User's Manual
TR3-C302

TAKAYA

Manual No.TDR-MNL-C302-EN-100

Introduction

Thank you for purchasing a TR3-C302 RFID READER/WRITER.

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

This product is conform to the FCC standards.
FCC Rules (Federal Communications Commission)
This product complies with Part 15 Subpart C of the FCC Rules.

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.

The following sentence has to be displayed on the outside of the device in which the transmitter module is installed : "Contains FCC ID: **********"

Japan Radio Law

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

Tags

This product can communicate the standard tags of ISO/IEC15693 and ISO/IEC18000-3(Mode1,3), ISO/IEC14443A, ISO/IEC14443B, ISO/IEC 18092(212kbps Passive Mode, FeliCa).

Supports	Manufacturer
Tag-it HF-I	Texas Instruments
my-d	Infineon Technologies
I･CODE SLI, Mifare Ultralight	NXP Semiconductors
MB89R118	FUJITSU Japan
Felica	Sony Corporation

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 JAISA ← 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.

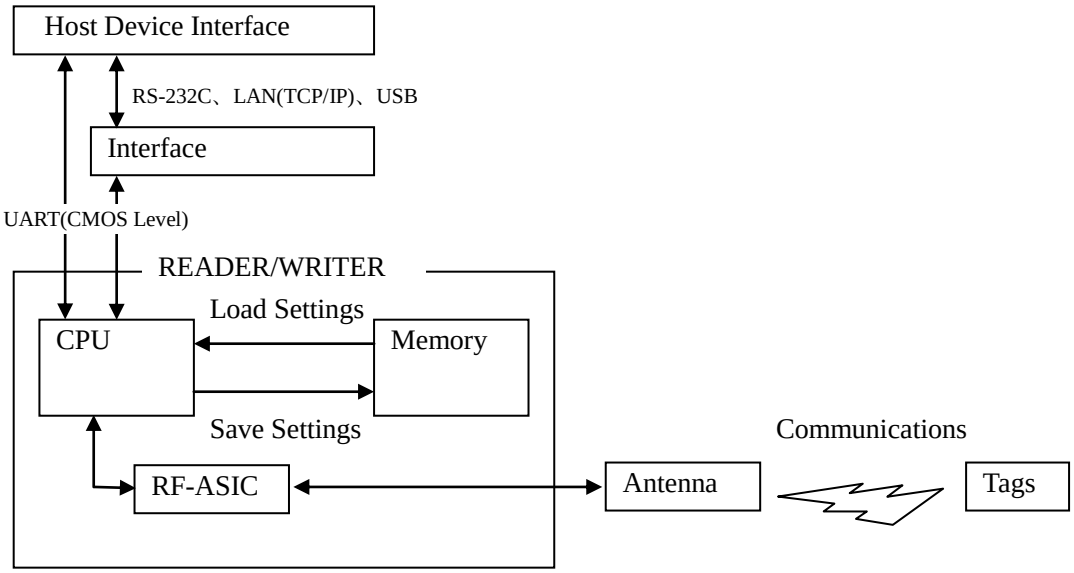
Installation
1. Turn off the power before installation or removing.
2. The following effects may not work correctly.
   - Near 13.56MHz radio device
   - Near speakers , Inverter, motor and Plasma Display
3. The communication range may vary due to environment and conditions.

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, 3) , ISO/IEC14443A, ISO/IEC14443B, ISO/IEC 18092(212kbps Passive Mode, FeliCa) is supports.

■ Rich Products
- ☐ Various interface RS-232C, USB, TCP/IP.
- ☐ Antennas of various sizes

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

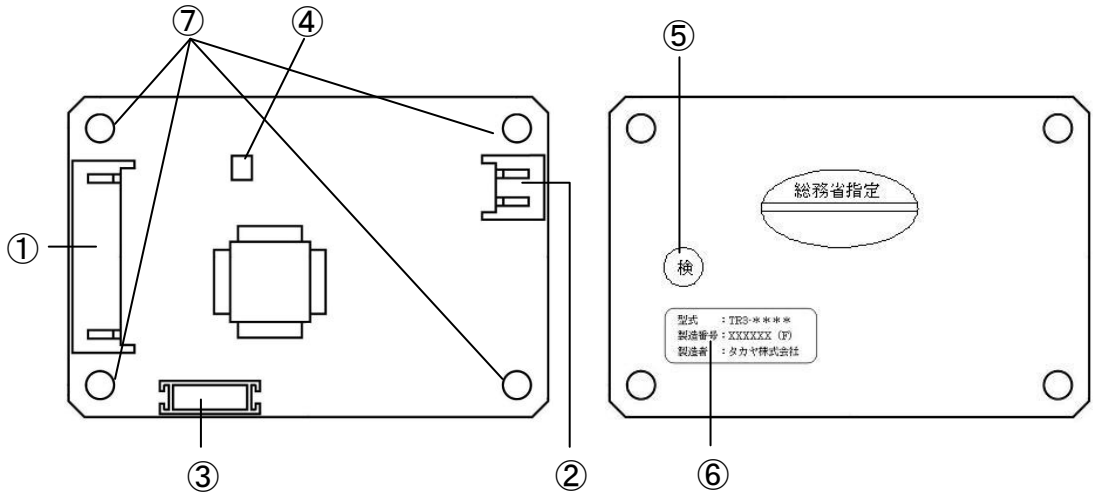
■ Useful
- ☐ Continuous inventory mode
  UID of the tag automatically sends Host Device.
- ☐ RDLoop mode
  UID or User Data of the tag automatically sends Host Device.

For more information please refer to the TR3-PROTOCOL manual.

■ Environmentally
EU RoHS(2002/95/EC) Support

2 Names of Parts and Functions

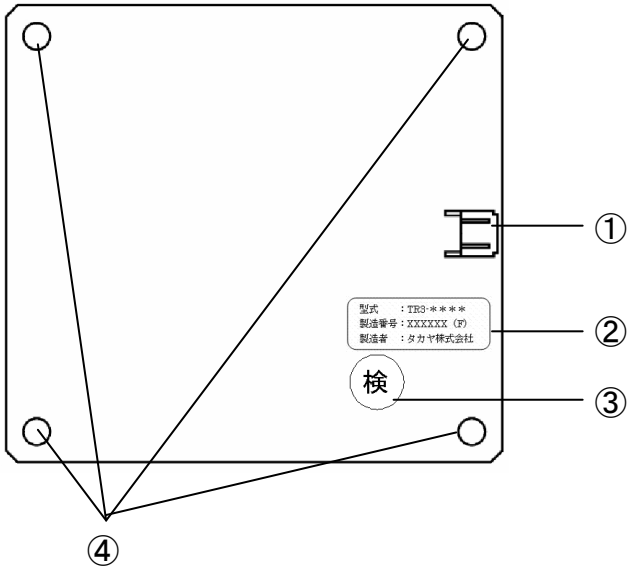
2.1 TR3-C302



No	Name	Description
①	CN1	This connector is for connection to the host.
②	CN2	Connect the antenna cable.
③	CN3	Connect the buzzer control cable.
④	LED1	Displays the status of this product.
⑤	Inspection mark	
⑥	Nameplate	Production numbers, will be 8-digit serial number. 型式 ：TR3-＊＊＊＊ — Model Name 製造番号：XXXXXX（F） — Serial number：＊＊＊＊＊＊＊＊(F) 製造者 ：タカヤ株式会社
⑦	Screw holes	M3 holes

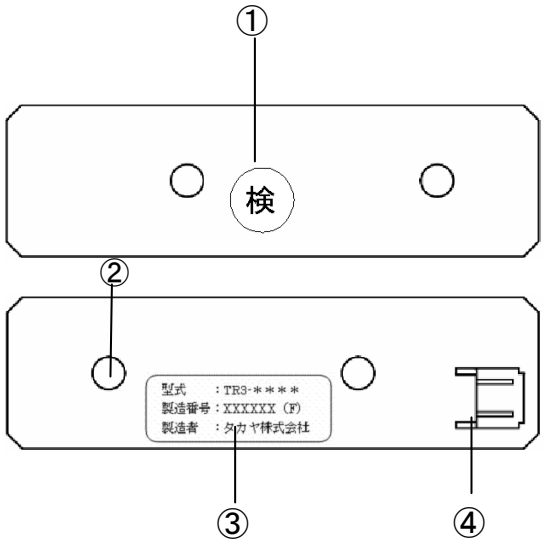
2.2 Antenna

2.2.1 TR3-A202



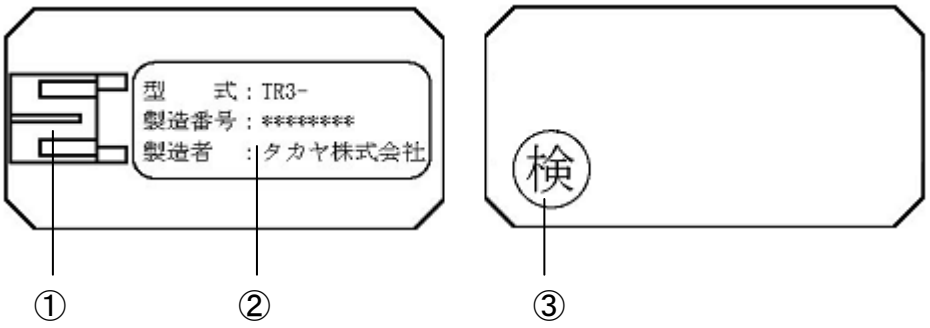
No	Name	Description
①	CN1	Connect the antenna cable.
②	Nameplate	Production numbers, will be 8-digit serial number. 型式 ：TR3-＊＊＊＊ — Model Name 製造番号：XXXXXX（F） — Serial number：＊＊＊＊＊＊＊＊(F) 製造者 ：タカヤ株式会社
③	Inspection mark	
④	Screw holes	M3 holes

2.2.2 TR3-A302



No	Name	Description
①	Inspection mark	
②	Screw holes	M3 holes
③	Nameplate	Production numbers, will be 8-digit serial number. 型式 ：TR3-＊＊＊＊ — Model Name 製造番号：XXXXXX（F） — Serial number：＊＊＊＊＊＊＊＊(F) 製造者 ：タカヤ株式会社
④	CN1	Connect the antenna cable.

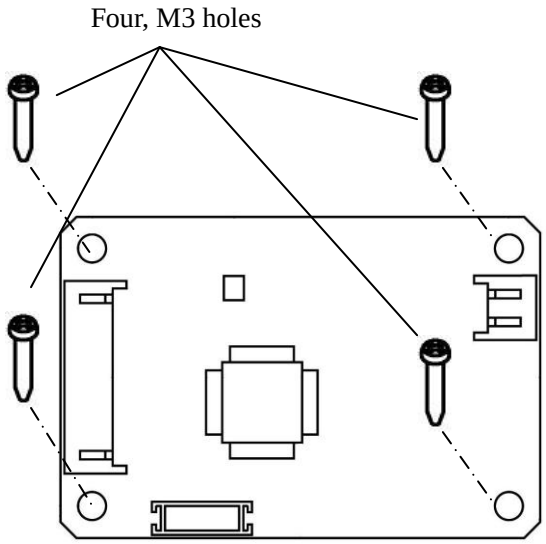
2.2.3 TR3-A401



No	Name	Description
①	CN1	Connect the antenna cable.
②	Nameplate	Production numbers, will be 8-digit serial number. 型式 ：TR3-＊＊＊＊ — Model Name 製造番号：XXXXXX（F） — Serial number：＊＊＊＊＊＊＊＊(F) 製造者 ：タカヤ株式会社
③	Inspection mark	

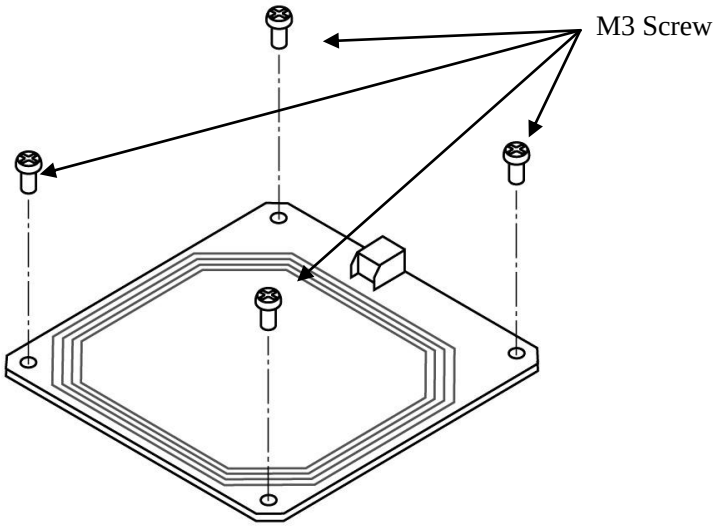
3 Installation and connection

3.1 Installation into a host device



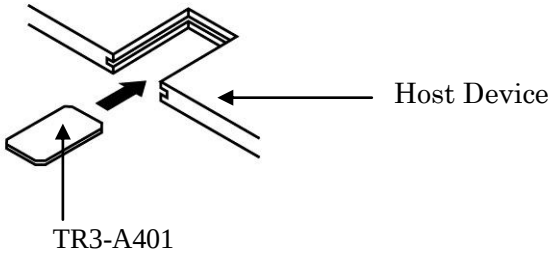
3.2 Antenna installation into a host device

3.2.1 Screw holes



3.2.2 Guide

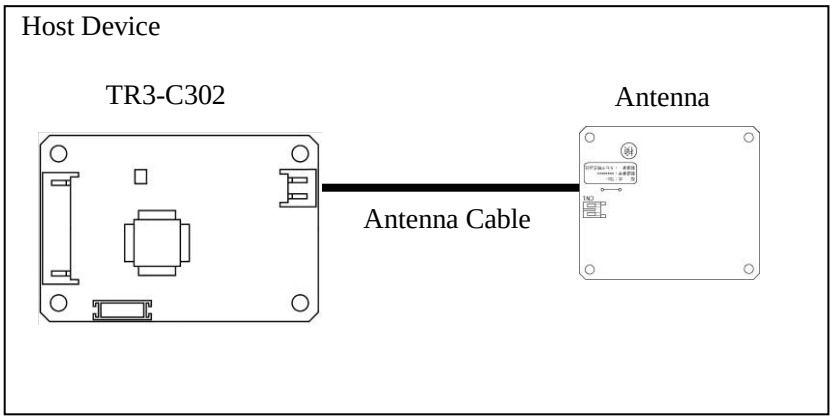
TR3-A401 is recommended that you set up a guide on fixed-like the figure below.



3.3 Connection

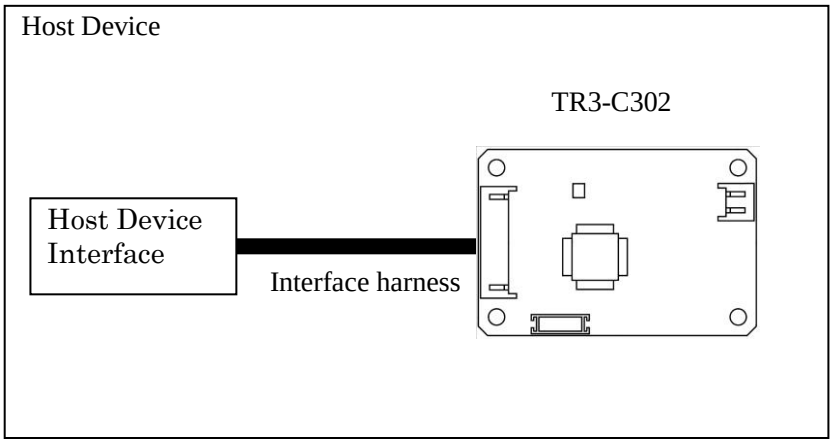
This product will connect with the antenna and antenna cables.
This product connects with Host Device that direct connection or connect using our interface.

3.3.1 Attaching the Cable and Antenna



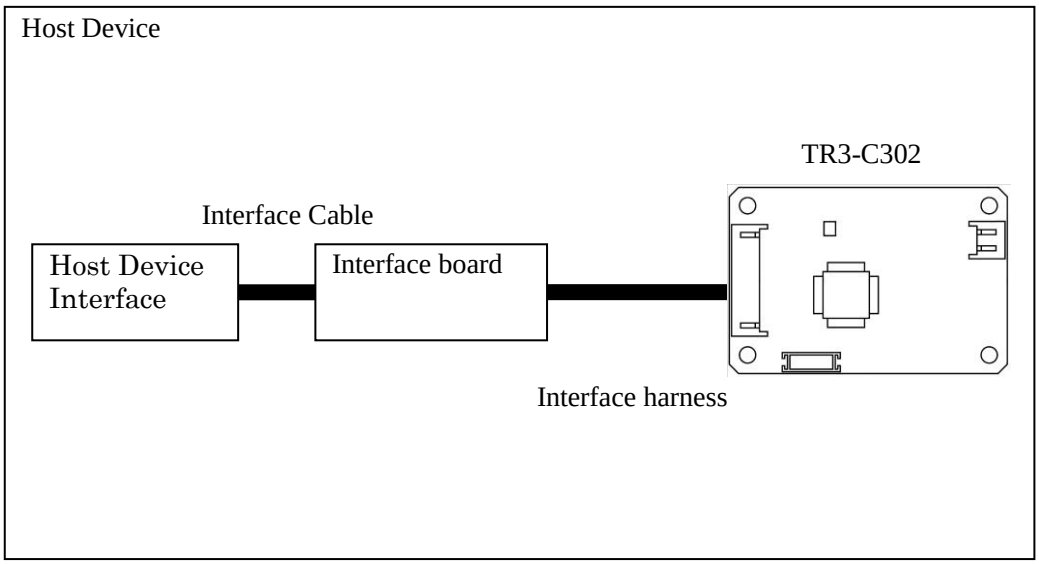
3.3.2 Direct connection to the Host Device Interface

Please prepare to the interface harness.



3.3.3 Using the interface board to connect to the Host Device Interface

Interface board, please contact us.



4 Specifications

4.1 TR3-C302

■ Specifications

<table>
<tr><th>Specifications</th><th>Item</th><th>Parameter</th></tr>
<tr><td>Applicable Standards</td><td>Japan Radio Law</td><td>ARIB STD-T82</td></tr>
<tr><td></td><td>RoHS</td><td>EU RoHS(2002/95/EC) Supports</td></tr>
<tr><td>Radio Frequency</td><td>Carrier frequency</td><td>13.56MHz ±50ppm(Ta=25℃) or less</td></tr>
<tr><td></td><td>Transmit power or power range</td><td>200mW ± 20%(Ta=25℃, VCC=5.0V)</td></tr>
<tr><td></td><td>Standards</td><td>ISO/IEC 15693、ISO/IEC18000-3(Mode1)
ISO/IEC 14443A、ISO/IEC 14443B、ISO/IEC 18092（FeliCa）</td></tr>
<tr><td></td><td>Tags</td><td>Tag-it HF-I, my-d, I･CODE SLI, MB89R118
Mifare Ultralight, FeliCa (※1)</td></tr>
<tr><td></td><td>Data rate</td><td>・ISO/IEC 15693,ISO/IEC18000-3(Mode1)
<table>
<tr><th></th><th>Speed</th><th>Data rate</th></tr>
<tr><td rowspan="2">Product⇒Tag</td><td>1/4</td><td>26.48kbps</td></tr>
<tr><td>1/256</td><td>1.65kbps</td></tr>
<tr><td>Tag⇒Product</td><td colspan="2">26.69kbps</td></tr>
</table>
・ISO/IEC18000-3(Mode3)
<table>
<tr><th></th><th>Parameter</th></tr>
<tr><td>Product⇒Tag</td><td>26.7kbps～100kbps</td></tr>
<tr><td>Tag⇒Product</td><td>53kbps</td></tr>
</table>
・ISO/IEC 14443A, ISO/IEC 14443B　106 kbps
・ISO/IEC 18092(Passive Mode)　212kbps</td></tr>
<tr><td></td><td>Modulation</td><td>・ISO/IEC 15693,ISO/IEC18000-3(Mode1)
<table>
<tr><th></th><th>Parameter</th></tr>
<tr><td>Product⇒Tag</td><td>ASK 10%　/ ASK 100%</td></tr>
<tr><td>Tag⇒Product</td><td>ASK</td></tr>
</table>
・ISO/IEC18000-3(Mode3)
<table>
<tr><th></th><th>Parameter</th></tr>
<tr><td>Product⇒Tag</td><td>ASK 10%</td></tr>
<tr><td>Tag⇒Product</td><td>ASK</td></tr>
</table>
・ISO/IEC 14443A
<table>
<tr><th></th><th>Parameter</th></tr>
<tr><td>Product⇒Tag</td><td>ASK 100%</td></tr>
<tr><td>Tag⇒Product</td><td>ASK</td></tr>
</table>
・ISO/IEC 14443B
<table>
<tr><th></th><th>Parameter</th></tr>
<tr><td>Product⇒Tag</td><td>ASK 10%</td></tr>
<tr><td>Tag⇒Product</td><td>ASK</td></tr>
</table>
・ISO/IEC 18092(Passive Mode)
<table>
<tr><th></th><th>Parameter</th></tr>
<tr><td>Product⇒Tag</td><td>ASK 10%</td></tr>
</table></td></tr>
<tr><td></td><td>Anti-collision</td><td>Support</td></tr>
</table>

※1：Tag-it HF-I is a registered trademark of Texas Instruments Incorporated.
my-d is a registered trademark of Infineon Technologies AG.
I･CODE SLI, Mifare Ultralight are registered trademarks of NXP Semiconductors.
MB89R118 is a registered trademark of FUJITSU Japan.
Felica is a registered trademark of Sony Corpration.

<table>
<tr><th>Specifications</th><th>Item</th><th>Parameter</th></tr>
<tr><td>Controll</td><td>Command</td><td>Please refer to the TR3-Protocol-Manual.</td></tr>
<tr><td></td><td>Host Interface</td><td>UART(CMOS)
<table>
<tr><th>Item</th><th>Parameter</th></tr>
<tr><td>Speed</td><td>9600bps
19200bps(※2)
38400bps</td></tr>
<tr><td>Data bits</td><td>8</td></tr>
<tr><td>Parity</td><td>None</td></tr>
<tr><td>Stop bit</td><td>1</td></tr>
<tr><td>Flow control</td><td>None</td></tr>
</table></td></tr>
<tr><td></td><td>LED1</td><td>1pc (3 colors, red/green/orange)</td></tr>
<tr><td>Connector</td><td>CN1</td><td>Connector : JST S10B-PH-SM4-TB(LF)(SN)
Housing : JST PHR-10
Contact : JST SPH-002T-P0.5S

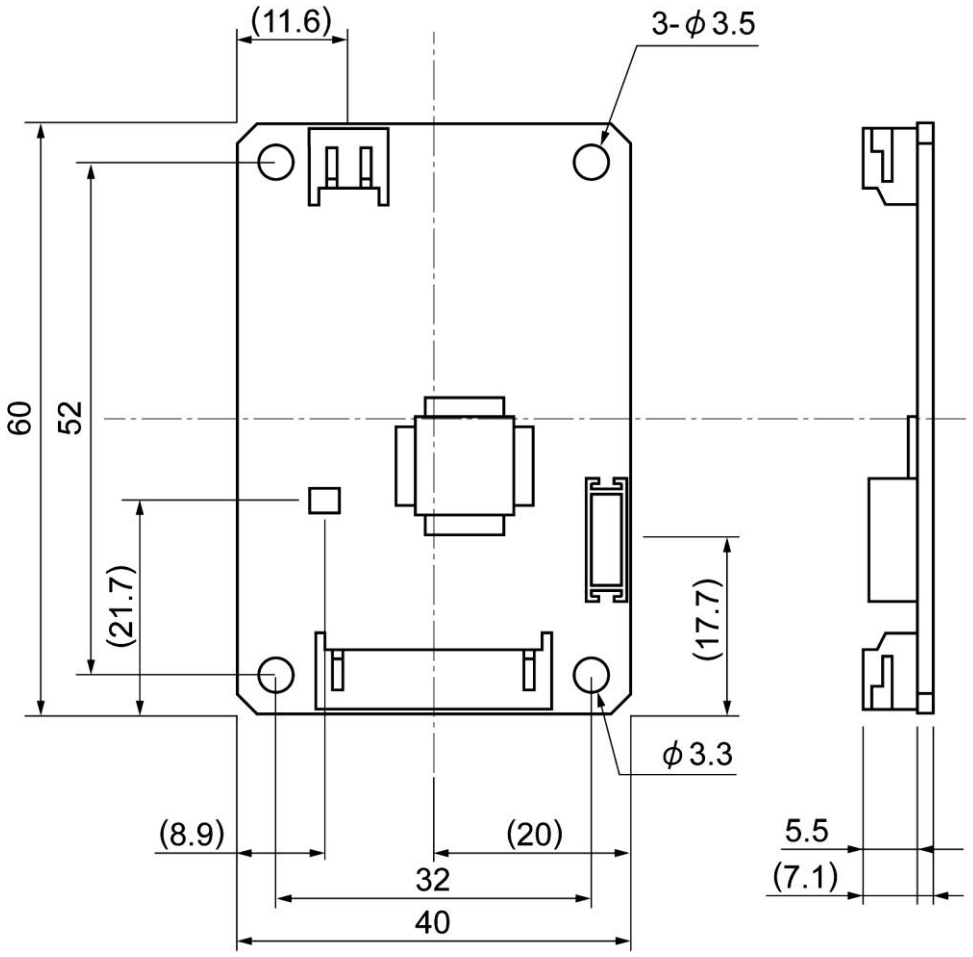
Pin assignment
<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>1</td><td>VCC</td><td>Power</td></tr>
<tr><td>2</td><td>VCC</td><td>Power</td></tr>
<tr><td>3</td><td>GND</td><td>GND</td></tr>
<tr><td>4</td><td>GND</td><td>GND</td></tr>
<tr><td>5</td><td>Rx</td><td>Received data signal</td></tr>
<tr><td>6</td><td>Tx</td><td>Transmitted data signal</td></tr>
<tr><td>7</td><td>VCC2</td><td>Power output</td></tr>
<tr><td>8</td><td>IO1</td><td>Input/Output or Detection signal output H : Detection</td></tr>
<tr><td>9</td><td>IO2</td><td>Input/Output or Trigger input
L : Trigger ON</td></tr>
<tr><td>10</td><td>IO3</td><td>Input/Output</td></tr>
</table></td></tr>
<tr><td></td><td>CN2</td><td>Connector : JST S2B-PH-SM4-TB(LF)(SN)
Housing : JST PHR-2
Contact : JST SPH-002T-P0.5S

Pin assignment
<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>1</td><td>RF</td><td>Analog signal</td></tr>
<tr><td>2</td><td>GND</td><td>GND</td></tr>
</table></td></tr>
</table>

※2：initialization

Specifications	Item	Parameter
Mechanical data	Dimensions (W x D x H)	40 x 60 x 7.1mm
	Weight	approx. 12g
	Installation	M3 Screw Screw is not included.
Electrical data	Power	Supply Voltage : DC+5.0V ±10% Current consumption : approx. 160mA Carrier off : approx. 35mA Power down mode : approx. 24mA Consumption : max 1.0W
Ambient Conditions	Temperature Operating range	0 to 55 degree
	Humidity Operating range	30 to 80%RH
	Temperature Storage range	0 to 55 degree
	Humidity Storage range	30 to 80%RH
Other	Accessories	None

■ Dimensions



Unit：mm
Tolerance：±1mm
( )is Recommended Dimension
Screw hole depth：3mm

■ Connections

Names	Model	Notes
Antenna	TR3-A202	
	TR3-A302	
	TR3-A401	
Cable	TR3-AC-1A-***	*** puts the cable length. 9cm ~ 50cm cable are available.
	TR3-AC-2A-***	*** puts the cable length. 10cm ~ 3m cable are available.
Interface board	TR3-IF-1C	RS232C interface
	TR3-IF-N1	TCP/IP interface
	TR3-IF-U1 TR3-IF-U1A	USB interface

■ Electrical Characteristics(CN1)

VDD=5V

Item	Condition	MIN	TYP	MAX	Unit
H input voltage	RX,IO1,IO2,IO3	2.5		5.0	V
L input voltage	RX,IO1,IO2,IO3	0		1.0	V
H output voltage	IOH=-5mA,-20mA	3.0			V
L output voltage	IOL=5mA,20mA			2.0	V
Pull-up resistor		25.0	50.0	100.0	kΩ

・TX, RX, IO1, IO2 and IO3 is, Pull-up resistor has been connected.

・TX, RX, IO1, IO2 and IO3 is, 100 ohm resistor has been connected.
Output port, LED is not driven. If the LED drive, please use the digital transistors.

4.2 Antenna

4.2.1 TR3-A202

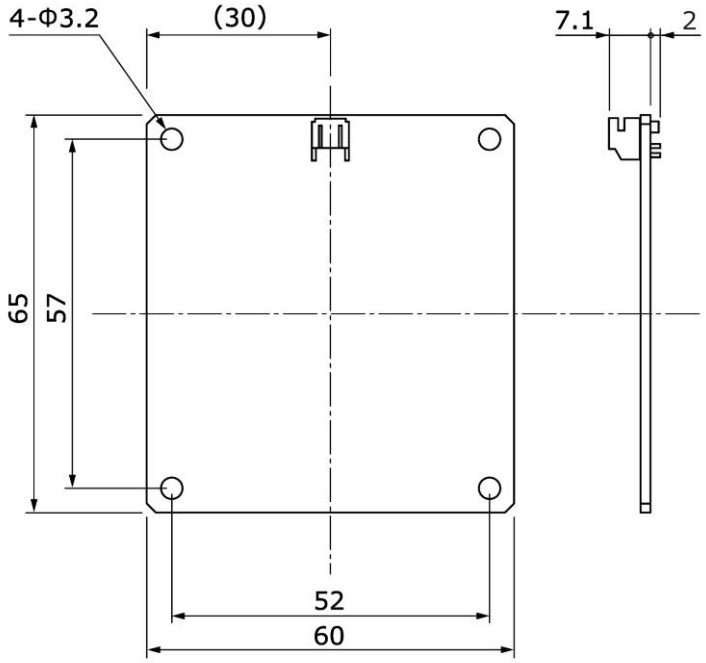
■ Specifications

Specifications	Item	Parameter
Applicable Standards	RoHS	EU RoHS(2002/95/EC) Support
Antenna	Resonant frequency	13.56MHz ±40kHz(Ta=25℃)
	Communication distance	Max 10cm (Communication distance depends on the environment.)
Connector	CN1	Connector : JST S2B-PH-SM4-TB(LF)(SN) Housing : JST PHR-2 Contact : JST SPH-002T-P0.5S Pin assignment
Mechanical data	Dimensions (W x D x H)	60 x 65 x 9.1 mm
	Weight	approx. 11g
	Installation	M3 Screw Screw is not included.
Ambient Conditions	Temperature Operating range	0 to 55 degree
	Humidity Operating range	30 to 80%RH
	Temperature Storage range	0 to 55 degree
	Humidity Storage range	30 to 80%RH
Other	Accessories	RFID Sticker 1 sheet Model Name : SEL41400L

Pin assignment

Pin No.	Symbol	Function
1	RF	Analog signal
2	GND	GND

■ Dimensions



Unit：mm
Tolerance：±1mm
Substrate thickness : 1.6mm

4.2.2 TR3-A302

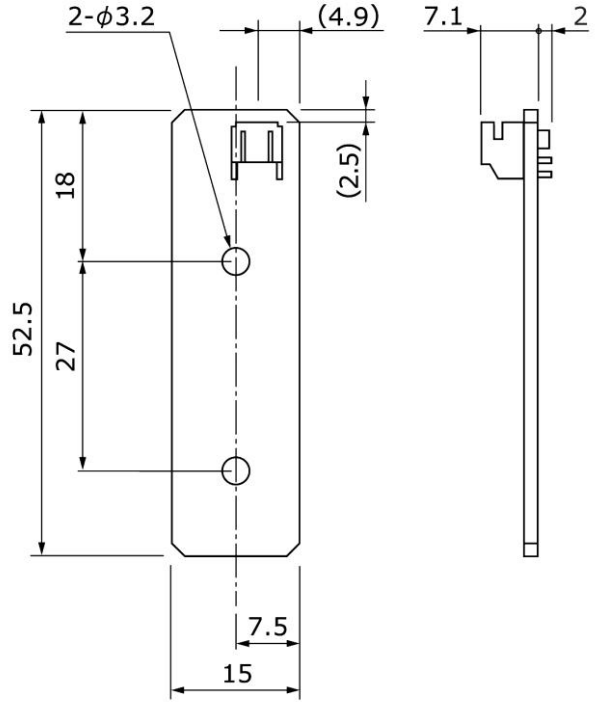
■ Specifications

Specifications	Item	Parameter
Applicable Standards	RoHS	EU RoHS(2002/95/EC) Support
Antenna	Resonant frequency	13.56MHz ±40kHz(Ta=25℃)
	Communication distance	Max 7cm (Communication distance depends on the environment.)
Connector	CN1	Connector : JST S2B-PH-SM4-TB(LF)(SN) Housing : JST PHR-2 Contact : JST SPH-002T-P0.5S Pin assignment

Pin No.	Symbol	Function
1	RF	Analog signal
2	GND	GND

Mechanical data	Dimensions (W x D x H)	15 x 52.5 x 9.1 mm
	Weight	approx. 3g
	Installation	M3 Screw Screw is not included.
Ambient Conditions	Temperature Operating range	0 to 55 degree
	Humidity Operating range	30 to 80%RH
	Temperature Storage range	0 to 55 degree
	Humidity Storage range	30 to 80%RH
Other	Accessories	RFID Sticker 1 sheet Model Name : SEL41400L

■ Dimensions



Unit：mm
Tolerance：±1mm
Substrate thickness : 1.6mm

4.2.3 TR3-A401

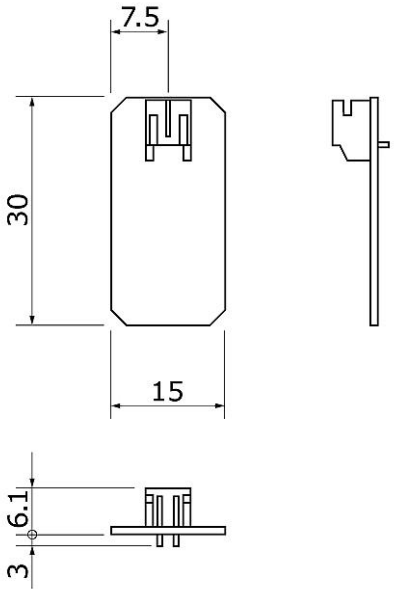
■ Specifications

Specifications	Item	Parameter
Applicable Standards	RoHS	EU RoHS(2002/95/EC) Support
Antenna	Resonant frequency	13.56MHz ±40kHz(Ta=25℃)
	Communication distance	Max 5cm (Communication distance depends on the environment.)
Connector	CN1	Connector : JST S2B-PH-K-S(LF)(SN) Housing : JST PHR-2 Contact : JST SPH-002T-P0.5S Pin assignment

Pin No.	Symbol	Function
1	RF	Analog signal
2	GND	GND

Mechanical data	Dimensions (W x D x H)	15 x 30 x 9.1 mm
	Weight	approx. 2g
	Installation	M3 Screw Screw is not included.
Ambient Conditions	Temperature Operating range	0 to 55 degree
	Humidity Operating range	30 to 80%RH
	Temperature Storage range	0 to 55 degree
	Humidity Storage range	30 to 80%RH
Other	Accessories	RFID Sticker 1 sheet Model Name : SEL41400L

■ Dimensions



Unit：mm
Tolerance：±1mm
Substrate thickness : 1.0mm

4.3 Cable

4.3.1 TR3-AC-1A-***

■ Model Name

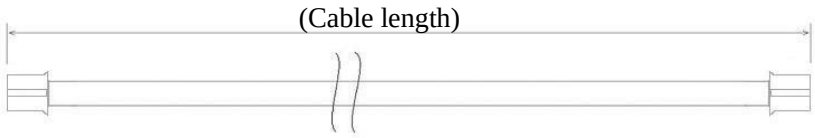
TR3-AC-1A-***

Enter the cable length(Unit:mm)
090～500

■ Specifications

Item	Parameter
RoHS	EU RoHS(2002/95/EC) Support
Linetype	Twisted pair cable
Connector	PH-PH
Cable loss	9cm : approx. 0.061dB 50cm : approx. 0.337dB

■ Dimensions



( )is Recommended Dimension

4.3.2 TR3-AC-2A-***

■ Model Name

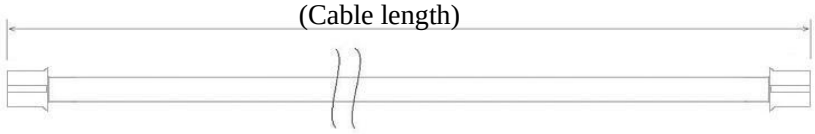
TR3-AC-2A-***

Enter the cable length(Unit:mm)
100～3M

■ Specifications

Item	Parameter
RoHS	EU RoHS(2002/95/EC) Support
Linetype	Coaxial cable 1.5D-2V
Connector	PH-PH
Cable loss	10cm : approx. 0.043dB 3m : approx. 0.255dB

■ Dimensions



( )is Recommended Dimension

5 Maintenance

This product is mainly used in electronic components and semiconductors.
Therefore, the long-term stable operation, the environment and conditions are expected to defect, as shown below.

- Device degradation due to overvoltage and overcurrent.
- Device degradation due to high temperature and long-term stress.
- Poor contact of the connector and cause deterioration of insulation by moisture or dust.
- Connector corrosion by corrosive gases.

In order to use this product at its best, please conduct routine or periodic inspections.

Item		Maintenance	Criteria
Ambient conditions	Temperature	Temperature Operating range	0 to 55 degree
	Humidity	Humidity Operating range	30 to 80%RH
	Enclosure rating	Check the dusty	None
	Corrosive	Check the corrosion	None
Power	Input	Check the voltage	Input Voltage : DC5V±10%
	Voltage fluctuation	Check the Voltage fluctuation	
Attachment	Product	Check the Screw	Checking and verifying
		Check the Connector	
	Cable	Check the Cable break	None
Performance		Check the Performance	Work

Revision History

Revision code	Date	Revised contents
1.00	2014/11/05	Original production

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