

Broken Arrow Amateur Radio Club

August Meeting 2013

"Lecture Notes"

PACKET RADIO

Tonight we'll discuss (in no particular order) :

0) A bit of background

1) What is packet radio ?

2) Where did it come from ?

3) What is it good for ? (Why would anyone want to use it ?)

4) What do you need to get started ? (Both options)

5) Some tips and commands

6) What can we do locally ?

7) APRS : a special case of packet

8) Packet via the International Space Station

9) The Future ?

10 Resources / Links

0) A bit of background

Wayne KW5M stirred the hornet's nest locally regarding packet earlier this year.

But, packet radio among radio amateurs goes way back to the late 1970s around the time of homebrew computers, TRS-80s and the like. It only made sense to make a computer network.

The Canadians came up with a 1200 bps TNC (think modem) for use on 2m in 1978. A packet radio article appeared in QST in 1981.

TNCs that comply with the Tuscon Amateur Packet Radio (TAPR) TNC-2 spec appeared in 1985 and these TNCs are what you'd find floating out there today. TAPR is still active.

1) What is packet radio ?

It's a digital mode. But so are RTTY and PSK-31. They both turn text into tones that can modulate a transmitter. What's different about packet ?

2) Where did it come from ?

Well, it sounds kinda British, and it is. Look up Don Davies. He was a researcher at the National Physics Laboratory working on the ARPA project to build a "survivable network" that would go on to be the Internet. This was in 1969. Long story short, a message would be chopped up into little pieces that would get through the network to the recipient by the best way possible. This was different from the traditional telephone network where a "circuit" or path between two parties would have to be up through the duration of the entire call. Packet principles were used on the ALOHA network.

3) What is it good for ? (Why would anyone want to use it ?)

ADVANTAGES

The packets that make up a particular message contain a piece of the message (the payload) along with to: , from:, error detection bits and routing information. (The specifics are called the AX.25 protocol.) This is good news for radio amateurs because :

- a) A message will be received correctly and in order through a mechanism of handshaking and ACK packets between the two parties. This is an improvement over RTTY or PSK-31.
- b) The routing information allows you use digipeaters to extend your ability to communicate beyond line of sight. ← "DX" for tech class licensees... kinda.
- c) 1200 bits per second isn't super-fast, but it's fast enough to facilitate more than a couple folks on a given channel at once. So, since just two folks can use the repeater at once, even a few folks on packet represent an improvement in channel efficiency.
- d) You can send messages that wouldn't be readily available to scanner listeners. Ex: lists of "victims"
... did I mention you don't have to be home to get a message ? Your TNC has a mailbox.

... it's only fair **DISADVANTAGES...**

- e) You need a pretty strong clear signal.
- f) you do need to be in line of sight to either another packet user or a digipeater.
- g) unless you have an old VT-100 or similar "dumb terminal" you need a computer. (but there just so happens to be cheap computer called a raspberry pi ...)

4) What do you need to get started ? (Both options)

OPTION 1

=====

software : A Terminal Emulator

Windows : Putty or Hyperterminal

Mac : Terminal

Linux : Minicom

a serial cable w/ USB adapter if necessary

a TNC :

used : PK-232, PK-88, PK-12, KAM, KPC-series

new : Kantronics, Coastal Chipworks

Appropriate cable from TNC to radio (see : ebay or www.packetradio.com)

an old rig like a HTX-202 is a good choice to get started.

I've tried a Baofeng with some success.

OPTION 2

=====

if you've got some experience with setting up PSK-31 stuff.

software : UZ7HO Soundmodem & Paxon Terminal

software : you could also try DireWolf or AGW Packet Engine

a rig interface like a RigBlaster or Signalink

radio

5) Some tips and commands

If you go with the first option, you'll have to get the computer's serial port to match baud rate. You'll have to experiment some with how much radio volume the TNC needs. Everybody knows how to identify the COM ports in Windows Device Manager, right ?

If you go with the second option you'll have to experiment some with audio sliders in Windows... just like you have to do with PSK-31.

Either way has some learning curve....

THERE IS A DIFFERENCE BETWEEN COMMAND AND CONVERSE MODE ON THE TNC

and you use CTRL-C to toggle between the two

HELP is your friend.

example :

HELP mon

frequently used commands

mycall kd5njr

unproto cq via kw5m

digi on

mon on

6) What can we do locally ?

keyboard to keyboard QSO :

c kn5ups-1

blah blah blah

ctrl-c

d

leave a message on someone's mailbox

c kw5m-3

// commands

b

ctrl-C

d

commands like :

help

rm // read mine

ll 10 // read last 10

s wb5mxo

b // bye

7) APRS : a special case of packet

APRS is a special configuration of packet stations and digis.

a) designed for position updates and **short messages**.

b) you don't need to know the name of the digipeaters. Wide1-1, wide 2-2

c) specialized software plots stations on a map. see: Ui-view, XASTIR, APRSIS32

d) www.aprs.fi

e) Igates allow for DX via the Internet

- f) no acks or retries. used for periodic information. not for critical information.
- g) balloons
- h) weather stations
- i) igates

8) Packet via the International Space Station

There is a digipeater on the International Space Station.

145.825 MHz

path: RS0ISS

see also : software UISS

9) The Future ?

- * The FCC allows faster bit rates on UHF frequencies and higher.
 - * you'll find older 9600 bps TNCs out there that once made up the 440 Mhz packet back bone.
 - * 56k at 440 MHz equipment almost in production.
 - * recycling IEEE 802.11 "wifi" routers ... 2.4GHz is "shared band".
 - * digital voice ← TAPR "Codec2"
- * The two-frequency method described in the wiki entry on the ALOHA network
- * a local digipeater (again)
 - 144.390 for APRS
 - 145.010 for packet
- * a BBS that would be more versatile than those provided in the TNCs (JNOS, FBB, etc.)
- * As many folks as interested set up an IGATE (APRSIS32 for Windows, XASTIR for Linux)
- * www.winlink.org ← it's in Owasso on 145.01

ASIDE : What I want to experiment with ...

- a) test my attic Jpole more.
- b) old HT vs. Baofeng ... what's better ?
- c) my cables came in ! Try FT-817 on 2m and 30m

10) Links and Resources

- a) Your Gateway to PACKET RADIO by Stan Horzepa , WA1LOU
- b) http://en.wikipedia.org/wiki/Donald_Davies
- c) <http://www.amazon.com/Where-Wizards-Stay-Up-Late/dp/0684832674>
- d) <http://en.wikipedia.org/wiki/ALOHAnet>
- e) http://en.wikipedia.org/wiki/Packet_network
- f) <http://www.4x4ham.com/showthread.php?1672-APRS-via-the-ISS&highlight=space+station>
- g) <http://www.4x4ham.com/content.php?265-Raspberry-Pi-Mobile-Part-2-Pi-as-a-TNC-Terminal>
- h) <http://www.choisser.com/packet/>
- i) <http://www.soundcardpacket.org/>
- j) <http://uz7ho.org.ua/packetradio.htm>
- k) <http://www.scs-ptc.com/downloads/paxcon>
- l) <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>
- m) <http://aprsisce.wikidot.com/>
- n) <http://twit.tv/show/ham-nation/76>
- o) http://wa8lmf.net/APRS_PSK63/index.htm ← APRS Messenger
http://wa8lmf.net/aprs/HF_APRS_Notes.htm ← 30m packet

14.105

Questions ?

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