The Amateur Packet Radio Handbook

Chapter 1 WHAT IS PACKET RADIO?

Packet radio is one of the newer modes of communication available to hams. It is also a mode with very rapid growth. Much of this growth is with new no-code hams who have had relatively little experience with ham radio. This chapter is intended for those of you who are just starting, or thinking of starting, with packet.

1.A WHAT IT IS

Digital methods of communication have been around since the very start of radio. CW (ie, Morse code) is really digital. The transmitter is switched on and off to convey information. In this mode, the relative duration of the on times and off times carries the information.

Voice varies some characteristic of a transmitter in proportion to the strength of the electrical signal coming from a microphone. The characteristic can be amplitude; this results in AM (amplitude modulated) or SSB (single side-band) transmissions. The characteristic can be frequency which results in FM (frequency modulated) transmissions.

After World War II, military and civilian teletype machines became available to hams. They were adapted to radio use and the result is RTTY (Radio TeleTYpe, often spoken as "ritty"). This is also a digital mode, but quite different from CW. This style of operation keeps the transmitter operating continuously rather than on-and-off. One mode sends a tone (rather like a voice signal but a single frequency). The data is carried by switching the tone frequency (ie, pitch) back and forth between two specific values. This is called audio frequency shift keying or AFSK. The other mode shifts the transmitter frequency back and forth between two values. This is called frequency shift keying or FSK. RTTY works fairly well... except that it is not a very efficient use of our limited frequencies, and it works more and more poorly as conditions become crowded.

Packet radio is one of several "modern" extensions of RTTY. Depending

on the operating frequency, packet may send much more rapidly than RTTY. It also has error correcting which RTTY does not. Packet is not the only such mode: AMTOR is another and CLOVER is a third. Both of these are considered "better" for use on lower frequencies and packet "better" for VHF. Packet may use FSK or AFSK; on VHF at standard character speeds, AFSK is commonly used.

Packet uses a protocol called AX.25. A protocol is a set of rules. In this case, the set of rules tells how characters a bundled together into a collection called a packet. It also tells how stations connect with each other and how errors are handled (see Chapter 10 for more information).

Thus, packet is a technique for sending and receiving characters. These characters usually represent typed text. But packet is not limited to straight text since any computer file such as a program is also represented by a set of characters.

1.B WHAT HAMS TO WITH PACKET RADIO

Packet radio is used for a great variety of things. The first which comes to mind is the hallowed QSO, the face-to-face, or in this case, keyboard-to-keyboard, conversation. QSOs are a big part of packet, also. But, percentage-wise, it makes up a smaller fraction of activity than most other modes.

So, what is the rest of the activity? Much of the message passing is through the medium of the bulletin board (BBS). This is basically like letter writing! Often, messages are left in the mailbox contained within a specific station's modem. Other times, messages are in independent bulletin boards. These are able to transfer messages from one BBS to another, automatically.

Many hams immediately think of emergency communications when they learn about packet radio. Indeed, under some circumstances, it works very well (see section 1.C).

Some of the other ham activities, such as DX, are more difficult. HF bands are preferred. Packet on HF takes a good deal of skill.

Many hams use packet in conjunction with other ham activities. One of the major ones is "DX spotting". In this case, packet is used as a method

for DX operators to notify each other when new DX stations appear on HF.

Traffic handling is another traditional ham activity and packet is useful here, also. It is particularly suitable with complex messages; the error correcting can improve accuracy. Traffic handling on packet is particularly useful in emergency situations where large amounts of "health-and-welfare" traffic are involved.

1.C WHAT IT WORKS WELL FOR

With the preceding summary of ways in which packet is used, it might seem to be a "universal" solution to amateur communications. Nothing could be further from the truth.

Packet is not very efficient on HF. AMTOR and CLOVER are usually superior in terms of frequency use and achieved character rate. This is a measure of how rapidly characters get delivered at the receiving end. It takes into account the error rate and everything which must be done to fix the errors. Packet is usually the preferred mode on VHF using FM. On VHF, tones are usually used, so it is FM-AFSK. At higher baud rates, true FSK is commonly used.

In emergency communications, packet does not work very well for tactical communications. This includes things such as base-camp to search-crew communications. Where it does work, and work very well, is strategic communications. This sort of work usually involves lists: "Avenue-A shelter needs 23 cots, 47 personal meal packs, ...". Packet insures accuracy in such situations. Incoming health-and-welfare messages trying to locate displaced individuals is another effective emergency use. Such messages can easily be circulated among shelters or other sites. Likewise, lengthy detailed reports from county emergency centers to regional or state centers are often handled by packet.

DX spotting also works well. These DX Clusters or DX Spotting Systems are widely distributed. In areas with substantial population density, several of these are often linked together.

Traditional QSOs are not as easy as one might like. This is especially true over long distances. Even though there is a network linking widely separated points, it does not always work that well for simple conversations.

BBS "mail" can work well or poorly, depending on local conditions. It may take only a few hours to move a message from coast to coast. But it may take that long or longer to move messages through a major metropolitan area.

From this discussion, it should be apparent that there are lots of interesting things to look for in packet. And just because something "works poorly" is not a reason to give up on it. This is an area where change is frequent. Ideas for improvement can make a difference. And, you need not be a computer professional to have fun!