

# BROADCAST

## *Communique*



A Look Ahead



## SNG REQUIREMENTS

- A QUALITY VEHICLE BUILT BY AN EXPERIENCED COMPANY
- FLEXIBLE DESIGNS WHICH ALLOW UNIQUE OPERATIONAL CONFIGURATIONS
- EXTENSIVE RF EXPERIENCE ALLOWING TRIPLE PATH SYSTEM INTEGRATION
- 24-HOUR PRODUCT SUPPORT
- REASONABLE DELIVERY
- COMPETITIVE PRICE

## When the CNN team checked off what they needed in SNG vehicles, Harris got perfect marks.

Whether they're dodging traffic across town, braving a hurricane, or scaling a rocky road to cover a forest fire, CNN satellite news teams need the added safety and security which is built into every ultra-rugged Harris Allied mobile SNG system.

For one mobile system or a whole fleet, like so many of the world's leading news organizations which already operate Harris mobile satellite uplinks, you will have a flexible design which allows unique operating configurations that best meet your specific requirements.



Add competitive prices, on-time delivery, 24-hour product support, a 1-year electronics warranty and a 15-year body warranty *that's the best in the industry*, and you can see why Harris Allied's mobile uplink vehicles are number one for performance and reliability, worldwide.

So, when you need mobile news gathering systems which are built to take anything that's thrown at them, do what CNN did - check out Harris.

**Harris Allied**  
7920 Kentucky Drive  
Florence, KY 41042 USA  
Phone: 606 282-4800  
Fax: 606 283-2818

 **HARRIS  
ALLIED**

©1995 Harris Corp.

# TAKING The Lead

## NAB '95 Curtain Call

By **MARTHA B. RAPP,**  
Manager—Public Relations

**C**learly Digital. If you had to describe NAB '95 in two words, those would be it. And Harris Allied even had a new icon to denote the trend.

The brainchild of FM Product Line Manager Daryl Buechting, the icon was initially developed for Harris' DIGIT — the world's only truly digital FM exciter. However, it quickly became apparent that the symbol would work as well across all product lines.

And so, whether it's the world's first digital ATV exciter ... the world's first digital MW transmitters ... the world's first affordable digital radio console ... the U.S.' first all-digital television network ... the digital SNG exciter, or hundreds of other products, if it's available from Harris Allied, it's not just digital.

It's CLEARLY DIGITAL™.

*"With its record attendance, NAB '95 was an outstanding show for the Broadcast*

*Division. There was much activity with domestic and international customers and potential customers. The very strong international attendance at our booths especially underscored the large number of overseas opportunities we see in all four of our business areas— Radio, Television, Studio and Systems."*

—**Joe Huie, VP and General Manager**

**The Envelope, Please.** Do you know what these products have in common?

- Harris Allied's DRC1000, the world's first affordable digital audio console developed specifically for radio by Zaxcom.
- The Intraplex Series 4400, a complete "plug-and-play" ISDN system that integrates codec, terminal adapter and NT-1 in a box about the size of a small laptop computer at a price under U.S. \$3,500.
- NTI's EQ3, the world's first air band equalizer using patented audio circuitry to produce sound that is free from phase shift, hiss, noise and distortion.
- Broadcast Tool's Talking Duck that conveniently identifies any audio circuit.

If you answered that each was displayed by Harris Allied during NAB '95 and each received Radio World's "Cool Stuff" Award, you're right. Congratulations.

*"NAB '95 was great. We've clearly turned the corner on digital technology: the all-digital facility is no longer a pipe dream or a fantasy. The pieces are all there and*

*they are cost-effective. Every segment is accepting digital — little stations and big stations. At recent NABs, we've heard comments like, 'This is neat, but we'll give it another year or two...' This year, broadcasters were clearly in the mode to upgrade.*

*While customers were really excited about the DRC1000, DDS, VoxPro and other digital products, they were also enthused about analog products like the Auditronics console and the EQ3— products that offer high value, improvements in efficiency, and quality. In general, there was a real upbeat feeling."*

—**Jim Woods, Director,**  
**Studio Product Line**

**Speaking of awards,** Television Broadcast readers have selected the Harris DSE 1400/DSR 1400 for an Excellence in Engineering Award. This rugged, integrated digital SNG system reduces transponder costs, increases transponder access, and is ideal for new or existing SNG vehicles, fly-aways and SCPC links.

*"If NAB '95 was a teapot, Harris' Television line did some stirring. Our demonstration of the only HDTV exciter with its own internally-generated ATV signal led the way! We turned heads of U.S. broadcasters; talked with several members of Congress, and even received a request to build an ATV transmitter for another country! Congrats to the Harris engineering team who made it possible."*

—**Bob Weirather, Director,**  
**TV Product Line**

# CONTENTS

<b>Radio Update</b> .....	<b>4</b>
<b>USA DR takes IBOC DAB on the road at NAB '95.</b>	
<b>Product Profile</b> .....	<b>5</b>
<b>Finally! An affordable, digital console for radio.</b>	
<b>Radio Technology</b> .....	<b>6, 7</b>
<b>How can you tell whether an FM exciter touted as digital is really digital?</b>	
<b>Product Showcase</b> .....	<b>8, 9</b>
<b>Radio Today</b> .....	<b>10, 11</b>
<b>A look at a new source of non-spot revenue for radio.</b>	

<b>TV Today</b> .....	<b>12, 13</b>
<b>Exclusive feedforward correction provides linearity for transmitter upgrade to digital transmission.</b>	
<b>Systems Today</b> .....	<b>14</b>
<b>Unique capabilities benefit ENG and SNG customers.</b>	
<b>Inside Story</b> .....	<b>15</b>
<b>Harris Allied's parent company notes 100th anniversary.</b>	

Broadcast Communiqué is a publication of Harris Corporation, Broadcast Division, which includes four key operations:

**Harris Allied Quincy:**  
3200 Wismann Lane, P.O. Box 4290  
Quincy, IL 62305-4290 U.S.A.

*RF equipment; RF systems; service; training*

**Harris Allied Richmond**  
3712 National Road West, P.O. Box 1487  
Richmond, IN 47375-1487 U.S.A.

*Radio studio and satellite equipment; service.*

**Harris Allied Florence**  
7290 Kentucky Drive  
Florence, Kentucky 41042 U.S.A.

*Audio, video and satellite systems; service.*

**Harris Allied Cambridge**  
515 Coldhams Lane, P.O. Box 41  
Cherry Hinton, Cambridge CB1 3JU U.K.

*RF equipment; radio studio and satellite equipment.*



# RADIO Update

## USA DR Takes IBOC DAB Show On The Road at NAB

By JUDITH GROSS,  
JG Communications

The spring NAB show in Las Vegas was the proving ground for long-awaited mobile demonstrations of IBOC (in-band, on-channel) DAB. And USA Digital Radio came through with flying colors, not only successfully giving bus tours of both AM and FM DAB systems, but bolstering their progress by some important alliances with other companies. These companies included Harris Allied and its equipment vendors, plus one large name in the radio receiver business.

More than a thousand show-goers rode the USA DR bus to compare analog and digital radio signals. Except for a few special tours, the trips for the AM and FM stations were separate routes in and around the Las Vegas convention center. The FM trip was designed to show how well the system eliminated multipath and other reflected interference. The AM trip was set up to show the robustness of the signal.

The AM signal originated right from the Radio Hall exhibit floor, at all-digital station KUSA set up by Harris Allied in a special booth. The frequency was 1660 kHz on the expanded AM band—an experimental license on the expanded band for the tests. Digital studio equipment consisted of the Audio-Metrics CD10E CD player and Radio Systems DDS, Unix-based hard disk storage, plus live announcers, all fed through a Zaxcom Digital Radio Console — a show debut. At the AM transmitter site was a Harris DX 10 which had been modified by Harris Allied and Xetron, the developers of the USA DR AM DAB system, to modulate both the analog and the digital AM. The digital signal was 25 dB lower in power than the analog and is modulated as a subcarrier of the regular analog AM.

The FM analog signal originated from KUNV, the University of Nevada at Las Vegas station, at 91.5 on the FM dial. A special Harris 2000 DAB Platinum series transmitter provided the digital FM DAB signal. The analog operated at 15 kW while the DAB FM was at 300 W of power. As with the AM signal, the FM DAB is 25 dB lower

than the analog signal, but for FM it is located in the side areas of the FM signal mask.

### Impressive improvement

For both DAB bus rides, a spectrum scope was visible throughout to pinpoint interference along the route. It was easy to see and hear multipath delay in the analog FM. With a slight delay between the analog and digital, it was possible to hear the regular FM signal breaking up, then switch to DAB and hear the exact same passage completely clear and free of multipath!

But if the FM was impressive, the AM was the show stopper. Generally the analog AM was free of interference, but was bandwidth limited by the NRSC mask and was mono. The switch over to digital opened the sound to full 15 kHz stereo which sounded as good as, or possibly better than many FM stations today! Subtle instruments and voices on musical selections which were missing from the analog AM were clear and crisp on the DAB signal. And the AM DAB remained strong even when the bus stopped briefly under a parking garage overpass.

Lots of broadcasters had questions about DAB, such as: How soon? How much? and just plain How? A Harris Allied Q&A on DAB helped by providing: Everything You Ever Wanted To Know About DAB, But Were Afraid To Ask. Generally, DAB engineers speculate that a station might plan on spending \$20-50,000 on implementing DAB. The good thing about IBOC DAB, however, is that it's an enhancement to a station's current signal, so it is not like building a whole new station. Those with older equipment might have to upgrade their facility first, especially those with older antenna systems. An updated information brochure on DAB is in the works and will

be available from Harris Allied soon.

### News on the receiver front

National Semiconductor Corp. announced that it would begin making receiver chips for radios which would decode USA DR's AM and FM DAB. The chips are expected to take about two years to produce and cost about 15% more than current radio receiver chips. A model of the chip became a coveted souvenir at the show and was handed to riders upon completion of the DAB tour. USA DR proponents say the next step will be to develop prototype DAB receivers to conduct further tests. The announcement by National Semiconductor was even more momentous considering that the FCC hasn't taken any action toward authorizing DAB or setting or protecting a standard.

Testing continues on both the AM and the FM DAB systems to determine such things as how the AM system works with directional arrays. This summer, the EIA will be conducting its field tests of DAB systems in San Francisco. And USA DR is working on preparing a petition for rulemaking to go to the FCC.

How soon will we see DAB stations on the air? If the progress made by USA DR and the announcement by National Semiconductor is any indication, it could be as soon as the next two to five years—at least for experimental stations. As far as supplying digital equipment to stations, Harris Allied's DX series transmitters could take an AM station from analog to digital with ease, and provide equipment for FM stations as well. And the full range of digital studio equipment which put DAB station KUSA on the air in Las Vegas will help stations make a smooth transition from analog to digital quickly and cost effectively.



Programming for KUSA-AM originated from Harris Allied's all-digital radio studio.

# PRODUCT Profile

**Finally! An Affordable, Digital On-Air Console *Just for Radio* Exclusively from Harris Allied**

By **JOHN HARONIAN**,  
Digital Studio Products Manager

Okay, you've heard it for years: "The all-digital studio is coming to radio"... "We're digital-compatible" or "digital-quality" or "digital-ready"... Blah, blah, yadda, yadda...

The discussion is over. The future is now.

Many practical radio professionals have been rightfully uninspired by the prospect of using digital audio in the station. There have been more and more products available with digital audio inputs and outputs, but in most cases they don't really come in handy.

Why?

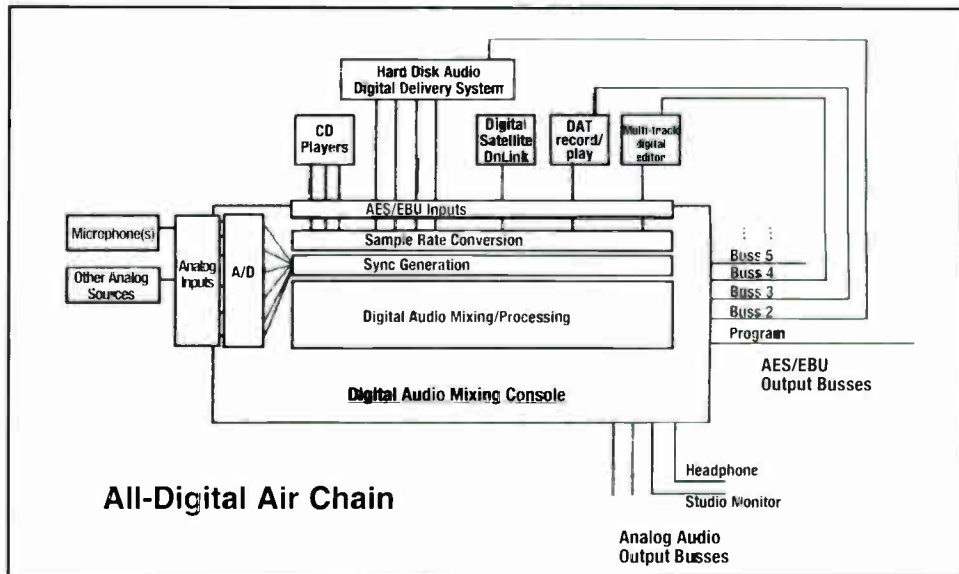
The whole facility has traditionally been built with analog audio as the common denominator. In order to do any mixing, routing, or distribution of audio, the only practical option has been to use analog audio. With all the various pieces of the station becoming "digital ready," the heart of the operation — the mixing console — has been analog.

Problem solved. The new Harris Allied DRC1000 (Digital Radio Console) by Zaxcom Audio — already well-known for its digital television consoles, has finally brought a truly digital, truly radio-oriented mixed into reach for the average budget. Priced under USD \$20,000, it's really Cool Stuff (Radio World thought so, too, at NAB).

## What Is the DRC1000?

To your staff, the DRC1000 is an on-air radio mixing console. It works very much like any other console they've used. It has faders (yes, they're P&G), ON/OFF buttons with remote control, meters, etc. But of course, it's more than that. The console comes in two parts — the controller, which is the part your operators see and use, and the Audio Processor, a 4-RU box that sits in an equipment rack and does all the work.

The Audio Processor unit has 11 AES/EBU digital audio inputs; seven AES/EBU outputs, and seven analog outputs. Each input has automatic sample rate conversion, and the unit generates its own synchronization. So there's not much to worry about, any AES/EBU signal you feed it will work just fine.



The unit employs 32-bit internal DSP functions, and the digital outputs are at 48kHz sample rate. The analog outputs — some 18 bit and some 20 bit — are very high quality as well. The standard unit includes EQ, compression/limiting, filtering, delay, pan, and other DSP functions for each channel.

The controller is very space-efficient. Within its 19"-by-17" footprint, it has 10 faders. Each fader has a bright 8-character display (to show the input name), START, STOP, buss selection and effects selection buttons. There are also a numbers pad, feature/setup buttons, and an LCD screen to set up various features like EQ, compression/gating, pan, and others. Standard machine control and RS-422 serial ports for interfacing to other equipment are also included. (In fact, a very intelligent

interface between the DRC1000 and the Radio Systems DDS audio storage system has already been developed.)

To expand the size of the console, you can link up to four Audio Processors (making 44 stereo inputs and 28 stereo outputs), and/or up to four controllers (giving you 40 faders). No matter how many controllers or Audio Processors you have, any input can be assigned to any fader.

Because you don't need to have all of your controllers in the same studio, this may totally eliminate the need for a router or duplication of audio around the facility.

To learn more about Harris Allied's exclusive DRC1000 by Zaxcom Audio, please contact us: In U.S.: 800-622-0022; in Canada: 800-269-6817; International: U.S. 317-935-1704.

# RADIO Technology

## How Can You Tell Whether An FM Exciter is REALLY Digital?

By DARYL M. BUECHTING,  
FM Product Line Manager

"It's great!"

"It's wonderful!"

"It's digital!"

*These terms are regularly used to describe new digital FM exciters available from most manufacturers. But are these exciters really digital? How can you tell whether an FM exciter is truly digital?*

*A truly digital exciter not only uses digital technology to create an FM-modulated signal, but it also can **directly** accept digital studio audio. Given these criteria, while many exciters are being touted as digital, only one—the Harris DIGIT™—is Clearly Digital in every way.*

*DIGIT creates FM modulation from a process called Direct Digital Synthesis (DDS). A Numerically Controlled Oscillator (NCO) processes 32-bit "words" composed of ones and zeros, directly translating them into FM modulation. Although one other exciter on the market uses digital processes to create FM modulation, DIGIT is the only FM exciter that accepts digital audio: Only DIGIT is available with a digital input that*

*conforms to the international standard for digital studio audio. This standard is often just referred to by the initials of the two groups that formulated and agreed to it—AES/EBU.*

*Following are some questions you may want to consider before you invest in an FM exciter to take you into the future.*

### **Why is it important to select a digital exciter with an AES/EBU input?**

An AES/EBU input is important because it is now possible to have a completely digital broadcast air chain. The exciter capable of accepting studio-standard digital audio becomes the final link in this chain.

Consider this process: The ones and zeros from a compact disc player with AES/EBU output (Denon 951F) can travel through a digital audio console (Harris Allied DRC1000 by Zaxcom), through a digital STL (Moseley DSP 6000) or digital telephone line, through a digital audio processor (Orban 8200) and directly into the digital input of the DIGIT. In this entire digital air-chain, there are no analog-to-digital or digital-to-analog conversions anywhere.

The absence of these conversions prevents any addition of hum, noise and distortion that can cause some of the compact disc's superior performance to be lost. This is why we call DIGIT—the only exciter with an AES/EBU input—the only truly digital exciter available.

No other manufacturers presently provide a digital input with their "digital" exciters. Only Harris has delivered AES/EBU input FM exciters. In fact, over two hundred DIGITs are already in the field. No other company can offer you field-proven reliability and full 16-bit digital performance as available in the DIGIT.

### **If DIGIT accepts a left and right digital signal, how does it become stereo?**



The digital input module to DIGIT contains a digital stereo generator. A digital signal processor (DSP) takes the AES/EBU signal and creates a digital composite signal. This signal is sent in a parallel data stream to the Numerically Controlled Oscillator that outputs an FM stereo signal.

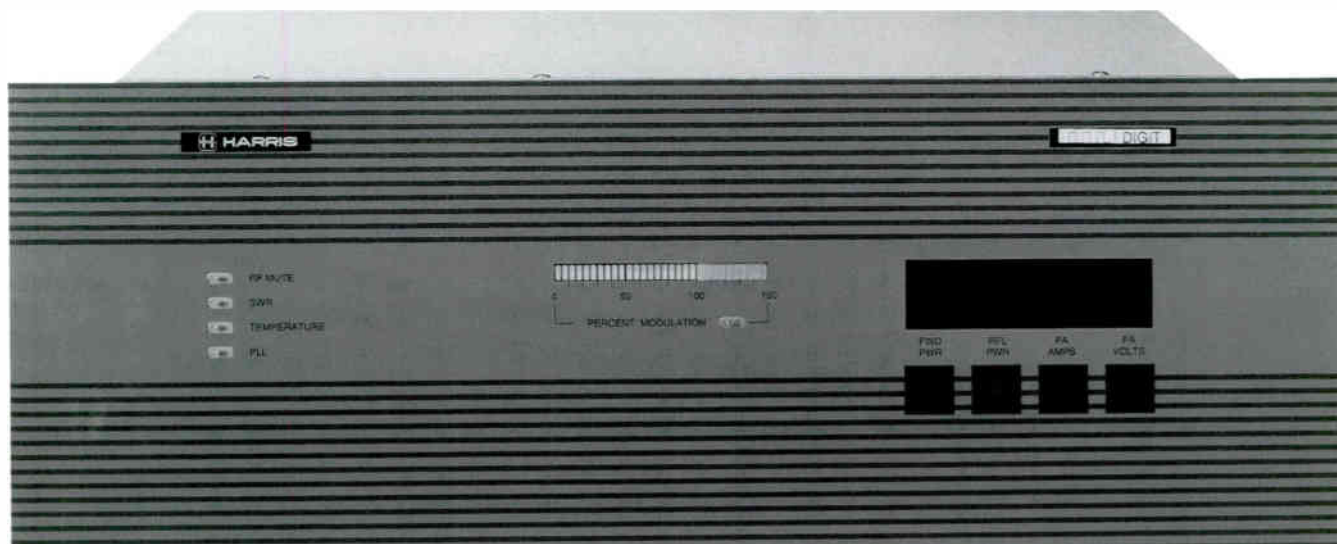
### **What is the SECRET WEAPON everyone is talking about?**

DIGIT's digital input module also includes a Digital Composite Limiter (DCL). This can be an important audio processing tool for your station. The DCL allows you to do all your audio processing to suit the format of your station prior to the AES/EBU input. Once you have the sound that you want, the DCL not only can help to maintain it, but will provide it louder and cleaner than anything else and still keep you perfectly legal!

The DCL is an implementation of the WAVES L1 Ultramaximizer™ which is used by many professional digital recording studios. Because it operates in the digital domain, it can "look ahead" and predict that an overmodulation peak is about to occur. The DCL then adjusts the input data to prevent the peak.

### **Doesn't an analog composite clipper perform the same function as the DCL?**

An analog composite clipper can provide the so-called brick wall effect, but because it is done in the analog domain, a great deal of



distortion is created and added to your FM signal.

#### Does the DIGIT provide for SCAs?

Yes. The DIGIT has three inputs for SCA. Two are standard-type inputs which accommodate inputs such as 67 kHz and 92 kHz. The third input is for RBDS (Radio Broadcast Data Service) equipment which is typically at 57 kHz. Also, a 19 kHz sync signal is provided for the RBDS generator.

#### Can our station use DIGIT even though we don't have a digital air chain right yet?

Yes. In fact there are several avenues you can follow and still use the digital input of a DIGIT.

1) You can use a new digital audio processor such as the Orban 8200 with digital I/O or the CRL DP100.

2) It is still possible to buy an analog-to-digital converter that can input either composite stereo or discrete left and right analog audio and output an AES/EBU digital audio signal. (Belar, Apogee, Lighthouse.)

3) Another way to get to studio-standard digital is by upgrading your STL to digital. AES/EBU digital encoder/decoder units are available from Moseley, TFT, Dolby, and QEI.

#### What if these avenues are not possible?

If you can't manage any of the above, you can get the DIGIT configured with an analog input module. The analog input module will accept an analog composite stereo signal with a built-in analog-to-digital converter. Later, you can change the analog input module to the digital input module. It takes only a couple of minutes to exchange modules on the exciter.

#### What happens if I lose the AES/EBU signal on its way to the DIGIT? Do I have any alternatives?

Yes, the DIGIT's digital input module also can be switched to accept standard analog composite stereo through SCA port 2. Some DIGIT users have even added components to their systems to switch from digital to analog automatically, should the AES/EBU signal be lost.

Hopefully, you have a better understanding of why the DIGIT exciter is the only truly digital FM exciter available today. The "secret weapon DCL" will remain exclusive to the DIGIT as well. Here at Harris we recognize that the future of broadcast equipment is digital.

In fact, it is "CLEARLY DIGITAL™" to us.

For more information on Harris DIGIT digital FM exciter, please contact Harris Allied: Telephone 217-222-8200, fax 217-222-0581.

<sup>1</sup>Audio Engineering Society and European Broadcasting Union

## Digital Exciter Becomes Standard in All "CD" Series FM Transmitters

Harris DIGIT™, the world's first and only truly digital FM exciter, is now the standard exciter in every Harris FM transmitter above 1 kilowatt.

DIGIT-equipped Harris transmitters are designated by a suffix of CD — which stands for Clearly Digital™.

The CD designation was chosen to denote DIGIT's unique ability to take a digital signal from a compact disc directly to FM stereo with absolutely no intervening analog steps. DIGIT is the only exciter in the world with this capability.

FM Product Line Manager Daryl M. Buechting reports that Harris made DIGIT the standard exciter to ensure that broadcasters purchasing new HT or Platinum transmitters can easily upgrade to an all-digital air-chain. DIGIT is available with either an analog input or an AES/EBU input.

"One beauty of DIGIT is that if you're not very far along in establishing a digital air-chain, you can use the analog input and still get the benefits of direct digital synthesis of FM," Buechting said. "When you're ready, you can upgrade to the digital input in about a minute and a half — it's a matter of removing four screws and changing plug-in input modules."

DIGIT also is available as a stand-alone unit for retrofit into any FM transmitter.

Transmitter prices will not increase with the addition of DIGIT. In fact, prices have been reduced for Platinum Series 2 - 20 kW solid state transmitters, which formerly did not include an exciter. Prices for HT Series



3.5 - 35 kW tube transmitters, which formerly included an analog exciter, have stayed the same.

## Harris Adds 150- and 200- KW Air- or Water-Cooled Power Blocks to DX Series MW Transmitter Line

Harris has expanded its high-power DX Series of digital solid state medium wave transmitters with an EPAC (Expanded Power Amplifier Cabinet) that makes it possible to create 150- and 200-kW "power blocks." Power blocks, used to configure DX systems through 2000 kilowatts, originally were only available in 100-kW air-cooled models.

Harris' EPAC is added to a basic 100-kW power block to increase output to 150 or 200 kilowatts. Each power block uses Harris' Digital Amplitude Modulation process to generate a signal by digitally varying voltage to solid state RF power amplifiers. High-power DX systems operate multiple power blocks in parallel and then sum output in a field-proven N-Way combiner.

For even greater flexibility, Harris now offers air or water cooling for 150- and 200-kW power blocks. Air cooling is recommended for systems through 300 kilowatts, and water

cooling — a simpler system — for higher-power systems.

Harris-patented Digital Amplitude Modulation technology was introduced in the DX 10, a 10-kW transmitter, in 1987. Today, more than 500 10- through 300-kW DX Series transmitters are operating worldwide; a 600-kW model has been demonstrated, and Harris is preparing to deliver the world's first two 1,000-kW DX systems.

—Martha B. Rapp,  
Manager — Public Relations

### Want to Learn More...

...about Harris radio transmitters? Just fax your request along with your name and mailing address to Harris Allied: (U.S. and Canada) 217-222-0581, (International) 217-224-2764.

# PRODUCT Showcase



**VoxPro™ Digital Sound Editing System by Audion**

You can rely on us to bring you the most innovative broadcast products available in the industry. VoxPro™ is the first digital sound editing system specifically designed to replace reel-to-reel tape recorders used on the air. VoxPro's most valuable benefit for "on air" professionals is its ability to record and edit telephone bits quickly and to improve quality easily. All this without the fear of making mistakes.



**Nigel B  
35" Power Strips**

With most racks 70" high and power strips made in 48" lengths, using two strips linked together is impossible because their combined length equals 96". The other problem is power strips that utilize the ends for cord intake.

Nigel B power strips are made in 35" lengths with the power entries side-mounted.

The 35" length make them suitable to be joined together to make one 70" strip. Twenty-four usable outlets take up less space in a 70" rack.

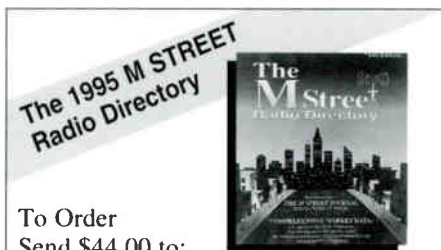
At NAB '95 we unveiled the world's first affordable digital console developed specifically for radio — the DRC1000 by Zaxcom Audio and Harris Allied. The basic unit offers 11 AES/EBU inputs, 7 output buses and can grow to fit any size facility. Can you believe analog inputs are optional!



**DRC1000 Digital Radio Console  
by Zaxcom Audio**

Designed to emulate the form, fit and function of familiar analog consoles, the DRC1000 has a 10-fader control surface. Each fader includes an 8-character LED display.

Call Harris Allied toll-free for complete details on this exciting new console that will be shipping in October.



To Order  
Send \$44.00 to:  
M STREET Corp.  
304 Park Ave. S., 7th Floor  
New York, NY 10010  
*make checks payable to "M STREET CORP."*

Considered by many to be the most authoritative source for radio station information. This 8" x 9" soft cover book lists addresses, phone numbers, personnel, formats, facilities, owners, markets and ratings for over 13,000 stations across the U.S. and Canada.



**Comrex Codec Buddy Remote Mixer**

A multifunction remote console designed to be used with digital audio codecs. The Buddy is a complete remote studio providing audio mixes for program feeds, communications, headphones and public addresses.

The Codec Buddy is also great for use with multiline frequency extenders or as a stand-alone remote console for use on a single, analog phone line.



**Symetrix 610 Broadcast Audio Delay**

Hold unwanted comments (*and their liabilities*) at bay while your stations' talent does their job with confidence and peace of mind.

As your program begins, the 610 gradually and unobtrusively delays or 'stretches out' the program until 7.5 seconds of 15kHz bandwidth stereo audio is stored in memory. Offensive comments are avoided by pressing the 'Dump Profanity' button. The memory is cleared and the host releases the offending caller. When the 'Dump Profanity' is pressed again, the 610 automatically begins to stretch the program audio again until the full 7.5 second delay is attained.

Illustrations, drawings, descriptions, measurements, weights and prices are subject to change without notice. Leasing and financing are available in most states with approved credit plus sales tax. Harris Allied disclaims any implied warranties of merchantability or of fitness for any particular purpose. Since Harris Allied cannot control the manner of use of products after their sale, Harris Allied will not be responsible for any consequential or indirect damages. Since Harris Allied is only acting as a distributor of products manufactured by other companies, Harris Allied expressly limits its liabilities to any warranty extended by the manufacturer. Harris Allied will pass these guarantees through to the customer.

© 1995 HARRIS CORP.





### Audio-Metrics Modular Furniture

Our new furniture line is completely modular. You can mix and match standard components for a perfect custom design for your studio.

Standard components can be shipped UPS and are available in a variety of colors, both light and dark, and are available in stand-up or sit-down heights.

Audio-Metrics modular furniture is sturdy, looks great and can be assembled by one person with basic hand tools and a drill.

All furniture is guaranteed with in-stock replacement parts and technical assistance. Any custom request will be accepted and quoted.

Audio-Metrics is available now for quick delivery from Harris Allied.

## Call Later.

Our extended hours make it easier to call on the service, selection and support of Harris Allied, the nation's largest supplier of broadcast equipment.



### Eastern

8:00 am-8:00 pm



### Central

7:00 am-7:00 pm



### Mountain

6:00 am-6:00 pm



### Pacific

5:00 am-5:00 pm

These Russian-manufactured microphones might not win any prizes for looks — so, who cares! The bottom line is that the Oktava MK012 and MK219 perform beautifully and come with an extremely attractive price tag from Harris Allied.



Oktava MK012 & MK219

These cardioid microphones have been put through some critical comparison tests with the industry leading mics and have left broadcasters pleasantly surprised with their high quality sound. We invite you to test one out for yourself. Hearing is believing with Oktava from Harris Allied.



Sine Systems' MBC-1

A light bulb in a little box that says "ON AIR" was a great idea — 70 years ago. Welcome to the 21st century with a totally new way to say "ON AIR." The MBC-1 from Sine Systems, combined with a locally purchased off-the-shelf electronic message board, results in a versatile and attractive studio display system.



Sine Systems' ACM-1

Are your tower lights on? The answer is important to public safety — and the FCC. Unlike other devices that tell you only if the lights are on or off, the ACM-1 AC Current Monitor allows you to detect a change in average lighting current as small as 1%. This is sufficient to spot a single bulb failure in most systems. One ACM-1 can monitor up to 70 amperes and works equally well on beacons and side-lights.

Turn your telephone into an "on-air" system with Gentner's TeleHybrid.

Telephone calls for broadcast, teleconferencing and pro audio applications just got easier. TeleHybrid is the key to simple, great sounding telephone calls on your professional audio system.



TeleHybrid by Gentner

TeleHybrid connects to your existing telephone and delivers full duplex audio to your console or conference system without echo or feedback.



AB-100 On-Air  
Announcer's  
Console  
by Clear Com

The AB-100 is a compact desktop unit designed for sports, live events, and voice-overs. The ultimate broadcast-quality tool for your announcers and commentators, the AB-100 integrates all of the inputs, outputs and controls necessary at the announce position.

### The "Talking Duck" By Broadcast Tools

It's brand new. It's unlike any other product available. It's the "Talking Duck" Audio Circuit Identifier.



The Talking Duck provides a convenient and accurate way to identify any and all of your remote circuits. With a push of a button, the Talking Duck allows you to record an identifying message up to 16 seconds in length.

Don't let your remote circuits ruffle your feathers any longer. Call Harris Allied to order your Talking Duck.

# RADIO Today

## RADIO-DINER™ Provides Stations New Non-Spot Revenue Source

By **MARTHA B. RAPP,**  
Manager – Public Relations

Imagine a mobile studio and/or entertainment environment that accommodates up to 20 guests and can be used by your air talent and sales crew year-round...

A custom designed and equipped vehicle that can practically pay for itself even before delivery...

A non-advertising revenue source that can be rented to brand managers and service providers for special go-anywhere promotions and demonstrations...

Sound too good to be true? It's not. It's called the RADIO-DINER™ and it's hot.

Although the RADIO-DINER only made its debut last October at World Media Expo '94, radio stations in dozens of markets, including Dallas, Detroit, Seattle, Washington D.C., Fresno, Atlanta and Miami, already have taken delivery of the vehicle, and even Rio de Janeiro is on line.

The RADIO-DINER is the brainchild of Bob Lewis, a former radio station sales manager who had an idea for a mobile media business in 1989. Lewis established a firm — Measured Marketing, Inc. in Atlanta, Georgia — to develop the concept at about the same time progressive radio stations began searching for non-advertising sources of revenue.

### RADIO-DINER Development

Product development for the RADIO-DINER began in earnest in 1992 when Lewis started working with Air Stream, an Ohio-based RV manufacturer.

Featuring the silver bullet-shaped body, Air Stream vehicles are highly recognizable. Every RADIO-DINER is highly stylized: some boast candy-striped awnings and include matching umbrella tables. Others intended for use by duopolies have rotating signs that allow call letters to easily be changed. Still others have prominent scroll-type "motion" signs that can be varied for individual promotions.

While appearance is the most notable part of the equation, radio stations also can order

RADIO-DINER's custom-equipped for their precise form, fit and function. Harris Allied's Richmond, Indiana radio-studio operation supplies equipment and integration and offers several benefits: With a line of more than 10,000 different products from 350+ leading manufacturers and a staff of applications specialists, Harris Allied can provide the equipment best suited to a station's precise requirements. Additionally, the technical staff, with more than 60 years' experience, ensures that each installation is handled professionally.

The end result is a vehicle with universal appeal: "Fourth graders gawk and consumers of all ages respond. They don't see a boring van — they see a diner and are attracted immediately."

### Beyond the Vehicle

Still, the identifiable, glitzy vehicles are only part of the equation: RADIO-DINER stations become members of the nationwide Mobile Media Network. "Our goal is to teach radio broadcasters how to work with mobile media," says Lewis. "We form a partnership with every station that buys a RADIO-DINER; each of these stations, in a sense, becomes a 'network affiliate.' Instead of selling air time, however, this network provides mobile marketing space."

Lewis explains the concept: "Assume a radio station only needs its RADIO-DINER three to six four-hour shifts per week for remote broadcasts and other station business. This leaves up to 18 four-hour avails each week when the diner could be generating revenue by being rented for such uses as short-term demonstrations or promotions by product or service suppliers. This is where Measured Marketing steps in."

For example, a product brand manager who wants to arrange samplings in 25 markets nationwide can contact Measured Marketing to coordinate with RADIO-DINER affiliates. In turn, Measured Marketing will handle all logistics, ordering products for the samplings,

and even arranging temporary staffing if necessary!

"One hardship most stations face is that they're always strapped for time," Lewis says. "We help stations get their hands around a non-traditional revenue stream. The firm even provides on-site training in mobile media programming and logistical operations for its customers," Lewis says, "and is starting a network newsletter."

While some stations say they cannot afford a RADIO-DINER, Lewis stresses that 95 percent of all customers to date have been able to raise capital from non-spot revenue sources even before the diners are delivered. For stations that do not want to make an outright purchase, three- four- and five-year leases are available.

Stations that become involved in mobile media typically budget \$37,500 to \$50,000 a year for operations. Most stations initially name a manager to handle RADIO-DINER logistics and also drive the vehicle. This allows mobile media staff to grow as revenues grow.

Beyond orders received to date, Lewis says Measured Media has received many letters of intent. He projects that as many as 75 RADIO-DINERs will be on the road by the end of 1996.

RADIO-DINERs are intended to be veritable icons on wheels for their radio station owners. Playable to any format (Country Cafe, Classic Rock Cafe, Good Times Oldies Diner), the media-based Diners are sold as "market exclusives" — only one to a given area. If the concept sounds good and there's already a RADIO-DINER in your area, don't worry: Lewis says Measured Marketing has a second distinctive vehicle in the works. Stay tuned.

-----  
For more information contact Measured Marketing: Telephone 404-455-1757 or fax 404-455-6604.



RADIO-DINER arrives in Richmond for outfitting

## Harris Allied Provides Turnkey Installations for RADIO-DINER™

One was custom-designed for a major market A.C. morning show with microphones for six. Another equipped for a country station featured an elaborate all-calfskin interior. A third was earmarked as a unique way to promote a major market personality, and still others have been outfitted as on-air studios for music stations.

In fact, Studio Technician Gary Hardwick reports, every RADIO-DINER arriving at Harris Allied's Richmond, Indiana facility for outfitting, has been different and unique. Since January 1995, that has been quite a few Diners: Hardwick and colleagues Jack Harris, Ron Oler and Tim Elstro have been turning out one RADIO-DINER every 10 days or so.

Broadcasters who order turnkey diners specify upfront how they want their trailers equipped. Although a menu listing all components needed for specific applications has been developed, Harris Allied can provide any piece of equipment in its line. "Our product range is definitely a benefit," says Harris Allied Broadcast Center's Chris Steele who serves as RADIO-DINER sales

coordinator. "And we can provide virtually anything at the best price."

When a RADIO-DINER arrives at Richmond from the Air Stream factory in Jackson Center, Ohio, Harris Allied is ready: All components are on hand and the technical staff is ready to tackle the two-day job.

Gary Hardwick stresses that every diner involves a variety of components. "It's not just a console or a CD player," Hardwick says. The majority also are equipped with RPU gear for remote broadcasts.

Although every RADIO-DINER is unique, Harris Allied and Air Stream have developed furniture configurations that make the best use of space and special wiring harnesses to facilitate equipment installation for any conceivable need. The Harris Allied crew also ensures that every part of the system is clearly labeled. "Ease of set-up is important," Hardwick says, "so you can just pull up, turn on the generator, and be ready to broadcast. Anyone with any knowledge of radio should be able to operate this system."

Harris Allied provides a customer manual including a wiring sheet and "how-to-make-it-work" information with each turnkey diner it provides. For added peace of mind,



**Harris Allied Studio Technician Gary Hardwick**

Hardwick adds, "Everything is fully tested and functional when it leaves here."

With 22 years in radio — the last four with Harris Allied, Hardwick thinks RADIO-DINERs are great: "I do know that remote units can make money, and the Diner/Cafe could even provide complete studio back-up if a station had a fire. It's a neat vehicle. If I were on the receiving end, I could think of endless possibilities."

## It's Modular! It's Reconfigurable! It's in Bullet-Proof Casing! Introducing Audio-Metrics Studio Furniture

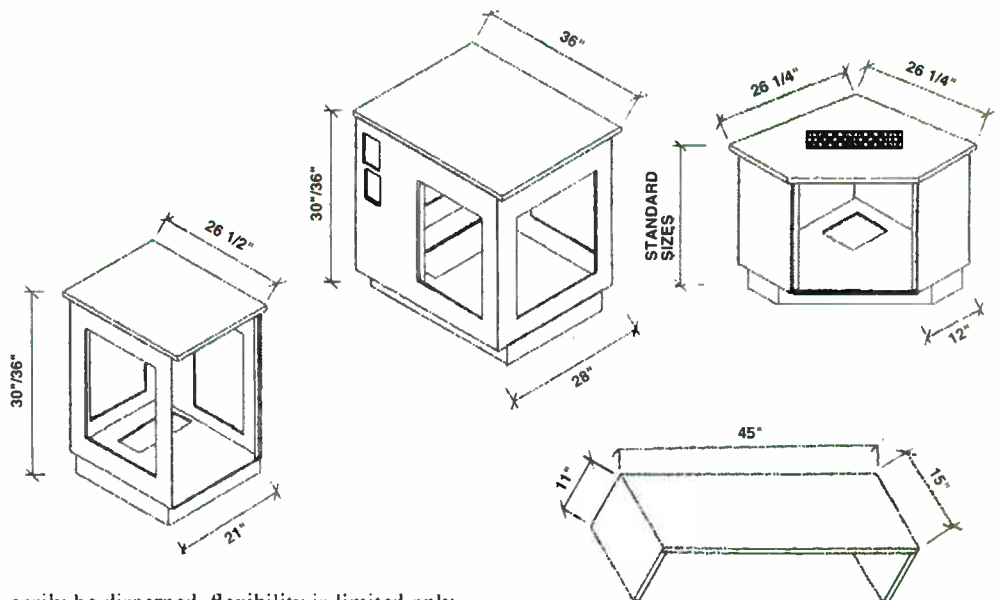
By DAVE BURNS,  
Radio Studio Products Manager

Standard, off-the-shelf, ship-now furniture is not new. This system of selling, buying and installing studio furniture has become a standard in broadcast studios of all sorts and sizes. It's attractive, easy to put together with minimum skills and tools, and generally costs much less than custom studio furniture and the local kitchen cabinet expert.

Think of the new Audio-Metrics Studio Furniture as a series of modular and re-configurable bullet-proof cases. Cases that go together to showcase and house digital and analog equipment.

Sturdy knock-down hardware speeds on-site assembly and ensures precision. The structural integrity achieved is that of a "built-in-the-shop" custom cabinet.

Accompanying drawings show several of the standard components and their dimensions. These components mix and match to form the furniture needed. Typical variations are represented in figures 1, 2 and 3. As can



easily be discerned, flexibility is limited only to the extent of the desired end results.

Audio-Metrics Studio Furniture is completely modular permitting a design unique to your station. Sit-down or stand-up operation heights are standard. A variety of standard colors are available, or we'll customize to any laminate or finish on special order. Technical assistance is always available.

Audio-Metrics Studio Furniture is generally in stock for prompt shipment via Fed X, UPS or your specified method. And once on

site, the furniture assembles easily with one person, basic hand-tools and a drill.

Available through Harris Allied, Audio-Metrics Studio Furniture provides the form you're been looking for and the function to practically and cost-effectively enhance your studios and operations.

For more information, please call: In U.S.: 800-622-0022; Canada: 800-269-6817; International: 317-935-1704.

## Feedforward Correction Ensures Superb Linearity in Sigma™ Series Class A/B Solid State Amplifiers

*Technique Provides IPA Linearity Needed for Digital TV Transmission*

By MIKE BELLIS,  
Tube Development Manager  
TV-RF Product Line

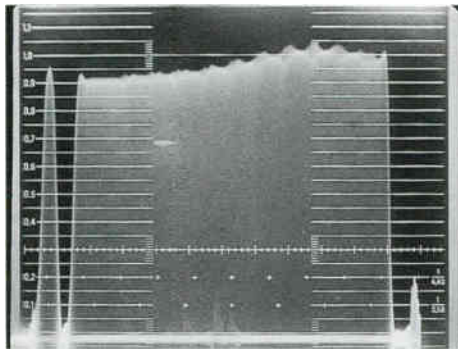
For superior efficiency, solid state amplifiers are generally operated in class A/B. This is particularly important for high power amplification. Unfortunately however, class A/B operation results in distortions that can be more difficult to linearise.

While traditional low power predistortion techniques can be used to correct the problem, a much more elegant solution exists. This solution, which has been used for many years to good effect in the communications industry, is feedforward correction.

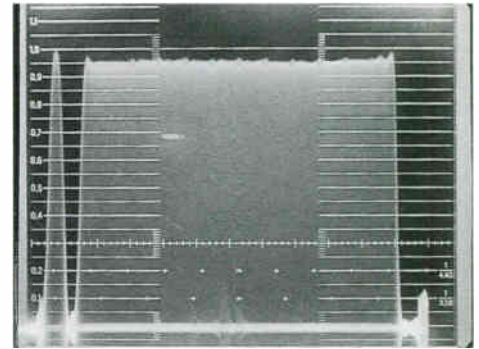
Feedforward correction has proven to be a very effective way to improve amplifier linearity. In the broadcast application, this technique results in the simultaneous correction of all major parameters, including low frequency linearity, differential gain and phase, incidental carrier phase modulation, and, in combined aural and visual amplification, intermodulation products.

Harris has adapted feedforward correction for use on the intermediate power amplifier (IPA) of Sigma™ Series transmitters. Because Sigma transmitters use Inductive

**Figure 1**  
Differential Gain:

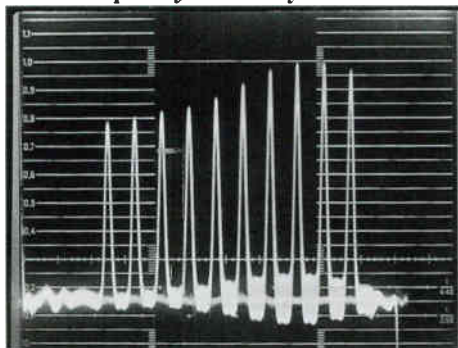


Before Feedforward Correction

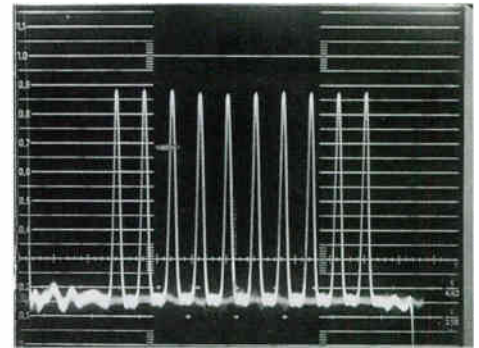


After Feedforward Correction

**Figure 2**  
Low Frequency Linearity:

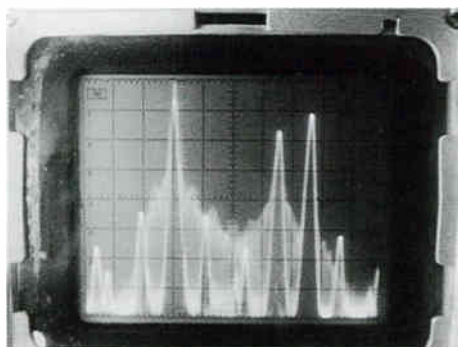


Before Feedforward Correction

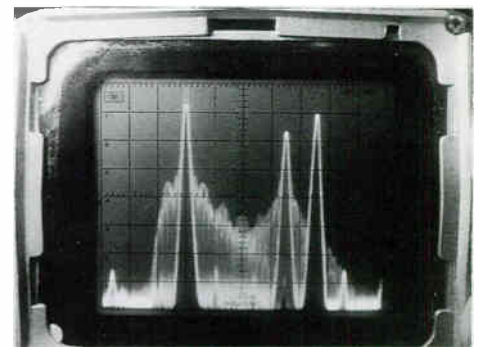


After Feedforward Correction

**Figure 3**  
IMD:

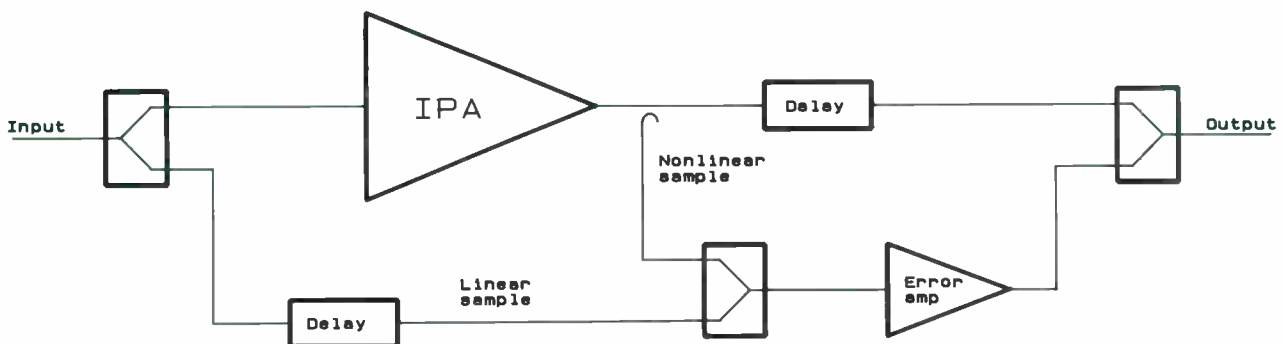


Before Feedforward Correction



After Feedforward Correction

**Figure 1: Typical Feedforward Amplifier**



Output Tubes (IOTs) for combined amplification of the visual and aural signal, very linear amplifiers are required. The result is a class A/B IPA with performance that far exceeds that of a class A amplifier of equivalent power capability.

#### How Feedforward Correction Works

Basically, feedforward correction provides an error signal that exactly represents distortions created by the non-linear amplifier. The error signal is then added back to the desired main signal in "anti-phase," cancelling the distortions originally produced.

Figure 1 shows a typical configuration using feedforward correction. An RF sample is taken from the main signal path and used as a linear sample. The linear sample is delayed by a delay equal to that created by the main amplifier. The linear sample is then mixed in a low level combiner with the non-linear sample taken from the output of the main amplifier. At the combiner input, the amplitude of the two signals are made equal and the phase is arranged so that the carriers cancel out, leaving the distortion products. The distortion products (or error signal) are then amplified by the smaller linear amplifier and added back to the main signal path in anti-phase with equal amplitude, thus cancelling the distortion created by the main amplifier.

In the Sigma transmitter, the main amplifier is the high power class A/B IPA. By using a simple set-up procedure involving adjustments to amplitude and phase, a totally linear output is obtained. Waveforms of the performance of the Sigma IPA before and after the application of feedforward correction are shown in figures 2 and 3. The power output of the IPA is 500W peak sync vision, with 50W of aural power.

The IPA will appear transparent to the pre-corrections for the linearising of the IOT. This part of the signal will be seen by both the linear and nonlinear samples, and hence will cancel at the low level combiner and not be fed forward with the error signal.

While discussions so far have centred around correction of analogue signals, feedforward correction also will prove extremely beneficial when the IPA is confronted with digital signals. Improved IPA linearity will mean that such signals as single carrier VSB and multicarrier COFDM will be amplified without the introduction of severe IMD products.

For more information about Sigma Series transmitters, please contact Harris Allied: Telephone (U.S. and Canada) 217-222-8200, (International) 217-222-8290; fax (U.S. and Canada) 217-222-0581, (International) 217-224-2764.

## Harris 8-VSB Digital ATV Exciter Promises Practical Solution during Transition to Digital Terrestrial TV

The world's first 8-VSB digital exciter, currently being developed as a practical upgrade solution for broadcasters during the transition to digital terrestrial television, was demonstrated by Harris throughout the 1995 NAB Convention. The exciter uses proprietary techniques to achieve bandwidth-efficient modulation of the Grand Alliance (GA) 8-VSB digital ATV signal.

Throughout NAB, the operating exciter filtered and modulated a signal generated by Harris' Random Data Generator. The data generator duplicated the precise segment sync and field sync of the GA format. After modulation, the resulting IF signal was upconverted to UHF channel 47 (671 MHz). Eye pattern, signal constellation and spectrum data was then displayed on Hewlett-Packard's new vector signal analyzer with 8-VSB capability.

Harris Senior Scientist Bob Davis noted that three additional features will be added to the final exciter. These features include

Harris-patented Adaptive Nonlinearity Compensation to linearize the power amplifier; Adaptive Equalization for frequency response and group delay compensation; and Reed-Solomon coding, Interleaving, and Trellis coding in accordance with the GA specification.



"Harris believes this 8-VSB Digital ATV Exciter will provide a robust, reliable, and cost-effective solution for station upgrades as the changeover to digital terrestrial broadcast TV transmission occurs," Davis said.

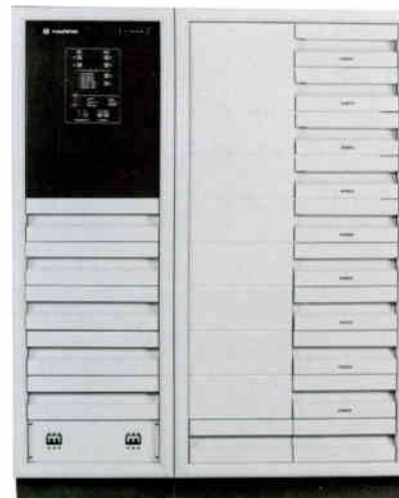
For a copy of a white paper, [Harris 8-VSB Digital ATV Exciter](#), please fax your request to Harris Allied: (U.S. and Canada) 217-222-0581, (International) 217-224-2764.

## Harris Adds 5 and 10 kW Transmitters to Platinum Series® 'EL' VHF Solid State Transmitter Line

Harris has added 5- and 10-kilowatt models to its line of Platinum SeriesR "EL" transmitters. Platinum "EL" transmitters— cost-effective, no-frills-added transmitters that provide maximum field-proven solid state reliability— are also available in 500-, 1000- and 2000-watt models.

Designed for reliable, unattended operation, these transmitters are tested at 6kV mains AC transient to assure reliable operation during storms, brown-outs, and removal and restoration of mains power. Available in combined or main/alternate configurations, EL transmitters feature hot-pluggable solid state modules; a positive pressure air system and regulated power supplies. Options include dual exciters, line frequency offset and NICAM, IRT and BTSC dual carrier sound.

More information is available by contacting Harris Allied: Telephone (U.S. and Canada) 217-222-8200, (International) 217-222-8290; fax (U.S. and Canada) 217-222-0581, (International) 217-224-2764.



**Harris HT ELSHS, 5 KW solid state VHF transmitter**

## BBC Awards Harris Contract for UHF Transmitters, Services

The British Broadcasting Corporation (BBC) has awarded Harris a major contract to provide advanced television broadcast transmission equipment and services as part of an on-going modernization program.

Harris Allied Cambridge, U.K. will provide 32 Harris UltraVision solid state UHF transmitters to replace older klystron transmitters at eight existing BBC sites. The UltraVision transmit-

ters, configured as parallel systems ranging in power from 6 kW to 23 kW, will provide BBC1 and BBC2 viewers with high-quality pictures. The transmitters also will bring stereo sound to several areas where it is not yet available.

In addition, Harris will install the transmitters and refurbish electrical and cooling systems at each of the eight sites. Work will begin in July 1995 and be completed in May 1996.

# SYSTEMS Today

## Unique Custom Capabilities Benefit Harris Allied SNG/ENG Customers

By **JIM SPRINGFIELD**,  
Information Specialist

"Live from..."

Most of us have heard this lead-in from local or national news anchors or special program hosts thousands of times. And, as broadcasters, we know that "live" television or radio coverage of an event requires two things — a lot of work and the right equipment.

Whether you want to cover a breaking news story or bring your audience a concert or a sporting event, Harris Allied's systems operation can provide you with the Electronic News Gathering (ENG) or Remote Production Unit (RPU) units that are custom-suited for the job.

"We understand that each news or production organization has a unique mission based on its location, budget and programming philosophy," said Mark Vorhees, mobile systems sales manager. "Because of this, each one of our mobile systems is essentially custom-designed and built specifically to meet

the customer's particular considerations."

Currently Harris Allied's line of mobile ENG/RPU systems includes seven basic vehicles ranging from small, go-anywhere systems like the M-1/M-1ENG to the M-40, a 40-foot full-audio/video production trailer.

Vorhees noted that while other mobile system integrator offer only a limited set of off-the-shelf designs then expect their customers to adjust their needs to conform to these standard systems, Harris Allied is different. "We offer a set of standard configurations as a cost-effective starting point from which a customized system can be designed," he said.

With over 500 years' experience in the operational and manufacturing side of broadcasting, Harris Allied's systems team is strong in system planning, design, engineering and installation. "When a potential customer comes to us with a concept, our team can sit down and help design a system that is best suited for the requirements," Vorhees added.

This has proven to be especially important for the international market because of differences in television formats, electrical standards, climate, terrain, and telecommunication infrastructures.

Three recent projects illustrate the scope of Harris Allied's expertise:

- Mexico's TV Azteca recently purchased two M-24s to provide production support for sound stages. Instead of purchasing and installing a separate production facility for each sound stage, TV Azteca will be able to simply drive the M-24s to the active sound stage(s); plug them into a hard-wired signal panel, and be ready for action in a matter of minutes.

- Radio Television Malaysia (RTM) is developing remote broadcast and ENG capabilities as part of a long-range telecommunications infrastructure development program. RTM covers a massive area extending from the Malaysian peninsula to the northern part of the island of Borneo.

Harris Allied provided RTM with three M-1ENGs, each built on a Volkswagen LT-45 chassis modified for four-wheel drive capability. Each M-1ENG works in conjunction with a Harris Allied S-21T trailerized mobile satellite uplink system. Each M-1ENG produces raw video with several cameras connected to a wireless microwave link. Raw video is edited and processed with the M-1ENG's production system. The processed signal is then relayed via another microwave link to an S-21T, which sends programming to the network for broadcasting.

- WNCN-TV in the Raleigh-Durham, North Carolina area ordered two M-1ENGs with 58-foot masts—the tallest Harris Allied has ever used on the M-1ENG. WNCN needed the extra height because of the rolling hills and mountainous terrain in its area of operation. To meet this requirement, Harris Allied designed the mast system and its location within the vehicle, taking into account the different center of gravity, wind-loading, and other factors that influence the stability and safety of a vehicle.

"Our experience enables us to design and build systems that will do everything our customers want them to do," Vorhees concluded. "I guess you could say we haven't lost sight of the fact that *custom* is the most important part of our *customer*." 🚀



### Harris Allied ENG and Production Systems:

- M-1** Budget-conscious producer.
- M-1ENG** For radio or TV, it towers above the rest.
- M-11ENG** Radio or TV— with or without roads.
- M-24** Radio? TV? Cable? Industrial? Whatever.
- M-30** Affordable. Manageable. Network capability.
- M-40** Network on wheels.
- MB-30** The big picture in television.

## Harris Corporation — The First 100 Years

Alfred and Charles Harris loved to tinker. When they weren't running their jewelry store in Niles, Ohio, they were inventing. In fact, they had lost a goodly sum of money on a nail feeder invention, a racing-sulky speed indicator, and a 24-hour clock.

Although the brothers agreed not to get involved with more inventions, in 1890 they invented an automatic sheet feeder that would eliminate the laborious job of hand-feeding printing presses.

On December 23, 1895, the Harris Automatic Press Company was incorporated and went into business in two rooms in an old house in Niles.

Their first press was a revolutionary breakthrough, delivering ten times what a pressman could feed by hand!

The Harris Automatic Press Company was responsible for many printing innovations during the early 1900's, including the first commercially-successful offset lithographic press and the first two-color offset press. The company made several key acquisitions in addition to strong internal growth during the first half of the century and became one of the world's largest and most successful manufacturers of printing equipment.

In the mid-1950's, Harris-Intertype (as the company was then called) developed a much broader view of its destiny — to become a manufacturer of electronic communication equipment. In 1957, Harris-Intertype acquired its first electronics business — Gates Radio of Quincy, Illinois (which would become Harris Broadcast Division).

Over the years, the company continued to grow with a series of acquisitions. The most significant occurred in 1967 when Harris acquired Radiation Incorporated of Melbourne, Florida. Founded in 1950, Radiation had quickly become a leading developer of miniaturized electronic tracking and pulse code technologies for the United

States' space program. Electronics from Radiation were used on the U.S.' first communication and weather satellites; by the military for the Minuteman, Atlas and Polaris missile systems, and in the first manned spaceflights, including the Apollo mission to the moon. Radiation also was an early entrant into the microelectronics business, developing its first semiconductor in 1963.

After the Harris-Intertype/Radiation merger in 1967, the company continued to expand its electronics business with the acquisition of Rochester, New York-based RF Communications (1969) and Farinon Communications, a producer of microwave radios (1980) and parent of Digital Telephone Systems and Dracon Industries. These companies, along with Harris Broadcast, are the basis of Harris' communications business.

In 1974, the name of the company changed to Harris Corporation, and four years later, headquarters were relocated from Cleveland to Melbourne. Harris sold its printing business in 1983 and acquired Lanier Business Products— now known as Lanier Worldwide, the world's largest independent supplier of office systems.

In 1988, Harris more than doubled the size of its semiconductor business with the acquisition of General Electric's semiconductor operation.

Today, Harris, a worldwide company with annual sales of approximately \$3.5 billion and 27,000 people, is focused on four major businesses— Electronic Systems, Semiconductors, Communications, and Lanier. While the size and scope of the company have changed dramatically over the past 100 years, the fundamentals remain the same: innovative, high-quality products, systems and services that exceed customer expectations.



The company's first plant was two rooms in the house at Niles, Ohio where U.S. President William McKinley was born

# INSIDE Story

## Appointments Announced



Sparano



Leong

David Sparano has joined Harris as a senior sales applications engineer for the TV-RF product line, based in Quincy. For the past 2 1/2 years, he was a field engineer for Comark, at Southwick, Massachusetts. Previously he was chief engineer for WVCR-FM and a contract engineer for other radio stations in the Albany, New York area. He is a member of SBE, IEEE and SMPTE. David holds a B.S. degree in physics from Siena College, Albany, and an M.S. degree in management from Rensselaer Polytechnic Institute in Troy, New York.

Cal Vandegrift has re-joined Harris Allied as a sales representative in the Pacific Northwest. Based in the Seattle area, Cal will represent Harris Allied's radio-studio line to broadcasters in Washington, Oregon, Idaho and Alaska. With 35 years in radio, Cal has had extensive experience with stations and broadcast suppliers. Cal may be reached by phone: 1-800-566-0773 (toll-free) or 206-874-7444, or by fax: 206-874-8866.

Billy Leong has joined Harris as a senior principal engineer based in Quincy. A 20-year employee of Harris, Leong received a B.S. degree in electrical engineering from National Cheng Kung University in Taiwan and M.S. degree in electrical engineering from the University of Texas at Arlington. He is proficient in Chinese, Mandarin, Cantonese, Taiwanese and writes and speaks some Malay. Prior to joining Harris, Leong held various positions in RF and microwave design engineering.



# A Hot Little Number *uncovered at NAB*



The smoke has cleared. If you didn't make it to NAB, this was the talk of the town. Still is.

So, what's the big deal? We introduced the first digital console developed for radio broadcasts—the DRC 1000 Digital Radio Console by Zaxcom Audio.

And we kept the price very affordable.

What more could you ask for— how about the fact that a basic unit offers 11 AES/EBU inputs, 7 output buses and can grow with you to fit any size facility!

That's not all. Can you believe analog inputs are optional? It's true. All this and much more.



More good news—the DRC 1000 will be shipping in October. Call us for complete details.

1-800-622-0022

FAX 317-966-0623

Southern CA 1-800-690-2828

**HARRIS  
ALLIED**