HF Band RFID reader writer unit
HRWAFE-CP0803F
User's Manual

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Table of Contents

1. Introduction

This document is an explanation of the method of operating HF Band RFID reader writer unit HRWAFE-CP0803F.

2. Outline

This unit is supplied power by the electromagnetic radiation when IC tag enters in the communication area of the antenna unit, and can communicate the wireless with IC tag.

The antenna unit consists of 12×2 24 antennas in total, and can be communicated from the main body of the readout device with IC tag by switching and making the antenna work in all the vicinity of the antenna.

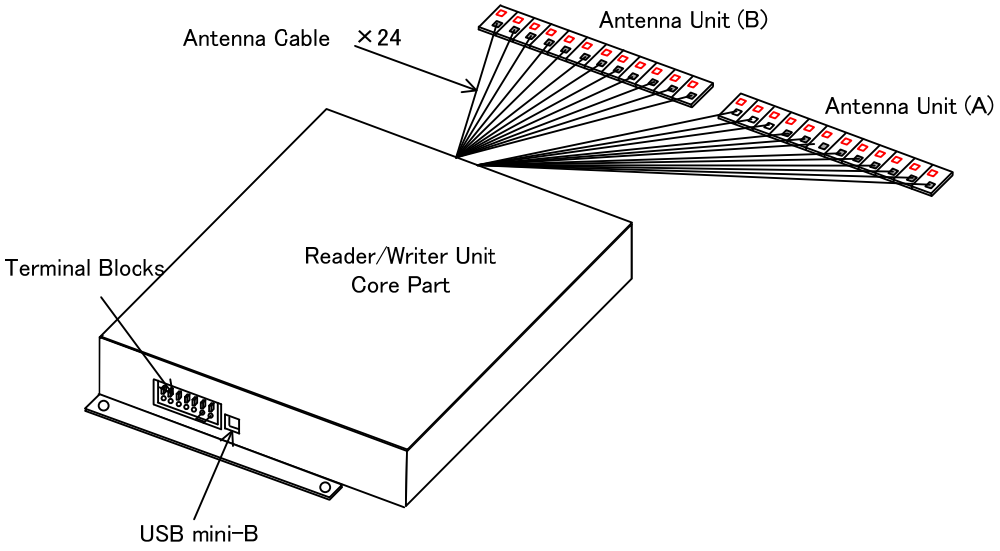
Moreover, can it communicate with RS-232C, and a host equipment control the reader writer unit with a host equipment.

The USB connector is an interface for the maintenance to rewrite the firmware of this device.

3. Directions

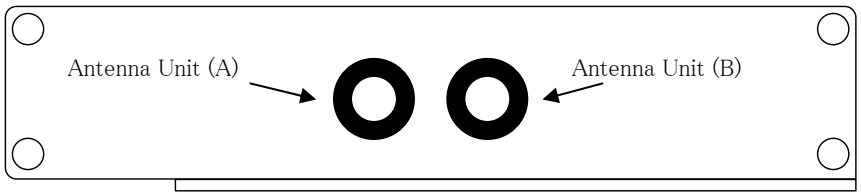
When a model in the limitation on EMC standard EN301489-3 for the CE marking agreement concerned uses the power cable of 3m or more, the ferrite core and the screened cable are needed.

4. Connection of equipment



1) Connect the antenna cable with the antenna unit.

Connect 24 antenna cables that have gone out from two places of the main body of the readout device with each antenna of the antenna unit.

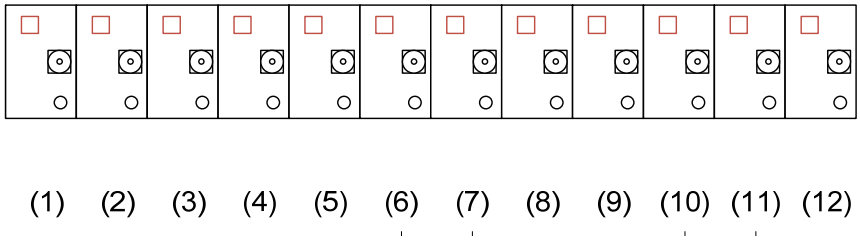


Antenna connection cable side panel

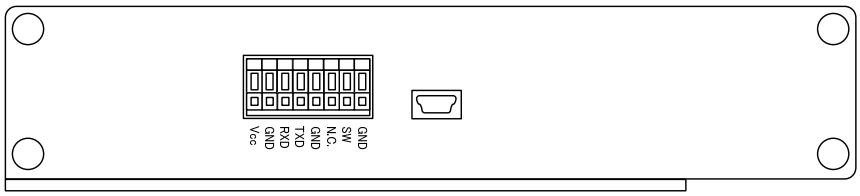
1-24 that shows connected antenna markers have taken side with the antenna cable. Connect 1-12 antenna cables and connect antenna unit （A） and 13-24 antenna cables with antenna unit （B）. Connected table is shown below.

Number display	Antenna number [Antenna Unit A]	Number display	Antenna Number [Antenna Unit B]
1	(1)	13	(1)
2	(2)	14	(2)
3	(3)	15	(3)
4	(4)	16	(4)
5	(5)	17	(5)
6	(6)	18	(6)
7	(7)	19	(7)
8	(8)	20	(8)
9	(9)	21	(9)
10	(10)	22	(10)
11	(11)	23	(11)
12	(12)	24	(12)

The antenna number of the antenna unit is shown below. （connector connection side）



2) External I/F connection



［External I/F side panel］

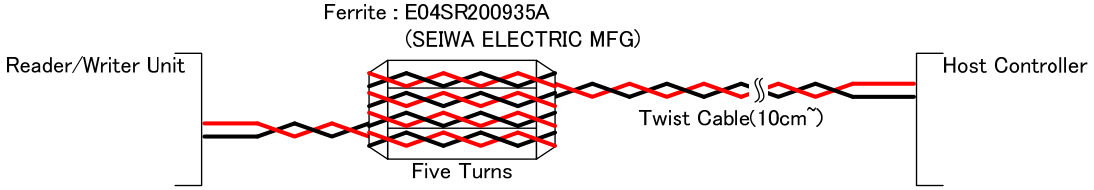
It connects in pin （Vcc） the first terminal stand and the cable of the playground is connected with power supply DC24V and the second pin （GND）.
terminal stand 3（RXD） and 4（TXD）5（GND） Cable （RS-232C） of host I/F is connected with the turn pin.

Pin No.	Signal	I/O	Function
1	VCC	-	Power supply DC24V
2	GND	-	Ground for VCC（DC24V）
3	RXD	I	Reader writer unit receive data
4	TXD	O	Reader writer unit send data
5	GND	—	Ground for RS232C
6	N.C.	-	Unused (Non Connect)
7	SW	I	Firmware rewriting terminal（unused usually）
8	GND	-	Playground of SW（unused usually）

※ It doesn't use terminal stand 6（N.C.）, 7（SW）, 8（GND）and the USB mini-B connector when you operate it.
Use them only when you rewrite the firmware of the reader writer unit.
Please refer to "HRWAFE-CP0803F firmware rewriting manual" for the rewrite method of the firmware.

Power Supply Cable

The power supply cable uses the cable with the following ferrite. Five turns of the cable to the ferrite. The ferrite is brought close to the Reader/Writer Unit side.



3) Power-on procedure and behavior of reader writer unit

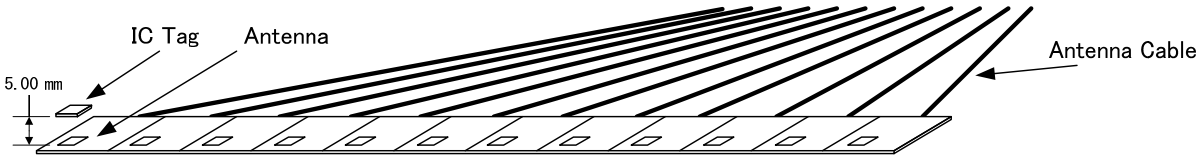
Supply DC24V from the outside to terminal stand 1 (Vcc) and 2 (GND) turn pin.

A host equipment can control the reader writer unit by the RS-232C interface of 3 and 4-the fifth pin.

Refer to clause 3 of the protocol specification for details of the control method.

IC tag is supplied power by the electromagnetic radiation when entering in the antenna communication area of the reader writer unit, and communicates the wireless with the reader writer unit.

Target IC tag is produced by DNP, product name is ACCUWAVE IM-0505-SLI. The range of the communication becomes 5mm or less in the vertical direction from each antenna communication part.



5. Protocol specification

※FeliCa is a registered trademark of Sony Ltd.. FeliCa is a technological method of the contactless IC card that Sony Ltd. developed.

※ Additionally, the brand name and the product name, etc. are the trademarks or, in general, registered trademarks of each company.

5.1. Communication interface

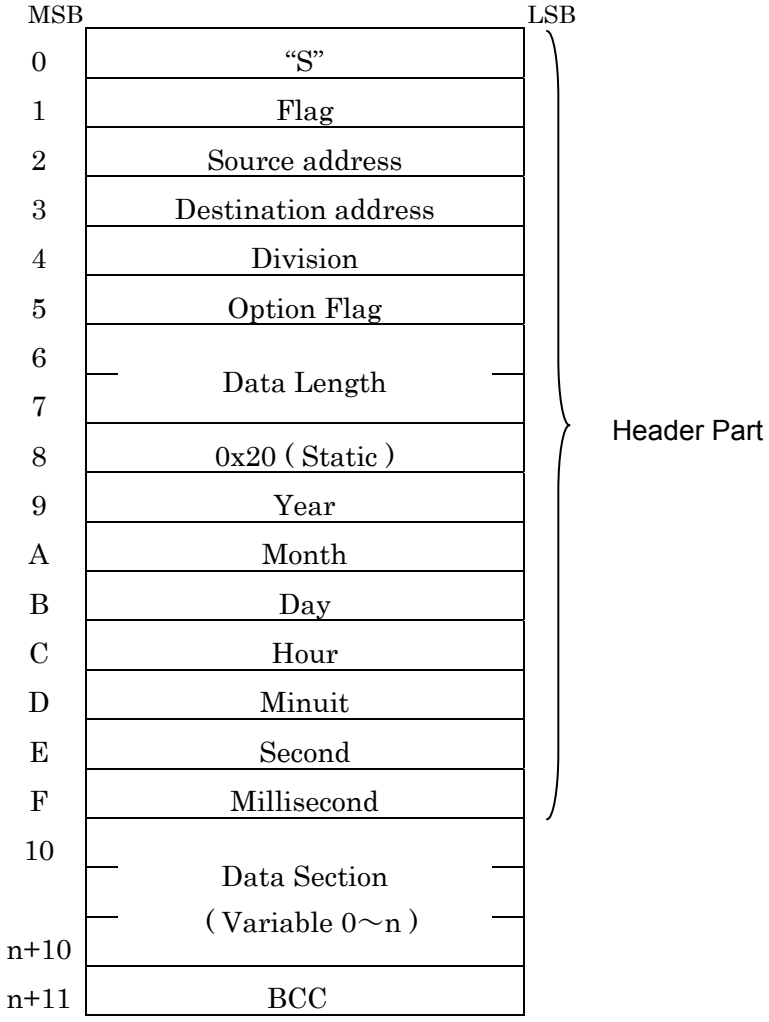
① RS-232C

- Bit rate 9600～115200bps (Default : 38400bps)
- Data length 8bit
- Parity bit none
- Stop bit 1bit
- Flowcontrol none

5.2. Message List

Message	Division	Function
Set Protocol Type	14	Set the protocol used.
Get Protocol Type	15	Acquire the protocol type the reader writer is using now.
Set Transmission Output	16	Output the transmission when you connect the HRWAFE module (Low/High Power) .
Get Transmission Output	1B	Acquire the transmission output setting when the HRWAFE module is connected.
Set Serial Speed	17	Set line speed of serial communication (RS-232C/UART) .
Get Serial Speed	18	Acquire line speed of serial communication (RS-232C/UART) .
Control RF Transmission Output	19	Do the radio frequency transmission output control.
Get The Type of Equipment	1A	Acquire the type of the connected equipment.
Get Tag ID	20	Acquire tag ID from the reader writer.
Read Memory Area	22	Read data from the memory of IC tag.
Write Memory Area	23	Write data to the memory of IC tag.
Set EEPROM Data	40	Set data to EEPROM.
Get EEPROM Data	41	Acquire data from EEPROM.
Through Command	80	Send the command to IC tag as is.
Get Firmware Version	81	Acquire the equipment and firmware version information.
Reset	FF	Reset the reader writer.
Notify Tag ID	21	Notify of the information from the reader writer when antenna status was changed.
Operation Mode	85	Do the continuous monitoring processing control.

5.3. Message Format



Flag	Error Flag (0 : None、1 : It is.) .
Message Division	Division of command message.
Source address	Equipment number for sending station (value of DISP SW) . ※ When RS-485 is connected.
Destination address	equipment number. ※ When RS-485 of destination is connected.
Option Flag	Flag for enhancing in the future.
Data Length	Data length of data division (Little endian) .
Y,M,D,H,M,S,MS	BCDData (RTC at unmounting、0 Static) .
BCC	"S" Value added to - data division (n) (lower 1byte) .

※Make the message length below 1024 bytes as a whole.

5.4. Error Format

The error code table of the error response to each message is shown as follows.

[Format]

Header part (16Bytes)	Error code (1 Bytes)	Information (n Bytes)	BCC (1 Bytes)

5.4.1. Error Codes

Sheet 1 Error Codes

Code (hex)	Meaning	Note
20	Response none (There is no response from IC tag.)	
80	IC tag error	
FD	Parameter error	
FE	BCC error	
FF	Internal error	

5.4.2. Information

When error code is 80h (IC tag error) , error information （error code） from IC tag is stored.

1. When the protocol is ISO15693

Sheet 2 error information

Code (hex)	Meaning	Note
01	Command not adopted. The demand command code cannot be recognized.	
02	Command not recognized. For instance, the form error occurred.	
03	Arbitrary command not adopted.	
0F	Error that is of uncertain cause or doesn't adopt.	
10	The specified block cannot be used （Do not exist) .	
11	The specified block cannot be locked again because it has already been locked.	
12	The specified block cannot change the content because it is locked.	
13	Writing data to the specified block was not normally completed.	
14	The lock to the specified block was not normally completed.	

5.5. Messages

5.5.1. Set Protocol Type (Message Division : 14h)

Set protocol （1 : ISO15693, 2 : ISO14443A, 3 : ISO14443B, 4 : FeliCa, 6 : MIFARE® Ultralight, 7 : SRIX4K） used.

※ This product is 1 : Use "1" because it is an equipment of the ISO15693 exclusive use.

	MSB							LSB
10	Protocol							

- Protocol 1 : ISO15693
  2 : ISO14443A
  3 : ISO14443B
  4 : FeliCa
  6 : MIFARE® Ultralight
  7 : SRIX4K

[The response of the Set Protocol Type]

The response of the Set Protocol Type.

◆ Success

Data division is none

◆ Fail

	MSB							LSB
10	Error code							

5.5.2. Get Protocol Type (Message Division : 15h)

Acquire the protocol type the reader writer is using now.. The data division is none.

[The response of the Get Protocol]

The response of the Protocol acquisition.

◆ Success

	MSB	LSB
10	Protocol	

- Protocol 1 : ISO15693
  2 : ISO14443A
  3 : ISO14443B
  4 : FeliCa
  6 : MIFARE® Ultralight
  7 : SRIX4K

◆ Fail

	MSB	LSB
10	Error Code	

5.5.3. Set Transmission Output (Message Division : 16h)

Set transmission output (Low Power/High Power) .

※ This product uses "Low Power" and use "0".
(1 : Do not use High Power.)

	MSB							LSB
10	Output							

・ Output 0 : Low Power
1 : High Power

[The response of the Set Transmission Output]

The response of the Set Transmission Output

◆ Success

Data division is none

◆ Fail

	MSB							LSB
10	Error Code							

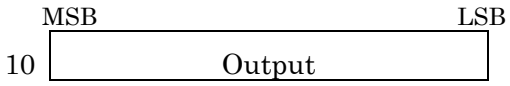
5.5.4. Get Transmission Output (Message Division : 1Bh)

Get transmission output (Low Power/High Power) .Data division is none.

[The response of Get Transmission output]

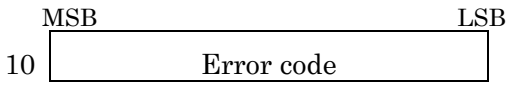
The response of Get Transmission output。

◆ Success



・ Output 0 : Low Power
1 : High Power

◆ Fail



5.5.5. Set Serial Speed (Message Division : 17h)

Set Serial speed of the serial communication （RS-232C/UART CMOS 3.3V）. **It changes the line speed after responds to the serial line speed settings.**

※ This product uses only RS-232C.

	MSB	LSB
10	Type	
11	Serial speed	

- Type 0 : RS-232C
  1 : UART[CMOS 3.3V]
- Serial speed 0 : 9600
  1 : 19200
  2 : 38400
  3 : 57600
  4 : 115200

※ Default Speed is 2 : 38400

[The response of Set Serial speed]

The response of Set Serial speed

◆ Success

Data division is none

◆ Fail

	MSB	LSB
10	Error code	

5.5.6. Get Serial Speed (Message Division : 18h)

Acquire line speed of the serial communication （RS-232C/UART CMOS 3.3V）.

	MSB		LSB
10	Type		

- Type 0 : RS-232C
  1 : UART[CMOS 3.3V]

[The response of Get Serial speed]

The response of Get Serial speed

◆ Success

	MSB		LSB
10	Serial speed		

- Serial speed 0 : 9600
  1 : 19200
  2 : 38400
  3 : 57600
  4 : 115200

◆ Fail

	MSB		LSB
10	Error code		

5.5.7. Control RF Transmission Output (Message Division : 19h)

Control RF transmission output.

	MSB							LSB
10	Power							

- Power 1 : Output
  0 : Stop

[The response of Control RF Transmission Output]

◆ Success

Data division is none

◆ Fail

	MSB							LSB
10	Error code							

5.5.8. Get The Type of Equipment (Message Division : 1Ah)

Acquire the type of the connected equipment. Data division is none.

※ This product is 1： HRWAFE is used.

[The response of Get The Type of Equipment]

◆ Success

	MSB	LSB
10	Type	

・ Type 1：HRWAFE
2：HRWHPA

◆ Fail

	MSB	LSB
10	Error code	

5.5.9. Get Tag ID (Message Division : 20h)

Acquire tag ID from the reader writer.

● Protocol:ISO15693

	MSB	LSB
10	Flag	

・ Flag 0 : Read a single Tag
1 : Read multiple tags (Every Tag)

[The response of Get Tag ID]

The response of Get Tag ID

◆ Success

	MSB	LSB	
10	Amount of tag (n)		
11	CRC Flag		
12	Length of tag		
13	ID		Tag 1
～			
1C			
1D	CID		
	Tag 2		
	～		
m	Tag n		

・ Amount of tag The number of tag data (1-100)
・ CRC Error Flag Effective, invalid flag of tag n (0: Effective)
・ Length of tag Tag ID length
・ ID Peculiar identifier
・ CID Chip ID (Add when protocol is SRIX4K only)
※ In anti-collision, there is the possibility that the overlapping ID occurs because of overlapped condition of the IC tags.

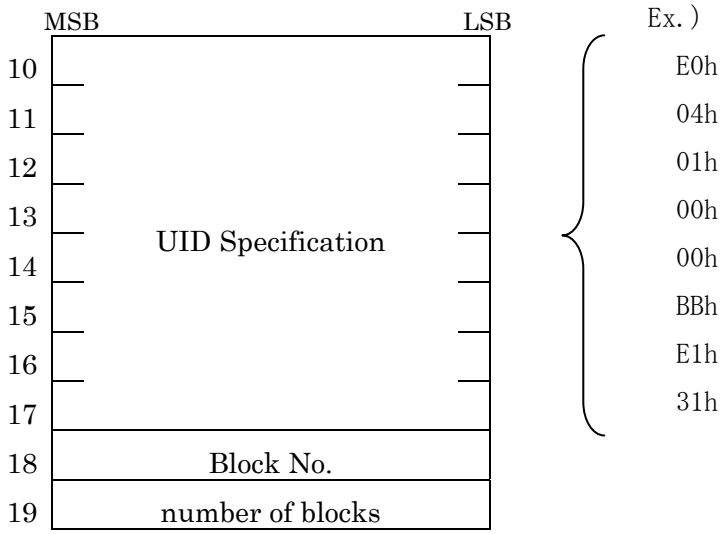
◆ Fail

	MSB	LSB
10	Error code	

5.5.10. Read Memory Area (Message Division : 22h)

Read data from the memory of IC tag. Specify UID, starting block No. and the number of blocks and acquire memory data.

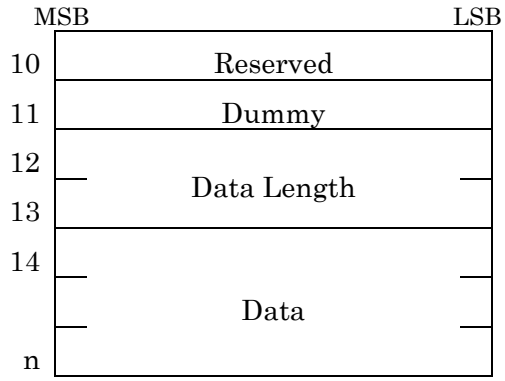
● When Protocol is ISO15693



- UID Specification　UID specification that read memory (8Bytes)
- Block No.　Starting Block No. (0~255)
- number of blocks　Acquired the number of blocks (1~255,0) . If 0, it becomes the number of blocks 256.

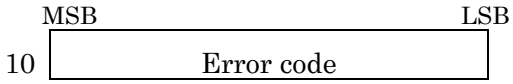
[The response of Read Memory]

◆ Success



- Reserved / Dummy 0 (Static)
- Data Length Data Length
- Data Data of indicated Blocks

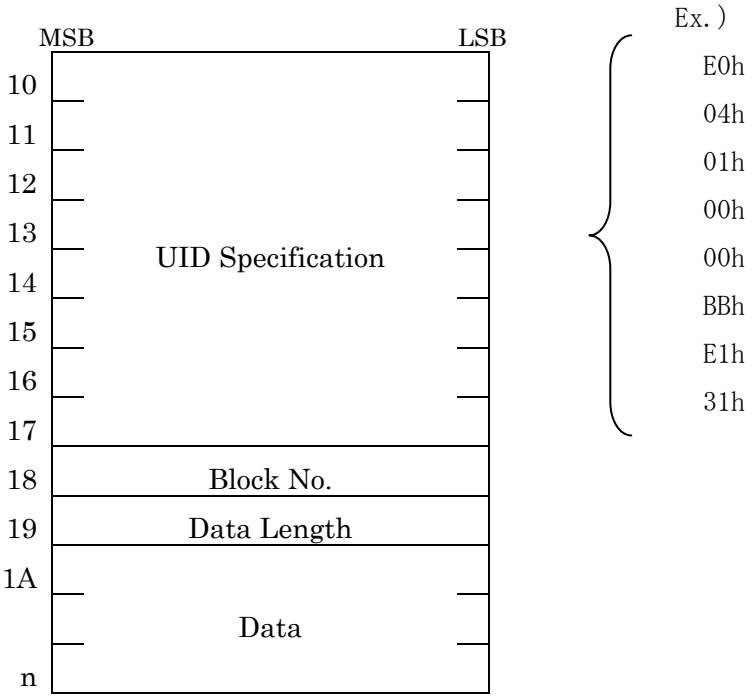
◆ Fail



5.5.11. Write Memory Area (Message Division : 23h)

Write data to the memory of IC tag.

- When Protocol is ISO15693

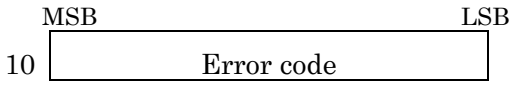


- UID Specification : UID specification that write memory (8Bytes)
- Block No. : Starting Block No. (0~255)
- Data Length : Data Length
- Data : Data to Write

[The response of Write Memory Area]

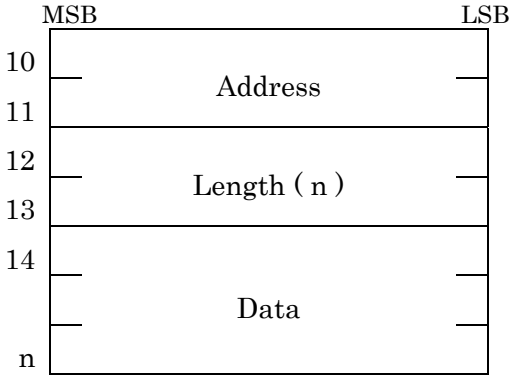
- Success
  Data division is none

- Fail



5.5.12. Set EEPROM Data (Message Division : 40h)

Set data to EEPROM



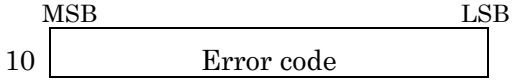
- Address　　Start address to write (0～15359)
- Length　　Data Length (1～64)
- Data　　Data to Write

[The response of Set EEPROM Data]

- Success

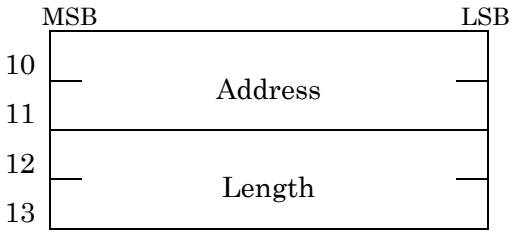
  Data division is none

- Fail



5.5.13. Get EEPROM Data (Message Division : 41h)

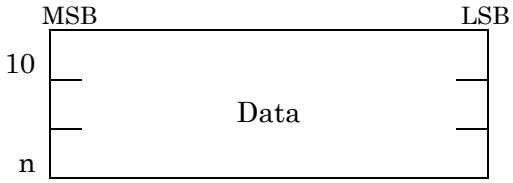
Acquire data from EEPROM.



- Address Start address to Read (0~15359)
- Length Data Length (1~64)

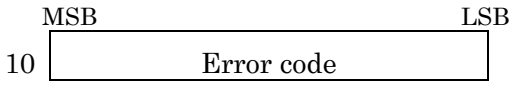
[The response of Get EEPROM Data]

◆ Success



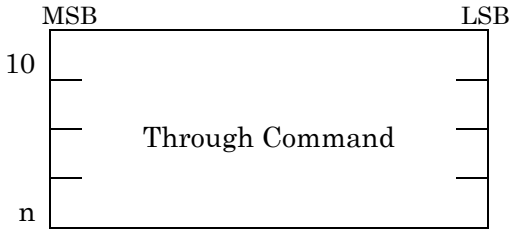
- Data Data of specified Length

◆ Fail



5.5.14. Through Command (Message Division : 80h)

Send the command to IC tag as is.



- Through Command : Command in accordance with protocol

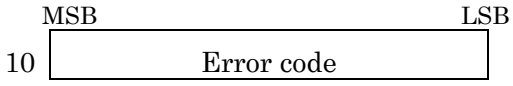
※ The correspondence protocol is ISO15693..

[The response of Through Command]

◆ Success

- Message The response of Message received from each IC tag

◆ Fail

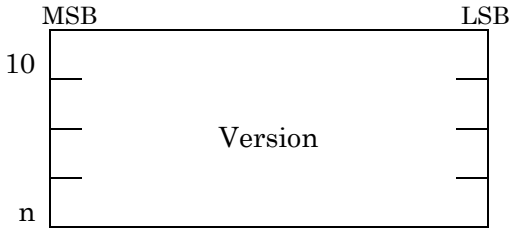


5.5.15. Get Firmware Version (Message Division : 81h)

Acquire the equipment and firmware version information. Data division is none.

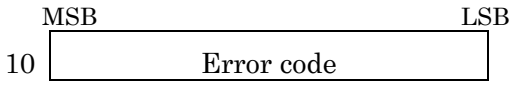
[The response of Get Firmware Version]

◆ Success



・ Version Character

◆ Fail



5.5.16. Reset (Message Division : FFh)

Reset a Reader / Writer

Data division is none.

[The response of Reset]

- Success

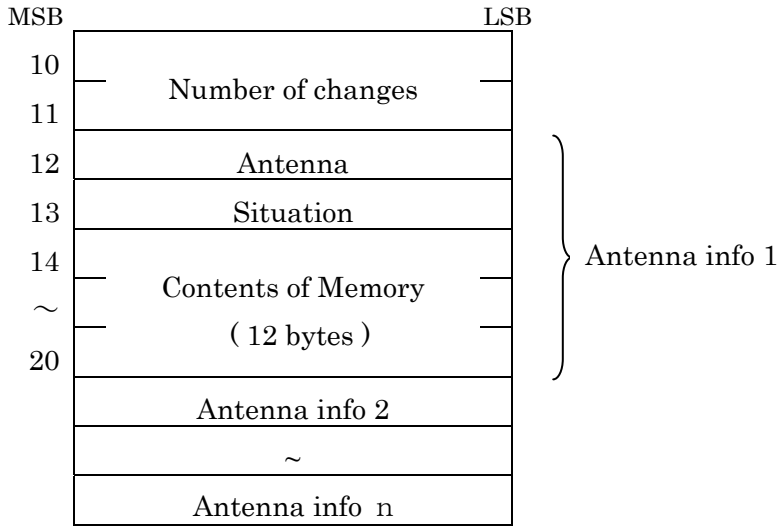
  Data division is none

- Fail

	MSB	LSB
10	Error code	

5.5.17. Notify Tag ID (Message Division : 21h)

Notify of the information (antenna number, state, and memory data) from the reader writer when antenna status was changed.



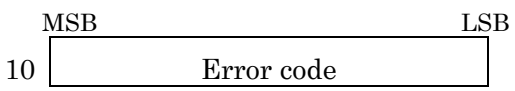
- Number of changes — The number of changed antenna (1～24)
- Antenna — Changed antenna No. (1～24)
- Situation — Tag is in the antenna field (1) and no tags (0)
- Contents of memory — unique ID registered in tag (12 bytes) zero filled if there is no tags (0)

[The response of Notify Tag ID]

◆ Success

Data division is none

◆ Fail



5.5.18. Operation Mode (Message Division : 85h)

Set the operation mode. Begin the continuous monitoring processing when the mode begins. Stop the continuous monitoring processing when the mode stops.

	MSB		LSB
10	Mode		
11	Retry		
12	Antenna		

- Mode — Start (1) 、Stop (0)
- Retry — The retry number of times of tag ID notification (0~9)
- Antenna — Specify the target antennas. （0： All 1： Steps 1-12 and 2： The lower 13-24)

[The response of Operation Mode]

◆ Success

Data division is none

◆ Fail

	MSB	LSB
10	Error code	

6. Regulatory Information

6.1. USA-Federal Communications Commission (FCC)

- This device complies with Part 15 of the FCC Rules. Operation is subject to thefollowing two conditions: (1) this device may not cause harmful interference,and (2) this device must accept any interference received, including interference that may cause undesired operation.

- CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE MANUFACTURER 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: WLJHACP0803F "

6.2. CE Marking - Declaration of Confirmity(CE) CE0560

- Česky [Czech]
  Sobal Corporation tímto prohlašuje, že tento *HRWAFE-CP0803F* je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.

- Dansk [Danish]
  Undertegnede Sobal Corporation erklærer herved, at følgende udstyr HRWAFE-CP0803F overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

- Deutsch [German]
  Hiermit erklärt Sobal Corporation, dass sich das Gerät HRWAFE-CP0803F in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.

- Eesti [Estonian]
  Käesolevaga kinnitab Sobal Corporation seadme HRWAFE-CP0803F vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

- English
  Hereby, Sobal Corporation, declares that this HRWAFE-CP0803F is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC
  .
- Español [Spanish]
  Por medio de la presente Sobal Corporation declara que el HRWAFE-CP0803F cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

- Ελληνική [Greek]

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Sobal Corporation ΔΗΛΩΝΕΙ ΟΤΙ HRWAFE-CP0803F ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.

- Français [French]
  Par la présente Sobal Corporation déclare que l'appareil HRWAFE-CP0803F est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

- Italiano [Italian]
  Con la presente Sobal Corporation dichiara che questo HRWAFE-CP0803F è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

- Latviski [Latvian]
  Ar šo Sobal Corporation deklarē, ka HRWAFE-CP0803F atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.

- Lietuvių [Lithuanian]
  Šiuo Sobal Corporation deklaruoja, kad šis HRWAFE-CP0803F atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.

- Nederlands [Dutch]
  Hierbij verklaart Sobal Corporation dat het toestel HRWAFE-CP0803F in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.

- Malti [Maltese]
  Hawnhekk, Sobal Corporation, jiddikjara li dan HRWAFE-CP0803F jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.

- Magyar [Hungarian]
  Alulírott, Sobal Corporation nyilatkozom, hogy a HRWAFE-CP0803F megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.

- Polski [Polish]
  Niniejszym firma Sobal Corporation oświadcza, że HRWAFE-CP0803F jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.

- Português [Portuguese]
  Sobal Corporation declara que este HRWAFE-CP0803F está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

- Slovensko [Slovenian]
  Sobal Corporation izjavlja, da je ta HRWAFE-CP0803F v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.

- Slovensky [Slovak]

Sobal Corporation týmto vyhlasuje, že HRWAFE-CP0803F spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.

- Suomi [Finnish]
  Sobal Corporation vakuuttaa täten että HRWAFE-CP0803F tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

- Svenska [Swedish]
  Härmed intygar Sobal Corporation att denna HRWAFE-CP0803F står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

- Íslenska [Icelandic]
  Hér með lýsir Sobal Corporation yfir því að HRWAFE-CP0803F er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC.

- Norsk [Norwegian]
  Sobal Corporation erklærer herved at utstyret HRWAFE-CP0803F er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.

- [Bulgarian]
  С настоящето Sobal Corporation декларира, че HRWAFE-CP0803F отговаря на съществените изисквания и другите приложими изисквания на Директива 1999/5/EC.

- [Romanian]
  Prin prezenta, Sobal Corporation, declarã cã aparatul HRWAFE-CP0803F este în conformitate cu cerinþele esenþiale °i cu alte prevederi pertinente ale Directivei 1999/5/CE

7. Contuct us

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