



PRELIMINARY

**Electromagnetic Inductive
RFID System**

V720-series

User's Manual

USB Type RFID Unit

V720S-HMU01

About this Manual:

This manual describes the installation and operation of the V720-series Electromagnetic Inductive RFID System (V720S-HMU01) and includes the sections described below.

Please read this manual carefully and be sure you understand the information provided before attempting to install and operate the System.

Section 1 provides the features of the V720S-HMU01.

Section 2 provides the specifications and performance characteristics of the V720S-HMU01.

Section 3 provides the functions and operations of the V720S-HMU01.

Section 4 provides the communications functions and provides details on communications-related data and commands.

Section 5 provides the information of characteristics data.

Section 6 provides user application software samples.

* Prior to connect the RFID unit to the computer via USB, install the specified device driver into the computer referring to the Section 6 of this manual.

Precautions

Read and Understand this Manual

Please read and understand this manual before using the products. Please consult your OMRON representative if you have any questions or comments.

Warranty, Limitations of Liability

< WARRANTY >

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

< LIMITATIONS OF LIABILITY >

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

< SUITABILITY FOR USE >

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

< PROGRAMMABLE PRODUCTS >

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

< PERFORMANCE DATA >

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

< CHANGE IN SPECIFICATIONS >

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

< DIMENSIONS AND WEIGHTS >

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.


< ERRORS AND OMISSIONS >


The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions

This chapter provides important information for the safe use of this product.
Ensure to read the information carefully before use.

In the safety precautions below, severity is categorized as either “WARNING” or “CAUTION”.

 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
--	---

 Caution	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage. Property damage refers to extended damage caused to house/household goods or livestock/pets.
--	---

● Description of Symbols



Prohibition

Indicates an action or activity not permitted.



Observe strictly

Indicates the need to ensure the safe use of the product.



Ensure to establish a solid grounding

A label indicating that a device with a grounding terminal should always be grounded.



Electric shock hazard

A notification that alerts the possibility of electric shock under certain conditions.



Do not disassemble

A notification that prohibits disassembly when injuries caused by electric shocks may result.

Please ensure that all cautions and prohibitions are adhered to, since non-compliance may lead to serious injury or damage, in certain circumstances.

WARNING



Never disassemble, repair, or modify the main unit and cables.

- Do not disassemble, repair, or modify this product. Doing so may result in electric shock, fire, or personal injury.

Caution



Do not drop the device or apply physical shock.

- Doing so may result in personal injury or device damage.



Do not apply strong force to, or place heavy items on the device or cables.

- Doing so may deform or damage the device, resulting in electric shock or fire.



Use and store the product in an environment that is specified in the catalog or operation manual.

- Failure to do so may cause failure of the device, electric shock, or fire. Do not use or store the device in the following locations:
 - Locations that do not satisfy the specified operating conditions (-10°C to +40°C, 25%RH to 85%RH, non-condensing).
 - Locations that do not satisfy the specified storage conditions (-25°C to +65°C, 25%RH to 85%RH, non-condensing).
 - Locations where the RFID Unit is exposed to direct sunlight.
 - Locations where the RFID Unit is exposed to dust, corrosive gas, saline, or flammable gas.
 - Locations where the RFID Unit is exposed to direct heat.
 - Locations subject to condensation due to high humidity.
 - Locations subject to vibration or impact that exceed the limits outlined in the specifications.
 - Locations where the device may be exposed to water, oil, or chemical agents. (This applies to the models other than waterproof types.)
 - Outdoor
- Store and carry the product in packed state.



To avoid interferences with other systems, adhere to the following items and check them before using the product.

- The product uses a publicly available ISM frequency band of 13.56 MHz to communicate with Tags. Some transceivers, motors, monitoring devices, power supplies (power supply ICs), and other similar RFID systems may generate noise, which cause radio interference and may affect communication with Tags. If the product is required in the vicinity of these items, check for any interference prior to use.
- On the contrary, the system itself may affect radio station transmissions or medical devices. Be cautious when using the system in the environments where such effects might occur.
- To minimize noise effects, adhere to the following:
 - Establish a Class D grounding (former Class 3 grounding) for metal objects placed in the vicinity of the system.
 - Keep cables away from those with high voltages or heavy currents.



Do not allow the device or cables to be soused or exposed to water.

- Doing so may result in electric shock, fire or failure of non-waterproof devices or cables.



Connect the enclosed USB cable to the product for power supply.

- Failure to do so may damage the device or generate noise that affects receiving apparatus such as TV or radio.



Connect the enclosed USB cable only between this product and a computer.

- Do not extend or modify the connection with other USB cable or USB adaptor.



Handle the USB cable by the connector portion to prevent excessive stress on the connector.

- Failure to do so may result in poor contact or damage the device.



Handle the USB cable by the connector portion to prevent excessive stress on the connector.

- Failure to do so may result in poor contact or damage the device.



If the device fails or is exposed to water (non-waterproof devices or parts), or an unusual smell, smoke, or sparks are detected, immediately refrain from using the device and contact OMRON or a sales representative for service and repair.

- Continued use of the failed device may result in electric shock or fire.



Adhere following instruction to prevent the power supply or AC adaptor belonged to the computer from affecting communication with tags.

- Keep the distances from the power supply or AC adaptor for the computer as described in 5-6 “Positional Relation Between Reader and Computer” when use the device.



This product is not suitable for simultaneous connection of multiple units.

- Two or more products can not operate connecting with one computer.

Precautions

This chapter provides important information for international standards and copyright. Ensure to read the information carefully before use.

Declarations

V720S-HMU01 conform to the following laws and standards.

1) US standards

FCC Part 15 Subpart C: 2006

FCC ID: OZGV720SHMU01

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.

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

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.

2) Canadian standards

RSS-Gen Issue 1: September 2005

RSS-210 Issue 6: September 2005

IC Number: 850L-72HMU01

This device complies with RSS-Gen of IC Rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.

©Copyright OMRON Corporation 2007. All rights reserved.

This document is protected by copyright and is intended solely for use in conjunction with the product. Notify your OMRON representative before copying or reproducing this document in any manner, for any other purpose

TABLE OF CONTENTS

SECTION 1

Product Outline.....	1-1
1-1 Features	1-2

SECTION 2

Specifications and Performance	2-1
2-1 Nomenclature and Descriptions	2-2
2-2 Specifications.....	2-4
2-2-1 General Specifications.....	2-4
2-2-2 Interface Specifications	2-4
2-3 Dimensions	2-5

SECTION 3

RIFD Unit Operations	3-1
3-1 Outline of Operations.....	3-2
3-2 Tag Access Functions.....	3-3
3-2-1 Tag Memory Map	3-3
3-2-2 Single Access and FIFO Access Functions.....	3-8
3-2-3 Lock Function	3-9

SECTION 4

Controlling the RFID Unit	4-1
4-1 Communications Frames	4-2
4-1-1 CR Control.....	4-2
4-2 Data Formats	4-3
4-2-1 Command Code List.....	4-3
4-2-2 Communications Options	4-5
4-2-3 End Code List	4-9
4-3 Commands and Responses during CR Control	4-10
4-3-1 General Commands (Commands sent to RFID Unit)	4-10
4-3-2 Commands Common to the I-CODE1 and the I-CODESLI Chips	4-11
4-3-3 Commands Specific to the I-CODESLI Chip	4-15
4-3-4 Commands Specific to the I-CODE1 Chip.....	4-18
4-3-5 Old Commands Specific to the I-CODE1 Chip	4-20

SECTION 5

Characteristics Data (Reference).....	5-1
5-1 Communications Distance (Reference).....	5-2
5-2 Diagram of Communications Range (Reference)	5-3
5-3 Communications Time (Reference).....	5-6
5-3-1 Communications time	5-6
5-3-2 TAT (Turn Around Time).....	5-8
5-4 Effects of Surrounding Metal (Reference).....	5-9
5-5 Mutual Interference (Reference).....	5-10
5-6 Positional Relation Between the Reader and the Computer (Reference)	5-11

SECTION 6

Driver Installation	6-1
6-1 Before installation.....	6-2
6-2 Driver Installation	6-3

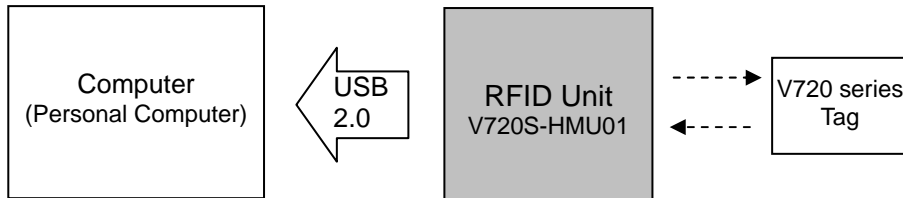
SECTION 1

Product Outline

The RFID Unit is a unit, which includes an antenna PCB and a control PCB with control and send-receive functions for communicating with OMRON V720-series Tags that use two types of Phillips Semiconductor I-CODE chips (product name: SL1 ICS30 01, commonly known as "I-CODE1", and product name: SL2 ICS20, commonly known as I-CODESLI); it also supports USB interface (USB2.0). The SL2 ICS20 chip fully conforms to ISO/IEC15693.

1-1	Features	1-2
------------	-----------------------	------------

1-1 Features



V720S-HMU01

Compact Body

- 80 x 50 x t19.5mm

Baud Rate and Communication Control Method for communicating with the Host Control Unit

- The USB interface enables simple connection to the computer.
- With the specified device driver, the reader works as a virtual COM port.
- The baud rate in use is 9,600 bps (as a virtual COM port).
- A normal CR control is used as the communications control method.
(Note: the number-of-characters control method is not supported)

User-friendly Command Structure

- Easy-to-understand command structure.
- Built-in repetitive data write command (enabled when writing identical data to tag memory areas).
- Specifiable data code (hexadecimal or ASCII) using read/write command.

Many Operating Modes

- Supports two operating modes -- single access mode and FIFO access mode -- according to the status of the tags within the communications range.
- Support for four communication modes according to the communication method with the Tag (three types in single access mode; Trigger, Auto, and Repeat).

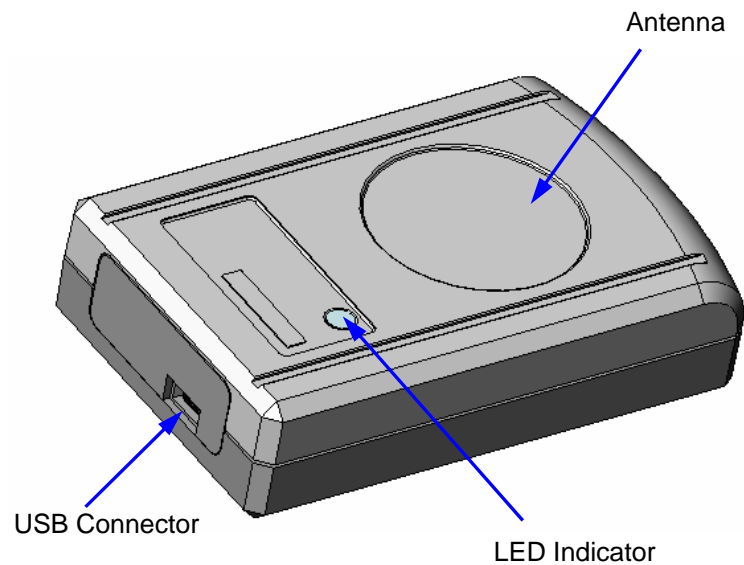
SECTION 2

Specifications and Performance

2-1	Nomenclature and Descriptions	2-2
2-2	Specifications	2-4
2-2-1	General Specifications.....	2-4
2-2-2	Interface Specifications	2-4
2-3	Dimensions	2-5

2-1 Nomenclature and Descriptions

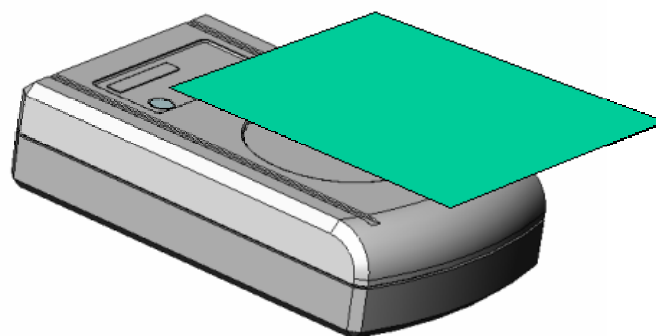
V720S-HMU01



Component Descriptions

- **USB Connector (USB Connector Mini B type)**
To connect to the computer, insert USB cable here. The USB interface conforms to USB 2.0.
- **Antenna**
To read tag data, set the tags near the antenna area as shown below.

The communication surface (antenna surface) is the top.



- **LED Indicator**
When the reader is communicating with the tag, the LED light is on.

⚠ Caution As the antenna is built in at the top of the RFID Unit, the direction of communication with the tag is the upward.

2-2 Specifications

2-2-1 General Specifications

Item	V720S-HMU01
Dimensions	80 × 50 × t 19.5 mm
Mounting method	Set on a flat surface
Power supply voltage	5.0 VDC (USB bus power)
Current consumption	100 mA max.
Vibration resistance	Destruction: 10 to 150 Hz, 0.1-mm half amplitude at 15 m/s ² in X, Y, and Z directions 10 times each for 8 minutes
Shock resistance	Destruction: 150 m/s ² three times each in 6 directions
Ambient operating temperature	-10 to +40
Ambient storage temperature	-25 to +65
Ambient operating humidity	25%RH to 85%RH max. (with no condensation)
Communications frequency	13.56 MHz
Weight	Approx. 40 g
Radio standards	Extremely low power radio station (Radio Law Article 4 Section 1 “ radio stations that discharge extremely low electric waves and specified by the Ministry of Posts and Telecommunications ”) In accordance with Radio Law enforcement regulation Article 6 Section 1, the field intensity is 500μV/m or less at distance of 3 m (322 MHz or less).

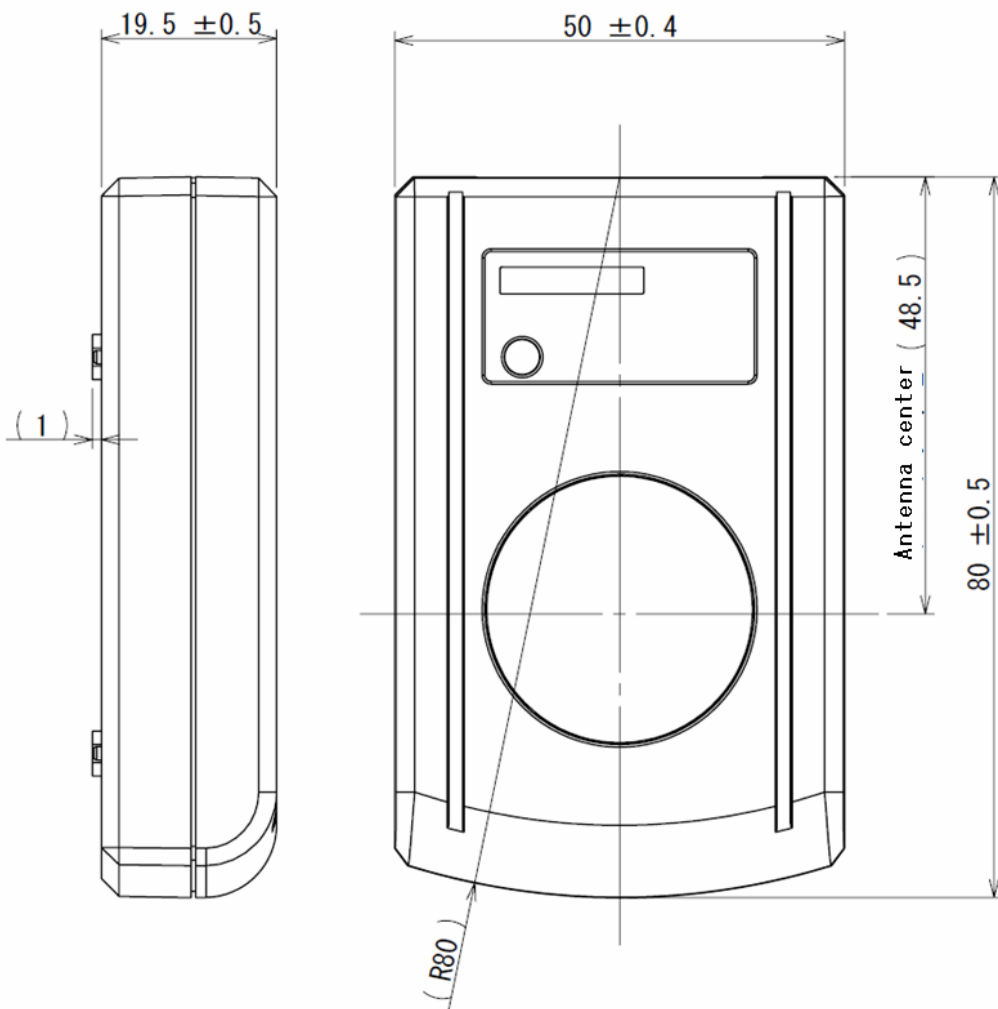
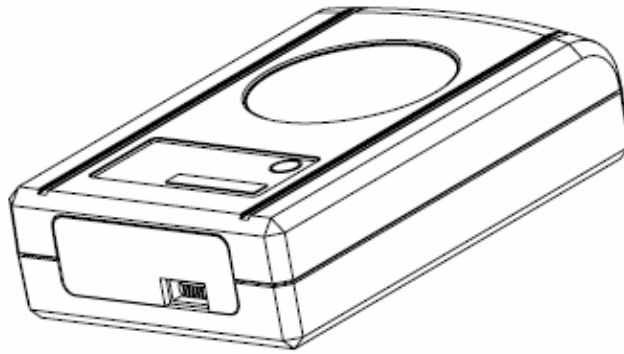
*1 For the information of communications distance and area, refer to the data in 5-1 and 5-2 of section 5.

2-2-2 Interface Specifications

Item	Details				
Connectors	USB mini B Connector				
Communications method	2-wire half duplex serial (appears as a virtual COM port on USB)				
Synchronous method	Asynchronous mode or start-stop synchronous mode				
Communications control method	CR control (Number-of-characters control is not supported)				
Baud rate	9,600 bps (Full speed device 12Mbps as a USB device)				
Character format	Start bits	Data bits	Parity	Stop bits	Total bits
	1	8	Even	1	11
Error detection method	Parity				
Bit send order	Least significant bit (LSB) first				

2-3 Dimensions

V720S-HMU01



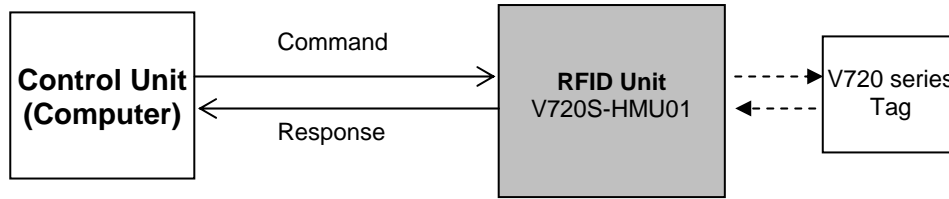
SECTION 3

RFID Unit Operations

3-1	Outline of Operations	3-2
3-2	Tag Access Functions	3-3
3-2-1	Tag Memory Map.....	3-3
3-2-2	Single Access and FIFO Access Functions	3-8
3-2-3	Lock Function	3-9

3-1 Outline of Operations

The RFID Unit reads or writes to the tags using commands sent from the host control unit, and returns the processing responses to the host control unit.



The RFID Unit has three operating modes. The conditions for changing the mode are shown in the following diagram.

- (1) Command waiting mode

In this mode, the COM port is open and ready to receive a command as a virtual COM port.

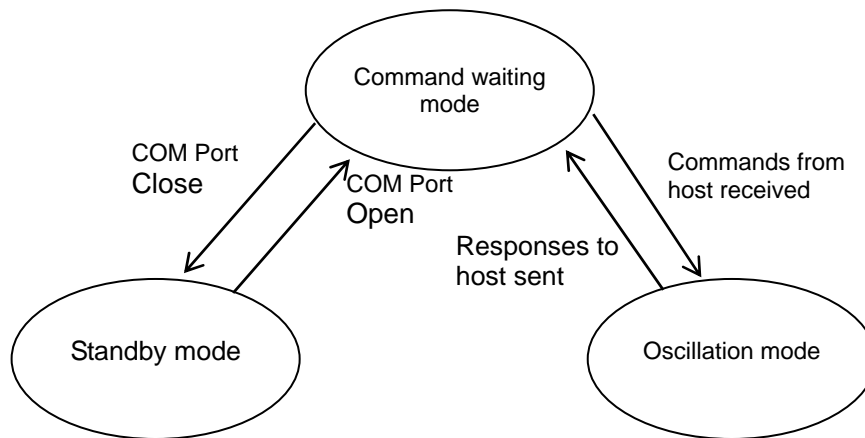
- (2) Oscillation mode

This mode performs communications with the tags.

When using FIFO access mode, oscillation mode continues until a STOP command or STOP signal is input.

- (3) Standby mode

In this mode, the COM port is closed as a virtual COM port.



Note As the first step, open the COM port so that the RFID unit will shift its mode from “Standby mode” to the “Command waiting mode”.

3-2 Tag Access Functions

3-2-1 Memory Map of Tag

3-2-1-1 I-CODE1 Chip (Philips IC product name : SL1 ICS30 01, SL ICS31 01)

1) Memory Map of I-CODE1

These specifications describe a Tag incorporating an IC chip I- CODE1 Label IC from Philips, which is accessed by the system.

This chip consists of a 64-byte memory. The upper five blocks (Blocks 0 to 4) of the memory are used as a system area having functions that do not relate to user memory. OMRON offers special commands for accessing this area in order to ensure the great ease of these functions by the user.

Refer to Command List for details. OMRON defines the blocks below Block 5 as the user memory area. Block 5 is page 00h, and the subsequent blocks are allocated as shown below.

The memory is organized with four bytes as one page (4 bytes = 32 bits). One page is the minimum unit that can be read from and written to the memory.

The memory allocation described in this user's manual is in accordance with OMRON's memory allocation scheme.

OMRON						PHILIPS
Bank	Page	Byte 0	Byte 1	Byte 2	Byte 3	Block
00 Hex	B Hex	SNR				0
	C Hex	SNR				1
	D Hex	Write-protect				2
	E Hex	QUIET/EAS				3
	F Hex	Family code/application ID or user area				4
	0 Hex	User area				5
	1 Hex					6
	2 Hex					7
	3 Hex					8
	4 Hex					9
	5 Hex					10
	6 Hex					11
	7 Hex					12
	8 Hex					13
	9 Hex					14
A Hex					15	

Special Note Block 4 can be used as part of the user memory when the Distinguished Tag Read/Write function by family code (FC) or application ID (AI) is not used. If such use is preferred, define this page as F Hex to use it as part of the user memory. In this case, the user memory area becomes 12 pages long.

2) System Area of I-CODE1

The system area of I-CODE1 is mapped onto the memory. OMRON allocates the system area to pages B Hex to F Hex.

(1) SNR (pages C Hex, B Hex)

SNR is a tag-specific code and has been written into the memory during the chip production process.

The RFID Unit is shipped with this page write-access inhibited (refer to page D Hex); there is no way of making this page rewritable by the user.

(2) Write-access conditions (page D Hex)

The pages are write-inhibited permanently if they are so indicated in the memory map. The factory settings are as follow. If the two bits of a particular page are 0.0, that page is write-protected.

Page D Hex	MSB								LSB							
Byte 0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
	Page E Hex				Page D Hex				Page C Hex				Page B Hex			
Byte 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Page 2 Hex				Page 1 Hex				Page 0 Hex				Page F Hex			
Byte 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Page 6 Hex				Page 5 Hex				Page 4 Hex				Page 3 Hex			
Byte 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Page A Hex				Page 9 Hex				Page 8 Hex				Page 7 Hex			

(3) QUIET/EAS (page E Hex)

QUIET mode: All the functions of a tag are suspended completely. Use Reset Quiet Bit to resume these functions. (q=0: QUIET mode disabled; q=1: QUIET mode enabled)

EAS mode: inhibition/permission of EAS function (e=0: EAS mode disabled; e=1: EAS mode enabled)

Page Eh	MSB								LSB							
Byte 0	x	x	x	x	q	q	e	e	x	x	x	x	q	q	e	e
Byte 1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Byte 2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Byte 3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

The pages marked with "x" in the table above are reserved for future use.

(4) Family code/application ID (page F Hex)

Family code and application ID are special areas for enabling the user to identify an IC that is suitable to a specific user application.

Block Eh	MSB								LSB							
Byte 0	Family code															
Byte 1	Application ID															
Byte 2	User area															
Byte 3	User area															

3-2-1-2 I-CODESLI Chip (Philips IC product name : SL2 ICS20)

In this module, processing is performed with the minimum access unit of one page (4 bytes), the maximum number of pages that can be processed simultaneously being one bank (16 pages), and up to a total of 16 banks (266 pages) being accessible.

The I-CODE 2 user memory area spans 112 bytes, or 28 pages, from page 00 Hex to page 1B Hex.

1) Max. address space of ISO/IEC15693 chip with a 4 Bytes/page organization

Bank	Page	Block	Byte 0	Byte 1	Byte 2	Byte 3	
00 Hex	0 Hex	0					
	1 Hex	1					
	2 Hex	2					
	3 Hex						
	4 Hex						
	5 Hex						
	6 Hex						
	7 Hex						
	8 Hex						
	9 Hex						
	A Hex						
	:	:					
	F Hex	15					
	01 Hex	0 Hex	16				
		1 Hex	17				
		:	:				
B Hex		27					
:		:					
F	31						
:	:	:					
0F Hex	0 Hex	240					
	1 Hex	241					
	:	:					
	F Hex	255					

I-CODESLI
user memory area

Page 00 Hex to 1B Hex
(28 pages = 112 bytes)

Caution The memory map above shows a memory area covered by the product. It complies with the ISO/IEC15693 standard. Proper operation is ensured for our Tag, which incorporates Philips' IC product SL2ICS20 (known as "I-CODESLI"), although this product incorporates a firmware allowing to access chips with a four bytes/page organization and fully compliant to ISO/IEC15693. Perform check test adequately when using other company's tag or tags that incorporate other ISO/IEC15693 chips.

2) System Area of I-CODESLI

The I-CODESLI system area of is reserved in an area different from the user memory.

Special commands are used for accessing the system area.

Byte 0	Byte 1	Byte 2	Byte 3
UID			
UID			
EAS/AFI/DSFID			
Write-protect			

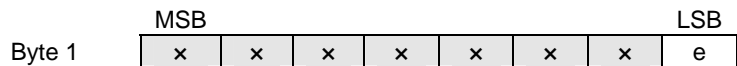
(1) UID

UID is a tag-specific code and has been written into the memory during the chip production process.

The RFID Unit is shipped with this page write-access inhibited; there is no way of making this page rewritable by the user.

(2) EAS/AFI/DSFID

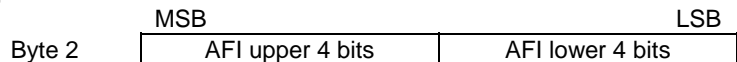
EAS mode: Inhibition/permission of EAS function
(e=0: EAS mode disabled; e=1: EAS mode enabled)



The pages marked with "x" in the table above are reserved for future use.

(3) AFI

AFI is a special area for enabling the user to identify a tag that is suitable to a specific user application.

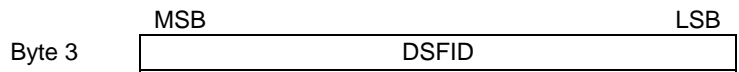


AFI upper 4 bits	AFI lower 4 bits	Application area	Example/reference
0	0	All areas	Area not identified
X	0	X area	Selected extensively
X	Y	Y category of X area	
0	Y	Limited to Y category	
1	0,Y	Transportation	Mass-transit, bus, air plane
2	0,Y	Finance	Bank
3	0,Y	Recognition	Access control
4	0,Y	Telecommunication	Public telephone, CSM
5	0,Y	Medical care	
6	0,Y	Multimedia	Internet
7	0,Y	Game	
8	0,Y	Data storage	Portable file
9	0,Y	Logistics	
A	0,Y	Home delivery services	
B	0,Y	Mail	
C	0,Y	Airplane luggage	
D	0,Y	Reservation	
E	0,Y	Reservation	
F	0,Y	Reservation	

*Remarks: X=1 to F Y=1 to F

(4) DSFID

DSFID indicates how the data is configured in the memory.



(5) Write-access conditions

The pages are write-inhibited permanently if they are so indicated in the memory map. The factory settings are as follow. If the bit of a particular page is 1, that page is write-protected.

	MSB	LSB
Byte 0	0	0
	Page 03	Page 02
	0	0
	Page 01	Page 00
	0	0
Byte 1	0	0
	Page 0B	Page 0A
	0	0
	Page 09	Page 08
	0	0
	Page 07	Page 06
	0	0
	Page 05	Page 04
Byte 2	0	0
	Page 13	Page 12
	0	0
	Page 11	Page 10
	0	0
	Page 0F	Page 0E
	0	0
	Page 0D	Page 0C
Byte 3	0	0
	Page 1B	Page 1A
	0	0
	Page 19	Page 18
	0	0
	Page 17	Page 16
	0	0
	Page 15	Page 14

3-2-2 Single Access and FIFO Access Functions

Single Access Mode

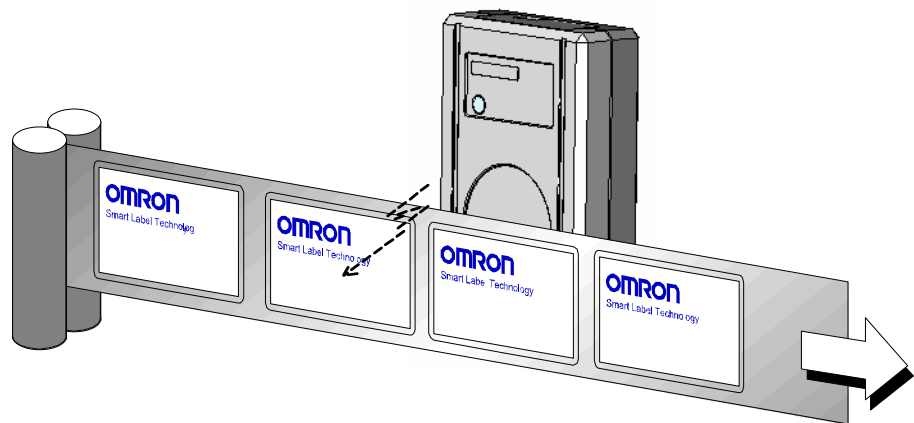
Use this mode to communicate with only one tag within the RFID Unit communications area.

The time required for communications with the tag is shorter compared with FIFO access mode.



FIFO Access Mode

FIFO (First In First Out) access mode enables reading tags in order as they enter the antenna communications range. Tags with which communications have been completed are prohibited from being accessed again, so even if tags with which communications have been completed are still within range of the antenna, communications will be possible with new tags as they enter the communications range. When two or more tags enter the antenna communications range at the same time, a communications error will occur. When a tag to which access has been prohibited moves out of the communications area, communications with it will be possible again if it reenters the antenna communications range.



The above diagram shows an example of a tag inspection line. When the distance between tags is small, two tags may enter the RFID Unit communications range at the same time. If this happens when in Single Access Mode, a communications error will occur, or even if read/write appears to have been performed, there is no way to know which of the two tags was read. In FIFO Access Mode, tags entering communications range can be read or written to in order, so this mode is suited to applications such as a tag inspection line, in which the order of access is important.

3-2-3 Lock Function

The lock function is a protection function provided to prevent the loss of data by unintentionally overwriting fixed data stored on the tags. This function can be set using the lock command. This function can be set using the lock command.

There is a lock setting area in the tag system area, enabling user-defined areas to be write-protected one page at a time. If the write command is executed for a page that has been write-protected, a write processing error will occur.

Note The lock function used with the V720 Series cannot be canceled. Pages that have been write-protected cannot be written to again, so be careful when using this function.

SECTION 4

Controlling the RFID Unit

4-1	Communications Frames	4-2
4-1-1	CR Control	4-2
4-2	Data Formats	4-3
4-2-1	Command Code List	4-3
4-2-2	Communications Options	4-5
4-2-3	End Code List	4-9
4-3	Commands and Responses during CR Control	4-10
4-3-1	General Commands (Commands sent to RFID Unit)	4-10
4-3-2	Commands Common to the I-CODE1 and the I-CODESLI Chips	4-11
4-3-3	Commands Specific to the I-CODESLI Chip	4-15
4-3-4	Commands Specific to the I-CODE1 Chip	4-18
4-3-5	Old Commands Specific to the I-CODE1 Chip	4-20

Caution

The method for controlling the RFID Unit from the host control unit is the CR control method.

CR control Data in the communications frame is handled as ASCII characters in 2-digit hexadecimal code (ASCII code). CR control simplifies operations with the host.

In this manual, the codes are displayed as follows:

ASCII characters: ' xx '

Control code using ASCII characters: '<Control code>'

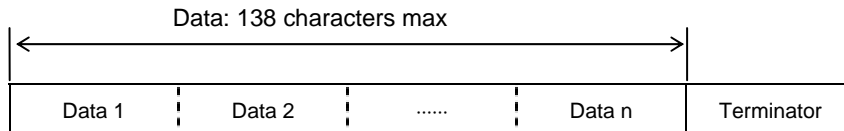
Displayed as hexadecimal code: xx Hex

4-1 Communications Frames

4-1-1 CR control

The frame format consists of data in ASCII characters and a terminator. '<CR>' (ASCII: 0D Hex), the terminator, cannot be used in the data ASCII characters.

The CR control method is useful when the RFID Unit is connected to a PC and the like.



Data	No. of characters	Details
Data	1 to 138	Command parameters (ASCII characters)
Terminator	1	Code '<CR>' (0D Hex), which indicates end of communications frame

(Communications Control Procedure)

When a character is first received, reception starts, and when <CR> is received, the frame ends. If the interval between data is greater than 2 sec, a communications error occurs. If a communications error occurs, a frame error end code (Error code: '18') is sent as the response from the RFID Unit to the host.

4-2 Data Formats

The data in the communications frames used for commands and responses use the following formats.

■ Command

The command data consists of the command, communications options, and parameters. The communications options are added only to commands 01 to 03.

Command	Communications option	Parameter 1	Parameter n
---------	-----------------------	-------------	-------	-------------

■ Response

The response data consists of an end code and parameters.

End code	Parameter 1	Parameter n
----------	-------------	-------	-------------

4-2-1 Command Code List

Commands specify RFID Unit processing. The commands are given in the following table.

1) General Commands (Commands sent to the RFID Unit)

Command name	No.	Details
Test	10	Sends the received data to the host device.
ACK	11	The host device received the data properly.
NACK	12	The host device did not receive the data properly.
STOP	13	Ends the command currently being executed. Stops antenna oscillation.

2) Commands Common to the I-CODE1 and the I-CODESLI Chips

Command name	No.	Details
Read	31	Reads tag memory data on a page basis.
Write	32	Writes data to tag memory on a page basis.
Write identical data	33	Writes identical data to tag memory on a page basis.
Read UID (SNR)	35	Reads tag serial numbers.
Set write-protection	39	Sets write-protection on a page basis

3) Commands Specific to the I-CODESLI Chip

Command name	No.	Details
Set AFI	36	Overwrites and locks tag AFI.
Set DSFID	37	Overwrites and locks tag DSFID.
Read Tag info	3A	Reads tag system information.
Read UID & data	41	Reads tag UID and memory data simultaneously.
EAS Alarm	42	Sends EAS Alarm to the tag.
Set EAS	43	Enables/disables and locks EAS.

4) Commands Specific to the I-CODE1 Chip

Command name	No.	Details
Read SNR	05	Reads tag serial numbers.
Read Family Code and Application ID	06	Reads tag family codes and application IDs.
Set Family Code and Application ID	07	Writes tag family codes and application IDs.
Set EAS	08	Permits/prohibits EAS commands to the tags.
EAS	24	Sends EAS commands to the tags.

5) Old Commands Specific to the I-CODE1 Chip (replaced by the Commands Common to the I-CODE1 and the I-CODESLI Chips)

Command name	No.	Details
Read	01	Reads tag memory data on a page basis.
Write	02	Writes data to tag memory on a page basis.
Write identical data	03	Writes identical data to tag memory on a page basis.
Set write-protection	09	Sets write-protection on a page basis.

4-2-2 Communications Options

The data code and communications mode can be specified as communications options. Data code specification is possible only when using CR control.

Bit	7	6	5	4	3	2	1	0
Setting details	0	0	Tag type	Data code	Communications mode			

*Bits 6 and 7 must be 0.

1) Specifying Tag Type

Setting	Value	Details
I-CODE1	0	When accessing a tag equipped with I-CODE1
ISO/IEC15693 (4byte/page type)	1	When accessing a tag equipped with I-CODESLI Addendum: when accessing the tag equipped with a chip with a four bytes/page organization and fully conforming to ISO/IEC15693

2) Specifying Data Code

■ Using CR Control

Specify the data code to perform read/write communications between the RFID Unit and the host control unit. The specification concerns the data to be written/read to/from the user memory, as well as the test data.

Setting	Value	Details												
Hex	0	Two-character data consisting of 0 to 9 and A to F is handled as 2-digit hexadecimal data. Two characters occupy one byte of tag memory. Example: When 12345678 is written to page 0, tag memory is used as shown below. <table border="1"> <tr> <td>Page 0</td> <td>Byte 0</td> <td>12</td> </tr> <tr> <td></td> <td>Byte 1</td> <td>34</td> </tr> <tr> <td></td> <td>Byte 2</td> <td>56</td> </tr> <tr> <td></td> <td>Byte 3</td> <td>78</td> </tr> </table>	Page 0	Byte 0	12		Byte 1	34		Byte 2	56		Byte 3	78
Page 0	Byte 0	12												
	Byte 1	34												
	Byte 2	56												
	Byte 3	78												
ASCII	1	One character of data occupies one byte of tag memory as ASCII or JIS8 unit code. Example: When 'ABCD' is written to page 0, tag memory is used as shown below. <table border="1"> <tr> <td>Byte 0</td> <td>41</td> </tr> <tr> <td>Byte 1</td> <td>42</td> </tr> <tr> <td>Byte 2</td> <td>43</td> </tr> <tr> <td>Byte 3</td> <td>44</td> </tr> </table>	Byte 0	41	Byte 1	42	Byte 2	43	Byte 3	44				
Byte 0	41													
Byte 1	42													
Byte 2	43													
Byte 3	44													

3) Specifying the Communications Mode

The following seven communications modes are supported for different processing procedures and execution timing.

Communications mode	No.	Details
Single Trigger	0 Hex	After a command is received, communications with the tag is performed immediately and a response is sent. If there is no tag in communications range, a No Tag error is sent. After the response has been sent, the mode changes to sleep mode. Only one tag is permitted in communications range.
Single Auto	1 Hex	After a command is received, this mode waits for a tag to enter communications range, and then performs communications with the tag. After the response has been sent, the mode changes to sleep mode. If a STOP command is received while waiting for a tag, the command is ended. Only one tag is permitted in communications range.
Single Repeat	2 Hex	After a command is received, this mode waits for a tag to enter communications range, and then performs communications with the tag. If this mode has been specified, the command is repeated sequentially until a STOP command is received. This mode is enabled only for read commands. Only one tag is permitted in communications range.
FIFO Trigger	8 Hex	After a command is received, communications with the tag is performed immediately and a response is sent. If there is no tag in communications range, a No Tag error is sent. Access is prohibited to tags with which communications have been completed, and the RFID Unit continues unmodulated oscillation. Tags with which communications have been completed do not respond to the next command. After the response has been sent, the mode changes to sleep mode. If a STOP command is received, oscillation stops.
FIFO Auto	9 Hex	After a command is received, this mode waits for a tag to enter communications range, and then performs communications with the tag. Access is prohibited to tags with which communications have been completed, and the RFID Unit continues unmodulated oscillation. Tags with which communications have been completed do not respond to the next command. After the response has been sent, the mode changes to sleep mode. If a STOP command is received while waiting for a tag, the command is ended.
FIFO Continuous	A Hex	After a command is received, this mode waits for a tag to enter communications range, and then performs communications with the tag. Access is prohibited to tags with which communications have been completed, and the RFID Unit continues unmodulated oscillation. Tags with which communications have been completed do not respond to the next command. After the response has been sent, when ACK is received, this mode again waits for a tag to enter communications range, and then performs communications with the tag. If a STOP command is received while waiting for a tag, the command is ended.
FIFO Repeat	B Hex	After a command is received, this mode waits for a tag to enter communications range, and then performs communications with the tag. Access is prohibited to tags with which communications have been completed. Tags with which communications have been completed do not respond to the next command. If this mode has been specified, the command is repeated sequentially until a STOP command is received.

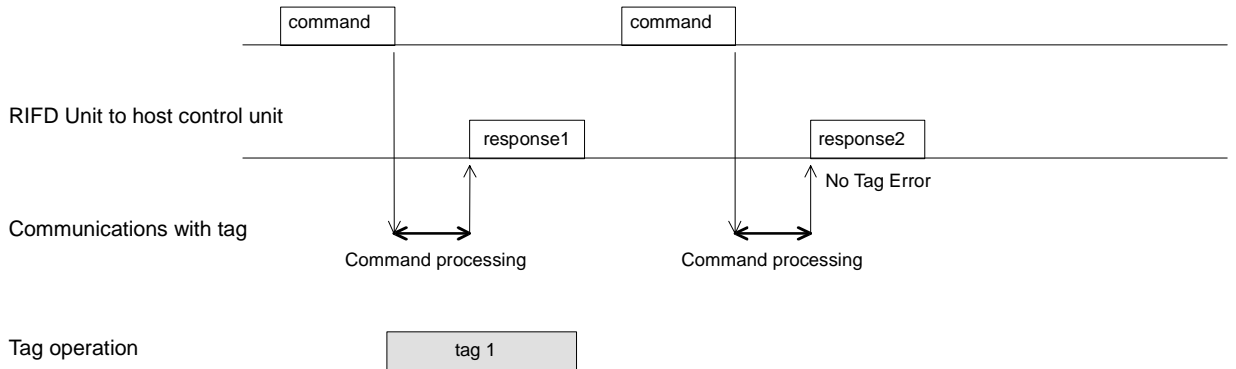
Note Single repeat mode can only be specified for commands 01, 31, 35, 3A, 41, and 42.

4) Communications Modes Diagrams

1) Single Trigger

■ Operation Sequence

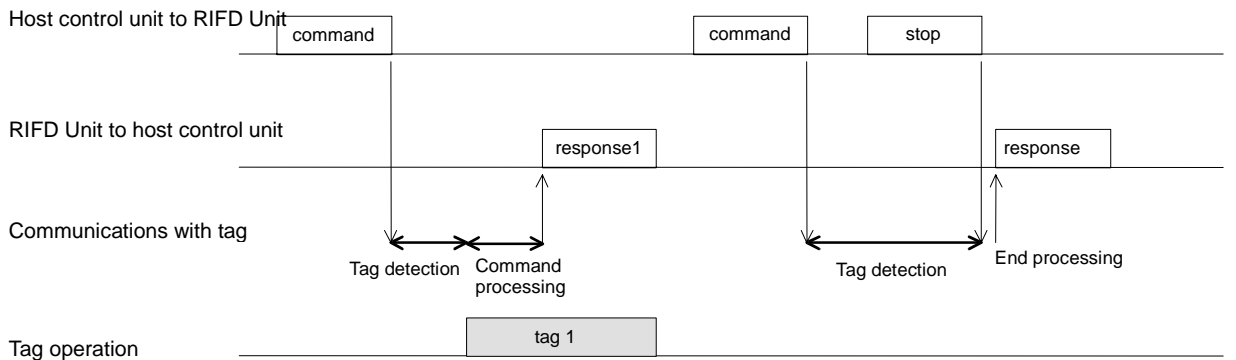
Host control unit to RIFD Unit



2) Single Auto

■ Operation Sequence

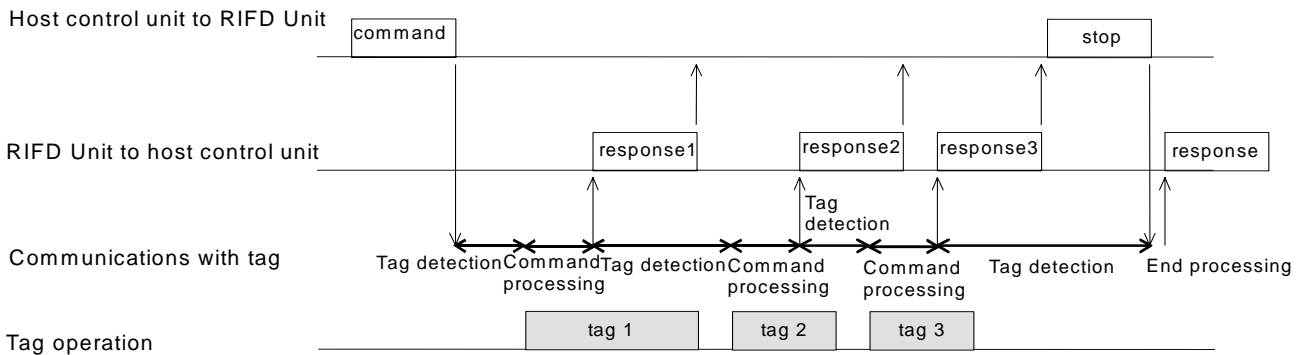
Host control unit to RIFD Unit



3) Single Repeat

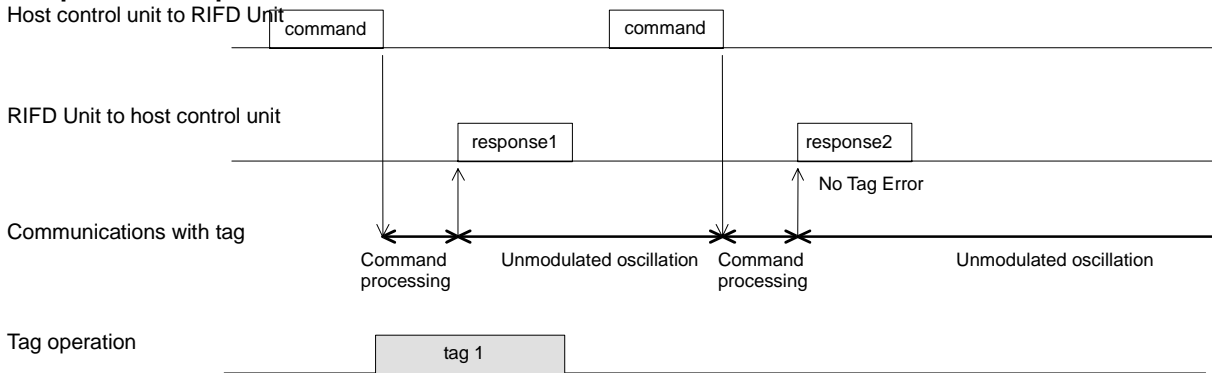
■ Operation Sequence

Host control unit to RIFD Unit



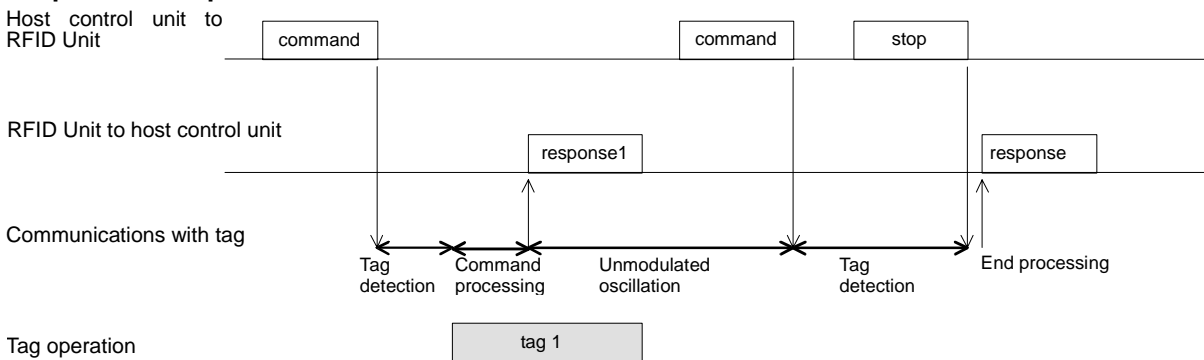
4) FIFO Trigger

■ Operation Sequence



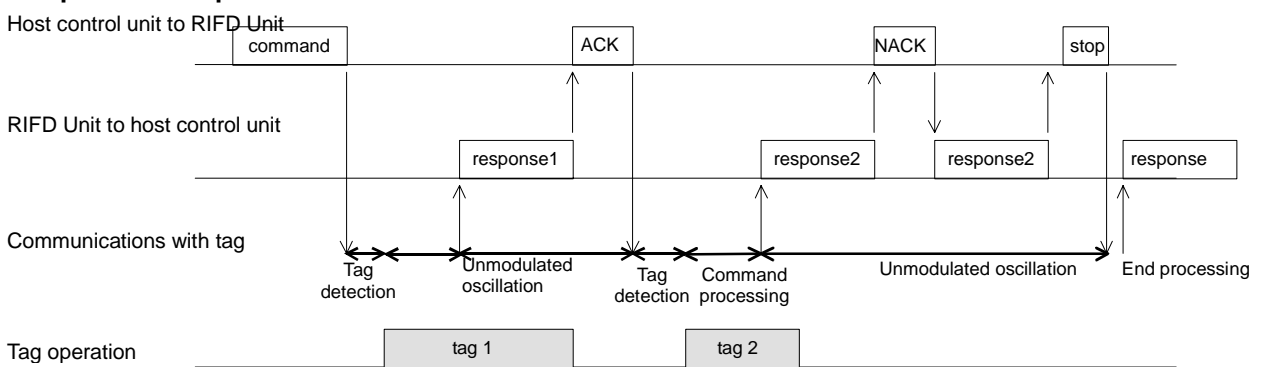
5) FIFO Auto

■ Operation Sequence



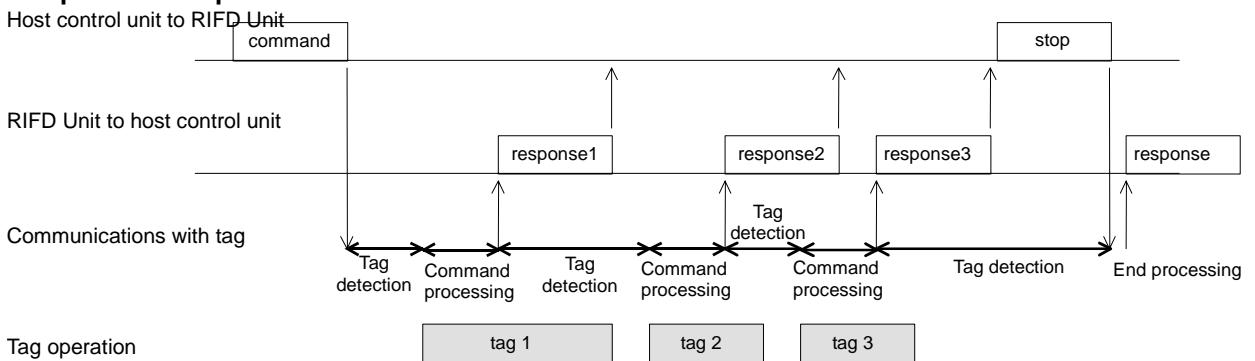
6) FIFO Continuous

■ Operation Sequence



7) FIFO Repeat

■ Operation Sequence



4-2-3 End Code List

■ Communications between Host Device and RFID Unit

End code	Name	Details
10	Parity Error	<ul style="list-style-type: none"> There is a character with a parity error in the command received.
11	Framing Error	<ul style="list-style-type: none"> There is a character with a framing error in the command received.
12	Overrun Error	<ul style="list-style-type: none"> There is a character with an overrun error in the command received.
14	Format Error	<ul style="list-style-type: none"> Command format does not match specifications. Examples: Command is not defined, page/address specifications are invalid, etc.
18	Frame Error	<ul style="list-style-type: none"> Characters are received more than 2 sec apart Frame received exceeds 140

■ Communications between RFID Unit and Tags

End code	Name	Details
70	Communications Error	<ul style="list-style-type: none"> Interference, such as noise, has occurred during communications with the tags, preventing normal completion.
71	Write Error	<ul style="list-style-type: none"> Write command has been specified to a page that has been write-prohibited. There is a tag area to which reading is possible, but writing is not possible. Correct data cannot be written because the tag has exceeded its usable write life.
72	No Tag Error	<ul style="list-style-type: none"> There was no tag in the communications area when the command was executed. The specified pages do not exist (I-CODESLI).
79	Command Error	<ul style="list-style-type: none"> (see Comparison with ISO Error Code)
7A	Address Error	<ul style="list-style-type: none"> The specified pages do not exist.

■ Comparison with ISO Error Code

When an ISO tag responds by returning an error, the unit responds with the end code shown in the following table.

ISO code	Details	End code
01	Command not in use. Cannot recognize request command code.	79
02	Unrecognized command. Example: format error	79
03	Any unused command.	79
0F	Unknown or unused error code.	79
10	Specified block cannot be used (not present).	7A
11	Specified block cannot be re-locked because it has been already locked.	00
12	The contents of the specified block cannot be changed because it is locked.	71
13	Writing to the specified block did not end normally.	71
14	Locking of the specified block did not end normally.	71
Others	RFU	79

4-3 Commands and Responses during CR Control

4-3-1 General Commands (Commands sent to the RFID Unit)

1) Test

This command tests communications with the host. When this command is received, the RFID Unit sends the same data to the host.

■ **Command**

Command	Test data		
' 1 ' | ' 0 '	Data 1	.....	Data n

■ **Response**

End code	Test data		
' 0 ' | ' 0 '	Data 1	.....	Data n

The test data returned is the same as the command data.

2) ACK

Use this command when the communications mode is FIFO Continuous Mode.

ACK is sent after the response has been received, and the next read operation is permitted.

■ **Command**

Command
' 1 ' | ' 1 '

■ **Response**

There is no response to ACK.

3) NACK

If the host control unit does not receive a response normally, NACK is sent as a request to resend the response.

When the RFID Unit receives the NACK command, it resends the immediately preceding response.

■ **Command**

Command
' 1 ' | ' 2 '

■ **Response**

The immediately preceding response data is resent.

4) STOP

Use this command to stop the RFID Unit processing. When this command is received, the RFID Unit stops processing the current command and enters sleep mode. If the antenna is oscillating, the oscillation also stops.

■ **Command**

Command
' 1 ' | ' 3 '

■ **Response**

End code
' 0 ' | ' 0 '

4-3-2 Commands Common to the I-CODE1 and the I-CODESLI Chips

1) Read

Use this command to read data from the tags. Data can be read from a user-specified page.

■ Command

This command sends the pages to be read as command parameters. The page specification is as follows: The bits that correspond to the pages to be read are set to 1, and all other bits are set to 0. This binary number is converted to hexadecimal and sent with the command. The pages are specified by the user.

Command	Communications option	Bank specification	Page specification															
'3'	'1'																	

Tag type	Bank specification (Settable value)	Page specification (settable value)															
		F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
I-CODE1	'00'	'00' to 'FF'								'00' to 'FF'							
ISO chip	'00' to '0F'	'00' to 'FF'								'00' to 'FF'							

■ Response

Returns the data read and the end code (normal end: '00'). The read data is returned sequentially in ascending order of the pages specified. If an error occurs, an error code is returned. In the case of a Tag equipped with I-CODE1, the read data is returned in the order: B→C→D→E→F→0→1→...→A.

End code	Read data ^{*1}		
'0' '0'	Data 1	...	Data n

*1 Number of data n = Number of specified pages x 8 (hexadecimal)

Number of data n = Number of specified pages x 4 (ASCII)

Command Example

The following table gives the tag user memory details for the following example of commands and responses.

Page	Byte 0	Byte 1	Byte 2	Byte 3
0	30 Hex	31 Hex	32 Hex	33 Hex
1	34 Hex	35 Hex	36 Hex	37 Hex
2	38 Hex	39 Hex	30 Hex	30 Hex
3	40 Hex	41 Hex	42 Hex	43 Hex
4	44 Hex	45 Hex	46 Hex	47 Hex
5	48 Hex	49 Hex	4A Hex	4B Hex
6	4C Hex	4D Hex	4E Hex	4F Hex
7	50 Hex	51 Hex	52 Hex	53 Hex
8	54 Hex	55 Hex	56 Hex	57 Hex
9	58 Hex	59 Hex	5A Hex	61 Hex
10	62 Hex	63 Hex	64 Hex	65 Hex

- (1) Reading the following four pages: 1, 3, 5, and 6, using Single Trigger Mode with hexadecimal is as follows:

Command '01 00 006A<CR>'

Response '00 34353637 40414243 48494A4B 4C4D4E4F<CR>'

- (2) Reading the following four pages: 1, 3, 5, and 6, using Single Trigger Mode with ASCII is as follows:

Command '01 10 006A<CR>'

Response '00 4567 @ABC HIJK LMNO<CR>'

2) Write

Use this command to write tag data on a page basis. Data can be written to user-specified pages (except B Hex to E Hex for I-CODE1). The maximum number of pages which can be written to in a single operation is one bank, and writing to pages across banks is impossible. There is no need to perform the verify read process, since this command performs it as part of its execution.

■ Command

This command sends the data to be written as parameters. The page specification is as follows: The bits that correspond to the pages to be written are set to 1, and all other bits are set to 0. This binary number is converted to hexadecimal and sent with the command. Specify the write data sequentially in ascending order of the specified page. In the case of a Tag equipped with I-CODE1, specify the write data in the order: F⇒0⇒1⇒...⇒A.

Command	Communications option	Bank specification	Page specification	Write data ^{*1}
'3' '2'				Data 1 ... Data n

Tag type	Bank specification (Settable value)	Page specification (settable value)															
		F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
I-CODE1	'00'	0	0	0	0												
ISO chip	'00' to '0F'	'00' to 'FF'							'00' to 'FF'								

*1 Number of data n = Number of specified pages x 8 (hexadecimal)
 Number of data n = Number of specified pages x 4 (ASCII)

■ Response

The response returns the end code (normal end: '00').

End code
'0' '0'

Command Example

The following table gives details of tag user memory when executing the following command.

Page	Byte 0	Byte 1	Byte 2	Byte 3
0	30 Hex	31 Hex	32 Hex	33 Hex
1	34 Hex	35 Hex	36 Hex	37 Hex
2	38 Hex	39 Hex	30 Hex	30 Hex
3	40 Hex	41 Hex	42 Hex	43 Hex
4	44 Hex	45 Hex	46 Hex	47 Hex
5	48 Hex	49 Hex	4A Hex	4B Hex
6	4C Hex	4D Hex	4E Hex	4F Hex
7	50 Hex	51 Hex	52 Hex	53 Hex
8	52 Hex	46 Hex	49 Hex	44 Hex
9	58 Hex	59 Hex	5A Hex	61 Hex
10	56 Hex	37 Hex	32 Hex	30 Hex

- (1) Writing 52464944 hexadecimal to page 8, and 56373230 hexadecimal to page 10 using FIFO Repeat Mode, with hexadecimal:
 Command '02 0B 0500 52464944 56373230<CR>'
 Response '00<CR>
- (2) Writing 'RFID' hexadecimal to page 8, and 'V720' hexadecimal to page 10 using FIFO Repeat Mode, with ASCII:
 Command '02 1B 0500 RFID V720<CR>'
 Response '00<CR>

Data written to tag memory is the same for both (1) and (2).

3) Write identical data

Use this command to write identical data to tags by the page. Data can be written to user-specified pages (except B Hex to E Hex for I-CODE1). This command is useful when writing the same data to multiple pages.

The maximum number of pages which can be written to in a single operation is one bank, and writing to pages across banks is impossible.

There is no need to perform the verify read process, since this command performs it as part of its execution.

■ Command

As parameters, the command sends specification of the pages to be written and the data to write to the specified pages one page at a time. The page specification is as follows: The bits that correspond to the pages to be written are set to 1, and all other bits are set to 0. This binary number is converted to hexadecimal and sent with the command. The write data is specified sequentially in ascending order of the pages specified. In the case of a Tag equipped with I-CODE1, specify the write data in the order: F→0→1→...→A.

Command	Communications option	Bank specification	Page specification	Write data *1
'3' '3'				Data 1 ... Data n

Tag type	Bank specification (Settable value)	Page specification (settable value)															
		F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
I-CODE1	'00'	0	0	0	0	0											
ISO chip	'00' to '0F'	'00' to 'FF'								'00' to 'FF'							

*1 Number of data n = Number of specified pages x 8 (hexadecimal)
 Number of data n = Number of specified pages x 4 (ASCII)

■ Response

The response returns the end code (normal end: '00').

End code
'0' '0'

Command Example

The following table gives details of tag user memory when executing the following command.

Page	Byte 0	Byte 1	Byte 2	Byte 3
0	30 Hex	31 Hex	32 Hex	33 Hex
1	34 Hex	35 Hex	36 Hex	37 Hex
2	38 Hex	39 Hex	30 Hex	30 Hex
3	40 Hex	41 Hex	42 Hex	43 Hex
4	44 Hex	45 Hex	46 Hex	47 Hex
5	48 Hex	49 Hex	4A Hex	4B Hex
6	4C Hex	4D Hex	4E Hex	4F Hex
7	50 Hex	51 Hex	52 Hex	53 Hex
8	30 Hex	30 Hex	30 Hex	30 Hex
9	30 Hex	30 Hex	30 Hex	30 Hex
10	30 Hex	30 Hex	30 Hex	30 Hex

- (1) Writing 30303030 hexadecimal to pages 8, 9, and 10 using FIFO Trigger Mode with hexadecimal:
Command '03 08 0700 30303030<CR>'
Response '00<CR>'
 - (2) Writing '0000' to pages 8, 9, and 10 using FIFO Trigger Mode with ASCII:
Command '03 18 0700 0000<CR>'
Response '00<CR>'
- Data written to tag memory is the same for both (1) and (2).

4) Read UID (SNR)

Use this command to read the serial numbers from the tags.

■ Command

Command		Communica- tions option
'3'	'5'	

■ Response

The response returns the UID (SNR) read and the end code (normal end: 00).

End code		UID (SNR)		
'0'	'0'	Data 1	...	Data 8

5) Set write-protection to Tag

Use this command to write-prohibit tags.

The maximum number of pages that can be write-protected in a single operation is one bank, and write-protecting pages across banks is impossible.

■ Command

This command sends the pages to be write-protected as command data. The page specification is achieved by setting the bit corresponding to each page to ON. When performing reading only, all the page specifications are set to OFF.

Command		Communica- tions option	Bank specification	Page specification	
'3'	'9'				

Tag type	Bank	Page specification (settable value)															
		F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
I-CODE1	'00'				0	0											
ISO chip	'00' to '0F'	'00' to 'FF'						'00' to 'FF'									

■ Response

The response returns the setting status for write-protection and the end code (normal end: '00').

End code	Setting status				
	Bank specification		Page specification		
'0'	'0'				

4-3-3 Commands Specific to the I-CODESLI Chip

1) Write, Lock AFI

Use this command to change or lock tag AFI.

■ **Command**

Command	Communications option	Process option	Data
'3' '6'			

	Process option	Data
Write AFI	01 Hex	AFI = 00 to FF(Hex)
Lock AFI	02 Hex	00 Hex

■ **Response**

The response returns the end code (normal end: '00').

End code
'0' '0'

2) Write, Lock DSFID

Use this command to change or lock tag DSFID.

■ **Command**

Command	Communications option	Process option	Data
'3' '7'			

	Process option	Data
Write DSFID	01 Hex	AFI = 00 to FF(Hex)
Lock DSFID	02 Hex	00 Hex

■ **Response**

The response returns the end code (normal end: '00').

End code
'0' '0'

3) Read Tag Info

Use this command to read tag system information.

■ Command

Command	Communications option
'3' 'A'	

■ Response

The response returns the information flag, UID, the information data, and the end code (normal end: '00'). The data returned in the information data is changed with the information flag.

End code	Information flag	UID			Information		
'0' '0'		Data 1	...	Data 8	Data 1	...	Data n

• Information flag

Bit	7	6	5	4	3	2	1	0
	0	0	0	0	IC information	Memory size	AFI	DSFID

• Information (variable data length)

DSFID	AFI	VICC memory size		IC information
		Number of blocks	Block length	

*Only information with the bit set by the information flag is stored.

*Number of blocks = 00h (1 block) to FFh (256 block)

*Block length = 00h (1 byte) to 1Fh (32 byte)

4) Read UID & Data

Use this command to read UID and data from the tags at the same time. Data can be read from a user-specified page.

The maximum number of pages that can be read in one operation is one bank (16 pages), and reading pages across banks is impossible.

■ Command

This command sends the pages to be read as command data. The page specification is achieved by setting the bit corresponding to each page to ON.

Command	Communications option	Bank specification	Page specification
'4' '1'			

Tag type	Bank	Page																
		F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	
ISO chip	00 to 0F																	

■ Response

The response returns the UID and data read and the end code (normal end: 00). The read data is returned sequentially in the order of the pages specified.

End code	UID			Read data*		
'0' '0'	Data 1	...	Data 8	Data 1	...	Data n

* Number of read data n = Number of specified pages × page unit (4 bytes)

5) EAS Alarm Command

Requests EAS data to the tags.

■ Command

Command	Communications option
'4' '2'	

■ Response

The response returns the EAS data read and the end code (normal end: 00).

End code	EAS data
'0' '0'	'F4CD460EABE509FE178D011C4B81926E415B5961F6F5D10D8F398B48A54EECF7'

6) Set EAS

Enables/disables and locks EAS to the tags.

■ Command

Command	Communications option	Process option	Data
'4' '3'			

	Process option	Data
Enable EAS	01 HEX	00 HEX: disabled/01 HEX: enabled
Lock EAS	02 Hex	00 Hex

■ Response

The response returns the end code (normal end: '00').

End code
'0' '0'

4-3-4 Commands Specific to the I-CODE1 Chip

1) Read Serial Nnumber

Use this command to read tag serial numbers.

■ **Command**

Command
'0' : '5'

■ **Response**

The response returns the tag serial number read, and the end code (normal end: '00').

End code	Tag serial number		
'0' : '0'	Data 1	.....	Data n

The tag serial number is 16 digits in hexadecimal code.

2) Read Family Code and Application ID

Use this command to read tag family codes and application IDs.

■ **Command**

Command
'0' : '6'

■ **Response**

The response returns the tag family code, application ID read, and end code (normal end: '00').

End code	Family Code	Application ID
'0' : '0'	'00' to 'FF'	'00' to 'FF'

3) Write Family Code and Application ID

Use this command to set the tag family codes and application IDs.

■ **Command**

Command	Family Code	Application ID
'0' : '7'	'00' to 'FF'	'00' to 'FF'

■ **Response**

The response returns the end code (normal end: '00').

End code
'0' : '0'

4) Set EAS mode

Use this command to set whether to permit or prohibit tag EAS responses.

■ Command

Command	Set value
'0' '8'	

Set value: '00' Permit
 '01' Prohibit

■ Response

The response returns the end code (normal end: '00').

End code
'0' '0'

5) EAS

Sends EAS commands to the tags. EAS data, which is the response from the tags, is fixed data, as shown below.

■ Command

Command
'2' '4'

■ Response

EAS data
'2FB36270D5A7907FE8B18038D281497682DA9A866FAF8BB0F19CD112A57237EF'

Note If there is no tag in the communications area, undefined data of 64 characters will be returned.

4-3-5 Old Commands Specific to the I-CODE1 Chip

The command can be replaced by Section 4 “Commands Common to the I-CODE1 and the I-CODESLI Chips”.

1) Read

Use this command to read data from the tags. Data can be read from a user-specified page.

■ Command

This command sends the pages to be read as command parameters. The page specification is as follows: The bits that correspond to the pages to be read are set to 1, and all other bits are set to 0. This binary number is converted to hexadecimal and sent with the command. The pages are specified by the user.

Command	Communications option	Page specification (4 characters)																				
'0' '1'																						
Bit		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0					
Page		F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0					
Settable Value		'00' to 'FF'								'00' to 'FF'												

■ Response

The response returns the data read and the end code (normal end: '00').The read data is returned sequentially in ascending order of the pages specified. If an error occurs, an error code is returned. In the case of a Tag equipped with I-CODE1, the read data is returned in the order: B⇒C⇒D⇒E⇒F⇒0⇒1⇒...⇒A.

End code	Read data ^{*1}		
'0' '0'	Data 1	.....	Data n

*1 Number of data n = Number of specified pages x 8 (hexadecimal)
 Number of data n = Number of specified pages x 4 (ASCII)

<Command Example>

The following table gives the tag user memory details for the following example of commands and responses.

Page	Byte 0	Byte 1	Byte 2	Byte 3
0	30 Hex	31 Hex	32 Hex	33 Hex
1	34 Hex	35 Hex	36 Hex	37 Hex
2	38 Hex	39 Hex	30 Hex	30 Hex
3	40 Hex	41 Hex	42 Hex	43 Hex
4	44 Hex	45 Hex	46 Hex	47 Hex
5	48 Hex	49 Hex	4A Hex	4B Hex
6	4C Hex	4D Hex	4E Hex	4F Hex
7	50 Hex	51 Hex	52 Hex	53 Hex
8	54 Hex	55 Hex	56 Hex	57 Hex
9	58 Hex	59 Hex	5A Hex	61 Hex
10	62 Hex	63 Hex	64 Hex	65 Hex

(1) Reading the following four pages: 1, 3, 5, and 6, using Single Trigger Mode with hexadecimal is as follows:

Command '01 00 006A<CR>'
Response '00 34353637 40414243 48494A4B 4C4D4E4F<CR>'

(2) Reading the following four pages: 1, 3, 5, and 6, using Single Trigger Mode with ASCII is as follows:

Command '01 10 006A<CR>'
Response '00 4567 @ABC HIJK LMNO<CR>'

2) Write

Use this command to write data to tags on a page basis. Data is written to user-specified pages.

There is no need to perform the verify read process, since this command performs it as part of its execution.

■ Command

This command sends the data to be written as parameters. The page specification is as follows: The bits that correspond to the pages to be written are set to 1, and all other bits are set to 0. This binary number is converted to hexadecimal and sent with the command. Specify the write data sequentially in ascending order of the pages specified. In the case of a Tag equipped with I-CODE1, specify the write data in the order: F⇒0⇒1⇒...⇒A.

Command		Communica-tions option	Page specification (4 characters)								Write data*1							
'0'	'2'									Data 1	.....	Data n						

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Page	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Settable Value	'00' to '07' '10' to '17'								'00' to 'FF'							

*1 Number of data n = Number of specified pages x 8 (hexadecimal)
 Number of data n = Number of specified pages x 4 (ASCII)

■ Response

The response returns the end code (normal end: '00').

End code
'0' : '0'

<Command Example>

The following table gives details of tag user memory when executing the following command.

Page	Byte 0	Byte 1	Byte 2	Byte 3
0	30 Hex	31 Hex	32 Hex	33 Hex
1	34 Hex	35 Hex	36 Hex	37 Hex
2	38 Hex	39 Hex	30 Hex	30 Hex
3	40 Hex	41 Hex	42 Hex	43 Hex
4	44 Hex	45 Hex	46 Hex	47 Hex
5	48 Hex	49 Hex	4A Hex	4B Hex
6	4C Hex	4D Hex	4E Hex	4F Hex
7	50 Hex	51 Hex	52 Hex	53 Hex
8	52 Hex	46 Hex	49 Hex	44 Hex
9	58 Hex	59 Hex	5A Hex	61 Hex
10	56 Hex	37 Hex	32 Hex	30 Hex

- (1) Writing 52464944 hexadecimal to page 8, and 56373230 hexadecimal to page 10 using FIFO Repeat Mode, with hexadecimal:

Command '02 0B 0500 52464944 56373230<CR>'
 Response '00<CR>

- (2) Writing 'RFID' hexadecimal to page 8, and 'V720' hexadecimal to page 10 using FIFO Repeat Mode, with ASCII:

Command '02 1B 0500 RFID V720<CR>'
 Response '00<CR>

Data written to tag memory is the same for both (1) and (2).

3) Write identical data

Use this command to write identical data to tags by the page. Data is written to user-specified pages. This command is useful when writing the same data to multiple pages (specification is required only once).

There is no need to perform the verify read process, since this command performs it as part of its execution.

■ Command

As parameters, the command sends specification of the pages to be written and the data to write to the specified pages one page at a time. The page specification is as follows: The bits that correspond to the pages to be written are set to 1, and all other bits are set to 0. This binary number is converted to hexadecimal and sent with the command. Specify the write data sequentially in ascending order of the pages specified. In the case of a Tag equipped with I-CODE1, specify the write data in the order: F⇒0⇒1⇒...⇒A.

Command	Communications option	Page specification (4 characters)		Write data*1		
'0' | '3'	Data 1	.....	Data n

Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Page	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Settable Value	'00' to '07' '10' to '17'								'00' to 'FF'							

*1 Number of data n = Number of specified pages x 8 (hexadecimal)
 Number of data n = Number of specified pages x 4 (ASCII)

■ Response

The response returns the end code (normal end: '00').

End code
'0' | '0'

Command Example

The following table gives details of tag user memory when executing the following command.

Page	Byte 0	Byte 1	Byte 2	Byte 3
0	30 Hex	31 Hex	32 Hex	33 Hex
1	34 Hex	35 Hex	36 Hex	37 Hex
2	38 Hex	39 Hex	30 Hex	30 Hex
3	40 Hex	41 Hex	42 Hex	43 Hex
4	44 Hex	45 Hex	46 Hex	47 Hex
5	48 Hex	49 Hex	4A Hex	4B Hex
6	4C Hex	4D Hex	4E Hex	4F Hex
7	50 Hex	51 Hex	52 Hex	53 Hex
8	30 Hex	30 Hex	30 Hex	30 Hex
9	30 Hex	30 Hex	30 Hex	30 Hex
10	30 Hex	30 Hex	30 Hex	30 Hex

- (1) Writing 30303030 hexadecimal to pages 8, 9, and 10 using FIFO Trigger Mode with hexadecimal:

Command '03 08 0700 30303030<CR>'
Response '00<CR>

(2) Writing '0000' to pages 8, 9, and 10 using FIFO Trigger Mode with ASCII:

Command '03 18 0700 0000<CR>'
Response '00<CR>

Data written to tag memory is the same for both (1) and (2).

4) Set lock

Use this command to write-prohibit tags.

■ Command

This command sends the pages to be write-protected as command data. The page specification is as follows: The bits that correspond to the pages to be write-protected are set to 1, and all other bits are set to 0. This binary number is converted to hexadecimal and sent with the command. To read the current write-prohibit settings, set the page specification to '0000'.

Command	Page specification (4 characters)															
'0' '9'																
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Page	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Settable Value	Page B Hex and C Hex must be 0.								'00' to 'FF'							

■ Response

The response returns the setting status for write-protection and the end code (normal end: '00'). The page specification is as follows: The bits that correspond to the write-protect pages are set to 1, and all other bits are set to 0.

End code	Setting status															
'0' '0'																
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Page	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Value	Page B Hex and C Hex are 0.								'00' to 'FF'							

Note The lock function used with the V720 Series cannot be canceled. Pages that have been write-protected cannot be written to again, so be careful when using this function.

SECTION 5

Characteristics Data (Reference)

5-1	Communications Distance (Reference)	5-2
5-2	Diagram of Communications Range (Reference)	5-3
5-3	Communications Time (Reference)	5-7
5-3-1	Communications time	5-7
5-3-2	TAT (Turn Around Time)	5-8
5-4	Effects of Surrounding Metal (Reference)	5-9
5-5	Mutual Interference (Reference)	5-10
5-6	Positional Relation Between Reader and Computer (Reference)	5-11

5-1 Communications Distance (Reference)

The communications distance is given in the following table. The communications distance changes, however, depending on the tag inlet forming material, and the tag and RFID Unit mounting conditions, so check the conditions of use beforehand.

1) I-CODE1 Tag Inlet

Model	Specifications	Shape	Communication distance (reference)
V720-D52P03	Inlet	φ21	2 to 19mm
V720-D52P04	Inlet	Rectangle 16.5x22	3 to 19mm

2) I-CODESLI Tag Inlet and Tag (available soon)

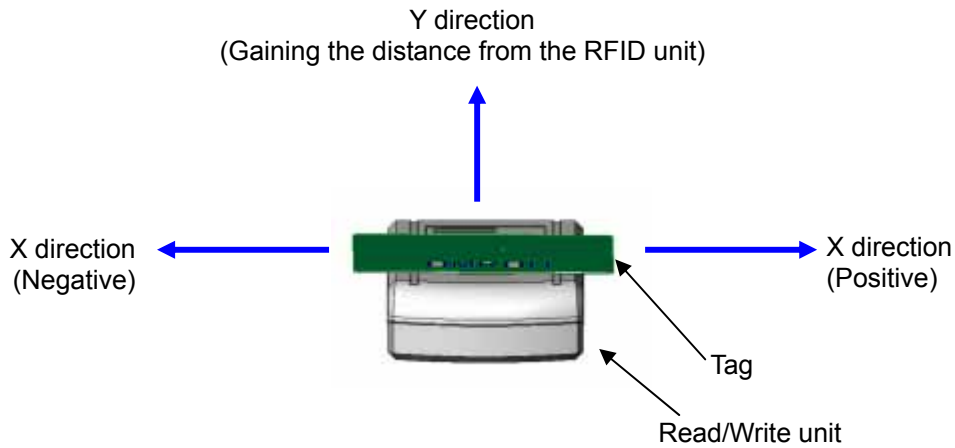
Model	Specifications	Shape	Communication distance (reference)
V720S-D13P01	Inlet	ISO card 46 x 76	0 to 45 mm
V720S-D13P02	Inlet	Half 46 x 43	0 to 36 mm
V720S-D13P06	Inlet	32 x 72	0 to 35 mm
V720S-D13P30	Tag	ISO card 46 x 76	0 to 62 mm
V720S-D13P40	Tag	ISO card 46 x 76	0 to 42 mm

Note The communications distances shown above are based on the use of standard tags at a temperature of 25°C.

5-2 Diagram of Communications Range (Reference)

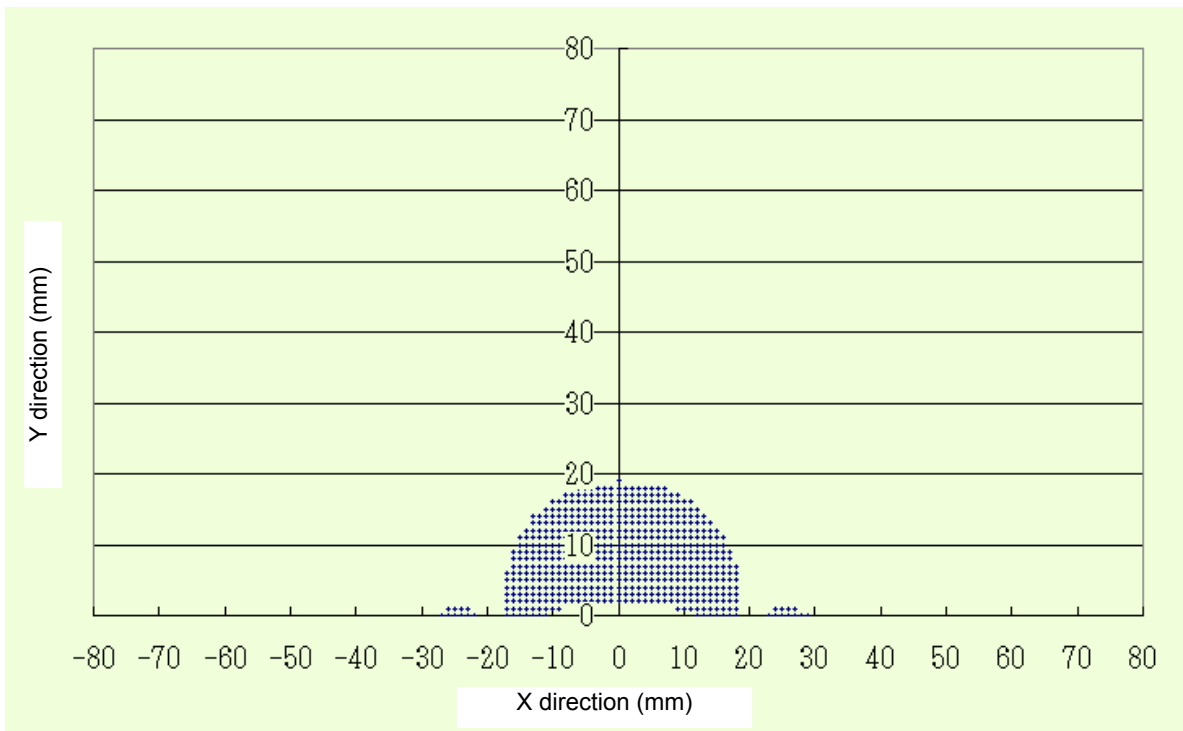
A diagram of the V720S-HMU01 communications range is given below. The communications range differs, however, depending on the mounting conditions and the environmental conditions.

X and Y directions represented in the following diagrams correspond to each direction of X and Y directions shown with arrows in the following figure.

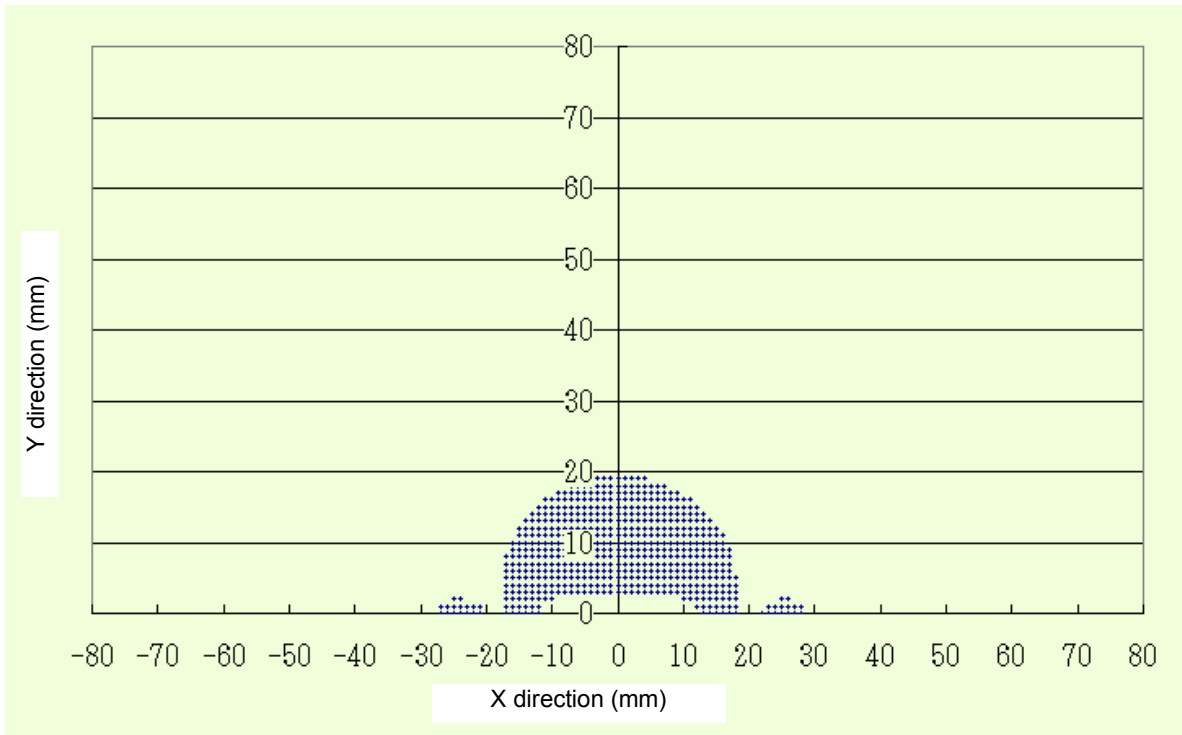


1) I-CODE1 Tag

Tag: V720-D52P03

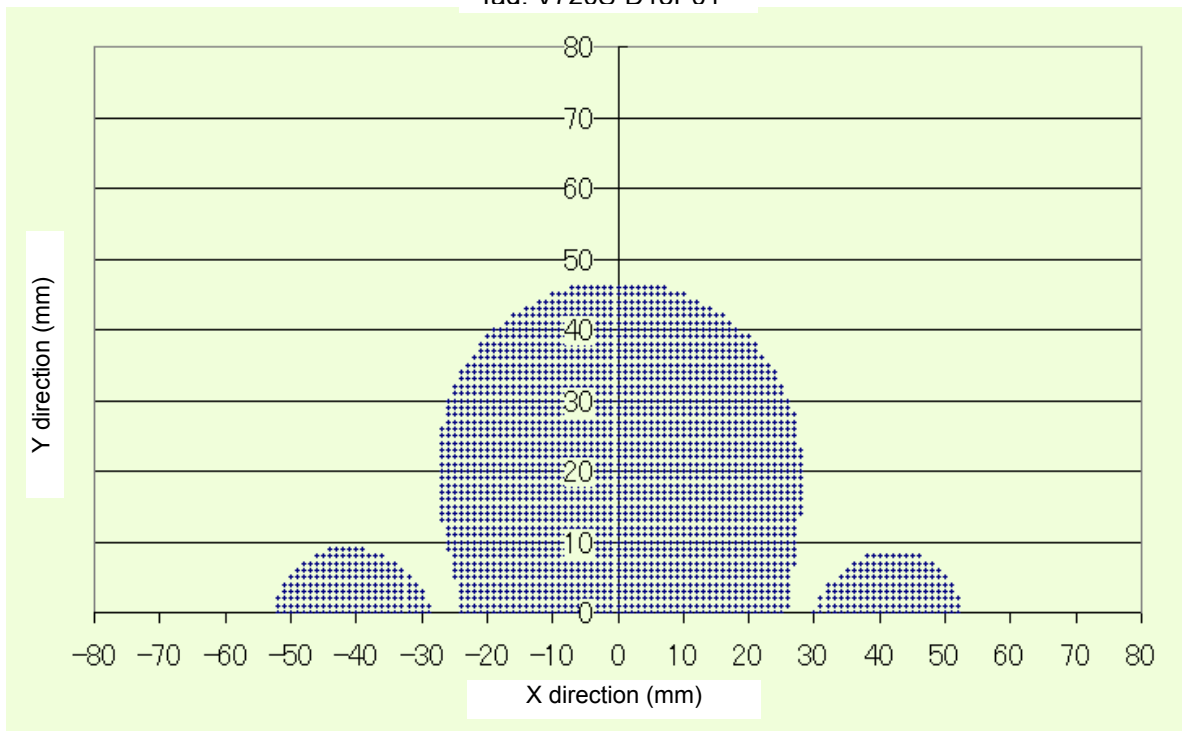


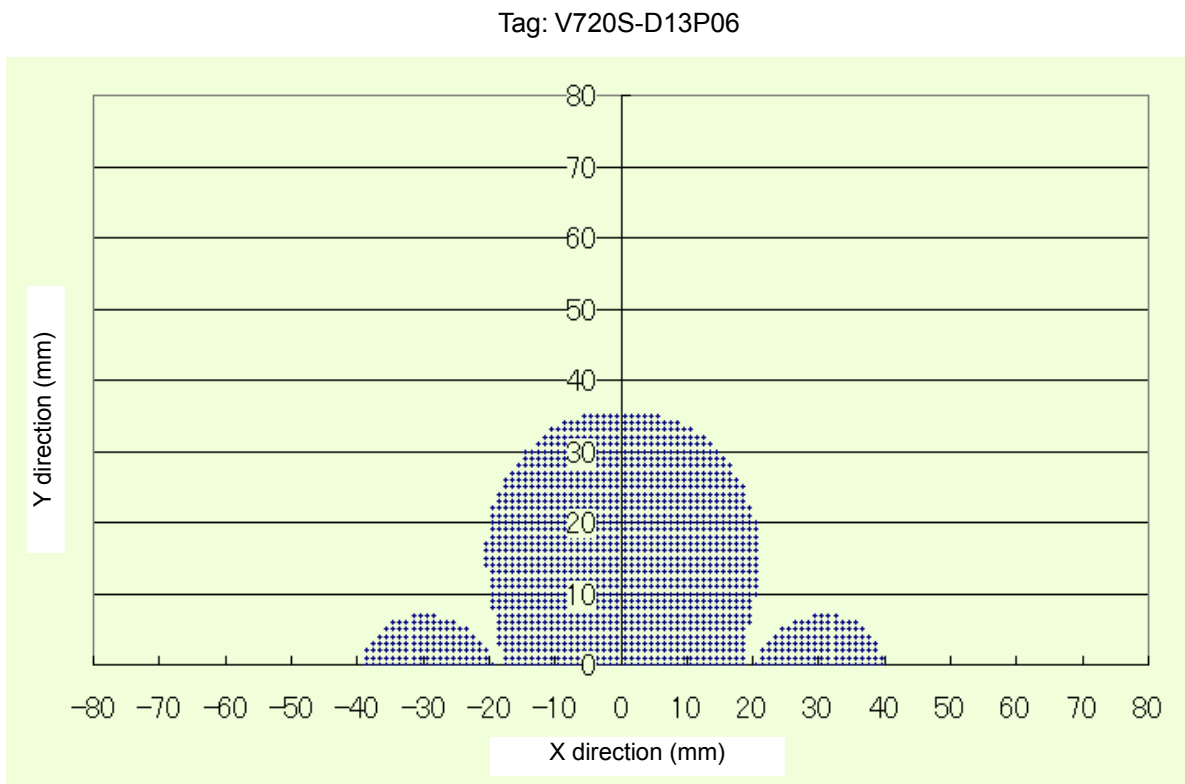
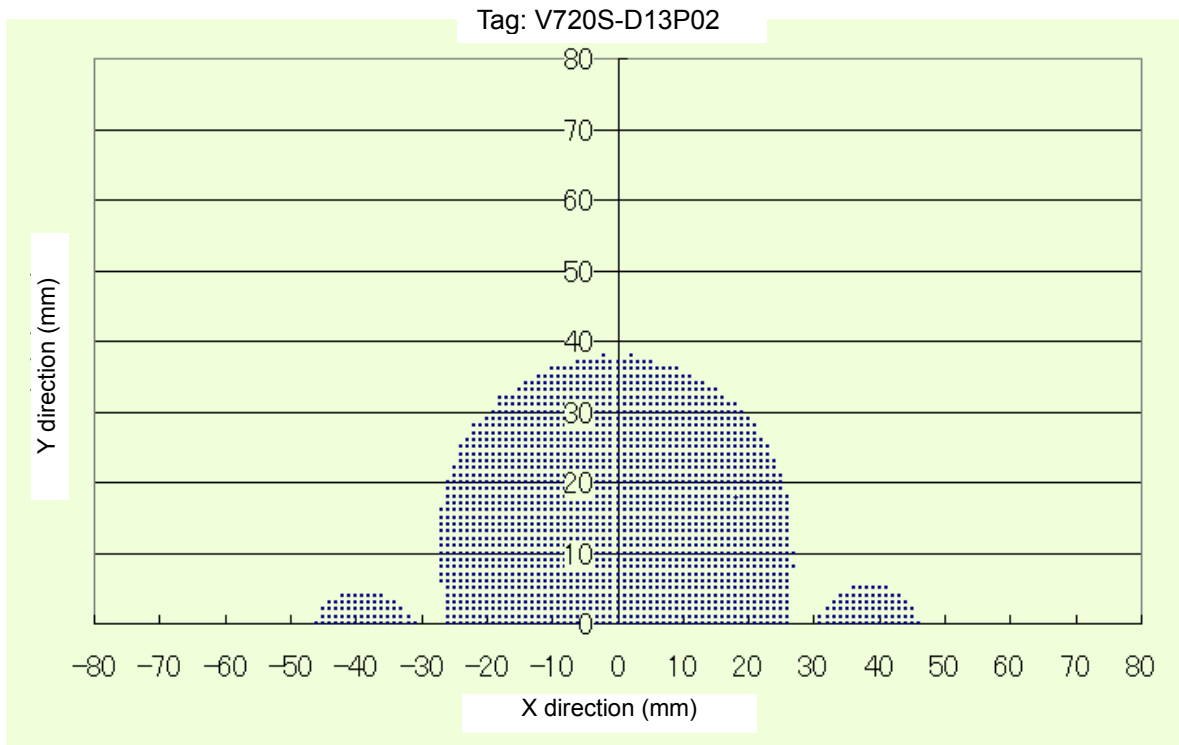
Tag: V720-D52P04



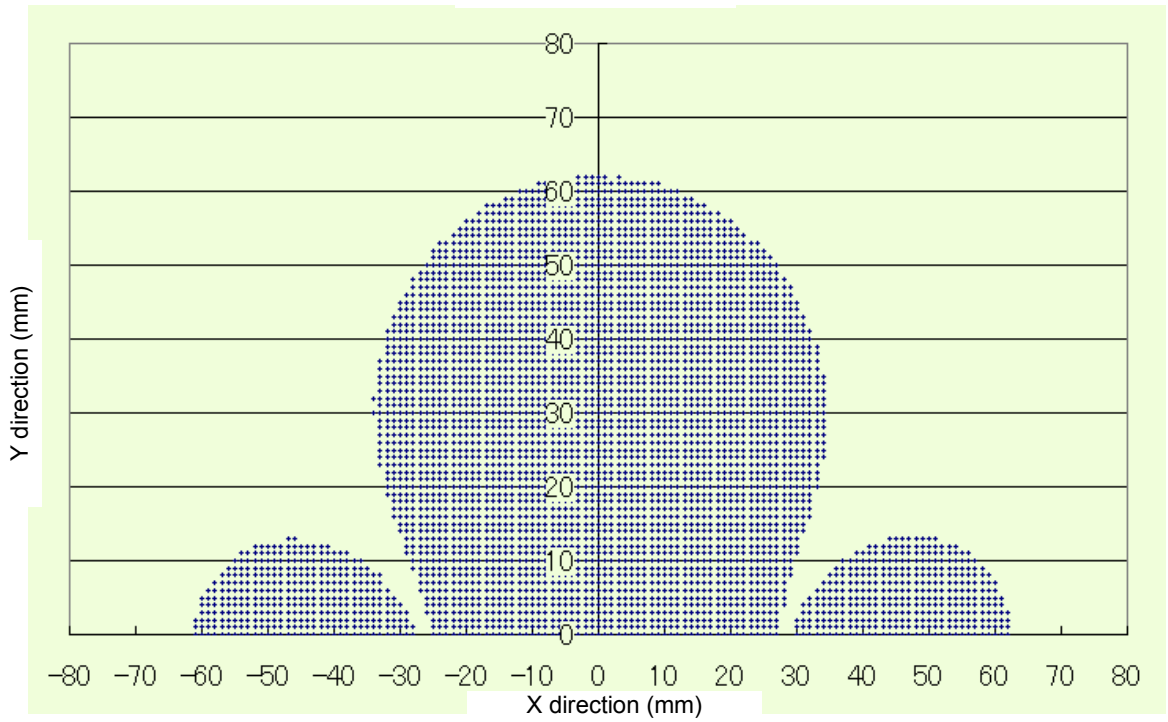
2) I-CODESLI Tag

Tag: V720S-D13P01

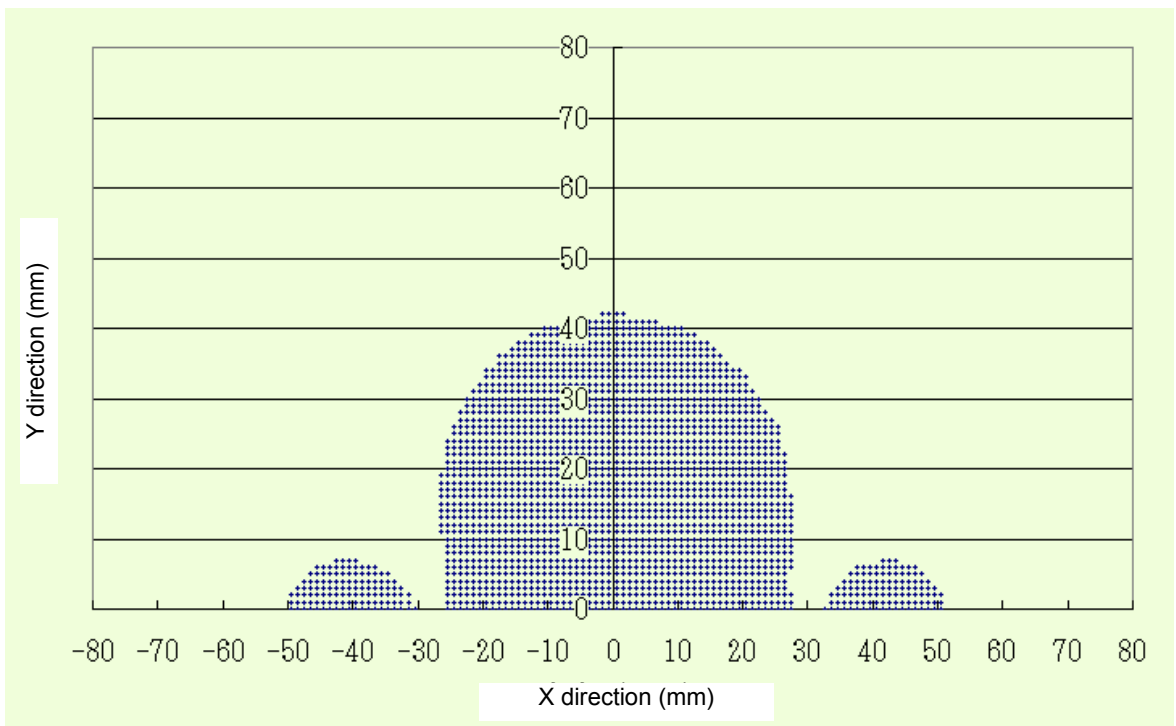




Tag: V720S-D13P30

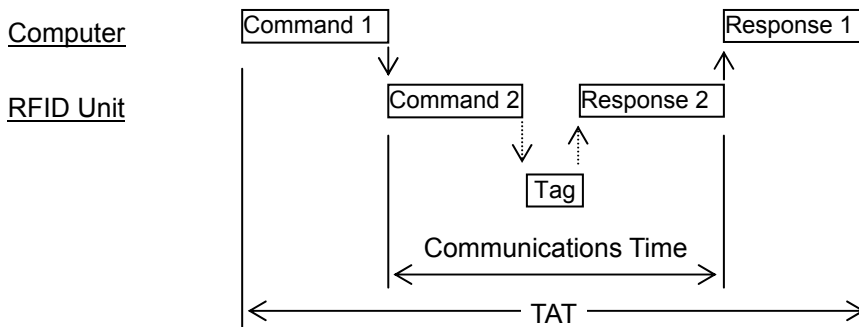
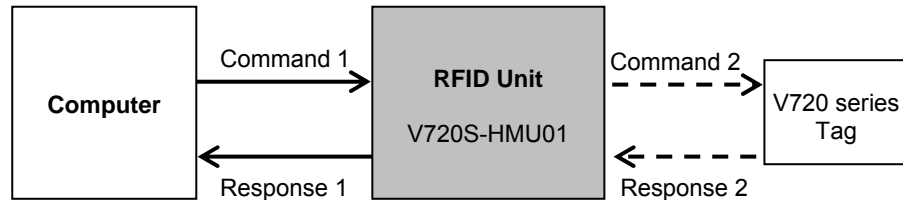


Tag: V720S-D13P40



5-3 Communications Time (Reference)

The communications time given below includes the communications time and TAT (Turn Around Time).



5-3-1 Communications time

The communications time is the communications processing time between the RFID Unit and the tags. The communications time differs depending on the number of pages being written or read.

Specifying Number of Pages to Be Written/Read Continuously

Formulas

Command	Communications time (ms)	
	I-CODE 1	I-CODE SLI
Read	$T = 1.3N + 6.2$	$T = 1.3N + 6.0$
Write	$T = 13N + 13.5$	$T = 13.6N + 15.5$

N: No. of pages processed

Not Specifying Number of Pages to Be Written/Read Continuously

Formulas

Command	Communications time (ms)	
	I-CODE1	I-CODESLI
Read	$T = 1.3N_R + 6.2$	$T = 1.3N_R + 6.0$
Write	$T = 11.7N_W + 1.3N_R + 13.5$	$T = 12.3N_W + 1.3N_R + 15.5$

$N_R = (\text{Maximum number of specified pages} - \text{minimum number of specified pages}) + 1$

$N_W = \text{No. of pages written}$

Note When using I-CODE1 tags, convert the pages Bh through Fh in the system area as shown below:

Page B ⇒ Page -5

Page C ⇒ Page -4

Page D ⇒ Page -3

Page E ⇒ Page -2

Page F ⇒ Page -1

When using I-CODESLI tags, calculate the page numbers by converting them into decimal numbers.

Example: Reading data from pages 1, 5, and 9

$$T = 1.3 \times (9 - 1 + 1) + 6.2 = 17.9 \text{ ms (for I-CODE1)}$$

$$T = 1.3 \times (9 - 1 + 1) + 6.0 = 17.7 \text{ ms (for I-CODESLI)}$$

Example: Reading data from pages C, 5, and 9

$$T = 1.3 \times (9 - (-4) + 1) + 6.2 = 24.4 \text{ ms (for I-CODE1)}$$

$$T = 1.3 \times (12 - 5 + 1) + 6.0 = 16.6 \text{ ms (for I-CODESLI)}$$

Example: Writing data to pages 2, 4, 9, and 10

$$T = 11.7 \times 4 + 1.3 \times (10 - 2 + 1) + 13.5 = 72 \text{ ms (for I-CODE1)}$$

$$T = 12.3 \times 4 + 1.3 \times (10 - 2 + 1) + 15.5 = 76.4 \text{ ms (for I-CODESLI)}$$

Communications Time Calculation Conditions

- Communications mode: Single Trigger Mode
- Communications errors must not occur, such as due to noises.

5-3-2 TAT (Turn Around Time)

The TAT is the time taken from when the host control unit sends a command to the RFID Unit, to when a response is received and completed.

The time differs depending on the baud rate and the communications control method setting.

Example of TAT Calculation

Example: Reading from page 0 to page 4

I-CODE1	I-CODESLI
(1)During command send $9[\text{char.}] \times 11 [\text{bits}] / 9600[\text{bps}] \times 1000[\text{ms/s}] \approx 10.32\text{ms}$	(1)During command send $11[\text{char.}] \times 11 [\text{bits}] / 9600[\text{bps}] \times 1000[\text{ms/s}] \approx 12.61\text{ms}$
(2)During communications $6.5 + 6.2 = 12.7\text{ms}$	(2)During communications $6.5 + 6.0 = 12.5\text{ms}$
(3)During reception of response $43[\text{char.}] \times 11 [\text{bits}] / 9600[\text{bps}] \times 1000[\text{ms/s}] \approx 49.27\text{ms}$	(3)During reception of response $43[\text{char.}] \times 11 [\text{bits}] / 9600[\text{bps}] \times 1000[\text{ms/s}] \approx 49.27\text{ms}$
The TAT in to the above example is (1) + (2) + (3) = 72.29 ms.	The TAT in to the above example is (1) + (2) + (3) = 74.38 ms.

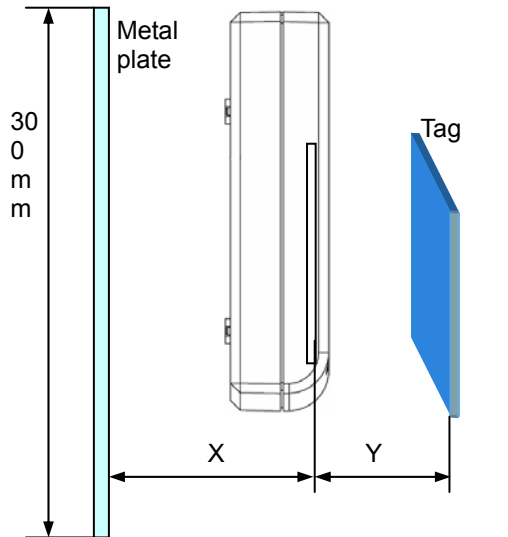
The calculations are performed according to the following conditions.

- Communications mode : Single Trigger Mode
- Communications control method : CR control
- Baud rate : 9,600 bps
- Data code specification : Hexadecimal
- Commands sent from the host control unit are sent continuously without spaces between the characters.
- Communications errors must not occur, such as due to noises.

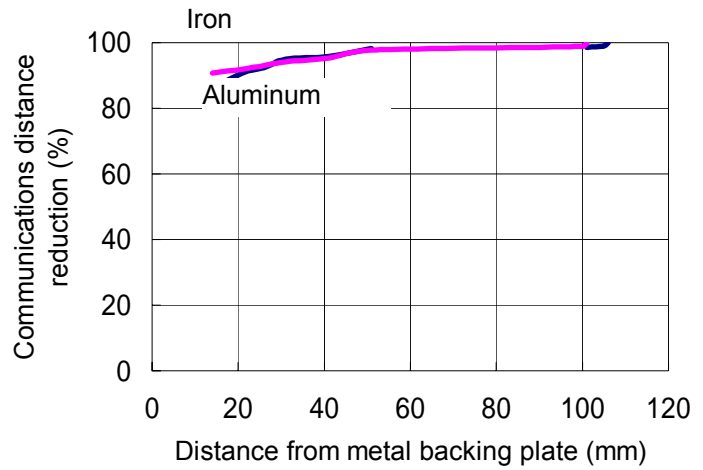
5-4 Effects of Surrounding Metal (Reference)

If there is a metal backing plate on the RFID Unit, communication distance with the tags will be reduced. The data given below is for aluminum and iron.

V720S-HMU01



X: distance between Metal and plate



Measuring conditions

Aluminum: 300 × 300 × t1.5 mm

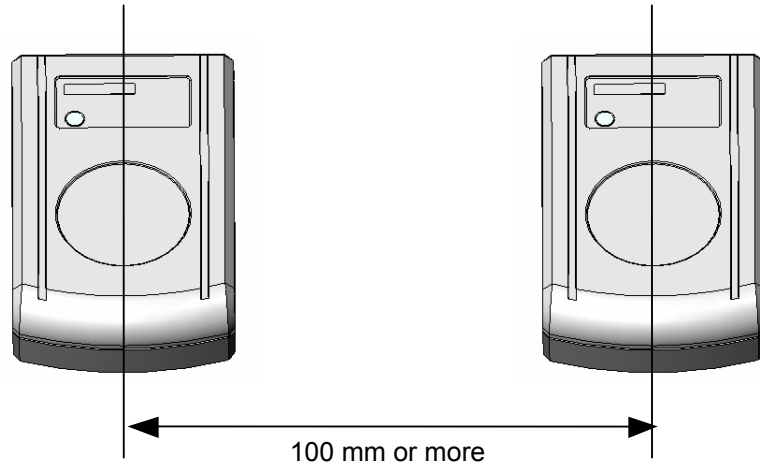
Iron: 300 × 300 × t1.0 mm

Note Communication distance with tags may be reduced due to metallic materials used in the operating environment such as a table or desk. The effect varies depending on the material. Make sure how the material has impact on it before operation.

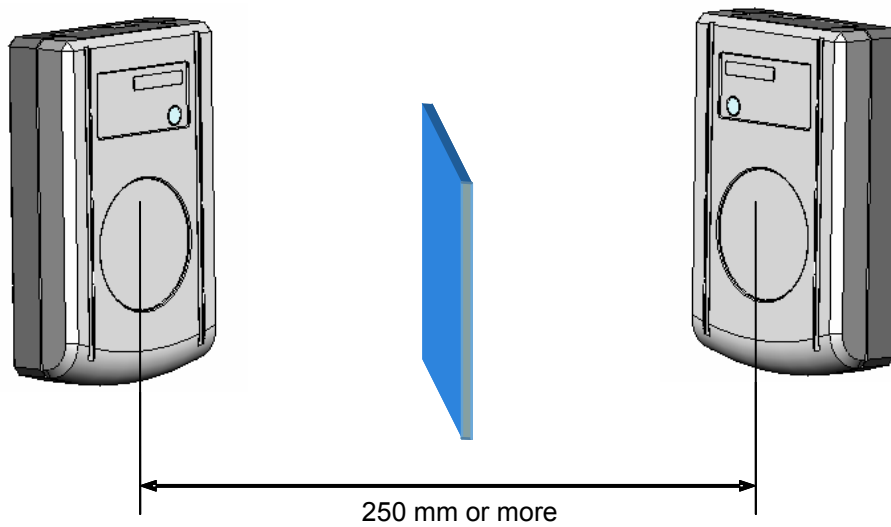
5-5 Mutual Interference (Reference)

If using multiple RFID Units near each other, keep a distance as shown below to prevent malfunction due to mutual interference.

Parallel Antennas



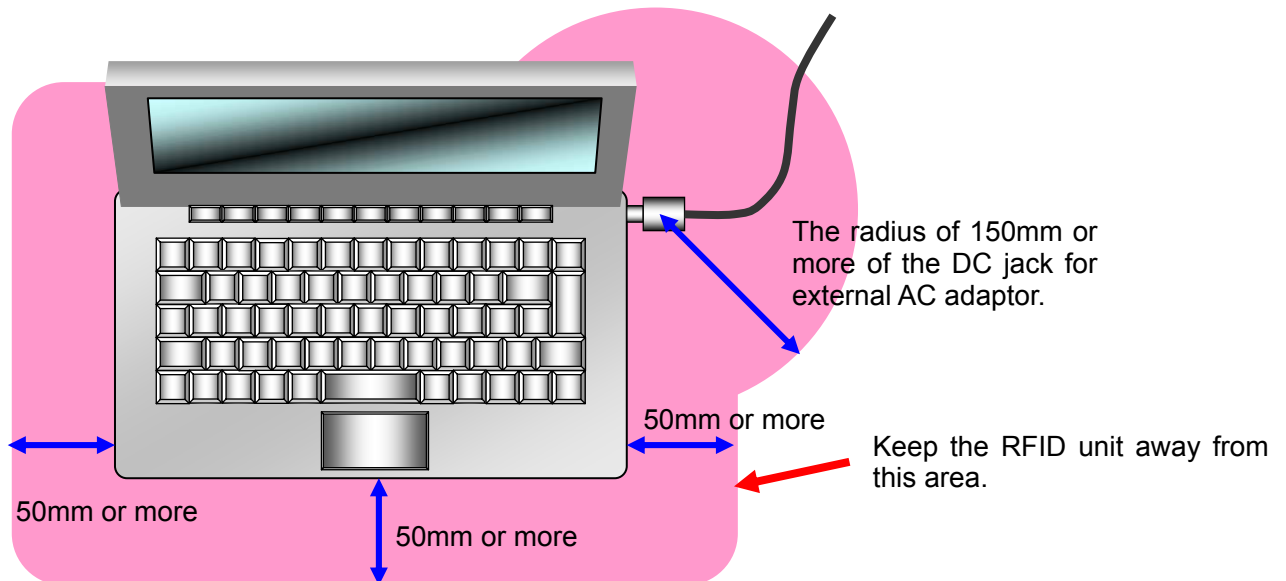
Facing Antennas



Note Mutual interference depends on the operating environment of the RFID Unit and tags, so be sure to check the environment before operation.

5-6 Positional Relation Between Reader and Computer (Reference)

To minimize the effect of noise caused by computer (or the power supply circuit), keep the RFID unit away from the area described as below.



When you use the reader with desktop computer, keep it away from the joint of AC power supply cord.

Note Effects of noise depend on the operating environment of the RFID Unit and the computer, so be sure to check the environment before operation.

Section 6

Driver Installation

6-1	Before Installation	6-1
6-2	Driver Installation	6-2

6-1 Before Installation

This section describes how to install the specified device driver (called “Driver”), which has to be installed in the computer to operate the RFID unit (V720S-HMU01). This Driver appears as a virtual COM port on the computer.

[System Requirements]

Make sure the computer to be connected with the RFID unit meets the system requirements for running the Driver as below.

- OS: Windows XP home/Professional or Windows 2000 Professional.
- USB port available (USB1.0 or USB2.0)
- The specified Driver installable.
- An administrator of the computer shall install the Driver.

[How to obtain the Driver]

Visit our Web site (<http://www.omronrfid.com/>) and download the Driver from the download page. If you download the Driver, the compressed file of V720S-HMU01.exe is stored in the computer.

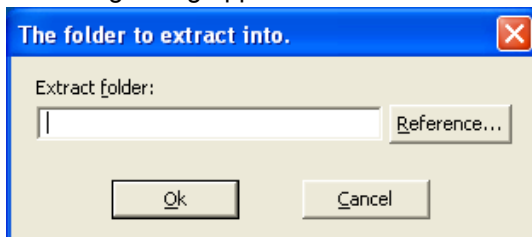
Note:

- The Driver must be installed before connecting the RFID unit to your computer.
- If you happen to connect the RFID unit to the computer before installation of the Driver, cancel the connection then start to install referring to “If you connect before installing” described in the end of this section.
- An administrator of the computer shall install the Driver.

6-2 Driver Installation

[Decompression of the Driver]

- (1) Run the **V720S-HMU01(E).exe** downloaded from the Web site mentioned above.
- (2) The following dialog appears.



(3) If you change the direction of the decompressed file, click **“Change”** then click **“OK”**.

If you do not change the direction, just click **“OK”**.

(4) The folder **V720S-HMU01** appears in the directed folder.

If you do not change the direction, the folder **V720S-HMU01** appears in the same folder as **V720S-HMU01.exe** is placed.

V720S-HMU01 folder includes following two folders,

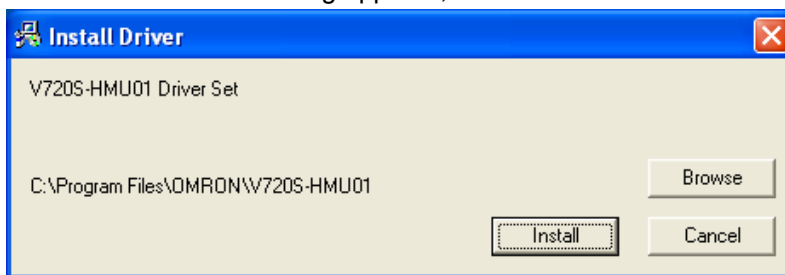
driver <= In this folder, the Driver is stored.

utility <= Utilities to be used for identification of port numbers are stored.

[Driver Installation]

(1) Double click the **setup.exe** in the **driver** folder to start the installation process.

(2) When the **Install Driver** dialog appears, click **“Install”**.

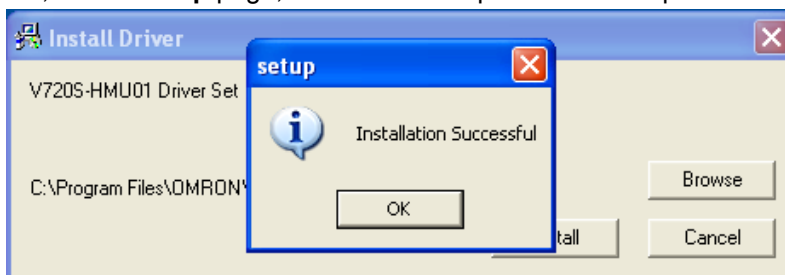


- If you use Windows XP SP2 or later version, the following page appears. On this page, click **“Continue”** to go back to the **Install Driver** page. This warning page appears twice. On each page, click **“Continue”**.
- If you use Windows 2000, this page does not appear.



(3) Install Driver page appears again and installation is processed.

Then, on the **setup** page, click **OK** to complete the install process.



[Connection with RFID Unit]

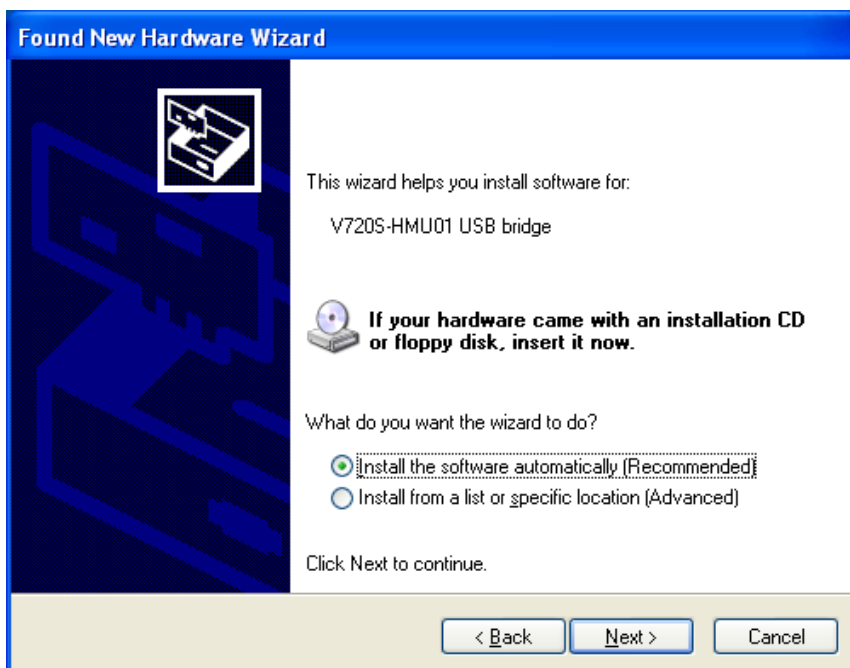
After installing the Driver, connect the RFID unit (V720S-HMU01) to the computer through USB connector.

- (1) Just after connecting the RFID unit to the computer, following page appears.

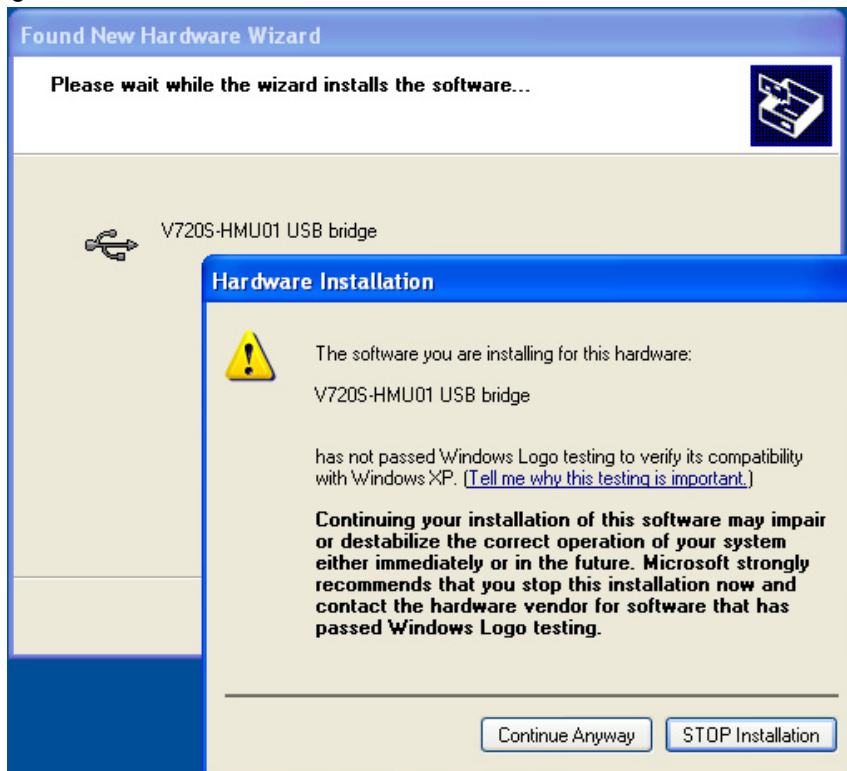


- (2) On the “**Found New Hardware Wizard**” page, Click “**No, not this time**” and then click “**Next**”. If you use the Windows 2000, this page is automatically skipped and the following page appears.

- (3) On the second “**Found New Hardware Wizard**” page, make sure “Install the software automatically [Recommended]” is checked then click the “**Next**” button.



- (4) When the “**Hardware Installation**” page appears over the third “**Found New Hardware Wizard**” page, click the “**Continue**” button.



- (5) On the last “**Found New Hardware Wizard**” page, click “**Finish**” button to complete the wizard. Now you are able to use the RFID unit.



Caution

- Above pages shown from (1) to (5) appear twice because two software; USB Bridge software and Virtual COM software, have to be installed. In each time, implement in the same way according to the above procedures.

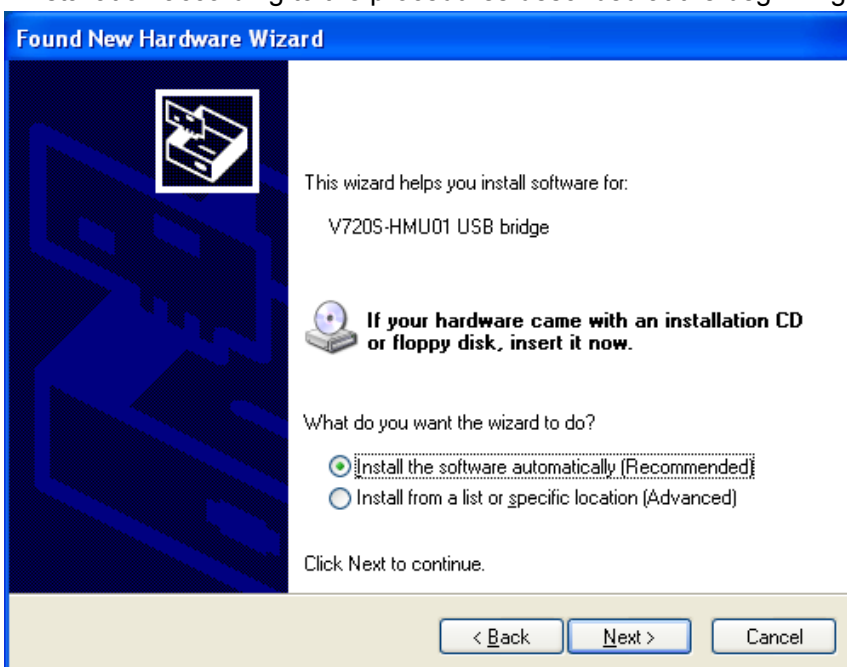
[If you connect RFID unit before installing the Driver]

If you connect the RFID unit to the computer before installing the Driver, you can not set up the Driver in the usual manner. After connecting the unit to the computer, one of following pages will appear. See which page appears on your computer window and follow the procedures corresponding to the page.

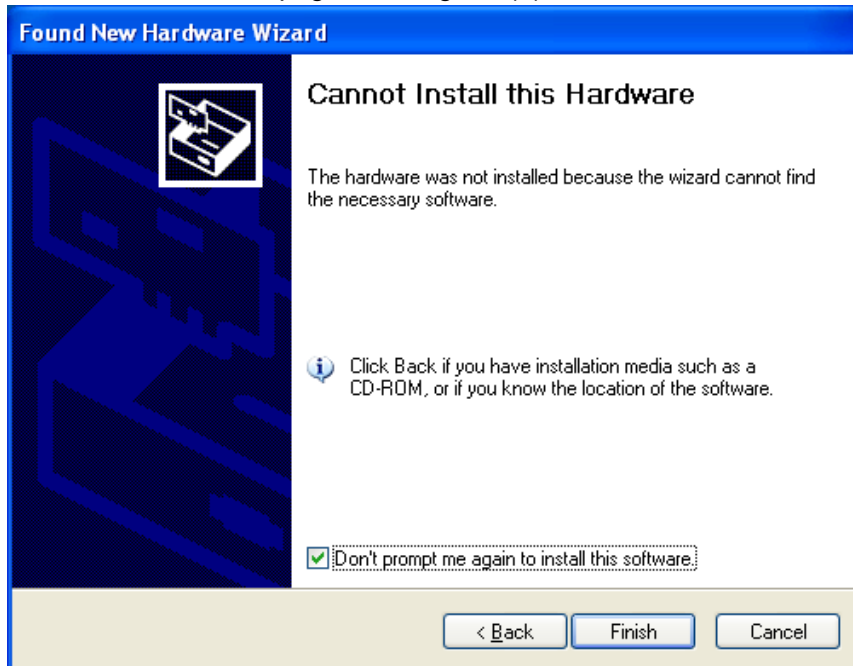
- (1) On the page as below, click the **“Cancel”** button and then remove the RFID unit. Start Driver installation according to the procedures described at the beginning of this section.



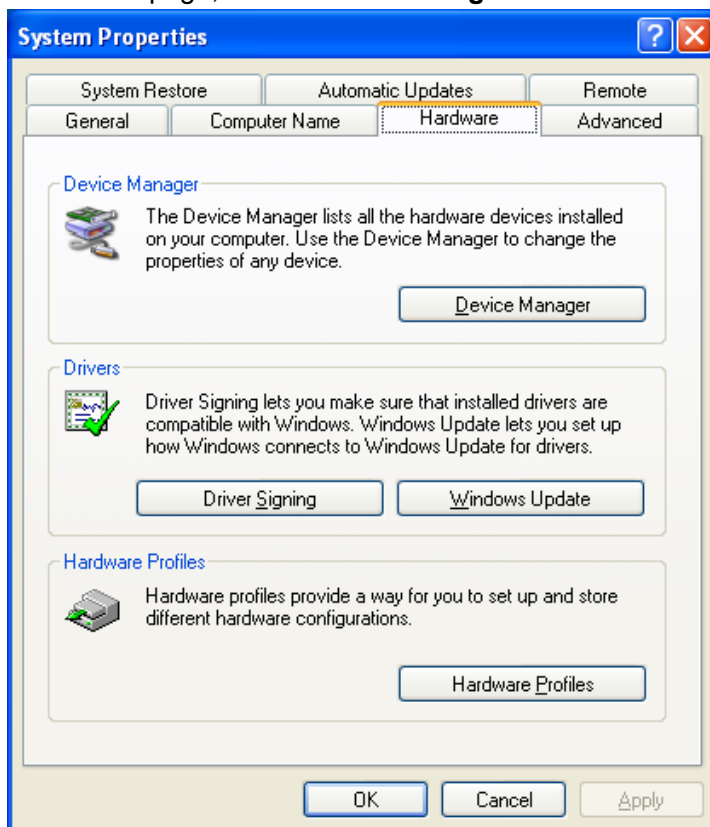
- (2) On the page as below, click the **“Cancel”** button and then remove the RFID unit. Start Driver installation according to the procedures described at the beginning of this section.



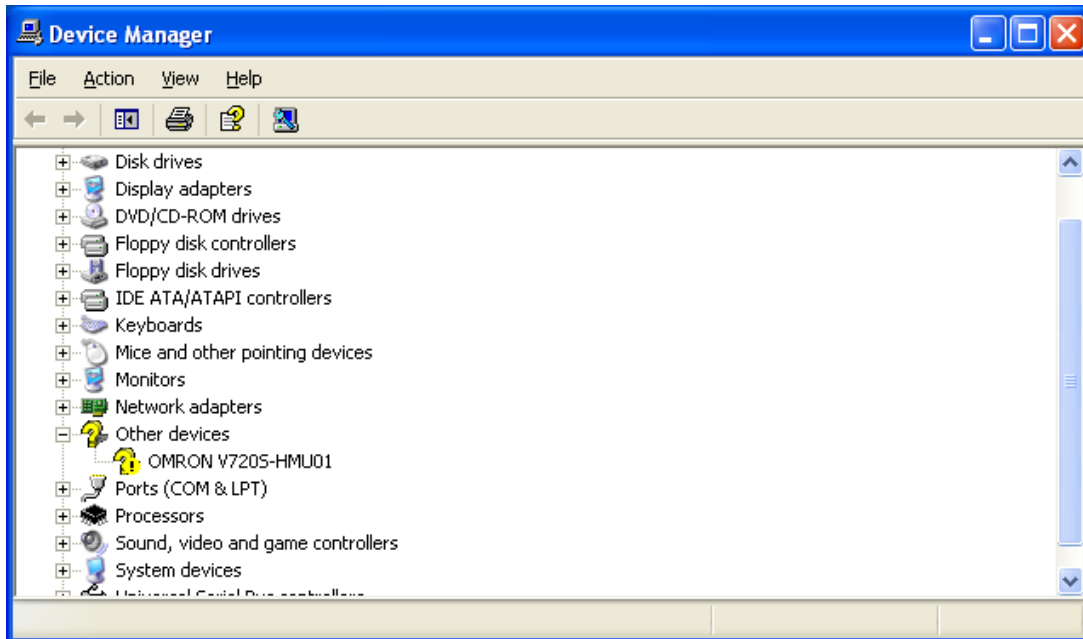
- (3) On the page as below, click the “**Cancel**” button and then remove the RFID unit. Start Driver installation according to the procedures described at the beginning of this section. If you have clicked the “**Finish**” on the page below, go to (4).



- (4) If you happen to click the “**Finish**” button, you have to delete the device. To delete the device, open the **System Property** window then click **Hardware** tab. On the Hardware page, click “**Device Manager**”.



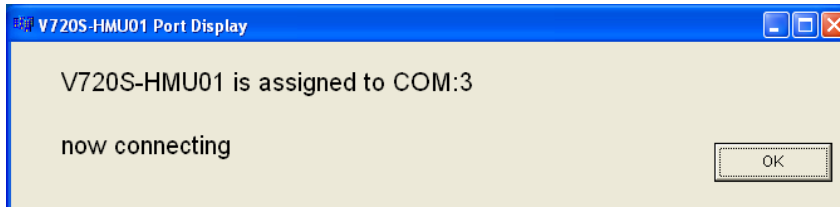
- (5) On the **Device Manager** page, make sure **OMRON V720S-HMU01** appears under the “**Other Device**”.



- (6) Point the **OMRON V720S-HMU01** and click the right mouse button to open drop-down menu. Choose the “**Delete**” in the menu to complete deletion.
After deleting the device, remove the RFID unit, then start to install the Driver again.

[To See Port Number]

Find the **disPort.exe** file in the utility folder that is extracted from the driver file, **V720S-HMU01.exe**. Click the **disPort.exe** file. Following dialogue appears.



You can check what port number is assigned for the RFID unit (In the case of above dialogue, COM3: is assigned.)

Caution

- Execution of **dispPort.exe** requires another file **CP210xManufacturing.dll** in the same folder.
If you copy or move the **dispPort.exe** to use it, copy or move the **CP210xManufacturing.dll** file into the same place.

Revision History

A manual revision code appears as a suffix to the manual number on the front cover of the manual.

Manual No. SRFM-017A

↑
Revision code

The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

Revision code	Date	Revised content
A	Dec, 2007	The first edition

OMRON CORPORATION
RFID BUSINESS DEVELOPMENT DEPARTMENT
3-4-10 Toranomom Minato-ku, Tokyo, 105-0001
Japan
Tel: (81)3-3436-7317/ Fax: (81)3-3436-7387

Regional Headquarters

OMRON ELECTRONICS LLC
RFID DIVISION
One Commerce Drive, Schaumburg, IL 60173
U.S.A.
Tel: (1)888-303-RFID (7343) /Fax: (1)847-925-1260

OMRON EUROPE B.V.
Wegalaan 57, NL-2132 JD Hoofddorp
The Netherlands
Tel: (31)23-568-1200/Fax: (31)23-568-1222

OMRON ASIA PACIFIC PTE. LTD.
83 Clemenceau Avenue,
#11-01, UE Square,
239920 Singapore
Tel: (65)835-3011/Fax: (65)835-2711

OMCC: OMRON (CHINA) CO., LTD.
Rm.302, AZIA Center, 1233 Lujiazui Ring Road
Pudong New Area, Shanghai 200120, PRC.
Tel: (86)21-5888-1666
Fax: (86)21-58888-7633/7933

Up-to-date information on RFID Systems can be accessed at OMRON's web site at
<http://www.omronrfid.com/>

Authorized Distributor: