC Part15 Subpart C FCC ID: MK4C106-A3540
	ISED	ISED ID: 31742-C106A3540
	RoHS	Compliant with the EU RoHS (2002/95/EC) However, the 10 substances prohibited by (EU) 2015/863 are below the standard value.

※1   This product incorporates a reader/writer module that has been certified by the type of designation stipulated by the Radio Law of Japan. Therefore, it is not necessary to apply for permission to install high-frequency equipment in Japan. However, please note that if you use it in a combination of equipment configurations that we do not approve, or if you modify it to emit illegal radio waves, it will be a violation of the Radio Law and you will be punished.

※2   This product is for domestic use only, and we do not provide maintenance service or technical support overseas.

※3   FCC NOTICE
    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 the interference 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.

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

Specification	Item	Contents
Radio Frequency	Carrier frequency	13.56MHz ± 50ppm(Ta=25℃)
	Air interface standard /transmit power	This product adjusts its transmit power in response to air interface standard. And air interface standard depends on its model name.

【TR3XM-C106-A3540】

Standards	Transmit power
ISO/IEC15693、ISO/IEC18000-3(Mode1) ISO/IEC14443 Type A (MIFARE Classic is not supported) ISO/IEC18092 (212kbps, Passive Mode)	125mW ± 30% （Ta=25℃、VCC=5.0V）
ISO/IEC14443 Type B	250mW ± 30% （Ta=25℃、VCC=5.0V）

【TR3XM-C106-A3540-MFC】

Standards	Transmit power
ISO/IEC15693、ISO/IEC18000-3(Mode1) ISO/IEC14443 Type A (MIFARE Classic is supported)	125mW ± 30% （Ta=25℃、VCC=5.0V）

【TR3XM-C106-A3540-ILT】

Standards	Transmit power
ISO/IEC15693、ISO/IEC18000-3(Mode1) ISO/IEC18000-3(Mode3)	125mW ± 30% （Ta=25℃、VCC=5.0V）

Data rate			
Air interface standards	RW⇒Tags		Tags⇒RW
ISO/IEC15693 ISO/IEC18000-3(Mode1)	26.48kbps[1/4]		26.69kbps
ISO/IEC14443 TypeA	106kbps		
ISO/IEC14443 TypeB	106kbps		
ISO/IEC18092 (212kbps, Passive Mode)	212kbps		
ISO/IEC18000-3(Mode3)	26.7～100kbps		53kbps ※1

※1 Sub career Frequency：423kHz, Encoding method：Manchester4 pulse

Specification	Item	Contents
Radio Frequency	Modulation	
	Communication distance (VDD=5V)	
	Anti-collision	

Modulation:

Air interface standards	RW⇒Tags	Tags⇒RW
ISO/IEC15693 ISO/IEC18000-3(Mode1)	ASK10%(initial) ASK100%	ASK
ISO/IEC14443 TypeA	ASK100%	ASK
ISO/IEC14443 TypeB	ASK10%	OOK-Manchester
ISO/IEC18092 (212kbps, Passive Mode)	ASK10%	ASK
ISO/IEC18000-3(Mode3)	ASK10%	Sub career Frequency：423kHz only Encoding method：Manchester4 pulse only

Communication distance (VDD=5V):

Air interface standards	Distance
ISO/IEC15693 ISO/IEC18000-3(Mode1)	Approx.12cm Tag：RI-TH1-CB1A-00 (by TI) （Tag-it HF-I Plus）
ISO/IEC14443 TypeA	Approx.8.0cm Tag：MUL5080C1 (by UPM) （MIFARE Ultralight）
ISO/IEC14443 TypeB	Approx.3.0cm Tag：「ISO/IEC14443 TypeB Card size」(by SHARP)
ISO/IEC18092 (212kbps, Passive Mode)	Approx.8.0cm Tag：ISO Card (by SAG) （FeliCa Lite-S）
ISO/IEC18000-3(Mode3)	Approx.3.0cm Tag： Block (by SMARTRAC) (ICODE ILT-M）

The communication distance varies depending on the surrounding metal, noise, power supply, temperature, and other usage environment, antenna used, and tag used.

Anti-collision:

Air interface standards	Anti-collision
ISO/IEC15693 ISO/IEC18000-3(Mode1)	Support
ISO/IEC14443 TypeA	Unsupport
ISO/IEC14443 TypeB	Unsupport
ISO/IEC18092 (212kbps, Passive Mode)	Unsupport
ISO/IEC18000-3(Mode3)	Support

Specification	Item	Contents		
Control	Host interface	UART (CMOS Level serial)		
		Item	Contents	
		Data rate	9600bps 19200bps(initial) 38400bps 115200bps	
		Data bit	8	
		Parity	None	
		Stop bit	1	
		フロー制御	Flow control	
	LED	1 LED (red/green/orange)		
Connector	CN1	・Connector 　Model：S5B-ZR-SM4A-TF(LF)(SN) manufactured by JST 　Cable-side housing model：ZHR-5 　Cable-side contact model：SZH-002T-P0.5 ・Pin-assignment		
		Pin number	Signal	Function
		1	VCC	Power input
		2	GND	GND
		3	Rx	Serial input (CMOS level)
		4	Tx	Serial output (CMOS level)
		5	3.3V	3.3V output
Mechanical data	Dimensions (W x D x H)	35(W)×40(D)×7.5(H)mm		
	Weight	Approx. 5g		
	Installation	M2 Screw Screw is not included.		
Electrical data	Power	Supply Voltage	DC+3.3V～5.0V±10%(※2)	
		Current consumption	Approx. 95mA(125mW) (※3) Approx. 115mA(250mW) (※3)	
		Current consumption (Carrer Off)	Approx. 18.5mA (125mA) (※3) Approx. 18.5mA (250mA) (※3)	
		Current consumption (Power down)	Approx. 0.022mA (125mA) (※3) Approx. 0.022mA (125mA) (※3)	
		Current consumption (Card detection)※3	Approx. 0.038mA (125mA) (※3) (※4)	
		Power consumption	Approx. 0.7W	

Specification	Item	Contents
Ambient Conditions	Temperature operating range	0～55℃
	Humidity Operating range	30～80%RH (No condensation)
	Temperature Storage range	0～55℃
	Humidity Storage range	30～80%RH (No condensation)

<Regarding registered trademarks>
   Proprietary nouns such as company names and product names described in this manual are trademarks or registered trademarks of each company.
   The ICODE SLI series is a trademark or registered trademark of NXP Semiconductors.

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        which the receiver is connected.
      -Consult the dealer or an experienced radio/TV technician for help.

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

5 Maintenance

This product is mainly made from electronic components and semiconductors.
Therefore, the long-term stable operation is expected. However, the defects as shown below are expected depending on environment and condition.

●Deterioration of elements resulted from overvoltage or overcurrent
●Deterioration of elements resulted from long-term damage in high temperature
●Deterioration of insulation and poor contact resulted from humidity or dust
●Corrosion of elements or poor contact resulted from Corrosive gas

To use this product in best condition, you are recommended to check regularly.

Item		Check	criterion
Surroundings	Temperature	Surrounding temperature	0～55℃
	Humidity	Surrounding humidity	30～85%RH
	Dust	Dust	None
	Corrosive gas	Corrosion	None
Power supply voltage	Input voltage	Voltage	When in 5.0V：DC+5.0V±10%
	Voltage fluctuation	Radical fluctuation	When in 3.3V：DC+3.3V±10%
Attachment	Main body	Screw looseness	Not loose
		Connector attachment	Locked or screw tightening
	Cable	Is there sign of cut?	None
Power-on	Function	Function check	Normal

Revision History

Revision code	Date	Revised contents
1.00	2024/6/26	Original production

TAKAYA