

The Official Publication of the Worldwide TV-FM DX Association

MARCH 2004

The Magazine for TV and FM DXers

THIS MONTH !

Doug Smith's ATSC-Part Six

Weak Signal Reception and the 32 Bay Antenna!

TV and FM DXing was Never So Much Fun!

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# THE WORLDWIDE TV-FM DX ASSOCIATION

*Serving the UHF-VHF Enthusiast*

THE VHF-UHF DIGEST IS THE OFFICIAL PUBLICATION OF THE WORLDWIDE TV-FM DX ASSOCIATION DEDICATED TO THE OBSERVATION AND STUDY OF THE PROPAGATION OF LONG DISTANCE TELEVISION AND FM BROADCASTING SIGNALS AT VHF AND UHF. WTFDA IS GOVERNED BY A BOARD OF DIRECTORS: DOUG SMITH, GREG CONIGLIO, BRUCE HALL, DAVE JANOWIAK AND MIKE BUGAJ.



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**MARCH 2004**



Finally! For those of you online with an email address, we now offer a quick, convenient and secure way to join or renew your membership in the WTFDA from our page at:

<http://fmdx.usclargo.com/join.html>

Dues are \$25 if paid to our Paypal account. But of course you can always renew by check or money order for the usual price of just \$24. Either way, it's still a bargain!

## VUDS ON A CD!

Every VUD from Jan 1980 to December 1989 is on this disk. You'll need Adobe Reader to read them. Why have a box of old VUDs taking up space when you can have this. **It's yours for just \$8.00 per disk.** Send your check or money order for \$8.00 to WTFDA, P.O. 501, Somersville, CT 06072. Make it payable to Dave Janowiak.



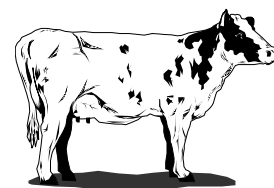
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It must be March. Both Matt Sittel and John Zondlo told me that they have either very little or nothing to send in this month. With the weather and lack of DX, that is understandable. Also Satellite News is unavailable this month. If it seems like you've read this paragraph before, it's very similar to last month's. Not much has changed.

So, what we have for you this month is an article by Bob Cooper that I have been holding on to for a few months now plus part two of a great article that was found on the internet. We can now reveal the name of the author. So if you liked the 16 bay article, we hope you enjoy the article on the 32 bay antenna.

# OMAHA 2004



The WTFDA Convention July 30, 31 and August 1, 2004

Mike Hawk and Matt Sittel welcome you to Omaha for the 2004 WTFDA Convention. You'll be staying at the **Park Plaza Regency Lodge** with a central Omaha location near 108th and Pacific just off of I-680. Additionally, they have promised that we can assemble antennas on-site during the convention. You can reach the hotel at (402)397-8000. Please call the hotel for rates and tell them you're with the WTFDA. Be there!



# The Mailbox

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## MARCH 2004

It's March. We're back again. There is not a whole lot to report since last time DX-wise except that February 12 brought a mid-day FM Es opening to northeast North America, being noticed from Nashville to Boston. Unfortunately, some of us had to work that day and missed it. Such is life.

With a little luck conditions may start to improve in March. March is really not known for anything except for being the month that begins spring. It would be nice if it also began tropo and E skip. Don't expect that to happen just yet.

## MEMBERS AND MORE

Let's dig into our stack of stuff and see what's there.

We have two new members. The first is **Richard Porter**. Richard lives in Wood Dale, IL and lists his interests as TV and FM. Next we have **Larry Lee Back**. Larry lives in Middletown, OH and is interested in TV, FM and Weather DX. Welcome to you both and I hope you enjoy the club!

Rejoining the club is **Carlton Howington**. Carlton is down there in St. Petersburg, FL and we're glad to have him back.

Now to our list of renewers: **S. Kaimbridge Hood (MA)**, **Jim Pizzi (NV)**, **Jeff Wolf (MD)**, **Steve Chudoff (PA)**, **William Higgs (CA)**, **George Rogers (GA)**, **Frank Drobny (CA)**, **Dr. Bruce Elving (MN)**, **Joe Kureth (MD)**, **Paul Mitschler (NM)**, **Paul Froehlich (MN)**, **Wallace Dixon (MA)**, **Morris Sorensen (MB)** and **Robert Steadman (WI)**. Thanks for your support and a special thanks for those who renew with Paypal.

John Vervoort asks the following questions: "I've noticed that the year-end summary of reporters' loggings has not been published in the VUD for the past two years or so. Is there any reason for this?"

Sure there is a reason. The reason is that nobody volunteered to do it. If you and I are thinking about the same thing, then Adam Rivers did the last year-end review (with charts, I think). Since that time nobody has come forward to do it and frankly, I haven't

even thought about it. **Greg Coniglio** did some fantastic year-end reviews for quite a while when he was the editor of FM News, but Greg did this on his own time without being asked. This effort probably took him some time since you don't just put a report of this type together in an evening or two.

John also asks "Also is there a small possibility that the convention for 2005 could be held within a 100 mile radius of New York City?"

I'm not at all sure what we have in the works for 2005, if anything. I think a couple of ideas were floating around but nothing definite. I myself would love a convention in the New York City area, but where the conventions are held depends on who we get to host them. Just a few years back we had a convention at Rick Shaftan's place in New Jersey and we've had a couple in Western New York, so really I'm happy to see conventions sprout up in other parts of the country.

At one time there was an idea expressed about holding a convention in Canada. That would be fun.

What I'd like to do is go back to the fact that all of us (me, Doug and all the editors) are volunteers...meaning we don't get paid. We volunteer for various reasons, a few being service to the club, enjoyment of our job and international fame. Well, scratch the fame part. The club runs on volunteers and that's how things get done. If you see something that is missing in the VUD or if you have an idea for something you want to see in the VUD and you have the time and the energy to do it, email us, tell us what you want to do and then do it! The new Weather DX column is a perfect example. Jason came to me with an idea and asked how we could make it happen. We made it happen. Now I hope you weather band folks support it!

Never hesitate to come to me or the Board of Directors with any idea.

## 1980S VUDS ON A CD

So, here was a brilliant idea I had over two years ago. The idea was to scan every VUD from January 1980 to December 1989 and put them all on a compact disc to view on your computer. The project took much longer

than I had anticipated. I aged two years and added more gray hair while scanning page after page. But the good news is **it's done!**

So if you want a complete set of 1980s VUDs, now is the time to get one. We've set the price to \$8.00 per CD and the money goes to the club.

When you pop this CD in your drive, you'll find 10 folders, one for each year. Inside each folder you'll find 12 pdf files, one for each month. You'll find one additional folder containing the VUD covers for that year. The covers are jpegs. Adobe Reader will let you read the VUD files.

If the idea of reading old VUDs on your computer interests you, consider purchasing a CD. The club had some great technical articles during the 80s as well as F2 and other DX related articles. This is one way for you to get them again. These VUDs won't rip or fade. Just don't step on the CD or use them as Frisbees.



ONKYO T450 RDS TUNER

### Onkyo T450 RDS vs. Yamaha T-85

**Bill Nollman** compares the two:

1. I'm happy to report that my Yamaha T-85 still is the best tuner that I have ever used.
2. I can tell you that the Onkyo T-450 is pretty darn close in almost all areas. Even stock it was pretty DX friendly. I had to check a lot of freqs to be sure the filters were really needed. Some locals showed this rather easy, but semi-locals were very DX-able. Sensitivity and Selectivity (with the filters modified) 80is exactly the same as my Yamaha T-85, which is amazing for a tuner with next to nothing inside of it. As for overload rejection I had a very hard time finding any frequency where it would overload ! It did overload on 94.9 when pointed right at Meriden Mountain (92.5, 95.7, 105.9 – all 50kw'ers at 9 miles) although even the Yamaha will do that with the APS-13 (with the inside VHF TV antenna the T-85 doesn't do it, so the Onkyo is slightly more overload sensitive) but that is a tough test. Otherwise, the only overload indications I could see were minor.
3. Audio quality is excellent, and the built in circuitry that auto adjusts for mono/stereo and wide/narrow is very good (although sometimes on borderline stations the audio goes in and out and you have to force it into mono).

Only slight weaknesses.

1. The tuner can be forced into mono, but can't be forced into stereo. I like to hear all the stereo noise there is. On the Yamaha I

even found a way to modify it so every signal is noisy and in stereo with the weakest signal.

2. The RDS isn't quite as sensitive as the T-85 with the external RDS Manager with the PI code chip modification. I also don't see an external RDS chip on the board so the tuner may or may not be able to be modified for PC RDS software connection. This might be doable as the connector from the main board to the display was labeled RDS Clock and RDS Data - which is very likely where one would connect for that feature.

3. The flywheel tuning could be a bit weightier. But it is a nice way to tune just the same.

### OOPS!

Let's hope this doesn't become a regular feature, but I was informed that I ran the wrong picture of the LG LST3100A last month. Old eagle-eye Karl Zuk happened to spot the photo and realized it was the wrong picture. Karl was also kind enough to send me the correct picture which you will find directly below.



THE REAL LG LST3100A

### MORE IBOC NEWS

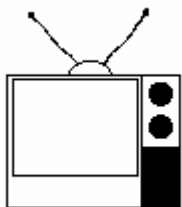
Late word comes to us from Kevin Redding via Cris Alexander of Crawford Broadcasting in Chicago that three of Crawford's FM stations there are now transmitting IBOC. The stations are WPWX 92.3 (urban/hip-hop), WYCA 102.3 (Christian talk) and WSRB 106.3 (soul & r&b). So if you hear something "funny" this summer during skip openings, it might be one of these three stations.

### ONE MORE TOWER PICTURE



We leave you with this picture of WCIB 101.9 Falmouth, MA taken by me from the adjoining Walmart parking lot in November. This photo looks south. -Mike





# TV News

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1385 Old Clarksville Pike  
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<http://www.w9wi.com>

## March 2004

### Abbreviations:

AF	Applied For (a new station)	PG	Power change granted
Aux	Auxiliary (backup) transmitter	PR	Power change requested
CC	Callsign change	QC	Channel (frequency) change on the air
CL	City-of-license change	QG	Channel change granted
DE	License/permit deleted	QR	Channel change requested
FC	Programming (format) change	RE	Reinstated (previously-dismissed app.)
FTP	Failure to Prosecute	ROA	Request of Applicant
GA	Granted amendment (to table of channel allotments)	SI	Off the air (silent)
LC	License to Cover	STA	Special Temporary Authority
NS	Permit granted for new station	XC	Transmitter site changed
NW	New station on the air	XG	Transmitter site change granted
PA	Proposed Amendment	XR	Transmitter site change requested
PC	Power (and/or tower height) change on the air		

### News:

(full-power analog stations in **bold face**; LPTV and translators in regular type; full-power digital stations in **bold italics**)

#### Alabama:

Demopolis	38 W38DQ	NS 500w, 32-27-17/ 87-46-11
<b>Demopolis</b>	<b>41 WIIQ</b>	<b>PC&lt;324m, 32-21-45/ 87-52-04</b>
<b>Dozier</b>	<b>2 WDIQ</b>	<b>PG&gt;226m</b>
<b>Louisville</b>	<b>44 WGIQ-DT</b>	<b>NW 925kw/243</b>
Moundville	3 WDVZ-CA	PC>1.6kw, 33-09-36/ 97-30-55; CL fm Greensboro
Somerville	29 WMJN-LP	QC from ch. 43, 12kw, 34-30-43/ 86-50-55; CL from Decatur
<u>Alaska:</u>		
Anchorage	17 NEW-LP	AF dismissed
<b>Anchorage</b>	<b>20 KTBY-DT</b>	<b>PG&lt;54.4kw/52 61-11-33/ 149-54-01</b>
<b>Anchorage</b>	<b>33 KDMD</b>	<b>PG&gt;66kw/300 61-20-11/ 149-30-48; already on</b>
Homer	2 K02IB	PR*>3kw
<b>Juneau</b>	<b>3 KTOO-TV</b>	<b>PR&lt;500w/-323</b>
<b>Juneau</b>	<b>10 KTOO-DT</b>	<b>QR from ch. 6, 1kw/-363m, 58-17-56/ 134-24-07</b>
Kenai	10 K10NC	PG>1.2kw, 60-31-56/ 151-05-00

#### Arizona:

Chloride	30 K30GG	QC from K54DE; 70w
Concho	10 K10OZ	NS 950w, 34-14-58/ 109-35-11
<b>Douglas</b>	<b>3 KFTU</b>	<b>PG&lt;5m, 31-22-38/ 109-31-20</b>
Flagstaff	23 K23HB	NS 50kw, 35-14-33/ 111-36-40
Globe	53 K53IR	NS 3kw, 33-20-20/ 110-52-16
Kingman	20 K55GG	QR from ch. 55, 790w
Peach Springs	26 K26GF	QC from K54DD; 70w
<b>Phoenix</b>	<b>31 KSAZ-DT</b>	<b>NS 87.7kw/473 (aux)</b>
Phoenix	41 KPFD-LP	CC from KPSW-LP
<b>Tucson</b>	<b>6 KUAT-TV</b>	<b>PC&lt;33.9kw/ 1101m</b>
Tucson	14 KUDF-LP	CC from KQBN-LP
Tucson	29 KPCE-LP	PR<15kw, 32-14-56/ 111-06-58; CL fm Green Vly.
Winslow	38 K38IH	NS 1kw, 35-08-42/ 110-29-03
<u>Arkansas:</u>		
El Dorado	51 K46DT	QR from ch. 46 dismissed
El Dorado	66 K66EX	PR>150kw, already granted
El Dorado	69 K69HO	PR>150kw, already granted

Little Rock	36	KKAP	NW 2570kw/ 346m, 34-47-56/ 92-29-44
Mountain Home	26	K26GS	PC<18.1kw
Rogers	51	KFAA	PR>151kw/26 7 36-24-48/ 93-57-17
Springdale	4	K04PV	QC from K15DR; 3kw
<b>California: Anaheim</b>	<b>56</b>	<b>KDOC-TV</b>	<b>PR 2450kw/927</b>
Arroyo Grande	20	KSSY-LP	QR from ch. 66, 20kw, 35-06-25/ 120-30-58
Bakersfield	2	K02PZ	NS 70w, 35-03-30/ 119-24-40
Bakersfield	18	K18HD	NS 7kw, 35-19-12/ 118-47-22
Banning	33	K33HU	NS 5.5kw, 34-03-46/ 116-53-34
Barstow	16	K16GE	NS 1kw, 34-53-07/ 116-53-45
Chico	28	KKPM-CA	PC>135kw, 39-12-20/ 121-49-06
Chico	33	K33HV	NS 3.1kw, 39-48-42/ 121-33-30
Daggett	46	K46HT	QG from K44DV
Fresno	11	KGMC-LP	QG from ch. 22, 3kw
Fresno	38	KHSC-LP	PR>150kw
Hemet	27	KHEM-LP	PR>15kw
Jones Valley Park	4	K04PQ	NS 6.3w, 40-43-31/ 122-14-08
Joshua Tree	21	K21GR	QC fm. K59BM
Lucerne Valley	22	K22HA	QG fm K68CW
<b>Monterey</b>	<b>67</b>	<b>KSMS-TV</b>	<b>app. to add 210kw vertical</b>
Morongo Valley	40	K62AO	QR from ch. 62
Palm Springs	31	K31HU	NS 9.7kw, 33-51-58/ 116-26-02
Porterville	31	KVVG-LP	CC from KKAK-LP
Redding	47	K47GR	PG>47kw, 40-20-41/ 121-56-48

Sacramento	3	KCRA-TV	NW 100kw/446 38- 14-50/ 121-30-03 (aux); PG>600m, drop DA for main TX, already on
<b>Sacramento</b>	<b>35</b>	<b>KCRA-DT</b>	<b>NW 1000kw/462m 38-14-50/ 121- 30-03</b>
Salinas	3	KMMD-CA	PR<90w, 36-32-06/ 121-37-09
<b>San Diego</b>	<b>19</b>	<b>KSWB-DT</b>	<b>PG&lt;598m</b>
San Fernando Valley	6	KSFV-LP	QG from ch. 26, 500w
San Francisco	28	KFTL-CA	CC from KBIT- CA
San Luis Obispo	16	K16GF	QR from K15BD, 16kw; already granted
<b>Stockton</b>	<b>46</b>	<b>KQCA-DT</b>	<b>PR&lt;580m</b>
<b>Stockton</b>	<b>64</b>	<b>KTFK-TV</b>	<b>CC fm KFTL</b>
Ventura	23	KIMG-LP	CC from K23EQ
<b>Colorado:</b>			
Anton	51	K51HS	NS 525w, 39-51-17/ 103-20-38
Ashcroft	21	K21HF	NS 156w, 39-08-48/ 106-52-11
Ashcroft	32	K32GQ	NS 156w, 39-08-48/ 106-52-11
Aurora	39	KDEV-LP	QC from ch. 62, 35kw
Buena Vista & Salida	9	K09XS	NS 17w, 38-44-37/ 106-11-50
Carbondale	29	K29CK	XG 39-25-24/ 107-22-32
Colorado Springs	57	KXTU-LP	PG>135kw; already on
Denver	45	KHDT-LP	CC from K45HH
<b>Durango</b>	<b>20</b>	<b>KRMU-DT</b>	<b>AF 46kw/130m, DA, 37-15-46/ 107-53-58</b>
Estes Park	49	K49IB	NS 400w, 40-25-13/ 105-26-39
Hartsel	20	K68AR	QR from ch. 68, 3.4kw
Hartsel	23	K70FL	QR from ch. 70, 3.4kw
South Fork	25	K25HX	NS 10.3kw, 37-43-45/ 106-35-19 (KOB-4 NBC)
Vail	45	K45IE	NS 25kw, 39-37-06/ 106-23-08

Woody Creek 39 K39HE NS 1.21kw,  
39-18-30/  
106-57-15

**Connecticut:**  
Granby 12 WESA-LP CC fm W12CL  
Hartford 6 WRNT-LP CC from  
WMLD-LP  
Hartford 28 W28CT QG from  
W11BJ, 5.6kw,  
42-14-30/  
72-38-57  
**Hartford 31 WTIC-DT QG from ch.  
5,  
425kw/501m**  
**New Haven 39 WCTX-DT PG>170kw/30  
1**

**District of Columbia:**  
**Washington 34 WUSA-DT PC>1000kw**

**Florida:**  
Gainesville 8 WNFT-LP CC fm  
W08DW  
Inglis 58 W58DM NS 1kw,  
29-01-19/  
82-41-19  
Jacksonville 50 W50CO QC from ch.  
65, 16.5kw;  
PR>29.8kw,  
already  
granted  
Key West 27 WGZT-LP CC from  
W27CR  
Lake City 66 WJXE-LP CC from  
W66CQ  
Live Oak 26 W26CZ NS 150kw,  
30-00-40/  
83-01-51  
Miami 34 WVFW-LP LC rescinded  
& application  
dismissed  
Sebring 5 WOCX-CA CC from  
WSUX-CA  
Tampa 46 WVEA-LP PG>75kw  
Yankeetown 43 W43CI NS 10kw,  
29-01-18/  
82-41-20

**Georgia:**  
**Atlanta 27 WAGA-DT NS  
846kw/287m  
(aux)**  
Atlanta 55 WDAH-CA CC from  
W55CR  
**Augusta 6 WJBF PC>495m,  
33-24-20/  
81-50-01**  
Dalton 6 W06BY NS 2.5kw,  
34-47-21/  
84-57-35  
(Daystar relig.)  
**Savannah 3 WSAV-TV PG<442m**  
**Savannah 39 WSAV-DT PG>442m**

**Hawaii:**  
Hilo 14 KWHH PR>30.5m,  
19-43-00/  
155-08-15  
dismissed

Hilo 34 K34HC NS 20kw,  
19-35-06/  
155-07-10  
(TBN)  
Hilo 38 K38HZ NS 32kw,  
19-35-00/  
155-07-26  
Holualoa 26 K26HL NS 150kw,  
19-42-57/  
155-54-29  
**Honolulu 9 KGMB PG<105kw/  
-12m**  
Kailua-Kona 32 K32GJ NS 5kw,  
19-43-04/  
155-55-00  
(TBN)  
Kailua-Kona 38 K38HU NS 10kw,  
19-43-04/  
155-55-00  
(TBN)  
Kula 17 K17GR NS 50kw,  
20-41-19/  
156-22-16

**Idaho:**  
Bonners  
Ferry 50 K50GL QC fm  
K13HQ, 760w,  
48-36-38/  
116-15-28  
Malad 31 K31HS NS 1.2kw,  
42-04-50/  
112-12-29  
**Pocatello 15 KPIF CC for NS**

**Illinois:**  
**Chicago 19 WGN-DT PR>310kw  
(aux)**  
Chicago 23 WFBT-CA PC>51kw  
**Chicago 27 WCIU-DT PG>510m**  
**Chicago 47 WTTW-DT NS 150kw/474  
(aux)**  
Quincy 69 W53BP QR fm ch. 53,  
150kw,  
41-14-10/  
91-03-35, CL  
back from  
Chicago but  
site is near  
Muscatine,  
Iowa

**Rockford 17 WTVO PG to drop  
DA**

**Indiana:**  
Columbia 27 W27CT NS 2kw,  
39-37-55/  
85-06-10  
**Gary 17 WYIN-DT PG<290m,  
41-20-56/  
87-24-02;  
already on**  
**Indianapolis 44 WTBU-DT PG<215kw,  
drop DA**  
**Indianapolis 45 WXIN-DT NW  
700kw/285**  
**Lafayette 11 WLFI-DT PG<214m**  
Terre Haute 34 W34DD NS 50kw,  
39-13-55/  
87-23-41

**Iowa:**

Knoxville 51 K51FJ PR>150kw,  
41-36-37/  
93-21-52;  
CL from  
Ottumwa;  
already  
granted

**Sioux City 28 KSIN-DT PG**  
**475kw/348,**  
**42-30-53/**  
**96-18-15**

**Kansas:**  
**Colby 19 NEW PA, DTV, non-**  
**commercial**  
**by KSWK-3**

Dodge City 43 K43HN NW 23.3kw,  
37-46-51/  
100-04-11

Dodge City 48 K48IU NS 15.03kw,  
37-43-21/  
99-59-37

Hays 46 K46HH NS 10kw,  
38-55-20/  
99-21-12  
(TBN)

**Hutchinson 29 KPTS-DT NW**  
**146kw/217**

Junction City 30 K30HN NS 21kw,  
39-00-48/  
96-52-40

Pittsburg 54 K54IV NS 9kw,  
37-24-47/  
94-38-14  
(TBN)

**Kentucky:**  
Irvine 25 W66DA QR from ch.  
66, 150kw,  
37-36-47/  
83-40-18;  
CL from  
Talbert

Martin 32 W32CX NS 9.2kw,  
37-29-30/  
82-31-14

**Louisiana:**  
Alexandria 63 K16DK QR from ch.  
16, 5kw

**Alexandria 25 KLPA-TV PG<1690kw/**  
**413m**

**Baton Rouge 25 WLPB-DT PR>200kw/29**  
**5**

Haynesville 69 K69HO PR>150kw,  
32-50-02/  
93-12-47; CL  
from El  
Dorado, AR

Marion 66 K66EX PR>150kw,  
32-53-59/  
92-14-35; CL  
from El  
Dorado, AR

Monroe 22 KMNO-LP PR>18.2kw;  
already  
granted

**Maine:**  
**Portland 43 WPXT-DT GA from ch. 4**  
Topsfield 56 W56EF NS 1kw,  
45-23-18/  
67-47-54

**Maryland:**

**Baltimore 38 WJZ-DT NS 306kw/283**  
**(aux)**

**Hagerstown 55 WHAG-DT PG>359m,**  
**39-39-45/**  
**77-57-54**

**Massachuse**  
**tts:**  
**Cambridge 41 WLVI-DT NS 550kw/345**  
**New Bedford 22 WLWC-DT NS 350kw/203**

**Michigan:**  
**Bad Axe 15 WDCP-DT NW**  
**50kw/141m**

**East Lansing 55 WKAR-DT NW**  
**54.6kw/294**  
**42-42-07/**  
**84-24-48**

Ironwood 32 W32CV NS 15.9kw,  
46-26-28/  
90-11-26  
(KQDS-21Fox)

Marquette 17 W17CS PR<8.9kw,  
46-30-52/  
87-28-36

**Marquette 35 WLUC-DT NW**  
**63kw/257m**

**Saginaw 25 WEYI-TV PG<395m;**  
**already on**

**Saginaw 30 WEYI-DT PG>193kw/35**  
**6; already on**

**Minnesota:**  
**Bemidji 18 KAWA-DT NW 80kw/303**

Jackson 19 K19FO NS 2kw,  
43-36-12/  
94-59-33

Olivia 47 K47JE NS 30kw,  
44-45-49/  
94-55-50  
(3Abn)

Vesta 51 K51GL NW 45kw,  
44-29-03/  
95-29-25  
(3Abn)

Wadena 47 K47JC NS 5.3kw,  
46-26-18/  
95-06-09  
(3Abn)

**Mississippi:**  
**Bude 17 WMAU-TV PG<340m**

Calhoun City 34 W34BJ PR>50kw,  
34-01-17/  
89-21-17;  
already granted

Carthage 50 NEW-LP AF dismissed

Greenville 63 K63HD NS 10kw,  
33-24-21/  
90-59-30

Greenwood 43 K43IU NS 5.38kw,  
33-32-40/  
90-08-35

**Missouri:**  
Columbia 32 K11SN QR from ch.  
11, 143.2kw,  
38-47-28/  
92-17-43

Jefferson City 38 K11TB QR from ch.  
11, 143kw,  
38-47-28/  
92-17-43



Springfield 21 KOZK PC 1188kw/  
617m,  
37-10-11/  
92-56-30

Springfield 23 KOZK-DT NW  
100kw/617,  
37-10-11/  
92-56-30

St. Louis 28 K28IK QG from  
K62EG, 50kw

Montana:  
Butte 5 KXLF-DT QG from ch.  
15, 5.45kw/  
588m

Darby 54 K54IY NS 1kw,  
45-58-57/  
114-09-57

Great Falls 26 KLMN NW 355kw/65,  
47-32-23/  
111-17-06

Havre 11 K11VL NS 3kw,  
48-29-39/  
109-42-48

Missoula 17 KMMF NW 589kw/  
628m,  
46-48-08/  
113-58-19

Polson 51 K52BL QR from ch.  
52, 48-00-40/  
114-21-48

Nevada:  
Beowawe 20 K20HX NS 165w,  
40-37-15/  
116-41-17

Denio 38 K38IA NS 376w,  
41-50-50/  
118-35-20

Elko 32 K32GK NS 1kw,  
40-49-16/  
115-42-04

Elko 36 K36HA NS 1kw,  
40-49-16/  
115-42-04

Elko 38 K38IF NS 960w,  
40-42-00/  
115-54-09

Gabbs 6 K06NZ NS 57w,  
38-52-02/  
117-53-39;  
already on

Gabbs 13 K13YK NW 60w,  
38-52-02/  
117-53-39

Las Vegas 12 KTNV-DT NS  
9.55kw/568  
(aux)

Laughlin 49 K67HO QR from ch.  
67, 150kw,  
35-28-14/  
114-55-11

Lund &  
Preston 45 K45HS NS 3.5489kw,  
39-13-40/  
114-58-30

Mesquite 2 K02FN PG>280w,  
36-49-55/  
114-03-32

Parumph  
(sic) 62 KHMP-LP NW 5kw,  
36-12-15/  
115-57-13

Ryndon 5 K05LP NS 63w,  
40-57-54/  
115-36-47

Ryndon 6 K06NY NS 62w,  
40-57-54/  
115-36-47

Ryndon 12 K12PT NS 70w,  
40-57-54/  
115-36-47

Ryndon 16 K16FV NS 154w,  
40-57-54/  
115-36-47

Valmy 40 K40HK NS 1.13kw,  
40-56-24/  
117-23-36

New Hampshire:  
Concord 21 WPXG PC>2300kw

New Jersey:  
Newark 68 WFUT PG<424m

Secaucus 38 WWOR-DT PR  
170kw/397,  
40-44-54/  
73-59-10

New Mexico:  
Aztec 38 K38DA PG>990w,  
36-48-39/  
107-53-50

Black Lake 6 K06MS PR\*>80w

Capulin 33 K33GC PR>970w

Espanola 48 K48IE NS 500w,  
35-53-55/  
105-53-52  
(KOB-4 NBC)

Farmington 43 K43AI PR\*>9.4kw

Hobbs 47 NEW-DT GA, non-  
commercial,  
by KENW-3

Quemado 15 K02GB XR 34-19-47/  
108-34-41

Roswell 27 KRPV PR<460kw

Roswell 31 NEW-DT PA by KENW

Roswell 36 K30HI QR from ch.  
30 dismissed

New York:  
Arcade 62 NEW 9 applications  
dismissed

Bronx 38 WBQM-LP CC fm W38CL

Buffalo 29 WUTV-DT NW, 35kw/301

Canisteo &  
Hornell 26 W26CY NS 400w,  
42-16-02/  
77-37-55  
(WSKG-46)

New York 24 WNYE-DT NS  
200kw/411m

Poughkeeps  
ie 27 WTBY-DT NW  
800kw/358,  
41-29-20/  
73-56-53

Rochester 36 WBXO-LP PR<1.9kw,  
already  
granted

Watertown 21 WWTI-DT NW  
25kw/331m

North  
Carolina:  
Greenville 44 W60CV QG from ch.  
60, 35.2kw

Lenoir 49 WTBL-LP QC from ch.  
53

Ohio:

**Bowling Green** 27 WBGU-TV drops DA

Bridgeport 28 WDBW-CA CC fm W28AS  
**Cincinnati** 5 WLWT NW69.2kw/19  
 9 (aux)

**Cleveland** 31 WJW-DT NS  
 61.5kw/257  
 (aux)

**Columbus** 38 WOSU-DT NW  
 250kw/291

Dayton 40 WRCX-LP QC from ch.  
 51, 29kw

Steubenville 29 W29CZ QG frm  
 W25CI,  
 13.65kw

**Oklahoma:**

**Elk City** 31 KEYU-DT NS 700kw/305

**Norman** 46 KOCM PR>2000kw

Oklahoma 41 KXOC-LP QG fm ch. 54,  
 City 48.8kw

Tulsa 21 K21HC QC from  
 K69GO, 43kw,  
 36-06-09/  
 95-54-38

**Oregon:**

Eugene 49 KAMK-LP QR from ch.  
 53, 10kw

Glide 26 K26HO QG from  
 K02AU,  
 10.8kw,  
 43-22-19/ 123-  
 03-48

Grants Pass 50 K50FW PG>2.81kw,  
 42-24-42/  
 123-16-59

Klamath Falls 25 K56EW QR from ch.  
 56, 7.244kw,  
 42-05-56/  
 121-38-02

**La Grande** 5 KTVR-DT PG<775m,  
 45-18-33/ 117-  
 43-54

**La Grande** 16 KPOU NW 60.3kw/  
 773m,  
 45-18-35/  
 117-43-57

**Portland** 6 KOIN PG<491m

Prineville 40 K40HU QG fm K66AZ,  
 27.1kw

Tolo 3 K03EI PR\*>1kw,  
 42-22-41/  
 122-50-43

**Pennsylvania:**

**Charleroi** 26 WMVH-CA CC fm W26AV

**Erie** 54 WQLN PR>271m,  
 42-02-34/  
 80-03-56

Kittanning 25 WKHU-CA CC fm W25AX

**Philadelphia** 35 WYBE PC  
 1000kw/343  
 40-02-30/  
 75-14-11

**Scranton** 32 WQPX-DT PG>528kw/35  
 4 41-26-06/  
 75-43-35

Uniontown 35 WWKH-CA CC fm  
 W35AW

Washington 20 WWLM-CA CC fm W20AN

**Rhode Island:**

**Providence** 21 WSBE-DT PR>268m

Providence 50 WRIW-LP PG<15.4kw,  
 41-48-17/  
 71-28-24

**South Carolina:**

Honea Path 65 W65DS PC>5.1kw

Johnston 46 W56EE QR from ch.  
 56, 46.4kw

**South Dakota:**

Lead 56 K56IL NS 1kw,  
 44-19-36/  
 103-50-14

Rapid City 44 KWBH-LP QR\* from ch.  
 27, 27kw

**Sioux Falls** 23 KCSD-TV PG<11.2kw

Watertown 42 K42FI FC; sold to  
 KDLT-46 NBC

**Tennessee:**

Bolivar 64 W64BZ XG 35-12-02/  
 88-58-30; CL  
 from Jackson

Gatlinburg 28 W28CS NS 15kw,  
 35-42-29/  
 83-31-15

Gatlinburg 46 WDWC-LP CC from  
 W46DJ

Jackson 62 W62CJ PG>150kw,  
 35-39-47/  
 88-45-24

Memphis 19 WJRJ-LP PG>55kw,  
 35-08-41/  
 90-02-57; CC  
 to WRJR-LP?

Stanton 38 W38BY XG 35-24-56/  
 89-23-18; CL  
 from Jackson

**Texas:**

**Alvin** 67 KFTH PC 4800kw/  
 598, 29-34-15/  
 95-30-37

Amarillo 5 K05LS NS 2.5kw,  
 35-13-36/  
 102-00-24

Amarillo 6 NEW-LP AF dismissed

**Austin** 42 KEYE-TV PC>5000kw/  
 380m 30-19-  
 19/  
 97-48-12

**Austin** 43 KEYE-DT NW 1000kw/  
 395m,  
 30-19-18/  
 97-48-12

Beesville 44, NEW-LP AF dismissed  
 46

Big Spring 52 NEW-LP AF dismissed

Britton 26 KODF-LP CC from  
 K26HF

Corpus Christi 64 KYDF-LP CC from  
 K64GI

**Dallas** 45 KDTX-DT PG>1000kw/  
 494m,  
 32-32-36/  
 96-57-32

Dallas & Mesquite	34 KJJM-LP	QC from ch. 46, 50kw, 32-35-21/96-58-13	Blanding/Monticello	45 K45GM	QC from K25FC, 300w, 37-50-22/109-27-42
Denison	44 NEW-LP	AF dismissed	Cedar City	17 K17GS	NS 10kw, 37-39-59/113-04-53
<b>El Paso</b>	<b>38 KSCE</b>	<b>PG&lt;542m, 31-48-19/106-28-59</b>	Coalville	24 K24GF	NS 140w, 40-55-26/111-23-51
Evant	57 K57JI	NS 1kw, 31-27-05/98-07-12	Enterprise	13 K13HH	PC>900w, 37-36-08/113-44-13
<b>Garland</b>	<b>23 KUVN</b>	<b>PC&lt;517m, 32-35-21/96-58-12</b>	Hanna & Tabiona	6 K06NX	NS 5.2w, 40-23-07/110-45-28
George West	26 NEW-LP	AF dismissed	Heber & Midway	18 K18GV	NS 1.43kw, 40-33-45/111-28-30
Lufkin	42 KLNLM-LP	PG<5.9kw, 31-21-55/94-45-59	Henefer & Echo	29 K29FY	NS 260w, 40-58-40/111-26-08
Lufkin	53 K53IQ	NS 10kw, 31-20-18/94-41-16	Henefer & Echo	38 K38HW	NS 260w, 40-58-40/111-26-08
Matador	45 K45FE	XR* 33-58-54/100-54-48	Park City	57 KULU-LP	CC from K57JB
Midland	51 NEW-LP	AF dismissed	<b>Price</b>	<b>3 KUTF-DT</b>	<b>AF 9.4kw/658m</b>
Midland	52 NEW-LP	AF dismissed (2)	Price	27 K27HU	NS 1.73kw, 39-36-38/110-48-47
Midland	54 NEW-LP	AF dismissed	Rural Summitt Co.	63 K63GY	NS 1.23kw, 40-51-18/111-28-44
<b>Nacogdoches</b>	<b>19 KYTX</b>	<b>AF dismissed</b>	Samak	33 K33HP	NS 140w, 40-37-56/111-15-30
<b>Odessa</b>	<b>38 KOCV-DT</b>	<b>CC from KLSB-TV NW 500kw/80m</b>	Samak	38 K38HV	NS 140w, 40-37-56/111-15-30
Odessa	54 NEW-LP	AF dismissed	Scipio	41 K41IG	NS 160w, 39-11-54/112-08-33
Pecos	59 NEW-LP	AF dismissed	Scofield	27 K27HV	NS 1.73kw, 39-42-40/111-09-20
Pine Springs	59 NEW-LP	AF dismissed	Summit Co. Wanship	22 K22DM	PR>990w
Quanah	31 K31HC	NS 750w, 34-12-41/99-44-05	Wanship	31 K31HG	NS 260w, 40-48-31/111-23-41
San Angelo	49 KIDW-LP	CC from K49HS	Wanship	33 K33HQ	NS 260w, 40-48-31/111-23-41
<b>San Antonio</b>	<b>39 KWEX-DT</b>	<b>NW 400kw/414, 29-17-38/98-15-30</b>	<b>Virginia:</b>	Luray	23 W23CP
Snyder	36 K42ET	QR* from ch. 42, 47kw, 32-46-36/100-53-53	Luray	23 W23CP	NS 150kw, 38-38-17/78-24-06 (Daystar relig.)
Tulia	55 K55JV	NS 886w, 34-32-12/101-44-25	<b>Richmond</b>	<b>57 WCVW</b>	<b>PR&lt;50kw</b>
<b>Victoria</b>	<b>11 KVCT-DT</b>	<b>QG from ch34, 18kw/290m, 28-50-42/97-07-33</b>	<b>Washington:</b>	<b>Bellingham</b>	<b>19 KBCB-DT</b>
Victoria	13 K13YM	NS 3kw, 28-47-26/96-57-24	<b>Bellingham</b>	<b>24 KBCB</b>	<b>NW 165kw/757 PC&gt;3090kw/757m</b>
Wichita Falls	36 K36GZ	NS 2.5kw, 33-53-23/98-33-31			
Wichita Falls	52 NEW-LP	AF dismissed			
<b>Utah:</b>					
Beaver	7 K07GY	PC>130w			
Beaver	9 K09CS	PC>130w			
Beaver	11 K11CX	PC>130w			
Beaver	13 K13CV	PC>130w			

<b>Pullman</b>	<b>24 KQUP</b>	<b>PR&lt;29.2kw/ 329m, 46-51-44/ 117-10-22; already granted</b>
Seattle	40 K68DL	QR from ch. 68, 16.6kw
<b>Yakima</b>	<b>21 KYVE-DT</b>	<b>NW 50kw/280m</b>
Yakima	27 KAZW-LP	QC from ch. 14, 44kw, 46-31-57/ 120-30-37
<b>West</b>		
<b>Virginia:</b>		
<b>Charleston</b>	<b>52 960722KO</b>	<b>AF 100kw/273, 38-30-21/ 82-12-33, DA</b>
<b>Huntington</b>	<b>34 WPBY-DT</b>	<b>PG 60kw/378</b>
<b>Parkersburg</b>	<b>49 WTAP-DT</b>	<b>PG&gt;193m</b>
<b>Wisconsin:</b>		
<b>Fond du Lac</b>	<b>44 WMMF-DT</b>	<b>PR&gt;700kw/19 5 43-26-20/ 88-31-29</b>
<b>Janesville</b>	<b>32 WBUW-DT</b>	<b>PR&gt;387m, DA, 43-03-03/ 89-29-13</b>
<b>Janesville</b>	<b>57 WBUW</b>	<b>PR&lt;415m, 43-03-03/ 89-29-13</b>
Milwaukee	63 WYTU-LP	CC fm W63CU
<b>Wyoming:</b>		
Afton	3 K03HP	NS 3kw, 42-43-22/ 110-57-42
Afton	32 K32GP	NS 150kw, 42-43-21/ 110-57-41
Afton	41 K41IM	NS 150kw, 42-43-22/ 110-57-42
Afton	43 K43IV	NS 150kw, 42-43-21/ 110-57-41
Afton	45 K45IH	NS 150kw, 42-43-21/ 110-57-41
<b>Casper</b>	<b>13 KCWY</b>	<b>PG&gt;10.25kw</b>
Cokeville	30 K30IA	NS 49kw, 42-04-04/ 111-00-37
Cokeville	48 K48IV	NS 49kw, 42-04-04/ 111-00-37
Sheridan	26 K26BE	PR*<2.97kw
Sheridan	58 K58HZ	NS 1kw, 44-48-15/ 106-55-00

**U.S. Possessions:**



**Puerto Rico:**

Isabel 28 WVQS-LP CC fm W28BA  
Segunda

<b>Mayaguez</b>	<b>23 WNJX-DT</b>	<b>PR&gt;693m; already granted</b>
<b>Ponce</b>	<b>15 WTIN-DT</b>	<b>NS 380kw/844</b>
Ponce	36 W36DB	NS 1kw, 18-02-19/ 66-39-04
<b>San Juan</b>	<b>32 WTCV-DT</b>	<b>PG&lt;3.9kw/505 , 18-16-30/ 66-05-36</b>
<b>San Sebastian</b>	<b>39 WJWN-DT</b>	<b>PR 700kw/627, 18-09-00/ 66-59-00</b>



**U.S. Virgin Islands:**

Charlotte 22 WMNS-LP CC fm K22GA  
Amalie

**Canada:**



**British Columbia:**

**Vancouver 33 CIVT-DT NS, 319w**

**Ontario:**

**Hamilton 15 CKXT-DT1 NS, 4.1kw**  
**Hamilton 35 CITS-DT NS (see text)**  
**Toronto 20 CBLT-DT NS, 38kw**  
**Toronto 24 CBLFT-DT NS, 2.5kw**  
**Toronto 40 CFTO-DT NS, 17.4kw**  
**Toronto 65 CIII-DT-41 AF 3kw/459m**  
**Toronto 66 CKXT-DT NS, 3kw,  
already on**

Thanks to Kevin Redding, Tim Pacan VA3FU, and Bill Draeb for information appearing elsewhere in this month's column.

WWOR-DT's application is to replace their destroyed World Trade Center facility with a new transmitter on the Empire State Building.

KRMU already holds a CP for analog operation on channel 20, as does KEYU for channel 31.

The seven LPTV changes marked with an \*asterisk have been accepted for filing and are not mutually-exclusive with any other applications. Unless one or more successful petitions to deny are filed, these changes will be granted. (I'm afraid the deadline for such petitions was the 21<sup>st</sup> of February)

The same Public Notice listed roughly 250 applications for new LPTVs. These applications will receive the same treatment, being granted unless successful petitions to deny were filed by the 21<sup>st</sup>. You'll see them here as they're acted on.

WPXT-DT originally applied to move to channel 36; however, Canada objected that this channel would cause interference to four

allotments in Quebec and New Brunswick. Moving from channel 4 to a UHF channel will clear other conflicts with Canadian stations, as well as preventing the displacement of W04BS in Bethel.

W28CT's application to move from channel 11 was a second choice. They'd first applied for channel 16, then asked the FCC to dismiss that application and go for channel 28 instead. Call letters W16BX had already been assigned for the first application.

Incidentally, while the principal community remains listed as Hartford, Connecticut, the channel 28 coordinates are on the WGGB-40 tower in Holyoke, Massachusetts - this will essentially be a Springfield, Mass. station.

The rescision of WVFW-LP's license to cover does not necessarily mean WVFW is dead. It may simply mean some measurements were improperly done, or there were unresolved interference problems that will require resolution before a permanent license can be granted.

The new channel 52 application in West Virginia is for DTV, paired with an already-granted analog permit for channel 23.

CITS-DT in Ontario had requested channel 21, but the CBC objected, fearing interference to their CBLT-DT on adjacent channel 20. CITS agreed to accept channel 35 instead. They now must file new technical plans.

I was surprised to see the channel change application for K70FL; I thought channels 70-83 died out two-three years ago. If anyone out there is within a reasonable distance of Hartsel, I'd sure love to know whether this station is actually still operating on channel 70!

WKOB-LP 53 New York City is being displaced from its channel by WFUT-DT. (the digital side of channel 68 in Newark, New Jersey) In turn, WKOB bid on and won a permit to move to channel 48.

Then... WRNN-62 Kingston filed a petition to change their DTV assignment from 21 to 48. The move would allow WRNN-DT to have some coverage in New York City. Such coverage would be impossible on channel 21 due to WLIW's analog signal on nearby Long Island.

As you might imagine, WKOB was not happy about being displaced again. Especially as

they don't believe any other suitable channels are available.

The Commission, however, has ruled that LPTV remains a secondary service. It's completely unprotected from interference from full-license stations (analog or digital) and must not interfere with any such stations. Even if the LPTV was there first. The channel 48 assignment to WRNN is otherwise acceptable, so it stands.

Class A status protects LPTVs from some full-power encroachment, but WKOB doesn't have that status. (it's not clear to me that Class A status would have saved WKOB-LP from WRNN's change anyway.)

WKOB has lost their final petition for reconsideration. It's looking like they'll have to buy out some other LPTV in order to remain on the air.

(They should try channels 6, 8, 10, or 12. WBQM-LP has a permit for channel 3 in the Bronx, and WCEA-LP has tried channel 3 in Boston. Certainly other first-adjacent VHF channels should work, much to the consternation of area TV DXers!)

Many of the new LPTV grants this month are to local translator authorities. It would seem the TV translator is not yet dead!

## THIS MONTH'S COVER

This month we take a break from antennas and show you a good old coverage map. This one shows the coverage of WBYN 107.5 in Boyertown, PA. Old timers will remember this as WBYO. This is just one of the maps sent in by Joe Kureth in Uniontown, MD. Thank you Joe and thanks to Bruce Elving for the map he sent. We'll use them all.



# ATSC PRIMER VI

DOUG SMITH

## *Analog to Digital Transition*

The transition from analog to digital is well along.

<b>Category</b>	<b>Deadline</b>	<b>Stations</b>	<b>On Air</b>	<b>Licensed</b>	<b>STA<sup>1</sup></b>	<b>Extensions</b>
Top 10 market network affiliates <sup>2</sup>	1. May. 1999	40	38	38	0	2 <sup>3</sup>
Top 30 market network affiliates	1. Nov. 1999	119	114	109	5	5
Other commercial stations	1. May. 2002	1,196	883	295	588	313
Non-commercial stations	1. May. 2003	373	183	114	69	190
All stations	1. May. 2003	1,688	1,180	518	662	508

(as of July 30, 2003)

### **Deadlines & Extensions:**

As you can see, many stations have not met their deadlines. FCC staff is authorized to grant up to two six-month extensions to the DTV deadlines. Stations requesting extensions must show necessity due to circumstances beyond the licensee's control, or unforeseeable. Any extensions beyond the second – or any recommendation by Commission staff that a first or second extension be denied – must be referred to the Commissioners.

In a few cases, extensions have been denied. In practice the denial has had little effect – the stations' digital construction permits have been given an extra six months of life anyway. However, the stations involved have been formally admonished. They are also required to file regular progress reports with the FCC – reports not required of stations that are on schedule with the transition.

In 2003, procedures were set for dealing with stations that fail to meet schedule. A three-step procedure has been established for such stations:

1. An unjustified extension will be denied and the station formally admonished. The station must submit a report within 30 days showing the steps it will take to complete construction and the dates each step is expected to be completed. Except in the most extreme cases, the final step must be scheduled within 6 months of the date of admonishment. 60 days after the initial report, a second report must be submitted showing the station's progress and justifying any delays.
2. If construction is not complete by the end of the six-month period, the station will be fined<sup>4</sup>. A report on progress will be required every 30 days.
3. One year after initial admonishment, the station's DTV permit will expire. The station will be allowed to continue NTSC operation until the end of transition.

1 Special Temporary Authority.

2 ABC, CBS, Fox, or NBC. UPN and WB aren't officially networks under FCC rules.

3 WABC-DT and WNBC-DT New York City, which were on the air but destroyed in the 9/11 attacks.

4 No amount is indicated for the fine.



At that time it will be required to go dark. The Commission indicates the station will be allowed to apply for a DTV permit for one of its channels at this point; however, others will be allowed to apply for the channels as well, and the original licensee will be on the same basis as the new applicants.

Should a station lose its DTV permit for inaction, the DTV channel allotment will be deleted “without prejudice”. Parties – either the station in question or someone else – may ask that the channel be returned to the allocation table, and the Commission will consider doing so. Some channels in the table are considered unacceptable for permanent use due to interference issues; these channels will not be returned to the table if lost as a result of inaction.

***Stations without second channel assignments:***

Each full-power analog station holding a construction permit as of April 3, 1997 has been assigned a second channel for DTV operation. As of that date, no applications for new stations would be accepted. However, a few dozen applications were already on file awaiting FCC action. Some of these applications have now been granted; indeed, some are now on the air<sup>5</sup>. These stations will not automatically receive a second channel for DTV. Some<sup>6</sup> have asked the FCC to allocate an additional channel for DTV operation. Others<sup>7</sup> have chosen to sign on the air as digital stations, with no analog counterpart. Some<sup>8</sup> have both analog and digital permits for the same channel; presumably they plan to simply shut down the analog operation at some future point and instantly switch to digital.

***Early closure of analog:***

One might think the FCC would consider it desirable for stations to “jump the gun”, to close their analog operations and become DTV only earlier than required by the timetable above. This does not seem to be the case. Two stations have done so so far. WWAC-53 (DTV 44) in Atlantic City, New Jersey is one. Their DTV transmitter site is much closer to Philadelphia than their analog site; by switching to digital they achieve cable carriage in many Philadelphia-area systems. The other to switch is KVMD-31 (DTV 23) Twentynine Palms, California. This station had to try twice; the first time the FCC denied their request. They succeeded when they proved that literally nobody was watching their over-the-air analog signal. Why such conditions weren't placed on WWAC I don't know. (or were they, and just not well-publicized?) In any case, a switch to digital operation before the deadline requires FCC approval.



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5KBEJ-2 Fredericksburg, Texas is probably the best-known.

6For example, KBEJ, who's requested DTV channel 63.

7The two I know of are WTLF-24 Tallahassee, Florida and WTPX-46 Antigo, Wisconsin.

8For example, KAZA-54 Avalon, California. However, this station now has also applied to allot channel 47 to Avalon for digital operation.

March 2004

More photos from Danny Ogleshorpe, Shreveport, LA:



WIVB-4 Buffalo, NY  
 1091 mi Es seen 2/6/03  
 @1000 CT



XHHLO-5 Tehuacan, PUE  
 990 mi Es seen 7/10/03  
 #1418 CT



KQTV-2 St. Joseph, MO  
 513 mi Es seen 6/22/03  
 @1500 CT



KGAN-2 Cedar Rapids, IA  
 672 mi Es seen 8/17/03  
 @1100 CT  
*beautiful ID! - jtk*



CKPR-2 Thunder Bay, ON  
 1130 mi Es seen 7/23/03  
 @1200 CT

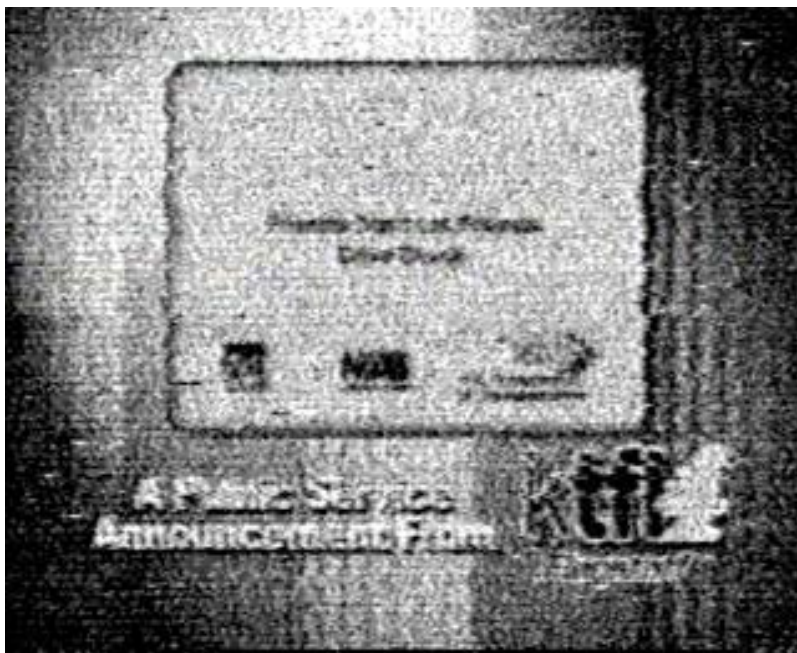
Comments: "CKPR-2 is my most common ID from Canada. CKPR-2 and WBAY-2 Green Bay often battle for control of channel 2."





WMAQ-5 Chicago, IL  
 737 mi Es seen 7/30/03  
 @0855 CT

"This is the best ID ever taped here from WMAQ. WBBM-2 is fairly regular during Es season, but WMAQ is not as common."



KTFL-4 Flagstaff, AZ  
 1045 mi Es seen 9/5/03  
 @1100 CT

"KNAZ-2 is my most common Es catch from west of the Mississippi River. KTFL-4 is not received as often as KNAZ, and the signal rarely matches KNAZ's strength."



KCEB-54 Longview, TX  
 57 mi Tr seen 8/19/03  
 "new to the air"

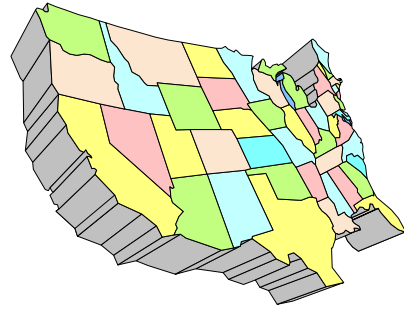
"There *\*was\** a 58 LPTV in Tyler on Doug's list a few years ago. I've never seen it. The 48 is seen every so often."

Thanks, Danny! As always, great photos. DXers, your photos can appear here, too. Send hard copies by snail mail and I'll scan 'em, or email them to me if you have a scanner.

73's,  
 JEFF

# WESTERN TV DX

**VICTOR FRANK**  
**12450 SKYLINE BLVD.**  
**WOODSIDE, CA 94062-4554**  
**Victor.frank@sri.com**



**Dennis Park Smith**, 3605 San Remo Drive, Santa Barbara, CA 93105-2523 (805)687-7803

This report is for January 2004. Southern California coastal tropo conditions on TV-FM to San Diego/Tijuana (200mi/ 320km) existed most of the time, with no storms or unsettled weather. Conditions were quite stable most of the time with some air layering, until Jan. 24, when a series of mild rains came through which put an end to both the stable pattern and the tropo DX.

Jan. 6 morning:	Poor
Jan. 6 evening:	Fair
Jan. 7-9 morning:	Poor
Jan. 9 evening:	Fair
Jan. 10-11 morning:	Poor
Jan. 11 evening-13:	Fair
Jan. 14:	None
Jan. 15-23:	Variably poor
Jan. 24-29 morning:	None (Jan. 24 & 28 sl rain)
Jan. 29 evening-30:	Poor
Jan. 31:	None (windy)

I was in Wasco Jan. 21-22 where the weather was nice and foggy. I expect tropo DX, but caught only poor KCSO-19 (Univision) Modesto at 175 miles on Jan. 21 and nothing more. The fog extended up to 2000 feet, which may have been too high or too uneven to be effective at Wasco's 325 feet elevation.

In Santa Barbara, a new signal was noted on Jan. 23: Ch. 8 LPTV Santa Barbara with Almavision Hispanic Network (Spanish, religious). A few years ago, K08MP was on with Pax network and then went off. This appears to be a completely new operation with a stronger signal than K08MP.

Best of DX to All. Dennis

We mangled Jeff's report in the last issue. Here it is again with mileages properly placed.

**Jeff Kruszka**, 5024 S. Braxton Ave., Baton Rouge, LA 70817

November 2003 CT

1 tr	2007	KATV	7 AR	305
14 tr	2327	<u>KTBS-DT</u>	28 LA	3 pgms 205
	2346	<u>KCEB</u>	54 TX	255
15 tr	0052	<u>KSLA-DT</u>	17 LA	205
20 GW	0645	<u>KLPB-DT</u>	23 LA	55
tr	1938	XHAB	7 TA	505
	1942	XHFOX	17 TA	535
	1947	KXAN	36 TX	395
	2006	KEDT	16 TX	425

	2202	KVDA	60 TX	445
	2306	KWTV-DT	53 TX	365
	2335	unid DTV	22 to W.	
	2355	KNVA	54 TX	395
21 tr	0639	KXAM	14 TX	445
	0644	KEYE	42 TX	395
	1806	KATV	7 AR	305
	2019	WJSP	28 GA	390
22 Es	1928	unid	5 SS briefly	

December 2003

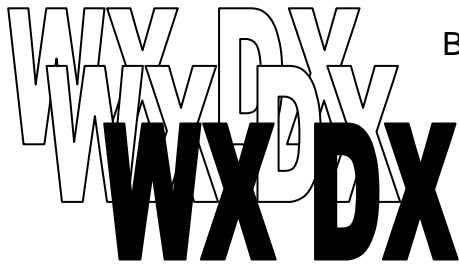
4 Es	1814	unid 3,4 SS		
13 Es	1148	unid 4, 5 SS		
15 tr	0648	<u>KEJB</u>	43 AR	Note 1 205
	2148	XHAB	7 TA	505
	2149	KEDT	16 TX	425
	2152	unid DTV	23 to W.	
	2154	XHFOX	17 TA	535
	2234	WXIA	11 GA	455
	2241	WJSP	28 GA	390
	2312	WGCL	46 GA	455
	2315	WATL	36 GA	455
	2327	WTBS	17 GA	455
	2331	WHNT	19 AL	400
	2335	WHSB	63 GA	490
	2338	WVEA	62 FL	575
	2339	unid DTV	22 to E.	
	2345	WXPX	66 FL	560
	2352	WFTT	50 FL	550
	2354	WFTX	36 FL	620
	2358	WFTS	28 FL	550
16 tr	0001	WUPA-DT	43 GA	Note 2 455
	0014	WBBH	20 FL	620
		<u>WTOG-DT</u>	59 FL	Note 3 550
	0019	WAFF	48 AL	400
	0021	WTWC	40 FL	405
	0035	WXELt	42 FL	
	0045	WPGA	58 GA	460
	0049	WACH	57 SC	640
	0059	WFLX	29 FL	720
27 Es	1829	XHG	4 JAL	1020
29 Es	2023	KSNC	2 KS	floater 695
	2100	KDBC	4 TX	910
	2103	unid 4 "ER" in SS		
30 Es	1834	unids 3-6		
31 Es	2034	unid 4 SS		

Note 1 – test slide announcing "Coming January 2004"

Note 2 – one program, but no PSIP info

Note 3 – no picture, but snagged the PSIP: Pgm 1: "WTOG High Definition"

Nice tropo opening on the night of Dec. 15<sup>th</sup>. I expected more DTV's to pop in, but no luck with the low sensitivity Hauppauge card.



Beyond FM  
 Beyond TV  
 USA – CANADA  
 Weather Radio Monitoring

Submit weather band loggings and weather radio news to  
 Jason Koralja at: [jkbi01@hotmail.com](mailto:jkbi01@hotmail.com) (Subject: WXDX)

March 2003

NEWS: Jan. 1 to Feb. 4

- NEW STATION – Kodiak (Cape Gull), AK – WNG529 has signed on the air at 162.500mHz with 5 watts.
- NEW STATION – Anchorage (Dillingham), AK – Calls TBA has signed on the air at 162.500mHz with 5 watts.
- NEW STATION – Kodiak (Marmot Island), AK –Calls TBA has signed on the air at 162.500mHz with 5 watts.
- NEW STATION – Naked Island, AK – WNG530 has signed on the air at 162.500mHz with 5 watts.
- NEW STATION – Potato Point, AK – WNG527 has signed on the air at 162.425mHz with 5 watts.
- NEW STATION – Kodiak (Sitkinak Dome), AK –Calls TBA has signed on the air at 162.450mHz with 5 watts.
- NEW STATION – Tripod Hill, AK – Calls TBA has signed on the air at 162.450mHz with 5 watts.

DX LOGGINGS (Jan.18 to Feb. 15)

No DX loggings were submitted this month. Loggings for February should be submitted before February 15<sup>th</sup>.

COLUMN NEWS

I want to feature YOUR TOWN as the listening site of the month! Please send me YOUR non-dx loggings before March 15 using the format below.

SITE OF THE MONTH

A monthly feature highlighting weather radio reception around the country during normal reception conditions.

**Surf City, New Jersey:**

Frequency	Station	City	Quality
142.400	KHB38	Atlantic City	Strong
162.450	WXM60	Southard	Good
162.475	KIH28	Philadelphia	Fair

**MARK TRAIL CHAMPIONS  
 NOAA WEATHER RADIO-**  
 THE VOICE OF THE NATIONAL WEATHER  
 SERVICE



Mark Trail image courtesy of North America Syndicate, Inc., World Rights Reserved

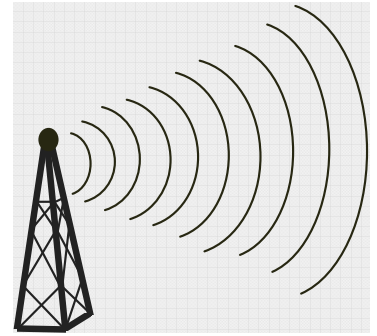


- NOAA Radios broadcast:
- Weather warnings and watches
  - Non-weather related hazards information
  - Amber alerts





# Northern FM DX



**Keith McGinnis**  
387 Shirley Street, Winthrop, MA 02152  
longwave@attbi.com 617-846-5760

For Dxers in the following states: CT IA ID IL IN MA ME MI MN MT ND NE NH NJ NY OH OR PA RI SD VT WA WI WY and all of Canada. Please submit by the 10<sup>th</sup> of each month. If possible please submit in the formats shown Below.

**EDITORS NOTE: PLEASE NOTE THAT ANY TYPEWRITTEN OR HANDWRITTEN REPORTS MIGHT BE DELAYED TILL A LATER ISSUE AS TIME PERMITS. ALSO PLEASE KEEP REPORTS AS RECENT AS POSSIBLE (THE LAST 3 MONTHS SHOULD WORK FINE). THANK YOU.**

## **Jason Koralja Surf City NJ Equipment: Sony ICFW7600GR w/ built in whip**

### December 28 2003 Tr

WRSU 88.7 New Brunswick NJ 58 miles (over semilocal WXXY)  
WSCL 89.5 Salisbury MD 104 miles

WSOU 89.5 South Orange NJ 75 miles  
WHRO 90.3 Norfolk VA 235 miles  
WZBH 93.5 Georgetown DE 99 miles  
WKCK 93.7 Chesapeake VA 242 miles  
WXEZ 94.1 Yorktown VA 213 miles

## **John Ebeling Bloomington MN**

### **Equipment: Pioneer TX 9500 IF Modified Tuner with a Stereo Probe 9 at 25 ft AGL.**

### December 24 Tr

2130 KPHR 106.3 Ortonville MN 156

### December 25 Tr

0100 KFGI 103.5 Brainerd MN 113  
0107 KIKV 100.7 Sauk Centre MN  
'kick FM' 101  
0116 KMSR 94.3 Alexandria MN 123

### December 26 Tr

1200 WFMP 107.1 Coon Rapids MN 13  
This station was in New Richmond WI, but moved to MN months ago. The transmitter site, state, and city of licence changed: hence, it is being counted as a new MN station.

Also had a few pirates over the holidays. 87.9 again as 'the Christmas station' saying after 7 years, this is the last year. Also 'revolution radio' on 97.9 and 97.7 at times. Also relaying the 87.9 pirate with christmas music on the 25th, when they were on 97.7. Switched back to 97.9 after that. Both located in the south metro area of the Twin Cities.

### January 8 Tr

1700 KNSE 90.1 Austin MN 82 miles  
(Minnesota Public Radio) New station. No stereo.

### January 10, 2004 Es

1500 XHAHC 90.9 Chihuahua CI Mexico  
1324 miles

This was a real odd Es opening, in that no other stations were received.

XHAHC was received for about 45 minutes, often registering a 3 to 4 on the Pioneer meter scale. Of course, in stereo with that strong of a signal.

Reflecting back, it just seems odd that I had no other stations during the opening, even though I scanned the band quite often with my other tuner while recording XHAHC. This reception also reminds me of my Baker Lake, NWT reception many years ago. There, again, that was the only station from the north and was in for about roughly an hour at my cabin location. For all the years I've been DXing, these have to go down as the "oddest" FM receptions I have encountered!



**Saul Chernos: 57 Berkeley St. Toronto ON M5A2W5 416-364-0725  
schernos@sympatico.ca**

October 11 Tr (Toronto)

0618 WKSB 102.7 Williamsport PA Kiss FM  
0632 WKYE 95.5 Johnstown PA Key 95  
0739 \*WVPM 90.9 Morgantown WV WV Public Radio  
0745 WPDX 104.9 Clarksburg WV Classic Country WPDX, k  
0803 WMAJ 104.9 Hollidaysburg PAMagic 104-dot-9

October 19 MS (Burnt River)

1125 KDLO 96.9 Watertown SD RDS: KDLO (upon waking)  
1428 KFNN 97.9 Fargo ND This is KFNN...

October 25 Tr (TO)

1745 \*CKBT 91.5 Kitchener ON 91.5 The Beat, dance-pop

October 29 Tr (TO)

2356 \*CBL4 97.1 Owen Sound ON CBC Radio 2 testing  
2357 \*CBL1 104.7 Huntsville ON CBC Radio 2 testing

October 31 Tr (BR)

1720 \*CBL1 104.7 Huntsville ON CBC Radio 2 testing  
1721 \*CBL4 97.1 Owen Sound ONCBC Radio 2 testing

November 1 Tr (BR)

0715 \*CBL3 90.7 Orillia ONCBC Radio 2 testing

November 3 MS (BR)

0738 \*WRSA 96.9 Decatur ALLight 96.9

November 5 Tr (TO)

1150 \*CBL3 90.7 Orillia ONCBC Radio 2

November 6 Tr (TO)

0610 WUBJ 88.1 Jamestown NY CKLN on low power  
0635 WVIA 89.9 Scranton PA NPR

November 15 MS (BR)

1258 WLLK 93.9 Burnside KYRDS; WLLK; Bobby Hamilton in live car race

November 19 MS (BR) (Leonids)

0325 WSIP 98.9 Paintsville KY Well, WSIP wants to...  
0627 KIAQ 96.9 Clarion IA K-97 weather, for today sunny and warmer  
0903 KNOX 94.7 Grand Forks ND The Wolves are off until Friday night when they play the Cleveland Cavaliers...The Rooster 94.7  
0913 KQRC 98.9 Leavenworth KS Kansas City on the Rock KQRC, wx & time

0914 KSPQ 93.9 West Plains MO West Plains in announcement  
1037 \*KJCK 97.5 Junction City KS Big Cat 97-5; 762-5525/2632, DJ Chad Allen

December 14 MS (BR) (Geminids)

0748 WLLK 93.9 Burnside KYRDS: WLLK  
0803 \*KRMS 93.5 Osage Beach MO ID  
0915 KNEN 94.7 Norfolk NE U of NE Omaha & Lincoln in sports  
0925 KMFY 96.9 Grand Rapids MN ID  
0933 KIAQ 96.9 Clarion IA RDS: KIAQ-FM  
0937 \*WXQQ 96.9 Wauseon OH Q 96-9, 419 area code  
0946 KKOW 96.9 Pittsburgh KSRDS: KKOW, k  
0948 CKLF 94.7 Brandon MB Shoal Lake, Dauphin, etc... wx  
2202 WLLK 93.9 Burnside KY 93-9 WLLK Burnside (weak, no RDS)

December 15 MS (BR) (Geminids)

0858 \*CJXL 96.9 Moncton NB Yost Vineyards in NS (ad checks w/stn)  
0900 KZKX 96.9 Seward NE Wherever NE Lottery tickets are sold  
0911 WDJR 96.9 Enterprise AL RDS: CNTRY969  
0935 KZBK 96.9 Brookfield MO Z96-9 KZBK sandwiched between Jonathan & Mary

December 28 Tr (TO)

0121 \*CJLF2 89.3 Peterborough ON //100.3 CJLF; g-mx (soft pop to punk)  
0135 \*CFWP 98.3 Wahta (Bala) ON The Hawk 98.3, drums, pop & country, Native/English

December 30 Tr (TO)

1035 LP 104.9 North York ON ShaneBaghaiHomes.com, 1 Avondale condos

\* = New

The Geminids meteor shower really rocked this year, with some decent storming and two new provinces (MB and NB) and one new state (OH) via this mode of propagation. The Leonids were not quite up to those last year, but there was still three to four hours of pretty solid storming.

A few new semi-locals to contend with, which will definitely hurt or even end tropo on a couple frequencies at my Burnt River and Snowball (Toronto suburb) sites. Es will also be hindered on a couple of frequencies, as well.

The LP logged Dec 30 stand for low power, and is a real-estate developer's 'talking condo' - probably no more than a few watts. It is near Yonge & Sheppard in central Toronto, about a block from a competing developer who has been using 100.3 for about a year.

This wraps up the 2003 FM DX season, which had its ups and downs but was mostly up. I haven't had a really good knock-em-down FALL tropo session in a good decade or so. Maybe 2004? I'm using a Sangean ATS909 portable with the whip and also the radio inside my Toyota car radio. Toronto DX is had at various high sites in the suburbs, where I can better null the locals and semi-locals. 73s, Saul

**Adam Rivers – Chicopee MA patriotsrule417@yahoo.com**  
**http://adamskewlsite.freesevers.com/dx/**

Equipment: Sherwood S-7250 tuner, FM dipole, Conrad RDS manager, RDS in 2003 Dodge Durango

November 23 Tr

2126 WGH 97.3 Newport News VA 97-3  
 The Eagle  
 2150 WZBH 93.5 Georgetown DE rock;  
 93-5 The Beach  
 2207 WRSF 105.7 Columbia NC Dixie  
 105.7  
 2208 WZPR 92.3 Nags Head NC  
 strongest; Power 92.3, Outer Banks #1 Hit Music Station  
 2222 WYND 97.1 Hatteras NC long  
 Wright Bros. Promo; The Wind 97.1  
 2232 WQHQ 104.7 Ocean City MD Delilah;  
 Q105  
 2319 WKHI 107.5 Fruitland MD Lite Rock  
 w/ Xmas music

November 24 Tr

0637 WBLM 102.9 Portland ME over DRC  
 w/ morning show talk  
 0659 WZBH 93.5 Georgetown DE in ST  
 93-5 the beach  
 0705 WGMD 92.7 Rehoboth Beach DE  
 news; wx; calls  
 0708 CJYC 98.9 Saint John NB C98; St.  
 Johns Classic Rock

December 9 Tr

2000 WPDH 101.5 Poughkeepsie NY legal  
 ID

December 15 GW/Tr

WMAS 94.7 off from 10am – 6pm at least  
 Mostly heard WJMN on 94.5, WFME on 94.7,  
 WHOM/WKLL on 94.9  
 Also heard: WYUL 94.7 Chatageuay NY with Liz Phair's  
 "Why Can't I", "Hit FM"  
 1735 WBAR 94.7 Lake Luzerne NY religious, new

December 23 Es

1550 WIRK 107.9 W Palm Beach FL  
 country; 107.9 WIRK  
 1600 WAMR 107.5 Miami FL legal ID in  
 English; SS talk  
 1602 WRMA 106.7 Ft. Lauderdale FL legal  
 in English; SS music talk  
 1611 WCMQ 92.3 Hialeah FL

December 28 Tr

2358 WRSF 105.7 Columbia NC Dixie  
 105.7; very strong

December 29 Tr

0007 WAWZ 99.1 Zarepath NJ Star 99.1  
 0054 WUSL 98.9 Philadelphia PA  
 Power99FM

**Rick Shaftan Sparta NJ**

**Equipment: Realistic STA-2280, Conrad RDS Manager, Two APS 14s stagger  
 stacked with two FM 13s.**

**@ is new. First number at end is bearing, second is mileage.**

December 13 Ms

0641 WVAS 90.7Montgomery AL RDS PI EEEE  
 231 877

December 20 Ms

0544 @WCMT 101.7Martin TN RDS PI 5B3B, in  
 again for longer @ 1736 with readout showing on main  
 window. 252 829

December 25 Ms

0818 WANZ 100.5Northport AL RDS PI 5613 237  
 898

December 27 GW

2319 @WKGB 92.5 Conklin NY Same station, new  
 state 90 322

January 3 2004 Ms

1315 WCMT 101.7Martin TN RDS PI 5B3B, THE  
 BEST SONGS ON THE RADIO 252 829

**WTFDA EMAIL REFLECTORS**

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**The WTFDA DXalert list...**send an email to WTFDA2-subscribe@topica.com 33subs

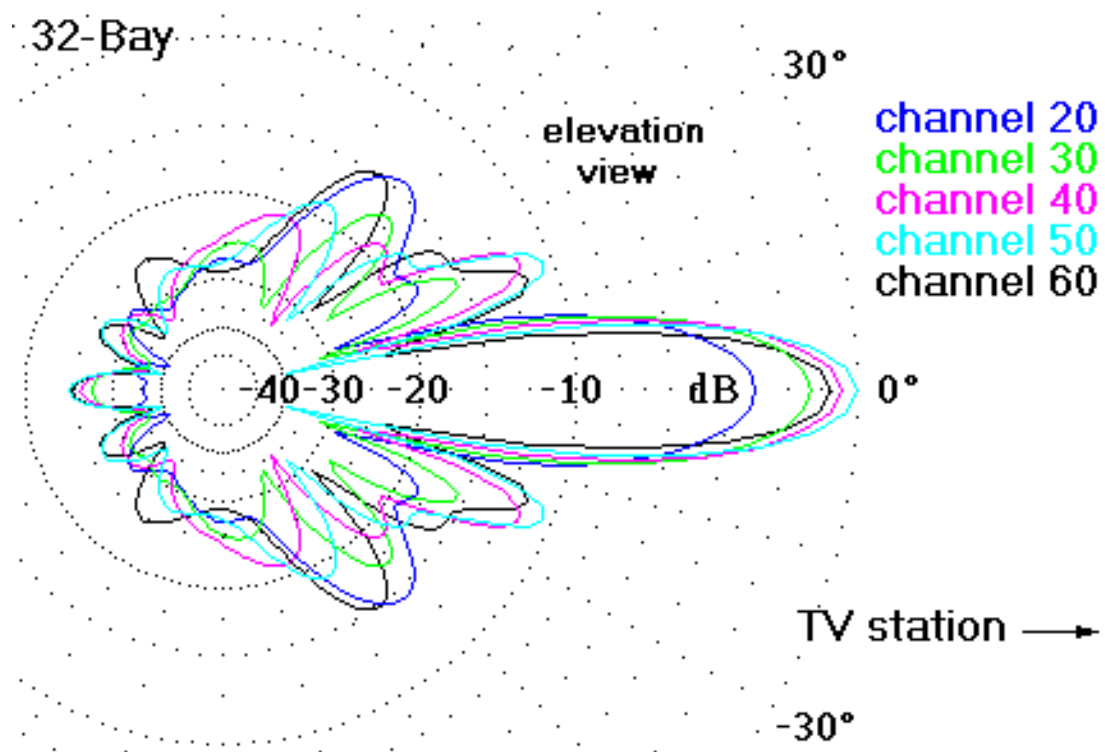
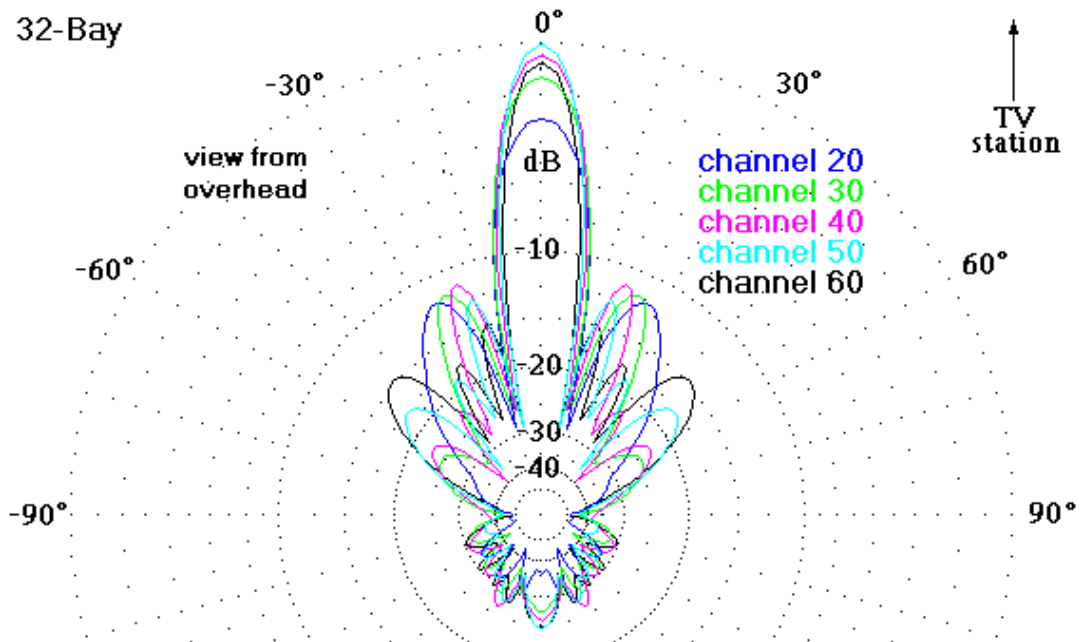
**The WTFDA AM DX list...**send to WTFDA-AM-subscribe @topica.com 58 subs

DX Alerts contain real time, concise alerts of E skip and widespread tropo. No discussion is permitted

# A 32-Bay UHF Antenna

Author: Ken Nist, MSEE (ret), KQ6QV

The section "A 16-Bay UHF Antenna" is required reading before this section. All of the principles described there apply here.



## VERSION TWO WITH TWO MASTS:



The author's antenna was constructed with a common 4-way splitter as the combiner. The first version of the antenna had a shared amplifier. The second version had four Channel Master 7777 amplifiers that could be powered individually from the author's living room. This made it clear how much each unit was contributing to the signal strength.

In a neighborhood with hot and cold spots, it is generally not possible to find a spot that is hot for all stations. The author constructed this antenna in the hopes that its gain would overcome the disadvantage of not being in a hot spot. In that respect the antenna was a complete failure. Neither the signal strength nor the signal/noise ratio showed much improvement over a single 4228. The author eventually determined that the antenna was working properly, and would have been a great antenna in most neighborhoods. But when the field strength varies over the face of the antenna, the antenna will scatter (retransmit) most of the improvement that ganging promises.

### **Weighty concerns**

At 15 lb., the 4228 is a heavy antenna. The total weight of the four antennas, mast, mounting irons, etc. will exceed 75 lb. Putting it on a sloped-roof building probably requires a crane. Most likely, severe weather will eventually destroy whatever it is attached to. Repairing a brick chimney is expensive. For roof mounting, it is probably wiser to gang four lightweight Yagi/Corner-Reflectors such as the Winegard 9032. You would be giving up the low channels, but you would be more likely to live to enjoy the others.

### **Summary**

Channel Master used to make the 4251, a reflector antenna with a 7-foot parabolic dish. The last one was manufactured in 2000. That is probably the only antenna that will rival the 32-Bay.

The author eventually broke up the 32-bay into two one-over-the-other 16-bays. Both outperformed an 8-bay, and spots were found for them where all the local channels could be received.

This page is part of "An HDTV Primer", which starts at [www.hdtvprimer.com](http://www.hdtvprimer.com)  
Reprinted with permission of Ken Nist KQ6QV

# WEAK SIGNAL RECEPTION TECHNIQUES

PART ONE  
BOB COOPER

TECH BULLETIN 9302 ISSUED 01 JUNE 1993

According to a study conducted by TVNZ and BCL, approximately 6% of all New Zealand households remain beyond fringe for television reception; ie., they are unserved by TVNZ services. According to New Zealand On Air (NZOA) more than 20% of all New Zealand households live in areas where TV3 service is not available. Yet New Zealand has nearly 500 TV transmitter sites and more than 1,050 separate TV transmitters to serve approximately 1.1 million households.

The model for New Zealand TV transmission service originated in the UK where the country was divided into service zones and each zone was systematically filled in with main and repeater transmitters situated to take advantage of natural terrain elevations overlooking concentrations of population. The UK Plan began immediately after the cessation of World War Two and initially relied upon five band 1 VHF channels allocated for television. As long as the only programming was from the BBC, and, the BBC itself was limited to a pair (2) of programming channels, the capacity of the five television channels was (almost) adequate provided each transmission and relay site was carefully orchestrated with directional transmit antennas and alternate site use of vertical and horizontal polarization. But as the public's demand for alternate television services grew, and the BBC was joined first by ITV and then by a fourth service (channel 4), it was soon apparent the VHF allocations could not provide the channel capacity to offer even four channels to each household in the UK. Subsequently all television was reallocated to UHF (bands IV and V) and in the process the original 1936ish 405 line standard television service was modernized to the quasi-European 625 line standard.

Why might this be of interest to New Zealand TV stockists/aerialists?

There is every indication virtually no new transmitting sites will be developed in the future, and almost as much certainty TV3 present transmitter siting will grow only marginally (if at all) beyond those now on the air or long planned. In addition to these trends, we now have the introduction of additional new (UHF/bands IV and V) independent channels of service which by their nature are likely to limit their service to the primary population "centres". Unlike the past where, when new services were introduced, (TV2 followed by TV3) viewers in more rural regions could patiently await the extension of these services into their areas, the wait for additional services in the future could be forever.

## THE FUTURE IS UHF

In the process of creating national networks for TVs 1 and 2, and leaving channels in-waiting for the promise of TV3, virtually all VHF (bands I and III) channels have been taken. This will require new services such as TAB to operate in the band IV and V frequencies. UHF, as an allocation for television broadcast, is neither new nor undesirable; the first UHF television broadcasts were in North America (1949) and shortly thereafter in the UK. UHF is in fact a superior frequency region for television for a number of reasons, including:

- 1) Smaller, more compact aerials for a given amount of gain;
- 2) The opportunity to create sizeable receiving antenna array gain with still manageable physical size installations.
- 3) A 'quieter' noise environment than either bands III or I resulting in cleaner video less affected by man-made interference.
- 4) Better transmitter linearity which produces subjectively improved picture definition.
- 5) The opportunity to create more controlled transmit antenna coverage patterns with higher ERPs (effective radiated powers) for a given amount of transmitting power.

In the case of New Zealand, with far fewer transmitters sharing any given channel nationwide, there will also be far less co-channel interference at UHF than at VHF although this situation could change in time as the number of operating UHF transmitters grows. As a practical matter, lacking co-channel interference it will be possible for stockist-installers to create sensitive, high gain, long range reception antenna systems without fear of picking up two or more stations on the desired channel (see Tech Bulletin 9301 for a discussion of co-channel interference phasing techniques).

For the pluses of UHF, there are also negatives when comparing UHF to the established VHF coverage.

1) The typical (read average) television tuner has a noise figure (level of sensitivity) at UHF which is rarely better than 1/4th the comparable sensitivity of the same receiver at VHF. This means it may take 6 dB more signal at UHF to produce a given video signal to noise ratio as it does at VHF. Another way to look at this as an installer is to assume you may require 6 dB more receive antenna gain for a UHF channel as a VHF channel arriving from the same transmitting site if both VHF and UHF transmitters operate with the same ERP (transmitter radiated power).

2) Transmission line losses at UHF are proportionately higher at UHF than VHF; typically 3 times as great at channel 40 as at channel 2. Since transmission line attenuation (signal losses) can be irreplaceable, UHF may cause installers to place (signal) amplifiers where similar VHF installations required no signal amplification.

3) Signal propagation at UHF is less predictable than at VHF; beyond line of sight the signal tends to layer (horizontal polarization) and pocket (vertical polarization). This means the installer may find a seriously degraded signal at roofline as he positions the mast and antenna in a bracket; ultimately locating the missing but anticipated signal only a metre higher (or lower, or, to the left or right!). The installer may spend several extra hours completing a UHF installation.

4) Connectors at UHF are dangerous; hard splices roulette. And moisture in a fitting, connection or downline is a sure ticket for a service call. Corrosion from air contaminants and/or moisture are problems at VHF; at UHF the customer will lose service sooner (ie., "The connector didn't LOOK that bad!").

5) In the primary service region where signal levels tend to be high, multi-path (ghosting) can be significant at UHF. Finding a 'clean' picture, especially when the transmissions contain much text (such as TAB), can be a challenge. This Tech Bulletin will deal with these issues, and more.

### **SO MUCH BANDWIDTH / So Little Signal**

If television were to launch today from the present plateau of technology, it would little resemble our present 7(8) megahertz wide spectrum-hungry analogy transmission scheme. Arguably, it would utilize FM rather than AM for video modulation, place audio on FM sub-carriers, and feature digital compression of video information squeezing as many as ten separate video (+ audio) programmes into a 7(8) megahertz bandwidth. Alas, while the next generation of satellite transmissions could reflect these advances (and others not yet announced), here on terra-firma we are forced to make-do with a system designed for us in the 1950s. This is not to say we are stuck with 1950s reception techniques. Worldwide many creative engineers have developed ways of fine tuning our present terrestrial broadcasting system to produce results inconceivable 40 or even ten years ago.

a) *Bandwidth*. Indirectly, the least flexible aspect of our present telecasting system is the bandwidth. By spreading the modulation information across a space of 6.105 megahertz (including NICAM stereo), we are asking the demodulator in the receiver to react to information simultaneously spread over a bandwidth as great as 6 AM broadcast bands or more than half as wide as our FM broadcast band. Inside this bandwidth we place four totally independent modulation schemes; one for the video definition, one for colour, one for monoaural audio and finally one for stereo audio. It is some wonder so many homes receive as good pictures as they do given the haphazard manner in which this has developed!

*Anything we do in the attempt to take such a signal off-air and deliver it in home must not lose sight of the complexity of the modulation schemes and extraordinary bandwidth involved.*

b) Signal plus noise to noise. Inside of this 6.105 megahertz channel-width there is noise. Turn off the transmitter, leaving the channel 'blank' and there is noise. You can hear the 'hiss' in the speaker; you can see the 'snow' on the screen. Disconnect the antenna transmission line; there is still 'hiss' and 'snow'. This tells us that while the amount of hiss and snow may have diminished when the aerial was disconnected, not all of this noise is coming from outside the receiver. Can the receiver be creating noise???

Sadly, yes. Think about this. If a TV signal is rated as good or excellent because of the (complete) lack of noise, and the receiver itself creates noise, how much less signal would be required for a good or excellent picture if the TV set created no noise?

Yes, noise (some noise) is endemic to analog TV transmission. But the amount of noise? Well, it can be reduced as we shall see.

### **NEXT TO NO NOISE**

The answer to the question "How much less signal... " if there were no noise? In practical terms, most coverage areas would double, reducing the number of transmitter sites by 50% % or more. This assumes coverage areas would also not be co-channel interference limited(see Tech Bulletin 9301 in this series).

TV coverage schemes were cast in 1950s and 60s planning that led the way for TVNZ to create the first (national) network.



Planners reacted to the technology as it then existed; state-of-the-art more than three decades ago. What was that state-of-the-art?

1) Black and white transmissions [colour was functional but not refined, PAL was on paper, not in the air];

2) Monoaural sound [NICAM was not even on paper];

3) Moderate transmitter powers [this was key; even in North America transmitter outputs greater than 10 kilowatts visual were unusual];

4) High transmitter maintenance [also key since many New Zealand transmitter sites would be in locations where frequent visits would be difficult];

5) UHF was experimental [also key as serious planning for UHF use in New Zealand was derailed by the early UHF myths; ie., it was very short range, transmitter tubes lasted weeks rather than years, receivers were unstable and consumer-troublesome).

And the most critical technical restrictions of the era:

6) VHF receivers had front-end noise figures in excess of 10 dB best case or 15 dB worst case while typical receiving antennas were 3-5 dB of gain capable. Couple this to high-loss transmission lines and the total lack of masthead amplifiers ...and you have the basis for the New Zealand television allocations scheme we now inherit. I.e: "a transmitter on every mountain top ... a chicken in every pot".

Early receiver manufacturers found they could improve fringe reception by narrowing the TV receiver's IF bandwidth. Special fringe models world wide reduced the IF to 60 or 70% of the total bandwidth because when the bandwidth is narrowed the total amount of noise from outside the receiver, or that generated inside the receiver, is reduced. Less noise, better signal plus noise to noise ratios  $S+N/NR$  or SNR). They got away with this 'tweak' because transmissions were in black and white and a reduction in definition (ie., bandwidth) was an appropriate trade-off for a reduction in noise. And as a practical matter, TV transmitters were not very linear resulting in as much as 40% of their assigned bandwidth going unused anyhow. If no important modulation information was there, why process that part of the channel at the receiver? All of this would end with the introduction of colour.

The system we have inherited is the natural progression from this foundation. Full bandwidth came with better transmission linearity; colour demanded full bandwidth capacity and greatly improved phase relationships within the receiver. NICAM pushed the bandwidth once again, with band I and III NICAM actually centered inside the lower sideband of the next upper channel. Our cup overflowed.

Simultaneously the demands on the spectrum have multiplied; in Wellington, for one example, the Kaukau transmitter site (channels 1, 5 and 11 horizontal) reaches approximately 75% of area homes. 32 additional transmitter sites with 95 transmitters are required to bring three-channel service to the remaining 25% of the homes. Nationwide, 495 transmitter sites populated with nearly 1,100 transmitters reach (according to TVNZ/BCL) 94% of New Zealand homes; TV3, not more than 80% of homes.

So while TV reception equipment (antennas, downlines, masthead amplifiers and the TV receivers themselves) are three-decades-improved from the original assumed engineering standards, the filling of the spectrum with hundreds of low power (VHF) relay (translator) transmitters has greatly diminished the opportunity for installers to extend reception into the new fringe areas now possible with improved receiving equipment.

In a single sentence:

*The improvements in reception technology offers the opportunity for quality reception at 50% greater distances than thirty years ago; but, the proliferation of transmitters has so cluttered the airwaves with co-channel interference that the limiting factor now is often not receive system sensitivity but on channel interference (see Tech Bulletin 9301 dealing with co-channel interference phasing).*

The technology to reach many of those homes unserved by TVs 1, 2 and 3 exists but the application of this modern technology is seldom practiced. This is the thrust of this Tech Bulletin (9302).

## **HOW LOW CAN YOU GO?**

Earlier was mentioned the theoretical question of "how far could transmission ranges extend if there were no receive system noise?". The answer to be completely accurate approaches infinity; and is of little importance since in practical terms it is not attainable. But as an illustration of what can be done with proper receive system engineering approaching theoretical limits, it is a valid thought exercise. It is important that installers not dismiss distances of 150, 200 or even 300 kilometres as nonsense until state-of-today's-art reception techniques have been examined.



FIRST let's establish what today's theoretical limits might be. Our only assumption is the lack of CCI or co-channel interference as a limiting factor; you, the installer, are bound only to respect the more or less 6.105 MHz bandwidth of the transmitted signal. If CCI is a consideration, you should read this in conjunction with Tech Bulletin 9301 (dealing with co-channel elimination).

a) *NOISE FLOOR*. In the absence of co-channel, the limiting factor is noise, the noise found inside of our to-be-received bandwidth. That noise comes from two primary sources.

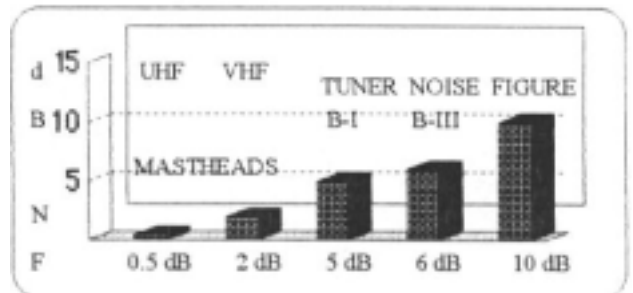
- 1) Noise intercepted by the receive antenna array and carried to the receiver input terminals by the transmission line; and,
- 2) Noise generated (and amplified) inside of the receiver electronics; which you should know is controllable, but not totally unavoidable.

If you select a modern, stock TV receiver fresh from carton, it will have a noise figure (ie., a real number measuring its own internal noise threshold). It may be difficult to find this number in the consumer-oriented instructions so we'll note here what you would read if you could find such a spec. Noise Figure (n/f) in a today-installation can be as low as 0.5 dB (UHF with quality masthead) or as poor as 10+ dB (UHF with no masthead). Typical VHF noise figures are 5 dB for the TV set tuner on band I; 6 dB on band III.

The noise power is sensitive to bandwidth. One method of reducing the apparent noise is to reduce the bandwidth of the receiver (recall the fringe model TV sets with IF bandwidths reduced for improved performance). A receive system with a noise figure of zero, desirable, is unattainable.

The TV set noise figure can be markedly improved with a well engineered masthead amplifier appropriately installed. The noise figure of the entire system, not the noise figure of the TV set alone, will determine the quality of reception possible. A low noise VHF masthead amplifier (typically with a noise figure of 2 dB or less) has the ability to double (i.e., 3 dB improve) the receive system sensitivity. We'll see why and how shortly.

b) *NOISE LIMITING* In the real world, there is noise; the antenna system finds noise (radiated by power lines, neon-signs, neighbor's fishtank-heaters, electric-stock fences, ad infinitum), and, the receiver generates its own noise and having done this dastardly deed proceeds to amplify that noise (along with the antenna contributed noise) in each successive receiver gain stage. Thus these noise sources become the noise-hiss you hear in the speaker and the dancing (snow) 'dots' and 'dashes' you see in the picture.



So what are the practical limits of noise limiting; if you reduce the noise contributing elements to their attainable minimums, how weak a signal can you use to produce a watchable TV picture? The answer is buried, like the TV picture in the noise, under several layers of variables. First we'll define picture quality when the picture is marred by noise; noise from any source.

Read the two photo captions here (right), carefully. The TV signal level (50 microvolts; the same as -26 dBmV, or, 34 dBuV) is constant; what changes is the noise figure of the TV receiving system. The top photo is the 50 microvolt signal as displayed on a UHF TV tuner with a 10 dB noise figure. The bottom figure is the same 50 microvolt signal when the TV tuner is preceded with a 0.5 dB noise figure masthead at the antenna.



Or, let's look at this in another way. Four illustrative off screen photos appear on the facing page.

We have a single five element yagi for a distant channel 9 and a 80 microvolt (-22 dBmV; 38 dBuV) signal going to a modern TV set. The picture has a measured signal + noise to noise ratio (SNR) of 16 dB (top left photo, next page). Now we replace the 5 element yagi with a single ten element yagi. The signal level rises to 110 microvolts (19 dB SNR).

Alas, the customer again wants a still better picture so the antenna size is increased, again, to a pair of 10 element yagis and we add a mast-head with a 2 dB noise figure. Our net gain will now be 2.5 dB for the double size antenna, and, 3.5 dB for the low noise masthead. The 25 dB SNR signal (150 microvolts before the amplifier gain is included) signal is at top right on the facing page.

The customer wants still more so we graduate to 4 times 10 elements. The additional 2.5 dB of antenna gain increases the SNR to 27.5 (28) dB at a measured antenna signal level of 220 microvolts (-13 dBmV/47 dBuV); less the pre-amplifier voltage gain.

In the four off screen photos, you can see with your own eyes the positive differences

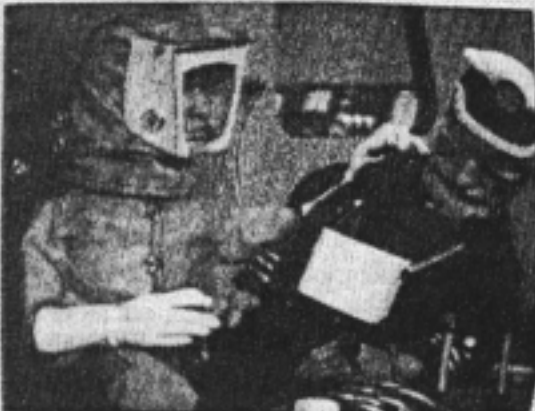
created by expanding the customer's antenna system from a single five element yagi and no masthead pre-amplifier to a stacked array of four - ten element yagis with a 2 dB noise figure masthead unit. A set of photos later in this Tech Bulletin show the ranges between 10 dB SNR and 40 dB SNR. But how do these signal plus noise to noise ratio numbers (abbreviated SNR here) correlate to picture quality? A table on page eight here lists the results of extensive testing conducted by the (American) Federal Communications Commission and dozens of independent TV equipment manufacturers in the period 1956-1959. From these tests we have the worldwide application of the so-called TASO Scale which breaks reception quality into six easily remembered stages. The steps between stages are 6 dB (in SNR), which reflects the kind of signal quality changes necessary to allow typical consumers to 'grade' the reception quality improvement (or degrading; in the reverse direction). From the four photos on this page, our range then becomes TASO Grade 5 (5 element antenna) to TASO Grade 3 (stacked array of four 10 element antennas, plus the addition of the 2 dB n/f masthead amplifier). In non-technical, descriptive terms the customer would understand the picture has improved from 'very objectionable noise' (and no color) at Grade 5 to 'solid color, some noise' at Grade 3. Now we have the entire installation defined in a precise manner; as the installer you can measure and calculate the 'system numbers' while the customer has been told what specifically to expect after authorizing you to upgrade the system from their original simplistic five element yagi.



5 Elements/80 microvolts/16 dB SNR



2 'x' 10 L'mnts/150 microV/25 dB SNR



10 L'mnts/110 microV/19 dB SNR



40 L'Mnts/220 microV/28 dB SNR

To Be continued...

# EARLY FM DX MEMORIES

JOHN EBELING

As a long time FM DXer for over 50 years. I thought I should commit a few thoughts to paper to indicate how FM DX reception has vastly changed over the years. With the FM band being filled with new stations in the past few years - almost as bad as the AM band - my thoughts frequently revert to the early days (circa 1948-1958) of FM broadcasting when the band, literally, was wide open with few stations in operation. Those that were operating often were part timers, being on the air for limited hours.

Tropics reception of those early stations was truly long distance in that during a signal fade, only background noise prevailed and there were usually no other stations on the same frequency. Now, during a signal fade, there are usually several stations fighting for the same frequency.

I recall that in Duluth, MN (where I started DXing) of consistently tuning in a somewhat maverick station around 1950. The station was WWCF 94.9 (now WOLX) located in Baraboo, WI. They usually signed on at 10:30 AM and always had announcers that sounded as if they had no experience whatsoever. Their ID always said "WWCF from high atop the Baraboo bluffs in Greenfield Township". The effective radiated power back then was about 37kw. Now, from a closer location, I can not receive WOLX due to other stations dominating the frequency.

Another aspect of early FM radio was that of music programmed to city bus riders: Transit Radio. This was done in Duluth and Minneapolis/St. Paul, MN. The Duluth version was done by WEBC-FM on 92.3, using 33-1/3 RPM transcriptions. A tone was used to boost the audio during commercials. The Twin Cities version was done by then WMIN-FM on 99.5 (later to become WLOL-FM & then KSJN) which used the new, at the time, 45 RPM

records along with RCA's new player, which could hold up to 12 records. One could hear the lead-in grooves at the start of the record(s) as well as the cycle noise of the player as these players had no mute during the change cycle. Another station using the 45 RPM system, but not for transit, was WOW-FM on 99.9 in Omaha, NE. They usually put in a fairly good signal into the Twin Cities area. Occasionally, a record would have a bad groove or two, and usually would repeat for some time before someone at the station actually listened and activated the reject switch.

Another early FM practice, which never would be done today, is the practice of changing the level of modulation of the main carrier. This was done by WLOL-FM in the mid-fifties. WLOL-FM 99.5 signed on the air in December of 1956, basically as a means to distribute Muzak to the area via a 67kHz sub-carrier, which was to replace the then used telephone lines. WLOL-FM's main carrier duplicated the WLOL-AM programming during the day, with the modulation at a reduced audio level to minimize "cross-talk" between the main & sub carriers. At 7 PM or so, the FM outlet began for the limited audience at the time, classical music programming, at which time the audio level increased to a normal level. One could really hear the difference! About midnight, the separate programming ceased and the audio level would again drop. Back then, in the early days of SCA use. I suspect that technology was not as refined as later on, as the FCC had just recently approved the use of SCA technology.

Speaking of Muzak, one more incident comes to mind, flack around 1965. KYSM-FM, 103.5 in Mankato, MN had Muzak on both their main carrier and their 67 kHz sub-carrier...the same music on both channels. Why, I don't know. but this lasted for a few months, as I recall.  
---John Ebeling, Oct 2002

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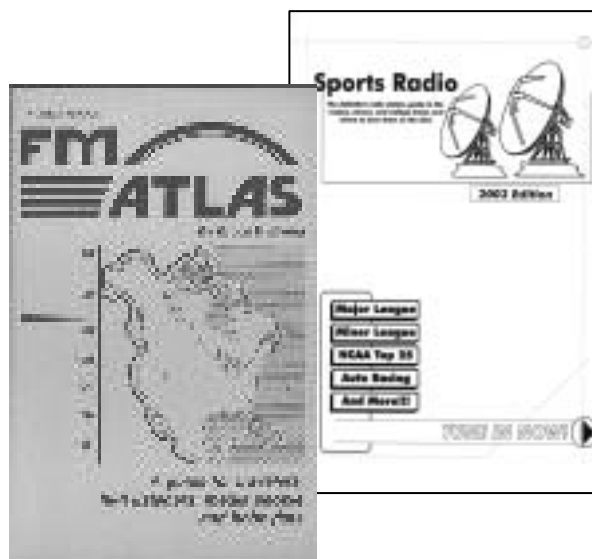
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### FM ATLAS #19

Bruce Elving's newest listing of FM Stations is just \$23.00. Send your check or money order to FM Atlas, PO Box 336, Esko, MN 55733-9413 and keep it next to your radio or in the glove box of your car!

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