

# Ways to Rapidly and Cost Effectively Expand Your Remote Capability



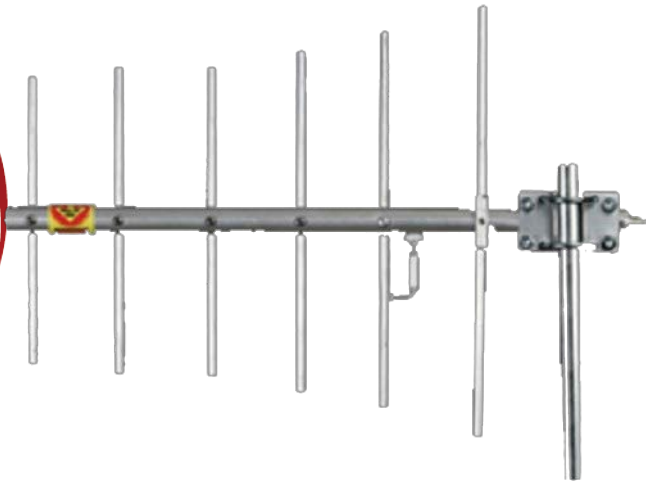
## The Codec Company

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## Ways to be cost effective with rapid deployment

- Switch Transport Method for Remote while still having backups
- Reduce the amount of equipment required
- Long-Term ready equipment

Do you still use?



Big, Hard to move around, Limited in Range,  
Time Consuming to setup

What about this?



Good for call in's,  
but why use this  
quality of remotes?



And These...?

Good Quality,  
Reliable,  
Out Dated



So where do we go from here?

So what do these have in common?



The Codec Company

**Tieline**<sup>®</sup>   
The Codec Company





Inexpensive  
Easy to get installed  
Great Quality  
Reliable?  
Possibilities Limitless

Just How Inexpensive is it really?



- ISDN – Base cost & Pay per minute  
(with most plans, now increasing monthly)
- POTS – Base Cost & feature cost  
(Hard to get Analog line, In most cases must be digital)
- Internet DSL – Base Cost
- Internet T1 (or Managed Internet) –  
Base Cost
- Fiber Internet – Base Cost

Easy to install



- ISDN – Very few service providers will **not** offer ISDN as an option for new contracts
- POTS – Easy to install however they are now running Digital instead of Analog
- IP (DSL, T1, Fiber) – Easy to install and maintain – Typically can be installed with 1-5 business days depending on your location. Few locations will exceed 5 days.

Great quality audio for IP



- Ranges between G.711 to PCM
- Bitrates can typically go up to 384 Kbps  
(depending on manufacturer)
- Sampling rates range between 8 KHz to 96 KHz (depending on manufacturer)

So how reliable vs. IP?



- ISDN – It just works and maintains the connection
- POTS – It works as long as you have a analog and clean phone line
- IP – Multiple Variables, but requires a one-time setup at the studio and there are features to help maintain the connection.

So how reliable is IP? (Con't)

- **Features**

- Forward Error Correction
- Extended Jitter Buffer (longer Latency)
- Packet Duplication (depends on manufacturer)
- High quality with low bitrates with low latency
  - i.e. Some Algorithms will maintain FM (or greater) quality audio at low bitrates.
    - OPUS : **48Kbps** (Stereo) 20 KHz Audio Bandwidth – 20 ms
    - AAC-LC :
    - E-APT<sub>x</sub> : 576 Kbps (Stereo) 24 KHz Audio Bandwidth – **2.5 to 4 ms**

# What is Forward Error Correction?

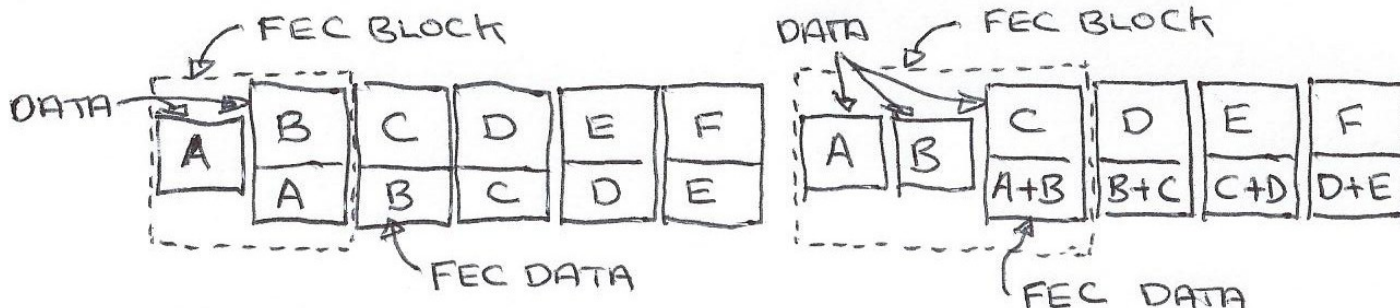
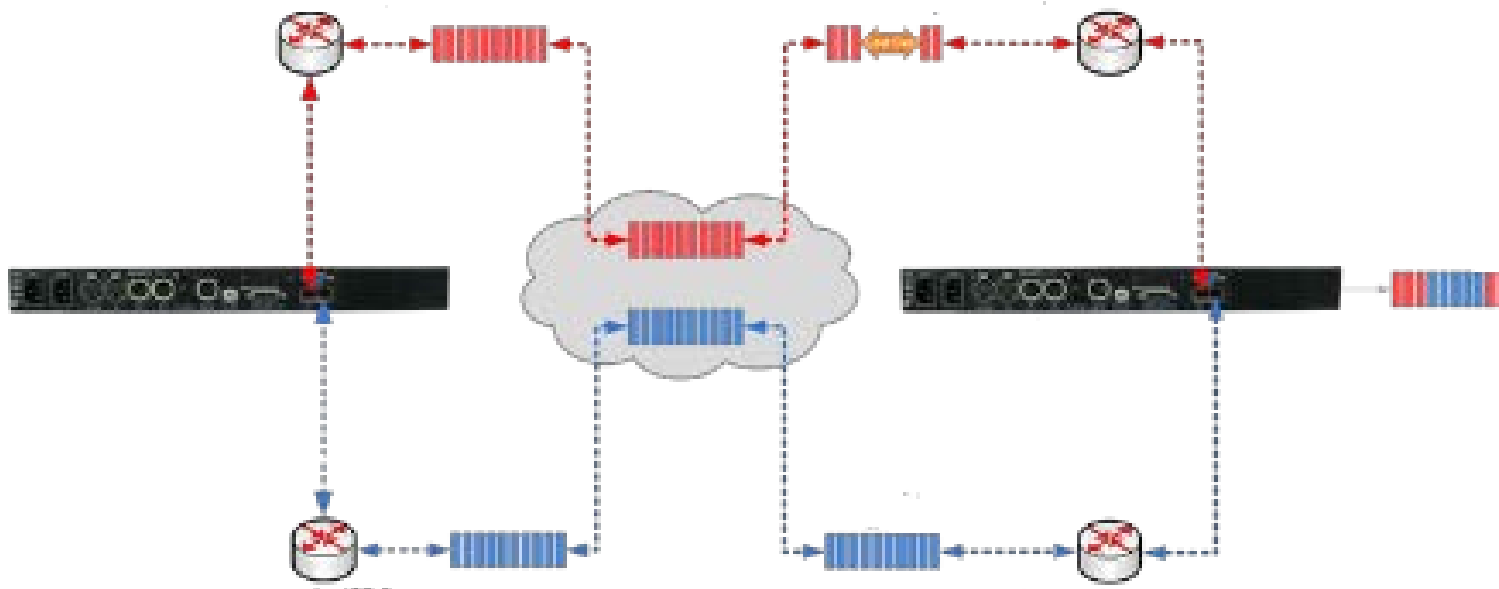


FIGURE 1: RS-(2,1) CODE

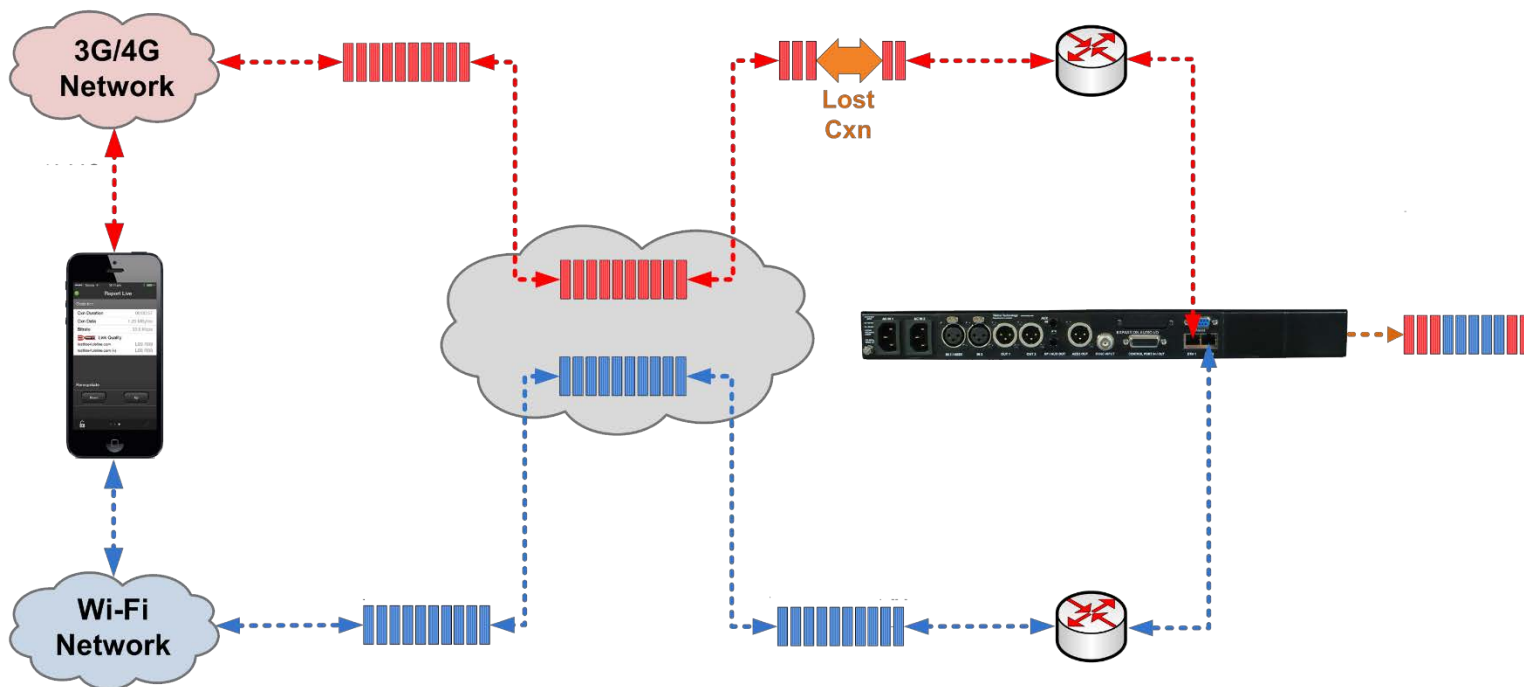
FIGURE 2: RS-(3,2) CODE

# What is Packet Duplication?





# Packet Duplication Gone Mobile



Reduce the Required Equipment

Studio: Do your RFCB's



R: Do your research

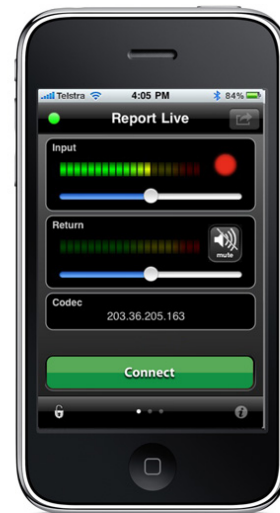
F/C: Look at features & capability

B: Base decision on applications over cost



Mobile: Do your RFCP's

R: Do your research  
F/C: Look at features & capability  
B: Base decision applications over cost



Long-Term ready equipment

- Purchase IP audio Codecs
  - You may want them to have options for POTS & ISDN
- Make sure that the IP audio codec not only supports IPv4, but IPv6.
- Think about how many remotes you do at the same time, as well as how many you will want to do as you expand? (i.e. 1, 2, 3, 4, etc...)

For those who don't know...

- IPv4 – 4.3 Billion Possibilities
  - 162.17.7.247 - Shortened
  - xxx.xxx.xxx.xxx
- IPv6 –  $2.4 \times 10^{38}$  (340 Undecillion)
  - fe00:0000:0000:0000:0230:abcd:1234 Long  
(Can not remember...)
  - Shortened – fe00::230:abcd:1234

## Examples

- **Comrex Access** — Mono/ Stereo/ Dual Mono Remotes



- **Tieline's Merlin Plus** — Mono/ Stereo/ Dual Mono/ 6x Mono Remotes/ Stereo with IFB/ 2 Stereo & 2 Mono



## Ways to be cost effective



- Switching to IP Audio Link
  - Saves Money on Communication Links
- Reduce the amount of equipment required
  - Saves Rack Space in the Studio
  - Saves the amount of equipment out at the remote
  - Saves Money!
- Become Long-Term ready equipment
  - IPv6
  - Multiple Remotes





Questions?

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