7

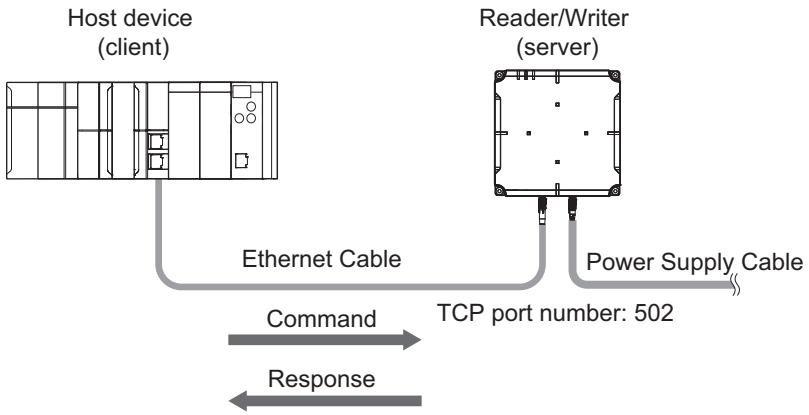
Modbus/TCP Communications

This section provides an overview of Modbus/TCP communications and describes the communications format, communications commands, and communications procedure.

7-1 Outline

7-1-1 Modbus/TCP Communications

- A V780 Reader/Writer can perform Modbus/TCP-compliant message communications with the host device (PLC).
- Communications between the host device (PLC) and the V780 Reader/Writer are performed on a client-server basis using the TCP/IP protocol. The computer, PLC, or other host device is the client and the Reader/Writer is the server.
- The message that the host device (PLC) sends to the Reader/Writer is called a command. The message that the Reader/Writer returns is called the response.



Additional Information

Modbus/TCP Protocol

The Modbus/TCP protocol is a communications protocol developed for PLCs by Modicon Inc.(AEG Schneider Automation International S.A.S.). It is an open standard and has been used for a variety of industrial devices.

A query in Modbus/TCP communications is called a command in this manual.

7-1-2 Modbus/TCP Function Codes Supported by the V780

The Modbus/TCP function codes that are supported by the V780 Reader/Writer are given in the following table.

Function code	Description
FC03 and FC16 (normal commands)	These function codes comply with Modbus/TCP Class 0. The basic Modbus/TCP function codes are classified in Class 0. Class 0 contains the following two functions: Read Multiple Resisters (FC03) and Write Multiple Registers (FC16). These are called normal commands in this manual.
FC100 (expanded command)	This function code has a unique format that was defined by OMRON. This function code is used to reduce command/response exchanges between the host device and Reader/Writer and give priority to the performance of communications with the host device. This is called an expanded command in this manual.

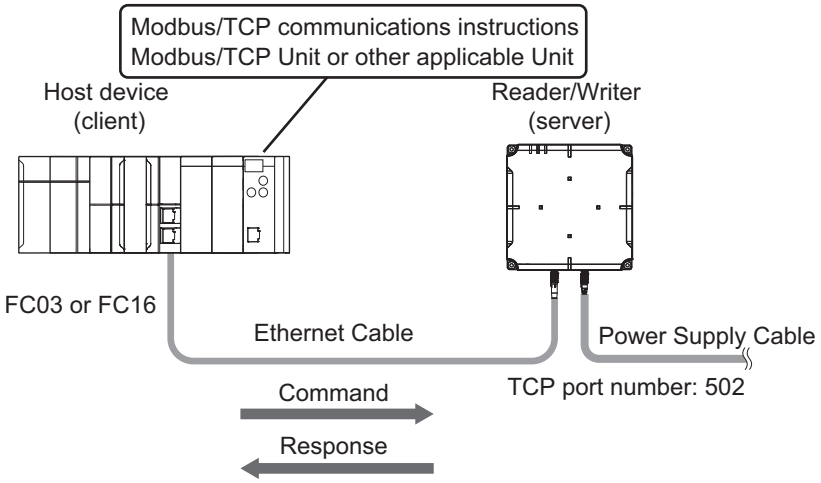
7-1-3 Communications System

There are two communications systems used by the V780 depending on the function codes that are used.

Modbus/TCP Communications System (FC03 and FC16)

The communications system that uses normal commands that are compliant with Modbus/TCP Class 0 is shown below.

Refer to *7-2 Message Formats* on page 7-5 for details on the normal commands.

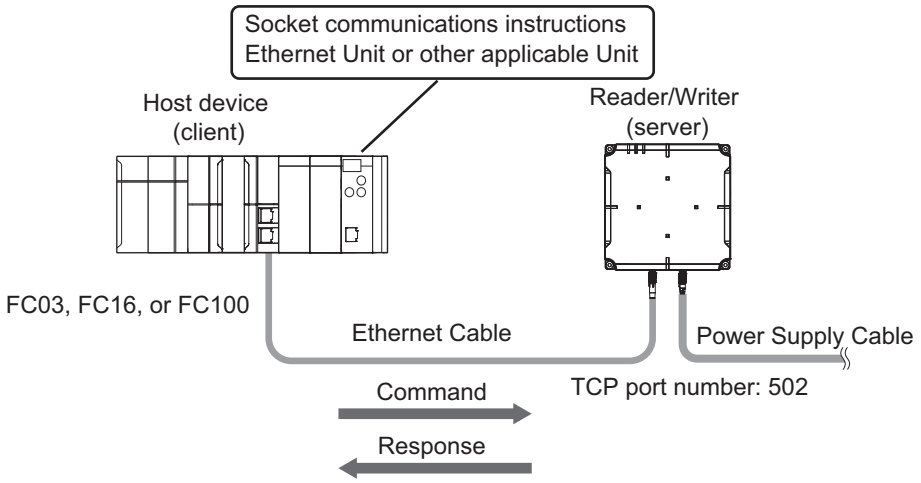


TCP/IP Socket Communications System (FC03, FC16, and FC100)

The expanded command that has a unique format defined by OMRON (FC100) cannot be sent with a Modbus/TCP Class 0-compliant protocol. The TCP/IP socket communications of the host device (PLC) are used instead.

Refer to *7-2 Message Formats* on page 7-5 for details on the expanded communications commands.

Refer to *7-4 Communications Procedure* on page 7-11 for information on creating a program for TCP/IP communications.



Precautions for Correct Use

Communications Units and communications commands that support the Modbus/TCP protocol support only function codes that comply with Modbus/TCP Class 0. Therefore, the function code FC100 for expanded commands cannot be used.

IP Address Settings of the Reader/Writer

You can set any IP address for the V780 Reader/Writer.

For details, refer to *7-6-5 Reader/Writer Setting Commands: Network Settings* on page 7-54 or *Setting the IP Address of the Reader/Writer from a Web Browser* on page 5-4.

Port Numbers Used for Modbus/TCP Communications

Normally, port number 502 (01F6 hex) is used for Modbus/TCP communications.

With the V780 Reader/Writer, you can change the port number to between 1,024 and 65,535 (0400 hex and FFFF hex).

For details, refer to *?8-2-3 ????????* (P.8-5)?.

7-2 Message Formats

7-2-1 Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	…	Byte-n
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Data			
XXXX hex		Always 0000 hex.		XXXX hex		Always FF hex.	03 hex, 10 hex, or 64 hex	XX...XX hex			

X: Any value, n: 4,351 max.

Range included in the field length.

Command frame length

Transaction Identifier

This value is used to identify the message sent by the host device.

The transaction identifier in the response from the Reader/Writer will be a copy of the value that is specified here.

Protocol Identifier

This field is always 0000 hex.

Field Length

Specify the number of bytes inclusively from the unit identifier through the end of the data.

If the function code is FC03 or FC16, the maximum field length is 250 bytes.

If the function code is FC100, the maximum field length is 4,346 bytes.

Unit Identifier

This field is always FF hex.

Function Code

The function code indicates the command to request execution from the Reader/Writer.

Function code	Function	Remarks
FC03 (03 hex)	Read Holding Register	Modbus/TCP Class 0 compliant
FC16 (10 hex)	Write Holding Register	
FC100 (64 hex)	Reader/Writer command	This function code is used for commands with a unique manufacturer definition that gives priority to the performance of communications with the host device.

Data

Specify the data that is relevant to the function code.

The format of the data depends on the function code.

7-2-2 Response Format for Normal Completion

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	…	Byte-n
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Data			
XXXX hex		Always 0000 hex.		XXXX hex		Always FF hex.	03 hex, 10 hex, or 64 hex	XX...XX hex			

X: Any value, n: 9,215 max.

Range included in the field length.

Transaction Identifier

The value that was specified in the command is set.

Protocol Identifier

This field is always 0000 hex.

Field Length

The number of bytes inclusively from the unit identifier through the end of the data is set.

Unit Identifier

This field is always FF hex.

Function Code

The value of the function code that was specified in the command is set.

Data

The data that is relevant to the function code is set.

The format of the data depends on the function code.

7-2-3 Response Format for Error Completion

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
XXXX hex		Always 0000 hex.		Always 0003 hex.		Always FF hex.	83 hex, 90 hex, or E4 hex	XX hex

X: Any value

Range included in the field length.

Transaction Identifier

The value that was specified in the command is set.

Protocol Identifier

This field is always 0000 hex.

Field Length

This field is always 0003 hex.

Unit Identifier

This field is always FF hex.

Function Code

The value of the function code that was specified in the command plus 80 hex is set.

Exception Code

A code that provides information on the error is set.

You can use the error code to identify the error that was detected by the Reader/Writer. The exception code and error code are related as given below. Refer to the most recent command error information or command error log to check details on the error using the error code.

Exception code	Exception code meaning	V780 error code	
01 hex	Illegal function	1001 hex	Frame length error
		1002 hex	Frame header error
		1003 hex	Unknown command error
02 hex	Illegal data address	1004 hex	Command format error
03 hex	Illegal data value	1005 hex	Command parameter error
04 hex	Failure in slave device	2*** hex	RF Tag communications error
		1018 hex	Command execution failure, minor fault
		101F hex	Command execution failure, major fault
06 hex	Slave device busy	1011 hex	Command execution failure, busy

7-2-4 Read Multiple Resisters Command/Response (FC03)

Command Format

Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Function code	Register address		Word count	
03 hex	XXXX hex		0001 to 0078 hex (1 to 120)	

Normal Response Format

Byte-7	Byte-8	Byte-9	…	Byte-n
Function code	Byte count	Read holding register data		
03 hex	XX hex	XX...XX hex		

7-2-5 Write Multiple Resisters Command/Response (FC16)

Command Format

Byte-7	Byte-8	Byte-9	Byte-10	Byte-11	Byte-12	Byte-13	…	Byte-n
Function code	Register address		Word count		Byte count	Write holding register data		
10 hex	XXXX hex		0001 to 0078 hex (1 to 120)		Word count x 2	XX...XX hex		

Normal Response Format

Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Function code	Register address		Word count	
10 hex	XXXX hex		0001 to 0078 hex (1 to 120)	

7-2-6 Expanded Command/Response (FC100)

Command Format

Byte-7	Byte-8	Byte-9	Byte-10	…	Byte-n
Function code	Subfunction code		Expanded command parameters		
64 hex	XXXX hex		XX...XX hex		

Normal Response Format

Byte-7	Byte-8	Byte-9	Byte-10	…	Byte-n
Function code	Subfunction code		Expanded response data		
64 hex	XXXX hex		XX...XX hex		

7-3 RF Communications Command Options

This section describes the options that you can use together with RF communications commands (multiaccess or Modbus expansion). You can specify options to get the EPC of the RF Tag, the reception level, or other communications information together with the normal data for the command.

For commands with the multiaccess specification, the communications information specified with the option is returned in the response for the command that gets the execution results, i.e., the two commands are used together.

For commands with the Modbus expansion, the communications information specified with the option is returned as an attachment to the response.

Options

● Options

Item	Relevant bit	Description	Information size
EPC	Bit 0	The StoredPC and EPC code are attached.	32 words
Reception level	Bit 1	The reception level (signed hexadecimal) is attached. FFFF to FF9D hex (-1 to -99 [dBm]) • A value of 0 will be set if processing ended in an error.	1 word
Reserved 1	Bits 2 to 3	• These bits are reserved.	---
Diagnostic result	Bit 4	The diagnostic results (4-digit hexadecimal) are attached. If communications diagnostics are disabled, 0000 hex is attached. For details, refer to *Response Formats* on page 7-125 under *GET COMMUNICATIONS DIAGNOSTIC INFORMATION* on page 7-125.	1 word
Reserved 2	Bits 5 to 15	• These bits are reserved.	---

Option Specification Examples:

Specify 0001 hex to have the EPC attached.

Specify 0003 hex to have the EPC and reception level attached.

Specify 0011 hex to have the EPC and diagnostic results attached.

● Options Supported by RF Communications Commands

OK: Option can be specified, No: Option cannot be specified. (A parameter error will occur if it is.)

---: Reserved (Always specify 0 for these unused bits.)

Classification	Command	Options				
		Reserved	Diagnostic results	Reserved	RSSI	EPC
		Bits 5 to 15	Bit 4	Bits 2 and 3	Bit 1	Bit 0
Communications command, multiaccess	SET MULTIACCESS ID READ	---	No	---	OK	No
	SET MULTIACCESS DATA READ	---	No	---	OK	OK

Classification	Command	Options				
		Reserved	Diag-nostic results	Reserved	RSSI	EPC
		Bits 5 to 15	Bit 4	Bits 2 and 3	Bit 1	Bit 0
Communications command, Modbus expansion	EXTENDED DATA READ	---	OK	---	OK	OK
	EXTENDED DATA WRITE	---	OK	---	OK	OK
	EXTENDED MULTIACCESS ID READ	---	No	---	OK	No
	EXTENDED MULTIACCESS DATA READ	---	No	---	OK	OK

7-4 Communications Procedure

In the computer, PLC, or other host devices, write the program to communicate with the Reader/Writer using TCP sockets.

If you use an Modbus/TCP master device, follow the communications procedure for the device you are using.

7-4-1 Command Communications Procedure

A connection is required between the host device and Reader/Writer to communicate with the Reader/Writer. After you establish a connection, send commands and receive the responses.

1 Connection Processing: Opening a Socket

Send a request for a connection from the host device to the Reader/Writer and establish a TCP connection. Monitor for connection timeouts as required.

2 Command Send Processing: Sending Socket Data

Send the command from the host device to the Reader/Writer in a message.

Monitor for send timeouts as required.

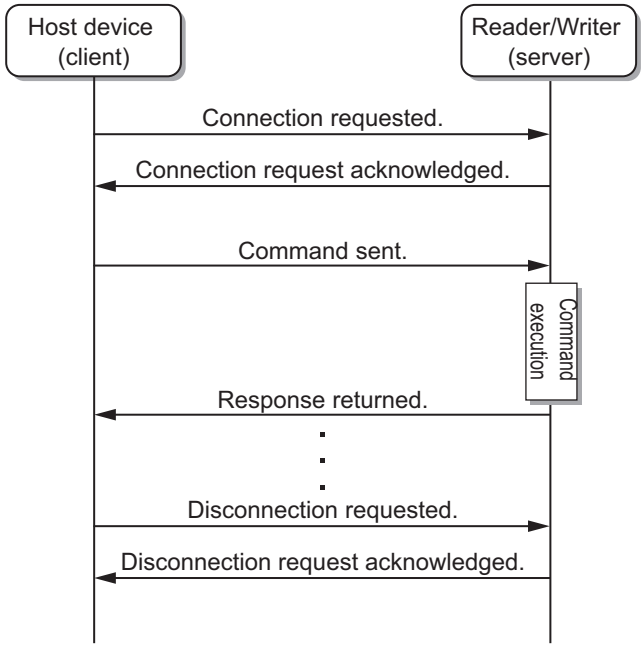
3 Response Reception Processing: Receiving Socket Data

At the host device, wait to receive the message from the host device and receive the response.

Monitor for reception timeouts as required.

4 Disconnection Processing: Closing the Socket

Send a request for a disconnection from the host device to the Reader/Writer and disconnect the TCP connection. Monitor for disconnection timeouts as required.



Precautions for Correct Use

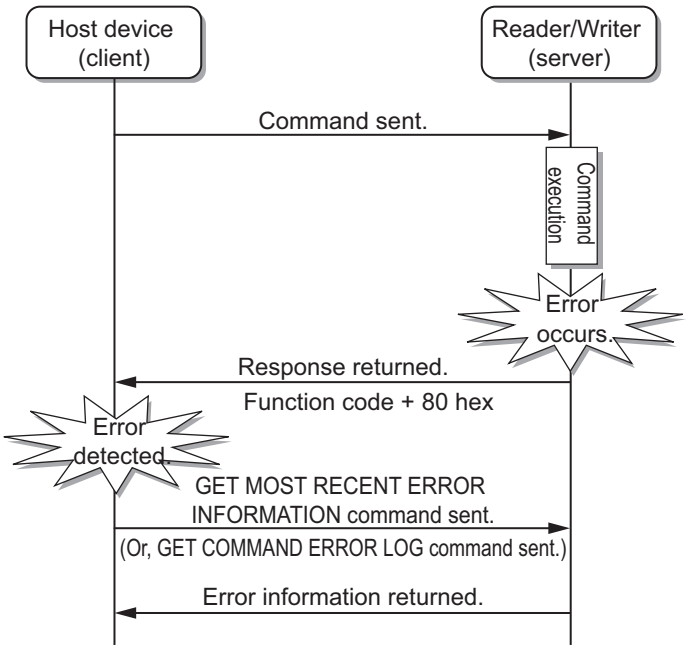
Access to a Reader/Writer is possible from only one host device at a time.

If a host device B connects to a Reader/Writer while another host device A is already connected to it, the connection between host device A and the Reader/Writer will be automatically disconnected and a connection with host device B will be established.

7-4-2 Error Response Reception Procedure

If an error response is received, you can check the most recent command error information or command error log in the Reader/Writer to get details on the nature of the error. An error has occurred if the function code in the response that was returned from the Reader/Writer is 80 hex higher than the function code in the query.

You can do this by sending a GET MOST RECENT ERROR INFORMATION command or GET COMMAND ERROR LOG command from the host device or by using the Web browser interface through the Web server.

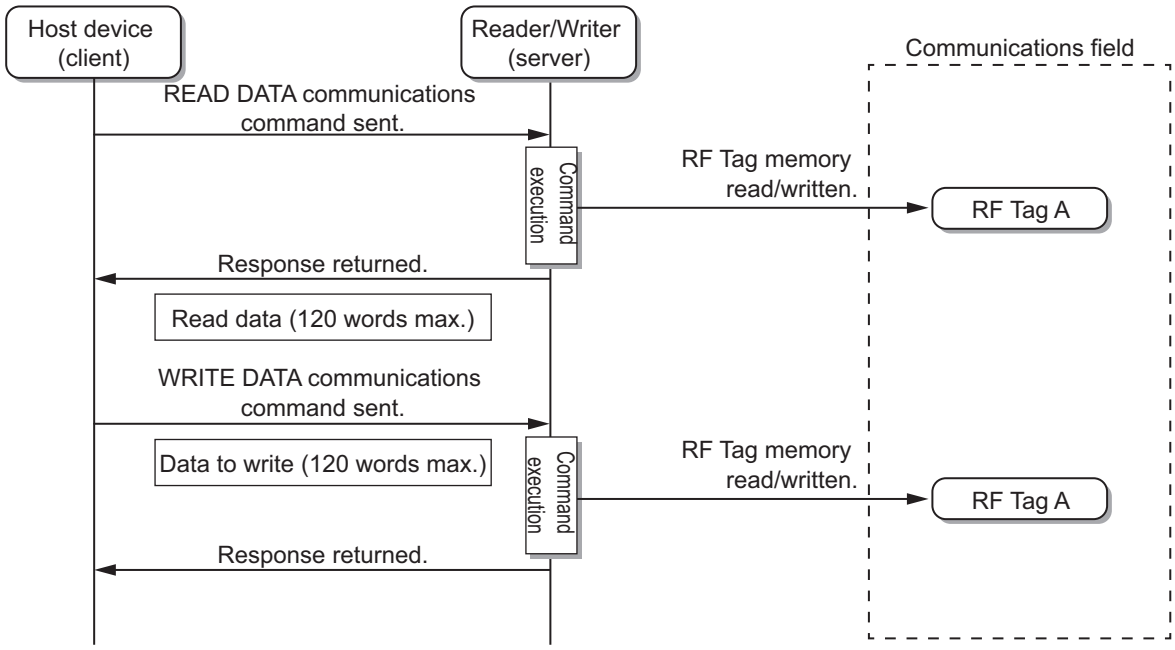


7-4-3 RF Tag Communications Command Procedure for Single-access Communications

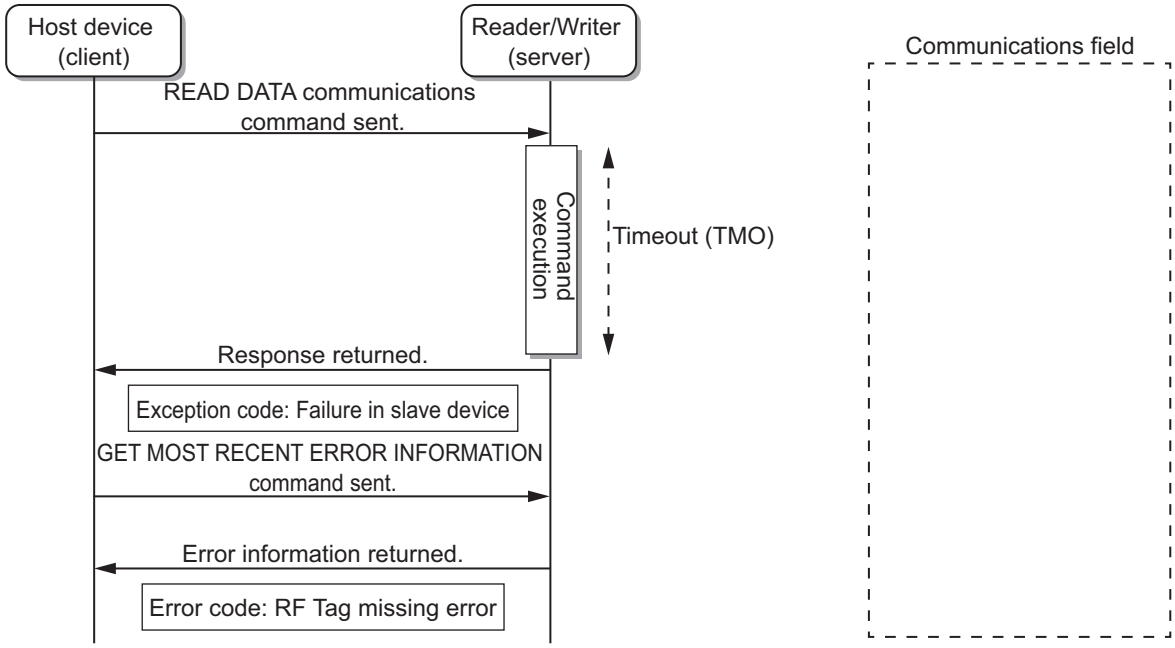
When you send an RF Tag communications command with single-access communications, the Reader/Writer communicates with only one RF Tag in the communications field.

Using a Normal Command (FC03 or FC16)

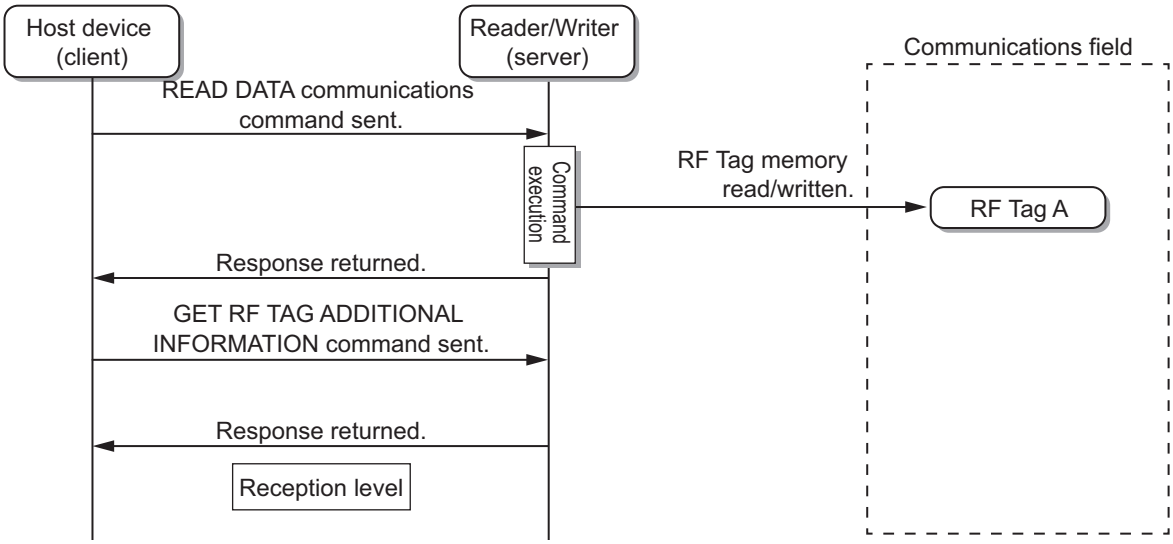
With a normal command, the maximum size of data that you can read from an RF Tag is 120 words. To read more data than that, you must use more than one READ DATA or WRITE DATA command, or use an expanded command.



If communications with an RF Tag are not possible, a “failure in slave device” exception code (04 hex) is returned in an error response. Following the error response reception procedure.



If you want to check the EPC code or reception level when communications with the RF Tag are successful, send a GET RF TAG ADDITIONAL INFORMATION command after the response to the communications command has been received. The reception level from the RF Tag that was just communicated with will be returned.

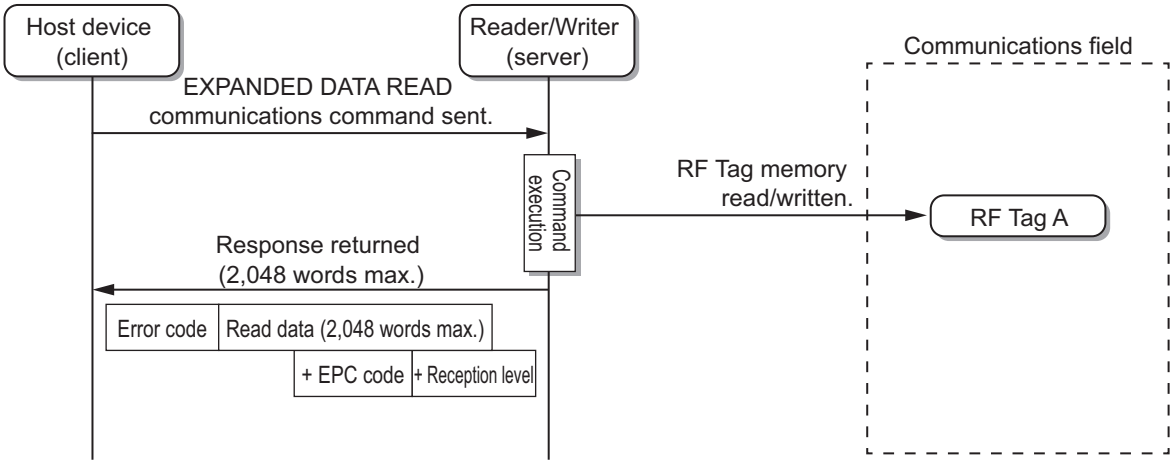


Using an Expanded Command (FC100)

With an expanded command, the maximum size of data that you can read from an RF Tag is 2,048 words.

If an error occurs in the RF Tag communications, the error code is returned with the response. No additional command is required to check the error code.

You can also specify a command option to have the EPC code or reception level returned with the other data.



7-4-4 RF Tag Communications Command Procedure for Multiaccess Communications

When you send an RF Tag communications command with multiaccess communications, the Reader/Writer communicates with more than one RF Tag in the communications field.

The Reader/Writer will communicate with all of the RF Tags in the communications field within the communications timeout time (64 max.) and then return a response.

Using a Normal Command (FC03 or FC16)

With a normal multiaccess RF Tag command, two commands are used to exchange the data, one to set communications and another to get the results.

1 Sending the Command to Set Communications

First, send the command to set communications.

If the Reader/Writer detects even one RF Tag, the results of execution are returned as a normal response.

If no RF Tags were detected, an RF Tag missing error is returned.

2 Sending the Command to Get the Results

Send the command to get the results.

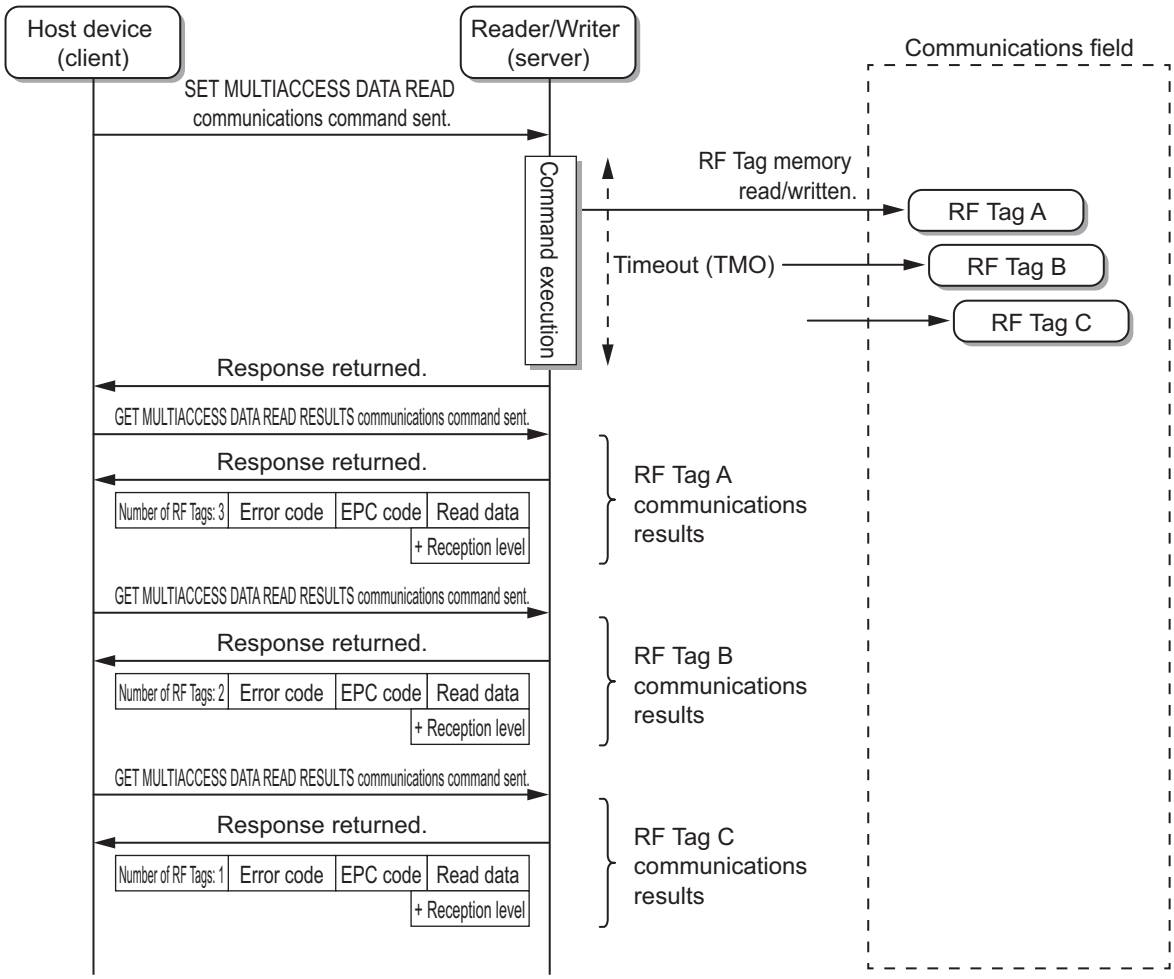
When you execute the command to get the results, the results of communications with the first RF Tag that was detected will be returned. The communications results will contain the number of RF Tags detected, the error code, and, for READ DATA, the EPC code.

If the option is specified, the reception level information is also attached.

3 Repeatedly Getting the Results

Execute the command to get the results once for every RF Tag that was detected.

The number of RF Tags that was detected by the Reader/Writer is included in the response to the command to get the results. Repeatedly send the command until the number of RF Tags in the response is 1.

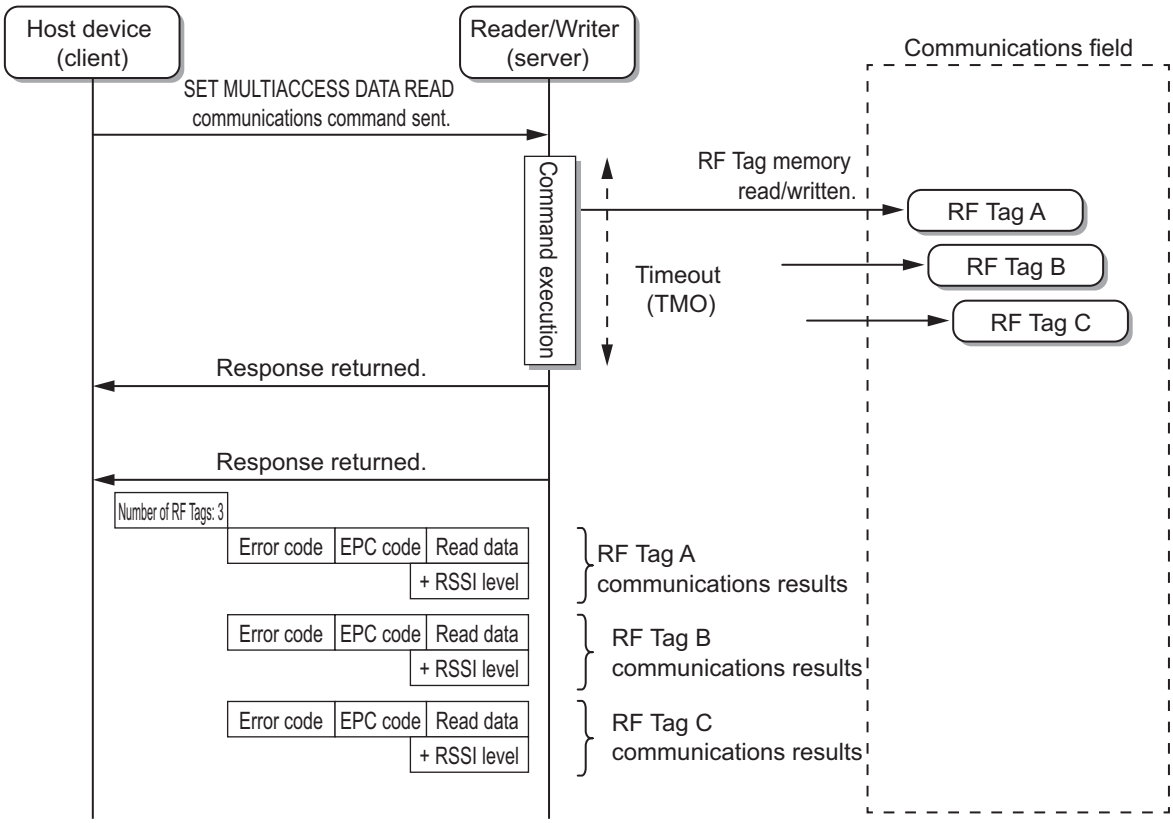


Precautions for Correct Use

If you execute another communications command (e.g., a single-access read, write, or fill command or a multiaccess read command) before you execute the commands to get the results, the multiaccess communications results held in the Reader/Writer will be cleared.

Using an Expanded Command (FC100)

With an expanded command, you can execute one multiaccess RF Tag command to get the communications results from more than one RF Tag with only one command.



Precautions for Correct Use

The normal MULTIACCESS DATA READ and MULTIACCESS ID READ communications commands are designed for applications that read two to five RF Tags at one time. If your application requires reading more RF Tags than that, we recommend that you use an expanded command.

7-5 Commands

The commands that you can send to a Reader/Writer are listed below.

The command codes are used to identify the commands and they are recorded in the most recent command error information and command error log with an error response is returned. (This information is not included in the Modbus/TCP message format.)

Single-access Communications Commands

Command name	Function code	Register address	Command code
READ ID	FC03	4000 hex	0001 hex
WRITE ID	FC16	4000 hex	0002 hex
READ DATA	FC03	0000 to 07FF hex 1000 to 17FF hex 2000 to 27FF hex 3000 to 3FFF hex*1	0003 hex
WRITE DATA	FC16	0000 to 07FF hex 1000 to 17FF hex 2000 to 27FF hex 3000 to 3FFF hex	0004 hex
LOCK	FC16	8000 hex	0005 hex
DATA FILL	FC16	8100H hex	0006 hex

Multiaccess Communications Commands

Command name	Function code	Register address	Command code
SET MULTIACCESS ID READ	FC16	Always 9000 hex.	0101 hex
GET MULTIACCESS ID READ RESULTS	FC03	Always 9100 hex.	0102 hex
SET MULTIACCESS DATA READ	FC16	Always 9200 hex.	0103 hex
GET MULTIACCESS DATA READ RESULTS	FC03	Always 9300 hex.	0104 hex

Modbus Expansion Communications Commands

Command name	Function code	Subfunction code	Command code
EXTENDED DATA READ	FC100	0001 hex	0201 hex
EXTENDED DATA WRITE	FC100	0002 hex	0202 hex
EXTENDED MULTIACCESS ID READ	FC100	0003 hex	0203 hex
EXTENDED MULTIACCESS DATA READ	FC100	0004 hex	0204 hex

Reader/Writer Control Commands

Command name	Function code	Register address	Command code
INITIALIZE	FC16	A000 hex	1001 hex
RESET	FC16	A100 hex	1002 hex
STOP	FC16	A200 hex	1003 hex
RESET FOCUS	FC16	A300 hex	1004 hex

Reader/Writer Setting Commands: Network Settings

Command name	Function code	Register address	Command code
SET TCP/IP COMMUNICATIONS CONDITIONS	FC16	B000 hex	2001 hex
GET TCP/IP COMMUNICATIONS CONDITIONS	FC03	B000H hex	2002 hex
SET DEVICE NAME	FC16	B100 hex	2003 hex
GET DEVICE NAME	FC03	B100 hex	2004 hex
SET MODBUS/TCP COMMUNICATIONS CONDITIONS	FC16	B200 hex	2005 hex
GET MODBUS/TCP COMMUNICATIONS CONDITIONS	FC03	B200 hex	2006 hex
SET WEB COMMUNICATIONS CONDITIONS	FC16	B300 hex	2007 hex
GET WEB COMMUNICATIONS CONDITIONS	FC03	B300 hex	2008 hex
SET WEB PASSWORD	FC16	B400 hex	2009 hex
GET WEB PASSWORD	FC03	B400 hex	200A hex

Reader/Writer Setting Commands: Device Settings

Command name	Function code	Register address	Command code
SET OPERATION INDICATOR CUSTOM CONDITIONS	FC16	B800 hex	5001 hex
GET OPERATION INDICATOR CUSTOM CONDITIONS	FC03	B800 hex	5002 hex

Reader/Writer Setting Commands: Communications Settings

Command name	Function code	Register address	Command code
SET TAG COMMUNICATIONS CONDITIONS	FC16	C000 hex	3001 hex
GET TAG COMMUNICATIONS CONDITIONS	FC03	C000 hex	3002 hex
SET TRANSMISSION POWER	FC16	C100 hex	3003 hex
GET TRANSMISSION POWER	FC03	C100 hex	3004 hex
SET CHANNEL	FC16	C200 hex	3005 hex
GET CHANNEL	FC03	C200 hex	3006 hex
SET GEN2 SESSION	FC16	C300 hex	3007 hex

Command name	Function code	Register address	Command code
GET GEN2 SESSION	FC03	C300 hex	3008 hex
SET ACCESS PASSWORD	FC16	C400 hex	3009 hex
GET ACCESS PASSWORD	FC03	C400 hex	300A hex
SET RF TAG SELECTION FILTER CONDITIONS	FC16	C500 hex	300B hex
GET RF TAG SELECTION FILTER CONDITIONS	FC03	C500 hex	300C hex
SET RSSI FILTER CONDITIONS	FC16	C600 hex	300D hex
GET RSSI FILTER CONDITIONS	FC03	C600 hex	300E hex
SET TRANSMISSION TIME	FC16	C700 hex	300F hex
GET TRANSMISSION TIME	FC03	C700 hex	3010 hex

Maintenance Commands: Device Information

Command name	Function code	Register address	Command code
GET MODEL INFORMATION	FC03	D000 hex	4001 hex
GET FIRMWARE VERSION	FC03	D100 hex	4002 hex
GET MAC ADDRESS	FC03	D200 hex	4003 hex
GET OPERATING STATUS	FC03	D300 hex	4004 hex
GET TIME INFORMATION	FC03	D400 hex	4005 hex
SET TIME INFORMATION	FC16	D400 hex	4006 hex

Maintenance Commands: Log Information

Command name	Function code	Register address	Command code
GET SYSTEM ERROR LOG	FC03	D600 hex	4101 hex
CLEAR SYSTEM ERROR LOG	FC16	D700 hex	4102 hex
GET COMMAND ERROR LOG	FC03	D800 hex	4103 hex
GET MOST RECENT COMMAND ERROR INFORMATION	FC03	D900 hex	4104 hex

Maintenance Commands: RF Communications Information

Command name	Function code	Register address	Command code
GET RF TAG ADDITIONAL INFORMATION	FC03	DA00 hex	4201 hex
GET NOISE LEVEL	FC03	DB00 hex	4202 hex
GET COMMUNICATIONS DIAGNOSTIC INFORMATION	FC03	DC00 hex	4203 hex

7-6 V780 Command Details

7-6-1 Single-access Communications Commands

READ ID

● Function

This command reads the ID (i.e., the EPC code) of the RF Tag in the communications field.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	4000 hex		0020 hex	

Parameter	Description
Register address	The register address (4000 hex) that specifies reading the ID
Word count	The number of words in the read StoredPC and EPC code (always 0020 hex).

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	StoredPC	
X	X	0000 hex		0043 hex		FF hex	03 hex	40 hex	2 bytes	

Byte-11	…	Byte-72
EPC code		
62 bytes		

Parameter	Description
StoredPC	Gives the StoredPD data in 4-digit hexadecimal. The upper 5 bits are the EPC word length. (Refer to *StoredPC Bit Format* on page 20, below.)
EPC code	Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.

Note If the reception level is required, use *GET RF TAG ADDITIONAL INFORMATION* on page 7-121.

Additional Information

• StoredPC Bit Format

10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
PC + EPC length 16 x (n + 1)					RFU		0:EPS 1:AFI	Data							

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Reading the ID Data from the RF Tagt

Example 1: Execution When an RF Tag Is in the Communications Field (StoredPC: 3000 hex, EPC code: 111122223333444455556666 hex)

TX: 000000000006FF0340000020

RX: 000000000043FF03403000111122223333444455556666600…00

* Words 7 through 31 of the EPC code section (i.e., the words past the EPC length of 6 words) are filled with zeros.

Example 2: Execution When an RF Tag Is Not in the Communications Field (Exception Code: 04 Hex (Failure in Device))

TX: 000000000006FF0340000020

RX: 000000000003FF8304

WRITE ID

● Function

This command writes the ID (i.e., the EPC code) to the RF Tag in the communications field.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		2 bytes		FF hex	10 hex	4000 hex		2 bytes	

Byte-12	Byte-13	Byte-14	Byte-15	…	Byte-n
Byte count	EPC length		EPC code		
1 byte	2 bytes		0 to 62 bytes		

Parameter	Description
Field length	Setting range: 0015 to 0047 hex
Register address	The register address (4000 hex) that specifies reading or writing the ID
Word count	Setting range: 0001 to 0020 hex
Byte count	Setting range: 02 to 40 hex
EPC length	Gives the word size of the EPC code in 4-digit hexadecimal. 0000 to 001F hex (0 to 32)
EPC code	Gives the Tag-specific information according to Gen2 standards.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	2 bytes		2 bytes	

Parameter	Description
Register address	The register address from the command is set
Word count	The word count from the command is set.

Note If the reception level is required, use *GET RF TAG ADDITIONAL INFORMATION* on page 7-121.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

Execution Examples

Writing the ID Data to an RF Tag (EPC Length: 0006 Hex, EPC Code: 111122223333444455556666 Hex)

TX: 000000000015FF10400000070E00061111222233334444555566666

RX: 000000000006FF1040000007

READ DATA

● Function

This command reads data from the RF Tag in the communications field.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	2 bytes		2 bytes	

Parameter	Description
Register address	Specify in 4-digit hexadecimal the start address for reading data. Setting ranges (word address specifications) 0000 to 07FF hex: Reserved area 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area
Word count	Specify in 4-digit hexadecimal the number of words of data to read. Setting range: 0001 to 0078 hex (1 to 120)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	…	Byte-n
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Read data		
X	X	0000 hex		00 hex	1 byte	FF hex	03 hex	1 byte	2 to 240 bytes		

Parameter	Description
Byte count	Contains the number of bytes of data that were read from the RF Tag in 2-digit hexadecimal. (02 to F0 hex)
Read data	The data that was read from the RF Tag is attached.

Note If the reception level is required, use *GET RF TAG ADDITIONAL INFORMATION* on page 7-121.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

Execution Examples

Reading Four Words of Data (1111222233334444 Hex) Starting from Word Address 0123 Hex (User Area) in the RF Tag

TX: 000000000006FF0331230004

RX: 000000000013FF03081111222233334444

WRITE DATA

● Function

This command writes data to the RF Tag in the communications field.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		2 bytes		FF hex	10 hex	2 bytes		2 bytes	

Byte-12	Byte-13	…	Byte-n
Byte count	Data to write		
1 byte	1 to 120 words		

Parameter	Description
Field length	Setting range: 0009 to 00F7 hex (9 to 247)
Register address	Specify in 4-digit hexadecimal the start address for writing data in the RF Tag. Setting ranges (word address specifications) 0000 to 07FF hex: Reserved area 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area
Word count	Specify in 4-digit hexadecimal the number of words of data to write. Setting range: 0001 to 0078 hex (120 words max.)
Byte count	Specify in 4-digit hexadecimal the number of bytes of data to write. Setting range: 02 to F0 hex (240 bytes max.)
Data to write	Specify the data to write to RF Tag. Between 1 and 120 words of data can be written with one command.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	2 bytes		2 bytes	

Parameter	Description
Register address	The register address from the command is set
Word count	The word count from the command is set.

Note If the reception level is required, use *GET RF TAG ADDITIONAL INFORMATION* on page 7-121.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Writing Four Words of Data (1111222233334444 Hex) Starting from Word Address 0123 Hex (User Area) in the RF Tag

TX: 00000000000FFF1031230004081111222233334444

RX: 000000000006FF1031230004

LOCK

● Function

This command locks or unlocks the memory of the RF Tag in the communications field.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000F hex		FF hex	10 hex	8000F hex		0004 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	…	Byte-20
Byte count	Lock operation		Area to lock/unlock		Password		
08 hex	2 bytes		2 bytes		4 bytes		

Parameter	Description
Lock operation	Specify locking or unlocking. 0000 hex: Unlock 0001 hex: Lock • If you specify locking the EPC, TID, or user area, you will no longer be able to write data to that area. • If you specify locking the access password, you will no longer be able to read the access password area. • When you unlock an area, specify all of the areas that have been locked.
Area to lock/unlock	Specify one or more of the EPC, TID, and user areas. EPC area: 0001 hex TID area: 0002 hex User area: 0004 hex Access password: 0008 hex • If all zeros is specified, a command parameter error will occur.
Password	Specify the access password to set in the Tag in 8-digit hexadecimal (32 bits) (00000000 hex). Locking: The access password to set in the RF Tag to lock. Unlocking: The access password in the RF Tag to unlock.

Note 1. When an area is locked, the specified password is written to the access password area in the RF Tag.

2. If an address error, lock error, or RF Tag system error occurs when locking an area, the access password area in the RF Tag will be cleared to all zeros.

3. When an RF Tag is unlocked, the access password area in the RF Tag will be cleared to all zeros.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	2 bytes		2 bytes	

Parameter	Description
Register address	The register address from the command is set
Word count	The word count from the command is set.

Note If the reception level is required, use *GET RF TAG ADDITIONAL INFORMATION* on page 7-121.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Example 1: Locking the User Area of the RF Tag with a Password of 12345678 Hex

TX: 00000000000FFF1080000004080001000412345678

RX: 000000000006FF1080000004

Example 2: Unlocking the User Area

TX: 00000000000FFF10800000040800000000412345678

RX: 000000000006FF1080000004

DATA FILL

● Function

This command writes the specified data to the specified number of words beginning from the specified write start address. The specifications are made in the command.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000D hex		FF hex	10 hex	8100 hex		0003 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18
Byte count	Fill information					
	Fill address		Number of fill words		Fill data	
06 hex	2 bytes		2 bytes		2 bytes	

Parameter		Description
Register address		The register address (8100 hex) that specifies filling data
Word count		Number of words of fill information (0003 hex)
Byte count		Number of bytes of fill information (06 hex)
Fill information	Fill address	Specify in 4-digit hexadecimal the start address for writing data in the RF Tag. 0000 to 07FF hex: Reserved area 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area
	Number of fill words	Specify in 4-digit hexadecimal the number of words of data to fill. Setting range: 0000 hex or 0001 to 0800 hex • If 0000 hex is specified for the number of fill words, the entire memory area will be filled. • You cannot write data to more than one area with the same command.
	Fill data	Specify in 4-digit hexadecimal the data to write to the RF Tag.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	2 bytes		0003 hex	

Parameter	Description
Register address	The register address from the command is set
Word count	The word count from the command is set.

Note If the reception level is required, use *GET RF TAG ADDITIONAL INFORMATION* on page 7-121.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Example 1: Writing 5A5A Hex to Four Words Starting from Word Address 0100 Hex (User Area) in the RF Tag

TX: 00000000000DFF1081000003063100000045A5A

RX: 000000000006FF1081000003

Example 2: Writing 5A5A Hex to the Entire User Area in the RF Tag

TX: 00000000000DFF1081000003063000000005A5A

RX: 000000000006FF1081000003

7-6-2 Multiaccess Communications Commands

SET MULTIACCESS ID READ

● Function

This command specifies reading the IDs (i.e., the ECP codes) of the RF Tags in the communications field.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	9000F hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Options	
02 hex	2 bytes	

Parameter	Description
Register address	The register address (9000 hex) that specifies setting multiaccess ID reading
Word count	The number of words for the option (0001 hex)
Byte count	The number of option bytes (02 hex)
Options	For details, refer to *7-3 RF Communications Command Options* on page 7-9. Options are implemented in a normal response to the *GET MULTIACCESS ID READ RESULTS* on page 7-33.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Word count	
X	X	0000 hex		0004 hex		FF hex	10 hex	0001 hex	

Parameter	Description
Word count	Always 0001 hex.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Specifying Multiaccess Reading of the IDs by the Reader/Writer with No Options

Example 1: Execution when an RF Tag Is in the Communications Field

TX: 000000000009FF1090000001020000

RX: 000000000004FF100001

Example 2: Execution When an RF Tag Is Not in the Communications Field (Exception Code: 04 Hex (Failure in Device))

TX: 000000000009FF1090000001020000

RX: 000000000003FF9004

GET MULTIACCESS ID READ RESULTS

● Function

This command reads data from the RF Tag in the communications field.

You can specify reading up to 2,048 words with one GET MULTIACCESS ID READ RESULTS command.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	9100F hex		2 bytes	

Parameter	Description
Register address	The register address (9100 hex) that specifies getting the results of multiaccess ID reading
Word count	0022 hex + Option size • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Number of RF Tags	
X	X	0000 hex		2 bytes		FF hex	03 hex	1 byte	2 bytes	

Byte-11	Byte-12	Byte-13	Byte-14	Byte-15	...	Byte-76	Byte-77	Byte-78
Error code		StoredPC		EPC code			Options	
							Reception level	
2 bytes		2 bytes		62 bytes			2 bytes	

Parameter		Description
Field length		Gives the total number of bytes starting from the unit identifier in 4-digit hexadecimal. 0047 hex + Option size • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.
Byte count		Gives the total number of bytes starting from the number of RF Tags in 2-digit hexadecimal. 44 hex + Option size • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.
Number of RF Tags		Gives the number of RF Tags that were read in 4-digit decimal. (0001 to 001F hex) The number of RF Tags is decremented when a command response is returned.
Error code		Gives the RF Tag access results in 4-digit hexadecimal. 0000 hex: Normal end Not 0000 hex: Error code • For details on the error codes, refer to *?9-2-1 ??????* (P.9-3)?.
StoredPC		Gives the StoredPC data in 4-digit hexadecimal. The upper 5 bits are the EPC word length.
EPC code		Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.
Options		This section may be omitted depending on the option value for the SET MULTIACCESS ID READ command.
	Reception level	The reception level is attached in signed 4-digit hexadecimal. FFFF to FF9D hex (–1 to -99 [dBm])

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Specifying Getting the Results of Multiaccess Reading of the IDs by the Reader/Writer with No Options

There are three RF Tags in the communications field.

① Getting the First Results (Getting the Communications Results for RF Tag A)

TX: 000000000006FF0391000022

RX: 000000000047FF03440003000003000AAAA…AAAA0000…0000

*Number of RF Tags: 3, RF Tag A error code + StoredPC + EPC code (The six words of the EPC length are all AAAA hex.)

② Getting the Second Results (Getting the Communications Results for RF Tag B)

TX: 000000000006FF0391000022

RX:000000000047FF0344000200003000BBBB…BBBB0000…0000

*Number of RF Tags: 2, RF Tag A error code + StoredPC + EPC code (The six words of the EPC length are all BBBB hex.)

③ Getting the Third Results (Getting the Communications Results for RF Tag C)

TX: 000000000006FF0391000022

RX: 000000000047FF0344000120020000…0000

*Number of RF Tags: 1, RF Tag C error code (2002 hex: Communications error)

④ Getting the Fourth Results (No Communications Results)

TX: 000000000006FF0391000022

RX: 000000000047FF034400000000…0000

*Number of RF Tags: 0, Remaining data: All 00 hex

SET MULTIACCESS DATA READ

● Function

This command specifies reading data from the RF Tags in the communications field.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000D hex		FF hex	10 hex	9200F hex		0003 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18
Byte count	Read area start address		Read size		Options	
06 hex	2 bytes		2 bytes		2 bytes	

Parameter	Description
Register address	The register address (9200 hex) that specifies setting multiaccess data reading
Read area start address	Specify in 4-digit hexadecimal the start address for reading data. Setting ranges (word address specifications) 0000 to 07FF hex: Reserved area 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area
Read size	Specify in 4-digit hexadecimal the number of words of data to read. Setting range: 0001 to 0020 hex (1 to 32)
Options	For details, refer to *7-3 RF Communications Command Options* on page 7-9.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Word count	
X	X	0000 hex		0004 hex		FF hex	10 hex	0003 hex	

Parameter	Description
Word count	Always 0003 hex.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

Execution Examples

Specifying to the Reader/Writer a Multiaccess Data Read of Four Words Starting from Word Address 0123 Hex (User Area) with No Options

Example 1: Execution when an RF Tag Is in the Communications Field

TX: 00000000000DFF109200000306312300040000

RX: 000000000004FF100003

Example 2: Execution When an RF Tag Is Not in the Communications Field (Exception Code: 04 Hex (Failure in Device))

TX: 00000000000DFF109200000306312300040000

RX: 000000000003FF9004

GET MULTIACCESS DATA READ RESULTS

Function

This command specifies getting the results of reading data from the RF Tags in the communications field.

To enable identifying the RF Tags that were read, the StoredPC and EPC code are attached to the read data.

The number of results data from RF Tag communications stored in the Reader/Writer is decremented when a command response is returned.

Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	9300 hex		2 bytes	

Parameter	Description
Register address	The register address (9300 hex) that specifies getting the results of multiaccess data reading
Word count	Specify the total number of words starting from the number of RF Tags in the response in 4-digit hexadecimal. 0003 to 0022 hex + Option size • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.

Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Number of RF Tags	
X	X	0000 hex		2 bytes		FF hex	03 hex	1 byte	2 bytes	

Byte-12	...	...	...	...	...	...	Byte-12+ n-1
Error code		Read data			Options		
2 bytes		2 to 64 bytes			0 to 66 bytes		
					StoredPC	EPC code	Reception level
					2 bytes	62 bytes	2 bytes

n: 6 to 132

Parameter	Description
Field length	Gives the total number of bytes starting from the unit identifier in 4-digit hexadecimal. 0009 to 0047 hex + Option size • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.

Parameter		Description
Byte count		Gives the total number of bytes starting from the number of RF Tags in 2-digit hexadecimal. 06 to 44 hex + Option size • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.
Number of RF Tags		Gives the number of RF Tags that were read in 4-digit decimal. (0001 to 001F hex) The number of RF Tags is decremented when a command response is returned.
Error code		Gives the RF Tag access results in 4-digit hexadecimal. 0000 hex: Normal end Not 0000 hex: Error code • For details on the error codes, refer to *?9-2-1 ??????* (P.9-3)?.
Read data		The data that was read from the RF Tag is attached.
Options		This section may be omitted depending on the option value for the SET MULTI-ACCESS ID READ command.
	StoredPC	Gives the StoredPC data in 4-digit hexadecimal. The upper 5 bits are the EPC word length.
	EPC code	Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.
	Reception level	The reception level is attached in signed 4-digit hexadecimal. FFFF to FF9D hex (-1 to -99 [dBm])

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Specifying Getting the Results of Multiaccess Reading of Four-word Data by the Reader/Writer with No Options

There are three RF Tags in the communications field.

① Getting the First Results (Getting the Communications Results for RF Tag A)

TX: 000000000006FF0393000006

RX: 00000000000FFF030C00030000AAAA…AAAA

*Number of RF Tags: 3, RF Tag A error code + Read data (All four words are AAAA hex.)

② Getting the Second Results (Getting the Communications Results for RF Tag B)

TX: 000000000006FF0393000006

RX: 00000000000FFF030C00020000AAAA…AAAA

*Number of RF Tags: 2, RF Tag B error code + Read data (All four words are BBBB hex.)

③ Getting the Third Results (Getting the Communications Results for RF Tag C)

TX: 000000000006FF0393000006

RX: 00000000000FFF030C000120020000…0000

*Number of RF Tags: 1, RF Tag C error code (2002 hex: Communications error)

④ Getting the Fourth Results (No Communications Results)

TX: 000000000006FF0393000006

RX: 00000000000FFF030C000000000000…0000

*Number of RF Tags: 0, Remaining data: All 00 hex

7-6-3 Modbus Expansion Communications Commands

EXTENDED DATA READ

● Function

This command reads data from the RF Tag in the communications field.

You can specify reading up to 2,048 words with one EXTENDED DATA READ command.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Read area start address	
X	X	0000 hex		000A hex		FF hex	64 hex	0001 hex		2 bytes	

Byte-12	Byte-13	Byte-14	Byte-15
Read size		Options	
2 bytes		2 bytes	

Parameter	Description
Subfunction code	0001 hex: EXTENDED DATA READ
Read area start address	Specify in 4-digit hexadecimal the start address for reading data. Setting ranges (word address specifications) 0000 to 07FF hex: Reserved area 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area
Read size	Specify in 4-digit hexadecimal the start address for reading data. Setting range: 0001 to 0800 hex (2,048 words max.)
Options	For details, refer to *7-3 RF Communications Command Options* on page 7-9.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Error code	
X	X	0000 hex		2 bytes		FF hex	64 hex	0001 hex		0000 hex	

Byte-12	...	...	...	...	...	...	...	...	...	Byte-n
Read data			Options							
1 to 2,048 words (2 to 4,096 bytes)			0 to 68 bytes							

StoredPC	EPC code	Reception level	Diagnostic results
2 bytes	62 bytes	2 bytes	2 bytes

Note The contents depend on the options specified in the command.

Parameter		Description
Field length		0008 to 1006 hex + Option size • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.
Read data		The data that was read from the RF Tag is attached. (Range: 0001 to 0800 hex, in words)
Options		These parameters may be omitted depending on the option value.
	StoredPC	Gives the StoredPC data in 4-digit hexadecimal. The upper 5 bits are the EPC word length.
	EPC code	Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.
	Reception level	The reception level is attached in signed 4-digit hexadecimal. FFFF to FF9D hex (-1 to -99 [dBm])
	Diagnostic results	Gives the diagnostic results in 4-digit hexadecimal. For details, refer to *Response Formats* on page 7-125 under NTLPxREF Communications Diagnostic Information.

• Error Response: RF Tag Communications Error

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Error code	
X	X	0000 hex		0006 hex		FF hex	64 hex	0001 hex		2 bytes	

Parameter	Description
Error code	For details, refer to *?9-2-1 ??????* (P.9-3)?.

• Error Response: Command Error

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	E5 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Reading 2,048 Words of Data Starting from Word Address 0000 Hex (User Area) in the RF Tag with No Options

Example 1: Execution When an RF Tag Is Not in the Communications Field (Read Data: 1111222233334444…FFFF Hex)

TX: 00000000000AFF640001300008000000

RX: 000000000806FF6400010000111122233334444…FFFF

Example 2: Execution When an RF Tag Is Not in the Communications Field (Error Code: 2001 Hex (RF Tag Missing Error))

TX: 00000000000AFF640001300008000000

RX: 000000000006FF6400012001

EXTENDED DATA WRITE

● Function

This command writes data to the RF Tag in the communications field.

You can specify writing up to 2,048 words with one EXTENDED DATA WRITE command.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Write area start address	
X	X	0000 hex		000C to 100A hex		FF hex	64 hex	0002 hex		2 bytes	

Byte-12	Byte-13	Byte-14	...	Byte-n + n
Write size		Data to write		Options
2 bytes		1 to 2,048 words (2 to 4,096 bytes)		2 bytes

Parameter	Description
Field length	Setting range: 000C to 100A hex
Subfunction code	0002 hex: EXTENDED DATA WRITE
Write area start address	Specify in 4-digit hexadecimal the start address for writing data in the RF Tag. Setting ranges (word address specifications) 0000 to 07FF hex: Reserved area 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area
Write size	Specify in 4-digit hexadecimal the number of words of data to write. Setting range: 0001 to 0800 hex (2,048 words max.)
Data to write	The data to write
Options	For details, refer to *7-3 RF Communications Command Options* on page 7-9.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Error code	
X	X	0000 hex		2 bytes		FF hex	64 hex	0002 hex		0000 hex	

Byte-12	...	...	...	...	...	...	Byte-n
Options							
0 to 68 bytes							

StoredPC	EPC code	Reception level	Diagnostic results
2 bytes	62 bytes	2 bytes	2 bytes

Parameter		Description
Field length		Normal completion: 0006 hex + Option size • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.
Error code		For details, refer to *?9-2-1 ??????* (P.9-3)?.
Options		These parameters may be omitted depending on the option value.
	StoredPC	Gives the StoredPC data in 4-digit hexadecimal. The upper 5 bits are the EPC word length.
	EPC code	Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.
	Reception level	The reception level is attached in signed 4-digit hexadecimal. FFFF to FF9D hex (-1 to -99 [dBm])
	Diagnostic results	Gives the diagnostic results in 4-digit hexadecimal. For details, refer to *Response Formats* on page 7-125 under NTLPxREF Communications Diagnostic Information.

• Error Response: RF Tag Communications Error

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Error code	
X	X	0000 hex		0006 hex		FF hex	64 hex	0002 hex		2 bytes	

Parameter	Description
Error code	For details, refer to N*?9-2-1 ??????* (P.9-3)?.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	E4 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Writing 2,048 Words of Data Starting from Word Address 0000 Hex (User Area) in the RF Tag with No Options

Example 1: Execution When an RF Tag Is Not in the Communications Field (Error Code: 0000 (Normal Completion))

TX: 00000000100AFF64000230001111222233334444…FFFF0000

RX: 000000000006FF6600010000

Example 2: Execution When an RF Tag Is Not in the Communications Field (Error Code: 2001 Hex (RF Tag Missing Error))

TX: 00000000100AFF64000230001111222233334444…FFFF0000

RX: 000000000006FF640002200

EXTENDED MULTIACCESS ID READ

● Function

This command reads the IDs (EPC codes) of multiple RF Tags in the communications field.

You can get the IDs (EPC codes) of more than one RF Tag with one EXTENDED MULTIACCESS ID READ command.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Options	
X	X	0000 hex		0006 hex		FF hex	64 hex	0003 hex		2 bytes	

Parameter	Description
Subfunction code	0003 hex: EXTENDED MULTIACCESS ID READ
Options	For details, refer to *7-3 RF Communications Command Options* on page 7-9.

● Response Formats

- Normal Response or Error Response: RF Tag Communications Error

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Number of RF Tags (m)	
X	X	0000 hex		2 bytes		FF hex	64 hex	0003 hex		0000 to 0040 hex	

Byte-12	...	Byte-12 + n - 1	...	Byte-12+n *(m-1)	...	Byte-12+(n*m)-1
Information from RF Tag 1			...	Information from RF Tag m		
n = 66 to 68 bytes			...	n = 66 to 68 bytes		

Information from RF Tag x			
Error code	StoredPC	EPC code	Options
			Reception level
2 bytes	2 bytes	62 bytes	2 bytes

Parameter			Description
Field length			0048 to 0F86 hex + (Option size × m) • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.
Number of RF Tags			Gives the number of RF Tags that were detected in 4-digit decimal. 0000 to 0040 hex (0 to 64)
Information from RF Tag 1	Error code		For details, refer to *?9-2-1 ??????* (P.9-3)?.
	StoredPC		Gives the StoredPC data in 4-digit hexadecimal. The upper 5 bits are the EPC word length.
	EPC code		Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.
	Options		These parameters may be omitted depending on the option value.
		Reception level	The reception level is attached in signed 4-digit hexadecimal. FFFF to FF9D hex (-1 to -99 [dBm])

• Error Response: Command Error

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	E4 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution for Reading ID Data from Multiple RF Tags with no Option Specification

Example 1: Execution When Four RF Tags Are in the Communications Field

TX: 000000000006FF6400030000

RX: 000000000116FF6400030004

00003000AAAA…AAAA0000…0000: RF Tag A error code + StoredPC + EPC code (The six words of the EPC length are all AAAA hex.)

00003000BBBB…BBBB0000…0000: RF Tag B error code + StoredPC + EPC code (The six words of the EPC length are all BBBB hex.)

00003000CCCC…CCCC0000…0000: RF Tag C error code + StoredPC + EPC code (The six words of the EPC length are all CCCC hex.)

200200000000000000000…0000: RF Tag D error code (2002 hex (communications error))

Example 2: Execution When an RF Tag Is Not in the Communications Field (Exception Code: 04 Hex (Failure in Device))

TX: 000000000006FF6400030000

RX: 000000000003FFE404

EXTENDED MULTIACCESS DATA READ

● Function

This command reads data from multiple RF Tags in the communications field.

You can get data from more than one RF Tag with one EXTENDED MULTIACCESS DATA READ command.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Read area start address	
X	X	0000 hex		000A hex		FF hex	64 hex	0004 hex		2 bytes	

Byte-12	Byte-13	Byte-14	Byte-15
Read size		Options	
2 bytes		2 bytes	

Parameter	Description
Subfunction code	0004 hex: EXTENDED MULTIACCESS DATA READ
Read area start address	Specify in 4-digit hexadecimal the start address for reading data. Setting ranges (word address specifications) 0000 to 07FF hex: Reserved area 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area
Read size	Specify in 4-digit hexadecimal the start address for reading data. Setting range: 0001 to 0020 hex (1 to 32)
Options	For details, refer to *7-3 RF Communications Command Options* on page 7-9.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Subfunction code		Number of RF Tags (m)	
X	X	0000 hex		2 bytes		FF hex	64 hex	0004 hex		0000 to 0040 hex	

Byte-12	...	Byte-12 + n - 1	...	Byte-12+n* (m-1)	...	Byte-12+ (n*m)-1
Information from RF Tag 1			...	Information from RF Tag m		
n = 4 to 132 bytes			...	n = 4 to 132 bytes		

Information from RF Tag x		
Error code	Read data	Options
2 bytes	2 to 64 bytes	0 to 66 bytes

StoredPC	EPC code	Reception level
2 bytes	62 bytes	2 bytes

Parameter			Description
Field length			000A to 2106 hex + (Option size × m) • For details on option sizes, refer to *7-3 RF Communications Command Options* on page 7-9.
Number of RF Tags			Gives the number of RF Tags that were detected in 4-digit decimal. 0000 to 0040 hex (0 to 64)
Information from RF Tag 1	Error code		For details, refer to *?9-2-1 ??????* (P.9-3)?.
	Read data		The data that was read from the RF Tag is attached. The bytes that exceed the word count will be filled with 00 hex.
	Options		This section may be omitted depending on the option value for the SET MULTIACCESS ID READ command.
		Stored PC	Gives the StoredPC data in 4-digit hexadecimal. The upper 5 bits are the EPC word length.
		EPC code	Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.
		Reception level	The reception level is attached in signed 4-digit hexadecimal. FFFF to FF9D hex (-1 to -99 [dBm])

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	E4 hex	1 byte

Note If the exception code is 04 hex (failure in slave device), this format is not used and a response is returned.

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Reading 4 Words of Data Starting from Word Address 0123 Hex (User Area) in Multiple RF Tags with No Options

Example 1: Execution When Four RF Tags Are in the Communications Field

TX: 00000000000AFF640004312300040000

RX: 00000000002EFF6400040004

0000AAAAAAAAAAAAAAAA: RF Tag A error code + Read data (4 words, all AAAA hex)

0000BBBBBBBBBBBBBBBB: RF Tag B error code + Read data (4 words, all BBBB hex)

0000CCCCCCCCCCCCCCCC: RF Tag C error code + Read data (4 words, all CCCC hex)

200200000000000000000: RF Tag D error code (2002 hex (communications error))

Example 2: Execution When an RF Tag Is Not in the Communications Field (Exception Code: 04 Hex (Failure in Device))

TX: 00000000000AFF640004312300040000

RX: 000000000003FFE404

7-6-4 Reader/Writer Control Commands

INITIALIZE

● Function

This command initializes the Reader/Writer settings. (That is, it returns them to the default settings.)

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	A000 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Options	
02 hex	0000 hex	

Parameter	Description
Register address	The register address (A000 hex) that specifies initializing settings
Word count	The number of words for the option (0001 hex)
Byte count	The number of option bytes (02 hex)
Options	0000 hex: No options

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	A000 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Initialize the Reader/Writer Settings

TX: 000000000009FF10A0000001020000

RX: 000000000006FF10A0000001

RESET

● Function

This command restarts the entire Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	A100 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Options	
02 hex	2 bytes	

Parameter	Description
Register address	The register address (A100 hex) that specifies resetting the Reader/Writer.
Word count	The number of words for the option (0001 hex)
Byte count	The number of option bytes (02 hex)
Options	0001 hex: Repeat FFFF hex: Forced reset

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	A100 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

Note A response is not returned for forced resetting.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution to Restart the Entire Reader/Writer

TX: 000000000009FF10A1000001020000

RX: 000000000006FF10A1000001

STOP

● Function

This command stops RF Tag communications command execution by the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	A200 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Options	
02 hex	0000 hex	

Parameter	Description
Register address	The register address (A200 hex) that specifies stopping execution
Word count	The number of words for the option (0001 hex)
Byte count	The number of option bytes (02 hex)
Options	0000 hex: No options

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	A200 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

Note A response is not returned for forced resetting.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution to Stop RF Tag Communications Command Execution by the Reader/Writer

TX: 000000000009FF10A2000001020000

RX: 000000000006FF10A2000001

RESET FOCUS

● Function

This command initializes the target level information of all the RF Tags that are being monitored by the Reader/Writer in Focus Mode.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	A300 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Options	
02 hex	0000 hex	

Parameter	Description
Register address	The register address (A300 hex) that specifies resetting the focus
Word count	The number of words for the option (0001 hex)
Byte count	The number of option bytes (02 hex)
Options	0000 hex: No options

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	A300 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution to Initialize Target Levels of All RF Tags Monitored by Reader/Writer in Focus Mode

TX: 000000000009FF10A3000001020000

RX: 000000000009FF10A3000001020000

7-6-5 Reader/Writer Setting Commands: Network Settings

SET TCP/IP COMMUNICATIONS CONDITIONS

● Function

This command sets the TCP/IP communications conditions of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0015 hex		FF hex	10 hex	B000 hex		0007 hex	

Byte-12	Byte-13	Byte-14	Byte-15	...	Byte-18	Byte-19	...	Byte-22	Byte-23	...	Byte-26
Byte count	TCP/IP communications conditions										
0E hex	IP address setting method	IP address				Subnet mask			Gateway address		
	2 bytes	4 bytes				4 bytes			4 bytes		

Parameter		Description	Default setting
Register address		The register address (B000 hex) that specifies the TCP/IP communications conditions.	
Word count		The number of words in the TCP/IP communications conditions (0007 hex)	
Byte count		The number of bytes in the TCP/IP communications conditions (0E hex)	
TCP/IP communications conditions	IP address setting method	Specify in 4-digit hexadecimal the IP address setting method. 0000 hex: Fixed setting 00001 hex: Obtain from BOOTP server 0002 hex: Get from BOOTP server as fixed settings	0000 hex
	IP address*1	Specify in 8-digit hexadecimal the fixed IP addresses to set. Setting range: 00000000 to DFFFFFFF hex Example: C0A801C8 hex (192.168.1.200)	C0A801C8 hex
	Subnet mask*1	Specify in 8-digit hexadecimal the subnet mask to set. Setting range: FF000000 to FFFFFFFF hex Example: FFFFFF00 hex (255.255.255.0)	FFFFFF00 hex
	Gateway address*1	Specify in 8-digit hexadecimal the gateway address to set. Setting range: 00000000 to DFFFFFFF hex Example: C0A801FE hex (192.168.1.254)	C0A801FE hex

*1. Specify 00000000 hex for any IP address setting method other than using a fixed IP address.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B000 hex		0007 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution to Set the Following TCP/IP Communications Conditions in the Reader/Writer

IP address setting method: Fixed, IP address: 192.168.1.200, Subnet mask: 255.255.255.0, Gateway address: 192.168.1.1

TX: 000000000015FF10B00000070E0000C0A801C8FFFFFF00C0A80101

RX: 000000000006FF10B0000007

GET TCP/IP COMMUNICATIONS CONDITIONS

● Function

This command is used to check the TCP/IP communications conditions that are set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B000 hex		0007 hex	

Parameter	Description
Register address	The register address (B000 hex) that specifies the TCP/IP communications conditions.
Word count	The number of words of the TCP/IP communications conditions to read (0007 hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0011 hex		FF hex	03 hex	0E hex

Byte-9	Byte-10	Byte-11	...	Byte-14	Byte-15	...	Byte-18	Byte-19	...	Byte-22
TCP/IP communications conditions										
IP address setting method		IP address			Subnet mask			Gateway address		
2 bytes		4 bytes			4 bytes			4 bytes		

Parameter		Description	Default setting
Byte count		The number of bytes in the TCP/IP communications conditions that were read (0E hex)	
TCP/IP communications conditions	IP address setting method	Gives the IP address setting method that was read in 4-digit hexadecimal. 0000 hex: Fixed setting 00001 hex: Obtain from BOOTP server 0002 hex: Get from BOOTP server as fixed settings	0000 hex
	IP address*1	Gives the IP address that was read in 8-digit hexadecimal. Example: C0A801C8 hex (192.168.1.200)	C0A801C8 hex
	Subnet mask*1	Gives the subnet mask that was read in 8-digit hexadecimal. Example: FFFFFF00 hex (255.255.255.0)	FFFFFF00 hex
	Gateway address*1	Gives the gateway address that was read in 8-digits hexadecimal. Example: C0A801FE hex (192.168.1.254)	C0A801FE hex

*1. For any IP address setting method except for using a fixed address, 00000000 hex is returned.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When the Following TCP/IP Communications Conditions Are Set in the Reader/Writer

IP address setting method: Fixed, IP address: 192.168.1.200, Subnet mask: 255.255.255.0, Gateway address: 192.168.1.1

TX: 000000000006FF03B0000007

RX: 000000000011FF030E0000C0A801C8FFFFFF00C0A80101

SET DEVICE NAME

● Function

This command is used to set or clear a name for the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0047 hex		FF hex	10 hex	B100 hex		0020 hex	

Byte-12	Byte-13	...	Byte-76
Byte count	Device name		
40 hex	64 bytes		

Parameter	Description
Register address	The register address (B100 hex) that specifies the device name
Word count	The number of words in the device name (0020 hex)
Byte count	The number of bytes in the device name (40 hex)
Device name	ASCII characters, 64 bytes max. (63 ASCII characters max. + End code of 00 hex) If there are fewer than 63 characters, the remaining bytes are filled with 00 hex. The device name is given with ASCII characters 20 hex (space) to 7E hex (~). Specify 00 hex for all bytes to clear the device name.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B100 hex		0020 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Set the Reader/Writer Device Name to V780-A001

TX: 000000000047FF10B10000204056363830532D413030310000000000…00

RX: 000000000006FF10B1000020

GET DEVICE NAME

● Function

This command is used to check the name that is set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B100 hex		0020 hex	

Parameter	Description
Register address	The register address (B100 hex) that specifies the device name
Word count	The number of words in the device name (0020 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	...	Byte-72
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Device name		
X	X	0000 hex		0043 hex		FF hex	03 hex	40 hex	64 bytes		

Parameter	Description
Byte count	The number of words in the device name that was read (40 hex)
Device name	The device name that was read is given with up to 64 bytes of ASCII characters (up to 63 ASCII characters plus the end code (00 hex)) If there are fewer than 63 characters, the remaining bytes are filled with 00 hex. The device name is given with ASCII characters 20 hex (space) to 7E hex (~).

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When the Reader/Writer Device Name Is Set to V780-A001

TX: 000000000006FF03B1000020

RX: 000000000043FF034056363830532D413030310000000000…00

SET MODBUS/TCP COMMUNICATIONS CONDITIONS

● Function

This command sets the Modbus/TCP communications conditions of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	B200 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Modbus/TC communications conditions	
	Port number	
02 hex	2 bytes	

Parameter		Description	Default setting
Register address		The register address (B200 hex) that specifies the Modbus/TCP communications conditions	
Word count		The number of words in the Modbus/TCP communications conditions (0001 hex)	
Byte count		The number of bytes in the Modbus/TCP communications conditions (02 hex)	
Modbus/TC communications conditions	Port number	Specify the Modbus/TCP communications port number in 4-digit hexadecimal. Setting range: 01F6 hex or 0400 to FFFF hex Example: 01F6 hex (502) • IANA manages ports 000 to 03FF hex.	01F6 hex (502)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B200 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Set the Following Modbus/TCP Communications Conditions in the Reader/Writer

Port number: 502

TX: 000000000009FF10B20000010201F6

RX: 000000000006FF10B2000001

GET MODBUS/TCP COMMUNICATIONS CONDITIONS

● Function

This command is used to check the Modbus/TCP communications conditions of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B200 hex		0001 hex	

Parameter	Description	Default setting
Register address	The register address (B200 hex) that specifies the Modbus/TCP communications conditions	
Word count	The number of words of the Modbus/TCP communications conditions to read (0001 hex)	

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Modbus/TC communications conditions	
									Port number	
X	X	0000 hex		0005 hex		FF hex	03 hex	02 hex	2 bytes	

Parameter		Description
Byte count		The number of bytes in the Modbus/TCP communications conditions that were read (02 hex)
Modbus/TC communications conditions	Port number	Gives the Modbus/TCP communications port number in 4-digit hexadecimal. Example: 01F6 hex (502)

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When the Following Modbus/TCP Communications Conditions Are Set in the Reader/Writer

Port number: 502

TX: 000000000006FF03B2000001

RX: 000000000005FF030201F6

SET WEB COMMUNICATIONS CONDITIONS

● Function

This command sets the Web browser communications conditions of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	B300 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Web communications conditions	
	Port number	
02 hex	2 bytes	

Parameter		Description	Default setting
Register address		The register address (B300 hex) that specifies the Web communications conditions	
Word count		The number of words in the Web communications conditions (0001 hex)	
Byte count		The number of bytes in the Web communications conditions (02 hex)	
Web communications conditions	Port number	Specify the Web communications port number in 4-digit hexadecimal. Setting range: 0400 to FFFF hex Example: 1BB2 hex (7090) • IANA manages ports 000 to 03FF hex.	1BB2 hex (7090)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B300 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution to Set the Following Web Communications Conditions in the Reader/Writer

Port number: 7090

TX: 000000000009FF10B3000001021BB2

RX: 000000000006FF10B3000001

GET WEB COMMUNICATIONS CONDITIONS

● Function

This command is used to check the Web browser communications conditions of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B300 hex		0001 hex	

Parameter	Description
Register address	The register address (B300 hex) that specifies the Web communications conditions
Word count	The number of words of the Web communications conditions to read (0001 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Web communications conditions	
									Port number	
X	X	0000 hex		0005 hex		FF hex	03 hex	02 hex	2 bytes	

Parameter		Description
Byte count		The number of bytes in the Web communications conditions that were read (02 hex)
Web communications conditions	Port number	Gives the Web communications port number that was read in 4-digit hexadecimal. Example: 1BB2 hex (7090)

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When the Following Web Communications Conditions Are Set in the Reader/Writer

Port number: 7090

TX: 000000000006FF03B3000001

RX: 000000000005FF03021BB2

SET WEB PASSWORD

● Function

This command sets or clears the Reader/Writer login password for the Web browser interface.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0017 hex		FF hex	10 hex	B400 hex		0008 hex	

Byte-12	Byte-13	...	Byte-28
Byte count	Web password		
10 hex	16 bytes		

Parameter	Description
Register address	The register address (B400 hex) that specifies the Web password
Word count	The number of words in the Web password (0008 hex)
Byte count	The number of bytes in the Web password (10 hex)
Web password	Specify the Web password with up to 16 bytes of ASCII characters (up to 15 ASCII characters plus the end code (00 hex)). If there are fewer than 15 characters, fill the remaining bytes with 00 hex. You can specify ASCII characters 20 hex (space) to 7E hex (~). To clear the password, specify 00 hex for all of the write data.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B400 hex		0008 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Setting the Reader/Writer Web Password to “password”

TX: 000000000017FF10B40000081070617373776F72640000000000000000000

RX: 000000000006FF10B4000008

GET WEB PASSWORD

● Function

This command is used to check the login password that is set in the Reader/Writer for the Web browser interface.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B400 hex		0008 hex	

Parameter	Description
Register address	The register address (B400 hex) that specifies the Web password
Word count	The number of words in the Web password (0008 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	...	Byte-24
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Web password		
X	X	0000 hex		0013 hex		FF hex	03 hex	10 hex	16 bytes		

Parameter	Description
Byte count	The number of bytes in the Web password that was read (10 hex)
Web password	Gives the Web password that was read with up to 16 bytes of ASCII characters (up to 15 ASCII characters plus the end code (00 hex)). If there are fewer than 15 characters, the remaining bytes are filled with 00 hex. The Web password is given with ASCII characters 20 hex (space) to 7E hex (~).

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When the Reader/Writer Web Password Is Set to “password”

TX: 000000000006FF03B4000008

RX: 000000000013FF031070617373776F72640000000000000000

7-6-6 Reader/Writer Setting Commands: Communications Settings

SET TAG COMMUNICATIONS CONDITIONS

● Function

This command sets the communications conditions for the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0011 hex		FF hex	10 hex	C000 hex		0005 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18	Byte-19	Byte-20	Byte-21	Byte-22
Byte count	Communications conditions									
0A hex	RF communications mode		RF communications speed		RF communications timeout time		Write verification		Reserved	
	2 bytes		2 bytes		2 bytes		2 bytes		0000 hex	

Parameter		Description	Default setting
Register address		The register address (C000 hex) that specifies the RF communications conditions	
Word count		The number of words in the RF communications conditions (0005 hex)	
Byte count		The number of bytes in the RF communications conditions (0A hex)	
Communications conditions	RF communications mode	Specify the communications mode in 4-digit hexadecimal. 0000 hex: Once 0001 hex: Auto 0002 hex: Focus	0000 hex
	RF communications speed	Specify the communications speed in 4-digit hexadecimal. 0000 hex: Automatic (default) 0001 hex: High speed 0002 hex: Normal speed	0000 hex
	RF communications timeout time	Specify the RF communications timeout time. 0001 to EA60 hex (1 to 60,000 [ms])	00FA hex (250)
	Write verification	Specify in 4-digit hexadecimal whether to perform write verification. 0000 hex: Disable, 0001 hex: Enable	0001 hex

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	C000 hex		0005 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution to Set the Following RF Communications Conditions in the Reader/Writer

RF communications mode: Once, RF communications speed: Auto, RF communications timeout time: 250 ms, Write verification: Enabled

TX: 000000000011FF10C00000050A0000000000FA00010000

RX: 000000000006FF10C0000005

GET TAG COMMUNICATIONS CONDITIONS

● Function

This command is used to check the RF communications conditions that are set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C000 hex		0005 hex	

Parameter	Description
Register address	The register address (C000 hex) that specifies the RF communications conditions
Word count	The number of words of the RF communications conditions to read (0005 hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		000D hex		FF hex	03 hex	0A hex

Byte-9	Byte-10	Byte-11	Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18
Communications conditions									
RF communications mode		RF communications speed		RF communications timeout time		Write verification		Reserved	
2 bytes		2 bytes		2 bytes		2 bytes		0000 hex	

Parameter		Description	Default setting
Register address		The register address (C000 hex) that specifies the RF communications conditions	
Word count		The number of words in the RF communications conditions (0005 hex)	
Byte count		The number of bytes in the RF communications conditions (0A hex)	
Communications conditions	RF communications mode	Gives the communications mode in 4-digit hexadecimal. 0000 hex: Once 0001 hex: Auto 0002 hex: Focus	0000 hex
	RF communications speed	Gives the communications speed in 4-digit hexadecimal. 0000 hex: Automatic (default) 0001 hex: High speed 0002 hex: Normal speed	0000 hex
	RF communications timeout time	Gives the RF communications timeout time. 0001 to EA60 hex (1 to 60,000 [ms])	00FA hex (250)
	Write verification	Gives whether write verification is being performed in 4-digit hexadecimal. 0000 hex: Disable, 0001 hex: Enable	0001 hex

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When the Following RF Communications Conditions Are Set in the Reader/Writer

RF communications mode: Once, RF communications speed: Auto, RF communications timeout time: 250 ms, Write verification: Enabled

TX: 000000000006FF03C0000005

RX: 00000000000DFF030A0000000000FA00010000

SET TRANSMISSION POWER

● Function

This command sets the transmission powers of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000B hex		FF hex	10 hex	C100 hex		0002 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16
Byte count	Transmission power			
04 hex	Read transmission power		Write transmission power	
	2 bytes		2 bytes	

Parameter		Description	Default setting
Register address		The register address (C100 hex) that specifies setting the transmission powers	
Word count		The number of words in the transmission power settings (0002 hex)	
Byte count		The number of bytes in the transmission power setting (04 hex)	
Transmission power	Read transmission power	Specify the transmission power for read RF communications commands in 4-digit hexadecimal. 000F to 001B hex (15 to 27 dBm)	001B hex (27 [dBm])
	Write transmission power	Specify the transmission power for write RF communications commands in 4-digit hexadecimal. 000F to 001B hex (15 to 27 dBm)	001B hex (27 [dBm])

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	C100 hex		0002 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Set the Following Transmission Powers in the Reader/Writer

Read transmission power: 27 dBm, Write transmission power: 27 dBm

TX: 00000000000BFF10C100000204001B001B

RX: 000000000006FF10C1000002

GET TRANSMISSION POWER

Function

This command is used to check the transmission powers that are set in the Reader/Writer.

Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C100 hex		0002 hex	

Parameter	Description
Register address	The register address (C100 hex) that specifies setting the transmission power
Word count	The number of words of the antenna setting to read (0002 hex)

Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex

Byte-9	Byte-10	Byte-11	Byte-12
Transmission powers			
Read transmission power		Write transmission power	
2 bytes		2 bytes	

Parameter		Description	Default setting
Byte count		The number of bytes in the transmission powers (06 hex)	
Transmission power	Read transmission power	Gives the transmission power for read RF communications commands in 4-digit hexadecimal. 000F to 001B hex (15 to 27 dBm)	001B hex (27 [dBm])
	Write transmission power	Gives the transmission power for write RF communications commands in 4-digit hexadecimal. 000F to 001B hex (15 to 27 dBm)	001B hex (27 [dBm])

Execution Examples

Execution When the Following RF Transmission Powers Are Set in the Reader/Writer

Read transmission power: 27 dBm, Write transmission power: 27dBm

TX: 000000000006FF03C1000002

RX: 000000000007FF0304001B001B

SET CHANNEL

● Function

This command sets the channel in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	C200 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Channel	
02 hex	2 bytes	

Parameter	Description	Default setting
Register address	The register address (C200 hex) that specifies the channel	
Channel	Specify the channel in 4-digit hexadecimal. 0000 hex: Auto 0002 hex: Channel 2 0008 hex: Channel 8 000E hex: Channel 14	0000 hex

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	C200 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Set Channel 2 for the Reader/Writer

TX: 000000000009FF10C2000001020002

RX: 000000000006FF10C2000001

GET CHANNEL

● Function

This command is used to check the channel that is set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C200 hex		1 byte	

Parameter	Description
Register address	The register address (C200 hex) that specifies the channel
Word count	Always 0001 hex.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Channel	
X	X	0000 hex		0005 hex		FF hex	03 hex	02 hex	2 bytes	

Parameter	Description	Default setting
Field length	Always 0005 hex.	
Byte count	Always 02 hex.	
Channel	Gives the channel in 4-digit hexadecimal. 0000 hex: Auto 0002 hex: Channel 2 0008 hex: Channel 8 000E hex: Channel 14	0000 hex

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When Channel 2 Is Set for the Reader/Writer

TX: 000000000006FF03C2000001

RX: 000000000005FF03020002

SET GEN2 SESSION

● Function

This command sets the Gen2 session for the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		009 hex		FF hex	10 hex	C300 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Gen2 Session	
02 hex	2 bytes	

Parameter	Description	Default setting
Register address	The register address (C300 hex) that specifies the Gen2 session setting	
Word count	The number of words in the Gen2 session setting (0001 hex)	
Byte count	The number of bytes in the Gen2 session setting (02 hex)	
Gen2 session	Specify the session to use for RF Tag communications in 4-digit hexadecimal. 0000 hex: S0 flag 0001 hex: S1 flag 0002 hex: S2 flag 0003 hex: S3 flag	0000 hex

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	C300 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Set S2 as the Gen2 Session for the Reader/Writer

TX: 000000000009FF10C3000001020002

RX: 000000000006FF10C3000001

GET GEN2 SESSION

● Function

This command is used to check the Gen2 session that is set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C300 hex		0001 hex	

Parameter	Description
Register address	The register address (C300 hex) that specifies the Gen2 session setting
Word count	The number of words in the Gen2 session setting to read (0001 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Gen2 session	
X	X	0000 hex		0005 hex		FF hex	03 hex	02 hex	2 bytes	

Parameter	Description	Default setting
Byte count	The number of bytes in the Gen2 session setting that was read (02 hex)	
Gen2 session	Gives the session that is being used for RF Tag communications in 4-digit hexadecimal. 0000 hex: S0 flag (default) 0001 hex: S1 flag 0002 hex: S2 flag 0003 hex: S3 flag	0000 hex

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When S2 Is Set as the Gen2 Session for the Reader/Writer

TX: 000000000006FF03C3000001

RX: 000000000005FF03020002

SET ACCESS PASSWORD

● Function

This command sets the access password for RF Tag communications of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000B hex		FF hex	10 hex	C400 hex		0002 hex	

Byte-12	Byte-13	...	Byte-16
Byte count	Access password		
04 hex	4 bytes		

Parameter	Description	Default setting
Register address	The register address (C400 hex) that specifies the access password setting	
Access password	Specify the access password to use for RF Tag communications in 8-digit hexadecimal. The specified access password is stored in EEPROM memory in the Reader/Writer. If the access password in the RF Tag is not all zeros, the access password that is stored in EEPROM memory must be used to execute LOCK, WRITE ID, READ DATA, or WRITE DATA commands.	00000000 hex

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	C400 hex		0002 hex	

Parameter	Description
Word count	Always 0002 hex.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Set the Reader/Writer Access Password to “12345678 hex”

TX: 00000000000BFF10C40000020412345678

RX: 000000000006FF10C4000002

GET ACCESS PASSWORD

● Function

This command reads the access password that is set for RF Tag communications in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C400 hex		0002 hex	

Parameter	Description
Register address	The register address (C400 hex) that specifies reading the access password
Word count	The number of words in the access password to read (0002 hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	...	Byte-12
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Access password		
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex	4 bytes		

Parameter	Description	Default setting
Byte count	The number of bytes in the access password (04 hex)	
Access password	Gives the access password to use for RF Tag communications in 8-digit hexadecimal. The specified access password is stored in EEPROM memory in the Reader/Writer. If the access password in the RF Tag is not all zeros, the access password that is stored in EEPROM memory must be used to execute LOCK, WRITE ID, READ DATA, or WRITE DATA commands.	00000000 hex

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When the Reader/Writer Access Password Is Set to “12345678 hex”

TX: 000000000006FF03C4000002

RX: 000000000007FF030412345678

SET RF TAG SELECTION FILTER CONDITIONS

● Function

This command sets the RF Tag selection filter conditions for the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		002D hex		FF hex	10 hex	C500 hex		0013 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18	Byte-19	...	Byte-50
Byte count	RF Tag selection filter conditions								
	Enable/disable		Address		Data length		Data		
26 hex	2 bytes		2 bytes		2 bytes		32 bytes		

Parameter		Description	Default setting
Register address		The register address (C500 hex) that specifies setting the RF Tag selection filter conditions	
Word count		The number of words in the RF Tag selection filter conditions (0013 hex)	
Byte count		The number of bytes in the RF Tag selection filter conditions (26 hex)	
RF Tag selection filter conditions	Enable/disable	Specify whether to enable or disable RF Tag selection filter conditions in 4-digit hexadecimal. 0000 hex: Disable 0001 hex: Enable	0000 hex
	Address*1.	Set the address (in words) of the RF Tag to check for in 4-digit hexadecimal. Setting ranges (word address specifications) 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area *You cannot specify 0000 to 07FF hex (reserved area).	0000 hex
	Data length*1.	Specify the number of words of data to check in 4-digit hexadecimal. Setting range: 0000 to 0010 hex	0000 hex
	Data*1.	Specify the data to check for. (Always 16 words.) *Fill unused data with 0000 hex. *In compliance with Gen2 standards, bits 0 to 255 are masked, so the last bit of word 16 (bit 256) is ignored.	00....00 hex

*1. If the RF Tag selection filter conditions settings are disabled, this value is always 0000 hex.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	C500 hex		0013 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Example 1: Execution When Enabling RF Tag Selection Filter Conditions for the Reader/Writer with the Following Settings

Address: 3000 hex, Data length: 1 word, Data to check for: 1234 hex

TX: 00000000002DFF10C5000013260001300000001123400…00

RX: 000000000006FF10C5000013

Example 2: Execution When Disabling RF Tag Selection Filter Conditions for the Reader/Writer

TX: 00000000002DFF10C5000013260000000000000000000…00

RX: 000000000006FF10C5000013

GET RF TAG SELECTION FILTER CONDITIONS

● Function

This command reads the RF Tag selection filter conditions that are set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C500 hex		0013 hex	

Parameter	Description
Register address	The register address (C500 hex) that specifies setting the RF Tag selection filter conditions
Word count	The number of words in the RF Tag selection filter conditions to read (0013 hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0028 hex		FF hex	03 hex	26 hex

Byte-9	Byte-10	Byte-11	Byte-12	Byte-13	Byte-14	Byte-15	...	Byte-46
RF Tag selection filter conditions								
Enable/disable		Address		Data length		Data		
2 bytes		2 bytes		2 bytes		32 bytes		

Parameter		Description	Default setting
Byte count		The number of bytes in the RF Tag selection filter conditions (26 hex)	
RF Tag selection filter conditions	Enable/disable	Gives whether RF Tag selection filter conditions are enabled or disabled in 4-digit hexadecimal. 0000 hex: Disable 0001 hex: Enable	0000 hex
	Address*1.	Gives the address (in words) of the RF Tag to check for in 4-digit hexadecimal. 1000 to 17FF hex: EPC area 2000 to 27FF hex: TID area 3000 to 37FF hex: User area	0000 hex
	Data length*1.	Gives the number of words of data to check in 4-digit hexadecimal. 0000 to 0010 hex	0000 hex
	Data*1.	Gives the data to check for. (Always 16 words.) *Unused data is filled with 0000 hex. *In compliance with Gen2 standards, bits 0 to 255 are masked, so the last bit of word 16 (bit 256) is ignored.	00....00 hex

*1. If the RF Tag selection filter conditions settings are being disabled, this value is always 0000 hex.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When RF Tag Selection Filter Conditions for the Reader/Writer Are Enabled with the Following Settings

Address: 3000 hex, Data length: 1 word, Data to check: 1234 hex

TX: 000000000006FF03C5000013

RX: 000000000029FF0326000130000001123400…00

SET RSSI FILTER CONDITIONS

● Function

This command sets the RSSI filter conditions for the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000D hex		FF hex	10 hex	C600 hex		0003 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18
Byte count	RSSI filter conditions					
	Enable/disable		High threshold		Low threshold	
06 hex	2 bytes		2 bytes		2 bytes	

Parameter		Description	Default setting
Register address		The register address (C600 hex) that specifies the RSSI filter conditions	
Word count		The number of words in the RSSI filter conditions (0003 hex)	
Byte count		The number of bytes in the RSSI filter conditions (06 hex)	
RSSI filter conditions	Enable/disable	Specify whether the RSSI filter is enabled or disabled in 4-digits hexadecimal. 0000 hex: Disable 0001 hex: Enable	0000 hex
	High threshold*1	Specify the high threshold for the reception level in signed 4-digit hexadecimal. FFF6 to FFBA hex (0 or -70 to -10) [dBm]	0000 hex
	Low threshold*1	Specify the low threshold for the reception level in signed 4-digit hexadecimal. FFF6 to FFBA hex (0 or -70 to -10) [dBm]	0000 hex

*1. When you disable the RSSI filter conditions, set the high and low thresholds to 0000 hex. When you enable the RSSI filter, set the high threshold value for the reception level to a higher value than the low threshold level. Otherwise, a command parameter error will occur.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	C600 hex		0003 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.

● Execution Examples

Example 1: Execution When Enabling RSSI Filter Conditions for the Reader/Writer with the Following Settings

High threshold: -40 dBm (FFD8 hex), Low threshold: -64 dBm (FFC0 hex)

TX: 00000000000DFF10C6000003060001FFD8FFC0

RX: 000000000006FF10C6000003

Example 2: Execution When Disabling RSSI Filter Conditions for the Reader/Writer

TX: 00000000000DFF10C600000306000000000000

RX: 000000000006FF10C6000003

GET RSSI FILTER CONDITIONS

● Function

This command is used to check the RSSI filter conditions that are set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C600 hex		0003 hex	

Parameter	Description
Register address	The register address (C600 hex) that specifies reading the RSSI filter conditions
Word count	The number of words in the RSSI filter conditions to read (0003 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0009 hex		FF hex	03 hex	04 hex

Byte-9	Byte-10	Byte-11	Byte-12	Byte-13	Byte-14
RSSI filter conditions					
Enable/disable		High threshold		Low threshold	
2 bytes		2 bytes		2 bytes	

Parameter		Description	Default setting
Byte count		The number of bytes in the RSSI filter conditions (06 hex)	
RSSI filter conditions	Enable/disable	Gives whether the RSSI filter is enabled or disabled in 4-digits hexadecimal. 0000 hex: Disable 0001 hex: Enable	0000 hex
	High threshold *1	Gives the RSSI high threshold level in signed 4-digit hexadecimal. FFF6 to FFBA hex (0 or –70 to –10) [dBm]	0000 hex
	Low threshold *1	Gives the RSSI low threshold level in signed 4-digit hexadecimal. FFF6 to FFBA hex (0 or –70 to –10) [dBm]	0000 hex

*1. If the RSSI filter conditions are disabled, the high and low threshold levels will always be 0000 hex.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution When RSSI Filter Conditions for the Reader/Writer Are Enabled with the Following Settings

High threshold: -40 dBm (FFD8 hex), Low threshold: -64 dBm (FFC0 hex)

TX: 000000000006FF03C6000003

RX: 000000000009FF03060001FFD8FFC0

SET TRANSMISSION TIME

● Function

This command sets the time to stop the transmission power.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000B hex		FF hex	10 hex	C700 hex		0002 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16
Byte count	Stop time		Continuous transmission time	
04 hex	2 bytes		2 bytes	

Parameter	Description	Default setting
Register address	The register address (C700 hex) that specifies setting the transmission times	
Word count	The number of words in the transmission time setting (0002 hex)	
Byte count	The number of bytes in the transmission time setting (04 hex)	
Stop time *1	Specify the time to stop the output during RF communications command execution in 4-digit hexadecimal. 0000 hex or 000A to 03E8 hex (0000 hex = None, or 10 to 1,000) [ms]	0000 hex
Continuous transmission time *1	Specify the maximum time to continuously output radio waves during RF communications command execution in 4-digit hexadecimal. 0000 hex or 0190 to 2710 hex (0000 hex = Unlimited, or 400 to 10,000) [ms]	0000 hex

*1. If you set a stop time, do not set the continuous transmission time to 0000 hex (unlimited). A command parameter error will occur if only the stop time or only the continuous transmission time is set to 0.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	C700 hex		0002 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Example 1: Execution to Set the Following Times in the Reader/Writer

Stop time: 10 ms (000A hex), Continuous transmission time: 400 ms (0190 hex)

TX: 00000000000BFF10C700000204000A0190

RX: 000000000006FF10C7000002

Example 2: Execution to Set the Following Times in the Reader/Writer

Stop time: None, Continuous transmission time: Unlimited

TX: 00000000000BFF10C70000020400000000

RX: 000000000006FF10C7000002

GET TRANSMISSION TIME

● Function

This command is used to check the transmission times that are set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C700 hex		0002 hex	

Parameter	Description
Register address	The register address (C700 hex) that specifies reading the transmission time settings
Word count	Always 0002 hex.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex

Byte-9	Byte-10	Byte-11	Byte-12
Stop time		Continuous transmission time	
2 bytes		2 bytes	

Parameter	Description	Default setting
Field length	Always 0007 hex.	
Byte count	The number of bytes in the transmission times to read (04 hex)	
Stop time	Gives the time that is set to stop the output during RF communications command execution in 4-digit hexadecimal. 0000 hex or 000A to 03E8 hex (0000 hex = None, or 10 to 1,000) [ms]	0000 hex
Continuous transmission time	Gives the maximum time that is set to continuously output radio waves during RF communications command execution in 4-digit hexadecimal. 0000 hex, 0190 to 2710 hex (0000 hex: Unlimited, or 400 to 10,000) [ms]	0000 hex

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution When the Following RF Transmission Times Are Set in the Reader/Writer

Stop time: 10 ms (000A hex), Continuous transmission time: 400 ms (0190 hex)

TX: 000000000006FF03C7000002

RX: 000000000007FF0304000A0190

7-6-7 Reader/Writer Setting Commands: Device Settings

SET OPERATION INDICATOR CUSTOM CONDITIONS

● Function

This command sets the colors of the NORM/ERR indicators during command execution.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000D hex		FF hex	10 hex	B800 hex		0003 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18
Byte count	Color to flash once for normal command execution		Color to flash once for command error		Color to flash once for unstable communications	
06 hex	2 bytes		2 bytes		2 bytes	

Parameter	Description	
Register address	The register address (B800 hex) that specifies setting operation indicator custom conditions	
Word count	The number of words in the operation indicator custom condition settings (0003 hex)	
Byte count	The number of bytes in the operation indicator custom condition settings (06 hex)	
Color to flash once for normal command execution	Specify the color to flash once when V780 command processing ends normally in 4-digit hexadecimal. 0000 hex: Default 0001 hex: Green 0002 hex: Red 0003 hex: Yellow 0004 hex: Blue 0005 hex: Cyan 0006 hex: Magenta 0007 hex: White FFFF hex: Do not flash.*1	0000 hex
Color to flash once for command error	Specify the color to flash once when V780 command processing ends in an error in 4-digit hexadecimal. *The color settings are they same as for flashing once for normal command completion, given above.	0002 hex
Color to flash once for unstable communications	Specify the color to flash once when the results of executing communications diagnostics indicates that communications are unstable in 4-digit hexadecimal. *The colors settings are they same as for flashing once for normal command completion, given above.	0003 hex

*1. To prevent the NORM/ERR indicators from lighting at all during command execution, set all of the lighting conditions to “Do not flash.” You cannot prevent them from lighting by setting only individual conditions.

Precautions for Correct Use

If you set all of the conditions to “Do not flash,” the NORM/ERR indicators will not light at all even during operation in Focus Mode.

Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B800 hex		0003 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Set Operation Indicator Custom Conditions for the Reader/Writer

Example 1: Execution to Change to the Following Colors for the NORM/ERR Indicators during Command Execution

Normal completion: Cyan, Error completion: Magenta, Unstable communications: White

TX: 00000000000DFF10B800000306000500060007

RX: 000000000006FF10B8000003

Example 2: Execution to Change the NORM/ERR Indicators to Not Light at All during Command Execution

TX: 00000000000DFF10B800000306FFFFFFFFFFFF

RX: 000000000006FF10B8000003

GET OPERATION INDICATOR CUSTOM CONDITIONS

● Function

This command is used to check the NORM/ERR indicator lighting colors for communications results that are set in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B800 hex		0003 hex	

Parameter	Description	Default setting
Register address	The register address (B800 hex) that specifies the operation indicator custom settings	
Word count	The number of words in the operation indicator custom conditions to read (0003 hex)	

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0009 hex		FF hex	03 hex	06 hex

Byte-9	Byte-10	Byte-11	Byte-12	Byte-13	Byte-14
Color to flash once for normal command execution		Color to flash once for command error		Color to flash once for unstable communications	
2 bytes		2 bytes		2 bytes	

Parameter	Description	
Byte count	The number of bytes in the operation indicator custom settings (06 hex)	
Color to flash once for normal command execution	Gives the color to flash once when V780 command processing ends normally in 4-digit hexadecimal. 0001 hex: Green 0002 hex: Red 0003 hex: Yellow 0004 hex: Blue 0004 hex: Blue 0006 hex: Magenta 0007 hex: White FFFF hex: Do not flash.	0001 hex
Color to flash once for command error	Gives the color to flash once when V780 command processing ends in an error in 4-digit hexadecimal. *The colors settings are they same as for flashing once for normal command completion, given above.	0002 hex
Color to flash once for unstable communications	Gives the color to flash once when the results of executing communications diagnostics indicates that communications are unstable in 4-digit hexadecimal. *The colors settings are they same as for flashing once for normal command completion, given above.	0003 hex

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution When the Following NORM/ERR Indicator Lighting Colors Are Set for Command Execution by the Reader/Writer

Normal completion: Green, Error completion: Red, Unstable communications: Yellow

TX: 000000000006FF03B8000003

RX: 000000000009FF0306000100020003

7-6-8 Maintenance Commands: Device Information

GET MODEL INFORMATION

● Function

This command is used to check the model number of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D000 hex		0010 hex	

Parameter	Description
Register address	The register address (D000 hex) that specifies the model number information
Word count	The number of words in the model number information to read (0010 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	...	Byte-40
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Model information		
X	X	0000 hex		0023 hex		FF hex	03 hex	20 hex	32 bytes		

Parameter	Description
Byte count	The number of bytes in the model number information that was read (20 hex)
Model information	Gives the model information that was read with up to 32 bytes of ASCII characters (up to 31 ASCII characters plus the end code (00 hex)). If there are fewer than 31 characters, the remaining bytes are filled with 00 hex. The model number is given with ASCII characters 20 hex (space) to 7E hex (~).

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Read the Model Number When a V780-HMD68-ETN Reader/Writer Is Being Used

TX: 000000000006FF03D0000010

RX:
000000000023FF0320563738302D484D4436382D45544E00000000000000000000000000000000000000

GET FIRMWARE VERSION

● Function

This command reads the firmware version of the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D100 hex		0006 hex	

Parameter	Description
Register address	The register address (D100 hex) that specifies the firmware version
Word count	The number of words in the firmware version information to read (0006 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		000F hex		FF hex	03 hex	0C hex

Byte-9	Byte-10	Byte-11	Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18	Byte-19	Byte-20
Firmware version											
Major version of Run Mode program		Minor version of Run Mode program		Run Mode program revision		Major version of Safe Mode program		Minor version of Safe Mode program		Safe Mode program revision	
2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes	

Parameter		Description
Byte count		The number of bytes in the firmware version information (0C hex)
Firmware version	Major version of Run Mode program	0000 to 0099 hex (BCD)
	Minor version of Run Mode program	0000 to 0099 hex (BCD)
	Run Mode program revision	0000 to 9999 hex (BCD)
	Major version of Safe Mode program	0000 to 0099 hex (BCD)
	Minor version of Safe Mode program	0000 to 0099 hex (BCD)
	Safe Mode program revision	0000 to 9999 hex (BCD)

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution with the Following Firmware Versions in the Reader/Writer

Run Mode program version: 1.2.3, Safe Mode program version: 1.2.2

TX: 000000000006FF03D1000006

RX: 00000000000FFF030C000100020003000100020002

GET MAC ADDRESS

● Function

This command is used to check the MAC address from the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D200 hex		0003 hex	

Parameter	Description
Register address	The register address (D200 hex) that specifies the MAC address
Word count	The number of words in the MAC address to read (0003 hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	...	Byte-14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	MAC address		
X	X	0000 hex		0009 hex		FF hex	03 hex	06 hex	6 bytes		

Parameter	Description
Byte count	The number of bytes in the MAC address that was read (06 hex)
MAC address	Gives the MAC address that was read as a 12-digit hexadecimal between 000000000000 and FFFFFFFFFFFF hex.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution to Read a MAC Address of “11-22-33-44-55-66” from the Reader/Writer

TX: 000000000006FF03D2000003

RX: 000000000009FF0306112233445566

GET OPERATING STATUS

● Function

This command is used to check the operating status from the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D300 hex		0002 hex	

Parameter	Description
Register address	The register address (D300 hex) that specifies the operating status
Word count	The number of words in the Reader/Writer operating status to read (0002 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex

Byte-9	Byte-10	Byte-11	Byte-12
Reader/Writer operating status			
Mode		Status	
2 bytes		2 bytes	

Parameter		Description
Byte count		The number of bytes in the Reader/Writer operating status that was read (0C hex)
Reader/Writer operating status	Mode	Gives the mode of the Reader/Writer that was read in 4-digits hexadecimal. 0000 hex: Safe Mode 0001 hex: Run Mode
	Status	Gives the status of the Reader/Writer that was read in 4-digits hexadecimal. 0001 hex: Idling 0002 hex: RF Tag communications in progress 0003 hex: Changing settings 0004 hex: Error

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution with the Following Reader/Writer Operating Status

Mode: Run Mode, Status: Idling

TX: 000000000006FF03D3000002

RX: 000000000007FF030400010001

GET TIME INFORMATION

● Function

This command is used to check the time information from the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D400 hex		0002 hex	

Parameter	Description
Register address	The register address (D400 hex) that specifies the time information
Word count	The number of words in the time information to read (0002 hex)

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	...	Byte-12
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Time information		
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex	4 bytes		

Actual time flag:*1 0/1	Hour: 0 to 23	Minutes: 0 to 59	Seconds: 0 to 59
1 byte	1 byte	1 byte	1 byte

Parameter	Description
Byte count	The number of bytes in the time information that was read (04 hex)
Time information	Gives the time information that is managed inside the Reader/Writer in 4-digit hexadecimal. *1 This byte indicates whether the actual time was set from the host device. 0: The time has not been set, so the time information gives the running time since the power supply to the Reader/Writer was turned ON. 1: The time was set, so the time information is the running time from the time set from the host device.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution When the Time Information in the Reader/Writer Is 09:30:10

TX: 000000000006FF03D4000002
RX: 000000000007FF030400091E0A

SET TIME INFORMATION

● Function

This command sets the time information in the Reader/Writer.

When the Reader/Writer is restarted, the time information is reset. (All zeros will be set for the actual time flag, hour, minutes, and seconds.)

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Command Format		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		000B hex		FF hex	10 hex	D400 hex		0002 hex	

Byte-12	Byte-13	Byte-14	Byte-15	Byte-16
Byte count	Time information			
	Reserved	Hour: 0 to 23	Minutes: 0 to 59	Seconds: 0 to 59
04 hex	1 byte	1 byte	1 byte	1 byte

Parameter	Description
Register address	The register address (D400 hex) that specifies the time information
Word count	The number of words of time information (0002 hex)
Byte count	The number of bytes of time information (04 hex)
Time information	The time to set in the Reader/Writer in 8-digit hexadecimal.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	D400 hex		0002 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Set the Time Information in the Reader/Writer to 09:30:10

TX: 00000000000BFF10D40000020400091E0A

RX: 000000000006FF10D4000002

7-6-9 Maintenance Commands: Log Information

GET SYSTEM ERROR LOG

● Function

This command is used to check the log of system errors that have occurred in the Reader/Writer.

The system error log is retained even when the Reader/Writer is restarted.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D600 hex		0079 hex	

Parameter	Description
Register address	The register address (D600 hex) that specifies the system error log information
Word count	The number of words in the system error log information to read (0079 hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Number of records	
X	X	0000 hex		00F5 hex		FF hex	03 hex	F2 hex	1 word	

Byte-11	...	Byte-26	Byte-27	...	Byte-42	...	Byte-235	...	Byte-250
Newest record in system error log			Newest record - 1 in system error log			...	Newest record - 14 in system error log		
16 bytes			16 bytes			...	16 bytes		

Time information	Error code	Reserved	Attached information 1	Attached information 2
4 bytes	2 bytes	2 bytes	4 bytes	4 bytes

Parameter		Description
Byte count		The number of bytes in system error log (F2 hex)
Number of records		Gives the number of records in the valid data of the system error log.
Newest record in system error log	Time information	Gives the time information in 8-digit hexadecimal (actual time flag, hour, minutes, and seconds).
	Error code	For details, refer to *?9-2-1 ??????* (P.9-3)?.
	Reserved	(Reserved for future use as error device information.)
	Attached information 1	Additional error information 1 (00 hex if there is no attached information)
	Attached information 2	Additional error information 2 (00 hex if there is no attached information)
Newest record – 1 in system error log	---	---
...	...	...
Newest record – 14 in system error log	---	---

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution with the Following System Error Log in the Reader/Writer

Number of records	2
Newest record	Time information: 09:31:30, Error code: 8011 hex (IP address conflict), Attached information: None
Newest record – 1	Time information: 09:30:10, Error code: 8012 hex (BOOTP server connection failed), Attached information: None

TX: 000000000006FF03D6000079

RX: 0000000000F5FF03F2000201091F1E80110000000000000000000000001091E0A8012
0000000000000000.....00

CLEAR SYSTEM ERROR LOG

● Function

This command clears the log of system errors (fatal errors) that is stored in the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0009 hex		FF hex	10 hex	D700 hex		0001 hex	

Byte-12	Byte-13	Byte-14
Byte count	Clear type	
02 hex	2 bytes	

Parameter	Description
Register address	The register address (D700 hex) that specifies clearing the system error log information
Word count	The number of words for system error log clear (0001 hex)
Byte count	The number of bytes for system error log clear (02 hex)
Clear type	0000 hex: Clear all

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	D700 hex		0001 hex	

Parameter	Description
Register address	The register address from the command is set.
Word count	The word count from the command is set.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution to Clear the System Error Log in the Reader/Writer

TX: 000000000009FF10D7000001020000

RX: 000000000006FF10D7000001

GET COMMAND ERROR LOG

● Function

This command is used to check the log of command errors that have occurred in the Reader/Writer.

The command error log information is cleared when the Reader/Writer is restarted.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D800 hex		0061 hex	

Parameter	Description
Register address	The register address (D800 hex) that specifies the command error log information
Word count	The number of words in the command error log to read (0061 hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Number of records	
X	X	0000 hex		00C5 hex		FF hex	03 hex	C2 hex	2 bytes	

Byte-11	...	Byte-34	Byte-35	...	Byte-58	...	Byte-179	...	Byte-202
Newest record in the command error log			Newest record - 1 in the command error log			...	Newest record -7 in the command error log		
24 bytes			24 bytes			...	24 bytes		

Time information	IP address of the remote device	Transaction identifier	Command code	Error code
4 bytes	4 bytes	2 bytes	2 bytes	2 bytes

Reserved	Attached information 1	Attached information 2
2 bytes	4 bytes	4 bytes

Parameter		Description
Number of records		Gives the number of records in the valid data of the system error log.
Newest record in the command error log	Time information	Gives the time information in 8-digit hexadecimal (actual time flag, hour, minutes, and seconds).
	IP address of the remote device	Gives the IP address that was read in 8-digit hexadecimal. Example: C0A801C8 hex (192.168.1.200)
	Transaction identifier	The transaction identifier specified in the command that produced the error
	Command code	Gives the command code in 8-digit hexadecimal.
	Error code	For details, refer to *?9-2-1 ??????* (P.9-3)?.
	Reserved	(Reserved for future use as error device information.)
	Attached information 1	Gives additional information 1 on the error in 16-digit hexadecimal.
	Attached information 2	Gives additional information 2 on the error in 16-digit hexadecimal.

Parameter		Description
Newest record - 1 in the command error log	---	---
...	...	...
Newest record -7 in the command error log	---	---

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution with the Following Command Error Log in the Reader/Writer

Number of records	2
Newest record	Time information: 09:31:30, IP address: 192.168.1.121, Command code: 0004 hex (WRITE DATA), Error code: 1005 hex (command parameter error), Attached information: None
Newest record - 1	Time information: 09:30:10, IP address: 192.168.1.120, Command code: 0003 hex (READ DATA), Error code: 2004 hex (address error), Attached information: None

TX: 000000000006FF03D8000061

RX: 0000000000C5FF03C2000201091F1EC0A80178000000041005000000000000000000001091E0AC0A80178000000032004000000000000000000…00

GET MOST RECENT COMMAND ERROR INFORMATION

● Function

This command is used to check the most recent command error information from the Reader/Writer.

The most recent command error information is cleared when the Reader/Writer is restarted.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D900 hex		000C hex	

Parameter	Description
Register address	The register address (D900 hex) that specifies reading the most recent command error information
Word count	The number of words in the most recent command error information to read (000C hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		001B hex		FF hex	03 hex	18 hex

Byte-9	...	Byte-12	Byte-13	...	Byte-16	Byte-17	Byte-18	Byte-19	Byte-20	Byte-21	Byte-22
Most recent command error information											
Time information			IP address of the remote device			Transaction identifier		Command code		Error code	
4 bytes			4 bytes			2 bytes		2 bytes		2 bytes	

Byte-23	Byte-24	Byte-25	Byte-26	Byte-27	Byte-28	Byte-29	Byte-30	Byte-31	Byte-32
Most recent command error information									
Reserved		Attached information 1				Attached information 2			
2 bytes		4 bytes				4 bytes			

Parameter		Description
Byte count		The number of bytes in the most recent command error information that was read (18 hex)
Most recent command error information	Time information	Gives the time information in 8-digit hexadecimal
	IP address of the remote device	Gives the IP address that was read in 8-digit hexadecimal. Example: C0A801C8 hex (192.168.1.200)
	Transaction identifier	The transaction identifier specified in the command that produced the error
	Command code	Gives the command code in 8-digit hexadecimal.
	Error code	For details, refer to *?9-2-1 ??????* (P.9-3)?.
	Reserved	(Reserved for future use as error device information.)
	Attached information 1	Gives additional information 1 on the error in 8-digit hexadecimal.
	Attached information 2	Gives additional information 2 on the error in 8-digit hexadecimal.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution with the Following Most Recent Command Error Information in the Reader/Writer

Time information: 09:31:30, IP address: 192.168.1.121, Command code: 0004 hex (WRITE DATA), Error code: 1005 hex (command parameter error), Attached information: None

TX: 000000000006FF03D900000C

RX: 00000000001BFF031801091F1EC0A80178000000041005000000000000000000000

7-6-10 Maintenance Commands: RF Communications Information

GET RF TAG ADDITIONAL INFORMATION

● Function

This command us used to check the attached information (i.e., the EPC code and reception level) that resulted from communications for a single-access command with the immediately preceding RF Tag.

If communications for the immediately preceding single-access command ended in an error, attached information of 00 hex will be returned.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	DA00 hex		0021 hex	

Parameter	Description
Register address	The register address (DA00 hex) for reading the attached information for RF Tag communications
Word count	Always 0021 hex.

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0045 hex		FF hex	03 hex	42 hex

Byte-9	Byte-10	Byte-11	...	Byte-72	Byte-73	Byte-74
StoredPC		EPC code			Reception level	
2 bytes		62 bytes			2 bytes	

Parameter	Description
StoredPC	Gives the StoredPC data in 4-digit hexadecimal. The upper 5 bits are the EPC word length.
EPC code	Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.
Reception level	Gives the reception level in signed hexadecimal. FFFF to FF9D hex (-1 to -99) [dBm]

- Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution for the Following Attached Information as the Results of Reader/Writer Communications with the Immediately Preceding RF Tag

StoredPC: 3000 hex, EPC code: 111122223333444455556666 hex, Reception level: -27 (FFE5 hex)

TX: 000000000006FF03DA000021

RX: 000000000045FF0342300011112222333344445555666600…00FFE5

GET NOISE LEVEL

● Function

This command measures the ambient noise level around the Reader/Writer.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	DB00 hex		000F hex	

Parameter	Description
Register address	The register address (DB00 hex) for getting the noise level
Word count	Always 000F hex. The noise information for channels 1 to 15 is read at the same time.

● Response Formats

• Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0021 hex		FF hex	03 hex	1E hex

Byte-9	Byte-10	...	Byte-37	Byte-38
Channel 1 noise level		...	Channel 15 noise level	
2 bytes		...	2 bytes	

Parameter	Description
Channel 1 noise level	Gives the noise level for channel 1 in signed 2-digit hexadecimal. FFFF to FF9D hex (-1 to -99) [dBm]
...	...
Channel 15 noise level	Gives the noise level for channel 15in signed 2-digit hexadecimal. FFFF to FF9D hex (-1 to -99) [dBm]

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

Execution Examples

Execution When the Reader/Writer Measures the Following Noise Levels

Channel 1 noise level: -40 dBm (FFD8 hex), Channel 2 noise level: -77 (FFB3 hex), … , Channel 15 noise level: -77(FFB3 hex)

TX: 000000000006FF03DB00000F

RX: 000000000021FF031EFFD8FFB3…FFB3

GET COMMUNICATIONS DIAGNOSTIC INFORMATION

● Function

This command gets the most recent communications diagnostic information.

● Command Format

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8	Byte-9	Byte-10	Byte-11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	DC00 hex		002E hex	

Parameter	Description
Register address	The register address (DC00 hex) for reading the communications diagnostic information
Word count	The number of words in the communications diagnostic information to read (002E hex)

● Response Formats

- Normal Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		005F hex		FF hex	03 hex	5C hex

Byte-9	...	Byte-88
Most recent communications diagnostic information		
92 bytes		

Byte-9	...	Byte-12	Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18	Byte-19	Byte-20
Communications diagnostic information										
Time information			Command code		Error code		Diagnostic results		Detailed diagnostic results	
4 bytes			2 bytes		2 bytes		2 bytes		2 bytes	

Byte-21	Byte-22	Byte-23	Byte-24	Byte-25	Byte-26	Byte-27	Byte-28	Byte-29	Byte-30	Byte-31	Byte-32
Communications diagnostic information											
Reserved 1		Reserved 2		Reserved 3		Reserved 4		Reception level		Noise level	
2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes	

Byte-33	Byte-34	Byte-35	Byte-36	Byte-37	Byte-38	Byte-39	...	Byte-100
Communications diagnostic information								
Reserved 5		Reserved 6		Stored PC		EPC code		
2 bytes		2 bytes		2 bytes		62 bytes		

Parameter		Description
Byte count		The number of bytes in the most recent communications diagnosis information (5C hex)
Most recent communications diagnostic information	Time information	Gives the time information in 8-digit hexadecimal (actual time flag, hour, minutes, and seconds).
	Command code	Gives the command code in 8-digit hexadecimal.
	Error code	For details, refer to *Exception Code* on page 7-7 under *Response Format for Error Completion* on page 7-7.
	Diagnostic results	Gives the diagnostic results in 4-digit hexadecimal. FFFF hex: Error (Set when the error code is not normal.) 0000 hex: Normal 0001 hex: Insufficient power to send 0002 hex: Insufficient power to receive 0003 hex: Too much noise 0005 hex: Insufficient read data (Diagnostic processing for these results is performed only in Focus Mode.) 0006 hex: Excessive read data (Diagnostic processing for these results is performed only in Focus Mode.)
	Diagnostic details	Gives the diagnostic details in 4-digit hexadecimal. Bit 0: Insufficient power to send flag Bit 1: Insufficient power to receive flag Bit 2: Too much noise Bit 3: Reserved Bit 4: Insufficient data read flag Bit 5: Excessive data read flag Bits 6 to 15: Reserved (all zeros) *Bits 4 and 5 are output for diagnostic processing only in Focus Mode. They are not output in any other mode.
	Reserved 1 to 4	0000 hex: No specifications
	Reception level	Gives the reception level in signed 4-digit hexadecimal. FFFF to FF9D hex (-1 to -99) [dBm]
	Noise level	Gives the noise level in signed 4-digit hexadecimal. FFFF to FF9D hex (-1 to -99) [dBm]
	Reserved 5 and 6	0000 hex: No specifications
	Stored PC	Gives the StoredPC data of the RF Tag for diagnostics in 4-digit hexadecimal. The upper 5 bits are the EPC word length.
	EPC code	Gives the Tag-specific information according to Gen2 standards. All bytes of the EPC code section that exceed the EPC word length in the StoredPC are filled with 00 hex.

*1. All of the most recent communications diagnostic information will be 00 hex if communications diagnostics are disabled.

*2. This data is output for diagnostic processing only in Focus Mode. It is not output in any other mode.

• Error Response

Byte-0	Byte-1	Byte-2	Byte-3	Byte-4	Byte-5	Byte-6	Byte-7	Byte-8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to *Exception Code* on page 7-7 under *7-2-3 Response Format for Error Completion* on page 7-7.

● Execution Examples

Execution with the Following Most Recent Communications Diagnostic Information in the Reader/Writer

Time information: 09:31:30, Command code: 0003 hex (READ DATA), Error code: 0000 hex (normal), Diagnostic results: Insufficient power to send (0001 hex), Diagnostic details: Insufficient power to send + Insufficient power to receive (0003 hex), Reception level: -41 dBm (FFD7 hex), Noise level: -70 dBm (FFBA hex), EPC code: 11…11

TX: 000000000006FF03DC00002E

RX: 00000000005FFF035C 01091F1E 0003 0000 0001 0003 0000000000000000 FFD7 FFBA 00000000 30001111…11110000…0000