

DENSO

2D Code Handy Scanner

AT27Q-SB

User's Manual

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Preface

Thank you for using the AT27Q 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 handy 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 AT27Q 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

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
- Free exhibition and event information for new products
- Free web-information service “QBdirect”

QBdirect Service Contents

| | |
|----------------------------------|--|
| Information search service (FAQ) | Offers detailed information on each product. |
| Download service | Offers downloads of repair modules for the latest AT27Q 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.



WARNING

Alerts you to those conditions that could cause serious bodily injury or death if the instructions are not followed correctly.



CAUTION

Alerts you to those conditions that could cause minor bodily injury or substantial property damage if the instructions are not followed correctly.

Meaning of Symbols



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



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

CAUTION



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.

Handling the battery cartridge

Wrong handling of the battery cartridge could result in a heat, smoke, explosion, or fire. Be sure to observe the following.



- Never disassemble or heat the battery cartridge, nor put it into fire or water; doing so could cause battery-rupture or leakage of battery fluid, resulting in a fire or bodily injury.
- Do not carry or store the battery cartridge together with metallic ballpoint pens, necklaces, coins, hairpins, etc.
Doing so could short-circuit the terminal pins, causing the batteries to rupture or the battery fluid to leak, resulting in a fire or bodily injury.
- Never put the battery cartridge into a microwave oven or high-pressure container.
Doing so could cause the batteries to break, generate heat, rupture or burn.
- Avoid dropping the battery cartridge or letting it undergo any shock or impact.
Doing so could cause the batteries to break, generate heat, rupture or burn.
- Never charge the battery cartridge where any inflammable gases may be emitted; doing so could cause fire.
- If any abnormality is detected--smoking, abnormal odors, discoloration or deformation when the battery cartridge is in use, in storage or being charged, remove the battery cartridge from the scanner or charger.



- Only use the dedicated charger for charging the battery cartridge.
Using a different type of charger could cause battery-rupture or leakage of battery fluid and result in a fire, bodily injury, or serious damage to property.
- The battery cartridge contains strong alkaline liquid (electrolyte).
If battery liquid leaks from the battery cartridge and it gets into your eyes, rinse them with clean water thoroughly without rubbing and consult a doctor as soon as possible. Otherwise, you may damage your eyes.

⚠ CAUTION

Handling the scanner

Wrong handling of the battery cartridge could result in a heat, smoke, explosion, or fire. Be sure to observe the following

| | | |
|--|--|---|
|  | <ul style="list-style-type: none"> The scanner uses a laser light for indicating the scanning range. The intensity of laser light might be too low to inflict bodily injury. However, do not stare into beam. <p>The scanner complies with IEC 60825-1 Ed.2:2007.</p> <p>In accordance with Clause 5 and 6, IEC 60825-1, the following information is provided to the user:</p> <p>LASER LIGHT DO NOT STARE INTO BEAM CLASS 2 LASER PRODUCT</p> |  |
| <p>Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser light exposure.</p> | | |
|  | <ul style="list-style-type: none"> If smoke, abnormal odors or noises come from the scanner, immediately remove the battery cartridge 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 remove the battery cartridge and contact your nearest dealer. Failure to do so could cause fire or electrical shock. If you drop the scanner so as to affect the operation or damage its housing, remove the battery cartridge and contact your nearest dealer. Failure to do so could cause fire or electrical shock. Do not use the scanner where any inflammable gases may be emitted. Doing so could cause fire. Do not subject the scanning window of the scanner to direct sunlight for extended periods. Doing so could damage the scanner, resulting in a fire. Never bring any metals into contact with the terminals in connectors. Doing so could produce a large current through the scanner, resulting in heat or fire, as well as damage to the scanner. Stop charging if it cannot be completed within the specified time. Never put the scanner into a microwave oven or high-pressure container. Doing so could cause the batteries to break, generate heat, rupture or burn. | |
| <ul style="list-style-type: none"> Never use the scanner on the line voltage other than the specified level. Doing so could cause the charger to break or burn. | | |
|  | <ul style="list-style-type: none"> Use the dedicated battery cartridge only. Failure to do so could result in fire. | |

⚠ CAUTION

Handling the scanner

Wrong handling of the battery cartridge could result in a heat, smoke, explosion, or fire. Be sure to observe the following

| | |
|---|---|
|  Never disassemble | <ul style="list-style-type: none"> • Never disassemble or modify the scanner; doing so could result in an accident such as break or fire. Doing so could result in a fire or electrical shock. |
|  | <ul style="list-style-type: none"> • If you are not using the scanner for a long time, be sure to remove the battery cartridge for safety. Failure to do so could result in a fire. |
|  | <ul style="list-style-type: none"> • Do not put the scanner on an unstable or inclined plane. The scanner may drop, creating injuries. • Never put the scanner in places where there are excessively high temperatures, such as inside closed-up automobiles, or in places exposed to direct sunlight. Doing so could affect the housing or parts, resulting in a fire. • Avoid using the scanner in extremely humid areas, or where there are drastic temperature changes. Moisture will get into the scanner, resulting in malfunction, fire or electrical shock. • Do not place the scanner 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. • Never cover or wrap up the scanner in a cloth or blanket. Doing so could cause the unit to heat up inside, deforming its housing, resulting in a fire. Always use the scanner in a well-ventilated area. • Do not insert or drop foreign materials such as metals or anything inflammable through the openings (vents or scanning window) into the scanner. Doing so could result in a fire or electrical shock. • Do not scratch or modify the scanner. Doing so could damage the scanner, creating a fire hazard. • Do not put heavy material on the scanner, or allow the scanner to get pressed under heavy material. • Do not look into the light source from the scanning window or do not point the scanning window at other people's eyes. Eyesight may be damaged by direct exposure to this light. • Do not use the scanner if your hands are wet or damp. Doing so could result in an electrical shock. |

 **CAUTION**

Handling the scanner

Wrong handling of the battery cartridge could result in a heat, smoke, explosion, or fire. Be sure to observe the following

| | |
|--|--|
|  | <ul style="list-style-type: none">• Never use chemicals or organic solvents such as benzene and thinner to clean the housing. Do not apply insecticide to the scanner. Doing so could result in a marred or cracked housing, electrical shock or fire.• Do not use the scanner with anti-slip gloves containing plasticizer. The scanner housing may be broken, creating injuries, electrical shock, or fire. |
|  | <ul style="list-style-type: none">• When taking care of the scanner, remove the battery cartridge. Failure to do so could result in an electrical shock.• Do not drop the scanner. The housing may be broken, creating injuries. Using the scanner whose housing is broken could result in smoke or fire. Remove the battery cartridge from the scanner. Then contact your nearest dealer. |

Components Required

The scanner (AT27Q-SB) requires the following components that differ depending upon whether the communications adapter is used and which interface is selected.

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

Basic components

The table below lists the basic components required for the use of the communications adapter.

| | | |
|----------------------------|---------------------|-------------|
| (1) Scanner | AT27Q-SB | |
| (2) Communications adapter | BA11-RKU or BA20-RU | |
| (3) Charger | CH-AT10L | |
| (4) AC adapter | AD2-1005/3000 | For charger |

Components required for individual interfaces

- For RS-232C interface

| | | |
|-----------------------------|---------------|----------------------------|
| (5) RS-232C interface cable | CBBA-RS2000/9 | |
| (6) AC adapter | AD2-1005/3000 | For communications adapter |

- For RS-232C interface and communications adapter mounted in the charger

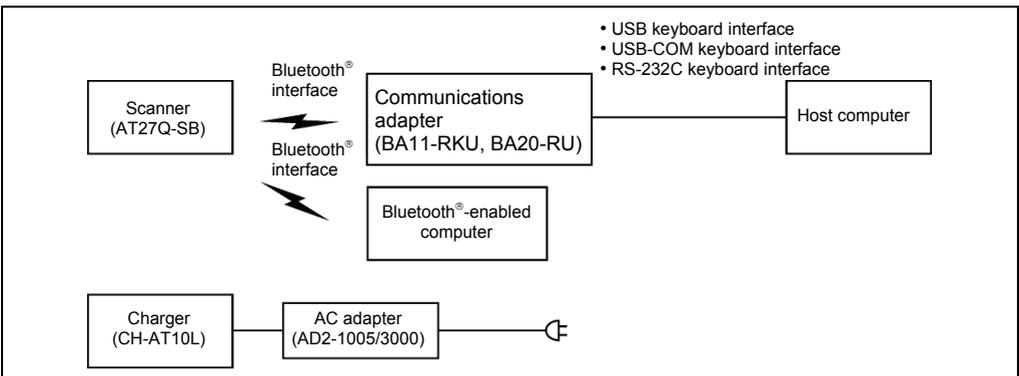
| | | |
|---|-----------------|--|
| (5) RS-232C interface cable, Charger built-in type | CBBA-RS2000/9-1 | |
|---|-----------------|--|

- For USB keyboard or USB-COM interface

| | | |
|-------------------------|---------------|--|
| (5) USB interface cable | CBBA-US2000/4 | |
|-------------------------|---------------|--|

■ When directly communicating with Bluetooth-enabled equipment (neither BA11-RKU nor BA20-RU is used)

| | | |
|----------------|---------------|-------------|
| (1) Scanner | AT27Q-SB | |
| (2) Charger | CH-AT10L | |
| (3) AC adapter | AD2-1005/3000 | For charger |



Bluetooth® Wireless Communication Link

The scanner AT27Q-SB uses Bluetooth® wireless networking technology.

| Item | Specifications |
|--|---|
| Standard | Bluetooth® Specification Ver. 2.1+EDR |
| Radio output | Class 2 (maximum 2.5 mW) |
| Profile(s) supported | SPP (Serial Port Profile), HID (Human Interface Device Profile) |
| Communications range (reference value*1) | Max. 10 m, with no obstructions |

*1 This value is for wireless networking between the scanner and the BA11-RKU communications adapter. The communications range varies with the equipment used and the operating environment.

Wireless networking requires a stable radio environment. Not all operating environments provide this. In particular, note that

- Using the scanner in close proximity to other wireless LAN equipment operating in the same frequency band (2.4 GHz) risks radio interference that can reduce throughput or even entirely block wireless networking.
- Microwave ovens, industrial heating equipment, high-frequency medical equipment, and other equipment using the 2.4 GHz band can sometimes block wireless networking.
- Electromagnetic noise from computers, refrigerators, and other home appliances can sometimes block wireless networking.
- The following environments can sometimes block wireless networking.
 - Metal objects or particles in the vicinity
 - Metal walls around the area
 - Excessive vibration
- The communications range of 10 m given above is merely a reference value assuming a clear line of sight. Reliable wireless networking is by no means guaranteed at 10 m for all combinations of equipment used and operating environments. Some combinations might even work for greater distances, but be sure to confirm that the scanner link operates properly before introducing the link operation.

NOTE: To System Designers:

- Before developing applications, make sure that the intended environment is free of the interference factors above and thus actually capable of supporting link operation.
- When introducing the scanner into an environment where equipment using radio waves in the 2.4 GHz band operates or when introducing such equipment after the introduction of the scanner, be sure to confirm that the scanner radio link operates properly with all equipment being in operation beforehand.
- If the environment of the radio communications system is changed after the introduction (e.g., newly installed household appliances and movement/addition of shelves or objects), then confirm that the radio link operates properly again before the actual use.

Care and Maintenance

■ Proper Care of the reading window

Dust or dirt accumulating on the clear plate of the code reading window will affect reading performance. If you use the scanner in dusty areas, therefore, 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 with a cotton swab or the similar soft one gently.
- 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.

Note

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

Chapter 1 Names and Functions

Built-in antenna

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

Indicator LED

Illuminates in blue when the scanner has read a code successfully.
Refer to Section 7.2 for details.
If any error occurs, this LED flashes in red.

Reading window

Bring this window to a code to be scanned.



Trigger switch

Press this switch to read data or initiate a Bluetooth® wireless link.

The following read modes are available to match the needs of the intended application.

- Auto-off mode
- Momentary switching mode
- Momentary switching mode (Reverse Type)
- Alternate switching mode
- Continuous reading mode 1
- Continuous reading mode 2
- Auto sensing mode
- Auto stand mode

(The factory default setting is auto-off mode.)

Refer to Chapter 5 for details.

- The Bluetooth® wireless link is disconnected by holding down the trigger switch. (Bluetooth® wireless link disconnection is set to enable when shipped from the factory.)

Beep hole

The beeper sounds when the scanner has read a code successfully.

Battery cover

Remove this cover to replace the battery cartridge.

Chapter 2 Bluetooth® Interface

For terms relating to Bluetooth® wireless communication in this manual, refer to Appendix 3 "Bluetooth® Glossary."

2.1 Enabling Bluetooth® Interface

Using the scanner for the first time requires scanning the "Start setting" and "Start operation" QR Code symbols given in Section 12.2 with the procedure in Section 12.1. Using the scanner when the "End operation" is selected requires scanning the "Start operation" QR Code symbol. Scanning those code symbols enables the Bluetooth® interface.

Note: Always disable this scanner's Bluetooth® interface in hospitals, aircraft, and other environments where the Bluetooth® radio waves (2400 to 2483.5 MHz, maximum 2.5 mW) present a potential safety risk.

This scanner interprets the "End operation" QR Code symbol as a command to disable the Bluetooth® interface.

Note: When the scanner leaves the factory or it has scanned the "End operation" QR Code (in Section 13.2), it no longer reads codes except the "Start operation" QR code, the "batch-process" QR code, and the barcode on the reverse side of the Communications adapter (BA series).

2.2 Establishing Bluetooth® Wireless Link

After enabling the Bluetooth® interface, establish a Bluetooth® wireless link between the scanner and the communications adapter (BA series) or some other Bluetooth® equipment using the following procedures. Both devices have slave as their default configuration.

The scanner can configure itself as both a slave (default) and master. To configure it as a slave, use the QR-coded parameter menu or configuration software (ScannerSetting_2D)*; to configure it as a master, it is necessary to specify the slave's Bluetooth® address to the scanner.

Tip: In addition to "As a master" and "As a slave" parameters, the configuration software provides a choice of "No slave/master configuration change" (see page 68) that prevents the Bluetooth® wireless link from getting broken when you change other parameters with the configuration software or batch-process QR Code symbols (see Chapter 4).

Scanner as Slave (default)

The scanner is a slave by default. This slave can establish a Bluetooth® wireless link with the communications adapter (BA series) or some other Bluetooth® equipment as a master without special communication procedures.

- (1) If the scanner is currently a master, use the scanner to read the "Configure as slave" QR Code symbol given in Section 12.2 using the procedure in Section 12.1 to switch it to slave operation.
- (2) Wait for the scanner to beep three times, press the scanner's trigger switch, and wait approximately two minutes (default) for the master device to connect to this slave.
- (3) Configure the communications adapter (or some other Bluetooth® equipment) as a master and specify the scanner's Bluetooth® address.

For the communications adapter, use the configuration software (BASetting). (For other Bluetooth® equipment, use the procedures set forth in the user's manual.)

- (4) Wait for the communications adapter (or some other Bluetooth® equipment) to establish a Bluetooth® wireless link with the scanner as a slave.
- (5) Wait for the scanner to beep twice and the indicator LED to turn green (for 0.5 second), indicating a successful connection.

Note: If the master device cannot discover the scanner available in the vicinity, set the longer inquiry time and let the master device search it again.

Note: In response to the connection request from the master device, the scanner unconditionally connects to it. No Bluetooth® passkey is required to specify.

* The configuration software (ScannerSetting_2D) is available as free downloads from our website at <http://www.denso-wave.com/>.

Scanner as Master

To configure the scanner as a master and the communications adapter (or some other Bluetooth® equipment) as a slave, follow the sample procedures given below and specify the slave's Bluetooth® address to the scanner. The connection ratio of the scanner and slave device should be 1:1.

Using the communications adapter (example)

- (1) Use the scanner to read the bar code (communications adapter's Bluetooth® address) on the back of the communications adapter.
- (2) Wait for the scanner to configure itself as a master and establish a Bluetooth® wireless link with the communications adapter.
- (3) Wait for the scanner to beep twice and the indicator LED to turn green (for 0.5 second).

Using some other Bluetooth® device (example)

- (1) Confirm the device's Bluetooth® address.
For the instructions on how to confirm, see the user's manual.
- (2) With the configuration software (ScannerSetting_2D)*, generate a "Bluetooth® address" code that specifies the equipment's Bluetooth® address to the scanner.

When using a commercially available code generator, generate it in the following format.

| Code type | Data format |
|---------------------|-------------------------|
| QR Code Model 1, 2 | %% ADDRXXXXXXXXXXXXX %% |
| CODE 128 Code Set A | ADDRXXXXXXXXXXXXX |

(Note) XXXXXXXXXXXXXXXX should be a Bluetooth® address in hexadecimal.

Example: Bluetooth® address 000AF1234567



- (3) Use the scanner to read the "Bluetooth® address" code.
- (4) Wait for the scanner as a master to establish a Bluetooth® wireless link with the specified Bluetooth® device.
- (5) Wait for the scanner to beep twice and the indicator LED to turn green (for 0.5 second), indicating a successful connection.

Note: The scanner does not check the Bluetooth® passkey when connecting to the slave device. If the slave device is so set up that it asks for the Bluetooth® passkey, therefore, modify the slave's setting to unconditionally connect to the master device, using the procedures set forth in the user's manual.

When connecting the scanner with an iPhone or iPad.

Follow the procedures below when connecting the scanner with an iPhone or iPad.

When using the operator's guide (included with the scanner).

- (1) Turn the connected device ON to switch on the Bluetooth® function.
- (2) Set the scanner communication settings.
Allows the scanner to scan “iOS(iPhone,iPad)”QR Code at Easy connection setup, QR-coded Parameter Menu. Wait for the scanner to beep three times to complete the settings.
- (3) Press the trigger switch of the scanner and wait for the connected device to be connected.
- (4) Select the scanner from the connected device list and connect it to the device. The scanner beeps twice if successfully connected.
- (5) The next time connecting to the device, simply press the trigger switch.

When using the configuration software (ScannerSetting_2D)

- (1) Select the SPP profile for the scanner and connect it to the communication adapter (BA11-RKU or BA20-RU) or the host computer equipped with the Bluetooth®.
- (2) Change the scanner settings to “HID” for the interface, “SSP” for the security function, “Slave” for the mode, “Peripheral keyboard” for the local device ID of the software (ScannerSetting_2D).
- (3) Select the scanner from the connected device list and connect it to the device. The scanner beeps twice if successfully connected.
- (4) The next time connecting to the device, repeat the step (3).

2.3 Breaking Bluetooth® Wireless Links

Holding down the trigger switch for 5 seconds or scanning the "Break Bluetooth® wireless link" QR Code symbol forcibly breaks the scanner's Bluetooth® wireless link. (The QR Code symbol is given in Section 12.2 and its procedure in Section 12.1.)

Note: Breaking the Bluetooth® wireless link does not disable the Bluetooth® interface. To disable it, scan the "End operation" QR Code symbol.

2.4 Reestablishing Bluetooth® Wireless Links

When the scanner's Bluetooth® wireless link has been broken by any of the following events, pressing the trigger switch reestablishes the Bluetooth® wireless link. The scanner as a slave waits for a connection request from the master; the scanner as a master connects to a target slave.

- Scanning the "Break Bluetooth® wireless link" QR Code symbol (See Sections 12.1 and 12.2.)
- Holding down the trigger switch to break the Bluetooth® wireless link
- Modifying the scanner configuration with the configuration software (ScannerSetting_2D)
- "Reconnect request" dialog displayed by the configuration software (ScannerSetting_2D)
- Replacing the battery cartridge

2.5 Indication of Bluetooth® Wireless Link Status

The scanner's indicator LED and beeper together indicate the status of the scanner's Bluetooth® wireless link.

When the trigger switch is held down:

| Indicator LED | Beeper | Scanner Status |
|--------------------------------|--------|---|
| Red, flashing | Silent | Reading is not possible when there is no Bluetooth® wireless link on enabling the link. |
| Red, flashing twice repeatedly | | The scanner has scanned the "End operation" QR Code symbol. |

When the trigger switch is pressed and released:

| Indicator LED | Beeper | Scanner Status |
|------------------------|--------|---|
| Blue, flashing rapidly | Silent | The scanner, as a master, is searching for a connection target. |
| Blue, flashing slowly | | The scanner, as a slave, is waiting for a master to connect. |

When the Bluetooth® wireless link is established or broken:

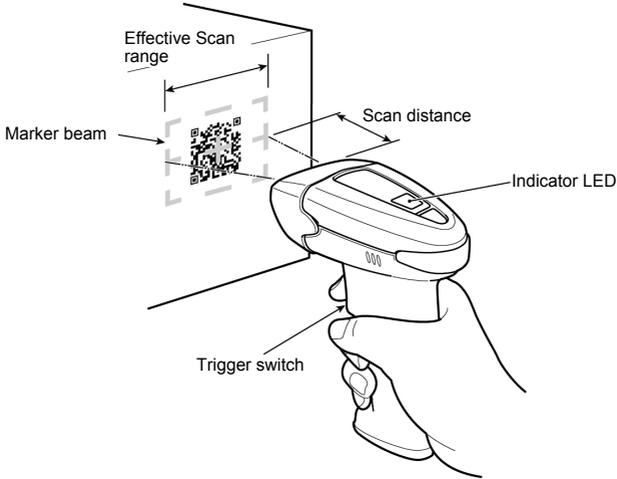
| Indicator LED | Beeper | Scanner Status |
|--------------------|-----------------|--|
| Green for 1 second | Two short beeps | The Bluetooth® wireless link is ready for use. |
| Red for 1 second | Long beep | The Bluetooth® wireless link no longer exists. |

3.1 Before Use

Be sure to charge the battery cartridge loaded in the scanner with the dedicated charger before using the scanner for the first time or after an extended period of disuse. (For the charging procedure, refer to Chapter 9.)

3.2 Operation Procedure

- (1) Bring the reading window to a target code and press the trigger switch. The marker beam comes on, indicating the scan range. Align the center of the marker beam with that of the target code.
(This step is not required for continuous reading modes 1, 2 and auto sensing mode.)



- (2) Wait for the indicator LED to turn blue and the beeper to sound, indicating a successfully read.

Note: The actual scan range is narrower than the marker range. The scan range is approx. 6cm (2.4") wide by 4cm (1.6") high when the scanning distance is approx. 10cm (3.9").

Note: The marker range should only be used as a guide. It does not assure that a code within the marker range can be read.

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

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

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

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

■ Scanning mode

| | |
|------------------------|--|
| Regular read mode | This mode transfers the code data when the scanner has read the code successfully. |
| Data verification mode | This mode verifies the code data against the master data stored in the scanner. (Refer to Section 6.1 for details.) |

■ Switching to sleep mode for power saving

The scanner switches from standby to sleep mode to save power when the trigger switch is off in the auto-off or momentary switching mode or when the scanner is on standby in the alternate switching mode. (The scanner does not switch to the sleep mode in the continuous reading mode 1 or 2 or in the auto sensing mode.)

The transition period from standby to sleep mode is 30 seconds in the ordinary current mode. In the power saving mode (default), the scanner immediately switches to sleep mode. Only the configuration software (ScannerSetting_2D) provides a choice of these two modes.

The scanner in sleep mode takes more time (approx. 100 ms) to start and complete a sequence of scanning operation than the one on standby.

■ Auto power-off

If the scanner remains unused for the specified timeout period, it automatically shuts itself down. The timeout period can be specified within the range from 5 to 640 minutes in 5-minute increments by using the configuration software (ScannerSetting_2D). The configuration software can also disable this auto power-off feature.

■ Scanning with Bluetooth® wireless link broken

The scanner can read codes even with the Bluetooth® wireless link being broken. Use this scanning way when scanning codes is required but data transfer is not, for instance, when the scanner itself checks the verification result without transferring it to the host computer.

Scanning with Bluetooth® wireless link broken and that with Bluetooth® wireless link established can be switched only with the QR-coded parameter menu.

| | |
|---|--|
| "Scan w/ Bluetooth® link broken" QR Code symbol | Allows the scanner to scan codes with the Bluetooth® wireless link being <u>broken</u> . Scanning the QR Code symbol also disables the Bluetooth® interface, making data transfer with the host computer impossible. |
| Cancel "Scan w/ Bluetooth® link broken" QR Code symbol | Cancels the "Scan w/ Bluetooth® link broken" setting. Scanning the QR Code symbol allows the scanner to scan codes with the Bluetooth® wireless link being <u>established</u> . It also enables the Bluetooth® interface, making data transfer with the host computer possible. |

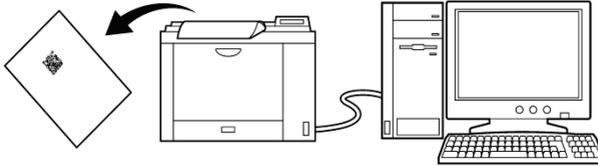
Note: The "Scan w/ Bluetooth® link broken" parameter retains its setting even the scanner reads the "End operation" and "Start operation" QR Code symbols in this order with the "Scan w/ Bluetooth® link broken" being selected. To cancel the setting, you need to scan the "Cancel "Scan w/ Bluetooth® link broken" QR Code symbol.

Chapter 4 Customizing the Scanner

You can customize the scanner by modifying communications, code type, and other scanner parameters with the QR-coded parameter menu or the configuration software ScannerSetting_2D*. These parameters retain their settings even when the power is off.

TIP: The scanner can hold not only its own parameter settings but also communications adapter parameter settings in its memory and customize the communications adapter via the Bluetooth® wireless link. There are two types of bar-coded parameter menus available for scanners (Section 12.2) and communications adapters (Section 13.2).

- (1) Scanning parameter setting QR Code symbols in the **QR-coded parameter menu** by pressing the trigger switch.
(The QR-coded parameter menus for scanners and communications adapters are given in Chapters 12 and 13, respectively.)
- (2) Using the **configuration software (ScannerSetting_2D)** in your computer. It is recommended that the scanner be configured as a master.
(This software also offers batch-process QR Code symbols for ready by scanners in the field.)



Note: Customizing the scanner with the configuration software or batch-process QR Code symbols breaks the Bluetooth® wireless link, so it is necessary to establish the link again after customizing. To prevent the Bluetooth® wireless link from getting broken, select the "No slave/master configuration change" parameter for the item "Configure the scanner as master or slave."

Note: When the "End operation" parameter is selected with the scanner, no parameter setting is possible. Prior to starting parameter setting, therefore, be sure to scan the "Start operation" QR Code symbol. See Chapter 2 for the "Start operation" and "End operation."

Note: When even the scanner is being charged, you can customize it with the configuration software except when the "End operation" parameter is selected.

Note: The configuration software is not available via HID (Human Interface Device) Profile.

* The configuration software (ScannerSetting_2D) is available as free downloads from our website at <http://www.denso-wave.com/>.

Chapter 5 Scanning Control

Two types of scanning controls are available--Trigger switch control and Software control.

Trigger switch control: Pressing the trigger switch readies the scanner for scanning. (Refer to Section 5.1.)

Software control: Instead of pressing the trigger switch, you send control commands from the host computer via the Bluetooth® interface to ready the scanner for scanning or put the scanner on standby. (Refer to Section 5.2.) The software control is not available via HID (Human Interface Device) Profile.

In addition, the auto sensing mode is also available. (Refer to Sections 5.3 and 5.4.)

5.1 Trigger Switch Control

Pressing the trigger switch turns on the illumination LEDs and readies the scanner for scanning. The scanner supports the following six trigger switch operating modes. Select the one that best meets your needs using the QR-coded parameter menu or the configuration software (ScannerSetting_2D).

(1) Auto-off mode

When the trigger switch is pressed, the scanner is brought to the Active state for approximately 5 seconds.

The scanner automatically returns to the Ready state when reading is successfully completed, or after approximately five seconds elapsed with the trigger switch pressed.

The scanner goes to the Ready state if the trigger switch is released before five seconds elapses. (in the case of normal mode)

When the Auto off mode is set to be active only once (One-shot mode), the time required for the scanner to become the Ready state after the trigger switch was pressed shall be designated in the setting.

(2) Momentary switching mode

The scanner is brought to the Active state only when the trigger switch is pressed, and returns to the Ready state when the trigger switch is released.

(3) Momentary switching mode (Reverse type)

The scanner is brought to the Ready state only when the trigger switch is pressed, and returns to the Active state when the trigger switch is released.

(4) Alternate switching mode

The scanner alternates between the Active state and the Ready state every time the trigger switch is pressed.

(5) Continuous reading mode 1

Establishing the Bluetooth® wireless link or selecting the "Scan w/ Bluetooth® link broken" parameter, the scanner lights the illumination LEDs and becomes ready to scan. The scanner ignores all trigger switch input.

If the scanner receives the Z, READOFF or LOFF command, it switches to standby; if it receives the R, READON or LON command, it becomes ready to scan.

You can select whether or not the scanner transmits the ERROR command when the scanner cannot complete reading and switches to standby, using the configuration software (ScannerSetting_2D).

(6) Continuous reading mode 2

This mode is functionally equivalent to the continuous reading mode 1, except that the scanner waits for a command upon completion of scanning. To become ready to scan, the scanner should receive the Z, READOFF or LOFF command to switch to standby and then receive the R, READON or LON command.

You can select whether or not the scanner transmits the ERROR command when the scanner cannot complete scanning and switches to standby, using the configuration software (ScannerSetting_2D).

Note: When you are setting parameters using the QR-coded parameter menu, the scanner is always in the auto-off mode regardless of the trigger switch operating mode selected.

Note: Establishing the Bluetooth® wireless link or selecting the "Scan w/ Bluetooth® link broken" parameter enables the trigger switch control.

5.2 Software Control

You can control the scanner by sending scanning control commands from the host computer via the Bluetooth® interface, instead of pressing the trigger switch.

Scanning control commands include R, READON, LON, Z, READOFF and LOFF and are restricted by the trigger switch operating modes, as listed below.

(√ : Command valid)

| Commands | Description | Trigger switch operating modes | | | | Continuous reading mode 1 or 2 |
|------------------------|---|--------------------------------|--------------------------|---|--------------------------|--------------------------------|
| | | Auto-off mode | Momentary switching mode | Momentary switching mode (Reverse type) | Alternate switching mode | |
| R, READON, LON | <u>Ready-to-scan commands</u> Upon receipt of one of these commands, the scanner lights the illumination LEDs and becomes ready to scan. | -- | -- | -- | -- | √ |
| Z, READOFF, LOFF | <u>Standby commands</u> Upon receipt of one of these commands, the scanner turns off the illumination LEDs and switches to standby. | -- | -- | -- | -- | √ |

Each of these commands should be enclosed with a header and terminator for transmission according to the communications conditions of the scanner.

5.3 Auto Sensing Mode--Automatic detection of labels

After establishing the Bluetooth® wireless link or selecting the "Scan w/ Bluetooth® link broken" parameter, in the Auto Sensing mode (Auto sense operation in Auto stand mode is included), bringing a code label within the scan range of the reading window turns on the illumination LEDs and starts the scanner reading the code. No trigger switch operation is required. Use this mode when the scanner is stationary to a stand and a code label is moved.

The illumination LEDs come on when you bring a code label within the designated range or move a code label within the same range. These LEDs turn off when a code label is moved away from the range or stays within the range without move for approx. 3 seconds.

In the Auto stand mode, after establishing the Bluetooth® wireless link or selecting the "Scan w/ Bluetooth® link broken" parameter, the scanner is set to the Auto sense operation when the power is turned on.

If the trigger switch is pressed while the scanner is operating in this mode, the scanner goes to the Auto off and reads a code whenever the trigger switch is pressed.

However, the scanner will automatically return to the Auto sense operation if the trigger switch is not pressed for longer than a time specified for the scanner to return to the Auto sense.

The time for the scanner to return to the Auto sense operation from the Auto off operation can be selected with the configuration software (ScannerSetting_2D).

Auto sensing mode and Auto stand mode are selected with the QR-coded parameter menu or the configuration software (Scanner Setting_2D).

The scanner offers a choice of three sensitivity levels for responding to codes. Switch to a higher sensitivity level if the illumination LEDs will not come on when a code is brought into the range, for example.

Note: Even if you do not bring a code label within the scan range, the illumination LEDs may come on when the ambient level of light changes or any shadows move within the scan range.

Note: To enable the scanner to work properly in auto sensing mode, an ambient illuminance of at least 500 lx is required.

6.1 Data Verification Mode

The data verification mode verifies the code data read against the master data stored in the scanner and reports the match status with data output.

Data verification read is available in two types--"n-point verification" and "2-point verification," which can be selected with the configuration software (ScannerSetting_2D).

Selecting the n-point verification requires registering master data only one time for 1:n verification. The scanner verifies all code data read after registration against the master data.

The 2-point verification refers to 1:1 verification. Selecting it requires registering master data each time preceding code scanning. After registration of master data, the scanner reads a code, verifies the code data read against the master data and then becomes ready to register new master data. This way, the 2-point verification read alternately repeats master data registration and code scanning.

In n-point verification read, master data can be registered with "preset master registration" or "scan master registration"; in 2-point verification read, with "scan master registration" only. The preset master registration registers master data with the configuration software (ScannerSetting_2D) beforehand, and the scan master registration, by scanning a master code label.

The master data registered by "preset master registration" or "scan master registration" will be sent to the host computer when you scan the "Output master data" code given on page 16.

The verification parameters can be specified with the configuration software (ScannerSetting_2D).

6.1.1 Data verification read procedure

■ n-point verification

Preset master registration

This is available only when n-point verification is selected. Register the code type and data to be used for verification using the configuration software (ScannerSetting_2D). Up to 99 digits can be registered.

The registered master data will be preserved even if the scanner is turned off. To clear it, first clear the registered master data stored in the host computer with the configuration software (ScannerSetting_2D) and then send the new setting data to the scanner.

Scan master registration

- 1) Switch the scanner to the Data Verification mode.
- 2) Send a scan entry control command "E" from the host to the scanner. (Refer to Appendix 2 for control commands.)
The indicator LED lights in green.
- 3) Use the scanner to scan a master code to be registered. (The scanner operates in the trigger switch operating mode currently set.) After registration of master data, the indicator LED turns blue and then goes OFF.
- 4) Use the scanner to scan a target code. The scanner verifies the code read against the master data registered and then outputs the result. After a successful read, the indicator LED lights in blue.

During the registration operation above, if the master data has fewer characters than specified (e.g., less than the specified verification start position), the registration operation aborts with an error.

Even if "Preset master registration" has been made, you can make "Scan master registration." If both have been made, the number of characters to verify that has been specified with "Preset master registration" and the master data that has been specified with "Scan master registration" will be valid.

Note: The registered master data will be cleared when you customize the scanner by modifying the parameters with the configuration software (ScannerSetting_2D) or a batch-process QR code symbol.

Note: If no master data has been entered by either "Preset master registration" or "Scan master registration," the indicator LED flashes in red, during which it is impossible to scan codes.

■ 2-point verification

Scan master registration

- 1) Switch the scanner to the data verification mode. The indicator LED lights in green.
- 2) Use the scanner to scan a master code to be registered. (The scanner operates in the trigger switch operating mode currently set.) After the registration of master data, the indicator LED turns blue and then goes OFF.
- 3) Use the scanner to scan a target code. The scanner verifies the code read against the master data registered and then outputs the result.

After a successful read, the indicator LED lights in blue, indicating that the scanner is ready to register *new* master data.

During the registration procedure above, if the master data has fewer characters than specified (e.g., less than the specified verification start position), the registration operation aborts with an error. The scanner becomes ready to register master data again.

Verification retry after mismatch in 2-point verification

The 2-point verification read provides the "Verification retry after mismatch" option that retries verification against the *same* master data. Enabling this option with the configuration software (ScannerSetting_2D) readies the scanner not for registering *new* master data but for reading a bar code again if the verification result is a mismatch.

Disabling this option readies the scanner for registering *new* master data after bar code reading, no matter what the verification result is.

Note: Any of the following events clears the master data stored in the scanner.

- Turning the scanner power off.
- Modifying the verification start position or the number of characters to verify.
- Customizing the scanner by modifying the parameters with the configuration software (ScannerSetting_2D) or by scanning a batch-process OR code symbol.

Note: The data verification area can be selected from "Code type + code data" or "Code data only" with the configuration software (ScannerSetting_2D).

6.1.2 Specifying a verification object

You can specify two types of verification objects--data string and data block. For data string verification, specify the verification start position and the number of characters to be verified. For data block verification, specify one of the data blocks delimited by commas in the CSV format.

(1) Data string verification

The scanner verifies data specified by the verification start position and the number of characters to be verified against the master data registered in the scanner, and then it outputs the verification result.

The verification start position should be within the range of 1 to 999, and the number of characters* to be verified, within the range of 1 to 99.

*The number of characters for Code 39 and Codabar (NW-7) symbols should be specified including start and stop codes.

In any of the following cases, the verification results in a mismatch:

- 1) The verification data in the specified position does not match the master data.
- 2) The code type which the verification data belongs to is different from the one which the master data belongs to. See **(Note)** below.
- 3) All data specified is not included or no data is included within the specified range.

(Examples)

| Master data registered | Verification start position | No. of characters to be verified | Data string read (Verification object) | Result |
|------------------------|-----------------------------|----------------------------------|--|----------|
| 345 | 3 | 3 | 00345 | Match |
| 345 | 3 | 3 | 00345678 | Match |
| 345 | 3 | 3 | 00346 | Mismatch |
| 345 | 3 | 3 | 0034 | Mismatch |

(2) Data block verification

If data is saved in the comma-delimited CSV format, the scanner verifies data in the specified data block against the master data registered in the scanner, and then outputs the verification result.

The data block position should be within the range of 1 to 99.

In any of the following cases, the verification results in a mismatch:

- 1) The verification data in the specified block does not match the master data.
- 2) The code type which the verification data belongs to is different from the one which the master data belongs to. See **(Note)** below.
- 3) All data specified is not included or no data is included within the specified block.
- 4) The data block to be verified exceeds 99 characters in length.

(Examples)

| Master data registered | Position of data block to be verified | Data block read (Verification object) | Result |
|------------------------|---------------------------------------|---------------------------------------|----------|
| 345 | 3 | 0,12,345,6789 | Match |
| 345 | 3 | 0,12,346,6789 | Mismatch |
| 345 | 3 | 0,12,3456,6789 | Mismatch |
| 345 | 3 | 0,12,34,6789 | Mismatch |
| 345 | 3 | 0,12 | Mismatch |

(Note) Whether the code ID mark is matched or not is determined not by the combination of code ID marks Type 1 and Type 2 but by Type 1 only (refer to Chapter 8, Section 8.2).

6.1.3 Verification result output

(1) Report of match/mismatch status

You can select any of the following report types using the configuration software (ScannerSetting_2D). Selecting "Disable transmission" reports nothing.

| |
|-------------------------|
| If there is a match: |
| Disable transmission. |
| Code data transmission. |
| OK transmission. |

| |
|-------------------------|
| If there is a mismatch: |
| Disable transmission. |
| Code data transmission. |
| NG transmission. |

(2) Beeper and indicator LED

You can check whether the verification result is a match or mismatch with the beeper and indicator LED.

When the beeper and indicator LED are enabled, they act as shown below in default setting.

| | | Beeper | | Indicator LED |
|---------|-------------------------|------------------------|---------------------|-----------------|
| | | Beeping times | Beeping tone | |
| 2-point | If there is a match: | Emits a short 2 beeps. | Middle beeping tone | Lights in blue. |
| | If there is a mismatch: | Emits a long beep. | High beeping tone | Flashes in red. |
| n-point | If there is a match: | Emits a short 1 beep. | Middle beeping tone | Lights in blue. |
| | If there is a mismatch: | Emits a long beep. | Middle beeping tone | Flashes in red. |

Output of the master data registered

Scanning the "Output master data" code given below lets the scanner output the verification section of master data entered in the Data verification read procedure, together with the code ID mark.



"Output master data" code

6.2 Editing Data

You can edit and output code data read, in any of the four data edit modes--"data extraction mode," "data substitution mode," "data blocksorting mode" and "ADF script mode." These data edit modes can be selected with the configuration software (ScannerSetting_2D). The default is "No editing."

Note: In the case of multi-line bar codes, unless all code ID marks read are matched, the data editing processing will result in an error regardless of whether or not the data read contains any error. Whether the code ID mark is matched is determined not by the combination of code ID marks but by Type 1 only (refer to Chapter 8, Section 8.2).

Note: In the case of split QR Code, the scanner in edit mode or batch edit mode performs data editing processing upon completion of scanning of all split code symbols; in non-edit mode, it performs each time a single split code symbol is read.

6.2.1 Data extraction mode

This mode offers three extraction choices--"data string," "data block" and "AI (Application Identifier)-prefixed string" extractions from code data read and then outputs it.

The "data block" extraction is available only when code data is in the comma-delimited CSV format. The "AI-prefixed string" extraction is available for GS1-128 (EAN-128), GS1 DataBar (RSS), and EAN.UCC Composite symbols (excluding linear components in a UPC/EAN Composite symbol).

6.2.1.1 Extracting a data string

The scanner extracts a data string specified by the "Extraction start position" and "Extraction end position" from a code specified by the "Code type" and then outputs it in the data transmission format selected in the scanner (see Chapter 8, Section 8.2). The extraction conditions and extraction start and end positions are listed below.

■ Extraction conditions

| Extraction conditions | Choices |
|--|------------------------|
| "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 2of5 (ITF) |
| Standard 2of5 (STF) | |
| GS1 DataBar | |
| EAN.UCC Composite symbology | |
| "Data transfer regardless of error result" | Permit/Prohibit |

If the scanner fails to extract a data string or scans a code not specified by "Code type" when the "Data transfer regardless of error result" is permitted, then it outputs the data read as is without editing.

■ Extraction start and end positions

| "Extraction start position" | "Extraction end position" |
|-----------------------------|--|
| Head position | n th position |
| Tail position | |
| n th position | Tail position |
| | By n positions from the start position |
| | n th position |

The n can be 1 through 9999. Note that if the extraction start position is specified as n th position, the extraction end position should be equal to or greater than the extraction start position.

Note: The number of characters for Code 39 and NW-7 symbols should be specified including start and stop codes.

Example Code read: QR Code, Data: 12345,
Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Type 1,
Transmission of the number of digits: Enable, Prefix/Suffix: None, BCC: Disable

| Extraction conditions | Extraction start position | Extraction end position | Output data |
|--|---------------------------|-------------------------|----------------------|
| "Code type": QR Code "Data transfer regardless of error result": Prohibit | Head position | 3rd position | [STX]Q0003123[ETX] |
| | Tail position | 3rd position | [STX]Q0003345[ETX] |
| | 1st position | Tail position | [STX]Q000512345[ETX] |
| | 1st position | By 3 positions | [STX]Q0003123[ETX] |
| | 2nd position | 4th position | [STX]Q0003234[ETX] |
| | Head position | 6th position | Error |
| | Tail position | 6th position | Error |
| | 6th position | Tail position | Error |
| | 6th position | By 10 positions | Error |
| | 1st position | 6th position | Error |
| "Code type": QR Code "Data transfer regardless of error result": Permit | Head position | 6th position | [STX]Q000512345[ETX] |
| | Tail position | 6th position | [STX]Q000512345[ETX] |
| | 6th position | Tail position | [STX]Q000512345[ETX] |
| | 6th position | By 10 positions | [STX]Q000512345[ETX] |
| | 1st position | 6th position | [STX]Q000512345[ETX] |
| "Code type": PDF417 "Data transfer regardless of error result": Prohibit | Invalid if specified. | Invalid if specified. | Error |
| "Code type": PDF417 "Data transfer regardless of error result": Permit | Invalid if specified. | Invalid if specified. | [STX]Q000512345[ETX] |

6.2.1.2 Extracting data blocks

If data read is in the comma-delimited CSV format, the scanner extracts data blocks specified by the data block numbers from a code specified by the "Code type" and then outputs it in the data transmission format selected in the scanner (see Chapter 8, Section 8.2). The extraction conditions and data block numbers are listed below.

■ Extraction conditions

| Extraction conditions | Choices |
|--|-----------------|
| "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 2of5 (ITF) | |
| Standard 2of5 (STF) | |
| GS1 DataBar | |
| EAN.UPC Composite symbology | |
| "Data transfer regardless of error result" | Permit/Prohibit |

If the scanner fails to extract a data block or scans a code not specified by "Code type" when the "Data transfer regardless of error result" is permitted, then it outputs the data read as is without editing.

■ Data block numbers

Each data block number should be within the range from 1 through 99. Up to three blocks can be extracted.

Example Code read: QR Code, Data: (See the table below.)

Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Disable,
Transmission of the number of digits: Disable, Prefix/Suffix: None, BCC: Disable

| Extraction conditions | Data read | Data block numbers | Output data |
|--|----------------|-----------------------|--------------------------------------|
| "Code type": QR Code | 1,23,456,7890 | 1, 2 and 3 | [STX]1[ETX][STX]23[ETX][STX]456[ETX] |
| "Data transfer regardless of error result": Prohibit | 1,23,456,7890 | 3, 1 and 2 | [STX]456[ETX][STX]1[ETX][STX]23[ETX] |
| | 1234567890 | 1 | [STX]1234567890[ETX] |
| | 1,,23,456,7890 | 2 and 5 | [STX][ETX][STX]7890[ETX] |
| | 1,23,456,7890 | 5 | Error |
| | 1,23,456,7890 | 4 and 5 | Error |
| | 1234567890 | 1 and 2 | Error |
| "Code type": QR Code | 1,23,456,7890 | 5 | [STX]1,23,456,7890[ETX] |
| "Data transfer regardless of error result": Permit | 1,23,456,7890 | 4 and 5 | [STX]1,23,456,7890[ETX] |
| | 1234567890 | 1 and 2 | [STX]1234567890[ETX] |
| "Code type": PDF417 | | | |
| "Data transfer regardless of error result": Prohibit | 1,23,456,7890 | Invalid if specified. | Error |
| "Code type": PDF417 | | | |
| "Data transfer regardless of error result": Permit | 1,23,456,7890 | Invalid if specified. | [STX]1,23,456,7890[ETX] |

6.2.1.3 Extracting AI (Application Identifier)-prefixed strings

If the scanner reads any of GS1-128, GS1 DataBar, and GS1 Composite symbols (excluding linear components in a UPC/EAN Composite symbol), it edits the data according to AIs and outputs it in the data transmission format selected in the scanner (see Chapter 8, Section 8.2).

The "AI-prefixed string" extraction is available in two modes--AI-delimited mode and AI parenthesizing mode. AIs to be used for data editing are listed in [\(3\) AI table](#) later.

(1) AI-delimited mode

In this mode, the scanner extracts strings prefixed with AIs specified (up to three types of AIs) and separates them with the specified delimiters (selectable from headers/terminators, commas and tabs) instead of AIs to output them.

■ Extraction conditions

| Extraction conditions | Choices |
|--|-----------------|
| "Data transfer regardless of error result" | Permit/Prohibit |

If the scanner fails to extract an AI-prefixed string when the "Data transfer regardless of error result" is permitted, it outputs the data read as is without editing.

■ Delimiters

Delimiters can be any of the following three--header/terminator, comma and tab.

• Header/terminator

Specifying a header/terminator as delimiters prefixes a header and suffixes a terminator to each element string separated.

A scanner ID, code ID mark, the number of digits, prefix, and suffix can be also added to each element string if their transmissions are enabled. The number of digits is the count of each element string edited.

Example Data read: (01)94901234567894(11)030808(13)030810

Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Disable,
Transmission of the number of digits: Enable, Prefix/Suffix: None, BCC: Disable

| AIs specified | Output data |
|---------------|--|
| 01,11,13 | [STX]001494901234567894[ETX][STX]0006030808[ETX][STX]0006030810[ETX] |

• Comma

Specifying a comma as delimiters outputs comma-delimited data. No comma follows the tail of the data.

A header and terminator are added to the full string. None of a scanner ID, code ID mark, the number of digits, prefix, and suffix is added even if their transmissions are enabled.

Example Data read: (01)94901234567894(11)030808(13)030810

Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Disable,
Transmission of the number of digits: Disable, Prefix/Suffix: None, BCC: Disable

| AIs specified | Output data |
|---------------|--|
| 01,11,13 | [STX]94901234567894,030808,030810[ETX] |

• Tab (ASCII 09H (HT))

Specifying a tab as delimiters outputs tab-delimited data. No tab follows the tail of the data.

A header and terminator are added to the full string. None of a scanner ID, code ID mark, the number of digits, prefix, and suffix is added even if their transmissions are enabled.

Example Data read: (01)94901234567894(11)030808(13)030810

Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Disable,
Transmission of the number of digits: Disable, Prefix/Suffix: None, BCC: Disable

| AIs specified | Output data |
|---------------|--|
| 01,11,13 | [STX]94901234567894[TAB]030808[TAB]030810[ETX] |

Example Data read: (01)94901234567894(11)030808(13)030810(17)040208(17)040305
 Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Disable,
 Transmission of the number of digits: Disable, Prefix/Suffix: None, BCC: Disable

| Extraction conditions | AIs specified | Delimiter | Output data |
|--|---------------|--|--|
| "Data transfer regardless of error result": Prohibit | 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 |
| | 01,11,17 | | [STX]94901234567894,030808,040208[ETX] |
| "Data transfer regardless of error result": Permit | 17,11 | [STX]040208,030808[ETX] | |
| | 17,17 | [STX]040208,040305[ETX] | |
| | 12 | [STX]019490123456789411030808130308101704020817040305[ETX] | |
| | 01,12 | | |
| | 01,01 | | |

(Note 1) Element strings will be output in the order of AIs specified.

(Note 2) If data read contains two or more element strings prefixed with the same AI, those element strings will be output in the order arranged in that data read.

(Note 3) If data read does not contain a string prefixed with the specified AI or it contains such data but its number of digits is more or less than the one defined for that AI, an error will result when the "Data transfer regardless of error result" is prohibited.

(2) AI parenthesizing mode

In this mode, the scanner parenthesizes AIs contained in data read and outputs the edited data according to the extraction conditions.

■ Extraction conditions

| Extraction conditions | Choices |
|--|-----------------|
| "Data transfer regardless of error result" | Permit/Prohibit |

If the scanner fails to extract an AI-prefixed element string when the "Data transfer regardless of error result" is permitted, it outputs the data read as is without editing.

Example Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Disable,
Transmission of the number of digits: Disable, Prefix/Suffix: None, BCC: Disable

| Extraction conditions | Data read | Output data |
|--|---|---|
| "Data transfer regardless of error result": Prohibit | 0194901234567894110308081303 081017040208 | [STX](01)94901234567894(11)030808(13)030810(17)040208[ETX] |
| | 0194901234567894110308081303 081061704020817040305 | Error (Note 1) |
| "Data transfer regardless of error result": Permit | 0194901234567894110308081303 081017040208 | [STX](01)94901234567894(11)030808(13)030810(17)040208[ETX] |
| | 0194901234567894110308081303 081061704020817040305 | [STX]0194901234567894110308081303081061704020817040305[ETX] |

(Note 1) Data from the head to element string 030810 prefixed with AI (13) can be normally extracted, but the following data (as underlined below) causes an error since it starts with 6 that cannot start any AI.

(01)94901234567894(11)030808(13)03081061704020817040305

(3) AI table

In the AI-prefixed string extraction, the scanner edits data according to the Application Identifiers (AIs) defined below.

| AI | Format | Description |
|------|------------|---|
| 00 | n2+n18 | Serial Shipping Container Code (SSCC) |
| 01 | n2+n14 | Global Trade Item Number (GTIN) |
| 02 | n2+n14 | GTIN of Trade Items Contained in a logistic unit (For Use with AI 37 Only) |
| 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 | Product Variant |
| 21 | n2+an..20 | Serial Number |
| 22 | n2+an..29 | HIBCC (Health Industry Business Communication Council)--Quantity, Date, Batch, and Link |
| 23n | n3+n..19 | Batch or Lot Number (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 | Quantity |
| 310n | n4+n6 | Net Weight, Kilograms |
| 311n | n4+n6 | Length or 1st Dimension, Meters |
| 312n | n4+n6 | Width, Diameter, or 2nd Dimension, Meters |
| 313n | n4+n6 | Depth, Thickness, Height, or 3rd Dimension, Meters |
| 314n | n4+n6 | Area, Square Meters (***) |
| 315n | n4+n6 | Volume, Liters (***) |
| 316n | n4+n6 | Volume, Cubic Meters (***) |

| AI | Format | Description |
|------|--------|---|
| 320n | n4+n6 | Net Weight, Pounds (***) |
| 321n | n4+n6 | Length or 1st Dimension, Inches (***) |
| 322n | n4+n6 | Length or 1st Dimension, Feet (***) |
| 323n | n4+n6 | Length or 1st Dimension, Yards (***) |
| 324n | n4+n6 | Width, Diameter, or 2nd Dimension, Inches (***) |
| 325n | n4+n6 | Width, Diameter, or 2nd Dimension, Feet (***) |
| 326n | n4+n6 | Width, Diameter, or 2nd Dimension, Yards (***) |
| 327n | n4+n6 | Depth, Thickness, Height, or 3rd Dimension, Inches (***) |
| 328n | n4+n6 | Depth, Thickness, Height, or 3rd Dimension, Feet (***) |
| 329n | n4+n6 | Depth, Thickness, Height, or 3rd Dimension, Yards (***) |
| 330n | n4+n6 | Gross Weight, Kilograms (***) |
| 331n | n4+n6 | Length or 1st Dimension, Meters, Logistics (***) |
| 332n | n4+n6 | Width, Diameter, or 2nd Dimension, Meters, Logistics (***) |
| 333n | n4+n6 | Depth, Thickness, Height, or 3rd Dimension, Meters, Logistics (***) |
| 334n | n4+n6 | Area, Square Meters, Symbology (***) |
| 335n | n4+n6 | Gross Volume, Liters (***) |
| 336n | n4+n6 | Gross Volume, Cubic Meters (***) |
| 337n | n4+n6 | Kilograms per Square Meter (pressure) (***) |
| 340n | n4+n6 | Gross Weight, Pounds (***) |
| 341n | n4+n6 | Length or 1st Dimension, Inches, Logistics (***) |
| 342n | n4+n6 | Length or 1st Dimension, Feet, Logistics (***) |
| 343n | n4+n6 | Length or 1st Dimension, Yards, Logistics (***) |
| 344n | n4+n6 | Width, Diameter, or 2nd Dimension, Inches, Logistics (***) |
| 345n | n4+n6 | Width, Diameter, or 2nd Dimension, Feet, Logistics (***) |
| 346n | n4+n6 | Width, Diameter, or 2nd Dimension, Yards, Logistics (***) |
| 347n | n4+n6 | Depth, Thickness, Height, or 3rd Dimension, Inches, Logistics (***) |
| 348n | n4+n6 | Depth, Thickness, Height, or 3rd Dimension, Feet, Logistics (***) |
| 349n | n4+n6 | Depth, Thickness, Height, or 3rd Dimension, Yards, Logistics (***) |
| 350n | n4+n6 | Area, Square Inches (***) |
| 351n | n4+n6 | Area, Square Feet (***) |
| 352n | n4+n6 | Area, Square Yards (***) |

| AI | Format | Description |
|------|-----------|--|
| 353n | n4+n6 | Area, Square Inches, Logistics (***) |
| 354n | n4+n6 | Area, Square Feet, Logistics (***) |
| 355n | n4+n6 | Area, Square Yards, Logistics (***) |
| 356n | n4+n6 | Net Weight, Troy Ounces (***) |
| 357n | n4+n6 | Net Volume, Ounces (***) |
| 360n | n4+n6 | Volume, Quarts (***) |
| 361n | n4+n6 | Volume, Gallons (***) |
| 362n | n4+n6 | Gross Volume, Quarts (***) |
| 363n | n4+n6 | Gross Volume, Gallons (***) |
| 364n | n4+n6 | Volume, Cubic Inches (***) |
| 365n | n4+n6 | Volume, Cubic Feet (***) |
| 366n | n4+n6 | Volume, Cubic Yards (***) |
| 367n | n4+n6 | Gross Volume, Cubic Inches (***) |
| 368n | n4+n6 | Gross Volume, Cubic Feet (***) |
| 369n | n4+n6 | Gross Volume, Cubic Yards (***) |
| 37 | n2+n..8 | Quantity (For Use with AI 02 Only) |
| 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 | Consignment Number |
| 402 | n3+n17 | Shipment Identification Number |
| 403 | n3+an..30 | Routing Code |
| 410 | n3+n13 | Ship to (Deliver to) EAN.UCC Global Location Number |
| 411 | n3+n13 | Bill to (Invoice to) EAN.UCC Global Location Number |
| 412 | n3+n13 | Purchased from EAN.UCC Global Location Number |
| 413 | n3+n13 | Ship for (Deliver for) EAN.UCC Global Location Number |
| 414 | n3+n13 | Identification of a Physical Location--EAN.UCC Global Location Number |
| 415 | n3+n13 | EAN.UCC Global Location Number of the Invoicing Party |
| 420 | n3+an..20 | Ship to (Deliver to) Postal Code Within a Single Postal Authority |

| AI | Format | Description |
|------|--------------------|--|
| 421 | n3+n3+an..9 | Ship to (Deliver to) Postal Code with Three-Digit ISO Country Code Prefix |
| 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 of Final Processing |
| 43 | n2+n4+n7+an..10+n1 | Carrier Assigned Tracking Number |
| 7001 | n4+n13 | NATO Stock Number (NSN) |
| 7002 | n4+an..30 | UN/ECE Meat Carcasses and Cuts Classification |
| 7003 | n4+n10 | Effective term (YYMMDDHHMM) |
| 7030 | n4+n3+an..27 | Approval Number of Processor with Three-Digit ISO Country Code, Butchery |
| 7031 | n4+n3+an..27 | Approval Number of Processor with Three-Digit ISO Country Code, 1st Processing Place |
| 703n | n4+n3+an..27 | Approval Number of Processor with Three-Digit ISO Country Code, 2nd to 9th Processing Places |
| 8001 | n4+n14 | Roll Products--Width, Length, Core Diameter, Direction, and Splices |
| 8002 | n4+an..20 | Cellular Mobile Telephone Identifier |
| 8003 | n4+n14+an..16 | EAN.UCC Global Returnable Asset Identifier (GRAI) |
| 8004 | n4+an..30 | EAN.UCC Global Individual Asset Identifier (GIAI) |
| 8005 | n4+n6 | Price Per Unit of Measure |
| 8006 | n4+n14+n2+n2 | Identification of the Component 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 | EAN.UCC Global Service Relation Number (GSRN) |
| 8020 | n4+an25 | Payment Slip Reference Number |
| 8100 | n4+n1+n5 | UPC Coupon Extended Code--Number System Character and Offer Code |
| 8101 | n4+n1+n5+n4 | UPC Coupon Extended Code--Number System Character, Offer Code, and End of Offer Code |
| 8102 | n4+n1+n1 | UPC Coupon Extended Code--Number System Character Preceded by Zero |
| 90 | n2+an..30 | FACT Data Identifiers |
| 91 | n2+an..30 | Company Internal Information--Company |
| 92 | n2+an..30 | Company Internal Information--Company |

| AI | Format | Description |
|----|-----------|---------------------------------------|
| 93 | n2+an..30 | Company Internal Information--Company |
| 94 | n2+an..30 | Company Internal Information--Company |
| 95 | n2+an..30 | Company Internal Information--Carrier |
| 96 | n2+an..30 | Company Internal Information--Carrier |
| 97 | n2+an..30 | Company Internal Information--Company |
| 98 | n2+an..30 | Company Internal Information--Company |
| 99 | n2+an..30 | Company Internal Information |

(*) To indicate only year and month, DD must be filled with "00."

(**) n indicates the length of data.

(***) n indicates the decimal point position.

| | |
|------|---------------------------------------|
| a | Alphabetic characters |
| a3 | 3 alphabetic characters, fixed length |
| a..3 | Up to 3 alphabetic characters |

| | |
|------|------------------------------------|
| n | Numeric characters |
| n3 | 3 numeric characters, fixed length |
| n..3 | Up to 3 numeric characters |

| | |
|-------|---|
| an | Alphanumeric characters |
| an3 | 3 alphanumeric characters, fixed length |
| an..3 | Up to 3 alphanumeric characters |

(Note 1) If the specified AI is variable in length and the number of digits in data read is less than the maximum number of digits defined for the AI, then the output contains data read up to a GS (1Dh).

6.2.2 Data substitution mode

If the scanner reads a code specified by the "Code type" in this mode, it searches the data read for the specified string (max. 16 ASCII characters), substitutes it with the specified substitution string (max. 16 ASCII characters), and outputs it in the data transmission format selected in the scanner (see Chapter 8, Section 8.2).

■ Substitution conditions

| Substitution conditions | Choices |
|---------------------------------------|--|
| "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 2of5 (ITF) |
| Standard 2of5 (STF) | |
| GS1 DataBar | |
| EAN.UPC Composite symbology | |
| Search string and substitution string | Max. 16 ASCII characters (00h to FFh) each |

Example Code read: PDF417, Data: 12345678,
 Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Disable,
 Transmission of the number of digits: Disable, Prefix/Suffix: None, BCC: Disable

| Substitution condition | Search string and Substitution string | Output data |
|------------------------|---------------------------------------|--------------------|
| "Code type": PDF417 | 2 → A 4 → B | [STX]1A3B5678[ETX] |

6.2.3 Data blocksorting mode

The scanner splits code data read into a maximum of 5 blocks at the specified split positions, sorts those blocks in the specified order, and outputs it in the data transmission format selected in the scanner (see Chapter 8, Section 8.2).

Note: The split position must be specified by the number of digits from the head of code data read. Specifying the number of digits exceeding that in the code data results in an error.

■ Blocksorting conditions

| Blocksorting conditions | Choices |
|-----------------------------|------------------------|
| "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 2of5 (ITF) |
| | Standard 2of5 (STF) |
| GS1 DataBar | |
| EAN.UPC Composite symbology | |

Example Code read: Code 128, Data: 1234567890,
Header: STX, Terminator: ETX, Scanner ID: Disable, Code ID mark: Disable,
Transmission of the number of digits: 4 digits, Prefix/Suffix: None, BCC: Disable

| Split position | Order of blocks | Output data |
|----------------------------|-----------------|---------------------------|
| 3rd position, 8th position | Block 2, 1, 3 | [STX]K00104567812390[ETX] |
| 3rd position, 8th position | Block 1, 3 | [STX]K000512390[ETX] |

6.2.4 ADF script mode

The ADF script refers to a simple program language designed for editing of data read. It enables the following functions.

- (1) Extracting data that is fixed or variable in length
- (2) Supporting Application Identifiers (AIs) in GS1-128, GS1 DataBar and EAN.UCC Composite symbols
- (3) Sorting data blocks into the specified order
- (4) Collating data for verification
- (5) Outputting same data repeatedly
- (6) Performing four arithmetic operations including residue calculation, e.g., transformation of units
- (7) Substituting data
- (8) Comparing character strings
- (9) Driving indicator LED and beeper

The ADF script mode can be programmed with the configuration software (ScannerSetting_2D). To configure the scanner with the ADF script, transfer the script to the scanner or generate an ADF script QR code symbol with the configuration software (ScannerSetting_2D) and use the scanner to read the symbol.

For the specifications and instructions for use of the ADF script, refer to the ADF Script User's Guide.

Note: The GTIN format conversion and ADF script mode cannot be used together with any of other edit modes (data extraction mode, data substitution mode, and data blocksorting mode).

6.3 Point Scan Mode

In the point scan mode, you can aim at a target code by matching up the center spot of the marker beam with that code.

If there is no code at that center spot or the scanner cannot detect the marker beam due to high levels of ambient lighting, the scanner cannot read anything. The point scan mode takes effect only when the marker is permitted to light.

6.4 Scanning a Mirror Image 2D Code

If you enable the mirror image scanning with the configuration software (ScannerSetting_2D), the scanner can scan a mirror image 2D code as well as a normal image. Note that when the mirror image scanning is enabled, the time required for scanning may increase.

6.5 Scanning a Black-and-white Inverted Code

The scanner usually scans a black-and-white normal code (black cells/bars on a white background). You can switch the scanner to scan a black-and-white inverted code (white cells/bars on a black background) or to scan both types of codes while automatically identifying them, using the QR-coded parameter menu or the configuration software (ScannerSetting_2D).

Note that the automatic detection scanning may take more time than normal code or inverted code scanning.

A black-and-white inverted code requires a black quiet zone of more than the number of cells defined in the code specifications.

6.6 Scanning Structured Appended QR (iQR) Code Symbols

QR Code symbology can split data into a maximum of 16 blocks and encode each of them into a Structured Appended QR Code symbol (model 1 or 2) or Structured Appended iQR Code symbol. Structured Appended Code scanning is possible only with the same Code model.

The scanner can scan Structured Appended Code symbols and restore them to the original data string in edit mode, batch edit mode, and non-edit mode, which you can select using the QR-coded parameter menu or configuration software (ScannerSetting_2D).

Edit mode

The scanner accumulates and edits Structured Appended Code symbols read and then sends the edited data to the host computer. If the total data volume of Structured Appended Code symbols exceeds 8 kilobytes, a read error will result and the accumulated data will be discarded.

Batch edit mode (for QR Code Model 1 and Model 2 only)

If all the Structured Appended Code symbol which is split in less than four to be scanned lie within the readable area, the scanner reads them all once and then edits and sends them to the host computer.

Non-edit mode

Each time a single split Code symbol is read, the scanner sends the data read to the host computer.

When scanning Structured Appended Code symbols, the scanner beeps in a different way from usual. That is, when the scanner reads the first split code, it beeps twice and enters the Structured Appended Code scanning mode. When the scanner completes the sequence of scanning, it beeps three times.

Note: If you scan any non-split QR (iQR) Code symbol or a code other than a QR (iQR) Code symbol midway through a sequence of Structured Appended Code scanning, the scanner cancels the Structured Appended Code scanning, discards the Structured Appended Code data already scanned, and sends the code scanned last.

Note: If the scanner switches to standby in the Auto-off mode (after approx. 5 seconds of holding down the trigger switch or by releasing the trigger switch within 5 seconds) or the Structured Appended Code scanning interval exceeds approx. 3 seconds in any trigger switch operating mode except Auto-off mode, then the scanner discards the data scanned and cancels the Structured Appended Code scanning sequence.

Note: If you scan a Structured Appended Code symbol of any other Code before completion of the current scanning sequence, the scanner discards the data already scanned and starts a new scanning sequence.

6.7 Multi-line Barcode Scanning

The scanner can scan up to 3 lines of bar codes in the readable area at any one time. You can specify the number of lines to be scanned, the data output order and output format using the configuration software (ScannerSetting_2D).*

6.7.1 Number of lines

The number of lines allowed for multi-line barcode scanning is 2 or 3. This setting is essential.

6.7.2 Data output order

You can specify the data output order by designating code types*¹, heading characters*², or the number of digits to be scanned*³.

*¹ Code types should be selected from readable bar codes you enable. This setting is essential.

*² Up to two heading characters can be specified. If a question mark (?) is specified, it acts as a wild card. This setting can be omitted.

*³ The number of digits to be scanned varies depending upon the code type. This setting is essential.

Note: The number of characters for Code 39 symbols should be specified including start and stop codes.

6.7.3 Output format

You can select either the header/terminator- or comma-delimited output format.

(1) Header/terminator-delimited output format

Specifying this format allows the scanner to output multiple lines of barcode data in succession in the data transmission format selected (see Section 8.2) so that the headers and terminators act as delimiters. For UPC and EAN codes, the number of digits will be omitted.

(2) Comma-delimited output format

Specifying this format allows the scanner to output multiple lines of barcode data delimited with commas in the data transmission format selected (see Section 8.2). Note that the scanner outputs the code ID mark specified for the first line barcode and the number of digits including the delimiter commas. The number of digits will not be omitted even for UPC and EAN codes.

Note 1: Bar code types specified for multi-line barcode scanning cannot be read individually.

Note 2: The scanner cannot read multi-line barcodes of UPC/EAN with add-on.

Note 3: If linear components in a UPC/EAN Composite symbol are specified for multi-line barcode scanning, EAN.UCC Composite symbols including the specified linear components cannot be read.

6.8 Scanning an SQRC (Security QR Code) Symbol

An SQRC symbol refers to a security QR Code symbol that consists of public and nonpublic data. The nonpublic data can be read only when the encryption key configured in the scanner matches the one in the SQRC symbol.

To read an SQRC symbol with the scanner, it is necessary to enable SQRC scanning ("SQRC symbols only" or "both SQRC symbols and QR Code symbols") using the configuration software (ScannerSetting_2D). The following SQRC related parameters can be also specified--"Data transmission after match of encryption key," and "Data transmission after mismatch of encryption key."

Note: SQRC scanning requires configuring an encryption key beforehand with the SQRC configuration software (SQRC Setting) separately prepared.

7.1 Beeper

(1) Beeping

The scanner emits a short or long beeps, once or a couple of times as described below.

The beeper emits a **short beep** when:

- the scanner has read a code successfully,
 - code data read matches the master data in the data verification mode,(2-point:2 beeps, n-point:1 beep)
 - the scanner has read a Structured Appended QR (iQR) Code symbol,
 - the "Start setting" or "End setting" code is read (3 beeps) or the parameter setting QR Code symbols are read (1 beep) from the QR-coded parameter menu (given in Chapter 12),
 - the configuration software (ScannerSetting_2D) starts up or accepts new settings (3 beeps), or
 - the scanner has read a batch-process QR Code symbol generated with the configuration software (ScannerSetting_2D) (3 beeps).
 - a Bluetooth® wireless link is established, or
 - the charge of the battery cartridge has lowered, turning the scanner off (5 beeps, slightly longer).
-

The beeper emits a **long beep** when:

- code data read does not match the master data in the data verification mode,
 - the scanner has read Structured Appended QR (iQR) Code symbols in edit mode and the accumulated data exceeds 8 kilobytes,
 - a master code has the wrong number of digits during registration of master data,
 - a code other than a parameter setting code is read during parameter setting by 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 data read does not match the one configured in the scanner in SQRC scanning (when the "data transmission after mismatch of encryption key" is disabled),
 - a communications error has occurred, or
 - an invalid control command is received.
 - a Bluetooth® wireless link is broken,
 - transfer of communications adapter parameter settings is ended normally (1 beep) or abnormally (3 beeps), or
 - the scanner has failed to save the parameter settings entered with the QR-coded parameter menu or the configuration software.
-

When the scanner is turned on, the configuration software (ScannerSetting_2D) provides a choice of beeper ON/OFF (default: ON), but does not provide a choice of beeper tone.

You can disable the beeper using the QR-coded parameter menu or configuration software (ScannerSetting_2D)*. In any of the following cases, however, the beeper sounds regardless of that beeper setting:

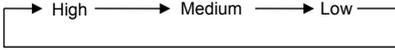
- when you make settings by scanning the QR-coded parameter menu,
- when the scanner receives a beeper-ON command from the host computer,
- when the configuration software (ScannerSetting_2D) starts up or any setting you have made is established,
- when the scanner reads a batch-process QR Code symbol, and
- when the parameter values are saved by a PW command (refer to Appendix 2).
- when the Bluetooth wireless link is established or broken,
- when the charge of the battery cartridge has lowered,
- when the scanner has failed to save the parameter settings, or
- when transfer of communications adapter parameter settings is normally ended.

(2) Adjusting the beeper volume

You can adjust the beeper volume to three levels--high, medium and low--using the QR-coded parameter menu or configuration software (ScannerSetting_2D). The factory default is High.

Note: Enabling the Bluetooth interface with the "Start operation" QR Code symbol allows the beeper volume adjustment.

Each time the "Beeper volume" QR Code symbol is read, the beeper volume cycles as shown below. The factory default is High.



Even if the scanner is turned off, this setting will be retained.

7.2 Indicator LED

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

The indicator LED lights **in blue** when:

- the scanner has read a code successfully,
 - the scanner has read a Structured Appended QR (iQR) Code symbol,
 - code data read matches the master data in the data verification mode, or
 - master data has been successfully registered in the data verification mode.
-

The indicator LED lights **in green** when:

- the scanner is ready to register master data.
-

The indicator LED lights **in red** when:

- the trigger switch is pressed when the trigger switch control is disabled.
-

The indicator LED **flashes in red** when:

- the scanner has received an abnormal control command,
 - the scanner has failed to edit data read,
 - no master data has been registered in the data verification mode(n-point).
 - code data read does not match the master data in the data verification mode,
 - a master code has the wrong number of digits during registration of master data,
 - the scanner has read Structured Appended QR (iQR) Code symbol in edit mode and the accumulated data exceeds 8 kilobytes,
 - the scanner has failed to save 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 read during parameter setting by the QR-coded parameter menu,
 - a transmission error or timeout occurred when the scanner was communicating with the configuration software (ScannerSetting_2D),
 - a run-time error has occurred in ADF script,
 - the trigger switch is pressed when a Bluetooth wireless link is broken.
 - the trigger switch is pressed on "End operation."
-

The indicator LED **flashes in orange** when:

- the charge of the battery cartridge has lowered or
 - the scanner turns itself off due to low charge of the battery cartridge.
-

The indicator LED **flashes in blue** when:

- the "Start setting" or "End setting" code is read from the QR-coded parameter menu (given in Chapter 12),
 - the scanner starts or ends a sequence of Structured Appended QR (iQR) Code scanning,
 - the parameter values are saved by a PW command (refer to Appendix 2),
 - scanner as master is establishing the Bluetooth wireless link.
 - scanner as slave is establishing the Bluetooth wireless link
-

The indicator LED can be disabled with the QR-coded parameter menu or configuration software (ScannerSetting_2D). In any of the following cases, however, the indicator LED comes on regardless of the current LED setting.

- When the scanner is being customized with the QR-coded parameter menu (Chapter 12),
- When the scanner receives an LED-ON command (LB, LG or LR) from the host computer (refer to Appendix 2),
- When the configuration software (ScannerSetting_2D) starts up or any setting is newly established,
- When the scanner reads a batch-process QR Code symbol,
- When the parameter values are saved by a PW command (refer to Appendix 2),
- When the scanner is in the scanner entry mode (refer to control command "E" in Appendix 2),
- When a master code is being registered or the registration is completed,
- When any error has occurred during registration of a master code,
- When the scanner has failed to save parameter values specified with the configuration software (ScannerSetting_2D), QR-coded parameter menu, or control commands,
- When a run-time error has occurred in ADF script, or
- When the trigger switch is pressed when the trigger switch control is disabled.
- the Bluetooth® wireless link status is displayed,
- the charge of the battery cartridge has lowered,
- the charging/discharging state is displayed,
- the parameter transfer status from the scanner to the communications adapter is displayed, or
- the scanner failed to save setting.

7.3 Marker Beam

The red marker beam (semiconductor laser) comes on to indicate the scanning area as a guide.

The marker provides a choice of the three modes--normal marker mode, marker-OFF mode and marker-ON mode that can be selected by using the QR-coded parameter menu or the configuration software (ScannerSetting_2D).

(1) Normal marker mode

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

When the scanner is ready to scan (that is, within approx. 5 seconds from the depression of the trigger switch or until completion of reading from that), the marker beam remains on. If you release the trigger switch when the scanner is ready, the marker beam will go off.

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

In the momentary switching mode, holding down the trigger switch turns on the marker beam.

When the scanner is ready to scan (that is, while the trigger switch is held down in the momentary switching mode or when the scanner is ready to scan in the alternate switching mode), the marker beam remains on. When the scanner is on standby (that is, the trigger switch is released in the momentary switching mode or when the scanner is on standby in the alternate switching mode), the marker beam will go off.

When the trigger switch is in Momentary switching mode (Reverse Type):

In the momentary switching mode (Reverse Type), the marker beam remains on while the trigger switch is in the released position.

When the scanner is ready to scan (that is, the trigger switch is released in the momentary switching mode reverse type), the marker beam remains on. When the scanner is on standby (that is, while the trigger switch is held down in the momentary switching mode reverse type), the marker beam will go off.

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

Turning the scanner on activates the marker and keeps it on.

If the scanner receives the Z, READOFF or LOFF command, it turns off the marker beam; if it receives the R, READON or LON command, it keeps the marker beam on.

When the trigger switch is in Auto sensing mode or auto sense state of the Auto stand mode:

When the scanner senses a code coming into the readable area and becomes ready to scan, it automatically turns on the marker beam. After approx. 3 seconds from completion of scanning or if scanning is not completed within approx. 3 seconds, the scanner switches to standby and turns off the marker beam.

(2) Marker-OFF mode

The marker beam will not come on under any conditions.

(3) Marker-ON mode

When the scanner switches to standby, the marker beam is turned on for approx. 30 seconds.

When it is ready to scan, the marker beam remains on.

7.4 Illumination LEDs

When the scanner is ready to scan, the illumination LEDs are turned on.

The illumination LEDs provide the two choices--ON, OFF by using the configuration software (ScannerSetting_2D).

Enable or disable of "Power save mode" can be selected. The default setting is "Enable".

When "Power save mode" is enabled, 20% power consumption is saved by less brightness of the illumination LEDs.

(Note) When "Power save mode" is enabled, a reading distance may be shorter under 500 lx ambient illumination.

8.1 Bluetooth® Interface

The QR-coded parameter menu and the configuration software (ScannerSetting_2D) provide a choice of various communications conditions. Under the communications conditions you choose, code data read can be transferred to the external equipment or computer.

(1) Communications protocol

When the scanner is in SPP profile, you can select either non-acknowledge mode, ACK/NAK mode, or data packaging mode.

Non-acknowledge mode (default)

The scanner transfers code data read, regardless of the CTS signal level.

ACK/NAK mode

The scanner transfers code data read, regardless of the CTS signal level. After that, however, it waits for the response from the host and processes it. The configuration software (ScannerSetting_2D) only provides ACK/NAK timeout settings from 100 ms to 9.9 s in 100 ms increments.

ACK: Normal end

NAK: Retransfer

Data packaging mode

The scanner wraps the code data in a packet with a CRC for transfer to the Communication Adapter (BA series) ^(*) or a commercially available Bluetooth® device or other equipment. For further details, see Section 8.5.

(2) Timeout period for slave to wait for a connection request

The scanner, as a slave, waits for a connection request from the master for the specified timeout period--2 (default), 4, 10, or 30 minutes.

If the scanner cannot receive a connection request from the master within the specified timeout period, it switches to standby, the same status as the Bluetooth® wireless link has been broken.

^(*) This function is supported in firmware version 2.00 or later

8.2 HID Profile

The scanner supports the Human Interface Device Profile (HID) that enables connecting to an iPhone or iPad equipped with Bluetooth module that is compatible with Bluetooth® Specification Ver. 2.1+EDR.

(1) CAPS Lock state

Select the CAPS Lock ON or OFF to match the state of the host computer. (Default: CAPS Lock OFF)

(2) Keyboard type

Select the type of the connected keyboard. (Default: Type 106, Japanese)

(3) Numeric data transmission format

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

(4) Binary data conversion

Select the conversion type to be applied to data read, from the following:

- "No conversion"(ASCII) (default) : Outputs 00h to 7Fh data in ASCII format bitwise. Selecting this parameter does not output 80h to FFh data. Scanning operation is completed, when data is 80h to FFh.
- "Binary conversion" : Converts 00h to FFh data to binary format bitwise and outputs it.
- "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 apply, it converts such data to binary format bitwise and outputs it instead.
8140 to 9FFC、E040 to EFFC are allocated for Kanji
e.g.) When scanning code data is “Kanji”,
Data : Kanji
Shift JIS : 8ABF 8E9A

| Binary conversion format | Output data | Note |
|--------------------------|---|--|
| No conversion | No output | Scanning operation is completed only. |
| Binary conversion | 8Ah BFh 8Eh 9Ah Assigned characters | Output with binary data 1 byte by 1 byte |
| Kanji conversion | “Kanji” | Output with Kanji conversion (Note) |

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

8.3 Communication Format

■ Data transmission format

Select one of the following two data transmission formats.

| Header | Scanner ID | Code ID mark | Prefix | No. of digits | | | | Code data | Suffix | Terminator | BCC |
|--------|------------|--------------|--------|---------------|----|----|----|-----------|--------|------------|-----|
| | | | | n1 | n2 | n3 | n4 | | | | |
| | | | | | | | | | | | |

| Header | Scanner ID | Prefix | Code ID mark | No. of digits | | | | Code data | Suffix | Terminator | BCC |
|--------|------------|--------|--------------|---------------|----|----|----|-----------|--------|------------|-----|
| | | | | n1 | n2 | n3 | n4 | | | | |
| | | | | | | | | | | | |

(1) Header/Terminator

The following choices are available.

SPP profile

Header: None (default), STX, or User Selection

Terminator: CR (default), None, LF, CR/LF, ETX, or User Selection

HID profile

Header: None (default), TAB, ESC, ENTER, or User Selection

Terminator: ENTER (default), None, TAB, ESC, or User Selection

For details, refer to Chapter 11.

(2) Scanner ID

A scanner ID is a unique serial number assigned to an individual scanner at the time of shipment. It consists of six numerals.

(3) Prefix/Suffix

A prefix or suffix consists of up to eight ASCII characters (00h to FFh). You can set a prefix or suffix with the configuration software (ScannerSetting_2D). (Default: No prefix or suffix)

(4) BCC

The Block Character Check (BCC) exclusive-ORs all bits at the same bit level in characters following the header and preceding the terminator in a transmission block to generate a horizontal parity byte to be transferred in a binary code. The BCC can be enabled or disabled. If no header is prefixed or the USB keyboard interface is selected, no BCC will be transferred.

(5) Code ID mark

This optional field specifies the code system. It offers ten combinations with five code ID 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 ID mark. (Default: No transmission)

(1/2)

| Code type | | Code ID mark | | | | |
|-----------|------------------------------|-----------------|------------|----------|------------|--|
| | | Type 1 | | Type 2 | | |
| | | Coupling | Separating | Coupling | Separating | |
| 2D codes | QR Code | | Q | | Q | |
| | Structured Appended QR Code | Edit mode | Q | | Q | |
| | | Batch edit mode | Q | | Q | |
| | | Non-edit mode | S | | S | |
| | MicroQR Code | | Q | | Q | |
| | SQRC | | Q | | Q | |
| | iQR Code | | G | | G | |
| | Structured Appended iQR Code | 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 | | |

| Code type | | | Code ID mark | | | |
|----------------------|-----------------------|---------------------|------------------|------------|----------|------------|
| | | | Type 1 | | Type 2 | |
| | | | Coupling | Separating | Coupling | Separating |
| Bar codes | UPC-A | Without add-on | | A | A | |
| | | With 2-digit add-on | Linear component | A | A | |
| | | | Add-on | None | None | |
| | | With 5-digit add-on | Linear component | A | A | |
| | | | Add-on | None | None | |
| | | UPC-E | Without add-on | | C | E |
| | With 2-digit add-on | | Linear component | C | E | |
| | | | Add-on | None | None | |
| | With 5-digit add-on | | Linear component | C | E | |
| | | | Add-on | None | None | |
| | EAN-13 | | Without add-on | | A | F |
| | | With 2-digit add-on | Linear component | A | F | |
| | | | Add-on | None | None | |
| | | With 5-digit add-on | Linear component | A | F | |
| | | | Add-on | None | None | |
| | | EAN-8 | Without add-on | | B | FF |
| | With 2-digit add-on | | Linear component | B | FF | |
| | | | Add-on | None | None | |
| | With 5-digit add-on | | Linear component | B | FF | |
| | | | Add-on | None | None | |
| | Interleaved 2of5 | | | I | I | |
| | Standard 2of5(short) | | | H | H | |
| | Standard 2of5(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 ID mark | | | | |
|--|--|-------------|---------------------|------------------|------------|------------|------------|------------|
| | | | | Type 1 | | Type 2 | | |
| | | | | Coupling | Separating | Coupling | Separating | |
| GS1 Composite symbols | GS1 DataBar (Note 1) CC-A GS1 DataBar (Note 1) CC-B | GS1 DataBar | | V | R | V | R | |
| | | CC-A, CC-B | | None | Y (Note 2) | None | Y (Note 2) | |
| | UPC-A CC-A, UPC-A CC-B | UPC-A | Without add-on | | V | A | V | A |
| | | | With 2-digit add-on | Linear component | V | A | V | A |
| | | | | Add-on | None | None | None | None |
| | | | With 5-digit add-on | Linear component | 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 |
| | | | With 2-digit add-on | Linear component | V | A | V | F |
| | | | | Add-on | None | None | None | None |
| | | | With 5-digit add-on | Linear component | 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 |
| | | | With 2-digit add-on | Linear component | V | C | V | E |
| | | | | Add-on | None | None | None | None |
| | | | With 5-digit add-on | Linear component | 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 |
| | | | With 2-digit add-on | Linear component | V | B | V | FF |
| | | | | Add-on | None | None | None | None |
| | | | With 5-digit add-on | Linear component | 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 ID mark | | | | |
|-----------|------------------------------|-----------------|------------|-----------------|------------|--|
| | | Type 3 | | Type 4 (Note 3) | | |
| | | Coupling | Separating | Coupling | Separating | |
| 2D codes | QR Code | | P01 | |]Qm | |
| | Structured Appended QR Code | Edit mode | P01 | |]Qm | |
| | | Batch edit mode | P01 | |]Qm | |
| | | Non-edit mode | P01 | | S (Note 4) | |
| | MicroQR Code | | P01 | | Q (Note 4) | |
| | SQRC | | P01 | | Q (Note 4) | |
| | iQR Code | | G | |]Qm | |
| | Structured Appended iQR Code | 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 | |

| Code type | | | Code ID mark | | | | |
|----------------------|-----------------------|---------------------|------------------|------------|-----------------|------------|--------------|
| | | | Type 3 | | Type 4 (Note 3) | | |
| | | | Coupling | Separating | Coupling | Separating | |
| Bar codes | UPC-A | Without add-on | | A | |]X0 | |
| | | With 2-digit add-on | Linear component | A | |]X3 |]X0 |
| | | | Add-on | None | | None |]X1 (Note 2) |
| | | With 5-digit add-on | Linear component | A | |]X3 |]X0 |
| | | | Add-on | None | | None |]X2 (Note 2) |
| | | UPC-E | Without add-on | | A | |]X0 |
| | With 2-digit add-on | | Linear component | A | |]X3 |]X0 |
| | | | Add-on | None | | None |]X1 (Note 2) |
| | With 5-digit add-on | | Linear component | A | |]X3 |]X0 |
| | | | Add-on | None | | None |]X2 (Note 2) |
| | EAN-13 | | Without add-on | | A | |]E0 |
| | | With 2-digit add-on | Linear component | A | |]E3 |]E0 |
| | | | Add-on | None | | None |]E1 (Note 2) |
| | | With 5-digit add-on | Linear component | A | |]E3 |]E0 |
| | | | Add-on | None | | None |]E2 (Note 2) |
| | | EAN-8 | Without add-on | | A | |]E4 |
| | With 2-digit add-on | | Linear component | A | |]E5 |]E4 |
| | | | Add-on | None | | None |]E1 (Note 2) |
| | With 5-digit add-on | | Linear component | A | |]E6 |]E4 |
| | | | Add-on | None | | None |]E2 (Note 2) |
| | Interleaved 2of5 | | | F | |]Im | |
| | Standard 2of5(short) | | | G | |]R0 | |
| | Standard 2of5(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 | | |

| Code type | | | | Code ID mark | | | | |
|--|--|------------|---------------------|------------------|--------------|-----------------|--------------|--------------|
| | | | | Type 3 | | Type 4 (Note 3) | | |
| | | | | Coupling | Separating | Coupling | Separating | |
| GS1 Composite symbols | GS1 DataBar (Note 1) CC-A GS1 DataBar (Note 1) CC-B | RSS | | T | R |]e0 | | |
| | | CC-A, CC-B | | None | X (Note 2) | None | | |
| | UPC-A CC-A, UPC-A CC-B | UPC-A | Without add-on | | T | A |]X0 | |
| | | | With 2-digit add-on | Linear component | T | A |]X3 |]X0 |
| | | | | Add-on | None | None | None |]X1 (Note 2) |
| | | | With 5-digit add-on | Linear component | T | A |]X3 |]X0 |
| | | | | Add-on | None | None | None |]X2 (Note 2) |
| | | | CC-A, CC-B | | None | X (Note 2) |]e0 (Note 2) | |
| | EAN-13 CC-A, EAN-13 CC-B | EAN-13 | Without add-on | | T | A |]E0 | |
| | | | With 2-digit add-on | Linear component | T | A |]E3 |]E0 |
| | | | | Add-on | None | None | None |]E1 (Note 2) |
| | | | With 5-digit add-on | Linear component | T | A |]E3 |]E0 |
| | | | | Add-on | None | None | None |]E2 (Note 2) |
| | | | CC-A, CC-B | | None | X (Note 2) |]e0 (Note 2) | |
| | UPC-E CC-A, UPC-E CC-B | UPC-E | Without add-on | | T | A |]X0 | |
| | | | With 2-digit add-on | Linear component | T | A |]X3 |]X0 |
| | | | | Add-on | None | None | None |]X1 (Note 2) |
| | | | With 5-digit add-on | Linear component | T | A |]X3 |]X0 |
| | | | | Add-on | None | None | None |]X2 (Note 2) |
| | | | CC-A, CC-B | | None | X (Note 2) |]e0 (Note 2) | |
| | EAN-8 CC-A, EAN-8 CC-B | EAN-8 | Without add-on | | T | A |]E4 | |
| | | | With 2-digit add-on | Linear component | T | A |]E5 |]E4 |
| | | | | Add-on | None | None | None |]E1 (Note 2) |
| With 5-digit add-on | | | Linear component | 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 represents: GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Limited, GS1 DataBar Stacked, GS1 DataBar Expanded, GS1 DataBar Stacked Omnidirectional, and GS1 DataBar Expanded Stacked.

(Note 2) These code ID marks are contained in code data.

(Note 3) Type 4 is a code ID mark system compliant with 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) | Options |
|--------------|----------------------------------|--|---|
| 2D codes | QR Code | 0 | Model 1 |
| | | 1 | Model 2 |
| | iQR Code | A | No FNC1 in the 1st character positions from start code |
| | | C | FNC1 in the 1st character positions from start code |
| | | E | FNC1 in the 2nd character positions 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 | |
| Bar codes | Interleaved 2of5 | 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 ID mark for Interleaved 2of5 with option “Scanning enabled, with a check digit (Check digit transmission disabled)” is JI3.

J: Flag character (ASCII 93h)

I: Code character (Interleaved 2of5)

3: Modifier character (See the table above.)

(Note 4) For code ID marks not compliant with the AIM USA “Guidelines on Symbology Identifiers,” same characters as ones defined in Type 1 apply.

(6) Number of digits

This optional field specifies whether or not to transmit the number of digits (2 or 4 bytes) of code data to transmit or disables the transmission (default). Note that UPC and EAN codes (except GS1-128) skip this field.

4 digits (4 byte) transmission

- n1: thousands (0 to 9)
- n2: hundreds (0 to 9)
- n3: tens (0 to 9)
- n4: units (0 to 9)

2 digits (2 byte) transmission

- n1: tens (0 to 9)
- n2: units (0 to 9)

(7) Code data

The data format for each symbology is described below.

QR Code / MicroQR Code / iQR Code

Code data read will be transmitted as is.

Structured Appended QR Code / Structured Appended iQR Code

In edit mode and batch edit mode (Structured Appended QR Code only): The scanner edits code data read and then 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 code data read. The code number and the number of splits are 1 byte each and the parity, 2 bytes in hexadecimal format.

SQRC

Code data read will be transmitted as is. When “Enable transmission of disclosed data only” is selected in “SQRC Encryption key match”, it transmits only non-disclosure data.

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

X_n : Disclosure data

Y_m : Non-disclosure data

When “Disclosure data plus non-disclosure 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 “Transmit only non-disclosure data” is selected, the following format applies.

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

PDF417, MicroPDF417, MaxiCode, Data Matrix, and Aztec

Code data read will be transmitted as is.

UPC-A

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

The conversion to the GTIN format is selectable. For the GTIN format conversion, refer to Section 8.3.

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

0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D

0: Padding character for adjustment of the data length

S: Number system character

UPC-A with add-on

A code ID mark precedes add-on code data under the conditions "Code ID mark: Type 4" and "Code ID mark output mode: Separating." (For details about the code ID mark, refer to (5) Code ID mark on pages 42 to 46.)

The conversion to the GTIN format is selectable. For the GTIN format conversion, refer to Section 8.3.

When the conversion to the GTIN format is disabled, the following formats apply.

With 2-digit add-on:

0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D X₁₁ X₁₂

With 5-digit add-on:

0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D X₁₁ X₁₂ X₁₃ X₁₄ X₁₅

0: Padding character for adjustment of the data length

S: Number system character

X₁₁₋₁₅: Add-on code data

UPC-E

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

The conversion to the GTIN format or to the UPC-A are selectable. For the GTIN format conversion, refer to Section 8.3.

When the conversion to the GTIN format is disabled, the following formats apply.

- Conversion to UPC-A disabled

$X_1 X_2 X_3 X_4 X_5 X_6 C/D$

- Conversion to UPC-A enabled

$X_6=0-2 \quad 0 S X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D$

$X_6=3 \quad 0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D$

$X_6=4 \quad 0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D$

$X_6=5-9 \quad 0 S X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6 C/D$

0: Padding character for adjustment of the data length

S: Number system character

UPC-E with add-on

A code ID mark precedes add-on code data under the conditions "Code ID mark: Type 4" and "Code ID mark output mode: Separating." (For details about the code ID mark, refer to (5) Code ID mark on pages 42 to 46.)

The conversion to the GTIN format or to the UPC-A are selectable. For the GTIN format conversion, refer to Section 8.3.

When the conversion to the GTIN format is disabled, the following formats apply.

With 2-digit add-on:

- Conversion to UPC-A disabled

$0 X_1 X_2 X_3 X_4 X_5 X_6 C/D X_7 X_8$

- Conversion to UPC-A enabled

$X_6=0-2 \quad 0 S X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5 C/D X_7 X_8$

$X_6=3 \quad 0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D X_7 X_8$

$X_6=4 \quad 0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D X_7 X_8$

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

With 5-digit add-on:

- Conversion to UPC-A disabled

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

- Conversion to UPC-A enabled

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

$X_6=3 \quad 0 S X_1 X_2 X_3 0 0 0 0 0 X_4 X_5 C/D X_7 X_8 X_9 X_{10} X_{11}$

$X_6=4 \quad 0 S X_1 X_2 X_3 X_4 0 0 0 0 0 X_5 C/D X_7 X_8 X_9 X_{10} X_{11}$

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

0: Padding character for adjustment of the data length

S: Number system character

X_{7-11} : Add-on code data

EAN-13

You can select whether or not to transmit the two prefix characters "P₁" and "P₂" and a check digit to the host. The conversion to the ISBN/ISSN format is selectable. Enabling the conversion allows EAN-13 code with prefix characters 978 or 979 to be converted into the ISBN format, and EAN-13 code with prefix characters 977, into the ISSN format.

The conversion to the GTIN format is also selectable. For the GTIN format conversion, refer to Section 8.3.

When the conversion to the GTIN format is disabled, the following formats apply.

- Conversion to ISBN/ISSN disabled

P₁ P₂ P₃ X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ C/D

P_n: Prefix characters

- Conversion to ISBN/ISSN enabled

To the ISBN format

X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ C/D (*¹)

To the ISSN format

X₁ X₂ X₃ X₄ X₅ X₆ X₇ C/D (*¹)

(*¹) Check digits in the ISBN/ISSN format are calculated (MOD-11) and transferred to the host.

EAN-13 with add-on

A code ID mark precedes add-on code data under the conditions "Code ID mark: Type 4" and "Code ID mark output mode: Separating." (For details about the code ID mark, refer to (5) Code ID mark on pages 42 to 46.)

The conversion to the GTIN format is selectable. For the GTIN format conversion, refer to Section 8.3.

When the conversion to the GTIN format is disabled, the following formats apply.

With 2-digit add-on:

P₁ P₂ P₃ X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ C/D X₁₀ X₁₁

With 5-digit add-on:

P₁ P₂ P₃ X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ C/D X₁₀ X₁₁ X₁₂ X₁₃ X₁₄

P_n: Prefix characters

X₁₀₋₁₄: Add-on code data

EAN-8

You can select whether or not to transmit a check digit to the host. The conversion to EAN-13 is selectable.

The conversion to the GTIN format is also selectable. For the GTIN format conversion, refer to Section 8.3.

When the conversion to the GTIN format is disabled, the following formats apply.

- Conversion to EAN-13 disabled

P₁ P₂ P₃ X₁ X₂ X₃ X₄ C/D

- Conversion to EAN-13 enabled

0 0 0 0 0 P₁ P₂ P₃ X₁ X₂ X₃ X₄ C/D

P_n: Prefix characters

EAN-8 with add-on

A code ID mark precedes add-on code data under the conditions "Code ID mark: Type 4" and "Code ID mark output mode: Separating." (For details about the code ID mark, refer to (5) Code ID mark on pages 42 to 46.)

The conversion to the GTIN format is selectable. For the GTIN format conversion, refer to Section 8.3.

When the conversion to the GTIN format is disabled, the following formats apply.

With 2-digit add-on:

$P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D X_5 X_6$

With 5-digit add-on:

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

P_n : Prefix characters

X_{5-9} : Add-on code data

Code 39

Code data read will be transmitted as is.

You can select whether or not to transmit start and stop codes ("*").

Interleaved 2of5, Standard 2of5

The scanner transmits code data read, starting from the character following the start code to the one preceding the stop code. No start/stop codes will be transmitted.

Codabar (NW-7)

The scanner transmits code data read including the start/stop codes. You can select whether or not to transmit start/stop codes.

Code 128 (GS1-128)

The scanner transmits code data read, starting from the character following the start code to the one preceding the check digit. Start/stop codes, FNC codes, or check digit will not be transmitted. Note that FNC1 placed in character positions other than the 1st and 2nd ones from the start code will be converted to GS (1Dh) and transferred.

The conversion to the GTIN format is also selectable. For the GTIN format conversion, refer to Section 8.3.

Code 93

The scanner transmits code data read, excluding start and stop codes and a check digit.

GS1 DataBar

Code data read will be transmitted as is.

FNC1 of GS1 DataBar Expanded will be converted to GS(1Dh) and can be selectable from either transferred or user selection.

The conversion to the GTIN format is also selectable. For the GTIN format conversion, refer to Section 9.5.

GS1 DataBar Composite symbols

Code data read will be transmitted as is.

Under the conditions “Code ID mark: Type 1” and “Code ID mark output mode: Separating,” a separator (GS: 1Dh) and 2D code ID mark are inserted between the linear component and 2D Composite component. (For details about the code ID mark, refer to (5) Code ID mark)

Under the conditions “Code ID mark: Type 4” and “Linear component length (GS1 Databar, GS1-128): Variable,” a separator (GS: 1Dh) is inserted between the linear component and 2D Composite component.

EAN/UPC Composite symbols

Code data read will be transmitted as is.

You can select whether or not to transmit a check digit of the linear component (EAN/UPC).

Under the conditions “Code ID mark: Type 1” and “Code ID mark output mode: Separating,” a separator (GS: 1Dh) and 2D code ID mark are inserted between the linear component and 2D Composite component.

Under the conditions “Code ID mark: Type 2,” the 2D code ID mark is inserted between the linear component and 2D Composite component. (For details about the code ID mark, refer to (5) Code ID mark)

8.4 GTIN Format Conversion

Enabling the GTIN (Global Trade Item Number) format conversion allows UPC-A, UPC-E, EAN-13, EAN-8, and Interleaved 2of5 (14-digit) data to output in the GTIN format. It also allows GS1 DataBar and GS1-128 data in the GTIN format to output in the EAN format (product code format).

Note: Under any of the following conditions, the GTIN format conversion is invalid.

- In scanning bar code types specified for multi-line barcode scanning
- In any of the data edit modes (data extraction mode, data substitution mode, data blocksorting mode, and ADF script mode)

(1) Conversion from UPC/EAN/Interleaved 2of5 (14-digit) to GTIN format

Conversion provides two choices--16- and 14-digit GTIN formats. The former adds the Application Identifier (AI) "01" and Package Indicator PI as a prefix, and the latter, a PI only.

If the GTIN format conversion is enabled, however, the output formats available for UPC-A, UPC-E, EAN-13, and EAN8 do not apply.

UPC-A

- Data read

0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D

0: Padding character for adjustment of the data length

S: Number system character

- Conversion to 16-digit GTIN format (AI "01" and PI added)

0 1 PI 0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D ^{(*)1}

^{(*)1} Check digits are calculated again and transferred regardless of the transmission specified.

- Conversion to 14-digit GTIN format (PI added)

PI 0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D ^{(*)2}

^{(*)2} Check digits are calculated again and transferred regardless of the transmission specified.

UPC-A with add-on

- Data read

With 2-digit add-on:

0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D X₁₁ X₁₂

With 5-digit add-on:

0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D X₁₁ X₁₂ X₁₃ X₁₄ X₁₅

0: Padding character for adjustment of the data length

S: Number system character

X₁₁₋₁₅: Add-on code data

- Conversion to 16-digit GTIN format (AI "01" and PI added)

With 2-digit add-on:

0 1 PI 0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D X₁₁ X₁₂ ^{(*)1}

With 5-digit add-on:

0 1 PI 0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D X₁₁ X₁₂ X₁₃ X₁₄ X₁₅ ^{(*)1}

^{(*)1} Check digits are calculated again and transferred regardless of the transmission specified.

- Conversion to 14-digit GTIN format (PI added)

With 2-digit add-on:

PI 0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D X₁₁ X₁₂ ^{(*)2}

With 5-digit add-on:

PI 0 S X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ C/D X₁₁ X₁₂ X₁₃ X₁₄ X₁₅ ^{(*)2}

^{(*)2} Check digits are calculated again and transferred regardless of the transmission specified.

UPC-E

- Data read

0 X₁ X₂ X₃ X₄ X₅ X₆ C/D

0: Padding character for adjustment of the data length

- Conversion to 16-digit GTIN format (AI "01" and PI added)

X₆=0-2 0 1 PI 0 S X₁ X₂ X₆ 0 0 0 0 X₃ X₄ X₅ C/D ^{(*)1}

X₆=3 0 1 PI 0 S X₁ X₂ X₃ 0 0 0 0 X₄ X₅ C/D ^{(*)1}

X₆=4 0 1 PI 0 S X₁ X₂ X₃ X₄ 0 0 0 0 X₅ C/D ^{(*)1}

X₆=5-9 0 1 PI 0 S X₁ X₂ X₃ X₄ X₅ 0 0 0 0 X₆ C/D ^{(*)1}

^{(*)1} Check digits are calculated again and transferred regardless of the transmission specification.

- Conversion to 14-digit GTIN format (PI added)

X₆=0-2 PI 0 S X₁ X₂ X₆ 0 0 0 0 X₃ X₄ X₅ C/D ^{(*)2}

X₆=3 PI 0 S X₁ X₂ X₃ 0 0 0 0 X₄ X₅ C/D ^{(*)2}

X₆=4 PI 0 S X₁ X₂ X₃ X₄ 0 0 0 0 X₅ C/D ^{(*)2}

X₆=5-9 PI 0 S X₁ X₂ X₃ X₄ X₅ 0 0 0 0 X₆ C/D ^{(*)2}

^{(*)2} Check digits are calculated again and transferred regardless of the transmission specified.

UPC-E with add-on

- Data read

With 2-digit add-on:

0 X₁ X₂ X₃ X₄ X₅ X₆ C/D X₇ X₈

With 5-digit add-on:

0 X₁ X₂ X₃ X₄ X₅ X₆ C/D X₇ X₈ X₉ X₁₀ X₁₁

0: Padding character for adjustment of the data length

X₇₋₁₁: Add-on code data

- Conversion to 16-digit GTIN format (AI "01" and PI added)

With 2-digit add-on:

X₆=0-2 0 1 PI 0 S X₁ X₂ X₆ 0 0 0 0 X₃ X₄ X₅ C/D X₇ X₈ ^{(*)1}

X₆=3 0 1 PI 0 S X₁ X₂ X₃ 0 0 0 0 X₄ X₅ C/D X₇ X₈ ^{(*)1}

X₆=4 0 1 PI 0 S X₁ X₂ X₃ X₄ 0 0 0 0 X₅ C/D X₇ X₈ ^{(*)1}

X₆=5-9 0 1 PI 0 S X₁ X₂ X₃ X₄ X₅ 0 0 0 0 X₆ C/D X₇ X₈ ^{(*)1}

With 5-digit add-on:

X₆=0-2 0 1 PI 0 S X₁ X₂ X₆ 0 0 0 0 X₃ X₄ X₅ C/D X₇ X₈ X₉ X₁₀ X₁₁ ^{(*)1}

X₆=3 0 1 PI 0 S X₁ X₂ X₃ 0 0 0 0 X₄ X₅ C/D X₇ X₈ X₉ X₁₀ X₁₁ ^{(*)1}

X₆=4 0 1 PI 0 S X₁ X₂ X₃ X₄ 0 0 0 0 X₅ C/D X₇ X₈ X₉ X₁₀ X₁₁ ^{(*)1}

X₆=5-9 0 1 PI 0 S X₁ X₂ X₃ X₄ X₅ 0 0 0 0 X₆ C/D X₇ X₈ X₉ X₁₀ X₁₁ ^{(*)1}

^{(*)1} Check digits are calculated again and transferred regardless of the transmission specified.

- Conversion to 14-digit GTIN format (PI added)

With 2-digit add-on:

$X_6=0-2$ PI 0 S $X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5$ C/D $X_7 X_8$ ^(*2)

$X_6=3$ PI 0 S $X_1 X_2 X_3 0 0 0 0 0 X_4 X_5$ C/D $X_7 X_8$ ^(*2)

$X_6=4$ PI 0 S $X_1 X_2 X_3 X_4 0 0 0 0 0 X_5$ C/D $X_7 X_8$ ^(*2)

$X_6=5-9$ PI 0 S $X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6$ C/D $X_7 X_8$ ^(*2)

With 5-digit add-on:

$X_6=0-2$ PI 0 S $X_1 X_2 X_6 0 0 0 0 X_3 X_4 X_5$ C/D $X_7 X_8 X_9 X_{10} X_{11}$ ^(*2)

$X_6=3$ PI 0 S $X_1 X_2 X_3 0 0 0 0 0 X_4 X_5$ C/D $X_7 X_8 X_9 X_{10} X_{11}$ ^(*2)

$X_6=4$ PI 0 S $X_1 X_2 X_3 X_4 0 0 0 0 0 X_5$ C/D $X_7 X_8 X_9 X_{10} X_{11}$ ^(*2)

$X_6=5-9$ PI 0 S $X_1 X_2 X_3 X_4 X_5 0 0 0 0 X_6$ C/D $X_7 X_8 X_9 X_{10} X_{11}$ ^(*2)

^(*2) Check digits are calculated again and transferred regardless of the transmission specified.

EAN-13

- Data read

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

P_n : Prefix characters

- Conversion to 16-digit GTIN format (AI "01" and PI added)

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) Check digits are calculated again and transferred regardless of the transmission specified.

- Conversion to 14-digit GTIN format (PI added)

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) Check digits are calculated again and transferred regardless of the transmission specified.

EAN-13 with add-on

- Data read

With 2-digit add-on:

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

With 5-digit add-on:

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

P_n : Prefix characters

X_{10-14} : Add-on code data

- Conversion to 16-digit GTIN format (AI "01" and PI added)

With 2-digit add-on:

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

With 5-digit add-on:

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

^(*1) Check digits are calculated again and transferred regardless of the transmission specified.

- Conversion to 14-digit GTIN format (PI added)

With 2-digit add-on:

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

With 5-digit add-on:

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

^(*2) Check digits are calculated again and transferred regardless of the transmission specified.

EAN-8

- Data read

$P_1 P_2 P_3 X_1 X_2 X_3 X_4 X_5 C/D$

P_n : Prefix characters

- Conversion to 16-digit GTIN format (AI "01" and PI added)

$0 1 P I 0 0 0 0 0 P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D$ (*1)

(*1) Check digits are calculated again and transferred regardless of the transmission specified.

- Conversion to 14-digit GTIN format (PI added)

$P I 0 0 0 0 0 P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D$ (*2)

(*2) Check digits are calculated again and transferred regardless of the transmission specified.

EAN-8 with add-on

- Data read

With 2-digit add-on:

$P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D X_5 X_6$

With 5-digit add-on:

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

P_n : Prefix characters

X_{5-9} : Add-on code data

- Conversion to 16-digit GTIN format (AI "01" and PI added)

With 2-digit add-on:

$0 1 P I 0 0 0 0 0 P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D X_5 X_6$ (*1)

With 5-digit add-on:

$0 1 P I 0 0 0 0 0 P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D X_5 X_6 X_7 X_8 X_9$ (*1)

(*1) Check digits are calculated again and transferred regardless of the transmission specified.

- Conversion to 14-digit GTIN format (PI added)

With 2-digit add-on:

$P I 0 0 0 0 0 P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D X_5 X_6$ (*2)

With 5-digit add-on:

$P I 0 0 0 0 0 P_1 P_2 P_3 X_1 X_2 X_3 X_4 C/D X_5 X_6 X_7 X_8 X_9$ (*2)

(*2) Check digits are calculated again and transferred regardless of the transmission specified.

Interleaved 2 of 5(14-digit)

- Data read

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

- Conversion to GTIN format (AI "01" added)

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

(*1) Check digits are calculated again and transferred regardless of the transmission specified.

(2) Conversion from GS1 DataBar/GS1-128 in GTIN format to EAN format

GS1 DataBar or GS1-128 data read in the GTIN format (16-digit with AI “01”) can be converted to the EAN format if the conversion is enabled. The conversion provides two choices--13- or 14-digit EAN formats. The former trims the Application Identifier (AI) “01” and Package Indicator PI, and the latter, a PI only.

GS1 DataBar

- Data read

0 1 PI X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ X₁₁ X₁₂ C/D

PI: Package indicator

- Conversion to 13-digit EAN format (AI “01” and PI trimmed)

X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ X₁₁ X₁₂ C/D ^(*)

^(*) Check digits are calculated again and transferred regardless of the transmission specified. If the transmission of a code ID mark is enabled in the scanner, the code ID mark of EAN-13 is transferred.

- Conversion to 14-digit EAN format (AI “01” trimmed)

PI X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ X₁₁ X₁₂ C/D

GS1-128

- Data read

0 1 PI X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ X₁₁ X₁₂ X₁₃ C/D

PI: Package indicator

- Conversion to 13-digit EAN format (AI “01” and PI trimmed)

X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ X₁₁ X₁₂ X₁₃ C/D ^(*)

^(*) Check digits are calculated again and transferred regardless of the transmission specified. If the transmission of a code ID mark is enabled in the scanner, the code ID mark of EAN-13 is transferred.

- Conversion to 14-digit EAN format (AI “01” trimmed)

PI X₁ X₂ X₃ X₄ X₅ X₆ X₇ X₈ X₉ X₁₀ X₁₁ X₁₂ X₁₃ C/D

8.5 Data Packaging (Packetizing)

Data packaging is available to boost the reliability of data transfers over the Bluetooth® wireless link from the scanner to commercially available Bluetooth® device, or other target device.

Data packaging wraps the transfer data in packets with the following format. After sending a packet, the scanner waits for a response from the target device. ACK indicates a successful transfer; NAK represents a request to resend.

The scanner configuration software (ScannerSetting_2D) provides ACK/NAK timeout settings from 100 to 9900 ms in 100 ms intervals.

If there is no response within the specified time limit, the scanner sounds the error beep to indicate that the data transfer was unsuccessful. The scanner cannot read in a new code while it is waiting for a response.

This functionality provides a scanner operator working some distance from the host with better information as to whether the transfer data has been correctly transmitted to the host. Note, however, that wireless communications are such that the scanner can sometimes fail to receive ACK (or NAK) responses even when the data has been correctly transmitted. It is therefore important to use the scanner in an environment supporting stable wireless communications.

There are two types of Data Packaging mode: “Data Packaging (to host)” and “Data Packaging (to BA)”.

Data Packaging (to host)

In using a host with a Bluetooth® device, the host needs to be programmed to reply to data from the scanner. The scanner convert the bar code data read in to packets with the following format for transfer to the host.

- Data transmission format

| | | | | | | | | | |
|--------|-----|----------------------|------------------|-------|---------------|------------|------------|------------|-----|
| Header | | Number of data bytes | Container number | Spare | Transfer data | CRC | | Terminator | |
| DLE | STX | | | | | Lower half | Upper half | DLE | ETX |

The following describes each field in detail.

(1) Header (2 bytes)

This data sequence indicates the start of data packaging.

(2) Number of data bytes (2 bytes)

This specifies the number of data bytes in the packet. This number includes everything from the header to the terminator.

(3) Container number (1 bytes)

Upper 4bit : transmission number, Under 4bit : All transmission numbers

(4) Spare (1 bytes)

This field is for future expansion. The value is currently fixed at 00h.

(5) Transfer data

This is the data before packetized.

(6) CRC (2 bytes)

This 16-bit CRC is calculated from the "Number of data bytes" through "Transfer data" using the CCITT CRC polynomial $x^{16}+x^{12}+x^5+1$. The two bytes appear in little-endian order: LSB first, MSB second.

(7) Terminator (2 bytes)

This data sequence indicates the end of data packaging.

Note: If DLE (10h) is contained in the data anywhere else than in the header or terminator, it will be preceded by another DLE in data transfer. If the connection target is other than the communications adapter in data packaging, it is necessary to delete the added DLE in CRC calculation or data retrieval.

Example of analysis for packet received

Data received (hexadecimal)

10H 02h 00h 13h 00h 00h 31h 32h 33h 34h 35h 36h 37h 38h 0Dh C4h 18h 10h 03h



(1) Compare data lengths.

Data length received in packet: 0013h = 19 bytes

Data received in packet: 19 bytes

(2) Compare CRCs.

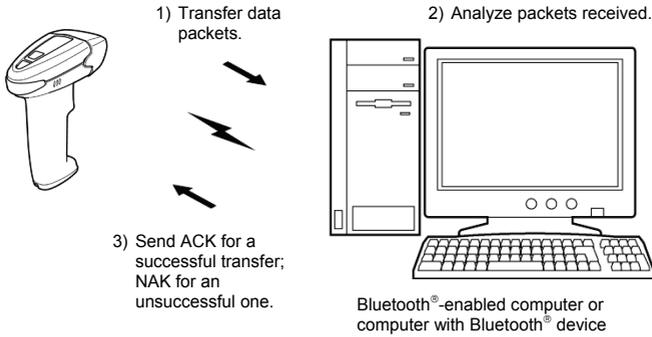
- 1) Initialize CRC to 0.
- 2) Retrieve the first data byte (00h).
- 3) Shift the current CRC value one bit to the left. If the shift produces overflow, XOR the result with 1021h.
- 4) Shift the data byte one bit to the left. If the shift produces overflow, XOR the current CRC value with 0001h.
- 5) Repeat steps 3) and 4) a total of 8 times.
- 6) Retrieve the second data byte (13h).
- 7) Repeat steps 3) and 4) a total of 8 times.
- 8) Repeat this calculation through to the final byte.
- 9) Finally repeat the calculation for the two bytes (C4h 18h) in the CRC storage area, but reverse them first because the 16-bit CRC is stored in little-endian order.

| Data | CRC |
|------|-------|
| -- | 0000h |
| 00h | 0000h |
| 13h | 1300h |
| 00h | 0013h |
| 00h | 221Ah |
| 31h | 8EF9h |
| 32h | 58C0h |
| 33h | F554h |
| 34h | 2054h |
| 35h | 2181h |
| 36h | A3A0h |
| 37h | 92A9h |
| 38h | 0059h |
| 0Dh | C244h |
| 18h | 1CE2h |
| C4h | 0000h |

(3) A result of 0000h indicates a successful transfer; a nonzero one, an error.

Scanner settings: Data packaging mode (to host)

A computer needs to be programmed to reply to the scanner.

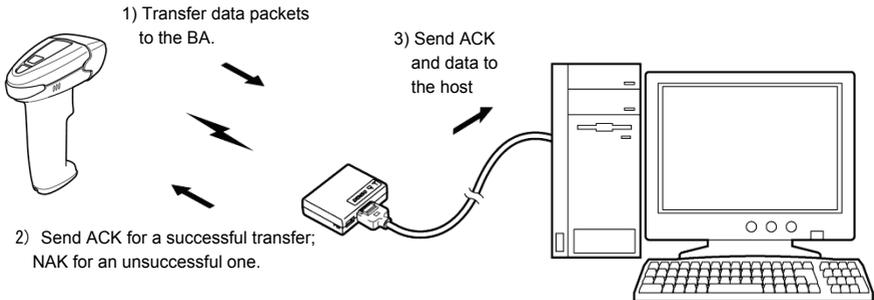


Data Packaging (to BA) ^(*)

In using the BA series, the host is not necessary to be programmed because the BA replies automatically. It uses the same transmission format as data packing (to host).

Scanner settings: Data packaging mode (to BA)

Communication adapter settings: Communication with AT/GT Series

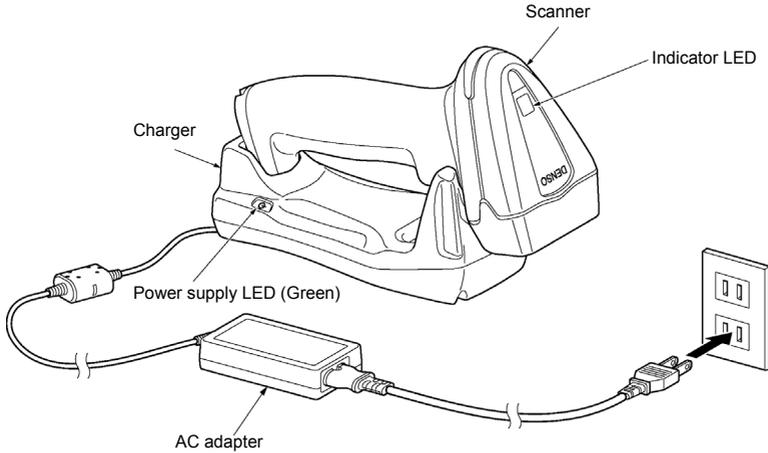


^(*) This function is supported in firmware version 2.00 or later

Chapter 9 Charging and Replacing the Battery Cartridge

The scanner sounds a warning when the charge is low. Immediately recharge the battery cartridge. Some heat generation in the scanner unit or charger during charging is perfectly normal.

9.1 Charging the Battery Cartridge



■ Important notes on care and handling

- Use the charger only in locations satisfying the following conditions.
 - Ambient temperature of 10 to 40°C
 - Humidity of 20% to 80%
 - No dust or excessive vibration
 - No splashing of water or other liquids
- Do not leave the charger in direct sunlight, in an automobile, or other location exposed to high temperatures.
- Keep the charger away from telephones, television sets, radios, and other equipment sensitive to electromagnetic noise.
- Disconnect the charger from the electrical outlet when not in use.
- Occasionally clean the charging pins with a dry cotton swab or similar material. Allowing foreign matter to accumulate can interfere with proper charging.

■ Charging procedure

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

Confirm that the charger's green power supply LED lights.

- (2) Place the scanner in the charger.

The scanner's indicator LED turns red, indicating the start of charging.

When charging is complete, approximately 2.5 hours later, the charge LED goes off and the indicator LED turns green.

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

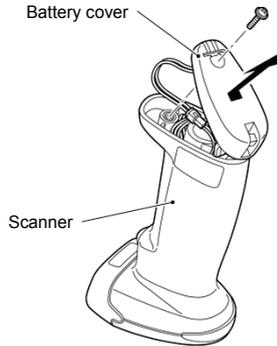
| Operation and Status | Scanner's indicator LED |
|-----------------------------------|-------------------------|
| Place the scanner in the charger. | Red |
| ↓ | |
| Charging starts. | Red |
| ↓ Approximately 2.5 hours later | |
| Charging complete. | Green |

9.2 Replacing the Battery Cartridge

The rechargeable battery cartridge is a consumable part with a finite service life. It is time to replace it when a full charge lasts a significantly shorter time than previously. Note that the service life varies with usage conditions

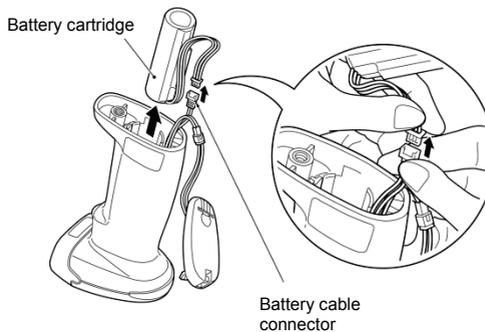
Follow the replacement procedure given below also when it is necessary to take the battery cartridge out of the scanner due to any scanner trouble.

- (1) Remove the screw that secures the battery cover.
- (2) Open the battery cover gently that is connected with the cable.

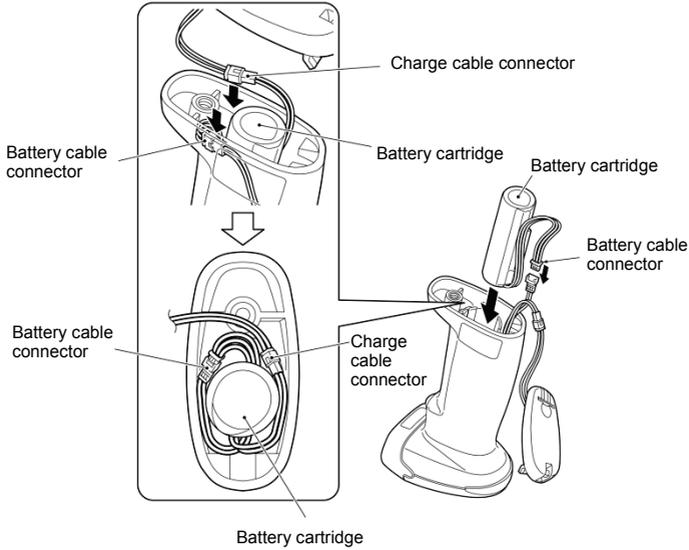


- (3) The battery cartridge out of the scanner.
- (4) Disconnect the battery cable connector.

Note: When disconnecting the cable connector, be sure to hold the connector housings as shown below. Do not pull the cables; doing so will result in broken wires.



- (5) Connect a new battery cartridge to the battery cable connector.
- (6) Insert the new battery cartridge into the scanner.
- (7) Route the cables in the space around the battery cartridge, close the battery cover, and secure it with the screw, taking care not to pinch the cables between the casing and the battery cover.



Note: After replacement of the battery cartridge, be sure to charge it.

Note: Do not peel off the protection film covering the battery cartridge.

9.3 Recycling the Battery Cartridge

The Li-ion battery inside the rechargeable battery cartridge contains recyclable rare elements, so please recycle by returning the spent rechargeable battery cartridge to the nearest shop collecting rechargeable batteries for recycling or contacting your nearest distributor.



Li-ion

Always observe the following safety precautions before throwing the spent rechargeable battery cartridge into the recycle box.

- Cover the terminals with cellophane tape or other insulating material to prevent a short circuit, which risks heat generation or fire.
- Do not remove the tubing, plastic wrapping, or other material covering the battery.
- Do not disassemble the rechargeable battery cartridge.

10.1 Outline

The scanner supports image capturing that allows you to capture a graphic as a bitmap (BMP) or JPEG image and output it to the host computer. The JPEG image offers three quality choices--standard, high, and low.

The image size can be selected from standard WVGA, 1/4 WVGA and 1/16 WVGA. If you select 1/4 WVGA or 1/16 WVGA, select also the output image area--the full image area or the center portion of the image area. When the full image area is selected, the scanner thins out the resolution of the full image area by skipping every other pixel so that the image quality becomes low; when the center portion is selected, the scanner extracts the center portion of the image area so that the visual area becomes smaller but the image quality does not change.

The scanner can also output a thumbnail to help you aim at a target. The thumbnail images can be saved as a BMP or JPEG image in 1/64 WVGA or 1/4 WVGA, respectively.

You can select the output format, image size, output image area and whether or not to use a thumbnail by modifying the parameters of the IMAGEOUT command.

Note: Selecting the HID profile disables the image capturing function.

10.2 Image Capturing Specifications

(1) Output file format

BMP or JPEG file format

(2) Image size and output image area

| Image size | Number of pixels | BMP | JPEG | Image output area |
|-----------------------|------------------|-----|------|--|
| Standard WVGA | 752 x 480 | √ | √ | Full image area |
| 1/4 WVGA | 376 x 240 | √ | √ | Full or center portion of the image area |
| 1/16 WVGA | 188 x 120 | √ | √ | Full or center portion of the image area |
| Thumbnail (1/64 WVGA) | 94 x 60 | √ | -- | Full image area |
| Thumbnail (1/4 WVGA) | 376 x 240 | -- | √ | Full image area |

(3) Communications protocol for image transmission

Xmodem 1K

(4) Image output command

IMAGEOUT#l#m#n Enable the thumbnail transmission

IMAGEOUT#l#m#n#o Disable the thumbnail transmission

The selections available for parameters l, m, n and o are as follows:

l: Output file format

| | |
|---------|---------------|
| B | BMP |
| J or J0 | JPEG (Medium) |
| J1 | JPEG (High) |
| J2 | JPEG (Low) |

m: Image size

| | |
|---|--------------|
| 0 | Standard VGA |
| 2 | 1/4 VGA |
| 4 | 1/16 VGA |

n: Image output area

| | |
|---|----------------------------------|
| F | Full image area |
| C | Center portion of the image area |

o: Thumbnail

| | |
|---|---|
| 0 | Disable thumbnail transmission |
| 1 | Enable thumbnail transmission of BMP images in 1/64 VGA |
| 2 | Enable thumbnail transmission of JPEG images in 1/4 VGA |

(5) Image capturing operation

- 1) Upon receipt of an IMAGEOUT command, the scanner captures an image, beeps three times, and switches to the image transmission mode (Xmodem 1K protocol).
- 2) When the thumbnail is enabled:
The scanner transmits a thumbnail (BMP file in 1/64 WVGA or JPEG file in 1/4 WVGA) repeatedly.
Pressing the trigger switch causes the scanner to beep once, capture an image, and start transmission (Xmodem 1K protocol).
When the thumbnail is disabled:
The scanner immediately captures an image and transmits it in the format specified by IMAGEOUT parameters (Xmodem 1K protocol).
- 3) Upon completion of transmission, the scanner beeps once and exits the image transmission mode.

(6) Notes

- Image transmission can only be command-controlled; it cannot be started by the QR-coded parameter menu.
- When the scanner is in the image transmission mode, it cannot scan bar codes or 2D codes. The protocol is fixed to the Xmodem 1K.
- Parameters of the IMAGEOUT command should be uppercase or numerical ASCII characters.
- Transmission condition settings such as header, terminator and transmission speed for the image transmission are the same as those for ordinary commands.
- Transmission speed and other conditions when the Xmodem 1K protocol is used are the same as those with the normal communications protocol (non-acknowledge mode or ACK/NAK mode).
- Upon completion of image transmission, the scanner returns to the normal communications protocol (non-acknowledge mode or ACK/NAK mode).
- In a JPEG file format, images are compression-converted, so the image quality may be lower.

(7) Image transmission time required (Typical)

The table below lists the typical image transmission time required from image capturing to conversion and transmission under the following conditions:

Communications adapter BA11-RKU or BA20-RU using the RS-232C interface

Communications protocol: Xmodem 1K

Transmission speed: 115200 bps

However, this may vary according to the Bluetooth® radio wave state and the settings made in the host computer.

| Image type | Output file format | Image file size | Image transmission time |
|-----------------------|--------------------|-----------------|-------------------------|
| Standard WVGA | BMP | 353 KB | 76 sec. |
| 1/4 WVGA | BMP | 89.2 KB | 20 sec. |
| 1/16 WVGA | BMP | 23.1 KB | 5.3 sec. |
| Thumbnail (1/64 WVGA) | BMP | 6 KB | 2.1 sec. |
| Thumbnail (1/4 WVGA) | JPEG | 4.8 KB | 2.0 sec. |
| Standard WVGA | JPEG | 25 KB* | 8.3 sec. |

* In a JPEG file format, images will be compression-converted, so the file size may vary, depending on images scanned (approx. 10 to 40 KB, normally 25 KB). No compression ratio can be specified.

Chapter 11 Parameters and Defaults

The tables below list the parameters and their defaults. Those parameters can be changed with the QR-coded parameter menu or configuration software (ScannerSetting_2D), except shadowed ones only with the configuration software. When the scanner leaves the factory, all of these parameters are set to defaults.

(1) Reading modes

| Items | Parameters | Defaults | Refer to: |
|---|---|----------|-------------|
| Scanning with Bluetooth® wireless link broken | Scan w/ Bluetooth® link broken | | Section 3.2 |
| | Cancel "Scan w/ Bluetooth® link broken" | √ | |
| Scanning modes | Regular read mode | √ | Section 6.1 |
| | Data verification mode (n-point verification) | | |
| | Data verification mode (2-point verification) | | |
| Data editing | No editing | √ | Section 6.2 |
| | Data extraction mode | | |
| | Data substitution mode | | |
| | Data blocksorting mode | | |
| | ADF script mode | | |
| Point scan mode | Enable | | Section 6.3 |
| | Disable | √ | |
| Period of double-read prevention | Double-read enabled | | Section 3 |
| | Period of double-read prevention 0.1 to 9.9 seconds | 1s | |

 : Can be changed only with the configuration software.

(2) Communications modes

| Items | Parameters | Defaults | Refer to: |
|--|--|----------|-------------|
| Connection target of scanner | BA series | √ | Section 2.2 |
| | Windows PC/Android | | |
| | iOS (iPhone/iPad) | | |
| Profile | SPP | √ | |
| | HID | | |
| Easy connection setup (See Note 1.) This item is applied to the firmware version 2.00 lower. | Windows PC (SPP,HID Profile with PINCODE) | | Section 2.2 |
| | Windows PC (SPP,HID Profile without PINCODE) | | |
| | Android (SPP Profile) | | |
| | Android (HID Profile) | | |
| | iPhone, iPad | | |
| Easy connection setup (See Note 1.) This item is applied to the firmware version 2.00 or above. | Windows PC (HID Profile) | | Section 2.2 |
| | Android, Windows PC (SPP Profile) | | |
| | Android (HID Profile) | | |
| | iPhone, iPad (HID Profile) | | |

(Note 1): Can be changed only with the QR-coded parameter menu.

(3) Bluetooth® communications parameters for SPP Profile

| Items | Parameters | Defaults | Refer to: |
|-------------------------|-------------------------------|----------|-----------------|
| Communications protocol | Non-acknowledge mode | √ | Section 8.1 (1) |
| | ACK/NAK mode | | |
| | Data packaging mode (to host) | | |
| | Data packaging mode (to BA) | | |
| ACK/NAK timeout | 0.1~9.9sec | 1sec | |

 : Can be changed only with the configuration software.

(4) Bluetooth® communications parameters for HID Profile

| Items | Parameters | Defaults | Refer to: |
|---|-----------------------------|----------|----------------------------------|
| CAPS mode | Manual | √ | Section 8.2 (1) (See Note 1.) |
| | Auto | | |
| Host's CAPS LOCK status | OFF (Lowercase letter) | √ | Section 8.2 (1) (See Note 1.) |
| | ON (Uppercase letter) | | |
| Keyboard type | U.S. English (101 key type) | | Section 8.2 (2) |
| | Germany (102 key type) | | |
| | French (102 key type) | | |
| | U.K. English (102 key type) | | |
| | Italian (102 key type) | | |
| | Swedish (102 key type) | | |
| | Japanese (106 key type) | √ | |
| Numeric key selection (0 to 9) | Inboard numeric keys | √ | Section 8.2 (3) (See Note 3.) |
| | Numeric keypad | | |
| Binary data conversion (See Note 2.) | None (ASCII) | √ | Section 8.2 (4) |
| | Binary conversion | | |
| | Kanji conversion | | |

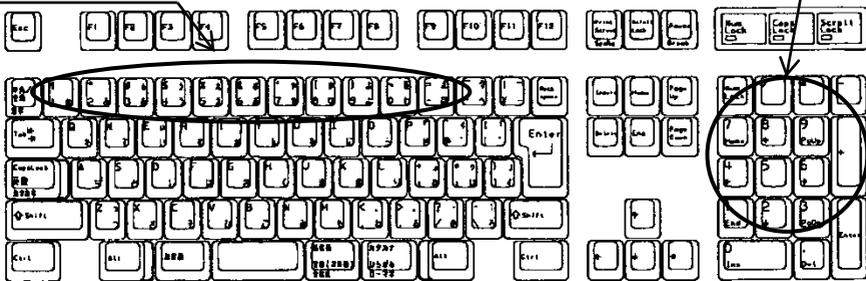
(Note 1) Select the Caps Lock state that matches host's keyboard state.

(Note 2) Some applications cannot output data correctly on the display.

(Note 3) When selecting "Numeric keypad for the numeric data transmission format, set the host's NUM LOCK to ON.

Inboard numeric keys

Numeric keypad



Japanese (106 key type)

■ : Can be changed only with the configuration software.

| Items | Parameters | Defaults | Refer to: |
|----------------------------|------------|----------|---------------|
| Special key transfer mode | Enable | | (See Note 4.) |
| | Disable | √ | |
| Data transmission interval | 0ms | √ | |
| | 1ms | | |
| | 10ms | | |
| | 15ms | | |
| | 30ms | | |
| | 50ms | | |
| | 100ms | | |
| Software keyboard | Enable | √ | |
| | Disable | | |

(Note 4) Special key transfer applies to the fields except header and terminator in the data transmission format. Enabling this function substitutes E7h to FDh data with the special keys as listed below and transmits the substituted data to the host.

The Left SHIFT, Left CTRL, and Left ALT are transmitted as a simultaneous depression with the subsequent character or key.

| Lower \ Upper | 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 Substitution Table

(5) Bluetooth® communications parameters

| Items | Parameters | Defaults | Refer to: |
|---|--|----------|---------------------------|
| Configure the scanner as master or slave | As a master | | Section 2.2 |
| | As a slave | √ | |
| | No slave/master configuration change | | |
| Connection target of scanner as master | Bluetooth® address | √ | Section 2.2 |
| | Local name | | |
| | Communications adapter (BA11-RKU, BA20-RU) | | |
| Specification of connection target's address | Connection target's address | None | Section 2.2 |
| Timeout period for slave to wait for a connection request | 2 minutes | √ | Section 8.1 (2) |
| | 4 minutes | | |
| | 10 minutes | | |
| | 30 minutes | | |
| Clear the transfer buffer when the Bluetooth link is broken | Enable | | |
| | Disable | √ | |
| Bluetooth® interface | Start operation | √ | Section 2.1 (See Note 1.) |
| | End operation | | |
| PIN code | 1 to 8 digits alphanumeric characters or symbols | 1234 | |
| Security function | Enable | √ | |
| | Disable | | |
| Local Class of Device | Unclassified device | √ | |
| | Keyboard | | |

(Note 1) The factory default is "End operation."



Can be changed only with the configuration software.

(6) Data transmission format for SPP Profile

| Items | Parameters | Defaults | Refer to: |
|---------------------|--------------|----------|----------------------------------|
| Header | None | √ | Section 8.3 (1) |
| | STX | | |
| | User-defined | | |
| Terminator | None | | |
| | ETX | | |
| | CR | √ | |
| | LF | | |
| | CR LF | | |
| | User-defined | | |
| Transmission of BCC | Enabled | | Section 8.3 (1) (See Note 1.) |
| | Disabled | √ | |

(Note 1) No BCC will be transferred if no header is prefixed.

: Can be changed only with the configuration software.

(7) Data transmission format for HID Profile

| Items | Parameters | Defaults | Refer to: |
|--------------|------------|----------|------------------|
| Header | NONE | √ | Section 8.3, (1) |
| | STX | | |
| | ETX | | |
| | CR | | |
| | LF | | |
| | CR LF | | |
| | TAB | | |
| | ESC | | |
| | ENTER | | |
| | Right Ctrl | | |
| | ← | | |
| | ↑ | | |
| | → | | |
| | ↓ | | |
| User-defined | | | |
| Terminator | NONE | | Section 8.3, (1) |
| | STX | | |
| | ETX | | |
| | CR | | |
| | LF | | |
| | CR LF | | |
| | TAB | | |
| | ESC | | |
| | ENTER | √ | |
| | Right Ctrl | | |
| | ← | | |
| | ↑ | | |
| | → | | |
| | ↓ | | |
| User-defined | | | |

 : Can be changed only with the configuration software.

(8) Data transmission format common to all interfaces

| Items | Parameters | Defaults | Refer to: |
|---|-------------------------|----------|------------------|
| Transmission of code ID mark | Enable | | Section 8.3 |
| | Disable | √ | |
| Code ID mark position | Before prefix | | Section 8.3 |
| | After prefix | √ | |
| Code ID mark | Type 1 (DENSO1) | √ | Section 8.3, (5) |
| | Type 2 (DENSO2) | | |
| | Type 3 | | |
| | Type 4 | | |
| | User-defined | | |
| Code ID mark output mode | Coupling | √ | Section 8.3, (5) |
| | Separating | | |
| Transmission of the number of digits (not applicable to UPC/EAN codes) | Enable, in 4 digits | | Section 8.3, (6) |
| | Enable, in 2 digits | | |
| | Disable | √ | |
| Prefix transmission | Enable | | Section 8.3, (2) |
| | Disable | √ | |
| Suffix transmission | Enable | | Section 8.3, (2) |
| | Disable | √ | |
| Scanner ID output | Enable | | Section 8.3, (4) |
| | Disable | √ | |
| GTIN format conversion | Enable | | Section 8.4 |
| | Disable | √ | |
| Conversion type from UPC/EAN/ Interleaved 2of5 (14-digit) to GTIN format | Conversion to 16 digits | √ | |
| | Conversion to 14 digits | | |
| | Conversion prohibited | | |
| Conversion type from GS1 DataBar /GS1-128 in GTIN format to EAN format | Conversion to 14 digits | √ | |
| | Conversion to 13 digits | | |
| | Conversion prohibited | | |
| Prefix PI in conversion from UPC/EAN/ Interleaved 2of5 (14-digit) to GTIN format | 0 to 9 | 0 | |

(Note 1) No BCC will be transferred if no header is prefixed.

 : Can be changed only with the configuration software.

(9) 2D codes, mirror image, black-and-white inverted codes and SQRC

| Items | Parameters | Defaults | Refer to: | |
|---|--|----------|-------------------------------|-------------------------------|
| Reading mirror image codes | Enable | | Section 7.4 | |
| | Disable | √ | | |
| Reading black-and-white inverted codes | Black cells/bars on a white background | √ | Section 7.5 | |
| | White cell/bars on a black background | | | |
| | Auto detection of black and white inverted codes | | | |
| Edit/Non-edit mode for Structured Appended QR Code | Edit mode | √ | Section 7.6 | |
| | Batch edit mode | | | |
| | Non-edit mode | | | |
| Reading MicroQR | Enable | √ | Section 12.2 | |
| | Disable | | | |
| Reading PDF417 | Enable | √ | | |
| | Disable | | | |
| Reading MicroPDF417 | Enable | | | |
| | Disable | √ | | |
| Reading MaxiCode | Enable | √ | | |
| | Disable | | | |
| Reading DataMatrix (Square) | Enable | √ | | Section 12.2 (See Note 1.) |
| | Disable | | | |
| Reading DataMatrix (Rectangular) | Enable | √ | | |
| | Disable | | | |
| QR Code, minimum version readable | 1 to 40 | 1 | Section 12.2 (See Note 2.) | |
| QR Code, maximum version readable | | 40 | | |
| MicroQR, minimum version readable | 1 to 4 | 1 | | |
| MicroQR, maximum version readable | | 4 | | |
| Data Matrix (Square), minimum code number readable | 1 to 24 | 1 | | |
| Data Matrix (Square), maximum code number readable | | 24 | | |
| Data Matrix (Rectangular), minimum code number readable | 1 to 6 | 1 | | |
| Data Matrix (Rectangular), maximum code number readable | | 6 | | |

(Note 1) Using the QR-coded parameter menu enables or disables scanning of both Square and Rectangular Data Matrix symbols at the same time.

(Note 2) The parameter setting ranges are different from versions or code numbers that the scanner can actually read.

 : Can be changed only with the configuration software.

| Items | Parameters | Defaults | Refer to: | |
|---|--|----------|----------------------------|----------------------------|
| Reading SQR Code | Enable (SQR Code and QR Code symbols) | | Section 7.8 | |
| | Enable (SQR Code symbol only) | | | |
| | Disable | √ | | |
| SQR Code Encryption key mismatch | Reading disabled | √ | | |
| | Enable transmission of disclosure data only | | | |
| SQR Code Encryption key match | Enable transmission of disclosed data + undisclosed data | √ | | |
| | Enable transmission of undisclosed data only | | | |
| SQR Code, minimum version readable | Setting range 1-40 | 1 | | Section 12.2 (See Note 1.) |
| SQR Code, maximum version readable | | 40 | | |
| Reading iQR Code (square) | Enable | | | Section 12.2 |
| | Disable | √ | | |
| iQR Code, (square) minimum version readable | Setting range 1-61 | 1 | Section 12.2 (See Note 1.) | |
| iQR Code, (square) maximum version readable | | 61 | | |
| Reading iQR Code (rectangular) | Enable | | Section 12.2 | |
| | Disable | √ | | |
| iQR Code, (rectangular) minimum version readable | Setting range 1-15 | 1 | Section 12.2 (See Note 1.) | |
| iQR Code, (rectangular) maximum version readable | | 15 | | |
| Edit/Non-edit mode for Structured Appended iQR Code | Edit mode | √ | Section 7.6 | |
| | Non-edit mode | | | |
| Reading Aztec (Full Range) | Enable | | Section 12.2 | |
| | Disable | √ | | |
| Reading Aztec (Compact) | Enable | | | |
| | Disable | √ | | |
| Aztec, (Full range) minimum version readable | Setting range 1-32 | 1 | Section 12.2 (See Note 1.) | |
| Aztec, (Full range) maximum version readable | | 32 | | |
| Aztec, (Compact) minimum version readable | Setting range 1-4 | 1 | | |
| Aztec, (Compact) maximum version readable | | 4 | | |

(Note 1) The parameter setting ranges are different from versions or code numbers that the scanner can actually read.

■ : Can be changed only with the configuration software.

(10) Bar codesUPC-A/E, EAN-13/8

| Items | Parameters | Defaults | Refer to: | |
|---|------------|----------|-----------------------|--|
| Scanning UPC-A and EAN-13 | Enable | √ | Sections 9.4 and 12.2 | |
| | Disable | | | |
| UPC-A transmission of check digit | Enable | √ | Sections 9.4 and 12.2 | |
| | Disable | | | |
| UPC-A transmission of number system character | Enable | √ | | |
| | Disable | | | |
| UPC-A transmission of the leading character | Enable | √ | | |
| | Disable | | | |
| EAN-13 transmission of check digit | Enable | √ | | |
| | Disable | | | |
| EAN-13 transmission of country code | Enable | √ | | Sections 9.4 and 12.2 (See Note 1.) |
| | Disable | | | |
| EAN-13 conversion to the ISBN / ISSN format | Enable | | Sections 9.4 and 12.2 | |
| | Disable | √ | | |
| Reading UPC-E | Enable | √ | | |
| | Disable | | | |
| UPC-E transmission of check digit | Enable | √ | | |
| | Disable | | | |
| UPC-E transmission of the leading character | Enable | | | |
| | Disable | √ | | |
| UPC-E transmission of number system character | Enable | √ | | |
| | Disable | | | |
| UPC-E conversion to the UPC-A format | Enable | | | |
| | Disable | √ | | |

(Note 1) A country code is in the upper two digits of the prefix character field in EAN-13.

: Can be changed only with the configuration software.

| Items | Parameters | Defaults | Refer to: |
|---------------------------------------|-------------------|----------|-----------------------|
| Reading EAN-8 | Enable | √ | Sections 9.4 and 12.2 |
| | Disable | | |
| EAN-8 transmission of check digit | Enable | √ | Sections 9.4 and 12.2 |
| | Disable | | |
| EAN-8 Conversion to the EAN-13 format | Enable | | |
| | Disable | √ | |
| Reading UPC/EAN with 2-digit add-on | Enable | | |
| | Disable | √ | |
| Reading UPC/EAN with 5-digit add-on | Enable | | |
| | Disable | √ | |
| Reading UPC/EAN with add-on only | Enable | | |
| | Disable | √ | |
| Add-on check level | Disabled checking | √ | |
| | Levels 1 to 4 | | |

Interleaved 2of5

| Items | Parameters | Defaults | Refer to: |
|--|---|-----------|---------------|
| Reading Interleaved 2of5 | Enable, without a check digit | √ | Section 12.2 |
| | Enable, with a check digit (Check digit transmission enabled) | | |
| | Enable, with a check digit (Check digit transmission disabled) | | |
| | Disable | | |
| Minimum number of readable digits for Interleaved 2of5 | 2 to 99 digits | 4 digits | (See Note 1.) |
| Maximum number of readable digits for Interleaved 2of5 | | 99 digits | |

(Note 1) The parameter setting ranges are different from the numbers of digits that the scanner can actually read.

Standard 2of5

| Items | Parameters | Defaults | Refer to: |
|--|-------------------------------|-----------|---------------|
| Reading <u>Standard 2of5</u> | Enable, without a check digit | | Section 12.2 |
| | Enable, with a check digit | | |
| | Disable | √ | |
| Standard 2of5 transmission of check digit | Enable | √ | |
| | Disable | | |
| Minimum number of readable digits for <u>Standard 2of5</u> | 3 to 99 digits | 3 digits | (See Note 1.) |
| Maximum number of readable digits for <u>Standard 2of5</u> | | 99 digits | |

(Note 1) The parameter setting ranges are different from the numbers of digits that the scanner can actually read.

■ : Can be changed only with the configuration software.

Codabar (NW-7)

| Items | Parameters | Defaults | Refer to: |
|--|---|-----------|---------------|
| Reading Codabar (NW-7) | Enable, without a check digit | √ | Section 12.2 |
| | Enable, with a check digit (Check digit transmission enabled) | | |
| | Enable, with a check digit (Check digit transmission disabled) | | |
| | Disable | | |
| Minimum number of readable digits for Codabar (NW-7) | 3 to 99 digits (including start/stop codes) | 4 digits | (See Note 1.) |
| Maximum number of readable digits for Codabar (NW-7) | | 99 digits | |
| Transmission of Start/Stop codes for Codabar (NW-7) | Transmit a/b/c/d | √ | Section 12.2 |
| | Transmit A/B/C/D | | |
| | Disable | | |
| Check digit method for Codabar (NW-7) | MOD-16 | √ | Section 12.2 |
| | 7-check method | | |

(Note 1) The parameter setting ranges are different from the numbers of digits that the scanner can actually read.

Code 39

| Item | Parameters | Defaults | Refer to: |
|---|---|-----------|---------------|
| Reading Code 39 | Enable, without a check digit | √ | Section 12.2 |
| | Enable, with a check digit (Check digit transmission enabled) | | |
| | Enable, with a check digit (Check digit transmission disabled) | | |
| | Disable | | |
| Minimum number of readable digits for Code 39 | 1 to 99 digits (excluding start/stop codes) | 1 digit | (See Note 1.) |
| Maximum number of readable digits for Code 39 | | 99 digits | |
| Transmission of Start/Stop codes for Code 39 | Enable | | Section 12.2 |
| | Disable | √ | |
| Conversion to FULL ASCII | Enable | | Section 12.2 |
| | Disable | √ | |

(Note 1) The parameter setting ranges are different from the numbers of digits that the scanner can actually read.

 : Can be changed only with the configuration software.

Code 128, GS1-128

| Items | Parameters | Defaults | Refer to: |
|--|--|-----------|-------------------------------|
| Reading Code 128 | Enable | √ | Section 12.2 (See Note 2.) |
| | Disable | | |
| Reading GS1-128 | Enable | √ | |
| | Disable | | |
| Minimum number of readable digits for Code 128 | 1 to 99 digits (excluding start/stop codes and 1-digit check digit) | 1 digit | (See Note 1.) |
| Maximum number of readable digits for Code 128 | | 99 digits | |
| Transmission of FNC1 for Code 128 | Disable | | Section 12.2 |
| | Transmit GS | √ | |
| | User-defined | | |
| Minimum number of readable digits for GS1-128 | 1 to 99 digits (excluding start/stop codes and 1-digit check digit) | 1 digit | (See Note 1.) |
| Maximum number of readable digits for GS1-128 | | 99 digits | |
| Transmission of FNC1 for GS1-128 | Disable | | Section 12.2 |
| | Transmit GS | √ | |
| | User-defined | | |

(Note 1) The setting ranges are different from the numbers of digits that the scanner can actually read.

(Note 2) Using the QR-coded parameter menu enables or disables scanning of both Code 128 and GS1-128 at the same time.

Code 93

| Items | Parameters | Defaults | Refer to: |
|---|---|-----------|---------------|
| Reading Code 93 | Enable | | Section 12.2 |
| | Disable | √ | |
| Minimum number of readable digits for Code 93 | 1 to 99 digits (excluding start/stop codes and 2-digit check digits) | 1 digit | (See Note 1.) |
| Maximum number of readable digits for Code 93 | | 99 digits | |

(Note 1) The setting ranges are different from the numbers of digits that the scanner can actually read.

 : Can be changed only with the configuration software.

GS1 DataBar, GS1 Composite symbols

| Items | Parameters | Defaults | Refer to: |
|--|--------------|----------|--------------|
| Reading GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Limited, GS1 DataBar Expanded (Note 1) | Enable | | Section 12.2 |
| | Disable | √ | |
| Reading GS1 DataBar Stacked, GS1 DataBar Expanded Stacked, GS1 DataBar Stacked Omnidirectional (Note 2) | Enable | | |
| | Disable | √ | |
| Transmission of FNC1 for GS1 DataBar Expanded code | Enable | | |
| | Transmit GS | √ | |
| | User-defined | | |
| Reading EAN/UPC Composite symbols | Enable | | |
| | Disable | √ | |
| Reading GS1 DataBar Composite with CC-A | Enable | | |
| | Disable | √ | |
| Reading GS1 DataBar Composite with CC-B | Enable | | |
| | Disable | √ | |
| Reading EAN/UPC Composite with CC-A | Enable | | |
| | Disable | √ | |
| Reading EAN/UPC Composite with CC-B | Enable | | |
| | Disable | √ | |
| Reading <u>GS1-128</u> Composite with CC-A | Enable | | |
| | Disable | √ | |
| Reading <u>GS1-128</u> Composite with CC-B | Enable | | |
| | Disable | √ | |
| Reading <u>GS1-128</u> Composite with CC-C | Enable | | |
| | Disable | √ | |

(Note 1) Indicates GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Limited and GS1 DataBar Expanded .

(Note 2) Indicates GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional and GS1 DataBar Expanded Stacked .

(Note 3) In the QR Code menu, the GS1 DataBar cannot separately be selected and they are enabled or disabled all together.

(Note 4) In the QR Code menu, the COMPOSITE codes cannot separately be selected and they are enabled or disabled all together.

 : Can be changed only with the configuration software.

Multi-line barcode scanning

| Items | Parameters | Defaults | Refer to: |
|---|------------------------------------|----------------|-------------|
| Reading multi-line bar codes | Enable | | Section 7.7 |
| | Disable | √ | |
| Number of lines for multi-line barcode scanning | Two lines | √ | |
| | Three lines | | |
| Output format for multi-line bar codes | Header/Terminator-delimited | | |
| | Comma-delimited | √ | |
| First-line barcode | Selectable from readable bar codes | Not specified. | |
| First-line barcode character | Up to 2 ASCII characters | Not specified. | |
| First-line barcode minimum number of readable digits | Max. 99 digits | Not specified. | |
| First-line barcode maximum number of readable digits | Max. 99 digits | Not specified. | |
| Second-line barcode | Selectable from readable bar codes | Not specified. | |
| Second-line barcode character | Up to 2 ASCII characters | Not specified. | |
| Second-line barcode minimum number of readable digits | Max. 99 digits | Not specified. | |
| Second-line barcode maximum number of readable digits | Max. 99 digits | Not specified. | |
| Third-line barcode | Selectable from readable bar codes | Not specified. | |
| Third-line barcode character | Up to 2 ASCII characters | Not specified. | |
| Third-line barcode minimum number of readable digits | Max. 99 digits | Not specified. | |
| Third-line barcode maximum number of readable digits | Max. 99 digits | Not specified. | |

: Can be changed only with the configuration software.

(11) Trigger switch control

| Items | Parameters | Defaults | Refer to: |
|--|---|----------|-------------|
| Trigger switch control mode | Auto-off mode | √ | Section 5.1 |
| | Momentary switching mode | | |
| | Momentary switching mode (Reverse Type) | | |
| | Alternate switching mode | | |
| | Continuous reading mode 1 | | |
| | Continuous reading mode 2 | | |
| | Auto sense mode | | Section 5.3 |
| Auto stand mode | | | |
| Auto-off mode reading time (One shot mode) | 1s | | Section 5.1 |
| | 2s | | |
| | 3s | | |
| | 4s | | |
| | 5s | √ | |
| Time from Auto stand mode to Auto sensing mode | 1s | | Section 5.3 |
| | 2s | √ | |
| | 3s | | |
| | 4s | | |
| | 5s | | |
| | 6s | | |
| | 7s | | |
| | 8s | | |
| | 9s | | |
| Error issue when reading fails | Enable | | Section 5.1 |
| | Disable | √ | |
| Sensibility level | High | | Section 5.3 |
| | Medium | √ | |
| | Low | | |
| Break Bluetooth wireless link | Enable | √ | Section 2.3 |
| | Disable | | |

■ : Can be changed only with the configuration software.

(12) Beeper, indicator LED, marker beam and illumination LEDs

| Items | Parameters | Defaults | Refer to: |
|-----------------------------------|-------------------------------|----------|-------------|
| Beeper control | Enable | √ | Section 7.1 |
| | Disable | | |
| Beeping tone | Low beeping tone (2.5 kHz) | | |
| | Medium beeping tone (2.7 kHz) | √ | |
| | High beeping tone (2.9 kHz) | | |
| Beeper beep time | Short (60 ms) | | |
| | Medium (80 ms) | √ | |
| | Long (120 ms) | | |
| Beeper volume | High | √ | |
| | Medium | | |
| | Low | | |
| Scan complete sound | Single beep | √ | Section 7.1 |
| | Multiple beep | | |
| Indicator LED control | Enable | √ | Section 7.2 |
| | Disable | | |
| Marker | Marker-OFF mode | | Section 7.3 |
| | Normal marker mode | √ | |
| | Marker-ON mode | | |
| Beeper sound when power turned ON | Enable | | Section 7.1 |
| | Disable | √ | |
| Illumination LED | Turns off | | Section 7.4 |
| | Turns on | √ | |
| Power save mode | Enable (Note 1) | √ | Section 7.4 |
| | Disable | | |

(Note1) When "Power save mode" is enabled, a reading distance may be shorter under 500 lx ambient illumination.

■ : Can be changed only with the configuration software.

(13) Data verification conditions and data editing conditions

| Items | Parameters | Defaults | Refer to: |
|---|---|----------------------|-------------|
| Data to be verified | Data block verification | | Section 6.1 |
| | Data string verification | √ | |
| Preset registration | Enable | | |
| | Disable | √ | |
| Verification start position for data string verification | 001 to 999 positions (Specify with ASCII characters) | 1 | |
| Number of characters to verify for data string verification (without preset master registration) | 01 to 99 positions (Specify with ASCII characters) | 99 | |
| Position of data block to verify for data block verification | 01 to 99 positions (Specify with ASCII characters) | 1 | |
| Transmission of verification result for a match (When verification OK) | Disable | √ | |
| | Enable code data transmission | | |
| | Enable OK transmission | | |
| Transmission of verification result for a mismatch (When verification NG) | Disable | √ | |
| | Enable code data transmission | | |
| | Enable OK transmission | | |
| Verification retry after fail judgment in 2-point verification | Enable | | |
| | Disable | √ | |
| Verification range | Code type + code data | √ | |
| | Code data only | | |
| Code type in data editing | Selectable from codes available | Any code (Note 1) | Section 6.2 |
| Transmit data regardless of the results | Enable | | |
| | Disable | √ | |
| Data extraction mode | Data string extraction mode | √ | |
| | Extraction block mode | | |
| | AI mode | | |
| Data string extraction mode - Start position | First position | | |
| | Last position | | |
| | Specified position | √ | |
| Data string extraction mode - End position | Last character | √ | |
| | Specified digits | | |
| | Specified position | | |
| Data string extraction mode - Specified position for extraction start position | 0001 to 9999 positions (Specify with ASCII characters) | 1 | |
| Data string extraction mode - Specified position for extraction last position | 0001 to 9999 positions (Specify with ASCII characters) | 9999 | |
| Extraction block mode - Extraction block number (Maximum 3 blocks) | 01 to 99 positions (Specify with ASCII characters) | Not specified. | |

(Note 1) Selecting "Any code" edits all types of codes.

 : Can be changed only with the configuration software.

| Items | Parameters | Defaults | Refer to: |
|---|---|---------------------|-------------|
| Search string and substitution string in data substitution mode | Max. 16 ASCII characters | No specified. | Section 6.2 |
| Number of splits in data blocksorting mode | 2 to 5 splits | 2 | |
| Split position in data blocksorting mode | 0001 to 9999 positions, specified by ASCII characters | Single character | |
| Order of blocks in data blocksorting mode | Blocks 1 to 5 | Block 1/ Block 2 | |
| AI mode | AI split mode | √ | |
| | AI parenthesis mode | | |
| AI split mode - Availability of AI #1 | Enable | √ | |
| | Disable | | |
| AI split mode - Availability of AI #2 | Enable | | |
| | Disable | √ | |
| AI split mode - Availability of AI #3 | Enable | | |
| | Disable | √ | |
| AI split mode - AI #1 | Selectable from AI candidates (Note 2) | 00 | |
| AI split mode - AI #2 | Selectable from AI candidates (Note 2) | 00 | |
| AI split mode - AI #3 | Selectable from AI candidates (Note 2) | 00 | |
| AI split mode - Delimiter | Header/Terminator | √ | |
| | Comma | | |
| | Tab (09h) | | |

(Note 2) For details about AI candidates, refer to Chapter 6, Section 6.2.1.3, "(3) AI table."

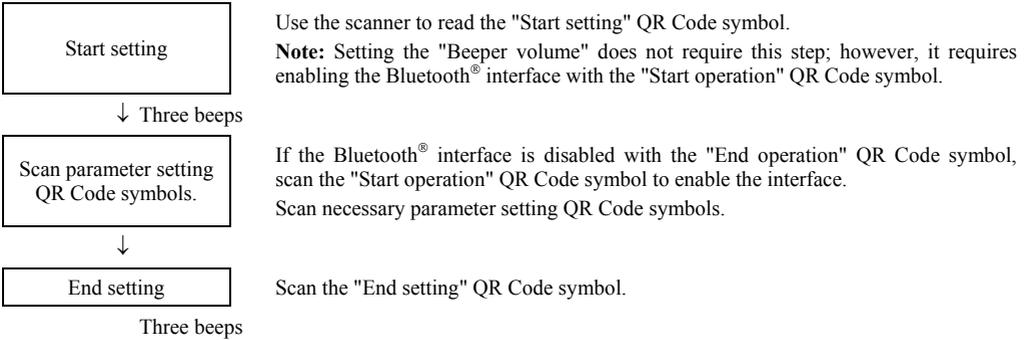
■: Can be changed only with the configuration software.

(9) Switching to sleep mode for power saving and auto power-off

| Items | Parameters | Defaults | Refer to: |
|--|--|----------|-------------|
| Switching to sleep mode for power saving | After 30 seconds (Ordinary current mode) | | Section 3.2 |
| | Immediately (Power saving mode) | √ | |
| Power save mode (Auto sense mode) | Disable | √ | |
| | Short ~ Long | | |
| Auto power-off | 5 to 640 minutes | 485 min. | Section 3.2 |
| | Disable | | |

■: Can be changed only with the configuration software.

12.1 Customizing the Scanner with the QR-Coded Parameter Menu



Scanning the "All defaults" QR Code symbol from the QR-coded parameter menu makes all items in the menu revert to the factory defaults.

TIP: "Beeper volume" QR Code symbol in the QR-coded parameter menu

The beeper volume can be set even if the above procedure is omitted. No "Start setting" or "End setting" QR Code symbol is required to be scanned.

Each time the "Beeper volume" QR Code symbol is scanned, the beeper volume cycles through High, Medium and Low. The factory default is High.

12.2 QR-coded Parameter Menu

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

Easy connection setup

To set the connection corresponding to the connected device, simply scan the QR Codes below.

(Connected device should be equipped with Bluetooth® module that is compatible with Bluetooth® Specification Ver. 2.1+EDR.)

Applied to the firmware version 2.00 lower.



Windows PC
(SPP, HID Profile with PINCODE)



Windows PC
(SPP, HID Profile without
PINCODE)



Android
(HID Profile)



Android
(SPP Profile)



iOS (iPhone , iPad)
(HID Profile)

Applied to the firmware version 2.00 or above.



iOS (iPhone , iPad)
(HID Profile)



Android
(HID Profile)



Android, Windows PC
(SPP Profile)



Windows PC
(HID Profile)

The beeper volume can be set by scanning the following QR Code symbol only. No "Start setting" or "End setting" QR Code symbol required to be scanned.

Adjusting the beeper volume

Scanning this QR Code symbol cycles the beeper volume through High, Medium and Low. The factory default is High.



Beeper volume

■ Menu control (Starting/Ending the Setting Procedure and Reverting to Defaults)



Start setting



Start setting

(When the "White code on black background" is set)"



Cancel



All defaults



End setting

■ Bluetooth® interface and link

Enabling/disabling Bluetooth® interface and breaking the Bluetooth® wireless link

| | |
|--|---|
|  Start operation (default) |  End operation |
|  Break Bluetooth® wireless link | |

Scanning with Bluetooth® wireless link broken

Scanning the "Scan w/ Bluetooth® link broken" QR Code symbol allows the scanner to scan codes with the Bluetooth® wireless link being broken. With this setting selected, data transfer with the host computer is impossible.

| | |
|--|---|
|  "Scan w/ Bluetooth® link broken" |  Cancel "Scan w/ Bluetooth® link broken" (default) |
|--|---|

Configuring the scanner as slave

Scanning the following QR Code symbol configures the scanner as a slave.

| |
|---|
|  Configure as slave (default) |
|---|

Start pairing

Scanning the following QR Code symbol starts Pairing.

| |
|---|
|  Start pairing (default) |
|---|

■ Bluetooth® wireless communications parameters

Procedure

| | |
|---|--|
|  Non-acknowledge mode (default) |  ACK/NAK mode |
|---|--|

Header (SPP Profile)

| | |
|--|---|
|  None (default) |  STX |
|--|---|

Header (HID Profile)

| | | |
|--|--|---|
|  None (default) |  TAB |  Enter |
|--|--|---|

Terminator (SPP Profile)

| | | |
|--|--|--|
|  None |  ETX | |
|  CR(default) |  LF |  CR LF |

Terminator (HID Profile)

| | | |
|--|--|--|
|  None |  TAB |  Enter(default) |
|  CR |  LF |  CR+LF |

Timeout period for slave to wait for a connection request

| | |
|---|--|
|  2 minutes (default) |  4 minutes |
|  10 minutes |  30 minutes |

■ Data transmission format

Transmission of code ID mark

| | |
|---|--|
|  Disable (default) |  Enable |
|---|--|

Transmission of the number of digits

| | |
|--|--|
|  Disable (default) | |
|  Enable in 2 digits |  Enable in 4 digits |

Transmission of BCC

| | |
|---|--|
|  Disable (default) |  Enable |
|---|--|

■ 2D codes, mirror image and black-and-white inverted codes

Scanning MicroQR Code



Disable



Enable (default)

Scanning black-and-white inverted codes



Black cells/bars on a white background (default)



White cells/bars on a black background



Automatically identify black and white inverted codes

Scanning split QR Code ("Structured Append")



Edit mode (default)



Non-edit mode



Batch edit mode

Scanning PDF417



Disable



Enable (default)

Scanning MaxiCode



Disable



Enable (default)

Scanning Data Matrix



Disable



Enable (default)

■ Bar codes

Scanning UPC-A, UPC-E, EAN-13 and EAN-8



Disable



Enable (default)

Scanning Interleaved 2of5



Disable



Enable with a check digit
(Check digit transmission
disabled)



Enable without
a check digit (default)



Enable with a check digit
(Check digit transmission
enabled)

Scanning Code 128 (GS1-128)



Disable



Enable (default)

Scanning Codabar (NW-7)



Disable



Enable without a check digit
(default)



Enable with a check digit
(Check digit transmission enabled)



Enable with a check digit
(Check digit transmission disabled)

Transmission of start/stop codes for Codabar (NW-7)



Disable



Enable (default)

Scanning Code 39

| | |
|--|---|
|  <p>Disable</p> |  <p>Enable without a check digit (default)</p> |
|  <p>Enable with a check digit (Check digit transmission enabled)</p> |  <p>Enable with a check digit (Check digit transmission disabled)</p> |

Transmission of start/stop codes for Code 39

| | |
|---|--|
|  <p>Disable (default)</p> |  <p>Enable</p> |
|---|--|

Scanning Code 93

| | |
|---|--|
|  <p>Disable (default)</p> |  <p>Enable</p> |
|---|--|

Scanning GS1 DataBar

| | |
|---|--|
|  <p>Disable (default)</p> |  <p>Enable</p> |
|---|--|

Scanning Composite

| | |
|---|--|
|  <p>Disable (default)</p> |  <p>Enable</p> |
|---|--|

■ Other settings

Trigger switch control

| | |
|---|---|
|  Auto-off mode (default) |  Alternate switching mode |
|  Momentary switching mode |  Continuous reading mode 1 |
|  Continuous reading mode 2 |  Auto sensing mode |

Beeper control

| | |
|---|--|
|  Disable |  Enable (default) |
|---|--|

Indicator LED

| | |
|---|--|
|  Disable |  Enable (default) |
|---|--|

Power save mode

| | |
|---|--|
|  Disable |  Enable (default) |
|---|--|

Chapter 13 QR-Coded Parameter Menu for Communications Adapters (BA11-RKU, BA20-RU)

13.1 Customizing the Communications Adapter from the Scanner

The scanner can customize the communications adapter by scanning the QR-coded parameter menu for communications adapters and transferring their settings held in the scanner memory via the Bluetooth® wireless link using the following procedure.

Scanner
Store the communications adapter parameter settings in the scanner memory.



Communications adapter
Power the communications adapter.



Communications adapter
Switch to the setup mode.



Communications adapter Interface/power supply LED: Flashes in orange
Bluetooth® status display LED (blue): Flashes slowly
(The communications adapter, as a slave, is waiting for a master to connect.)

Scanner
Establish the Bluetooth® wireless link.



Scanner's indicator LED: Flashes in blue
(The scanner beeps three times and initiates a Bluetooth® wireless link, as a master.)

Scanner →
Communications adapter
Transfer the communications adapter parameter settings.



Scanner Indicator LED: Lights in green
Communications adapter Bluetooth® status display LED (blue): Flashes rapidly

Use the scanner to scan the QR-coded parameter menu designed for communications adapters (Section 13.2) to store their parameter settings into the scanner memory.

Tip: Using the configuration software (ScannerSetting_2D) designed for scanners also allows parameter settings for communications adapters. It, however, requires connecting the adapter via a USB-COM or RS-232C interface to the host computer. For details, refer to the "Communications Adapter User's Manual."

Power the communications adapter.

Note: Any type of interfaces that power the communications adapter can be used, regardless of the interface setting made in the adapter. For the interfacing procedure, refer to the "Communications Adapter User's Manual," Chapter 2.

Hold down the SETUP button provided on the bottom of the communications adapter for at least 0.5 second with a pin or the like to switch to the setup mode.

Note: Leaving the communications adapter for 3 minutes or more after depression of the SETUP button automatically exits the setup mode.

After establishment of the Bluetooth® wireless link, the scanner inquires of the communications adapter about the current status and transfers the communications adapter parameter settings stored in the memory.

Note: If the scanner cannot receive an acknowledge response from the communications adapter, it cancels the parameter setting sequence. Both the scanner and communications adapter automatically return to standby for initiation of a Bluetooth® wireless link.

End of transfer

After normal end of transfer of parameter settings, the scanner's indicator LED turns blue with one beep.

If the parameter transfer does not end normally, the scanner's indicator LED turns red with three beeps.

Both the scanner and communications adapter automatically reset themselves regardless of whether the parameter transfer ends normally.

Communications adapter Interface/power supply LED: Lights in green
(Both the scanner and communications adapter switch to standby for initiation of a Bluetooth® wireless link.)

13.2 QR-Coded Parameter Menu for Communications Adapters

■ Menu control (Starting/Ending the Setting Procedure and Reverting to Defaults)



Start setting



Start setting
(When the "White code on black background" is set)



Cancel



All defaults



End setting

■ Interface



USB keyboard interface (default)



RS-232C interface



USB-COM interface

■ Communications parameters for USB-COM interface

Monitoring CTS (USB-COM interface)



Disable



Enable (default)

■ Communications parameters for RS-232C interface

Transmission speed (RS-232C interface)



1200 bps



2400 bps



4800 bps



9600 bps (default)



14400 bps



19200 bps



38400 bps



57600 bps



115200 bps

Data bit (RS-232C interface)



7 bits



8 bits (default)

Parity (RS-232C interface)



None (default)



EVEN



ODD

Stop bit (RS-232C interface)



1 bit (default)



2 bits

Monitoring CTS (RS-232C interface)



Disable



Enable (default)

■ Specifying communications parameters for the USB keyboard interface

Specifying the keyboard type with USB keyboard interface



U.S. English



French



Italian



Swedish



German



U.K. English



(default)
< Japan >

※Above default is BA11-RKU. In case of BA10-RKU, default is U.S.English.

Chapter 14 Troubleshooting

Problem 1: Low reading efficiency.

| Probable cause | What to do: |
|---|---|
| <ul style="list-style-type: none">• A target code is not within the scan range of the reading window. | <ul style="list-style-type: none">• Bring a code within the scan range. |
| <ul style="list-style-type: none">• The code may be smeared. | <ul style="list-style-type: none">• Wipe off the dirt from the code. |
| <ul style="list-style-type: none">• The code may be blurred. | <ul style="list-style-type: none">• Use a code clearly printed. |

Problem 2: Cannot read 2D codes or bar codes.

| Probable cause | What to do: |
|---|---|
| <ul style="list-style-type: none">• The type of the code to be scanned has not been set as a readable code. | <ul style="list-style-type: none">• Enable the type of the code to be scanned as a readable code. |
| <ul style="list-style-type: none">• The scanned bar code contains no check digit, while the "Enable, with a check digit" parameter is selected. | <ul style="list-style-type: none">• Select the "Enable, without a check digit" parameter. |
| <ul style="list-style-type: none">• The check digit contained in the scanned bar code is wrong. | <ul style="list-style-type: none">• Use a correct bar code. |

Problem 3: Code data not displayed on the computer screen correctly.

| Probable cause | What to do: |
|--|---|
| <ul style="list-style-type: none">• The target Bluetooth® device is not ready for communication. | <ul style="list-style-type: none">• Refer to the user's manual of the target Bluetooth® device. |
| <ul style="list-style-type: none">• The target Bluetooth® device is located too far from your scanner. | <ul style="list-style-type: none">• Bring the target Bluetooth® device and your scanner close to each other. |
| <ul style="list-style-type: none">• The Bluetooth® wireless link with the target Bluetooth® device is not established. | <ul style="list-style-type: none">• Establish the Bluetooth® wireless link with the target Bluetooth® device. |
| <ul style="list-style-type: none">• The "Scanning w/ Bluetooth® wireless link broken" is selected. | <ul style="list-style-type: none">• Cancel the setting. (See Chapter 3.) |

Problem 4: Scanner's operation period too short even after recharge.

| Probable cause | What to do: |
|--|---|
| <ul style="list-style-type: none">• The scanner may not be placed in the charger properly. | <ul style="list-style-type: none">• Place the scanner in the charger properly. (See Section 9.1.) |

Problem 5: Bluetooth® wireless link unexpectedly broken

| Probable cause | What to do: |
|---|---|
| <ul style="list-style-type: none">• The automatic disconnection may be enabled. | <ul style="list-style-type: none">• Press the trigger switch to reestablish the Bluetooth® wireless link.• Change the timeout period for scanner to wait for a connection request if necessary. (See Section 8.1.) |

Appendix 1 Specifications

| Item | | AT27Q-SB |
|----------------------------|-----------------------------|--|
| Scanning specifications | Readable codes | QR Code (Model 1 and Model 2), MicroQR, SQRC ^(*1) , iQR, PDF417, MicroPDF417, MaxiCode, Data Matrix, Aztec, and GS1 Composite symbol EAN-13/8, UPC-A/E, UPC/EAN with add-on, Interleaved 2of5 (ITF), Standard 2of5 (STF), Code 39, Codabar (NW-7), Code 93, Code 128, GS1-128, and GS1 DataBar |
| | Skew angle | 360° |
| | Scanning resolution | 0.167 mm (6.6 mils) min. for two-dimensional codes 0.125 mm (4.9 mils) min. for bar codes |
| | Elevation angle (skew) | ±50° |
| | Tilt angle (pitch) | ±50° |
| | Light source | LED (red) |
| | Reading confirmation | Blue LED, and beeper |
| Interface | Bluetooth® | Built-in Bluetooth® wireless device compliant with Bluetooth® Specification Ver. 2.1+EDR |
| | Profile(s) supported | SPP (Serial Port Profile) HID (Human Interface Device Profile) |
| Input power requirements | Main power | Li-ion battery cartridge |
| | Operating voltage range | 3.7 V DC |
| Operating time | | 28 hours (if code scanning is repeated every 5 seconds) |
| Environmental conditions | Operating temperature range | -5 to 50°C |
| | Operating humidity range | 10 to 90% RH ^(*2) |
| | Storage temperature range | -10 to 60°C |
| | Storage humidity range | 5 to 95% RH ^(*2) |
| | Ambient illuminance range | Max. 10,000 lux |
| Dimensions (W) x (D) x (H) | | 63 x 95 x 163 mm (2.5 x 3.7 x 6.4 inches) |
| Weight | | Approx. 200 g |

(*1) To use SQRC, contact your Denso Wave representative.

(*2) Sharp temperature change, dewing or freezing not allowed, wet-bulb temperature 30°C max.

Appendix 2 Control Commands

Control commands refer to commands that are exchanged between the host computer and the scanner via the communications line.

Some of the control commands that the host computer issues are functionally equivalent to some parameters that can be set with the QR-coded parameter menu (refer to Chapter 11). Control command settings have priority over settings made with the QR-coded parameter menu.

Note that turning off the scanner will clear control command settings so that settings made with the QR-coded parameter menu will take effect unless the PW command is sent to the scanner for saving control command settings into the FLASH ROM.

If commands other than ones listed below are sent to the scanner, the scanner operation is not assured.

Note: Until the completion of execution of a specified control command, the subsequent command will not be executed.

Commands consisting only of the command section

| Control Commands | Transfer Direction | Function |
|--|--------------------|---|
| | Scanner ←→ Host | |
| Z (Note 1) (Note 2) | ← | Switch to standby Upon receipt of the Z, READOFF or LOFF command, the scanner switches to standby as long as the trigger switch control is set to continuous reading mode 1 or 2. |
| READOFF | ← | |
| LOFF | ← | |
| R (Note 1) | ← | Ready to scan Upon receipt of the R, READON or LON command, the scanner becomes ready to scan as long as the trigger switch control is set to continuous reading mode 1 or 2. |
| READON | ← | |
| LON | ← | |
| B1 B2 B3 (Note 3) (Note 4) | ← | Sound the beeper Within 100 ms from the receipt of any of B1, B2 and B3 commands, the scanner beeps for the period specified below. B1: Beep for approx. 60, 80 or 120 ms once. Beeps for approx. 70 ms twice. B2: Beep for approx. 120 ms B3: Beep for approx. 240 ms Even if the beeping is prohibited or the scanner is on standby, the beeper will be able to sound. |
| BH1, BM1, BL1 BH2, BM2, BL2 BH3, BM3, BL3 (Note 3) (Note 4) | ← | Specifies the beeper tone. Adding this command to B1, B2 and B3 commands allows the scanner to beep at the specified frequency. H: High (2.9 kHz) M: Medium (2.7 kHz) L: Low (2.5 kHz) |
| LB (Note 3) | ← | Light the blue indicator LED Within 100 ms from the receipt of the LB command, the blue indicator LED lights for approx. 500 ms. |
| LG (Note 3) | ← | Light the green indicator LED Within 100 ms from the receipt of the LG command, the green indicator LED lights for approx. 500 ms. |

| Control Commands | Transfer Direction | | Function |
|--|--------------------|---------|--|
| | Scanner | ←→ Host | |
| LR (Note 3) | ← | | Light the red indicator LED Within 100 ms from the receipt of the LR command, the red indicator LED lights for approx. 500 ms. |
| IMAGEOUT | ← | | Capture image Refer to Chapter 10 for details. |
| 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) | ← | | Save parameters This command saves settings made with U1 through U7 commands into the EEPROM. Without the PW command, the scanner will lose settings made with U1 through U7 when it is turned off. |
| VER | ← | | Request for software version <Response from the scanner> Ver.n.nn where n.nn is version number (Ex. Ver.1.00) |
| VERF | ← | | Request for the parameter setting version This command checks the version of the parameter settings made in the scanner when the scanner is linked with the configuration software (ScannerSetting_2D). <Response from the scanner> Ver.n.nn.mm where n.nn.mm is version number (Ex. Ver.1.00.00) and mm is parameter setting version. |
| E | ← | | Request for scan entry mode In scan master registration for n-point verification, switching the scanner to the data verification mode, sending a scan entry control command "E" from the host, and scanning a master code with the scanner registers the master data which is saved in the FLASH ROM. |
| ID | ← | | Request for scanner ID (serial number) <Response from the scanner> ID.nnnnnn where nnnnnn is a serial number (Ex. ID.000001) |
| TMON (Note 6) | ← | | Enable trigger switch It enables the trigger switch control. |
| TMOFF (Note 6) | ← | | Disable trigger switch It disables the trigger switch control and switches the scanner standby. |
| ERROR | → | | Scanning failure When the scanner (which is ready to scan) cannot complete scanning and switches to standby, it sends the ERROR command as long as the trigger switch control is set to continuous reading mode 1 or 2. Whether or not to send this command can be selected. |

| Control Commands | Transfer Direction | | Function |
|------------------|---|---------|--|
| | Scanner | ←→ Host | |
| OK |  | | Verification match If code data scanned matches master data in data verification mode, the scanner sends this command as long as the OK transmission is enabled for a match. |
| NG |  | | Verification mismatch If code data scanned does not match master data in data verification mode, the scanner sends this command as long as the NG transmission is enabled for a mismatch. |
| DEFAULT |  | | Set to default It sets all scanner designations to default. |

(Note 1) If the scanner receives the R command twice with the reading window being applied to a code (for example, it receives the R command, sends the code data read, and receives the Z and R commands), it will send even the same code data twice. This is because the Z command cancels the duplication prevention processing.

In split QR Code scanning operation, if the scanner receives the Z command and switches to standby before scanning a set of split QR Code symbols, the duplication prevention processing will be canceled. The code data that has been read halfway will be discarded.

The READOFF and LOFF commands produce the same result as the Z command, the READON and LON commands, as the R command.

(Note 2) When the scanner is on standby, pressing the trigger switch may light the LEDs momentarily, but the scanner cannot scan codes.

(Note 3) After receipt of one of the B1 to B3, BH1 to BH3, BM1 to BM3, BL1 to BL3, LB, LG and LR command, the scanner may need a maximum of 100 ms to execute the command.

(Note 4) Beeping specified by control commands B1, BH1, BM1, and BL1 is dependent on the reading completion sound and its length.

(Note 5) The PW can save settings into the FLASH ROM a maximum of 1,000,000 times due to the restrictions on the EEPROM.

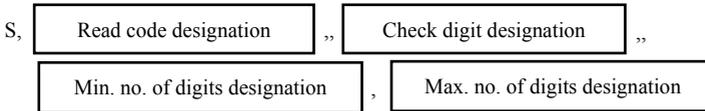
(Note 6) These control commands are available only when the scanner is not in data verification mode

Commands consisting of the command section and option sections

| Control Commands | Transfer Direction | Function |
|------------------|--------------------|--|
| | Scanner ←→ Host | |
| S | ← | Barcode reading conditions designation By designating options such as those shown below, all types of read conditions are set. If even one error occurs among all option designations, the scanner transmits command “Q” (once every second) for the purpose of requesting the read conditions designation again. |
| D | ← | 2D code reading conditions designation By designating options such as those shown below, all types of read conditions are set. If even one error occurs among all option designations, the scanner transmits command “Q” (once every second) for the purpose of requesting the read conditions designation again. |

Commands

(1) Option section format of S command

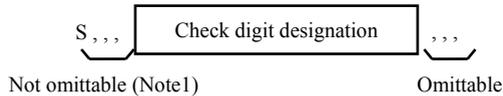


Each of all option is separated by a comma (,).

Only a comma is required in order not to set an option in the middle.

However, if options are set part of the way and subsequent options are not set, commas can be omitted.

(Example)



Note:

1. The codes that option items are not designated are not readable.
Maximum number of commas is 6.
2. “S,” does not change any setting.
3. It is necessary to set double commas “,,”
between the “Read code designation” and “Check digit designation”
and between the “Check digit designation” and “Min. no. digits designation”

Designate the read codes, the check digit, the minimum number of digits and the maximum number of digits according to the table shown below.

| Read code | Readable code symbology | Check digit | Min. no. of digits | Max. no. of digits |
|-----------|---|-------------|------------------------|--------------------|
| A | UPC-A, UPC-E, EAN8, EAN13 | — | — | — |
| E | UPC-A, UPC-E, EAN8, EAN13 UPC/EAN with Add-on | — | — | — |
| H | Standard 2 of 5 | H | H3 ^(NOTE 2) | H99 |
| I | Interleaved 2 of 5 | I | I4 ^(NOE 3) | I99 |
| N | Codabar(NW-7) | N | N4 ^(NOTE 4) | N99 |
| M | CODE39 | M | M1 | M99 |
| L | CODE93 | — | L1 | L99 |
| K | CODE128, GS1-128 | — | K1 | K99 |
| R | GS1 DataBar Omnidirectional, GS1 DataBar Stacked, GS1 DataBar Truncated, GS1 DataBar Stacked Omnidirectional | — | R1 | R99 |

Read codes are designated by the above alphabets.

Check digits are designated by the same alphabets of read codes.

Numbers of digits are designated by the same alphabets of read codes and digit numbers up to 99.

Min. no. of digits must be lower than max.no. of digits.

If no number of digits is designated, the number is set to the default.

Note: 1. When A and E are set at the same time, the command is invalid.

2. In multi-reading, no. of digits is more than 3.

In single-reading, no. of digits is more than 1.

3. In multi-reading, Min. no. of digits is more than 4.

In single-reading, Min. no. of digits is more than 2.

4. If no Min. no. of digits is designated, the number is 4.

[Example]

S,ANL

Readable codes UPC-A/E, EAN8/13, Codabar and CODE93.

No check of the check digit in Codabar and CODE93

Number of digits default (Codabar and CODE93).

S,INM,,NM,,I10N5,I20N12

Readable codes Interleaved 2 of 5, Codabar and CODE39.

No check of the check digit in Interleaved 2 of 5

Check of the check digit in Codabar and CODE39

Number of digits

Inrerleaved 2 of 5 10 to 20 digits

Codabar 5 to 12 digits

CODE39 default

S,INM,,,,N5M8,I20N5

Readable codes Interleaved 2 of 5, Codabar and CODE39.

No check of the check digit in Interleaved 2 of 5, Codabar and CODE39

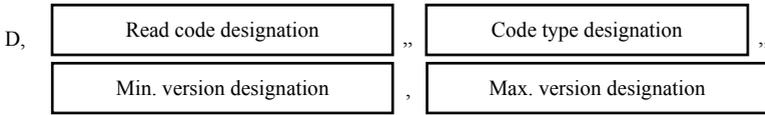
Number of digits

Inrerleaved 2 of 5 4 to 20 digits

Codabar 5digits

CODE93 default

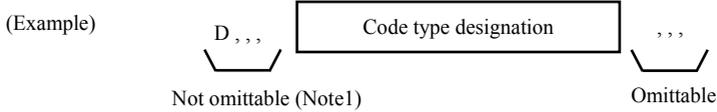
(2) Option section format of D command



Each of all option is separated by commas.

Only a comma is required in order not to set an option in the middle.

However, if options are set part of the way and subsequent options are not set, commas can be omitted.



- Note:
1. The codes that option items are not designated are not readable.
Maximum number of commas is 6.
 2. "D," does not change any setting.
 3. It is necessary to set double commas " ," between the "Read code designation" and "Check digit designation" and between the "Check digit designation" and "Min. no. digits designation"

Designate the read codes, the code types, the minimum version and the maximum version according to the table shown below.

| Read code | Readable code symbology | Code type | Readable code type | Min. version | Max. version |
|-----------|-------------------------|-----------|--------------------|--------------|--------------|
| Q | QR Code | QM | Model 1 | Q01 | Q40 |
| | | QL | Model 2 | | |
| | | QS | micro | QM1 | QM4 |
| X | MaxiCode | — | | — | — |
| Y | PDF417 | YM | PDF417 | — | — |
| | | YS | Micro PDF | | |
| Z | DataMatrix | ZS | Square | Z01 | Z24 |
| | | ZR | Rectangle | ZR1 | ZR6 |
| J | AzTec | — | | — | — |
| V | GS1 Composite | — | | — | — |

Read codes are designated by the above alphabets.

Code types are designated by the two alphabets .

Min. version must be lower than max. version.

If no version is designated, the version is set to the default.

- Note:
1. When no Code type of QR code, PDF417 or DataMatrix are designated, all code types are readable.
 2. The versions of DataMatrix are defined by the tables below.

< DataMatrix square >

| Version | ROW×COL | Version | ROW×COL | Version | ROW×COL | Version | 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 |

< DataMatrix rectangle >

| Version | ROW×COL | Version | ROW×COL | Version | ROW×COL |
|---------|---------|---------|---------|---------|---------|
| 1 | 8×18 | 3 | 12×26 | 5 | 16×36 |
| 2 | 8×32 | 4 | 12×36 | 6 | 16×36 |

[Example]

D,QYJ

- Designated codes are QR Code (model 1, 2, micro) , PDF417 (PDF417, micro PDF) and AzTec.
- Designated version is default setting.

D,QY,,QLSQMYM

- Designated codes are QR Code (model 1, 2, micro) and PDF417 (PDF417).
- Designated version is default setting.

D,QZ,,QLQS,,Q14QM1Z08ZR4,, Q20QM2Z08

- Designated codes are QR Code (model 2, micro) and DataMatrix (square, rectangle) .
- Designated version
 - QR Code model 2 version 14- 20
 - QR Code micro version 1 - 2
 - DataMatrix square version 8
 - DataMatrix rectangle version 4 - 6

Appendix 3 Bluetooth® Glossary

The table below lists Bluetooth® terms used in this manual.

| | |
|------------------------------|---|
| Bluetooth® Address (BD_ADDR) | Bluetooth® Device Address. Each Bluetooth® equipment is allocated a unique 48-bit device address defined by the Bluetooth® SIG. |
| Bluetooth® Passkey (PIN) | Bluetooth® Personal Identification Number. This is a maximum of 16 bytes of passkey used to authenticate two Bluetooth® devices in pairing. Once authentication is performed, no Bluetooth® passkey input is required for the next authentication. |
| Local Name | Bluetooth® Device Name. This is a user-friendly name for the Bluetooth® Device to identify itself. |
| Bluetooth® Wireless Link | Wireless communications line connecting the master and slave devices. |
| Master | Master device that initiates and requests operations and controls slave devices. |
| Slave | Slave device that is network-controlled by the master device in Bluetooth® wireless communication. |

Appendix 4 Pairing

Bluetooth communication provides a verification function to identify a communication partner. This is a function to prevent the access from indefinite Bluetooth apparatus by confirming a communication partner. Pairing (or bonding) means this function. When two Bluetooth apparatuses are connected first, the pairing authenticates each other by common PIN code (or a pass key). By pairing, a security link can be established between an apparatus and an apparatus, and the service for each apparatus is available quickly without inputting PIN code from the second connection.

The scanner's waiting time for pairing is 2 minutes and 30 seconds. If pairing completes successfully within this time, the scanner becomes in connection waiting mode. If pairing does not complete, the scanner becomes in sleep mode.

The scanner supports PIN codes 1 to 8 characters long. These consist of numerals, symbols and other ASCII characters.

In SPP (Secure Simple Pairing) connection to the SSP-compatible devices, the PIN code is not required.

■ The PIN code setting

Default of the PIN code of the scanner is "1234". The PIN code can be changed by the configuration software "Scanner Setting 2D" provided by DENSO WAVE.

■ Pairing by the scanner

By the following procedure, the scanner establishes pairing with a Bluetooth device.

The scanner
Memorizes a Bluetooth device
to connect

Change the scanner mode into master mode with the configuration software "Scanner Setting_2D) and write the Bluetooth address and the PIN code of the device to connect.



The Bluetooth device to
connect
Waits pairing request.

Change the Bluetooth device to be in pairing waiting mode according to its manual.

Note: Refer to the manual of the Bluetooth device for pairing procedure.



The scanner
Requests pairing.

Read the "start pairing" of the QR coded parameter menu.

Note: If the scanner receives no pairing request from the Bluetooth device within 2minutes and 30 seconds, it aborts pairing.

↓ The green indicator of the scanner is blinking as the scanner is in master mode.

Pairing completion

If pairing completes successfully, the scanner lights the blue indicator and sounds one short beep.

If pairing does not complete, the scanner lights the red indicator and sounds one long beeps.

(The scanner is waiting for connection from the Bluetooth device.)

■ Pairing by a Bluetooth device

By the following procedure, a Bluetooth device establishes pairing with the scanner.

The scanner
Memorizes the PIN code

Change the scanner mode into slave mode with the configuration software “Scanner Setting_2D) and write the PIN code to the scanner.

↓

The scanner
Waits pairing request.

Scan “Start pairing” QR code.

Note: If the scanner receives no pairing request from the Bluetooth device within 2minutes and 30 seconds, it aborts pairing.

↓ The green indicator of the scanner is blinking as the scanner is in slave mode.

The Bluetooth device
Carries our pairing

Select the scanner on the Bluetooth device and input the PIN code of the scanner.

Note: Refer to the manual of the Bluetooth device for pairing procedure.

↓

Pairing completion

When pairing completes successfully, the scanner turns on the blue indicator and sounds one short beeper.

When pairing does not completes, the scanner turns on the red indicator and sounds one long beeper.

(The scanner is waiting for connection from the Bluetooth device.)

2D Code Handy Scanner

AT27Q-SB

User's Manual

Third Edition, May 2015

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