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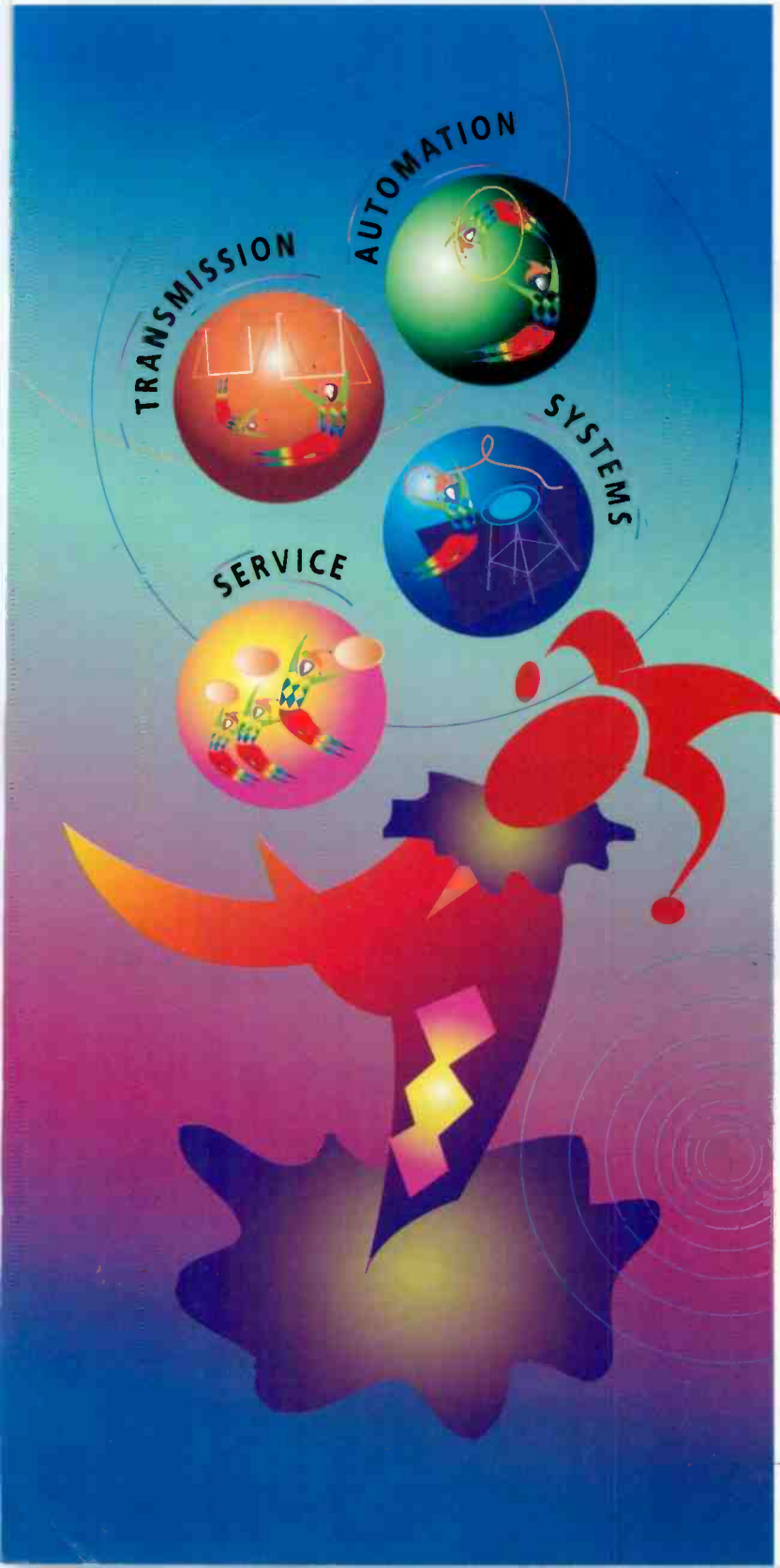

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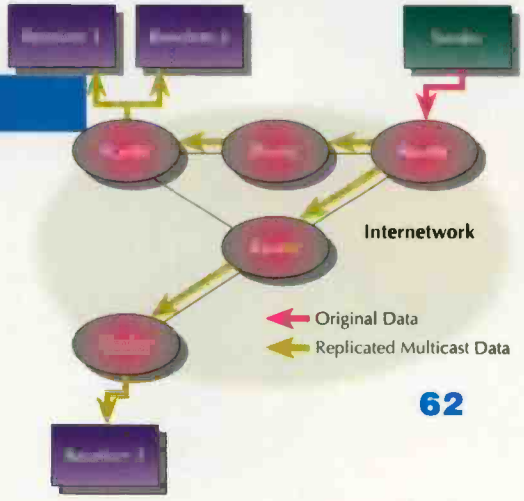

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ON THE COVER: Radio stations have always controlled their transmission facilities. There are several options for hosting the online presence. Cover design by Michael J. Knust.

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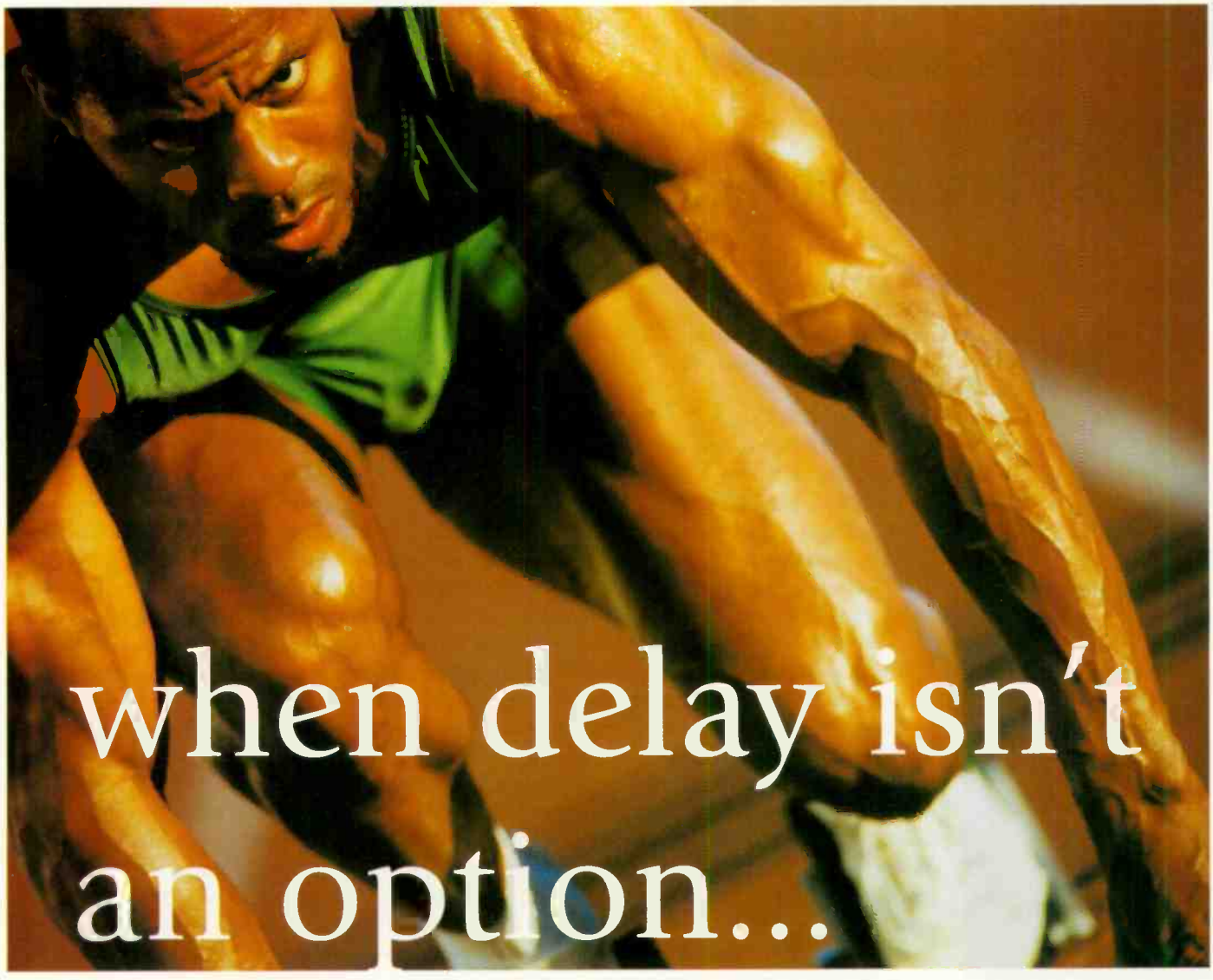

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Viewpoint

The new action hero

When Michael Powell was appointed FCC chairman earlier this year, the Commission was already under fire from several sides. Many people thought that Kennard's FCC would move the organization forward and show some genuine results with its actions. Unfortunately, Kennard came in with great expectations and left with unfulfilled promises.

When Powell was appointed, I felt that we may have been provided with a chairman that would bring some respect back to the commission; the same commission in which Congress had already lost faith, as evidenced by the passage of the Radio Preservation Act. We needed the FCC and its chairman to turn things around and take responsibility for past actions and inactions.

Powell has gotten into the thick of things by acting on three issues in which most broadcasters have a direct interest. The first item was the approval of several station ownership transfers. By attending to this act, the commission immediately reduced a backlog. This likely put the commission back on the good side of many broadcasters.

The next two items happened almost simultaneously and involve the Emergency Alert System (EAS) and the Broadcast Auxiliary Services (BAS), both of interest to broadcasters. The EAS NPRM addresses several issued raised by the Society of Broadcast Engineers, the National Weather Service and others. Key points include additional FIPS codes, additional and standardized alert codes, an increase in the relay period for required monthly tests and the addition of a text protocol. This NPRM won't fix everything, but it finally brings the item to the top of the list again.

The other action involves BAS, including studio-to-transmitter links (STL), remote pickup (RPU) frequencies, and a few other items. The main points here would change the rules to allow digital modulation for all BAS services and to re-allocate the BAS bands into smaller blocks to allow greater efficiency in their use. The specifics of these two actions can be found on the FCC website at the URLs listed here. I urge you to read these releases and file your comments with the FCC.

Powell had an on-stage conversation with the Cellular Technology and Internet Association president at the CTIA convention in March. Powell summed up the recent activity when he stated that the FCC is rethinking its business model, like any business should. He added, "We are in the process of reviewing the optimal organization and structure for the FCC and [will] be responsive in Internet time."

What will set Powell apart from his predecessor are his comments about the FCC's activity to accelerate decision making and step up enforcement. Powell said, "We are putting increasing emphasis on an enforcement model as opposed to a regulatory model. When you cheat, we'll get you at the back end." I hope that the new commissioners are willing to work with Powell and not against him to restore the reputation and value of the FCC.

Powell has also acknowledged that the FCC is understaffed with engineers. The FCC is feeling the same shortage that broadcasting already knows. In addition to hiring additional engineering staff, Powell wants the FCC attorneys to familiarize themselves with engineering and technical issues. The FCC currently has little more than 250 engineers out of a staff of about 2,000.

I think Powell has the makings of one of the best commissioners ever. He is stepping in and putting the wheels in motion, unlike the previous Chairman, whose actions lacked a clear focus based on current conditions and technology, but seemed to be based instead on political agendas.

Chriss Scherer, editor
chriss_scherer@intertec.com

On the Road:

Chriss will moderate two sessions at NAB:
International DAB Panel - April 22, 5:00pm
LVCC N249. The state of DAB around the world.
What You Missed at the Show - April 25, 9:00am
LVCC N240. It's a big show with lots to see.

FCC Actions:

EAS
http://www.fcc.gov/eb/Orders/2001/fcc01088.txt

BAS
http://www.fcc.gov/Daily_Releases/Daily_Business/2001/db0320/fcc01092.txt

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Engineering 101

By John Caracciolo

As consolidation comes to a close, radio general managers are faced with increasing the profit margin of the station. Because of high cash flow multiples paid for acquisitions, owners will seek double-digit revenue increases, and the consolidation benefits of eliminating overlapping expenses, to achieve required returns to their radio assets. Increased returns can be realized by increasing revenue or decreasing expenses. Today's general manager needs to make tough budgetary decisions that will affect the future of the facility. These decisions must be well thought out, effective, and profitable. Such decisions must be made quickly, so a working knowledge of the entire business operation is essential.

Management, sales and engineering can benefit from departmental interaction.

The GM is born

General managers usually begin in sales. Since radio is based on sales, it is natural that many radio station executives come up through the sales ranks. This is effective and creates knowledgeable radio business executives that have excellent people skills, great persuasive talents, and a good working knowledge of the radio station business flow. Since the sales department interacts with every other department in a radio station, the GM usually has a good understanding of how every department functions. With this knowledge, business decisions can be made with an understanding and consciousness of the bottom line and the future profitability of the company. This sounds great, but the engineering department, which holds the broadcast facility together, is the department with which sales executives interact the least.

Communicate

I am one of the very few. I am an engineer by trade. Radio engineering is my passion, my hobby, and my life. Radio management is my job. Running a successful radio company is my task. As I write this, I do so with the knowledge of both departments, and from both sides of the desk. Understanding the inner workings of the engineering department is simple. As a general manager, you don't need to know the resistor color code, or Ohm's law, but understanding the daily tasks for which your engineering department is responsible and understanding how the department works, is vital for a successful operation. It is just as important as understanding commercial inventory management. Both the sales department and the engineering department must be viewed as potential profit centers. Dialog with the engineering department is essential, but micromanaging the department is not only time consuming and wasteful, but in the end will prove detrimental to the overall success.

Knowing the technology

For the purpose of simplicity, let's look at the radio-engineering department as a separate division that needs to contribute to the overall success of the company by achieving profitability.

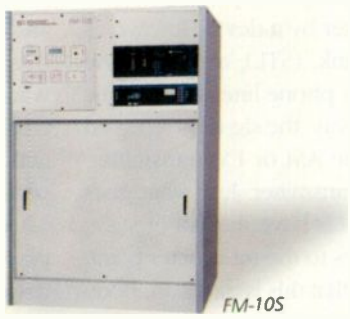
Any successful business needs reliability, adaptability, and customer service. The radio-engineering department is no different. The purpose of the engineering department is to continually service and support the operational requirements of the radio station and to facilitate an uninterrupted program flow to the end users. In simple terms, a general manager might interpret this as keeping everything working and keeping the station on the air; in real life, it is so much more.

The engineering department of the 21st century is a multi-faceted synergistic technology department. Today's engineer must be a master of computer technology and RF systems, have a working knowledge of HVAC, be fluent in basic electronics, be an excellent communicator, and have wonderful people skills. As a general manager, you must understand that the business you are running is a cutting edge, high technology business, and to keep your business growing, your engineer must keep your company competitive. This means investing in changing technology and constantly improving your product—in this case, the sound of your station.

Around the facility

Every source in your studio—CD players, tape decks, microphones, and commercial systems—is routed and mixed down at a central point.

It does not matter if it is an analog or digital signal, or a mono or stereo program, the on-air mix is basically the same. The output of this console is then fed to a processor



FM-10S

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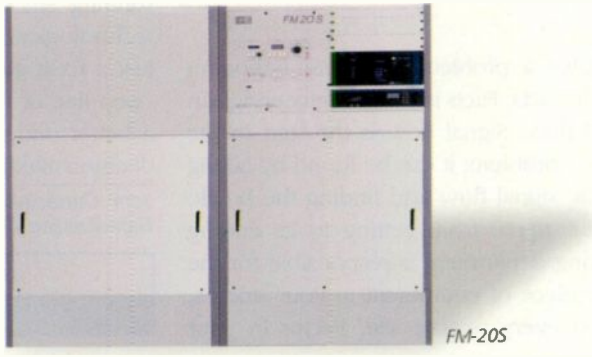
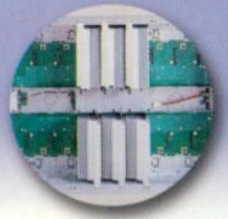


FM-20S

our FM-20S is way cool!

HOT-PLUGGABLE IPA/PAs



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or router to your transmitter. If your transmitter is located at a different location from your studio, the program signal needs to be sent to your transmitter by a device known as an STL. A studio to transmitter link, (STL), can be in the form of a Microwave transmitter, a phone line, a fiber optic link, or a straight wire run. Either way, the signal is received at the transmitter and fed into the AM or FM transmitter.

Our engineer is always at the transmitter. Just what goes on at that mystical place? Some GMs have the out of sight, out of mind attitude when it comes to the transmitter plant. Successful radio executives know that this is the heart, body and soul of the radio station. Without a functional transmission plant, the new studios do not matter, and the great jingle package is just a DAT tape. The signal you deliver, commercials, music, promos, it all comes down to one wire, one cable, one input: the input to your transmitter.

Break it down

When trying to solve a problem, the most important thing to do is to get the facts. Facts in radio engineering can be viewed as signal flow. Signal flow is the start to the finish, and if there is a problem, it can be found by taking an overall look at the signal flow and finding the break. What is stopping the signal from getting to its ending point? The engineering department is responsible for the signal flow of every piece of equipment in your studios, your transmitter, and every remote site. Factor in your office computer network and every printer in your building, and you have a massive collection of technology and one department to deal with it all.

As a radio executive running a 21st century facility, you want everything you do, every decision you make, to create growth. Unfortunately, the stuff that you have to do gets in the way and is much less important than what you planned on doing.

A chief engineer may have to deal with a broken CD player, or a bad remote sound system, or may have to help a jock deal with a new piece of equipment. These important tasks do nothing to help grow the company.

Many of the important jobs that a manager does to grow the company are just insignificant details that add up to running the company. The radio engineering mission is to keep everyone informed and the technical operation running smoothly. The GM, though running a major technological company, may perceive the engineer as just a fix-it guy. The reality is a different story. Keep an open line of communication with your CE. You will gain a better understanding of your technical operation, and decision making will become much easier.

John Carraciolo is vice president and general manager of Jarad Broadcasting Company, Garden City, NY.

Managing Technology in June:
Making Purchase Decisions

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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Mutual impedance

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

Matters of impedance are deeply significant in radio engineering. In audio, with lower frequencies, the actual component values are generally considerably larger than those used in RF work, but the effects of wrong component values are frequently more aurally apparent than similar failures in RF. In the latter, incorrect components may affect impedance and produce catastrophic problems, putting the station off the air.

The audio engineer has been accustomed to working with values of 150Ω to 600Ω for many years. The shift to bridging inputs has brought input impedances up to 10kΩ or more. Today, however, values of 75Ω and 110Ω are used with digital audio.

Directional antenna systems are sensitive to impedance variations.

The RF engineer is still mainly concerned with 50Ω transmission lines, which makes life a little easier and more consistent. Correct line, load and operating impedances are of vital importance to directional antenna designers and operating engineers.

All individual towers have their own characteristic impedance, which is approximated using this formula:

$$Z_o = 60(ln \frac{2G}{A} - 1)\Omega$$

Where *ln* = natural logarithm
A = equivalent radius of antenna
G = height of antenna

In the case of a single non-directional antenna system, we are not normally concerned with characteristic impedance at this point, because the approximate base operating impedance can be obtained from published curves. The base operating impedance will be measured after all construction is completed, all appendages are added and the antenna is energized for the first time. The desired antenna current will be determined based on I^2R and the transmitter operating at authorized power.

However, whenever an antenna is placed within the field of another antenna, the operating impedance of each antenna will be changed. The degree of change is controlled by such things as proximity, current in the antenna, antenna length and the method of connecting the base into the system. This means that, for the directional antenna designer, a new term has to be considered. This is known as *mutual impedance*.

Mutual impedance

A directional AM broadcast array consists of two or more radiators. These may be arranged in almost any formation as needed to produce the desired radiation pattern. The array will have one reference tower and as many additional towers as needed. The design of the system will call for each tower to have unique specifications of current, phase and base operating impedance to produce the desired pattern.

Usually, a change in one tower's operating parameters will result in a small (or large) change in other towers. How many towers are affected, and how much, depends on the location of the altered tower and the amount of change.

If incorrect antenna system operation is suspected, it is very important not to change the phasor settings of the reference tower. Any change made in the reference tower's parameters will affect every other tower and cause a lot of unnecessary work. Occasionally, in the case of a two-tower array, very small adjustments may be made to the reference tower in order to "tweak" a reading. But this is a special case, where the resulting parameter changes can be easily controlled, and it should not be done as normal practice.

During the design of the directional array, it becomes necessary to determine the mutual impedance arising in the array. A directional antenna designed with a very high mutual impedance will tend to be unstable and oversensitive to adjustments. Therefore, it is important

On The Air

A Monthly Newsletter from Broadcast Software International Issue 3

News

BSI Joins the Cast of CBS' Y&R

In an industry crowded with broadcast automation options, CBS' eye met BSI. It was love at first sight. CBS Television City had their choice of digital audio systems, but they selected Broadcast Software International's Series 200.

"When I saw a demo of the BSI software, I just thought 'Wow'," said Ray Lignowski, Audio Supervisor at CBS Television City. "With BSI, we can work the way we want to. The BSI system is very versatile and easy to use. No other digital workstation does what BSI does."

CBS engineers cite several reasons for choosing Broadcast Software International. BSI's ability to provide quality systems at prices that fit CBS's budget was important. CBS was also looking for a system that was easy to operate and could satisfy the demands of live entertainment production.

BSI will furnish digital audio systems for CBS' live entertainment programming, which includes the daytime drama The Young and the Restless. CBS will be using BSI Series 200 automation systems. The $15,999 Series 200 system includes 2 rack-mount Pentium class PCs and flat screen monitors. BSI is providing their broadcast and production software, as well as Cool Edit Pro from Syntrillium. The system also includes dual ASI 4113 audio cards from AudioScience. In coming months, BSI will provide systems for additional CBS productions.

"We are proud to be chosen by yet another company recognized worldwide for quality broadcasting," said BSI President Ron Burley, "Working with CBS is a great opportunity. Live broadcast support is a unique challenge. We love finding new ways to improve our products."

Quote of the Month

"I went to WaveStation Weekend and thoroughly enjoyed it. Ron's demos are a must-see."

Dan Kolenda
WVIJ- Port Charlotte, FL

Calendar

Apr 24, Demonstration of a hot new product at the NAB by BSI President Ron Burley. Call for an invitation.

Aug 16-18, WaveStation Weekend Training Session

Birthdays:
Apr 3 1942, Wayne Newton
Apr 10 1984, Mandy Moore

Tip

Email Remote Control

BSI's WebConnect accessory allows you to send files to your automation system using regular email. Unlike FTP or pcAnywhere, WebConnect requires only email capability on the sending machine. You can create and email a file to your automation system for air play. Radio groups can update every station with one email. WebConnect can also notify you via email or pager if there is an out-of-date or missing item. You can do it with WebConnect!

User File

KLEY - Matt Clark

Matt Clark started at KLEY about the time when they decided to get a new automation system. "I researched up and down all the different systems. By far, for the price and features, the best solution was WaveStation."

KLEY really depends on their $1499 WaveStation system. "Because we're such a small operation, with only two full-time employees, having a reliable automation system is very important to us," said Matt. "And WaveStation's ease-of-use really simplifies our work all the way around. It's very flexible, allowing us to instantly be running live-assist or fully automated."

Matt finds that BSI's tech support after the sale is great too. "I remember one time late on a Sunday night. We had a problem with our system, but couldn't figure it out ourselves. The tech guy at BSI was great. He walked me through step-by-step to fix our problem. He was patient and asked the right questions. It was just such a smooth and fluid process. If you've ever spent any time on the phone with your typical tech support guy, you know that that's very hard to come by."

Matt's advice to people looking at BSI's WaveStation, "It's a 'can't-go-wrong' type of purchase."

Send us your story.

to check this parameter early in the design stage. Short tower spacing of less than about 65 degrees is usually an indication that mutual impedance may be excessive, which can lead to feeder and phasor design problems.

It is usual to refer to the mutual impedance as Z_{NS}.

$$Z_{NS} = \sqrt{B_S}\,(Z_N - Z_g)$$

This becomes a complex number, and the root can be obtained by halving the angle and finding the square root of the magnitude. This gives one number for magnitude, which can be either positive or negative. It is generally possible to determine which sign is correct by inspection and comparison with the tower data, or a chart such as Figure 1.

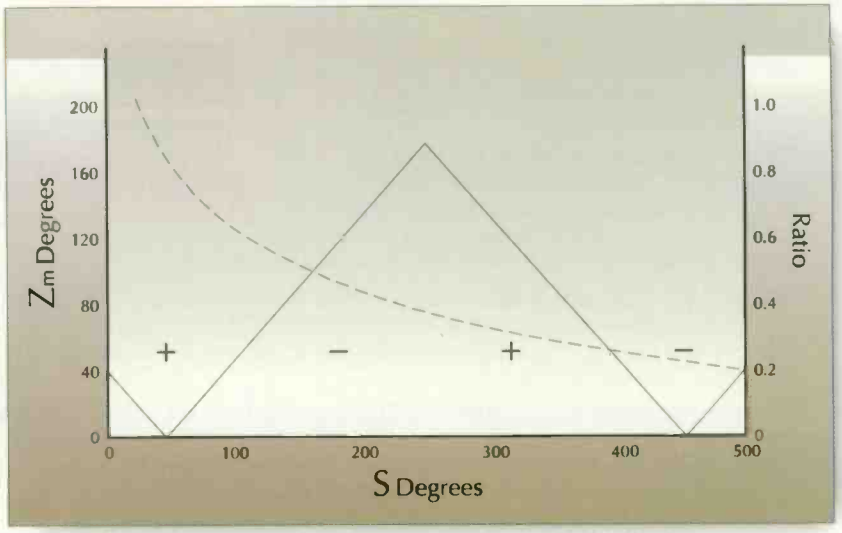

Figure 1. Mutual impedance based on measured and calculated values.

The relationship between the towers is rather like that in a transformer, where the coupling between the windings controls the degree of mutual inductance. The voltage developed in a second tower is related to the phase angle, and it depends on their spacing. This requires that the coupling factor be described in terms of angle and magnitude—in other words, impedance.

It's been a long time since I heard of any engineer doing this, but it is possible to measure the mutual impedance of a pair of towers. Knowledge of a method might come in handy one day in the field.

Measuring mutual impedance

Assume two towers: North (N) and South (S). Float tower S and measure the base impedance of tower N. Thus: $Z_N = R_N + jX_N$.

Then, float tower N and measure the base impedance of tower S. Thus: $Z_S = R_S + jX_S$.

Ground the base of tower S with a reactance equal to $-jX_N$. This will self resonate the south tower. Measure the base impedance of the north tower. Thus: $Z_g = R_g + jX_g$.

E-mail John at batcom@bright.net.

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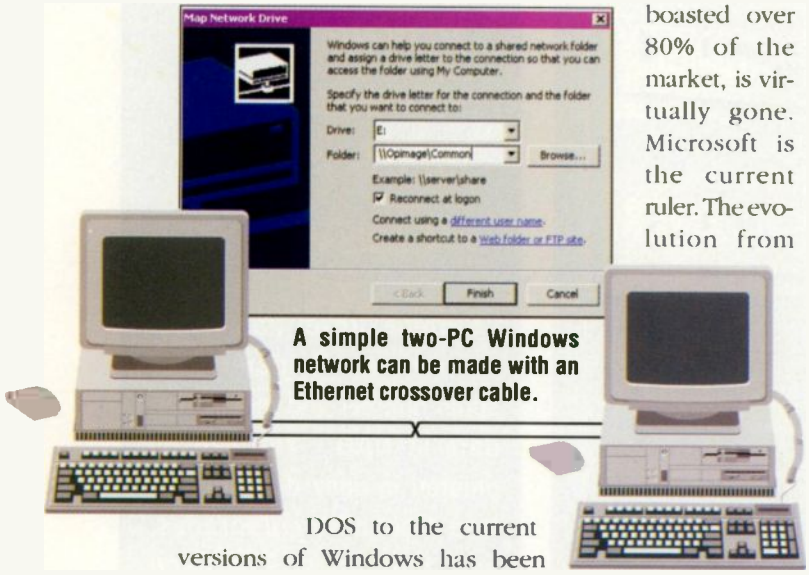
Setting up a LAN

By Kevin McNamara, CNE

Local Area Networks (LAN) allow users to share data and resources, such as printers and Internet connections. It's hard to find a business without a LAN and, in fact, the number of households today with two or more PCs is around 20%. Many multiple-PC households are connected to a LAN. The proliferation of LANs is due to the availability of inexpensive, higher performance hardware and improved network-friendly operating systems. Setting up a LAN may seem fundamental to most of us, but given the rate that technology changes these days, a little review is in order.

Network operating systems

The battle of the PC-based Network Operating System (NOS) is quietly coming to an end. Novell, which once boasted over 80% of the market, is virtually gone. Microsoft is the current ruler. The evolution from DOS to the current versions of Windows has been frustrating for most users. However, Microsoft recognized that the operating systems for both standalone PCs and network servers would need to fully support the TCP/IP protocol that is used exclusively for all communications on the Internet. Novell, on the other hand, built its NOS around IPX. This lack of native TCP/IP support caused its market share to dwindle.



A simple two-PC Windows network can be made with an Ethernet crossover cable.

Protocols define and implement the means for data communications devices to communicate with one another. It once was fairly difficult to mix different types of computers, such as Macintosh and Windows, in part due to different protocols being used. This was solved by creating network-client programs that were loaded on the PC during the boot process. These client programs permitted data files to be shared between machines.

Protocol types

Novell used the IPX protocol, which stands for Internetwork Packet Exchange. IPX is a *connectionless protocol*, which means that acknowledgement is not required for any sent packet. The data reliability is handled at a higher layer. The networking hardware determines how devices will be addressed.

IPX is considered to be a *routable* protocol, allowing for data packets to be sent through certain devices and to arrive properly at the intended destination. Packets of data are broken into smaller packets called *datagrams*, which set a predetermined size and contain information that will deliver the packets to the desired destination.

Microsoft developed another popular protocol called *NetBEUI* or Network BIOS Extended User Interface. NetBEUI was designed to extend the Basic Input/Output System (BIOS) of the PC operating system to support basic networking functions. The NetBEUI protocol is not routable; however, it works very well in small peer-to-peer networks. If you are looking to quickly assemble a small Windows-based network, or just need to move large files from one machine to another, setting up a network connection is easy:

- Connect two machines to a hub using standard Ethernet cabling or directly to each other using a crossover Ethernet cable.
- Add NetBEUI under *protocols* in the network setup box in Windows.
- Enable *Share files and printers* in the network setup.
- Enable *Sharing* for the drive (or directory) that you want to make available to the other machine. This is done by right clicking the proper directory in Windows Explorer, selecting *share* and selecting *share this folder*.

This assumes that each machine has a properly configured network interface card (NIC) installed. You should be able to see the drives and directories that you permitted to be shared by clicking on *Network Neighborhood*. Once you find the directories you need, select *Map Network Drive*. You will be given a choice of drive letters that can be assigned to the remote drive (typically the next letter); click *OK*, and that drive should be listed along with your local drives in Windows Explorer.

The TCP/IP protocol is the basis for all communications over the Internet and for most LANs. TCP/IP has been around for several decades and was originally developed to facilitate reliable data communications between different computer platforms connected to a variety of transport systems, i.e. dial-up, T1.

continued on page 27

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About Prime Image

You are about to discover a new way to create additional revenue from your radio station. The often-heard wish of having more time has been answered. In radio, time means revenue. Prime Image Inc. is in the time business. The company's experience in time manipulation for broadcast and video applications has gained notoriety and respect within the industry. We're glad that you are interested in learning more about Prime Image and its latest revenue-creation product, CASH.

Based near San Francisco, Prime Image is a closely controlled manufacturer of corporate, industrial and broadcast video equipment. The principals within the company have vast experience in the broadcast and video industries. The company manufactures a quality, easy-to-use line of transcoding time base correctors, synchronizers, digital standards converters, audio/video delays, desktop video products and digital program time reduction/ editing equipment.

Incorporated in 1985, Prime Image takes great pride in its corporate image and integrity. Of particular importance to the company is customer service. All Prime Image products include a three-year warranty that covers round-trip express shipping charges within the United States, parts, labor, product updates, revibrating and product burn-in.

Prime Image has a manufacturing, engineering and sales office in San Jose, CA, which serves a limited, select professional distribution network worldwide. The escalating growth of the company for varied applications is handled by an elite group of professional distributors.

Bill Hendershot, president and founder of Prime Image, was awarded an Emmy for the development of the world's first digital video timebase corrector. This was the first fully digital video product. He has also been nominated for Emmy awards for the development of many other products and continues to develop state-of-the-art video and broadcast equipment.

The company's product line includes timebase correctors, video standard converters, synchronizers and audio/video delays. The experience gained in manipulating time for video has been carried over to audio applications. One Prime Image product, the Time Machine, was developed to create additional time within a video program. This same idea has been carried over to audio for the development of CASH.

While the unit is a piece of hardware, it should be considered a revenue tool and not a capital purchase. The cost of the unit can easily be covered by the revenue it creates. In very little time, the additional revenue will exceed the initial cost, and the true value of the CASH can be realized.

To help stations put CASH to use, a leasing program is available. Contact Prime Image for specific information on leasing or purchasing a unit.

In the following pages you will learn more about what CASH is, what it has done for other stations and what it can do for your station.

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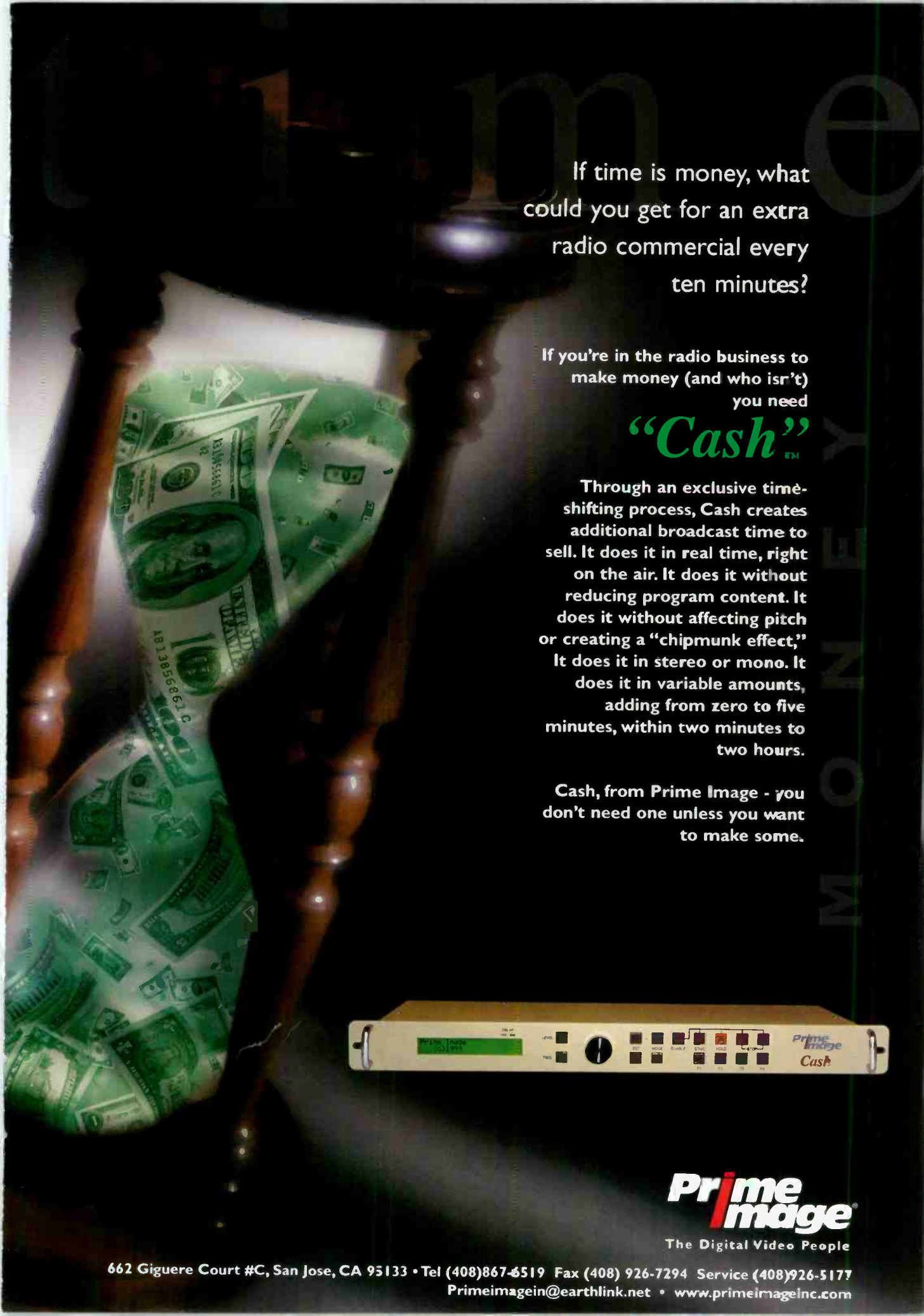
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CASH in action

Going into major markets

Playing in a major market is a worthy goal for any broadcaster or equipment manufacturer. CASH has made it into six of the top-ten markets with ABC Radio. These units are used at six leading talk stations on some of the program material.

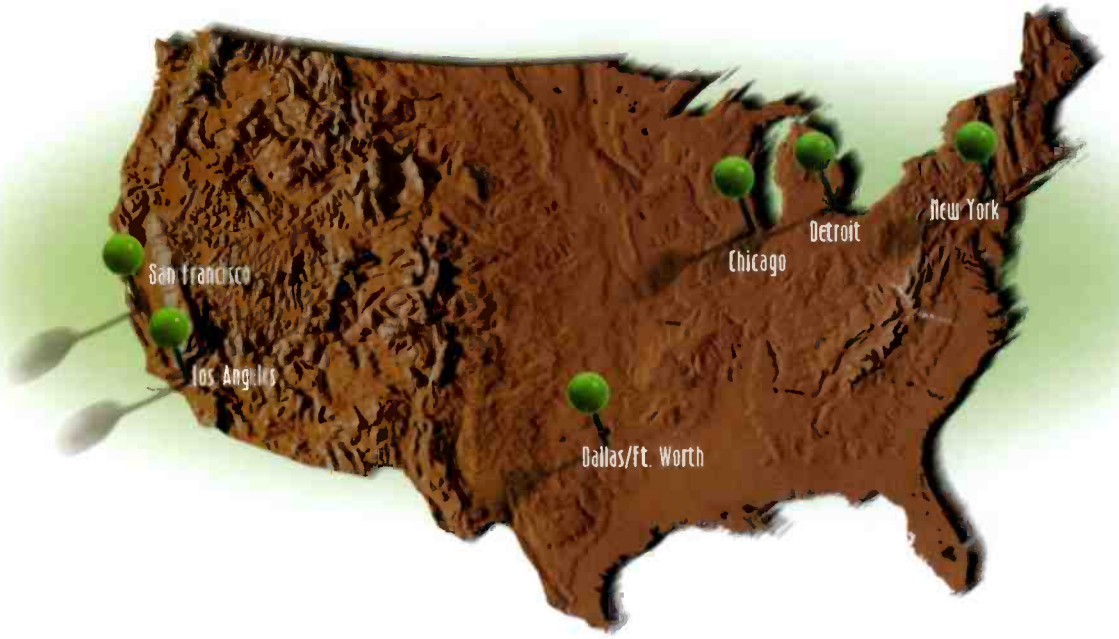
Bert Goldman, vice president of engineering, radio division, noted that, "CASH works inaudibly, and when used conservatively like we do, there is no noticeable effect." Since the audio is digitized but not data reduced, there is no degradation from encoding and decoding the audio. The ABC stations are only inserting one additional minute per hour, which is very conservative since the unit is capable of inserting up to four minutes per hour.

Goldman continues, "the idea to use CASH was presented at the corporate level. The concept makes sense, and the decision was made to try it on some of our stations. This test led to the purchase of six of the units." The issue of cost was easily justified as well. "A cost analysis quickly revealed that this was something to try. Payback is extremely rapid for a major market station. In some cases, this may be less than 30 days."

An executive at ABC first saw an ad for the CASH and then asked Goldman about it. After contacting Prime Image and learning about the unit, Goldman became even more interested. "The more I learned about the unit, the more I thought it was worth a try. When I explained to the CEO what it could do, he was very excited."

The next step was to install and test CASH at a station. The test was done in New York City on the Rush Limbaugh Show. While the test was intended to be confidential, word got out and even appeared in the pages of the *New York Times*. However, Goldman summarized the test results by saying, "the initial tests had positive results and led to our final purchase of six units."

The key to a successful application is programming the unit properly and triggering the events at the right time. Once CASH is installed, each operator should be fully trained on its operation and function. Like any other piece of equipment, when it is used by a skilled operator, the results can be very profitable.



CASH in Philadelphia

Payback in days

Beasley's WWDB-FM is a full-time talk station. It now originates all its programming locally, but until recently aired several syndicated talk shows. Like most syndicated shows, local spot insertion time is limited. Dennis Begley, general manager of WWDB, was interested in a way to generate additional revenue during these shows. For his station, CASH was the answer.

"Someone on the staff saw the article in the *New York Times*," says Begley referring to the use of CASH on WABC during the Rush Limbaugh show. "It interested us, and by the next day we bought one." For WWDB, the unit was installed and quickly started generating new-found revenue for the station on two syndicated programs.

"We used the CASH rather conservatively, adding only two minutes of time per hour." At this level of time insertion, Begley says that it is impossible for a listener to tell that anything is being added to the program. He added, "the show host might be able to hear that something is different only because people know their own voices and speech."

WWDB only used CASH on syndicated shows. It works equally as well on live programming, but for WWDB, this would require some additional installation such as direct monitor feeds for the host. At the time, this was something that the station did not want to undertake. The time constraints in syndicated shows are very tight. The CASH allows some flexibility in adding additional commercial time and new-found revenue.

The return on investment was very fast as well. WWDB added two minutes per hour, six hours a day, five days a week. These additional 60 spots averaged $300 each. In a few days the cost of the CASH was covered and Begley quickly saw the value of the unit.

Begley particularly likes the fact that the program can be aired without losing any material. "The full show can run in its entirety and still provide extra commercial inventory," he says. "The average person cannot tell that the audio is being affected. There is no way in the world that anyone could tell."

Training the operators was not a problem. The unit was installed to operate on a single pushbutton, so instead of simply starting the commercial, one button started the commercial and began buffering the program audio.

WWDB does not air any syndicated programs right now but has plans to use CASH again very soon.

CASH heads south

Not just for major markets

When Kent Dunn, general manager of Beasley's six stations in Augusta, GA heard about CASH from Dennis Begley, general manager of sister-station WWDB, Philadelphia, Dunn, like many others, was very interested.

In smaller markets, every ad dollar is important. CASH offers a way to create more time to generate additional revenue. When asked about the cost of the unit, Dunn replied, "Our spot rate in Augusta is considerably less than Philadelphia [see page 5], so payback on the unit will take longer than one week, but should still be less than 60 days. After that it's strictly additional revenue." This is why CASH should be viewed as a revenue tool and not a capital equipment purchase.

The Augusta group has been using CASH on WRDW-AM during syndicated programming. "We are typically inserting 60 to 90 seconds per hour during syndicated programming. This has given us a way to supplement our bottom line," adds Dunn. At this time there are no plans to use CASH on live programming since time constraints are not an issue. During live programming the station already has complete control over time on the local level. However, if the need arises, CASH is ready to be put into service.

Dunn adds, "I'm amazed at the ability for us to create the additional time within syndicated programming without any effect on the content." Quality is important to Dunn. "We would not compromise the programming content regardless of what could be gained from it as far as available time to sell. In this case, it's the best of both worlds. We're able to get more inventory without changing the show's content in any noticable way."

Overall, Dunn is completely satisfied with the CASH and what it can do. "We are certainly pleased with the product," states Dunn. CASH has provided an easy means to supplement WRDW's bottom line.

Dunn tried CASH on the recommendation from WRDW's Philadelphia sister station [see page 5]. Installation and operation of CASH was easy, especially since WRDW could pull from the experience already gained from the Philadelphia station. Dunn says, "It is very easy to operate — very similar to operating a profanity delay. Once it has been setup and activated it does the work for you."

The Product

What is CASH?

There are not enough hours in the day. This phrase is uttered countless times every day. However, there are now more hours in a broadcast day thanks to CASH.

The general idea behind CASH is simple. The time during a radio program is finite. In many situations, the ability to add just one more commercial would provide substantial revenue for a station. CASH provides a simple means to create the additional time within a program that can supplement the bottom line.

Time manipulation is not always an easy concept to understand. To illustrate how easy it is to use CASH, consider this example that involves a 12-minute program with two minutes of commercials. In this example, we want to insert an additional 30 seconds for a sponsorship within the 12 minutes.

First, CASH must be programmed with the time information specific to the program. The *Program Time* is 12 minutes. The *Hold Time* for commercials is two minutes. The *Insertion Time*, that is the time that will be added to the program, is 30 seconds.

The audio path is shown in Figure 1. The program begins at 7:00:00. At 7:00:00, the program feeds the CASH input through the console connection. The inserted program material is played directly on the air through the audio router. A contact closure will start the CASH's buffer. This closure can be the same command that starts the inserted commercial. While the inserted 30-second commercial is playing, there is no audio coming out of the CASH because it is buffering.

At 7:00:30, the inserted commercial ends and the CASH provides audio at its output. The audio buffer, now holding 30 seconds of audio, will slowly decrease the amount of audio in the buffer during the duration of the program.

The regular two-minute commercial break is scheduled for 7:05:00. These commercials are also fed into the CASH, but at that time the unit is placed into *Hold* while the commercials are playing. This prevents the time reduction process from being applied to the commercials. The 60-second commercial will still be 60 seconds long. When the commercials end, the unit is released from its hold function, and the buffer again begins to unload.

At 7:12:00, the audio output of the CASH will have met real time.

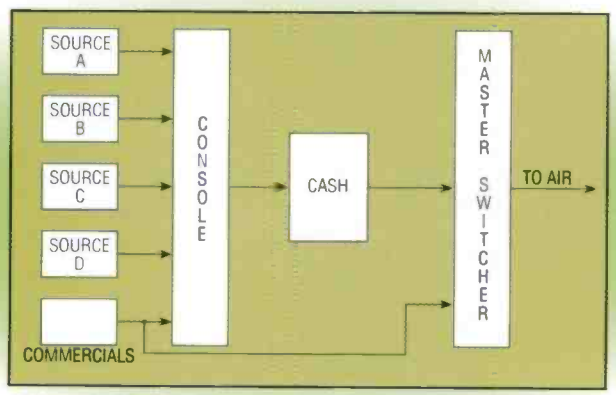


Figure 1. The audio-signal path for using CASH.

CASH Specifications

Input Level: 0 or +4dBm 600 ohm or HiZ Bal or Unbal, XLR

Output Level: 0 or +4 dBm 600 ohm Bal or Unbal, XLR

Variable Level: ±16 dBm (clips at +20 dBm)

Frequency Response: ±0.5dB, 20Hz to 20kHz

Channel Separation: 96dB

S/N (A-wt-filter): 86dB

THD: 0.04%

Additional Commercial Time: 2 seconds to 4 minutes mono,
2 seconds to 2 minutes stereo

Variable Commercial Time: 0.1 second steps

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The TCP/IP protocol is actually the combination of two protocols – Transport Control Protocol (TCP) and Internet Protocol (IP). The Internet Protocol defines a data delivery system wherein the sending and receiving machines are not necessarily directly connected. IP is responsible for breaking the data into datagrams and inserting the proper addressing information. The Transmission Control Protocol works with IP to provide reliable delivery. It provides a means to ensure that the various datagrams making up a message are reassembled in the correct order at their final destination and that any missing datagrams are re-sent until they are correctly received.

LAN Types

PC-based networks fall into two categories—peer-to-peer or client-server LANs. Peer-to-peer LANs are the easiest (and least expensive) to implement. All Windows versions since Windows95 provide the tools to connect to other Windows-based PCs using various protocols. Peer-to-peer networks are intended for small workgroups, typically around 10 users.

Client-server LANS account for the majority of corporate networks. The servers provide a means of centralized management, security and resource sharing. Larger LANs can consist of multiple servers distributed across physical locations, even different countries. The servers can also provide specialized functions, such as database, e-mail or fax distribution.

Another variation of the client-server network is the *thin* client-server. One of the defining characteristics of this type of network is that the primary processing work is always done on the server, while the client workstation is not much more than a dumb terminal. Typically, these terminals are more advanced than what was available in the past and support a variety of graphics and HTML.

Hubs, switches and routers

Virtually all LANs use Ethernet as a means to transport data. Ethernet uses a star topology, where devices are attached to a central Hub. Hubs are available to support the 10, 100 and 1000Mb/s Ethernet standard.

A switch is an enhanced hub. In a hub all the Ethernet signals collide. A switch creates a virtual path between two devices, eliminating the potential data collision.

Routers can determine where to route data, based on address information contained within the packet. Fundamentally, routers are used to connect two or more networks together. Probably the most common use for routers is to connect a LAN to the Internet.

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) 253-1640 or go to www.sbe.org for more information on SBE Certification.

Streaming decision appealed

By Harry Martin

In January, the NAB and several broadcast groups sued the U.S. Registrar of Copyrights, seeking to overturn the Copyright Office's final rule that radio broadcasters simultaneously streaming their signals on the Internet are responsible for millions of dollars in royalty payments to record companies.

Historically, there has never been copyright protection for sound recordings of musical compositions. Limited copyright protection was first given to record companies and labels in the Sound Recording Amendment of 1971. The purpose of this amendment was to prevent the unauthorized reproduction and piracy of sound recordings. Until 1995, however, Congress had refused to afford protection for the public performance of sound recordings.

In 1995, Congress enacted the Digital Performance Right in Sound Recordings Act (DPRA), which expanded copyright protection for public performance rights in sound recordings to cover certain digital, audio subscription transmissions as well as digital, audio interactive transmissions. Nevertheless, this protection was limited, and the free play of over-the-air transmissions of sound recordings by radio broadcasters remained exempt from copyright liability. With the passage of the Digital Millennium Copyright Act (DMCA) in 1998, Congress expanded the scope of the DPRA's statutory license to include certain nonsubscription digital audio transmissions. The DMCA did not, however, repeal the DPRA's provisions exempting over-the-air streaming transmissions by radio broadcasters.

The NAB argues that nonsubscription simultaneous streaming transmissions of over-the-air radio broadcasts by FCC-licensed stations are exempt from the digital performance right in sound recordings found in the Copyright Act. Therefore, such streaming transmissions should not be subject to either compulsory licensing under the Act or discretionary licensing by individual copyright owners.

Many stations engage in the simultaneous streaming of their over-the-air broadcasts on the Internet. The Copyright Act specifically exempts a nonsubscription broadcast transmission, defined as a transmission made by an FCC-licensed terrestrial broadcast station, from copyright liability. The simultaneous streaming of free over-the-air broadcast transmissions on the Internet is, by definition, a nonsubscription transmission; the issue continues to be whether streaming is a broadcast transmission.

The NAB argues that by excluding simultaneous streaming transmissions from the definition of a nonsubscription broadcast transmission, the Copyright Office will hinder the development and growth of a new entertainment medium. Furthermore, if subjected to liability, radio broadcasters would either have to negotiate individual licenses with every copyright owner of a sound recording or, if they qualify, get a compulsory license and pay an undetermined amount in royalties annually.

If the court does not reverse the Copyright Office's ruling, streaming may be doomed. Consequently, the NAB is asking the court to decree that FCC-licensed broadcasters simultaneously streaming their signals are subject to neither a compulsory license nor a discretionary license by individual copyright holders. The NAB has asked the court for expedited hearing of its case.

Tax certificates reexamined

Also in January, Congressman Charles Rangel (D-NY) announced that he intends to introduce legislation that would restore tax incentives intended to promote minority ownership of telecommunications businesses. In a press release issued by his office, Congressman Rangel noted that minority ownership of television stations is at its lowest level in 10 years, and minorities own less than four percent of the full power broadcast stations in the United States. Although Congressman Rangel did not provide specific details of his proposed bill, he indicated that it would offer tax incentives to reward owners who sell their broadcast stations or other telecommunications businesses to minorities. Thus, it seems likely that the approach taken by Congressman Rangel will draw upon the former §1071 and the FCC tax certificate program.

Under previous versions of the Internal Revenue Code, the seller could treat sales and exchanges of certain broadcast properties as involuntary conversions under former §1071 of the Code, provided that the FCC issued an appropriate tax certificate. The FCC certificate would specify that the sale was necessary to facilitate FCC policies, such as the policy to expand minority ownership of broadcast properties or policies aimed at reducing cross ownership of broadcast properties and other media outlets.

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

Dateline

Radio stations in the following locations must file their biennial ownership reports on or before June 1, 2001: Arizona, DC, Idaho, Maryland, Michigan, Nevada, New Mexico, Ohio, Utah, Virginia, West Virginia and Wyoming.

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NETCAST IN-HOUSE

Establishing and maintaining your station's Internet presence is a full-time job.

Having a presence on the Internet isn't exactly a walk in the park. Some of the obstacles include buggy software, unstable hardware, and untested custom applications to be installed, configured, and secured. Building and maintaining a successful system is tough to do. It's even tougher to do it right. Why go through it alone? There are plenty of Internet service providers (ISPs) that are more than willing to help you. All you have to do is decide if you want their help, and if so, whose services you should choose.

Technology is exceedingly accessible compared with what it was just five years ago. Chances are good that there is already software that does whatever you can dream up. Why write it yourself when you can buy it? The same situation is true when getting a new server.

Anyone can set up a server today. Follow the manual, type this, install that, and it's done. But the number of people who can set up a server that doesn't need to be restarted every week, and doesn't get into a locked process loop or misallocate system resources, is decreasing. Rather than buy the components, assemble them, install an operating system, application and security software, should you just hire a company to do it for you? It's easy to be distracted by maintenance and fail to concentrate on the content.

Each situation is different, so whether or not to use an ISP is something you'll have to decide for yourself. Here are a few ideas to help steer you in the right direction. Consider all the questions carefully, and decide on your own whether or not it's worth doing it yourself anymore.

Determine resources

Are there other people who will be helping you to set up, maintain, and update the server? Many public radio stations are associated with educational institutions that already have an established information technology department. Commercial stations may be owned by a larger corporation, which may also have an existing IT department. Not only can these IT departments assist the station in procuring and configuring a server, they may already have a program in place for maintaining their servers.

How much time do you or others have to devote to the server? What skills do you and your colleagues bring to the project? Perhaps someone in your organization has some experience in Solaris or Windows NT that you can apply to this new server, or maybe you already use Novell for your network file server. If so, that's something else you won't have to re-learn with the new server before you troubleshoot it.

How much money do you have for this server? It's easy to budget the initial costs for hardware and software, but what about the future? Budget enough money for software updates, and hard drive and processor fan replacement. And budget the time to perform those upgrades. You may also need to budget for contracted maintenance on it when you have a problem you either can't solve or are too busy to solve yourself.

ING OR ISP?

By William Harrison

Finally—and perhaps most critical—how much spare bandwidth do you already have at your facilities? The addition of another server on the current network load is an important consideration. You may have to purchase more bandwidth or have another line put in.

Determine needs

Will you require a specific operating system on the server; perhaps a specific programming language or application? If you want to use ColdFusion, you won't be running RedHat on your server. To run mod_perl, you probably won't use Windows 2000. Other considerations include a secure certificate to allow online credit card submission and perhaps some sort of database connectivity—either with database software installed on that server or on a different server—to drive the website or some other function, such as a message board or collection of those credit cards.

provider

user

NETCASTING

Keep in mind the future needs of that server as well. Public radio stations could integrate their membership database with the site to allow users to customize their experience. Commercial stations can maintain a listener database as well. To do this, you may need a more powerful server than you initially thought. Plan for that now, so you don't end up having to rebuild the server in a year.

Contracting an ISP to maintain and house your servers can reduce the workload of station staff.

Bandwidth

Content may still be king, but bandwidth is the real power behind the throne. Whether you're serving up Web pages, discussion boards, chat rooms, mailing lists, or streaming media, it all comes down to bandwidth. It can be difficult to determine how much is enough.

Companies such as Akamai specialize in providing unlimited streams for everything from special events to everyday radio broadcasts. Typical cost is about 1cent/MB per stream. But how much bandwidth is enough? A decent audio stream can be done at 24kb/s. Let's make the numbers easier and work with 20kb/s. One person listening to your station over the Net will cost about $15 each week. A 24-hour Web stream will cost $788 per year at 20kb/s per listener. A 60kb/s stream will cost about $2,364 per year. If mulitiple streams are served, the numbers get really scary very fast. Granted, people don't listen 24 hours a day, but at peak times it's easy to serve enough simultaneous connections to cost a significant amount.

On your own

You can serve the site yourself; just be sure you know what you're getting into. Maintaining a Web server carries the same responsibility as maintaining a transmitter. It operates 24 hours a day.

Security is very important. A server is only as secure as its weakest point, whether that is an exploited bug in software, or a user whose password is the same as his login ID. Security goes beyond fixing bugs and protecting passwords; it extends to the individual user accounts used to access it. I can't tell you how many times I've found plain-text passwords on accounts with root privileges, or an FTP program's .ini file (with cached passwords) stored in a public server directory so that people have easy access to it. A server is not "secure" simply because it has a secure certificate on it.

There are some questions to ask yourself: Are you going to keep up with all the security advisories on your server's operating system, as well as specific modules, languages, and applications? Will you perform routine security audits on the box, verifying log files and making sure passwords are changed regularly? Can you spend the necessary time to maintain the server yourself, or will it be forgotten as other projects begin to creep up? What is the backup plan in case you are unable to get to work or if your sysadmin leaves (or worse, you have to fire him unexpectedly)?

Security can be summed up in three words: Use common sense. If you don't need a feature of the program, disable it or uninstall it. Some flavors of Linux ship with PCMCIA drivers loaded by default, but I've never seen a server use them. Get rid of them. If there is no printer installed on the server, uninstall the daemon. Instead of listening for connections on all ports, only listen on the ports you've specified for use by certain software.

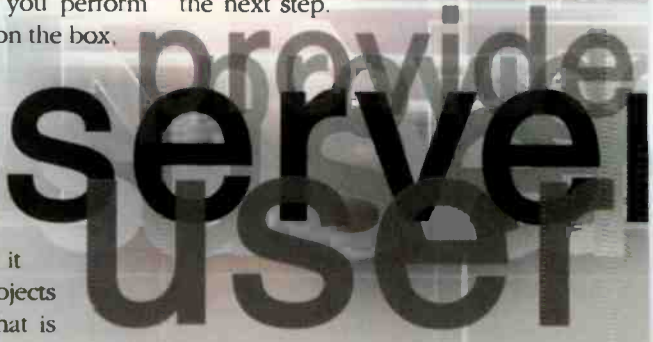
Keep up with the current security advisories from CERT (www.cert.org) as well as the website of your chosen operating system. Keep up with current stable releases of the software on your server, as well as notices on the software's website about problems. Check the websites often (a minimum of once a month) for updates and advisories. Sign up for the mailing list of your operating system to get e-mail notification of security alerts.

Make frequent backups. Backup the system before any major change to the server, not just afterwards. Take a set home, store it on another server or burn it to a few CDs; it doesn't matter, as long as you retain the data in case something goes horribly wrong.

By now you've either decided you are able to do it all yourself, or you've been frightened enough to consider getting some assistance. If the latter is your case, keep reading.

So you need an ISP

Whether you want an ISP to handle the whole process or simply start it, you still have to select an ISP. There are plenty of ISPs to choose from. Determining which fits your needs is the next step.



Find out if site hosting is the ISP's core business. There are a lot of companies that provide web hosting or co-location in addition to other services, such as cable TV or telephone services. Providing servers should be the company's prime business. If not, move on.

Check the company's Internet connection. There should be more than

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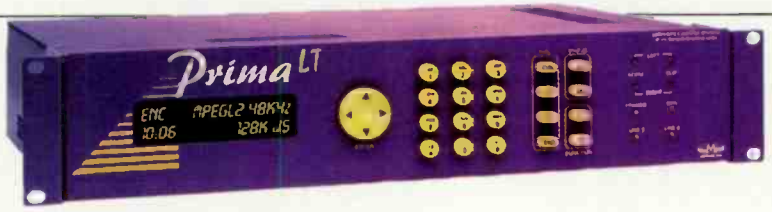

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one route to the backbone provider. Be sure they not only have redundant lines to a single backbone, but are also connected to multiple backbones.

Examine the size of the ISP's staff. You don't want a company that is one person, but you also don't want one with too many employees. Oversized companies may not provide the personalized service you desire. You might get lost in their numbers and never speak to the same person twice, making it more difficult to solve a problem.

Look at the experience record of the ISP. How many years has it been in business? The new kid on the block is probably still working on its business model and trying to figure out how to be profitable.

On call

Demand 24-hour support. If it's not offered, keep looking. If you have to ask for it, it's probably not very good. Also determine if the support is via e-mail only, or if a real person is available on the other end of the phone.

Verify the fault-tolerant equipment in use. Each server should be on a UPS. The UPS can power a single server, one rack of servers, or the entire office. The routers must also be on the UPS. Determine how long the ISP can operate during a power outage.

Check to see if the ISP will backup your server. If yes, how often will it be backed up? In case of a problem, will the ISP restore your data, or just the operating system of the server? If a backup will not be done, see what steps can be taken to have a backup made.

Some ISPs will let you build your own hardware and then simply plug it into their backbone. Other ISPs will only sell you one type of hardware, which makes it easier for the ISP to support and maintain, since all the supported systems use roughly the same components. The ISP might even have some spare parts, so your server can be back up and running without an overnight parts delivery.

Find out where the ISP and its servers are located. Many national ISPs have experienced recent financial trouble during the computer and tech industries slump. Some ISPs have gone out of business. I know of one station whose website was hosted by a national company. This ISP notified the station that all the servers were to be shut off at midnight that night since it was going out of business. The station didn't have access to the pages that were already up, so the pages had to be recreated from scratch on a new server at a new ISP in record time.

This brings up the most important question of all: will the ISP be around next year? You don't want to have to set up the server again a year from now at a different ISP. Find a company that's been in business a while, and has been profitable instead of undergoing reorganizations and layoffs.

NETCASTING

network as well, or are the chief engineer. Outsourcing that responsibility makes things easier for the organization, easier for the individual, and more reliable—provided you choose the right company.

Knowing that you can sleep through the night without worrying about your server provides peace of mind. It's comforting to know that other people are actively defending your server (as well as others) from attacks from outsiders, malicious programs and worms.

When you find your next ISP, tell them what you want today, as well as what you'd like one year from now. Get the root password so you have full access to the data. Get a a backup as often as you think you need one. This can also avoid problems if a move to a new ISP is required. Get a cell phone and pager number of a real person, so you're not stuck with e-mail-only support or a recording.

At the end of the year, people won't really care if you did it all yourself or if you outsourced the server. They'll care about what's on the server, the content, how well things worked, if it drew any traffic, and if it was popular enough to be considered a success.

William Harrison Jr. is manager of Web Technology for WETA-FM and WETA-TV, Washington, DC.

Final thoughts

It all comes down to how much your peace of mind is worth. Many stations simply cannot afford a knowledgeable and experienced staff to take care of their servers on a 24-hour-a-day basis. Many sysadmins are actually responsible for the regular

ISP Pros:

- Usually have better and more reliable hardware and a faster turnaround time
- Usually have better connectivity to the rest of the world with expandability as needed
- Usually more up-to-date with security issues and software vulnerabilities
- Multiple sysadmins to help with problems
- Usually have a secure site certificate that can be used for SSL connections (credit card acceptance, online store)
- Usually have dedicated servers for specific purposes (database, mailing list, chat room)

ISP Cons:

- Higher initial expense (but cost of staff person to maintain system must be considered)
- Limited access to the server
- Potential sacrifice in customizable options

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Audio Processing

A True Art Form

By Steve Fluker

The on-air audio processor is the pallet, and the individual settings are your brushes.

As listeners scan through the radio dial, different things can catch their ears. It's the challenge of each radio station to get the listener to stop on their station for a while. The station's format will get the attention of the button pusher first. Once someone finds your station, it's up to you to keep them coming back for more.

The way the station's audio sounds is just as important as the format being played. Two stations can play the same song yet sound very different. The proper use and setup of the audio processor is just as important to remain competitive as programming the right mix of music. This is where the engineer can become more of an artist.

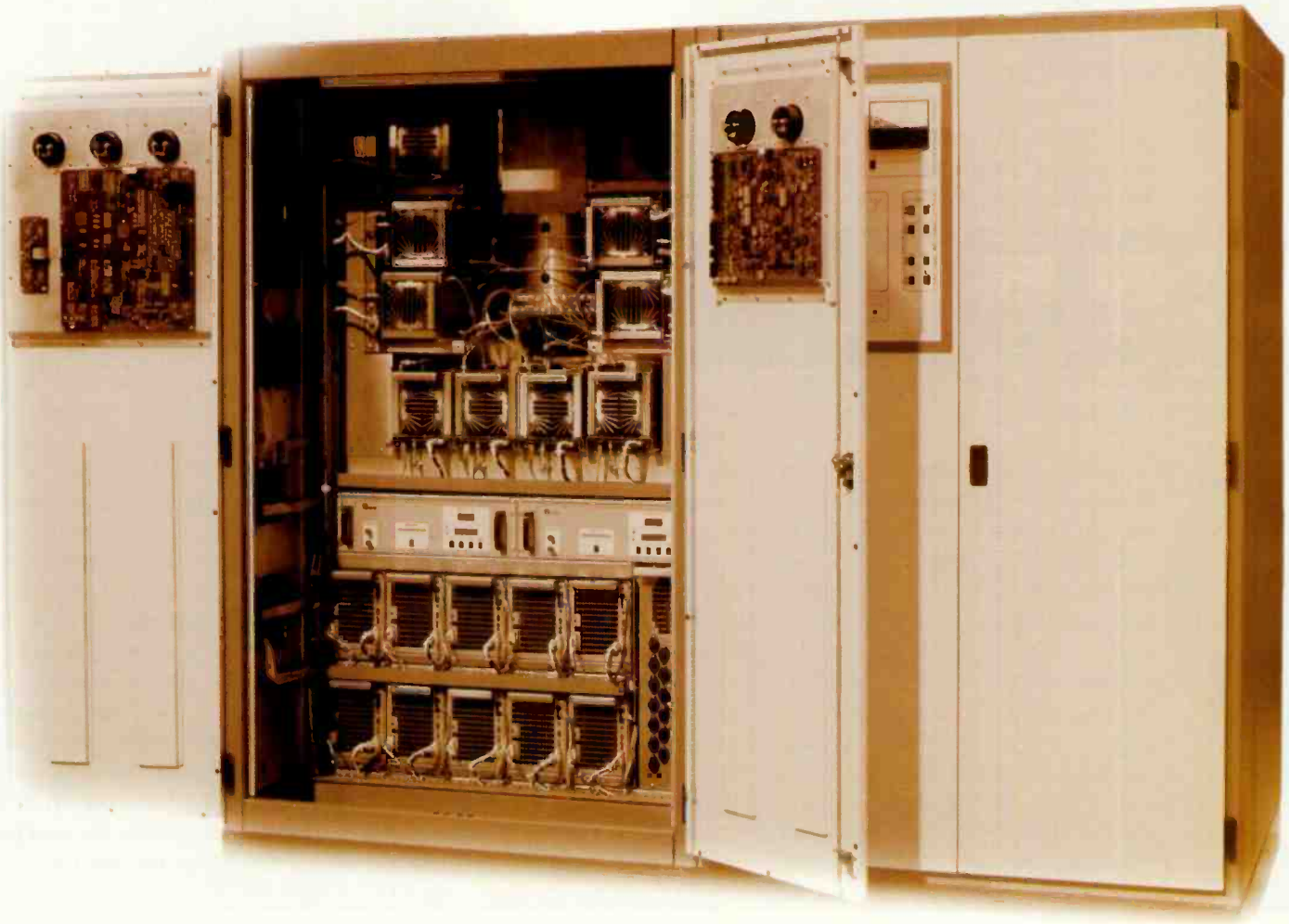
When selecting and setting up the sound of the radio station, you must be aware of the format and your competition. The wrong processing settings can cause the listener to switch to another station, and not really realize why. A radio station pushing its processor too heavily can cause listener fatigue and he will switch to another station looking for some peace. It's a subconscious thing, but in time might make the listener stop turning to your station.

Tailored to your format

The sound of your radio station can actually set the listener's mood. Put yourself in the shoes of that listener and think about what you would like to hear. A rock or classic rock listener usually expects the music to be loud, even if he doesn't turn up the volume. For this, you want to push the processor more, keeping the average level of the music high. You also want to reduce the amount of loud peaks, since a listener might want to have his radio turned up as loud as possible. Frequent peaks can cause the music to distort. If the competing station is "cranked up" louder, the listener will feel like that's the better station with more power, and not even realize why.

For the adult contemporary radio station, a smooth, clean sound is desired. You want the listener to tune in and stay for a while. You don't want that fatiguing effect, which will cause a station switch or turning off the radio altogether. If you want to attract the listener at work though, an overall consistency of volume is desired. Many office listeners have small tabletop radios on their desk, and keep the volume low.

Urban and hip-hop stations want to have a sound with a boom to it. It's important for the processor to have a clean, and very distinct bottom end.



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Audio Processing

A muddy rumble won't do it. The low frequency energy must be well defined and strong. At the same time, the music must be loud, but have a good perceived dynamic range to keep that strong, *in-your-face* punch.

The Dorrough DAP 310 is credited as being the first multiband audio processor.

Classical music stations have a real challenge. Many of classical listeners are true audiophiles, and want the music to sound pure and clean. The problem is that many classical listeners, like the adult contemporary listeners, tune in while at work and can't hear the quiet passages. High-quality home sound systems will bring out all of the noises and reception problems present in FM broadcasts.

Processing's role

The first processors had a different primary purpose than the processors of today. Early models were used to control the audio levels to prevent over-modulation. Some were also used as automatic gain controllers to keep the volume more consistent on the air. For AM radio stations, higher modulation carried the signal farther.

Engineers and programmers took these processors and pushed them to do more than they were designed to do. The result was a "pumping" sound as the processor would rapidly turn the volume up and down to keep the level constant. This led to newer designs and new features. Controls and circuits were added to clamp down on the volume to prevent the over-modulation, but were slower to turn it back up to reduce the noticeable side effects. An audio gate was added to stop the processor from turning up the volume when the audio level was very quiet. This would prevent the compressor from turning up the volume on tape hiss or other recording noises.

As the quality of recordings improved, so did the demand for new processors. Bass drums were now coming through the recording better, and would cause the processor to turn down not only the drumbeat, but also all of the other areas of the audio, once again creating that pumping sound. The same would happen with trumpet sounds, and other strong instruments. Designers added multiple bands to their units to allow the drum beat to be controlled without effecting the guitars, pianos, and vocals. When one radio station jumped on the latest and greatest processor, the others had to do something or lose the battle. The rush for manufacturers to create the best processor on the market was born.

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Audio Processing

More sophisticated

The audio processors of today have become much more complex and help radio stations achieve audio quality that was not possible only a few years ago. There was a slow period when analog processors had reached their limits, but digital audio still had too many artifacts to really sound right. However, as digital signal processors (DSPs) improved through higher sampling rates, and now with true 24-bit resolution, the digital processors have taken the market by storm.

The latest generation of on-air processors continue to build on the basics of audio processing but use digital signal processing instead of analog circuits.

Digital processors have many advantages over their analog counterparts. First, you are dealing with data (1s and 0s). Second, you can make very accurate changes in one area without affecting another. Audio filters can be much more precise, allowing us to squeeze every ounce of energy possible while protecting the integrity of the radio carrier. Some digital FM processors also include composite clippers. In analog circuits, a composite clipper can produce overshoots and harmonics that cause noises in the subcarrier channels. Stations leasing these channels had to limit the amount of clipping used, thus reducing their loudness. New digital clippers eliminate these problems, and the newest designs have even eliminated aliasing. Even the old problem of modulation of the stereo pilot is cured. Digital stereo generators can produce a pilot frequency that remains rock-solid and stable.

Today, many stations have asked for more control over their sound. The designers of the new processors have been responsive and give complete control over the functions of their machines. For a novice, this can be dangerous, as you can now make adjustments to such extremes that the audio can sound terrible, but with a trained ear, the audio can be tuned to sound incredible. For those who don't want to experiment, the digital processors offer pre-set memories for

different formats. A processor can literally go from the box to on air in minutes. If you do decide to make adjustments, you can save your changes as you go. When you think you're close to the sound you want, just press save. If subsequent changes degrade the audio, go back to where you were. For stations with multiple formats, the processors can be programmed with day parts. Now, a station running classical music in the morning and jazz in the evening can have the best setting for both, and even change the presets automatically.

On IBOC and Internet

With IBOC on the horizon, we need to be looking at what our needs will be for processing. Perhaps the most important thing to remember is that IBOC will be able to pass frequencies up to 20kHz. Conventional FM broadcasting is limited

High-quality audio processing with analog circuits is still popular and practical.

to 15kHz. Many of the digital audio products on the market, including computer storage devices, STLs and digital processors use a 32kb/s sampling rate, which is fine for FM quality, but will restrict the potential quality for IBOC. In response to this, some of the newer digital processors on the market have increased their sampling to 48kb/s, which make them ready to give the highest possible quality for an IBOC signal.

On the subject of new technologies, streaming audio on the Internet is becoming more and more popular. With this new trend comes an entirely new array of audio challenges. It doesn't take much surfing on the net to notice that some stations sound good, while others sound horrible. What's the reason for this? The main reason is the lack of, or misused, processing. One of the biggest mistakes made by the broadcaster is to use the output of an FM tuner as the audio source. Another mistake is to take a spare audio output off of your on-air processor to feed the Net. To pass quality audio online, it is necessary to incorporate very sophisticated digital data compression schemes. These compression algorithms look for inaudible parts of the music and eliminate them. (See *How it Works* in the February 2001 *BE Radio*.) When you use an on-air processor, you are feeding pre-emphasised and clipped audio, which the netcoder doesn't know how to handle. Heavy processing produces a very dense audio signal, and again, the netcoder can't find quiet sounds to discard.

On-air audio processing is as much science as it is art, and many products use very different approaches. A complete understanding of the unit is essential to achieving ideal results.

You can hear artifacts in the sound. Some of these include ringing, swishing or an *underwater* sound.

To get the best quality Internet audio, use an audio processor designed for this purpose. Setup the processor to eliminate anything that can't be passed over the Net with a low-pass filter. For example, if your streaming audio carrier sets up your station with a 20kb/s service, you will have a usable audio bandwidth of 7.5 to 10kHz. Anything higher than this just causes problems with the encoder and is the cause of the ringing. Also, unlike most radio stations on the air, don't overdo your Internet processing. Keep the frequency response as flat as possible. Don't use any clipping or make your audio too dense. Again, this doesn't give anything for the encoder to work with. Since it has to eliminate something, it is now likely to get rid of important audio. For radio stations in the early stages of Internet streaming that don't have the budget for a separate processor, try to at least find an old equalizer sitting on the shelf to roll off the high frequencies.

Processing is here to stay

As the listener is becoming more and more critical of audio quality, we can expect to see higher demands on our broadcast sound. As a result, the manufacturers of audio processors will continue to move forward to provide what we are looking for. There's no shortage of technical advances available for them either. The power available in CPUs is increasing every day. To keep up with the competition, it may be necessary to upgrade your on-air processing on a regular basis, or you'll get left behind.

Steve Fluker is the director of engineering of Cox Radio, Orlando.

Volumax photo by Chuck Leavens.

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THE SBE/NFL GAME-DAY COORDINATORS

A New Era in Cooperative Spectrum Management

By Mark Krieger, CBT

For any venue, frequency coordination begins weeks before and sometimes continues until the end of the event.

The year is 1998. The setting is a professional football stadium in a large midwestern city. Technicians and crews have been working on and off for the past 24 hours in preparation for an NFL national broadcast. On the sidelines, coaches, equipment managers and player personnel for each team make last-minute preparations as the scoreboard clock rolls down to kickoff—it's showtime.

Behind the visiting team bench, a documentary videographer prepares as his soundman switches on his equipment and performs level checks. Meanwhile, an on-field color commentator on the opposing sideline looks up in confusion as his IFB link, functioning perfectly moments before, drowns in a distorted wail.

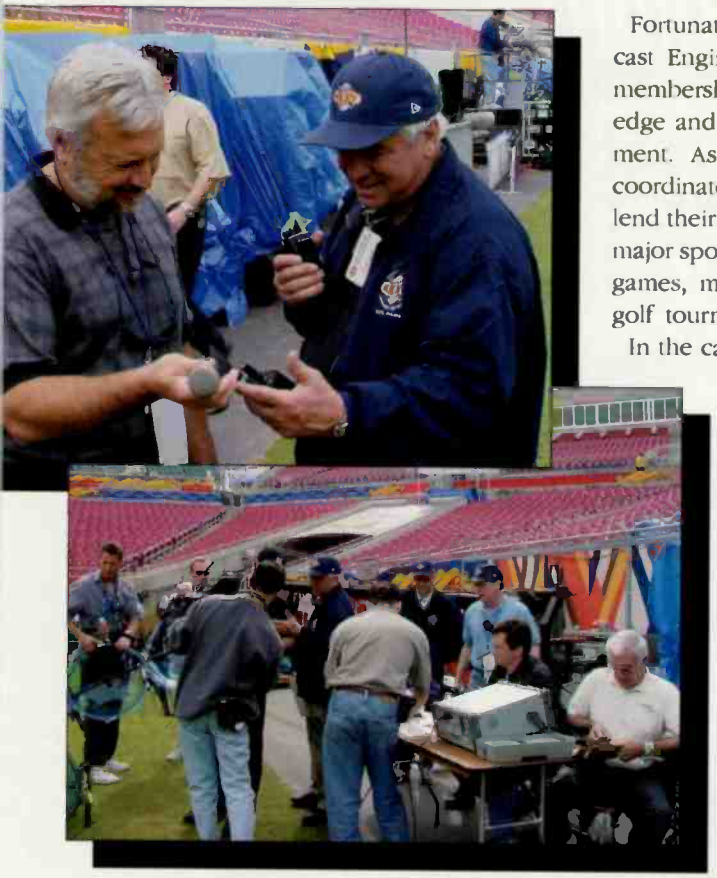
Just after kickoff, the quarterback is forced to burn a precious time-out because he cannot hear the play call of the offensive coach in his in-helmet receiver. The transmission has been buried by the conversation of a local trucking executive and his brother-in-law, who decided to bring a couple of the company walkie-talkies to the game so they could "keep in touch" from their respective seats.

All in all, these events were not the kind of "contact sport" that teams, fans and broadcasters had come to expect at an NFL event—and it was a game in which the participants would rather not have played. Unfortunately, by the late 1990s, scenes similar to this one were becoming common.

Recognizing the need

Issues of RF interference and compatibility are as old as radio itself. Yet the proliferation of wireless devices of all types, coupled with the diminishing technical consciousness of their users, has resulted in a geometric increase in the occurrence of "wireless collision." This unforeseen byproduct of the current technology boom has left professional sports producers, among others, scrambling to stave off the effects of electromagnetic chaos.

SBE/NFL GDC



Fortunately, the Society of Broadcast Engineers has long attracted a membership with a wealth of knowledge and skill in spectrum management. As a result, SBE frequency coordinators are now called upon to lend their special skills at a variety of major sporting events, such as all-star games, major auto races, and even golf tournaments.

In the case of the NFL, an appreciation for the value of efficient spectrum management originated with the Super Bowl, unquestionably the highest stake, most heavily produced single event in professional sports. It was during the season leading up to Super Bowl XXX that Jay Gerber of NFL Films asked SBE frequency coordinator Karl Voss to directly participate in the event coordination effort at the behest of the NFL's special events division. The results, according to Gerber, were "impressive," and later led to a deliberation on whether such a program should be adopted across the league.

According to SBE and NFL personnel, the evolution of the league-wide frequency coordination program was epic in nature. This wasn't unexpected, given that issues of trust and control are most sensitive in any negotiation where broad contrasts exist between organizational cultures. The NFL and SBE were no exception to this rule, and it took years, not months, to reach a consensus on the plan.

A detailed chronicle of that process would fill a book. But the very existence of the program today speaks volumes about the tremendous patience and hard work contributed to the effort by individuals from both organizations.

Game-day frequency coordination efforts reach a peak just before the start of the game. Ralph Beaver, CBT, Tampa GDC (top, right), verifies a wireless mic frequency.

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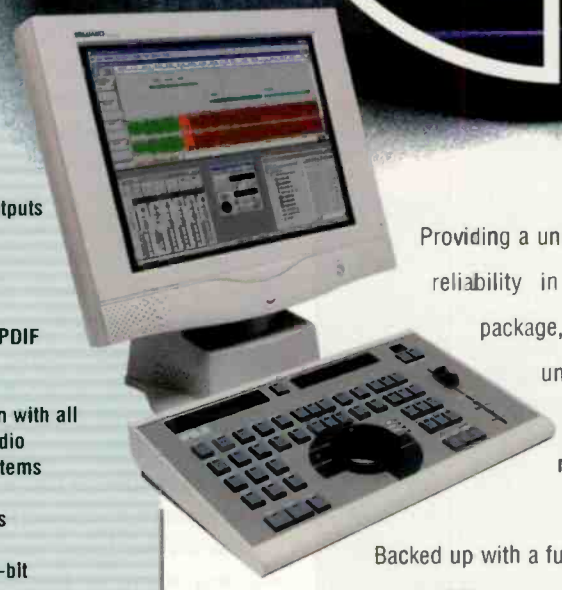

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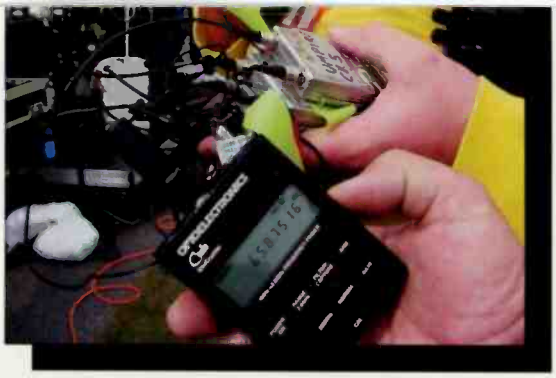
SBE/NFL GDC

The coordinator's perspective

At its core, the Game-Day Frequency Coordination program is largely a local operation. For every NFL venue, the SBE provides a voluntary coordinator, sometimes with an assistant, who handles all phases of that stadium's coordination. These individuals have at their disposal a standard NFL-issued equipment kit, consisting of a laptop PC with special software, a high-quality broadband radio receiver, and a handheld frequency counter. In addition, most coordinators pack their own set of binoculars, cell phones, and some type of hand-held scanner. In markets where spectrum congestion is particularly notorious, and during playoff and championship games, more sophisticated tools, such as spectrum analyzers and Doppler DF hardware, may be deployed.



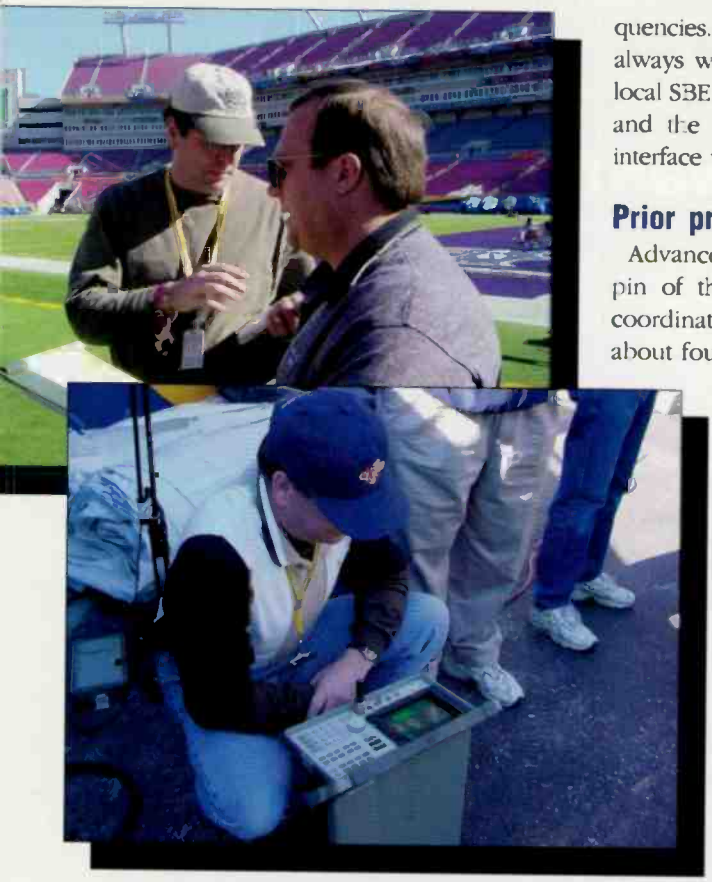
To verify usage, a variety of tools are used by the coordinators, such as this portable frequency counter.

While the action is local, frequency coordinators are in constant touch with SBE and league officials via an e-mail list server. The e-mail list also allows local coordinators to share their knowledge and experiences, making it one of the most valuable resources in the program.

To say that the coordinator's task is complex understates the issues involved. To begin with, the SBE has no official coordination authority beyond those frequencies eligible to broadcasters under Part 74. This means that non-broadcast auxiliary frequencies such as those covered by Part 90 (business) are coordinated by other entities. Furthermore, coordination authority doesn't impart enforcement authority of any kind and relies, instead, on voluntary cooperation. Thus, any ability to enforce compliance with a coordination plan rests with the team that controls the stadium and has the authority to withhold or revoke working credentials.

Though such sanctions aren't to be taken lightly, professional ethics render them largely symbolic in nature. Cooperation, not coercion, is what drives the program's success. Even Part 90 users realize that interference-free operations ultimately benefit everyone involved, and they are generally responsive to the informational advisories provided by coordinators.

The realities of spectrum beyond the stadium gates are one more factor that the coordinator has to consider. To facilitate this, the game-day coordination database is linked to the Percon database, allowing a one-key look at local users on a given frequency, along with the distance and bearing. With this, the coordinator can offer heads-up warnings and alternate frequency suggestions to users who coordinate in advance on non-Part 74 fre-



quencies. The game-day coordinator always works hand-in-glove with the local SBE coordinator (if he is not one and the same) to assure a smooth interface with local Part 74 users.

Prior preparation

Advance coordination is the linchpin of the SBE/NFL program. The coordination process really begins about four weeks before the exhibition season. During this period, the coordinator makes contact with local team representatives, stadium officials and technicians, and home radio broadcasters to build the list of frequencies and users that constitute the static portion of the database for the season. This includes referee wireless microphones, handheld wireless microphones for pre-game and halftime, Camlink and Coachcom wireless links, IFBs and other broadcast wireless devices, as well as two-way radio equipment in use by stadium security, vendors, and other workers and officials. All told, this list alone can contain hundreds of frequencies.

Karl Voss (top, right) and SBE Frequency Coordination Chairman Rick Edwards, CPBE (bottom), were involved in creating the GDC program. Both were on-site for Super Bowl XXXV.

In the database software, all low-power operations in unused TV channels are automatically checked against local TV/DTV operations, and any conflicts are flagged on entry, saving enormous labor. Another asset of the system is its ability to factor in bandwidth when calculating potential conflict. Since microwave video hops are included in coordination efforts, a detailed database is essential.

Although the program flags all potential conflicts according to entered parameters, the database is no substitute for the RF experience of a coordinator. The database cannot predict inter-

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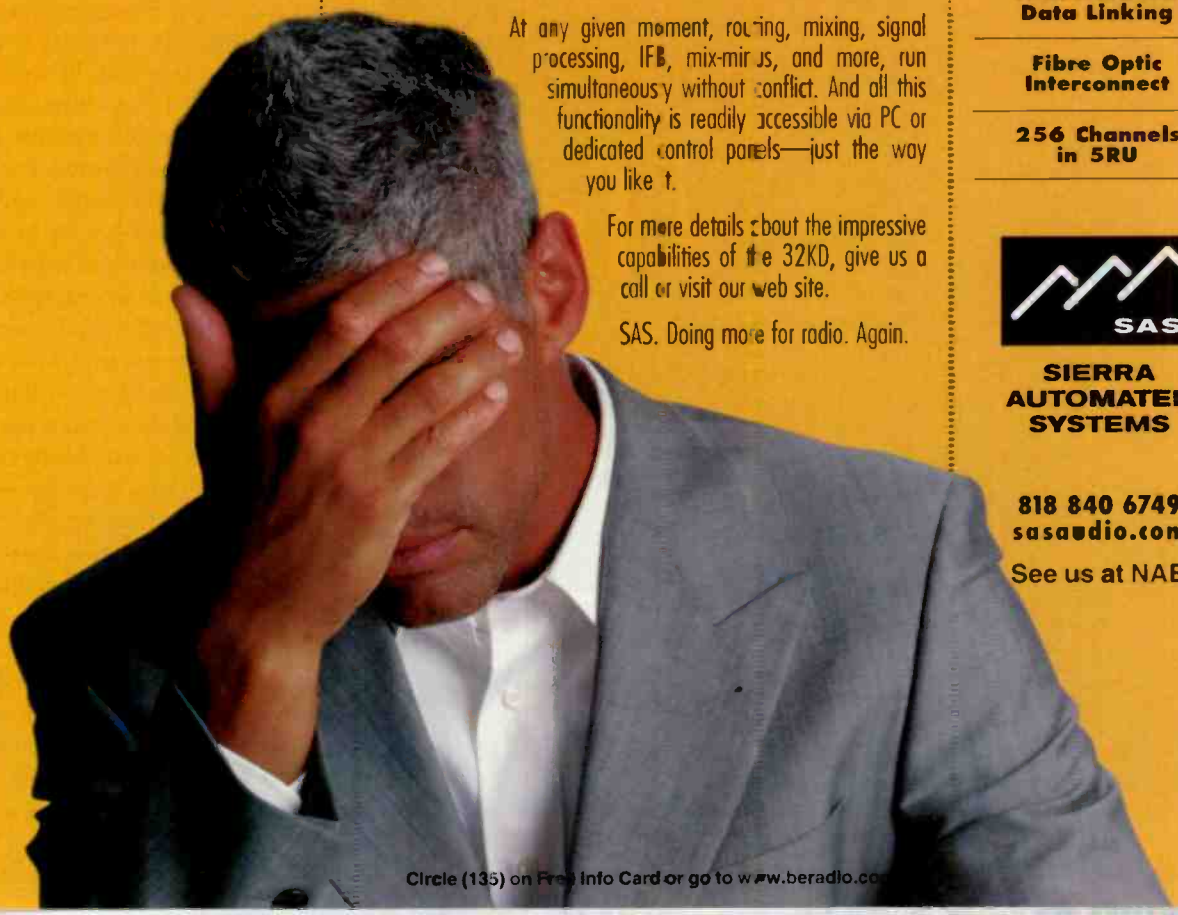

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modulation product generation, nor can it foretell the effects of blanketing interference, where broadcast booths and their associated antenna arrays are locked together in close quarters. These issues are left for resolution on game day.

As the season progresses, traveling media submit their frequency requests ahead of time via e-mail to the central SBE coordination address, which then automatically forwards it to the appropriate coordinator. Regardless of when the information is submited, it's the coordinator's job to enter the data and provide the appropriate clearances or alternate recommendations. Each game day is saved as a separate file, automatically incorporating the static season data with the itinerant users at a given game. On the day of the game, the game day coordinator can print a complete profile of the day's users for easy reference.

Rick Edwards, Jay Gerber of the NFL and Ralph Beaver discuss the day's progress.

The game-day experience

The coordinators typically set up in the press box or other league-provided vantage point several hours before the game. Soon thereafter, they may walk through the venue; through home and visiting team sideline operations, TV, radio, and stadium audio/video operating locations. This tour serves several functions. First, it allows a coordinator to make contact and uncover emerging conflicts early. Second, it serves to confirm that all parties are in compliance with the day's coordination plan. Finally, it builds mutual confidence and rapport between those sharing spectrum and the coordinator. Any last minute adjustments to the day's coordination plan are usually made at this time.

Returning to the press box, the coordinators begin monitoring key frequencies (such as the critical coach-to-QB channels) for potential interference. Visual sweeps of the field and sideline areas with binoculars can spot any wireless gear that may not have been previously coordinated. Previous experience with the venue and the media players comes heavily into play at this point, as a seasoned coordinator is often able to sort new, uncoordinated arrivals from the other media visually. A potential interferer can then be intercepted and queried regarding his intent to use wireless equipment and whether he has complied with league policy. In most cases, these parties are quite cooperative with the effort, and the hand-held frequency counters quickly determine usage, allowing on-the-spot coordination.

After a final flurry of activity, the coordinators settle down in their seats and monitor the action. In general, most conflicts are resolved by kick-off, and while some problems may emerge later in the game, they are an

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The Game-Day Coordinator Program in Action

SUPER BOWL XXXV

By Chriss Scherer, editor

An event of the magnitude of the Super Bowl allows no room for error from the players or the media covering the game. The scenario at the beginning of this month's *On Location* article described an interference situation that could result regardless of any frequency coordination efforts, but it can easily be corrected with the tools and skills of the on-site coordinator.

To cover Super Bowl XXXV, the effort was expanded beyond the usual measures taken for a local football game. Ralph Beaver is the Tampa GDC, and Casey Knoettgen is the alternate. For this game, Karl Voss, one of the developers of the GDC program came in to oversee the game. Rick Edwards, SBE vice president and chairman of the SBE frequency coordination committee was also on-site. In all, 13 people were part of the GDC team during the game, and a few others were available to assist with additional duties as needed.

Planning for the game began in September 2000. The first step was to examine the local TV and radio usage to build the game database. The first frequency coordination requests were submitted at the end of September.

On October 6, 2000, a meeting was held in Tampa to brief the local frequency coordination team on the particulars for the Super Bowl. From that point forward, the e-mail list created for the event began to bustle with activity. Once the event was over, a stack of paper more than six inches thick was created with notes, reminders, questions and answers.

As requests for frequencies came, Voss entered them into the database and made the necessary suggestions to accommodate everyone. Any requests that were sent to Beaver or Knoettgen as the local coordinators and Tampa GDCs were sent to Voss. This single-point clearinghouse was a vital step in ensuring that all the information was current. The heaviest workload with frequency requests came just before the game. There was an initial spike, likely due to stations learning that their own team had made it to the Super Bowl.

As the more than 3,000 credentialed media passed through the frequency coordination checkpoint on the day of the game, each RF radiating device was checked with a frequency counter and/or a spectrum analyzer. RF users that did not pass through this point on the day of the game were checked on previous occasions. Once a device was approved, a green flag was attached to it for easy recognition by the GDC team.

There were three users with more than 85 frequencies each and one user with 145 frequencies. In selecting the assigned frequencies, the proposed application of the frequency, the venue, any local TV activity, the date and time of use were all taken into account. Some frequencies were used by three different entities; one user pre-game, another user at half-time, and a third user for post-game.

Planning for Super Bowl XXXVI in New Orleans began in February 2001.

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exception. The ability to sit through the entire game without the disruption of a distress call provides the coordinator with a distinct and satisfying sense of accomplishment.

The final threat to a collision-free event occurs during the last minutes of the game as wireless equipment moves to the locker rooms. Uncoordinated local press can provide a few unexpected thrills at this time.

Finally, the last notes are made, the gear packed up, and the coordinator is ready for the long march through ranks of homeward-bound fans. As the process prepares to recycle for the following week, feedback via the e-mail list server filters in from around the country. This is a time when coordinators can sit back, relax and share their experience. All told, they have probably given up a couple of hours during the week handling pregame coordination, along with about six hours of activity on game day. All of this time is voluntary. While the program does provide a reimbursement plan to cover phone, transportation and administrative expenses, the rewards of serving as a coordinator are limited to the satisfaction of being part of an effort to support other broadcast and media professionals.

Non-broadcast frequencies, such as the coach-to-QB channels, are also coordinated.

Final thoughts

The SBE/NFL game-day frequency coordination program is still very much a work-in-progress. Improved software is being prepared for distribution, while lessons learned during the season are being reviewed. With the benefit of this year's experience, the Fall 2001 season is likely to flow more smoothly for everyone involved.

It would be disingenuous to say that the program has been without its critics. Some have questioned whether the material benefits the SBE garners from its relationship with the NFL are worth the effort expended. Still others, apparently unaware of the escalation of event-intensive interference, have argued that the program is superfluous and unwarranted.

Such views overlook a broader perspective—one that reveals SBE gaining valuable experience and stature as an organization preparing for a new role in a new century. The degree to which the SBE assumes that role depends largely on the commitment and dedication of its members, and the goodwill and confidence of its partners in the American broadcast industry. The SBE/NFL frequency coordination program appears to be a step in the right direction.

Mark Krieger, BE Radio's consultant on contract engineering, is also the SBE/NFL game day coordinator for Cleveland.

Photos of Super Bowl XXXV are courtesy of Ralph Beaver.

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IP multicast

By Ken Nosé

The Internet is based on a layered protocol model. Each layer provides specific services and has particular responsibilities. The *Internet protocol*, or IP, is responsible for routing data from one place to another on the Internet and is referred to as a network layer protocol. IP multicast is an extension to the standard IP-network layer that allows a single copy of data to be routed to any number of interested receivers. This happens invisibly to the sender and is handled by the network infrastructure. IP multicast improves the efficiency and scalability of applications such as streaming multimedia, audio-video conferencing and one-to-many data-push applications, as only one copy of data will pass through any link in the network, regardless of the number of recipients. Unlike the point-to-point method used in regular unicast IP, where the sender has to send a separate copy of data out to each receiver directly, the number of recipients isn't limited by the bandwidth available to the sender.

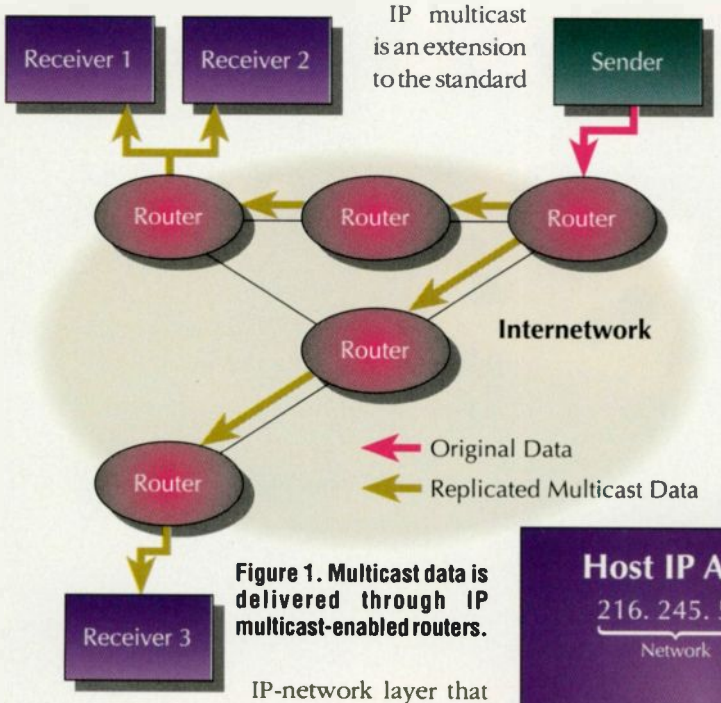

Figure 1. Multicast data is delivered through IP multicast-enabled routers.

Network-layer routing is accomplished with IP addresses, which uniquely identify every device on the Internet. A normal unicast IP transmission involves a source IP address and destination IP address. Routers use the source and destination IP addresses to find a path from the sender to the receiver across the Internet. IP transmission between hosts on the same physical network happens without the assistance of routers.

IP multicast uses the concept of an IP *group address*. An IP group address doesn't correspond to a particular device anywhere on the Internet, but rather to a unique transmission. Figure 1 shows an example of a host IP address and a multicast group address. The first three bytes of the host address identify a specific network, and the last byte is the local address of the host. In a multicast address, the upper four bits of the first byte are always 1110 (binary), and the rest of the address identifies a specific group address. In decimal, this results in a range of addresses from 224.0.0.0 to 239.255.255.255.

To send IP multicast content, a sender transmits data to a group address destination. The router on the sender's network sees that it has the group address data on its local network, and informs other routers that it is available. To get IP multicast content, a new receiver informs a router on its local network that it is interested in receiving data from the group address. The router then has the responsibility of locating an occurrence of that group address transmission among other routers and getting it to the local network.

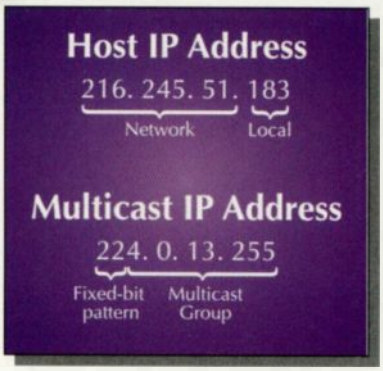

Figure 2. Examples of host and multicast IP addresses.

Figure 2 demonstrates a multicast transmission across several networks. Although the routers use complex protocols to distribute multicast data, all of this is invisible to the senders and receivers. Once the IP routers have established a path between the multicast sender and receiver, any other device on the receiver's local network can also receive the multicast data.

Because IP multicast is specifically a network-layer protocol, it only offers the same *best effort* delivery as unicast IP, with no retransmission of lost packets or guarantees that packets will arrive in the same order that they were sent. As with IP in general, these tasks are the responsibility of higher-level protocols, or the application itself.

Ken Nosé is chief software architect of NeoSonic Industries, Cleveland.

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Marantz PMD680

By J. Kirk Chestnut

Wouldn't it be nice to send a recorder into the field that never came back to the shop for repair? Most field recorders rely on mechanical transports that are prone to failure. There is an alternative. The Marantz PMD680 has no moving parts because it uses PC memory cards for media. With no moving parts, this device will spend more time covering stories in the field than covering space on the repair bench.

Out of the box

Setup is fairly straightforward, and after the initial configuration, I was recording within five minutes. In a short time, I discovered the more advanced recording features. An array of function buttons provides a wide variety of settings and options including input selection, record-level function, media settings and a button lock (to prevent accidental button presses). The backlit LCD displays timing, record level and transport status. The look and feel is similar to other Marantz portable recorders.

Performance at a glance

- Built-in microphone and speaker
- Multiple file formats
- Solid-state media
- Pre-record memory buffer
- Basic file editing
- Lightweight

The recording level is adjustable with the front-panel dial. A limiter can be switched on as well, or automatic level control (ALC) can be selected. The ambient noise control (ANC) provides fairly good background noise cancellation. A great feature is the pre-record function. It saves up to two seconds of audio in buffer memory before the record button is pressed. If the speaker at that important press conference starts before you were ready, pre-record will still get those first few words. In order to preserve precious recording space, a Silent Skip mode pauses the recorder when the audio level drops below -30dB.

Recordings are stored on a credit card-sized PCMCIA card (also called a PC card). One benefit to this computer-standard media is that the PC card can be read on a computer. Most laptops have PC card slots. Desktop computers can add a card reader that will appear as an additional hard drive. Audio files do not need to be dubbed, since the files are ready to play in their current form.

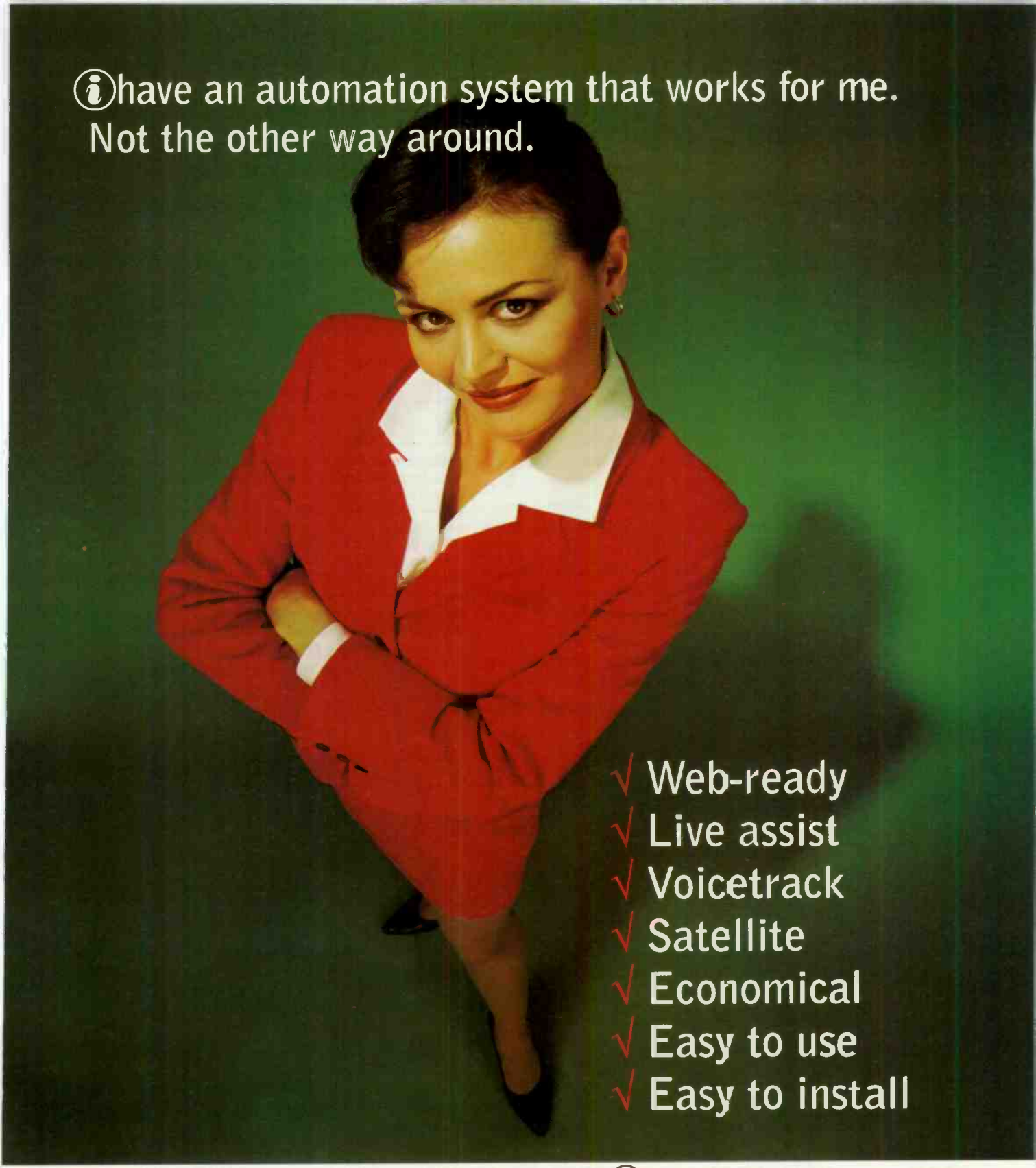
Cards are available through any computer supply store, and Marantz lists several approved third-party vendors. The PMD680 encodes audio in two different recording formats: compressed MPEG1 LayerII (MP2) and uncompressed 16-bit PCM. The digital stream is stored as one of three different MS-DOS/Windows compatible file types: wave (.wav), broadcast wave (.bwf) or raw MP2 (.mp2). A unique feature of the .bwf is its ability to store special user-defined data in the extension chunk. Three data lines can store information representing the radio station, reporter or recording deck.

Recording and more

Depending on application and budget, the capacity of the PC card will determine the recording length and quality. The PMD680 can record at rates of 32-, 48-, 64-, 128- and 192kb/s in the MP2 mode or 768kb/s in the PCM mode. Changing the recording rate requires programming a three position selector, which allows switching between long play (LP), medium play (MP) and standard play (SP) rates. Select lower rates for logging or transcription and higher rates for better fidelity. A 32MB PC card will store about 1.5 hours of AM-quality recording. That same card will yield only five minutes of true PCM audio. A 32MB card costs approximately $100. Of course, larger capacity cards can be purchased with a larger price tag. An 880MB card costs about $2,000. The PMD680 supports cards up to 2.15GB.

The edit decision list marks (EDL marks) provide a very basic means of editing sequential cuts together. An edit marker, including a time and date stamp, is recorded at the beginning of each cut. Up to 255 EDL marks can be logged for easy segment identification and location. EDLs can be used for looping playback or searching for a particular point in the recording. One limitation to the EDL system is that it can only play tracks in sequential order.

The unit is powered three ways: AC adapter, eight alkaline AA batteries or a rechargeable Ni-Cad battery pack. Battery life is indicated on the front panel and is preserved with an auto power-off feature. I recommend purchasing the optional Ni-Cad pack. During testing, I consumed a set of alkaline batteries in less than thirty minutes. A Ni-Cad pack charges within the case and is fully recharged within three hours.



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Pros and cons

The lack of moving parts should prove to be a time saver. No moving parts mean less maintenance time. Direct file reading will also save time in transferring files to a DAW or on-air playback system.

Detail of the control and transport buttons.

The overall audio quality is amazingly good at low recording rates. Input connections include ¼" and XLR mic and RCA phono line. Analog audio output is available on an RCA phono jack and a digital S/PDIF output is provided. Also provided is a remote control jack for pause control. An optional telephone jack connection allows audio to be sent down or recorded from a POTS line.

The sample frequency is fixed at 48kHz. Some stations use different sampling rates as house sandards, and sample-rate conversion will be required to use the audio files. As I mentioned before, the unit draws considerable power from alkaline batteries. The AC adapter or the optional Ni-Cad batteries are recommended for sessions longer than 30 minutes.

The PMD680 fits a special niche for radio news or any type of field production requiring quality speech reproduction. This recorder will become increasingly practical in days to come, particularly as the cost of the media decreases. Historically, computer storage capacity goes up while pricing comes down. I also expect that the next generation of tapeless recorders will include direct computer interfaces or a network connection.

J. Kirk Chestnut is an engineer at Entercom Kansas City, Westwood, KS.

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Audemat FM-MC3.2 with Goldenear

Roswell Clark

At some point in an engineer's career, questions such as "How does our signal compare to so-and-so?" or, "Have we increased multipath along the highway lately?" are likely to occur. Sometimes, these questions are asked on an ongoing basis. The task of collecting, quantifying and reporting the relevant descriptive information to management in an easily digestible form is a serious challenge.

A series of spot readings taken at various points in a general area can provide some idea of signal strength and perhaps be a basis for a competitive signal comparison. With some creativity and skill with a spreadsheet program, an interesting chart may be produced. Depending on the circumstances, such as the number of carriers sampled and how these samples were taken, this process could take days, if not weeks, to compile. Hiring a consultant to gather the readings, either on the ground or from an airplane, has always been an option; however, the money for outside consulting for every signal-integrity question that arises is usually not available.

Performance at a glance

- Monitor up to 99 stations
- Optional Goldenear software for quality analysis
- Dynamic signal mapping
- Excellent manufacturer support
- Stores GPS data
- Overlay data on standard maps
- Full-color reports

Filling a need

How can the signal analysis needs of upper management be met while creating reports that make sense to those who would rather not attempt to digest reams of data? Either the engineer needs to create more time or get better tools.

The Audemat FM-MC3.2 is one such tool. While traditional signal strength meters can only sample one carrier at a time, the MC3.2 can simultaneously record up to 99 independent stations. With its internal GPS, it can also record the reading location while you take a leisurely drive through your market. After the readings are taken and stored, various color reports can be generated. One feature is the ability to overlay the GPS readings on a map of the area showing local highways and other landscape features. The signals are color-coded by signal intensity, so it is easy to see what the relative readings are at a glance. For those who insist on numerical data, readings can be output as a chart or tables.

The setup is straightforward. There are some language translation curiosities, as the manufacturer is headquarted in France. A laptop computer connects to the MC3 for data collection and for measurement parameter setup. Information about the stations to be sampled is entered in descriptive fields including frequency and call letters. Each sample's frequency and trigger method are entered as separate parameters, along with the option to collect GPS information. The unit also comes with a clamp-on sensor that detects a chalk mark on a vehicle's tire for marking a distance-based measurement interval. Other triggers, such as pressing a computer key or timed interval triggers, can also be used.

Once programmed and installed in a vehicle, the MC3.2 takes care of everything as you drive through the areas of interest. Since a laptop communicates with the MC3 to store the collected data, a laptop power adapter is a good idea for extended driving.

The data collected from your driving tour, called a *campaign*, can later be manipulated to create various reports. The signal strength data can be overlayed onto a GPS-enabled map, a free download from a link on the Audemat website. Although downloading and overlaying the campaign on a single map was relatively easy, spanning the same campaign across several adjacent maps proved to be tricky. There is no built-in method to merge adjacent maps into a single larger map. This may not be an issue for some areas, but in our case, the campaign crossed multiple map regions. I first had to create a single map showing the entire coverage area.

To do this, I exported the maps to .BMP files and then merged the images into one larger image. I used PowerPoint, but any graphics program could do this. The collected data image was then placed on top of this composite image and resized manually. The end result proved to be very acceptable to management, and I was able to quickly provide a visual comparison of our competitor's and our signals in the market. When the mapping challenge was described to Audemat, they quickly responded with various solutions including burning CDs with the entire USA or specific regions of the USA. Functions similar to those of some of the familiar map sites, such as MapQuest, were also discussed as a possibility.

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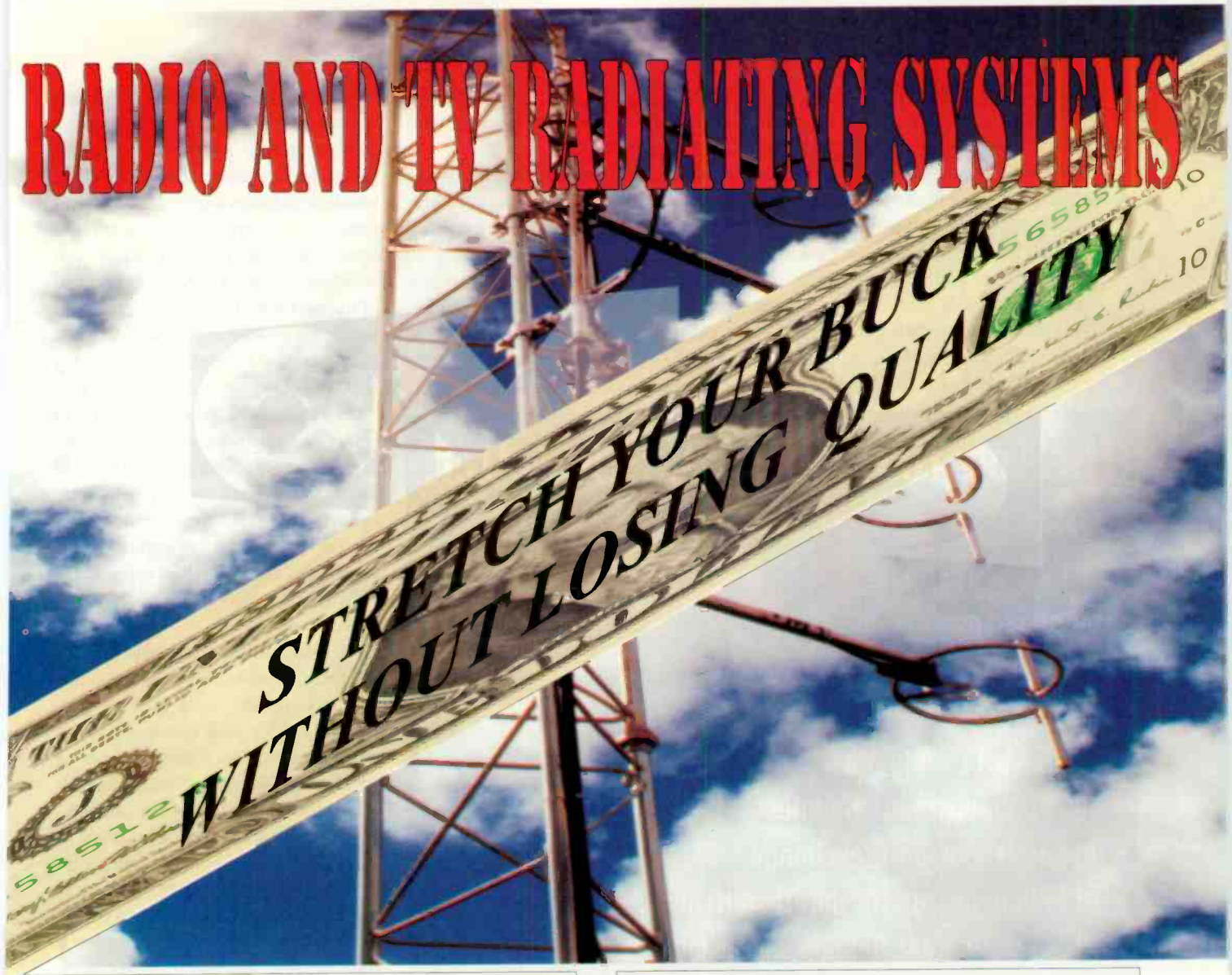

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GP-4	$2,600	6Kw
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Qualitative analysis

A separate component of the system, called Goldenear, performs a different type of analysis. While the signal reader measures multiple carriers and focuses the readings on a single parameter—signal strength, Goldenear takes a single carrier and records multiple parameters such as pilot, signal strength, RBDS, left audio, right audio, L+R, L-R and multipath. At the same time that the GPS and signal parameters are being measured and stored, the station's audio is recorded onto the hard drive as a .WAV file.

Data for Goldenear is collected while a campaign is driven. Computer hotkeys can identify landmarks expected to have an influence on the signal. During campaign playback, these features can help explain abnormalities.

Completed campaigns can be viewed with the Goldenear reader, a separate program. The reader visually and audibly recreates the campaign. Overlaying the results on a map is an interesting display option. As the campaign is played back, a marker that looks like a small car indicates where the audio and data were taken. In poor reception areas, the signal-quality readings can be viewed to help identify the source of the problem. Hearing the error and seeing the various signal parameters at the same time is helpful. The program also calculates a quality index that takes into account all of the readings to compute a relative quality rating from one to five, providing a reference of the overall signal in a given area. Goldenear and RF measurement data can be stored on a network to allow file sharing and campaign comparison to help before and after evaluations of a market or station.

The Audemat system should be considered part of an effective monitoring and measurement tool arsenal. The FM-MC3.2 with Goldenear complements such data collection tools as spectrum analyzers and tunable modulation monitors, to assist in identifying trouble spots and evaluating a market's signals. For a corporation considering market entry, the information gathered can identify competitive signal issues.

Roswell Clark is director of technical operations at Cox Radio, Tampa.

Audemat

P 866-Audemat
F 703-433-5452
W www.audemat.com
E info@audemat.com

Editor's note: *Field Reports are an exclusive* BE Radio *feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.*
These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.
It is the responsibility of BE Radio *to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by* BE Radio.

FOR MORE INFORMATION
Circle (203) on Free Info Card or go to www.beradio.com

New Products

NAB2001 booth numbers are shown when available.

Targeted ad insertion system

RCS

Booth i5946, L429, R1925

▶ **SplitStream:** Using specific database and profile information, SplitStream inserts ads targeted to each listener. SplitStream automatically switches away from a commercial or promotional spot and inserts alternate material in its place. The advertisements can include graphical components and click-throughs to encourage impulse buying. SplitStream can send different ads to individual listeners simultaneously, giving advertisers a focused and effective way of reaching consumers.This ad insertion system can be combined with another RCS product called RadioShow, an Internet audio player and graphic synchronizer. RadioShow is branded by the content provider, which enables interactive advertising and provides animated graphics and e-commerce capability to any broadcast or webcast facility.

914-428-4600; fax 914-428-5922; www.rcsworks.com; info@rcsworks.com

Circle (271) on Free Info Card or go to www.beradio.com

Solid-state AM transmitter

Continental

Booth L12211

K5-A3: This 3kW solid-state transmitter features digital controls and displays. The solid-state power circuits use HEXFET transistors, reaching an efficiency exceeding 90 percent. Additional features include a PWM modulation system and two predefined power levels. From the AC line feed to the RF output, this equipment typically provides 80 percent efficiency, which is maintained in a variety of operating conditions. This transmitter can reach positive peak modulation levels of 150 percent. Operation can be single or three-phase.

800-733-5011; fax 214-381-3250
www.contelec.com; sales@contelec.com

Circle (255) on Free Info Card or go to www.beradio.com

Trafficking system

SpotTaxi.com

Booth E5035

SpotTaxi.com 3.1: The latest version of FastChannel's SpotTaxi.com application includes an interface for trafficking spots to Internet radio companies. SpotTaxi.com 3.1 also features upgrades that expand the service to include radio network destinations, TV stations and enhancements in the ordering, contact and administrative functions. The interface enables the agency traffic manager to simultaneously distribute spots to Internet and terrestrial radio stations. Enhancements include the expansion of the network destination function to include hundreds of TV stations, Internet radio and customer-defined specific destinations, as well as ordering system enhancements. Upgrades have also been completed to include easier access to contact information, column sorting and administrative flexibility to assign user access to download, and routing notification capabilities.

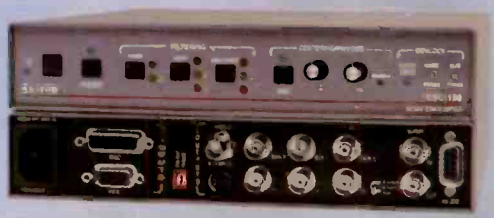
925-376-1954; fax 925-376-1954
www.spottaxi.com
info@spottaxi.com

Circle (268) on Free Info Card or go to www.beradio.com

Computer-to-video scan converters

Extron

Booth M7936



▶ **VSC 75, VSC 300, VSC 300D and VSC 150:** Using Extron's digital processing to convert high-resolution computer-video images from as high as 1280×1024 @ 60Hz to NTSC or PAL video, the VSC 75 features an internal color-bar test-pattern generator, two user-selectable levels of vertical filtering, picture adjustment controls, RS-232 control, and a rack-mountable enclosure. With user-selectable levels of horizontal and vertical filtering, and autoscanning technology, the broadcast-quality VSC 300 and VSC 300D provide optimal scan conversion for any application. The VSC 300D is identical to the VSC 300 but has an added digital video output module. Genlock capabilities come standard on the VSC 300 and VSC 300D. Offering user-selectable levels of horizontal, vertical, and encoder filtering, picture adjustment controls, genlocking, and an IR remote control, the VSC 150 autoscans computer images up to 1,280×1024 @ 60Hz. The VSC 150 features 15-pin HD and 15-pin D input/loop-out connectors and offers composite video, S-video, component video, and RGBHV output formats. The VSC 150 features a 100 to 240VAC, 50/60 Hz, internal power supply.

800-633-9876; fax 714-491-1517; www.extron.com; support@extron.com

Circle (257) on Free Info Card or go to www.beradio.com

New Products

Routing audio via Ethernet
QSC Audio

Rave/s-24: A signal transport system that allows you to route multiple channels of audio over standard Ethernet hardware and cabling using Peak Audio's CobraNet technology. A single RAVE network can replace hundreds of analog audio cables, reducing installation time, effort and cabling costs while improving routing flexibility and audio performance. Up to 64 channels of uncompressed 24-bit, 48kHz digital audio can be transmitted over a single Rave repeater network with no bit-rate reduction processing or other quality compromises. Additionally, Rave now supports switched network topologies, allowing for larger channel capacity and greater versatility. With a switched network, it is possible to run hundreds of channels of audio in coexistence with asynchronous PC or control traffic.

714-957-7100; fax 714-754-6174; www.qscaudio.com; info@qscaudio.com
Circle (266) on Free Info Card or go to www.beradio.com

CD-to-PC ripping software
Broadcast Software International
Booth i7239, R1915

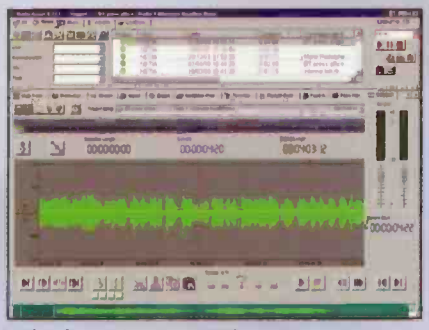
Speedy 3.0: The professional features of Speedy 3.0 include labeling technology that uses the online CDDB service to place descriptive information within audio files; ripping speeds in excess of 20× standard; and RapidRip for speed loading of CDs and semi-automated ripping. Speedy 3.0 also introduces an optional file naming convention that will be supported by BSI and other digital audio providers. The naming convention provides a unique filename for each song, as derived from the CDDB database. Speedy 3.0 supports all such linear and compressed audio formats as WAV, MP3, MP2 and ADPCM. Other features include the ability to play files digitally from a CD, normalization of ripped audio levels and silence trim.

888-BSI-USA1; fax 541-338-8656
www.bsiusa.com; info@bsiusa.com
Circle (254) on Free Info Card
or go to www.beradio.com

New Products

Editing tools
Netia Digital Audio
Booth R2973

▼ **Snippets:** Several sounds can be edited on a single track, each one identifiable by a different color. The



interface gives direct access to the spectrum, and modifications in each cut are immediately visible. A cut can either delete a selection or trim the pieces outside the selection. When items are cut, they are dropped in a bin where the sound rejects can be played, named, pasted or saved. After a cut, the reading head is positioned two seconds before the cut point, so the user can listen to the sequence lead-in. Fade points can be set directly while editing. The actual time function displays the start of an item. Additionally, there is a new function for the creator module: automatic display of the duration between the start of a cut and the current position.

973-364-7511; fax 973-364-7522; www.netia.fr
Circle (263) on Free Info Card or go to www.beradio.com

Weather alert receiver
Hamtronics

▶ **RWX receiver:** Automatic mode provides storm watch, alerting you by unmuting receiver and providing an output to trip remote equipment when the weather station broadcasts an alert tone.

A Storm Watch LED indicates that receiver is actively monitoring for warnings. Listen mode allows you to manually unmute a receiver to get an update on weather conditions and then reset the automatic alerting circuit when done. The RWX Receiver is small enough for emergency or portable use and can be powered from a 9-12V battery. The receiver uses crystal control for accuracy, and all 7 channels are provided, including split channels. An internal switch allows selection of a receiving channel. Sensitivity of 0.15µV provides good reception, even at distances of 70 miles or more, with a suitable antenna.

716-392-9430; fax 716-392-9430; www.hamtronics.com
jv@hamtronics.com
Circle (258) on Free Info Card or go to www.beradio.com

New Products

Addition to NewsBoss
Broadcast Electronics
Booth i6126, R2505

WebCaster: An addition to NewsBoss, the WebCaster automatically converts radio news items into website news at virtually no cost. NewsBoss WebCaster is included with the latest version of NewsBoss, enabling even small newsrooms to create website news for their own station and to generate extra revenue by providing Internet news to third-party websites. NewsBoss WebCaster allows flexibility, giving full functionality configuration. The use of web-friendly open standards such as XML and News Industry text formats also allows users to customize the appearance of their website news to match any existing website design. NewsBoss WebCaster imposes no extra demands on journalists because WebCaster operates in the background, sending the desired text and audio to your website in the format required.

217-224-9600; fax 217-224-9607; www.bdcast.com
bdcast@bdcast.com
Circle (253) on Free Info Card or go to www.beradio.com

FM antenna
Kathrein, Scala Division
Booth L9574

Model 754 154: A circularly polarized broadband FM directional antenna of hot-dip galvanized steel suitable for triangular or round masts. Even under severe icy conditions, the antenna is still functional due to its heavy-duty construction and the fiberglass covers for the feed points.

541-779-6500; fax 541-779-3991
www.scala.net; broadcast@kathrein.com
Circle (260) on Free Info Card or go to www.beradio.com

AES/EBU digital cable
Belden
Booth L8783

1800F High Flex: A high-performance, shielded, twisted-pair cable that meets the latest AES/EBU standards for digital audio applications and provides performance for traditional analog audio microphone applications. Features include bare copper, datalene insulation, conductors cabled with fillers, paper tape separator, 95 percent tinned copper french-braid shield with bare-copper drain wire. Matte PVC jackets are available in red, yellow, green, blue, gray, and black. The color code is blue and white.

800-BELDEN1; fax 765-983-5294
www.belden.com; info@belden.email.com
Circle (252) on Free Info Card or go to www.beradio.com

New Products

Digital console
Harris
Booth L5023

BMXdigital: This digital console includes simultaneous analog and digital inputs and outputs to accommodate analog or digital sources without reconfiguration or switching cards. All modules are hot-swappable, enhancing on-the-fly serviceability. With its fully modular design, the BMXdigital is easy to reconfigure for the varied requirements of a station's different day parts, and a station can simply add modules as its requirements change. By combining contemporary styling with the construction of its analog sibling, the BMXdigital also meets the aesthetic demands of today's major market radio stations while providing the ease of use and reliability of older, analog consoles. The BMXdigital is available in a variety of frame sizes: 22,30 or 38 inputs.

800-622-0022; fax 513-459-3890
www.harris.com; broadcast@harris.com
Circle (259) on Free Info Card
or go to www.beradio.com

Digital audio player
Digigram
Booth R2773

▲ **HitPlayer-L:** Combines two stand-alone audio players with IP network services into a system for both automated and interactive audio applications. Program material can be streamed, played from local storage, or a combination of both. Applications include background music, public address, entertainment sound, interactive audio systems, and transportation information. An internal hard disk stores weeks of audio content. Supports industry-standard digital audio file formats including MP3 and MPEG Layer II. Audio selections are played based on programmed playlists, a playback scheduler, and/or network commands. Playlists can be updated by automatic or on-demand synchronization with remote FTP servers. The two independent stereo players have individual outputs that can be combined into a single output with mixing and crossfades.

703-875-9100; fax 703-875-9161
www.digigram.com; input@digigram.com
Circle (251) on Free Info Card or go to www.beradio.com

New Products

Profanity delay
Symetrix
Booth M9338, R2153

Air Tools 6100: A 24-bit digital delay unit for live broadcast that prevents unwanted profanity or comments from reaching the airwaves. As the program begins, the 6100 gradually delays or stretches out the program until up to 20 seconds of 20kHz bandwidth stereo audio is stored in memory. When a person on the telephone line says something the host or producer deems inappropriate for the broadcast, the host presses the dump profanity button, and the memory is cleared. Meanwhile, the host releases the offending caller from the telephone line and proceeds with the program. After the dump profanity button has been pressed, the 6100 automatically begins to stretch (time expand) the program audio again until the full delay is attained. The 6100 includes an automation interface for network broadcasts.

425-787-3222; fax 425-787-3211
www.symetrixaudio.com; symetrix@symetrixaudio.com
Circle (269) on Free Info Card or go to www.beradio.com

Dual processor audio system
Smarts Broadcast Systems
Booth R3024

X-2 series: The systems use two separate processors, sharing a passive-backplane mother board. One processor is dedicated to audio recording and reproduction and runs on a non-graphic operating system. The other processor runs under Windows 98 or 2000 and provides graphic user interfaces, touch screens, and other features that can only be offered in a Windows environment. The audio processor can continue to operate if the Windows processor should fail. The X-2 series Smartcaster is available in a production unit featuring digital editing, automatic CD recording and an on-air unit offering a Windows touch-screen display to provide a way to run live programming. All features of the standard Smartcaster units are preserved.

800-747-6278; fax 712-852-5030
www.smartsbroadcast.com
smarts@ncn.net
Circle (267) on Free Info Card or go to www.beradio.com


The future of electronic media
is going to be quite a ride.
[Please keep your arms and legs
inside the vehicle at all times.]
Hold on to your hat, because the digital technology
rules you learned today will be obsolete by morning.
In the future, the simple path from A to B will be filled with
plenty of twists and turns. Long uphill climbs.
And gravity-defying descents.
If you're one of the fortunate few, you'll raise your hands
in the air screaming, loving every minute of it.
Because you'll know — that in the future,
nobody will just coast to success.
Plan today to be on the right track tomorrow.
NAB 2001
The Convergence Marketplace
Take the Ride. NAB2001 • Conferences: April 21–25, 2001 • Exhibits: April 23–26 • E-TOPIA Exhibits Premier: April 22
Las Vegas, Nevada USA • Register at www.nab.org/conventions • 888.740.4622 • 202.429.5419

New Products

Studio condensor mic
Neumann
Booth R2253

▼ **M 150:** Based on the style and performance of the vintage M 50, the M 150 tube condenser microphone improves on its predecessors' performance with a titanium membrane and capsule, a transformerless tube amplifier based on the award-winning M 145 Tube microphone, and a sophisticated power supply. The 12mm titanium capsule delivers low self-noise (15 dB-A), extended frequency response and unprecedented transient response. The headgrill is formed like the original M 50. The pick-up pattern is circular at low frequencies and increasingly narrow up the spectrum. Provides 119dB of dynamic range, 20mV/Pa sensitivity, and 134dB maximum SPL.

860-434-5220; fax 860-434-3148
www.neumannusa.com
neumlt@neumannusa.com
Circle (264) on Free Info Card or go to www.beradio.com

New Products

Dual CD player
Denon Electronics
Booth R2702

▲ **DN-2100F:** A seamless loop feature lets the user create a looping sequence (two per drive) on a CD and allows instant switching between the set loops. The machine boasts a Hot Start/Stutter control, which gives the capability of being able to start at either of two different cue points with seamless audio playback. In Stutter mode, the two cue points are used for cue point sampling, which allows for instant triggering of momentary audio when the appropriate button is engaged and held, creating a stutter effect when done repeatedly. Brake and Platter-S modes are provided. Additional features of the DN-2100F include a Key Adjust feature and a fader start function.

973-396-0810; fax 973-396-7459; www.del.denon.com
Circle (272) on Free Info Card or go to www.beradio.com

Stereo microphone kits
DPA Microphones
Booth R3126

▶ **3532-S and 3532-T:** Both kits include a matched pair of 4041 microphones, and offer either solid-state (S) or tube (T) preamps. The 4041 is a large diameter (1") microphone. Exhibiting a transparent audio path with a low noise floor of maximum 7dB(A), the 4041 has a SPL handling capability of 144dB peak. Developed for the studio professional, the 3532-S A-B stereo kit uses solid-state mic preamps, while the 3532-T gives the option of the classic tube sound. Each pair of microphones comes in a foam-lined briefcase (KE3532) with either tube (MMP4000-T) or solid state (MMP4000-S) preamps and omnidirectional 1-inch cartridges (MMC4041). Both kits also include a two-channel high-voltage mic amp (HMA4000), two 30-foot microphone cables (DAO4110), two windscreens (DUA0040), and one stereo boom with holders (UA0836).

+45 4814 2828; fax +45 4814 2700
www.dpamicrophones.com; info@dpamicrophones.com
Circle (256) on Free Info Card or go to www.beradio.com

New Products

Studio support
Mager Systems
Booth R2701

▲ **Studio Furniture:** Mager Systems designs and fabricates award-winning studio furniture for radio and TV. In addition to the furniture designs, additional benefits and services are available including turnkey prewiring, true solid-wood premium construction, 3-D drawings and designs, delivery and installation. Materials are chosen for their quality, structural integrity and heat tolerance. All solid-surface counter tops include a 10-year warranty.

623-780-0045; fax 623-780-9860
www.magersystems.com; mager@magersystems.com
Circle (262) on Free Info Card or go to www.beradio.com

Cable assemblies
Andrew
Booth L9510, S2722

▼ **SureFlex Micro-Cable Assemblies:** These cables use a corrugated, solid-copper outer conductor and are manufactured using the SureFlex connector attachment process, which features soldered inner and outer con-

ductors to provide electrical stability and prevent water ingress. SureFlex Micro-Cable Assemblies have zero-halogen content and flame-retardant indoor/outdoor jackets. These small-diameter cable assemblies (3.6mm and 5.7mm) are for in-cabinet jumper applications for wireless and broadband systems, and technologies including EDGE, WCDMA, and CDMA2000.

800-DIAL-4-RF; fax 708-349-5444
www.andrew.com; rose.wolski@andrew.com
Circle (250) on Free Info Card or go to www.beradio.com

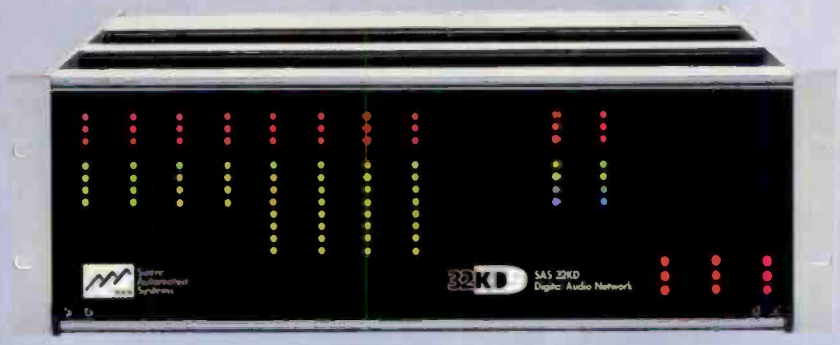
Button panel
Logitek
Booth R2147

Button12: A rack-mounted, programmable button panel that provides operational control of the Logitek Audio Engine or other external device, Button12 allows the user to push any button, and the function that has been set up for that button will occur. Functions can include GPI outputs to external devices or serial commands via Supervisor software. Vbutton is a software implementation of the Button12 Panel, Vbutton provides point-and-click selection of any function that a user has set up on the buttons.

877-231-5870; fax 713-664-4479; www.logitekaudio.com;info@logitekaudio.com
Circle (275) on Free Info Card or go to www.beradio.com

New Products

Digital audio routing switcher
Sierra Automated Systems
Booth R3105



▲ **32KD:** Performs switching, mixing, DSP, IFB and mix-minus functions using the SAS exclusive DTDM bus architecture, enhancing fault tolerance and minimizing single-point failure issues. Fiber-optic interfaces allow multiple mainframes to be linked together for almost unlimited expansion capabilities. Both analog and digital inputs and outputs are supported on user-selectable connector panels. The system also handles non-audio, such as serial data, and provides contact closures through a general-purpose interface. All SAS switchers use a variety of control methods, including rackmount and console-mount control panels, as well as soft panels and automation control. Special control panels for intercom systems and mix-minus programming are available.
818-840-6749; fax 818-840-6751; www.sasaudio.com; sales@sasaudio.com
Circle (270) on Free Info Card or go to www.beradio.com

Circle (157) on Free Info Card or go to www.beradio.com

Circle (158) on Free Info Card or go to www.beradio.com

New Products

Digital mixer
Tamura
Booth R1854

▶ **Qolle AMQ1000:** A 16-channel digital mixer designed for live broadcasts and suitable for small and mid-scale radio broadcasts, the AMQ1000 includes analog and digital input for mono, stereo, external, and talk back channels. High pass filtering is provided, as are equalization and compression. Eleven output circuits are available. The unit is designed for A/D and D/A installation for analog input/output and variable AUX output (TEL2, Mix minus1, AUX2). Specifications include frequency response 30Hz to 20kHz (analog input/output) and 20Hz to 20kHz (digital input/output), and power supply AC100 to 230V 50/60Hz.

909-699-1270; fax 909-676-9482
www.tamuracorp.com; sales@tamuracorp.com
Circle (265) on Free Info Card or go to www.beradio.com

Additions to the Flat-Pak line
RDL (Radio Design Labs)
Booth L4955, R3141

▶ **Flat-Pak products:** The new offerings in RDL's Flat-Pak line include the FP-BUC2 unbalanced to balanced converter; the FP-MP1 low-noise microphone preamp; the FP-MX4 four input mic/line mixer; the FP-SPR1 S/PDIF repeater; the FP-MPA2 microphone phantom adapter; and the FP-PEQ3 three-band parametric equalizer. All Flat-Pak models feature all-metal construction; cabinet, shelf or rack mounting; top mounted connectors; DC-jack input and DC-power bus output. The FP-RRA and FP-RRAH accessories provide a method of rack mounting the Flat-Pak units. With the FP-ALC2 Flat-Pak automatic level control, source signals enter the FP-ALC2 via RCA phono jacks and are adjusted to a 10dBV output level at the phono jack outputs. The auto-gain circuitry and the compression attack and release times are adjusted according to the program material.

800-281-2683; fax 805-684-9316; www.rdlnet.com
Circle (276) on Free Info Card or go to www.beradio.com

New Products

MP3 recorder/player
Dialog4 Systems Engineering

SounTainer: Boasting a programmable, software-driven architecture, SounTainer can be updated over the Internet. DigitalDNA technology from Motorola, provides DSP power. SounTainer currently offers MP3 encoding and playback technology, but future versions may be upgraded with virtually any available future audio technology. Dialog4 also offers the SounTainer technology including MMC support. This module is small and can be used in such devices as PDAs, 3G mobile phones, desktop-PCs and portable audio devices. SounTainer features a playback time of more than eight hours and a record time of more than four hours. SounTainer is housed in a PC ABS case with integrated microphone and line inputs, and integrated headphone and line outputs. A USB interface is included for connection to a computer, although the built-in MP3 encoder allows users to record directly from any line or microphone source without the need for a PC.

+49 7141 22660; fax +49 7141 22667; www.dialog4.com; info@dialog4.com

Circle (273) on Free Info Card or go to www.beradio.com

Voice recorder
Dynamic Instruments

The Verifier: The Verifier is capable of recording from eight up to 32 channels in a single chassis. It provides end users days or even weeks of on-line storage and retrieval and eliminates the additional burden of storing, filing, or retrieving archived media tapes or disks. The ability to quickly retrieve, review, duplicate and distribute recordings has been enhanced with playback software running on multiple remote PCs or workstations. The system has an upgrade path for increasing the number of record channels and for adding archive drives when necessary.

800-793-3358; fax 858-278-6700
www.dynamicinst.com

Circle (274) on Free Info Card or go to www.beradio.com

TDM router
Lighthouse Digital Systems
Booth L135

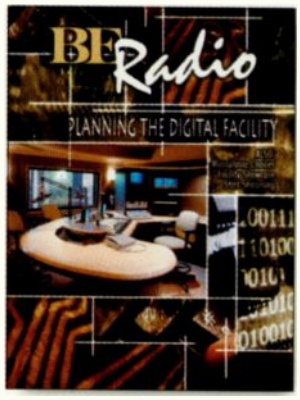
JOZ: Based on the second-generation SHARCO DSP, JOZ has a variety of features including: audio sample rates from 28kHz to 108kHz; 8k × 8k capability; test-signal generation and measurement; clickless switching; stereo-to-mono mixing; signal delay; multilevel mixing; equalization; and SMPTE and timecode generation and reads. The new control surface provides an easy-to-use hardware interface to manipulate the mixing features of JOZ.

800-323-8289; fax 530-272-8248; www.lighthousedigital.com; sales@lighthousedigital.com

Circle (261) on Free Info Card or go to www.beradio.com

Reader Feedback

Strong on LPFM



Don't be too sure about LPFM, Chriss [*Viewpoint*, January 2001]. We have applied for 105.9 in St George, SC. We do not expect to broadcast to people in cars at all, but we are interested in the more than 2,000 citizens that have crap/crud radio to listen to. Let those that want it have their garbage radio. Our citizens deserve something better than that, and we will give it to them. We already have grant financing available up the wazoo! We will use first-class equipment, most of it better than that used by the 100kW stations. Our sound will be clearer and not compressed to you-know-what. Don't rule us out just yet, Chriss.

Clarence Jones
retired broadcaster
St George, SC

Compared to what I have seen, your situation sounds better than most other LPFM hopefuls. If LPFM is allowed to continue after the planned field tests, I'm sure there will be a few stations that will be successful in their venture. Many will not. You have the advantage of many years of broadcast experience from which to draw. Many LPFM candidates do not.

Chriss Scherer
editor

Perpetuating parasitics

Dear John Battison:

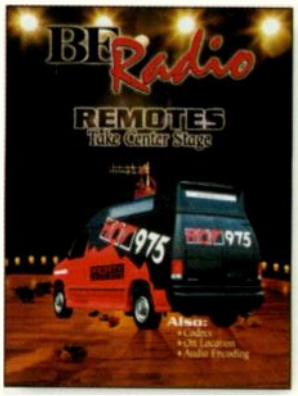
I just read your article on parasitic radiators (RF Engineering, January 2001), and I agree completely with your ideas.

All the directiional arrays I recently designed have used the self-resonant folded unipole as the main radiator and a parasitic element for the second tower. This design has shown great success by the way, and all the systems provide a sensational stability and a superb sound quality.

A good reference for a recent installation is ZYI-205, a 10kW daytimer on 1020kHz in Colatina, Brazil. The radiating system is a directional, two-antenna array, using the same method of a self-resonant folded unipole for antenna one and a parasitic (non-fed) tower for antenna two. The system also operates with a set of elevated radial wires parallel to ground.

Sylvio M. Damiani, P.E.
consulting engineer
São Paulo, Brazil

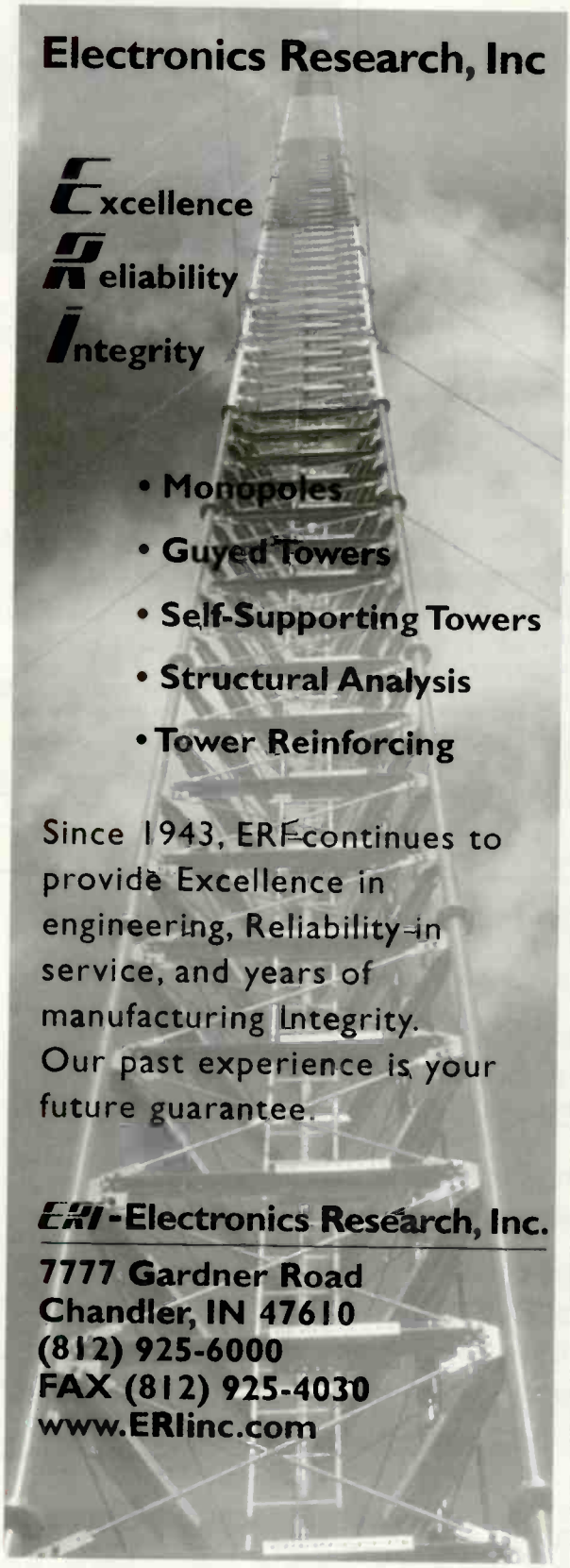
Helpful discussion



I always look forward the next issue of *BE Radio*. I especially appreciated the article by Jim Paluzzi on *The Costs of Digital* (Managing Technology, February 2001). I appreciated the explanation in the article regarding sampling rate (snapshots) and compression (compression is cheating). These were helpful explanations for non-engineers like me. It was a user-friendly explanation of a technical topic and helped me understand how digital works.

Thanks again!

Herb Smith
production manager
KLFC radio
Branson MO



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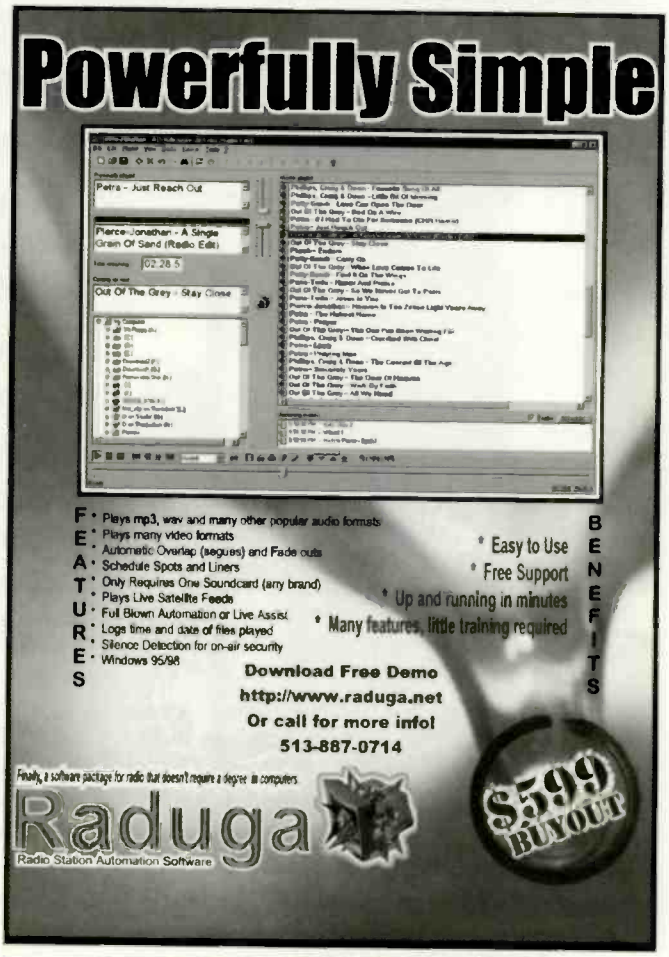

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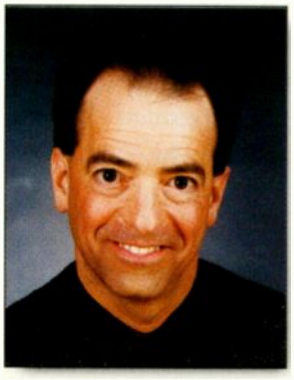
Public interest(ed)?

By Skip Pizzi, contributing editor

In the wake of the LPFM debate, there has been much lamenting over the fate of the public airwaves. The apparent demise of LPFM has brought forth the ire of those who feel that the public interest is not well served by today's broadcasters. They assert that the airwaves are held in the public trust by licensees, but that business interests have overwhelmed any public-service role played by broadcasters.

These critics of the status quo decry the consolidated control of existing radio licensees, blaming the big-business mentality for the lack of responsibility among today's radio stations. Some of the sharpest invectives have been leveled at NPR, which found itself in a rare congruence of opinion with NAB and commercial broadcasters, as they all filed comments against LPFM.



Yet it has been shown that true public-interest content isn't widely listened to by radio audiences. Given that radio in the US is driven by audience size (this is largely true even for public radio), broadcasters are faced with a quandary: how to provide adequate public service and maintain the proper stewardship and viability of their channels.

Defining interest

The traditional definition of public service content implies programming of little interest to most listeners, with the primary exception of emergency information. Given the EAS requirements, this important divergence seems well covered under today's environment. In almost every other case, however, public interest programming is a general tune-out.

Is the airing of content that makes most listeners dive for the off switch really making the airwaves serve the public interest? To paraphrase a familiar quotation, if a PSA runs in the radio forest and no one hears it, is the public interest served?

LPFM was one attempt to solve this dilemma, but not a very good one. Even if the new LP stations carried worthy content, squeezing them onto the dial by reducing interference criteria to existing services is not an optimal path to serving the greater good. The public votes with its ears every day, and uses radio (both commercial and non-commercial) to satisfy multiple needs. Reducing the quality of these services that are already widely used would be a net *disservice* to the populace.

Further, if the content of those stations were truly public-service oriented – a big if, as discussed here previously (see *The Last Byte*, April 2000) – their audiences would be even smaller than their coverage areas might dictate, due to the aforementioned reasons.

Is the airing of content that makes most listeners dive for the off switch really making the airwaves serve the public interest?

Finally, how would these stations survive? There are some fixed costs to operating a radio station, no matter how low its power or minimalist its programming. So some degree of popularity is critical if LPFM stations are to be anything other than subsidized private-interest shills, or just plain bad radio. Given their small audience potential, LPFM stations are most likely to fall into the latter categories, again providing little in the way of increased public service.

It's a new world

Are public service and good radio mutually exclusive? Perhaps not, but their intersection is small in today's media marketplace. Thankfully, broadcasters can now reach their audiences via multiple service paths, one of which is the Internet. Narrow-interest content, such as most public service programming, is perfectly suited to the Internet service model. Broadcasters can mention the availability of such content on their on-air service, but place most of the actual content online, and in greater amounts than they would currently run on-air.

Further, the on-demand potential of an Internet service allows this content to have higher public service value, because it can be made available in a "pull" mode whenever the listener wants it. In addition, online public-service audio programming can be supplemented by print content and links to public service agencies.

While the Internet does not yet have the reach that radio provides, the public service offerings in many markets could be greatly improved by such applications of broadcasters' websites. Many stations have already begun this process, and others will likely follow. The industry should take advantage of these emerging opportunities rather than attempting to force an outmoded retrofit solution. The accessible, yet personalized, nature of new media provides a more elegant compromise. Thus, broadcasters can manage the often divergent requirements of serving the public interest and the interested public.

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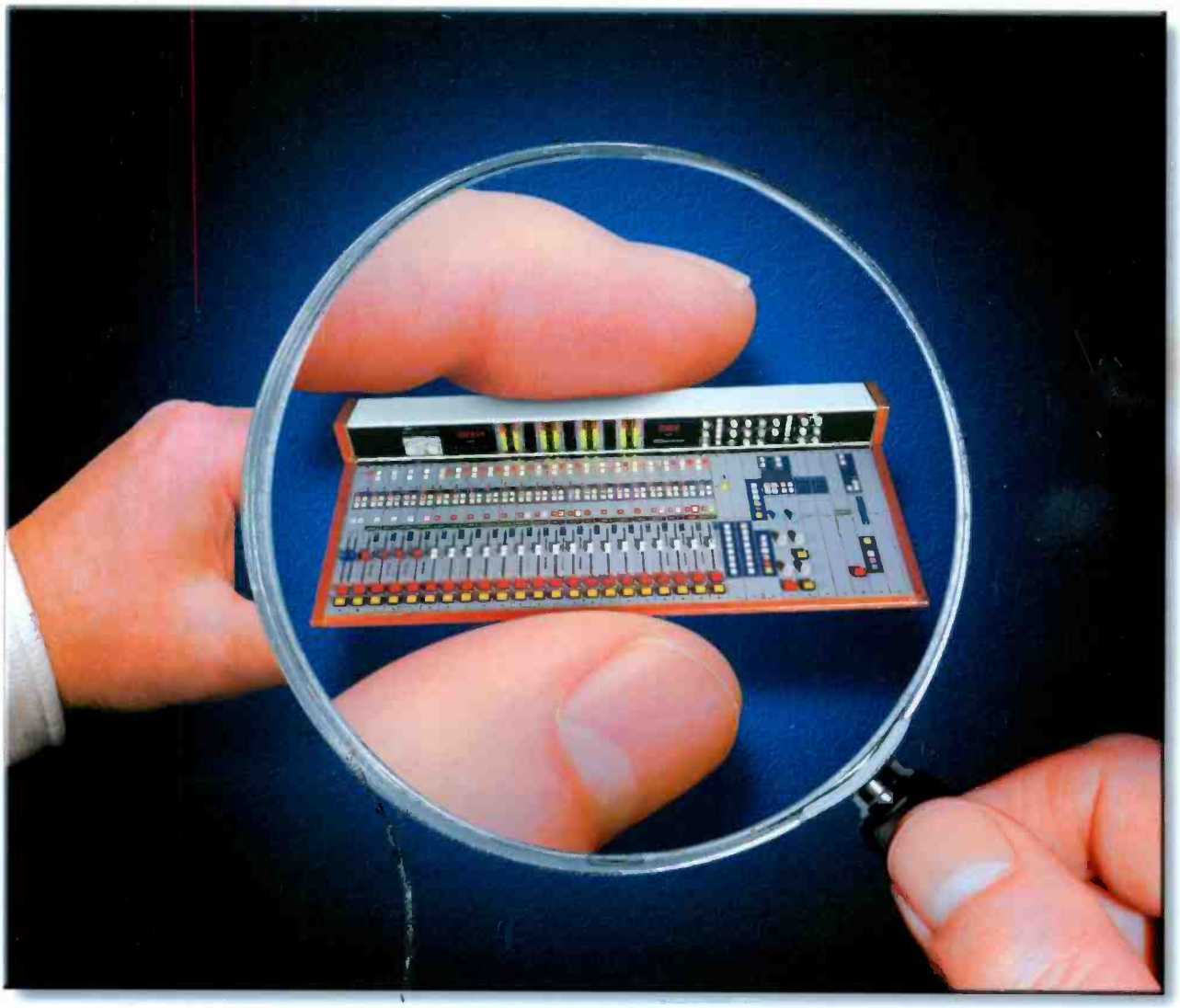

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