



DX NEWS

*the magazine of the
National Radio Club*

— SINCE 1933 —

VOLUME 51 ISSUE 28 July 16, 1984

Yes! The long awaited World Famous Log Book is finally ready to be handed out to you! After waiting nearly 3 years for this hummer, and having worked on it for the last couple of months, whew! Check out the page 47, to get the details on how to order your copy. We raised the price of the log by 50 cents, not too bad of a price considering its a full 8 1/2 x 11 size and larger type! Oh yea, don't forget about.....

NRC CONVENTION REGISTRATION DEADLINE is fast approaching!! When is it? AUGUST 15th So don't put it off too much longer!! Rip out page 48 and send it off to Wayne, TODAY!

NO MUSING COLUMN this issue. Ole Murphy (remember him, he wrote the laws) got to Pauls modem. Oh well, so much for High-Tech, back to the horses.

NO DXCHANGE COLUMN it should appear here next month. We do have on page 44, a list of items that were sent here via Dick Truax for sale from Betty Lord.

Joseph, Frequency Check list, Fela has asked me to mention to you folks that you should get your updates to the list to him ASAP, as his target date will be September 10th. Get your entries in ASAP. Also, Joe will be retiring from his duties as the Freq. Check List boss. Those wishing to apply for his post should either contact him or us here at HQ. Thanks for all the lists Joe. You sure you want to retire??

From Jay Smilkstein, he is looking for riders for his trip to the Convention, if interested contact him at 914-666-6811.

From Ron Schatz, comes word that 870 HSJB has been heard over WJL down his way. They are suppose to be at 25KW, hmmm. Also, the Cubans on 578 & 630 are now 68 Kw from 30 Kwatters.

The S. Illinois Univ. at Carbondale has written and asked if we would give them some names & address so that those individuals could be contacted to fill out a survey on the hobby of radio listening. If you would like to be a participant in this survey send a postcard stating that fact to us here at HQ, and your name will be forwarded to the appropriate department. Do not write to them directly as a control number, which we have here, has to be on the name prior to them sending you a survey.

Louisiana Frequency Exchange a all-band newsletter for those around the Louisiana State area. \$7.00 to LA, MS, AB; \$4.00 to all others (Huh?). Write to Louisiana Frequency Exchange, Box 45913, Baton Rouge, LA 70895. (It's different-HQ)

From a Larry Sarko, he is looking for those with "Urban Contemporary" stns in their areas to contact him, he'd like to swap/send tapes. Address: 387-B Eagle Heights, Madison, WI 53705.

LOOK INSIDE:

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AM SWITCH

JERRY STARR
C/O WHOT RADIO
401 N. BLAINE AVENUE
YOUNGSTOWN, OHIO 44505

CALL LETTER CHANGES

Old call:	New call:	Old call:	New call:
620 WABX SC Cayce	WLFF*	1360 WAZA GA Bainbridge	WYSE
650 *New MA Clinton	WBSO	1370 WTTT IN Bloomington	WGTC
670 *New GA Jefferson	WEEG	WRKT NY Rochester	WXXI
770 *New OH Buchtel	WAIS	1380 KWK MO St. Louis	KGLO
850 WOZO NY Penn Yan	WQKA	1390 *New LA Ridgecrest	KVLA
970 *New TN Colonial Heights	WIVK	1420 KSCR WA Renton	KRIZ
920 *New KY Midway	WKLU	1450 WTSA VT Brattleboro	WMMJ
940 KADO TX Texarkana	KTWN	1460 *New NJ Mount Holly	WRLB
980 KKS MN Richfield	KMFY	1470 WSAC KY Fort Knox	WBUL
1100 KREX CO Grand Junction	KIIO	KBXN UT Tremonton	KBCM
1110 *New WA Oak Harbor	KISD*	1490 WOFN FL Bradenton	WTRL
1170 *New AL Hanceville	WHZI	KBAB IA Indianola	KXLO
1180 *New GA Trion	WENL	1500 KNCI TX Boerne	KYCS*
1210 *New AZ Suvarita	KBCD	1510 KKNW WA Mountlake Terrace	KKZU
1230 KODE MO Joplin	KLES	1520 *New KY Greenup	WLGC
KHDN MT Hardin	KYTY	1570 WMMN MI Flint	WGMZ
1240 KBMY MT Billings	KUUS*	WBUZ NY Fredonia	WCGT
1270 WXYZ MI Detroit	WXYT	1600 WAQI OH Ashtabula	WAST*
1310 *New HI Honolulu	KKAI*	KEWS TX Cuero	KQRO
1330 KINE TX Kingsville	KDUV		

Notes on call letters: WLFF-620 applied for but never used WABX which was picked up by Clare, MI-990 as noted last issue. Oak Harbor-1110 applied for, then dropped KEUE between last issue and this. KBMY-1240 will indeed use KUUS despite the change of ownership as noted in previous issue. Honolulu-1310 had applied for, then dropped KHML. Boerne-1500 is a correction from last issue when a typo moved them to 1510 by mistake, they are still on 1500. WAQI-1600 has been off the air for over a year, this new call should signal their return, however nothing noted as of 7/3/84. They are semi-local in signal when they're on. I wonder how long it'll be before somebody snaps up WXYZ, always sort of sad to me to see old and long established calls like this and KWK disappearing.

APPLICATIONS FOR NEW STATIONS

590 FL Clewiston: 1000 D1
680 WA Lacey: 250 D1
720 PA Shiremanstown: 250 D1
750 FL Englewood: 1000 D3
810 TX Lacoste: 250 D1
950 AK Juneau: 5000/500 U1
980 NY Cazenovia: 1000/500 U4
1000 TX Marion: 1000 D1
1030 MD Indian Head: 50000 D3
1030 NC Mint Hill: 10000 D3
NC Wake Forest: 50000 (2500 CH) D3
1040 KY Cannonsburg: 10000 (1000 CH) D3
NC Lewisville: 10000 (2500 CH) D1
SC Hanahan: 10000/1000 U4
WV Green Valley: 10000 D1
1070 OR Klamath Falls: 10000 D1
1200 FL Dover: 25000/500 (5000 CH) U4
1240 AZ Quartzite: 1000/250 U1
1270 MN Baxter: 5000/5000 U4
1410 NC Deep Gap: 1000 D1
1490 AR Dardanelle: 1000/250 U1

GRANTS FOR NEW STATIONS

580 AZ Tucson: 5000/500 U2 replaces deleted KIKX facilities
650 MA Clinton: 10000/1000 U4
670 GA Jefferson: 1000 D3
710 MT Ennis: 10000 D1
750 IN Portage: 2500 D3
770 OH Buchtel: 250 D1
920 KY Midway: 500 D1
1110 WA Oak Harbor: 500 D1
1170 AL Hanceville: 500 D1
1180 GA Trion: 5000 D1
1260 AK Dutch Harbor: 500/500 U1 (corrects listing of call on 1200 last issue)
1310 HI Honolulu: 5000/5000 U1 replaces KNUI which moved to 900 kHz
1420 AK Bethel: 1000/1000 U1
1440 AR Bellefonte: 1000 D1
1520 KY Greenup: 5000 (500 CH) D1

APPLICATIONS FROM EXISTING FACILITIES

550 KAFY CA Bakersfield: day power to 5000, antenna to U4
570 WPLP FL Pinellas Park: 5000/5000 U4
610 WRUS KY Russellville: 500/500 U2
800 WSMJ KY Cave City: 500 D1 (raise power, change from D3)
1000 KHAM AR Horseshoe Bend: power to 1000
1050 WOKL WI Eau Claire: to Altoona, WI with 5000 D3
1070 WMIA PR Arecibo: night power to 2500
1230 WENY NY Elmira: to Southport, NY on 1200 kHz 5000/1000 U4
1250 KFAY AR Fayetteville: power to 5000
KLLK CA Willits: power to 5000/2500 U4, CP not on yet
1360 WMAC GA Metter: power to 1000
1380 WBNX NY New York: change from Specified Hours (SH) to U4 **
1450 WKIP NY Poughkeepsie: day power to 1000, becomes U1 **
1460 WFAB PR Juncos: to 770 kHz 1000/1000 U2
1520 WTHE NY Mineola: Critical Hours to 1000
1560 KGHO WA Hoquiam: to 1490 kHz 1000/250 U1

**Notes on applications: The WBNX-1380 situation is unclear. Just a few weeks ago they applied for this change to allow them to operate during the hours they used to go off the air to protect the limited operation of WAWZ in nearby Zaraphath, NJ. A week later several sources listed this as a GRANT. We have never seen the FCC move this swiftly on anything so we assume this might have been a typo from DC. It doesn't seem that both stations could operate at the same time due to their close proximity. While WAWZ has been having some problems with their FM facility, we know of no plans for them to drop their AM operation. More on this later no doubt. WKIP-1450 was one of a handful of Class IV stations that required a daytime DA to operate with 1000 watts. They chose to operate U1 with only 250 watts daytime, now they are applying to raise that to 1000 watts but remain non-DA daytime.

GRANTS TO EXISTING FACILITIES

640 WHLO OH Akron: 5000/5000 U4
660 KSKY TX Dallas: to Balch Springs, TX with 10000/1000 U1
790 WEAN RI Providence: from U4 to U2
800 KQIN WA Burien: to Burien-Seattle, WA with 50000/5000 U4 on 820 kHz
920 KORK NV Las Vegas: move XR
930 KWSB OR Seaside: to 840 kHz 1000/500 U1
1050 KBUF KS Garden City: to 1030 kHz 5000/1000 U4, move to Holcomb, KS
1130 WHHQ SC Hilton Head Island: 1000/500 U2
1140 WIXC TN Fayetteville: to Hazel Green, AL
1190 WANN MD Annapolis: changes in antenna system
1240 WJON MN St. Cloud: changes in antenna system, remove resistor
1270 KCVL WA Colville: to 1240 kHz 1000/250 U1
1310 KIOT CA Barstow: 5000/1000 U4
WOKA GA Douglas: remove antenna limiting resistor
1320 WLQY FL Hollywood: change daytime DA pattern
1340 KATL MT Miles City: to 770 kHz 10000/1000 U4
1350 WCOP GA Warner Robins: 5000/500 U2
1380 WNLA MS Indianola: move XR, new antenna
1440 KVON CA Napa: move XR
1450 KDXU UT St. George: relocate proposed XR site for their 890 kHz CP
1460 WBPA KY Elkhorn City: power to 5000
1480 KAPE TX San Antonio: power to 2500, changes in antenna system
1490 WEMJ NH Laconia: move XR
KVOZ TX Laredo: to 890 kHz 1000/250 U1, move to Del Mar Hills, TX
1530 WKDC IL Elmhurst: move XR, new antenna
1560 WKKW TN Nashville: change antenna system/directional pattern
1580 KNIX AZ Tempe: Critical Hours power to 50000
WGFV PR Morovis: to 2500/2500 U3

Notes on grants: Again a few newer members have written for clarification on some of the terms used in AM Switch. A station listed with a grant to "move XR" is not moving the transmitter (for which XR is the abbreviation) from one end of the building to another, they are actually relocating the transmitter/antenna at a different site from the present. Another member asks about the "antenna resistor" removals. Some stations, in order to provide the required signal overlap protection to other stations on their frequency, actually send less than their licensed power to the antenna. We know of one "1000 watt" station that actually puts out only 758 watts. Since the FCC does not license odd powers they are licensed at 1000 watts but operate at less. This is not uncommon. Since most transmitters are not capable of operation at these odd powers the most common practice is to insert a large resistor or power-dividing network at the XR output to the antenna. A resistor of specific resistance to dissipate the required wattage is used, the unused power turning into heat, which is how resistors work. When a station is granted approval to remove the limiting resistor it simply means they will be feeding more power to the antenna. For DX purposes this slight rise of power is insignificant but it might herald some testing activity by the station. If any other terms used in AM Switch have you baffled please write and ask.

OTHERNESS

- 880 TN White Pine: application returned by FCC. A year or so ago a few services ran this as a GRANT but it is still an application.
- 940 NC Pembroke: FCC returned application for new station
- 1010 KIQI CA San Francisco: FCC returned application for fulltime operation for the umpteenth time. KIQI's file at the FCC is about a foot thick.
- 1430 KCLK WA Clarkston: returned application for move to Asotin, WA fulltime
- 1450 KRZY NM Albuquerque: FCC dismissed application for extension of time to complete their fulltime CP on 1090 kHz. Lacking any further information this could mean several things. The KRZY 1090 CP was granted over three years ago. The FCC requires all CPs to be completed in a certain amount of time but has always been very generous in granting numerous extensions in completion time to nearly any station filing for them. Some extensions have been renewed again and again for years. The famous Nelsonville, OH 940 CP was on the books for 7 or 8 years before it finally was cancelled. Either KRZY asked to have the extension dismissed or the FCC got tired of granting them. If KRZY asked for this dismissal it could mean that either the work is nearing completion and the extension is not needed or they have decided not to move to 1090 for some reason. We'll check with our Albuquerque broadcasting connections and try to find out what is happening.
- 1530 WASC SC Spartanburg: FCC DISMISSED application for move to 760 kHz.

Whew!! A 2's pager this time. With long skips between issues the information sure piles up. I'm looking forward to the return of the weekly DX News when things can return to normal here in Melonville...or at least as normal as they get. I have to ask the question: How normal can it be when people like Dave Schmidt, Ron Musco, Dick Truax, John Golden, Ed Kreljny and Alfonso Bedoya drop by for weekend visits? Schmidt has been here twice already this year. No wonder both my neighbors sold their houses! Fanork! And a big 833 to all of you.

73 and Good DX,

Jerry & BKF

Jerry Starr & Buffalo K. Fooman who say "SEE Y'ALL IN COLORADO SPRINGS!"

POST-SUNSET RELIEF UNDER FIRE

Fulltime Hours Sought For 500 Daytimers On Foreign Clears

The Ad Hoc Committee of Daytimers on Foreign Clear Channels last week submitted a plan to the FCC that would permit fulltime service for over 500 daytimers on the 14 foreign clear channels. Simultaneously, relief previously granted to daytimers was coming under attack.

The Association for Broadcast Engineering Standards (ABES) has asked the FCC to reconsider its recent decision to increase the post-sunset power granted to many daytimers last fall. And, citing possible "irreparable injury" to fulltime stations, ABES asked for a stay of the new power limits until there's a ruling on its petition for reconsideration.

Daytimers Before New Stations

Granting fulltime status to daytimers on foreign clears would be an outgrowth of new treaties with Canada and Mexico. Those who will soon let the FCC put hundreds of new fulltime AMs on the foreign clears. The ad hoc group recommends that, before any new stations are licensed, the Commission should allow all daytimers on those channels to go fulltime with power up to 250 watts.

"The public interest will be better served by permitting over 500 current daytime-only stations to go on the air fulltime, with adequate power to serve their local communities, than by allowing many fewer new stations to go on the air with 1-50 kw of power," the committee argued.

The group submitted extensive technical data compiled by engineer Robert A. Jones showing that its proposal can be carried out "while providing full protection to the dominant foreign clear channel stations and without causing undue interference to co-channel U.S. stations."

Aborting "AM Birth Control Rule"

The ad hoc committee also seeks abolition of the so-called "AM birth control rule." Adopted in 1962, the rule sought to promote the development of FM by restricting new AMs to remote areas with little or no existing radio service.

Noting that FM is now the "dominant market force," the ad hoc group says unless the rule is abolished (or at least waived in the clear channel proceeding) daytimers stand virtually no chance of getting new fulltime channels assigned to their communities.

Engineers Claim Devastating Interference

In its filing, ABES said the Commission "lacked a factual basis" for upping daytime power levels in the two hours after sunset. It charged the increases "will cause devastating interference to the existing licensed service of many fulltime Class III stations."

ABES cited the example of WAKR/Akron. "Not only will new nighttime interference destroy WAKR's nighttime service to virtually all of Canton, OH, but... will preclude WAKR from providing adequate service within the city limits of Akron itself."

AM Strength Over Business Districts Eased

AM stations will no longer be required to place a 25 mV/m (millivolt per meter) signal over the entire business district of their communities of license. Last week the FCC cut that back to 5mV/m, the same strength it requires for residential areas. Stations can still use 25 mV/m if they wish.

The higher strength was first adopted to overcome noise from machinery and signal absorption by large buildings. But the Commission noted that most new AMs today are in small communities with few problems from man-made noise or steel-framed buildings. Also, it said suburban sprawl has made business and factory areas difficult to define in many areas.

In related action, the Commission:

- deleted the requirement that CP holders for directional AMs take field strength measurements for their license applications
- set primary service requirements of 2 mV/m for towns of 2500 or more people and 0.5 mV/m for smaller communities.

Motorola, Toshiba Sign

Alternate-Source Accord
SCHALMURG, Ill. — Motorola and Toshiba signed an alternate-source agreement whereby Motorola will give Toshiba technical information for Toshiba to produce Motorola's C-QUAM AM stereo decoder.

Motorola said the agreement is expected to significantly expand the adoption of the C-QUAM system by Japanese radio equipment manufacturers by making the parts more readily available through local sources in Japan.

The device was added in February, and has been chosen by Chrysler, Concord, Delco Electronics/General Motors, Jensen, Marantz, McIntosh, Potomac, Samsung and Sherwood. The product was designed for automotive and home audio system applications and performs the complete AM stereo signal decoding function in electronically tuned radios.

DOMESTIC DX DIGEST

DAVE SCHMIDT
42 CHELWYNNE RD.
CASTLE HILLS
NEW CASTLE, DE 19720

Here is the NRC column which matches the excitement of trying to type a column on an electric typewriter and having the electric go OFF! When sending your items in, type of neatly write, EDT, one side of the paper, leave some space between items, etal. Here we go:

The station you depend on

SPECIAL:

- 710 KFIA CA CARMICHAEL - Bad news, has started AN'ing on 6/11 w/Contemporary Christian Music, Go get 'em, they're beamed straight west! (DKK-CA) I've not known anyone from the west to be very straight! (DS)
- 790 KXTC CA CIOVIS - 6/5 1741 noted w/EZL music w/weak signal, new calls but same format, ex-KXQR. (DKK-CA)
- 1000 WCPL IL CHICAGO - Sked.: NSP w/Contemporary Christian Music, has dropped Mutual net and Larry King. Goodbye Washington! (DS-DE)
- 1120 KLIM CO LIMON - 5/28 1230 noted w/CW music format, 250 D1, another new Colorado station. (WH-CO)
- 1230 WKHT CT MANCHESTER - 5/29 0549 heard w/new call on top briefly in WEEX's null w/time, ID, weather, ex-WINF. (KG-PA) 6/17 0530 noted w/CW music, new calls, ex-WINF. (STAN-MA)
- 1250 WTAE PA PITTSBURGH - Now running NSP, has dropped MM 0200-0500 silent period. (JM-PA)
- 1270 WUTO OH MARYSVILLE - 7/1 0151+ xlnet signal w/WXYZ w/CW music, news on hour, weather, ads, PSAs, using "U Country" slogan. Per call to station, 1st day on was May 25th, add. 15151 US Route 30 East, 43040. (JM-PA)
- 1370 WRTK NY ROCHESTER - As of 6/19, station has been off the air. Station is in the process of being sold to local PBS outlet and is applying for the WXXI call, rumored to be returning by 7/1. (JB-NY) Someone called that they have indeed returned with some type of split schedule but I've misplaced the note, falls under the Charlie McCarthy department! (DS)
- 1380 KGLD MO ST. LOUIS - 6/1 2022 rock oldies, ID'ing as "1380 K-Gold", local ads, weather. Ex-KWK. (EB-MO) 6/14 2300 noted w/oldies and "K-Gold" ID's. (JJR-WI)
- WNVR CT NAUGATUCK - 6/21 0515-0530 noted on AN w/the Larry King show from Mutual. (KG-PA)
- 1400 KRE CA BERKELEY - Noted off both MM 6/4 and 6/11, hopefully sked is now AN-6, dropping NSP. (DKK-CA)
- 1570 WQTW PA LATROBE - 6/26 has returned to the air w/ID's as "16-Q" featuring 50's, 60's and 70's rock oldies and mix of 80's music, add.: Box 208, 15650. Actual 1st day back was 6/13. (JM-PA)



MIDDAY - MIDNITE:

- 730 WPIT PA PITTSBURGH - 6/18 1540 noted off, possibly due to power failure, noted on ET later 6/19 0125. (JM-PA)
- 750 WPDV WV CLARKSBURG - 6/18 1540 fair w/WPIT off w/CW music, ads, Mutual news, WV weather. (JM-PA)
- 930 WIZR NY JOHNSTOWN - 5/21 2015 strong w/no data s/off and invite to tune WSRG-FM 105, no SSB. (KG-PA)
- 960 WSBY MD SALISBURY - 6/15 2220-2248 finally noted w/WFIR, fair w/Orioles baseball, MoR music, Marine weather, female anc'r.(JM)
- 1150 WJBO LA BATON ROUGE - 6/11 2159 fair o/jumble w/end of news then ID. (LG-PL)
- 1170 KVOO OK TULSA - 6/17 2133 contest promo, ID, "Big Country Radio" slogan into sports. (LG-PL)
- 1300 WKCY VA HARRISONBURG - 6/24 2042 fair but fading w/full data s/off "providing the best in entertainment". (JM-PA)
- 1310 WIBA WI MADISON - 6/14 2316 fair w/sports program. (JM-PA)
- WDOD TN CHATTANOOGA - 6/11 2205 w/end of local news, weather, ID, good signal, a regular here. (LG-PL) Irregular here! (DS)
- 1350 WWRB PA WINDSER - 6/10 2044 good w/full data s/off and vocal SSB.(JB)
- 1360 WMOV WV RAVENSWOOD - 6/16 2100 ID noted at tail end of s/off. (JB-NY)
- WHBG VA HARRISONBURG - 6/10 2045 good w/full data s/off o/WIXZ/WKOP. (JB-NY) Yeah, their f/c should knock the wall down there.(DS)
- 1370 WEIF WV MOUNDSVILLE - 6/10 2045-2059 xlnet after WKMC s/off w/religious music up til full data s/off, Praise Radio slogan. (JB-NY)
- WELW NY ELLENVILLE - 6/19 2030 good w/s/off with invite to tune in PM, local WRTK was off. (JB-NY)



KMIS

AM-FM

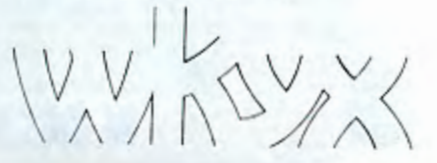
KSOH

100% RADIO • STEREO • 106

1380 WACB PA KITTANING - 6/12 2032 good w/ID, local car ad. (JB-NY)
 1410 WMML AL MOBILE - 6/11 2153 w/"14 MML" ID and promo for "Dad of the Year", into CW music. (LG-FL)
 1420 WCED PA DUBUIS - 6/23 2041-2046 good o/WHK w/Top 40 music, weather, ad, gone at power cut. (JM-PA)
 WACK NY NEWARK - 6/24 2040-2045 EZL music and full data s/off, anc'd power as 500 watts fulltime and 0500 s/on. This is a full-time station but s/off at local sunset (maybe on Sunday only). (KG-PA) I believe WKLV-1440 has the b-st Sunday schedule, they don't s/on at all! WBSG-1550 had a Sunday sunset s/off years ago even though they're fulltime. (DS)
 WMYL NY HERKIMER - 6/18 2030-2045 on top w/MYL and frequent ID's and MYL promos, no data s/off mentioning formerly WRMV and 0600 s/on, invite to listen to MYL 24 hours a day on WYUT-FM 92.7 in Stereo! (KG-PA)
 1440 WCBL PA CARBONDALE - 6/19 2045 s/off very good w/invite for written comments about station operation. (JB-NY)
 1460 WBNS OH COLUMBUS - 6/6 2050 fair in mess w/Clippers baseball, ad.(JM)
 1470 WOHO OH TOLDO - 6/11 2217 tentative w/Reds baseball and muddled similar sounding ID, could this be anyone else? (LG-FL)
 WPDN NY POTSDAM - 6/12 2042 full data s/off good w/no WWG-1460 splash. (JB-NY)
 WTRR MD WESTMINSTER - 6/28 2113 noted w/promo and ID during Orioles baseball w/WSAN. (JM-PA)
 1480 CKAN ON NEWCASTLE - 6/14 2049 very strong w/"CK Country" slogan.(JB)
 1490 WDLG NY PORT JERVIS - 6/21 2055 o/all w/dual ID for 96.7 PM stereo and 1490 AM, into a 50's oldie, later 2119 w/Tri State weather, not heard since 5/3/71 DX TEST! (KG-A)
 1530 WDEY MI LAPEER - 6/16 2115 xint w/s/off w/invite to tune in FM.(JB)
 1550 WBCV TN BRISTOL - 5/22 2015-2030 s/off good in CBE's null w/gospel music program w/female anc'r, giving May sked as 0615-2030, s/off by male w/closing theme song. (KG-PA)
 WJLY PA BRADDOCK-PITTSBURGH - 6/18 2020 not-d off early due to same T-Storm that wiped out WPIT-730. (JM-PA)
 1560 UNID 6/14 2159-2237 ET w/OC and TT of various hertz, strong thru WQXR, looped west. (KG-PA)
 1580 WBBE KY GEORGETOWN - 6/15 2100 fair w/s/off and light jazz music, noted after WVKO s/off. (JM-PA)
 WVKO OH COLUMBUS - 6/15 2100 good w/B/Sol music, s/off w/Slogan "KO-16, the Rhythm of the City", FM 94.7 mentions. (JM-PA)
 KLOU LA LAKE CHARLES - 6/18 2228 caught this w/ID only o/several others, had this on: veried in KY. (LG-FL)
 1590 WCCL MS JACKSON - 6/18 2154 noted w/ID between rock selections.(LG)
 1600 WXVI AL MONTGOMERY - 6/18 2216 frequent "Love 16" ID's, gospel music, NAACP promos. (LG-FL)

MIDNITE - MIDDAY:

540 CBK SK WATROUS - 6/14 0112 classical music alone w/fades. (WF-IN)
 570 KLCAC CA LOS ANGELES - 6/4 0413 w/ID thru KLUB then CW music.(DKK-CA)
 600 KOGO CA SAN DIEGO - 6/11 atop all AM w/Larry King snow w/KFRC-610 off, rocker noted under, likely CFUN. (DKK-CA) Or WCAO if the signal was 3 years late! (DS)
 610 *KFRC CA SAN FRANCISCO - 6/11 0333 noted off at tune in, still off 0540. (DKK-CA) No wonder I didn't hear 'em, %&#*!!!(DS)
 KYJC OR MEDFORD - 6/11 0333-0540 weak/fair w/female anc'r, rock music, news, ID and time checks, KFRC was off. (DKK-CA)
 620 KNCS CA HANFORD - 6/11 0334 thru KTAR/KGW w/ID, CW music. (DKK-CA)
 640 KGVV MT BELGRADE - 6/12 0731-0737 w/UPI news (just missed 0730 s/on!), into Contemporary Christian Music, easy in KPI null until fade out. (DKK-CA)
 680 WCBM MD BALTIMORE - 6/21 0142 good w/WPTF absent w/News Talk 68 IDs and Talk Radio network. (JM-PA)
 WINR NY BINGHAMTON - 6/21 0159 very good w/MYL and "AM 680" ID's, RKO news, weather, PSA, gave name and called, was amazed that I heard them. (JM-PA) Yeah, I wish I'd be amazed sometime!(DS)
 790 WQXI GA ATLANTA - 6/7 0109+ good but fading w/60's music and PSA.(JM)
 UNID 6/7 0115 someone w/Reds baseball, looping east-west, WAKY?(JM) Might have been, likely was, who? (DS)
 850 WIVS IL CRYSTAL LAKE - 5/17 0727 w/local news, ID o/others. (EB-MO)
 WKBZ MI MUSKEGON - 6/15 0043 o/KOA w/MOR music. (WF-IN)



910 *KNEW CA OAKLAND - 6/11 0434 noted off at this time, was on at 0400 tune in, still off past 0540. (DKK-CA)
 KPOF CO DENVER - 6/11 0435-0529 poking thru XEAO w/religious program, submerged mostly but did surface for 1 good ID. (DKK-CA)
 KALL UT SALT LAKE CITY - 6/11 0434-0540+ snared dominance with XEAO while KNEW was off. (DKK-CA)
 920 KORK NV LAS VEGAS - 6/11 0511 thru KOLO w/ID, ads then "Something Stupid". (DKK-CA) How'd they get a copy of this column? (DS)
 CKCY ON SAULT STE MARIE - 6/14 0132 w/Top 40 music o/WBAA. (WF-IN)
 930 WIZR NY JOHNSTOWN - 5/22 0600-0617 good in WCNR's null w/news, weather, ad and Ag Radio Net. farm news, into MYL type music. (KG-PA)
 940 KIOA IA DES MOINES - 6/11 0221+ in very well w/MoR music, Command weather, PSA, ID, ABC news, gave request number, called and they mentioned after 0300 about being heard in Pittsburgh. Don't know why! (JM-PA) I do but I won't tell! (DS)
 950 WWJ MI DETROIT - 6/14 0138 news on auto emissions tests o/WJPC, as usual. (WF-IN) 6/20 0206 weather, local news, faded soon to WJPC. (EB-MO)
 960 WSBT IN SOUTH BEND - 6/20 0200 ID into CBS news o/others. (EB-MO)
 990 UNID 6/11 0510 someone w/good signal w/Talknet, looping east/west, any ideas? Not WNOX. (JM-PA) Lot's....but not printable!(DS)
 WABX WI CLARE - 6/4 0600 poor w/s/on into CNN news. (JJR-WI)
 1050 CFYN ON SAULT STE MARIE - 6/14 0144 in WHN null w/MoR music. (WF-IN)
 1060 WNOE LA NEW ORLEANS - 5/28 0333+ atop w/CW music, time check and ID, anc'd as AM stereo, atop KUKQ/KRSP w/KPAY off. (DKK-CA)
 *KYW PA PHILADELPHIA - 6/17 0105 full data s/off and SSB, off for xmtr work, only Cuban noted on open channel, back 0157 w/OC and TT periods. (KG-PA) Rats....missed that one, too! (DS)
 *WHFB MI BENTON HARBOR - 6/11 0015 fair in KYW fades w/ID and time checks during ET. (JM-PA)
 1070 WTSO WI MADISON - 6/14 0157 Music Country Network, CW music, ID and AP news, u/CHOK/WIBC. (WF-IN)
 1080 WYCM NC MURPHYSBORO - heard in Hilton Parking Lot at Claymont, DE on 1984 Blazer radio from 0700-0720 on 5/20 w/UNID (not WVIC)...Schmidt sez WQRO. Both needed in Poquonock by the Wiz. This took place during the Wiz's annual pilgrimage to New Castle 5/19 to 5/20. (WIZ-DE) This report was not typed, double spaced on neatly written BUT the contributor was type accepted, double spaced and neatly written! (DS)
 1090*WBAL MD BALTIMORE - 7/2 0140 noted w/various TT this AM. (DS-DE)
 1100*WWE OH CLEVELAND - 6/25 0130 noted off this AM. (JM-PA)
 UNID 6/14 0228 Spanish music noted u/WWE, probably you know who! (WF-IN) Does he verie? (DS)
 1170 KSTT IA DAVENPORT - 6/14 0208 w/Nighttime America, no sign of either WVA or KVOO. (WF-IN)
 1220*WGAR OH CLEVELAND - 6/25 0210 noted off this AM, OC and TT. (JM-PA)
 1230 WLFH NY LITTLE FALLS - 5/29 0542-0547 strong in WBBX's null w/Mickey Gilley song, weather, time and community notes. (KG-PA)
 WHUC NY HUDSON - 5/29 0555 fair in WBBX's null w/full data s/on, no SSB noted. (KG-PA)
 1250*WTAE PA PITTSBURGH - 7/2 0130 noted on ET w/TT and OC, only loud CHWO noted u/OC. (DS-DE) And you missed it John! (DS)
 1260*WNRK DE NEWARK - 5/25 0000-0103 ET w/pop music and ID's, conducted by Charlie Slezak, long ID at end requesting reports. (DS-DE)
 1310*UNID 6/4 0245 someone looping north/south w/different levels of tone, sweeps, etc. (JM-PA)
 WTLB NY UTICA - 6/16 0325 w/calls and talk, ID, noted in null of WIBA w/fair signal. (JJR-WI)
 1330*UNID 5/21 0024-0110+ TT w/various hertz tone, strong o/all.(KG-PA)
 1350 CKAR ON OSHAWA - 6/11 0106+ very strong at times w/Top 40 music, ID, w/CKQT FM, reported. (JM-PA) To who? Smokey the Bear? (DS)
 1360 KRYS TX CORPUS CHRISTIE - 6/16 0337 fair w/Top 40 music and ID, no sign of WSAI/WGEE. (JJR-WI)
 1370 WKMC PA ROARING SPRINGS - 6/26 0545 just missed s/on, mention of owners given then taken out by WIXZ-1360. (JM-PA)
 1380 WMLP PA MILTON - 6/26 0528 fair w/Kate Smith and God Bless America, ID, s/on, weather then MoR/Top 40 music before fading. (JM-PA)
 WVIN NY BATH - 6/5 0653 finally noted my closest unheard w/local ad, fair w/local WRTK-1370 off. (JB-NY) Mine, too! (JM-PA)
 1400 WHGB PA HARRISBURG - 7/2 0115 briefly very strong w/weather, ID and MYL music, quickly faded. (DS-DE)
 1440 WKLV VA BLACKSTONE - 6/26 0600 very good w/s/on "to inform and serve the public interest" then ABC news. Did not verie my PPC eye! (JM-PA) You wrote to small, John! (DS)
 1460*WDOG SC ALLENDALE - 6/25 0146-0154 o/WCMB w/TT, ID and time check.(KG)



- 1480 WFXW IL GENEVA - 6/12 0022 contest promo, weather, MoR music, and ID, mixing w/others. (EB-MO)
 *UNID 6/25 0245-0305 o/all w/TT, NO ID, looped west. (KG-PA)
 1490 WABJ MI ADRIAN - 6/4 0105 very good w/ABC news, weather, local race results from Toledo and WQTE-FM ID. (JM-PA)
 WAYB VA WAYNESBORO - 6/12 0008 very good w/"your weather station" ID, brief sermon then full data s/off. (JM-PA)
 KTRR MO ROLLA - 6/16 0107 noted w/s/off w/SSB. (JJR-WI)
 1540 WPKZ PA PUNKSUTAWNEY - 6/6 0600 in well w/s/on. (JB-NY)
 1550 *WCHU TN CHATTANOOGA - 6/11 0200 fair w/EZL music and ID for FM.(JM-PA)
 *WVAB VA VIRGINIA BEACH - 6/10 0116 xlnt w/TT for xmtr work w/Top 40 music and ID's. (JM-PA)
 WSER MD ELKTON - 6/9 0601 in remarkably well w/s/on. (JB-NY) Why that's just remarkable! (DS)
 WTTC PA TOWANDA - 6/6 0600 all alone w/s/on w/SSB. (JB-NY) Ditto (DS)
 1560 KQJJ IA IOWA CITY - 7/2 0207 noted w/weather, extended forecast then fast, no data s/off, to return 0530, good w/WQXR off. (DS-DE)
 WFSP WV KINGWOOD - 6/9 0601 s/on weak but audible, no WQXR. (JB-NY)
 1570 WKOL NY AMSTERDAM - 6/6 0601 good signal w/s/on. (JB-NY)
 1580 *WLIM NY PATCHOQUE - 6/15 0058-0102 noted on ST w/Big Band Music, ID. (WF-IN) 6/15 0135-0204 very strong w/big band, 40's music and ID. (JM-PA) 7/2 0145 noted on BT w/rock music, oldies, ID w/mention of 10kw day power, sounded like it, too! (DS-DE)
 1590 KCIN CA VICTORVILLE - 6/9 0831-0833 punched thru w/ID's u/KBBQ, KLIV was buried or gone for about 5 minutes. (DKK-CA)
 1600 WTRU MI MUSKEGON - 6/12 0032 rock music, ID, promo, taking out local KATZ. (EB-MO) Hope they had fun! (DS)

ADDRESSES:

- 680 WINR NY BINGHAMTON - Per verie, Box 68. (JM-PA)
 1430 WJRB TN MADISON - Per verie, 48 Music Square East, Nashville. (JM-PA)
 1460 WBNS OH COLUMBUS - Per verie, 175 South 3rd St., 43215. (JM-PA)
 1580 WLIM NY PATCHOQUE - Per phone call, 45 Pennsylvania Ave, Medford, 11763, same as old WYFA calls. (JM-PA)
 1590 WPLW PA CARNEGIE - Per verie, 201 Ewing Ave, Pittsburgh 15205. (JM-PA)

FREQ. CHECK UPDATER:

- 2nd FRI - Delete WSHP-1480.
 3rd MON - Delete WRNL-910.
 Add WSHP-1480 0530-0545 with tone.
 3rd THU - Change WFTR-1450 time to 0207-0215.
 Change calls, WFEC-1400 is now WHGB.
 Change calls, WXAM-1400 is now WKAV.

1060

RANDUMBS:

This is all up to and including 7/4, column going out 7/5 AM, hope that it gets there on time?
 Yes, the Wizard was here the weekend of 5/20, the town just hasn't been the same!
 Lots of travel this past month, including still another trip to Youngstown and Jerry Starr land, with an actual on site visit to the famous WSAJ-1340 still-being-used longwire antenna! Can't believe I heard that thing here! Thanks Bonnie and Jerry (again) for the fine time, as well as all the others!
 That's everything....next column in about 4 weeks so dust off the dials and given 'em a spin, when you hear something, send it along!

PINE TUNERS DEPT.:

- WH-CO/Wayne Heinen, Aurora, CO
 STAN-MA/Stan Morse, Bradford, MA/HQ180A, SM2
 DKK-CA/Don Kaskey, San Francisco, CA/HQ140X, SM2
 WIZ-DE/The Wizard from Poquonock, lost again!
 WF-IN/Wendall Ford, Westville IN/CBC AM/FM
 KG-PA/Kermit Geary, Walnutport, PA/HQ180, SM2, R389, LW.
 JM-PA/John Malicky, Pittsburgh, PA/AIwa AR158
 JB-NY/Jerry Bond, Rochester, NY/HQ140AX, LW, Loop
 LG-FL/Lynn Gillis, Tallahassee, FL/TRF, TVI, FM images!
 JJR-WI/John Reiger, West Allis, WI/R1000, IC R70, Kowalski Loop
 EB-MO/Eric Bueneman, Hazelwood, MO/DX200, Superadio II, SM-2.
 DS-DE/You expected Archie Bunker?/HQ180A, HQ180AX, SM-2, STILL short LW!

And now we close and leave the rest of this space for comments from the under the table office of Mike and Sue! Ask 'em about that at the Springs!

**INTERNATIONAL
DX DIGEST**

CHUCK HUTTON
1035 LATHAM ROAD
DECATUR, GA 30033
(404) 633-1198
BEFORE 2300 ELT

Times are GMT. For ELT subtract 4 hours. Deadlines are usually Monday.

- 164 FRANCE Allouis 0338 5/14 dinner mx, FF talk by man fair. (Hakiel)
 218 MONACO Roumoules 0334 5/14 pop mx, FF talk, good. (Hakiel)
 254 ALGERIA Tipaza 0342 6/6 AA talk, AA mx, best LW stn, good. (Hakiel)
 440 CUBA R. Progreso CMBB Guanabacoa YL with news to 0400, patriotic promo and ID then ballads at 0401, good 5/31. (Frodge)
 806 NETHERLANDS ANTILLES PJB Bonaire with religious promo to 0400 6/8, then Radio Bible Hour w/CKLW, good. (Frodge)
 834 BELIZE man with MoR vocals, "Sunday Night Serenade", ORN de WHAS, fair 6/4. (Frodge)
 870 ARGENTINA Buenos Aires LRA1 0430 6/23 man and woman in spirited talk, no loop necessary as signal was way o/WML, good. (Hakiel)
 1000 BRAZIL Sao Paulo ZYK522 0227 5/28 PP talk, ID, fair. (Hakiel)
 1001 PANAMA Chitre? 0240 5/28 new stn? ID's as R. Nacional de Panama. (Hakiel)
 1165 ANTIGUA St. John's woman anchor with light classical instrumental mx program, ORN de WJMA, fair/poor 6/12. (Frodge)
 1404 FRANCE Ajaccio 0328 5/21 FF pop mx, "La Vie en Rose", good, presumed to be France as no Africans were in but several French stns were. (Hakiel)
 1521 SPAIN unknown 0344 6/11 much SS talk by man, fair. (Hakiel)
 1539 SPAIN Valladolid 0352 6/11 SS talk, mx, vocals, poor. This night exceptional for reception from Spain. Every high frequency channel had signals from Spain. (Hakiel)
 1555 CAYMAN ISLANDS R. Cayman 0301 6/8 BBC news to 0310 then woman with local mx to 0320 then EZL mx/oldies fair/poor. (Frodge)
 1584 SPAIN(?) unid with group singing and crowd noises like party or festival, severe fading and fair/poor 0431 6/11. (Frodge)
 1610 ANGUILLA Caribbean Beacon 0420 6/7 accented man with MoR religious mx, ORN de chirper and ORN, good. (Frodge)

Well well...Not a whole lot here this time. That is if I really did find all the DXD stuff which is in the room that has all the furniture from the living room and the books from the bookcase strewn everywhere while we repaint and strip the hardwood floors. I could barely find space to fire up the computer and type this little bit of stuff. Sorry there isn't more to show you guys this time around....

Harold Frodge-Midland, MI ??????????? (you blew it Harold)
 George Hakiel-W. Islip, Lon Geylunt (an area east of NYC) R71A, LW's, loops

It's Finally HERE !!

(Well, Almost !!)

**The 7th Editon of the
DOMESTIC LOG BOOK**

We are now taking pre-publication orders.

CHECK OUT PAGE 47.....

FILL IT OUT.....

DO
IT
NOW
!!!!

MAIL IT IN.....

TODAY!!!

FORMATS

OF THE MONTH CLUB

TONY FITZHERBERT
356 JACKMAN AVENUE
FAIRFIELD, CT 06430

Welcome to the Summer Solstice edition of the Format of the Month Club, the most exciting column in the wonderful world of broadcasting! We have many items from our contributors this time, so turn on your radios, and let us go!!

540	WABO	PA	Canonsburg	- Gospel and relig. nx, and syndicated religious talk (JM)
550	KUSA	MO	St. Louis	- CWM (EB)
	WKRC	OH	Cincinnati	- Ad Con and 60's and 70's oldies "55 KRC"(JM)
570	WRTH	IL	Wood River	- Now BBD, ex MYL, RKO Net (EB)
	WSEI	MA	Boston	- "News Radio" with both CBS and APR. (TF)
	WKBS	PA	Uniontown	- Talk, MOR, CBS News and Features (JM)
620	WHJB	PA	Greensburg	- CWM, "Country Connection", Mutual Nx (JM)
630	KYOK	MO	St. Louis	- Talk (EB)
640	WHLO	OH	Akron	- BBL, BBD, CBS (JM)
660	CFPR	AB	Calgary	- On the air in Jan, 1984, pop or T40, very upbeat, contests, 24 hour, NSP, always used "CFR" slogan, NEVER CWM!! (BH)
680	WISR	PA	Butler	- MOR and soft rock, with very local nx(JM)
690	KSTL	MO	St. Louis	- Ethnic, Religion (EB)
730	WJMW	AL	Athens	- CWM, APR news, anticipating change to 770
	CKLG	BC	Vancouver	- Now 7-40 CHR, had been more pop- (JM)
	KWRE	MO	Warrenton	- Ad Con in recent years, 24 hour, NSP (BH)
	WPIT	PA	Pittsburgh	- CWM (EB)
760	KSJL	TX	San Antonio	- Gospel and Religious programs, my favorite slobber! (JM). My favorite non-verifier!(TF)
				- Now on w/ 50 KW/ 1 KW U-4, with Rock, Blues Black Programming, R & B, and some SS - ID's as "All Hit Radio - 76" and "The Spirit of 76", no network noted as yet (BH - TX as contrasted with BH who will be ID'd at the end of the column!!!
770	WEW	MO	St. Louis	- BBD (EB)
790	WSIG	VA	Mt. Jackson	- Modern CWM, Virginia Tech Sports, APR Nx
800	CKLW	ON	Windsor	- BBD, drops ROK (EB)
810	WEDO	PA	McKeesport	- Lots of oldie radio programs including Golden Age of Radio Theatre, some MOR "Radio 51" and "The very best Music to You" (JM)
850	KFUO	MO	Clayton	- Religion (EB)
	WCOY	FL	West Palm Beach	- Ad Con, drops WEAT call and News - talk
860	WAMO	PA	Pittsburgh	- Gospel and relig in the morning, from (PN). noon to 5PM, oldies with Porky Chedwick, SEN net, sometimes simulcasts with FM with urban contemporary music (JM)
900	CJVI	BC	Victoria	- Has dropped CWM, after years as a success with that format, now Ad Con (BH)
	WNYN	OH	Canton	- MOR, ABC Direction Net. (JM)
910	WAVL	PA	Apollo	- "910 Christian Radio", religious music programs and preaching, also Heritage and music (Classical nx after 2 PM for 45 minutes)
920	WMMN	WV	Fairmont	- Soft rock, MOR, CBS (JM)
940	KFRE	CA	Fresno	- Now CWM, ex pop. 24 hours, NSP (BH)
920 (again, out of sequence!!)	KYST	TX	Texas City	- Texas City has dropped ALL BEATLES and has gone SS!! (CD)
940	WESA	PA	Chaleroi	- Simulcasts w/ FM "98 ESA", Rock, ABC nx (JM)
	WKGW	VA	Smithfield	- Religion (JM)
950	WQBE	WV	Charleston	- CWM "Certified 24 Carat Country" ABC Nx, Music Country net at night (JM)
960	WHYL	PA	Carlisle	- Contemporary CWM, simulcasts w/ FM (JM)
970	KYTE	OR	Portland	- Changed formats in Feb to the official MYL format/ This was the second format change in less than a year, went to pop format in Summer 1983, after years as a country station (BH)
	WTKN	PA	Pittsburgh	- Talkradio, ABC net. (JM)
1010	KXEN	MO	St. Louis	- Religion (EB)
1020	KDKA	PA	Pittsburgh	- Now all Urban Contemporary, hi!!! (JM)
1030	KMAS	WA	Shelton - Olympia	- now on 1030, ex 1280, Ad Con format, local nx at :57, A(1) nx on the hour. Heavily into serving "southern Puget Sound" (i.e. de-emphasizing small town of Shelton, trying to reach the state capital of Olympia..still daytime, but planning to go fulltime soon(BH).

Formats -2-

1040	WKSE	PA	Everett	- CWM, A(1) nx (JM)
1050	WBUT	PA	Butler	- MOR, Mutual Nx (JM)
1060	WRGW	OH	Canton	- "Home of Adult Radio" w/ oldies, MOR, soft rock (JM)
				(PN)
	KHJK	TX	Lockhart	- Dropped KCLL call and CWM, now is religion.
1080	WEPF	PA	Pittsburgh	- CWM, ABC nx (JM)
1050 (out of sequence, again)	WHOI	GA	Augusta	- Inspirational Radio (JM)
	WTSJ	OH	Cincinnati	- Contemporary Christian Music, ABC nx, "The Sound of Joy" (JM)
1110	WKEG	PA	Washington	- Ad Con, "The Great 11" (JM)
	KTEK	TX	Alvin	- Has dropped CWM for Rel/Gospel (CD)
1120	KMOX	MO	St. Louis	- News Talk (EB)
1130	WASP	PA	Brownsville	- CWM (JM)
1150	WKPA	PA	New Kensington	- MOR "The Everything Station", Mutual (JM)
1170	WVVA	WV	Wheeling	- CWM and A(1), paid Religion nights (JM)
1190	KEX	OR	Portland	- Drops L. King nights, now 24 hour Ad Con, NSP (BH)
1230	WESX	MA	Salem	- UPI NX and Features, variety, lots of local nx and features (TF)
	WBVP	PA	Beaver Falls	- MOR, ABC nx(JM)
	WKBO	PA	Harrisburg	- Ad Con, Talk, NBC News (JM)
1240	WBAX	PA	Wikes - Barre	- "Station of the Stars" (JM)
1250	WTAE	PA	Pittsburgh	- Current hits, Steelers FB, "PA's information and sports authority"(JM)
1260	WIBV	IL	Bellville	- CWM, CNN network(EB)
	WEZE	MA	Boston	- Contemporary Christian, Mutual (TF)
	KOIT	CA	San Francisco	- BFL 24 hours NSP (BH)
1270	KORY	NV	Sparks-Reno	- Ex KRCI, but still oldies format (BH)
1280	KYKN	OR	Eugene	- CWM 24 hours, ex KBDF, which was news-talk with CNN and ABC Talkradio, both dropped
	WKST	PA	New Castle	- "Music and Memories", local HS sx(JM)(BH)
1290	WOMP	OH	Bellaire	- "Talk Radio 1290" local talk shows, w/ APR nx. (JM)
1300	WCLG	WV	Morgantown	- MOR "The one to turn to -CLG", NBC (JM)
1320	KSIV	MO	Clayton	- Religion (EB)
	WJAS	PA	Pittsburgh	- MYL, ABC Directions (JM)
1330	KUPL	OR	Portland	- Now CWM, ex MYL(BH)
1340	KATY	CA	San Luis Obispo	- back on the air, after silent since Summer of 1983/ SMN BBD (PN)
	WROD	FL	Daytona Beach	- MYL, ABC Nx (JM)
	WSTV	OH	Stuebenville	- EZL, Mutual nx(JM)
	WCVI	PA	Connellsville	- CWM "Fayette's best country", ABC nx(JM)
	WKSE	WV	Welch	- Now CWM (PN)
1350	WRKM	TN	Carthage	- T40, POP, CWM, MOR and local and regional sports, Univ. of Tenn FB (JM)
	WVVA	VA	Norton	- Simulcasts w/ FM w/ T40, Ad Con, sports
1360	WLYN	MA	Lynn	- Ethnic but w/ "Music Radio" musical (TF) fillers, probably for the FM which is ROK
	KXBJ	MN	Benidji	- Now CWM(PN)
	WIXZ	PA	McKeesport	- CWM, SP on Mx(JM)
	KAMT	WA	Tacoma	- Ad Con, ex KMO which was CWM for years.
1370	WOOH	KY	Grayson	- CWM with segments of bluegrass and GOS, heavy emphasis on local nx(JM)
	WPEA	NE	Manchester	- T40 with some oldies, ABC nx(JM)
1380	KWK	MO	St. Louis	- ROK, soon to be dropped (if not already) for oldies(EB)
1380	WACB	PA	Kittanning	- Soft rock and 60's oldies(JM)
1390	WEED	NC	Rocky Mount	- CHR (country nx, John??), ABC Contemporary and info news (JM)
1400	KNDE	CA	VISALIA	- EX KONG with Christian, now is BBD (PN)
	WYNP	GA	Alpharetta	- ex WMOE, now is news-talk(PN)
1410	WDOE	NY	Dunkirk	- MYL, A(1) news(JM)
	KQV	PA	Pittsburgh	- All news, CBS, L. King(JM)
1420	WMYL	NY	Herkimer	- ex WMRV, MYL, BBD(PN)
	WHK	OH	Cleveland	- oldies, "Solid Gold 14-X" NBC, former CWM
1430	WIL	MO	St. Louis	- CWM(EB)
1440	WAJR	WV	Morgantown	- CWM(JM)
1450	WDAD	PA	Indiana	- Ad Con, CBS (JM)
	WJPA	PA	Washington	- MOR, Mutual, L. King(JM)
1460	WBET	MA	Brockton	- "Great Songs, Great Stars" Irish programs A(1) NEWS (JM)
	WERN	MI	Big Rapids	- Rock, T-40 (JM)
	KIRL	MO	St. Charles	- Gospel(EB)
	WCMB	PA	Harrisburg	- CWM, RKO(JM)

- 1450 WAME NC Charlotte - 24 hour Christian "Sonlife Radio" (JM).
- WCNS FA Latrobe - CMM (JM).
- 1400 KBAS Bullhead City - CMM (PN) (In Arizona)
- WOLF NY Syracuse - reported to be album rock simulcasting WMAQ-95.3, planning to go urban contemporary, may have happened(PN).
- WEST IL East St. Louis - Soul, CHR(EB).
- WOHI OH East Liverpool - Soft rock and oldies(JM).
- 1510 WINV IL Highland - Ad Con.(EB).
- WRUA PA Monroeville - "Pittsburgh's all oldies"(JM).
- 1520 WDSL NC Monckville - 40% Gospel, 60% CMM(JM).
- KYXI OR Oregon City - drops all news for NOS, with drivetime news blocks and L. King all night (BH).
- 1550 WNTN MA Newton - weekdays features mx for break dancing "Boston's Official DanceMusic Station, Irish on Saturdays, ethnic on Sunday(TF).
- WJLY PA Braddock - Gospel and Religious Programs, ID for "Braddock-Pittsburgh"(JM).
- 1570 WOKZ IL Alton - Ad Con(EB).
- WBVD MA Beverly - drops CMM, clustered Ad Con, "Voice of the North Shore"(TF).
- CHLO ON St. Thomas - MYL (JM).
- WQZW PA Latrobe - CMM "The Solid Gold Sound of the Brand NEW 16Q" (JM).
- 1580 WGBB FL Mt. Dora - ESD ABC nx(JM).
- 1590 WPLW PA Carnegie - Contemporary REL "Sunshine 16" (JM).
- 1600 WRBN GA Warner Robbins - MOR, Mutual and Ga Net nx(JM).
- KATZ MO St. Louis - Urban Contemporary, Gospel(EB)
- WANR WV Wheeling - was CHR, now EZL(PN).

Well, a blockbuster, but now is all hunt and pecked!! This has been brought to you (on this falling typewriter) by the following public spirited sponsors: (EB) is Eric Bueneman, our Bandscan editor.(JM) is John Malicky, the "Bar of Pittsburgh"(BH) is our West Coast Correspondent, Bill Hardy. Conrad Durocher is (CD), and (BH) in Texas is Bill Hale. From Texas comes (PN), or Paul Nolan.(TF), of course, is the guy who put this together. Gentlemen, thank you so much!!! And, for the rest of you...well, if WLS goes urban gospel, or WMAQ formats continuous Chicago Symphony, over 700 people want to hear about it. What formats are interesting in YOUR area? By the way, it is almost time for my annual railroad trip, this year to Chicago, so between trips on the Chicago and Northwestern and the South Shore, and that great rail trip of all time, the Englewood and Jackson Park elevated, I hope to hear some Chicagoland stations...and hopefully will visit a couple for profiles..including a 5 hour a day AM outlet with 95 foot tower atop an eleven story hotel.....get those formats in!!!

73's.

Tom

DIAL TWISTING

HERE ARE THE WORDS

D G L I T K O T W P I A J S S G W U S O J T X G A J
 R A A S M H H M I W N R N L W Y N E F E D R M Y
 X B N C I D B W N G X O I K B I A R X F L G W B V F
 F S U C G T P A C H W B X K M K W B V P W L H W F
 E W A T S Y V N J N K S E D F I A P W R H J Z U W
 W F W W W O T C P M G R L I V P I H K R F J V B D
 G R U H P K C H O I Y U C H A V D O W P E C W P F W
 N D N T X I N D X S Z C V C Z T H K I R O B G N A W
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 F H U O I H A V V H P N D P H S T B O T J S M W N
 Y F L M B S T W Y V N R X H T Y V F E L G R D V A
 A G E A M C T T B A E N E T X R K C F P W P H C O
 N S M V B C B N W A Y N O X K T I O L W O O W G Z
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TO LOOK FOR:

- CBL
- CBM
- CBU
- KCBS
- KFI
- KIRO
- KMGX
- KOB
- KXEL
- KYW
- WBAC
- WBAL
- WBAL
- WBAP
- WBDM
- WBT
- WBZ
- WCCO
- WCBS
- WGN
- WCFL
- NHDH
- WGY
- WTNS
- WIND
- WKWB
- WJR
- WMAQ
- WLV
- WDR
- WNBC
- WPKD
- WPTV
- WTD
- WRVA
- WTC
- WSM
- XEWA
- NWL

Answers P. 41

THERE ARE 40 WORDS HERE - CAN YOU FIND THEM?

BANDSCAN

ERIC BUENEMAN
 836 LAMPLIGHT LANE
 HAZELWOOD, MO 63042
 (314)-895-1436
 (1700 TO 2400 ELT)

Here is the official WOC column which is just as exciting as sue knitter listening to Laura Branigan (Have you lost your self Control-y-ni), and Mike Knitter (the Great) listening to Michael Jackson! (Are you causing more Thrillers, Mike-y-ni) Your editor comes out with WOC scans this time out (I'll never beat Tony Fitcherbert at this game), one a night scan (done solo) from my home WOC, and a day scan from Springfield, MO (which we'll present in a moment). The first one is an updated scan (night) done by your editor, using a realistic WA-200, a General Electric Superadio II and an SA-2. (Note: = neara while local sta. is off.)

- 540 CBK, Regina, SK
- 540 KENA, San Luis Potosi, MX
- 550 KUSA, Ft. Lauderdale, FL
- 550 KUSA, San Antonio, TX
- 550 KFYA, Bismarck, ND
- 560 KLVJ, Beaumont, TX
- 570 WNAZ, Yankton, SD
- 580 CMLA, Santa Clara, Cuba
- 580 WATY, LaCrosse, WI
- 580 WISQ, Topeka, KS
- 590 WJAH, Wood River, IL
- 590 WOC, Omaha, NE
- 590 KLSB, Austin, TX
- 590 CACA, La Julia, Cuba
- 600 KRAV, Urbana, MO
- 610 WDAF, Kansas City, MO
- 610 WSGN, Birmingham, AL
- 620 WTKV, Milwaukee, WI
- 620 KWFT, Wichita Falls, TX
- 630 KXOK, St. Louis, MO
- 630 KSLA, San Antonio, TX (D)
- 640 CABB, Guanabacoa, Cuba
- 640 WMLS, Norman, OK (now fulltime!)
- 640 KFI, Los Angeles, CA
- 650 WSN, Nashville, TN
- 660 WNBC, New York, NY
- 670 WEA, Chicago, IL
- 680 KFLA, St. Joseph, MO
- 680 WKWJ, Memphis, TN
- 680 KNSA, San Francisco, CA (D)
- 690 CMAA, Santa Clara, Cuba
- 690 WTLA, New Orleans, LA
- 700 WLV, Cincinnati, OH
- 710 WOR, New York, NY
- 720 WGN, Chicago, IL
- 730 AEA, Mexico City, MX
- 740 CBL, Toronto, CA
- 740 KRAQ, Tulsa, OK
- 740 KTAH, Houston, TX
- 750 WBB, Atlanta, GA
- 760 WJX, Detroit, MI
- 770 WABC, New York, NY
- 780 WBBM, Chicago, IL
- 790 WNC, Memphis, TN
- 790 WAKY, Louisville, KY
- 800 CMLA, Windsor, CA
- 800 FJB, Bonaire, N.A.
- 810 XEROK, Ciudad Juarez, MX
- 810 WGY, Schenectady, NY
- 820 KCKO, Kansas City, MO
- 820 WBAF, Fort Worth, TX
- 830 WCCO, Minneapolis, MN
- 834 Radio Belize, Belize City
- 840 WNAS, Louisville, KY
- 850 KCA, Denver, CO
- 860 CJBC, Toronto, ON
- 860 WJAG, Douglas, GA (D)
- 870 WFL, New Orleans, LA
- 880 WCBQ, New York, NY
- 890 WLS, Chicago, IL
- 900 AEA, Mexico City, MX
- 900 CMLA, Hamilton, CA
- 910 WGLC, Miami, CA
- 910 WATF, Worldview, MO
- 920 WNU, Granite City, IL
- 920 WJHL, Fairbault, MN
- 920 WJOL, Little Rock, AR
- 930 WJAO, Quincy, IL
- 930 WJLI, Jackson, MS
- 930 WJAY, Oklahoma City, CA
- 940 WJLA, Mount Vernon, IL
- 940 WJON, Des Moines, IA
- 940 CBL, Montreal, PQ
- 950 KRAQ, Houston, TX
- 950 WLSA, Montgomery, AL
- 950 WJL, Detroit, MI
- 950 WJOL, Spartanburg, SC
- 960 WJLA, Shenandoah, VA
- 960 WJBI, South Bend, IN
- 970 WJAY, Springfield, IL
- 970 WJVS, Louisville, KY
- 980 WJLA, Nashville, TN
- 980 WJUB, Two Rivers, WI
- 990 CBL, Winnipeg, MB
- 990 WJOL, Knoxville, TN
- 1000 WJFL, Chicago, IL
- 1000 KJOK, Oklahoma City, CA
- 1010 CFBT, Toronto, CA
- 1010 WJNS, New York, NY
- 1010 KJLA, Little Rock, AR
- 1020 WJLA, Pittsburg, PA
- 1030 WJOL, Boston, MA
- 1030 KJTO, Casper, WY
- 1030 KJOS, Farmington, MN
- 1040 WJOL, Des Moines, IA
- 1050 AEA, Monterrey, MX
- 1050 CFBT, Saul Ste. Marie, ON
- 1050 CBLA, Toronto, CA
- 1050 CKB, St. Boniface, MB
- 1050 WJNS, New York, NY
- 1060 WJLA, Philadelphia, PA
- 1070 CACA, Sarnia, ON
- 1070 WJLA, Memphis, TN
- 1070 WJBC, Indianapolis, IN
- 1070 KKA, Los Angeles, CA
- 1080 KJLD, Dallas, TX
- 1080 WJLI, Louisville, KY
- 1080 WJIC, Hartford, CT
- 1090 WJAY, Little Rock, AR
- 1100 WJWB, Cleveland, OH
- 1100 HJAT, Barranquilla, Colombia
- 1110 WJOL, Omaha, NE
- 1120 WJCA, St. Louis, MO
- 1130 WJKN, Shreveport, LA
- 1130 WJAY, Minneapolis, MN
- 1140 WJVA, Richmond, VA
- 1150 WJOC, Sioux Falls, SD (D)
- 1150 CROC, Hamilton, CA
- 1150 WJLA, Lima, ON
- 1150 WJOL, Chattanooga, TN

KIX-FUN RADIO
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Here we go with page two of the great Florissant Valley nighttime bandscan.

Table listing radio stations with call letters, frequencies, and locations. Includes stations like WJBC, WJJD, KSL, etc.

(Also note: (D) means "difficult catch") will WAG get their set together and drop religion?

Now for the Springfield, MO Daytime Bandscan using a General Electric Superaudio II.

Small table listing stations like KWTO, WISW, KBHS with frequencies and locations.

NRC STAMP SERVICE

BRIAN PITMAN - 835 Milford Drive, Apt #102 - Kingston, ON CANADA K7P1A7

(Canadian & American Stamps only) If you want stamps for either country, let me know the quantity. Please include the proper amount of funds to cover the purchase of those stamps and also include return postage funds.

Here we go with Page Two of the great Ozark Mountain Country Daytime Bandscan.

Table listing radio stations with call letters, frequencies, and locations. Includes stations like WLS, KFA, KBJ, etc.

Good: Out in the country 20 miles from local txs at a beverage antenna site

Bad: Near local txs

Next Scan: SKIF DABLSIN, Overland Park, KS (please list equipment) (daytime)

Large table listing various radio stations with call letters, frequencies, and locations. Includes stations like KWMT-IA, KFRK-KS, KUSA-MO, etc.

GATEWAY BROADCASTING CORP.

KROS/KSAY

P.O. BOX 518 CLINTON, IOWA 52732

KYW NEWS RADIO 1060

Next Scan: MICHAEL ALLEN, Billings, OK (News 5:00-7, 2000 7:00-7:30, 8:00 8:00-9:00, 9:00-10:00, two 70-foot longwires) (day)

Table listing radio stations and call letters. Columns include station call letters and frequencies. Includes stations like KMT-LA, KAPL-OK, KJLH-TX, etc.

Next Scan: ED DALL FORD, westville, IN (CZC AM/PM stereo dual tape player/record) (table-top) (night) (NOTE: * heard while local is off.)

Table listing radio stations and call letters. Columns include station call letters and frequencies. Includes stations like CBK-SK, WJAN-VA, WJFC-IL, etc.

RADIO STATIONS
WHMI & WHMI-FM
HOWELL, MICHIGAN 48843

best of us and 73's,
Eric Bueneman
ERIC BUENEMAN-KLAW/011/48000

STATION PROFILE

TONY FITZHERBERT
356 JACKMAN AVENUE
FAIRFIELD, CT 06430

"AM 1520"
WRID 1520KHZ
Homer City, Pennsylvania

by Guest Editor John Malicky



Creating interesting and entertaining "real people" moments (commercials) is just one of the many things performed for the Indiana community by Ray Goss, Vice President and the leader of "AM 1520's" team of creative copywriting wizards. Mr. Goss had served for 15 years as General Manager of local station WDAF, following earlier positions as morning DJ, news announcer, and later, as Sales Manager. In addition to being recognized as Stan Freburg who is behind the mic for a local commercial for the Grenney Tavern in Indiana, Goss is well-known for his 16 years of play-by-play announcing of Duquesne DuKes basketball. He has also done announcing for Indiana University of Pennsylvania football and basketball, Penn State football, and Indiana county harness racing. He is one of the author's favorite and is held in high regard when Ray Goss does Duquesne basketball.

After leaving WDAF of Indiana in 1981, Ray Goss temporarily shelved his career in broadcasting to take on several independent projects, including the organization of the commemorative book for a Jimmy Stewart birthday celebration last year. Yet Goss still had broadcasting at heart, so when former colleague Mark Harley proposed the idea of getting together to put a new radio station on the air, Goss responded enthusiastically. Harley had recently resigned as General Manager of WMAJ/WXLR in State College, after 11 years with WDAF's owners - the Progressive Publishing Company. His accounting and management expertise was the ideal complement to Goss' creative sales mind. So, with 35 years of combined radio experience behind them, the pair formed RayMark Broadcasting and set out to put a new station on the air.

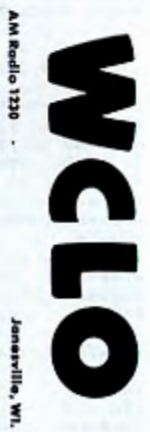
As it happened, Ridge Communications of Somerset owned the license to an AM station in Homer City which had never signed on the air. Negotiations began, and, after months of thorough investigation by the Federal Communications Commission and the Small Business Administration, WRID was sold to RayMark, a new license to broadcast was granted, and four towers were raised on a site just north of Homer City on old route 119.

It was decided that to serve the most widespread audience, an "adult contemporary" format would be most suitable - current music, personalities, and information directed to an adult audience. And a network affiliation would assure the best quality programming possible. The burgeoning Satellite Music Network in Chicago, boasting over 300 affiliates nationally, was contacted. Their "Starstation" format offered the right mix of major market air talent, carefully selected music, and well-balanced "breaks", opportunities or cutting away from the network to insert the all-important local programming - news, weather, sports, public service...and commercials.

A satellite "dish" was set up to receive the live transmission from Chicago. Studios were completed in a new building near the site of the towers. And, on October 25, 1983, "AM 1520" signed on the air. The station is currently 500 watts directional daytime and is anticipating receiving FCC approval for 1000 watts shortly.

The early success of "AM 1520" has been the result of team effort. The station operates with a staff of nine (plus air personalities). With a common goal of providing the most listenable radio possible, the individual talents have crossed paths continuously. In addition to Mr. Goss and Mr. Harley, there is Dave Goss, "AM 1520's" production director and chief sportscaster. Dave signs the station on the air weekday mornings and handles the on-air chores until noon. AM-1520's news director is Laura Sadowski. Laura tracks down the stories that break during the day, compiles "just the facts", and condenses it all into the concise "AM 1520" Local Report", which follows the world and national news from the network. Off-mic, "AM 1520's" sales staff add their own efforts to the creative process. Account executives Noreen Sprawls and Christine Goss do most of the legwork involved with getting advertisers on the air. Completing the sales team is Steve McCormick, the station's main contact to the advertising agencies. In the final process, WRID's Traffic Director, Dave Romance, organizes the commercial orders into time assignments in the station's logs. Completing the staff is Chief Engineer, Fred Shetler.

"AM 1520" kicked off with a first in local radio history. The station qualified listeners by a phone contest on the air in the fall and gave away a brand new 1984 car as the grand prize. The postcard response was phenomenal and gave the station its first clue that the audience was appreciating its advertised "more music, fewer commercials". Another major promotion was being planned in the spring.



With the advantages of programming via satellite, and with a creative staff determined to provide a fresh approach to local radio, the future's looking good for "AM 1520".

The author would like to thank Mr. Ray Goss for confirming his report of WRID and sending a copy of "Indiana Magazine" from which this story was condensed.



2020 W. Grant Rd.
Post Office Box 5585
Tucson, Arizona 85703

KTCT 990 KHz

Every major market area in the United States has had its Top 40 station, which in the late 1950's, and through the '60's into the 1970's, captured a giant's share of the listenership with a steady patter of rock music spun by fast-talking personalities. While many former Top 40 stations such as WIBG (Wibbage), WMEX ("Mimmex"), and WJAB ("Mister Jab") have vanished forever from Philadelphia, Boston, and Portland, Maine, respectively, Tucson's KTCT-990, with which Tucson has grown up for over 25 years, is still going strong as a well-programmed Contemporary Hit Radio outlet. Lotus Communications owner Howard Kalmenson, a real hands on executive involves himself in every aspect of KTCT and sister station KPLX, "96 Rock", an album oriented rock station.

With an air date in December 1949, KTCT has for the majority of its life formatted T40 music. Today, the station ranks among the top five in the Tucson Arbitrans.

The station is affiliated with Associated Press for news. The live-assisted music is augmented on weekends by several public service programs. Also, the station carries sports features such as the Indianapolis 500, as well as frequent weekday sports, featuring Tom Boyd. Remotes from local businesses plus live coverage of local happenings such as the premiere of "Return of Jedi", add to the KTCT programming - as does the syndicated program "Soundtrack of the 60's" on Sunday nights.

KTCT-KPLX have occupied the same building since KTCT's inception, although the original building has been expanded several times. Today, a huge hallway greets visitors to the stations. It is surrounded by administrative and sales offices. To the rear are the AM and FM studios, the newsroom, the PD's office, and the engineering offices, and transmitter. The complex is located on Jackrabbit Road, just off Grant Road, immediately west of Interstate 10, north of downtown Tucson.

KTCT began operations as a 1000 watt ND station, and, in 1968 was granted a daytime power increase to 10KW. Five guyed 192 foot towers surround the modern cement broadcasting center. Both the day and night patterns require four towers. The daytime trapezoidal array nulls Phoenix because of an old overlapping coverage law (a former owner also owned a station in Phoenix). The 1000 watt nighttime signal nulls toward California, and also protects Mexico as part of a treaty arrangement. The KPLX tower about 1-1/2 mile north of the studios. KTCT operated 24 hours a day, with silent period.

KTCT is a fine example of a Top 40 Station which rode the top of the ratings in the 1960's, which has cast complacency aside, studying the changing tastes of its market, and aggressively programming for the market - remaining a success, while many of its contemporaries of the 1960's are but memories.... like the music which was played during that era.

Thanks are due to Gary Kabrick, KTCT Chief Engineer for his help in the preparation of this station profile. Gary has spent his life in Radio, in Albuquerque, and other Southwestern locations.

790 MIGHTY KCEE

2100 NORTH SILVERBELL ROAD TUCSON, ARIZONA 85745

A boat race in a dry riverbed sponsored by a reputable, responsible radio station? Yes, indeed, this is but one feature sponsored by Tucson, Arizona's KCEE. Annually, "The Mighty 790" sponsors the Rillito River Regatta. Now the Rillito River is usually a dry run (except after a heavy rain, when it becomes a raging brown torrent), and the regatta consists of a parade of colorfully adorned vans and floats along the bed of the wash.

The remainder of KCEE's programming is far more normal. For the past four years, Metropolitan Tucson has enjoyed an entertaining format of oldies. Since its airdate of October 1, 1954, KCEE has formatted MOR, T40, and C&M, at different times - but the oldies (from the 60's, 70's, and early 80's) format has proven to be most successful. Oriented to the 24-49 year old audience, the oldies are augmented by special oldies weekends, and even days dedicated to one artist, such as Barry Manilow or the Beach Boys. On Sunday, Dick Clark's "Rock and Roll Revival", rounds out the broadcast week. News comes from the Mutual Network, with extensive local coverage of news and sports happenings in Tucson.

The studios and offices have been located at 2100 North Silverbell Road, northwest of downtown Tucson. The building, to which an addition is under construction, houses sales and traffic offices, a conference room, sales offices, executive offices, a newsroom, and studios for KWFM-92.9, a rock-formatted station, purchased by KCEE's owners on March 23, 1984. KCEE employs about 30 people.

The call KCEE has no intended meaning, but leads uniformly with KCEY - Turlock, California, its former sister station, when KCEE was owned by the Behan Broadcasting Company. The station was purchased in the past few years by Suncom, Ltd.

The transmitter is a Continental 5 KW model, and the backup is the original 1958 Collins transmitter. The signal is fed to three guyed 256 foot tall towers, in line East to West, next to the studios. The 5000 watt daytime ad 500 watt night signals null west to protect KABC-790, in Los Angeles.

Heartly thanks are extended to KCEE Chief Engineer Bill Croghan. A former NRC member, Bill was CE at KCEY, Turlock, and has worked in broadcasting in Buffalo, on Long Island, and the other areas. We greatly appreciate Bill's help in completing this profile of KCEE.



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EAST PROVIDENCE BROADCASTING, INC.

The Rural Voice of Nebraska
KRVN
880 Farm Radio
P.O. Box 880
Lexington, Nebraska 68850 0880

DXing The 1984 Solar Eclipse

Berry Thoses

The solar eclipse of May 30, 1984 kind of snuck up on me. I didn't learn until the day before that Pensacola, Florida would experience 96% totality and that another eclipse wasn't due here until 2017. Furthermore, it wasn't until the morning of the eclipse that I definitely decided to sacrifice a half day of work (in the interest of DX science, of course) to see what the effects of an eclipse-weakened D-layer of the ionosphere would be on BCB DX. As a result of these 11th hour events, my hastily devised monitoring plan was, I'm sure, far from optimal. Nonetheless, it did result in some interesting listening and loggings.

Having never before DXed an eclipse, I didn't really know what to expect. I assumed that, since the darkness path was moving from west to east, stations from the west might begin appearing via skywave some time before the eclipse began in Pensacola. As it turned out, skywave reception wasn't definitely noticeable until the eclipse had begun in Pensacola and no unequivocal westerly bias was noted at that time. There did seem to be a slight easterly "opening" after the eclipse had peaked here and had begun receding, however. The strongest signals throughout the eclipse, though, seemed to originate from locations along the 100% totality path (i.e., New Orleans, southern Alabama, Atlanta); but this is a subjective observation.

About an hour before the scheduled beginning of the eclipse in Pensacola (9:45 a.m. CDT), I ran down the dial and selected frequencies to monitor which either had no discernable signals on them or which had weak to poor signal levels. It turned out that on that morning 40 channels fit the bill (a receiver with a multi-channel memory would have come in handy in this instance) but I will report on only a fraction of those. The monitoring equipment included an ICOM R-70 and a Yaesu FRG-7, each connected to its own loop and longwire antenna.

8:41 a.m. (one hour before eclipse onset)

The following frequencies showed no signs of signals or carriers and were checked throughout the eclipse:

530	834	1130
555	890	1210
630	1000	
655	1070	
700	1100	

Below are the channels monitored which had low level signals discernable one hour before eclipse onset:

580-WDBO (FL)	1090-UNID
630-UNID	1120-Cuba
750-WSB (GA)	1150-WGEA (AL)
820-Cuba	1530-WAAB (AL)
960-WERC (AL)	1560-WBDL (LA)

9:44 a.m. (eclipse onset)

There seemed (somewhat strangely) to be a slight increase in noise level at this time which continued throughout the eclipse. This may have been a purely local (i.e., line noise) phenomenon; I'm not certain.

About 15 minutes after onset, a few subaudible hets (SAHs) and carriers began to appear and overall signal levels seemed to

KROW
RADIO 1460

WSWG

POST OFFICE BOX 1686
GREENWOOD, MISS. 38920

increase. Following are the loggings made during this time period (bold type indicates a change from the preceding monitoring window):

530--nil
555--nil
580--WDBO + 1 UNID
630--now 2 UNIDs
650--nil
655--weak carrier
700--weak carrier
750--WSB still weak
820--Cuba same
834--Belize carrier appears
890--nil
960--WERC, no change
1000--nil
1070--WAPI (AL) appears
1090--Cuba ID'd
1100--weak carrier
1130--fair carrier now
1150--WGEA still here
1210--nil
1530--WAAB + 1 UNID
1570--WBDL a little stronger

11:00 a.m. (peak of eclipse)

About 30 minutes before the peak of the eclipse, signal levels began increasing dramatically and SAHs were becoming more numerous as multipaths and new stations began interacting. At the peak, the band sounded like sunrise or sunset skip with much GRM and "beating" on most channels.

530--2 carriers SAH'ing
555--carrier (Costa Rica)
580--loud WDBO + 1 UNID
630--KTIB (LA) and WJDB (AL) good
650--WSM fair
655--nil
700--MLW weak
750--WSB now good
820--Cuba + weak WSBP (TX)
834--Belize with poor audio
890--weak EE (MLB?)
960--WRFC (GA) good w/WERC
1000--WKWK (FL) + 1 UNID
1070--WAPI loud
1090--WBLB (LA) appears atop Cuba
1100--WVME (OH) poor
1130--KMKH (LA) good
1150--WTHP (FL) good + 3 UNIDs
1210--WDSR (GA) fair/good
1530--WAAB + 3 UNIDs
1570--3 UNIDs

11:45 a.m. (end of eclipse)

530--2 carriers
555--carrier gone
580--WGAC (GA) atop WDBO
630--KTIB and WJDB still here
650--WSM remains poor
655--nil
700--carrier
750--no WSB (?)
820--WDBP gone
834--Belize intermittent
890--nil
960--1 weak UNID
1000--nil
1070--1 weak UNID

WROW
59 AM FM-STEREO 95

341 NORTHERN BOULEVARD, ALBANY, N.Y. 12204

1090--Cuba back, no WBLG
1100--nil
1130--GFM madness
1150--WTMP + 1 UNID
1210--nil
1530--WAAO + 1 UNID
1570--garbled mess

12:15 P.M.

By 30 minutes after the end of the eclipse, conditions were rapidly returning to normal, although some ionospheric action was discernable. I had to get to work so I wasn't able to follow band conditions any longer but it had seemed that the variable critical to eclipse BCB DX was the stage of the eclipse at my location. By far, the most notable band conditions occurred during the peak of the eclipse overhead. Post-eclipse skip to the east definitely lingered much longer and was more noticeable than any pre-onset skip to the west (perhaps de-ionization takes longer than ionization (?)). At any rate, DXing the solar eclipse of 1984 was an enjoyable (though hectic) experience and I hope others of you were able to scan the dial during the phenomenon.

73's--GT

ST. LOUIS DX CLUBS: 1970'S-PRESENT

by Eric Busenman

There have been two DX clubs in St. Louis that have come and gone. A third one is trying to surpass the others in longevity and bulletin quality. Profiling the two clubs that have come and gone:

St. Louis DX'ers Association: This was a short-lived club that was around in the early 1970's led by Walt Breville. The first two bulletins were published in the May-June 1982 edition of The Gridly Wave of SLIDX. The first bulletin contained the addresses of known St. Louis BCB DX'ers, two classified ads for receivers, and an article on "alien humanoids" broadcasting on VLF and SW. The second bulletin contained an article on the FCC's grant for WESL-1490, east St. Louis, IL's construction permit, sunset skip DX logs and logs from rarely heard states. It's a shame that this bulletin didn't last too long, it was such a good bulletin indeed!

St. Louis International DX'ers: This club was founded in 1979 by Terry Klasek and two other DXers. The first few bulletins contained logs and DX information, but the later bulletins included increasing amounts of DX humor. Mark Strickert remarked in the May 1984 issue of "DECALCOMANIA" that Mr. Klasek "sort of give a bad name (ill-deserved) to having fun with what is 'Just-a-Hobby!'. The loggings decreased as humor set in. Because of Terry Klasek's preoccupation with other things, SLIDX folded at the end of 1983. Their bulletin was mediocre, but humor ruined it.

The latest DX club to come along in St. Louis is the Gateway DX Club Int'l. (GDAXI). Two bulletins have been issued since formation earlier this year (1984). The writer runs this club. Our interests include SW/mw/Ew/IV/amateur radio mailing. The GDAXI has monthly meetings for St. Louis DXers, comes out with "DX Scene" every other month. The club has advertised on WRNO Shortwave, local educational FM station KSLH-91.5 MHz, as well as "SWL" of ASWLC, "DX News" of ARG, "DECALCOMANIA", with more clubs to come, and it has attracted twelve members so far. GDAXI is a growing club with more members to come. Hopefully, GDAXI will outlast both SLIDX and SLIDX.

KCXL Signs On As KC Urban

Maxwell Consulting Manager:
Moore Named GM/PD

Kansas City gained a new station last week when dayliner KCXL signed on under the guidance of consulting manager Don Maxwell and GM/PD Chuck Moore. The Urban Contemporary AM facility is the first station property for Kansas City Communications, Inc., whose President is Elbert Anderson.

Skewing primarily toward the 25-49 audience, the KCXL format blends black/urban, pop, gospel, crossover, and oldies, with little or no hard rock. "We have been overwhelmed by the response to our station from the black community - even before we were on the air," Maxwell remarked. "People have been hungry for the kind of format we are offering, and our promise to delete songs with offensive lyrics from our playlist has found warm support from area church groups."

It's Finally HERE !!

(Well, Almost !!)

The 7th Edition of the
DOMESTIC LOG BOOK

We are now taking pre-publication orders.

TOP END

1600-1800 KHZ RANGE

TIMES ARE GMT

DEADLINE: LAST SAT. OF MONTH

CRAIG HEALY
66 COVE STREET
PAWTUCKET, RI 02861

July 1984... Not a lot happening as you might expect in the summer. The column will be in a "mailbag" format this month.

From the June 1984 "QST": Racal-Decca has filed a petition in partial opposition to an ARRL petition concerning 160m ham operation. In Racal-Decca's paper they state that "The existing radiolocation spectrum below 1800 kHz is overcrowded and inadequate as things now stand...." Racal anticipates that it will have to move many, if not most, of its existing operations from the 1605-1800 kHz band to 1900-2000 kHz. I'm sure we haven't heard the last of this.

From Mike Hardester: You mention Top End sounds such as "Cubic Argo" and "Decca HiFix". Just what do these sound like? If you have time, a cassette with the "Greatest Hits of Top End" giving samples of these would be helpful. (I'll do that this Fall..ed)

From Walter Shepherd: I don't wish to spoil anyone's fun...but I've been in the military electronics business for over 20 years and would hesitate to believe any rumors or stories about spies, spooks or covert military useage of the 170 meter band. This is not based on direct knowledge, but on my judgement. A few facts: 1. 170 meter antenna systems are cumbersome and not compatible with mobility...a prime military requirement. 2. 170 meters does not offer the propagation stability of longwave. 3. D layer absorption during daylight hours limits the application to short range transmissions. One can get short range coverage elsewhere. VHF, UHF and microwaves have plenty of spectrum, low cost and compact antennas. 4. The 170 meter band is certainly not very private. Transmissions can be readily monitored from off-shore. Some loggings: 1609.9 YOSEMITE NATIONAL PARK TIS Heard nightly

1623 ECUADOR Pastaza 0900 6/2 PAT beacon. Listed on 1655 in the Beacon Guide (An updater last Summer had it moving to 1625..ed)

1700.4 ??? 0930 6/2 Raspy pulsed signal, no musical tone. Sounded like wide-band phase modulation within pulse. Pulse repetition rate about 2.5 pulses per second at a 50% duty factor.

1727 ??? (no time/date) 17 unmodulated carriers spaced equally 825 Hz apart. Starts at 1727.000, then 1727.825, 1728.650,...to 1740.200. All equal amplitude and steady. A similar signal, with a spacing of 425 Hz was heard on 1762.25-1776.28. (No idea. If it was TV sync., it'd be there most nights..ed)

From Kermit Geary:

1620 ??? 0445 5/31 Cubic Argo, fair

1620 ??? 0432 6/12 KA83774 Fair w/continuous ID

1620 ??? 0635 4/1 SDT beacon, fair

1629 ??? 0215 4/19 KA83781 Fair, ID every 4 minutes

1642 ??? 0439 5/31 KA83337 Fair, ID every 4 minutes

1642 ??? 0440 5/31 KA83795 Fair, ID every 4 minutes

1642 ??? 0441 5/31 NV45 and dash. Fair, ID every 4 minutes

1667 ??? 0105 3/23 USB signal, msw conversing in English

1692 ??? 1120 10/19/83 MEJ beacon

1695 CUBA ?? Hrd occ. w/MOR LA mx, weak. The following announcement heard: "La Voz Nacional de las emisoras del Instituto Cubano de Radio y Television transmitiendo para todo el pueblo un programa especial con motivo de en la noche." The missing words sounded like "escocho postulado", obviously misunderstood because they are not Spanish words. Believe this is a fundamental frequency because nothing is heard between 845 and 850 in the AM band.

(Back in February, C.M. Stanbury reported that this is probably the R. Cadena Agremonte xtr listed to 1580. This drifted in the past..ed)

From John Ramsey:

1619 ??? 0152 6/6 KA83772 w/ good signal. ID repeated three times every 3 minutes. Stopped in the middle of a fourth time IDing.

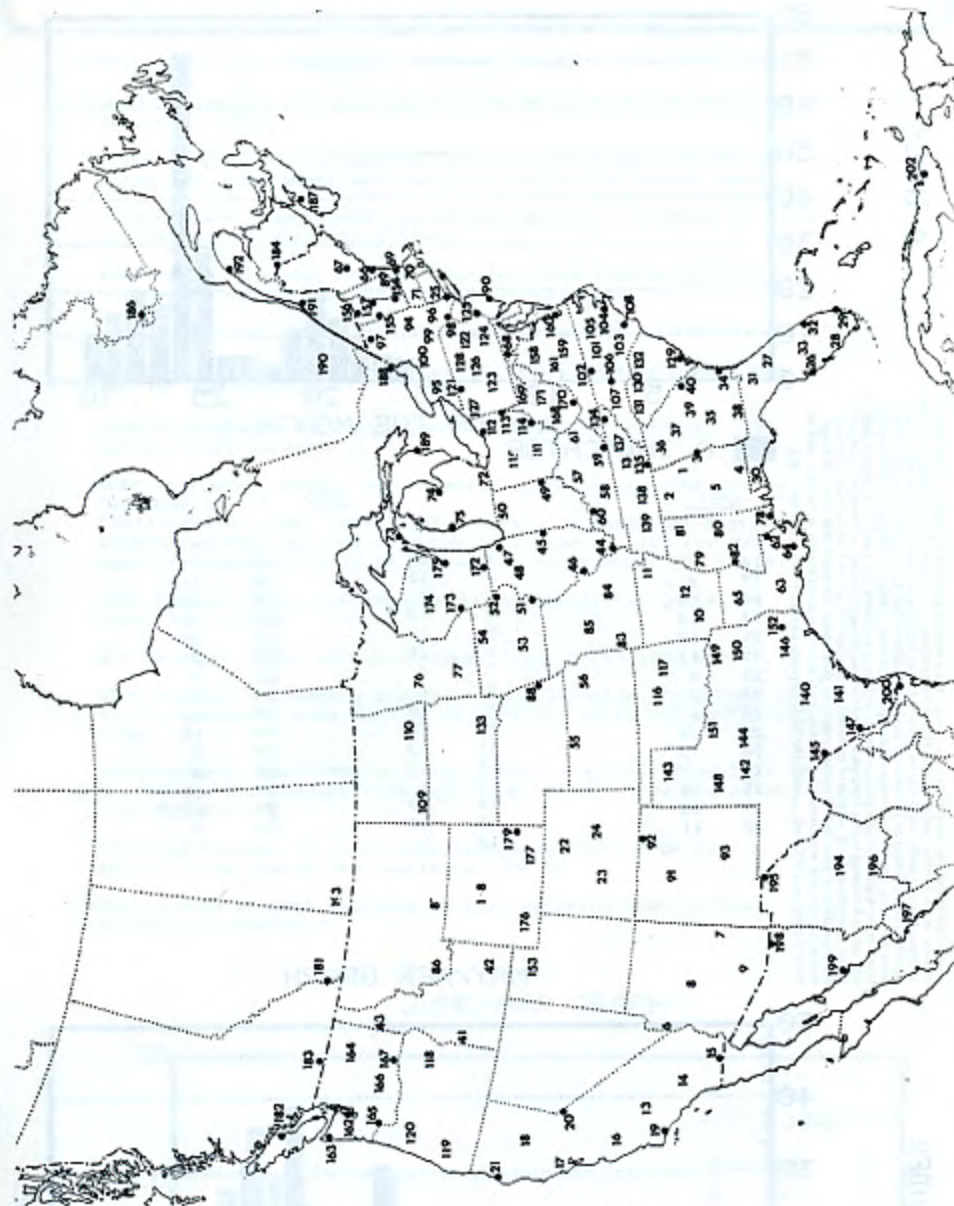
1622 ??? 0200 6/6 KA83775 Good signal, same format as above. (Note difference of 3 kHz in freq. and 3 digits in call!)

1631 ??? 0158 6/6 L425 and dash, good.

In the past, I got KA83223 on 1628 and KA83329 on 1634, 6 kHz apart. Call is 6 digits apart, too. Has anyone noticed this before? (bears looking into..ed)

1. WANA	ANNISTON	71. WACH	WEST SPINGFIELD	141. KIRL	BEEVILLE
2. WAJF	DECATUR	72. WAJF	ADRIAN	142. KBST	BIG SPING
3. WRLD	LANETT	73. WTIQ	MANISTIQUE	143. KOTV	BORGER
4. WRDJ	SAMSON	74. WMPX	MIDLAND	144. KNEL	BRADY
5. WHBB	SELMA	75. WPKB	WHITEHALL	145. KVMC	DEL RIO
6. FBAS	BULLHEAD CITY	76. KYRA	ALEXANDRIA	146. ESAM	HUNTSVILLE
7. KCUZ	CLIFTON	77. KLGR	REDWOOD FALLS	147. KVOZ	LAREDO
8. KYCA	PRESCOTT	78. WIND	BILOXI	148. KZ2N	LITTLEFIELD
9. KAIR	TUCSON	79. KCLD	CLEVELAND	149. KPLT	PARIS
10. KXAR	HOPE	80. WPOC	PHILADELPHIA	150. KBOK	TYLER
11. KDRS	PARACOULD	81. WTUP	TUPELO	151. KVMC	VERNON
12. KOTN	PINE BLUFF	82. WJFL	VICKSBURG	152. KVLL	WOODVILLE
13. KWAC	BAKERSFIELD	83. KDMO	CARTHAGE	153. KJON	OGDEN
14. FGDJ	BARNING	84. KTTR	ROLLA	154. KWVT	BRATTLEBORO
15. KICO	CALEXICO	85. KDRO	SEDALIA	155. WPAD	MIDDLEBURY
16. KRKC	KING CITY	86. FDBI	DILLON	156. WIKI	NEWPORT
17. KTOB	PETALUMA	87. KLYC	LAUREL	157. WYKR	WELLS RIVER
18. KBLF	RED BLUFF	88. KYNN	OMAHA	158. WQVA	CULPEPPER
19. KDS	SANTA BARBARA	89. WEMJ	LACONIA	159. WPAK	FARMVILLE
20. KOWL	SOUTH LAKE TAHOE	90. WUSS	ATLANTIC CITY	160. WPEX	HAMPTON
21. KSYC	YREKA	91. KRSN	LOS ALAMOS	161. WAYE	HAYNESROPO
22. FBOL	BOULDER	92. FRTN	RATON	162. FBRO	BRFERTON
23. KUCU	GUNNISON	93. KAOV	RUIDOSA DOWNS	163. KWAC	FORKS
24. KTIQ	MANITOW SPRINGS	94. WCSS	AMSTERDAM	164. KEYC	GRAND COULEE
25. WGCH	GREENWICH	95. WETA	BATAVIA	165. KLOC	KELSO
26. WOFN	BRADENTON	96. WKNY	KINGSTON	166. KENE	TOPPENISH
27. WXVQ	DE LAND	97. WICY	MALONE	167. KTEL	WALLA WALLA
28. WKEM	IMOKALEE	98. VDLC	PORT JERVIS	168. WYIT	CHARLESTON
29. WMBM	MIAMI BEACH	99. WCDO	SIDNEY	169. WTCS	FAIRMONT
30. WKCK	MILTON	100. WOLF	SYRACUSE	170. WAEY	PRINCETON
31. WPXE	STARKE	101. WDUR	DURHAM	171. WSCB	SUTTON
32. WTTB	VERO BEACH	102. WLOE	EDEN	172. WGEZ	BELOIT
33. WSTR	WINTER PAVEN	103. VFLB	FAYETTEVILLE	173. WLXR	LA CROSSE
34. WMOG	BRUNSWICK	104. WRNB	NEW BERN	174. WICM	MEDFORD
35. WMJM	CORDELE	105. WRMT	ROCKY MOUNT	175. WYTL	OSHKOSH
36. UYYZ	JASPER	106. WSTP	SALISBURY	176. KUGR	GREEN RIVER
37. WRFD	MONROE	107. WSVN	VALDESE	177. KOJO	LARAMIE
38. WSPB	QUITMAN	108. WMIL	VILMINGTON	178. KRTR	THERMOPOLIS
39. WSNT	SANDERSVILLE	109. KNDC	HETTLINGER	179. KGOS	TORRINGTON
40. WSYL	SYLVANIA	110. KOVC	VALLEY CITY	*180. WZNS	PONCE PR
41. FCID	CALDWELL	111. WBEK	CHILLICOTHE	181. CJPR	CROWSNEST PASS
42. KKLK	CHUBBUCK	112. WJMO	CLEVELAND HEIGHTS	182. CPWB	CAMPBELL
43. KOFE	ST. MARIES	113. WOPI	EAST LIVERPOOL	183. CKOO-1	OSOYOOS
44. WKRO	CAIRO	114. WMOA	MARIETTA	184. CKIV	GRAND SAULT
45. WDNV	DANVILLE	115. WNRN	MARION	*185. VOHF	FARMON FIELD NF
46. WESL	EAST ST. LOUIS	116. KOKC	GUTHRIE	186. CBDQ	WABUSH
47. WOPA	OAK PARK	117. KBIX	MUSKOGEE	187. CKEN	KENTVILLE
48. WZOE	PRINCETON	118. KBKR	BAKER	188. CFRC	KINGSTON
49. WKBY	RICHMOND	119. KRKR	ROSEBURG	189. CFPB	PORT ELGIN
50. WNDU	SOUTH BEND	120. KBZY	SALEM	190. CKLR	L'ANNONCIATION
51. KBUR	BURLINGTON	121. WESB	BRADFORD	191. CKBN	MONTMAGNY
52. WDBQ	DUBUQUE	122. WAZL	HAZLETON	192. CJMC	STE ANNE DES MONTS
53. KBAB	INDIANOLA	123. WJNL	JOHNSTOWN	193. CJSN	SHAUNAVON
54. KRIB	MASON CITY	124. WJPA	LANCASTER	194. XEDC	CHIHUAHUA
55. KKAN	PHILLIPSBURG	125. WBCB	LEVITTOWN	195. XEJC	CIUDAD JUAREZ
56. KTOP	TOPEKA	126. WRF	LEWISTOWN	196. XEJR	FARRAL
57. WFKY	FRANKFORT	127. WMGW	MEADVILLE	197. XEVP	GUASAVE
58. WWAY	GLASCOM	128. WNST	WELLSBORO	198. XEAQ	AGUA PRIETA
59. WIFY	MIDDLESBOROUGH	129. WVCB	BEAUFORT	199. XEDR	GUAYMAS
60. WOHM	OWENSBORO	130. WCCD	CHESTER	200. XEMS	NATAMOROS
61. WSPV	PAINTSVILLE	131. WMRB	GREENVILLE	*201. CMCN	SAN JOSE CUBA
62. WJKC	BOGALUSA	132. WSDC	HARTSVILLE	202. CMDH	MAYARI
63. KEUN	EUNICE	133. KORN	MITCHELL		
64. KJIN	HOUMA	134. WOPB	BRISTOL		
65. KRUS	RUSTON	135. WDXB	CHATTANOOGA		
66. WFOR	PORTLAND	136. WCEV	CROSSVILLE		
67. WTVL	WATERVILLE	137. WITA	KNOXVILLE		
68. WARK	HAGERSTOWN	138. WJFM	LEWISBURG		
69. WHAV	HAVERTHILL	139. WDXL	LEXINGTON		
70. WNRK	MILFORD	140. KNOW	AUSTIN		

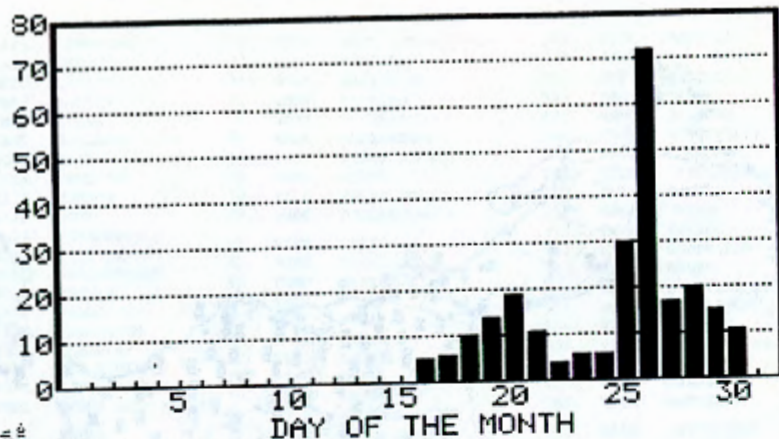
** NOT PLOTTED



BY:

BILL HALE

1984 NRC CONVENTION
LABOR DAY WEEKEND
REGISTRATION DEADLINE AUG 15TH

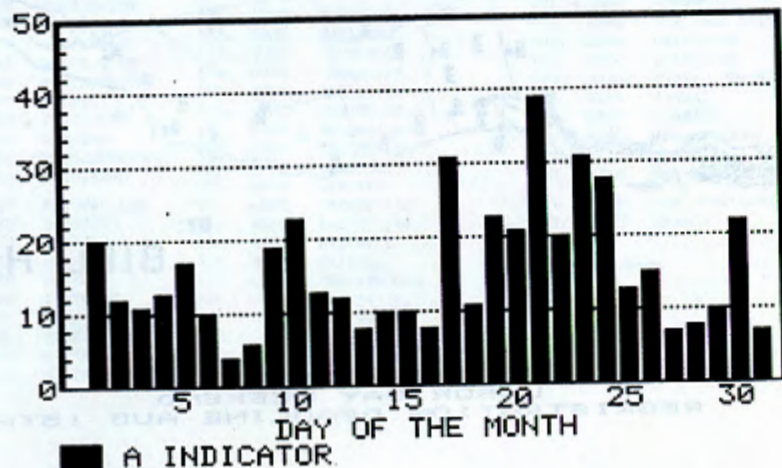


■ A INDICATOR

APRIL		MAY	
DATE	A INDICATOR	DATE	A INDICATOR
16	5	1	20
17	6	2	12
18	10	3	11
19	14	4	13
20	19	5	17
21	11	6	10
22	4	7	4
23	6	8	6
24	6	9	19
25	30	10	23
26	72	11	13
27	17	12	12
28	20	13	8
29	15	14	10
30	11	15	10
		16	8

Low AFR values for many stations in the Frederickburg (VA) area of geomagnetic activity in the magnetic field. High values above 20 indicate that medium wave signals from the South and from local stations predominating due to this absorption of the more northerly signals. Low values over a period of time indicate a likelihood of more reception on the higher-latitude paths -- more, and more northerly, TAs and TP's. Several days of low values following higher ones are needed for conditions to return to "normal" to raise the possibility of good high-latitude reception. For additional information on the use of the A₁ and related indicators as a DX tool, consult the NRC Reprints List for relevant articles. -RJE

MAY/AFR GRAPH



■ A INDICATOR

BROADCAST STATION CHANGES-1934

WJJD-Moosehart, Ill granted permission to go on the air 5:00 am August 1, 1934.

KTRH-Houston, TX, to operate on 630 kc, May 1 to October 1, using 250 watts power at night and 1000 watts during the day.

KFPY-Spokane, Washington, to operate on 890 kc instead of 1340 kc, using 1000 watts full time.

KBIR-Butte, Montana, shifts frequency from 1360 kc to 1340 kc, 1000 watts daytime, 500 watts night, full time.

WLAP-Lexington, KY, shifts frequency from 1200 to 1420 kc.

WCBS-Charleston, West Virginia, increases daytime power from 500 to 1000 watts.

WPRO-Providence, RI, experimental operation on 630 kc, 250 watts, until December 1.

WDRG-Worcester, Mass., experimental operation on 1280 kc, to December 1.

WISN-Milwaukee, WI, now operates full time on 1120 kc, daytime, power increased from 20 to 500 watts, night power 250 watts.

KDA-Denver, Colo, increases power to 500 watts, unlimited time, 830 kc.

WHN-New York City, increases power from 250 to 1000 watts.

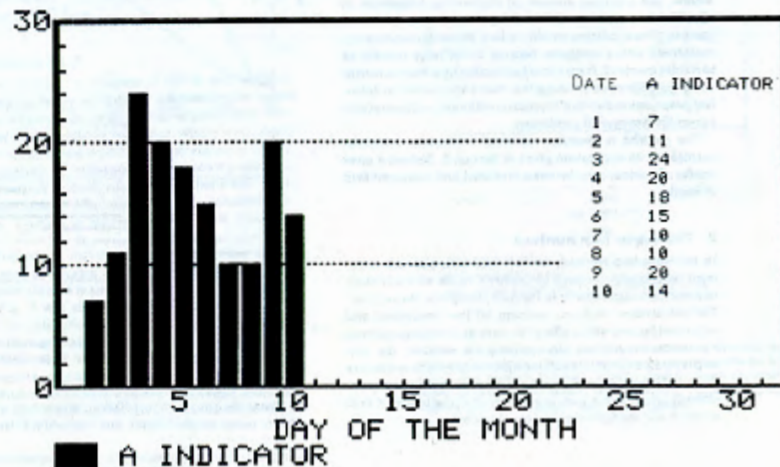
WDNC-Durham, NC, moving station from Wilmington, to Durham and shifts frequency from 1370 kc to 1500 kc, using 100 watts full time.

WALA (formerly WDX)-Mobile, Ala, shifts frequency from 1410 kc to 1380 kc and changes from part time to full time operation with 500 watts.

KFAC-Los Angeles, CA, increases operating hours from half time to full time, using 1000 watts on 1300 kc.

Seeing WCBS in West Virginia is like watching WNBC in New Britain, Connecticut.

JUNE/AFR GRAPH



■ A INDICATOR

M.F. Propagation: a wave-hop method for ionospheric field-strength prediction

(REPRINTED HERE WITH PERMISSION FROM THE BBC & THE AUTHOR)

P. Knight, M.A., Ph.D., C.Eng., M.I.E.E.

Research Department

Summary: A new method for calculating the strength of medium-frequency sky-wave signals at night is described. Estimated losses due to all the ionospheric and terrestrial factors which affect a wave as it propagates from transmitter to receiver are subtracted from the field strength which would arise if losses were absent. The process is carried out for each propagation mode which is likely to make a significant contribution to the received signal; the contributions are then added on a power basis. The method is intended for world-wide application and for paths of any length. Field strengths predicted by this method for 152 paths in different parts of the world have been found to agree reasonably well with measured values.

- 1 Introduction
- 2 The wave-hop method
 - 2.1 Mode selection
 - 2.2 Unattenuated field-strength
 - 2.3 Convergence gain
 - 2.4 Radiation angle
 - 2.5 Ground loss at transmitter and receiver
 - 2.6 Polarisation coupling loss at transmitter and receiver
 - 2.7 Residual ionospheric absorption
 - 2.8 Intermediate reflection loss
 - 2.9 Transmitting aerial correction
- 3 Application of the wave-hop method
- 4 Comparison of measured and predicted field strengths
- 5 Solar-cycle, diurnal and random variations
 - 5.1 Solar-cycle variation
 - 5.2 Diurnal variation
 - 5.3 Random variation
- 6 Propagation to short distances
- 7 Horizontal transmitting aerials
- 8 Discussion
- 9 References
- 10 Appendix

Ground loss at transmitter and receiver
Polarisation coupling loss at transmitter and receiver
Ionospheric loss
Intermediate reflection loss (for multi-hop modes)

A transmitting aerial correction is then applied to each of the modes and, if two or more are of comparable strength, their powers are added.

The calculation gives the median field strength which should be observed after sunset when nocturnal conditions are well established over the entire path. The predicted field strength also corresponds to minimum solar activity. Further corrections may then be applied to determine the quasi-maximum field strength, or the field-strength at times nearer sunset or sunrise, or at some other point in the solar cycle.

2.1 Mode selection

Although m.f. propagation is mainly via the E-layer, F-layer reflections may occur at short distances at the higher frequencies in the band. Fig. 1(a) shows the reflections which are likely to occur six hours after sunset if the critical frequency varies in the manner described in Reference 2. It also shows that E- and F-layer reflections may be received simultaneously on short-distance paths.

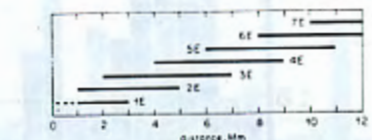
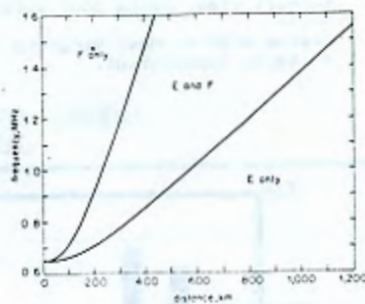


Fig. 1 Mode selection charts
(a) One-hop modes propagating six hours after sunset
(b) E-layer modes propagating to longer distances

At distances greater than 1200km, single-hop modes are unable to penetrate the E-layer, and multi-hop F-layer reflections

do not usually contribute significantly to the received signal. At the longer distances, therefore, E-layer reflections are the only propagation modes which need to be considered and Fig. 1(b) shows the modes which should be taken into consideration. Fig. 1(b) takes account of diffraction around the curvature of the Earth; this may considerably extend the effective range of low-angle modes, especially when one of the terminals is situated close to the sea.

2.2 Unattenuated field-strength

The basic field strength to which convergence gain is added and from which all other losses subtracted, is shown in Fig. 2. This is the field strength which would be measured if the transmitter radiated with a cymomotive force (c.m.f.) of 300V in all directions above the horizontal and if the Earth and ionosphere behaved as perfect plane reflectors. The receiver is assumed to be connected to a loop or ferrite-rod aerial near the ground with its axis perpendicular to the direction of the transmitter; this orientation normally gives maximum pick-up.* With these assumptions, the unattenuated field-strength is given by

$$E = 66 + 20 \log_{10} \frac{300}{d} \quad (1)$$

where E is in dBs relative to $1 \mu\text{V/m}$ and d is the path length via the ionosphere. Equation (1) includes 6dB to take account of the addition of the direct and ground-reflected waves at the receiver.

Fig. 2 shows the unattenuated field-strength for a range of distances measured along the surface of the Earth. In calculating d , the F-layer was assumed to have a virtual height of 220km, and the height of the E-layer was assumed to vary between 100km at vertical incidence and 90 km at very oblique incidence; these heights were derived from ray-tracing computations with a model ionosphere.^{2,3}

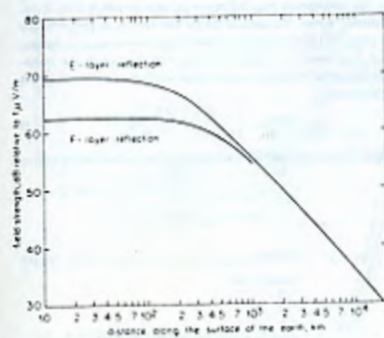


Fig. 2 Unattenuated field strength

Fig. 2 makes no allowance for convergence gain, which is discussed in the next section.

2.3 Convergence gain

The ionosphere behaves as a spherical mirror and causes a certain amount of focusing, thereby increasing the signal strength by an amount known as the convergence gain. This gain is greatest at very oblique incidence, where it is subject to an upper limit of about 9dB because waves are returned from the ionosphere by refraction rather than by specular reflection. Curves of convergence gain vs radiation angle which take refraction into account have been calculated by Bradley.⁴ Fig. 3 which is derived mainly from Bradley's curves, shows convergence gain for E-layer reflections as a function of hop length measured along the surface of the Earth. The convergence gain for F-layer reflections for hop lengths less than 1000km is similar.

Although Fig. 3 was calculated for single-hop paths, it may be used for multi-hop paths with little error because ionospheric focusing on subsequent hops is approximately cancelled by defocusing at the intermediate ground reflections. It is important to note that Fig. 3 gives convergence gain as a function of hop length and not path length, and that the gain must not be included in the calculation more than once.

* On short-distance paths near the magnetic equator a different orientation may sometimes give greater pick-up.

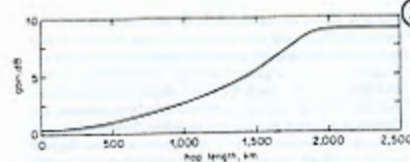


Fig. 3 Convergence gain

Since the unattenuated field strength and convergence gain are assumed to be independent of frequency, both may be combined in a single set of curves.

2.4 Radiation angle

An important parameter is the radiation angle, since this affects the ground loss at transmitter and receiver, the intermediate reflection loss, and, to a lesser extent, the polarisation coupling loss.

The ray-tracing computer program described in Reference 3 gives the distance at which a wave returns to Earth for a specified radiation angle. This distance depends on the virtual height of the reflecting layer and therefore varies with frequency and direction of propagation. An extensive series of ray-tracing computations for temperate and equatorial latitudes, for all directions of propagation and for frequencies throughout the m.f. band, has shown that the relationship between radiation angle and range is remarkably constant; a single curve for each layer therefore suffices.

Fig. 4 shows radiation-angle curves for E- and F-layer reflections, derived from the ray-tracing computations.* Fig. 4 may also be used to obtain the angle of arrival at the receiver even though it may differ slightly from the radiation angle because of ionospheric tilts and effects caused by the Earth's magnetic field; for all practical purposes the two angles may be assumed to be equal.

It will be seen that Fig. 4(b) has been extended to include negative radiation angles; these correspond to diffraction around the curvature of the Earth, and are defined in the inset to Fig. 4(b). To preserve symmetry and so avoid a discontinuity

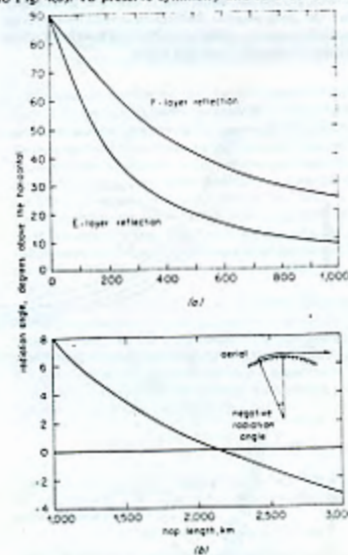


Fig. 4 Radiation angle
(a) short distances
(b) longer distances: E-layer reflection only

* All the computations used for the construction of these curves were performed with the idealised electron-density profile for six hours after sunset. Although slightly shorter ranges are computed for times nearer sunset, the variation of range during the night is relatively small and may be disregarded.

finity in the curve, the diffraction angles are assumed to be the same at both ends of the path, although they may in fact be unequal; this point is discussed further in the next section. In calculating the negative radiation angles shown in Fig. 4(b), allowance was made for atmospheric refraction, which has the effect of increasing the radius of curvature of the Earth by a factor of about 1.25 at medium frequencies.⁷

Fig. 4 may be used for multi-hop paths provided the path length is divided by the number of hops. If the hop-length exceeds 2,100 km, diffraction will occur at the intermediate Earth reflection points as well as at the terminals; such multi-hop modes are unlikely to contribute significantly to the signals received over very long paths, however, because of the high total diffraction loss.

2.5 Ground loss at transmitter and receiver

In calculating the unattenuated field strength shown in Fig. 2, the transmitter was assumed to radiate with a c.m.f. of 300 V in all directions above the horizontal. Although this assumes a hypothetical reference aerial, the concept enables the actual field strength to be calculated for any practical aerial system.

In designing such a system, it is usual to assume that the ground is perfectly conducting, the effect of finite ground conductivity being taken into account subsequently. Thus if the aerial is a vertical mast or tower, the low angle radiation which is responsible for long-distance propagation via the ionosphere will be reduced by ground loss.⁸ This loss, which is small at coastal sites and greatest at inland sites, must be applied as a correction to the unattenuated field strength. A similar correction must also be applied at the receiver, since all practical receiving aerials, including loop and ferrite-rod aerials, respond mainly to the vertically-polarised components of downcoming sky-waves.

If Earth curvature were neglected the ground loss at each end of path would be given by

$$L_g = 6 - 20 \log_{10} |1 + \rho_z(x)| \text{ dB} \quad (2)$$

where $\rho_z(x)$ is the Fresnel plane-wave reflection coefficient for vertically-polarised plane waves incident at angle α to the horizontal. Since $\rho_z = -1$ when $\alpha = 0$ for all ground conductivities, ground loss would tend to infinity at grazing incidence if the Earth were flat. Diffraction around the curvature of the Earth, however, causes ground loss to have finite values at grazing and negative radiation angles.

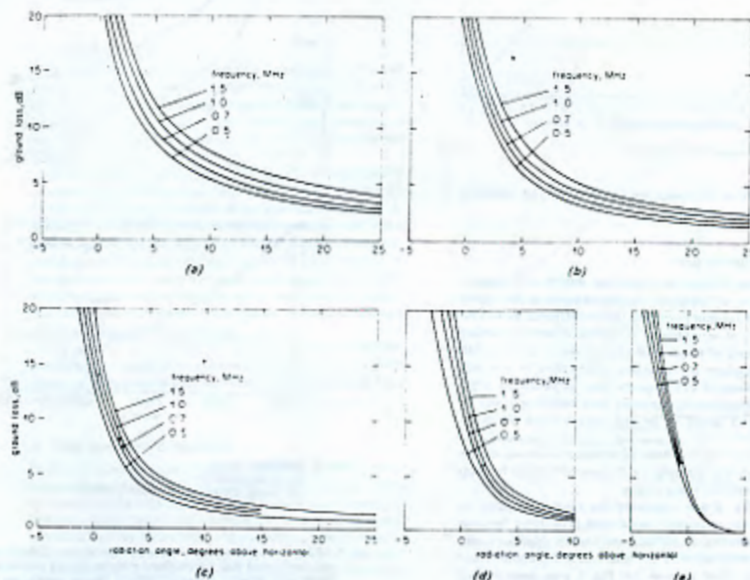


Fig. 5 Ground loss

(a) ground conductivity 1 mS/m (b) ground conductivity 3 mS/m (c) ground conductivity 10 mS/m (d) ground conductivity 30 mS/m (e) sea water

Diffraction around an imperfectly-conducting sphere has been studied theoretically by Wait and Conda¹ and their theory is applied here to the calculation of ground loss for radiation angles less than 5°, the radius of the Earth being increased by a factor of 1.25 to allow for atmospheric refraction. The result of the calculation, for land of various conductivities and for sea, is shown in Fig. 5 together with losses for higher angles calculated from Equation (2).

The ground-loss corrections shown in Fig. 5 are valid provided the ground is level and reasonably uniform for several kilometres in the direction of propagation. This condition may not be satisfied if the transmitter or receiver is situated near the sea or on the edge of a sea inlet, or if the aerial is situated on sloping ground or on a hill or cliff. The ground loss which arises in such circumstances is considered in detail in Reference 6.

On single-hop paths involving diffraction around the curvature of the Earth, it is reasonable to assume that the negative radiation angles at both ends of the path are equal if the ground conductivities at the two terminals are similar. When the conductivities are very different, however, this may not be true; for example if one terminal is near the sea and the other is well inland, a greater diffraction angle might be expected at the sea terminal. Calculations assuming different combinations of diffraction angles at the terminals have shown, however, that the total ground loss on such paths does not depend critically on the way in which the total diffraction angle is shared between the two ends of the path. It may therefore be assumed to be equally divided between the two ends and given by Fig. 4(b) even when the conductivities are dissimilar.

2.6 Polarisation coupling loss at transmitter and receiver

At medium frequencies only the ordinary wave need be considered because the extraordinary wave is greatly attenuated and seldom contributes to the received signal. Waves incident on the ionosphere may be resolved into ordinary and extraordinary waves, the ratio of the power density of the ordinary wave to that of the incident wave being known as the polarisation coupling loss. It has been shown⁹ that when the transmitting aerial radiates vertical polarisation, the coupling loss is given by

$$L_c = 10 \log_{10} \left(\frac{1 + M^2}{\cos^2 \psi + M^2 \sin^2 \psi} \right) \quad (3)$$

where M is the axial ratio of the ordinary-wave polarisation

ellipse and ψ is the angle by which its minor axis is tilted from the horizontal plane. Formulae for calculating M and ψ in terms of frequency, magnetic-dip latitude, direction of propagation and angle of incidence at the ionosphere are given in References 3 and 8.

When the elliptically-polarised ordinary wave which emerges from the ionosphere is received on a loop or open-wire aerial, additional coupling loss is incurred because m.f. receiving aerials respond only to the vertically-polarised components of downcoming waves. This loss is also given by Equation (3) provided M and ψ are the values applicable to downcoming waves.

On short single-hop paths, curves such as those of Fig. 4 of Reference 8 may be used to determine the sum of the coupling losses at transmitter and receiver. On long paths, however, the coupling losses at transmitter and receiver must be calculated separately because the magnetic dip latitudes and directions of propagation (relative to magnetic north) at the terminals will, in general, be somewhat different. In the wave-hop method described here, coupling losses at transmitter and receiver are calculated separately for paths of all lengths.

A set of curves which give polarisation coupling losses at individual terminals are contained in Fig. 6. Although polarisation coupling loss depends to some extent on frequency and angle of incidence at the ionosphere, Fig. 6 may be used with negligible error for all frequencies in the m.f. band and for radiation angles up to 20° from the horizontal. The direction of propagation ψ is defined in the inset; on short paths the values of ψ for the two terminals tend to be complementary. The 'nearer magnetic pole' referred to in Fig. 6 is the magnetic pole in the same hemisphere as the point where the wave enters or leaves the ionosphere.

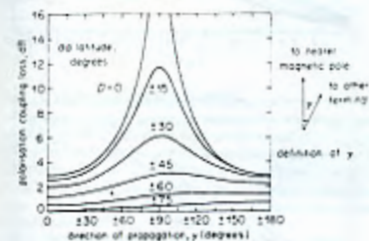


Fig. 6 Polarisation coupling loss at transmitter or receiver

2.7 Residual ionospheric absorption

At m.f., ionospheric absorption depends on time after sunset, solar activity, geomagnetism and frequency. This section considers the absorption which remains late at night during periods of low solar activity.

The Earth's magnetic field has two distinct effects on ionospheric absorption. Firstly it is responsible for the auroral zones, regions centred on the magnetic poles where absorption losses are high. Distance from the auroral zone is believed to be of considerable importance; for example, ionospheric losses in North America are known to be greater than in Europe.¹⁰ Secondly the rate of attenuation of a wave in the ionosphere depends on the angle between its direction of propagation and the direction of the Earth's magnetic field, the rate of attenuation being least when these two directions are parallel.

These two effects in combination cause ionospheric losses on NS paths to be less than on EW paths. Long NS paths usually pass through equatorial regions, where propagation tends to be parallel to the Earth's field and auroral effects are absent. On the other hand, EW paths tend to be transverse to the Earth's field, and some EW paths (especially those across the North Atlantic) are close to the auroral zone.

The way in which ionospheric losses would vary if auroral effects were absent has been studied by means of an extensive series of ray-tracing computations, using an ionospheric model assumed to be common to all geographical areas. The model is essentially the same as that derived in Reference 2 for six hours after sunset, but all collision frequencies were halved in order to obtain reasonably good agreement between measured and predicted field strengths for Europe. The ionospheric model is therefore believed to be reasonably

accurate for Europe but does not necessarily apply to other parts of the world.

The method described in Reference 3 was used for the ray-tracing computations; regional variations in the strength and direction of the Earth's magnetic field were therefore taken fully into account. A detailed study was made of propagation from hypothetical transmitters situated at Berlin and at Kaduna, Africa; Kaduna lies on the geomagnetic equator. In Europe, ionospheric losses were found to be almost independent of direction of propagation; this is to be expected because the Earth's magnetic field is almost vertical. Losses on EW paths in Europe and Africa were found to be similar; this is also to be expected because EW propagation tends to be transverse to the Earth's magnetic field at all latitudes. Furthermore, step-by-step ray-tracing computations¹¹ have shown that most ordinary-wave attenuation occurs near the ionospheric reflection point, where EW propagation is exactly transverse and independent of the strength of the Earth's magnetic field.

Ordinary-wave losses computed for single-hop EW paths are shown by unbroken lines in Fig. 7. Although the losses decrease with increasing frequency, the reduction is less than would be expected if waves of all frequencies followed identical paths; waves of higher frequencies penetrate more deeply into the ionosphere. Fig. 7 shows that losses for low-angle modes tend to be almost independent of hop length because of the very small variation of the angle of incidence at the ionosphere.

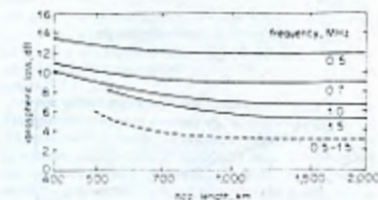


Fig. 7 Computed ionospheric losses
— East-west propagation at all latitudes ($\theta = 90^\circ$)
- - - North-south propagation at magnetic equator ($\theta = 0^\circ$)

Propagation parallel to the Earth's magnetic field was studied by computing losses on single-hop NS paths having reflection points situated at the geomagnetic equator. Although most of the computations involved reflection over Kaduna, some additional computations were made for other equatorial regions since some dependence on the strength of the Earth's magnetic field was expected. The strength of the Earth's field was, however, found to have negligible influence on the computed losses, which were also found to be almost independent of frequency. The results of the computations for equatorial NS paths are shown by the broken curve of Fig. 7.

As mentioned earlier, ionospheric loss depends on the angle θ between direction of propagation and that of the Earth's magnetic field. At the ionospheric reflection point, where most loss is incurred, the values of θ for the EW and equatorial NS paths considered here are 90° and 0° respectively. In the Appendix it is shown that the ordinary-wave loss for any other value of θ is given approximately* by

$$L_\theta = \frac{L_{90} \sin^2 \theta + 2L_0 \cos^2 \theta}{1 + \cos^2 \theta} \text{ dB} \quad (4)$$

where L_0 and L_{90} are the losses given by Fig. 7 for $\theta = 0$ and 90° respectively. The value of θ at the ionospheric reflection point is given by

$$\cos \theta = \cos D \cos \psi \quad (5)$$

where D is the magnetic dip latitude and ψ is the direction of propagation relative to the magnetic NS axis.

In calculating L_θ it is convenient to arrange Equation (4) in the form

$$L_\theta = L_0 + (L_{90} - L_0)G \text{ dB} \quad (6)$$

where $G = \sin^2 \theta / (1 + \cos^2 \theta)$.

* Losses calculated from Equation (4) for paths passing over Kaduna in all possible directions relative to the NS axis have shown good agreement with losses computed for the same paths by ray-tracing.

Fig. 8(a) is a contour chart which gives G in terms of D and γ . For hop lengths greater than 1200 km Equation (6) may be further simplified to

$$L_0 = 3.0 + LG \text{ dB} \quad (7)$$

where L is the limiting value of $L_{11} - L_0$ for long hops, derived from Fig. 7 and shown in Fig. 8(b) as a function of frequency.

Since the losses shown in Fig. 7 were computed with an ionospheric model which may be invalid outside Europe, losses derived from Fig. 7 for other parts of the world should be treated with caution. Near the auroral zone, such losses may have to be multiplied by a factor greater than 1.0, while in tropical regions multiplication factors less than unity may be required.

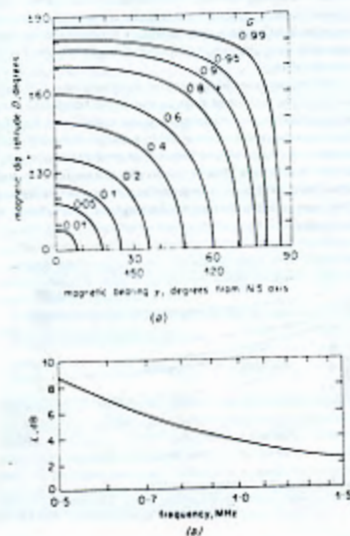


Fig. 8 Ionospheric loss charts
Ionospheric loss per hop = $3.0 + LG$ dB
(a) contour plot of G (b) loss factor L

2.8 Intermediate reflection loss

Intermediate reflection loss on multi-hop paths depends on the polarisation of the downcoming wave, the polarisation of the wave accepted by the ionosphere at the next hop, and on the ground constants. There are three situations in which the loss may be high:

1. In temperate latitudes when the downcoming wave is incident at the Brewster angle, because the ordinary wave is essentially vertically polarised.
2. For East-West propagation with sea reflection at 45° dip latitude, when the ordinary wave re-enters the ionosphere as the extraordinary wave and is absorbed.
3. For North-South propagation with sea reflection at the magnetic equator, when the ordinary wave is again converted into the extraordinary wave and absorbed.

Intermediate reflection loss is, in general, non-reciprocal, i.e. its value changes if the direction of propagation between two given terminals is reversed. The non-reciprocal effect is most apparent when waves are reflected from land at angles near the Brewster angle, waves propagating towards the west suffering the greater loss. Waves reflected from the sea, however, have similar losses in both directions of propagation.

A general formula for intermediate reflection loss is derived in Reference 8 and quoted in Reference 2.* This loss is a

* In Reference 2 the last term in the numerator of the right-hand side of Equation (15) should be $M_1 \cos \alpha_1$, not $M_1 \sin \alpha_1$.

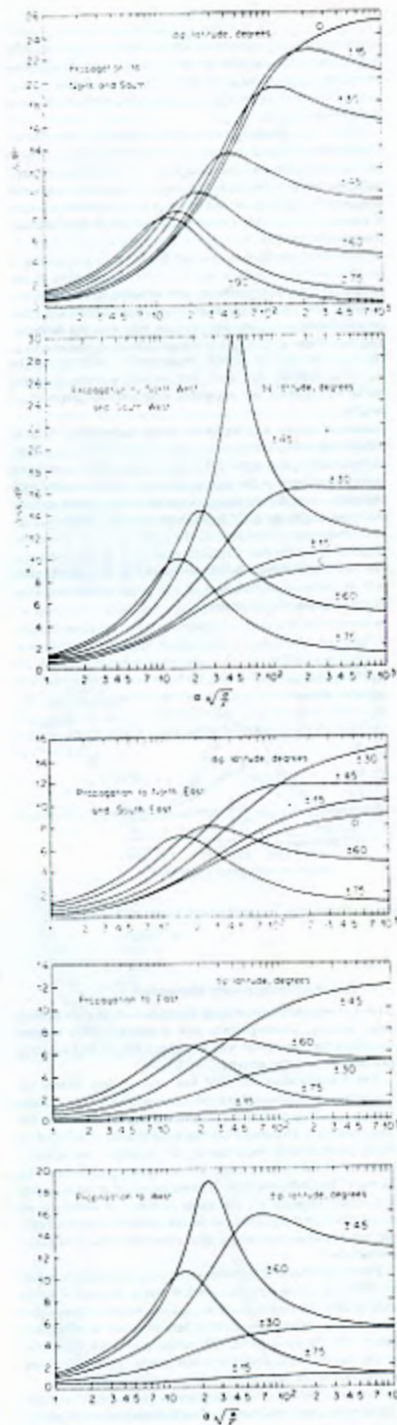


Fig. 9 Intermediate reflection loss
 α = angle of arrival, degrees to horizontal
 σ = ground conductivity, mS/m. F = frequency, MHz
For sea water, $\sigma = 4000$ mS/m

function of a large number of variables and should, ideally, always be computed. To enable losses to be estimated from curves, however, the following simplifying assumptions have been made:

1. The dip latitude and direction of propagation at the points where the wave leaves the ionosphere, and re-enters after reflection, are the same as the value at the Earth reflection point, except on NS paths near the equator, where an allowance has been made for the change in dip latitude.
2. The frequency is approximately equal to the gyro-magnetic frequency.
3. The angle of incidence at the ionosphere is 80° ; this angle is approximately correct for hop lengths greater than 1000 km.
4. The reflection coefficient for horizontally-polarised radiation is -1.0 .

Fig. 9 shows intermediate reflection losses, computed with these assumptions, for five directions of propagation relative to magnetic north and for a range of dip latitudes. The curves are plotted as a function of $\alpha(F^2)$ where α is the radiation angle in degrees, σ is the ground conductivity in mS/m and F is the frequency in MHz. Because of the simplifying assumptions, Fig. 9 should not be used for values of σ greater than 10.

The theory described above makes no allowance for Earth curvature, which would be expected to have a significant effect when α is less than 2° . Although the effect of Earth curvature on intermediate reflection loss has not yet been studied, it is possible that, at grazing incidence, the loss may tend to a value of about 6 dB under all circumstances. Although greater losses would be incurred with negative radiation angles because of diffraction, multi-hop paths involving negative radiation angles are unlikely to contribute significantly to received signals.

2.9 Transmitting aerial correction

When two or more modes of comparable amplitude are present their combined effect must be calculated.

In calculating the strengths of individual modes the transmitter is assumed to radiate with a c.m.f. of 300 V at all vertical angles. Before individual modes can be added, corrections must be made for the vertical radiation pattern (v.r.p.) of the transmitting aerial.

Fig. 10 shows the corrections required for vertical transmitting aerials of various heights radiating 1 kW. The corrections are similar to those given in Fig. 1 of CCIR Report 264-2, but are drawn as a function of radiation angle. No allowance has been made for imperfect ground conductivity in deriving these curves because this is taken account of in the ground loss calculation described in Section 2.3.

After correction the modes are added on a power basis; Fig. 11 may be used for this operation. If more than two modes are significant, Fig. 11 may then be used to add the resultant of any two modes to a third; this process may be repeated until all the significant modes have been accounted for.

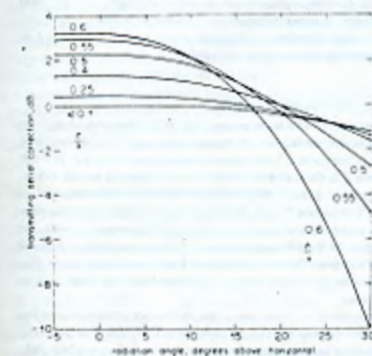


Fig. 10 Vertical transmitting aerial correction

h/λ = aerial height in wavelengths

3 Application of the wave-hop method

To illustrate the use of the wave-hop method, its application to the Rome-Tsumb (S.W. Africa) path is described in this section. Details of the calculation are given in Table I.

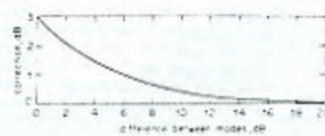


Fig. 11 Chart for mode addition

The path length is 6740 km and Fig. 2 indicates that the 3E, 4E and 5E modes should be considered. The radiation angle for the 3E mode is -0.3° , however, and a rough estimate shows that it is unlikely to make a significant contribution to the received signal because of the diffraction losses at the terminals and at the intermediate ground reflection points. Detailed calculations were therefore confined to the 4E and 5E modes.

In the table the sum of the unattenuated field strength, the convergence gain and the transmitting aerial correction is referred to as the 'field strength without losses', and all losses are subtracted from this figure. Before calculating individual losses it is an advantage to tabulate all the values of dip latitude (D), ground conductivity (σ) and direction of propagation relative to the magnetic NS axis (γ) which are required. Values of γ are omitted from Table I, however, since this particular path is very close to the NS axis over its entire length.

A few points concerning the calculation for the Rome-Tsumb path are worth mentioning. At Rome the distance to the sea in the direction of propagation is about 30 km, and the transmitter can therefore be regarded as situated on an inland site, assumed to have a conductivity of 15 mS/m. Ground conductivities at the intermediate reflection points and at the receiver were derived from the World conductivity map.¹¹ The polarisation coupling losses at transmitter and receiver are equal; this is unusual but it arises because the terminals are situated in opposite hemispheres at roughly the same dip latitudes.

Measurements of the Rome transmission were made at Tsumb in 1971 by the Fernmelde-technisches Zentralamt (FTZ) of the Deutsche Bundespost. The median field strength measured in June 1971, six hours after sunset at the northern-most ionospheric reflection point, was 37.5 dB relative to $1 \mu\text{V/m}$ (dBu). Assuming a transmitter power of 540 kW and an aerial gain, relative to that of a single 0.52λ mast, of 2.3 dB in the direction of Tsumb, the measured field strength would have been 7.9 dBu if 1 kW had been radiated from a single 0.52λ mast. The measured field strength therefore exceeds the predicted value by about 7 dB, and the discrepancy would be increased by a further 4 dB if the solar cycle correction for Europe described in Section 5.1 were taken into consideration. The discrepancy may arise because of the presence of sporadic-E layers in equatorial regions; these would tend to reduce both ionospheric and intermediate reflection losses.

4 Comparison of measured and predicted field strengths

About eighty papers and documents which contain information about m.f. propagation at night have been studied and a detailed comparison between predicted and measured field strengths has been made. Reliable measurements made over considerable periods for 21 European paths, 26 North American paths, 22 Australian paths, 60 paths between Australia and New Zealand and 35 long-distance paths are available, together with measurements made over shorter periods for Asian and African paths, and for paths from Ascension Island. Extensive measurements have also been made in the USSR. The quantity which is usually measured is the median field strength observed during an hour, or half an hour, centred on a particular time after sunset. As these hourly (or half-hourly) medians vary considerably from night to night, the measured field strength compared with predictions is the value exceeded on 50 per cent of the nights on which measurements were made. Measurements have been standardised to six hours after sunset where necessary and solar activity corrections have been applied to measurements made in tem-

TABLE I
Field-Strength Prediction for Rome-Taswell Path

Distance 6740km Frequency 0.845 MHz	Unattenuated field strength 39.0 dB _s Transmitting aerial 0.52 λ mast radiators					
	4E		SE			
Mode	1685		1348			
Hop length, km	2.3 ²		4.6 ²			
Radiation angle	6.9		4.3			
Convergence gain, dB	2.4		2.3			
Transmitting aerial correction, dB	48.3		45.6			
Field strength without losses, dB _s						
	<i>D</i>	α mS/m	Loss dB	<i>D</i>	α mS/m	Loss dB
Ground loss at transmitter	—	15	6.8	—	15	4.0
Polarisation coupling loss	50 ²	—	2.3	51 ²	—	2.3
Ionsospheric loss (1st hop)	48 ²	—	4.8	49 ²	—	4.8
Ground reflection loss	32 ²	8	3.8	39 ²	8	8.0
Ionsospheric loss (2nd hop)	20 ²	—	3.3	28 ²	—	3.6
Ground reflection loss	3 ²	30	5.6	16 ²	10	6.8
Ionsospheric loss (3rd hop)	-18 ²	—	3.2	4 ²	—	3.0
Ground reflection loss	-32 ²	15	4.8	-15 ²	15	7.7
Ionsospheric loss (4th hop)	-47 ²	—	4.1	-27 ²	—	3.6
Ground reflection loss	—	—	—	-38 ²	15	9.0
Ionsospheric loss (5th hop)	—	—	—	-50 ²	—	5.0
Polarisation coupling loss	-50 ²	—	2.3	-52 ²	—	2.3
Ground loss at receiver	—	15	6.8	—	15	4.0
Total loss			47.8			64.1
Field strength, dB _s , for 1 kW radiated	0.5				-18.5	
Predicted field strength			0.6 dB _s			

perate latitudes to estimate the values which would be observed at the minimum of the solar cycle.

The measured field strengths for the European paths are the values which were obtained for six hours after sunset when the measurements were subjected to the method of analysis described in Section 5.2. Those for the North American paths¹¹ were derived by extrapolating regression analyses of the type described in Reference 12 to zero sunspot number; 2.5 dB was then added because the measurements were made two hours after sunset. The 2.5 dB correction was also added to the Australian¹² and New Zealand¹⁴ measurements for the same reason. The Australian measurements were not corrected for solar activity because they were made at sunspot minimum, but the EBU correction for sunspot number 80

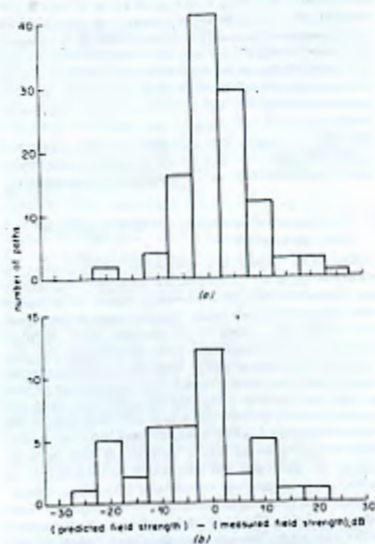


Fig. 12 Distribution of differences between predicted and measured field strengths
(a) Paths shorter than 3000 km
(b) Paths longer than 3000 km

was applied to the New Zealand measurements, full details of which were supplied to the BBC by courtesy of the Australian Post Office.

The long-distance measurements include some of the previous measurements from which the so-called Cairo curves were derived; they were derived from Reference 15, where 9 dB was subtracted to convert measured quasi-maximum field strengths to median values. No correction was made for solar activity. Results for the long-distance EBU paths are also given in Reference 15. The solar-activity correction was again omitted because it is uncertain what correction, if any, is required for long-distance paths.

Fig. 12 shows histograms of the difference between 152 predicted and measured field strengths. On paths shorter than 3000 km, 84 per cent of the differences are less than 10 dB and on longer paths 66 per cent of the differences come within this range. Some of the larger discrepancies may be caused by uncertainties about effective ground conductivities at transmitting and receiving sites, and at intermediate ground reflection points.

5 Solar-cycle, diurnal and random variations

The wave-hop method described in Section 3 predicts the median field strength six hours after sunset when solar activity is least. The quasi-maximum field strength, or the field strength at some other time of night or point in the solar cycle, may be estimated from the predicted value by means of corrections discussed in this section.

5.1 Solar-cycle variation

Solar activity increases ionospheric absorption loss at m.f. An analysis of measurements made in Europe¹³ has shown that, as a consequence, field strengths are reduced by $K_R \times 10^{0.1 R}$ dB, where R is the sunspot number and d is the path length in km. Somewhat greater field-strength variations are observed in North America¹⁴ and Australia,¹¹ presumably because they are close to the auroral zones. Measurements made on twenty-six North American paths¹¹ have been analysed by the method described in Reference 12 and the results show that the solar-cycle variation is approximately double that in Europe.

In general it would seem that field strengths estimated for minimum solar activity by the method described in Section 2 should be reduced by $K_R d$ dB, where K is a factor which may prove to be a function of distance from the auroral zones. In Europe, for example, K is equal to 10^{-3} and in North America it is about twice this value.

5.2 Diurnal variation

The prediction method described in Section 3 estimates the field strength six hours after sunset. It is well known that m.f. sky-wave field strengths are lower nearer to sunset, and at sunrise.

In order to study the diurnal variation, median field strengths measured by the EBU during half-hour periods throughout the night on about twenty European paths were classified by a computer according to the time after sunset, or before sunrise, at which the measurements were made. The EBU correction for solar activity was applied to each individual measurement, and the computer then found the field strengths exceeded for 50 per cent of the time during consecutive half-hour periods after sunset or before sunrise. The diurnal variations obtained on all paths were found to be similar to the average variation shown in Fig. 13. Similar variations have been observed in Australia¹⁵ and India.¹⁴ Fig. 13 also agrees well with variations observed on very long paths, provided the time reference is local time at the hop which controls the onset of night-time propagation, or the commencement of day-time propagation.

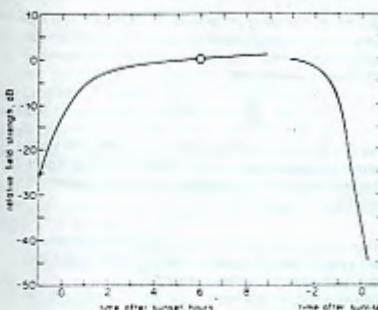


Fig. 13 Diurnal variation

The reference times are the times of sunset and sunrise at sea level.

Fig. 13 may be used provisionally to derive field strengths for any time during the night from predictions for six hours after sunset or from measurements made at that time. Detailed study of the results of the computer analysis may reveal some dependence of the diurnal variation on both frequency and time of year.

5.3 Random variation

Medium-frequency ionospheric signals fluctuate because the ionosphere is turbulent. When a single E-layer mode predominates the fading rate is slow,¹⁶ but when two or more modes of comparable amplitude are present the fading rate is much more rapid.

Considerable variation in the median field strength measured during one hour is observed from night to night because of changing ionospheric conditions. The statistic which is usually quoted is the field strength which is exceeded by the hourly median on 50 per cent of the nights of the year at a stated time after sunset. This is the quantity which is predicted by the wave-hop method described in Section 2.

A knowledge of the amount by which this field strength is exceeded for shorter periods is essential. Sufficient information appears to be available for reliable estimates to be obtained, but this aspect has not yet been studied in detail.

6 Propagation to short distances

The wave-hop method described in Section 2 is intended for distances greater than 500 km. It cannot be used for shorter distances in its present form because high radiation angles are beyond the range of validity of many of the curves.

Experience with anti-fading mast radiators suggests that the reflection coefficient of the ionosphere in Europe rises to a maximum value of about -10 dB late at night, at all frequencies in the m.f. band. Thus the maximum field strength which is likely to be observed in Europe may be estimated from the

* The number of deep fades per hour is about ten times the frequency in MHz.

unattenuated field strength given in Fig. 2 by subtracting 10 dB, the appropriate reflecting layer or layers being determined by reference to Fig. 1(a). Actual field strengths may sometimes be much lower than values predicted in this way, especially when reflected waves are about to penetrate the E-layer.

Of the 10 dB of residual attenuation, 4-6 dB is accounted for by polarisation coupling loss and the remainder is due to ionospheric absorption. In other temperate latitudes the polarisation coupling loss will be similar but the ionospheric absorption may be significantly different. In tropical latitudes, polarisation coupling loss will be low on North-South paths and high on East-West paths unless transmissions are radiated from horizontal aeriels, discussed further in the next section.

7 Horizontal transmitting aeriels

In the prediction method described in Section 2 the transmitting aerial is assumed to be vertical. Horizontal aeriels are sometimes used for short-distance sky-wave broadcasting, however, and their use calls for some modifications to the prediction method which are discussed in this section.

The principal factors which must be taken into consideration are the change in polarisation coupling loss and the effect of finite ground conductivity. Once the wave has entered the ionosphere its propagation is independent of the transmitter which excited it, and no further modifications to the preferred method are required.

In general, horizontal aeriels radiate elliptical polarisation and the calculation of polarisation coupling loss is complicated. The calculation is, however, relatively simple in the following situations:

1. At the high angles corresponding to the service area, where the radiation is essentially plane polarised. In European and other temperate latitudes the total coupling loss for both ends of the path will be 4-6 dB, as with vertical transmitting aeriels. In tropical latitudes the polarisation coupling loss at the transmitting end of the path will be provided the axes of the horizontal dipoles lie in a magnetic North-South direction; if they lie East-West, however, the coupling loss will be very high.
2. In the 'broadside' directions, where the radiation is horizontally polarised. For low-angle radiation, the polarisation coupling loss at the transmitting end of the path may be derived by adding 1 dB to the values shown in Fig. 4 of Reference 19.
3. In the 'end-on' directions, where the radiation is vertically polarised and the coupling loss is exactly the same as that calculated for vertical aeriels, described in Section 2.6.

At low angles the effect of finite ground conductivity and Earth curvature must be taken into consideration. In the 'end-on' directions, finite ground conductivity increases, rather than decreases, the strength of low angle radiation compared with that which would be observed if the ground were perfectly conducting.¹⁷ The effect of Earth curvature has not yet been studied.

Since the prediction method is based on a semi-isotropic transmitting aerial whose c.m.f. is 300 V, curves similar to those of Fig. 10 must be used to correct for the v.r.p.s. of horizontal transmitting aeriels. Beyond the service area, multi-hop high-angle F-layer modes may predominate because horizontal aeriels radiate more strongly at high angles.

8 Discussion

The wave-hop method relies on the calculation of as many of the factors which control m.f. ionospheric propagation as possible. Errors are therefore mainly caused by uncertainty about those factors which cannot be calculated but must be derived from measurement. The principal source of error is lack of knowledge about the variation of ionospheric absorption with latitude and with solar activity. Uncertainty about ground conductivities also leads to errors, especially when low-angle modes are involved.

To obtain more precise information about ionospheric absorption, a detailed comparison of predicted and measured field strengths on paths of about 1000 km needs to be undertaken. If this can be done for as many regions as possible, a world-wide picture of the variation of absorption should result. It may be possible to incorporate this variation in the prediction method, possibly as an ionospheric-loss multiplication factor which depends on geographical location.

Application of the wave-hop method tends to be laborious and time-consuming, especially when long-distance paths are

concerned. To facilitate its use it may be desirable to translate it into a computer program, especially as some factors, such as intermediate ground reflection loss, are more conveniently obtained by computation. A disadvantage, however, is that a world map of ground conductivity would have to be stored in the computer, together with less detailed information about the strength and direction of the Earth's magnetic field. An alternative would be to use the method to calculate propagation curves for typical conditions; this approach may be quite satisfactory for distances up to about 3000 km.

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Court to Rule on Radio Tower

By MARY CASE
Special to the *Vindicator*

CORTLAND — The question of whether a radio tower will be erected on McCleary-Jacoby Road in Bazetta Township is going to court.

Bazetta trustees Monday designated its legal advisor Atty. Robert Burkey to represent the township Board of Zoning Appeals in fighting an appeal by a township couple who oppose a variance to allow a radio tower to be erected in their neighborhood.

David and Mary Lou Reese, whose property ad-

joins the site where the radio tower and transmitter will be constructed, filed an appeal in Common Pleas Court of a decision by the Zoning Board of Appeals on May 22.

In that ruling, Nancy Hoffman, who has applied for a license to operate an AM station at 830 kilocycles in Trumbull County, was given a variance from zoning regulations to construct the needed tower on land owned by the Conservation League Inc. on McCleary-Jacoby Road.

Homeowners in the area had contended that the purpose of the Conservation League was to promote conservation and preserve land.

FROM 6/6/84
YOUNGSTOWN VINDICATOR

REAL ESTATE PROBLEMS ARE THE SINGLE LEADING CAUSE OF CPS GETTING ON THE AIR LATE. IN THIS CASE, THE CP HASN'T EVEN BEEN GRANTED YET & ALREADY THEY HAVE PROBLEMS. THIS IS FOR THE CORTLAND, OH APPLICATION ON 830 KHZ.

J. STARR



FM WAVELENGTH TOWER



KWBE AM & FM

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HEATHCOTE, INDIANAPOLIS
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Dallas Lankford
(c) 1984

10 Appendix

Ionospheric attenuation of the ordinary wave

It has been shown²² that the imaginary part χ of the complex refractive index of a wave of any polarisation traversing the lower ionosphere is given by

$$\chi = \frac{XZ}{4(1 - RR^*)} \left[\frac{2\sin^2 \theta}{1 + Z^2} - \frac{\cos^2 \theta - jR(\cos^2 \theta - jR^*)}{(1 - Y^2 - Z^2)} + \frac{\cos^2 \theta - jR(\cos^2 \theta - jR^*)}{(1 - Y^2 + Z^2)} \right] \quad (8)$$

where the asterisk denotes the complex conjugate and the symbols have the usual meanings ascribed to them in the magneto-ionic theory.²³ The rate of attenuation of the wave is described by the equation

$$\frac{dP}{dz} = -2kP\chi \quad (9)$$

where P is the power density of the wave, z is distance in the direction of propagation, $k = 2\pi/\lambda$ and λ is the wave-length.

The polarisation of the ordinary wave is given approximately by

$$R = -j\cos\theta \quad (10)$$

if (1) the frequency is close to the gyro-magnetic frequency (as at m.f.) and (2) electron-molecule collisions have a negligible effect on polarisation (justified here²⁴).

Equation (10) is exact when $\theta = 0$ and 90° and it may be shown that Equation (8) then simplifies to

$$\chi_0 = \frac{XZ}{2(1 + Y^2 - Z^2)} \quad \text{when } \theta = 0 \quad (11)$$

$$\chi_{90} = \frac{XZ}{2(1 - Z^2)} \quad \text{when } \theta = 90^\circ \quad (12)$$

If Equations (10), (11) and (12) are substituted in Equation (8) it may be shown that

$$\chi = \frac{X \sin^2 \theta - 2\chi_0 \cos^2 \theta}{1 + \cos^2 \theta} \quad (13)$$

Equation (13) applies to every point on the path. Since the variation of θ along the path is relatively small in the region where most ionospheric absorption takes place, θ may be assumed to be constant with little error. If Equation (13) is substituted in Equation (9) and then integrated, it may be shown that the total ionospheric loss for any given value of θ is given by

$$L_\theta = \frac{L_0 \sin^2 \theta - 2L_{90} \cos^2 \theta}{1 + \cos^2 \theta} \text{ dB} \quad (14)$$

where L_0 and L_{90} are the ionospheric losses in dB when $\theta = 0$ and 90° respectively.

Seaver [1984] does not seem to understand the nature of science because he claims to refute my theory, Lankford [1984], with his theory alone. But it is impossible for one scientific theory to refute another without some experimental evidence which agrees with the one theory and disagrees with the other. Seaver [1984] did not present any such experimental evidence, and so he has not refuted my theory.

One of the primary differences between Seaver's theory and mine is the arrival angle of BCB (540-1600 khz) signals which have been propagated over large distances. Seaver takes 1 degree, while I take 10 degrees as representative. To the best of my knowledge, there are no published experimental measurements of arrival angles below 5 mhz, so the bottom line is that BCB arrival angles are not presently known. However, it is interesting to examine the experimental measurements made between 5 and 20 mhz which have been published by Beynon [1954], Hallborg and Goldman [1947], Utlaut [1961], Wilkins and Kift [1957], and Wilkins and Minnis [1956], and to see how trends in those measurements would extrapolate to the BCB.

At 5 mhz, the average arrival angle was found to vary between 10 and 30 degrees, while at higher frequencies the range was about 7 to 20 degrees. The most detailed study of arrival angles is by Wilkins and Kift [1957] who display hundreds of arrival angle measurements taken over two three hour periods on October 9 and November 6, 1953 for a Negombo, Ceylon - Slough, U. K. path and a frequency near 16 mhz. During both of these periods about 30% of the measured arrival angles were below 5 degrees, and there were even a few 1 degree measurements. The 1 degree measurements were transient, and did not persist for any extended period of time. Average arrival angle of the strongest component was about 7 degrees.

For the 1 degree arrival hypothesis of Seaver [1984] and others to be correct would require a dramatic reversal of the increasing arrival angle vs. decreasing frequency which is observed in the 5 - 20 mhz range.

Consequently, I will stick with my 10 degree arrival angle hypothesis until someone shows me published experimental measurements to the contrary. And if the 10 degree arrival angle hypothesis is correct, then the methods of Seaver [1984] predict much lower signal strengths than are required for long distance BCB reception. So it is Seaver's theory which would appear to be wrong.

The myth that the extraordinary mode can be ignored in models of BCB propagation appears to originate in a mistake by Appleton [1925] who published an incorrect formula for gyro-frequency which gave values about half what they should have been. Thus Appleton concluded that the extraordinary mode would be heavily absorbed throughout the entire BCB in Europe. Even after Nichols and Schelleng [1925] had pointed out the mistake, Appleton apparently continued to use his previous (incorrect) conclusion. For example, in Appleton [1927] we find, "The marked absorption in the D layer will act differentially on the two waves which are, in general, transmitted, so that for wave-lengths in the broadcasting band in Europe we may expect only the non-critical ray to reach the ground with any appreciable intensity." The non-critical ray referred to above is the ordinary ray. Appleton also made several other errors in his original descriptions of ionospheric propagation: errors in describing the polarization of radio waves, Appleton [1925], and an error in the index of refraction formula, Appleton [1927]. Gillmor [1982] made the following comments about two of these errors in response to a letter of mine about these and other matters. "...the 500 khz vs. 1400 khz error I have mentioned at some lengths in speeches... There are other reasons for addition for Appleton, Nichols and Schelleng, etc. using various frequencies for gyro. At least one, I suspect, for Appleton was in hoping to account for fading and swinging on ZLO. The other point, circularly vs. elliptically polarized waves I recognized..."

I started disbelieving the myth that the extraordinary mode can be ignored in models of BCB propagation after reading the remarkable paper of Watts and Brown [1954] and seeing the strong extraordinary traces on many of their low and medium frequency vertical incidence ionograms where the myth says there should be no appreciable traces, namely in the 540 - 1100 khz range. There must now be thousands, perhaps hundreds of thousands, of ionograms which show strong extraordinary traces below gyrofrequency, and even some ionograms which show gyrotraces, yet somehow the myth persists that such traces are not there. Strange... There have been no experimental measurements of extraordinary mode absorption in the 540 - 1100 range, so it is impossible to draw any conclusions about the quantitative strength of the extraordinary mode from experimental evidence. Using the Altar-Appleton index of refraction formula, see Gillmor [1982], one can show that the ratio of the ordinary transverse absorption coefficient to the extraordinary longitudinal absorption coefficient is approximately $(1 - f_H/f)^2$ where f_H is gyrofrequency and f is signal frequency. The approximation is accurate except within a few 10's of khz of gyrofrequency. Thus in the central USA where gyrofrequency is about 1.5 mhz, below 750 khz the extraordinary longitudinal mode is actually absorbed less than the ordinary transverse mode. Vertical incidence propagation is approximately longitudinal, so this explains why we see strong extraordinary traces below about 1100 khz on vertical incidence ionograms made in the

continental USA. I have not completed my studies of the general case, but preliminary investigations indicate that similar results hold in general, and that the "break even point" for the continental USA is about 800 khz.

Gillmor's comment above about Appleton's interest in 210 provides an interesting example to examine in view of my theoretical analysis above of extraordinary absorption below gyro-frequency. According to my sources (such as Medium Wave News, Vol. 25, No. 2, 12/78, edition 173) 210 operated on 830 khz prior to 1927. The 830 frequency is very near my estimated break even point of about 800 khz, although gyrofrequency is lower in the U. K. Even so, the heavy fading of 210 could be accounted for by the strong interference between the ordinary and extraordinary waves of similar amplitudes. Such effects have been reported by Rao and Rao [1958] and Tantry and Khashtgir [1951].

Further support for my hypothesis of significant extraordinary mode involvement in oblique ECB propagation below 1100 khz in the continental USA comes from the second oblique incidence ionogram of Fenwick and Barry [1966]. Their Fig. 7 shows a strong trace between 700 and 1100 which has no earlier trace. According to their interpretation, all traces on their ionogram are E traces, and we must accept that there can be 2-hop E over a frequency range which has no 1-hop E on the 2000 km path from Stanford, CA to Lubbock, TX. I don't believe it. The only reasonable explanation is that the trace between 700 and 1100 khz is the extraordinary mode I have hypothesized, or something even more exotic, such as mode coupling. Polarization measurements were not made by Fenwick and Barry [1966] from which mode could have been identified, and with which the issue could have been definitely decided.

We have shown that our hypothesis of significant extraordinary mode involvement in ECB propagation below gyrofrequency in the continental USA is entirely consistent with both theory and experimental measurements. This does not mean we claim our hypothesis is a fact, only that no experimental measurements refute our hypothesis. In closing we would like to emphasize that despite the implication by Seaver [1984], we never hypothesized the F mode as the primary mode for long distance ECB propagation. To the contrary, we pointed out in Lankford [1984] that most high latitude paths are probably via only the E because of the higher ionization levels at higher latitudes. So in many ways our theory agrees with Seaver [1984]. We apparently disagree strongly only for refraction points which fall more or less within the continental USA where we have hypothesized that F refractions of the extraordinary mode can play an important role below gyrofrequency, and on the arrival angle hypothesis, which also allows ordinary mode F refractions under suitable conditions.

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**WPMB-15
WKRV fm107**

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Permission is given to the National Radio Club to publish this article.

EPA Claims Radiation From Radio, TV Antennas A Health Risk

Friday, June 15, 1984 DAYTONA BEACH EVENING NEWS - 13/

By WILLIAM J. BROAD
(CIHM New York Times News Service)
NEW YORK — The Environmental Protection Agency plans to recommend that the federal government for the first time limit the strength of radiation from the antennas of radio and television transmitters because of possible human health risks.

New studies have raised a question whether broadcast radiation under certain conditions may cause disorders in the nervous and immune systems. As a result, sources at the EPA and the broadcast industry say, the federal government is moving for limitations.

Although some scientists disagree with the new studies, federal officials and some health associations have concluded that preventive calls for increasing the margin of safety.

IF THE PROPOSED rules are adopted, they could have adverse economic effects on the broadcast industry and perhaps reduce the quality of some radio and television reception.

Some broadcasters in dense urban areas would be required to cut the power of transmitters, to raise antennas or to move antennas and transmitters to less populated areas, according to industry experts and federal officials.

Nevertheless, most industry representatives are themselves pressing for some regulation, although they do not concede that broadcast transmissions are hazardous. They contend, rather, that local ordinances are developing into a patchwork that is hampering their operation.

THE EPA PROPOSALS, scheduled to appear in the Federal Register this month, set limits for exposure to radio frequency and microwave radiation, according to Richard A. Tell, head of the agency's branch for nonionizing radiation. These regulations affect only

antennas to transmit radio and television signals, both sound and picture, not home television sets or radios.

One reason for federal action is that recent studies suggest low doses of radio and television waves may have subtle biological effects on humans and animals, possibly bringing dangers to health. Other studies, however, find no health risks whatsoever.

Federal officials say the proposed federal standard will almost certainly be stricter than the voluntary one, though less strict than some local ordinances. A national standard would supersede local rules and regulations.

The specifics of the proposed limits are not yet officially known, so there is no indication if any neighborhood is regarded as being at potential risk or what distances from transmission sites are considered safe. The regulations in general will deal with the number of microwatts of radio frequency energy that can be deposited in a square centimeter of human skin.

Since the power of a transmitter falls off rapidly with distance, in the same way a flashlight beam quickly dissipates, the dose of radiation depends on the distance between the person and a transmitter's antenna.

THE IMPACT OF the new rules will be greatest on city based broadcasters with antennas on short towers, since this is where the interaction of people and radio waves is greatest.

The strictest federal rules would be for broadcasters near the FM frequencies, according to scientists familiar with the proposal, since their antennas tend to be closer to the public and these waves are most easily picked up by the

human body.
Television stations, even though their wavelengths are quite close to those of FM stations, will not be so dramatically affected by the new rules, according to federal officials, because television broadcasters tend to have antennas atop tall towers, distant from humans, so they can reach larger audiences. FM antennas, on the other hand, tend to be shorter and thus closer to humans.



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Universal is pleased to present a solution! We are presently compiling a directory of listeners. This computer-based list will offer accurate and current information on active listeners. Important information on all registered listeners will be displayed. We will include name, address, phone number, type of listening, and club affiliations. This book will be an invaluable guide in familiarizing you with other listeners in your area.

We need your help to make it happen! WE WANT TO INCLUDE YOU in the next edition. Please fill out the form below and return immediately. Your listing will be without charge. You will be notified when the directory is available, but you are under NO OBLIGATION to buy one. It costs nothing to be listed. We would like your information whether you wish to buy the directory or not. So help us bring DXers together! Tear-off the form below and return it to Universal today. Thank you!



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580 WCHS-WV 1110 WCBR-KY 1290 WHIO-OH 1400 WKPT-TN 1520 WSVL-IN
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700 WLW-OH 1230 WHIO-OH 1340 WLBC-IN WPAR-WV WND1-IN
790 WKY-KY WHIR-KY WKCB-KY 1490 WBEX-OH 1570 WPTW-OH
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920 WNNI-OH 1240 WHIZ-OH WKXE-WV WOPI-TN
930 WGNT-WV WHBU-IN 1390 WMPD-OH WMOA-OH (+38 FM)
990 WJEH-OH WFTM-KY 1400 WPAY-OH WKAY-KY

Los Angeles Dodgers (2/21/84)
610 KAVL-CA 960 KNEZ-CA^b 1300 KRDP-CA 1450 KJMB-CA 1560 KPMC-CA
620 KTAR-AZ 970 KVMH-CA^b 1370 KWRM-CA KP51-CA
720 KDMN-NV 1020 KTNQ-CA^b 1400 KTUC-AZ KVEN-CA (+8 FM)
790 KABC-CA 1230 KTB5-CA KONG-CA 1490 KGUD-CA
920 KVEC-CA 1250 KTM5-CA 1440 KUHL-CA KYCA-AZ

Chicago Sting (NASL) 1984

560 WIND-IL No Network; Howard Balsom, Greg Coler

^aThe list is subject to change.

^bSpanish language broadcasts

Thanks to Greg Hardison for the Dodgers' list.

Please send me any lists that you may have that I have not published. These teams are Red Sox, Tigers, Yankees, Athletics, Mariners, Rangers, Expos, Mets, Cardinals, Astros, and Padres.

WJR loses radio's top spot

WJOI's happy news: They're No. 1

Easy listening WJOI-FM has surpassed WJH-AM as the top-rated radio station in Detroit, according to the latest survey from Arbitron.

WJOI is credited with 9.1 percent of the Detroit listening audience age 12 or older — enough ears to make it the most listened-to station on either the AM or the FM dial.

WJR, which has been No. 1 for years, was second with 7.4 percent. The ratings are for three months ending March 28. Each point represents a percentage of the total metro radio audience.

In 1982, WJOI found itself the only easy-listening station in Detroit after two rivals changed format. For about a year, WJOI was running a strong second behind WJR.

"There obviously are people out there who still want the easy music, the instrumentals, and they tune to it," says Steve Van Dert, operations manager for WJOI. "I'm thankful there are people out there who appreciate what we're programming."

Van Dert says there's an "easy listening" trend around the country: "They're starting to pop up in the top 10 and top 5. But to become No. 1 is

something."

Indeed, many radio regulars around town say they have trouble remembering when WJR was not the city's top-rated station. However, WJR also carries Tiger baseball and is expected to increase its audience now that the season is under way — and especially if the Tigers stay hot.

Elsewhere, the biggest slip in ratings befell soft-rock WMJF-FM, which in the September-December ratings had boasted a hefty 6.0, good for No. 4 overall. "Magic" fell to a 4.0 rating, dropping out of the top 10. WNIC-FM took over the lead in the soft rock/adult contemporary daylight with a 4.7 rating, with WOMC-FM posting a 3.9, WCZY-FM a 3.6 and newcomer WCLS-FM (formerly WABX) a skimpy 1.8 rating.

While all this was going on, "hot hits" WHYY-FM slipped into the No. 10 spot, album-rock WRIF-FM rose to No. 3 with an impressive 6.2 rating, and black WJLB-FM passed rival WDRQ-FM, 5.7 to 4.4.

Following the top 10 stations (see box) are, in order, WMJF-FM (4.0), WOMC-FM (3.9), WCZY-FM (3.6), WCTI-AM (3.3), WWWW-FM (3.1),

(3.1), WJZZ-FM (2.1), WCXI-FM (2.0), WCLS-FM (1.8 percent), CPXX/CKJY-FM (1.7), WHND-AM (1.6), WQHS-FM (1.6), WLJS-FM (1.6), CKLW-AM (1.4), WGPB-FM (1.1), WCHH-AM (1.0), and WQRH-AM (1.0).

Three stations are credited with less than one percent of the audience: WMUZ-FM, WNIC-AM and WLQV-AM.

—GEORGE BULLARD

Radio ratings

Here are the 10 most listened-to stations in the Detroit area according to the Arbitron Co.'s January-March ratings survey, based on listening estimates of persons 12 and older. Also indicated are the 10 leading stations in last year's September-December ratings period, with their shares at that time. Each point represents a percentage of the total metro radio audience.

STATION	JAN/MARCH	SEPT/DEC
1. WJOI-FM (9.1)	9.1	WJR 9.6
2. WJR-AM (7.4)	7.4	WJOL 7.3
3. WRIF-FM (6.2)	6.2	WWJ 6.0
4. WWJ-AM (5.9)	5.9	WJLB 5.0
5. WJLB-FM (5.7)	5.7	WLLZ 5.3
6. WXYZ-AM (4.9)	4.9	WRIF 5.3
7. WLLZ-FM (4.8)	4.8	WORC 5.3
8. WNIC-FM (4.0)	4.7	WJLB 5.0
9. WDRQ-FM (4.4)	4.4	WNIC 4.5
10. WHYY-FM (3.3)	4.2	WXYZ 3.9

The Unofficial EXCHANGE Column (for this issue):

Following items are from Carlton Lord's estate, being sold for Betty Lord.

National NC-183D general coverage receiver, tunes 540KHz-30MHz, in 4 bands plus 47-54MHz. In nearly mint condition with matching speaker and manual. This unit was serviced and aligned by Steve Bohac in late 1981 and is in perfect operating condition. One of National's best, 17 tubes, originally sold for \$500.00 in late 1950's. From my several days use, would rate it almost on a par with HQ-150 or HQ-160. \$225.00 plus shipping.

Hallicrafter SX-62 general coverage receiver, tunes 540KHz to 168MHz, continuous. A good general coverage unit in excellent physical and operating condition. Has a speaker also. A good second receiver for DXing frequencies above 30MHz. \$100.00 plus shipping.

Following unit is my equipment:

Drake R-7 general coverage receiver, tunes 10KHz-30MHz, continuous, with 4, 2.3KHz and 300Hz filters, NB-7A noise blanker. In mint condition with manual. Very little used. \$800.00 and I will UPS anywhere in U.S.

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We found some more in the back warehouse..... 50th Anniversary Books!!!!!!

The Publication Center has dug up a whole box of the 50th Anniversary Books. So, for those that have written to us here at HQ, you can now order the book from the Pub. Center.

Cost: US\$11.00 U.S. & Canadian Members
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Publication Center Address on Back Cover

'Datacasts' will send software over airwaves

By John Schoenwald

Picture this, radio fans. You're lolling in the backyard hammock, sipping a cool drink and waiting for your favorite classical music program. Suddenly your radio begins to chirp like a cricket.

You forget. Your personal computer's favorite program is on. It's time for the "Datacast Show."

As absurd as it may seem, "datacasting" might not be far away. If all goes as planned, Learfield Communications of Pleasant, Calif. will be the first to broadcast selected areas of the Midwest, including Missouri and Kansas, in three to four months.

Datacasting, or the transmitting of computer data by the airwaves, is new to the personal and home computer businesses in years, according to its promoters. They envision a world in which promising computer software programs would be "played" on the airwaves, just as new record releases are broadcast before they hit the charts.

And who would pay for the datacast? Advertisers, of course.

"We've got two million bytes of free software we'd like to give away with Learfield," said Michael Dorland, president of Microperipheral Corp. of Redmond, Wash., which plans to offer the service in a joint venture with Learfield. "This is priced right for America. This is free."

Well, almost. In order for your computer to listen to your radio, a device marketed by Microperipheral for \$70 called a "Shuttle Communicator" is needed. It allows the high-speed broadcast of electronic data to be received by a modem in seconds, undistorted, as a message over telephone lines.

The technology has already been tested. At 6:06 a.m. April 14, Learfield became the first company to distribute computer programming by way of the Westar III satellite. The programs, which also were broadcast April 16 and 18, were made on standard AM and FM stations and were broadcast on the Brownfield network, a farm radio service carried on 120 stations in 16 states.

The service, tentatively titled Radiovision of America, offers a way for software firms to overcome the massive costs of

distributing their products to computer retail stores, according to Mr. Dorland. As in many marketing endeavors, packaging and distribution costs usually make up most of the price of a product.

But Mr. Dorland said he would not mind paying a budding computer software writer \$20,000 to develop a program if an advertiser would pay for the airtime to transmit it.

There's the rub. For such a technology to be cost-effective, the computer program must have to be transmitted quickly. Mr. Dorland said he would like to transmit at 4,800 baud, or 480 characters per second. At that rate, he said, it would take about 10 seconds to transmit a program as complex as VisiCalc into a Radio Shack "Model 100" computer.

The transmissions, which might also contain a short message from an advertiser, would sound like a cricket chirping. A listener who hadn't yet bought a computer could tape record the broadcast to get a pass through the shuttle communicator. After which it would appear on the computer screen in the form of software code.

Mr. Dorland said the technology is a way to close the growing gap between

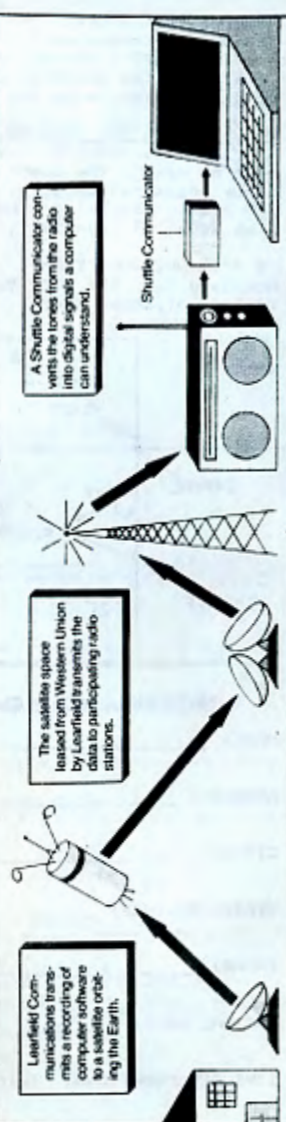
those in society who are versed in computers and those who are computer-illiterate. He also says the farm market, where the distribution channels for agricultural computer software are not fully developed, is especially suited to this type of service.

But there are problems. Jeff Smith, a vice president of marketing for Learfield, said the company might not be able to convince enough radio stations to transmit the software if not enough people owned computers to benefit from the datacast. And the broadcast has to be packaged and scheduled to appeal to a mass audience.

Another problem: a moment of static during the transmission could render the software useless to a sensitive computer system, according to John Williams, a staff engineer with the National Association of Broadcasters in Washington.

And it is unclear whether software companies, already concerned about piracy of their products, would like to have them distributed for free to millions of radio listeners. Mr. Dorland says this piracy is a moot issue if software writers are paid before the product is broadcast.

How a Learfield datacast works



Steve White switches the dial to WGNG

PROVIDENCE — Steve White, the controversial radio talk show host who last month quit station WHJZ in a dispute over the station's "broadcast policies and procedures," starting tonight will be host of a three-hour, Monday-through-Friday talk show on rival station WGNG.

WGNG made the announcement after a 20-minute broadcast in which White assailed WHJZ, the former Clanci administration and the Greenhouse Compact; declared he would continue his crusade

against "corruption, doubletalk and dishonesty," and vowed that — unlike General McArthur — he would not fade away.

White's show will run 9 p.m. to midnight, the station said.

John Schoenwald is a freelance writer.

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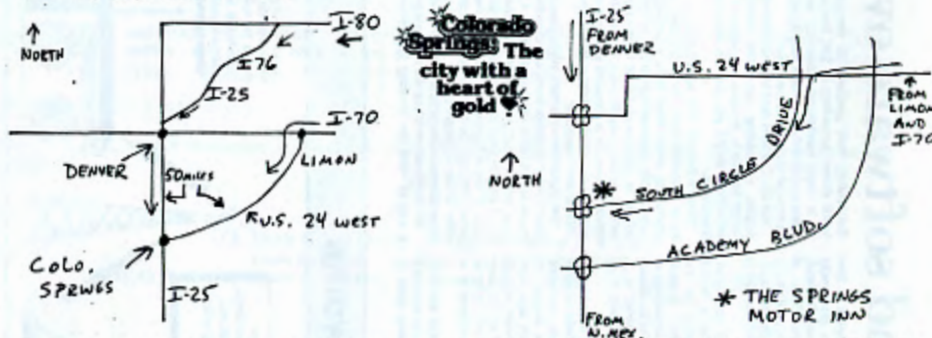
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