Radio Guide

www.radio-guide.com

Digital Issue Now On-Line

July-August 2009 – Vol. 17, No. 4

The Nautel NV Series FM Transmitter – a Quantum Leap

Inside Radio Guide

This issue on-line at: www.radio-guide.com

6 - Cover Story: Nautel NV Series FM Transmitters

10 - FCC Focus: R&O Allows AM Stations to Rebroadcast on FM Translators

12 - Studio Site: Travelin' Light – Audio in a Flash

16 - Safety & Security: A Key to Profitability in Tough Times

18 - Station Ops: Office Networking

22 - Practical Engineering: AM Towers and Wireless Can Thrive Together

26 - Chief Engineer: Housekeeping & Preparation Eases Emergency Stress

30 - Transmitter Site: Seeing the Spectrum – The (Very) Light Way

Bigger, Bolder, Brighter!

Third-generation "DAVID" FM-airchain processing gives a strong, competitive sound at a remarkable value. New features bring a new standard in performance. Ask for a demo at your station.

Inovonics
1305 Fair Ave. • Santa Cruz, CA 95060
TEL: (831) 458-0552 • FAX: (831) 458-0554
www.inovon.com • e-mail: info@inovon.com

DAVID-III - $2200

Visit www.inovon.com for full technical details

World Radio History

MATCHBOX IS A SONG, A TOY CAR AND A PIZZA CHAIN. BUT THIS ONE HAS A USB PORT.

THE NEW BLUE BOX THAT DOES IT ALL!

The USB Matchbox II is the premier USB audio interface for broadcast station and professional audio installations. Used instead of a common PC "sound card", the USB Matchbox II eliminates common PC interface problems of buzz, noise, insufficient headroom and incorrect levels.

The USB Matchbox II provides both analog and digital interface with stereo analog I/O on XLRs at pro levels as well as an AES/EBU digital output. Plus, there's a headphone output for critical monitoring.

We've utilized Burr-Brown's new-generation phase coherent ADC/DAC, in addition to advanced audio circuitry, to yield exceptional sonic performance. The unit supports 32, 44.1, and 48 kHz sample rates and is plug-and-play compatible with Windows, Mac, and Linux operating systems. The USB Matchbox II also features a built-in AC power supply to ensure operation at true professional audio levels with exceptional headroom.

So, dust off that die-cast car, grab a tasty slice, and punch up Carl Perkins on your computer with the USB Matchbox II to hear him like you've never heard him before!

WE BUILD SOLUTIONS.

DIGITAL SOLUTIONS. ANALOG SOLUTIONS. FUNCTIONAL. RELIABLE. AFFORDABLE.

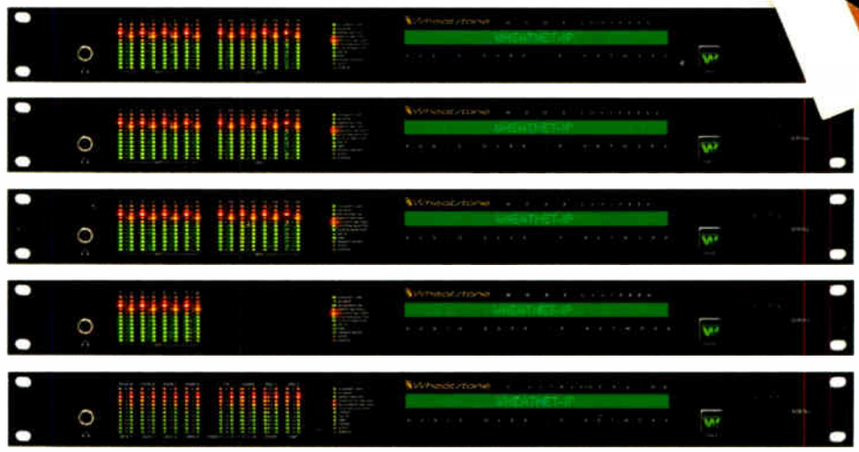
Visit www.henryeng.com for all of Henry's solutions!

HENRY ENGINEERING

Henry Engineering • 503 Key Vista Drive, • Sierra Madre, CA 91024 USA • T: 626.355.3656 • F: 626.355.0077 • email: Info@henryeng.com

Pizza, toy cars or 50's song writers are not meant to be inferred as endorsers of any Henry product.

World Radio History



AUDIO-OVER-IP ROUTING. SOME TECHNICAL STUFF

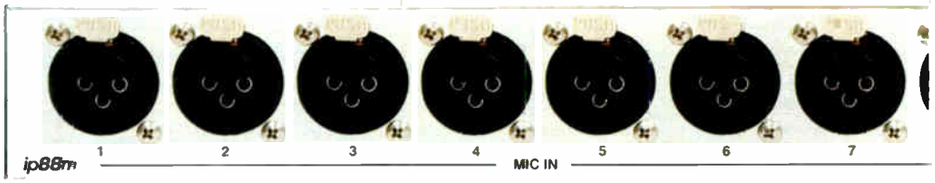
WHEATSTONE and WheatNet®-IP

WheatNet-IP is the new name for Wheatstone's Audio-over-IP networking, routing, and mixing system. First introduced at NAB 2008, it now accounts for the vast majority of networking systems that Wheatstone quotes and installs.

First, a quick overview, and then why WheatNet-IP has been so successful, not only in converting Wheatstone's loyal clients to AoIP, but also in convincing clients of the superiority of Wheatstone's technology over other choices.

WheatNet-IP BLADES

We call our I/O and mixing hardware and software "BLADEs"... way beyond the cutting edge, they're sharp and to the point (and yes, pun intended). Each BLADE is designed for a specific function—we don't cram unrelated tasks into one box making a central point of failure; we all know about "putting all your eggs in one basket."



BLADES are access points in and out of the network. They interface seamlessly with Wheatstone's Evolution Series Console Control Surfaces, the Glass-E Virtual Console Control Surface, most of the popular automation systems, and streaming audio.

Three BLADES are line level I/O interfaces, one all analog, one all digital, and one half of each. Our newest BLADE provides mic level inputs. A fifth hardware BLADE mixes the audio for a Wheatstone console control surface. Each of the BLADEs and each Wheatstone console control surface connects to the network with a single CAT5E/6 cable.

BLADES are loaded with lots more sharp features: Each includes two 8x2 virtual utility mixers that can be used for a wide range of applications, a front panel headphone jack with source select and level control to monitor any system source, SNMP messaging for alerts, and silence detection on each output that can trigger alarms or make a routing change.

There's also WheatNet-PC, a software BLADE that you install on automation system computers, news workstations, or even the PD and GM's desk computers—to control, play and record audio on and off the network. It eliminates the expensive sound card, and replaces tons of audio and control wiring with a single CAT5E/6 cable.

EASE OF INSTALLATION

The relatively small channel count of each I/O BLADE allows you to conveniently locate it close to your equipment. In TOC/Master Control there's no need for a back wall full of punch blocks; a BLADE (or occasionally two) in each rack keeps audio and control wiring entirely within the rack, allowing for a fast and clean build-out. In the studio, usually just one line level BLADE is required; they're silent, so you can locate them with live mics.

FAST AND SIMPLE SETUP

Wheatstone's goal was a system that's extraordinarily easy to implement without the need for super complicated network engineering, and where you don't need to be concerned about setting priorities to assure that those signals that are most critical are available.

WheatNet-IP setup is easy, intuitive, and takes only a few minutes until you're on the air. The front panel setup wizard in each BLADE gets you up and running in moments. Extensive front panel metering and status indicators provide quick confirmation that all is well. WheatNet-IP's web interface and WheatNet-IP Navigator software let you further customize your system, locally or remotely, with input and output names, logic associations, routing and much more.

RELIABILITY

Audio everywhere all the time, and keeping you on the air, were foremost in the design of WheatNet-IP.

Wheatstone chose Gigabit Ethernet (1000BASE-T) because 100BASE-T just can't simultaneously handle the large number of audio channels prevalent today in large broadcast plants without the very real risk of audio not being available when you need it. Gigabit protocol means all audio everywhere with extremely low latency.

WheatNet-IP is completely self-contained—no PC is required to perform any of the system functions, including routing, mixing, salvos, and logic control. The PC is needed only for configuration changes.

Each BLADE carries a complete map of the entire connected network in its onboard CPU flash RAM. Talk about redundancy: a system with 36 BLADEs has 35 backups! Need to replace a BLADE? Assign its ID number and connect it to the network—it will query the other connected BLADEs and import all the necessary configuration settings!

BLADES

ip88m ANALOG MIC I/O BLADE: 8 fully balanced reference-grade mic preamps with phantom power, 8 analog outputs, 12 universal logic (GPIO) ports programmable as inputs or outputs, routable throughout the system.

LINE LEVEL I/O BLADEs: 16 input channels, 16 output channels (switchable 8 stereo, 16 mono, or any combination) and 12 universal logic (GPIO) ports.

ip88a ANALOG I/O BLADE: 16 analog in/out

ip88d AES DIGITAL I/O BLADE: 8 AES (16 channels) in/out.

ip88ad ANALOG & DIGITAL I/O BLADE: 8 analog in/out, 4 AES (8 channels) in/out.

ip88e WheatNet-IP MIX ENGINE BLADE: Handles all of the mixes from Wheatstone Evolution Series Console Control Surfaces and the Wheatstone Glass-E Virtual Console Control Surface, distributing the four stereo PGM, four stereo AUX SEND, per-channel MIX-MINUS, monitor outputs and other bus signals to the network. Once on the network, they are available as sources and outputs anywhere. This creates an extremely flexible system, where program outputs from one surface can be a source on any other surface; for example a news mixer's program bus as a source on the air studio surface. While the ip88e doesn't house audio I/O, it does include 12 universal logic (GPIO) ports.

WheatNet-PC BLADE: Installs on Windows PCs to replace the sound card; interfaces eight stereo audio signals in/out, plus automation control data (start, stop, etc.).

Audio Networking—Simply Evolved

WHEATNET-IP

Wheatstone

phone 1.252.638-7000 | www.wheatstone.com | sales@wheatstone.com

World Radio History

Radio Guide

Contents

July-August 2009

Nautel's NV Series FM Transmitters 6

FCC Focus 10
R&O Allows AM Stations to Rebroadcast on FM Translators

Studio Site 12
Travelin' Light – Audio in a Flash

Safety & Security 16
A Key to Profitability in Tough Times

Station Ops 18
Office Networking

Practical Engineering 22
AM Towers and Wireless Carriers Can Thrive Together

Chief Engineer 26
Good Housekeeping Preparation Eases Emergency Stress

Transmitter Site 30
Seeing the Spectrum – The (Very) Light Way

Field Guide - *Sandies* 34
Dynamax Consoles

Field Guide - *Armstrong* 36
Short Wave Saves the Day at CFRX

Tech Tips 38
A Rechargeable Battery Saver

Tech Tips 40
A New Use for an Old Tool

Service Guide . . . . . 42 & 44
Radio Equipment, Products, and Services

Radio Pipeline . . . . . 43 & 45
New Equipment, Equipment Mods and Updates, Industry Info

Final Stage 47
Convention, and Event Register – Advertiser Information

Cover Photo:

The Nautel NV40 Series Development Team
Courtesy of Nautel Ltd.

Radio Guide Home Page: www.radio-guide.com
Classified Ads: www.radio-classifieds.com
Radio History: www.oldradio.com

Radio Guide
Volume 17 – Issue 4

PO Box 20975, Sedona, AZ 86341
Phone: 928-284-3700 • Fax: 866-728-5764
Ray Topp *(Publisher)* – radio@rconnect.com

Radio Guide, ISSN 1061-7027, is published bi-monthly, six times a year, by Media Magazines Inc., PO Box 20975, Sedona, AZ 86341. Radio Guide is copyright 2009, Media Magazines Inc., and may not be copied, reproduced, or stored in any format, without the written permission of the publisher

Radio Waves

by Ray Topp – Publisher

Lead or Follow

In their efforts at competition, most radio stations usually won't mention another directly by call letters. Instead, a few may emulate their programming, or even try to generate confusion by using similar graphics and logos.

A similar situation has come to our attention. A major radio trade publication has recently changed format – obviously following ***Radio Guide's*** lead.

No Confusion Here

The years have taught me that size really *doesn't* matter. It's all about quality content – exactly what most successful radio stations use to attract and keep their listeners. ***Radio Guide*** has delivered, and will continue to deliver, the content its "listeners" want.

Of course there's no secret to any of this. As long as you keep letting us know what you need, we'll keep giving you what you expect.

And we don't expect to be confused with any other radio publication – you know better than to let that happen.

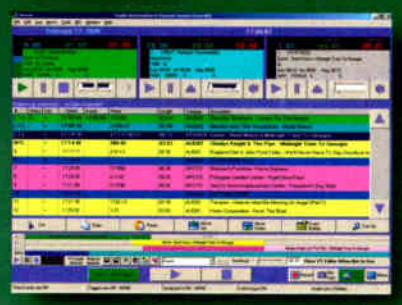
We'll Keep it Coming

As long as you continue to support ***Radio Guide*** with your input and response, that's all we really need to keep it going.

Although the economy has certainly taken a dive, your commitment and loyalty to ***Radio Guide*** and its advertisers have helped us continue to provide the radio industry with a solid source of technical content.

If you'd like to become a columnist, or an occasional writer for ***Radio Guide***, contact us right away. There are no special qualifications – just a desire to let others know what you know. Let's do it together. – *Ray T.*

Simian



Fully automated or live assist play out software.

Advanced features for radio stations including easy satellite network integration.

BSI

Complete PC Broadcast Systems

Fully configured and broadcast ready play out systems and networks.

Optional music, advert & promo scheduling software and remote control hardware.

Music library available.

SkimmerPlus

Advanced 24/7 audio logging and skimming.

Single or multiple channel recordings triggered by time or external triggers.

Archive capability satisfies or exceeds logging requirements in many countries.

Password protected remote web playback or FTP transfer of audio archive.

Broadcast Software International
503 E. 11th Avenue, Eugene, OR 97401 USA
Direct: 541-338-8588 Fax: 541-338-8656
www.bsiusa.com sales@bsiusa.com

World Radio History

The Metropolitan Opera sets the standard for great sound.

And it's chosen ACCESS to let the world listen in.

"Opera is one of the most challenging musical genres to do complete justice to in a broadcast, but ACCESS makes it easy."

—Matthew Galek, Broadcast Engineer for The Metropolitan Opera

The Met's Matthew Galek is a Real-World Super Hero

Not content to rest on its laurels, the most renowned and respected opera company in the world is determined to connect with the widest possible audience—in the highest audio fidelity. With engineer Matthew Galek at the transmission helm, the Metropolitan Opera broadcasts its Saturday matinee to an ever growing number of affiliates using ACCESS (and the optional AAC suite) in multistreaming mode. With ACCESS, the Met's broadcasts offer all the sonic richness it's famous for—over the most challenging IP networks. ACCESS delivers mono or stereo over DSL, Cable, Wi-Fi, 3G cellular, satellite, POTS (yep, ACCESS is a full featured POTS codec and works seamlessly with Matrix, Vector and Bluebox)—plus some services you may not have even heard of. Given the challenges of the public Internet, it's no small boast to say that ACCESS will perform in real time over most available IP connections.

AAC-SOFTWARE

Contact Comrex today and find out how ACCESS can help you become a Real-World Super Hero—wherever you are!

ACCESS

Put Comrex On The Line.

COMREX

19 Pine Road, Devens, MA 01434 USA Tel: 978-784-1776 • Fax: 978-784-1717 • Toll Free: 800-237-1776 • www.comrex.com • e-mail: info@comrex.com

World Radio History

Nautel's NV Series Transmitters

When It Comes to Transmitters It's a Whole New Ball Game

by Ernie Belanger

When I first was tasked to write the cover story for ***Radio Guide*** about the Nautel NV series transmitters, I put serious thought into the approach I should take.

I didn't want this to be a fluff piece; I wanted to dig deep, to understand the design philosophy, to ask the questions any engineer would ask if given the opportunity. So, I drew from my years of experience in the field and from my 20 plus years of experience in RF sales and marketing.

The Cynic

I'll admit I went into this a bit cynical, balancing that with the "keep neutral and balanced," mantra drilled into me early in my career, as a stringer in a radio newsroom.

I had concerns about the design that were raised while observing a demo of the transmitter on the NAB show floor and by some of the information I had read on the New NV Series. Armed with all that, I contacted John Whyte, Nautel's Director of Marketing, and I emailed him my laundry list of questions. About a week later, I was expecting answers so I could begin writing this. Instead I got a call from John with an invitation to visit Nautel, meet with the design team and discuss the transmitter in detail. It was to be no holds barred – ask what I wanted of whomever I chose.

First Impressions

Upon arriving at Nautel, I immediately sensed a very relaxed friendly atmosphere among its employees – from reception through accounting, production, test and engineering, right up to the CEO Peter Conlon. It wasn't a show just because I was there; I could sense it was a sincere part of the daily culture at Nautel.

This is important because it is that relaxed atmosphere that fosters a sense of family and ownership that translates into the dedication to quality and pride in workmanship I found during my visit.

I sat down for a lengthy discussion with FM Project Leader Scott Marchand, to gain enlightenment about the NV Series, its unique approach to control, and some of the design philosophy that helped to develop a transmitter that reinvents the way we think about transmitters.

"Our primary goal was to gain a larger portion of the high power market by developing a compact, solid state transmitter that would compete with high power tube transmitters. We wouldn't stop at power level though; we would exceed them in redundancy, reliability, and customer experience with enhanced features and functionality," he explained. Their approach brought about a scalable design, with cross platform compatible parts to keep manufacturing cost lower and some very innovating thinking with regard to serviceability and customer support.

Don't Judge a Book by Its Cover

On the surface, the NV series is no different than any other FM solid state transmitter; MUX in equals RF out, using a number of RF modules combined together to achieve needed power and a couple of bells and whistles thrown in for the "gee wiz" factor. Well, if you believe that, I've got a bridge in Brooklyn to sell you.

A Look Inside

Let's start with the RF modules. They aren't just Power Amplifiers driven by a single driver or Intermediate Power Amplifier (IPA).

Each Nautel module contains both its own IPA and the final RF amplifiers. This design eliminates the single IPA approach that often turns into a single point of failure that can take you off the air.

The combining methodology is a structure of custom 3 dB hybrid couplers, each combining two, 2.5 kW RF blocks. Should an RF module or a combiner fail, you will remain on the air at reduced power.

An NV Series transmitter going through Nautel's testing and burn-in before shipment. Note the unit is covered in plastic to help avoid scratches to the transmitter's finish. Nautel has a reputation of paying attention to even this smallest of detail.

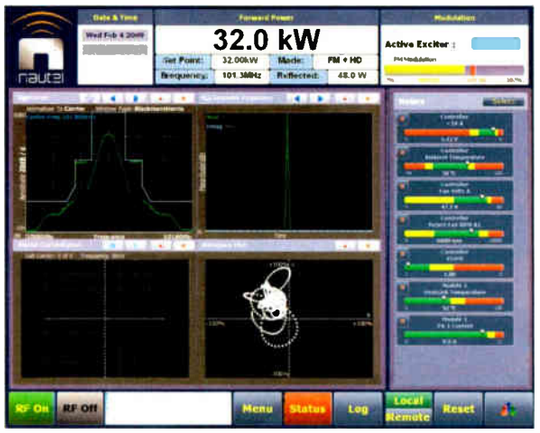
Integrated Exciters

One of the first red flags raised by me was the NV's integrated FM exciter.

I believe that it is important that an engineer be able to patch a standby exciter into the system in an emergency. I also believe that it is important that a station have the ability to choose whatever exciter it wants to use. I had understood it was impossible here, because of the integrated design. It turns out I had received some misinformation.

Scott assured me that Nautel's design team had thought about those issues as well. You can use the analog exciter of your choice with the NV series but, as Scott explained, in doing so you would have to mount the exciter externally and you would lose the advantage of controlling your exciter via the Advance User Interface (AUI).

He went on to explain that the design team tried to eliminate all single points of failure. In doing so, they designed enough room in the transmitter for a second integrated exciter. By using this main/standby configuration, you can eliminate downtime from an exciter failure. Plus the exciters have the capability of being synchronized using GPS, 10 MHz sync tone and they have SCA and RBDS inputs as well.



A Screen Shot from the Nautel's AUI showing some of the monitoring and instrumentation available.

Food For Thought

Now, after you get over the shock to your conventional thinking, take a moment to really think about it. Today's exciters are pretty much a single board with a power supply – a series of inputs and an RF output. This is then housed in a chassis with a meter, and an interface for control and monitoring. Nautel simply eliminated the chassis with its rack ears, routed the monitoring to the AUI, thus eliminating the front panel. They also eliminated the need to hook the exciter up separately to a remote control, but for us old timers, the remote facility is there, should we want to use it.

I do like the main/standby option because it eliminates a single point of failure. I've always been an advocate of having a backup in hand for every single point of failure in my RF chain. The problem we face as engineers is that most station owners can't be convinced to make the investment, even though it protects their revenue stream. This may have just become a lot easier.

The AUI

In striving to build a transmitter with maximum serviceability, Nautel's engineers developed a multi-layered system with triple redundancy that can give you more information than any other transmitter available today. Plus, it's loaded with diagnostic tools to ensure your transmitter is operating at peak efficiency and within the FCC regulations.

The Advanced User Interface (AUI) consists of a 17-inch, touch-screen LCD monitor, a Single Board Computer (SBC) and the software that runs on it. It has a built in server that not only displays the data on the monitor but it also makes that data available to a remote user.

In addition, you not only have the measurements from every parameter of the transmitter at your fingertips, but you also have instant access to software based tools such as a highly accurate modulation monitor, an

(Continued on Page 8)

World Radio History

Tieline IP Audio Codec Solutions

Low Cost, IP STL and Audio Distribution

Tieline Commander Studio rack mount IP codecs are the ideal solution for STL and distribution links.

Broadcast Quality IP STL from just

$2,350 Per Codec

- A range of high quality compression algorithms delivering STL quality audio at amazingly low bit rates saving you thousands of dollars per year
- Uncompressed 22kHz audio with ultra low latency.
- Automatic QoS Performance Engine manages IP network jitter and maximizes low delay. Most STL competitors do not offer this.
- Automatic fail detection and switching to optional backup POTS, ISDN or wireless networks (using optional cards).
- Professional high quality audio connectors with relay and RS232 control.
- Control of remotely located units via the Internet.
- Multi unicast to more than 1 destination.

Low cost remote broadcast, mobile reporting and temporary links.

Broadcast quality IP remotes from just

$2,350 Per Codec

Thousands of radio and TV stations use Tieline remote codecs everyday to deliver studio quality remotes from anywhere. See Tieline.com for pictures and stories.

- Simple to use and feature one-touch dialing to the studio.
- Great for desktop multi talent or mobile single reporter remotes
- Plug into a LAN and broadcast over the Internet live or add an optional wireless 3G module and battery kit to go completely wireless (20 kHz mono or stereo).
- You can even add optional 15kHz POTS or 20kHz stereo ISDN modules.
- Remote control of talent's input audio level from the studio so you don't have to rely on announcers setting levels, or send a technician out into the field.
- Mono, Dual Mono, Stereo, Joint Stereo and Dual Program standard profiles
- Compatible with Comrex over POTS and all other brands over IP and ISDN.

Sports and talkshow mixer/codec

Tieline i-Mix combines multiple products into a single simple box saving you thousands of dollars.

A complete sports and talkshow commentary solution from

$4,590

- 6-input digital mixing with incredibly flexible cross point audio routing.
- IP and POTS codecs already on-board.
- Bi-directional audio & simultaneous communications circuits
- 4 headphone outputs and send/return mix monitoring
- An on-board PA control with telephone hybrid to take live callers in the field
- A wireless-compatible IP, 3G/3.5G, POTS, ISDN, GSM & BGAN Satellite card (optional)
- On-board relay and RS-232 with full studio remote control.
- Compatible with Comrex over POTS and all other brands over IP and ISDN.

Tieline®
www.tieline.com

Get a live video demo right now at www.tieline.com/videos

800-780-4750
INDIANAPOLIS

World Radio History

FCC Focus

By Cary S. Tepper

Report and Order Allows AM Stations to Rebroadcast on FM Translators

On June 29, 2009, the Federal Communications Commission (FCC) issued a Report and Order adopting a revision of its Rules to allow certain AM radio stations to rebroadcast their programming on certain FM translator stations.

The FCC's action was the culmination of a two-year effort by numerous AM broadcasters and leading broadcast associations that sought help for many AM broadcast stations that could not adequately provide service coverage to their respective community of license, especially at night.

Technical Criteria

As a result of the newly adopted rules, AM broadcast stations will be allowed to use currently authorized FM translator stations – those now licensed or currently authorized construction permits – to rebroadcast their AM signal provided that no portion of the 60 dBu contour of the FM translator station extends beyond the smaller of (1) a 25-mile radius from the AM station's transmitting site; or (2) the 2 mV/m daytime contour of the AM station.

Also, AM broadcast licensees with Class D facilities will be allowed to originate programming on the FM translator stations during periods when their Class D AM station is not authorized to operate.

Cross Service Beneficial

In adopting these Rules changes, the FCC recognizes that cross-service translators will improve the ability of AM stations to provide service to their local communities by filling in service voids in their intended coverage areas. Since it is undisputed that many AM stations lose both nighttime and daytime coverage at various locations within their protected daytime coverage areas, the FCC concluded that the time is right for these actions.

The Report and Order also points out that many such cross-service relationships have existed lately, pursuant to Special Temporary Authority (STA), and the benefit of those experimental situations has helped guide this new policy.

The FCC has concluded that it is in the public interest to allow AM stations to use FM translators to help build their audiences and furthering the FCC's goal that each broadcast station provide reliable service to its community of license. The Rule change is also designed to promote diversity to some extent in the nighttime hours by allowing Class D AM stations to expand their programming to include nighttime coverage of local news, sporting events and issues of local interest.

Qualified Translators

The Rule change only applies to those FM translators with licenses or construction permits in effect as of May 1, 2009. Subsequent modification of any eligible FM translator station will not affect its eligibility to rebroadcast an AM signal. Accordingly, any FM translator station that meets the qualifying technical criteria set forth in these new Rules, that commences the rebroadcast of an AM station, must notify the FCC's Media Bureau in writing the identity of the AM "primary station" being rebroadcast. A copy of such notice should be sent to Rob Gates at the FCC to ensure proper processing.

Any application or notification from an FM translator station initially authorized after May 1, 2009 to rebroadcast an AM station will be dismissed without further consideration.

If an FM translator station is not now located in the appropriate area, it might be feasible to modify the translator station's facilities by relocating to within an area that meets the policy criteria. As a rule of thumb, the FCC will approve of a minor change in facilities of an FM translator station if the service area of the current facilities overlaps the service area of the proposed new facilities. The FCC sometimes approves these types of minor change applications within two weeks of filing.

Should an FM translator station require a major change in facilities to relocate to an appropriate area, the FCC will entertain a waiver of the major change prohibition on a case-by-case basis.

A Big Plus for Class D AM

Since Class D AM stations are at a competitive and public service disadvantage due to their shorter broadcast day, the FCC has decided that it is in the public interest to allow FM translators to provide fill-in service for Class D stations, and to allow Class D stations to originate programming on them when the AM station is not permitted to operate. However, at times when the Class D station is operating at reduced power (such as pre-sunrise and post-sunset or nighttime hours), the FM translator cannot originate any programming but merely rebroadcast the AM signal. AM Stations cannot discontinue their pre-sunrise and post sunset authorizations in order to originate programming on translators. This authority is considered part of the FCC License.

No Change in Call Signs or ID

The FCC has decided to continue to use the current FM translator call signs for any translator station associating itself with an AM broadcast station. Some parties wanted the translator to adopt the AM station's call sign, but the FCC decided that could be confused with booster station call signs. Translators can continue to be identified using FSK ID.

Translator Ownership

With regard to potential ownership limits on FM translators as AM fill-ins, the FCC has decided not to imposes any ownership restrictions or caps, but it does reserve the right to revoke cross-service arrangements where it is shown that use of multiple FM translators in a certain area is an abuse of the Rules.

With regard to rebroadcast consent agreements between FM translator licensees and AM broadcast stations, this can only be done where the translator station operates on a commercial frequency. The FCC has not to changed its Rules with regard to the type of support a primary station can give to a translator station. Under these new policies, an AM broadcaster cannot pay the FM translator licensee. Translator owners are still allowed to use 30 seconds each hour to broadcast sponsorship announcements to raise revenue.

AM on LPFM

Finally, the FCC will allow AM broadcast stations to rebroadcast their programming on an LPFM station at times when the AM station is not authorized to operate. If an LPFM licensee and an AM broadcaster find a mutually beneficial way to cooperate in rebroadcasting the AM signal on the LPFM station in a manner that complies with the LPFM rules, the FCC will allow them to do so.

Cary S. Tepper is a principal of the law firm Booth, Freret, Imlay & Tepper, PC in Bethesda, Maryland. Contact him at tepperlaw@aol.com

World Radio History

Introducing the NV Series

3.5kW – 44kW FM

more POWER
more CONTROL
more OPTIONS

Following the extremely successful launch of the NV40 FM transmitter, broadcasters asked when they could get the advanced features of an NV40 in a midrange power transmitter? The answer is now. Introducing the NV Series of FM transmitters with power outputs of 3.5kW to 44kW.

All NV transmitters come complete with an integral advanced digital exciter, Nautel's Advanced User Interface, built in instrumentation and all of the redundancy, hot-swap serviceability and reliable rugged design that you have come to expect from Nautel.

Learn more at **nautel.com/expectmore**
902.823.5131

Advanced User Interface

5 year warranty*

HD Radio Pure Digital. Clear Radio.

Making Digital Radio **Work.**

nautel

*Its Nautel's 40th anniversary: all NV and NX Series transmitters purchased in 2009 will receive a 5 year warranty

World Radio History

Travelin' Light – Audio in a Flash

by George Zahn

Remember when the teacher said class could be held outside? This issue, in Studio Site, we take you out of the cozy confines of the studio environments to what used to be one of the most challenging, and maddening technical environments: remote recording.

A Trip Down Memory Lane

Nod or raise your hand if you go back far enough to remember lugging a Tascam or Otari reel-to-reel deck, a pair of mics, cables, and stands, plus some cans to record the local choir or orchestra. Mind you, it was more complex if you needed to record rock or jazz, but you could actually pull off that X-Y pair stereo recording by plugging the microphones directly into the mic inputs on the reel deck. With any luck, the rig totaled maybe fifty or sixty pounds.

Later we had DAT and other component-style, line-in recorders which required toting at least a small console to interface the microphones to the recorders. Meanwhile, our news departments in those days of yore had their trusty Marantz portable cassette recorders and their EV 635's, but you couldn't capture a good stereo music recording on cassette and an omnidirectional mic.

An engineer or producer who chose to be cryogenically preserved in those days of the 80's or 90's and revived today, wouldn't know how to react to the options in field recording.

The Triceratops vs. the nimble Flash Recorder. Which would you rather lug around?

The Incredible Lightness of Recording

Forget needing a gym membership to be in good enough shape to carry a Triceratops-sized, reel-to-reel deck. The transition actually started slowly in the late 1980's and into the 90's with a few brave companies eschewing cassette, DAT, or MiniDisc, but the recent boom of digital flash recorders has caused prices to plummet, and many stations to re-evaluate how they record outside the walls of their studios.

Even those early flash recorders only had built in condenser microphones and you still needed to take external microphones for quality recording in the field. Also in those early days, we didn't have the ease of audio transfer that the post-USB brings us today.

Flash Recording

First a quick look at what flash recording is. Basically we replace the moving parts, including moving media such as a cassette or reel tape and all the audio drawbacks (wow, flutter, etc.) that came along for the tape transport ride. In DAT and MiniDisc, the processors were already converting incoming audio to digital code – why not just store it on a solid state "drive" that simply plugged into the recorder. We've seen these drives in "card" formats such as SD, Memory Stick, and others.

SDHC Memory Card

Advances in miniaturization for memory created the boom for digital photography in the last ten years as the same size card can now hold so much more and be accessed even more quickly.

Digital recording of audio, and even video, has not been far behind, especially with more acceptable digital compression.

OK, so the digital recorder now converts audio and stores it on a solid state flash memory card. That groggy but recovering cryogenic engineer would still be planning to pack microphones, cables and stands just to do a simple field recording. How surprising would it be to see that not only are these digital recorders smaller than the big old Marantz cassette Superscopes, but many have not one, but stereo microphones built in. And the mics aren't just some "throw away" basic electret condenser, but fairly nice sounding microphones. Some units actually provide four "elements" in the recorder to provide for some creative recording on a shoestring.

Up "Pops" a Problem

Let's not get too excited yet. You won't find a professional frequency response graph with the built-in microphones, but in general, these mics are designed for far better fidelity than we might have expected from past built-in transducers.

My limited experience, and from discussions with other professionals, so far indicates that the mics tend to be slightly brighter, accentuating the midrange and treble. This can make the occasional popping plosive "P" on the bottom end all that much more jarring.

Again, in my limited experience, it appears that while many of us have been spoiled by the forgiving pop filter constructed into many of even the most basic PA and broadcast mics, the smaller profile of the portable digital recorder with built-in microphones does not allow space for material in the capsule to disperse fast approaching plosives.

The best defense you have is usually a mesh covering, which looks good, but needs a windscreen, or basically distance from the microphone to avoid popping "P" problems.

Hands-On Experience

In a future article, I'll pass along some of my first hand experience with a portable digital recording unit I purchased more than a year ago. It has made remote production life immeasurably easier in most cases, allowing me to record easily in places that would previously have been logistically unavailable, or at least much less convenient.

So far I've used my recorder to capture natural stereo sound in the field for documentary and news stories. I've felt confident enough to use it as my sole source recording for field interviews with national newsmakers.

I've used it as a simple recording deck, using the line input to record from a multi-channel console at venues around Cincinnati, and I've simply used it as a hand-held microphone/recorder for less critical "testimonial promo" interviews at station events. I also welcome news of some of your experiences, pro and con, with different units so we can all learn together. I'd also like to hear what features are most important to you as a broadcaster. What are your favorite field stories with flash recorders?

Dropping Below the "CETT" Line

When I started planning this article months ago, I was already amazed at the incredible selection of flash recorders on the market. Now of equal astonishment is the dramatically dropping price in many cases. Prices once ranged from $300 for a pretty basic unit with flash recording and at least two microphones, to $1,000 and much more for some units that provided high quality, low impedance XLR microphone inputs with phantom power for those who don't want to leave their recording to the mercy of the manufacturer's built-in mics. Now, even in this economy, many prices have fallen below the MPP ("Major Planned Purchase") line and closer to the CETT ("Cheap Enough To Try") line.

The unofficial CETT line in my life is the point at which my wife considers it a good enough balance of price paid, versus keeping me out doing stuff and experimenting with recording.

The author's flash recorder, a "AA" battery and his coffee mug. This photo really gives you a size perspective.

Some of the portable digital recorder factors we'll examine in the next article include many of the concerns we might have about any microphone: frequency response, handling noise, plosive handling and overload, but also new concerns that come with solid state recorders includ-

(Continued on Page 14)

World Radio History

Your Studio – Wherever YOU Are

Take BluePack On The Road – Keep BlueKeeper At Your Desk

BluePack

Bluetooth

Conducting interviews from your desktop or in the field is now easier than ever. With JK Audio's new BlueKeeper and BluePack, it's as simple as making a phone call. Using your Bluetooth™-equipped cell phone, you just pair and go (or stay). Effortlessly capture your voice and the caller on separate channels of your flash recorder or computer. Perfect for broadcast production.

The versatile BluePack (with a convenient beltpack clip) gives you a balanced mic input with a high-performance microphone preamp, stereo line-out, and an aux send. Together with your Bluetooth-equipped cell phone and a compact portable recorder or computer, it provides an incredibly compact production solution for interviews from wherever you happen to be. OR use it to send live man-on-the-street interviews back to your facility FROM your cell phone.

BlueKeeper gives you the power to mix mic and line level signals with calls from your wireless right at your desktop. It gives you a balanced XLR input with a professional mic preamp for superior sound quality and an XLR output. Mini jacks provide stereo lines in and out, a mono mic-out and a stereo headphone out. As with BluePack, use it to capture an interview or call in a story from Your Studio, wherever that might be.

Whether your interviews are in the field or at your desk, JK Audio's BlueKeeper and BluePack are an integral part of your studio.

BlueKeeper

Bluetooth

JK Audio

TOOLS FOR SUCCESSFUL RADIO

www.jkaudio.com

JK Audio, Inc. Sandwich, IL 60548 USA • Tel: +1-815-786-2929 • Fax: +1-815-786-8502 • www.jkaudio.com • info@jkaudio.com

World Radio History

Studio Site

by George Zahn

– Continued From Page 12 –

ing media compatibility (not all SD Cards are created equal), software issues, accessories to consider, including basic windscreens, handles and desk attachments, and even "raincoats" to protect your investment.

You Can Flash in Studio Too

If you're looking on the market for one of these flash recorders, there are some different styles ranging from rack mount units for studio use to a couple of styles for field recording on the go. The rack mounts, including models by Tascam, Marantz, and Fostex, list a bit higher than some portable models at $650 to almost $1500. The reason for the higher price is that most feature balanced XLR inputs as well as at least one form of digital input and output.

They do have a built-in mono mic, but, more importantly, line inputs and balanced XLR mic inputs just like the old cassette recorders. Other similar decks include the Fostex FR2 which offers up to 24-bit, 192 kHz field recording and can record on PCMCIA 1.8" hard disk drives and Compact Flash (type II), and the FR2-LE which is a scaled down version. Tascam makes the HDP2 which offers time stamped Broadcast WAVE files for syncing in digital audio workstations.

Light Heavyweights

For the hand-held recorders that include at least two microphones, you have a plethora of choices: the Yamaha Pocketrak 2G-CA (claims to be 2 ounces), Edirol's R-09HR,

The Marantz PMD 580 studio flash recorder shown with flash card slot door open.

Most all appear to fit single in a rack space and record on Compact Flash Cards (some do use SD cards as well).

The studio models don't have the built-in microphones, but do boast everything from USB capability on many models to Ethernet connections on some of the higher end models (Marantz PMD 580). Almost all offer a variety of recording formats and digital sampling rates, plus at least an RS-232 serial control. The adjustable sampling rates could turn one of these units into a nice logging machine for the right station.

For those who love the old Marantz cassette shoulder strap-style recorders used for decades by news reporters, there are similar, and thank goodness lighter, decks that will remind you of the old cassette feel with flash recording. Among those are, of course, the Marantz 670 and 671 which both look very similar to the old cassette style.

the Marantz PMD620 (which unlike some others, does have a built-in speaker), or the PMD660 (which has two nice balanced XLR inputs). Others include two different Tascam units: the DR07 (stereo electret mic built in) and the DR-100 (with two unidirectional *and* two omnidirectional mics in the unit). Sony's PCMD50 has USB 2.0 capability and the Olympus LS-10 comes with 2 GB of internal memory. The Zoom H-2 has four mic capsules and the H-4N has two mics but more quiet mic pre-amps which allow 4-channel simultaneous recording). The AEQ PAW120 comes with a mono mic, but connection for a stereo mic.

For more musical applications, Edirol enters the fray with the R-44, a basically hand-held, 4-track unit with built-in mics, and some basic included effects as well. Many of these list from $270-$999 plus, but can be found much lower in price by shopping around.

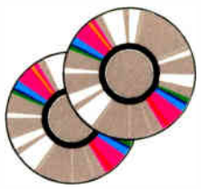
The ZOOM Hand-Held recorder.

Other hand-helds in the more exotic realm include the HHB DRM85 which is a mono hand-held microphone that has built-in flash recording. HHB offers unidirectional and omnidirectional pickup patterns, and the mics also have a line input which makes it a stand-alone digital recorder if you don't need the microphone.

Alesis has a ProTrack sleek interface which accepts an iPod. The ProTrack does not have built in mics, but provides two XLR connections with phantom power for condenser mics you can attach to the unit. M-Audio makes the MicroTrack II with balanced 1/4-inch TRS inputs but no built-in mics. And for those concerned about durability, you can spend a lot more ($1,995 list) which has bells and whistles plus a titanium body, still weighing in at only about 18 ounces!

Whether these newer recording units are going to totally revolutionize the way we attack tricky broadcast field recording remains to be seen. Some of you may be already out there using one as I have. Please share your pros and cons about the model(s) you're using. Next issue, we'll share some first-hand flash recorder field recording stories.

George Zahn is the Station Director/General Manager for WMKV Radio in Cincinnati, Ohio and a Peabody Award-winning producer. He has countless hours of recording experience, which also entails more than 500 hours of field production and recording, most notably as recording engineer for Riders Radio Theatre heard on many NPR stations. Share your "feedback" with George and your story may end up in a future article. Contact George at gzahn@mkcommunities.org.



Missing Some of Your Radio Guides? Get Them *All* on CD-ROM

Sometimes that magazine you lent out does not come back. Or maybe you left it at the studio, and need it at the transmitter. Not to worry. The new ***Radio Guide*** CD Archive set now includes every issue of ***Radio Guide*** from Jan 2004 to Dec 2008.

Radio Guide CD-ROM Volume 1 – January 2004 through December 2008

An complete browser-compatible index for all issues is included, for easier article location. Archive issues are formatted in standard PDF's for easy viewing, searching, and printing.

A table of contents for the ***Radio Guide*** archive may be found at: **www.radio-guide.com/rgarchive.htm**

Advance Discount Orders Now Being Accepted

www.radio-guide.com/products.htm

Normal Price: $49.00 – Advance Order Price: $35.00

Check payments accepted at:

Radio Guide, PO Box 20975, Sedona, AZ 86341

Please include your snailmail and email addresses.

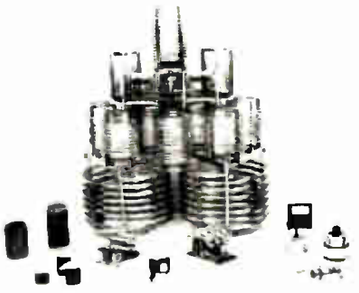
World Radio History

AM Antenna Solutions

Directional Antenna Systems

Diplexer/Triplexer Systems

High-Power Antenna Tuning Units



RF Components

LBA Technology - your trusted supplier of digital engineered AM antenna systems. LBA customized products include:

- **Directional Antenna Systems**
- **ATU's**
- **Multiplexers**
- **Combiners**
- **Cellular/PCS Colocation**
- **Isolators**
- **RF Components**

We offer complete RF project design, management, procurement and installation services.

LBA enables thousands of broadcasters in the US and worldwide to:

Reach Farther, Sound Better!

Factory Dealer For:

COMET · JENNINGS · SCHOMANDL · KATHREIN · TOMCO

OVER 45 YEARS EXPERIENCE IN AM

LBA TECHNOLOGY, INC.

3400 Tupper Drive, Greenville, NC 27834
800-522-4464 / 252-757-0279 Fax: 252-752-9155
LBATech@LBAGroup.com

www.LBAGroup.com

SINCE 1963

World Radio History

Safety and Security

A Key to Profitability in Tough Times

by Jeff Johnson

With our industry fighting constraints of reduced staff and budget in a tight economy, securing our property from loss and protecting the safety of our people – and doing so economically – is more important than ever.

We may think of safety and security first in terms of towers and locks, but it extends to protecting intellectual property on our computers, fire suppression technology, equipment design that is inherently safer, and extends even to stress reducing management techniques that promote worker health and productivity.

This regular column will address all of these areas, including that most important software of all, our minds' ability to perform efficiently and – most importantly – safely.

Let us begin with possibly the most visible safety regulated environment – and to many the most scary – that of tower climbing.

Climb, Young Man, Climb

Most of us shudder at just having both feet off the ground anywhere but in a hammock! Many managers likewise shudder at the cost of hiring tower crews for even the most simple of jobs, but at hundreds of feet – such as relamping or making ordinary repairs.

With an in-house climber, an organization can quickly correct problems at height and may be able to promptly cancel notices of tower beacon outages, inspect towers and antennas, and fix minor faults before they become major, costly disasters. Athletic and interested staff members may acquire training and certification from a number of available schools.

Recently the author, a climber, attended a course at one such school, Comtrain, of Monroe, WI, www.comtrainusa.com. The course, "Tower Climbing Safety and Rescue," prepares and certifies the participant in an understanding of legally required equipment and procedures for safe climbing and, if necessary, rescue of an injured or incapacitated fellow climber.

A climb harness including a seat strap.

This article is not intended as a comprehensive overview of Occupational Safety and Health Administration (OSHA) regulations, but as a practical guide for those overseeing such work in order to judge the general safety awareness and compliance of those working on a station's towers and property.

Look Out Below

Those on the ground assisting or observing have safety rules to follow. Anything, even a small nut, when dropped from hundreds of feet can be lethal. Everyone within a radius of half of a tower's height should wear a hard hat. Comtrain recommends a 100% radius.

Falls the Most Obvious Hazzard

Although other hazards affect a climber, falls are the most obvious. There are three terms to understand: fall protection, fall restraint, and fall arrest. Each has a particular meaning. 100% fall protection must be maintained whenever a worker is more than six feet above a lower level or the ground. Either of two methods are satisfactory – fall restraint or fall arrest. Utilizing both is recommended.

Fall restraint means preventing a climber from being able to fall. A tower climber's fall restraint consists of a harness, positioning lanyards (ropes) and possibly apparatus at the waist such as a "pelican hook." Restraint should restrict a fall to no more than two feet. Restraint equipment connects to a climber's body harness. The harness encircles the chest, waist, and legs of a climber

There are "D" shaped attachment rings on each side of the waist belt for short horizontal attachment to the tower such as with a pelican hook, or a safety climb device There are "D" rings for more vertical attachment via lanyards to the seat for hanging in a sitting position, and a "D" ring on the back between the shoulders.

Oops!

Should a fall occur, a Personal Fall Arrest System (PFAS) will come into play. This is a component of fall protection to control and stop a fall. The back "D" ring of the harness is used as a connection point for fall arrest. It is recommended that a PFAS be utilized whenever a fall restraint system is in use. It is a safety backup. Fall arrest comes into play when a fall restraint has failed and a fall is occurring.

Is he dead or alive?

Fall arrest gear must absorb energy while stopping the fall during an 18" deceleration distance. This is necessary to minimize injury. Usually a shock absorbing lanyard attached to the climber's harness back "D" ring is used.

OSHA limits free fall to a maximum of six feet and the total allowable fall to nine and a half feet. It's important to keep the attach point of the PFAS to the structure as high as possible, preferably at the height of the harness attach point or higher.

Another fall arrest system is the Self Retracting Lanyard (SRL). It is a spool of cable or webbing that operates rather like the retractor on an automotive seat belt. It allows two feet (24") of free-fall then 18" of deceleration. An SRL will allow greater freedom of movement about a work zone while affording adequate fall arrest.

The PFAS attachment must be made to an anchor point rated at five thousand pounds. If no convenient anchor point is available a Temporary Horizontal Life Line (THLL) may be strung as an attach point. A secondary vertical safety rope properly attached well above the work position with a rope grab on the safety rope attached to a shock absorbing lanyard connected to the back "D" ring satisfies the 100% fall protection rule.

Should a fall occurred, and the victim is in their harness hanging from the back "D" ring, the victim is not yet safe. The person may suffer suspension trauma which is blood pooling in the legs that causes the victim to pass out. Newer harnesses may have a lanyard deployable, something like a jump rope to stand on, thus lessening the constriction of the upper legs.

Getting Them Down

The fall victim must be quickly rescued. They may be able to swing over to the tower and reattach or they may be hanging in mid-air requiring rescue. The technique taught at Comtrain is controlled descent via a rope from above the victim utilizing a descent device. The training course discussed this technique, and all participants practiced the role of the rescuer and the victim.

A successful rescue.

Crew Safety Meeting

Although crew safety meetings are only required to be held weekly, it is prudent to hold a safety meeting the first thing each day. Four points should be discussed: 1) the location of a first aid kit, 2) the location of the nearest emergency medical facility and the location of the work site if an emergency crew must come to the site, 3) a hazard assessment, and 4) each worker understands and agrees to an emergency response plan.

When observing a tower crew, if a safety meeting is held each morning, an inspection of equipment is made before placing it in service each day, and employment of 100% fall protection is observed when above six feet, you can be assured that a fall or other accident on your site causing injury or liability is unlikely.

The author recommends acquiring the book "Tower Climbing Safety and Rescue" from Comtrain.

Jeff Johnson can be reached at: jeff@rfproof.com.

World Radio History

MT-MR Platinum STL System

Why the MT-MR Platinum?

-For its **excellent quality-price** value.

-For its **adjustable transmission power** output from 0 to 20W for any selected operational frequency.

-For its **double conversion receiver**, that makes it apt for **digital codification** (Up to 4 audio channels).

-For being **digitally synthesized** in 20 MHz operational band for frequencies from 150 MHz to 960 MHz.

-For the fact that **both the transmitter and receiver can measure the modulation percentage and pilot signal level** (19 KHz stereo without disconnecting the audio from the transmitter).

-For its **remote control**.

-For its **analog telemetry**.

-For being made for **mono or stereo (MPX) signal**.

-For its **capability to work with AC power voltage from 90 to 250 V, 50/60 Hz**, and also with external battery if needed.

OMB, the Future of Communication

OMB

OMB AMERICA
phone. (305) 477-0973
(305) 477-0974
fax. (305) 477-0611

3100 NW 72nd. Ave. Unit 112
MIAMI, Florida 33122 USA
http://www.omb.com
usa@omb.com

World Radio History

27,832 products in stock at press time!

Headsets!

Last Chance on the Lowest Prices EVER on these MVPs!

Visit BSWUSA.com for more details

SENNHEISER

beyerdynamic

HMD280 AT BSW FOR ONLY $239!

HMD25XQ AT BSW FOR ONLY $399!

Tieline

MARTI

COMREX

Telos

Codecs!

Free stuff with our top selling gear!

Great Package Deals!

Lowest Prices!

Visit BSWUSA.com for more details

broadcast gear from people you trust

BSW

Broadcast Supply Worldwide

Knowledgeable Sales Staff

BSW's sales professionals have decades of real-world broadcast and recording experience to offer expert help with your purchase.

Station Ops

by Christopher "Doc" Tarr

Office Networking

In today's broadcast facility, there are often many different pieces of computer gear that need to talk to each other. Because of the demands on the Engineering staff, and sometimes due to the intimidation factor that networks can hold, these new pieces of gear often simply get connected to open ports on an existing network, without giving a second thought to how it will exist with the other gear. After a while the exponential growth due to this "layer over layer" method of networking makes it difficult to manage, and prone to problems like slowdowns and wide spread computer infections.

Taking Back Control

So, how do we take back control of our networks? What is the smartest way to plan for future network growth?

The best way is to asses your current and future needs, take a look at your entire network and all of the devices on it, and break it down into smaller segments both by physical location and by function. By doing this sort of planning, you can drastically cut the amount of network chatter, operate your network efficiently and also provide better security.

Make a Map

So, how do we break it up? First, take a close look at your network and sort it out.

It helps to diagram it out by listing all of your equipment, and drawing the connections to the switches and then diagramming how the switches connect to each other and the Internet.

Key Questions

While doing this, ask these questions: Do all your devices really need network connectivity? Of those that do, how many need to see the public Internet? Also, what machines are critical? Are there any computers that would seriously harm business if they got infected or crashed hard?

Take that information and use it to divide up your network into segments, thinking about what systems can be on a network just by themselves (automation systems are a good example) or possibly on a different subnet such as monitoring equipment.

ANNUAL REMOTE SALE ON NOW! LOWEST PRICES OF THE YEAR!

broadcast gear from people you trust

BSW

Lowest Prices and Largest Inventory on EVERYTHING For Broadcast

BSWUSA.COM 800-426-8434

Piece by Piece

Let's talk about how to break down your entire network.

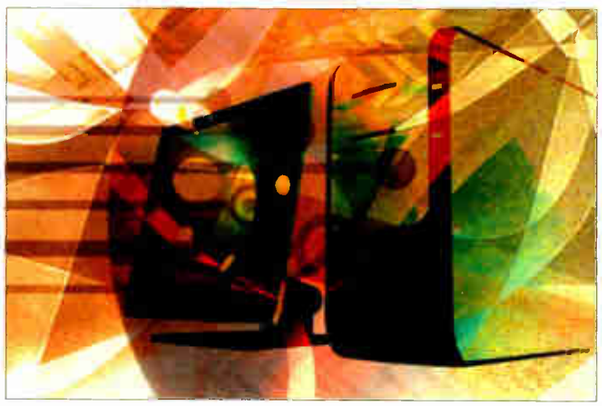
We'll start with the office network. This network consists of the bulk of the office computers and sometimes hosts a domain controller or file server, and usually connects your facility to the Internet. This type of network is often the most difficult to manage, since it contains a variety of software, operating systems and users. Generally if there is going to be a widespread worm or virus, it will start here.

Next is the automation system network. For small stations, this may be two computers (Production and On-air) all the way up to several workstations and servers for a large cluster. This network is critical, and requires significant uptime numbers.

What other networks might exist?

Streaming computers often are connected to the Internet 24/7, and usually require ports to be open to function. Because of this, it is a very good idea to isolate those computers as well. All they should see is the Internet, and not your local network.

HD Radio systems will often require a separate network as well, or at the very least a dedicated switch due to the amount of sustained data traffic it requires. Additionally, you probably have a switch in your transmitter building to feed PAD and RDS data to various boxes as well as ethernet connectivity for your audio processing.



There are different ways to divide up your network.

The One Switch OOPS!

One option is to plug it all into one big switch and create subnets, or mini networks, on the physical network. Generally this is accomplished by giving specific networks their own IP address and Subnet address scheme.

This offers basic isolation, but does leave holes open. Someone could easily change the IP address of a machine and connect it to any other of your networks. In addition to the security risks, this method places a lot of traffic on your

(Continued on Page 20)

World Radio History

The new M Class Audio Console from SAS.

Upscale Performance. Downscale Price.

M Class opens the doors of SAS console ownership to everyone.

Engineered from the ground up to be affordable, yet still worthy of the SAS name, the M Class sets new standards in console design. engineering and price. Stand-alone or networked, a typical M Class console is around $13,000, so it's a perfect replacement for aging analog mixers. Equip an M Class console with a Flex² module and enjoy direct connectivity to SAS 32KD, RIOLink and even 64000 series routers. M Class - it's everything you've been waiting for in an SAS console. Give us a call to see how we can help with your next project.

See more at sasaudio.com

SAS
SIERRA AUTOMATED SYSTEMS

20 years of listening. 20 years of innovation.

818.840.6749 • www.sasaudio.com

World Radio History

Continued From Page 18

Office Networking

network switches, since the traffic is still traversing the same physical layer.

Using the single switch approach also creates a single point of failure that can take your entire network down at any time.

A Better Mouse Trap – Secure and Fast

A better way is to create a separate physical network for each system, with it's own switch and firewall, if necessary.

The benefit to this is that there is a physical disconnect between computers on different networks, which eliminates the potential for "cross-contamination."

For example, if someone in the office gets infected, the very worst that would happen is that the other office computers would get infected. While that means a bad day for you, the station will still be on the air, and your critical systems will still operate.

Additionally, you eliminate the risk of some curious employee poking around and trying to access things they shouldn't be accessing. Taking that a step further, breaking physical locations into "zones" is also helpful.

The Zone Approach

I recently remodeled a facility, and when installing the networking, I broke the building into three zones, each with their own network switch. Each of those switches connected to each other and the server room on a gigabit backbone.

This makes troubleshooting much easier, and can split up the networking load substantially, versus having all your machines on one or two stacked switches.

Dealing With Necessary Crossover

So, we've discussed treating your individual networks as separate entities, isolated from one another. What if there is pressure to connect some computers on these individual networks to the office network so that the staff can access various systems, for example the music and scheduling functions on the automation system? It's not an unusual, or even inappropriate, request, and is a relatively easy problem to solve.

If you have computers on the office network that need to exchange data with machines on another network, use a computer with dual network cards and good firewall and anti-virus software.

If you are familiar with the inner workings of the operating system of the computer in question, you can also edit the routing tables to prevent traffic from "jumping" from one network to the other.

Yes, you have opened up a hole that you tried to prevent by separating the networks, but if it's limited to one or two computers, you can focus on locking down those computers to prevent problems.

Intermediary Server

Another option is to use an "intermediary" server that can straddle both networks and can pass the information back and forth.

This allows even greater flexibility, and can provide an easy way to quickly isolate networks from one another if a problem arises. If a virus or worm starts to propagate through your network, you could pre-emptively "pull the plug" on the server, eliminating the possibility the infection jumping networks.

Forward Thinking

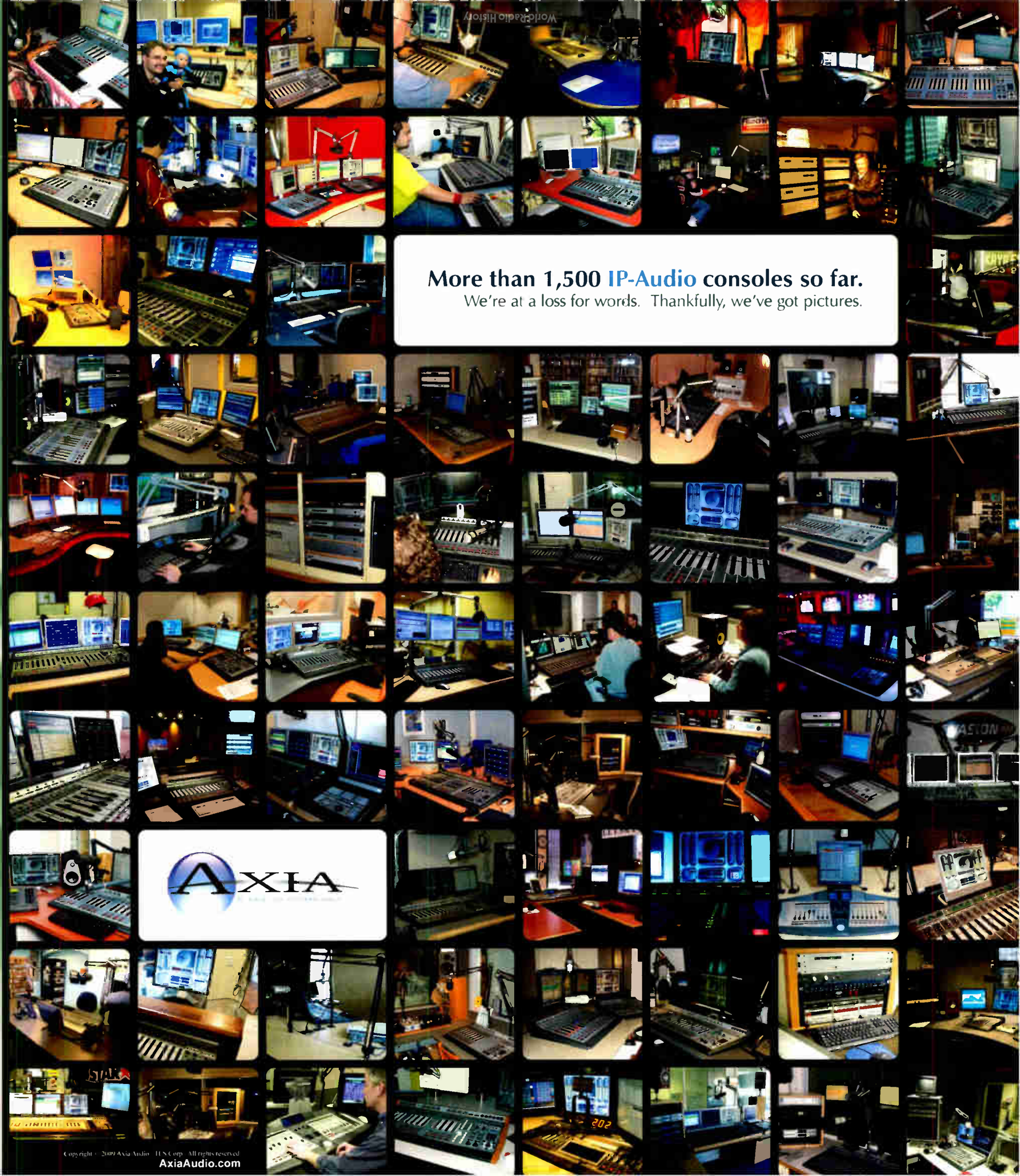
We can pretty much assume that as time marches on, we're only going to be adding more and more devices to our network. It's easy for the busy Engineer to just take whatever the device is and plug it into the first available network port.

At first that works just fine, but after a while you'll start hearing complaints about how slow the network is, or you'll have some device lose its mind and start flooding your network. Then it becomes a real challenge to find out where the trouble is!

A little planning and work now will insure that your networks scale well into the future, keeping your facility running smoothly and your co-workers productive.

Christopher "Doc" Tarr is the Director of Engineering and IT at Entercom's stations in Madison and Milwaukee, Wisconsin.

World Radio History


More than 1,500 IP-Audio consoles so far.
We're at a loss for words. Thankfully, we've got pictures.
AXIA
Copyright © 2009 Axia Audio LLC Corp All rights reserved
AxiaAudio.com

Practical Engineering

AM Towers and Wireless Carriers Can Thrive Together

by Lawrence Behr

Once it was sagely written that wireless carriers and AM radio station towers were never to partner, that to do so offended the natural order of the airwaves. The good news is that this tired piece of conventional wisdom can be tossed.

There are proven collocation engineering systems that successfully wed wireless antennas and AM towers to create mutually functional and mutually profitable architecture for carriers and tower.

In this article, Lawrence Behr, founder and chief executive officer of LBA Group Inc. in Greenville, N.C., explains how to join the two pieces of the collocation puzzle.

Historically AM Had Collocation Problems

The name of the game today for wireless carriers and tower owners alike is "collocation." Not usually considered for the arrangement, however, are the estimated ten thousand existing AM radio broadcast towers across the United States.

Historically, the wireless industry has been warned to steer clear of AM radio stations. The warning has been twofold: neither attach to their towers, nor interfere with their broadcast patterns. Indeed, wireless carriers must prove to the Federal Communications Commission (FCC) that they have avoided all such problems when constructing or modifying any tower within three kilometers of an AM station.

In the past, the towers were considered unsuitable by most wireless carriers (cellular, PCS, SMR) because of presumed grounding difficulties, interference and safety considerations. Coordinating construction between the vastly different AM and wireless cultures was frequently a slow and painful process. From an engineering perspective, the process of integration and demonstrating license compliance to the FCC often required delays and costs unacceptable to wireless carriers. AM station owners also wanted assurances that collocation methods proposed by a wireless operator posed no threat to their signal coverage pattern.

Integration Made Easy

New technologies are now available to overcome these problems and efficiently integrate wireless and AM systems at reasonable costs.

In the AM band, the tower itself is the radiating element without a need for attached antennas, whereas wireless antennas and coaxial cables are self-contained systems that merely attach to support structures. Achieving compatibility with the AM tower through electrical integration or isolation of wireless antennas is a challenging engineering exercise.

Because AM broadcasting is a specialized field, many wireless system designers and constructors are unfamiliar with lower frequency technology and are unaware of cost-effective compatibility techniques for wireless and AM.

New Approaches to AM Collocation

One technological approach to AM collocation is a proprietary system called CoLoSite℠. This technology has been developed through the collaboration of two LBA Group companies with more than 35 years of experience in the AM broadcast and wireless industries. The system is based on patented hardware by LBA Technology Inc., with engineering and systems integration implemented by Lawrence Behr Associates, Inc. The resulting system's approach overcomes the traditional obstacles to collocation while permitting virtually unlimited wireless users on most AM towers.

With this system, collocation is practical for both single tower and multiple tower AM antenna systems. Using the system, wireless antenna and coaxial cable installations have virtually no effect on host AM towers and the AM signal has no effect on the wireless antenna. The hardware components are permanently integrated into the AM system and are designed for a "utility-grade" life cycle. Moreover, antennas and transmission lines can be added without the use of additional isolation devices. This means a tower owner can lease additional space to other wireless carriers, limited only by a tower's structural capacity.

On non-directional towers, an isolation system called CoLoPole® typically is used. This system directly grounds an AM tower. Wireless antennas and transmission lines are mounted and bonded directly onto a structure. The system uses a unique wire cage impedance transformer. Lower portions of the cage are heavily insulated and spaced away from the tower to allow ready operational access to the wireless antenna system. The system benefits the AM station with improved efficiency, "air sound" and lightning protection, thus enhancing the collocation experience for the station.

Directional stations use multiple towers to form an FCC-licensed radiation pattern crucial to protecting other stations from interference. This licensed pattern cannot be disrupted by collocation. The cost-effective approach to doing this is a specially designed isolation system between the base

(Continued on Page 24)

When You Want More Than Just An Antenna

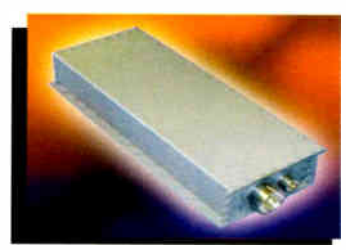
Full line of HD Radio Accessories: Circulators, Mask Filters, Reject Tuners, and Rigid Components.

JAMPRO

Made in USA since 1954

MASTER FM DUAL INPUT HD ANTENNA

JSHD DUAL INPUT HD SIDEMOUNT ANTENNA



RCHA 10dB HIGH LEVEL HD INJECTOR

JAMPRO ANTENNAS/RF SYSTEMS, INC. • P.O. Box 292880 • Sacramento, CA 92829 USA • Phone (916) 383-1177 • Fax (916) 383-1182 • www.jampro.com Your Partner for HD Radio Solutions

HD READY

World Radio History

If you thought that you couldn't afford new Automation,

then think DIGILINK-XTREME !

- Quad Play with Dual Record
- Sound card hardware included
- 16 input switcher included
- Powerful one week automation
- Voice tracking
- Ball games mode
- Music scheduler
- Phoner recorder/editor

only $100/month

Xtreme is ideal for Live On Air, Hard disk automation, Satellite automation, Internet Radio, and so much more. For less than the monthly cost of a cell phone contract you get everything including support and updates (just add a PC) !!!

advanced radio consoles for ALL jobs,

the ARC-10 and ARC-15

ARC-15
$3,495

ARC-10
starts at $1,599

The ARC-10 and ARC-15 are ideal for On Air, Production, and News studios. Available in either balanced or unbalanced models they fit every application.

- 10-15 channels, Pgm & Aud outputs
- Built in telephone channel for Call in shows
- 2-5 mics, (depending on model)
- PC sound card built in

'All NEW' from Arrakis Systems

NEW... a modular, analog console

the MARC-15

starts at only
$4,999

PC interface module for digital playback and record

- modular
- 3 mixing buses
- 2 inputs per channel
- control room and studio
- supports 2 phone channels
- electronic switching w LED lamps

www.arrakis-systems.com

970-461-0730

World Radio History

Practical Engineering

– Continued from Page 22 –

station equipment and the AM tower. For this purpose, LBA has developed the CoLoCoil®. It effectively prevents wireless transmission lines from interfering with the operating parameters of the directional AM towers. Because CoLoCoils® are modular, adding wireless equipment to a tower in the future is done systematically and with minimal impact on AM host facilities or the carrier's compound.

CoLoCoils® at WJOY in Burlington, VT

AM Collocation Planning

Planning for AM collocation begins with an analysis of a station facility. While all AM stations theoretically may be used for wireless collocations, practical factors render some facilities economically or technically unattractive for collocation.

It is important that an AM collocation integrator be involved at the site acquisition stage to avoid misunderstanding and unnecessary costs. There are numerous subtleties to negotiating a satisfactory lease or acquisition agreement. Advance screening of all potential sites can also eliminate unneeded and expensive detuning situations.

Professionally managed AM collocation has been repeatedly accomplished throughout the country for such wireless carriers as Sprint, Nextel, AT&T and Omnipoint. With expert planning, a wireless carrier and AM host partner not only can co-exist, they can fashion a long-term collocation relationship. – *Radio Guide* –

A Collocation Success Story

by Giles Lambertson

New England radio station owner Bob Vinikoor hadn't seriously considered leasing space on his AM towers to wireless carriers until a carrier approached him five years ago. The president of Koor Communications listened to the proposal and soon thereafter his 200-foot-tall tower for WNTK-AM 1010 was doing double duty and earning him extra revenue.

In fact, the tower is now home to four wireless carrier antennas. In all, three of four towers serving Koor Communications radio stations in New Hampshire and Vermont are partnering with wireless companies.

The wireless carrier involved in the initial WNTK project contracted with a North Carolina telecommunications firm, Lawrence Behr Associates, to install a system that would seamlessly integrate the AM and wireless functions on Vinikoor's tower. To accomplish that, Lawrence Behr Associates utilized a patented signal isolation device developed by LBA Technology engineers called CoLoCoil®.

"I've never had a problem with the CoLoCoils," Vinikoor said in June, referring to the original installation and several others that followed on his towers. "I would certainly recommend collocation of wireless and other carriers. It is painless."

When Vinikoor testifies to the value of collocation, he knows whereof he speaks. In 2002, he successfully culminated a 10-year legal battle to erect a new radio tower in Lebanon, N.H. Success came after repeated setbacks at the local and Superior Court level. By the time the state Supreme Court ruled he could build the structure, "it had cost me more in engineering and legal fees than it cost to actually build the tower."

Vinikoor says he is sympathetic to the plight of wireless carriers unable to build their vertical structures. "It is difficult to build new towers in an anti-tower environment; collocating is simply a matter of following the path of least resistance."

Vinikoor believes more AM radio station owners haven't offered their towers for collocation for two reasons. First, they just haven't given it much consideration. "Radio people I know haven't expressed any reluctance to collocate with a wireless company," he says. "They just haven't focused on it. It is not seen as a big part of their business. We see it as a big part of our business."

The second factor is that wireless carriers aren't aware of their towers. The FAA doesn't require registration of all towers. "The towers that aren't registered don't show up in the data base that carriers search for collocations. That's why owners should get on the FAA list. It doesn't cost anything," Vinikoor advises.

He charges varying rates depending upon the market, for ground space and for vertical space. The higher on a tower an antenna is placed, the greater the premium charged. Vinikoor's wireless partners pay from $1,600 to $2,400 a month to collocate on his structures. – *Radio Guide* –

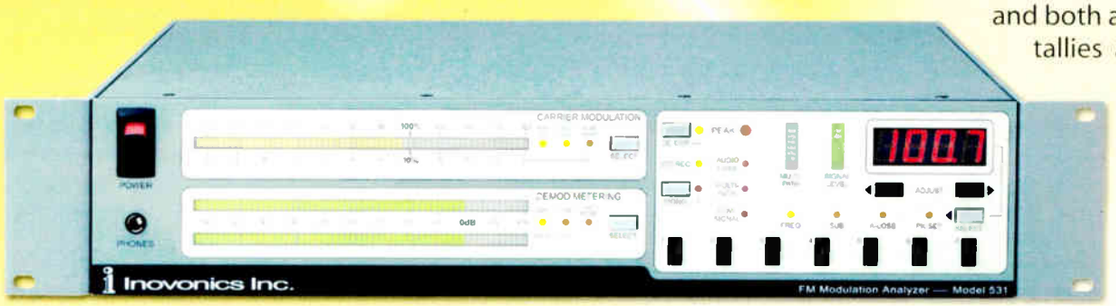
For more information about AM Collocation email the LBA Group: Lbatech@Lbagroup.com

TOP VALUE FM Monitor

This Easy-to-Use FM Mod-Monitor Gives Accurate Off-Air Measurements

A wealth of features makes Inovonics' second-generation 531 the undisputed value leader in FM Monitoring. In addition to the high-resolution total-mod display, the 531 also shows stereo audio levels, SCA and RDS subcarrier injection, plus a relative indication of incidental AM noise. A digitally-tuned preselector with programmable presets lets you quickly compare your station's parameters with those of market companions.

Signal strength and multipath readouts simplify antenna alignment and help validate all measurements. Rear-panel appointments include balanced audio out, composite in/outs, and both antenna and high-level RF inputs. Alarm tallies are provided for overmod, audio loss, carrier loss and excessive multipath.



"Other guys imitate us…
But the original's still the greatest."
— Billy Page THE IN CROWD

For full technical details, visit…

www.inovon.com

Inovonics
1305 Fair Ave. • Santa Cruz, CA 95060
TEL: (831) 458-0552 • FAX: (831) 458-0554
www.inovon.com • e-mail: info@inovon.com

World Radio History

RF Specialties® Group

Serving Broadcasters For 27 YEARS

RF Specialties has everything from the microphone to the antenna.

- Transmitters
- Antennas
- Audio Processing
- Consoles & Racks
- STL / RPU Systems
- Microphones
- Audio Cable
- Combiners and Phasors
- Transmission Line
- Towers and Lighting
- T-1 and IP Audio CODECS
- HD Monitoring
- RF Analyzers
- Remote Control Systems
- Telephone Hybrids

"RF" IS GOOD FOR YOU!

Call your nearest RF Specialties Office:

www.rfspecialties.com

RFSCA	San Diego CA Steve	619-501-3936
RFSCA	Las Vegas NV Bill	888-737-7321
RFSCA	San Francisco CA Paul	925-270-8939
RFSWA	Mukilteo WA Walt	425-210-9196
RFSWA	Vancouver WA Bob	800-735-7051
RFSTX	Amarillo TX Don & Mo	800-537-1801
RFSTX	Dallas TX Wray	888-839-7373
RFSMO	Kansas City MO Chris	800-467-7373
RFSMO	Raymore MO John	877-331-4930
RFSMO	Richmond IN Rick	888-966-1990
RFSPA	Ebensburg PA Dave	866-736-3736
RFSPA	Pittsburgh PA Ed	866-412-7373
RFSPA	Philadelphia PA Phil	888-737-4452
RFSGA	Thomasville GA Chris	800-476-8943
RFSGA	Crestview FL Bill	850-621-3680
RFSGA	Murray KY Dave	270-767-7644

Fine Print: : The FIRST customer to call their favorite RFS office, and mention this AD, wins a $10 Gift Card .from Starbucks. Limit of ONE card from each of the above listed office. Previous winners not eligible.

World Radio History

Chief Engineer

by "Tweaker"

Good Housekeeping and Preparation Eases Emergency Stress

We've all had it happen. The "off the air" call comes when you need it least – when you're spending time with the family or when you don't have quick access to our work vehicle. Murphy's law steps in and raises havoc. If you aren't prepared it can spell disaster. The last thing you need is to add additional stress to a situation which is already potentially stress filled.

With a little bit of preventative good housekeeping you can minimize the effect of the "emergency" both on yourself and on your station's revenue stream.

Organize Now, Not in the Middle of a Crisis

When you need to get your hands on your equipment manuals it is most often a crisis situation. The automation is down, your STL or transmitter is having a problem or another key piece of equipment is in need of an immediate fix to keep the station running.

An "off air" situation comes with its own level of stress. The last thing you need to do is add stress to yourself by taking precious time to look for equipment documentation. Just as stressful is discovering that your documentation doesn't contain the revisions that match the piece of equipment you have.

Check Your Documentation Today

Take the time now to find all of your equipment manuals. Check to make sure the manuals you have match the technical revision of the equipment on hand. If the documentation you have doesn't match your equipment, call the manufacturer's support line to get the proper manual or schematic revisions that match.

Keep in mind that, on occasion, the engineering department will make changes to circuit boards or other design changes that become incorporated into production units before the formal documentation is completed. The equipment into which the changes are incorporated sometimes is shipped with the older documentation that doesn't include the changes.

At a lot of stations the engineers who held the position before you may have made modifications that aren't reflected in the documentation you have. In this case take the time now, before a crisis, to modify your manuals to add those changes.

Designate a Storage Location

Set up a file cabinet to store the manuals and be sure to return them to their proper storage location after each use. Take a quick trip to the office supply store to get the proper sized suspended file pockets you need. Make sure that each one is properly marked for identification.

Expanding hanging pocket files are also handy for manuals in three ring binders. The advantage of using these, rather than just sticking the binder in a drawer, is retention of loose pages. Should any pages fall out they will be "captured" in the suspension pocket and not lost in the file drawer.

Storage at Your Transmitter Site

Make copies of the manuals for the equipment that is located at your transmitter site, or if you have an additional site location such as a remote studio. Since these locations usually are limited for space, and in the case of the transmitter site it is usually rather Spartan, consider purchasing one of the waterproof and "critter" proof portable plastic storage containers that are available for file storage. Some models come with a suspension file frame. If the one you choose doesn't have one it can be purchased separately for a few dollars.

Be sure to mark the manuals you store here in the same way you did back at the station so there is consistency in your system.

Electronic Files

Should you prefer to have copies of documentation on your computer or on a thumb drive for storage, check the manufacturer's web site to see if they have an electronic version. If so, download it now. Make sure it matches the equipment you have.

If not, call the manufacturer to find out if one is available that has the revisions you need and if it could be sent via email or possibly downloaded from the manufacturer's FTP site.

Worst case, scan your existing manual, with revisions, into your computer and save it as a PDF file for quick access.

Many manufacturers are happy to provide you with documentation that includes the revisions that match your equipment. By doing so they help minimize the number of calls you might have to make to their tech support line and they keep a happy customer, happy.

Schematics

To make sure you always have quick access to readable schematics you may want to consider having copies made.

(Continued on Page 28)

LARCAN
We hear you. Loud and clear.

LOOK TO LARCAN FOR INNOVATIVE IBOC FM SOLUTIONS - ENCORE SERIES

Designed with a difference to ensure the highest quality audio performance - LARCAN's new Encore Series offers a superior range of IBOC FM translators. Customer driven and purpose designed for optimum performance - we bring you the best in IBOC FM broadcast technology. Encore, Applaud innovation.

We hear you. Loud and clear.

IBOC FM Translator
(Model: DRT-01)

Encore Series Features:

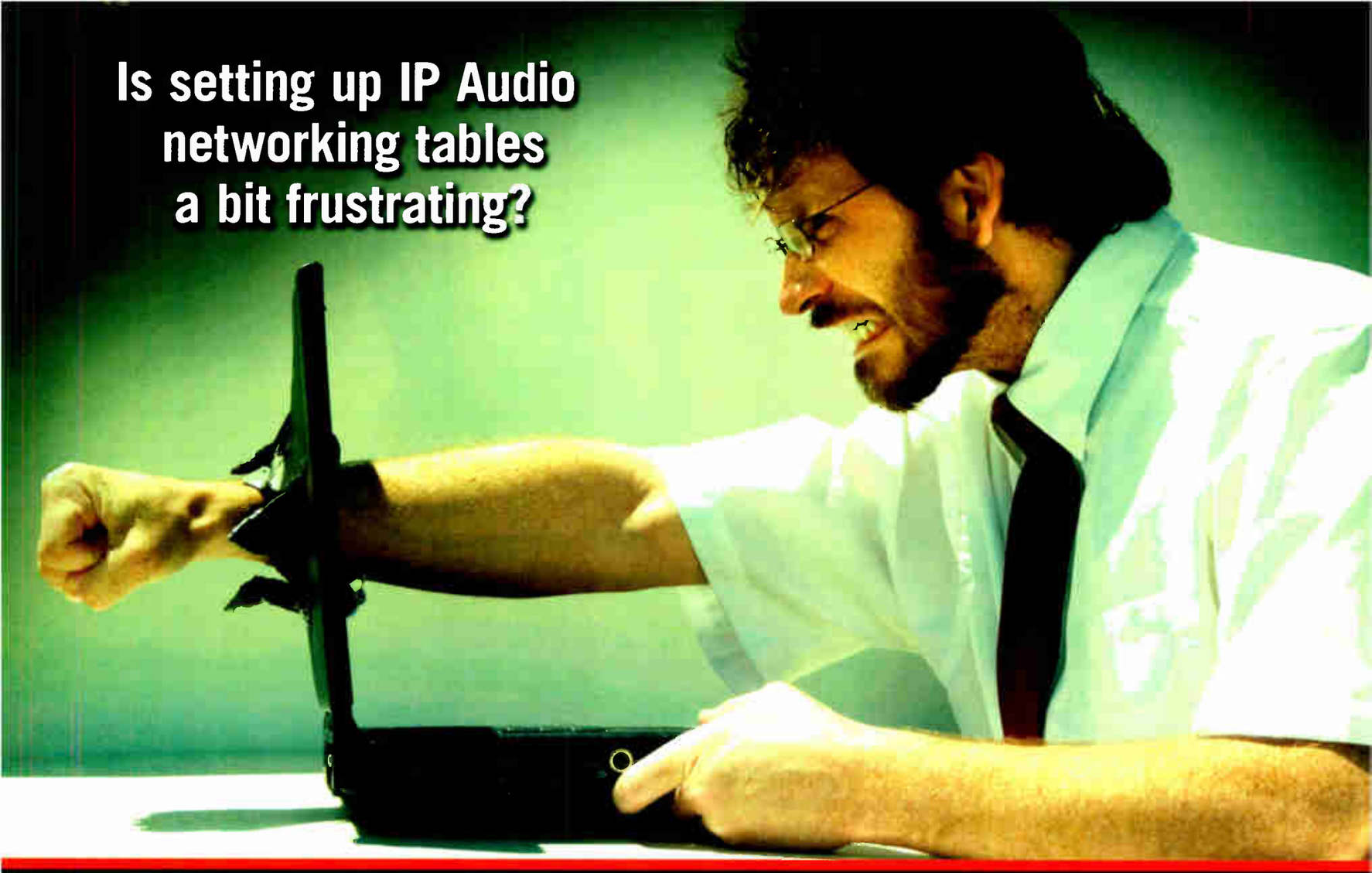
- Superior IBOC FM Performance & Coverage
- Extensive Power Range from 25W to 250W
- Broadband Design
- Frequency Agile
- Integrated Features & Adaptable
- Complete Solutions for Analog FM & IBOC Digital Radio
- Innovative Design

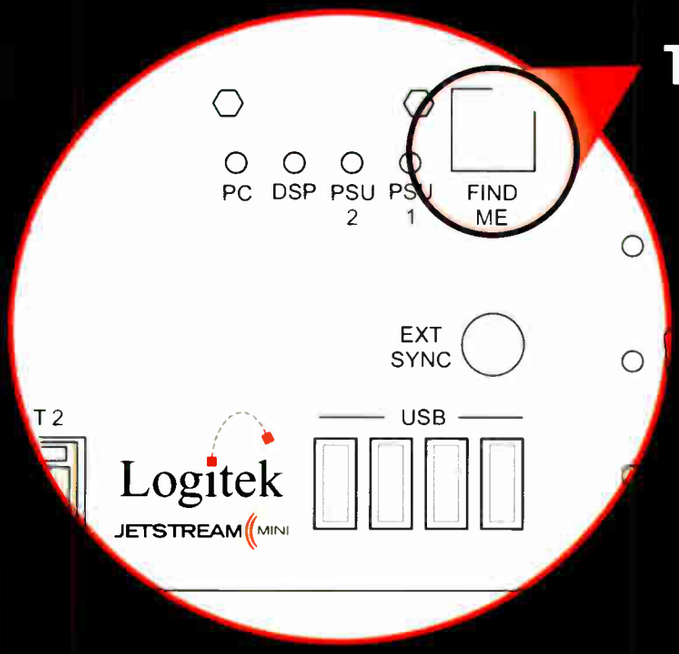
TRUE LARCAN TECHNOLOGY

U.S. Tel: 1-303-665-8000 • Fax: 1-303-673-9900 Canada Tel: 1-905-564-9222 • Fax: 1-905-564-9244
www.larcan.com Email: sales@larcan.com

World Radio History

Is setting up IP Audio networking tables a bit frustrating?





Try the One-Second JetStream approach.

Press one button to find other JetStream units on your network and automatically configure your system.

You'll save time, money and rack space, while enjoying the convenience of Logitek's next generation IP audio routing solution.

Call today **800.231.5870** for more information or to schedule a demonstration.

JETSTREAM MINI

©2009 Logitek Electronic Systems, Inc.

Next Generation IP Audio
logitekaudio.com

Logitek
Console Router Systems

World Radio History

Chief Engineer

– Continued From Page 26 –

Many office supply store copy centers are equipped with full size copiers that can handle a schematic.

One downside of electronic manuals is that schematics often are reduced to a size that is virtually unreadable. This is because the manufacturer is providing a printable version of the manual which prints out to normal letter size paper.

Some manufacturers will provide you with both the reduced version of schematics, to print with the manual, and full size electronic schematics. You can take an electronic, full size version of the schematics to the copy center and have them reproduced at size or reduced to a smaller size for ease of storage. Be sure that, whatever size you reduce it to, it is easily readable.

The Legal Stuff

Should you choose to have copies made, you may need to get a release letter from the manufacturer. This letter must authorize reproduction of the material.

Some copy centers require this before they will run the job. This is their protection against someone illegally reproducing copyrighted material.

Binders and Shipping Tubes

Depending on the size of the manual you may opt to have the copy center bind it for you. Your other option is the old standby, a three ring binder.

A shipping tube is great for the schematics you are having made. Be sure that you get the size which is closest to the height of the schematic reproductions you have ordered. Nothing is less fun than trying to get documents out of a shipping tube after they have slipped down the tube and are now just out of finger's reach.

Once you get back to the office clearly mark the binder and the shipping tube.

You may want to place the tube next to the file cabinet that contains your manuals so you have quick access.

Some engineers have purchased a waterproof fishing rod tube for storing schematics at the transmitter site. While they usually are more expensive they are also "critter" proof.

Once you go through the process of organizing your documentation it will be ready when you need it.

Quick Grab Tool / Safety Board at Your Transmitter Site

This idea is inexpensive and great in an emergency or even for routine maintenance.

Materials

Peg board, peg board hangers, a white paint pen or sharpie, eight foot 2x4 studs, and anchors that are appropriate for the walls of your transmitter building. You could make this with half-inch plywood or strand board using nails or "L" hooks to mount the tools if you prefer.

Be sure you have a drill powerful enough to place the anchor holes in the wall and the proper drill bit at the size needed for mounting the board.

The Tool Side

Take an inventory of the tools that are unique to the site, a tube puller, high voltage probe, etc. – also those tools used the most to perform routine maintenance at the site.

With the board lying horizontal, place the tools on the board designating a location for each tool. Place the peg, lay the tool in place and outline it using the paint pen or sharpie. After you have outlined the tool mark the outline with the name of the tool. Also mark the holes where the peg will be placed when the board is mounted.

Upon finishing your layout, mount the board on the wall using the 2x4s and anchors. Then hang the pegs where you marked the holes. Finally hang the tools in their assigned positions.

You will now have immediate access to the tools that are unique to the site and those you use most often at the site. Plus, you can immediately tell which tool is missing after you finished routine or emergency work. Be sure the tool board is completely populated before you leave the site so everything you need will be ready for your next visit.

In an emergency, having tools hanging in the proper location can save precious time as you'll have the basics you need waiting for you when you get to the site.

The Safety Side

Designate a portion of the board to be used for safety equipment. You could paint it a different color or get some yellow and black safety tape for quick visual reference.

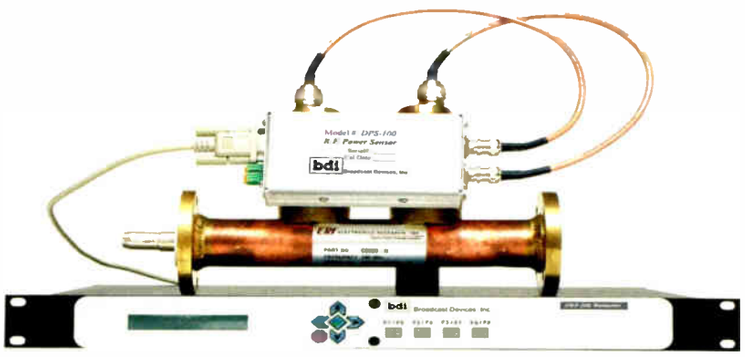
Put your first aid kit in this section. You may want to include a snake bite kit or a bee sting kit. You can use a clear, zip lock bag hung on a peg with the small kit inside.

Purchase a wooden cane for the board as well. This can be used as a personnel safety grab hook in a high voltage area.

These organizational tips will take very little time to put into place, and once you get them done you will save hours of frustration and stress in a "crisis." – *Radio Guide* –

Digital R.F. And Audio Management Solutions

New! The SWP-200 Calibrated RF Power Meter & RF Switch Controller is suitable for digital & analog forward and reflected power measurements . Provides complete control of one to up to four RF switches. The SWP-200 can be interfaced to your existing four port switches, can *(optionally)* be supplied with interface cables for most four port switches made.



The SWP-200 can operate in Hands Off (Pre-programed) or manually controlled modes. One-button control of four port switches, manages interlock closures, and transmitter control in a single rack unit chassis. Additional features include RF failure and RF safety sensing to protect a switch from damage if RF is present, and a switch command is called for. The SWP-200 can also be used in AM radio applications to control multiple open frame contactors. This is a reliable, versatile RF support product that provides around the clock peace of mind.

The ATB-300 is an analog and digital audio switcher/router with outstanding features not found in other single box solutions

***Powerful DSP Architecture* provides state of the art control, and allows for future expansion and feature upgrades. Simple front panel menu programming of silence sense delay, priority channel, revert timeout - program up to 8 channels for secondary, tertiary, etc. sources , input mode selection, input/output gain and input phase inversion. Revert feature returns to primary channel when signal integrity is restored automatically. Programmable silence threshold, proprietary "Silent Switch" feature for seamless switching between sources and synchronous AES switching eliminates artifacts. Frame Rate Conversion on all digital inputs, and programmable alarm contacts. Fully Remote Control Ready - Parallel standard, serial interface optional Power Fail Memory - Returns to last channel selected upon power up. Great as a studio switcher or, transmitter site STL switcher. Available in 8 different analog and digital configurations. Visit our web site or contact the factory for complete details.**

www.Broadcast-Devices.com

Broadcast Devices, Inc.
Tel. (914) 737-5032 Fax. (914) 736-6916

bdi

World Radio History

Sicon-8 Internet & Voice Remote Control

The CircuitWerkes Sicon-8 Voice Remote Control

- Uses Dial-up, Internet Web server or free Sicontroller Software!
- 8 channels of metering, status and control (expandable to 32) and up to 5 alarms per channel.
- No accessories necessary to control your site right out of the box.
- Auto-ranging, auto-calibrating meters make setup a snap.
- Includes: Function scheduler, auto-logging & alarm reporting.

Internal Web Server

Free Sicontroller Software

The Sicon-8 lets you control your site via Internet with its internal Web server, via telephone, auto-answering cell phone or with our free software. Setup is a breeze using the Sicontroller software that also includes scripting, e-mail alerts, multi-site management, virtual metering & much more!

NEW!! Web-Based Silence Sensor

Introducing the Silence Sentinal

Discover more online at www.circuitwerkes.com

- Detects Stereo or Dual Mono Silence (independantly adjustable channels).
- User-programmed relays (DPDT) close automatically or via Web control
- Balanced or unbalanced audio inputs.
- External trigger inputs activate user-defined actions.
- Optional Multi-Site monitoring software coming soon!

Remote Broadcasting Solutions

MicTel Mic/Line to Telephone Interface

- Outputs & Inputs for telephone handset, cellular phone or balanced line level at up to +10dBm.
- Operates up to 36+ hours on two 9V alkaline batteries.
- High quality, user-switchable, internal limiter prevents clipping.
- External power input with silent, auto-switching battery backup.
- Individual gain controls for send, receive & headphones levels.

Unattended Dial-Up Broadcasts with the DR-10

- The DR-10 is a Dial-Up remote control with balanced, telephone audio input & output that can control many automation systems or your audio console for unattended remote broadcasts.
- Our Silencer™ option removes control tones from the audio path
- Use the DPDT relays to insert the phone audio directly into the program path when necessary, especially for emergencies.

TelTap Pocket-Sized Manual Telephone Coupler

- Can be used as a phone tap or a passive manual telephone coupler.
- Send or receive telephone audio.
- Compact size & low cost makes the TelTap a great addition to your remote kit for main or backup capabilities.

Lots More CircuitWerkes Problem Solvers

- Transcon-16 - Move up to 16 contact closures from room to room over an audio cable
- DT-232 - Turns DTMF sequences into user-programmed serial outputs & action steps.
- FSK Encoders, decoders, tranceivers and contact-to-FSK encoders/decoders.
- SUB-03 Subaudible tone decoder and SEN-6 Subaudible encoder.
- HC-3 telephone autocoupler and AC-12 rack of autocouplers
- DTMF-16 and DS-8 DTMF tone decoders.

Find Full product info & downloadable manuals online at www.circuitwerkes.com. 352-335-6555

World Radio History

Transmitter Site

Seeing the Spectrum – The (Very) Light Way

by Phil Alexander

What is an OBW you say? You will not find a paragraph about those letters in the FCC Rules unless you know they mean Occupied Band Width. FM and TV stations must run an OBW if they make changes that might affect their emissions. AM stations get to do it once a year. For many years this meant hauling a large, heavy test instrument into the field for making measurements. Now, there is a better way.

Phil Alexander looks at the state of the art of OBW measuring instruments (A/K/A Spectrum Analyzers) and shows us the really light way of getting the data back from the field and into a technical report that every FCC inspector demands when reviewing your files.

Not a Good Day

It was a hot day in Austin last year when Alan and I were doing the 2008 ***Radio Guide*** AM Transmission Seminar in conjunction with the Texas Association Broadcasters convention. How hot was it? Well, on the two day trip from Indianapolis to Austin in a car loaded with test gear I think the thermometer may have dropped near 100° F sometime during the night. In other words, getting there was not a fun trip and my mood was similar to a grizzly bear awakened half way through its winter long nap.

Barry, our intrepid organizer and leader is always bringing new and interesting stuff to the seminars, and this time his latest find was a prototype of an Agilent hand-held spectrum analyzer. I thought I had seen this movie before, but for contrast and perhaps for ballast I had packed my trusty old Hewlett-Packard (HP) 8568B for comparison.

For those who are not familiar with it the HP 8568B is a big old lab quality instrument that does everything but move easily from place to place. It is more "luggable" than portable, but it does break down into two fifty pound cases plus a small plotter for recording traces. I only put up with it because it will do almost anything I ask of it and once it is setup it is easy to use.

Since the 8568B is the direct ancestor of the newer Agilent E440x models that the major transmitter manufacturers treat as the "gold standard" of spectrum analysis, I thought it would make a great "then and now" comparison for the seminar class, and I secretly expected to explain the differences in a list of things you give up when moving to new, lightweight instruments.

Those of us who have complained to Quincy about IBOC boxes that appeared to have the digital set a bit too high and have heard the standard "Well, have you checked it on an E4402?" refrain, know this drill very well.

Low Expectations

In other words, my mood was less than optimum and my expectations were low.

However, I thought a comparison would be an interesting educational experience for those attending the seminar even though I fully expected to hear that if the requirements were as difficult as measuring an AM-IBOC hybrid station's output to NRSC-5 standards, the instrument of choice should be the Agilent E4402 – just as the guys from Quincy trained us.

Can Phil Be Wrong?

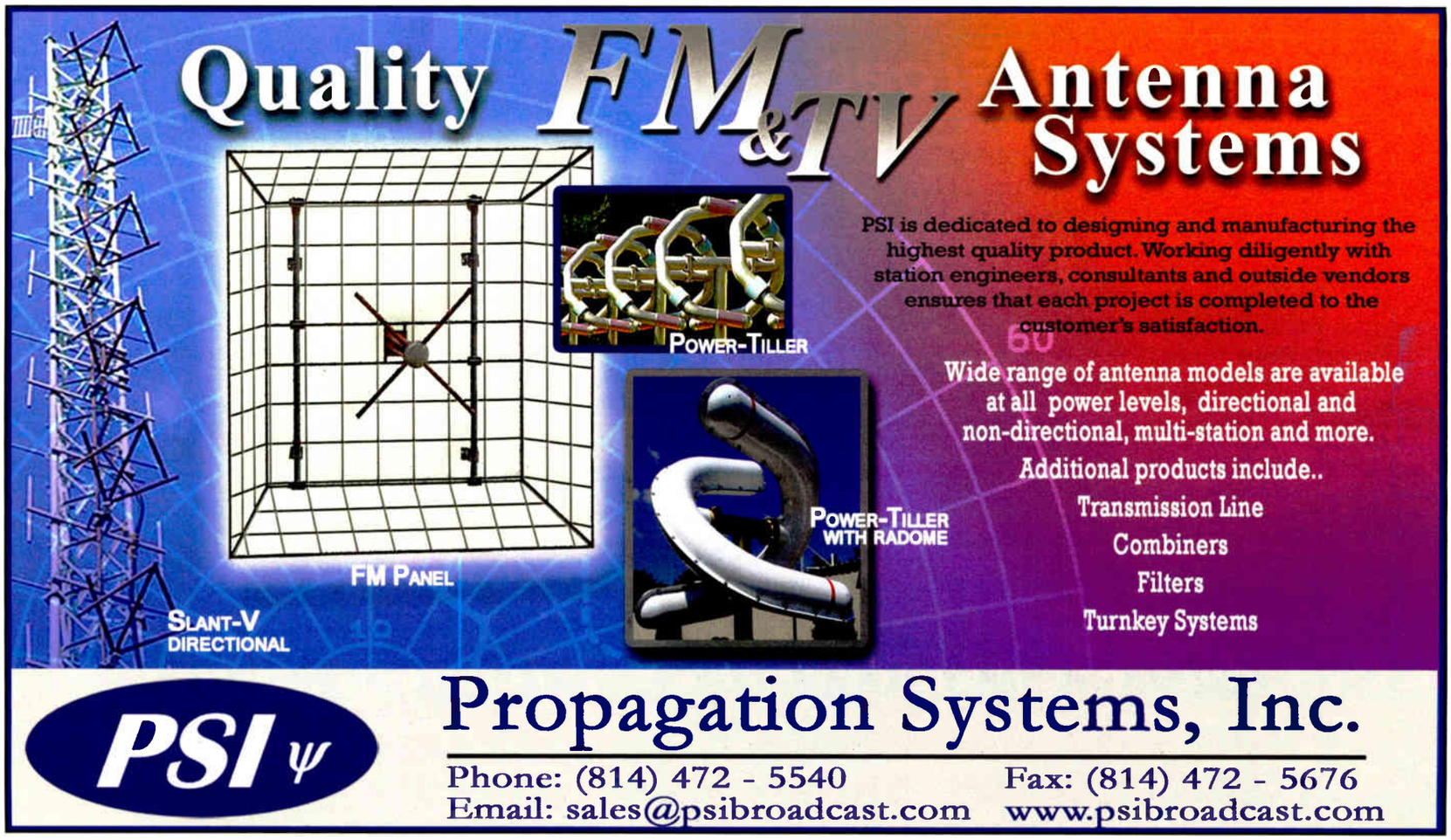
In a word, yes. All my preconceptions were shattered when I met Randy Tanner from Agilent and talked to him about his amazing little blue and gray box. It was just a casual conversation at first, but when I asked how the N9340B compared with the E4402 etc., what I heard surprised me.

Randy said, "That was a problem for us and is a reason we had to delay the launch longer than we would have liked." He went on to say that their design standard for noise was essentially the same performance as the E4402 specification. The first attempt did not succeed so they started over and accomplished their goal. The more we talked the more interested I became in this little box.

Design Philosophy

The basic design of the N9340B is a strong and capable hardware platform keeping the familiar operating characteristics of its heritage. If you know how to operate any HP/Agilent spectrum analyzer built within the past 30 years, most of the basic N9340B operation will seem intuitive. On this basic platform Agilent has engineered a wide range of options in software. This includes options for AM-IBOC hybrid mode NRSC OBW measurements, an on board tracking generator, power measurement, field intensity and many other options. With this system, upgrades to keep the instrument up to date with the latest advances become simple and easy. In fact, the N9340B is a work in progress, but one that is already well advanced and continuously improving.

(Continued on Page 32)

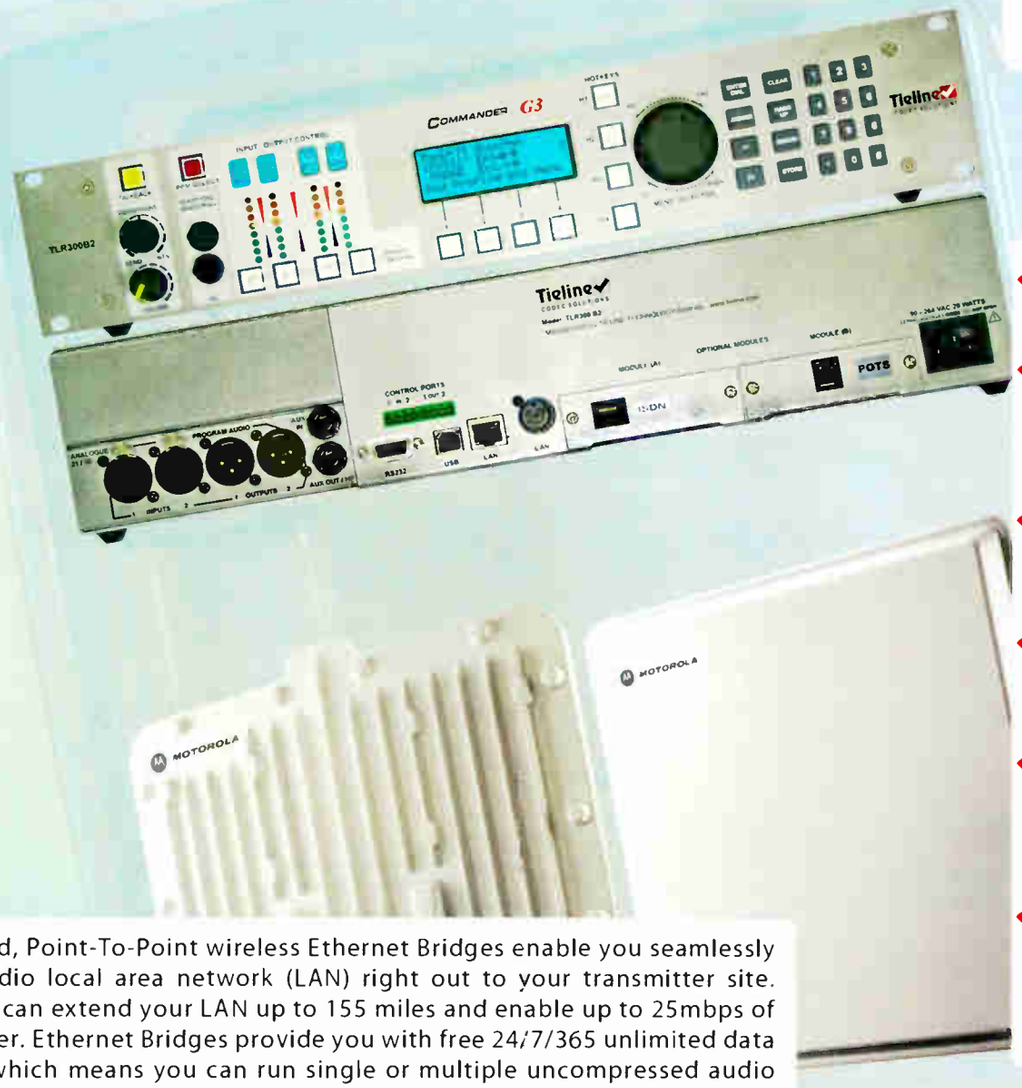


World Radio History

YOUR COMPLETE LOW COS

Wireless 802.x IP STL or Distributio

Tieline Rackmount IP Codec and Wireless Ethernet Bridge



Tieline® TECHNOLOGY

QoS Performance Engine TECHNOLOGY

- 24/7/365 audio reliability over long and short haul IP links
- Ultra low latency high quality audio from 15kHz stereo at 64kbps to 22kHz linear stereo audio at 2.3mbps
- Up to two independent audio streams over the same link between two codecs
- QOS Performance Engine Technology automatically manages your IP connection
- Fully automated failover connection to a backup transport such as ISDN, POTS, X.21 or another IP link
- No on-going costs to operate

Try it free today!
Call SCMS and ask how

Outdoor Fixed, Point-To-Point wireless Ethernet Bridges enable you seamlessly link your studio local area network (LAN) right out to your transmitter site. Some brands can extend your LAN up to 155 miles and enable up to 25mbps of IP data transfer. Ethernet Bridges provide you with free 24/7/365 unlimited data throughput which means you can run single or multiple uncompressed audio channels between studios or as STL's and they're surprisingly economical.

Contact SCMS **1-800-438-6040** sales@scmsinc.com

Mid-South: 1-877-391-2650
Central: 1-731-695-1714
West Coast: 1-866-673-9267
Mid-West: 1-513-899-3036
North-East: 1-315-623-7655
Bradley Div.: 1-800-732-7665
South-Atlantic: 1-770-632-1295
South-West: 1-210-775-2725
North Central: 1-513-376-8600
Pro Audio: 1-877-640-8205
Latin America: 1-760-650-1427

SCMS INC.
YOU KNOW WE KNOW RADIO!

www.scmsinc.com

World Radio History

Transmitter Site

– Continued From Page 30 –

All of this fits into a hand-held enclosure with 6-1/2 inch LCD screen that is about 12-1/2 inches wide, slightly over 8 inches high, less than 2-3/4 inches thick, and weighs about eight pounds complete with battery and heavy ballistic nylon carrying case that has covers that open for normal operation. For the frequent fliers there is also a well cushioned hard case complete with extendable towing handle and roller wheels.

Both cases share one fault. Neither the basic soft case nor the hard case has room for the cables, adapters and accessory items needed for use with the analyzer, so be prepared to carry a small gadget bag full of these things.

Fixing Problems

I found a few aggravating functions in the demonstrator I evaluated for this article. That same instrument was one of two that Randy Tanner displayed at the NAB show in Las Vegas in April. It had a nasty habit of calculating upper and lower span limits as a percentage of center frequency, thus moving from 1000 kHz to 1500 kHz increased the span by fifty percent.

While this might be useful in some product development labs, it added tedious unnecessary fiddling whenever the setup was changed from one station to another. When I commented about this (and one or two lesser complaints) Randy said he had loaded the latest updates before bringing the instruments to the show.

Rather than the span recalculating itself, it stayed exactly where I put it for the first measurement through several center frequency changes. It seems others objected to the original algorithm, and it was fixed along with other improvements.

For an old hardware guy, software does seem to have a few advantages.

One of those advantages is buying only as much instrument function as you need, or starting out with a minimum of functions and adding more when needed, or as the budget permits.

The Agilent N9340B

Field Work

Working with the N9340B is about as easy as it gets. One essential accessory is the 12 volt adapter that allows keeping the battery full while working all day in the field. On the other hand, if you only need a couple of measurements, a fully charged battery will probably outlast your laptop computer. While there are several functions that make a laptop useful for taking a more detailed look at spectra than can be seen on the built-in LCD screen, such as when spur hunting or making comparisons of multiple scans, the basic instrument works well as a stand-alone for all the standard measurements.

I used one of Chris Scott's LP-3 H-field antennas which is a good, widely used shielded loop, but not known for high sensitivity. Using it directly, without the optional pre-amp function, I got excellent results with a couple of 5 kW stations before the fields of Central Indiana turned to mud in one of the wettest spring seasons on record. Since the N9340B DANL (Displayed Average Noise Level) decreases 20 dB with the preamp function, I expect that even low power stations will not present all the challenges usually confronted while trying to obtain accurate spectra.

Bringing Home The Data

Photos, data plots, arcane data files, a printout, a floppy disc; all will work for data transport from field to office, but the N9340B uses none of the above. Instead, there is a slot for a standard memory stick or thumb drive.

Loading spectra in JPEG form is simply a few clicks on the menu screens, or the data can be left in the instrument and downloaded as the onboard memory fills up. I liked the memory stick idea so well I didn't risk making a mistake and erasing my data.

Back in the office, importing the JPEG directly into a report is very simple and takes far less time than cleaning up some of the older data for report presentation.

The Bottom Line

Not only will the N9340B do everything and more than my old reliable HP 8568B, it is about 92 pounds lighter, so I will have my own in a few weeks. – *Radio Guide* –

Integration

[in-ti-grey'-shuhn] – noun 1. an act or instance of combining into an integral whole.

It should have been our middle name,
but it wouldn't tell the whole story.

Customized Automation Systems

Studio Design and Project Management

Broadcast Equipment with Exceptional Pricing

Complete Turnkey Installation

Broadcast Equipment Repair

On-site Troubleshooting and Maintenance

At Lightner Electronics, we don't just install broadcast facilities. We guarantee, service and repair all of the equipment we sell as well as existing broadcast gear of any type. No matter what electronics you have or plan to have, we are your Ultimate Solution.

For broadcast integration, sales and service there is only one name you need to remember:

Lightner Electronics Inc.

Your Ultimate Solution.

Toll Free: 866-239-3888
Fax: 814-239-8402
www.LightnerElectronics.com

photo by Chriss Scherer

World Radio History

ONE

EVERYBODY WANTS ONE!

The ONE processor that can adapt to any application, the Omnia ONE is designed as a "universal hardware platform." Using the latest and most powerful DSP hardware architecture, the Omnia ONE platform can handle and adapt to the demands of both traditional and digital broadcasting through simple software downloads. No wonder it's the most successful product introduction in Omnia history! Available in AM, FM, Multicast, and Studio Pro versions.

6EXi

FIRST CHOICE OF MAJOR-MARKET BROADCASTERS WORLDWIDE.

When we first introduced Omnia-6, it set the industry pundits back on their heels. 96kHz sampling/24-bit resolution? Very cool! Five bands of AGC? Six bands of limiting? Unheard of! So much power it was amazing. As it turns out, the powerful, musical, natural sound of Omnia-6 was just what broadcasters were waiting for. Omnia-6EX and 6EXi became, and remain, the in-demand processors at major-market stations around the globe.

OMNIA PROCESSING

5EX HD+FM

No matter what your transmission method, Omnia 5EX HD+FM provides what no other can: The competition-crushing, market-dominating, accept-no-substitutes Omnia sound – sound so pure, clean and compelling that it's almost an unfair advantage.

5EX HD+AM

Here is the reason why more of the world's powerhouse AM radio stations have turned to Omnia processing. More clarity, more presence, more power, more flexibility. AM radio never sounded so good.

8x

The power of eight discrete, three-band stereo Omnia processors in a single, networked box.

A/X

Dramatically improve the sound of your streams with the power, punch and purity of Omnia A/X processing for your audio workstation.

Omnia
A Telos Company

www.OmniaAudio.com

© 2009 TLS Corp. Omnia, 8x, A/X, 5AM, 5FM, ONE, 6EXi TM TLS Corp. All rights reserved.

Radio Never Sleeps. Neither do we. We're here for you, anytime, with free round-the-clock, 24/7 technical support. Call +1-216-622-0247.

World Radio History

Sandies' Dynamax Consoles

by Scott Schmeling

I installed my first Dynamax console a little over ten years ago. It was 12-mixer MXL series. I remember being impressed then with how easily it went in and how great it sounded.

Well Pleased With the Original

All the input/output wiring connections were screw down terminal strip type. The layout of the console was clean and easy to operate.

Each mixing channel had A/B input select switches as well as output assign switches for four output busses; Program and Audition plus Mono-1 and Mono-2. Uses for Program and Audition were pretty obvious and Mono-1 could be used to create a mix-minus for feeding the telephone interface, but at the time I really couldn't see any purpose for the Mono-2 output. (That has since changed – stay tuned!)

The second console tricked me. It was an MXE series (the primary difference is a narrower mixer module). I didn't discover until I was ready to do the install that the input wiring for the MXE series goes to db-9 connectors, not the terminal strips like the MXL – a minor set back. The connectors were included with the console – I just had to heat up the soldering iron and build some cables.

I now have roughly 16 Dynamax consoles in service, mostly the MXE Series.

Not So Good News

A few years ago, when I was placing an order for another Dynamax console, I was urged to re-think my choice. Problems had been developing with the company that owned the Dynamax line that were affecting manufacturing and service. When that console arrived, hardware was loose, the meter bridge was bent and part of the console was not operating. I shipped it back, it was repaired and returned. But I was wondering if I should have heeded the "re-think" advice.

Scott with one of his 16 Dynamax Consoles.

A New Owner – Quality Restored

The next time I called my supplier to order a console I was told that Dave Strode had purchased the Dynamax line and was ramping up production with his own company, Sandies. Confidence was being restored! I breathed a quiet sigh of relief and placed the order.

I find the consoles to be very reliable, well designed, and easily serviced. All IC's are in sockets. The volume sliders are connectorized. Volume is controlled by voltage controlled amplifiers (VCA's) so the audio doesn't leave the circuit board to go to the slider. The cue and headphone amps provide plenty of power. Monitor and Headphone Select switches allow monitoring of all output busses plus cue and air.

All output busses are metered (Audition and Mono-1/Mono-2 share meters through a selector switch). All inputs have independent level trim pots on the A and B inputs with a wide enough range to handle unbalanced (-10db) and balanced (+4 or +8) sources.

The Interface board allows remote On/Off of each mixer module as well as remote start of your source equipment. There are jumper options for cue muting, monitor dimming, phones "auto-cue" (cue feeding headphones).

No matter how dependable something is, you still need reliable service. I get that with Dave Strode. If I have a problem that "isn't making sense," I can call Dave, and together we (he) can figure it out. If I need a part or an assembly I usually have it the next day.

By the way, remember that Mono-2 buss that I couldn't see any purpose for? We now also use Tieline codec's. I use Mono-2 to create a mix-minus to feed my Tielines. I can create two separate mix-minus busses this way, and staff on a Tieline remote can interact with phone callers – just as if they were still in the studio!

Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting group with stations across southern Minnesota.

Sandies can be contacted at 215-547-2570 or www.sandiesusa.com

Introducing Broadcast Electronics' Economic Stimulus Package
Affordable Transmitter to Studio Solutions!

NEW!

STX LP
• Scalable 1kW to 5kW FM Solid State
• IP Connectivity • Compact Design
• Redundant Controller
• Integrated Exciter

AudioVault FleX Xpress
• Configurations for Smaller, Price Sensitive Stations
• Widgets can be Purchased Ala Carte
• Shares 4th Generation AudioVAULT FleX Architecture
• Intuitive, Easy-To-Use Graphics

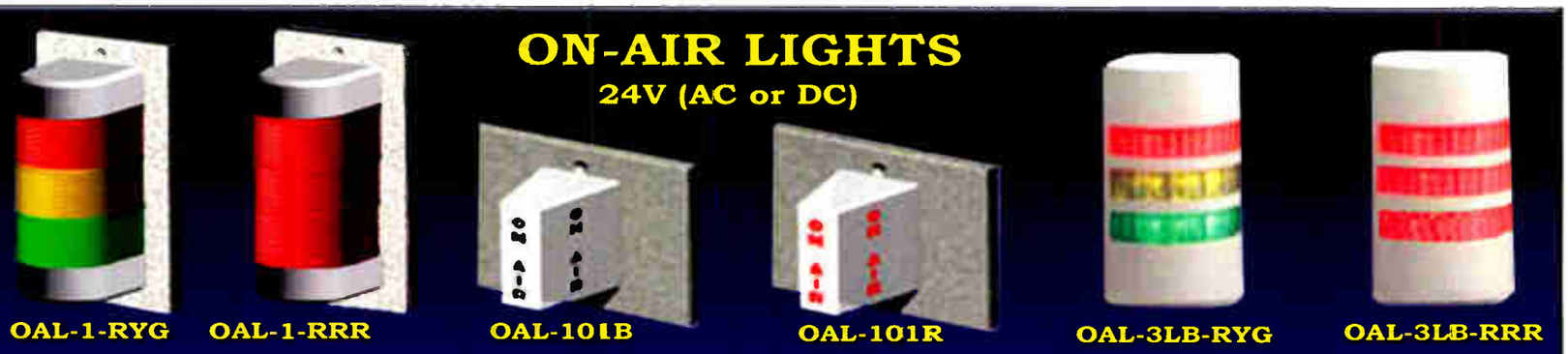
Broadcast Electronics 50 Years 1959-2009 Serving Radio Broadcasters Worldwide

For more information, visit our website at
www.bdcast.com/stimulus

Tomorrow's Radio Today
Broadcast Electronics, Inc.
(217) 224-9600
bdcast@bdcast.com

World Radio History

ON-AIR LIGHTS
24V (AC or DC)



OAL-1-RYG OAL-1-RRR OAL-101B OAL-101R OAL-3LB-RYG OAL-3LB-RRR

STUDIO ACCESSORIES

800.779.7575

RAM

www.ramsyscom.com

ACTIVE PANELS

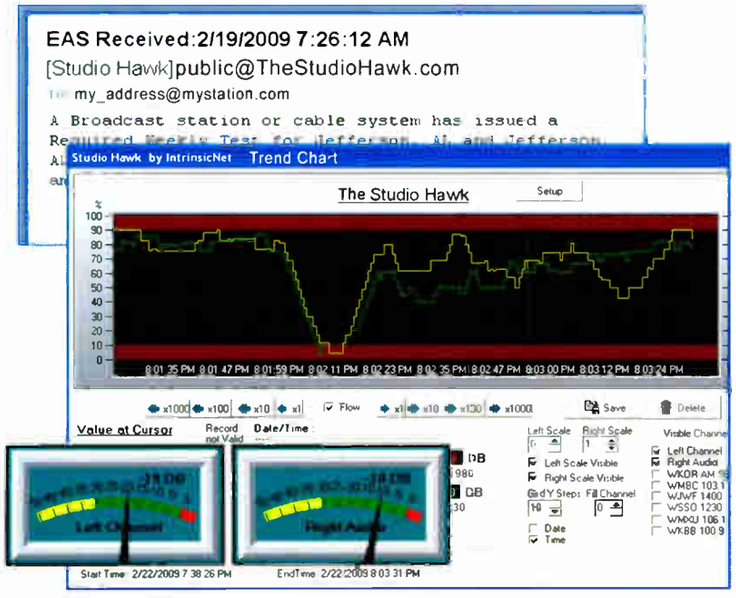
AJP-WB AHCP-WB

PASSIVE PANELS

PJP-CB PHCP-WB HCP-515

HEADSET CONTROL PANELS

THE STUDIO HAWK



FREE demo at
www.TheStudioHawk.com

Your **Low Cost** Solution for **Monitoring** Audio and **EAS Receivers**

$650

+ Monitors 8 status channels, 8 analog channels and 8 relays
  + **Expandable** to 24 channels
  + **Emails** or **text messages** of alarms
  + **Multiple contacts** for each alarm with delays between text messages
  + Receive a **daily dead air report pdf** by email
  + Receive a **Monday morning EAS** verification report
  + Trigger **audible alarms** via signaling devices
+ Records EAS data (transmitted and received)
+ Filters EAS alerts that can be emailed or sent via text message

by intrinsicNet

World Radio History

Armstrong Short Wave Saves the Day at CFRX

by Ian Sharp

CFRX 6070 Toronto, licensed at 1000 Watts on the 49 meter band has operated continuously since its inception in 1933. The pattern was originally a figure-8 with two towers, designed to cover northern Ontario where the original CFRB signal did not reach.

A snow storm took down one of the towers, and so CFRX has been omni-directional ever since. We receive QSL requests from U.S. states on the East Coast and Mid-West, as well as provinces in Eastern Canada, which are promptly answered by the Ontario DX Association. CFRX is co-sited with its MW sister CFRB 1010 and simulcasts the programming, operating as a public service and does not generate revenue.

In 1983, the original hand built transmitter was replaced by an Elcom-Bauer 701BHF. In 2007 it was one of only three operating in Canada. The other two are operated by the CBC RCI on the East and West Coasts. The other three private licenses for SW are very low power signals

The Day the Bauer Died

When a tenant knocked down the quarter-wave vertical antenna, the transmitter was off air for an extended period, followed by a difficulty restoring modulation to the grids of the IPA stage.

In spite of help from Elcom's owner Paul Gregg, we were unable to restore the transmitter to its original state. In the meantime, Standard Broadcasting had been sold to Astral Media, and as a condition of sale, all licensed frequencies had to be working. We needed an answer – and quickly! The new owners were waiting.

Armstrong to the Rescue

After searching in vain to find a viable HF transmitter manufacturer both at home and abroad, I got a phone call from Don Smith of Capella Telecommunications Inc. He assured me that Armstrong was able to build us a 1 kW AM SW transmitter, supply it in the time frame we needed, and also get the necessary type approval from Industry Canada, a sticking point for most of the manufacturers we had asked.

Don Smith of Capella and Ernie Belanger of Armstrong were both very eager to get us up and running on the X1000B box. With some fine tuning at the factory to meet the rigorous second adjacent numbers required by Industry Canada, and a field visit by Armstrong once the box was in place, we and Industry Canada are both very pleased with performance.

CFRX's Armstrong X1000B SW transmitter installed.

Jerry Whitney, senior engineer at Armstrong has been exceptional in supporting the product even with complete replacement of the combiner coaxial cables when a transient spike took one out. He was also helpful in implementing a proper static drain on the coaxial output in the final field testing that was done on site.

We are very pleased with the Armstrong product in its modular design, stable output power and frequency over a wide range of temperatures, and easy installation. The remote metering and status, along with front panel metering provide adequate monitoring for our plant control.

(left to right) Wally Lenox, Astral Radio, Armstrong's Gerry Whitney, and Ian Sharp the author, confirming the X1000B's Short Wave performance. The old Bauer 701BHF is in the background.

We are most grateful for the help that Don Smith of Capella and Sinan at Armstrong have given, going beyond the call to find solutions throughout this installation. I would recommend Armstrong to any engineer looking for a quality product from a quality supplier.

Ian Sharp is the Chief Engineer at CFRX and CFRB in Toronto. Don Smith can be reach at Capella Telecommunication, Inc. 905-436-8113 or email dsmith@capella.ca. Contact Armstrong Transmitter at 315-673-1269 email sales@armstrongtx.com

Shively Labs®

Radio is our main line, not just a side-line.

State-of-the-art design

Proven reliability

Cool and blue – no boring black or gray here!

P. O. Box 389, 188 Harrison Rd., Bridgton, Maine USA 04009
(207) 647-3327 (888) SHIVELY FAX (207) 647-8273
sales@shively.com www.shively.com

- An Employee-Owned Company -
ISO-9001:2000 Certified

World Radio History

The Preferred Choice

for Automation and Switching Solutions

ACS 8.2 Plus Audio Control Switcher

SS 4.4 Stereo Matrix Switcher

16x1 Stereo Switcher/Router

SS 2.1 III
Switcher/Router

SS 8.1 II
Switcher/Router

SS 16.4 Stereo Switcher

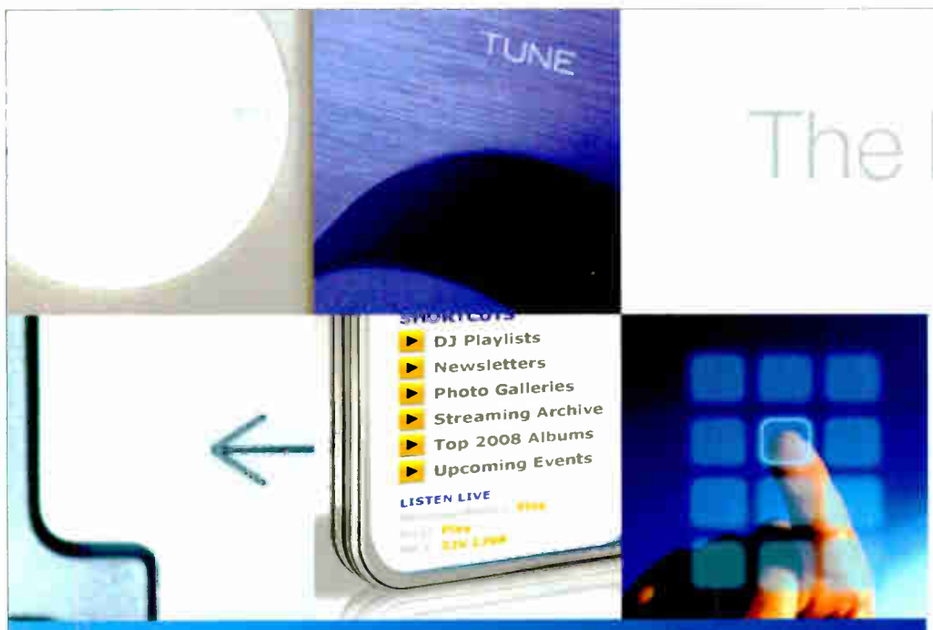
SS 4.1 Plus
Switcher/Router

BROADCAST tools

www.broadcasttools.com

Manufactured with Pride in the USA

INNOVATIVE PROBLEM SOLVING TOOLS FOR BROADCAST



Join the revolution. Register at www.nabradioshow.com

The Dial and Beyond

Profit from what's now — and what's next.

NAB Radio Show® Engineering Program

This year's three-day Engineering Program focuses on:

- planning, building and maintaining an IP-based radio facility
- operating under emergency conditions
- computerized antenna modeling
- preventing tower failures
- datacasting opportunities and much more!

Sessions are presented in workshop format with time for Q&A and interaction with experts and peers. The relaxed atmosphere of the NAB Radio Show means you always have plenty of time to network. Enjoy lunch and refreshments on the show floor while learning about exhibitor's latest products.

Attending the NAB Radio Show is an excellent way for busy radio engineers like you to advance your technical expertise, enabling you to maintain your edge in an increasingly competitive business.

NAB RADIO SHOW®

September 23–25, 2009
Pennsylvania Convention Center, Philadelphia
www.nabradioshow.com

Add to the conversation on Twitter at #radiorevolution!

World Radio History

Tech Tips

from Ray Vaughan

A Rechargeable Battery Saver

A few years ago I built something that has saved me a lot of battery packs. Have you ever plugged in a battery operated device to charge it, then forgot about it? Perhaps you came back a few days later to unplug the charger and you noticed the batteries were warm. Oops, you just fried another set of ni-cads!

The problem is that the cheap chargers just do not know when to quit. They will keep current flowing through the batteries for way too long – and heat equals death for ni-cad batteries. It is also a waste of electricity. By the way, if the device does not have an indicator to show you that charging has stopped, then it is most likely still going – even days later.

This simple project will solve your problems, but timing is everything.

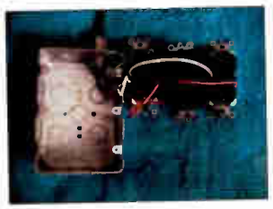
Simple Project

The main component for this project is the Intermatic 12 hour shut off timer, FD12HWC. It is a simple mechanical timer that goes off after ticking down for the amount of time you dial up. If you act fast, Home Depot seems to have these on closeout at $5 each, way down from the $15 plus I paid. If you miss these at Home Depot, I am sure you will be able to purchase a similar timer there, or at your local electrical wholesale house.

The rest of the parts are cheap electrical supplies available at Home Depot for just a few bucks. An electrical box, some receptacles, and some wire; get the deeper electrical box to give you a little more room for the wiring. All in all, you should be able to make one of these for a few dollars.

Putting it All Togther

Here are some pictures of the one I made. It should take about 2 hours to do this project, one of those walking around in Home Depot. Wire it up as described below. I used stranded #12 wire to connect between the parts, but #14 would be fine.



To wire this timer project, the black wire from the line cord goes to one side of the timer. The other side of the timer goes to the darker brass screws on the receptacles. This is the "hot" side. The white wire from the line cord goes to the silver screws on the receptacles. That is the Neutral. The green ground wire from the line cord goes to the electrical box.

Caution

If this is your first project that uses 120 volts, get a friend to check the wiring for you. He or she can use an Ohm meter to verify that the Hot and Neutral are not shorted to each other, or to the metal box. Or, you can use a three-light outlet checker to make sure you got the receptacle wiring right. Do *not* attempt to plug this in while the box is open and the wires are exposed.

After you are sure the wiring is correct, line up the 6 mounting screws in the center of the receptacle slots, and put the timer and sockets in the electrical box.

Of course, you are perfectly free to modify this design. Maybe you only desire one duplex receptacle? Maybe you would find it convenient to mount it on the wall in the shop and omit the line cord? Or, you could add a pilot light? You might even want another one in the kitchen to turn off the coffee maker after you have that morning brew. In other words, use your imagination and have fun with the project.

This is what it looks like with the newer fancy wall plate. It works with the older style too.

Now when your batteries start to get low, plug the charger into your battery saver and twist the knob to set it for 5 to 12 hours, depending on the recommended time in the devices instructions. Set it ... and forget it. – *Radio Guide* –

$25 REWARD for Tech-Tips

Send them to: radioguide@earthlink.net

GR
GORMAN-REDLICH
257 W. Union Street, Athens, OH 45701
Phone: 740-593-3150 – Fax: 740-592-3898

30 Years Experience with Alerting Equipment

Model CRW-S Weather Receiver

Model CRW-S Weather Receiver

For receiving alerts from the National Weather Service (NWS).

Redesign of our Model CRW now with the "SAME" decoder feature.

Easy to Use and Reliable EAS Equipment*

- *Pre-programmed for your location.*
- *Program interrupt relays built in.*
- *Six audio inputs.*
- *2 minutes stored audio.*
- *All operations via keypad.*

EAS1 Encoder-Decoder

EAS1 Encoder-Decoder
EAS1 Decoder
EAS1-CG Encoder Decoder with built-in character generator.
**Optional DTMF interface available.*

Model CMR Digital Antenna Monitor

Model CMR Digital Antenna Monitor

- *Remote Controllable*
- *True ratio readings.*
- *Phase sign automatic, no extra operation.*

Contact Jim Gorman at: 740-593-3150
jimg@gorman-redlich.com • www.gorman-redlich.com

AM Ground Systems Co.
www.amgroundsystems.com
1-877-766-2999
eng@amgroundsystems.com

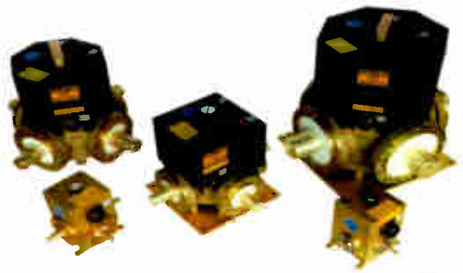
Physical AM Site Services
Construction
Evaluation
Repair
MOM Modeling Preparation work
Sample, Feed & Control Line Replacement & Repair

Serving the Technical and Construction needs of AM Broadcasters for 25 Years

A division of
KK Broadcast Engineering

World Radio History

WHY NOT SWITCH TO MCI?
COMPLETE FM/TV PRODUCT LINE



- ANTENNAS
- SPLITTERS
- NOTCH FILTERS
- HARMONIC FILTERS
- POWER COMBINERS
- CHANNEL COMBINERS
- N +1 SWITCHING MATRIX

Coax switches from 7/8" through 6-1/8" Control panels available.

Free UPS Ground shipping within the continental USA and Canada - SWITCHES ONLY

Micro Communications, Inc.
Toll Free: 800-545-0608
www.mcibroadcast.com

VISA MasterCard

TRANSCOM CORPORATION
Serving the Broadcast Industry Since 1978

Visit Our Website – www.fmamtv.com
Send your e-mail requests to: transcom@fmamtv.com

Fine Used AM & FM Transmitters & New Equipment

AM	5 kW	1982	Harris MW5A
	5 kW	1987	Harris MW5B
	5 kW	1987	Harris SX5A Solid State
	10 kW	1985	Continental 316F
	10 kW	1985	Harris MW10B Solid State
FM	1.0 kW	2009	Crown FM 1000E (demo) Solid State
	2.0 kW	2004	Crown FM2000E
	14+5 kW	2005	BE Fmi1405 Solid State
	20.0 kW	2005	BE FM20S Solid State
	20.0 kW	1983	Harris FM20K
	21.5 kW	1989	Continental 816R-2B
	27.5 kW	1984	Continental 816R-4B
	30 kW	1994	Harris HT30CD
	30 kW	2003	Harris HT30CD
	35 kW	2003	Harris HT35 CD
	50 kW	1982	Harris Combiner *(w/auto exciter-transmitter switcher)*

USED MISC. EQUIPMENT:
Bird RF Thruline Watt Meter, 50S

EXCITERS:
"New" 30W Synthesized Exciters
Used Harris Digit 2nd Generation
Used Nautel NE-50 Exciter

Please go to our website for updated listings.
Retuning and testing available – call for quote!
OMB STL systems for radio, complete with antenna and cable for under $5,000!

2655 Philmont Ave, Ste 200, Huntington Valley, PA 19006
800-441-8454 • 215-938-7304 • Fax: 215-938-7361

ECONCO
Rebuilt Power Tubes

Approximately One Half the Cost of New

3,000 Hour Unconditional Guarantee
Call for Your Quotation

Phone: 530-662-7553 • Fax: 530-666-7760
Toll Free: 800-532-6626
www.econco.com
1318 Commerce Ave, Woodland, CA 95776

fanfare fm **FP-TRO**

The Ultimate IBOC Receiver/Translator

Designed to accommodate "full envelope" baseband signals (IBOC and analog), **Fanfare's** new age receiver/translator, the **TRO**, is fully self-contained and does not require an IBOC exciter. In fact it arrives in a 2 module configuration ready for deployment under all existing FM modulation forms. The "**TRO**" offers considerable versatility requiring only connection to the receiving antenna and a linearized PA. If necessary, the receiver and translator modules can be separated by up to 200' of coax, or by STL. The latter would be of value for some repeater applications as well.

At the heart of the **TRO** design is our patented, Omega **NTP**-based technology which enables the **TRO** to establish a noise floor that is often below normal measure. This significant noise reduction manifests itself in significantly increased sensitivity and adjacent noise rejection which is essential to assure reception of low-level IBOC signals.

fanfare fm
6509 Transit Road, Unit H-1
Bowmansville NY 14026
Email "prainfo@fanforefm.com"

1-800-268-8637(U.S. & Canada)
Voice - 716-683-5451
Fax - 716-683-5421
Website: "www.fanforefm.com"

Designing receivers that broadcasters can rely on

World Radio History

Tech Tips

from John Stortz

A New Use for an Old Tool

Some might not believe this one, but it really worked. We were in the middle of renovating our studio offices and I was assigned to move all of the phone, data, and monitor speaker wiring in the manager's office. Of course, all this stuff must be relocated from the east wall to the west wall. And, thereon hangs this tale.

Thwarted

I was planning to use surface raceway to run the wires. However, during a previous renovation, the concrete walls were covered with 1" styrofoam insulation, covered with thin wood paneling (which was later covered with wallpaper). Moving the manager's couch away from the wall, I noticed there was an open – but empty – metal electrical box behind the couch. "How convenient, I thought."

Then, an attic check revealed there were *two* stubbed-off conduits rising out of the wall and into the attic. There must be a second box behind the panel, but how to find it?

A stud finder did not work, tapping the wall did not work, nor did a compass or gauss meter. Just as I was ready to give up, I happened to come across an old hand-held bulk eraser.

Testing, Testing

While the bulk eraser was energized, I slowly moved the eraser along the wall. When the bulk eraser was near the hidden steel electrical box and conduit, I could feel the eraser vibrate. Actually, now that I think about it, if I had been monitoring the current with my Kill-A-Watt, I could have "seen" a change in the tape eraser's current when the bulk eraser met up with the metal conduit *[Radio Guide, February 2003]*.

John demonstrates how to locate a hidden conduit box with a tape eraser.

We then probed the wall by drilling small holes through the panel board and styrofoam, the second drill hole went into the void of the long-abandoned electrical box – which conveniently had no cover on it. It seemed like success!

Surprises Uncovered

However, when we attempted to drop a fish tape down the conduit from the attic, the fish tape stopped very solidly before reaching the freshly opened electrical box. Making a full opening into the box in order to determine why the conduit appeared to be blocked, we discovered the conduit went to the floor, rather than the attic. It turned out to be a conduit connecting to the telephone box on the opposite wall.

So we adapted: My shop-vac made quick work of getting a string thru the conduit, and the string pulled the new phone wire. But what about that second conduit stub in the attic?

My helper suggested there might be another box in the wall, slightly above the one we had just discovered. Another "scan" with the bulk eraser revealed a third empty electrical box at just the right position to house a volume control for the room speakers.

If you look carefully at the picture, you can see why we thought the conduit stub went to the lower box, initially. It turned out that there were two boxes, one directly over the other. The box near the floor has conduit going down into the concrete floor and over to a telephone panel. The higher box was the one with the conduit stubbed off above the ceiling.

One box turns into three with the "magnetic probe."

So we discovered we already had outlets for telephone, data, and volume control – all built into the wall and forgotten, more than 20 years ago, but revealed with a more than 20 year old bulk tape eraser. And here you thought that old tape stuff was useless, just attracting dust in the storage room!

The Other Show

Of course, one of Murphy's Laws had to intervene. Perhaps it is number 18: "Anytime you install a switch or volume knob, someone will cover it with some furniture." Yes, shortly after we got all the boxes wired, new furniture arrived, complete with a seven-foot-wide hutch on the one side that would completely block any possible access to the L-pad knob!

Nevertheless, the project proved why a smart engineer saves all that old gear, instead of tossing everything not in current use into the dumpster. – *Radio Guide* –

The STATI-CAT is Back!

Now Manufactured by *nott ltd*

GILASTAT
Tower/Structures Up to 100'
80 Stainless Steel Points

STATI-CAT
Tower/Structures up to 200'
120 1/8" Stainless Steel Points

EAGLES NEST
Tower/Structures Over 200'
792 1/8" Stainless Steel Points

Call Today for a Free Consultation on Your Application

Reduce Lightning Damage by Lowering the Incidence of a Direct Lightning Strike to:

- Buildings
- Industrial Facilities
- Communications Towers
- Electric Utility Substations

505-327-5646 *nott ltd*

www.nottltd.com • info@nottltd.com

Bay Country Broadcast Equipment

Buy • Sell • Trade

Your #1 Source for Quality Used Radio Broadcast Equipment

View our latest list of equipment on-line at:
www.baycountry.com
Or call and we will fax it to you.

All equipment sold with a 15 day return guarantee.

Turn Your Excess Gear Into Cash

Fax or email your list to us and we will respond with our offer promptly.
We only buy good working equipment with traceable serial numbers.
Fax Your List Today – 443-596-0212

Welcome to Bay Country BROADCAST EQUIPMENT

http://www.baycountry.com
(Website Updated Daily)

E-mail: sales@baycountry.com
877-722-1031 (Toll Free) 443-596-0212 (Fax)
7117 Olivia Rd, Baltimore, MD 21220

World Radio History

MAKE WAVES

EXPECT MORE FROM YOUR AM TRANSMITTER

Presenting the Armstrong Transmitter X-1000B

Bring major market sound to your radio station with the dual, hot-swappable 600 Watt RF modules capable of 150% modulation in Armstrong Transmitter's X-1000B, (1KW HD & DRM ready AM transmitter).

Engineered with the latest technology advances, X-1000B offers high reliability and built-in redundancy. Get ready to save money while improving your sound and reliability. Call us today!

ARMSTRONG
TRANSMITTER CORPORATION

Tel 315-673-1269 ▲ sales@armstrongtx.com ▲ www.armstrongtx.com

DH

* Gibraltar IV Series
* Horizon to Horizon
* Standard AZ-EL
* Heavy Duty Polar

ANTENNAS
ANTENNAS
ANTENNAS
ANTENNAS
ANTENNAS
ANTENNAS

COMMERCIAL QUALITY

Call For Info

800-627-9443 608-326-8406

www.dhsatellite.com

Offering:
* Feed Horns
* LNB's
* Multi-Cable
* Receivers
* Controllers
* Antenna Covers
* Custom Fabrications

OVER 600,000 Manufactured
* High Efficiency * Custom Fabrications
* Fast Direct Delivery * 5 Year Warranty

Fax: 608-326-4233
Email: dhsat@mhtc.net

Buy Factory Direct & Save!

Need Digital?

Add AES/EBU digital ports to your composite STL with TFT DMM92 Digital Encoder and Decoder.

Model DMM92 STL Digital Model/Multiplexer

Add AES/EBU to your existing analog EAS with TFT Model 629 Dual Digital Insertion Unit for two AES/EBU digital channels.

Model 629 EAS Digital Insertion Unit

Advanced Technology Only From TFT

TFT INC

ph:(+1)408-943-9323 fax:(+1)408-432-9218
1953 Concourse Drive, San Jose, CA 95131
www.TFTInc.com e-mail:info@tftinc.com

BEXT

FROM THE TALL TO THE SMALL

FM & TV Transmitters
Solid State or Tube
Antennas & Combiners

20 Years of Service
Asistencia en Español
24 Hour Support
2 Years Warranty

www.bext.com
Tel 619 239 8462
Fax 619 239 8474
bext@bext.com

NEW
EXCITERS/TRANSMITTERS
w/stereo generator & audio limiter,
field programmable FSK ID keyer, all built-in!

World Radio History

Service Guide

Radio Equipment Products and Services

Personal RF Monitor Value!

The SafeOne™ alerts to hazardous RF above FCC limits from 10 – 10,000 MHz!

Easy mount to belt or tower harness, rugged nylon holster

Long battery life

Simple operation

SCHOMANDL KATHREIN NAB Booth N9115

Meet **OSHA** rules for **50% less** than competitors!

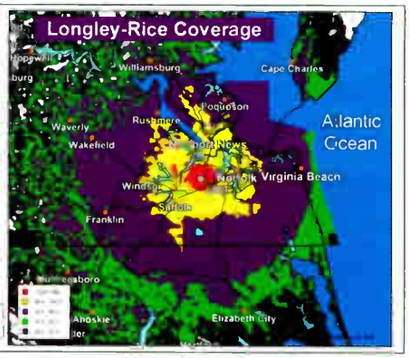
Call **800-522-4464** or order on line at www.LBAGroup.com/Safeone

LBA TECHNOLOGY, INC.
Greenville, North Carolina
RF Systems Since 1963

V-Soft COMMUNICATIONS
The Leader in Broadcast Engineering Consulting Software!

- Use Probe 3™ to create stunning "real-world" coverage maps using Longley-Rice and other models.
- Run Terrain-3D™ to plot STL paths and Longley-Rice coverage over 3D terrain.
- Run AM-Pro 2™ to perform AM skywave and groundwave allocation studies, interference analysis, & coverage mapping.
- Use FMCommander™ to study FM allocations using contour-to-contour protections. and minium spacings.

www.v-soft.com • info@v-soft.com • 1-800-743-3684



RF PARTS COMPANY
From Milliwatts to Kilowatts℠

Eimac • Amperex • Svetlana • M/A-Com
Motorola • Toshiba • Philips • Mitsubishi
Se Habla Español • **We Export**

800-737-2787
760-744-0700 Email: rfp@rfparts.com
www.rfparts.com

BROADCAST WORKS

Full Service Broadcast Engineering
Project Management - Studio Build Outs
Transmitter Sites - IBOC Installation
Automation Systems - STL & RPU Repairs
Full Service Shop - Emergency Equipment Rental
24/7/365 Tech Support

We can team up with your engineer to supply extra manpower for big projects – or we can see your project through turn-key.

Serving Broadcasters for over 12 years.
888-509-2470 • www.broadcastworks.com

Professional Engineering Services
- ★FCC Applications
- ★Coverage modeling
- ★RF exposure limit reports
- ★STL & microwave path analysis
- ★Co-location and interference studies
- ★Expert witness testimony by P.E.s

www.rfengineers.com
RFEngineers, Inc. 352-367-1725

D&C Electronics Co.
- New Tubes -

We have the alternatives for all your needs, at the lowest prices, direct from our stock!

EIMAC, SVETLANA, PRO-TEK®, EEV, and many others.

352-592-7800 or 800-881-2374

VISA & MASTERCARD Accepted

Doug Vernier
Telecommunications Consultants

- FCC Applications for AM, FM, TV, DTV, LPTV, STL
- Upgrade and Due Diligence Analysis
- Frequency Searches
- Site Relocations
- Propagation Prediction with Custom Mapping
- Demographic Analysis
- Directional Antenna Design

V-Soft COMMUNICATIONS
We use V-Soft Software!
www.v-soft.com consulting@v-soft.com 800-743-3684

AM Ground Systems Co.

Ground System Construction, Evaluation & Repair

1-877-766-2999
www.amgroundsystems.com

Chris Scott & Associates
Visit our website
www.scott-inc.com

Ph: (270)781-5301
Fax: (270)781-1232
Bowling Green, Kentucky

NRSC Loop Antenna

AM-FM Notch Filters

TRANSMITTING
CAPACITORS
MICA-VACUUM-CERAMIC

SURCOM ASSOCIATES, INC.
(760) 438-4420
LINK@SURCOM.COM

Silver Plating Powder
Silver Plate On-The-Job with Cool-Amp!!

Cool-Amp	Conducto-Lube
*Maintain your RF frequency *Keep your PCBs cool *Increase conductivity *Minimize power loss from corrosion & oxidation	*Reduce resistance *Prevent power interruptions *Prevent data errors *Prevent power failure

COOL-AMP COMPANY Conducto-Lube
Ph: 503-624-6426 Fax: 503-624-6436
www.cool-amp.com email: sales@cool-amp.com

BAUER TRANSMITTERS, INC.
www.bauertx.com

BAUER - ELCOM BAUER - SPARTA - CETEC
Re-Manufactured
Bauer Transmitters Available
AM/FM – 2.5 kW to 25 kW
www.bauertx.com paul@bauertx.com
915-595-1048 Fax: 915-595-1840

World Radio History

Radio Pipeline

New Equipm

Updates and Modif

Industry Information & News

Axia – DM Engineering – Inovonics

DM Engineering Silence Sense Jr.

The newly revised Silence Sense Jr. is a microprocessor based, economical approach to silence sense detection. Compact in size, only 4.6 x 2.6 x 1.2 inches overall, it packs many features that are desired by the broadcaster. The unit is housed in an ABS plastic case and does not require any rack space. Audio input and relay output connections are made by a Eurostyle screw terminal block, so no soldering is required.

The single ended audio input allows for a wide range, with a user accessible gain control with LED indication for setting the proper audio level.

There are two maximum time-out ranges that are jumper selectable by the user, one minute (adjustable from 2 seconds to approximately 55 seconds) and four minutes (adjustable from 5 seconds to approximately four minutes). This allows for accurately setting the time-out which is precisely repetitive. Time-out is indicated by a LED indicator that resets when audio is reapplied.

The time-out output is by relay contacts rated at 2 amps at 30 VDC. The contacts are supplied normally open but can be changed to normally closed by an internal jumper. A front panel switch selects either momentary (approximately one second) or continuous relay closure upon time-out. A continuous relay closure resets upon reapplication of audio.

Power is supplied by a 9-12 VDC "Wall Wart." Battery back-up is standard and a 9V (NEDA 1604A) battery is supplied. The back-up battery is housed within the enclosure.

For more details on this and other innovative products for the broadcaster please visit us on the web at www.dmengineering.com

DM Engineering
805-987-7881 • www.dmengineering.com

Inovonics Model 730 "Flagship" RDS/RBDS Encoder

Inovonics' 730 conforms to American and European standards, responding to both ASCII and UECP instruction sets. It supports song 'tagging' (for subsequent music download/purchase), as well as RT+ and other advanced RadioData applications.

In addition, the 730 can automatically parse and send unformatted satellite-streamed song title information. Many new cell phones and MP3 players come with built-in FM radios, giving the broadcaster yet another opportunity to deliver visual messages.

The encoder connects with virtually any station playout (automation) system to send song info, program promos or advertising for instant display on radio faceplates. Interface is either an RS-232 serial link or an IP network (LAN or Internet) connection. In addition to one UDP and two TCP ports, a front-panel USB connector gives quick access for encoder programming.

The 730 features a front-panel LCD screen and jog wheel for convenient on-site setup without a computer, yet the supplied self-guiding Windows® software enables fast and intuitive PC programming. The unit also includes a built-in Scheduler that is capable of storing and queuing up to twenty 128-character scrolling messages for transmission at specific times on given dates or recurring days of the week.

Accurate Clock Time and Date (CT) timekeeping with automatic tracking of Daylight Saving Time is assured with an Internet connection, and RDS subcarrier injection is adjustable from the front panel or from a remote location using the setup software.

Internal data diagnostics and transmission safeguards guarantee foolproof installation and operation, and field-upgradeable firmware ensures compatibility with any forthcoming RDS/RBDS applications.

Inovonics Inc.
831-458-0552 • www.inovon.com

Axia PowerStation IP-Audio Console System

PowerStation, Axia's new all-in-one IP-Audio console system, combines analog, digital and microphone I/O, a console power supply, DSP mixing engine and network switch into one easy-to-deploy package.

Connect your studio gear with standard CAT-5 cables, connect an Element console with just one cable, name your sources with a browser, and you're ready for air.

Make PowerStation the heart of a stand-alone studio (with support for consoles as large as 40 faders) or part of a larger Axia network; Simple Networking with Gigabit Livewire lets you daisy-chain up to 4 PowerStations for easy multi-studio installation without a separate core switch. And it's built to deliver 24/7 reliability, hardened with industrial-grade components and redundant power capabilities.

PowerStation works with Axia's Element 2.0 family of broadcast consoles. Element 2.0 has cool features like voice and headphone processing by Omnia, peak and average metering, one-touch phone recording, automatic mix-minus, an eight-channel Virtual Mixer that combines multiple audio streams for control with a single fader, motorized faders, built in controls for Telos telephone systems, and Show Profiles that instantly recall talent's favorite settings.

Element is nearly indestructible, with avionics-grade switches, bullet-proof optical encoders, silky-smooth conductive-plastic faders and a thick extruded aluminum frame – built to handle anything your jocks can dish out. Element is custom-sized to your specifications from 2 to 40 faders, with single-frame or split-frame configuration available.

Axia
216-241-7225 • www.axiaaudio.com

Running to the site? Time to Remote the site!
Several Models Available
Stackley Devices, LLC
(609) 647-9677

Remotely Control Your AC Devices Today!

www remote-outlet com

StackleyDevices
CREATIVE ELECTRONICS & SPECIALTIES

DA HOOK Safety Grounding Hook

Solid Brass Hook & Hardware
Fiberglass Rod Handle
#10 Copper Cable & Alligator Clip

DA GAP Lightning Dissapation Gap

Available with Horn or Ball Gaps
Patented (#5,661,262)
Hot Adjust Mechanism

Wilk Science and Technology Inc.
1112 North Grove Avenue, Oak Park, Illinois 60302
Telephone & Fax: (708) 524-8588

BESCO INTERNACIONAL

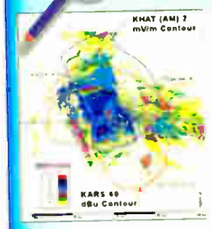
World Leader in AM-FM Transmitters

Complete Inventory at:
www.Besco-Int.com
Pre-Owned AM-FM units in stock!

R.E. Witkovski - President
Rob Malany - Vice President
Info: (972)-931-6055
Sales: (321)-960-4001
Email: Sales@Besco-Int.com

World Radio History

rfInvestigator V3.0



FM...AM...or Both

You choose!

rfSoftware, Inc.

innovative engineering tools

Are you tired of switching from program to program to complete a project?

How about displaying your drive test output on top of your Longley-Rice prediction to SEE how your station is operating.

Save *time, money, and hard drive space,* with software that gives you all the tools in one program to work *smarter not harder.*

Call 352-367-1700 for Details!

Visit www.rfsoftware.com Today

TLM-1 TOWER LIGHT MONITOR

Avoid Costly FCC Fines for Lighting Violations!

A microprocessor based system designed to monitor the status of FAA type A incandescent tower lights.

- Individual alarms for photocell, flasher, beacon & marker.
- General alarm output for any failure type.
- Status outputs for lights on/off and beacon on/off.
- LED indicators for each alarm and status output.
- Opto-isolated failsafe outputs for each alarm.
- Easy setup – one button calibration.
- Installs inside the transmitter building.

FM Services

www.towermonitor.com • 336-667-7091

MOORETRONIX

BROADCAST & INDUSTRIAL ELECTRONICS

Our 7th Year

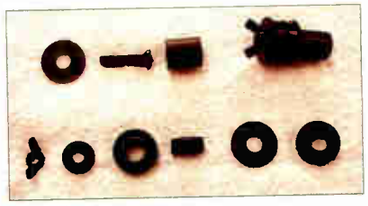
Our client list continues to grow. Thank you for your confidence and equipment purchases.

We Re-Condition

Pacific Recorders BMX I-II-III, AMX, ABX and RMX, Stereo-Mixer and Mixer News-Mixer products.

We have replacement Wind Screens and Blast Filters for the SM-5B microphone.

We now have SM-5B hanger hardware as shown in the photo.



See the "News-Update" page at our website.

Tel: 800-300-0733 Fax: 231-924-7812

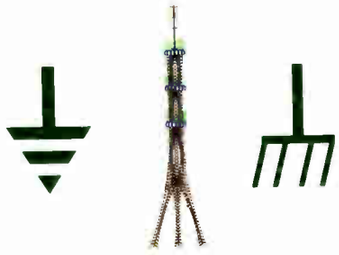
WWW.MOORETRONIX.COM

Radio Works R. F. Consulting

Broadcast & Communications Design & Repairs
Grounding Systems Design Assistance
Coaxial & Wave Guide Systems Testing
Communications Industry Testing from 100 kHz to 20.0 GHz

Gary A. Minker
Office (561) 969-9245 • Iden 159*61*1957
7225 Catalina Isle Drive, Lake Worth, FL 33467
Email: Gary@radioworksrfconsulting.com

Please visit our Web Site to download an article on Grounding Methods
http://radioworksrfconsulting.com/download.htm



Celebrating Our 27th Year
Serving Our Customers

RECEIVERS

OUTSTANDING specifications and pricing on professional quality receivers for EAS, station monitoring and translator applications.

The AFC3 is a three receiver rack mount that is configured for your EAS or monitoring specific application.

Our AF210FM receivers meet today's Translator application specifications for reliability, linearity and cost.

DAYTON INDUSTRIAL CORPORATION

2237 Industrial Blvd., Sarasota, FL 34234 Tel: (941) 351 4454
Quality Receivers Designed and Manufactured in the USA
Email: sales@daytonindustrial.com Website: www.daytonindustrial.com

Professional Equipment Repair

- Consoles
- Exciters
- STLS
- Automation Systems
- Audio Processors
- Transmitters
- Remote Equipment

at Lightner Electronics, Inc.

Toll Free: 866-239-3888
www.LightnerElectronics.com

www.digitalradioengineering.com

Phone: 845-355-4001

digitalradio engineering

Professional Broadcast Engineering Services

Consulting • Project Management • Contract Engineering
FCC Alternative Inspections • Due Diligence Inspections
Engineering Staff Oversight • Engineering Staff Assistance
Facility Inventory • Broadcast Equipment Acquisition
New & Pre-owned Broadcast Equipment Sales

McPherson Radio

Specializing in pre-owned QEI transmitter products.

QEI 6 Month Warranty – QEI

All equipment tuned and tested on your frequency.
MRC has a repair facility to meet your broadcast needs, for repair of QEI exciters and low power transmitters.
Other broadcast manufacturer products are welcomed too.

Bob Brown at 856-232-1625 Fax: 856-232-2075
Email: mcphersonradio@comcast.net

TOWER SIGNS

antennaID@msn.com

E-MAIL US FOR A FREE PDF CATALOG

STANDARD FCC OR MADE TO ORDER METAL SIGNS
FCC TOWER REGISTRATION SIGNS WITH PHONE
COMMERCIAL GRADE - NO FADING - NO EXTRA COST

RED GUY WIRE MARKER BALLS AND YELLOW GAURDS
COAX & ANTENNA NUMBERED TAGS

ANTENNA ID PRODUCTS
610-458-8418 www.antennaID.com

World Radio History

Radio Pipeline

Comrex – Henry Engineering – LARCAN

New Equipment

Updates and Modifications

Industry Information & News

Comrex Access 2.7 Provides "Brute" Force for Access IP Transmission

Comrex Corporation has announced the release of ACCESS 2.7 for its ACCESS Portable and ACCESS Rackmount Stereo BRIC IP Codecs. In addition to functionality enhancements, added support for 3G and 4G wireless devices, the addition of FLAC algorithms and web browser improvements, ACCESS 2.7 features a significant technology enhancement known as BRIC Reliable UDP Transmission Enhancement or BRUTE.

"When Comrex introduced BRIC Technology in 2005, it was a breakthrough in providing reliable audio transmission over the public Internet," says Comrex Tech Director Thomas Hartnett. "Since then, we've gained lots of experience on extra-challenging IP wireless networks like Wi-Fi, satellite and 3G. At the same time these networks have skyrocketed in popularity. As a result, these services can be burdened with overuse which sometimes causes IP audio transmission to suffer." Hartnett continues," We've taken our findings back to the lab and improved on the BRIC concept by adding a reliability layer along with intelligent congestion avoidance. The resultant combination, BRUTE, delivers the best possible user experience over modern networks, especially those plagued by over-utilization and marginal coverage."

The ACCESS 2.7 Update with BRUTE is available for free to all existing ACCESS Portable and Rackmount users via download from the Comrex website at: www.comrex.com/updates or by contacting Comrex Tech Support at 978-784-1776. ACCESS 2.7 will be included on all newly purchased ACCESS units shipped from Comrex.

Comrex
978-784-1776 • www.comrex.com

Henry Engineering Announces New PowerSwitch™

PowerSwitch is an automatic fail-safe AC power controller. PowerSwitch will automatically switch AC power between "Main" and "Backup" equipment.

PowerSwitch was developed for use with Arbitron PPM™ encoders. The PPM encoder encodes a radio station's call letters and other data into their audio stream. The stations ratings are determined by this data; it is critical that the encoding be 100% reliable so that all ratings data is captured.

In a typical installation, two PPM encoders and a PPM monitor are installed. One encoder is the Main unit, and the second is a Backup unit. The PPM monitor continually monitors the encoding, and provides an Error output if the Main encoder fails.

When the PowerSwitch senses the Error output from the PPM monitor, it transfers AC power to the Backup PPM encoder. The Bypass Relay in the (deactivated) Main encoder routes audio through the Backup unit so that encoding continues without data loss.

This redundancy with automatic backup ensures that radio stations never lose ratings data in the event of a fault with their main PPM encoder.

PowerSwitch can also be used in any application where AC power needs to be remotely turned on or off, for example, to reboot a PC (or other equipment) at a remote transmitter site. The unit can be controlled using any GPI contact closure, and will control up to 500 watts of AC load.

PowerSwitch is now in stock. List price: $240.

Arbitron PPM™, PPM™, and PPM™ Monitor are trademarks of Arbitron Inc. Used with permission.

Henry Engineering
626-355-3656 • www.henryeng.com

LARCAN Encore Series 25-250 Watt IBOC FM Translators

The new Encore Series is a complete IBOC FM translator solution – combining field proven translator and linear amplifier technology. The first digital FM translators of its kind, the new Encore Series is feature rich with proven performance.

The technology driving Encore was developed through combining specialized television and radio broadcast design techniques. Incorporating TV transmitter amplifier designs and applying them to digital radio, the Encore IBOC FM Translator delivers unrivaled digital FM radio quality sound. Highly linear amplifiers and custom designed IF filtering enable optimum reception and output power in digital operation. The result is a level of quality, linearity, and clarity that commands attention.

The Encore IBOC FM Translator Series is designed for FM stations leading the way to digital by implementing IBOC (In-Band On-Channel) digital radio rebroadcast operation.

LARCAN's innovative Encore Series is a complete solution to meet all the needs of your future digital FM radio business. Integrating leading edge filtering and new linear conversion technologies, the Encore Series of translators takes the digital FM signal and translates/repeats it – keeping the IBOC digital signal intact. The result is an IBOC FM translator that delivers the original analog FM signal and the digital portion of the signal together to your audience. The Encore Series is available from 25W to 250W, providing an affordable and complete IBOC FM translator solution.

- Extensive power range, integrated features, and adaptable to meet your rebroadcast needs.
- Capable of all standards in analog FM and IBOC digital radio.
- Superior IBOC FM performance and coverage. Proven technology meets the stringent rebroadcast criteria adopted.

LARCAN
303-665-8000 • www.larcan.com

COMMERCIAL RADIO COMPANY
Original Parts: New and Used for RCA, Harris/Gates, Continental/Collins, CCA, Bauer, and Raytheon Transmitters
MICA Capacitors • CERAMIC Capacitors
FIXED and VARIABLE VACUUM Capacitors
NON-PCB OIL FILLED Capacitor Transmitter Replacement Kits
Resistors & Rheostats • Weschler AC, DC, and RF Meters.
Custom Calibration of AC, DC, and RF Meters
Rebuild, Repair & Calibration of General Radio Co. Instruments
Phone: 802-226-7582 • Fax: 802-226-7738
www.commercialradiocompany.us
VISA, Mastercard, Discover, AMEX, COD's, and pre-approved PO's

World Radio History

EVENT 5800

HIGH CAPACITY BIDIRECTIONAL STUDIO TRANSMITTER LINK

TRANSPORTS UP TO 9 RADIO STATIONS, UNCOMPRESSED, OVER A SINGLE LINK

EVENT 5800 IDU

EVENT 5800 ODU

The Moseley Event 5800 — is a carrier class T1/E1/IP Ethernet radio link. Combined with the Starlink SL9003T1, the Event 5800 creates a high capacity bidirectional STL/TSL.

HIGH PAYLOAD CAPACITY

HD RADIO™ READY TODAY

LEVERAGE IP DEVICES AND APPS

EASY DEPLOYMENT

EXCELLENT ROI

Moseley

www.moseleysb.com

Dave Chancey: (805) 968 9621

Bill Gould: (978) 373 6303

World Radio History

Final Stage

RADIO ROUNDUP

The Radio Guide Event Register

Email your dates and info to: ***radio@rconnect.com***

TAB Trade Show and SBE, 56th Annual Convention
August 19-20, 2009
Renaissance Austin hotel – Austin, Texas
www.tab.org/convention-and-trade-show

NAB Radio Show 2009
September 23-25, 2009
Philadelphia, Pennsylvania
www.nabradioshow.com

SBE 22 Broadcast and Technology Expo
October 6-7, 2009
Tuning Stone Resort and Casino – Verona, New York
www.sbe22expo.org

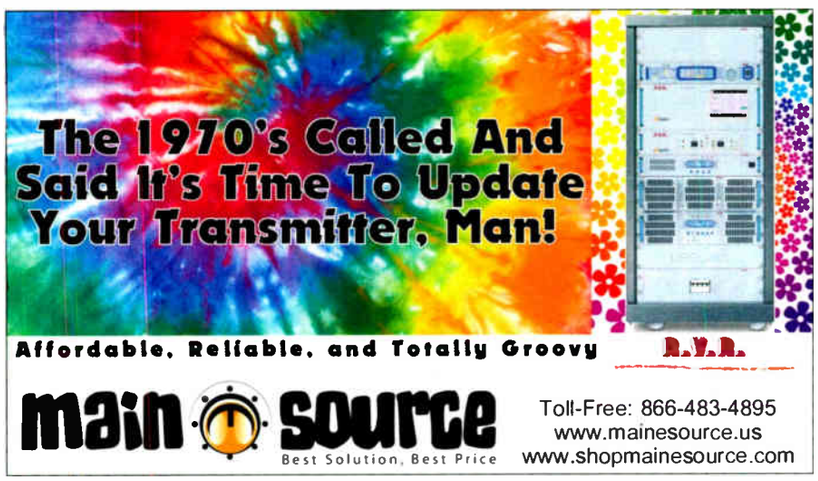
127th AES Convention
October 9-12, 2009
Javits Center – New York
www.aes.org/events/127/

Wisconsin Broadcast Clinic
October 13-15, 2009
Madison, Wisconsin
www.wi-broadcasters.org

Pittsburgh SBE Chapter 20, 2009 Equipment Expo
October 19-20, 2009
Pittsburgh Expomart – Monroeville, Pennsylvania
www.sbe20.org/expo.html

Radio Guide Advertiser Info – Jul/Aug 2009

Advertiser - Page	Website	Advertiser - Page	Website
Altronic - 20	www.altronic.com	Kintronic Labs - 9	www.kintronic.com
AM Ground Systems - 38	www.amgroundsystems.com	LARCAN - 26	www.larcan.com
Armstrong Transmitters - 41	www.armstrongtx.com	LBA Technology - 15	www.lbagroup.com
Arrakis - 23	www.arrakis-systems.com	Lightner Electronics - 32	www.lightnerelectronics.com
Axia - 21	www.axiaaudio.com	Logitek - 27	www.logitekaudio.com
Bay Country - 40	www.baycountry.com	Mainsource - 47	www.mainesource.us
BEXT - 41	www.bext.com	Micro Communications - 39	www.mcibroadcast.com
Broadcast Devices - 28	www.broadcast-devices.com	Moseley - 46	www.moseleysb.com
Broadcast Electronics - 34	www.bdcast.com	Nautel - 11	www.nautel.com
Broadcast Software Intl. - 4	www.bsiusa.com	NAB Radio Show - 37	www.nabradioshow.com
Broadcast Tools - 37	www.broadcasttools.com	Nott Ltd. - 40	www.nottltd.com
BSW - 18	www.bswusa.cm	OMB America - 17	www.omb.com
CircuitWerkes - 29	www.circuitwerkes.com	Omnia - 33	www.omniaaudio.com
Comrex - 5	www.comrex.com	Pristine - 8	www.pristinesys.com
D&H Antennas - 41	www.dhsatellite.com	PSI (Propagation Systems) - 30	www.psibroadcast.com
DM Engineering - 47	www.dmengineering.com	RAM - 35	www.ramsyscom.com
Davicom - 10	www.davicom.com	RF Specialties - 25	www.rfspecialties.com
Econco Tubes - 39	www.econco.com	SAS - 19	www.sasaudio.com
Fanfare - 39	www.fanfare.com	SCMS - 31	www.scmsinc.com
Gorman Redlich - 38	www.gorman-redlich.com	Shively - 36	www.shively.com
Harbach (Peter Dahl) - 47	www.pwdahl.com	SystemsStore - 47	www.systemsstore.com
Henry Engineering - 2	www.henryeng.com	Telos - 48	www.telos-systems.com
Inovonics - 1, 24	www.inovon.com	TFT - 41	www.tftinc.com
Intrinsicnet (MySine) - 35	www.plussine.com	Tieline - 7	www.tieline.com
Jampro - 22	www.jampro.com	Transcom - 39	www.fmamtv.com
JK Audio - 13	www.jkaudio.com	Vorsis (Wheatstone) - 3	www.vorsis.com



main source
Best Solution, Best Price

Toll-Free: 866-483-4895
www.mainesource.us
www.shopmainesource.com

GOT ENDEC?

We've Got
Multi Station Relay Adapters for you!

Control up to 4 stations with one Endec and one MSRA! Both rack mount and cabinet units available. Compatible with Endec models SE1822 and the new Digital 3644 when used in analog EAS audio mode.

Only $529.00 + shipping

For more details on this and other innovative products for the broadcaster, call or visit us on the web at:

DM Engineering
www.dmengineering.com
2174 Chandler St. Camarillo, CA 93010 805-987-7881 800-249-0487

PETER DAHL transformers

Now Available from Harbach Electronics

Magnetics for Broadcast, Communications and Amateur. Also rewinding selected transformers and chokes

Harbach Electronics, LLC
Phone: 419-945-2359 • Email: xfmr@pwdahl.com
www.pwdahl.com

SYSTEMS STORE .com

The Preferred Source For Krone
Punch Blocks, Punch Tools, & Patch Cords In Stock

CBT Classic On-Air Lights – Barix - Gepco - Henry Engineering
LEA Surge Protection – Middle Atlantic – Neutrik – OC White Mic Arms
Optelator – Platinum Tools - Switchcraft - Ward Beck

....and Much More

www.SystemsStore.com

Sales@SystemsStore.com Tel: 407-656-3719 Fax: 407-656-5474

World Radio History

PRSRT STD
U.S. POSTAGE
PAID
PERMIT NO. 410
BEAVER DAM WI

Radio Guide

Radio Guide: www.radio-guide.com
Radio Directory: www.radiolinks.net
Used Gear: www.radio-classifieds.com
Radio History: www.oldradio.com

Locks In Your IP Connection Where Others Fail

Engineered to use public IP networks and mobile phone data services, the Z/IP Mixer combines the excellent performance of the original Zephyr/IP with the convenience of a digital four-channel stereo mixer. Designed to deliver high-quality audio transmission with low delay, even over less than perfect networks. Enclosed in a road-ready portable chassis, built to go wherever the action is.

Z/IPMIXER: Lock it in.

Telos
AUDIO | NETWORKS
Telos-Systems.com
Telos and Zephyr are registered trademarks of TLS Corp. ©2009. All rights Reserved.

Radio Never Sleeps. Neither do we. We're here for you, anytime, with free round-the-clock, 24/7 technical support. Call +1-216-622-0247.

World Radio History