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Radio

THE RADIO TECHNOLOGY LEADER

iHeartMedia

Portland Revisited

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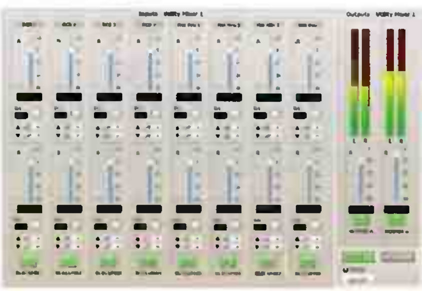
When we invented modern radio audio networking, we vowed to build the first truly intelligent IP audio system. One where every interface held the DNA of the entire system for recovery. A system with true Gigabit connectivity. One that required only a single CAT-6 cable to interface any network piece – to carry audio AND control information. A system that could actually be up 24/7/365 and handle everything you need yet so simple to interface as to be virtually foolproof. Well, here ya go.

- **Gigabit Connectivity**
  All BLADE-3s use Gigabit Ethernet. This makes all the difference in network capacity, near zero latency, throughput, reliability – in short, everything.

- **Virtually All Audio Formats**
  BLADEs are built to handle and convert native analog, microphone, AES/EBU, SPDIF, AOIP, MADI, SDI and AES67.



- **Two 8x2 Utility Mixers**
  Each BLADE has two 8x2 utility mixers that can be configured in many different formats. Two 8x2, four 4x1, etc. These internal mixers are full featured and include panning, channel ON/OFF, fader levels, and access to any source signal in the system. They also include a full ACI (Automation Control Interface) allowing remote control, ducking, auto fade, channel on/off, levels, source assign, etc.
- **Audio & Control Routing Matrix**
- **Source & Destination Control**
  Each BLADE has the ability to route any system source to the destinations on that BLADE.
- **Front Panel Logic Indicators***
- **12 Universal GPI/O Ports**
- **128 Software Logic Ports***
  Used to interface with software switches, indicators, and control functions throughout the system.
- **Built-in Audio Clip Player***
- **Silence Detection**
- **Dual OLED Displays***
- **LIO/SLIO Logging***
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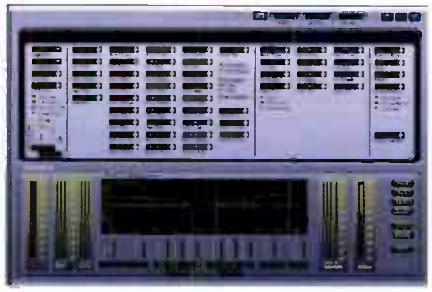
  Allows the same source to be identified by different names. Multiple aliases can be used so different operators can share logic functions, source feeds, routing, etc.
- **Auto Mono Summing**
- **Signal Splitting**
- **Gain Control on Every Input & Output**
- **Balance Control**



- **Stereo Audio Processor***
  Each BLADE-3 has a stereo multiband processor with the following: 4-band parametric equalizer, 3-way crossovers, 3 compressors, 3 limiters, and a final look-ahead limiter. This is a "routable processor," meaning it is not limited to the local I/O on the BLADE – it can be considered a network resource.
- **Onboard Intelligent OS**
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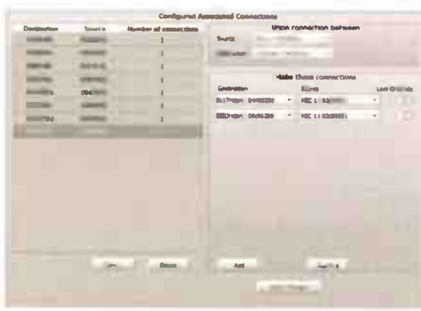
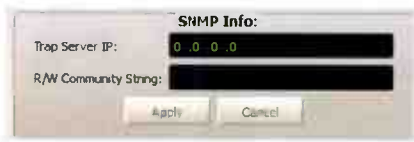


- **Associated Connections***
  This is a great feature in BLADEs for callers, codecs, networks, remote broadcast & live talk shows that require a mix-minus. You can create a predetermined back haul, IFB feed or mix-minus for each device based on its location in the system or on a fader. If you have a shared resource connected to your system, such as a codec, the software will "automagically" give the proper return feed to the codec based on its destination. When a base connection is made, up to ten additional connections can be made. This significantly helps streamline studio routing, phone and codec selection.
- **44.1 or 48K Sampling Rates**
- **Flexible Signal Configuration**
  Signal can be defined as up to 16 mono, 8 stereo or any combination of mono and stereo totaling 16 channels.

- **AES67***
  Ability to support AES67 compliant devices. Allows WheatNet-IP system to synchronize to IEEE1588 from a PTP grandmaster clock and ingest/stream AES67 compliant packets.
- **44.1, 48K, External Sync or AES67 Operation***
- **Clock/Sync and Alarm Indicators***
- **Automation Control Interface**
  This is a "tool box" that every BLADE has that allows full control of the BLADE's functions such as routing, ducking, panning, full logic control, mixing and silence detection. Each BLADE supports up to 20 ACI connections which can be used with devices like Talent Stations, GP panels, SideBoards, etc. It also allows control of our partners' third party equipment.
- **Front Panel Headphone Jack & Source Selection**
- **Salvos/Macros**
- **Studio Bypass**



- **Front Panel Input and Output Metering**
  There is metering for every input and output on the system – 12-segment, multi-color LEDs that can be used for metering inputs and outputs as 8 pairs or 16 mono signals.
- **SNMP**
  SNMP gives you centralized monitoring over large distributed systems. You can configure alarms and set thresholds to get notified if and when a problem occurs. The instant alarms and notifications help you take quick corrective actions through e-mail, SMS, and executing custom scripts.
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  Has both DB25 to make transitional wiring easy for existing BRIDGE TDM customers and RJ45 – Studio Hub compatible RJ connectors for input and output.
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- **Automatic Backup**
- **Alarm Notification**
- **NTP**
- **Front Panel Locking**
- **Version Checker**
- **Crosspoint Save**
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OK, this spread is an advertising space paid for by Wheatstone. But hopefully you'll find it informative and compelling.

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FIND THE MIC AND WIN!

Tell us where you think the mic icon is placed on this issue's cover and you could win a Hosa USX-110 mic-to-USB interface. Send your entry to radio@RadioMagOnline.com by March 10. Be sure to include your guess, name, job title, company name, mailing address and phone number. No purchase necessary. For complete rules go to RadioMagOnline.com

VIEWPOINT

Loudness: The Unwinnable War

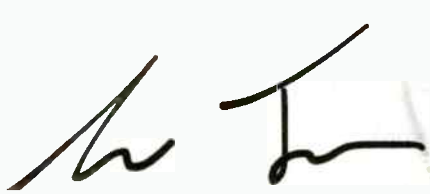
As audio processing technology has continued to advance, we've found many new ways to manipulate the "sound" of our product on the air. Modern processors can go from a whisper to a roar and beyond, but are listeners really tuning to your station simply because it's louder than the competition? This is a topic that is almost as old as audio processing technology itself, but despite many years of talking about it and a number of recent discussions about moving in the opposite direction, loudness still seems to be the ultimate goal among many broadcasters.

I remember listening to radio growing up in the '80s and very early '90s. The radio stations in my relatively rural area of the country all had a very particular "sound" to them. None of them really "jumped" off the dial, and if anything most had a somewhat "warm and subdued" quality to them. Very clean, within the limitations of FM and AM transmission; and no one station was particularly louder than another. I suspect part of this was due to the audio processing technology available at the time (Prisms and 8100s, Compellors and Dominators, or perhaps a CRL chain) but it may also have been due to the fact that the processing for the most part had been installed and adjusted by the same group of engineers. The managers and programming staff of those stations were more than happy to trust the engineers' judgment, perhaps with a few small tweaks, but there was no "loudness war" in my part of the country.

At some point during this time period, one station in particular (a country format) really started to jump off the dial. It was much louder and very "crisp." They started promoting that they were now "digital." I had to wonder exactly what that meant … Digital playback from CDs had started to become more common, and digital audio processors were just barely starting to hit the marketplace, but actual digital broadcast transmission was not even on the horizon at the time. I tried to reach their engineer to ask some questions (as a curious teenager) but never found out exactly what they had changed. Regardless, it sounded extremely good … and was in fact very loud compared to the other stations on the dial. This was the beginning of my exposure to the "loudness war."

Later in my radio career, I found myself in a major metropolitan area. Stations there were loud and proud of it. I, on the other hand, worked for a classical station that had to hold its own on the dial among the flamethrowers while still appeasing the "golden ears." Ultimately, I did manage to find a good compromise but I was not about to try competing in terms of loudness on a classical music format by simply "cranking it to 11."

With the increasing number of media options available to listeners, does being "louder" on the dial still make sense or is it time to revisit your approach to processing? When it comes to loudness, eventually you reach a point of diminishing returns (and the ultimate limits of modulation and audio levels). Processing is a tool, like anything else, and can be used to "shape" your sound, but it ultimately comes down (as always) to the content.



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EAS Alert — No Way, No Más

by Lee Petro

In December, I made brief mention of an EAS tone issue originating in Nashville, Tenn. The radio station in question was discussing the impact of an EAS test during the World Series, and mistakenly triggered the alert system on AT&T's U-verse cable system. Two more recent cases should drive home the point that broadcasters should never use the EAS alert tone during non-EAS events. Moreover, this policy applies to video programming producers who may lack transmission facilities, but still will be liable to the FCC for violations.

The first case deals with three companies had aired commercials for the movie "Olympus Has Fallen." At least one of the movie trailers repeatedly ran the EAS alert with the text "This is not a drill." The FCC issued initial forfeitures of $1.2 million to Viacom, $530,000 to NBC Universal and $280,000 to ESPN.

Rather than fighting the forfeiture, NBC Universal paid the forfeiture for its cable systems that aired the trailer.

However, Viacom and ESPN did not pay the forfeiture and asked the FCC for a reduction. Their arguments centered on the fact that the parties were not broadcasters, thus the rules did not apply to them. Further, they argued that it was clear from the trailer that the alert did not relate to an actual event. As such, there was no chance for confusion.

The FCC disagreed with each of these arguments. First, it found that the prohibition on false EAS alerts applies to all entities, regardless of whether they are broadcasters or the programmers that distributed the trailers to broadcasters and cable systems. Furthermore, the Enforcement Bureau was not swayed by the "lack of confusion" argument, finding instead that the prohibition on false EAS alerts is straightforward: No false alerts, ever. Finally, the FCC also relied on the fact that both companies had reviewed the advertisements and had the ability to reject the advertisements prior to their distribution.

As such, the Enforcement Bureau determined that there was no reasonable question whether the forfeitures should be reduced. Moreover, the FCC looked at both the wide distribution system for the companies and their ability to pay the forfeiture in refusing to reduce the amounts.

The same rules apply whether the broadcast is in English or Spanish. Just last month, the FCC reached a settlement with a Spanish-language broadcaster in New York. The on-air talent acknowledged at the time that playing the EAS alert tones was illegal, but continued to do so.

The Enforcement Bureau reached an agreement with the broadcaster, whereby the broadcaster admitted liability and agreed to a forfeiture of $20,000. The broadcaster also agreed to a three-year program, which involves compliance training, the drafting of a compliance manual and the submission of annual compliance reports for the duration. So, on top of the forfeiture, the licensee will be required to spend additional time (and money) to develop and comply with the terms of the consent decree.

The short answer to these problems is to instruct your staff that EAS alerts may never be used on air, and to develop procedures to review advertisements aired on your station to weed out any violations.

Finally, the FCC also issued a forfeiture of $25,000 relating to three STL facilities that were operating from unauthorized sites. Recently, the staff has been more active in this regard, and a broadcaster was found to be operating from a site a little less than one mile from their authorized location. The FCC notified the broadcaster, and then revisited the site one year later and found that the issue had not been corrected. As a result, the FCC issued a forfeiture of $12,000 for operating an unauthorized site, and an additional $13,000 for failing to correct the problem after being notified. The licensee requested a reduction, but the forfeiture was upheld.

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DATELINE

April 1, 2015 — Stations in Delaware, Indiana, Kentucky, Pennsylvania, Tennessee and Texas must place Annual EEO Public File Reports in local public inspection file.

April 1, 2015 — Noncommercial Educational FM stations in Texas must file Biennial Ownership Report (FCC Form 323-E).

April 10, 2015 — Stations must place 2015 1st Quarter Issues/Programs list in local public inspection file.

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Build a Reliable Transmitter Site

by Doug Irwin, CPBE AMD DRB

Every radio or TV station engineer wants to have a reliable transmitter site. Specifically though, what is meant by reliable? Naturally we want any transmitter site to be trouble-free; we also want it to run consistently and be predictable. On a personal note, no one wants to be called out in the middle of the night to fix transmitter site problems. With fewer and fewer staff responsible for more and more remote sites, we seek to minimize unscheduled, emergency trips. We want reliability, consistency and predictability at any transmitter site; the achievement of those qualities is what this article is about. Much of this material has been covered in the pages of Radio before, but these points can never be emphasized enough.

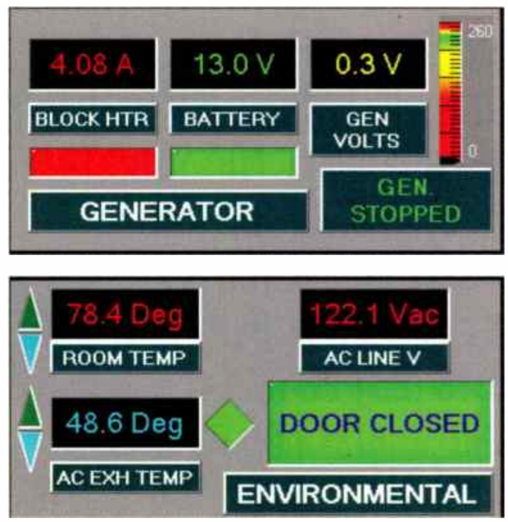

Figure 1: Generator and HVAC Monitoring

SHELTER

As an engineer dealing with remote sites, it isn't just the equipment that you need worry about; all manner of things can happen to an unattended site sitting out in the middle of nowhere. Having a poor shelter, for example, can lead to many other problems.

Creatures of the wild are often attracted to the shelter and warmth of transmitter buildings. Aside from having to clean up big messes left from mice that sometimes build nests in equipment, a more serious problem can come from the fact that rodents have a tendency to eat wire insulation. This can lead to open circuits, short circuits or other issues that show up if water happens to touch the wires for some reason. Rats and mice will often die right in the transmitter building, leading to further messes and awful smells. Snakes are another matter. I haven't had much experience with them; however, I did once clean a tube-type transmitter that had been invaded by a snake. It had come in through a transmission line conduit and decided that the HV power supply was the place to be, with predictable results. That was nearly 30 years ago, and I can still remember how bad it was.

Water is another common issue at a transmitter site. An obvious problem is leaks through the ceiling that drip right in to the top of your transmitter or rack. A less obvious issue is condensate from an air conditioner with plugged drains that manages to drip into a transmitter or rack. The worst scenario with water is flooding, of course.

A large part of site management is mitigating the problems I've mentioned so far. If you are sharing space with other tenants, especially those with outside walls, you'll be challenged to keep varmints out because many of the ingress points are outside of your control. All you can really do is exercise your rights in the lease and have the landlord keep these problems in check. On the other hand, if the site belongs to you, I recommend the following:

Carefully block all potential ingress points for mice, rats and snakes. This includes windows, holes that pass coaxial cable or conduits outside, vent holes and door seals.

Look for water leaks while it is raining. Sometimes you can find evidence of leaks after the rain has passed and things have dried out, but it is much easier to see where drips are originating while they are actually happening.

When air conditioners are installed, plan for appropriate drainage. Having drip pans underneath air conditioners is fine, but if the drains get blocked the condensate water can end up in places that you don't want. Avoid placing pans or drain lines over transmitters and racks if at all possible.

Flooding. The prevention of flooding is something you can really only do when the site is being constructed from the ground up. For AM sites, if a site is built in a flood plain, plan for a height that will accommodate at least a 100-year flood level. Include the building, ATUs and tower bases. As for mountaintop FM sites, consider the possibilities of landslides that could damage your building from below (washouts) or from above (mudslides).

A major part of building a reliable transmitter site is anticipation of things that could go wrong. The four items I've just mentioned are predictable and can be addressed ahead of time.

ALTERNATE POWER SOURCES

It's only after you've generated your own power for more than several hours that you begin to realize how difficult it can be. Your local utility does it 24/7/365 so of course, they have it figured out (for the most part).

If you are installing a new generator, your design issues are size and runtime. If the transmitter site already exists and all loads are wired to the same distribution panel, then clearly the generator will need to be large enough to power all the loads. If you are starting from the ground up, you might want to consider having an emergency panel, which is one that is sourced from the automatic transfer switch, but does not power all the loads.

Fuel storage is always a difficult problem because one must balance the maximum anticipated runtime against the cost of the fuel, the cost of storage vessels and even fuel maintenance. Always remember that the situation causing the power outage is also likely to cause problems for your local utility and the fuel company you use. If you normally maintain enough fuel to run 36 hours (for example) and find later that the road to your transmitter site is closed and cannot be reopened for several days, then trouble is at hand. I'll offer up one piece of advice here: "Get it all going in." You'll find it far easier to get money to install a larger generator and/or more fuel storage *when the project is in the design phase* than you will if you try to get everything upgraded after the fact.

Clearly, regular generator maintenance is crucial to your peace of mind, and nothing solidifies it more than testing the generator under load. During this test, all the various elements of the system get used in an "emergency" situation. Predictability is what is important here. You need to know what is going to happen when there is a power failure at the site.

During the test, look for the following:

- After the transfer occurs, your normal air-chain should power up and all user-selected configurations should be remembered. It should require no intervention.
- All UPSs should have no problem running on generator power.
- Any remote control signaling regarding the generator should be active. Likely you'll have "generator running" status along with "generator transferred to load" status.
- All IP network equipment restored and automatically connected. E-mails regarding transfer should have gone out and been received by the far end devices.
- Upon re-transfer, all elements of the air chain should continue without problems, obviously. The generator should have a cool-down period after the re-transfer of 10 to 15 minutes.
- Remote controls should indicate the generator is off-line.

There will always be some question as to length of the load-test. From my own experience, I would recommend at least 4 hours. Just remember:

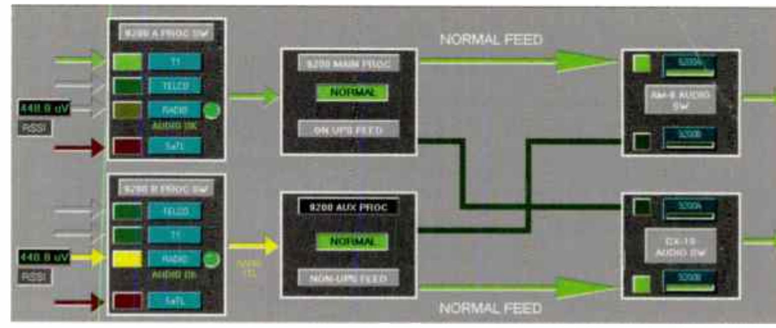

Figure 2: Audio Chain Monitoring and Control

The longer it goes, the more confidence instilled. If you schedule regular infrared testing of your electrical system, it's a good idea to do so while testing the generator under load, because it allows you to test the integrity of the electrical connections that are not normally used.

There are two schools of thought regarding the testing of generators without the load. Many (including myself) have tested generators on a regular basis without a load attached. Still, many other users insist that it's ultimately harmful to the generator to do so. It's beyond the scope of this article to get in to the reasons for that. I suggest you consult your manufacturer's rep or your maintenance company to help in deciding what to do.

Figure 3: Tunwall Antenna Switch Controller

One cannot forget about the generator between test periods, though; far too many things can happen to it. Monitor the following on your generator during its quiet periods:

Remote diagnostics via serial or network connection. Run the user interface on a computer that is remotely accessible, and look in on it periodically.

Operation of the block heater. A failure of the block heater doesn't equate to a failure of the generator, but keeping an eye on the unit is a good idea. You can do this easily enough by measuring the current draw of the block heater itself. Monitoring will likely require a remote control that can be "scripted" because you won't want constant status changes caused by the heater going on and off, but you will want to know if the operation is normal over a test period of 24 hours.

Battery voltage. Without a properly charged battery, the generator isn't going to start, no matter what. Monitor the battery "float" voltage with alarms that let you know if it is too low or too high. "Too low" likely means the battery isn't properly charged, while "too high" likely means that your battery charger is boiling off the electrolyte, leading to eventual failure.

ENVIRONMENTAL CONTROL

The near-ubiquity of microprocessors at transmitter sites makes environmental control much more important than it once was. In the "old days" you could get away with much wider temperature swings inside of a transmitter space than you can expect to now.

Like generators, air conditioners are used to solve one set of problems at a remote site, while bringing their own new set of problems along for the ride. As with generators, it's likely that you'll hire a service company for their maintenance. It's a good idea to test your service company's "after-hours" response on occasion, to make sure you have the correct phone numbers (they do get changed sometimes, after all) and just to see how long response time is.

If you are building a new site or replacing older A/C units, it's a great idea to look at units that have remote access. One such line is the Challenger series from Liebert.

With IP access to A/C units, you're presented with several advantages:

- Access to the operation of the unit, often on a very granular level of detail
- E-mail alerts in the event of problems
- If the unit supports SNMP, then you can monitor it automatically and continually without having to resort to Web access.

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Simian Remote clients are completely free. All you need is the Simian Gateway and you can install and run a Simian Remote client on as many devices as you wish. There are Simian Remote client versions for both Windows PC and iPad.

Simian Gateway runs alongside Simian 2.2 PRO to manage TCP/IP communications between Simian Remote clients & Simian 2.2 PRO.

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Obviously not all units have this capability and you may be saddled with an inherited, "old-fashioned" unit. There are still measurements that can be made that will allow you to see what is going on from afar. For example:

- Measure room temperature at a spot in the room where the air is "mixed" — in other words, not too close to the cold air outlet of your A/C unit, and not directly above a transmitter exhaust.
- Separately measure the outlet air temperature of your A/C unit.
- In the event you receive a "high temp" alarm in the transmitter space you can then check the temperature of the A/C unit's output air, to see whether or not it's cold. If not, clearly you have a problem.

If you want to take a more proactive approach, consider the following steps:

- Measure the room temperature and the A/C output temperature separately.
- Detect if the A/C unit has been called upon to provide cooling. This will require a remote control that supports scripting. Compare the "calling" of the A/C unit with the cold air output temperature of the A/C unit. If the thermostat is calling for cold air but none is coming out, you have a problem on your hands.

Figure 4: Redundant AC Power Feeds

The advantage to this method is that you'll be made aware that a problem exists before the room temperature gets out of hand. This is also why you'll want to know your service company's after-hours number. This kind of problem never seems to happen during business hours …

REDUNDANCY IN AIR CHAINS

System redundancy is the key factor in the creation of a reliable transmitter site. There should be no "single thread" systems, every element of which is a single point of failure (SPOF). Each element of the transmitter facility should have a backup.

- There should be at least two means of getting program from its origination point to the transmitter site.
- There should be at least two transmitters.
- Having access to two antennas is very desirable.

Ideally you will be able to deliver program audio to the transmitter site via a "wire line" of some type as well as a radio circuit. The reason for this is simple: The types of failures experienced by one type don't have anything to do with the types of failures experienced by the other.

Radio links can be disrupted by failure of the equipment, transmission lines, antennas or interference. "Wireline" circuits can be disrupted by physical failures such as cut cables or fiber, or a power failure at the central office or somewhere else along the path.

The key is to build your system such that an unfortunate event that disrupts one studio-to-transmitter (STL) link doesn't disrupt the other at the same time.

There are far more options for both radio and wireline STLs than there were just 10 years ago. In addition to 950 MHz band radio systems, we now can complete the "last mile" connection via Part 101 radio systems (such as licensed 11 GHz radios) and of course, you can always try an unlicensed ISM band radio system. In terms of "wirelines" we now have DSL and metro Ethernet in addition to the legacy TDM types such as T1 and T3.

Aside from two program outputs from two separate STLs, it's a good idea to have two separate audio processors as well. The reasons for this are simple: Most (if not all) of the features that we expect of audio processors nowadays can only be accomplished by means of embedded software. Even the most well-designed hardware can be brought to its knees if just the right quirky "glitch" conditions occur.

Once you have the gear in place, you'll have to determine the best way to connect all of it together, being careful not to develop any SPOFs. Where I work in Los Angeles we've developed what we refer to as the "matrix." A Burk U.I. (by Dennis Sloatman) is shown below in Figure 2.

From left to right: We have a four-input audio switch (using magnetic-latching relays) that chooses one of four program audio feeds that are sent to the input of one of two audio processors. At the far right we see both main and auxiliary transmitters. Each has a two-input audio switch (again, magnetic-latching relays) that can be fed from the output of either audio processor. In this fashion, we can use any audio source, by way of either audio processor, for either of the transmitters.

Having more than one transmitter is probably considered a luxury by some, but it's inevitable that a single transmitter will need to be "off" at some point, whether it is because of a failure, a tube change or a software update. Even the most modern solid-state transmitters need a break now and then. When that occurs, your station is essentially "out of business." As part of the creation of a reliable and predictable transmitter site, having at least one auxiliary transmitter is a "must." It may be difficult from a budget standpoint to justify such an acquisition, but there are some options:

- When obtaining a new transmitter, keep the "old" one, and use it as your backup;
- Buy a second transmitter on the used market, restore it and use it as your backup;
- Buy a low-power transmitter for use only as a backup.

With two transmitters in place, you'll need a way to switch their outputs between the antenna, and a test load; so when considering the budget for such a project, don't forget these two vital items. If you want to have access to the RF coaxial switch by remote control, you may want to consider a commercially available RF switch and transmitter controller. Take a look at Figure 3.

Tunwall Radio makes a nice line of antenna switch/transmitter controllers that are based on programmable logic controllers. I should also mention, though, that if you have a remote control that will do scripting, you can roll your own "controller" fairly easily by interfacing it with your coaxial switch.

You may have noticed from Figure 3 the controller is designed to accommodate three transmitters and two antennas (for an FM system). Those organizations that consider a second transmitter to be a luxury would obviously feel the same way about a second antenna, but there are plenty of reasons for having one.

In FM systems, for example:

- Failure of one or more antenna elements
- Failure of the transmission line
- Necessity of lowering power for the accommodation of tower climbers

For AM directional antennas, it makes sense to consider backup in case of failure of transmission line, the phasor or another antenna system component.

An antenna or transmission line isn't something that you can necessarily just repair in an hour or two. The way to minimize repair and off-air time is to plan for it before it ever happens. For an FM station, this would mean installing another antenna and transmission line on the tower (or preferably, an adjacent tower). For an AM directional, this would mean having an easy-to-use “non-D” tower that you could switch to (albeit at lower power) while you analyzing the problem with the directional system.

SINGLE POINTS OF FAILURE

I alluded to SPOFs earlier—but what exactly do I mean by that? When you build multiple, parallel air chains (as described earlier) there will always be the temptation to use elements that are common to both chains.

Here are the most common examples:

- Multiple air chains all energized by the same circuit breaker
- Multiple air chains all energized by a common UPS
- Multiple air chains that share a distribution amplifier
- Multiple air chains that share an active switch (i.e. one that needs power to pass signals)

There are subtle SPOFs though, some of which may be impractical to circumvent:

- All AC power comes from one panel that is fed from an automatic transfer switch (ATS)
- Two telco wireline sources that originate from the same telco rack that has no emergency power
- Two radio STL receivers fed by the same dish and transmission line
- A single transmitting antenna (AM or FM)

Consider the common SPOFs first. You must never allow the failure of a circuit breaker to de-energize both air chains. If you have more than one rack, make sure that each rack is fed from a separate breaker in the distribution panel. Put one air chain in one rack, and other air chain in the other rack. If you have no choice but to put everything in one rack, see to it that there are two AC power sources in the rack. Use one circuit for one air chain and the other circuit for the other. Label the individual elements of the air chain as to their specified AC source. (See Figure 4.)

UPS failures are all too frequent because when they are installed, it’s easy just to plug every element of the air chain into it and then walk away. UPSs at the transmitter site have become common as equipment has become more sophisticated and sensitive to power interruptions. Just as with the AC power sources described earlier, don’t plug each element of each air chain into the same UPS. Either place one UPS in each rack, using different ones for different air chains, or if you are stuck with a single rack, have one outlet strip energized by the UPS and one energized by “raw” AC power. Plug one air chain into the UPS and one into raw power. That way if the UPS fails, you’ll still have an air chain to work with. As you recall from our “matrix” discussion earlier, that one air chain should be available to at least one of your transmitters. Finally, don’t plug the UPS into that same “raw” source. Use a different breaker for it.

Figure 5: Redundant Automatic Transfer Switches

Never allow a distribution amp (DA) to take you off the air. What I typically do is to “bridge” the DA input across program feeds that need distribution. The actual on-air feed does not go through a DA itself. I’ve seen instances in which both air chains actually went through a common DA. In this case, a single popped fuse could take the radio station off-air.

Since AES I/O in STLs is common nowadays, it’s tempting to use an AES DA to drive multiple air chains. You have the same potential problem here as with the older DA types; one blown fuse takes the radio station off the air. We do two things to get around this: AES distribution is done passively with AES splitting transformers and AES switching is done with devices that are based on magnetic latching relays. These have the advantage that they are totally passive — needing no power to pass signals — and naturally they work fine passing audio as well. The disadvantage is that when they switch, any AES receiver immediately downstream needs to re-sync, leaving a short gap in your audio.

The more subtle SPOFs can naturally be harder to "see" at first. Rare is the transmitter site that has more than a single ATS, but this is another common spot for major failures. The way around this would be to have two ATSs, one feeding one air chain and transmitter, and the other feeding another air chain and transmitter. (See Figure 5.) Granted, this is probably not a practical solution for most stations. The best you can do is to carefully maintain the ATS and all associated wiring and contactors. Perform regular IR testing on the inside of the panel(s) with the load energized. This is standard operating procedure in many office buildings.

Local exchange carriers that maintain large mux/de-mux facilities at transmitter sites often don't pay close attention to backup power. You may see arrays of batteries all connected to provide –48 VDC, but do you have any idea how long those will last during a power outage? My point here is that you may have a "main" and "backup" program circuit (or T1) from telco, but if they both come out of the same de-mux rack, they'll both die at the same time if the power is out too long. The solution here is to not rely on "wire line" for both the main and backup STL.

Likewise, having two radio STLs is great, unless a common antenna and transmission line feeds them. Two STL receivers ideally will be fed by two separate STL receive antennas; that way, when one dish gets blown out of alignment in a storm, or gets struck by hunks of ice falling off the tower, you don't lose the signal for both STL receivers.

REMOTE ACCESS

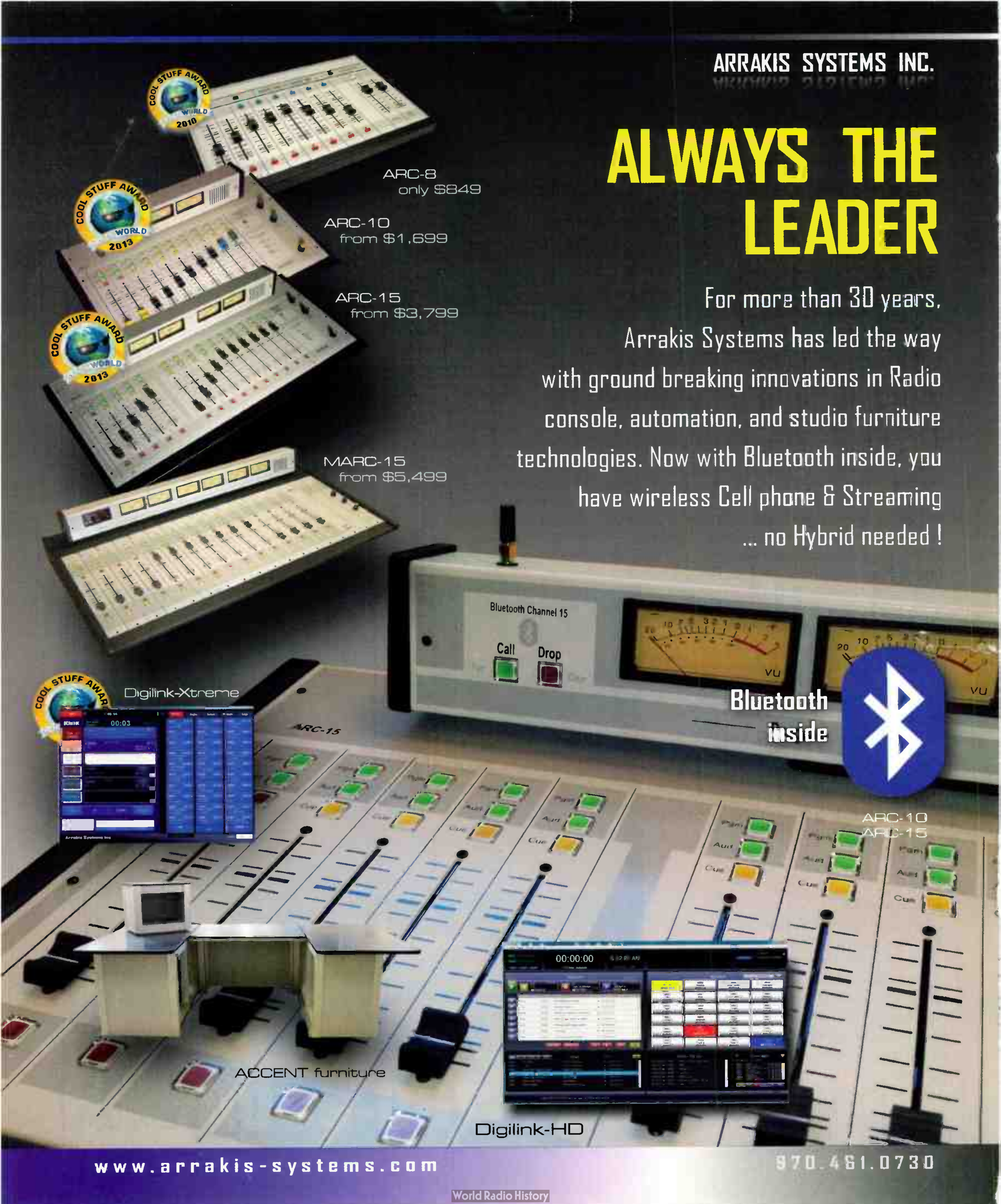
For many years most of us were satisfied with simple telephone access to the transmitter site. With the proliferation of devices at remote sites that support IP communication, however, telephone access isn't really much good anymore (except perhaps as a backup). IP support from "remote" devices also typically affords us much more granular detail about what is going on in a device or system.

You can make use of IP connectivity in one or more ways:

- Browsing into the site (HTTP)
- Having devices e-mail you with issues (SMTP)
- Having devices send SNMP traps
- Constantly measuring certain parameters via SNMP

Once you start taking advantage of the new features offered by devices and remote controls, the importance of constant and reliable IP connectivity increases. In most cases you would use private network connections at your remote site since one end of the connection is probably at your studio location. Having alternate IP access is ideal, but not practical in many cases. You may have two STLs that can carry IP traffic or you may be able to obtain a DSL (or even a T1) from your local telco to provide a second means of communications. In that case you would use a router to allow incoming packets to reach the LAN via one or the other path. A more practical approach might be a second remote control that would have its IP connectivity served by a second network. This second remote control not only allows backup IP communications, but backs up your primary remote control as well. Virtually all current remote control manufacturers provide IP support, including Burk, WorldCast Systems, Broadcast Tools, Davicom, Statmon and Sealevel.

The reason we all want reliability at remote sites is because none of us want interruptions to our daily lives and routines. Due to the 24/7 nature of our business, failures at remote sites often require one to "drop everything" and go to the site to take care of whatever issue exists. However, with proper planning and implementation of the techniques described in this article, the number of emergency calls can substantially reduced — not to zero, of course, but close to it. Perhaps most importantly, with reliability, predictability and consistency at your remote sites, you will likely be able to deal with these emergencies on your own terms, instead of the other way around.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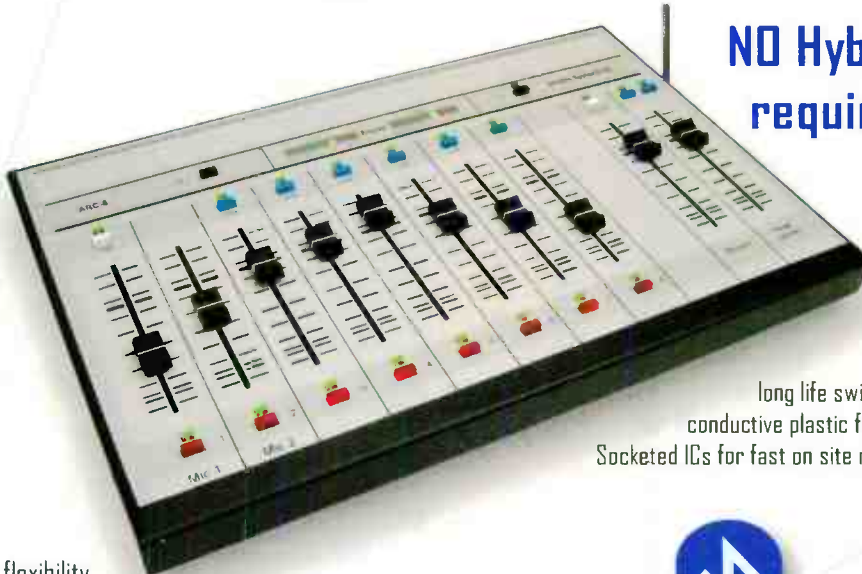

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FACILITYSHOWCASE

iHeartMedia Portland: Revisited

by Dee McVicker

A Wheatstone "SideBoard" in one of the AM talk studios allows the talent to handle phone calls and other audio.

There's nothing like a brand-new studio to rally the masses.

But it's also interesting to revisit a newer studio that has been around long enough for the new shine to wear off — to see how the studios held up after the honeymoon phase, when the dust had long settled and the equipment had been bumped around a bit, and what lessons might have been learned.

Several representatives of Wheatstone got our chance during a recent tour of iHeartMedia's Portland studio facility, which was constructed in September 2012 out of office space on the top two of a four-story building in Tigard, Ore. Director of Engineering Chris Weiss showed us around the 25,000-square-foot facility and talked about what worked out well, and what he would change two and a half years later. While this facility was a notable one for Wheatstone, it involved numerous vendors, and Radio magazine Editor Shane Toven asked us to write about the lessons of the project in its entirety.

Chris Weiss started the tour by saying that the one thing he would change, if possible, was the space allotted for iHeartMedia Portland's cluster of stations, which include KKRZ(FM/HD), KKCW(FM), KFBW(FM/HD), KLTH(FM), KXJM(FM), KPOJ(AM) and KEX(AM). But since that was a real estate improbability in Portland, he had to work with 25,000 square feet for all seven stations, about the same square footage as the older facility in downtown Portland but for almost half again more stations. The old studios along the Willamette River jammed in the two AMs and three FMs, plus a little extra for regular sportscasting of the Portland Trail Blazers. The new space would house these five stations, plus the two additional FMs that were previously located in an adjacent building, for a total of 17 studios.

Being able to build it from the ground up made all the difference. There were no stairwells to work around, and the space could be laid out where it made the most sense. As a result, architects Luckett & Farley, which have worked on a number of iHeartMedia studios, located all studios on the third floor on interior walls, with corridors separating them from exterior walls. Not having to soundproof for traffic outside came with a huge cost savings, since windows didn't have to be triple-glazed or quadruple-glazed.

COMPUTERS AND "KEYBOARDS"

To make it all fit, the studios ended up being slightly smaller in the new facility compared to the old. Weiss said AoIP and automation more than canceled out the difference and then some. "Pretty much all we have in the studios are computers and this big, funny-looking keyboard thing that we call a surface," teased Weiss, pointing to an E-6 control surface in the main FM studio for top-40 KKRZ (Z100).

The music FMs in the cluster have a similar studio layout, each with either an E-4 or E-6 control surface facing four computer screens — two for the RCS NexGen digital automation and two for the Internet and/or VoxPro. Weiss chose predominantly E-6 surfaces for music stations because of the EQ and dynamics processing on each channel.

The furniture, which was made by Studio Technology, still looks new out of the box, a testament to its durability. Most studios also have Blue Sky EXO2 speakers and M2 mic processors for ElectroVoice RE20 and RE27

Wheatstone Blades in the TOC handle audio and logic I/O from each station's airchain and other equipment.

The E-6 surface was chosen on music stations for its EQ and dynamics processing control among other reasons.

mics, which were brought over from the old studios.

Six of the studios have the Audioarts IP-12 consoles, which integrate with the E-6 consoles for both general production as well as live, multi-studio programs.

Weiss went with a larger, 20-channel E-6 frame for both of the AMs, which look identical except for the logos. The AM studios are set up with board op in the middle surrounded by four computer screens for NexGen and Internet access, and a call screening/production position along the wall. Each of the two AMs also has a talk studio associated with its main studio, and these each have a Wheatstone SideBoard surface with hybrid phone system. All studios and associated talk studios can operate independently as needed.

"We have different salvos in the Wheatstone system so we can change the setup of the (main) AM studio board instantly, whether it's part of what is going on in the talk studio or in the main studio only," explained Weiss. This has proved useful when supporting talent from other markets that need a studio when they are in Portland, such as Johnjay & Rich and various Fox Sports talent.

The grand tally of Wheatstone gear came to 56 WheatNet-IP I/O Blades, 49 audio drivers, 23 Wheatstone M2 dual-channel mic processors to handle 46 microphones, and 13 control surfaces all connected through a WheatNet-IP audio network.

NO DO-OVERS

In retrospect, Weiss said there were a few things he would have done differently. "I think I could have paid closer attention to the studio sizes, layouts and sight lines a bit more. We had a very short amount of time to discuss layout with the architect before locking things in, so that I was only able to focus on a couple of key studio clusters. This ended up making for a little extra work during the construction as we had to adjust furniture and equipment placement to retain good sight lines," he commented.

In addition, "All new computers in the studios would have made the station moves simpler as well. We migrated most of the machines from the old studios and had a number of hard drive failures and NIC incompatibilities on the day of individual station moves," he added.

But if success is measured in the number of change requests from air staff, on that count Weiss succeeded. Most of what he had anticipated in the design phase went as planned in the working phase, now two years and several months later.

"Things have been untouched here since we moved in," he commented as he pulled open a panel beneath the studio desk in the Z100 studio that revealed the heart of the system, a WheatNet-IP console Blade and a lineup of CAT-6 cabling snapped neatly in place and labeled, plus a small Cisco 2960 switch that's one of several edge switches for the WheatNet-IP audio network.

Fourteen CAT6 interconnects to the rack room upstairs, and RG-6 jacks that interconnect to the wall and up the ceiling are in place should iHeartMedia want to put in video cameras for streaming purposes.

"I really didn't want to have to run new cable after we built this out," he added.

Weiss went on to explain that the main studios are hub points in the network, and therefore can operate as part of a cluster of studios or independently if need be.

"To be able to distribute audio over IP like this, it's so simple. There's just so many cool things we can easily do," he said, recalling a recent remote at the Rose Quarter stadium for the Trail Blazers that involved all seven stations at the same time. "It was more a staffing issue. Could we have enough promotion and programming staff to handle all this? But from an equipment standpoint, it was easy," he said. For the remote, iHeartMedia Portland used a couple of M4-IP four channel mic processors onsite at the location for a direct tie back into the network.

IN THE TOC

For the TOC, Weiss laid out the equipment here based on three things: redundancy, redundancy and redundancy.

Instead of putting all network access units in the same rack, he set up separate racks for each station with their associated I/O Blades, PPM encoding, audio server and backup STL links. "I didn't want to put all the Wheatstone Blades in one rack. If you lose a breaker, then you have all the PDs coming at you at once. This has worked out much better by splitting it by station," explained Weiss.

Each station rack includes a Wheatstone I/O Blade (with analog and digital I/O), plus a Wheatstone Aura8-IP Blade. The Aura8-IP Blade is used to preprocess the audio before it goes into the PPM box, as well as provide pre-delay headphone processing. Included in the rack are main and backup Arbitron PPM encoders, as well as an AirTools profanity delay, and an audio server and streaming audio server.

More Wheatstone Blades are out at the transmitter sites linked through single mode fiber STLs. Sage Alerting Systems EAS ENDECs are also located in a shared rack in the TOC as a source on the system.

On Weiss' list of "keepers" the Middle Atlantic BGR racks were probably close to the top, as these racks, which are used predominantly for network servers, gave him some decent cable management capability. CAT-6 cable snapped in easily and the racks have a small side panel that runs the length of the rack to manage cabling and wiring off to the side, sight unseen. In the old studios, which were built in 1978, he had inherited a mish-mash of racks, some of which were less than a few feet deep and fed wiring from troughs underneath so it was always an ordeal to sort through wiring.

Now, two and a half years later, he's awash in rack space. "We ended up with a lot of extra rack space once we got rid of all the distribution amps and virtualized everything," he said, referring to the two 8x2 stereo mixers built into each I/O Blade. Each station's air chain rack is only half full, and there are even three racks that still remain empty.

At the center of the operation are the audio network's core Cisco switches, which are bonded together on a backplane in the TOC, with gigabit connections to every other switch and element in the network.

"Everything works better at a gig, especially NexGen," commented Weiss, who monitors network traffic on a regular basis. Normal NexGen traffic hovers around the 100 Mbps mark, whereas on the fiber connection to The Pittock NAP, which hubs out to all the transmitter sites, Weiss routinely sees steady traffic at about 150 Mbps. "150 megabits. That freaked me out at first because you never see that kind of bandwidth solid on a circuit. But that's what it takes because it's running all this AoIP back and forth, and we run a video feed for the Trail Blazers over that," he said.

Before leaving the TOC, Weiss stopped briefly to read the indicators on the emergency lifeline, the Mitsubishi UPS system, which is capable of running the facility until the generator kicks in. The UPS maintains about a 25 percent load on it, and could run the technical operation for nearly a half hour on its own; batteries on it are tested every six months whether it needs it or not.

Overall, most everything in the facility is as it was when the studios were first installed two and a half years ago, except the Clear Channel logo itself. "We're now in logo transition. We still have to change the building signage to 'iHeartMedia' and make that change throughout," commented Weiss. ◘

Dee McVicker is a freelance author for Wheatstone Corp. and owner of Grassroots Communications.

Thinking About Disaster Recovery: Response-Based Planning

by Scott Bridgewater


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Bad stuff happens, right? Even in a well-built and maintained operation, there's always something that threatens to take you off-air: bad weather, power utility issues, human error ("oops"!). Even something like your air conditioner breaking late on a Friday night can temporarily put you out of business. Those and many other incidents all fit under the "Disaster Recovery" heading.

Why worry about disaster recovery? The simplest and cheapest thing to do during a threatening incident is to shut everything off, hunker down and wait for the bad situation to pass. What's wrong with that? Preparing for incidents isn't an abstraction or a luxury; you need to respond when there's a failure.

If you aren't prepared to respond to an incident (or don't have a good plan to exercise those preparations), you'll lose money, audience and respect. Simple as that. If you're off the air, you're not making money. You can do the math to calculate how long you can be offline before you've eaten up any "savings" from not being prepared. There's a secondary cost, too. If you're off the air when your audience needs your services, they'll go to someone else and maybe not come back. There's also the commitment radio stations have with their communities to provide useful information during incidents; if you're off the air, you're not meeting your commitments.

OK, you have good disaster recovery preparations and lots of redundancy in your plant. You're ready to go, right? If you have disaster preparations but don't have a written, tested, practiced and curated plan, your station isn't ready for an incident. Broadcast facilities can be fairly complex operations, especially when you factor in translators, HD Radio channels and online streams, all with different (or common) content stores and technology.

Do any of the following sound familiar?

- "I've been meaning to write something down, but it's just been too busy … forever."
- "Yes, we have a disaster recovery plan; I keep it in my head — so all anyone has to do is call."
- "That was an intern project five or six years ago."
- "Yes, we had one, but it was impossible to maintain. There are just too many ways things can go wrong."

A lot of disaster recovery plans are unwieldy, burdened by a seemingly infinite number of specific scenarios. Some, good intentions aside, never get written down because of the daunting amount of detail required. They're written from a troubleshooting perspective instead of an operations perspective. The plans are written by engineers who want to understand what's gone wrong rather than taking protective action to keep their service alive. In other words, a lot of disaster recovery plans are cause-focused rather than response-focused.

Cause-focused scenarios aren't an inherently terrible way to think about disaster recovery. It helps to think through a specific incident as a template for the preparations needed to respond and recover. A cause-focused scenario could be "the air conditioning died," which generates procedures on troubleshooting and fixing the issue. Additional procedures describe what operations and on-air staff needs to do — in this case, get ready to shut down unneeded devices or get ready to move to a backup site.

As you add more scenarios, you get a detailed list of possible causes of service interruptions with overlapping response plans. So far, so good.

The trouble comes when faced with a complex facility and dozens of scenarios. A facility doesn't have to be large or in a large market to be complex these days; even smaller stations have HD Radio channels and significant online presences. Where there was at one time a single program stream feeding a transmitter, there's easily up to a half-dozen or more individual streams, each important to its listeners.

It's difficult to build a responsible plan to meet each scenario based on individual causes, not to mention the challenges to staff at the early stages of an incident trying to categorize the scenario properly and select an appropriate response plan.

Another way to look at the situation is to think about what staff response to an incident looks like, not the specific cause. For example, it really doesn't matter whether there's a fire in the building or a storm has broken windows and killed power sources; at the start, staff has to do largely the same things: Get out safely and move services to a backup site.

Separating causes from incident responses radically reduces the number of scenarios and the complexity of the responses. This is important for staffers trying to respond to an incident when faced with incomplete or confusing information.

What do response-focused scenarios look like? Here are a few examples I've used in working on disaster recovery projects:

Evacuate Building Immediately — Operations Offline: This is the worst-case scenario. The main production/studio site is offline and staff has to leave immediately. This could be due to fire, power issues that can't be mitigated, severe weather, earthquakes, building collapse or environment issues. In this case, service interruption is almost inevitable and noticeable to listeners. Staff focus at this point is getting everyone to a safe place and to start up a backup site (if one is available). Communications, especially anything that goes through the main facility, could be interrupted.

Evacuate Building Soon — Transition to Backup: This is the most likely scenario for broadcast operations. Something has happened that will more than likely drive staff from main production/studio site, but not immediately. This could be due to non-catastrophic building damage, power issues (including running out of generator fuel), predicted bad weather (especially events like hurricanes), HVAC failure or serious telecom issues. Staff focus is to start up and cleanly transition to backup site(s) with minimal interruption and making sure the content caches at the backup sites are current.

Lights On, Nobody Home — Evacuate Operating Facility: This is on the surface an unlikely scenario, but it's not unheard of. In this case, something has driven the people from the production/studio site, but the infrastructure is largely or completely operational. Causes for this scenario include environmental issues, external unrest or threats, some weather issues that keep staff from making it to work. This scenario is heavy on remote access to internal systems at the site.

I'm sure you can think of other scenarios. Notice how high-level the scenarios are; they're expressed as operational actions, not as triggering incidents. They're distinct enough that determining which path to follow after a triggering incident is a fairly straightforward process. It shouldn't take more than a few minutes to figure out whether your facility needs to be evacuated immediately, whether staff can wait (and work) for a few hours or whether the technical core is operational. They should also be easy to communicate to managers who may be called on to make important decisions about how to proceed in a very short time.

There are a few important exceptions to the response-focused scenarios. In almost every part of the country, there's a well-known threat: in the West, it's earthquakes or fires; on the Gulf Coast and eastern seaboard, it's hurricanes, in the Midwest, there's Tornado Alley; etc. Each of those scenarios has unique features that need to be addressed. For example, if you have a station in a location that could be affected by an earthquake, you need to be prepared for the possibility that your backup site is affected by the same incident that forced you from your studios, and that staff mobility may be severely curtailed. In those cases, a specific scenario for that incident is absolutely appropriate.

Another exception would be for nonstandard but manageable operations. The prime example here is, "Running safely on UPS and generator." There may be actions staff has to take, like shutting down unused equipment to shed load, but the staff is otherwise operating in place. Of course, this could evolve into "Evacuate Building Soon" as an incident threatens to extend past the generator's fuel supply.

To build out a straightforward disaster recovery plan, start with five or six high-level scenarios, then add three lists to each scenario:

First, make a list of assumptions. What systems and facilities need to be active and available to execute your plan properly? That list would have items like:

- Backup audio codec at DR site has the proper setup information
- There's power at the DR site and systems there respond to pings
- There's a bailout bag with laptop, batteries and a phone at the main site and ready to go.

These are great items to check weekly or daily.

Second, make a list of procedures to execute to respond to the incident. That list has items like:

- Switch to the backup codec feeding the transmitter
- Switch online streams to their backup systems
- Any other procedures to switch to backup systems

Third, make a list of procedures to execute to return to normal operations, items like:

- Switch the transmitter feed back to the main studio
- Switch online streams back to their main systems
- Any other procedures to switch back to main systems

The third list is especially important if your incident response includes systems that have frequently updated databases, like content management and automation systems. If you're not careful, you can sometimes cause more damage restoring normal operations than the original incident.

That's the core of an effective response-based disaster recovery plan. It's still a lot of work to construct (especially from scratch) and must be tested and maintained, but this architecture is much more straightforward than trying to write and curate dozens of "if this breaks" scenarios. It's not a complete plan yet; you still need communications and decision-making sections. I'll have more on those later.

Next time, I'll talk about using IT planning tools, especially Recovery Time Objective (RTO) and Recovery Point Objective (RPO), to help you figure out recovery priorities. They provide a great way to think about your broadcast plant and give insight into your architecture and recovery procedures.

Scott Bridgewater works with radio stations, program producers and other media companies to help them solve sticky problems, including analyzing and enhancing their disaster recovery preparations. Feel free to drop him a line: scott.bridgewater@gmail.com.

Aaron 650: A Solid Performer In Difficult Reception Conditions

by Dan Houg

At no previous time in broadcast history has the need for excellent FM tuners been greater. With the build-out of the FM band, close frequency spacing and adjacent channel interference have resulted in a crowded, noisy band that challenges receivers. Ironically, until recent years, the quality of available FM receivers had been declining while the FM band itself became more crowded and noisy. Arguably the best tuner one could buy in terms of reception performance at one point was the Sony XDR-F1HD, an unassuming little $100 consumer box with astounding FM performance that was only in production for a short period of time. Good tuner options were limited to scouring eBay for these Sony tuners or vintage analog tuners.

Fortunately, all of that has changed. A new generation of tuners based on software-defined radio technology have exceeded the best vintage tuners in terms of reception performance through the use of powerful digital signal processing. These processors-as-radio-receivers put the FM/AM front ends, tuning synthesizer, channel filtering, FM multipath improvement, demodulation, FM stereo decoding, weak signal processing, noise blanking and RDS on an integrated device and have achieved amazing performance.

As the broadcast engineer for Northern Community Radio, I run a small network of two full-power FM stations (KAXE and KBXE) and two translators which rebroadcast the KAXE signal (delivered over-the-air via FM receiver) from 73 and 90 miles away respectively. In addition, I use a signal received over-the-air from 85-miles away an STL backup for KBXE. My motivation to find and use the best FM tuner is high and I had the opportunity to test the Inovonics Aaron 650 FM Rebroadcast Receiver, a feature-laden model upgrade from the base Aaron 640. Inovonics' website has an excellent model comparison chart between the two models.

MORE INFO

www.inovonicsbroadcast.com
info@inovonicsbroadcast.com
831-458-0552

FEATURES AND OPERATION

Composite pass-through or regeneration

The Aaron 650 operates in either composite pass-through or composite regeneration mode. Pass-through mode eliminates retransmission delay (latency); but the reception magic turns on with composite regeneration. This mode completely reconstructs your baseband signal for lower noise and allows you to alter your RDBS messaging prior to rebroadcast. The effect of cleaning up the signal is dramatic as evidenced on the very cool OLED FFT Spectrum Analyzer built into the unit as well as audio listening tests. It should be noted that the headphone output on the Aaron 650 is always outputting audio from a baseband regenerated signal, so headphone audio cannot be used as an A-B comparison when baseband regeneration is toggled on and off via the user interface. For my listening tests, I used an Inovonics INOmini 514 FM Multiplex Decoder and listened to the MPX output of the Aaron 650 as I toggled the baseband regeneration on and off. The feature made a dramatic difference in quality on weak signals. Unfortunately this function is not available on the Aaron 640 model, but in my opinion it is absolutely worth the price premium in difficult reception conditions.

DUAL ANTENNA INPUTS AND MPX OUTPUTS

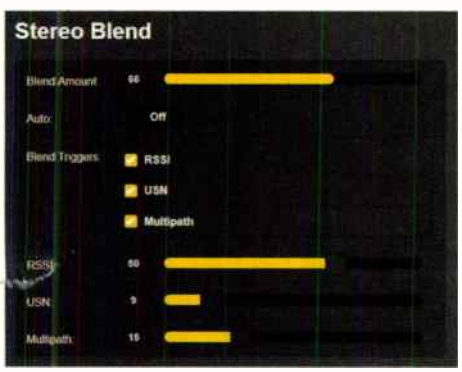
The Aaron 650 also has dual antenna inputs and composite outputs, as well as balanced analog and AES digital line outputs. Multiple antenna inputs are just the ticket for off-air receive situations where one wants to switch between independently optimized RX antennas. Station presets can be saved, and it also saves the chosen antenna input along with all other reception parameters, a nice programming feature that was not overlooked.

STREAMING AUDIO CONFIDENCE MONITOR

Confidence monitoring of the received signal quality and preset choice can be done remotely over the streaming audio utility built into the Web GUI. This is an excellent feature that gives a choice of two streaming rates for high or low quality connections and runs with about a 5-second encoding delivery delay.

ADVANCED METERING AND SPECTRAL ANALYSIS

The most eye-catching feature is the FFT Spectrum Analyzer for the MPX, Left/Right XY plots and audio levels over time, as well as the built in Band-Scanner for local RF spectrum analysis. Presented on the high-resolution OLED display, the effects of baseband regeneration can be immediately seen on the recreated MPX output. The band scanner is particularly useful to see signal levels entering the antenna input from the entire FM band as this can point out possible frequencies needing attenuation with an external filter. The OLED display actually has a higher resolution than the Web GUI representation and if one pauses the cursor over a peak, the frequency is displayed. This is another useful little feature in the unit's interface.



Aaron 650 Stereo Blend Control

ALARMS, ALERTS, BACKUPS

The Aaron 650 is well equipped with local alarm tallies plus self-logging alarms that constantly check for Audio Loss, RF Loss and RDS Loss. Upon loss of the incoming carrier, loss of program audio or RDS "hijacking," the off-air program may be replaced with prerecorded material on an SD card, a streaming audio feed or a secondary off-air frequency. E-mail and text notifications can be sent on these conditions, and SNMP is supported for remote monitoring and control.

RECEPTION TOOLS

With the advent of software-defined radio and DSP control comes a suite of control parameters that put vintage analog receivers to shame. There is active reception processing for bandwidth, stereo blend, HF blending and multipath mitigation. For example, within the stereo blend reception tool, the blend amount is immediately displayed. When the AUTO featured is turned off, the parameters of RSSI, USN and multipath can be selected in any combination with sliders that adjust the amount of blend based on the threshold of the selected parameter. You can listen and see the blend amount in an effective interface. Note that the web GUI is the best way to access and adjust these parameters and one can tweak the receiver while wearing a pair of headphones plugged into the front panel. The receiver includes an internal test oscillator. Frequency, output and L+R balance are adjustable — a handy tool for setting up the outputs.

IMPRESSIONS

Upon receipt of the Aaron 650, the first thing I did was check the Inovonics website for a firmware upgrade. I'm pleased to report that access to the firmware is an open and direct download, without registration, authentication or waiting to be emailed the file. This is desirable for the broadcast engineer who may be working with limited time constraints or at odd hours. Additionally, the firmware upgrade process went smoothly and matched printed instructions. Boot time from a cold power up is fast, around 1 second. The single "turn and push" front-panel knob to access the sub menus functioned well and has a good intuitive logic; however the Web GUI of this unit is a nicer way to explore the receiver as it has a clear and responsive layout. The lack of a chassis fan is appreciated and I can see these receivers being bought by the hi-fi crowd for DX listening.

At our transmitter site I mounted the Aaron 650 alongside another excellent DSP radio, which served as an 85-mile over-the-air source of network audio in case our STL fails. Both were excellent on a weak receive signal. As an experiment, I padded the split antenna input until each receiver became noisy. This point occurred at an indicated 1 dBuV RSSI on both receivers and both became listenable at 4–6 dBuV. While the competing unit has far greater granularity over reception parameters such as signal attack Tc, signal release Tc, multipath attack Tc, I found that I preferred the user interface of the Aaron 650 as one could adjust reception controls with a simpler interface that allowed me to dial up the clearest reception in a shorter amount of time. With the Aaron, each simple slider move results in an instantaneous change of the reception tool and in the headphone audio. As with audio processor presets, it is important for DSP-controlled receivers to be able to run close to optimum performance with the heavy lifting already done for you as sometimes too many choices can be paralyzing. Alternative to manual adjustment, the "AUTO" mode of each reception tool has been programmed with effective algorithms and result in excellent, effortless reception.

If there is one design gripe I have, it is that in order to accomplish a hard reset to return all values to a factory default including password, a front-panel button must be pressed while simultaneously applying power to the IEC connector in the rear. This almost necessitates removal from the rack, an inconvenience for any software controlled equipment that may need a reset.

In summary, the Aaron 650 FM Rebroadcast Receiver is a winner. It provides the necessary architecture for full-featured translator use along with reception performance and IP connectivity which previous generations of equipment lack. It is nice to know that one doesn't have to cruise eBay for that vintage Sansui 9090db receiver to get the performance you need.

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DECEMBER ISSUE

Larry Berger
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What's in a Title?

by The Wandering Engineer

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Some years ago, the director of engineering for a group was a position that the best and most ambitious broadcast engineers strove for. Once enough experience had been gained and an effective (albeit often "unique") method for best managing other engineers and working with senior level group management had been learned, a group might promote you from within or seek you out for the role of DOE. Along with the title and role came a certain amount of respect and visibility in the industry as a result of volunteer activities.

There is some great confusion over titles now, as what was once "chief engineer" has become "vice president" in many stations. While the real wages for the role probably have declined with time, title inflation made two full jumps as the chief engineer position, once below the group director, assumed the title of VP that was once the title above DE. This title inflation created all sorts of new titles like "senior vice president" and "executive vice president." Maintenance managers became chief engineers, and then there are the more reasonable titles of market chief or cluster chief. Never mind the fact that more than one group believes that even the title engineer itself when used in relation to broadcasting, trains, or buildings is extravagant. Of course reality didn't change, only the words became useless. My favorite broadcast organization is in a small market and has 30 employees … 16 are VPs of one sort or another.

What do you put on a résumé when applying to a place where title inflation has run its course? Do you say you were the "chief engineer," as your business card stated? Or "vice president of engineering," because that is what that newly minted GM understands? The last titles that made any sense were group director of engineering and station chief engineer, so for the purpose of this piece let's just hold tightly on to "DOE" and "CE."

The traditional DOE was one of the reasons groups had an advantage. He mentored his minions and set the standard of performance.

Consolidation has rapidly reduced the number of groups and thus the number of group DOEs, first in radio and now in TV. If the group is really big, there might be a layer of regional directors or market DOEs, but the ratio of higher-level engineering management to station level management has steadily decreased. When the industry tries to bring the DOEs together, the group of invites shrinks each year and even fewer have time or energy for industry functions. Odds are a given station will rarely see the DOE and when they do, it's often a ceremonial fly-by given how thin DOEs are spread. Some groups get the DOE and the CEs together periodically via phone or Web meeting. Still others gather at the spring NAB show, but the NAB convention floor has fewer and fewer call letter badges. Most of the DOEs we've grown fond of have retired and/or moved off to their wind down careers or passions.

The traditional DOE was one of the reasons groups had an advantage. He mentored his minions and set the standard of performance. With white glove detail, she (there was at least one female DOE) inspected the stations. It was the DOE who understood and gathered metrics to determine replacement cycles and how to most effectively invest in and apply new technology. The DOE was the CTO.

But far more important was that the traditional DOE was the career coach. Broadcasting isn't alone as an industry, but too often we have all but stopped developing and maturing talent in our organizations. Feedback is still the breakfast of champions. A good DOE gives good feedback. A great DOE provides cover when needed. The era of the diminished DOE has great costs.

The right things only happen when we make the opportunities.

The Wandering Engineer is an industry stalwart who has been in broadcasting since the days of Marconi and Tesla. He gives his thoughts on the current state of broadcast engineering and the broadcast engineer.

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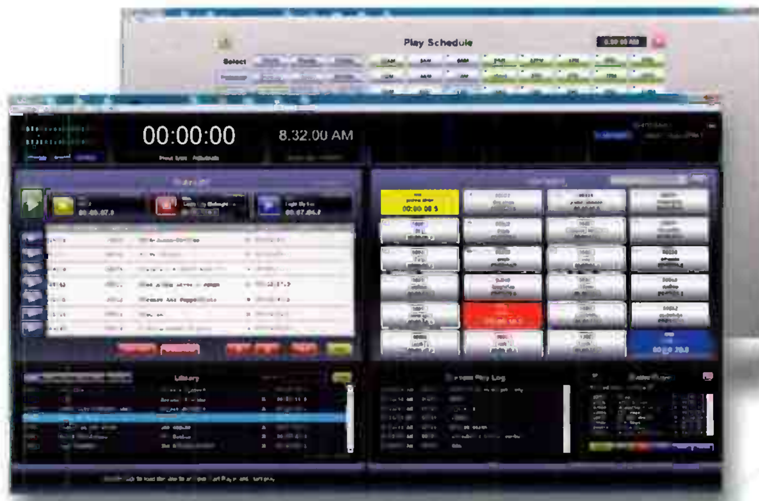

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