# Packet is Dead! Long Live Packet!

What’s Old Is New Again

# Introduction - Mat Murdock - K2MJM

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- IT Geek
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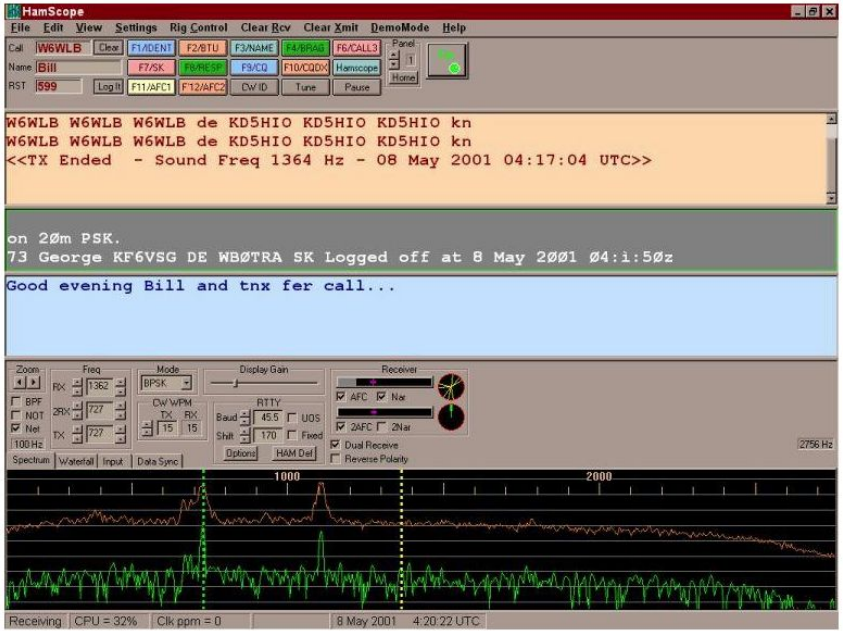
# Remember When….


This was the original caption “Alright, so it’s old… So is everyone in this room.”

# The State Of Packet When I Started

- Outdated and unsupported Software
  - https://www.dxzone.com/catalog/Software/Packet/
- Very little documentation
- Nothing to connect to
- Lack of purpose
  - Purpose maintains interest



# What is Packet Radio? Thanks Wikipedia

- Packet radio is a digital radio communications mode used to send packets of data.
- Packet radio uses packet switching to transmit datagrams. This is very similar to how packets of data are transferred between nodes on the Internet.
- Packet radio can be used to transmit data long distances.
- Packet radio generally uses AX.25 protocol.
- Every AX.25 packet includes the sender's amateur radio callsign, which satisfies the US FCC requirements for amateur radio station identification.

# What Type of Speeds Are We Looking At?

1200 Baud

- AFSK (Audio Frequency Shift Key)
  - Uses 1200 and 2200 Hz AUDIO tones FM'd onto a carrier
- Generally used on 2 Meters (VHF)
- Hardware is generally inexpensive
- Will work with about any radio out there

9600 Baud

- FSK (Frequency Shift Keying)
  - It shifts between 2 RF frequencies, e.g. 145.007 and 145.013 MHz for a nominal center frequency of 145.01
- Generally used on 70 Centimeters (UHF)
- Hardware is a bit more expensive
- Radios need to be be a bit higher quality

# Bit Error Rate (BER) - Needed for Good 9600 speeds.

- Not all radios are equal
- Many radios with a packet port have the BER tested by the ARRL
- Not always published - manufacturer does not publish
- Only radios with good BER will work
- Bit Error Rate (BER) of blank or lower
- 5x10-4, That means 5 bit errors for every 10,000 bits sent.

| | | |
|---|---|---|
| IC2820H | IC-208H | FT-8000R |
| FT-8800R | FT-7800R | FT-7900R |
| TM-733A | TM-D700A | TM-D710A/G |
| TM-V71A | | |

Slide courtesy of Mark Griffith KD0QYN

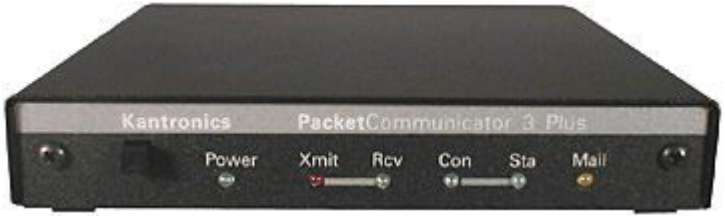
# Let’s talk hardware

There are three categories of TNC’s

- Hardware TNC
  - Packet processing is done in hardware and human readable output to computer.
  - Generally can be configured to run in KISS mode
  - Cost is usually higher
  - Generally maxes out at 9600 baud
- KISS Mode Only TNC
  - Offloads processing to computer
  - Cost is usually less
  - Current TNC’s are experimental at 9600 baud, but getting better.
- Sound Card Based TNC
  - Offloads processing to computer
  - A bit harder to get running
  - Can test out many of the new digital modes

# Hardware TNC


Kantronics KPC-9612+ 1200 & 9600 baud - $399




Kantronics KPC-3+ 1200 baud - $199


Timewave PK-96 1200 / 9600 baud - $219

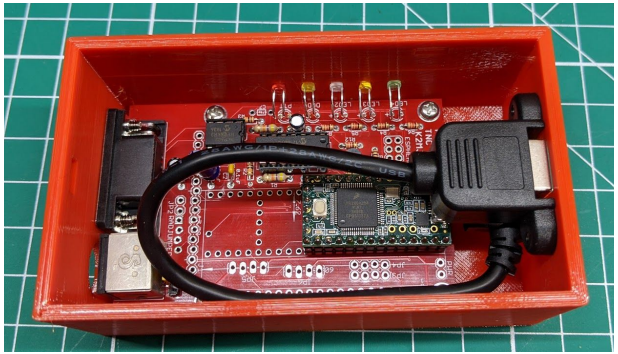

Kenwood TM-D710G 1200 & 9600 baud - $505

Demo - This isn’t going to end well.

# KISS Based TNC


MFJ TNC-X 1200 baud - $150

TNC-Pi9k6 1200 baud / 9600
Experimental - $50 to $55



# TNC-Pi9k6 - Details

- Arduino CPU
  - 32 bit ARM processor
  - 72 MHz Cortex-M4
- Audio is processed on aTeensy 3.2 running Soundmodem by Thomas Sailer
- Designed by John Wiseman G8BPQ
- Modification by Mat Murdock K2MJM
- 1200 Baud / 9600 Baud Experimental - At your own risk - If you get it working let me know.
- Can run stand alone and as a Pi Hat
  - Direct replacement for TNC-Pi by Coastal Chipworks
    - BTW, they just close their doors.
- $50 with case at the show ($55 online)

# Demo - Seriously, two live demos?!?!?

# Sound Card Based TNC


Signalink 300 / 1200 baud - $125.95

Popular for digital modes. Requires more work then Hardware and KISS TNC's.

All software based so when new digital modes come out it just requires new software.

AGWPE seems to work well for 2 meter operation.

# Demo - Is There an EMT in the house?

# Why Packet?

- It is reliable
- Doesn’t require alignment of radios for long distance communications
- Fast enough for most messaging purposes
- Events
  - Wasatch 100
  - Salt Flats 100 a couple of years ago
- Even at 1200 baud you can relay information faster than via voice.
- New and exciting modes
  - ARDOP - Amateur Radio Digital Open Protocol
    - https://winlink.org/content/ardop_overview
  - VARA -
    - https://rosmodem.wordpress.com/