

DENSO



Barcode/2D code
Handy Terminal

**BHT-1800QWB
BHT-1800QWBG
Hardware User's Manual**



Preface

Thank you for using the DENSO WAVE Barcode Handy Terminals BHT-1800.

Please read this manual thoroughly prior to the operation to ensure full use of the product's functionality, and store safely in a convenient location for quick reference even after reading.

This is an instruction manual for the BHT-1800.

The BHT-1800 is developed as wireless stations for the low power data communication system and has been given a certificate of technological conformance defined by the applicable radio law, allowing users not to apply for or obtain a license to use a wireless station. Any modification or reconstruction of the radio station is strictly banned by the radio law and anyone who has violated this regulation is subject to penalties.

Bluetooth® is a registered trademark of Bluetooth SIG and DENSO WAVE is using it under its license.

The firmware of this product shall not be reverse-engineered, decompiled, disassembled, integrated, modified or transformed in anyway or any form.

LCD may contain not illuminated pixels or always illuminated pixels. It may also contain uneven color and brightness. They are not failures. Slight Newton's ring may happen to appear on the touch screen, but it is not a failure, either.

Liability Limitations

- DENSO WAVE INCORPORATED does not assume any product liability (including damages for lost profits, interruption of operations, or the loss of business-related information) arising out of, or in connection with, the use of, or inability to use the BHT system software or related manuals.
- DENSO WAVE INCORPORATED ("DENSO WAVE") takes reasonable precautions to ensure its products do not infringe upon any patents or other intellectual property rights of other(s), however, DENSO WAVE cannot be responsible for any patent or other intellectual property right infringement(s) or violation(s) arising from any of the following 1) - 3).
 - 1) The use of DENSO WAVE's products in connection or in combination with other components, products, devices, data processing systems or software not supplied by DENSO WAVE.
 - 2) The use of DENSO WAVE's products in a manner for which they were not intended nor designed.
 - 3) The modification of DENSO WAVE's products by parties other than DENSO WAVE.
- If it is judged by DENSO WAVE INCORPORATED that malfunction of the product is due to the product having been dropped or subjected to impact, repairs will be made at a reasonable charge even within the warranty period.
- DENSO WAVE will not bear any responsibility for data which customers have recorded and are received by DENSO WAVE for repair and analysis.

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.

- The 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 BHT Series systems or software, and sample programs.
E-mail inquiries	Product related queries can be sent in 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>

Inquiries

For inquires relating to products, please access our website <https://www.denso-wave.com> .

Technical inquiries can be made at our exclusive website for registered users (QBdirect).

Safety Precautions

Be sure to observe all these safety precautions.

Please **READ** through this manual carefully. It will enable you to use the BHT and CU correctly.
Always keep this manual nearby for speedy reference.

Safety precautions description in this document

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 levels and meaning of symbols are as follows;

Warning level

 DANGER	Alerts you to those conditions that could imminently lead to serious bodily injury or death if the instructions are not followed correctly.
 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 (▲) with a picture inside alerts you to a warning of danger. Here you see the warning for electrical shock.
	A diagonal line through a circle (⊘) warns you of something you should not do; it may or may not have a picture inside. Here you see a screwdriver inside the circle, meaning that you should not disassemble.
	A blue circle (●) with a picture inside alerts you to something you MUST do. This example shows that you MUST unplug the power cord.

 **DANGER**

Handling the batteries

Wrong handling the batteries may result in electrical shock, overheating, smoke generation, combustion, blowout, or leakage of battery fluid. Please read the following items prior to use.

	<ul style="list-style-type: none"> • Never disassemble or modify the battery.
	<ul style="list-style-type: none"> • Do not stick a needle into the battery, hammer at it, or tread on it. • Avoid dropping or throwing the battery or letting it undergo any shock or impact. • Do not use significantly damaged or deformed batteries. Do not use batteries when they are subject to the impact, for example, a drop impact. • Never connect the battery (+) and (-) terminals with a metal object such as a piece of wire. • Do not carry or store the battery together with metallic ball-point pens, necklaces, coins, hairpins, etc. • Do not get the BHT wet or put it in water or seawater.
	<ul style="list-style-type: none"> • Never burn or heat the battery. • Never use, leave, or charge the battery in the vicinity of high-temperature locations (60 °C or higher) such as a fire, stove, or under a scorching sun. • Do not use or store the battery in places exceeding the service or storage temperature.
	<ul style="list-style-type: none"> • Never charge the battery near a fire or in strong sunlight. Raised battery temperature may result in leakage of battery fluid, blowout, or combustion. • Never charge or use the battery where any inflammable gases may be emitted. • Never apply solder directly to the battery. • Do not use batteries other than the specified ones.
	<ul style="list-style-type: none"> • If the battery fluid leaked from the battery gets into the eyes, wash thoroughly with clean water such as tap water without rubbing and obtain medical treatment immediately. Failure to do so will result in eye injuries. • During use, charging, or storage of the battery, if odors come from the battery, the battery is overheated, discolored, deformed, or anything unusual is found, unload the battery from the BHT or charger. Do not use the battery.
	<ul style="list-style-type: none"> • If the battery does not finish recharging within the specified time, stop recharging.



WARNING

To system designers

	<ul style="list-style-type: none"> When introducing BHTs in those systems that could affect human lives, develop applications carefully through redundancy and safety design which avoids the feasibility of affecting human lives even if a data error occurs.
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Handling the BHT

Wrong handling of the BHT may affect normal operation or result in, electric shock, generating heat and smoke, and vision disturbance. Be sure to observe the following.

	<ul style="list-style-type: none"> Never disassemble or modify the BHT.
	<ul style="list-style-type: none"> Avoid dropping or throwing the battery or letting it undergo any shock or impact. When the BHT is subject to the strong impact, for example, a drop impact, check the case for any damage and the battery for damage, leakage and overheating. Never use a battery once it is damaged, heated or has a fluid leakage. Never use a damaged case. If the battery fluid leaked from the battery gets into the eyes, wash thoroughly with clean water such as tap water without rubbing and obtain medical treatment immediately. Failure to do so will result in eye injuries. Do not insert any foreign materials into the battery cartridge. Do not get the BHT wet or put it in water or seawater. Never put the BHT in a microwave oven or high-pressure container. Never put the BHT in places where there are excessively high temperatures, such as inside closed-up automobiles, or in places exposed to direct sunlight. Avoid using the BHT in extremely humid or dusty areas, or where there are drastic temperature changes.
	<ul style="list-style-type: none"> If smoke, abnormal odor or noise comes from the BHT, immediately turn off the power and remove the battery cartridge from the scanner case.
	<ul style="list-style-type: none"> If the LCD screen is broken by mistake, care must be taken not to get the liquid crystal into your eyes or mouth or drop it on your skin.
	<ul style="list-style-type: none"> Be careful of broken glass if the LCD screen is accidentally cracked or broken. It may cause bodily injury.
	<ul style="list-style-type: none"> If the LCD screen is accidentally broken and liquid crystal gets into your eyes or mouth, wash it off immediately with clean water and then seek medical care. Or, if it is attached to your skin or clothes, wipe it off immediately and then wash it using soap and water. Failure to do so may lead to vision loss or cause trouble in the skin. Never stare into the reading window. Failure to do so will result in vision disturbance.

BHT-1800 Series

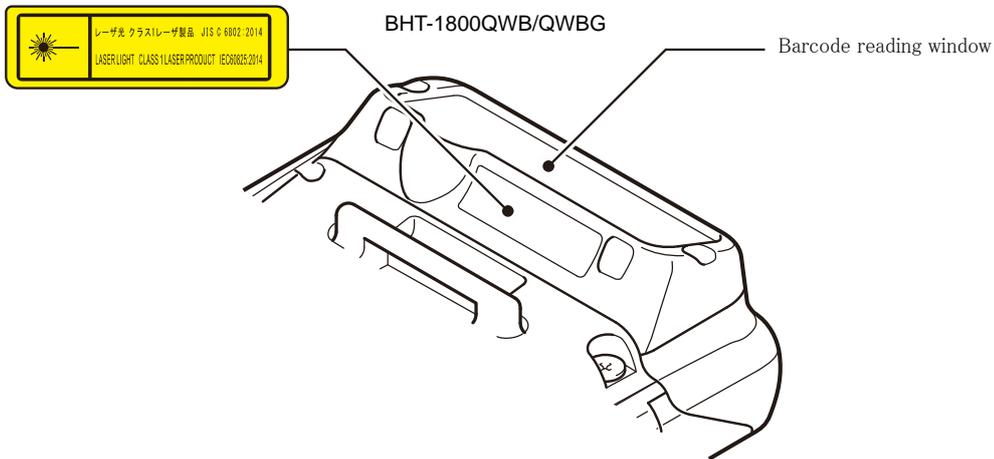
Handling the batteries

Wrong handling the batteries may result in electrical shock, overheating, smoke generation, combustion, or blowout. Please read the following items prior to use.

	<ul style="list-style-type: none">• The battery is exclusively for the BHT. Do not use the battery for purposes other than charging the BHT.
	<ul style="list-style-type: none">• Use the specified charger or charging cable.

Handling the scanner using a laser light

	<ul style="list-style-type: none">• Never stare into the laser light.• Never point the code reading windows at someone's eyes.
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CAUTION

Handling the BHT

Wrong handling of the BHT may affect normal operation or result in overheating, smoke generation, failure, and vision disturbance. Be sure to observe the following.

	<ul style="list-style-type: none"> • When using the hand strap or neck strap, exercise due care to avoid getting them caught in other objects or entangled in rotating machinery. Failure to do so could result in accident or injury.
	<ul style="list-style-type: none"> • Do not move your ear close to the speaker while the Buzzer is beeping. Doing so could lead to hearing difficulty. • Do not operate the BHT in environments where static electricity can build into significant charges. Doing so could result in malfunction or mechanical failure. • Avoid dropping the battery cartridge or letting it undergo any strong shock or impact. Doing so could result in malfunction or mechanical failure. • Do not use the BHT near a wireless transmitter such as a personal radio or ham radio. Doing so could result in malfunction or mechanical failure. • Do not touch BHT with oily hands or gloves containing oil such as machine oil and grease. Doing so may cause the deformation and discoloration of a device. • This product incorporates a connector for microSD cards. Do not insert anything other than these cards. Do not insert a card inversely, diagonally and with twisted. If a card is inserted forcibly, this could damage a card or a connector. • Do not attach a wet BHT or rechargeable battery cartridge to CU. • Do not use excessive force when inserting or removing the battery cartridge. Doing so could result in malfunction or mechanical failure. • Keep magnetic cards such as a cash card or a credit card away from the BHT. Failure to do so could cause loss of magnetic data.

About This Product

The BHT-1800 handy terminal, powered by Android™ 7.1.2 Nougat, is light-weight, easy to use, providing powerful and handy tools for the purpose of delivering flexibility in customization.

Specifically designed to work as an industrial PDA, it provides rich options for data collection, voice and data communication, long-lasting working hours, and so on. Its large color transmissive display guarantees ease in reading in all lighting conditions. Integrated with Bluetooth® v4.1, v2.1+EDR, 802.11a/b/g/n technologies, this BHT also includes a GSM/GPRS/EDGE/WCDMA/UMTS/HSDPA/HSUPA/HSPA+/LTE module (WWAN model only) to gain greater speeds and optimal mobility. In particular, an integrated GPS receiver is made available for use with third-party location-based applications.

This manual serves to guide you through how to install, configure, and operate this BHT.

We recommend you to keep one copy of the manual at hand for quick reference or maintenance purposes.

To avoid any improper disposal or operation, please read the manual thoroughly before use.

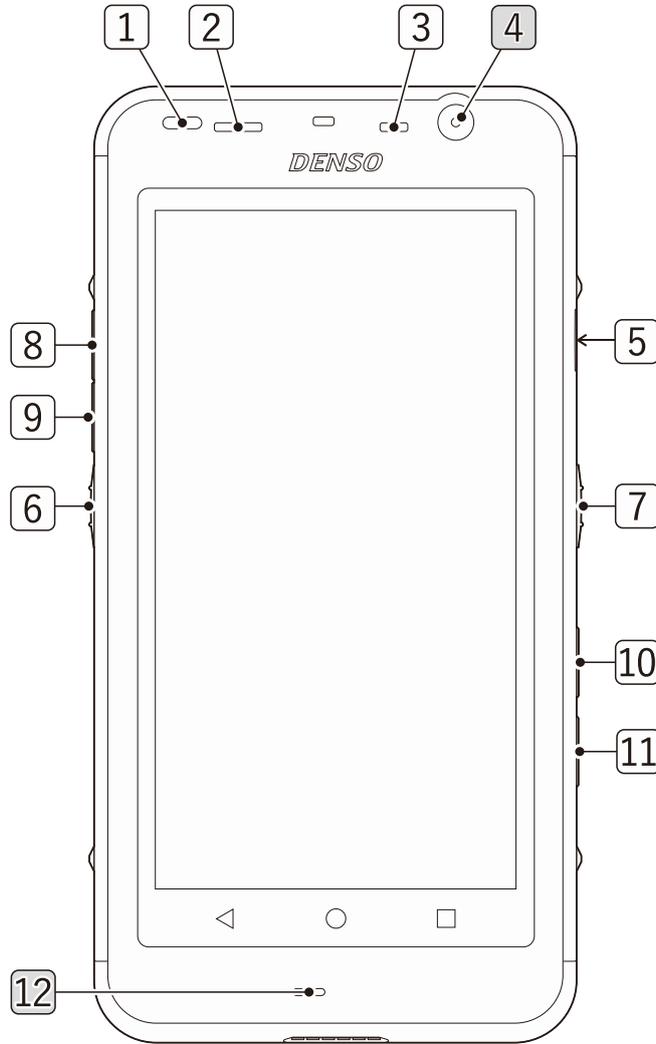
Features of This Product

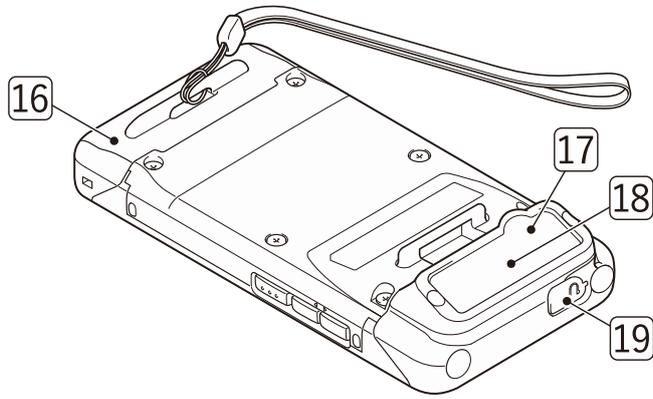
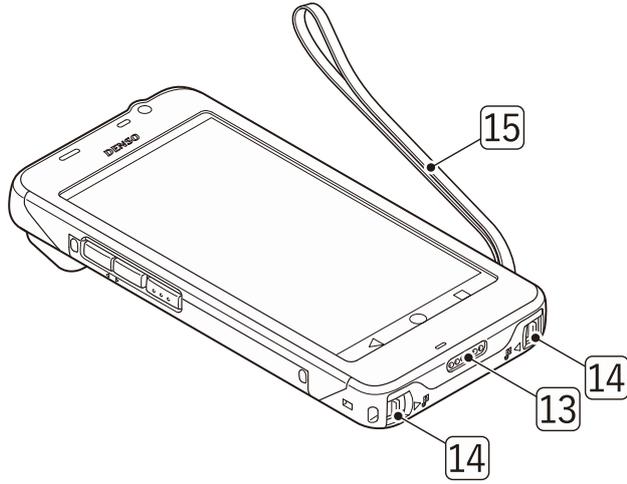
- Built tough to survive drop test and sealed against moisture/dust to industrial standard IP67*.
- Android™ 7.1.2 Nougat operating system with a powerful Qualcomm® APQ8009, MSM8909 (WWAN model) 1.3 GHz Quad-Core processor
- 16 GB eMMC flash memory to store OS and software programs
- 2 GB LPDDR3 SDRAM to store and run programs, as well as store program data
- One expansion slot for microSDHC card up to 32 GB or microSDXC card up to 2 TB
- For model with camera, built-in 8.0 Megapixel rear camera with white LED for flash and auto focus
- Left and right side triggers for ambidextrous scanning
- Total wireless solution — connectively includes Bluetooth® v4.1 and v2.1+EDR, 802.11a/b/g/n, GSM/GPRS/EDGE/ WCDMA/UMTS/HSDPA/HSUPA/HSPA+/LTE (WWAN model only), and near field communication (NFC).
- A 5.0" color transmissive display with 720 X 1200 pixels to deliver excellent visibility in all lighting conditions
- Built-in scan engine setting tool "Reader Configuration" which serves out-of-the-box keyboard wedge functionality
- Accessories and peripherals include Communication Unit CU-BL1-18, CU-BU1-18, multiple BHT charger CH-B4-18, and USB direct cable CBBHT-US2000/C18-4A, Li-ion BT-180LA battery.

* IP67 is not a guaranteed value, but a test value at the normal temperature.

1 Quick Start Guide

1.1 Appearance





Description of key

No.	Key	Name	Function of overview
①		Status indicator	Denotes the code reading status or the charging status with color or flashing state of light.
②		Speaker	Sound comes out of it.
③		Receiver	Receives speaker's voice when talking. This function is integrated in the WWAN model.
④		Front camera	Mounted on the LCD screen side for capturing the image
⑤		Power key	Powers ON/OFF
⑥		Left trigger key	Reads codes.
⑦		Right trigger key	
⑧		Magic key [M1]	[M1] to [M4] keys can be used in place of [SF] key, [ENT] key, [Back light] key, [MENU] key or [BS/C] key depending on settings.
⑨		Magic key [M2]	Strings can be assigned with the user program. [M1] key can operate as MENU key by holding down for more than one second, and displays the following screens.
⑩		Magic key [M3]	- Beeper volume level
⑪		Magic key [M4]	- Vibrator - Brightness of screen - Power saving
⑫		Microphone	Picks up voice when talking. This function is integrated in the WWAN model.
⑬		Interface connector	Makes data communication using the Communication Unit and charges. Keep this clean so as not to cause a contact failure.
⑭		Battery cover lock	To be fixed so that a battery cover will not be opened unnecessarily. Press and then slide it.
⑮		Hand strap	Attach the hand strap referring to 1.3 Attaching the Hand Strap so as not to drop the BHT during the operation.
⑯		Battery cover	To be opened when replacing the main battery and SIM and microSD cards.
⑰		Rear camera	Captures the image.
⑱		Barcode reading window	Contains a camera for reading codes. Keep it always clean so as not to cause any scratches.
⑲		Audio plug cover	To be opened when using a round plug for a headset. When not in use, be sure to close it to avoid the entry of water drop.

③ and ⑫ are equipped depending on the model.

1.2 Supporting Model List

BHT-1800 series enables the option selection by model as shown in the table below.

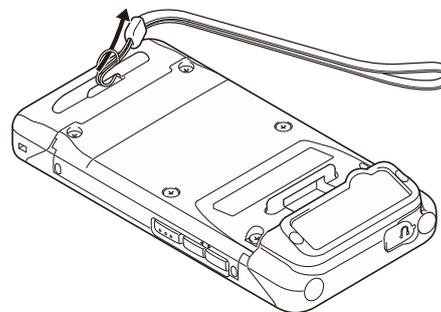
	LTE, GPS	Receiver, microphone	WLAN, Bluetooth®	NFC
BHT-1800QWB-1	—	—	✓	—
BHT-1800QWB-2	—	✓	✓	—
BHT-1800QWB-3	—	✓	✓	✓
BHT-1800QWBG-1	✓	✓	✓	—
BHT-1800QWBG-2	✓	✓	✓	—
BHT-1800QWBG-3	✓	✓	✓	✓

	Code reading	Front camera	Rear camera	Light/ Proximity sensor
BHT-1800QWB-1	2D code	—	✓	—
BHT-1800QWB-2	2D code	✓	✓	✓
BHT-1800QWB-3	2D code	✓	✓	✓
BHT-1800QWBG-1	2D code	—	✓	✓
BHT-1800QWBG-2	2D code	✓	✓	✓
BHT-1800QWBG-3	2D code	✓	✓	✓

1.3 Attaching the Hand Strap

Attach the packaged hand strap when using BHT in order to prevent it from being dropped during the operation.

Fix the hand strap to BHT-1800 as shown in the figure at right.



1.4 Installing Battery

The BHT main body and the main battery are packaged separately due to the conditions of shipment and storage.

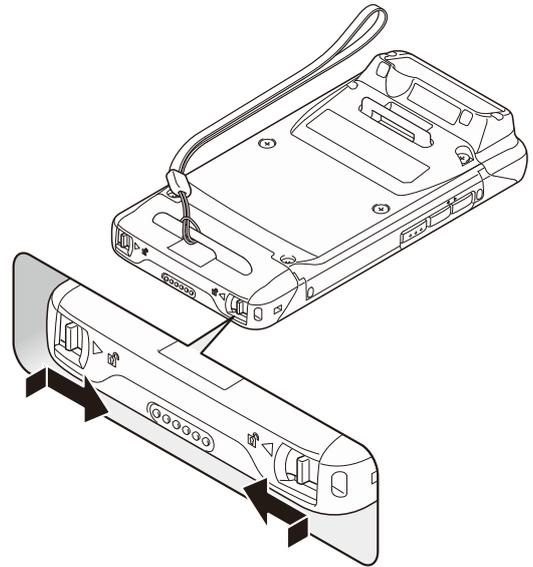
Caution: Incorrect handling may decrease the lifetime of battery.

Warning: Before powering on, confirm that the battery cover lock is positioned at the "Lock" position. To use BHT for the first time, install a charged battery and lock the battery cover. Then turn ON the power button.

Install the main battery in accordance with the following steps.

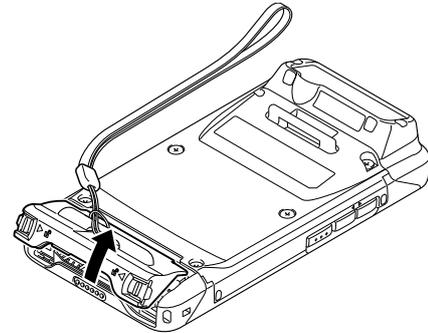
Step 1

Push and slide the battery cover locks in the direction indicated by the arrow.



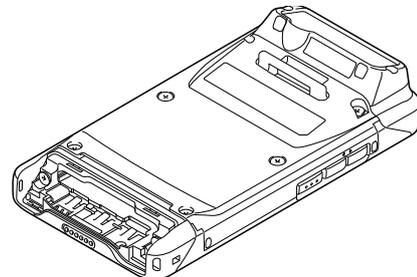
Step 2

Open the battery cover.



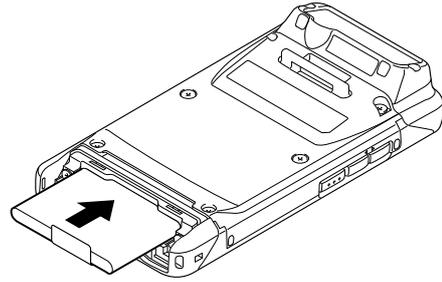
Step 3

Remove the battery cover.



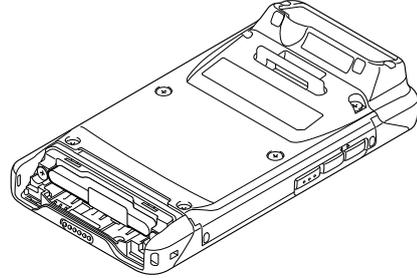
Step 4

Pay attention to the direction of the battery electrodes and install the battery.



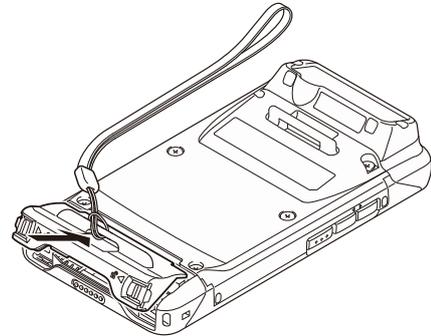
Step 5

Push the battery all the way in.



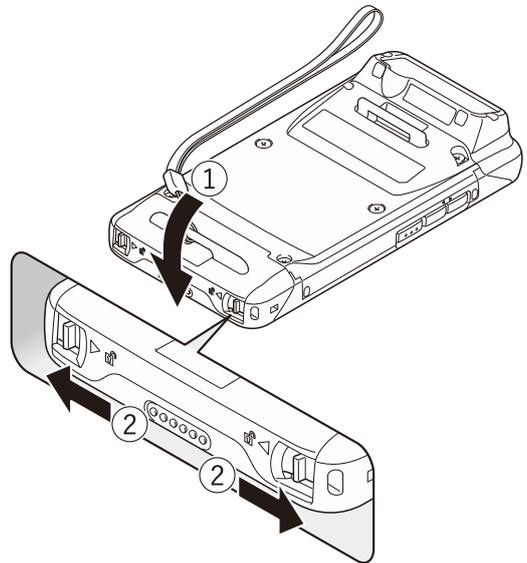
Step 6

Insert the battery cover tab.



Step 7

Close the battery cover ①. And slide the battery cover lock ② in the direction indicated by the arrow to lock the battery cover in position.

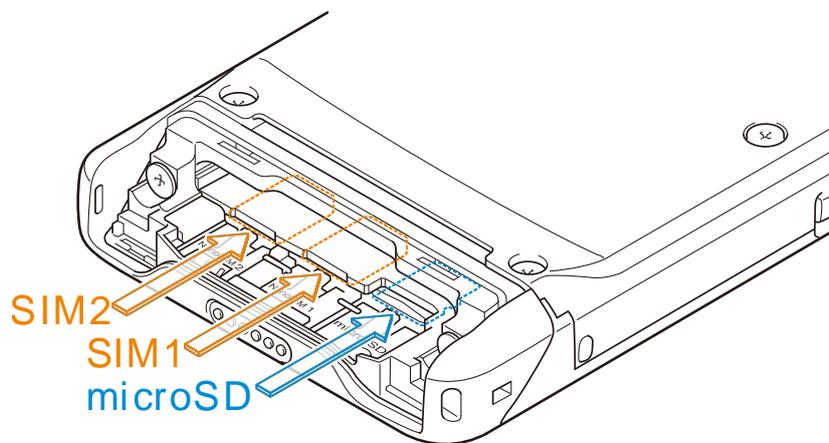


1.5 Installing and Removing SIM Card/microSD Card

BHT-1800 Handy Terminal is equipped with one microSD card slot. WWAN model is equipped with two SIM card slots as well.

Installation of a card

1. Remove the battery cover as described in battery removal.
2. Insert the cards into the respective slots in the directions indicated. Push the cards to lock them in.
Note that when you insert the cards into the slots, the metal contact sides of SIM card should face upwards, while those of microSD card should face downwards.
3. Place the battery cover back and push the battery cover lock to the "Lock" position.



Supporting card

1. Both SIM1 and SIM2 card slots support 2G/3G/4G cards. However, 3G/4G data can be transmitted on either SIM, but not on both at the same time. For details on managing dual SIM cards, refer to SIM Card Management (WWAN Model Only) in the Software User's Manual.
2. SIM1 card or SIM2 card relevant functions are only supported on WWAN model. For more details on specification-wise differences between WWAN model and WLAN model, please refer to Specifications.

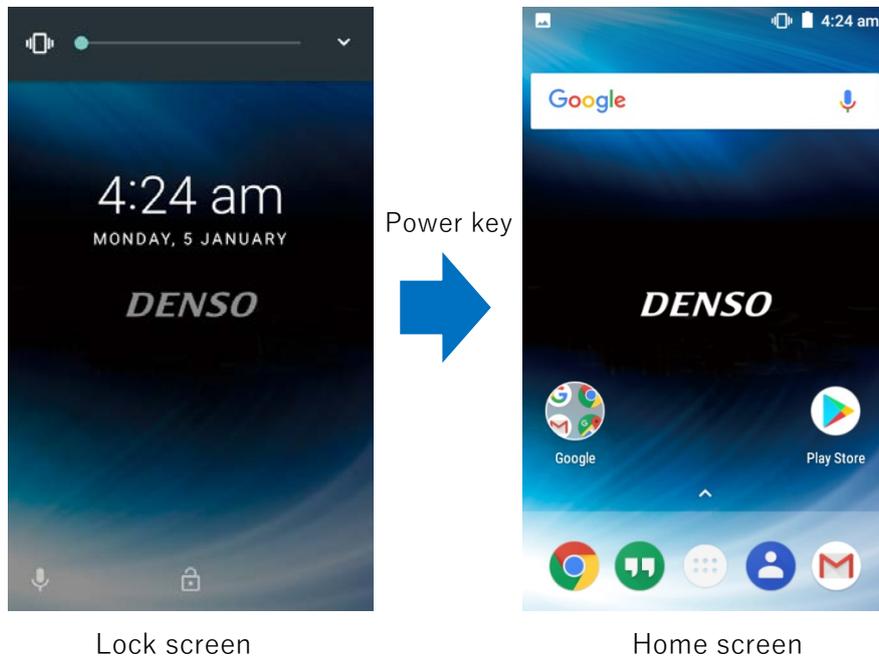
Removal of cards

1. Remove the battery cover.
2. Push a card to eject it from its slot, and take it out of the slot.
3. Place the battery cover back and push the battery cover lock to the "Lock" position.

1.6 Power ON/OFF BHT

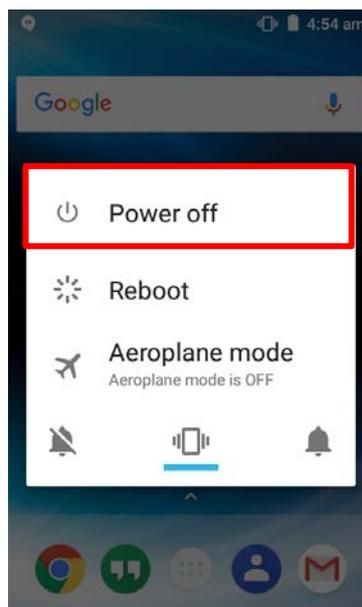
Power ON

To power on BHT, press and hold the power button  located on the upper right side of BHT. BHT will turn on and show the lock screen after splash screen. Swipe the lock screen upward to display the home screen. BHT will not turn on unless a battery cover is fixed to the right position.



Power OFF

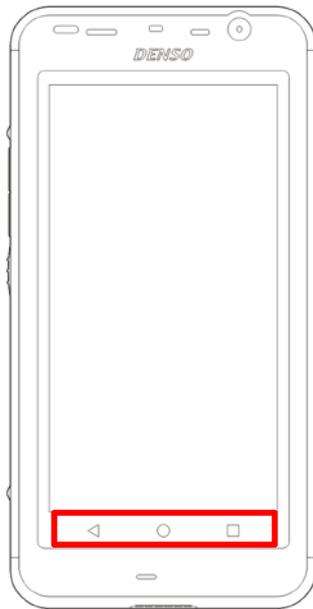
Press the power button , and a menu will appear on the screen which allows you to power off BHT. Make sure all user data have been stored before tapping on Power off.



1.7 Using Hardware Buttons

On the bottom of BHT are three hardware buttons that deliver the following functions.

Button	Function	Description
	Back button	Returns to the previous screen or closes the active window or keyboard.
	Home button	Displays the Home screen.
	Recent apps button	Opens a list of recently used applications.



1.8 Charging

The main battery may not be charged to full for shipment. When you first receive the kit package, you need to charge the main battery to full before using BHT. You may use the Communication Unit or multiple BHT charger to charge the BHT.

1.8.1 Charging time

The main battery powers the BHT to work. It takes approximately 4.5 hours to charge an empty main battery to full. The status indicator above the screen (located on the right) will light up in red while charging and will turn green when charging is complete.

When the main battery is removed, BHT data will be retained for at least 3 minutes.

The backup battery is mounted on the main board. Its role is to retain data in DRAM when the main battery is replaced. Replace the main battery within one minute. To charge a backup battery to full, it takes approximately 10 hours from the completely discharged state to the fully charged state using the main battery or power adapter.

1.8.2 Charging temperature

It is recommended to charge the battery at room temperature (18 ° to 25 °C) for optimal performance. Note that battery charging stops when the ambient temperature drops below 0 °C or exceeds 40 °C.

1.8.3 Operation on battery power

When 802.11a/b/g/n, GSM/GPRS/EDGE/WCDMA/UMTS/HSDPA/HSUPA/HSPA+/LTE, Bluetooth® v4.1+EDR/LE and GPS are all enabled on battery power, the main battery level will drop down substantially. Prolonged use of the display and continued scanning of barcodes will also affect battery level.

In order to prevent system from shutting down after the battery is drained out, we suggest that you keep a fresh battery for replacement at all times, or connect BHT to the Communication Unit or USB Direct Cable for charging.

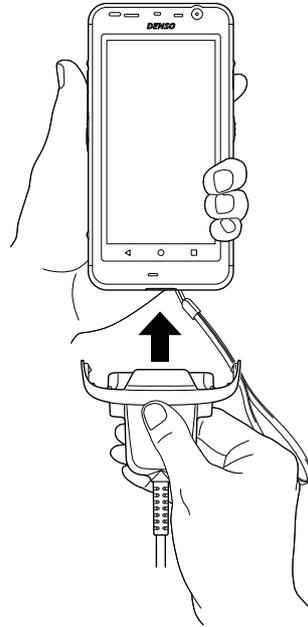
1.8.4 Use of USB Direct Cable

The USB Direct Cable provides a convenient way to charge your BHT.

Fasten the USB Direct Cable to the lower end of the BHT.

Connect the other end of the cable to the USB port or the USB power adapter of a host computer.

It may take long to charge to full depending on the power supply capacity of the host computer.



While the battery is being charged, the status indicator on BHT will indicate the charging status.

Status	Description
Red, solid	While charging BHT
Red, blink	Charging error (Charging will stop.)
Green, solid	Charging complete
No light	The cable is not correctly connected.

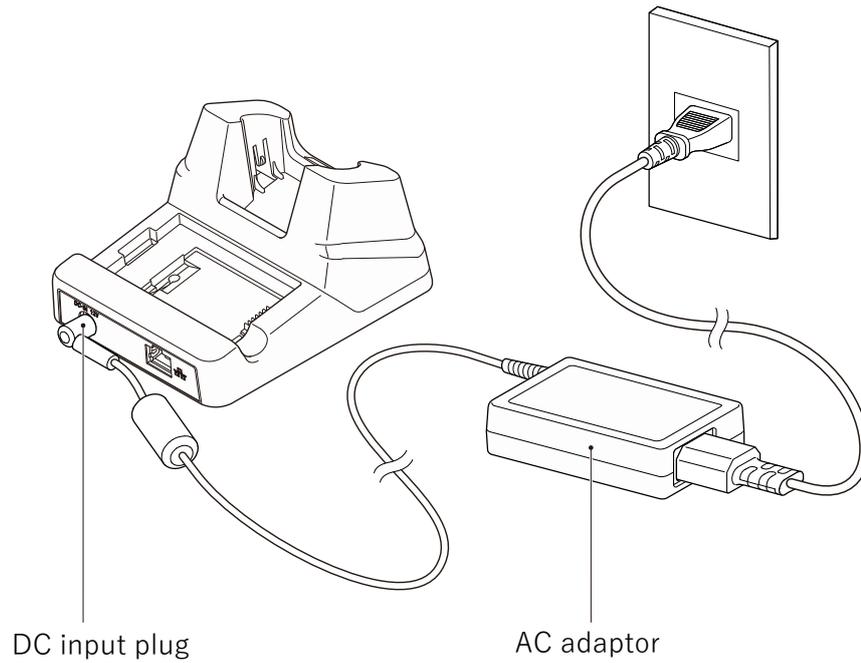
1.8.5 Use of Communication Unit

The Communication Unit charges both your BHT and a spare battery at the same time.

Preparation of Communication Unit

Connect the AC adaptor to the Communication Unit.

To carry out data communication, connect a communication cable to the Communication Unit.

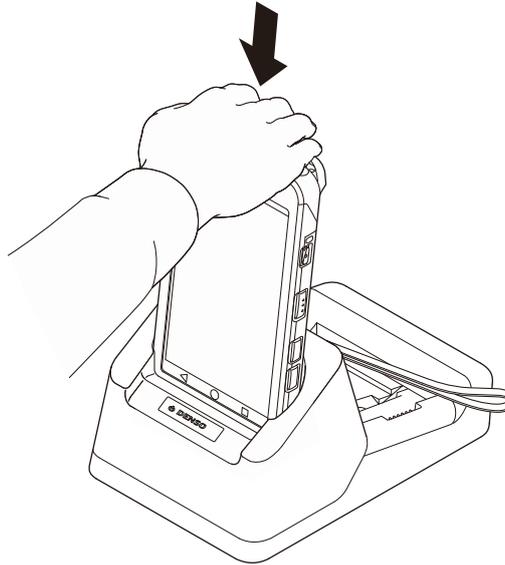


As for CU-BU1-18, the BHT may be charged through the USB connector.
It may take longer to charge than when using the AC adaptor.
Do not charge a spare battery using the USB power supply.

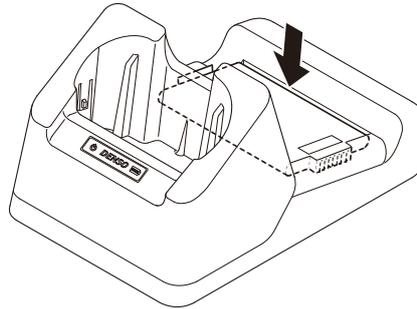
Charging procedure

Charge your BHT using the Communication Unit as described below.

Insert your BHT onto the Communication Unit. Press BHT down till you hear a 'click' to make sure it is secured in the charging station.



Insert a spare battery in the slot for charging the spare battery located at the back of the CU as shown in a figure below.



The status of BHT charging is shown on the status indicator of the BHT, while the status of spare battery charging is shown in the status indicator of the Cradle.

The battery charging status is shown as below:

Status	Description
Red, solid	While charging BHT
Red, blink	Charging error (Charging will stop.)
Green, solid	Charging complete
No light	The charging cable is not correctly connected.

Not charging could be the result of battery damage, battery's failure to touch the connector, or AC plug coming off.

Charging error could be due to high battery temperature.

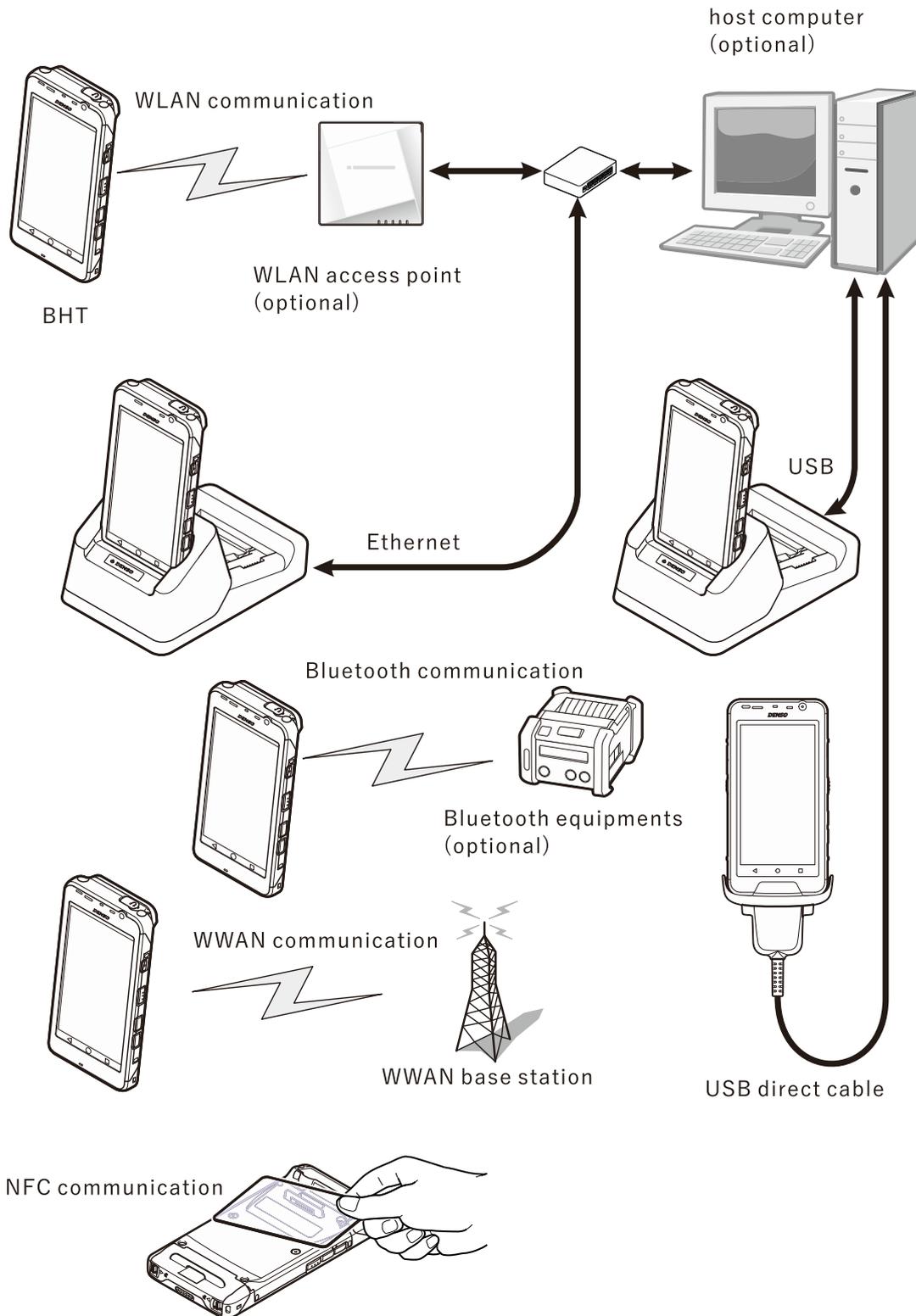
Notice on the power source of the Communication Unit

As for Communication Unit CU-BU1-18 with USB interface, be sure to unplug the USB connector first and then unplug the DC input connector when both DC input connector and USB connector are inserted.

If the DC input connector is unplugged first, CU may stop its operation at the moment and disable communication and charging.

1.9 Communication

The barcode data collection system using BHT can connect various types of hardware to the BHT through each communication system.



1.9.1 USB Communication

Communication between BHT and a host computer through the Communication Unit with USB interface or by directly connecting them using the USB direct cable to enable the data communication complying with USB2.0 standard.

For the connection with the Communication Unit, refer to 1.8.5 Use of Communication Unit.

For the connection using the USB direct cable, refer to 1.8.4 Use of USB Direct Cable.

For the data communication through USB, refer to "Data Communication by the USB Connection" in the BHT-1700/1800 Software User's Manual.

1.9.2 Ethernet Communication

Communication between BHT and a host computer through the Communication Unit with the Ethernet (Wired LAN) interface to enable the data communication complying with 100BASE-TX or 10BASE-T standard.

For the connection with the Communication Unit, refer to 1.8.5 Use of Communication Unit.

For the data communication through the Ethernet, refer to "Wired LAN" in the BHT-1700/1800 Software User's Manual.

1.9.3 WLAN Communication

Communication between BHT and a host computer through the LAN access point to enable the data communication complying with IEEE 802.11 a/b/g/n standard.

For the connection with the Communication Unit, refer to 1.8.5 Use of Communication Unit.

For the data communication through WLAN, refer to "Wired LAN" in the BHT-1700/1800 Software User's Manual.

1.9.4 WWAN Communication

Communication between BHT of WWAN supporting model and a host computer through the WWAN network to enable the data communication and the audio communication complying with GSM/GPRS/EDGE/

WCDMA/UMTS/HSDPA/ HSUPA/HSPA+/LTE standard. Available wireless interface depends on the telecommunications carrier providing WWAN.

For the data communication through WWAN, refer to "Mobile network" in the BHT-1700/1800 Software User's Manual.

1.9.5 Bluetooth® Communication

Communication between BHT and a Bluetooth® integrating device to enable the data communication complying with Bluetooth® v4.1+EDR/LE standard.

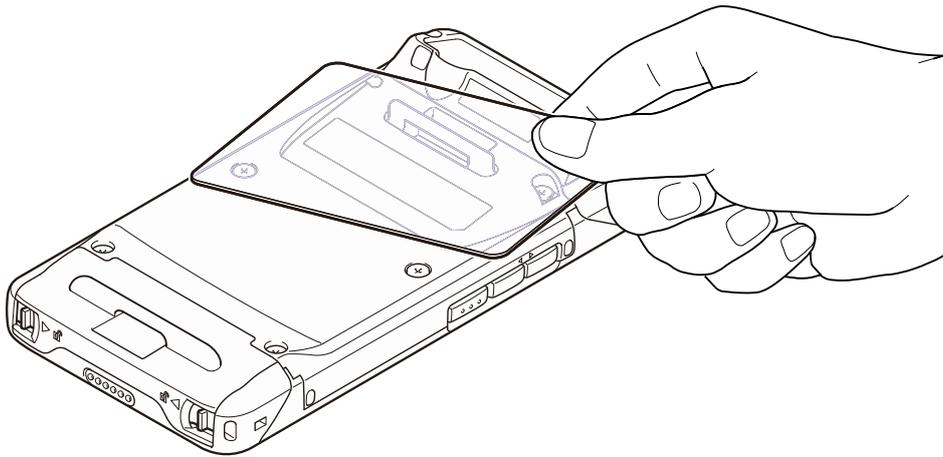
For data communication through Bluetooth®, refer to "Bluetooth®" in the BHT-1700/1800 Software User's Manual.

1.9.6 MFC Communication

Communication between BHT of NFC supporting model and NFC tag or NFC supporting device to enable data communication complying with Mifare, Felica standard.

Near Field communications (NFC) uses close proximity (2 cm or less) to establish WLAN communication through electromagnetic fields. BHT can collect information from NFC tags, exchange information with other NFC supporting devices, and even change information on the NFC tag if authorized.

For data communication through NFC communication, refer to "Communication Using NFC" in the BHT-1700/1800 Software User's Manual.



2 Using BHT-1800

2.1 Battery

Main Battery

BHT is powered by BT-180LA, 3.85 V/2900 mAh rechargeable Li-ion battery pack. It takes approximately 4 hours at 18 ° to 35 °C ambient temperature to charge them to full using the Communication Unit with AC adaptor or the charger. However, the charging time may vary by your working condition.

Backup Battery

Settled on the main board is a backup battery that is used to protect data of BHT when the main battery is replaced. The backup battery is a 6 mAh rechargeable nickel-hydrogen battery. Replace the main battery within one minute. When the backup battery is charged by the main battery or the power adapter, it takes approximately 10 hours from the completely discharged state to the fully charged state.

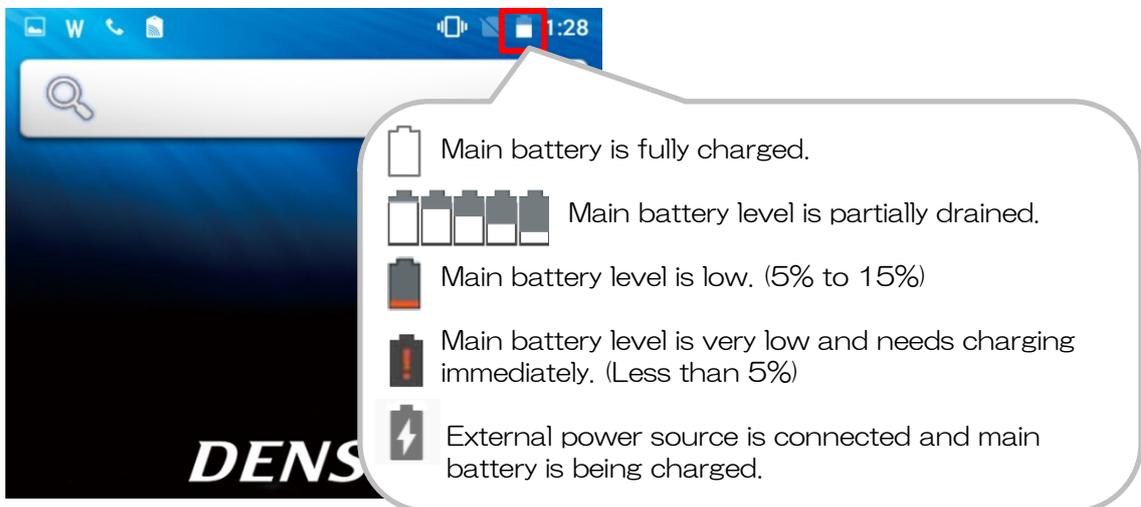
Caution:

1. The battery cover must be secured in position. If not, the BHT cannot turn on by pressing the power key.
2. For a new main battery, make sure it is fully charged before using.
3. If you put away BHT with the main battery removed for a long time, it may take longer to charge the backup battery. If you keep the BHT for a long time, insert the fully charged main battery to save.
4. For details, refer to BHT-1700/1800 Software User's Manual.

2.1.1 Battery Status Indicators

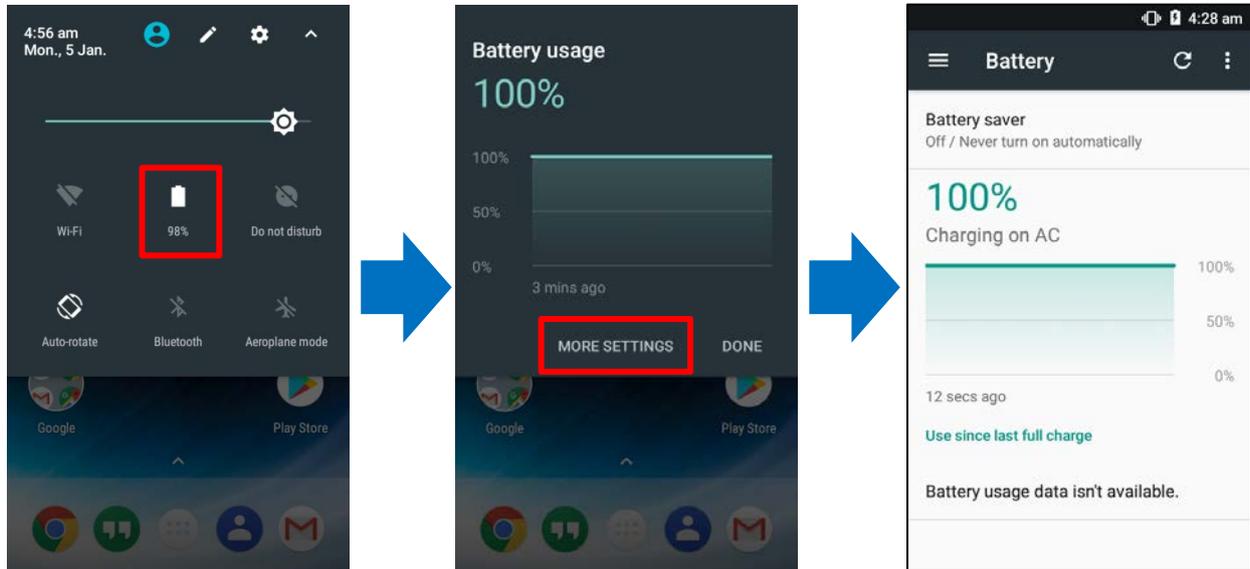
The main battery pack is the only power source for BHT to work. Therefore, when the main battery level goes low, you need to replace the battery pack with a charged one or charge it as soon as possible. You should backup important data on a regular basis.

By checking the battery status icon on Status Bar, you can tell the battery level remaining in the main battery.



To check the exact remaining percentage of power and battery life:

1. Swipe down from the top of the screen with two fingers to open QuickSettings.
2. The percentage of remaining battery power is shown below the battery icon; you can tap on it to enter Battery Settings for more details and configurations.



Note:

When BHT is fully charged and battery level reaches 100%, the battery icon will change from  to  to indicate that charging is completed.

Caution:

1. Once the battery level drops below 15%, the low battery notification will be displayed on the screen.
2. Data loss with RAM may occur when battery level is low. Always save data before the battery runs out of power or keep a fresh battery for replacement.
3. Constant use of BHT at low battery level may affect battery life. For maximum performance, recharge the battery periodically to avoid battery drain and maintain good battery health.

2.1.2 Monitoring Battery Level

Main battery level

The main battery is the only source that feeds BHT to work. It also supplies the backup battery on the main board in order to avoid the data loss. When the main battery level gets low, recharge it or replace it as soon as possible. Most critically, back up the important data from time to time to protect your work.

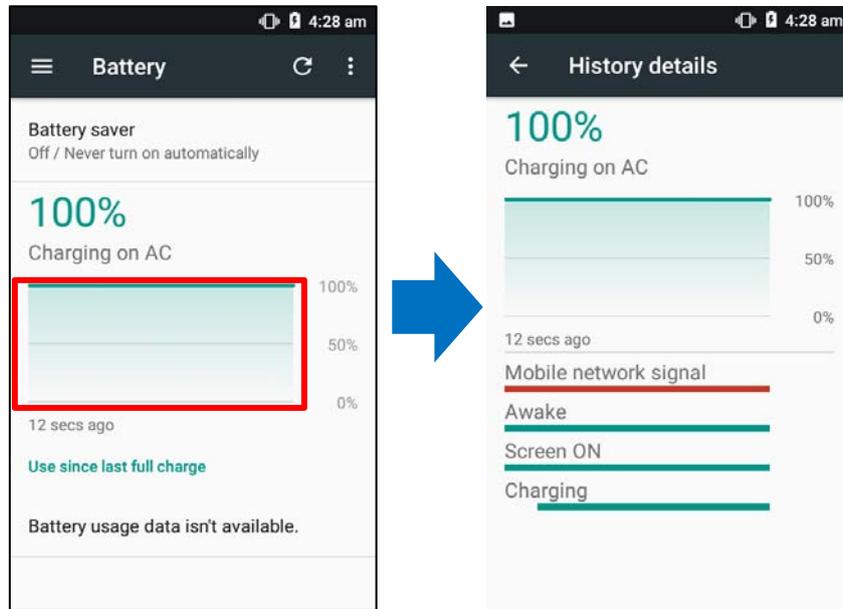
To check main battery level:

Tap All apps  | Settings  | Battery  .

Battery level percentage is also shown to provide a clear grasp of the remaining battery power. The screen also shows the rate of battery discharge since the last battery charging session, how long the

device has been running on battery power, and which applications are consuming the most battery power.

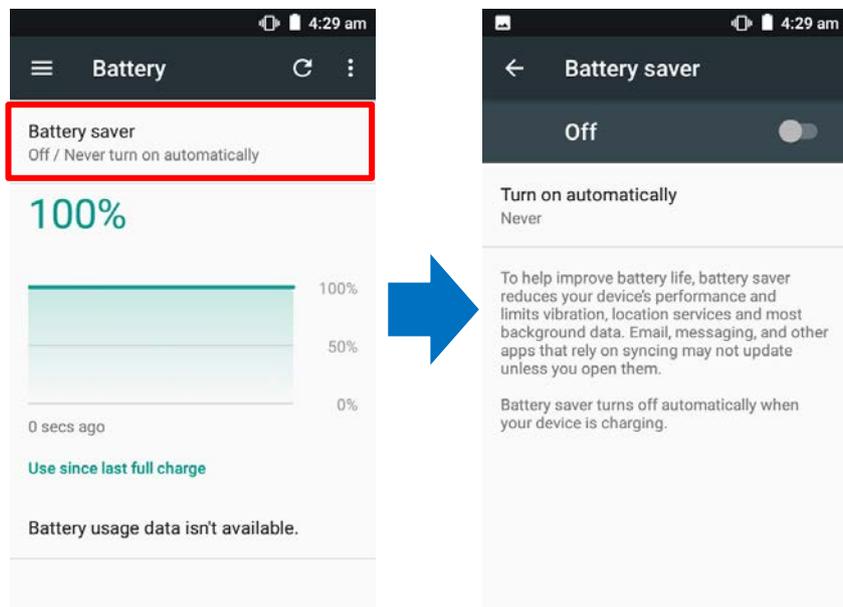
To look at the timeline of each application that drained or has been draining the battery power, tap on the chart, which enables you to diagnose any serious power drains.



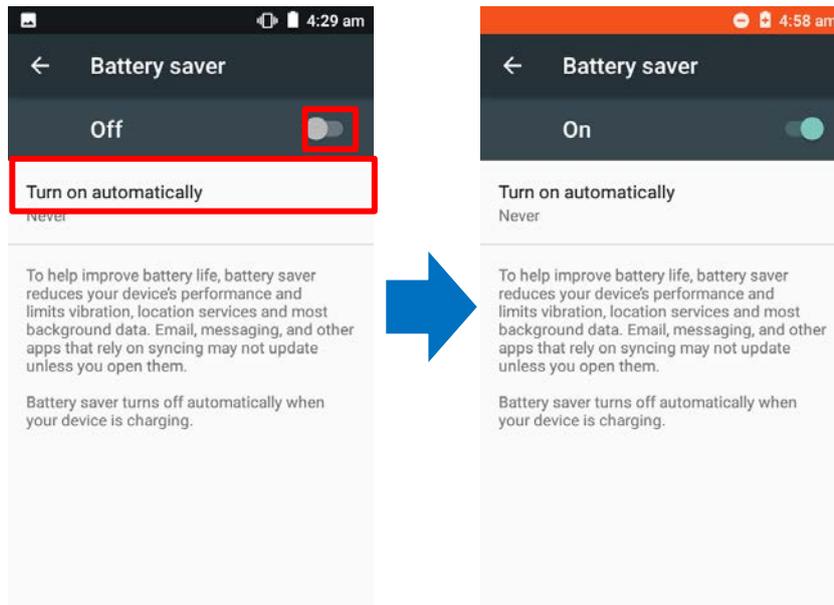
Battery saver mode

You can have the Battery saver mode automatically turned on when the main battery level gets low. This mode will limit the use of location services, vibration and most background processing data.

On Battery screen, tap on Menu and then select "Battery saver".



Switch on the function and choose when to have this mode automatically activated. After enabling this function, the title bar of the screen will turn orange.



The battery saver mode will automatically become inactive when BHT is being charged.

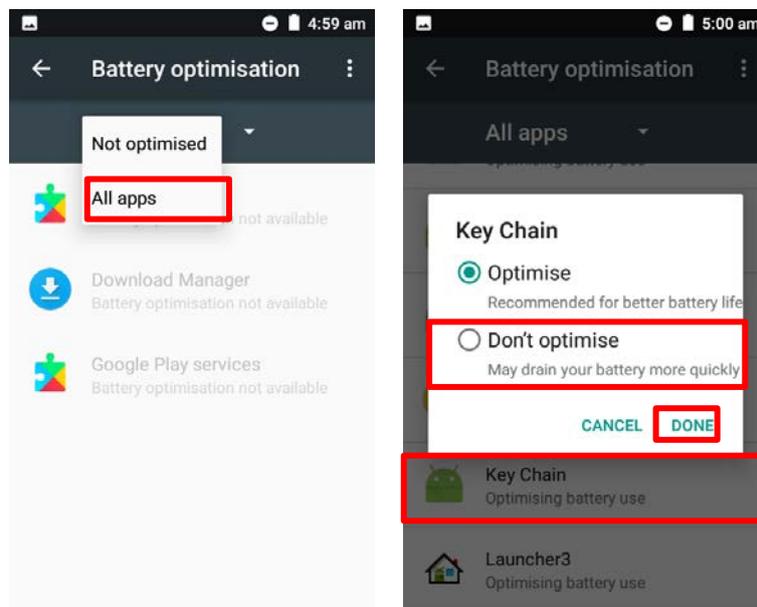
Battery optimisation

With Battery optimisation enabled for the applications, you can make sure they stay inactive when your BHT is idle or when applications have not been used for days.

On battery screen, tap Menu and then select "Battery optimisation".



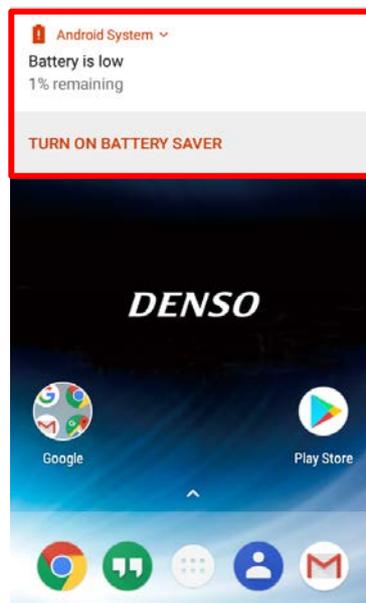
On the dropdown list, select “All apps”, and all the applications will be optimised by this function by default. You can individually turn off the optimisation mode of certain app. If you would like it always activated by tapping on the App. name, select “Don't optimise” and then “DONE”.



Low battery alert

BHT prompts a warning notification reminding you to charge the main battery and the status indicator will blink red when the main battery level drops to 15% and 5%.

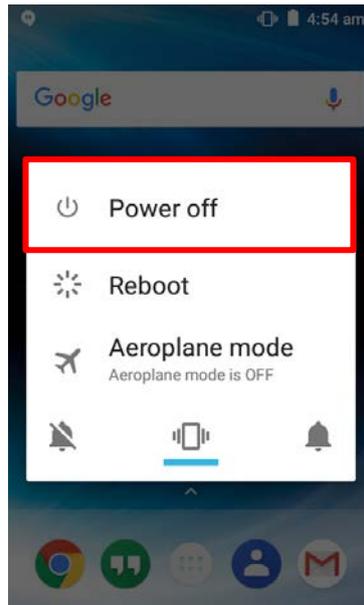
Opening Notification Drawer, you will also see this warning appearing on the notification list; you may turn on Battery saver mode, connect BHT to an external power source, or replace the main battery pack as soon as possible. To replace the main battery pack, see Replacing main battery.



Replacing main battery

When the main battery level is low, follow the steps below to replace the main battery.

1. Press and hold the power button on the side of the BHT.
Tap “Power off” in the pop up menu. BHT will power off.



2. Open the battery cover and insert a charged battery as in Installing Battery.
3. Press the power button to power on.
4. Before replacing the main battery, make sure the backup battery is well-charged in order to avoid unnecessary data loss. After removing the main battery, insert a well-charged battery as soon as possible.

Hot swap

Backup battery supplies system power during battery swap.

When battery cover is removed, the system will enter suspend mode and not wake up until the battery cover is put back and the power button is pressed.

To perform the hot swap:

Make sure the new battery is fully-charged.

1. Follow Step 1 to 2 in Installing Battery to remove the battery cover. Upon the removal of the cover, the system will prepare to enter suspend mode with the red light lit, which will last for 3 to 5seconds.
2. Observe the status indicator on the upper area of the front side of the BHT. As the red light goes off, the BHT is in complete suspend mode and the main battery is ready to be replaced. Remove the battery and replace it with the new one.

Caution: Please do not perform a battery swapping before BHT's OS is ready. (Home Screen is displayed.) Removing the battery cover during the start-up of BHT (pressing down the power button until the Home Screen is displayed) may cause a system failure.

Note: When the main battery is removed, the system will stay in suspend mode. To avoid the system being shut down without warning, please replace the main battery within one minute. If the status indicator stays lit over 10 seconds after removing the battery cover, please put the battery cover back right away and perform the hot swap later.

2.1.3 Power Management

Here are some tips to help you save battery power.

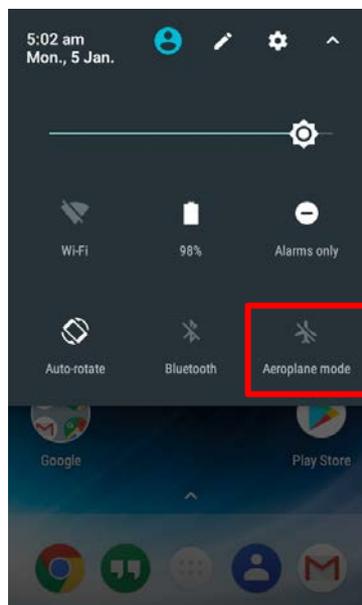
Caution: Using backlight, wireless connectivity, and peripheral devices while on battery power will substantially reduce battery power.

- Bring an additional main battery pack with you when you go out.
- End wireless connections (such as Bluetooth® transmission, wireless connection, NFC and GPS) which are not in use.
- Shorten the screen turn off time. See Timeout Settings.
- Reduce the screen brightness level. See Screen Brightness.
- Shut down automatic data syncing of applications (such as E-mail, calendar and contacts).
- Enable Battery saver mode and Battery optimisation mode. See Battery Saver Mode and Battery Optimisation Mode.
- If you use the battery saver mode, the power will be automatically turned off while charging.
- Optimise the battery.

Entering Aeroplane mode

Turning on the Aeroplane mode enables you to turn off all the wireless radios on your BHT (including call functions and data communication functions using Bluetooth®, Wi-Fi, and 3G/4G), which will considerably reduce power consumption of your battery.

1. To enter the Aeroplane mode, swipe down from the top of the screen with two fingers and open the Quick settings.
2. Tap on the Aeroplane mode icon, and you can switch turning ON/OFF of the mode.



2.2 Memory

- Flash Memory (ROM)
- 16 GB flash memory for storing the OS(Android™ 7.1.2 Nougat) and custom application programs
- Random-access memory (RAM)
- 2 GB RAM for storing and running programs, as well as storing program data
- Expansion slot

BHT is equipped with one SD card slot which can accommodate a micro SD card, a microSDHC or a microSDXC card. When selecting an SD card for the best compatibility and performance with BHT-1800 series, please make sure of the capacity you need. For the use of SDXC card, please use a new card and make sure that it has not been used in other host devices (computers, cameras, or SD card readers).

Card	Capacity
SDXC	64 GB – 2 TB
SDHC	4 GB – 32 GB
SD	128 MB – 2 GB

Caution of data loss

When the main battery is removed or drained, the backup battery on the main board takes over to supply BHT and keep it in suspension. A fully charged backup battery will retain the data in the RAM for 3 minutes. When the backup battery is drained out as well, BHT will shut down, and all unsaved data will be lost.

If you want to put away BHT for a couple of days, you should be aware that data loss occurs when the main battery and backup battery discharges completely. Therefore, it is necessary to backup data and files before putting away BHT.

2.3 Touch Screen

BHT comes with 5" transmissive LCD with 720 by 1280 pixels resolution. The LED backlight of the screen, which helps ease reading under dim environments, can be controlled manually and automatically.

Note: Do not use any pointed or sharp objects to move against the surface of the screen.

2.4 Notifications

2.4.1 Status Indicator

Status indicator located above the touch screen provide information about charging status, scanner light beam, and scanner “Good Read” during data collection.

Action	Status indication	Description
Charging	Green, solid	Charging complete
	Red, solid	Charging BHT
	Red, blinking	Charging error (for instance, battery not in place)
Barcode or NFC card decode	Green, flash once	Good read
BHT is on backup battery power. (The battery cover is removed.)	Red, solid	Upon the removal of the battery cover, the red light is on for a while and then goes off to signal that the main battery is ready to be removed. Please refer to Hot Swap to perform a successful battery swapping.

Note: To enable the notification of barcode decode, it must be turned on in the Reader Configuration.

2.4.2 Audio

The speaker is used to play sounds for events in windows and programs, or play audio files. In addition, it can be programmed for status feedback. BHT also supports using Bluetooth® headsets.

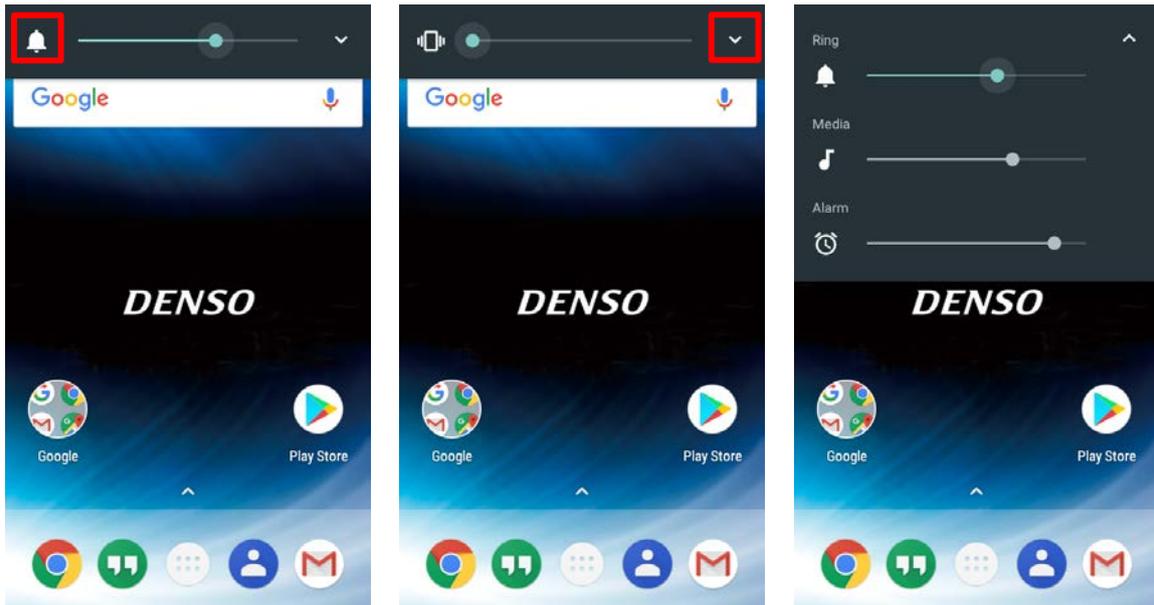
Supported audio file formats include: WAV, MP3, AAC, AAC+, Enhanced AAC+, AU (including ADPCM), Midi, XMF, AMR (NB and WB).

Use the volume buttons on the side of BHT to adjust the system volume.

2.4.3 Vibration

BHT is integrated with a vibrator and it can be helpful when working in noisy environments. You may also set BHT to vibrate only, in which all system sounds will be muted and replaced by the vibrator.

On any screen, press down Volume Up or Volume Down key to open the quick sound menu. Tap  to switch BHT to Vibration mode. To modify specific sound settings, tap  to access more settings.



2.5 Cameras

An 8-megapixel rear camera integrated in BHT and a 5-megapixel front camera integrated in only the specific models specified in 1.2 Supporting Model List are specially designed for collecting image data. You may use the Camera application to take images. By default, the images taken by this camera application are saved as JPG files in DCIM folder in the BHT's main storage.

2.6 Legal Information

Confirm the legal information.

Tap All apps  | Settings  | About phone  | Legal information.

Legal information is displayed.

3 Basic Operation

This chapter describes the basic skills to work with BHT-1800 handy terminal, for instance how to operate the home screen, check of system statuses and management notifications.

The add-on utilities for applications regarding data reading, processing and transmission are introduced in the following chapters.

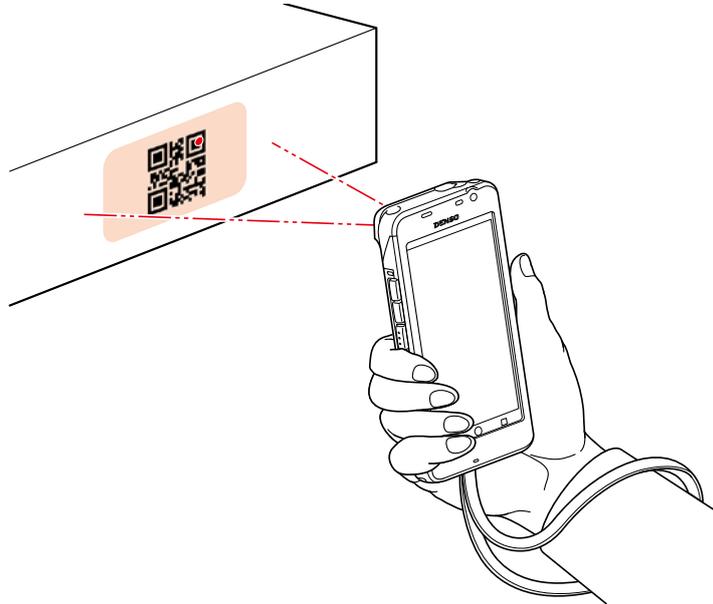
3.1 Reading Barcodes

Read barcodes as described below.

1. Press the power key to power on BHT.
2. Start up the code reading application.
3. Point the reading windows towards the barcode to read and press one of the side triggers.

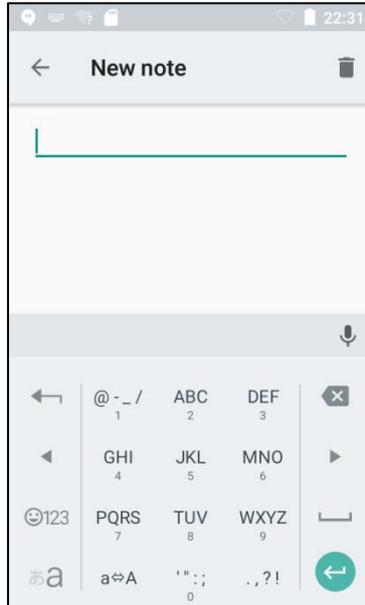
Light for reading is irradiated and the printed barcode is read.

The light for reading goes off when the data are decoded or the decode time has elapsed.



3.2 Keyboard Input

When the text input field appears, the on-screen keyboard is opened automatically. The style of keyboard varies according to the data type (texts or numbers) this field requires. Data can also be input with the keyboard in the main body of BHT.



3.3 Data Transmission

Data collected by BHT can be transmitted to the host computer by USB communication, Ethernet communication, Bluetooth® communication, WLAN communication and WWAN communication. Data transmission methods and setting methods vary according to the system our customer uses. Please contact a system administrator for details of the operation. Upload collected data to the host computer as soon as possible.

3.4 Suspend

3.4.1 Suspend mode

To minimize power consumption and prevent unintended operation, suspend BHT if you are not actively using it. BHT can be quickly awoken from suspend mode to operate as needed. When BHT enters suspend mode, the system is in a power-saving status, meaning that the BHT will not respond to screen touch, and that volume keys and side buttons will also be unavailable until the BHT is unlocked.

Suspending BHT

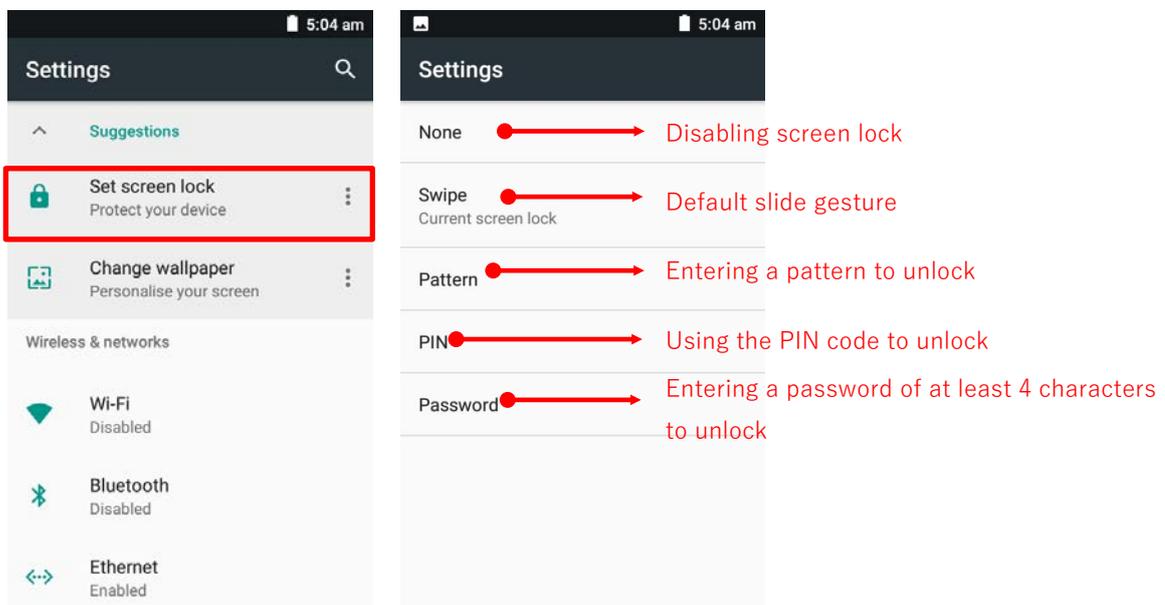
Press the power button  to suspend BHT. BHT will automatically suspend when the period set in the Screen Timeout Settings has passed without any activity.

3.4.2 Security lock

Setting a screen lock allows you to protect your personal data on the BHT while it is not at your hand. Since various types of screen lock and Smart Lock are available, you can not only enjoy the benefits of this function but also great convenience.

Locking BHT

Tap All apps  | Setting  | Security  | Screen Lock to change the lock method.



By selecting a method, such as pattern, PIN or Password, you can access advanced settings to customise personal lock settings.

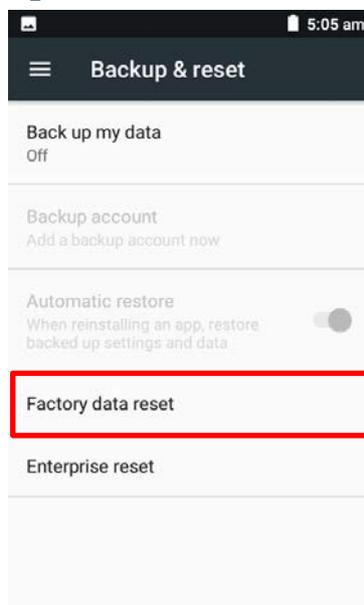
To save battery power, suspend BHT when not in use.

3.5 Resetting to the Factory Default

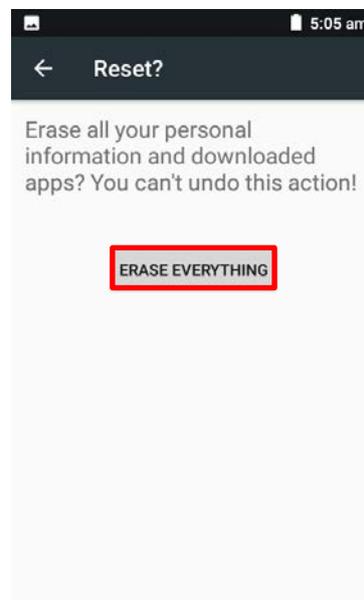
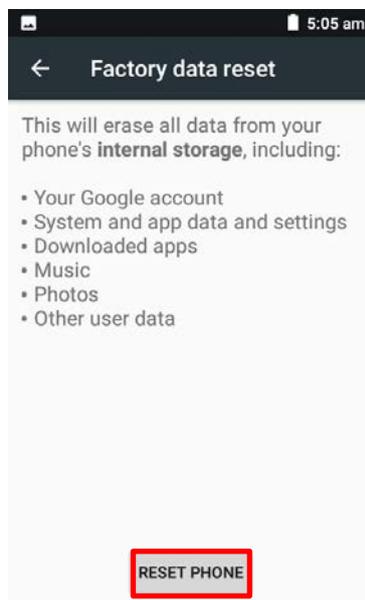
Resetting to a factory default will erase all data on your BHT including call logs, messages files as well as your installed apps and their associated data, and revert the BHT back to its original state in which you powered on for the first time. It is strongly recommended that you back up important data before resetting to the factory default.

Reset to the factory default as described below.

1. Tap All apps  | Settings  | Backup & reset  and factory data reset.



2. Tap RESET PHONE and then tap ERASE EVERYTHING to reset to the factory default.



4 Specifications

4.1 Model/Platform/Processor/Memory

BHT-1800 comes in six models as described below:

WWAN model: BHT-1800QWBG-1, BHT-1800QWBG-2, BHT-1800QWBG-3

WLAN model: BHT-1800BWB-1, BHT-1800QWB-2, BHT-1800QWB-3

4.1.1 Operating system/CPU

OS version	Android™ 7.1.2 Nougat
CPU	Qualcomm® APQ8009 (WLAN model) Quad-core1.3 GHz Qualcomm® MSM8909 (WWAN model) Quad-core1.3 GHz
Memory ROM RAM	16 GB eMMC (MLC) / User data 10 GB 2 GB LPDDR3 SDRAM
Expansion Slot	microSDHC card slot (Max. 32 GB) X 1 SDXC supported (Max. 2 TB) Micro SIM socket X 2

4.2 Communication/Data Capture

4.2.1 Communication

Bluetooth®	Bluetooth® Class II, v4.1+EDR/LE
WLAN	IEEE 802.11a/b/g/n
WWAN (Not supported on WLAN model)	Built-in WWAN modem (Quadband GSM, UMTS, LTE functions): GSM/GPRS/EDGE/WCDMA/UMTS/HSDPA/HSUPA/HSPA+/LTE Radio frequency GSM/GPRS/EDGE/WCDMA/UMTS/HSDPA/HSUPA: B1 (2100), B2 (1900), B6 (800), B8 (900) LTE band FDD: B1 (2100), B3 (1800), B7 (2600), B8 (900), B19 (800), B20 (800)
GPS	GPS, AGPS support, GLONASS support, ephemeris downloadable. (As for WLAN model, AGPS is not supported.)

4.2.2 Data/Image Capture

Cameras	8-Mega pixels, 5-Mega pixels (optional)
Code Reader	2D Imager
HF RFID Reader	ISO14443A/B (Mifare), ISO15693 (Felica) Supports NFC (P2P, Card reader, Card emulation) Perform a sufficient reading test with a card to be used preliminarily. It is not recommended to read the IC driver's license. (DENSO WAVE has already checked and evaluated that a part of driver's licenses are not readable.)

4.3 Electrical Characteristics

4.3.1 Batteries

Main Battery Pack	Rechargeable Li-ion battery: 3.85 V, 2900 mAh Charging temperature: 0 ° to 40 °C Minimum charging time: 4 hours at 25 °C Please charge batteries from 0 ° to 35 °C in temperature. To ensure that the battery is being charged under a safe condition, battery disable charging when ambient temperature drops below 0 °C or exceeds 40 °C, and resume charging after its temperature returns within the acceptable range.
Backup Battery	Rechargeable nickel-hydrogen battery: 3.6 V, 6 mAh Data retention for one minute Charging time: 10 hours

4.3.2 Working Time

WWAN model	Supports working time for up to 12 hours at 25 °C.
WLAN model	Supports working time for up to 24 hours at 25 °C.

4.4 Physical Characteristics

4.4.1 Color Touch Screen Display

Display	5" Transmissive IPS LCD, Dragontrail®PRO Glass
Resolution	HD (720 X 1280 pixels)

4.4.2 Notifications

Status indicator	Lighting red when charging, green when charging is completed Lighting blue when reading is completed
Audio	Integrated with one speaker, dual array digital microphones with echo and noise cancellation, HD voice support

4.4.3 Dimensions and Weight

Dimensions (Length X Width X Height)	BHT-1800QWB-1: 188.5 mm X 71.0 mm X 32.3 mm BHT-1800QWB-2: 188.5 mm X 71.0 mm X 32.3 mm BHT-1800QWB-3: 188.5 mm X 71.0 mm X 32.3 mm BHT-1800QWBG-1: 188.5 mm X 71.0 mm X 32.3 mm BHT-1800QWBG-2: 188.5 mm X 71.0 mm X 32.3 mm BHT-1800QWBG-3: 188.5 mm X 71.0 mm X 32.3 mm
Weight (Including battery cover and battery)	BHT-1800QWB-1: Approx. 265 g BHT-1800QWB-2: Approx. 265 g BHT-1800QWB-3: Approx. 295 g BHT-1800QWBG-1: Approx. 270 g BHT-1800QWBG-2: Approx. 270 g BHT-1800QWBG-3: Approx. 300 g

4.5 Environmental Characteristics

4.5.1 Temperature/Humidity

Operating	-20 ° to 50 °C, 10% to 90% RH (Non-condensing)
Storage	-30 ° to 60 °C, 5% to 95% RH (Non-condensing)
Charging	0 ° to 40 °C, 10% to 90% RH (Non-condensing)

Appendix I

Reading configuration

Symbologies supported

Codabar	
Code 11	
Code 39	Code 39
	Trioptic Code 39
	Italian Pharmacode (Code 32)
Code 93	
Code 128	Code 128
	GS1-128 (EAN-128)
	ISBT 128
Code 2 of 5	Chinese 25
	Industrial 25 (Discrete 25)
	Interleaved 25
	Convert Interleaved 25 to EAN-13
	Matrix 25
Composite Code	Composite CC-A/B
	Composite CC-C
	Composite TLC 39
GS1 DataBar (RSS)	GS1 DataBar-14 (RSS-14)
	GS1 DataBar Limited (RSS Limited)
	GS1 DataBar Expanded (RSS Expanded)
	Convert to UPC/EAN
MSI	
Postal Codes	Australian Postal
	Japan Postal
	Netherlands KIX Code
	US Postnet
	US Planet
	UK Postal

EAN/UPC	EAN-8
	EAN-8 Extend
	EAN-13
	Bookland EAN (ISBN)
	ISSN EAN
	UPC-A
	UPC-E
	Convert to UPC-A
	UPC-E1
	Convert to UPC-A
2D Symbologies	Aztec
	Data Matrix
	Maxicode
	MacroPDF
	MicroPDF417
	MicroQR
	PDF417
	QR Code

Handy Terminal

BHT-1800 series

Hardware

User's Manual

Preview Edition August 2018

DENSO WAVE INCORPORATED