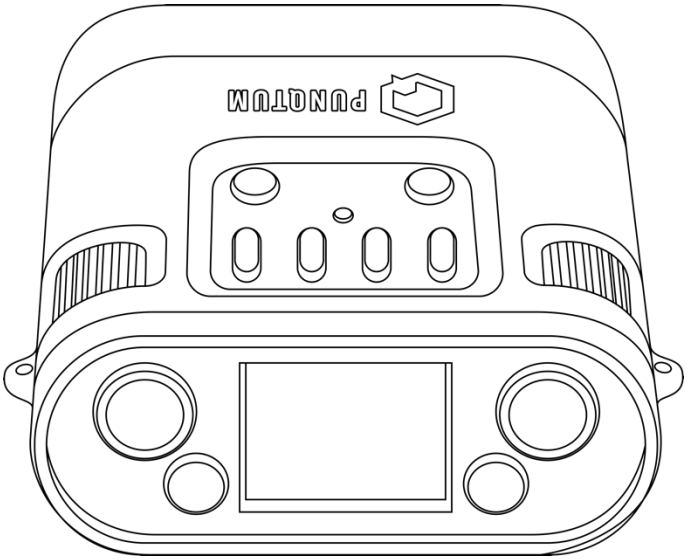
PUNQTUM

BY RIEDEL

USER MANUAL

Q110 – Beltpack

Q-Series Network Based Partyline System



This manual is applicable for the Firmware Version: 2.3

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1 Preface

Welcome to the PunQtum digital partyline family!
This document provides detailed information about the PunQtum Q-Series digital partyline system, pin outs, mechanical and electrical data.

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1.1 Information

Symbols

The following tables are used to indicate hazards and provide cautionary information in relation to the handling and use of the equipment.

	This text indicates a situation that needs your close attention. It may also be used to alert against unsafe practices.

	This text is for general information. It indicates the activity for ease of work or for better understanding.

Service

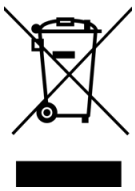
- All service must be provided ONLY by qualified service personnel.
- There are no user-serviceable parts inside the devices.
- Do not plug in, turn on or attempt to operate an obviously damaged device.
- Never attempt to modify the equipment components for any reason.

	All adjustments have been done at the factory before the shipment of the devices. No maintenance is required and no user-serviceable parts are inside the unit.

Environment

- Never expose the device to high concentrations of dust or humidity.
- Never expose the device to any liquids.
- If the device has been exposed to a cold environment and transferred to a warm environment, condensation may form inside the housing. Wait at least 2 hours before applying any power to the device.

Disposal

	This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an authorized collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product please contact the local authority responsible.

2 About PunQtum Q-Series Digital Partyline System

PunQtum Q-Series digital partyline system is a digital, easy to use, full-duplex communications solution for theater and broadcast applications as well as for all kinds of cultural events like concerts, etc.
It is an all-new, network-based partyline system which combines all standard partyline system features including wireless access and more with the advantages of modern IP networks.
PunQtum Q-Series works on standard network infrastructure and is easy to install and set up.
The system works “out of the box” with a factory default configuration but can be quickly configured by user-friendly software to meet individual needs.
The system is completely decentralized. There is no master station or any other central point of intelligence in the whole system. All processing is handled locally in each device except for the PunQtum wireless Apps which require a PunQtum Q210 PW Speaker Station to serve as a bridge to the Q-Series digital partyline system. The capacity of one partyline system is set to a maximum of 32 channels, 4 program inputs, up to 4 public announce outputs and 32 control outputs. Each PunQtum Q210 PW Speaker Station serves up to 4 PunQtum Wireless App connections.

PunQtum Q-Series digital partyline systems are based on Roles and I/O settings to ease the use and administration of partyline systems.
A Role is a template for the channel configuration of a device. This allows channel settings and alternate functions to be predefined for different Roles needed to run a live show. As an example, think of the stage manager, sound, light, wardrobe and security personnel having different communication channels available to deliver a perfect job.
An I/O setting is a template for the settings of the equipment connected to a device. This, for example, allows I/O settings to be available for different Headsets being used at a venue to cover for different environmental situations.
Each device can be configured to any Role and I/O setting available.

Multiple PunQtum partyline systems can share the same network infrastructure. This allows for the creation of production islands within a campus using the same IT network infrastructure. The number of devices (Beltpacks/Speaker Stations and Wireless Apps) is theoretically infinite but limited by the network capacity. Beltpacks are powered by PoE, either from a PoE switch or from a Speaker Station. They can be daisy-chained to reduce wiring efforts on site.

Beltpacks and Wireless Apps support simultaneous use of 2 channels with separate TALK and CALL buttons. An alternate page button allows the user to quickly reach alternate functions such as public announce, Talk To All, Talk To Many, control general purpose outputs and access system functions like Mic Kill asf. The Beltpack is designed with a combination of premium materials, including high-impact plastics and rubber to make it both tough and comfortable to use in any situation.

PunQtum Q-Series Beltpacks, Wireless Apps and Speaker Stations allow users to replay missed or not understood messages. Program input signals can be fed into the system using an analog audio input at any Speaker Station.

Sunlight readable, dimmable RGB color displays used for Beltpacks and Speaker Stations make for excellent readability of the intuitive user interface.

3 Operating Elements

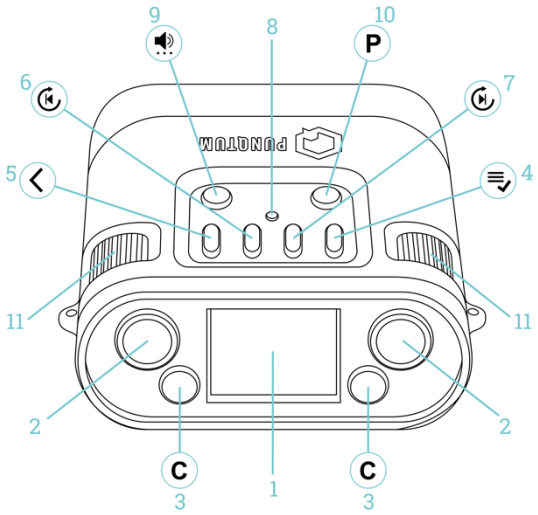


Figure 1

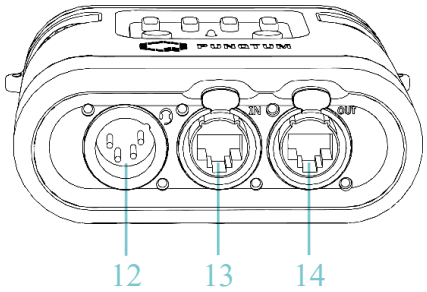


Figure 2

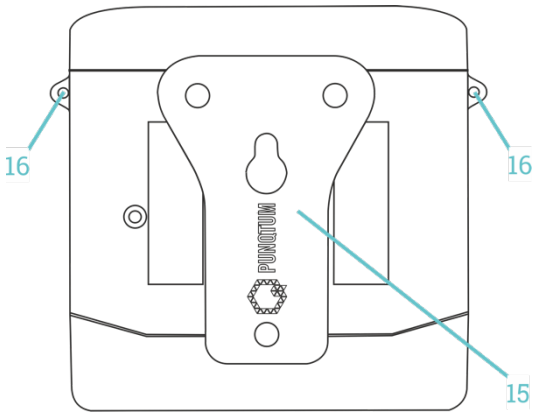


Figure 3

1	Color TFT display
2	TALK buttons
3	CALL buttons
4	MENU / OK button
5	BACK button
6	REPLAY / SKIP BACK button
7	REPLAY / SKIP FORWARD button
8	Finger position marker
9	VOLUME button
10	Alternate page button
11	Rotary Encoders
12	Headset connector
13	Network & PoE input
14	Network & PoE output (pass through)
15	Beltclip
16	Lanyard or safety cord mounting holes

4 Getting Started

The Q110 Beltpack is delivered with a factory default system configuration and will work "out of the box". The Beltpack supports monaural headsets with a dynamic or electret microphone.

4.1 Powering Up

The Beltpack is powered by any PoE-compliant (IEEE 802.3af, 3at or 3bt) power supply. Regular PoE switches or PoE injectors can be used as well as a PunQtum Q210P Speakerstation or another Q110 Beltpack.

4.1.1 Star Topology

Star topologies using Ethernet switches are preferred to daisy-chained networks.

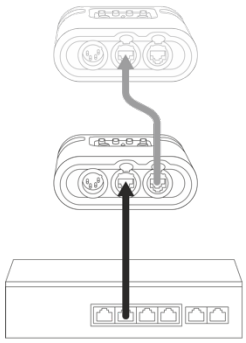
4.1.2 Daisy Chain

Although PunQtum Beltpacks can be intelligent and reliably daisy-chained, please note that the number of daisy-chained Q110 units is limited by the available PoE power budget, Ethernet cable length and quality.

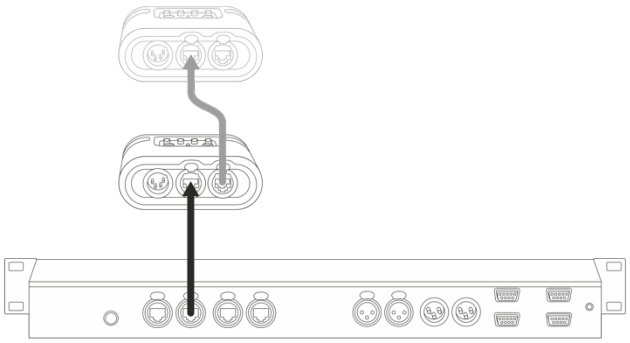
The number of Q110 daisy-chained are set to a maximum of:

- PoE port comply with PoE+ standard (802.3 at): **4 Beltpacks**
  (100m cable length between each device, cable AWG26)
- PoE port comply with standard (802.3 bt): **8 Beltpacks**
  (100m cable length between each device, cable AWG22)

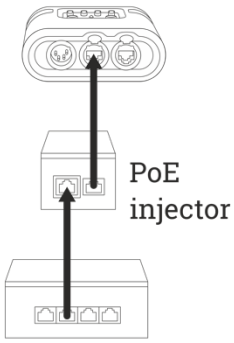
One or more Q110 powered by a PoE switch:



One or more Q110 powered by a PunQtum Q210P Speakerstation:



One or more Q110 powered by a PoE injector:



Connect your headset, press TALK and enjoy.

4.2 Multicast Audio Streams

If you do not have any other audio streams present in your network infrastructure, you will most probably be fine.

If you are using PunQtum Q-Series digital partyline systems in networks together with other audio network streaming technologies such as Ravenna, DANTE™ or other multicast-based streaming technologies, you need to make sure that your network infrastructure is capable of supporting IGMP (Internet Group Management Protocol) and that IGMP is correctly set up and configured:

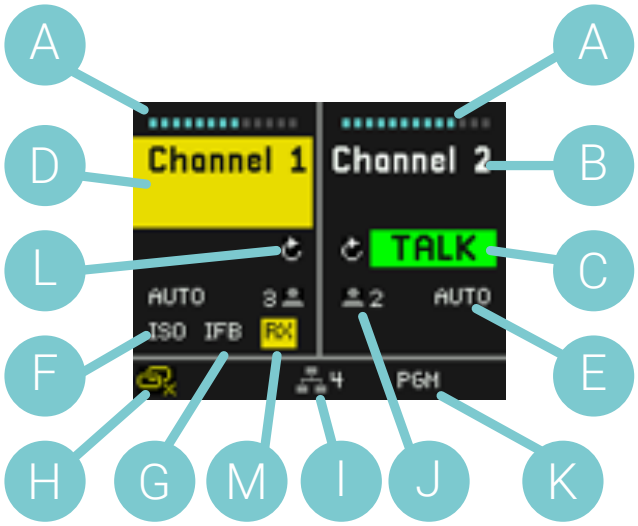
	If you use a single switch only, it is irrelevant if the switch has IGMP snooping (aka multicast filtering) enabled or not. As soon as you have two switches, and one or more switches happen to have IGMP snooping enabled, it is necessary to configure one and only one IGMP querier in the network (usually, you select one switch). Without an IGMP querier, the multicast traffic will stop after a while due to IGMP timeouts. PunQtum Q-Series digital partyline system supports IGMP V2.

5 Using your Beltpack

Once you have connected your Beltpack to the system, the Beltpack will use the defined Role from its memory. A Beltpack that is “new out of the box” will have a factory default Role. This way all Beltpacks will be able to find each other without the need of the Q-tool configuration software.

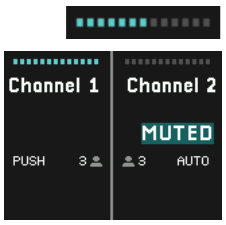
5.1 Main Display

In normal operation the display will provide you with information on Channel A, Channel B and on the Network.



A	Channel Volume
B	Channel Name
C	TALK active indication
D	CALL active indication
E	TALK button operation mode
F	ISO active indication
G	IFB active indication
H	Daisy chain link indication
I	Partyline system device count
J	Channel user count
K	PGM indication
L	Replay available indication
M	Audio receive indication

5.1.1 Channel Volume (A)



Channel volume control can be set by the rotary encoder knobs (11 on Figure 2) on the side of the Beltpack. Moving the rotary knob clockwise will increase the volume, counter-clockwise operation will decrease the volume. Setting a channel volume to zero will mark the channel as muted:

5.1.2 Channel Name (B)



The Channel Name shown is the Name as defined in the configuration of Q-Tool.

5.1.3 TALK active indication (C)

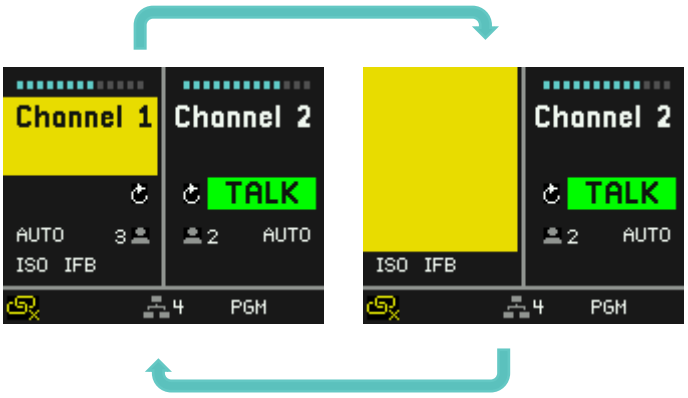


An active TALK function is indicated in the display per Channel. Use the TALK Buttons (item 2 on Figure 2) to switch on and off the TALK status of each Channel.

5.1.4 CALL active indication (D)



If a CALL signal is received on a Channel, the display will show a yellow flashing square on the Name of the Channel. A CALL buzzer signal will be heard at the same time.
If the CALL signal remains active for more than two seconds the display will flash with a larger section of the Channel. At the same time, a different buzzer signal will be heard.
The volume of the buzzer signal can be changed individually on each device, see 0



5.1.5 TALK Button operation modes (E)



The TALK button offers three operation modes.

1. AUTO, a double function:
   - Push the TALK button momentarily, the TALK function is now latched On.
   - Push the TALK button momentarily, the TALK function is now Off.
   - Push and hold the TALK button, the TALK function is active as long as the TALK button is held, when the TALK button is released the TALK function is switched Off.

2. LATCH:
   - Push the TALK button momentarily, the TALK function is now latched On.
   - Push the TALK button momentarily, the TALK function is now Off.

3. PUSH:
   - Push and hold the TALK button, the TALK function is active as long as the TALK button is held, when the TALK button is released the TALK function is switched Off.

TALK button operation mode can be set using the configuration software.



If the operation mode is displayed in orange, quiet environment mode is active for the respective channel.

5.1.6 ISO active indication (F)



The symbol ISO indicates an active Isolate function. When you activate the TALK button of that Channel you will only hear the users of that Channel, audio from other Channels you receive is muted.

5.1.7 IFB active indication (G)



The symbol IFB indicates an active Interrupt Fold Back. The program input signal level is dimmed by the amount specified in a Role if someone is speaking on the channel.

5.1.8 Daisy Chain Link indication (H)



This symbol indicates that you cannot power another Beltpack from your device.
Your Beltpack calculates the available power as a result of the power provided from your PoE device and the number of units already connected.

5.1.9 Partyline system device count (I)



Shows the number of units participating in your partyline system. If the symbol is shown in red, your device is the only one in the system.

5.1.10 Channel User Count (J)



Shows the number of users available on this channel. If the symbol is shown in red, you are the only user of this channel.

5.1.11 PGM indication (K)



The PGM symbol indicates a selected program input. If the symbol is shown in white the program input is received, if red, the program input is not received. Program inputs are only available if configured on a PunQtum Q210P Speakerstation as part of the partyline system.

5.1.12 Replay available indication (L)



The recorded messages can be replayed by pushing the Replay buttons on the top of the Beltpack.





By pushing either of the Replay buttons on top of the Beltpack, the last recorded message will be played back immediately.
Use the Replay buttons on top of the Beltpack to scroll through the list. You can see how long ago each message was recorded, how long each recorded message is and the dot shows which Channel each was recorded from. While playing back you may use the Channel Volume Encoders to adjust the volume of the playback.
A long press on the back button will delete all recorded messages.
Replay indication will be shown if there is a recording present on that Channel.
If message recording is disabled in Q-Tool, the replay available indication is crossed out.



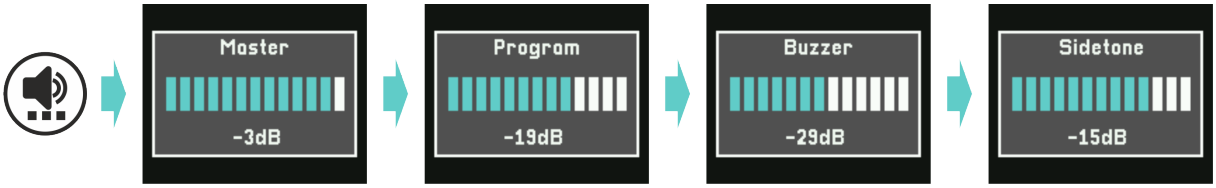
5.1.13 Audio receive indication (M)



The yellow RX indication is shown if audio is being received on the channel.

5.2 Volume Button

Pressing the Volume Button will cycle you through all available volume settings.



You may adjust each volume setting using any rotary encoder. Your settings are stored in your Beltpack.

Master volume sets the overall volume for your Beltpack.
Program volume controls the volume of your program input.
Buzzer volume controls the volume of the CALL signals.
Sidetone volume controls the volume of your own voice.

If your Beltpack is in normal operation mode, the rotary encoders will control the listening volume of the active channels.

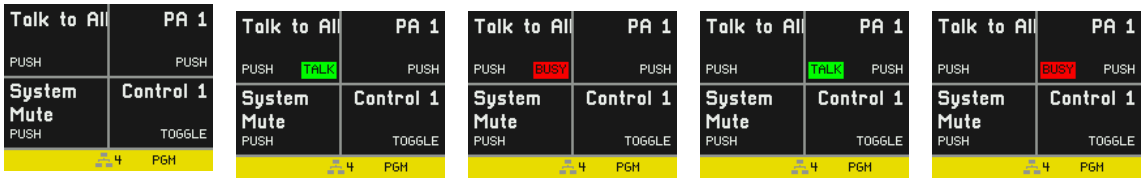
5.3 Alternate Page Button

Pressing the Alternate Page Button (P) will temporarily give access to functions like public announce, Talk To All and Talk To Many, control outputs switching, System Mute, System Silent and Mic Kill. You can assign a maximum of 4 functions to this page using Q-tool configuration software.

A second press on the Alternate Page button or a press on the Back button will leave the alternate page.

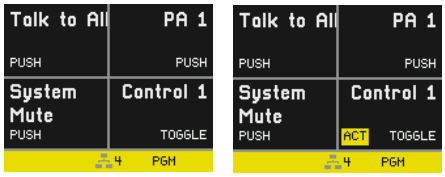
If no functions are assigned to the alternate page, the Alternate Page button is inactive.

5.3.1 Public Announce, Talk to All & Talk to Many functions (P)



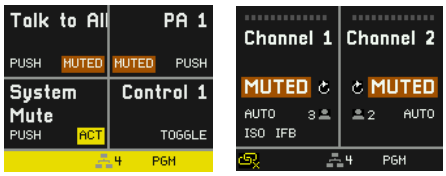
The assigned function can be activated by pressing the TALK or the CALL button near the quadrant.
The display will show a green TALK indication or a red BUSY indication if someone else is already using this function. Once the other user disables his TALK function, your TALK will show green and you can talk. For TALK button modes see 4.4.5.

5.3.2 Control Outputs switching



Control outputs are part of the Q210P Speakerstation product, but can be controlled from any device in the system. If the output is active you will see a yellow ACT indicator.

5.3.3 System Mute function



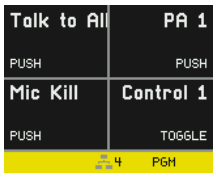
SYSTEM MUTE disables all CALL and TALK functions and mutes all program input signals and stays active as long as the Button is pressed (PUSH behavior). If System Mute is active you will be notified by an orange MUTED indicator.

5.3.4 System Silent function



System silent stops the speaker of the Q210P Speakerstation and any other (future) devices from making sound. Public announcements remain functional, optical signaling when using a CALL function remains functional as well. The function is activated through a button push. Pressing the button again deactivates the function (TOGGLE behavior). If system silent is active. you will be notified by an orange SILENT indicator.

5.3.5 Mic Kill function



Clicking the Mic Kill button on a device will reset all active TALK functions of the channels the device role is assigned to except for the TALK functions active on the device where Mic Kill is issued. A long press on the Mic Kill button will reset all active TALK functions of all channels available in the system configuration except for the TALK functions active on the device where Mic Kill is issued. The purpose of this function is to be able to 'silence' overly busy channels to be able to transmit important / urgent messages.

Please note that the mic kill function is not applied to interface connections, because they are typically used to interconnect different communication systems. Mic kill functions can be propagated to and received from other systems using the GPIO ports on a PunQtum Speaker Station.

6 Menu operation

The Role and I/O setting define most of the settings for the user. Some of the items can be changed by the user via the Menu. If items are locked in Q-Tool then they will not show.

Use this button to enter the menu, navigate thru the menu and to select an item.

A long press on the menu button briefly shows the device model, device name and installed FW version.

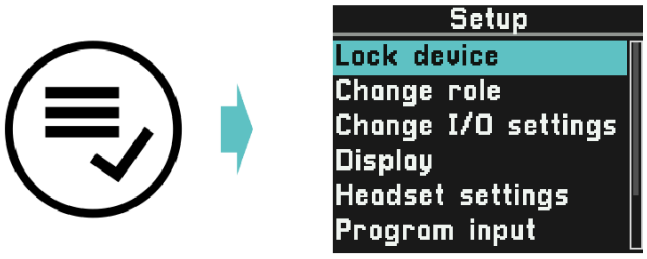


Use this button to do a step back in the menu and to exit the menu.

Menu Structure Q110

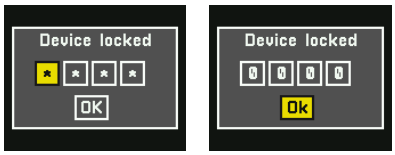
- Lock device → Yes, No
- Change role → Choose from list
- Change I/O settings → Choose from list
- Display
  - Brightness → Low, Medium, High
  - Dark screen saver → On, Off
  - Screen flip → On, Off
- Headset settings
  - Microphone gain → 0 to 67 dB
  - Microphone type → Dynamic or Electret
  - Microphone limiter → On, Off
  - Band pass filter → On, Off
  - VOX threshold → Off to -12 dB
  - VOX release time → 500 to 5000 ms
- Program input → Choose from list
- Device
  - Reset local changes → Yes, No
  - Save pers. settings
  - Load pers. settings
  - Factory reset → Yes, No
- About → Scroll through list

6.1 Lock Device

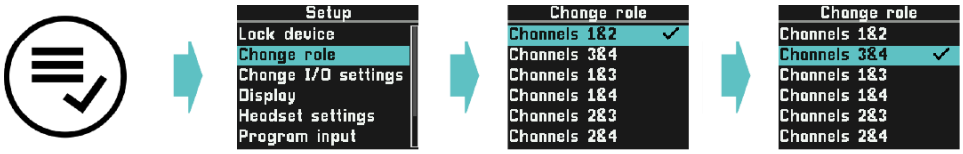


Role settings for your device may include an option to lock the front panel using a 4 digit pin. The pin is defined per Role in Q-Tool configuration software.
The lock device menu entry is only shown if the selected Role has an active lock front panel option.
Note that the factory default configuration does not include front panel locking.

To lock your device, select ‘Lock device’ on your device.
To unlock your device, enter the 4-digit pin in the lock screen an confirm the unlock.

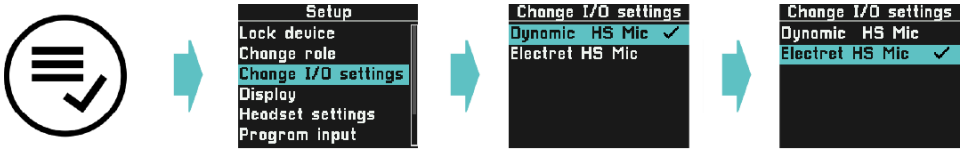


6.2 Change Role



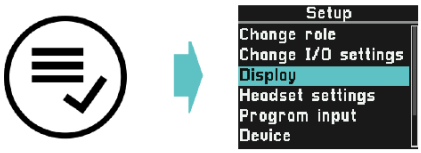
You may change your active Role. Roles can be defined with the help of Q-Tool configuration software.

6.3 Change I/O settings

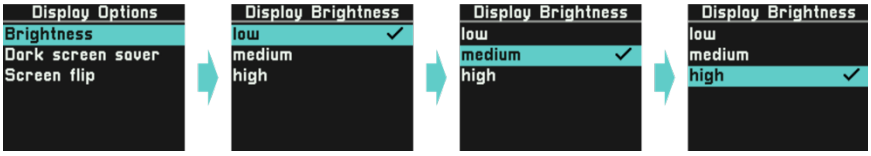


Select from different Headset settings presets. Q-Tool configuration software allows to define more I/O settings to match the specifics of the Headset of your choice.

6.4 Display

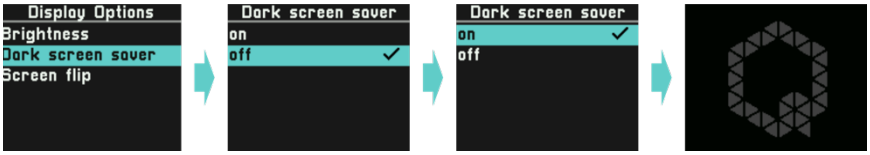


6.4.1 Brightness



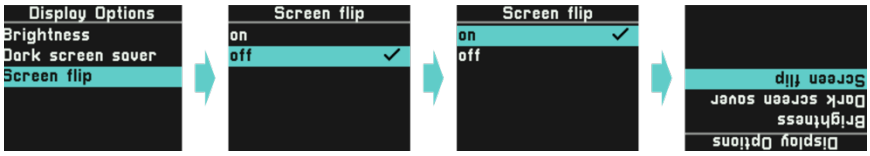
Brightness lets you control the backlight of the Display.

6.4.2 Dark Screen Saver



If the Dark Screen Saver is enabled, it will be activated automatically and deactivated by any button press or encoder turn. It will show a very low brightness Q logo when active.

6.4.3 Screen Flip



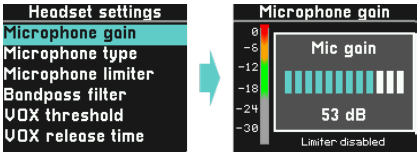
The Screen Flip will turn your display upside down and flip the TALK and CALL control buttons to match. Use this setting when mounting your Beltpack in an upside down situation.

6.5 Headset settings



Headset settings enable access to the settings predefined in the I/O settings. This gives you the option to fine-tune settings according to your specific situation. Your settings will be stored on the device and are applied again when you power up your device.

6.5.1 Microphone Gain



The gain of your microphone can be adjusted from 0 dB to 67 dB. Speak into your microphone at the volume you typically use when working and adjust the level to be in the upper green range.
Please note that the limiter function is temporarily set to off when setting the gain level.

6.5.2 Microphone Type



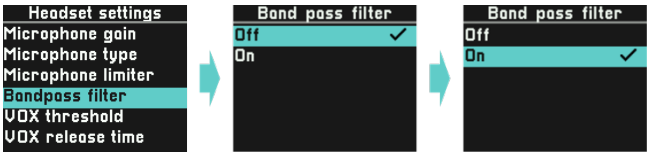
Electret microphones require a bias voltage for correct operation. If you set the microphone type to electret, a bias voltage will be applied to the microphone input. Dynamic microphones work without bias voltage.

6.5.3 Microphone Limiter



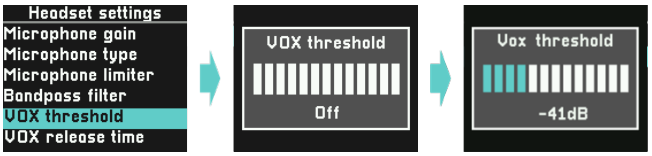
The limiter function is used to avoid distorted signals if someone gets excited and starts to speak more loudly. We recommend to set the limiter to on.

6.5.4 Band Pass Filter



A Band Pass filter removes lower and higher frequencies from your microphone signal to improve speech intelligibility. Set to on if desired.

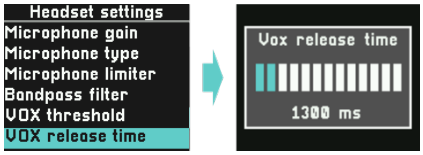
6.5.5 Vox Threshold



The Vox function acts as a signal gate and is used to reduce background noise in the system. The Vox threshold level determines at which level an audio signal is passed on to the system. Setting the Vox threshold to off completely removes the gate function from the signal path.

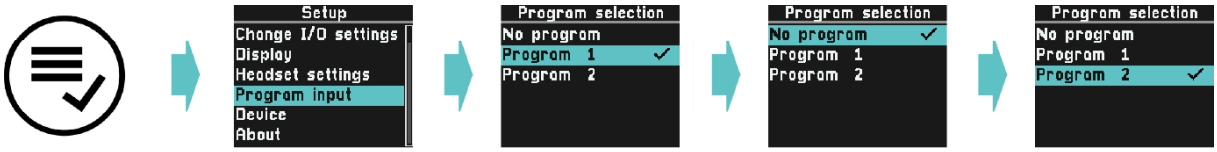
Make sure the level of your speech is higher than the VOX threshold level. Useable range is -64dB to -12dB

6.5.6 Vox Release



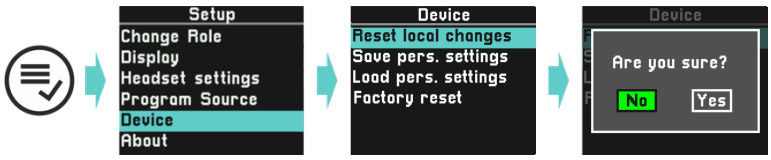
Vox release time determines how long your speech signal will be passed on to the system once the signal level goes below the VOX threshold level. This is used to avoid chopping your speech. VOX release time can be set from 500 milliseconds to 5 seconds in steps of 100 milliseconds.

6.6 Program Input



The Program Inputs defined for your partyline system are listed here. You may select the Program Input that best suits your Role. Selecting “No program” will switch off the Program input on your unit.
The program volume can be controlled using the volume button. See 0

6.7 Device



All current settings of your device are stored locally and applied again when powering up the device. Locally changed settings are not overwritten by system updates if:

- The system name is unchanged
- The system contains the currently active role name
- The system contains the currently active I/O settings name

6.7.1 Reset Local Changes

With this choice you will revert all settings to the values as set in the active Role and I/O setting. Volumes will be set to the default values and the screen flip will be set to off. This command can also be sent from Q-Tool.

6.7.2 Save personal settings

This will save your personal settings to a storage space on your unit that is NOT overwritten by a firmware or a system update. Previously saved settings will be overwritten.
Personal settings include:

Microphone settings:
- Microphone gain
- Microphone type
- Bandpass Filter
- VOX threshold
- VOX release time

Display settings:
- Brightness
- Screensaver
- Screen flipped

Volume settings:
- Master output
- Partyline fader left
- Partyline fader right
- Sidetone fader
- Program fader
- Buzzer fader

6.7.3 Load personal settings

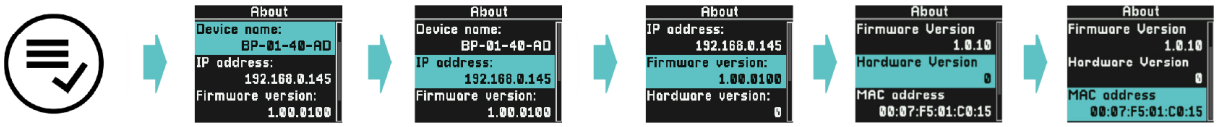
This will restore your previously saved personal settings and apply them instantly.

6.7.4 Factory reset

The unit will be reset to factory default settings.

Please note that your device will lose connection to your active partyline system unless it is the factory default system. Use Q-Tool to add a device to a system other than the factory default system.

6.8 About



Get access to read only information about your device. Scroll to access all available information.

6.8.1 Device Name

The default name of your device is derived from the unique MAC address of your device. Use Q-Tool to name the device differently. The given name will not be changed when applying a FW update. Resetting the device to factory default condition will also reset the device name.

6.8.2 IP Address

This is the currently used IP address of the device.

6.8.3 Firmware Version

This is the current firmware version. Use Q-Tool to retrieve and apply FW updates.

6.8.4 Hardware Version

This is the hardware version of your unit. This value cannot be changed.

6.8.5 MAC address

This is the MAC address of your device. This value cannot be changed.

7 Lock modes

Different lock modes are offered to cover specific use cases. Lock modes are selectable per role.

7.1 Device lock

A locked device remains silent and cannot be operated before it is unlocked. Lock your device if you must leave it in a public place.

- Lock function is engaged on boot
- To unlock, press the menu button and enter the PIN defined in the role to unlock

7.2 Handsfree talk

Handsfree talk enables communication in situations where manual operation of the device is not possible:

- Lock function is engaged on boot.
- Lock function enables the talk channel(s) permanently
- Alt page functions are not available
- Message playback is not available
- Mic kill signals are ignored in handsfree mode
- All button and rotary functions are disabled except for the unlock procedure based on the lock code defined for the mode
- Handsfree mode and the locked state is indicated in the device display:

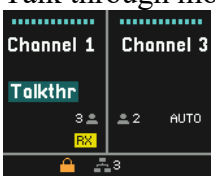


- A device in handsfree mode can talk to a maximum of 2 channels
- If quiet environment mode is active, maximum use of 5 Beltpacks on the same channel is possible. There is no limitation if quiet environment mode is disabled
- An unlocked device allows for setting all levels and functionality defined in the role
- To unlock, press the menu button and enter the PIN defined in the role to unlock

7.3 Talk Through

Talk through operation uses the first channel for talkthrough communication. All other channels are not affected and can be used as configured.

- Lock function is engaged on boot
- Talk through channel behavior:
  - Channel and master volume buttons are locked
  - Talk function is available if configured (push or off)
  - Call button is disabled
- Input selection is locked to gooseneck
- Sidetone volume is set to zero
- Talk through mode and the locked state is indicated in the device display:



- Remaining channels are fully functional in locked mode
- Alt functions are available
- An unlocked device allows for setting all levels and functionality defined in the role
- To unlock, press the menu button and enter the PIN defined in the role to unlock

8 Q-Tool

Get your free copy of Q-Tool, the Q-series digital partyline configuration software to enjoy the full features of your PunQtum partyline. You may download it from the PunQtum website https://punqtum.com/q-tool/



Please read the Q-Tool manual for more information on the configuration with Q-Tool.

9 Connector Pinout

9.1 Headset Connector

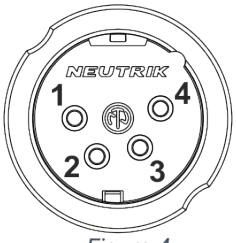


Figure 4

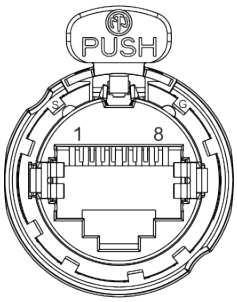
Pin	Description
1	Microphone -
2	Microphone + / +5V bias voltage for electret mic
3	Earphones -
4	Earphones +

The headset connector is a 4-pole male XLR connector and supports mono headsets with electret or dynamic microphones, depending on menu settings.

The microphone bias power (+5.8V) will be switched on/off according to the mic type setting. This can be changed directly in the Beltpack menu 6.5.2
Earphones output can be limited not to exceed a defined volume level. This is configured in the role settings using Q-Tool configuration software.

9.2 Network Connectors

PoE input & PoE output (pass through)



Pin	Description
1	TxRX A +
2	TxRX A -
3	TxRX B +
4	Input DC +
5	Input DC +
6	TxRX B -
7	Input DC -
8	Input DC -

10 Technical specifications

Technical specifications are available in the Q110 Beltpack data sheet available from our website.