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19 Most important: You!

CPC Calendar ...

<table>
<thead>
<tr>
<th>Date</th>
<th>Station</th>
<th>From/To (EST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 11</td>
<td>WCOP-1350</td>
<td>4:30/5:00 AM</td>
</tr>
<tr>
<td>Nov. 12</td>
<td>WSYB-1380</td>
<td>5:30/6:00 AM</td>
</tr>
<tr>
<td>Nov. 12</td>
<td>WARU-1600</td>
<td>2:00/2:30 AM</td>
</tr>
<tr>
<td>Nov. 16</td>
<td>KRON-1490</td>
<td>7:45/8:00 AM</td>
</tr>
<tr>
<td>Nov. 25</td>
<td>KSTL-690</td>
<td>1:01/2 AM</td>
</tr>
<tr>
<td>Dec. 1</td>
<td>KLFR-1300</td>
<td>2:10/2:30 AM</td>
</tr>
<tr>
<td>Dec. 10</td>
<td>KUMA-1280</td>
<td>3:00/3:30 AM</td>
</tr>
<tr>
<td>Dec. 16</td>
<td>KTLJ-1590</td>
<td>7:45/8:00 AM</td>
</tr>
<tr>
<td>Dec. 17</td>
<td>KVMB-1330</td>
<td>3:00/3:30 AM</td>
</tr>
</tbody>
</table>

As you can see the tests are still rolling in. We are still in need of targets and contributions to continue sending letters for January through March. Send them to Jeff Tyma, 10359 Severance Dr, Parker CO 80134.

WCOP-1350, P.O. BOX 2127, Warner Robins, GA 31088-2127, will conduct a special DX TEST on Sunday Morning November 11, 1990 from 0430 to 0500. Test details to follow. Our thanks to the General Manager of WCOP for this test. Arranged by the Colorado CPC Machine for the National Radio Club.

WSKB-1380, P.O. BOX 249, Rutland VT 05701, will conduct a special DX TEST on November 11, 1990 from 0530 to 0600 EST. This test will consist of normal AdCom music program with interspersed voice and Morse code ID's. Our thanks to Mr. Tom Elmore for this test. Arranged by the Colorado CPC Machine for the National Radio Club.

WARU-1600, P.O. BOX A, Peru, IN 46970, will conduct a DX TEST on November 12, 1990 from 0200 to 0230 EST. This test will consist of Voice ID's, Code ID's and March music. We would like to thank Chief Engineer Mr. James L. Swearingen for this test. Arranged by the Colorado CPC Machine for the National Radio Club.

KRKY-1600, 7075 W. Hampden Ave, Denver, CO 80227, will conduct a SPECIAL DX TEST on November 12, 1990 from 0230-0300 EST using 5000 non-directional. The test will consist of both Morse Code and Voice ID's. KRKY will be silent for the preceding 1/2 hour and will be conducting routine maintenance. Our thanks to Gird M. Westerberg, Chief Engineer, arranged by the Colorado CPC Machine for the National Radio Club.

KORN-1490, 319 North Main, Mitchell SD 57301 will conduct a Special DX TEST on Friday Morning November 16th from 0500 to 0630 EST. Test details will follow. Our thanks to Mr. Joseph R. Shields for this test. Arranged by the Colorado CPC Machine for the National Radio Club.

KSTL-690, 814 N. Third St, St. Louis, MO 63102 will conduct a special DX TEST on Sunday Morning November 25, 1990 beginning at 0101 ELT. Test will be conducted with KSTL's Proof of Performance testing and will contain tones, possibly music and station ID's. Our thanks to Mr. Chris Davis, Sales Manager for this fine opportunity. Arranged by the Colorado CPC Machine for the National Radio Club.

KLFR-1300, P.O. BOX 249, Rutland VT 05701, will conduct a special DX TEST on Saturday Morning December 1, 1990 beginning at 0645 to 0700 EST. The test will contain tones voice and Morse code ID's. Our thanks to Mr. Jeff Jones, Station Manager. Arranged by Colorado CPC Machine for the National Radio Club.

KATL-770, BOX 770, Miles City, MT 59301, will conduct a special DX TEST on Sunday Morning December 2, 1990 from 0700 to 0730 ELT. This test is arranged by the Colorado CPC Machine for the National Radio Club.

DX Time Machine

From the Pages of DX News

50 years ago... from the Nov. 9, 1940 DXN: CX-6-650 Uruguay and CP-3-1390 Bolivia were scheduled for testing for the NRC.

25 years ago... from the Nov. 13, 1965 DXN: Eight domestic stations were scheduled for testing by the NRC; other clubs accounted for six more tests.

10 years ago... from the Nov. 10, 1980 DXN: Gene Martin, Denver, heard far-eastern Europeans during late September and early October, including Bulgaria-747 and Turkey-657... Skip Arey's "Pseudo-Diversity" Reception article was sub-titled: "Let Your Brain Do the Work."
test will be their regularly scheduled programming (beloved to be Adult Contemporary) but, KATL will switch to Day power and antenna and give test announcements during this time period. We'd like to thank General Manager Mr. Donald L. Richard for this test. Arranged by the Colorado CCC Machine for the National Radio Club.

KOJM-610, P.O. BOX 7000, Havre, MT 59501 will present a special DX test Monday Morning December 3, 1990 between 0300 and 0330 EST. This test will contain Morse Code ID's and other programming. Our thanks to Bob Yaw Chief Engineer for conducting this test. Arranged by the Colorado CCC Machine for the National Radio Club.

KUMA-1200, P.O. BOX 340, Pendleton OR 97801 will conduct a special DX Test on Sunday morning December 10, 1990 beginning at 0300 EST. This test will consist of a Special Public Service announcement for the National Radio Club. There will be Morse Code ID's contained in the announcement. This will air two of more times between 0300 and 0330, KUMA will be broadcasting NRC TalkNet at this time. Our thanks to Mr. Greg A. Smith General Manager. Arranged by the Colorado CCC Machine for the National Radio Club.

KTIL-1800, P.O. BOX 440, Tillamook, OP 97141 will conduct a special DX TEST on Sunday Morning December 16, 1990 from 0300 to 0330 EST. Test will consist of Music and ID's. Our thanks to Van Mac President for this test. Arranged by the Colorado CCC Machine.

KRMJ-1330, S. Est Eyre St., Spokane, WA 99203 will conduct a special DX TEST on Monday Morning December 17, 1990 from 0300 to 0330 EST. Test will contain music, voice and Morse code ID's. Our thanks to Gordon Canada of the Washington Contest Club for this fine opportunity. (This year's Frequency, 0300 and 0330 and will be sent out. Remember to listen to KRMJ. Arranged by the Colorado CCC Machine for the National Radio Club.

From the editor ... A great big thank you to host Rich Dan for his Iowa City get-together, which brought 13 users out, mostly from Iowa and Illinois.

From the GM ... Don't forget to get those FM station updates in to make December 1. Include format, network, a telephone number, and also antenna height, address, vertical and horizontal powers, frequency, location, etc.

---

**AM Switch**

Jerry Starr
c/o WHOT Radio
4404 Simon Road
Youngstown, OH 44512-1320

**CALL LETTER CHANGES**

910 WCKN SC Dorchester WYMO
990 KFGM TX Wichita Falls KKKK
1060 KTLG TX Gilmer KHYM
1340 KMMD LA Shreveport KITY
1570 WHOG FL Fernandina Beach WQAI

**APPLICATIONS FOR NEW STATIONS**

None

**GRANT FOR NEW STATION**

1440 KY Paris: 1000 DI (replaces the facilities of WRLF which had its license revoked following an extended period of silence)

**APPLICATIONS FROM EXISTING FACILITIES**

1470 WQSN MI Kalamazoo: day power to 900 watts

**GRANTS TO EXISTING FACILITIES**

None

**OTHERNESS**

740 CHCM NF Maryestown: station is here, ex-560 kHz
1060 KFIT TX Lockhart: silent station is back ON THE AIR
1260 WCSS MS Ripley: silent station has new owners, should return
1490 WOLF NY Syracuse: silent station is back ON THE AIR, relaying

WNR-FM Waterloo, NY

73 and Good DX, Jerry & BF Jerry Starr & Buffalo R. Foeman

---

**IN THE BEGINNING**

BY JOHN D. BOWKER

This is the complete list of U. S. broadcast stations on the indicated frequency as published by the Federal Radio Commission in 1934. "S" means shared; "SH" means specified hours; "J" indicates transmitter location; "D" means daytime operation only; "U" means unlimited time.

<table>
<thead>
<tr>
<th>Frequency (kHz)</th>
<th>Call letters</th>
<th>Main studio and transmitter location</th>
<th>Power</th>
<th>Time designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>770, clear</td>
<td>WBBM</td>
<td>Chicago, Ill., T--Glenview</td>
<td>25 kW</td>
<td>U except S.H. night when synchronized with KFAB exp.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>U-D, S.H. night synchronized with WBBM, exp.</td>
</tr>
<tr>
<td></td>
<td>KFAB</td>
<td>Lincoln, Nebr.</td>
<td>5 kW</td>
<td></td>
</tr>
</tbody>
</table>

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**NRC Coffee Mug**

Nine-ounce size ... white glass ... with NRC emblem printed in black on both sides. It's oven-proof and microwaveable. Makes a great gift for a fellow DX'er or for yourself. $6 to U. S. addresses $6.75 Canadian. Order from the Pub Center.
MEDIUM WAVE rA Mathings

* This column is being prepared two days early due to a death in the family and associated travel out of town. Hopefully, next week we'll be back to the regular schedule.

Altn. Charles Rehl! Jerry Starr sex that WCTF 1090 Vernon, CT (your odd nighttime logging of 109, Issue 4) that these guys are a satellite-controlled operation out of San Francisco which are merely robust and for the most part no local operators. The big thing is they DO NOT have nighttime authority, nor have they applied for same. Guess you caught them with their splinters down!

Rich Frehe asks Whatabak is a Kowal Log? Are any of those air-core loops available on the market? Although I've seen Kowalski's mezzanine loan times in DDRX-E & -W, I don't have any personal knowledge of them. Or are air-core loops available. Help, anyone!

Issues 1, 2 and 3 saw 27 GM's readers logged and to be checked for possible record distances. Two did, in fact, make it on to the WT Hall of Fame! Plus, Gils Alsman's cats from the real north, Arkibob, Sweden. All but two of those are new record holders. See below for details.

**SPECIAL**

**KDIA (12/1)**

770 KPBC TX GARLAND - 10/13 1959 with REL mt in WARC fade - promo ending with

-JOBD weekly reporting at 6:15 on 10/11 801 pm on the new 10? 770 KPBC had some power cut before legal ID. Log shows this as KGGR (CR-ON) [I don't get them well down here FL & DUNIH, but have heard] Pionne Power 770 as a chopper and KBP as a jingle; maybe Jerry or one of the DEFM members can fill us in on this. By the way, they give (214) 446-0770 as a phone number, what's in the Log - Ed.

900 KXIC IA IOWA CITY - has dropped The Oldies Channel in favor of simulcasting TV's

CNN Headline News during the day and running Taffa at night; what a waste of airspace (RD-IA)

940 KQOA IA DES MOINES - 10/11 1233 with OLY by Creative, Stills & Rush and The

Doors sandwiched around this new ID: The All New 93.3 FM and 94.9 AM, KQOA! the first instance I can think of where FM decides to simulcast an AM at night. (RD-IA)

1450 WPNS PA ERIE - recent OSL states stat on 24 hours as in Log, but is 0600-0100 M-F, 0700-0100 Sat, and 0900-0100 Sun; also is affiliated with American Radio Network and carries Monday Night FB (DT-ON)

1500 KDFN MO DONIPHAN - per 10/12 0700 sign-on, power is D2 2500, CH 1400 ( differs from Log) (REH-ON)

**UNIDS AND UNID HELP**

**610 UNID ?? - 10/10 0635 off frequency SS station playing a variety of LA mt, hopped a shade west of due south; heavy WTVN splash made for tough copy; still there 10/18 with sign-on at 0600 (0700 on Sunday 10/14) (REH-ON)

940 WMIX IL MOUNT VERNON - this is Mike Hawk's unmID with Cardinal BB, they are a regular here at night under KIOA, Hello, John Callahan (RD-IA)

1230 KSSC MO JOPLIN - this is most likely Mike Hawk's unmID with Cardinal BB, they carry them and are one of my most frequent NY visitors (RD-IA)

1500 UNID ?? - 10/13 2040 under WFBQ with BRED/NOS program called Saturday Night Dance Party; last at 2100 with either sign-off or power cut (REH-ON)

**DX AND EQUIPMENT TESTS**

940 WPAW WI FT ATKINSON - 10/14 0500-0600 very weak voice, unreadable, scratches of code and mt, some static on carrier until 0544, talk assumed to be WWJ (very weak); CBM sign-on at 0600 (DT-ON)

1500 WLUX LA BATON ROUGE - 10/11 no sign of them; CBE very strong and they sign on at 0500 (DT-ON)

**MIDNIGHT TO 0800 HOURS ELT**

710 WOR NY NEW YORK - 09/05 crystal clear with the Morning Business Journal, wish I could get it this well at home (RD-Tern Creek, KY at David Reit's place)

860 WOUL FL DUNDEE - 10/14 0704 ending wx and ws - TLL pgm with disclaimer - The notes expressed by this program's jocks are not necessarily those of WOUL's, under a partially null CBJC, FL #170 (REH-ON)

1170 KVOD OK TULSA - 10/09 0150 good with KVOD Color Radar Weather Forecast, near by KSTT must have been off, as they should have been filling this channel (RD-IA)

1320 WBRT KY BARDSTOWN - 10/13 0600 fair with OSL (RD-Tern Creek, KY)

1390 WCSE SC CHARLESTON - 10/09 0400 fair with Neil Seltzer on the bird - KOOL GOLD (1980), WCSE ID; SC #1 at this QTH (RD-IA)

1490 WSSS NJ ATLANTIC CITY - 10/18 0104-0229 with Larry King, MBS News, WSSS News, by female; poor, but dominating 1400 QRM from unbkw IDs (DT-ON)

1540 WPTP NY ALBANY - 10/13 0004 good with message from Council on Alcohol Abuse, ID This is AM 1540 - WPTP, unbID under them, probably KXEL, local CHIN off (MS-ON)

1570 CRLN MO PONTRIAL - 10/18 0210-0218 WOR in FF, male & female FF amens; mid-point, station QRM from CPFR (DT-ON)

1580 WKID IL AURORA - 10/12 0123 Pure Gold 1580, WKID ID, heard thru CBJ during pause in CBJ's talk; talk about luck! [and skill - hi - Ed.] new, NF (RF-OH)

WYKO OH COLUMBUS - 10/13 0650-0700 with rap ID at 0700 WYKO South Columbus soul mt, poor under unbID (DT-ON)

0800 TO 1600 HOURS ELT

740 KCBS CA SAN FRANCISCO - 10/18 0823-0829 best-ever signal heard from this all-news station; Truthful and weather together, every 10 minutes heat on KCBS News Radio 74, 1st report near (WCM-SD)

880 KIGHT AR SHERIDAN - 10/22 0815-0825 format easy to keycode for KRVN ag news, detailed wx, country mt mailing address: 1545 Geyer Springs Rd., Little Rock, AR 72209 (WCM-SD)

1460 WLQG GA BUFORD - 10/17 0330 popped out of the mist just long enough for ID by male and then = 1400 News by female (REH-ON)

KGGO IA DES MOINES - 10/13 1100 good in KMRY splatter with 95 KGGO ID - song by Shouting Star (att: Todd Hunschip) (RD-IA)

WBAT Radio

1600 TO 2400 HOURS ELT

560 WIND IL CHICAGO - 10/10 2256 fair with SS talk - SB ball by male vocalist, call ID sung in BE at 2300 (MS-ON)

800 CKLW WI WINDSOR - 10/13 1731 good with traffic 7 by Jay Anderson from local AAA; a great afternoon catch at this distance (RD-on 1-74 near Crawfordville, IN)

930 KOA CO DENVER - 10/18 2350 very good with ID on the Denver Broncos Network (RD-on 1-74 near Bloomington, IL)

790 WBMK IL METROPOLIS - 10/25 1930 fair with Lionel Cartwright's My Heart Is Set On You (RD-on 1-74 near Bloomington, IL)

WOKY WI MILWAUKEE - 10/15 1905 good with stock market report, ws, 51° at your official station average, AM 920 WOKY, with CLS mtg (MS-ON)

950 KLIK MO JEFFERSON CITY - 10/19 1937 good with promo for KLIK Party Line - wx & ID (RD-IA)

WSAP SC SPARTANBURG - 10/17 1215 UNL'T with ID - Elton John's Manda Can't Buy You Love (RD-on US 25 near the NC-SC border)

790 WING KY LOUISVILLE - 10/15 2111 fair with AM wx and Wave 970 ID (RD-IA)

980 WTRY NY TROY - 10/13 1855 good with ads for Motel 6, Armory Garage - Used Car Dept, and Flower Shop, WTRY Weather Watch (MS-ON)

1040 WHO IA DES MOINES - 10/16 2300 good with replay of Iowa Michigan State FB game (RD-in Great Smoky Mountains Nat'l Park near Maryville, TN)

1090 Wooke PA SUNBURY - 10/21 1740 good stop, in CHOK null with promo for WOKK Roundup pgm, ID 1741 - soft rock mm; new (RF-OH)

1120 WNNM GA GARDEN - 10/17 1658 with BRN disclaimer followed by Bill Cosby PSA on voting - off after from 10:16 rerouting WNNM Garden - Wmwn. We're business news for Maxon on AM 1210, no SS; weak but not a peep out of KNOX; ex-WYKO (REH-ON)

CJTF PQ TROIS RIVIÈRES - 10/12 1927 fair with FF talk, program vacate, ads, CJTF at 1900 (MS-ON)
I guess the USPS finally caught up with me and Paul to the disk swap. Our first really crushed out disk was returned to me by the Thursday before Paul's deadline. Oh well, hopefully we can go to a modern solution. Right? Paul? (Yep! -psh)

Midnight to Monday!

940 WPAF Fort Atkinson
10/14 0500-0600 Not hrd. Only Regular KFRE w/ CW and semi regular KDFE w/ CWX. (Thanks for the kind words re: CFC-ed). (RQ-AR)
1450 WILX 1050, Lafayette Rouge
10/13 0347-0556 Hrd some TT's, 1x KDFE was off but returned an hour after the test. (Tim, I got a note for similar report so probably was true) (ED)
540 KIJO CA Costa Mesa
10/12 0247 Good w/ FCLX (MC: CW feed) / FM. JD on hour was FM only. JD an hour minutes later over mc: "This is KIJO, 5-40, AM, Costa Mesa." This marks the end of a good jazz format. (EX-KIJO) (TH-CA)
650 KMJT UT Salt Lake Cnty Mx & MX "The all-new 5-60 AM" A new PIST. (ex-KIJO) (TH-CA)
550 KMUH HI Waikiki
10/23 0920 Good w/ AdCon on KCRW/Roy. Good low band sound for KCRW from Hawaii. (TH-CA)
570 KGON HI Laie
10/23 0917 AdCon Mx, possible slogans "This is KGON, News and Weather." (TH-CA)
600 KLKO HI Honolulu
10/8 0340 Noted off this AM, strange slop no new DX (TH-CA)
650 WSM TN Nashville
10/25 0507 Poor w/ CISL nulled. 1x Wx & ID. First time hrd at this QTH. Nt hrd since 1986. (JW-OR)
670 KPUA HI Honolulu
10/23 0818-0912 Good w/ KOBI nulled. Old PAP w/ KQ Roo from 1965-1985 "76 KFRA" and "AM Stereo KFRA". Slogans. Legal ID & CBSX on the hour. Added Conditions to KFMX n/h at 0853. (TH-CA)
690 KHEY TX El Paso
10/23 0625-0715 Fair to good, VY loud at El Paso but fair to good. FMX n/n w/ "2 other X's". (TH-CA)
720 KUAI HI Wailea, Kauai
10/15 0416-0503 Fair to good. "Hawaii's Leading ID & info service". (TH-CA)
750 KXLL TX Fort Worth
10/22 0411-0508 Fair Good/ g o KAMA/COAL TALKNET legal ID, CBSX, ID n/n man, Simulcast CBS TV "Nightwatch" Finally enough for a report. (TH-CA)
760 KGU HI Honolulu
10/22 0704 Fair w/ KFMB running OX w/ CBSX & TALKNET. KFMB ran some TT about 0600 and was off without s/on on 0758. (TH-CA)
765 KSJL TX San Antonio
10/23 0217 Fair w/ KFMB on OX w/ Z-Rock feed and ID's & slogans. (TH-CA)
770 KDAB WA Seattle
10/22 0359-0558 Poor w/ KFMB on OX, CBSX //
When you go listen to the Natural Radio, you'll see what a different world of listening there is. It's a world of music, of voices, of sounds, of places. It's a world where you can hear things you never thought you could hear.

The Natural Radio is a network of radio stations that broadcast the sounds of the natural world. The stations are located in different places around the world, and each one captures the sounds of its own unique environment. Whether it's the ocean waves of a beach, the rustling of the leaves in a forest, or the chirping of birds in a park, the Natural Radio brings these sounds to your ears.

The stations are not just about music, though. They also broadcast natural sounds, such as the sound of a waterfall, the scrape of a leaf against the ground, or the crackle of a campfire. These sounds can be just as soothing as music, and they can help you relax and unwind.

The Natural Radio is a great way to escape from the stresses of daily life. Whether you're at home, in the car, or on the go, you can always find a Natural Radio station to tune into. So next time you're feeling stressed out, take a few minutes to tune in to the Natural Radio and let the soothing sounds of the natural world wash over you.
NRC Stationery
Now only $5.00 for 100 sheets...
including the NRC logo and header in black ink.
Order today from the Pub Center.

During any given winter, there's a scene similar to this going down in some MW DXer's home, somewhere in North America.

A mid-December Saturday, early afternoon. Thanksgiving is over and an Alaskan memory and Christmas looms unpropitiously upon the horizon. Outside, the weather is so cold/rainy/snowy (circle one) that you can't find a full regalia of Arctic Survival Gear (4 requirements): simply make the short trip to the next door and step inside, the only offering there consists of onions on $500 another boring afternoon of meaningless college Bowl Games and/or a wife never lets you forget that last week you promised you'd Pruitt knife the keetchup off the bathroom ceiling.

You sit in your easy-chair, one eye half-open, glancing occasionally at the Pipo-Benz-Pepper Hellen Bowl (each team featuring at least six players who are shoe-shots for the Heisman Trophy), the other eye glazed out the window at the continuously-falling precipitation. Mechanically, your left hand lurches for the seventh mug of Hot Buttered Rum of the day, while your right hand doesn't care whether to part the little lady on the rump, or to grab the remote and watch something a little more exciting - like C-Span, for example.

"Too bad that it isn't snowing down", you muttered, as your fingers settle for the remote. "At least then I'd be able to sit down at the rig and do a little MW DXing on an afternoon, and no DX could be heard this early in the day, especially here on the west coast...

At this point, the right hand should still be there, put a two-hour remote back on the coffee table and do a re-think. Perhaps one of the lore of the land knows of the nearest MW DX machine would be surprised more satisfying as either the rump or the remote. Who says there isn't any good DXing to be had on the west coast before sundown? As a 20-year veteran of MW DX, I honestly state that some of the most satisfying catches of my DXing career occurred during the pre-sunset hours here in the Willamette Valley of Western Oregon.

There are many things that one can do to enhance one's chances of hearing exciting DX at a time that is supposedly bereft of DX, the most notable of which are: (1) Becoming familiar with pre-sunset propagation characteristics and (2) learning how to Target possible DX catches. For, despite the commonly-held (and often club-perpetuated) beliefs, sunset DXing from the west coast can be quite productive in providing a catch of MW stations to the east of your location before the sunset power-down or sign-off... as much as one and one-quarter hours before local sunset. One only needs to implement a well-informed, systematic approach.

New This Week!

At my location, approximately 70 miles south of the 46th Parallel (far away from the Equator and the nearest MW DXer to the east) in the Pacific Ocean, I've been fortunate enough to hear some exciting DX catches that came about only because

I chose to attempt to refute the idea that sunrise was not necessarily "the best time" that reception conditions to the east were enhanced. But perhaps DXP's fortune is not the correct word to use here...

All DXing copy word was organized for "prepared..."

The idea of long-range DXing "against the grain" requires some effort it is to be profitable. Due to my preparedness (copied with a basic understanding of sunset propagation characteristics). KFL, on 5000 watts, was heard only on 380 (daytime operation only) 750 miles to the southeast, was positively ID'd on a November afternoon in 1984 at 04:00 pm... 

A half-hour ahead of my local sunset, KFAM, a 20,000-watt station in Salt Lake City, Utah (1000 watts nighttime operation), 450 miles to the east, was positively ID'd on a November afternoon in 1985 at 4:30 pm... a full-hour ahead of my local sunset. KGW, 5000-watt station in Belgrade, Montana on 640 (1000 watts nighttime operation) 425 miles to the east, was positively ID'd on a November afternoon in 1984 at 4:28 pm... 45 minutes ahead of my local sunset, and KATQ (which was at the time) a 5000-watt station in Plentywood, Montana (daytime operation only) 615 miles to the east, was positively ID'd on a November afternoon in 1984 at 3:30 pm... a full one hour, 15 minutes ahead of my local sunset.

Not one of the stations listed above was simply stumbled upon chance. Each was a methodically thought-out Going Against The Grain target. Being that there are many knobs of the dial, the nearest MW DX machine would be perceived more satisfying as either the rump or the remote. Who says there isn't any good DXing to be had on the west coast before sundown? As a 20-year veteran of MW DXing, I honestly state that some of the most satisfying catches of my DXing career occurred during the pre-sunset hours here in the Willamette Valley of Western Oregon.

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You Heard It Somewhere Else First...

In the IARU New Member Packet, there is an article entitled "Times To Listen For CB DX". In part, the author of this article states, "Many daytime-only stations can be logged in the hour or two preceding sunset... The sunset skip period is particularly useful to DXers in the eastern part of North America, because stations in the states farther west become audible after local daytimers have signed off. Western DXers have an advantage in being able to pick up many eastern signs-on in the morning. This would seem to immediately put off a new member (or other listeners) the reliable DXing to the east from the west coast, as it did me when I was a new.."
member to the club and still a little naive as to what was possible to be heard.

As my professional life and home life progressed over the years, parallel to my DX'ing career, I found that sunset on the weekends was virtually the only time I could squeeze in some DX'ing. And I found that some amazing things could be heard during the hour or so preceding sunset. My envy of the easterner's "advantage" at sunset DX gave me the motivation to actively investigate the phenomenon of sunset DX.

In a capitated form, here are the basics of sunset DX.

The Federal Communications Commission has assigned "official" sunset times for daytime-only stations and stations which must reduce their power at night. This "official" sunset time is whenever the time the sun actually occurs on the 15th day of each month, rounded off to the nearest 15 minutes. Because sunset times change as much as to one minutes a day, this "average" is responsible for the fact that the "last half of the month in the fall and the first half of the month in the spring" stations that are assigned sign-off or power-down times at sunset routinely operate on daytime power for as much as 15 minutes past when sunset actually occurs. In other words, daytime-only stations are on the air for 15 minutes "at night", and stations which must reduce to nighttime powers after dark are still operating with full daytime power for as much as 15 "nighttime" minutes - the 15 minutes that occur directly before/after "actual" sundown. Thus, for any given month across the county can be mapped out, showing the 15 minute increments within which stations must sign-off (daytime operation only stations) or power-down (reduced power at night stations). A sample Sunset Map for the month of October follows:

Sunset maps for every month of the year are available from the National Radio Club. They are an absolute essential set and/or for any DX'ing enthusiast; there is absolutely no way that anyone serious about a systematic approach to sunset DXing can make do without this basic reference.

We've Been Down This Road Once Or Twice Before.

For the sake of brevity on an already much-covered subject, only a very basic and much-simplified version of medium-wave propagation will be presented here. Those requiring a more detailed version of these processes might refer to the list of references at the end of this article. The articles listed will be the best bet for answering unanswered questions inadvertently raised here. Other good bets include any decent-sized library that includes references on radio wave propagation.

During the daytime, the D and E layers in the Ionosphere are responsible for returning/absorbing skywave signals emitted from earth. Because most of the energy from any emitted Medium Wave signal is absorbed by these layers during the daytime and thus not returned to earth for reception at great distances, most daytime DXQ loggings of the Groundwave variety, typically resulting in receptions of stations located a couple hundred miles away or less. At night however, these layers either do not absorb their signal-absorbing qualities disappear with them, or they metamorphose into signal reflecting/refracting layers, thereby allowing medium wave signals to travel and be received over much greater distances.

Ground waves, however, are not reflected/refracted off the ionosphere but rather travel along the ground, following the curvature of the earth. Because the earth is less than a perfect conductor, the amount of signal conducted is directly proportionate to the conductive properties of the soil over which it travels - and conductivity values vary from area to area. Certain soils conduct radio waves more efficiently than others. Water is the most nearly perfect radio wave conductor, which accounts for the fact that coastal areas receive signals of better quality than those over inland areas. (In the two cases, the ionospheric reflection qualities are not as well as in inland areas.)

Rocky soils are the least conductive. Water-saturated (heavy rain) or water-covered (heavy snow) areas typically experience enhanced groundwave reception due to the fact that the water content of the soil helps to increase the level of conductivity of the surrounding ground. If the path between the receiving site and the transmitting site has seen a particularly precipitation-laden winter, reception quality will be higher at the receiving end than it was the previous year. Areas which have been "perpetually soaked" Oregon, I can personally vouch for the conductivity-increasing qualities of rain and snow.

Going Against The Grain—And Why It Works.

It is easy to see why sunset can easily be tuned as a prime DX time for east coast DXers: When the sun sets in an easterner's 15 minute "slice" of the country, their local stations will either sign-off or switch to reduced nighttime power for nighttime patterns, thus freezing up some frequencies for daytime station reception. So, for 15 minutes at least, stations 15 minutes away from a DX'ers receiving site will still be operating in daytime mode and will become potential targets because of the lack of activity in nighttime, and 15 minutes away (where the operation stations are located), it is nearly nighttime. After those stations sign-off or switch to nighttime facilities, another 15-minute "slice" will open up, and so on, across the continent. In contrast, for west coasters, the sunset scenario goes like this: During the period immediately preceding local sunset, the Ionosphere to the east becomes nightime-like in nature, while the Ionosphere directly beyond that is already fully-delved in darkness and displays full nighttime-like qualities. Skywaves traveling from east to west experience full nighttime ionospheric qualities at their point of origin, followed by increasingly nighttime-like qualities as they travel westward, ending with enhanced groundwave qualities (due to heavy rain-soaked and snow-covered DXer operating sites during winter months). In other words, regular daytime DX operation to the east at sundown is not only a possibility, but a reality in a lot of areas of the west coast, contrary to popular belief.

Identifying Potential Target Stations.

Now that we have discussed the rationale for attempting sunset DX from the west coast, let us now discuss the characteristics that make up a potential sunset DX Target.

Definition: A potential sunset DX Target is any needed/unheard station that is located in an area where the suns down time for the given month is no more than one and one-half hours ahead of the DDX Target's sunset.

Selection: To be considered for designation as a Target, the station in question:
1. Should not be on the same frequency as a local station, unless the DX'er is in possession of a highly directional receiving antenna which would allow for the complete or near-complete nulling of said local;
2. Should not be on a frequency immediately adjacent to a local station, unless, as above, the station's nulling can be adequately nulled;
3. Should lie in a direction approximating the direction in which the DX'er's receiving antenna is pointed, should a directional antenna be in use at the time. If an omnidirectional or an easily rotatable loop antenna is used, the direction of the target station is not as critical;
4. Should be verifiable as being currently on the air. (Station lists are available—See "Tools Required For The Job" immediately following this section);
5. Should be a station that:
   a. Operates daytime only (sign-offs at sunsets), or
   b. Pows-down, their transmitter significantly at their local sunset, and/or
   c. Changes antenna patterns at night and broadcasts the bulk of their signal in a direction not favorable to reception at the DX'er's location, or
   d. Is otherwise not receivable at the DX'er's location after sunset, whatever the reason.
1. Will have a greater chance of being heard as the sun sets if its location is to the north of the DX'er's location, as well as to the east. This is due to the rotation of the earth about its axis. The more northerly the location of the station, the shorter the amount of daylight hours during the winter day. Hence the more the "daytime" ionospheric conditions approximate "nighttime" ionospheric conditions.
2. An extreme example of this would be Alaska, where, at mid-winter in the most northern latitudes, the sun never rises, even at noon. There, one DX'er with nighttime conditions 24 hours a day for several months of the year.

Tools Required For The Job

It will be assumed that the reader will already have in his possession or will be able to obtain the essential: A radio capable of accurate timekeeping, a sense of electronics intuition, a simple aerial (or at least one driven by a homemade antenna), a willingness to spend a couple of hours preparing a Target List. Beyond these basics, the following should be at hand for proper preparation of said Target List:

1. A current listing of all stations known to be operating in North America. The most notable of these is the National Radio Club's 1991 Log. Keeping this log up-to-date is vital for DXing. DX News will forestall many hours of frustration attempting to hear a station that is not currently on the air. There are other listings available, but none worthy of mention (or purchase);
2. Sun/Sunset Maps, available from the NRC. A sample map was depicted earlier in this article.
3. -Rand/McNally Road Atlas (or similar).
4. A 12-inch ruler. This, with 3 (above) will be used to determine sunset times for those stations located "on the line" between the 15 minute sunsets depicted on the Sun/Sunset Maps. (The process will be outlined later in this article.)

Because my personal experience has shown the period between the end of November to late January (approximately Thanksgiving to Super Bowl time) to be the most productive for sunset DX, the basic sunset DX'er might also find it handy to visit a library where newspapers from their Target's towns will be available. This will enable them to find exact sunset times for their Target towns for the 15th of each month, and more. These times are usually listed on a "Today's Vital Statistics"-type page, along with current local and national weather and such. Also, the sunset time for this year's DX'er's location will be available by referencing the local newspaper. Because these times do not change from year to year, once they are isolated and noted, one need not look them up again.

In addition, the more well-equipped DX'er might wish to have the following available:

1. A receiver capable of receiving WWV or WWVH, where propagation conditions/forecasts are available at 18 minutes past each hour. With a spate of articles detailing these broadcasts being available, there is no need in this article to go into the usefulness of these broadcasts to the MWX DX'er.
2. "DX Edge", a product available from Xantek, Inc. (P.O. Box 854, Madison Square Station, New York, NY 10159) which depicts sunrise/sunset times for the entire world for every month of the year (a perfect gift for the DX'er), as well as daytime/nightime areas. Unfortunately for the DXer, DX Edge is not as detailed as the Sunset/Sunrise Maps in its depiction of 15-minute sunsets increases. On the plus side is the fact that it covers the entire world (Western Canada is prime sunset DX territory for the west coast sunset DX'er) instead of only the United States. Also available, from the NRC, are Gordon P. Nelson's world sunrise-sunset maps and computer programs, in ser-
(Continued on next page)
DX Helper, a Macintosh program available from Antennas West (P. O. Box 50062-X, Provo, UT 84663) or direct from MacTrak Software (P. O. Box 1990, Port Orchard, WA 98366). Although intended for use by amateur radio operators, this program will, through manipulation of the Mac's Alarm Clock, allow users to determine the time zone of any location on the surface of the earth (with, I've found, a plus-or-minus error of less than 10 miles in most cases, certainly more accurate for determining those 'on-the-line' stations than simply referring to the Sunrise/Sunset Maps.

4-Goode's World Atlas (for use with the Macintosh program above, this reference will allow the DX'er to look up any city in North America (or the world) and obtain the exact Latitude/Longitude of any Target city for comparison to DX Helper's Flat World Map. Careful manipulation of the mouse will yield a location within 10 miles or so of any spot on earth and display much usable data in an information box. A display screen for March 31 (of any year) current time. This program will also calculate Great Circle distances and display a Great Circle Map based on the DX'er's location. (Anyone possessing this piece of software who desires assistance on how to utilize it for MWDX purposes can feel free to contact me for more detailed info.)

Target Sheet Fabrication and Usage
The following information should be included for each of the Target selected:
1-The Target's call letters;
2-Target's station's frequency;
3-Target's station's daytime operating power;
4-Target's station's nighttime power;
5-Target's station's location (city and state and/or Latitude and Longitude);
6-Target's station's local sunset time on the 15th of each month the DX'er anticipates attempting to log the station.

For reference, the following is a selected section of a recent Target sheet that I constructed on the Macintosh, utilizing Microsoft File, Version 1.04 (stations sorted by frequency):

<table>
<thead>
<tr>
<th>Call</th>
<th>Freq.</th>
<th>Day</th>
<th>Nit</th>
<th>Location</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>KUP</td>
<td>540</td>
<td>10000</td>
<td>500</td>
<td>Carmel Valley, CA</td>
<td>0</td>
<td>15</td>
<td>-15</td>
<td>-15</td>
<td>-15</td>
<td>0</td>
</tr>
<tr>
<td>C3E</td>
<td>550</td>
<td>25000</td>
<td>5000</td>
<td>Kamloops, BC</td>
<td>+15</td>
<td>30</td>
<td>+30</td>
<td>+45</td>
<td>+45</td>
<td>+15</td>
</tr>
<tr>
<td>KEGZ</td>
<td>600</td>
<td>50000</td>
<td>1000</td>
<td>Kispel, MT</td>
<td>+30</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+30</td>
</tr>
<tr>
<td>CHNL</td>
<td>610</td>
<td>25000</td>
<td>1000</td>
<td>Kamloops, BC</td>
<td>+15</td>
<td>30</td>
<td>+30</td>
<td>+60</td>
<td>+60</td>
<td>+75</td>
</tr>
<tr>
<td>KGPI</td>
<td>610</td>
<td>25000</td>
<td>1000</td>
<td>Kamloops, BC</td>
<td>+60</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+60</td>
</tr>
<tr>
<td>KGPI</td>
<td>610</td>
<td>10000</td>
<td>500</td>
<td>St Vrain, CO</td>
<td>+15</td>
<td>30</td>
<td>+30</td>
<td>+60</td>
<td>+60</td>
<td>+60</td>
</tr>
<tr>
<td>KFCE</td>
<td>650</td>
<td>50000</td>
<td>500</td>
<td>Rancho Cordova, CA</td>
<td>0</td>
<td>15</td>
<td>-15</td>
<td>-15</td>
<td>-15</td>
<td>0</td>
</tr>
<tr>
<td>KGOO</td>
<td>650</td>
<td>10000</td>
<td>5000</td>
<td>Pullman, WA</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+45</td>
</tr>
<tr>
<td>KAPS</td>
<td>660</td>
<td>10000</td>
<td>5000</td>
<td>Mt Vernon, WA</td>
<td>0</td>
<td>15</td>
<td>+15</td>
<td>+15</td>
<td>+15</td>
<td>0</td>
</tr>
<tr>
<td>KGDG</td>
<td>660</td>
<td>10000</td>
<td>1000</td>
<td>Orcutt, CA</td>
<td>0</td>
<td>-15</td>
<td>-15</td>
<td>-15</td>
<td>-15</td>
<td>0</td>
</tr>
<tr>
<td>KXKR</td>
<td>680</td>
<td>5000</td>
<td>-1-5</td>
<td>Helena, MT</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
</tr>
<tr>
<td>KKI</td>
<td>680</td>
<td>10000</td>
<td>400</td>
<td>Blackfoot, ID</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
</tr>
<tr>
<td>C9UD</td>
<td>700</td>
<td>50000</td>
<td>25000</td>
<td>Red Deer, AB</td>
<td>+60</td>
<td>-60</td>
<td>+60</td>
<td>+60</td>
<td>+60</td>
<td>+60</td>
</tr>
<tr>
<td>KUJZ</td>
<td>700</td>
<td>10000</td>
<td>5000</td>
<td>Solderad, CA</td>
<td>0</td>
<td>-15</td>
<td>-15</td>
<td>-15</td>
<td>-15</td>
<td>0</td>
</tr>
<tr>
<td>KRVV</td>
<td>700</td>
<td>10000</td>
<td>1000</td>
<td>Newport, WA</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
</tr>
<tr>
<td>KMTW</td>
<td>700</td>
<td>10000</td>
<td>1000</td>
<td>Silt, CO</td>
<td>+60</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+60</td>
</tr>
<tr>
<td>KY8I</td>
<td>700</td>
<td>10000</td>
<td>1000</td>
<td>Oro Valley, AZ</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
<td>+45</td>
</tr>
<tr>
<td>KSPD</td>
<td>710</td>
<td>10000</td>
<td>500</td>
<td>Dixon, WA</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
</tr>
<tr>
<td>KSPD</td>
<td>710</td>
<td>10000</td>
<td>500</td>
<td>Boise, ID</td>
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<td>15</td>
<td>-15</td>
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<tr>
<td>KFL</td>
<td>830</td>
<td>50000</td>
<td>1000</td>
<td>Tucson, AZ</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
<td>+30</td>
</tr>
</tbody>
</table>

DX Helper: Flat Map and Info Box centered at Delta, Utah

As can be seen, the following pertinent MWDX information can be obtained from this display - In the box: Latitude and Longitude of the Target city (in this instance, Delta, Utah); bearing degrees from true north at which the Target city is located; the distance from the DX'er's location to Target city; Sunrise and sunset times on this particular day (in GMT); easily converted to PST for any day of the year the DX'er selects; and (on the map): Location selected (depicted by the large black dot); high noon, wherever in the world it happens to be (depicted by the circle/cross); Gray-Line, separating daylight from darkness (width of Gray-Line depicts sunrise/sunset zones), date, and

As can be seen, a large portion of the Target sheet is dedicated to listing the sign-on times for each Target, for each of the six weeks of each month of the DX season: October, November, December, January, February and March. These are listed in minutes plus (or in certain rare instances minutes minus) the sunset time at the DX'er's reception location. For example, at my location in Oregon, Kamloops, British Columbia displays the following local sunset times: +45, +30, +30, +60, +45, +45; for the months of October, November, December, January, February and March, respectively. From the earlier discussion of Sunset Propagation (continued on next page)

tion, we can determine that the potentially most productive times to attempt a logging of a Target in Kamloops, BC would be the months of October, February and March because of the fact that the local sunset is only 15 minutes ahead of sunset at my location, thereby assuring a nearly-total nighttime path between the two stations. Divide this by the utilization of this potentially productive path for reception due to the fact that my local sunset is 45 minutes behind Kamloops', necessitating a signal path that must traverse much more daylight.

By contrast, sunset times for Carmel, California appear thus: -15, -15, -15, 0, 0, 0. For the months of October, February and March, local sunset for Carmel is the same as my location in Oregon (thus 0). During the months of November, December and January sunset is actually 15 minutes after sunset at my location (thus -15). Any of the latter-mentioned months make Carmel a potentially productive Target due to the fact that any signal received from this area will have to traverse the body of the earth, and consequently, to the local sun having no absorptive characteristics, but will still be operating with their higher daytime power (if required to power-down at sunset), or will still be on the air (if required to sign-off at sunset).

To determine sunset time accurately, the Sunset Maps, road atlas and 12-inch ruler come into play. Admittedly, this method is not as accurate as utilizing "DX Helper" or referring to a Target city's local newspaper, but nevertheless, it is far more accurate than simply referring to the Sunset Maps alone and should be used whenever a potential Target is "on the line" and it is not possible to determine in which 15 minute sunset segment a Target falls. By placing the ruler (a piece of string might also be successfully used) on the 6-state map in the Road Atlas and approximating the sunset line (referring to the Sunset Map), it becomes possible to determine on which side of the line the Target falls. It is imperative that the ruler be placed on the map in a manner that as closely as possible approximates the line on the Sunset Map. Pay close attention to "give-away" locators clues, where the sunset line crosses conspicuous river bends, grazes state corners, divides lakes, etc. Careful placement of the ruler (or string) should, in most cases, yield a definitive determination. Any Target still in question should be listed on the Target sheet as a "?", until the missing info can somehow be supplied (again you are referred to the newspaper section of the local library).

In the meantime, the Target in question can simply be tried for during both of the 15 minute increments in which it might reside.

Target Sheet Helpful Hints
1-Although my recent Target sheets tend to sport 75 or more Targets ranging in location from northern Alberta to western New Mexico, it is advisable to keep the initial Target sheets unimmitidating; around 25 Targets is enough at the beginning.

2-West coast sunset DX'ers should also be realistic in their expectations: A 250-watt station from Northern Saskatchewan is quite unlikely to be heard on the west coast at any time of the day, let alone sunset. A 10,000 watt or 50,000 watt station from adjacent states that signs off at sundown or powers-down to 100 watts or less after dark is a much more realistic Target.

3-It is often helpful to highlight, with a fluorescent marker, those months when the local sunset times are at their smallest differential from the receiving site. This makes selections from the sheet a seamless procedure. For example: The DX'er begins DXing at, say, one and one-quarter hours ahead of their local sunset in, say, November. Fifteen minutes

(continued on next page)
will be spent DXing some or all of the frequencies where -75 is highlighted. Next, 15 minutes will be spent DXing all of the highlighted +60 stations, then the +45 stations, and so on, DXing in 15 minute increments until the 0 stations or -15 stations have been attempted. (Stations in the -35 category are rare, even from here in the Pacific Northwest.)

4—When a potential Target becomes a logging, a line drawn through it on the Target sheet will delete it from further attempts, thereby assuring that valuable DX time is not wasted trying for an already-heard station.

5—Keep copies, detailed notes and become familiar with interfering stations on each frequency. This will allow the DXer to immediately identify out-of-the-ordinary reception conditions when they occur and allow those conditions to be fully exploited.

Ketch-up on your DX

The systematized approach to sunset DXing outlined in this article should assist nearly any west coast DX'er eager to increase their Stations Heard totals by allowing them to log stations that they would normally not be able to hear. This method has been a part of my DXing Game Plan since 1982, when I first realized that DXing at sunset was infinitely more engrossing than a sleepy Saturday afternoon of The ESPN/Lynx/Loyd bowl game.

OK, I guess you could call it the Touchdown Technique by doing your latrine duty. Go ahead and put a kneeled station on the noodle over your head like you promised; if you put off the job one more time you'll not only find yourself doing it when there really is something interesting to watch on TV, but you'll probably also end up taking the heat for the ketch-up being the ceiling in the first place. Besides, maybe if you selfishly declare full responsibility for dwelling wide-care and maintenance, and consistently perform your duty with a nary a whimper, your wife will notice and become so overwhelmed and touched (not to mention bewildered) that she will insist on doing everything else around the house, leaving you free to DX not only at sundown, but at any other time you wish to. When in Rome, :) One thing's for sure: The ketch-up is in no immediate danger of scraping itself off the ceiling. So be safe. The only sure way to beat Bowl Game Boredom is to settle in at the knobs. The ketch-up will still be there tomorrow.

In The Aftermath

Undoubtedly, the information submitted here is not new, but it is something that I implement this type of approach. It was not my intent to imply such. My intent was to re-establish this approach for those west coast DXers who may have forgotten it and/or not to suggest it to newcomers, who may have never used it.

I also wish to offer my suggestions as is: how this approach could be most efficiently utilized. In addition, it was my intention to support the various radio clubs mentioned in this article (all of which I am a member) by disseminating this information through their respective bulletins and "giving back" some of the fruits of my DXing experiences after years of exploiting the info in their bulletins for the single-minded goal of increasing my Stations Heard totals.

Anyone newly or currently using this systematized sunset DX approach (or a variation of it) who would like to gain or make contact with DXers whose interest concerns same is encouraged to contact me through the publisher of DX News.

This article was processed and assembled on a Macintosh computer, utilizing various versions of MacWrite, FullPaint, MicroSoft File, Aldus PageMaker and DX Helper.

I would like to thank Mr. Randall Stegemeyer of MacTrak Software for his time, correspondence and assistance in answering questions about DX Helper which ultimately led to my greater understanding of the software which, in turn, led to the construction of this article.

I also wish to thank Mr. Bill Hardy of Aberdeen, WA for supplying me with encouragement to finish this article and 2nd copyright/public domain info for the Sunrise/Sunset maps.

References


DX Helper Instruction Manuals/ Suggestions/Adendum concerning same is encouraged to contact me through the publisher of DX News.

"DXing From The Twilight Zone", by Phil Sullivan. © National Radio Club Reprint.

"DXing The Broadcast Band", by C. M. Stansbury II. © Popular Electronics, February 1962.


"Popular Communications" magazine. Articles and issues you may wish to try here.


"Times To Listen For BCX DX", © International Radio Club of America New Member Packet


R. J. Edmunds
753 Valley Road
Blue Bell, PA. 19423-2052

"The Answer Man"

"No Question Is A Dumb Question"

Answers to members’ questions, from the basic to the technical.

Hold on. Again, as promised, this edition of the Answerman column will be devoted to a series of questions relating to AM stereo which were posed last spring.

NOTE: First, C-Duan is Motorola. Of the five proposed systems, Belar folded very early on. Magnavox went out in the early ’80s, and in the late ’80s, the Harris system (technically the best of the lot) threw in the towel. VHFer International and Motorola C-Duan. This state of affairs is due to the FCC’s adjudication of the issue of choosing a standard for the industry. Australia was among others who were among those choosing between C-Duan and while Japan is still running comparison tests between C-Duan and Kahn. To the best of my knowledge, there really isn’t any reference source.

QUESTION: Is there a good reference book or magazine article on this? I have been told of two systems, Kahn and Motorola. Where does C-Duan fit into the picture, I don’t know.

ANSWERS: First, C-Duan is Motorola. Of the five proposed systems, Belar folded very early on. Magnavox went out in the early ’80s, and in the late ’80s, the Harris system (technically the best of the lot) threw in the towel. VHFer International and Motorola C-Duan. This state of affairs is due to the FCC’s adjudication of the issue of choosing a standard for the industry. Australia was among others who were among those choosing between C-Duan and while Japan is still running comparison tests between C-Duan and Kahn. To the best of my knowledge, there really isn’t any reference source.

QUESTION: Is it feasible to make one’s own detector for this? Where would one get a diagram, and for which system? Maybe switchable?

ANSWERS: Motorola makes a decoding IC which is used in most AM stereo receivers which handle C-Duan, and it is available commercially, but at unknown cost. The circuitry might be obtained as a copy of the patent. Nothing is known to be available in the same manner for Kahn-Hazeltine.

QUESTION: Can you buy a receiver for this? Down a cheap consumer type which picks up FM stereo also now pick up AM stereo? Are there any manufacturers’ standards for this?

ANSWERS: No switchable receivers are currently marketed, although you might be able to pick up on a leftover or used Sony SFH-1000 or SFH-A1 portable AM/FM stereo receiver which did allow switching between the four remaining systems after Belar folded. Kahn-Hazeltine was the only one of the four not using phase modulation for the left-right components; that system split the waveform. The other three: the left, right, and other, are AM stereo. AM stereo is currently available in all car radios in Chrysler products, and in most GM and Ford products, (mostly thanks to Motorola’s position in the car radio manufacturing market), plus a select few by Volkswagen, and even a few by Volvo.

Radio Shack has at least one two-channel-equipped retro-car radio. Denon has recently introduced at least one high (at least 99.95dB of SNR) stereo AM/FM receiver. The list on that is $39.95, and a reference is available if you know where you are. Sony also manufactured, briefly, a "boob-box" with AM stereo, and a couple of car radio models, although I can’t cite specific models. There is also a company in Moonachie, NJ, called Target Tuning DCO, which is manufacturing fixed-tuned radios for AM and FM stereo stations to distribute as promotional items to its listeners.

QUESTION: When a station advertises AM stereo, how do you know which system is being used? Is there any way to tell on a conventional receiver if a station is broadcasting in stereo, maybe by detecting a subcarrier, or the like?

ANSWERS: In all but about ten cases (most notably, KSL-1160, which is stereo only in the daytime), the predominate system is C-Duan, with about 600 stations nationwide. It uses a phase-modulated pilot tone which enables a receiver equipped with a stereo light to light the indicator. At one time, Kahn had over 100 stations. Otherwise, the issue is similar to determining the existence of an FM Stereo signal with a monaural receiver— you can’t do it.
R-390A Audio Output Impedance Matching

By Dr. Dallas Lankford

Some people who use R-390As complain about hum, low audio output level, and poor frequency response. However, an R-390A has excellent audio quality and enough audio output power to drive any loudspeaker you put in front of it, when used with an appropriate audio impedance matching transformer that matches the 600 ohm audio output impedance to a speaker or headphones. The purpose of this note is to discuss appropriate audio impedance matching transformers for use with an R-390A.

The usual reason for hum and low audio output level with an R-390A is that low impedance headphones and a low impedance speaker, usually 8 ohms, are used without an audio transformer to match the 600 ohm output of the R-390A to the output impedance of the loudspeaker. The common cause of poor audio frequency response is the use of a military surplus LS-166 speaker. It has a built-in 600 to 8 ohm audio transformer and 8 ohm speaker, but the audio transformer has a limited frequency response of 350 to 3500 Hz. The LS-166 and similar speakers are designed for voice reception only.

The R-390A local audio output is rated as 500 milliwatts with less than 10% distortion into a 600 ohm load, and 1 milliwatt into a 600 ohm load. The line output is rated as 10 milliwatts with less than 5% distortion into a 600 ohm load. Measured linear distortion was less than 2% of local audio output power before clipping is 1 watt into a 600 ohm load. Measured local audio frequency response is approximately flat from 100 Hz to 10,000 Hz, and drops off slowly below 100 Hz and above 10,000 Hz.

One of the best ways to match the 600 ohm audio output impedance of an R-390A to low impedance headphones or a low impedance speaker is to use an audio line transformer. Line transformers come in two varieties - 25 volt line transformers, and 70.7 volt line transformers. They are designed for use with public address and audio distribution systems. The 25 volt line transformers are intended for use with amplifiers which have a 25 volt RMS maximum output, while the 70.7 volt line transformers are intended for use with amplifiers which have a 70.7 volt RMS maximum output. The 25 volt line transformers typically have primary taps with impedances which are multiples or fractions of 625 ohms (equivalently multiples or fractions of 1/4 watt). The 70.7 volt line transformers typically have primary taps with impedances which are multiples or fractions of 5000 ohms (equivalently multiples or fractions of 1 watt).

Currently I use a 25 volt line transformer, Stancor type AR089. The Stancor AR089 has primary taps marked 0, 1, 2, and 1/2 watt, and a secondary marked 8 ohms. Since the primary taps of a line transformer are often specified in watts, you will have to convert the watt ratings to ohms. For example, using the formula R = V^2 / P, where R is the impedance in ohms, V is the voltage rating in volts RMS, and P is the power rating in watts, it follows that the 1/2 watt primary tap is R = 850/0.5 = 1700 ohms, approximately the same as the 0, 1, and 2 watt primary taps are 625, 312, and 156 ohms respectively. For a 70.7 volt line transformer with primary taps of 10, 5, 2.5, 1.25, and 0.62 watts, the equivalent primary impedances can be calculated as 500, 1000, 2000, 4000, and 8000 ohms respectively.

In my experience, it does not make any significant difference whether you match the R-390A 600 ohm audio output impedance with the 625 ohm primary tap of a 25 volt line transformer or the 500 ohm primary tap of a 70.7 volt line transformer. In fact, you can use a 1000 ohm or 1250 ohm primary tap of a line transformer; the only noticeable effect is a small decrease in maximum available audio output power.

The Stancor AR089 transformer is available from Fair Radio for $5 plus shipping. Since Fair Radio has a $10 minimum order, if you are not ordering other items that you might prefer to use the Radio Shack 70 volt line transformer, catalog number 32-1031, for $5.95. The Radio Shack transformer has primary taps of 0/075/1.25/0.62 watts and secondary taps of 4/8/16 ohms.

My current audio impedance matching adapter is shown in the following schematic. I used both the 625 and 1250 ohm primary taps of the Stancor AR089. I cut off the two extra primary tap leads flush with the primary windings. A 3 meg ohm half watt resistor was used to provide a tap output. The transformer was mounted in a small metal box with four standard 1/4 inch headphone jacks for input and output. Audio cables with standard 1/4 inch phone plugs are used to connect the adapter to a speaker or to the headphone jack of the R-390A or other receiver. A homebrew audio cable with headphone plug on one end and lug on the other is required for connecting the adapter to the terminal strip on the R-390A rear panel. You should note that terminal 7 on the audio cable should be terminal 7 on the R-390A rear panel terminal strip.

The 625 ohm primary of my adapter is used with an R-390A. The 1250 ohm primary is used with the high impedance headphone jacks of other receivers, such as a Hammillard HQ-180(A) or HQ-13G.

Perhaps it is appropriate to mention here that I have observed unnecessary replacement of power supply electrolytics in two R-390A receivers, probably as a consequence of

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unsuccessful attempts to eliminate hum from headphone audio output. In one case, new electrolytic capacitors were installed, which had been disconnected from the original wiring by the multi-section electrolytic. In another case, an intermittent loss of power was traced to a frayed conductor at the multi-section electrolytic; the soldered leads had been trimmed back through the solder pads without resoldering them. After the careless and unnecessary tampering had been repaired, and an audio impedance matching adapter was used, the headphone audio output of these two IC-180As was excellent.

**TOWER TIP**

KXIC - 1040

1 km, 3, 190 km

IOWA CITY, IOWA

**CITY PARK**

No. Dubuque St.

MARYLOR RESIDENCE HALL

**WHAT TO LOOK FOR:** Two guyed and pointed towers oriented in a northeast-southwest direction easily visible for several miles on either side of Interstate 280.

**SUBMITTED BY:** RICK DAU, Oakland, Iowa

Send information about a.m. broadcast towers in your area to John D. Bowker, 142 Beech Dr., Princeton, NJ 08540. Include a simple map of the nearby highways and landmarks. Tell how many towers, how they are laid out, and any other information that will help in spotting each station.

**Facts About NRC's DX Audio Service**

The DX Audio Service, now in its third year of operation, provides the ONLY T monthly broadcast news coverage service for DXers and DX listeners. The DX Audio Service, available to everyone anywhere, is designed to inform the radio listener in a way that is pleasing and informative. Many of the announcers on the service are professional broadcasters giving their free time to give listeners the finest service available.

DXAS was started to provide broadcast information, both AM and FM to the blind DX listener. It has evolved into a service which provides useful material to all types of listeners. Many of our subscribers listen to the tape to obtain the latest news, to listen to the network's coverage of news events. One-year subscription, subscriber keeps the cassette monthly.

**The Answer Man**

Got a question about radio? Send it to Russ Edmunds, 753 Valley Rd., Blue Bell, PA 19422-2052. No question is a dumb question, and Russ will answer all, from basic to highly technical. Watch for the answer in DX News!

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**Musings of the Members**

**BOB EMGLER**

Greetings from the land of high taxes, New Jersey. I would like to congratulate John Maloney for a job well done and wish the best of luck to the transmitter of KRKA. The two silent speakers were excellent. I wish they could have spoken longer. Digital broadcasting may eliminate our hobby so DXers may not hear each other's words during the day time.

**CHUCK JORDAN**

Two new stations were announced in the past few weeks. WZGL and WZEL in New York City. They are expected to go on the air within the next few months. I hope they are successful.

**DWAYNE COPE**

With the new season upon us, I hope to be more active in the hobby and report more often. I'm sure that everyone is looking forward to the DX season. I have been working on some projects in the past few weeks. I'm looking forward to hearing from everyone.

**JESSIE LEE**

Greetings from Kansas City, MO. I have been busy working on some projects in the past few weeks. I'm looking forward to hearing from everyone.
By doing this AM broadcasters cut their own throats when they caused an even deeper decline in listenership. Had the AM broadcasters stuck to their guns I think they would be doing much better today. Granted there are only my theories but I do believe formars have a much greater influence in pulling in listeners than just sound quality does. I don't buy the idea that digital radio will come out and hundreds of thousands of potential radio buyers will say 'oh wow! Sounds just like CD's coming out of a radio' and then immediately proceed to junk all of their AM-FM sets. Digital radio will come into existence in 10 years only if manufacturing interests 'trick' it of the public as it has been done with CD's over vinyl. In all probability it will happen just that way.

DAVE SCHMIDT - P O BOX 11502 - WILMINGTON, DE 19850

And that is everything received here thru 10/27, with this going out 10/28. One last point, Saturday, I finally found an interesting point in his above report, and I would be most interested in seeing how the digital system will work under 'real world' conditions, such as what mountains due to FM signals in areas such as western NC and SW VA citizens (who try to listen to FM while driving 42 miles out). There is a lot more to it, I think, then what they're telling me. I did try the WFMN-940 test, no sign of any of the lessons, I listened to a tape about 5 times. A number of semi-formats, and instead of the 'glowing format' chance have been sent to Mr. Tony. And that for this week, all reports are welcomed, sticking with the radio related/DX filler info. 73's

Joel M. Bowers

Need more information about MW DX?

Mail $1.00 to the NRC Pub Center;
ask for the Reprints Catalog

Join the verification game!

Now, you can help out with station tests. Here's how: Send Wayne Henlen - 4131 S. Andes Way - Aurora, CO 80013 two 25¢ stamps per station, and Wayne and Jeff Tynan will print and mail an effective test request letter for you. You can either specify station and time, or just take pot luck. Increase your verities and help other NRC'ers at the same time... join the verification game!