Chapter 24, Inc.
Madison, Wisconsin

Society of Broadcast Engineers *April 2002*

THE SECRET LIFE OF TIMECODE

By Steve Paugh

The BIG MYTH regarding timecode is that it is a time-of-day clock. Timecode is not used for telling time, it is used for consecutively numbering frames of video. Unlike film, where you can hold a strip of film up to the light and count the frames, videotape, no matter how you hold it to the light, does not show any visible image.

Timecode was invented 1967 when most TV was black and white, and consisted of images that flashed on the screen 30 times a second. Actually, the flashing of images occurs 60 times a second; this is the "interlace" thing. An image flashing at a repetition rate of 30 will appear to the viewer to be "flickering" or pulsing. At a rate of 60 flashes per second, the human eye blends the images together into an apparently constant intensity. Some people claim that they can still see flickering at 60 images per second, and others proposed an even higher repetition rate (especially the computer types), but that is a topic for another time.

As an aside, movies are projected at 24 frames per second. Each frame is projected twice, giving 48 frames per second. That is why when you look up at the projection booth in a theater you can see the projector beam flickering in the darkened theater.

Back to the topic at hand. To more easily edit videotape we need a way to "number" the frames of video. All video tape machines record a signal on the tape called the control track. This is not done for our benefit, but is used by the innards of the tape machine to properly play back the tape. The control track is a pulse recorded on the tape, one pulse per video frame. Every control track pulse looks like every other control track pulse. The pulse caries no information, it is either there or not there.

It is possible to edit using only control track pulses. This is done by

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Next Meeting:

**Thursday,
April 18, 2002**

NAB Review

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

**at the Dry Bean
Saloon and
Smokehouse
5264 Verona Road**

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

In This Issue:

THE NHL IN HD

By Andy Rothschadl

In the past 3 years of operating several satellite trucks, the experiences have been plentiful. One extreme is getting Al Gore's ear wax on my ear piece while talking to Tom Brokow. Another is just hoping for a green light on a weigh station scale in Quebec, because I couldn't understand the other options. But on March 22nd, this was one of the more technically 'cool' jobs I was able to work on.

HD Net is on DirecTV's channel 199. It is available with a HD receiver while also looking at their secondary orbital location at 119 degrees west. It provides 16 hours a day of HD programming. Among the choices they offer is live programming that usually consists of sports with an occasional concert in the mix. They own two identical trucks with their own uplinks on the tractors that usually provide the live programming. Unfortunately for them, during the week of March 17th, they mangled their dish on unit HD-1 after a NHL game when the driver attempted to drive the tractor back to the trailer with the dish still pointed at AMC-3 (GE-3 for us in the business that don't like changes). Bad for them, good for me.

HD Net has a detailed website at www.hd.net. Rather than repeat the specs and show pictures of the vehicles and the network, I'll elaborate what I learned about the network and what they go through that isn't on their informational site. The network hopes to televise 65 NHL games, and this upcoming season televise 80 baseball games. This includes 3 from Milwaukee in April. To do this, each of the two trucks does a show every 3 days.

The HD-1 unit was used as NBC's HD master control during the Olympics.

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March Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Wednesday, March 20, 2002 at the studios of WHA-TV in Madison, Wisconsin for the chapter's monthly meeting. There were 12 members in attendance, 11 of whom were certified, and no guests.

The meeting was called to order at 7:09 PM by chairman Tom Smith. There was a correction to the February meeting minutes as published in the newsletter: Ron Viste of Chapter 112 was incorrectly referred to as "Tom" Viste. (Secretary Tom Weeden apologized and offered to let Ron refer to Tom as "Ron," as this was Tom's second offense.) The corrected minutes were approved.

Treasurer Stan Scharch was absent. Newsletter editor Mike Norton announced the deadline for articles for the April issue will be due at midnight, Friday, April 5th. The folding party will be held Wednesday, April 10th at 5:30 PM at WKOW-TV.

Denise Maney from the Program Committee was absent. Steve Paugh reported that the April program would be the NAB review and elections.

Membership chair Paul Stoffel reported that membership renewals are due April 1, and that the newsletter circulation count is approximately 117.

Sustaining membership chair Fred Sperry reported renewals by Clark Wire and Cable, Wisconsin Public Television, Maney-Logic, and Swiderski Electronics. Chapter 24 has 23 sustaining members. Special Events Coordinator Lonnie Cooks and Certification chair Jim Hermanson were absent.

National Liaison Leonard Charles reported that the National office is looking for a part-time frequency coordinator. The September 11th Broadcast Engineers Relief Fund was at $254,367. The SBE Board meeting at the NAB convention has been moved to the Las Vegas Hilton. The SBE booth which was to be in the South Hall will now be in the center lobby at the Las Vegas Convention Center. The projected attendance of the EAS meeting at NAB has grown beyond room capacity, and an alternate location is being sought. All engineering sessions at NAB will be in the South Hall, 2nd floor. The Ennes Workshop/Broadcast Networking tutorial and exam will be in the North Hall. The annual SBE membership drive runs through May 31st, with prizes offered. The awards committee is accepting nominations for awards. Charles also mentioned the Leadership Seminars coming this summer.

Frequency Coordinator Tom Smith reported that CBS's wireless contractor for the NCAA games had contacted him for coordination for the upcoming tournament in Madison.

Steve Paugh reported that the Chapter 24 DTV Web Site Committee had met. Jay Mielke is working on the web site layout, and that a domain name had been registered for the site: <widigital.tv>.

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Meeting Minutes (continued)

Tom Smith reported that WHA-DT's transmitter "runs," and all is installed except the logic circuits for RF switching. The studio-to-transmitter link is up, and the Harris encoder is scheduled to arrive in April.

There was no old business.

In new business, Newsletter Editor Mike Norton requested approval to upgrade the PageMaker 5.0 software (1993 version) used for layout of the newsletter. Version 7.0 upgrade is available for about $80. The officers approved the purchase.

There was discussion on election procedures. Steve Paugh from the Election Committee will put out the call for nominations in the April newsletter, with the actual election to be held in May instead of April.

Paul Stoffel reported that the Wisconsin Public Television production facility at UW-Green Bay will be shut down July 1st, resulting in the loss of 11 positions.

Fred Sperry reported that the ECB (Educational Communications Board) has hired Jim Klas to be the Director of Media Technology at the Telecommunication Operations Center.

Tom Smith recognized Vicki Kipp who had two of her recent tower articles from the Chapter 24 newsletter reprinted in Site Magazine.

The meeting adjourned at 7:35 PM. This month's program was presented by Tom Smith on web resources for broadcasters.

Submitted by Tom Weeden, Secretary

AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

• Wisconsin Governor Scott McCallum signed AB368, the FCC PRB-1 Amateur Radio Antenna Protection Act, into law last week. The governor's stroke of the pen April 2 makes the Badger State the 16th to incorporate the language of the limited federal preemption known as PRB-1 into its statutes. The new law became effective immediately.

AB368 mirrors the language of the limited federal preemption. It requires that ordinances or resolutions affecting the placement, screening or height of amateur radio antennas or support structures have a "reasonable and clearly defined aesthetic, public health or safety objective." Such an ordinance or resolution also must represent "the minimum practical regulation" necessary to accomplish the locality's objectives and must reasonably accommodate amateur radio communication.

"After summarizing the contents of the law, Governor McCallum made a special point of noting the important role that Wisconsin hams play in providing emergency and public communication support throughout the state," said ARRL Wisconsin Section Government Liaison Jim Lackore, AD9X, who was present at the signing. The Amateur Radio antenna bill was one of six pieces of legislation that McCallum signed into law April 2 during a ceremony at the Oshkosh Senior Center.

• The FCC has again targeted amateur radio's primary allocation at 2390 to 2400 MHz for possible sharing or use by other radio services. A Notice of Proposed Rulemaking (WT Docket 02-55)—released in mid-March but not yet available for public comment—invites comments on either sharing the band with public safety services being displaced from 800 MHz, or moving amateurs elsewhere.

The FCC says increasing incidents of harmful interference to public safety systems in the 800-MHz band prompted the rulemaking proceeding. To alleviate the problem, the Commission now is exploring the possibility of restructuring the 800 MHz band and moving some occupants elsewhere.

"In this proceeding, if commenting parties believe that incumbent amateur services cannot co-exist with relocated 800 MHz services," the FCC said, "we seek comment on whether incumbent amateur services could be relocated, what spectrum could be used for their relocation, and what procedures would apply to such relocation." The FCC NPRM identifies the 2390-2400 MHz band as an "Unlicensed PCS Band." Unlicensed, asynchronous PCS devices were authorized there in 1995, but amateur radio remains primary on the segment.

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

THE SECRET LIFE OF TIMECODE (continued from page 1)

"counting" control track pulses. If you mark an "in," and then play the tape forward from that point, each frame of video will add one count to the display. Since each frame of video has one control track pulse associated with it, we can move forward or backward on the tape, adding or subtracting counts from the counter display. Of course, if the tape slips a little or looses contact with the "control track head," your count will be off. That is why control track editing systems will have an accuracy of +/- one frame at best. And if you eject the tape, the count is lost.

Now if we could uniquely identify each control track pulse we could somehow tell them apart. This would allow us to uniquely number each and every frame of video on the tape. One way would be to call the first frame of video number one. That would make the last frame of video on a 30 minute tape number fifty-four thousand. A spot 1 minute, 18 seconds and 21 frames into the tape would be frame number two thousand, three hundred and sixty-one. There are actually devices that use such a scheme.

What really makes sense is to use a numbering system based on the universal quantity; time. This scheme worked out very nicely since video originally ran at 30 frames per second. Every time we counted 30 frames, we know that one second has elapsed. Sixty seconds make a minute, and so on. Each frame of video is then labeled as hours, minutes, seconds and frames. The short hand notation that we are familiar with is HH:MM:SS.FF. [Technical Aside: the timecode signal is not recorded on the control track, it is usually recorded on a separate audio channel specially designed for timecode. Some older machines that did not originally support timecode record the signal on one of the normal audio channels, usually CH2.] We now have a system where tape time coincides exactly with earth time. Then along came color TV and our "tape clock" no longer coincided with earth time. Let's see why.

To do this, we need to define the concept of the "Master Clock" The master clock is the source of all time. The master clock is divided down to give us an easy to count signal. For the earth clock we have the concept of the second, or the "tick" and the "tock." The pendulum of the clock is designed to have a period of one second. The gears of the clock count the ticks and tocks and display the count on a dial marked in hours, minutes and seconds.

Science has learned to generate ticks and tocks electronically through the use of devices called oscillators. Oscillators are sometimes called clocks, but not all clocks are oscillators. An example of a clock that is not an oscillator is the electric clock on your desk. Electric clocks get their "master clock" signal from your local power company. The master clock frequency is 60 cycles per second. Every time your desk clock receives 60 pulses from the power company, one second is added to the clock display. (Battery powered clocks have little tiny power companies built in called crystal oscillators.)

To make the discussion of clocks and oscillators easier we need to introduce the topic of frequency. Frequency is the rate at which some thing happens. The fundamental unit of frequency is the cycle. We further define frequency as the rate at which something happens in a particular unit of time. The unit of time we prefer to work in is the second. This then makes the complete definition of frequency as the number of cycles per second of some event. If the power company delivers power at the rate of 60 pulses per second, the frequency of the power supply can be expressed at 60 cycles-per-second, or 60 c.p.s.

Obviously, cycles-per-second is way too descriptive of what we are talking about and "outsiders" may actually begin to understand what we technical types are up to. Therefore we need a "secret code word" to use when we really mean cycles-per-second. The secret word chosen was Hertz, abbreviated as Hz. Now 60 cycles-per-second becomes 60 Hz and no one knows what we are talking about. I trust you will keep the secret safe.

Back to the master clock. Back in the days of B&W television, the master clock frequency chosen was 15,750 Hz. This is called the "line rate". Another number chosen was 525, for the number of lines in a picture. Using the interlace method, the 525 lines are divided over two "fields". These two fields make a one complete picture, which we call a "frame". To get the frame rate we divide the line rate by the field rate, (15,750/262.5) which gives us, TA-DA, 60 Hz, same as the power company. TV time then matches earth time.

When the National Television Systems Committee (NTSC!) met to write the rule book for color TV they choose a new number for the master clock frequency. The number chosen was 3,579,545 Hz. This number we call the "Burst" frequency. A nickname for this number that you might have heard is '358', a type of engineer shorthand for 3.58 which is pronounced 'three-point-five-eight'. When we say 358 we really mean 3.579545 Mhz. The

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THE SECRET LIFE OF TIMECODE (continued)

former just rolls off the tongue easier. If we divide 3.579545 Mhz by 59,718.75, we come up with a frame rate of (hold on to your hat) 59.94. Then they said close enough. There are some very good technical reasons for them having done this, but it sure complicated our life in timecode land. [Technical aside: You really don't want to know where 59,718.75 came from, it is a true story, but who needs the truth if it's dull.]

If the power company were to send you 59.94 Hz power instead of 60 Hz power your clocks would be running slow. How slow? How about 1 minute and 26 seconds a day, or 43 minutes a month. There you have it–with the advent of color, TV time and earth time no longer agree. Now one "hour" of TV (or tape time if you prefer) equals one hour and 3.6 seconds of earth time.

Video production people are not too upset if a 30 minute program really runs 30 minutes and 1.8 seconds TRT (Total Running Time), but broadcast people require that 30 minute programs run exactly 30 minutes, no slop allowed. The solution to this problem is the invention of the dreaded "drop-frame" time code.

To make tape time agree with earth time, we need to "speed up" tape time. We do this by making the tape timer skip ahead every so often. In fact we need to skip ahead one count on the timer one hundred and eight times each and every hour! We get 108 frames by multiplying 3.6 seconds by 30 frames per second. If we drop 108 frames per hour (drop-frame, get it?) then tape time once again equals earth time. If we don't drop 108 frames per hour we have, TA-DA, non-drop frame time code, or NDF in secret code. Instead of saying earth time we usually speak of "time of day" or TOD.

The "dropped" frames need to be evenly spaced over one hour, we can't just go from 00:59:56.12 to 1:00:00.00 even. The official drop frame policy is to drop 2 frames each minute, except at 00:00:00.00, 00:10:00.00, 00:20:00.00, 00:30:00.00, 00:40:00.00, 00:50:00.00. OK, so what does that mean? When you are in drop frame mode (DF from now on), the tape timer starts at 00:00:00.00 and increments one count at a time until you reach 00:00:59.29 and then the counter jumps to 00:01:00.02, skipping 00:01.00.00 and 00:01:00.01. The counter skips 2 frames each minute, except at the even 10 minute intervals listed above. As an editor, it means that 00:01:00.00 is not a valid DF time code.

Computer based edit systems will automatically enter 00:01:00.02 if you try to enter 1 minute even. Some times you have to manually calculate edit durations if you need an effect lasting a certain number of frames that crosses one of the drop frame windows. If a tape machine refused to search to a specific point it might be because that timecode number does not exist! Remember, in DF mode, some timecode numbers are not allowed. The non-allowed numbers are the really neat ones too, like 1 minute, zero frames even.

To recap, DF timecode *can* be used as a time of day clock, especially is we ignore the frames digits. NDF timecode is effectively running slow with respect to TOD to the tune of 3.6 seconds per hour. To put it another way, a tape recorded in NDF mode until the timecode display reads 1 hour will really have 1 hour and 3.6 sec of video recorded on it! If you record in DF mode until the display reads 1 hour, you will have 1 hour of material. If you record the same scene with two cameras, one in DF and 1 in NDF for 1 hour of TOD time measured with a stop watch, both cameras will have tapes with 1 hours worth of material on them. Choosing DF or NDF does not cause any type of tape time warp, 1 hour is still 1 hour! The difference is when you watch the timecode displays on playback. At the end of 1 hour of play the VTR with the DF tape in it will read 1 hour, the VTR with the NDF tape in it will read 59 minutes, 56 seconds and 12 frames. This is why NDF timecode can not be used as a TOD clock!

In the above example, the editor will go nuts trying to do match frame edits on a 2 camera shoot with one recorded in DF and the other in NDF. Most edit systems can intermingle DF and NDF source tapes. It is usually the human editor who ends up getting their brain scrambled. There are pocket calculators available that can convert between DF and NDF. These calculators can also add and subtract times and even convert between film and video rates. In a multiple camera shoot it is very important that everyone be in the same mode. In the edit session, we can edit on to tape that has been blacked in either DF or NDF mode as desired.

All tapes produced for broadcast should be in DF timecode mode. In fact, some of the more popular tape based commercial insertion machines will not accept tapes with NDF timecode! Editors usually prefer to produce in NDF mode, and for a 60 second spot we have an error of less than 2 frames.

Hope this explains how we got into the DF/NDF mess. By the way, high definition television includes 29.97 frame rate in the table of possible formats, rather than changing it back to 30 frames. Ah, progress.

THE NHL IN HD (continued from page 1)

When I was connected to it, it was providing an HD feed of the Anaheim Mighty Ducks at the St. Louis Blues hockey game at the Savvis Center in the downtown area. HD Net has an agreement to work with Fox Sports Net for National League Hockey, Major League Baseball, and La Crosse. The network tries not to be the only truck at a venue. Rather, they always try to piggy-back off the standard definition feed. This way they use the main announcers and use their graphics. The graphics are upconverted for the HD broadcast. The "Fox Box" (scoreboard and clock, nowadays almost always keyed in) is positioned into the top left corner of the 16:9 screen. Full screen graphics are stretched to feed the switcher. Unfortunately, this mutates logos a bit. The HD truck also grabs a few camera sources and program output from the main truck. This video will be used for any highlights missed by the five high definition cameras. When the SD video is used, it is DVE'd on top of the 16:9 live video in a 4:3 box with a title underneath, "standard television."

The two trucks were built by the staff at the network. They are a little different than any of the other 40+ production trucks that I have connected to. The most noticeable difference is the 50 inch Panasonic wide screen in the middle of the production monitor wall. The tape "room" is only a bench behind the main row that consists of two Sony HD decks and a Sony MAV-555 (one channel) sunk into the console. Everything else is pretty consistent with a "B" size production truck.

The cameras are hooked up with a transmit and receive pair of fibers run to each camera position. Each camera position is powered locally instead of from the truck. This enables them to not be dependent on Sony's expensive camera cable that has the fiber and copper in the jacket. The cameras needed to be slightly modified to run in this configuration. A safety feature that only allows the camera's laser to transmit while connected to the original cable was bypassed by a 1k ohm resistor across the connection. HD Net is having several venues wired with fiber for this purpose.

The Savvis Center is mostly a fiber-only venue for feeding live productions due to local politics and a lack of unobstructed parking for uplink trucks. Unfortunately for HD Net, Vyvx still cannot carry the packet structure of a HD feed. The transmission path started in the equipment area of the trailer. The main and backup encoders are located there that provides a 20 mb data stream. At this venue, to get to my uplink truck involved a few pieces of glass and copper. From the production truck, a 100' 75 ohm cable went to a Telecast Viper fiber termination near the production truck area under the parking ramp. From there, the fiber went about 1500' to the south side of the arena to another termination near where my uplink truck was parked on the sidewalk. Now, back on copper cable, the signal was brought into the truck to the modulators borrowed from the crippled uplink tractor. The outputs from the main and backup modulators then went to my upconverters' combiners. A second later, the signal was seen in HD Net's production center in Denver.

In Denver, video and audio for the network's one commercial customer, Mitsubishi, and promotional material are spliced into the encoded signal. The program is then sent on a dedicated DS3 circuit to DirecTV in LA. The signal is never decoded until it gets to the viewer's receiver at the home. The whole process takes about 12 seconds to get to the viewer. HD Net claims the lack of decoding and encoding keeps the quality above any other network. The HD Net engineers claim NBC's Tonight Show comes close. The Tonight Show's signal goes straight from LA to the satellite and then to the affiliates.

The crew of HD-1 were very open and willing to answer the many questions I had. They said it was part of their mission to help people get interested in High Definition Television. This openess is part of the reason that the co-creator of the network, Mark Cuban, is paying for the start up costs to get more events in HD. Check out their web site and swing by their truck in Milwaukee during the Brewers games on April 16th, 18th, or 19th. I'm sure they won't mind.

CHAPTER 24 TO CREATE DTV WEB SITE FOR CONSUMERS

By Steve Paugh

The Wisconsin Broadcasters Association would like to enlist the Wisconsin chapters of the SBE to assist in the creation a consumer oriented Digital Television web site with specific local broadcaster information. During the December 2001 SBE meeting, Chapter Chair Tom Smith proposed that a committee be formed to create a Chapter 24 web site for the Madison area that would link to the WBA site.

The goal of the web site is to educate consumers on the purchase, installation and operation of Digital Television sets. On February 28, 2002, interested Chapter 24 members met at WISC-TV to organize the creation of the web site. In attendance were Steve Paugh, chair; Jay Mielke, web master; Tom Weeden, content author; Tom Smith, content author; Kevin Rupert, content author; Jim Hermanson, content advisor; and Leonard Charles, WISC representative.

The committee selected the web name WIDIGITAL.TV and approved the $29 per year cost to register the name. Web master Jay Mielke will take care of the registration and hosting arrangements. The initial layout was discussed and Jay will work a design for the site. Once the initial design is determined and approved by the committee, the Chapter 24 membership will be invited to review the work in progress and the committee will solicit the membership for additional editorial content. We look forward to the debut of WIDIGITAL.TV and hope it will provide the consumer with the information they need to confidently embrace Digital TV. Thanks to all of our committee members, and we hope that each member of Chapter 24 can help contribute to the success of this project.

TOP TEN WEB SITES

By Tom Smith

At the March meeting of Chapter 24, I presented a program on using the Web to find information on actions of the FCC and other government agencies. I also showed a number of sites that can provide information useful in a broadcast engineer's daily job. At the end of the meeting, I was asked to come up with a list of my top ten web sites.

In this article, I will give the sites that I have found useful for finding information about the FCC, Congress, and other government actions. Some of the sites are good sources on information about stations in your area or in other parts of the country. There are also sites that help in finding technical resources and manufacturers information on equipment.

What makes a good web site that can help you do your job better or keep you informed on changes in the industry that will affect your future? There are a number of things to ask yourself when selecting a web site. Does it have information that I can use to do my job? Can it answer questions or help me plan a project? Will it give me information on government or business actions that may affect the future of my job or broadcasting? Finally, not all sites that give you information about broadcasting are broadcast related. Some are for other industries regulated by the FCC, while some are general news sites.

Web site *number one* on my list is the **FCC**. It is found at www.fcc.gov and from there you can link directly to the various bureaus, the Commissioner's web pages, and to FCC releases and documents that are headlined on the home page. As broadcasters, we should have the Mass Media Bureau (www.fcc.gov/mmb) book marked on our computer. This page has links to a search engine for license information such as transmitter information, ownership information, and copies of recent applications. There are links to notices and actions on rulemakings, station applications and press releases.

Another bureau of the FCC to have bookmarked is the **Wireless Bureau** (www.fcc.gov/wtb). It licenses everything other than broadcast stations, including your STL and remote pick-up units. Besides links to information on its actions, it has databases for tower registration, auctions, and the biggest database of the FCC, the Universal Licensing System, that is supposed to allow you to find information on all wireless licenses. It still seems to be a work in progress and takes a lot of time to learn to use.

The final page at the FCC web site that is highly useful is www.fcc.gov/updates.html and is exactly what the URL says. This page will link you to a number of pages that will give you daily updates on actions by the FCC. In fact, you can subscribe to the daily update link and have it e-mailed to you every business day. It will give you direct links to many notices that are released by the FCC everyday.

Web site *number two* in my top ten is the **U.S. Government Printing Office** (www.access.gpo.gov). It gives access to many documents published by the government, including the FCC Rules and the FEDERAL REGISTER (www.access.gpo.gov/su_docs/aces/aces140.html), which is published daily and is the official notice of a FCC or any government rulemaking inquiry or action.

Web site *number three* is **BROADCAST.NET** (www.broadcast.net) which links to just about everything in broadcasting, including most manufacturers, trade groups including state broadcasting associations, chat groups, the FCC, and SBE chapters around the country. In fact, BROADCAST.NET hosts many broadcast groups, including many SBE chapters.

Web site *number four* is **Cable** (www.cable.doit.wisc.edu), which is run by Dave Devereaux-Weber of the University of Wisconsin's computer center DoIT. Dave's site is to cable and computers like BROADCAST.NET is to broadcasting. There are links to cable, fiber, and computer manufacturers, trade groups, and other cable and computer sites. Links are provided to local broadcasting and cable operations as well as channel and frequency tables.

Web site *number five* is one of two station search pages. **TV Radio World** (www.tvradioworld.com) is a site that lists all TV and radio stations with web sites. But, the more interesting part of the site is that it directly links to all of the separate information sites of the FCC. If you want license information, just point your mouse. The same goes for a map of the transmitter site or application information. This site greatly reduces the time spent searching for FCC information.

Web site *number six* is the second of the two station search pages. **100,000Watts** (www.100kwatts.tmi.net) lists all the radio and TV stations in the US by either state or market. This site lists the technical information of each station, with a link to a map of the transmitter site and a link to their web page if the station has one. While not

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

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

TOP TEN WEB SITES (continued)

as deep with its links as TV Radio World, all stations are listed along with a page listing recent FCC changes to the station, such as call letters.

A third license search site that can provide some aid is **Radiostation.Com** (www.radiostation.com). This is the first license search site that I used. It originally was for AM and FM stations, but later added TV with the addition of the Kodis search site. The Kodis site will find and map all stations with a selected radius of particular location, which can give a nice view of the distribution of stations in area. The problem with this site is that it has not been update for quite a while and is somewhat out of date.

Web Site *number seven* is the **NEW YORK TIMES** (www.nytimes.com). The NEW YORK TIMES is a good source to follow both technology and business news that affects our industry. A non-broadcast news source gives a different perspective to what is going on, plus it is more timely than most trade sites. The arts and the opinion pages have some interesting stories, and comments on broadcasting or technical issues from time to time and are worth a check on a daily basis. You need to register online with the NEW YORK TIMES to access the site, and a daily e-mail headline service is available that can be customized to your tastes. The only charge is for the use of the online archives.

Web site *number eight* is the **WASHINGTON POST** (www.washingtonpost.com), which gives regular coverage of the FCC and Congressional actions on broadcast and spectrum issues. They have a page covering technology and the FCC Called **WASHTECH.COM** (www.washtech.com). The nice thing about the WASHINGTON POST is they archive for a number of months, while the NY TIMES only archives for seven days and then charges to download articles from longer than seven days.

Web site *number nine* is **GEBBIE.INC** (www.gebbieinc.com). This is a great site to find newspaper or radio web sites. They publish a directory of the news publishing industry and have a nice search engine for finding papers, both weeklies and dailies.

Web site *number 10* is **REELRADIO** (www.reelradio.com), which is an audio site that has archived old radio airchecks from the sixties, seventies and eighties. You can hear Cousin Brucie, Larry Lujack and most of the great disc jockeys of the past, including clips from Milwaukee's WOKY.

Those are my top ten, but there are a few that I would not like to leave out. Because what happens in land mobile and wireless communications affects spectrum issues in broadcasting, there are a few sites that I visit regular. They are WIRELESS WEEK (www.wirelessweek.com), BROADBAND WEEK (www.broadbandweek.com) and MOBILE RADIO TECHNOLOGY (www.mrtmag.com).

The last site that I would like to list is one for that day when work is going bad and you start daydreaming about your own little radio station. The site is called Buy Sell Radio (www.buysellradio.com). This web site lists small and medium size stations that are for sale—from 250 watt daytime AMs to 100,000 watt FM stations. So far, I have not found one that I can afford (which is next to nothing) in or near Wisconsin.

If you haven't noticed, there are not any websites that are purely technical in nature. They are mostly either news sites or sites to research information on a particular station or product. That is because there is plenty of information on technical changes to the industry in most of the broadcast engineering journals and at various conferences.

I believe that news sites are important because actions by Congress, the FCC or business leaders have more sudden impact on the broadcast industry than technology does. Technology changes happen over a period of time, mainly because no facility has the capital to convert a plant overnight. Most of us usually upgrade a little each year until we get to a point that a major piece of the plant is needed to complete the project. But, the FCC or Congress can issue an edict such as DTV or ownership rule changes and our industry and jobs are quickly impacted. Keeping track of these changes is important for both business planning in your station and planning your career.

Finally, you do not have to spend a lot of time to keep up with these news sites. Most of them have a daily e-mail headline service with links to the stories on their web sites. If you don't wish to have the e-mail service, the use and organization of bookmarks in your web browser can get you through a fair number of sites quickly. Visit the sites at the end of the day when you make a final check of your e-mail for the day. It will only take five to ten minutes to skim most of the web site and read the few new articles that appear each day.

Congratulations to Chapter 24 member Mark Croom who recently passed his Technician Class amateur exam and is now licensed as KC9BFF.

Some Chapter 24 hams have been meeting on the air informally on Saturday mornings at 9:30. Frequencies vary, but recently have been 21.440 MHz on HF and 146.52 MHz on VHF. Contact WJ9H (wj9h@arrl.net) for more information.

FCC GRANTS BIG REFUND

By Tom Smith

The FCC has refunded $2.8 billion of the down payments that it collected from the winners of Auction No. 35. That was the auction for the disputed spectrum which was originally won by NextWave Personal Communications in an earlier auction. The Courts have ruled that the FCC did not have the right to cancel NextWave's licenses and hold another auction after Nextwave defaulted on their payments and declared bankruptcy.

The amount the FCC has returned is 85% of the winners' down payment. The winners of the second auction are still required to make full payment should the Supreme Court rule in favor of the FCC and allow the cancellation of Nextwave's licenses. The remaining 15% of the down payments is equal to a 3% penalty of the full amount, if they were to default on that payment. Some of the companies getting a refund include Verizon, Cingular, VoiceStream Wireless, and AT&T Wireless.

From FCC Press Release (www.fcc.gov)

SBE Short Circuits – April 2002

By John L. Poray, CAE
SBE Executive Director

BOOK ON 9-11 TO BENEFIT FAMILIES OF WTC BROADCAST ENGINEERS

This month, Bonus Books is releasing a book titled *Covering Catastrophe, Broadcast Journalists Review September 11*. Written by five New York City broadcast journalists, the book describes the events of September 11 in New York, Washington, D.C and Pennsylvania through the eyes of reporters, news anchors, cameramen and others who covered the stories that day.

All proceeds from the book will be donated to two charitable funds that benefit survivors and their families. SBE and the Ennes Trust are pleased to have the Broadcast Engineers Relief Fund, established on September 13, as one of those funds. The other is the CitiGroup Foundation Scholarship Fund. The epilogue of the book is dedicated to the six broadcast engineers who lost their lives while working in the North Tower of the World Trade Center.

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.

SUN TO SHINE ON SBE MEMBERSHIP DRIVE

The SBE Membership Drive is in its second month. There's still plenty of time for you to participate and win a great prize. 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

(continued on page 10)

POWELL PROPOSES ACTIONS TO SPEED DTV

By Tom Smith

FCC Chairman Michel Powell sent Senator Ernest Hollings (Chairman of the Senate Committee on Commerce, Science and Transportation) and Congressman Billy Tauzan (Chairman of the House's Committee on Energy and Commerce) letters that propose voluntary deadlines to speed the transition to DTV.

In the proposal, he asks that ABC, CBS, FOX, NBC, HBO, and Showtime provide 50% of their primetime schedules in high-definition or value-added programming, beginning with the 2002-2003 season. Value added programming would include interactive or innovative multicasting.

The Chairman would ask that by January 1, 2003, DTV stations of the big four networks in markets 1-100 have equipment to pass network DTV, including HDTV without degradation, and to promote DTV on their analog stations.

Cable systems would be asked to provide the signals of up to five stations that carry value-added programming, if their plant has 750 MHz channel capacity or higher. They are asked to lease or sell set-top boxes that would allow the display of HDTV. The cable systems are asked to promote the digital programming on their system and in their billing.

Direct Broadcast Satellite is asked to provide five channels of digital value added programming during 50% of the primetime schedule.

Equipment manufacturers are being asked to meet the demand for digital cable set-top boxes that allow for the display of HDTV, and market broadcast, cable, and satellite DTV options at point of sale.

Manufacturers are also asked to provide DTV tuners in 50% of sets 36 inches and larger by January 1, 2004 with 100% by January 1, 2005. All sets 25 to 35 inches would have DTV tuners in 50% of the sets by January 1, 2005 and 100% of the sets by January 1, 2006. All sets 13 to 24 inches would have to meet the 50% requirement by December 31, 2006. All HDTV capable TV receivers and displays would need to have digital inputs (either 1394/5C and/or DV1/HDCP by January 1, 2004.

The intent of the Chairman is to increase digital content and make the content available to cable subscribers. He also does not plan to wait for copy protection and plug-and-play cable compatibility issues to be resolved before moving forward.

From FCC Release (www.fcc.gov).

FCC Rulemakings

Compiled By Tom Smith

DECLARATORY RULING AND ORDER CSR-5865-Z

National Association of Broadcasters and Association of Local Television Stations, Request for Modification or Clarification of Broadcast Carriage Rules for Satellite Carriers

The FCC has ruled that direct broadcast satellite provider EchoStar's use of two dishes to provide local TV stations violates the Communications Act and FCC Rules. The FCC ruled that EchoStar violated the rules because subscribers may have not been aware they were missing local stations that they paid $5.95 for. Some of the channels were on a second satellite, and viewer guides on the receivers did not note the fact that the stations were missing. The FCC also ruled that the cost of the second dish was an inconvenience to the subscriber and that that installation was an additional charge. The ruling noted that local stations on the second dish were discriminated against because subscribers were not adequately notified of the need for a second dish.

EchoStar must do the follow to meet the FCC ruling. They must move local stations to satellites that serve the continental US, and require only one dish. Until that happens, they must notify consumers of the need for a second dish and absorb the cost. They must install the second dish as part of the package, when the subscriber signs up for local into local service. All of this must be explained on EchoStar's web site and they must train service representatives, distributors, and dealers of the need and means to obtain the second dish. Finally all stations must be on the program guide with information on obtaining them.

If EchoStar is unable to comply, they can apply for a temporary waiver to avoid removing stations in markets already served by local into local.

From FCC Release (www.fcc.gov).

SBE Short Circuits (continued)

Phoenix this fall *and* a Panasonic TV, compliments of SBE and Panasonic! 1st prize is an entertainment package that 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 $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. For more information, contact Angel Bates at abates@sbe.org or (317) 846-9000.

SBE NATIONAL AWARDS NOMINATIONS OPEN

The SBE Awards Committee is now accepting nominations for the 2001 SBE National Awards. The Committee is chaired by Board member, Mark Humphrey, CPBE of WPLY-FM/Radio One in Philadelphia. The SBE National Awards recognize achievement by both individual members and chapters.

A nomination form was included in the March issue of the SBE SIGNAL. You may also 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.

MANAGEMENT TRAINING FOR BROADCAST ENGINEERS!

SBE, in conjunction with leader skills trainer, Dick Cupka, has been providing opportunities for broadcast engineers to receive training in management skills since 1997. SBE has scheduled the two-part Leader Skills Seminar for June and August 2002. Course I will be held June 5-7 and Course II, August 7-9. Both courses will be held in Indianapolis at the Marten House Hotel and Conference Center.

Dick Cupka has instructed management training and leadership skills specifically designed for broadcast engineers for more than 30 years More than 1,000 broadcast engineers have participated in his Leader Skills seminars sponsored by SBE and previously, by NAB.

To register or for more information, call Angel Bates at the SBE National Office at (317) 846-9000 or e-mail Angel at abates@sbe.org. The seminar fee for each course is $475.

SBE YOUTH MEMBERSHIP INFO

A SBE Youth Member is a member of the Society of Broadcast Engineers that is of high-school age and who has an interest in broadcast engineering.

Who Should Join SBE?

Students in grades nine through 12 who have an interest in the technical side of broadcasting are eligible for Youth Membership in SBE.

If you are active with your school radio or television station, an amateur radio club or have your own amateur radio station and have an interest in the technology that makes them operate, then Youth Membership in SBE is for you!

Maybe you have not had the opportunity to get involved in one of the station activities mentioned, but you have an interest in communications technology, –computers, transmitters, audio and video equipment– membership in SBE can help you learn more about the field.

For more information on SBE or Youth Membership, please contact the SBE National Office at (317) 253-1640, or visit the SBE web site at www.sbe.org.

CALL FOR NOMINATIONS

By Steve Paugh,
Nominations Chair

Elections are normally held in April, but this year we were late in forming an elections committee, therefore, nominations will be solicited during the April 18th meeting. During the May meeting we will hold elections for the offices of Chair, Vice-Chair, Secretary and Treasurer for the 2002-2003 term. All interested members of Chapter 24 who are current in their dues are eligible to run for elected office. The nominations committee is now accepting nominations for all four offices. Our current officers are;

Chair -	Tom Smith
Vice Chair -	Vicki Kipp
Treasurer -	Stan Scharch
Secretary -	Tom Weeden

If you would like to run for an office, or know someone who wishes to run, please bring it to the attention of the nominations chair. All nominees are requested to submit a short biography for publishing with the ballot. Please send nominations and bio information to spaugh@wisctv.com. The nominations committee is still being finalized.

The election ballot will be included in the May newsletter. The deadline for nominations and the submission of biographies will be 48 hours prior to the deadline for submissions to the May newsletter, as announced during the April 18th meeting. We hope you will consider serving Chapter 24 as an elected officer.

LOCAL LEGALS

Compiled by Tom Smith

GRANTED

NEW FM, Boscobel, WI
96.7 MHz

The FCC has allocated a new FM channel to Boscobel as its first FM station, at the request of Starboard Broadcasting, Inc. This station is classified as a C3, which means that it can operate with 25 KW at 100 meters. The FCC has not set a filing window to accept applications to participate in an auction for this channel.

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

Thanks to Tom Smith for arranging the dinner and program location, and for presenting the March program on broadcast web sites.

The *Chapter 24 Newsletter* is published monthly by Chapter 24 Inc, Madison, WI.

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

SBE Chapter 24 Newsletter,
2029 Greenway Cross #11
Madison, WI 53713-3000

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

CHAPTER 24 SUSTAINING MEMBERS

RECENT RENEWALS:

Clark Wire and Cable
National Tower Service
Swiderski Electronics

THANKS TO ALL OUR SUSTAINING MEMBERS:

Alpha Video
Belden Wire and Cable
Broadcast Richardson
CTI
Fujinon Inc.
Graybar
Harris Corporation
maney-logic
Norlight Telecommunications
Panasonic Broadcast
Roscor Wisconsin
Ross Video
Scharch Electronics
Sony Broadcast
Token Creek Productions
Wisconsin Public TV
WISC-TV 3
WKOW-TV 27
WMSN-TV 47
WMTV-TV 15

SBE
SBE Chapter 24 Newsletter
2029 Greenway Cross #11
Madison, WI 53713-3000

FIRST CLASS MAIL

Newsletter edited on Pagemaker 5.0 by: Mike Norton
Contributors this month: Steve Paugh, Andy Rothschadl, Tom Smith, and Tom Weeden.
Thanks to Leonard Charles for his work on the Chapter 24 WWW page.

APRIL MEETING and PROGRAM

Society of Broadcast Engineers
CHAPTER 24 MADISON, WISCONSIN
Thursday, April 18, 2002

NAB Review

Join us this month for a discussion with those who attended the annual NAB convention in Las Vegas. Hear first hand about the new products and equipment shown, and technical presentations. If you went to the big show, we welcome you to share your perspective and let us know what you learned!

Dutch Treat Dinner
at 5:30 PM
at the Dry Bean Saloon & Smokehouse
5264 Verona Road

Meeting and Program
at 7:00 PM

To assist in planning we would like to know how many people to expect. Please RSVP by either sending a message to denise@maney-logic.com or calling 277-8001, by April 15th at 4PM. (We will be ordering off the menu.)

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

2002 UPCOMING MEETING/PROGRAM DATES:

Day	Date	Program
Tuesday	May 21	Elections and Lightning Protection

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