DENSO

2D code Handy Scanner

SF1-QBi-T

User's Manual

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Introduction

Thank you for purchasing the SF1-QBi-T DENSO WAVE 2D code Handy Scanner.

Please READ through this manual carefully. It will enable you to operate your scanner correctly.

After you have finished reading this manual, keep it in a safe place for speedy reference.

Note: Do not use this scanner in an environment with electrical noise that can trigger malfunction.

Note: Specifications described in this manual are supported by SF1-QBi-T Firmware version 1.00 or later.

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Customer Registration and Inquiries

■ Customer Registration

To allow us to provide our customers with comprehensive service and support, we request that all customers complete a Member Registration Form. Registered members will be offered the following privileges.

Latest upgrade information

Information regarding new products, exhibitions and events

Free web-information service "QBdirect"

QBdirect Service Contents

Information search service (FAQ)	Offers detailed information on each product.
Download service	Offers downloads of repair modules for the latest SF1-QBi-T systems or software, and sample programs.
E-mail inquiries	Allows customers to send product-related queries by e-mail.

* Please note that these privileges may be subject to change without prior notice.

● How to Register

Access the URL below and follow the instructions provided.

https://www.denso-wave.com/en/

SAFETY PRECAUTIONS

Be sure to observe all these safety precautions.

■ Please READ through these instructions carefully. They will enable you to use the scanner correctly.

■ Always keep this manual nearby for speedy reference.

Strict observance of these warnings and cautions is a MUST for preventing accidents that could result in bodily injury and substantial property damage.

Make sure you fully understand all definitions of these terms and symbols given below before you proceed to the text itself.

⚠ **DANGER**	Alerts you to those conditions which have a high likelihood of causing serious bodily injury or death if the instructions are not followed correctly.
⚠ **WARNING**	Alerts you to those conditions which could cause serious bodily injury or death if the instructions are not followed correctly.
⚠ **CAUTION**	Alerts you to those conditions that could cause minor bodily injury or substantial property damage if the instructions are not followed correctly.

Meaning of Symbols

A triangle (⚠) with a picture inside alerts you to a warning of danger.
Here you see the warning for electrical shock.

A diagonal line through a circle (⊘) warns you of something you should not do; it may or may not have a picture inside.
Here you see a screwdriver inside the circle, meaning that you should not disassemble.

A black circle (●) with a picture inside alerts you to something you MUST do.
This example shows that you MUST unplug the power cord.

<table>
<tr><td colspan="2">⚠ **DANGER**</td></tr>
</table>

Handling the rechargeable battery

Incorrect handling of the rechargeable battery could cause the battery to generate heat or smoke, or to rupture or burn. This is DANGEROUS. Be sure to observe the following.

🚫	• Never disassemble or modify the rechargeable battery. • Never connect the positive and negative terminals of the rechargeable battery with a wire or other metallic materials. • Do not carry or store the rechargeable battery together with necklaces, hairpins, or anything else metallic. • Never burn or heat the rechargeable battery. • Do not use or leave the rechargeable battery anywhere there is excessively high temperature (50°C or higher), such as near fire or stoves. • Never immerse the rechargeable battery in water of any kind or moisten it. • Never charge the rechargeable battery near a fire or in other high-temperature locations. • Never charge or use the rechargeable battery where any inflammable gases may be emitted. • Do not stick a needle into the rechargeable battery, hammer it, or tread on it. • Do not let the rechargeable battery undergo any shock or impact or throw it at something hard. • Do not use a rechargeable battery that is notably deformed, scratched, or cracked. • Never solder anything directly to the rechargeable battery. • Do not use the rechargeable battery with equipment other than the scanner. • If abnormal odor, heat, discoloration, deformation or any other abnormal conditions are noticed when the rechargeable battery is in use, being charged, or is in storage, remove it from the scanner or charger and avoid further use.
❗	• Only use the dedicated charger for charging the rechargeable battery. • If battery fluid leaks from the rechargeable battery and it gets into your eyes, rinse them with clean water thoroughly without rubbing and consult a doctor as soon as possible. Doing otherwise may damage your eyes.

⚠ WARNING

Warning: To System Designers

🛈	● When introducing the scanner in those systems that could affect human lives (e.g., medicines management system), develop applications carefully through redundancy and safety design which avoids the feasibility of affecting human lives even if a data error occurs.

Incorrect handling of the scanner could cause it to generate heat or smoke, or to rupture or burn. Be sure to observe the following.

🚫	● If smoke, abnormal odors or noises come from the scanner, immediately discontinue use, remove the rechargeable battery from the scanner, and contact your nearest dealer. Failure to do so could cause fire or electrical shock.
	● If foreign materials or liquid enter the device, immediately remove the rechargeable battery from the scanner and contact your nearest dealer. Failure to do so could cause fire or electrical shock.
	● If the device ceases to operate or its housing is broken due to being dropped or receiving any other strong impact, immediately remove the rechargeable battery from the scanner and contact your nearest dealer. Failure to do so could cause fire or electrical shock.
	● Never charge or use the scanner where any inflammable gases may be emitted. Doing so could cause fire.
	● Do not subject the scanning window of the scanner to direct sunlight for extended periods. Doing so could damage the scanner, resulting in a fire.
	● Never allow the charging terminals to come in contact with metal, etc. Large current flowing through the device could cause overheating, fire or breakage.
	● If the battery does not finish charging within the specified time, stop charging.
	● Never put the scanner into a microwave oven or high-pressure container.
🛈	● Only use the specified rechargeable batterys. Failure to do so could cause fire.

⚠ CAUTION

Incorrect handling of the scanner could cause it to generate heat or smoke, or to rupture or burn. Be sure to observe the following.

Never disassemble	• Never disassemble or modify the scanner. Doing so could result in a fire or electrical shock.
❗	• If you are not using the scanner for a long time, be sure to remove the rechargeable battery for safety. Failure to do so could result in a fire.
🚫	• Do not put the scanner on an unstable or inclined plane. The scanner may drop, causing injuries. • Never put the scanner in places where there are excessively high temperatures, such as inside closed-up automobiles, or in places exposed to direct sunlight. Doing so could affect the housing or parts, resulting in a fire. • Avoid using the scanner in extremely humid areas, or where there are drastic temperature changes. Moisture will get into the scanner, resulting in malfunction, fire or electrical shock. • Do not place the scanner anyplace where it may be subjected to oily smoke or steam, e.g., near a cooking range or humidifier. Doing so could result in a fire or electrical shock. • Never cover or wrap in a cloth or blanket. Doing so could cause the unit to heat up inside, deforming its housing, resulting in a fire. Always use the scanner in a well-ventilated area. • Do not insert or drop foreign materials such as metals or anything inflammable through the openings into the scanner. Doing so could result in a fire or electrical shock. • Never scratch or modify the scanner. Doing so could damage the scanner, resulting in a fire. • Do not put heavy material on the scanner, or allow the cable to get pressed under heavy material. • Do not look into the light source from the scanning window or do not point the scanning window at other people's eyes. Eyesight may be damaged by direct exposure to this light. • Do not use the scanner if your hands are wet or damp. Doing so could result in an electrical shock. • Never use chemicals or organic solvents such as benzene and thinner to clean the housing. Do not apply insecticide to the scanner. Doing so could result in a marred or cracked housing, electrical shock or fire. • Do not use the scanner with anti-slip gloves containing plasticizer. The scanner housing may break, causing injuries, electrical shock, or fire. • When using a hand strap or neck strap, be careful not to hook it on anything or get caught in a rotating object. It may cause damage or injury.

⚠ CAUTION

Incorrect handling of the scanner could cause it to generate heat or smoke, or to rupture or burn.
Be sure to observe the following.

🚫	● Do not put your ear close to the buzzer while the sound is ringing. It may cause deafness. ● Do not apply an excessive force when removing the rechargeable battery. Doing so may break the rechargeable battery wire or cause equipment failure. ● When removing the rechargeable battery, please remove static electricity before removing it. It may cause equipment failure. ● When inserting or removing the rechargeable battery, do not touch any parts other than the connector with tweezers. It may cause equipment failure. ● Do not use the scanner in environments where large static electricity is generated. It may cause malfunction or failure of equipment. ● Do not use the scanner in an environment where oil may adhere. It may cause equipment failure. ● Do not bring the magnetic card close to the buzzer of the scanner. Magnetic data may be lost.
🔌	● When performing care and maintenance, for safety remove the rechargeable battery from the scanner. Failure to do so could result in an electrical shock. ● Never drop the scanner. The scanner housing may break, causing injuries. Remove the rechargeable battery from the scanner and contact your nearest dealer. Failure to do so could result in smoke or fire. ● As the rechargeable battery at the time of shipment has a low charge condition, please use it after charging it with a dedicated charger (CH-SF11) before use.

Components

As described below, the devices required for this scanner differ depending on the parameters for use.

■When using a communications adapter (BA20-RU or BA11-RKU)

Basic Devices

When using a communications adapter, the following basic devices are required, regardless of interface.

(1) Scanner	SF1-QBi-T	*1
(2) Communications adapter	BA20-RU/BA11-RKU	
(3) Battery charger	CH-SF11	
(4) AC adapter	AD2 series	For battery charger

*1   SF1-QBi-T is a model that compatible with iAP and has a touch switch function.

Devices required for individual interfaces

● For RS-232C interface

(5) RS-232C interface cable	CBBA-RS2000/9	
(6) AC adapter	AD2 series	For communications adapter

● For USB interface (USB keyboard or USB-COM)

(5) USB interface cable	CBBA-US2000/4	

■ When communicating directly with Bluetooth®-equipped devices (when not using a communications adapter)

(1) Scanner	SF1-QBi-T	
(2) Battery charger	CH-SF11	
(3) AC adapter	AD2 series	For battery charger
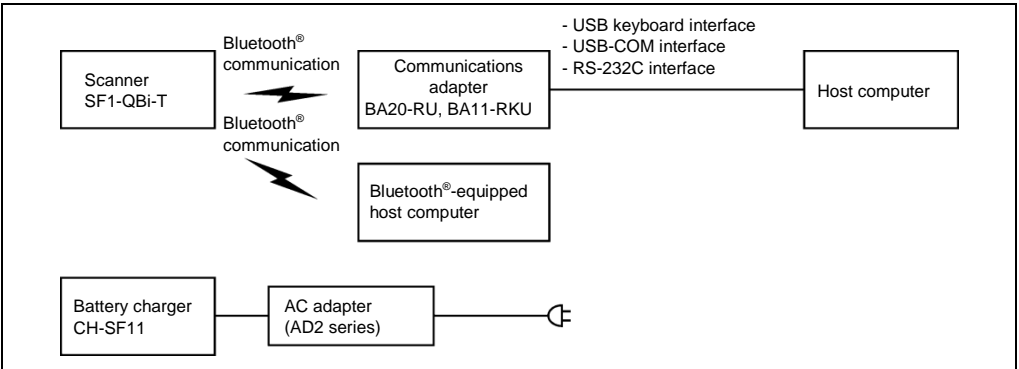
■ When used as a wearable scanner

(1) Scanner	SF1-QBi-T	
(2) Wearable attachment	AW2-001-R etc	*1
(3) Communications adapter	BA20-RU/BA11-RKU	
(4) Battery charger	CH-SF11	
(5) AC adapter	AD2 series	For battery charger

*1   Please refer to the instruction manual of wearable attachment for details.

Wireless communication

This scanner is equipped with wireless facilities based on Bluetooth® wireless technology.

Item	Specifications
Specifications	Bluetooth® Specification Ver. 2.1+EDR standard
Radio output	Class 2 (maximum 2.5 mW)
Supported profiles	Serial Port Profile / Human Interface Device Profile / iAP
Communication distance (reference value) (∗1)	Approximately 10 meters or more (unobstructed)

(∗1) Values are for data sent through the scanner and communications adapter (BA20-RU or BA11-RKU). Communication distance will vary depending on the device receiving the communication and the operating environment.

Notes for using wireless communication

There may be times when communication is not possible due to the operating environment. Be mindful of the following points and use the scanner in an environment where radio waves are stable.

- When using the scanner in close proximity of devices equipped with wireless LAN capabilities using the same frequency band as the scanner (2.4 GHz), the generated radio interference may reduce transmission speed or make transmission impossible.
- As the scanner uses the same 2.4 GHz frequency band as devices such as microwave ovens, industrial heaters, and high frequency medical equipment, communication may not be possible when near these devices.
- Electromagnetic noise from computers, refrigerators, or other home appliances may make communication impossible when nearby.
- Communication may not be possible in the following locations.

  Locations near metal or in which there is a lot of metallic powder
  Rooms enclosed by metallic walls
  Locations which receive strong vibrations

- Although the general possible communication distance under the conditions in which that distance has been measured is approximately ten meters (unobstructed), under other conditions, even communication within ten meters may not be possible due to the device receiving the communication and the operating environment.
  As there are individual variances in the possible communication distances of scanners, confirm that problem-free communication is possible before implementation.

Note: To System Designers

- Before developing applications, make sure that the intended environment is free of the interference factors above and thus actually capable of supporting link operation.
- If the enviromnent changes (e.g. newly installed electric equipments and movement / addition of shelves or objects), make sure that the scanner communicates properly with all equipment again before actual use.
- Make sure that the scanner communicates properly with all equipment in the environment where other equipment using the 2.4 GHz band is already operated or newly added to the existing system.

Care and Maintenance

■ Proper Care of the reading window

Dust or dirt accumulating on the clear plate of the reading window will affect reading performance.

If you use the scanner in dusty areas, periodically check the clear plate and clean it if dusty.

- To clean the plate, first blow the dust away with an airbrush. Then wipe the plate gently with a soft item such as a cotton swab.
- If sand or hard particles have accumulated, never rub the plate; doing so will scratch or damage it. Blow the particles away with an airbrush or a soft brush.
- Clean the charging terminals regularly. If it gets dirty, clean it each time.

■ Proper Care of the Scanner Body

Wipe any dirt from the scanner body with a dry, soft cloth.

CAUTION
- Never use substances such as benzine or alcohol, as this may cause the housing to be marred or paint to peel off.
- If excessively dirty, wipe with a soft cloth that has been soaked in soapy water (always use neutral detergent) and wrung out thoroughly.

Chapter 1   Names and Functions

Touch switch
When touching with your finger, illumination Area will light up and reading starts.
☞ Refer to Chapter 5 for details.

Built-in antenna
Bluetooth® antenna.
Do not modify this antenna section or cover it by hand.

Trigger switch
Press this switch to read data or initiate a Bluetooth® wireless link.
The read modes are available to match the needs of the intended application.
☞ Refer to Chapter 5 for details.

Magic key
When this key is pressed at the time of power-off, power-on of the
scanner is carried out and Bluetooth® wireless link is started.
Press and hold this key to disconnect the Bluetooth® wireless link.
Press it for a short time to check the remaining battery power.
☞ Refer to Chapter 6 for details.

Beeper
The beeper sounds when the scanner has scanned a code
successfully.

Indicator LED1
Illuminates in blue when the scanner
has read a code successfully.
If any error occurs, this indicator flashes
in red. Indicates the status of the scanner's
Bluetooth® wireless link.
☞ Refer to Chapter 8 for details.

Charge terminals
Place on the Charger to charge the SF1-QBi-T.

Strap hole
Use to attach a hand strap.

Indicator LED2
Illuminates in blue when the scanner
has read a code successfully.
If any error occurs, this indicator flashes in red.
Indicates the status of the battery level.
☞ Refer to Chapter 8 for details.

Vibrator
The viblator builds in the scanner.

Battery cover
Remove this cover to replace the battery.
☞ Refer to Chapter 2 Section 2.3 for details.

Reading window
Bring this window to a code to be
scanned.

1

Chapter 2   Basic Operation

2.1   Charging the rechargeable battery

When using the scanner for the first time or when not using it for a long time, be sure to charge it before using it.

■Charging procedure

(1) Connect the AC adapter to the charger and then plug it into an electrical outlet.

(2) Place the scanner in the charger. The scanner's indicator LED2 turns red, indicating the start of charging.
When charging is complete approximately 2.5 hours later, the indicator LED2 turns green.

(3) Remove the scanner from the charger and unplug the AC adapter from the electrical outlet.

Operation and Status	Scanner's indicator LED2
Place the scanner in the charger.	**Red**
↓	
Charging starts.	**Red**
↓ **Approximately 2.5 hours later**	
Charging complete.	**Green**

Charger

DC input connector

AC adapter

Indicator LED2
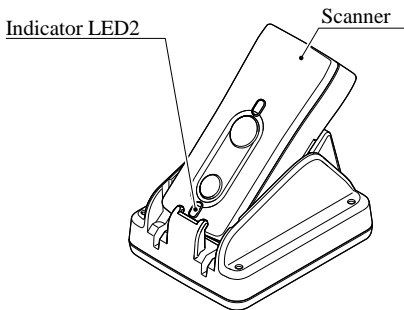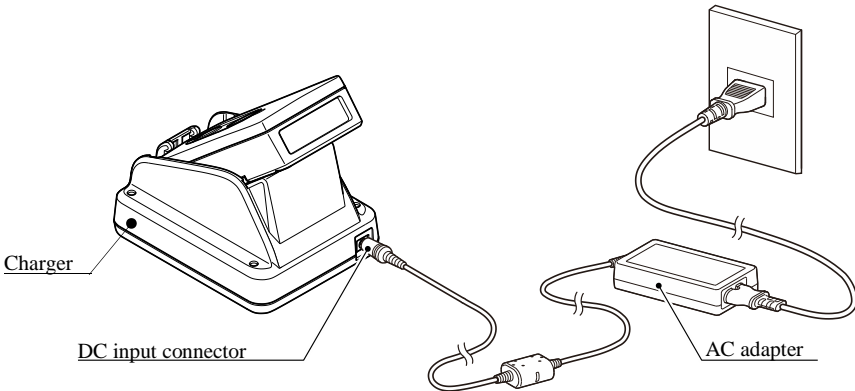
Scanner

If the indicator LED 2 does not light or blinks red, charging is not possible. Please refer to Chapter 14 and take action. While charging, the scanner and charger may become warm, but this is not a malfunction.

■Handling precautions

・Charge in the following locations.

- Locations with an ambient temperature between 0°C and 40°C
- Locations with humidity between 10% and 90%
- Locations with little dust and no excessive vibration
- Locations which will not come into contact with water

・Do not place the scanner or rechargeable battery in direct sunlight (closed vehicles, etc.) or in high-temperature locations.

・Unplug from the outlet when not in use.

・Occasionally clean the charging terminals with a cotton swab, etc. The battery will not charge correctly if the terminals are dirty.

・If using the strap of optional accessory, put the strap around the strap guide. The strap may contact the charging terminals and may not charge. For charger strap guides, refer to Operator's Guide of the charger.

・If you do not use the scanner for a long time, remove the battery from the scanner and store it.

・Please be sure to attach the battery cover when using the scanner.

2.2   Remaining Battery Level Indications

The remaining battery level can be checked by lighting of the indicator LED2 by pressing the magic key quickly.

The remaining battery level is displayed in three stages.

Battery level 40% or more	Lights in green.
39% to 10%	Lights in orange.
Less than 10%	Lights in red.

Note:
- The remaining battery level is not an accurate indicator.
  Use this purely as an approximate indicator.

2.3 Rechargeable Battery Replacement Method

When the time in which the scanner can be used becomes noticeably shorter despite charging the rechargeable battery, replace the rechargeable battery.

Before changing the battery, please turn off the power of the scanner.

Note: The rechargeable battery cartridge is perishable and as such its life is limited. The length of its life depends on the usage conditions. Furthermore, follow the procedure below to remove the rechargeable battery cartridge when the scanner has malfunctioned. If the screws fixing battery cover are loose, please tighten them again.

Follow the steps below to set the battery correctly.

(1) Remove the screws ① and remove the battery cover ②.

Note:
・Do not remove the sealing rubber and the cushioning material attached to the battery cover.

Battery cover
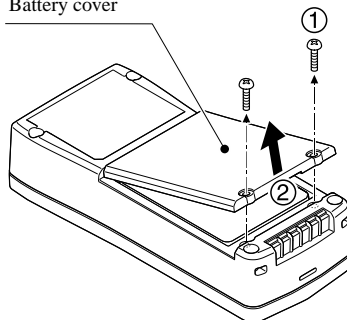
(2) Remove the rechargeable battery from the scanner.

Rechargeable battery
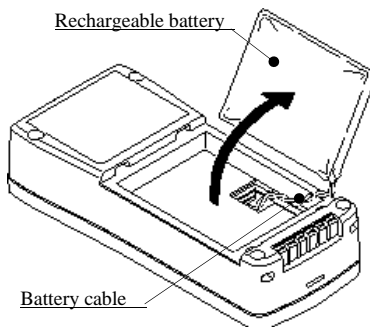
Battery cable

(3) Grasp the battery cable connector with tweezers or the like, remove it in the direction of the arrow, and remove the rechargeable battery.

Note:

・When disconnecting the battery cable connector, be sure to hold the connector. Pulling the cable may cause a break and cause malfunction.

・Please remove the battery with static electricity removed. It may cause the equipment to break down.

・Do not touch parts other than the connector with tweezers or the like. It may cause the equipment to break down.
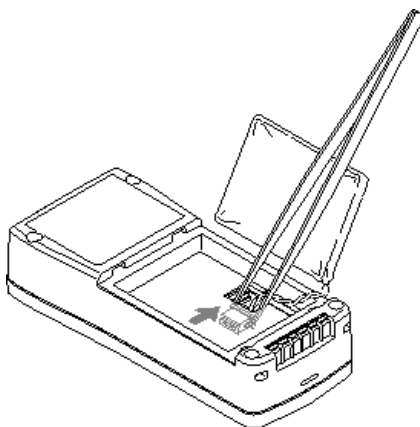
(4)   Insert the connector of the new battery firmly into the
scanner side connector. The direction of the battery cable
connector is attached so that the charging terminal side (the
right side of the figure) becomes the red wire.

     Note:

      ・Do not attempt to insert the connector in the wrong
       direction. It may cause equipment malfunction.

      ・Be careful not to short the + positive and – negative
       terminals of the battery with tweezers or the like. It may
       cause overheating, smoke, rupture or ignition of the
       battery.

Wire(red)

Scanner side connector
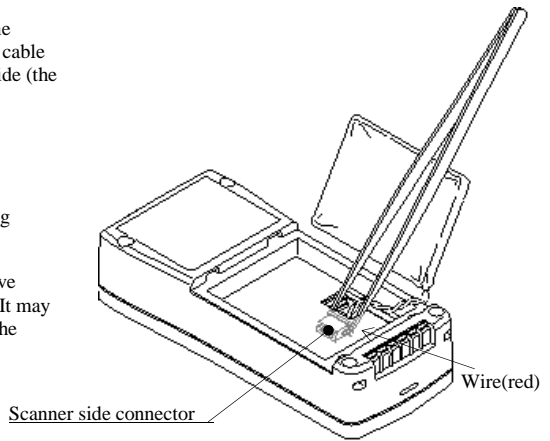
(5)   Crawl the battery cable so that it can be stored in the cable
trench of the scanner and insert the battery.

     Note:

      ・Please install the battery cable so that it does not get caught
       between the rechargeable battery and the cases. If it is
       forcibly assembled, it may break and cause malfunction.

      ・If the battery cable is twisted about 3 times so that the wire
       does not break up, it will be easier to store in trench of the
       case..

      ・Be careful not to pull the battery cable wire. It may break
       and cause a failure.

trench of the case

Rechargeable battery
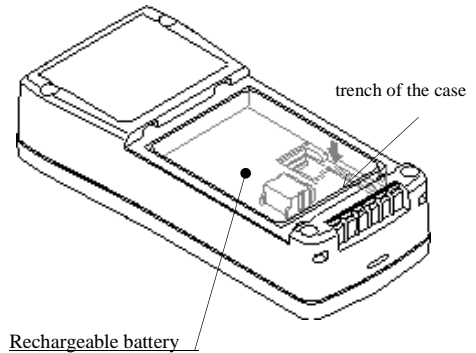
(6)   Close the battery cover and fasten it with screws.

     Note:

      ・Please do not overtighten with a strong force. The
       battery cover is deformed.

      ・Do not close the battery cover while the sealing rubber
       is out of the groove. The waterproof function (IP 54)
       will deteriorate and the battery cover will deform.

      ・Be sure to charge the battery after replacing the
       rechargeable battery.
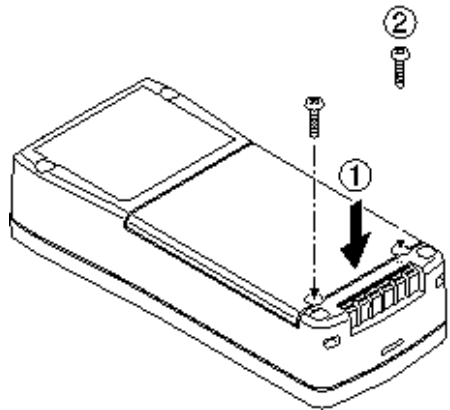
2.4 Recycling the Rechargeable Battery

● The rechargeable battery used with this product employs a lithium-ion battery which includes rare recyclable resources. Please recycle so that these resources can be reused.

Li-ion 00

● Please take any expended rechargeable battery to your nearest cooperating rechargeable battery recycler, or contact your nearest Denso office.

Pay careful attention to the following points when placing the used rechargeable battery into the recycling box of a recycler.

- In order to prevent heat generation and fire caused by a short, cover the connector with cellophane tape, etc. And place it in the box in an insulted state.

- Never remove the vinyl coverings (coating, tubes, etc.)

- Never disassemble or modify the rechargeable battery.

2.5 Turning the Scanner On and Off

Turning the scanner on

When the scanner is turned off, pressing the magic key will start the Bluetooth® wireless link. Using the scanner when the "End operation" is selected requires scanning the "Start operation" QR Code symbols given in Section 12.2 with the procedure in Section 12.1. (When the scanner is turned on, pressing the trigger switch will start the Bluetooth® wireless link.)

Turning the scanner off

When the scanner is not used for a long time, turn the scanner off by holding the trigger switch and the magic key down for three seconds or more.

Auto power-off

The timeout period for automatically turning the scanner off when it has not been used for a long time can be set within the range 5 to 640 minutes in 5-minute increments. Auto power-off can also be set to disabled. This function can be set up only on the configuration software (ScannerSetting_2D)*.

*The configuration software (ScannerSetting_2D) is available as a free download from our website at
https://www.denso-wave.com.

2.6   Scanning Codes

Be sure to charge the battery before using the scanner for the first time or after an extended period of disuse.

(1)   Bring the reading window to a target code and press the trigger switch. The scanner turns the marker beam and illumination LED on to indicate the scanning range and scans the code respectively. Align the center of the marker beam with that of the target code.

The factory default setting for SF1-QBi-T is the touch switch switching "enable". Do the scanning operation with the touch switch.
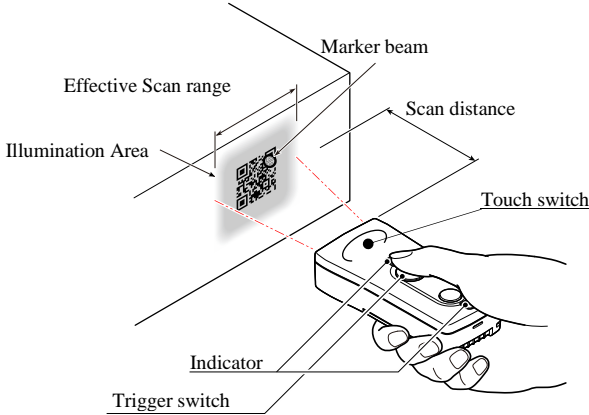
(2)   Wait for the two indicators to turn blue and the beeper to sound, indicating a successfully scanning.

NOTE: The illumination area should only be used as a guide. It does not assure that a code within the illumination area can be read.

NOTE: The actual scan range is narrower than the illumination area. The scan range is approx 6 cm (2.4 ″) wide by 4 cm (1.6 ″) high when the scan distance is approx 10 cm (3.9 ″).

NOTE: Allow only a single code to come within the field of view except when the multi-line code scanning is allowed. Having more than one code within the field of view either causes the read to fail or produces multiple input.

NOTE: The double-read prevention enabled time can be specified with the configuration software (ScannerSetting_2D).

NOTE: The scanner can read codes omnidirectionally. Note that a target code plus its margin should lie within the scan range.

NOTE: If the scanner fails to read due to specular effects or other factors, change the scanning angle of the reading window or the distance from the codes, and repeat the process. (Specular effects occur when the reflection of the light from the label surface is too strong, such as when the reflecting surface is polished or covered with vinyl.)

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* The configuration software (ScannerSetting_2D) is available as a free download from our website at
https://www.denso-wave.com.

■Scanning mode

Regular scanning mode	The data is transferred once the code has been read correctly.
Data verification mode	The data of the code that has been scanned is compared with that of the registered code to verify whether they match.. ☞ Refer to Section 7.1 for details.

■Power saver -- Entering Sleep state

When the trigger switch operation mode is set to auto-off mode or momentary switching mode with the trigger switch off, or when the scanner has entered the Ready state in alternate switching mode, it will enter Sleep state in order to reduce power consumption. (The scanner will not enter the Sleep state when in continuous reading mode 1 or 2)

The scanner will enter the Sleep state after 30 s in Normal consumption mode and will enter Sleep state immediately in Low consumption mode (default). Normal consumption mode and Low consumption mode can only be switched with the configuration software (ScannerSetting_2D).

When scanning from Sleep state, the scanning speed will take approximately 100 ms longer than when scanning from the Ready state.

> **NOTE**: When using the SF1-QBi-T as a wearable scanner, turn on the scanner after attaching the attachment. If attached to the attachment after the scanner is turned on, the Low consumption mode will not be set and the usage time will be shortened.

Chapter 3   Bluetooth® wireless communication

See Appendix 3 for terms regarding Bluetooth® wireless communication.

3.1   Enabling Bluetooth® wireless communication

When using the scanner for the first time, Press and hold the magic key to turn the scanner on.This procedure enables the Bluetooth® wireless communication function.

Note: In hospitals, airplanes, and other locations where there is a possibility that Bluetooth® radio waves (2400 MHz - 2483.5 MHz, 2.5 mW max.) may have an effect, disable the Bluetooth® wireless communication function of this scanner.

   To disable the Bluetooth® wireless communication function of this scanner, read the "End operation" QR code in Section 12.2 following the procedure in Section 12.1.

Note: When in the default factory setting or "End operation" has been set, the scanner cannot read codes other than the "Start operation" QR code, the batch setting QR Code, or the barcode on the back of the communications adapter. Reading the "Start operation" QR code in Section 12.2 following the procedure in Section 12.1 enables the Bluetooth® wireless communication function.

3.2 Establishing Bluetooth® wireless communication

After the Bluetooth® wireless communication function has been enabled, the descriptions in this Chapter can be used to establish a Bluetooth® wireless communication connection between the scanner and the BA series communications adapter or other Bluetooth® device. The scanner and the communications adapter are both set as slave devices by default.

There are methods to set the scanner to connect as the slave device (default) or as the master device. Use the QR-coded parameter menu or the configuration software (ScannerSetting_2D)* to set the scanner as the slave device. When setting the scanner as the master device, the Bluetooth® address of the connecting slave device must be set.

A usage profile must also be set. Use the QR-coded parameter menu or the configuration software (ScannerSetting_2D)* to set the profile.

Note: When using the configuration software, in addition to setting the master or slave, there is also a "No change" option. When this is selected, Bluetooth® wireless communication will not be disconnected when other parameters are changed using the configuration software or batch setting QR code (Refer to Chapter 4).

When connecting the scanner to an iPhone, iPad, iPod, Android, Windows PC or other device

The scanner can be connected to an iPhone, iPad, iPod, Android, Windows PC or other device equipped with a Bluetooth® module that is compatible with Bluetooth® Specification Ver. 2.1+EDR.

(1) Turn the scanner and connected device on. Initiate the Bluetooth® wireless link.

(2) Set the scanner communication settings.

Scan the "Easy connection setup" QR code corresponding to the connected device and the compatible profile.

Easy connection setup
To set the connection corresponding to the connected device, simply read the QR codes below.
(The connected device should be equipped with Bluetooth® module that is compatible with Bluetooth® Specification Ver. 2.1+EDR.)
The 1st connection waits for the connection from a connection target. With future connections, you can connect by only pressing the trigger switch. (Only when connecting with the same device)

To set the parameters, simply scan the QR codes below. Scanning the "Start setting" QR Code symbol and "End setting" QR Code symbol is not required.

The Easy connection setup QR Code, please perform reading after setting completion in other items. It may be overwritten connection setting when setting other items after Easy connection setup QR Code reading.

iOS (iPhone, iPad iPod)
(HID Profile)

iOS(iPhone, iPad, iPod)
(iAP)

Android
(HID Profile)

Windows PC, Android
(SPP Profile)

Windows PC
(HID Profile)

If the scanner beeps three times, this indicates that it is standing by for the wireless link.

* the configuration software (ScannerSetting_2D) is available as a free download from our website at
https://www.denso-wave.com.

(3) Start up the Bluetooth® wireless link of the connected device and connect the device to the scanner.

iOS (HID Profile)

   1. Start up the iOS "Setup" icon.

   2. Select "Bluetooth".

   3. Select "SF1".
     The scanner beeps twice when a successful connection is made.

* The setting of the software keyboard function can be changed only when connecting the scanner to iPhone, iPad or iPod.
  Whether or not to display the software keyboard can be switched by pressing the magic key for approx. 500 msec.

Android (HID Profile)

   1. Start up the Android "Setup" icon.

   2. Select "Bluetooth".

   3. Select "SF1".

   4. When the "PIN" code confirmation is displayed, enter "1234".
     The scanner beeps twice when a successful connection is made.

Android (SPP Profile)

   1. Start up the Android "Setup" icon.

   2. Select "Bluetooth".

   3. Select "SF1".

   4. When the "PIN" code confirmation is displayed, enter "1234".

   5. When the scanner is successfully connected, "SF1" is displayed on the paired device.

* "Connect" is displayed on the screen; however, at this time, the LED does not light and the scanner does not beep.

   6. In the operation app, perform "Connect" and select "SF1".
     This initiates the link and the scanner sounds the beep twice.

Windows PC (HID Profile)

   1. The Bluetooth icon is displayed in the notification area at the bottom right of the screen. Right click the icon and then
     click [Add a Device].

   2. From the list of devices, select "SF1".
     Drive installation starts.

   3. When the "PIN" code confirmation is displayed, enter "1234".

   4. Select "Skip obtaining driver software from Windows Update".
     After a while, the Bluetooth HID device is installed and a link is established.
     The scanner beeps twice when a successful connection is made.

Windows PC (SPP Profile)

1. The Bluetooth icon is displayed in the notification area at the bottom right of the screen. Right click the icon and then click [Add a Device].

2. From the list of devices, select "SF1". Drive installation starts.

3. When the "PIN" code confirmation is displayed, enter "1234".

4. Select "Skip obtaining driver software from Windows Update".
   After a while, the standard serial interface via the Bluetooth wireless link is readied.

5. From the Windows toolbar, select "Open settings" under "Bluetooth Devices".

6. Click on the "COM Ports" tab, and check the COM port No. assigned to SF1.

7. In the operation app, open the assigned COM port. This completes pairing and the wireless link is established.
   After a while, the scanner sounds the beep twice.

iOS (iAP Protocol)

1. Start up the iOS "Setup" icon.

2. Select "Bluetooth".

3. Select "SF1".

4. In the operation app, perform "Connect" and select "SF1". This initiates the link and the scanner sounds the beep twice.

(4) The next time connecting to the device, simply press the trigger switch. (Only when connecting with the same device)

Connecting the scanner as a slave device (default)

The scanner is set as a slave device by default. When the scanner has been set as a slave, communications adapters, commercial Bluetooth® devices, etc. can be used as the master device. In this case, special settings are not required for communication.

(1) When the scanner has been set as a master device, read the "Set as slave" QR code in Section 12.2 following the procedure in Section 12.1 to set it as a slave device.

(2) Set the profile to be used. Use the scanner to scan the "SPP profile" or "HID profile" QR Code symbol given in Section 12.2 and its procedure in Section 12.1. (When the scanner leaves the factory, the default setting is "SPP profile".)

(3) When settings have been completed and the beeper sounds three times, pull the trigger switch. The scanner will wait for a connection from a master device for approximately 2 minutes (default).

(4) When connecting to a communications adapter, set the communications adapter as the master device and set the Bluetooth® address of the scanner. Use the configuration software (BASetting) to set the Bluetooth® address of the communications adapter.
When connecting to a commercial Bluetooth® device, use the commercial Bluetooth® device to search for the scanner and connect to it. Follow the instructions in the manual of the commercial Bluetooth® device for operation.

(5) When using a communications adapter or commercial Bluetooth® device, start a Bluetooth® wireless communication link connection with the scanner set as a slave device.

(6) When the connection has been established, the scanner beeper will sound two times and the indicator LED illuminates in green (for 0.5 seconds).

Note: If a search from the master device does not detect a scanner within range, make the connection start duration longer and perform the search again.

Note: When connecting an SPP profile to a commercial Bluetooth® device, connection may not complete until the device-side COM port opens following authentication. Open the COM port after authentication is complete.

Note: For connection with a communications adapter, only an SPP profile is possible.

<u>Connecting the scanner as a master device</u>

When using the scanner as the master device and a communications adapter or commercial Bluetooth® device, etc. as the slave device, the Bluetooth® address of the connecting slave device must be set on the scanner. Refer to the examples below. The connection between the scanner and the slave device is a 1:1 connection.

Using a communications adapter (example)

(1) Use the scanner to read the barcode (the Bluetooth® address of the communications adapter) on the back of the communications adapter.
Start a Bluetooth® wireless communication link connection with the communications adapter with the scanner set as the master device.

(2) When the connection has been established, the scanner beeper will sound two times and the indicator LED illuminates in green (for 0.5 s).

| Note: | For connection with a communications adapter, the SPP profile connects automatically. Connection with a communications adapter cannot be made with an HID profile. |

Using a commercial Bluetooth® device (example)

(1) Confirm the Bluetooth® address of the connecting Bluetooth® device.
To confirm the Bluetooth® address, follow the instructions in the manual of the Bluetooth® device.

(2) Use the configuration software (ScannerSetting_2D)* to create a code ("Set Bluetooth® address" code) for setting the confirmed Bluetooth® address.
When using commercial code creation software, create a code in the below formats.

Code type	Data format
QR Code Model 1, 2	%% ADDRXXXXXXXXXXXX %%
Code 128 Code Set A	ADDRXXXXXXXXXXXX

Note: Specify the Bluetooth® address (hexadecimal) in the XXXXXXXXXXXX portion.

Example: Bluetooth® address "000AF1234567"

ADDR000AF1234567

(3) Set a usage profile. The profile can be set up in configuration software (ScannerSetting_2D). (Factory settings: Set to "SPP profile")

(4) Use the scanner to read the "Set Bluetooth® address" code.

(5) After successfully scanning the code, start a Bluetooth® wireless communication link connection with the specified Bluetooth® device with the scanner set as the master device.

(6) When the connection has been established, the scanner beeper will sound two times and the indicator LED illuminates in green (for 0.5 s).

| Note: | Depending on the connecting Bluetooth® device, it may not be possible to connect as the master device with a device that has never been connected. In this case, use the QR-coded parameter menu "Easy connection setting". When "Easy connection setting" is used, the scanner will connect as the slave device for the initial connection only, and will connect as the master device for all subsequent connections. |
| Note: | When connecting an SPP profile to a commercial Bluetooth® device, connection may not complete until the device-side COM port opens following authentication. Open the COM port after authentication is complete. |

Using configuration software (ScannerSetting_2D)*

(1) Set the scanner to SPP profile and connect to the communications adapter or a host computer equipped with Bluetooth®.

(2) The configuration software (ScannerSetting_2D)* can perform settings configured to the connecting device in the following aspects.
- Connecting device (Android, Windows PC, iPhone, iPad, iPod)
- Profile (SPP/HID) or Protocol (iAP)
- Mode (master/slave)
- Local device ID (other devices, keyboard peripheral)

(3) Search for the scanner from the connecting device and connect.
When the connection is successfully established, the beeper will sound two times.

(4) The operations in (3) are also required for subsequent connections.

Note: It is possible to show/hide the software keyboard by pulling the trigger switch two times within a short time. This function is limited to when iPhone, iPad or iPod has been selected as the connecting device.
This function can be enabled and disabled using the configuration software (ScannerSetting_2D).

3.3 Disconnecting Bluetooth® wireless communication

Press and hold the magic key for at least 2 seconds or read the "Disconnect Bluetooth® wireless communication QR code in Section 12.2 following the procedure in Section 12.1 to forcibly disconnect Bluetooth® wireless communication.

In addition, the operation following disconnection of Bluetooth® wireless communication using the magic key can be selected from the following two types.

■ Reconnection by pulling the trigger switch
Pull the trigger switch to connect in master mode or slave mode (depending on which has been configured).

■ Host connection standby
For first-time connections, regardless of whether the scanner is in master mode or slave mode, the scanner automatically switches to slave mode and awaits a connection from the connecting device. For subsequent connections, it is possible to connect to the initial device by simply pulling the scanner trigger switch after the scanner has switched to master mode.

Note:	Even when Bluetooth® wireless communication is disconnected in this way, the Bluetooth® wireless communication function remains on. To disable the Bluetooth® wireless communication function, read the "End operation QR code in Section 12.2 following the procedure in Section 12.1.
Note:	When the scanner awaits a connection from the host, the Bluetooth® wireless communication mode parameters are the same as those when Bluetooth® wireless communication is disconnected.
Note:	The user can select whether the Bluetooth® wireless communication disconnection function is available via the configuration software. (Refer to Chapter 11)

■ Bluetooth®-disconnect scanning
Scanning is possible when Bluetooth® wireless communication has been disconnected. This function is used when scanning a code will suffice and data transfer is not necessary. For example, it can be used in data verification mode for scanner-only determination without sending verification results to the host computer.

The function can only be switched with the QR-coded parameter menu.

Bluetooth®-disconnect scanning	Enables code scanning when Bluetooth® wireless communication has been disconnected. As the Bluetooth® wireless communication function is disabled, data cannot be transferred to or from the host computer.
Cancel Bluetooth®-disconnect scanning	Cancels "Bluetooth®-disconnect scanning." Enables code scanning when Bluetooth® wireless communication has been connected. As the Bluetooth® wireless communication function is enabled, data can be transferred to and from the host computer.

Note:	When "Bluetooth® disconnect scanning" is enabled, it will remain enabled even if "End operation" or "Start operation" QR-coded parameter menus are scanned. To cancel, the "Cancel Bluetooth®-disconnect scanning" QR code in Section 12.2 must be read following the procedure in Section 12.1.

■Auto-power off

The user can select the timing with which the scanner will automatically turn off (5 min-640 min intervals of 5 min) when the scanner is not used for a certain length of time. The user can also disable auto-power off. This function can only be set with the configuration software (ScannerSetting_2D).

3.4 Reconnecting Bluetooth® wireless communication

When Bluetooth® wireless communication has been disconnected using the operation below, pull the trigger switch to reconnect. Wireless communication is reconnected if the scanner is the master device; the scanner waits for a connection request from the master device if it is the slave device.

- When Bluetooth®-disconnect scanning has been set by scanning the "Bluetooth®-disconnect scanning" QR code in Section 12.2 following the procedure in Section 12.1, scan the "Cancel Bluetooth® disconnect" QR code. Pull the trigger switch after "Cancel Bluetooth®-disconnect" has been set. .

- When the scanner has automatically turned off, pull the trigger switch. .

- When Bluetooth® wireless communication settings have been changed from the configuration software (ScannerSetting_2D), pull the trigger switch. .

- When the configuration software (ScannerSetting_2D) displays the reconnection request dialog, pull the trigger switch. .

3.5 Scanner Bluetooth® wireless communication connection status

The user can confirm the Bluetooth® wireless communication connection status of the scanner using the scanner indicator LED1 and the timing of the beeper.

When the trigger switch is pulled and held down

Indicator LED1 status	Beeper	Scanner status
Flashes in red (fixed period)	Does not sound	A scan was performed while the scanner was in an operation-enabled state when Bluetooth® wireless communication was disconnected.
Flashes in red two times and turns off (repeats)		"End operation" set.
Unlit		Power is off.

When the trigger switch has been pulled and released

Indicator LED1 status	Beeper	Scanner status
Flashes in blue (short period)	Does not sound	The scanner is searching for a connection as the master device.
Flashes in blue (long period)		The scanner is awaiting a connection with the master device as the slave device.

When connection or disconnection has occurred

Indicator LED1 status	Beeper	Scanner status
Illuminates in green (0.5 s)	Two short beeps	A Bluetooth® wireless communication connection has been successfully established.
Illuminates in red (0.5 s)	One long beep	A Bluetooth® wireless communication connection has been disconnected.

Chapter 4   Parameter Settings

With this scanner, communication, code types and other parameters can be set using one of two methods, the QR-coded parameter menu or the configuration software (ScannerSetting_2D).* The set parameter values will be retained even after the scanner is turned off.

Note: Scanner parameters and communications adapter parameters can both be stored in the memory of the scanner; it is also possible to set the communications adapter from the scanner using Bluetooth® wireless communication. See Chapter 13 for details. There are codes for scanner setting (Section 12.2) and communications adapter setting (Section 13.2) in the QR-coded parameter menu.

(1) Parameters can be set by pulling the trigger switch and reading the QR code for parameter setting (QR-coded parameter menu).

(See Chapter 12 for setting the scanner and Chapter 13 for setting the communications adapter using the scanner.)

(2) Parameters can be set through the computer using the configuration software (ScannerSetting_2D)*. In this case, we recommend that the scanner be set as the master device.

(It is possible to generate a batch setting QR Code with the configuration software, and set parameters by reading it with the scanner.)
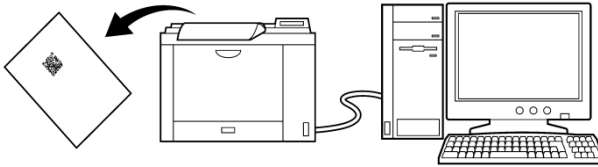
Note:	Because Bluetooth® wireless communication is disconnected when the scanner is set using the configuration software and batch setting QR code, reconnection is required once settings have been configured successfully. However, when "Bluetooth® wireless communication connection" is set to "No change" using the configuration software, Bluetooth® wireless communication will not be disconnected.
Note:	Settings cannot be configured when the scanner is in the End operation state. Be sure to switch to the Start operation state before setting. Refer to Chapter 3 Section 3.1 for details regarding Start operation and End operation.
Note:	The configuration software cannot be used when HID (Human Interface Device Profile) is selected. Generate a batch setting QR code with the configuration software and set parameters.
Note:	Parameters will not be retained if the battery is low. Set the parameters after charging.

* the configuration software (ScannerSetting_2D) is available as a free download from our website at
   https://www.denso-wave.com.

Chapter 5   Scanning Control

Scanning can be controlled through three different methods, "scanning using the trigger switch" (Section 5.1), "scanning using software control" (Section 5.2) or "scanning using the touch switch" (Section 5.3)
"Scanning using the trigger switch" enables the user to scan by operating the trigger switch. (Excludes continuous reading modes 1 and 2)

With "scanning using software control," however, the trigger switch is not pulled, rather control commands for Active state, Ready state etc. are sent from a computer or other control device. "Scanning using software control" cannot be used when HID (Human Interface Device Profile) is selected.

"scanning using the touch switch" is a function installed only in SF1-QBi-T, and scanning is possible by operating the touch switch.,

5.1   Scanning Using the Trigger Switch

Pulling the trigger switch illuminates the illumination light and puts the scanner in the Active state. The five types of trigger switch operation modes are as follows: Using the QR-coded parameter menu or configuration software (ScannerSetting_2D) select the operating mode in accordance with your objective.

(1) Auto-off Mode

The scanner enters the Active state while the trigger switch is pulled. Two settings for the duration of the Active state, "normal" and "one shot," are available. Make a selection in the configuration software (ScannerSetting_2D).

- Normal
  The scanner automatically returns to the Ready state when scanning is successfully completed, or after approximately five seconds have elapsed with the trigger switch pulled.
   If the trigger switch is released before five seconds have elapsed, the scanner returns to the Ready state.

- One shot
  The scanner only remains in the Active state for the one shot setting duration once the trigger switch is pulled.
   The one shot setting duration can be set using the configuration software (ScannerSetting_2D).

(2) Momentary Switching Mode

The scanner enters the Active state only while the trigger switch is pulled, and returns to the Ready state when the trigger switch is released.

(3) Alternate Switching Mode

The scanner switches between the Active state and the Ready state every time the trigger switch is pulled.

(4) Continuous Reading Mode 1

When turned on, the scanner illumination light comes on and the scanner goes into the Active state. All trigger switch functions are ignored.

The scanner enters the Ready state when it receives a "Z", "READOFF" or "LOFF" command, and enters the Active state when it receives an "R", "READON" or "LON" command.

Using the configuration software (ScannerSetting_2D), the user can select whether to send an "ERROR" command to the host unit when the scanner enters the Ready state after failing to complete the scan while in Active state.

(5) Continuous Reading Mode 2

Similar to continuous reading mode 1.

The difference between this and continuous reading mode 1 is that the scanner enters standby state when scanning is complete. To return to the Active state, the scanner must first receive a "Z", "READOFF" or "LOFF" command and enter the Ready state, and then receive an"R", "READON" or "LON" command.

Using the configuration software (ScannerSetting_2D), the user can select whether to send an "ERROR" command to the host unit when the scanner enters the Ready state after failing to complete the scan while in Active state.

Note:	The scanner will enter the auto-off mode regardless of the trigger switch settings while parameters are being set in the QR-coded parameter menu.
Note:	Trigger switch operation is only enabled after establishing a Bluetooth® wireless communication connection or when "Wireless-disconnect scanning" has been set.

5.2 Scanning Using Software Control

Instead of pulling the trigger switch to carry out scanning operations, these can be carried out via communication from a computer or other control device.

These software control commands are affected by the trigger switch operation mode as shown in the table below. (Refer to Appendix 2: Control Commands for detailed control commands.)

Commands	Content	Trigger switch operation mode				
		Auto-off mode	Momentary switching mode	Alternate switching mode	Continuous reading mode 1	Continuous reading mode 2
R, READON, LON	Activation commands When these commands are received, the illumination light comes on and the scanner enters the Active state.	×	×	×	○	○
Z, READOFF, LOFF	Ready commands When these commands are received, the illumination light goes out and the scanner enters the Ready state.	×	×	×	○	○

To send a command, attach a header and terminator in accordance to the scanner communications conditions and send.

5.3 Scanning Using the Touch Switch

Touch switch is a function installed only in SF1-QBi-T, and by touching the touch switch instead of the trigger switch, the illumination light is turned on and it becomes the Active state. The touch switch and the trigger switch are in an exclusive operation, and the default setting of SF1-QBi-T is the touch switch switching "enable".

This configuration is settable by using the configuration software (ScannerSetting_2D) or by reading QR-coded parameter menu.

Note: The following cases, there is a possibility that the touch switch makes an error.
  - Touch the switch with wet hands or immediately after applying hand cream.
  - Touch the switch with thick gloves or with an adhesive plaster applied finger.
  - Touch the switch other than a finger such as a ballpoint pen.
  - Touch the switch with more than one finger at the same time.
  - Touch the switch with fingertips.
  - Use the switch near conductive materials such as metals.
  - Use the switch in places where radiation noise, induction noise, or electrostatic noise may be generated.

Note: When using the SF1-QBi-T as a wearable scanner, turn on the scanner after attaching the attachment. If attached to the attachment after the scanner is turned on, the Low consumption mode will not be set and the usage time will be shortened. And even if you operate the attachment finger trigger, the first operation is ignored.

Chapter 6   Magic Key

The magic key can be used as an auxiliary key for scanning or data transfer. In the magic key operation modes, the following types are available. And it is also possible to select to ignore this function. Using the configuration software (ScannerSetting_2D), select the function that best suits your needs.

(1)   Specific character transfer function

Sends characters (max. 10 bytes) specified with the configuration software (ScannerSetting_2D) every time the magic key is pressed.

(2)   No function assigned

No function is assigned to the magic key. Pressing the magic key does not affect the operation of the scanner.

The magic key also has the following functions. These functions are independent of the above magic key operation function.

Power supply function

With the power turned off, the power can be turned on by pressing the magic key for 1 second or more. If the power does not turn on by pressing for 1 second or less, release the magic key for 1 second or more and then press and hold.

With the power turned on, The power can be turned off by simultaneously pressing the magic key and the trigger switch for 3 seconds or more.

Software keyboard

Setting of the software keyboard function can be changed only when connecting the scanner to iPhone, iPad or iPod. Whether or not to display the software keyboard can be switched by pressing the magic key for approx 500 msec.

However, it becomes invalid when data verification mode or n-point verification mode is set.

Battery level indicator

By pressing the magic key for about 500 ms, battery level check will be indicated on the indicator LED 2 . This function can be selected as the always on mode of the indicator LED 2.

Master code resistration

Pressing the magic key for approximately two seconds when in data verification mode (refer to Section 7.1) causes the indicator LED to illuminate in green, indicating that the master code has been registered. Codes read while the magic key is held down will become master codes.

Scan lock release

Pressing the magic key releases the Ready state set by the scan lock function (refer to Section 7.1.3) in the data verification mode.

If the scanner enters the Ready state set by the scan lock function, the above magic key functions are ignored until the scan lock is released by pressing the magic key.

Bluetooth® wireless communication disconnection

After establishing a Bluetooth® wireless link, Bluetooth® wireless communication can be disconnected by holding the magic key for five seconds or more.

However, if the scanner is operating in data verification mode (excluding 2-point verification), wireless communication disconnection is disabled. In addition, when the magic key is pressed down for five seconds or more while the Bluetooth® wireless link is being established, the Bluetooth® wireless communication processing will be suspended. The operation following disconnection of Bluetooth® wireless communication using the magic key can be selected from the following two types.

- Reconnection by pulling the trigger switch
  Pull the trigger switch to connect in master mode or slave mode (depending on which has been configured).
  In master mode, the scanner connects to the slave device; in slave mode, the scanner awaits aconnection from the master device.

- Host connection standby
  For first-time connections, regardless of whether the scanner is in master mode or slave mode, the scanner automatically switches to slave mode and awaits a connection from the connecting device. The Bluetooth® wireless communication mode parameters are the same as those when Bluetooth® wireless communication is disconnected. (Refer to Chapter 11) For subsequent connections, it is possible to connect to the initial device by simply pulling the scanner trigger switch after the scanner has switched to master mode.

> Note: The user can select whether the Bluetooth® wireless communication disconnection function is available via the QR-coded parameter menu or the configuration software. (Refer to Chapter 11)

Forced termination of ADF script

The scanner cannot scan a code if an infinite loop ADF script is running. To terminate the ADF script, press the magic key for approximately two seconds.

Chapter 7　　　Scanning Function

7.1　Data Verification Mode

When placed in data verification mode, the data of the code that has been scanned is compared with that of the master data to verify whether they match.

Two data verification modes, "n-point verification" and "2-point verification," are available. Make a selection in the configuration software (ScannerSetting_2D).

When "n-point verification" is selected, master data is registered once and then 1:n verification is performed to verify any codes scanned subsequently against this master data.

"2-point verification" is a 1:1 verification: once master data is registered and the scanner has compared a scanned code with this, the scanner enters standby state awaiting new master data registration. In this way, the scanner repeatedly alternates between master data registration and code scanning.

Master data registration methods: for "n-point verification" master data can be registered through "preset master registration" or "master scanning registration"; for "2-point verification" registration is only available through "master scanning registration". With "preset master registration," master data is registered in advance using the configuration software (ScannerSetting_2D). For "master scanning registration," master data is registered by scanning the master code label.

Registered master data can be outputted to the host by scanning the "master data output" code (See Chapter 7 Section 7.1.3), regardless of which of the above registration methods is used.
Parameters related to verification scanning can be set using the configuration software (ScannerSetting_2D).

7.1.1 Data Verification Scanning Procedures

■ n-Point Verification

<u>Preset Master Registration</u>

Preset master registration is only available in the n-point verification mode. Register the "code type" and "the portion of data to be verified" using the configuration software (ScannerSetting_2D). Up to 99 digits of data can be registered.
The registered master data will be retained even after the scanner is turned off. To clear the registered data, use the configuration software (ScannerSetting_2D) and clear the master data registered in the host computer, and download the newly configured data to the scanner.

<u>Master Registration</u>

1) Switch the scanner to the data verification mode.

2) Press the magic key for approximately two seconds, or send the scan entry control command "E" from the host computer to the scanner (refer to Appendix 2 for control commands), and the indicator LED illuminates in green.

3) Holding down the magic key, scan and register the code to be used as master data. (Scan the code with the procedure for the trigger switch operation mode selected.) The indicator LED will briefly illuminate in blue after master data is registered, and then go out.

4) Scan a code to verify. The scanner outputs the verification result after verifying the scanned data against the registered master data. The indicator LED illuminates in blue when the scanner has scanned a code successfully.

When registering the master data, an error occurs if the data read does not meet the number of characters of the registered verification data, such as when the number of digits is less than the specified verification starting position.
"Master scanning registration" can be carried out even if a "preset master registration" exists. In this case, the number of digits registered in the "preset master registration" is used as the verification digit number, and the data registered in the "master scanning registration" is used as the verification content.
Registered master data is outputted to the host when the "master data output" code (refer to Section 7.1.3) is read.

Note: Control commands cannot be used when HID (Human Interface Device Profile) is selected.

Note: Registered master data will be cleared in the following instance.
If parameter settings are changed using the configuration software (ScannerSetting_2D), batch setting QR Code, or QR-coded parameter menu.

Note: Master data can be registered an unlimited number of times while the magic key is pressed and the indicator LED is illuminated in green. The last code to be scanned is the master data.

Note: If master data registration using "preset master registration" or "master scanning registration" fails, the indicator LED will flash in red. Code scanning is not available while the light is flashing.

■ 2-Point Verification

Master Registration

1) Switch the scanner to the data verification mode. The indicator LED illuminates in green.

2) Scan and register the code to be used as master data. (Scan the code with the procedure for the trigger switch operation mode selected.) The indicator LED will briefly illuminate in blue after master data is registered, and then go out.

3) Scan a code to verify. The scanner outputs the verification result after verifying the scanned data against the registered master data.

When the scanner has scanned a code successfully, the indicator LED illuminates in blue before changing to green indicating that it is in standby state awaiting new master data registration.

When registering the master data, an error occurs if the data read does not meet the number of characters of the registered verification data, such as when the number of digits is less than the specified verification starting position. If an error occurs, the scanner will return to the master data registration standby state.

* "Reverification attempt after NG judgment" in 2-point verification

2-point verification is provided with a "Reverification attempt after NG judgment" function to attempt reverification against the same master data if the result of the data verification is a mismatch (NG judgment). If the reverification attempt function is enabled using the configuration software (ScannerSetting_2D), the scanner will remain in code scanning standby state until verification succeeds. When this function is disabled (default), the scanner will return to the master data registration standby state after a single scan, regardless of the verification result.

Note: Registered master data will be cleared in the following instance.
- When the scanner is turned off
- When the verification starting position or verification digit numbers change
- If parameter settings are changed using the configuration software (ScannerSetting_2D), batch setting QR Code or QR-coded parameter menu

Note: When an NG judgment is received after data verification, the user can select whether to implement the verification process once more via the configuration software (ScannerSetting_2D).

Note: The verification range can be set to either "code type + code data" or "code data only" in the configuration software (ScannerSetting_2D).

7.1.2 Designating Targets for Data Verification

When designating a data verification target, "data string" or "data block" can be selected. "Data string" refers to a data area specified by the verification start position and the number of verification digits. "Data block" refers to a CSV formatted data block separated by commas.

(1) Data String Verification

The scanner compares data specified by the verification start position and the number of verification digits with the master data registered in the scanner, and then outputs the result.

The verification start position can be set from 1 to 999, and the number of verification digits can be set from 1 to 99*. (*The scanning digit numbers for Code 39, Codabar (NW-7) must be set and include the start-stop code.)

A mismatch occurs in the following instances:

1) The data in the specified area does not match the master data.

2) The code types do not match the master data (refer to the notes below).

3) There is missing data or no data in the specified area.

Example:

Master data	Verification start position	Number of verification digits	Scanned data (for verification)	Verification result
345	3	3	00**345**	Match
345	3	3	00**345**678	Match
345	3	3	00**34**6	Mismatch
345	3	3	00**34**	Mismatch

(2) Data Block Verification

The scanner compares the CSV formatted data block separated by commas with the registered master data, and then outputs the result.

The verification data block position can be set from 1 to 99.

A mismatch occurs in the following instances:

1) The data in the specified block does not match the master data.

2) The code types do not match the master data (refer to the notes below).

3) There is missing data or no data in the specified block.

4) The number of digits in the block for verification exceeds 99.

Example:

Master data	Verification data block position	Scanned data (for verification)	Verification result
345	3	0,12,**345**,6789	Match
345	3	0,12,**346**,6789	Mismatch
345	3	0,12,**345**6,6789	Mismatch
345	3	0,12,**34**,6789	Mismatch
345	3	0,12	Mismatch

> Note: Only Type 1 code type verification judgment is carried out regardless of the code mark type setting in the configuration software (ScannerSetting_2D). (Refer to Section 9.4 (5))

7.1.3 Verification Result Output

(1) Verification Result Based Data Output

One of the following three data output patterns can be selected in the configuration software (ScannerSetting_2D) for each of the two possible results, "verification matched" and "verification mismatched".

No output will occur if "Transfer disabled" is selected.

	Verification matched	Verification mismatched
1	Transfer disabled	Transfer disabled
2	Code data transfer enabled	Code data transfer enabled
3	OK transfer enabled	NG transfer enabled

(2) Confirmation via Beeper, Indicator LED, Vibrator

A match or mismatch verification result can be confirmed with the buzzer, indicator LED and vibrator.

The table below indicates the scanner operation when the beeper, indicator LED and vibrator are enabled.

	Beeper	Indicator LED	Vibrator	
			Vibration enabled for OK result	Vibration enabled for NG result
Verification matched	Short beep	Blue light	Vibration	-
Verification mismatched	Long beep	Red light	-	Vibration

(3) Scan Lock

The scan lock is a function used to lock the scanner in the Ready state if a mismatch occurs. Select using the configuration software (ScannerSetting_2D).

Once the scanner enters this state, the scanner stays in the Ready state regardless of trigger switch control, and ignores any subsequent trigger switch pulls and commands to enable Active state (R, READON, LON).

To release the scan lock, press the magic key or turn off the scanner.

Output of Registered Master Data

Read the code below to output both the master data verification part registered through the data verification reading procedures and the code mark.

"Master Data Output" code

7.2 Data Edit Mode

The scanned code data can be edited and output in the following modes: "Data extraction mode," "data conversion mode," "block sorting mode," and "ADF script mode". These data editing modes can be set using the configuration software (ScannerSetting_2D). The default mode is "non-edit mode".

Note:	If the scanning code is a multi-line barcode, the code type for all lines must match or the scanner will register a data editing processing error, regardless of whether or not there is an error in the scanned data. Only Type 1 code type verification assessment is carried out, regardless of the code mark type setting. (Refer to Section 9.4 (5))
Note:	The scanner edits split QR or iQR Codes after all the split codes are completely scanned in the edit mode or batch edit mode. The scanner edits split codes on an individual bases each time a split code is scanned in the non-edit mode.

7.2.1 Data Extraction Mode

The scanner extracts a portion of the scanned data for output. Three types of data extraction modes are available: "Data string extraction mode," "data block extraction mode," and "AI (Application Identifier) extraction mode". "Data block extraction mode" can be utilized with CSV formatted data block separated by commas. "AI extraction" can be utilized with GS1-128, GS1 DataBar, GS1 Composite (excludes linear components of UPC/EAN Composite).

7.2.1.1 Data String Extraction Mode

The scanner extracts the portion of data specified by the "extraction start position" and "extraction end position" from the code specified in the parameter "code type" and outputs it in the specified data transmission format (See Chapter 9 Section 9.4). The parameters, extraction start position, and extraction end position values are as follows.

■Parameters

Parameters	Value
Code type	Any code
	QR Code
	iQR Code
	PDF417
	Data Matrix
	MaxiCode
	Aztec
	UPC-A/EAN-13
	UPC-E
	EAN-8
	Code 128
	GS1-128
	Codabar (NW-7)
	Code 39
	Code 93
	Interleaved 2 of 5 (ITF)
	Standard 2 of 5 (STF)
	GS1 DataBar
	GS1 Composite
Transmit data regardless of the results	Enabled/Disabled

When "Transmit data regardless of the results" is enabled, the scanned data will be output without editing if data string extraction fails or a non-specified code is scanned.

■Extraction start position, Extraction end position

Extraction start position	Extraction end position
First character	Position specified/To the nth digit
Last character	
Position specified/From the nth digit	Last character
	Number of digits specified/n digits worth
	Position specified/To the nth digit

n can be set within a range of 1 and 9999. However, when the extraction start position is set to "position specified/from the nth digit," the start position must be set to a number less than or equal to the end position.

> Note: The scanning digit numbers for Code 39, Codabar (NW-7) must be set and include the start-stop code.

Example: A QR Code with data 12345 is scanned with the following parameters

Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Type 1, The number of digits: 4 digit transmission enabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Parameters	Extraction start position	Extraction end position	Output data
Code type: QR Transmit data regardless of the results: Disabled	First character	3rd digit	[STX]Q0003123[ETX]
	Last character	3rd digit	[STX]Q0003345[ETX]
	1st digit	Last character	[STX]Q000512345[ETX]
	1st digit	3-digit length	[STX]Q0003123[ETX]
	2nd digit	4th digit	[STX]Q0003234[ETX]
	First character	6th digit	Error
	Last character	6th digit	Error
	6th digit	Last character	Error
	6th digit	10-digit length	Error
	1st digit	6th digit	Error
Code type: QR Transmit data regardless of the results: Enabled	First character	6th digit	[STX]Q000512345[ETX]
	Last character	6th digit	[STX]Q000512345[ETX]
	6th digit	Last character	[STX]Q000512345[ETX]
	6th digit	10-digit length	[STX]Q000512345[ETX]
	1st digit	6th digit	[STX]Q000512345[ETX]
Code type: PDF417 Transmit data regardless of the results: Disabled	All specifications invalid	All specifications invalid	Error
Code type: PDF417 Transmit data regardless of the results: Enabled	All specifications invalid	All specifications invalid	[STX]Q000512345[ETX]

7.2.1.2 Data Block Extraction

If the scanned data is CSV formatted data separated by commas, the scanner extracts data blocks specified by the "extraction block number" from codes specified in the parameter code type and outputs these data blocks in the data transmission format (See Chapter 9 Section 9.4) selected in the scanner.

■Parameters

Parameters	Value
Code type	Any code
	QR Code
	iQR Code
	PDF417
	Data Matrix
	MaxiCode
	Aztec
	UPC-A/EAN-13
	UPC-E
	EAN-8
	Code 128
	GS1-128
	Codabar (NW-7)
	Code 39
	Code 93
	Interleaved 2 of 5 (ITF)
	Standard 2 of 5 (STF)
	GS1 DataBar
	GS1 Composite
Transmit data regardless of the results	Enabled/Disabled

When "Transmit data regardless of the results" is enabled, the scanned data will be output without editing if data block extraction fails or a non-specified code is scanned.

■Extraction block number

The extraction block number can be set to a figure between 1 and 99 and up to three blocks of data can be extracted.

Example: A QR Code with the following data is scanned.

Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Disabled, The Number of Digits: Disabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Parameters	Scanned data	Extraction block	Output data
Code type: QR Transmit data regardless of the results: Disabled	1,23,456,7890	1 2 3	[STX]1[ETX][STX]23[ETX][STX]456[ETX]
	1,23,456,7890	3 1 2	[STX]456[ETX][STX]1[ETX][STX]23[ETX]
	1234567890	1	[STX]1234567890[ETX]
	1,,23,456,7890	2 5	[STX][ETX][STX]7890[ETX]
	1,23,456,7890	5	Error
	1,23,456,7890	4 5	Error
	1234567890	1 2	Error
Code type: QR Transmit data regardless of the results: Enabled	1,23,456,7890	5	[STX]1,23,456,7890[ETX]
	1,23,456,7890	4 5	[STX]1,23,456,7890[ETX]
	1234567890	1 2	[STX]1234567890[ETX]
Code type: PDF417 Transmit data regardless of the results: Disabled	1,23,456,7890	All specifications invalid	Error
Code type: PDF417 Transmit data regardless of the results: Enabled	1,23,456,7890	All specifications invalid	[STX]1,23,456,7890[ETX]

7.2.1.3 AI (Application Identifier) Extraction

When the scanned code is a GS1-128, GS1 DataBar, or GS1 Composite (excludes linear components of UPC/EAN Composite) code, the scanner edits the data using AI (Application Identifier) and outputs scanned data in the data transmission format (See Chapter 9 Section 9.4) selected in the scanner in accordance with the specified parameters.

Two types of AI extraction are available: AI delimited mode and AI parenthesis mode. For the AI used in data editing, refer to (3) AI Table that follows below.

(1) AI Delimited Mode

The scanner extracts the data using the specified AI (maximum of three types) and replaces the AI with specified delimiters (selected from three types: header/terminator, comma, tab) for output.

■Parameters

Parameters	Value
Transmit data regardless of the results	Enabled/Disabled

When "Transmit data regardless of the results" is enabled, the scanned data will be output without editing if AI extraction fails.

■Delimiters

●Header/Terminator

The scanner adds headers and terminators to each split string and outputs the data.

The scanner ID, code mark, number of digits, prefix and suffix are added to each split data if enabled for output.

The total number of digits output will be the number of digits post edit.

Example: Scanned data: "(01)94901234567894(11)030808(13)030810" Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Disabled, The number of digits: Disabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Specified AI	Output Data
01,11,13	[STX]001494901234567894[ETX][STX]0006030808[ETX][STX]0006030810[ETX]

● Comma

The scanner outputs split strings delimited by commas. No comma is added to the last item of split data.

A header and terminator are added to each item of split data. The scanner ID, code mark, number of digits, prefix and suffix are not output, regardless of whether output is enabled or disabled.

Example: Scanned data: "(01)94901234567894(11)030808(13)030810" Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Disabled, The number of digits: Disabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Specified AI	Output Data
01,11,13	[STX]94901234567894,030808,030810[ETX]

●Tab (ASCII code 09H<HT>)

The scanner outputs split strings delimited by tabs. No tab is added to the last item of split data.

A header and terminator are added to each item of split data. The scanner ID, code mark, number of digits, prefix and suffix are not output, regardless of whether output is enabled or disabled.

Example: Scanned data: "(01)94901234567894(11)030808(13)030810" Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Disabled, The number of digits: Disabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Specified AI	Output Data
01,11,13	[STX]94901234567894[TAB]030808[TAB]030810[ETX]

Example: Scanned data: "(01)94901234567894(11)030808(13)030810(17)040208(17)040305" Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Disabled, The number of digits: Disabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Parameters	Specified AI	Delimiters	Output data
Transmit data regardless of the results: Disabled	01,11,17	Comma	[STX]94901234567894,030808,040208[ETX]
	17,11		[STX]040208,030808[ETX]
	17,17		[STX]040208,040305[ETX]
	12		Error
	01,12		Error
	01,01		Error
Transmit data regardless of the results: Enabled	01,11,17		[STX]94901234567894,030808,040208[ETX]
	17,11		[STX]040208,030808[ETX]
	17,17		[STX]040208,040305[ETX]
	12		[STX]019490123456789411030808130308101704020817040305[ETX]
	01,12		
	01,01		

Note:	The edited output data is output in the AI-specified set order.
Note:	Data is output in the order in which data is scanned if multiple identical AI-specified data exists in the scanned data.
Note:	When "Transmit data regardless of the results" is disabled, an error will occur if the scanned data contains none of the data specified in the AI extract or there are insufficient digits.

(2) AI Parenthesis Mode

The scanner encloses the AI in parentheses and outputs the data in accordance with the specified parameters.

■Parameters

Parameters	Value
Transmit data regardless of the results	Enabled/Disabled

When "Transmit data regardless of the results" is enabled, the scanned data will be output without editing if AI extraction fails.

Example: Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Disabled, The Number of Digits: Disabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Parameters	Scanned data	Output data
Transmit data regardless of the results:　Disabled	0194901234567894110308081303 081017040208	[STX](01)94901234567894(11)030 808(13)030810(17)040208[ETX]
	0194901234567894110308081303 081061704020817040305	Error (refer to the details below)
Transmit data regardless of the results:　Enabled	0194901234567894110308081303 081017040208	[STX](01)94901234567894(11)030 808(13)030810(17)040208[ETX]
	0194901234567894110308081303 081061704020817040305	[STX]0194901234567894110308081303030 81061704020817040305[ETX]

Note:　A data extraction error occurs due to the non-existence of an AI which starts with "6" (underlined part) following the AI "13" (030810) data (see the following example). (01)94901234567894(11)030808(13)030810<u>61704020817040305</u>

(3) AI Table

In "AI (Application Identifier) extraction" data is edited according to the AI defined in the table below.

AI	Number of digits	Description
00	n2+n18	Serial Shipping Container Code (SSCC)
01	n2+n14	Global Trade Item Number (GTIN)
02	n2+n14	GTIN of Contained Trade Items (must be processed with AI37)
03	n2+n14	Reserved
04	n2+n16	Reserved
10	n2+an..20	Batch or Lot Number
11	n2+n6	Production Date (YYMMDD) (*)
12	n2+n6	Due Date (YYMMDD) (*)
13	n2+n6	Packaging Date (YYMMDD) (*)
15	n2+n6	Best Before Date (YYMMDD) (*)
17	n2+n6	Expiration Date (YYMMDD) (*)
20	n2+n2	Variant Number
21	n2+an..20	Serial Number
22	n2+an..29	Application conforming to the definition of HIBCC (Health Industry Business Communication Council)
23n	n3+n..19	Batch or Lot Number (for transitional use) (**)
240	n3+an..30	Additional Product Identification Assigned by the Manufacturer
241	n3+an..30	Customer Part Number
250	n3+an..30	Secondary Serial Number
251	n3+an...30	Reference to Source Entity
252	n3+n27	Global Serial Number
30	n2+n..8	Count of Items
310n	n4+n6	Net weight, Kilograms
311n	n4+n6	Length or first dimension, Meters
312n	n4+n6	Width, diameter, or second dimension, Meters
313n	n4+n6	Depth, thickness, height, or third dimension, Meters
314n	n4+n6	Area, Square meters (***)
315n	n4+n6	Net volume, Liters (***)
316n	n4+n6	Net volume, Cubic meters (***)

AI	Number of digits	Description
320n	n4+n6	Net weight, Pounds (***)
321n	n4+n6	Length or first dimension, Inches (***)
322n	n4+n6	Length or first dimension, Feet (***)
323n	n4+n6	Length or first dimension, Yards (***)
324n	n4+n6	Width, diameter, or second dimension, Inches (***)
325n	n4+n6	Width, diameter, or second dimension, Feet (***)
326n	n4+n6	Width, diameter, or second dimension, Yards (***)
327n	n4+n6	Depth, thickness, height, or third dimension, Inches (***)
328n	n4+n6	Depth, thickness, height, or third dimension, Feet (***)
329n	n4+n6	Depth, thickness, height, or third dimension, Yards (***)
330n	n4+n6	Logistic weight, Kilograms (***)
331n	n4+n6	Length or first dimension, Meters, Logistics Measures (***)
332n	n4+n6	Width, diameter, or second dimension, Meters, Logistics Measures (***)
333n	n4+n6	Depth, thickness, height, or third dimension, Meters, Logistics Measures (***)
334n	n4+n6	Area, Square meters, symbol logic (***)
335n	n4+n6	Logistic volume, Liters (***)
336n	n4+n6	Logistic volume, Cubic meters (***)
337n	n4+n6	Kilograms Per Square Meter (Pressure) (***)
340n	n4+n6	Logistic weight, Pounds (***)
341n	n4+n6	Length or first dimension, Inches, Logistics Measures (***)
342n	n4+n6	Length or first dimension, Feet, Logistics Measures (***)
343n	n4+n6	Length or first dimension, Yards, Logistics Measures (***)
344n	n4+n6	Width, diameter, or second dimension, Inches, Logistics Measures (***)
345n	n4+n6	Width, diameter, or second dimension, Feet, Logistics Measures (***)
346n	n4+n6	Width, diameter, or second dimension, Yards, Logistics Measures (***)
347n	n4+n6	Depth, thickness, height, or third dimension, Inches, Logistics Measures (***)
348n	n4+n6	Depth, thickness, height, or third dimension, Feet, Logistics Measures (***)
349n	n4+n6	Depth, thickness, height, or third dimension, Yards, Logistics Measures (***)
350n	n4+n6	Area, Square inches (***)
351n	n4+n6	Area, Square feet (***)
352n	n4+n6	Area, Square yards (***)

AI	Number of digits	Description
353n	n4+n6	Area, Square inches, Logistic Measures (***)
354n	n4+n6	Area, Square feet, Logistic Measures (***)
355n	n4+n6	Area, Square yards, Logistic Measures (***)
356n	n4+n6	Net weight, Troy ounces (***)
357n	n4+n6	Net weight (or volume), Ounces (***)
360n	n4+n6	Net volume, Quarts (***)
361n	n4+n6	Net volume, Gallons (U.S.) (***)
362n	n4+n6	Logistic volume, Quarts (***)
363n	n4+n6	Logistic volume, Gallons (U.S.) (***)
364n	n4+n6	Net volume, Cubic inches (***)
365n	n4+n6	Net volume, Cubic feet (***)
366n	n4+n6	Net volume, Cubic yards (***)
367n	n4+n6	Logistic volume, Cubic inches (***)
368n	n4+n6	Logistic volume, Cubic feet (***)
369n	n4+n6	Logistic volume, Cubic yards (***)
37	n2+n..8	Count of Trade Items (must be processed with AI02)
390n	n4+n15	Amount Payable - Single Monetary Area
391n	n4+n3+n15	Amount Payable and ISO Currency Code
392n	n4+n15	Amount Payable for a Variable Measure Trade Item - Single Monetary Area
393n	n4+n3+n15	Amount Payable for a Variable Measure Trade Item and ISO Currency Code
400	n3+an..30	Customer's Purchase Order Number
401	n3+an..30	Global Identification Number for Consignment (GINC)
402	n3+n17	Global Shipment Identification Number (GSIN)
403	n3+an..30	Routing Code
410	n3+n13	Ship to - Deliver to Global Location Number
411	n3+n13	Bill to - Invoice to Global Location Number
412	n3+n13	Purchased from Global Location Number
413	n3+n13	Ship for - Deliver for - Forward to Global Location Number
414	n3+n13	Identification of a Physical Location - Global Location Number
415	n3+n13	Global Location Number of the Invoicing Party
420	n3+an..20	Ship to - Deliver to Postal Code within a Single Postal Authority

AI	Number of digits	Description
421	n3+n3+an..9	Ship to - Deliver to Postal Code with Three-Digit ISO Country Code
422	n3+n3	Country of Origin of a Trade Item
423	n3+n15	Country of Initial Processing
424	n3+n3	Country of Processing
425	n3+n3	Country of Disassembly
426	n3+n3	Country Covering Full Process Chain
43	n2+n4+n7+an..10+n1	Transport Freight Number
7001	n4+n13	NATO Stock Number (NSN)
7002	n4+an..30	UN/ECE Meat Carcasses and Cuts Classification
7003	n4+n10	Expiration Date and Time (YYMMDDHHMM)
7030	n4+n3+an..27	Approval Number of Processor with Three-Digit ISO Country Code: Slaughterhouse
7031	n4+n3+an..27	Approval Number of Processor with Three-Digit ISO Country Code: First deboning/cutting hall
703n	n4+n3+an..27	Approval Number of Processor with Three-Digit ISO Country Code: Second through ninth processing location
8001	n4+n14	Roll Products - Width, Length, Core Diameter, Direction, Splices
8002	n4+an..20	Cellular Mobile Telephone Identifier
8003	n4+n14+an..16	Global Returnable Asset Identifier (GRAI)
8004	n4+an..30	Global Individual Asset Identifier (GIAI)
8005	n4+n6	Price per Unit of Measure
8006	n4+n14+n2+n2	Identification of the Components of a Trade Item
8007	n4+an30	International Bank Account Number (IBAN)
8008	n4+n6+n6	Date and Time of Production (YYMMDDHHMMSS)
8018	n4+n18	Global Service Relation Number (GSRN)
8020	n4+an25	Payment Slip Reference Number
8100	n4+n1+n5	Coupon Extended Bar Code - UPC Prefix and Offer Code
8101	n4+n1+n5+n4	Coupon Extended Bar Code - UPC Prefix, Offer Code, Expiration Date
8102	n4+n1+n1	Coupon Extended Bar Code - "0" + UPC Prefix
90	n2+an..30	Information Mutually Agreed Between Trading Partners
91	n2+an..30	Company Internal Information
92	n2+an..30	Company Internal Information

AI	Number of digits	Description
93	n2+an..30	Company Internal Information
94	n2+an..30	Company Internal Information
95	n2+an..30	Carrier Internal Information
96	n2+an..30	Carrier Internal Information
97	n2+an..30	Company Internal Information
98	n2+an..30	Company Internal Information
99	n2+an..30	Internal Information

(*)   DD is "00" when displaying the year and month only

(**)   "n" indicates the data length

(***) "n" indicates the location of the decimal point

a	Alphabetic characters
a3	Three alphabetic characters
a..3	Up to three alphabetic characters
n	numerals
n3	Three numerals
n..3	Up to three numerals
an	Alphanumeric character
an3	Three alphanumeric characters
an..3	Up to three alphanumeric characters

> Note: When the length of the specified AI is variable and the number of digits of the scanned data is less than the maximum AI digit number, the scanner outputs the scanned data up to and including GS (1Dh).

7.2.2 Data Conversion Mode

In data conversion mode, when a code specified in the parameter "code type" is scanned in, the scanner searches for and converts the characters for conversion (up to 16 ASCII characters), and outputs the data in the data transmission format (refer to Section 9.4) set by the scanner.

■Parameters

Parameters	Value
Code type	Any code
	QR Code
	iQR Code
	PDF417
	Data Matrix
	MaxiCode
	Aztec
	UPC-A/EAN-13
	UPC-E
	EAN-8
	Code 128
	GS1-128
	Codabar (NW-7)
	Code 39
	Code 93
	Interleaved 2 of 5 (ITF)
	Standard 2 of 5 (STF)
	GS1 DataBar
	GS1 Composite
Characters for conversion/Converted characters	Set a maximum of 16 ASCII characters (00h-FFh)

Example: Scanned code: PDF417, Scanned data: "12345678"

Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Disabled, The Number of Digits: Disabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Data conversion parameters	Characters for conversion → Converted characters	Output data
Code type: PDF417	2 → A 4 → B	[STX]1A3B5678[ETX]

7.2.3 Block Sorting Mode

The scanner splits a code specified in the parameter "Code type" at the specified position(s) (max. five divisions), and sorts these data blocks into the specified output sequence for output in the transmission format (refer to Section 9.4) specified by the scanner.

Note: An editing error occurs if the number of digits specified as the splitting point exceeds the scanned data size.

■Parameters

Parameters	Value
Code type	Any code
	QR Code
	iQR Code
	PDF417
	Data Matrix
	MaxiCode
	Aztec
	UPC-A/EAN-13
	UPC-E
	EAN-8
	Code 128
	GS1-128
	Codabar (NW-7)
	Code 39
	Code 93
	Interleaved 2 of 5 (ITF)
	Standard 2 of 5 (STF)
	GS1 DataBar
	GS1 Composite
Transmit data regardless of the results	Enabled/Disabled

Example: Scanned code: Code 128, Scanned data: "1234567890"
   Header: STX, Terminator: ETX, Scanner ID: Prohibited, Code mark: Disabled, The Number of Digits: 4 digit transmission enabled, Prefix/Suffix transmission: Not specified, BCC transmission: Disabled

Splitting Position	Output Order	Output Data
Third digit, eighth digit	Block 2, 1, 3	[STX]K00104567812390[ETX]
Third digit, eighth digit	Block 1, 3	[STX]K000512390[ETX]

7.2.4 ADF Script Mode

ADF script is a simple programming language used to edit scanned data. The main functions of ADF script are listed below.

(1) Fixed/variable length data extraction

(2) GS1-128, GS1 DataBar, GS1 Composite AI (Application Identifier) compatibility

(3) Sorting disordered data into the prescribed order

(4) Data verification

(5) Repeated output of the same data

(6) Four basic arithmetic operations including remainder calculation such as unit conversion

(7) Data conversion (substitution)

(8) Character string comparison

(9) Control of the indicator LED, beeper, and vibrator

Use the configuration software (ScannerSetting_2D) to create an ADF script. Set up the ADF script on the scanner using the configuration software or by scanning a configuration QR Code created to set up the ADF script.

Refer to the "ADF Script User's Guide" for details of ADF script specifications and usage method.

> Note: ADF scripts cannot be used in conjunction with GTIN conversion or data editing modes (data extraction mode, data conversion mode, or block sorting mode).

7.3   Point Scan Mode

The scanner scans a code by aiming at a code at the center of the marker. The code will not be scanned if there is no code under the intersection of the cross or if the scanner cannot detect the marker due to external light etc. Also, this mode is available only when marker illumination is enabled.

7.4   Mirror Image Code Scanning

The scanner can scan both standard and mirror image 2D codes. Use the configuration software (ScannerSetting_2D) to enable or disable the mirror image code scanning. 2D code scanning may take longer if the mirror image code scanning is enabled.

7.5   Black-and-white Inverted Code Scanning

The scanner can scan black-and-white inverted 2D codes or barcodes. Use the QR-coded parameter menu or the configuration software (ScannerSetting_2D) to switch between normal code scanning, black-and-white inverted code scanning, or normal/inverted code auto detect scanning.

Auto detect scanning may take longer than normal code scanning or black-and-white inverted code scanning.

A black-and-white inverted code requires a black level margin equal to or exceeding the standard QR Code margin around the code symbol.

7.6   Split QR Code Scanning

With QR Code models 1 and 2, and iQR Codes, the data can be split into a maximum of 16 codes for processing as individual split codes. Split codes can only be scanned by the same model.

For split code scanning, use the QR-coded parameter menu or configuration software (ScannerSetting_2D) to select either "edit mode," "batch edit mode," or "non-edit mode".

Edit Mode

Scanned split codes are stored and edited by the scanner before being sent to the host computer. If the amount of data exceeds 8KB, a scanning error occurs and the stored data is cleared.

Batch Edit Mode (QR Code Models 1 and 2 Only)

If all of the split codes (divided into a maximum of four) fit within the scanning field of the scanner, they will be scanned in a single pass, edited and sent to the host computer.

Non-edit Mode

Data is sent to the host computer each time an individual split code is scanned.

The beeper sounds twice when split code scanning commences (scanning of the initial split code completes), and three times when split code scanning is complete (scanning of all codes is complete).

Note:	If the scanner scans a QR (iQR) code that is not split or a code other than a QR (iQR) code while operating in split code scanning mode, split code scanning will be terminated, any split codes mid-scan will be discarded, and the code scanned most recently will be sent to the host computer.
Note:	Scanned data is cleared and split code scanning is terminated if the scanner goes into Ready state in auto-off mode (five seconds have elapsed with the trigger switch pulled, or the trigger switch is released within five seconds), or if scanning of a subsequent code is not complete within approximately three seconds in any other mode.
Note:	If another split code is scanned before previous split code scanning completes, data scanned previously is cleared, and scanning of the new split code commences.

7.7 Multi-line Barcode Scanning

The scanner is capable of scanning up to three lines of barcodes within its scanning field at a single time.

Use the configuration software (ScannerSetting_2D) to specify the number of lines, data output order, and output format of the multi-line barcode to be scanned.

7.7.1 Number of Lines

Set the number of lines to two or three. The number of lines must be specified.

7.7.2 Data Output Order

Set the code type, character strings, and the number of code digits to determine the output order of a scanned barcode.

Note:	Select the code type from those barcodes that are enabled. This step cannot be omitted.
Note:	For the character strings, specify the first one or two characters of data. A question mark "?" is treated as a wild card. This step can be omitted.
Note:	The number of code digits that can be set differs depending on the code type. This step cannot be omitted. The scanning digit numbers for Codabar (NW-7), Code 39 must be set and include the start-stop code.

7.7.3 Output Format

Select either the header/terminator-delimited format or the comma-delimited format as the output format.

(1) Header/Terminator

Data is output line by line in accordance with the specified data transmission format (refer to Section 9.4). The number of digits will be omitted for the UPC and EAN codes.

(2) Comma

Data is output separated by commas in accordance with the specified data transmission format (refer to Section 9.4). Only the code mark set for the first line is output and the number of digits includes commas. The number of digits is not omitted for UPC and EAN codes in comma-delimited formats.

Note:	Barcodes specified for multi-line barcode scanning cannot be scanned individually.
Note:	Multi-line barcodes with UPC/EAN add-on cannot be scanned.
Note:	GS1 composite codes that contain linear components cannot be scanned if the linear component data is specified for multi-line barcode scanning.
Note:	EAN/UPC composite codes that contain linear components cannot be scanned if the linear component data is specified for multi-line barcode scanning.

7.8 SQRC Scanning

SQRC are QR Codes with scanning restrictions. These SQRC are composed of disclosed and undisclosed data Scanning of the undisclosed component is only possible if the encryption key set in the scanner matches that in the SQRC.

To enable scanning of SQRC, use the configuration software (ScannerSetting_2D) to set the scanner to "enable scanning of SQRC only," or "enable scanning of SQRC and QR Codes".

Note:	An encryption key is necessary for SQRC scanning. In order to set encryption keys, dedicated SQRC scan setting software (SQRC Setting) is required.

Chapter 8   Beeper, Indicator LED, Vibrator, Marker, Illumination Light

8.1   Beeper

(1) Beeper Sound

The beeper emits a single or multiple long or short beeps according to the various conditions.

The beeper emits a short beep when

- the code has scanned successfully,

- the scanner completed master data registration successfully in "data verification mode",

- the scanned code data matches the master data in "data verification mode,"

- transfer is completed by "specified character transfer" by magic key,

- the code scanned by "data editing" conformed the data editing conditions,

- a split QR Code is scanned,

- a "Setting commencement" or "Setting completion" code is read (3 short beeps), or a parameter setting code is read (1 short beep) while setting parameters via the QR-coded parameter menu (Chapter 12),

- the configuration software (ScannerSetting_2D) starts, or configuration changes take effect (3 beeps),

- a batch setting QR Code generated in the configuration software is scanned (3 beeps),

- the power supply has turned on (4 short beeps),

- Bluetooth® wireless communication connection is established (2 short beeps),

- the scanner is going to turn off due to the low battery level of the rechargeable battery cartridge (5 slightly longer short beeps), or

- the software keyboard on/off switching function has been used (iPhone/iPad/iPod connections only. 2 short beeps).

The beeper emits a long beep when

- the code data scanned in "data verification mode" does not match the master data,

- the scanned code in "Data editing" is not compatible with the data editing conditions, and the scanned data can not be transferred,

- the stored data of a split QR Code scanned in edit mode exceeds 8KB,

- a master code digit number error has occurred during master data registration,

- a code other than a parameter setting code is scanned during parameter setting using the QR-coded parameter menu,

- parameter setting was not completed successfully by setting with the QR-coded parameter menu,

- a transmission error or timeout occurred when the scanner was communicating with the configuration software (ScannerSetting_2D),

- the encryption key of scanned data does not match the one configured in the scanner in SQRC scanning (when "data transmission after mismatch of encryption key" is disabled),

- a communication error has occurred,

- an invalid control command is received,

- Bluetooth® wireless communication is disconnected,

- the communications adapter is successfully set from the scanner (1 beep) or not successfully set (3 beeps), or

- parameter settings are changed via the QR-coded parameter menu or configuration software but those setting values have failed to save, or

- you press the trigger switch and the magic key for three seconds or more and the power of the scanner is turned off.

Use the configuration software (ScannerSetting_2D) to enable/disable the beeper sound <u>when the scanner is turned on</u> (Default: enable). The beeper tone cannot be changed.

Beeper sound can be disabled using the QR-coded parameter menu or the configuration software. In the following instances, however, the beeper sounds regardless of that beeper setting:

- when the scanner is customized with the QR-coded parameter menu (Chapter 12),

- when the scanner receives a beeper-ON command from the host computer,

- when the configuration software starts, or configuration changes take effect,

- when the scanner scans a batch setting QR Code, or

- when the parameter values are saved by a PW command (refer to Appendix 2),

- when the battery voltage has dropped,

- when the scanner has failed to save the parameter settings, or

- when you press the trigger switch and the magic key for three seconds or more and the power of the scanner is turned off.

(2) Adjusting the Beeper Volume

Use the QR-coded parameter menu or configuration software (ScannerSetting_2D) to adjust the beeper volume to three levels - high, medium and low.

Each time the "Beeper volume" QR Code is read, the beeper volume cycles as shown below.
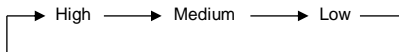
The final setting will be retained even after the scanner is turned off.

(Factory settings: High)

(3) Beeper tone

Use the configuration software (ScannerSetting_2D) to adjust the beeper volume to three levels.

Low: 1.5 kHz, Medium: 2.4 kHz, High: 3.3 kHz

Factory settings: Set to "Medium".

The final setting will be retained even after the scanner is turned off.

8.2   Indicator LED

The indicator LED illuminates or flashes in blue, green, red or orange as described below.

The indicator LED illuminates in blue when:

- the code has scanned successfully,

- the "Start setting" or "End setting" code is scanned from the QR-coded parameter menu (Chapter 12),

- the parameter values are saved by a PW command (refer to Appendix 2),

- a split QR Code is scanned,

- the scanned code matches the master data in "data verification mode", or

- the master data has been registered successfully in "data verification mode".

The indicator LED illuminates in green when:

- a transfer has been commenced with the specific character transfer function,

- the scanner is in master data registration standby state in the data verification mode,

- the battery has charged completely, (Only the indicator LED2), or

- the remaining battery level is found to be 40% or more as a result of performing the battery level check. (Only the indicator LED2)

The indicator LED illuminates in orange when:

- the remaining battery level is found to be between 10% to 39% as a result of performing the battery level check. (Only the indicator LED2)

The indicator LED illuminates in red when:

- Bluetooth® communication has been disconnected, (Only the indicator LED1)

- the battery is charging, (Only the indicator LED2) or

- the remaining battery level is found to be 10% or less as a result of performing the battery level check. (Only the indicator LED2)

The indicator LED flashes in red when:

- the scanner has received an abnormal control command,

- the scanner has failed to edit read data,

- the master data has not been registered successfully in "data verification mode (n-point)",

- the code scanned in "data verification mode" does not match the master data,

- a digit number error has occurred during master code registration in "data verification mode",

- data stored in Split mode exceeds 8KB,

- the scanner has failed to save the set parameter values specified with the configuration software, QR-coded parameter menu, or control commands,

- a code other than a parameter setting code is scanned during parameter setting via the QR-coded parameter menu,

- a communication error or communication timeout occurs while setting parameters with the configuration software,

- a run-time error has occurred in ADF script,

- the trigger switch is pulled while Bluetooth® communication has been disconnected in the operation-enabled state,

- the trigger switch is pulled while End operation has been set, or

- during charging, an abnormality is detected (Only the indicator LED2).

The indicator LED flashes in orange when:

- the battery level of the rechargeable battery is low (Only the indicator LED2, long flashes), or

- the scanner is going to turn off due to the low battery level of the rechargeable battery (Only the indicator LED2).

The indicator LED flashes in blue when:

- the scanner commences or completes reading from the QR-coded parameter menu (Chapter 12),

- the scanner commences or completes a split QR Code scanning,

- when the parameter values are saved by a PW command (refer to Appendix 2),

- the scanner is processing a connection with a slave device as the master device, or (Only the indicator LED1)

- the scanner is processing a connection with a master device as the slave device. (Only the indicator LED1)

You can disable the indicator LED using the QR-coded parameter menu or configuration software (ScannerSetting_2D). In any of the following cases, however, the indicator LED illuminates regardless of that setting.

- when the scanner is customized with the QR-coded parameter menu (Chapter 12),

- when the scanner receives an indicator LED-ON command (LB, LG or LR) from the host computer (refer to Appendix 2),

- when the configuration software starts, or configuration changes take effect,

- when the scanner scans a batch setting QR Code,

- when the parameter values are saved by a PW command (refer to Appendix 2),

- when the scanner is in entry mode (refer to control command "E" in Appendix 2),

- during master data registration and when master data registration has successfully completed,

- when an error occurs during master data registration,

- when scanned code data does not match, when scan lock is enabled, or when master data has not been registered successfully in "data verification mode,"

- when a transfer has been successfully completed with the specific character transfer function,

- the scanner has failed to save the set parameter values specified with the configuration software (ScannerSetting_2D), QR-coded parameter menu, or control commands,

- a run-time error has occurred in ADF script,

- the trigger switch is pulled when the trigger switch control is deactivated,

- the scanner displays the Bluetooth® wireless communication status,

- the battery level is low,

- when displaying the charge status, or

- when displaying the scanner to communications adapter parameter setting status.

8.3   Vibrator

Use the QR-coded parameter menu or the configuration software (ScannerSetting_2D) to select whether the scanner will vibrate when an "OK" action occurs or when the action is "NG". There are settings for disabling vibrator operation.

Use the QR-coded parameter menu or the configuration software (ScannerSetting_2D) to enable / disable viblate when touch switch is turned on in SF1-QBi-T. The default setting is viblation "enable".

If OK vibration is enabled, the scanner will vibrate when:

- the scanned data has been transferred successfully,

- the scanned code data matches the master data in "data verification mode",

- the master data has been registered successfully in "data verification mode",

- the scanner has scanned a split QR code,

- the transfer of a scanned split QR Code has been successfully completed in batch edit mode,

- a "Setting commencement" code, "Setting completion" code or parameter setting code is read from the QR-coded parameter menu,

- the configuration process using the configuration software (ScannerSetting_2D) is commenced or completed, or

- a batch setting QR Code created in the configuration software is read.

If NG vibration is enabled, the scanner will vibrate when:

- a digit number error has occurred during master data registration in "data verification mode",

- the code data scanned in "data verification mode" does not match the master data,

- the stored data of a split QR Code scanned in edit mode exceeds 8KB,

- the scanned split QR Code data does not match the master data,

- a code that is not a setting code is read during configuration using the QR-coded parameter menu,

- an ACK response is not issued in ACK/NAK mode,

- an invalid control command is received (refer to Appendix 2),

- a communication error or communication timeout occurs while setting parameters with the configuration software (ScannerSetting_2D),

- a run-time error has occurred in ADF script, or

- the encryption key of scanned data does not match the one configured in the scanner in SQRC scanning (when "scanning after mismatch of encryption key" is disabled).

8.4　Marker

The red marker beam (the LED turns red) lights up to indicate the about center of the scanning area.
Using the QR-coded parameter menu or configuration software (ScannerSetting_2D), select one of the three following modes.

8.4.1 Normal Marker Mode

When the trigger switch is in auto-off mode

The marker beam illuminates continuously while the trigger switch is held down.

When the scanner is ready (that is, within approximately five seconds of pulling the trigger switch or until completion of scanning), the marker beam illuminates continuously. The marker beam turns off when five seconds have elapsed in the Active state after the trigger switch is pulled, when scanning is successfully completed, or when the trigger switch is released.

When the trigger switch is in Momentary switching mode or Alternate switching mode

In Momentary switching mode, the marker beam illuminates continuously while the trigger switch is held down.

When the scanner is ready (while the trigger switch is held down in Momentary switching mode or the scanner is in the Active state in the Alternate switching mode), the marker beam illuminates continuously.

When the scanner is on standby (while the trigger switch is released in Momentary switching mode or when the scanner is in the Ready state in the Alternate switching mode), the marker beam turns off.

When the trigger switch is in Continuous reading mode 1 or 2

When the scanner is turned on, the marker beam illuminates continuously.

The marker beam turns off when it receives a "Z", "READOFF" or "LOFF" command, and illuminates continuously when it receives an "R", "READON" or "LON" command.

8.4.2 Marker-OFF Mode

The marker beam will not illuminate under any conditions.

8.4.3 Marker-ON Mode

When the scanner enters Ready state, the marker beam illuminates continuously for approximately 30 seconds before turning off. The marker beam illuminates continuously when it is ready to scan.

8.5　Illumination Light

The illumination LEDs light up when the scanner is in the Active state.

Using the configuration software (ScannerSetting_2D), illumination lights can be turned on or off.

Chapter 9   Communication

9.1   Bluetooth® Interface

Use the QR-coded parameter menu or the configuration software (ScannerSetting_2D) to set the communications conditions. Scanned data can be transmitted to external devices or computers in the following formats.

The waiting time for a connection from a master device when the scanner is the slave device can be selected from 2 minutes (default), 4 minutes, 10 minutes, and 30 minutes.

When the waiting time is exceeded and there has been no connection with a master device, the scanner stands by in the same state as when Bluetooth® wireless communication has been disconnected.

9.2   SPP Profile

The scanner supports Serial Port Profile (SPP), which can connect to an Android device, PC, or other device equipped with a Bluetooth® Specification Ver. 2.1+EDR-compatible Bluetooth® module.

The user can select Non-acknowledge mode, ACK/NAK mode, or data packing (data packetizing).

Non-acknowledge mode (default)

Scanned data is sent.

ACK/NAK mode

Scanned data is sent and then processed according to the response from the computer etc.

ACK: Normal completion
NAK: Resend

Note: Using the configuration software (ScannerSetting_2D), the user can set ACK/NAK response confirmation timing to a figure between 100ms and 9.9s (at intervals of 100ms).

Data packing (data packetizing)

■ "Data packing (host)"

When scanned data is sent to a commercial Bluetooth® device etc., it is packetized. Refer to section 9.6 for details.

■ "Data packing (BA)"

When scanned data is sent to our BA series communications adapter, it is packetized. Refer to section 9.6 for details.

9.3 HID Profile

The scanner supports Human Interface Device Profile (HID profile), which can connect to an iPhone, iPad, iPod, Android device, Windows PC, or other device equipped with a Bluetooth® Specification Ver. 2.1+EDR-compatible Bluetooth® module.

(1) Caps Lock Status

Align with the Caps Lock status of the host computer.
(Default: Caps Lock off)

(2) Keyboard Type

Set to the connected keyboard type. (Default: Japanese (106 Keyboard)

(3) Numeric Data Transmission Format

Select "inboard numeric keys" or "numeric keys" on the connected keyboard.
(Default: Inboard numeric keys)

(4) Binary Data Conversion

Select the conversion type to be applied to scanned data from the following:

- "None" (ASCII) (default):	Converts 00h to 7Fh data to ASCII format, and outputs it bytewise. 80h to FFh data is not output with this setting. Scanning operations are completed even though the data is not output.
- Binary conversion:	Converts 00h to FFh data to binary format, and outputs it bytewise.
- Kanji conversion	Converts 00h to FFh data to Shift JIS format and outputs it, two bytes at a time. If there is any data to which this Kanji conversion cannot be applied, such data is converted to binary format and output bytewise. 8140 to 9FFC, E040 to EFFC are allocated for Kanji.

Example: When scanned code data is "Kanji (漢字)"
 Data: 漢 字
 Shift JIS: 8ABF 8E9A

Binary Data Conversion Format	Output Data	Note
None	Not output	Only the scanning operation is completed.
Binary conversion	8Ah BFh 8Eh 9Ah Assigned characters	Output bytewise in binary format.
Kanji conversion	"Kanji" (漢字)	Output with Kanji conversion *

* Note that some connected devices or applications may fail to output converted data as it is displayed.

9.4　Communication Format

Select the data communication format from the following two options.

Header	Scanner ID	Code mark	Prefix	Number of digits				Code data	Suffix	Terminator	BCC
				n1	n2	n3	n4				

Header	Scanner ID	Prefix	Code mark	Number of digits				Code data	Suffix	Terminator	BCC
				n1	n2	n3	n4				

Each item is described as follows:

(1) Header and Terminator

Select from the following options.

SPP Profile

Header:　　　　　None (default), STX, or user selection
Terminator:　　　CR (default), none, LF, CR/LF, ETX, or user selection

HID Profile

Header:　　　　　None (default), TAB, ESC, or ENTER, etc.
Terminator:　　　None, TAB, ESC, or ENTER (default), etc.

　　☞　　Refer to Chapter 11 for details.

(Note) Please use SDK provided by our company for iAP protocol.

(2) Scanner ID

Transfer is conducted using the unique 6-digit scanner ID (serial number) set at factory shipment.

(3) Prefix/Suffix

A prefix/suffix of up to 8 bytes can be set from a combination of any ASCII characters (00h to FFh) using the configuration software (ScannerSetting_2D). (Default:　None)

(4) BCC

The XOR (exclusive or) is made for each bit that comes after the header up to the terminator, and is transmitted as binary code in single bytes. You can select whether or not to transmit the BCC. BCC is not transferred if there is no header, or the scanner is set to HID profile.

(5) Code Mark

This optional field specifies the code system. Code marks can be selected from the types (Type 1, Type 2, Type 3, Type 4, and user-defined) listed below.

2 output modes are available for above-mentioned 5 types marks: Coupling and separating.

Coupling: Assigns a single code mark to the combination of the main symbol of barcodes with UPC/EAN add-on + add-on component.

Separating: Assigns code marks to the main symbol of barcodes with UPC/EAN add-on and the add-on component respectively.

For user-defined code marks, a code mark of up to 4 bytes can be set from a combination of any ASCII characters (00h to FEh) for each of the following barcode types.

You can also select whether or not to transmit the code mark. (Default: Transfer disabled)

Code Type			Code mark			
			Type1		Type2	
			Coupling	Separating	Coupling	Separating
2D code	QR code		Q		Q	
	QR code (Split mode)	Edit mode	Q		Q	
		Batch edit mode	Q		Q	
		Non-edit mode	S		S	
	Micro QR code		Q		Q	
	SQRC		Q		Q	
	iQR code		G		G	
	iQR code (Split mode)	Edit mode	G		G	
		Non-edit mode	S		S	
	MaxiCode		X		X	
	PDF417		Y		Y	
	MicroPDF417		Y		Y	
	Data Matrix	Square	Z		Z	
		Rectangular	Z		Z	
	Aztec		J		J	
Barcode	UPC-A	Without add-on	A		A	
		With 2-digit add-on	Linear	A		A
			Add-on	None		None
		With 5-digit add-on	Linear	A		A
			Add-on	None		None
	UPC-E	Without add-on	C		E	
		With 2-digit add-on	Linear	C		E
			Add-on	None		None
		With 5-digit add-on	Linear	C		E
			Add-on	None		None

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Code Type				Code mark			
				Type1		Type2	
				Coupling	Separating	Coupling	Separating
Barcode	EAN-13	Without add-on		A		F	
		With 2-digit add-on	Linear	A		F	
			Add-on	None		None	
		With 5-digit add-on	Linear	A		F	
			Add-on	None		None	
	EAN-8	Without add-on		B		FF	
		With 2-digit add-on	Linear	B		FF	
			Add-on	None		None	
		With 5-digit add-on	Linear	B		FF	
			Add-on	None		None	
	Interleaved 2 of 5			I		I	
	Standard 2 of 5 (short)			H		H	
	Standard 2 of 5 (normal)			H		H	
	Code 39			M		M	
	Code 39 Full ASCII			M		M	
	Codabar (NW-7)			N		N	
	Code 128			K		K	
	GS1-128			W		W	
	Code 93			L		L	
	GS1 DataBar (Note 1)			R		R	

Code Type				Code mark			
				Type1		Type2	
				Coupling	Separating	Coupling	Separating
GS1 Composite	GS1 DataBar (Note 1) CC-A GS1 DataBar (Note 1) CC-B	GS1 DataBar		V	R	V	R
		CC-A, CC-B		None	Y (Note 2)	None	Y (Note 2)
	UPC-A CC-A, UPC-A CC-B	UPC-A	Without add-on	V	A	V	A
			With 2-digit add-on — Linear	V	A	V	A
			With 2-digit add-on — Add-on	None	None	None	None
			With 5-digit add-on — Linear	V	A	V	A
			With 5-digit add-on — Add-on	None	None	None	None
		CC-A, CC-B		None	Y (Note 2)	None	Y (Note 2)
	EAN-13 CC-A, EAN-13 CC-B	EAN-13	Without add-on	V	A	V	F
			With 2-digit add-on — Linear	V	A	V	F
			With 2-digit add-on — Add-on	None	None	None	None
			With 5-digit add-on — Linear	V	A	V	F
			With 5-digit add-on — Add-on	None	None	None	None
		CC-A, CC-B		None	Y (Note 2)	None	Y (Note 2)
	UPC-E CC-A, UPC-E CC-B	UPC-E	Without add-on	V	C	V	E
			With 2-digit add-on — Linear	V	C	V	E
			With 2-digit add-on — Add-on	None	None	None	None
			With 5-digit add-on — Linear	V	C	V	E
			With 5-digit add-on — Add-on	None	None	None	None
		CC-A, CC-B		None	Y (Note 2)	None	Y (Note 2)
	EAN-8 CC-A, EAN-8 CC-B	EAN-8	Without add-on	V	B	V	FF
			With 2-digit add-on — Linear	V	B	V	FF
			With 2-digit add-on — Add-on	None	None	None	None
			With 5-digit add-on — Linear	V	B	V	FF
			With 5-digit add-on — Add-on	None	None	None	None
		CC-A, CC-B		None	Y (Note 2)	None	Y (Note 2)
	GS1-128 CC-A, GS1-128 CC-B, GS1-128 CC-C	GS1-128		V	W	V	W
		CC-A, CC-B, CC-C		None	Y (Note 2)	None	Y (Note 2)

Code Type				Code mark			
				Type3		Type 4 (Note 3)	
				Coupling	Separating	Coupling	Separating
2D code	QR code			P01	P01	]Qm	]Qm
	QR code (Split mode)	Edit mode		P01	P01	]Qm	]Qm
		Batch edit mode		P01	P01	]Qm	]Qm
		Non-edit mode		P01	P01	S (Note 4)	S (Note 4)
	Micro QR code			P01	P01	Q (Note 4)	Q (Note 4)
	SQRC			Q	Q	Q (Note 4)	Q (Note 4)
	iQR code			G	G	]Qm	]Qm
	iQR code (Split mode)	Edit mode		G	G	]Qm	]Qm
		Non-edit mode		S	S	S	S
	MaxiCode			P02	P02	]Um	]Um
	PDF417			X	X	]L0	]L0
	MicroPDF417			X	X	]L0	]L0
	Data Matrix	Square		P00	P00	]dm	]dm
		Rectangular		P00	P00	]dm	]dm
	Aztec			z	z	]zm	]zm
Barcode	UPC-A	Without add-on		A	A	]X0	]X0
		With 2-digit add-on	Linear	A	A	]X3	]X0
			Add-on	None	None	None	]X1 (Note 2)
		With 5-digit add-on	Linear	A	A	]X3	]X0
			Add-on	None	None	None	]X2 (Note 2)
	UPC-E	Without add-on		A	A	]X0	]X0
		With 2-digit add-on	Linear	A	A	]X3	]X0
			Add-on	None	None	None	]X1 (Note 2)
		With 5-digit add-on	Linear	A	A	]X3	]X0
			Add-on	None	None	None	]X2 (Note 2)
	EAN-13	Without add-on		A	A	]E0	]E0
		With 2-digit add-on	Linear	A	A	]E3	]E0
			Add-on	None	None	None	]E1 (Note 2)
		With 5-digit add-on	Linear	A	A	]E3	]E0
			Add-on	None	None	None	]E2 (Note 2)
	EAN-8	Without add-on		A	A	]E4	]E4
		With 2-digit add-on	Linear	A	A	]E5	]E4
			Add-on	None	None	None	]E1 (Note 2)
		With 5-digit add-on	Linear	A	A	]E6	]E4
			Add-on	None	None	None	]E2 (Note 2)

	Code Type				Code mark			
					Type3		Type 4 (Note 3)	
					Coupling	Separating	Coupling	Separating
Barcode	Interleaved 2 of 5				F		]Im	
	Standard 2 of 5 (short)				G		]R0	
	Standard 2 of 5 (normal)				G		]S0	
	Code 39				B		]Am	
	Code 39 Full ASCII				B		]Am	
	Codabar (NW-7)				C		]Fm	
	Code 128				D		]Cm	
	GS1-128				K		]C1	
	Code 93				E		]G0	
	GS1 DataBar (Note 1)				R		]e0	
GS1 Composite	GS1 DataBar (Note 1) CC-A GS1 DataBar (Note 1) CC-B	GS1 DataBar			T	R	]e0	
		CC-A, CC-B			None	X (Note 2)	None	
	UPC-A CC-A, UPC-A CC-B	UPC-A	Without add-on		T	A	]X0	
			With 2-digit add-on	Linear	T	A	]X3	]X0
				Add-on	None	None	None	]X1 (Note 2)
			With 5-digit add-on	Linear	T	A	]X3	]X0
				Add-on	None	None	None	]X2 (Note 2)
		CC-A, CC-B			None	X (Note 2)	]e0 (Note 2)	
	EAN-13 CC-A, EAN-13 CC-B	EAN-13	Without add-on		T	A	]E0	
			With 2-digit add-on	Linear	T	A	]E3	]E0
				Add-on	None	None	None	]E1 (Note 2)
			With 5-digit add-on	Linear	T	A	]E3	]E0
				Add-on	None	None	None	]E2 (Note 2)
		CC-A, CC-B			None	X (Note 2)	]e0 (Note 2)	
	UPC-E CC-A, UPC-E CC-B	UPC-E	Without add-on		T	A	]X0	
			With 2-digit add-on	Linear	T	A	]X3	]X0
				Add-on	None	None	None	]X1 (Note 2)
			With 5-digit add-on	Linear	T	A	]X3	]X0
				Add-on	None	None	None	]X2 (Note 2)
		CC-A, CC-B			None	X (Note 2)	]e0 (Note 2)	
	EAN-8 CC-A, EAN-8 CC-B	EAN-8	Without add-on		T	A	]E4	
			With 2-digit add-on	Linear	T	A	]E5	]E4
				Add-on	None	None	None	]E1 (Note 2)
			With 5-digit add-on	Linear	T	A	]E6	]E4
				Add-on	None	None	None	]E2 (Note 2)
		CC-A, CC-B			None	X (Note 2)	]e0 (Note 2)	
	GS1-128 CC-A, GS1-128 CC-B, GS1-128 CC-C	GS1-128			T	K	]e0	
		CC-A, CC-B, CC-C			None	X (Note 2)	None	

Note 1: "GS1 DataBar" refers to all of the following codes:
GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Limited, GS1 DataBar Stacked, GS1 DataBar Expanded, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Expanded Stacked

Note 2: These code marks are contained in the code data.

Note 3: Type 4 code mark is a code mark system that conforms to the AIM USA "Guidelines on Symbology Identifiers." The "m" suffix is a modifier character that differs depending upon options of individual symbologies as defined below.

Code Type		"m" (Modifer character)	Option
2D Code	QR Code	0	Model 1
		1	Model 2
	iQR Code	A	No FNC1 in the 1st character position from start code
		C	FNC1 in the 1st character position from start code
		E	FNC1 in the 2nd character position from start code
	MaxiCode	0	Mode 4, mode 5
		1	Mode 2, mode 3
	Data Matrix	1	ECC-200
		2	ECC-200 (FNC1 in the 1st or 5th character position from start code)
		3	ECC-200 (FNC1 in the 2nd or 6th character position from start code)
	Aztec	0	No options
		1	FNC1 preceding the 1st message character
		2	FNC1 subsequent to the 1st character or digit pairs
Barcode	Interleaved 2 of 5	0	Scanning enabled, without a check digit
		1	Scanning enabled, with a check digit (Check digit transmission enabled)
		3	Scanning enabled, with a check digit (Check digit transmission disabled)
	CODE39 CODE39 Full ASCII	0	Scanning enabled, without a check digit
		1	Scanning enabled, with a check digit (Check digit transmission enabled)
		3	Scanning enabled, with a check digit (Check digit transmission disabled)
	Codabar	0	Scanning enabled, without a check digit
		1	Scanning enabled, with a check digit (Check digit transmission enabled)
		3	Scanning enabled, with a check digit (Check digit transmission disabled)
	CODE128	0	No FNC1 in the 1st and 2nd character positions from start code
		2	FNC1 in the 2nd character position from start code

Example: The code mark for Interleaved 2 of 5with option "Scanning enabled, with a check digit (Check digit transmission disabled)" is "]I3".
]: Flag character (ASCII 93h)
I: Code character (Interleaved 2 of 5)
3: Modifier character (Refer to the above table)

Note 4: For code marks that do not conform to the AIM USA "Guidelines on Symbology Identifiers," the characters are the same as those defined in Type 1.

(6) Number of Digits

This optional field specifies whether to transmit the number of digits of code data. The default setting is transfer disabled.

When transmission is enabled, select between four digits (4 bytes) or two digits (2 bytes). The number of digits will be omitted for the UPC and EAN codes.

- Four-digit (4-byte) transmission
n1:   thousands (0 to 9)
n2:   hundreds (0 to 9)
n3:   tens (0 to 9)
n4:   units (0 to 9)

- Two-digit (2-byte) transmission
n1:   tens (0 to 9)
n2:   units (0 to 9)

(7) Code Data

The transmission data format for each set of codes is described below.

QR Code, Micro QR Code, iQR Code

The scanned data is transmitted as is.

Split QR/iQR Codes

In edit mode, batch edit mode (Split QR codes only):
The scanner edits scanned data and transmits it. It does not transmit the code number, number of splits, or parity.

In non-edit mode:
The scanner transmits the code number, the number of splits, parity, and scanned code data. The code number and number of splits are transmitted in single bytes in hexadecimal format. Parity is transmitted in 2 bytes in the same format.

SQRC

The scanned data is transmitted as is. When "Transmission of undisclosed data only" is selected in "SQRC encryption key match processing," only undisclosed data is transmitted.

$X_1 \, X_2 \, \cdots X_{n-1} \, X_n \, Y_1 \, Y_2 \, \cdots Y_{m-1} \, Y_m$
X_n: Disclosed data
Y_m: Undisclosed data

When "Transmission of disclosed data and undisclosed data" is selected, the following format applies.

$X_1 \, X_2 \, \cdots X_{n-1} \, X_n \, Y_1 \, Y_2 \, \cdots Y_{m-1} \, Y_m$

When "Transmission of undisclosed data only" is selected, the following format applies.

$Y_1 \, Y_2 \, \cdots Y_{m-1} \, Y_m$

PDF417, MicroPDF417, MaxiCode, Data Matrix, Aztec

The scanned data is transmitted as is.

UPC-A

You can select whether or not to transmit the padding character "0", number system character "S", and the check digit to the host. Disabling the transmission of the number system character "S" automatically disables the transmission of the padding character "0".

You can also select whether or not to convert to GTIN format. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

When conversion to GTIN format is disabled, the following format applies.

0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D

0: Padding character for adjustment of the data length
S: Number system character

With UPC-A Add-on

If the scanner is set to "Code mark type: Type 4," and "Code mark output mode: Separating," a code mark will be applied in front of the add-on code data. (For details on the code mark applied, refer to Section 9.4.(5))

You can also select whether or not to convert to GTIN format. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

When conversion to GTIN format is disabled, the following format applies.

With 2-digit add-on:
0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12}

With 5-digit add-on:
0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12} X_{13} X_{14} X_{15}

0: Padding character for adjustment of the data length
S: Number system character
X_{11-15}: Add-on code data

UPC-E

You can select whether or not to transmit the padding character "0", number system character "S", and the check digit to the host. Disabling the transmission of the number system character "S" automatically disables the transmission of the padding character "0".

You can also select whether or not to convert to GTIN format and UPC-A. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

When conversion to GTIN format is disabled, the following format applies.

- Conversion to UPC-A disabled
0 X_1 X_2 X_3 X_4 X_5 X_6 C/D

- Conversion to UPC-A enabled
X_6=0-2   0 S X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D
X_6=3   0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D
X_6=4   0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D
X_6=5-9   0 S X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6 C/D

0: Padding character for adjustment of the data length
S: Number system character

With UPC-E Add-on

If the scanner is set to "Code mark type: Type 4," and "Code mark output mode: Separating," a code mark will be applied in front of the add-on code data. (For details on the code mark applied, refer to Section 9.4 (5))

You can also select whether or not to convert to GTIN format and UPC-A. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

When conversion to GTIN format is disabled, the following format applies.

With 2-digit add-on:
- Conversion to UPC-A disabled
$0 \ X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ X_6 \ C/D \ X_7 \ X_8$

- Conversion to UPC-A enabled

X_6=0-2	$0 \ S \ X_1 \ X_2 \ X_6 \ 0 \ 0 \ 0 \ 0 \ X_3 \ X_4 \ X_5 \ C/D \ X_7 \ X_8$
X_6=3	$0 \ S \ X_1 \ X_2 \ X_3 \ 0 \ 0 \ 0 \ 0 \ 0 \ X_4 \ X_5 \ C/D \ X_7 \ X_8$
X_6=4	$0 \ S \ X_1 \ X_2 \ X_3 \ X_4 \ 0 \ 0 \ 0 \ 0 \ 0 \ X_5 \ C/D \ X_7 \ X_8$
X_6=5-9	$0 \ S \ X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ 0 \ 0 \ 0 \ 0 \ X_6 \ C/D \ X_7 \ X_8$

With 5-digit add-on:
- Conversion to UPC-A disabled
$0 \ X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ X_6 \ C/D \ X_7 \ X_8 \ X_9 \ X_{10} \ X_{11}$

- Conversion to UPC-A enabled

X_6=0-2	$0 \ S \ X_1 \ X_2 \ X_6 \ 0 \ 0 \ 0 \ 0 \ X_3 \ X_4 \ X_5 \ C/D \ X_7 \ X_8 \ X_9 \ X_{10} \ X_{11}$
X_6=3	$0 \ S \ X_1 \ X_2 \ X_3 \ 0 \ 0 \ 0 \ 0 \ 0 \ X_4 \ X_5 \ C/D \ X_7 \ X_8 \ X_9 \ X_{10} \ X_{11}$
X_6=4	$0 \ S \ X_1 \ X_2 \ X_3 \ X_4 \ 0 \ 0 \ 0 \ 0 \ 0 \ X_5 \ C/D \ X_7 \ X_8 \ X_9 \ X_{10} \ X_{11}$
X_6=5-9	$0 \ S \ X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ 0 \ 0 \ 0 \ 0 \ X_6 \ C/D \ X_7 \ X_8 \ X_9 \ X_{10} \ X_{11}$

0:	Padding character for adjustment of the data length
S:	Number system character
X_{7-11}:	Add-on code data

EAN-13

You can select whether or not to transmit the two prefix characters "P_1" and "P_2" and the check digit to the host. Conversion to ISBN/ISSN format is also an option. If conversion is enabled, codes with prefix characters "978" and "979" are converted to ISBN format, and codes with the prefix character "977" are converted to ISSN format.

You can also select whether or not to convert to GTIN format. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

When conversion to GTIN format is disabled, the following format applies.

- Conversion to ISBN/ISSN format disabled
$P_1 \ P_2 \ P_3 \ X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ X_6 \ X_7 \ X_8 \ X_9 \ C/D$

P_n: Prefix character

- Conversion to ISBN/ISSN format enabled
ISBN format
   $X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ X_6 \ X_7 \ X_8 \ X_9 \ C/D(^*1)$
ISSN format
   $X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ X_6 \ X_7 \ C/D(^*1)$

(*1) ISBN/ISSN check digits are calculated using MOD-11 and transmitted to the host.

With EAN-13 Add-on:

If the scanner is set to "Code mark type: Type 4," and "Code mark output mode: Separating," a code mark will be applied in front of the add-on code data. (For details on the code mark applied, refer to Section 9.4 (5))

You can also select whether or not to convert to GTIN format. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

When conversion to GTIN format is disabled, the following format applies.

With 2-digit add-on:
$P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9$ C/D $X_{10} X_{11}$

With 5-digit add-on:
$P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9$ C/D $X_{10} X_{11} X_{12} X_{13} X_{14}$

P_n:　　　　　Prefix character
X_{10-14}:　　　Add-on code data

EAN-8

You can select whether or not to transmit the check digit. You can also select whether or not to convert to GTIN format and EAN-13. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

When conversion to GTIN format is disabled, the following format applies.

- Conversion to EAN-13 disabled
$P_1 P_2 P_3 X_1 X_2 X_3 X_4$ C/D

- Conversion to EAN-13 enabled
0 0 0 0 0 $P_1 P_2 P_3 X_1 X_2 X_3 X_4$ C/D

P_n:　　Prefix character

With EAN-8 Add-on:

If the scanner is set to "Code mark type: Type 4," and "Code mark output mode: Separating," a code mark will be applied in front of the add-on code data. (For details on the code mark applied, refer to Section 9.4 (5))

You can also select whether or not to convert to GTIN format. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

When conversion to GTIN format is disabled, the following format applies.

With 2-digit add-on:
$P_1 P_2 P_3 X_1 X_2 X_3 X_4$ C/D $X_5 X_6$

With 5-digit add-on:
$P_1 P_2 P_3 X_1 X_2 X_3 X_4$ C/D $X_5 X_6 X_7 X_8 X_9$

P_n:　　　　　Prefix character
X_{5-14}:　　　Add-on code data

Code 39

The scanned data is transmitted as is.

You can select whether or not to transmit the start-stop codes. Start-stop codes are "*".

Interleaved 2 of 5, Standard 2 of 5

The scanner transmits scanned code data, starting from the character following the start code to the one preceding the stop code.

Note that the start-stop codes will not be transmitted.

Codabar (NW-7)

The scanned data is transmitted with the start-stop codes included.

You can select whether or not to transmit the start-stop codes.

Code 128 (GS1-128)

The scanner transmits scanned code data, starting from the character following the start code to the one preceding the check digit. Note that the start-stop code, FNC code, and check digit are not transmitted.

FNC1 in the first and second positions after the start code will not be transmitted. For FNC1 in other positions, the user can select between the following options: disable transmission/conversion to <GS> (1Dh) and transmission/user selection.

You can also select whether or not to convert to GTIN format. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

Code 93

The scanned data is transmitted without the start-stop codes and check digit.

GS1 DataBar

The scanned data is transmitted as is.

For GS1 DataBar Expanded FNC1, the user can select between the following options: disable transmission/conversion to <GS> (1Dh) and transmission/user selection.

You can also select whether or not to convert to GTIN format. (Refer to Section 9.5 for details on enabling conversion to GTIN format.)

GS1 DataBar Composite

The scanned data is transmitted as is.

If the scanner is set to "Code mark type: Type 1" and "Code mark output mode: Separating," a separator <GS> (1Dh) and 2D code mark will be applied between the linear code data and 2D code data. (For details on the code mark applied, refer to Section 9.4 (5))

If the scanner is set to "Code mark type: Type 4" and variable linear component (GS1 DataBar) code length, a separator <GS> (1Dh) will be applied between the linear code data and 2D code data.

UPC/EAN Composite

The scanned data is transmitted as is.

If the scanner is set to "Code mark type: Type 1" and "Code mark output mode: Separating," a separator <GS> (1Dh) and 2D code mark will be applied between the linear code data and 2D code data.

If the scanner is set to "Code mark type: Type 4," a 2D code mark will be applied between the linear code data and 2D code data. (For details on the code mark applied, refer to Section 9.4 (5))

<u>Composite with UPC/EAN Add-on</u>

The scanned data is transmitted as is.

If the scanner is set to "Code mark type: Type 1" and "Code mark output mode: Separating," a separator <GS> (1Dh) and 2D code mark will be applied between the linear code data and 2D code data.

If the scanner is set to "Code mark type: Type 4" and "Code mark output mode: Coupling," a 2D code mark will be applied between the linear code data and 2D code data.

If the scanner is set to "Code mark type: Type 4" and "Code mark output mode: Separating," a code mark will be applied in front of the add-on component and between the add-on code data and 2D code data. (For details on the code mark applied, refer to Section 9.4 (5))

<u>GS1-128 Composite</u>

The scanned data is transmitted as is.

If the scanner is set to "Code mark type: Type 1" and "Code mark output mode: Separating," a separator <GS> (1Dh) and 2D code mark will be applied between the linear code data and 2D code data.

If the scanner is set to "Code mark type: Type 4" and variable linear component (GS1-128) code length, a separator <GS> (1Dh) will be applied between the linear code data and 2D code data. (For details on the code mark applied, refer to Section 9.4 (5))

9.5 GTIN Conversion

When GTIN (Global Trade Item Number) format is enabled, UPC-A, UPC-E, EAN-13, EAN-8, and Interleaved 2 of 5 (14 digits) formats can be converted to GTIN for output. GS1 DataBar, GS1-128 in GTIN format can also be outputted in product code (EAN-13/JAN-13) format.

Note: GTIN conversion is disabled under the following conditions.
- When scanning codes under the conditions specified for multi-line barcodes.
- When using data edit mode (data extraction mode, data conversion mode, block sorting mode, and ADF script mode).

---

(1) Converting UPC/EAN/Interleaved 2 of 5 (14 digits) to GTIN Format)

When converting to GTIN format, you can select either 16-digit or 14-digit format. If 16-digit format is selected, the application identifier "01" and package indicator PI will be added at the start of the code before transmission; if 14-digit code conversion is selected, PI will be added at the start of the code.

However, this will not be applied to output formats that can be specified in UPC-A, UPC-E, EAN-13, and EAN-8.

UPC-A

- Scanned data
  0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D

  0:   Padding character for adjustment of the data length
  S: Number system character

- Conversion to 16 digits (the application identifier "01" and PI are added at the start of the code before transmission)
  0 1 PI 0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D (*1)

  (*1) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

- Conversion to 14 digits (PI is added at the start of the code before transmission)
  PI 0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D (*2)

  (*2) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

With UPC-A Add-on

- Scanned data

With 2-digit add-on:
  0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12}

With 5-digit add-on:
  0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12} X_{13} X_{14} X_{15}

  0:         Padding character for adjustment of the data length
  S: Number system character
  X_{11-15}:   Add-on code data

- Conversion to 16 digits (the application identifier "01" and PI are added at the start of the code before transmission)

With 2-digit add-on:
  0 1 PI 0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12} (*1)

With 5-digit add-on:
  0 1 PI 0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12} X_{13} X_{14} X_{15} (*1)

  (*1) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

- Conversion to 14 digits (PI is added at the start of the code before transmission)

With 2-digit add-on:
  PI 0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12} (*2)

With 5-digit add-on:
  PI 0 S X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12} X_{13} X_{14} X_{15} (*2)

  (*2) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

UPC-E

- Scanned data

  0 X_1 X_2 X_3 X_4 X_5 X_6 C/D

  0:    Padding character for adjustment of the data length

- Conversion to 16 digits (the application identifier "01" and PI are added at the start of the code before transmission)

  X_6=0-2 0 1 PI 0 0 X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D (*1)
  X_6=3 0 1 PI 0 0 X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D (*1)
  X_6=4 0 1 PI 0 0 X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D (*1)
  X_6=5-9 0 1 PI 0 0 X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6 C/D (*1)

  (*1) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

- Conversion to 14 digits (PI is added at the start of the code before transmission)

  X_6=0-2   PI 0 S X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D (*2)
  X_6=3   PI 0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D (*2)
  X_6=4   PI 0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D (*2)
  X_6=5-9   PI 0 S X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6 C/D (*2)

  (*2) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

With UPC-E Add-on

- Scanned data

With 2-digit add-on:
  0 X_1 X_2 X_3 X_4 X_5 X_6 C/D X_7 X_8

With 5-digit add-on:
  0 X_1 X_2 X_3 X_4 X_5 X_6 C/D X_7 X_8 X_9 X_{10} X_{11}

  0:          Padding character for adjustment of the data length
  X_{7-11}:   Add-on code data

- Conversion to 16 digits (the application identifier "01" and PI are added at the start of the code before transmission)
With 2-digit add-on:
  X_6=0-2   0 1 PI 0 S X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D X_7 X_8 (*1)
  X_6=3   0 1 PI 0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D X_7 X_8 (*1)
  X_6=4   0 1 PI 0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D X_7 X_8 (*1)
  X_6=5-9   0 1 PI 0 S X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6 C/D X_7 X_8 (*1)

With 5-digit add-on:
  X_6=0-2   0 1 PI 0 S X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D X_7 X_8 X_9 X_{10} X_{11} (*1)
  X_6=3   0 1 PI 0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D X_7 X_8 X_9 X_{10} X_{11} (*1)
  X_6=4   0 1 PI 0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D X_7 X_8 X_9 X_{10} X_{11} (*1)
  X_6=5-9   0 1 PI 0 S X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6 C/D X_7 X_8 X_9 X_{10} X_{11} (*1)

  (*1) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

- Conversion to 14 digits (PI is added at the start of the code before transmission)
With 2-digit add-on:
  X_6=0-2   PI 0 S X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D X_7 X_8 (*2)
  X_6=3   PI 0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D X_7 X_8 (*2)
  X_6=4   PI 0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D X_7 X_8 (*2)
  X_6=5-9   PI 0 S X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6 C/D X_7 X_8 (*2)

With 5-digit add-on:
  X_6=0-2   PI 0 S X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D X_7 X_8 X_9 X_{10} X_{11} (*2)
  X_6=3   PI 0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D X_7 X_8 X_9 X_{10} X_{11} (*2)
  X_6=4   PI 0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D X_7 X_8 X_9 X_{10} X_{11} (*2)
  X_6=5-9   PI 0 S X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6 C/D X_7 X_8 X_9 X_{10} X_{11} (*2)

  (*2) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

EAN-13

- Scanned data

  P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D

  P_n: Prefix character

- Conversion to 16 digits (the application identifier "01" and PI are added at the start of the code before transmission)
  0 1 PI P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D (*1)

  (*1) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

- Conversion to 14 digits (PI is added at the start of the code before transmission)
  PI P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D (*2)

  (*2) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

With EAN-13 Add-on:

- Scanned data

With 2-digit add-on:

P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D X_{10} X_{11}

With 5-digit add-on:

P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D X_{10} X_{11} X_{12} X_{13} X_{14}

P_n: Prefix character
X_{10-14}:   Add-on code data

- Conversion to 16 digits (the application identifier "01" and PI are added at the start of the code before transmission)

With 2-digit add-on:

0 1 PI P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D X_{10} X_{11} (*[1])

With 5-digit add-on:

0 1 PI P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D X_{10} X_{11} X_{12} X_{13} X_{14} (*[1])

(*[1]) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

- Conversion to 14 digits (PI is added at the start of the code before transmission)

With 2-digit add-on:

PI P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D X_{10} X_{11} (*[2])

With 5-digit add-on:

PI P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 C/D X_{10} X_{11} X_{12} X_{13} X_{14} (*[2])

(*[2]) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

EAN-8

- Scanned data

P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D

P_n: Prefix character

- Conversion to 16 digits (the application identifier "01" and PI are added at the start of the code before transmission)

0 1 PI 0 0 0 0 0 P_1 P_2 X_1 X_2 X_3 X_4 C/D (*[1])

(*[1]) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

- Conversion to 14 digits (PI is added at the start of the code before transmission)

PI 0 0 0 0 0 P_1 P_2 X_1 X_2 X_3 X_4 C/D (*[2])

(*[2]) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

<u>With EAN-8 Add-on:</u>

- Scanned data

With 2-digit add-on:

$P_1 P_2 X_1 X_2 X_3 X_4$ C/D $X_5 X_6$

With 5-digit add-on:

$P_1 P_2 X_1 X_2 X_3 X_4$ C/D $X_5 X_6 X_7 X_8 X_9$

P_n: Prefix character
X_{6-10}:   Add-on code data

- Conversion to 16 digits (the application identifier "01" and PI are added at the start of the code before transmission)

With 2-digit add-on:

0 1 PI 0 0 0 0 0 $P_1 P_2 X_1 X_2 X_3 X_4$ C/D $X_5 X_6$ (*1)

With 5-digit add-on:

0 1 PI 0 0 0 0 0 $P_1 P_2 X_1 X_2 X_3 X_4$ C/D $X_5 X_6 X_7 X_8 X_9$ (*1)

(*1) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

- Conversion to 14 digits (PI is added at the start of the code before transmission)

With 2-digit add-on:

PI 0 0 0 0 0 $P_1 P_2 X_1 X_2 X_3 X_4$ C/D $X_5 X_6$ (*2)

With 5-digit add-on:

PI 0 0 0 0 0 $P_1 P_2 X_1 X_2 X_3 X_4$ C/D $X_5 X_6 X_7 X_8 X_9$ (*2)

(*2) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

<u>Interleaved 2 of 5 (14 digits)</u>

- Scanned data

$X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} X_{11} X_{12} X_{13}$ C/D

- GTIN conversion enabled (the application identifier "01" is added at the start of the code before transmission)

0 1 $X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} X_{11} X_{12} X_{13}$ C/D (*1)

(*1) The check digit is recalculated and transmitted, regardless of whether or not transmission is enabled.

(2) Converting GS1 DataBar and GS1-128 in GTIN Format to ENA/JAN

You can select whether or not to convert scanned GS1 DataBar or GS1-128 in GTIN format (16 digits with application identifier "01") to EAN/JAN format.

Choose from conversion to 13-digit EAN/JAN format (the application identifier "01" and PI at the start of the code are not transmitted) or conversion to 14-digit EAN/JAN format (the application identifier "01" at the start of the code is not transmitted).

GS1 DataBar

- Scanned data

  0 1 PI X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} X_{11} X_{12} C/D

  PI: Package indicator

- Conversion to 13 digits (the application identifier "01" and PI at the start of the code are not transmitted)

  X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} X_{11} X_{12} C/D [*1]

  (*1) The check digit is recalculated and transmitted.
  If code mark transmission is enabled in the scanner settings, the EAN-13 code mark is transmitted.

- Conversion to 14 digits (the application identifier "01" is not transmitted)

  PI X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} X_{11} X_{12} C/D

GS1-128

- Scanned data

  0 1 PI X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} X_{11} X_{12} X_{13} C/D

  PI: Package indicator

- Conversion to 13 digits (the application identifier "01" and PI at the start of the code are not transmitted)

  X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} X_{11} X_{12} X_{13} C/D [*1]

  (*1) The check digit is recalculated and transmitted. If code mark transmission is enabled in the scanner settings, the EAN-13 code mark is transmitted.

- Conversion to 14 digits (the application identifier "01" is not transmitted)

  PI X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} X_{11} X_{12} X_{13} C/D

9.6   Data Packing (data packetizing)

Data packing (data packetizing) is used when the user wants to increase the reliability of wireless communication.

With data packing, data being sent via wireless communication is first converted to the following formats (packetized) before being sent. After sending one packet, the scanner waits for a response (ACK/NAK) from the communications adapter (BA series), commercial Bluetooth® device, or other device. In the case of an ACK response, the operation completes normally; in the case of a NAK response, the data is resent.

Using the configuration software (ScannerSetting_2D), the user can set ACK/NAK response confirmation timing to a figure between 100 ms and 9900 ms (at intervals of 100 ms).

If there is no ACK or NAK response within the ACK/NAK response confirmation timing, the scanner will sound the error beeper to indicate that the data has not been sent successfully. The scanner cannot scan codes while waiting for a response during the ACK/NAK response confirmation timing.

These functions allow the user to confirm whether the scanned data has been sent to the host successfully, even while working in a location separated from the host. However, a characteristic of wireless communication is that there are instances when the scanner cannot confirm the ACK or NAK response even when data has been sent to the host successfully. Use the scanner in an environment that allows stable wireless communication.

There are two methods of data packing: "data packing (host)" and "data packing (BA)".

Note:	The data packing function cannot be used when HID (Human Interface Device Profile) is selected.

■ Data packing (host)

Used when communicating via a commercial Bluetooth® device etc. Program the host so that received data can be confirmed and a response can be sent to the scanner.
The scanner converts scanned barcode data to the following formats (packetizing) and sends it to the host.

- Transmission format

Header		Data length	Container number	Reserve	Transmission data	CRC		Terminator	
DLE	STX					Lower half	Upper half	DLE	ETX

Each item is described as follows:

(1) Header (2 bytes)

Packet start data.

(2) Data length (2 bytes)

The length of data in packetized data between the header and the terminator.

(3) Container number (1 byte)

Upper 4-bit: transmission number, Lower 4-bit: All transmission numbers

(4) Reserve (1 byte)

Space reserved for extension. Value fixed at 00h.

(5) Transmission data
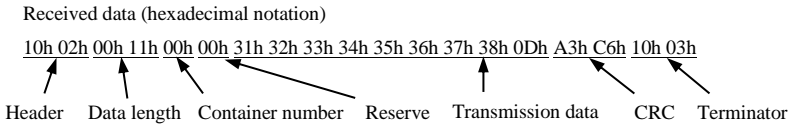
Data before packetizing.

(6) CRC (2 bytes)

16-bit CRC. The result of calculating data from data length to transmission data in LSB first format using the CRC-CCITT method (polynomial $X^{16}+X^{12}+X^5+1$). Stored in a lower half, upper half byte order.

(7) Terminator (2 bytes)

Packet end data.

Note: If the DLE (10h) is included in data other than the header or terminator, the DLE is applied to the front of the header before the data is transferred. When performing data packing (data packetizing) using a device other than the communications adapter, the applied DLE must be deleted by CRC calculation and retrieving the transferred data.

Received packet analysis example

Received data (hexadecimal notation)

10h 02h 00h 11h 00h 00h 31h 32h 33h 34h 35h 36h 37h 38h 0Dh A3h C6h 10h 03h

Header　Data length　Container number　Reserve　Transmission data　CRC　Terminator

(1) Confirm data length.

Data length stored in received data = 0011h = 17 bytes

Data length of received data = 17 bytes

(2) Confirm CRC.

1) Set CRC value to 0.

2) Retrieve the first data byte (00h).

3) Shift CRC value 1 bit to the left.
When there are too many digits due to the shift, XOR the 1021h at the CRC value.

4) Shift the retrieved data 1 bit to the left.
When there are too many digits due to the shift, XOR the 0001h at the CRC value.

5) Repeat the calculations in 3) and 4) 8 times.

6) Retrieve the second data byte (13h).

7) Repeat the calculations in 3) and 4) 8 times.

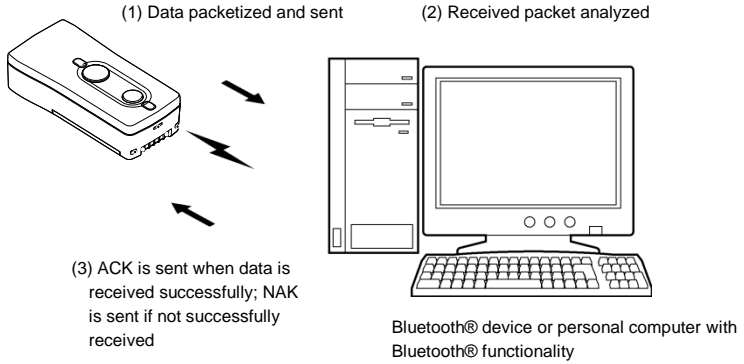8) Repeat this calculation up to the final byte.

9) Finally, perform the same calculation on 2 byte CRC storage area (A3h C6h).

Data	CRC
-	0000h
00h	0000h
11h	1100h
00h	0011h
00h	0108Ah
31h	BD49h
32h	ED78h
33h	CC22h
34h	36DCh
35h	29D7h
36h	941Bh
37h	99C6h
38h	9BA3h
0Dh	9A0Ah
A3h	0CC0h
C6h	0000h

(3)　If the result of the calculation is 0000h, data has been received successfully.

If the result of the calculation is a value other than 0000h, data has not been received successfully.
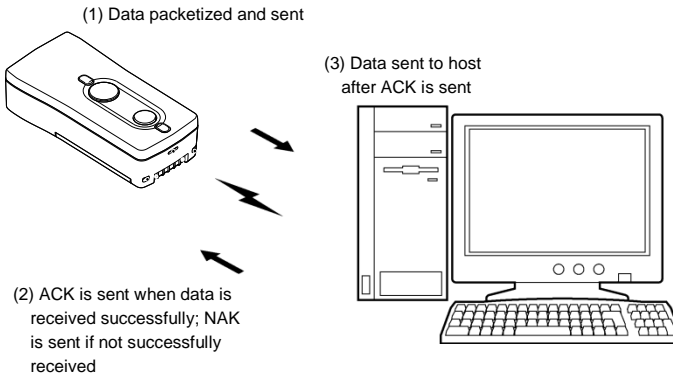
- Scanner setting
  ・ Data packing (host)

(1) Data packetized and sent

(2) Received packet analyzed

(3) ACK is sent when data is received successfully; NAK is sent if not successfully received

Bluetooth® device or personal computer with Bluetooth® functionality

■ Data packing (BA)

Used when communicating via communications adapter (BA series). The communications adapter itself confirms received data and responds to the scanner. Transmission format is the same as data packing (host).

- Scanner setting
  ・ Data packing (BA)

- Communications adapter setting
  ・ Communication with AT/GT/SF1 series

(1) Data packetized and sent

(3) Data sent to host after ACK is sent

(2) ACK is sent when data is received successfully; NAK is sent if not successfully received

Chapter 10 Image Capture Function

10.1 Function Outline

The scanner is equipped with an image capture function. Scanned images can be output in either BMP (bitmap file) format or as a JPEG (standard, high, or low quality).

Image size can be selected from Standard SVGA, 1/4 SVGA and 1/16 SVGA. When 1/4 SVGA or 1/16 SVGA is selected, users can select whether to enlarge the image to fit the screen, or to extract the center portion of the full screen (1/1 SVGA).

When "enlarge the image to fit the screen" is selected, the visual field becomes wider, but at the cost of image quality deterioration. When "extract the center portion of the full screen (1/1 SVGA)" is selected, the visual field becomes narrower, but the quality of the image does not deteriorate.

An image transfer function allows the image to be made into a thumbnail for ease of selection. Thumbnail size can be selected from 1/64 SVGA in bitmap format and 1/4 SVGA in JPEG format.

Parameters such as output format, image size, image format, and whether to create thumbnails can be changed via the image output settings command [IMAGEOUT].

Note: The image capture function cannot be used when HID (Human Interface Device Profile) is selected.

10.2 Specifications

(1) Output Format

BMP or JPEG

(2) Image Size

Image Size	No. of Pixels	BMP	JPEG	Image Output Area
Standard SVGA	800 x 600	○	○	Full screen
1/4 SVGA	400 x 296	○	○	Full screen/Screen center
1/16 SVGA	200 x 144	○	○	Full screen/Screen center
Thumbnail (1/64 SVGA)	96 x 72	○	-	Full screen
Thumbnail (1/4 SVGA)	400 x 296	-	○	Full screen

(3) Communication Protocol for Image Transmission

Xmodem 1K

(4) Image Output Setting Command

IMAGEOUT#1#m#n. . . . .   Thumbnail transmission is enabled
Or
IMAGEOUT #1#m#n#o ....   Thumbnail transmission is disabled

The details of the four parameters are as follows:

1:   Output format (file type)

B	BMP format
J or J0	JPEG format (standard)
J1	JPEG format (high quality)
J2	JPEG format (low quality)

M: Image Size

0	Standard SVGA
2	1/4 SVGA
4	1/16 SVGA

N: Image Output Area

F	Full screen
C	Screen center

O: Whether to use a thumbnail

0	Thumbnail transmission is disabled
None or 1	1/64 SVGA BMP thumbnail transmission
2	1/4 SVGA JPEG thumbnail transmission

(5) Operation

1. When the scanner receives the IMAGEOUT command, it captures the image and the beeper sounds three times. The scanner then enters image transmission mode (Xmodem 1K Protocol).

2. "When thumbnail transmission is enabled"

   Thumbnails (1/64 SVGA BMP files, 1/4 SVGA JPEG files) are repeatedly transmitted.

   When the trigger switch is pulled, the scanner captures the image and begins image transmission (Xmodem 1K Protocol). (The beeper sounds once when the trigger switch is pulled.)

   "When thumbnail transmission is disabled"

   The scanner immediately captures the image and begins transmission (Xmodem 1K Protocol) based on the set parameters.

3. Once image transmission is completed, the beeper sounds once and the scanner returns from image transmission mode to normal operation mode.

(6) Note:

 - Only control commands can be used to enable image transmission. There is no setting to initiate it in the QR Menu.

 - During image transmission mode, scanning of barcodes or 2D codes, etc. is disabled. Further, the protocol is fixed as Xmodem 1K.

 - When setting the command parameters, use uppercase or numeric ASCII characters.

 - Communications condition settings such as the command header, terminator, transmission speed, etc. are the same as those of normal commands.

 - Transmission conditions when in the Xmodem 1K Protocol are the same as during normal operation mode (non-acknowledge mode or ACK/NAK).

 - Once image transmission is completed, the transmission protocol will return to normal operation mode (non-acknowledge mode or ACK/NAK).

 - As the image is compressed during conversion to JPEG format, image quality may deteriorate.

(7) Image Transmission Time (Standard Value)

The communications adapter interface uses USB interface (BA20-RU). Transmission time will change due to the condition of Bluetooth® radio waves, host settings, etc.

Image type	Output format	Image file size	Transmission time
Standard SVGA	BMP	470 KB	66 s
1 / 4 SVGA	BMP	117 KB	17 s
1 / 16 SVGA	BMP	30 KB	5 s
Thumbnail (1/64 SVGA)	BMP	8 KB	3 s
Thumbnail (1/4 SVGA)	JPEG	*	-
Standard SVGA	JPEG	*	-

* As the image will undergo compression and conversion when JPEG format is selected, the file size will change depending on the photo image. The compression rate cannot be set.

Chapter 11   Settings Overview and Factory Settings

The following parameters can be selected via the QR-coded parameter menu or configuration software (ScannerSetting_2D). However, the parameters in the shaded boxes can only be set via the configuration software. At the time of shipping, all settings are set to the factory defaults.

(1) Customizing Reading Mode Parameters

Settings	Parameters	Default	Refer to
Bluetooth® connection	Wireless-disconnect scanning enabled		Section 3.3
	Wireless-disconnect scanning disabled	*	
Data verification mode	Regular scanning mode	*	Section 7.1
	n-point verification mode		
	2-point verification mode		
Data edit mode	Unedited	*	Section 7.2
	Data extraction mode		
	Data conversion mode		
	Block sorting mode		
	ADF script mode		
Point scan mode	Enabled		Section 7.3
	Disabled	*	
Double scan prevention time	Double scan enabled		Section 2.3
	Double scan prevention time Set range 0.1 - 9.9 s	1 s	

: Only available via configuration software.

(2) Customizing Communications Mode Parameters

Settings	Parameters	Default	Refer to
Connected device	BA series	*	Section 3.2
	Windows PC/Android		
	iPhone/iPad/iPod		
Profile	SPP	*	Appendix 1
	HID		
	iAP		
Easy connection setting (Note 1)	Windows PC (HID profile)		Section 3.2
	Android, Windows PC (SPP profile)		
	Android (HID profile)		
	iOS (iPhone, iPad, iPod) (HID)		
	iOS (iPhone, iPad, iPod) (iAP)		

: Only available via configuration software.

Note 1: Only available via QR-coded parameter menu

(3) Bluetooth® Communications Parameters Specification (when SPP profile set)

Settings	Parameters	Default	Refer to
Communication procedures	Non-acknowledge mode	*	Section 9.2
	ACK/NAK mode (host)		
	Data packing mode (host)		
	Data packing mode (BA series)		
ACK/NAK response verification time	Set range 0.1 - 9.9 s	1 s	

▨ : Only available via configuration software.

(4) Bluetooth® Communications Parameters Specification (when HID profile set)

Settings	Parameters	Default	Refer to
CAPS mode	Manual	*	Section 9.3 (1) (Note 1)
	Automatic		
CAPS LOCK setting	CAPS LOCK off	*	Section 9.3 (1) (Note 1)
	CAPS LOCK on		
Keyboard type	U.S English (101 Keyboard)		Section 9.3 (2)
	Germany (102 Keyboard)		
	French (102 Keyboard)		
	U.K. English (102 Keyboard)		
	Italian (102 Keyboard)		
	Swedish (102 Keyboard)		
	Japanese (106 Keyboard)	*	
Numerical data (0-9) transmission format	Inboard numeric keys	*	Section 9.3 (3) (Note 3)
	Numeric keys		
Binary data conversion (Note 2)	None (ASCII conversion)	*	Section 9.3 (4)
	Binary conversion		
	Kanji conversion		

▨ : Only available via configuration software.

Note 1: Align with the Caps Lock setting of the system.

Note 2: Some applications may not output data correctly on the display.

Note 3: When using the numeric keys to set the numerical data transmission format, change the host's NUM LOCK to ON.

Numeric keys

Inboard numeric keys

(Example) Japanese (106 Keyboard)
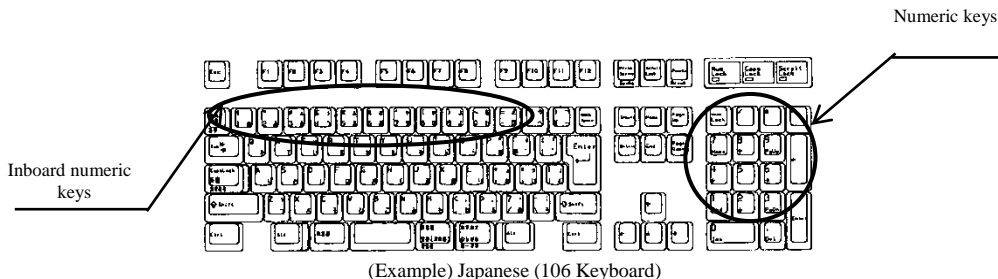
Settings	Parameters	Default	Refer to
Special key transmission mode	Enabled		(Note 4)
	Disabled	*	
Data transmission interval	0 ms	*	
	1 ms		
	10 ms		
	15 ms		
	30 ms		
	50 ms		
	100 ms		
Software keyboard	Enabled (magic key)	*	Section 3.2
	Enabled (trigger key)		
	Disabled		

: Only available via configuration software.

Note 1: It is possible to select whether or not special keys are transmitted for sections of data other than the communication format header/terminator. When special key transmission is enabled, data from E7h to FDh is substituted with special keys according to the special key conversion table below and then transmitted.

Left SHIFT, left CTRL and left ALT will be transmitted when the character or key set subsequently is pressed at the same time.

Upper Digit / Lower Digit	E	F
0		↓
1		F1
2		F2
3		F3
4		F4
5	HOME	F5
6	END	F6
7	Left SHIFT	F7
8	Left CTRL	F8
9	Left ALT	F9
A	TAB	F10
B	ESC	F11
C	ENTER	F12
D	←	Right CTRL
E	↑	
F	→	

Special key conversion table

(5) Bluetooth® Communications Parameters Specification

Settings	Parameters	Default	Refer to
Bluetooth® wireless communication connection	Master mode		Section 3.2
	Slave mode	*	
	No change		
Connecting device when master	Address	*	Section 3.2
	Local name		
Specify address of connecting device	Address of connecting device	Not specified	Section 3.2
Connection standby time when slave	2 minutes	*	Section 9.1
	4 minutes		
	10 minutes		
	30 minutes		
Send/receive buffer clear for wireless-disconnect	Enabled	*	
	Disabled		
Operating state	Start operation	*	Section 3.1 (Note 1)
	End operation		
PIN code	One to eight alphanumeric characters	1234	Appendix 3
Security function	Disabled	*	
	Enabled		
Local device ID	Other devices	*	
	Keyboard peripheral		

: Only available via configuration software.

Note 1: Factory settings: Set to "End operation"

(6) Data Transmission Format Specification (when SPP profile set)

Settings	Parameters	Default	Refer to
Header	None	*	Section 9.4 (1)
	STX		
	User selection		
Terminator	None		
	ETX		
	CR	*	
	LF		
	CR LF		
	User selection		
BCC transmission	Transmission enabled		Section 9.4 (4) (Note 1)
	Transfer disabled	*	

: Only available via configuration software.

Note 1: When "No header" is set, BCC transmission is automatically disabled.

(7) Data Transmission Format Specification (when HID profile set)

Settings	Parameters	Default	Refer to
Header	None	*	Section 9.4 (1)
	STX		
	ETX		
	CR		
	LF		
	CR+LF		
	TAB		
	ESC		
	ENTER		
	Execute (right CTRL)		
	←		
	↑		
	→		
	↓		
	User selection		
Terminator	None		
	STX		
	ETX		
	CR		
	LF		
	CR+LF		
	TAB		
	ESC		
	ENTER	*	
	Execute (right CTRL)		
	←		
	↑		
	→		
	↓		
	User selection		

    : Only available via configuration software.

(8) Data Transmission Format Specification

Settings	Parameters	Default	Refer to
Code mark transmission	Transmission enabled		Section 9.4 (5)
	Transfer disabled	*	
Code mark addition position	Before the prefix		Section 9.4
	After the prefix	*	
Code mark types	Type1	*	Section 9.4 (5)
	Type2		
	Type3		
	Type4		
	User selection		
Code mark output mode	Coupling	*	Section 9.4 (5)
	Separating		
Digit transmission (excluding UPC/EAN Code)	4-digit transmission enabled		Section 9.4 (6)
	2-digit transmission enabled		
	Transfer disabled	*	
Prefix transmission	Transmission enabled		Section 9.4 (3)
	Transfer disabled	*	
Suffix transmission	Transmission enabled		
	Transfer disabled	*	
Scanner ID output	Transmission enabled		Section 9.4 (2)
	Transfer disabled	*	
GTIN Conversion	Enabled		Section 9.5
	Disabled	*	
GTIN → EAN/JAN conversion type	Conversion to 14 digits	*	
	Conversion to 13 digits		
	Conversion disabled		
EAN/UPC → GTIN conversion type	Conversion to 16 digits	*	
	Conversion to 14 digits		
	Conversion disabled		
EAN/UPC → GTIN conversion with PI	0-9	0	Section 9.5

: Only available via configuration software.

(9) Specifying 2D Codes, Mirror Images, Black-and-white Inverted Codes, and SQRC

Settings	Parameters	Default	Refer to
Mirror image 2D code scanning	Enabled		Section 7.4
	Disabled	*	
Black-and-white inverted code scanning	Black-and-white normal code	*	Section 7.5
	Black-and-white inverted code		
	Black-and-white auto-detect		
Split QR Code scanning	Edit mode	*	Section 7.6
	Batch edit mode		
	Non-edit mode		
QR Code scanning	Enabled	*	(Note 1)
	Disabled		
Micro QR Code Scanning	Enabled	*	
	Disabled		
PDF417 scanning	Enabled	*	
	Disabled		
MicroPDF417 scanning	Enabled		
	Disabled	*	
MaxiCode scanning	Enabled	*	
	Disabled		
Data Matrix (Square) scanning	Enabled	*	(Note 2)
	Disabled		
Data Matrix (Rectangular) scanning	Enabled	*	
	Disabled		
QR Code minimum scannable version	Setting range 1-40	1	(Note 3)
QR Code maximum scannable version		40	
Micro QR Code minimum scannable version	Setting range 1-4	1	
Micro QR Code maximum scannable version		4	
Data Matrix (square) minimum scannable code no.	Setting range 1-24	1	
Data matrix (square) maximum scannable code no.		24	
Data matrix (rectangular) minimum scannable code no.	Setting range 1-6	1	
Data matrix (rectangular) maximum scannable code no.		6	

⬚ : Only available via configuration software.

Note 1: If disabled, scanning of QR codes, Micro QR codes and SQRCs are disabled. However, even if QR Code scanning is disabled, QR-coded parameter menu reading and batch setting QR codes scanning is possible.

Note 2: Square and rectangular data matrices are simultaneously enabled/disabled with the QR-coded parameter menu.

Note 3: The parameter setting range and scannable versions and code numbers differ.

Settings	Parameters	Default	Refer to
SQRC scanning	Enabled (SQRC and QR Code)		Section 7.8
	Only SQRC scanning enabled		
	Disabled	*	
SQRC encryption key mismatch processing	Scanning disabled	*	
	Transmission of disclosed data only		
SQRC encryption key match processing	Transmission of disclosed data and undisclosed data	*	
	Transmission of undisclosed data only		
SQRC Code minimum readable version	Setting range 1-40	1	
SQRC Code, maximum readable version		40	
iQR Code (square) scanning	Scanning enabled		(Note 1)
	Scanning disabled	*	
iQR Code (square) minimum scannable version	Setting range 1-61	1	(Note 1)
iQR Code (square) maximum scannable version		61	
iQR Code (rectangular) scanning	Scanning enabled		
	Scanning disabled	*	
iQR Code (rectangular) minimum scannable version	Setting range 1-15	1	(Note 1)
iQR Code (rectangular) maximum scannable version		15	
iQR code split mode scanning	Edit mode	*	Section 7.6
	Non-edit mode		
Aztec (Full Range) scanning	Enabled		
	Disabled	*	
Aztec (Compact) scanning	Enabled		
	Disabled	*	
Aztec (Full Range) minimum scannable layer	Setting range 1-32	1	(Note 1)
Aztec (Full Range) maximum scannable layer		32	
Aztec (Compact) minimum scannable layer	Setting range 1-4	1	
Aztec (Compact) maximum scannable layer		4	

▨ : Only available via configuration software.

Note 1: The parameter setting range and scannable versions and code numbers differ.

(10) Barcode Specification

UPC-A/E, EAN-13/8

Settings	Parameters	Default	Refer to
UPC-A, EAN-13 scanning	Enabled	*	(note 2)
	Disabled		
UPC-A C/D transmission	Transmission enabled	*	Section 9.4 (7)
	Transfer disabled		
UPC-A number system character transmission	Transmission enabled	*	
	Transfer disabled		
Transmission of UPC-A padding characters for adjustment of the data length	Transmission enabled	*	
	Transfer disabled		
EAN-13 C/D transmission	Transmission enabled	*	
	Transfer disabled		
EAN-13 country code transmission	Transmission enabled	*	Section 9.4 (7) (Note 1)
	Transfer disabled		
EAN-13 ISBN/ISSN conversion	Conversion enabled		Section 9.4 (7)
	Conversion disabled	*	
UPC-E Code scanning	Enabled	*	(note 2)
	Disabled		
UPC-E C/D transmission	Transmission enabled	*	Section 9.4 (7)
	Transfer disabled		
UPC-E number system character transmission	Transmission enabled	*	
	Transfer disabled		
Transmission of UPC-E padding character for adjustment of the data length	Transmission enabled		
	Transfer disabled	*	
UPC-E UPC-A conversion	Conversion enabled		
	Conversion disabled	*	

[   ] : Only available via configuration software.

Note 1: The country code is displayed in the upper two digits of the EAN-13 prefix character.

Settings	Parameters	Default	Refer to
EAN-8 code scanning	Enabled	*	(note 2)
	Disabled		
EAN-8 C/D transmission	Transmission enabled	*	Section 9.4 (7)
	Transfer disabled		
EAN-8 EAN-13 conversion	Conversion enabled		
	Conversion disabled	*	
UPC/EAN add-on 2-digit scanning	Enabled		
	Disabled	*	
UPC/EAN add-on 5-digit scanning	Enabled		
	Disabled	*	
UPC/EAN add-on only scanning	Enabled		
	Disabled	*	
UPC/EAN add-on check level	Disabled	*	
	Settings range - level 1-4		

: Only available via configuration software.

Note 2: UPC-A, EAN-13, UPC-E, EAN-8 are simultaneously enabled/disabled with the QR-coded parameter menu.

Interleaved 2 of 5

Settings	Parameters	Default	Refer to
Interleaved 2 of 5 scanning	Scanning enabled (without check digit)	*	
	Scanning enabled (with check digit) (check digit transmission enabled)		
	Scanning enabled (with check digit) (check digit transmission disabled)		
	Disabled		
Interleaved 2 of 5 minimum scannable digits	2-99 digits	4 digits	(Note 1)
Interleaved 2 of 5 maximum scannable digits		99 digits	

: Only available via configuration software.

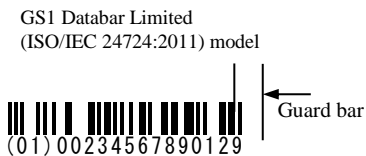Note 1: The parameter setting range and the number of scannable digits differ.
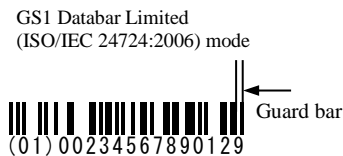
Standard 2 of 5

Settings	Parameters	Default	Refer to
Standard 2 of 5 scanning	Scanning enabled (without check digit)		
	Scanning enabled (with check digit) (check digit transmission enabled)		
	Scanning enabled (with check digit) (check digit transmission disabled)		
	Disabled	*	
Standard 2 of 5 minimum scannable digits	2-99 digits	3 digits	(Note 1)
Standard 2 of 5 maximum scannable digits		99 digits	

⬜ : Only available via configuration software.

Note 1: The parameter setting range and the number of scannable digits differ.

Codabar(NW-7)

Settings	Parameters	Default	Refer to
Codabar (NW-7) scanning	Scanning enabled (without check digit)	*	
	Scanning enabled (with check digit) (check digit transmission enabled)		
	Scanning enabled (with check digit) (check digit transmission disabled)		
	Disabled		
Codabar (NW-7) minimum scannable digits	3-99 digits(incl. start-stop code)	4 digits	(Note 1)
Codabar (NW-7) maximum scannable digits		99 digits	
Codabar (NW-7) start-stop code transmission	Transmission enabled (a/b/c/d)	*	Section 9.4 (7)
	Transmission enabled (A/B/C/D)		
	Disabled		
Codabar (NW-7) check digit calculation method	MOD-16	*	
	7 Check		

⬜ : Only available via configuration software.

Note 1: The parameter setting range and the number of scannable digits differ.

Code 39

Settings	Parameters	Default	Refer to
Code 39 scanning	Scanning enabled (without check digit)	*	
	Scanning enabled (with check digit) (check digit transmission enabled)		
	Scanning enabled (with check digit) (check digit transmission disabled)		
	Disabled		
Code 39 minimum scannable digits	3-99 digits(incl. start-stop code)	3 digits	(Note 1)
Code 39 maximum scannable digits		99 digits	
Code 39 start-stop code transmission	Transmission enabled		Section 9.4 (7)
	Transfer disabled	*	
Code 39 Full ASCII conversion	Conversion enabled		
	Conversion disabled	*	

▮▮▮ : Only available via configuration software.
Note 1: The parameter setting range and the number of scannable digits differ.

Code 128, GS1-128

Settings	Parameters	Default	Refer to
Code 128 scanning	Enabled	*	
	Disabled		(Note 2)
GS1-128 scanning	Enabled	*	
	Disabled		
Code 128 minimum scannable digits	1-99 digits (excl. start-stop code and 1-digit check digit)	1 digit	(Note 1)
Code 128 maximum scannable digits		99 digits	
Code 128 FNC1 transmission	Transfer disabled		Section 9.4 (7)
	Convert to GS and transmit	*	
	User selection		
GS1-128 minimum scannable digits	1-99 digits (excl. start-stop code and 1-digit check digit)	1 digit	(Note 1)
GS1-128 maximum scannable digits		99 digits	
GS1-128 FNC1 transmission	Transfer disabled		Section 9.4 (7)
	Convert to GS and transmit	*	
	User selection		

▮▮▮ : Only available via configuration software.
Note 1: The parameter setting range and the number of scannable digits differ.
Note 2: Code 128 and GS1-128 are simultaneously enabled/disabled with the QR-coded parameter menu.

Code 93

Settings	Parameters	Default	Refer to
Code 93 scanning	Enabled		
	Disabled	*	
Code 93 minimum scannable digits	1-99 digits (excl. start-stop code and 2-digit check digit)	1 digit	(Note 1)
Code 93 maximum scannable digits		99 digits	

⬛ : Only available via configuration software.

Note 1: The parameter setting range and the number of scannable digits differ.

GS1 DataBar, GS1 Composite

Settings	Parameters	Default	Refer to
GS1 DataBar Omnidirectional, GS1 DataBar Truncated scanning	Enabled		
	Disabled	*	
GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional scanning	Enabled		
	Disabled	*	
GS1 DataBar Limited scanning	Enabled (ISO/IEC24724:2006)		(Note 1)
	Enabled (ISO/IEC24724:2011) (Note 3)		
	Disabled	*	
GS1 DataBar Expanded scanning	Enabled		
	Disabled	*	
GS1 DataBar Expanded Stacked scanning	Enabled		
	Disabled	*	
GS1 DataBar Expanded minimum scannable digits	1-99 digits	1 digit	
GS1 DataBar Expanded maximum scannable digits		99 digits	
Transmission of FNC1 for GS1 DataBar Expanded code	Transfer disabled		Section 9.4 (7)
	Convert to GS and transmit	*	
	User selection		
GS1 Composite scanning	Enabled		
	Disabled	*	(Note 2)
GS1 DataBar Composite (with CC-A) scanning	Enabled		
	Disabled	*	

Note 1: GS1 DataBar Codes are simultaneously enabled/disabled with the QR coded parameter menu. Configuration software can be enabled or disabled individually.
Note 2: GS1 Composite codes are simultaneously enabled/disabled with the QR-coded parameter menu. Configuration software can be enabled or disabled individually.
Note 3: Scannable only if the space for five modules is included in the right guard bar.

GS1 Databar Limited
(ISO/IEC 24724:2006) mode

← Guard bar
(01) 00234567890129

GS1 Databar Limited
(ISO/IEC 24724:2011) model

← Guard bar
(01) 00234567890129

Settings	Parameters	Default	Refer to
GS1 DataBar Composite (with CC-B) scanning	Enabled		
	Disabled	*	
EAN/UPC Composite (with CC-A) scanning	Enabled		
	Disabled	*	
EAN/UPC Composite (with CC-B) scanning	Enabled		
	Disabled	*	
GS1-128 Composite (with CC-A) scanning	Enabled		(Note 2)
	Disabled	*	
GS1-128 Composite (with CC-B) scanning	Enabled		
	Disabled	*	
GS1-128 Composite (with CC-C) scanning	Enabled		
	Disabled	*	

Note 2: GS1 Composite codes are simultaneously enabled/disabled with the QR-coded parameter menu. Configuration software can be enabled or disabled individually.

Configuring multi-line barcode scanning

Settings	Parameters	Default	Refer to
Multi-line barcode scanning	Enabled		
	Disabled	*	
Multi-line barcode scanning: No. of lines	2 lines	*	
	3 lines		
Multi-line barcode output format	Header/terminator		
	Comma	*	
1st line barcode code type	Specified from scannable codes	Not specified	
1st line barcode lead character	Specified by up to two ASCII characters	Not specified	
1st line barcode minimum scannable digits	Maximum 99 digits	Not specified	
1st line barcode maximum scannable digits	Maximum 99 digits	Not specified	
2nd line barcode code type	Specified from scannable codes	Not specified	Section 7.7
2nd line barcode lead character	Specified by up to two ASCII characters	Not specified	
2nd line barcode minimum scannable digits	Maximum 99 digits	Not specified	
2nd line barcode maximum scannable digits	Maximum 99 digits	Not specified	
3rd line barcode code type	Specified from scannable codes	Not specified	
3rd line barcode lead character	Specified by up to two ASCII characters	Not specified	
3rd line barcode minimum scannable digits	Maximum 99 digits	Not specified	
3rd line barcode maximum scannable digits	Maximum 99 digits	Not specified	

: Only available via configuration software.

(11) Trigger Switch/Magic Key Control/touch switch

Settings	Parameters	Default	Refer to
Trigger switch control	Auto-off mode	*	Section 5.1
	Momentary switching mode		
	Alternate switching mode		
	Continuous reading mode 1		
	Continuous reading mode 2		
Auto-off mode scanning mode	Normal	*	Section 5.1 (1)
	One-shot 1 s		
	One-shot 2 s		
	One-shot 3 s		
	One-shot 4 s		
	One-shot 5 s		
Error transmission when scanning fails	"ERROR" transmission enabled		Section 5.1
	Transmission disabled	*	
Magic key control	Specific character transfer function		Section 6
	No function assigned	*	
Magic key Bluetooth® disconnection	Enabled	*	Chapter 6
	Disabled		
Operation following Bluetooth® disconnection disconnection via pressing the magic key	Reconnection by pulling the trigger switch	*	Chapter 6
	Host connection standby.		
Battery level indicator	Magic key operation mode	*	Chapter 6
	Always on mode		
Touch switch control	Auto-off mode	*	Section 5.3
	Momentary switching mode		
	Alternate switching mode		
	Continuous reading mode 1		
	Continuous reading mode 2		
touch switch switching	Enabled	*	Chapter 5
	Disabled		
Sensitivity level in touch switch	High		Chapter 5
	Medium	*	
	Low		
Vibration when the touch switch turns ON	Enabled	*	Section 8.3
	Disabled		

: Only available via configuration software.

(12) Beeper, Indicator LED, Vibrator, Marker, Illumination Light, Power saving

Settings	Parameters	Default	Refer to
Beeper sound	Enabled	*	Section 8.1
	Disabled		
Beeper tone	Low (approx. 1.5 kHz)		
	Medium (approx. 2.4 kHz)	*	
	High (approx. 3.3 kHz)		
Beeper sounding time	Short (approx. 60 ms)		
	Medium (approx. 80 ms)	*	
	Long (approx. 120 ms)		
Beeper volume	High	*	
	Medium		
	Low		
Scanning complete sound	Single beep	*	
	Multiple beeps		
Beeper sound when power turned on	Enabled	*	
	Disabled		
Indicator LED illumination	Enabled	*	Section 8.2
	Disabled		
Vibrator	Vibrates when "OK"		Section 8.3
	Vibrates when "NG"		
	Vibration disabled	*	
Marker illumination	Marker-off mode		Section 8.4
	Standard marker mode	*	
	Marker-on mode		
Illumination light (LED)	Disabled		Section 8.5
	Enabled	*	
Switching to sleep mode for power saving	Immediately	*	Section 2.6
	After 30 seconds		
Auto-power off	Setting range 5 to 640 minutes	60 minutes	Section 3.3
	Disabled		

⬛ : Only available via configuration software.

(13) Specifying Data Verification and Data Editing Conditions

Settings	Parameters	Default	Refer to
Scan lock	Enabled		Section 7.1
	Disabled	*	
Data verification mode verification target	Data string verification	*	
	Data block verification		

Settings	Parameters	Default	Refer to
Preset master registration	Enabled		
	Disabled	*	
Data string verification start position	001-999 digits ASCII characters specified	1	
Data string verification digits (without preset master registration)	01-99 digits ASCII characters specified	99	
Data block verification block position	01-99 digits ASCII characters specified	1	
Verification result transmission: OK result	Transfer disabled	*	
	Code data transmitted		
	"OK" transmitted		
Verification result transmission: NG result	Transfer disabled	*	
	Code data transmitted		
	"NG" transmitted		
Reverification attempt after NG judgment (During 2-point verification only)	Enabled		
	Disabled	*	
Verification range	Code type + code data	*	
	Code data only		
Applicable codes for data editing	Specified from codes	Any code (Note 1)	
Data editing error processing	Transmit data regardless of the results		
	Transmit data when successful	*	
"Data Extraction Mode" during data editing	Data string extraction	*	
	Data block extraction		
	AI mode		
"Data string extraction" start position	First character		Section 7.2
	Last character		
	Specified position	*	
"Data string extraction" end position	Last character	*	
	Specified no. of digits		
	Specified position		
"Data string extraction" start digit	0001-9999 digits ASCII characters specified	1	
"Data string extraction" end digit	0001-9999 digits ASCII characters specified	9999	

▓▓▓▓ : Only available via configuration software.

Note 1: When "Any code" is selected, all code data is edited.

Settings	Parameters	Default	Refer to
No. of blocks in "data block extraction" (max. 3)	01-99 digits ASCII characters specified	Not specified	Section 7.2
Characters for conversion and conversion character specification in data conversion mode	Max. 16 characters ASCII characters specified	Not specified	
Block sorting mode division count	2-5 divisions	2 divisions	
Block sorting mode division position	0001-9999 characters ASCII characters specified	1 character	
Block sorting mode output order	BLOCK 1-5	BLOCK 1/ BLOCK 2	
AI mode	AI split mode	*	
	AI parenthesis mode		
AI split mode AI1 designation: enabled/disabled	Enabled	*	
	Disabled		
AI Split Mode AI2 designation: enabled/disabled	Enabled		
	Disabled	*	
AI split mode AI3 designation: enabled/disabled	Enabled		
	Disabled	*	
AI split mode AI1 designated	Specified from AI candidates (Note 2)	00	
AI split mode AI2 designated	Specified from AI candidates (Note 2)	00	
AI split mode AI3 designated	Specified from AI candidates (Note 2)	00	
AI split mode delimiters	Header/Terminator	*	
	Comma		
	Tab		

▭ : Only available via configuration software.

Note 2: For more details on AI, refer to Chapter 7, "7.2.1.3 (3) AI Table".

Chapter 12   QR-coded Parameter Menu

12.1 Setting Methods via the QR-coded Parameter Menu

| Setting commencement |

Scan the "Setting commencement" QR Code.

↓ The beeper will sound 3 times.

| Scanning parameter setting codes |

Scan the QR Code you wish to set.

↓

| Setting completion |

Scan the "Setting completion" QR Code.

The beeper will sound 3 times.
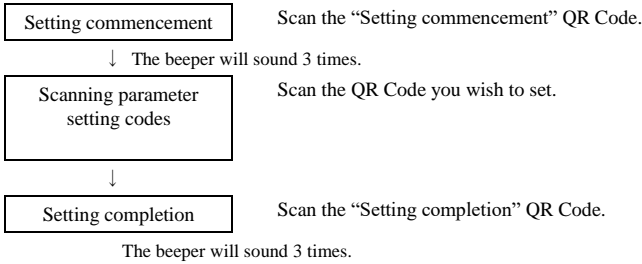
Setting to "All default" will return all parameters to default settings. The default is indicated with < > in the QR-coded parameter menu.

Note:

"Easy connection setting"

This parameter makes scanning the "Setting commencement" and "Setting completion" QR codes unnecessary.

"Beeper volume adjustment"

This parameter makes scanning the "Setting commencement" and "Setting completion" QR codes unnecessary.

Scanning the "Beeper volume" QR code will cause the beeper's volume to cycle (repeatedly) between "high," "medium" and "low". Factory settings: High

12.2 QR-coded Parameter Menu

The following setting can be made just by scanning the QR codes with this parameter, without needing to scan the "Setting commencement" or "Setting completion" QR codes.

Easy connection setting
Scanning the following QR codes will allow the user to easily set a connection suited to the device being connected.
(Connecting device requires a Bluetooth® Specification Ver. 2.1+EDR-compatible Bluetooth® module)

iOS (iPhone, iPad, iPod)
(HID Profile)

iOS (iPhone, iPad, iPod)
(iAP Protocol)

Android
(HID Profile)

Android, Windows PC
(SPP Profile)

Windows PC
(HID Profile)

*1: Scan the Easy connection setting QR code after setting other parameters. When setting parameters after scanning the Easy connection setting barcode, connection settings may be overwritten.

The following setting can be made just by scanning the QR codes with this parameter, without needing to scan the "Setting commencement" or "Setting completion" QR codes.

Beeper sound adjustment

Scanning the following QR code will cause the beeper's volume to cycle (repeatedly) between "high," "medium" and "low". The factory default setting is "high".

Changing buzzer volume

■ Setting Commencement, Setting Completion, Defaults

Setting commencement

Setting commencement

Cancel

All Default

Setting completion
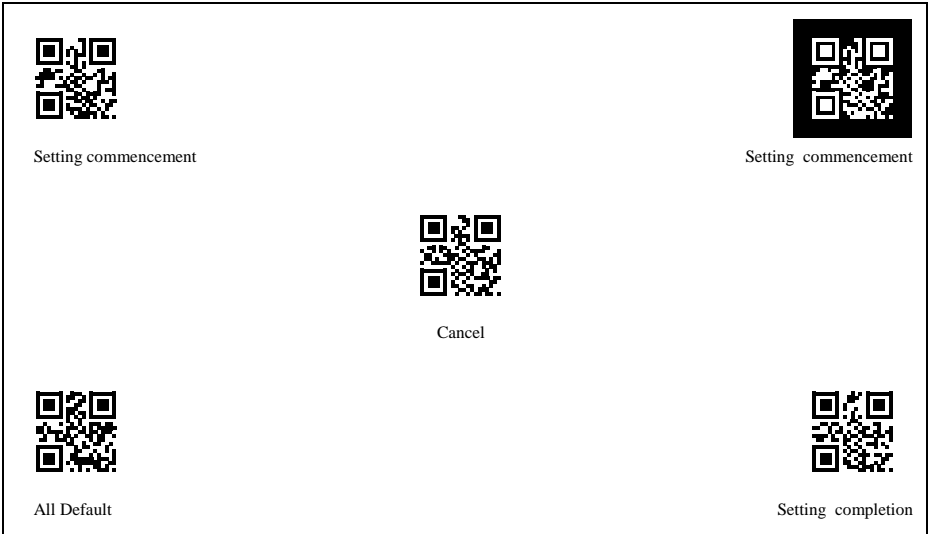
■ Bluetooth® wireless communication

Operation

<Start operation>

End operation

Bluetooth® wireless communication disconnection

Bluetooth®-disconnect scanning

Scanning the "Bluetooth®-disconnect scanning" QR code allows scanning when Bluetooth® wireless communication has been disconnected. In this state, data cannot be transmitted to or from the host computer.

Bluetooth®-disconnect scanning

<Cancel Bluetooth®-disconnect scanning>

Slave setting

Scanning the following code will allow the user to set the scanner as a slave.

<Set as slave>

■ Bluetooth® wireless communications parameters specification

Communication procedures

<Non-acknowledge mode>	ACK/NAK mode

Header (when SPP profile set)

<None>	STX

Header (when HID profile set)

<None>	TAB	Enter

Terminator (when SPP profile set)

None	ETX	
<CR>	LF	CR LF

Terminator (when HID profile set)

None	TAB	<Enter>
CR	LF	CR+LF

Connection standby time when slave

<2 minutes>

4 minutes

10 minutes

30 minutes

Keyboard-type (when HID profile set)

U.S. English (101-key Keyboard)

<Japanese (106-key Keyboard)>

■ Transmission Format
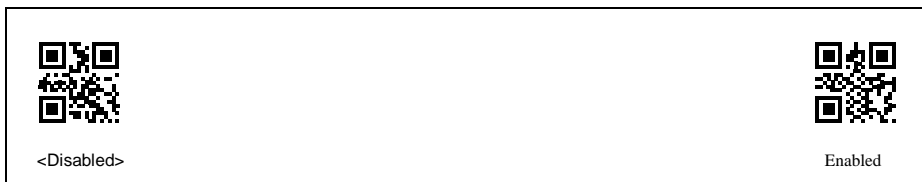
Code mark transmission

<Disabled>

Enabled

Digit no. transmission

<Disabled>

2-digit transmission enabled
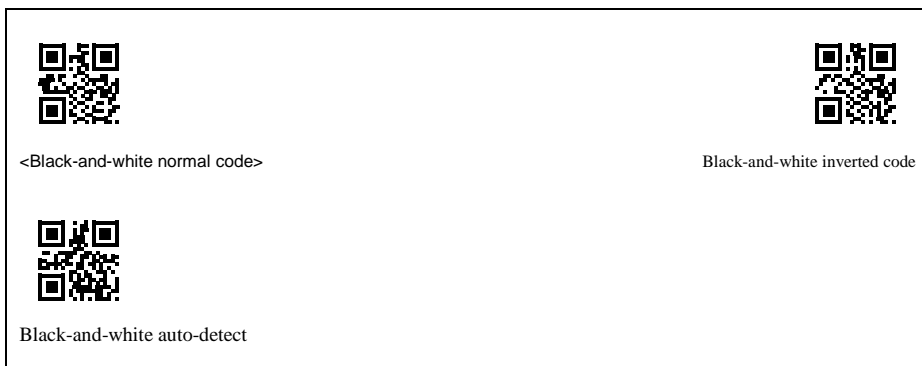

4-digit transmission enabled

BCC transmission

<Disabled>

Enabled

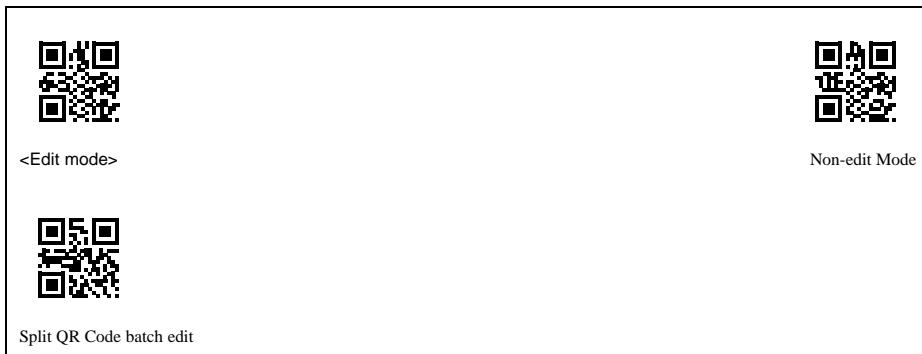■ Specifying 2D Code, Black-and-white Inversion

Micro QR Code scanning

Disabled

<Enabled>

Black-and-white inverted code scanning

<Black-and-white normal code>

Black-and-white inverted code

Black-and-white auto-detect

Split QR Code

<Edit mode>

Non-edit Mode

Split QR Code batch edit

PDF417 scanning

Disabled   <Enabled>

MaxiCode scanning

Disabled   <Enabled>

Data Matrix scanning

Disabled   <Enabled>

■ Scannable Barcode Settings

UPC-A, UPC-E, EAN-13, EAN-8 scanning

Disabled   <Enabled>

Interleaved 2 of 5 scanning

Disabled	Scanning with check digit enabled (Check digit transmission disabled)
<Scanning without check digit enabled>	Scanning with check digit enabled (Check digit transmission enabled)

Code 128 (GS1-128) scanning

Disabled	<Enabled>

Codabar (NW-7) scanning

Disabled	<Scanning without check digit enabled>
Scanning with check digit enabled (Check digit transmission enabled)	Scanning with check digit enabled (Check digit transmission disabled)

Codabar (NW-7) start-stop code transmission

Disabled

<Enabled>

Code 39 scanning

Disabled

<Scanning without check digit enabled>

Scanning with check digit enabled (Check digit transmission enabled)

Scanning with check digit enabled (Check digit transmission disabled)

Code 39 start-stop code transmission

<Disabled>

Enabled

Code 93 scanning

<Disabled>

Enabled

GS1 DataBar scanning

<Disabled>	Enabled

GS1 Composite scanning

<Disabled>	Enabled

■ Other Settings

Trigger switch control/Touch switch control

<Auto-off mode>	Alternate switching mode

Momentary switching mode

Continuous reading mode 1	Continuous reading mode 2

Beeper control

Sound disabled   <Sound enabled>

Indicator LED

Illumination disabled   <Illumination enabled>

Vibrator

Vibrates when "OK"   Vibrates when "NG"

<Vibration disabled>

Battery level indicator

<Magic key operation mode>   Always on mode

Touch switch switching

<Enable>   Disable

Sensitivity level in touch switch (note 1)

High   <Medium>   Low

Vibration when the touch switch turns ON (note 1)

<Enable>   Disable
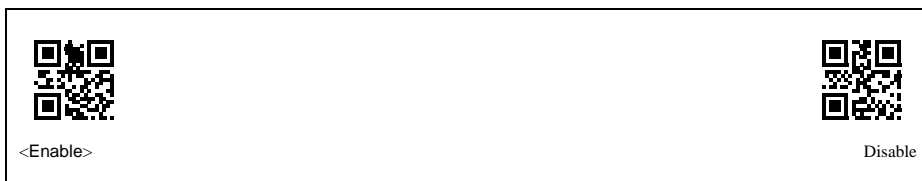
(note 1) : This setting is only available for touch switch switching"enable"

Chapter 13   QR-Coded Parameter Menu for Setting the Communications Adapter (BA Series)

13.1 Setting Methods via QR-coded Parameter Menu for Setting the Communications Adapter

The user can set the communications adapter (BA20-RU, BA11-RKU) from the scanner by using the QR-coded parameter menu for setting the communications adapter.

<table>
<tr>
<td>

Scanner
Storing parameters for the communications adapter

</td>
<td>

Scan the QR-coded parameter menu for setting the communications adapter to store the parameters.

Reference: It is also possible to set parameters for the communications adapter by using the configuration software (BASetting). To do this, the communications adapter must be connected to the host computer via the USB-COM interface or the RS-232C interface. Refer to the "communications adapter manual" for details

</td>
</tr>
</table>

↓

<table>
<tr>
<td>

Communications adapter
Power supply

</td>
<td>

Supply power to the communications adapter.

Note: Because the goal here is to supply power, it is possible to connect with a different interface to the settings in the communications adapter. For methods to connect through each interface, refer to Chapter 2 of the "communications adapter manual".

</td>
</tr>
</table>

↓

<table>
<tr>
<td>

Communications adapter
Switching to settings mode

</td>
<td>

Using a pin or other instrument, press the "setup button" on the back of the communications adapter for 0.5 seconds or longer to switch to settings mode.

Note: After the setup button has been pressed and nothing else is done for three minutes or more, the communications adapter will automatically return to normal mode from settings mode.

</td>
</tr>
</table>

↓ Communications adapter interface/power LED: Flashes in orange
　　Bluetooth® status indicator LED (blue): Slow flash (when set as a slave and waiting for connection)

<table>
<tr>
<td>

Scanner
Bluetooth® wireless link connection

</td>
<td>

Use the scanner which has stored parameters for the communications adapter to read the barcode on the back of the communications adapter.

</td>
</tr>
</table>

↓ (The scanner beeper will sound three times and Bluetooth® wireless communication will start.)
　　Scanner indicator LED: Flashes in blue (connecting as the master)

<table>
<tr>
<td>

Scanner → Communications adapter
Send parameters for the communications adapter

</td>
<td>

When Bluetooth® wireless communication has been connected, the scanner will confirm the status of the communications adapter and send the parameters stored in the scanner to the communications adapter.

Note: When the scanner is unable to confirm the status of the communications adapter, parameter setting will be canceled and the scanner and communications adapter will automatically standby for a Bluetooth® wireless link connection.

</td>
</tr>
</table>

↓ Scanner indicator LED: Illuminates in green
　　Communications adapter Bluetooth® status indicator LED (blue): Fast flash

<table>
<tr>
<td>

Sending ends

</td>
<td>

When parameters have been sent successfully, the scanner indicator LED illuminates in blue and the scanner beeper sounds once.

When parameters have not been sent successfully, the scanner indicator LED illuminates in red and the scanner beeper sounds three times.

The scanner and communications adapter will automatically reset regardless of whether parameters are sent successfully or not.

</td>
</tr>
</table>

(The scanner and communications adapter will standby for a Bluetooth® wireless link connection.)
Communications adapter interface/power LED: Illuminates in green

13.2 QR-Coded Parameter Menu for Setting the Communications Adapter

■ Setting Commencement, Setting Completion, Defaults

Setting commencement

Setting commencement

Cancel

All Default

Setting completion

■ Specifying Interface

<USB keyboard interface>
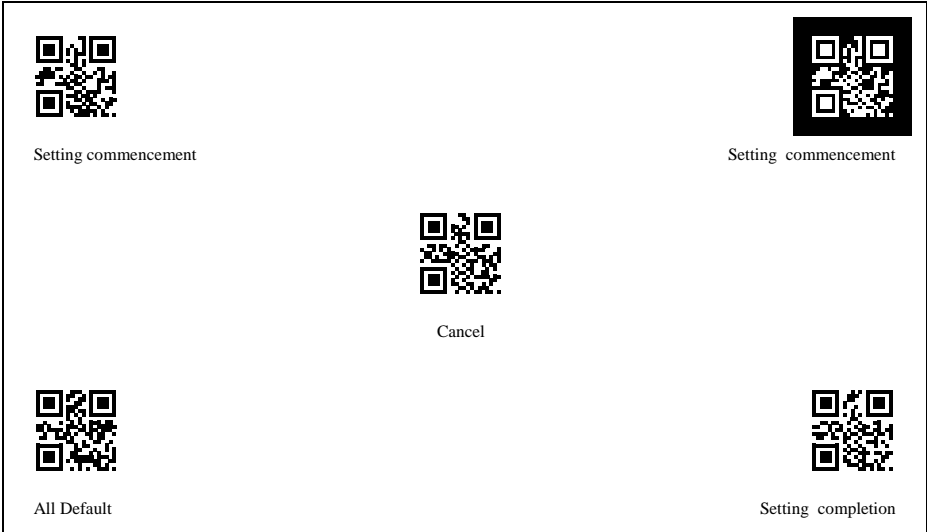
RS-232C Interface

USB-COM Interface

■ Specifying Communications Parameters for the USB-COM Interface

CTS control (USB-COM interface)

Not controlled   <Controlled>

■ Specifying RS-232C Interface Communications Parameters

Transmission speed (RS-232C interface)

1200bps   2400bps

4800bps   <9600bps>

14400bps   19200bps

38400bps   57600bps

115200bps
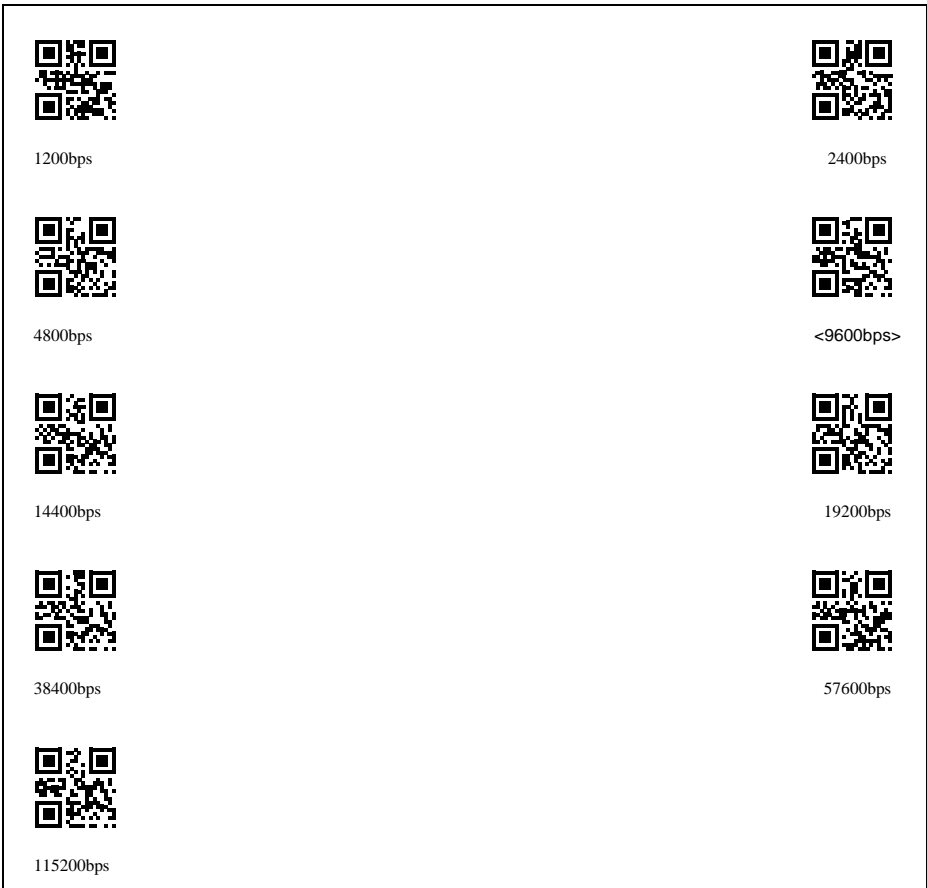
Word length (RS-232C interface)

7 bits   <8 bits>

Parity(RS-232C interface)

<Disabled>

Even number   Odd number

Stop bit (RS-232C interface)

<1 bit>   2 bits

CTS signal control (RS-232C interface)

Not controlled   <Controlled>

■ Specifying Communications Parameters for the USB Keyboard Interface

Specifying USB keyboard interface keyboard type

<U.S. English>

German

French

U.K. English

Italian

Japan

Swedish

Chapter 14   Simple Troubleshooting

Problem 1:   Cannot correctly scan code

Things to check	Measures
Is the position of the scanner correctly aligned with the code?	Align the scanner correctly with the code.
Is the code obscured by dirt, etc.?	Wipe away anything obscuring the code.
Is the code blurred?	Use a code that is not blurred.

Problem 2:   Cannot scan code

Things to check	Measures
Has the type of code to be scanned been enabled for scanning?	Enable the type of code to be scanned as a scannable code.
Is the code to be scanned set as with check digit even though the barcode has no check digit?	Enable scanning without check digit.
Is the check digit of the barcode you have scanned incorrect?	Use the correct barcode.

Problem 3:   The code data is not correctly displayed on the computer

Things to check	Measures
Is the connecting Bluetooth® device able to communicate?	See the manual for the connecting Bluetooth® device.
Is the connecting Bluetooth® device too far away?	Bring the scanner and the Bluetooth® device closer together.
Is there a connection to the connecting Bluetooth® device?	Connect the connecting Bluetooth® device.
Is "Bluetooth®-disconnect scanning" selected?	Cancel Bluetooth®-disconnect scanning. (Refer to Chapter 3)

Problem 4:   The scanner can only be used for a short time, even after charging

Things to check	Measures
Is the scanner set on the battery charger correctly?	Set the scanner on the battery charger correctly. (Refer to Chapter 2)
Is the ambient temperature other than 0 to 40°C?	Charge within 0 to 40 ° C.
Is the charging terminals of the scanner or charger dirty?	Wipe away dirt.
Is the charge and discharge repeated more often?	If the old rechargeable battery has been charged and discharged repeatedly, replace it with a new one.

Problem 5:   Bluetooth® wireless communication is disconnected

Things to check	Measures
Is the scanner set to "Auto-power off"?	Pull the trigger switch to reconnect. (Refer to Section 3.4)
	Change the auto-power off time. (Refer to Section 3.3)

Appendix 1: Specifications

Articles		Specifications
Scanner	Scanning Code	QR code (model 1, model 2), micro QR code, SQRC[*1], iQR, PDF417, MicroPDF417, MaxiCode, Data Matrix, Aztec, GS1 Composite, EAN-13/8, UPC-A/E, UPC/EAN with add-on, Interleaved 2of5 (ITF), Standard 2 of 5 (STF), Code 39, Codabar (NW-7), Code 128, Code 93, GS1-128, GS1 DataBar
	Skew angle	360°
	Minimum resolution	2D code: 0.167 mm (*2) Barcode: 0.125 mm (*3)
	Elevation angle	+/-50°
	Tilt angle	+/-50°
	Light source	LED (red)
	Scanning check	Blue LED, beeper, vibrator
Interface		Equipped with wireless facilities conforming to Bluetooth® Specification Ver. 2.1+EDR
Available operating time		24 hours (*4)
Input power supply	Main power supply	Lithium-ion battery
Environmental conditions	Operating temperature range	-20° to 50°C (State of charge : 0° to 40°C)
	Operating humidity range	10%-90% RH [*5]
	Storage temperature range	-20° to 60°C
	Storage humidity range	5%-95% RH [*5]
	Operating illumination range	10,000 lx or less
External dimensions		42×89.5×21.4 mm
Protection class		IP54
Drop impact durability[*6]		2.5 m drop, 1.5 m drop × 100 times, 0.5 m Tumble × 3000 times
Key operation durability[*6]		1 million times
Weight		Approximately 80 g (including rechargeable battery)

(*1) Please contact separately when using SQRCs outside of Japan.

(*2) Applies to QR codes and Data Matrix.

(*3) Applies to codes other than GS1 Databar

(*4) Denso measured reference value

- Battery type: Using a new, fully charged single-purpose lithium-ion battery

- Connected to: BA series communications adapter (BA20-KU)

- One code scanned every five seconds

(∗5) Ensure that the wet-bulb temperature remains at 30℃ or less, and prevent rapid changes in temperature, condensation and frost.

(∗6) It is a test value, not a guaranteed value.

Appendix 2: Control Commands

The commands which are transmitted between the host unit and the scanner through the communication line are called the control commands.

Items set by control commands from the host unit overlap those indicated in "Parameter setting by QR Code parameter menu". Designation by the control command prevails over that by the QR Code parameter menu (refer to Chapter 12). However, unless a PW command is given, the value set with the control command (excluding U commands) will not be stored in the internal FLASH ROM, and therefore if the power is turned OFF, all designations made with control commands will be cleared, and only the parameters set with the QR Code parameter menu will be valid.

The control commands are categorized into two types:

    (1) Commands only consist of the command field.

    (2) Commands consist of the command field and the option fields.

If a command other than one of the above is transmitted to the scanner, the outcome is not guaranteed.

 Note 1: Control commands cannot be utilized when HID (Human Interface Device Profile) is selected.

 Note 2: A command will not be initiated until the preceding command is completed.

(1) Command only consist of the command field

Command	Direction Scanner ← → Host	Contents

Z (Note 1) (Note 2)
  READOFF
  LOFF
	←	Scanning standby
		Only when the trigger switch is set to continuous reading mode 1 or mode 2, the scanner will enter the scanning standby mode by receiving "Z", "READOFF" or "LOFF" command.

R (Note 1)
  READON
  LON
	←	Scanning start
		Only when the trigger switch is set to continuous reading mode 1 or mode 2, the scanner enters the scanning ready mode by receiving "R", "READON" or "LON" command.

B1 B2 B3 (Note 3) (Note 4)	←	Beeper It beeps in the specified time within 100 ms after the command is received. Beeper can be operated even if it is disabled or if the scanner is in the standby mode. B1: Beeps for approx. 60 ms, 80 ms, 120 ms, or 140 ms. B2: Beeps for approx. 120 ms. B3: Beeps for approx. 240 ms.

BH1, BM1, BL1
BH2, BM2, BL2
BH3, BM3, BL3
(Note 3) (Note 4)
	←	Buzzer sound (tone specification)
		By adding a tone option to the above command, the buzzer can be sounded in various tones.
		· Tone options
		  "H": Beeps in a high-pitch tone (3.3 kHz).
		  "M": Beeps in a medium-pitch tone (2.4 kHz).
		  "L": Beeps in a low-pitch tone (1.5 kHz).

Command	Direction Scanner ←——→ Host	Contents
LB (Note 3)	←———	Blue LED indicator illumination The LED indicators illuminates in blue for approximately 500 ms within 100 ms after the command is received.
LG (Note 3)	←———	Green LED indicator illumination The LED indicators illuminates in blue for approximately 500 ms within 100 ms after the command is received.
LR (Note 3)	←———	Red LED indicator illumination The LED indicators illuminates in blue for approximately 500 ms within 100 ms after the command is received.
VO (Note 3)	←———	Vibration The vibrator vibrates for approximately 100 ms within 100 ms after the command is received.
U1 U2 U3 U4　　(Note 5) U5	←———	Trigger switch control "U1" Auto off mode "U2" Momentary switching mode "U3" Alternate switching mode "U4" Continuous reading mode 1 "U5" Continuous reading mode 2
PW (Note 5)	←———	Parameter storage The values set with only commands other than U1 to U5 are stored in the internal FLASH ROM. If no command is issued, these values do not remain when the power is turned OFF, and original values return.
VER	←———	Firmware version request Response from the scanner: Ver.n.nn n.nn.: Version No. example: Ver. 1.00
VERF	←———	Setting parameter version request Check the setting parameter version required to generate a batch setting QR Code (when not connected to the scanner) with the configuration software (ScannerSetting_2D). Response from the scanner: Ver.n.nn.mm n.nn.: Firmware version No. 　mm: Setting parameter Version No. Example: Ver. 1.00.00
E	←———	Scan entry remote request When performing n-point verification scanning, the system enters the master code registration status and registration is performed by scanning a master code. The registered master code data is stored in the FLASH ROM.
ID	←———	Scanner ID (Serial number) request <Scanner response> "ID. nnnnnn" 　nnnnnn: serial number, e.g., ID. 000001
TMON (Note 6)	←———	Trigger switch and magic key function enable 　Enables trigger switch and magic key control.
TMOFF (Note 6)	←———	Trigger switch and magic key function disable 　Disables trigger switch and magic key control, and scanner enters Ready state.

Control command	Transmission orientation Scanner ◄──────► Host	Contents
ERROR	──────────►	Scan fail When set to Continuous reading mode 1 or 2, data is transmitted when scanner enters Ready state without completing scanning in Active state. Possible to select whether to transmit.
OK	──────────►	Match Only if data output is set to "OK" when verified data matches, this command will be transmitted when data scanned matches the master code in the verification scanning mode.
NG	──────────►	Mismatch Only if data output is set to "NG" when verified data does not match, this command will be transmitted when data scanned does not match the master code in the verification scanning mode.
DEFAULT	◄──────────	Restores the parameter settings to default.
IMAGEOUT	◄──────────	Image output setting Refer to Chapter 10 for details.

Note 1: When the code remains within the reading window, if the scanner receives the "Z" and then "R" commands after the scanned data is transmitted by the receipt of the "R" command, the scanned data is transmitted again. This is because the "Z" command clears the prevention of double scanning.
For the same reason, if the scanner enters the scanning standby mode by the receipt of the "Z" command before all the blocks of a Structured Append Code are completely scanned, the Structured Append Code data are cleared. However, even when "READOFF" or "LOFF" command is received instead of "Z" command, or "READOFF" or "LOFF" instead of "R" command, operation will be the same.

Note 2: Even if you press the trigger switch in Ready state for scanning, the LED may light up momentarily, but scanning can not be performed.

Note 3: It may take a maximum of 100ms to run the command after receiving B1- B3, BH1-BH3, BM1-BM3, BL1-BL3, LB, LG, LR, or VO command.

Note 4: The command "B1" (including BH1, BM1 and BL1) beeper beep time is based on the setting for the scan complete sound and beeper beep time when scanning is complete.

Note 5: Parameter memory storage executed with the PW command can be performed up to one million times due to restrictions on the number of times data can be written to the FLASH ROM.

Note 6: This can only be used when data verification scanning is not set.

(2) Commands consist of the command field and the option fields

Command	Direction		Contents
	Scanner ◄─────► Host		
S	◄───────		1D code scanning configuration
D	◄───────		2D code scanning configuration

Note 1: Settings can be saved to the FLASH ROM via the "PW" command.
Note 2: Configuration does not change if only the above command is sent.

■Format of the command option field of the command S
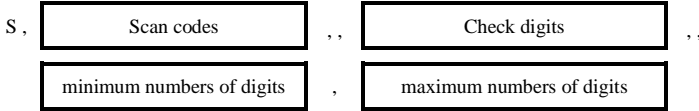
S , | Scan codes | , , | Check digits | , ,

| minimum numbers of digits | , | maximum numbers of digits |

Each option must delimit by a comma.
A comma is required even if an option is not set.
A comma is omissible if rest of the sub sequential options is not required to set.

Example

S , , , | Check digits | , , ,

Not omissible (Note 1) Omissible
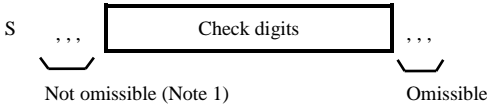
Note 1: If the option fields are not set, code scanning instructed by the command will be disabled. Up to six commas can be used.

Note 2: Configuration will not be changed if "S," is set.

Note 3: Insert two commas ",," in places between,
   • "Scan code" and "Check digit" fields.
   • "Check digit" and "minimum number of digits" field

Scan code, Check digit, Minimum digits and Maximum digits must be set as shown on the table below.

Scan code	Readable codes	Check digit	Minimum number of digits	Maximum number of digits
A	UPC-A, UPC-E, EAN-8, EAN-13	-	-	-
E	UPC-A, UPC-E, EAN-8, EAN-13 UPC/EAN with Add-on	-	-	-
H	Standard 2 of 5 (STF)	H	H3 (Note 2)	H99
I	Interleaved 2 of 5 (ITF)	I	I4 (Note 3)	I99
N	Codabar (NW-7)	N	N4 (Note 4) (Note 5)	N99
M	Code 39	M	M1	M99
L	Code 93	-	L1	L99
K	Code 128, GS1-128	-	K1	K99
R	GS1 DataBar Omnidirectional, GS1 DataBar Stacked, GS1 DataBar Truncated, GS1 DataBar Stacked Omnidirectional	-	R1	R99

Specify Scan code and Check digit by the alphabet symbol, minimum and maximum number of digits by the alphabet symbol followed by one or two digits of numeric number(s).
Settable range is from the minimum number of digits to the maximum number of digits. The default value shown on the table above is set if the minimum and maximum number of digits are not set.

Note 1: An error occurs if the symbol A and E are specified at the same time.

Note 2: The minimum number of digits is three for multiple reading, one for simgle reading.

Note 3: The minimum number of digits is four for multiple reading, two for simgle reading.

Note 4: The minimum number of digits can be set to one, and will be set to the value shown on the table above if not set.

Note 5: The minimum number of digits and the maximum number of digits need to setting number of digits including start code and stop code.

Example
   S,ANL
   • Readable code: UPC, UPC-E, EAN-8, EAN-13, Codabar (without check digit), Code 93
   • Readable number of digits: Default

   S,INM,,NM,,I10N5,I20N12
   • Readable code: Interleaved 2 of 5 (without check digit), Codabar (Check digitdisabled), Code 39 (Check
                                   digit enabled)
   • Readable number of digits: Interleaved 2 of 5 (10 to 20 digits), Codabar (5 to 12 digits), Code39 (default)

   S,INM,,,,N5M8,I20N5
   • Readable code: Interleaved 2 of 5 (Check digit disabled), Codabar (Check digit disabled), Code39 (Check
                                   digit disabled)
   • Readable number of digits: Interleaved 2 of 5 (4-20 digits), Codabar (NW-7) (5 digits), Code 39 (8-99 digits)
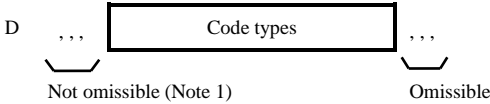
■Format of the command option field of the command D
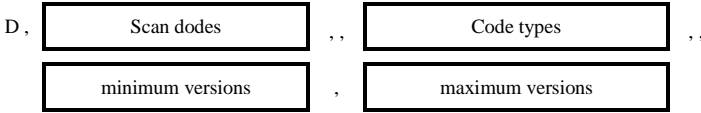
D ,	Scan dodes	, ,	Code types	, ,
	minimum versions	,	maximum versions	

Each option must delimit by a comma.
A comma is required even if an option is not set. A comma is omissible if rest of the sub sequential options is not required
to set.

Example

D	, , ,	Code types	, , ,

Not omissible (Note 1)   Omissible

Note 1: If the option fields are not set, code scanning instructed by the command will be disabled. Up to six commas can be
        used.

Note 2: Configuration will not be changed if "D," is set.

Note 3: Insert two commas "," in places between,
        • "Scan code" and "Code type" fields.
        • "Code type" and "minimum version" field

Scan code, code type, minimum version, maximum version must be set as shown on the table below.

Alphabet symbol	Readable code	Code type	Readable code	Minimum version	Maximum version
Q	QR code	QM	Model 1	Q01	Q40
		QL	Model 2		
		QS	Micro QR code	QM1	QM4
X	MaxiCode	-		-	-
Y	PDF417	YM	PDF417	-	-
		YS	MicroPDF417		
Z	Data Matrix	ZS	Square	Z01	Z24
		ZR	Rectangular	ZR1	ZR6
J	Aztec	-		-	-
V	GS1 Composite	-		-	-

Specify "readable code" by the alphabet symbol, "code type" by the specific alphabet symbol and the code type (alphabet), "minimum version" and "maximum version" by the alphabet symbol and the number of digits (one digit or two digits). Settable range is from the minimum version to the maximum version. The default value shown on the table above is set if the minimum and maximum version are not set.

Note 1: If the code type is omitted for QR code, PDF417 or DataMatrix, all code types are enabled.

Note 2: Version for DataMatrix is defined as shown on the table below.

<Data Matrix (Square)>

Version	No. of cells ROW × COL	Version	No. of cells ROW × COL	Version	No. of cells ROW × COL	Version	No. of cells ROW × COL
1	10 × 10	7	22 × 22	13	44 × 44	19	88 × 88
2	12 × 12	8	24 × 24	14	48 × 48	20	96 × 96
3	14 × 14	9	26 × 26	15	52 × 52	21	104 × 104
4	16 × 16	10	32 × 32	16	64 × 64	22	120 × 120
5	18 × 18	11	36 × 36	17	72 × 72	23	132 × 132
6	20 × 20	12	40 × 40	18	80 × 80	24	144 × 144

<Data Matrix (Rectangular)>

Version	No. of cells ROW × COL	Version	No. of cells ROW × COL	Version	No. of cells ROW × COL
1	8 × 18	3	12 × 26	5	16 × 36
2	8 × 32	4	12 × 36	6	16 × 48

○ Example
D,QYJ
• Scanning code: QR code (model 1, model 2, micro QR code), PDF417 (PDF417, MicroPDF), Aztec
• No. of scanning digits: Default value

D,QY,,QLQSQMYM
• Scanning code: QR code (model 1, model 2, micro QR code), PDF417 (PDF417)
• No. of scanning digits: Default value

D,QZ,,QLQS,,Q14QM1Z08ZR4,Q20QM2Z08
• Scanning code: QR code (model 2, micro QR code), DataMatrix (square, rectangular)
• No. of scanning digits: QR code_model 2 (version 14-20), QR code_micro QR code (version 1-2), Data Matrix square (version 8), Data Matrix rectangular (version 4-6)

Appendix 3: Bluetooth® Wireless Communication Glossary

This section explains terms regarding Bluetooth® wireless communication.

Bluetooth® address (Bluetooth® Device Address) (BD_ADDR)	A 48-bit address to identify Bluetooth® devices. The address is defined by the Bluetooth® SIG of each Bluetooth® device
PIN Code Bluetooth® Passkey	A password (16 bytes max.) used to authenticate Bluetooth® devices. The connecting Bluetooth® device is authenticated by entering the same PIN Code as that device. Once the device is authenticated for the first time, there is no need to enter the PIN Code again for subsequent connections. Also called a Bluetooth® Passkey.
Local name (Bluetooth® Device Name)	A user-friendly name the Bluetooth® device uses to identify itself.
Bluetooth® wireless communication	The communication line which connects the master device and the slave device. When Bluetooth® wireless communication is connected, data can be communicated between the master device and the slave device.
Master device	The device which controls Bluetooth® wireless communication.
Slave device	The device for which Bluetooth® wireless communication is controlled by the master device.

2D code handy scanner

SF1-QBi-T

Manual

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