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K4PKT-1 and APRS

Bill Manley KB4XE

July 1999 *White Noise* announce the inauguration of our K4PKT-1 APRS site in Clewiston. The system has operated faithfully since, linking our Florida East Coast with operations on the West Coast.

Tune your APRS station to 144.39, set up a Florida map, and soon your screen will look like this. Notice K4PKT-1 in the center of the state.



What Are Packets?

Doug Welcker WB4KGY

"Packet" is a generic term for a bundle of data, usually in binary form, organized in a specific way for transmission. A packet consists of the data to be transmitted and certain control information. The three principal elements of a packet are the header (control information such as synchronizing bits, address of the destination or target device, address of the originating device, and length of the packet); the text or payload (the data to be transmitted); and the trailer (error detection and correction bits). NOTE AX25 does not include correction bits - Ed.

Packets are routed over networks to specific remote locations. Assembling the data into individual packets involves a process of segmentation or subdivision of larger sets of data as specified by the native protocol of the transmitting device. Since each packet may have a unique identification and destination address, the individual packets in a stream of packets from one source and travel different paths. Packet sequence numbers allow the destination node to reassemble the packet data in the proper sequence before presenting it to the target device.

The Internet Protocol is a standard on describing software that keeps track of network addresses for different nodes, routes outgoing packets, and recognizes incoming packets. By instructing the network how to read the packets and where to send them, IP allows a packet to traverse multiple networks on the way to its final destination.

Examples of packet-based networks include corporate intranets and the internet, which was the first public packet based data network and remains by far the most heavily used. Originally designed for data application, technological advances have enabled packet-based networks to handle streaming data. These advances, combined with the huge bandwidth advantages HFC networks, have the potential to eliminate the disadvantages of packet-based networks (compared to circuit-switched).

By Dr. Bill Wall e-mail; bill.wall@sciatl.com

TAMING THE BUTTERNUT - Revisited

Bill Manley KB4XE

Last June I reported on my experiences in tuning my new Butternut HF9V vertical antenna. At the time I mentioned somewhat tongue in cheek "... the care and maintenance of the nine band antenna would become a hobby in itself". The comment was more prophetic than I expected.

Problems tuning the Butternut HF9V, and the WARC band add-on modifications for the HF6V antennas, have been a popular thread within the rec.radio.amateur.antenna internet newsgroup. A number of users have found it impossible to tune the 17 meter band below 3:1 SWR although the manufacturer proclaims 2:1 or better is achievable on all bands. I've shared personal discussions with a number of the news group respondents and benefited by their many thoughtful suggestions. Also I've done some analytic work, using Smith Charts as well as trial and error experimentation myself. My conclusion is that the factory provided coaxial transformer is too short.

The antenna includes a 136 inch 75 ohm coaxial impedance transformer connected to its base. The 50 ohm drive line is connected to the distal end of the 75 ohm coax. The purpose of the 75 ohm coax is to transform the high 20 meter impedance found at the antenna base to a reasonable value in the shack. Although the transformer performs the intended job at 20 meters, it detunes 17 meters.

Measurements made at the base of the antenna found about 150 ohms at 20 meters and about 35 ohms at 17 meters. Plotting these values and parameters on a Smith Chart showed that the 3:1 20 meter SWR at antenna base would be transformed to 1.3:1 at the drive point. The 1.4:1 SWR at 17 meters would be transformed to 3.1:1 at the drive point. This is too high to be driven by an average transceiver. Then, again using the Smith Chart, I simulated lengthening the coax transformer. I found that an physical

length of 170 inches, electrical length of 270 inches, improved 17M tuning while slightly compromising 20M. It provided a 1.6:1 SWR for both bands.

I tested this theory with a 170 inch coax transformer on my antenna and managed to acquire better than 2:1 SWR for both bands. Close enough!.

I'm now satisfied with my HF9V performance on all bands. But I remain puzzled about what magic was performed by Butternut to justify the claimed 2:1 or better SWR on all bands.

PBPG Minutes

November 11, 1999

OPENING AND REPORTS

President Doug Welcker WB4KGY brought the meeting to order at 19:30 hrs.

TREASURER'S REPORT

The treasurer's report will be published in the "White Noise" as soon as vacationing committee members return home.

TECHNICAL COMMITTEE REPORT

President Doug reported on the following items: The Boca Raton APRS site was off last Saturday and Sunday. A power-on-reset Monday morning returned the site to normal operation. Again the K4PKT switch has had no problems for the past month. Our next technical task is to get the APRS equipment at Stuart on-line. Rich K4GPS, Andy KF4ATC and Doug did a Vector Analyzer test on all the transmission lines. No antenna was detected on the spare line. Andy and Doug investigated a report that Stuart's transmission lines were loose. Turns out that the Stuart repeater line and two commercial lines were loose. Cause of problem appears to have been due to use of plastic ties deteriorating over time, especially with exposure to sunlight. Wire ties have much longer life spans. President Doug recommended that all of the lines be redone in wires ties.

OLD BUSINESS

Next "White Noise" is at the printer and will be mailed shortly.

Hamfest Report: The booth was setup Friday afternoon with Andy and Marvin's KD2CK help. Jamey KD4LXB brought his computer and demo'd APRS all weekend from the booth. Burck KC4UEV won PBPG second prize in the prize drawing Tiny-2 MK-2 and one of the club computers. PBPG first prize EARTHMATE & Software was won by Ernie Marquez KF4IHX. Andy KF4ATC won the grand prize of the Hamfest, a HF Icom transceiver.

PBPG has 6 packet books for lending. Those who want to borrow a book should see Secretary Burck Grosse.

A handout for SWITCHES and NODES are now available on the WEB site. Any comments would be welcomed.

NEWS AND INFO

Jamey Timberman has been involved in a very severe automotive collision. In addition to club members contacting Jamey, our secretary arranged for a card to be signed by everyone present at the November meeting. It was forwarded to Jamey.

Wyatt Bishop K4VJI became a silent key this week. Long time member of the packet radio fraternity and a super good guy.

NEC is exiting Packard Bell sales in the United States.

Information was given on the November 11th Hamfest in Port St. Lucie, the November 20/21st Tampa State Convention, and the December 4th Hamfest in Okeechobee.

NEW BUSINESS

Allen Richter W4PHL from the Palm Beach County EOC is requesting assistance in setting up 220Mhz emergency BBS system.

Allen requested the PBPG give a talk to county communications personnel to educate them on packet radio. Doug will give the presentation Tuesday.

The next meeting is scheduled for Thursday, December 9, 1999.

ADJOURNMENT

The meeting was concluded at 20:10 hrs.

Broward Amateur Radio Digital Society

November 20, 1999

The November meeting program was programming and applications of the Programmable Integrated Circuit by John Wilson, KN4HX. John went over the definitions and differences on the PIC versus the single board computer, the BASIC Stamp, and the microprocessor. He described the hardware including input output and instruction set. He finished with applications. We got a bit hung up on the analogue to digital converter range and resolution but John straightened us out. Lou, N4ZZZ, missed the meeting but Carl, W9ZGU, filled in his spot by falling asleep. Randy, K9BCT, made the meeting so we gave the Palm Beach Packet Group umbrella spiel. That is getting harder to remember as we don't get many newcomers.

For the December 18 meeting Jim, WA4CSQ, is going to tie convolution into the previous spread spectrum programs. He claims he will make this mysterious subject very simple with no math.

Bob, N4CU

Suppose Edgar Allan Poe Used a Computer - -

*Once upon a midnight dreary, fingers cramped and vision bleary,
System manuals piled high and wasted paper on the floor,
Longing for the warmth of bedsheets,
Still I sat there, doing spreadsheets...
Having reached the bottom line, I took a floppy from the drawer.
Typing with a steady hand, I then invoked the SAVE command
and waited for the disk to store,
Only this and nothing more.*

*Deep into the monitor peering, long I sat there wond'ring, fearing,
Doubting, while the disk kept churning, turning yet to churn some more.
"Save!" I said, "You cursed monster! Save my data from before!"
One thing did the phosphors answer, only this and nothing more,
Just, "Abort, Retry, Ignore?"*

*Was this some occult illusion? Some maniacal intrusion?
These were choices undesired, ones I'd never faced before.
Carefully, I weighed the choices as the disk made monstrous noises.
The cursor flashed, insistent, waiting, baiting me to type some more.
Clearly I must press a key, choosing one and nothing more,
From "Abort, Retry, Ignore?"*

*With my fingers pale and trembling, Slowly toward the keyboard bending,
Longing for a happy ending, hoping all would be restored,
Praying for some guarantee Timidly I pressed a key.
But on the screen there still persisted, words appearing as before.
Ghastly grim they blinked and taunted, haunted, as my patience wore,
Saying, "Abort, Retry, Ignore?"*

*I tried to catch the chips off-guard - I pressed again, but twice as hard.
I pleaded with the cursed machine: I begged and cried and then I swore.
Then I tried in desperation, sev'ral random combinations,
Still there came the incantation, just as senseless as before.
Cursor blinking, mocking, winking, flashing nonsense as before.
Reading, "Abort, Retry, Ignore?"*

*There I sat, distraught, exhausted; by my own machine accosted
Getting up I turned away and paced across the office floor.
And then I saw dreadful sight: a lightning bolt cut through the night.
A gasp of horror overtook me, shook me to my very core.
The lightning zapped my previous data, lost and gone forevermore.
Not even, "Abort, Retry, Ignore?"*

*To this day I do not know The place to which lost data goes.
What demonic nether world is wrought where data will be stored,
Beyond the reach of mortal souls, beyond the ether, in black holes?
But sure as there's C, Pascal, Lotus, Ashton-Tate and more,
You will one day be left to wander, lost on some Plutonian shore,
Pleading, "Abort, Retry, Ignore?"*