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The Radio Technology Leader
August 2001
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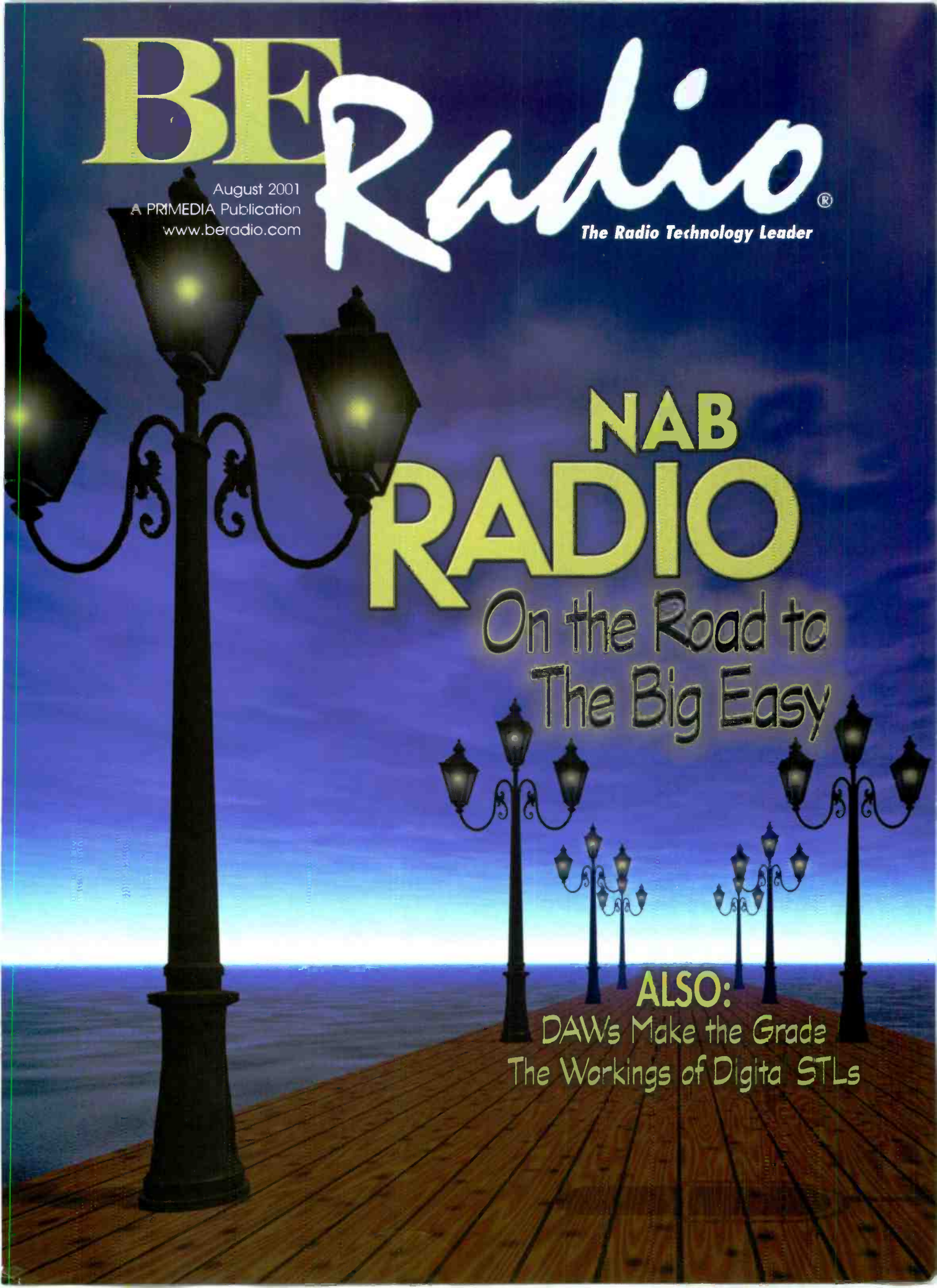

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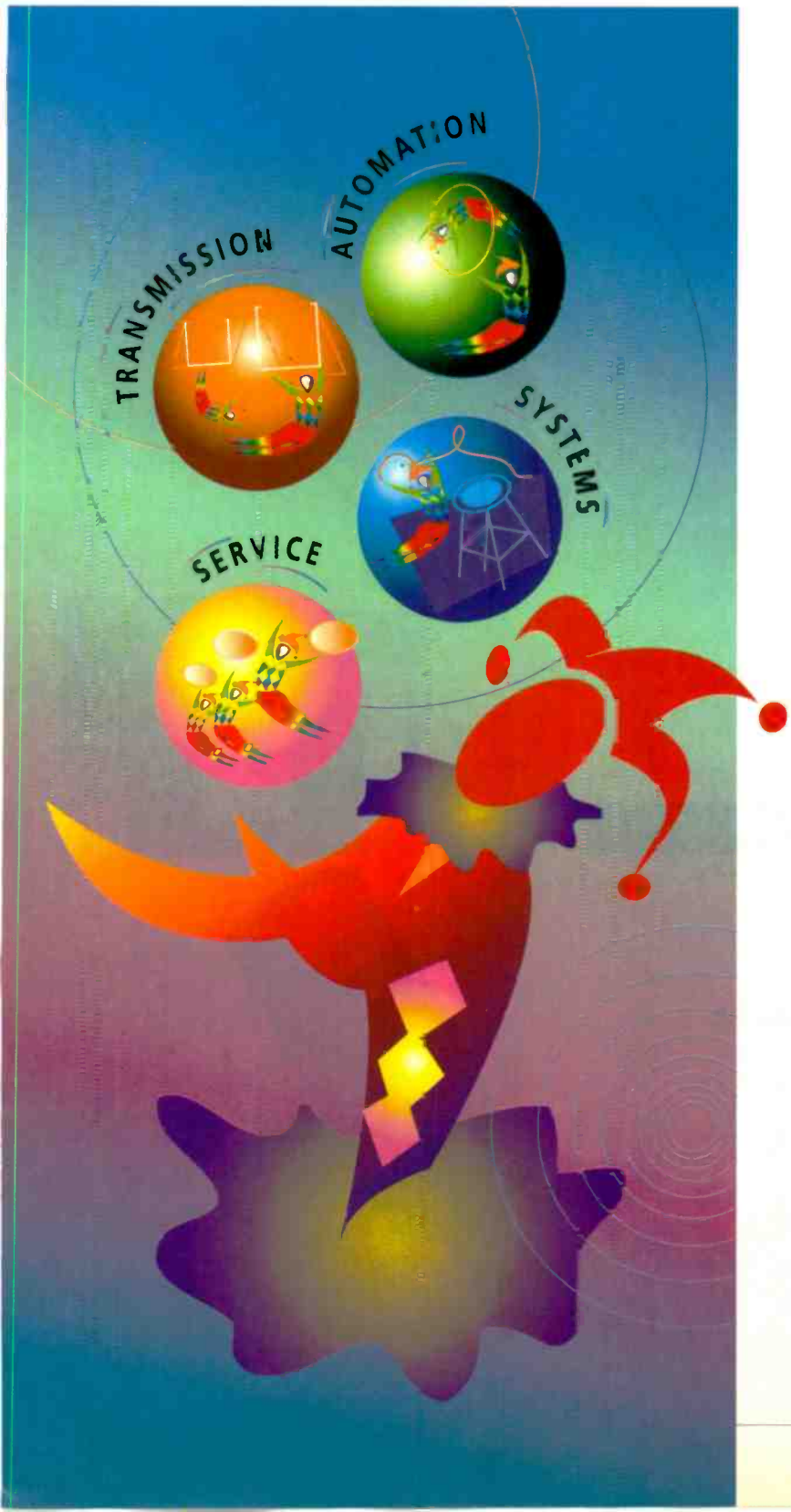

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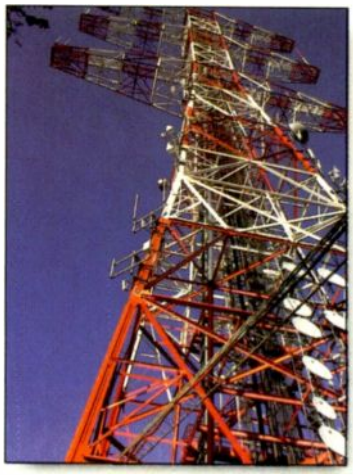

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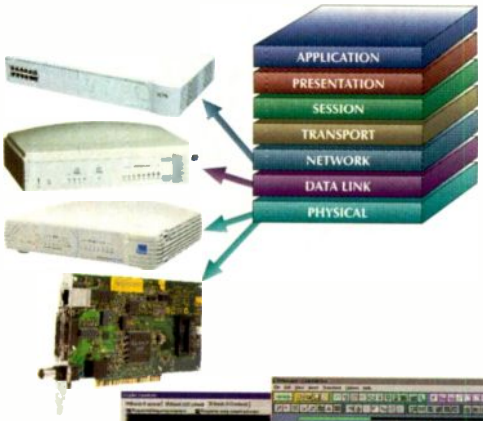

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3 Radio heads South and returns to New Orleans. Make the most of your time at the convention with er design by Michael J. Knust.

"You just have to speak to the right people."

Shannon Black, on-air talent at KRQQ FM, at the VADIS DC console.

"After looking at several options, we decided on the VADIS platform and DC consoles from KLOTZ," says John Decker, Chief Engineer, Capstar Communications, Tucson. "Why? First, our install would be much faster since most of the plant wiring could be reduced to a simple Ethernet line and a fiber optic cable connecting each room with our rack room.

"Secondly, all four stations were to be housed in the same facility, and we had to share audio sources all around the plant. This is a function that is part of the KLOTZ system. Our entire plant is now based on a digital audio 'back-bone' that provides an improved audio signal.

"We also purchased five DC consoles. The air talent finds the DC consoles simple to operate. They can put any source in our plant on any fader of the console with a simple LCD button in the meter bridge. Giving the operator the ability to call up any source to a fader is great since each operator prefers a different arrangement of sources on the console."

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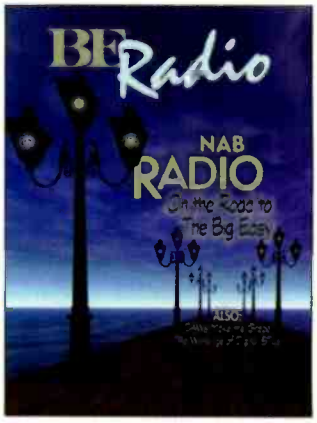

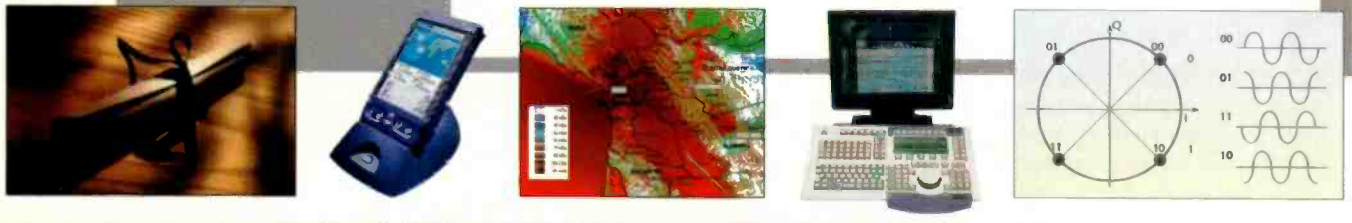

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Watch those hands

I am sure you have cursed another driver for paying more attention to his cellphone call than to the road. The sensory blitz of everyday life is hard to avoid, and someone splitting his attention between driving and finalizing dinner plans does not make my travel experience any more enjoyable or safe.

We're all guilty of splitting our attention while on the road at some point. Some people are better than others in this transit multitasking. My favorite combination is the person smoking, eating putting on makeup or shaving, and adjusting the radio while keeping an eye out for the correct turn. Feel free to take as many lanes as you need.

Some states have already enacted legislation to restrict some of this attention depriving behavior with laws restricting mobile phone usage to hands-free operation only. While this certainly helps keep both hands available for the wheel (or more likely the Super Big Gulp) it does not guarantee that the driver's mind is on the road.

This movement has now moved to a national level. In May, separate Bills were introduced to the House and the Senate, which are designed to force states to enact laws restricting the use of mobile phones while operating a motor vehicle. The House Bill (H.R. 1837), introduced by Representative Ackerman of New York, is titled the *Call Responsibly and Stay Healthy Act 2001*. The Senate version, introduced by Senator Cozine of New Jersey, is titled the *Mobile Telephone Driving Safety Act of 2001* (Bill S. 927).

Both Bills have very similar wording and call for the states to pass laws requiring mobile phones to only be used with hands-free adapters while the user operates a motor vehicle. The only exception is for emergencies. States that do not pass laws that fall into this area will have federal highway funds withheld. This process was also used to raise state drinking ages to 21.

From a consumer point of view, this is a great idea. As I mentioned earlier, there are already too many distractions on the road, and keeping both of the driver's hands free will certainly help. For the business of radio, there could be some undesired consequences.

The immediate nature of radio sometimes relies on cellphones for a last-minute on-air report. When a report deals with a crisis, and the reporter uses a cellphone, it may qualify as an emergency. Station personnel could easily claim that the report is a call to action. Weather emergencies and other events do not wait for someone to plug in a hands-free adapter.

When the station's employee driving to the remote site calls the station for directions, it is not an emergency if he is five minutes late for the appearance at the Hot Tub Outlet. Likewise, a salesperson arranging a quick tee time is not part of an emergency.

Situations like these can bend the rules on emergency use, and it will be up to the individual person to make the right choice and not try to get special treatment to evade the law.

One other potential consequence concerns the actual definition of "mobile telephone." The Bills target users of hand-held telephones on public switched networks, such as PCS, GSM and analog cellular. If the definition is not clearly defined, it could also cover two-way radios and any point-to-point two-way communication. Some stations could be heavily affected by legislation that is too broad in its coverage.

This could become a situation to watch as the Bills make their way through the process. Both are currently in committee review, so it may be a while until they see much public activity. When someone says there ought to be a law, be careful what you wish for. You just might get what you thought you wanted if you don't define the terms properly.

Chriss Scherer, editor
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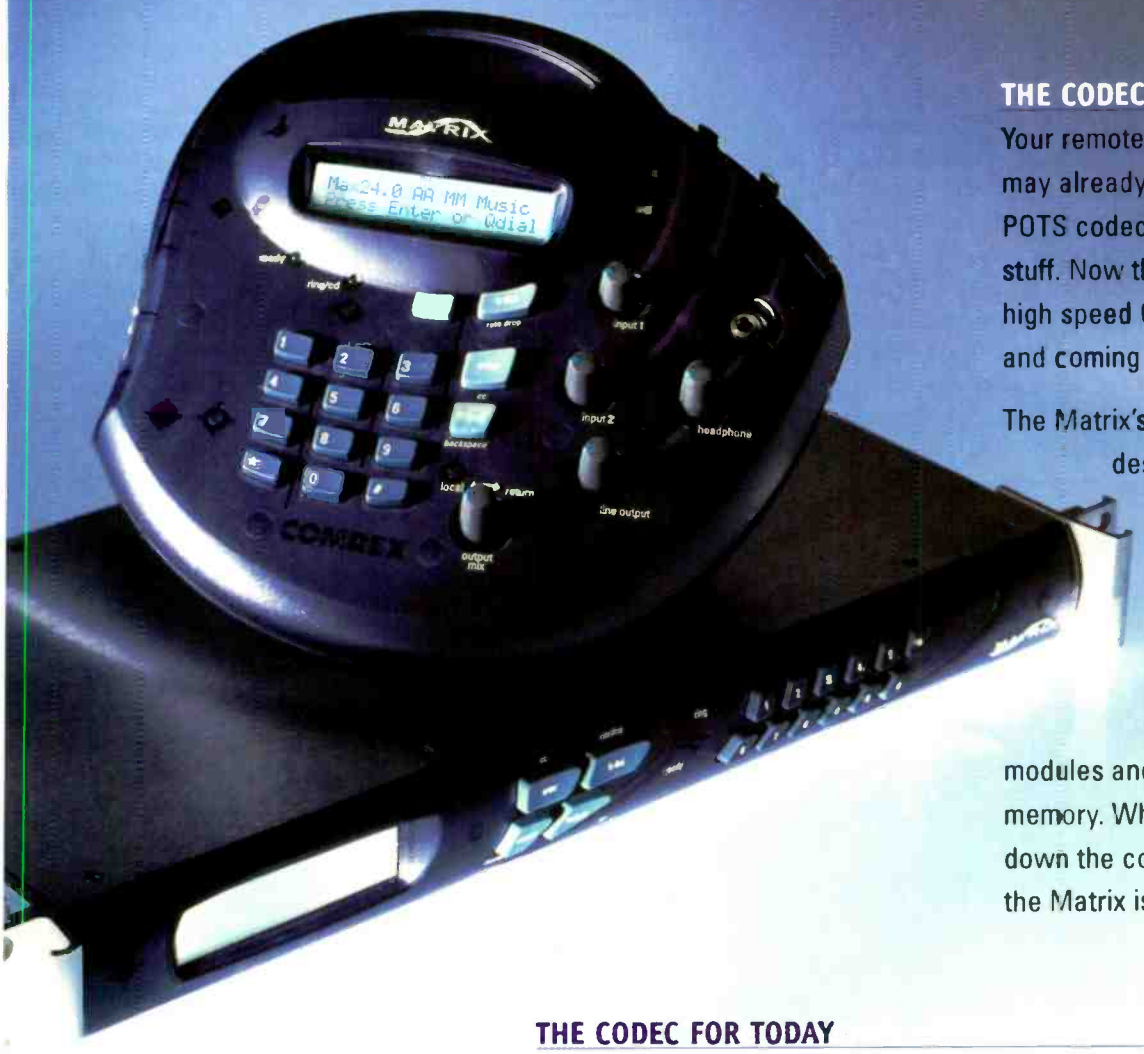

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* ISDN module required

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Hiring technical staff

By Ron Bartlebaugh

The hiring of technical staff is critical to any operation. A typical broadcast operation relies heavily on computer technology not only for its office functionality, but also for its program production and delivery. This reliance on computer technology has created a newly titled position in the broadcast industry known as a broadcast computer technician. Many companies seek broadcast engineers who have a good balance of knowledge and skills in the area of computer hardware and software as well as video, audio, and transmission. Larger companies have recognized the need for a staff of computer technicians that work in conjunction with the station's broadcast engineering staff. Collectively, those positions are then responsible for the entire technical operation of a broadcast facility. It is important for each employer to determine whether one person with many skills would be best for the position or if hiring two people of multiple yet different and complementary abilities would better suit the need.

Hire someone who can help your staff solve problems.

Begin your search by defining what you want and need. Create an accurate job description that outlines the responsibilities and qualifications of the position. First create an appropriate job title for the position. Next compose a description of the position that best describes the areas and levels of responsibility and functionality of the job. Within the qualifications section of the job description, list the education and experience requirements for the person that you hope to find. Finally, list the base pay and benefits package available for the position. Paying less for an entry-level person with minimal or no experience may be beneficial to your operating budget up-front; however, in the long run, it may be detrimental if the person lacks the knowledge and experience that is really needed in order to do the job correctly. Offering a handsome and yet affordable salary and benefits package will often attract a better quality candidate. The job description should be well defined and be one that exactly describes the type of person you are looking for as well as what their performance expectations are to be.

Your goal should be to hire the best person for the position and one who will meet your company's needs and objectives. Look for a person who can help your staff solve problems. Strive to hire a person who knows and understands technology, as well as one who has the ability to address your staff's needs in a mode of customer service and satisfaction. Seek out people who understand teamwork, have people skills, are detail oriented, have good problem solving skills, and who appear to have a good work ethic. A strong candidate will have a good balance of technical and business knowledge as well as proper behavior patterns.

Where to look

Locating potential job candidates can be challenging. The Society of Broadcast Engineers (SBE) operates a website (www.sbe.org) where a job opportunity can be posted. A similar service is also available through broadcast.net and its broadcast-résumé list server. Résumés of job seekers are also available for review on these Web pages. Alert the SBE chapter in your area of the job opportunity. Local chapter information is available via the SBE Web page. Networking with various broadcast industry professionals is an excellent way in which to gather the names of potential candidates. Often a call to a larger broadcast equipment distributor will yield the names of persons known to be seeking advancement in employment opportunities. Advertising in trade-specific publications will directly expose your position opening to the industry. Traditional newspaper advertising should not be overlooked, nor should the use of search firms and Internet recruiting.

As an employer, it is often difficult to assess the knowledge and skills of each candidate. There are many certifications available to qualified persons in the broadcast and computer industry. Certifications effectively measure the performance of a person on a defined skill level. The

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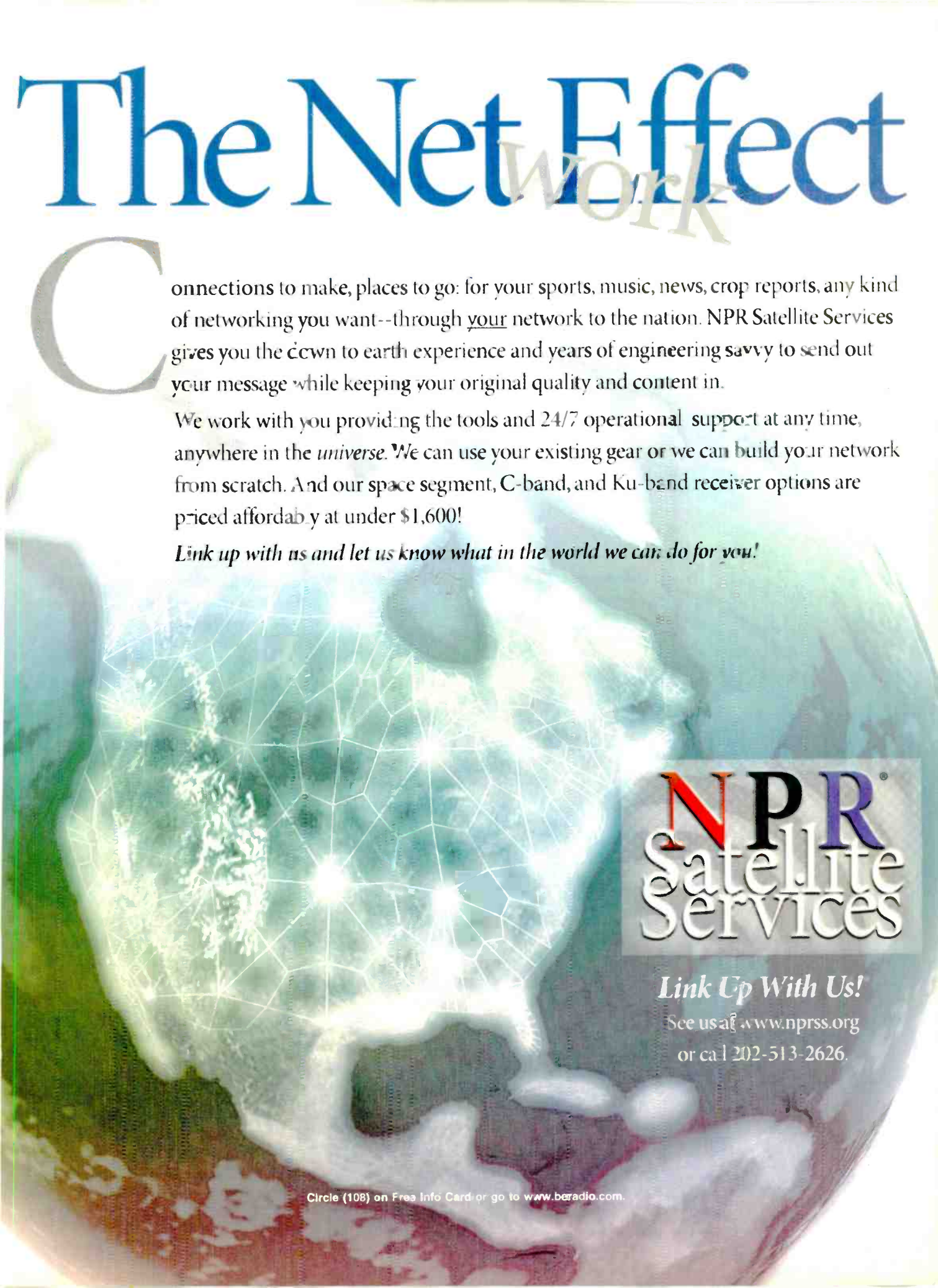

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Society of Broadcast Engineers offers certifications ranging from Television Operator to Professional Broadcast Engineer (CPBE). The SBE certification as a Certified Broadcast Networking Technologist (CBNT) is for people who have demonstrated a basic familiarity with networking hardware used in business and audio/video applications in broadcast facilities. Other levels of SBE certifications reflect a person's abilities and knowledge in broadcasting at various levels. In addition, many companies in the computer industry, including Microsoft, IBM, Novell, and Cisco, offer many levels of certification. Check each applicant's résumé for experience in technology as well as industry experience. Look for persons who have experience working with the brands of equipment located in your facility and the types of computer operating platforms in use. Seek individuals who belong to industry-related professional organizations and who actively attend industry trade shows and seminars. A strong candidate will be one who demonstrates a desire to learn and otherwise continuously improve his level of skill and ability.

Professional certification provides a standardized method for determining a candidate's qualifications.

When conducting interviews, be sure to follow all legal guidelines for interviewing and hiring. Have the candidate meet with multiple people on your staff who may be able to provide a different perspective of the interviewee. Create a list of several questions to ask each candidate and then judge how each candidate relates to and otherwise interprets each question. Ask the candidate what he would do in a particular situation. Look for a positive response to the question, and listen to and look at the candidate's thought processes. Comparing the responses will greatly assist in determining the best candidate for the position. Also determine how the candidate's current job environment is similar to or different from yours. Be prepared to make a quick decision. Qualified candidates are in high demand and may go elsewhere due to the highly competitive marketplace.

Ron Bartlebaugh is director of engineering for the WKSU Stations, Kent, OH, and president of Audio and Broadcast Specialists, Akron, OH.

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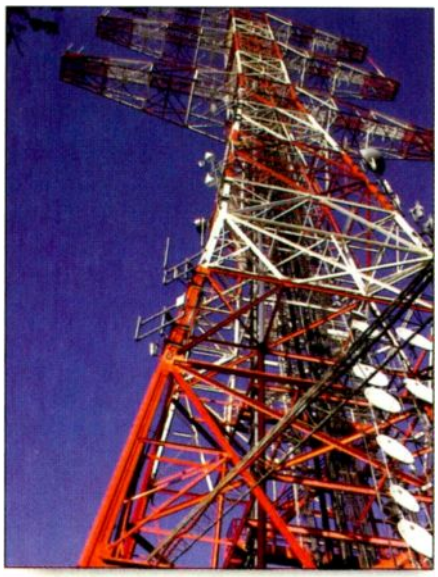
Thoughts on FM

By John Battison, P.E., technical editor, RF

I often wonder if Major Armstrong knew what he was giving to the world when he began developing frequency modulation as a public service. Before World War Two, when the low-band FM service was a comparatively high frequency, it seems that not much attention had been paid to possible long distance interference produced by local VHF broadcasts. Not long after WW2, it was discovered that the BBC TV broadcasts were receiving interference from the Chicago Police transmissions. This led to a reevaluation of the frequency allocations, and our TV channel 1, which was in the top end of the 40MHz band, was deleted. Fortunately, no channel 1 stations had been built, although one channel 1 CP had been issued. This was quickly changed to another usable channel.



Armstrong's tower in Alpine, NJ, is still being used today, but houses only one FM broadcast signal.

By the time that the TV problems had arisen, our FM service had long since been changed to the high band at twice the original allocation frequency. This was particularly important to me because my first job at KMBC in November 1945 was to convert its low-band FM transmitter to 99.7MHz. Happily, the new frequency was exactly twice the old one. It was only necessary to build a doubler stage and a new PA, and then find a new antenna. The latter was the hardest part.

The station also had an experimental television license and a fine laboratory on the top floor of the Kansas City Power and Light Building. This was where I did my development work on the new transmitter. The station would have preferred to buy a new transmitter, but none were available at that time (the "don't you know there's a war on?" attitude still prevailed).

I had the idea that it might be possible to obtain a circular pattern by means of some kind of long radiator around the top of the tower because it was not easy to buy FM antennas in those days.

Unfortunately, all the details of my idea have been lost and forgotten. I do recall, however, that the pattern seemed quite circular, but in the absence of any measuring equipment, all I could do was to compare reception at different points on a receiver and a whip antenna.

Fortunately, a Federal triangular FM antenna became available suddenly, and the problem was solved before the FCC looked into my experiments.

A simple start

When Major Armstrong was developing FM, he probably used simple dipole antennas at first. Then, as the commercial application of the new medium began to appear, he no doubt gave attention to the method of radiating the new signal.

It must have been obvious as Major Armstrong progressed with the development of FM that the narrow bandwidth and highly directional properties of dipoles would hinder FM's growth unless patterns and characteristics were modified. It was necessary to develop antennas with broad bandwidths, lower Q and more or less circular patterns. It's interesting to reflect on the fact that the original humble, simple, single-dipole radiator has become important today as a major part of the popular panel antenna. Although the windloading tends to be a little high, the panel-dipole antenna produces one of the most circular patterns available in FM.

Fifty years ago we didn't have an EPA , and no one worried about the effects of RF non-ionizing radiation (and no one yet has proved that it hurts us). However, the FM antenna manufacturer still has to contend with downward radiation and consider antenna bay spacing in his design.

Antenna-bay spacing and number of bays still seem to control the level of downward radiation as modified by various antenna engineers. Over the years, simple FM broadcasting has matured into a highly technical operation, in many ways, perhaps, more complicated than the directional AM antenna field. As FM ERP has increased and stabilized, matters that probably were not even considered have now become essential.

Some time around 1960, in an effort to improve stability of reception, a number of FM antenna manufacturers developed *circular polarization (CPOL)*. The FCC permitted equal power in both horizontal and vertical polarizations, but vertical power may never exceed horizontal. Coverage is based on the horizontal signal, and vertical power is not considered when calculating contours.

It was anticipated that CPOL would improve reception for receivers using line cords as antennas (with various polarizations), as well as auto radios and in areas of tall buildings and mountainous terrain. In many cases, reception did improve; however, it was found that maximum improve-

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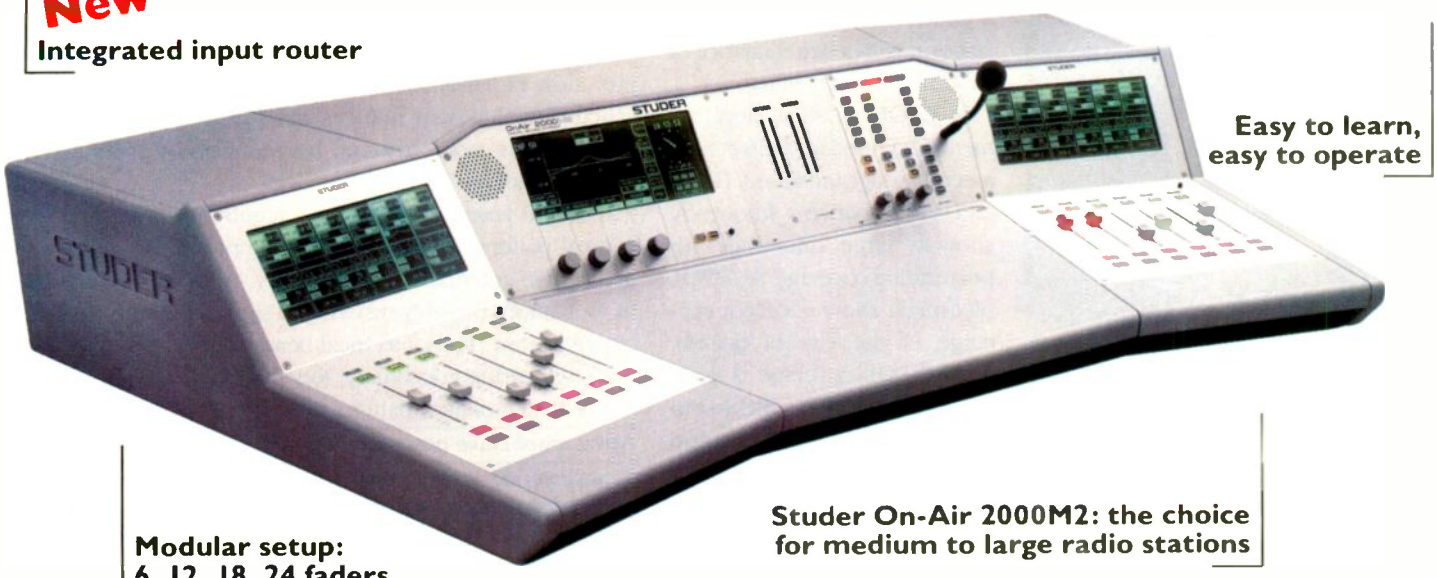

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A circularly polarized antenna, such as this FMA-727 from Armstrong Transmitters, provides a signal in both the horizontal and vertical planes.

ment could only be obtained by using CPOL receiving antennas as well. Unfortunately, few people can find CPOL receiving antennas. Nevertheless, there is a definite benefit in most cases because the average listening location will likely have a wider choice of signal polarizations, with a better chance of capturing a clean signal.

As CPOL antenna development continued and directional antenna usage increased, HPOL and VPOL patterns frequently showed large differences in polarization coverage. An HPOL plot might show excellent coverage of the city of license, while VPOL coverage is poor and *vice versa*. This has led to the introduction of short vertical parasitic correction rods located near the antenna in an attempt to make the two polarizations provide overlapping coverage by modifying the vertical signal.

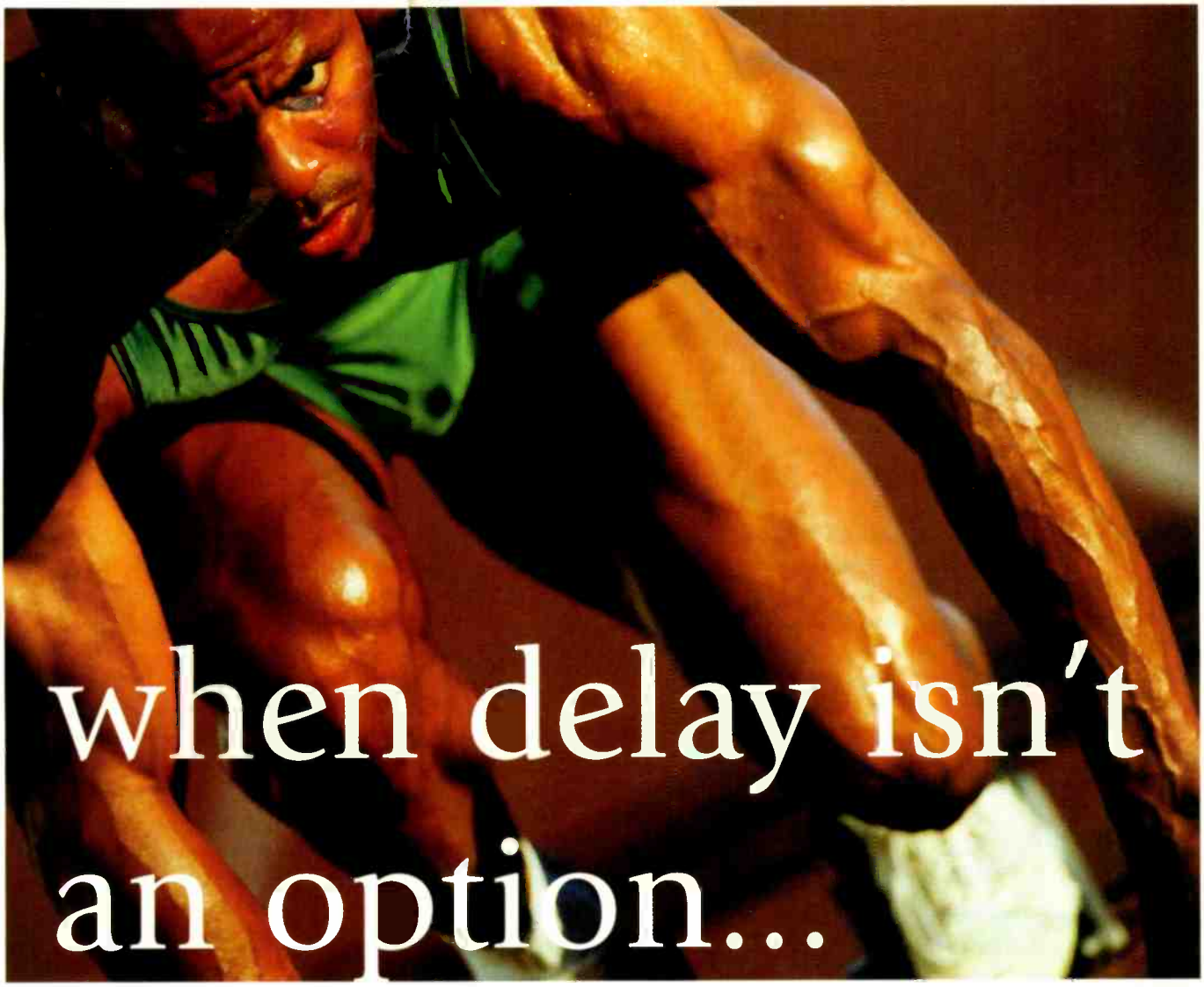
The use of CP requires twice the transmitter power, or twice the antenna gain, needed for HPOL to provide equivalent vertical and horizontal coverage. This often poses financial questions of transmitter operating costs versus antenna support costs.

As the number of bays increases, other problems arise. Neglecting tower windloading, the greater the antenna gain, the narrower the vertical beamwidth. Wide bay spacing of up to one wavelength tends to increase the radiation at extreme angles of elevation. This means that more power is directed downward (frowned upon by the EPA) and into the air, where there are no listeners. High elevation radiation can be reduced by using half-wave spacing, which also reduces the tower space required, and multiple sidelobes can be reduced by careful bay spacing and feeder design.

About 50 years ago not much attention was paid to the vertical patterns of the relatively simple HPOL antennas, unless the antenna was on a very tall tower or a high mountaintop, possibly resulting in signals passing over the city of license. Thus, electrical beam tilt found its way into our engineering vocabulary, together with new interest in the vertical radiation pattern.

Alpine tower photo courtesy of the Alpine Tower Company.

E-mail John at batcom@bright.net.



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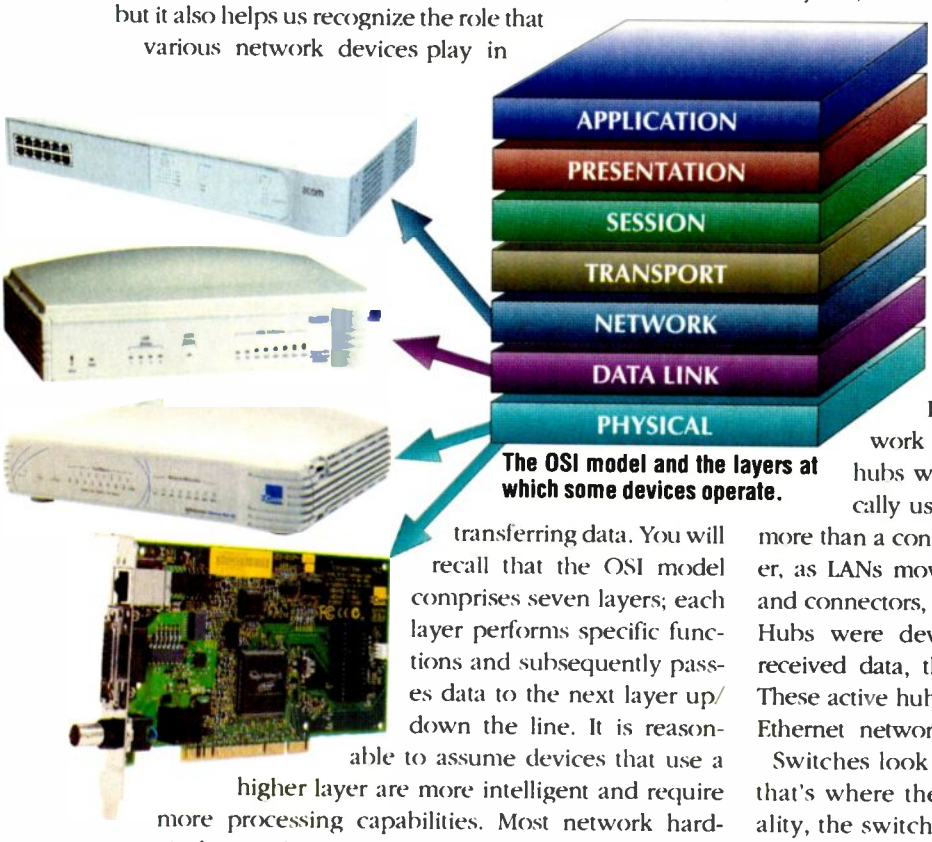
Switches and hubs

By Kevin McNamara, CNE

Last month, I discussed Ethernet routers and some of the concepts behind routing. This month, we will look at a slightly different piece of network hardware, the Ethernet switch. I use the term slightly because, operationally, the current generations of Ethernet switches have a great deal in common with routers.

LAN hardware and the OSI model

In order to fully understand how switches work, it is useful to know where the basic network components—hubs, bridges and routers—fit with the Open Standards Interconnect (OSI) model. The OSI not only provides a method for PCs to seamlessly communicate with each other, but it also helps us recognize the role that various network devices play in transferring data. You will recall that the OSI model comprises seven layers; each layer performs specific functions and subsequently passes data to the next layer up/down the line. It is reasonable to assume devices that use a higher layer are more intelligent and require more processing capabilities. Most network hardware is designed to operate at a specific layer, or, in some cases, more than one. For example, *network interface cards* (NIC), or something as simple as the network cabling, operate at Layer 1, the physical layer, which deals with the communications hardware. Active hubs also work at Layer 1, since their main function is to regenerate signals carried over the cabling. This regeneration can also make it possible to operate different connection speeds, i.e. 10Mb/s and 100Mb/s within the same network segment.



The OSI model and the layers at which some devices operate.

Layer 2 of the OSI model, the Data Link Layer, assures that data moves information reliably between two points. You see layer 2 activity on the flashing lamps typically found on most network devices. Bridges are an example of a network device operating at Layer 2. The primary function of the bridge is to segment traffic between two different networks by filtering data based on the Media Access Control (MAC) protocol ID number. Bridges can also have more sophisticated features, such as the ability to talk with other bridges and dynamically route traffic for the most efficient traffic flow.

Layer 3, the Network Layer, provides the ability to route data based on Internet Protocol (IP) addressing. Router operations (discussed in last month's column) are based primarily on Layer 3; however, routers can also use Layers 1 and 2, depending on the specific features. Next generation routers will use Layers 4 and higher; however, the power and complexity required to implement these devices will be sizable.

Hubs and switches

Hubs form the central terminus in a network based on a Star topology. The earliest hubs were called passive hubs. They were typically used with coaxial media and were nothing more than a constant impedance resistive splitter. However, as LANs moved toward using telephone type wiring and connectors, losses through the cabling were an issue. Hubs were developed that electronically regenerated received data, thus enabling longer lengths of cabling. These active hubs became the standard device used in an Ethernet network.

Switches look and feel like a basic network hub, but that's where the similarity ends. In terms of functionality, the switch resembles a high performance bridge. Like the bridge, switches operate at Layers 1 and 2, permit the isolation of LAN traffic and can establish full-duplex connections with other switches. Perhaps the easiest way to visualize how a switch differs from a hub is that the hub simply receives data and regenerates that data to all ports simultaneously, while a switch sets up each port as an individual path for data. For example, an eight-port switch will permit up to four separate data paths to be established. Switches

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are constructed using a high-performance backplane designed to support throughputs in excess of 100Mb/s or higher.

In a broadcast environment, where the facility supports a mixed variety of data traffic such as streaming audio and simple file transfers, network performance would materially improve simply by replacing a hub with a switch. Switches, however, do not provide any meaningful level of security as do devices operating at higher layers, such as routers.

Varieties of switches

Switches are intelligent devices that read the incoming packets and make the decision where to send the data. The current generation of switch is based on either of two technologies—store-and-forward or cut-through.

Switches using the store-and-forward method require that an entire packet be received before it is sent to the appropriate port. This permits very efficient translation between connections of different speeds. Because data is stored before being sent, there is some delay, or latency, developed. This latency is typically not noticeable in most 10 or 100Mb/s LANs with moderate data traffic.

If latency is an issue, than a switch using the cut-through method would be advised. Cut-through switches pass packets through immediately after reading the destination information. In many cases, data has been passed before the packet has been fully received. Cut-through switches are pricier than store-and-forward, but are recommended for larger high-performance LANs or LAN backbones above 100Mb/s.

Most common switches at the local computer emporium are of the store-and-forward variety. You'll probably find that it is harder to locate basic hubs anymore, as the price of consumer level switches have fallen below the $100 price-point.

Because switches operate at layer 2, they permit the passing of traffic from a variety of network protocols, such as IP, IPX, etc. This is particularly important if you mix network operating systems, such as Netware (4.x and lower) and Windows. Some switches permit the ability to filter data based on criteria such as protocol.

Migrating to switched a LAN environment provides a significant increase in network performance for a relatively low investment. Switches can also provide effective load balancing on LANs with mixed speed connections. Data collisions that would bring Ethernet networks to a standstill can be minimized or eliminated through the use of switches.

Kevin McNamara, BE Radio's consultant on computer technology, is president of Applied Wireless Inc., New Market, MD.

All of the Networks articles have been approved by the SBE Certification Committee as suitable study material that may assist your preparation for the SBE Certified Broadcast Networking Technologist exam. Contact the SBE at (317) 846-9000 or go to www.sbe.org for more information on SBE Certification.

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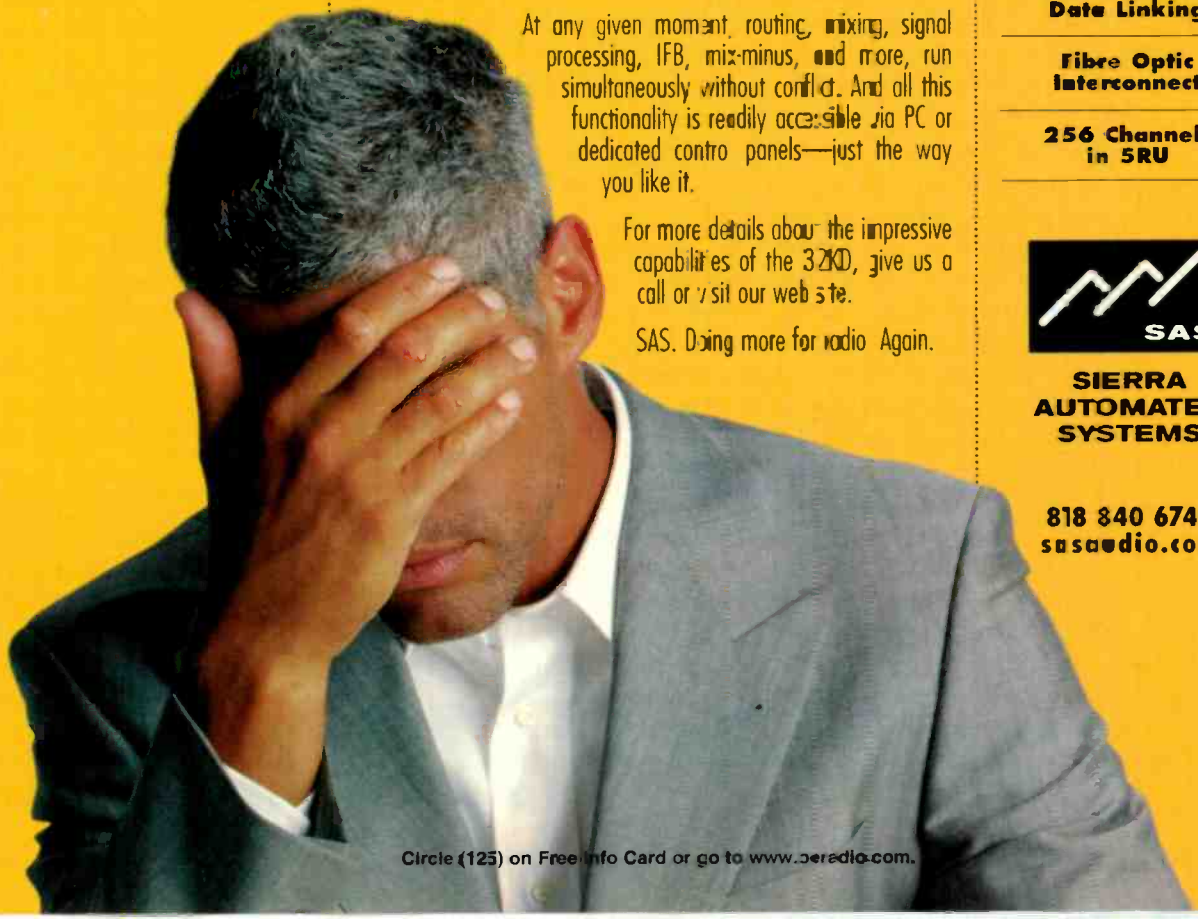

Rules for digital auxiliary services proposed

By Harry Martin

In an ever-evolving effort to smooth the transition from analog to digital technology, the Federal Communications Commission is proposing to revise its rules to allow broadcast auxiliary services (BAS) to convert to digital technology along with broadcast stations.

Because BAS stations are used by networks, and TV and radio stations transmit program material from the locations of breaking news stories or major events to studios, BAS stations must be technologically compatible with the rest of the broadcast industry. However, under the current rules, digital modulation can only be used in specified BAS bands, which slows the broadcast industry's transition to digital. For that reason, the Commission is proposing rules permitting TV and aural BAS stations to use any available digital modulation techniques in all BAS frequency bands.

The Commission is also considering an expansion of its short-term operation rule, which allows AM and FM stations to operate broadcast auxiliary stations up to 720 hours per year without prior authorization from the Commission. The rule allows broadcasters to cover events outside a station's normal operating area without coming to the Commission with STA requests. The proposed rule would expand the short-term operation rule to include broadcast network entities, cable network entities and low power television stations. Under this rule, BAS licensees would need to notify the Commission of short-term operation for planned events, such as conventions and sporting events, but not for unplanned events, such as natural disasters. The Commission also seeks comment on whether 720 hours is an appropriate cap on annual short-term operations.

Additionally, BAS and other radio services share several frequency bands and have technically and operationally similar stations. Nonetheless, they sometimes must operate under different technical rules. Such inconsistencies have led to confusion when licensees in different services have tried to operate in the same geographic areas. The proposed rules would conform technical rules that are at odds, including transmitter power and emission limits, for services including BAS, Cable Television Relay Service (CARS), and Fixed Microwave Services (FS). Further, the Commission proposes to require aural and TV BAS stations to coordinate shared frequency use, minimizing harmful interference that may occur when a station begins transmitting.

Other proposals designed to update the BAS rules would permit BAS applicants to operate under temporary conditional authority after an application has been properly filed, and make BAS application rules consistent with the FCC's Universal Licensing System (ULS).

FCC may dismantle Mass Media Bureau

The FCC is planning to seek additional comment from the communications industry and other interested parties on a reorganization of the agency along functional lines, as well as on the implementation of the following policy goals:

- The development of a clear substantive policy vision, consistent with the various communications statutes and rules to guide agency deliberations;
- The creation of a management style that builds a strong team, produces a cohesive and efficient operation, and leads to clear and timely decisions;
- The development of independent technical and economic expertise through recruitment, training, and employee development; and

While the reorganization is still on the drawing board, it has been informally reported that the Television Branch of the Mass Media Bureau may be merged into the Cable Bureau. It also has been reported that the audio services regulatory staff, which deals with the nation's radio stations, may be moved into the Wireless Bureau. This dismantling of the Mass Media Bureau would likely cause a loss of knowledgeable top-level staff, subject radio and TV to different regulatory schemes, and otherwise make the FCC less responsive to broadcasters' needs.

EAS Handbook revised

The FCC has released a revised 2001 edition of the Emergency Alert System (EAS) AM/FM and TV Handbooks. The handbooks have been revised to delete references to the Authenticator List, which is no longer used. FCC rules require each station to keep a handbook at duty positions or EAS equipment locations, immediately available to staff responsible for authenticating messages and initiating EAS actions.

Harry Martin is an attorney with Fletcher, Heald & Hildreth, PLC., Arlington, VA. E-mail martin@fhh-telcomlaw.com.

Dateline

October 1, 2001 is the deadline for biennial ownership reports for stations in the following states and territories: Alaska, Florida, Guam, Hawaii, Iowa, Mariana Islands, Missouri, Oregon, Puerto Rico, Samoa, Virgin Islands and Washington.

By October 10, issues/programs lists for the period July 1 to September 30 must be placed in stations' public files.

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THE NAB RADIO SHOW

On the Road to The Big Easy

By Chriss Scherer, editor,
and Cindy Holst, associate editor

When the NAB Radio Show returned after the demise of the World Media Expo, New Orleans played host to the event. That show was well attended, and New Orleans proved itself to be a worthy convention city. Four years later, the NAB Radio Show is making its way back to the Big Easy.

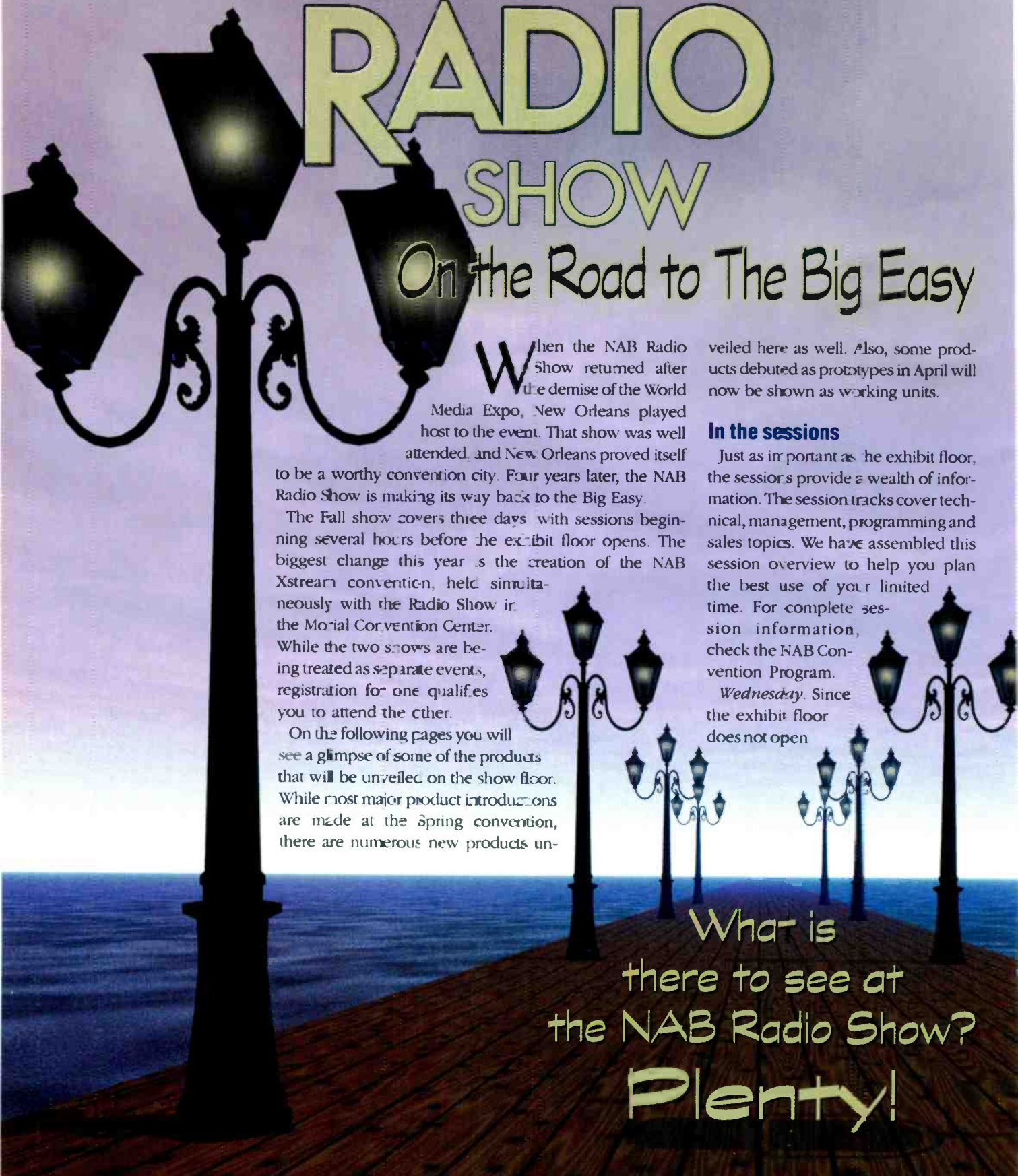
The Fall show covers three days with sessions beginning several hours before the exhibit floor opens. The biggest change this year is the creation of the NAB Xstream convention, held simultaneously with the Radio Show in the Morial Convention Center. While the two shows are being treated as separate events, registration for one qualifies you to attend the other.

On the following pages you will see a glimpse of some of the products that will be unveiled on the show floor. While most major product introductions are made at the Spring convention, there are numerous new products unveiled here as well. Also, some products debuted as prototypes in April will now be shown as working units.

In the sessions

Just as important as the exhibit floor, the sessions provide a wealth of information. The session tracks cover technical, management, programming and sales topics. We have assembled this session overview to help you plan the best use of your limited time. For complete session information, check the NAB Convention Program.

Wednesday. Since the exhibit floor does not open



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until the evening on Wednesday, there is plenty of time to attend one of the sessions during the day. Making its annual appearance for a full-day session is the AM/FM Antenna Certification Workshop. This detailed look into the final element of the broadcast system has been updated and will include information on maintenance and inspection of antenna systems. The final portion will address the new engineering considerations when evaluating safe lifting capacities for gin poles.

At 1pm, the session *The Portable People Meter is Coming* will look at the technology and discuss the results of its first test in the United States (The Arbitron Portable People meter was outlined in the July 2000 issue of *BE Radio*). This session will provide new insight into the future of radio ratings.

Nearly every station has some kind of Web presence. The session at 1pm will provide information on determining a station's Web strategy and what type of content to make available.

At 2:15, the session *Steering Clear of FCC Fines and Forfeitures* will look at topics such as indecent programming, failure to maintain public inspection files and improperly installed EAS equipment. The Chief of the FCC's Enforcement Bureau and several radio legal counselors will steer you clear of the FCC's fines and forfeitures.

Thursday. Radio's future is digital. The day-long session on Thursday called *Digital Radio Certification Workshop* runs from 10:30am to 5pm. It is expected that 2002 will be the year for the commercial start of IBOC. Attendees will gather practical implementation information needed for budgeting and implementing an IBOC system.

Panelists include representatives from iBiquity Digital and several manufacturers that cover areas affected by the conversion to IBOC.

In a less-intensive session called *Understanding New Technology & Radio* (3pm to 4pm), attendees can learn about radio's role in the changing entertainment landscape.

Friday. The counterpart to the Wednesday session is the *AM/FM Transmitter Certification Workshop*. Also a day-long session (8am to 3pm), this covers the ins and outs of the transmitter facility and offers some helpful tips and techniques that will find quick use in the field.

Look next door

The Xstream convention has its own track of sessions, some of which have a direct radio appeal outside the show's efforts to be an all-encompassing streaming event. Here is a brief list of some sessions on Friday with radio appeal.

10am: AM Small-Market Streaming—How to Really Do it on a Budget

10:20am: AM Leveraging Your Assets—Making the Most of Your Media

11:15am: Internet Appliances—Threatening the Livelihood of the PC

2:25pm: Digital Rights Management—A Legal Guide

3:20pm: Legal Issues Around Streaming Audio

Of course, New Orleans offers plenty to see and do outside the convention, especially if food and music appeal to you.

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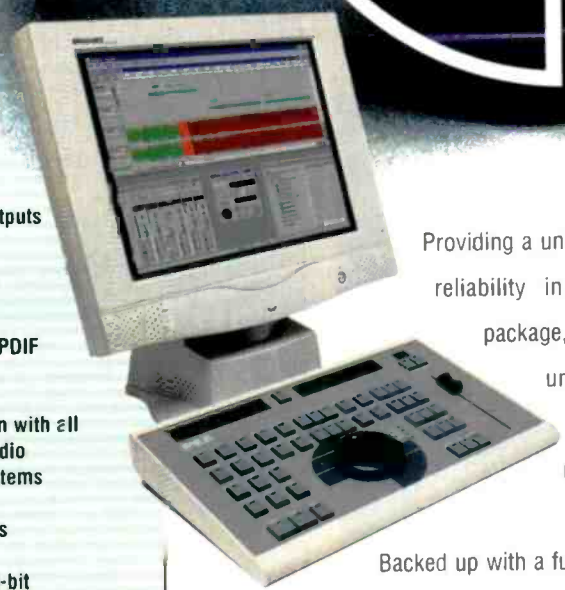

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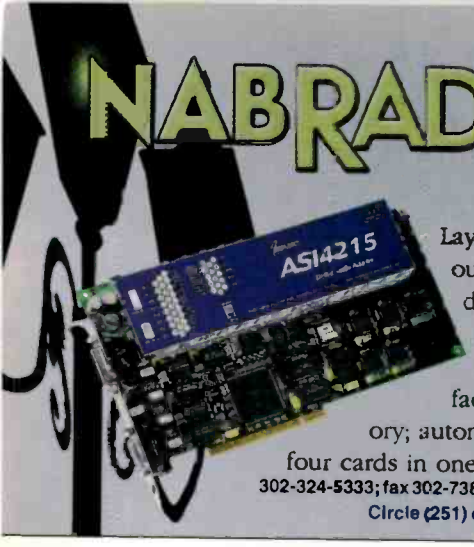

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- Thursday, September 6
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- Friday, September 7
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On The Air

A Monthly Newsletter from Broadcast Software International Issue 6

News

You're Invited to BSI on the Bayou

If you're going to the NAB Radio Show in September, put a few hours aside Wednesday evening (Sept. 5) for BSI On The Bayou. Broadcast Software International is hosting a two-and-a-half-hour riverboat cruise, aboard the elegant Riverboat Cajun Queen. The cruise will officially launch BSI's newest automation software currently codenamed "Simian" and demonstrate several other new BSI products.

BSI's Simian is the first of a new generation of digital automation solutions. Many features are still confidential; though we can tell you that Simian incorporates advanced capabilities for self-diagnosis and repair, interstation communications and streaming spot substitution. Simian is touchscreen enabled and will support tagging and simultaneous multiple playback of all professional audio file types.

We'll also be showing our new audio capture software, Skimmer, which is great for sampling jocks or any other kind of air check. Skimmer can record up to an entire year of audio, with any minute of any day instantly accessible.

If you need more than a riverboat cruise and new product demos to peak your interest, we'll also have prize drawings twice an hour for super-cool prizes from BSI and our partner companies, Syntrillium and AudioScience. (Remember to bring a business card to enter the drawing.)

You'll need to have an invitation to join us on the "big muddy" for BSI on the Bayou, so call ahead to 888-BSI-USA1 (274-8721). We'll have refreshments and some great music from southern artists. We'd really like you to join us.

Quote of the Month

"I want to pay compliments to your tech support. They responded promptly and helped me get through the problem."

Keith Shipman, President
Horizon Broadcasting Group-
Bend, OR

Calendar

Aug 23-25, WaveStation Weekend Training Session

Sept 5, Demonstration of a new automation product at the NAB. Call for an invitation.

Birthdays:
Aug 25 1949, Gene Simmons
Aug 28 1982, LeAnn Rimes

Tip

On-Board CODECS

A professional audio card with an on-board codec allows the sound card to decode compressed audio files (such as MP3) directly on the card with a built-in logic chip. This is a great resource saver for the computer, as it would otherwise have to open a software codec, pass the audio files through that program and then return the uncompressed audio data to the audio card for output.

User File

KWDB - Rick Bell

Rick Bell in Oak Harbor, Washington has been running WaveStation since they switched on the transmitter in March of 2000. "The best thing I can say about WaveStation is that we're still learning things about it. Every time we turn around, it seems like we've discovered something new." Rick says, "We've only scratched the surface of what WaveStation is capable of doing."

Despite the number of features, just about everyone at the station knows the basics of WaveStation. "A friend of mine has another automation system, and it just seems like the learning curve for WaveStation is much shorter."

BSI has also been really responsive. "What I really like about the software and the support that you folks have is that you take input from all the users out there and you actually pursue fixing things." In an emergency, he knows he has someone he can count on. "I can't say enough about your tech support. Those guys are just it. They've gone way out of their way to help me. When they answer the phone, there's a sigh of relief on my end."

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WorldNet Milano: Features standard and enhanced apt-X, the company's upgraded data compression algorithm, which offers a reduction in coding delay, improvements in audio quality and increased dynamic range. The Milano features four ISDN interfaces (S or U), in addition to permanent digital links, and has available audio bandwidths from 10Hz to 22.5kHz, with corresponding synchronous bit rates from 56kb/s to 576kb/s. This full duplex, multi-channel ISDN audio coded is suitable for inter-studio networking, remote/outside broadcasts and STL applications.

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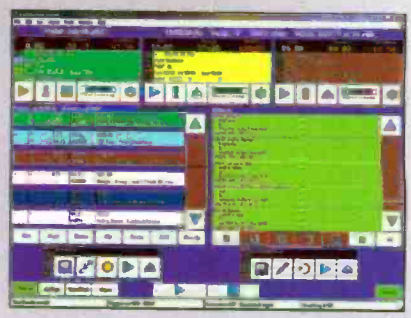
Broadcast Software International

▼ **Simian:** This automation software, known only by the development codename Simian, is the first of a new generation of digital automation systems. Many features are still confidential, although BSI reveals that Simian incorporates advanced



capabilities for self-diagnosis and repair, interstation communications, streaming spot substitution, remote control and live support. Touch-screen enabled, Simian will support tagging and simultaneous multiple playback of all professional audio file types. Simian's official launch will be at the NAB Radio Show during the BSI On The Bayou riverboat demonstration. Contact BSI for complimentary tickets.

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Solid-state retrofit
Continental Electronics
Booth 1904

Dual IPA upgrade: This upgrade provides parallel dual redundancy so that if a module fails in the IPA, the station stays on the air. Also offers an improvement in AM noise. Using two combined modules isolates the IPA from the PA grid at warm up. Greatly reduces the cost of repairs in the unlikely event of module failure, and modules can be repaired in the field using common parts. Better bandwidth and AM noise performance improve FM stereo and SCA performance. Stations can install the IPA upgrade kit. Kit includes full installation and operation instructions.

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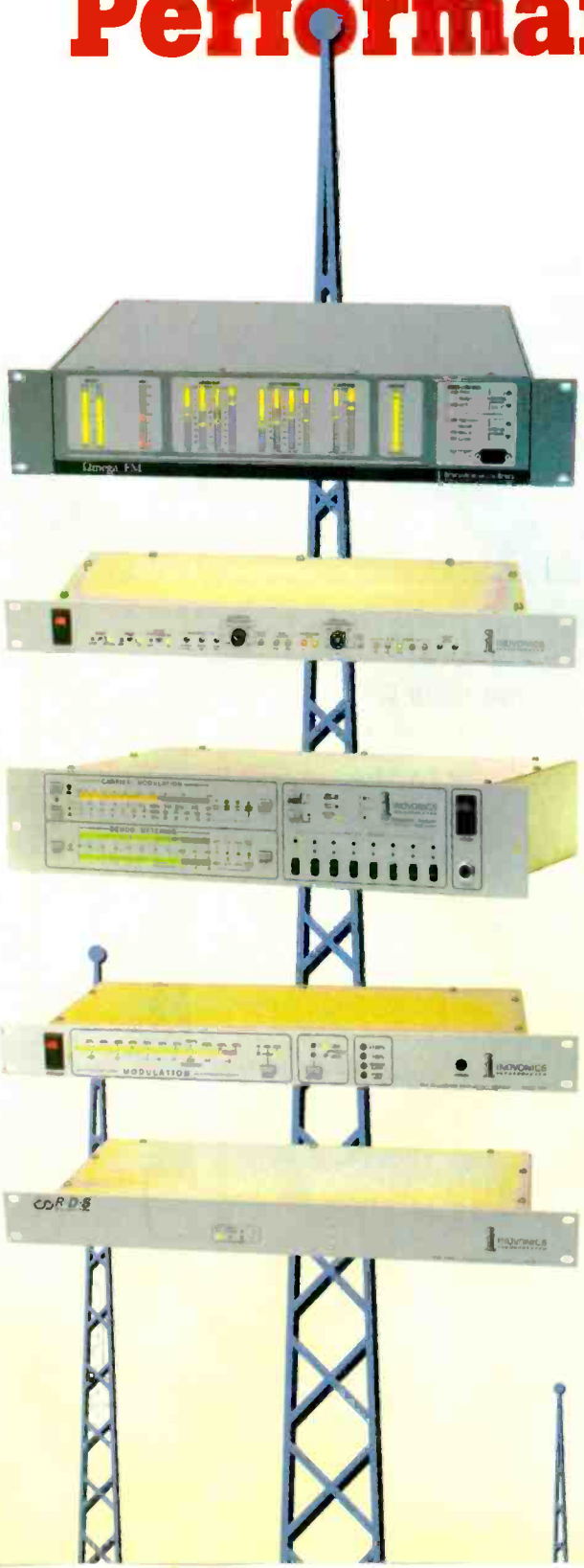

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A fully-digital processor/stereo-gen without DSP chips! Our uncomplicated software-based design gives a big, bright and clean sound. A short signal path keeps latency low and your audio fresh and grunge-free.

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Interactive encoder (shown) works with hard-disk automation to transmit song titles, contests and advertising. We make a low-cost "mini encoder" too, and a full-function RDS/RBDS decoder/reader.

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Inovonics, Inc.

1305 Fair Avenue • Santa Cruz, CA 95060

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NABRADIO

Numix console accessory
Logitek
Booth 1948

Selector wedge: The monitor speakers, operator headphones, guest headphones and the cue speaker are controlled from the Selector wedge. A multistation talkback system is offered. LCD panels allow input sources and output destinations to be assigned to each fader and monitor channel. Pan/balance and optional three band EQ for each fader is controlled by the selections LCD screen. The preset system is also controlled from this screen. A bank of relays allows for remote starting of local machines. A cue in phones button is included. Two three-color LED stereo meters monitor the on-air program and speaker feed. Each meter offers simultaneous VU, true peak and peak hold.

877-231-5870; fax 713-664-4479
www.logitekaudio.com;info@logitekaudio.com
Circle (262) on Free Info Card
or go to www.beradio.com

Schedule controller
Broadcast Tools
Booth 1936

▶ **PSC II:** The front panel provides for a six-digit, 1/2-inch seven-segment LED display. Front panel LEDs are provided for the 16 relays; signal loss; device #1 serial data; device #2 serial data; power; control port serial data and 1 PPS. The PSC II controls functions by either scheduled time and date, time and day of week, serial port commands and remote input contact closures. Using non-volatile memory for the two serial control ports, each of the 64 control macros may have up to 32 characters, including control characters. The PSC II's non-volatile memory also contains 199 scheduled events. The PSC II is furnished with a Garmin 12 Channel GPS receiver with embedded antenna. Programming is accomplished with any non-dedicated computer and communication software.

877-250-5575; fax 360-854-9479; www.broadcasttools.com;bti@broadcasttools.com
Circle (254) on Free Info Card or go to www.beradio.com

DEMO ROOM

Digital FM processor
Inovonics
Booth 2043

◀ **Omega_FM:** A largely software-based digital on-air processor/generator, Omega_FM offers a short and direct program signal path that keeps latency (audio delay) at a minimum. The user interface includes a no-menu front panel setup that suits a variety of applications or allows any PC to be connected for control over all processing parameters.

800-733-0552; fax 831-458-0554; www.inovon.com; info@inovon.com
Circle (260) on Free Info Card or go to www.beradio.com

ARRAKIS SYSTEMS INC.

CONDENSED CATALOG
FALL 2001

RADIO HARD DISK LIVE ON AIR Production & Automation SYSTEM

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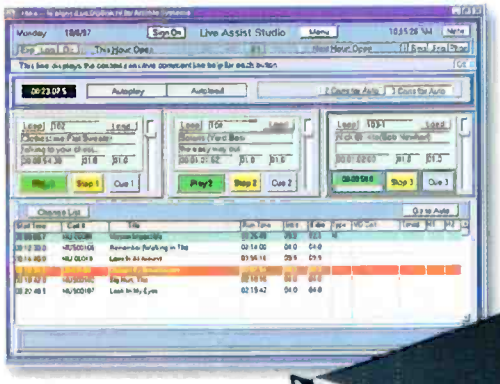
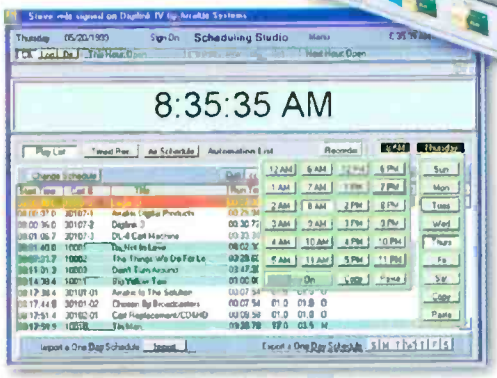


ON AIR SCREEN



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Jingle Box

Automation System

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1200 Series

Analog Consoles

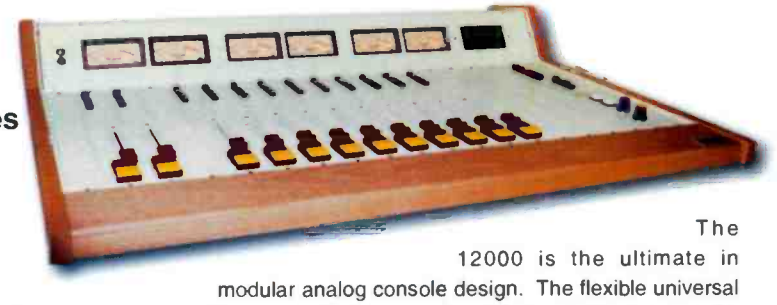
- High Performance Analog Design
- 5, 10, 15 Channel Models
- Full Source Logic Control
- Telephone Mix Minus

Found in hundreds of stations around the world, the 1200 is a #1 selling radio broadcast console. Low noise mic preamps and active balanced design assures clean transparent sound. High quality Penny & Giles slide faders, 5M operation On/Off switchers, heavy metal panels, and solid oak means many years of reliable use. Connectorized inputs and outputs speed installation, while socketed ICs (not cheap surface mount) make fast on site service possible. The advanced DC control design removes audio from faders & switches. The choice of broadcasters around the world, the 1200 is the ideal choice for your station.

1200-5S	$2,295
1200-10S	$3,495
1200-15S	$4,495

12000 Series

Modular Analog Consoles



- Fully Modular with Input & Output Modules
- 8, 18, & 28 Channel Mainframes
- Option Modules - Phone, DA, & More
- Dual Telephone Mix Minus Buses

The 12000 is the ultimate in modular analog console design. The flexible universal bus means any module can be in any position, and mic or line modules with optional panning & mode support any input source. Three stereo buses with mono mixdown plus two mix minus telephone buses provides the mixing power for any On Air format. Comprehensive source control with turret logic, starts and stops sources and is ideal for Talk Studios. Powerful, flexible, and high performance, the 12000 is found in radio stations from Europe, to Asia, to Africa, to your own backyard.

12K8-6	$4,350
12K18-12	$7,075
12K18-18	$8,755

Revolution Series

Digital & Analog Consoles

- Digital AND Analog Console Design
- 18 Ch Mainframe w/ 12 & 18 Ch Configurations
- Reliable P&G Faders, 5M Cycles
- Dual Telephone Mix Minus Buses

The Revolution is a dual box design for flexibility & ease of installation. All audio processing is located in a 4RU rack mounted unit while control is provided from the console shown at the right (or from easy to use PC software, REV-12P version). With 3 stereo mixing buses, 2 telephone mix minus buses, cue, control room & studio monitor, earphones, talk turret logic, source control, 5 mic preamps, analog & digital for ALL outputs, and choice of analog or digital for ALL inputs, this is a truly REVOLUTION in console design. Configure the console for analog operation today and reconfigure it for digital tommorrow . . . YOUR choice ! ! !

REV-12P	$3,995
REV-12C	$7,495
REV-18C	$8,295
REV-18X	$8.995

FOR DETAILED INFORMATION ON THESE PRODUCTS GO TO WWW.ARRAKIS-SYSTEMS.COM

MODULUX FLEX-STUDIO FURNITURE

$4,995
MSRP

The Modulux Flex-Studio is a complete modular design that can be configured in dozens of different ways to meet nearly any studio design. It can be assembled left or right-handed as well as in all of our standard configurations. Complete with racks, access doors, interview table, and much more.

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ARRAKIS SYSTEMS INC.

FALL 2001
CONDENSED CATALOG

NABRADIO

DEMO ROOM

Digital matrix mixer
Gentner

▲ **PSR1212:** A highly-advanced 12x12 digital matrix mixer with audio processing. The PSR1212 uses an internal macro language and 32 user-definable presets to adapt to a variety of sound reinforcement and room-combining applications in auditoriums, stadiums, theatres, gymnasiums, hotel/convention centers, conference rooms, training rooms, and boardrooms. The PSR1212 facilitates local and remote PC setup and diagnostics, logic outputs, and gated microphone operation. Microphone inputs can be individually customized to gate on and off as you wish, while automatic gain control keeps the overall sound level consistent. Input channels one through eight can be configured as an automatic microphone mixer. The Expansion Bus network architecture allows up to eight PSR1212s and up to 96 inputs, 96 outputs, and 64 microphones to be controlled as if part of a single unit.

800-945-7730; fax 801-977-0087
www.gentner.com
bcastinfo@gentner.com
Circle (258) on Free Info Card or go to www.beradio.com

Analog and digital converter
Prism Sound

▼ **Dream ADA-8:** This converter provides eight channels of 24-bit, 96kHz A/D and D/A conversion. The goals of ultimate sound quality and versatility have been realized in a multi-channel format. Analog input and output sensitivity (and inter-channel balance) are software-adjustable over the entire range with 0.05dB resolution. Inputs and outputs are transformerless, electronically balanced and fully floating, to ensure freedom from noise pick-up and crosstalk. The ADA-8 avoids the effects of jitter with independent, multi-stage PLLs, featuring jitter-attenuation and clock generation and recovery. The ADA-8 has two digital I/O module slots into which a variety of modules can be fitted, including AES3 (2-speed or 2-wire), TDIF, ADAT or SDIF.

973-299-7790; fax 973-299-7759
www.prismsound.com
sales@prismsound.com
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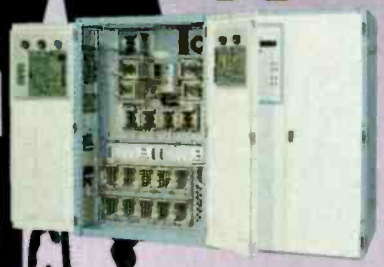
NABRADIO

Solid-state transmitters
Nautel
Booth 2040

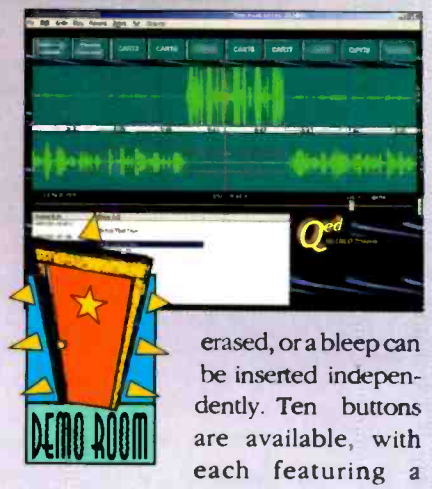


◀ **Q20/20:** Addressing the power requirements of 22kW and 44kW, the Q20/20 is a single ended solid-state transmitter. Reliability is enhanced though redundancy and duplication features: multiple power amplifiers provide modular reserve. Facilities are provided for duplication of the exciter, IPA and IPA power supply and low voltage power supplies. The common DC bus is developed from parallel redundant rectifiers.

207-947-8200; fax 207-947-3693; www.nautel.com; info@nautel.com
Circle (263) on Free Info Card or go to www.beradio.com

Telephone call editor
ENCO Systems
Booth 1962

▼ **Qed:** Running on a Pentium III CPU with Windows 2000 and using the Digigram PCX-924 DSP board, Qed is an editing system that is optimized for on-air recording and editing of phone calls. Scrolling waveforms follow the audio; marker points make editing simple. Left or right channels can be



erased, or a bleep can be inserted independently. Ten buttons are available, with each featuring a countdown timer. Qed is balanced analog and digital ready. Plus, the Qed can be controlled with the included jog/shuttle control surface, keyboard shortcuts, the mouse or an optional touchscreen. Qed is available as a turnkey solution—including computer, DSP board, controller and software.

800-362-6797; fax 248-827-4441
www.enco.com; support@enco.com
Circle (256) on Free Info Card or go to www.beradio.com

Management software
Wicks Broadcast Solutions
Booth 1810

RateMinder: Software specifically designed for the radio industry that allows station management to track inventory levels and trends, thereby enabling better pricing decisions to help the station meet and exceed revenue goals. RateMinder is a sales proposal tool for creating more attractive packages while at the same time maximizing yield. It integrates a full range of sales proposal and management functions into one paperless system—giving account executives more control, flexibility, efficiency and productivity. Interfaces directly with the station's traffic and billing system.

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NAB RADIO

Music programming tool
RCS
Booth 1920

▶ **Selector Enterprise:** Allows radio stations in a group to share information on songs, links, promos, individual and collective airplay, and copyright data. Create a common numbering system for songs and promos. Compare the common points of your successes; upgrade underachievers and organize by regions, ratings and formats. Run instant spin comparisons to learn which songs your successful stations played most. Analyze song and promo rotations to view success patterns and identify problem stations or areas.

914-428-4600; fax 914-428-5922; www.rcsworks.com; info@rcsworks.com
Circle (265) on Free Info Card or go to www.beradio.com

Digital on-air broadcast console
Harris
Booth 1604

Legacy: Features include: mainframe sizes of 14, 22 and 30 input modules; A and B inputs that accommodate analog and digital sources; hot swappability of all modules; digital and analog outputs for four program buses, stereo send and telco record mix; off-line and mix-minus outputs for up to four telco/codec input modules; stereo cue with automatic metering; accessible I/O connections and set-up switches; and a full suite of opto-isolated control logic.

800-622-0022; fax 513-459-3890; www.harris.com;broadcast@harris.com
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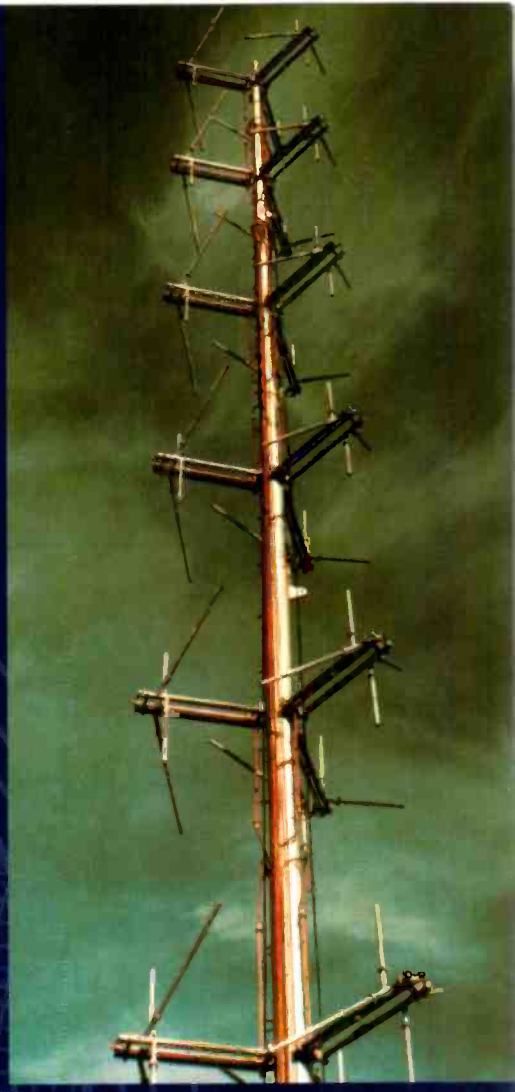
NAB Radio Exhibitors

For multi-station, wide bandwidth, high power antenna systems, the choice is Dielectric.



Dielectric has the most complete broadband product line including side mount and top mount arrays, transmission line, combining systems, and monitoring systems. We also offer custom engineered towers, installation, and rigging services. Add over 800 years of combined engineering experience on staff and you know that a partnership with Dielectric is *the* choice to make.

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Process This!

Introducing

The NEW Aphex 2020MkII

The original Aphex Model 2020 audio processor set the standard for audio quality, loudness and extended coverage. Not content to sit on its laurels Aphex continued to research ways to improve performance even further. The result is the 2020MkII.

New processing algorithms and circuit designs, in addition to the fifteen proprietary circuits* from the original, allow even greater loudness without sacrificing a clean, natural sound. The MkII's increased flexibility also gives a station the ability to create its own unique sonic signature. New features include a split band optical high frequency limiter, a low distortion overshoot compensated low pass filter* (with no spurs), improved remote control interface, RDS, and dual composite outputs.

Audition the new 2020 MkII on your station and you'll find that Aphex has really done its homework—creating a processor with performance and features unmatched at any price. The 2020MkII —in a class by itself.

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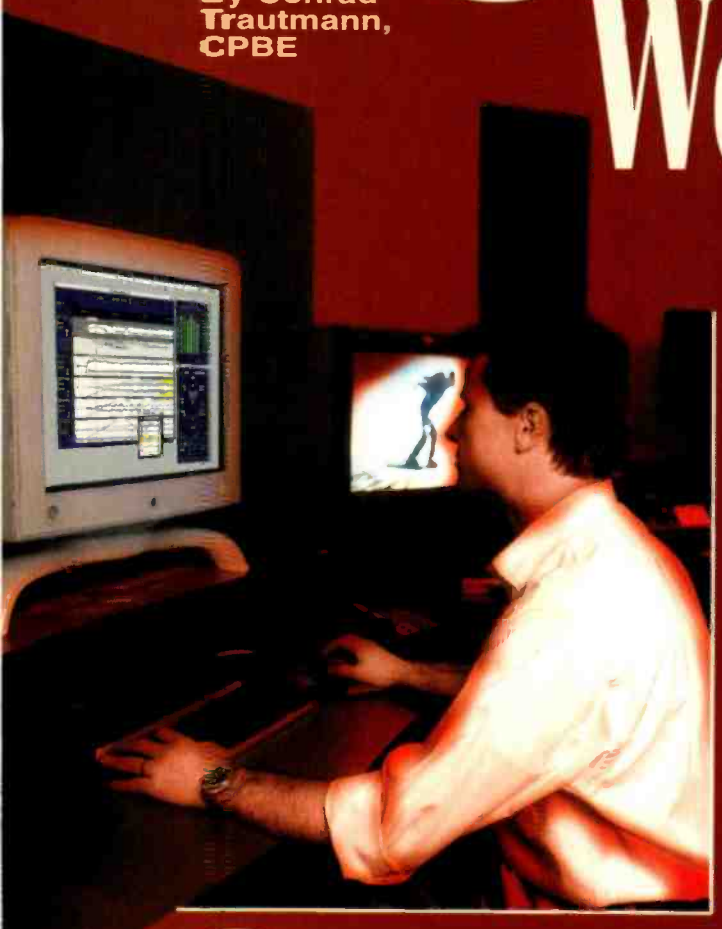
*(patented or patent pending)

Digital Audio Workstations

By Conrad Trautmann, CPBE



These production workhorses range in scale and features. What information should be gathered when purchasing and installing a DAW?

One would think that by now all radio stations and audio production studios have replaced their analog reel-to-reel tape recorders with some type of digital editing system. Many have, but surprisingly, my visits to different facilities have revealed that there are still many that haven't upgraded to the latest technology. For those that haven't, or for those looking to expand or build new studios, the information that follows should help determine what is needed.

Like most pieces of equipment purchased today, *digital audio workstations* (DAWs) will vary in price depending on complexity, quality and features. If cut-and-paste editing on just a few tracks is all that is needed, it is possible to get free software that can be loaded on an off-the-shelf PC with a sound card. If high quality is required, or a wide range of effects is needed, prices will climb. The most expensive systems usually come as a complete package, with all of the software and hardware being sold by the manufacturer.

Returning to the free software mentioned in the previous paragraph, Digidesign offers a scaled-down version of software that can be downloaded right from its website called ProTools Free. It's a 10MB download and offers eight tracks of audio and 48 tracks of MIDI editing capability. Digidesign recommends at least a Pentium III series machine with a large hard drive, 128MB of RAM and a 1024×768 monitor. It runs on Windows ME or 98, or a Macintosh. ProTools Free is capable of performing any basic radio commercial production. Another free route is using bundled software that some manufacturers include with other programs and hardware.

If the basic editing functions aren't enough, then *plug-ins* are necessary. In an analog studio, it used to be necessary to buy an external compressor, equalizer or maybe even a pitch-shifting processor. Now these effects come on a floppy disc or a CD-ROM. Many third-party companies create software effects that are capable of running with popular systems. They can be purchased al-la-carte, so users only buy what is needed. Effects such as echo chamber, noise reduction, limiter, compressor, equalizer, delay, reverb, time shift (stretch or compress), pitch shift, flanger, vocoder and more are available. Fairlight, another DAW manufacturer, has a Plug-In Manager, which allows third-party plug-ins to work with its software.

A common find

Another powerful software package showing up in many radio production studios is Cool Edit, or Cool Edit Pro, by Syntrillium. For $399, users pay for and download Cool Edit Pro right from the Syntrillium website. It runs on Windows 9x/ME/NT and 2000. Cool Edit Pro offers more tracks and additional features over the basic Cool Edit software. It supports multiple file formats, from WAV to MP3. Plug-ins are available for a multitude of effects processing.

Similar to Cool Edit, there is SAW by Innovative Quality Software. SAW can be loaded on a PC, providing a DAW at a reasonable cost.

Digigram, a manufacturer of audio cards, manufactures its own version of DAW software. The X-Track Audio Suite is multitrack audio editing software. Some may already use the X-Tracs under a different name, since Digigram offers an OEM version to other manufacturers.

It has an unlimited number of virtual

RADIO AND TV RADIATING SYSTEMS

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SGP-2	$2,690	8Kw
SGP-3	$3,595	10Kw
SGP-4	$4,500	10Kw
SGP-5	$5,300	10Kw
SGP-6	$6,100	10Kw

FM Antennas
Educational circular polarization

MP-1	$250	0.6Kw
MP-2	$680	0.8Kw
MP-3	$980	0.8Kw
MP-4	$1,280	0.8Kw
MP2-4	$1,820	2Kw
MP3-5	$2,270	3Kw
MP3-6	$2,740	3kw

FM Antennas
Low power circular polarization

GP-1	$350	1.5Kw
GP-2	$1,350	3Kw
GP-3	$1,900	5Kw
GP-4	$2,600	6Kw
GP-5	$3,150	6Kw
GP-6	$3,700	6kw

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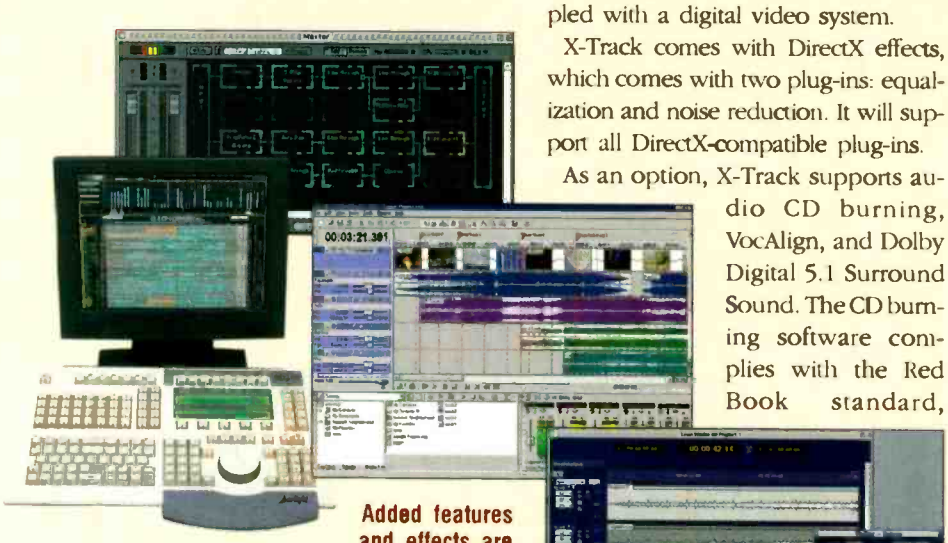
Digital Audio Workstations



Added features and effects are possible with third-party plug-ins.

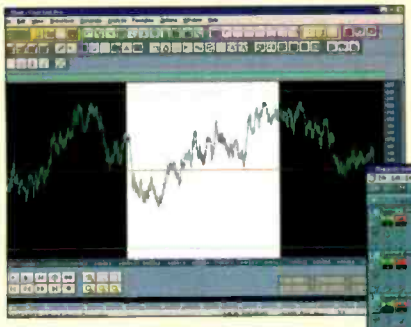
tracks that can be assigned to inputs or outputs or serve as work tracks. When used on a laptop with a Digigram PCXpocket (PCMCIA) audio card, it makes the laptop a mobile DAW. It supports many synchronization modes that will drive external equipment, and frame access is available when coupled with a digital video system.

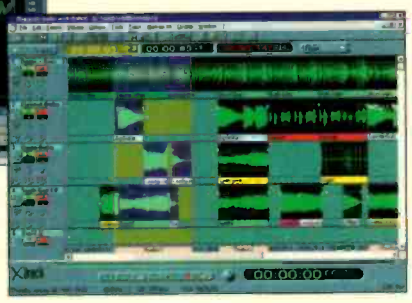
X-Track comes with DirectX effects, which comes with two plug-ins: equalization and noise reduction. It will support all DirectX-compatible plug-ins.

As an option, X-Track supports audio CD burning, VocAlign, and Dolby Digital 5.1 Surround Sound. The CD burning software complies with the Red Book standard, ensuring that the CD can be played in all players. VocAlign will automatically synchronize two audio signals. This could be helpful with lip-synching, foreign dialog replacement or even modifying the timing of one track to match another.

The software-based systems are primarily mouse and keyboard driven, but many allow for the connection of external control surfaces such as a JL Cooper panel, which brings out fader control and transport functions.

One of the first professional DAWs developed specifically for the radio industry was the AKG DSE7000, which has evolved into the Orban Audicy. Sold as a complete package, it includes the software, computer, audio cards, monitor and a custom control surface. It assembles on to a roll-around stand and will fit nicely into the space vacated by a reel-to-reel tape recorder. One feature that stands out on this system is the built-in scrub wheel. It takes the place of rocking those reels back and forth on a reel-to-reel machine to find





Inexpensive, quality packages are available with features rivaling larger systems.

formats, records in and plays back 32-bit, 192kHz files. It has VST plug-in capability. It also supports Digidesign file formats. This Macintosh-based product runs on a G3 or higher and requires OS 8.6 or higher.

Sonic Foundry's DAW is called Sound Forge 5.0. It's a two track digital editor that has a multitude of effects available, and it supports DirectX audio plug-ins. Version 5.0 supports 24-bit, 192kHz sampling and has a built in CD-burning program. It can also rip a CD. Also new for version 5.0 is support for Windows Media Audio

the edit point. The design of this system makes it easy for anyone used to editing tape to make the transition to digital. Also worth noting, the Audicy stores the audio for a production in RAM. All edits are done in real time, rather than reading and writing them to the hard drive; a big time savings for someone who does extensive editing. It also prevents the occasional glitching during playback that can be caused by a slow or fragmented hard drive. Many expected effects are built in to the Audicy, such as compression, time-shifting, and equalization, and they are easy to apply to an individual track or entire production.

Audicy also supports Cart Chunk technology, which places a header with information into the final audio file created. It contains information that most on-air digital audio delivery systems require such as cart numbers, titles, end-dates and more. The Audicy can be networked to a digital audio delivery system, and the files can be saved in a directory that the on-air system will typically be set up to poll, looking for new material. Other companies are also beginning to jump on the Cart Chunk bandwagon. Sadie has added Cart Chunk support to the RADiA digital workstation.

TC Works is a German-based company that produces Spark and Spark XL 2.0. Like most other DAWs discussed here, it supports most file

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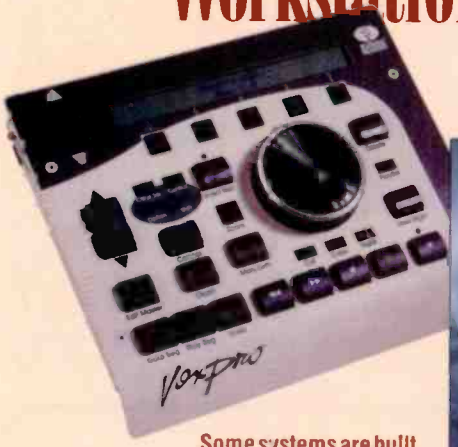

Some systems are built on hardware and software platforms such as the Orban Audicy and the Audion Labs VoxPro.

(WMA), OggVorbis (OGG) and Perfect Clarity Audio (PCA). Sound Forge can export in QuickTime (MOV) and RealVideo 8 (RM) formats. Sound Forge also offers a software package called Vegas, which offers multitrack editing and DirectX plug-in support.

If mastering an audio production is the desire, then a higher-end system is probably what should be purchased. Run on a Power Macintosh G3 or G4, Sonic Solution's hardware includes an HDSP processor and audio interface. The audio recording into the system is linear PCM audio, 16-bit to 24-bit with sample rates from 44.1kHz to 192kHz. Each processor card that uses a PCI slot, can record eight simultaneous 24-bit, 96kHz recordings. Processing and equalization occur using Sonic's 48-bit processing. CD burning is built into the software, making the mastering process an integrated part of the session.

If there are multiple DAWs in different studios, it may be necessary to network more than one DAW in order to share files. This can be handled a few different ways.

If using a Microsoft Windows based-system for the DAW operating system, it's fairly easy to set up file sharing on the hard drives for those systems by using a basic Ethernet LAN. This allows all of the systems to see the other's hard drives. If a production begins in one room and needs to be finished in another, either copy or move the file from one drive to the other. In most cases, users would want the file on the local hard drive while editing. Depending on the size of the file, this could take some time. This is probably not the best way to manage files in a larger facility with many people doing production, but it would work in a station with just a few DAWs.

Another option is to set up a central file server, where all productions are stored. This offers the advantage of data backup capabilities. Fault tolerance can be added with a redundant file server. Using a central server helps keep things organized, making all files easily available to all DAWs. Most DAWs come with network support.

Not all editing requires a PC. Some portable recorders include basic editing, and dedicated hardware editors are also very functional.

A popular theme at the NAB show this year is portability. Interfaces, audio cards, hardware and software are all available now to allow digital editing on the road. Digigram has offered this for some time already.

Digidesign recently announced the Magma 2-Slot Cardbus PCI Expansion System. It allows the addition of two PCI slots to an Apple PowerBook G4—allowing Digi 001 or ProTools|24 MIX hardware to be used with a laptop computer.

Some DAWs are designed for specific uses. The VoxPro and VoxPro PC from Audion Labs is a two-track editor, primarily designed for telephone call recording and editing.

Outside the PC

The 360 Systems ShortCut is designed to be a reel-to-reel replacement for radio stations. The ShortCut comes in a tabletop package and provides basic audio editing functions. An LCD screen allows the user to see the audio waveform, and the ShortCut also has a scrub wheel, allowing for quick and easy editing.

For portability, Sound Devices manufactures an interface, the USBPre1.5, (a *BE Radio* 2001 Pick Hit) that converts an analog audio input and to USB for connection to a laptop. It also has S/PDIF outputs. It has multiple inputs, with two balanced mic inputs, two balanced line inputs and two unbalanced tape inputs.

While not truly a DAW, the Sonifex Courier portable recorder uses an internal hard disk from 260MB to 1.04GB. It has recording times up to one and a half hours of linear stereo at a 48kHz sample rate or over two days of recording using MPEG Layer II at 48kb/s. Sample rates are available from 8kHz to 48kHz in linear mode,

or 8kb/s to 384kb/s in MPEG mode. The recorder includes some basic editing functions as well, which makes it and recorders like it suitable for limited field recording and editing.

DAWs range in scale and features, from free, downloadable software that can be easily installed, to high-end systems that can synchronize to video. Individuals must decide which is right for a particular application.

Conrad Trautmann is vice president of engineering for Westwood One, New York City.

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Today's high-performance AUDIO

By Toni Flosi

With a ten-year history of bringing some of the best and brightest in classical music to the radio, National Public Radio's *Performance Today* boasts a listenership just under two million and a carriage list of over 250 stations. It is the most listened-to classical show on public radio and broadcasts two hours per day, seven days a week. Two to three live performances air in a typical month with a scope ranging from solo piano to chamber orchestra.

In an ongoing effort to raise its level of quality, *Performance Today* borrowed two of Neumann's new M150 Tube microphones during a week of intensive live on-air performances. Engineers ran the M150 Tubes against NPR's collection of vintage and new microphones on piano, strings, guitar and an eccentric quartet.

Three to four "Artist in Residency" features per year bring in a selected artist for two weeks. During the second week, the artist performs live either solo or with accompaniment for one hour every day. Station personnel capitalize on the unusually high number of live performances during the second week to try new equipment and new techniques. The acquisition of the new microphone coincided with just such a week.

The Neumann M150 Tube inherits much of its design from the Neumann M50, a microphone that has earned the respect of classical recording engineers for its exceptional rendering of strings and orchestras. Both microphones feature a unique polar pattern. At low frequencies, the mics have an omnidirectional pattern. The directionality increases with higher frequencies. Both microphones possess a sound that engineers describe as clear and free of mud, smear, and haze. The M150 Tube departs from the older M50 with the incorporation of a titanium capsule, a sophisticated power supply, lower self-noise and a transformerless tube amplifier. The

titanium capsule owes its existence to recent advances in materials procurement and machining.

Regular use of the Neumann website pinboard alerted one NPR engineer to the release of the new microphone. Familiar with the reputation of the M50, acquisitions producer Steve Zakar worked out an arrangement with Neumann to borrow the M150 microphones for *Performance Today*.

The pure sound

To put the trial into context, one must realize that the *Performance Today* staff is forever fighting the acoustical space within which they work. As home to other NPR programs, including NPR news, studio 4A was constructed and treated for multi-purpose use. The 1,800-square-foot, two-story studio has hosted everything from election night coverage to town hall meetings to orchestras. Balancing all of these uses requires compromises, chief among them ambiance. The space is, in a word, very dead.

Musicians seldom love the space, but they do get enough of a bounce to hear themselves and one another. The *Performance Today* production staff gives musicians enough time to acclimate and to balance themselves. Unlike jazz sessions broadcast from the studio, engineers treat classical sessions with generous amounts of artificial reverb from a Lexicon 480 or a TC Electronic 6000.

The studio A4 control room.

The artist in residence during the trial was pianist Jeremy Denk. During the week, he performed solo on Monday and Wednesday. A violinist accompanied him on Tuesday, and a string quartet joined him on Thursday and Friday. Additionally, *Performance Today* taped a session with legendary classical guitarist Pepe Romero on Friday. The following Monday saw Quartetto Gelato in the studio for another opportunity to try out the M150 Tubes.

The microphone placement used with a string quartet.

Every microphone used in the comparisons went through Millennia Media preamplifiers for the utmost in signal quality. A Studer 950-S digital board using stock converters performed any necessary mixing and sent the resultant audio out for satellite uplink. Additionally, *Performance Today* archived the sessions to 16-bit DAT at both 48kHz and 44.1kHz. Artists received a courtesy CD.

The Neumann M150 Tubes ran against a well-respected assemblage of contemporary and vintage microphones including Sennheiser MKH20, Neumann KM63, and Neumann KM86. The KM86s were turbo charged by microphone modifier Klaus Heyne. Each of the microphones had a unique sound with a high degree of definition, clarity, and space. One could imagine specific contexts in which any one of them would have served the situation best. Engineers left all of the microphones up during the week and made comparisons with every new instrument, player, and style. They made the latter comparisons on the theory that repertoire makes a difference and that different styles often call for different sounds.

The house piano is a Steinway B. Small elevators and windows dashed aspirations to employ a full-sized Concert D years ago, and *Performance Today* has been attempting to make the B sound like a Concert D ever since. Nevertheless, the instrument is in excellent condition and has been played by such luminaries as Jean-Yves Thibaudet and Leif Ove Andsnes.

Location, location, location

The *Performance Today* engineers positioned the M150 Tubes one foot apart and seven feet back from the piano. To insure high-fidelity mono-compatibility, they aimed the microphones straight ahead. They report that the microphones conveyed a

spectacular sense of space and were amazingly transparent. They credit that transparency with improving the sound with the Lexicon 480 reverberation. Overall, the piano sounded rich, large, and sonically full-bodied.

Zakar noted that studio 4A is notoriously unflattering for violins. In *Performance Today's* estimation, the lack of reverberation hits the violin the hardest, as so much of what we expect from a violin is attributable to room sound. Ambiance contributes particularly to the mellowing of highs and the deepening of lows. Without it, the violin sounds flat and screechy.

In the case of violins, the M150 Tube merely captured the problematic screechiness in intricate detail. Consequently, for both the violin accompaniment on Tuesday and for the string quartet on Thursday and Friday, *Performance Today* used the mellower Sennheiser MKH20s for broadcast because of their subdued high end, slightly exaggerated low end and overall fidelity.

The guitar recording session on Friday allowed the staff to break from their Neumann M269c habit. Popular for use on vocals, the cardioid M269c is well liked with guitars. However, the engineers were eager to try an omni with Pepe Romero and quickly decided that the Neumann M150 Tube outperformed the M269c in the given context.

Compared to other mics in its class, the M150 Tube produced better results at a more distant placement. After much experimentation, the M150 Tubes ended up six feet away from the guitar. Again, in the interest of mono-compatibility, the microphones sat parallel to each other, one foot apart. The clarity and detail they conveyed revealed all the colors of Romero's fine instrument and captured his fingering and nuance dynamics. Additionally, the considerable distance between the microphones and the guitar mitigated the irritating finger squeak that is so often accentuated by close micing techniques.

As evidenced by its name, the Quartetto Gelato (Ice Cream Quartet) has a unique take on classical music. The four musicians frequently switch between such instruments as guitar, accordion, oboe, English horn, cello and voice in addition to the traditional quartet strings. The group has gained widespread popularity adapting popular music (such as traditional Italian love songs) to fit their more classical instrumentation and attitude.

Consequently, *Performance Today* was free to experiment with nonstandard classical sounds and opted for a drier studio sound in lieu of the usual concert hall target. Engineers erected a stereo pair as before and allowed the seasoned musicians to balance themselves. The result was an attractive studio sound that was uncompromised by supplemental microphones.

NPR's *Performance Today* covers a broad spectrum of styles and instruments, and a diverse microphone arsenal allows the show to capture the best performances possible.

Toni Flosi is president of AAdvert International, Glenview, IL, a PR agency specializing in professional audio.

Digital STLs

By Dave Agnew, CSRE

Until the last few years, the narrow bandwidth (300kHz) of the 950MHz radio channels, which was adequate for the audio and technical standards of the all-analog world, was insufficient to handle the much greater bandwidth of the digital signals of newer generation, AES3-compliant studio equipment. If stations wanted to use 950MHz radio channels for their studio-to-transmitter link, they had to compress their high-bandwidth digital audio to fit the limited bandwidth of the STL.

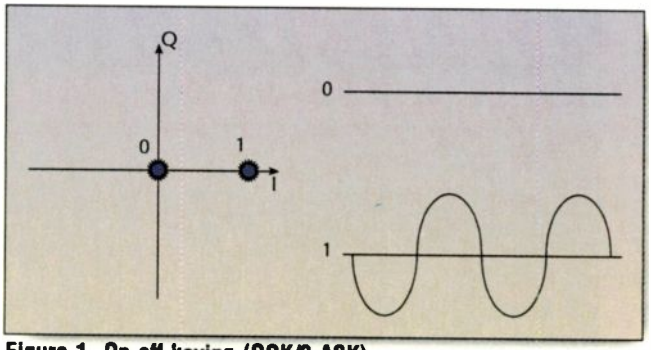


Figure 1. On-off keying (OOK/2-ASK).

Neither of the two types of data compression schemes—lossless and lossy—was very practical, however. While lossless data compression does not degrade the quality of the received data in theory, current lossless compression technologies used on personal computers are simply not effective in reducing audio data in practice. Lossy-type data compression schemes, which take advantage of perceptual masking to discard some of the audio without being very noticeable to the listener, can provide satisfactory results when used properly. However, when a signal is compressed two or more times—for example, for music storage *and* to convey audio from the studio to the transmitter—listeners begin to notice reduced audio quality.

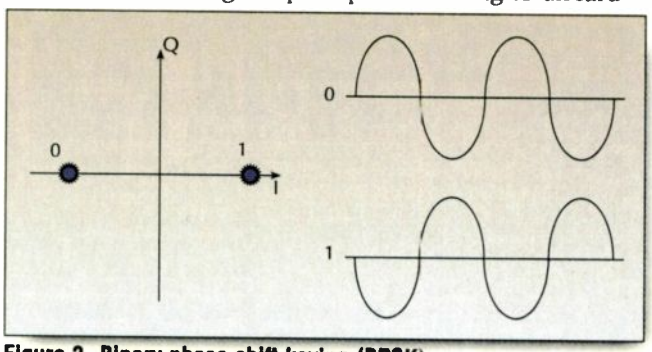


Figure 2. Binary phase shift keying (BPSK).

It was only with the introduction of 950MHz, frequency agile, digital STLs, which use true digital modulation techniques to transport uncompressed AES3 digital audio, that it was possible for broadcasters to implement a digital studio-to-transmitter link without the previously required use of lossy data compression. This new approach prevents the possibility of cascading compression algorithms within the STL link, which can cause audible artifacts in the recovered signal.

Several digital modulation techniques are in use today, each with its own set of advantages and disadvantages. Some methods are very robust but require large amounts of bandwidth. Others are more spectrally efficient but can be more prone to errors, requiring more sophisticated forms of error correction. The goal of all of these techniques is to transport unimpaired digital 1s and 0s from point A to point B.

Digital modulation

The amplitude and the phase of a high frequency carrier can be represented using a phasor or vector diagram. The I (In-Phase) axis of the phasor represents the in-phase component and its amplitude, and the Q (Quadrature) axis represents a 90 degree phase shift from the reference axis I. With this diagram, it is possible to represent a carrier at different points of amplitude, phase or combinations of the two. These points on the phasor are referred to as constellation points.

One of the most basic forms of digital modulation is called Amplitude Shift Keying (ASK). In amplitude shift keying, the carrier has two possible states, On and Off, On representing a digital 1, and Off representing a digital 0. One bit of digital data may be transmitted using ASK. Figure 1 shows ASK using the phasor diagram.

Bi-Phase Shift Keying (BPSK) allows the transmission of one bit of digital information in both states 0 and 1 by shifting the phase of the carrier from 0° (reference) to 180°. Figure 2 shows BPSK. The 0° reference represents a digital 1 and the 180° position represents a digital 0.

Quadrature Phase Shift Keying (QPSK) allows the transmission of 2 bits of data within the same occupied bandwidth as BPSK. QPSK uses four phase positions, 45°, 135°, 225°, and 315°, to represent a 0 or 1 for two bits of digital data. Figure 3 graphically represents QPSK. The individual phase positions represent the value of the digital word as in BPSK. BPSK and QPSK vary the phase of the carrier to represent more digital data bits.

A third method, Quadrature Amplitude Modulation (QAM), varies both the phase and amplitude of a carrier to represent more symbol points and thus more bits of digital data within the same occupied bandwidth. Typical QAM formats are 16QAM, 32QAM and 64QAM, allowing the transmission of 4-, 5- and 6-bit digital words, respectively. The advantage of QAM over BPSK and QPSK is that more data may be transmitted within the same RF bandwidth. The disadvantage of higher rate QAM formats is that the signal becomes more delicate and prone to errors as the number of symbol points increases. As the QAM rate increases, from 16 to 64, more sophisticated modulation detection circuitry and the addition of different forms of error correction are required in order to keep the Bit-Error-Rate (BER) low. Figure 4 is a graphic representation of 16QAM.

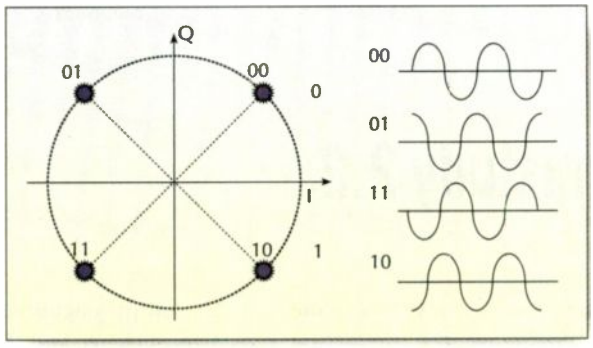


Figure 3. Quadrature phase shift keying (QPSK/QAM).

Digital RF STL systems today use various QAM rates and different bandwidths (depending on the type of modulation and number of channels of linear audio) to modulate a combination of main channel audio, auxiliary audio and RS232 data subcarriers onto the RF carrier. Different manufacturers offer different solutions. The various transmitter input signals are combined into a baseband signal and then coded using different forms of error correction algorithms. The final PA in the STL amplifies the small signal output of the modulator. The power amplifier typically employs linearization techniques that correct for channel impairments and nonlinearities in the power amplifier, in order to meet the channel RF mask requirements.

With two watts of average power output and a receiver signal threshold of -90dB (7mV), it is possible to operate with paths up to 50 miles using 8-foot parabolic dishes and still maintain an adequate fade margin of about 40dB.

The receiver demodulates the RF carrier back to the coded baseband signal. The encoded data stream is then applied to an inverse coding algorithm, which rearranges the data back into its original order, correcting errors incurred along the way. Most receivers will simultaneously output AES3 digital audio, optical AES3 audio, analog left and right audio signals, data channels and other various optional outputs.

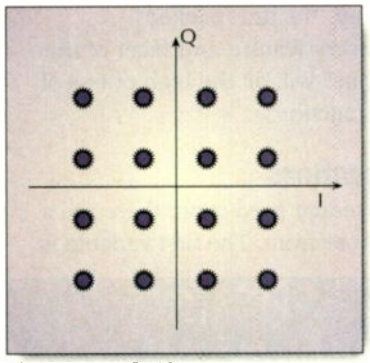


Figure 4. 16QAM.

There are many advantages to using an uncompressed all-digital path from your studio to your transmitter, including the elimination of all A/D and D/A conversions, which add distortion, noise and system costs–as well as full digital quality delivered to the on-air signal. Recent technological advancements make all of this possible using standard, off-the-shelf products.

Dave Agnew is a senior FM applications engineer at Harris Corporation Broadcast Communications Division, Cincinnati.

RadioSoft Comstudy 2.2

By Jeff Littlejohn

ComStudy 2.2 is a suite of RF study tools, the primary functions of which are the prediction coverage and interference, along with the study of AM and FM allocations. The software also supports TV and land mobile; however, my version does not support those functions. If I had to describe this software in just a few words, I'd have to say, "feature packed".

I can scarcely touch on every feature and facet of this program in a short space, but I will hit the high points of the most commonly used functions.

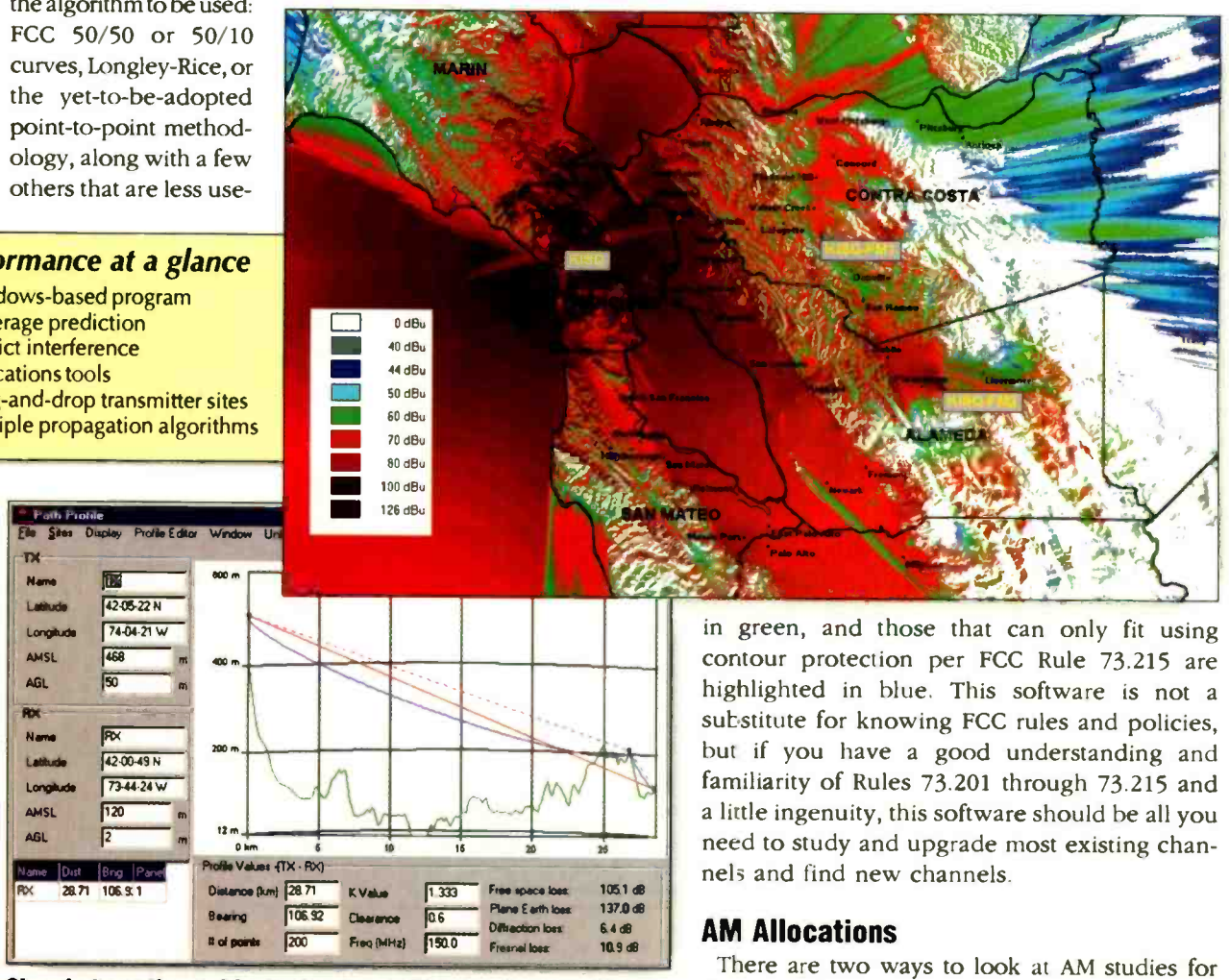
FM coverage and allocations

When it comes to FM coverage prediction, there are a number of variables to choose from. The first variable is the algorithm to be used: FCC 50/50 or 50/10 curves, Longley-Rice, or the yet-to-be-adopted point-to-point methodology, along with a few others that are less useful for FM propagation. Then choose the height of your receive antenna and the amount of environmental loss from foliage and urban clutter. You can also choose from a variety of terrain databases (30", 15" or 3") and even select the degree of detail that the program analyzes. Once the analysis is completed, you can assign a different color or hue to each of 36 different signal levels.

The FM Allocations Module is somewhat unique. When a set of coordinates is studied, the program analyzes all frequencies and all classes of stations each time. It takes the computer about three seconds to perform all this analysis. Once completed, you can quickly see which coordinates will fit. Channels that are fully spaced per FCC Rule 73.207 are highlighted in green, and those that can only fit using contour protection per FCC Rule 73.215 are highlighted in blue. This software is not a substitute for knowing FCC rules and policies, but if you have a good understanding and familiarity of Rules 73.201 through 73.215 and a little ingenuity, this software should be all you need to study and upgrade most existing channels and find new channels.

Performance at a glance

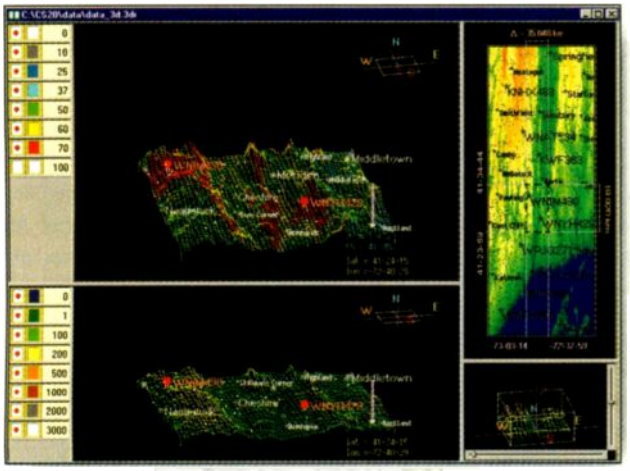
- Windows-based program
- Coverage prediction
- Predict interference
- Allocations tools
- Drag-and-drop transmitter sites
- Multiple propagation algorithms



Signal strengths and instant path profiles can be viewed for existing or future transmitter sites.

AM Allocations

There are two ways to look at AM studies for daytime. The software can either produce a contour overlap map or a limits study.



The three-dimensional terrain viewer allows you to rotate the image to better see signal propagation.

For the contour overlap study, ComStudy searches the AM database for stations that are ±30kHz from the center frequency within a given distance, and then calculates all of the pertinent contours and displays them on a map. ComStudy assigns the same color for the service contour of your station and the contours of the interfering stations. You don't need to remember that the 0.5mV of your station and the 0.25mV contour for first adjacent stations shouldn't overlap. Instead, you simply look for overlapping contours of the same color.

The Daytime Limits study creates a file depicting the bearing and maximum inverse field allowable toward each co-channel and adjacent channel station, which can then be plotted on a polar map with the proposed pattern. Stations that are properly protected will show up in blue. Stations that are being interfered with will show up in red. With this same software module, you can get an indication of what would happen if the station operated with a different set of phase/power parameters and how that would affect nearby stations.

Conductivity information can be taken from the M3 data, or you can enter conductivity data from a previous proof, whichever is more accurate. Comstudy will recalculate the contours accordingly. You can even add towers, change their height and adjust the orientation of the array. This is certainly much easier than calculating several pages of vector math. Radio Soft even enables you to change parameters on the fly and see the results to the shape of the pattern in real time. With this tool, pattern design is less like engineering and more like a video game.

The AM allocations module is a very good tool, but should only be relied upon for daytime/groundwave studies. While there do not appear to be any errors in the nighttime/skywave study software, duplicate and erroneous entries in the AM database render it inaccurate in many cases, so those studies should be left to the consultants.

Drag and drop

What if you needed to find a transmitter location that covers the city of license and the most populated areas, yet doesn't have prohibited overlap with other stations? There is an easy solution: use Drag and Drop, one of the

Field Report

most powerful tools ComStudy 2.2 offers. It allows an existing transmitter site to be moved to a new location by simply clicking on the site and sliding it to the new location. As the site is moved, all of the associated contours are updated in real time, allowing hundreds of sites to be analyzed in just a few moments.

The only knock about this program is documentation. Most of the functions and features within Comstudy 2.2 are either poorly documented or in some cases, not documented at all. This made it difficult to fully use all of the features at first. However, I did find the staff at Radio Soft willing to talk me through problems and functions over the phone. Better documentation is certainly needed; however, once you learn some of the secrets, it's a very powerful and useful tool. Not only does it provide most of the analysis tools that you need for AM and FM work, but it also gives you the ability to display them in a user-friendly fashion.

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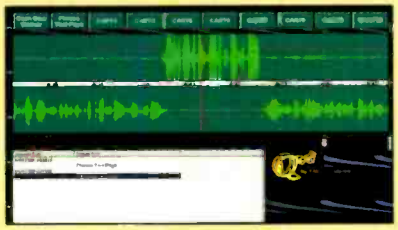

ENCO Systems

Qed

Optimized for recording and editing of phone calls. Features scrolling waveforms, independent channel editing and 10 assignable buttons.

Inovonics

Omega_FM

Software-based digital on-air processor with low audio delay. User interface includes a no-menu front panel setup or allows any PC to be connected for control over all processing parameters.

AKG C 4500B-BC

By Jon Taylor

When I started in radio, at a small AM/FM in Iowa, microphones were simple and cheap. There was always an abundance of hand-held stick-mics and inexpensive stand-mounted microphones. These ancient necessities of the business were neither powered nor processed. Did they sound good? Not really.

Today's phantom-powered microphones are put through a somewhat complex chain of equalizers and limiters, or at the very least a mic processor offering some fairly good compression. The result is a velvety rich sound that seems to actually sound better than your voice does. The AKG C 4500B-BC is one of these microphones.

Performance at a glance

- Cardioid pattern
- Designed for close-up use
- Gold-sputtered, plastic foil diaphragm
- Switchable 20dB attenuator
- Bass cut filter
- Die-cast body
- Dual wire-mesh grill

This powered, cardiod polar-pattern mic has a diaphragm made of plastic foil that is gold sputtered on one side, which prevents local shorts to the back electrode. The C 4500B-BC's body is die-cast metal, and AKG touts it as "especially made for radio broadcasters." To me, that means it must be tough. It is. I didn't pound it repeatedly on the production board or drop it off the sixth floor of the building, but it appears far from delicate. It should easily survive a decade or two of radio's cruelest use.

Features and sound

The C 4500B-BC has a frequency response of 20Hz to 20kHz with a switchable pre-attenuation pad, allowing you to increase the SPL capability by 20dB. I find that with today's mic processors, most installations use the -20dB switch and even build an additional pad to prevent an overload of input to the processor. It also has a bass-cut filter that reduces low-end distortion and proximity effect. The filter has a 6dB/octave slope starting at 120Hz. It also features a dual wire-mesh grille. The sound entry is on the front—that is to say, it is end-fed. It is not a vertical microphone that often blocks the user from seeing directly ahead. This makes it well-suited for reading copy or news.

How does it sound? Good. Really good. I used it in three different studios. I replaced a $1,500 mic in one room with the C 4500B-BC, and after boosting the high end a bit through the parametric EQ on the mic processor (personal taste), I thought it sounded large and dripping with richness. I shouted in the mic to see if I could make it distort. I couldn't. I got right on it and read some copy; it came out sounding wonderful. I even asked a coworker to come in and sing in the microphone. He's always complaining that, when he sings loudly, the mics at the station overload—not the C 4500B-BC. It's performance in the other studios in which I tested it was just as pleasing.

I think the AKG C 4500B-BC would be an excellent on-air or news mic. The bass roll-off would be a plus for AM stations, and the all-metal die-cast body shields from RF interference and all the other little hisses that stations seem to possess. It would enhance voice-over studios with its tolerance for being moved and switched out for other microphones, plus it can produce satisfactory results for those that shout and the meek. Although I did not test it on musical instruments, I believe that the C 4500B-BC would make a decent instrument microphone, especially on a drum kit, being that it can take the impact of high sound levels with little distortion.

The microphone is shock-mounted internally, but it also comes with a spider suspension mount and a foam windscreen. Other accessories are also available, such as an additional pop filter and various stands.

Overall, the C 4500B-BC is a rugged mic with the ability to be used in production, as a voiceover mic, or on-air. A colleague put it best, "It can handle the meatball-surgery production that is forced out daily."

Jon Taylor is creative services director of KCFX-FM, Kansas City.

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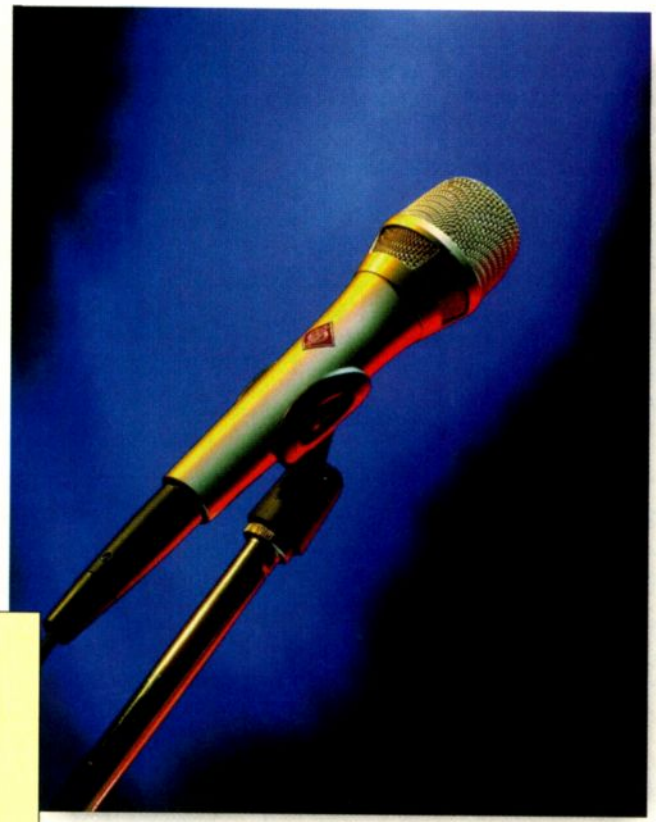
Neumann KMS 105

by Brian Sanders

Neumann's recent addition to the stage microphone category has provided the broadcaster with a new and effective tool. The Neumann KMS 105 is a handheld supercardioid condenser mic. It's the latest advancement in the line that goes back to the Neumann K 50 capsule used in the earlier KMS 150 handheld and the KM 185. The designers have devoted particular thought to the special requirements of the stage vocalist: ruggedness, resistance to popping and wind noise, and reduced susceptibility to feedback. That thought has paid off and lends itself well to handheld radio applications.



The KMS 105 performs with virtually no handling noise, is comfortable to hold, and has a very solid feel. Though this Neumann is about the same size (slightly longer) as other popular handheld mics, it weighs about 30 percent more. I won't give the embarrassing details, but it also passed the "Oops! Uh-oh...," drop-test I occasionally perform.

Performance at a glance

- Excellent off-axis response
- P-pop resistant
- Voice-flattering frequency response
- Minimal handling noise
- Rugged design

The 105 is designed to be worked closely, and careful and innovative attention has been paid to the design of the integral pop filter system. Unlike most other mics, no foam elements are used in its windscreen. Instead, four mesh baskets constructed of differing gauge wire are stacked in the head assembly in an effort to eliminate plosive blasts without altering natural tone color. The effort is successful, although as we'll discuss later, nothing is perfect.

There are no pads, roll-offs or other switches on the KMS 105. They're not necessary. Very little will overwhelm the mic volume-wise: maximum input sound pressure level is 150dB (THD 0.5%) and self-noise is rated at 18dB-A, which computes to a dynamic range of 132dB. Directional handheld mics are worked fairly closely, and proximity effect can cause boominess and bass build-up. The KMS 105 compensates with an always-on bass reduction circuit that attenuates bass response in the free field but keeps things flat when the announcer goes right up on top of the mic. (Put differently, the mic is built bass-shy, until proximity raises response up to normal.) A slight presence bump—just 4dB at about 12KHz—gives the mic a little air.

The mic's supercardioid pattern is tight but not overly so, unlike other mics possessed of a maddeningly elusive sweet spot. Staying on-mic was never an issue for our test subjects. With onstage monitors, the narrower pattern helps provide a higher level of feedback protection. The 105 really gets the job done with its remarkably even, and therefore predictable, off-axis response.

In the studio

A vocal performance is an excellent test for a handheld mic, because singers typically provide a greater dynamic and frequency range than a radio announcer. Our first stop was the performance studio at KNPR in Las Vegas, where Steely Dan backup singer Victoria Cave was busy recording a set of standards with her bassist father, Jay, and his jazz trio. She graciously auditioned the mic for us, first as a handheld. This application is home turf for the

KMS 105, and it performed much as expected: well-balanced and highly-detailed when worked close. We then tried the mic on a stand with the singer backed away about 18-24 inches, much as she would approach a large-diaphragm studio condenser. The built-in low frequency reduction was apparent, and we found about four inches was a good working distance.

Off-axis coloration, so often present in directional mics, was minimal with the KMS 105. The physical setup in the studio was intimate: The group set up all in the same room, and Vickie stood just a few feet to the right of the pianist facing him, a placement allowing some piano leakage through the back side of the vocal mic. Though attenuated by the potent supercardioid pattern, the piano sound was uncolored and natural-sounding, and didn't clash with the piano mics.

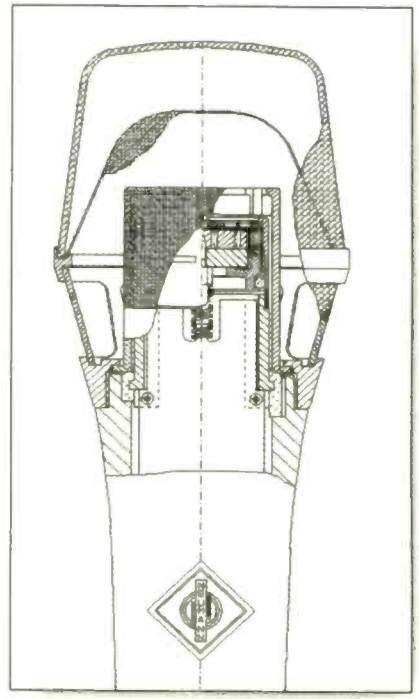
I also had a chance to try the new Neumann during one of KNPR's monthly live in-studio classical music broadcasts. The format of this show calls for the host to provide live continuity from a fixed position, and I generally prefer a large-diaphragm condenser. Once per show, however, the host is supposed to walk about in-studio and interact with the performing ensemble or members of the live studio audience. The KMS 105 is ideal for this. At the appropriate time, the host turns away from the stand mic to pick up the handheld and continues for a seamless live–mic swap. The 105's decided lack of handling noise is an appreciated characteristic here. In the future, I'll probably forego the other mic entirely and use the Neumann throughout.

The compact design, rugged construction and trademark Neumann sonics all suggest this could be a strong on-air announcer mic. The list price brings it into the same general range as the most popular radio-studio dynamic mics. I also put the KMS 105 on the air for a few days at the small university station across town. Because the experience level at the volunteer station runs from veteran to novice, this trial turned out to be the acid test. In short, they loved it. The on-air staff openly appreciated the flattering new mic and didn't want to give it back.

Field Report

Even the general manager noticed a difference. The only problems we encountered were some pesky "P" pops from some of the most inexperienced announcers.

Granted, we didn't use an external foam windscreen (available from Neumann in six colors as an accessory), but the inevitable conclusion is that not even Neumann's new design, by itself, is a match for a novice college radio announcer. Fortunately, that's a consideration for very few.



Cutaway drawing of the mic showing the multiple mesh screens.

The Neumann KMS 105 combines the sound of a condenser with the advantages of a handheld. While its primary market will be live stage reinforcement, it will also be attractive to broadcasters who seek a rugged, affordable studio-quality condenser mic that is equally at home in the air studio, the production studio, or on the road.

Brian Sanders is a morning announcer at KCRW.com, and a freelance producer based in Southern California.

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Reader Feedback

Find-your-way PDA

I was thrilled to see the Palm FASTtrack download listing that was on the NAB floor. But, I assume that the program won't work on my PocketPC Casio E-115. I know Palm has the big share of the handheld market, but PocketPC is gaining, and I happen to think it's a better system anyway.

So, here's hoping future handheld data files will work on a PocketPC.

I always enjoy reading *BE Radio*.

Dr. David Spiceland
associate professor
Appalachian State University
Boone, NC

I'm glad you like the idea. I hope we can create a Win CE and other versions in the future. This is the first time we offered the the FASTtrack in a portable format. You're right, we chose the Palm OS because of its popularity. We will look at other formats for next year.

Chriss Scherer
editor

NFL GDC is A-OK

The NFL Game Day Coordinator article in the April 2001 issue is informative and appreciated by all that are mentioned in it. The folks work hard as volunteers all season long and deserve a great deal of credit and acknowledgement.

It was at Super Bowl XXIX that the NFL first recognized the problems of RF interference and asked me for help with this mystifying situation. That was the nucleus of the GDC program launched by the NFL at Super Bowl XXX at Tempe Stadium in Phoenix.

The NFL has been proactive with its development and support of the NFL/SBE joint venture for the purpose of NFL event coordination.

It should be noted that the Super Bowl is set up as a non-SBE event. SBE coordinators are hired by the NFL, and I am the manager of that effort.

I thank you for your efforts and appreciate the fact that any ink the program gets will help further the public awareness of the need to coordinate in this ever burgeoning wireless arena.

I am personally very pleased with the program, as is the League. I think we've hit a home run with event coordination for the NFL. I've even offered to help anywhere I can as a volunteer to try and spread the concept to other types of events.

There are still a number of other ideas to further enhance the public awareness of the heightened responsibility for proper and effective coordination.

We at the NFL in concert with the SBE will continue to develop this program and find enhancements that will help us achieve the most interference-free environment possible for everyone.

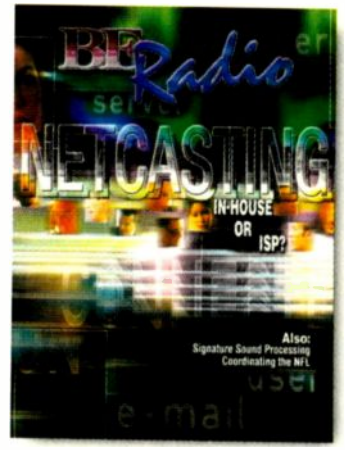
Jay Gerber
manager
NFL Frequency Organization Group

Reader Feedback

Interest in disinterest

Dear Skip:

Belatedly, I have read your column about LPFM and the public interest [*Last Byte*, April 2001]. Your analysis is quite accurate, but I wish to add my own comment based on my experience as a member of the board of directors of a now defunt nonprofit organization that promoted eclecticism in radio programming in the San Francisco Area during the '90s.



I agree that most proponents of LPFM, those who disparage the way that broadcasters serve "the public interest," would probably prefer to substitute their own judgment for the judgment of those making programming decisions at radio stations. Either they feel that most programming does not truly address the listeners' desires, or they believe that "quality programming" that reflects their own ideology should be rammed down listeners' throats (or ear canals).

For the latter group I have no sympathy. As you pointed out, the listeners vote with their ears, and I believe that if people want to listen in large numbers to a particular program or format, such programming is in the public interest as a matter of definition.

It's the former group that I sympathize with to some extent—and our nonprofit organization tried to deal with the alleged shortcomings in local radio programming, though without much success. Our views stemmed from the anecdotal observation that a particular station in San Francisco in the mid-80s had favorable word-of-mouth presence but failed commercially because the ratings did not reflect the community support that we believed truly did exist.

Those of us who feel that various interests of the listening public are going unmet would have to put up or shut up: if the programs/formats we like are not actually being listened to, then by definition they are not in the public interest.

John Covell
Former member, Bd. of Dirs.
Coalition for Eclectic Radio
San Francisco

Dear John:

I too have mixed feelings about the plight of LPFM. While it would be beneficial to have more choice of programming and greater public access to the airwaves, LPFM just isn't the right way to do it. The Internet may provide a better answer.

Skip Pizzi
contributing editor

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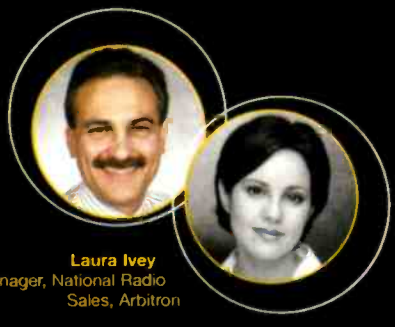

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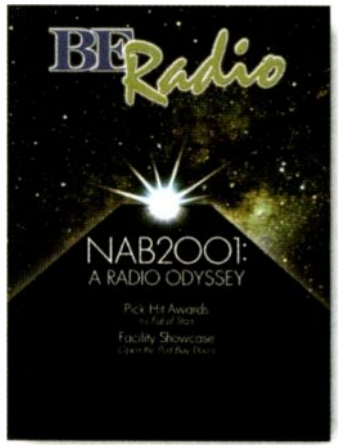
Reader Feedback

Let me clarify

I want to comment on Jim Paluzzi's article in the June issue. He makes some good points, but a few need a little more explanation.

"Never buy based on a demo" could better be worded *"A demo is only one part of the buying process."* The other steps that he describes are very legitimate and should probably be done before a demo. As much as we salespeople hate demos (I'm not sure that buyers know that we do), they are very beneficial in showing users that the proposed system is not difficult to learn and will not make their jobs harder or take longer.



"Find at least two installations of the proposed system at facilities similar to yours. Travel to those stations and spend a day talking to management, engineering and operations." This is great advice in which buyers usually will not invest the time or small budget to follow.

"If you hear frequent references to only one person at the station who 'really knows how to make this thing work' run away from the product." It has been my experience with software products that most operators are typical users. In a successful installation, at least one staff person will go deeper and learn to make the system "sing" in their application. This is and always has been true with almost all broadcast equipment including tape-based automation, consoles, etc.

"Visit the factory." This is more great advice that few buyers will invest the time or budget to do. I also suggest asking about the most common software and workflow problems that users have rather than just hardware problems. All reputable vendors use non-proprietary, off-the-shelf hardware. Hardware is no longer unique and does not typically distinguish one vendor's system from another.

"System training can be ... hardly worth the expense." This is the statement that I disagree with the most. In selling automation for over twenty years, I have never seen a successful installation without factory training. Trying to find another user for training usually winds up to be a very frustrating experience. A radio station's staff organization and workflow is somewhat unique to it. A user from a different station probably only knows how the system works in his operation. Many of the system's capabilities may be unknown to him because his station doesn't need them. Further, a trainer who has experience with operations at other co-owned stations within a group may be extremely valuable.

One of the biggest challenges most vendors face is keeping their existing user base knowledgeable about product advancements. Too often systems are bad-mouthed and replaced because a vendor didn't communicate new feature releases and enhancements well.

Criss Onan
sales manager
RCS
Fairport, NY

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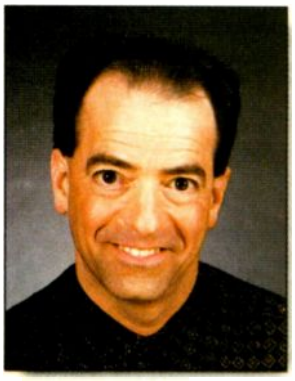
Back to school

By Skip Pizzi, contributing editor

At this time of year we tend to think about moving to the next educational level. Whether we are professionally involved in academia or just regular life, the shared experience of our school years brings back the annual fall memory of fresh starts, new books and sharp pencils. In today's technology-driven environment, learning never ends, so this feeling can be valuably applied to our careers as they continue to develop and change.

Here are a few recent examples that show the value of such study and its ability to substantially influence or amend previous practices.



WWW—the early years

Many stations are learning how to use the Web as an important ancillary service outlet. Rather than simply using it in a duplicative fashion to stream their air signal (which others like the RIAA and AFTRA are learning how to exploit), or as a typical business/promotional site, a tour of some current radio station websites shows numerous cool ideas. One is the posting of recipes mentioned in a talk show on food preparation. Consider listeners struggling to commit an ingredient list to memory while driving and their relief in hearing the host say, "This recipe is available on our website." This creates real good will for the station and builds strong branding to listeners. (Now all they have to remember is the station's URL.) This association is strengthened if the site is later consulted and the recipe is easily found, nicely formatted and ready for printing.

Similar value is provided by any listing of useful, broadcast-related information, such as discographies or bibliographies of artists or authors interviewed on air. Several stations present elements of their playlists as well, such as new artists added in the current week/month, or top-10 artists of the year. Local arts calendars and other event lists make sense, too.

The jury is still out on actual revenue production from a radio station website, but it's important to remember that our knowledge and exploration of this area is not yet complete. Some recent studies conducted by the Interactive Advertising Bureau (www.iab.net) and others show that the much-maligned banner ad may actually have been too *small* to be effective. New Web-advertising aesthetics are developing with larger, more intrusive styles, and these have been found to be up to 40% more effective than banner ads. Of course, that may not be saying much, given the sense of how ineffective banner ads have been. But these studies are also finding that the metric of click-through usage may be a naïve way to gauge effectiveness. Just because it's uniquely possible to directly measure a Web-ad's impact in this way doesn't mean that the ad won't have a more traditional, impression-based, indirect value. What we know about using the Web today may be akin to a 16th century map of the western hemisphere.

What we know about using the Web today may be akin to a 16th century map of the western hemisphere.

Another case of climbing the learning curve was recently reported by XM Satellite Radio. In an attempt to reduce the pain of paying a monthly service fee for radio content, GMAC Financing will include XM's $9.95 monthly service charge in car lease or loan statements of consumers who wish to enable their new cars with the satellite radio service.

Closed minds need not apply

It's easy to look back and see how dumb we once were, but much harder to acknowledge that we'll someday (probably soon) feel the same way about our present level of understanding. We must therefore vigilantly remind ourselves to keep our minds open to new and revised thinking, particularly for areas in which our experience does not yet run deep. The common wisdom in new technologies is often nothing more than the perception du jour.

You don't have to look very far in radio broadcasting to see some lessons learned the hard way in this respect. Many major markets have an FM station owned by a non-profit organization that is not in the reserved band (88.1 to 91.9MHz). Nearly all of these situations exist because the commercial broadcasters who were original licensees of those frequencies believed that FM would never succeed, and thus gave away their FM channels as charitable contributions to the non-profits. The tax benefits seemed brilliant at the time, but a few years later these broadcasters realized the premature and uneducated nature of their decisions. Live and learn.

Life would be dull indeed if we knew all the answers all the time. That's what makes continuing education so much fun, and so essential.

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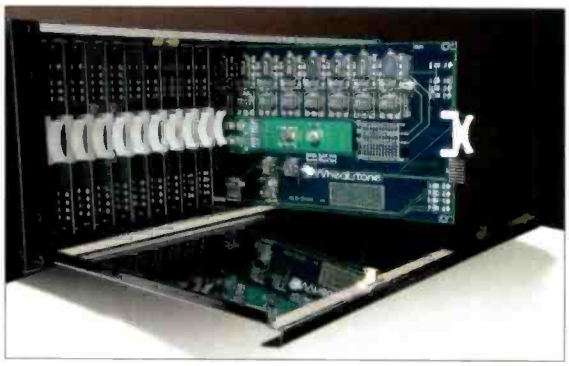

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