



# Radio

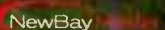
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**REJECTED**

## Patent Office Dismisses Mission Abstract Data Automation Claim

Mission Abstract Data, a company that has pursued action on two patents it holds (5,809,246 and 5,629,867), seems to have lost its fight. The patents, which essentially describe methods of storing and retrieving music on a hard drive system for radio station playback, are the source of legal action where Mission Abstract Data (MAD) filed a lawsuit against several large broadcast-

ers and sought licensing fees from radio stations for using the technology. Several automation system manufacturers appealed to the US Patent and Trademark Office (PTO) claiming the MAD patents were filed on technology that already existed. The Patent Office released a detailed action that rejects many of the claims from MAD. Among the exhibits showing the technology already existed before the patent was filed included materials from Arrakis for the Digilink and Dalet.

In patent '246, claims 1-7, 10, 11, 14, 17, 18, 21, 24, and 27 were rejected. In patent '867 claims 1, 2, 4, 6 and 7 were rejected. While the patents also cover the use of accessing music via a phone or cable network – aspects that are still being upheld – the elements of a PC with central storage and a shared audio file database have been shown to be existing art from the Arrakis and Dalet materials.

Mission Abstract Data has 60 days to appeal, but this action helps radio broadcasters in avoiding liability under the patent claims.

The lawsuit against CBS, Beasley, Cox, Greater Media, Cumulus and others in Delaware is still pending. That case was on hold pending action by the Patent Office and is now slated to convene on Oct. 27.

➔ Read what Mike Palmer, president of Arrakis, had to say on the topic at RadioMagOnline.com.

The SBE honored its 5th and 6th presidents by renaming its annual awards to the James C. Wulliman Educator of the Year Award, and the Robert Flanders Engineer of the Year Award.

Dial Global's completed merger with Westwood One provides more than 200 radio programs/services to more than 7,000 stations.

Cadillac will add HD Radio to the XTS luxury sedan in 2013.



The FCC released the promised EAS Handbook specifically for the Nov. 9, 2011, national EAS test. Find the handbook and reporting forms at [www.fcc.gov/encyclopedia/emergency-alert-system-nationwide-test](http://www.fcc.gov/encyclopedia/emergency-alert-system-nationwide-test).

Broadcast Electronics acquired LocalMedia assets, moving CrowdControl, DJ Wall and SMS Campaign Manager under subsidiary BE Digital Media Solutions.

## 50 Years of FM Stereo 131st AES Salutes the Milestone

After its first four decades of transmitting in mono, in 1961 the FCC chose among competing systems to declare a standard for FM stereo broadcasting. On Oct. 21, 2011, from 7:30 p.m. to 9 p.m., a panel of FM radio engineers gathered at the Clear Channel Studios in the PC Richards & Sons Theater at 32 Avenue of the Americas in lower Manhattan to celebrate FM stereo's 50th anniversary.

The event was a highlight of the 131st AES Convention held Oct. 20-23, 2011, at the Jacob Javits Convention Center in New York. Developed by the New York Section of the AES and by AES Convention Broadcast/Streaming Events Co-Chair David Bialik, the panel was co-chaired by Bialik and Scott Fybush of Fybush.com. Participants included Richard Burden, an original member of the FM Stereo Committee; Frank Foti, Omnia Audio; Richard Mertz, Cavell and Mertz; Arno Meyer, Belar; Robert Orban, Orban; Skip Pizzi, NAB; Bill Sacks, Orban; Eric Small, Modulation Sciences; Jeff Smith, Clear Channel; and former WQXR Radio Chief Engineer Herb Squire.

Topics included FM stereo's birth, the merits of the competing systems that sought FCC approval, the initial technical challenges faced by the new medium, the development of high-density FM audio processing, and the future of analog FM stereo in an increasingly digital world.

### NAB Promotes Cole to EVP, Government Relations

NAB SVP of Government Relations Kelly Cole has been promoted to executive vice president, where she will oversee all advocacy efforts of the department. In addition, Curtis LeGeyt, senior counsel to Sen. Patrick Leahy's Senate Judiciary Committee, will join the NAB as SVP and legislative counsel in the NAB's Government Relations department; he will report to Cole.



Cole joined the NAB in 2006 after six years as telecommunications counsel to the House Committee on Energy and Commerce, where she was an advisor on legal and policy issues relating to communications and the Internet. LeGeyt joins the NAB after serving on the staff of the Senate Judiciary Committee since 2009 as counsel to Chairman Patrick Leahy (D-VT) and then as senior counsel.



### FIND THE MIC AND WIN!

Tell us where you think the mic icon is placed on this issue's cover and you could win a Hosa USX-100 mic-to-USB interface. Send your entry to [radio@RadioMagOnline.com](mailto:radio@RadioMagOnline.com) by Dec. 10. Be sure to include your guess, name, job title, company name, mailing address and phone number. No purchase necessary. For complete rules, go to [RadioMagOnline.com](http://RadioMagOnline.com)



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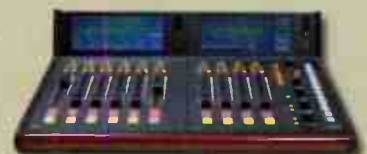
# CHOICES:



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# An End to the Automation Patent Claim?



**W**hen the 2011 NAB Show opened last April, the typical buzz of new technology was interrupted with some confused looks. A company called Mission Abstract Data (a.k.a. DigiMedia) had started contacting radio stations to negotiate licensing fees and filed a lawsuit against several larger broadcast licensees for patent infringement on the use of computer-based radio automation technology. Everyone I spoke to was puzzled by the action. Automation systems have been around for more than a decade, so it was strange the patent holder decided to wait more than 15 years to make a claim. And for the patent holder to go after radio stations – the end users – seemed ridiculous.

Nonetheless, automation manufacturers past and present took it seriously and began their efforts to demonstrate the faults of the patent claim. Radio broadcast trade publications solicited materials from stations to show that computer-based automation systems had been in use before the 1994 patent filing. Manufacturers scrambled to find long-forgotten manuals and documentation.

The outcome loomed over radio broadcasting for several months as appeals and filings were made. But in the middle of October, a sigh of relief came from radio stations when the US Patent and Trademark Office (PTO) issued two office actions that may relieve broadcasters and manufacturers from any potential patent infringement.


The two patents, 5,629,867 and 5,809,246, both relate to a system that retrieves music from a digital database. The patent description included specifications including accessing several hundred songs from a common database of several disk arrays, a processor to program the operation of the station, and work consoles to access the system. Sounds like the system you have likely used all along. There are other provisions in the patent, including access via a telephone and Touch-Tones, and access to the system by a cable TV provider.

Several automation system manufacturers appealed to the PTO claiming the Mission Abstract patents were filed on technology that already existed, and subsequently, the PTO has rejected many of the claims from Mission Abstract Data. Among the exhibits showing the technology already existed before the patent was filed included materials from Arrakis for the Digilink and Dalet.

In patent '246, five of the 10 claims were rejected. In patent '867, 15 of the 29 claims were rejected. While the patents also cover the use of accessing music via a phone or cable network – aspects that are still being upheld – the elements of a PC with central storage and a shared audio file database have been shown to be existing art from the Arrakis and Dalet materials.

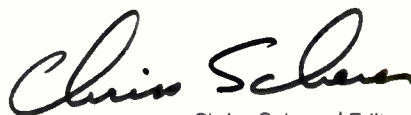
MAD has until December to appeal the decision, and there is still a lawsuit pending. There's little doubt MAD will continue to try to enforce its patent and obtain licensing agreements from stations. Before this is all over, the US PTO will issue a final office action.

## TEST RESULTS

The national EAS test will take place as this issue is being mailed. *Radio* magazine has followed the planning and information sharing leading up to the test, including posting a video to demonstrate what radio stations will experience on test day. We welcome your feedback on the test event. Post your comments at [RadioMagOnline.com](http://RadioMagOnline.com). 

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World Radio History



by Jeremy Ruck

# Directional Antenna Basics

**T**here is no way to cover all the important concepts of directional antennas in a single column.

There have been many voluminous tomes written about this subject. This month we will look at some of the basics of AM directional antennas, and in subsequent months delve deeper into the directional array.

The first thing to remember about antennas is that every one is, in some way or another, directional. The only truly non-directional antenna is the isotropic radiator, a theoretical construct, which would look like a point source in space with no preferred direction of radiation. Although the sun, at a distance, is isotropic, an antenna with that quality cannot be constructed. Beyond the disturbance caused by the feed point, an isotropic antenna would ultimately violate Maxwell's Equations.

The ground plane antenna, which is the general topology in modern run-of-the-mill AM systems, is for practical purposes, non-directional in a given horizontal plane. Although the local environment and construction of the antenna will tend to induce some directional characteristics, we can consider such an antenna essentially non-directional in nature. In the vertical plane, the situation is very different. The sinusoidal distribution of current in the radiating element results in directional characteristics in the vertical plane. This directionality can cause nighttime interference to other facilities. Conversely, this vertical plane directionality can also be used to prevent interference in certain regions by varying the radiator height.

The directional AM antenna is comprised of two or more active elements. The topology of the directional array usually falls into four broad categories. The simplest, in-line array, consists of two or more elements along the same azimuth.

Similar to the in-line array is the dogleg. The dogleg is typically a three-tower array on two separate azimuths. The center tower is common

to both azimuths, and the result is a "bend" in the middle of the tower line. Ultimately, a dogleg would not necessarily have to be limited to three towers, but does have to be based on an odd number of towers.

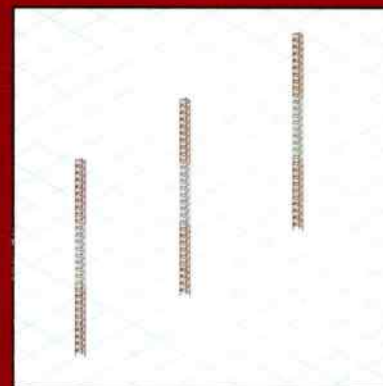
Next in complexity is the parallelogram. The parallelogram consists of an even number of elements and is characterized by a quadrilateral shape. This shape may range from a square, through a rectangle to a parallelogram that looks like a box squashed almost flat. Typically, any design where the array looks like a four-sided figure with the opposite sides equal in length will be referred to as a parallelogram.

The fourth and final broad category includes those designs that do not nicely fit into the other three categories. They include designs with several tower lines, odd inconsistent spacings and strange orientations. For instance, there is an array in Southern Illinois that started out as a three-tower in-line to which two additional towers were added. These two towers were added on separate lines, so from the air the array looks almost like a trapezoid.

## STAYING IN PHASE

The geometry of the array defines the basic shape of the pattern that will result. Included in the geometry is the orientation of each of the towers as well as the spacing between the elements. In addition to these values, each tower also has an associated field ratio and phase relative to a reference value. These parameters, along with the input power and afore discussed height, define the theoretical parameters of the pattern.

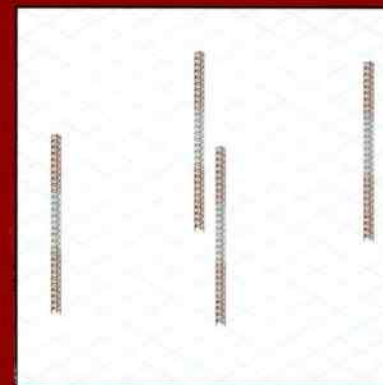
The creation of these various field ratios and phases is the job of the phaser and the ATU (antenna tuning unit), which you may sometimes see as ACU or other similar term. As the RF enters the phaser cabinet, it will usually encounter a common point trim circuit, which transforms the impedance of the actual common point into something the transmitter



An inline array has two or more towers in a straight line.



A dogleg array has an odd number of towers oriented in a right angle.



A parallelogram array has a quadrilateral shape that ranges from a square to a parallelogram.

will like. Typically, this is an impedance of 50Ω resistance and a few ohms or less of reactance. In a directional antenna system, the current and impedance at this location is what defines the input power to the directional antenna. Unless subsequently modified, the input power for a directional antenna is 8 percent above nominal powers of 5kW or less, and 5.3 percent above nominal powers greater than 5kW.

The actual common point lies beyond the trim

**ARE YOU AN AM DIRECTIONAL SPECIALIST?**

The Society of Broadcast Engineers Program of Certification offers a specialist certification (AM Directional Specialist or AMD) to help evaluate an individual's ability to perform the necessary tasks to keep facilities operating properly. Maintaining directional antenna arrays involves a higher degree of skill and understanding of RF theory.

The exam covers the operation, maintenance and repair of a directional antenna system. It also gauges a person's knowledge of AM radiators, understanding of the principles of phase

addition and cancellation, familiarity with the various components used in a directional antenna system, and ability to correctly make necessary measurements and take proper procedures to make repairs and adjustments to the system.

To apply for a specialist certification, individuals must currently hold certification on the Broadcast Engineer, Senior Broadcast Engineer or Professional Broadcast Engineer Certification level. Contact the SBE for more information ([www.sbe.org](http://www.sbe.org)).

circuit. This location is common to the various networks of the array. Immediately downstream from this location is where the power division and initial phasing will take place. In distributed systems, there may be additional distribution occurring at each tower, but such topologies are the exception rather than the rule.

At the outputs of this network, or networks, the RF will typically enter the transmission line feeding each tower. At the far end of the transmission line is the ATU. This portion of the system takes its RF at the transmission line impedance and transforms it to the tower drive

point impedance using a specific phase shift.

The drive point impedance of each tower is the impedance of the tower when the array is active. It is derived from the self-impedance of the tower and the coupling that occurs with other elements in the array when the array is active. Certain designs can result in a negative tower, which is a condition in which the resistance of the drive point impedance is less than zero. Instead of delivering power to the array, the negative tower is parasitic and absorbs power delivering it back to the phaser. Contrary to popular wisdom, a negative tower is not a nine-headed Hydra unless

the impedance is within a couple of ohms of zero. Such low impedances, regardless of the sign, tend to cause stability issues.

Now that the power is out to the tower, we have to have some way of measuring what is actually there. This is where the sampling system comes into play. Typically, current transformers or sample loops are used to feed a voltage sample back to the phase monitor. Section 73.68 of the Commission's Rules provides the requirements for approved sampling systems. In addition to the sampling system, many arrays still have ways of measuring the base currents. Although no longer mandatory, maintaining the ability to measure base currents is highly recommended as it provides an additional health check on the antenna.

Next time I'll delve deeper into the directional antenna array and look at tee networks. **Q**

*Ruck is a senior engineer with D.L. Markley and Associates, Peoria, IL.*

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by Lee Petro

# FM Translator Moves Granted Under Certain Circumstances

**T**he FCC has proposed the adoption of “floors” that would limit the processing of FM translators in markets where there was not sufficient spectrum for the introduction of future LPFM stations.

In a recent decision, though, the Commission appeared to introduce a limited opportunity for FM translators to be moved under certain circumstances. In the past, the Commission had permitted licensees to file applications to change the transmitter site of an FM translator so long as the 1mV/m contour of the proposed facilities would overlap with that of the previously authorized facility. These applications were treated as minor changes, and therefore, the applicant did not have to wait for a filing window to submit the site change application.

However, licensees began to file two or more minor site change applications to reach a new site, which, if the applicant had filed for initially, would have been treated as a major change application and subjected to competing applications. Informally, over the past year, the Commission’s staff processed these serial applications on a less expedited basis. In the Further Notice, though, the Commission imposed a freeze on modifications of FM translators that

proposed a change in transmitter site into one of the markets that the Commission had identified as lacking sufficient spectrum for LPFM stations.

A recent decision by the Media Bureau may reopen the door to significant site change applications under certain limited situations. In particular, an applicant submitted an application proposing facilities that did not result in overlapping 1mV/m contours, but rather only the 0.1mV/m contours overlapped. The applicant requested a waiver of the Commission’s minor change application processing rules, arguing that since the Commission’s rules preclude the filing of applications that would result in overlapping 0.1mV/m contours, an application to change the transmitter site of an existing FM Translator should be treated as minor under the same circumstance.

The Commission agreed with the applicant, granting the waiver request. In its decision, the Commission noted that the treatment of the application as a minor change would not undermine the Commission’s rules, and would not adversely affect the Commission’s actions in the Further Notice. The market into which the translator was proposing to move was not spectrum limited, and the FM translator was to be used to rebroadcast an AM station.

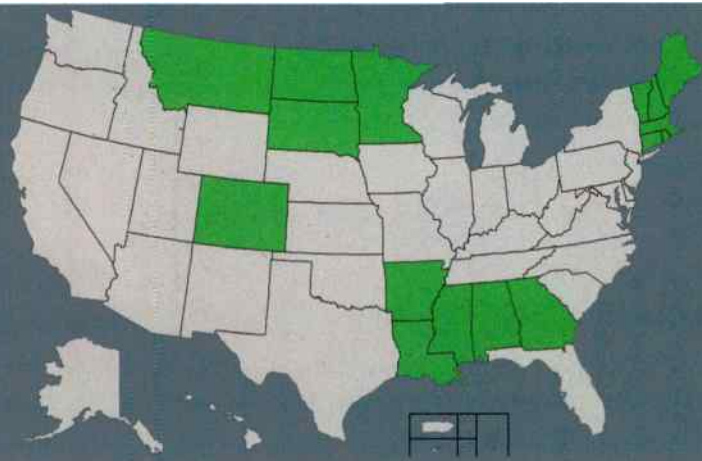
While the Commission did not codify this

policy in a rule, it would appear that future waiver requests would be granted under the following circumstances:

- The licensee in question had no history of filing serial mod applications;
- The proposed modification would have been mutually exclusive with the station’s authorized facilities, even though there was no overlap of the proposed and authorized 1mV/m contours;
- The market into which the translator would be moved had not been identified as spectrum-limited in the Further Notice, and the proposed move would not foreclose any future LPFM licensing opportunities there; and
- The move was intended to facilitate the use of the translator as a fill-in for an AM station.

Since the Commission is currently trying to implement the Local Community Radio Act, a waiver request which proposes both a significant site change and a transmitter site within a spectrum-limited market (e.g., the top 30 markets) would probably not be granted. The relief was granted as a waiver, so future requests will be reviewed on a case-by-case basis, but the referenced factors should guide request preparations. ☺

*Petro is a member of Fletcher, Heald & Hildreth, PLC, Arlington, VA. Email: petro@fhhlaw.com.*



## DATELINE

**Dec. 1:** Stations in GA and AL file License Renewal Application and EEO Program Report. Noncommercial stations also file their Biennial Ownership Report (FCC 323-E). Begin running License Renewal Post-Filing Announcements, continuing on Dec. 16. Jan. 1 and 16, Feb. 1 and 16, 2012.

- Commercial radio and television stations, including LPTV and Class A television stations, file Biennial Ownership Report (FCC Form 323).
- Stations located in AR, LA, and MS begin their pre-filing announcements, continuing on Dec. 16, Jan. 1 and 16.
- Stations with five or more full-time employees located in AL, CO, CT, GA, ME, MA, MN, MT, NH, ND, RI, SD, and VT must place EEO Public File Reports in their public inspection files. For all stations with websites, the report must be posted there as well.
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World Radio History

# PREFABRICATED SHELTERS

By Ron Bartlebaugh, CBNT

Explore the practical, functional, flexible world of manufactured outdoor buildings

**W**hen you need a transmitter building that requires minimal site preparation and provides a lifetime of service and protection with maximum security, durability, quick delivery and set up, then a prefabricated shelter may be your best investment. A shelter can be designed to a customer's specifications for a turnkey installation. The unit will be shipped fully assembled, ready to go, with only utility and ground connections required assuming there has been advance preparation of an acceptable foundation with ample large vehicle site access. A prefabricated shelter can include lighting, electrical wiring and receptacles, heaters, air conditioning and ventilation, standby electrical power generators with automatic transfer



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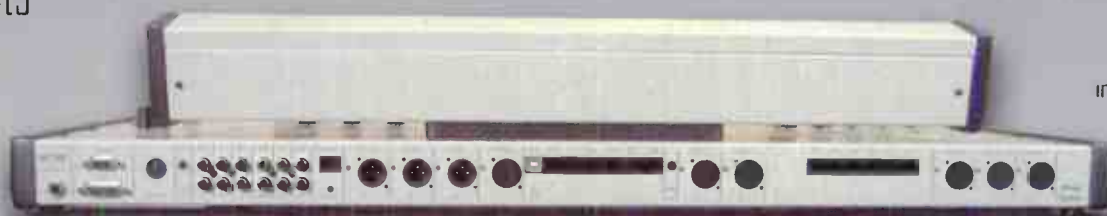
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Once set in place, the building is secured to the foundation pad.



Prefab shelters can be ordered with coax entry panels already installed.

within the building including electrical and HVAC systems connectivity. The building is assembled and completely wired to the customer's exact specifications within a well-controlled environment at the manufacturer's facility. When the

placement and required customization. All leading prefabricated shelter companies have an in-house staff that will work with the customer to ascertain their needs and design a building that best meets those requirements – both now and far into the future. Many companies also offer a high-level of integration assistance where needed by a customer who may otherwise have limited staff or other qualified external services available. In some cases, new broadcast equipment can be delivered directly to a structure manufacturer who will place the equipment

building arrives on site, the station can be placed on the air quickly with minimal effort. That methodology is highly desirable for organizations seeking a turnkey installation.

When planning a building, it is important to coordinate requirements with well-qualified designers, architects, engineers, technicians, contractors, and, of course, the station's owner. Build a team who will guarantee the best possible end result. Closely integrate the local design team with the prefabrication-building vendor's team of in-house experts.

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**WHAT TO LOOK FOR**

Determine the design criteria of the building by calculating several parameters up front. Consider equipment sizes and placements, weights, BTU outputs, ventilation, cooling and heating requirements, and electrical power needs. Specify what RF cables will be entering and exiting the building and where. Note required cable ladders and the need for a cable entry port. Work with the building's design team to create a master ground system within the building (halo type or other as determined) and be sure the building's master ground system is properly connected to the tower ground system. Include EMI and RFI shielding if required. Specify an electrical surge suppressor unit for the building that will protect the entire internal electrical distribution system. When a standby electrical power generator is to be placed, specify the placement of its automatic transfer switch (ATS) within the building.



HVAC can be built into the shelter.

Many building manufacturers can provide a structure that will include a separate room for housing the generator within projects that have a sufficient budget for such. Be sure to include the necessary surge suppression systems for all incoming and outgoing RF lines, communications and data lines, etc. For customers located in heavy snow and ice climates, roof weight bearing load should become a design criteria along with roof protection from fall-

ing ice formed on adjacently located towers. Also include protection over externally located emergency standby power generators and other critical equipment located in a similar manner.

To further protect the new facility, specify a highly functional and reliable security system that will monitor and/or detect the following parameters: intrusion, high and low temperature, humidity, air conditioning compressor lockout, smoke, fire, tower intrusion, building external

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entry port ground system tampering (copper theft is an issue), moisture and power failure.

Other considerations for a prefabricated shelter project are site location and access, soil condition, and building foundation preparation requirements and limitations including a hazardous materials EPA study if required, state and local building and zoning codes, laws, rules, regulations, ownership rights, access road right of way legal clearance and utility availabilities. Can a large truck and a crane, if needed, drive into the building location? Can the owners of those vehicles obtain the necessary wide-load permits for driving on the roads leading up to the site? What about other items such as creature comforts (bathroom facilities or toilet rental), potential noise issues and the possible need for noise abatement, neighborhood light pollution from your outdoor security lighting system, drainage (is the site in a flood zone?), landscape needs and maintenance, access road maintenance including snow removal, security fencing including a gate at the access road entry point, and legal agreements with co-tenants, if any.

List the acquisition of the correct size, type, and number of fire extinguishers for the building and a well-equipped first aid center

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including an emergency eye wash station. Also include within the project's budget all the necessary exterior and interior signs such as no trespassing, danger high voltage, emergency contact information, tower registration number and all required RF level notification signs.

Green solutions that include intelligent energy management make prefabricated structures even more attractive in today's environmentally conscious society. Total project cost for a prefabricated shelter in most cases will be much less than comparable site-built construction. Many units are available with GSA code registration and are approved by the building department of most states therefore minimizing the time required to obtain approvals from local building and zoning departments.

Prefabricated shelters are highly practical, functional, and offer a flexible, long term, cost effective solution to many building requirements. **0**

*Bartlebaugh is director of broadcast engineering for the WKSU Stations, Kent State University, Kent, OH.*

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# SHORT-TIMER

Merlin Media makes quick work of a format change

By Chriss Scherer, editor



The studio for WWWW has a window looking into the shopping area of the Chicago Merchandise Mart.

**O**n July 31, 2011, a format switch was thrown in Chicago when WKQX became WWWW News 101.1. The all-news FM station took to the air after a fast 35-day countdown to convert the operation from a rock format to the news format, which included a fully staffed newsroom.

The format swap was the result of the station changing hands from Emmis Communications to Merlin Media. Merlin itself made headlines with the return of Randy Michaels to radio. Merlin bought three stations from Emmis, with WLUP-FM Chicago and WRXP-FM New York being

the other two. Two weeks after WKQX became WWWW, WRXP became WEMP-FM News 101.9. This article focuses on the work at the Chicago station, but much of the efforts were repeated in New York as well.

Converting an existing music format station to all news isn't a simple matter of putting a new air staff in place. The two stations needed to build complete news operations. The process began when Randy Michaels tapped Mark Olkowski to be the technical consultant for Merlin Media. Olkowski then contacted Dan Braverman at Radio Systems. Olkowski has several years of experience with news radio, having been the engineering manager at CBS

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World Radio History

One newsroom workstation in use



New York overseeing WCBS-AM (among other stations). Radio Systems worked with Olkowski at WCBS, which also led to work at KYW-AM Philadelphia, so Radio Systems, too, had experience with news radio operations. Chicago Director of Engineering Patrick Berger also had some experience with news

radio from his days of working at a Milwaukee news station.

The marching orders were simple: Get the two stations ready for an all-news format. The caveat was that the project had to be done in weeks, not months. Braverman described the integration of a format change in an existing space with continuing live operations and using legacy equipment as the perfect storm of complexity.

The Chicago stations are housed in the Chicago Merchandise Mart, which is the second largest building by area in the United States (behind the Pentagon). Its 25 floors span two city blocks and have 4.2 million square feet of space, which includes business offices, retail shopping, scores of luxury boutiques and several restaurants. The studios on the second floor were built in 2000, and WLUP moved in to the space in 2005. At that time, digital routing systems were not widely deployed, so the analog systems were kept in place. That infrastructure still works fine today, and coupled with the short time frame, a complete system replacement was not part of the plan.

## WHERE TO BEGIN?

The first step was deciding where to put the newsroom. Fortunately for Merlin, the office space acquired with the stations had some flexibility. A larger room was located near the studios and TOC, but it was being used by the business office and the interactive group. These departments were moved to another area of the facility that at one time housed the staff of the early version of Emmis Interactive.

Once cleared, the space was prepped for a newsroom. Workstation furniture was moved in so 10 news workstations could be assembled.

Meanwhile, equipment had to be ordered. But a major decision had to be made: how to handle the new audio routing and switching needs. The stations already had fully functioning air studios. The WWWN air studio was ready for live talk with nine mic positions already in place. (The studio was originally built for the Mancow Morning Show.) The on-air console, a Wheatstone A6000, was ready for the new format. But the news operation was going to need not only routing capability, but smarter logic for dynamic mix minuses and split headphone feeds. Radio Systems suggested layering an Axia Livewire system on top of the existing audio infrastructure.

The digital routing system allowed new flexibility for the station. Inherent to most modern routing systems, the station can create dynamic mix minuses and split headphone feeds automatically. The Livewire system also positions the stations for future upgrades as needed, including adding mixing surfaces.

From there, measurements were made to determine cabling needs and equipment was ordered.

TOC already had 15 racks in place. To house the new equipment, two new Middle Atlantic racks were added to TOC, as well as one rack in the air studio. A third rack was added in TOC for the new IT equipment. This was done initially during the LMA, because Emmis is a publicly traded company and Merlin is private, so certain Sarbanes-Oxley rules had to be observed. That third IT rack now houses the station's IT equipment.



A broader view of the newsroom

As equipment arrived at the Radio Systems facility near Philadelphia, the news workstations were built and prewired with StudioHub+. Likewise, StudioHub+ panels were dropped in place at the stations. This preliminary work allowed installation to proceed quickly, which helped the accelerated time schedule. In most cases, the prewiring made the installation plug and play.

## EQUIPMENT LIST

RCS NexGen  
SAS 64000, 32000  
Shure SM-7B  
Wheatstone A6000,  
A7000 consoles for on-air

Added:  
Axia Livewire  
Comrex Access  
Middle Atlantic racks  
Radio Systems CT-2002,  
StudioHub+, integration  
services  
RCS NewsGen  
Telos Hx1

## OUTSIDE EFFORTS

To pull cables and upgrade the electrical service as needed, as well as some drywall work, Patrick Berger took advantage of his already existing relationships with the building owners and trades. Chicago is known for its strong unions, but there were never any difficulties in getting the work done. The building has several trade contractors it uses, and those groups had already worked in the radio station, so it was easy to outline the scope of the project and set them to work.

Because most of the equipment is connected with StudioHub+, it wasn't necessary to spend time attaching multitudes of connectors. Low-voltage contractors could handle the wiring.

The Newsroom workstations are all built the same. Each rack has two Axia Router Selector nodes, a Telos

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## FACILITYSHOWCASE

Hx1 hybrid, a StudioHub+ 10-slot panel populated with modules to essentially create a small mix position with a mic input, headphone output, source selector, profanity delay control and additional I/O. An air monitor, router monitor and convenience outlets are also available. Each news workstation can be put directly on the air for newsroom actualities.

One workstation also houses two Comrex Access codecs so they are visibly accessible at all times. Another workstation has expansion space for another codec if it's needed in the future.

Detail of a newsroom workstation



be routed to on-air use. Once-aired, calls are put on hold so they can be picked up as needed. This eliminated needing a separate business phone and on-air phone system.

### MAKING THE SWITCH

Only 35 days elapsed from the day the new format plans were announced until the format was switched. The last 10 days of this period were used to actually install and configure the new equipment. Once it was on the air, small tweaks were made as they became apparent. For example, additional clocks were needed in new sight lines. Strobe warning lights were moved. A second automation system monitor screen was added for the on-air cohort. Berger notes that a few items weren't completely ready for the cutover, but the staff has been professional about the process to implement the small changes.

While layering a system on another system is not usually the ideal solution, it worked for Merlin because it provided the fast turnaround the company needed while preserving the existing infrastructure. The stations' lease will be renewed in 2015, and the current plan is to implement a facility-wide upgrade at that time. But for now, the all-news format is up and running and on the air. 📻



WWWN air studio

One challenge for many stations, regardless of format, is the struggle between business phones and on-air phones. For WWWN, one system does both. Radio Systems adapted a Panasonic phone system for broadcast use. This system can access PRI and POTS lines, includes an intercom function and has all the features of a traditional office phone system. With some minor modifications it has been adapted for broadcast. Four extensions are assigned to Telos hybrids on air, so any calls to the station – on air, newsroom or business office – can

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by Doug Irwin  
CPBE AMD

# Using Ferrites

I have worked on some tough RFI problems in my career. In one particular, an AM station was causing problems in an enormous warehouse that stored fireworks; it was getting in to their telephone system as well as an IP-based inventory system (all done via Wi-fi). In the end, judicious use of ferrites solved those problems. That's our topic this time around.

First, let's first review how these RFI problems come about. Any wire in the presence of an alternating magnetic field is by nature an antenna. In the vast majority of cases, the signals induced in those wires are just too weak to matter; however, if the wire is near a strong alternating field (like an AM or FM transmitter) enough

current can be induced to flow in the wire to cause problems with whatever circuitry happens to also be connected to that same wire. The 'other circuitry' could be a telephone, an alarm system, someone's home entertainment system, a computer, or my personal favorite – an oven. (I was an active ham as a teenager – when I got on 40 meters, our house's oven thermostat used to go on and off.)

If you have just moved your transmitter site you have a year to resolve interference complaints inside the 1V/m contour for AM and the 115dBu contour for FM (see 73.88 and 73.318 respectively). Some devices are specifically excluded in 73.318; and perhaps your transmitter site has been in place for way more than a year. Still, it

is probably wise to help your neighbors out in the mitigation of RF interference. Just keep in mind that there are limits to your liability as far as the FCC is concerned anyway.

## A POSSIBLE ANSWER

Obviously when someone or something is near the transmitter site, there is little if anything you can do to move it farther away. Your neighbors probably aren't going to move just to get away from RFI. Likewise you certainly aren't moving the transmitter. So what

has to happen then, to make this problem go away? Well, the installation of ferrites could be the answer. Ferrites work by greatly reducing the current flow, at the interfering frequency, in



the 'antenna' that is the root of the problem. The 'wire' is made to look like a high-impedance at the interfering frequency, thus severely reducing the current flow, and likely curing the problem.

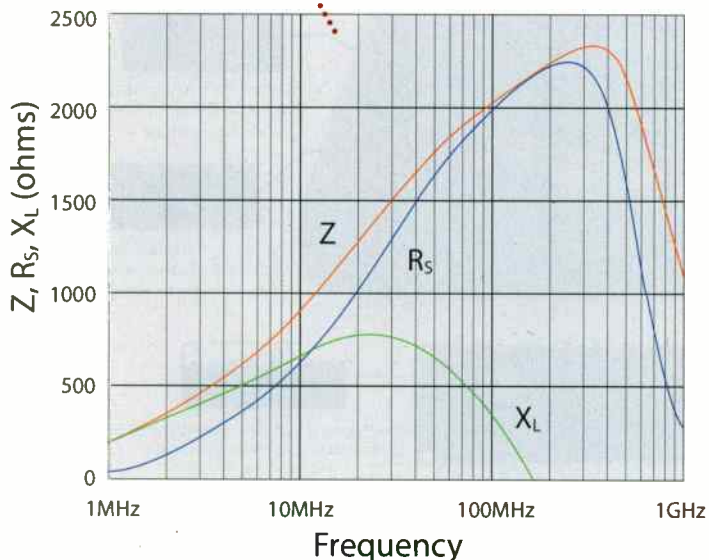
Ferrites come in different shapes, sizes, and formulas: there are ferrite beads, toroids, and split beads. Perhaps most importantly though, is the fact that different formulas are used for different interfering frequencies: mixes 73, 31, 43, 44, 61 and 64 are a few of those. Mix 73 is effective at AM frequencies; Mix 43 would be better for FM frequencies.

Beads are small cylinders through which you can run the wires that are picking up the unwanted RF. Of course to install those, you may have to un-solder, and then re-solder wires in the equipment you are trying to eliminate RF from. That, of course, isn't always practical. Toroids are used to mitigate common mode pickup; in other words, the same amount of RF on both leads (like with twin-lead – you can wrap that around the toroid) or coax – you can wrap that around the toroid to reject RF induced in to the shield. If that isn't practical, you can use split-beads – two pieces that come apart, fit around the offending cable, and then snap together. Likely you've seen these on computer cables before.

Next month we'll delve in to specific situations and how they can be solved. **Q**

*Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at [doug@dougirwin.net](mailto:doug@dougirwin.net).*

A comparison of impedance, reactance and resistance vs. frequency for a material 43 ferrite ring.



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World Radio History

# Adobe Audition CS5.5

by Chris Wygal, CBRE

**F**ew things are more frustrating than a workflow that doesn't flow. Most of us have dealt with systems that either disrupt our projects, or fail to meet our needs completely. Since most of our daily tasks live on a PC or Mac, software purchasing choices will make or break our daily workflow capabilities.

Adobe Audition CS5.5 will enhance your audio production creativity, increase workflow efficiency and fit into your budget. Audition is built on a legacy software design that has been a workhorse in radio audio production for more than a decade. With new cross-platform availability and a fresh look, it brings efficiency for broadcast audio production to current users with Windows, and a host of new users with Macs.

Yes, with its CS5.5 release, Audition is now available for Mac users. In addition to the Adobe Creative Suite 5.5, Audition offers competitive audio design software that will greatly enhance the creative experience while not destroying the budget.

## ALL RIGHT THERE

This version of Audition has been engineered from the ground up. It is considered a "mature version" of Audition 3.0. While the DSP is the same, it's essentially new software. For radio professionals, the dockable effects pane in edit view is world changing. In edit mode, effects can be auditioned in real-time, as opposed to applying the process, or opening audio files in the multi-track editor. For example, if normalizing, hard limiting and touching up with a bit of EQ are standard user processes, that specific rack can be quickly opened and readily auditioned while editing. Audition CS5.5 uses a multiple-core software design that lightens the load on a computer. As far as I/O connectivity goes, Audition will integrate with devices as simple as motherboard-mounted soundcards to extensive Firewire interfaces.

A feature-rich line of effects courtesy of iZotope Radius make processes such as

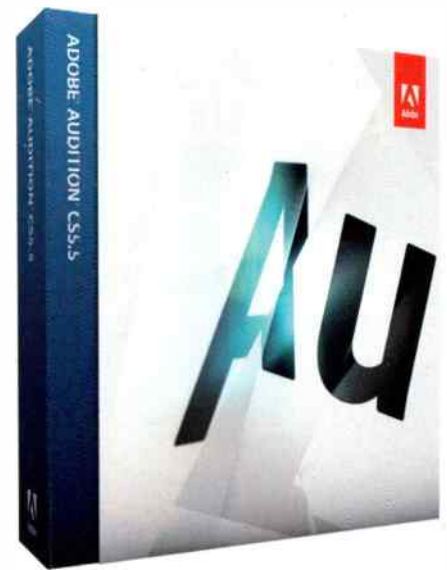
multi-band compression and tube-modeled processors very sweet. On the occasion when quick-fix processing is needed, added features like the speech volume leveler makes sound crafting easier. An endless supply of reverb, echo and delay effects can also be applied for even more creativity.

While not necessarily new to Audition CS5.5, the mastering processor is a paramount difference between Audition and other audio editing packages. With retro, tape and tube exciter emulation, spatial widener, loudness maximizer, reverb and three-band EQ, the mastering processor provides an ultimate tool in creating powerful final mastering. Each effect setting also has many useful presets that can be augmented to create custom user presets.

## A NEW "LOOK"

Spectral view editing is a great way to heal portions of the waveform and pinpoint frequency-specific problems. Audition CS5.5 now allows the user to see the waveform view and spectral view simultaneously. Waveform view lends itself to a more visually familiar way to see the audio while healing the file is more diagnostic in spectral view. Using both at the same time is very effective.

The new design allows for docking and floating panes and windows throughout the workspace. This is one of the more important features in the increased workflow category. While dropdown menus and keystrokes are effective ways of accessing features, displaying them onscreen with the workspace is invaluable. The clean architecture permits more economic use of space. As an example, the effects rack, diagnostics, properties, playlist, selection/view, time display, transport and workspace are all visible in a recent work session I was using. Additionally, that was only on one screen. Many more windows and panes could be docked and floated in a dual-screen work environment. Of the many dockable features, playlist and metadata windows are helpful for tagging and identifying audio clips for automation systems. EOMs can be established



## TOP 5 FEATURES

- > Work on multiple multitrack sessions
- > Multiple-core processing
- > Cross-platform availability for Mac and PC
- > integrates with Adobe Premiere Pro
- > Built-in iZotope Radius effects

using the markers in the playlist window, and BWF, ID3, RIFF and XMP data can be added or edited in the metadata window. All of this is onscreen with the waveform.

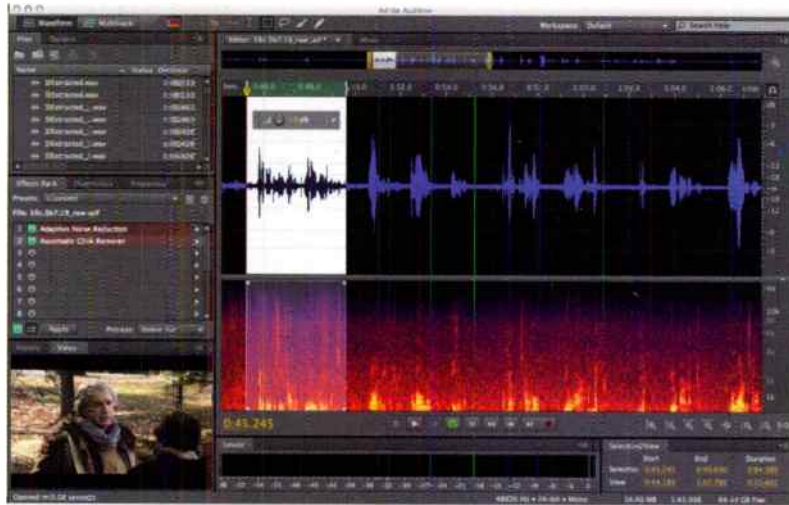
In addition to real-time effects in edit view and the ability to dock and float countless panels, batch processing can be done while editing – a major time saver. Suppose several files in the currently opened session need 60Hz hum elimination and normalizing. They will also need format converting from wave to MP3. Those files can be dragged and dropped into the batch process pane. The processes are selected and the batch goes to work while the user continues editing. More than one session can be open at once as well. This is light-years ahead of other versions of Audition, where users spent a great deal of time saving, closing and re-opening different session all while working on the same project.

The HUD or "heads-up display" is a floating control that hovers over the waveform workspace. It quickly lets the user make amplitude changes to a selected portion of the audio. The HUD is effectively a volume knob that can be clicked and turned, as if on a virtual mixing board. The amplitude levels range from infinity (less than -100)

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Batch process files while editing and use real-time effects in edit and session views.



to +15dB. The HUD can be pinned in one place or moved.

Whether a novice or well-seasoned audio editor, mistakes are inevitable. In more instances than I can count, I've made irreparable mistakes to audio files, many times after the talent has already left the building. Audition CS5.5 features an "undo history" that allows for several layers of undos.

The session or multitrack editor is similar to its 3.0 predecessor, which was in and of itself highly functional. Real-time effects and the same dockable panels are available onscreen however the user sees fit. Audition CS5.5 added a "pre-render track" feature, clickable on each track in the session mixer view. Pre-rendering allows for improved performance in sessions where CPU usage is high. This feature also improves latency

issues. All of the familiar routing, assign and effects bus options are available on the session mixer. A 5.1 audio track can be added to the session as well.

With the inclusion of Audition CS5.5 in the Adobe Master Collection Suite and Production Premium Suite, video editors can integrate Audition with Adobe Premiere Pro. This brings a new realm of audio creativity options to

video editors, especially with Audition's new ability to use 5.1 surround files in the multitrack sessions. Audition uses several SMPTE time sync standards including 24fps, 25fps, 29.97fps and 30fps.

Audition CS5.5 continues in the tradition of smart, efficient and hard-working audio software. The onscreen look is impressive, but the performance is second to none. No compromise is apparent in the effects features Audition has to offer. And if the onboard effects aren't enough, VST and other plugins can be installed as well. All in all, audio and video folks are going to find Audition CS5.5 an invaluable addition to their editing suite. **O**

*Wygat is the programmer and engineer for Victory FM at Liberty University, Lynchburg, VA.*

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## Olympus DM-620

by Gil Wilson

**W**hen trying to decide on a digital recorder you may feel overwhelmed with the selection available. There are so many brands, styles and microphone architectures, that you have to first decide what you want to do with your portable recorder. The Olympus DM-620 may be your be all end all decision. The 620 is flexible and expandable for nearly any future use.

First, the most unique feature of this recorder is the Tresmic 3 microphone system. Tresmic captures a wider stereo sound with two mics mounted left and right of the top of the recorder and a third mic in the middle. The middle mic is omnidirectional and can be adjusted to affect the width of the stereo pickup, from 180 degrees to about 45 degrees. The center omni-directional mic captures lower bass ranges with stunning clarity.

The center mic can be turned off, but the added ambiance of the center mic makes the recordings on this device pop. Take this recorder to a meeting hall and catch the speaker with the mic zoomed in, or questions from the audience using the full 180 degrees of coverage.

Full coverage is also good for capturing surround-

ing noise without overpowering an interview.

Mic sensitivity can be adjusted on the fly by using the left and right buttons on the front of the recorder. These mics can be very sensitive and cover a large distance. The recorder comes with five preset recording scenes and three more user designed scenes for your recording uses: lecture, conference, meeting, dictation and music. Lecture, for the lecture hall focuses on the center speaker, the mic sensitivity is high and the zoom mic is picking up more forward sound. Conference setting still has high sensitivity, but the zoom mic is collecting a full 180-degree range of sound. Meeting is a middle sensitivity setting and dictation has low sensitivity. For music, sensitivity is set by the user. All of these settings can be adjusted and then saved if the settings are going to be used again.

### IN THE FIELD

Recording a live concert with low mic sensitivity was clear and crisp while keeping good bass levels creating a full spectrum sound. No sound loss was ever experienced using this recorder for one-on-one interviews, or city hall meetings. In fact listening to the recordings with headphones puts you back into the



place where the recording was made keeping all sound natural.

The 4GB of built-in memory, microSD card slot and three recording formats allow you to record a lot of audio.

More than 5 hours of linear PCM recording time, more than 131 hours of MP3 recording time and more than 1,000 hours of WMA recording time are available.

Other features include a built-in speaker, standard mini plug headphone jack, a connection for a remote device (sold separately), USB port for charging the included NiMH batteries and transferring files, and a microSD slot for up to 32GB of external storage.

The recorder can be used with either the included NiMH rechargeables or any two AAA Alkaline batteries. Charging time is approximately three hours from dead to full charge for about 19 hours of use time. Using alkaline batteries can boost that up to about 25 hours, but you of course lose the rechargeable aspect. The DM-620 can be recharged through a computer with any USB 2.0 connection or in a USB power station.

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Back on the sensitivity of the mics; I was toying around with the mic before taking it out to run its field tests and at the same time I was watching one of the many ghost-hunting shows on television. I looked at the DM-620 and thought, this device is way better than any of the recorders those guys use for their EVPs. So this sparked an idea, I then contacted a friend who is in a local paranormal investigators group and said, "Hey, take me ghost hunting, I've got the coolest recorder and want to test it."

So we went ghost hunting at an abandoned church where they claim lots of activity takes place. They wanted to do what they call an EVP session (EVP = Electronic Voice Phenomenon, which is claimed to record the voices of paranormal entities). This session involved leaving recorders in the building with no one around and going back to listen. They left their recorder in first. We then went outside and I was checking out the features on the recorder deciding

Tresmic 3 captures a wider stereo sound with two mics mounted left and right and a third mic in the middle.

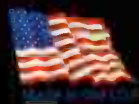
on what settings I wanted to use, I decided to fully take advantage of the center mic, and made the setting for the wide stereo recording, I then decided to set the sensitivity quite high. We collected the previous recorder and I set the Olympus DM-620 to record and we left it in the church. While outside, we analyzed the audio on the first recorder. After collecting the DM-620 we listened to what was captured. We were amazed at the full range of sounds captured. The sound was an exact duplicate of what was heard within, full thumps of our footsteps, crickets outside and then we were amazed at the sound of a ghost, mocking us. OK actually no ghosts found, but this recorder was so good that it not only captured the sounds inside the chapel, but also picked up the sounds outside the building. The recording was of us outside the building in



a parking lot 20' away listening to the previous recording. So if you want range, the DM-620 has it. Not so sure about ghosts. I'll leave that to the professional ghost hunters, and stick with being a broadcaster. 

*Wilson is an announcer, producer, webmaster and promotions guy at WAKO-AM/FM, Lawrenceville, IL, and an independent producer/voice talent.*

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# Telephone Hybrids

**I**t's hard to imagine creating great radio without listener interaction, and the classic form of interaction is the telephone. The basic technology of an analog telephone line (plain old telephone service, or POTS) hasn't changed much over the years, but the ability to send and receive high-quality audio through that phone line certainly has.

Digital technology has given the telephone hybrid outstanding audio specifications in send and receive audio isolation, as well as the ability to adapt for ever-changing telephone line conditions. Digital audio processing has also improved the sonic performance.

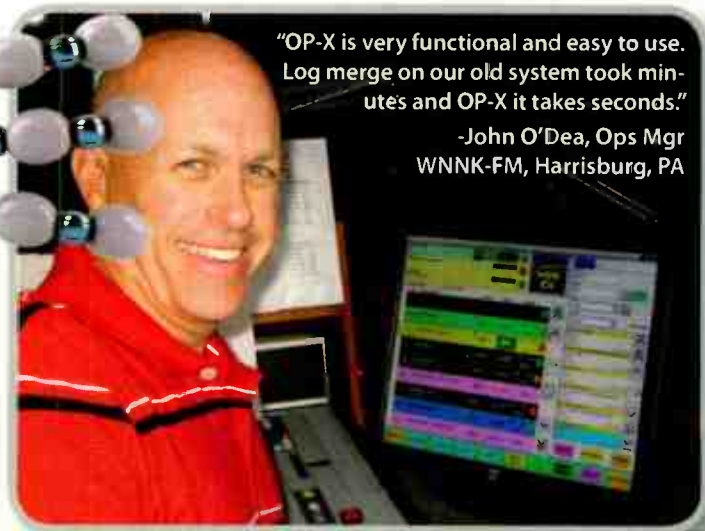
While newer technology for telephony exists, the POTS line is still in common use. We picked four popular single-line telephone hybrids to compare. 



| Model   | AEQ TH-03   | Comrex DH20  | JK Audio Inkeeper 1x  | Telos Hx1   |
|---|---|--|---|---|
| Price   | \$895   | \$995  | \$795   | \$795   |
| Incoming Line Capacity                        | One   | One  | One   | One   |
| Hybrids                                       | Digital with Electronic Echo Supression   | Digital  | Digital   | Digital   |
| Audio I/O                                     | Analog or Digital   | Analog   | Analog  | Analog (AES optional)   |
| Audio input (send)                            | Analog or Digital AES or EBU  | XLR, mic/line selectable   | Mic/line balanced XLR   | XLR, mic/line selectable  |
| Audio output (receive)                        | Analog or Digital AES or EBU  | XLR  | Balanced XLR (2)  | XLR   |
| Send processing                               | 250Hz frequency extender, which enhances bass frequencies   | None   | Input limiter   | Sample rate conversion, high-pass filter, frequency shifter, AGC/limiter  |
| Receive processing                            | 250Hz frequency extender, which enhances bass frequencies. Also includes auto gain control  | AGC, downward expander, caller control (ducking), high/low pass filtering, echo cancellation | Dual convergence echo cancellation, AGC, presence equalization, ducking                 | High-pass "hum" filter, smart AGC/platform leveler, noise gate, caller ducking, Telos' Digital Dynamic Equalization 3-band adaptive spectrl processor, sample rate conversion |
| Input Analog-to-digital converter resolution  | 24-bit D/A converter resolution   | 16-bit   | 16-bit  | 20-bit  |
| Output digital-to-analog-converter resolution | 24-bit D/A converter resolution   | 16-bit   | 16-bit  | 24-bit  |
| Frequency response                            | 300Hz-4kHz (extender off)/50Hz-3,750Hz (extender on)  | 250Hz to 3.5kHz  | 100Hz to 3.4kHz   | 200 to 3.4kHz   |
| Signal to Noise                               | Absolute noise: TX <-66dBm. RX <-68dBm. Cross-talk lower than absolute noise  | >56dB  | 52dB (receive audio during call)  | >90dB   |
| Analog telephone line connectivity            | RJ-11, standard POTS line, 600Ω Z.  | RJ-11 connector, POTS line or analog extension from a PBX or dry line                        | RJ-11   | Universal POTS interface for worldwide application, programmable loop current, auto-answer with selectable ring count, worldwide disconnect signal detection                  |
| Size  | 1RU   | 1RU  | 1.75"x7.3"x19"  | 1RU   |
| Other models                                  | TH-03.1 A (analog), TH-03.1 D (digital), TH-03.2 AA (two-line analog), TH-03.2 AD (two-line analog/digital), TH-03.2 DD (two-lines digital) | DH22 (two-line), DH30 (added functions)  | Tabletop version available, Inkeeper 2 (two-line), Inkeeper 4 (four-line), Inkeeper LTD | Hx2 (two-line)  |
| Weight  | 6lbs 3oz  | 6.35lbs  | 5.7lbs  | 5lbs  |
| Power   | 90-250Vac, 50/60Hz, 20W   | 100-240Vac, 50/60Hz, 30W   | 120-240Vac  | 100V-240V   |

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# NEWPRODUCTS



## ERI-Electronics Research | Broadband coaxial motorized switches

**CS203 and CS400:** The CS203 (1<sup>5</sup>/<sub>8</sub>"") and CS400 (4<sup>1</sup>/<sub>16</sub>"") broadband (54MHz to 862MHz) coaxial motorized switches complete the family introduced by ERI with the CS300 3<sup>1</sup>/<sub>8</sub>" switch at the 2010 NAB Show. The switch family includes a precision Geneva drive and operates on any VHF or UHF channel without tuning or modification. This makes it particularly suitable for use in N+1 transmitter systems.  
[www.ERlinc.com](http://www.ERlinc.com)



## Auralex Acoustics | StudiofoamPro panel

**SonoLitePro:** An entry-level, fabric-wrapped StudiofoamPro panel comprised of Class A fire-rated materials, SonoLitePro presents a low-cost option for sound absorption. The panels are available in two sizes: 2' x 2' and 2' x 4', both 1.5" thick. They are available in black or tan and feature squared edges. Providing an overall Noise Coefficient Rating (NRC) of 0.90, this product is a cost-effective alternative to expensive fabric-wrapped fiberglass panels.  
[www.auralex.com](http://www.auralex.com)

## NeoGroupe | Contest assistance

**NeoAgent:** NeoAgent provides streamlined radio audience facilities including listener self-registration for contest participation; browser-based question input to the NeoScreener database; automated retrieval of SMS and WebForm questions for quick display to NeoScreener operators; contest schedule display in either the on-air schedule or a browser page; and listener self-registration for show attendance.  
[www.neogroupe.com](http://www.neogroupe.com)

## Sound4 | Voice processor

**VoiceL:** Sound4 VoiceL is powered with an HQ-Sound 192kHz audio processing engine, a Sound4 patented technology. Its processing structure includes an advanced de-esser, three-band noise gate, three-band processor, four-band parametric EQ, and a brick wall limiter. Sound4 VoiceL is flexible, its adaptability to all kinds of voice is amazing. From natural tone to big and very structured tone, everything is possible in few clicks.  
[www.sound4.biz](http://www.sound4.biz)

## Aphex Systems | Aural exciter and optical big bottom

**Aural Exciter:** Each of the Aural Exciter's two independent channels feature tune, harmonics and mix controls, enabling focus on select frequencies just like an EQ. But unlike an EQ, the Aural Exciter's harmonic processing doesn't boost the signal's output level, maintaining a clear and balanced sound. The new Aural Exciter and Optical Big Bottom features the same audio quality, with the highest quality componentry and rugged, durable construction to withstand the rigors of travel and constant use. For individual sounds or entire mixes, the Aural Exciter brings out detail, clarity and imaging that elevates sound without adding level. The Optical Big Bottom adds a deep, powerful low-frequency punch, without the unwanted level boost that comes from adding traditional EQ. Deeper, more resonant bass response with tighter articulation helps to extend low frequency power and spectrum without the build-up or driver-damaging tendencies of bass EQ.  
[www.aphex.com](http://www.aphex.com)



## Mackie | Live mixers

**ProFX16, ProFX22:** With increased channel count and useful tools like dedicated inline compression, both of these new models are do-it-all live sound solutions. The 16-channel ProFX16 and 22-channel ProFX22 feature front end Mackie low-noise, high-headroom preamps work with LED metering and 60mm faders on each channel keep levels in check. Every channel also features three-band EQ. All ProFX mixers offer an integrated 32-bit RMFX effects processor with 16 gig-ready effects and a seven-band graphic EQ for simple tuning of mains or monitors. The built-in USB interface allows the user to record the show and stream back music for breaks or integration into the mix. A rugged, solid steel chassis with protective ABS sidecheeks offers impact-resistance.  
[www.mackie.com](http://www.mackie.com)

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*The winner is drawn from the correct entries for the issue two months prior. No purchase necessary. For complete rules, go to [RadiMagOnline.com](http://RadiMagOnline.com).*

### Roland | Portable recorder

**R-26:** Both omnidirectional and XY stereo mic types are integrated into the R-26's chassis, providing mic options to suit any style of audio recording. In addition, there are two XLR/TRS combo inputs with phantom power for connecting high quality external mics or line-level devices, plus a stereo mini-jack for a plug-in powered mic. The R-26 is equipped with Roland's proprietary IARC (Isolated Adaptive Recording Circuit) on the inputs for the built-in mics and as well as the external inputs. This analog circuit is completely isolated from the digital circuitry and has its own power supply, reducing digital noise and achieving very clear sound. Audio from the onboard mics can be mixed internally and captured to a single stereo file. The onboard mics and external inputs can be recorded as three separate stereo files (six channels total) for mixing together later. Resolutions from MP3 up to 24-bit/96kHz are supported, and available file types include WAV and BWF. The unit can also record both WAV/BWF and MP3 formats simultaneously.

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### Audio-Technica | Omnidirectional condenser boundary mic

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[www.audio-technica.com](http://www.audio-technica.com)



### Hughey & Phillips Inc | Dual medium intensity LED strobe system

**Horizon Series:** This system provides daytime white and nighttime red lights in one unit. Its self-contained power supply, with available GPS sync and day/night sensor, simplifies wiring but also accepts external signals if desired. Advanced features include LED modules, cutting edge optics, individual LED monitoring/bypass, and active lightning protection (patent pending). The unit also monitors the system and provides a NO or NC alarm contact upon any system failure.

[www.hugheyandphillips.com](http://www.hugheyandphillips.com)

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## NEWPRODUCTS



### Ledtronics | LED pilot lights

**RPLH Series:** These 22mm and 30mm direct incandescent-replacement panel LED pilot lamps and holders comprise an integrated modular system. The RPLH Series are complete assemblies that incorporate the lens, lamp and lamp holder. Offering sunlight-visible light colors, the lamps feature T3-1/4 (9mm) single-contact miniature bayonet bases that give installation a familiar twist. RPLH Series LED lamp assemblies are rated for 130Vdc/120Vac input ñ 50Vdc minimum. They directly replace 28MB, 313, 757, 1819MB series incandescent bulbs. Colors include: 650nm red, 610nm amber, 596nm yellow, 519nm green, 462nm blue and 8000 Kelvin white.

[www.ledtronics.com](http://www.ledtronics.com)

### Wharfedale Pro | Loudspeaker

**Diva 6:** Based on a two-way co-axial design, the Diva 6 uses a 6" custom Wharfedale Pro transducer with a 2" diaphragm, 1.2" exit titanium compression driver on a coaxially mounted waveguide. The Diva 6 has a very wide frequency response of 60Hz - 20kHz and is capable of 108dB SPL at 1m. The distinctive spheroid ported cabinet eliminates internal standing waves improving efficiency and low frequency output.

[www.wharfedalepro.com](http://www.wharfedalepro.com)



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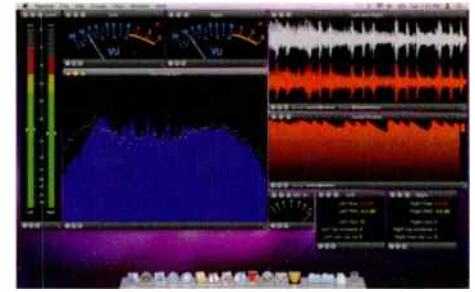


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by Erin Shipp



Maj. Edwin H. Armstrong, Columbia University professor and pioneer inventor of the superheterodyne circuit, and Paul DeMars, the chief for Yankee Network, in front of W1XOJ's transmitter control panel.

## That Was Then: W1XOJ Boston

On Aug. 18, 1937, the FCC issued the first FM construction permit to W1XOJ, Boston. The station signed on in 1941 as WGTR.

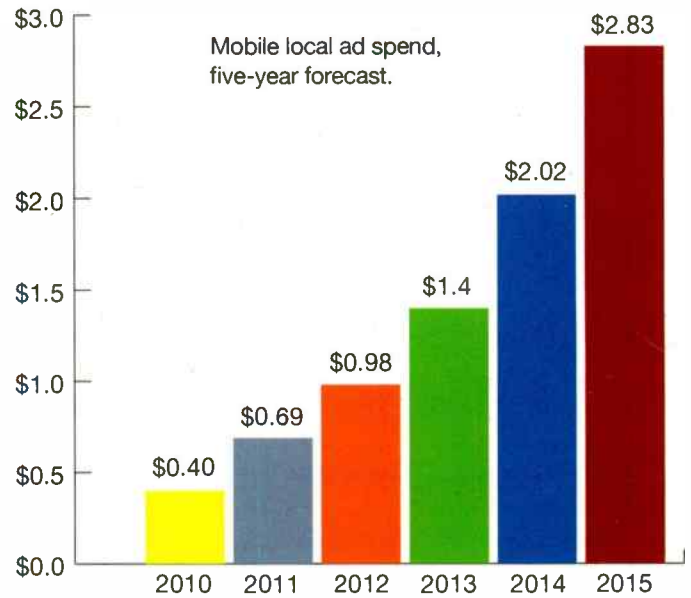
Dan Kelleher is the chief engineer for WSRS 96.1 FM, located on Little Asnebumskit in Paxton, MA, about 1,800' from where W1XOJ was sited. He writes, "W1XOJ at one time had a CP for 300kW on 42MHz. They expected to have a 'city grade' contour covering all of New England past Augusta, ME, beyond New York City to the edge of Philly and west covering Albany and Utica, NY. They never were able to make that much RF but attempted to by installing 10 transmitters and antennas. I do not know what maximum ERP was ever achieved. Edwin H. Armstrong picked this hill and sped the tower and equipment, which was built by REL and paid for by John Shepard.

"It must have been quite a challenge given the technology. The Mass State Police still keeps its 41.5MHz analog FM system in place from Mt. Wachussett. I'm told that is the only signal that reaches into all the valleys of the Berkshires at the western end of the state. And it's 300W ERP.

"The IEEE is looking into the FM relay network as a Milestone Project that should be recognized as a significant technical achievement. The only other Milestone Projects in Massachusetts are the Brant Rock broadcast of Fessenden and the Boston subway system's electric motor and associated distribution system. But they are frustrated with the lack of and conflicting information available."

### MORE ONLINE

Hear a February 1941 audio recording between Armstrong in NY, relayed to Alpine, NJ, Meriden, CT, Paxton and Boston, MA, and Mt. Washington. They talk about S/N ratio, keeping the new diesel generators going, the wx on Mt. Washington and the idea of broadcasting the sound of 200mph winds. You can clearly hear that Armstrong was connected via a telco line, the others are all off air FM.



## Mobile local ad revenues to grow

According to BIA/Kelsey's "Annual U.S. Local Media Forecast, 2010-2015 Mobile Local Media," U.S. mobile local ad revenues are projected to grow from \$404 million in 2010 to \$2.83 billion in 2015. Total U.S. mobile ad spending will grow from \$790 million in 2010 to \$4 billion in 2015. This makes locally targeted mobile ads 51 percent of overall U.S. mobile ad spending, growing to 70 percent by 2015. BIA/Kelsey defines mobile local advertising as that which targets users in specific locations or contains location-specific calls to action. Among the drivers of mobile ad revenue growth are smartphone penetration, mobile Web usage and related increases in ad inventory.

### Total Impact of Local Radio Broadcasting

**\$453.88 billion** in GDP annually

**980 thousand** jobs on an annual basis

Source: *An Analysis of the Importance of Commercial Local Radio and Television Broadcasting to the United States Economy*, Woods & Poole Economics.



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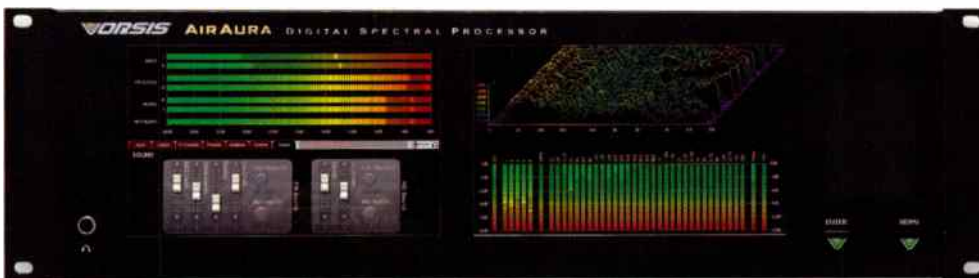
In a side-by-side listening comparison, you'll hear that this difference is HUGE. 31-Band Limiting is also relevant because it's a natural division – each band represents one third-octave of the audio spectrum. This makes processing more natural and more musical.

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