

***DENSO***

**2D Code Handy Scanner**

**GT20Q-SM**

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**User's Manual**

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## Introduction

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Thank you for purchasing the GT20Q 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 GT20Q Firmware version 1.00 or later.

- DENSO WAVE INCORPORATED does not assume any product liability arising out of, or in connection with, the application or use of any product, circuit, or application described herein.
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## Customer Registration and Inquiries

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### ■ 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 update modules for the latest GT20 Series 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.

<http://www.qbdirect.net>

# 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.

	<b>WARNING</b>	Alerts you to those conditions which could cause serious bodily injury or death if the instructions are not followed correctly.
	<b>CAUTION</b>	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 blue circle (●) with a picture inside alerts you to something you MUST do.  
This example shows that you MUST unplug the power cord.



## 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 lead to visual impairment.  
Be sure to observe the following.



- Never stare into the laser light.

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 allow the connector terminal to come in contact with metal, etc.  
Large current flowing through the device could cause overheating, fire or breakage.
- Never allow the AC adapter to become wet.  
Doing so could cause fire or electrical shock.
- Never use the scanner on the line voltage other than the specified level.  
Doing so could cause the scanner to break or burn.
- Never use the scanner where any inflammable gases may be emitted.  
Doing so could cause fire.
- Do not scratch, modify, forcibly bend, twist, pull, or heat the power cord for the AC adapter.  
Also, do not put heavy material on the power cord for the AC adapter, or allow it to get pressed under heavy material.  
Doing so could damage the power cord, creating a fire hazard.
- 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.



- If smoke, abnormal odors or noises come from the scanner, immediately turn off the power, unplug the interface cable and AC adapter connector, and contact your nearest dealer.  
Failure to do so could cause fire or electrical shock.
- If foreign material or water gets into the scanner, immediately turn off the power, unplug the interface cable and AC adapter connector, and contact your nearest dealer.  
Failure to do so could cause fire or electrical shock.
- If you drop the scanner and the operation is affected or the housing is damaged, turn off the power to the host, unplug the interface cable and AC adapter connector, and contact your nearest dealer.  
Failure to do so could cause fire or electrical shock.



## 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.

 <p>Never disassemble</p>	<ul style="list-style-type: none"><li>● Never disassemble or modify the scanner. Doing so could result in a fire or electrical shock.</li></ul>
	<ul style="list-style-type: none"><li>● Do not put the scanner on an unstable or inclined plane. The scanner may drop, causing injuries.</li><li>● 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.</li><li>● 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.</li><li>● Do not place the scanner anywhere 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.</li><li>● Never cover or wrap the device or AC adapter 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.</li><li>● Never place the power cord of the AC adapter in the vicinity of heating equipment. Doing so could cause the coating of the power cord to melt, resulting in a fire or electrical shock.</li><li>● Do not scratch or modify the scanner or interface cable, or heat, forcibly bend, twist, or pull the interface cable. Doing so could damage the scanner or interface cable, resulting in a fire.</li><li>● Do not put heavy material on the scanner or interface cable, or allow the cable to get pressed under heavy material.</li><li>● 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.</li><li>● Do not use the scanner if your hands are wet or damp. Doing so could result in an electrical shock.</li><li>● 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.</li><li>● Do not use the scanner with anti-slip gloves containing plasticizer. The scanner housing may break, causing injuries, electrical shock, or fire.</li><li>● Do not use or store near processors or on carpets or other locations where there is strong magnetism or static electricity is easily generated. Doing so could affect the parts, causing malfunction or scanner failure.</li></ul>



## 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.

	<ul style="list-style-type: none"><li>● Be sure to hold the main body of the AC adapter when unplugging it from the socket. Failure to do so could result in broken power cord lead wires, leading to burnout, electrical shock or fire.</li><li>● If the interface cable becomes damaged (lead-wire exposure, broken lead wire etc.), contact your nearest dealer for a replacement. Failure to do so could cause fire.</li></ul>
	<ul style="list-style-type: none"><li>● If thunder sounds, unplug the AC adapter from the socket without delay. Failure to do so could damage the scanner, resulting in a fire.</li><li>● For safety reasons, be sure to unplug the AC adapter from the socket when performing care and maintenance. Failure to do so could result in an electrical shock.</li><li>● Never drop the scanner. The scanner housing may break, causing injuries. Unplug the AC adapter from the socket and contact your nearest dealer. Failure to do so could result in smoke or fire.</li></ul>

## Care and Maintenance

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Dust or dirt accumulating on the clear plate of the code scanning 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.

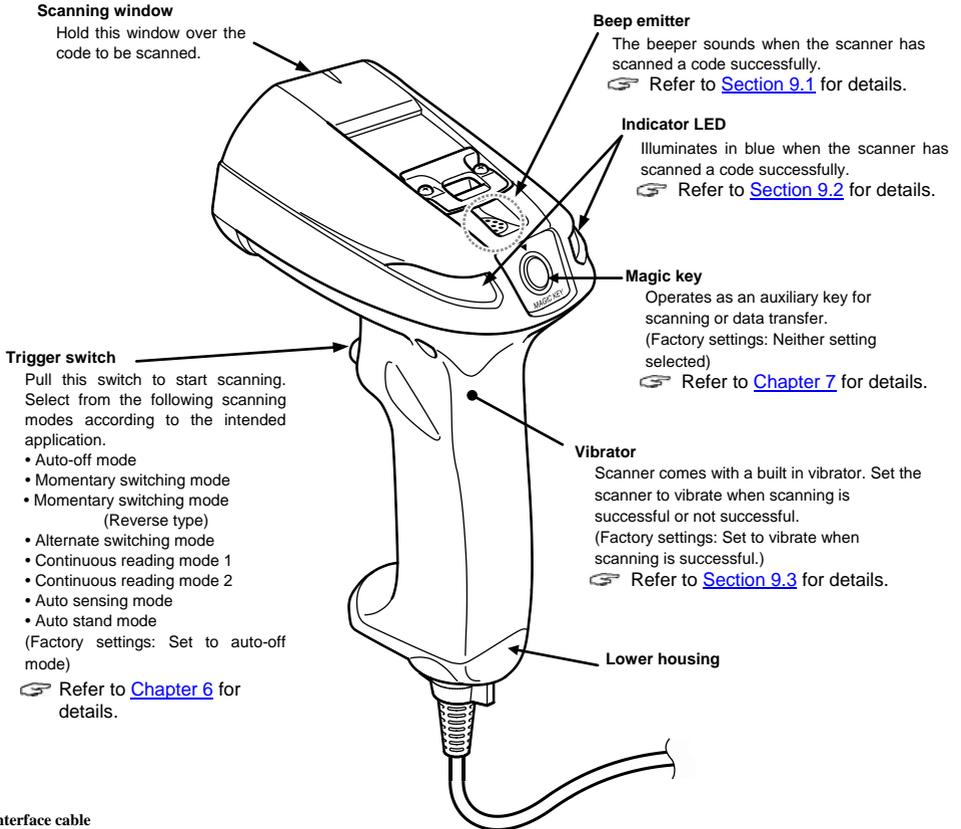
### ■ Proper Care of the Scanner Body

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



## Interface cable

Connect the interface cable to personal computers or the like. There are two types of cable:

- RS-232C interface
- USB interface

Connect the scanner to a computer or the like.

The scanner automatically distinguishes between the RS-232C interface and USB interface when the interface cable is connected.

☞ Refer to [Chapter 3](#) for details on connecting to the host and USB interface settings.

# Chapter 2 Preparation for Use

## 2.1 Operating Environment (USB Interface)

When using the USB interface, you will need a computer fitted with a USB port. As shown in the table below, the computing environment requirements differ depending on whether you use a USB-COM interface or a USB keyboard interface. (Factory settings: Set to USB-COM interface)

USB-COM interface: For the USB-COM interface, a dedicated Active USB-COM port driver (virtual COM port driver) must be installed. This scanner can be used via applications that utilize existing serial ports. Refer to [Section 3.2.1](#) for driver set up; for detailed specifications refer to [Section 10.2](#).

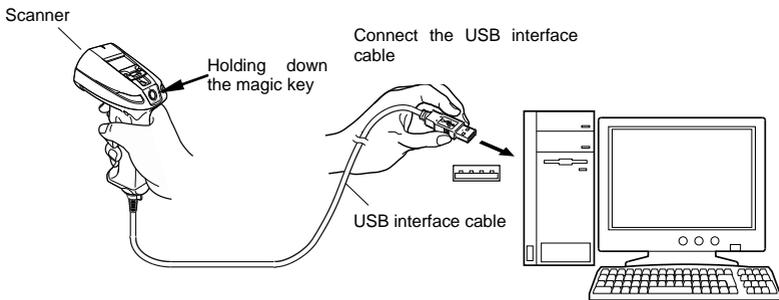
USB keyboard interface: A dedicated driver is not required. The data scanned by the scanner can be inputted directly at the position of the cursor in the application. Refer to [Section 3.2.2](#) for driver set up; for detailed specifications refer to [Section 10.3](#).

	Requirements for using a USB-COM interface (Factory settings):	Requirements for using a USB keyboard interface:
Computer	Windows OS	
Driver	An Active USB-COM port driver supplied by DENSO WAVE	OS standard driver

**Note:** Refer to QBdirect for types of compatible operating systems.

Use one of the following to switch between the USB-COM interface and USB keyboard interface.

- QR-coded parameter menu (refer to [Chapter 13](#))
- Configuration software (ScannerSetting\_2D)\*
- Holding down the magic key, connect the scanner USB interface cable to the computer or USB hub. (If the scanner was set to the USB-COM interface, it will switch to the USB keyboard interface and the indicator LED will illuminate in orange. Conversely, if the scanner was set to the USB keyboard interface, it will switch to the USB-COM interface and the indicator LED will illuminate in blue.)



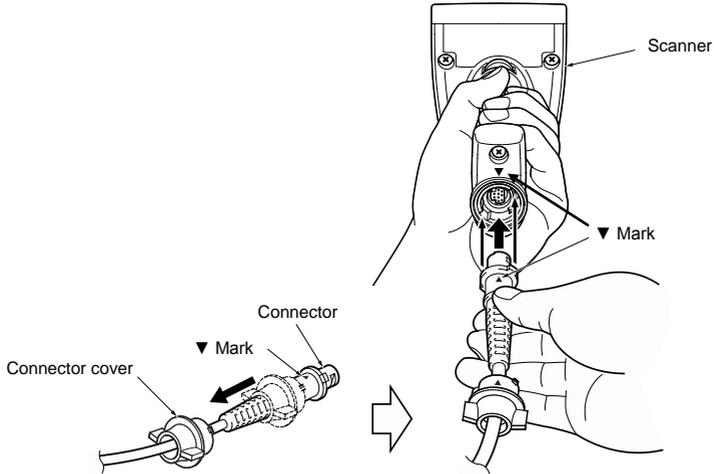
The new interface setting will be retained even after the scanner is turned off.

\* The configuration software (ScannerSetting\_2D) can be downloaded from our website “QBdirect” free of charge by registered users.  
<http://www.qbdirect.net>

## 2.2 Connecting the Interface Cable to the Scanner

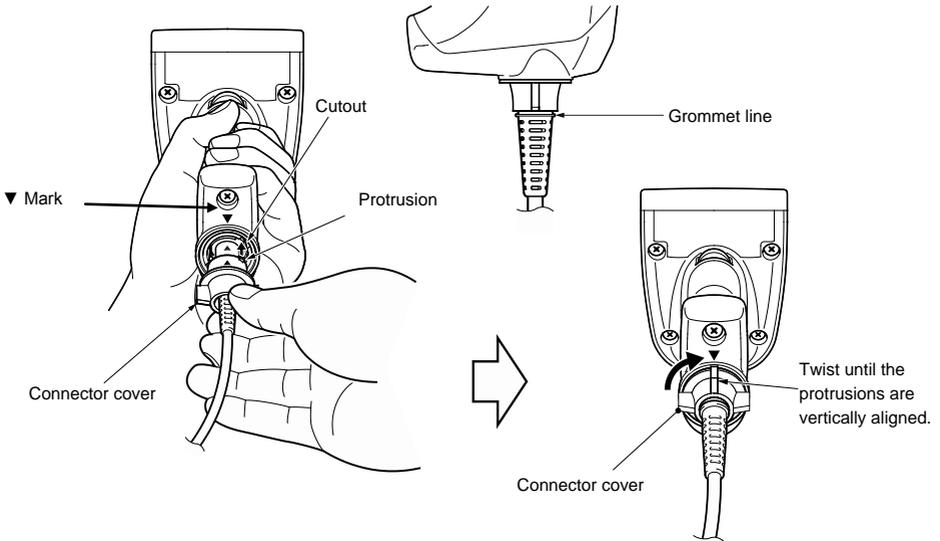
- (1) Detach the connector cover of the interface cable from the connector.
- (2) Connect the cable connector to the connector on the underside of the scanner.

**Note:** Hold the scanner body, align the ▼ marks on the scanner and cable, and insert the cable as far as it will go.



- (3) Align the ▼ marks on the scanner and connector cover, and insert the connector cover up to the point where the grommet line is visible.

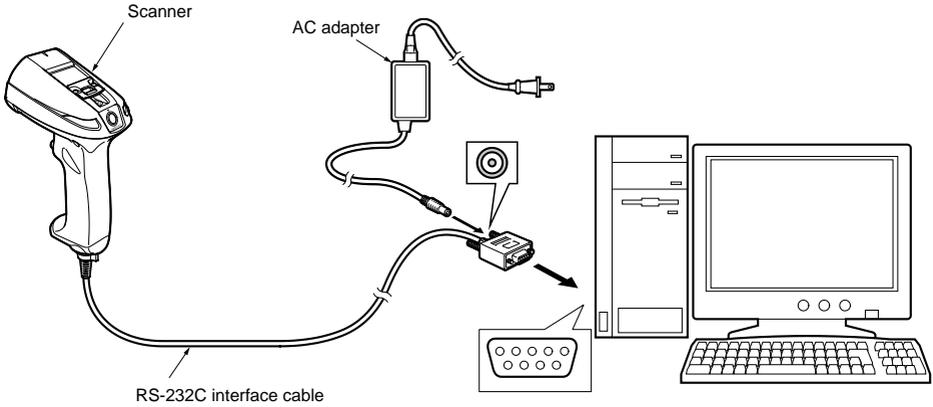
Next, twist to the right until the connector cover protrusions are vertically aligned and the cable locks into place.



## Chapter 3 Connecting to the Computer

### 3.1 Using the RS-232C Interface

(1) Connect the RS-232C interface cable to the computer.



(2) Connect the AC adapter to the DC power jack on the RS-232C connector.

**Note:** Hold the connector when removing the connector and DC power jack. Pulling directly on the cable causes broken lead wires.

**Note:** Avoid inserting and removing the connector wherever possible. Doing so could result in weak connector contacts.

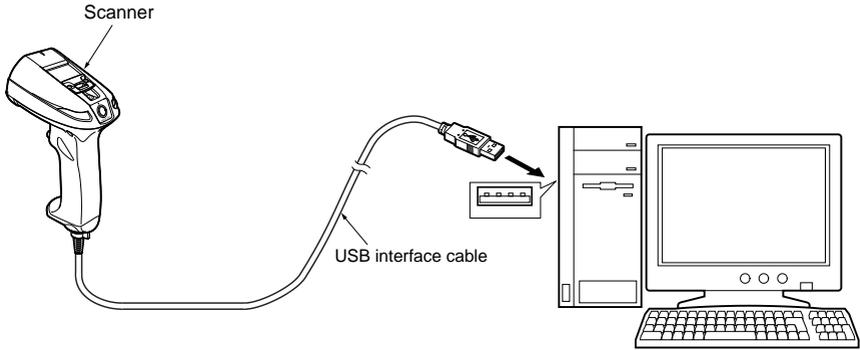
**Note:** Always use the dedicated AC adapter.

## 3.2 Using the USB Interface

Communication with the computer can be carried out via the USB-COM interface or the USB keyboard interface. Device driver set up is required for each of these (refer to [Section 3.2.1](#) or [3.2.2](#)).

### Precautions for USB Interface Cable Connection

- The driver must be installed on the computer before connecting the USB interface cable in order to use the USB-COM interface.



- Leave an interval of 10 seconds or more between removing and inserting the USB connector as it may take anywhere up to approximately 10 seconds for the computer to recognize or delete the USB device.
- The USB connector can be removed or inserted even if the computer is on. However, do not remove or insert the USB connector in any of the following instances.
  - While the computer is on standby (suspended)
- Do not insert or remove other USB devices while the scanner is processing the connection.
- Connect the scanner directly to the USB port of the computer itself or a self-powered hub. In some instances connection may not be possible, depending on the type of hub. If the operation is unstable, connect the scanner directly to the USB port of the computer itself.
- Do not extend the cable.

### 3.2.1 Setting Up the USB-COM Interface

The Active USB-COM port driver supplied by DENSO WAVE must be installed on the computer in order to use the scanner with the USB-COM interface. This driver can be downloaded from our website “QBdirect” free of charge. For supply in CD media format, please contact us at the details given in the introduction.

<http://www.qbdirect.net>

The downloaded file is compressed. Extract the files before use.

For the latest information, refer to the manual that comes with the driver.

#### **Precautions for Installation and Use of the Active USB-COM Port Driver**

- Have a user with administrator privileges install the driver.
- Microsoft has not issued a digital signature for this driver. Using the driver signature options and local policy security options, take steps to ensure that installation of a driver without signature is not blocked.
- Although the USB device can be removed or inserted during communication (while the COM port is open), any data communicated during removal of the USB device will be lost.
- Even if the USB device has been removed, the port continues to function as a virtual serial port and therefore has a permanent COM port number.
- This driver cannot be used concurrently with existing USB-COM device drivers. You will be asked to uninstall any existing USB-COM device drivers when installing this driver.
- If this driver is installed multiple times on a single PC, multiple units of this USB device can be used, however it is not possible to uninstall these drivers individually. All of the drivers will be uninstalled in a single batch.

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#### **Installation Procedures**

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For the installation procedures, please refer to the Active USB-COM Port Driver Installation Guide that comes with the downloaded driver.

### 3.2.2 Setting Up the USB Keyboard Interface

A USB class driver “HID (Human Interface Devices)” is used to communicate using the USB keyboard interface. This driver is included in the Windows system files.

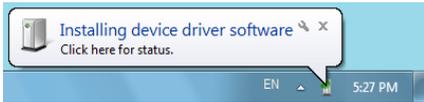
**Note:** If the scanner is set to the USB-COM interface, follow the procedures in [Section 2.1](#) to switch to the USB keyboard interface. (Factory settings: Set to USB-COM interface)

Connect the scanner USB interface cable to the USB port of the computer itself or USB hub.

For the following we will explain using examples from Windows 7, Windows 8, and Windows Vista procedures.

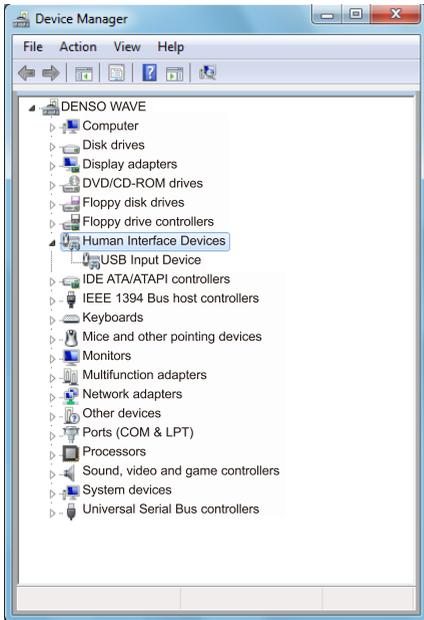
#### **Windows 7, Windows 8, Windows Vista**

- (1) Turn on the computer and activate Windows 7, Windows 8 or Windows Vista, and log in as a user with administrator privileges.
- (2) Connect the USB interface cable of the scanner to the computer or USB hub.



- (3) The message, “Installing device driver software” is displayed on the taskbar at the lower right of the screen.

Scanner recognition will be automatic. Once the scanner has been recognized the message will disappear.



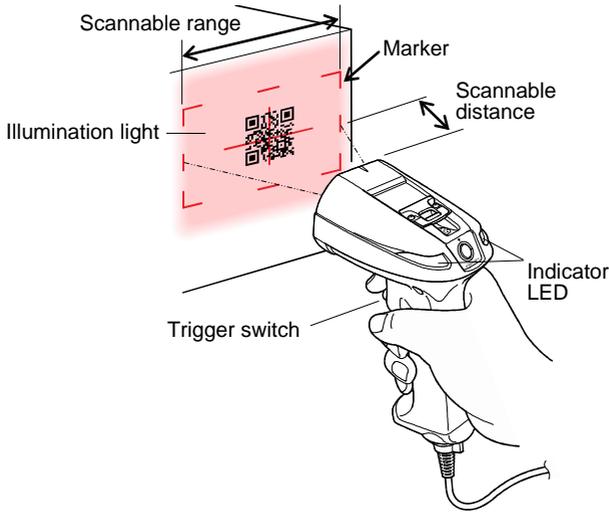
- (4) To check whether the USB device has been installed correctly, go to the “Device Manager” screen.

If “USB input device” has been added under the “Human Interface Devices” menu item, the scanner has been connected correctly.

Reconnect the scanner if this item has not been added, or if a  or  mark is displayed.

## Chapter 4 Scanning Method

- Place the scanning window over the code, and pull the trigger switch. The markers indicating the scanning range and the illumination light for scanning the code illuminate, and the code can be scanned.  
(If the trigger switch mode is in momentary switching mode (reverse type), release the trigger switch. This operation is not necessary if the trigger switch mode is set to continuous reading modes 1 or 2, or auto sensing mode.)



- Once the code has been scanned correctly, the indicator LED will illuminate in blue, the beeper will sound and the unit will vibrate.

- Note:** The scannable range indicated by the markers is only a reference, and does not guarantee that codes within this range will be scanned.
- Note:** The scannable range is smaller than the area indicated by the markers.  
When the scanning distance is 7.5 cm, the scannable range is approximately  $6 \times 4$  cm.
- Note:** Unless multi-line barcode scanning is enabled, or the split QR Code scanning mode is set to "batch edit mode," do not attempt to place more than one code within the scannable range. If two codes are in the scannable range simultaneously, the codes may not be scanned, or the scanner may scan them in alternately over and over again.
- Note:** The duration of double scan prevention can be set using the configuration software (ScannerSetting\_2D).
- Note:** Codes can be scanned from any direction, but please scan the code from a position where everything including the margins fit comfortably within the scanning field.
- Note:** Depending on the scanner illumination light, the room lighting, and the label angle, the light reflected off the label may become exceedingly strong in places, creating a specular effect that prevents code scanning. To resolve this issue, change the angles and/or distance of the label and scanner.

### ■ 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 <a href="#">Section 8.1</a> for details.

## Chapter 5 Parameter Settings

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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).<sup>\*</sup> The set parameter values will be retained even after the scanner is turned off.

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

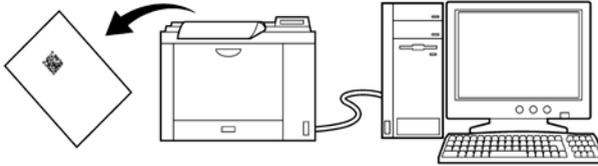
(For details on the QR-coded parameter menu, refer to [Chapter 13](#).)

- (2) Parameters can be set through the computer using the configuration software (ScannerSetting\_2D)<sup>\*</sup>

Configuration software can be operated via the RS-232C interface or USB-COM interface. If parameters are set in the USB keyboard interface, it will be necessary to switch to the USB-COM interface.

(To do this, you will need to use the QR-coded parameter menu to change the interface to the USB-COM interface, and install the Active USB-COM port driver supplied by DENSO WAVE. Refer to [Section 3.2.1](#).)

It is possible to generate a batch setting QR Code with the configuration software, and set parameters by reading it with the scanner. Batch setting QR Codes can be read using any of the following interfaces: the RS-232C interface, USB-COM interface or the USB keyboard interface.



<sup>\*</sup> The configuration software (ScannerSetting\_2D) can be downloaded from our website “QBdirect” free of charge by registered users.

<http://www.qbdirect.net>

## Chapter 6 Scanning Control

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Scanning can be controlled through two different methods, “scanning using the trigger switch” ([Section 6.1](#)), or “scanning using software control” ([Section 6.2](#)). “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 utilized when the USB keyboard interface is selected.

In addition to these, auto sensing mode (includes auto stand mode) can also be used (refer to [Section 6.3](#)).

### 6.1 Scanning Using the Trigger Switch

Pulling the trigger switch illuminates the illumination light and puts the scanner in the Active state. The six 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 5 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 held down, and returns to the Ready state when the trigger switch is released.

#### (3) Momentary Switching Mode (Reverse type)

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

#### (4) Alternate Switching Mode

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

#### (5) 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.

## (6) 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.

## 6.2 Scanning Using Software Control

Instead of pulling the trigger switch to carry out scanning operations, these are carried out via the RS-232C interface or USB-COM interface 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 (Reverse type)	Momentary switching mode	Alternate switching mode	Continuous reading mode 1	Continuous reading mode 2
R, READON, LON	<u>Activation commands</u> When these commands are received, the illumination light comes on and the scanner enters the Active state	×	×	×	×	✓	✓
Z, READOFF, LOFF	<u>Ready commands</u> 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.

## 6.3 Scanning through Automatic Label Recognition

In auto sensing mode (including auto sensing operation in auto stand mode) there is no need to operate the trigger switch; approach the scanner with the code and the illumination light comes on making scanning available. This mode is used when the scanner is sitting in the stand and the codes are brought up to the scanner for scanning.

The illumination light comes on when the codes are brought within the scanning field, or codes within the field are moved. If a code is removed from the scanning field or codes within the scanning field are not moved for approximately three seconds, the illumination light will go out.

In auto stand mode, the scanner operates in auto sensing mode after the power is turned on.

If the trigger switch is pulled during auto-sensing operation, the scanner enters auto-off mode and scanning can be carried out using trigger switch operations. Switching from auto-off mode to auto sensing mode can be done manually or automatically, and the preferred option can be selected in configuration software (ScannerSetting\_2D).

### - Manual

If the trigger switch is pulled three times within approximately one second while the scanner is operating in auto-off mode, the scanner switches to auto sensing mode.

### - Automatic

The scanner automatically returns to the auto sensing mode when, after switching to auto-off Ready state, the trigger switch is not pulled for longer than the time specified for the scanner to return to the auto sensing mode.

The auto sensing return timing can be set using the configuration software (ScannerSetting\_2D).

Auto sensing mode and auto stand mode can be selected using the QR-coded parameter menu or configuration software (ScannerSetting\_2D).

The level of sensitivity of the scanner to the code can be set to “high,” “medium,” or “low.” For example, if the illumination light is slow to come on when the code is brought up to the scanner, set the code sensitivity level to “high.” Select the sensitivity level in the configuration software (ScannerSetting\_2D).

**Note:** Even if there is no code in the scanning field, the illumination light may come on if the brightness of the room changes or if shadows in the scanning field move.

**Note:** Ambient illumination of 500 lx or more is necessary for auto sensing mode to work properly.

## Chapter 7 Magic Key

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The magic key can be used as an auxiliary key for scanning or data transfer. One of the following seven functions can be assigned to the magic key. 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) **Scanning code switching function**  
Toggles the scanner between two types of scanning codes selected in advance using the configuration software (ScannerSetting\_2D) every time the magic key is pressed.  
Codes which were otherwise not enabled for scanning can be scanned in if specified using this function.  
Furthermore, pressing the magic key five times within 2 seconds releases this function and enables reading of codes other than the two selected types for a short period of time. Pressing the magic key again will reactivate this function.
- (2) **Data retransfer function**  
The scanner resends data previously sent each time the magic key is pressed.  
  
Data sent previously will not be resent if it is cleared by turning off the power after a code is scanned.
- (3) **Specific character transfer function**  
Sends characters (max. 10 bytes) specified using the configuration software (ScannerSetting\_2D) every time the magic key is pressed.
- (4) **Scanning active/ready switching function**  
Toggles between Ready state and Active state every time the magic key is pressed when the trigger switch operation mode is in continuous reading mode 1 or 2.  
If the error message for scan failure is enabled, the "ERROR" command is sent to the host when the scanner switches from the Active state to the Ready state without completing a scan.
- (5) **Marker switching function**  
Toggles the marker mode between Always-ON and the current set marker mode every time the magic key is pressed.
- (6) **Barcode reader mode switching function**  
Toggles the scanner between the normal read mode and the barcode reader mode every time the magic key is pressed, regardless of whether or not the barcode reader mode is enabled (refer to [Section 8.3](#)). The barcode reader mode overrides the point scan mode (refer to [Section 8.4](#)) even if the point scan mode is enabled.
- (7) **Auto sensing mode switching function**  
Toggles the scanner between the auto sensing mode and the currently selected trigger switch mode every time the magic key is pressed.  
  
The trigger mode cannot be changed by any command or the QR-coded parameter menu while using this function.
- (8) **No function assigned**  
No function has been assigned to the magic key. Pressing the magic key does not affect the operation of the scanner.

The table below illustrates the relationship between magic key operation functions and trigger switch operation modes. (Identical for regular scanning mode and data verification mode) An × in the table below indicates that the magic key operation function is deactivated. For example, even if the scanning active/ready switching function has been set on the magic key, it will be ignored while in auto-off mode.

Magic key operation function	Trigger switch operation mode						Auto sensing mode	Auto stand mode
	Auto-off mode	Momentary switching mode	Momentary switching mode (Reverse type)	Alternate switching mode	Continuous reading mode 1	Continuous reading mode 2		
Scanning code switching function	✓	✓	✓	✓	✓	✓	✓	✓
Data retransfer function	✓	✓	✓	✓	✓	✓	✓	✓
Specific character transfer function	✓	✓	✓	✓	✓	✓	✓	✓
Scanning active/ready switching function	×	×	×	×	✓	✓	×	×
Marker switching function	✓	✓	✓	✓	✓	✓	✓	✓
Barcode reader mode switching function	✓	✓	✓	✓	✓	✓	✓	✓
Auto sensing mode switching function	✓	✓	✓	✓	✓	✓	×	×
No function assigned	✓	✓	✓	✓	✓	✓	✓	✓

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

#### Master code registration

Pressing the magic key for approximately two seconds when in data verification mode (refer to [Section 8.1](#)) 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 8.1.3](#)) 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.

#### Temporary barcode reader mode release

If the barcode reader mode (refer to [Section 8.3](#)) is selected while using the USB keyboard interface, both the QR-coded parameter menu and the configuration software (ScannerSetting\_2D) cannot be used. To use the QR-coded parameter menu or configuration software in these circumstances, hold down the magic key for approximately two seconds to temporarily release the barcode reader mode. When parameters are set using the QR-coded parameter menu or configuration software, the temporary release will be overridden and the mode will return to the barcode reader mode.

#### Interface switching

Switches the interface mode to whichever interface is not used by the scanner when the scanner is turned on while the magic key is held down.

The indicator LED illuminates in blue if the interface is changed to the USB-COM interface, and orange if changed to the USB keyboard interface.

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

#### Forced termination of ADF script

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

## Chapter 8 Scanning Function

### 8.1 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 (refer to [Section 8.1.3](#)), regardless of which of the above registration methods is used.

Parameters related to verification scanning can be set using the configuration software (ScannerSetting\_2D).

#### 8.1.1 Data Verification Scanning Procedures

##### ■ n-Point Verification

###### Preset Master Registration

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.

###### Master Registration

- 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) 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 8.1.3](#)) is read.

**Note:** Control commands cannot be utilized when the USB keyboard interface 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:** The verification range can be set to either “code type + code data” or “code data only” in the configuration software (ScannerSetting\_2D).

## 8.1.2 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 <b>345</b>	Match
345	3	3	00 <b>345</b> 678	Match
345	3	3	00 <b>346</b>	Mismatch
345	3	3	00 <b>34</b>	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, <b>345</b> ,6789	Match
345	3	0,12, <b>346</b> ,6789	Mismatch
345	3	0,12, <b>3456</b> ,6789	Mismatch
345	3	0,12, <b>34</b> ,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 10.4](#))

### 8.1.3 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 prohibited” 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 beeper, 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 Release

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, and 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

## 8.2 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 10.4](#))

**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.

### 8.2.1 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).

#### 8.2.1.1 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 (refer to [Section 10.4](#)). 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]

### 8.2.1.2 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 (refer to [Section 10.4](#)) 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]

### 8.2.1.3 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 (refer to [Section 10.4](#)) 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	0194901234567894110308081303081017040208	[STX](01)94901234567894(11)030808(13)030810(17)040208[ETX]
	0194901234567894110308081303081061704020817040305	Error (refer to the details below)
Transmit data regardless of the results: Enabled	0194901234567894110308081303081017040208	[STX](01)94901234567894(11)030808(13)030810(17)040208[ETX]
	0194901234567894110308081303081061704020817040305	[STX]0194901234567894110308081303081061704020817040305[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)03081061704020817040305

### (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).

## 8.2.2. 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 10.4](#)) 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]

### 8.2.3 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 10.4](#)) 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	

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]

## 8.2.4 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.

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

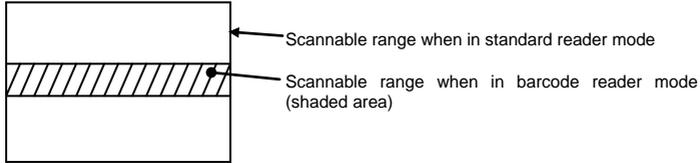
### 8.3 Barcode Reader Mode

In barcode reader mode, the scannable range on the longitudinal scale is limited to the central 15% shown in the figure below, with a skew angle diameter of  $5^{\circ} \geq \theta \geq -5^{\circ}$ .

Less time is therefore required for barcode scanning than standard reader mode.

2-D codes and multi-line barcodes cannot be scanned in this mode, even if scanning of these codes is enabled. Also, the point scan mode (refer to [Section 8.4](#)) cannot be enabled while the scanner is in this mode. If both modes are enabled, the mode most recently enabled will be activated.

If the barcode reader mode is selected while using the USB keyboard interface, both the QR-coded parameter menu and the configuration software cannot be used. Hold down the magic key for approximately two seconds to temporarily release the barcode reader mode. (Refer to [Chapter 7](#))



### 8.4 Point Scan Mode

The scanner scans a code by aiming at a code under the intersection of the cross 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.

### 8.5 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.

### 8.6 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.

## 8.7 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 8 kilo bytes, 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 (5 seconds have elapsed with the trigger switch pulled, or the trigger switch is released within 5 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.

## 8.8 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.

### 8.8.1 Number of Lines

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

### 8.8.2 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.

### 8.8.3 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 10.4](#)). 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 10.4](#)). 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 UPC/EAN with 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.

## 8.9 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 9 Beeper, Indicator LED, Vibrator, Marker, Illumination Light

## 9.1 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 scanned code data matches the master data in “data verification mode,”
  - a split QR Code is scanned,
  - a “Start setting” or “End setting” code is read (three beeps), or a parameter setting code is read (one beep) while implementing settings in the QR-coded parameter menu ([Chapter 12](#)),
  - the configuration software (ScannerSetting\_2D) starts, or configuration changes take effect (three beeps), or
  - a batch setting QR Code generated in the configuration software is scanned (three beeps).
- 

---

#### The beeper emits a long beep when

---

- 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,
  - 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,
  - 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, or
  - an invalid control command is received.
- 

Use the configuration software (ScannerSetting\_2D) to enable/disable the beeper sound when the scanner is turned on (Default: disabled). The beeper tone cannot be changed.

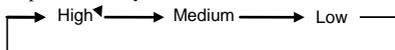
Beeper sound can be disabled using the QR-coded parameter menu or the configuration software. In the following instances, however, the beeper sounds regardless of that beeper setting:

- when the scanner is customized with the QR-coded parameter menu ([Chapter 13](#)),
- 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](#)).

### (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)

## 9.2 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 scanner commences or completes reading from the QR-coded parameter menu ([Chapter 12](#)),
  - the scanner commences or completes a split QR Code scanning,
  - a split QR Code is scanned,
  - when the parameter values are saved by a PW command (refer to [Appendix 2](#)),
  - the scanned code matches the master data in “data verification mode,”
  - the master data has been registered successfully in “data verification mode,” or
  - the scanner has been turned on while holding the magic key down and switched to the USB-COM interface.
- 

---

The indicator LED illuminates in green when:

---

- a transfer has been commenced with the data retransfer function,
  - a code has been scanned successfully while the scanning code switching function or the barcode reader mode switching function is enabled,
  - 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, or
  - the barcode reader mode is temporarily released.
- 

---

The indicator LED illuminates in red when:

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- an invalid control command is received.
  - the scanner has failed to edit read data,
  - the code scanned in “data verification mode” does not match the master data,
  - a digit number error has occurred during master data registration in “data verification mode,”
  - a transfer cannot be performed with the data retransfer function,
  - the magic key is pressed while the scanning active/ready switching function is assigned to it and is disabled due to the trigger switch operation mode being set to something other than continuous reading mode 1 or 2 with a control command (refer to [Appendix 2](#)),
  - the scan lock is enabled,
  - the stored data of a split QR Code scanned in edit mode exceeds 8 KB,
  - 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 code other than a parameter setting code is scanned during parameter setting by the QR-coded parameter menu,
  - 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 trigger switch is pulled when the trigger switch control is deactivated.
-

---

The indicator LED flashes in red when:

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- the master data has not been registered successfully in “data verification mode”
- 

---

The indicator LED alternates between blue and orange when:

---

- the scanning codes are switched with the scanning code switching function,
  - the scanning codes are switched with the barcode reader mode switching function, or
  - the scanning codes are switched with the magic key auto sensing mode switching function.
- 

---

The indicator LED illuminates in orange when:

---

- the scanner has been turned on while the magic key is held down and has switched to the USB keyboard interface.
- 

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 13](#)),
- 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, or
- 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 data retransfer function or there is no previous scanned data when attempting retransfer,
- when a transfer has been successfully completed with the specific character transfer function,
- when the configuration status of the scanning code switching function is displayed,
- when the magic key is pressed while the scanning active/ready switching function is assigned to it and is disabled due to the trigger switch operation mode being set to something other than continuous reading mode 1 or 2 with a control command (refer to [Appendix 2](#)),
- when the configuration status of the barcode reader mode switching function is displayed,
- 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, or
- a hardware error has occurred.

## 9.3 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.

---

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 transfer has been successfully completed with the specific character transfer function or data retransfer function,
  - the scanning codes are switched using the scanning code switching function,
  - a “settings commenced” code, “settings terminated” 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 terminated,
  - a batch setting QR Code created in the configuration software is read, or
  - the barcode reader mode is successfully released with the temporary barcode reader mode release function.
- 

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,
  - the data cannot be sent due to CTS = Low error,
  - an ACK response is not issued in ACK/NAK mode,
  - an invalid control command is received (refer to [Appendix 2](#)),
  - there is no previous scanning data when resending data, or
  - a communication error or communication timeout occurs while setting parameters with the configuration software (ScannerSetting\_2D).
- 

<p><b>Note:</b> We recommend that you disable vibration when using your scanner fixed to a stand.</p>
---

## 9.4 Marker

The red semiconductor laser illuminates to indicate the scanning area as a guide.

Using the QR-coded parameter menu or configuration software (ScannerSetting\_2D), select one of the three following modes.

### 9.4.1 Normal Marker Mode

When the trigger switch is in auto-off mode or auto stand mode auto-off

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 5 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 momentary switching mode (Reverse type)

In Momentary switching mode (reverse type), the marker beam illuminates continuously when the trigger switch is released.

When the scanner is ready (when the trigger switch is released in Momentary switching mode (reverse type), the marker beam illuminates continuously. When the scanner is on standby (when the trigger switch is pulled in Momentary switching mode (reverse type)), the marker beam turns off.

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

The marker beam illuminates continuously while the scanner is turned on.

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.

When the trigger switch is in Auto sensing mode or performing auto sensing in Auto stand mode

The scanner detects code-like items entering the scanning field, and switches the scanner to the Active state, illuminating the marker beam continuously. The marker beam will turn off after 3 seconds have elapsed following successful scanning completion or when scanning is not completed successfully after then scanner has switched to Active state and 3 seconds have elapsed.

### 9.4.2 Marker-OFF Mode

The marker beam will not illuminate under any conditions.

### 9.4.3 Marker-ON Mode

When the scanner enters Ready state, the marker beam illuminates continuously for approximately thirty seconds before turning off.

The marker beam illuminates continuously when it is ready to scan.

## 9.5 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.

When the illumination LEDs are on, it is possible to activate an “ECO mode” which controls the brightness of the LEDs and reduces electrical consumption by 20%. Factory settings: Set to “ECO mode”

\* When “ECO mode” is activated, scanning distance is shortened in dark locations with ambient illumination of 500 lx or less.

# Chapter 10 Communication

---

## 10.1 RS-232C Interface

When the RS-232C interface is selected, communication is via an asynchronous serial interface at RS-232C signal levels.

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.

### (1) Communication Procedures

Select either Non-acknowledge mode or ACK/NAK mode.

#### Non-acknowledge mode (default)

Scanned data is sent when CTS signal transmission is enabled.

**Note:** Use the configuration software (ScannerSetting\_2D) to set the CTS signal monitoring timing to a figure between 100ms and 9.9s (at intervals of 100ms), and CTS signal control to “activate/deactivate control.”

#### ACK/NAK mode

When CTS signal transmission is enabled, scanned data is sent and then processed according to the response from the computer, etc.

ACK: Normal completion

NAK: Retry

**Note:** Use the configuration software (ScannerSetting\_2D) to set the CTS signal monitoring timing and ACK/NAK response confirmation timing to a figure between 100ms and 9.9s (at intervals of 100ms).

### (2) RTS Signal Procedure

Select between Scanner ready mode and Data ready mode.

#### Scanner ready mode (default)

The RTS signal remains ON once the power is turned on and scanner communication is enabled. Ensure that the RTS signal is ON when transmitting commands from the host to the scanner.

#### Data ready mode

The RTS signal turns ON before the scanner transfers data, and turns OFF when data transfer is completed. Commands can be sent from the host to the scanner regardless of whether or not the RTS signal is ON. However, the scanner cannot receive commands for a set period of time immediately after the power is turned on.

### (3) Transmission Speed

Select the transmission speed from one of six options between 4800 bps and 115200 bps (default: 38400 bps).

### (4) Transmission Characters

Transfer characters are all in ASCII code. Select any combination of the following values as the transfer format.

Word length: 7 bits, 8 bits (default)

Parity: EVEN, ODD, NONE (default)

Stop bit: 1 bit (default), 2 bits

**Note:** However, if the word length is set to 7 bits, the uppermost bit will not be transferred when the data contains Kanji characters or binary data.

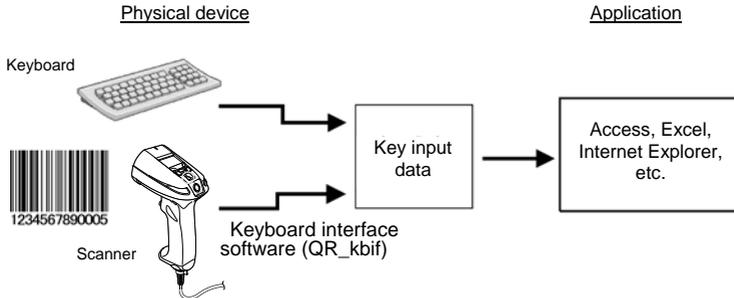
## 10.2 USB-COM Interface

This scanner conforms to USB 1.1 (Universal Serial Bus Specification Revision 1.1).

Installation of a dedicated Active USB-COM port driver on the computer enables use of the USB-COM interface with communication software utilizing an existing serial port.

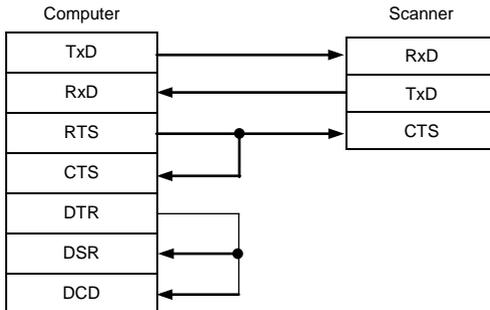
**Note:** Keyboard interface software (QR\_kbif) is required for directly inputting scanned data transmitted from the scanner via the USB-COM interface into an application (Access, Excel, Internet Explorer, etc.). As shown in the diagram below, QR\_kbif converts scanned data and transfers it to the application just as if it had been inputted on a keyboard. This program enables use of scanned data with all applications that allow key-based input. QR\_kbif can be downloaded from our website “QBdirect” free of charge by registered users.

<http://www.qbdirect.net>



### ■ Precautions for Use

- When connecting this interface for the first time or changing the scanner connection port, check the COM port number in the device manager etc. before use.
- When using multiple types of communication software or multiple scanners on the host computer simultaneously, be sure to specify a different COM port number for each piece of software.
- If operations are suspended while the communication software is activated, some host computers may not be able to communicate when the suspension is released. To re-enable communication, close the program and then reactivate it.
- There is no need to change the transmission speed/data length, or parity/stop bit length settings in the communication software using the serial port as these are ignored. Select “Hardware” (RTS/CTS) or “None” for the flow control.
- The computer virtual COM port and scanner are connected virtually as shown below.



## ■ Communication Procedures

Select either Non-acknowledge mode or ACK/NAK mode.

### Non-acknowledge mode (default)

Scanned data is sent when CTS signal transmission is enabled.

Note: Use the configuration software (ScannerSetting\_2D) to set the CTS signal monitoring timing to a figure between 100ms and 9.9s in intervals of 100ms, and CTS signal control to “activate/deactivate control.”

### ACK/NAK mode

When CTS signal transmission is enabled, scanned data is sent and then processed according to the response from the computer, etc.

ACK: Normal completion

NAK: Retry

Note: Use the configuration software (ScannerSetting\_2D) to set the CTS signal monitoring timing and ACK/NAK response confirmation timing to a figure between 100ms and 9.9s (at intervals of 100ms).

## ■ Remote Wakeup

The “standby state” host is released by holding down the trigger switch on the scanner. (Default: Enabled)

Remote wakeup can be enabled or disabled.

**Note:** The remote wakeup function cannot be used in the following instances:

- The host does not support the remote wakeup.
- Remote wakeup is disabled in the scanner settings.

## 10.3 USB Keyboard Interface

The USB keyboard interface does not require a special driver; data scanned is inputted directly at the position of the cursor in the application.

USB keyboard interface operation conforms to the following specifications.

- Universal Serial Bus (USB) Device Class Definition for Human Interface Devices (HID) Version 1.11
- Universal Serial Bus (USB) HID Usage Tables Version 1.11 keyboard

### (1) Caps Lock Status

Align with the Caps Lock status of the keyboard.

(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 bitwise. 80h to FFh data is not outputted 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 bitwise.
- 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 outputted bitwise. 8140 to 9FFC, E040 to EFFC are allocated for Kanji.  
Example: When scanned code data is “漢字” (Kanji)  
Data: 漢字 (Kanji)  
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 bitwise in binary format.
Kanji conversion	“漢字” (Kanji)	Output with Kanji conversion *

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

### (5) Data Transmission Interval

The data transmission interval can be selected from seven levels ranging from 1 to 100 ms. (Default: 10 ms)

### (6) Remote Wakeup

The “standby state” host is released by holding down the trigger switch on the scanner. (Default: Enabled)

Remote wakeup can be enabled or disabled.

**Note:** The remote wakeup function cannot be used in the following instances:

- The host does not support the remote wakeup.
- Remote wakeup is disabled in the scanner settings.

## 10.4 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.

#### RS-232C, USB-COM interface

Header: None (default), STX, or user selection

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

#### USB keyboard interface

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

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

☞ Refer to [Chapter 12](#) for details.

### (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 byte. 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 USB keyboard interface.

### (5) Code Mark

This optional field specifies the code system. It offers ten combinations with five code marks (Type 1, Type 2, Type 3, Type 4, and user-defined) and two output modes (coupling and separating) as listed below.

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
2-D 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		
		2-digit with Add-on	Linear	A		
			Add-on	None		
		5-digit with Add-on	Linear	A		
			Add-on	None		
		UPC-E	Without add-on		C	
	2-digit with Add-on		Linear	C		
			Add-on	None		
	5-digit with Add-on		Linear	C		
		Add-on	None			

Code Type			Code mark			
			Type1		Type2	
			Coupling	Separating	Coupling	Separating
Barcode	EAN-13	Without add-on		A	F	
		2-digit with Add-on	Linear	A	F	
			Add-on	None	None	
		5-digit with Add-on	Linear	A	F	
			Add-on	None	None	
		EAN-8	Without add-on		B	FF
	2-digit with Add-on		Linear	B	FF	
			Add-on	None	None	
	5-digit with 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
			2-digit with Add-on	Linear	V	A	V	A
				Add-on	None	None	None	None
			5-digit with Add-on	Linear	V	A	V	A
				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
			2-digit with Add-on	Linear	V	A	V	F
				Add-on	None	None	None	None
			5-digit with Add-on	Linear	V	A	V	F
				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
			2-digit with Add-on	Linear	V	C	V	E
				Add-on	None	None	None	None
			5-digit with Add-on	Linear	V	C	V	E
				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
			2-digit with Add-on	Linear	V	B	V	FF
				Add-on	None	None	None	None
			5-digit with Add-on	Linear	V	B	V	FF
				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
2-D code	QR code		P01	Qm		
	QR code (Split mode)	Edit mode	P01	Qm		
		Batch edit mode	P01	Qm		
		Non-edit mode	P01	S (Note 4)		
	Micro QR code		P01	Q (Note 4)		
	SQRC		Q	Q (Note 4)		
	iQR code		G	Qm		
	iQR code (Split mode)	Edit mode	G	Qm		
		Non-edit mode	S	S		
	MaxiCode		P02	Um		
	PDF417		X	L0		
	MicroPDF417		X	L0		
	Data Matrix	Square	P00	dm		
Rectangular		P00	dm			
Aztec		z	zm			
Barcode	UPC-A	Without add-on		A	X0	
		2-digit with Add-on	Linear	A	X3	X0
			Add-on	None	None	X1 (Note 2)
		5-digit with Add-on	Linear	A	X3	X0
	Add-on		None	None	X2 (Note 2)	
	UPC-E	Without add-on		A	X0	
		2-digit with Add-on	Linear	A	X3	X0
			Add-on	None	None	X1 (Note 2)
		5-digit with Add-on	Linear	A	X3	X0
	Add-on		None	None	X2 (Note 2)	
	EAN-13	Without add-on		A	E0	
		2-digit with Add-on	Linear	A	E3	E0
			Add-on	None	None	E1 (Note 2)
		5-digit with Add-on	Linear	A	E3	E0
	Add-on		None	None	E2 (Note 2)	
	EAN-8	Without add-on		A	E4	
		2-digit with Add-on	Linear	A	E5	E4
			Add-on	None	None	E1 (Note 2)
		5-digit with Add-on	Linear	A	E6	E4
	Add-on		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	
			2-digit with Add-on	Linear	T	A	]X3	]X0
				Add-on	None	None	None	]X1 (Note 2)
			5-digit with 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	
			2-digit with Add-on	Linear	T	A	]E3	]E0
				Add-on	None	None	None	]E1 (Note 2)
			5-digit with 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	
			2-digit with Add-on	Linear	T	A	]X3	]X0
				Add-on	None	None	None	]X1 (Note 2)
			5-digit with 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	
			2-digit with Add-on	Linear	T	A	]E5	]E4
				Add-on	None	None	None	]E1 (Note 2)
			5-digit with 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” (Modifier character)	Option
2-D 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 pair	
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)
	Code 39 Code 39 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)
	Code 128	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 5 with option “Scanning enabled, with a check digit (Check digit transmission disabled)” is “J13”.

J: Flag character (ASCII 93h)

1: 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 transmission 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 (0-9)
  - n2: hundreds (0-9)
  - n3: tens (0-9)
  - n4: units (0-9)
- Two-digit (2-byte) transmission
  - n1: tens (0-9)
  - n2: units (0-9)

## (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 byte 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 10.5](#) for details on enabling conversion to GTIN format.)

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

0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D

0: Padding character for adjustment of the data length

S: Number system character

## UPC-A with 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 [\(5\) Code Mark](#).)

You can also select whether or not to convert to GTIN format. (Refer to [Section 10.5](#) for details on enabling conversion to GTIN format.)

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

2-digit with Add-on:

0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D X<sub>11</sub> X<sub>12</sub>

5-digit with Add-on:

0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D X<sub>11</sub> X<sub>12</sub> X<sub>13</sub> X<sub>14</sub> X<sub>15</sub>

0: Padding character for adjustment of the data length

S: Number system character

X<sub>11-15</sub>: 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 10.5](#) 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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> C/D

- Conversion to UPC-A enabled

X<sub>6</sub>=0-2 0 S X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D

X<sub>6</sub>=3 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D

X<sub>6</sub>=4 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D

X<sub>6</sub>=5-9 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 X<sub>6</sub> C/D

0: Padding character for adjustment of the data length

S: Number system character

## UPC-E with 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 [\(5\) Code Mark.](#))

You can also select whether or not to convert to GTIN format and UPC-A. (Refer to [Section 10.5](#) for details on enabling conversion to GTIN format.)

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

2-digit with Add-on:

- Conversion to UPC-A disabled

0 X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub>

- Conversion to UPC-A enabled

X<sub>6</sub>=0-2 0 S X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub>

X<sub>6</sub>=3 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub>

X<sub>6</sub>=4 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub>

X<sub>6</sub>=5-9 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 0 X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub>

5-digit with Add-on:

- Conversion to UPC-A disabled

0 X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub>

- Conversion to UPC-A enabled

X<sub>6</sub>=0-2 0 S X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub>

X<sub>6</sub>=3 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub>

X<sub>6</sub>=4 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub>

X<sub>6</sub>=5-9 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 0 X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub>

0: Padding character for adjustment of the data length

S: Number system character

X<sub>7-11</sub>: Add-on code data

## EAN-13

You can select whether or not to transmit the two prefix characters “P<sub>1</sub>” and “P<sub>2</sub>” 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 10.5](#) 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<sub>1</sub> P<sub>2</sub> P<sub>3</sub> X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> C/D

P<sub>n</sub>: Prefix character

- Conversion to ISBN/ISSN format enabled

ISBN format

X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> C/D(\*1)

ISSN format

X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> C/D(\*1)

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

### EAN-13 with 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 [\(5\) Code Mark.](#))

You can also select whether or not to convert to GTIN format. (Refer to [Section 10.5](#) for details on enabling conversion to GTIN format.)

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

2-digit with Add-on:

P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> C/D X<sub>10</sub> X<sub>11</sub>

5-digit with Add-on:

P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> C/D X<sub>10</sub> X<sub>11</sub> X<sub>12</sub> X<sub>13</sub> X<sub>14</sub>

P<sub>n</sub>: Prefix character

X<sub>10-14</sub>: 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 10.5](#) 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<sub>1</sub> P<sub>2</sub> P<sub>3</sub> X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> C/D

- Conversion to EAN-13 enabled

0 0 0 0 0 P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> C/D

P<sub>n</sub>: Prefix character

### EAN-8 with Add-on

If the scanner is set to “Code mark type: Type 4,” and 2Code 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 [\(5\) Code Mark.](#))

You can also select whether or not to convert to GTIN format. (Refer to [Section 10.5](#) for details on enabling conversion to GTIN format.)

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

2-digit with Add-on:

P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> C/D X<sub>5</sub> X<sub>6</sub>

5-digit with Add-on:

P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> C/D X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub>

P<sub>n</sub>: Prefix character

X<sub>5-9</sub>: 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 10.5](#) 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 10.5](#) 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 10.4 \(5\)](#))

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 10.4 \(5\)](#))

### UPC/EAN Composite with Add-on

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 10.4 \(5\)](#))

### GS1-128 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” 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 10.4 \(5\)](#))

## 10.5 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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> 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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> 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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D (\*2)

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

#### UPC-A with Add-on

- Scanned data

2-digit with Add-on:

0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D X<sub>11</sub> X<sub>12</sub>

5-digit with Add-on:

0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D X<sub>11</sub> X<sub>12</sub> X<sub>13</sub> X<sub>14</sub> X<sub>15</sub>

0: Padding character for adjustment of the data length

S: Number system character

X<sub>11-15</sub>: Add-on code data

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

2-digit with Add-on:

0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D X<sub>11</sub> X<sub>12</sub> (\*1)

5-digit with Add-on:

0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D X<sub>11</sub> X<sub>12</sub> X<sub>13</sub> X<sub>14</sub> X<sub>15</sub> (\*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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D X<sub>11</sub> X<sub>12</sub> (\*2)

With 5-digit add-on:

PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> C/D X<sub>11</sub> X<sub>12</sub> X<sub>13</sub> X<sub>14</sub> X<sub>15</sub> (\*2)

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

## UPC-E

- Scanned data

0 X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> 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<sub>6</sub>=0-2 0 1 PI 0 0 X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D (\*1)

X<sub>6</sub>=3 0 1 PI 0 0 X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D (\*1)

X<sub>6</sub>=4 0 1 PI 0 0 X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D (\*1)

X<sub>6</sub>=5-9 0 1 PI 0 0 X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 X<sub>6</sub> 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<sub>6</sub>=0-2 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D (\*2)

X<sub>6</sub>=3 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D (\*2)

X<sub>6</sub>=4 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D (\*2)

X<sub>6</sub>=5-9 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 X<sub>6</sub> C/D (\*2)

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

## UPC-E with Add-on

- Scanned data

2-digit with Add-on:

0 X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub>

5-digit with Add-on:

0 X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub>

0: Padding character for adjustment of the data length

X<sub>7:11</sub>: Add-on code data

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

2-digit with Add-on:

X<sub>6</sub>=0-2 0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> (\*1)

X<sub>6</sub>=3 0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> (\*1)

X<sub>6</sub>=4 0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> (\*1)

X<sub>6</sub>=5-9 0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub> (\*1)

5-digit with Add-on:

X<sub>6</sub>=0-2 0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> (\*1)

X<sub>6</sub>=3 0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> (\*1)

X<sub>6</sub>=4 0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> (\*1)

X<sub>6</sub>=5-9 0 1 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> (\*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)

2-digit with Add-on:

X<sub>6</sub>=0-2 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> (\*2)

X<sub>6</sub>=3 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> (\*2)

X<sub>6</sub>=4 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> (\*2)

X<sub>6</sub>=5-9 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub> (\*2)

5-digit with Add-on:

X<sub>6</sub>=0-2 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>6</sub> 0 0 0 0 X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> (\*2)

X<sub>6</sub>=3 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> 0 0 0 0 0 X<sub>4</sub> X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> (\*2)

X<sub>6</sub>=4 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> 0 0 0 0 0 X<sub>5</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> (\*2)

X<sub>6</sub>=5-9 PI 0 S X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> 0 0 0 0 X<sub>6</sub> C/D X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> (\*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.

### EAN-13 with Add-on

- Scanned data

2-digit with Add-on:

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

5-digit with 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)

2-digit with 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)

5-digit with 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)

2-digit with 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)

5-digit with 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.

### EAN-8 with Add-on

- Scanned data

2-digit with Add-on:

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

5-digit with 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)

2-digit with Add-on:

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

5-digit with Add-on:

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

(\*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)

2-digit with Add-on:

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

5-digit with Add-on:

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

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

### Interleaved 2 of 5 (14 digits)

- 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 EAN/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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> X<sub>12</sub> 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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> X<sub>12</sub> 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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> X<sub>12</sub> C/D

### GS1-128

- Scanned data

0 1 PI X<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> X<sub>12</sub> X<sub>13</sub> 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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> X<sub>12</sub> X<sub>13</sub> 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<sub>1</sub> X<sub>2</sub> X<sub>3</sub> X<sub>4</sub> X<sub>5</sub> X<sub>6</sub> X<sub>7</sub> X<sub>8</sub> X<sub>9</sub> X<sub>10</sub> X<sub>11</sub> X<sub>12</sub> X<sub>13</sub> C/D

# Chapter 11 Image Capture Function

## 11.1 Function Outline

The GT20Q-SM 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 WVGA, 1/4 WVGA and 1/16 WVGA. When 1/4 WVGA or 1/16 WVGA is selected, users can select whether to enlarge the image to fit the screen, or to extract the center portion of the full screen (1/16WVGA).

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 (1/16 WVGA)” 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 WVGA in bitmap format and 1/4 WVGA 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 utilized when the USB keyboard interface is selected.

## 11.2 Specifications

### (1) Output Format

BMP or JPEG

### (2) Image Size

Image Size	No. of Pixels	BMP	JPEG	Image Output Area
Standard WVGA	752 x 480	✓	✓	Full screen
1/4 WVGA	376 x 240	✓	✓	Full screen/Screen center
1/16 WVGA	188 x 120	✓	✓	Full screen/Screen center
Thumbnail (1/64 WVGA)	94 x 60	✓	×	Full screen
Thumbnail (1/4 WVGA)	376 x 240	×	✓	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 WVGA
2	1/4 WVGA
4	1/16 WVGA

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 WVGA BMP thumbnail transmission
2	1/4 WVGA 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 WVGA BMP files, 1/4 WVGA 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 speed 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)

This shows the standard speed of image capture, conversion and transmission when the interface is set to “RS-232C (Transmission Speed 115200 bps),” or “USB-COM.” The transmission time will differ depending on the host’s settings and the performance of the host computer.

Image type	Output format	Image file size	Transmission time	
			RS-232C	USB-COM
Standard WVGA	BMP	353 KB	32.5 s	3.5 s
1/4 WVGA	BMP	89.2 KB	8.2 s	1.4 s
1/16 WVGA	BMP	23.1 KB	2.5 s	0.5 s
Thumbnail(1/64 WVGA)	BMP	6 KB	1 s	0.3 s
Thumbnail (1/4 WVGA)	JPEG	4.8 KB	0.8 s	0.2 s
Standard WVGA	JPEG	25 KB*	3.8 s	0.8 s

\* As the image will undergo compression and conversion when JPEG format is selected, the file size will change depending on the photo image (approx. 10-40 KB, typically around 25 KB) The compression rate cannot be set.

## Chapter 12 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
Data verification mode	Regular scanning mode	✓	<a href="#">Section 8.1</a>
	n-point verification mode		
	2-point verification mode		
Data edit mode	Unedited	✓	<a href="#">Section 8.2</a>
	Data extraction mode		
	Data conversion mode		
	Block sorting mode		
	ADF script mode		
Point scan mode	Enabled		<a href="#">Section 8.4</a>
	Disabled	✓	
Double scan prevention time	Double scan enabled		<a href="#">Chapter 4</a>
	Double scan prevention time Set range 0.1-9.9 s	1 s	

### (2) Interface Settings

Settings	Parameters	Default	Refer to
Interface	RS-232C Interface	✓ (Note 1)	<a href="#">Chapter 10</a>
	USB-COM Interface	✓ (Note 1)	
	USB Keyboard Interface (Note 2)		

: Only available via configuration software.

Note 1: RS-232C or USB-COM are auto-detected via the interface cable.

Note 2: Configuration software (ScannerSetting\_2D) cannot be utilized when the USB keyboard interface is selected.

### (3) Specifying Communications Parameter for the RS-232C Interface

Only available when set to the RS-232C interface.

Settings	Parameters	Default	Refer to
Communication procedures	Non-acknowledge mode	✓	<a href="#">Section 10.1 (1)</a>
	ACK/NAK mode		
Transmission speed	4800 bps		<a href="#">Section 10.1 (3)</a>
	9600 bps		
	19200 bps		
	38400 bps	✓	
	57600 bps		
	115200 bps		
Word length	7 bits		<a href="#">Section 10.1 (4)</a>
	8 bits	✓	
Parity	Odd number		
	Even number		
	None	✓	
Stop bit	1 bit	✓	
	2 bits		
CTS signal control	Controlled		<a href="#">Section 10.1 (1)</a>
	Not controlled	✓	
CTS signal monitoring time	0.1-9.9 s	2 s	<a href="#">Section 10.1 (1)</a>
ACK/NAK response verification time	0.1-9.9 s	1 s	
RTS signal control procedure	Scanner ready mode	✓	<a href="#">Section 10.1 (2)</a>
	Data ready mode		

### (4) Specifying Communications Parameter for the USB-COM Interface

Only available when set to the USB-COM interface.

Settings	Parameters	Default	Refer to
Communication procedures	Non-acknowledge mode	✓	<a href="#">Section 10.2</a>
	ACK/NAK mode		
CTS signal control	Controlled		<a href="#">Section 10.2</a>
	Not controlled	✓	
CTS signal monitoring time	0.1-9.9 s	2 s	<a href="#">Section 10.2</a>
ACK/NAK response verification time	0.1-9.9 s	1 s	
Remote wakeup	Enabled	✓	<a href="#">Section 10.2</a>
	Disabled		

: Only available via configuration software.

## (5) Specifying Communications Parameter for the USB Keyboard Interface

Only available when set to the USB keyboard interface.

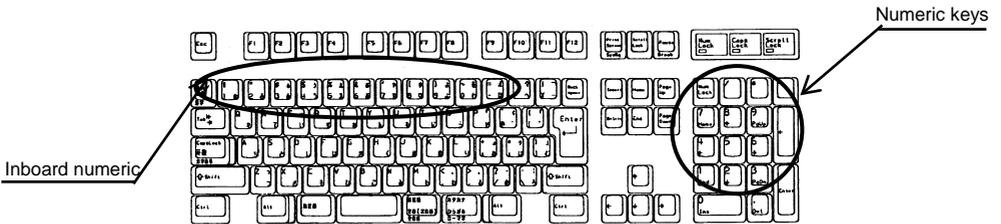
Settings	Parameters	Default	Refer to
CAPS mode	Manual	✓	<a href="#">Section 10.3 (1)</a> (Note 1)
	Automatic		
CAPS LOCK setting	CAPS LOCK OFF	✓	<a href="#">Section 10.3 (1)</a> (Note 1)
	CAPS LOCK ON		
Keyboard type	U.S English (101 Keyboard)		<a href="#">Section 10.3 (2)</a>
	Germany (102 Keyboard)		
	French (102 Keyboard)		
	U.K. English (102 Keyboard)		
	Italian (102 Keyboard)		
	Swedish (102 Keyboard)		
Numerical data (0-9) transmission format	Inboard numeric keys	✓	<a href="#">Section 10.3 (3)</a> (Note 3)
	Numeric keys		
Binary data conversion (Note 2)	None (ASCII conversion)	✓	<a href="#">Section 10.3 (4)</a>
	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.



(Example) Japanese (106 Keyboard)

Settings	Parameters	Default	Refer to
Special key transmission mode	Enabled		(Note 4)
	Disabled	✓	
Data transmission interval	1 ms		<a href="#">Section 10.3 (5)</a>
	5 ms		
	10 ms	✓	
	15 ms		
	30 ms		
	50 ms		
	100 ms		
Remote wakeup	Enabled	✓	<a href="#">Section 10.3 (6)</a>
	Disabled		

: Only available via configuration software.

Note 4: 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 E5h 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

## (6) Customizing Data Transmission Formats Common to All Interfaces

Settings	Parameters	Default	Refer to
Code mark transmission	Transmission enabled		<a href="#">Section 10.4</a>
	Transfer disabled	✓	
Code mark addition position	Before the prefix		<a href="#">Section 10.4</a>
	After the prefix	✓	
Code mark types	Type1 (DENSO1)	✓	<a href="#">Section 10.4 (5)</a>
	Type2 (DENSO2)		
	Type3		
	Type4		
	User selection		
Code mark output mode	Coupling	✓	<a href="#">Section 10.4 (5)</a>
	Separating		
Digit transmission (excluding UPC/EAN Code)	4-digit transmission enabled		<a href="#">Section 10.4 (6)</a>
	2-digit transmission enabled		
	Transfer disabled	✓	
Prefix transmission	Transmission enabled		<a href="#">Section 10.4 (3)</a>
	Transfer disabled	✓	
Suffix transmission	Transmission enabled		<a href="#">Section 10.4 (3)</a>
	Transfer disabled	✓	
Scanner ID output	Transmission enabled		<a href="#">Section 10.4 (2)</a>
	Transfer disabled	✓	
GTIN format conversion	Enabled		<a href="#">Section 10.5</a>
	Disabled	✓	
UPC/EAN/Interleaved 2 of 5 (14 digits) → GTIN format conversion type	Conversion to 16 digits	✓	
	Conversion to 14 digits		
	Conversion disabled		
GTIN Format GS1 DataBar/GS1-128 → EAN/JAN conversion type	Conversion to 14 digits	✓	
	Conversion to 13 digits		
	Conversion disabled		
UPC/EAN/Interleaved 2 of 5 (14 digits) → GTIN conversion with PI added	0-9	0	

 : Only available via configuration software.

### (7) Customizing Data Transmission Formats for the RS-232C/USB-COM Interface

Settings	Parameters	Default	Refer to
Header	None	✓	<a href="#">Section 10.4 (1)</a>
	STX		
	User selection		
Terminator	None		
	ETX		
	CR	✓	
	LF		
	CR LF		
	User selection		
BCC transmission	Transmission enabled		<a href="#">Section 10.4 (4)</a>
	Transfer disabled	✓	

: Only available via configuration software.

**(8) Customizing Data Transmission Formats for the USB Keyboard Interface**

Settings	Parameters	Default	Refer to
Header	None	✓	<a href="#">Section 10.4 (1)</a>
	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.

## (9) Specifying 2D Codes, Mirror Images, Black-and-white Inverted Codes, and SQRC

Settings	Parameters	Default	Refer to
Mirror image 2D code scanning	Enabled		<a href="#">Section 8.5</a>
	Disabled	✓	
Black-and-white inverted code scanning	Black-and-white normal code	✓	<a href="#">Section 8.6</a>
	Black-and-white inverted code		
	Black-and-white auto-detect		
Split QR Code scanning	Edit mode	✓	<a href="#">Section 8.7</a>
	Batch edit mode		
	Non-edit mode		
QR Code scanning	Enabled	✓	(Note 1)
	Disabled		
Micro QR Code Scanning	Enabled	✓	<a href="#">Section 13.2</a>
	Disabled		
PDF417 scanning	Enabled	✓	
	Disabled		
MicroPDF417 scanning	Enabled		
	Disabled	✓	
MaxiCode scanning	Enabled	✓	<a href="#">Section 13.2</a>
	Disabled		
Data Matrix (Square) scanning	Enabled	✓	<a href="#">Section 13.2</a>
	Disabled		
Data Matrix (Rectangular) scanning	Enabled	✓	(Note 2)
	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)		<a href="#">Section 8.9</a>	
	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			
iQR Code (square) scanning	Scanning enabled			
	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 8.7	
	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) Customizing Barcode

### UPC-A/E, EAN-13/8

Settings	Parameters	Default	Refer to	
UPC-A, EAN-13 scanning	Enabled	✓	<a href="#">Section 10.4</a> and <a href="#">Section 13.2</a>	
	Disabled			
UPC-A C/D transmission	Transmission enabled	✓	Section 10.4	
	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	✓		<a href="#">Section 10.4</a> (Note 1)
	Transmission disabled			
EAN-13 ISBN/ISSN conversion	Conversion enabled		Section 10.4	
	Conversion disabled	✓		
UPC-E Code scanning	Enabled	✓		
	Disabled			
UPC-E C/D transmission	Transmission enabled	✓		
	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	✓	<a href="#">Section 10.4</a> and <a href="#">Section 13.2</a>
	Disabled		
EAN-8 C/D transmission	Transmission enabled	✓	Section 10.4
	Transfer disabled		
EAN-8 EAN-13 conversion	Conversion enabled		
	Conversion disabled	✓	
UPC/EAN with Add-on 2-digit scanning	Enabled		
	Disabled	✓	
UPC/EAN with Add-on 5-digit scanning	Enabled		
	Disabled	✓	
UPC/EAN with Add-on only scanning	Enabled		
	Disabled	✓	
UPC/EAN with Add-on check level	Disabled	✓	
	Settings range - level 1-4		

#### Interleaved 2 of 5

Settings	Parameters	Default	Refer to
Interleaved 2 of 5 scanning	Scanning enabled (without check digit)	✓	<a href="#">Section 13.2</a>
	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	

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	3-99 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)	✓	<a href="#">Section 13.2</a>
	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)	✓	<a href="#">Section 13.2</a>
	Transmission enabled (A/B/C/D)		
	Disabled		
Codabar (NW-7) check digit calculation method	MOD-16	✓	
	7 Check		

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)	✓	<a href="#">Section 13.2</a>
	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		<a href="#">Section 13.2</a>
	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	✓	<a href="#">Section 13.2</a> (Note 2)
	Disabled		
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		
	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		
	Convert to GS and transmit	✓	
	User selection		

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		<a href="#">Section 13.2</a>
	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		Section 13.2 (Note 1)
	Disabled	✓	
GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional scanning	Enabled		
	Disabled	✓	
GS1 DataBar Limited scanning	Enabled (ISO/IEC24724: 2006)		
	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		
	Convert to GS and transmit	✓	
	User selection		
GS1 Composite scanning	Enabled		Section 13.2 (Note 2)
	Disabled	✓	
GS1 DataBar Composite (with CC-A) scanning	Enabled		
	Disabled	✓	
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		
	Disabled	✓	
GS1-128 Composite (with CC-B) scanning	Enabled		
	Disabled	✓	
GS1-128 Composite (with CC-C) scanning	Enabled		
	Disabled	✓	

: Only available via configuration software.

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.



Configuring multi-line barcode scanning

Settings	Parameters	Default	Refer to
Multi-line barcode scanning	Enabled		<a href="#">Section 8.8</a>
	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	
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

Settings	Parameters	Default	Refer to
Trigger switch control	Auto-off mode	✓	<a href="#">Section 6.1</a>
	Momentary switching mode		
	Momentary switching mode (reverse type)		
	Alternate switching mode		
	Continuous reading mode 1		
	Continuous reading mode 2		
	Auto sensing mode		<a href="#">Section 6.3</a>
Auto stand mode			
Auto-off mode scanning mode	Normal	✓	<a href="#">Section 6.1</a>
Auto-off mode (one-shot) scanning enabled time	One-shot		
	1 s		
	2 s		
	3 s		
	4 s		
5 s	✓		
Auto stand mode to auto sensing mode switching method	Manual		<a href="#">Section 6.3</a>
	Automatic	✓	
Auto stand mode to auto sensing mode switching time	1 s		<a href="#">Section 6.3</a>
	2 s	✓	
	3 s		
	4 s		
	5 s		
	6 s		
	7 s		
	8 s		
9 s			
Error transmission when scanning fails	“ERROR” transmission enabled		<a href="#">Section 6.1</a>
	Transmission disabled	✓	
Scanner sensitivity level in auto sensing mode	High		<a href="#">Section 6.3</a>
	Standard	✓	
	Low		
USB-COM interface/USB keyboard interface switching when turning power on	Enabled	✓	<a href="#">Section 6.1</a>
	Disabled		

: Only available via configuration software.

Settings	Parameters	Default	Refer to
Magic key control	Scanning code switching function		<a href="#">Chapter 7</a>
	Data retransfer function		
	Specific character transfer function		
	Scanning active/ready switching function		
	Marker switching function		
	Barcode reader mode switching function		
	Auto sensing mode switching function		
No function assigned	✓		

 : Only available via configuration software.

## (12) Beeper, Indicator LED, Vibrator, Marker, Illumination Light

Settings	Parameters	Default	Refer to
Beeper sound	Enabled	✓	<a href="#">Section 9.1</a>
	Disabled		
Beeper tone	Low (approx. 2.5 kHz)		
	Medium (approx. 3.0 kHz)	✓	
	High (approx. 3.5 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	✓	<a href="#">Section 9.2</a>
	Disabled		
Vibrator	Vibrates when “OK”	✓	<a href="#">Section 9.3</a>
	Vibrates when “NG”		
	Vibration disabled		
Marker illumination	Marker-off mode		<a href="#">Section 9.4</a>
	Standard marker mode	✓	
	Marker-on mode		
Illumination light (LED)	Disabled		<a href="#">Section 9.5</a>
	Enabled	✓	
Illumination light (LED) ECO mode	Enabled (Note 1)	✓	<a href="#">Section 9.5</a>
	Disabled		

: Only available via configuration software.

Note 1: As the brightness of the illumination LED is restricted, users will need to scan at close proximity in dark areas.

### (13) Specifying Data Verification and Data Editing Conditions

Settings	Parameters	Default	Refer to
Scan lock	Enabled		<a href="#">Section 8.1</a>
	None	✓	
Data verification mode verification target	Data string verification	✓	
	Data block verification		
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)	<a href="#">Section 8.2</a>
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		
	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	<a href="#">Section 8.2</a>
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, 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		

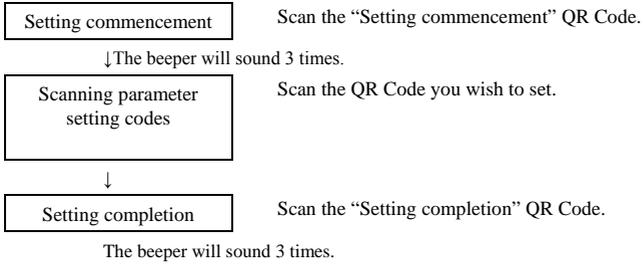
: Only available via configuration software.

Note 2: For more details on AI, refer to [Chapter 8, “8-2-1-3 \(3\) AI Table.”](#)

## Chapter 13 QR-coded Parameter Menu

---

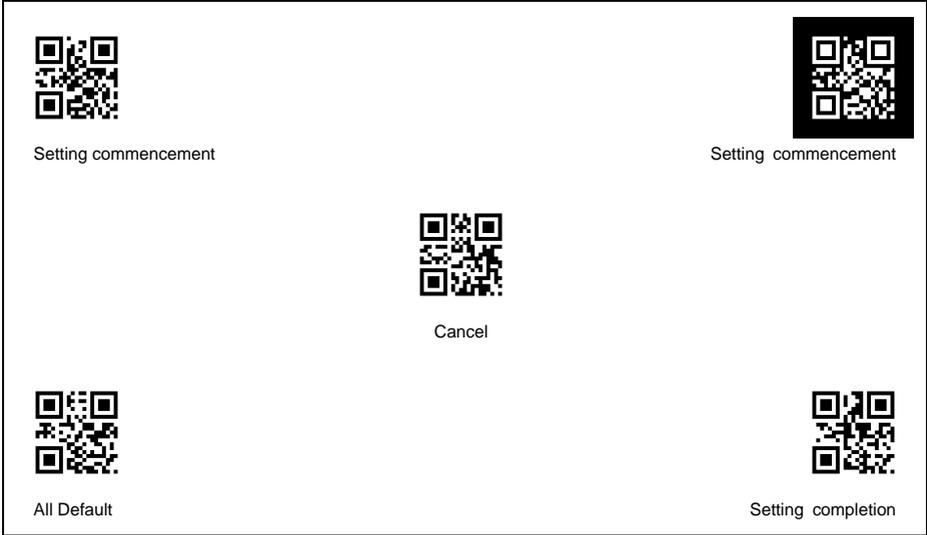
### 13.1 Setting Methods via the QR-coded Parameter Menu



Setting to “All default” will return all parameters to default settings. The default is indicated with < > in the QR-coded parameter menu.

## 13.2 QR-coded Parameter Menu

### ■ Setting Commencement, Setting Completion, Defaults



The following setting can be made just by scanning the QR code with these parameters, 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

■ Specifying Communications Parameter for the RS-232C Interface

Communication procedures

 <Non-acknowledge mode>	 ACK/NAK mode
---	---

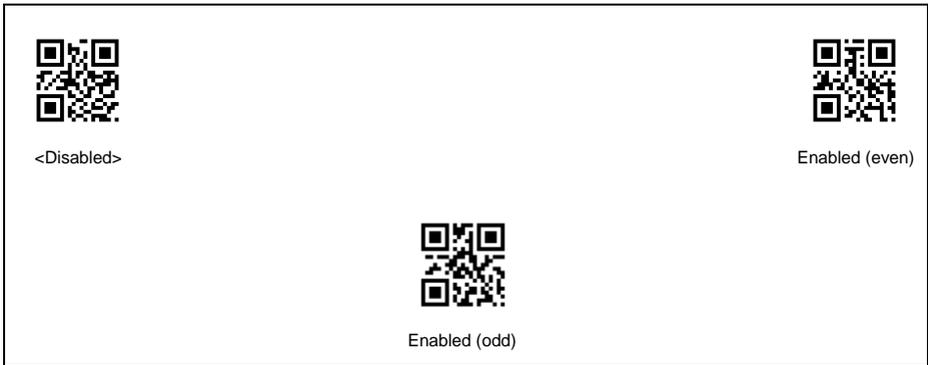
Transmission speed

 4800 bps	 9600 bps
 19200 bps	 <38400 bps>
 57600 bps	 115200 bps

Word length

 7 bits	 <8 bits>
---	---

## Parity



## Stop bit



## ■ Specifying USB Interface



■ Specifying Communications Parameter for the USB-COM Interface

Communication procedure (USB-COM interface)

 <Non-acknowledge mode>	 ACK/NAK mode
---	---

Header (USB-COM interface)

 <Disabled>	 STX
---	--

Terminator (USB-COM interface)

 Disabled	
 ETX	 <CR>
 LF	 CR LF

BCC transmission (USB-COM interface)

 <Disabled>	 Enabled
---	--

■ Specifying Communications Parameter for the USB keyboard Interface

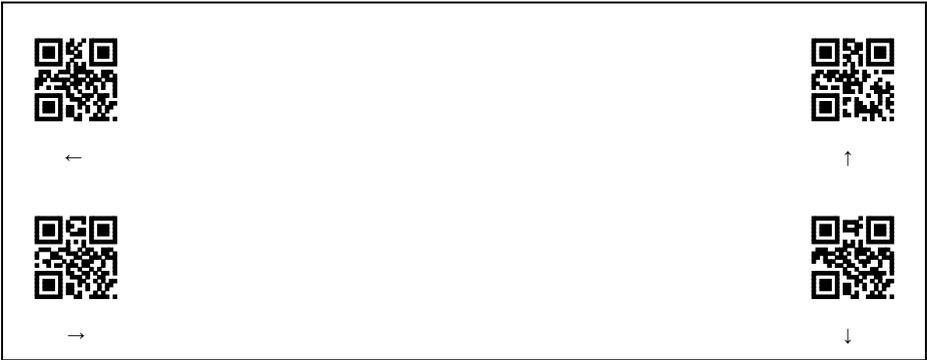
Binary data conversion

 <Disabled (ASCII conversion)>	 Binary conversion
 Kanji conversion	

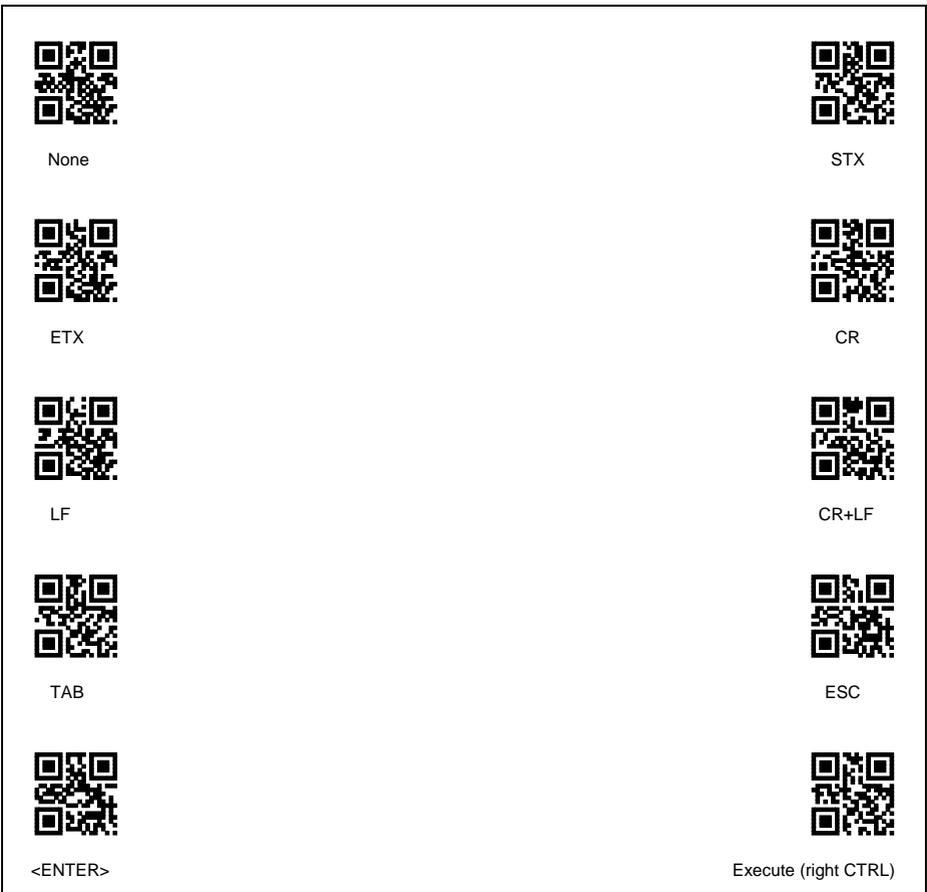
Header (USB keyboard interface)

 <Disabled>	 STX
 ETX	 CR
 LF	 CR+LF
 TAB	 ESC
 ENTER	 Execute (right CTRL)

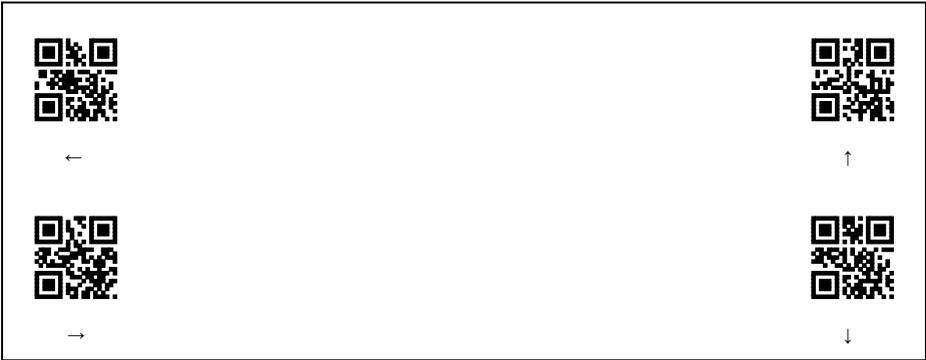
Header (USB keyboard interface)



Terminator (USB keyboard interface)



Terminator (USB keyboard interface)



■ Transmission Format

Code mark transmission



Digit no. transmission

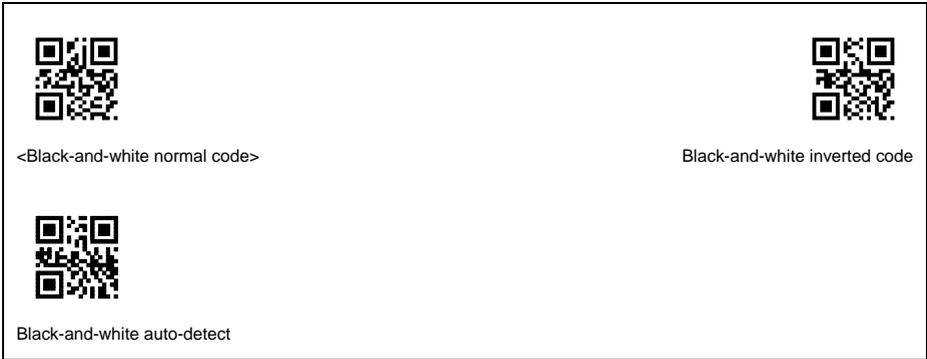


■ Specifying 2D Code, Black-and-white Inversion

Micro QR Code scanning



Black-and-white inverted code scanning



Split QR Code



PDF417 scanning



MaxiCode scanning

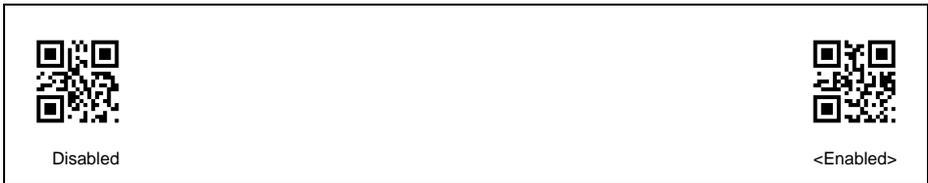


Data Matrix scanning

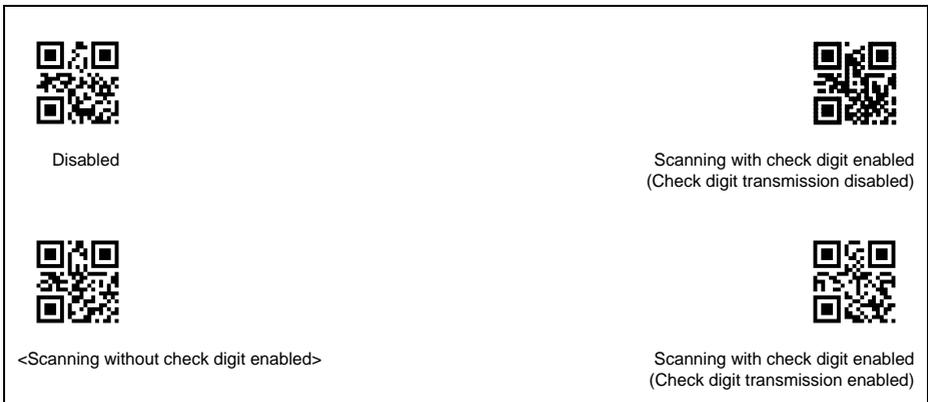


■ Scannable Barcode Settings

UPC-A, UPC-E, EAN-13, EAN-8 scanning



Interleaved 2 of 5 scanning



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

 <p data-bbox="128 239 212 263">&lt;Disabled&gt;</p>	 <p data-bbox="901 239 985 263">Enabled</p>
---	--

Code 93 scanning

 <p data-bbox="128 491 212 515">&lt;Disabled&gt;</p>	 <p data-bbox="901 491 985 515">Enabled</p>
---	--

GS1 DataBar scanning

 <p data-bbox="128 740 212 764">&lt;Disabled&gt;</p>	 <p data-bbox="901 740 985 764">Enabled</p>
---	--

GS1 Composite scanning

 <p data-bbox="128 1021 212 1045">&lt;Disabled&gt;</p>	 <p data-bbox="901 1021 985 1045">Enabled</p>
--	---

■ Other Settings

Trigger switch control

 <Auto-off mode>	 Alternate switching mode
 Momentary switching mode	 Momentary switching mode (reverse type)
 Continuous reading mode 1	 Continuous reading mode 2
 Auto sensing mode	 Auto stand mode

Beeper control

 Sound disabled	 <Sound enabled>
--	---

Indicator LED

 Illumination disabled	 <Illumination enabled>
--	---

Vibrator



<Vibrates when "OK">



Vibrates when "NG"



Vibration disabled

ECO mode



Disabled



<Enabled>

## 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 (USB-COM interface)

Things to check	Measures
Are the communications conditions of the computer and the scanner different?	Set the communications conditions to those of the computer.
Are you using a driver other than the Active USB-COM port driver produced by DENSO WAVE?	Use the Active USB-COM port driver produced by DENSO WAVE.

### Problem 4: The code data is not correctly displayed on the computer (USB keyboard interface)

Things to check	Measures
Is the computer's keyboard different from the keyboard type in the scanner settings?	Set the keyboard type to that used by the computer (this can be checked in the keyboard in the control panel).
Is the keyboard Caps Lock state different from that of the scanner?	Align the keyboard state and scanner settings.
Is the Kanji/Japanese syllabary character conversion functioning, preventing conversion to Latin characters/Japanese syllabary? Or, are characters being input as full-width?	Set the computer to single-byte alphanumeric input mode.
Are you using a driver other than the OS standard driver?	Use the OS standard driver.
Is the computer registering keyboard buttons as pressed?	Do not press keys during code scanning.

### Problem 5: The code data is not correctly displayed on the computer (RS-232C interface)

Things to check	Measures
Are the communications conditions of the computer and the scanner different?	Set the communications conditions to those of the computer.

## Appendix 1: Specifications

Articles		Specifications
Scanner	Scanning Code	QR code (model 1, model 2), micro QR code, SQRC <sup>(*1)</sup> , iQR, PDF417, MicroPDF417, MaxiCode, Data Matrix, Aztec, GS1 Composite, EAN-13/8, UPC-A/E, UPC/EAN with Add-on, Interleaved 2 of 5 (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
	Elevation angle	+/-50°
	Tilt angle	+/-50°
	Light source	LED (red)
	Scanning check	Blue LED, beeper, vibrator
Interface		RS-232C, USB-COM interface, USB keyboard interface
Input power supply	Operating power source voltage	DC 5 V +/-5%
	Power consumption (During auto-off mode)	Max. 500 mA
Environmental conditions	Operating temperature range	-20° to 50°C
	Operating humidity range	10%-90% RH <sup>(*3)</sup>
	Storage temperature range	-20° to 60°C
	Storage humidity range	5%-95% RH <sup>(*3)</sup>
	Operating illumination range	10,000 lx or below
External dimensions		73 × 92 × 184 mm
Weight		Approx. 180 g (excl. cable)

(\*1) Please contact separately when using SQRCs outside of Japan.

(\*2) Applies to QR Codes and Data Matrix.

(\*3) Ensure that the wet-bulb temperature remains at 30°C or less, and prevent rapid changes in temperature, condensation and frost.

## 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 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 the USB keyboard interface is selected.

Note 2: A command will not be initiated until the preceding command is completed.

Note 3: Up to one second is required after the host recognizes the virtual COM port in order for the scanner to be enabled to receive commands when using USB-COM interface.

### (1) Command only consist of the command field

Command	Direction		Contents
	Scanner	← → Host	
Z (Note 1) (Note 2)	←		Scanning standby
READOFF	←		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” of “LOFF” command.
LOFF	←		
R (Note 1)	←		Scanning start
READON	←		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” of “LON” command.
LON	←		
B1 B2 B3 (Note 3) (Note 4)	←		<p>Beeper</p> <p>It beeps in the specified time within 100 ms after the command is received.</p> <p>Beeper can be operated even if it is disabled or if the scanner is in the standby mode.</p> <p>B1: Beeps for approx. 80 ms, 60 ms, 120 ms, or 140 ms.</p> <p>B2: Beeps for approx. 120 ms.</p> <p>B3: Beeps for approx. 240 ms.</p>
BH1, BM1, BL1 BH2, BM2, BL2 BH3, BM3, BL3 (Note 3) (Note 4)	←		<p>Buzzer sound (tone specification)</p> <p>By adding a tone option to the above command, the buzzer can be sounded in various tones.</p> <ul style="list-style-type: none"> <li>· Tone options</li> </ul> <p>“H”: Beeps in a high-pitch tone (3.5 kHz).</p> <p>“M”: Beeps in a medium-pitch tone (3.0 kHz).</p> <p>“L”: Beeps in a low-pitch tone (2.5 kHz).</p>

Command	Direction	Contents
	Scanner ←→ Host	
LB (Note 3)	←	Blue LED indicator illumination The LED indicators illuminate in blue for approximately 500 ms within 100 ms after the command is received.
LG (Note 3)	←	Green LED indicator illumination The LED indicators illuminate in blue for approximately 500 ms within 100 ms after the command is received.
LR (Note 3)	←	Red LED indicator illumination The LED indicators illuminate in blue for approximately 500 ms within 100 ms after the command is received.
VO (Note 3)	←	Vibration The vibrator vibrates for approximately 180 ms within 100 ms after the command is received.
U1 U2 U3 U4 U5 U6 U7 U8	←	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 “U6” Auto sensing mode “U7” Auto stand mode “U8” Momentary switching mode (reverse type)
PW (Note 5)	←	Parameter storage The values set with commands U1 to U8 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: er.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 function enable Enables trigger switch control.
TMOFF (Note 6)	←	Trigger switch function disable Disables trigger switch control, and scanner enters Ready state.

Command	Transmission orientation	Contents
	Scanner ←→ Host	
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 <a href="#">Chapter 11</a> for details.

Note 1: Operation is not guaranteed if any command other than the above is transmitted to scanner.

Note 2: 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 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: When the trigger switch is pulled in the scanning standby mode, the LED may momentarily light up. However, scanning is not allowed.

Note 5: 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 6: This can only be used when data verification scanning is not set.

Note 7: The next command operation is not performed until the current operation is complete.

Note 8: In order to enable command receipt, up to one second is required after the host recognizes the virtual COM port when using the USB-COM interface.

Note 9: This cannot be used when using the USB keyboard interface. (See [section 3.2.2](#).)

Note 10: 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.

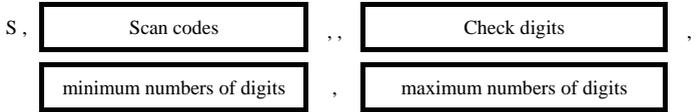
**(2) Commands consist of the command field and the option fields**

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**

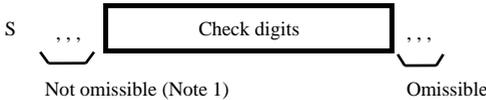


Each option must delimit by a comma.

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



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,

- “San 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 <sup>(Note 2)</sup>	H99
I	Interleaved 2 of 5 (ITF)	I	I4 <sup>(Note 3)</sup>	I99
N	Codabar (NW-7)	N	N4 <sup>(Note 4)</sup>	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 single reading.

Note 3: The minimum number of digits is four for multiple reading, two for single 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.

**Example**

S,ANL

- Readable code: UPC-A, UPC-E, EAN-8, EAN-13, Codabar (without check digit), Code 93
- Readable number of digits: Default

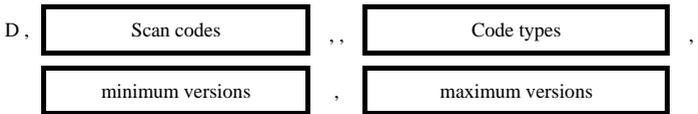
S,INM,,NM,,I10N5,I20N12

- Readable code: Interleaved 2 of 5 (without check digit), Codabar (NW-7) (Check digit disabled), 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)

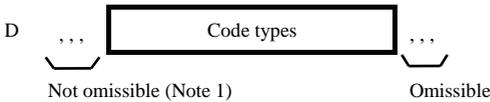
**■Format of the command option field of the command D**



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**



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,

- “San 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						
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

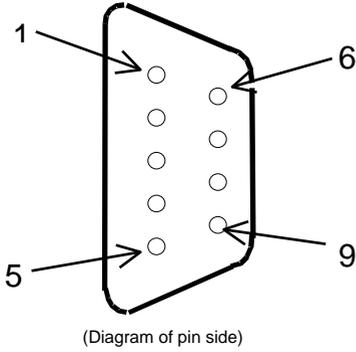
D,QZ,,QLQS,,Q14QM1Z08ZR4,Q20QM2Z08

- 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: Interface Specifications

## ■ RS-232C Interface

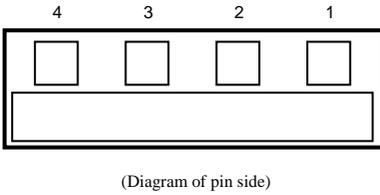
D-sub 9-pin socket type



Pin number	Terminal name
1	N.C.
2	TxD
3	RxD
4	Short to pin 6
5	GND
6	Short to pin 4
7	CTS
8	RTS
9	N.C.

## ■ USB Interface

USB plug type A connector



Pin number	Terminal name
1	DC 5 V
2	D-
3	D+
4	GND

2D code handy scanner

GT20Q-SM

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