

Financing the Issue at NPR

Washington DC ... National Public Radio members held their 12th Annual Conference in Washington during the 3rd week of April, 1982. Because NPR must seek funds to replace federal grants, the Conference was dominated by discussions concerning new revenue producing ventures. NPR will continue, as in the past, to seek funds through traditional sources such as community drives, etc.

Satellite valuable

NPR officials discovered quickly that their state-of-the-art satellite system is especially valuable when combined with FM/SCA to deliver a variety of commercial services. The most promising of these is digital data delivery. Digital is the wave of the future for audio, but presently it is only used for computer information delivery.

NPR is considering a joint venture with the National Information Utilities Corp, and the new joint company is called "Information Network Corp." The INC would transmit digital information on a station's subcarrier channel. NPR studies

indicate that small stations could earn upwards of \$6,000 per year and those in larger markets up to \$75,000 from this service.

Some additional good news was that NPR's engineers have made several ad-

vances in SCA technology which improves performance characteristics permitting the delivery of both an analog aural service and a data channel at the same time. NPR is filing a request with the FCC for permission to use these new

techniques.

NPR is also looking at digital technology applied to main channel FM broadcasting as a second source of future income. The service to be provided is *(continued on page 14)*

AM Stereo Update

Washington DC ... In conversations with broadcasters, receiver manufacturers, trade associations, and the AM stereo proponents, it is clear that confusion still reigns over which AM stereo system should be used. Many of those involved hope someone else will pick the system that can be used by broadcasters and receiver manufacturers alike.

As of early May, 1982, the FCC Lab in Columbia MD had received a type acceptance request and documentation from only one AM stereo exciter manufacturer. Lab officials stated they expect to receive more requests for type acceptance within a short time.

The type acceptance procedure normally takes from 30 to 60 days if the documentation is in order. The approval will be granted or refused from a study of the data submitted by the manufacturer rather than from testing by the Lab of hardware submitted.

Kahn ready to go

According to Leonard R. Kahn, 14 stations, all of which are in major markets and are owned by major groups, are ready to begin stereo transmission once the Kahn/Hazeltine exciter is type approved. Listeners could receive stereo programs by using the "two receiver

method," a unique feature of this system. Kahn added that his request for type acceptance had been received by the FCC on April 28, 1982.

Jim DeCaro, the GM of WFIL/Philadelphia, one of the stations ready to use the Kahn system, told RW that his station, one of the LIN group, had spent \$35,000 upgrading facilities in preparation for AM stereo.

He also noted that during previous testing the quality of sound was high, there was no interference, and good stereo separation existed over long distances. DeCaro was enthusiastic about what stereo could do for AM radio.

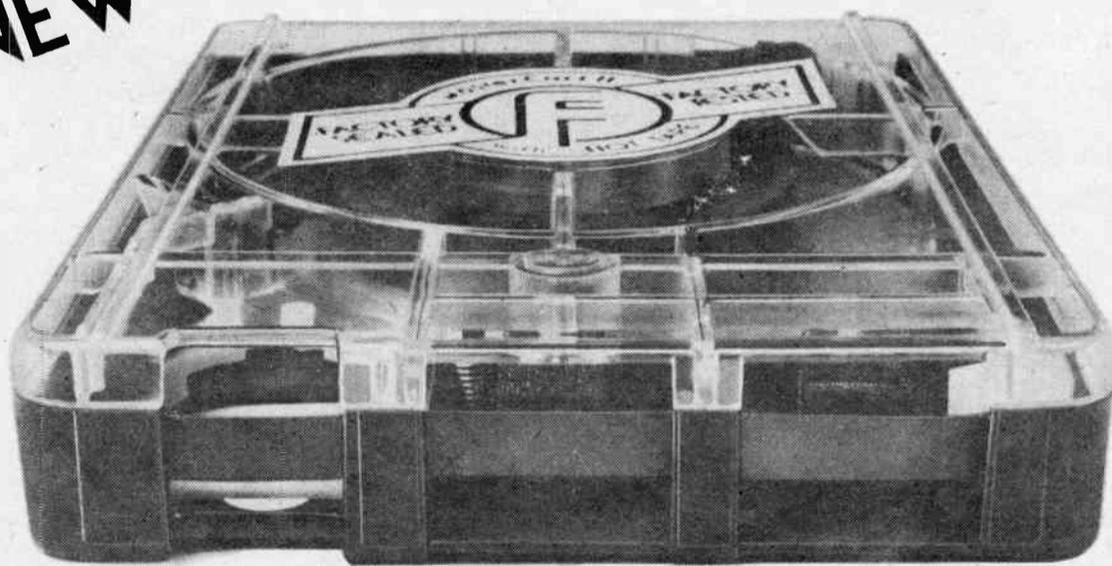
Harris spokesman Mitch Montgomery said that at the end of April Harris had 115 stations committed to their system and that 4 or 5 new orders were received each week. He noted that Harris modified its pilot tone system to improve reliability and reduce receiver costs to the level of the other proponents.

(continued on page 6)

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Working With Directional Antennas

by John Battison, DE
WOSU/Columbus

Columbus OH ... The average directional antenna is not really very complicated! It may seem so, because there is more than 1 tower and it is necessary to work with a phasor in addition to transmitter output tuning. However, it must be borne in mind that the common point impedance and current really correspond to the base impedance and base current of a single tower.

In the case of a non-directional antenna it is necessary to adjust the antenna tuning unit (ATU) to match the antenna to the transmission line. In the case of a directional antenna it is necessary to match the ATU's and adjust the phasor to obtain the required antenna phase relationships and current ratios to produce the planned antenna pattern.

Installation

Let us first discuss the basic installation requirements for a directional antenna (DA) system. A DA consists of 2 or more towers which may be arranged in a straight line, a "dogleg" of 2 or more towers in line with 1 or more towers slightly offset from the original line, or a group of 4, or more, arranged in pairs to form a parallelogram or rectangle.

Regardless of the shape that the directional antenna takes, there is a very important parameter known as azimuth. This is the axis of the towers in the case

of inline, or the center line of a dog leg or parallelogram array. This azimuth is extremely important because all protection and coverage values are calculated with reference to this bearing.

It is usual to measure these angles with reference to the true North meridian and to label them so many degrees in a clockwise direction from North.

"... the assumption is made that the antenna is operating over a perfectly conducting, smooth, flat earth."

Sometimes however, the magnetic meridian is used, therefore it is important to identify it.

Accuracy in constructing and locating this line of towers is essential. During preliminary construction it is mandatory that a qualified surveyor or land engineer lay out the line of towers so that they are properly oriented. Once construction has been completed it becomes extremely expensive to move towers around!

If an error is made in the height of a tower, it can sometimes be corrected within limits, either by reducing its height if too tall or adding top loading if it is not possible to increase its length mechanically. Sometimes, if an error is made in the orientation of the line of towers, it is possible to make small corrections by changing the current ratios

the southerly tower as number 1 and make it the reference tower. Thus in the case of a 2 tower array the north tower would be number 2.

In the case of a 3 tower array the center tower would be indicated as "center," and number 2. The northernmost tower becomes number 3. In cases of multiple tower arrays, a similar numbering system is employed so that the towers are clearly identified.

The antenna monitor depends for its indications upon sampling signals derived from each individual antenna. If quarter-wave towers are used, it is usual to mount the sampling loop about 8-10' above the ground, at the point of maximum current. The voltage developed in this loop is transmitted by means of coaxial cable through an isolating coil at the base of the tower if the loop is grounded; or directly through the coax without the isolating coil if the loop and the sampling line are insulated from the tower.

If a sampling loop is not used, a current sampling transformer is used with towers that do not greatly exceed a quarter-wave length in height. The current sampling transformer method is to be preferred because the transformer is more mechanically sound than the sampling loop, and it's not exposed to damage and does not deteriorate in the weather.

This transformer is a simple coaxial transformer which is connected in (or around) the conductor leading from the ATU to the antenna. Its location makes it far more secure and reliable than a sample loop which can be blown away or misaligned by high winds. It is important to ensure that all sample loops in a directional array are located on the same relative side of the towers, and are aligned in the same direction so that they sample similar currents and phases.

The antenna monitor measures the phase relationship between the reference tower and the tower selected (by means of a push button switch on the panel). Phase relationship of each tower is indicated on a meter calibrated in degrees. Current ratio is indicated on a separate meter which provides a direct reading of the current ratio between the antennas.

It is preferred practice to bury the transmission and sampling lines be-

(continued on page 14)

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and/or phase relationships electrically.

Each tower has an associated ATU. It is best to locate these tuning units inside a small "dog house," or protective building, beside each tower. This facilitates maintenance and adjustment during bad weather.

Tower lighting is generally required, and the Austin transformer is the most satisfactory method of conveying AC power across the base insulator. However, lighting chokes are widely used and are quite satisfactory when properly bypassed and constructed. It should be noted, however, that lighting chokes are more prone to cause antenna operating problems than the Austin transformer.

Antenna Monitors

Unique to the directional antenna system is the antenna phase and ratio monitor. Once the antenna has been constructed and properly adjusted, the engineer relies on this monitor to ensure that the antenna is operating in accordance with its licensed parameters.

This monitor provides two individual readouts for each tower. These are the phase relationships between the reference tower and the tower being measured, and the current ratios between the reference tower and the tower being measured. It is common practice to label

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Canadian Content

NAB Report . . . Where are We Going?

by Rob Meuser/Tech Dir
CHAM/Hamilton

Dallas TX . . . This report comes to you from the NAB pressroom as the Convention is about to close. AM stereo was the main topic this year, at least for technical types. We have many problems yet to solve, and everyone feels that they have the best solution.

On the positive side, Bob Orban and Mike Dorrrough both have built some new boxes that give us a better shot at sounding louder and better at the same time. Both are quite different, and naturally, if you ask either of them to comment, the other guy's approach was the wrong one. That's what makes radio fun, sometimes.

New STL's

For Canadians, I found 2 new STL's that might really work even at 450 MHz. One, the Moseley can even do stereo at 450, if you can get a license for the bandwidth.

The Canadian Nautel Company did quite well at the show. I've talked them into supplying a free plug in, no wires to fiddle with, stereo interface adaptor with each of their transmitters. You can now go lo-fi stereo without even going off the air for more than the time it takes to re-patch the audio feed. If we somehow get hi-fi stereo the Nautel can give you an IM of under 1%.

The real impression of the show was one of a trend. That trend centers around satellite distribution. The new satellite audio networks are being distributed over links that have about 45 dB SNR without companding. Stations will receive, via companders, a pre-crunched

signal that is about the same as the present day cartridge.

An exception to this is the RCA "ADDS" system that is multichannel digital and gives 75 dB. In the US this is a system while in Canada RCA will probably make the hardware available as a straight purchase.

Given the prospect of medium fi satellite signals driving AM and FM stations, I sense that the consumer doesn't have a chance of getting a quality signal from any broadcast medium. We have low quality TV, low quality AM and are

rapidly destroying FM, the only medium that was technically high quality from the beginning.

Bottom line

The bottom line is of course money. We often forget that people are in broadcasting to make money, and manufacturers are interested in a device that gives them the best cost effectiveness. It is ironic that at this session of the NAB there was a seminar on high definition television. TV is somewhat threatened by higher quality home video devices! Peo-

ple do notice quality, that is if they ever once get a point for comparison.

In this case it is the money, not dedication, that says now we must raise the quality of our product. Will radio be the same? Will we end up fighting home entertainment more than the AM/FM mono or stereo battle? Think about that!

AM stereo as the NAB closes this year is still not being presented by any proponent as a system of reasonable quality. The audio processor manufacturers have shown no imagination in solving
(continued on page 5)

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Ever AM Stereo

Dear RW:

I think the FCC made a mistake. How can the marketplace possibly make a decision? It looks like another Quad situation. I think the manufacturers of broadcast gear and/or the NAB should get together and decide on a system so no one gets burnt.

Richard Robinson/Trod Nossel
Wallingford CT

Dear RW:

These supply and demand theories work very well *ceteris paribus* (ie: all other considerations remaining equal and unchanged). We have no plans to pursue any of the AM stereo systems in the foreseeable future. There's a lot to be lost and very little to be gained.

Rick Sietsema/CE
WZUE/Harrisburg PA

Dear RW:

I think the FCC did the only thing they could. We will do nothing for now. The way receiver manufacturers go will help us decide what we will do.

EW Bie/CE
Memphis TN

Dear RW:

I think it was a weak FCC that could not make a decision. If they really thought all of the systems were so good that they could not have made a decision between them, they should have put all 5 in a hat and pulled 1 out as the winner. It would have given the Chairman his much talked about lottery, and no one could have sued because he lost. We are going to wait and see if the Japanese manufacturers will make the FCC decision for them.

Bill Barry/CE
WAMB/Nashville

Dear RW:

The Magnavox decision proved that whatever system the FCC picked the others would fight anything except their own. The FCC decision was the best under the circumstances.

Even though we don't have a timetable, the marketplace will treat us equally with everyone else. As a result we are going to wait on American ingenuity to bring out, maybe not necessarily the best, but the "firstest with the mostest." It's like a freight train at a railroad crossing. As long as it is moving we know that the caboose has to come sometime.

Louis J. Maierhofer/CE
WTGC/Altoona PA

RW Replies: Glad to hear from all of you out there. RW will continue to cover AM stereo as the situation develops.

Top Loading

Dear RW:

Regarding "Top-loading with Guy-wires" (April, 1982, *Radio World*), allow me to point out that the efficacy of such top-loading may sometimes be improved by the addition of a series reactance at the top of the tower. For example, if the guy has a low resistance and high negative reactance (typical of short lengths), it is possible to increase the current entering the guy by using an inductor to tune out the capacitive reactance.

However, this technique has limited utility since the field from the downward-directed guy-wire can still oppose that of the tower. Therefore careful analysis of each situation is required, preferably using the moment-method.

Grant Bingeman/Sr Eng
Continental Elect/Dallas TX

RW Replies: Thanks for the clarification, Grant.

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Bill Sacks on the Audio Process

Digital Audio Processing ?

Arlington VA ... Digital processing and storage of audio is here and the idea is exciting. Unfortunately the art is in its infancy and though, in a more ideal state, digitized audio would have incredible creative possibilities, the current generation of digital audio equipment is not sonically on a par with carefully optimized analog reproduction.

A bit about digital

Digital audio is an approximation of the original analog waveform produced by sampling at specific intervals at a clock rate at least 2 times the highest frequency of interest. At each sampling interval the instantaneous voltage of the waveform is measured and assigned a number. The number of incremental values is determined by the number of bits available and the dynamic range required.

Current digital audio systems use a word length of 14 bits for the new compact disc (and other consumer products), while 16 bits are used for so called professional applications. The audio signal is analog and has an infinite number of values along this range. The digital representation only can have a finite number of steps. The inability of any digital device to increment an infinite number of voltage levels is known as the quantization error.

Some of the problems

A sampling rate of twice the highest frequency of interest is known as the Nyquist limit. In industrial/control apparatus this is considered the absolute minimum for sampling analog signals. The Nyquist limit is valid for sine waves.

A square wave at 15 kHz has harmonic components to 150 kHz. Digital audio

systems which sample at 40 to 50 kHz must have low pass input filters to restrict input signals to below half of the sampling rate.

If signals (or their harmonics) at the sampling frequency are allowed to reach the analog to digital converter, aliasing occurs creating errors which are a form of distortion. In current systems these filters must have a steep slope with a cut off frequency at about 15 kHz. These filters generally have poor transient response and may cause warts.

The digital audio that I have heard is somewhat striking because of its lack of noise, but the music does not sound real. A well cut analog direct-to-disc, such as the Sheffield Labs' Harry James album, "The King James Version," has an intimate subtle detail that I have never heard on digital reproductions.

Standards or restrictions

Standards for digital audio are now being set by the AES. The probable standard will be 16 bits at 48 kHz. I do not believe that the current systems are good enough for high fidelity audio.

Unfortunately in digital systems adding bits and increasing clock rates is currently very expensive in cash and circuit board real estate. Listen to a 20 year old high quality recording that has never been played, play it on a straight line tracking turntable (tracking the record the way the lathe cut it), and you will hear nuances in the music that have been

preserved in a true analog form.

As the reproduction equipment continually improves you will be able to hear finer and finer details of the same recording. A digital storage format will have a finite number of bits of information and will always have the same number of bits of information. No substantially finer resolution in reproduction will be possible in the future.

Compare this to looking at a photograph through a deliberately misfocused magnifying glass (the magnifying glass is analogous to reproduction equipment). As the lens is focused on the picture, more and more detail becomes evident until the image seen through the lens is approximately the same sharpness as the original photograph. With some more magnification, further detail is visible.

Now suppose the still photograph in this example was digitally produced. As the lens focuses in closer and closer, the smooth transitions in the original picture become apparent as bits of information with no continuity (somewhat like a newsprint photo).

As sampling rate and word length increase substantially and the filters don't have to start rolling off until 50 kHz, digital audio will probably sound reasonable (especially when it can fool us psychoacoustically). At that point analog recording will become a method of the past and we'll miss it, because even then digital will never have the truly infinite resolution of analog.

Canadian Content

(continued from page 2)

the real problems many broadcaster will face in getting a reasonable signal in stereo out of their studio, to the transmitter, and then into the air.

We have still not formally dealt with an essential problem, that of pre-emphasis. Go back and read Chris Payne's paper from the last NAB. While I don't agree with it completely, it is close enough for a start. We must have at least a semi-standard way to make a new stereo receiver sound decent when receiving old mono-processed AM stations. We must have a way to make AM stereo stations still competitive on old mono radios.

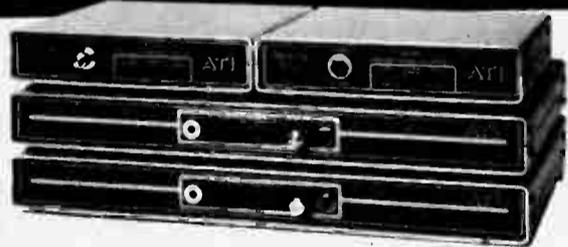
In some parts of the continent we must take drastic steps to raise the amount of

signal available from an AM station because simply if your audience cannot hear you, they can't listen. If you think back, that's the real reason that FM got started in the first place, to get a signal (then in mono) into the areas that AM couldn't reach.

All these problems must be dealt with for a coherent system to work and survive. I am personally going to hedge my bets. I have some new talk show and remote football broadcast projects awaiting me when I return to CHAM. When they are working, all I have to worry about is getting to 3 kHz in mono. Maybe this is the real new AM radio. Till next month, happy clicks and pops to you in both channels, and keep on crunching.

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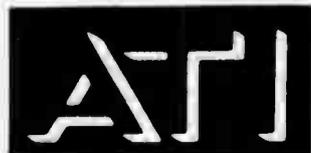
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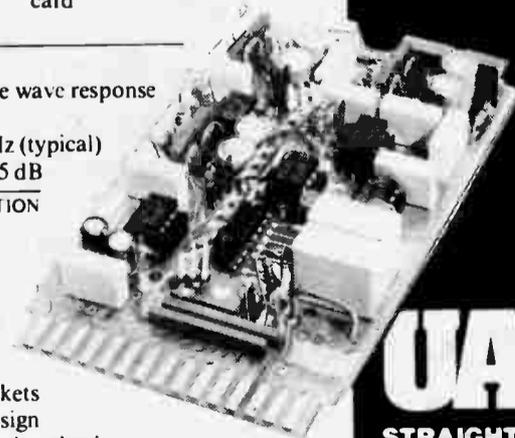
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Engineering Management

Field Service Engineering

by John M. Cummuta

Lansing IA ... The radio engineering marketplace is changing for a multitude of reasons, and the engineers in it are having to re-evaluate how best to serve that marketplace and be paid for it. Some entrepreneurial types have decided that the time has come for engineers to serve several stations in a given area, or in some cases many stations across a state or region.

One of these people is Mark Persons from Brainerd, Minnesota. Many of you will recognize Mark's name from a column he writes in Electronics Industries' *Common Point* newsletter. I talked with Mark about what it's like to be out there making one's entire livelihood from field engineering without a stable salary from one station. We also discussed the many considerations of getting into this line of work.

All in a name

"I call it Broadcast Engineering or Field Service Engineering," Mark said, "I stay away from the term Contract Engineer like the devil. Whenever you sign contracts, somebody comes out ahead and somebody comes out the loser. I feel that the engineer should go to the broadcaster and, for time and materials, solve the problem."

Persons services about 30 stations in the northern Minnesota area, including a station in Brainerd where he had been CE for 10 years. After starting his field service business, he added the responsibilities of the station across town, and now serves 3 markets with multiple clients.

Believing that the pool of "knowledgeable" broadcast engineers is drying up, Persons sees plenty of room for good

engineers to fill the void. But rather than just transferring the engineering load from a staff person to an "on-call" serviceman, Mark envisions a 3-tiered engineering program for small market radio.

"The broadcaster should do as much for himself as possible," he says. "I feel the manager should seek out at least one person for the staff that can do all the day-to-day maintenance. When something serious occurs, they hire me or another field service engineer who comes

in with expensive test equipment and does everything in between what the station engineer can handle and that reserved for the consulting engineer."

The equipment isn't the only thing that's expensive, and Mark is the first to admit that he does very well being a field service engineer. When the phone rings and he has to take his truck to a client station, the meter runs at \$13.75 an hour plus 25¢ a mile on the road. As he comes through the door and shakes your hand, the rate changes to \$32 an hour. These

may sound like substantial amounts of money, but Mark, and the managements of at least 30 radio stations think it's a pretty good deal.

"I look at the law of supply and demand working constantly in the marketplace," he says. "Many stations can do very well with a chief operator for lower wages. When something serious or above the chief operator's level of expertise happens, they call me. Persons says that some stations call him once or twice a

(continued on page 15)

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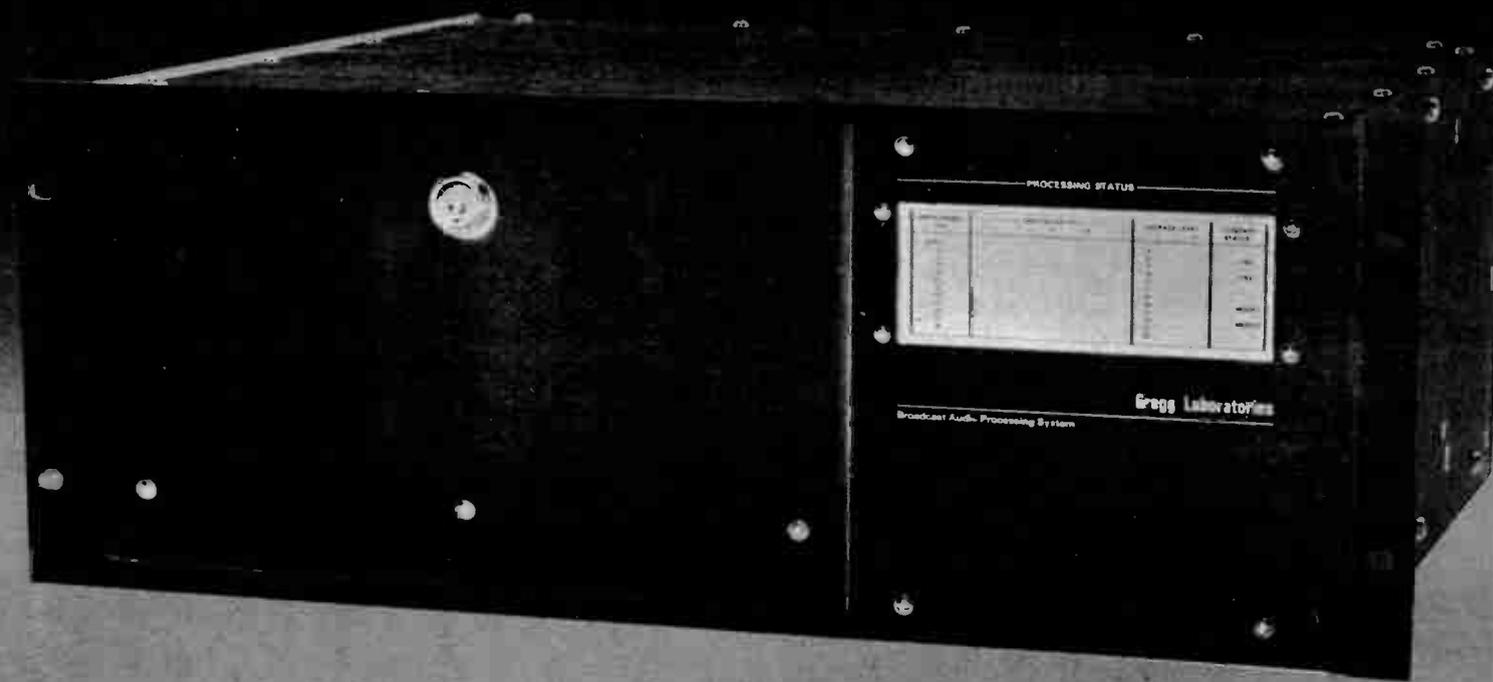
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The Radio Doctor

What to do When Pink Slipped

by Henry B. Ruh

Chicago IL ... The trend for a long time has been to reduce the staff of the typical radio station to the bare minimum. There are only a few dozen stations which still employ "engineers" and "announcers" in a split studio/control room operation, and most of these dinosaurs are still around because the unions have not yet caved in. The days of the studio operator or control room operator are numbered and if you are in that position, I advise you to get some marketable skills pronto, or look forward to early retirement.

Necessary evil?

It is no secret that engineering has been a "necessary evil" at many stations in all size markets and it has been a long questioned expense at bigger stations. A group owner, looking at a budget of \$100,000 per year per radio station just for engineering salaries, will ask why do I need them?

The DJ's operate the consoles, and the VP for Engineering handles all the heavy weight FCC filings. Why do I need the engineering staff, spending money on all those parts and supplies, constantly recommending expensive audio gear and new transmitters, and running up all that overtime with late night work?

Good question! The answer has often been printed in engineering journals, but I've never seen it in *Broadcasting* or *The Wall Street Journal*.

It is no wonder that stations have elected one of several courses in light of the recent licensing decisions. Let attrition take its toll and as engineers quit or retire, simply choose not to replace them. Fire the staff and keep a one man "chief engineer and bottle washer." Do away with a full time person and simply contract on an "as needed basis". Utilize the services of a contract chief who will

manager simply decided to dump the engineering staff to save money.

Afterall, the economy is tough right now, and a lot of marginal stations are going to be in red ink due to falling ad revenues. The owner/manager is going to do his job by getting rid of any expense he can. Now is a good time to use the engineering expenses as a quick fix, even if it's just to cover for poor

employers are out there.

Third, start checking the trade magazines for ads for jobs you find interesting or feel qualified for. Don't be afraid to apply for some which may be "marginally related." Often an ad will ask for a specific list of qualifications, and the prospective employer may really need someone with your qualifications once you discover what the job really entails.

Not all managers know what they want and often just list general terms. "Must be familiar with digital logic" doesn't mean you have to have a degree in computer sciences; they may have a digital clock or TRS-80. Also check with your local union, trade association, or professional associations such as SBE or state broadcasting association.

Also, be sure to tell your friends and business contacts. Often the salesman who comes to your door has information about other stations which have openings and can give you valuable leads.

For each job lead, get the name of the contact person. The one person who is going to make the decisions. Draft a short cover letter: "Dear Sir, I am applying for the position with your firm. I am enclosing my resume for your consideration. Yours truly." If you know something about the firm, include some detail which says to the reader, "this applicant is knowledgeable about our company, or our product, or our field." Do not include personal details beyond your name, address and the telephone number where you can be reached. It's fine to list personal and professional references, but if you are going into your fourth page, it's better to simply say, "references upon request". Be sure to include your professional memberships, licenses held, and any special skills.

Mail it

Each cover letter should be addressed to the contact person. Larger corporations may misroute your letter if you do not make it clear to whom you want the application directed. Use a clean fresh envelope. Unless requested do not send a photo or other recorded material.

The next is very important. After you have sent your letters out, wait a few days and then call the person to whom you sent your application. "Hi, I'm just calling to confirm that you received the resume I sent you a few days ago. I am interested in the position and would not want to miss the opportunity because of bad mail service." After a response, find out if the contact person has read your resume. Then, "I would like to know if you need any additional material, audition tape, photos, or samples of my work. I have several examples in my memorabilia file and can send you a few items."

You have now done 3 important things. The contact person knows you are a serious candidate. You have shown genuine interest in the position and you

(continued on page 12)

"Naturally, the time to start looking for a new job is while you still have one ..."

come in for a once a week or once a month look see and collect his fee.

Let's hope you have option one, either you can quit or retire. But if you have option two, you have gotten or are about to get the proverbial pink slip stating that your services are no longer needed. What are you going to do?

Look before leaving

Naturally, the time to start looking for a new job is while you still have one because it's better to leave on your own terms. But fear not if you leave under less desirable conditions. Perhaps you overspent the budget trying to keep a station on the air which had been run into the ground by a too small engineering budget, or perhaps the owner or

sales or poor management.

It's easy to look good if you fire a few folks when business gets bad. After all, you're just doing your job getting rid of unneeded personnel and expenses. Just look at all the money spent on tubes, parts, and heaven forbid, all those shop tools!

The action you should be taking should be along these lines. First, type up a clean resume. List your education, diplomas, degrees, and other activities. Then a run down of past employment. A few lines, the less the better, for each job entry should give a good idea of what you did at each place. For example, you would not ramble on about particular shows you worked as an audio console operator, but you should note that you operated the console for "several network productions and syndicated programs."

The most common method is to list your experience in reverse chronological order, that is the current position first, your just previous work next, and then all the way back to the first job. An acceptable option is to group your experiences. You may have worked in the recording field, radio, TV, cable, sales, news, promotion, or whatever.

List the positions you hold in each area, with a clear title for each group. If you are not a good typist, do the best you can and then have a typing service make the final copy for you. This is usually very inexpensive, running about \$2 per page with most secretarial services.

Take the finished copy and proof it. Correct any errors and then have it retyped if necessary. Your image will derive from what the reader sees on the page, and a messy resume is very likely to be tossed out rather than read. Use your best grammar and do not be afraid to use complete sentences.

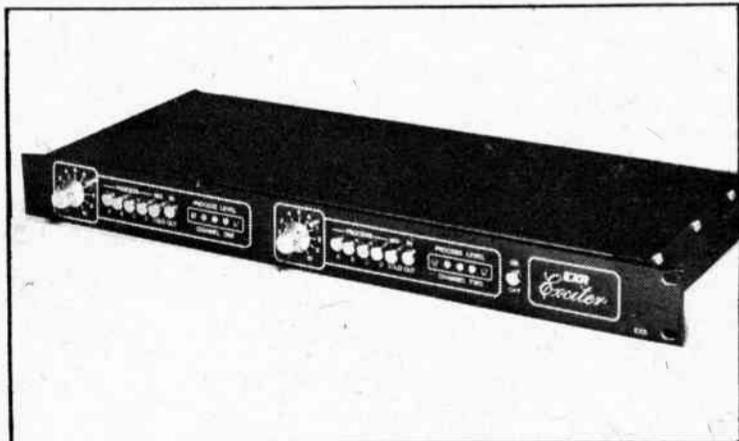
Next steps

Second, take your completed resume to a local print shop, a PIP for example or other quick print service will do nicely. They can run off printed copies of a 2 page resume for about \$10-15 depending on local prices. An order for 100 copies is not too much, depending on your field and how many potential

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**Stations who granted us permission to announce their plans to equip.

Ready for the Microcomputer Age?

Part III

by Roger Skolnik/Pres
Media Service Concepts

Chicago IL . . . Previous Articles in this series have suggested many different radio station microcomputer applications. I have also given you some guidelines for evaluating and purchasing micro hardware and software.

But is your station really ready to enter the microcomputer age? Are you ready to confront several issues and explore solutions? In this article we'll examine some additional attitudinal and logistical changes that will affect your decisions and commitments.

Computer literates

Coping with "computer literacy" is an important facet of the microcomputer age. By computer literacy, I mean having a basic understanding of microcomputer operations and their related activities. I am not suggesting advanced expertise in writing computer programs. That will occur later, as self-motivated individuals commit to learning computer programming in order to solve their own unique problems.

Someone at the station must be the computer literate and be responsible for the microcomputer's operation. The software you purchase can be "user-friendly," but it is not foolproof. You or your computer literate-designee must coordinate the use of that software, working with the manufacturer to make necessary modifications or additions.

Think about some practical micro-related examples. Every computer has a Manual which explains such basic actions as turning on the machine and getting it to run. Who is going to read and understand the Manual?

There are many other continuing activities. It is wise to make duplicates of master programs, and essential to back-up all data disks. At a more mundane level, someone has to order the printer paper, change the ribbon, and maintain liaison with a local computer dealer.

A knowledgeable staff member can save additional money simply by recognizing inexpensive, pre-packaged general software programs that can easily be adapted to radio station functions. Try to designate at least 2 people as your computer literates, so you will have a back-up if one person leaves.

It is important that these individuals

be selected early, so they can participate in hardware and software acquisition. They need not even be the primary micro users, but they should be clearly perceived as the "experts" for help. The computer literate's primary qualifications are an open mind, intelligent and logical thought processes, and a lack of fear when it comes to coping with computers. Surely someone on your staff meets those criteria.

Service bureau mentality

Service bureaus are large data-processing organizations that deliver a nicely-packaged, finished report to your desk. They are hired to shield you from the physical work so you can concentrate on decision-making functions.

Some individuals select a service bureau approach by choosing to farm-out as much work as possible. We can illustrate this issue by focusing on the area of radio ratings. Arbitron, for example, is a service bureau in the sense that it gathers listenership information,

processes it, and assembles the data in a printed book.

Beyond publishing numbers, Arbitron also provides some rather expensive ratings analyses through their AID program. This is an added profit center for them, and the information is certainly useful in making decisions about programming.

But for less money and a little more work, you can obtain extensive ratings analyses through a microcomputer program like the RECALL package provided by our firm. It provides many break-outs of audience flow, reach and frequency, time spent listening, and re-cycling. It allows competitor comparisons, and also lets you view a four-book track record.

The key is your willingness to sit down and work with the microcomputer. You don't have to write programs, but you must invest time in learning how to use the software. Sometimes you have to input data that the programs call for. Often you will experiment with graphics op-

tions or printed formats, until your personal learning curve improves and you master the software capabilities.

Your rewards are greater knowledge and flexibility, usually at much lower costs than receiving service bureau reports. Indeed, your costs dramatically dip as you push the software to its limits.

Microcomputer software should provide many different reports and analyses, without incurring new service bureau charges every time you just want to examine the data from a new perspective. That flexibility is the ultimate advantage of owning your own micro.

The price differences are often a direct reflection of the labor you or your staff members personally contribute. Someone has to pay for service. If you can absorb the cost of labor, you will be controlling a major force behind high prices.

Not every station project is suited for microcomputer applications. In my next article I'll explore the hidden costs in owning and operating your own micro system.

What to do When Pink Slipped

(continued from page 10)

have acknowledged the contact person's importance to your efforts to secure the job. You have also reinforced the contact person's memory of your name, qualifications, and made the first personal contact.

You can now continue and ask for a personal interview. This simple follow up call will often carry you over the hump when there are a multitude of applicants, or when your experience is a little light.

The interview

When you are granted the personal interview, show up on time (even a little early), be neatly groomed, and be self confident. Few personnel managers know much about the actual jobs. They will judge you on your personal command of the generalities of the field, your manner, your self image, and how you conduct yourself in a professional environment.

If you pass the "entry exam," you will be passed on to a department head, supervisor or manager who will ask you about specifics of your experience, opinions about industry trends, and feel out your qualifications for the specific

job they have. Here, you have to exercise a lot of judgement. You may be asked your opinion about XYZ company.

It's better to generalize than to point out specific complaints you may have. If you are pressed, offer what you think is the least offensive problem, rather than trying to get into a personal attack on your former employer. This is not the time to air "dirty laundry" rather it's a time to show that your looking for a position because you are interested in a more secure future, or to better yourself, or to expand your horizons.

Shortly thereafter, you should either be given the tour, or told, thanks but no thanks. Don't be huffy if you are not made an immediate offer, or more often, offered less than you asked. The question of money is often to feel out your level of self confidence.

Be prepared to respond with a reasonable and fair salary request. Quoting a range, such as I'm looking for something in the range of \$30-40K, allows the manager some leeway to discuss your desires, outline benefits, fringes, and come back with an evaluation of what you are worth to them.

If you say, "I want \$35,000," you

might appear too inflexible thus missing a good job that pays \$33,000.

Where counts too

Now that you have some guidance on how to go about looking, applying, and getting the job, where are the jobs and where are you going to go? Obviously, the number of technical jobs at radio and TV stations is on the decline. The current opportunities are in related areas. The recording business is about shot, so recording studio jobs are not plentiful either. A lot of record executives are out looking too.

Industrial TV is on a big upswing. More and more companies are going to in-house TV for training, sales, and product demonstrations. Another area is in home video and video production houses. Satellite TV has finally come of age and there is a lot of money to be made installing and selling TVRO systems to individuals, motels, and taverns.

If you are heavy with credentials, then perhaps consulting is the field for you. Perhaps you would like to take some time and write some books. Soon the FCC will start granting LPTV licenses, which will all have to be built, programmed and fixed.

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Field Service Engineering

(continued from page 7)

month, knowing it will cost them a little money, but they feel they are better off having him check things over periodically. "Some stations, depending on the level of experience there, might only have me out there once every six months," he says.

I asked Mark what it takes to get started in Field Service Engineering. He said that the most important element is an awareness of what other stations in your area are doing. He also listed a desire to work hard, guts and an outgoing personality in addition to a good working knowledge of broadcast electronics as key ingredients of a successful Field Service Engineer. "A person, if he wants to test himself, can ask himself if he knows the personnel from other area stations. If he does, then chances are he has the outgoing personality necessary," says Persons.

You don't have to be a genius in every area of broadcast electronics to make a good field service engineer though. Persons says that just like chief operators, field service engineers have their strong points and their weak points. He says that's when one engineer calls up another he knows is strong in the area he needs help in and says, hey, come on over and give me a hand with this one. "I've had that happen to me on occasion," he says.

NPR's Idea

(continued from page 14)

NPR is well known as a leader in satellite use in radio. Naturally there were several sessions devoted to this subject and these included sessions on: how to build a satellite earth terminal; three well attended sessions describing NPR's Satellite Operations Support System or SOSS; and finally, an uplink seminar.

Quality audio transmission and transmission techniques were featured in seminars reviewing laser communications systems; fiber optic technology; a panel session on remote pickups, STL equipment and radio ENG. Included also was a session that proved very popular and which was devoted to the transportable 14 GHz uplink package designed by the NPR Research and Development Department.

Other sessions of a more general interest were: a workshop on mic placement for jazz and classical recording, a seminar to develop confidence when adding an FM/SCA, ideas on how to extend coverage through use of repeaters and translators, and, as with every broadcasting conference, an FCC technical panel where Commission engineers answered questions.

NPR is known for the excellence of its engineering staff which is headed by Dick Cassidy and includes, among others, Wayne Hetrick, John Kean, Skip Pizzi, Blan Shattuck, and Bruce Wahl. Thanks to the engineering staff at NPR, the technical sessions were outstanding.

Mark Persons makes a sizeable portion of his income selling equipment to stations he services. He also operates a service shop at his home where he designs and builds a line of "live-assist" controllers. He also does extensive re-engineering of control boards and other broadcast equipment, but says that an engineer can make a good living just servicing broadcast stations, if he does good work.

The costs

If you're wondering what type of outlays are involved in terms of test equip-

ment, Mark has over \$30,000 worth, but some of that is in his service center. "If the person is right for this job, they already have a shop of their own. This kind of life is not easy. You've got to be with it to the point where if you get a call at 3 o'clock in the morning, you want to go out and do something for the guy. You want to help him work on his transmitter through the night."

Mark is that kind of guy, and he has the 1040 forms to prove it. The broadcast industry, especially in the rural areas, will be more and more in need of

people who can respond to a late night call, but not ask for a weekly paycheck. If you think you have some of the qualifications listed above, but have a few questions that haven't yet been answered, stay tuned to this column. You can help yourself in this area by writing any specific questions down and sending them to me, so as I talk to others in this business I can ask your question too.

In any case, the challenge of Field Service Engineering is out there. If you have the "guts" as Mark Persons says, have at it.

DISTRIBUTOR DIRECTORY

The following is a listing of distributors that serve the broadcast industry and who would be glad to help you with any of your equipment needs. Contact any of them directly, or circle the appropriate number(s) on the Reader Inquiry Card and send it to **Radio World** today. We will forward your request to the distributors, and they will send you their literature or line cards.

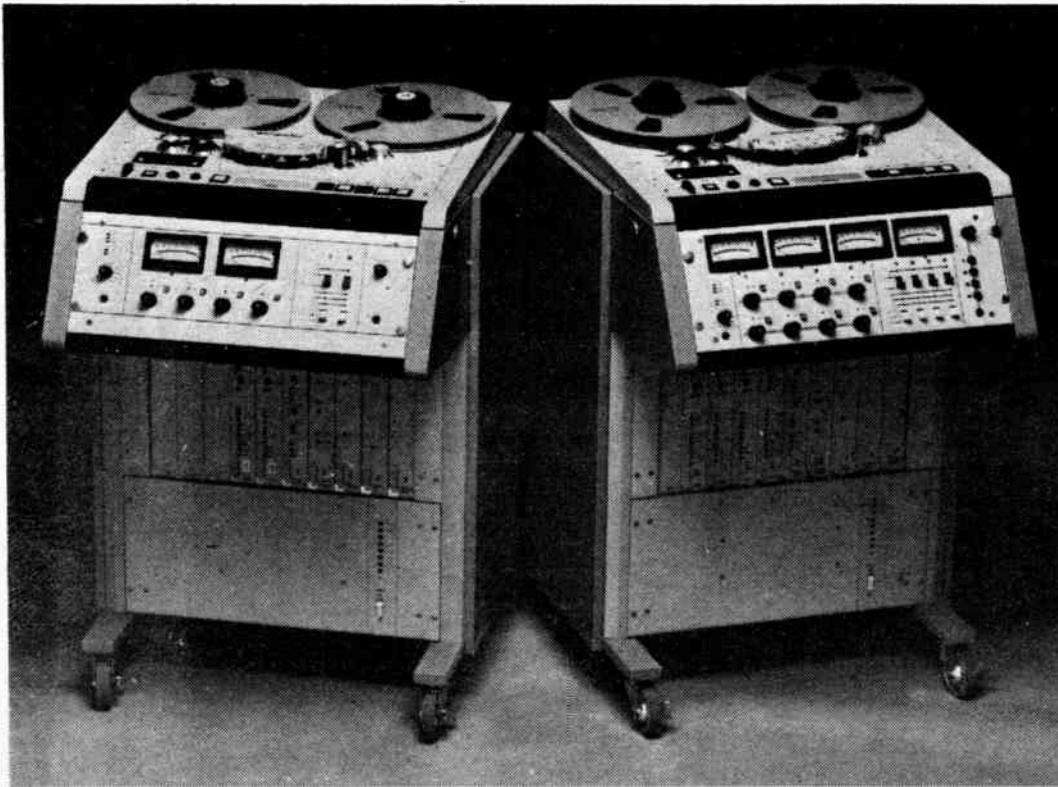
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