

BE Radio®

March 2001

An INTERTEC®/PRIMEDIA Publication
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The Radio Technology Leader

GEARING UP NAB 2001



Also:
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Build your Station's Intranet
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AUDIOARTS DIGITAL D-70



The D-70 digital console from AUDIOARTS not only utilizes the latest in digital technology and chip sets, it can be ordered with a serial interface that lets it integrate with most popular automation systems and station routers; it even has WHEATSTONE's exclusive VDIP™ software system.

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With a compact, tabletop-mount footprint and a modular rear connector system that utilizes plug-in submodules for easy analog-to-digital field switches, the D-70 can be configured onsite quickly and easily. On the functional side, fullscale digital peak plus simultaneous VU metering, LED illumination everywhere, built-in machine interface, automatic timer and clock (stand-alone or ESE slave) all come standard, along with separate source selection for control room and studio plus built in talk-back. You can even order the D-70 console with a SUPERPHONE module to support two callers with automatic digitally generated mix-minus. Both digital and analog line selector panels are also available.



THE D-70 DIGITAL AUDIO CONSOLE —benefit from WHEATSTONE's experience— at an AUDIOARTS price!

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Taking care of today's broadcasting needs while moving toward a digital future is a tough juggling act. You need to maintain and, perhaps, upgrade current systems. Maybe you're even contemplating complete station makeovers. Fortunately there's a company with the resources and dexterity to help you maintain your balance: Harris.

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- Radio - AM, FM, IBOC, DAB
- STL - single to multiple site linking

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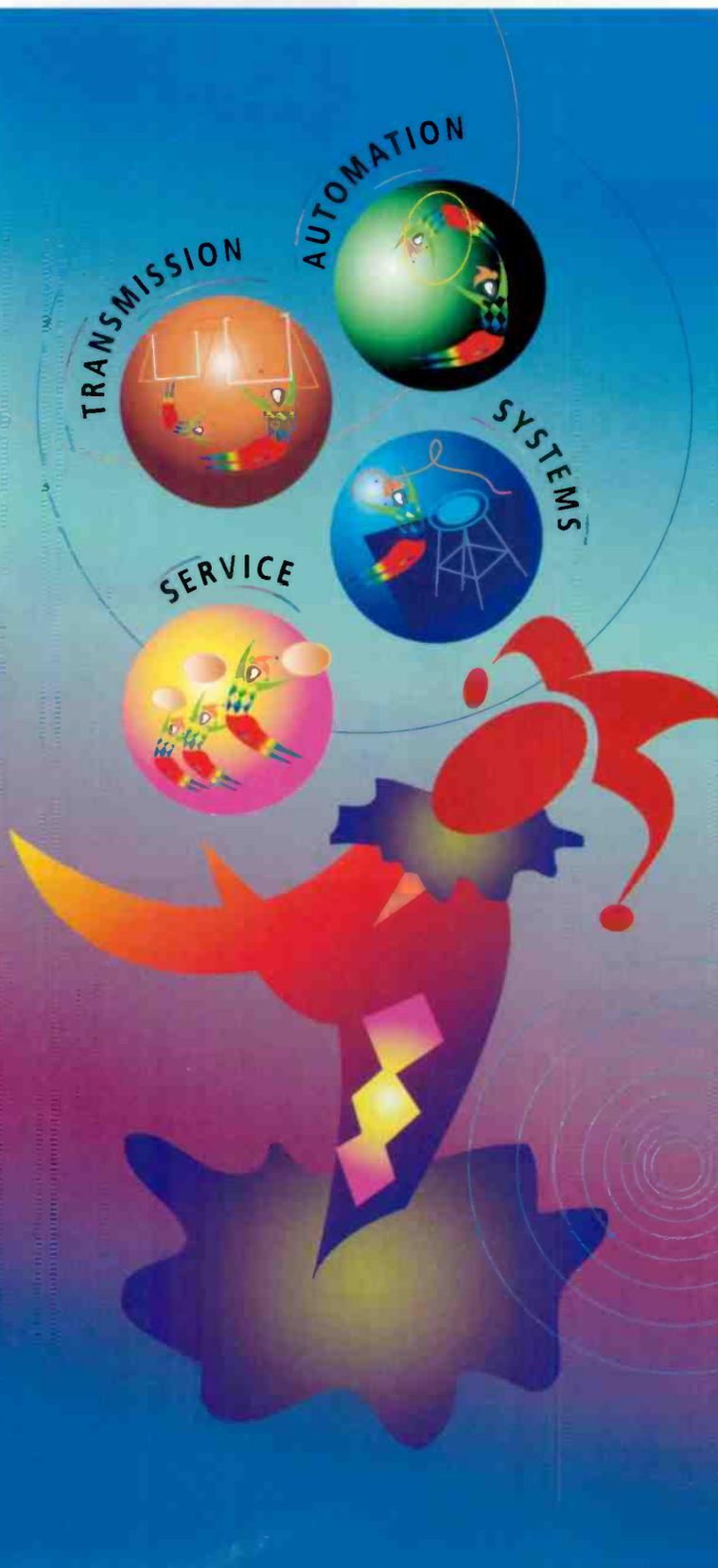
next level solutions

SERVICE

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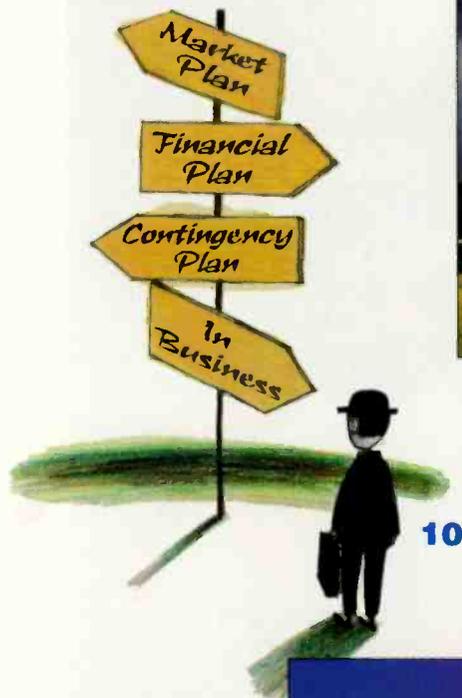


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ON THE COVER: The cogs are in motion for NAB2001. This month's issue prepares you for everything the convention has to offer. Cover design by Michael J. Knust.

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



- Installed in world class facilities
- Integrated platform concept
- Fiber optic networking
- Any audio source, anywhere

"When faced with moving seven major radio stations into one consolidated facility, we suddenly realized the limitations of using a conventional analog approach," says Jan Chadwell, AM Chief Engineer, Clear Channel Denver. "KLOTZ provided the solution with their digital consoles and VACIS platform. We were able to consolidate the majority of the sources and destinations in one large master rack room."

"KLOTZ allowed us to achieve in eight months what would have taken us two years had we gone analog. Performance has been beyond anything we could have anticipated. The flexibility, ease of use, low maintenance, and great factory support have reinforced our decision. Thank you KLOTZ!"



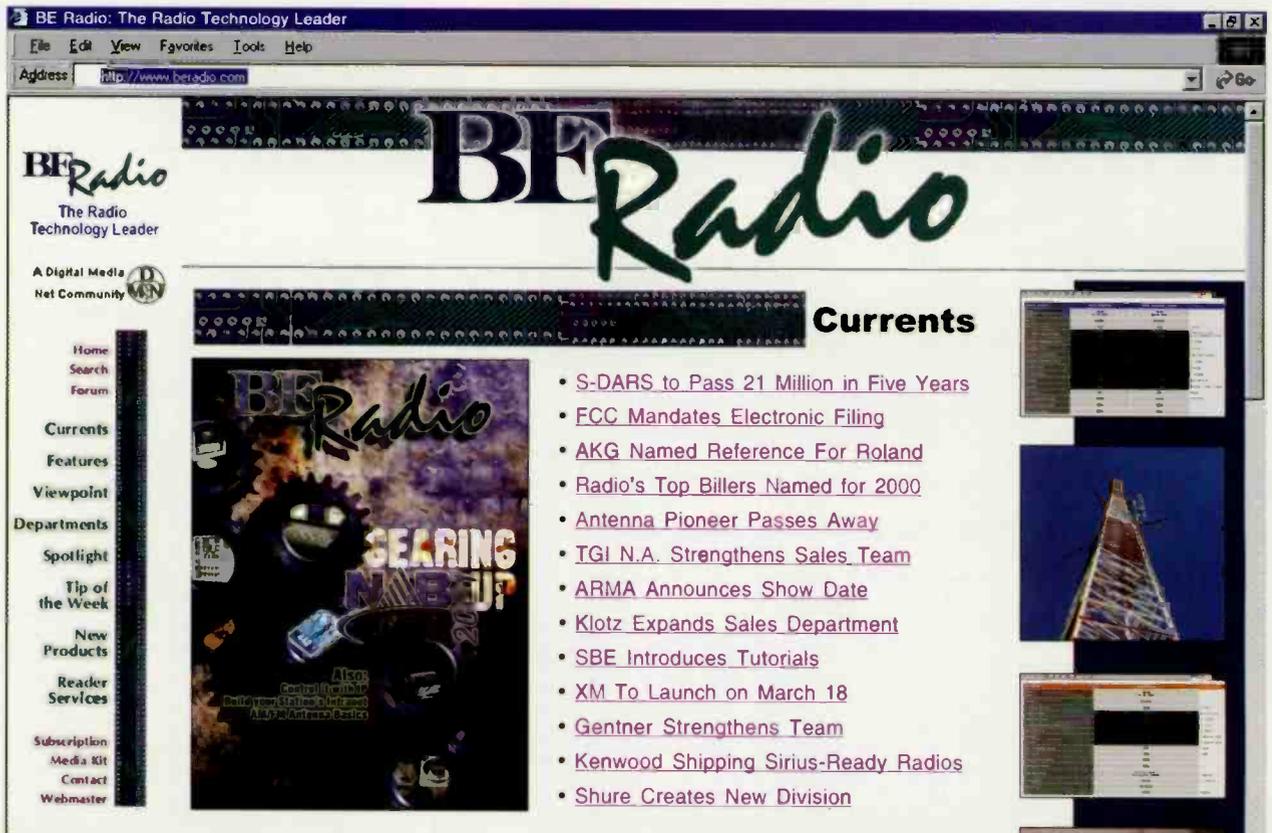
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NAB Extra!

With links to the manufacturers

Demo Room

Online product demonstrations

March Issue

Read it online. Plus streaming stations and more.





On The Air

A Monthly Newsletter from Broadcast Software International

Issue 2

Quote of the Month

"We were in a lot of trouble and you bailed us out. Your software and customer service are above and beyond the industry standard."

Katina Stamat
WPDO- Howell, NJ

News

System Design Made Easy

What do you do when you want more than software, but don't need a turnkey system? Look to BSI's new studio automation kits.

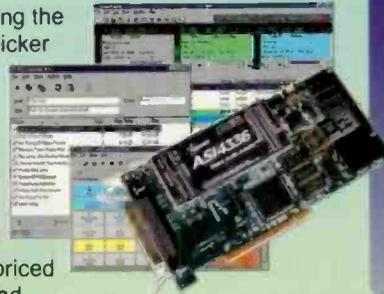
BSI's new Studio Kits give greater design and cost-saving opportunities to broadcast engineers and studio designers. The three kits are optimized combinations of software and hardware customized for small, medium and large market broadcasters.

"These are complete two-studio automation kits... just missing the PC's," says BSI President Ron Burley, "System design is quicker and easier because we've done all the difficult research and testing."

The Studio Kits come in three configurations and offer significant savings when compared to purchasing the components individually. The \$4,799 US Studio Kit 100 is geared towards smaller markets and single stations. The Studio Kit 200 provides the versatility and power required in mid-sized markets, for just \$6,599 US. The Studio Kit 300, priced at \$9,999 US, is a world-class package for major markets and enterprise broadcast facilities.

Each Studio Kit contains all of the hardware and software needed to equip a production and air studio. Among the products included in the Studio Kits are BSI's acclaimed WaveStation digital automation system, Cool Edit Pro editing software from Syntrillium Software and professional audio adaptors from AudioScience. Each kit also comes with one year of free tech support and software upgrades.

"With our Studio Kits, all you need is a Pentium class PC and you're on the air," says Burley. "Our customers often already have computers or have the ability to barter them. Studio Kits give them the ability to build a top-of-the-line system using that hardware."



Calendar

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

Aug 16-18, WaveStation Weekend

Birthdays:
Mar 25 1942, Aretha Franklin
Mar 25 1920, Howard Cosell

Tip

Dynamic Web site

You don't need an expensive hosting service to have a dynamite station web site. BSI's \$1499 US WaveStation automation software can automatically post to your web site what's playing, recently played and what's coming up. Build your own page with station graphics and text, then just insert a few special HTML tags for WaveStation to fill-in. You can even give songs and spots their own web pages or frames. Banner ads anyone?

New Horizon

BSI's turnkey automation systems are setting a new standard for reliability, affordability and power. Two studio complete systems start at \$8,999 US.



Series 300 shown

www.bsiusa.com

User File

KRQZ - Lenny Harris



Lenny Harris of Trinity Church realized that he wanted to combine his love of music and his ideals into a radio station for teens. "We searched a long time for an automation system," said Lenny. "We didn't have a large budget, so we needed something that was going to be

affordable, user-friendly and really easy.

"I downloaded the WaveStation demo and was able to figure it out just by playing with it. Other stations I asked about the program were really happy with it. I was pretty sold on buying the WaveStation, and then I went back to Ohio to see our network and they were using it. I thought if it worked for them, it would surely work for us."

WaveStation has been a KRQZ hero. "We were on network, but nothing was coming out," recounted Lenny. "It only took me a few seconds to get our next stopset on-the-air and line up a few songs to cover the outage. WaveStation saved the day."

Lenny is really happy with his system. "We checked just about every other kind of software out there. There're a lot of good people in the industry, but BSI's WaveStation is the most reasonably priced and user-friendly product that we found anywhere." Send us your User File story.

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Broadcast Software International

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Bringing the show to you

Here we are again, getting ready for another NAB convention. Whether you attend the show or not, this annual event influences you and your broadcast operation because most exhibitors choose this show to unveil their new services and hardware. Attending the convention gives you the chance to see new products being demonstrated. These demonstrations can provide insight into how a product functions and can sometimes reveal an interesting characteristic or capability that make that product the perfect solution for your needs.

As you walk the show floor following your plan of who and what to see, you will find other new products that spark your interest as well. I'm sure you will find more than what you originally planned to see.



But while the NAB convention continues to grow in attendance, not everyone has the opportunity to go. State and regional conventions offer similar opportunities, but these shows may not correspond to your capital purchase schedule. Even monthly SBE

meetings may not be able to provide timely information. So what's the best way to arrange a product demonstration that fits your schedule? It's called the Demo Room, and it's a new feature for *BE Radio*.

Each issue of *BE Radio* brings you information about technology for radio broadcasting. The written word and color photos tell a full story, but may not give you everything you want to know. We have developed the Demo Room to bring you complete manufacturer demonstrations about the latest new products. New demonstrations will be added every month, so there is sure to be something that will interest you. Even better, you can access this information online when it fits your schedule.

When you see the Demo Room logo like the one to the above right, it tells you that a product demo is available online. Simply go to www.beradio.com and click on the Demo Room logo to see that demonstration. All the demos are available in both Windows Media and Real formats in a variety of data rates. As long as you have Internet access, your private demo is waiting for you. You don't need to wait for more information about the products that interest you. The Demo Room brings them to you on demand.

With the constant press for time, you need information

that fits your schedule. When a demo is posted to the Demo Room, you may not have an immediate interest in the product, but you may some time later. The Demo Room will also feature an archive section where you can search any of the past demos that are posted there.

The Demo Room was created in a partnership with Intertec Publishing's sister company, Industry Click. All the magazines within the entertainment technology division are arranging product demonstrations as well. While you're looking for a Demo Room feature from *BE Radio*, you may find a demonstration from *Broadcast Engineering*, *Mix*, *Netmedia* or any other Intertec publication that is of interest as well.

The Internet already supplies an incredible amount of information. You have probably already visited BERadio.com to see the additional monthly features and updated-daily industry news. The Demo Room is another way that we're using the Web to bring you more valuable information when you want it.



Chris Scherer

Chriss Scherer, editor
chriss_scherer@intertec.com

On the Road:

Chriss will moderate two sessions at NAB:

- **International DAB Panel** - April 22
A look at the state of DAB outside the U.S.
- **What You Missed on the Show Floor** - April 25
It's a b.g show with lots to see.

Check the NAB2001 guide for session locations.



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COMREX

Business 101 for engineers

By Mark Krieger, CBT

In January, we surfed across some of the salient issues of small business accounting as applied to contract engineers. Along the way, we briefly touched on the need for a business plan. This month, we'll reexamine that concept and attempt to explain its fundamental importance in the startup and operation of a contract engineering business.

So, why do we need a business plan? Well, to begin with, most reputable lending institutions require submission of such a plan as a prerequisite of the business loan application process. Obviously, the lender wants to know whether the applicant has thoroughly thought through the financial parameters of any proposal. Required or not, the assembly of a business plan is a practical exercise that influences day-to-day operation and fiscal decision making. Since every business has finite amounts of available labor, equipment and capital, the plan serves as a road map for the most efficient allocation of those resources in a way that maximizes profit on each sale. Furthermore, a good plan reduces uncertainty, allowing you to focus on task execution while minimizing worry about the big picture.

Goals and decisions

Drafting a business plan needn't be complex, but it should reflect realistic assumptions and goals. Thus, it's best to set passion aside and conduct the planning process through the application of logic, math and factual data.

To begin formulating your plan, first determine the specific goal of the business. For example, let's say the goal is to provide a steady income for you and your family until retirement. This means that from day one, you will have to factor in your expected salary, along with tax-deferred investment contributions, as an expense. Perhaps the goal is to aggressively build the business, foregoing near-term income for growth. Here, you may want to take only a limited draw from the business while reinvesting in added employees and equipment needed in order to boost productivity and expand the client base. In either case, the goal will help establish priorities for the allocation of resources.

Once the goals have been identified, there are specific questions to address. What services will you be offering,

and how much can you reasonably expect to charge for them? How much demand exists for your service, and how is it likely to change over time? How much capital and equipment are you going to need? These issues require basic research, and should be answered thoughtfully.

As you proceed, you're likely to discover that planning is an evolutionary process during which many new questions emerge as you answer existing ones. This is beneficial, because it forces you to build detail into your vision as it crystallizes it into an executable plan.

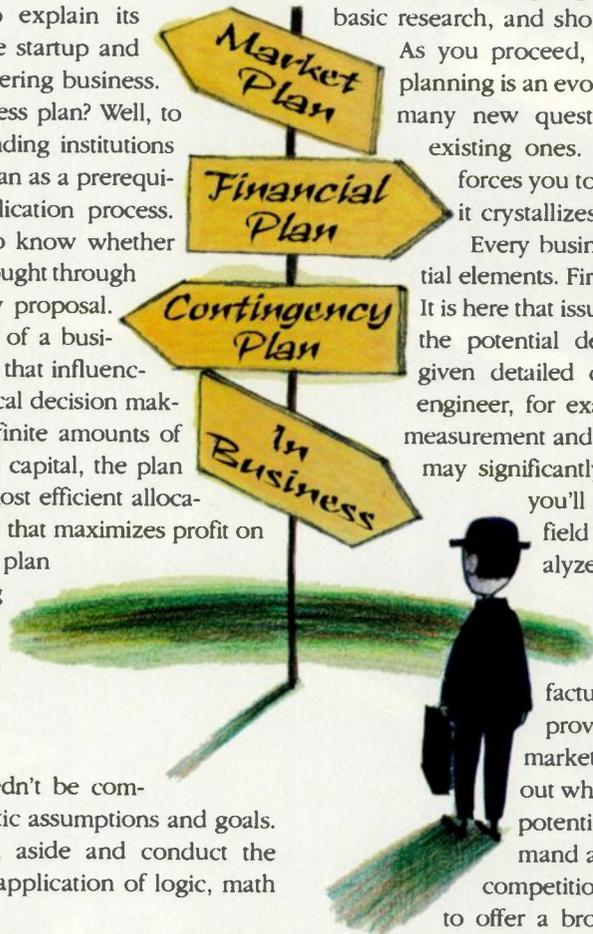
Every business plan contains three essential elements. First on the list is the market plan. It is here that issues of services to be offered and the potential demand for those services are given detailed consideration. As a broadcast engineer, for example, are you going to offer measurement and certification services? If so, this may significantly affect the amount of capital you'll need to invest in things like

field strength meters, spectrum analyzers and the like. Thus, demand for these services and what you can competitively charge for them should be based on factual research, not intuition. Call providers of similar services in your market or a comparable one to find out what they charge, then check with potential clients to establish both demand and the prospects for profitable competition. While it may seem desirable to offer a broad range of services, stick to what you know and do best; otherwise, productivity, reputation and profitability may suffer.

Self-promotion

Promotion is an important facet of the market plan. Broadcast engineering is different than retailing in that the potential customer base is fairly specific. Though this might suggest that personal visits and phone calls are more effective in establishing and building business relationships than direct mail advertising, this doesn't mean there isn't a place for both. Don't assume that word-of-mouth is going to sustain your business. Effective marketing is fundamental to success and will be explored in an upcoming issue.

The second essential component is the financial plan, where you will establish the projected operating budget



We've been around the bases a few times, and it's a big field.



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Contract Engineering

including working capital, capital expenditures (equipment), operating expenses (salary or draw, debt service and overhead) and gross revenue. Be thorough and conservative in your projections. High initial capital expenditures may be reduced somewhat by leasing vehicles or equipment, but you will ultimately pay more for them over the life of the asset. Still, leasing offers flexibility in terms of upgrading, so it can be a useful option in some cases.

develop coping strategies for problems that may develop. For example, if you are going to run a one-man (or woman) operation, who will service your accounts if you are ill or temporarily disabled? Or... what if a large group that handles engineering functions in-house buys out several key clients? While you may not be able to control these circumstances, you can certainly be proactive in developing a plan to cope with them. In the first example, this could be accomplished by securing a prior agreement with another engineer to handle your accounts on

a temporary basis in exchange for the like. In the example involving ownership changes, longer-term contracts might buy you time needed to develop new business to replace that which is going away. In each case, think it through, and be creative.

Finally, be mindful of the value of your local library as an educational resource. There, you'll find many excellent volumes that treat this subject in the greater detail it deserves. So set your goals, do the research and get to work on a business plan that works for you.

Mark Krieger, BE Radio's consultant on contract engineering, can be reached at mkrieger@drfast.net. He is based in Cleveland.

Essential Elements of a Good Business Plan

Determine a market plan	Design a financial plan	Develop a contingency plan
Decide services offered	Project budget	Plan coping strategies
Assess demand for your services	Consider leasing	Expect the unexpected
Plan a marketing strategy	Capitalize	Consider long-term contracts

Remember that many ultimately successful businesses lose money during startup and early operation. This is not a crisis if you've projected and planned for it. Experts point out that along with poor planning, under-capitalization is the single biggest factor behind the majority of small businesses failures. It takes money to make money, so be sure you have everything you need before you leave the starting gate.

The last piece of the puzzle is the contingency plan. Simply put, this is a "what if..." exercise, allowing you to

**Contract Engineering in March:
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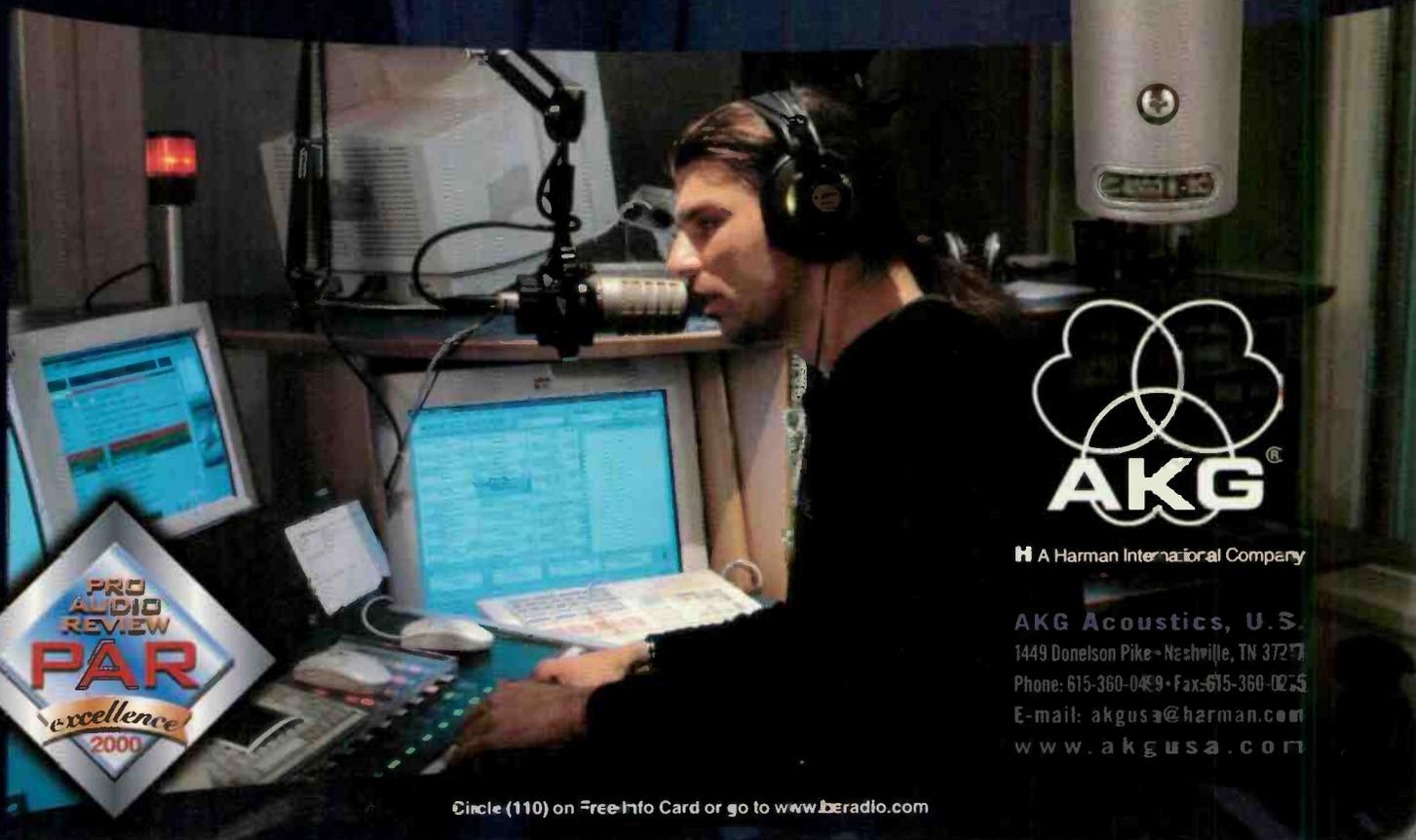
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Control over IP

By Chuck Leavens

Several years ago, I was setting up a remote access server for our employees to dial into our company LAN. I was amazed at how easy the setup was. Just plug into a 10baseT connection, and attach the modems. These servers were controlled and configured by a Web browser. I was overwhelmed with the level of configuration and amount of data available. What's more is that this unit could be held in my palm.

This is when I realized the benefits of having broadcast gear operate the same way. Imagine a facility remote control with an RJ-45 connector that you plug into the network. Secure configurations, status readings and data displays are all accessible in real time from anywhere on the network or around the world via Web browser.

What about audio processing? Will your next processor

have an RJ-45 connector for direct connection to the network, giving

systems or HVAC systems. With built-in Web servers, full data and configuration is available via Web browser.

This is possible with a dedicated facilities remote control. Gentner has an IP module included with the GSC-3000 remote control. The GSC-3000 Network Module operates on a computer attached to a GSC-3000, allowing the system to talk over IP for sharing of the system data and control. It allows multiple connections at the same time, transmits alarms to system users and can block unauthorized access to the system by allowing or disallowing certain IP addresses or subnets. It's this kind of preparatory planning that will be included in future broadcast equipment designs. Audio processing control by modem has been available for some time, but IP offers the added advantage of speed, which displays better real-time data and allows for constant connections without tying up phone lines.

Omnia offers IP control of the Omnia 6 with an RJ-45 jack on the back of the unit. The Omnia 3 is capable of network-enabled remote control with an optional upgrade

kit, which converts the unit from control via the normal serial port into LAN/WAN or Internet control via a 10baseT Ethernet port. Both units use Windows client applications for the user interface.

Orban also offers full control over IP with the Optimod 8400. The 8400 offers TCP/IP networkability and the traditional dial-up PC Remote control. A rear panel slot will accommodate a modem or Ethernet network card.

The software allows you to control virtually everything available on the front panel.

The remote management software for these products also allows you to load and save presets, and to share custom presets between various units. Imagine fast setups and changes from anywhere—especially where your favorite reference speakers are. This allows the same setting to be shared between two or more units. The backup processor can have identical settings to the main unit.

IT and telco

Telos includes IP-based control and setup of its latest phone systems. System setup of functions such as line rollovers, line/set assignments, call screening and inter-studio communication can be done easily. The system communicates directly with an ISDN PRI service to provide up to 120 incoming call circuits, which can be dynamically allocated across 32 separate studios. In this application, control over IP is the most logical management solution.

1000W Amplifier	1000W Amplifier	1000W Amplifier Encoder	Checklist
Type	81.00	81.00	
Date	81.00.0000	81.00.0000	
Name	0.0000	0.0000	
Software version	0.00	0.00	7.0.04
Output power	1.00	1.00	1.0000 (+20%) Power stability: 0.00
Temperature	1.00	1.00	0.00
Voltage	1.00	1.00	1.00
Current	1.00	1.00	1.00
RF output	0.00	0.00	0.00
RF available power	0.00	0.00	0.00
Programmed value	0.00	0.00	0.00
Measured value	0.00	0.00	0.00

Equipment status and control over IP turns a Web browser into an equipment control interface.

100W Amplifier	Parameters	Checklist
Type	81.00	
Date	81.00.0000	
Name	0.0000	
Software version	0.00	7.0.04
Output power	1.00	1.0000 (+20%)
Temperature	1.00	1.00
Voltage	1.00	1.00
Current	1.00	1.0000 (+20%)
RF output	0.00	0.00
RF available power	0.00	0.00
Programmed value	0.00	0.00
Measured value	0.00	0.00
RF output	0.00	0.00
Programmed value	0.00	0.00
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RF output	0.00	0.00
Programmed value	0.00	0.00
Measured value	0.00	0.00
RF output	0.00	0.00
Programmed value	0.00	0.00
Measured value	0.00	0.00
RF output	0.00	0.00
Programmed value	0.00	0.00
Measured value	0.00	0.00

fast and complete control

real-time display of the settings? The ability to control processing by modem has existed for some time, but taking it to the level of control of a secure Web browser from anywhere could make it very convenient.

The technology exists that allows you to sit at your desk and monitor all your major systems from one screen. This is common in the IT industry with server monitoring and control, and broadcast is following. Transmitter remote controls, computer systems, audio processing, telephone systems and physical plant services are all available, with full control a click away on the same screen.

Device control

Aztec Radiomedia has a line of products designed to control transmitters, exciters and monitor audio processing as well as monitor and control multiple RS-232 and parallel devices from anywhere in the world, using any browser or Telnet client. The same products can be used to control and monitor other devices and even security



Drive this...

Just as a car needs a reliable driver, so does every radio broadcast transmitter. The Crown FM series exciters, drivers and low power transmitters offer reliability unsurpassed throughout the world. Incorporating standard features as an integral part of all power levels, the quality in workmanship standard is consistent for all of Crown Broadcast products.

The exciter/driver model offers high reliability as an RF driver while maintaining the audio purity associated with FM broadcasting today. The internal low pass filter allows the exciter to be placed directly on-air in the event of a main transmitter failure.

Crown transmitters are stand alone low power units and can be configured with optional stereo generator and audio processor. Thousands of broadcasters around the world have come to appreciate the rugged, reliability of the Crown Broadcast line of transmitters.

So when making your decision on a new exciter, RF driver or low power transmitter, reliability should be at the top of your list. Crown Broadcast builds reliable transmitters from 1 watt to 2 kilowatts.

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E casting

Another use that many have discovered for control over IP is computer, workstations and server control. Remote software such as pcAnywhere, Timbuktu or NetOp is commonly used. These software packages can often save a trip to the station during off-hours to reset mission-critical computer systems. We control servers and voice-track for our 24-hour jazz network via one of these packages. With T1 circuits, access to the remote systems is fast and easy. We voicetrack, maintain and administer the database over the IP connection.

As an IT manager, I have learned that installing remote software on machines can also help solve problems when a user has a specific question or concern. Being able to look over the shoulder of a user to figure out problems from home or on the road has saved a great deal of time at our station. Many people are aware of pcAnywhere for controlling computers remotely. While pcAnywhere is good for control between PCs, there are other remote control software products that offer the advantage of being cross-platform, so a PC can remote control a Mac, or a Mac can control a PC, or a PC can run OS/2. For a cross-platform shop, the ability to go in any direction with computer control and support is an important advantage.

AT&T is developing another level of this with Virtual

Network Computing. In VNC, cross communication between any platform is easy and fast. This adds the UNIX platform in cross-platform control between UNIX flavors, PCs with Windows and Macintosh. While a preferred method of UNIX users has always been to telnet to UNIX via a command line, this offers the ability to control UNIX, X Windows or Solaris from any other platform. There are other

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NetOp
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AT&T
www.uk.research.att.com/vnc

advantages to this system as well: the applications are small (the PC version will fit and run on a floppy disk), and they're free. VNC can be downloaded from the AT&T website.

The lines between computer and broadcast equipment have been blurred for some time. It's exciting that manufacturers are building the products or devising retrofit methods for existing products. Using this technology for remote control in all the ways discussed is becoming more of a necessity as we become more dependent on the technology and still want to have some time off. As for me, I think these are some of the most exciting developments in my 30 years in the business.

Chuck Leavens is director of engineering and IT management for WDUQ-FM Duquesne University, Pittsburgh.



FM-10S

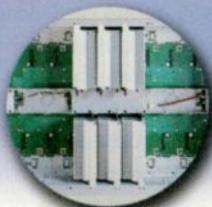
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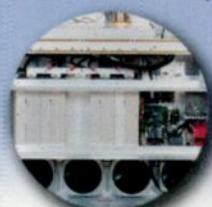
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Antenna basics

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

The author Gertrude Stein once said “a rose is a rose, is a rose is a rose.” Maybe “an antenna is an antenna, is an antenna” also applies, but an AM antenna is not an FM antenna. Their requirements are very different.

AM antenna requirements are almost the opposite of FM requirements. AM coverage is based on groundwave propagation. Hence, ground conductivity is far more important to an AM antenna than actual height above ground. On the other hand, successful FM transmission is dependent on

antenna height above ground, or line-of-sight. The antenna height above the average elevation of the ground surrounding the antenna is of particular importance.

Most AM transmissions rely on groundwave signals to maintain coverage. Only a relatively few clear channel stations produce a useful skywave signal that is protected by the FCC's Rules. There is a daily change in AM signals caused by reduction of power at night to avoid interference and interference caused by skywaves that return to earth only at night. But FM signals do not normally suffer from similar diurnal changes, and once in place, an FM signal is usually constant within its service contour. Nevertheless, FM signals can also be affected by unusual weather conditions such as *ducting* and sporadic e-layer conditions.

receiving antenna. This is a figure originally taken from the height of an average two-story house with an outdoor antenna. Soil conductivity and vegetation can have considerable effect on FM reception. The result of lowering the receiving antenna to a few feet above ground is a loss of around 6 or 7dB, some of which is caused by soil effect.

In AM operation, the signal is *vertically polarized* (Vpol). FM signals were originally *horizontally polarized* (Hpol), but now, *circular polarization* (Cpol) is used almost exclusively. Sometimes, the signal separation provided by vertical versus horizontal polarization is used to prevent interference between NCE stations. This is especially useful in the educational FM band when interference is often experienced on TV channel 6, and the interfering NCE station can obtain an extra 6dB of interference reduction by using vertical polarization.

Vpol does not necessarily improve or increase coverage, but it generally tends to produce better FM reception on automobile radios. Vertical antennas and windshield antennas take advantage of the vertical component; although the polarization is generally quite mixed by the time the signal has traversed many different reflecting surfaces. As a matter of fact, elliptical polarization is often preferred to Cpol.

There are two schools of thought regarding the efficacy of Cpol. It was originally tried in the western mountainous country, and the deep canyons of Chicago. First reports were quite glowing—provided that Cpol receiving antennas were used; now it seems that opinions are varied. Unfortunately, Cpol receiving antennas are seldom used. The vertical signal portion of Cpol is sometimes blamed for excessive multipath interference. The term *picket fencing* is sometimes applied to this phenomenon.

There are several other problems associated with finding a good FM transmitter antenna location. These include *fresnel zone* clearance, in which mid-path clearance can affect reception. In flat regions, the midpath beam radius can have considerable effect on the received signal. Ground reflections and grazing angle effects can produce varying Vpol and Hpol signal attenuation. Signal depolarization is caused by scattering, refracting and reflecting surfaces. Additionally, vegetation losses increase attenuation. At times, it seems a miracle that any signal gets anywhere.

AM differences

The whole of a massive AM tower is used as the radiator. The FM antenna is a comparatively small device mounted on the top or side of a tall tower. Provided that proper isolation is used, this tower may also be used as an AM



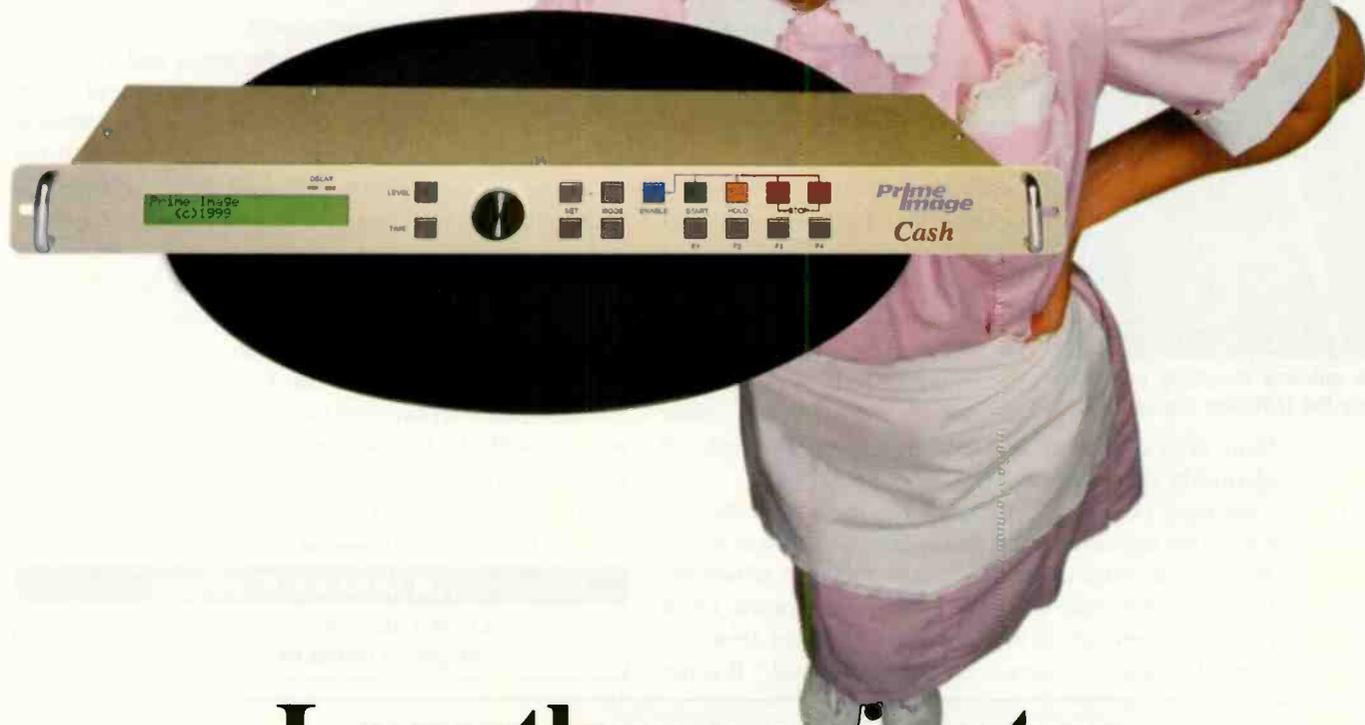
The tower itself is the RF radiator in AM applications.

Polarization

Radio waves are similar to light waves in that they cannot be bent around a radius. However, they can be caused to navigate a bend or made to change direction by refraction in the atmosphere, or even by a phenomenon called *knife edge refraction*. The latter can cause unexpected interference and unusual long distance reception.

As a result of these radio-wave characteristics, FM relies on line-of-sight transmission for station coverage. Service contour location calculations (0.5mV/m or 1mV/m) are based on the height above average terrain of the transmitting antenna and the height of the receiving antenna above ground. FCC Rules assume a height of 30 feet for the

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RF Engineering

radiator if desired, while supporting the FM antenna.

Apart from the radiation requirements of FM, it is the difference in frequency that makes the FM antenna so convenient to build, install and adjust to a desired pattern. In AM, a single wavelength is 984 feet for a 1MHz signal. In FM, one wavelength is about 12 feet. Thus, the popular quarter-wave antenna often used for AM might be 246 feet high, and the FM antenna elements would be only around

three or six feet long, depending on the antenna design.

Directional AM stations require large ground areas to mount two or more antennas to produce the desired directional pattern. On the other hand, FM antenna systems require a single tower to mount any reasonable number of FM radiators. Generally the desired radiation pattern can be obtained using one FM antenna unit, and additional similar units are stacked to obtain antenna gain.

Remember that, as the antenna gain figure is increased by adding bays, the radiated beam is narrowed considerably, and with very high gain antennas, it is possible to beam the signal over closer-in receivers. To overcome this, either

beam tilt or null fill can be used. Beam tilt can be produced electrically or mechanically.

Electrical beam tilt is accomplished by advancing current in the upper bays and reducing it in the lower levels. Mechanical beam tilt produces a problem in which the beam on the side opposite to the downward tilt is projected upwards as the antenna is moved from the vertical. Still more listeners are lost on that side. It is not

often used intentionally. Null fill is produced by introducing sufficient power to fill the elevation nulls produced by high-gain multiple bays.

It is important to realize that the average FM transmitting antenna is basically non-directional. It is the method of installing the antenna on a support that distorts the pattern and can make it quasi-directional. Examination of the vertical and horizontal radiation patterns of an antenna mounted on a tower generally shows an appreciable difference between the Hpol and Vpol coverage. Engineers usually take advantage of this distortion by mounting the antenna to obtain the best coverage of desired areas and to dedicate Vpol coverage of heavily traveled roads serving auto receivers.

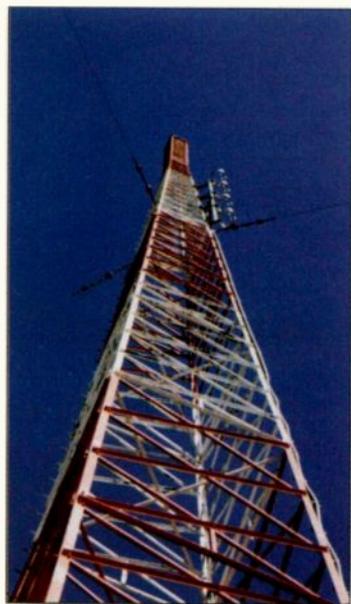
These differences in radiation patterns are produced by the presence of the tower itself. These effects vary depending on where the antenna is mounted—on the leg or the face of a tower, as well as the size of the tower and the actual construction and spacing between the antenna and tower. In cases of severe Vpol distortion, vertical parasitic elements are installed to correct the pattern and restore it to better circularity. In my opinion, the best basic circularity is obtained from a pole-mounted antenna on top of a tower or from panel antennas mounted on all sides of the tower.

When a directional pattern is required, the effects of antenna location on the tower, the mounting method and the tower itself are considered in the pattern design. The final pattern is measured on an antenna range. The manufacturer's report then forms the proof that the FCC requires with the license application. This is very different from an AM DA, where the consulting engineer performs the proof and submits the data.

E-mail John at: batcom@bright.net.

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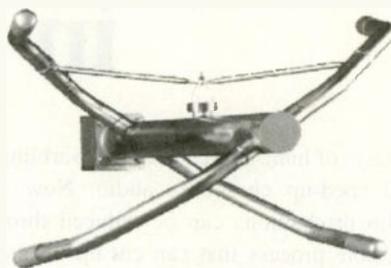
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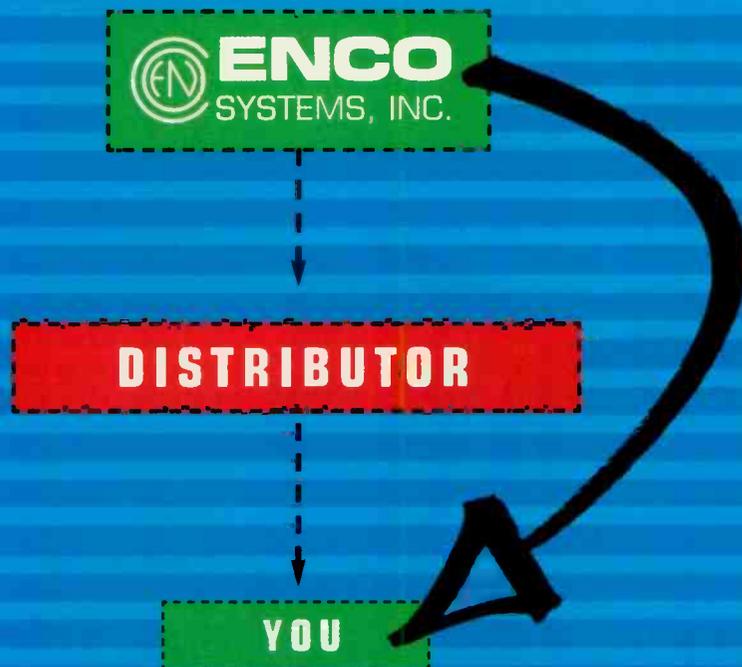
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Building an intranet

By Kevin McNamara, CNE

Most stations are using the Web as a means to communicate with listeners and as a means to extend marketing efforts. Many companies are using Web technology to communicate with employees through an *intranet*. What is an intranet? It is a website that is only accessible to users within the company. The addition of an intranet can provide a wealth of information to employees, while creating significant savings for the company.



Almost any PC with a reasonable processor speed can be used as Linux Web server.

Building an intranet

Intranets are accessed using a Web browser. Assuming there is a PC-based network in place and your employees are connected to it, you have most of the basic equipment. The key component of an intranet is a PC configured as a *Web server*. The tricky part is determining how much information you want to provide and how many users will need access to it. Let's consider a few fundamental issues in selecting and configuring a server.

A fully functional Web server can be implemented using any of the classic network operating systems, such as Unix (or Linux), Windows NT or Sun. Each of these has merits; however, unless you have a large budget or corporate mandate, the Linux operating system is probably the best choice in terms of price, power and scalability. Another advantage is that Linux will operate on virtually any PC platform from a 386 or higher. From a performance standpoint, I advise using a PC with a Pentium 2 or higher CPU, at least 128MB of RAM and as much disk space as possible. Once the Linux operating

system is properly loaded and configured, load the Web server software. The most popular Web server software is called Apache and, like Linux, is available as a free download. There are numerous websites that deal with both Linux and Apache and will take you step-by-step through the setup process. These programs can also be purchased as boxed versions containing *wizards* that automate the installation.

The PC selected for this application will also require the installation of a *network interface card* (NIC) compatible with your network infrastructure. Assuming you are using an Ethernet network, a simple 100baseT NIC would work; however, some networks use a hybrid design typically consisting of a Token Ring backbone (copper or fiber) connecting multiple servers that are tied (through a router) to one or more Ethernet segments. In this situation, I advise attaching the Web server to the ring backbone.

IP addressing

The subject of IP addressing is somewhat complex and the subject of many textbooks; however, you should know some basic information. An IP address is a unique identifier for a device attached to a TCP/IP network. In the setup, establish a fixed (or static) IP address and name for the Web server. Like telephone numbers, IP addresses (as opposed to domain names) used on the Internet are assigned and registered to individual and corporate users by The Internet Corporation for Assigned Names and Numbers (ICANN); however, a block of IP addresses (192.168.0.0 to 192.168.255.255) are reserved for assignment to private networks *not* connected to the Internet. Generally, these IP addresses are assigned to local network equipment. LANs with a direct connection to an Internet gateway may have one or more assigned IP address, however the local devices attached to the network will still be given addresses from the reserved block. A router is placed between the Internet gateway termination and local network server in order to properly form a connection between the Internet and each individual workstation.

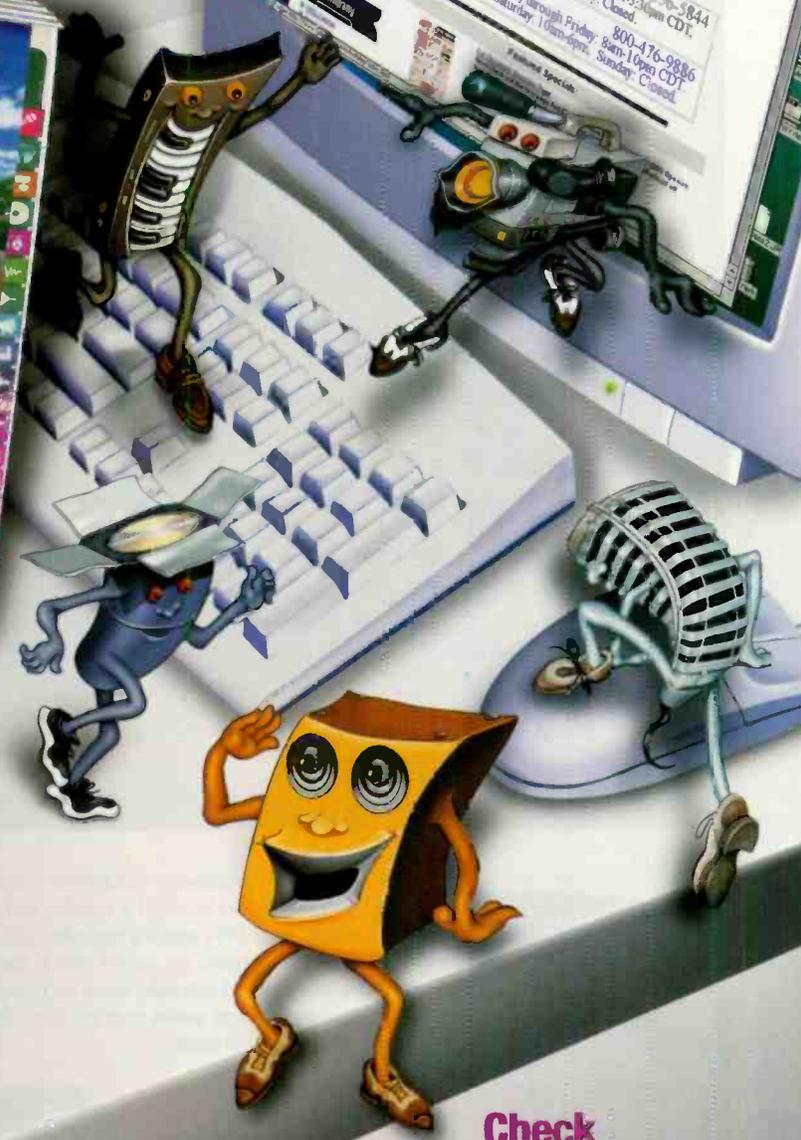
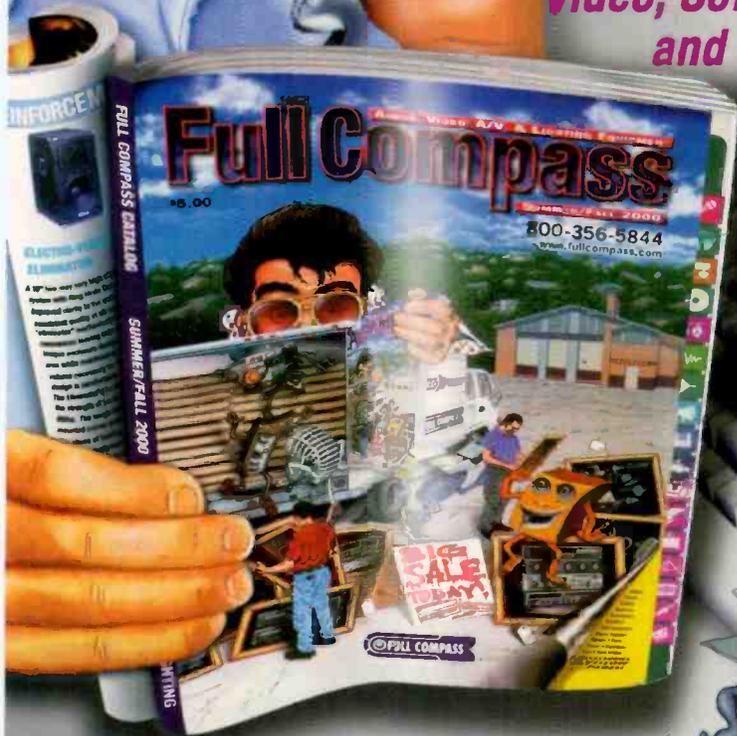
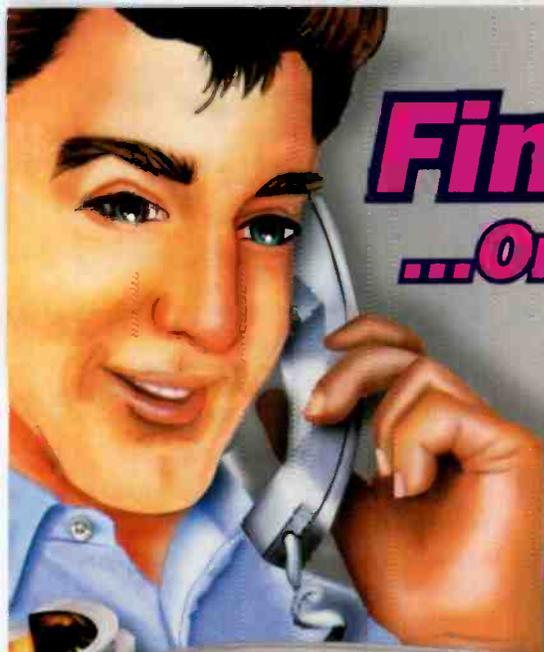
For most applications, an intranet Web server should be attached on the "local network" side of a router so that traffic to/from the server stays "in the house."

Intranet content

The purpose of an intranet is to provide a convenient method for employees to find a variety of information related to the business, such as:

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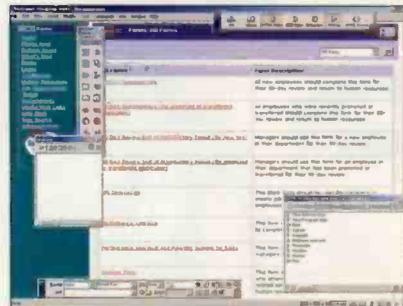
Interactive Communications. Company events, sales and ratings info.

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Perhaps the primary advantage of a

well-implemented intranet is a cumulative cost savings. For example, if an employee needs certain health benefits information, she could find everything necessary on the intranet, thus saving time otherwise spent with the benefits coordinator. Any tool that reduces time spent on a particular task creates savings. If 100 employees save 10 minutes per day, it would equate to 1,000 total minutes per day of time saved.



Intranet pages can be created with graphic HTML editors such as Dreamweaver.

Creating the site

Like the Internet, intranet sites are viewed using a browser and content can be created using HTML, Flash, Java, ActiveX or any other Web development environment. Programs such as FrontPage, Go Live and Dreamweaver make the process of site creation easier. Most current office applications provide a means to save documents in the HTML format, which makes it easy to add and update the site as needed. Older documents, or those that do not exist as files, can be scanned and saved as a PDF file using Adobe Acrobat. If controlling access to certain areas of the intranet is an issue, pages can be password protected as necessary.

The most crucial part of deploying a successful intranet is making employees aware that the site exists and that it is a relevant source of information. Gaining access to your intranet is as simple as pointing a Web browser to the IP address of the intranet server. Creating a shortcut to the site on each desktop can make it easy to access; better yet, set the default homepage for each browser to the intranet site.

Intranets are proven to increase the efficiency of communications within a company, providing steps are taken to create a site that is easy to use, content rich and a source of up-to-date information.

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

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The Newsletter For the Broadcast Industry

EEO rules invalidated

By Harry Martin

In a unanimous decision, the United States Court of Appeals for the District of Columbia Circuit vacated the EEO rules that became effective in April 2000. While the Commission could appeal the Court's decision, that is unlikely given Chairman William Kennard's departure and his replacement by Republican Chairman Michael Powell. However, it is expected that the public interest groups that participated in the court case will appeal, even if the Commission does not do so. This could delay final dismantling of the EEO rules, which technically remain in effect until the Court's decision is final. Nevertheless, on January 31, the FCC announced the suspension of all EEO reporting and filing requirements until further notice.

The Court found that the rules were unconstitutional because they were not narrowly tailored to further a compelling governmental interest in preventing discrimination. Focusing on Option B of the Commission's rules, the Court concluded that the Commission's requirements pressured broadcasters to focus recruiting efforts on minorities and women in order to induce more applicants from those groups. In this connection, the Court noted that the FCC had clearly indicated it would investigate any licensee that reported few or no employment applications from minorities or women. The requirement in Option B that licensees report the race of each applicant would be relevant to the prevention of discrimination, the Court said, only if the FCC were to assume that minority groups would respond to non-discriminatory recruitment efforts in some predetermined ratio, such as in proportion to their percentage representation in the local work force. Any such assumption, it was found, stands in direct opposition to the guarantee of equal protection under the constitution.

Efforts to promote minority participation in the media are now expected in Congress, where various groups have been seeking the reinstatement of the tax certificate program. Under the previous tax certificate program, companies that sold their stations to minority-controlled entities were eligible to defer payment of capital gain taxes. In a statement released just before his departure, outgoing Chairman Kennard urged Congress to increase funding for the Telecommunications Development Fund, which provides capital for small minority- and female-owned businesses.

New Chairman in Place

Effective January 23, Michael Powell, the son of Secretary of State Colin Powell, became Chairman of the FCC. Powell has served on the FCC since 1998 when he was nominated by President Clinton to fill a Republican vacancy. Powell, a lawyer, previously worked at the Department of Justice and in private practice. He is a graduate of William and Mary College and Georgetown University Law School.

Kennard resigned effective January 19, 2001, the day before President Bush's inauguration. The other incumbent commissioners are Gloria Tristani and Susan Ness, both Democrats, and Harold Furchtgott-Roth, a Republican. President Bush is expected to appoint another Republican commissioner within the next few months, and replacements for Ness and Furchtgott-Roth, whose terms have expired, may be confirmed by this summer.

The change in administration at the FCC may bring benefits to radio broadcasters. As indicated above, it is unlikely the new Commission will appeal the invalidation of the agency's EEO rules, which were developed under the guidance of Chairman Bill Kennard. Further, the previous administration's efforts to tighten up on the local ownership rules is not likely to be a priority. Indeed, in the pending market definition rulemaking proceeding, then-Commissioner Powell issued a statement saying the Commission should not attempt to restrict local ownership to any extent beyond the limits included in the statutory scheme. (In its market-definition rulemaking notice, the FCC proposed the use of narrow Arbitron-defined market boundaries instead of the broader signal overlap standard now used. This would make it harder for an owner to buy more stations in a market. Powell is on record as opposing this stricter standard.) However, it is still anticipated that some technical changes in the rules will be made to align the current definition of radio market with the methodology used to count the number of stations an owner may have in a market.

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

Dateline

Radio stations in the following states must file their biennial ownership reports on or before April 1, 2001: Delaware, Indiana, Kentucky, Pennsylvania, Tennessee and Texas

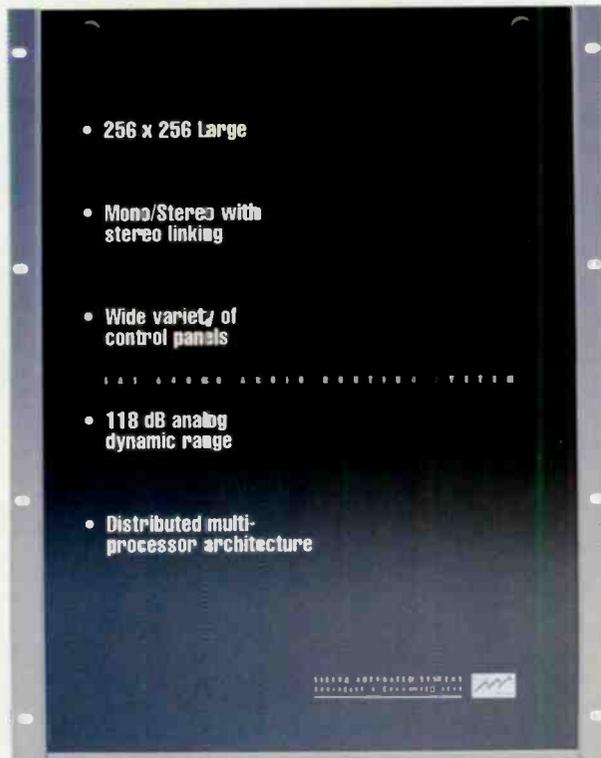
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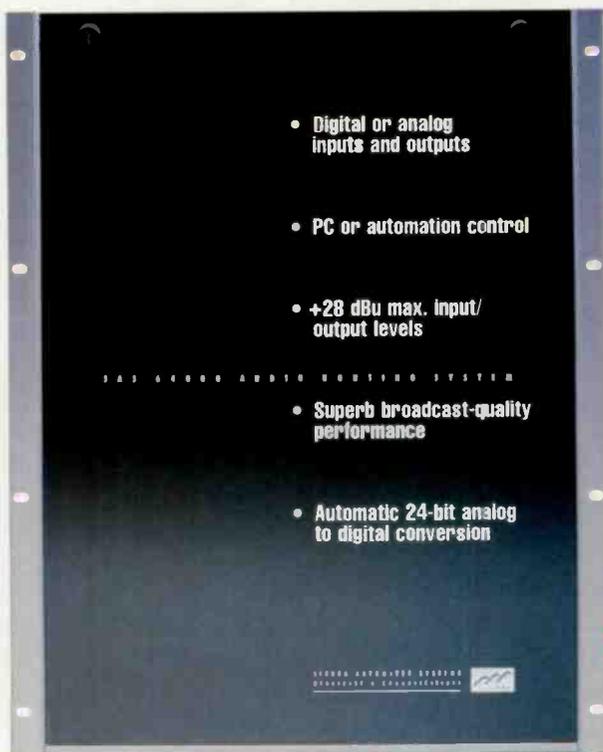


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Audio Accessories

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Walters-Storyk	i5963
LPB	i6129
RealNetworks	i6726
Otari	L 377
Hafler Professional	L 771
Lucent Technologies	L 941
Switchcraft	L 4403
beyerdynamic	L 4405
ATI	L 4414
Audio Accessories	L 4428
Whirlwind	L 4645
Harris	L 5023
Acoustical Solutions	L 6218
Panasonic	L 7020
Acoustic Systems	L 7777
Leitch	L 8720

Telex Communications	L 8763
Prime Image	L10382
Sony Electronics	L11600
Opamp Labs	L11671
Dorrough Electronic	L11677
Mohawk/CDT	L12177
Clark Wire & Cable	L12580
Gefen Inc	M 9339
JBL Professional	M 9353
Mackie Designs	M10142
WhisperRoom	M10451
Benchmark	R1752
illbruck/Sonex Acoustical Div	R1756
Eventide	R1917
Circuitwerkes	R1846, R1915
Acoustics First	R1856
AEQ	R1863
RCS	R1925, i5946, L 429
Joemeek	R1930

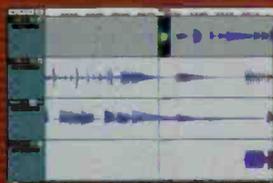
Inevonics	R1953
Genelec Oy	R1969, M 9571
AudioScience	R1983
QEI	R2035
Industrial Acoustics	R2047

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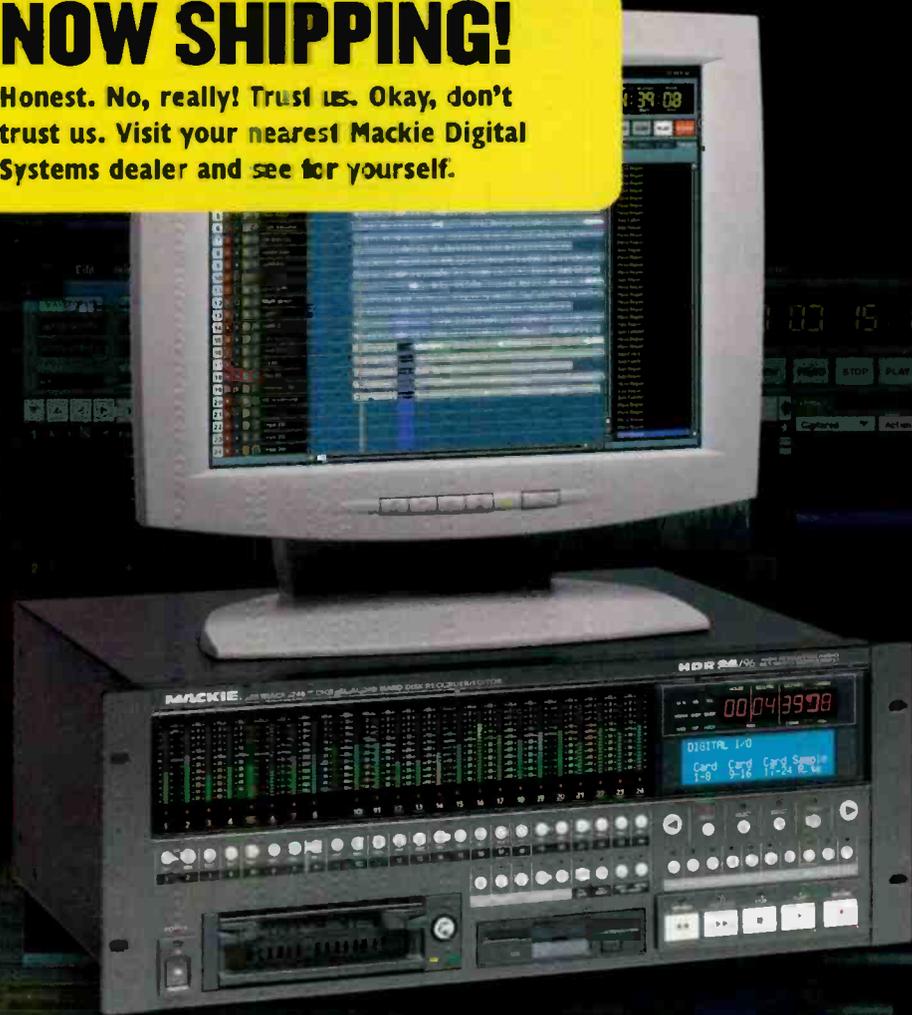
Find more information on the NAB website:
www.nab.org/conventions/nab2001

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Coming soon: extended EQ processing and editing functions.

- Built-in 20-gig Ultra-DMA hard disk plus front panel bay for additional easily available pullout drives
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- Remotes available.

- 24 tracks...24-bits
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- Affordable pull-out media
- Built-in SVGA, mouse & keyboard ports
- Built-in 100BaseT Ethernet

New hard disk recorders are popping up all over the place.

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NAB FAST TRACK 2001

HHB	R2053
TC Electronic	R2101, M 9639
TFT	R2109
Ward-Beck	R2124
Studer	R2125
AKG	R2125, E5606
Neutrik	R2130, L11636

Henry Engineering	R2132
TASCAM/Teac Professional	R2141
Logitek	R2147
Symetrix	R2153, M 9338
Lucid Technology	R2153, M 9338
Gorman-Redlich	R2200
Wheatstone	R2205
Sennheiser Electronics	R2253
Yamaha	R2275
Broadcast Richardson	R2325
Solid State Logic	R2515
RAM Broadcast Systems	R2600
Audio-Technica	R2647

Arrakis	R2733
Lectrosonics	R2747
AETA Audio	R2752
Aztec Radiomedia	R2773
Digigram	R2773
Wohler	R2925, L 6049
Musicam USA	R2935
Sonifex Ltd	R3001
Audio Processing Technology	R3015
Audemat	R3035
Independent Audio/Sonifex	R3102
Armstrong Transmitter	R3115
TGI North America Inc/Fastforms	R3126
RDL (Radio Design Labs)	R3141, L 4955
Martinsound	R3224
Miller & Kreisel	S2546
Audio Toys	TI659

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LPB	i6129
Broadcast Technology	L 1555
Harris	L 5023
Radiomax/Intermax	R1758
AEQ	R1863
Radio Systems	R1935
Inovonics	R1953
Orban	R2015, i6226
Circuit Research Labs	R2015, i6226
Aphex Systems	R2034
AEV	R2063
IDT Image Developpement	R2069
TC Electronic	R2101, M 9639
Ward-Beck	R2124
Studer	R2125
TASCAM/Teac Professional	R2141
Logitek	R2147
Audioarts Engineering	R2205
Auditronics	R2205
Wheatstone	R2205
Omnia	R2263
RAM Broadcast Systems	R2600
Arrakis	R2733
Autogram	R2915
Klotz Digital	R2963, M 9071
Independent Audio/Sonifex	R3102
Audio Toys	T1659

Audio Mixers • Portable •

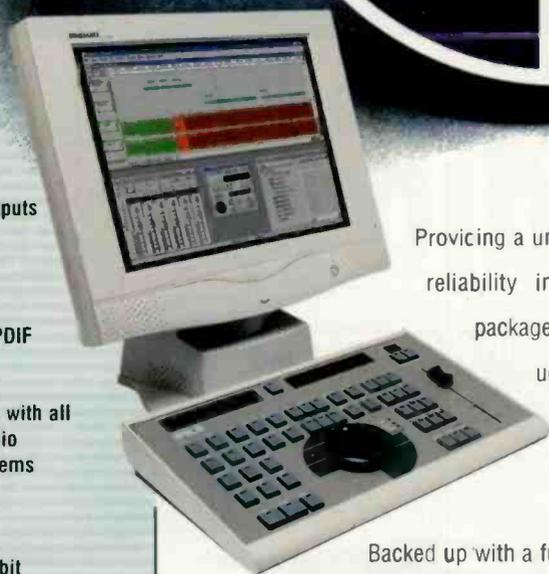
ATI	L 4414
Shure	L 4614
Zaxcom	L 6473
Mackie Designs	M1C142
Audio Developments	R1753
JK Audio	R1833
Studer	R2125

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AETA Audio	R2752
Audio Toys	T1659

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• Studio, Recording •

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Graham-Patten	L 955
ATI	L 4414
Shure	L 4614
Whirlwind	L 4645
Harris	L 5023
Panasonic	L 7020
Zaxcom	L 8473
Telex Communications	L 8763
Sony Electronics	L11600
Mackie Designs	M10142
AMEK US	R1629
Audio Developments	R1753
Radiomax/Intermax	R1758
AEQ	R1863

TC Electronic	R2101, M 9639
Ward-Beck	R2124
Studer	R2125
TASCAM/Teac Professional	R2141
Logitek	R2147
Symetrix	R2153, M 9338
Auditronics	R2205
Wheatstone	R2205
Audioarts Engineering	R2205
Sennheiser Electronics	R2253
Yamaha	R2275
Solid State Logic	R2515
Calrec Audio Ltd	R2569
Harrison by GLW	R2641
Audio-Technica	R2647
Arrakis	R2733
Klotz Digital	R2963, M 9071
Martinsound	R3224
Audio Toys	T1659

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DigiDesign	i7221
Shure	L 4614
FM Systems	L 4650
Prime Image	L10382
Gefen Inc	M 9339
Eventide	R1817

Joemeek	R1930
Circuit Research Labs	R2015, i6226
Orban	R2015, i6226
Aphex Systems	R2034
HNB	R2053
TC Electronic	R2101, M 9639
Symetrix	R2153, M 9338
Omnia	R2263
Dan Dugan Sound Design	R3021
SADiE	R3175
Audio Toys	T1659

Automation Systems
• Radio •

LPB	i6129
ScheduALL by VisuAll	i6746
Sony Electronics	L11600
Management Data Media Systems ..	L12234
Fairlight USA	R1616
RCS	R1925, I5946, L 429
Dalet Digital Media	R1941, i5849
Register Data Systems	R2005
Prophet Systems	R2115
On Air Digital USA	R2148
Broadcast Electronics	R2505, i6126
Cartworks/dbm Systems	R2603
Computer Concepts	R2633

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Modulux is the #1 selling furniture system



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The Modulux Flex-Studio is a complete modular studio package that can be configured in dozens of different ways to meet nearly any studio design. It can be assembled left or right handed as well as in all of our standard configurations: Short L, Long L, and Unbalanced U. Far superior to custom cabinetry, Modulux engineered studio systems are precision factory mass manufactured. Quality, strength, durability and appearance are all improved over custom built cabinets.

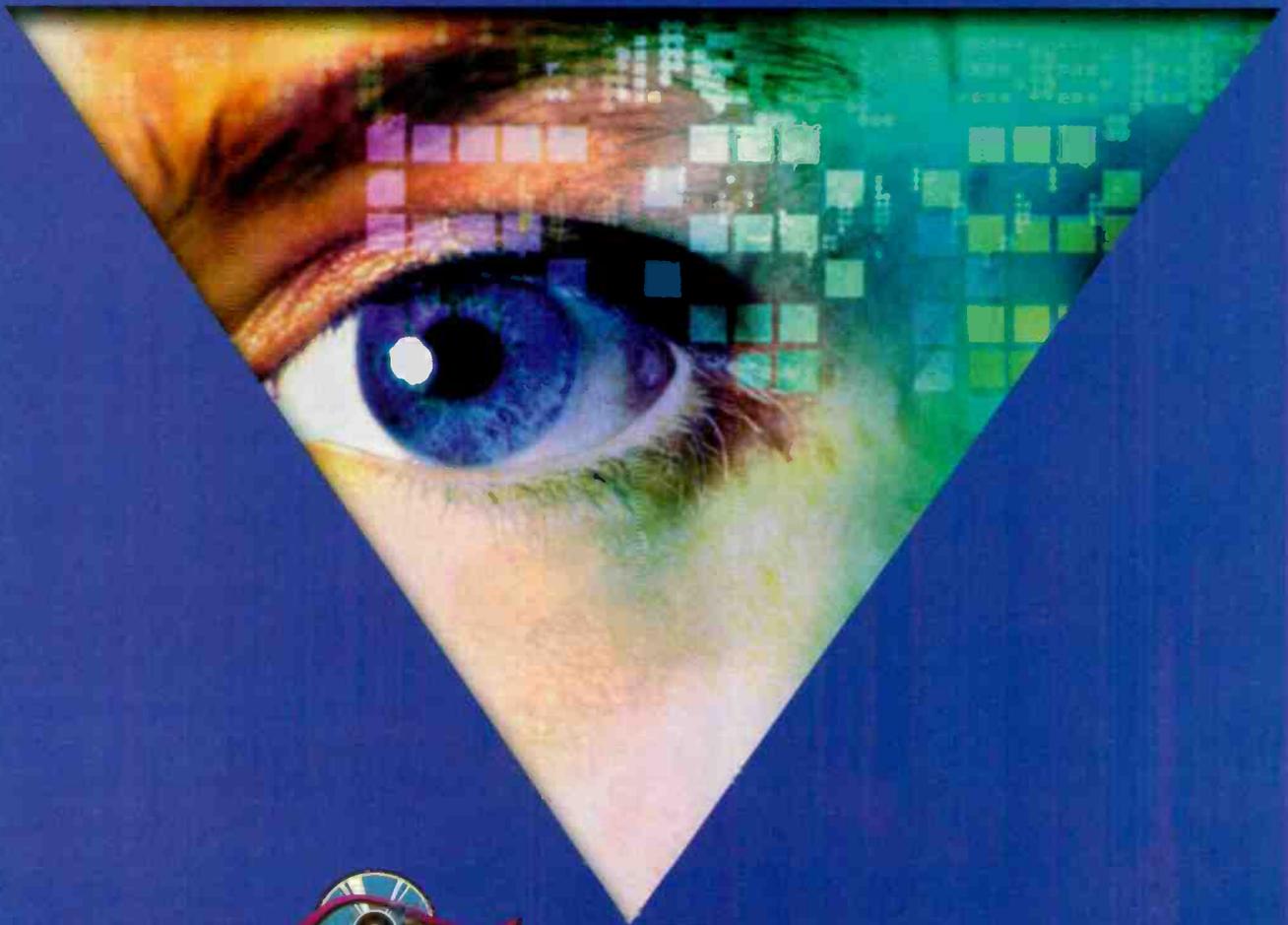


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Pristine Systems	R2701
Arrakis	R2733
Aztec Radiomedia	R2773
Scott Studios	R2905, L 4401
MediaTouch Systems	R2953
Netia Digital Audio	R2973
Smarts Broadcast Systems	R3024
ENCO Systems	R3041
Mediatron	R3149

Audio Recording, Storage & Playback

Sonic Foundry	i5867
Otari	L 377
Harris	L 5023
Nagra	L 5238
Zaxcom	L 8473
DRS Ahead Technology	L 9023
Sony Electronics	L11600
Fairlight USA	R1616
Eventide	R1817

HHB	R2053
Studer	R2125
Henry Engineering	R2132
TASCAM/Teac Professional	R2141
Broadcast Electronics	R2505, i6126
360 Systems	R2741
Aztec Radiomedia	R2773
Digigram	R2773
MediaTouch Systems	R2953
Sonifex Ltd	R3001
ENCO Systems	R3041
Independent Audio/Sonifex	R3102

Audio Routing & Distribution

Lighthouse Digital Systems	L 135
Otari	L 377
Graham-Patten	L 955
ATI	L 4414
Philips	L 5010
Harris	L 5023
Leitch	L 8720
Sony Electronics	L11600
Opamp Labs	L11671
Apogee Electronics	M 9340
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Benchmark	R1752

JK Audio	R1833
Sine Systems	R1915
Radio Systems	R1935
Antex Electronics	R2033
Prophet Systems	R2115
Ward-Beck	R2124
Studer	R2125
Henry Engineering	R2132
Logitek	R2147
Lucid Technology	R2153, M 9338
Wheatstone	R2205
Yamaha	R2275
Broadcast Electronics	R2505, i6126
RAM Broadcast Systems	R2600
dB Technologies/ Audio Intervisual ..	R2855
Wohler	R2925, L 6049
Klotz Digital	R2963, M 9071
Sonifex Ltd	R3001
Independent Audio/Sonifex	R3102
Sierra Automated Systems	R3105
RDL (Radio Design Labs)	R3141, L 4955
Martinsound	R3224

Computers & Peripherals

Soundscape	E2818
Waves	E2913
LPB	i6129

continued on page 40

We Found Your Digital Console Wish List

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We have a great selection of console control surfaces including the modular Numlx (shown here), our "traditional" ROC-5 and ROC-10 surfaces, and our Vmlx Virtual mixer. All control surfaces are powered by the Logitek Audio Engine, our DSP-based digital mixer / router. Call your Logitek dealer for more information, or visit our website at www.logitekaudio.com.



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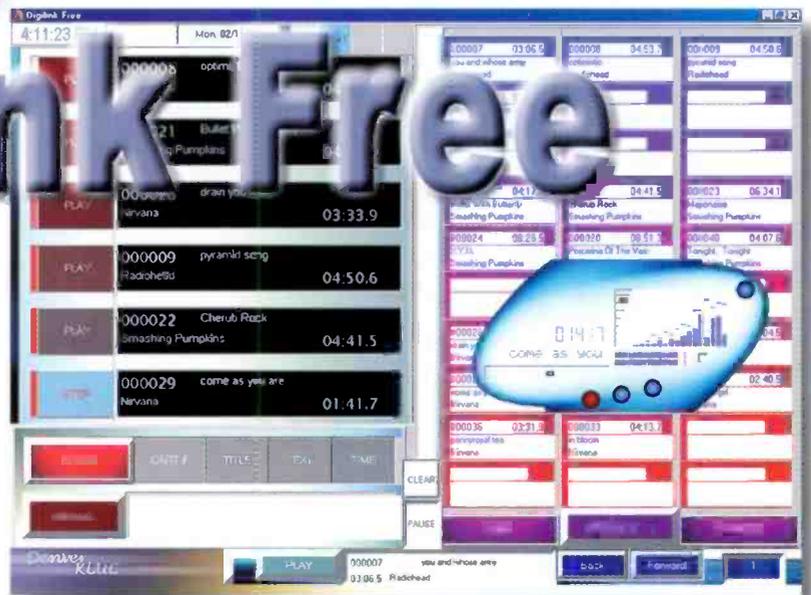
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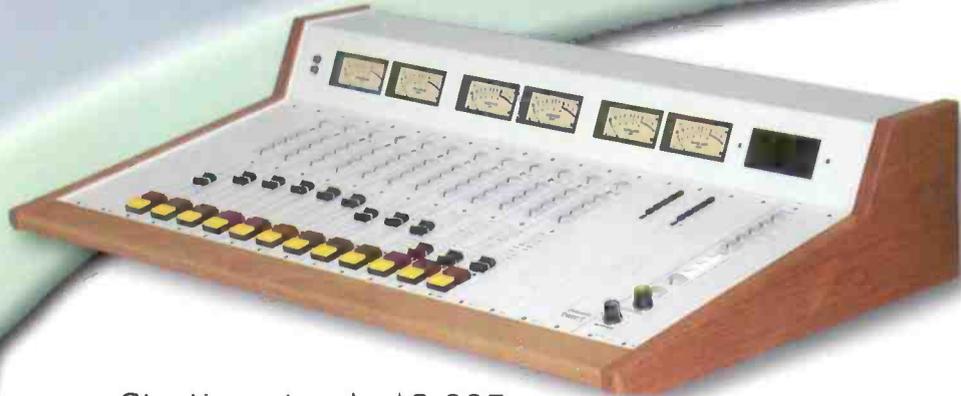


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Revolution Series Consoles



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- Both Analog & Digital Operation
- Console Control -or- PC Control Systems
- 12, 18, & 28 Channel Mainframes

The Revolution is the unparalleled radio console that is at home in both digital & analog studios. With a distinctive 2 piece modular design made up of a rack mounted digital audio engine & console control board, the Revolution has the greater features, reliability, performance & lower price that makes the competition obsolete.

1200 Series Consoles

- Ideal for On Air, Production, Talk & News
- High Performance Analog Design
- Fast & Easy Installation
- Starting at only \$2,295

The 1200 Series is a blend of thoughtful design, quality components & the culmination of more than 20 years of design & manufacture experience. With three model sizes, 5, 10, & 15 channels, the 1200 is ideal for large studio applications.



12,000 Series Consoles



- Starting at only \$4,350
- 8, 18, & 28 Channel Models
- Fully Modular Design for Greater Flexibility
- 3 Stereo Buses, Telephone Module Options

The 12,000 Series was designed with the advanced On Air & Production Studios of the 21st Century in mind. Modular, reliable, flexible & powerful, the 12,000 is found around the world from New York to Tokyo to Paris. The Arrakis 12,000 Series is perfect for any size market or any radio application.

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105 hours audio storage, 7 input play switcher, 7 input record switcher, DL4-AUTO software for On Air, DL4-SCHED for Production & Scheduling, & a Triple Play & Record DL4 Workstation, this powerful 2 studio system requires only 2 customer supplied PCs.



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- Radiused End Panels for Stylish Look
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The ARC Plus transmitter remote control system provides ultra fast response, more sites and an enhanced feature set. The unit is available in dial-up, full-time and multi-site configurations.

Also available is the ESI-ESP Spanish-language speech interface, which features fluent Spanish, and the ARC-16 ESP with displays in Spanish. Existing ARC-16s can be converted to the Spanish versions.



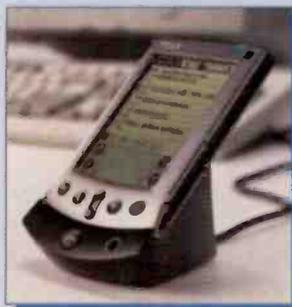
Dalet Digital Media

On-Air Now! takes advantage of the multimedia capabilities of the Internet by presenting synchronized text, audio, and video to webcast audiences. Complete song and artist info, album art and other information can be displayed.



TC Electronic

The D22 II is an enhanced version of the original D22 digital delay and offers up 2600ms on two channels with a maximum delay of 60 frames. It also features 24-bit A/D-D/A converters, and a compliment of digital I/Os including, AES/EBU, S/PDIF, and Wordclock BNC 75Ω. Programmable setups can be stored for total instant recall.



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Rorke Data	i6442
Intel	i6519
Masterclock	L 159
Philips	L 5010
Harris	L 5023
Panasonic	L 7020
Leitch	L 8720

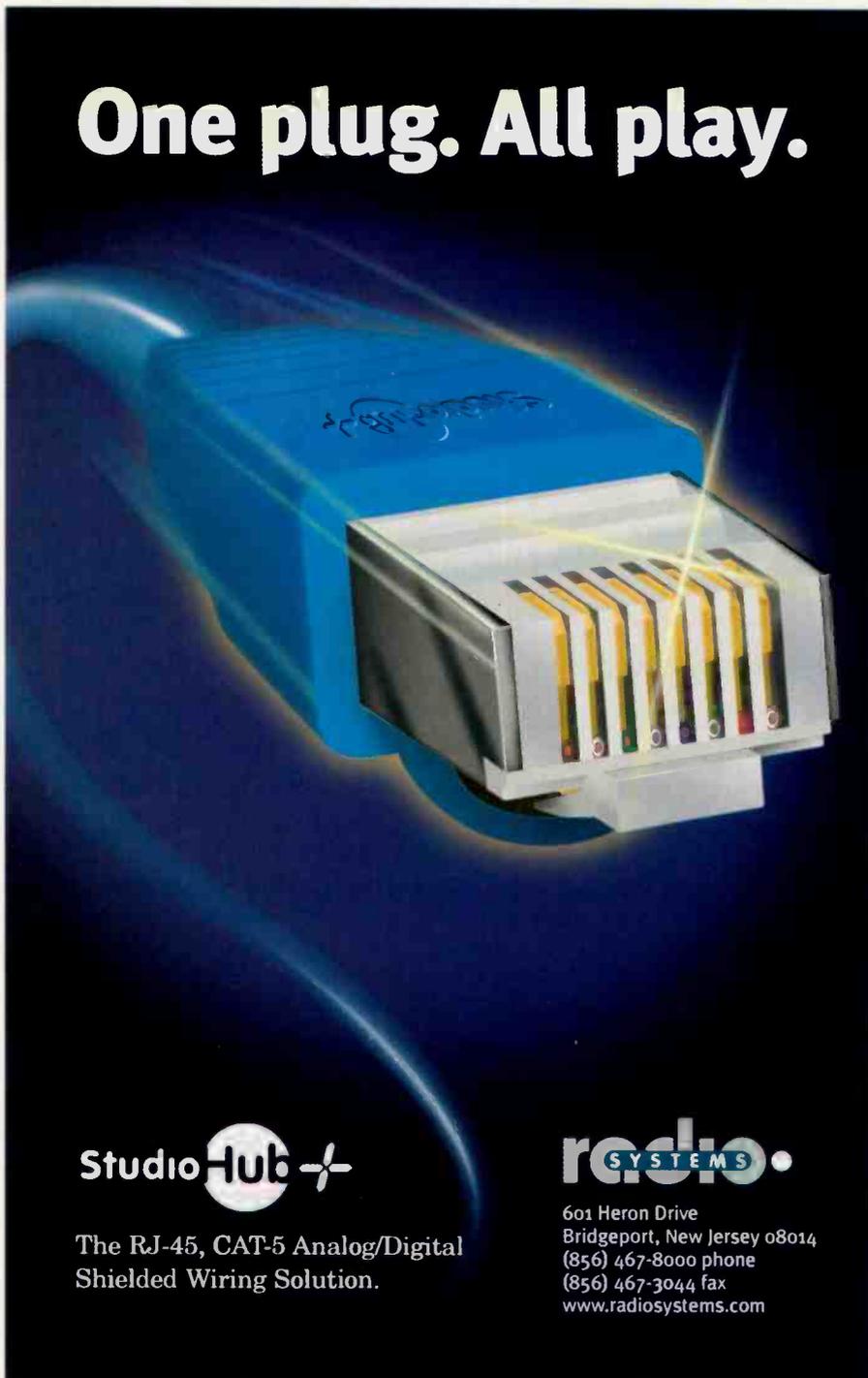
Telex Communications	L 8763
Tektronix Inc	L 9534
Compaq	M 7863
Gefen Inc	M 9339
Porter Case	M 9673
Radiomax/Intermax	R1758
RCS	R1925, i5946, L 429
Dalet Digital Media	R1941, i5849
AudioScience	R1983
Antex Electronics	R2033
Lucid Technology	R2153, M 9338
Aztec Radiomedia	R2773
Digigram	R2773

Scott Studios	R2905, L 4401
Musicam USA	R2935
Netia Digital Audio	R2973
Audio Processing Technology	R3015
ENCO Systems	R3041
Quantum	S3537

Digital Audio Workstations

Syntrillium Software	E2539
Soundscape	E2818
Sonic Foundry	i5867
DigiDesign	i7221
Otari	L 377
Avid	M 8318
Fairlight USA	R1616
Dalet Digital Media	R1941, i5849
Orban	R2015, i6226
Prophet Systems	R2115
Studer	R2125
TASCAM/Teac Professional	R2141
Yamaha	R2275
Solid State Logic	R2515
Pristine Systems	R2701
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Telex Communications	L 8763
Anchor Audio Communications/Portaco ..	L11869
JK Audio	R1833
Comrex	R2525
Sierra Automated Systems	R3105

Microphones & Accessories

Soundscape	E2818
Vega	E2829
Marshall Electronics	L 144, S3460
Otari	L 377
beyerdynamic	L 4405
Shure	L 4614
Harris	L 5023
Nady Systems	L 5033
Telex Communications	L 8763
Electrc-Voice	L 8763
Sony Electronics	L11600
Dorrrough Electronic	L11677
Rycote Microphone Windshields ..	R1653
Circuitwerkes	R1845, R1915
Joemeek	R1930
TC Electronic	R2131, M 9639

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4.

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5.

Purchase a 950 MHz RF STL. The channel allocation is free, and the money you save over a T1 STL goes straight to your bottom line.

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Moseley

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AKG	R2125, E5606
Neumann	R2253
Sennheiser Electronics	R2253
Omnia	R2263
Harrison by GLW	R2641
Audio-Technica	R2647
Lectrosonics	R2747
Sound Devices	R2900
Wohler	R2925, L 6049
Azden	R3047
Independent Audio/Sonifex	R3102
Schoeps/Posthorn Recordings	R3124
DPA Microphones	R3126
TGI North America Inc/Fastforms	R3126
Martinsound	R3224
The Hollywood Edge, Soundelux Micro	T 544

Microwave, Fiber Optic & Telco Equipment

SpotTaxi.com	E5035
Otari	L 377

Itelco USA Inc	L 1417
Superior Broadcast	L 1535
ATI	L 4414
Harris	L 5023
Microwave Radio Communications ...	L 6420
Andrew	L 9510, S2722
Tektronix Inc	L 9534
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DB Elettronica	R1641
JK Audio	R1833
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Energy-Onix	R1855
AEQ	R1863
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Dalet Digital Media	R1941, I5849
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QEI	R2035
Henry Engineering	R2132
Telos Systems	R2263
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Comrex	R2525
Moseley Associates	R2553
AETA Audio	R2752
Aztec Radiomedia	R2773

Musicam USA	R2935
Sonifex Ltd	R3001
Audio Processing Technology	R3015
ENCO Systems	R3041
Independent Audio/Sonifex	R3102
Armstrong Transmitter	R3115
Wegener Communications	S3420

Recording Media & Accessories

Audiolab Electronics	E3434
Professional Label	L 8206
JVC	L11509
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Apogee Electronics	M 9340
HHB	R2053
TASCAM/Teac Professional	R2141

Power Products, Batteries, Generators, UPS

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Mole-Richardson	L 6450
Telex Communications	L 8763
Belden	L 8783
Lightning Eliminators & Consultants ...	L 8926
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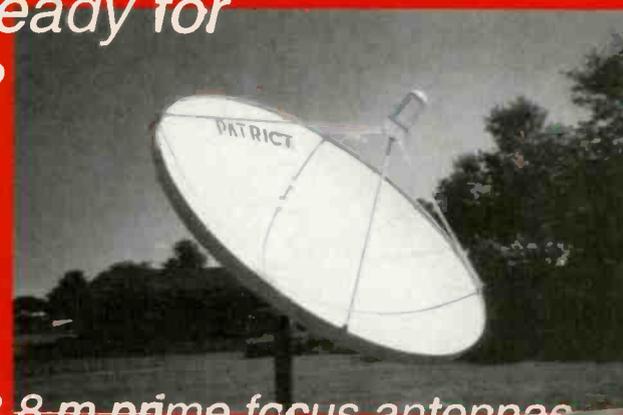
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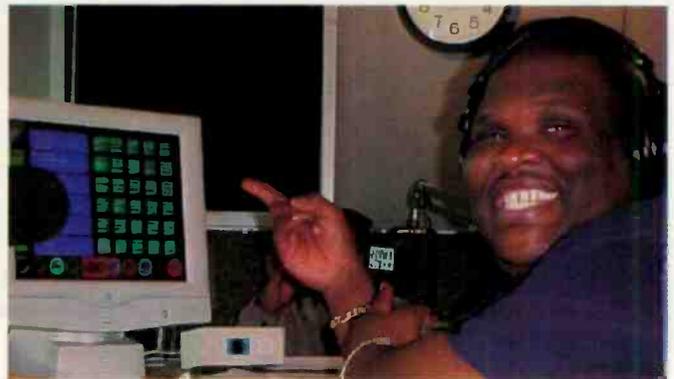
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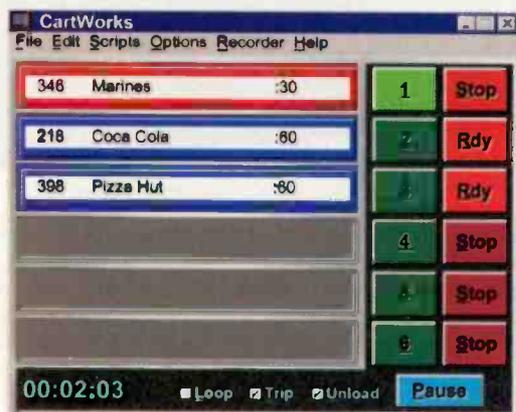
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12:13:01

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12:18:08	M2174	Friends	Elton John	02:20	:05	C	MUS
12:20:28	M1732	Dance The Night	Van Halen	02:47	:13	F	MUS
12:23:13	V026	Voice Track 26		00:12			VTK
12:23:25	DALIVE	SPOT SET		03:00			COM
12:26:25	J011	Jingle / Fast		00:06			Jin
12:26:31	M0713	Listen To Her Heart	Tom Petty	02:48	:11	C	MUS
12:28:18	V027	Voice Track 27		00:15			VTK
12:29:34	M2214	Black Friday	Steely Dan	03:40	:12	F	MUS
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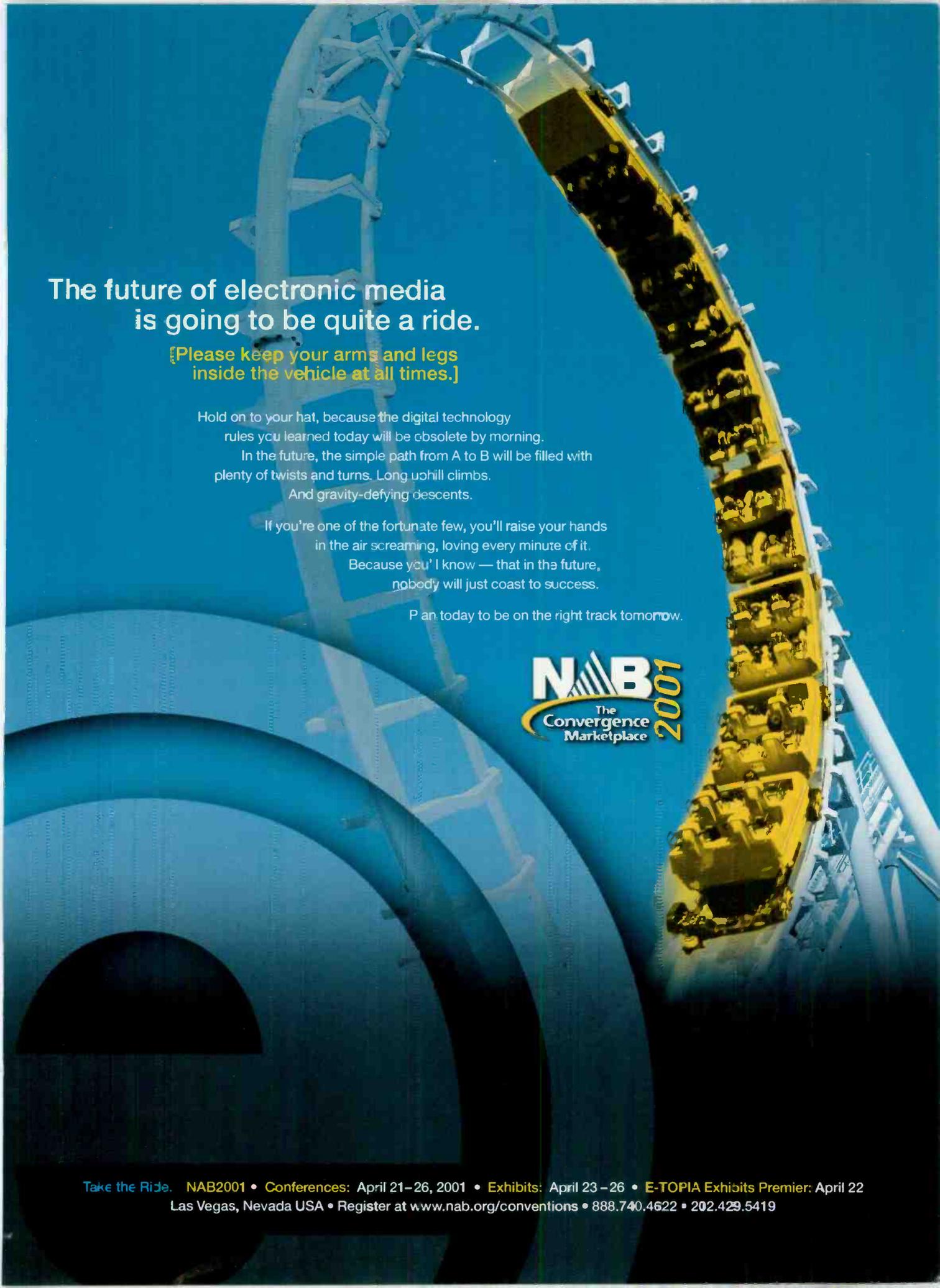
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Booth information is current as of February 5, 2001.



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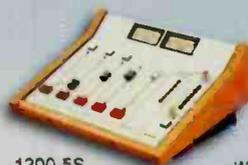
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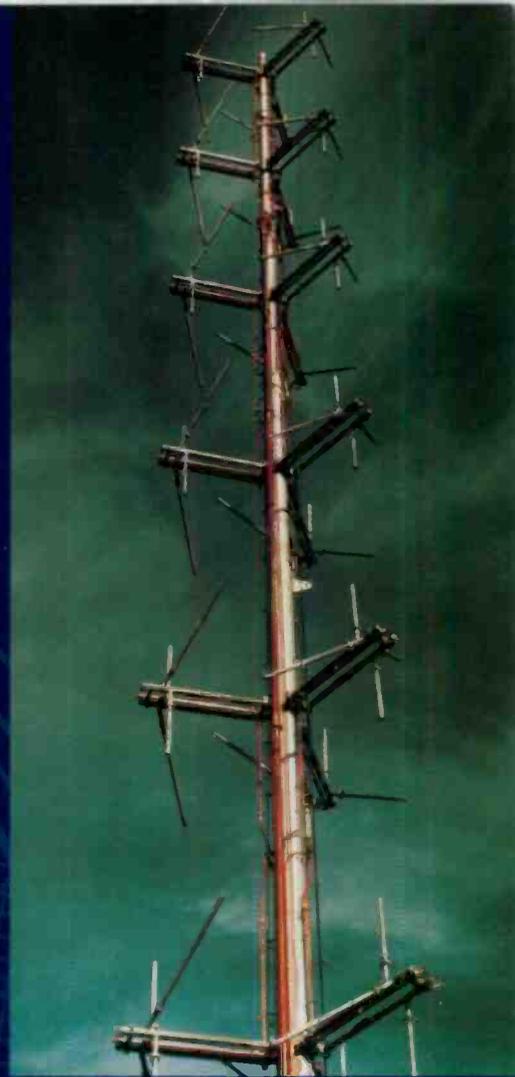
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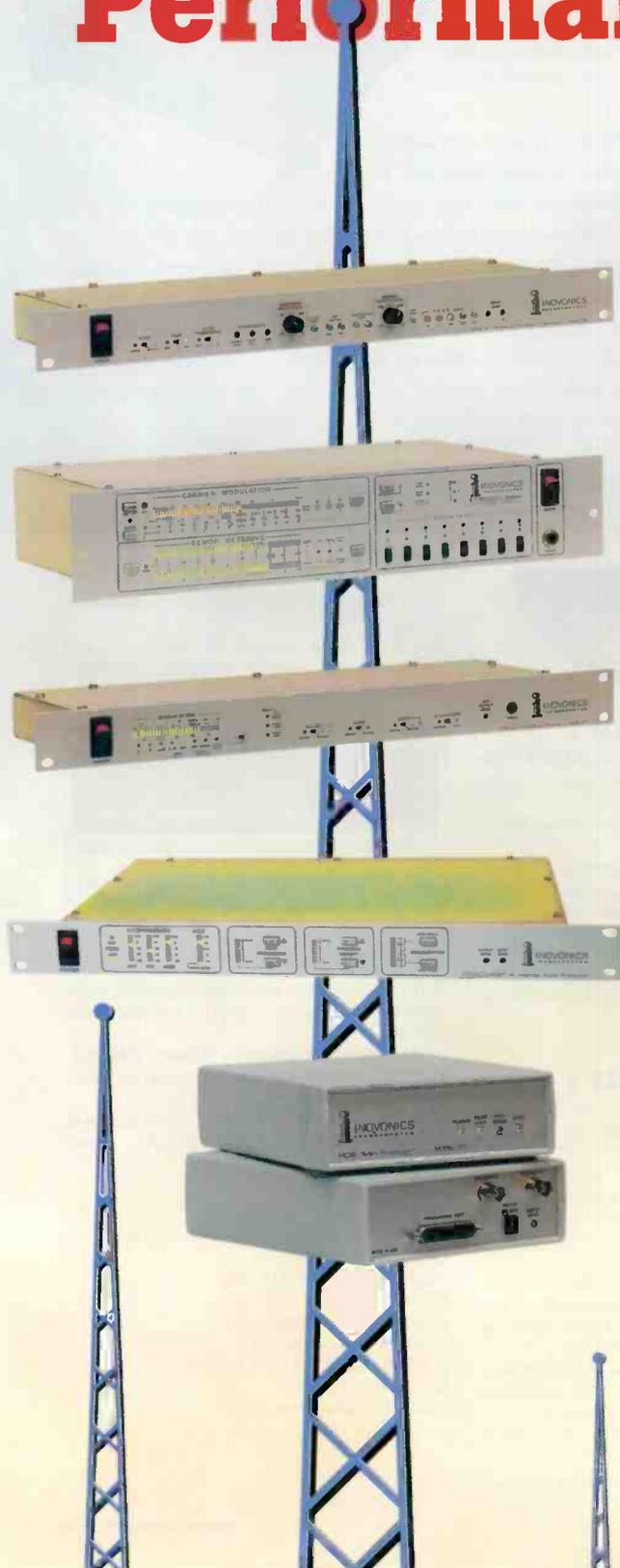
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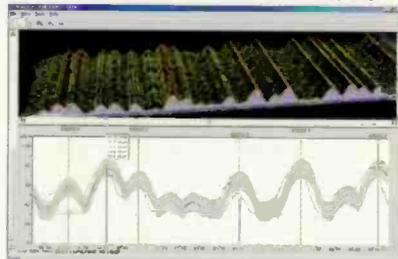
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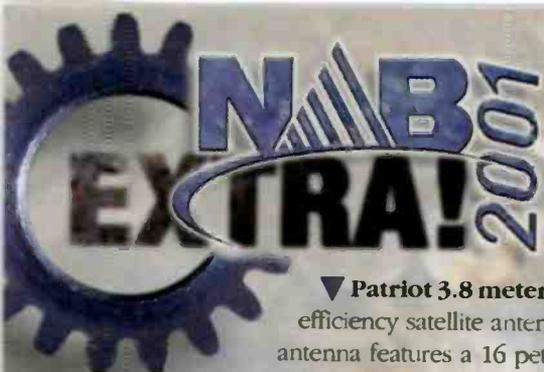
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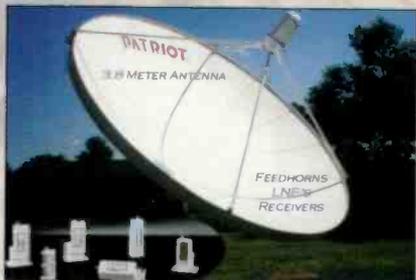
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Booths T434,
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▼ **Patriot 3.8 meter antenna:** A C/Ku high-efficiency satellite antenna, the Patriot 3.8 meter antenna features a 16 petal design for high accuracy with low transportation costs. Mounting options include Az/El fixed, polar mount and king post. The Patriot 3.8 is ideal for educational, business, data and voice applications. Additional features include 125 mph wind



loading (survival) and surface tolerance within .02 inches. The antenna is compliant with FCC spec 29-25 Log 0 for 2° spacing. The entire antenna is powder-coat painted. The Patriot 3.8 has an in-ground mast foundation and offers an optional pipe stand with bolt and template kit. The Company is offering special package pricing for radio stations on the solid-aluminum Patriot 3.8 meter antenna.

800-470-3510; fax 517-629-6690
www.sepatriot.com; info@sepatriot.com
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Vadis DC II enhancements
Klotz Digital
Booths R2963, M9071

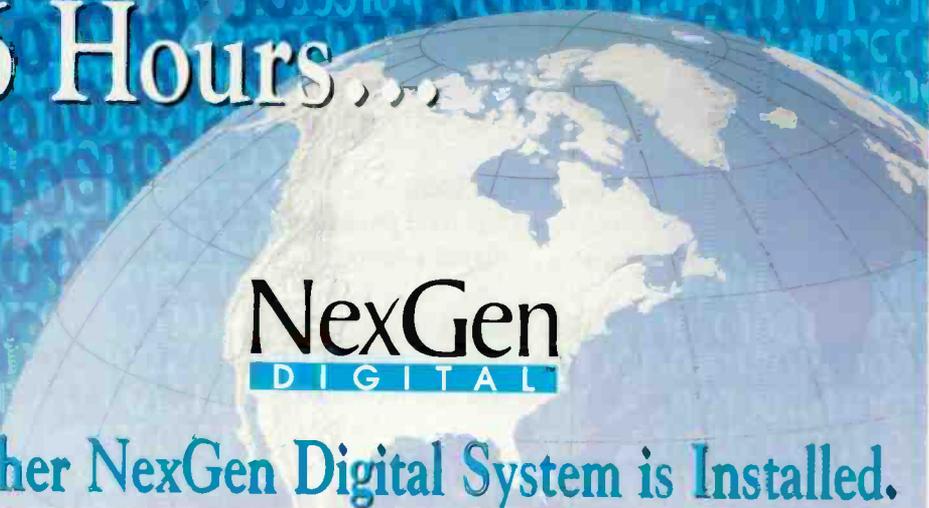
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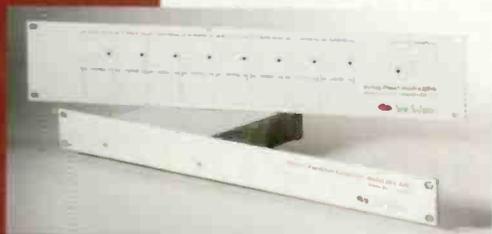
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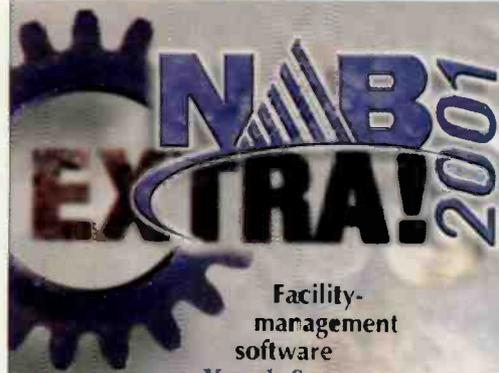
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Solid-state FM dual transmitter system

Nautel

Booth R2725



◀ **Q40:** The dual configuration Q40 with a 44kW capability offers a practical solid-state transmitter for high-power FM stations. Overall efficiency of 68% keeps operating costs and cooling requirements at a minimum. The built-in redundancy and duplication features contribute to exceptionally high on-air reliability. Broadband RF Power Modules and switching Power Supply Modules are on-air serviceable. Low Voltage Power Supplies are duplicated, and duplication of the digital exciter, IPA and IPA power supply are available.

902-823-2233; fax 902-823-3183; www.nautel.com; info@nautel.com

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

FM transmitter

Marti Electronics

Booth R2505

PNP1000: This 1kW transmitter with built in exciter uses much of the proven technology already available in products like the PNP150, the FX50 FM exciter, the C series solid-state FM transmitters and the FM10S solid-state 10kW transmitter. The PNP1000 is a rack-mountable single box that provides excellent performance. Because of its complete frequency agility without the need for any field tuning, it is great for use as a back up transmitter for a single station or station group. It also offers performance on a level that can be used as the primary transmitter in any competitive market. The PNP1000 accepts virtually any type of input including AES/EBU, left and right analog audio, composite, S/PDIF or optical.

817-645-9163; fax 817-641-3869

www.martielelectronics.com; marti@flash.net

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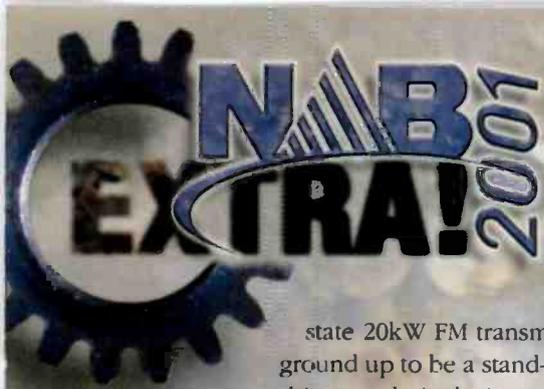
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Solid-state FM transmitter
Broadcast Electronics
Booths R2505, i6126

▼ **FM20S:** A solid-state 20kW FM transmitter designed from the ground up to be a stand-alone unit. The internal combiner and single integral controller make the

FM20S a cost-effective option for high-power solid-state FM applications. This design is based on the FM10S, 10kW solid state FM transmitter. The FM20S has a high level of redundancy, and offers the capability of bypass-

ing the final combiner to allow the transmitter to be on the air at 10kW in case of an emergency.

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www.bdcast.com; bdcast@bdcast.com

Circle (254) on Free Info Card or go to www.beradio.com



Equipment carrying case
Sonic Sense
Booth R1752

► **SoniCase:** Constructed using double layers of 1,000 denier Cordura fabric, the SoniCase is an equipment carrying case designed for use by location-recording professionals. The weather-resistant enclosure provides storage and protection for a full-size portable DAT recorder, two rechargeable batteries, a microphone preamp, microphones, cables, and other accessories. Double-protection against the elements is afforded by a full-coverage rain fly, which opens to reveal transparent plastic windows safeguarding the gear inside. The windows, when shut, keep moisture out while maintaining unobstructed front panel visibility of components stored on the SoniCase's four shelves. Durable 1/4-inch padding lines the interior of the SoniCase throughout. A padded shoulder strap is included with each case, as is a securing waistband.

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musicmusicmusic

Booth R2081

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Wireless receiver

Electro-Voice

Booth L8763



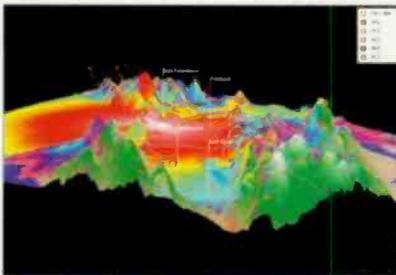
▲ **N/DYM SCU receiver:** The SCU wireless receiver includes such innovations as ClearScan Auto Channel Select and 10-channel frequency agility. New features found on the SCU receiver include detachable antennas, and RF and audio level metering. In addition, the SCU receiver ships with rack-mount hardware. The SCU receiver is compatible with all EV N/DYM transmitters. ClearScan Auto Channel Select fully automates the process of channel selection and system set-up. Operation in the UHF frequency band is further enhanced by the secure-phase diversity system for clear and drop-out free audio. In addition, the N/DYM SCU wireless receiver can be used with the APDY antenna splitter to run up to four receivers from two antennas and one power supply.

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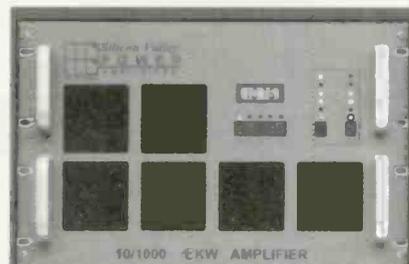
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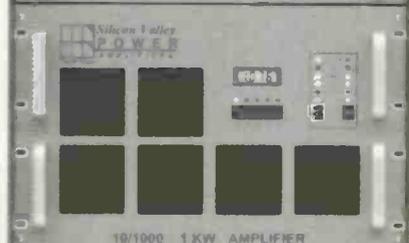
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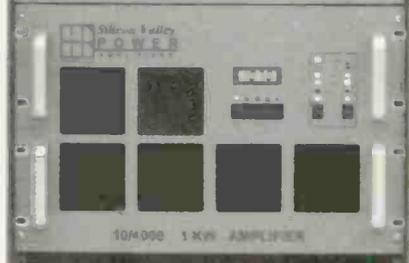
10/1000 1KW AMPLIFIER



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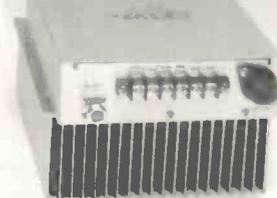
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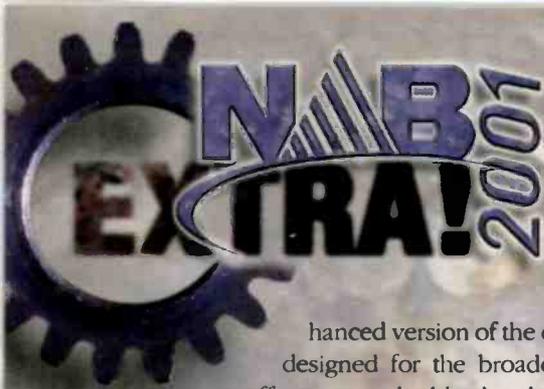


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March 2001 BE Radio 65



Digital broadcast delay
 TC Electronic
 Booths R2101,
 M9639

▼ **D22 II:** An enhanced version of the original D22 digital delay designed for the broadcast industry, this delay offers up to double the delay time of the original delay per channel (now 2600ms on two channels with



max. delay of 60 frames). It also features 24-bit AD/DA converters, as well as a compliment of digital I/Os including, AES/EBU, S/PDIF, and Wordclock BNC 75Ω. The D22 Digital Broadcast Delay II provides seamless delay updating. Internal Sample rates of 44.1kHz and 48kHz are supported with external rates of 32, 44.1 and 48kHz. Programmable setups can be stored for total instant recall. The D22 digital broadcast delay II can display time in frames, sub-frames, milliseconds and sub-milliseconds (0.1 ms increments), and offers tap delay time with online or preview modes.

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Cable connectors and bulkheads

Neutrik
 Booths R2130, L11636

► **BNC 75Ω connectors and bulkheads:** The 75Ω cable connector series offers a push-pull version that simplifies assembly and requires only a center contact crimp die after cable preparation. It also includes screw lock cable retention.



Accessories include color-coded boots in standard resistor colors and three transparent colors. Screen and jacket crimp technology prevent an exposed grounding braid on cable assemblies. The Neutrik BNC 75Ω impedance bulkhead jacks recessed versions are available in nickel or black housings and fit in the standard D series hole cutout. Each variant has the same specifications with their own special features. Features include electrical performance to 3GHz, true 75Ω impedance, return loss/VSWR data, stainless steel Optalloy-plated ground contact, and gold-plated center contacts.

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NAB EXTRA! 2001

Telephone handset audio tap JK Audio Booth R1833

▼ **Voice Path:** Routes the audio from any telephone into your PC sound card. The attached cables connect directly to the in and out jacks on your sound card. Use your PC software to record, edit, and then

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Portable audio codec AETA Audio Booth R2752

Scoop E-Z: A portable audio codec for live outside broadcasts, the Scoop E-Z is capable of using analog (POTS) and digital (ISDN) telephone networks. Inmarsat (satellite) terminals and broadcasts benefit from the maximum bandwidth available. If broadcasts require GSM, wireless remotes, they can be done using the Scoop E-Z with an upgrade. Audio interfaces include a two-channel audio mixer; VCA; compressor and limiter selectable; mic supplies: Ph48, Ph12 or T12; high sensitivity VU or Peak LED metering; two microphone line; two XLR plug and two headphones; 1/4" jack, adjustable output.

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Routing controllers Logitek Booth R2147

► Route3 and Vroute: Router con-

trollers for the Logitek Audio Engine (a digital audio mixer/router) include the Route3 and Vroute. Route3 is a rack-mounted routing controller that gives full input selection control for three devices with a simple, easy-to-learn interface. The same labels that display on any Logitek Control Surface are displayed in the Route3 LCD window. The Vroute is a PC version of the Route3. Vroute gives full menu selection control for one to 12 Audio Engine outputs with a simple point-and-click interface.

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Transmitter remote control system
Burk Technology
Booth R1805

▼ **ARC Plus:** The ARC Plus transmitter remote control system provides ultra fast response, more sites and an enhanced feature set. It's 60 times faster for instantaneous updates and still provides the ability to connect more sites than before.



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Rotary phase converter
Kay Industries
Booth R2134

► **Phasemaster Type T-R:** This Rotary Phase Converter installs in minutes and operates any three-phase transmitter from a one-phase supply. Operating on a one-phase rate structure using a phase converter eliminates the demand charges common to utility three-phase rates. The signature feature of the Phasemaster Type T-R is a load range controller that enables the converter to maintain a balanced voltage within three percent to all types of broadcast transmitters, including DTV, regardless of power requirements. The Type T-R converter also features built-in disconnect switch, fuses, terminal blocks and surge protection that enable the installer to hook up the converter in minutes. It is designed for a simple "two wires in, three wires out" installation.



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FM Antennas Low power circular polarization

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Independent Audio/Sonifex
Booth R3102

▼ **Net-Log Logger:** Designed to be operated and controlled by PCs on a network, Net-Log combines the reliability of a dedicated hardware recorder with the flexibility of editing and playout over



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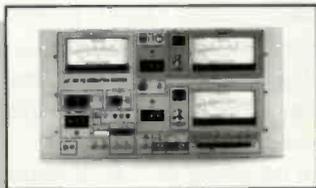
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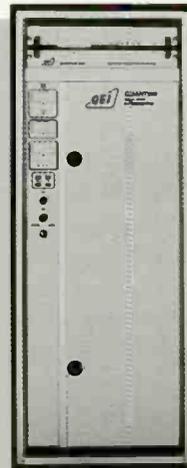
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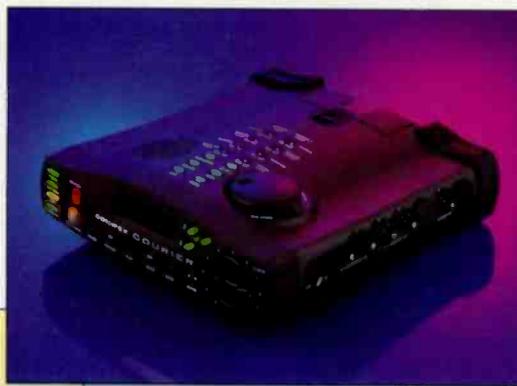
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Sonifex Courier

By Alan Van Zelfden

The Sonifex Courier is a portable hard disk-based recorder that is a beauty to behold and a cinch to use. Introduced in late 1998, the Courier has been used by broadcast news departments and independent sound recordists across the United States as a replacement for portable DAT and cassette recorders.

I learned about the Courier in mid-1999 when I began searching for a portable digital recorder that I could take on location to independently produce documentaries and short news clips. My primary objective was to find a machine that was dependable, easy to use, offered top-notch audio and would not be rendered immediately obsolete by advancing technology.



Performance at a glance

- Field-upgradeable software
- Supports multiple audio formats
- Easy to use
- Readily available recording media
- RS-232 communication
- Interfaces to audio editors

I dismissed DAT because the medium was not conducive to reviewing and editing sound files in the field.

My only other options were MiniDisc and hard disk-based recorders. After researching the Courier, which can record hours of uncompressed audio via Type II and III PCM/CA cards, it became evident that portable disk-based recording was the technology I wanted.

Only a handful of manufacturers currently offer portable disk-based recorders. Designed to be carried by a shoulder strap, each compact recorder is geared toward digital news gathering. I chose the Courier based on a ratio of benefits to price.

Featuring an aerodynamic body that looks as though it were developed in a wind tunnel, the Courier packs a lot in its lightweight plastic shell. Easily accessible on the front panel are the customary controls—power, record, pause, rewind, forward, battery and disk check, stop, mark, and volume. There is also a confidence monitor button that allows you to ensure audio is actually being recorded.

The left side of the machine has a DC port to run the Courier from AC power, an RS-232 port to transfer files to a PC, an optional ISDN slot for sending audio files by telephone and the PC card slot. The right side features a headphone volume knob and 1/4" headphone jack, two XLR mic/line-inputs, two XLR line-outputs and an AES3

output. The Courier's camcorder-style battery clicks into a port on the back of the unit.

When harnessed in the carrying case, the Courier is a pleasure to use in the field. Hanging from the shoulder strap, the case allows the user to access the machine's entire front and top editing panels while recording. The case also has drawstring enclosures on both sides through which to run mic, power and headphone cords to the Courier while it is securely protected by the ballistic-strength canvas.

The carrying case even sports an additional cargo area, partitioned by a stiff divider, that can be outfitted with additional supplies such as a battery pack, spare PC cards and a sandwich for those really long, on-location assignments.

Setup and go

Before beginning an assignment, the machine's recording format must be set. The Courier's set-up menu groups the

relevant audio settings, which are labeled with names such as CD Quality, FM Quality and AM Quality. Users can rename the formats or create other recording combinations and give them personalized labels.

Any of these settings can be edited on a PC through the supplied software and then downloaded to the recorder via the RS-232 connector. The Courier supports both linear (no compression), .WAV, and MPEG layer 2 (compressed) and raw .MP2 audio file formats, with sample rates ranging from 8kHz to 48kHz in either mono or stereo.

Recording is initiated by engaging the record button. The machine's autolock feature disables all other front-panel controls, except the level control, during recording. Each time the record button is disengaged, the Courier creates what it calls a cut. To avoid needlessly short cuts, engaging the rec-pause button halts recording without generating a new cut.

One of my first recording assignments led me to the Texas-Mexico border to interview a woman who was helping feed and clothe the poor. For three days I followed her about her duties, recording interviews on the run with a handheld mic and, when time permitted, rigging subjects with a wireless lapel mic. Rarely did I take the Courier from its bag, instead opting to use the bag's side entry ports.

I trusted my sound files to a 1GB Type III PC card. Technology has increased the capacity of PC cards and made them increasingly affordable. The same manufacturer now makes a 2GB Type II card (which is more compact



The transport controls and display.

from the border assignment, I popped the Type III card into a PC card reader installed in my computer. Once the PC card registers on my desktop, I open the recorded material via my sound editor. An hour-long sound recording takes approximately a minute to open. Once the file is in my sound editor, I erase the PC card.



The side panel has power, serial data and ISDN jacks. The PC card slot accepts Type II or Type III cards.

PC card readers are inexpensive and readily available, both as internal and external peripherals. Which brings me to a crucial reason I chose a disk-based recorder over DAT or MiniDisc: PC card drives are standard operating equipment on portable notebook computers. Eventually, I will purchase a notebook, which will allow me to upload audio files on location, immediately begin editing and free up valuable hard disk space. Although I have never used DAT, everyone I've talked to, and research I've read, indicates that transferring DAT files to a PC consumes copious time.

In an effort to keep the Courier flexible and competitive, Sonifex periodically updates the machine's operating software and posts the updates on the company's website. Twice I have downloaded updated software. In an era where a particular technology can be outdated almost as soon as it is released, it's reassuring to know that my recorder will not soon suffer such a fate.

Alan Van Zelfden is an independent producer and journalist in Dallas.

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than a Type III card) for the same price. The Courier can use either card format.

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Don't delay codecs

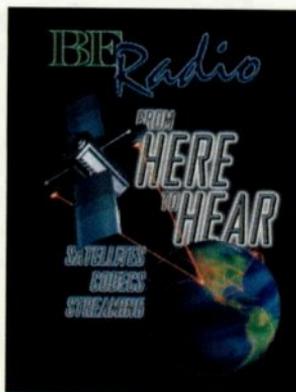
I have to comment on the *Audio Codecs* article in the November 2000 issue. I agree that broadcasters today never had it so good with on-demand, bi-directional 22kHz stereo digital service. The article would have been greatly enriched if the author had taken a look at the apt-X codec algorithm; a coding solution that has been universally accepted as probably the best there is. In terms of signal delay, it made me grimace when I looked at some of the delay figures in the table. I pity the interviewer with some of those quoted delays. Equally, what about the poor presenter expected to monitor the backhaul leg or off-air feed from a transmitter with an STL codec in addition to a codec with some of those quoted delays. I believe that 20ms delay is about just how much delay a person can reasonably handle.

In live scenarios, where program continuity is desirable, delay is crucial. In a 15kHz stereo circuit, the standard apt-X algorithm will introduce 7.5ms delay, while the new enhanced version of apt-X reduces the delay to 6ms. It gets even better for 22kHz stereo where delay is a mere 2.5ms, now improved to 2ms.

What happens to the codec when the data network nasties rear their ugly heads? Some codecs just lie down and mute. Apt-X can soldier on, securely delivering acceptable audio even with 1 bit error in 1,000.

How does the audio stand up to additional passes of coding, especially with algorithms with compression ratios greater than 4:1? The effects of concatenation or tandem coding must be considered when the same audio file is expected to endure further stages of compression. It is widely accepted that 4:1 is a fairly safe bet if further coding is anticipated. One apt-X user is happy for me to quote that on occasions he has successfully subjected his audio to some forty passes of coding. A mighty boast, but it makes the point that, when it comes to repeatability, apt-X is the best.

*Fred Wylie
technical consultant
Audio Processing Technology
Belfast, Ireland*



Popular parasitics

John Battison:

I was just looking through my new issue of BE Radio [*RF Engineering*, January 2001]. Great article on parasitic radiators. Very interesting stuff. I always look forward to reading your articles.

*Arnie Clawson
Chief Engineer
Clear Channel Communications
Ashland, OH*

John Battison:

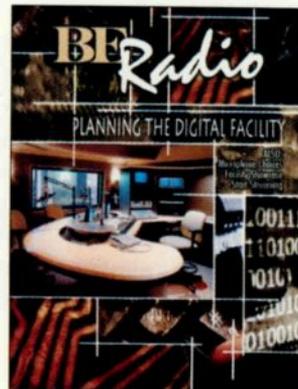
With great interest I just read your article about Parasitic Radiators. I am a very active ham radio operator and very much interested in the low bands, especially 160 meter.

We just finished a contest on the 160m band last weekend. We used a portable setup with military surplus mast that consisted of two verticals spaced 130 feet apart, 70 feet high with 3 top loading wires 45 feet long and a slope angle of 45 degrees. For the switching we used a home-built hybrid coupler to make the artificial delay to switch it in three directions: infire, endfire and broadside. These are shunt-fed, grounded verticals. In this case, we used a slant-feed system 11 feet high and 11 feet out of the vertical. An omega capacitor system with two vacuum variables were used for the tuning network.

After some fine tuning, I was able to get both towers to 1:1 SWR. The front-to-back ratio on this array was amazing; about 35dB.

I have shared the electronic version of your article with my fellow ham radio amateurs on my website at www.topband.net. The website is devoted solely to 160 meter applications. Please let me know what you think. I welcome any advice you can offer.

*Willem A. Angenent
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Lancaster, CA*



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2.5 KW	FM	1980	Harris FM 2.5K Single Phase
2.5 KW	FM	1976	Collins 831D Single Phase
3.8 KW	FM	1994	Continental 814J-Solid State, Sgl. Phase
5 KW	FM	1967	Collins 830E
6 KW	FM	1994	Henry 6000D Single Phase
10 KW	FM	1995	QEI FM Q10, 000B-Single Phase
10 KW	FM	1974	Harris FM10H/K
30 KW	FM	1995	S/B FMQ 30,000B-1

AM
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MITTERS

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1 KW	AM	1981	Harris MW1A
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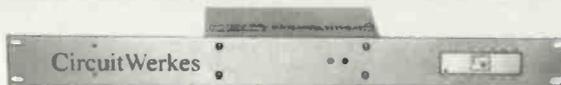
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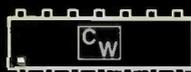


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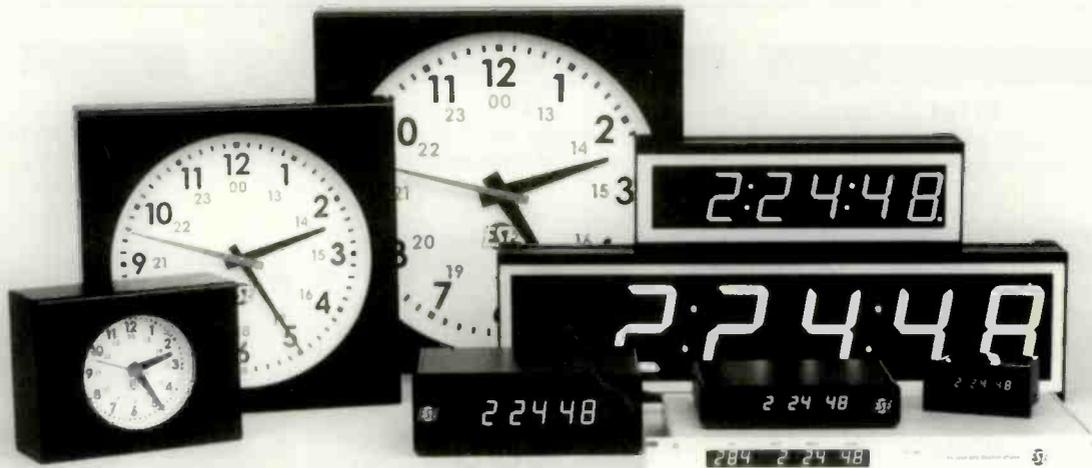
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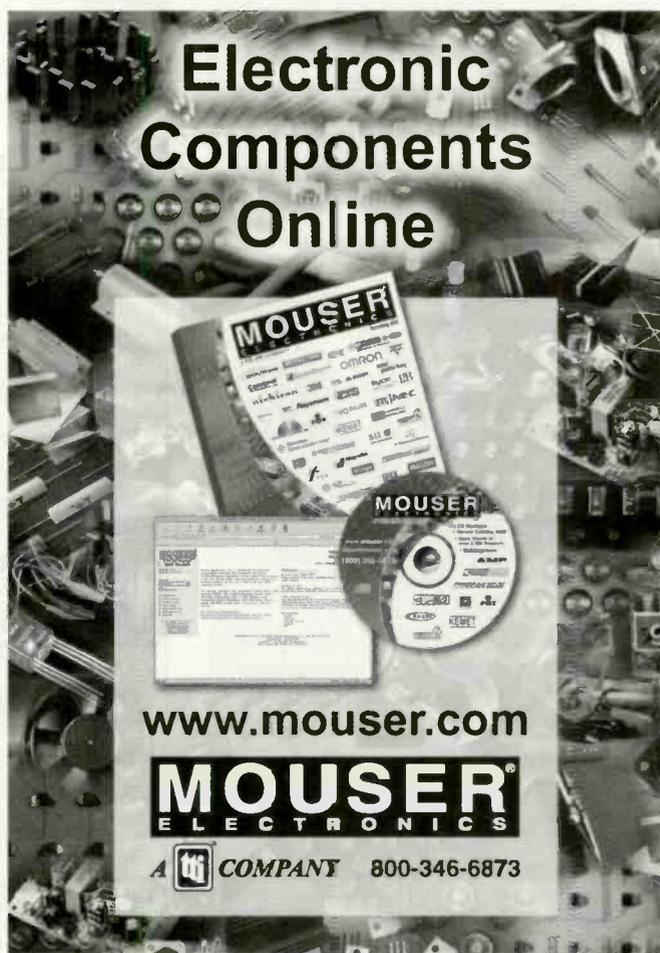
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BERADIO (ISSN 1081-3357) is published monthly and mailed free to qualified recipients by INTERTEC, 9800 Metcalf, Overland Park, KS 66212-2215. Non-qualified persons may subscribe at the following rates: USA and Canada, one year, \$45.00; all other countries, one year, \$60.00 (surface mail), \$100.00 (air mail). Single copy price, \$10.00. Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canada Post International Publications Mail (Canadian Distribution) Sales Agreement No. 0956244. POSTMASTER: Send address changes to *BE Radio*, P.O. Box 12937, Overland Park, KS 66282-2937.

BE Radio is edited for corporate management, technical management/engineering and operations and station management at radio stations and recording studios. Qualified persons also include consultants, contract engineers and dealer/distributors of radio broadcast equipment.

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Accelerated aging

By Skip Pizzi, contributing editor

Recently, while helping my son excavate the archeological site known as his room, I unearthed an old magazine. Its cover carried a date of September 2000, providing a handy identifier for the age of the particular strata we were working on at the time. Saved from the trouble of Carbon-14 dating the artifact, we celebrated by taking a break from our work. I picked up the magazine and quickly flipped through it, and I encountered an even more interesting discovery.

The publication was focused primarily on streaming media issues, and it immediately struck me how many of the advertisements it contained were for companies that either no longer existed or weren't really doing much of what the ads mentioned anymore. Many of the magazine's articles featured companies who were also now defunct, or had never realized the plans they presented in grandiose terms on those pages.

You could probably pick up any number of old broadcast trade magazines and experience the same sense

of wonder at how many things have changed or gone away, but you'd have to reach back at least several *years* to get much of that effect. Here, the phenomenon had occurred in fairly strong fashion within about half a year. It gave credence to the (already aged) expression that refers to a six-month period as an "Internet decade."

Straddling the fence

Pity the poor broadcaster who must try to negotiate these radically different environments simultaneously today. One foot walks on ice while the other treads molasses. The difficult changes brought on by consolidation in the broadcast space seem positively glacial in velocity when compared to the travails of the online world.

Nevertheless, this unique duality may be the best thing that could happen to an Internet start-up. Most Internet-only companies that live on the icy side of the fence have now fallen and they can't get up, as the exhumed magazine so starkly revealed. Working the clicks without the bricks has proven dangerous, and only those with the most patient pools of venture capital have survived. On the other hand, those Internet ventures with strong traditional businesses behind them have fared somewhat

better, and although many have scaled back their online adventures, the corporations continue, generally wiser for the experience. This careful straddling maneuver, although painful and requiring substantial agility, may be the right (or perhaps the only) way to manage the transition that faces our industry.

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Lessons learned

The short term view

might conclude that the current downturn in the Internet economy spells the end of a brief fad, and we may wish it good riddance. The more sensible, long-term outlook tells us that we've witnessed the birthing pains of a new giant that will grow – perhaps fitfully, at first – into a long, strong reign.

The pendulum effect that often accompanies new trends may apply here. It provides that early adopters will rush headlong into eager acceptance of the emergent mode, followed by a strong backlash and rejection, which eventually gives rise to a sensible, moderate and widespread adoption. The radical energy must be burned off before the centrist compromise can emerge. (Many in our industry may recall the example of the pendulum's swing on the introduction of stereo production to the record business: First came head-twisting, vertigo-inducing, ping-pong effects, followed by Phil Spector's "Back to Mono" movement, then the ultimate embrace of a mature aesthetic for stereo imagery that continues today.)

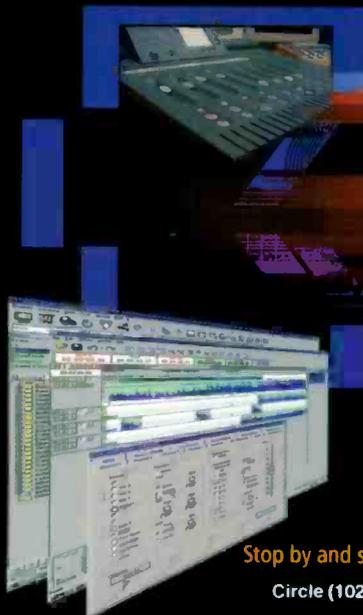
In the Internet case, the late 90s served as venue for the outward swing of the pendulum, which hit the peg hard early last year. We're now on the backward side, and probably still have substantial distance remaining before hitting the other wall. In fact, the space we're passing right now may be the middle ground that we'll eventually settle upon, so watch carefully as it goes by. (If you lived here, you'd be home by now.) Complicating this are the some parametric changes now entering the environment, such as broadband and wireless Internet deliveries, along with new music licensing rules. These may set off their own mini-pendulum effects, and the resultant interference patterns may delay stable equilibrium for some time.

How all this shakes out will determine the ultimate fate of radio broadcasters in the digital age. This makes strategic planning a serious challenge, but a little review of (recent) history every so often helps us keep the big picture in mind.



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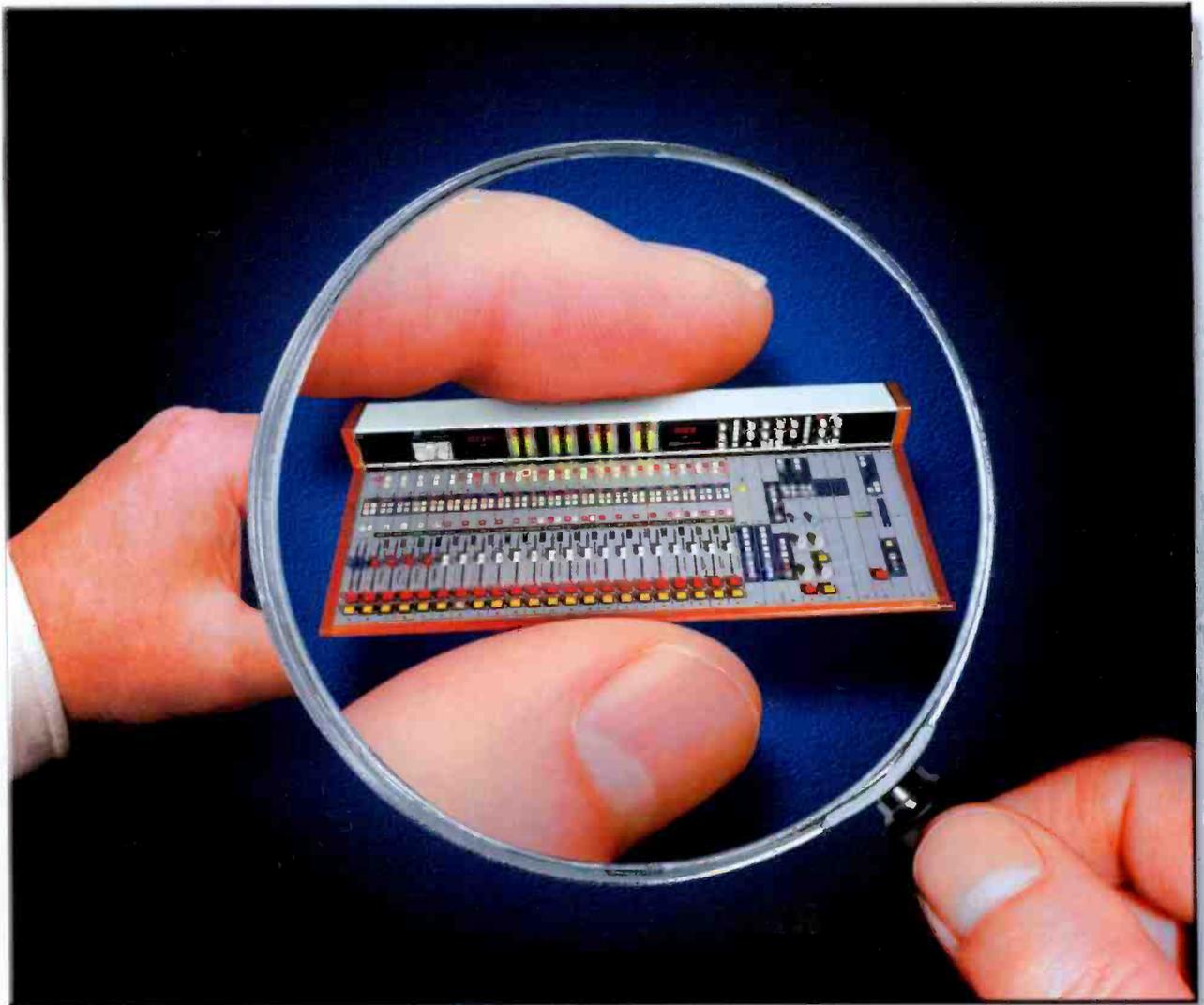
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