Bandwidth Requirements for Digital Voice

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RF vs Network Protocols

- RF Protocols are designed to minimize BW while maintaining Data Integrity in a Noisy Environment.
- Network Protocols are designed to maximize throughput in a generally reliable link.
# Digital Voice RF BW

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<th>Vocoder</th>
<th>Voice Data</th>
<th>FEC</th>
<th>Frame AuxData</th>
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Ethernet II Frame
## Data Requirements

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Things to Consider

- Multiple ways to do the same thing
  - D-Plus
  - X Reflector
  - DCS CCS
  - DMR
  - Motorola Hytera ????
Internet Engineering Task Force

- Not a Club or Entity
- No Dues or Membership
- No Corporate Sponsorship
- Has no Authority
- Organized by Working Groups
- Operates on Rough Consensus
Goal of the ARETF

• Become The Place to further the Development, Testing and Dissemination of Amateur Radio Standards
Status

• Forum is up
• Repository Established
  • Format defined
• Authentication WG
  • First Draft Published
• Digital Radio Testing WG
Interested?

www.ARETF.org
UDRX-440
Universal Digital Radio

- 25W 70cm SDR
- 4800 to over 100kbps
- AX25 and D-STAR
- Open Source Linux Server
- Network Interface via Web Browser
- 4 USB Accessory Ports
History

• Announced in 2012
• Total RF Re-Design in 2013
• Processor Board running continuously
• Prototype 3 working in RF Lab Now
Switching to the R-Pi 2

- Lower cost
- Current Design
- Ability to Upgrade in the Future
- Developer Community
UDRX Current
SBC & RF Deck
UDR SBC vs Raspberry Pi2
Cross-Connect Board
Test Configuration
PiDV TM

- AMBE3000 Vocoder
- 26 Pin Raspberry Pi Header
  - Works with all R-Pi variants
- Serial Port Interface
- Standalone or AMBE Server
ThumbDV™

- AMBE3000 Vocoder
- FTDI USB Serial Converter
- Standalone or AMBE Server
UDRC - Universal Digital Radio Controller

• Controller for Yaesu DRX-1
• Raspberry Pi 2 Shield
• Adds D-STAR 9600 Packet Support
  • Controller
  • Audio CODEC
• 12V Powered