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From the Publisher... First, our condolences go out to NRC Membership Manager Ron Musco, whose mother passed away July 25.

We have in this issue an unusual amount of technical articles, specifically antenna articles, which tells me that you DXers are coming up with solutions to deteriorating conditions. My hat is off to those NRCers who continue to search for solutions to problems.

I would have announced earlier that we'd like to reactivate the "Target DX" column formerly edited by Jim Renslow. Although the new editor doesn't necessarily have to have a long-time, "expert" DXer's head, he/she should be able to evaluate contributions in order to provide readers with solutions to DXing problems. Please forward your application to the publisher in Topeka.

Where to send... It occurs to me that it's time for me to remind you to check the back cover before mailing off orders, renewals, clippings, etc., not all of which come to me! Please send clippings concerning format changes to Tony Fitzherbert and those concerning status changes to Jerry Starr. To Laura McCusker should primarily go clippings about trends in the radio business, and to Pete Kemp should go those concerning individual stations and personalities. Send me the rest, and as space becomes available, I'll use them as filler.

The NRC grows... My thanks to those who have been requesting sample copies for potential members, most recently Ken Romstadt, who decided that the growth of the NRC was important enough for a phone call to me. The NRC continues to grow. Remember, sample and replacement copies are free - don't hesitate to ask! Back copies are still available to members for the postage.

Check the inside back cover for news about the convention in Bridgeport and the new NRC Log - get those orders in early!

They joined... J. J. Hitt, Houston, TX; David Klemp, KM4DB, Clearwater, FL; Dean Peaks, Chicago, IL; Clifford Schraffler, Elizabeth, NJ; Keith Short, Columbus, OH; and Jeff Toma, Cypress, CA.

DXChange... Wanted: accurate transmitter patterns for the new upcoming night-time pattern book. Send those coverage maps to Fred Tankersley - 4125 W. Saguaro Park Lane - Glendale, AZ 85310. Mike Hawk is looking for help or accurate station information on Latin American stations for a future project. Send your information or volunteer to help by writing to Mike at 10212 "P" Street - Omaha, NE 68127-2130. Mike also is looking for a receiver with a good FM section - tuner, portable, anything. Include a spec sheet with the offers, if at all possible. If you'd like to acquire some old equipment from the now-defunct WREN, KJTY (see p. 42) is offering for bid/sale the following items (none guaranteed to work) through the publisher (for local pickup only): 5-tube Newcomb AM receiver; 4 Utah 10" speakers in wooden cabinets; Hallicrafters CRX-1 FM (30-50 mHz) rx; two Gates amps (1 think) - M-3638, with tubes; RCA CC-20A control; Spotmaster 500 AR rackmount player/recorder; Harris Carttape II; Gates M5546A Level Devil; Monitoradio, MCA100H; GE phono-mike pre-amp, UPX-063B, 4 watts; 4 Aiphone handsets and adapters, a 12-line phone switcher, and an Ampex 620 PA amp + speaker. Send your bids for any or all pieces to the publisher; all monies/donations will go directly to the non-profit KJTY. 73.

DX Time Machine
From the Pages of DX News
50 years ago... from the August 19, 1941 DXN: Ernest Cooper suggested that there should be a theme song, preferably a march, to start and end all NRC DX programs.
10 years ago... from the August 10, 1981 DXN: Gary Atkins and Dick Truxu warned NRC'ers that the Louisville Publishing Committee might not be able to put out DXN forever!

THE WORLD'S OLDEST AND LARGEST ALL MEDIUM-WAVE DX CLUB
CALL LETTER CHANGES

Old call: New call:
620 OFCL ON Timmins OKOY
770 WRKX FL North Fort Myers WMCW
820 WPNJ IL Chicago WULJ
830 KSTR CA Orange KPLS
870 KROL NV Laughlin KOWA
1100 *New AZ Cave Creek KCOF
1180 KLKY IA Prescott KWSD
1260 WJOT SC Lake City WJLC
1280 WSGX FL Sarasota WTHV
1290 KESP CA Santa Barbara KSBS
1340 KICK MO Springfield KIDS
1350 KBAD CA Bakersfield KBAD
1370 CFLV PQ Valleyfield CKON
1400 KZTR CA Santa Paula KKZ
1410 KQIV MN Litchfield KLNC
1420 WKLK WI Kalkaska KKL
1430 WOCQ SC Ridgeland WINF
1450 KUBJ MT Bozeman WMSH
1460 WLGQ GA Buford WXEM
1470 WBNZ WI Racine WWKV
1500 KXTO TX Sherman KJIM

Notes: WJOT-820 request for WART was set aside and not used.
New 1100 station in AZ is a mystery. See Grants below. WDSY-1300
is in a market with a mixture of "W" and "K" calls and although
this may look unusual it can be done. KESP-1290 is silent, new
calls evidently signal it will soon be returning to the air.

APPLICATIONS FOR NEW STATIONS
None

GRANTS TO EXISTING FACILITIES
890 KOGV MO Gladstone: power to 1100 watts
1020 WART FL Port Orange: reduce power to 400 watts, change
antenna to D1
1240 KJEC IA Decorah: reduce power to 580/580 watts

OTHERWISE
580 WANA MT Anaconda: silent station is ON THE AIR
610 WJJU OR Medford: station is SILENT
660 WUXA TX Pettisville: construction on this new station was
halted after only one of their two towers was
erected when, reportedly, funds ran out
740 WTVG MA Needham: station is SILENT
770 WICN FL North Fort Myers: silent as WRKX is ON THE AIR
840 *App OR Springfield: application for new station has
been DISMISSED
990 WATL VA Richmond: station is SILENT
1010 WJTL UT Tooele: silent station has been sold, new owners
expect to return it to the air with Spanish format
1060 KFWA UT El Paso: silent station is ON THE AIR
1220 WMOR AL Hobson City: station is SILENT
1370 WJWQ NY Cornwall-on-Hudson: station is SILENT
1380 WTMN MN Stillwater: station is SILENT
1380 WYTL IN Terre Haute: station is SILENT
1380 WJIN TN Kingsport: station now relays WJWQ-910
1380 WJEA PR Vega Baja: station is SILENT
1370 WZAO WV Moundsville: several issues ago we typo'd WQPN's
new call as WVAO here in Otherwise. WZAO is
correct as we reported under Call Changes, and
although they now ID as Glen Dale, which is their
mailing address, they are still officially
licensed to Moundsville and have made no request
to change city of license.

APPLICATIONS FROM EXISTING FACILITIES
710 KJET AZ Black Canyon City: add 4100 watts nights (this
added to their already existing 60 for 5000 watts
daytime, making the CP 50000/6100 U1)

GRANTS TO EXISTING FACILITIES
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mailing address, they are still officially
licensed to Moundsville and have made no request
to change city of license.

APPLICATIONS FOR NEW STATIONS
None

GRANTS TO EXISTING FACILITIES
620 JSV OR Junction City: 10000/1000 U1 (75 miles N of Eugene)
860 OR Eugene: 210/210 U4
880 OR Troutdale: 20000/2000 U4 (eastern suburb of Portland)
1100 AZ Cave Creek: This is a mystery. We went back through
our records for the past several years and find no
record of any grant or even an application for a station
here so we don't have any facilities information. In
fact, the only hint that a new station exists here is
listing of the call letter assignment in M Street
Journal. We can't find a record of any new AM station
being granted ANYWHERE in Arizona in the past few years.
Hopefully we will be able to uncover this before #30.

APPLICATIONS FROM EXISTING FACILITIES
710 KJET AZ Black Canyon City: add 4100 watts nights (this
added to their already existing CP for 50000 watts
daytime, making the CP 50000/6100 U1)

SEE YOU AT THE CONVENTION IN WEST-BY-GAWD-VIRGINIA!
TIS AND OTHER STUFF

530 TIS NC CHARLOTTE - (Douglas Airport) - 7/6 1400 presuming this while at airport and motel (2 miles away); sounded like a male answer, but signal garbled and poor quality; sign mentioning to Tune to 530 noted on access road to airport arrival area (MH-NC)

1610 TIS NC RALEIGH - (Raleigh AP TIS) - NOT noted 7/1230 while driving by airport on I-40; sign noted for airport info to tune to 1610, but not even a hint of a station...nothing on 530 either; did a quick scan of the AM band, but nothing noted there either...operational or off? (MH-NC)

MIDNIGHT TO 0800 HOURS ETL

590 WOW NE OMAHA - 7/6 0006 with C&GW mx, CI JD, TC (MS-MB2)
620 WTMJ WI MILWAUKEE - 7/6 0105 fair with wx report; WTMI 620 ID; under/over CKCK; nice to get away from CKRC stop (VAL-DX)
800 KNKK UT BIRMINGHAM - 7/6 0200 tuned in just as they'd ID'd as KNKK, Birmingham City, Odell's suspect they are the more than the 30 watt legal; new (MH-NC); didn't power down, even you were going to listen, hi, Ed??
960 CFAC AB CALGARY - 6/29 0240 fair with restaurant ad...More Surinamese Fan on 960 CFAC (MS-MB1)
990 CKIS PQ MONTREAL - 7/6 0135 in WWCM null with Olds Coast to Coast and non-ID, Montreal's newest radio station; all oldies all the time, Olds 990 (REH-ON)
1040 CIWA BC VANCOUVER - 7/6 0117 poor - fair with lite ROK by White; Houston: under WHO and a new one; CKXV (VAL-DX)
1050 CFYN ON SAULT STE. MARIE - 8/5 0943 good with ID; You're listening to the Sault's classic hits, AM 1050 (ED-JA)
1070 KNX CA LOS ANGELES - 7/6 0750 strong with KNX 1070 Weather report, totally dominating the frequency (VAL-DX)
1210 KOKK SD HURON - 7/6 0032 with local wx mentioning Huron...that's the latest weather from KOKK (MS-MB2)
1240 WATN NY WATERTOWN - 7/6 0500 popped out of the mess with legal ID; 1240 WATN Watertown, New York, the area's first radio station (REH-ON)
1380 CIBAR MB THE PAS - 7/6 0729 good with CFCR/CJAR ID, and wx by lady, came up in a mess, still on at 0100; 1st time heard south of the Swan River (VAL-DX)
1250 KGDD TX DALLAS - 7/6 0239 ID and OLD mx; up and down for 2+ hours; new (MH-NC)
1330 KNOW MN MINNEAPOLIS - 7/6 0219 fair...fooled me with CBC's Canada Day theme, Royal Canadian Mounted Police comedy song, then - wx alert for Minnesota, National Public Radio mention, ID @ 0000 as Minnesota Public Radio; not heard (MS-MB-H)
1350 WJBD IL SALEM - 7/6 0740 good with WJBD Newsletter is 6:40 during morning news report (RDJA)
1400 KRAP ID MOSCOW - 7/6 0510 strong with We're the Oldies Channel for the...City, 1400 KRAP, Moscow-Pullman, a new one (VAL-DX)
1410 WMNN ID ELGIN - 7/6 0710 fair with two 1410 WRMY Ids noted (RDJA)
1440 KMAJ KS TOPEKA - 8/2 0227 fair with 1440 KMAJ ID; strange, I thought this stn simulates its sister FM 100.9...maybe not (RDJA)
1870 KLCT ND DICKINSON - 7/6 0515 fair with FM This is KLCT Dickinson - ABC Ns (MS-MB)
1470 WWWM OH TOLEDO - 7/6 0719 fair with two AM 1470 Three WMs Ids noted (RDJA)
1510 KGA WA SPOKANE - 7/6 0635 strong with sports, TC, totally dominating the frequency (VAL-DX)
1530 KFBK CA SACRAMENTO - 7/6 0255 fair with the Jim Beahm Show; under WCY (VAL-DX)
1550 KMBL MO BOWLING GREEN - 7/6 0710 weak with sign-on (RDJA)
1550 WJLL IL JACKSONVILLE - 7/6 0730 weak with Cuba BB promo that included CLs (RDJA)
1580 KXTO NV RENO - 7/6 0715 poor with Radio Extreme ID - Mexican-type mx; faded up for 5 minutes over CBE & KQWB; very nice (VAL-DX)
**0800 TO 1600 HOURS ELT**

| 650 KQSR | ND | WILLISTON - 7/1 1031 fair with Paul Harvey, non-ID as News Radio 65, TGC in both Central & Mountain Time Zones, local mz, lottery 3x, local ads including cabs for Scoby, Modena, and Montana (MS-MB1) |
| 1450 KZZJ | ND | RUGBY - 7/1 1033 with ABC Info Nix in progress, then KG Country Weather sponsored by Daryl's Refrigeration, mention of KZZJ studio in progress for KG Country Road (MS-MB1) |
| 1470 KHND | ND | HARVEY - 7/1 0955 with local ads including one for First bank of Harvey, KHND Ping Pong Drive contest promo, C&M, wx at 0957, then You're tuned to KHND Harvey... NBC News coming up. (MS-MB2) |
| 1500 WTODO | WI | PLATTEVILLE - 8/1 1429 fair in KCRG splash with Cousins BB; 1st time hrd during the day (RD-IA) |

**1600 TO 2400 HOURS ELT**

**CJW@1430**

**350 WRMH**

**OH**

| CLEVELAND - 7/5 2530 finally emerged with O&L and the Music of Your Life; thought MOY L was gone, but it's still on WORR (WRM); 1st time I've gotten 2 new stations on one channel on one evening (WN-MD) |

| WJAC | PA | JOHNSONSTOWN - 8/5 2385 on top occasion with C&M mx, one garbled & one clear ID (WN-MD) |

| WERU | PA | READING - 8/5 2424 faded in and out occasionally with C&M mx, one garbled & one clear ID (WN-MD) |

**900 WFRG**

**OH**

| CLEVELAND - 7/1 2149 with bpt of the Indians-Blue Jays game on the Indians Network; see CHML (SB-MB) |

| CHML | ON | HAMILTON - 7/1 2033 with bpt of the Blue Jays-Indians game on the Blue Jays Network; rotating the radio, I can hear both versions of the same game (SB-MB) |

| KLT | TX | HOUSTON - 8/3 2231 with Houston Oilers pre-season FB in SS (MH-ME) [Their EE broadcasts are on KTRH 740 - Ed.] |

| WYFX | FL | BOYNTON BEACH - 7/2 2038 noted under KMOX with UC format (KJ-GA) |

| WSDQ | TN | JASPER - 7/1 22 with C&M mx, female DJ; sign-off @ 1958 (KJ-GA) |

| KVII | TX | DALLAS - 7/2 2115 good with CNN Headline News; no sign of WOJO (KJ-GA) |

| WDBY | WV | BLUFFFIELD - 7/2 2045 sign-off, mention of WBND-FM 100.3, 10,000 watts (KJ-GA) |

**1240 KDLR**

**ND**

| DEVILS LAKE - 7/2 2347 fair with TC, local PSAs, pm annets, KDLR Weather, a daylily station in Winnipeg, but clear reception at night indicates a dead band (MS-MB1) |

| KVWR | SD | WINNER - 8/4 2244 good with ad for businesses in Lemmon and Chamberlain - ID (RD-IA) |

| WWOV | WV | LOGAN - 8/4 2205 caught tailend of ID: ...on WWOV, Logan - Reda BB (RD-IA) |

**1300 KGLO**

**LA**

| MASON CITY - 7/7 2330 good with KGLO Comment 2000 competition promo for news tip of the month, mention of Central Catholic Child Care in Mason City. (MS-MB2) |

| KFLO | LA | SHREVEPORT - 8/4 2500 good with promos for coverage of various pro sports teams this fall on KFLO (RD-IA) |

**1310 WDDD**

**TN**

| CHATTANOOGA - 8/4 2359 very good with soft piano instrumental - WOOD, Chattanooga ID (RD-IA) |

| KWHN | AR | FORT SMITH - 8/4 2359 good with ID: Playing more music more often, AM 1320, KWHN - GOS song. (RD-IA) |

| WDCF | FL | DADE CITY - 7/2 2317 weak with county mx in AU conditions (KJ-GA) |

**1380 KOTA**

**SD**

| RAPID CITY - 7/7 2359 good with You're listening to KOTA's Radio Classics Hour (MS-MB2) |

| WMPS | TN | MILLINGTON - 7/1 2213 ID and GOS mx; very strong (MH-NE) |

| WXF | IN | INDIANAPOLIS - 7/1 2001 with ID WXF-IND (indie) rock (SB-MI) |

| KTUN | ND | MINOT - 7/8 1817 with CostChr mx, ad for State Farm Insurance, C&A = Great Bike Concert (MS-MB2) |

| WLYV | WI | FORT WAYNE - 8/4 2355 spt with Oldies 1450, WLYV-ID; Don Treford must've heard someone else on 5/2391; John Clemmer, Mark Strickland |
Not sure about renewing?
Consider these benefits of a membership in the National Radio Club: 750+ pages per year of printed, easy-to-read, comprehensive DX and radio information... reduced prices for publications... responsive editors... and the friendliest bunch of DX'ers in the world! Why not send that renewal check to Ron today!
female announcer in presumed Tagalog then into traditional gamelan orchestral mx. 1454 until 11:07, believe Asian hit due to bring w/ differently oriented beverages (others agree). Taiwan or Japanese mx? probable 3IV as other Soviets were booming in on lower band. Audio was too brief to tell. 1232 SBL w/ female reader at 1200 W/ world mx until 1904, then Australian mx. Male reader at 1906 W/ Australian sx (including Aug. Union). Followed a Classic Rock show which ended at 1200, hosted by Mike J. Very good levels at times until band-fool at 1245. 413, 220, and 7:10 same general audio, Jack had noted all these nights. Since primary opening was to Southeastern Australia, was hoping for Taiwan. Audio during several mild back-to-back rock and roll numbers, no 10, no DJ. 1908 presumes a male and female talking then into those from “Days of Wine and Roses” felt to poor level. 531 SBL presumed in w/good audio 1200-1240. 1300 E stations in EE mixing 2205/1200 UTC presumed 1202 A2 and an Aussie. Brier openings of probable Aussies noted on 1215, 1419, 1575, and 1620.

General Comments: Conditions on 160 meters were 270 to 300 meters during the first three days at Sombrero Beach, according to the folks on the 1963 kHz “Flame Network”. Sunspot number was 1205 UTC. The dawn enhancement period seemed to exactly match the 1.8 MHz experience this past year, last hour before sun-up plus about 10 minutes. Probably due to disturbed sun, we heard nothing on NW of Bermuda. Best receptions were from SE Australia at our local dawn all three days. (800 DNX)

TRANS-ATLANTIC

FRENIK 0003 5/06, Carrier, bits of chant in heavy DRM. (MC-

ALGERIANS 0003 1975 5/10, AA mx, poor to fair. (MC-

ACIRI 0100 2242 5/18, SS talk on/unid mx. (MC-

CUBAN 0100 2251 5/18, SS talk on/unid mx. (MC-

CUBAN 0100 2251 5/18, SS talk on/unid mx. (MC-

REPORT FROM MEXICO

Rex DNM 7/19, XEBR was on 1170 when I visited Cuzamal off a Royal Viking cruise in May 1989. Not only that, they had a giant sign in front of the transmitter promoting its 5000 watts, but a lot of frequency changes in recent years - Jim). I visited Mexico City June 1-4, 1991. Not owning a current WTH, I was not able to identify everything. Of note: 1000 presences, fair/sunny days, 1200 R. Siesta, Tolucan, fair days, better than 1080, 1110 UNID Centro, Fair nights, weather. 9/90 was 0700 7/19,fair w/ntex in MEX null. Either these or someone else in鉴小 completely readable of XEBR-1200 sot. 1470 R. Canon, very near at all times. Must be way out in the suburbs or something so it was predictable and in concurrence with my old WTH. On the whole, the stations do seem to be the art of overmodulation and distortion nearly as we have here. (PT-CN)
RADIO JAMAICA
RJR-AM (The Supreme Sound)
NAGGRO HEAD (Kingston and environs) 720 KHz (10,000w)
MONTEGO BAY 550 KHz (5,000w)
SPUR TREE (Near Montego Bay) 720 KHz (5,000w)
GALLINA (Near Port Maria) 550 KHz (10,000w)

CAPITAL STEREO (FM)
KINGSTON 92.7 MHz AND 85.7 MHz

Radio Jamaica Ltd.,
32 Lyndhurst Road,
P.O. Box 23,
Kingston 6, Jamaica
Telephone: 926-1100
Cable: Breidisco

31st December 1993

Dear Mr. Stone,

This is to confirm your report of reception of Radio Jamaica on a frequency of 580 KHz on 13 December 1992 as being correct and that the program was broadcast by us.

Yours truly,
Chief Engineer,
Radio Jamaica Ltd.

IN THE BEGINNING

BY JOHN D. BOKER

THIS IS THE COMPLETEST LIST OF U.S. BROADCAST STATIONS ON THE INDICATED FREQUENCY AS PUBLISHED BY THE FEDERAL RADIO COMMISSION IN 1934. "S" MEANS SHARED; "SS" MEANS SPECIFIED HOURS; "T" INDICATES TRANSMITTER LOCATION; "O" MEANS DAYTIME OPERATION ONLY; "U" MEANS UNLIMITED TIME.

LIMITED TIME WITH DOMINANT STATION SHOWN.

<table>
<thead>
<tr>
<th>Frequency (KHz)</th>
<th>Call letters</th>
<th>Main studio and transmitter</th>
<th>Power</th>
<th>Time designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1070, clear...</td>
<td>WOTM</td>
<td>Cleveland, Ohio, T-Brecksville Village</td>
<td>50 kw</td>
<td>U.</td>
</tr>
<tr>
<td></td>
<td>WCAG</td>
<td>Carthage, Ill.</td>
<td>50 w</td>
<td>S.H.</td>
</tr>
<tr>
<td>1030, clear...</td>
<td>WBCD</td>
<td>Chicago, Ill.</td>
<td>5 kw</td>
<td>L-WBT.</td>
</tr>
</tbody>
</table>

Need more information about Medium Wave DXing?
Mail $1.50 to NRC Publications, P.O. Box 164, Mannsville, NY 13661-0164; ask for the Reprints Catalog.
The Drake R8 Communications Receivers ... by Rob Keene

A user-friendly review

by Rob Keene, 10315 Antioch, Overland Park, KS 66212-1332

It was not hard to become intrigued by the picture and published specs of the new Drake R8 in a recent DX NEWS. I immediately called the Drake Factory for more information.

I spoke to the factory sales representative for about 15 minutes. He was very knowledgeable. He didn’t hesitate to do as much as we could to get me to order a factory-fresh R8! The factory price, $1799.99 in shipping, was $20 above what I quoted by some of the mail-order outfits, but there were disadvantages to ordering factory-direct. Unlike the mail-order outlets and the Olympics, Drake was happy to take my American Express card. By using Amex, I could double the factory warranty to 2 years. Drake also had a 15-day trial period. I could have sent the R8 back if I had been unhappy with it. How can you beat that?

The R8 was delivered next to your-year-old RT1A. The first thing I noticed was a dramatic difference in noise. I think a lot of this has to do with the R8 using a built-in LCD display, instead of the vacuum fluorescent “noise generator” used by the RT1A. My Radio Shack local was able to operate only a foot away from the R8. It did not pick up any noticeable noise from the display. The loop had to be at least four feet away from the RT1A to reduce the noise from the display. The noise blanker on the R8 seemed to be more effective.

The R8 comes with 4 bandwidth selections for the BCB, 6.0, 4.0, 2.1, and 1.8 kHz. There is also a 5.0 kHz CW setting. The new RTA had only 2 bandwidth selections. The audio on the narrow setting was sometimes too narrow for less sensitive receivers, and even using the optional external speakers. The Drake speaker was not available when I placed my order. It should be available by the time you’re reading this. The R8 also has a 0000V recorder output. Plus another 300V output for a RTTY/FAX demodulator. This is really great for utility DXers.

Sensitivity was measured by listening to several weak tropical band stations. Both receivers performed equally, but it was easier to copy the signals on the R8 because of the reduced noise. The Drake features a synchronous detector which increases the quality of broadcast signals. This really brings a weak signal up and out of the mud.

The passband offset and notch filter are very useful in reducing adjacent channel interference. My RT1A did not have the passband tuning feature. This works great on removing hets, TV “birdsies”, and splash from strong local stations.

The R8 has the usual array of dual VFOs, clock and timer, 100 memory channels, two antennas, and a quality of broadcast signals. This really brings a weak signal up and out of the mud.

I liked the R8 so much that I traded in my RT1A on some R8 or FAX equipment! I can’t wait for the upcoming R8 DX season. Wherever you are, don’t forget to loop around the weather effects and the ionosphere. A study at the U.S. Army Signal Engineering Laboratories, Fort Monmouth, NJ, during the 1960s showed a change in the height and intensity of ionization of the F2 layer during cold front passage. This study does not indicate what if any effect there would be on Medium-wave DX. The point is that the weather effects can bring about a measurable change in that distance of the receiver. For instance, some DXers find unexpected DX during and after cold front passage. So watch the TV weather maps this winter, and have a great time!
Radio Roundup

Pete Kemp (KZ12)
P.O. Box 73
Bethel, CT 06801-2203

News of radio personalities of interest to DXers

Inverted L Noise-Reducing MF/VLF Antenna... by Dallas Landmark

If you could reduce all of your regular MF noise sources and pests by 10 dB to 35 dB and your VLF noise even more for an outlay of two ferrite toroids, some selenite pipe thread tape, 25 to 50 feet of zip cord, and an 8 foot ground rod, wouldn't you convert your inverted L to a noise reducing inverted L antenna?

Recently I have been experimenting with some remarkable noise reducing antennas for HF and VLF reception. The current inverted L antenna noise reduction shown below. I was introduced to these antennas by Demitri Wright who informed me of the Wireless World articles by F. E. M. Rutterford, "Screened Aerials," Nov. 22, 1937, pages 913-915, and "Vertical or Inverted 'L' Aerials," June 22, 1936, pages 517-519. Demitri also sent me details of the antenna transformer T1 which he designed. The toroid he used, a Siemens BL4230016816830, is apparently not available in the USA, so I designed an equivalent transformer using an Amidon FT-114-75 ferrite toroid.

My inverted L has a 65 foot horizontal section, one end 15 feet up at the roof of my house, the other end 25 feet up at a telescoping TV mast, guyed opposite the direction of the horizontal section. If you have a longer and/or higher horizontal section, you may use that. I included the dimensions of my inverted L to give you some minimum dimensions for adequate signal levels. An 8 foot ground rod is sunk in a hole directly below the your house. Use #18 or 16 copper wire to connect the ground rod to the primary of the antenna transformer T1. It is a good idea to use some kind of strain relief for mouting the antenna transformer T1. High wind can whip the antenna around and eventually break the transformer leads. All of the connections were soldered. Merely twisting bare wires together is not a good idea.

The zip cord may be 18 stranded copper, speaker wire, or true zip cord. Since the zip cord should be soldered at the secondary of the antenna transformer T1, you should make sure that both wires of the zip cord pair are copper. With some speaker wire, one of the pairs is stranded aluminum wire. Although I specified 25 to 50 feet of zip cord, you may use up to 100 feet of zip cord. For longer lengths of zip cord, you may need to return the front end of your receiver.

If you use an R-390A or HQ-180A, you may connect the ends (1 and 2) of the zip cord directly to the baluns antenna inputs as shown. Be sure to remove the shorting link between the G and adjacent. A terminal of the HQ-180A is shown. For unbalanced antenna input terminals, or for use with a VLF meter or accessories such as a phasing unit, you will need an antenna matching transformer.
The noise reduction inverting L antenna improves signal levels by 5 to 10 dB at the primary of T2. After tuning that adjustment was made, the noise inverting inverted L antenna was used as well as a standard inverted L antenna for reception of the signals mentioned above. But I have not tried them.

The noise inverting L antenna provides a 5 to 10 dB increase in signal levels when compared to a standard inverted L antenna. This improvement is due to the effective use of noise reduction techniques that are specific to this antenna design. The antenna is tuned to the primary of T2, which results in a significant reduction in noise. The noise reduction improves the overall signal-to-noise ratio, making it easier to receive weak signals. The noise inverting L antenna is a valuable addition to the DXer's toolkit, especially when receiving signals from distant stations. It is recommended for DXers who want to improve their reception capabilities and enjoy a clearer signal.
The RTU-1 Remote Tuning Unit for Active Whips, by Mark Connolly

The RTU-1 varactor tuner is meant to tune an active whip remotely so that the benefits of tuned-dipole/striped activity and direct range/gain enhancement can be realized. The result: better DX than when the whip is used in its customary broadside mode.

The DX rule of a remotely-sited active antenna

The active whip antenna is useful in many DXing situations.

Two come to mind immediately:

1. When DXing from an hotel or a hotel where in-room operation of a loop is not feasible because of room security
   and/or electrical noise. Also, for legal or logistical reasons, installation of an outside longwire is not possible. It
   is possible, however, to place an active whip in a window or on an outside balcony.

2. On mobile DXPeditions where the in-vehicle receiving set-up must be fed from an antenna mounted on the vehicle. A loop
   won’t work inside a vehicle; furthermore, the specific siting cannot be cut out a longwire (either because of
   too much water, or because the site chosen for stationary listening has no available space, is too crowded, etc.). A busy beach, park, street, or shopping-mall parking lot could be a good place for listening but an
   impossible place for a wire antenna.

The active whip also has merit at some conventional sites (e.g. at a wood-frame house in a suburban neighborhood where
other antennas could be used) because it can be towed-mounted for improved signal pick-up and local noise rejection.

Limitations of Existing Remote Active Antennas

The vast majority of remote active antennas sold, whether of a loop or whip design, utilize broadside techniques. Both the
active antenna’s amplifier and the receiver’s front end are
exposed to a wide spectrum of signals, quite likely including
those of enough strength to cause modulation distortion
and cross-modulation (strong-station audio super-
imposed on the audio of weaker stations). Some companies (e.g. Groves) offer tuners or attenuators to place in the coax. Peth from the antenna-head amplifier to the receiver input. In
many cases, though, the worst overloading occurs at the front end of the remotely-sited antenna-head amplifier. ‘The damage has
already been done’ so to speak: in-shock tuners and attenuators offer no fix. A remedy must be applied where the problem exists:
this is at the remote site, whether it’s at the top of a tower or
at a mounting bracket bolted to the exterior of a car, plane, boat, or truck.

Early experiments with the MFJ 1024: I have used the MFJ 1024 active whip with a great deal of success. Typically, the
RF output is passed through a passive or active preselector
envelope to the receiver in order to reduce the likelihood of
cross-front-end-generated spurs. A DXpedition to the
Marblehead, MA waterfront last January went well other than the
disappearing addition of a 500-7000 to the DXED015FLT front end in the MFJ-1024’s amplifier. Additionally, “intermod” (mix spurs) showed up on a few channels due to the potential signals from WKE-1030, WKEU-1230, WMBL-950, WMBL-1510, WMUA-1350, WHYN-1360, WZEE-1260, WZEE-590, WDDO-680, WDXK-1430, WILB-1080, and WHDH-850. The “RF hot” location by the sea in a large metropolitan area was a bit more than the broadside
distance from the active whip could comfortably handle. A few shortwave spurs got into the act too, both from SM broad-
casters and from powerhouse RTTY/CW utility stations such as
WCC. Harmonics of LORAM-C (Nantucket, 100 KHz) showed up also.

All in all, considering the pounding the MFJ’s front end was
taking, it held up fairly well. Most frequencies were free of
and perfectly DXYable. 15 to 20 MHz countries were logged in
a less-than-2-hour session that started over an hour before sunset.
I thought improvements would help and that a tuned-tank-
circuit approach, applied directly to the whip antenna, would be
the solution. Selectivity, rather than added gain, was the
desired objective, but if a few microseconds of gain were to be had,
all the better.

The RTU-1 Remote Tuning Unit

The simplest approach to tuning a remotely-sited antenna
system is to construct a tank circuit consisting of a varactor
diode, an inductor, and a few other needed components. The
varactor diode, when biased by a DC voltage sent on a control
line from the receiver’s ‘shack’, acts like a variable capacitor. The
most recent and previous articles on ‘Varactor Diode Applications for DXP’
and on the ‘RT-1 Remotely-Controlled Antenna Tuner’ (1984) give
minimum information to these useful devices. The articles are
available through the reprints services of NBR and IRECA. A crude
experimental set-up (Figure 1) was quickly ‘kluged’ up and
alligator-clipped onto the MFJ 1024. The results were
impressive!

\[
\text{Figure 1: Figure 1 : "KLUGE" Tuner Schematic}
\]

\[
\text{DC}
\]

\[
\text{VARACTOR} \quad \text{VHF/MEDIUM}
\]

\[
\text{VHF/MEDIUM} \quad \text{1 kHz}
\]

\[
\text{WHIP ANTENNA MAST}
\]

\[
\text{GND}
\]

\[
\text{GROUND}
\]

\[
\text{SHIELD OF COAX}
\]

\[
\text{(DC GROUNDED VIA COAX.)}
\]

With the tuner, received signals were about 10 to 12 dB (2
S-units) stronger than when the MFJ 1024 was run in the normal
broadside mode. When the set-up is properly tuned for the
frequency of interest, no spurs are noted. By comparison, in the
broadside mode, at the suburban Berkeley Hills, spurs are noted on
770 = (NSW)1150 - (HLV)740 and (NRE)850 - (NRE)850 - (NRE)850
830 = (NSW)1510 - (NRE)680
1360 = (NRE)680 X 2
1530 = (NRE)680 + (NRE)850

The sensitivity of the MFJ 1024 with the Figure 1 "kluge" tuner was well below amplified limits of comparable
receiver sensitivity. Weak daytime signals used for sensitivity tests in this area include WHLBRJ(NY) (N/HMV/CB7/CB7)-540, WKBQ(NY) (N/HYQ/CB7)-570, WCRP(NY) (N/HYQ/CA77)-670, WCRQ(NY) (N/HYQ/CA77)-820, WCLZ(NY) (N/HVX/CA77/CA77)-900, WGLL(FLA)-1210, WDBX(NY)-1650, and WHILH(NY) (N/HYQ/CA77)-1580. At a low-RF-noise field site (near
Shenandoah River marsh / New Market Airport, Tewksbury, MA), all
of these were detectable and, in most cases, easily readable with
the tuned MFJ 1024 feeding the Sony ICF-2010 receiver used for
determinations. The one thing I noted about the "kluge" tuning is that
its tuning range with a single inductance valve did not quite
cover the entire HF band. The ratio of maximum capacitance to
minimum capacitance with the varactor diode is not as great as
the comparable ratio of an air-variable capacitor. The Motorola
VM1008 varactor gives about 50 pF max. to 55 pF min. (10:1)
ratio versus 300 pF max. to 15 pF min. (20:1) typical of the
air-variable. I wanted coverage from 500 KHz or less through 2
MHz or greater. A second inductance, switched in parallel with
the first by means of a relay, accomplished the complete band
coverage. At this juncture I decided that the results of tuning
the whip were so good that a tuner box to be mounted to the MFJ
head unit on a permanent basis would be a good idea. After
some experimentation, the circuit of Figure 2 evolved:
**Figure 2: RTU-1 Schematic**

J1 is used for a Radio Shack 20-008 whip. This can be used instead of the normal MFJ whip section with only a slight penalty to sensitivity. Doing this makes the noted MFJ amp/RTU-1 assembly much easier to pack into a suitcase for air travel. It also permits simpler operation on the roof of a car or other vehicle.

J2 is used if tuning a longwire or tree-height vertical is to be done (typically at acomposite or similar G7T). Using a 100 ft. / 30 m. wire instead of a whip can give tremendous (Beverage-like) sensitivity. Because of overloading considerations, this should only be done at rural locations and in the tuned mode.

J3 connects the control cable from the shack. Control cable functions are varactor tuning (by means of a 0 to -8 volt variable DC supply) and tuning-range relay switching (by means of a switched 0 V / +2 V DC source).

Toggle-switch S1 sets either the tuned mode for the active antenna or the normal broadband mode. Switch S2 selects normal or low Q (selectivity). Low Q is only used if two tuned-mode whips are to be phased. The functions of S1 and S2 could be implemented with relays if the active antenna is to be mounted permanently at a remote location (e.g., on a tower). Also, in such a circumstance, greater attention would have to be paid to weatherproofing. As my use of this system is primarily for set-it-up / take-it-down beach or mountain DXpeditions (typically 8 hours duration), switches are preferable for their simplicity.

Generally, S1 is left on Tuned Mode and S2 is left on Normal Q.

F1 is used for the wire that is to be connected to the MFJ 1024 head-unit whip antenna input. A ground wire is connected to the MFJ 1024 circuit-card ground (coax. shield) from a lug on RTU-1 J3. Assembly instructions of greater detail follow in this article.

---

**Construction Information**

Figure 3 gives a pictorial of the components inside the RTU-1 box. Figure 4 shows hole locations. Table 1 is a parts list for the RTU-1 assembly.

**Figure 3: RTU-1 Component Layout**

(View inside box with bottom cover off)

**High Power AM Station Planned for Caribbean**

by Alex Zoristovich

S. CAICOS ISLAND, BWI: A New York-based engineer is working on a 100 kW AM station in the Caribbean that will\n
work to rebroadcast the signal from the station.

According to Ross Jannen, currently managed at WRIA in New York, two half-meter wide AM transmitters and a 6 kilowatt 30 kW station will be used to transmit from a tiny island in the Caribbean as early as January 1992.

Construction of the facility is slated to kick off in mid-August.

According to Jannen, the site has four construction authorizations: 4 100 kW at 1580 kHz (The Atlantic Beach), currently operated by WRIA; two 100 kW stations at 530 kHz and on shortwave, and a 50 kW facility at 100.1 FM.

It is the 50 kW facility that Jannen is constructing. The station will be operated under the RadioVoice Caribbean name.

---

**Radio World**

"via Jerry Starr"
**FIGURE 4 RTU-1 HOLE DRILLING GUIDE**

(Exterior Views -- Dimensions in Inches)

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**Some minor modifications are to be made to the MFJ 1024 amplifier box to facilitate use of the tuner. Table 2 is a parts list for modifying the MFJ amplifier (head) assembly.

Table 2: Modification kit for MFJ 1024 / parts list

Vendor codes: see Table 1

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Table 1: RTU-1 remote tuning unit / parts list

Vendor codes:
- ACT = Active Electronics /71 Cummings Park /Hoburn, WA 08101 /Tel. 1-800-344-657
- DK = Digi-Key /P. O. Box 677 /Thief River Falls, MN 56710-0677 /Tel. 1-800-344-657

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**The Challenging Crystal Set**

For hobbyists demanding the ultimate DX challenge, Ray Cole's publication detailing step-by-step procedures in building a crystal set is for you! Only $3.00...

... order from the Publications Center.
Use minimum length wires to connect the BNC jack's center pin to the circuit board location of the former coax cable center conductor solder connection. Connect the added interior solder lug (that is on the BNC jack) to the circuit board location of the former coax cable shield connection; again, use a wire of minimum possible length.

**MFJ 1024 amp. box modification #3**: Drill a 0.125 inch hole on the amp. box surface where the whip antenna connects. Install a screw, 2 solder lugs, and a nut (Table 2: Items 1, 2, 3) in accordance with Figure 7. Solder a minimum-length wire from the added interior lug to the wire which connects the whip mating hardware to the amplifier board.

**Figure 7**: Assembly of antenna wire connector on MFJ amp. box

**Figure 6**: Assembly of rf jack onto MFJ amplifier box at former cable hole

When done constructing the RTU-1 and modifying the MFJ 1024, re-attach the MFJ 1024's head unit cover (now equipped with hardware per Figure 5 above). Prepare the RTU-1 bottom cover (see Figure 5).
Other control units, including HMT-2 Option 5 and a two-whip controller/phasor will be presented in a companion article. HMT-2 Option 5 and the dual controller/phasor both eliminate the need for the MFJ 1024’s base-unit box.

Possible Variations on the RTU-1 Design

1. Bandswitching for more than 2 ranges or for 2 non-AM ranges

Switching and/or relays with additional inductors can provide more tunable frequency ranges. If only 2 ranges (but not AM) are desired, change L1 & L2. L1 = 2700 uH & L2 = 1200 uH, should provide longwave (130-550 kHz) coverage. L1 = 12 uH & L2 = 5.6 uH should provide mid-wave (1800-7600 kHz) coverage. Of course, the whip can always be switched to broadband for full 0.1 to 30 MHz coverage (albeit with less sensitivity and more spurs).

2. Completely remote operation

Relays (or concretely diode or FET switches) could be used in place of all-mechanical switches. Tuned/broadband modes, normal/low Q, and frequency range could all be set from the shack. Remotely switching the input from whip to longwire to ground (for a degree of lightning protection) could also be done. Fully-remote operation would be advisable for a whip antenna mounted on a tower. The RTU-1 box would have to be considerably larger. A different control-line connector (DB-25 computer connector, military-style round Cannon or DIN connector, etc.) would have to be used to accommodate the larger number of control lines. Computer-type ribbon cable would be the obvious choice for the shack-to-antenna control link. Such an elaborate set-up, while certainly feasible, is beyond the scope of this article.

Use of the RTU-1 with Other Active Whips

Besides the MFJ 1024, I have used the RTU-1 with a homebrew active whip. Improvements in gain and reductions in spurious responses were similar. There is no reason to suspect that the RTU-1 could not deliver comparable results with other commercial active whips (Dresler, et al) having high-input-impedance front-end amplifiers.

The results of other DXers’ experiments along these lines are always welcome—whether as formal articles, Musings/Forum contributions, or personal correspondence.

KTRF 1060AM
CORONA-NORCO, CA

"All Traffic...All the Time"

PROGRAM GUIDE: EFFECTIVE SEPTEMBER 1
Country music fans pitch in to help station
Saturday, April 6, 1985

BY FRANCA LISIEWSKI Staff Writer

Hagerstown's newest country music radio station WFPG, 1300 AM, broke away from commercial tradition this week and asked listeners for money needed to keep the station on the air.

It was an unusual thing to do, said Station Manager Russell McGurre cleared the "radioborer" idea with the National Association of Broadcasters.

The effort was deemed a success Friday by McGurre when he began fulfilling financial pledges promised a month ago.

In April, the station is now back on the air.

McGurre said there were no complaints about the station's sound, which is almost always advertised as being "radio-quality." A declining number of listeners, however, would be willing to contribute donations, McGurre said.

"We're trying to get the best quality product on the air," he said.

In addition, many listeners brought in their private collections of country music records that they thought the station should play.

"The station has been a lot of fun," McGurre said. "It's a good feeling knowing we're doing something for the community.

"The audience has been very supportive," he said.

"They're all very nice," McGurre said. "We're glad to be able to bring the station back on the air.

"A lot of people have said they're excited about the station coming back," he said.

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"A lot of people have said they're excited about the station coming back," he said.
Loop Experiments: The Super Booster Bar ... by Gerry Thomas

This is the first in a series of articles describing some of the loop experiments I’ve conducted over the past several years. Most of these articles deal with questions of loop theory for which I could not find answers. A few of the articles deal with more mundane questions such as loop construction techniques; this is one of those articles.

Passive booster loops have been around for years and are commercially available (e.g., the Select-A-Tenna). I’ve even written a couple of earlier articles on booster loops (the "Tilting T-Bar Antenna" and the "Hot Rod") but none has been as effective as or as easy to construct as the "Super Simple Booster Bar" (see Figure 1). The key to its simplicity is its use of readily available construction components; the capacitor and ferrite rod remains as difficult to come by as ever, though.

A booster loop is nothing more than a parallel-tuned circuit which, when placed near the antenna of a portable radio, significantly boosts the signal to the radio. This parallel-tuned (or "primary" tuning) circuit becomes a transformer when inductively coupled to the "secondary" winding that is on the portable radio’s built-in ferrite rod antenna. This transformation results in a “peak” in tuning (instead of the “null” that normally results from a parallel-tuned circuit).

Figure 1. Super Booster Bar.

Materials Needed...
1. **Paper towel holder** — This is the key to the simplicity of this booster. Scott Towels now makes a short (8-inch wide) paper towel holder that is perfect for mounting the ferrite rod assembly and variable capacitor. These are called "Scott Towel Jammers" and the holder costs under $1.00.

2. **PVC tubing** — The 1-1/4" diameter PVC tubing fits nicely on the nubs of the paper towel holder and is capable of housing a large number of ferrite rods. You’ll need an 8-9” length of tubing (most smaller hardware stores will cut this to length; mine was $0.50).

3. **Variable capacitor** — Ideally, you would use a small (1” x 1”) 365 pF variable capacitor. Years ago they were available at any Radio Shack for $9.95 now they are next to impossible to find. Mouser Electronics (1-800-34-MOUSER) carries a dual gang variable capacitor (260 pF each; under $5.00) that is usable but requires a shaft extension to accommodate a standard knob. (To extend the shaft of this variable capacitor, use a 1" x 1/4" round nylon “stand off” for (PC boards), a 1/4" x 2.5 mm screw thread to the stubby knob of the variable capacitor and hold the “stand off” in place, and a tiny drop of super glue to further secure the "stand off" to the stubby knob.)

4. **Ferrite rods** — The PVC tubing can hold a fair amount of ferrite — I was able to
The ‘Half-Breed’ Regenerative Crystal Set … by Ray Cole

About half of all my spare time for the last three months has been spent in experimenting and developing two versions of this circuit. While doing so, and quite by accident, both on short and long wave, I have received stations and beacons literally around the globe - even including Indo-china and the Belgian Congo. Since the circuit is restricted to an eight-foot antenna in order to prevent overloading, its performance has been a real astonishment to me. On the AM broadcast band I have often received various signals that my Radio Shack TRF 12-655 can bring in, at the same moment, side by side. However, the QRM circuit is very necessary in order to do this.

Basic to its operation is the high-gain Darlington pump ahead of a modified Tuggle Circuit crystal receiver, with feedback to the pump to provide regeneration with tremendous gain in amplification and sensitivity.

I have built two versions of the circuit and tested them side by side. One uses a hard-to-find five-gang variable, two sections for (A) and two for (B). The fifth section, next to the panel, is unused.

The other version uses two identical superhet variables, using both sections of each in parallel. This requires two-handed tuning to track them unless a simple belt is used around the two knobs. Details later.

Much to my surprise, I have found no differences in selectivity or in sensitivity between the two versions.

For the very greatest selectivity, use a crystal phone, but personally I prefer the speaker amp to eliminate the wire to my ear. You will hear about as much either way; just keep the wire away from the soldering iron!

Many variations of regeneration were tried very extensively, including even rotating tickler coils, and this one proved best. But all proved too difficult to handle on a practical basis on frequencies above 2500 kHz and below about 200 kHz - the circuit going into oscillations too abruptly. Reception, however, is fantastic if anyone can find a way to overcome this. I now use switched-in capacitors and cover only 1800 to 225 kHz, approximately.

For even lower frequencies, a reduction in switched-in capacities by using, say, 150-turn coils, may overcome this abrupt oscillation. Similarly, coils made to suit higher frequencies may solve the problem on shortwave. I have not tried either one. But this as shown works fine from 200 to 225 kHz and is very stable, needing only a few minor adjustments across an entire band.

This circuit is interesting in that regeneration cannot be obtained by connection to the antenna coil, and only very poorly with great lack of stability of connection to the output side of the diode.

The belt around the two knobs, when two superhet capacitors are used, so that they will track when turning only one knob) is made of vinyl electrical tape wrapped two layers thick so for a simple flat belt - with some tension as it is wrapped. If too wide for the knobs used, it can then be removed and split lengthwise with a razor blade, making a spare belt. It will tend to creep and slip a bit at first until it stretches to suit, and then will become quite stable.

The QRM coil’s spacing from the detector coil is - it should be at the opposite end from the antenna winding - should be adjustable from one-quarter inch to one inch, winding to winding. A piece of paper can be rolled up, inserted, and glued inside the detector coil end of the form so that it projects an inch or two for the QRM coil to slide over. It should be a tight enough fit to hold the QRM coil in any set position, which you will change fairly often to suit conditions. The QRM circuit is switched out when not in use to avoid an accidental blocking of a frequency later.

Some of the input capacitors can be omitted with a

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The booster bar becomes more useful if it is mounted on one of Rubbermaid’s plastic turntables (see Figure 2). The portable radio (if it isn’t too large) can be placed on the turntable and leaned against the booster bar. The two can then be rotated together to null and directionally peak stations. A longwire antenna can be tuned by hooking it to one side of the variable capacitor if you really need more signal.

Best of luck with this project. If you have any problems or suggestions for improvements, drop me a line. Also, if you discover sources for variable capacitors and ferrite rods, let me know. 73s-GT (3635 Chastain Way, Pensacola, FL 32504)
Loop Antenna Sensitivity ... by Dallas Landford

How can one estimate the sensitivity of a loop antenna? And how sensitive should a loop antenna be for state of the art performance in the MW band? The purpose of this note is to discuss these two questions.

Ideally, the best way to estimate the sensitivity of a loop antenna is to measure it. But that requires a shielded room and calibrated test equipment which are beyond the means of most hams. Fortunately, in his article "Loop Antennas for Kilometric Waves," Wireless Engineer, Feb. 1955, pages 41-44, J. S. Belrose derived some formulas which can be used to make quite accurate estimates of loop antenna sensitivity. He showed that the signal to noise ratio at a tuned loop is given by

\[
\frac{\text{Signal}}{\text{Noise}} = \frac{6.63 \times 10^3 \times M \times \rho \times \mu}{\sqrt{\frac{\Delta f}{f}}}
\]

where \(N\) is the number of turns of the loop, \(A\) is the area in square meters enclosed by one turn of the loop coil, \(\mu\) is the permeability of free space (4\(\pi\) x 10\(^{-7}\)), \(\rho\) is the resistivity of the loop, \(\Delta f\) is the bandwidth in Hz seen at the detector of the receiver, \(L\) is the length in meters of the wire forming the loop, and \(f\) is the frequency in MHz. For an air core loop, \(\mu\) = 1. In Belrose's article he pointed out that the noise which limits the sensitivity of a loop antenna is thermal noise due to the resistive component of the loop antenna's impedance. We will call this noise loop noise.

The noise floor of a loop antenna is defined as the voltage equal to a fixed field strength which produces a signal to noise ratio of 1. The noise floor of a loop antenna is the voltage equal to the loop noise floor. Solving the previous equation with \(\text{Signal}/\text{Noise} = 1\), we get the following:

\[
\text{Noise Floor} = \frac{6.63 \times 10^3 \times M \times \rho \times \mu}{\sqrt{\Delta f}}
\]

The variables in the above equation are dependent on each other to some extent, but for the sake of discussion let us assume that \(L = 15\) m (so that a 660 ft capacitor tunes the loop to 500 kHz), that \(\Delta f = 2\) kHz (which is about the minimum useable bandwidth), that \(f = 100\) MHz (not unreasonable for an extra loaded loop coil), and that \(M = 1\). For these assumptions we get the following:

\[
\text{Noise Floor} = 0.037 \times 10^{-6} \text{ Volts}
\]

With the assumptions above, a 2 foot square air core loop has 14 turns, a 1 foot square air core loop has 22 turns, an 8 inch square air core loop has 36 turns, and a Space Magnet rod (17" long by 9/16" diameter, \(M = 400\)) has 30 turns. The air core loops have \(M = 1\), while the Space Magnet rod has \(M = 150\). We can also convert to other bandwidths by multiplying by the square root of one half the bandwidth in MHz. Thus we get the following:

<table>
<thead>
<tr>
<th>Air Core And Ferrite Rod Loop Noise Floors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
</tr>
<tr>
<td>2 foot</td>
</tr>
<tr>
<td>1 foot</td>
</tr>
<tr>
<td>8 inch</td>
</tr>
<tr>
<td>Space Mag.</td>
</tr>
</tbody>
</table>

So what do these numbers mean? Can you hear anything on a 1 foot air core loop that you can't hear on a Space Magnet? Can you hear anything on a 2 foot air core loop that you can't hear on a 1 foot air core loop? It all depends on the kind of signal you want to hear and your minimum man-made and power line noise at your location. As I have said in previous articles, if you live in a large urban area, you don't have to worry about anything on a 1 or 2 foot air core loop antenna which you cannot hear equally well on a Space Magnet or similar ferrite rod loop antenna. Incidentally, I have wound coils on all kinds of ferrite rods, bundled, not overlapped, overlapped, close wound, spaced over the entire length of the rod, and names it ... I've tried them all. As long as you use at least 4 rods of \(M = 125\) bundled and overlapped, or at least 7 rods bundled and not overlapped, the noise floors are all virtually identical. Also, based on listening tests, the noise floor of a 6 inch loop is virtually identical with the noise floor of a Space Magnet, which agrees with the numbers in the table above since it is currently used for 10 ferrite cylinders of \(M = 125\) which are 1" long by 1/2" diameter. The noise floor of his ferrite rod loops is identical to the Space Magnet based on my listening tests (this is the Great Little Loop). So my following remarks about the Space Magnet apply to any well-designed ferrite rod loop and to the 6 inch air core loop.

As I have remarked in previous articles, I am fortunate to live in a small town where ambient man-made and power line noise occasionally fall to very low levels. On those occasions (and only on those occasions) I can hear a very definite difference between the Space Magnet and a 1 foot air core loop. On a few weak daytime signals the 1 foot air core loop (and of course the 2 foot air core loop) will produce clear audio when the Space Magnet produces no audio at all. The amps of my loops have been equalized so that the output signal levels of all of my loops are virtually the same. I concluded that this difference between the 1 foot air core loop and the Space Magnet is due to the lower noise floor of the 1 foot loop.

About once a year the daytime noise levels at my location (Ruston, LA) drop to super low levels. On these occasions I can often hear WOAI San Antonio on 1200 kHz fading in and out of the noise. When the WOAI was such a solidly modulated weak signal and the noise was below my background noise level, I thought I was in the clear above all background noise. Maybe I wanted to hear a difference, but it did seem like I could follow WOAI easily into the ambient noise with the 2 foot loop than with the 1 foot loop. And it did seem that WOAI was clearer on the 2 foot loop than on the 1 foot loop. However, there was no dramatic difference between the 1 foot and 2 foot loop like there is between the 1 foot and 2 foot loop and the Space Magnet.

When signal levels are much higher, such as when DXing domestic channels or foreign stations at night, there is no difference between what you can hear with the various loops. However, there are some situations where a 1 foot air core loop might produce clearer audio when a ferrite rod loop does not. Unfortunately, I am not in a position to compare loops for most of those situations. A few years ago I can recall a Raider game on 765 at local super station channel 11. I thought the signal was low and below the noise. I expected to hear clearer audio on the Space Magnet than the ferrite rod loop. I was surprised at the clarity of the audio when I tuned into the ferrite rod loop on that signal.

High-Performance One-Foot Air Core Loop ... by Dallas Landford

In my recent article "What's Wrong With Present Day Loop Antennas?" I observed as others before me have observed that a 4 foot air core loop is too large for most DXers, and agreed with Russell Edmunds and Ralph Cennello that a 2 foot air core is long enough that a 2 foot air core antenna can be a useful starting point for a high performance loop antenna. And in my companion article "High Dynamic Range One-Foot Air Core Loops" I presented two unsimplified and one simplified 2 foot air core loops. But a 2 foot air core loop is still quite large for most DXers. I was also motivated to develop a 1 foot air core loop and companion amplifier which are not much larger than the Space Magnet ferrite rod loop, but which have demonstrably better performance -- a lower noise floor (better sensitivity), and much better signal handling performance.

The main problem with developing a high performance 1 foot air core loop was the amp. The improved balanced differential amp (IBDA) in the first article above, while adequate for ferrite rod loops, had detectable odd order IMD products when used with a 1 foot air core loop. Tapped signals on the IBDA input on the 1 foot air core loop improved the IMD somewhat, but did not eliminate the spurious response completely. The USB and LSB improvement tests on the 1 foot loop was tried with the 1 foot loop, but the amp gain was slightly inadequate for the 1 foot loop. The solution was to add a second U-310 amp.

... End of Document
The dual U-310 amp in Fig. 1 below is identical to the amp for my 2 foot loop (in Fig. 5 of the second article above, to U. A different source bias circuit is required for Q2 to isolate the source of Q2 from 9 volts DC applied to the drain of Q1 through T3. The source bias resistor for Q1 is the combined resistance of R1 and R2. It is built into two parts because the combined circuit (R1 + R2 = W) amp gain is not uniform throughout the MV band; gain at higher frequencies is higher. It might seem that inverting resistance (R1) in the signal path would lower gain uniformly, but that did not happen; gain at lower frequencies is unchanged, while gain at higher frequencies is reduced. By trial and error R1 = R2 = 220 ohms was found to give nearly uniform gain while coming close to the Q3 source of 520 ohms. Output power was somewhat higher for the 2 foot air core loop with two taps, than with single taps were used.

![Figure 1](https://via.placeholder.com/150)

**Figure 1**

One Foot Air Core Loop

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**WREN bird comes down**

*By LINDA LAIRD*

**HISTORIC TOPEKA, Inc. gave it a second chance to live.**

The incident occurred on Wednesday evening, when Jeray Hopkins, a former mayor of Topeka, Kansas, and a great-grandson of the late Thomas Jefferson Topeka, was out for a walk near his home in south Topeka. While walking, he noticed a bird on the ground that appeared to be injured. He approached it and discovered that it was a WREN bird, commonly known as the "Wren." The bird was injured and appeared to be struggling to fly. Hopkins immediately called the Topeka Police Department to report the incident.

The police arrived on the scene and found the WREN bird on the ground. They assessed its injuries and determined that it was best to bring the bird to the local wildlife rehabilitation center for treatment. Hopkins took the bird to the center, where it received the necessary care and attention to recover fully.

"We are grateful to Hopkins for his quick thinking and prompt action," said Officer John Smith, a spokesperson for the Topeka Police Department. "It is fortunate that Hopkins was able to locate the bird and bring it to the wildlife center in time for treatment."

The Topeka Police Department encourages all residents to be vigilant and report any incidents involving wildlife or injured animals. They remind the community to always call the proper authorities to handle such situations to ensure the well-being of the animals involved.

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**Musing of the Moment**

*Dave Schmidt, P.O. Box 11502, Wilmington, DE 19850-1502*

"Thoughts from NRC members... the opinions expressed in this column are those of the individual writer and do not necessarily reflect those of the editors, publishers, or the National Radio Club, Inc."

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**JERRY STRIP – WQRT RADIO – 4140 SIMON ROAD – YOUNGSTOWN, OH 44511**

Greetings. What a strange experience! While walking around the exhibit hall at the Dayton Hamvention, who should I literally run into but Mike Knit-talor himself? "Hello, there! How are things in the NABC?" was the first line of questioning. He had some questions about the new station he had built with NRC hams Dick Trask & Al Merriman. I was truly surprised to see non-ham Mike there. He had heard the call of the NRICers to actually meet Buffalo K. Foon-man and the rest of the NABC. "Wow, you're a real ham - I'm not even that good." I told him that I was nice to meet him as well. He asked me about the Radio Meric that covers the problems faced by many smaller AM stations. WMEC was WRIK simulcast with their FM and in management’s view the AM revenue was less than the fixed utility & insurance costs to keep it on so they took the AM off the air, loaded the transmitter into a truck & off it went! In view of the present state of AM’s general health, I have to wonder who will be the people lining up to get a license for the stations in the 1600-2000 kHz expanded broadcast band? The FCC claims to have had a large number of inquiries about the availability of these frequencies. It should be real interesting to see just what happens. See you at the convention! 73 & Good DX

---

**MARK CONNOOILY – 30 WILLIAM ROAD – BILLERICA, MA 01821-6375**

WNE 760 (Leicester, MA) is on with a religious signal. It seems to be on daytime-only, if operating at night, it must be low power, as the usual WHD/ Columbus/Venezuela/Cuba mix shows here after dark. WNE’s day strength is compared with the 15 kHz WBYE/WBYC and runs a comparable signal. Recent daytime drives along the coast north of Boston (Cape Ann) reveals a CFD 780 Dartmouth, NS to us. Its groundwave strength near the water is fair/good, and the CFDR 780 Ultrawave Digipeater (0.5 miles inland) and WBMR/WMBR/ Venezuala/other stations at night. It runs a CHR/Top 40 format with some 80’s era hits mixed in. Like CHTM 770, CFDR is a good daytime “antenna testing” station to a good, but very close-in area. It is a good antenna check for the stations in the eastern MA/RI & probably coastal ME, NH, CT, NY, NJ, DE. Wasn’t Yarmouth, NS (CGLS-1340) supposed to go to 780? By the way, the addition of the Portsmouth, NH stations to the line-up has moved the station to a more seaworthy antenna, even more so. I used to enjoy listening to CLJS groundwave when it is Gloucester/ Rockport, MA, getting behind the ‘right rock’ usually killed competitive WBMR. Not through the right rock, the signal is more reliable. Station is a good monitoring tool. The stations are not the only one in this area. Some 1450 guys is somewhat off channel causing a growl, similar situations exist on groundwaves of 1340 and 1560. I would think that with a 2 channel receiver, counters being accessible at hobbyist prices (under $500), off frequency problems would be a thing of the past. Another local note: TIS stations at the Tijohoro, MA/Nashua, NH border have been heard on 530 & 610 kHz. Range of these is a great car radio. This is a couple of miles at best but with a serious DX receiver/antenna combo, they can be heard in for a least 30 miles with no problem. Skip bury through the KOKM spectral map with PDB-800 & SE Whinnam-825?? I haven’t heard them lately. They used to be ‘peers’! Are we dealing with power changes/antenna changes/increased ORM/rotten conditions? I’d like to know. With KOKM/Tom/Jack/Thomas/other closer to the station, counters being accessible at hobbyist prices (under $500), off frequency problems would be a thing of the past. Report that vacation trip DX! Hope all have a great summer!

---

**MICHAEL HAPK (KB8GY/E/T) – 10212 S STREET – OMAHA, NE 68127-2130**

Hard to believe that at one point I haven’t DX ed in over a month! That excludes some QSO listening done in Evergreen, CO in late June. Some changes in the SDR market have occurred. I reported on a new unit from Fenmore Electronics, 1000 MHz software defined radio running along some trees along with the ATS-803. I did a lot of QY listening with KN2Z-1320, KWO-1400, KGOS-1450, KADA-1300 being the best catches. I also had the opportunity to listen to the KHQA-1400 as well. The DX was done in Omaha with WBOG-1570 the only new one heard. FM/TV/SW & ham radio is filling a lot of my day here now that it is summer and WX DX is slow. My log stands at 1371 with call changes, 1326 without, last year was my best year for DX. I hope everyone had a fun as I did! 73’s.

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**The Answer Man**

Got a question about radio? Send it to NRC’s Answer Man: Russell Edmunds - 753 Valley Road, Blue Ridge, GA 30513

Note: Question is a dumb question, and Russell will answer all, from basic to highly technical. Watch for the answer in DX News!"
"Hot Rodding" the Realistic 12-625 ... by Ray Cole

I have a Realistic TRF 12-655 and a 12-625. Reports of other 12-625 owners indicate poor results with some of them. In fact, I began experimenting and found a simple way, without a signal generator, to peak my 12-625 which now has it closely tracking my 12-655 in side by side tests on very weak signals across this area. The 12-625 has slightly more selectivity adjacent to local signals (to be expected with its RF stage).

Then, in addition, I found a simple way to externally couple my #8 vertical antenna to it and about triple its receiving power.

Set the AM-FM switch to AM and the tone control to high. Pull off the three front knobs. Completely "wound" the five phillips screws in back (one in the battery compartment). They may or may not fall out of their counterparts holes. Replace the batteries. Pull off the front panel.

You will notice 8 IF transformers. Four of these have larger diameter trimmer screws. The other four have smaller case. The latter are toward the right, with a plastic handle, and are only on those with the small screws - and none should need more than a quarter turn.

But the big secret to this process is to first locate a station signal as near to the midrange frequency (450 kHz) as you can find one that is not too local. Then constantly "fan" the dial across this signal with one hand while with the other you slightly and slowly turn in both directions, the screwdriver to the right of the tuning capacitor.

The object is to locate the IF setting that will give the loudest signal regardless of where the dial is. It may move as much as one-eighth inch to where you find it best. And it may increase in volume by two or three times at that point.

You will now have moved all your station settings somewhat, across your entire dial, but since it was totally inaccurate to begin with, you haven't lost a thing - You've actually moved all across the band.

I expect the subject will soon turn to IF settings, and I expect that a few of the "back" IF settings will be the right one. The object is to find one that will work best and give you the best performance. If you find one that you like, you can make some notes or make the settings permanent. You will find that the settings will stay in place. I have run on long enough, so 73's...
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