

DENSO

Bluetooth® Adapter

BA20-RU

User's Manual

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Preface

Thank you for using the BA20-RU DENSO WAVE Bluetooth® adapter.

Please READ through this manual carefully. It will enable you to use the Bluetooth® adapter BA20-RU 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 BA20-RU 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 BA20-RU 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 Bluetooth® adapter BA20-RU correctly.
- Always keep this manual nearby for speedy reference.

Strict observance of these warning and caution indications is a **MUST** for preventing accidents which could result in bodily injury and substantial property damage. Make sure you fully understand all definitions of these terms and related symbols given below, before you proceed on to the text itself.

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

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

Meaning of Symbols



A triangle (Δ) 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) alerts you to 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.

 **WARNING**

To System Designers:

- When introducing the Bluetooth® adapter 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.



- When using the RS-232C interface, use the dedicated AC adapter only.
Failure to do so could result in fire.
- If the interface cable or AC adapter cable (if connected) is damaged, e.g., exposed or broken lead wires, stop using it and contact your nearest dealer.
Failure to do so could result in a fire or electrical shock.



- Never bring any metals into contact with the terminals in connectors.
Doing so could produce a large current through the Bluetooth® adapter, resulting in heat or fire, as well as damage to the Bluetooth® adapter.
- Never use the Bluetooth® adapter on the line voltage other than the specified level.
Doing so could cause the Bluetooth® adapter to break or burn.
- Do not use the Bluetooth® adapter where any inflammable gases may be emitted.
Doing so could cause fire.
- Keep the AC adapter away from water.
Failure to do so could cause fire or electrical shock.
- Do not scratch, modify, bend, twist, pull, or heat the interface cable or AC adapter cable (if connected). Do not place heavy material on it or allow it to get pressed under heavy material.
Doing so could break cables, resulting in a fire.



- If smoke, abnormal odors or noises come from the Bluetooth® adapter, immediately switch off the host PC, unplug the AC adapter (if connected) from the electrical outlet and the interface cable from the host PC, and contact your nearest dealer.
Failure to do so could cause fire or electrical shock.
- If foreign material or water gets into the Bluetooth® adapter, immediately unplug the AC adapter (if connected) from the electrical outlet and the interface cable from the host PC, and contact your nearest dealer.
Failure to do so could cause fire or electrical shock.
- If you drop the Bluetooth® adapter so as to affect the operation or damage its housing, switch off the host PC, unplug the AC adapter (if connected) and the interface cable, and contact your nearest dealer.
Failure to do so could cause fire or electrical shock.

CAUTION



Never
disassemble

- Never disassemble or modify the Bluetooth® adapter; doing so could result in an accident such as break or fire.
Doing so could result in a fire or electrical shock.



- Do not put the Bluetooth® adapter on an unstable or inclined plane.
The Bluetooth® adapter may drop, creating injuries.
- Never put the Bluetooth® adapter 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 Bluetooth® adapter in extremely humid areas, or where there are drastic temperature changes.
Moisture will get into the Bluetooth® adapter, resulting in malfunction, fire or electrical shock.
- Do not place the Bluetooth® adapter 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 Bluetooth® adapter or AC adapter in a cloth or blanket.
Doing so could cause the unit to heat up inside, deforming its housing, resulting in a fire.
Always use the Bluetooth® adapter and AC adapter in a well-ventilated area.
- Keep the AC adapter cable away from any heating equipment.
Failure to do so could melt the sheathing, resulting in a fire or electrical shock.
- Do not insert or drop foreign materials such as metals or anything inflammable through the openings or vents into the Bluetooth® adapter.
Doing so could result in a fire or electrical shock.
- Do not scratch or modify the Bluetooth® adapter or its interface cable. Do not bend, twist, pull, or heat the cable.
Doing so could damage the Bluetooth® adapter or its interface cable, creating a fire hazard.
- Do not use the Bluetooth® adapter if your hands are wet or damp.
Doing so could result in an electrical shock.
- Never use chemicals or organic solvents such as benzene and thinner to clean the housing. Do not apply insecticide to the Bluetooth® adapter.
Doing so could result in a marred or cracked housing, electrical shock or fire.
- Do not use the Bluetooth® adapter with anti-slip gloves containing plasticizer.
The Bluetooth® adapter housing may be broken, creating injuries, electrical shock, or fire.

Bluetooth® Wireless Communication Link

The Bluetooth® adapter BA20-RU 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	Serial port profile
Communications range (reference value*1)	Max. 10 m, with no obstructions

*1 This is a value for the communication between the Bluetooth® adapter and the DENSO WAVE wireless scanner. Communication range varies depending on the device to communicate with and operating environment.

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

- Using the Bluetooth® adapter 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 Bluetooth® adapter link operates properly before introducing the link operation.

NOTE: To System Designers:

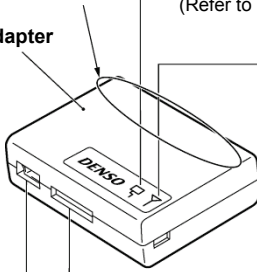
- Before developing applications, make sure that the intended environment is free of the interference factors above and thus actually capable of supporting link operation.
- When introducing the Bluetooth® adapter into an environment where equipment using radio waves in the 2.4 GHz band operates or when introducing such equipment after the introduction of the Bluetooth® adapter, be sure to confirm that the adapter 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.

Chapter 1 Part Names and Functions

Built-in antenna

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

Bluetooth® adapter



Interface/power supply LED

For the first two seconds after the power is first applied, the color indicates the interface setting.

- Orange: USB interface
- Red: RS-232C interface

After that, the LED is green to indicate that the adapter has power.
(Refer to Chapter 3 for details.)

Bluetooth® status display LED (blue)

This lights or blinks to indicate the current Bluetooth® wireless link status.

(Refer to Chapter 3 for details.)

RS-232C interface connector

USB interface connector

Interface connectors

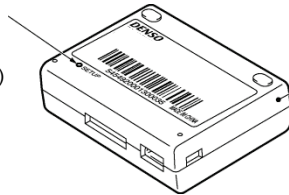
The unit uses these to exchange data with the host computer or similar communications device.

(Refer to Chapter 2 for details.)

SETUP button

Pressing this button initiates parameter specification for the Bluetooth® adapter.

(Refer to Chapter 4 for details.)



Bluetooth® adapter (rear)

Chapter 2 Connection to the Host Computer

The Bluetooth® adapter connects to the host computer via any of the following three interfaces.

- USB keyboard interface (default)* (See Section 2.3)
- USB-COM interface (See Section 2.3)
- RS-232C interface (See Section 2.4)

Note: Using a USB keyboard interface requires selecting the keyboard type that matches the one at the host computer with the configuration software “BA Setting”. Using any other interface requires changing the Bluetooth® adapter settings also with the configuration software. In any case using the configuration software, it is necessary to use a USB-COM interface (See Section 2.3) or RS-232C interface (See Section 2.4) to the host.

2.1 Location of the Bluetooth® Adapter

Locate the Bluetooth® adapter, observing the following notes in order to secure the wireless link between the Bluetooth® adapter and the scanner.

- Do not locate the Bluetooth® adapter on a metallic desk or wall. If it is unavoidable, keep the Bluetooth® adapter away at least 15 cm (5.9") from the metallic surface.
- Make sure that there is no metallic obstruction in the wireless path between the Bluetooth® adapter and the scanner.

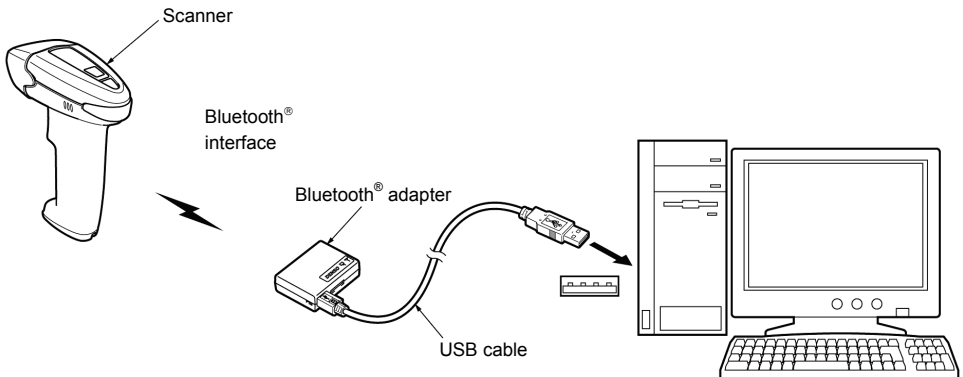
2.2 Connection between Interface Cable and Bluetooth® Adapter

Connect the desired interface cable to the corresponding interface connector provided on the side of the Bluetooth® adapter.

Note: Hold the Bluetooth® adapter, align the adapter's connector and interface cable connector with each other, and fully insert the interface cable into the adapter's connector.

2.3 Using USB Interface

USB interface



2.3.1 Operating environment

Using the Bluetooth® adapter's USB interface requires a host computer equipped with a USB port and one of the operating environments listed below that should be selected depending upon your choice of the USB interfaces--USB keyboard or USB-COM interface.

USB keyboard interface: Using this interface requires no particular driver installation. Via this interface, data sent from the Bluetooth® adapter can be entered to the cursor position in your applications.

USB-COM interface: Using this interface requires installing a virtual COM port driver “Active USB-COM port driver” provided by DENSO WAVE for accessing the Bluetooth® adapter with standard serial port communications software. (The Bluetooth® adapter in a USB-COM kit is configured as a USB-COM interface as an initial setting.)

	To use the USB keyboard interface:	To use the USB-COM interface:
Host computer	PCs that run on the following Windows	
Operating System (OS)	Windows Vista Windows 7 Windows 8 Windows 8.1	Windows Vista (32bit) Windows 7 (32/64bit) Windows 8 (32/64bit) Windows 8.1 (32/64bit)
USB driver	OS-supplied device driver	Active USB-COM port device driver provided by DENSO WAVE

Note 1: The interface can be switched using the configuration software “BA Setting”.

Note 2: Visit our free website QBdirect for the types of supported operating systems.

The configuration software “BA Setting” and “Active USB-COM port driver” are available to the registered members of QBdirect. You can be a member of this website for free at:

<http://www.qbdirect.net>

2.3.2 Notes for connecting the USB interface cable

- When plugging and unplugging the USB connector, put an interval of at least 10 seconds between those actions, since Windows may take several to 10 seconds to add or delete a USB device.
- Hot plugging/unplugging is allowed for USB devices. However, when the computer is in suspend mode, do not plug or unplug their cables.
- When the host computer is processing the Bluetooth® adapter connection, do not plug or unplug any other USB device cables.
- Directly connect the Bluetooth® adapter to the USB port on the host computer or to the self-powered hub. The Bluetooth® adapter may not be connected to some types of hubs. If the operation of the hub-connected Bluetooth® adapter is unstable, connect it directly to the USB port on the host computer.
- Do not use any extension cord.

2.3.3 Setting up the USB interface

Connecting via USB keyboard interface

The USB keyboard interface requires the USB device class driver for HID (Human Interface Device) which is included in Windows Operating Systems and whose setup wizard will automatically run. You do not need to install the device driver.

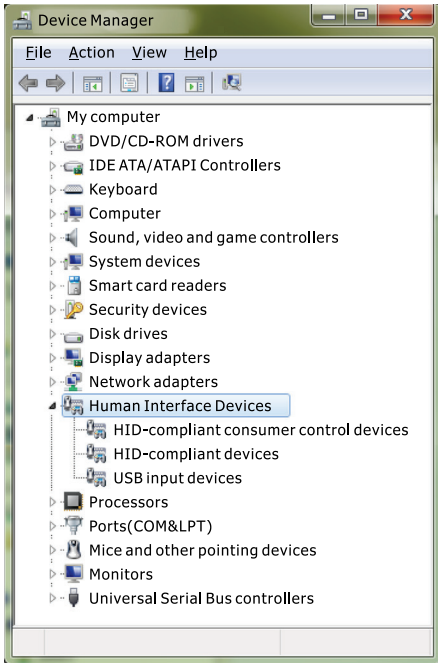
Set up the Bluetooth® adapter in the following steps. The same setup procedure for Windows 7 described here also applies to Windows 8/8.1 and Windows Vista.

Setup procedure

- (1) Switch the computer on to run Windows. Log on as an Administrator.
- (2) Connect the scanner's USB interface cable to the computer or USB hub.





- (4) Wait for the USB Human Interface Device hint to pop up on the task tray.



- (5) To check whether the USB device is working normally, open the Windows Device Manager.

If USB Human Interface Device is added to the sub-tree of Human Interface Devices as shown at left, the scanner is connected normally.

If the device is not added or it is marked with  or , remove this driver with the uninstaller, reboot your computer, and perform the above connection process again.

Connecting via USB-COM interface

Using the USB-COM interface requires installing the software “Active USB-COM port driver” provided by DENSO WAVE to the host computer. It can be downloaded for free from our website at:

<http://www.qbdirect.net>

The file downloaded contains the setup file for the driver and the installation guide. Install the Active USB-COM port driver in accordance with this installation guide. For the latest information, refer to the manual that comes with the driver.

Refer to “Active USB-COM Port Driver Installation Guide” for how to install “Active USB-COM port driver” and notes and precautions to observe when installing or operating it.

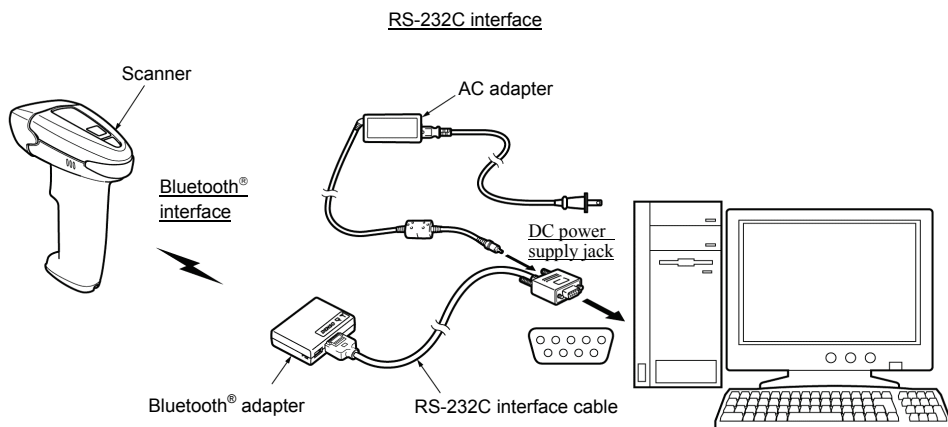
2.4 Using RS-232C Interface

The following two figures show the two AC adapter configurations available.

Configuration A: Plugging the AC adapter into the DC power supply jack on the RS-232C connector (this page)

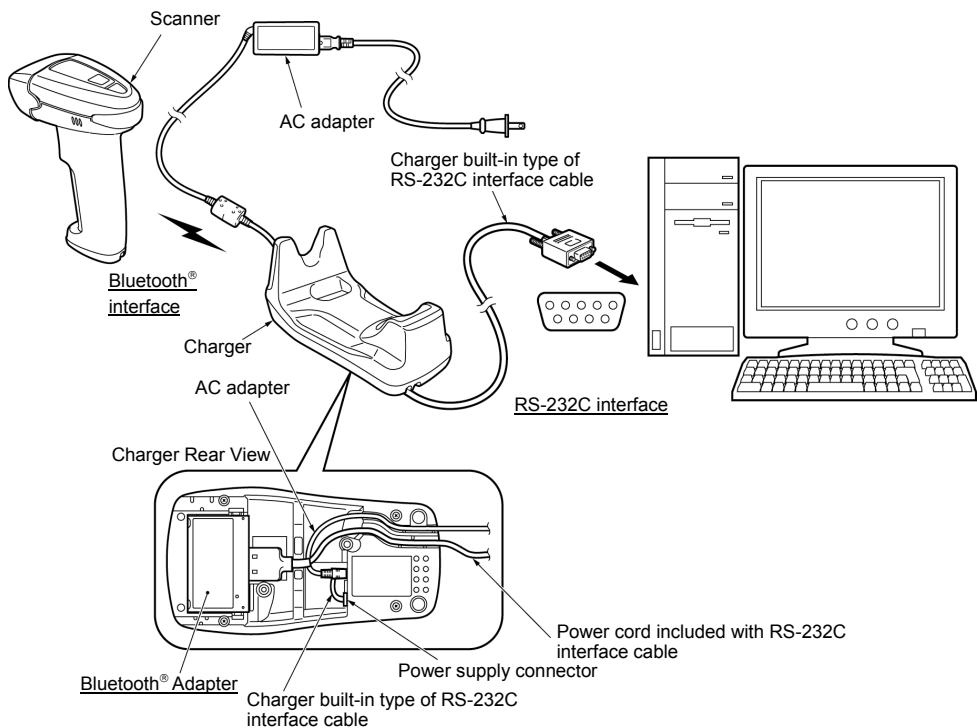
Configuration B: Mounting the Bluetooth® adapter inside the charger and supplying power via the charger and the charger built-in type of the RS-232C interface cable (next page)

- (1) Connect the Bluetooth® adapter to the host computer with an RS-232C interface cable.
- (2) Configuration A: Plug the AC adapter into the DC power supply jack on the RS-232C connector.



Configuration A

Configuration B: Mount the Bluetooth® adapter inside the charger and plug the power cord included with the RS-232C interface cable into the connector at the rear of the charger.



Configuration B

- When using the RS-232C interface for the first time, change the Bluetooth® adapter's interface settings to select the RS-232C interface with the configuration software BA Setting*. For details, refer to Chapter 4.

Note: The charger built-in type of the RS-232C interface cable is exclusively designed for the Bluetooth® adapter mounted inside the charger.

Note: Handle only the connector when unplugging the DC power supply from the jack. Pulling on the cable risks damaging the internal conductors.

Note: Avoid unnecessary connection and disconnection. Excessive wear can lead to faulty connections.

Note: Use only the AC adapter provided.

* Registered users can download the device drivers and the configuration software (BA Setting) from QBdirect, their customer support section on the Denso Wave website at no extra charge.

For further details on QBdirect or to register, visit the following URL.

<http://www.qbdirect.net>

Chapter 3 Bluetooth® Wireless Communication

3.1 Establishing Bluetooth® Wireless Link

To establish a Bluetooth® wireless link between the Bluetooth® adapter and the scanner (or some other Bluetooth® equipment), configure the Bluetooth® adapter as a slave (default) or master with the configuration software BA Setting*.

Bluetooth® adapter as slave (default)

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

Bluetooth® adapter as master

To use the scanner (or some other Bluetooth® equipment) as a slave, configure the Bluetooth® adapter as a master and specify the slave's Bluetooth® address to the Bluetooth® adapter with the configuration software “BA Setting*”. The connection ratio of the Bluetooth® adapter and slave device should be 1:1.

Note: The scanner is automatically connected to the communication adapter via the SPP profile. The scanner cannot be connected to the communication adapter using the HID profile.

* Registered users can download the device drivers and the configuration software “BA Setting” from QBdirect, their customer support section on the Denso Wave website at no extra charge.

For further details on QBdirect or to register, visit the following URL.

<http://www.qbdirect.net>

3.2 Indication of Bluetooth® Adapter Status

The Bluetooth® adapter's interface/power supply LED and Bluetooth® status display LED indicate the Bluetooth® adapter status, interfacing status, and Bluetooth® wireless link status.

Bluetooth® adapter status

Interface/power supply LED	Current status of the Bluetooth® adapter
Lights in green	The Bluetooth® adapter is powered on.
Flashes orange	The Bluetooth® adapter is in the setup mode.
Flashes red	An error has occurred in the Bluetooth® adapter.
Lights in red for 0.1 second	The packet received contains any errors.

Interfacing status

Interface/power supply LED	Current interfacing
Lights in orange for the first 2 seconds*	USB interface
Lights in red for the first 2 seconds*	RS-232C interface

* For the first 2 seconds after the power is first applied.

Bluetooth® wireless link status

Bluetooth® status display LED (blue)	Current Bluetooth® wireless link status
Flashes every 0.5 seconds	The Bluetooth® adapter is, as a master, searching for a slave device to connect.
Flashes every one seconds	The Bluetooth® adapter is, as a slave, waiting for a master to initiate Bluetooth® wireless connection. The Bluetooth® adapter is searching for a peripheral device during customization with the configuration software.
ON	The Bluetooth® wireless link is ready for use.
Flashes rapidly	Data transfer is in progress.
OFF	The Bluetooth® wireless link is broken.

Chapter 4 Customizing the Bluetooth® Adapter

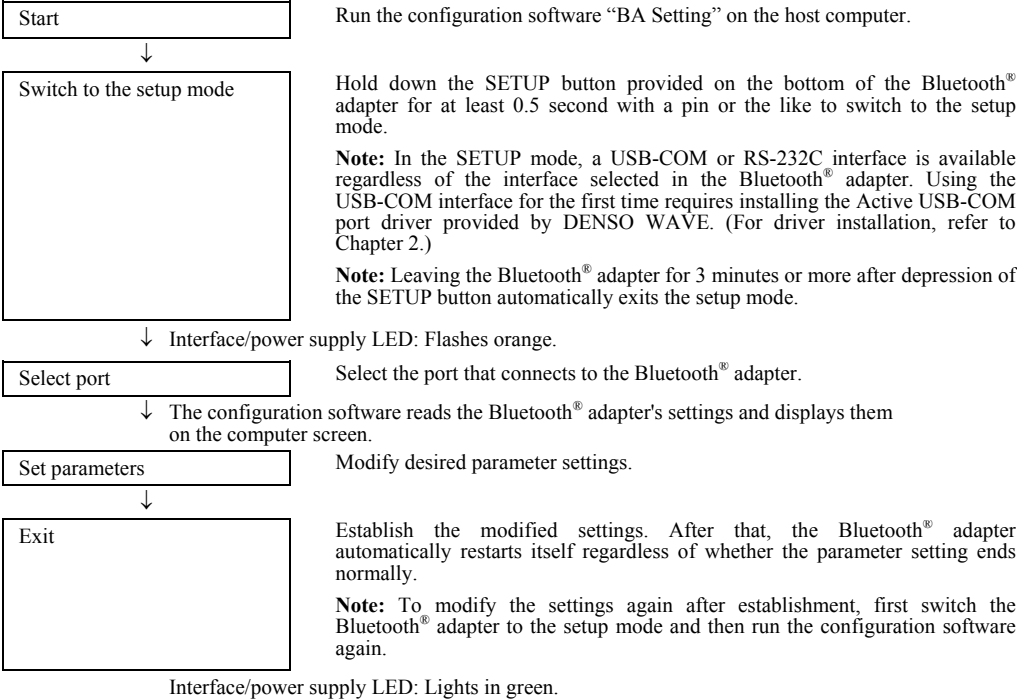
You can customize the Bluetooth® adapter by modifying communications, configuration (as slave/master), and other parameters with the configuration software “BA Setting*”. These parameters retain their settings even when the power is off.

* Registered users can download the device drivers and the configuration software “BA Setting” from QBDirect, their customer support section on the Denso Wave website at no extra charge.

For further details on QBDirect or to register, visit the following URL.

<http://www.qbdirect.net>

Configuring the Bluetooth® adapter



Chapter 5 Communication

5.1 Bluetooth® Interface

(1) Establishing a Bluetooth® wireless link as master or slave (default)

The Bluetooth® adapter, as a master or slave, can establish a Bluetooth® wireless link with the scanner (or some other Bluetooth® equipment).

Using the Bluetooth® adapter as a master requires setting a local name or Bluetooth® address of the slave device, using the configuration software BA Setting*.

(2) Local name and Bluetooth® address

Specify a local name and Bluetooth® address of the slave device with the configuration software.

Local name (Bluetooth® device name): This is a user-friendly name for the Bluetooth® device to identify itself. It can be a character string of a maximum of 30 consisting of alphanumerics and symbols.

Bluetooth® address BT_ADDR (Bluetooth® device address): This is a unique address defined by the Bluetooth® SIG. It can be a 12-character address.

(3) Clearing data after Bluetooth® wireless link breaks

Specify whether the scanner clears transfer data if the Bluetooth® wireless link breaks for some reason or other during a data transfer. Specifying no, the default setting, transmits any data remaining in the transfer buffer once the Bluetooth® wireless link is re-established. Note, however, that, regardless of this and other operation settings for Bluetooth® wireless link breaks, transfer data lost in transit is not resent.

(4) Connection target

Specify whether or not to communicate with the scanner that supports data packaging. Select “AT10/GT10 Series” to communicate with the scanner supporting the data packaging, or select “Other than AT10/GT10 Series” for communication with the scanner that does not support the data packaging .

Refer to the manual of the scanner to confirm whether they support data packing or not. The manual are available on QBdirect.

<http://www.qbdirect.net>

5.2 Interfacing with the Host

5.2.1 USB keyboard interface

The USB keyboard interface requires no dedicated device driver. Data read by the scanner can be entered to the cursor position in your applications.

The USB keyboard interface operates in conformity with the following:

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

(1) Caps mode and host's Caps Lock state

The "Caps mode" parameter determines whether or not to automatically detect the Caps Lock state of the host's keyboard (default: Auto setting). If it is set to "Auto setting," a change in the host's Caps Lock state is automatically reflected in the Bluetooth® adapter's setting.

If the "Caps mode" parameter is set to "Manual setting," be sure to manually set the "Caps Lock of host's keyboard" parameter to match the host's keyboard state (default: OFF).

(2) Keyboard type

Select the type of the connected keyboard. (Default: Type 106, japanese)
Improper setting may cause the computer to fail to receive data correctly.

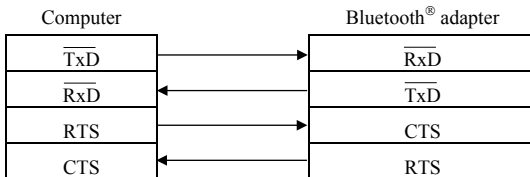
(3) Data transmission interval

When the Bluetooth® adapter sends a large volume of data in succession or it is connected to a computer whose processing speed is low, the computer may cause a data overflow and issue an alarm error. To avoid it, there are choices for transmission interval, ranging from 3 ms to 100 ms (default: 3 ms).

5.2.2 USB-COM interface

Installing our virtual COM port driver "Active USB-COM port driver" to the host computer enables the Bluetooth® adapter to operate with communications software using a conventional serial port.

The virtual COM port on the computer and the Bluetooth® adapter are connected with each other as shown below.



The configuration software BA Setting* provides two choices of the CTS signal monitor--enable and disable.

The USB-COM device driver emulates the communications settings (e.g., transmission speed, data bits, parity, and stop bits) of communications software using a serial port, so no communications setting is required for the Bluetooth® adapter.

(1) Monitoring CTS signal

The configuration software "BA Setting*" provides two choices of the CTS signal monitor--enable or disable.

Enabling the CTS signal monitor does not output data when the RTS signal at the host is disabled. At the Bluetooth® adapter, the RTS signal is usually enabled and it becomes disabled when the Bluetooth® adapter is not ready to receive data, e.g., due to a Bluetooth® wireless link not established with the target device.

5.2.3 RS-232C interface

The Bluetooth® adapter uses asynchronous data transmission and communicates with the connected host computer or external equipment in accordance with the RS-232C.

The configuration software “BA Setting*” provides communications conditions to select.

(1) Transmission speed

There are nine transmission speeds available, ranging from 1200 bps to 115200 bps .

(2) Characters

Characters to be transmitted are all ASCII codes. The frame format has the following parameters.

Data bits: 7 or 8 bits (default)
Parity: Odd, even, or none (default)
Stop bits: 1 bit (default) or 2 bits

(3) Monitoring CTS signal

The configuration software BA Setting* provides two choices of the CTS signal monitor--enable and disable.

Enabling the CTS signal monitor does not output data when the RTS signal at the host is disabled. At the Bluetooth® adapter, the RTS signal is usually enabled and it becomes disabled when the Bluetooth® adapter is not ready to receive data, e.g., due to a Bluetooth® wireless link not established with the target device.

* Registered users can download the device drivers and the configuration software (BA Setting) from QBdirect, their customer support section on the Denso Wave website at no extra charge.

For further details on QBdirect or to register, visit the following URL.

<http://www.qbdirect.net>

5.3 Data Transmission Format Selections

The header and terminator of data which received by Bluetooth wireless communications are changed and outputted to the specified data.

These selections are valid only when the USB keyboard interface is used.

Header

Search string (Before substitution)	A search string must be one character long and be any of ASCII characters 00h to 7Fh. The specification of the search string can be omitted. If no search string is specified, the Bluetooth® adapter automatically prefixes the specified substitution string to the head of the data and then outputs the data.
Substitution string (After substitution)	A substitution string must be a maximum of four characters long and consist of ASCII characters 00h to 7Fh and E5h to FDh. The specification of the substitution string can be omitted. If no substitution string is specified, the Bluetooth® adapter outputs data without header.

Terminator

Search string (Before substitution)	A search string must be one character long and be any of ASCII characters 00h to 7Fh. The search string must be specified.
Substitution string (After substitution)	A substitution string must be a maximum of four characters long and consist of ASCII characters 00h to 7Fh and E5h to FDh. The specification of the substitution string can be omitted. If no substitution string is specified, the Bluetooth® adapter outputs data without terminator.

By default, the header substitution is disabled and the terminator substitution is "Substitute CR with <Enter>".

Substitution example

Substitution settings

	Header	Terminator
Search string	<STX>	<ETX>
Substitution string	No	<Enter> (Enter key)

Result output

Data received	Output data
<STX>12345<ETX>	<Ctrl+B>12345<Enter>
12345<ETX>	12345<Enter>
12345<CR>	12345<Ctrl+M>

Note: The header <STX> is regarded as the keyboard's <Ctrl+B> in output data; the terminator <CR>, as the keyboard's <Ctrl+M>.

5.4 Data Packaging (Packetizing)

Data packaging can improve the reliability of wireless communication. This function is enabled only when connecting to the DENSO WAVE wireless scanner that supports data packaging.

Procedures

The Bluetooth® adapter analyzes incoming packets and only transfers the packet data to the computer or other host, returning ACK to the scanner, for the packets that pass a CRC check. Otherwise, it returns NAK, requesting a repeat transfer. The scanner cannot read in a new bar code until it receives an ACK. For further details on scanner operating procedures, refer to the User's Manual for the scanner.

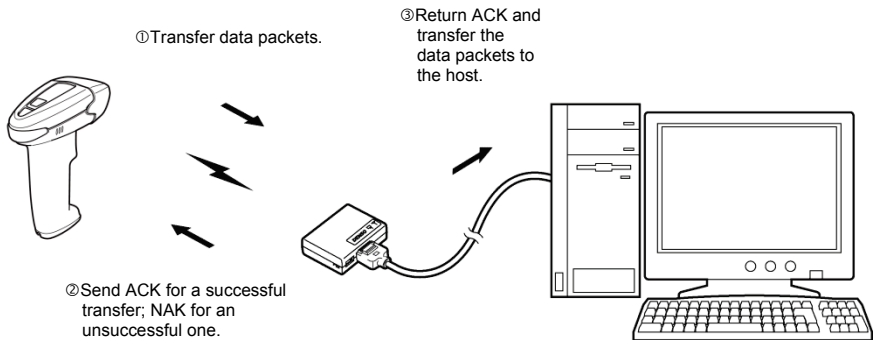
- Scanner setting

- Data packaging (BA)

- Bluetooth® adapter setting

- Communication with the AT10/GT10 Series
- Receiving fragmented packets

Whether or not to receive more than one packet can be selected for communication with the scanner set in the data packaging mode.



Refer to the manual of the scanner to confirm whether they support data packing or not. The manual are available on QBdirect

<http://www.qbdirect.net>

Chapter 6 Parameters and Defaults

When the Bluetooth® adapter leaves the factory, all of these parameters are set to the defaults, with the exception of the "interface to the host" parameter for the USB-COM kit.

(1) Communications parameters for Bluetooth® interface

Items	Parameters	USB-COM kit	Defaults	Refer to:
Configure the Bluetooth® adapter as master or slave	Master			Section 5.1 (1)
	Slave	√	√	
Clearing the transfer buffer when the Bluetooth® wireless link breaks	Enable			Section 5.1 (3)
	Disable	√	√	
Connection target	Communication with AT10/GT10 Series	√	√	Section 5.1 (4)
	Communication with other than AT10/GT10 Series			
PIN code	1 to 8 digits- Alphanumeric char. or symbols	1234	1234	Appendix 3
Reception of split packets	Enable	√	√	Section 5.4
	Disable			

(2) Interface to the host

Items	Parameters	USB-COM kit	Defaults	Refer to:
Interface	USB keyboard interface		√	Chapter 2
	USB-COM interface	√		
	RS-232C interface			

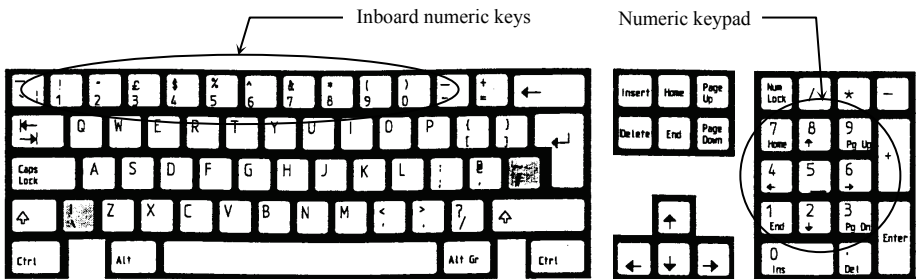
(3) Communications parameters for USB keyboard interface

The following settings take effect only when the USB keyboard interface is set up.

Items	Parameters	USB-COM kit	Defaults	Refer to:
Caps mode	Auto setting	√	√	Section 5.2.1 (1)
	Manual setting			
Caps Lock of host's keyboard	ON (Uppercase letter)			Section 5.2.1 (1) (See Note 1.)
	OFF (Lowercase letter)	√	√	
Keyboard type	U.S. English (101 keyboard)			Section 5.2.1 (2)
	Germany (102 keyboard)			
	French (102 keyboard)			
	U.K. English (102 keyboard)			
	Italian (102 keyboard)			
	Swedish (102 keyboard)			
	Japanese (106 keyboard)	√	√	
Data transmission interval	3 ms	√	√	Section 5.2.1 (3)
	6 ms			
	10 ms			
	16 ms			
	30 ms			
	50 ms			
	100 ms			
Numeric key type	Inboard numeric keys	√	√	(See Note 2.)
	Numeric keypad			
Kanji mode	Enable			(See Note 3.)
	Disable	√	√	
Special key transmission	Enable			(See Note 4.)
	Disable	√	√	

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

(Note 2) When selecting "Numeric keypad," set the host's Num Lock to ON.



U.S. English (101 key type)

(Note 3) The Kanji mode enables Kanji data to output in using the USB keyboard interface. However, Kanji characters may not be correctly output in some applications.

(Note 4) Special key transmission 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

(4) Communications parameters for USB-COM interface

The following settings take effect only when the USB-COM interface is set up.

Items	Parameters	USB-COM kit	Defaults	Refer to:
CTS signal monitor	Enable	√	√	Section 5.2.2 (1)
	Disable			

(5) Communications parameters for RS-232C interface

The following settings take effect when the RS-232C interface is set up.

Items	Parameters	USB-COM kit	Defaults	Refer to:
Transmission speed	1200 bps			Section 5.2.3 (1)
	2400 bps			
	4800 bps			
	9600 bps	√	√	
	14400 bps			
	19200 bps			
	38400 bps			
	57600 bps			
	115200 bps			
Data bits	7 bits			Section 5.2.3 (2)
	8 bits	√	√	
Parity	Odd			
	Even			
	None	√	√	
Stop bit	1 bit	√	√	
	2 bits			
CTS signal monitor	Enable	√	√	Section 5.2.3 (3)
	Disable			

(6) Data Transmission Format Selections

The following settings take effect only when the USB keyboard interface is set up.

Items	Parameters	USB-COM kit	Defaults	Refer to:
Substitution of header	Enable			Section 5.3
	Disable	√	√	
Search string for header	Single ASCII character (00h to 7Fh)			
Substitution string for header	Max. 4 ASCII characters (00h to 7Fh and E5h to FDh)			
Substitution of terminator	Enable	√	√	
	Disable			
Search string for terminator	Single ASCII character (00h to 7Fh)	CR (0Dh)	CR (0Dh)	
Substitution string for terminator	Max. 4 ASCII characters (00h to 7Fh and E5h to FDh)	Enter (ECh)	Enter (ECh)	

Chapter 7 Troubleshooting

Problem: Data not displayed on the computer screen correctly.

When using Bluetooth® interface

Probable cause	What to do:
The target Bluetooth® device is not ready for communication.	Refer to the user's manual of the target Bluetooth® device.
The target Bluetooth® device is located too far from your Bluetooth® adapter.	Check the Bluetooth® status display LED to see the Bluetooth® wireless link status. If there is no connection, bring the Bluetooth® adapter and the Bluetooth® device at the other end closer together until one is established.
The Bluetooth® wireless link with the target Bluetooth® device is not established.	Check the Bluetooth® status display LED to see the Bluetooth® wireless link status. If there is no connection, establish one between the Bluetooth® adapter and the Bluetooth® device at the other end.

When using USB keyboard interface

Probable cause	What to do:
The system-supplied device driver is not used.	Use a USB human interface device (HID) class driver.
The keyboard type selected at the Bluetooth® adapter does not match that of the computer keyboard.	Change the keyboard type to match the computer keyboard. (To check the current keyboard type, display the Keyboard Properties dialog box from the Control Panel.)
The character string entered contains any two-byte character(s).	Configure the host computer for ASCII input.
Any key on the keyboard is held down.	Do not press any key during data transfer.

When using USB-COM interface

Probable cause	What to do:
Any device driver other than the USB-COM device driver provided by DENSO WAVE is used.	Use the USB-COM device driver provided by DENSO WAVE.

When using RS-232C interface

Probable cause	What to do:
The communications conditions specified at the Bluetooth® adapter do not match the ones at the host computer.	Change the adapter's communications conditions to match the computer's ones.

Appendix 1 Specifications

Item		BA20-RU
Interfaces	To Bluetooth® equipment	Integrated with radio equipment compliant with Bluetooth® Specification Ver.2.1 + EDR
	To host	USB-keyboard interface USB-COM interface RS-232C interface
Input power requirements	Operating voltage range	5.0 V DC ±5%
USB	Standard	Compliant with USB 1.1
	Connector	Mini-B receptacle (5-pin)
	Power consumption (on 5.0 V DC)	In operation: 100 mA typ. In Bluetooth® wireless link operation: 80 mA typ. In suspend mode: 1.1 mA typ.
Environmental conditions	Operating temperature range	-5 to 50°C
	Operating humidity range	10 to 90% RH ⁽¹⁾
	Storage temperature range	-10 to 60°C
	Storage humidity range	5 to 95% RH ^(*)
Dimensions (W) x (D) x (H)		48.4 x 36.4 x 14.5 mm (1.9 x 1.4 x 0.6 inches)
Weight		Approx. 16 g (excluding the interface cable)

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

Appendix 2 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 3 Pairing (Device authentication)

Pairing (or bonding) is the Bluetooth® authentication process for confirming the device at the other end and thus blocking indiscriminate access from just any Bluetooth® device. It involves mutual authentication between two Bluetooth® devices by exchanging a mutually agreed PIN code (or pass key) when they first connect. This approach allows the two devices to both establish a secure link and rapidly access device services without re-entering the PIN code for subsequent connections.

The scanner supports PIN codes 0 to 8 bytes long consisting of letters, digits, and certain other ASCII characters.

When the scanner is configured as SSP (Secure Simple Pairing), the connection with the equipment corresponding to SSP can abbreviate the PIN code input.

Changing scanner PIN code

The scanner ships with an initial PIN code of 1234. Use the scanner configuration software (BA Setting) to change this.

Bluetooth® Adapter

BA20-RU

User's Manual

First Edition, May 2015

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