

Notification about the transfer of the semiconductor business

The semiconductor business of Panasonic Corporation was transferred on September 1, 2020 to Nuvoton Technology Corporation (hereinafter referred to as "Nuvoton"). Accordingly, Panasonic Semiconductor Solutions Co., Ltd. became under the umbrella of the Nuvoton Group, with the new name of Nuvoton Technology Corporation Japan (hereinafter referred to as "NTCJ").

In accordance with this transfer, semiconductor products will be handled as NTCJ-made products after September 1, 2020. However, such products will be continuously sold through Panasonic Corporation.

Publisher of this Document is NTCJ.

If you would find description "Panasonic" or "Panasonic semiconductor solutions", please replace it with NTCJ.

※ Except below description page

"Request for your special attention and precautions in using the technical information and semiconductors described in this book"

Nuvoton Technology Corporation Japan

SYSTEM LSI

Dual Interface RFID

MN63Y1210A-E1

Administrator's Manual Ver. 1.1

< nonNDA type >

About this manual

■ Organization

These specifications provide important information for users of the MN63Y1210-E1, including an overview and descriptions of functions.

■ Manual Configuration

Each section of this manual consists of a title, main text, and notes. The layout and definition of each section are shown below.

The diagram illustrates the layout of a manual section. It shows a page with a main title, a sub-title, a paragraph of text, a table, and a note. Labels on the right side of the page point to these elements:

- Middle title:** Points to the main title "1.1 UART".
- Small title:** Points to the sub-title "1.1.1 Communication Specifications".
- Text:** Points to the paragraph "Table 1-1 shows the UART specification of this RFID." and the table "Table 1-1 UART Communication Specification".
- Note:** Points to the note "Note: In order to ensure the timing margin, when sending consecutive data from the host, use a 2-bit stop bit or set the interval between stop bit and next start bit to 1 bit or more."

1.1 UART

This section describes the UART specification.

1.1.1 Communication Specifications

Table 1-1 shows the UART specification of this RFID.

Table 1-1 UART Communication Specification

Data transfer method	Asynchronous, half-duplex (Only IRQ notification allows full-duplex)
Data rate	200 bps, 2400 bps, 8000 bps, 9600 bps, 19200 bps, 38400 bps
Character transmission	·LSB-first ·Data (8 bits) ·Start bit (1bit) ·Parity bit (1bit, even) ·Stop bit (1bit) See Note below.
Other	No flow control signal (RTS/CTS)

Note: In order to ensure the timing margin, when sending consecutive data from the host, use a 2-bit stop bit or set the interval between stop bit and next start bit to 1 bit or more.

■ Finding Desired Information

This manual provides two methods for finding desired information quickly and easily.

1. Consult the table of contents at the front of the manual to locate desired titles.
2. Chapter names are located at the top outer corner of each page, and section titles are located at the bottom outer corner of each page.

Chapter 1 Overview

Chapter 2 System Area

Chapter 3 Error Code

Chapter 4 Annex

1

2

3

4

Contents

Chapter 1 Overview	7
1.1 Overview.....	8
Chapter 2 System Area	9
2.1 Physical Memory Map.....	10
2.2 System Area.....	11
2.2.1 Parameter Specification.....	11
2.2.2 Parameter Application Timing	13
Chapter 3 Error Code	15
3.1 Error Code	16
3.1.1 JISX6319-4.....	16
3.1.2 ISO/IEC14443 TypeB	16
3.1.3 Serial Interface (UART, Clock Synchronous).....	16
Chapter 4 Annex.....	17
4.1 Configuring the System Area	18
4.1.1 Precautions	18
4.1.2 Setting Procedures of System Area	19

Chapter 1 Overview

1.1 Overview

This is a manual for the administrator of the dual interface RFID (Radio Frequency Identification) LSI MN63Y1210A, and describes the following:

■ System area (Chapter 2)

Describes the information on security in the system area of FeRAM, which is omitted in the User's Manual.

■ Additional error codes (Chapter 3)

Provides the error codes related to the Administrator's Manual, which are not described in the User's Manual.

■ Annex (Chapter 4)

Describes examples of configuring the system area in the manufacturing process.

Chapter 2 System Area

2.1 Physical Memory Map

Figure 2-1 shows the physical memory map. The part indicated in bold italic is to be defined in this manual.

Block	Address	0x0	0x1	0x2	0x3	0x4	0x5	0x6	0x7	0x8	0x9	0xA	0xB	0xC	0xD	0xE	0xF
0	0x0000	User Area															
1	0x0010	User Area															
2	0x0020	User Area															
3	0x0030	User Area															
4	0x0040	User Area															
5	0x0050	User Area															
6	0x0060	User Area															
7	0x0070	User Area															
8	0x0080	User Area															
9	0x0090	User Area															
10	0x00A0	User Area															
11	0x00B0	User Area															
12	0x00C0	User Area															
13	0x00D0	User Area															
14	0x00E0	User Area															
15	0x00F0	User Area															
16	0x0100	User Area															
17	0x0110	User Area															
18	0x0120	User Area															
19	0x0130	User Area															
20	0x0140	User Area															
21	0x0150	User Area															
22	0x0160	User Area															
23	0x0170	User Area															
24	0x0180	User Area															
25	0x0190	User Area															
26	0x01A0	User Area															
27	0x01B0	Reserved															
28	0x01C0	Reserved															
29	0x01D0	Reserved								<i>CFEN</i>				<i>MC</i>			
30	0x01E0	SC	IDM						PMM		AFI	FWI	HW				
31	0x01F0	RORF				ROSI				SECURITY				TNPRM	<i>SL</i>	<i>Reserv ed</i>	

Figure 2-1 Physical Memory Map

2.2 System Area

This section describes the system area.

2.2.1 Parameter Specification

This section provides parameters for security in the system area. For information about other parameters, see the User's Manual.

All addresses and block numbers used in this section correspond to the physical address in Figure 2-1.

■ CFEN (4 bytes)

CFEN is a flag data to validate the setting values in the system area of FeRAM. Table 2-1 shows the valid setting values for system area. Until valid values are written to CFEN, default values (implemented in hardware) are used for each parameter. For information about the default values, see Section 3.3 in the User's Manual and the descriptions for each parameter in this section.

Table 2-1 Valid CFEN Setting Values for System Area

Address	0x01D8	0x01D9	0x01DA	0x01DB
System area enable setting	0x01	0x23	0x45	0x67

Note: In order to enable the written flag data, the RFID's power supplies (both VDD2 and the supply from RF interface) must be turned off once after writes. The data will be enabled after next power-on.

Note: Before writing valid setting values to CFEN, write the given setting values to each parameter in the system area of FeRAM. (Default values for each parameter are implemented in hardware.)

■ MC (4 bytes)

MC is a data to control the internal modes of this RFID.

In manufacturing process, when writing the Block 29 data to this area, write the data shown in Table 2-2.

Table 2-2 MC Setting Values

Address	0x01DC	0x01DD	0x01DE	0x01DF
System area enable setting	0x89	0xAB	0xCD	0xEF

SL (1 byte)

SL is a flag data to lock the system area. Table 2-3 shows the SL settings and corresponding values. Setting the SL to MODE1 or MODE2 allows to lock the write operation to parameters of the system area.

By default, the SL is set to 0x00 (MODE0).

Table 2-3 SL Settings and Corresponding Values

Mode	MODE0		MODE1		MODE2	
Setting value (Address: 0x01FE)	0x00		0x0F		0xFF	
Interface to be accessed	RF	Serial	RF	Serial	RF	Serial
Block27(0x01B0 to 0x01BF) *)	R/W	R/W	RO	RO	RO	RO
Block28(0x01C0 to 0x01CF) *)	R/W	R/W	RO	RO	RO	RO
Block29(0x01D0 to 0x01D7)	R/W	R/W	RO	RO	RO	RO
CFEN	R/W	R/W	RO	RO	RO	RO
MC	R/W	R/W	RO	RO	RO	RO
SC	R/W	R/W	RO	RO	RO	RO
IDM	R/W	R/W	RO	RO	RO	RO
PMM	R/W	R/W	RO	RO	RO	RO
AFI	R/W	R/W	RO	RO	RO	RO
FWI	R/W	R/W	RO	RO	RO	RO
HW	R/W	R/W	RO	RO	RO	RO
RORF	R/W	R/W	RO	R/W	RO	RO
ROSI	R/W	R/W	RO	R/W	RO	RO
SECURITY	R/W	R/W	RO	R/W	RO	RO
TNPRM	R/W	R/W	RO	R/W	RO	RO
SL	R/W	R/W	RO	R/W	RO	RO
Reserved	R/W	R/W	RO	R/W	RO	RO

*) All-0 is always read.

R/W: Read/Write, RO: Read Only

In addition, Figure 2-2 illustrates the state transition diagram between system lock modes. Writing 0x0F to SL allows to transition from MODE0 to MODE1. Writing 0xFF to SL allows to transition from MODE0 or MODE1 to MODE2. The transition from MODE2 to MODE1 is disabled. To transition from MODE1 or MODE2 to MODE0, an INIT command must be executed. For more information about the INIT command, see Chapter 3.

Note: SL is the flag data for locking the system area.

In order to release the system area that was once locked, dedicated command using the serial

The disclosure of this dedicated command, NDA is required.

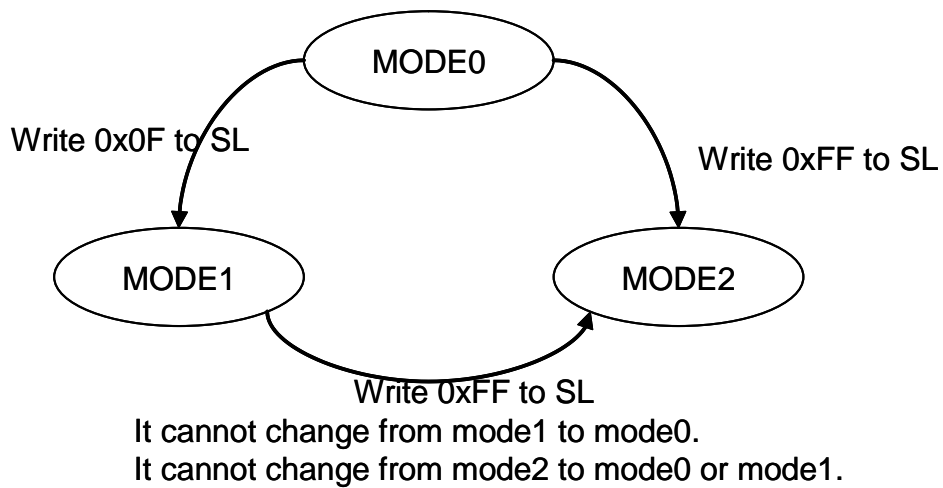


Figure 2-2 State Transition Diagram between System Lock Modes

2.2.2 Parameter Application Timing

Table 2-4 lists the setting application timings after rewriting parameters in the system area while CFEN is enabled.

Table 2-4 Parameter Application Timing

	A timing at which new parameter setting is applied after rewriting parameters while CFEN is enabled.
CFEN	Apply after turning power ON from OFF following rewrites.
MC	Apply after turning power ON from OFF following rewrites.
SL	Apply after turning power ON from OFF following rewrites.

Note: Power OFF means power supplies from both VDD2 and RF interface are OFF.

Chapter 3 Error Code

3.1 Error Code

This section provides the error codes related to this Administrator's Manual by interface, which are not described in the User's Manual.

3.1.1 JISX6319-4

Table 0-1 lists the meanings of statuses for JISX6319-4, which are not described in the User's Manual.

Table 0-1 Status Flag

Status flag 1	Status flag 2	Meaning	Description
0xFF	0xA2	Block count specification error	When writing to Block27 or Block28, the data size was other than 16 bytes.
0xFF	0x60	Self-diagnosis error	<ul style="list-style-type: none"> · Data was written over Block27 and Block28. · Write access to the system area (SL function) was performed while the system is locked.

3.1.2 ISO/IEC14443 TypeB

Table 0-2 lists the meanings of statuses for ISO/IEC14443 TypeB, which are not described in the User's Manual.

Table 0-2 Status Word

SW1	SW2	Meaning	Description
0x67	0x00	Lc/Le specification error	When writing to Block27 or Block28, the data size was other than 16 bytes.
0x6F	0x00	Self-diagnosis error	<ul style="list-style-type: none"> · Data was written over Block27 and Block28. · Write access to the system area (SL function) was performed while the system is locked.

3.1.3 Serial Interface (UART, Clock Synchronous)

Table 0-3 lists the meanings of statuses for serial interface (UART, Clock synchronous), which are not described in the User's Manual.

Table 0-3 Status

Value	Meaning	Description
0x26	Command parameter error	<ul style="list-style-type: none"> · When writing to Block27 or Block28, the data size was other than 16 bytes. · Write access to the system area (SL function) was performed while the system is locked. · Data was written over Block27 and Block28.

Chapter 4 Annex

4.1 Configuring the System Area

When configuring the system area in the manufacturing process, you must follow some precautions. This section describes the precautions and the setting procedures.

4.1.1 Precautions

Precautions are as follows:

- 1: When configuring the system area by using a contactless reader/writer while the contactless reader/writer turns carrier off every time a command is issued, it is necessary to observe the writing unit and order. For example, the parameters (e.g., SC, IDM) related to communication command can change their values when configuring the system area or when writing a valid value to CFEN (*). In this case, when writing a valid value to CFEN, writing data to Blocks 29 to 31 by a single command prevents the system area setting from being complicated.
- 2: Data must be written to Block 27 and Block 28 each in units of one block. Use a WRITE command to write a block (16 bytes).
- 3: All-0 is always read from Block 27 and Block 28, regardless of the value of written data.

(*) As an example, we assume that data is written to Blocks 29 and 30 in units of one block while the contactless reader/writer turns carrier off every time a command is issued.

- Description

(1) Writing to Block 29: Write a valid value to CFEN (CFEN has invalid value before executing (1)).

(2) Writing to Block 30: Write a given value to IDM.

When data is written in the order of (1) and (2), the value of IDM changes as follows.

Before executing (1): default value (0x02FE000000000000);

After executing (1): the value of FeRAM that is not written is set since (2) has not yet been executed.

When using READ and WRITE commands based on JISX6319-4, IDM must be specified. Although you can acquire the IDM of this RFID using a REQ command, it is necessary to insert a REQ command between (1) and (2) to acquire IDM and set that IDM to the IDM to which a value is to be written by a WRITE command in (2).

When writing a valid value to CFEN, it is recommended to use a single WRITE command for Blocks 29 to 31.

4.1.2 Setting Procedures of System Area

This section provides two setting procedures of the system area (Steps 1 and 2).

Figure 0-1 shows Step 1 (writing all data only in one process).

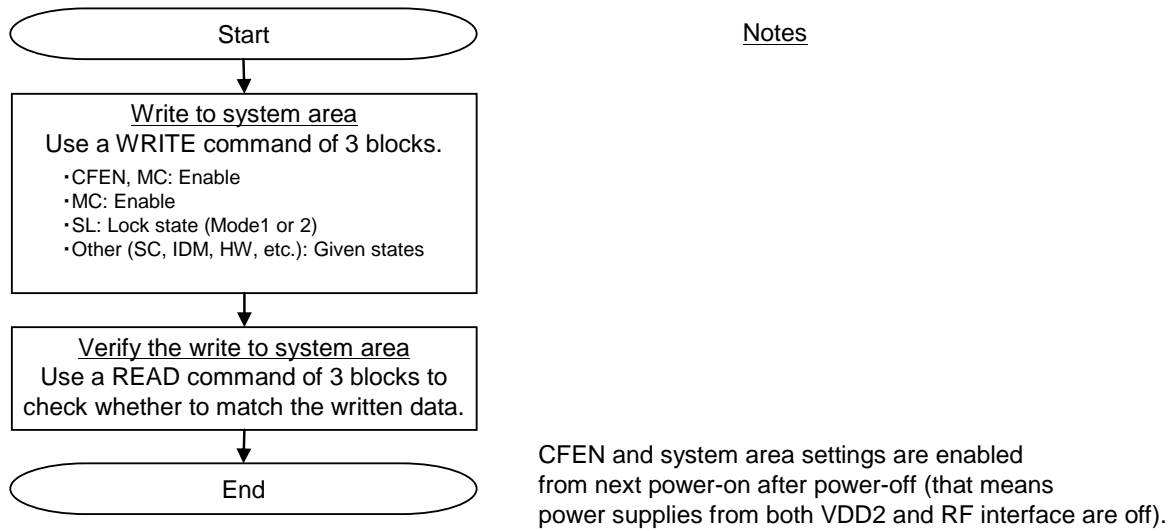


Figure 0-1 System Area Setting Procedure (Step 1)

Figure 0-2 shows Step 2 (writing all data in two processes). This step, for example, can be applied to the case in which first you configure the system area and then configure the user area in another process.

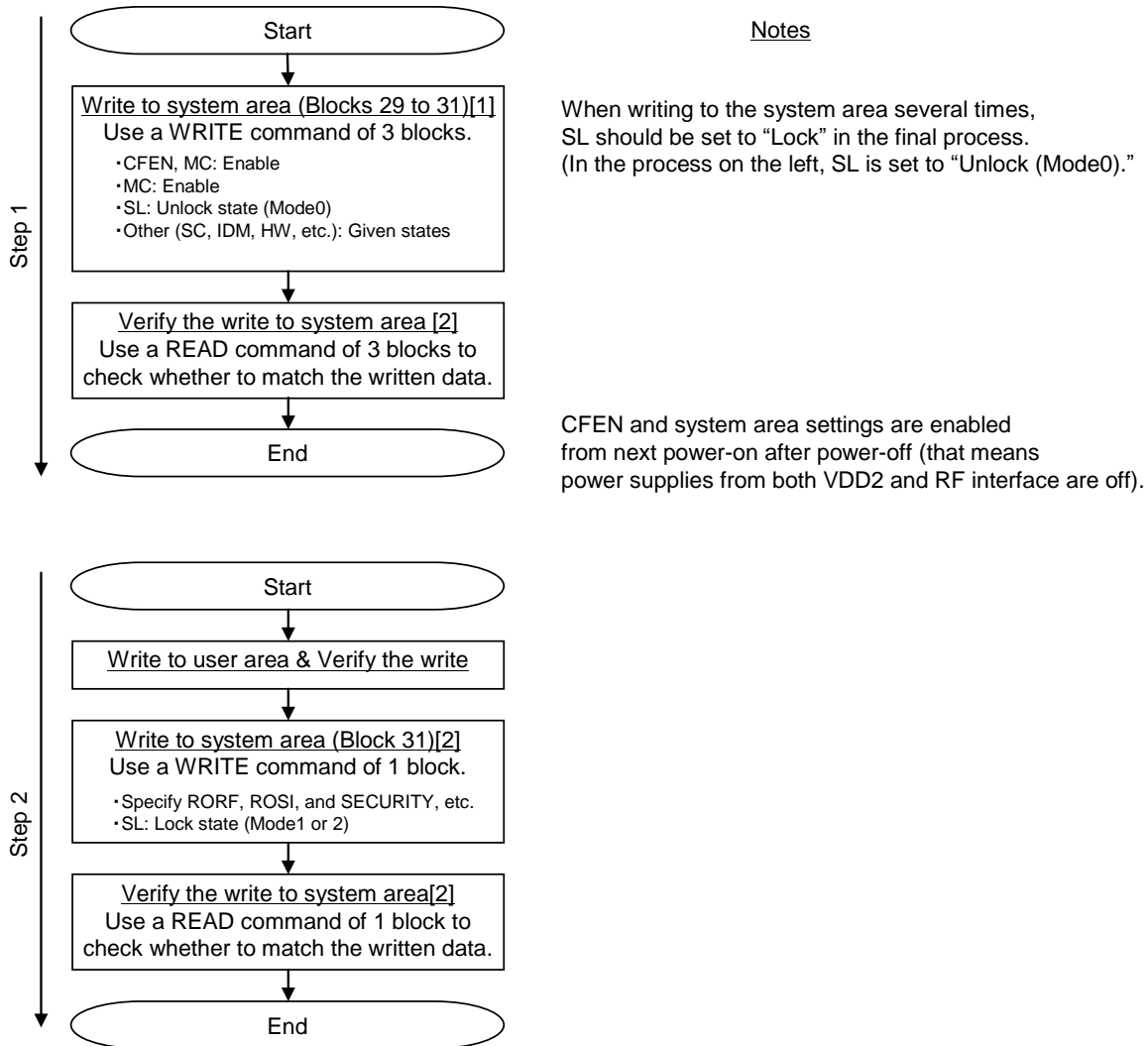


Figure 0-2 System Area Setting Procedure (Step 2)

Revision History

Revised on May 24, 2013

Purpose	Version 1.0			-		
	Page	Section	Comments	Page	Section	Comments

Revised on Jul 23, 2014

Purpose	Version 1.0			Version 1.1		
	Page	Section	Comments	Page	Section	Comments
Add	-	-	-	P12	-	Add Note, "SL is flag data for locking the system area..."
modify	P12	-	Fig2-2	P13	-	Fig2-2 State transition

MN63Y1210A-E1 Administrator's Manual

Jul. 23, 2014, Version 1.1

Issued by
Panasonic Semiconductor Solutions Co., Ltd.

Edited and produced by
Panasonic Semiconductor Solutions Co., Ltd.

© Panasonic Semiconductor Solutions Co., Ltd. 2014

Request for your special attention and precautions in using the technical information and semiconductors described in this book

- (1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.
- (2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation, Nuvoton Technology Corporation Japan or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information de-scribed in this book.
- (3) The products described in this book are intended to be used for general applications (such as office equipment, communications equipment, measuring instruments and household appliances), or for specific applications as expressly stated in this book.
Please consult with our sales staff in advance for information on the following applications, moreover please exchange documents separately on terms of use etc.: Special applications (such as for in-vehicle equipment, airplanes, aerospace, automotive equipment, traffic signaling equipment, combustion equipment, medical equipment and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
Unless exchanging documents on terms of use etc. in advance, it is to be understood that our company shall not be held responsible for any damage incurred as a result of or in connection with your using the products described in this book for any special application.
- (4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.
- (6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. We do not guarantee quality for disassembled products or the product re-mounted after removing from the mounting board.
When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.
- (7) When reselling products described in this book to other companies without our permission and receiving any claim of request from the resale destination, please understand that customers will bear the burden.
- (8) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of our company.