A Brief Review of Packet

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“Packet” radio

- Sending data between computers
- Divide the data in small units – “packets”
- Send the packets using radios
- Started in Hawaii (1970), moved to Canada (1978), then to US (1980)

Why bother?

- The packets can contain verification data that allows “error-free” data transfer
- One frequency can be used by multiple users “simultaneously”
- It is possible to network stations
- A standard protocol can be used on HF, VHF, UHF

Why packet in the Tri-Valley?

- Amateur radio is the “fallback” for all emergency communications in the Tri-Valley – all of the cities have committed to RACES
- Sending text (names, orders, documents) should only be done using packet for accuracy, historic record, save bandwidth
- Ability to use network helps insure ability to communicate locally and regionally

Amateur radio packet

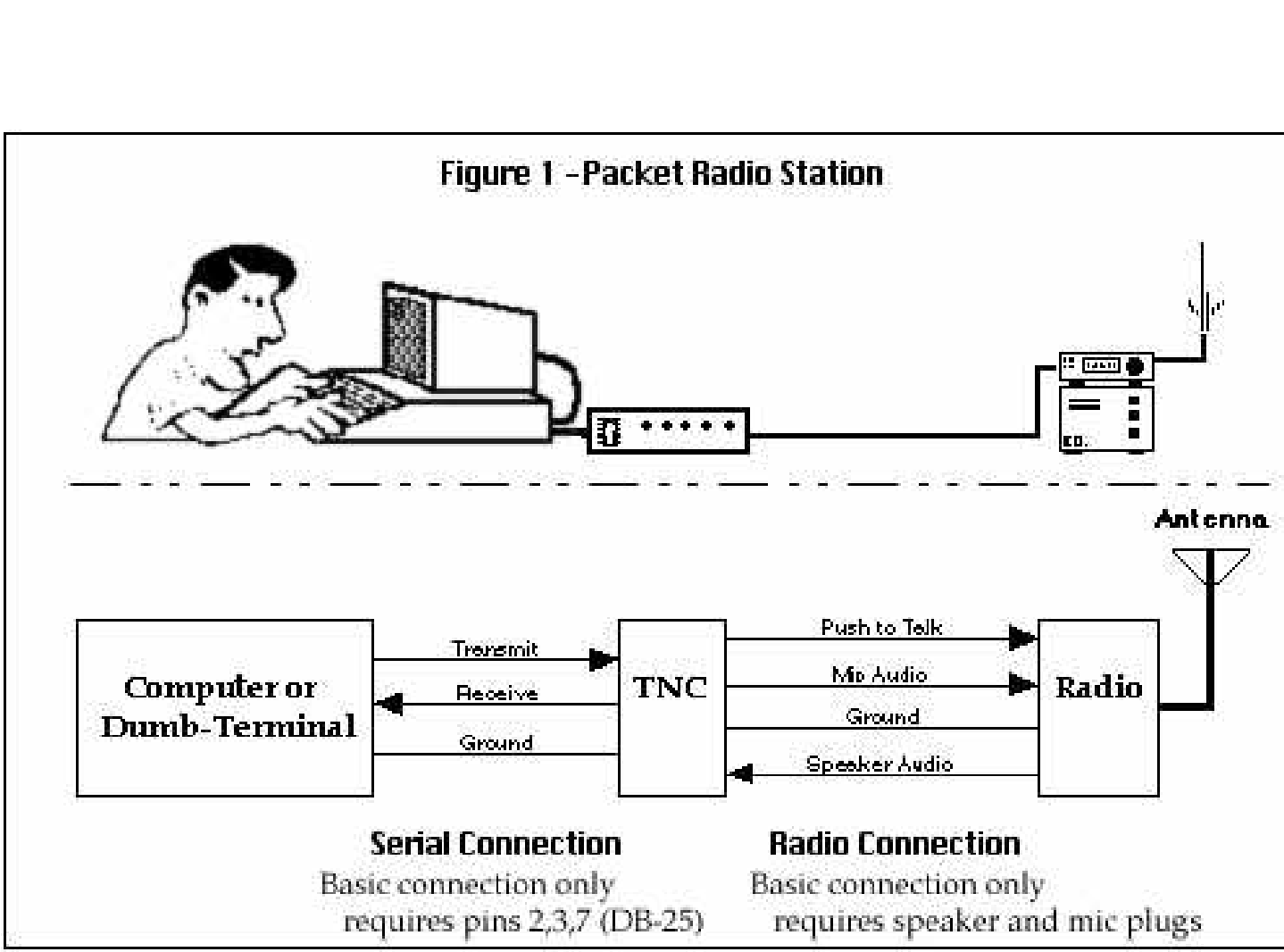
- AX.25 (1984) protocol is still the standard
- HF – 300 bits per second; VHF/UHF – 1200 and 9600 bits per second
- Many network protocols have been developed – transparent to the user
- Interface to TCP/IP allows Internet access

What’s in a packet station?

- Analog-digital interface – usually a computer
- Terminal node controller (TNC)
- Amateur radio station

- Today, the functions of the TNC can be done with computer hardware and software

Figure 1 -Packet Radio Station



Analog-digital interface

- A “dumb” terminal works; a computer does a lot more
- Many free/inexpensive packet programs provide lots of sophisticated data handling/processing capability:

  PET PacTerm WinPack Pa/KaGold

The TNC is the key

- Breaks digital data into packets, adds error correction bits, encodes the data into FSK tones, keys the transmitter, sends the packet

- Listens to the receiver, decodes the FSK tones, checks for errors, requests resend if needed, reassembles packets into data stream, converts stream into digital data

Soundcard TNC

- All of the functions of a TNC can be performed by a computer with a modern soundcard
- Software such as AGWPE eliminates the need for the TNC hardware: audio I/O goes between the radio and sound card, a digital output controls transmitter keying

Almost any radio will work

- For 1200 bps VHF/UHF packet, an HT is fine; quality and distance come with better radios and antennas
- For 9600 bps, VHF transmitter modulation is critical, set at 3 kHz not the usual 5 kHz; audio speaker connections won't work; need a specialized radio

Setting up the TNC

- A modern HF/VHF TNC may have 50+ parameters than can be user selected
- Default settings will usually get you on the air
- Computer-TNC baud rate is usually set automatically
- Enter your call sign (MYCALL)
- You’re ready to go!

Start by monitoring

- Select a packet frequency
- You will see all packets being sent, not just those sent to you (MON ON)

KQ6DI > KK6ZL: Have you written the LARK presentation? K

KK6ZL > KQ6DI: I thought you were going to do it. K

KQ6DI > KK6ZL: I think we are in trouble! SK

…

From > To: Text

Monitoring lets you see everything

- Depending on your software, you may see control information

01/12/04 10:14:23 KK6ZL-15*>KQ6DI: [I, 0, 2]:

01/12/04 10:14:27 KQ6DI*>KK6ZL-15: [D]:

- And “unconnected” packets addressed to no one

KK6ZL-14/R LARKPK/D KK6ZL-15/B TANK/N

NCPA Band Plan

- 144.31 BBS
  144.33 Balloon & experimental
  144.35 Keyboard to keyboard
  144.37 BBS LAN forwarding
  144.39 APRS (U.S. and Canada)
  144.41 Duplex, lower half (145.61 upper half, 1.2 MHz split)
  144.43 TCP/IP (OK to run duplex with 145.65)
  144.91 Keyboard to Keyboard (and EOC)
  144.93 BBS
  144.95 DX Spotting
  144.97 BBS
  144.99 BBS
  145.01 User Access
  145.03 Keyboard to Keyboard

- 145.05 Keyboard to Keyboard
  145.07 BBS
  145.09 BBS
  145.61 Duplex, upper half (144.41 lower half)
  145.63 BBS
  145.65 TCP/IP 9600 bps (OK to run duplex with 144.43)
  145.67 DX Spotting
  145.69 BBS
  145.71 9600 bps
  145.73 BBS
  145.75 TCP/IP
  145.77 DX Spotting
  146.58 DX Spotting

Making a connection

- cmd: Connect KK6ZL-15 <CR>
  - C KK6ZL-15<CR>

***** CONNECTED to KK6ZL-15**

[KPC3-8.2-HM$]

94761 BYTES AVAILABLE

THERE ARE 5 MESSAGES NUMBERED 5-16

LARK Packet System PBBS

ENTER COMMAND: B,J,K,L,R,S, or HELP >

PBBS commands – the HELP file

B(ye)	PBBS WILL DISCONNECT
J(heard)	CALLSIGNS WITH DAYSTAMP
J S(hort)	HEARD CALLSIGNS ONLY
J L(ong)	CALLSIGNS WITH DAYSTAMP AND VIAS
L(ist)	LIST MESSAGES YOU CAN READ
L <|> call	LIST MESSAGES FROM OR TO CALL
LB	LIST BULLETINS
LL n	LIST LAST n MESSSAGES
K(ill) n	DELETE MESSAGE NUMBER n
KM(ine)	DELETE MESSAGES ADDRESSED TO YOU
R(ead) n	READ MESSAGE NUMBER n
S(end) call	SEND MESSAGE TO callsign

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Connecting keyboard-to-keyboard

- Making the connection is the same as to a PBBS

  cmd: C KQ6DI<CR>

  cmd: ***CONNECTED TO KQ6DI

  >

- The exchange is then similar to RTTY, CW and PSK31
- Usually send one line at a time or indicate the end of a multi-line transmission – K, SK

Using the network

- You can connect from one station to another “through” intermediate stations

  cmd: connect WB6GUM-1 via KK6ZL-14

  cmd: c wb6gum-1 v kk6zl-14

  [KAME-6.1-HM$]

  100000 BYTES AVAILABLE

  THERE ARE NO MESSAGES

- Several intermediate stations may be used, but it can be slow due to transmission and retransmission at each point

Multi-connects

- Your software – TNC may allow you to connect to several stations at the same time
- Each connection is unique and requires switching from one data “stream” to another
- Carrying on several conversations at once is busy but not impossible
  - About like dinnertime with all of the kids home

Round table communication

- Packet protocol requires two stations to “connect” to each other
  - Only way to insure error-free communication
- Using “Unproto” (unconnected) mode works, but may result in collisions between messages and errors
  - Mcon and Mall settings set ON allow all packets to be monitored without control information filling the screen

It’s simple to get on the air with packet

So let’s give it a try !