SharkRF M1KE User Manual

version v69

SharkRF

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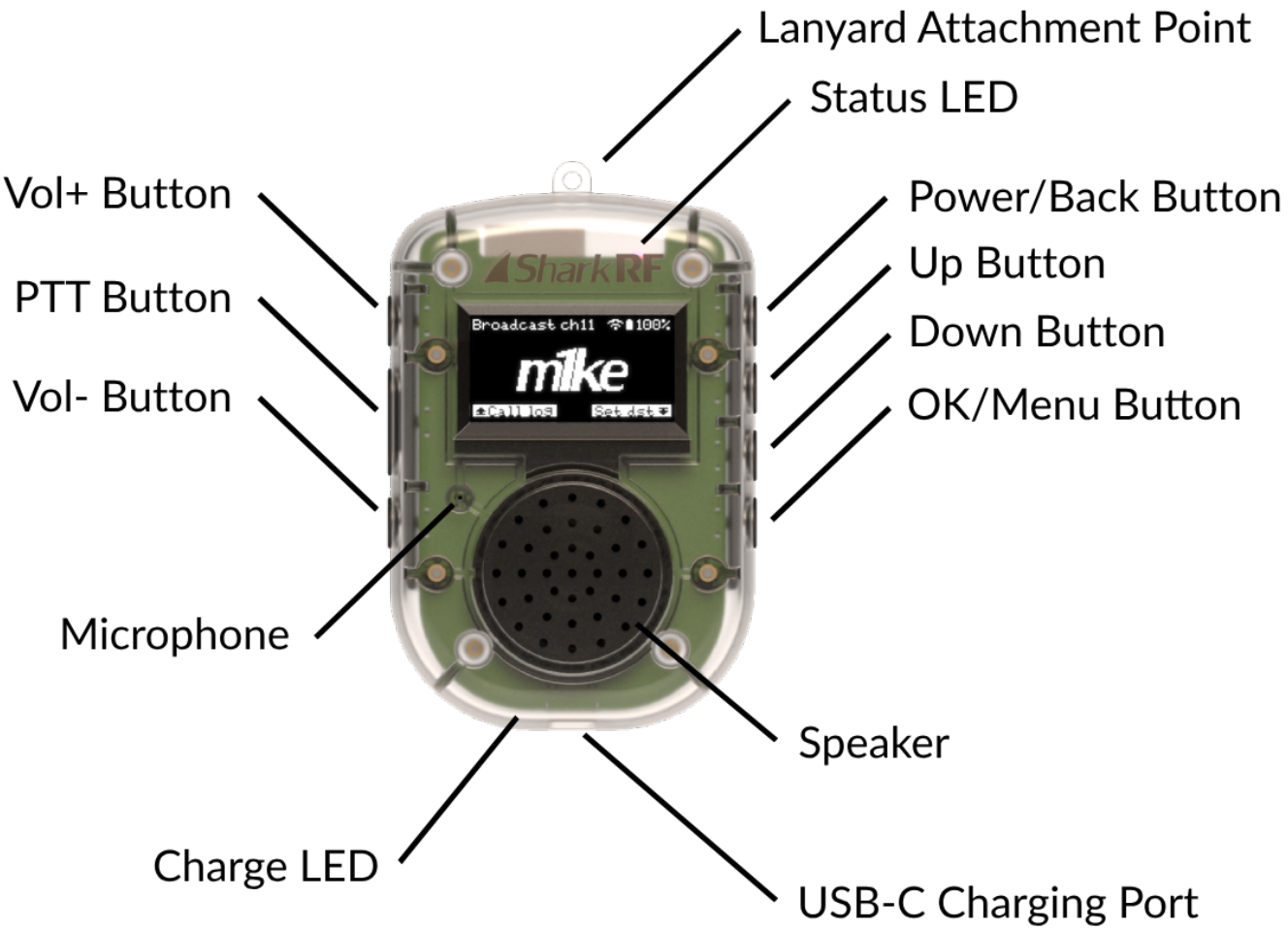
SharkRF M1KE User Manual



This user manual is for the **stable** firmware version **v69**. It's updated with new information when a new stable firmware is released.

PDF version

You can download the PDF version of the user manual **`here`**.

Warning

We do not recommend using the PDF version, as the online user manual gets updated when a new stable firmware is released.

Support information

The M1KE is designed to be very simple to use, but if you have questions, feel free to ask them in email. You can also seek help in our community forum.

Note

We don't have official support on other platforms like Facebook.

Trademarks

Company names and products in this manual are trademarks or registered trademarks of the respective company.

- D-STAR® is a registered trademark of Icom Inc.
- NXDN® is a registered trademark of JVC Kenwood Corp. and Icom Inc.
- APRS® is a registered trademark Tucson Amateur Packet Radio Corporation
- MMDVM® is a registered trademark of Shenzhen HKCNMA Co., Ltd.
- iPhone® is a registered trademark of Apple, Inc.
- Android® is a registered trademark of Google LLC.
- Wi-Fi® is a registered trademark of Wi-Fi Alliance.
- AllStarLink® is a registered trademark of AllStarLink, Inc.

Cautions

- AVOID using or placing the transceiver in direct sunlight or in areas with temperatures below –10°C (+14°F) or above +45°C (+113°F).
- DO NOT press the display.
- DO NOT press the buttons with excessive force.
- DO NOT blow compressed air into the device.
- DO NOT use a vacuum cleaner to clean the device.
- DO NOT use harsh chemicals, cleaning solvents, or strong detergents to clean the device.
- The transceiver will perform best if the microphone is 2 to 5 cm (1 to 2 inches away from the lips and the transceiver is vertical.
- Hearing experts advise against continuous high volume operation. If you experience a ringing in your ears, reduce the volume level or discontinue use.

First steps

Charging the battery

Connect the M1KE to a USB power supply to start charging the battery. The M1KE is fully functional while it is charging. The Charge LED next to the USB connector at the bottom of the device is only lit while the device is charging.

Warning

Make sure you use a USB charger which can supply enough current while the M1KE is turned on (min. 1500mA), otherwise the battery may not charge or deplete while the device is turned on.

Powering up

Press and hold the Power/Back Button for **1-2 seconds**.

Important

If you’re powering up a **brand new M1KE** which has **never been turned on before**, then connect it to a USB power supply first; otherwise **it will not turn on**.

Note

The status LED may blink green for a few seconds when turning on the M1KE for the first time.

Welcome screen

After the device has been powered up, the M1KE displays the boot logo and then the initialization setup welcome screen:

Press the OK/Menu Button to click on **Next >** and proceed to the next screen.

Note

You can talk to nearby M1KE devices which are on channel #1 (or other devices which support the Broadcast protocol) right now without further setup by pressing and holding the PTT (Push-To-Talk) Button.

Note

The display may get dim and be turned off when no button is pressed for a while. Press any button to wake it up.

If running on battery power, the device will power down after 3 minutes of inactivity (no button pressed) during the first initialization setup process.

Country screen

If you are located in the United States:

Press the Down Button and then press the OK/Menu Button to click on **Next >** and proceed to the next screen.

If you are not in the United States:

Press the OK/Menu Button to bring up the list of countries:

Use the Up Button and the Down Button to move the cursor and navigate the list. You can turn pages by moving the cursor to the arrows at the top right of the screen and pressing the OK/Menu Button.

Move the cursor to the country you are located in and press the OK/Menu Button. This will bring back the country screen and then you can proceed to the next screen by moving the cursor to the **Next >** button and pressing the OK/Menu Button.

Note

You can go back to the previous screen without selecting a country by pressing the Back Button.

Important

You can change the country of operation later on the Owner information screen under Main Menu / Settings on the device display or at the Network settings on the Network page of the web interface.

Select Wi-Fi® network screen

Note

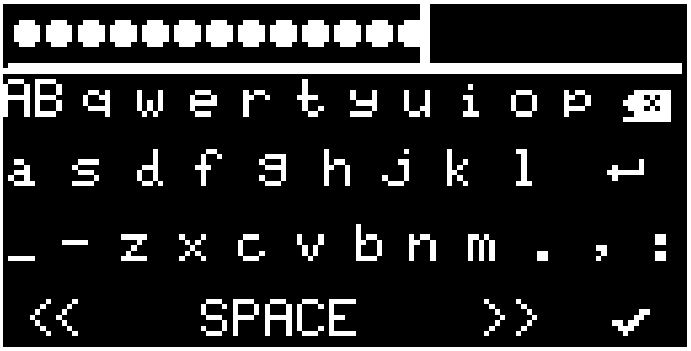
You can skip connecting to a Wi-Fi® network if you want to use the M1KE to talk directly to other M1KE devices on the same channel. See this page for more information about connecting to a Wi-Fi® network later.

Note

You can also use the M1KE's AP mode with a phone/tablet/computer to set up a Wi-Fi connection, see this page for more information.

Press the OK/Menu Button to bring up the list of detected Wi-Fi® networks:

Use the Up Button and the Down Button to move the cursor and navigate the list. Select your Wi-Fi® network by moving the cursor to it and pressing the OK/Menu Button. This will bring up the keyboard for the Wi-Fi® password entry:



Keyboard screen

Use the Up Button and the Down Button to move the cursor and navigate the keyboard. Press the OK/Menu Button to select a character. Finish entering the text by pressing the OK/Menu Button on the key.

Special keys:

- **1#** or **AB** or **ab** switches to alternate keyboards which lets you input more characters
- is the backspace key
- is the enter key which lets you input multi-line text where applicable
- **<<** and **>>** moves the cursor to the left and right
- finishes the entry and closes the keyboard

Note

You can go back to the previous screen without entering text by pressing the Back Button.

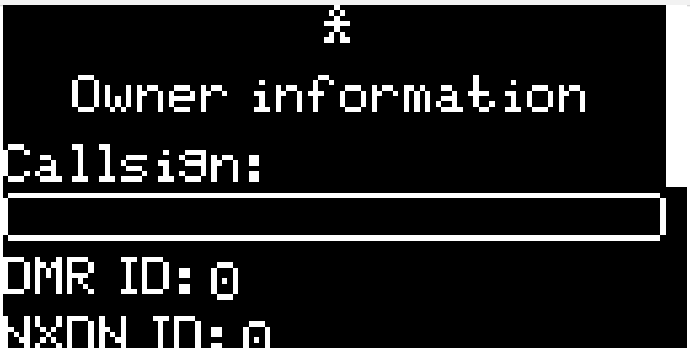
Important

After connecting to a Wi-Fi® network the M1KE will only be able to send and receive Broadcast calls on the connected Wi-Fi® network's channel.

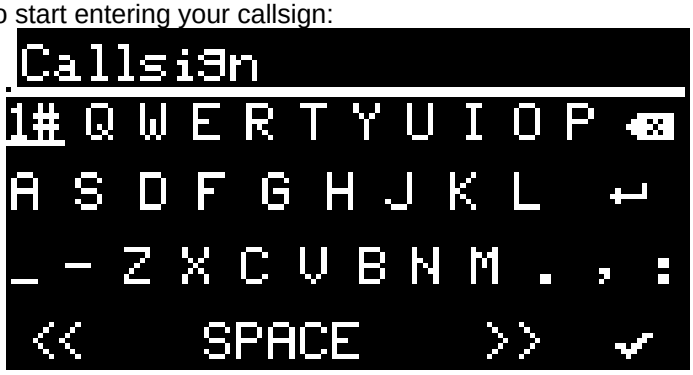
Note

See this page for more information about connecting to a Wi-Fi® network later.

Owner information screen



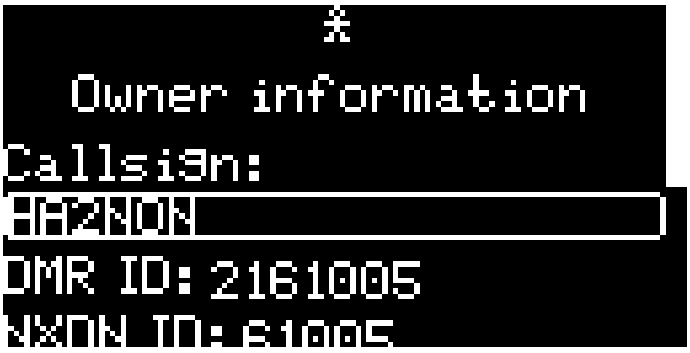
Press the OK/Menu Button to start entering your callsign:



Note

See the Keyboard screen section for information on how to enter text.

After entering your callsign, the M1KE looks up the DMR and NXDN® ID databases and fills the ID entries automatically:



Note

You can change the filled IDs by moving the cursor to the ID field and pressing the OK/Menu Button.

Navigate to the bottom of the screen with the Down Button and answer Yes or No for the valid amateur radio license question by pressing the OK/Menu Button on the respective Yes/No radio button:

Proceed to the next screen by moving the cursor to the **Next >** button and pressing the OK/Menu Button.

Important

You can change the owner information later on the Owner information screen under Main Menu / Settings on the device display or at the Owner information on the Quick Setup page of the web interface.

Initialization setup completed screen

Finish the initalization setup by pressing the OK/Menu Button.

Display

Main screen

When there is no ongoing call, the screen displays the following:

PTT destination section

This section displays the destination of the outgoing call when the PTT (Push-To-Talk) Button is pressed. You can change the PTT Destination by **long pressing** the Down button while the Main screen or the Ongoing call screen is active, or on the Mic settings page of the web interface.

Main logo

The main logo is displayed when there is no ongoing call. You can change the main logo at the Display / keypad settings on the Settings page of the web interface.

Status icons section

This section displays the status icons of the device.

Battery level

- Battery level
- Battery charging
- Unknown battery level
- Battery charger error

Wi-Fi® status

- Wi-Fi® connected, icon displayed according to signal strength. The icon is animating between these states when the device is trying to acquire an IP address from the Wi-Fi® network, or when roaming between Wi-Fi® access points.
- Wi-Fi® Access Point mode enabled
- Wi-Fi® disconnected

Message indicator

- New message received

Keypad lock indicator

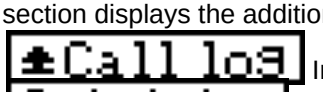
- Keypad locked

Mute indicator

- Speaker muted

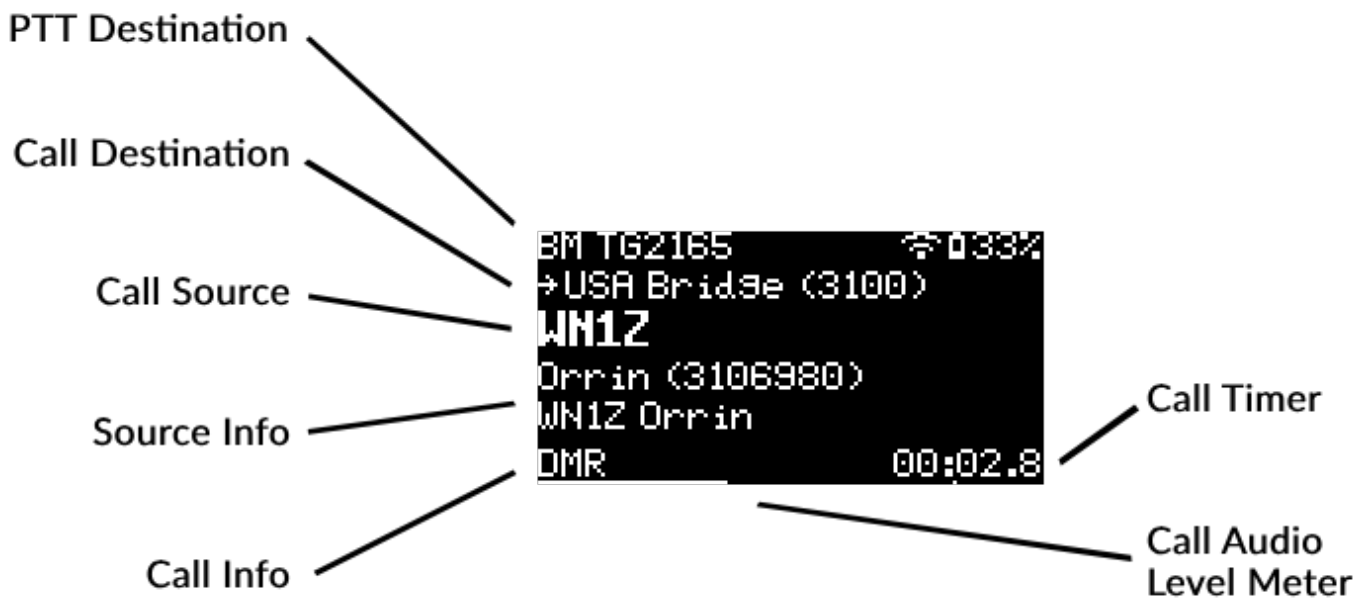
Buttons additional functions section

This section displays the additional functions of the buttons on the current screen.

-  Indicates that **long pressing** the Up Button shows the Call Log screen
- Indicates that **long pressing** the Down Button shows the PTT Destination Settings screen

Ongoing call screen

When there is an ongoing call, the screen displays the following:



PTT destination section

This section displays the currently active connector's name and the destination of the outgoing call when the PTT (Push-To-Talk) Button is pressed. If the currently active server is a saved one, then the server's name is displayed in this section.

Refer to the connectors page on how to change the active connector.

You can change the PTT Destination by **long pressing** the Down button while the Main screen or the Ongoing call screen is active, or on the Mic settings page of the web interface.

Call hold reply

The PTT destination section blinks if:

- The server is not reachable
- Finished receiving a DMR or NXDN® call from the network (and the Call hold setting is not zero)

In the latter case, the PTT destination section will display the received call's destination while blinking. Pressing PTT during this time changes the M1KE's PTT Destination to this destination.

This is useful if you have multiple talkgroups linked on a DMR or NXDN® network, and you want to reply to a call received on a different talkgroup than your current PTT Destination setting.

Call destination section

This section displays the destination of the call. The destination can be a callsign or an ID.

Call source section

This section displays the source of the call. The source can be a callsign or an ID.

Source info section

This section displays additional info about the source of the call. The first line displays the source's name and ID (if available and applicable). The second line displays the source station's broadcasted message (for example the Talker Alias if a DMR network is used).

Call info section

This section displays information about the call's protocol (example: DMR, C4FM etc.), voice codec (PCM, A3K etc.) or call type (*prv* for private calls, *data* for data calls).

If bit errors or packet loss is detected then this section displays the BER and Loss values for a few seconds.

Call timer section

This section displays the call's duration. If the call has been muted (for example by the Call mute settings on the Settings page of the web interface), then *MUTED* is blinking here.

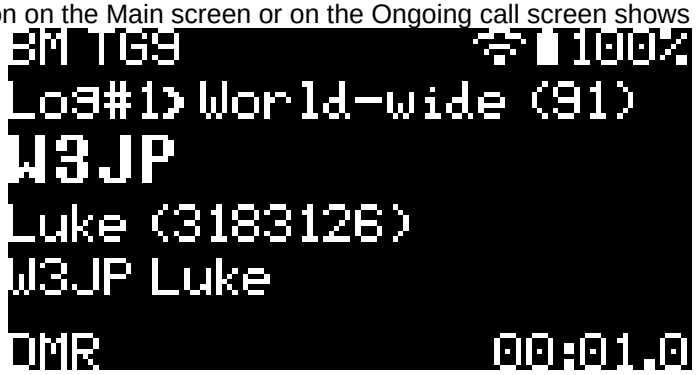
The call duration starts blinking if the call has ended. The duration of the blinking can be set at the Call hold setting.

Call audio level meter section

The call audio level meter is displayed at the bottom of the screen.

Call Log screen

Long pressing the Up Button on the Main screen or on the Ongoing call screen shows the Call Log:



You can navigate the Call Log with the Up/Down Buttons. The Call Log can be closed with the Power/Back Button.

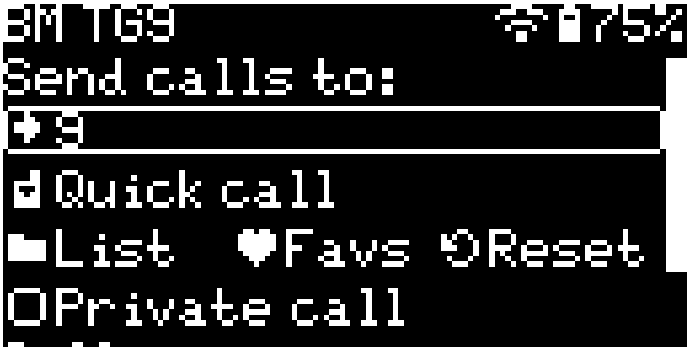
- The **Log#1** text shows that entry #1 is displayed.
- The bottom right corner alternates between the call duration and the start time of the call.
- Other fields share the same information as when the call was displayed previously on the Ongoing call screen.

Note

The Call Log can only store a limited number of entries.

PTT Destination Settings screen

Long pressing the Down Button on the Main screen or on the Ongoing call screen shows the PTT Destination Settings screen:



You can set the destination callsign or ID, call type (Private, or Group if the Private call option is not checked), call message of your **outgoing call**.

If the IAX2/AllStarLink® connector is active, then the IAX2/AllStarLink® menu will be shown instead of the PTT destination settings screen. See the IAX2/AllStarLink® connector page for more information.

Important

Changing the destination callsign does not change the currently active server. Use the Quick Setup screen to change the server.

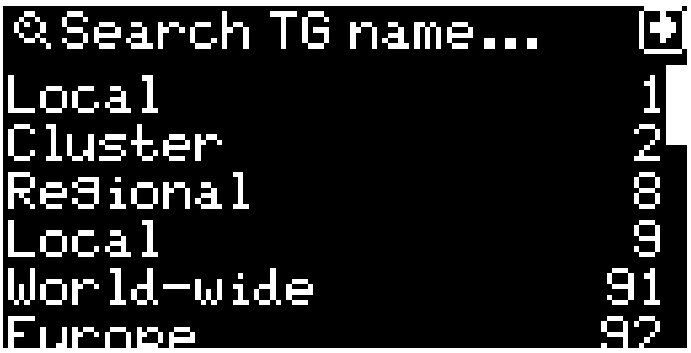
Note

The PTT Destination Settings can also be changed on the Mic settings page of the web interface.

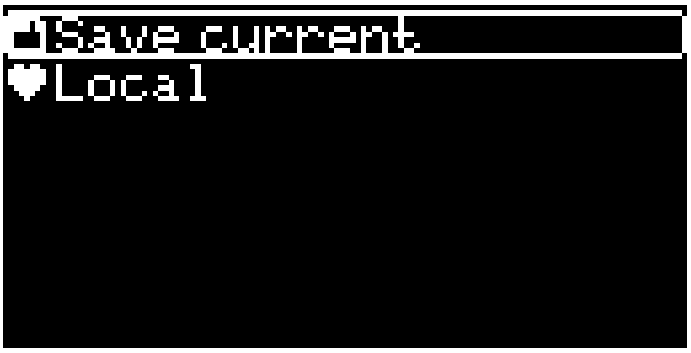
Note

The available options on this screen depend on the currently active connector, as each has its own set of PTT Destination Settings.

Entering the **List** view lets you choose a talkgroup (in case of a group call) or a remote party (in case of a private call):



You can save the current destination to the **Favs** (Favorites) list by entering the Favs screen and then selecting the “Save current” option:



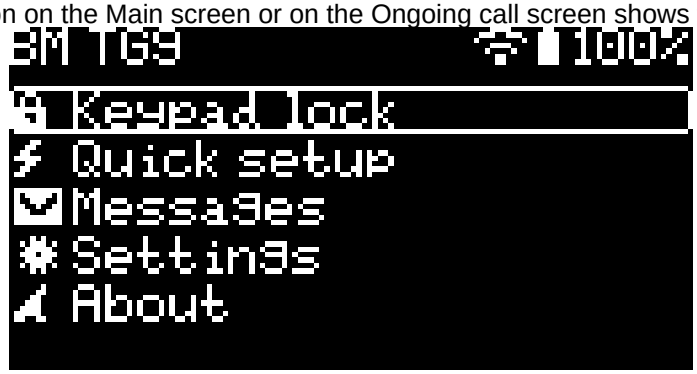
Saved entries can be recalled (or removed) by selecting them and choosing from the shown action dialog:

Note

The Favs list can also be edited on the Mic settings page of the web interface.

Main Menu screen

Pressing the OK/Menu Button on the Main screen or on the Ongoing call screen shows the Main Menu:



Keypad Lock

This option locks the keypad to prevent accidental key presses. To unlock the keypad, press and hold the OK/Menu Button for a few seconds.

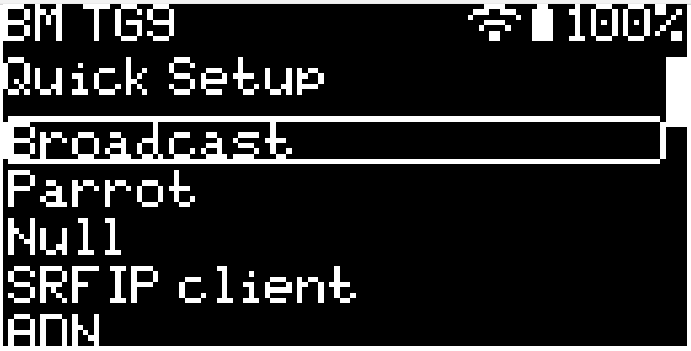
Keypad lock is also indicated by the icon on the screen at the Status icons section.

You can change which buttons the keypad lock affects at the Display / keypad settings on the Settings page of the web interface, or on the Display settings screen.

Connector specific menu items

Some menu items are only shown if the corresponding connector is active. See the Connector specific menu items page for more information.

Quick Setup



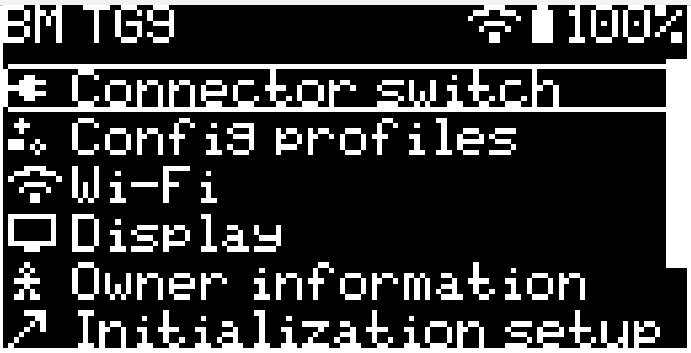
This screen lets you quickly set up the device to connect to a network. Refer to the description of connectors on the web interface for more information on the available settings for each network type.

Messages

This screen lets you **Send** messages and view the message **Mailbox**.

> **Note**
>
> Templates for sending messages can be set up at the Message send templates on the Settings page of the web interface.

Settings



This screen lets you change the most important set of the device's settings. Refer to the Settings screen page for more information.

> **Note**
>
> Not all device settings are available on the Settings screen. Use the web interface for more settings.

About

The About screen displays information (device UID, firmware version, etc.) about the device.

Connector specific menu items

Broadcast Neighbors

> **Note**
>
> This menu item is only shown if the Broadcast is active.

This option lets you see the list of detected neighbors and send messages to them.

Quick Call

> **Note**
>
> This menu item is only shown if the Homebrew/MMDVM® connector is active.

The Quick call list lets you quickly call ID 4000 with a group or private call, or an ID which is saved to the device's quick call memory. You can edit this list using the device display or at the Quick Call section of the web interface.

If the **Auto group call 4000** checkbox is checked, then the device will automatically start a quick call to TG4000 to make the server unlink everything before quick calling the desired ID.

Learn more about talkgroup linking/unlinking here.

Quick Call Favs

> **Note**
>
> This menu item is only shown if the Homebrew/MMDVM® connector is active.

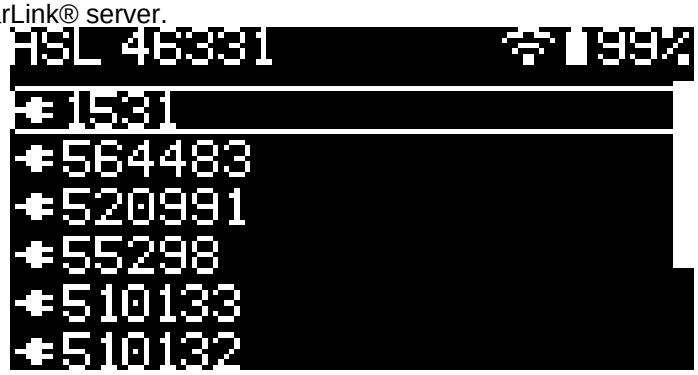
The Quick call favs list lets you quickly call an ID which is saved to the device's favorite PTT destinations. You can edit this list using the device display on the PTT Destination Settings screen, or on the web interface's Mic settings page.

IAX2/AllStarLink®

> **Note**
>
> This menu item is only shown if the IAX2/AllStarLink® connector is active.

Show ASL linked nodes

This menu item is only shown if the device is connected to a server in AllStarLink® mode. The list shows linked nodes reported by the AllStarLink® server.



You can find this list also on the Status page on the web interface.

Hang up call

This menu item is only shown if there is an ongoing call in IAX2 mode. It lets you hang up the call.

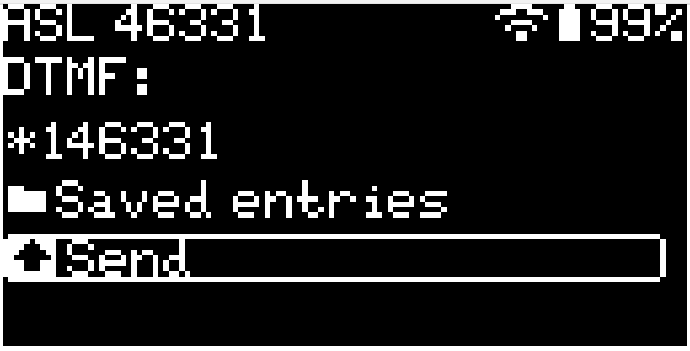
Call

This menu item is only shown in IAX2 mode. It lets you call other IAX2 devices by entering their numbers. You can save and recall numbers using the **Saved entries** menu item.

Note

If you want to use non-digit characters as part of the number, save an entry on the web interface's Call dialog.

DTMF



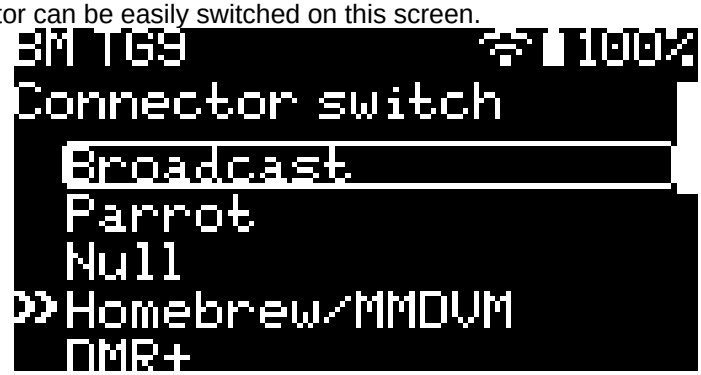
This menu item is only shown while a call is active. It lets you send DTMF digits. You can save and recall DTMF digits using the **Saved entries** menu item.

See the list of commands supported by AllStarLink® servers here. Note that not all commands are enabled on all servers.

Settings screen

Connector switch screen

The currently active connector can be easily switched on this screen.



Use the Quick Setup to set up a previously unconfigured connector to connect to a network.

Config profiles screen

> **Note**
>
> Refer to the Configuration profiles page for more information about configuration profiles.

The currently active configuration profile can be easily switched on this screen. You can also rename or copy a profile to another profile slot.

Select the profile you want to activate or edit with the Up/Down Buttons, then press the OK/Menu Button. The Edit profile screen will be displayed.

Edit profile screen

Activate

Select **Activate** to activate the configuration profile. The **Activate** menu item won't be displayed for the currently active profile.

> **Note**
>
> The device reboots when activating another configuration profile. Follow the steps described at the Welcome screen to initialize a profile which has never been used before.

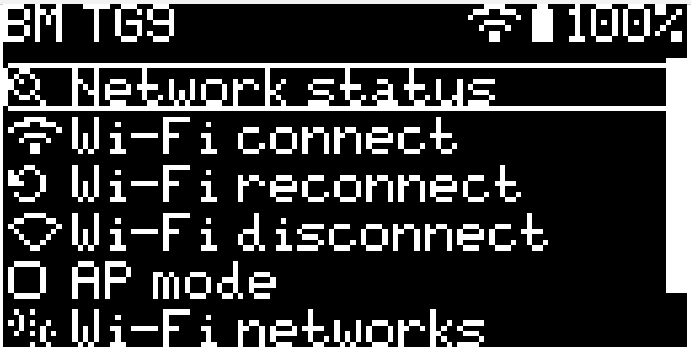
Rename

Select **Rename** to rename the configuration profile.

Copy to

Select a profile under **Copy to** to copy the current profile to another profile slot.

Wi-Fi® screen



Network status

This screen displays the current network status, including the currently connected Wi-Fi® network name, IP addresses, connection quality, signal strength and other information.

Wi-Fi® connect

This screen lets you scan and list available Wi-Fi® networks and connect to them.

Wi-Fi® reconnect

Starts connecting to a previously saved Wi-Fi® network.

Wi-Fi® disconnect

Disconnects from the currently connected Wi-Fi® network.

AP mode

Enables/disables Access Point mode. The device advertises its own Wi-Fi® network (called *M1KE AP* by factory default settings) which you can connect to using a phone, tablet or computer to access the device's web interface even when it's not connected to a Wi-Fi® network.

See this page for more information on how to use the AP mode.

Note

Only the Broadcast, Parrot and Null connectors are available when AP mode is enabled.

Wi-Fi® networks

This screen lets you edit the list of saved Wi-Fi® networks. Each slot stores the network name (SSID), and password. The device will try to connect to the network configured in the first slot, then to the second, and so on. After trying all of the configured networks, it restarts the sequence with the first network.

Presing the OK/Menu Button on a slot will open the Keyboard screen to enter the SSID and password for that slot.

Note

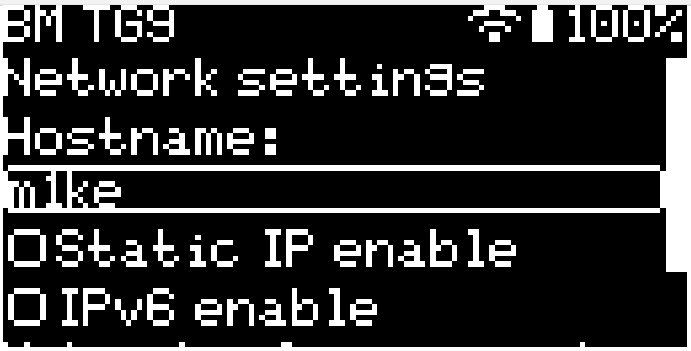
You can clear an entry if you set an empty SSID.

The **Save Wi-Fi® networks to all config profiles** checkbox at the bottom of this screen allows you to have a common list of saved Wi-Fi® networks across all *Configuration profiles*. This is enabled by factory default settings. If you turn this off then you can have up to 5 different Wi-Fi® network to connect to in each configuration profile.

Note

Refer to the Configuration profiles page for more information about configuration profiles.

Network settings

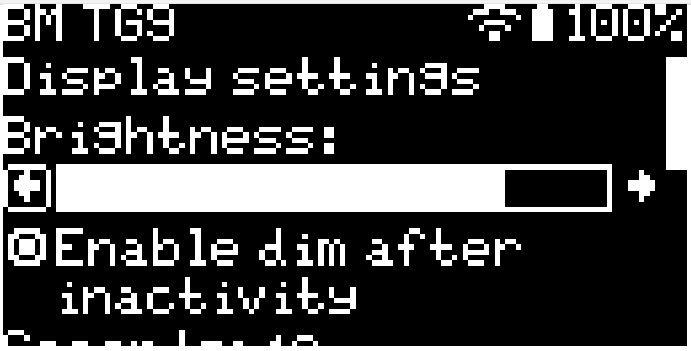


This screen lets you configure the device's network settings. You can change the device **hostname**, enable or disable **static IP address** and **IPv6** usage. You can also set a **web interface password**.

Note

The device has no web interface password set by factory default settings. Clear it if you've set a password and you want to disable the login screen.

Display settings screen



This screen lets you change the display settings of the device.

Brightness

Reducing the brightness of the display can help save battery power.

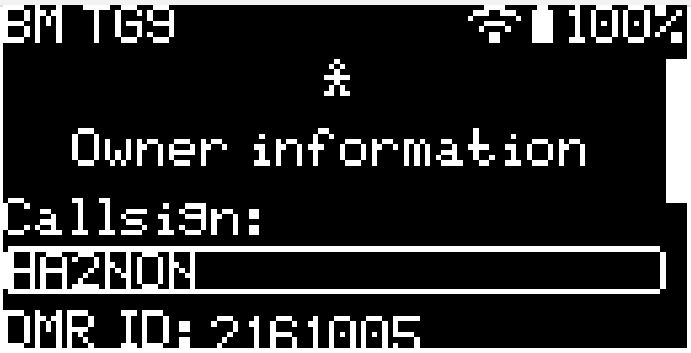
The **Enable dim after inactivity** checkbox allows you to enable or disable the automatic dimming of the display after a period of inactivity. You can set the time after which the display will dim by adjusting the **Seconds** setting below the checkbox.

The **Enable turn off display after dim** checkbox allows you to enable or disable the automatic turning off of the display after it has dimmed. You can set the time after which the display will turn off by adjusting the **Seconds** setting below the checkbox.

Keypad lock

You can set which set of buttons the Keypad Lock affects here.

Owner information screen



You can view and edit the owner information (callsign, DMR/NXDN IDs and license validity) of the device on this screen.

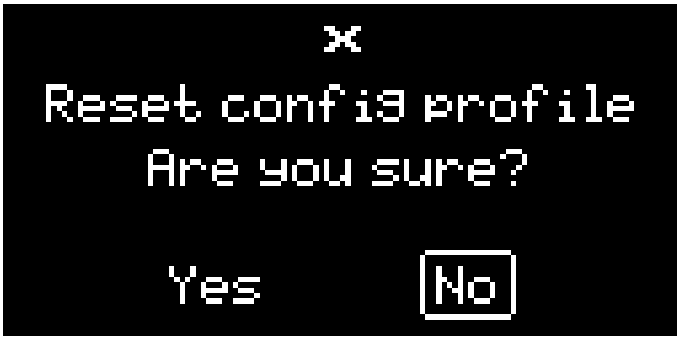
This callsign and IDs are used by the device to connect and send calls to the network.

See this page for more information about the license setting.

Initialization setup

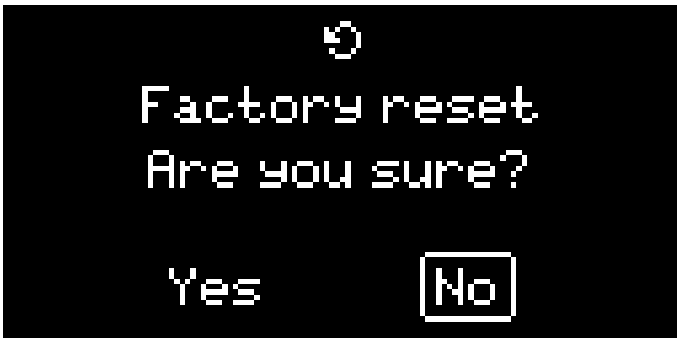
You can restart the Initialization setup by selecting this option. The Initialization Setup will guide you through the basic settings of the device (selecting the country of operation, connecting to a Wi-Fi network and setting the device's owner information).

Reset configuration profile



This lets you reset the active configuration profile of the device to factory default settings.

Factory reset



This lets you reset all configuration data of the device to factory default settings.

Web interface

Opening the web interface

Using sharkrf.link

You can use the webpage SharkRF Link to easily open the web interface of the device. Enter the **Device UID** (you can find this ID on the **sticker at the back of the device** or on the About screen), then click on the **Connect** button.

All entered device UIDs will be saved in your web browser's local storage so you don't have to enter them again. Just click on each of your saved M1KE's **Connect** button to open their web interfaces.

> **Important**
>
> Both your computer/tablet/phone with which you've opened SharkRF Link and the M1KE need to be connected to the exact same Wi-Fi® network.

Adding the web application to your phone's home screen

You can also add the SharkRF Link page as a web application (note that this is not the same as the SharkRF Link app), described below) to your phone's home screen by clicking on the **Add to Home screen** button at the bottom of the page on your mobile phone's browser.

If you are using an iPhone® and the **Add to Home screen** button does not appear at the bottom of the SharkRF Link page, you can use the following method to add the web app icon to your home screen:

1. Open SharkRF Link in the browser
2. Click on the iPhone®'s **Share icon** at the bottom
3. Click on the **Add to Home screen** button

Other ways

You can also open the web interface by entering http://m1ke.local/ or http://m1ke/ or the device's IP address into the web browser.

You can find the device's current IP address on the Network status screen.

The recommended way is to use SharkRF Link to open the web interface.

> **Important**
>
> Both your computer/tablet/phone and the M1KE need to be connected to the exact same Wi-Fi® network.

Note

If the web interface does not open, then check if the M1KE is connected to the Wi-Fi® network by looking at the Status Icons Section on the screen, or on the Network status screen. You can also find the device's current IP address on this screen.

Note

If http://m1ke.local/ and http://m1ke/ do not work on your non-Android® device then make sure **multicast data is not disabled on your Wi-Fi® network**.Some Wi-Fi® access points and routers have multicast data disabled by default. This is required for LLMNR and MDNS name resolving.

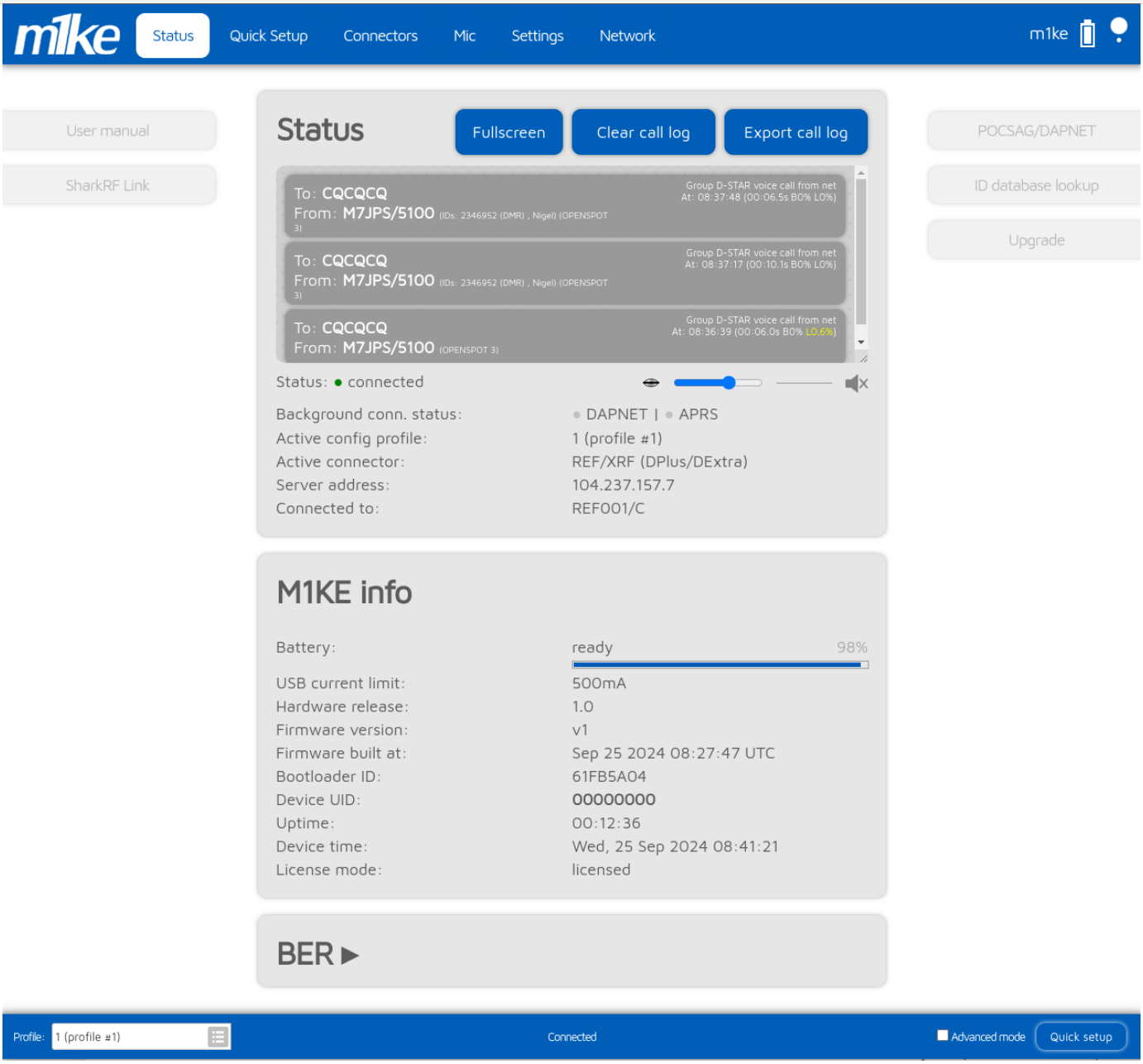
Some Android® phones do not support LLMNR or MDNS name resolving so these addresses won't work. In this case use SharkRF Link or enter the IP address of the M1KE into the browser to open the web interface.

Also check the **Wi-Fi® client isolation** (or similarly named) setting in your Wi-Fi® router's configuration. It should be turned off.

Note

IP addresses are assigned by your router to the M1KE, and they may change.

About the web interface



Header

Main menu

The **main menu** is at the left of the header. It is hidden if the browser window is small (for example on devices with smaller displays like mobile phones). In this case click on the **hamburger icon** at the right of the header to show the main menu.

Hostname

The device's **hostname** is displayed at the right of the page header.

The hostname is hidden if the browser window is small (for example on devices with smaller displays like mobile phones).

Battery charge status

The current **battery charge status** is shown right next to the hostname. Additional battery charge information is shown if the mouse is hovered over the battery icon (or the icon is clicked). Note that the displayed remaining battery charge/discharge time is an **estimate** and is affected by the device's recent power consumption.

Activity animation

When the web interface is communicating with the device, an **activity animation** (2 pulsing circles) is displayed next to the battery icon at the right of the header.

Footer

Configuration profile

The currently active configuration profile number and name is displayed at the left of the footer. You can also switch between configuration profiles here.

> **Note**
>
> Refer to the Configuration profiles page for more information about configuration profiles.

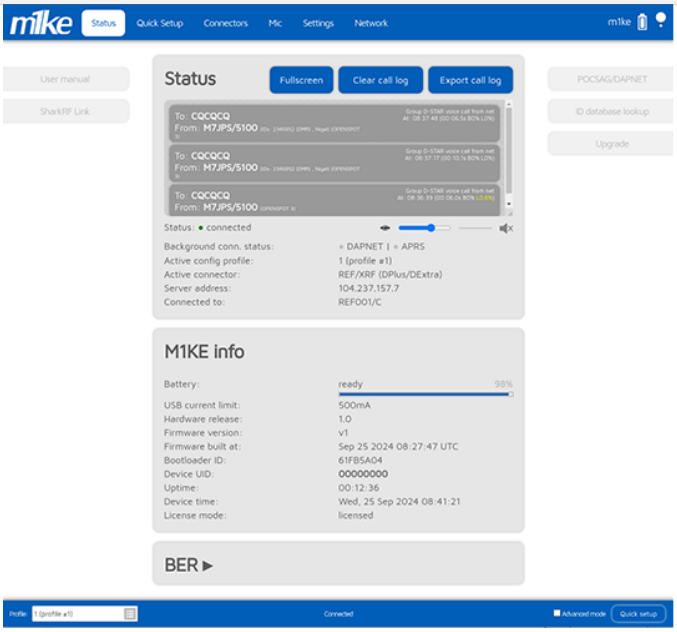
Device status

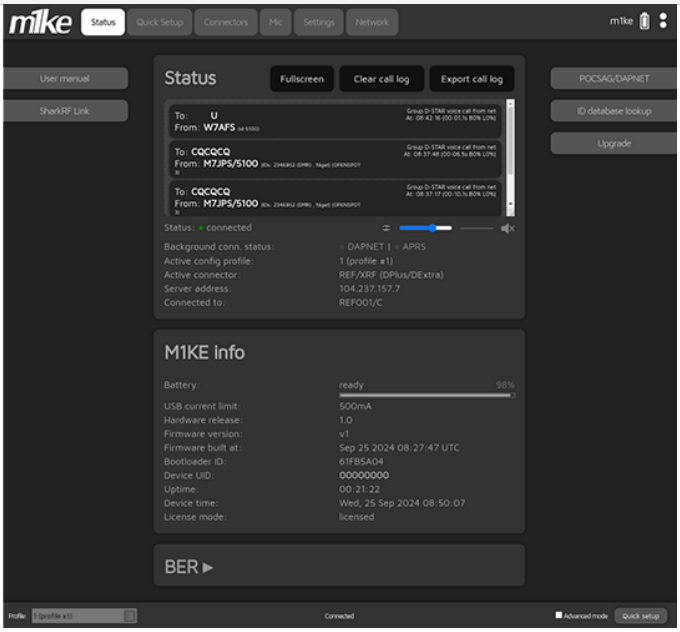
The device's current **status** is displayed in the middle of the footer.

Advanced mode

The **Advanced mode** checkbox is at the right of the footer. If this is checked, all advanced mode settings show up. Advanced mode is not needed for normal operation.

Light and dark web interface themes





You can switch between dark and light web interface themes at the Web inferface mode on the Quick Setup page or at the Miscellaneous settings on the Settings page.

Login page

This is the page where you can log in to the web interface. The M1KE does not have a web interface password by default, so the login page is not displayed initially. You can set a login password at the Network settings on the Network page of the web interface.

If you check the **Remember me** checkbox, the M1KE will not ask for a login password until the device gets rebooted, or the browser forgets the login cookie.

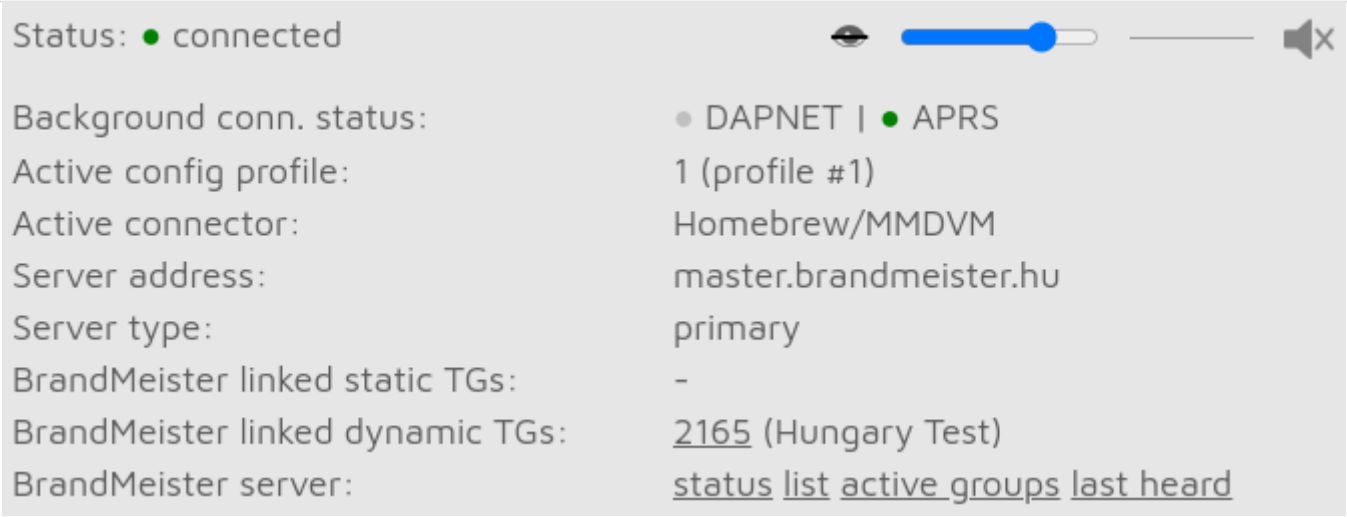
Forgotten password

If you forget your web interface password, then you can set a new one on the Wi-Fi® settings screen on the device's display.

Status page

On this page you can see general information about the device and ongoing calls.

Status



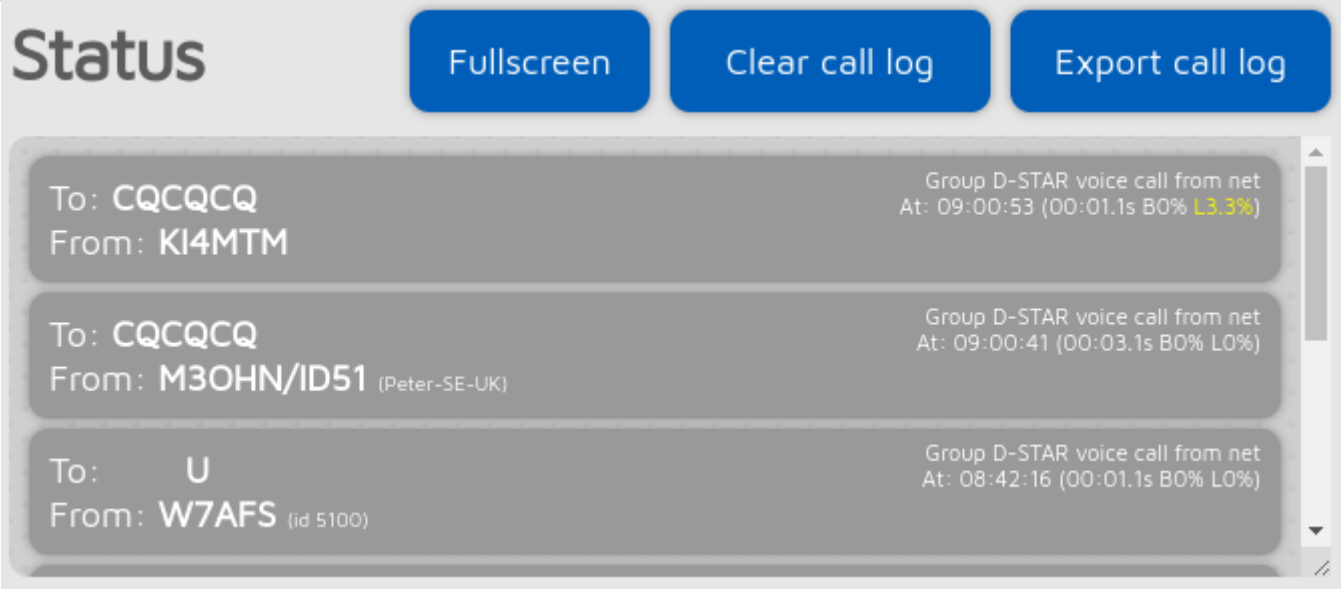
The status section shows the device status including the currently active configuration profile name and number, currently active connector and its configured server. Circle indicators of background connectors are green if they are connected to their configured servers.

Some connectors display additional information here like the list of linked talkgroups.

Note

The list of linked BrandMeister Network talkgroups are queried from the BrandMeister Network's API server by the web browser and may not always be accurate.

Call log



The call log displays all incoming, outgoing and voice announcement calls. In modes where IDs are used as destination and source identifiers (ex. DMR, NXDN®) the IDs are matched to the ID database and replaced with callsigns.

Each call log entry has information about the call at the top right corner. BER is displayed in percent after the letter **B**, packet loss (in case of network calls) is displayed in percent after the letter **L**. The **call duration** is also displayed after a call ends.

You can export all call log entries in *CSV* format by clicking on the **Export call log** button.

If Advanced mode is enabled, then the **Limit call log lines** checkbox is shown. If it is checked (it's checked by default) then only a limited number of call log entries are allowed to be in the call log. This is good for limiting the web browser's CPU and memory use.

Live display view

You can open and close the live display view by clicking on the eye button left to the call audio volume slider:

The live display view shows the contents of the device display in real time.

Use the buttons left to the live display view to remote control the device. The up and down buttons marked with letter **L** are for long press up and down.

You can also use the following keyboard shortcuts:

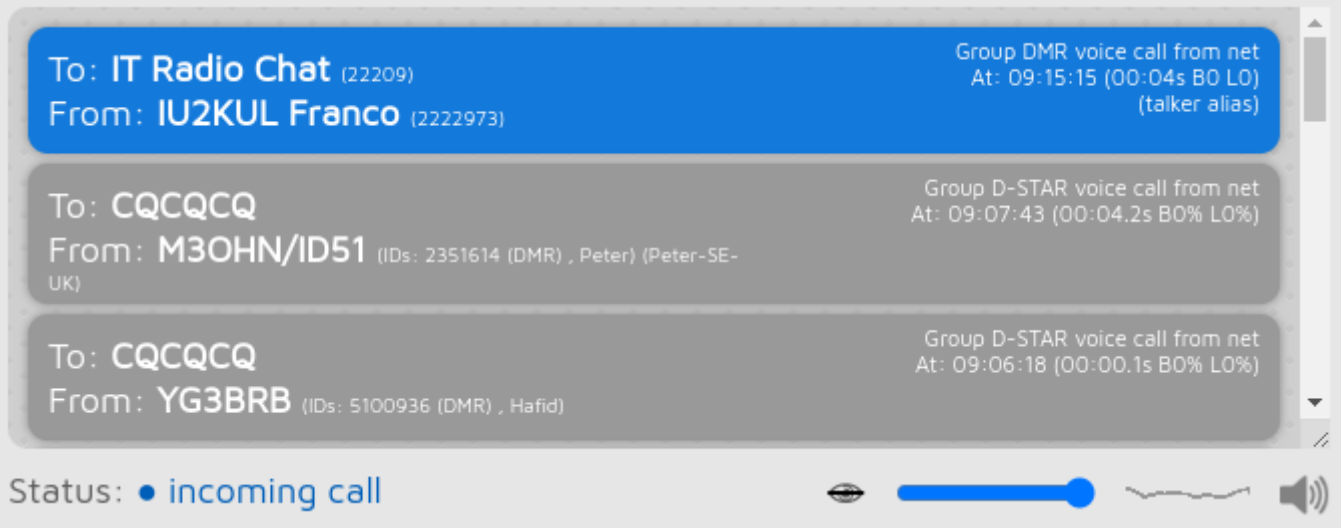
- *Ctrl+I* - Toggle live display view
- *Ctrl+Left* - Back button

- *Ctrl+Up* - Up button
- *Ctrl+Shift+Up* - Up button (long press)
- *Ctrl+Down* - Down button
- *Ctrl+Shift+Down* - Down button (long press)
- *Ctrl+Right* - OK/Menu button

Important

Smooth live display view requires a Wi-Fi® connection with a good signal quality. If you have issues with the live display view, then please try using different browsers and make sure they are updated to the latest version.

Call audio



You can toggle call audio playback by clicking on the **speaker icon** under the call log, or with the keyboard shortcut *Ctrl+M*.

There's a small oscilloscope view which shows call audio being played. Note that the oscilloscope view's signal levels does not actually represent the volume of the played back audio, as the web interface uses audio dynamic range compression.

You can change the audio volume with the slider, or with the keyboard shortcuts *Ctrl+V* and *Ctrl+B*.

Important

Smooth call audio playback requires a Wi-Fi® connection with a good signal quality. If you have issues with call audio playback, then please try using different browsers and make sure they are updated to the latest version.

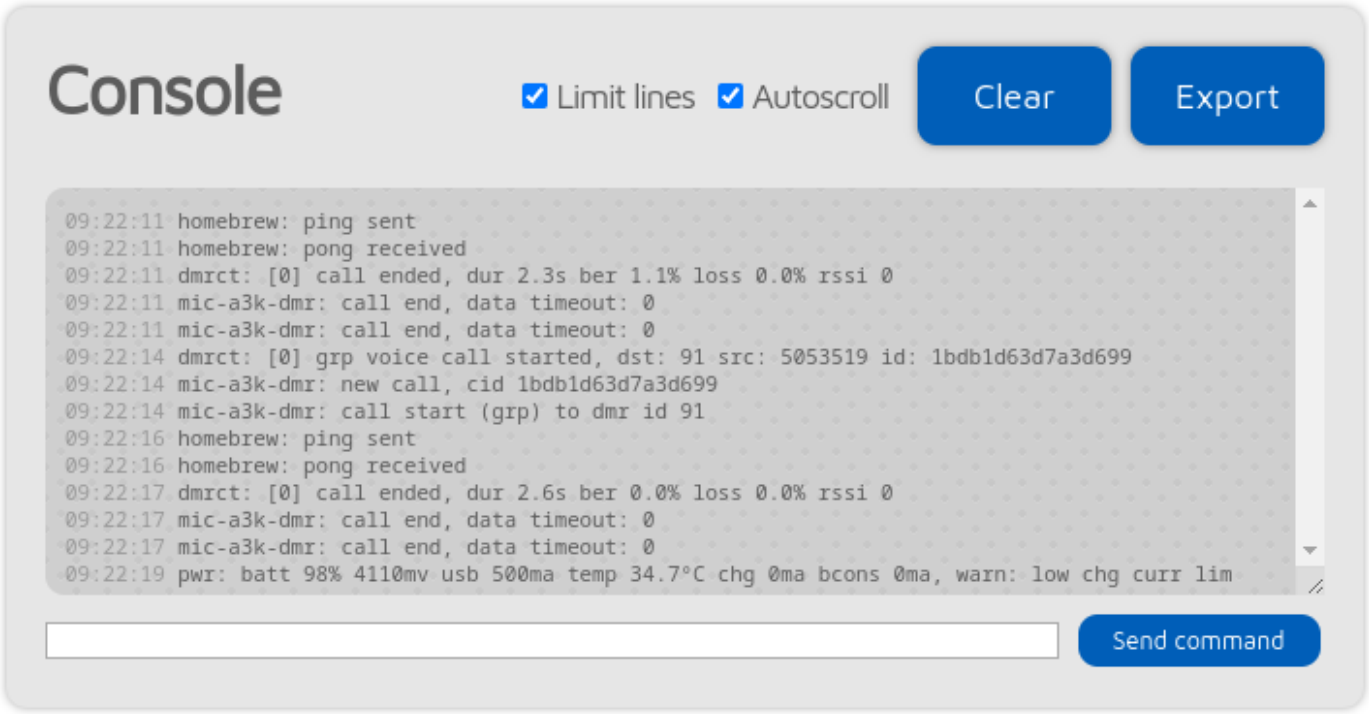
Note

Browsers reduce CPU allowance on non-active tabs after a while. The tab of the web interface must be kept active, otherwise the audio will be garbled. This browser behavior cannot be changed. If the audio becomes garbled, activate the tab, and/or reload the web interface to fix it.

Note

C4FM VW mode call audio playback is not supported.

Console



Note

This section is only shown if Advanced mode is enabled.

You can see all device log messages here. You can also send console commands to the device by typing them into the text input field and pressing the *Enter* key (or clicking on the Send command button). Enter **help** or **h** to see the list of available commands. You can turn on the device log by entering the **log** command.

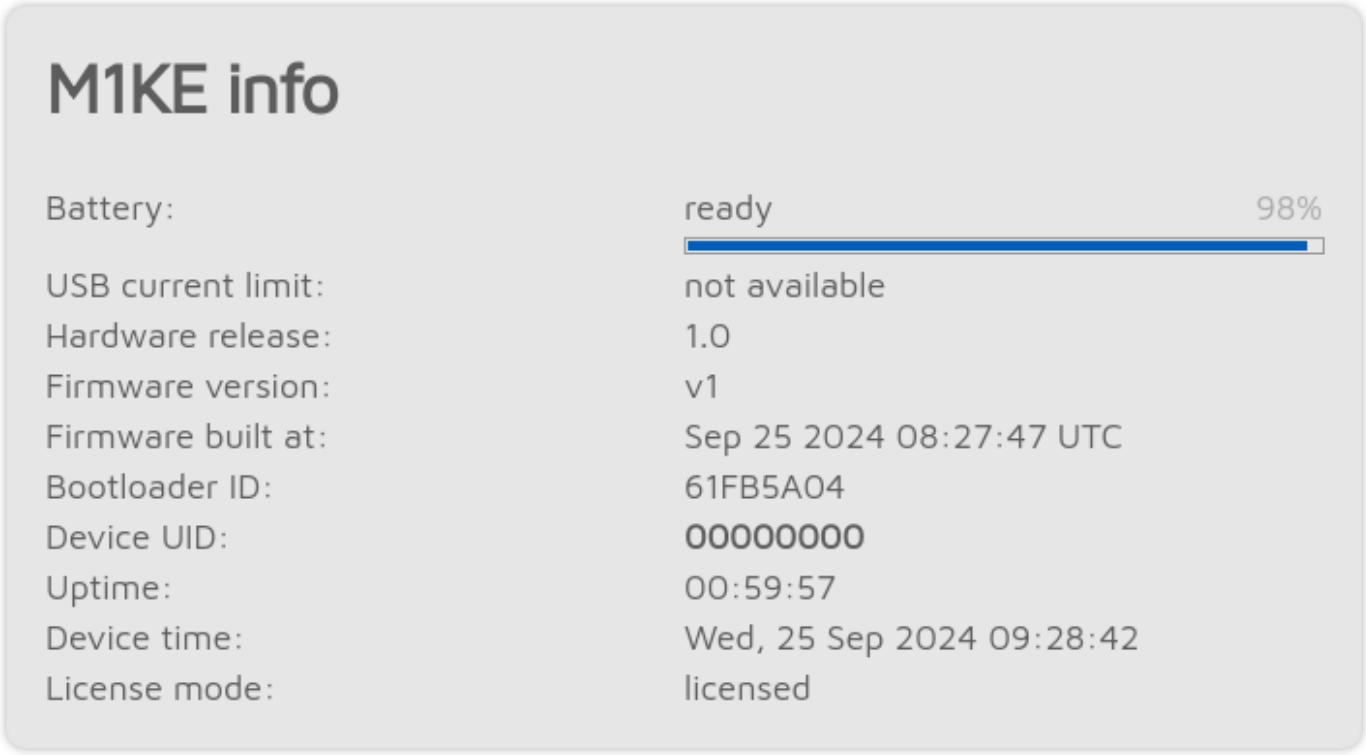
If **Limit lines** is checked (it's checked by default) then only a limited number of log lines are allowed to be in the log. This is good for limiting the web browser's CPU and memory use.

You can export the log lines to a *.txt* file by clicking on the **Export** button.

Note

Log lines are only added to the console while it is visible. Use the USB serial console for full log access.

M1KE info

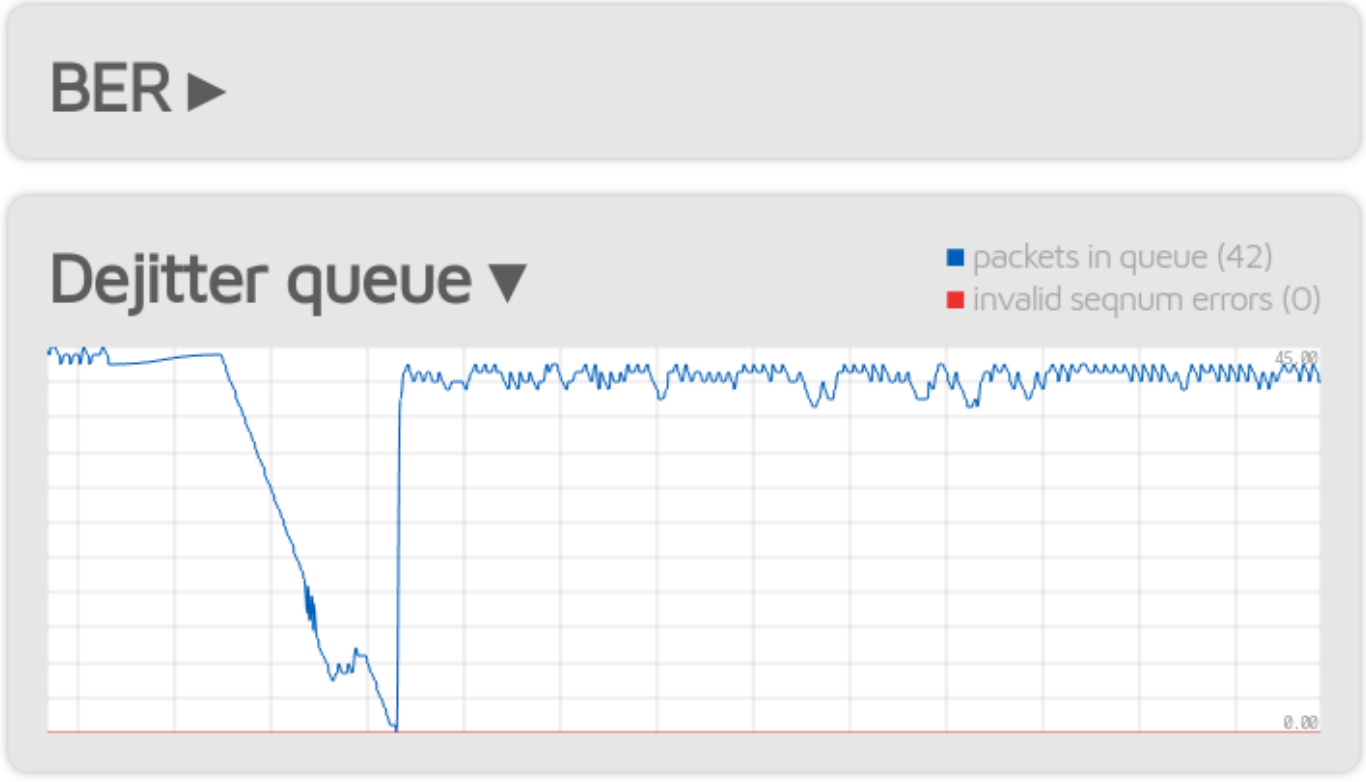


Here you can see basic information about the device.

USB current limit shows the used USB port current limit based on the connected port's detected capabilities.

Additional battery charge information is shown if the mouse is hovered over the charge percent (or the charge percent is clicked). The remaining battery charge/discharge time is an **estimate** and is affected by the device's recent power consumption.

Graphs



BER graph

Shows received Bit Error Ratio during a call.

Dejitter queue graph

> **Note**
>
> This graph is only shown if Advanced mode is enabled.

Shows the number of received packets waiting in the dejitter queue. All packets received from the network will go to this queue to eliminate **network jitter**.

- If the dejitter queue **length is too short**, the **graph's line can touch zero** during a call and the **audio can stop for a moment** as the device runs out of voice data to play.
- If the queue's length is **too long**, the delay can be uncomfortably high.

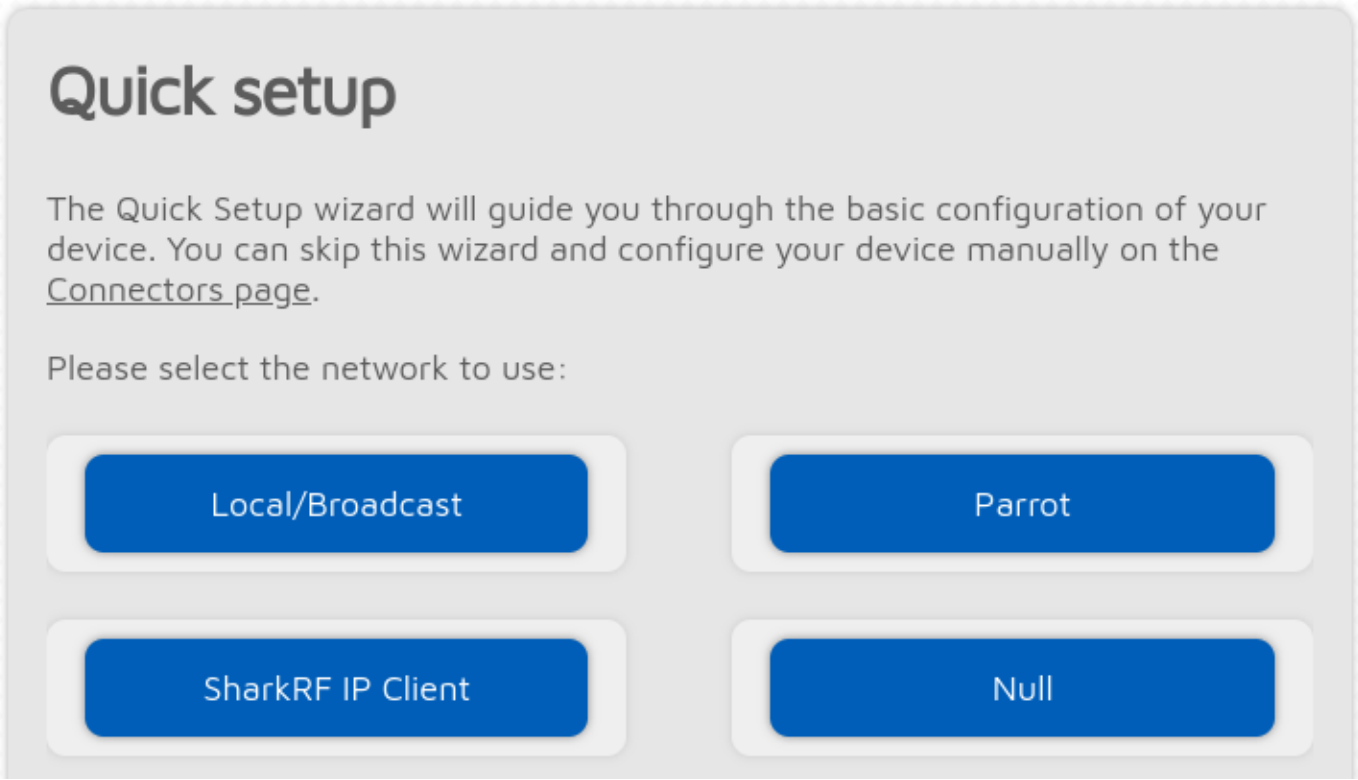
Setting the dejitter queue length

You can use this graph to set a proper dejitter queue length. There should be at least a few packets in the dejitter queue when receiving a call from the network.

You can set the dejitter queue length at the Network settings on the Network page (the setting only shows up if Advanced mode is enabled).

As a **general rule**, if you have a good network connection to the configured server, set dejitter queue length to 500ms, and if you have a mobile phone internet connection or voice stutters a lot, try setting the length to at least 1000ms.

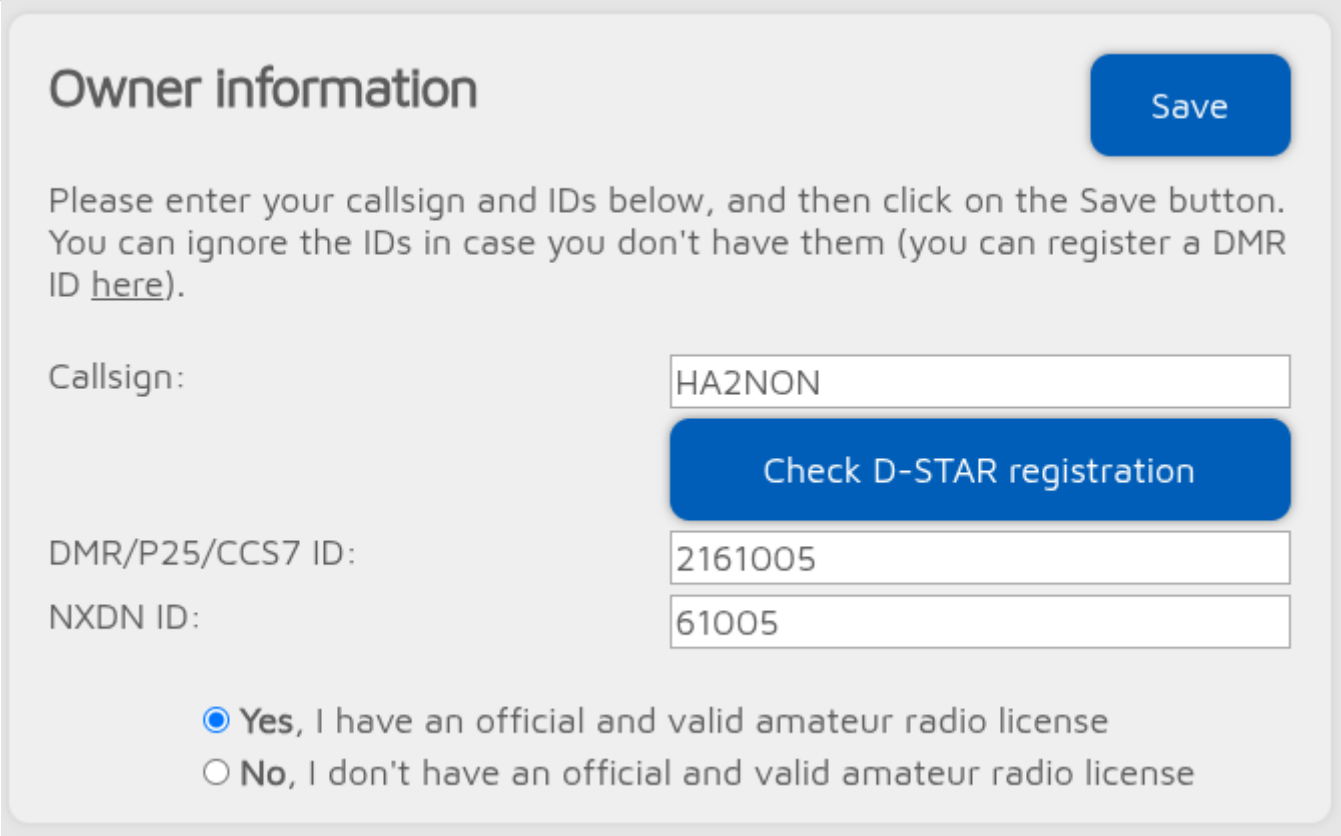
Quick Setup page



The easiest way to set up your device to connect to a server is to use the Quick Setup page. Select the network you want to connect and follow the steps.

You can also access the Quick Setup through your device's display menu.

Owner information

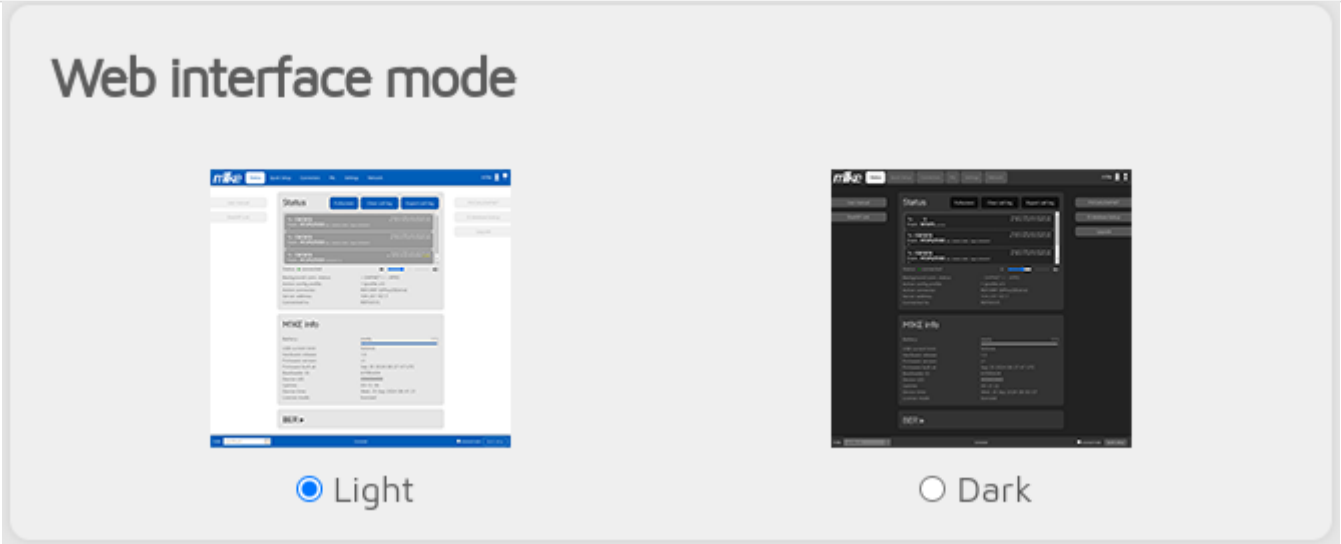


You can modify device owner information here. This callsign and IDs are used by the device to connect and send calls to the network.

See this page for more information about the license setting.

Classic REF/XRF servers require a valid, registered callsign. You can check your callsign's registration by clicking on the **Check D-STAR® registration** button.

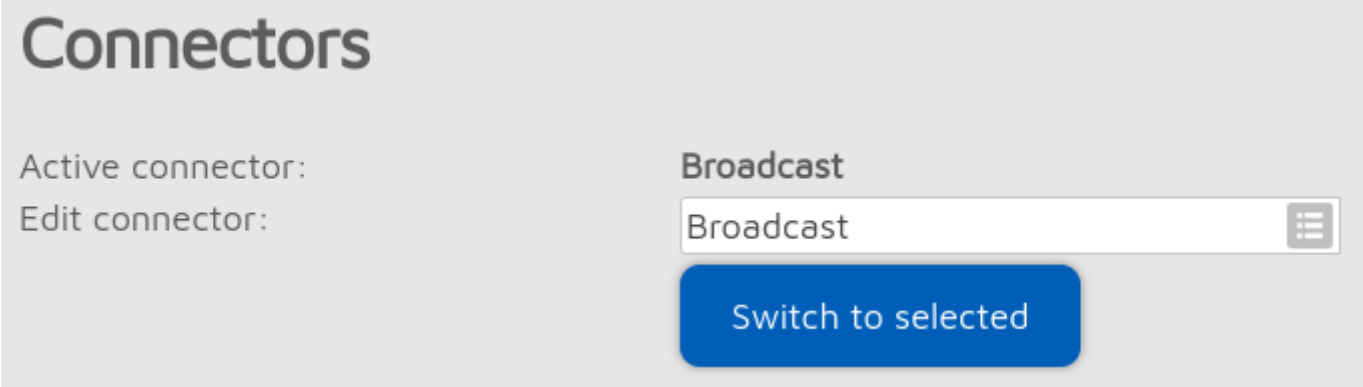
Web inferface mode



You can switch between light and dark web interface modes here.

Connectors page

About the connectors page



You can activate a connector by selecting it from the **Edit connector** list and clicking on the **Switch to selected** button. You can edit a connector's settings by selecting it from the **Edit connector** list. Don't forget to click on the **Save** button after changing a connector's settings.

Saving and recalling custom servers

Some connectors have **Add server** and **Remove** buttons. These can be used to add and remove **custom servers** in the server list. To remove a custom server from the list, select it before clicking on the **Remove** button. The **Add server** button changes to **Rename** when a custom server is selected. Clicking on the **Rename** button will let you change the name of the selected custom server entry.

> **Important**
>
> Saved custom servers are stored in the global storage which are common for all configuration profiles.

> **Note**
>
> Voice of incoming calls may stutter while the import operation is ongoing.

Keepalive interval, RX timeout

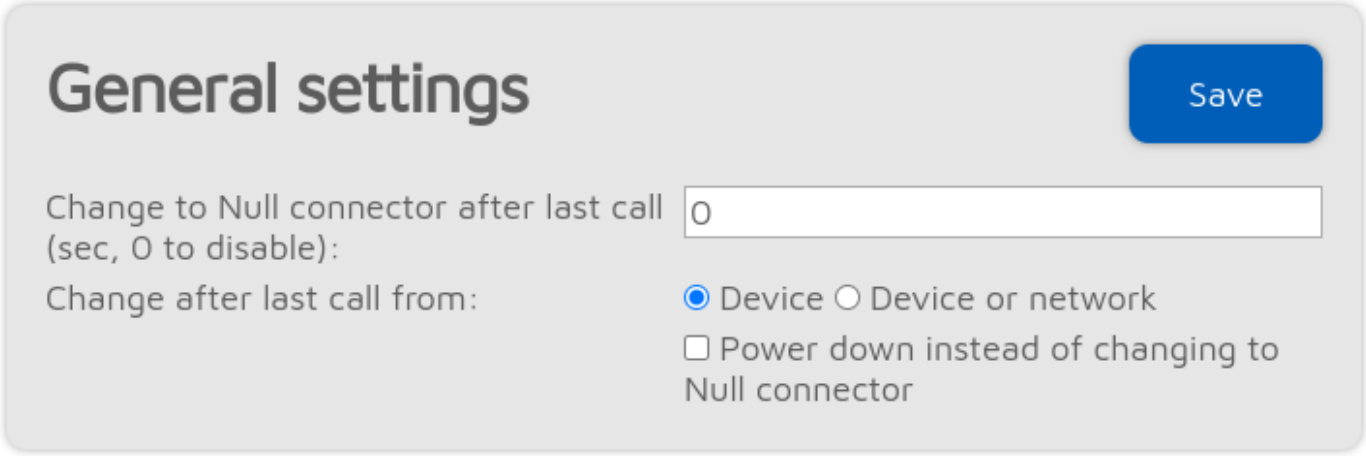
Some connectors have a **Keepalive interval** setting. This means the server requires the M1KE to periodically send **keepalive messages** to the server. The **RX timeout** setting specifies the time after the last received valid network packet needed for the M1KE to consider the connection is dead and it should reconnect.

> **Note**
>
> If the M1KE **frequently disconnects** from the server, try increasing the RX timeout.

> **Important**
>
> If a connector has both the **Keepalive interval** and **RX timeout** settings, then make sure the **RX timeout** is set to a greater value than the **Keepalive interval**.

As a general rule, try to **use a server nearest to your physical location** to avoid packet loss and high latency.

General settings



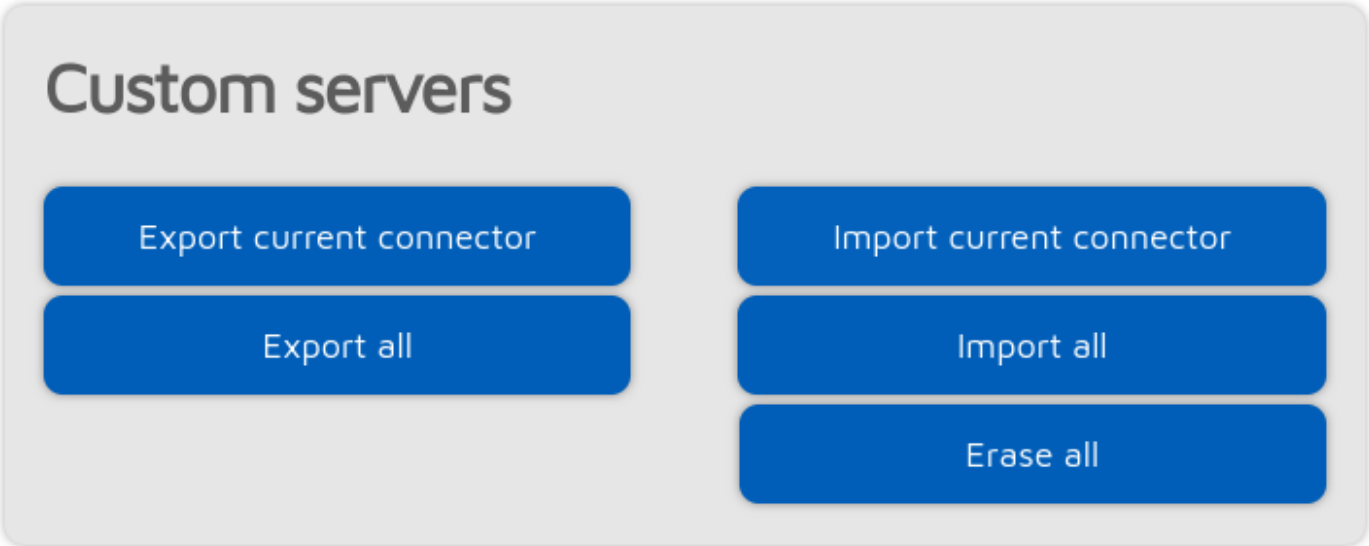
Note

This section is only shown if Advanced mode is enabled.

By setting the **Change to Null connector after last call** other than 0 will change the active connector to the Null connector after the last received call (minimum timeout value is 5 minutes). For example, if you set a timeout of 600 seconds, the device will change to the Null connector if there is no call received in the last 10 minutes.

If **Power down instead of changing to Null connector** is checked, then the device turns off when the timeout is reached. This can be used as an auto sleep feature.

Custom servers export/import



Note

This section is only shown if Advanced mode is enabled.

You can export/import custom servers of the selected connector or all connectors to/from a file here.

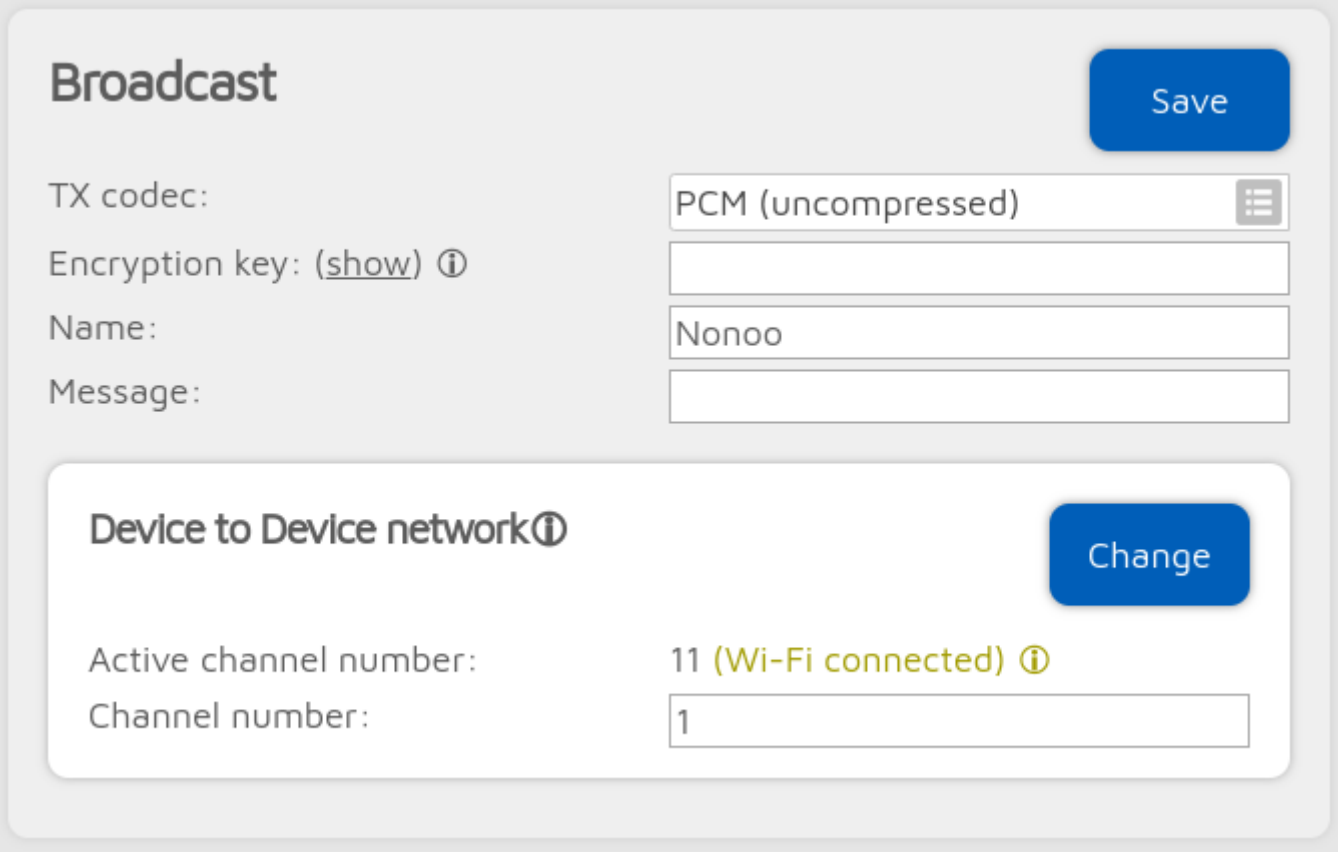
Important

Saved custom servers are stored in the global storage which are common for all configuration profiles.

Note

Voice of incoming calls may stutter while the import operation is ongoing.

Broadcast connector



This connector is active when the M1KE is not connected to a Wi-Fi® network.

You can use this connector to transmit to other devices which support the SharkRF Broadcast protocol:

- Nearby M1KE devices (Device to Device network)
- If the M1KE is connected to a Wi-Fi® network, then M1KE devices on the same network (Multicast network)

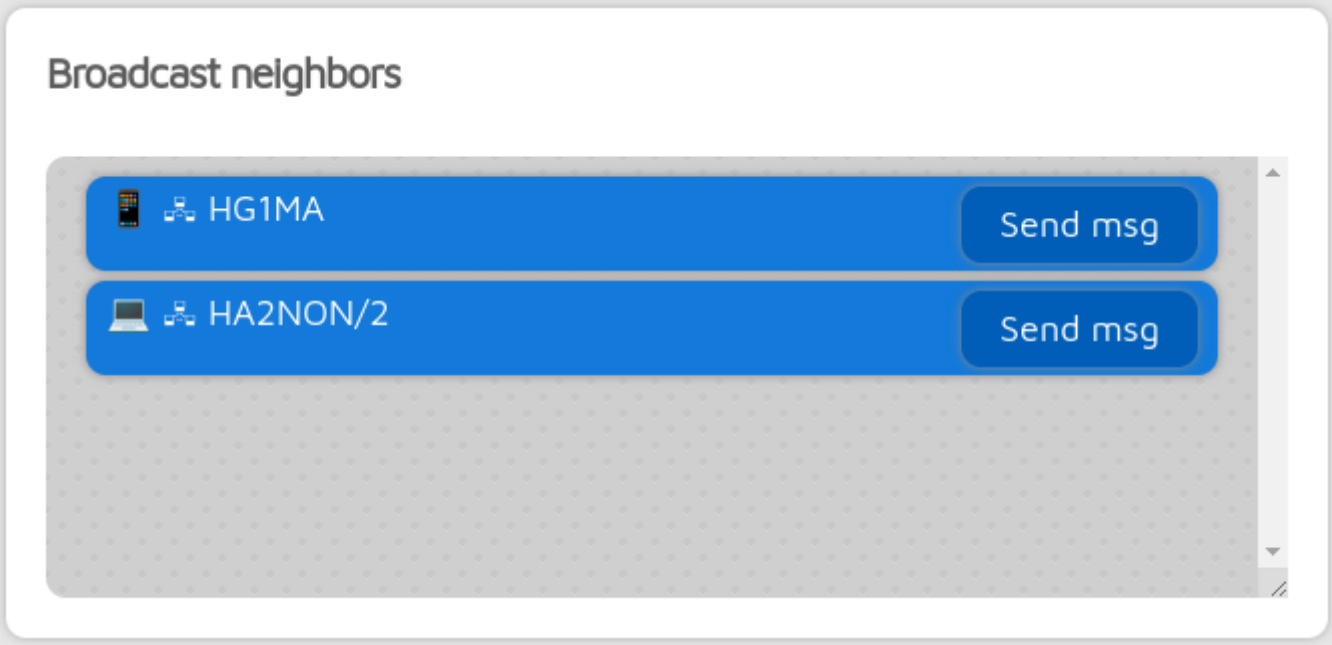
You can also remotely connect Device to Device or Multicast networks via the internet.

Broadcast neighbor list

If the Broadcast connector is active, then a menu item called **Bcast neighbors** will show up in the display's main menu. This menu item lets you view the list of other M1KE devices which are nearby or are on the same network:

Pressing the OK/Menu Button on a neighbor lets you send a message to that device.

You can find this list also on the Status page on the web interface:



Broadcast connector settings

The **TX codec** setting determines which codec is used for transmitting audio. The M1KE is able to decode both PCM and AMBE3000.

The **Encryption key** setting is used to encrypt the audio stream. The same key must be used on both the transmitting and receiving devices.

Message will be shown in the neighbor list of other devices.

Device to Device network

You can talk to other devices nearby on the same channel on the Device to Device network. This network is always active.

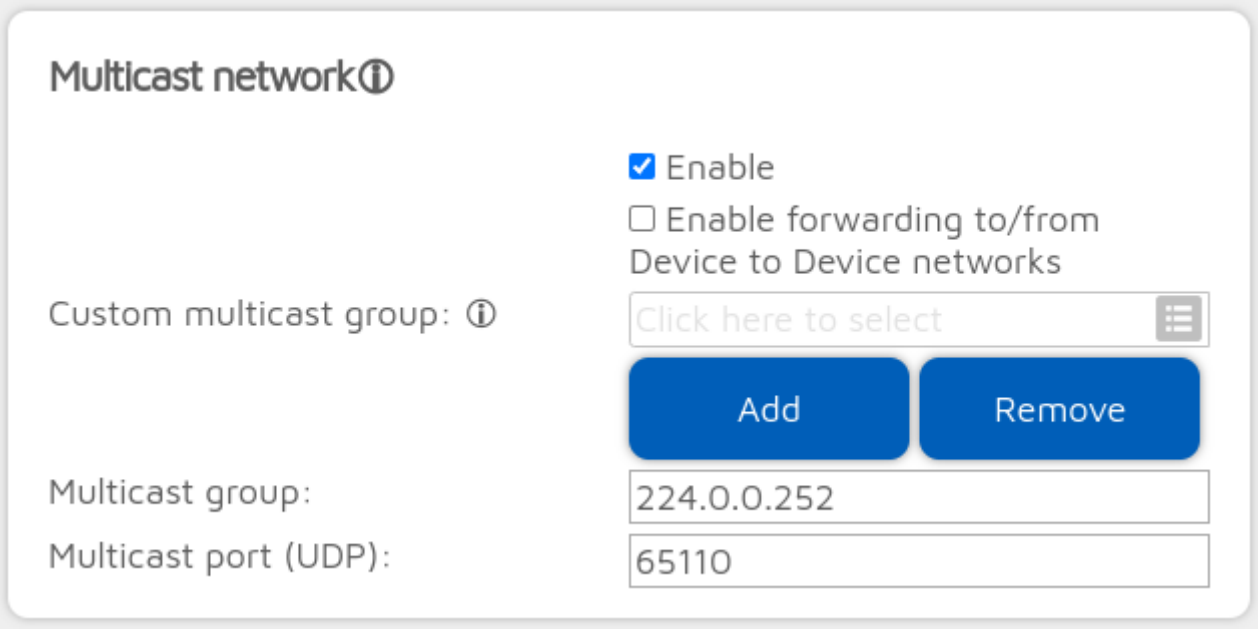
The M1KE always listens on the Device to Device network even when it is connected to a Wi-Fi® network. If it is not connected to a Wi-Fi® network, then the channel number can be set freely. If it is connected to a Wi-Fi® network, then the channel number is set to the same as the Wi-Fi® network's channel number.

If Advanced mode is enabled, then you can set a **Filter ID**. This ID must match on other devices, otherwise they won't be able to communicate with each other.

Note

Device to Device network channels are shared with other 2.4GHz protocols like Wi-Fi® and Bluetooth. You may experience dropouts if the currently used channel is congested.

Multicast network



Note

This section is only shown if Advanced mode is enabled.

If the M1KE is connected to a Wi-Fi® network, then it can also talk to other devices on the same Wi-Fi® network.

If Advanced mode is enabled, then the following settings are visible:

- You can **enable/disable** using the Multicast network
- You can **Enable forwarding to/from Device to Device networks**. If you enable this, then the device acts as a gateway and forwards received data from the Device to Device network to the Multicast network, and vice versa.
- **Multicast group** and **multicast port** settings must match on all devices which want to communicate with each other on the Multicast network.
- You can save custom multicast groups. Each custom group entry stores multicast group address, port, TX codec, encryption key, source callsign, name and message.

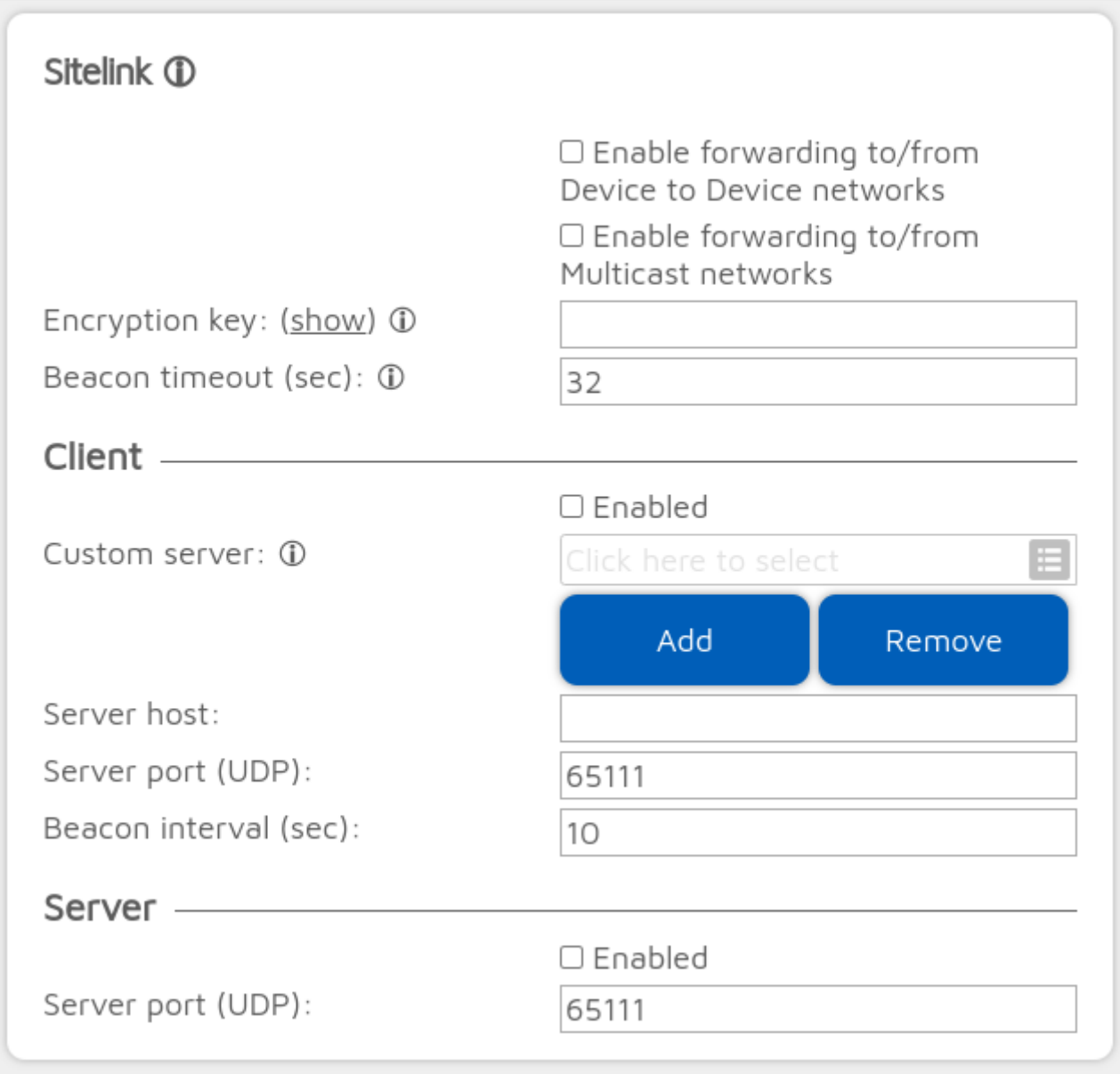
Important

Make sure multicast packets are not filtered by your Wi-Fi® access point.

Important

Avoid creating loops by enabling the **Enable forwarding to/from Device to Device networks** setting on only one device in the network.

Sitelink network



Note

This section is only shown if Advanced mode is enabled.

In this section you can configure the M1KE to connect Device to Device or Multicast networks via the internet. It can act as a client or a server.

If set, the **Encryption key** setting is applied for the Sitelink connection only and does not affect the Device to Device or Multicast network encryption.

A Sitelink client sends a beacon to the server every **Beacon interval (sec)** seconds. The server replies to this beacon. The **Beacon timeout** setting determines the timeout to consider the connection dead if no beacon or reply is received.

Note

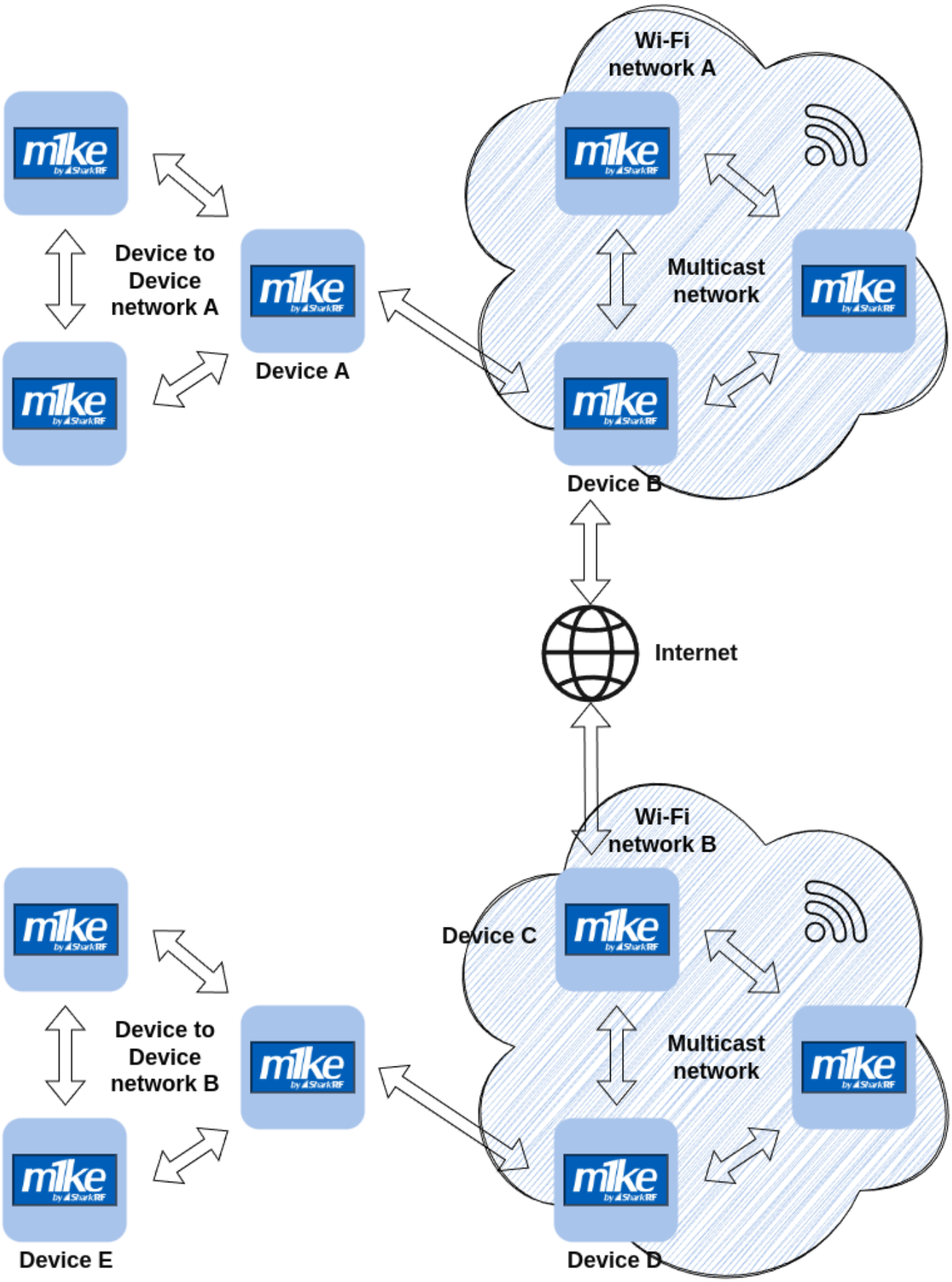
PTT will be disabled on the device if it acts as a Sitelink server.

Important

Avoid creating loops by having only one client and server in a network.

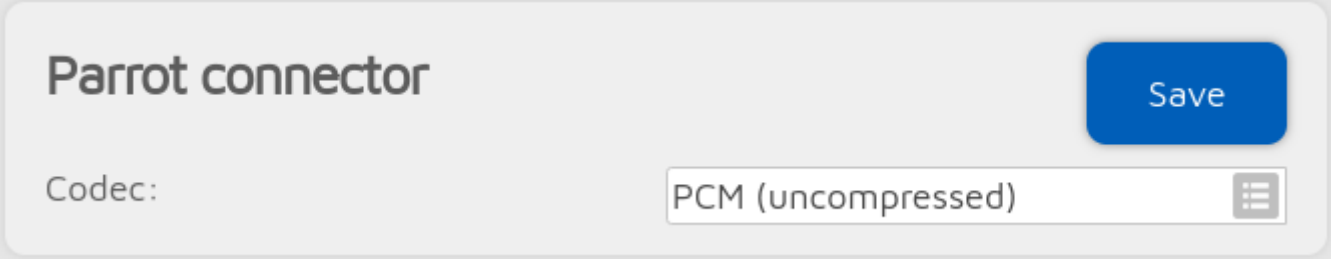
Broadcast network example

Here’s an example of a network which consists of several M1KE devices:


Wi-Fi
network A
Device to
Device
network A
Device A
Multicast
network
Device B
Internet
Wi-Fi
network B
Device C
Device to
Device
network B
Multicast
network
Device E
Device D

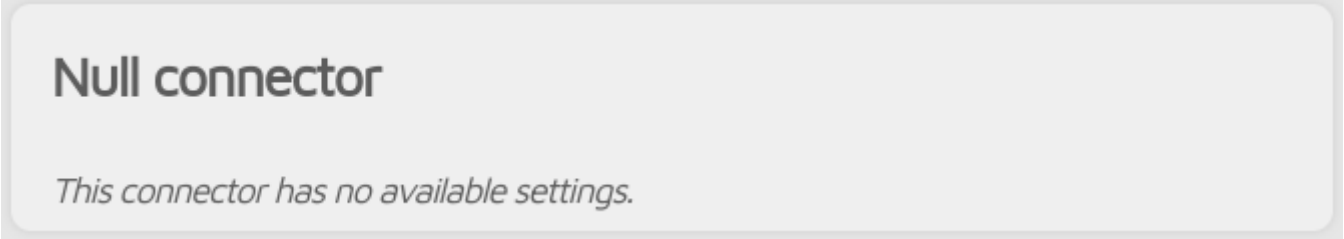
- **Device A** can talk to its neighbors over the Device to Device network
- **Device B** is connected to **Wi-Fi® network A**, and it can talk to its neighbors over the **Multicast network** on the Wi-Fi® network
- **Device B** is nearby **Device A** so they can communicate via the Device to Device network
- If **Device B** has the **Enable forwarding to/from Device to Device networks** setting enabled, then others on its Multicast network can talk to **Device A** and other devices on the Device to Device network, so the upper part of the network graph is fully connected.
- If **Device B** and **Device C** are configured as **Sitelink server** and **client**, then both networks can be connected via the internet. If **Device D** is also configured to forward between Device to Device and Multicast networks, then it is possible to talk between all devices on the network. For example, **Device E** can talk to **Device A**.

Parrot connector



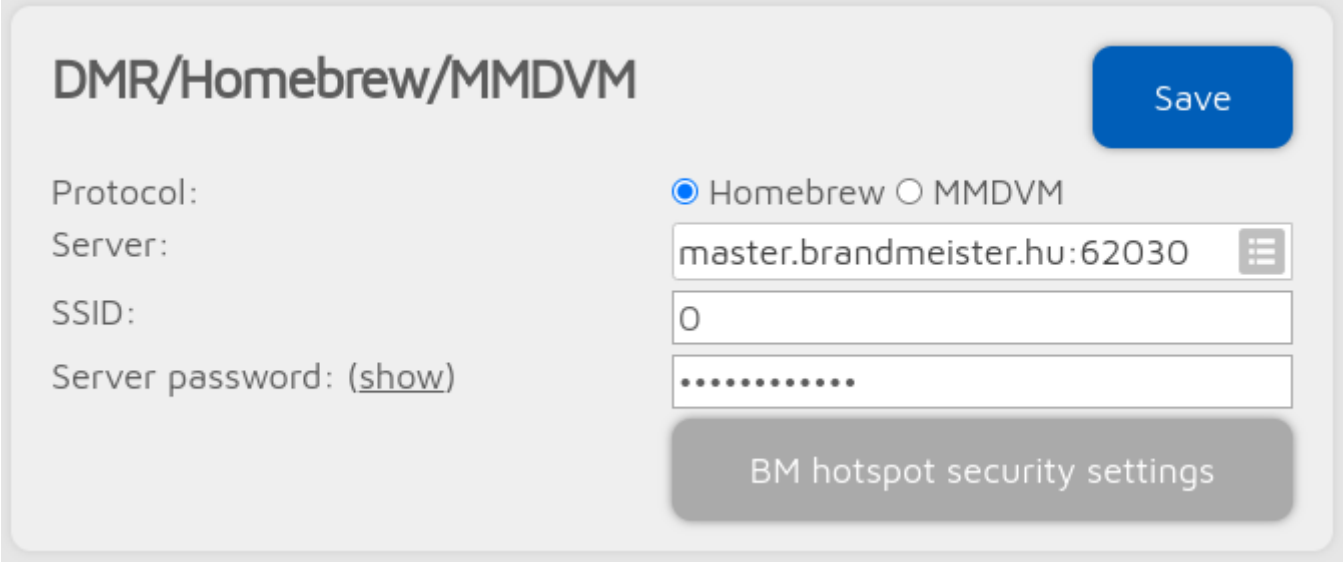
You can use this connector to check your own voice. If this connector is active and you press PTT, the device will record your transmission (up to 30 seconds) and plays it back after you release PTT.

Null connector



The Null connector is a special connector which does not connect anywhere.

Homebrew/MMDVM® connector



This connector supports 2 protocols: **Homebrew** and **MMDVM®**. Use the Homebrew protocol to connect to BrandMeister Network servers, and the MMDVM® protocol to connect to TGIF, DMRplus, Phoenix, DMR-MARC, XLX etc. servers.

Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

Note

Read more about DMR usage, talkgroup linking/unlinking here.

Connecting to a BrandMeister server

BrandMeister servers require this connector to be in **Homebrew** protocol mode. You can see the list of currently linked static, dynamic talkgroups and reflectors on the Status page of the web interface.

Set the **Server password** to the Hotspot security password you've set on your BrandMeister SelfCare page. Take a look at this page for more information about configuring a Hotspot security password.

If you use a BrandMeister server then the **BM hotspot security settings** button shows up which will take you to the BrandMeister SelfCare page.

Connecting to other servers

The default **Server password** for **MMDVM®** servers is *passw0rd* or *password*, but some servers do not use these defaults. Refer to the server's support page for the correct password.

SSIDs

You can optionally use SSIDs to connect **multiple devices** to the BrandMeister Network. Use separate SSID for each of your device. This way you **don't need to have multiple DMR IDs**.

As talkgroup linking/unlinking is managed entirely by the network/server based on the connected DMR ID, SSIDs can also be used to have a **different set of linked talkgroups on each** configuration profile.

Note

Read more about DMR usage, talkgroup linking/unlinking here.

Advanced settings

If Advanced mode is enabled, the following settings will be visible:

You can set a **backup server** which will be used if the device can't connect to the primary server for **Backup server activate connect timeout** seconds. If the backup server is disconnected then the primary one will be tried automatically again.

You can set the TDMA channel which the M1KE will use with the **DMO mode TDMA channel** setting. On the BrandMeister Network the DMO mode links the two timeslots together, so this setting is irrelevant.

Auto connect

The **Auto connect to ID** will be quick called when the device connects to the server. Please see the Quick Call for more information about this feature.

Note

Using the auto connect feature is **not needed (and not recommended) on BrandMeister**, as this network supports auto static talkgroups: the first talkgroup you call **after** calling TG4000 will be set as **auto static**. These talkgroups will not be unlinked after a timeout like dynamic talkgroups (this timeout is usually 15 minutes, but this depends on server settings).

Example: start a short call to TG4000. Then start a short call to TG3100. Now TG3100 will be auto static, which means it won't be unlinked after a timeout.

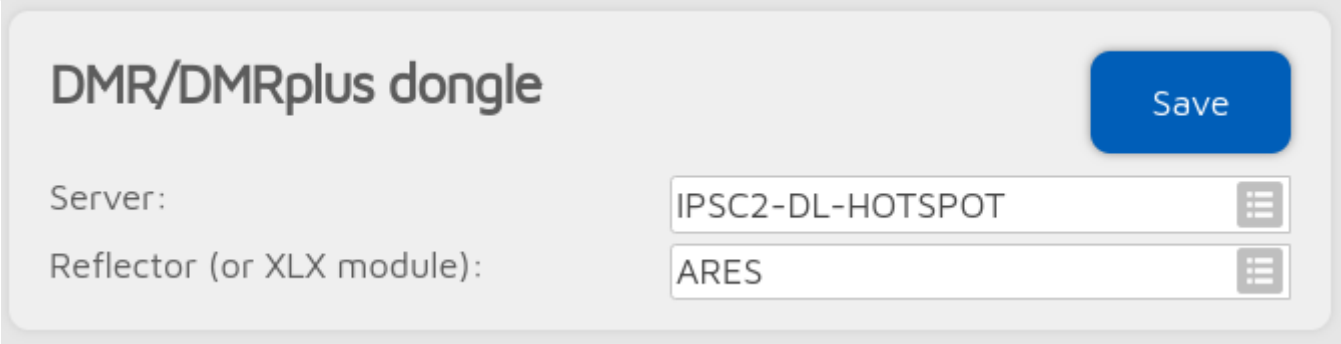
If you are using auto connect to a talkgroup, it is advisable to check the **Unlink TG/ref. on auto connect** checkbox. If it's checked, the device will automatically quick call TG4000 after it is connected to the server, so the currently active TG/reflector will be unlinked. This is useful if you only want to use a talkgroup, but the server always links you to a reflector automatically.

If you set the **Auto connect interval (sec)** setting to a value greater than zero then auto connect will be performed periodically.

Changing modules on XLX servers

To unlink the currently linked module, call DMR ID 4000 (either using the Quick Call on the web interface, or using a transceiver). To connect to module A, call DMR ID 4001, for module B call DMR ID 4002 and so on.

DMRplus dongle connector



You can use this connector to connect to a network which supports the DMRplus dongle protocol like DMRplus, Phoenix, DMR-MARC, XLX.

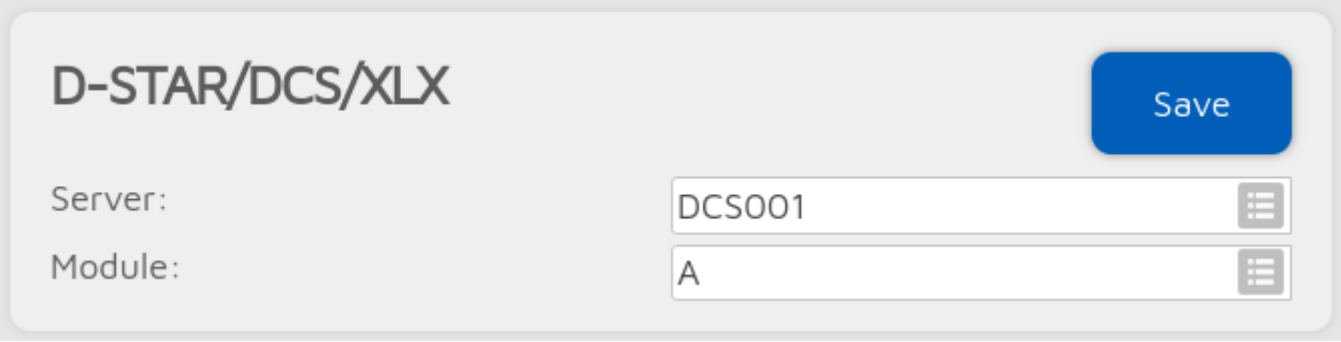
Warning

The DMRplus dongle connector is deprecated. It is recommended to use the Homebrew/MMDVM® connector instead.

Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

DCS/XLX connector



You can use this connector to connect to a network which supports the DCS protocol like DCS or XLX.

Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

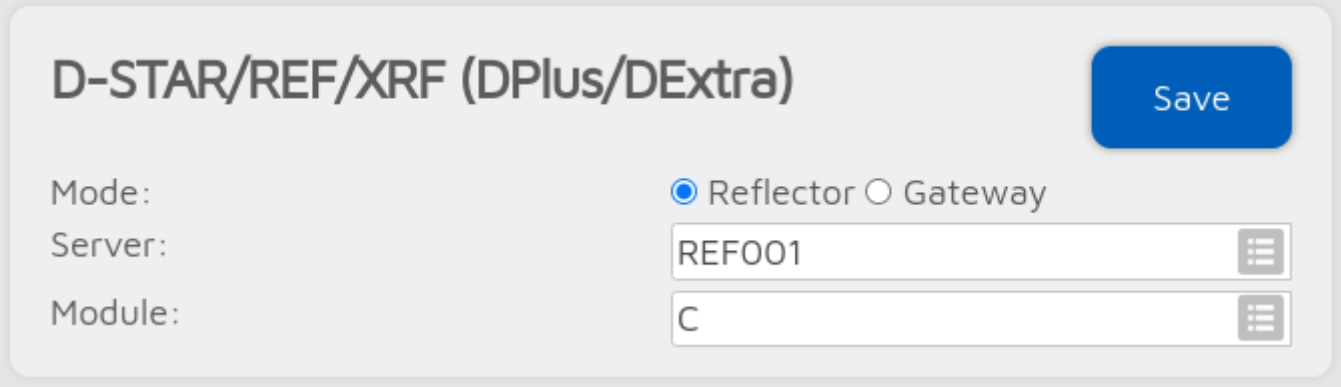
Note

DCS and XLX servers usually do not need a valid D-STAR® registration, but you can check your callsign's registration by clicking on the **Check D-STAR® registration** button at the Owner information on the Quick Setup page.

Advanced settings

If Advanced mode mode is enabled, and the **Auto set URCALL to network** setting is enabled, then the destination callsign of outgoing calls will be automatically set to CQCQCQ.

REF/XRF connector



You can use this connector to connect to a network which supports the Dplus protocol like REF or XRF.

Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

Note

Classic REF/XRF servers require a valid, registered callsign. You can check your callsign's registration by clicking on the **Check D-STAR® registration** button at the Owner information on the Quick Setup page.

If you connect to such a server with an invalid callsign registration, then the server may only serve a **read only** connection, which means you won't be able to transmit to the server. A warning notification will be shown on the web interface, and you'll see a warning at the **Connected to** field on the Status page.

Advanced usage

Connecting to a reflector

If you do not use the Quick Setup, and you want to use a reflector like REF001 or REF030, then:

- Set the **local module** to D
- Set the **Reflector/gateway ID** to the callsign of the reflector

Connecting to a gateway

If you do not use the Quick Setup, and you want to use a gateway, then:

- If the **Auto set URCALL to network** is not enabled, then set the PTT destination callsign to the gateway's callsign and remote module.

  Remote module should be the last character of the URCALL.
- Set the local module to a space character (make sure the "space" local module is registered in the D-STAR® registration system).
- Set the **Reflector/gateway ID** setting to the callsign of the repeater.

Note

You can change the PTT destination callsign on the device display or on the Mic settings page on the web interface.

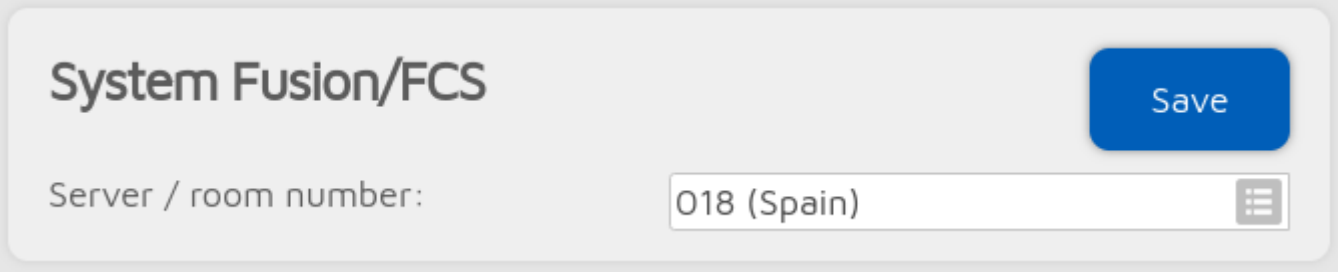
Advanced settings

Try remote module E on any classic reflector like REF001 or REF030 for the echo service (may not be enabled on some servers).

If Advanced mode is enabled, the following settings will be visible:

If the **Auto set URCALL to network** setting is enabled, and the REF/XRF connector is set to Reflector mode, then the destination callsign (URCALL) of outgoing calls will be automatically set to CQCQCQ. If the REF/XRF connector is set to Gateway mode, then the URCALL will be automatically set to the gateway's callsign and remote module.

FCS connector



You can use this connector to connect to a network which supports the FCS protocol like the FCS network.

Note

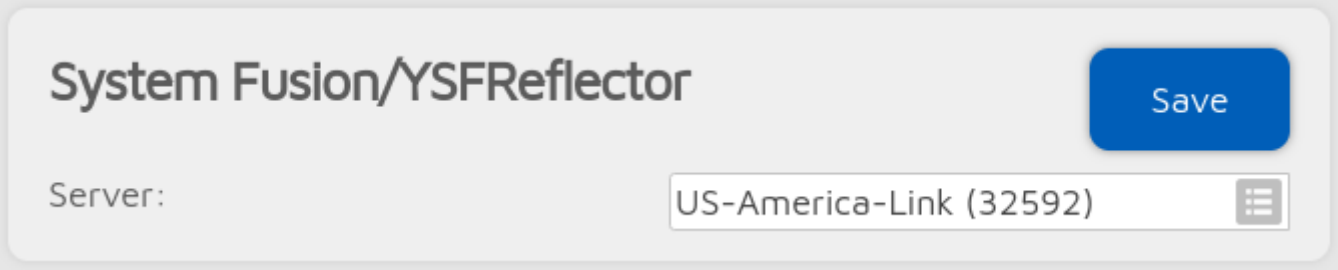
The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

Advanced settings

If Advanced mode is enabled, and you enter IDs into the **DGID list**, then they will be sent to the server. The server will link the specified DGIDs/rooms if it supports this functionality. Note that the server may override the **Room number** setting if the DGID list is not empty.

You can enable transmitting in VW (Voice Wide) mode, but we recommend using DN (Digital Narrow) mode instead, as it is more resilient to bit errors at the remote end and it also lets the listener see the caller information even when the call header is missed.

YSFReflector connector



You can use this connector to connect to a network which supports the YSFReflector protocol, like YSFReflector servers.

Note

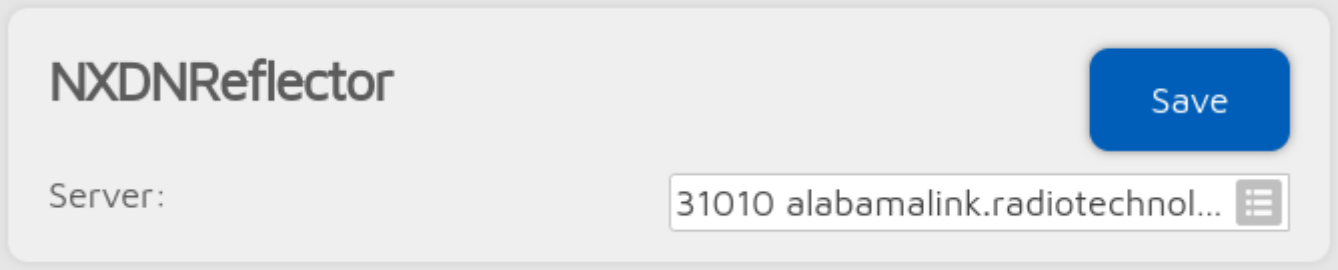
The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

Advanced settings

If Advanced mode is enabled, and you enter IDs into the **DGID list**, then they will be sent to the server. The server will link the specified DGIDs/rooms if it supports this functionality.

You can enable transmitting in VW (Voice Wide) mode, but we recommend using DN (Digital Narrow) mode instead, as it is more resilient to bit errors at the remote end and it also lets the listener see the caller information even when the call header is missed.

NXDNReflector connector



You can use this connector to connect to a network which supports the NXDNReflector protocol, like NXDNReflector servers.

Note

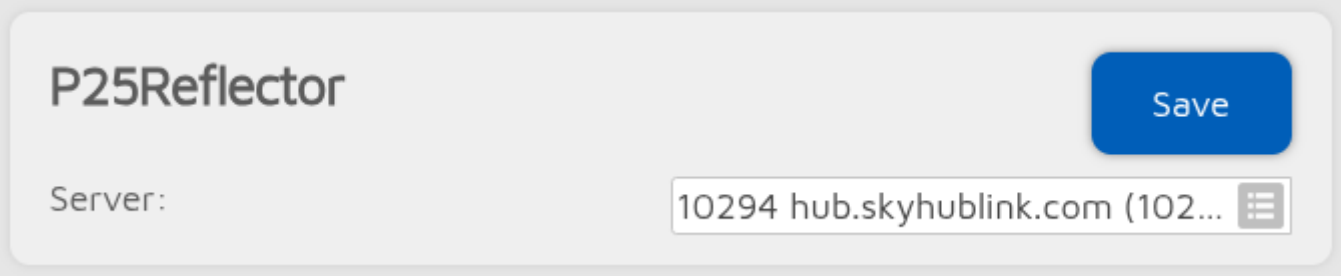
The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

Talkgroup handling

NXDNReflector servers handle only one talkgroup. You can find each server's talkgroup ID in the server list, or if you enable Advanced mode, then the talkgroup ID setting will be shown.

If you did not use the Quick Setup to set up the NXDNReflector connection, then make sure you send your calls as a group call to the talkgroup ID, otherwise the server will ignore them.

P25Reflector connector



You can use this connector to connect to a network which supports the P25Reflector protocol, like P25Reflector servers.

Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

Talkgroup handling

P25Reflector servers handle only one talkgroup. You can find each server's talkgroup ID in the server list, or if you enable Advanced mode, then the talkgroup ID setting will be shown.

IAX2/AllStarLink® connector

You can use this connector to connect to a network which supports the IAX2 (Inter-Asterisk eXchange) protocol, like AllStarLink® servers.

Note

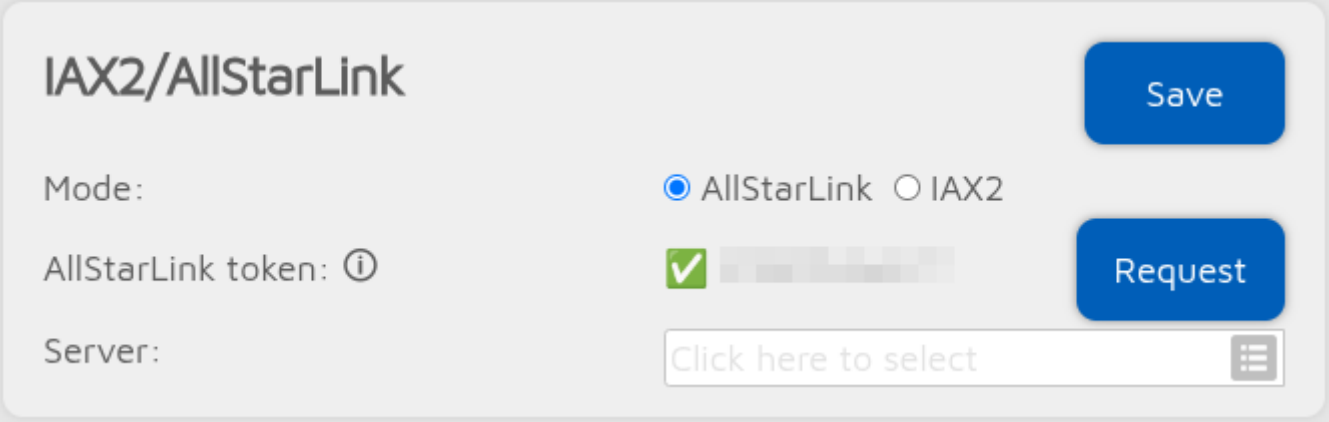
The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

The following voice codecs are supported (in order of preference):

- µ-law
- A-law
- ADPCM
- GSM

If this connector is active, a menu item called IAX2/AllStarLink® will appear in the display's main menu. You can also access this menu by **long pressing** the Down Button on the Main screen or on the Ongoing call screen.

AllStarLink® web transceiver mode



Token

A token is required to connect to an AllStarLink® server. This can be acquired from your AllStarLink® account (you need to sign up on allstarlink.org if you don't have one).

If you don't see a green check mark next to the token, then the token is invalid - you can request one by clicking on the **Request button** and entering your allstarlink.org account callsign and password.

Note

The entered callsign and password are not stored on the device or sent to SharkRF servers, they are only used for acquiring the token. Only the token generated by the AllStarLink® server is saved on the device.

Web transceiver connections

You can only connect to AllStarLink® servers which have web transceiver connections enabled (most of the servers have this setting enabled).

See the AllStarLink® node mode below if you want to connect to an AllStarLink® server which does not have web transceiver connections enabled.

Connecting to a server

Connecting and logging in to an AllStarLink® server may take 3-4 seconds depending on server settings.

If the server replies with the **No authority found** error message, then it means the server configuration is invalid for the stanza *allstar-public* (or web transceiver connections are disabled on the server). Contact the administrators of the server to fix the issue (or connect to another node and link the desired server with DTMF commands).

Note

The destination and source callsigns of AllStarLink® calls will always be the node ID, as AllStarLink® does not forward callsign information.

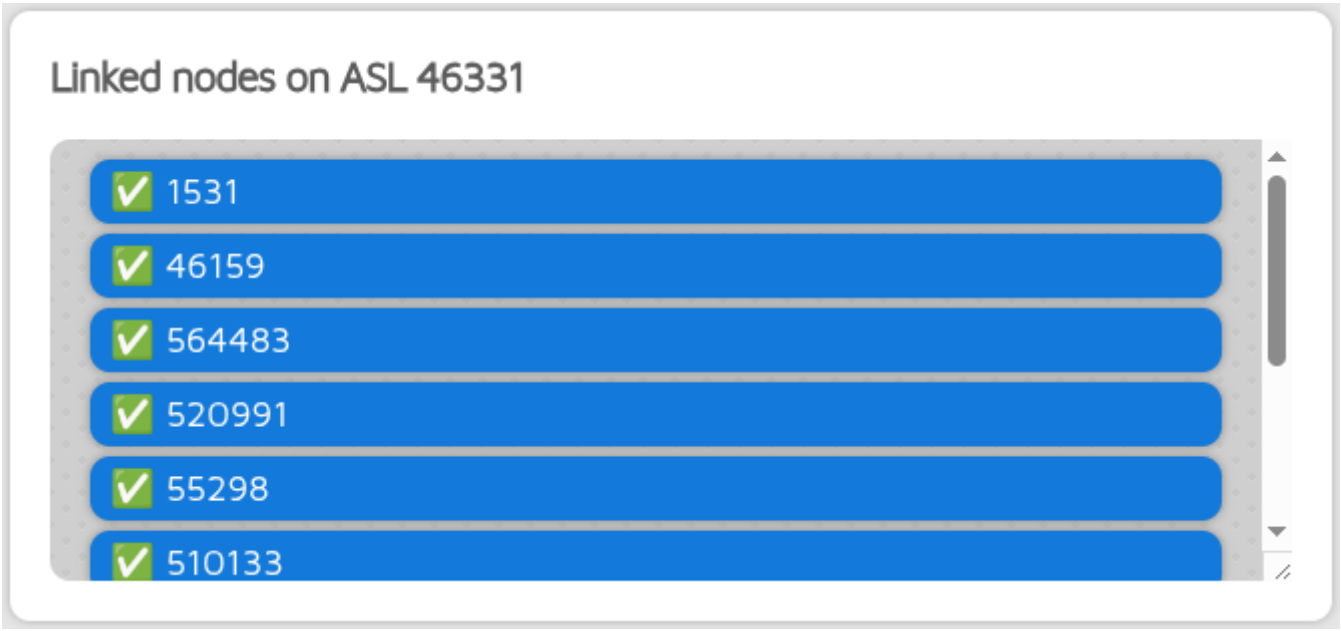
Linking/unlinking and other commands

You can send DTMF commands to the server to request status announcements or control linking and unlinking to other nodes. See the list of commands supported by AllStarLink® servers here. Use the IAX2/AllStarLink menu on the device display or the Call dialog on the web interface to send DTMF sequences.

Linked nodes list

You can find the list of linked nodes reported by the AllStarLink® server on the device display in the IAX2/AllStarLink® menu:

Or on the Status page on the web interface:



Meaning of the node icons:

- ■ Connection pending
- ■ Connected, receive only
- ■ Connected

Advanced settings

If Advanced mode is enabled, then you can enable/disable the **Display all telemetry** setting. This setting determines whether all or just relevant received server telemetry (node connected/disconnected/etc. messages) is displayed on the GUI and the web interface.

AllStarLink® node mode

This mode lets you use the M1KE as an AllStarLink® node, which means that you can connect to nodes even when they do not have web transceiver connections enabled.

Enable the **Register as a node** setting to turn on the AllStarLink® node mode.

Note

The **Register as a node** checkbox is only shown if Advanced mode is enabled.

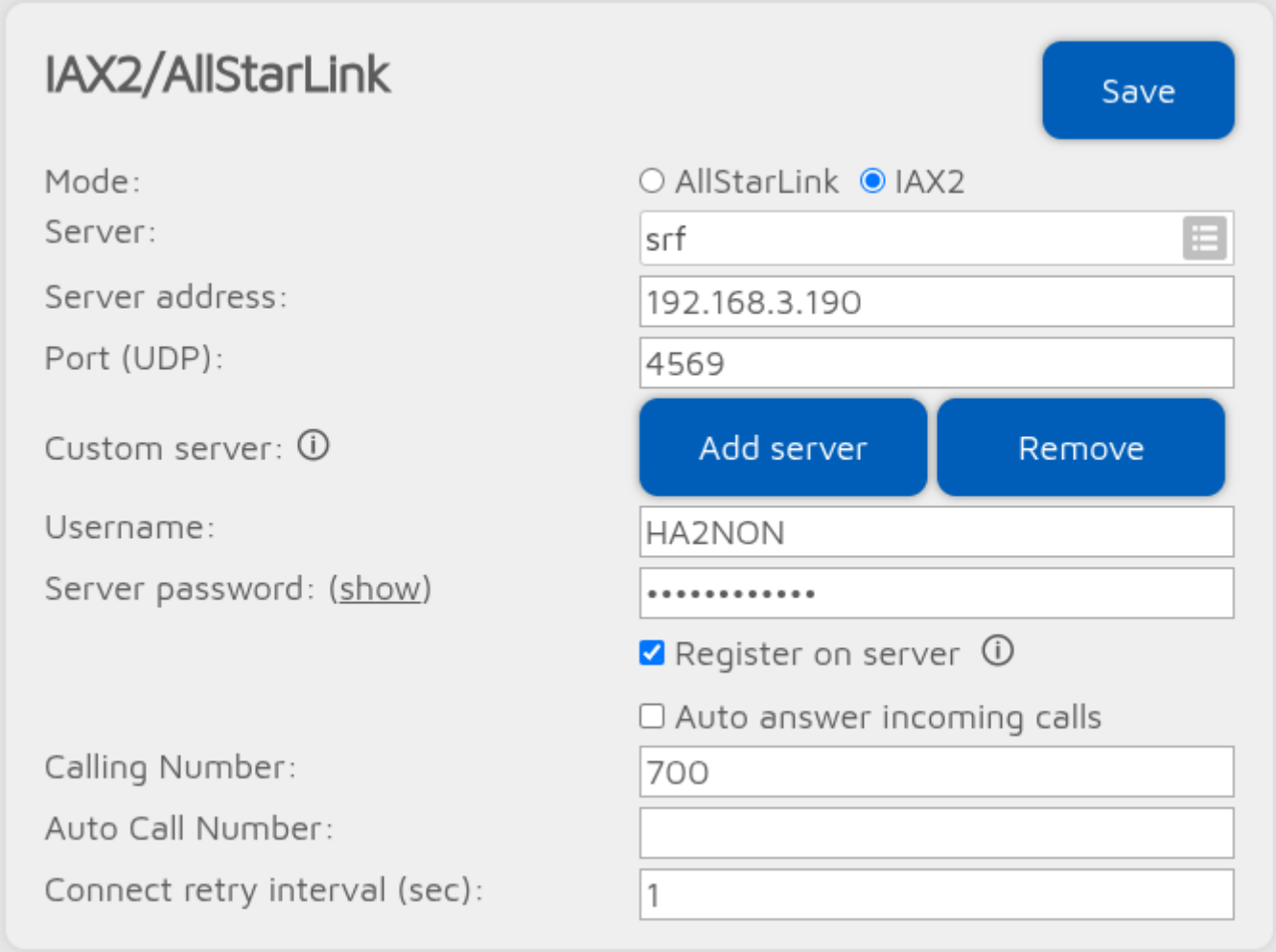
You need a registered AllStarLink® node ID and password to use this mode. See the **Request a node number** section on this page for more information on how to get a node ID and password. Enter your node ID and password in the **Local node ID** and **Local node password** fields.

Important

AllStarLink® nodes refresh the list of registered nodes every 5 minutes, so you may need to wait up to 5 minutes after enabling node mode for the servers to recognize your device as a node and allow you to connect.

The M1KE does not accept connections from other nodes so you don't need to set up port forwarding on your router.

IAX2 mode



This mode lets you call other IAX2 devices and register on IAX2 servers to send or receive calls.

EchoLink connector

You can use this connector to connect to the EchoLink network.

A valid EchoLink user account is required to use this connector. See the registration/validation instructions on echolink.org.

The callsign is taken from the device owner information's callsign setting. Enter the EchoLink account password for your callsign at the **EchoLink user password** field.

Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

Important

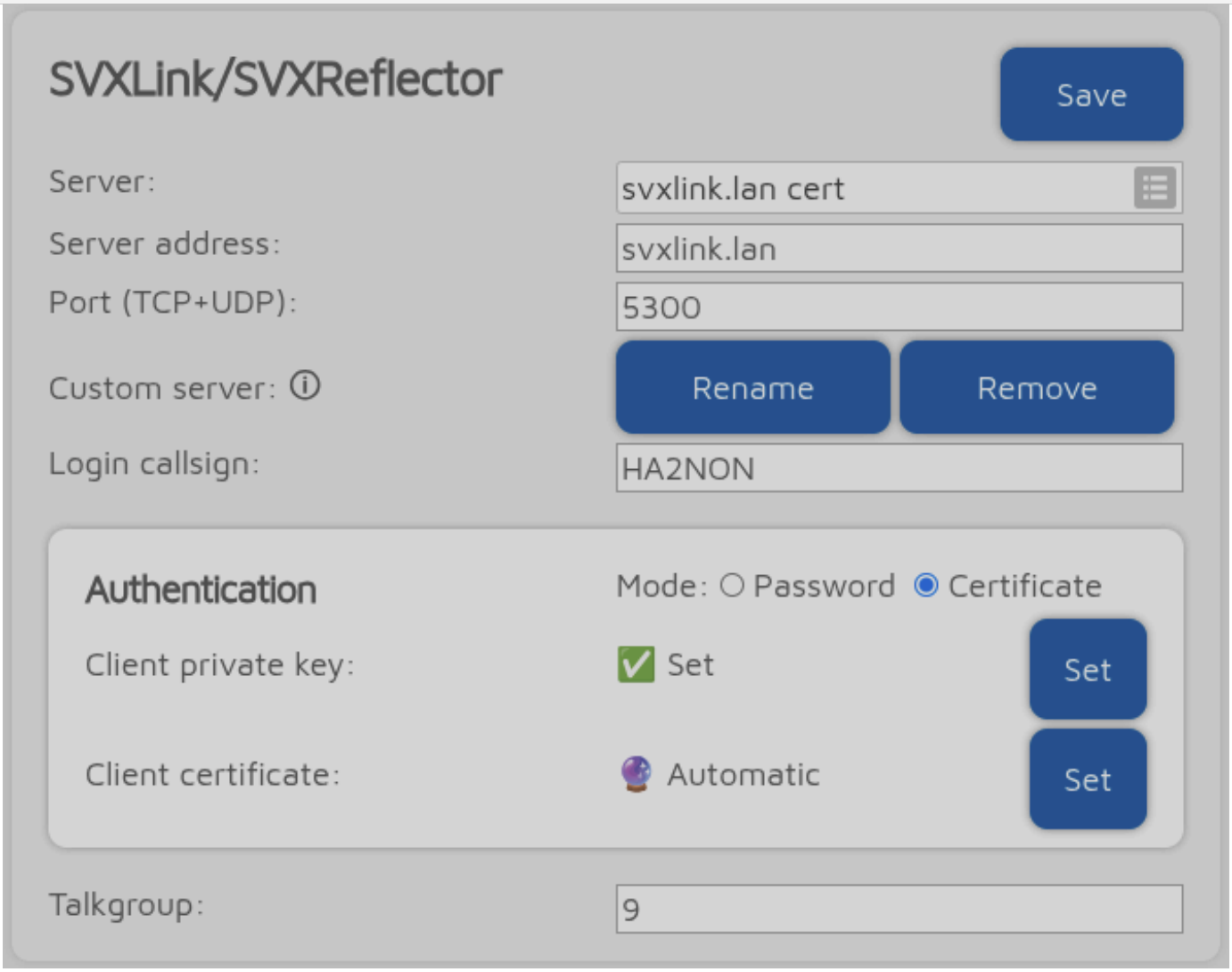
- The M1KE does not accept incoming EchoLink connections. It can only connect to other EchoLink servers.

Proxy servers

The EchoLink network requires that each client has a unique internet IP address. If your internet service provider uses Carrier Grade NAT (you don't have a unique public IP address) or you have connectivity issues, then enable the **Use proxy server** option.

If the **Auto select proxy server** option is enabled, the device will try to find the nearest available EchoLink proxy server automatically.

SVXReflector connector



You can use this connector to connect to servers which support the SVXReflector protocol. As there is no centralized catalog of SVXReflector servers, you need to obtain the server address and port to connect.

Note

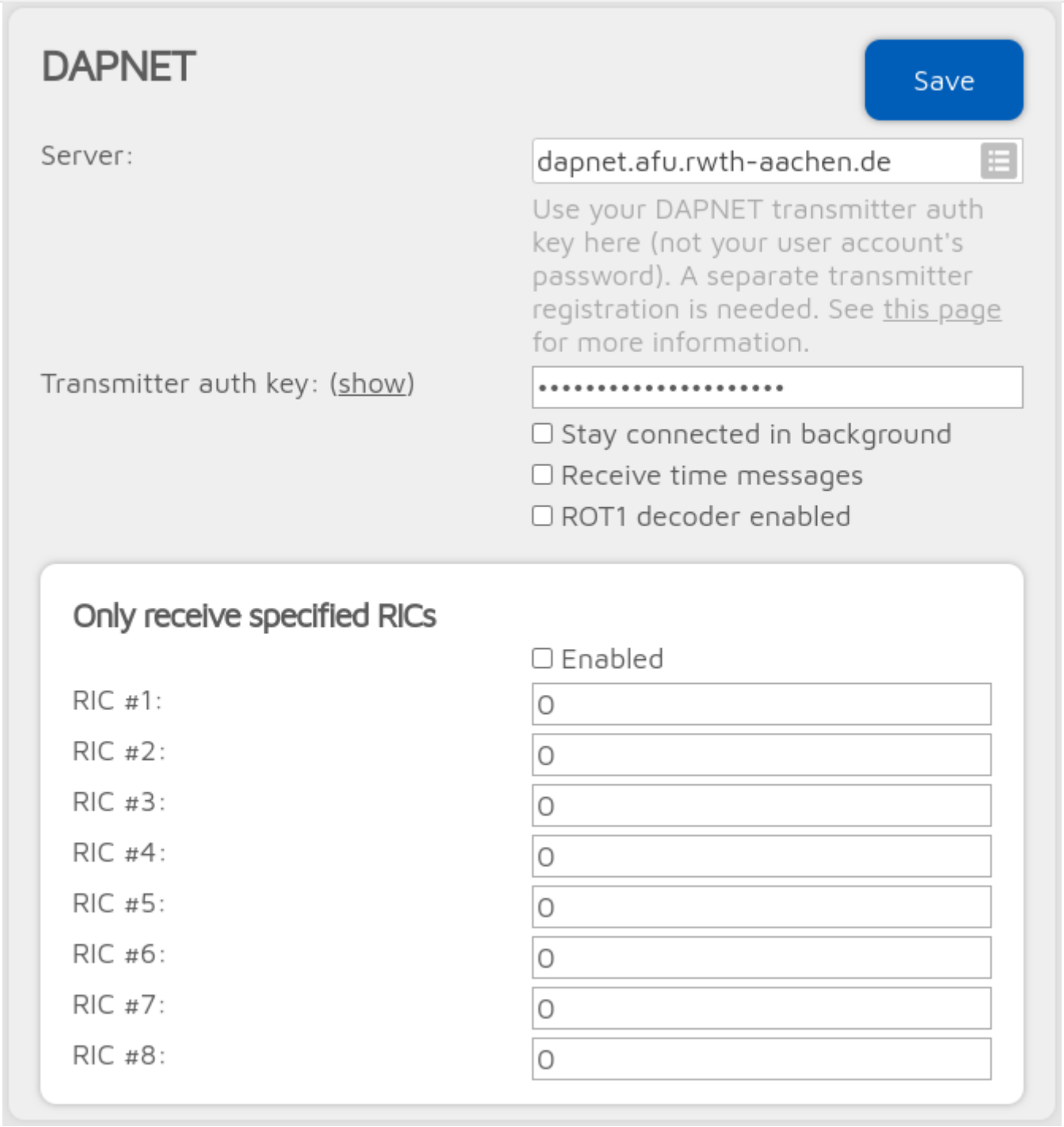
SVXReflector servers do not support audio monitoring of multiple talkgroups (only call information monitoring); therefore, linking to and listening to multiple talkgroups is not possible.

Certificate authentication

If a server does not accept password authentication, set the authentication mode to **Certificate**.

- **A client key is required**. If you don't have one yet, you can generate it in the web interface by clicking the Set button in the *Client private key* row, and then clicking **Generate** in the dialog that appears.
- If the server does not yet have a signed certificate for the client key, the M1KE will automatically request one. The server administrator should be notified of this automatically by the server.
- If the signed certificate is already present on the server, the M1KE will attempt to download it automatically and use it for authentication.
- Optionally, a client certificate can be provided manually; in this case, the M1KE will not request or download one from the server. The certificate can be a PEM-formatted chain, not just a single certificate.

DAPNET connector



You can use this connector to connect to a network which supports the DAPNET protocol. You can find more information about DAPNET here.

Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

This connector can stay active in the background if **Stay connected in background** is checked, which means you can use the device the same way as before with an active connector, but it will also be able to receive messages from DAPNET.

If the **Receive time messages** is unchecked then the time messages from DAPNET will be ignored.

Some messages are ROT1 encoded, these will be automatically decoded if the **ROT1 decoder** is enabled. Note that not all ROT1 encoded messages can be recognized automatically so there can be received messages which won't be automatically decoded.

You can specify up to 8 RICs (IDs) to filter messages. If the **Enabled** checkbox is checked, then the device will only receive DAPNET messages from these IDs.

DAPNET registration

You'll need a **transmitter registration** to be able to receive messages from DAPNET. See this page for more information.

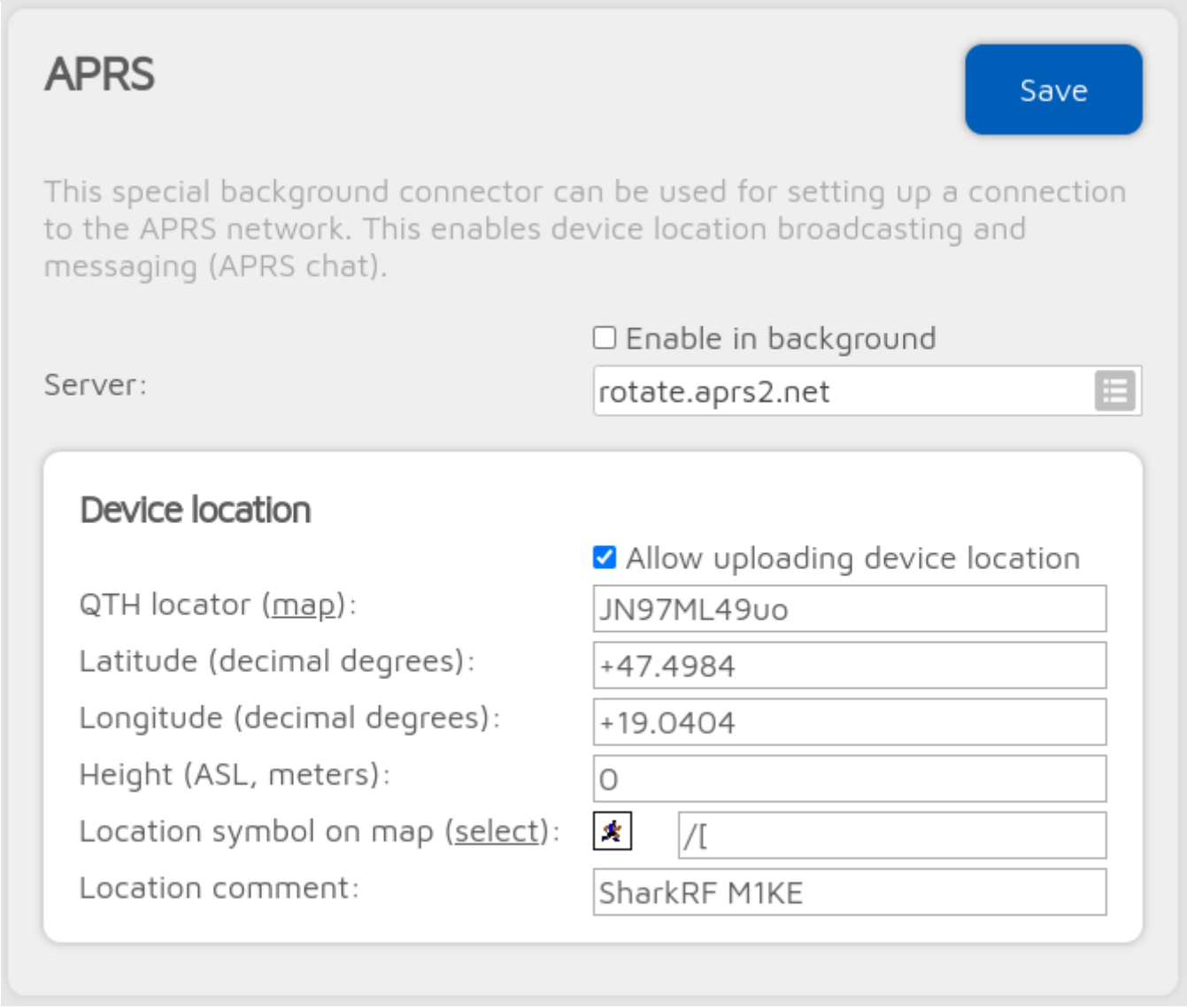
Personal registration is needed if you want to send messages.

Here's how to create these accounts:

1. Open a new ticket at support.hampager.de and select **New DAPNET Account with RIC** as the Help Topic.
2. Fill in all required data and create the ticket
3. Open a new ticket again and select **New DAPNET Transmitter** as the Help Topic.
4. Fill in all required data, set the **Transmitter Type** to personal, and create the ticket.

You can set your callsign for both the personal and the transmitter account.

APRS® connector



You can use this connector to connect to the APRS® network.

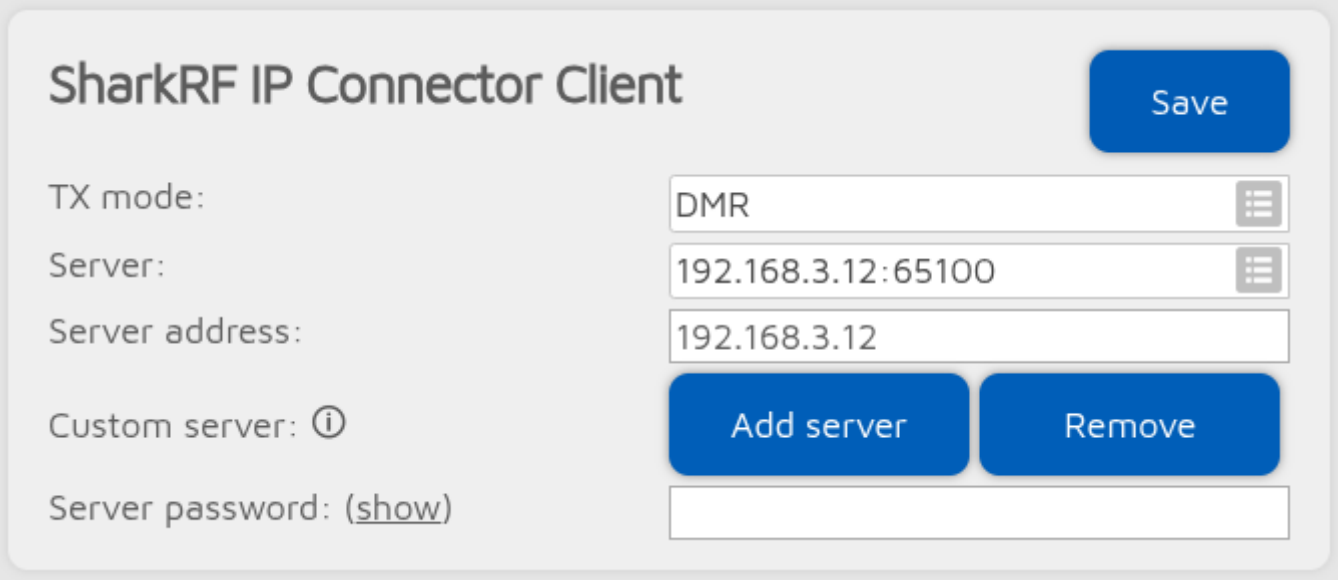
Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to set up this connector.

This connector can stay active in the background if **Stay connected in background** is checked, which means you can use the device the same way as before with an active connector, but it will also function as an APRS® client.

The device will automatically receive APRS® chat messages and if enabled, it can transmit the device location. If the APRS® connector is enabled then you can see its connection status on the Status page.

SharkRF IP Connector Client



You can use this connector to directly connect to another M1KE or openSPOT device, or a server which supports the SharkRF IP Connector protocol, or our open source SharkRF IP Connector Protocol Server.

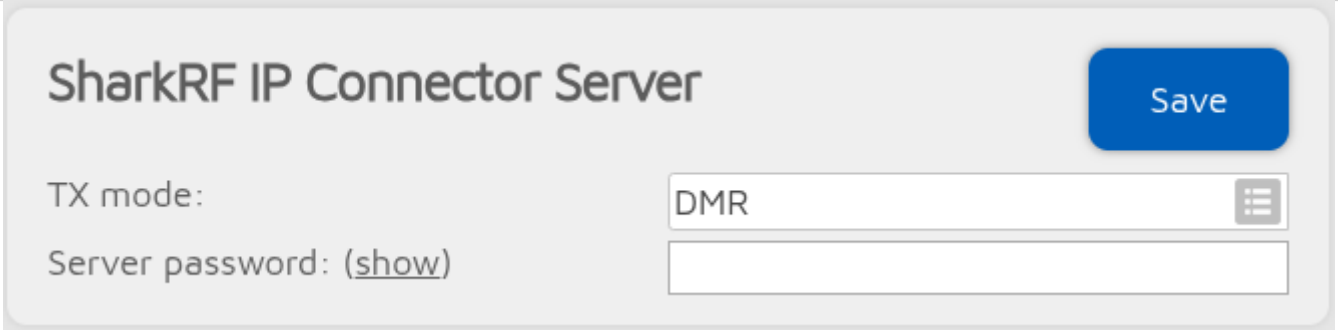
Note

The easiest way is to use the Quick Setup menu on the device or the Quick Setup page on the web interface to connect to these servers.

The protocol's documentation can be found on GitHub, so you can also develop your own application.

If you want to connect directly to another M1KE or openSPOT, make sure the another device is set up as the server, and the UDP port used by this connector (by default it's 65100) is correctly set up on the server's router (it's open on the firewall and is forwarded to the server on its local network).

SharkRF IP Connector Server



You can use this connector to accept up to 32 connections from another M1KE or openSPOT devices. You can use our open source SharkRF IP Connector Protocol Server instead of the built-in server if you want to link more devices.

The protocol's documentation can be found on GitHub, so you can also develop your own application.

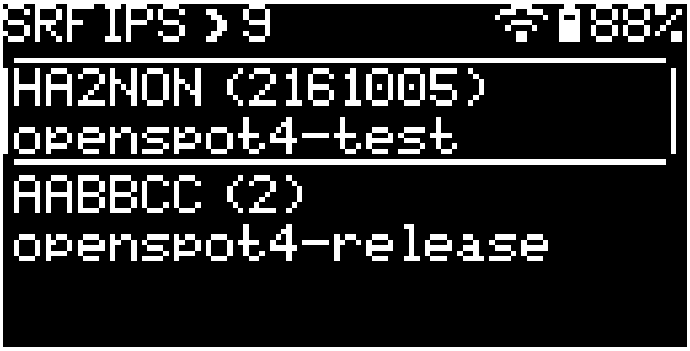
Make sure that the UDP port used by this connector (by default it's 65100) is correctly set up on your router (it's open on the firewall and is forwarded to the device's IP address).

Important

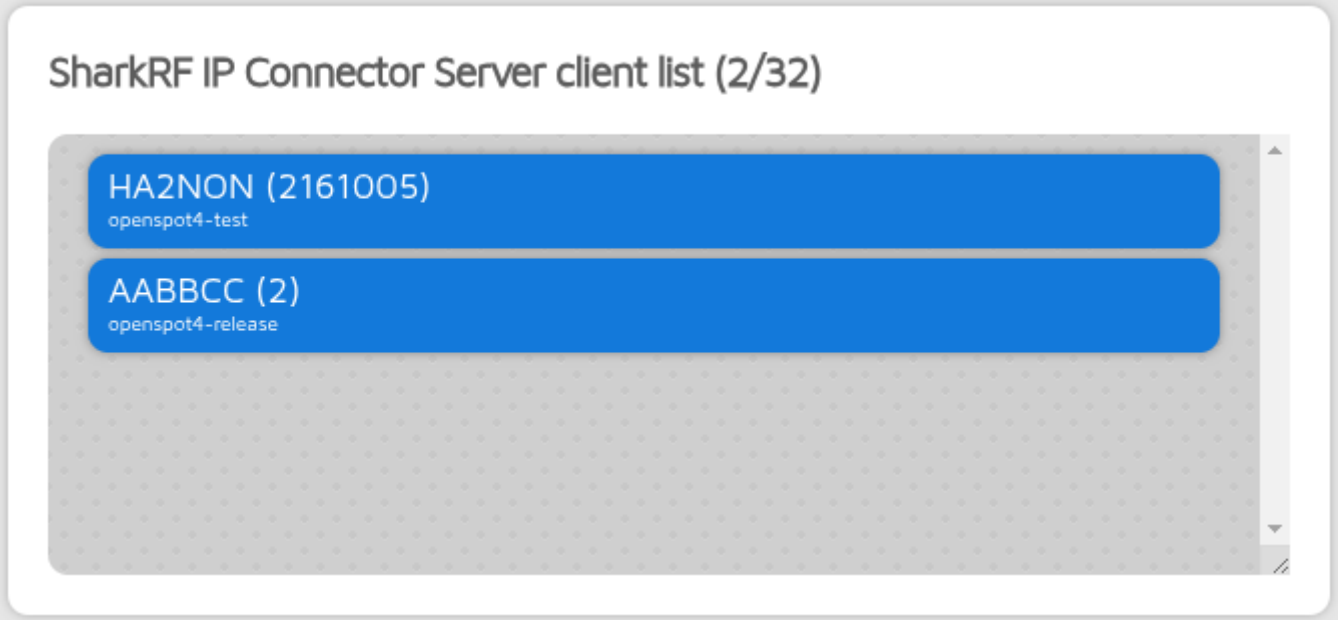
PTT is disabled if more than 1 client is connected.

Client list

If this connector is active, then a menu item called **SRF IPS clients** will show up in the display's main menu. This menu item lets you view the list of connected clients:



You can find this list also on the Status page on the web interface:



Restrictions

Note

This section is only shown if Advanced mode is enabled.

You can set the allowed/banned addresses and client IDs. You can enter IPv4 or IPv6 addresses and you can optionally specify address masks.

IPv4 address examples

- **192.168.3.1** (matches a unique address)
- **192.168.3.1/24** (matches all addresses in the 192.168.3.x range)
- **192.168.3.1/16** (matches all addresses in the 192.168.x.x range)

IPv6 address examples

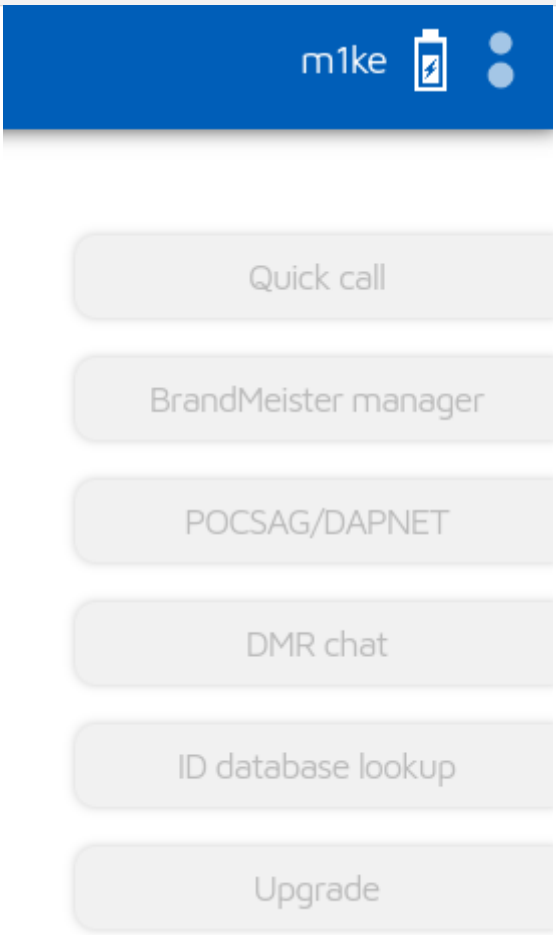
- **2001:db8::1** (matches a unique address)
- **2001:db8:3333:4444:5555:6666:7777:8888/112** (matches all addresses in the 2001:db8:3333:4444:5555:6666:7777:x range)
- **2001:db8:3333:4444:5555:6666:7777:8888/64** (matches all addresses in the 2001:db8:3333:4444:x:x:x:x range)

Important

Check the checkbox above the specified address or ID to allow the restriction.

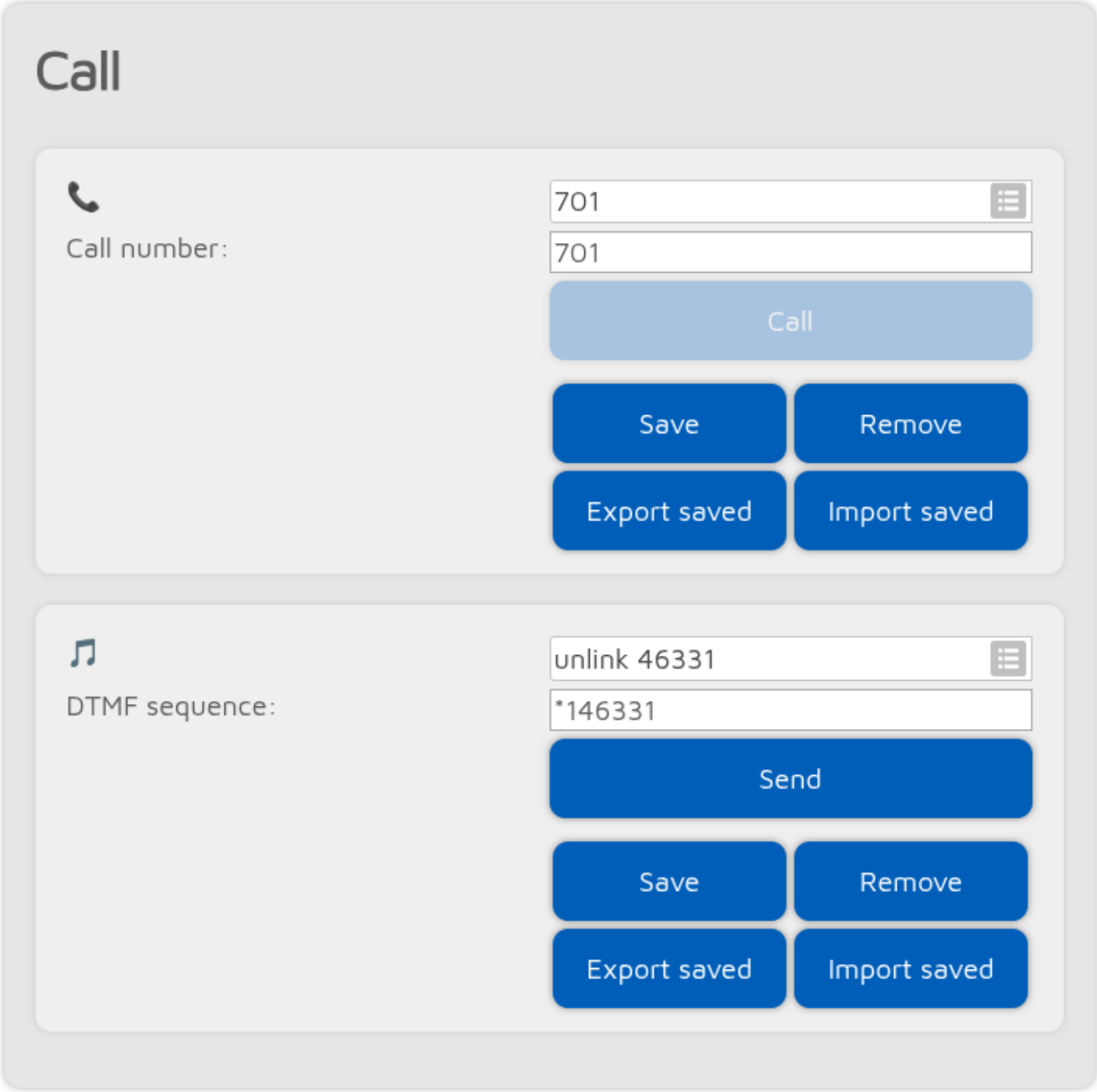
If a connecting client's address or ID is in the banned list, then the connection will be ignored even if the address is in the allowed list. If at least one allowed address is specified, then only the allowed addresses are allowed to connect.

Tools page / Side panels



If you are using a computer, or a screen with enough width, the Tools page gets hidden and side panels will show up on the web interface. On small screens they are hidden, and their contents can be found on the Tools page:

Call



The call dialog is available when the IAX2/AllStarLink® connector is active.

Calling a number

The call button is only enabled when the IAX2/AllStarLink® connector is in IAX2 mode.

Sending DTMF sequences

The DTMF send button is enabled when the IAX2/AllStarLink® connector is in AllStarLink® mode or there is an ongoing call in IAX2 mode.

See the list of commands supported by AllStarLink® servers here.

Note

Not all commands are enabled on all servers.

Storage

You can save and recall numbers and DTMF sequences and export/import them to/from files.

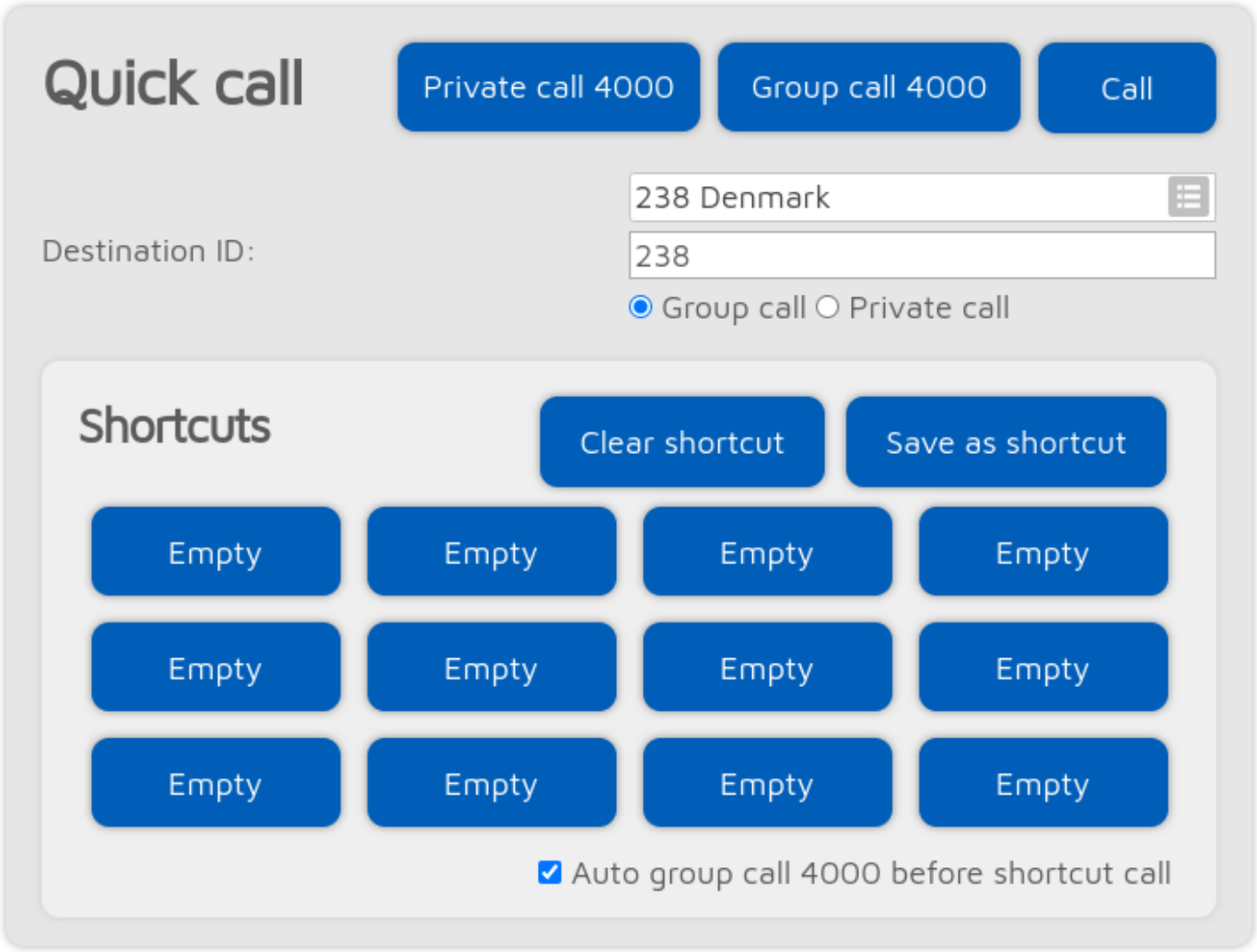
Important

Saved numbers and DTMF sequences are stored in the global storage which are common for all configuration profiles.

Note

Voice of incoming calls may stutter while the import operation is ongoing.

Quick Call



The quick call feature is available when the Homebrew/MMDVM® connector is active.

Reflector and talkgroup linking (and unlinking) is **done by the network, not the M1KE**. The M1KE has to make quick calls to **link or unlink talkgroups and reflectors**.

Note

A quick call is the same as pressing PTT for a short time (kerchunking). These empty calls will also show up on the BrandMeister Network's dashboard.

Starting a short private call to a reflector ID (between 4000 and 5000) will link the reflector. Starting a short group call to a talkgroup ID will link that TG. On the BrandMeister Network, reflectors are unlinked by starting a **private** call to ID 4000, and both reflectors and talkgroups are unlinked by starting a **group** call to ID 4000.

Quick call shortcuts can be stored in the M1KE's current configuration profile. If you hover the mouse cursor over a saved talkgroup's button, or the button is pressed for a few seconds then the talkgroup's name will appear.

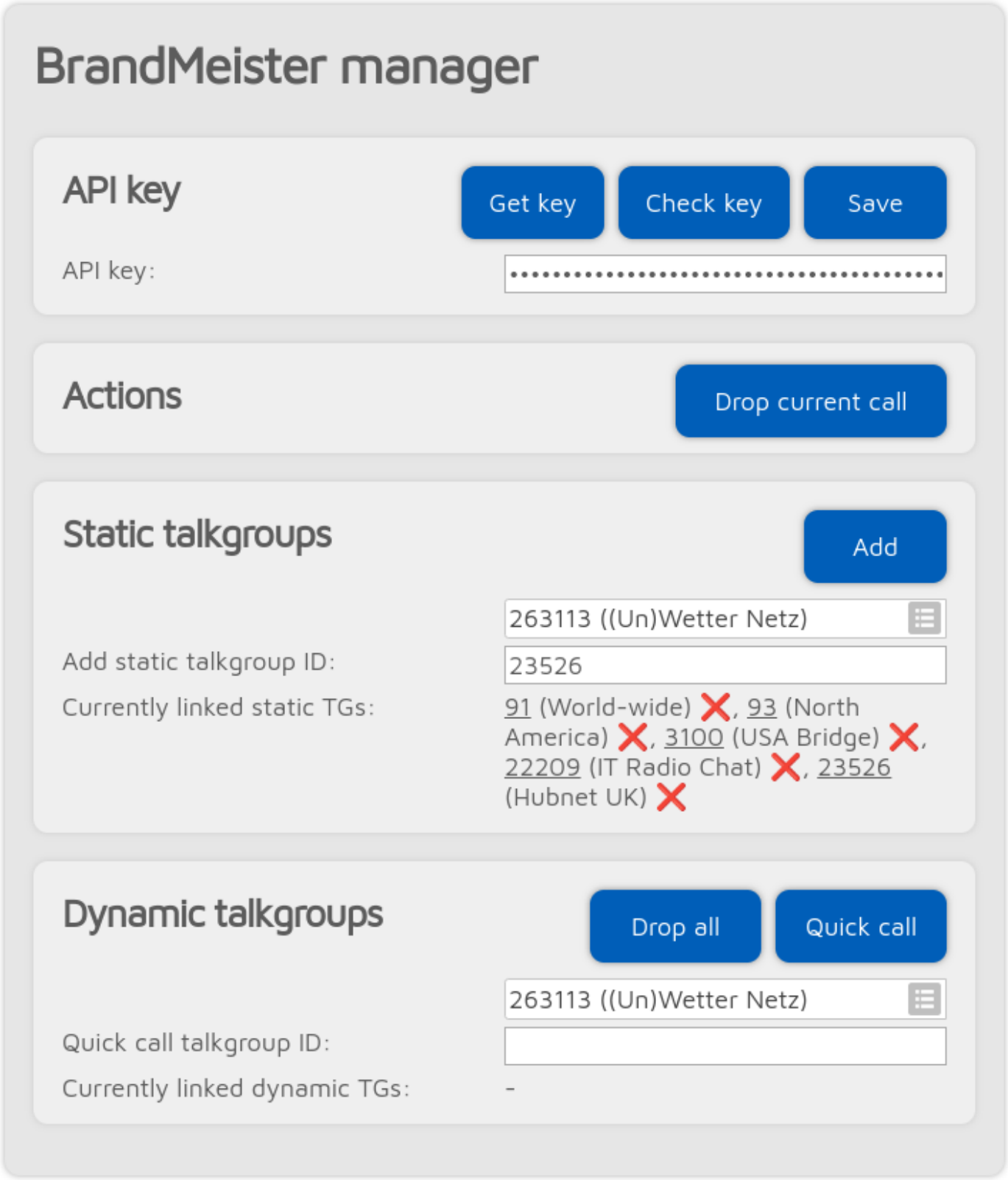
If the **Auto group call 4000 before shortcut call** checkbox is checked, then the device will automatically start a quick call to TG4000 to make the server unlink everything before quick calling the desired ID.

You can also perform (and edit) quick calls on the device display.

Note

Read more about DMR usage, talkgroup linking/unlinking here.

BrandMeister Manager



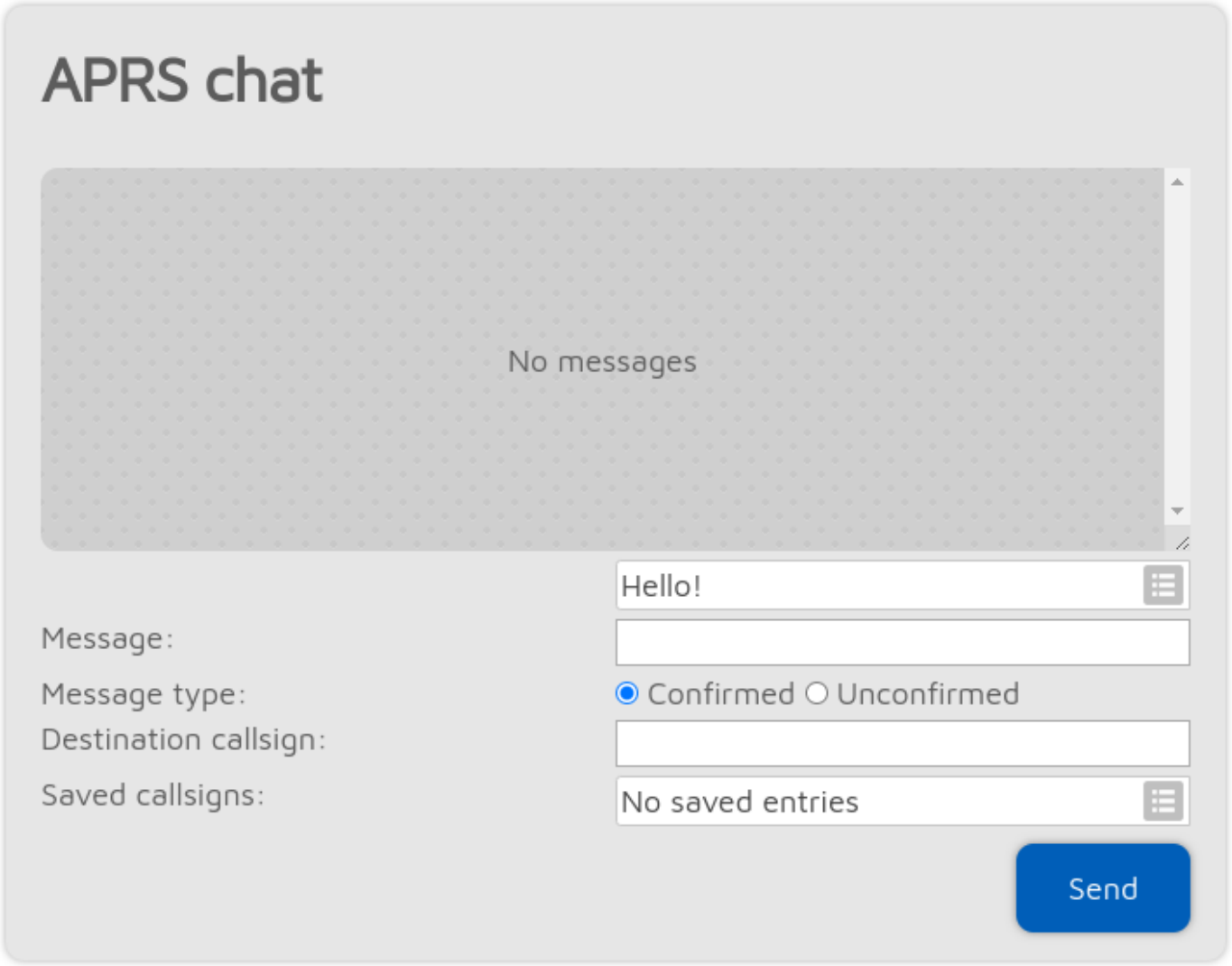
The BrandMeister Manager (BMM) is available when the Homebrew/MMDVM® connector is active, and it is configured for a BrandMeister server. With BMM, you can link/unlink **static** and **dynamic** talkgroups, and you can interrupt the currently ongoing call.

A BrandMeister **API key** is needed to use the BMM:

1. Get the API key by clicking on the **Get key** button, and logging into the BrandMeister SelfCare
2. Copy and paste the API key to the **API key** input field

3. Click on the **Save** button
4. Check the API key's validity by clicking on the **Check key** button

APRS® chat



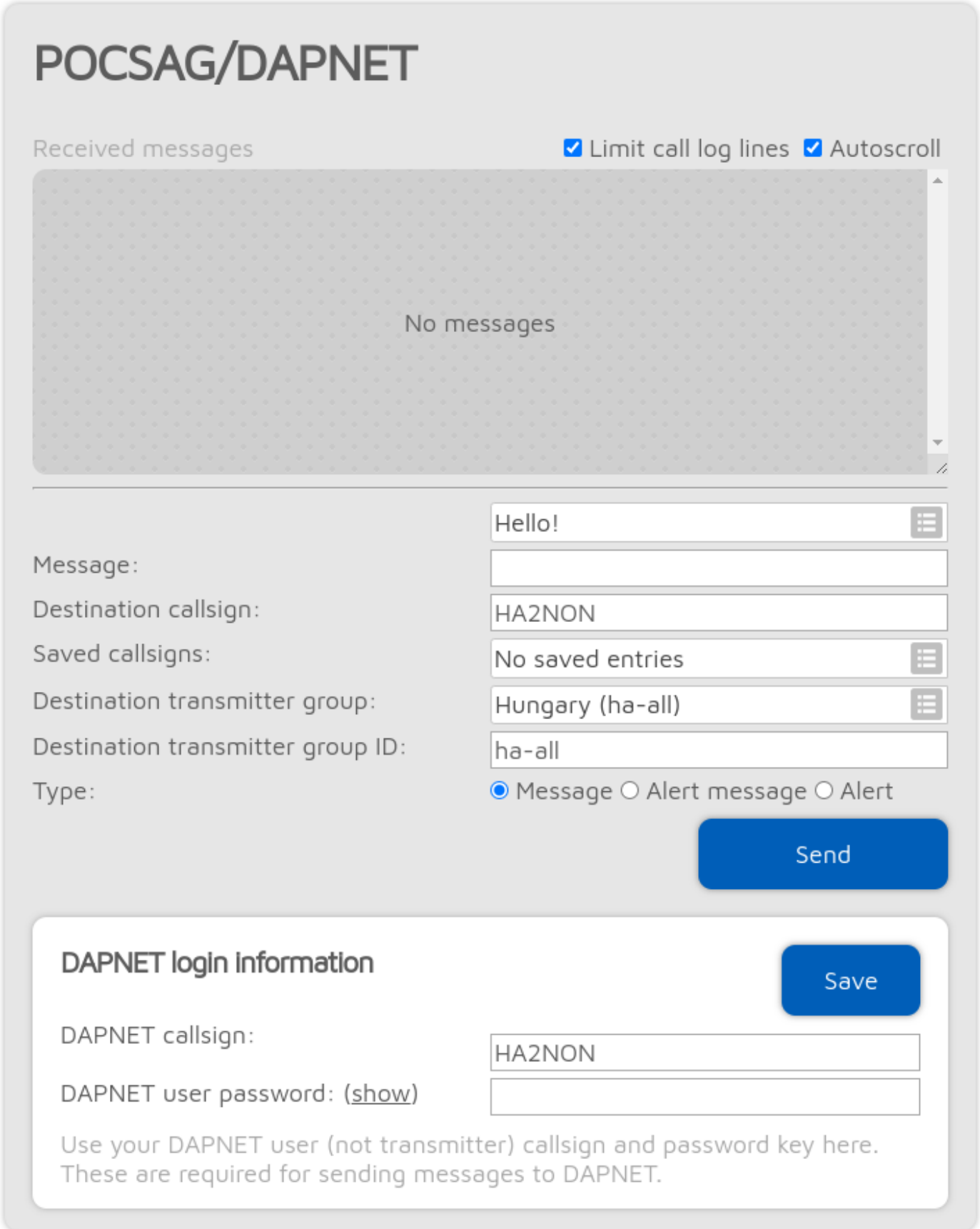
You can send and receive messages via the APRS® network. This feature is available when the APRS® connector is enabled.

Confirmed messages need to be acknowledged by the recipient. If the recipient is unavailable (which means no acknowledge is received for a specific time), then the device retries sending a few times before the message send times out. You can cancel the confirmed message send by clicking on the **Cancel** button.

Note

If a message bubble is clicked then its callsign will be set as the message send destination callsign.

POCSAG/DAPNET



You can see the received POCSAG/DAPNET messages here.

Make sure the DAPNET connector is active and connected to be able to receive messages.

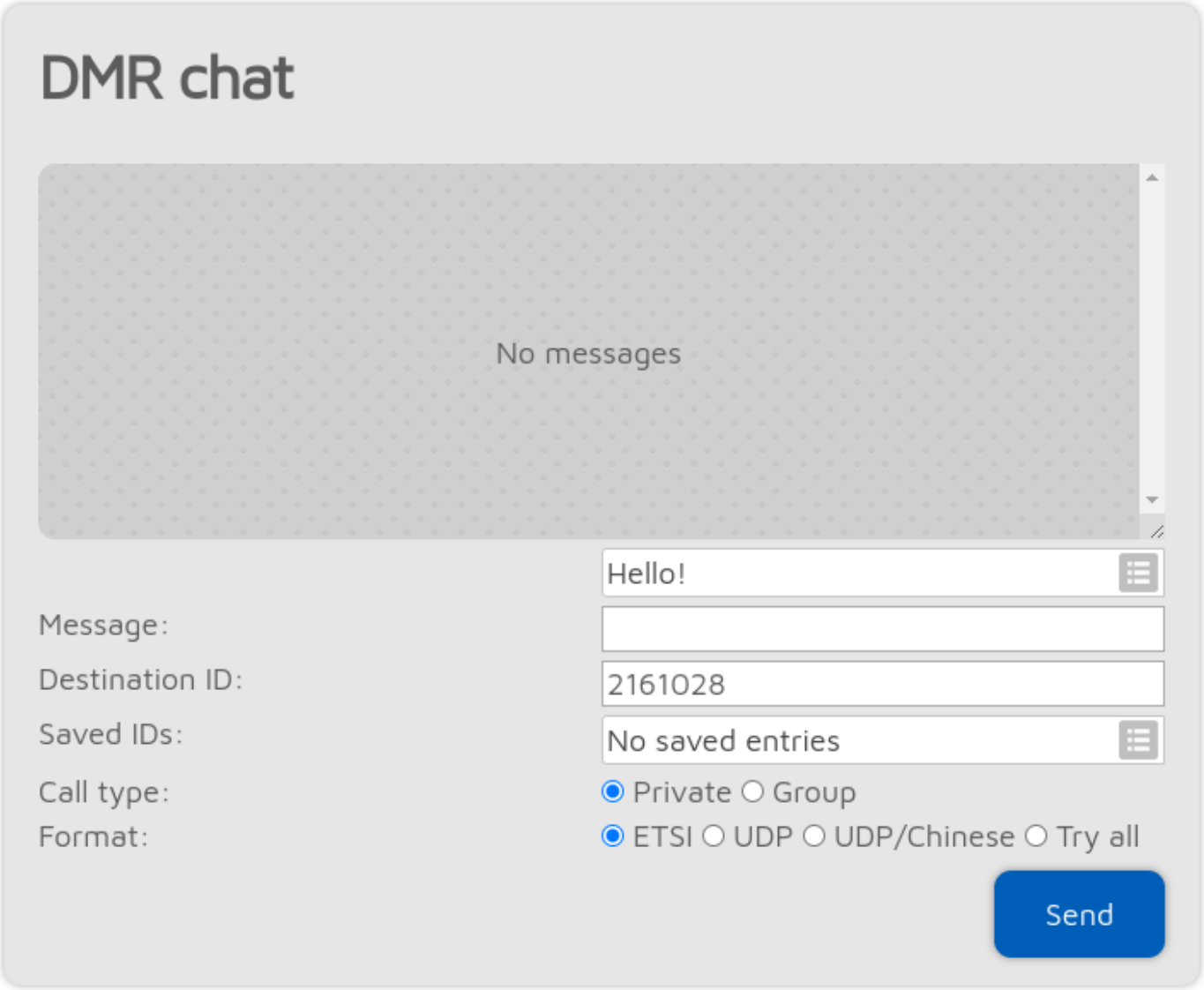
If you want to send a message to DAPNET, you have to set your DAPNET **user** callsign and password first. Note that these have to be the DAPNET **user** callsign and password, **not** the transmitter callsign and auth key you've set for the DAPNET connector. Multiple destination callsigns and transmitter groups can also be specified in a comma separated list.

Note

DAPNET messages are sent by your browser to the DAPNET API.

Sometimes the DAPNET API server does not respond to message send requests and times out, but correctly processes received messages.

DMR chat

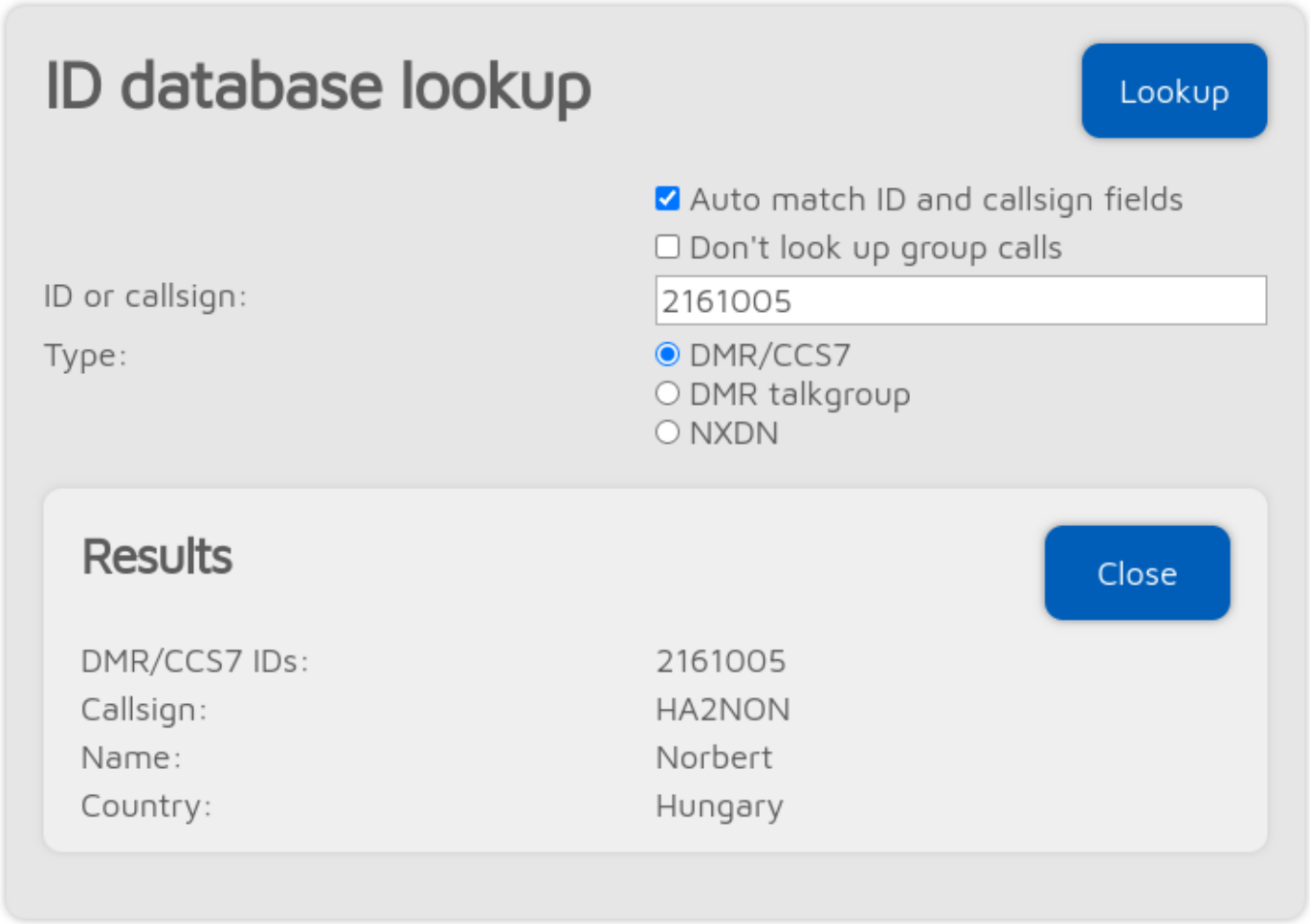


This feature is available when the currently active connector supports DMR SMS sending/receiving.

Sent messages are displayed on the right, received messages are displayed on the left of the chat box. You can click on each message for additional information.

Use the ETSI format if you want to send a message to another M1KE, or Hytera® radios, UDP format for Motorola® radios, and UDP/Chinese format for other Chinese radios (Tyt, Retevis, etc.).

ID database lookup

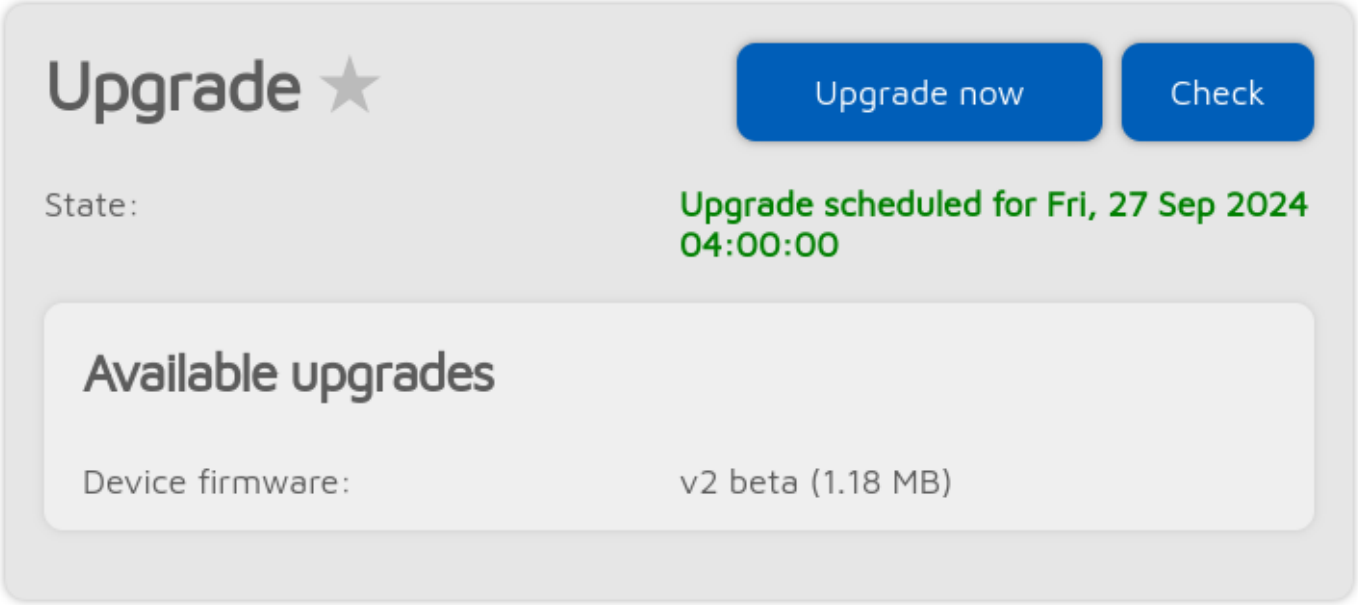


You can look up IDs or callsigns and display information about them.

If the **Auto match ID and callsign fields** checkbox is checked, then all callsigns and IDs will be matched when saving connector settings, and a warning will be displayed if the entered callsign does not match the entered ID according to the database. This is to prevent typos or invalid IDs when trying to connect to a network, as most servers do not allow connections with invalid IDs or callsigns.

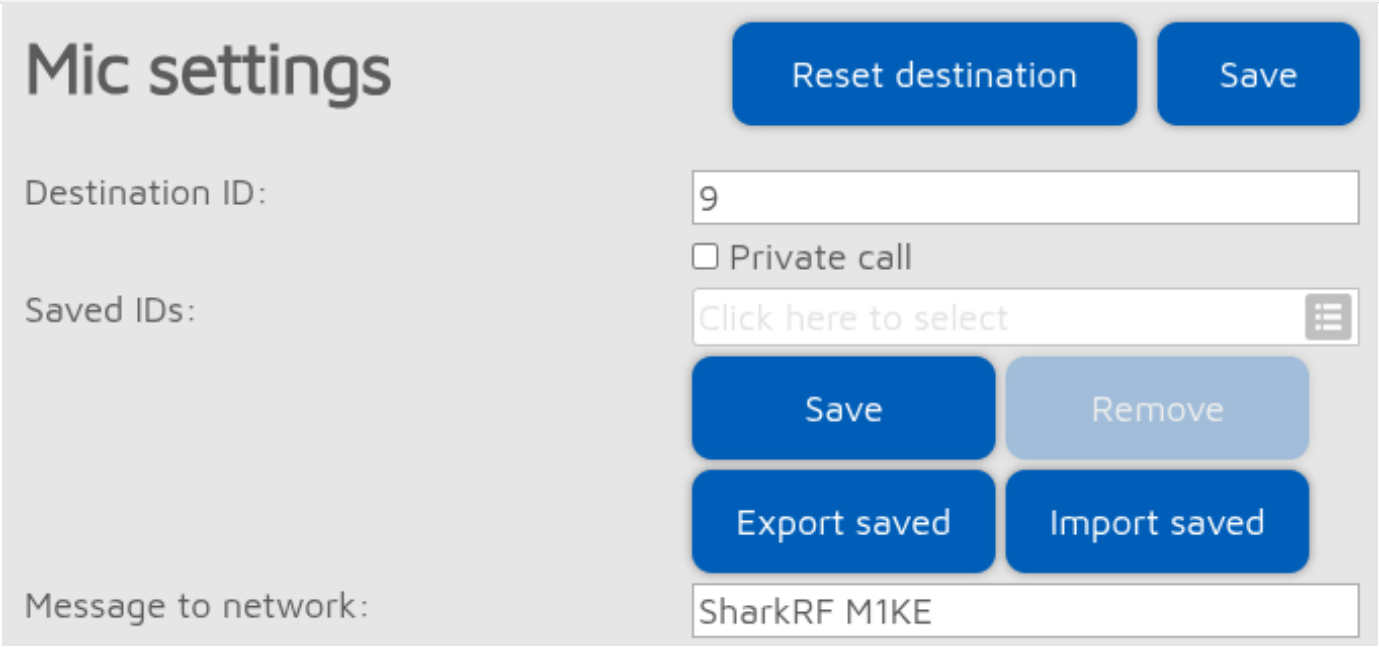
If the **Don’t look up group calls** setting is enabled, then group call IDs won’t be looked up in the call log.

Upgrade



Information about firmware upgrades are displayed here. You can also request an immediate upgrade availability check, and manually start the upgrade process if auto upgrades are disabled on the Settings page, Firmware upgrade section.

Mic settings page



You can set the destination callsign or ID, call type (Private, or Group if the Private call option is not checked), call message of your **outgoing call**.

Note

The available options in this section depend on the currently active connector, as each has its own set of PTT destination settings.

Saved IDs/callsigns

You can save the current destination to the Saved IDs/callsigns list by clicking on the **Save** button. To remove an entry, select it from the list and then click on the **Remove** button.

These saved IDs/callsigns will appear as **Favs** (Favorites) on the PTT Destination Settings screen.

If Advanced mode is enabled, then you can export and import the saved destinations list by clicking on the **Export saved** and **Import saved** buttons.

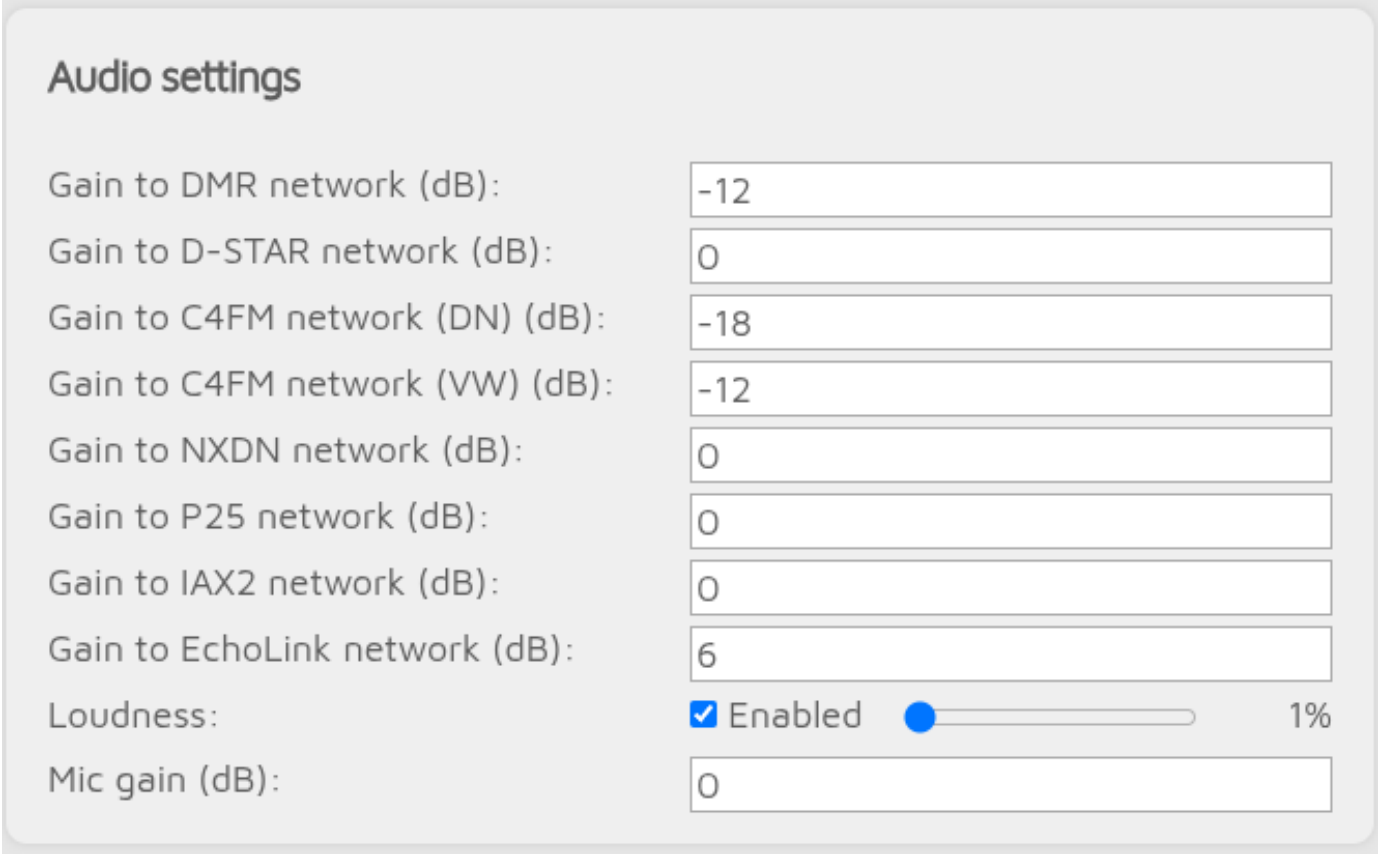
Important

Saved PTT destinations are stored in the global storage which are common for all configuration profiles.

Note

Voice of incoming calls may stutter while the import operation is ongoing.

Audio settings



The **Gain to DMR/D-STAR®/etc. network** fields set the audio gain level for the microphone for each network type. These all use different audio gain levels.

The **Loudness** setting controls the audio compression level. The default enabled 1% state gives a good audio quality. If you have a quiet voice, you can increase the loudness level to make your voice louder.

Use the **Mic gain** setting to reduce the microphone gain level if you have a loud voice (set it to -6 or -12 for example).

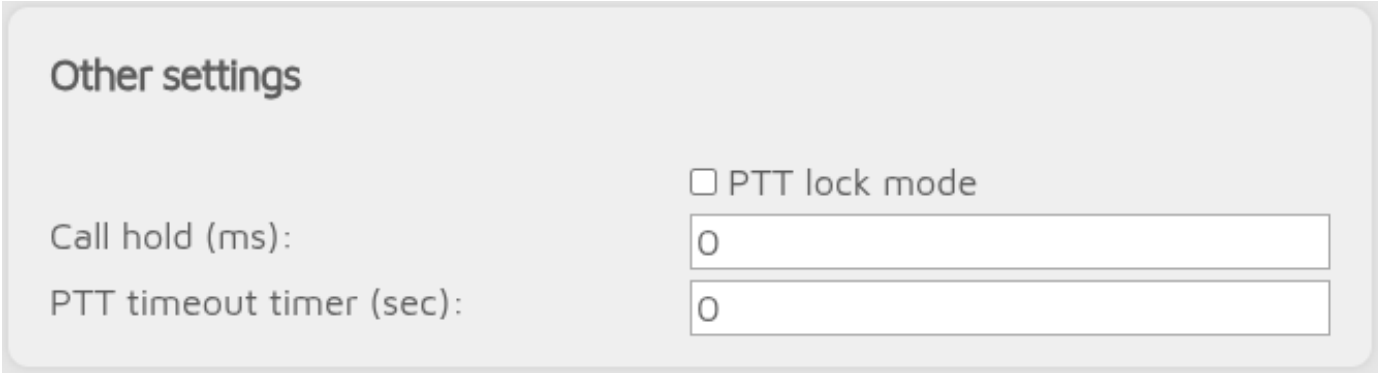
Important

You can use the Parrot connector to test your audio settings.

Other settings

Note

This section is only shown if Advanced mode is enabled.



If **PTT lock mode** is enabled, the PTT button functions as a toggle switch: transmission continues after you release the PTT button, and pressing the PTT button again turns off transmission.

The **Call hold** setting specifies the time to keep the last call displayed on the device screen after the call ends.

If a DMR or NXDN® call is received from the network, this setting also specifies the Call hold reply interval.

If the **PTT timeout timer** setting is not zero, then the length of a transmission is limited to the specified number of seconds. After this time, the transmission is automatically ended (PTT is released). Notification beeps will sound 10 seconds before the transmission is cut off.

Audio DSP FX

Note

This section is only shown if Advanced mode is enabled.

Noise reduction

The **Noise reduction** setting reduces the background noise level.

Pitch

The **Pitch** setting changes the pitch of your voice.

Chorus

The **Chorus** setting adds a chorus effect to your voice.

EQ

The **EQ** setting changes the audio equalizer settings of your voice. Check the checkbox below **Low**, **Mid**, and **High** to enable modifying the corresponding audio range.

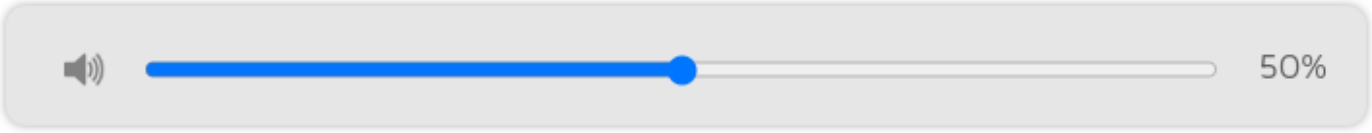
Delay

The **Delay** setting adds a delay effect to your voice.

> **Important**
>
> You can use the Parrot connector to test your audio settings.

Settings page

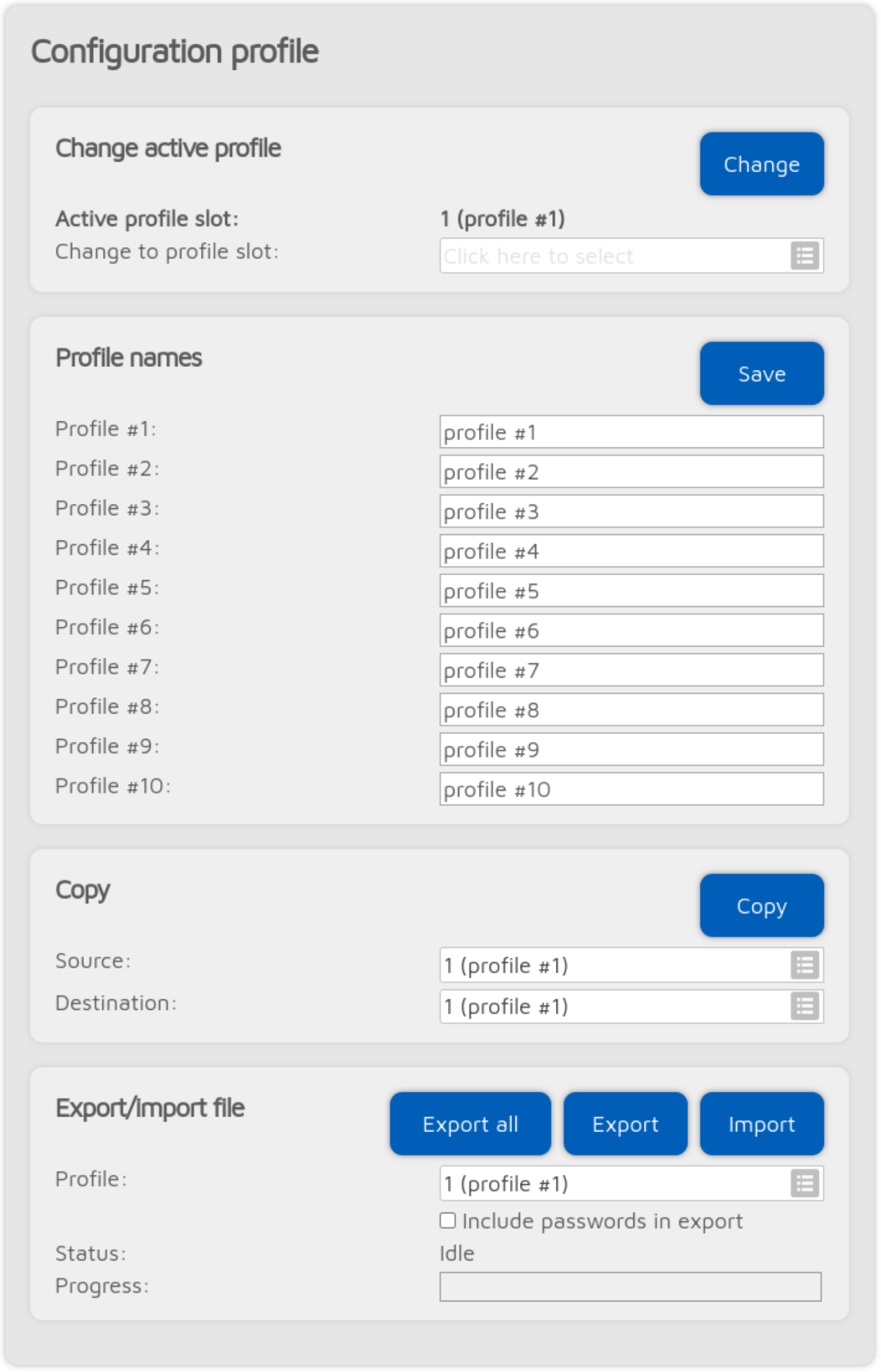
Audio volume



You can adjust the speaker volume with the slider. The new volume setting will be applied immediately. The speaker can be **muted** (and unmuted) by clicking the speaker icon.

Configuration profile

> **Note**
>
> Refer to the Configuration profiles page for more information about configuration profiles.


Configuration profile
Change active profile
Change
Active profile slot:
1 (profile #1)
Change to profile slot:
Click here to select
Profile names
Save
Profile #1:
profile #1
Profile #2:
profile #2
Profile #3:
profile #3
Profile #4:
profile #4
Profile #5:
profile #5
Profile #6:
profile #6
Profile #7:
profile #7
Profile #8:
profile #8
Profile #9:
profile #9
Profile #10:
profile #10
Copy
Copy
Source:
1 (profile #1)
Destination:
1 (profile #1)
Export/import file
Export all
Export
Import
Profile:
1 (profile #1)
Include passwords in export
Status:
Idle
Progress:

You can rename profiles, copy one to another slot or export/import to/from a file.

> **Note**
>
> If copying a profile to another slot, and both profiles have the default names (*profile #1*, *profile #2*, etc.), then the destination profile keeps its name.

> **Important**
>
> A configuration profile export file does not contain saved custom servers as these are stored in the global storage. Use the Export/import buttons at the Custom servers export/import section of the About the connectors page to export/import custom servers to/from a file.

Change profile on timeout

> **Note**
>
> This section is only shown if Advanced mode is enabled.

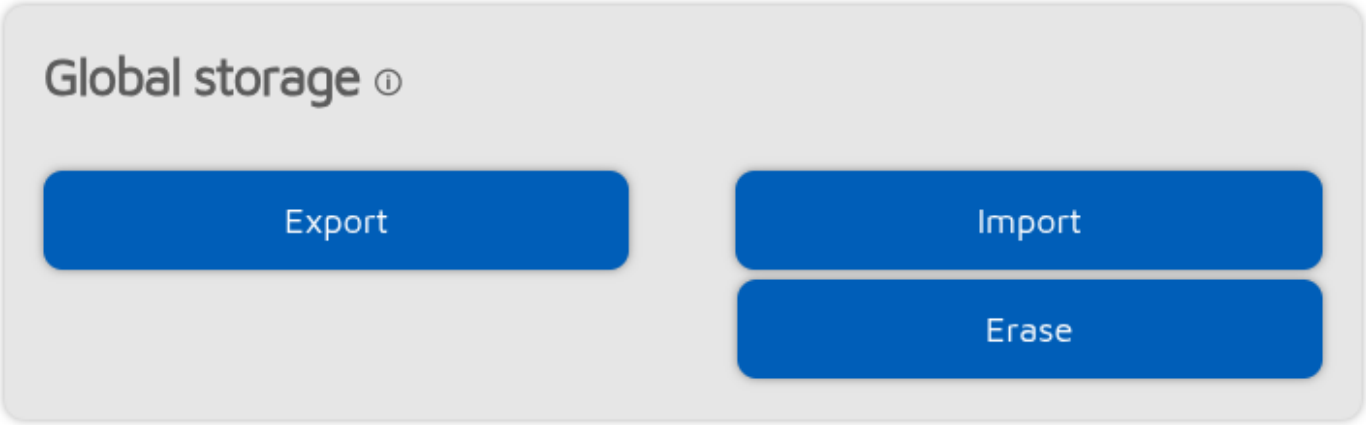
By setting the **Change after last call** setting to non-zero, the device will switch to the specified profile slot after a timeout since the last call is ended.

Miscellaneous profile settings

> **Note**
>
> This section is only shown if Advanced mode is enabled.

If the **Always use profile #1 on power on** setting is enabled, then profile #1 will always be loaded when powering on the device.

Global storage



The global storage stores custom servers, favorite PTT destinations, call numbers and DTMF sequences. These are are stored globally for all configuration profiles. Around 900 entries can be stored in the device.

You can Export to a file, Import from a file and Erase the global storage here.

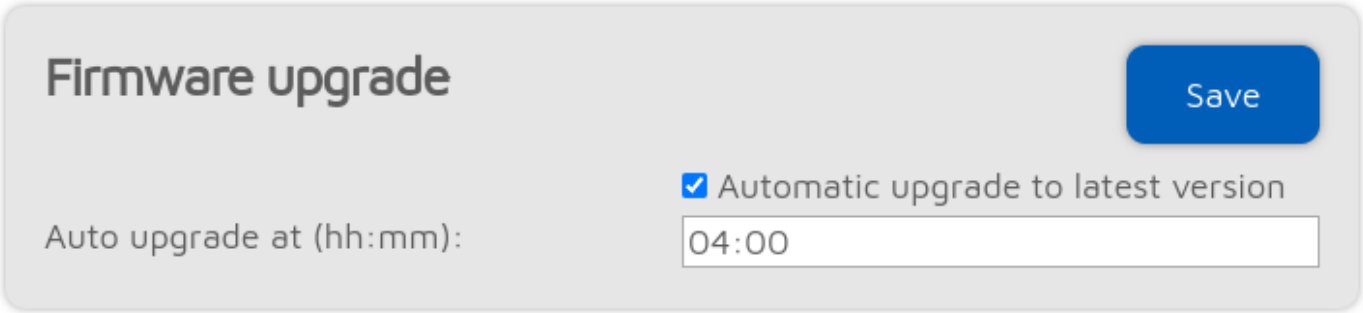
Important

Resetting a configuration profile does not erase the global storage. Only resetting all configuration profiles (factory reset) will erase the global storage.

Note

Voice of incoming calls may stutter while the import operation is ongoing.

Firmware upgrade



The device will **automatically** check for firmware upgrades periodically, as specified by the **Check interval** setting (only available if Advanced mode is enabled). If **Automatic upgrade** settings are checked then the device will **automatically download and apply** upgrades.

If a new firmware upgrade is available, downloading and applying the upgrade is automatically scheduled for the (local) time set by the **Auto upgrade at** setting. By default it's set to 4am next day. The upgrade will only be performed if there were no calls received for at least **Auto upgrade RX/TX delay** seconds (this setting is only available if Advanced mode is enabled).

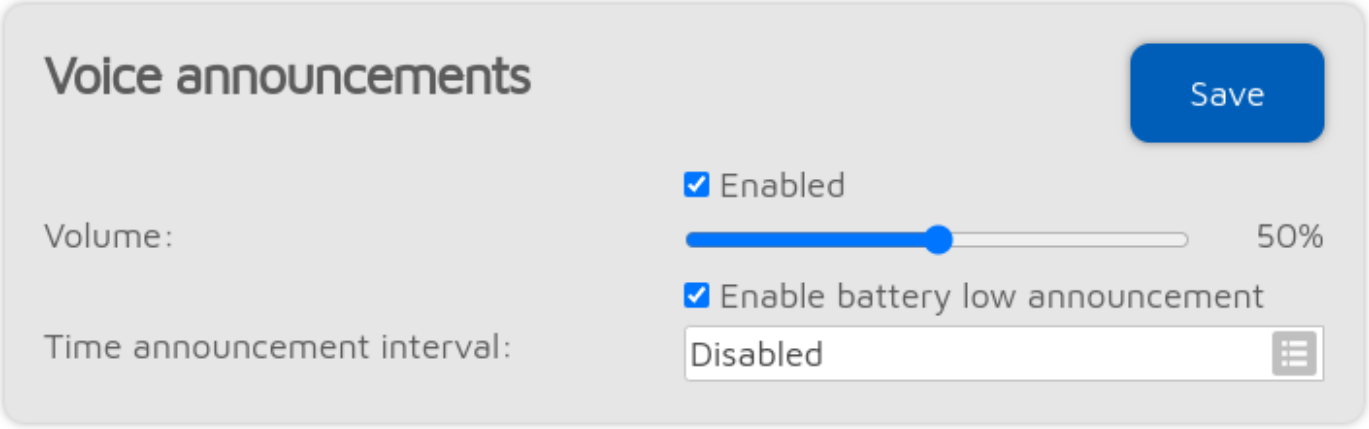
Important

The PTT (Push-To-Talk) Button and is disabled and the speaker is muted during the firmware upgrade download and installation. The device will not be able to receive and transmit calls.

Note

The device reverts to the previous firmware version if a reboot happens in 1 minute after the new firmware boots. The new firmware is finalized if the uptime reaches 1 minute.

Voice announcements



The device has a built-in voice announcement system. Some announcements are played locally from the built-in flash memory, but some are played using our open source voice announcement server.

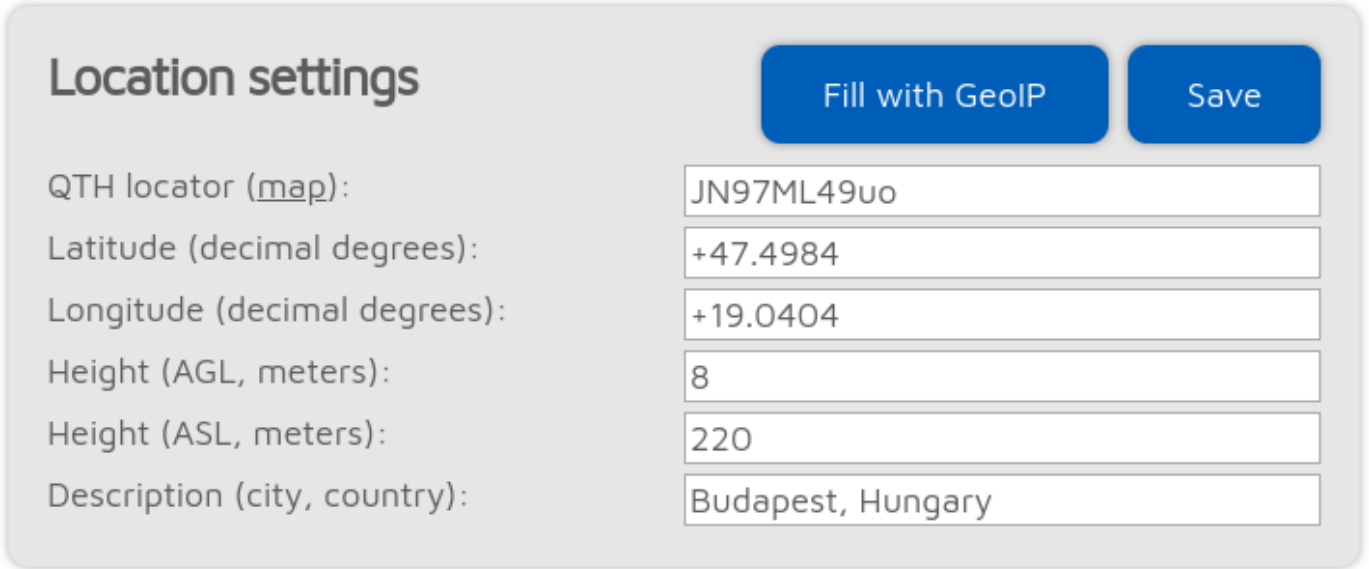
If the battery charge percentage is 15% or below, and the **Enable battery low announcement** is turned on, then the device plays battery charge status voice announcements every 5 minutes.

If the **Time announcement interval** is set, then the device will periodically announce current time. Interval is calculated from midnight, so for example if it is set to every 3 hours, then it will announce current time at 3AM, 6AM, 9AM and so on. Before announcing the time, the device checks if a call came from the network in the last 10 seconds. If yes, the time announcement will be skipped so it won't interfere with ongoing calls.

If you enable Advanced mode, the following settings will show up:

- You can shorten profile announcements by checking the **Shortened profile announcement** checkbox.
- If you don't want to hear the linked reflector/talkgroups list, then you can shorten BrandMeister announcements by checking the **Shortened BrandMeister announcement** checkbox.
- You can disable built-in voice announcements by checking the **Use server only** checkbox. Note that startup voice announcements played right after the device boots will still be played from the device's flash memory.
- You can set your own voice announcement server's host and port.
- **Net state announcement int.** sets the interval of the announcement if the device can't connect to a Wi-Fi® network.

Location settings



Setting location data is optional. It is used by some connectors like the Homebrew/MMDVM® connector to report the location of the device to the network.

The **Fill with GeoIP** button queries a GeoIP database to fill the location information based on the current external IP address of the browser.

Important

The precision of the GeoIP location data is limited and it may give inaccurate results.

Latitude and longitude is in decimal degrees. Conversion to/from QTH location format is automatic and precision is lower if you enter your location in QTH location format.

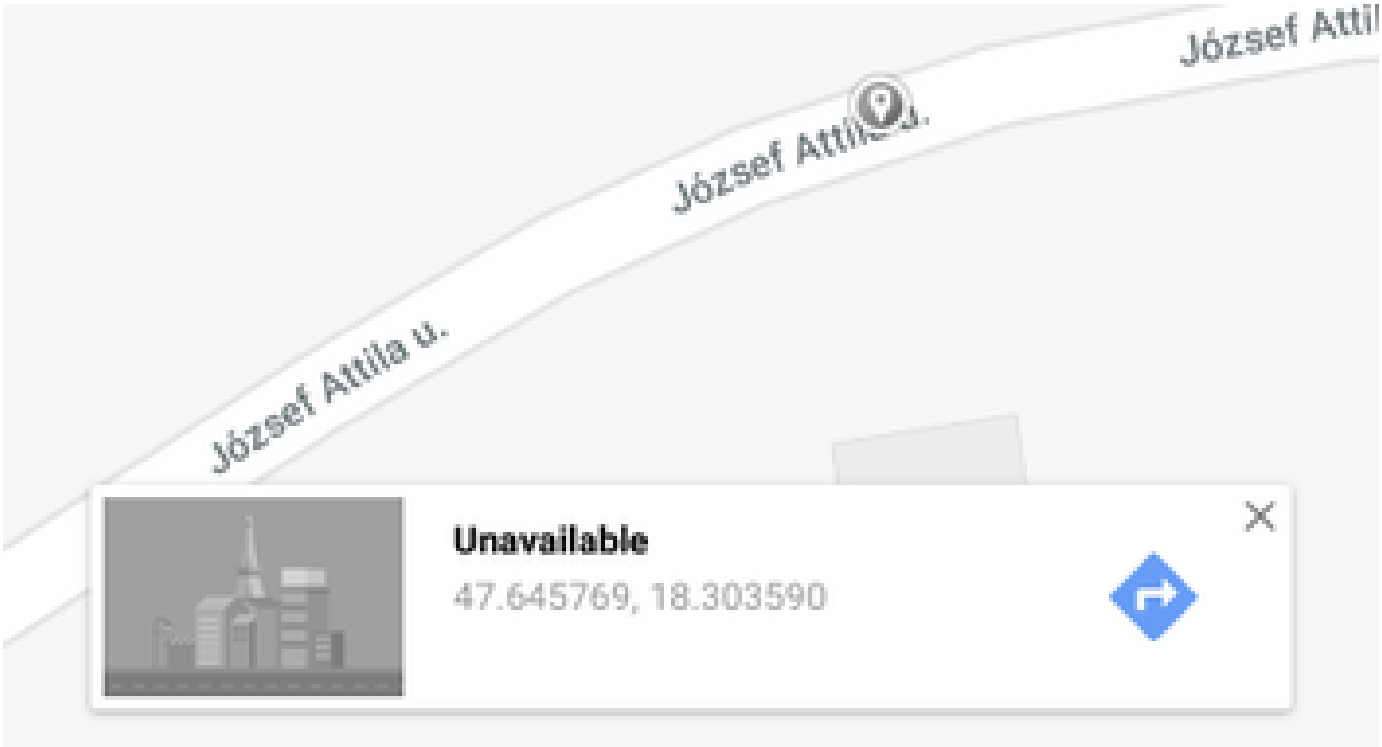
Important

The currently used network may truncate/modify all entered data.

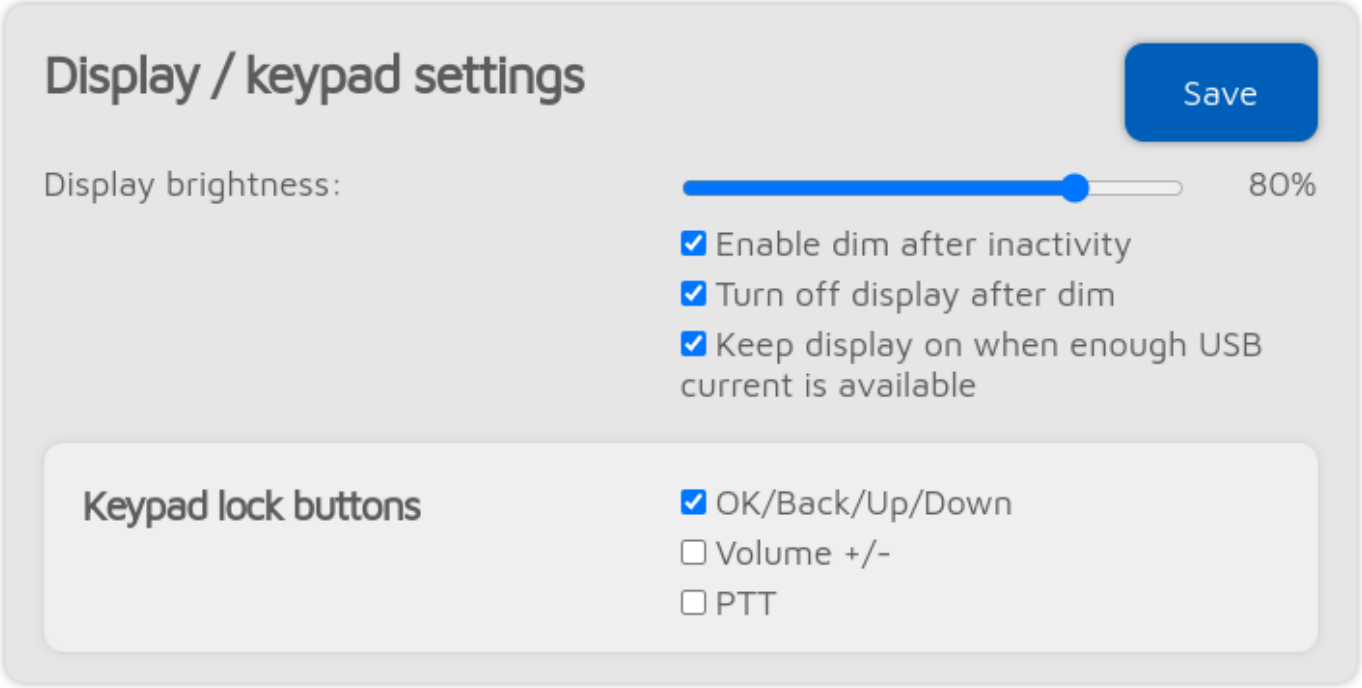
Both height values refer to the height of your device (they are used separately).

How to get a location in decimal degrees

Google Maps displays a location's coordinates in decimal degrees if you click on it:



Display / keypad settings



Reducing the brightness of the display can help save battery power.

The **Enable dim after inactivity** checkbox allows you to enable or disable the automatic dimming of the display after a period of inactivity. If Advanced mode is enabled, then you can set the time after which the display will dim by adjusting the **Dim after inactivity (sec)** setting below the checkbox.

The **Enable turn off display after dim** checkbox allows you to enable or disable the automatic turning off of the display after it has dimmed. If Advanced mode is enabbled, then you can set the time after which the display will turn off by adjusting the **Turn off display after dim delay (sec)** setting below the checkbox.

If the **Keep display on when enough USB current is available** setting is enabled, and a USB charger is connected (and it can supply enough power), then the display won't be turned off after dimming. In this case the **Enable turn off display after dim** setting is ignored.

Warning

Make sure you use a USB charger which can supply enough current while the M1KE is turned on (min. 1500mA), otherwise the battery may not charge or deplete while the device is turned on.

If the **Always show profile info** setting is enabled, then the Main screen always shows the name of the currently active configuration profile.

Keypad lock buttons

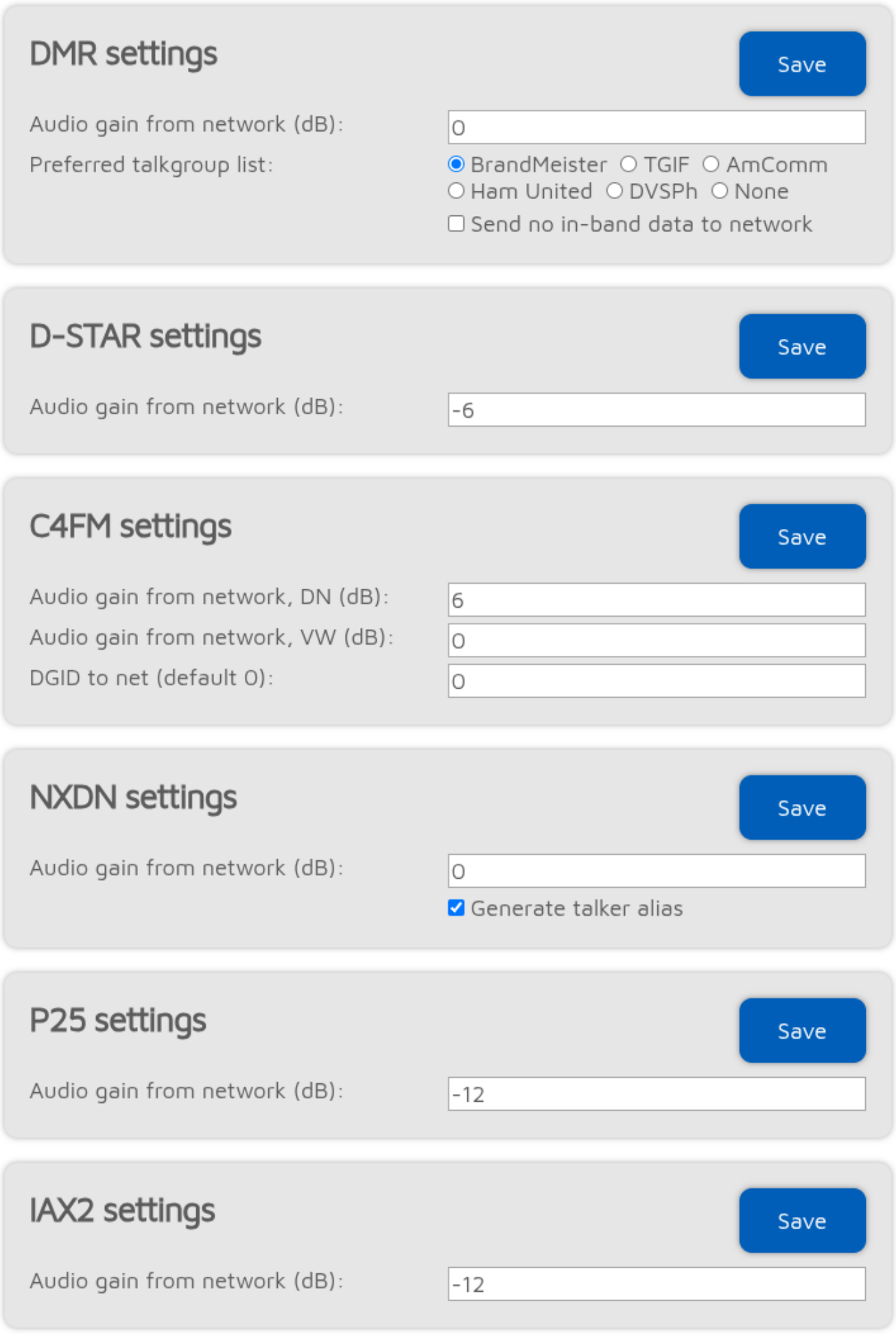
You can set which set of buttons the Keypad Lock affects here.

Advanced settings

Note

These sections are only shown if Advanced mode is enabled.

Mode settings


DMR settings
Save
Audio gain from network (dB):
0
Preferred talkgroup list:
BrandMeister
TGIF
AmComm
Ham United
DVSPh
None
Send no in-band data to network
D-STAR settings
Save
Audio gain from network (dB):
-6
C4FM settings
Save
Audio gain from network, DN (dB):
6
Audio gain from network, VW (dB):
0
DGID to net (default 0):
0
NXDN settings
Save
Audio gain from network (dB):
0
Generate talker alias
P25 settings
Save
Audio gain from network (dB):
-12
IAX2 settings
Save
Audio gain from network (dB):
-12

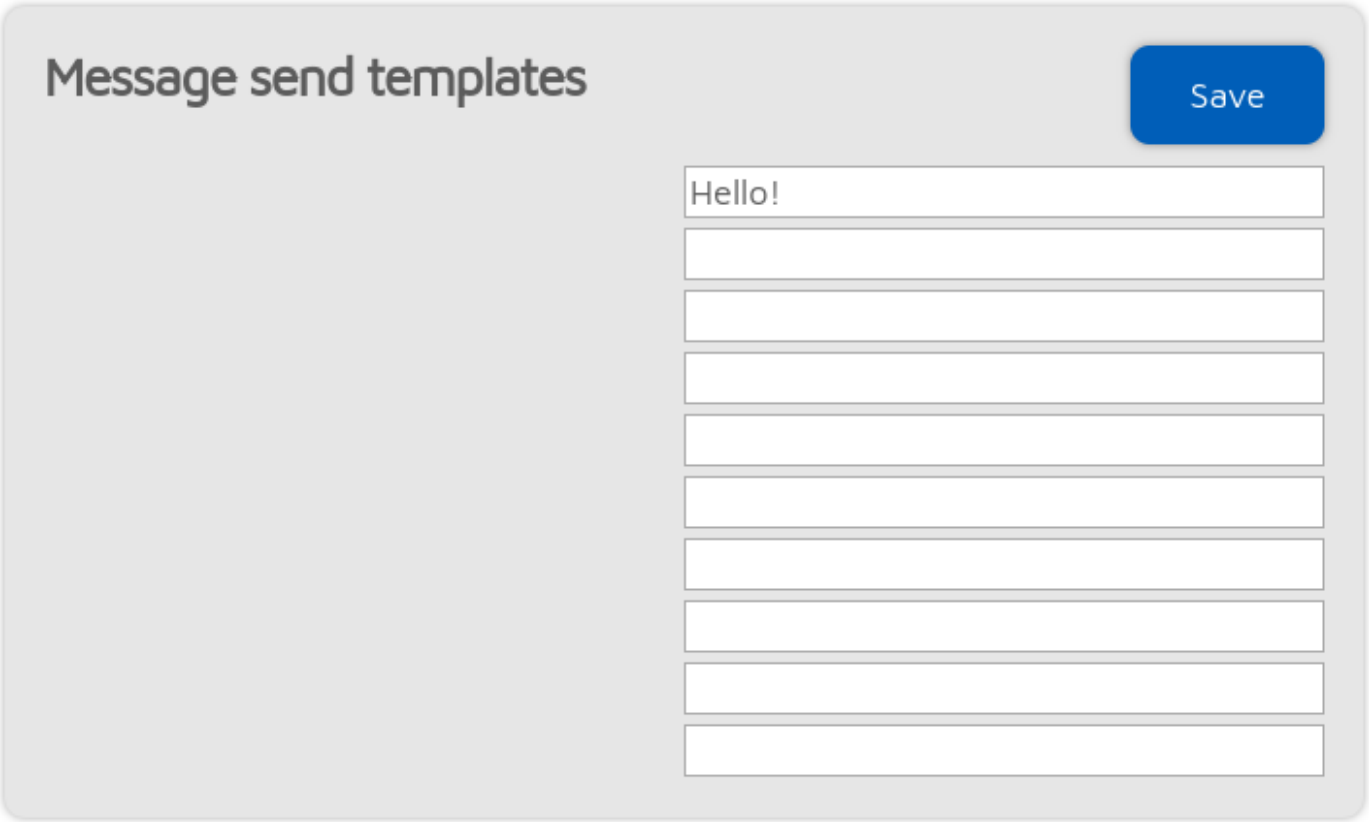
The **Audio gain from network (dB)** settings can be used to adjust the audio gain of received streams from each mode. These modes all use different audio gain levels.

The **Preferred talkgroup list** decides which talkgroup list to use for resolving talkgroup IDs to their names.

If the **Send no in-band data to network** setting is enabled, then in-band data (call message as talker alias) won't be sent to the network.

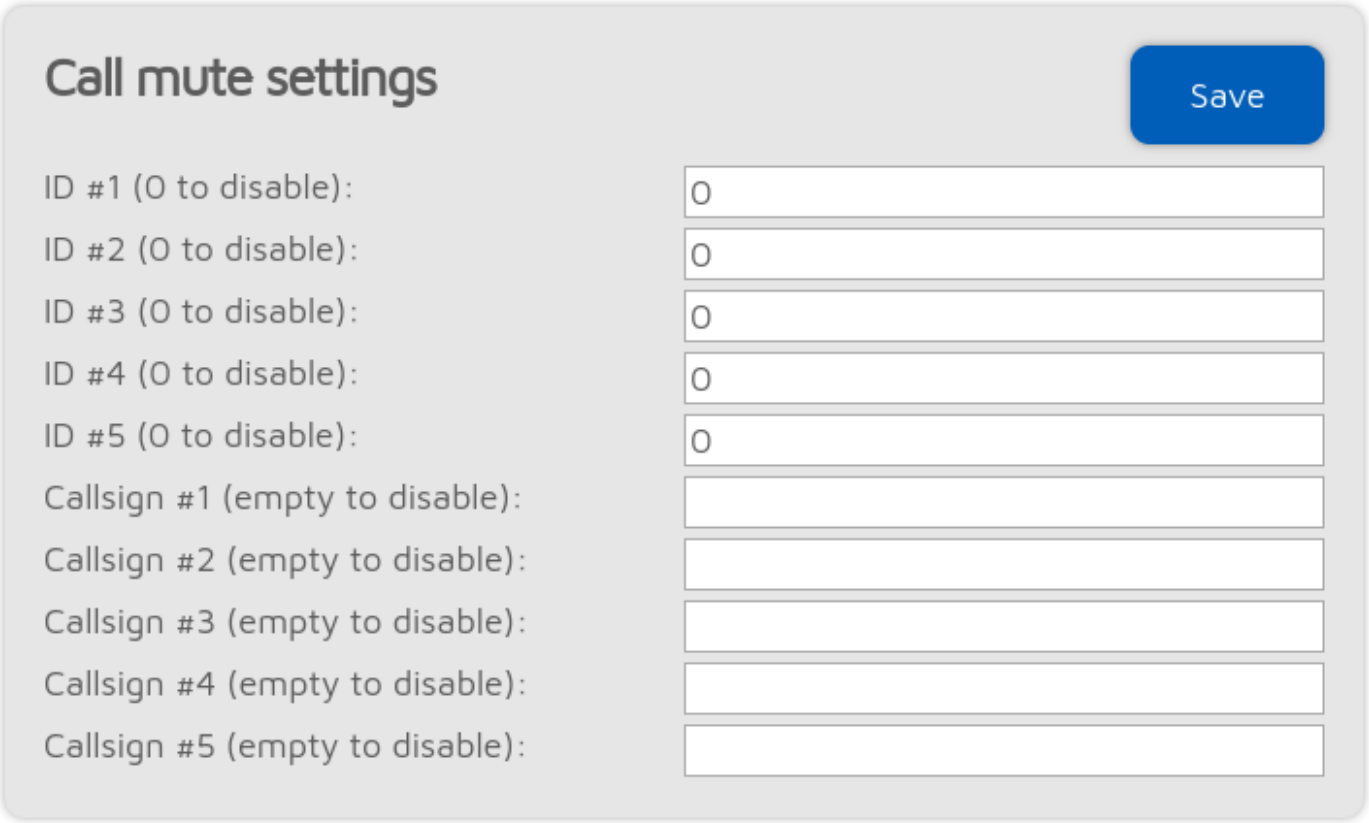
If the **Generate talker alias** setting is enabled then the device will send your call message at the beginning of the NXDN® call to the network.

Message send templates



You can set up to 10 message send templates here. These templates can be used to send predefined messages to the network.

Call mute settings

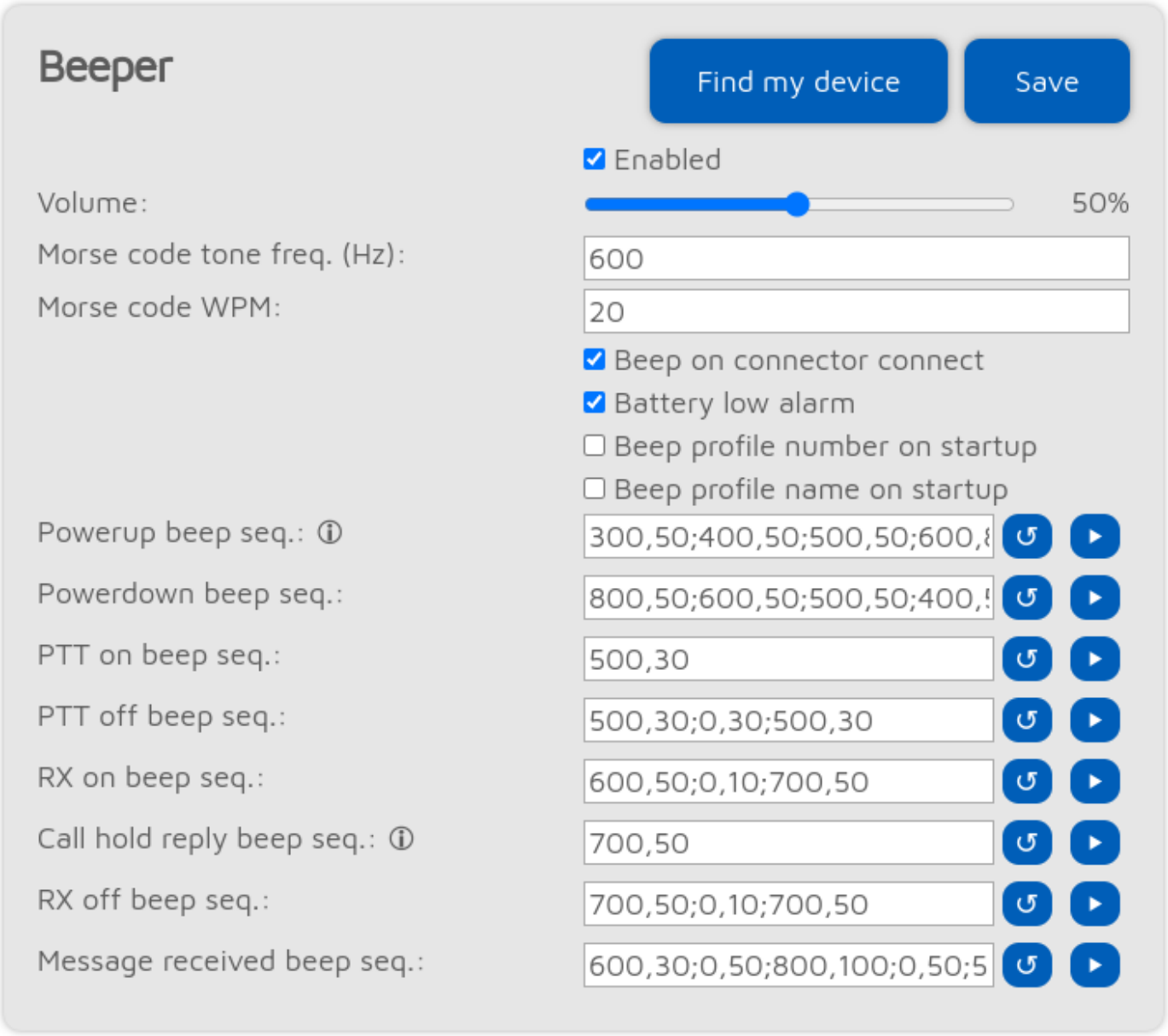


These settings allows you to mute calls coming from the given IDs and/or callsigns. Calls from muted IDs/callsigns will still be received, but with silent audio.

Note

Call mute settings will be applied when the next call is received.

Beeper settings



If a Morse code sequence is beeped then the **Morse code tone freq. (Hz)** and **Morse code WPM** can be adjusted.

If the **Beep profile number on startup** setting is enabled, then the device will play the letter *P* followed by the currently active profile number on startup in Morse code. If the **Beep profile number on startup** setting is enabled, then the profile's name will also be played in Morse code.

Beeper sequences

Each tone in the sequence is represented by a frequency (in Hz) and duration (in ms) pair of numbers, separated by a comma. Tones are separated by semicolons.

Example sequence: **500,80;0,50;600,50**

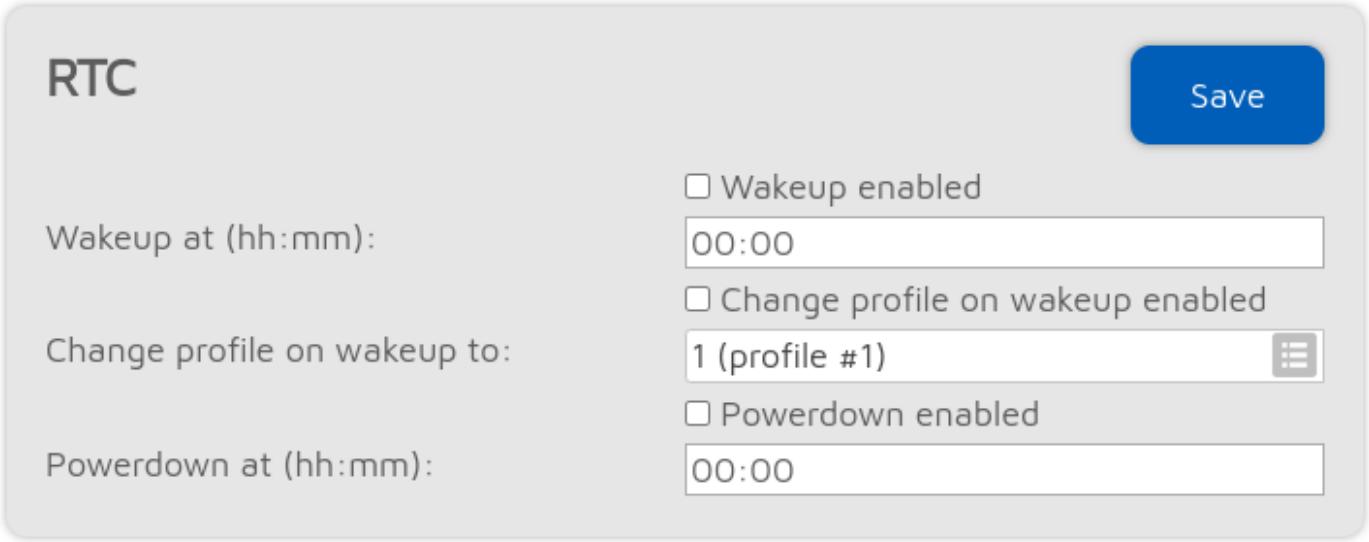
This example sequence has 2 tones, and a pause between them. The first one is 500Hz, 80ms long, the second one is 600Hz, 50ms long, and the pause between them is 50ms long.

The ↺ button resets the sequence to the factory default value.

Note

Clear the PTT on beep sequence to speed up the PTT response time.

RTC settings



You can set a daily wakeup and a powerdown time here. You can also set the profile to boot when waking up, so it's possible to jump between configuration profiles.

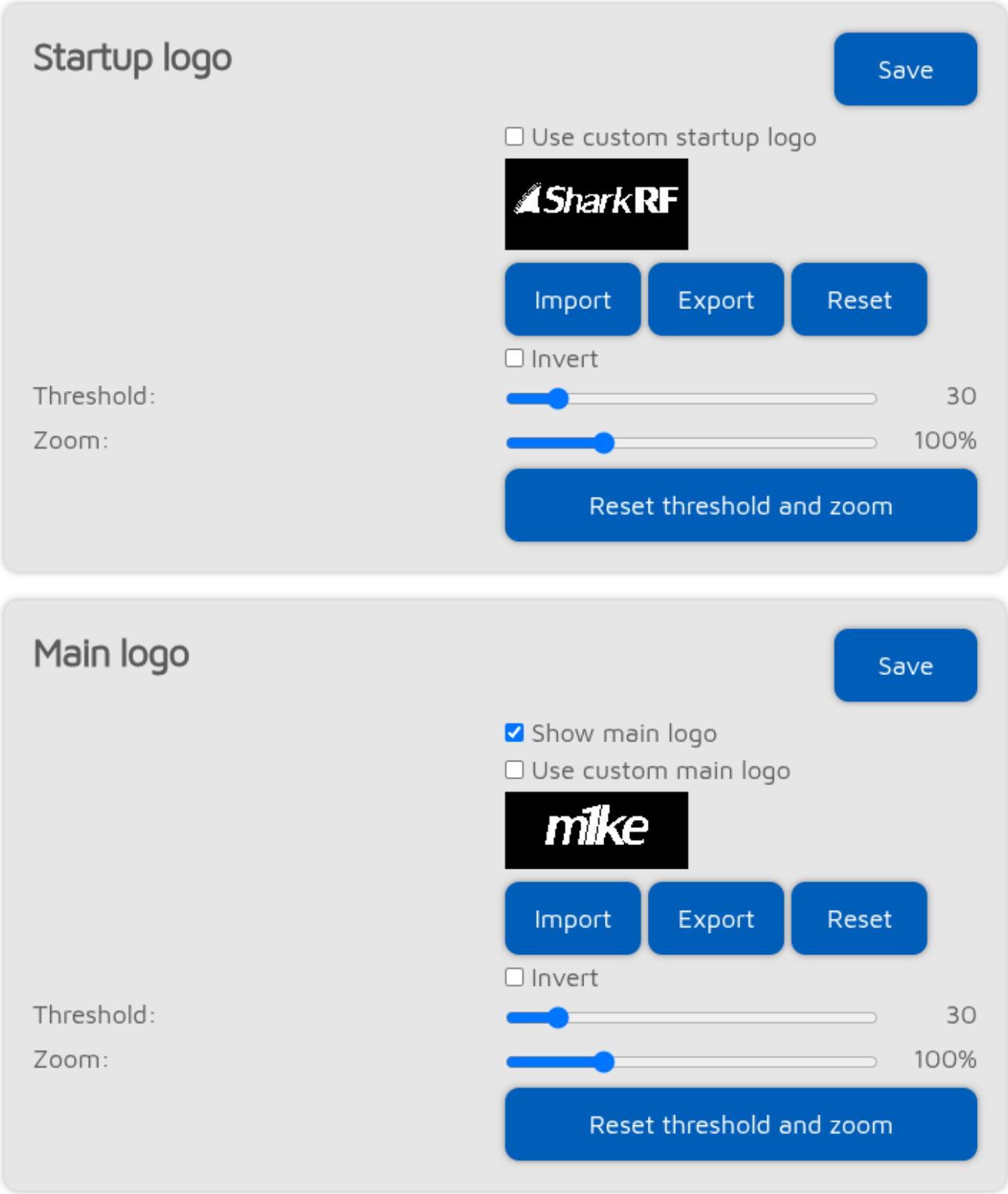
Speaker FX settings

The **Speaker FX** settings can be used to adjust the audio output of the device.

The **EQ** setting changes the audio equalizer settings. Check the checkbox below **Low**, **Mid**, and **High** to enable modifying the corresponding audio range.

The **Loudness** setting controls the audio compression level. The default enabled 1% state gives a good audio quality. If the speaker's audio level is not adequate, then you can increase the loudness level to make everything louder.

Logo settings

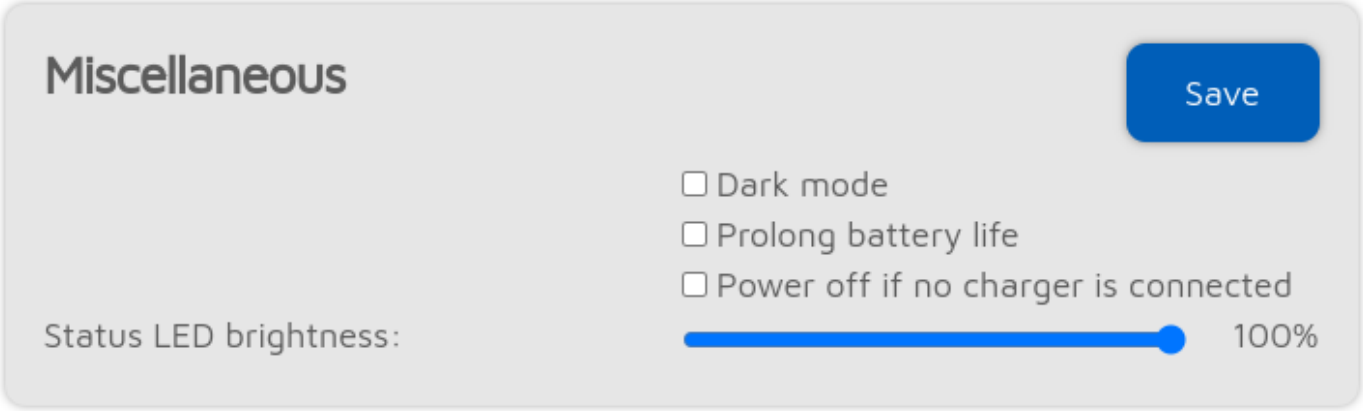


You can set custom startup and main logos. The startup logo is displayed when the device is turned on, and the main logo is displayed on the Main screen.

You can **import** image files in PNG, JPG or BMP format, and **export** in PNG format. You can reset the logos back to the default ones by clicking the **Reset** button.

Imported logos are automatically converted to 1-bit images (with black and white pixels). You can adjust the conversion **threshold**, **invert** the image pixels and **zoom** the image to fit the screen.

Miscellaneous settings



You can enable **Dark mode** here (and also on the Quick Setup page).

The battery will not fully charge if the **Prolong battery life** setting is enabled. Enable this if you use the device plugged into a USB power source 24/7.

Enabling the **Power off if no charger is connected** setting is useful if the device is installed in a vehicle, as if this setting is enabled, the device will follow the USB power status (it will turn off if USB power is lost and it will turn on if USB power is restored). If Advanced mode is enabled, you can set the **Power off delay**, which delays powering off if USB power is lost. This is useful if you want to keep using the device for a few minutes after USB power is lost (you've stopped the car).

Checking the **Disable callsign-ID database queries** setting is useful if the device is used in a network where internet access is disabled. This prevents the device from trying to get a callsign for an ID or vice versa from the SharkRF callsign-ID database.

If the **Unlink when power button pressed 3 times** setting is enabled (this is only visible if Advanced mode is enabled), and the Power/Back Button pressed 3 times quickly, then the device will do the following instead of beeping the currently active profile number and name in morse code:

- If the Homebrew/MMDVM® connector is active, then a quick call will be started to TG4000 to make the server unlink any linked dynamic talkgroups, and if the connector is connected using the Homebrew protocol, then a call interrupt command will also be sent to break any ongoing calls.
- In case any other connector is active, the Null connector will be activated

You can also set the **Status LED brightness** with the slider. The new brightness setting will be only applied at the next LED state change.

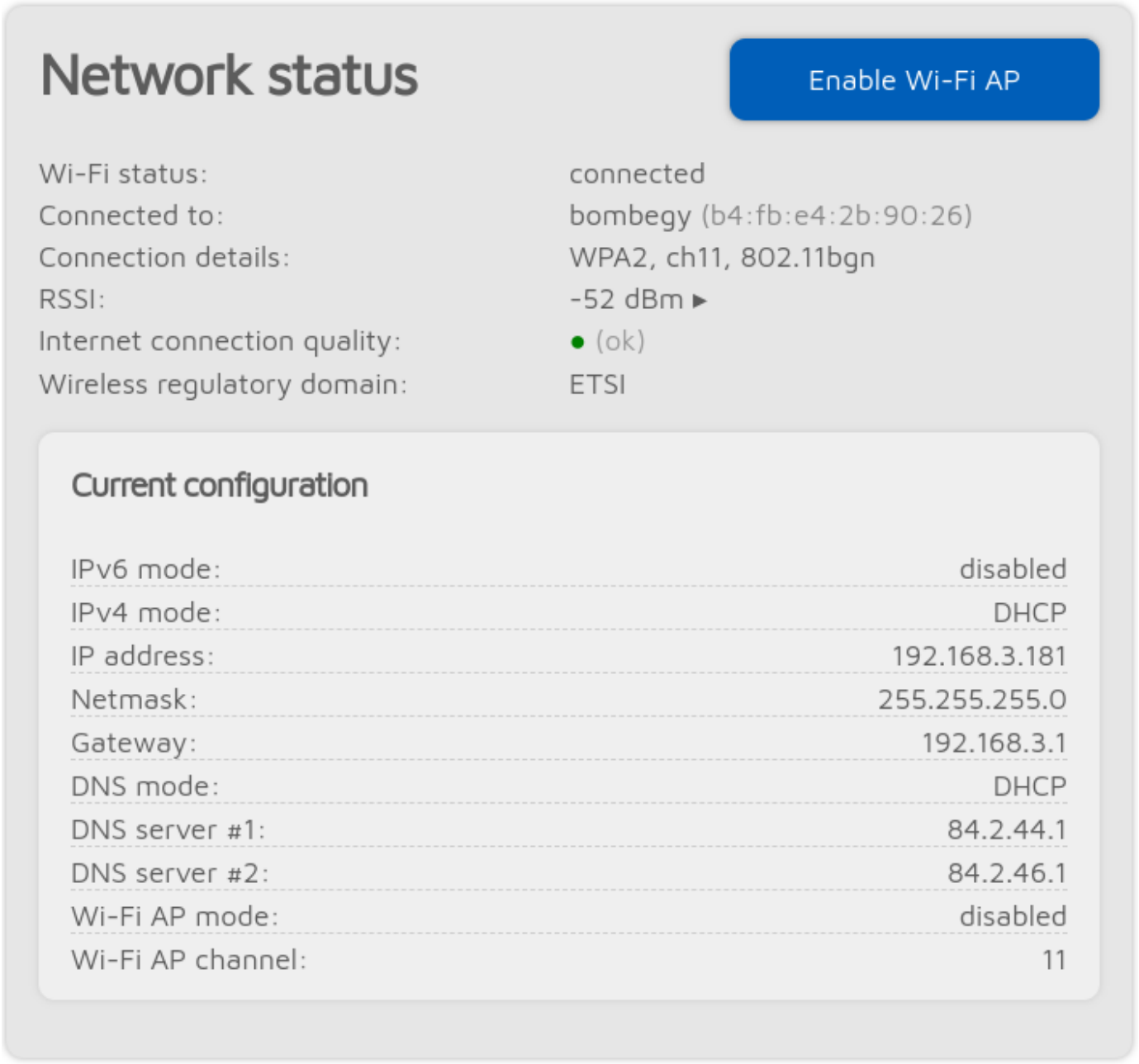
These buttons can be used for turning off/rebooting the device or resetting the Configuration profile to the default settings.

Important

Resetting a configuration profile does not erase the global storage. Only resetting all configuration profiles (factory reset) will erase the global storage.

Network page

Network status



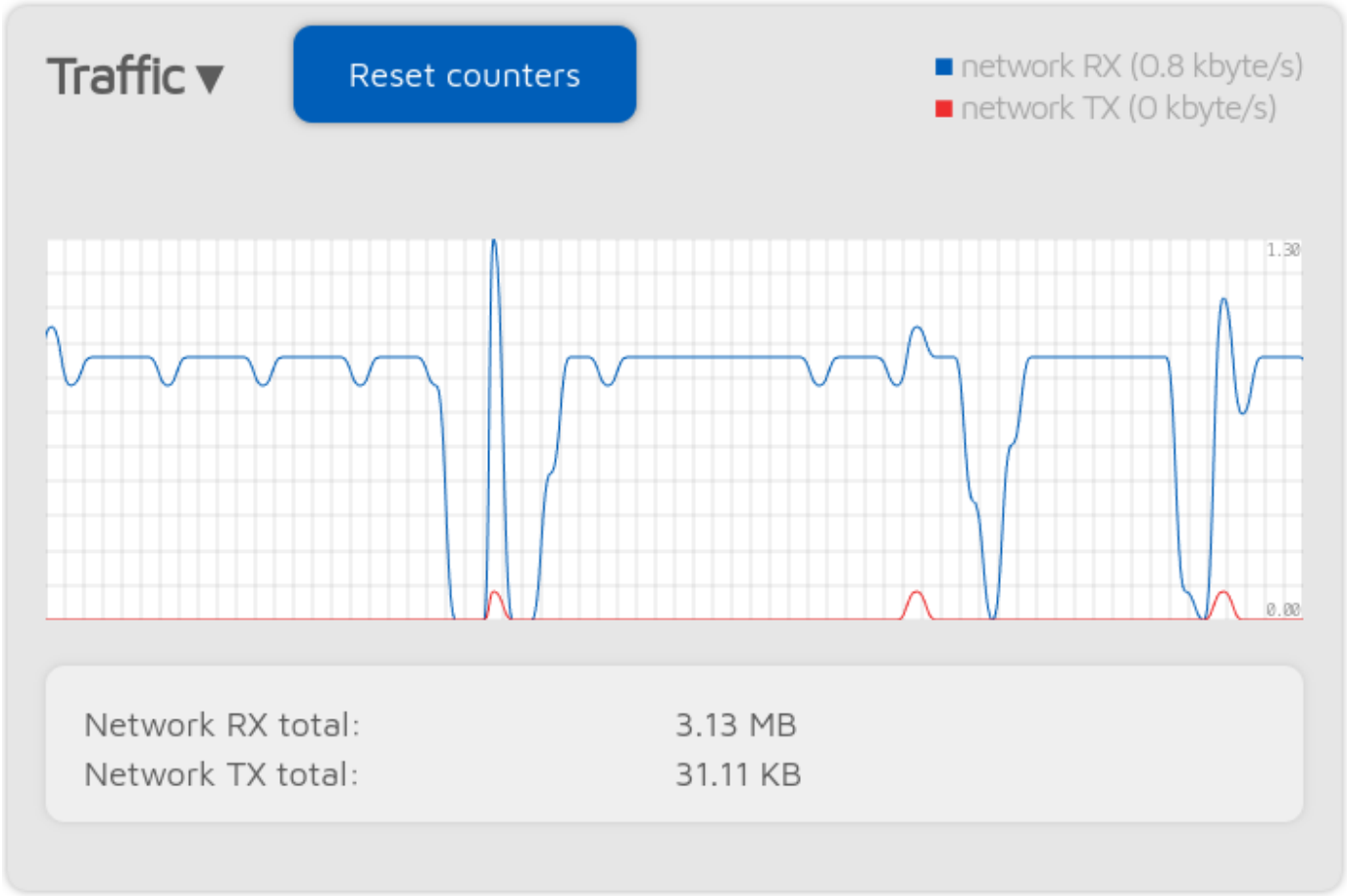
This section shows current network status. The **Wi-Fi® RSSI graph** can be shown by clicking on the little arrow next to the RSSI value.

The **Internet connection quality** is determined by the device by periodically measuring the network latency. You can get the measured latency value by hovering the mouse above (or clicking on) the quality display circle.

The **Wireless regulatory domain** is determined by the country of operation.

The device's built-in Wi-Fi® access point (AP) can be enabled/disabled with the **Enable/Disable Wi-Fi® AP** button. If enabled, the device advertises its own Wi-Fi® network (called *M1KE AP* by factory default settings) which you can connect to using a phone, tablet or computer to access the device's web interface even when it's not connected to a Wi-Fi® network.

Network traffic

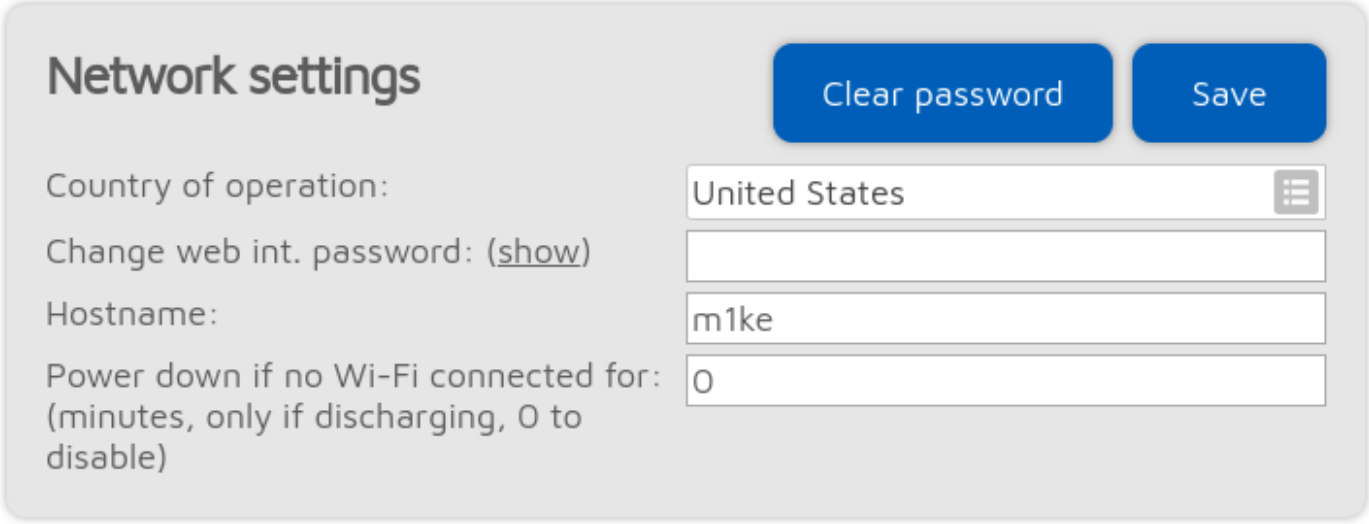


The **traffic graph** can be shown by clicking on the arrow at the top of the Traffic section. Values displayed are rough estimates.

The M1KE uses very little internet traffic. Depending on the active connector, the data rate estimates are as follows:

- Quiet channel is 36-180 kB / hour
- Active channel is 3-6 MB / hour

Network settings



The web interface of the device is not password protected by default, which means anyone on the local network can open it. You can set a password by entering it in the **Change web int. password** input field. To reset the factory default behavior and clear the password, click on the **Clear password** button.

The **Hostname** is used by built-in LLMNR and MDNS server which means you'll be able to open the web interface by entering http://hostname/ or http://hostname.local/ into the browser. The hostname is also displayed at the top right corner of the web interface.

Important

If you have **multiple M1KEs on the same network**, make sure you **use different hostnames** for each of them.

The following settings are only available if Advanced mode is enabled.

Please see the Setting the dejitter queue length section on the **Dejitter queue length** setting.

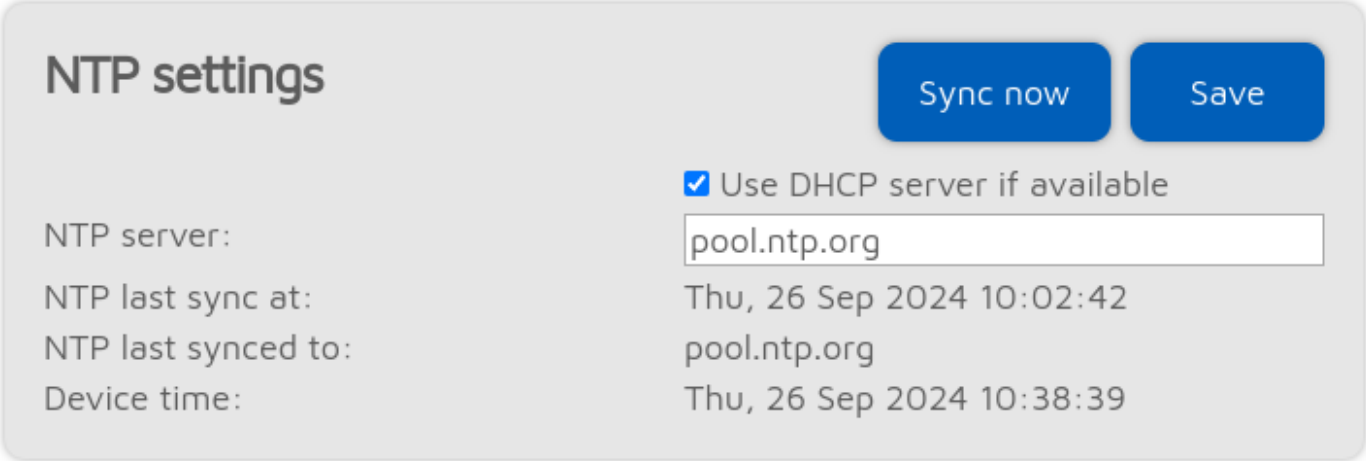
The **Call timeout duration (ms)** determines the time in milliseconds after which an ongoing call is considered as ended with a timeout (as no call end message was received).

The M1KE can send its log output to a syslog server set by the **Syslog server** field. Check the **Send log to syslog server** checkbox to enable using the syslog server.

NTP settings

Note

This section is only shown if Advanced mode is enabled.



The device synchronizes date and time using the Network Time Protocol (NTP). By default, the NTP server advertised by the Wi-Fi® network's DHCP server is used for synchronizing, but if the DHCP server does not advertise an NTP server, the host set at the **NTP server** setting will be used.

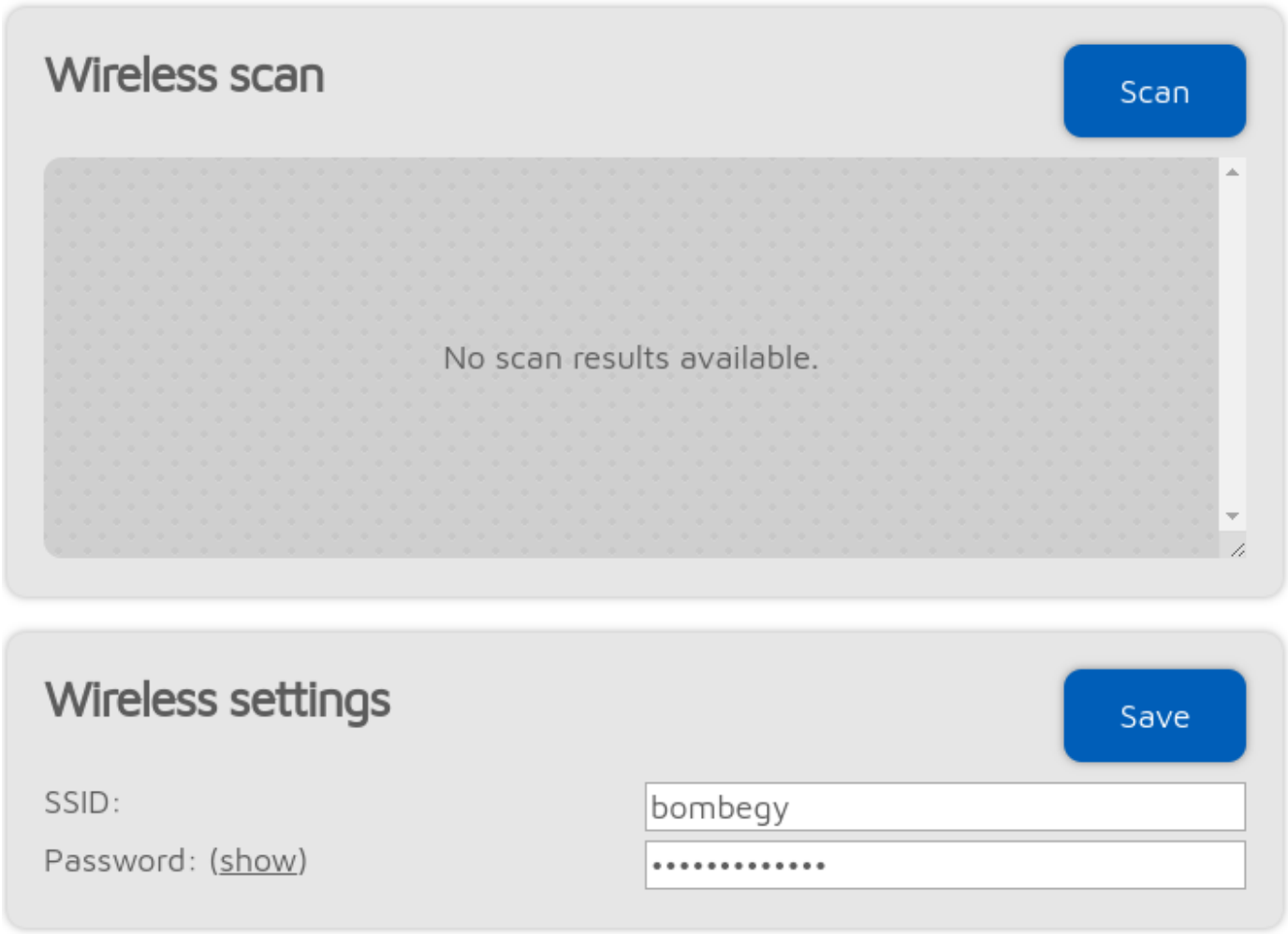
Note

The web interface loads the time from the device only **when the web interface is opened**. After that, the browser is updating the displayed clock and if the browser, or the web interface's browser tab is sent to the background then the time will be updated more irregularly due to the browser's CPU power saving mechanism. This causes the displayed M1KE device time to be incorrect, but **this does not affect the M1KE's clock, it will stay correct**. Reload the web interface to make the displayed device time accurate again.

Note

The device’s timezone setting is automatically synchronized with the browser’s timezone setting when the web interface is opened.

Wireless settings



If Advanced mode is enabled, you can define **up to 5 Wi-Fi® networks** (per Configuration profile) to connect. If the first configured Wi-Fi® network is not available, then the device will try connecting to the second one. If it’s not available either, then it’ll try the third one and so on. After trying all of the configured networks, it restarts the sequence with the first network.

If Advanced mode is enabled, the **Wireless scan** list will have a **Save** button for all previously unsaved networks instead of the **Connect** button. Clicking on the **Save** button lets you easily save the network to one of the 5 available Wi-Fi® network slots.

If you are manually adding a connection to an iPhone®’s shared internet connection then make sure you **copy and paste** the phone’s Wi-Fi® SSID as the iPhone® uses a special apostrophe character which looks nearly the same as the one you can enter with your keyboard, but it’s different, and all characters need to match.

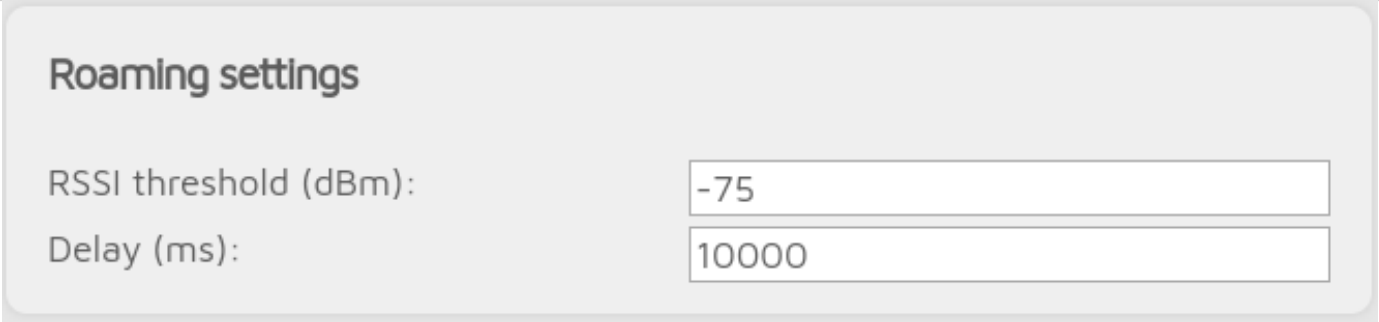
If the **Disable reconnect when no internet access detected** setting is active then the device won’t try connecting to other Wi-Fi® networks when there is no internet connection detected on the currently connected Wi-Fi® network.

Configuration profiles also contain Wi-Fi® networks and passwords. If the Save to all configuration profiles is on, then like it says it will store the Wi-Fi® network names and passwords into **all** profiles when you click on the **Save** button. This makes it act like there’s only one list of Wi-Fi® networks, but if you turn this setting off you can have different Wi-Fi® networks stored in each configuration profile. This can be useful if you want to use different profiles

based on your location - maybe one at home, one when you're tethered to your phone, one when you're visiting family, and so forth.

> **Note**
>
> If a BSSID is configured for a network then it'll be used instead of the SSID.

Roaming settings



The device supports automatic Wi-Fi® network roaming. The **Roaming threshold (dBm)** setting defines the signal strength level at which the device will start waiting for the **Delay (ms)** time before switching to another Wi-Fi® access point on the same network.

Access point mode settings

The AP mode SSID can be set in the **AP SSID** input field. By default there's no Wi-Fi® password set for the M1KE's AP mode, but you can set one at the **AP key** input field.

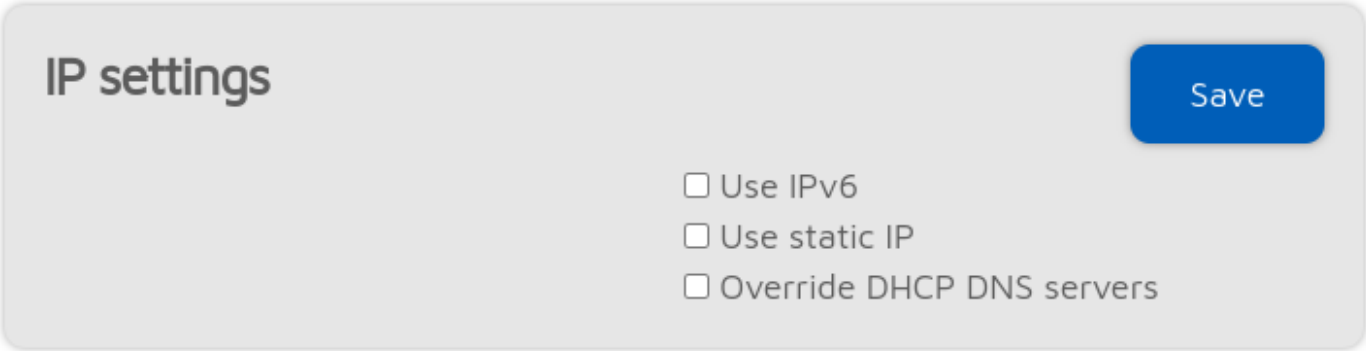
The AP mode Wi-Fi® channel can be set in the **Channel number** input field.

> **Note**
>
> A connected Wi-Fi® network's channel number will be used instead of the configured one while the M1KE is connected to a Wi-Fi® network.

See this page for more information on how to use the AP mode.

IP settings

> **Note**
>
> This section is only shown if Advanced mode is enabled.



By default, the DNS server advertised by the Wi-Fi® network's DHCP server is used. If you want to override the advertised DNS servers, then check the **Override DHCP DNS servers** checkbox.

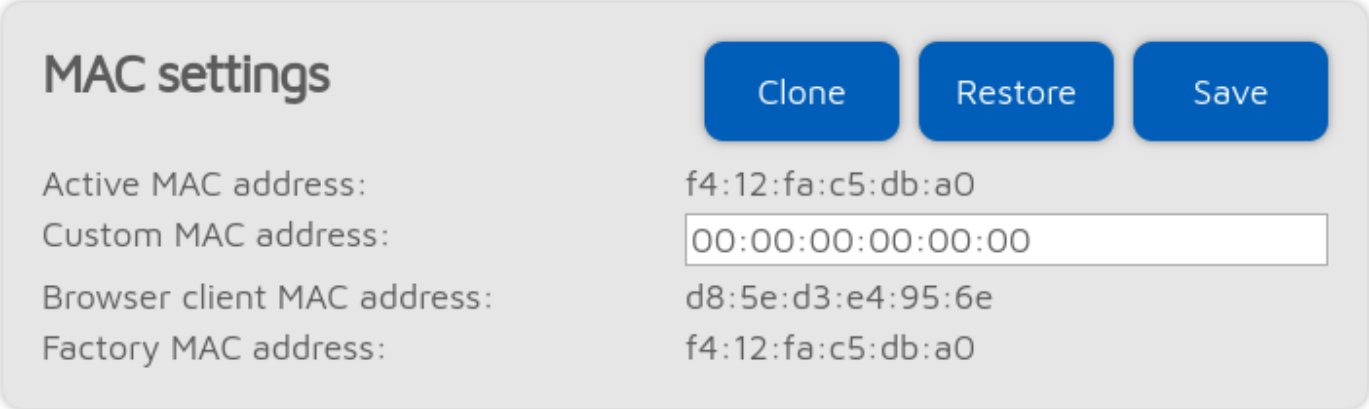
Note

If the device can't connect to servers, you can try overriding the DNS servers to 8.8.8.8 and 8.8.4.4.

MAC settings

Note

This section is only shown if Advanced mode is enabled.



You can change/clone the Wi-Fi® MAC address of the M1KE here. This is useful if you try to use a Wi-Fi® network which uses a captive portal for authentication (example: hotel or airport networks). In this case, do the following:

1. Connect to the Wi-Fi® network with your phone/tablet/computer, log in on the captive portal to enable the internet access for your phone/tablet/computer's MAC address
2. Enable the M1KE's access point (AP) mode
3. Connect your phone/tablet/computer to the **M1KE AP**, but exit the Initialization setup and open the Network page
4. Set the captive portal Wi-Fi® network's SSID and key at the **Wireless settings** section
5. Click on the **Clone** button at the MAC settings section (make sure **Advanced mode** is enabled so the MAC settings section is visible).
6. Disable the M1KE's AP mode

The device will connect to the captive portal Wi-Fi® network with your phone/tablet/computer's already logged in MAC address.

> **Important**
>
> MAC cloning may cause packet loss and the network connection of both devices may get periodically interrupted.

Basics

Buttons

Power/Back Button

Turning The Device On

Press and hold this button for **1-2 seconds**.

> **Important**
>
> If you're powering up a **brand new M1KE** which has **never been turned on before**, then connect it to a USB power supply first; otherwise **it will not turn on**.

Turning The Device Off

Press and hold this button until it turns off (**2-3 seconds**).

Note

About 3 seconds have to pass after turning off the device before it can be turned on again.

Warning

The device reboots (hard reset) if the power button is held more than about 8 seconds.

Short Press

If the button is pressed **for a short time**, it acts as a back button. You can use it to go back in the menu system.

Triple Press

If the button is pressed 3 times quickly while the Main screen is active, then the device will beep the currently active profile number and name in morse code. If the Unlink when power button pressed 3 times setting is enabled, then triple press behaves differently, see the Miscellaneous settings for details.

Up/Down Buttons

These buttons can be used to navigate in the menu system.

Some screens (like the Main screen) have additional functions for these buttons if they are pressed and held **for a few seconds**. These additional functions are displayed at the bottom of the screen:

On this screen:

- Long pressing the **Up button** shows the Call Log screen
- Triple pressing the **Up button** shows the Config profiles screen
- Long pressing the **Down button** shows the PTT Destination Settings screen
- Triple pressing the **Down button** toggles between the currently configured connector and the Null connector so you can quickly disconnect from the current network and call.

Pressing and holding the **Down button** while turning on the device enables the M1KE's access point (AP) mode.

OK/Menu Button

This button is used to confirm selections in the menu system, or entering the Main Menu if pressed on the Main screen or on the Ongoing call screen.

Volume Up/Down Buttons

These buttons can be used to adjust the volume of the device.

PTT (Push-To-Talk) Button

This button is used to transmit. Start speaking when the status LED becomes red, indicating that the transmission has started.

> **Note**
>
> Clear the PTT on beep sequence to speed up the PTT response time.

Connectors

The M1KE has several available connectors which you can use to connect the device to a server. Each connector has its own supported protocol(s) and settings.

For example, you can use the REF/XRF connector to connect the M1KE to a server which supports the Dplus protocol (REF001, REF030 or other REF, XRF servers or gateways).

You can only have one connector active at a time, however, some connectors can be configured to stay active in the background.

> **Note**
>
> The easiest way to choose which connector to select is using the Quick Setup page.

You can also change the active connector on the Connectors page of the web interface, or on the Connector switch screen (under Main Menu / Settings) on the device display.

License modes

You can operate the M1KE in **licensed** and **unlicensed** modes. A valid and active amateur radio license is required to operate the M1KE in licensed mode.

> **Important**
>
> Server lists are empty in unlicensed mode, however, you can add your custom servers.

The Initialization Setup process lets you choose the license mode.

You can change between licensed and unlicensed modes later at the Owner information on the Settings page of the web interface, or on the Owner information screen (under Main Menu / Settings) on the device display.

Configuration profiles

The M1KE stores all of its configuration in individual profiles. There are 10 of them and profile #1 is active by factory default settings.

If you change a setting either on the web interface or in the device menu, then the change will be stored automatically in the currently active configuration profile.

When the device boots up, it loads the information from one of the profiles into memory and uses that to configure itself. When you change profiles, it reboots and loads the newly selected profile into memory instead. It also “remembers” which profile you last selected, and if you power the M1KE off entirely, when you turn it back on, it will boot into whatever profile you had last selected.

Note

There is an Advanced mode setting called Always use profile #1 on power on, which is normally turned off. If you turn this setting on, then like it says it will always start with profile #1 when booting up from a full power-off.

Each profile contains things like which Connector (i.e. “REF/XRF” for D-STAR®, “Homebrew/MMDVM” for DMR, etc.) to use and what destination to send calls to (i.e. reflector/repeater for D-STAR®, talkgroup for DMR, etc.).

Profiles also contain Wi-Fi® networks and passwords. There’s an Advanced mode setting called Save to all configuration profiles which is normally turned on. When this is on, then like it says it will store the Wi-Fi® network names and passwords into **all** profiles when you click on the **Save** button. This makes it act like there’s only one list of Wi-Fi® networks, but if you turn this setting off you can have different Wi-Fi® networks stored in each configuration profile. This can be useful if you want to use different profiles based on your location - maybe one at home, one when you’re tethered to your phone, one when you’re visiting family, and so forth.

Globally stored settings

- The owner information (your call sign, DMR ID, NXDN® ID and the amateur radio license validity flag) is stored globally which means that it is the same across all configuration profiles.
- The Global storage stores custom servers, favorite PTT destinations, call numbers and DTMF sequences.

Switching between profiles

There are multiple methods to switch between configuration profiles:

- Using the Config profiles screen on the device
- Using the dropdown list in the Footer of the web interface
- Using the Configuration profile section on the Settings page

Note

The device reboots when activating another configuration profile. Follow the steps described at the Welcome screen to initialize a profile which has never been used before.

Connecting to a Wi-Fi® network

This page gives you a quick guide on how to connect to a Wi-Fi® network after the Initialization Setup has been completed.

Using the device display

1. Open the Wi-Fi® connect screen under Main Menu / Settings.
2. Select the network to connect
3. Enter the password if required

Using AP (Access Point) mode

1. Enable AP mode on the Wi-Fi® screen under Main Menu / Settings
2. The device starts broadcasting its own Wi-Fi® network called **M1KE AP**. Connect to this network using your phone, tablet or computer.
3. The initialization setup web page should automatically show up after your phone/tablet/computer is connected. If not, open a web browser and open http://192.168.99.1/

> **Note**
>
> This IP address is only active while AP mode is enabled on the M1KE and your phone/tablet/computer is connected to its Wi-Fi® network.

4. Complete the steps on the initialization setup web page

Using the web interface

1. Go to the Wireless settings on the Network page
2. Edit the list of networks, and/or use the Wireless scan feature

See this page for information about setting up both home and phone Wi-Fi® connections.

DMR usage

There are two basic types of DMR calls: **private** and **group**.

> **Important**
>
> Talkgroups and reflectors are network features, **they are completely handled by the network and not the M1KE**, and their behavior may be different on each server / network.

Talkgroups

DMR networks usually have **static** or **dynamic** linking available for a talkgroup. Statically linked TGs **remain linked all the time**, dynamically linked TGs stay linked for you **only for a limited amount of time after the last call** (usually 15 minutes on BrandMeister, depending on the currently used server's configuration).

Having a talkgroup linked either dynamically or statically means that stations which have the same linked talkgroup will receive all (usually group) calls sent to that talkgroup.

Example: if you have TG969 linked either dynamically or statically, then the server will forward group calls (coming from other stations) going to DMR ID 969 to your M1KE and you will hear them.

Dynamic talkgroups

> **Note**
>
> The following information is only valid for the BrandMeister Network. Other networks may behave differently.

Linking

You can **link** a TG dynamically by simply starting a (group) call to the talkgroup ID. The network will automatically link your M1KE to the called TG ID.

> **Note**
>
> You can use also the Quick Call feature on the web interface or on the device display to link talkgroups.
>
> If the **Auto group call** setting is enabled at the Quick Call settings, the device will automatically start a quick call to TG4000 before quick calling the desired ID. This ensures that all previously dynamically linked talkgroups are unlinked by the server first.

Unlinking

To **unlink** all dynamically linked talkgroups, call TG4000 (start a short group call to DMR ID 4000).

> **Note**
>
> Calling TG4000 will also unlink linked reflectors, not just all dynamic talkgroups.

Auto static talkgroups

There's BrandMeister Network feature called **auto static talkgroups**: the first talkgroup ID you call **after calling TG4000** will be linked auto static which means **it won't be unlinked after a timeout**. You can unlink this auto static TG by calling TG4000.

Static talkgroups

Static talkgroups on the BrandMeister Network

Statically linked TGs can be configured on the BrandMeister Network's dashboard after logging in, or by using the M1KE's BrandMeister Manager.

Static talkgroups on DMRplus/IPSC/other networks

You can define what TGs to link statically at the DMRplus options section at the bottom of the Homebrew/MMDVM® connector, or use the server's/network's dashboard (if available).

Reflectors

Reflector IDs are between DMR ID 4000 and 5000. To link a reflector, start a short **private** call to the reflector ID. To unlink the reflector, start a short **private** call to DMR ID 4000.

Only 1 reflector can be linked at a time. To talk on the linked reflector, send your calls to DMR ID 9 with a group call (TG9). You'll receive all calls from the reflector also to TG9.

> **Important**
>
> Reflectors have been turned off on the BrandMeister Network since 2020. Most servers already have them disabled. **Use talkgroups instead.**

Recommendations

BrandMeister Network

Avoid statically linking talkgroups and only **use one auto static talkgroup at a time**.

DMRplus/IPSC/other networks

Define what TGs to link statically at the DMRplus options section at the bottom of the Homebrew/MMDVM® connector.

Changing modules on XLX servers

To unlink the currently linked module, call DMR ID 4000. To connect to module A, call DMR ID 4001, for module B call DMR ID 4002 and so on.

Advanced usage

Setting up both home and phone Wi-Fi® connections

Set your **home Wi-Fi** network as SSID #1 (and key) and your **phone's Wi-Fi®** hotspot as SSID #2 (and key), so if your home Wi-Fi® (SSID #1) is not reachable, then the device will automatically try to connect to your phone's Wi-Fi® (SSID #2).

The easiest way to do this is to use the web interface:

1. Open the Network page, scroll to the *Wireless settings section*
2. Make sure Advanced mode is turned on to see all 5 Wi-Fi® slots

You can also do this on the device display:

1. Press the OK/Menu Button to open the main menu
2. Select Settings
3. Select Wi-Fi®
4. Select Wi-Fi® networks

Important

Make sure you enter passwords case sensitive.

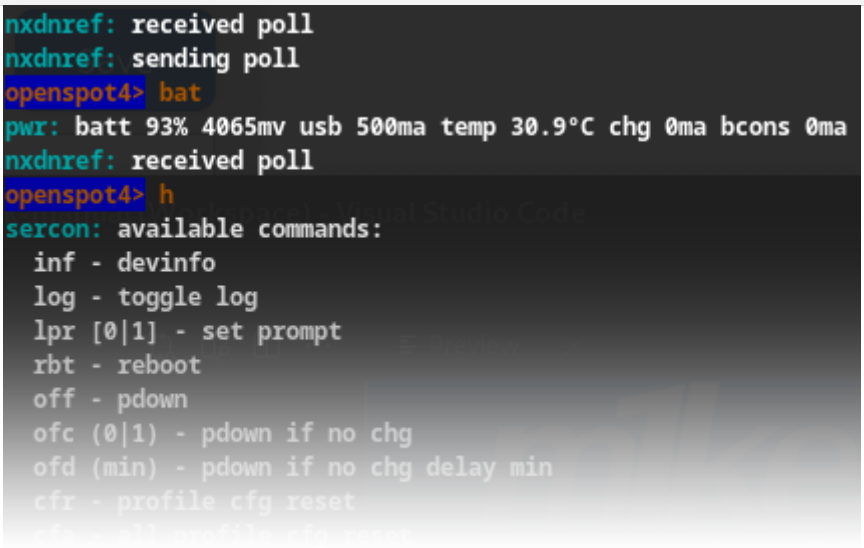
iPhone® notes

- Make sure you use the Save button at the **Wireless scan list** to save the iPhone®'s Wi-Fi® network to SSID slot #2 as it contains a **special apostrophe** character which you can't enter using your keyboard.
- Make sure you **keep the phone's Wi-Fi® hotspot settings page open** while doing a wireless scan on the M1KE, because the iPhone® only broadcasts its Wi-Fi® network name while that page is kept open on the phone. We have tested with iOS versions up to 13. Newer iOS versions may work differently.
- Make sure the option **Maximize compatibility** is enabled on the phone's hotspot settings page.
- Some time ago Apple changed how their phone's hotspot works - the first client can only connect when you have the *Personal Hotspot* settings open on the phone:

    1. Go into the *Personal Hotspot* settings and disable **Allow others to join**
    2. Turn off the M1KE
    3. Go into *Personal Hotspot* settings end enable **Allow others to join**. Don't leave this settings page!
    4. Turn on the M1KE

The M1KE should then connect. The downside to this is that after some time if nothing is using the phone's hotspot, to connect the first client you need to open the page again and wait for it to connect. When the phone's hotspot is in use other clients can connect freely later, but it stops broadcasting the phone's SSID after some time.

USB serial console



The M1KE shows up as a USB serial port (COM port) when plugged into a computer. You can use the serial console by clicking on this Connect button:

The browser will open a dialog where you can select the serial port that corresponds to the M1KE (usually labeled as **USB JTAG/serial debug unit**). If the device is not listed then try using a different USB cable and USB port on your computer.

After the device is connected by the browser a dialog shows up select **Logs & Console** to open the serial console.

The serial console can be used to change network settings, reboot the device, see its log, perform a configuration profile reset and many more. Enter **help** or **h** to see the list of available commands.

You can turn on the device log over the USB serial console by entering the **log** command.

Using serial terminal software

You can also open the M1KE's USB serial console with serial terminal software like PuTTY, RealTerm, TeraTerm, minicom etc.

To find out which is your M1KE's serial port device path (COM port number), look at the device list of your computer (in your operating system's control panel for example). You can use the following settings for opening the serial port, but in theory any configuration would work:

- Baud rate: 115200
- 8 data bits
- No parity bits
- 1 stop bit.

The M1KE's serial console does not require drivers on modern operating systems, as it shows up as a standard USB ACM device.

Factory reset

Button method

Hold the OK/Menu Button for at least 30 seconds to perform a full factory reset. After 30 seconds the LED will blink red 5 times and turns off. Release the OK/Menu Button and the device will reboot. All configuration profiles will be cleared.

Web interface method

Click on the **Reset all config profiles** button at the bottom of the Settings page.

If you only want to reset the active configuration profile to defaults, you can use the **Reset config profile** button at the bottom of the Settings page.

Console method

You can reset the active configuration profile to defaults with the **cfr**, and all configuration profiles with the **cfa** command.

You can use the Console on the Status page of the web interface, or through the USB serial console.

Miscellaneous

Troubleshooting

Important

Make sure you **always use the latest firmware version**.

If you can’t find an answer to your issue, then please send us an email, or ask help in our community forum.

The web interface can’t be opened

Follow the steps on the Opening the web interface page.

SharkRF Link does not open the M1KE’s web interface

Important

Make sure your web browser device (phone/tablet/computer) is connected to the exact same Wi-Fi® network the M1KE is using.

Check if the M1KE is connected to the Wi-Fi® network by looking at the Status icons section on the display. If the device is not connected to the Wi-Fi® network then follow the steps described on the Connecting to a Wi-Fi® network page.

Also check the Wi-Fi® client isolation in your Wi-Fi® router’s settings. It should be turned off. If you use iCloud Private Relay or other VPN services then turn them off, otherwise you won’t be able to access devices on your local Wi-Fi® network (which means you won’t be able to open the M1KE’s web interface).

The M1KE can’t connect to the Wi-Fi® network

Check if the M1KE is connected to the Wi-Fi® network by looking at the Status icons section on the display. If the device is not connected to the Wi-Fi® network then follow the steps described on the Connecting to a Wi-Fi® network page.

- Make sure you have enabled 2.4GHz in your Wi-Fi® router (or mobile phone hotspot), not just 5GHz
- Place the M1KE close to the Wi-Fi® router
- Make sure the Wi-Fi® bandwith is set to max. 20Mhz in the Wi-Fi® router (see explanation here)
- Disable band steering in the Wi-Fi® router’s configuration
- If it still does not work, try switching Wi-Fi® channel on your Wi-Fi® router. Only channels 1, 6 or 11 should be used (see explanation here)

The web interface only loads partially

Make sure you use a supported browser (Chrome, Firefox or Safari), and that the browser is updated to the latest version.

Try placing the device closer to the Wi-Fi® router or mobile phone hotspot.

Connector authentication failed messages are displayed

See the server password information on the Homebrew/MMDVM® connector.

I’m not hearing anything or volume is low

- Make sure the configured server is connected. The PTT destination section on the Main screen on the device’s display should not be blinking continuously, and the **Status** field on the Status page of the web interface should not show *Connector connecting*.

- Make sure the volume is turned up on the device, and that the device is not muted. You can increase/decrease the volume by pressing the Volume Up/Down Buttons and on the top of the Settings page of the web interface
- Check the **Audio gain from network (dB)** Mode settings on the Settings page of the web interface. If the used mode's audio gain is set to a low value, then increase it
- Turn off EQ at the Speaker FX settings section on the Settings page of the web interface
- Optionally enable and increase the **Loudness** setting at the Speaker FX settings section on the Settings page of the web interface

Note

You'll hear silence if the incoming transmission uses an unsupported voice codec and can't be decoded (for example C4FM VW mode transmissions).

No one is hearing me on the network

- Make sure the configured server is connected. The PTT destination section on the Main screen on the device's display should not be blinking continuously, and the **Status** field on the Status page of the web interface should not show *Connector connecting*.
- Make sure gain values are not set too low at the Audio settings on the Mic settings page of the web interface
- Turn off EQ at the Audio DSP FX on the Mic settings page of the web interface
- Optionally enable and increase the **Loudness** setting at the Audio settings on the Mic settings page of the web interface

If you are using the DCS/XLX or REF/XRF connector:

- Make sure your callsign registration is valid on this page.
- Check if your registered callsign exactly matches the callsign you've set in the connector settings
- Check if your registered callsign exactly matches the callsign you've set at the Owner information on the Quick Setup page
- There should be no suffixes or any whitespaces set in any of these callsigns

The M1KE can't connect to the selected server

If the PTT destination section on the Main screen on the device's display is blinking continuously, and the **Status** field on the Status page of the web interface shows *Connector connecting*, then the M1KE is trying to connect to the configured server.

Check if the M1KE is connected to the Wi-Fi® network by looking at the Status icons section on the display. If the device is not connected to the Wi-Fi® network then follow the steps described on the Connecting to a Wi-Fi® network page.

If it is connected to the Wi-Fi® network, then check the currently active connector's settings on the Connectors page of the web interface, or use the Quick Setup on the device display or on the web interface.

If the server requires a password to connect then verify it at the connector settings. Check the callsign and ID settings, make sure they the callsign and ID are valid and registered. If you want to connect to the BrandMeister network, then read the Connecting to a BrandMeister server on the Homebrew/MMDVM® connector.

If it still does not work, then the server may be currently offline, or there may be a connection issue between your M1KE and the server. You can try using another server, or enable the **Override DHCP DNS servers** setting at the IP settings on the Network page of the web interface.

Internet connection error status message is displayed

Follow the steps described at the The M1KE can't connect to the selected server.

Web interface call audio playback is choppy

Note that smooth call audio playback requires a Wi-Fi® connection with a good signal quality. If you have issues with call audio playback, then please try using different browsers and make sure they are updated to the latest version.

Browsers reduce CPU allowance on non-active tabs after a while. The tab of the web interface must be kept active, otherwise the audio will be garbled. This browser behavior cannot be changed. If the audio becomes garbled, activate the tab, and/or reload the web interface to fix it.

There are dropouts in calls, voice is stuttering

Please note that dropouts can happen when there's an issue/interference with:

- The server
- The server's internet connection (most amateur radio servers are running on unstable home internet connections not suitable for international links)
- The link between the server and your Wi-Fi® router, or your internet connection
- Your Wi-Fi® router
- The Wi-Fi® link between your M1KE and your Wi-Fi® router

These issues cause dropped packets, which are indicated on the Dejitter queue graph on the M1KE's Status page as **invalid seqnum errors**. They may cause dropouts in the voice transmissions.

If there are no invalid seqnum errors, but the Dejitter queue graph shows that the queue gets empty during a call, then you can try increasing the dejitter queue length.

Make sure you use a server nearest to your location to avoid network dropouts and high latency. Please keep in mind, that packet loss and high latency can occur in VoIP (Voice over IP) streams even if you have a really high quality network connection.

What you can do to avoid dropouts are:

- Use a different server, which has a stable connection (try BrandMeister servers, as they have a lot of servers worldwide with good quality international connections)
- Place the M1KE close to the Wi-Fi® router
- Make sure the Wi-Fi® bandwith is set to max. 20Mhz in the Wi-Fi® router (see explanation here)
- If it still does not work, try switching Wi-Fi® channel on your Wi-Fi® router. Only channels 1, 6 or 11 should be used (see explanation here)
- Try using a different Wi-Fi® router or internet connection

DMR ID is not in the database warnings

A valid DMR ID is only required by the network/server you use. The device only displays a warning about that and does not care if your ID is valid or not.

The device does not turn on

If pressing and holding the Power button for 1-2 seconds does not turn on the device, then connect it to a USB power supply and then try turning it on again.

If this does not help then:

- Try using a different USB charger, a different USB cable or a different USB port on the computer
- Try flipping the USB-C connector of the cable upside down for charging
- Charge for at least an hour to make sure the battery is not drained
- Hold the Power button for at least 8 seconds to perform a hard reboot.

If the charge LED next to the USB connector is blinking fast, then there's an error with the currently connected charger. In this case try using a different USB charger, a different USB cable or a different USB port on the computer.

If the status LED on the top of the device blinks 3 times and the device immediately turns off, then the battery is overheated, and its protection is active. Avoid exposing the device to direct sunlight or any heat source and wait a few minutes so the battery can cool down.

Firmware recovery

If you've performed the steps at the The device does not turn on and the device still does not turn on, then perform a firmware recovery through the USB port by connecting the device to your computer and click on this Connect button:

The browser will open a dialog where you can select the serial port that corresponds to the M1KE (usually labeled as **USB JTAG/serial debug unit**).

After the device is connected by the browser a dialog shows up. Select the **Install firmware** menu item to start the recovery process. You can find more information about the USB serial console here.

If the device is not listed then:

- Try using a different USB cable
- Try using a different USB port on your computer

If these don't help then press and hold both the Power button and the Volume down button on the device at the same time for 10 seconds to enter it into bootloader mode before clicking on the Connect button above. Nothing will be displayed on the device's screen and the status LED will be off while it's in bootloader mode.

Note that the device will stay in this mode until you perform a hard reboot by holding the Power button for at least 8 seconds.

The device turns off even when it's connected to a charger

Make sure you use a USB charger which can supply enough current for the device while it's operating (min. 1500mA).

Battery depletes too quickly

Make sure the battery is charged completely. If the battery is fully charged then the charge LED is off and the charging status displays *ready*. Length of the discharge time is affected by a lot of things.

The battery will discharge faster if:

- Display is on
- The device is playing back or sending a call
- There's traffic on the connected Wi-Fi® network (even if the traffic is not to/from the M1KE)
- Wi-Fi® signal quality
- Web interface is opened

The device display is not working

Press a button to wake up the display. Open the web interface and check the **Display brightness** setting at the Display / keypad settings on the Settings page.

Specifications

- Dimensions: 96 x 66 x 25 mm / 102 x 66 x 25 mm inc. the lanyard hole
- Weight: 136 grams

Operating temperature range

- Normal operation: -10 - +45 °C
- Battery charge: 0 - +40 °C

Power

- Battery: Polymer Lithium-Ion 3.7 V / 2900 mAh
- Power supply: 5 V DC through the USB-C port
- Recommended minimum power supply current rating: 1500 mA
- Power consumption: max. 1 A

Modem

- Supported protocols: IEEE 802.11b/g/n
- RF power output: 21.0 dBm (802.11b, 1 Mbps)
- Receive/transmit frequency range: 2.412 GHz - 2.484 GHz

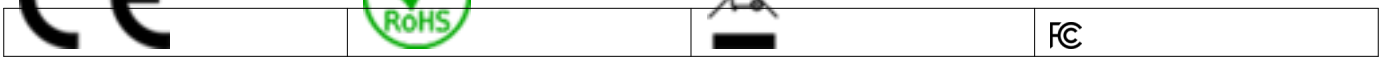
Receiver sensitivity

- 802.11b, 1 Mbps: -98.4 dBm
- 802.11g, 6 Mbps: -93.2 dBm
- 802.11n, HT20, MCS0: -92.6 dBm

Certifications

This device has been tested and certified according to the following standards and directives:

EN 300 328, EN 301 489-1, EN 301 489-17, ICNIRP, EN 50566, EN 62209-2, EN 62368-1, IEC 62133-2



This device complies with Part 15C of the FCC Rules.

All product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

Open source licenses

Here are the licences for various open source software used in the M1KE.

alertify.js

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jquery.js

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ladda.js

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pure.css

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js-sha256.js

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spin.js

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jsmn

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HamGridSquare.js

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Javascript routines to convert from lat-lon to Maidenhead Grid Squares typically used in Ham Radio Satellite operations and VHF Contests

Inspired in part by K6WRU Walter Underwood’s python answer http://ham.stackexchange.com/a/244 to this stack overflow question: How Can One Convert From Lat/Long to Grid Square http://ham.stackexchange.com/questions/221/how-can-one-convert-from-lat-long-to-grid-square

jquery-ui.js

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Smoothie Charts

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freertos-addons

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GSM 06.10 13 kbit/s RPE/LTP speech compression

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Berlin, 28.11.1994 Jutta Degener Carsten Bormann

Opus audio codec

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