The ROSE X.25 Packet Switch Application: "CWID"

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ABSTRACT

The purpose of this paper is introduce and describe tlhe CWID application for the ROSE X.25 Packet Switch. In certain countries the need to support this function has been raised as a regulatory issue. Now, at the option of the System Manager, the CWID application may be loaded and conform to this requirement.

INTRODUCTION

A general design principle for ROSE X.25 Packet Switch Applications is to only consume memory resources for features that are needed in a particular Switch or Network of Switches. Any of the optional applications may be uploaded over the network on an "as-needed" basis.

Some of applications that were developed required installation of special hooks in the ROSE X.25 Packet Switch EPROM code, but generally these hooks only use 20-30 bytes of code space.

Some of the applications that currently exist are LOADER, CONFIG, USERS, HEARD, INFO and other special applications created to debug the system.

These applications appear in the network as network reachable destination end points. For example: "C INFO V W2VY-3,201555", would provide local network information for the 201 Area Code..

An application should not disrupt the normal operation of a Switch, nor should it introduce excessive delays or use large amounts of memory. It also may be deleted when no longer need by the network users or managers, thereby releasing memory for use as buffer or application space.

EXISTING CWID METHODS

The existing user TNC code supports CWID by keying the PTT and then toggling some lines to manually send the CW. This method could not be used within the ROSE X.25 Packet Switch because many hooks would be needed, and the timers required for the proper keying rate did not exist. This approach would clearly consume more code space than could be justified for an optional application.

NEW METHODS

One method would be to fill a packet with data that would be sent at 1200 baud in an attempt to sound like CW. There would be two data patterns, one for "ON" and one for "OFF", but the packet required to send "DE W2VY" would be 722 bytes long and more than 1000 bytes for longer callsigns. It is not clear how well this would sound nor if it could be identified as an official CWID. The packet size would be quite large and a large amount of CPU time would be spent generating the packet.

It was desired that the CWID sound much like existing systems. The I/O Chip used in most TNCs is either the Z8440 SIO

or the Z8530 SCC. These chips have a lot in common and with some examination of speeds (WPM) and bit rates some interesting things are possible, CWID should run at about 20 WPM, which comes to 16 BPS (WPM / 1.25 = BPS). The SIO is generally configured for a Xl transmit clock, which means that the transmit clock is running 1200 BPS (1500 WPM). With a single I/O Write the clocking rate (divisor) can be changed to X16, X32 or X64. The result of the change is that the clock would be divided to generate the true bit rate. The rate of X64 yields 16.75 BPS or 23 WPM. At this rate the longest callsign would require 13 bytes of data.

The hooks required to implement the CWID in the ROSE X.25 Packet Switch EPROM is simply code to set and reset the baud rate divisor. The "CWID" packet can then be included in the normal data stream without major disruption to the port.

CODE SELECTION

The next step is to perform tests to pick the binary sequences to represent a DIT, DAH, Letter Space and Word Space. The one sequence that must be avoided is 5 l's in a row, because the HDLC encoding will insert a 0 bit for its transparency coding.

The sequence sent for a DIT is 01, DAH is 0001, Letter Space is 11 and Word space is 111. The word space should be longer, but we would start to get transparency inserted zero's, which made readability difficult.

IMPLEMENTATION

When implementing the ASCII - Binary CW coder a few interesting items came up. First, in data communications the Low Order bit is always sent first. The meant that all the data patterns had to be sent through a software shift register to determine the true byte pattern that needed to be sent.

Due to the nature of the SIO, there will be a SDLC Flag or two at the start of the transmission and a CRC or ABORT at the end of the frame. To improve readability the end of the CWID text is'indicated by an AR.

HIDDEN APPLICATION

The CWID Application is not a normal application. Since users don't interact with it over the air, It can be bundled into another application. The CWID has been included in a version of the INFO application, file name INFOCWID.LOD.

The INFO Application contains a couple of features, an INFO destination that will return configurable informational text, and plain-language connection status messages to supplement the terse codes provided in the ROSE X.25 Packet Switch EPROM code, In addition, the text can be in either English, Spanish, or German

CONCLUSION

This exact scheme will only work for 1200 baud packet using Bell 202 modems, but is an example of how other signalling systems can be built into existing systems.

The ability to remotely load applications into network switches is the single most important platform feature of the ROSE X.25 Packet Switch and allowed for the rapid implementation and testing of this valuable new feature.