Carolina DX Association

The Pileup

Newsletter of the CDXA W4DXA

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September 1997

CDXA PacketCluster system

N4ZC Stanley, NC		144.930 & 441.000
digis on Young Mountain		DXUYNG 441.00
(type <C DXZ> after connecting to DXYNG)		144.950
digi in Greensboro (type <C DXZ> after connecting to DXYNG)		144.950
digi on Beamer Knob (type <C DXZ> after connecting to DXBMR)		144.93
K4MD Charlotte, NC	144.910 & 441.075	(1200/9600 baud)
digi near Wingate		DXWIN 144.91

EDITORIAL

Responses to last month's *Pileup* surprised me. I received eight change-of-address notes. How these eight folks were getting their copies remains a mystery. Maybe they hadn't noticed the USPO stickers, since the back page is printed on goldenrod paper? In any case, thanks for the input & corrections. We are, of course, working on getting a new roster together WITH telephone numbers. For those who wrote & asked/suggested that we include e-mail addresses, please be patient. It's obviously impossible to include them within the current roster's layout; there's not enough space. So, we may dedicate a separate page to them, at a later date. So far, we only have about 12 e-mail addresses—in addition to PacketCluster folks.

Fall is approaching. The cooler weather (& the fear of even cooler days ahead) & furtive glances at the calendar create moments of anxiety for the perennial contest types among us. At the N4ZC station, we've made our list & we're checking it twice—in hopes of getting a pile of work done before the end of October. Similar glances at the latest propagation news from NBS has all of us excited. Surely, we're thinking, conditions are going to be better at last. And maybe, just maybe, if the numbers hold, we'll have some Europeans on 10M once again? If you hear Roger or myself talking about an "antenna party," why not try coming out to lend a hand? We can certainly use some help—even folks for ground crew jobs. Or simple stuff, like putting new clamps on beam elements or measuring radials or running feedlines & rotator control lines, all need to be done. Why not do something to help the CDXA's premiere contest station—to ensure we stay ahead of our competition to the North?

Plans to use the summer hiatus to erect towers at K4ZA fell by the wayside, while waiting (STILL) for my public utilities to bury power, telephone & cable lines. Luckily, I did not set any base sections, because if I had, I'm pretty sure I'd be running around angrily right now. Not that I'm not a bit angry, it's simply at a lower level, which is probably better for my health, anyway.

Member news: Several CDXA brethren were seen at the summer's final fling—the Shelby Hamfest ritual. K4MQG's prop pitch rotator received its final rebuild blessing, & went back into turning Gary's 2L 80M beam. Two members of the CDXA, W0ZV & N4SU, made the "Who's Who on the Top Band" listing. Bill's #1 in the world on 160, with 290 countries & 39 zones; Dave's in fifth position, with 270 countries & 39 zones. Impressive numbers, indeed. Congratulations! (And for those of you who may be interested, Dave has done some experimenting with Beverage antennas, & has some interesting solutions for terminations—specifically, using high mu cores to reduce the number of turns, & switching arrangements. Contact Dave directly for full details.) And don't forget our CDXA social gathering at K4BVQ's place this month. See the back page for details.

--K4ZA

PACKETCLUSTER NEWS

Our new DXBMR digi is on-the-air from Beamer Knob. It's located 3385 feet above sea level, about two miles west of I-77, near Fancy Gap, VA. <SH/ST DXBMR> will give you the beam heading & distance from your QTH. It's on 144.93 MHz. using a 20 watt radio. Without signal enhancement, this provides a marginal S3 signal into N4ZC in the middle of the day—from about 11 to 5. During high volume activity periods, like a contest, this link will not hold up. A new, 50 watt radio has been ordered to augment the signal path. This will help, but the real solution is the addition of a 441 MHz backbone via Young Mountain to DXBMR. This would guarantee a solid connection between N4ZC & DXBMR. We are waiting for K0SD to complete the Motorola radio conversions, then we'll install this backbone. (DXBMR was added to the CDXA digi sites to allow users having problems with DXGBO, DXUYNG or DXYNG better connections.) K0SD is also about to add a DXUGBO 441 MHz digi at his Greensboro site. This will allow those who have 441 MHz gear to connect there. It will also allow us to move DXGBO off 144.95 MHz, cutting down on collisions between DXYNG & DXGBO users.

We've been stressing the need to change our PacketCluster system from 144 to 440 MHz for quite a while. We continue to press for such a change. If you're thinking of new equipment, please check with your SYSOP to make certain the equipment will be compatible. Several months ago, CDXA bought 15 of the above-mentioned Motorola radios, to allow members an inexpensive way to move to 440 MHz. After conversion, these radios should cost about $125. These radios have been spoken for by various digis & members. We've recently found another source, so please tell your SYSOP if you are interested. And please keep in mind that your TNC needs to be able to operate with open squelch to use such radios. N4PQX can help you modify your TNC, if it does not have this option. Whether you move to 441 MHz or not, we urge all users to add the DCD mod to their TNCs, as detailed in last month's *Pileup*. And as always, use high power and the highest antenna you have for PacketCluster operation. Make those connections solid!

--N4ZC

TECH TIPS

Upgrade information on the MFJ family of TNCs, from the MFJ Technical Service folks. Clock speed on earlier TNCs can be upgraded to 4.195 MHz without changing the Z-80 microprocessor. This mod involves cutting a solder pad on JP2 & bridging the other pads on JP2 (pads 1 & 2). To upgrade to 9600 baud: all MFJ TNCs use the same upgrade, modem part #MFJ9600B. The differences center around how the modem is installed in each TNC. Firmware (chip) upgrades: the latest 1270 series version is V1.2.9, & can be ordered for $19.95, as part #MFJ40C. The 1274 part is the same as the 1270. The 1276 uses version 3.0, part # MFJ42C, at $19.95. The 1278 uses version 4.2, part #MFJ48B, at $24.95. The 9600 baud modem automatically allows open squelch operation, & all these mods or upgrades are easily done, according to the Technical Service folks. Thanks to AE4PB for calling MFJ & obtaining this information.

EFFECTS OF METAL STRUCTURES IN THE VICINTY OF A VERTICAL ANTENNA

I've always believed verticals radiate equally poorly in all directions. Yet, I needed an antenna to fill in some of the gaps on 40M—areas the rhombic doesn't cover well. Not wanting to put a beam up, I decided to try a quarter wave vertical with four elevated radials. The antenna did not equal the rhombic into Europe, but I was able to work almost everything I could hear, such as Japan, Australia, Indonesia, & Africa. And I seemed competitive. I decided to try a similar antenna on 80M. I have plenty of room, & could erect the vertical by suspending a line between two towers. I thought I'd model the antenna, using EZNEC, before doing any actual work. I'm glad I did.

I modeled the antenna to determine if mutual coupling would be a problem. Mutual coupling, interaction between two wires which becomes negligible only after a separation of several wavelengths, was a concern because of all the possible sights available, each would put the vertical close to one-half wavelength from the towers. What would these towers do to the vertical's directivity? I put the question to EZNEC, starting with an isolated quarter wave vertical as reference. This vertical, by itself, had a perfect circle azimuth pattern, & vertical radiation angle of 18 degrees (good for DX), with 2.4 dBi.

I then added the two towers, showing them as grounded verticals, with the quarter wave vertical approximately at their midpoint. Much to my dismay, the system showed an increase of gain in the North/South direction. I now had a "beam" antenna, with the European direction down by 8 dBi. Further work showed that even if I were to put up a vertical at each tower position, I would have to determine the mutual coupling. It got discouraging.

I investigated the 40M antenna next—since it worked so well. I found that the pattern was distorted, due to mutual coupling, but it was minimal, & the pattern looked like a multi-pointed star with rounded points. It works as well as it does because the operating wavelength & position is sufficiently remote from the interfering towers.

Deep into EZNEC by now, I decided to see how my towers would affect a 4-square array for 80M. Such an array would be in the middle of the rhombic towers, but all would be about 150 feet from the 4-square. I found that if the array fires at 45-degrees to a tower, there is little interaction. Radiation directly toward a tower is significantly affected. Each of the 70 foot towers decreased forward gain by 1.5 dBi. A 90 foot tower had negligible forward gain deterioration.

So, if your vertical is not performing as you think it should, & you're certain everything else is correct, check to see if you have mutual coupling between other vertical metallic members within an area of two or three wavelengths from it. If so, you'll simply have to live with the distortion. In my case, I learned I would be wasting my time putting an 80M vertical in the back meadow. It will have to go in the front meadow, & be made "cow proof," because that's what in the front meadow. Stay tuned.

--N4UH

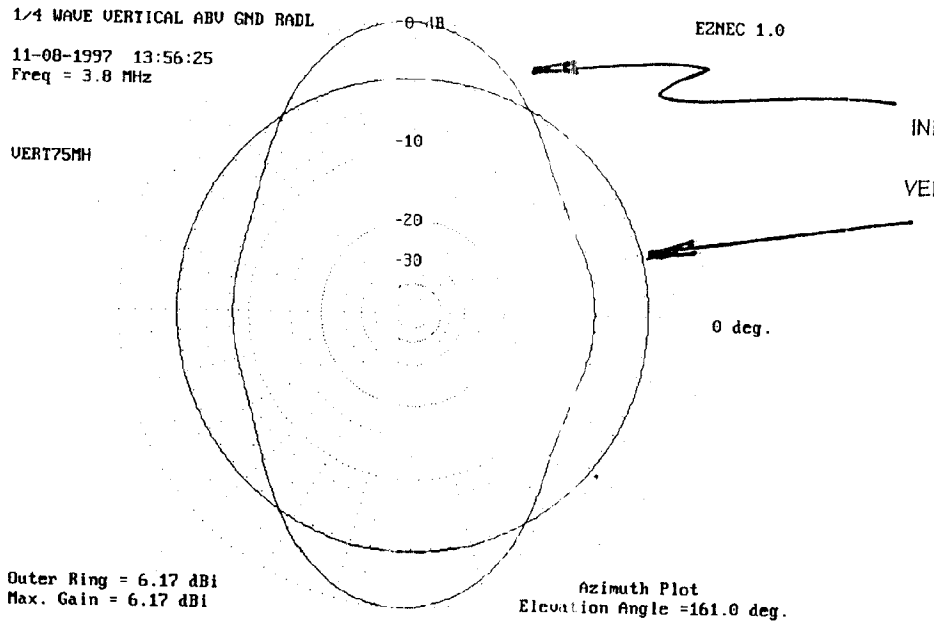


Figure 1
INFLUENCE OF TOWERS
VERTICAL IN THE CLEAR

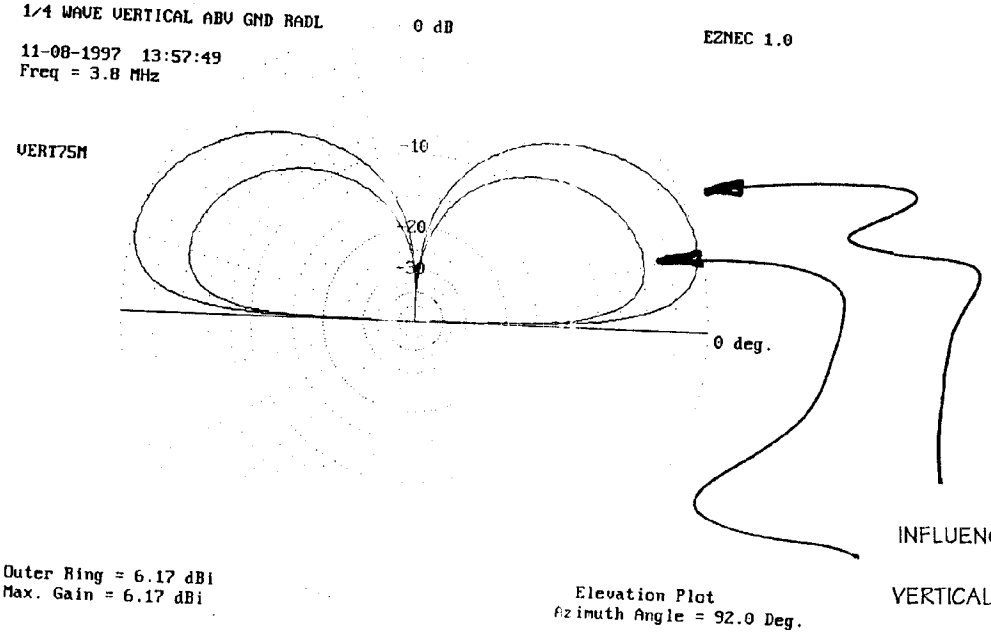
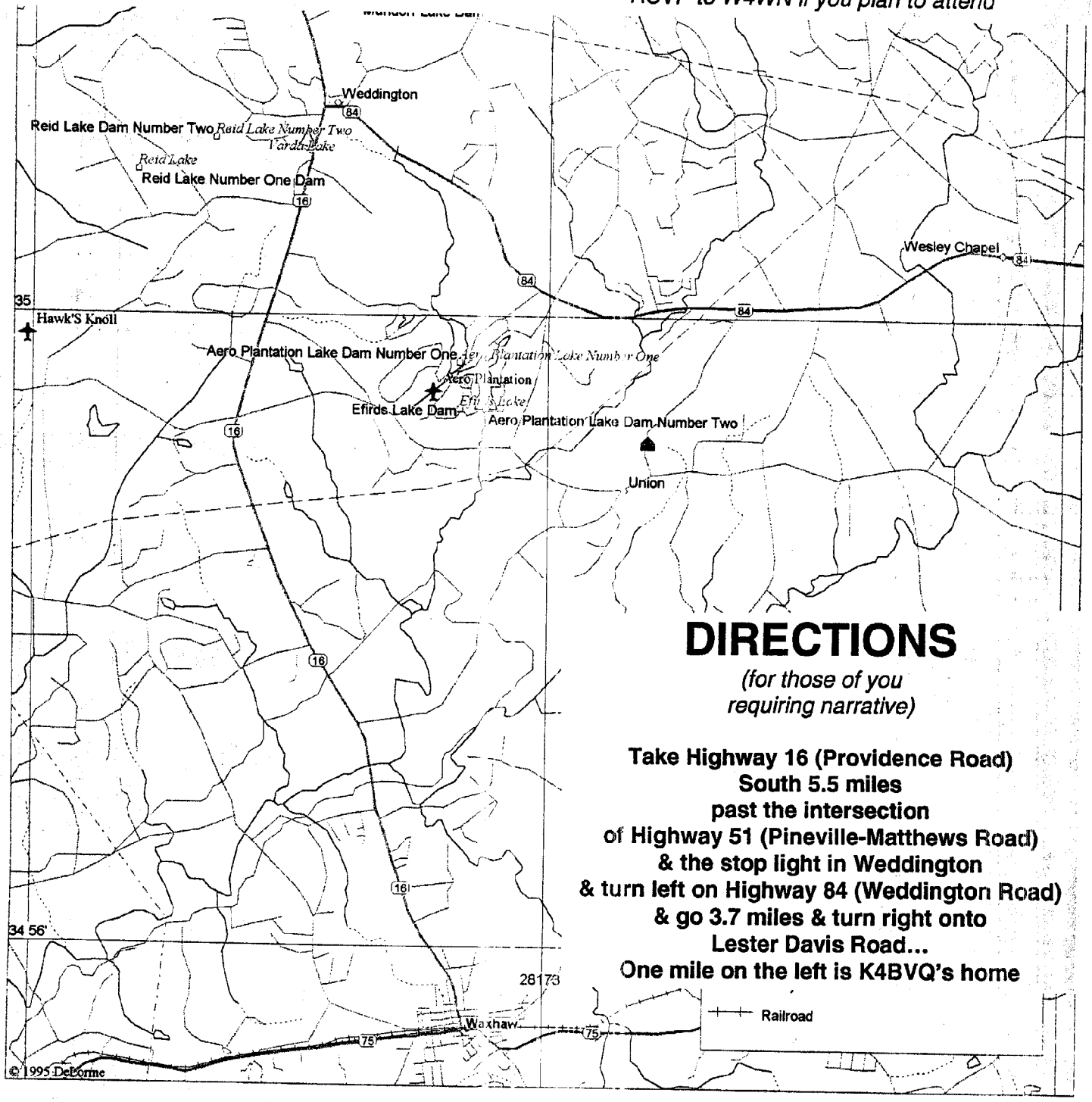


Figure 2
INFLUENCE OF TOWERS
VERTICAL IN THE CLEAR

THE BACK PAGE

CDXA social/BBQ at K4BVQ's
September 27, 1997
5 PM
cost/person $10.00
RSVP to W4WN if you plan to attend



DIRECTIONS

(for those of you requiring narrative)

Take Highway 16 (Providence Road)
South 5.5 miles
past the intersection
of Highway 51 (Pineville-Matthews Road)
& the stop light in Weddington
& turn left on Highway 84 (Weddington Road)
& go 3.7 miles & turn right onto
Lester Davis Road...
One mile on the left is K4BVQ's home

TRANSMISSION LINE MEASUREMENTS

Transmission line measurements pose unique problems. Unless you climb, your work must be done at ground level, at the input end. Sort of like trying to figure out how long your street is by standing in your driveway and looking toward the horizon. Luckily, there are some tools to make your life easier.

The simplest technique uses time domain reflectometry. TDRs work by sending a pulse down the transmission line. Any change in the impedance of that line, say a dent in the outer conductor, will cause a change in that impedance. The larger the impedance change, the greater the percentage of pulse reflected. The ultimate is, of course, either an open or a short, which will reflect all the signal. Since the TDR is a DC device, an open (an increase in impedance) will appear as a positive reflection, and a short (a decrease in impedance) will appear as a negative reflection.

Here's how: measure the time required for the pulse to travel to the impedance bump and back to the source, combined with the velocity factor, and you can compute the distance to the problem. Accuracy can be surprisingly good. But the TDR is not a panacea for transmission line measurements like we've all been searching for, because they have some simple limitations. First, frequency-sensitive problems cannot be determined with a TDR. Since antennas either look like an open or a short, the TDR will not tell you if the antenna works. And, if you have a gradually developing problem with your transmission line, the TDR won't help.

What to do? The solution is simple, highly accurate, and costs only around $40,000 to $60,000. It's a vector network analyzer. An RF device which sends stepped frequencies down the line to the load. Magnitude and phase of the returned signal are measured, analyzed, and can even be printed out, as VSWR, a polar plot, resistance, reactance, impedance, or even in Smith chart form.

Hams, obviously, won't be beating a path to H-P's door to buy one. In the meantime, I've bought the circuit board for the little TDR described in ARRL's *Antenna Book*, and am looking forward to using it before installing a few thousand feet of feedline around here. It seems logical to me also to somehow acquire a DC bridge—some way to measure DC resistance down to a few milliohms. Since most hams use antennas which look like a short to DC, measuring their resistance (and recording it), could prove useful when you encounter something like a KLM 40M beam with unusual intermittent problems. Checking such readings periodically should prove useful.

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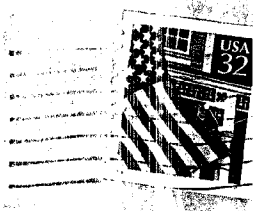

FIRST CLASS MAIL

See something wrong on your address label? Notify K4ZA at once!

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The Newsletter of the Carolina DX Association

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