PROTOCOL LEVEL 8
or
WHAT ABOUT THB USER?

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BACKGROUND

In 1981, Amateur packet radio was highly experimental. As late as 1984 there were serious questions of packet's viability as a useful mode in Amateur radio.

The early days of the packet revolution were filled with digital zealots proclaiming the virtues of the new mode. Their fervor spread, and Amateurs by the thousands climbed aboard the bandwagon. In 1989, with well over 100,000 TNCs in daily use in Amateur stations around the world, there is no doubt that packet is here to stay.

The question now?

Is packet to be useful to Communicators, or will it remain in the domain of the Techies?

YESTERYEAR'S PACKET PIONEER

In 1983, the TAPR Beta test demonstrated that groups of Amateurs, given operable equipment, could use packet on VHF to send data within a local group. It also demonstrated that a local group was necessary to assure sufficient technical know-how in getting packet stations on the air.

PACLEN, MAXFRAME, TXDELAY and DWAIT became bywords. Arguments raged regarding the interpretation of <CR> and <AUTOLF>. Manuals included lengthy appendices describing the intricacies of Level Two protocol. Anyone who didn't know the difference between hardware and software HDLC simply wasn't educated, and everyone who thought they did know would immediately jump on the channel and discuss the issue!

Hours were spent at club meetings and hamfests across the land describing the wonders of bit-stuffing, the magic of transparency and the evils of excessive packet overhead.

WINDS OF CHANGE

When TAPR marketed TNC kits (1983 through 1985), the first units were grabbed up and built by the techies. There were questions to answer and technical support to provide, but by and large the folks who

bought and built the early TNCs were able and willing to wade through hundreds of pages of documentation to configure and operate their packet stations.

Towards the end of the kitting experience, however, a definite trend emerged. More and more people were buying and building the kits, but not understanding the complexities of the TNC hardware and firmware. Kits were sent in for repair that had been improperly soldered and with sometimes gross errors in assembly. Questions were being asked that reflected inexperience in computing and data communications concepts. Many questions demonstrated a lack of understanding of basic commands and timing relationships of the AX.25 protocol.

TODAY'S PACKETEER

Many Amateurs today are not particularly technically inclined. This is neither good nor bad; it simply is.

It is useless to bemoan the bygone days of home-brew equipment. Today's bands are too crowded for efficient work with a spark gap transmitter and coherer detector.

Many people try HF packet and give up. They blame the demodulator (or the zealot who told them it was possible),

Many digipeaters and single-port network nodes are on hilltops with omnidirectional antennas. Folks who try to get through using these systems claim, "Packet doesn't work!" They blame the mode and ignore the practical impact of the implementation of the mode.

We live in a generation which requires illustrations rather than words; simplified explanations rather than rigorous -understanding.

The purpose here is not to belittle or condemn, The point is simply that many people now getting on packet are not technical people. Packet is not the end, but simply a means to other ends. These folks simply wish to communicate.

YESTERYEAR'S PACKET EQUIPMENT

Early automobiles required mechanical aptitude to operate. You had to set the spark, hand-crank the engine, patch the tires, adjust the throttle, squeeze the horn, double-clutch when shifting, wear goggles and tolerate the weather.

For this effort, you were rewarded with the ability to exceed 15 miles per hour and go uphill in reverse gear only.

Early packet equipment included numerous commands to configure the TNC to every conceivable type of terminal or computer. The user had to understand the meaning of NULLS, ASYNC PORTS and so on.

Manufacturers entering the packet fray struggled to outdo each other in advertised number of commands. Simpler equipment included non-mnemonic commands and required the user to not type when the radio channel was busy.

Yes, early packet gear was troublesome to interface and difficult to understand.

TODAY'S TNCS AND MULTI-MODE CONTROLLBRS

Today's automobiles include climate control, compact disc audio systerns, power sun roofs, automatic transmissions with overdrive and speech synthesized messages to tell you to add water to your windshield washer's reservoir.

Today's TNCs include numerous commands to configure the TNC to every conceivable type of terminal or computer. The user has to understand the meaning of NULLS, ASYNC PORTS and so on.

Manufacturers struggle to outdo each other in advertised number of commands,

Multi-mode controllers are even worse, often with literally hundreds of commands.

Yes, early packet gear was troublesome to interface and difficult to understand. Today's packet gear is more troublesome and difficult.

Progress nowadays means providing on-screen menus to crowd the myriad commands into little boxes that you can point to and alter. Organization may be better; a user's technical understanding requirements are at least as bad if not worse.

CAN WE IMPROVE THE SITUATION?

Allow me one last comparison.

Many folks today go out and purchase an MS-DOS computer. With an installed base of over 10 million units, you'd think the industry would be able to cater to the casual user.

Not so.

If you are a techie, you have undoubtedly been asked by people to help them set up their computer or format their hard disk so they could use their database or spreadsheet or word processor. In other words, these folks are interested in using the computer. They are not interested in the theory and operation of computing. The computer is a tool; the application program is the reason for obtaining the computer.

In the same light, it is my contention that many people getting on packet today couldn't care less about bit-stuffing and HDLC. They simply want to send data reliably from point A to point B. The mechanics of how the data gets there is of no interest. The mode is a means, not an end.

For these people, it is unreasonable to expect them to learn of the intricacies of Level Two (or higher) protocol. They drive cars with automatic transmissions. They don't want to have to use a clutch to send data.

SUGGESTIONS FOR THE 90S

In the 1990s, Amateur packet gear needs to be built for communicators. Command sets ought to be simplified, and the microprocessor should make many of the decisions now required by the user,

For example, the user's serial port, which connects to his computer or terminal, needs only the following options:

Data rate (baud), word length and parity.

Data rate can be automatically detected and retained. Word length is one of two choices. Parity is tied to word length, with even parity for 7 bits and no parity for 8 bits. The user now has to make only one decision (word length/parity).

Historically, TNCs were used with mechanical ASCII terminals running at 110 baud. (If someone really wants to run an antique like this, they can just as easily run an antique TNC that allows NULLS, odd parity and so forth!)

Almost everyone on packet nowadays uses a personal computer of some sort, The software in the personal computer allows setting up data rates, word length, parity, etc. So, rather than force the user to make several selections at both ends of the serial line, make the TNC a limited subset, then clearly document the subset,

Most telecomm programs default to 7 bits, even parity, 1200 baud. The TNC should match these defaults. Use of 8 bits and no parity may be easily selected for sending binary data. By careful selection of the key the user strikes to establish the data rate (carriage return, for example), parity can also be auto-detected. The user then has to make no selections regarding the serial port.

Other areas of simplification could involve the user telling the TNC how he is using the TNC, rather than specify everything to the TNC in exhaustive detail.

For example, the user could tell the TNC he is operating on HF, or VHF/FM or Satellite. The TNC would then set the TXDelay, FULLDUP, DWAIT, DIGIPEAT, MAXFRAME, PACLEN and other parameters to reasonable

defaults. If VHF/FM, the user could further specify whether a repeater was to be used, allowing setting of AXDelay and AXHang.

A first step in this direction has been taken by AEA in their PK-88 and PK-232 systems. If the user invokes the KISS command (SLIP protocol), system defaults are altered to automatically adjust to this environment.

A number of timing and other "link" parameters can be fully automated rather than simply auto-defaulted. For example, the MSYS packet bulletin board system software watches retries and alters PACLEN dynamically. See my paper on Thoughts on an Adaptive Link Level Protocol elsewhere in these proceedings for some ideas in this regard.

CONCLUSION

The purpose of this paper is to get people thinking about command structure simplification for packet radio controllers. Packet has grown from a newborn to adolescence. Whether it becomes a useful member of our Amateur communications society, or a merely ne'er-do-well of great potential, depends on how well its implementations match the user community that will apply it to solving communications problems.