

C.A.R.L.A. Repeater Link/Local Operation Guide

Introduction

The California Amateur Radio Linking Association, or C.A.R.L.A. for short, is a group that is dedicated to providing a robust amateur radio repeater system reaching far and wide across Northern & Central California and parts of Nevada for uses ranging from day to day conversations to emergency communications.

Link/Local Operation History & Overview

Early in the development of the C.A.R.L.A. system, the need became apparent for users of the system (not just the control operators) to be able to operate any individual repeater apart from the system on a temporary basis. The flexibility of offering any combination of localized or wide area communications during a local, regional, and far reaching emergency situations is a prime benefit. Also, reducing wear and tear on the system is important, especially as some systems do not have commercial power and rely on a combination of battery, wind, and solar power. Thus, a dual Link/Local PL (sub audible tone) system has been designed, and will eventually be deployed to all repeaters in the C.A.R.L.A. system.

Here's How it Works...

As with most repeaters, all the C.A.R.L.A. repeaters require a PL tone to be transmitted to the repeater in order to activate the repeater. In this case, however, there are two different PL tones that will activate the repeater in one of two modes, **Link** or **Local**.

- **When transmitting to the repeater:**

The **Link** tone will activate the repeater, and also transmit your audio out to the rest of the system.

The **Local** tone will activate the repeater, but will not transmit your audio to the rest of the system.

Thus, if two users are both within range of the same repeater, and wish to carry on a conversation between themselves without tying up the rest of the system, they would both use the **Local** tone.

- **When receiving from the repeater:**

If the repeater is currently in **Link** mode, you will receive audio both from the repeater and the rest of the system. This is the default mode if the repeater is idle.

If the repeater is currently in **Local** mode, you will receive audio only from the repeater. You will not hear audio from the rest of the system.

The repeaters encode an **Output** tone, so that users may utilize the CTCSS (sub audible tone squelch) feature of their radios to keep unwanted signals muted. On any repeater using the dual tone system, the **Output** tone is the same as the **Local** tone.

- **Changing Repeater Modes**

As previously mentioned, when the repeater is idle, it defaults to **Link** mode.

If the repeater is in **Local** mode, and becomes idle, after approximately 10 seconds it will revert to **Link** mode.

To keep the repeater in **Local** mode, continue your conversation on the repeater using the **Local** tone.

Link mode can be manually resumed by quickly keying up (kerchunking) the repeater using the **Link** tone.

Please Note: When manually resuming **Link** mode (before letting the 10 second mute timer countdown and reset by itself), the first key up only restores incoming audio from the rest of the system. Only on your second key up will your audio be heard on the rest of the system. Remember, however, that your audio will always be heard on the repeater, no matter what mode you are in.

- **Courtesy Tones**

For repeaters with the dual tone system, there are three distinct courtesy tones.

If a user transmits to the repeater using the **Link** PL tone, users on that repeater will hear the **Link** courtesy tone.

- **Link** courtesy tone: 2 Low, 1 High (Boop Boop Beep)

If a user transmits to the repeater using the **Local** PL tone, users on that repeater will hear the **Local** courtesy tone.

- **Local** courtesy tone: 2 Low (Boop Boop)

If the repeater is in **Link** mode, and receives audio from elsewhere on the system, users on that repeater will hear the **Incoming Link Audio** courtesy tone.

- **Incoming Link Audio** courtesy tone: 1 High (Beep)

Please Note: Generally we use the same courtesy tones on each repeater, however there are some differences around the system. If you have any questions about the courtesy tones on a repeater, or try them out for yourself. We always try to have the lower of the two PL tones be the LOCAL access and the higher of the two be the LINK access if that's easier to remember.

A picture is worth a thousand words...

Since link/local operation can be somewhat confusing for a first-time user of the system, we have included a visual guide to link/local operation in the following pages.

We have presented the following scenarios:

- **Scenario 1:**

Users want to converse across the system.

- **Scenario 2:**

Regional users want to converse locally on one repeater.

- **Scenario 3:**

Regional users want to converse locally on one repeater when other linked and local conversations are taking place elsewhere on the system.

- **Scenario 4:**

Regional users on repeater in **Local** mode wish to resume **Link** mode.

- **Scenario 5:**

Regional users on repeater in **Local** mode wish to manually resume **Link** mode before the timeout expires.

Diagram Key

In the following diagrams, the color key below applies:

Red for Link Input

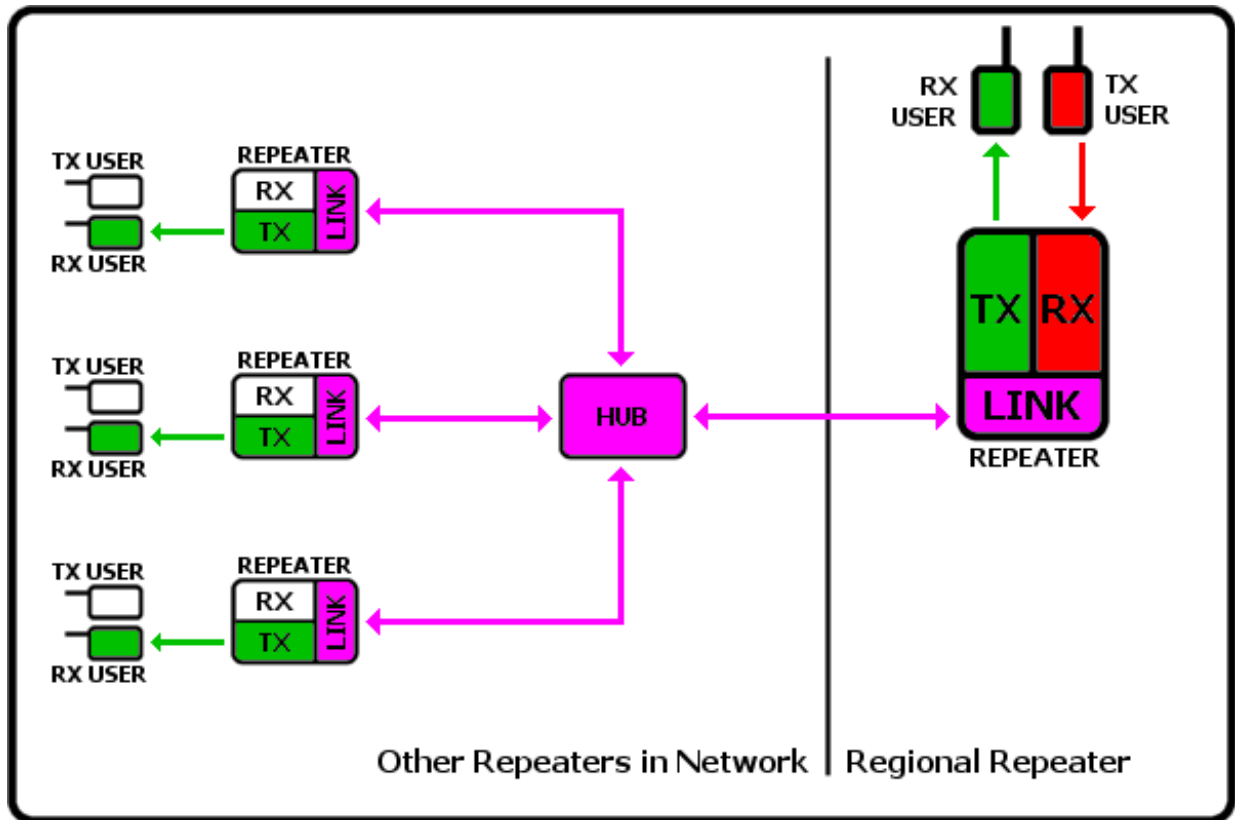
Blue for Local Input

Green for Repeater Output

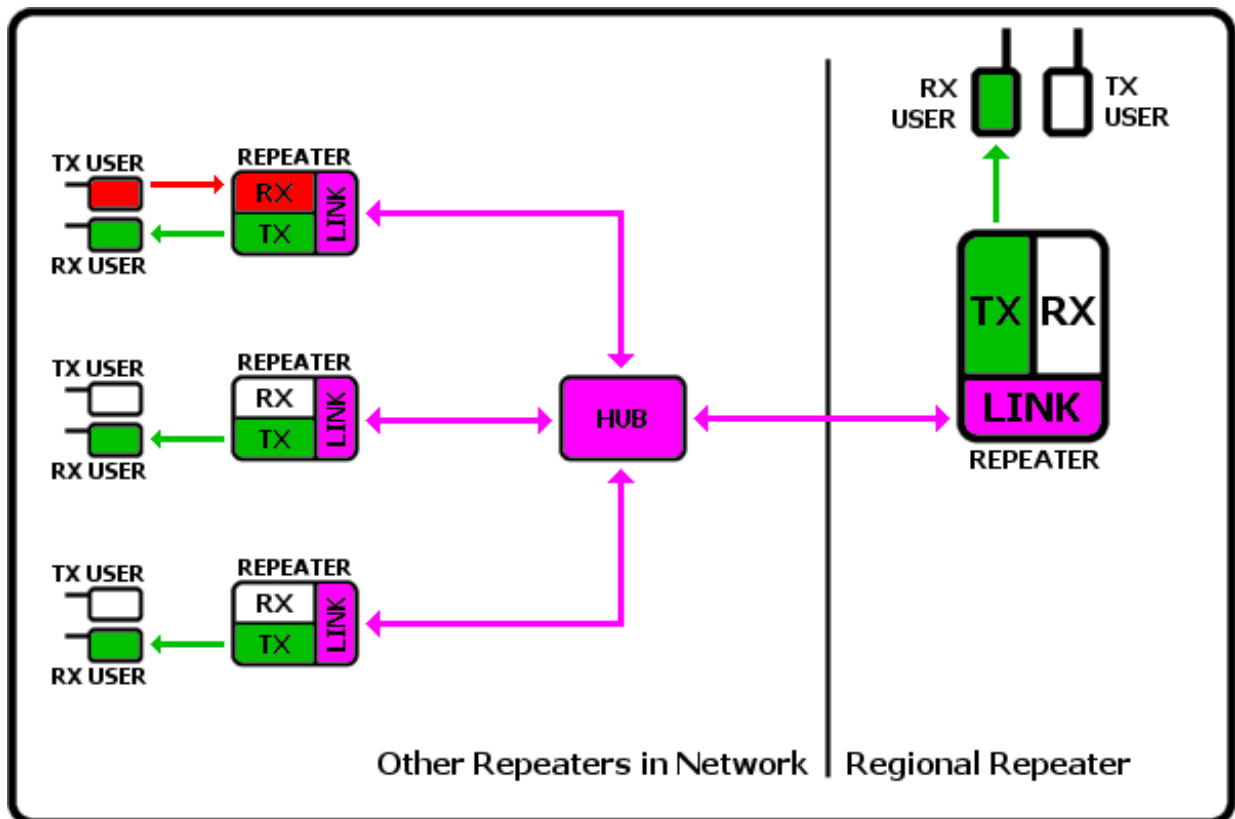
Purple for Link Audio between Repeaters

Scenario 1: Users want to converse across the system.

Here a user on a regional repeater is conversing with users elsewhere on the system:

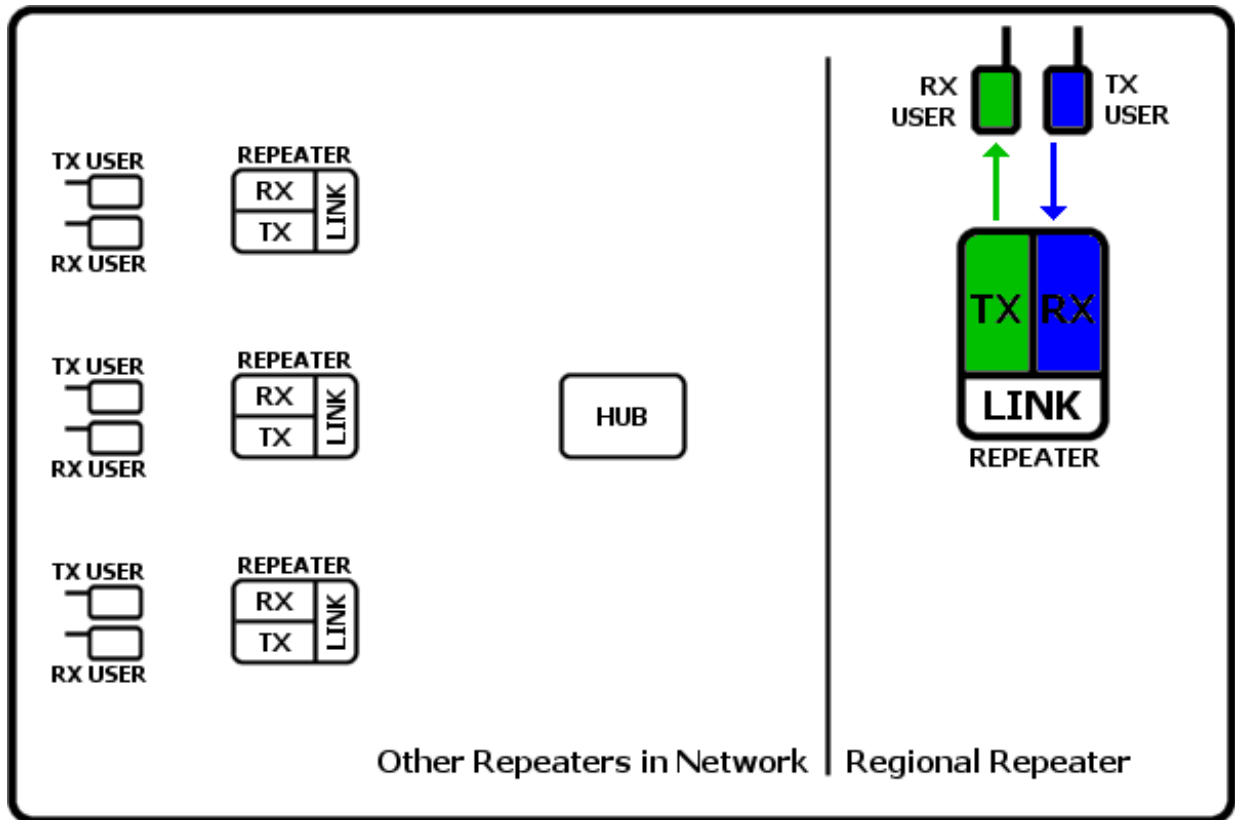


Here we see a user elsewhere on the system replying to the user on the regional repeater:



Scenario 2: Regional users want to converse locally on one repeater.

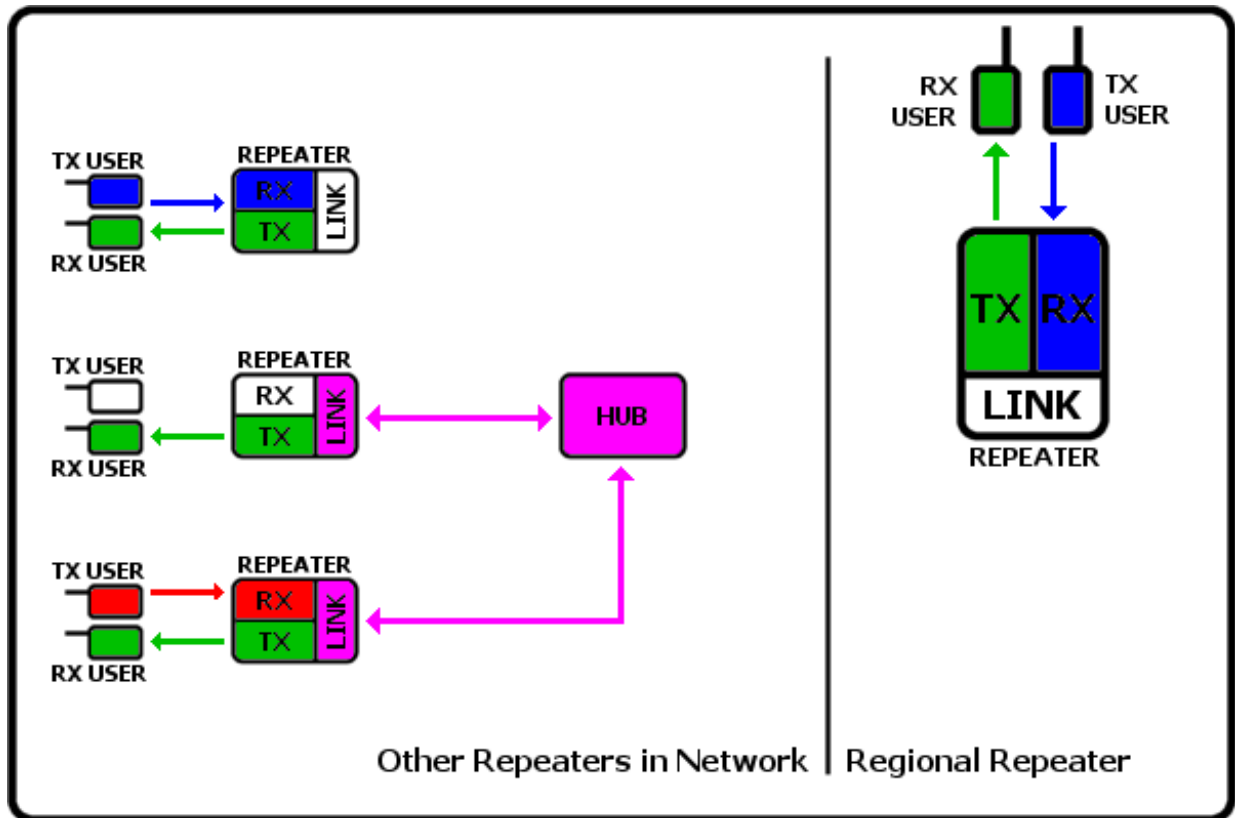
Here a regional user brings the repeater up in **Local** mode by using the **Local** tone:



Scenario 3: Regional users want to converse locally on one repeater when other linked and local conversations are taking place elsewhere on the system.

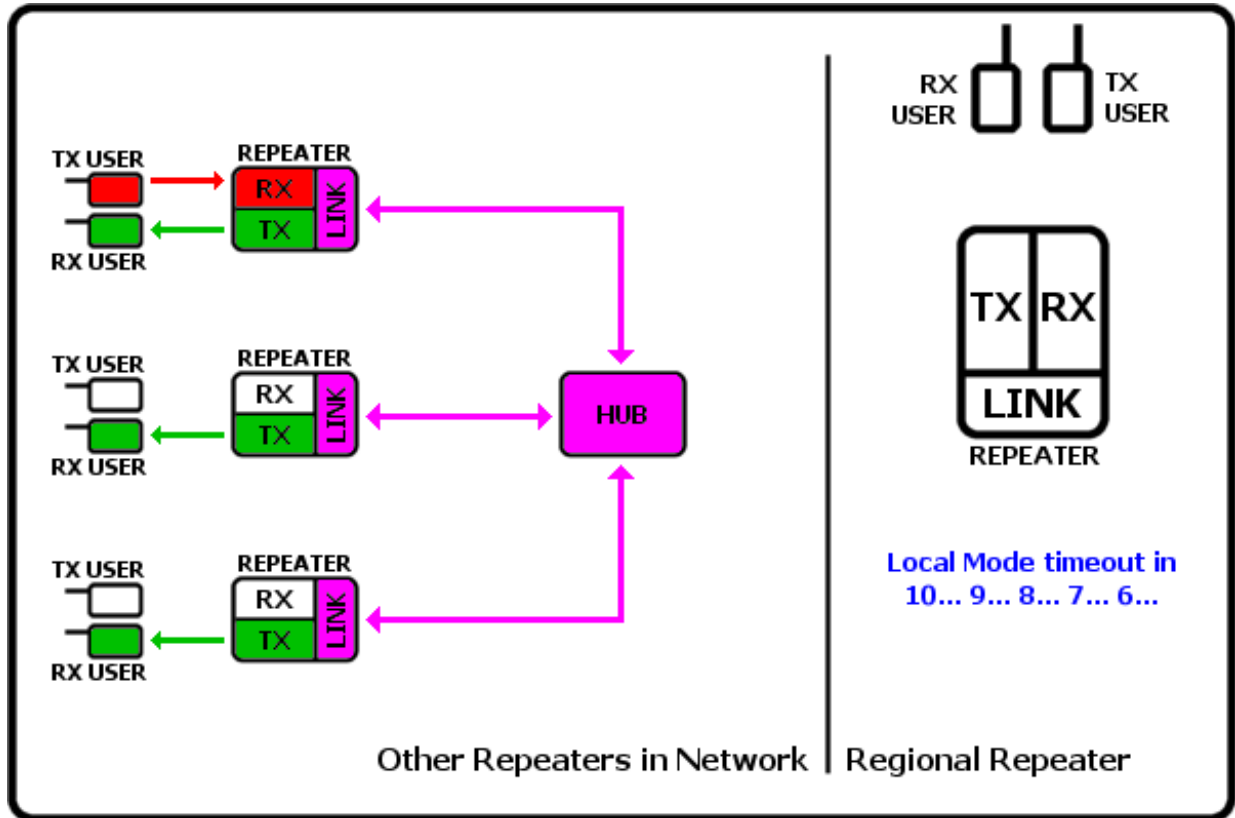
Here a regional user brings the repeater up in **Local** mode by using the **Local** tone.

Note that there is also one other local conversation, as well as linked conversation, occurring at the same time:

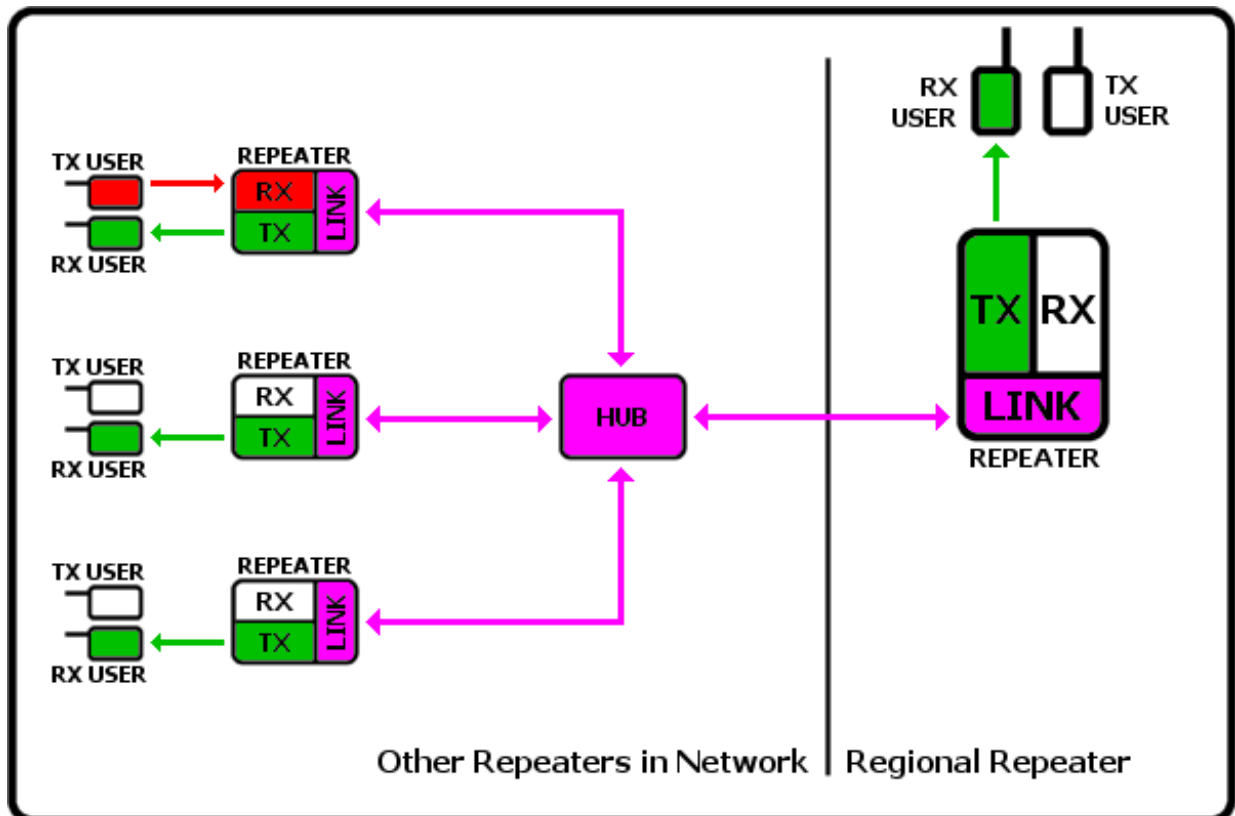


Scenario 4: Regional users on repeater in **Local** mode wish to resume **Link** mode.

If the local users want to return the repeater to the network, whether to hold a conversation or just to listen to users elsewhere on the system, they can stop transmitting with the **Local** tone, and wait for the timeout to count down...

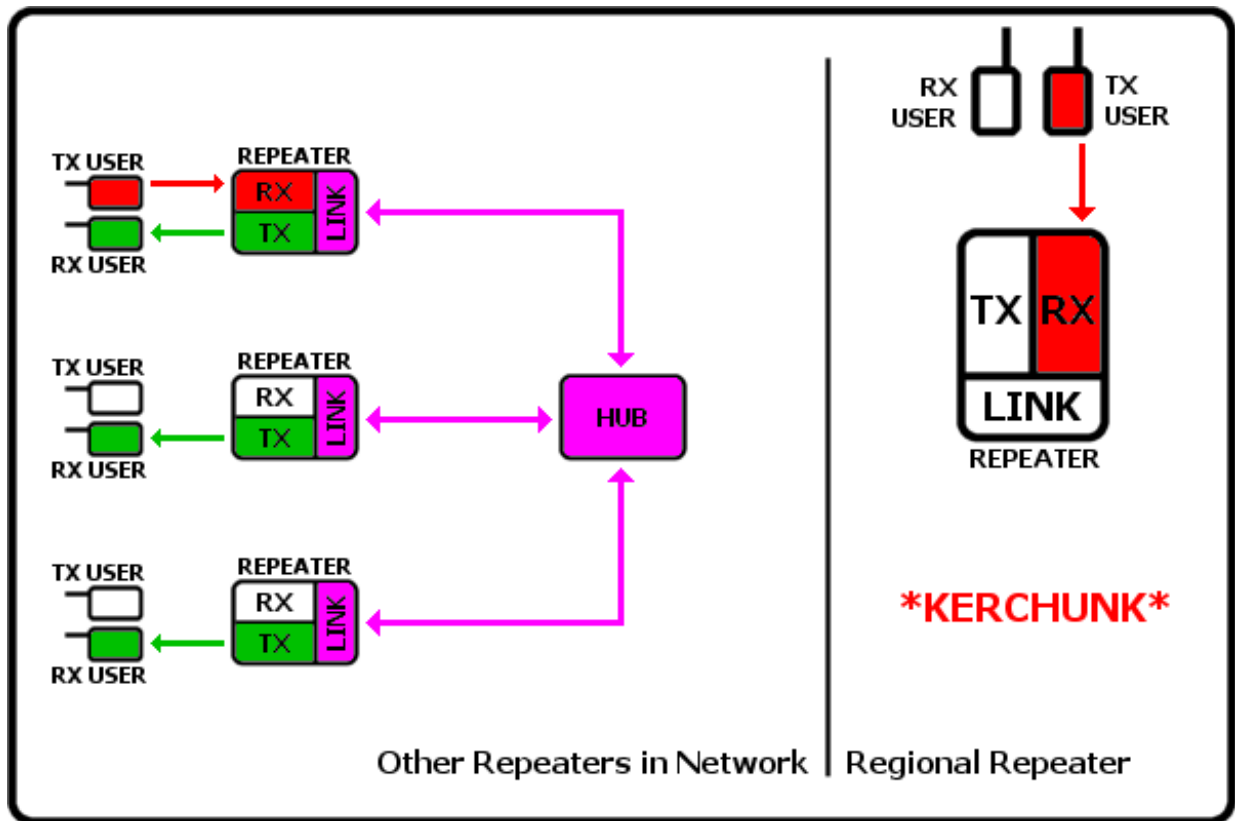


... and voila! They can hear the conversation going on elsewhere on the system:

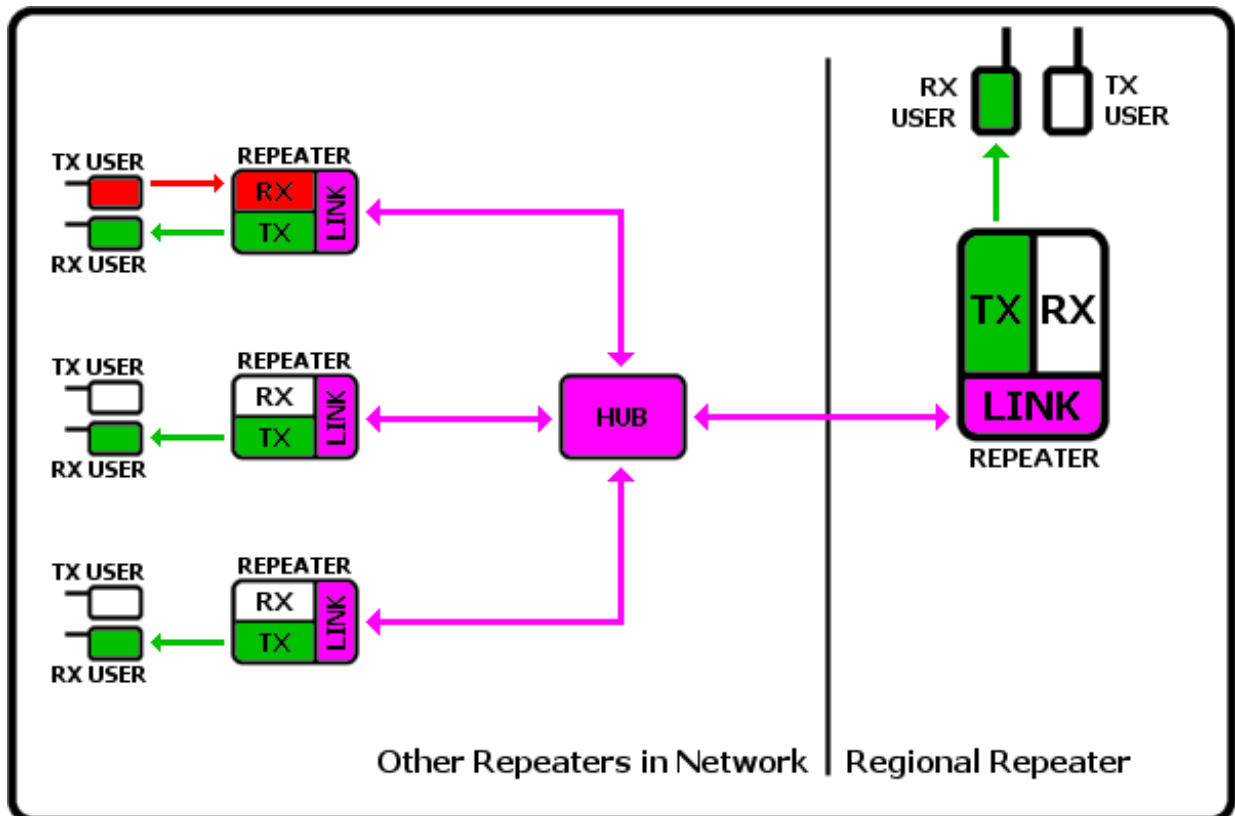


Scenario 5: Regional users on repeater in **Local** mode wish to manually resume **Link** mode before the timeout expires.

If for whatever reason you are on a repeater currently in **Local** mode and you need to manually return the local repeater to **Link** mode, simply "kerchunk" the local repeater with the **Link** tone...



... and voila! They can hear the conversation going on elsewhere on the system:



Frequently Asked Questions

We have a new F.A.Q. on the CARLA website. To access, click the following link:

<http://www.carlaradio.net/faq.html>

Further Information

Further information can be obtained from our website at <http://www.carlaradio.net/>

Included on the website is current information about which repeaters currently have a dual tone system installed, as well as frequencies, PL tones, and other information.

If you have any questions, please feel free to come up on the air on the C.A.R.L.A. system and ask to speak to one of the trustees or a control operator.

Conclusion

We hope the preceding guide has been useful for the reader. We look forward to hearing you on the air on the C.A.R.L.A. radio network soon!

Document Revision

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