

# DX NEWS

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National Radio Club*

SINCE 1933



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Back into the lake Yep, Mikee is in the lake again, under the ice. Seems he forgot to take off the info on WBLB-1510, Issue 14, page 2. So, if you would, please disregard that info from WBLB in the AM Switch column, and wait for Jerry to inform you on the status of WBLB.

DDXD Column change we'll run this one more time, remember DDXD column will be split into two ~~new~~ columns. DDXD - East will be headed up by Dave Schmidt. DDXD - West will be headed up by Nancy Hardy. The imaginary division line will be as follows. DDXD - East will consist of reports from members living in the Central, Eastern, Atlantic time zones. DDXD - West will consist of reports from members living in the Mountain, Pacific and points west. For those of you living in the center of the U.S. you may report to the one that serves your area better. Nancy Hardy's address is: 2301 Pacific Ave., Aberdeen, WA 98520-4527.

CPC TESTS --- Times listed are EASTERN Local Time

You'll get better returns if you include an SASE with your report

- Feb 10 WDCT-1310 Fairfax, VA 0100-0200 Program will consist of tones, IDs and music. Monday 1000w ND 0100-0130, 5000w DA 0130-0200. Reports to: Dave Schweikart, WDCT Radio, Box 1310, Fairfax, VA 22030-1310. Arranged by Dave Schweikart himself. (Thanks Dave - HQ)
- Feb 10 KURL-730 Billings, MT 0200 - ???? Test will be run with Proof of Performance test. Reports to Mr. Clark D. Prim, CE, KURL Radio, Box 31038, Billings, MT 59107 Arranged by Wayne Heinen and Ken Chatterton for the NRC.
- Feb 11 WIFX-1000 Jenkins, KY 0200 - ???? Program will consist of tones, music, IDs. Tuesday Reports to: Don Mussell, CE, Box 312, Jenkins, KY 41537. Arranged by John R. Malicky for the NRC.
- Feb 17 WVVW-1570, St. Marys, WV 1000w 0100-0130 with voice IDs, tones, music. Monday Reports to: Robert Eddy, Owner/GM. All correct reports will be verified by letter, SASE requested. Prepaid calls ONLY, 304-684-3400, NO COLLECT CALLS. Arranged by Kermit Geary for the National Radio Club.
- Mar 31 KPCR-1530 Bowling Green, MO 0300 - ???, Voice, Code ID's, and music will be used. Reports to: J. Paul Salois, President, KPCR Radio, Box 1, Bowling Green MO 63334 Arranged by Wayne Heinen and Dan Bartek for the NRC.

#### LOOK INSIDE:

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Listen to HCJB "DX Partyline", 0230 UTC Saturday night, for the "AM Interlude" Program with Wayne Heinen. Other stations carrying NRC items include Radio Earth, Radio RSA, WHBI, and KCBI!















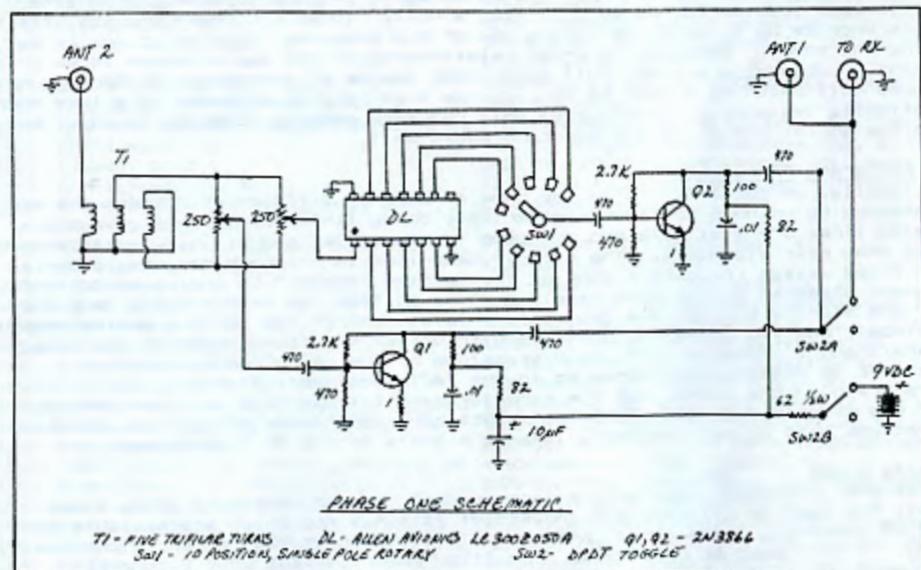
so began carrying delay lines at very attractive prices (about \$5) but the longest delay they offer is 200 nSecs and other specifications (e.g., input-output impedances, attenuation, etc.) are unknown (to me; a spec sheet has been ordered). Perhaps two of the 200-nSec Mouser lines could be cascaded in the described circuit (with suitable component value changes).

#### Phasing/Amplitude Controls

This portion of the circuit samples relative amounts of in-phase and out-of-phase signals to provide a resultant signal whose phase can be set anywhere between zero and 360 degrees. Relative amplitude is also controlled at this stage. To create this control, the signal from one of the antennas is passed through a broadband transformer with two secondaries -- one in phase, one 180 degrees out of phase. The broadband transformer is wound on an FT-37-61 toroid (Midwest Associates, 12033 Oswego St., No. Hollywood, CA 91607) with 28# wire in a five-turn, trifilar configuration. The outputs of both secondaries are paralleled to two, 250-Ohm linear taper, carbon composition potentiometers whose wipers serve as outputs to the next stage. Finding the required pots can be a problem (and expensive -- mine were \$5 each) but 250 Ohms allows fairly easy fine phasing adjustments. Easier to find 500 Ohm pots can be substituted but adjustment becomes a little touchier. Do not use wirewound pots.

#### Broadband Amplifiers

To offset the attenuation of the delay/phasing circuitry, two bipolar broadband amps are used. Special bipolar transistors were chosen (instead of FET's) for a couple of reasons. First, the low input impedance (less than 150 Ohms) of the bipolar transistors reduces the probability of amplifying stray RF and, secondly, the chosen transistors are used in CATV amps and have good dynamic range, linearity, and excellent noise figures (better than many FET's). The output of each amp at 10W frequencies is 15-20 dB and they are very quiet. I originally used the LT1001A made by TAW but the circuit values listed here are for the easier-to-find 203866 (Radio Shack 276-20386). The 700-Ohm output impedances of the two amps are combined to produce an approximate 50-Ohm impedance to the receiver input.



#### Construction

The circuitry is assembled on a PC board and housed in a metal, shielded cabinet. Signals are inputted and outputted to the Phase One using UHF con-

nectors and RG-58U coax (leads are as short as possible). Power is supplied with 9 VDC wall transformer and a DPDT toggle switches the Phase One in and out of the signal line.

Step-by-step construction details are being foregone in this article for several reasons: a) apparent displeasure on the part of some readers for lengthy technical articles; (b) experienced tinkerers should have no trouble working directly from the schematic; and (c) the Phase One in kit (with detailed instructions) and assembled form should be available from Radio Plus+ Electronics in 60-90 days.

#### Operation

The Phase One has only three principal controls -- delay range, amplitude, and phase. A single setting of the delay range control covers a large range of frequencies (about 1 MHz at 10W frequencies), so it is not routinely adjusted while RX'ing the BCB. The amplitude and phase controls interact so alternately adjusting each is required for the deepest null. I've found that simultaneously rotating each locates the general null settings quickly then alternately adjusting each for deepest null works best for me. With practice, optimal nulls rarely take more than 10 - 15 seconds to attain. Once a null has been established, it can be "steered" throughout 360 degrees using the phase control and with only minor adjustments to the amplitude pot. Because the bandwidth of the null in this broadband design is also quite large (depending on the spacing of the antennas, etc.), it is often possible to change receiver frequencies several tens of kHz and retain the same nulling effect. As an example, using the Phase One with a dipole and a longwire, I was trying to receive WVOG-680 (a regular receiver sensitivity/selectivity test station of mine). WVOG-680 is located about 750 miles to the west of me and radiates 1 kW. Reception of WVOG is usually bothered by both WHYD-610, a local splasher, and WDLP-590, a messy rocker. Luckily, because both WHYD and WDLP lay roughly in a straight line to the east of me, a single setting of the Phase One was able to simultaneously null both the 680 and 610 pests, and, at the same time, double the signal from WVOG to the west (due to the summing of the in-phase signals on the opposite side of the null). This was my best ever reception of WVOG. This example represents phasing in general, and broadband phasing in particular, at its best. Phasing has its limitations though. In fact, phasing is definitely not guaranteed to null all undesired stations. It can do very well with single mode, one hop signals but if an offending station is "beating" or fading, this usually indicates either a combination groundwave/skywave arrival or a multi-hop skip. In these cases, a single null will remove one signal but the other will remain. (On the drawing board, incidentally, is a two-stage phaser (the Phase Two) to attempt to deal with this situation... we'll see how it works.)

So far I've used the Phase One with two longwires, a loop and longwire, a loop and dipole, and a longwire and dipole and have had no trouble nulling all of my locals (the strongest is 5 kW WCQA-1370 at six miles) to the noise level. From what I've read, two verticals are the best to phase but I haven't given those a try. Neither have I spent a great deal of time testing the Phase One at frequencies above 1.6 MHz other than to confirm that at least partial nulls (due to the multi-skip nature of SW signals) can be obtained up to about 12 MHz. Much more testing needs to be done at HF frequencies and perhaps some design changes.

Well, that about sums up the Phase One. If you have any questions (or can provide any answers, hi) or if you would like to be notified of the availability of the Phase One in kit or assembled form, drop me a line at RADIO PLUS+ Electronics, 3635 Chastain Way, Pensacola, FL 32503. 73's....BT







