



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

Society of Broadcast Engineers

March 2002

The 2002 Consumer Electronics Show: A Broadcast Perspective – Part 2

By Fred Sperry

Last month we took a look at some observations from the January Consumer Electronics Show (CES) in Las Vegas as they related to television and video. This month we will explore the area of radio and receive antennas.

SATELLITERADIO

By far the most visible technology at CES was satellite radio. The two satellite radio players, XM and Sirius, made a point of making their presence known. XM had two large displays outside the convention center and Sirius had displays scattered throughout the lobby. Both XM and Sirius had impressive exhibits along with celebrity guests lined up through the week (See Figure 1). Both also broadcast live from the show (although Sirius was only available on the Internet at the time of the show).

Both Sirius and XM have exclusive agreements with different mobile radio manufacturers, and both displayed new offerings in this area. Although most of what was being shown were receive units that will allow satellite radio reception with your current car radio, there are numerous mobile radios becoming available with built-in satellite radio tuners. Even though the target market for satellite radio is in the mobile environment, radios are or will be available for in-home use. For XM, Sony has a plug and play model available that can be moved between the car and home stereo. Once the Sirius service is launched, Kenwood is planning to introduce a home-based system for their service.

XM was touting the fact that at the time of CES they had 30,000 subscribers since they launched service on November 12th of 2001. They pointed out that this makes satellite radio one of the fastest-selling consumer electronics

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Next Meeting:

**Wednesday,
March 20, 2002**

**Broadcast
Engineering and the
Web**

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

**at Nitty Gritty
223 N. Frances Street**

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

**at WHA-TV/Vilas Hall
821 University Ave.**

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EAS RULES AMENDED

By Leonard Charles

The FCC has released the long awaited Report and Order to amend Part 11 EAS rules. With this release comes the following changes in the way broadcasters and cable operators will comply with EAS rules:

1) add new state and local event codes, including a Child Abduction Event Code, and new location codes;

2) permit broadcast stations and cable systems to program their EAS equipment to selectively display and log state and local EAS messages—EAS equipment must continue to

display and log all national EAS messages and all required weekly and monthly tests;

3) increase the time for retransmitting Required Monthly Tests ("RMTs") from 15 to 60 minutes after receipt of the RMT message;

4) revise the modulation level of EAS codes to the maximum possible level but in no case less than 50% of full channel modulation limits;

5) permit broadcast stations to air the audio of a presidential EAS message from a higher quality, non-EAS source;

6) eliminate references to the now-

defunct Emergency Action Notification ("EAN") network;

7) eliminate the requirements that international High Frequency ("HF") broadcast stations purchase and install EAS equipment and cease broadcasting immediately upon receipt of a national-level EAS message;

8) exempt satellite/repeater broadcast stations which rebroadcast 100% of the programming of their hub station from the requirement to install EAS equipment;

9) authorize cable systems serving fewer than 5,000 subscribers to meet

(continued on page 10)

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February Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Tuesday, February 19, 2002 at Sonic Foundry in Madison, Wisconsin for the chapter's monthly meeting. There were 21 members in attendance, 14 of whom were certified, and one guest.

The meeting was called to order at 7:01 PM by chairman Tom Smith. The January meeting minutes as published in the newsletter were approved. Treasurer Stan Scharch reported that the chapter's bank balance was in the black.

Denise Maney from the Program Committee reported that Tom Smith would be giving the March program, and that future programs would be listed in the newsletter. Membership chair Paul Stoffel was absent.

Vicki Kipp reported for Sustaining Membership chair Fred Sperry that there were five renewals: Panasonic, Scharch Electronics, Harris, Fujinon, and WMTV. Special Events Coordinator Lonnie Cooks reported that he is very close to having a special event.

Certification chair Jim Hermanson reported Leonard Charles was recertified, possibly with a record number of certification credits. Also, one certification exam was recently given. The next local exam session is scheduled for June, with a registration deadline at the end of April. Jim has received new membership and certification booklets, and also has order forms for SBE materials. Anyone interested should see him. 2001 national statistics include 836 new certifications and 302 recertifications.

National Liaison Leonard Charles reported that the September 11th Broadcast Engineers Relief Fund was at \$247,000. Each family affected has received \$41,000, and the fund is still open. Reports from last month's strategic planning session will be out soon and published on the sbe.org web site. The SBE/NAB Engineering Conference will be held April 6-11 at the NAB convention in Las Vegas. Chuck has a schedule of SBE events at the convention. The 2002 leadership seminars will be held June 5-7 and August 7-9. The annual membership drive is underway, and the grand prize will be a trip to the fall meeting in Phoenix.

The chapter's DTV web project is underway, headed by Steve Paugh. Jay Mielke will design the web pages. A subcommittee meeting will be held at WISC-TV on Wednesday, February 27th at 7:00 PM.

Frequency Coordinator Tom Smith reported no new requests. Greg Dahl of WIBA sent Tom maps of all known STL paths in Madison.

Newsletter editor Mike Norton announced the deadline for articles for the March issue will be due at midnight, Friday, March 8th. The folding party will be held Wednesday, March 13th at WKOW-TV.

(continued on next page)

Meeting Minutes (continued)

In old business, Tom Smith reported that Tom Viste of Chapter 112 e-mailed him, informing him of their chapter's resolution to distribute the WBA DTV brochure, and their desire to link to our future DTV web site. Tom also mentioned a February 7th article in the New York Times about the NAB/CEA joint promotion of DTV, and their web site digitaltvzone.com.

In new business, Tom Smith reported a request from Iowa Public Television asking for promotion of their DTV symposium this November. Stan Scharch reported that the sbe24.org web site will be unavailable for a time February 20th for internet re-addressing. Cliff Groth reported that Terry Baun of the Milwaukee chapter is now in Indianapolis. With the loss of printing from the Journal Corporation, Chapter 28's newsletter will now send future newsletters by e-mail rather than printing them. Jim Hermanson reported that the new UW-Madison student-run FM station, WSUM, is scheduled to sign on February 22nd on 91.7 MHz.

The meeting adjourned at 7:31 PM.

Denise Maney introduced the program presented by Michael Bryant, Director of Training and Consulting Services at Sonic Foundry.

Submitted by Tom Weeden, Secretary

SBE Short Circuits—March 2002

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

SUN TO SHINE ON SBE MEMBERSHIP DRIVE

The SBE Membership Committee has rolled out the 2002 Membership Drive with increased incentives for each member participating. The Drive began on March 1 and continues through May 31. The Grand Prize will be a trip for one to the SBE National Meeting in sunny Phoenix this fall AND a Panasonic TV, compliments of SBE and Panasonic! 1st prize is an entertainment package that

AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

- Wisconsin Section Manager Don Michalski, W9IXG, is calling on amateurs in his section to urge Governor Scott McCallum to sign AB368, the Amateur Radio FCC PRB-1 Amateur Radio Antenna Protection Act. Michalski said McCallum's recent comments on emergency preparedness and public safety offer an opportunity to remind the governor that amateurs "are in concert with the governor's efforts to back our emergency services, and that we amateurs provide a valuable, free service" in supporting emergency response efforts. Once the measure reaches the governor's desk, he'll have until the end of April to sign the legislation.

- The FCC has redesigned its Amateur Radio Service Web site and changed the URL to <http://wireless.fcc.gov/services/amateur/>. The new layout makes it easier to find information on topics most requested by amateurs, including licensing, amateur exams, filing an application, changing an address or using the Universal Licensing System (ULS). The refurbished site also provides links to recent amateur radio-related news from the FCC. "The new design is a part of the Wireless Telecommunications Bureau's continuing effort to meet the needs of the Amateur Radio Service operators as identified in focus groups, letters, phone calls, and e-mails," the FCC said in a news release. The site, launched on February 20, includes a search engine for the entire FCC Web site <http://www.fcc.gov>.

- The Wireless Ethernet Compatibility Alliance—WECA, an industry coalition—has petitioned the FCC for additional 5-GHz spectrum to make more room for radio local area network (RLAN) systems and other unlicensed Part 15 devices. The FCC put the WECA petition on public notice in late January, not long after it was filed. WECA seeks to extend the available spectrum to include 5.470 to 5.725 GHz. The Amateur Service now shares 5.650 to 5.925 GHz on a secondary basis with government and non-government radars and non-government fixed satellite uplinks. In 1997, the FCC allocated 5.150 to 5.350 GHz and 5.725 to 5.825 GHz for so-called Unlicensed National Information Infrastructure (U-NII) wireless local area network devices.

(Excerpts from "The ARRL Letter" and the www.arrl.org web site)

consists of an RCA 27" Stereo Monitor-Receiver TV, compliments of Thomson Multimedia Broadcast & Network Solutions, a DVD Player, compliments of Acrodyne and a Freeplay, Freepower Radio, compliments of Broadcast Richardson. Other great prizes will be awarded and all recruiters will receive

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2002 Consumer Electronics Show (continued from page 1)



Figure 1. Left: The XM Satellite Radio indoor exhibit on the floor of CES. Right: XM broadcasting live on one of their 100 channels. The celebrity guest (the one with his hand raised) is Jon Anderson of the rock group "Yes."

products in history. Sirius launched service in Denver, Houston, Jackson and Phoenix back in February. Nationwide start-up is planned for August 1st of this year. This next year will be an interesting and telling one for the future of satellite radio. There has been talk that there may not be a large enough market for two satellite radio providers and rumors have circulated that Sirius could be bought out, possibly by XM. However, there were no signs of this at the show and Sirius appears ready to head out on their own.

IBOCDIGITALRADIO

Just across from the XM Satellite Radio exhibit was another form of digital radio. iBiquity had an exhibit promoting their in-band on-channel (IBOC) digital radio technology. This technology allows an IBOC equipped radio station to broadcast a high-quality digital audio signal on the same frequency as their current analog broadcasts. For those receiving the digital signal on an IBOC receiver, FM audio is said to have "CD-like quality" and AM audio is comparable to current analog FM. Reception problems with current analog transmissions (such as multi-path on FM and noise on AM) are said to no longer be an issue with digital broadcasting. Current analog AM/FM

service won't be affected by the IBOC digital service, so existing radios will not become obsolete until stations have converted over to all digital at a future date.

I had an opportunity to listen to audio through both an AM and FM IBOC system. Despite the less than ideal listening environment at the show, I could hear some sonic improvements between the analog and digital FM signal, but the real notable improvement is on the AM side. I'm not sure it sounded as good as current analog FM as has been said (again the listening environment was less than ideal), but it was certainly impressive with a much improved frequency response.

It appeared to me that the area of most interest to visitors to the iBiquity exhibit was the data services that will be possible with IBOC technology (see Figure 2). This tells me that the consumer industry sees this as one of the hot selling points of this technology. With advertising as one of the possible data services, broadcasters could find revenue potential with this service.

According to Scott Stull, Director of Broadcast Business Development for iBiquity, they plan to show broadcast



Figure 2. iBiquity Digital's IBOC technology will allow for new wireless data services to be delivered from AM and FM radio stations, such as station information, artist and song identification, scrolling of traffic, weather, news and sports scores, and much more. Photo and caption courtesy of iBiquity web site (ibiquity.com).

equipment at NAB this year. Following NAB, iBiquity plans to go on the air in 11 test markets, including Chicago. Receivers should be ready to show next year at CES.

RECEIVEANTENNAS

Antenna manufacturer Terk had an exhibit at CES displaying their line of innovative antennas. In addition to their array of indoor AM, FM and TV antennas, Terk has introduced two TV antennas said to be engineered for reception of HDTV broadcasts by using an impedance-matched amplifier calibrated for the requirements of DTV. The TV55 antenna has a design that allows it to be located virtually anywhere (Figure 3). It can be located indoors (on a windowsill for example) or can be mounted outdoors under the eaves of a roof, or as a rooftop antenna. It (continued on next page)



Figure 3. The Terk TV55 Antenna. (Photo courtesy of Terk and Caster Communications).

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2002 Consumer Electronics Show (conclusion)

addresses the need for those living in apartments or condominiums that want or need more than a set of rabbit ears for off-air reception. The HDTV60 antenna is a compact antenna meant for rooftop mounting. As you can see from Figure 4, this antenna is nothing like the traditional yagi antenna we're all used to.

Jensen introduced a new indoor

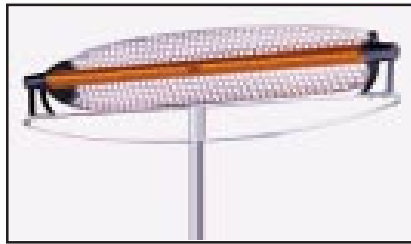


Figure 4. The Terk HDTV60 Antenna (Photo courtesy of Terk and Caster Communications).

set-top antenna (the TV940) with an interesting concept. This antenna is motorized and comes with a remote control. This allows you to adjust the antenna from your sofa. Besides the convenience factor, it avoids the problems of adjusting a set of rabbit ears for a good receive signal only to have the signal degrade as soon as you take your hands off the antenna elements. In addition, once you find the optimum position for the antenna for a given channel, you can save the setting in the remote control so you don't have to adjust the antenna each time you tune to that station.

CONCLUSION

I have to admit that prior to attending CES, as a broadcaster I had some reservations about how much I would get out of this show. However, I did find

it beneficial to observe the "consumer end" of our industry by seeing what is currently being offered to consumers, and noting future trends. Attending this show also made me realize that it is important for those of us in the broadcast industry to be aware of the state of over-the-air broadcasting within the consumer electronics industry.

As an example observations at this year's show, there didn't appear to be much talk about receiving HD content over-the-air from broadcast stations. Instead it seemed most of the focus was on watching HD over DBS, cable, or HD DVDs when they become available. As the broadcast industry experiences even greater competition from satellite and cable providers, it is going to become necessary for the broadcast industry to watch these trends.

OWNERSHIP LIMITS FALL

By Tom Smith

A court of appeals has voided two FCC rules concerning ownership limits of TV stations and cable systems. They completely overturned the TV-cable cross ownership rule. This rule forbid the ownership of both a TV station and a cable system in the same market. With this ruling, it is now allowable to own both in the same market. Some are already looking for more media mergers, with the possibility of cable giant AOL-Time Warner buying stations affiliated with its WB Network. AOL-Time Warner already owns cable systems in most of the major markets, but has been unable to purchase stations in those markets to anchor its broadcast network.

The court also ruled that the 35% ownership cap for TV stations was arbitrary and required the FCC to justify the limit. The ownership cap says that the number of homes in all the markets where a group owns TV stations cannot exceed 35% of the total homes in the nation. The FCC is expected to allow broadcast groups to increase the percentage of homes reached.

From The Washington Post, The New York Times, USA Today, and Broadcasting And Cable.

SBE Short Circuits (continued from page 3)

\$5 off their 2002 SBE membership renewal for each new member they recruit, up to \$25. Full details on the Membership Drive were mailed to each SBE member in February.

5TH EDITION OF TV OPERATORS HANDBOOK, CERTIFICATION PRACTICE TESTS NOW AVAILABLE

The new 5th edition of the SBE TV Operator Handbook, by Frederick Baumgartner and Douglas Garlinger is now available from the SBE National Office. Also, updated SBE Practice Test computer discs, used to prepare for the SBE Certification Exams are now available. To order either item, call the SBE National Office at (317) 846-9000 or e-mail Linda Godby at lgodby@sbe.org.

SBE NATIONAL AWARDS NOMINATIONS OPEN

The SBE Awards Committee is now accepting nominations for the 2001 SBE National Awards. The SBE National Awards recognize achievement by both individual members and chapters. You may request a form from Angel Bates at the SBE National Office by calling (317) 846-9000 or by e-mail at abates@sbe.org. Winners will receive their awards at the SBE National Meeting in Phoenix this October.



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!

SALT LAKE 2002: FROM OUTSIDE THE OUTSIDE FENCE

By Neal McLain,

Our esteemed editor, Mike Norton, has asked me to write a story about media facilities at the 2002 Olympic Games held here in Utah. Since I don't have any official connection with the Olympics or with any media organization, I don't have any insider information to report. But I did attend a brief tour of the media facilities with our local SBE Chapter, and I had a few encounters with the security guys. So here's a report from outside the outside fence.

Chapter 62 normally holds its meetings at noon on the first Friday of each month, at the Wyndham Hotel in downtown Salt Lake City. The January meeting included a tour of the Olympics Main Media Center (MMC), located in the Salt Palace Convention Center, which the Salt Lake Organizing Committee had taken over for administrative offices, security operations, and media facilities. According to the meeting announcement, we were to meet at the hotel for lunch, then walk to the Convention Center for a 45-minute tour.

For security reasons, we were told that we had to enter the Convention Center at the south entrance. Even though the Wyndham Hotel and the Convention Center are both in the same city block, this was still quite a hike: about half a mile (Figure 1).

So off we went, about 75 of us – far more people than normally attend Chapter 62 meetings. As we passed Abravanel Hall (home of the Utah Symphony), I noticed a big construction platform in the courtyard. More about this later.

We soon discovered that the entire Convention Center was surrounded by two chain-link fences (Figures 2-4).

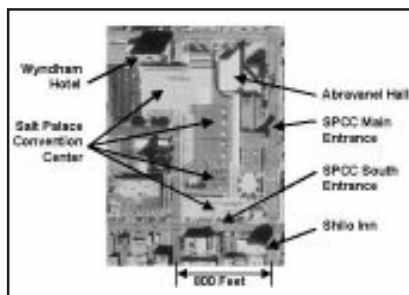


Figure 1. Salt Palace Convention Center and environs. Aerial photograph courtesy of United States Geological Survey.

Once we got inside the building, we had to sign in with security guards, leave our drivers' licenses, and get visitor badges. By the time we all got through security, half of the allotted 45 minutes was already gone, so it was a very quick tour.

The MMC includes offices for official-sponsor media personnel, a television production facility, and a big bullpen area for non-official-sponsor media personnel. Everything was still under construction, but it was interesting nevertheless.

The official-sponsor offices looked like plain old generic office space: beige drywall walls and hollow-core doors. Except that there were no ceilings: just free-standing walls with an open view to the roof of the convention center, maybe 50 feet overhead.

The television production facilities were still under construction, so we had to peek through a window. We were told that it would be the largest television production facility in the world, larger than No. 1 (NBC New York) and No. 2 (CNN Atlanta) combined. But all I could see was a bunch of guys pulling cables through racks.

(continued on next page)



Figure 2. Security fences surrounding the Salt Palace Convention Center, photographed from the 12th floor of the Shilo Inn. The inside fence is located on the sidewalk; the outside fence runs down the center of the street.



Figure 3. The outside fence in front of the main entrance to the Salt Palace Convention Center. During the Olympics, this entrance was blocked, forcing all personnel to use the south entrance.




Figure 4. The south entrance of the Salt Palace Convention Center. The tents in the foreground house security and first-aid facilities.

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SALT LAKE 2002 (continued)

The non-sponsor bullpen turned out to be the most interesting thing we saw. There were a couple hundred workstations arranged around huge TV screens. Each workstation was fitted with a Gateway PC, a telephone, and an internet connection. We were told that reporters could use the PCs to access all sorts of information about athletes, athletes' home countries, Olympic venues, Olympics history, Utah, Salt Lake City, the LDS Church,



Figure 5. Security personnel at University of Utah Stadium. Most security personnel were local police, but National Guard guys in camo were also in evidence at all venues.



Figure 6. University of Utah Stadium, from outside the outside fence.

even local restaurants. At the time of our visit, most of the PCs were still in boxes, but even that was an impressive sight: an entire wall of black-and-white Holstein spots.

Unfortunately, no cameras were permitted inside the building, so the only photos I could take were outside.

I tried to visit the Convention Center after the Olympics were officially under way, but I couldn't get near it. The entire place was surrounded by police arrayed along the outside fence.

I also tried to check out the University of Utah Stadium, where the opening and closing ceremonies took place. Again, I had to stay outside the outside fence because of all the security guys (Figure 5). But I did manage to get a picture (Figure 6).

After the Olympics ended, security measures seemed to evaporate. The day after the closing ceremony, I drove by the Ogden Ice Sheet (the curling venue)



Figure 7. Ogden Ice Sheet, the day after the closing ceremonies.

to see what was going on. Construction trucks were everywhere, taking down signs, dismantling fences, hauling concrete barriers. There were several police cars around, but they didn't seem to care about what I was doing. While I was parked illegally to take a picture (Figure 7) two cops drove by. They gave me a blank look and kept on driving.

And finally, a cultural note: once that big construction platform was cleared away from the Abravanel Hall courtyard, a gigantic glass sculpture appeared (Figure 8). It should look familiar to Chapter 24 members: the artist was Dale Chihuly, the same artist who created the glass installation at the Kohl Center.

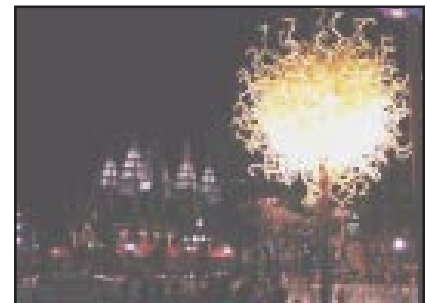


Figure 8. Dale Chihuly glass installation in Abravanel Hall courtyard, looking northeast toward Temple Square. The illuminated towers of the LDS Temple are visible at the left. (Photograph courtesy of Stephen Gabelnick.)

NEXT STOP FOR NEXTWAVE IS SUPREME COURT

By Tom Smith

The Supreme Court will hear an appeal by the Bush Administration to overturn a lower Appeal Court ruling concerning the licenses held by NextWave.

The FCC tried to reclaim licenses held by NextWave that they received in

an auction, but later defaulted on the payments. The FCC claimed that they had the right to reclaim the licenses because of the default, and then proceeded to reacquire them. In the first auction, NextWave had bid \$4.7 billion and in the second auction the licenses went for nearly \$17 billion.

A bankruptcy court ruled the FCC

could not reclaim the licenses from NextWave, and that they were protected under bankruptcy law.

The ruling was affirmed in appeal. The Department of Justice tried to work out a deal, but Congress failed to act.

From Broadband Week and past SBE Chapter 24 Newsletter Articles

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WSUM-FM SIGNS ON TRANSMITTER

By Vicki W. Kipp

There is something liberating about college radio. It provides the opportunity to develop disc jockey skills, while working from an eclectic playlist that would never be heard on commercial radio. Perhaps this is what inspired the supporters of WSUM to campaign for years to accomplish their dream of being a licensed FM broadcast station.

For more than four decades, the University of Wisconsin-Madison weathered multiple attempts at establishing a student radio station. The student radio station initially broadcast just to dormitories in two areas of campus, then illegally with low-power FM, and in recent years was limited to streaming audio on the Internet. At last, the UW-Madison student radio station, WSUM, is now broadcasting on the FCC-assigned FM frequency of 91.7 MHz with a coverage pattern focused on Madison. Accomplishing this goal required WSUM to obtain a license from the FCC, and then install a studio-to-transmitter link (STL), transmitter, tower, and antenna.

After securing approval from the UW-Madison and the UW-System, as well as funding from the student government, and a license from the FCC, WSUM's biggest obstacle was getting zoning board approval of the proposed tower site. The station had picked a location southwest of Madison in the rural town of Montrose. Town residents fought the tower because they feared it would lower their property values. After a three year legal battle, approval for WSUM's tower zoning application was upheld by a court decision, and construction could begin.

Considering the massive local resistance against locating the tower (Figure 1) in Montrose, it might seem intriguing that WSUM didn't choose another location. Relocating the tower was not an option because Montrose was the only place that WSUM's transmit antenna could be located to broadcast to Madison without causing interference to existing radio stations.



Figure 1. WSUM transmitter building and tower during station construction.

The technical process of taking a radio station from an Internet-only presence to a licensed broadcast station was accomplished through the efforts of many. Evans Consulting designed the WSUM transmission system. ComTrac, Inc constructed the tower. The Educational Communications Board coordinated and performed the equipment installation process. WSUM General Manager David Black led the mission of getting WSUM on the air, and prepared the WSUM student staff for that result.

STL

The WSUM studio is located in downtown Madison within "The Towers" apartment building at 602 State Street. The station needed a path to get program audio to the transmitter site, and considered installing a T-1 link between the studio and the transmitter as their main or backup STL. They decided against T-1 because of the cost of renting a circuit, and instead chose a microwave system.

The Harris CD Link Digital STL transmits WSUM's signal as uncompressed AES3 audio in a 300 kHz wide channel at 945.50 MHz at maximum power of 2 Watts. Keeping the signal digital throughout STL processing prevents compression artifacts and reduces the occurrence of distortion. A high-gain half-parabolic screen transmit antenna (Figure 2) targets a grid-type parabolic receiving



Figure 2. STL transmit antenna.

dish antenna at the Montrose end of the 14-mile STL path.

Initial plans called for locating the STL control module with the elevator switch gear in the Towers building elevator shaft, but the module would have been vulnerable to wide temperature variation and dust. The STL control module was installed in the WSUM studio so that it could be in a temperature and air-quality controlled environment. One of the problems presented by the change in location was running the heliax transmission line through the 8-stories of concrete between the studio and the rooftop STL antenna. Contractors had to core drill through the concrete, adding to the cost and timeline of the project.

TRANSMITTER

WSUM's Harris 'Platinum Z' transmitter is known for its clean and simple internal layout. The Harris Z5CD transmitter (Figure 3) owes its compactness to having all solid-state components. The air-cooled 5,600-watt transmitter runs on single-phase power. Power quality control is facilitated by a single-phase transient voltage suppression filter system in the transmitter.

Instead of tubes, the Z5CD transmitter has redundant hot-pluggable RF amplifier modules. WSUM's transmitter contains one exciter, with an option to add a second

(continued on next page)

WSUM-FM SIGNS ON TRANSMITTER (continued)

exciter for redundancy. The transmitter contains two Intermediate Power Amplifiers (IPA) modules. If the first amplifier should fail, the dual-PA module will switch to the reserve IPA amplifier without human intervention. The transmitter power will drop, but it will not go off the air. The transmitter has a protection circuit to reduce output power or shut down the transmitter if VSWR readings become too high.

The uncompressed AES3 signal is fed from the STL output directly to the AES3 input of the Digit CD ("Clearly Digital") exciter. The exciter generates a fully modulated RF carrier. The exciter uses a digital signal processor (DSP) as a stereo generator and composite limiter, and a 32-bit numerically controlled oscillator (NCO) as a digital modulator. The composite limiter uses proprietary "lookahead" circuitry to prevent overmodulation peaks before they occur.

TOWER

Built in a farm field in Montrose, WSUM's 403-foot tall and four-foot wide guy wire-supported steel lattice tower



Figure 3. WSUM transmitter. From top to bottom: metering, exciter, IPA module, and power supply.



Figure 4. Guy anchor for WSUM tower. (Figure 4) was manufactured by PiRod, Inc. Designed to withstand a 90-mph wind load, the tower meets the standards of the latest revision of the ANSITIA/EIARS-222-F code. The tower has the capacity to hold many cellular and PCS antennas, in addition to WSUM's antenna.

Tower lighting is accomplished with red obstruction lamps and a top mounted beacon. The tower is painted with alternate bands of aviation orange and white to meet FAA requirements.

ANTENNA

The FM signal travels up the tower to the antenna in air dielectric transmission line. The panel-type directional Jampro JAHD Arrowhead antenna is side-mounted on the tower. The circularly polarized transmit antenna (Figure 5) is capable of a bandwidth of +/- 100 KHz at 91.7 MHz. The antenna does not have beam tilt or null fill.

WSUM's city of license is Madison, Wisconsin, and the coverage pattern focuses on downtown Madison. The highly directional WSUM transmit antenna doesn't cause interference to other area radio stations. A parasitic



Figure 5. Jampro FM transmit antenna.

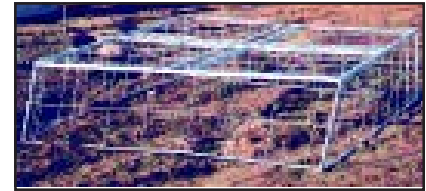


Figure 6. Transmit Antenna Reflector. metal reflector (Figure 6) installed directly behind the driven element enhances the directivity of WSUM's transmit antenna. The reflector prevents radiation to the south and limits radiation to the east and west. The antenna creates a single lobe pattern that spans 80-degrees to the north. The coverage pattern is very tight at the antenna and broadens as it moves away from the tower.

MONITORING

A Burk GSC-3000 transmitter remote control unit allows remote access to transmitter logging and control. Staff can contact the transmitter via touch-tone phone access for voice response, or modem for a data display. The Educational Communications Board Southern Field technical team will provide transmitter maintenance.

The students at WSUM can accurately monitor the off-air signal using a combination of the Belar digital frequency monitor, modulation monitor (designed for 91.7 MHz), stereo modulation monitor FM, and frequency agile FM RF amplifier.

CHALLENGES

No large project is completed without running into a few difficulties; WSUM was no exception. The antenna reflector arrived bent and broken as a result of shipping damage, and was sent back for repair. The STL transmitter had to be returned because its voltage controlled oscillator was inoperative. The box that the STL had been shipped in had been thrown out so duplicate packaging was requested from the manufacturer.

Despite these challenges, WSUM began broadcasting right on schedule on at 2:22 PM on 2/22/2002.

EAS RULES AMENDED (continued from page 1)

the October 1, 2002 deadline by installing certified EAS decoders, to the extent that such decoders may become available, rather than both encoders and decoders;

10) provide that low power FM stations need not install EAS decoders until one year after any such decoders are certified by the Commission.

To help EAS participants manage the financial consequences of these changes, the FCC will not require an immediate upgrade of existing EAS equipment. Rather, broadcast stations and cable systems will be permitted to upgrade their existing EAS equipment to add the new event and location codes on a voluntary basis until the equipment is replaced. All existing and new models of EAS equipment manufactured after August 1, 2003 will be required to be capable of receiving and transmitting the new codes. After February 1, 2004, broadcast stations and cable systems may not replace their existing EAS equipment with used equipment or older models of equipment that has not been upgraded to incorporate the new codes. In addition the FCC will not require recertification by manufacturers following modification of equipment to accommodate the changes of this Report and Order.

THE PARTICULARS

In their petition to change the EAS rules, the National Weather Service asked that all event codes be changed so that the third letter would be limited to one of four letters: "W" for warnings, "A" for watches, "E" for emergencies, and "S" for statements. This would make it easier, and thus cheaper, for consumer receivers to decode and react to messages based only on that letter. The FCC concurred but did not think the benefit of this change to existing codes would outweigh the risk of lost and confusing messages during the transition. They did agree, however, to adopt this format for all future event codes.

There will be 21 new event codes intended to aid in the dissemination of local and regional emergencies:

AWWAvalanche Warning
 AVAAvalanche Watch
 CAEChild Abduction Emergency
 CDWCivil Danger Warning
 CFWCoastal Flood Warning
 CFACoastal Flood Watch
 DSWDust Storm Warning
 EQWEarthquake Warning
 FRWFire Warning
 HMWHazardous Materials Warning
 LEWLaw Enforcement Warning
 LAELocal Area Emergency
 NMNNetwork Message Notification
 TOE911 Telephone Outage Emergency
 NUWNuclear Power Plant Warning
 RHWRadiological Hazard Warning
 SPWShelter in Place Warning
 SMWSpecial Marine Warning
 TRWTropical Storm Warning
 TRATropical Storm Watch
 VOWVolcano Warning

In addition to the new event codes, the FCC added new marine location codes suggested by NWS:

57 Eastern North Pacific Ocean, and along U.S. West Coast from Canadian border to Mexican border;
 58 North Pacific Ocean near Alaska, and along Alaska coastline including the Bering Sea and the Gulf of Alaska;
 59 Central Pacific Ocean, including Hawaiian waters;
 61 South Central Pacific Ocean, including American Samoa waters;
 65 Western Pacific Ocean, including Mariana Island waters;
 73 Western North Atlantic Ocean, and along U.S. East Coast, from Canadian border south to Currituck Beach Light, N.C.;
 75 Western North Atlantic Ocean, and along U.S. East Coast, south of Currituck Beach Light, N.C., following the coastline into Gulf of Mexico to Bonita Beach, FL., including the Caribbean;
 77 Gulf of Mexico, and along the U.S. Gulf Coast from the Mexican border to Bonita Beach, FL.;
 91 Lake Superior;
 92 Lake Michigan;
 93 Lake Huron;
 94 Lake St. Clair;
 96 Lake Erie;
 97 Lake Ontario;
 98 St. Lawrence River above St. Regis;

Further, the wording of the County

subdivision code within the location code will be revised to drop the "central" from the North Central, West Central, East Central and South Central codes so that each of these codes simply states its root compass direction.

There were many requests by petitioners that did not make the cut. The FCC disagreed with and declined the following changes:

- 1) They will not add an entire country location code to the EAS rules;
- 2) They will not add a School Closing Statement event code;
- 3) They will not add a Dam Break Warning event code;
- 4) They will not add NWS administrative codes to remotely control their transmitters;
- 5) They will not add a SKYWARN code;
- 6) They will not add a corresponding watch code for every warning code added;
- 7) They will not add any cancellation codes;
- 8) They will not amend Part 11 to permit the use of customized location coding;
- 9) They will not revise the WXR originator code to NWS;
- 10) They will not adopt an EAS text transmission protocol nor the TXT event code;
- 11) They will not change the way co-owned, co-located key stations originate messages;
- 12) They will not change the Required Monthly Test to a Required Quarterly Test;
- 13) They will not make the two-tone Attention Signal optional;
- 14) They will not require the Evacuation Immediate (EVI) code to be immediately retransmitted;
- 15) They will not require cable systems to implement selective override of broadcast signals;
- 16) They will not get involved in the QDI patent issue;
- 17) They will not amend the rules governing the valid time period of an EAS message;
- 18) They will not apply the EAS protocol to other radio services (ie: amateur radio).

 **FCC Rulemakings**

Compiled by Tom Smith

Comments are due April 15, 2002 and replies are due on May 15, 2002.

PROPOSEDRULEMAKINGS

**MM Docket No. 95-31: FCC 02-44
Reexamination of the Comparative
Standards for Noncommercial
Educational Applicants:
Association of America's Public
Television Stations' Motion for Stay
of Low Power Television Auction
(No. 81)**

The FCC is seeking comments on how to handle applications from noncommercial educational stations that apply for frequencies on the non-reserved or commercial FM or TV bands and in the AM, low-power, and translator services that have no reserved bands. The FCC has a conflict pertaining to the use of auctions for stations that are mutually exclusive in these bands. Congress says that the FCC must settle the dispute by auctioning the frequency to the applicant that is highest bidder, but Congress has exempted noncommercial stations from having to go through auctions. This presents a problem for the FCC. Should noncommercial stations be only allowed to apply for reserved frequencies, only allowed to receive a license for a nonreserved frequency when there is no commercial applicant, or be allowed to use a more relaxed method for determining reservation criteria?

The translator, low-power TV and AM bands present a more difficult problem, as there is no reserved spectrum and currently all applicants can apply for the same frequencies. The FCC is asking if some frequencies in these services should be reserved, or if some other method can be used.

FINAL RULEMAKING

**FCC 02-40
Implementation of LPTV Digital
Data Services Pilot Project**

The FCC has started a pilot project to use LPTV stations for the transmission of data such as the Internet. These stations will operate under a waiver and not an experimental license. Twelve stations are specified to be included in the project, with Congress requiring that one of the stations and repeaters be located in Alaska. A number of stations that are eligible for the project are owned by Accelernet which currently operates a LPTV station in Houston that is providing one way data transmission.

The stations would operate with a digital signal that is 10% of its analog signal power, and may not exceed 15 KW ERP in digital in the UHF band and 300 W in the VHF band. Response stations cannot operate with more than 10 watts for a fixed station and 3 watts for a portable station. The stations are allowed to use repeaters for better coverage.

The rules became effective on February 14, 2002 and the notice was published in the FEDERAL REGISTER on March 4, 2002, pages 9617-9621.

From the FEDERAL REGISTER
(www.access.gpo.gov)

Thanks to Denise Maney for arranging the Sonic Foundry program for the February meeting.

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MEMBERS**

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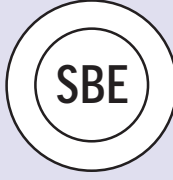
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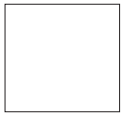
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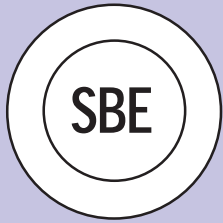


FIRST CLASS MAIL

Newsletter edited on Pagemaker 5.0 by: Mike Norton
 Contributors this month: Leonard Charles, Vicki W. Kipp, Neal McLain, Tom Smith, Fred Sperry, and Tom Weeden.
 Thanks to Leonard Charles 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 20, 2002

Broadcast Engineering and the Web

Join us this month to learn where to search the web for broadcast engineering information. Tom Smith will give a tour of the FCC and others web sites to answer your questions on the rules and station data.

Dutch Treat Dinner
at 5:30 PM

at Nitty Gritty Restaraunt and Bar
223 N. Frances Street

Meeting and Program
at 7:00 PM

at WHA-TV studios
821 University Avenue

By the corner of Park Street and University Avenue, take the stairs at the right of the garage doors; enter the building, take the stairs down to second floor, then follow the signs to Studio C.

Paid parking and meters are available at Granger Hall (across from Vilas Hall); metered parking by University Square and in Lot 46 ramp; paid parking in Lake Street ramp. Because there are no Kohl Center Events, there should be free parking at Lot 91 next to the Kohl Center and Lot 45 (after 6 PM) and Lot 51 on Charter Street.

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

2002 UPCOMING MEETING/PROGRAM DATES:

| Day | Date | Program |
|------------|-------------|--------------------------|
| Thursday | April 18 | Elections and NAB Review |
| Tuesday | May 21 | Lightning Protection |

Program Committee:

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277-5139

Fred Sperry
264-9806

Steve Zimmerman
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