



**BROADBAND NETWORKS
PART 19 - TWO-WAY TRANSMISSION**

By Neal McLain

This is Part 19 in a series of articles about coaxial broadband networks. In this article, we discuss two-way transmission issues.

FREQUENCY ALLOCATION PLANS

In a previous article (September 1997) we noted that the bandwidth of a broadband network is typically subdivided into "channels" and "bands." Although these terms originated during the early days of the cable television industry, they are still in use today even for non-video signals.

Each channel occupies 6 MHz. This, of course, is the bandwidth required by one NTSC television signal. A list of standard cable television channel-number assignments was published in the September 1997 article; these same assignments are also used for non-video signals.

Blocks of channels are grouped into bands as indicated in Figure 1. Broadcast engineers will recognize the origin of the terms "low band" and "high band" immediately. The names of the other bands were assigned in a rather haphazard fashion by cable television equipment manufacturers; these terms are not officially recognized by the FCC, but they are widely used within the industry.

TWO-WAY: BOTH DIRECTIONS SIMULTANEOUSLY

Over the years, equipment manufacturers have developed amplifiers capable of two-way transmission. These products allow network operators to divide the available bandwidth into two "paths" which carry signals in opposite directions through the same physical cables. The directions of the two paths are traditionally identified as follows:

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THE FCC ADOPTS FINAL DTV ALLOCATIONS TABLE

By Tom Smith

The FCC has issued the final table for DTV assignments. They took a number of actions in this notice.

In response to 231 petitions for reconsideration, they made 71 revisions including 42 changes to eliminate specific DTV to DTV adjacent channel situations and 29 changes to address other requests.

The FCC also tightened out-of-band emissions to encourage adjacent channel co-locations and changes to allow for better coverage.

These include the increase of power or tower height as long as there is no more than a 2% increase of interference to the population served by another station. UHF stations will be able to increase their power to 200 kw with up to 1000kw in the main service area. This depends on the beam tilt of the antenna.

Other issues in the notice included low-power TV and allowing stations within a market to exchange DTV allotments.

The largest and most controversial action was the adoption of a new

Next Meeting:

**Wednesday,
March 18, 1998**

**ATM and Data
Transfer
Technology**

**J.T. Whitney's
674 S. Whitney Way**

**Dutch Treat Dinner
at 5:30pm**

**Meeting & Program
at 7:00pm**

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core spectrum for DTV. The FCC originally said the core spectrum would be either channels 2-46 or 7-51. The FCC adopted channels 2-51 as the core channels to avoid the uncertainty over channels 2-6. This gives broadcasters 49 channels for DTV. Channel 37 is protected for scientific use. This means that broadcasters have lost 40% of the TV channels from the old channel 2-83 TV band that was in effect before channels 70-83 were given for land mobile and cellular phone service.

Chairman William Kennard and
(continued on page 8)

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February Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Tuesday, February 17, 1998, at J.T. Whitney restaurant in Madison, Wisconsin. There were 19 persons in attendance, including 15 members (14 certified) and three guests.

The meeting was called to order by Chair Fred Sperry at 7:22 pm. Secretary's report was made by Sperry in the absence of Neal McLain. The motion to approve the February minutes, as published in the newsletter, was carried.

Treasurer Stan Scharch stated that the details for the Treasurer's report were not available at that time, but that the chapter account was in the black.

Newsletter editor Mike Norton said that the deadline for the next newsletter would be March 6 at midnight. The folding party would be on March 11.

Membership committee by Paul Stoffel: The chapter presently has 69 members and sends out 138 newsletters. Stoffel reminded everyone about the membership drive going on now.

Sustaining membership report (by Sperry): Ramaker and Associates of Sauk City is the latest sustaining member. Tektronix has renewed, as has Harris.

Program committeeman Steve Zimmerman stated that there was nothing new to report.

Certification report (by Jim Hermanson): Jim reported that new certification and membership books are now available. The next exams will be given at NAB on April 7 with a February 20 deadline. Exams are also being given June 12 to 26 with an April 24 deadline. It was determined that Leonard Charles is still keeping the database for meeting attendance, for those requiring the information for recertification.

Frequency Coordination report (from Tom Smith): The only coordination needed was one wireless microphone.

National Liaison report (from Leonard Charles): (1) Jim Wulliman has been nominated to the WBA Hall of Fame. A letter to the WBA would help with this effort to honor one of the Society's pioneers. (2) The National Executive Committee, at their meeting in Florida, reported that the Society made over \$40,000 on their investments. (3) National Certification reports that they may go back to having computer study guides once again. They also report that there seems to be an increase in the exam failure rate. (4) National Frequency Coordination is concerned about the 2 Ghz band "giveaway" situation. The Legal department reports that they are trying to stay involved with this situation, but there does not appear

(continued on next page)

February Minutes (continued)

to be easy relief. (5) A method for electronic filing of part 74 applications is being worked out. (6) The futures committee is discussing what to do about a national convention after 2001 when the NAB will no longer have a hold on our participation. A computer area certification is being considered, as is a mentoring program to try to get more new blood into the society. Membership is up, but it is felt that more members under 35 are needed. (7) National awards nominations are starting. (8) There will be a National meeting October 28th and 29th in Seattle. (9) The Ennes Foundation is working on increasing scholarships for members. (We had none last year.) (10) Professional Liability insurance coverage is back. (11) The SBE booth at NAB convention will be in a different location this year. (12) The EAS committee is making reply comments on the Event codes.

Fred Sperry reports that there was no old business. In new business, Sperry reports that the Chapter is in the early stages of investigating incorporation. This would involve checking with a local lawyer at a cost of \$400 to \$500. The Chapter would have to vote on this expenditure. A vote will probably be taken at next month's meeting.

In professional news, Todd Hauser reported that Woodward Communications has hired Doug Campbell for their Madison stations. Todd will help with the consolidation of the studios on Mineral Point Road. WIBA now appears to have a vacancy in Engineering.

Jim Hermanson reported that the stations in Beaver Dam were looking for a new contract engineer.

There were no tech tips tonight.

Sperry then turned the meeting over to Steve Zimmerman who introduced the guests from Hartman & Associates and Tektronix who presented the program on digital test scopes.

Submitted by Kevin Ruppert, Vice Chair

AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

- Milwaukee's Amateur Electronic Supply, one of the largest dealers of ham equipment in the country, is under new ownership. AES was founded in 1957 by Terry Serman, W9DIA, who became interested in ham radio by working in his dad's electronics shop and went on to have a substantial impact on the ham radio marketplace. AES's new owner is Amateur Electronic Supply LLC, headed by Phil Majerus, a prominent Wisconsin businessman.
- Another bill to prohibit use of cellular and similar communications devices was recently introduced in the Wisconsin Assembly. This bill prohibits the driver of a motor vehicle from communicating to another through the use of a cellular telephone or similar mobile telecommunications device while the vehicle is in motion. An exemption is built in for police and emergency services. AB 754 was introduced by Representatives Baumgart and Ainsworth, but an aide in Baumgart's office says the bill is dead for this session of the Assembly.
- Among the astronauts on the upcoming space shuttle mission with Senator John Glenn will be two hams. American Scott Parazynski, KC5RSY, and European Space Agency astronaut Pedro Duque, KC5RGG, of Spain will be among an international crew. It's still not known if the Shuttle Amateur Radio Experiment (SAREX) will be on board STS-95, but it is under consideration.

(Excerpts from March 1998 "Badger State Smoke Signals" and "QST" magazine.)



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Broadband Networks Part Nineteen (continued)

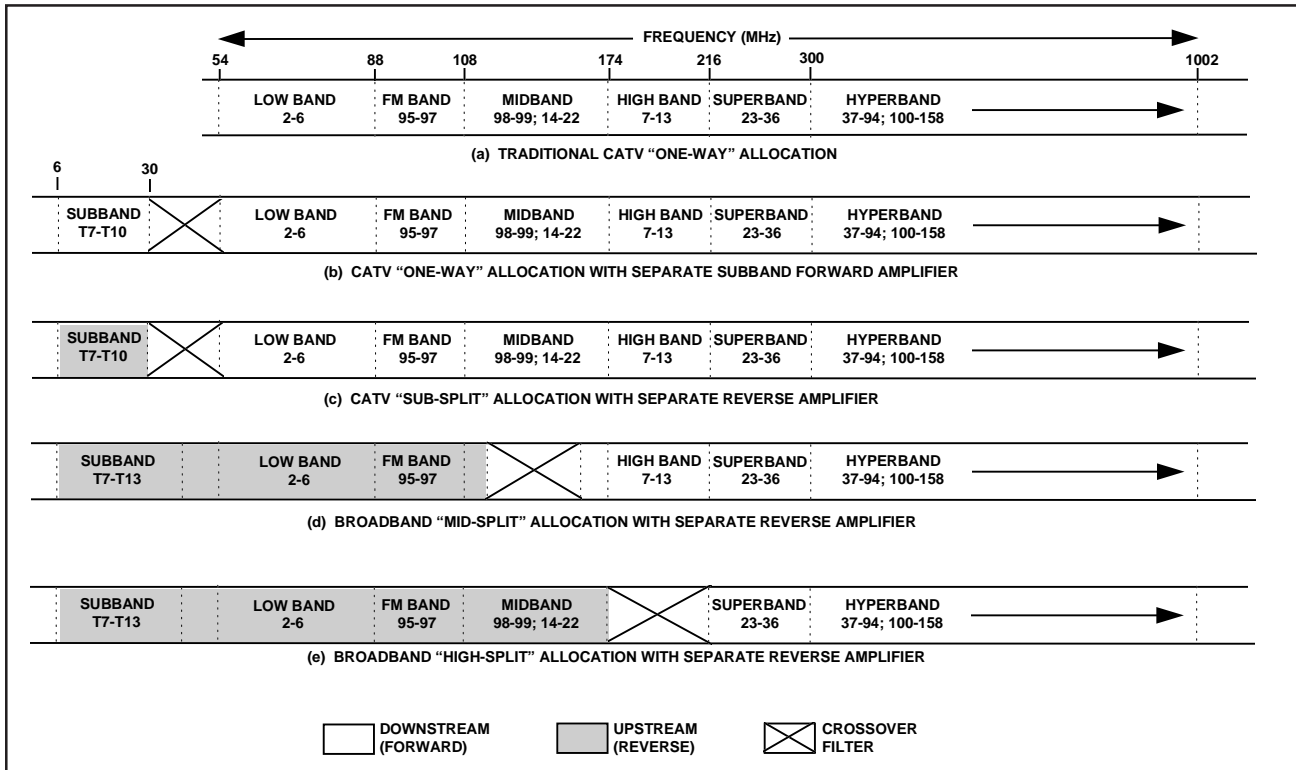


Figure 1. Bandwidth Allocation Plans. This chart specifies five commonly-used broadband-network bandwidth allocation plans. Note that the total bandwidth is divided into groups of channels called “bands.”

- Away from the headend: “downstream” or “forward.”
- Toward the headend: “upstream” or “reverse.”

The allocation of bandwidth between the two paths is determined by the configuration of the amplifiers. Figure 2 is a simplified block diagram of a typical two-way trunk amplifier. Note that there are actually two separate amplifiers oriented in opposite directions; a frequency “crossover” filter separates the two bands at the input and output of the amplifier housing.

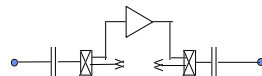
In an actual trunk amplifier housing, the individual forward and reverse amplifiers are constructed as plug-in modules.

BANDWIDTH ALLOCATIONS

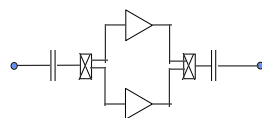
The allocation of bandwidth between the two paths of the network depends upon the application. Figure 1 illustrates five common allocation plans; these plans are more fully

described as follows:

- **Traditional CATV “one-way” allocation plan.** This is the allocation plan used by cable television networks if the reverse path is not required. The reverse amplifier module is simply omitted:

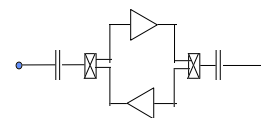


- **CATV “one-way” allocation plan with separate forward subband.** This is the allocation plan used by cable television networks in situations where the subband must be used for *downstream* signal distribution (a typical application: distribution of closed-circuit video programming to schools). This arrangement is implemented by inserting the reverse amplifier module backwards so that it amplifies the sub-band in the forward direction:



Of course, it would be possible to build a really-broad broadband amplifier which would amplify the entire spectrum from 5 to 1002 MHz; however, there’s apparently not much demand for such a product so amplifier manufacturers don’t offer them.

- **CATV “sub-split” two-way allocation plan.** This is the allocation plan used by cable television networks in situations where the subband is used for *upstream* signals (a typical application: transportation of video signals from schools back to the headend for redistribution to all subscribers over the downstream path). This arrangement is implemented by inserting the reverse amplifier module so that it amplifies the subband in the upstream direction:

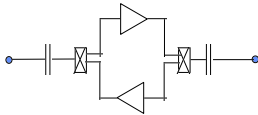


Note that the downstream path includes all cable channels from (continued on next page)

Broadband Networks Part Nineteen (continued)

Channel 2 on up; this is an obvious requirement if the downstream path is used for cable television distribution. Also, note that the subband is restricted to only four channels (T7-T10); channels T11-T13 are blocked by the crossover filters which separate the two paths.

• **CATV “mid-split” two-way allocation plan.** This is a common allocation plan for broadband networks dedicated to functions other than traditional cable television distribution. Like the sub-split plan, this plan is implemented by inserting the reverse amplifier so that it amplifies in the upstream direction:



This allocation plan is frequently used with “institutional networks” (“I-Nets”) dedicated to two-way voice, closed-circuit television, and data transmissions. Note that this plan allows all subband channels T7-T13 to be used for upstream signals; indeed, even the unnamed 4.25-MHz gap between Channel T13 and

Channel 2 can be used.

• **CATV “high-split” two-way allocation plan.** Another allocation plan for broadband networks dedicated to functions other than traditional cable television distribution. Note that the use of crossovers at higher frequencies results in a more even balance between the upstream and downstream bandwidths.

AMPLIFIER GAIN CONSIDERATIONS

As we have noted in previous articles, the signal attenuation of coaxial cable varies as a function of frequency: the higher the frequency, the greater the attenuation. This fact obviously affects the design of a two-way network: the higher-frequency path (usually downstream) is subject to much greater attenuation than the lower-frequency path. Consequently, the higher-frequency path requires more amplification to compensate for the higher loss.

The cable television sub-split spectrum represents an extreme case

in point. Consider a typical 53-channel system operating over 0.750” cable:

- The attenuation in the forward (downstream) direction at the highest frequency (402 MHz) is 1.07 dB per 100 feet. If we assume that forward amplifier gain has been specified at 25 dB, the separation between amplifiers must be about $25 / 1.07 * 100 = 2336$ feet.

- The attenuation in the reverse (upstream) direction at the highest frequency (30 MHz) is about 0.30 dB per 100 feet. Because the amplifier spacing is fixed at 2336 feet, the cable attenuation between amplifiers is only $2336 * 0.30 / 100$, or about 7 dB.

In theory, we could install a 7-dB reverse amplifier module in each amplifier housing. We should note, however, that a 7-dB amplifier module costs about the same as a 25-dB module.

We can accomplish the same result at considerably lower cost by installing a 21-dB amplifier module in every third amplifier housing and installing jumpers in the remaining housings:

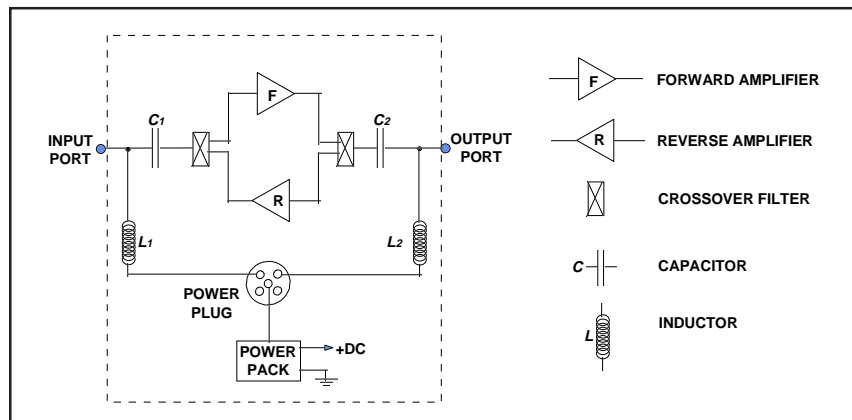
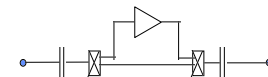
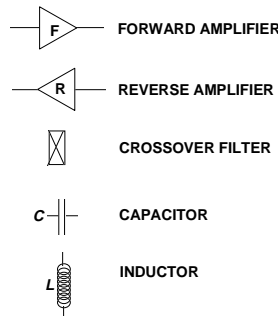


Figure 2. Trunk Amplifier Block Diagram. Note the crossover filters which separate the two signal paths. The power plug and power pack were described in the February 1998 article.



Besides lower cost, this technique presents another advantage: increased reliability. As we have noted on several previous occasions, the fewer amplifiers in a cascade, the better.

PASSIVE REVERSE

If the number of forward amplifiers involved is small, we can carry this (continued on page 6)

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Broadband Networks Part Nineteen (conclusion)

technique to the logical extreme: the completely passive reverse path containing no amplifiers at all.

Assume, as an example, the following scenario: we wish to carry a video signal on Channel T10 from a school to the headend for redistribution to all subscribers; the total number of forward amplifiers between the headend and the school is six. In the reverse direction, the signal leaving the school faces a total attenuation of about $6 \times 7 = 42$ dB before it arrives at the headend. If all six amplifier housings are fitted with reverse-path jumpers, we can easily reach the headend with adequate signal level.

Of course, we'd have to drive the reverse path at a fairly high level. If we wanted to arrive at the headend with at least +5 dBmV, we'd have to leave the school at +47 dBmV. This is roughly equal to the output level of a typical line extender, and it's well within the output capability of most standard modulators.

What about distortion? Wouldn't a high signal level such as this cause distortion along the line? No: distortion occurs in amplifiers, and in this scenario, there are no amplifiers.

AMPLIFIER ARCHITECTURE

In recent articles, we've discussed several of the requirements imposed on trunk amplifiers. Next month, we'll take a closer look at the way trunk amplifiers are constructed.

Incorporating Chapter 24

By Fred Sperry

As you may be aware, the National office of the SBE has been encouraging local chapters to become incorporated for some time now. Chapter 24's officers recently decided to move ahead with this initiative, feeling that the advantages of incorporating will benefit the Chapter.

The main advantage to incorporating is that a corporation has its own legal status. In our case, this means that individual chapter members are protected from legal action that could be brought about due to acts of the Chapter. There are also organizational benefits that come with incorporation. For example, corporations can have a perpetual

existence which can add stability to an organization.

The plan at this time is to implement this initiative in the next month or two. The Chapter will likely have to retain the services of a lawyer to complete this project. This could be a somewhat costly proposition that will need to be put to a vote at an upcoming Chapter meeting.

Please feel free to contact me if you have any comments or questions on this issue. I would also welcome anyone that may have experience, and could assist with the process of incorporating, to please contact me. My phone number and e-mail address can be found on page two of the newsletter.

Call for Nominations

By Fred Sperry

The nominations committee for the Chapter's April election has been formed. The committee members are as follows:

- Steve Paugh (Committee Chair) - 271-4321
- Denise Maney - 277-8001
- Jim Hermanson - 836-8340

If you are interested in nominating an individual, or nominating yourself for one of the offices of Chapter 24, please contact one of the above individuals by April 1st.

Elections will be held at the Chapter's April 16th meeting.

April Meeting - NAB Review

Chapter 24's April meeting scheduled for Thursday April 16th will be Chapter elections along with the annual NAB review. Chapter members who will be attending this year's NAB convention are encouraged to attend this meeting and report out on their observations from the convention. Anyone from radio who is attending NAB is especially encouraged to attend and give a report from the radio perspective.

The dinner and meeting will be held at the Wisconsin Public Broadcasting Center (ECB). Please contact Denise Maney at 277-8001 if you have any questions about this meeting.

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Hiring A True Consultant

By Ben Evans, P.E.

Not too many of us fix our own cars anymore, as many of our parents and grandparents did. The reason is that cars have gotten much more complicated, and it requires special tools, experience and skills in order to optimize cost, mileage, emissions, and performance. The same is true of broadcast technology - it has become so diverse, complex, and specialized, it is impossible to keep up with it unless communications technology is your main profession. As a result, many broadcast stations rely on outside engineering help for their transmitter planning, design, and implementation in order to assure they are receiving the best value for their money.

Hiring an engineering consultant must be done carefully, because, like any other profession, there are "wolves in lamb's clothing" out there. Think again of the automobile analogy - does anyone not have a story about a less-than-expert or not-quite ethical auto mechanic? You may even have had a similarly unpleasant experience with an engineering consultant. However, many broadcasters don't know what to look for in a good engineering consultant. Here are some guidelines:

1. A good consultant is vendor independent - i.e. doesn't sell the hardware, software or equipment that he recommends. Many vendors will set up a consultant service, often offered at give-away prices, so that they can sell you the equipment or receive "finder's fees" or commissions from equipment providers. As hard as it may be to believe, some of these "consultants" specifically tailor their recommendations to the equipment they represent. This is exactly why most large institutions and state agencies don't even allow consultants who have relationships with equipment suppliers to bid on broadcast facilities design projects. A true consultant will specify only the equipment that meets your needs, not the equipment he wants to sell you.

2. A good consultant works exclusively for your best interests. Beware of the "consultant" who tries to force you to work with him, because chances are he is really working on his own or someone else's behalf. A less-than-reputable broadcast consultant will call a station owner out of the blue and suggest that he or she move the transmitter, change frequency, or make some other change to the facility, and promise greater coverage for the station as a result. This consultant will likely insist that he handle all the required engineering work for you. Often the change the consultant recommends is designed to benefit a station that he or a client of his owns. If you already work with a consultant, have him check it out, or if you do not have a consultant, select one (see below) and get a second opinion. A consultant who owns broadcast stations or has applied to the FCC for new stations can easily get mixed up in such conflict of interest situations, so it is important for you to know if the consultant you're dealing with is also a station owner or applicant.

3. A good consultant is experienced. There are many consultants who enter the broadcast consulting field after leaving other types of jobs, or who have experience primarily with other aspects of communications. Their experience is therefore exclusive of the background and expertise required to address your technical requirements. Don't select a consultant based on personality alone. Ask other broadcasters and respected equipment manufacturers who they have dealt with and recommend. Qualify your candidates - How long have they been in business? Are they registered as Professional Engineers in their home state? Have they worked on projects similar to yours? Do they own broadcast properties or have any FCC applications pending for new stations (see above)? Ask for references and call on as many as you can. You're entitled to this information; after all, it's *your* project.

4. A good consultant knows all aspects of broadcast

engineering. Often, new consultants are really only well versed in preparing FCC construction permit applications. They may know the latest FCC technical rules, but often they are somewhat lacking in actual field experience.

Broad-based knowledge in practical broadcast technology is critical when you are seeking recommendations for the design of your broadcast facility. Such expertise should include not only the established technology for transmitter plant design, but the new digital technologies for broadcast applications.

5. A good consultant is responsive to your needs. The consulting firm you hire should have many levels of support, from field technicians to staff consultants to senior partners, each with an appropriate hourly rate, so that each job can be tailored utilizing the appropriate personnel in a cost effective manner. Everything a consultant does - from the services they provide to the recommendations they make - should be based on the specific needs of the client. Before you hire a consultant, you must know exactly what areas of support he provides (from office studies to on-site service) so that you can arrange for other service providers, as required, to complete your project in a timely manner. Your consultant should be able to tell you what other services you'll need, when you'll need them, and where to go to get them. Other services you might need, for example, might be: an attorney for assistance in special FCC authorizations, a structural engineer to determine your tower's loading capacity, or an engineering contractor to maintain your equipment.

I hope that you'll consider these factors when evaluating consultants to help you in your broadcast projects.

(Ben Evans is the head of the Broadcast Division for Evans Associates, a telecommunications consulting firm located in Thiensville, Wisconsin. Ben is also a member of SBE Chapter 28.)



LOCAL LEGALS

Compiled by Tom Smith

PROPOSED SALES

**WGLR-AM/FM Lancaster, WI
WPVL-AM/FM Platteville, WI**

Television Wisconsin Inc. has proposed to purchase WGLR-AM/FM from K to Z Ltd, Lancaster (James I. Zimmerman, Pres.) for \$1.66 million and WPVL-AM/FM from Platteville Broadcasting Inc. (Paul Braun) for \$825,000.

Television Wisconsin Inc. owns WISC-TV Madison and owns TV and Radio stations in the state of Washington. They are also buying an AM and FM station in Idaho.

WGLR-AM operates on 1280 khz with 500 watts and WGLR-FM operates on 97.7 mhz with 3.9 kw at 235 ft with a CP for 25 kw at 328 feet. WPVL-AM operates at 1590 khz with 1 kw during the day and 500 watts at night. WPVL-FM operates with 3 kw at 235 ft.

WGBW(FM), Green Bay, WI

The Board of Regents of the University of Wisconsin System is selling WGBW to the Evangel Ministries, Inc. (Donnie Slye, Chairman) for \$175,000.

The University System has just built a new station, WHID-FM with a stronger signal, to replace WGBW.

WGBW operates at 91.5 mhz with 710 watts at 741 feet.

CALL LETTER CHANGES

All of these call letter change have been granted.

WMJB, Evansville, WI is changed to WKPO; WJNW-TV Janesville, WI is changing to WHPN-TV

Mid-West Management, Madison, WI, for new AM is receiving WAWY

Compiled from BROADCASTING and CABLE and FCC Web Site

FCC ADOPTS FINAL DTV ALLOCATIONS (continued from page 1)

Commissioner Susan Ness issued separate statements in support of the action, stating that any loss in auction revenue by not allocating these 5 channels to other uses could be made up by the auction of new DTV stations in the future.

Commissioner Harold Furchtgott-Roth issued a statement against the allocating of the spectrum for a service that used fixed receivers and the loss of auction revenue from other services for use of the 30 mhz of spectrum.

The notice for the final allocation table is FCC 98-24 and the notice for the rules concerning the conversion to DTV is FCC 98-23 and are both available on the FCC web site.

From FCC press release (www.fcc.gov)

MADISON SWAPFEST & COMPUTER FAIR

By Jeremy Charles

The Madison Area Repeater Association, Inc. is proud to announce the 26th Annual Madison Swapfest and Computer Fair. This event features dealers of new and used gear for electronics enthusiasts, Amateur Radio operators and computer buffs. This year's Swapfest will be held on Sunday April 5, 1998. Doors open to the public from 8:00am until 1:00pm. Come early for the best deals!

The event will be at a new location: The Middleton Conference Center, 1313 John Q. Hammons Drive, in Middleton, WI. The Conference Center is attached to the Marriot, formerly known as the Holiday Inn Madison West. The complex is clearly visible from the intersection of Greenway Blvd. and Highway 12. Parking is free.

Tickets are on sale now. Admission donation is \$5 per person in advance, \$6 at the door. Children 10 and under are free. Vendor space is also on sale and going quickly. Please call (608) 245-8890 for recorded ordering information.

The Madison Area Repeater Association, Inc. is a non-profit public-service oriented Amateur Radio club. The proceeds from this event go directly toward funding two major Amateur Radio repeater systems in Madison which are used heavily in severe weather, disaster and other public service communications operations. The organizations served include the Badger Chapter of the American Red Cross, Dane County Emergency Management, the Madison Marathon, the National Weather Service and many other community events. The repeater output frequencies are 147.15 MHz

and 146.76 MHz.

Additional information can be obtained by listening to the recordings or leaving a message at (608) 245-8890. The Swapfest '98 web page is at <http://www.cs.wisc.edu/~jeremyc/mara/swapfest> and the Swapfest Chairman, Jeremy Charles, can be contacted via E-mail at: n9vht@skywarn.cs.wisc.edu

**Chapter 24
World Wide Web Site**
<http://www.sbe24.org>



Leonard Charles is the editor for the Electronic Version of this Newsletter, uploaded monthly onto SBE Chapter 24's web page.

SBE Short Circuits - March 1998

By John L. Poray, CAE
Executive Director

MEMBERSHIP DRIVE BEGAN MARCH 1

The annual SBE Membership Drive began March 1 and runs through May 31. Each SBE member is asked to recruit one new member during that time. Recruiters and new members can win great prizes! Recruiters are eligible to win the grand prize - a trip to the 1998 Electronic Media Expo & SBE National Meeting in Bellevue (Seattle), WA, October 27-29. Grand prize includes airfare for one (up to \$500, compliments of SBE) and three-night hotel accommodations in Bellevue, donated by SBE Chapter 16. Second prize is \$250 cash, donated by Cintel, Inc. Many other prizes have been donated for the Drive, plus, each recruiter will receive \$5.00 off his/her 1999 membership dues for each new member that he or she recruits, up to \$25. SBE members qualify by recruiting Regular, Associate or Sustaining Members. Look for details in the mailing that went to all SBE members in February. The prize drawing will be held July 11, 1998. Winners will be notified by phone and/or mail.

GET YOUR "INTRODUCTION TO DTV RF"

The SBE "Introduction to DTV RF" is now available from the SBE National Office. Member price is \$49 and non-member price is \$65 plus \$2.00 shipping per book. Indiana orders must add 5% sales tax. To order, call the SBE National Office at (317) 253-1640. You may fax your request to SBE at (317) 253-0418. Payment by credit card or check must accompany orders. Send mail orders to: DTV RF, Society of Broadcast Engineers, 8445 Keystone Crossing, Suite 140, Indianapolis, IN 46240.

REGISTER FOR LEADER SKILLS SEMINAR

SBE will sponsor the 30th Leader Skills Seminar, presented by Richard Cupka, June 8-12, 1998 in Indianapolis. This will be the second consecutive

year SBE has sponsored this program, designed to teach leadership and management skills to broadcast engineers.

The seminar will be held at the Indianapolis Quality Inn South. The cost for this intensive program is just \$650, far below similar programs. The fee includes all instruction materials and refreshment breaks each day. Food, lodging and transportation are additional. The nightly rate at the Quality Inn South is just \$69 plus 11% tax. To register, call the SBE National Office at (317) 253-1640 or by e-mail to Teresa Ransdell at transdell@sbe.org.

YOUTH MEMBERSHIP CATEGORY PROPOSED

SBE has been receiving comments about a preliminary proposal to add a Youth Membership category. A final proposal will be considered at the Board of Directors Meeting, April 5 in Las Vegas. A program involving high school-aged youth in SBE for the first time would be developed with the goal of educating young people about broadcast engineering and careers in the field. The intended result is to increase the flow of young people into broadcast engineering.

For more information about the proposal, see the SBE Web Site at www.sbe.org or the November/December issue of the SBE SIGNAL.

SBE MEMBERS GET DISCOUNT FOR NAB'98

Members of the Society of Broadcast Engineers can save \$300 on the Full Conference Registration for NAB'98 in Las Vegas. SBE members get the NAB member rate. Check the SBE Member box on the NAB'98 registration form.

SBE MEMBERSHIP RENEWAL TIME

SBE Membership renewal notices were mailed to all members (except Life Members) in mid-February. If you have not received yours, contact Teresa Ransdell at the SBE National Office at

(317) 253-1640 or transdell@sbe.org. Membership Renewals are due by April 1. Regular Member dues remain at \$55 for the seventh year.

SBE EVENTS AT NAB'98

Saturday, April 4

- Ennes Workshops - "Radio Bootcamp" 8:30 am - 5:00 pm Las Vegas Convention Center (admission included with full NAB Registration)

Sunday, April 5

- Board of Directors Meeting 8:30 am - 12:00 Noon Embassy Salon, Las Vegas Hilton Hotel

Monday, April 6

- Frequency Coordinators Meeting 2:00 pm - 3:00 pm Conference Room 13, Las Vegas Hilton Hotel (to be confirmed)

- Ennes Educational Foundation Trust Meeting 3:00 pm - 4:00 pm Conference Room 13, Las Vegas Hilton Hotel

Tuesday, April 7

- National Frequency Coordination Council Meeting 7:30 am - 8:30 am, Room N239/241, Las Vegas Convention Center

- Certification Exams 9:00 am - 12:00 Noon Conference Room 13, Las Vegas Hilton Hotel (pre-registration with SBE required)

- SBE Membership Meeting 5:15 pm - 6:00 pm N111/N112, Las Vegas Convention Center

- SBE Chapter Chairmen Meeting 6:00 pm - 6:45 pm N111/N112, Las Vegas Convention Center

Wednesday, April 8

- NAB Technology Luncheon 12:15 pm - 1:45 pm Las Vegas Hilton Hotel; Ticket required.

The SBE will operate a booth during show hours (Monday - Wednesday, 9:00 am - 6:00 pm and Thursday 9:00 am - 4:00 pm). Location will be Booth #8 in the front lobby of the Las Vegas Convention Center.

TELECOM INDUSTRY NEWS

By Neal McLain

OVERLAY AREA CODES: FIVE STATES APPROVE; ONE BACKS OFF

The battle over new area codes continues unabated in several states. As usual, the battle lines are the same: overlay or split? And if a split, where?

A major issue in overlay-vs.-split fights is the FCC's ten-digit dialing rule. Under this rule, in any overlay situation, all local calls must be dialed with the area code (the prefix "1" isn't required for local calls, although it's still required for toll calls in most states).

This rule was instituted after Ameritech tried to establish a separate area code for wireless (cellular and paging) customers in the Chicago area. The wireless companies didn't want to be stuck with "funny" numbers, so they petitioned the FCC. The FCC ruled in their favor. The only exception is 917 in New York City which was established before the FCC ten-digit rule.

In the past year or so, five states (Colorado, Georgia, Florida, Maryland, and New York) have approved overlays, at least tentatively. Meanwhile, one state (Pennsylvania) has reversed a previous decision and implemented a split instead. And Illinois is still arguing. In every case, the ten-digit dialing requirement has been a major point of contention during public hearings.

Here's a state-by-state summary:

COLORADO: New area code 720 was overlaid on 303 in the Denver metro area last month, and ten-digit dialing is now mandatory for local calls within the area. The state is considering making ten-digit dialing mandatory statewide; if implemented, even an intra-area code local call within 719 or 970 would have to include the area code. While this proposal is politically unpopular, it would get the issue over with once and for all.

GEORGIA: New area code 678 has been overlaid on 404 and 770 in the Atlanta metro area. Ten-digit dialing is mandatory for all calls within the area; however Atlanta-area residents were already used to this idea because calls between 404 and 770 have always been dialed as ten digits (the "1" prefix isn't required because they're local calls).

FLORIDA: The state PSC has tentatively ruled that a new area code (786) will be overlaid on part of 305 in the Miami area. At the present time, 305 covers two counties: Dade (Miami and suburbs) and Monroe (the Keys). Under the current proposal, 786 will be overlaid in Dade County only; the Keys will retain 305 exclusively. Presumably, this means that ten-digit dialing will be required only in Dade County; however, this issue apparently hasn't been resolved.

ILLINOIS: The situation in the Chicago area is a textbook example of what happens when the anti-overlay faction wins out. What used to be one area code (312) has already been split into five areas: 312, 630, 708, 773, and 847. And now, guess what: 847, serving the northern suburbs, is running out of central office codes. The split-vs.-

overlay fight has already begun: the anti-overlay folks are again arguing for a split in spite of the fact that a split would force many north-suburban residents to face the *third* area-code change in less than ten years.

MARYLAND: Maryland residents seem to have adjusted to ten-digit dialing quite nicely. Maryland has had four area codes in two geographic areas since last June, and ten-digit dialing has been a statewide requirement since that date.

NEW YORK: New York City will get two new overlays later this year: 646 in Manhattan and 347 in the other four boroughs. Once these codes are implemented, New York will have five area codes in two geographic areas: 212, 646, and 917 in Manhattan; 347, 718, and 917 in the rest of the city. As in all overlay situations, ten-digit dialing will be mandatory. This has been a particularly controversial issue among New Yorkers because New York already has an overlay that *doesn't* require ten-digit dialing: 917, the sole grandfathered exception to the FCC's ten-digit dialing rule.

PENNSYLVANIA: The Pennsylvania Public Utilities Commission has reversed its earlier decision: area code 412 will be split, not overlaid. The Pittsburgh metro area retains 412; the surrounding areas have been moved to 724. This decision turned on several factors, but public objection to the ten-digit dialing requirement was the central issue that caused one Commissioner to change his vote.

Sources: TELECOM DIGEST (<http://hyperarchive.lcs.mit.edu/>); LincMad: Forms of NPA Relief (<http://www.lincmad.com/>).


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 **FCC Rulemakings**

Compiled by Tom Smith

PROPOSED

**MM Docket No. 97-247; DA 98-354
Fees for Ancillary or
Supplementary Use of Digital
Television Spectrum Pursuant to
Section 336 (e)(1) of the
Telecommunications Act of 1996**

The FCC is extending the comment and reply periods on this notice of proposed rulemaking. The original deadlines were March 3, 1998 for comments and replies were due on April 2, 1998. the new deadline for comments is May 4, 1998 with replies due on June 2, 1998.

This extension is due to a request by the National Association of Broadcasters, so that they could further prepare research studies on the issues concerning fees for using part of the DTV signal for subscription services.

This action was adopted and released on February 23, 1997 and published in the FEDERAL REGISTER on March 2, 1998 on page 10180.

FINAL RULEMAKING

**ET Docket No. 97-157; FCC 97-421
Reallocation of TV Channels 60-69,
the 746-806 MHZ Band**

The FCC has reallocated channels 60-69 for public safety use, for commercial use by fixed and mobile services, and for new broadcasting services as required by the Balanced Budget Act of 1997.

TV channels 63, 64, 68 and 69 which total 24 mhz are being allocated to public

safety use, and these allocations were to take effect on January 1, 1998 as ordered by the Balanced Budget Act. The other channels may be allocated to fixed and land mobile services, and the FCC is retaining the allocation on broadcasting services to this band. These frequencies are to be auctioned in the future. This notice also outlined the transition of current TV stations to new channels in the DTV band and their protection from interference during the transition period on their current channels. The future of the transition for TV translators and low-power stations was also addressed.

This notice was adopted on December 31, 1997 and released on January 6, 1998. It was published on February 10, 1998 in the FEDERAL REGISTER on pages 6669-6675

Compiled from the FEDERAL REGISTER (www.access.gpo.gov)

The Chapter 24 Newsletter is published monthly. Submissions of interest to the broadcast technical community are welcome. You can email your articles to:

MNorton@mail.state.wi.us

or send them to:

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FIRST CLASS MAIL

Newsletter edited on Pagemaker 5.0 by: Mike Norton

Contributors this month: Jeremey Charles, Ben Evans, Neal McLain, Kevin Ruppert, Tom Smith, Fred Sperry, and Tom Weeden. Thanks to Chris Cain for his work on the Chapter 24 WWW page.

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MARCH MEETING and PROGRAM



**Society of Broadcast Engineers
CHAPTER 24 MADISON, WISCONSIN
Wednesday, March 18, 1998**

ATM and Data Transfer Technology

This month's meeting will feature a presentation on data transfer and Asynchronous Transfer Mode (ATM). Steve Shepard and Bill Mitsiopoulos from FORE Systems will present methods of sending digital data over telecommunications networks.

**Dutch Treat Dinner at 5:30pm
J. T. Whitney's
647 S. Whitney Way**

**Meeting and Program at 7:00pm
J.T. Whitney's
(in meeting room)**

Visitors and guests are welcome at all our SBE meetings!

1998 UPCOMING MEETING/PROGRAM DATES:

Day	Date	Program
Thursday	April 16	Elections and NAB Review
Tuesday	May 5	Telephone Company Tour
Wednesday	June 17	Sullivan NOAA Weather Office Tour

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