



**BROADBAND NETWORKS
PART 11 - AML MICROWAVE SYSTEMS**

By Neal McLain

This is the eleventh in a series of articles about coaxial broadband networks. In this article, we'll discuss the use of AML microwave systems to get around the noise and distortion constraints of trunk cascades.

BREAKING UP A TRUNK CASCADE

In Part 10, we discussed using a fiber optic link to break up long trunk cascades into shorter pieces. We can accomplish a similar result with microwave. Figure 1 shows the 32-amplifier cascade we discussed last month, broken into three shorter pieces by a microwave link.

The basic theory for transmitting broadband signals via microwave is simple: the entire broadband spectrum is simply upconverted in a heterodyne mixing circuit, amplified, and transmitted. At the receiving end, the process is reversed. Broadcast engineers will recognize this technique as single-sideband suppressed-carrier amplitude modulation in which the broadband spectrum is the modulating baseband.

Figure 2 shows a simplified implementation of this technique. The local oscillator generates the carrier; after modulation, a passband filter suppresses the carrier and the lower sideband.

The resulting microwave spectrum is, of course, identical to the broadband spectrum distributed on the coaxial cable in all respects except frequency. The modulation carried by each individual carrier remains intact.

This technique was originally developed by Theta-Com, a joint venture

(Continued on page 4)

Next Meeting:

**Tuesday,
June 17, 1997**

Facility Tour

**Norlight
Telecommunications**

**Norlight NMC
275 N. Corporate Dr.
Brookfield, WI**

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

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FCC TO HAVE A NEW LOOK

By Tom Smith

The FCC will soon have a new look as there will be four new commissioners, including a new chairman. On May 27th, in a surprise move, FCC chairman Reed Hundt sent President Clinton his resignation. He said that he will remain chairman until a replacement is confirmed. The reason that he gave was that it was time for a change at the commission, and that he wished to spend more time with his family. Hundt had been saying recently that he would be remaining with the Commission until his term ended in 1998. A number of his aids recently left and there were

suggestions in Washington that he would be leaving.

The only commissioner that will remain is Susan Ness. Her term ends in 1999. President Clinton recently appointed two new commissioners, which the Senate is expected to confirm. They are FCC General Counsel William Kennard, who will replace 23-year Commission veteran James Quello. Kennard was once an attorney for the NAB and fills a Democratic seat. The second appointment was for the vacant

Republican seat. That appointee is House Commerce Committee economist Harold Furhtgott-Roth and he will replace Andrew Barrett, who left the Commission a year ago.

Commissioner Rachel Chong's term will soon expire and Sen. John McCain, Chair of the Commerce Committee, is pushing for Michael Powell to replace her. Powell is the son of General Colin Powell, and is chief of staff in the Justice Department's antitrust division. Ms. Chong would

(continued on page 11)

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May Business Meeting Minutes

Chapter 24 of the Society of Broadcast Engineers met on Thursday, May 22, 1997, at C.J.'s Restaurant, in Madison. There were 20 persons in attendance, including 16 members (14 certified) and four guests. The meeting was chaired by Chapter 24 Chairman Fred Sperry.

Call to order: 7:06 pm. Fred thanked previous chair Paul Stoffel for his two year's of service to the Chapter. The minutes of the April meeting were approved, as published in the May Newsletter. Treasurer's Report (reported by Stan Scharch, Treasurer): The chapter balance is in the black. Newsletter Editor's Report (reported by Newsletter Editor Mike Norton): The deadline for the June Newsletter is midnight 6/6/97; the folding party is 5:30 pm 6/11/97 at WKOW-TV.

Sustaining Membership Report (reported by Fred Sperry): Recent renewals include Roscor Wisconsin and Sony; the Chapter now has a total of 24 sustaining members.

Program Committee (reported by Steve Zimmerman and Denise Maney): The June meeting will be held June 17, 1997, and will feature a visit to Norlight's facility in Brookfield. The July meeting will be the annual picnic, July 24, at Mendota County Park.

Certification and Education (reported by Jim Hermanson): (a) A recent Certification Report published by SBE headquarters office indicates that, as of 5/19/97, there have been 217 new certifications in 1997. (b) An examination period is scheduled in June, 1997; nationally, 188 individuals are scheduled to sit for this examination, although no one from the Madison Chapter is on the schedule. (c) First notices to those whose certification expires in July 1997 have been sent out; first notices to those whose certification expires in January 1998 will be sent out soon.

Frequency Coordination Report (reported by Tom Smith): Several coordination requests have been received, or are expected, for remote pickups related to the opening ceremonies of the new Monona Terrace Convention Center in Madison.

National Liaison Report: No report.
Old business: none.

New business (reported by Fred Sperry): (a) Nominations for Chapter Awards are now open; deadline is June 2. (b) The Chapter officers will meet on May 29 at ECB.

The business meeting was adjourned at 7:16 pm. The program featured a presentation by PrimeCo Personal Communications. PrimeCo plans to introduce PCS service in the Madison market soon.

Submitted by Neal McLain, Secretary

CHAPTER 24 OFFERS WBA SCHOLARSHIP

By Kevin Ruppert

Chapter 24 is offering one scholarship to the Wisconsin Broadcasters Association Engineering Workshop, taking place July 16 and 17 at the Abbey resort in Fontana, WI (Lake Geneva). The scholarship will be awarded on the basis of the following criteria and maximum number of points accumulated:

- 1) Must be a current member of Chapter 24.
- 2) Attendance at 6 of the 12 meetings prior to the July 2 application deadline.
- 3) Employment in or a student of a broadcast related field.
- 4) Must have SBE National dues paid for the current year.

Points will be assigned as follows:

a) 5 points for each month applicant has at least one article published in the Chapter 24 newsletter spanning the 12 issues prior to the July 2 application deadline.

b) 5 points for certification, any level.

c) 2 points for each monthly meeting attended in excess of the 6 required.

In the case of a tie, final selection will be by the elected officers of Chapter 24 or by a committee appointed by those officers, excluding any whom may have applied. If more than one applicant, an alternate will also be selected based on the second highest number of points. The scholarship winner will be required to write a summary article to be published in the chapter newsletter.

Scholarship recipient will receive \$160.00 to cover the \$40.00 conference registration fee along with one night lodging at the Abbey resort.

Applications should be in the form of a letter which is signed, dated and received no later than July 2, 1997. Please send the application to Kevin Ruppert at the following address:

Kevin Ruppert
WISC-TV
7025 Raymond Rd.
Madison, WI 53719

AMATEUR RADIO NEWS

By Tom Weeden, WJ9H

• An amateur radio special event station will be on board the Great Circus Train as it makes its annual trek from Baraboo to Milwaukee on July 7th and 8th. K9ZZ/Railroad Mobile has announced plans to operate on 7.240, 14.240 and possibly 21.325 MHz on HF. VHF operation will be on 146.55 MHz to local stations. The special event station will operate between about 9 AM and 6:45 PM on the 7th and 10 AM to 2:45 PM on the 8th.

• The standard application form for amateur radio stations, FCC Form 610, has been revised. The new 610, dated March 1997, now includes a space for the applicant's Internet address. This, along with other FCC forms is available for download from the FCC's web site (www.fcc.gov) and via the FCC's fax-on-demand service (202-418-0177). According to staff members at the Gettysburg FCC office, the Commission will continue to accept old Form 610s as far back as the November 1993 version until further notice.

• The number of licensed amateur radio operators in the US rose by about 12,000 in 1996. FCC statistics indicate that 28,854 new licenses were granted last year (less about 16,000 expirations for the net gain).

(Excerpts from June 1997 "Badger State Smoke Signals," May 1997 "QST," and "The ARRL Letter")


Annual Chapter Picnic Planned

By Denise Maney

This year we are trying something a little different for the Annual SBE Chapter 24 Picnic. The Annual Picnic will be held Thursday, July 24, after work, between 4PM and 8PM at the Mendota County Park on Highway M in Middleton. The Chapter will provide sliced ham and turkey, buns, and all the fixin's, including extra plates and

plasticware. We ask that you bring a dish to share and your own drinks.

As always family and friends are invited and welcome. Hope to see you all there. You may contact Denise if you need directions to the park. There will be a map provided in the July Newsletter.

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Broadband Networks Part Eleven (continued)

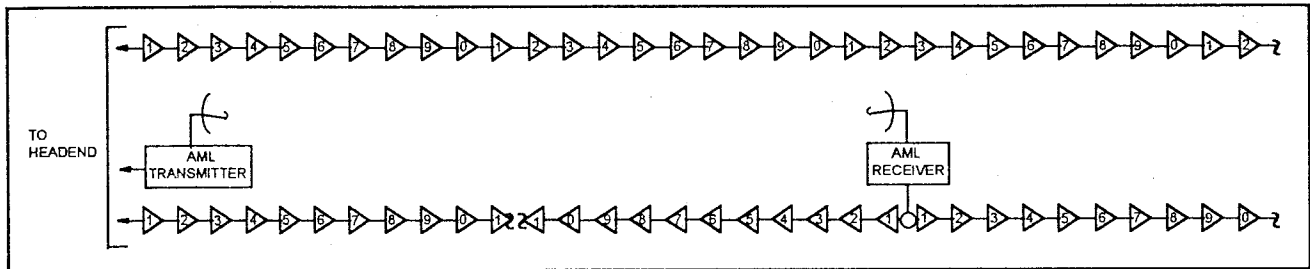


Figure 1. Breaking a 32-amplifier trunk cascade into three pieces with a microwave link.

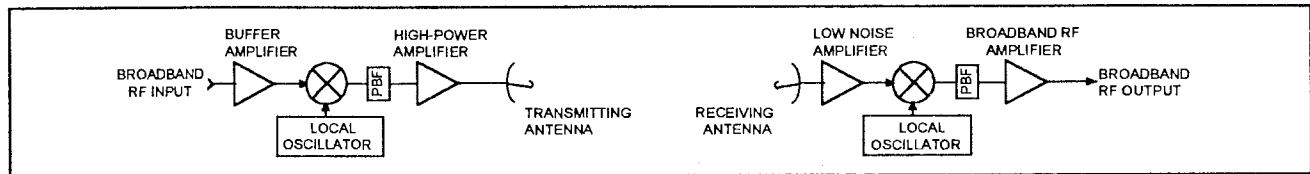


Figure 2. AML Microwave Transmission System - Simplified Block Diagram.

owned by Hughes Aircraft Company and TelePrompTer Corporation. Because of its use of amplitude modulation, Theta-Com called the system "amplitude modulated link," or AML. This name also reflects the fact that NTSC television signals are amplitude modulated. In recent years, as cable systems have extended their offerings to include audio and data signals, AML has sometimes been called "any modulation link."

FCC FREQUENCY ASSIGNMENTS

AML microwave systems operate in the so-called CARS band. The term "CARS" is an historical accident: back in the pre-satellite days when the band was first allocated, "CATV" stood for "community antenna television"; hence, the microwave service was called the "community antenna relay service," or CARS. Over the years, CATV has evolved to mean "cable television"; accordingly, the FCC has renamed the microwave band "cable television relay service." But the historic abbreviation CARS still hangs on.

Frequencies in the CARS band are allocated in Part 78 of the FCC Rules. Since the microwave spectrum is identical to the broadband spectrum distributed on the coaxial cable, every cable channel has a corresponding microwave channel. Figure 3 illustrates this relationship for the most common set of frequency assignments, designated "Group C" in the FCC Rules.

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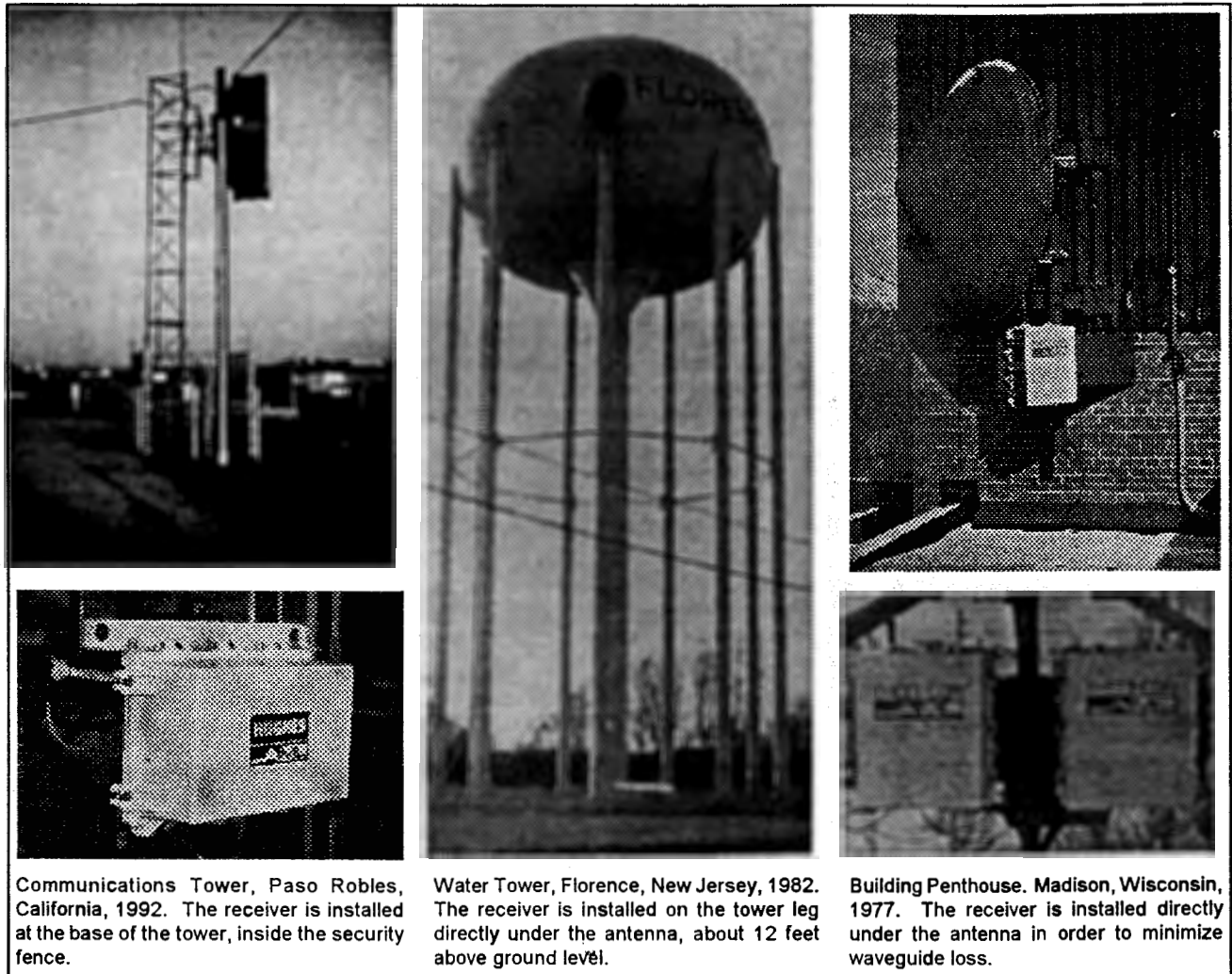
228	CHAN 24	12,8745
222	CHAN 23	12,8685
216	CHAN 13	12,8625
210	CHAN 12	12,8565
204	CHAN 11	12,8505
198	CHAN 10	12,8445
192	CHAN 9	12,8385
186	CHAN 8	12,8325
180	CHAN 7	12,8265
174	CHAN 22	12,8205
168	CHAN 21	12,8145
162	CHAN 20	12,8085
156	CHAN 19	12,8025
150	CHAN 18	12,7965
144	CHAN 17	12,7905
138	CHAN 16	12,7845
132	CHAN 15	12,7785
126	CHAN 14	12,7725
120	CHAN 14	12,7665
114	CHAN 99	12,7605
108	CHAN 98	12,7545
	FMBAND	
88	CHAN 6	12,7345
82	CHAN 5	12,7285
76		12,7225
72	CHAN 4	12,7165
66	CHAN 3	12,7125
60	CHAN 2	12,7065
54		12,7005

Figure 3. The 12-GHz Group-C CARS-band Frequency Allocation as specified in the FCC Rules. The Hughes pilot, at 73.956140 MHz, is the dotted line between channels 4 and 5. Above channel 24, the band extends to 552MHz (channel 78). Source: 47 CFR 78.18(a).

228	CHAN 24	18,3160
222	CHAN 23	18,3100
216	CHAN 13	18,3040
210	CHAN 12	18,2980
204	CHAN 11	18,2920
198	CHAN 10	18,2860
192	CHAN 9	18,2800
186	CHAN 8	18,2740
180	CHAN 7	18,2680
174	CHAN 22	18,2620
168	CHAN 21	18,2560
162	CHAN 20	18,2500
156	CHAN 19	18,2440
150	CHAN 18	18,2380
144	CHAN 17	18,2320
138	CHAN 16	18,2260
132	CHAN 15	18,2200
126	CHAN 14	18,2140
120	CHAN 14	18,2080
114	CHAN 99	18,2020
108	CHAN 98	18,1960
	FMBAND	
88	CHAN 6	18,1760
82	CHAN 5	18,1700
76		18,1640
72	CHAN 4	18,1600
66	CHAN 3	18,1540
60	CHAN 2	18,1480
54		18,1420

Figure 4. The 18-GHz CARS-band Frequency Allocation as implemented by Hughes. The pilot, at 72.93548387 MHz, is the dotted line between Channels 4 and 5. Above Challen 24, the band extends to 492 MHz (Channel 68). Source: Hughes Aircraft of Canada Limited.

Broadband Networks Part Eleven (continued)



Communications Tower, Paso Robles, California, 1992. The receiver is installed at the base of the tower, inside the security fence.

Water Tower, Florence, New Jersey, 1982. The receiver is installed on the tower leg directly under the antenna, about 12 feet above ground level.

Building Penthouse. Madison, Wisconsin, 1977. The receiver is installed directly under the antenna in order to minimize waveguide loss.

Figure 5. AML receivers are frequently installed outdoors. This figure illustrates three typical receive-site installations: a communications tower constructed specifically for the purpose; a water tower; and a building penthouse. Photographs by the author.

Note that, for the set of frequency assignments illustrated in Figure 3, the microwave frequency always equals the cable-channel frequency plus 12,646.5 MHz. Thus, the local oscillator must operate at 12,646.5 MHz.

AML systems are also permitted to operate in an 18-GHz CARS band (Figure 4). In this case, the microwave frequency always equals the cable-channel frequency plus 18,088.0 MHz, so the local oscillator must operate at 18,088.0 MHz.

FREQUENCY TOLERANCE

Part 78 imposes a frequency tolerance of $\pm 0.0005\%$ on AML transmitters. This

is a reasonable tolerance requirement for a transmitter operating in the 12-GHz band. But in an AML microwave system, microwave frequency errors are greatly magnified in the downconversion process.

Consider, for example, the Channel 2 visual carrier (55.25 MHz, or 12,701.75 MHz at microwave): at this frequency, an error of $+0.0005\%$ translates to about +63 KHz. After downconversion to VHF, the error is still +63 KHz, pushing the visual carrier up to about 55.31 MHz. At VHF, that's an error of about 0.033%.

And, of course, that figure considers only the error in the transmitter. If the local oscillator in the receiver does not

operate at the correct frequency, an additional frequency error is introduced. Moreover, in cable television applications, receivers are frequently installed outdoors where they are subject to wide temperature variations (Figure 5).

In short, it's easy to see that the frequency at the output of an AML receiver can vary over an unacceptably wide range if frequency-control measures are not introduced.

PHASE-LOCK CIRCUITRY

To solve this problem, manufacturers have devised techniques for phase-locking the receiver's local oscillator to

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Broadband Networks Part Eleven (continued)

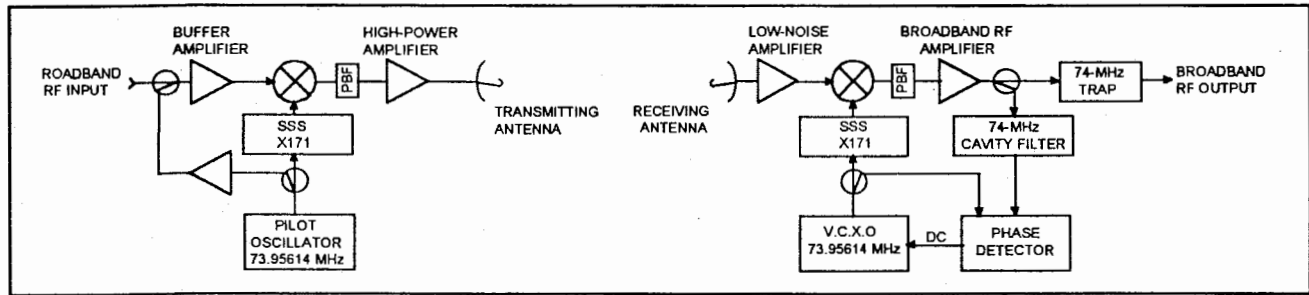


Figure 6. AML Microwave Transmission System including Phase-Lock Circuitry - Simplified Block Diagram.

the transmitter's local oscillator. Figure 6 illustrates the technique used by Hughes for equipment operating in the 12-GHz band.

At the transmitter, a precise crystal-controlled oscillator generates a "pilot" frequency at 73.956140 MHz. This frequency drives a solid state source (SSS). The SSS multiplies the pilot frequency by a factor of 171, producing the microwave local oscillator (LO) frequency 12,646.5 MHz. After amplification, the LO drives the mixing circuitry.

The pilot signal is also inserted into the incoming broadband signal, where it's transmitted to the receiver along with the rest of the broadband signal. Because it falls in the unused guard band between Channels 4 and 5, it does not interfere with the incoming broadband signal.

We can now see why 73.956140 MHz was selected as the pilot frequency:

- It's an integral submultiple of the required LO frequency.
- It falls in a vacant portion of the incoming broadband signal.
- It's close to 70 MHz (the standard microwave IF frequency), so that an off-the-shelf SSS can be used with relatively simple modification.

At the receiver, the pilot signal is generated by a voltage-controlled crystal oscillator (VCXO), also operating at 73.956140 MHz. The VCXO is phase-locked to the transmitter pilot oscillator as follows: a sample of the broadband signal is taken from the receiver output and passed to a cavity filter. The cavity filter extracts the pilot signal from the

broadband signal and passes it to a phase detector. The phase detector compares the VCXO frequency with the pilot frequency, and adjusts the VCXO drive voltage as necessary to keep the two signals in phase.

A similar technique is used for equipment operating in the 18-GHz band. Only the frequencies are different: the pilot operates at 72.93548387 MHz, and

the SSS multiplies it by 240 to obtain the LO frequency at 18,088.0 MHz.

TRANSMITTER OUTPUT POWER

The ALM microwave system is subject to the same distortion and channel-loading limitations which affect other broadband amplifiers. These limitations place an upper limit on transmitter output

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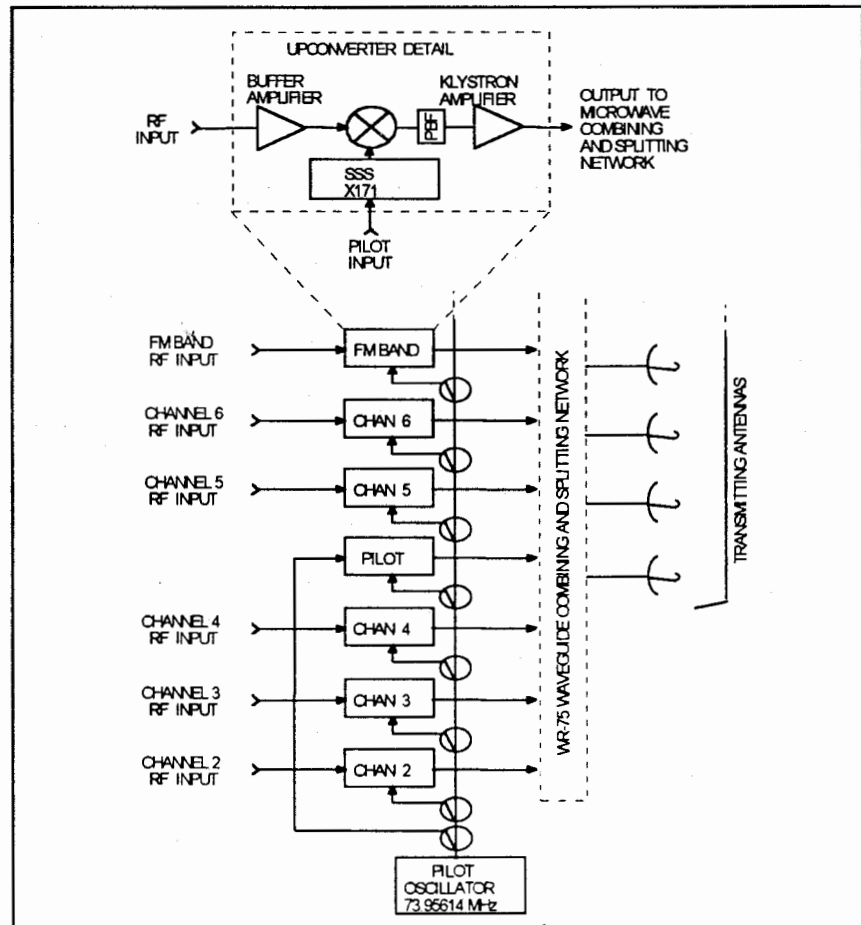


Figure 7. High-power AML Microwave Transmitter - Simplified Block Diagram. Each upconverter contains a buffer amplifier, mixer, klystron amplifier, and SSS, as shown in the detail at the top of the drawing.

Broadband Networks Part Eleven (conclusion)

power. As an example, Hughes' most powerful 12-GHz broadband transmitter is rated as follows:

Distortion 65 dBc.
 Number of channels 35.
 Power output +1.5 dBm.

To maintain this distortion rating, the output power must be derated if channel loading is increased. At 60 channels, the permissible output power drops to -1.0 dBm; at 80 channels, it drops to -3.0 dBm.

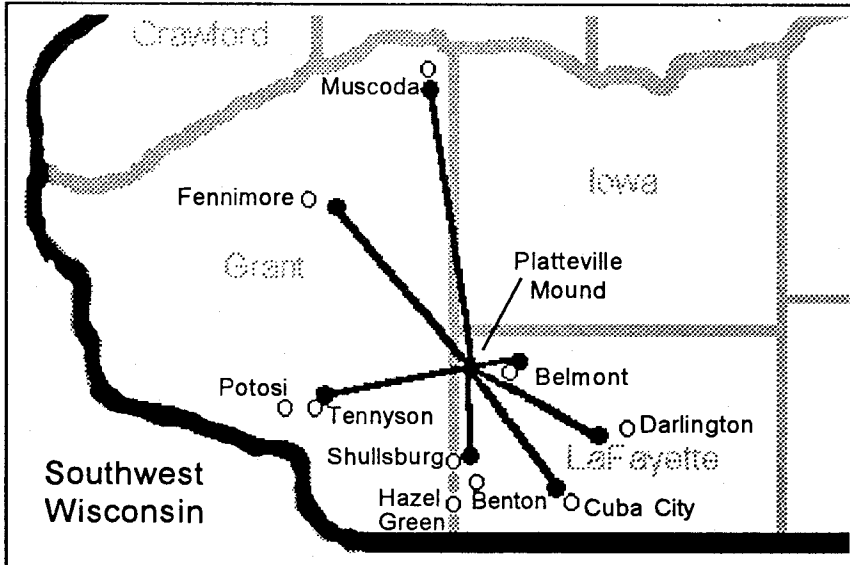


Figure 8. High-power AML microwave system owned by Intermedia Partners, an independent cable television operator partially owned by TCI. The transmitter is located on Platteville Mound, northeast of the City of Platteville (the mound with the big "M"). This AML system was originally constructed in 1981 by Niall Communications Group, a startup cable television operator partially owned by Jack O'Neill, a member of the UW-Platteville faculty. O'Neill is also the owner of Niall Enterprises, a Chapter 24 Sustaining Member.

To accommodate situations where higher power levels are required, Hughes offers a high-power "channelized" transmitter (Figure 7). In this transmitter, each channel has a separate upconverter rated at +37 dBm (5 watts). The microwave outputs of all upconverters are combined in a maze of 12-GHz waveguide plumbing. Besides combining channels, the waveguide network also splits the combined signal, providing several outputs at around +20 to +25 dBm each. This feature allows the use of a single high-power transmitter to feed several receive sites. High-power transmitters are frequently used to feed a number of widely-separated communities from a single location (Figure 8).

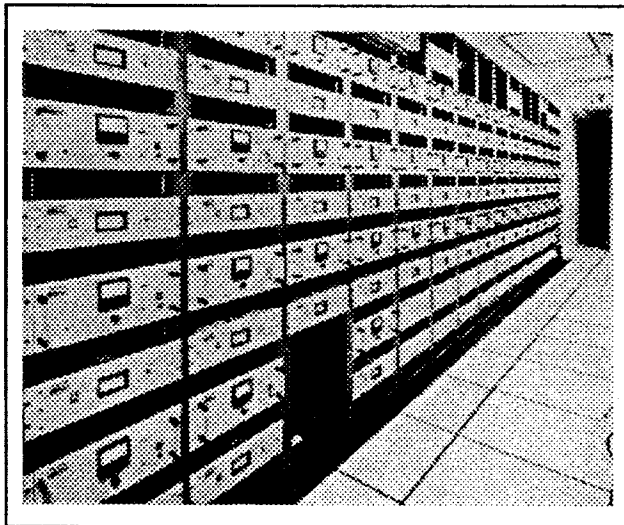


Figure 9. High-power AML transmitter. Each individual upconverter consists of two rack-mounted units: the upconverter unit and the klystron power supply. Additional rack space is required for cooling; consequently, a maximum of four upconverters can be placed in one rack.

Each high-power upconverter occupies about 20 inches of rack space (11 rack units), including a high-voltage power supply for the klystron, and vacant space for cooling. A large high-power AML transmitter, capable of transmitting the 50- to 75-channel offerings of a modern cable system, can easily occupy 20 racks (Figure 9). Measured in terms of capital outlay, floor space requirement, power consumption, and air-conditioning load, the operational costs of a big AML transmitter can approach those of a broadcast transmitter.

Photograph courtesy of Hughes Aircraft of Canada, Limited.

Next month, we'll continue with the discussion of the reasons for breaking long amplifier cascades.

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Emergency Alert System Firsthand

Compiled by Paul Stoffel

- From Louis LaBonte, KVIE, PBS e-mail: We had a surprise FCC EAS inspection today. We were the 6th station in the Sacramento area that they hit. They were interested in the tones that are sent in both level and length. They wanted us to send a Monthly Test to check the two-tone encoder. The logs and printed tapes were also checked to see if we were properly sending/receiving/logging tests and alerts.

- From the Portland Chapter 124 newsletter, "What the FCC inspector looked for": Authenticator Word List available; copy of the EAS Operating Handbook; EAS Encoder/Decoder installed and operational; the EAS Decoder tuned to correct stations in accordance with local/state plans (he wanted to hear all the monitored stations play through it); the Encoder timing for the two-tones 8-25 seconds in length; an RWT received, sent, and logged weekly (checked last 4 weeks of logs); can the operator describe how to conduct an RWT; was the RMT received and conducted within 15 minutes, and logged last month; and where is the old EBS equipment (it should be operational and available for use until 1/1/98). He also noted what EAS plans we had and what type of equipment we were using.

- From listserver e-mail: "According to the FCC inspector during our surprise EAS inspection (sigh), You must log all tests received from your assigned stations. And yes, they are very strict about logging, but what they want is a separate log containing all receptions and transmissions (listed separately of course).

According to the inspector, simply

stapling the printout to the log is not good enough...."

- From Paul Stoffel: The FCC requires the operator to "log" the following EAS messages:

- sent Required Weekly Test (RWT)
- received and sent Required Monthly Test (RMT)

- received RWTs from LP-1 and State Relay

- National-level Tests and Alert Messages

- any EAS alerts SENT. For example, a relayed severe thunderstorm warning (SVR), or tornado warning (TOR) from the NWS.

- Leonard Charles wrote about why a WX alert could be missed for Grant County on EAS: " Look in your State Plan, Appendix B, to determine which weather transmitters are responsible for which counties. There is a coverage map and a county-by-county listing. Grant county is covered by WXL-64 out of Dubuque.

- Tom Weeden added: You can get warning info at www.crh.noaa.gov/mkx/welcome.htm (Sullivan NWS's home page), but it may not be as current as a dedicated weather wire. La Crosse is at www.crh.noaa.gov/arx

- From Harris homepage: May 19, 1997. Sage has finished the firmware upgrade for the ENDEC. Shipping began on May 16, 1997. It may take up to 4 weeks to send all updates.

Also available on the web, DOS software for the new upgrade: Sage DOS software - Release Version 1.3.

- WMTV installed version 0.79T software in their TFT EAS equipment.

- July's RMT will originate from SR stations.

NEW CHAPTER MEMBERS

SBE Chapter 24 welcomes the following new members:

Bill Fletcher, Educational Communications Board, Madison (reinstated)

Kory Loy, WMTV, Madison

John Meany, John Deere Credit Services, Madison

Tim Perko, WMTV, Madison

Michael Murrey, Bliss Communications, Janesville

Jamie McCloskey, TCI (reinstated)

Professional Announcement

Dave Pritchard has been appointed to the newly created position of Director of Satellite and Video Services for Norlight Telecommunications Satellite and Video Services. Norlight Telecommunications is based in Brookfield, WI.

SBE Listserver Information

Chapter 24 members are invited to join the chapter's listserver. The e-mail address: majordomo@broadcast.net Body of e-mail message: subscribe msnbe (The "subject" line can be left blank.) To post to the list, send e-mail to: msnbe@broadcast.net

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

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A MESSAGE FROM THE NEW CHAIR

By Fred Sperry

I would like to start off by thanking everyone who participated in the Chapter's April election. I am pleased to have been elected as the new Chair of this Chapter. It is truly a great honor. And while I'm on the subject of thank you's, I would like to thank Paul Stoffel for his past two years as Chapter Chair. I think you will agree that he left me with a hard act to follow.

The strength of Chapter 24 lies in its membership and those who make up the Chapter Officers and Committee Appointees. I'm looking forward to working with the membership throughout the year as we continue to strive to maintain Chapter 24 as one of the strongest SBE Chapters in the country. I'm excited too with the opportunity to work with the officers of this Chapter, Vice Chair Kevin Ruppert, Secretary

Neal McLain, Treasurer Stan Sarch and Past Chair Paul Stoffel. I'm also pleased to announce that the current Committee Appointees have elected to continue at their posts for the next year. The chairs of these committees are listed on page two of the newsletter. However, this doesn't mean there aren't opportunities for those interested in getting more involved with Chapter 24. Please feel free to contact me if you are interested in volunteering for Chapter activities.

My first project as Chapter Chair was submitting nominations material to the National Awards committee. The nominees and categories submitted were as follows: The 42nd Annual Broadcast Clinic and "EAS Local Plan Case Studies" program presented by the Upper Midwest Region SBE Chapters as the *Best Regional Conference or Convention*; editors Mark Croom, Mike Norton and contributing authors for *Best Chapter*

Newsletter; Tom Smith for *Best Frequency Coordination Effort*; Gary Timm as *Broadcast Engineer of the Year*; Neal McLain's series on Broadband Networks as *Best Technical Program or Article* and Vicki Way for her article Television in the U.K.- London, England as *Best Student Program or Article*.

I would like to thank Leonard Charles for his fine work writing up a narrative to support the nomination of Gary Timm as Broadcast Engineer of the Year. Thanks also to Tom Smith and Paul Stoffel for their support.

I look forward to serving this Chapter as Chair for the next year. I would encourage anyone to contact me if you have any suggestions or comments about the Chapter. You can reach me by e-mail at "fsperry@mail.state.wi.us" or feel free to call me at (608)264-9806.

WBA SUMMER ENGINEERING WORKSHOP AND REGIONAL SBE MEETING SCHEDULED

On Wednesday, July 16th, 1997, the Wisconsin Broadcasters Association will hold their Summer Convention at the Abbey Resort, Lake Geneva/Fontana, WI.

Join your associates at the WBA Summer Convention for a full day of technical sessions designed to address issues of concern to both engineering and management.

Presentation Topics Include:

- Satellite Interference Causes/Cures (NSN Network Services)
- Environmental Issues (WI Dept. of Commerce)
- Broadcast Auxiliary Interference Issues (NuComm, Inc.)
- Local Zoning/Pre-emption and Tower issues (SBE General Counsel Chris Imlay)
- EAS Improvement (local/state EAS coordinators)
- Special DTV Technology luncheon presentation (Zenith)

Sessions begin at 8:30AM and conclude at 4:00PM. Registration for the full conference is just \$40, which includes the full day of technical sessions, the SBE Lunch and the DTV luncheon presentation, the Equipment Exhibits/ Reception, and the WBA Opening Night Dinner. Or, if you prefer, attend only the conference sessions and the SBE luncheon and equipment exhibition/reception for \$25.

To register, send your check for \$40 or \$25 per attendee before July 11, 1997 to:

Wisconsin Broadcasters Association
44 East Mifflin Street, Suite 900 Madison, WI 53703


Note: On-site registration will also be available between 8:00A- 8:30A on Wednesday July 16th, but please call WBA to reserve your place, 1-800-236-1922.



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FCC Rulemakings

Compiled by Tom Smith

**IB Docket 95-91; Gen Docket No. 90-357; FCC 97-70
Satellite Digital Audio Radio Service**

The FCC is seeking comment on the use of terrestrial repeaters or gap-fillers that would rebroadcast Satellite Digital Audio Radio transmissions. These transmitters will rebroadcast the signals of the digital radio signals from satellites in areas where they can not be received due to blockage from buildings and other obstructions.

This notice was adopted and released by the FCC on March 3, 1997 and published in the FEDERAL REGISTER on April 18, 1997 on pages 19,095-19,096. Comments were due on May 2, 1997 and replies were due on May 23, 1997. The comment period was extended to June 13, 1997 and comments were extended to June 27, 1997 in a notice published in the FEDERAL REGISTER on May 2, 1997 on page 24,073

**GC Docket No. 97-113; FCC 97-113
Electronic Filing of Documents in Rulemaking Proceedings**

The FCC would like to modify its rules to allow for parties interested in FCC rulemakings to file comments electronically in all FCC informal notice and comment proceedings. The FCC would still require formal comments to be filed on paper with the required number of copies. Informal comments will still be accepted on paper.

Comments were due on May 25, 1997 and replies were due on June 5, 1997. The FCC adopted and released this notice on April 7, 1997 and published

it in the FEDERAL REGISTER on April 21, 1997 on pages 19,247-19,251.

**ET Docket No. 95-18; FCC 97-93
2 GHz for Use by the Mobile Satellite Service**

The FCC has issued a further notice of rule making concerning the relocation of existing users of the frequencies that will be reallocated for the use of the new Mobile Satellite service. These frequencies include part of the 2 GHz TV remote pickup band. Issues that are discussed include the transition timing and any payments that the new users may need to pay to existing users for their expenses. (See Final Rulemakings below.)

Comments are due on June 23, 1997 and replies are due on July 21, 1997. The FCC adopted this notice on March 13, 1997 and released it on March 14, 1997. It was published in the FEDERAL REGISTER on April 22, 1997 on pages 19,538-19,541.

**ET Docket No. 97-94; FCC 97-84
Streamline the Equipment Authorization Process**

The FCC is proposing to amend its rules to allow for a simplified method of authorization of some equipment that the FCC checks for use by broadcasters and other spectrum users, and equipment that may cause interference.

The FCC would like to relax the certification requirements for part 15 unintentional radiators such as receivers other than FM and TV, broadcast equipment, part 18 equipment such as microwave ovens, and other equipment covered under other parts of the rules. The FCC would retain the requirements for digital equipment, Part 15 transmitters such as cordless phones, spread spectrum, and other unlicensed transmitters. The FCC is also proposing

electronic filing of applications for certification.

Comments are due July 21, 1997 and replies are due on August 18, 1997. This notice was adopted on March 13, 1997 and released on March 27, 1997. The notice was published in the FEDERAL REGISTER on May 5, 1997 on pages 24,383-24,387.

FINAL RULEMAKINGS

**ET Docket No. 95-18; FCC 97-93
2 GHz for Use by the Mobile Satellite Service**

This action by the FCC reallocates some of the 2 GHz spectrum from a number of different users to the new Mobile Satellite Service. This action includes a portion of the 2 GHz TV remote pickup band.

The TV pickup band will be reallocated from 1990-2110 MHz to 2025-2130 MHz. Each of the remote pickup channels bandwidth will be reduced from 17 MHz to 15 MHz. These new allocations become effective on January 1, 2000.

This notice was adopted on March 13, 1997 and released on March 14, 1997. This action became effective on May 22, 1997. It was published in the FEDERAL REGISTER on April 22, 1997 on pages 19,509-19,515.

**MM Docket No. 87-268; FCC 97-115
Advanced Television Systems and Their Impact on Existing Television Service**

This action adopts the Table of Allotments for digital television service. This concludes the rulemakings under the Sixth Report and Order on Advanced Television Systems.



(continued on nextpage)



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Steve Olson Account Manager
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Video and Networking Division
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847 734-6789 414 425-8537 Fax
847 364-7582 Fax

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ENTERPRISES

P.O. Box 314
Belmont, Wisconsin 53510
(608) 762-5327 John O'Neill

FCC Rulemakings (continued)

Also covered under this action are rules for use of DTV channels, procedures for assigning DTV channels, technical criteria for allocating additional DTV channels, and spectrum recovery. The Service replication table of DTV verses NTSC is also included.

These rules were adopted on April 3, 1997 and released on April 21, 1997. The rules became effective on June 13, 1997. The rules were published in the FEDERAL REGISTER on May 14, 1997 on pages 26,684-26,722.

MM Docket No. 87-268; FCC 97-116 Advanced Television Systems and Their Impact on Existing Television Service


This notice issues the final rules under the Fifth Report and Order concerning DTV. The rules concerning the transition from the NTSC to DTV system are covered by this action.

The timetable for application and transition to DTV is set along with the recovery of spectrum. Transmitter location and coverage of city of license rules are covered. Antenna technical standards such as height and pattern are in this action.

The FCC also set programming requirements such as making one free program channel available and simulcasting requirements of programming on both the NTSC and DTV transmitter. By April 1, 2005 all stations must air all of their programming on both the NTSC and DTV transmitter. Rules regulating multichannel video, ancillary, and supplementary services are also covered with this action.

These rules were adopted on April 3, 1997 and released on April 23, 1997. They become effective on June 16, 1997 with written comments from the public on new and/or modified information collections due on July 15, 1997. These rules were published on pages 26,966-26,992 in the FEDERAL REGISTER on May 16, 1997.

Compiled from the FEDERAL REGISTER. These notices available on the FCC Web Site (www.fcc.gov) or from the Government Printing Office (www.access.gpo.gov).


LOCAL LEGALS

Compiled by Tom Smith

Proposed

WMAD-FM, Sun Prairie, WI. 92.1 mhz

Madison Radio Group seeks to change antenna and effective radiated power. Filed May 22, 1997.

(From Broadcasting and Cable Magazine)

FCC Changes (continued from page 1)

like to retain her seat, but the Administration is working with McCain on Powell's appointment. McCain says that he will hold up the other appointments until Powell is nominated. Chong holds a Republican seat.

Possible replacements for Hundt include Ness, Kennard, White House economic advisor and former Common Carrier Bureau chief Kathleen Wallman, and former Commerce Committee counsel Ralph Everett.

Compiled from NY TIMES, WI. STATE JOURNAL, and BROADCASTING AND CABLE

SBE Membership Database

By Dave Biondi, Broadcast Net

There is a new chapter management feature on the sbe.org website. Jim Bernier has installed a search feature that provides SBE Membership Database Information for each chapter. This will produce an html report, based on the actual membership database at national headquarters, of all current members assigned to a chapter. This will be kept current and is a great way to find out who is actually in your chapter. At the bottom of the report there is an indication of how many chapter members are certified. To access this feature, click on the Chapter Rosters Button at: <http://www.sbe.org>.

CHAPTER 24 SUSTAINING MEMBERS

RECENT RENEWAL:

Fuji Film
Sony Broadcast

THANKS TO ALL OUR SUSTAINING MEMBERS:

Alpha Video
Broadcast Communications
CTI
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President

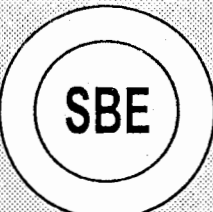
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SBE Chapter 24 Newsletter
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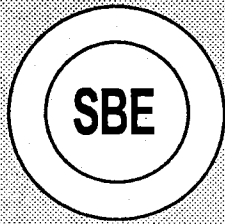
FIRST CLASS MAIL

Leonard Charles WISC-TV
5714 Modenaire Street
Madison, WI 53711

Newsletter edited on Pagemaker 5.0 by: Mike Norton
Contributors this month: Dave Biondi, Neal McLain, Denise Maney, Kevin Ruppert,
Tom Smith, Fred Sperry, Paul Stoffel, and Tom Weeden.
Thanks to Chris Cain for his work on the Chapter 24 WWW page.

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JUNE MEETING and PROGRAM



**Society of Broadcast Engineers
CHAPTER 24 MADISON, WISCONSIN
Tuesday, June 17, 1997**

Norlight Telecommunications Tour

This month's program will be a tour of the Norlight Telecommunications Network Management Center, located in Brookfield. The tour will include explanations of Norlight's telephony network and video service, a demonstration of MPEG1 compressed video currently in use, and a technical explanation of Badgernet (State of Wisconsin Sonet ring system).

Please meet at the Wisconsin Public Broadcasting Center (3319 W. Beltline Hwy) at 5:20pm, where we will car pool to Brookfield. Norlight will provide sandwiches before the meeting/program. Hope to see you there!

**Norlight Telecommunications
275 N. Corporate Drive
Brookfield, WI**

**Business meeting begins at 7:00pm,
followed by the program.**

Visitors and guests are welcome at all our SBE meetings!

1997 UPCOMING MEETING/PROGRAM DATES:

<u>Day</u>	<u>Date</u>	<u>Program</u>
Thursday	July 24	Chapter 24 Picnic

Program Committee:	Kerry Maki 833-0047	Denise Maney 277-8001	Steve Zimmerman 274-1234	Mark Croom 271-1025
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June SBE Short Circuits

*By John L. Poray, CAE
Executive Director*

NOMINEES ACCEPTED FROM MEMBERSHIP

Nominations of candidates for national officer and board seats may be made by any voting member in good standing. Nominations must be received by June 27 at the SBE National Office. Any eligible member proposed by ten or more members shall be added to the ballot. Nominees must be willing to run and serve if elected. Board members are required to attend two meetings each year while officers must attend four.

LOUISVILLE TO HOST NEW REGIONAL CONVENTION

Chapter 35 of Kentucky will sponsor a new SBE Regional Convention, October 18, 1997. The Chapter and national SBE are working together to put together a full day of educational opportunities for broadcast engineers. The Kentuckiana SBE Regional Convention will include Ennes Workshops, organized by Ennes Education Director, Richard Farquhar, CPBE, and an exhibit floor with space for up to 30 broadcast equipment manufacturers and representatives.

ENGINEERING MANAGEMENT COURSE SET TO BEGIN

The first SBE sponsored, and 29th overall, Leader-Skills Course for broadcast engineers is set to begin June 9 in Indianapolis. Eleven students will participate in the five day program, led by veteran management trainer, Richard Cupka. The students come from all over the United States, representing 10 states. Look for a follow-up in the July SBE Short Circuits.

UPDATED PREPARATION GUIDES AVAILABLE

SBE has discontinued sales of the SBE Certification Study Guides and replaced them with a new "Preparation Guide." The new guide is in a paper format and consists of 50 updated sample questions and includes an answer key. It provides a good sample of the types questions that a certification exam typically contains. There is a Preparation Guide for each level of SBE engineering certification.

A list of reference books, helpful in preparing for the exams, is also included. The Preparation Guides are convenient to use by an individual, or as a study tool in groups, such as in a chapter or at your station. The cost of each Preparation Guide is \$19. They can be ordered through the SBE National Office by calling (317) 253-1640.

RENEW NOW TO AVOID LAPSE.

SBE Membership renewals were due April 1. The grace period allowed by the By-laws ends June 30, so renew today to avoid being dropped. Regular and Associate dues remain at \$55 for the sixth year while Student Dues are \$15.

GREENBERG SCHOLARSHIP DONATIONS ACCEPTED

Donations to the Robert D. Greenberg Memorial Scholarship continue to be received. The scholarship was created in the name of Robert D. Greenberg, CPBE, who passed away unexpectedly March 20. Greenberg was an SBE member and worked for 18 years at the FCC, where he had been involved in numerous projects that impacted both the broadcaster and the consumer. The Greenberg Scholarship and the Ennes Scholarship are presented by the Ennes Educational Foundation Trust.

Persons interested in applying for the scholarship may request an application by calling the Society of Broadcast Engineers at (317) 253-1640. Faxed requests may also be made by calling (317) 253-0418. Information can also be obtained through the SBE Web Site by accessing the Ennes Educational Foundation Trust page.

Tax deductible donations may be made to the Ennes Educational Foundation Trust. Donors may specify their donation be for the Greenberg Scholarship, Ennes Scholarship or to help fund educational programs or publication projects of the Trust. Mail your donations to: Ennes Educational Foundation Trust, 8445 Keystone Crossing, Suite 140, Indianapolis, Indiana 46240.

AUDIO AND VIDEO ENGINEER CERTIFICATION

Earlier this year, the SBE announced the creation of new certification programs for Audio and Video Engineers. These are five year level programs (require five years experience) and require the applicant sit for an exam. The exams are similar to broadcast engineer exams except they do not include any RF related questions, and instead concentrate on either audio or video engineering. The Audio and Video Engineering exams are given during the same bi-yearly periods as SBE's other certification exams. If you are interested, call the SBE National Office at (317) 253-1640 and request information about either the Certified Engineer Audio or Certified Engineer Video programs.

ENNES INFORMATION ADDED TO SBE WEB SITE

An Ennes Educational Foundation Trust page has been created at the SBE Web Site. Information on the Ennes Scholarships, Workshops and educational articles can be found there. There is also information on how you can support this worthwhile organization with your financial support. Check it out at www.sbe.org.