Repeater Set-up for RAMP Server/Client Networks

RAMP modules

Application Note   *v1.0*

INTRODUCTION

In a RAMP server/client network, the client radios must be in range of the server to receive the synchronization beacon that allows them to communicate with other nodes in the network. In some applications, this may not be feasible due to distance or obstructions between the client and the server. For these networks, it is possible to configure two additional radios to act as a repeater in the network and extend the range.

This application note details the configuration of a point-to-multipoint network with one repeater. Additional repeaters can be added as long as they follow the same rules.

CONFIGURATION

Connect the central Host to a RAMP radio configured as a server in broadcast mode. Set up all other radios as clients (System ID and RF channel should match the server) with Auto Destination selected (+ Auto Dest Beacons for RM024 and LT1110). Each in-range client receives every message from the server radio and any responses from the clients are automatically addressed directly to the server.

Should the network's geographic size grow to where the central server cannot reach all client nodes, a repeater consisting of two RAMP radios wired back-to-back can be employed.

A repeater consists of two radios. One radio is configured as a client, identical to the existing clients synchronized to the central RAMP server. The other radio is configured as a server in broadcast mode with an RF channel higher than the RF Channel of the central RAMP server (AC4490 and CL4490 repeater servers should have RF Channels that are spaced 4-5 channels apart starting from the central RAMP server). Each repeater server should be on its own RF channel. Any client radio in range of this new repeater should have the same RF channel as the repeater server so they synchronize to it. **All radios in the network should share the same System ID.**

Note: Sync-to-channel should be enabled in AC4490 and CL4490 repeater networks if there are two or more repeaters in the network. This allows each server to synchronize their hop sequence with the central RAMP server.

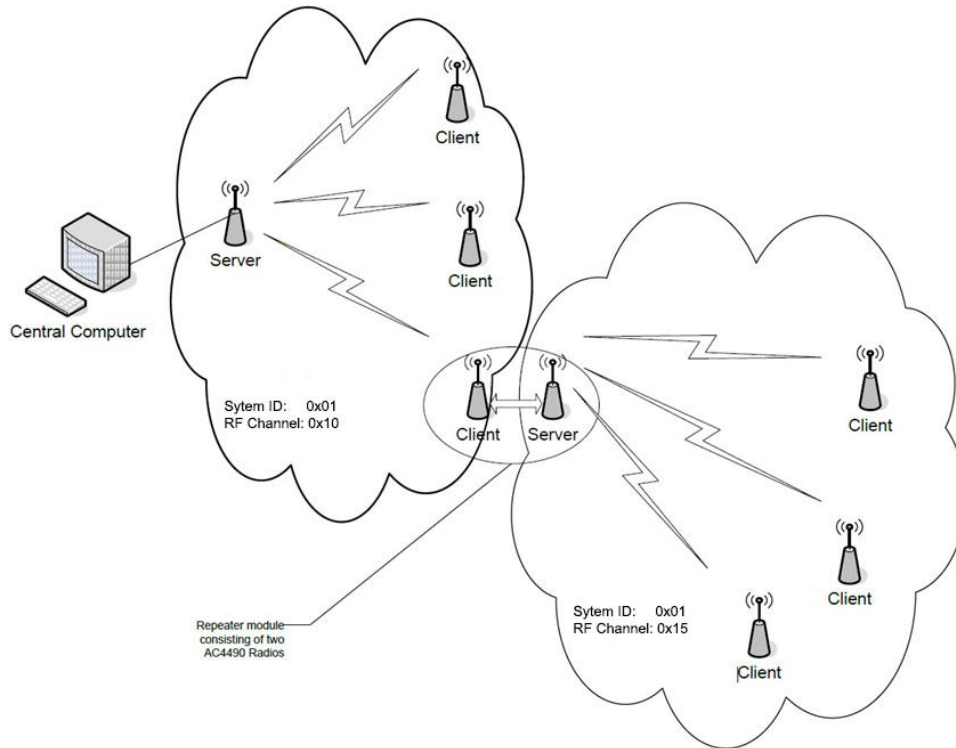Figure 1 shows a diagram of the network with the optional repeater.

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Figure 1: Network configured with repeater module

Message communication from the central RAMP server broadcasts out to all clients, including those connected to the repeater server. Messages from the clients are sent back addressed to the central RAMP server even when they are routed through the repeater sites.

In the case that the client radios are connected to hosts that roam, Auto-Channel can be used in addition to Auto-Destination on all clients that are not connected as a repeater. This allows the clients to choose which server to synchronize to and all data still ends up back at the central RAMP server. Clients used in the repeaters cannot use Auto-Channel and must have their RF channel set to the server they are meant to communicate with to prevent a communications loop between the repeater client and repeater server pair. Again, all radios in the network should have the same System ID.

Limitations

The following are limitations of this setup:

- The addition of the repeaters requires two additional radios which increases the cost of the systems.
- The repeater setup of a client and server must be sufficiently powered.
- The antennas of the client and the server in the repeater should be positioned to minimize interference. Ideally, the antennas should be placed greater than 10 feet from each other and, where possible, in different planes of radiation (perpendicular works best).
- When using RX API, there is no way to tell the client's MAC address from the RF packet when a message is routed through the repeaters to the central RAMP server. All messages routed through the repeater carry the repeater client's MAC address. The OEM must add their own layer of addressing into the data stream to address packets.
- Some additional latency is associated with the repeater. This latency is typically between 20 and 40 milliseconds.

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REVISION HISTORY

Version	Date	Notes	Approver
1.0	15 June 2016	Initial Release	Zach Hogya

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