

LT150 Mobile Digital Wireless Intercom User Manual (Version V2.0 191215)

(This manual applies to MS150 Version V112)



LaON Technology

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Important Safety Information

1. For LT150 systems, to reduce the risk of electric shock, explosion or fire;
 - Use only the supplied AC power adapter
 - Do not disassemble the product
 - Avoid contact with liquids besides the permitted certain equipments
 - Use only the proper type of battery and rechargeable battery supplied by the manufacturer
2. Battery Safety and Cautions
 - Do not charge with any other AC power adapter or charger.
 - Do not burn, disassemble, bend or short-circuit the battery.
 - Dispose of used up battery promptly and safely according to local regulations.
 - Keep battery away from children.
 - Do not short the metal contacts with electrically conducting material such as bracelets, keys, and etc.
 - Recommended battery storage temperature is -20 °C to 30°C for less than 1 year, -20°C to 40°C for less than 90 days, -20 °C to 50°C for Less than 30 days.
 - Recommended Battery charging temperature is 0°C to 40°C
 - Do not burn or expose batteries to excessive heat such as sunshine or other heat sources
 - When using alkaline or other maker's rechargeable batteries other than LAON provided rechargeable batteries, LTWI-BAT50 and LTWI-BAT150, use the same batteries as packaged by the makers for the same specifications, related current and voltage. In case of using non-LAON provided rechargeable batteries, use the maker designated battery charger. Two or Four batteries to be used together by putting into the Battery Sled of LAON products should be managed to have the same residual time, life and recharged with same cycles. Using batteries together with different specifications and natures may cause damages on inner parts of the applicable LAON product and affect battery operating time.
3. Antenna Safety and Cautions
 - Use only manufacturer supplied antennas.
 - Antenna shall be mounted in such a manner to minimize the potential for human contact during normal operation. The antenna of the Mobile Station should not be contacted during operation. The minimum separation distance of 7.9 inches (20 cm) from the antenna to the body of user required.

LT150 system operates in the 5GHz UNII band frequency range. LT150 system is approved for license free use in most countries. There may be restrictions on the use of some bands or RF spectrum operations in some countries. Therefore, it is your responsibility to confirm with the designated authorizer in your local area whether the equipment of the LT150 system approved to use in your country or not.

NOTICE

Illustrations, figures and images of this publication are only for explaining equipment's operations and functions and may roughly reflect the actual equipment.

Contact the designated distributors or retailers to avoid erroneous interpretations or language translations that may cause equipment malfunctioning.

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Section 1: Introduction

LaON Technology('LaON')'s patent-technology base digital wireless intercom system offers the best audio quality with an excellent clarity by using 5GHz UNII band, triple diversity - frequency, time and antenna, and frequency interference avoidance technologies. It guarantees the system stability even in the large congested site environments where various A/V and wireless equipment are co-located. With LT150 system's Mobile Station 'MS150', users can install the Station at the fixed place or use in mobile with a battery. In addition, external devices such as a speaker and microphone can be connected with the Mobile Station through Auxiliary In/Out interface. The Mobile Station can be operated in a Beltpack mode for the LT750's Base Station 'BS750' and the Auxiliary In/Out activation mode is still available when it is staying in a Beltpack mode. LT150 Mobile System provides the equivalent audio quality and performance to the highest range system, LT750 Expert System that is used for professional applications.

Main features

- **License-free 5GHz UNII BAND**

5GHz UNII Band, the worldwide license-free frequency band provides approximately up to 29 RF channels depending on the regions as opposed to few RF channels on 2.4GHz ISM band. Therefore, users can enjoy pleasant wireless communications with even less traffics or interferences. With the advantages of high frequency band, the system is also hardly affected by high-power digital equipment such as amplifiers and speakers.

- **Industry-top level audio quality**

23ms low latency, 7.2KHz audio bandwidth, ensures high-quality audio performance. GENIE has a complete hybrid wired and wireless intercom system for use in large, loud, and diverse site environments.

- **Two Communication groups**

Up to two Communication groups can be allocated for both of Mobile Station and each Beltpack.

- **Five full-duplex audio channels (1 MS + 4 Beltpacks)**

Five full-duplex audio channels are offered with one Mobile Station.

- **Up to 128 wireless Beltpacks (BP850,BP750,BP150) connection**

128 wireless Beltpacks can be connected freely to a Mobile Station.

- **Mobile Station**

The Mobile Station is compact and can be operated either by a rechargeable battery pack or AA type alkaline battery (x 6) with a LaON provided battery sled.

- **Wireless Beltpack in Master mode**

The wireless Beltpack provides the Master function of the Mobile Station in a location without a Mobile Station. The Master Beltpack can serve as a Master in a space independent of the Mobile Station RF space.

- **Auxiliary I/O interfaces**

Auxiliary Input / Output ports are provided to secure seamless connections with wired intercom systems, external audio devices and etc.

- **Various options on battery**

Either LaON provided rechargeable battery pack or AA type Alkaline battery with LaON designated battery Sled can be used for supplying power to the Beltpack. Also, commercial rechargeable battery may be used with the battery Sled.

- **Monitoring functions**

Beltpack provides various monitoring functions such as the link status, RSSI (Received Signal Strength Indication), battery status and etc.

- **Top security with AES 256 bits level 3 encryption**

Secure confidential communications with AES 256-bit level 3, highest encryption technology.

- **Efficient 7 or 8 ports chargers**

The charger has five bays that can charge the Beltpack with the battery pack inserted. Additionally, there are 2 bays for charging the battery pack. Two bays of these are used to charge the Mobile station battery. There is another type of the charger that can charge 8 battery packs.

- **Compact design**

A compact Beltpack with internal antennas supports high levels of mobility and wearables, along with a comfortable headset during harsh broadcasts and events.

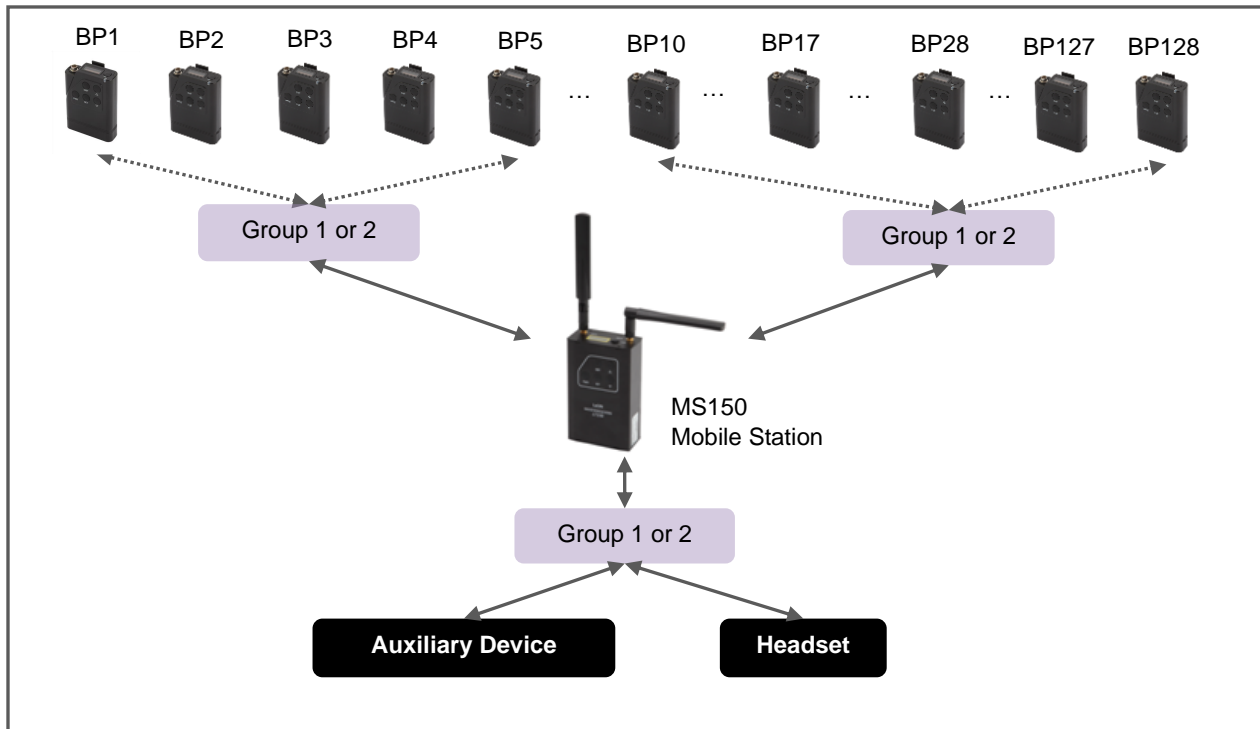
- **LaON In-house technologies and solutions**

LaON has developed from the wireless SoC built in the systems to the wireless intercom systems in-company by applying its own patent base technologies. Base on the know-how and comprehensive experiences in wireless technology, LaON offers timely and prompt service with full flexibilities for customer satisfactions with top priority.

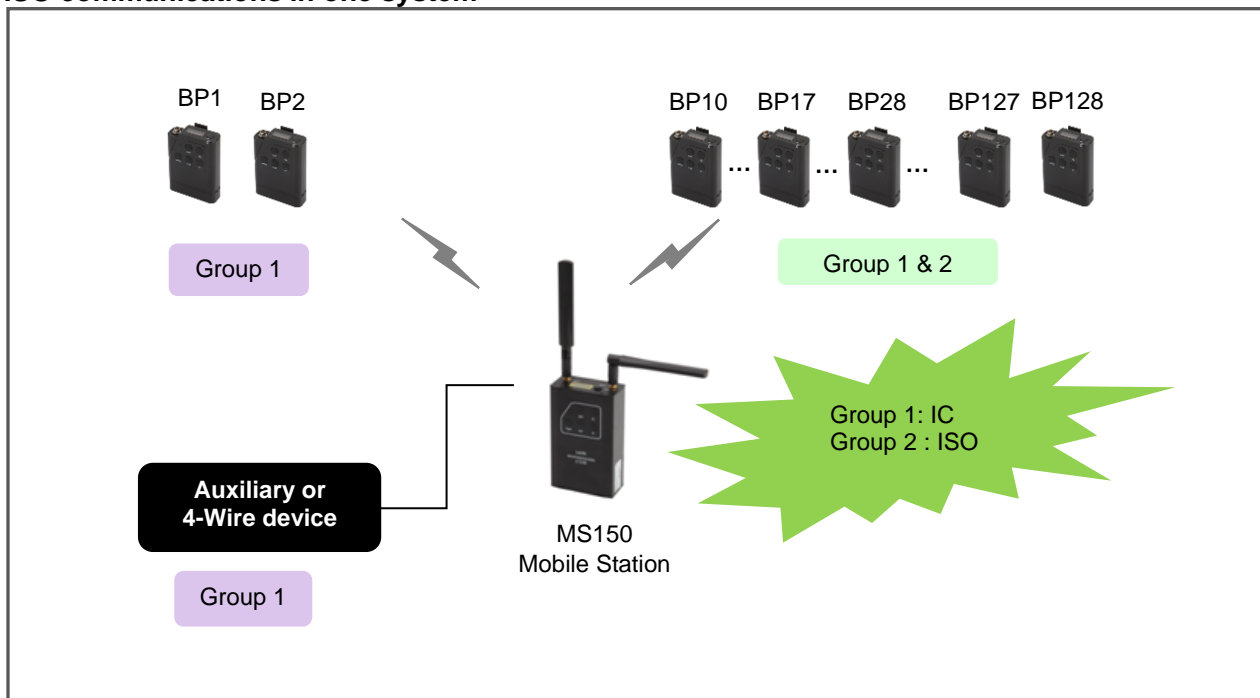
System usage example

Communication group allocations

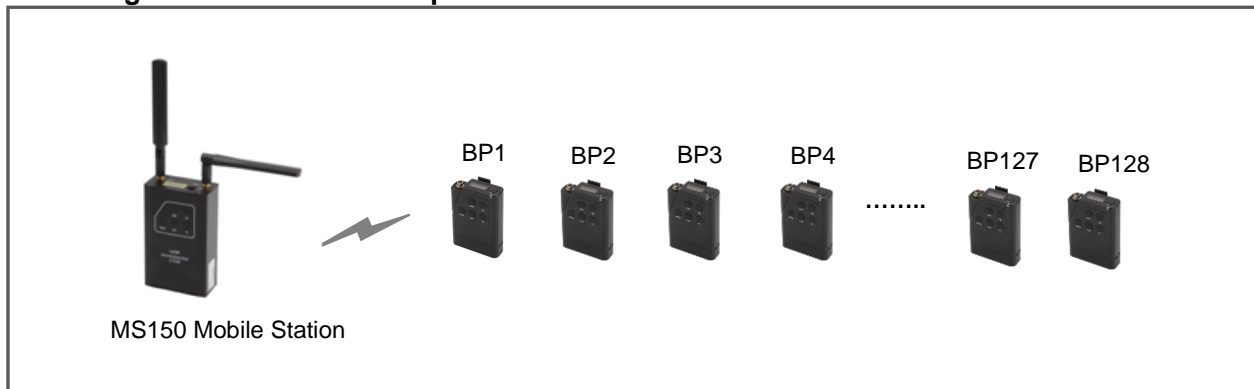
- For Mobile Station, up to two Communication groups can be allocated and either one group can be selected at once
- On Beltpack, communication in each individual Communication group or two Communication groups is available.
- On Mobile Station, the group channel setup and volume control will be applied the same to the device which is connected through auxiliary In/Out interface.



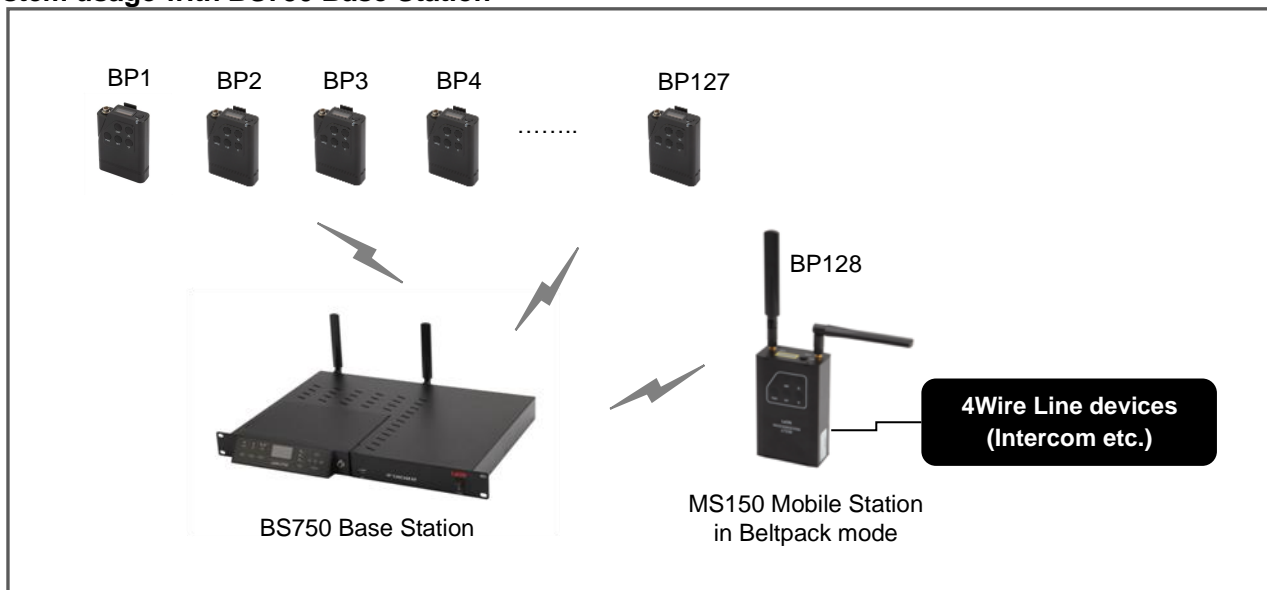
IC/ISO communications in one system



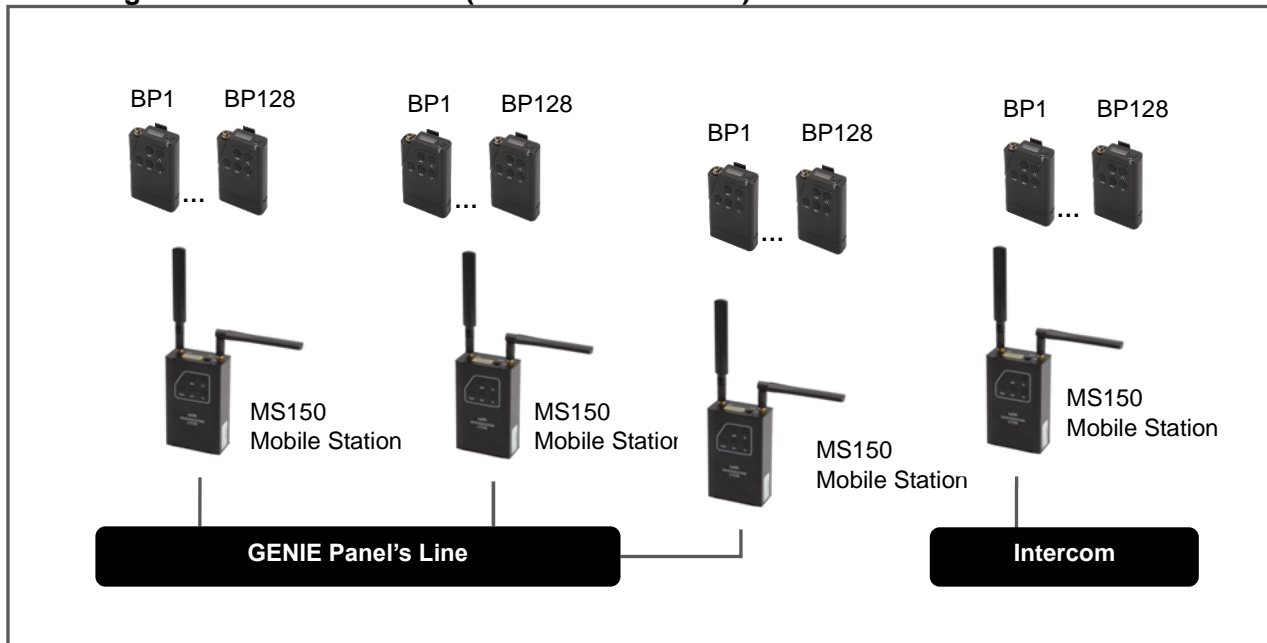
System usage of the stand-alone operation



System usage with BS750 Base Station



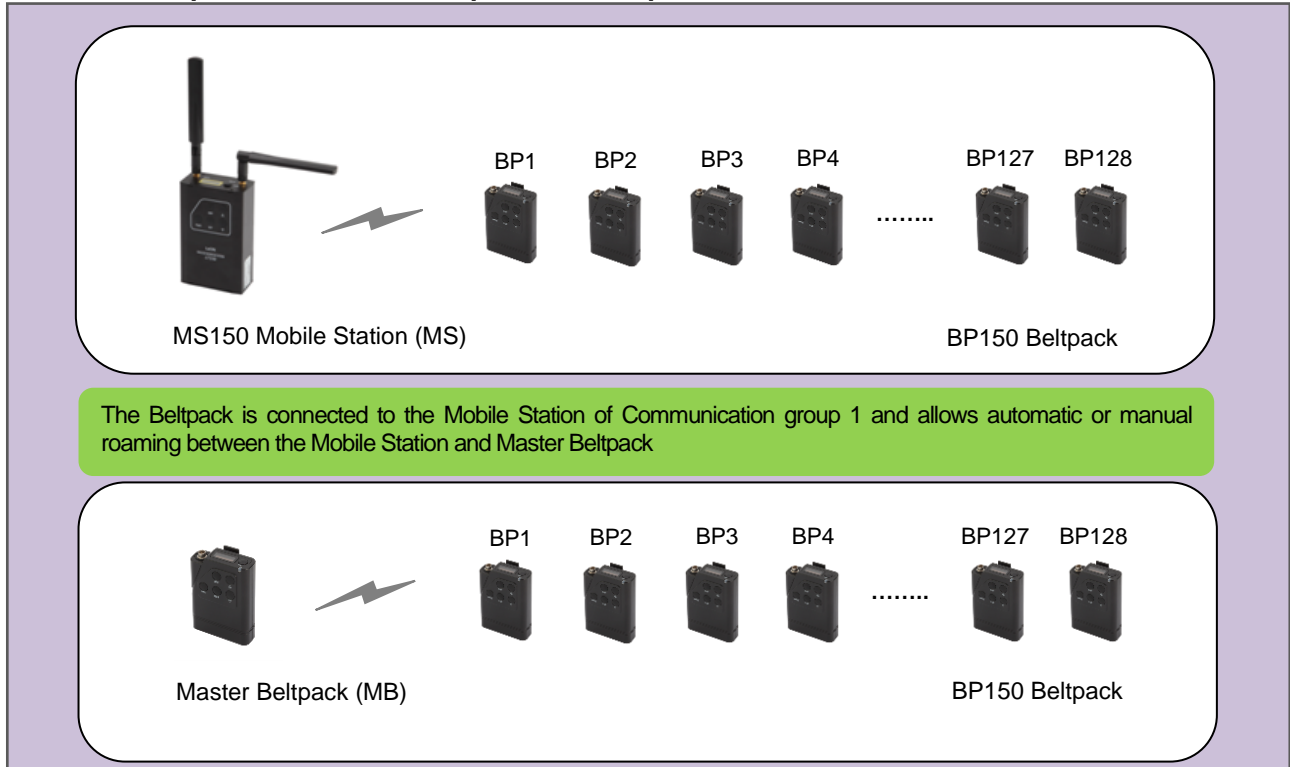
System usage with intercom devices (MS150 in 'MS' mode)



Master Beltpack (MB) mode

- A Beltpack can be set in Master Mode to replace the Mobile Station.
- In the Master Beltpack Mode, the system provides a single communication group channel with five (5) full-duplex audio channels (1 MB + 4 Beltpacks).
- Automatic handoff is available between the Mobile Station and Master Beltpack if they are located in independent separate area respectively. All Beltpacks to be connected to the Master Beltpack are automatically set to Communication group one (1).

Stand-alone operation in each independent RF space



NOTE: Do not use Mobile Station and Master Beltpack(MB) in a same coverage. Otherwise, the Beltpacks will be automatically linked to either one with stronger signal which will cause confusion and wrong operation on the wireless communication.

Section 2: Product overview

Mobile Station MS150 equipment



MS150 Mobile Station



Mobile Station Antenna



11.4-12.6VDC 3.33A Power supply



Battery sled



BAT150 Rechargeable battery (optional)



Mount kit, BRK150

- Mount kit 'BRK150' enables to fixed install the Mobile Station onto the wall or camera tripod.

Beltpack equipment



BP150 or BP750 or BP850 Beltpack



Battery sled



BAT50: 2450mAh, ~500 cycles
BAT50R: 2000mAh, ~2000 cycles
Rechargeable Battery Pack (Optional)



BPPCH100
Beltpack Pouch (Optional)

Battery chargers



BATCHG225 Battery Charger

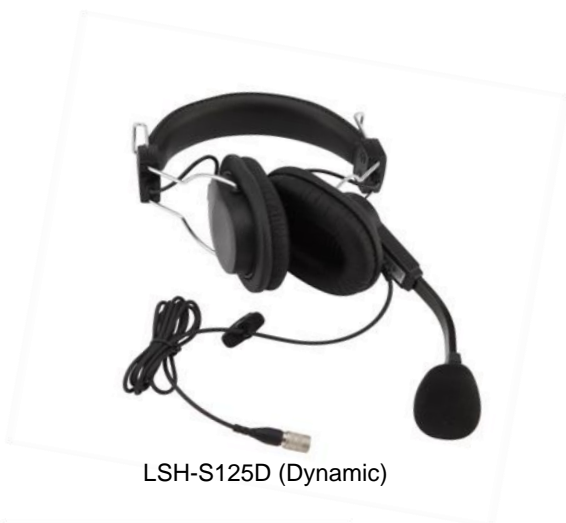


BATCHG125 Battery Charger



15VDC 8A Power Supply

Headsets



LSH-S125D (Dynamic)



LMH-125D (Dynamic)



LMH-10 (Dynamic)



LNH-20D (Neckband, Dynamic)



PTE-850 (Electret)

Mobile Station overview

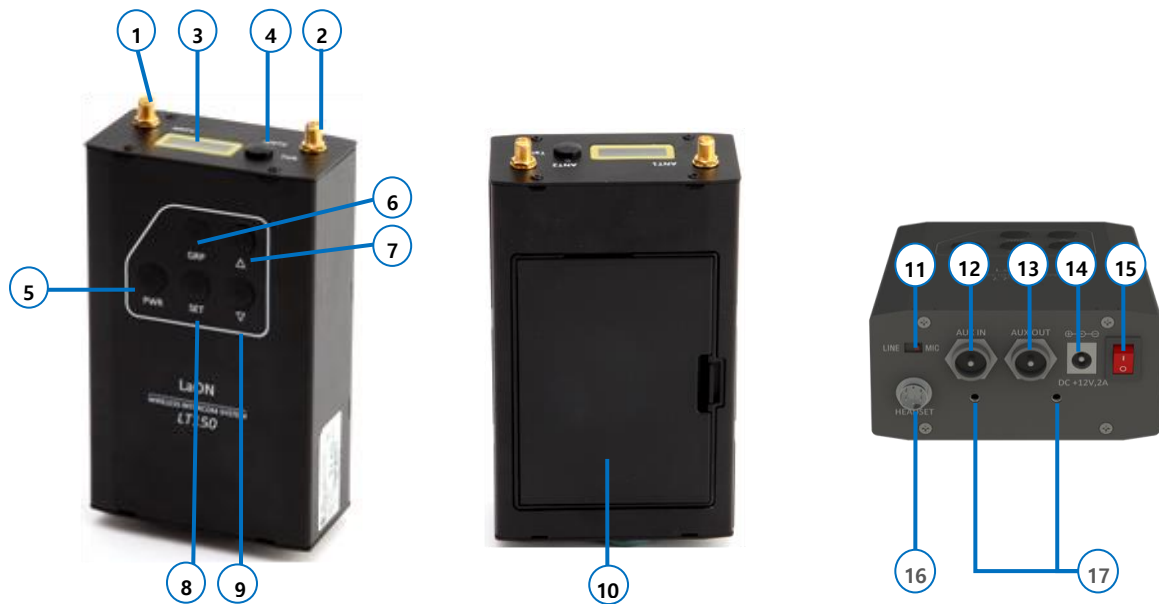


Figure 2-1. Panels of the Mobile Station

- 1. Antenna connector
- 2. Antenna connector
- 3. OLED Display
- 4. Talk button with indicator light
- 5. Power (PWR) button (press 3 sec)
- 6. Communication group (GRP) button
- 7. Volume up /Menu scroll button
- 8. Menu Set button
- 9. Volume down / Menu scroll button

- 10. Battery cover
- 11. AUX Input Line / Mic. level selection switch
- 12. AUX Input connector
- 13. AUX Output connector
- 14. 12V DC Power connector
- 15. Power switch
- 16. Headset cable connector (Receptacle)
- 17. Mount kit hole

Belpack overview

Belpack is moisture resistant which is excellent in using under humid environment.

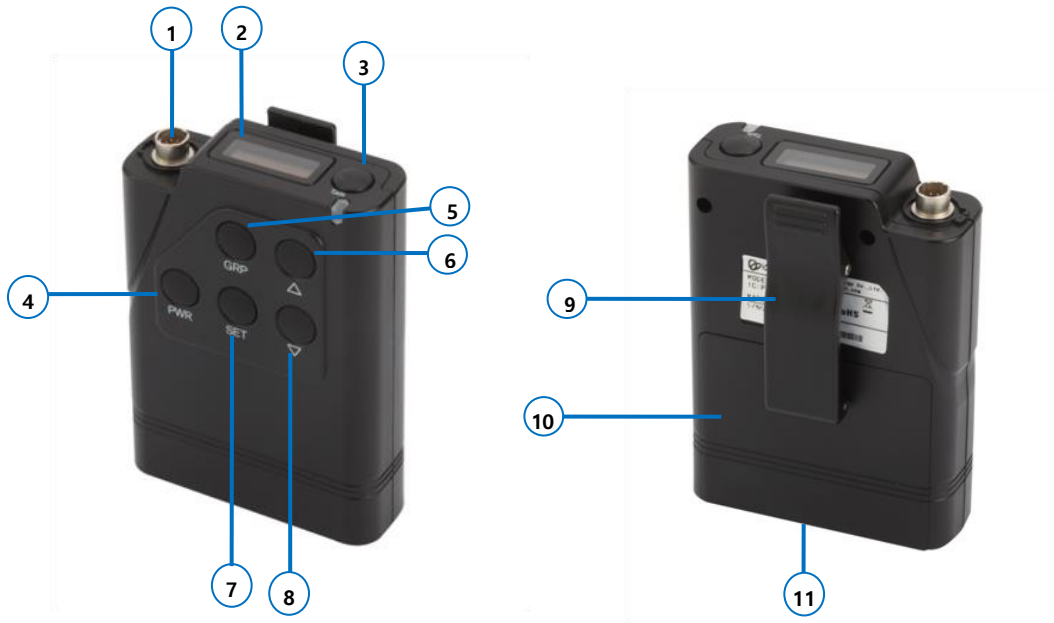
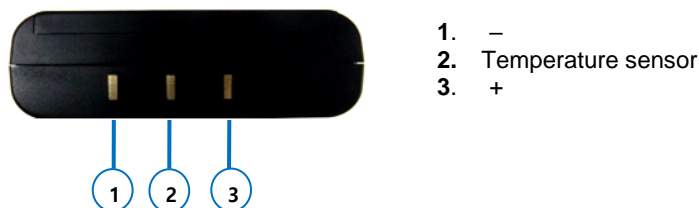


Figure 2-2. Panels of the Belpack

- 1. Headset cable connector (Receptacle)
 - 2. OLED display
 - 3. Talk button with indicator light
 - 4. Power (PWR) button, Manual roaming (press twice)
 - 5. Communication group (GRP) button/Talk button in Two groups mode
 - 6. Volume up /Menu scroll button
 - 7. Menu/Set button
 - 8. Volume down / Menu scroll button
 - 9. Belpack clip
 - 10. Battery cover
 - 11. Charging pinout (Bottom of the Belpack)
- Belpack pairing setup key: 'PWR + Set'
 - Manual handoff key: 'PWR + PWR' (Double click of PWR)

Belpack charging pinout



NOTE: Do not stand the Belpack direct on electric conductors such as iron plate, etc. and do not short the metal contacts on the bottom of the Belpack with those electrically conducting material.

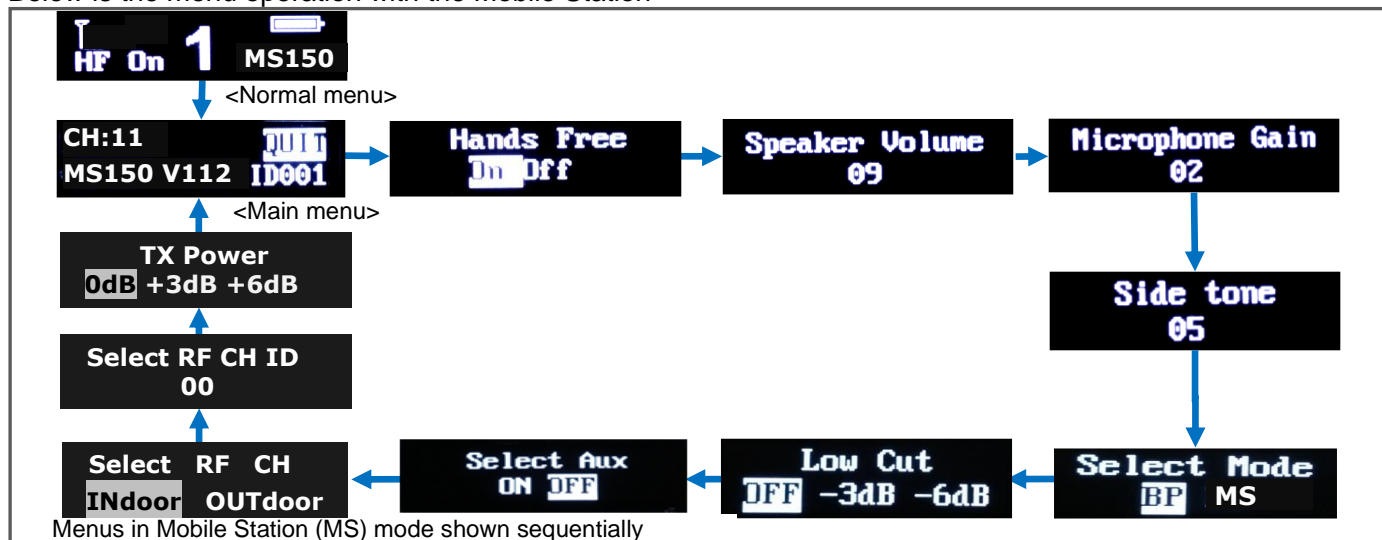
NOTE: It is necessary to store the battery after fully charged and separating from the Belpack. Turn off the Belpack before charging

LT150 Mobile system menus

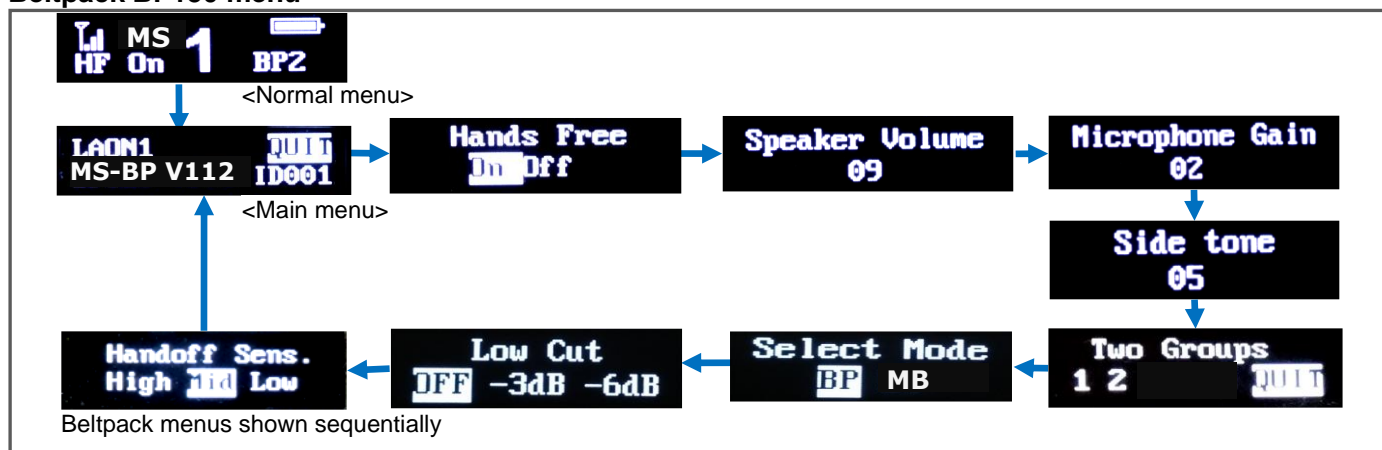
- Pressing Set button on the Normal menu will lead you to Main menu.
- On Main menu, press Up/Down direction key to move to the next menus.
- Pressing Power button once on any menu screen will lead you to the Normal menu.

MS150 Mobile Station menu ('MS' mode)

Below is the menu operation with the Mobile Station

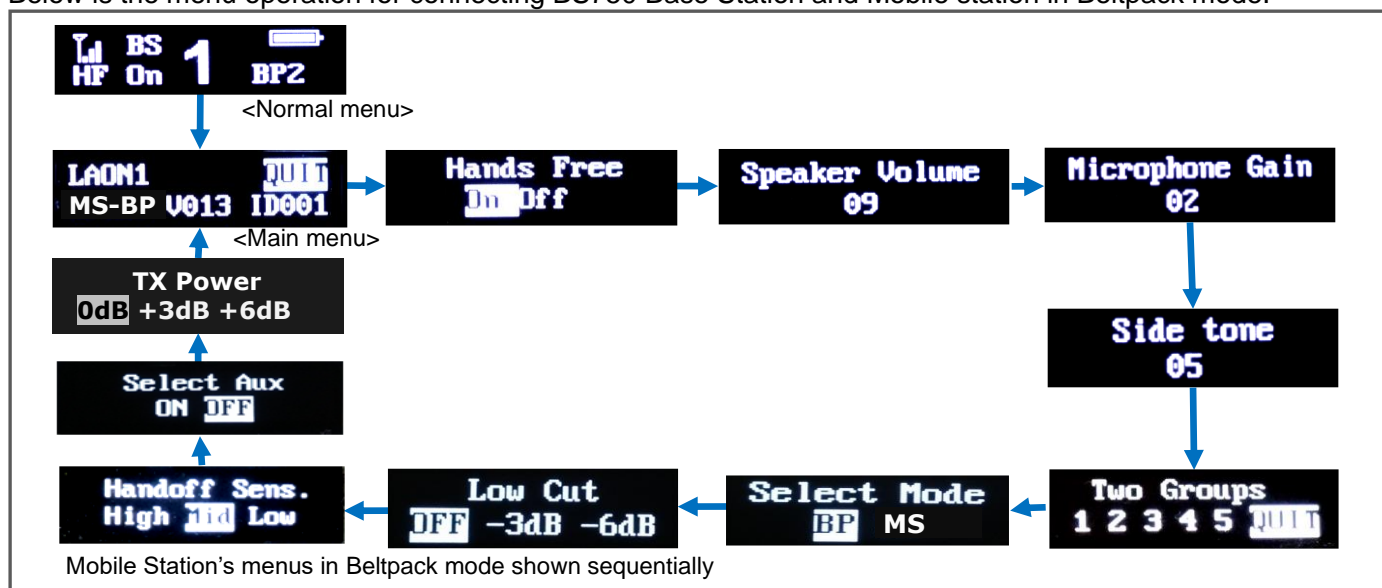


Beltpack BP150 menu



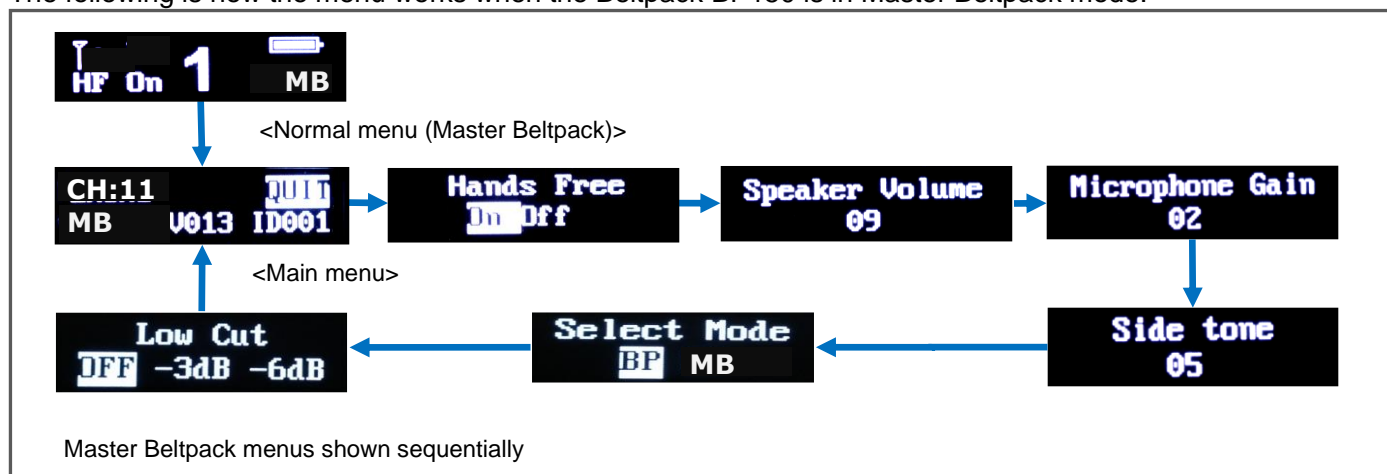
MS150 Mobile Station menu in Beltpack ('BP') mode

Below is the menu operation for connecting BS750 Base Station and Mobile station in Beltpack mode.



Beltpack BP150 menu in Master Beltpack ('MB') mode

The following is how the menu works when the Beltpack BP150 is in Master Beltpack mode.



Section 3: System setup and connections

Mobile Station setup

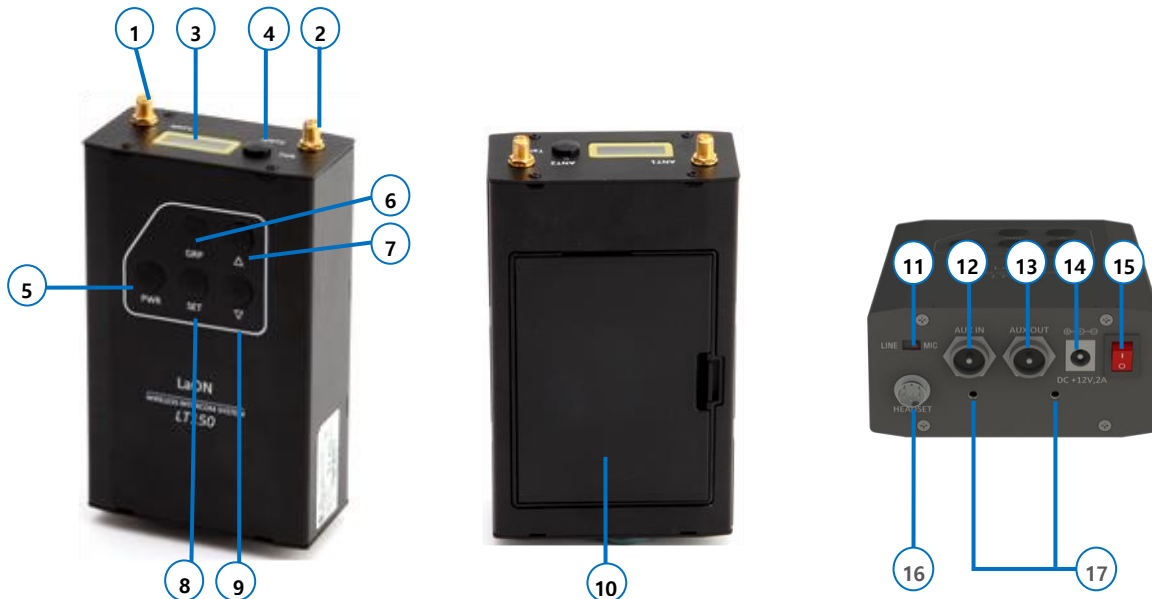


Figure 3-1. Panels of the Mobile Station

Antenna installation

Put two enclosed antennas to the antenna connectors (#1 and #2) on the upper panel of the Mobile Station. Turn the sleeve on each of the antenna connectors clockwise to tighten them and ensure that the antennas are connected firmly.

NOTE: The Mobile Station should be away from any metal obstructions, walls, and electronic equipment that can create radio interference. It is highly recommended to place the antenna as high as possible in the center of the coverage and away from obstructions.

NOTE: Mobile Station must be used **after its antenna connection**. If the antenna is not connected and operated, then **RF related circuits** may be **damaged**.

Supply the power to the Mobile Station.

- When you use the wall-adapter power supply:
Plug the DC cable from the enclosed wall-adapter power supply into the 12VDC Power connector (#14) on the bottom of the Mobile Station. Plug the large female connector at the end of the AC power cord into the power supply and plug the other end of the AC power cord into a standard wall outlet.
- When you use the battery:
Pull the cover up to open the battery cover (#10) and put a fully charged rechargeable battery pack (BAT150) or battery sled with six fresh AA 1.5v alkaline batteries. Make sure the position of polarity (+, -) is correct. When both options are used at the same time, power adapter will automatically be used.

The headset is with 'Push-Pull Lock' type connector. Connect the headset to the headset connector (#16) on the bottom panel of the Mobile Station. To disconnect the headset, hold the plug on the headset connector and pull out slightly turning.

Press the Power switch (#15) on the bottom panel of the Mobile Station and press Power button (#5) longer than 3 seconds to turn on the Mobile Station. A voice message 'Power on' will be heard from the headset, and the red Talk LED adjacent to the Talk button will go on. In MS mode, 'DFS detecting' message will be indicated on the Mobile Station's upper panel screen for one minute and once the detecting is completed, Normal menu with an indication 'MS150' will pop up as shown in Figure 3-2: After a few seconds, Talk LED will be changed to green slow flashing, indicating the Mobile Station is ready to use



Figure 3-2. Normal menu ('MS' mode)

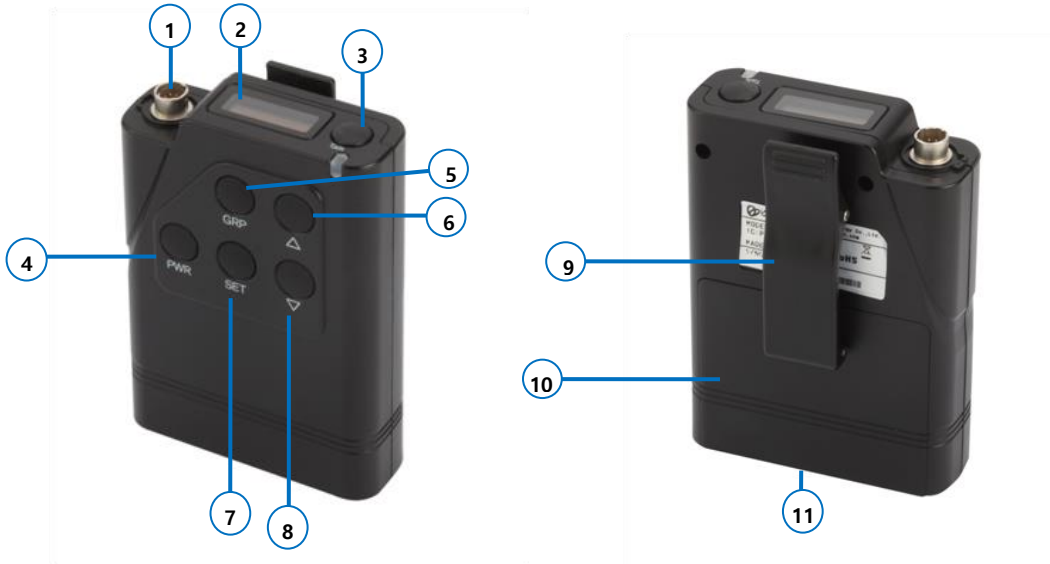
See the **MS150 Mobile Station operation** in Section 4 for details about the Normal menu.

Beltpack setup and pairing

When you operate each Beltpack for the first time with the Mobile Station, you must pair up the Beltpack with a Mobile Station. This pairing process allows a Mobile Station and a Beltpack to recognize each other and an own cryptic code will be given for the corresponding system. The Mobile Station will identify all the paired up Beltpacks and recognize the difference between the Beltpacks. If a Beltpack is added or replaced later, the new one is necessarily to be paired up with the Mobile Station.

Each Mobile Station allows up to one hundred twenty eight(128) Beltpack connections.

Beltpack setup



Before pairing up the Beltpack with the Mobile Station, set up all Beltpacks as following steps:

Slide the cover down to open the battery cover (#10), and put a fully charged rechargeable battery pack (BAT50 or BAT50R) or battery sled with two fresh AA 1.5V alkaline batteries. Make sure the position of polarity (+, -) is correct. Close the battery cover.

Pair Beltpacks

Check out the power status of the each Beltpack's, which will be paired up with Mobile Station. To execute a paring process, the Mobile Station and Beltpacks should be turned on. Beltpacks should not go further than 3 feet (1 meter) from the Mobile Station while they are being paired.

NOTE: Once paring is completed, the Mobile Station and each Beltpack should go further than 6.5 feet (2 meters) to operate otherwise, there could be audio breakups.

Ready to pair with Beltpack

Turn on the Beltpack by pressing PWR button for 2 seconds and confirm the Normal menu is displayed. When a Beltpack is not paired up yet, the LED adjacent to the Talk button will be flash red.

Pair Beltpack to Mobile Station

- Confirm the Normal screen of the Mobile Station is displayed on the OLED screen. If the screen is in a sleep mode, press Set to wake it up. On Mobile Station, press and hold the Set button on the front panel just after pressing and holding the Power (PWR) button. By doing this, the Mobile Station will be in 'pairing waiting mode' and the message, 'Pairing...' will appears shortly on the Mobile Station display and then you can release both buttons. In the Pairing wait mode, Mobile Station waits a pairing requirement from the Beltpack for 20 seconds, and during this time all communications between Beltpacks will be halted.
- Make sure that the Beltpack to pair is displayed on the Normal screen. Otherwise press Set to wake it up from the sleep mode and stay not further than 3 feet (1 meter) from the Mobile Station. Press and hold the Set button on the front panel just after pressing and holding the Power (PWR) button. By doing this, the Beltpack will also be in 'pairing processing mode' and the message, 'Pairing...' will shortly appears on the Beltpack display and then you can release both buttons.

The first time each Beltpack is paired to a Mobile Station, each ID number of the Beltpack is generated sequentially.

NOTE: When executing the pairing process with a Beltpack, after pressing and holding the PWR button, quickly press and hold the Set button otherwise, the Beltpack power may be turned off.

NOTE: While the pairing process, all communications will be halted temporarily and recovered upon completing the pairing.

If pairing completed properly:

The display of the Beltpack shows a Beltpack Label with an ID number that is sequentially generated from '1' to '128'. If the pairing is completed successfully 'Pairing...' message will be changed to 'Pairing Completed' within 20 seconds as shown from Figure 3-3. And the LED adjacent to the Talk button of the Beltpack is flash green.

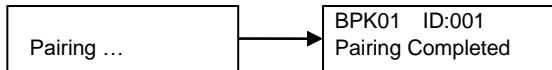


Figure 3-3: Pairing completed status

Repeat the pairing processing for each Beltpack.

After 20 seconds in Pairing wait mode, it automatically returns to the Normal screen.

If pairing is failed:

After the message 'Pairing...' appears on the Beltpack display, up to 20 seconds will be taken until the message, 'Pairing Failed' appears on the Beltpack display. Try to process the pairing again. If the pairing is failed again, try again after rebooting of the Beltpack. If these processes do still not work, please contact your dealer or manufacturer for the further supports.

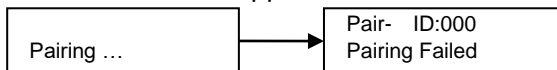


Figure 3-4: Pairing failed status

Battery charger BATCHG-125, BATCHG-225

The BATCHG125 is a seven-bay charger for recharging the BAT50 and BAT150 rechargeable battery packs. The charger has five bays that can charge the Beltpack with the battery pack inserted in the battery compartment. Additionally, there are 2 bays for charging the battery pack. Two bays of these are used to charge the Mobile station battery BAT150. Using the Beltpack/LTWI-BAT150 two-way bay, up to two BAT150 rechargeable battery packs can be recharged instead of the Beltpack. It takes approximately 4.5 hours to fully charge. LEDs indicate the recharging status. There is another type of the charger that can charge 8 BAT50 battery packs. The BATCHG225 is eight-bay charger for recharging the BAT50 battery pack.

See BATCHG125/BATCHG225 User Manual for details.

BRK150 Mount kit installation

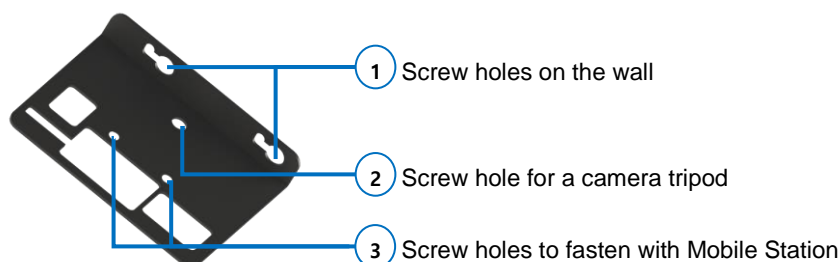


Figure 3-5. BRK150 Mount Kit

Fasten the enclosed two (2) screws on the bottom of the Mobile Station. And with the screw holes on the Mount Kit, the Mobile Station can be fixed install on a wall or camera tripod.

Section 4: system operation

Operating the Mobile Station MS150

MS150 exceptionally offers a mobile use with either a rechargeable battery pack, BAT150 or AA type alkaline batteries (x 6) with a LaON provided battery sled.



Figure 4-1. Panels of the Mobile Station

Power On

Turn on the Power toggle switch (#15) on the bottom panel of the Mobile Station and press Power button longer than 3 seconds to turn it on. A voice message 'Power on' will be heard from the headset, and the LED adjacent to the Talk button will go on. When the Mobile Station is in normal 'MS' mode, 'DFS detecting' will be indicated for one minute in the display of the upper panel, and once the detecting is completed, Normal menu will pop up as shown in Figure 4-2. 'MS150' appears on the screen to indicate that it is in Mobile Station mode. After a few seconds, The LED flash green to indicate that the Mobile Station is ready for use.

Power Off

Turn off with the Power toggle switch (#15) on the bottom panel of the Mobile Station.

When using battery, once the battery level is getting low, the power will be automatically off with the voice prompt from the headset, 'Change the battery'.

Normal menu on the Mobile Station's upper screen

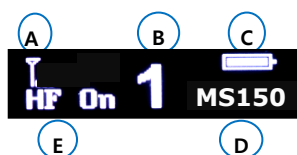


Figure 4-2. Normal menu

The item 'A' indicates the Beltpack's Received Signal Strength Indication (RSSI) level when Mobile Station is in the Beltpack mode operation. The RSSI level is presented graphically. This will not be indicated while the Mobile Station is in the 'MS' mode operation.

If 'BP' is selected in a Select Mode menu, the Mobile Station can be operated as a Beltpack for the Base Station BS750. Auxiliary device such as a speaker can still be connected though it is in the 'BP' mode.

The item 'B' indicates the Communication Group of the Mobile Station's headset. The numbers '1' and '2' stand for the number of the Communication Group channel.

The item 'C' indicates the Mobile Station's battery level. The battery level is presented graphically. When using power adapter, the graphic will be indicated as full.

The item 'D' indicates that the Mobile Station is in the 'MS' mode operation. While the Key Lock is set, 'Lock' will be indicated here to instead.

While the Mobile Station is in 'BP' mode operation, there will be a Beltpack ID indication to instead which has been set up to be linked to the Base Station BS750.

The item 'E' indicates Hands Free On/Off operation mode of the Mobile Station. If the headset of the Mobile Station is in the hands free on (Latched) mode operation, 'HF on' will appear in the display. If the headset of

Mobile Station is in the push-to-talk (hands free off) mode operation, 'HF off' will appear in the display accordingly.

Lock the menu

The Mobile Station keys can be locked to avoid any wrong operation by accident. Press and hold the PWR button (#5) and quickly press GRP button (#6) within one (1) second and release both. And the keys will be locked. In this mode, Set (#8) and GRP (#6) button will be inactivated and the Normal menu will show the text 'Lock' in the bottom-right of the screen. To unlock, press and hold the PWR button (#5) and quickly press GRP button (#6) within one second and release both again.

NOTE: Quickly operate to press the two buttons as instructed above otherwise, pressing PWR button longer than 2 seconds will make the Mobile Station turned off.

NOTE: This setting is valid regardless of the belt pack reboot.

Talk and Communication group buttons

Communication Group Button (#6)

Either Group 1 or Group 2 Communication Group can be selected on the Mobile Station. Mobile Station and Beltpacks in the same Communication group can talk with others in the designated group. Communication group of the Mobile Station is initially set to '1' (Group 1) by the factory default. To select or change Communication group on the Mobile Station, press the Communication group button (#6) on the front panel of the Mobile Station. It will be changed sequentially by each pressing, from '1' to '2'. Every time you press the Communication Group button, a voice message will be heard from the headset. The selected Communication Group is displayed on the Normal menu of the Mobile Station, as following examples.

'1': Mobile Station's Communication group is selected to '1'.

'2': Mobile Station's Communication group is selected to '2'.

The Communication group set for Mobile Station will be applied the same to the auxiliary input/output. While the auxiliary input/output is activated, all Beltpacks and the external device that has been connected can communicate together if they are in the same Communication group.

Talk button (#4)

Push-To-Talk (Hand-free off) mode

You can set a Mobile Station to be in Push-to-talk (PTT) communication mode in the 'Hands Free' menu. A voice message 'Hands free off' will be heard from the headset.

NOTE: After selecting the PTT mode, hands-free-on mode is disabled until it is changed to hands-free-on mode.

Press and hold the Talk button while talking. In PTT operation, audio will be transmitted only while you are pressing the Talk button.

Hands-Free-On mode

You can set a Mobile Station to be in Hands-free-on ('HFon') communication mode in the 'Hands Free' Menu. A voice message 'Hands free on' will be heard from the headset.

Press and release the Talk button to latch the transmission. After latching the transmission, talk and listen work as in normal telephone conversation. Press and release the Talk button again to stop the transmission, and you can listen only.

Talk LED

When the Mobile Station is transmitting, the LED on top of the Talk button will be solid green. When the Mobile Station is ready but not transmitting, that is listen only status, the LED on top of the Talk button flash green.

Talk LED operation

- Solid green: Listen and talk mode by pressing Talk button
- Green flashing slowly: Listen only mode
- Red flashing rapidly: Only while the Mobile Station is in the Beltpack mode, the Beltpack is not paired up yet or is not linked to any Base Station or Remote Antenna (Out of coverage)
- Red: When the battery level is low, a voice message, 'Change the battery' will be heard from the headset and the LED will be changed to red.

How to control menus (In 'MS' mode)

Main menu

Press any button if the screen is in sleep mode, then the Normal menu appears.
Press Set button under the Normal menu, then the Main menu appears.



Figure 4-3. Main menu in the 'MS' mode operation

The item 'A' indicates the frequency ID. The frequency ID map can be found out from the table 4-1 below.
The item 'B' indicates the Mobile Station's model name, software version and ID number.

On the Main menu, press Set to back to Normal menu.

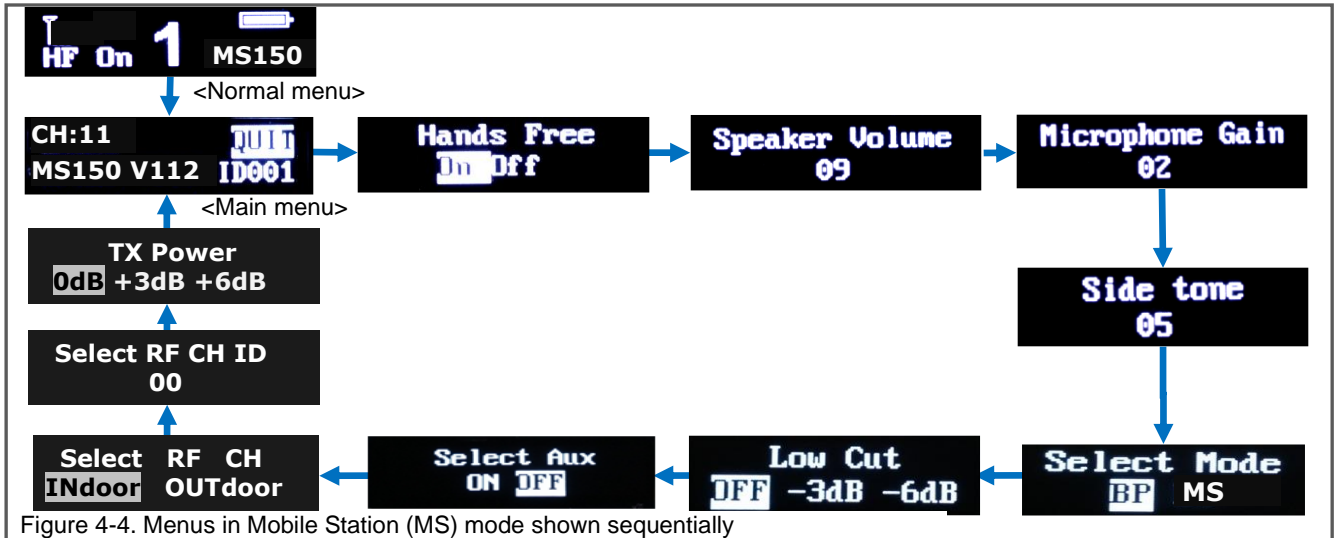


Figure 4-4. Menus in Mobile Station (MS) mode shown sequentially

Under the Main menu with Up or Down button, move to each menu sequentially and select a menu by pressing Set button. The selected menu will be flashing and ready to be edited. Use Up or Down button to change values. Press Set to save the settings and move to next item. Pressing once the power button will lead you to Normal menu directly.

Hands free (latched Talk) menu



Figure 4-5. Hands free menu

Move to Hands Free menu, and press Set button to select a mode with Up or Down button.

Speaker volume menu



Figure 4-6. Speaker volume menu

Move to Speaker volume menu, press Set button to select and adjust headset earphone volume level with Up or Down button. And press Up or Down button in the Normal menu will also allow you to change the earphone volume level directly.

If the auxiliary connection is activated, the auxiliary output gain will also be controlled with the speaker volume level adjustment.

Earphone Volume Up

Every time you press the volume up button, a beep sound will be heard from the headset. When the level is reached out to a maximum, a voice prompt, 'maximum' will be heard from the headset.

Earphone Volume Down

Every time you press the volume down button, a beep sound will be heard from the headset. When the level is reached out to a minimum, a voice prompt, 'minimum' will be heard from the headset.

NOTE: Headset safety

- Please note that there could possibly be various root causes of distortion, echo or cut-off of the microphone sounds of the headset. At the initial set up, for the safe use, it is encouraged to set these volume levels lower and start to adjust for the best level required by various site environments and improve matters caused by the relevant headset where applicable.
- When the microphone gain, side tone or earphone volume on a specific headset is set too high, It creates some kind of echo or distortion. Try to these gain or volume down for improving and mitigate the relevant matter.

Microphone gain menu



Figure 4-7. Microphone gain menu

Move to Microphone gain menu, press Set button to select and adjust headset microphone gain level with Up or Down button.

If the auxiliary connection is activated, auxiliary input gain will be adjustable by controlling microphone gain level.

Microphone Gain Up

Every time you press the volume up button, increased voice level will be heard from the headset while you are speaking to headset microphone. When the level is reached out to a maximum, a voice message, 'maximum' will be heard from the headset.

Microphone Gain Down

Every time you press the volume down button, decreased voice level will be heard from the headset while you are speaking to headset microphone. When the level is reached out to a minimum, a voice message, 'minimum' will be heard from the headset.

Sidetone menu



Figure 4-8. Sidetone menu

Move to Sidetone menu, press Set button to select and adjust headset Sidetone volume with Up or Down button. If the auxiliary connection is activated, the side tone will be heard on auxiliary output and there will be feedback from auxiliary input to output as well. If it is not required, set the side tone volume as '0' value. In this case, you will not hear auxiliary input from the headset of the Mobiles Station.

Sidetone Up

Every time you press the volume up button, a beep sound will be heard from the headset. When the level is reached out to a maximum, a voice prompt, 'maximum' will be heard from the headset.

Sidetone Down

Every time you press the volume down button, a beep sound will be heard from the headset. When the level is reached out to a minimum, a voice prompt, 'minimum' will be heard from the headset.

Select Mode menu



Figure 4-9. Select Mode menu

In Select Mode menu, a Mobile Station can be staying in MS mode or can be set into a Beltpack (BP) mode. In BP mode, Mobile Station performs as a Beltpack, BP750 of the LT750 Expert system. You need to pair up the Mobile Station in the BP mode with a BS750 Base Station for use.

Once either the BP or MS mode is selected in this menu, the mode of the Mobile Station will be switched as set with its automatic rebooting.

Low cut menu

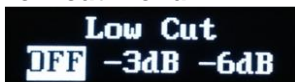


Figure 4-10. Low Cut menu

In Low Cut menu, the low frequency component such as the sound of wind and air conditioner can be adjustable. To cut the low frequency at maximum, select -6dB.

Select Aux menu

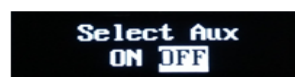


Figure 4-11. Select Aux menu

In Select Aux menu, you can activate the connection of auxiliary devices. Select 'On' when you connect and activate the connection. When it is set as 'On', the auxiliary input gain can be adjustable with the microphone gain control, and the auxiliary output gain can be adjustable with the speaker volume control. On auxiliary output, all sound heard through headset will be out the same.

NOTE: In Aux On mode, all voice prompts from headset will not be available.

NOTE: The battery will last for lesser hours in the Aux On mode. It is recommended to use the power adapter when you use the Mobile Station with a connection of auxiliary devices.

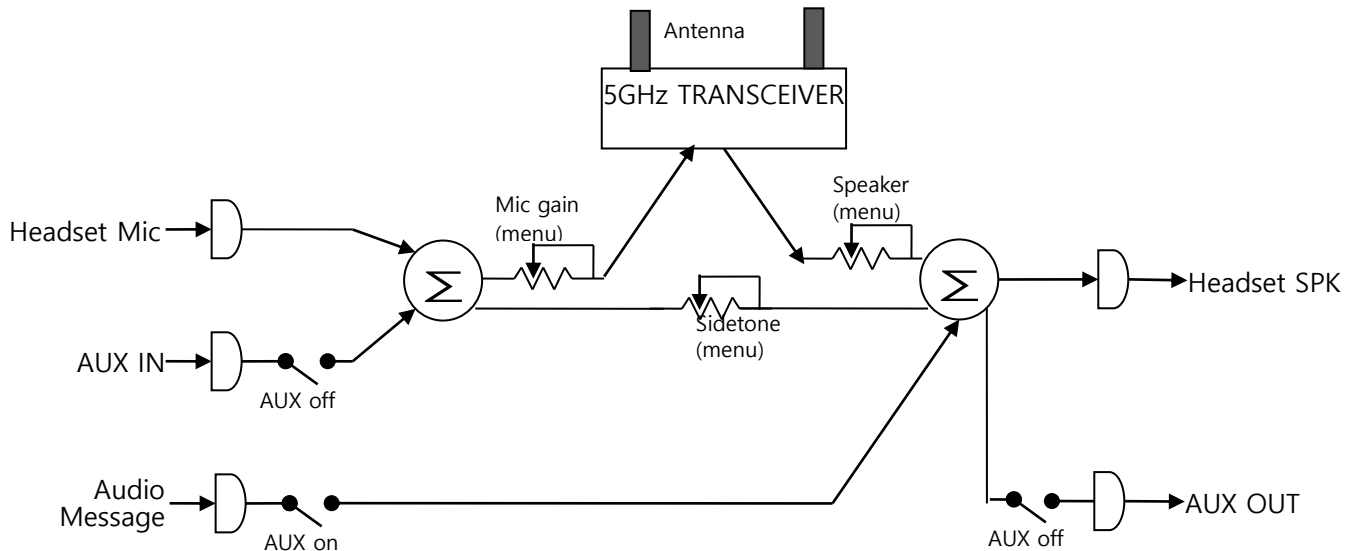


Figure 4-12. Audio block diagram

Select RF Channel menu



Figure 4-13. Select RF Channel menu

(This menu applies to MS150 Version V112)

On 5GHz UNII band, there is a separate definition and guideline for frequency channels to be used in indoor environments. On the Mobile Station, select 'Indoor' if you use the system in any indoor environments. Both outdoor and indoor usage frequency bands are available. When using the system at any outdoor environments, 'Outdoor' should mandatorily be selected. See 5GHz UNII frequency band, Table 4-1

NOTE: When changing 'Indoor' or 'Outdoor' settings, the Mobile Station automatically reboots and is set to the selected frequency band.

Select RF Channel ID menu



Figure 4-14. Select RF Channel ID menu

(This menu applies to MS150 Version V112)

Select Automatic:

When Automatic (Set to '00') is selected, Mobile Station automatically selects the frequency to be used.

Select from 1 to 29:

If you select a frequency ID number, Mobile Station uses a set frequency.

Frequency ID number, See 5GHz UNII frequency band, Table 4-1

Tx Power menu



Figure 4-15. Tx Power menu

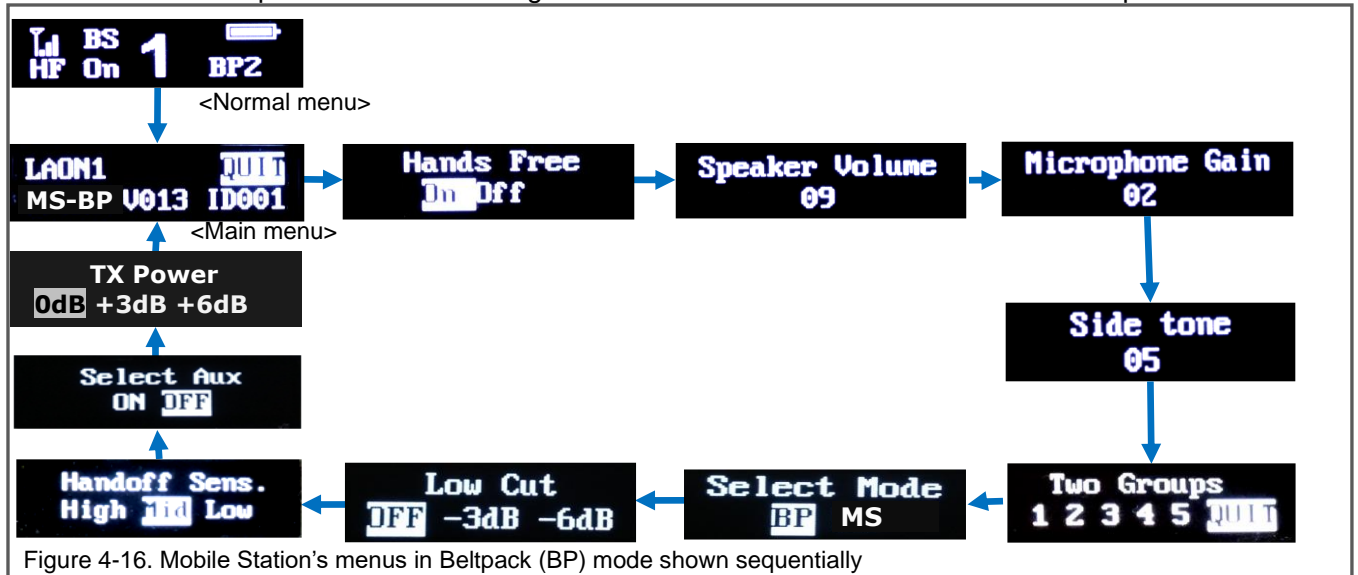
(This menu applies to MS150 Version V112)

Select the maximum radio transmission power for the Mobile Station.

Select +6 dB to increase the peak radio transmission power by 6dB. Select +3 dB to increase the peak radio transmission power by 3dB. If you set to +3dB or +6dB, battery usage time is less than when Tx Power is set to 0dB.

Mobile Station menu in Beltpack ('BP') mode

Below is the menu operation for connecting BS750 Base Station and Mobile station in Beltpack mode.



In Beltpack (BP) mode, the Beltpack menus will be shown in the Mobile Station accordingly. Therefore, there will be additional menus, Two Groups and Handoff Sensibility in compared with the menus in MS mode. As shown from the figure 4-17, Normal menu below, the Received Signal Strength Indication (RSSI) level 'A', Station ID that the Beltpack is linked to 'B' and the Beltpack label 'C' will be indicated on the display.

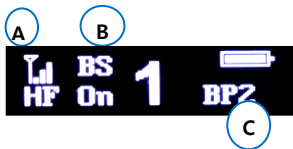


Figure 4-17. Normal menu in BP mode

NOTE: Once the Mobile Station is paired up with Base Station BS750 to be used as a Beltpack, the encryption code of the applicable Mobile Station is changed to the same encryption code of the Base Station BS750. To return in Mobile Station (MS) mode, all Beltpacks which need to be connected to the Mobile Station should be paired up again. Also, these Mobile Station in MS mode and Base Station BS750 which were connected before should not be used in the same coverage. Otherwise, all BP750 Beltpacks will be automatically linked to either station with stronger signal which may cause a confusion and wrong operation on wireless communication.

Two groups menu in BP mode



Figure 4-18. Two groups menu

Two groups menu is to set a 'simultaneous listen mode' for selected two groups within the allocated group channels to the Mobile Station in BP mode operation. Once the Two groups mode is set, GRP button (#6) on the front panel works as Talk button for the latter group selected in the Two groups menu screen. And the Talk button (#4) is to talk to the former group selected in the Two groups menu screen. Pressing either Talk or GRP button enables to talk to either group. And pressing both Talk and GRP buttons at the same time allows talking to both groups at the same time. Meanwhile, in Two groups mode, both two groups set will always be heard.

Move to the Two Groups menu and press Set to the edit mode. Move to the desired Communication group number to select by pressing Up or Down button and press Set on the number. Then the Communication group number will show dark text on a light background. On the screen of the Two groups menu, initially allocated Communication group numbers to the Beltpack will only be displayed. And, setting two groups is necessary for the Two groups mode. Otherwise, the set value will not be saved. To reset the groups, reverse all the set values. Move to Quit on the menu with Up or Down button and press Set to save.

Talk LED operation in Two groups

- Solid green: Listen and talk mode by pressing Talk button.
- Green flashing slowly: Listen only mode
- Solid orange: Listen two groups and talk to latter group which works with GRP button
- Orange flashing rapidly: Listen and talk both groups which works by pressing both Talk and GRP button
- Red: Status indicating the battery level is low. The message 'Change the battery' will be heard.

NOTE: Two groups menu will not appear if there is initially only one group channel is allocated or if the system is in the Master Station (MS) mode.

Handoff sensitivity menu in BP mode



Figure 4-19. Hands off sensitivity menu

Handoff (Roam) sensitivity menu is to set hands off sensitivity level. In case there are wide overlapping areas due to site or installation environment between the Base Station and Remote Antennas or Repeaters, set the sensitivity to High and check out the most appropriate level. With the level, High, the hands off will be implemented the fastest sensibly.

NOTE: Manual handoff between Stations is also available with a double click of the Power button on the front panel.

If no action is taken for 10 seconds on any menu, all changes made will be saved automatically and the display will be in sleep mode.

5GHz UNII frequency band

Select RF channel

On 5GHz UNII band, there is a separate definition and guideline for frequency channels to be used in indoor environments. On the Mobile Station, select 'Indoor' if you use the system in any indoor environments. When using the system at any outdoor environments, 'Outdoor' should mandatorily be selected. Selecting 'Indoor' allows the use of 'Indoor' and 'Outdoor' frequencies. Refer to the Table below for usable frequencies of indoor and outdoor in each region.

NOTE: Upon the change of the setting of indoor or outdoor, the Mobile Station should be rebooted and set the applicable frequencies as selected.

Frequency band

The following table lists the frequencies that can be used in 5GHz UNII band. The ID of frequency bands currently being used will be shown on the Mobile Station's Normal menu. LT150 which operates in 5GHz is approved for license free use in most countries. However, some countries may restrict the use of some band or RF spectrum operations. Therefore, it is your responsibility to find out whether the LT150 is permitted in your country or not.

NOTE: In the Mobile Station menu, ID numbers stands for each frequency band as shown in the table.

ID	WiFi Channel	Frequency	Band width	Korea	Australia, New Zealand,	EU, Japan, Singapore	US	China	Taiwan	Israel
01	32	5160MHz	20MHz	X	X	X	X	X	X	X
02	36	5180MHz	20MHz	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor
03	40	5200MHz	20MHz	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor
04	44	5220MHz	20MHz	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor
05	48	5240MHz	20MHz	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor
06	52	5260MHz	20MHz	O	Indoor	Indoor	O	O	Indoor	Indoor
07	56	5280MHz	20MHz	O	Indoor	Indoor	O	O	Indoor	Indoor
08	60	5300MHz	20MHz	O	Indoor	Indoor	O	O	Indoor	Indoor
09	64	5320MHz	20MHz	O	Indoor	Indoor	O	O	Indoor	Indoor
10	68	5340MHz	20MHz	X	X	X	X	X	X	X
11	96	5480MHz	20MHz	X	X	X	X	X	X	X
12	100	5500MHz	20MHz	O	O	O	O	X	O	X
13	104	5520MHz	20MHz	O	O	O	O	X	O	X
14	108	5540MHz	20MHz	O	O	O	O	X	O	X
15	112	5560MHz	20MHz	O	O	O	O	X	O	X
16	116	5580MHz	20MHz	O	O	O	O	X	O	X
17	120	5600MHz	20MHz	O	O	O	O	X	O	X
18	124	5620MHz	20MHz	O	O	O	O	X	O	X
19	128	5640MHz	20MHz	O	O	O	O	X	O	X
20	132	5660MHz	20MHz	O	O	O	O	X	O	X
21	136	5680MHz	20MHz	O	O	O	O	X	O	X
22	140	5700MHz	20MHz	O	O	O	O	X	O	X
23	149	5745MHz	20MHz	O	X	X	O	O	O	X
24	153	5765MHz	20MHz	O	X	X	O	O	O	X
25	157	5785MHz	20MHz	O	X	X	O	O	O	X
26	161	5805MHz	20MHz	O	X	X	O	O	O	X
27	165	5825MHz	20MHz	O	X	X	O	O	O	X
28	169	5845MHz	20MHz	X	X	X	X	X	X	X
29	173	5865MHz	20MHz	X	X	X	X	X	X	X

Table. Typical Radio frequency (RF) bands

Indoor: Radio frequencies that can only be used indoors. Outdoor frequencies are also used when the Indoor is selected.

Change batteries

When Battery level became weak, a voice message, 'Change battery' will be heard in the headset. When this happens, open the battery cover by sliding down, and remove batteries from the Beltpack battery compartment. The removable Battery sled will hold two 1.5v alkaline batteries. When you use two alkaline batteries, insert two 1.5v alkaline batteries into the Battery sled, and put it in the battery compartment on the rear of the Beltpack. When replacing a battery, make sure the position of polarity (+, -) is correct.

Voice messages in the headset of the Mobile Station

- 'Power on'
- 'Power off'
- 'Hands free on'
- 'hands free off'
- 'Beep'
- 'Maximum'
- 'Minimum'
- 'Audio channel is busy'
- 'Unlatched'
- 'Change battery'
- 'group one'
- 'group two'
- 'group three'
- 'group four'
- 'group five'
- 'Out of coverage'

Auxiliary device setup

The Communication Group channel of the auxiliary input/output will follow the Communication Group channel set of the Mobile Station. While the auxiliary input/output connection is activated on the Mobile Station's menu, any Beltpacks and auxiliary device in a same Communication Group channel can communicate together.

STEP 1

Activate the auxiliary device connection from the Select Aux menu. Select 'On' in the menu to activate the connections. Connect the 'Output cable connector' of the auxiliary device into the 'Aux In connector (#12)' of the Mobile Station, and 'Input cable connector' of the auxiliary device into the 'Aux Out connector (#13)' of the Mobile Station respectively. Both of 'Aux Out' and 'Aux In' connectors are the type of phone Jack (6.3Φ) 600Ω balanced, level adjustable.

NOTE: While the Mobile Station is operating in Aux On mode, the battery will last for less time. It is recommended to supply power to the Mobile Station using the specified power adapter.

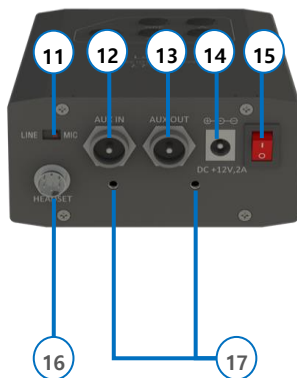


Figure 4-20. The bottom of the Mobile Station

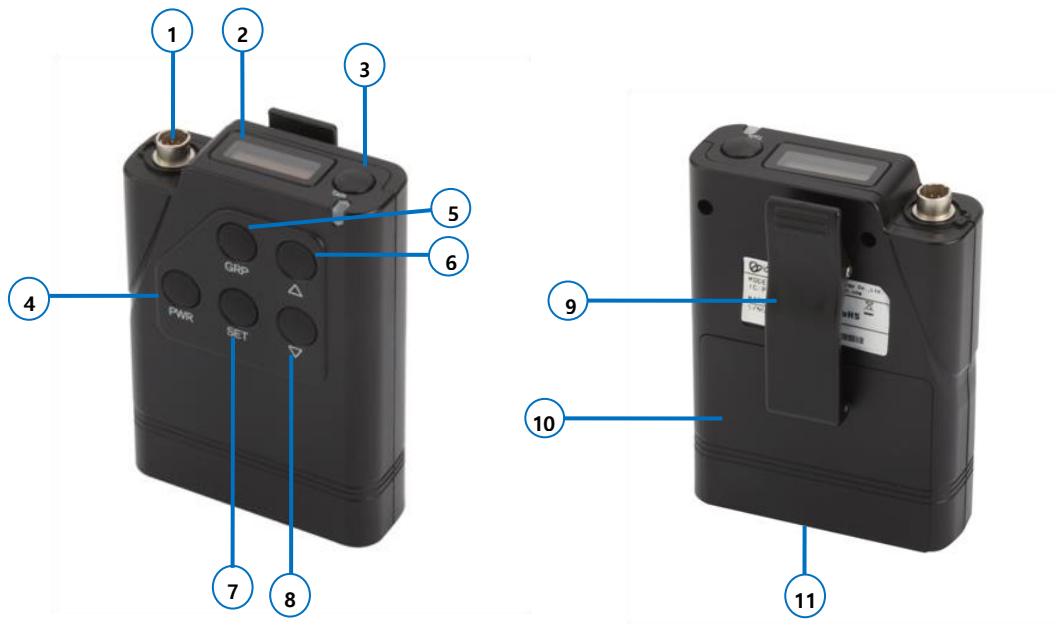
STEP 2

The level control for the auxiliary device follows the level control of the Mobile Station. In order to adjust the levels for the auxiliary device, move to Speaker Volume menu of the Mobile Station for the auxiliary output level adjustment and Microphone Gain menu for auxiliary input level adjustment.

STEP 3

The gain of the auxiliary input can be selected by the Aux Line or by the Mic level selection switch (#11). Set the connection to the wired intercom system to 'Line' and the connection to the microphone to 'Mic'.

Beltpack operation



Power On/Off

Power On

Press the PWR button (#4) longer than three seconds to turn on the Beltpack. A voice message 'Power on' will be heard from the headset, and the red Talk light adjacent to the Talk button will go on. After a few seconds, talk light will be changed to green slow flashing, indicating the Beltpack is ready to use, if the pairing with the Base Station is properly done.

Power Off

Press and hold the PWR button for approximately two seconds. A voice message 'Power off' will be heard in the headset and then the green slow flashing Talk light will go off.

Normal menu on the Beltpack's upper screen

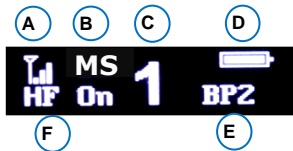


Figure 4-21. Normal menu

The item 'A' indicates the Beltpack's Received Signal Strength Indication (RSSI) level. The RSSI level is presented graphically.

The item 'B' indicates that the applicable Beltpack is connected to which device. When the Beltpack is connected to the Mobile Station, 'MS' will be shown. When the Beltpack is connected to the Master Beltpack, 'MB' will be shown.

The item 'C' indicates the Communication group of the Talk channel. The numbers 1 through 2 stands for the number of the Communication groups.

The item 'D' indicates the Beltpack's battery level. The battery level is presented graphically.

The item 'E' indicates the Beltpack's label. While the Lock is set, 'Lock' will be indicated here to instead.

The item 'F' indicates Beltpack's operation mode. If the Talk channel is in the Latched mode, 'HF on' (Hands free on) appears on the display. If the Talk channel is in the push-to-talk mode, 'HF off' (Hands Free off) appears on the display.

Lock the menu

The Beltpack keys can be locked to avoid any wrong operation by accident. Press and hold the PWR button (#4) of the Beltpack and quickly press GRP button (#5) within one second and release both. And the keys will be locked. In this mode, Set (#7) and GRP (#5) button will be inactivated and the Normal menu of the Beltpack will show the text 'Lock' in the bottom-right of the screen. To unlock, press and hold the PWR button (#4) and quickly press GRP button (#5) within one second and release both again.

NOTE: Quickly operate to press the two buttons as instructed above otherwise, pressing PWR button longer than 2 seconds will make the Beltpack turned off.

NOTE: When the Beltpack is in Two groups mode, GRP button works as Talk button for the latter group selected in Two groups menu screen.

NOTE: This setting is valid regardless of the belt pack reboot.

Talk and Beltpack Communication group buttons

Beltpack Communication group button (#5)

Up to two Communication groups can be allocated to Beltpack. Beltpacks in the same Communication group can talk with others in the designated group. To select Communication group on the Beltpack, press the Communication group button (#5). It will be changed sequentially by each pressing, from 1 to 2 within the allocated Communication groups. Every time you press the Communication group button, a voice message will be heard from the headset. The selected Communication group is displayed on the Normal menu of the Beltpack, as following examples.

- 1: Beltpack's Communication group is selected to 1.
- 2: Beltpack's Communication group is selected to 2.

If you select a Beltpack's Communication group same as that of the Line, allowing communication between the Line devices and wireless Beltpacks. Input and output level control is set via the menu of the Mobile Station.

NOTE: In Two groups mode of the Beltpack, the Communication group button (#5) works as Talk button for the latter group selected in Two groups menu screen.

Talk button (#3)

Push-To-Talk (Hand-free off) mode

You can set a Beltpack to be in Push-to-talk (PTT) communication mode in the 'Hands Free' menu. A voice message 'Hands free off' will be heard from the headset.

NOTE: After selecting the PTT mode, hands-free-on mode is disabled until it is changed to hands-free-on mode.

Press and hold the Talk button while talking. In PTT operation, audio will be transmitted only while you are pressing the Talk button.

Hands-Free-On mode

You can set a Beltpack to be in Hands-free-on ('HFon') communication mode in the 'Hands Free' Menu. A voice message 'Hands free on' will be heard from the headset.

Press and release the Talk button to latch the transmission. After latching the transmission, talk and listen work as in normal telephone conversation. Press and release the Talk button again to stop the transmission, and you can listen only.

Talk LED

When the Beltpack is transmitting, the LED on top of the Talk button will be solid green. When the Beltpack is ready but not transmitting, that is listen only status, the LED on top of the Talk button flash green. When the Beltpack is not ready for transmitting the audio, the LED on top of the Talk button flash red rapidly.

Talk LED operation

- Solid green: Listen and talk mode by pressing Talk button or, listen two groups and talk to former group in Two groups mode which works with Talk button
- Green flashing slowly: Listen only mode
- Solid orange: In Two groups mode, listen two groups and talk to latter group mode which works with GRP button
- Orange flashing rapidly: In Two groups mode, listen and talk both groups which works by pressing both Talk and GRP button
- Red flashing rapidly: The Beltpack is not paired up yet or is not linked to any Base Station or Remote Antenna (Out of coverage)
- Solid red: TTA is activated.
- Red: When the battery level is low, a voice message, 'Change the battery' will be heard from the headset and the LED will be changed to red.

How to control menus

Main menu

Press any button if the screen is in sleep mode, then the Normal menu appears.
Press Set button under the Normal menu, then the Main menu appears.



Figure 4-22. Main menu

The item 'A' indicates the Beltpack's Label.

The item 'B' indicates the Beltpack's model name, firmware version and ID number.

On the Main menu, press Set to back to Normal menu.

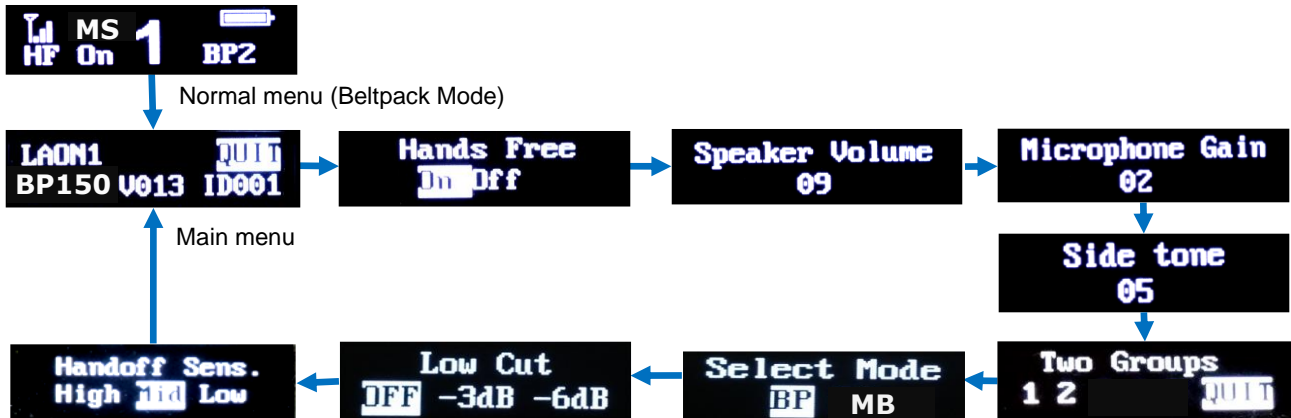


Figure 4-23. Menus shown sequentially

Under the Main menu with Up or Down button, move to each menu sequentially and select a menu by pressing Set button. The selected menu will be flashing and ready to be edited. Use Up or Down button to change values. Press Set to save the settings and move to next item. Pressing once the power button will lead you to Normal menu directly.

Hands free (Latched Talk) menu



Figure 4-24. Hands free menu

Move to Hands Free menu, and press Set button to select a mode with Up or Down button.

Speaker volume menu



Figure 4-25. Speaker volume menu

Move to Speaker volume menu, press Set button to select and adjust headset earphone volume level with Up or Down button. And press Up or Down button in the Normal menu will also allow you to change the earphone volume level directly.

Earphone Volume Up

Every time you press the volume up button, a beep sound will be heard from the headset. When the level is reached out to a maximum, a voice prompt, 'maximum' will be heard from the headset.

Earphone Volume Down

Every time you press the volume down button, a beep sound will be heard from the headset. When the level is reached out to a minimum, a voice prompt, 'minimum' will be heard from the headset.

NOTE: Headset safety

- Please note that there could possibly be various root causes of distortion, echo or cut-off of the microphone sounds of the headset. At the initial set up, for the safe use, it is encouraged to set these volume levels lower and start to adjust for the best level required by various site environments and improve matters caused by the relevant headset where applicable.
- When the microphone gain, side tone or earphone volume on a specific headset is set too high, It creates some kind of echo or distortion. Try to these gain or volume down for improving and mitigate the relevant matter.

Microphone gain menu



Figure 4-26. Microphone gain menu

Move to Microphone gain menu, press Set button to select and adjust headset microphone gain level with Up or Down button.

Microphone gain up

Every time you press the volume up button, increased voice level will be heard from the headset while you are speaking to headset microphone. When the level is reached out to a maximum, a voice message, 'maximum' will be heard from the headset.

Microphone gain down

Every time you press the volume down button, decreased voice level will be heard from the headset while you are speaking to headset microphone. When the level is reached out to a minimum, a voice message, 'minimum' will be heard from the headset.

Sidetone menu



Figure 4-27. Sidetone menu

Move to Sidetone menu, press Set button to select and adjust headset Sidetone volume with Up or Down button.

Sidetone Up

Every time you press the volume up button, a beep sound will be heard from the headset. When the level is reached out to a maximum, a voice prompt, 'maximum' will be heard from the headset.

Sidetone Down

Every time you press the volume down button, a beep sound will be heard from the headset. When the level is reached out to a minimum, a voice prompt, 'minimum' will be heard from the headset.

Two groups menu

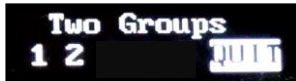


Figure 4-28. Two groups menu

Two groups menu is to set a 'simultaneous listen mode' for selected two groups within the allocated group channels to the Beltpack. Once the Two groups mode is set, GRP button (#5) on the front panel of the Beltpack works as Talk button for the latter group selected in the Two groups menu screen. And the Talk button (#3) is to talk to the former group selected in the Two groups menu screen. Pressing either Talk or GRP button enables to talk to either group. And pressing both Talk and GRP buttons at the same time allows talking to both groups at the same time. Meanwhile, in Two groups mode, both two groups set will always be heard.

Move to the Two Groups menu and press Set to the edit mode. Move to the desired Communication group number to select by pressing Up or Down button and press Set on the number. Then the Communication group number will show dark text on a light background. On the screen of the Two groups menu, initially allocated Communication group numbers to the Beltpack will only be displayed. And, setting two groups is necessary for the Two groups mode. Otherwise, the set value will not be saved. To reset the groups, reverse all the set values. Move to Quit on the menu with Up or Down button and press Set to save.

Talk LED operation in Two groups

- Solid green: Listen and talk mode by pressing Talk button.
- Green flashing slowly: Listen only mode
- Solid orange: Listen two groups and talk to latter group which works with GRP button
- Orange flashing rapidly: Listen and talk both groups which works by pressing both Talk and GRP button

NOTE: Two groups menu will not appear if there is initially only one group channel is allocated or if the system is in the Master Beltpack (MB) mode.

Select Mode menu



Figure 4-29. Mode selection menu

In Select Mode menu, a Beltpack can be set into a Master mode by selecting MB. The Beltpack in MB mode performs as a Master station.

Once either the BP or MB mode is selected in the menu display, the power of the Beltpack will be automatically off with a voice message, 'power off'. Turn on the Beltpack again then it will work in the selected mode.

Upon the power on the Beltpack in MB mode, 'DFS detecting' with a time indicator will be indicated in the Beltpack display. After one minute of the Scanning process is completed, 'MB' will appear in the bottom-right of the Normal menu. The menus of the Master Beltpack (MB) are as shown from the figure.

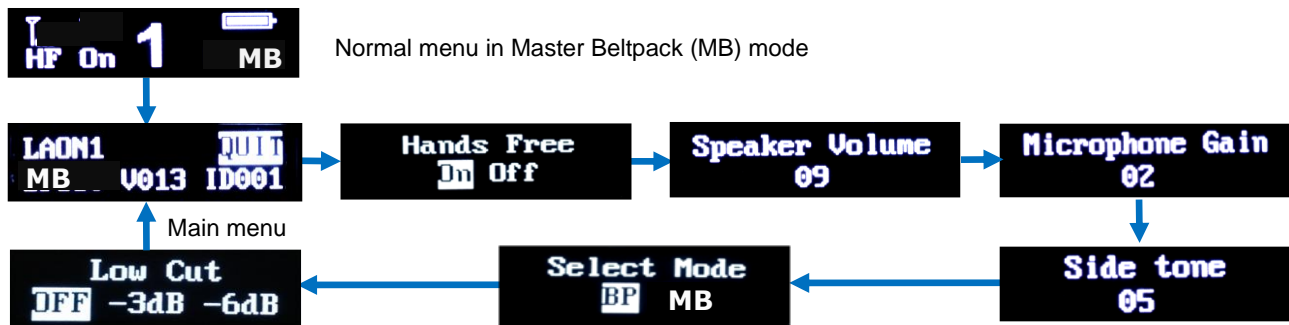


Figure 4-30. Master Beltpack (MB) menus shown sequentially

Normal menu shows where the Beltpack is connected. If a Beltpack in BP mode is connected to the Master Beltpack, 'MB' will appear in the Normal menu. The menus of the Beltpack linked to the Master Beltpack are as shown from the figure.

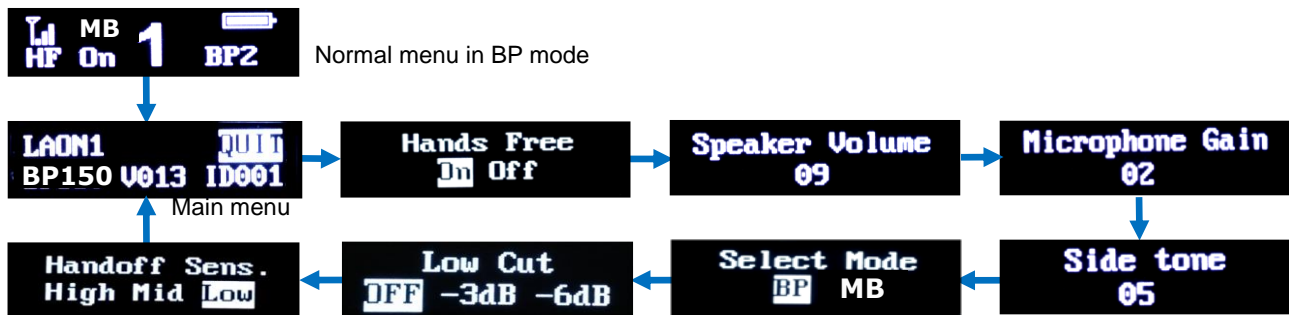


Figure 4-31. Beltpack menus shown sequentially that is linked to a Master Beltpack

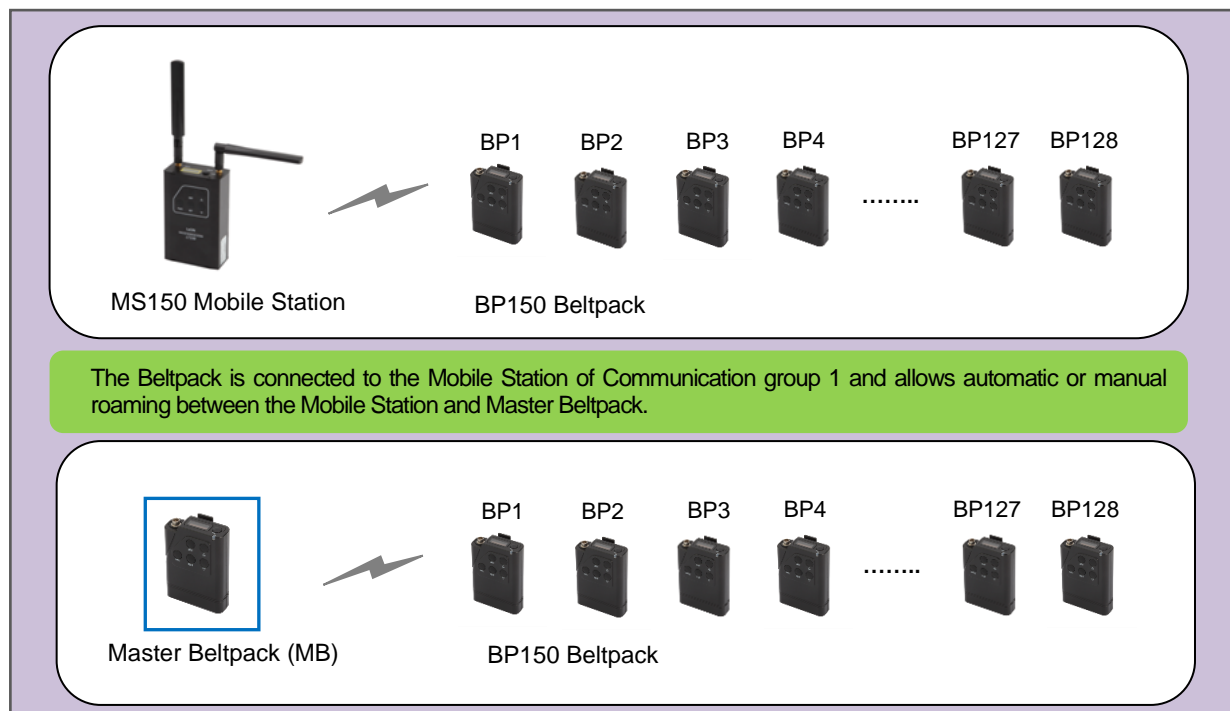
Master Beltpack mode operation

- Wireless communications among Beltpacks are available without Mobile Station by setting a Beltpack as a Master.
- Beltpack which is already paired up with the Mobile Station once will be automatically linked to the Master Beltpack when the Communication group channel is selected to Group 1 otherwise, the Communication group channel should be set to Group 1 for a connection to Master Beltpack.
- Beltpacks will be automatically roam between the Mobile Station and Master Beltpack if they are located far between or in separate area. Manual handoff is also available with double click of PWR button. It is not recommended to operate both Mobile Station and Master Beltpack in a same RF space.
- In Master Beltpack mode, system provides single Communication group channel with five full-duplex audio communication channels (1 MB + 4 BPs). Thus, for all Beltpacks to be linked to the Master Beltpack should set to Group 1.
- With a re-pairing of the Beltpack to the Master Beltpack, the Communication group channels set earlier will not be in active and changed to a single Communication group.

NOTE: Master Beltpack battery usage time is shorter than normal Beltpack usage time

NOTE: If the Mobile Station and Master Beltpack are co-existed in a same RF space, Beltpacks will be connected to the one with stronger signal which may be confused. Please use them in separate areas.

Stand-alone operation in each independent area



Pairing with Master Beltpack

BP850 Beltpack in a group channel one which is already paired up with the Mobile Station will automatically be linked to the Master Beltpack and any additional pairing setup is not required. If a Beltpack needs to be paired up again to the Master Beltpack, follow the process below. In any case, the Beltpack should initially be paired up with the Mobile Station.

- With the Master Beltpack, confirm if the Normal menu is displayed on the screen. Press and hold the Set button on the front panel just after pressing and holding the PWR button. By doing this, the Master Beltpack will be in 'pairing waiting mode' and the message, 'Pairing...' will shortly appears on the Master Beltpack display and you can release both buttons now.
- Master Beltpack will be waiting for the pairing requirement from the Beltpack for 20 seconds and all communications between Beltpack will be halted during this time.
- Prepare the Beltpack to be paired up with the Master Beltpack within 3 feet (1 meter). Confirm the Normal menu is displayed on the Beltpack. Press and hold the Set button on the front panel just after pressing and holding the PWR button. By doing this, the Beltpack will be in 'pairing processing mode' and the message, 'Pairing...' will shortly appears on the Beltpack display and you can release both buttons now.

If the pairing is completed successfully;

The message, 'Pairing...' will be changed to 'Pairing Completed' within 20 seconds as shown from the Figure. And the LED adjacent to the Talk button of the Beltpack is changed to green.

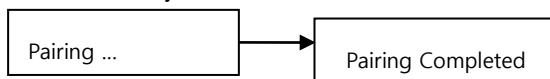


Figure 4-33. Pairing completed status

If the pairing is failed;

After the message 'Pairing...' appears on the Beltpack display, up to 20 seconds will be taken until the message, 'Pairing Failed' appears in the Beltpack display. Try to process again.

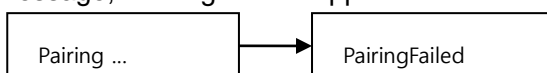


Figure 4-34. Pairing failed status

Low cut menu

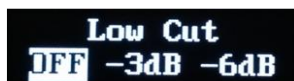


Figure 4-35. Low Cut menu

In Low cut menu, the low frequency component such as the sound of wind and air conditioner can be adjustable. To cut the low frequency at maximum, select -6dB.

Handoff sensibility menu



Figure 4-36. Handoff sensibility menu

Any Beltpack in Communication Group 1 will automatically be linked to the Master Beltpack. In Handoff Sensibility menu, the roaming sensibility between the Mobile Station and Master Beltpack can be set. With the level, 'High', the hand off will be implemented the fastest sensibly.

If no action is taken for 10 seconds on any menu, all changes made will be saved automatically except any setup in Two groups menu and the display will be off.

Change batteries

When Battery level became weak, a voice message, 'Change battery' will be heard in the headset. When this happens, open the battery cover by sliding down, and remove batteries from the Beltpack battery compartment. The removable Battery sled will hold two 1.5v alkaline batteries. When you use two alkaline batteries, insert two 1.5v alkaline batteries into the Battery sled, and put it in the battery compartment on the rear of the Beltpack. When replacing a battery, make sure the position of polarity (+, -) is correct.

Voice messages in the headset of the Beltpack

- | | |
|---------------------------|---------------------|
| ● 'Power on' | ● 'Unlatched' |
| ● 'Power off' | ● 'Change battery' |
| ● 'Hands free on' | ● 'group one' |
| ● 'hands free off' | ● 'group two' |
| ● 'Beep' | ● 'group three' |
| ● 'Maximum' | ● 'group four' |
| ● 'Minimum' | ● 'group five' |
| ● 'Audio channel is busy' | ● 'Out of coverage' |

Section 5: FAQs and Troubleshooting

Mobile Station

Regarding limited RF coverage

When there are audio breakups within the coverage

- Ensure that the antennas are properly connected and tightened on the Mobile Station.
- Confirm the antennas are positioned vertically and be folded completely as 90 degree.
- Check around the Mobile Station's line-of-sight and ensure that there are no physical obstructions around. While attaching the antennas directly to the rear panel of the mobile Station, the mobile Station should be away from any metal obstructions, walls, and electronic equipment that can create radio interference. If possible, the antenna should be located **as high as possible and away from obstructions and select location to the center of the coverage.**

Talk LED on the Mobile Station does not come on

- In case of low battery
If the battery level is low, Talk LED of the Mobile Station is changed to red. In case of low battery, it may cause a malfunction. Replace the battery immediately with a fully charged battery.
- Make sure that the power cords are properly plugged to the Mobile Station and standard wall outlet.
- Confirm that the POWER switch on the bottom panel of the mobile Station is turned on.

The battery running time of the Mobile Station is remarkably short

- While the Mobile Station is operated in AUX ON mode, the battery running hours will be lesser. It is recommended to use a designated power adapter to supply the power to the Mobile Station while the AUX mode is activated.

Connection does not work with a wired intercom system or microphone into the auxiliary input connector on the bottom of the Mobile Station

- Confirm if the mode selection switch of the auxiliary input on the bottom of the Mobile Station is correctly set for the respective connection

No audio data TX/RX between a Mobile Station and an external hardwired intercom system

- Make sure that the cables are firmly connected, and the AUX intercom is on.
- Confirm that the Mobile Station and AUX are in the same Communication Group.
- Make sure that the headset is firmly connected to the Beltpack or the Mobile Station.

Belpack

Belpack Talk LED does not turn on green and 'out of coverage' is heard in the headset.

- Confirm that the POWER switch is turned on and ensure that the battery is fully charged.
- Reboot the Belpack and Mobile Station again.
- Check out the coverage. You may be too far from the Mobile Station. The coverage can be varied depending on the site environments and basically the 'line-of-sight' should be secured between the Mobile Station and Belpack.

Communication is unable with single or multiple group channels

- Confirm Talk button and light of the Mobile Station and Belpack
- Check out if the correct communication group channel is selected
- In case a Belpack in the Master Belpack mode, communication is available in group #1 only

Communication or pairing is unable between the Mobile Station and Belpack

- Confirm with the power toggle switch of the Mobile Station if the power is on
- Make sure the two (2) antennas are properly and firmly connected to the Mobile Station
- Make sure the headset is firmly connected to the Belpack
- Check out if the pairing is made between the Mobile Station and Belpack

Audio breakups in the coverage

If the Belpack is near the Mobile Station however the RSSI level is low

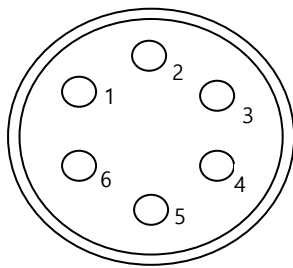
- In case of low battery
If the battery level is low, Talk LED of the Belpack is changed to red. In case of low battery, it may cause a malfunction. Replace the battery immediately with a fully charged battery or turn off the Belpack. In case of low battery, the TX and power is automatically off however continuous using or pressing Talk button of the Belpack and etc may cause bad affection to the wireless communications for a while.
- Ensure that the antennas are properly connected and tightened on the Mobile Station.

Section 6: Appendix

Factory default setting

Item	Mobile Station default	Beltpack default
Microphone gain	3	3
Speaker volume	8	8
Side tone volume	6	6
Communication group Selection	1	1
Talk(TX) button	Unlatched	Unlatched
Hands free mode	On	On
Auxiliary In/Out connection On/Off	Off	NA
Handoff Sensibility	Mid in BP Mode	Mid
Low cut	-6dB	-6dB
Mode Selection	MS	BP

6-PIN headset cable connector



1. Mic VCC +2V (For ECM microphone.)
2. Mic – (GND)
3. Mic + (For Dynamic microphone.)
4. Mic VCC +5V (For preamplifier mic. out)
5. Receiver -
6. Receiver +

Section 7: Specifications

Mobile Station MS150

RF Frequency:	UNII band: 5.16GHz~5.34GHz, 5.48GHz~5.70GHz, 5.745GHz~5.865GHz
Antenna Connector Type:	External $\frac{1}{2}$ -wave dipole, SMA connector
Transmitter	
Modulation Type:	QPSK
Frequency Stability:	± 2 ppm
Receiver	
RF Sensitivity:	-85dBm for 5 BER
Frequency Stability:	± 2 ppm
Beltpacks per Mobile station:	Inherently, 128 Beltpacks can be paired up, and four (4) Beltpacks operating in full-duplex (talk/listen) at the same time while five (5) full-duplex channel is provided including the Mobile Station.
Audio Communication Group:	Two (2)
Audio Frequency Response:	200 Hz to 7.2 kHz
Audio Dynamic Range	>70dB
S/N	>95dB @ 1Khz
Headset output:	400mW into 32 Ohm
Microphone Type:	Dynamic or Electret
Headset Connector:	6-pin mini-DIN male
Latency:	One-way system latency less than 23ms direct
Communication Security:	256 bits key AES level 3 Encryption
Auxiliary Input:	Phone Jack (6.3Φ), 600Ω balanced, level adjustable
Auxiliary output:	Phone Jack (6.3Φ), 600Ω balanced, level adjustable
Front Panel Display:	OLED 128 x 34 Resolutions
Front Panel Button:	Push buttons
Battery Requirement:	7.2V 2450mAh Rechargeable NiMH Battery or Six AA size 1.5V alkaline batteries
Battery life:	Twelve (12) hours in full duplex mode and Auxiliary Off mode Six (6) hours in full duplex and Auxiliary On mode
Power Input:	100-240VAC, 47-63Hz, 11.4-12.6VDC
Operating Temperature:	0°C to 50°C (32°F to 122°F)
Dimensions:	88.4 X 143 X 45.9 mm (WXHxD) (3.48 X 5.63 X 1.80 inch),
Weight:	1.344 lbs (610 g) with battery / 0.881 lbs (400 g) without battery

Beltpack BP150

RF Frequency:	UNII band: 5.16GHz~5.34GHz, 5.48GHz~5.70GHz, 5.745GHz~5.865GHz
Antenna Connector Type:	Internal
Transmitter	
Modulation Type:	QPSK
Frequency Stability:	± 2ppm
Receiver	
RF Sensitivity:	-85dBm for 5 BER
Frequency Stability:	± 2ppm
Master Beltpack Function:	Inherently, 128 Beltpacks can be paired up, and ten (4) Beltpacks operating in full-duplex (talk/listen) at the same time while five (5) full-duplex channel is provided including the Master Beltpack. Single communication group channel is assigned to the Master Beltpack.
Audio Communication Group:	Two (2)
Audio Frequency Response:	200 Hz to 7.2 kHz
Audio Dynamic Range	> 70dB
S/N	> 95dB @ 1Khz
Headset output:	110mW into 32 Ohm
Microphone Type:	Dynamic or Electret
Headset Connector:	6-pin mini-DIN male
Latency:	One-way system latency less than 23ms direct
Communication Security:	256 bits key AES level 3 Encryption
Display:	OLED 128 x 32 Resolutions
Button:	Push buttons
Battery Requirement:	2.4V 2450mAh Rechargeable NiMH Battery or Two AA size 1.5V alkaline
	batteries
Rechargeable Battery life:	Nine (9) hours in full duplex mode
Operating Temperature:	0°C to 50°C (32°F to 122°F)
Dimensions:	2.89W x 0.92L x 3.83H inch (7.35W x 2.35L x 9.73H cm) without Belt Clip
Weight:	0.445 lbs (202g) with battery / 0.29 lbs (133g) without battery

Battery charger BATCHG125

Power Input	The external PSU provides the 15VDC 8A and at its input takes 100-240VAC, 47-63Hz.
Operating Temperature	32 °F - 104°F (0°C – 40°C)
Number of Charging Ports	Seven port units for charging the LTWI-BAT150 and LTWI-BAT50 Rechargeable battery packs. Up to five Beltpacks and two BAT-50 batteries can be charged in one LTWI-BATCHG125 simultaneously. Up to two LTWI-BAT150 Rechargeable battery packs can be charged instead of the two Beltpacks.
Charging time	Full charge of the battery pack is obtained after 4 hours
Status Indicators	Power (green) 1ea Empty/Pending/Fail (amber) 1ea for each port Charge/Ready (red/green) 1ea for each port
Weight	2.853 lbs (1294g) without adapter and power cord (1955g with adapter and power cord)
Dimensions	9.33W x 8.26L x 3.93H inch (23.7W x 21.0L x 10.0H cm)

Battery charger BATCHG225

Power Input	The external PSU provides the 15VDC 8A and at its input takes 100-240VAC, 47-63Hz.
Operating Temperature	32 °F - 104°F (0°C – 40°C)
Number of Charging Ports	Eight ports for charging the LTWI-BAT50 Rechargeable battery packs and eight ports for storing.
Charging time	Full charge of the battery pack is obtained after 4 hours
Status Indicators	Power (green) 1ea Empty/Pending/Fail (amber) 1ea for each port Charge/Ready (red/green) 1ea for each port
Weight	2.363 lbs (1072.5g) without adapter and power cord (1910.5g with adapter and power cord)
Dimensions	8.78W x 7.08L x 2.28H inch (22.3W x 18.0L x 5.85H cm)

Rechargeable battery pack

BAT-150 Battery Pack	
Battery type	7.2V 2450mAH NiMH rechargeable battery pack
Charging cycles	~500 cycles
Storage Temperature	-4 °F - 104°F (-20°C – 40°C)
Weight	0.454 lbs (206g)
BAT-50 Battery Pack	
Battery type	2.4V 2450mAH NiMH rechargeable battery pack
Charging cycles	~500 cycles
Storage Temperature	-4 °F - 104°F (-20°C – 40°C)
Weight	0.161 lbs (73g)
BAT-50R Battery Pack	
Battery type	2.4V 2000mAH NiMH rechargeable battery pack
Charging cycles	~2000 cycles
Storage Temperature	-4 °F - 104°F (-20°C – 40°C)
Weight	0.161 lbs (73g)

Headsets

Model		LSH-S125D	LMH-125D	LNH-20D	LMH-10	PTE-850
Type		Double Headphone	Single Headphone	Neckband, Boom Mic Single Earphone	Lightweight Single Headphone	Single Earphone
Micro phone	Type	Dynamic Unidirectional, Noise Cancelling	Dynamic Unidirectional, Noise Cancelling	Dynamic Unidirectional, Noise Cancelling	Dynamic Unidirectional, Noise Cancelling	Electret
	Boom	300-degrees rotation Mute on/off	300-degrees rotation Mute on/off	Adjustable	270-degrees rotation	PTT Mic
	Impedance	560 Ohms±20%	560 Ohms±20%	200 Ohms±20%	200 Ohms±20%	2.2K Ohms
	Sensitivity	-62dB±3dB	-62dB±3dB	-66dB±4dB	-68dB±4dB	-50dB±4dB
	Frequency Response	400Hz~7KHz	400Hz~7KHz	200Hz~12KHz	100Hz~10KHz	20Hz~20KHz
Head Phone	Impedance	16 Ohms	32 Ohms	80 Ohms	32 Ohms	32 Ohms
	Max Input	500mW	500mW	300mW	300mW	50mW
	Output SPL	93dB±3.0dB at 1KHz	93dB±3.0dB at 1KHz	112dB±5.0dB at 1KHz	118dB±4.0dB at 1KHz	106dB±4.0dB at 1KHz
	Frequency Response	200Hz~10KHz	200Hz~10KHz	100Hz~3.5KHz	300Hz~4KHz	300~5KHz
Connector		6-pin mini-DIN	6-pin mini-DIN	6-pin mini-DIN	6-pin mini-DIN	6-pin mini-DIN
Cable		1200mm	1200mm	1350mm	1350mm	
Weight				120g	105g	

THANK YOU!

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