Raven Electronics Corp.

Trunked To Conventional Operation with Variable Voice Delay (conceptual)

Conventional users need a seamless method to communicate to the trunked radio system. Usually when a conventional user keys up to the trunked side a "talk permit" or "inhibit" tone is returned from the trunked radio. This tone could come anywhere between 0 and 3 seconds from the trunked side. Conventional user needs to key, talk, dekey, and then receive the trunked status tone which tells the conventional user their transmission either was successful or denied. As such, we need to record a configurable amount of time from the trunked side and forward it to the conventional user. Conversely, we DO NOT want to send voice audio to the trunked side until it has responded and dropped VOX (telling us the trunked radio has sent status tones). This means the store and forward feature must operate in two directions. Operation is as follows:

1. Conventional user keys up and talks.
2. While conventional side is keyed (with PTT or VOX) we record all audio from the trunked side for a configurable amount of time (up to several seconds).
3. While conventional side is keyed, we also record all audio from the conventional side until the trunked side drops VOX (meaning we received valid talk permit tones). This is our conventional side "variable audio delay".
4. When VOX drops from the trunked side (meaning we received valid trunked radio status) we then start sending delayed conventional recorded audio to the trunked side.
5. When the conventional side dekeys, we forward the recorded trunked radio status to the conventional side which will confirm (or not) that a valid transmission was sent.

Hardware configuration requires a single 476-151 module and a 476-777 Module.

Features required:

1. Create a new VoIP session type ("Trunked/Conventional Interoperability") in the web interface.
2. VoIP module must have the ability to have firmware upgraded in the field.
3. All blade configuration settings must be saved to the VoIP module so multiple computers can configure the device (use the Web interface ONLY for blade configuration). We DO NOT want the main 47698 pic to handle any advanced processing other than message forwarding. We cannot upgrade the PIC in the field currently so make messaging flexible.
4. Status events from the four-wire module must be sent to the VoIP module to initiate voice recording and store and forward feature—need full messaging implemented between modules.
5. All keying delays and keying options on the 4-wire modules should be handled via a message/command from the VoIP module during initial setup.
6. Bridge four wire ports and TDM channels to the VoIP module. VoIP module is a "drop-and-insert" device so audio goes from 4-wire port 1 to VoIP module and then to 4-wire port 2 (and

vice versa). This can be static for now and web updating can be added later but the command to set the FMIC up must come from the VoIP module on startup.

7. VoIP module must initiate recording based on VOX/COR from either of the 4-wire ports. Prefer recording to be in memory (if possible) but we can also save to the files system if we must.

8. VoIP module must FORWARD recorded voice from the conventional side to the trunked side. This is more like a "variable" audio delay feature. If the trunked side takes 3 seconds to send talk permit tone, our delay is 3 seconds PLUS the inherent audio delay on the 4-wire set during provisioning. If trunked side takes 1 second to respond, our delay is 1 second PLUS the inherent audio delay set during provisioning.

9. Trunked side can simply send user transmissions directly to the conventional side after keying conventional radio if the conventional side is not already receiving audio.

10. Provide an option to backhaul Trunked to conventional communication to an RTP endpoint.

11. Write a processor reboot routine

12. Create a status page (on web server) for link and TX/RX between trunked conventional

M4x – Typical Site
Showing Conventional To Trunked Communication Protocol

476-777 VoIP Module

Delays audio for the duration that the trunked radio is recording.

Begins transmission to trunked side when VOX transitions to idle on the trunked radio input.

OPTIONAL RTP Unicast session forwards all audio conventional/trunked inbound to IP endpoint (voice logger, console, etc)

Starts recording when conventional radio initiates inbound transmission. Stops recording when VOX transitions to idle from trunked radio.

Forwards recorded audio direct to conventional when conventional radio goes idle.

476-151

Port 2
4-Wire Audio
(Conventional)

Port 1
4-Wire Audio
(Trunked)

Voice Logger

WAN

Console

Conventional Subscriber

Turnked Subscriber/Dispatch