



**Chapter 24, Inc.
Madison, Wisconsin**

Society of Broadcast Engineers

August 2001



TOWER INDUSTRY PART 8 – TOWER LIGHTING AND PAINTING

By Vicki W. Kipp

Tower lighting is necessary for one reason: aircraft safety. If not for the fact that flyways and towers occupy some of the same altitudes, towers could be less conspicuous. Without airplanes, helicopters, and hot air balloons, towers could be painted to match the skyline, and be made to blend in discreetly. But as long as towers and aircraft co-exist, towers that present a hazard to air navigation need to be marked accordingly.

JOINTREGULATION

Towers fall under the authority of both the Federal Aviation Administration (FAA), which regulates tall structures that could be perilous to aeronautical navigation, and the Federal Communications Commission (FCC), which oversees broadcast towers.

Generally, towers that are 200 feet or taller require paint and/or obstruction lighting (Figure 1). Lighting and marking requirements will be listed on a station license. Details about lighting guidelines can be found in Part 17 of the FCC Rules and Regulations 'Construction Lighting and Marking of Antenna Structures.'

NEWTOWERS

When a new tower is built, one of the greatest challenges is to get the tower licensed. Both the FCC and the FAA must review the FAA form 7460-1 *Notice of Proposed Construction* for the new tower to determine if the tower would present a hazard. The FCC requires the FAA to review the safety of any tower over 200 feet above ground level (AGL) or any tower within a certain proximity to public use airports. For towers that apply for FAA approval, a study will be

(continued on page 4)

Next Meeting:

**Tuesday,
August 28, 2001**

**Madison
Candelabra
Update**

**WISC-TV
7025 Raymond Rd.**

Pizza at 5:30

**Meeting
and Program
at 7:00 PM**

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NEW VSB CIRCUIT ANNOUNCED

By Mike Norton

Panasonic's parent company, Matsushita Electric Industrial Co. announced the development of a single chip VSB demodulator for DTV receivers. Increased resistance to signal multipath and decreased power consumption are both listed as enhancements over previous VSB decoders.

According to Panasonic, the large scale integrated circuit (LSI) will enable wider and more stable indoor antenna reception of over the air broadcast 8VSB television signals, even compared to

the COFDM modulation format. Improvements in both dynamic and static multipath interference result in an effectiveness 100 times greater than previous Panasonic demodulator chips.

Included in the new chip are previously external detection circuitry components, a 10-bit analog to digital converter, and phase lock loop circuit. The LSI circuit is smaller than the company's previous VSB chips requiring only 25 percent of the mounting area, and can be produced for only one-third the cost.

The smaller package also offers low power consumption at 600 mW, about one-fifth the power requirement for most conventional products. The low power consumption is achieved by reducing the internal voltage to 1.8v, using a CMOS 4-layer 0.18-µm process, and optimizing the circuit architecture to dynamically adjust the frequency based on processing needs.

Orders from other digital television manufacturers for the new VSB chip will be taken later this month.

(Information from Panasonic web site at www.panasonic.com)

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July Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Thursday, July 26, 2001 at Mendota County Park in Middleton, Wisconsin for the chapter's annual picnic. There were 11 members in attendance, nine of whom were certified, and four guests.

The meeting was called to order at 7:07 PM by chairman Tom Smith. Minutes of the June meeting as published in the newsletter were approved.

Newsletter editor Mike Norton announced the deadline for articles for the August issue will be due at midnight, Friday, August 3. The folding party will be held Wednesday, August 8th at WKOW-TV.

Leonard Charles gave a brief update on work on the Madison Community Tower.

The business meeting adjourned at approximately 7:10 PM.

Picnicking served as the program for this month's meeting.

Submitted by Tom Weeden, Secretary

DTV DEADLINE EXTENSION REQUESTED

Two U.S. Senators have asked the FCC to extend the May 2002 digital transition deadline for stations in markets 75 and smaller. In a letter to the FCC, Montana Senators Conrad Burns, a Republican, and Max Baucus, a Democrat, said the current deadline presents an economic challenge to rural broadcasters. "We believe the small-market broadcasters need more time before being required to transmit a digital signal," they wrote.

The Senators didn't suggest a new deadline date, saying instead that the transition to digital shouldn't be required "until such time that the marketplace and sound business models allow for the successful adoption of digital television." There are 24 full power TV stations in Montana. None are listed as currently being on the air with DTV. Of the approximately 1500 TV stations in the U.S., 202 are currently broadcasting a digital signal.

(Information from www.tvinsite.com)

The *Chapter 24 Newsletter* is published monthly by Chapter 24 of the Society of Broadcast Engineers, Madison, WI.

Submissions of interest to the broadcast technical community are always welcome. You can mail articles to:

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or e-mail your articles to: MNorton@ecb.state.wi.us

WWV Surveys Users

By Mike Norton

In an effort to keep its technology current, the National Institute of Standards and Technology (NIST) is conducting a survey to better understand the needs of WWV/WWVB/WWVH users. A survey is underway, and responses are due by September 30, 2001. Many stations use the WWV stations for time synchronization or as a highly accurate frequency reference.

According to NIST, the survey should take less than 15 minutes to complete. In most cases it should take less than five minutes. Complete only the sections that pertain to your usage. The online version of the survey is available at www.timesurvey.nist.gov.

WWV and WWVB are located near Fort Collins, Colorado, about 60 miles north of Denver. WWV broadcasts time and frequency reference information on 5, 10, and 15 MHz at 10 kW, while 2.5 and 20 MHz transmitters are operated at 5 kW radiated power. WWVB broadcasts with a carrier frequency of 60 kHz with 50 kW of power.

A second NIST broadcast location in Hawaii is home to WWVH. This station broadcasts on 5, 10, and 15 MHz at 10 kW. A 2.5 MHz transmitter operates with a power of 5 kW.

NIST is responsible for providing the ultimate measurement reference for all physical quantities in the United States (not just time and frequency). More interesting information about these stations can be found on the NIST web page at <http://www.boulder.nist.gov/timefreq/stations/wwv.html>.

Thanks to Denise Maney for organizing the annual SBE picnic at Mendota County Park in July.



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AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

- Two petitions filed by the American Radio Relay League regarding spectrum allocations are in the news this month. The first requested the FCC to elevate amateur radio from secondary to primary status in the 2300 - 2305 MHz band and that no commercial operations be introduced there. There currently is no primary occupant of the band. The FCC issued a public notice and was seeking comments through August 1st. A competing petition was filed by AeroAstro Incorporated that seeks a new Miscellaneous Wireless Communication Service (MWCS) on the band and co-primary status with the amateur service. AeroAstro has called on the FCC to grant its request "subject to technical rules calculated to minimize harmful interference between the two services and to protect NASA's Deep Space Network," which operates below 2300 MHz.

Acknowledging the AeroAstro petition in its initial filing, the ARRL said it would impose "severe operating constraints on the Amateur Service" if the FCC were to grant it. The ARRL plans to file comments on the AeroAstro petition as well as on its own.

The ARRL has said that its latest petition would be "consistent with the protection requirements for government and NASA operations immediately below 2300 MHz and the MWCS operation above 2305 MHz."

- Another ARRL petition, filed recently, could result in a new high-frequency band for US amateurs. The ARRL has asked the FCC to allocate 5.250 to 5.400 MHz to the Amateur Service on a domestic (US-only), secondary basis. The League told the FCC that the new 60-meter band would aid emergency communication activities by filling a "propagation gap" between 80 and 40 meters. The ARRL said the propagation gap can hamper communication between the US and the Caribbean during severe weather emergencies.

As proposed, amateurs General class and higher would be permitted to operate phone, CW, data, image, and RTTY on the new band running maximum authorized power. The petition cites the success of the League's WA2XSY experimental operation in the 60-meter band, carried out since 1999, which confirmed its communication reliability. Even if the petition finds favor with the FCC, it's likely to be several years before the new band actually becomes available.

(Excerpts from "The ARRL Letter")

Thanks to WISC-TV for maintaining the web server for the Chapter 24 Web page!

Thanks to WKOW-TV for providing copying and folding facilities for the Chapter 24 newsletter!



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TOWER INDUSTRY PART 8 (continued from page 1)



Figure 1. Towers lit at night to warn airplanes.

done to analyze how the tower will affect aeronautical navigation. If the proposed tower were declared to be a physical hazard by the FAA, the FCC would deny the construction permit application. Topics studied by the FAA include approaches to nearby airports, including all instrument approach, departure, and missed approach paths, closeness to airways and nearness to Visual Flight Rules (VFR) flyways. A VFR flyway is any landmark - such as a road, river, or railroad - that a pilot may use to assist with direction finding during marginal flying conditions.

FAA review of any tower that is less than 200 feet tall and not near any aeronautical facilities is optional. However, it would be prudent to notify the FAA as a way to insure that you haven't missed a risk that could come back to haunt you later. One tricky issue is that when the rule says "not near any aeronautical facilities", it means existing facilities as well as facilities that have been planned and have filed notification with the FAA. If you don't file with the FAA for a review,



Figure 2. Flashing red beacon is hinged in the middle for relamping.

you may not be aware of pending sites that could conflict with your tower.

TEMPORARY LIGHTS

If your existing tower is undergoing construction, and the tower lighting is affected, it is your responsibility to implement temporary lighting. Install a temporary light, of similar type and intensity to the regular light, at the top of the tower. You may also need to install interim lights at periodic levels of the tower.

LIGHTS ON FOR SAFETY

Flashing Beacons

A large pulsing light that warns pilots of a tower's presence is called a beacon (Figure 2). Beacons can be either red or white, but red is more widely tolerated by neighbors. Beacons are characterized by their flash rate. Forty flashes per minute (FPM) is a common rate. Flashing beacons are required at

the top and periodic intermediate levels of tall towers. Towers that contain only beacon lighting must be painted.

Sidelights

Sidelights, otherwise known as red obstruction lights (Figure 3, 4), are constant burning red lights that help pilots identify an obstruction to their flight path. According to FAA/FCC guidelines, all red obstruction lighting must be turned on from sunset to sunrise. Continuously lit sidelights (continued on next page)



Figure 3. Red side light is steady burning.



Figure 4. Side lights. (Photo courtesy of Unimar, Inc.)

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TOWER INDUSTRY PART 8 (continued)

are required on the outside corners of the structure of a skeletal tower, per the FAA/FCC rules. For example, 3 lights per level are required for a triangular structure, while 4 lights per level are required for a square structure. The diameter of a tower structure also affects the number of lights required per level for that tower.

Medium and High Intensity Strobe Lighting

Unpainted towers are often required to display medium or high intensity strobe lighting (Figure 5). Unless otherwise specified, all medium and high intensity white strobe lights are to be lit at all times. Strobe lights flash brightly for visibility during the day and flash less brightly at night. In fact, the FAA requires that white strobe lights have considerably less light intensity at night than during the day. While high intensity strobe lighting can have a peak intensity of 270,000 candelas during the day, it is limited to



Figure 5. Strobe light opened up to show bulb.

20,000 candelas at twilight, and 2,000 candelas at night.

High intensity strobe lights are required on towers within VFR airspace. For structures shorter than 500 feet AGL, high intensity white strobe lights are not recommended. For structures taller than 500 feet, the tower owner may be allowed to choose between painting the tower or installing high intensity strobe lights. In the long term, it is more economical to install strobe lights. The FAA must approve high intensity strobe lights before they are installed.

RESISTANCE TO STROBE LIGHTING AT NIGHT

It is not unusual for the neighbors of a tower equipped with high intensity white strobe lights to complain to their elected officials about excessive brightness at night. As a result of widespread public outcry about white strobe lighting, the FAA and FCC have cut back on strobe lighting requirements for shorter towers, and suggested a dual-lighting plan. Building codes began requiring that towers had either red lights and paint, or a dual lighting systems with red lights at night.

DUAL LIGHTING

A dual lighting system uses a blend of beacons, side lights, and strobe lights. Dual lighting can solve conflicts when tower neighbors object to nighttime white strobe lights. A dual lighting system for an unpainted tower may encompass strobe lights for day visibility and flashing red beacons and obstruction lights at night. Using a dual lighting system allows the tower owners to avoid the expense of maintaining orange and white tower paint.



Figure 6. Photo control senses daylight levels to trigger lights to turn on at night. (Photo courtesy of Unimar, Inc.)

MONITORING LIGHTING

Operation of lights is controlled by a photocell (Figure 6) mounted on the tower which senses the level of sunlight visible and powers the lights on or off. The FCC Rules Section 17.47 requires that any radio or television station where tower lighting is mandated must either observe tower lights, visually or by automated monitoring system, at least once every 24 hours to ensure that all lights are operating properly. If you don't wish to do daily inspections, the other option is to install an automated alarm system that will detect any lighting failure and send an alarm to you. At least once every three months, you must inspect all of your tower's automatic and mechanical devices, indicators, and alarm systems for proper operation.

If you follow the requirements of FCC Rules 17.47, it is unlikely that the FCC would find that your station would have tower lights out without you knowing it first. However, hypothetically, a tower light could be burned out for almost a full day before being noted since the tower light check is only required once every 24 hours.

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TOWER INDUSTRY PART 8 (continued)

Furthermore, if the FCC notes or receives a complaint about inoperable tower lights that have not been reported to the FAA, a considerable fine could be levied.

LIGHTING FAILURE

If a flashing beacon or strobe light should fail for more than 30 minutes, you must notify the nearest FAA Flight Service Station (FSS) at once. It is essential to notify the FSS about a lighting failure in order to prevent aircraft collision and to limit your liability if an aircraft should hit the tower.

The telephone number for your local FSS should be posted at the transmitter control point. When you call the FSS to report an light outage, you will need to report the seven digit tower registration number, the number of lights involved, the height of the tower above mean sea level and ground level, the reason for the failure (if known), and the probable date for the completion of repairs. When you make the report, you will have to supply the FSS with your name, title, address, and telephone number. It is recommended that you make a note of the time and date that the lighting outage was called in, and the name of the FSS official that you spoke with.

The FSS will issue a Notice to Airman (NOTAM). This NOTAM will be included in the preflight briefing when a pilot calls in to file a flight plan. The NOTAM data is also included in the announcements on the Automatic Terminal Information Service (ATIS), an airport-to-plane transmission which pilots monitor before taxiing for departure and prior to landing.

NOTAM information will be disseminated by the FAA for 15 days unless they are notified that the lights have been restored to normal operation. If the FAA hasn't heard from you by the end of the 15-day NOTAM period, the NOTAM will be automatically cancelled under the presumption that the repairs are complete. If the FAA didn't cancel NOTAMs after 15 days, some NOTAMs would go on infinitely. If the light has not been restored to normal operation within 15 days, you must notify the FAA. The FAA will re-issue the NOTAM and inform the FCC that you have a lighting problem. If at all possible, you want to avoid having a notification such as this in your file.

While you do need to call the FAA if a beacon or strobe light fails, you do not need to notify them if a side light fails. However, the side light should be repaired or replaced promptly. Many flashing beacons contain two bulbs in each fixture. You are required to notify the FAA even if just one of the bulbs fails.

DRAWBACKS OF LIGHT

Lights, high intensity strobe lights in particular, are often favored over painting a tower because lights are perceived as being less expensive to maintain. However, tower lights are not without their hassles. Light bulbs burn out. Electrical lines to the bulbs can be shorted out by rain. Lighting hardware can become corroded. Lights can be cracked by chunks of falling ice. Lights can lose their power source during a power outage. Additional hazards to lights include disgruntled hunters that shoot at lighting, and troublemakers who climb towers to steal obstruction lights.

TOWER PAINTING

You can easily spot a painted tower at a great distance due to its vibrant coat of international orange and aviation white. Daytime visibility of the tower is the purpose of these loud stripes. These colors are specified for towers because they provide maximum visibility of the structure by contrast in colors. Towers up to 700 feet are marked with 7 equal width stripes with the top and bottom being orange. Taller towers require between 9 and 13 stripes depending on the height.

TIME TO PAINT

Federal standard FED-STD-595 lists the standards for chromaticity and luminance for a freshly painted tower. Weather, scaling, oxidation, and chipping cause painted towers to fade. Whenever a painted tower begins to fade beyond the limits of the FAA orange color tolerance chart, it must be repainted. The FAA or tower paint vendors can supply you with a color tolerance chart. Since the effect of weathering will be the greatest at the top of the tower, it is best to make your color comparison there. Check and maintain the brightness of your tower paint routinely because the FAA can cite your station and levy considerable fines if your tower paint is out of tolerance.

Repainting your tower is an expensive and labor-intensive proposition. The paint used on towers has qualities that make it robust enough to stand up to outdoor use. These characteristics factor into the cost of the paint. Regardless of how good the paint is, it will peel off or fade every few years.

(continued on next page)

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TOWER INDUSTRY PART 8 (conclusion)

The paint must be replaced by hand. Although it might seem quicker and easier to spray paint the tower, that is not a realistic plan. The spray paint can spatter for hundreds of yards with the slightest wind. Although international orange might look striking on a tower, it will not be well received if it lands on a house or vehicle. When you are painting a few hundred feet up on a tower, there is bound to be a breeze. Since wind at the higher altitudes doesn't get worn down by ground level friction, wind speed increase proportionately with height above ground level.

Tower paint is applied by technicians wearing "paint-mitts." Paint mitts are large textured gloves dipped in paint which are spread over every structural element of the tower. A physically powerful adult can paint 100 feet of an average tower in a full day. When hiring a tower painter, be cautious of swindlers who quote bargain rates and paint with amazing speed. These cons paint only the

underside of the tower since it is the only portion visible from the ground.

CONCLUSION

When the FAA or FCC requires a tower to be marked or lit, the tower must be illuminated solely or by a combination of red beacons, white strobes, red obstruction lights, and orange and white paint stripes. The FAA and FCC have strict rules for the operation and maintenance of tower lights and markings.

Next month, we'll continue our discussion of the tower industry.

Information for this article came from the following sources: NAB Engineering Handbook, 8th Edition; MFSF, Bruce Sterling "Spires on the Skyline"; Broadcast Engineering, Don Markley "Preparing Towers for Winter" and "Tower Lighting"; <http://www.unimar.com/>, Radio World, Harold Hallikainen "RF Radiation Exposure References, Tower Lights".

FCC Authorizes More Ka-Band Systems

By Mike Norton

On August 2, the FCC International Bureau authorized 11 companies to provide fixed-satellite services (FSS) from geostationary satellites, at a total of 34 orbital locations. These companies plan to provide telecommunications services, including broadband, interactive, direct-to-home and digital services. The authorizations include several new systems, as well as expanding previously licensed systems.

The licenses awarded to Hughes Communications, Inc., Loral Cyberstar, Inc., and PanAmSat Corporation expand the number of satellites each is authorized to implement under previous

Ka-band system licenses issued in 1997. In May 1997, the International Bureau licensed 13 companies to launch and operate GSO FSS satellite systems as part of the first Ka-band processing round.

The new licenses authorize downlink frequencies from 18.3 to 20.2 GHz, with the corresponding uplink frequencies from 28.35 to 30.0 GHz. Uplinks between 29.25–29.5GHz are to be shared on a co-primary basis with non-geostationary satellites, while 18.3–18.58 GHz downlink frequencies will have co-primary status with terrestrial fixed microwave systems.

(Information from www.fcc.gov)

SBE Listserver Info

Chapter 24 members are invited to join the chapter listserver. To subscribe, send an e-mail message to the following address: majordomo@broadcast.net

In the body of e-mail message type: subscribe msnbe. (The subject line can be left blank.) Instructions and a confirmation message will be sent to you. To post to the list, address you e-mail to: msnbe@broadcast.net

Also, join the Wisconsin SBE Chapters listserver. To subscribe, send e-mail to: majordomo@broadcast.net
Body of e-mail message: subscribe sbe-wi To post to the list, send e-mail to: sbe-wi@broadcast.net

The SBE National also has a listserver: To subscribe, send e-mail to: majordomo@broadcast.net
Body of e-mail message: subscribe sbe. To post to the list, send e-mail to: sbe@broadcast.net

There are also various other listservs of technical interest, such as the following discussion groups:

Digital Television (dtv), Electronic News Gathering (eng), Low Power FM (lpfm), Broadcast Radio Technical (radio-tech), SBE EAS (sbe-eas), Broadcast Television Technical (tv-tech), as well as others.

For more information on the operation of the listserver, send a e-mail message to majordomo@broadcast.net In the body of the message, type: help. The system will automatically reply with additional information.



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SBE Short Circuits – August 2001

*By John L. Poray, CAE
SBE Executive Director*

**ATSC EXECUTIVE DIRECTOR TO
KEYNOTE NATIONAL AWARDS
DINNER**

Mark Richer, Executive Director of the Advanced Television Systems Committee (ATSC) will be the keynote speaker at this year's SBE National Awards Dinner. ATSC is an international non-profit membership organization developing voluntary standards for the entire spectrum of advanced television systems. Specifically, ATSC is working to coordinate television standards among different communications media focusing on digital television, interactive systems and broadband multimedia communications. We are pleased to have Mark with us.

The National Awards Dinner is the final event during the SBE National Meeting, to be held at the Turning Stone Casino Resort in Verona, NY, September 12-13. The National Meeting is being held this year in conjunction with the Central New York SBE Regional Convention, sponsored by SBE Chapter 22. Turning Stone is approximately 30 miles east of Syracuse on I-90 and features 285 luxury hotel rooms, seven restaurants, 800-seat showroom, retail shopping, full service salon and health spa and Las Vegas style gaming. Golf and a RV Park also make up the complex.

The National Awards Dinner will feature the presentation of the SBE Broadcast Engineer of the Year, Educator of the Year and other individual and chapter awards. The introduction of newly elected SBE Fellows will cap the evening. We are pleased to announce that Leitch Inc. will once again serve as sponsor of the SBE

National Awards Dinner.

The Annual SBE Membership Meeting is another event held during the National Meeting. The induction of new national officers and directors will be held during the Annual Membership Meeting. SBE Fellows will enjoy the Fifth Annual Fellows Breakfast, sponsored by the Scala Division of Kathrein, Inc. The Regional Convention will include a full day of technical papers and the largest regional equipment exhibition in the northeast with over 100 exhibitors expected. A special EAS seminar (free) will also be held. Chapter 22 and TRON-Tek, Inc. will sponsor a reception following the exhibits and prior to the National Awards Dinner.

Registration for the Regional Convention is free and can be done online at the chapter web site, www.sbe22.org. Tickets to the SBE National Awards Dinner are available for \$10 each through the SBE National Office. Call (317) 846-9000 or e-mail lgodby@sbe.org to reserve your ticket. For more information, visit the SBE web site at www.sbe.org.

**REPPE WINS MEMBERSHIP DRIVE
GRANDPRIZE**

Robert Reppe of New Windsor, MD won the Grand Prize trip to the SBE National Meeting at the Turning Stone Casino Resort in Verona, NY in this year's SBE Membership Drive. Bob is a member of Chapter 46 in Baltimore. He recruited Paul Eicholtz. A complete list of prize winners and donors will be published in the September issue of the SBE SIGNAL.

**LISTINGS AVAILABLE TO
CONTRACT ENGINEERS**

Members of SBE who offer their services on contract or as a consultant can advertise their availability with a low-cost listing in the special Contract Engineers section of the Annual SBE Membership Directory and Buyer's Guide. However, the deadline of August 31 is fast approaching. Call or e-mail Angel Bates at the SBE National Office to include your listing. Phone: (317) 846-9000. E-mail: abates@sbe.org. Listings are also available on the SBE web site.

CERTIFICATION EXAM SESSION DATES ANNOUNCED FOR 2002

The SBE National Certification Committee has announced exam session dates for 2002. Check the list below for the exam period that is best for you. There is still an opportunity to take a certification exam this year. For more information about SBE Certification, see your Chapter Certification Chair or contact Linda Godby, Certification Director at the SBE National Office at (317) 846-9000 or lgodby@sbe.org.

<u>2001 Exam Dates</u>	<u>Location Application</u>	<u>Deadline</u>
August 17-27	Local Chapters	CLOSED
November 9-19	Local Chapters	September 28, 2001
February 9-19, 2002	Local Chapters	December 28, 2001
April 24, 2002	NAB Convention	March 12, 2002
June 8-18	Local Chapters	April 27, 2002
August 17-27, 2002	Local Chapters	June 16, 2002
November 9-19, 2002	Local Chapters	September 29, 2002



**Visit Chapter 24
on the World Wide Web**
<http://www.sbe24.org>

Steve Paugh is the editor for the HTML Version of this Newsletter, available monthly on the SBE Chapter 24 web page.

SBE CHAPTER OF THE AIR:

HamNet meets the second Sunday of each month at 0000 GMT on 14.205 MHz. Hal Hostetler WA7BGX is the Control Station.

SBE Short Circuits (continued)

EDUCATIONAL OPPORTUNITIES FOR BROADCAST ENGINEERS

There are numerous educational opportunities available to broadcast engineers in the coming months. Seven SBE Regional Conventions are scheduled from mid-August through the end of October along with four SBE Tutorials and an Ennes Workshop. In addition, ATSC and the Broadcast Technology Society of IEEE are also presenting seminars this fall.

SBE Regional Conventions

- August 15-17, Texas Association of Broadcasters/SBE Southwest Regional, San Antonio, TX
- September 12-13 Central New York Regional Convention & SBE National Meeting, Verona, NY
- September 19-20 Kentucky Broadcasters Assn./SBE Chapter 35 Regional Convention, Louisville, KY
- October 9 Broadcasters Clinic & Upper Midwest SBE Regional Convention, Madison, WI
- October 17-19 Chapter 9/Arizona Broadcasters Assn. Annual Convention, Phoenix, AZ
- October 24-25 Electronic Media Expo, Seattle, WA
- October 31 Chapter 20 Regional Convention, Pittsburgh, PA

Upcoming SBE Tutorials

- August 17 San Antonio, TX - Putting the Pieces Together
- September 19 Louisville, KY - Putting the Pieces Together
- September 21 Omaha, NE - Putting the Pieces Together
- October 2 Indianapolis, IN - FCC Boot Camp

Ennes Workshop

- October 12 Travecca Nazarene University, Nashville, TN

Other Industry Sponsored Programs

- October 3-5 BTS-IEEE Symposium, Alexandria, VA
www.ieee.org/organizations/bt
- October 23-24 ATSC Standards Seminar, St. Louis, MO
www.atsc.org

SBE RESUME SERVICE

Want to get your resume out to employers? Participate in SBE's new Resume Service, available to SBE members only, free of charge.

Call the SBE National Office at (317) 846-9000 or e-mail Scott Jones at kjones@sbe.org for a Resume Service participation form.



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THANKS TO ALL OUR SUSTAINING MEMBERS:

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- WMTV-TV 15



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FIRST CLASS MAIL

Newsletter edited on Pagemaker 5.0 by: Mike Norton Contributors this month: Vicki W. Kipp, Mike Norton, and Tom Weeden. Thanks to Leonard Charles for his work on the Chapter 24 WWW page.

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AUGUST MEETING and PROGRAM



**Society of Broadcast Engineers
CHAPTER 24 MADISON, WISCONSIN
Tuesday, August 28, 2001**

Madison Candelabra Digital Conversion

If you've happened to look up at the Candelabra tower on the West side of Madison in the last few months, you know that many changes have been happening. Join us as Chapter 24 member Leonard Charles takes us on a photo tour of the recent Candelabra construction project.

The chapter will provide pizza and soda, so we hope to see you there.

Pizza at 5:30 PM

**at WISC-TV
7025 Raymond Road**

**Meeting and Program
at 7:00 PM**

Visitors and guests are welcome at all of our SBE meetings!

2001 UPCOMING MEETING/PROGRAM DATES:

Day	Date	Program
Wednesday	September 19	Midwest Family Studio Tour
Wednesday	October 10	Broadcasters Clinic
Tuesday	November 20	IBOC Digital Radio

Program Committee: Denise Maney 277-8001 Steve Paugh 277-5139 Fred Sperry 264-9806 Steve Zimmerman 274-1234