

# Radio Guide

*Radio's Technology Magazine*



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January - 1991

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# Radio Guide

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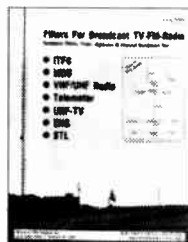
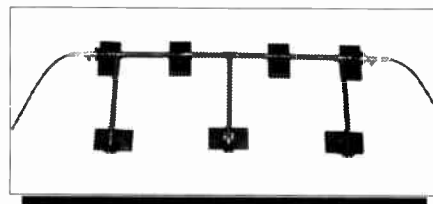
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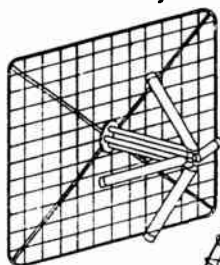
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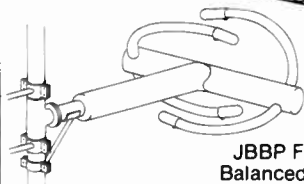
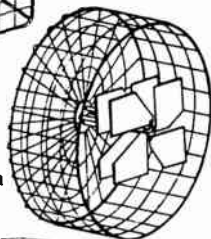
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# More After This!

Editorial  
Comments

## 1991 - Short & Sweet

### **We'll Talk a Lot About DAB**

The whole concept of DAB, in fact, has tremendous potential, and I'm all for it. Instead of realizing that potential, what we will have this year will be a fight to find a dominant system. Just when a resolution appears imminent, "Royalty" and "Copyright" will check in, claiming that there are hundreds (maybe even thousands) of criminal dubbers lurking about, ready to mass-produce bootlegged, digitally perfect copies of Led Zeppelin. The solution to all of this will be a royalty tax on electricity and batteries. If you power up - you pay!

### **Stations Will Go Dumb & Dark**

Convinced by certain industry gurus that they "don't really need an engineer any more," many stations will "go bare." After they've used their last fuse, jiggled their last power cord, and used their biggest hammer ... they will eventually, reluctantly realize the need for a technical person. They will find that the person they let go hasn't waited around and, yes, he'll come back, but why is he wearing a tie, and why does he want \$75.00 an hour, and does he really want the cash up front?

## Days in the Life

The days of 1990 have been gratifying. Your support of **Radio Guide** has been overwhelming, to say the least. As you see the changes taking place in **Radio Guide**, it may feel to you as if **Radio Guide** has outgrown the need for your input. Nothing could be further from the truth!

Your individual suggestions have more weight than you realize. Despite many differences, engineers do have much in common when it comes to the search for knowledge and information. A suggestion from one has the weight of many. We don't take polls or wait for a consensus. If you want us to do something, let us know - we usually just do it!

## In 1991, We Will Accomplish Three Things

**1. Radio Guide** will continue to grow until it becomes the primary source for all of your radio technical information. We'll keep **Radio Guide** focused on radio technology and try not to duplicate what the other trade publications are doing.

**2. Equipment Guide** will expand to become the most effective publication for the selling of used gear. We will also establish **Equipment Guide** as the location for all technical information regarding used equipment. It will become a clearing house for information from user and manufacture alike. Since buying and selling used gear is a time-sensitive task, we will publish **Equipment Guide** twice a month, as soon as possible.

**3. The Product Guide** will be published monthly, after spring NAB. The **Product Guide** will consist of new product information, press releases, etc. This will be the only publication devoted solely to the coverage of new equipment. There will be no editorial or "users reports" - just straight information from manufacturers on the products and services they have to offer your station.

## More Than You Know ...

Once again, thanks for your continued support. Thanks, also, for the support you've given our advertisers. Many of them took a chance on Radio Guide. You've proven to them what we've known all along. The true foundation of Radio is technology and those who work with it.

*Ray Topp - editor*

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at (507) 280-9668  
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## Schematics & Publications

### **RCA Broadcast News**

I need to located back-issues of RCA Broadcast News. I'm particularly in need of pre-1955 issues. If any Radio Guide readers have some old copies they no longer want, I'll be happy to help them clean out their closets and files. Barring actual copies, if any readers have a copy of the index RCA produced for this magazine, I'd like a photocopy of it so I can locate specific articles and get copies from one of the libraries where the magazine is available.

My need for copies is for a broadcast history project I'm involved in and also for presentations I often make to broadcasting classes. For the latter reason, I prefer top have actual copies of the magazine so I can convert some of RCA's photos to slides to show to the class.

Contact: Russ Hamnett, KNAU-FM, P.O. Box 5764, Northern Arizona University, Flagstaff, AZ 86011. Phone (602) 523-KNAU.

### **Wanted: Tech Manual**

I need schematics and retune procedures for an AEL model FM-20E exciter. Good photocopy is more than acceptable. Will be happy to pay shipping.

## **Are You a Writer?**

**We're looking for  
monthly columnists  
in these areas.**

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STL Systems*

Also would like to find an older Moseley stereo generator circa 1972. Unsure of actual model number; cheap (if possible).

Contact: Steve Coulam, KDVR-TV, 501 Wazee St., Denver, CO 80204. Phone (303) 595-3131

## Positions Open

### **TV Tech - Ohio**

Small market network TV has an opening for a Television Maintenance Technician. The applicant will be responsible for maintaining video and audio systems, including audio tape cartridge and 3/4" U-matic tape, and associated equipment in television broadcasting.

The applicant should also have RF knowledge of UHF-TV transmitters, UHF 2-way, 2 GHz microwave/ENG truck, and general transmission techniques.

Certification or prior broadcast experience is preferred. This position is full time with all normal benefits. This station is an equal opportunity employer.

Contact: Frederick Vobbe, WLIO-TV, P.O. Box 1689, Lima, OH 45802. Phone (419) 228-8835.

### **Radio CE - Cincinnati**

Cincinnati's top country AM/FM looking for a highly motivated Chief Engineer. Responsibilities will include troubleshooting and repair of a wide variety of broadcast equipment.

Good people skills and an ability to get the job done, is a must. FCC General License and five years professional experience required. SBE certification preferred.

Send resume and salary history to: Mr. George Toulas, WUBE/WDJO, 225 E. 6th St., Cincinnati, OH 45202.

## Editor's Notes:

### **Equipment Guide Up-Date**

*When you have used gear for sale, make sure that you fill out a separate form for each category of gear you wish to sell. This allows us to process the classified ads faster and also permits us to accept your ads closer to our print deadlines.*

*Remember, you may send in as many classified ad forms as you like; there's no limit! Just be sure that each form you send to us has only one category checked on it.*

*Equipment Guide works! It's that simple. All of the ads you see are current. Use your Equipment Guide.*

**Ray Topp**  
**editor/publisher**

## **Radio Guide**

**Vol. 4 - No. 1**  
**January 1991**

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Dale Tucker - sales manager  
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Walnut Creek, CA 94596  
(415) 935-1470

### **Editorial/Publishing Offices**

Ray Topp - publisher  
511 18th St. SE  
Rochester, MN 55904  
(507) 280-9668  
Fax (507) 280-9143

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All letters and copy submitted to Radio Guide are assumed to be for publication, unless notified otherwise.

## Positions Wanted

### **Graduate: Needs Job**

I am a recent college graduate and seeking employment in East and Central Pennsylvania in radio engineering, production and other relate work. I have served for 1-1/2 years as student engineer of the 3kW college FM station WFHC, with work including studio rewiring, equipment maintenance and repair, remote projects, production, and other work.

I am trainable, willing to work, and eager to learn. My resume and references are available. Please write (encouragement or inquires) to: John Askey, RD 3 Box 433, Bernville, PA 19506. Phone (215) 488-7704.

## Parts Information

### **P&G Faders**

Thanks to the many folks who called with the stateside address for Penny and Giles faders and parts. They're at (213) 393-0014 in Santa Monica, California.

Don't throw those bad faders away! Replace the bad parts and put 'em on the shelf. You'll need them in the middle of the night!

Don Payne, WZPL-FM, Indianapolis, IN. Phone (317) 637-8000.

## Equipment Wanted

### **Wanted: 8100's**

I am in need of Orban 8100's in any condition.

Contact: Mike Cooney, Broadcast Management, 610 N. Kiwanis, Sioux Falls, SD. Phone (605) 336-2706.

### **Wanted: SCPC**

We need an SCPC satellite receiver, and a Marti VHF remote transmitter/receiver pair.

Contact: Tim Lavender, WHAY Broadcasting, P.O. Box 69, Whitley City, KY 42653. Phone (606) 376-2218 Fax (606) 376-5146.

### **Wanted: Old Consoles**

Looking for the oldest console still in one piece. Items like RCA 76-B; Gates model 30 with cherrywood case; Collins 12H with split-Davenport, two-turntable fader in black wrinkle finish case; etc.

What do you have? Needs to be priced reasonably. Also looking for complete Ratheon RC-11 console.

Contact: Quin Morrison, 721 Walnut, Windsor, CO 80550. Phone (303) 686-7742.

### **Wanted: 8-channel Board**

Need an 8-channel mixing board; mike plus boom; studio tape deck; CD player; 2 turntables; 4 30-watt transmitters; 4 couplers; 1 distribution amp.; 2 cart players.

Hamline University is looking for this equipment for an AM radio station.

Contact: Dan Haertl, 1536 Hewitt Ave, St. Paul, MN 55104. Phone (612) 641-2056.

### **Wanted: Cart Deck**

We need an ITC stereo playback cart machine. Must be willing to sell cheap.

Contact: Paul Lotsof, KAVV-FM, P.O. Box 42977, Tucson, AZ 85733. Phone (602) 889-9797, 7 days a week, noon to midnight.

### **Wanted: Disc Recording**

Especially Fairchild, Presto, Rek-O-Kut. Amps., limiters, needles, blank discs, manuals, books, etc. Please call or write. Photographs and price are helpful.

Contact: Kim Gutzke, 7134 15th Ave. S., Minneapolis, MN. Phone (612) 866-6183.

## We Can Help!

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The new RE27N/D not only utilizes this time-proven design, but takes it one step further with the addition of EV's N/DYM<sup>®</sup> technology. Electro-Voice was the first audio manufacturer to harness the power of this rare-earth super magnet. N/DYM actually delivers four times the power of conventional magnets. The RE27N/D also offers three switchable filters, one high frequency and two low frequency. Due to the increased sensitivity provided by N/DYM, the switchable filters enable the selection of either a flat high-end response or a shelving emphasis above 4 kHz for enhanced vocal presence, and the option of two low-frequency rolloffs.

The net result: a microphone that is designed in the tradition of the RE20, but exhibits higher output and even wider frequency response, providing a high-performance version of the Variable-D design concept.

N/DYM and Variable-D are the ingredients of a perfect blend — the new RE27N/D.

For additional information, contact



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World Radio History



## Major Competition for TV and Radio Being Tested

AT&T and a phone company in Rochester, NY are testing a system that uses regular phone lines to deliver Integrated Service Digital Network services to homes in order to estimate the local revenue potentials from ISDN services. ISDN is the new digital service from phone companies that will bring video and audio to homes and businesses. It is the technology that will be major competition to broadcast radio and TV.

## The Hottest Programming

When technical advances allow "virtual reality" in the home or office, the ultimate entertainment will come from cable operators, telephone companies and networks of all kinds. Virtual reality is evolving right now. The "user" enters a computer generated world and feels as if it is the real world. This "transmission of presence" requires extreme technical transmission facilities such as fiber optics.

## It'll Take A Revolution in Programming to Launch DAB

While we are still debating if we even want digital radio, Japan is about to launch the world's first nationwide digital radio broadcasts. The start date is April, 1991, following tests that are running now. Early test programming is reported to be "relaxing but not sleepy" American music along with natural sounds such as birds and ocean waves. Naturally, there will be no commercials and a minimum of "DJ chatter." The vice president of Japan's first digital station, SDAB (Satellite Digital Audio Broadcasting), says, "There will be a revolution in the quality of programming. Otherwise we'd be just another radio station with a fancy transmission system." Words for the wise.

## 3-D Sound is Here

The hot news in radio processing is 3-D sound (with two speakers). It's a 2-speaker version of the ill-fated Quad

systems of the 70's. Only this time, the three dimensional soundscape comes from single-ended systems with no decoder boxes required at the receivers. Record manufacturers are already using these systems in their songs. Watch for radio equipment manufacturers to come out with new boxes by the spring NAB or sooner.

## How to Save Big Bucks on Your New Listener Line

Just a quick reminder that all the "listener line" type telephone access systems are simple voice mail systems with an interface to your equipment. The interface is the only difference between voice mail and listener line. You can negotiate with a local telco vendor to get your voice mail system. Markups are usually at least 50-percent.

## Make Conference Calls From A Pay Phone

A new service from Sprint allows conference calls from any phone including a pay phone (if you have a Sprint FONcard). Pay-phone callers only pay for the cost of two calls. After February, there will be an additional 75-cent fee per call. MCI has a limited version and is working on improving its conference call capabilities.

## It's So Simple, It's Beautiful

While some scientists look at the big picture (cosmology), others look at the fine details (quantum physics). Now many scientists are struggling to combine the two views in "quantum cosmology." The hope is that someday we'll see a pattern that demonstrates the simplicity of the scientific principles underlying existence.

## The World's Smallest Cellular Phone

You've seen the cellular phone get smaller and smaller, and for years I've been predicting a phone the size of a pen. The pen phone will be voice activated and will replace the personal calendar, your notebook, answering

machine, alarm clock, and maybe even your pen! Now Nippon Telegraph and Telephone in Japan has announced a phone that's one step closer. It's a palm-sized phone that is smaller and lighter than the MicroTac made by Motorola (the previous world's smallest phone). NTT's new phone weighs in at just 8.1 ounces and has a 45 minute talk-time as compared to the MicroTacs 30 minutes (both using their smallest batteries).

## Action Group Wants to Ban Phone in Cars

Meanwhile, a new political action group in California is lobbying for a ban on cellular phones by drivers in cars. They are worried about the person who's driving "by knee" while taking notes and holding a phone with their hands. There's a simple solution to this. For a couple hundred bucks, you can get a headset for your car-phone and get one hand back on the wheel. They work and sound great! I use one at work and one in the car. My neck has never felt better.

## Imagine This

Have you ever thought about how interesting it would be to put on a pair of headphones and glasses that could "pick up your thoughts" and record them on videotape? A musician could just imagine a song. An architect could imagine a building. A dreamer could record dreams. San Francisco researchers have developed a technique called MANSCAN (mental activity network scanner) which "can't yet detect the contents of thoughts." But it "clearly differentiates among many of the electro-chemical fireworks that underlie specific acts of cognition." Still a long way from "Brainstorm" or even "Holodeck," but researchers are working on it as you read this!

(continued on page-10)

# State of the Art

Continued . . .

## No Fueling Stops Between Galaxies

Astronomers once thought that clusters of galaxies were evenly spread across the universe. Now that maps of the entire universe are being developed, it can be seen that the clusters of galaxies are uneven. Planning long trips through space won't be as easy as we thought.

## Just Fax That Diskette to Me, Please!

Somebody had to come up with this, eventually. A new device called "diskfax" is a machine that you stick a floppy disk in, dial another diskfax machine - and voila! Your data is transmitted! It's like a fax machine, but uses floppy or hard disks instead of paper.

## Let Your PC Do The Walking

The FCC has finally approved something that I've been waiting for for years. Regional Bell operating companies are now allowed to provide electronic directory assistance, which lets users access phone numbers in the white and yellow pages by PC. Now all we need is the ability to make the call without hanging up and redialing once we get the number from information.

## Artificial Intelligence in Computers

Hitachi says it has developed the prototype of a neurocomputer that has the world's fastest learning capability. They reportedly have two application programs: one that predicts stock market prices and one that verifies signatures. The computer is said to have artificial intelligence because it can make decisions it's not programmed to make. Neurocomputing is a major trend in computers that will shape the future.

## Wireless LANS May Interfere With Reception

Another trend to watch in computing is wireless LANS (Local Area Networks). Radio frequency signals are used to connect workstations to printers and other peripheral devices. This will help reduce the tangle of wires in the office and home, but may cause interference to radio and TV reception.

## More On The Smart House

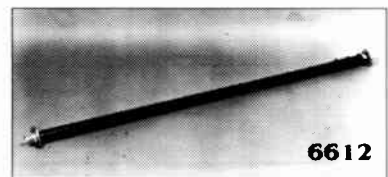
LANS, WANS, MANS, and now LONS. The former chairman of Apple Computers has joined with the co-founder of Rolm telephone systems to build a local operating network, or LON. The new system would change the way you turn on your lights, heat and cool your home, and operate your VCR, TV and radio. Chips would be built into just about any appliance.

## FM Harmonic Low Pass Filters 500 - 50,000 Watts

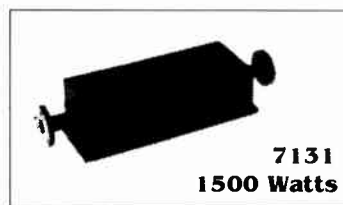
Delivery: 30 Days (Faster For Your Emergencies)



7123  
500 Watts

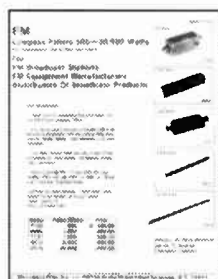


6612



7131  
1500 Watts

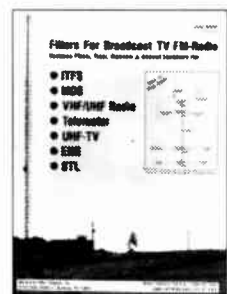
Model #	Watts
6612	6,000
6516	15,000
7772	30,000
7455	50,000



Bulletin #14

## Full Details In Bulletin #14!

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This form valid for all of 1991

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My intended use is:

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My need is:

- Immediate
- Near future
- Long range

I need:

- Prices
- Product literature
- Delivery information
- Ideas or help

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My Title: \_\_\_\_\_ FAX: \_\_\_\_\_

Company/Station: \_\_\_\_\_

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

ADVERTISEMENT

## What to Look Out For When Buying RF Components

This month we're going to take a look at capacitors. For broadcast applications, we have historically used mica and vacuum capacitors; the latter used in both fixed and variable types. Generally, vacuum capacitors are employed when the voltage or current requirements are higher than what is available with mica, or when the circuit requires a variable capacitor. We will not go into the process of manufacturing the capacitor because, as a field engineer, you are primarily interested in their application and maintenance and what to look for when replacing them.

When design engineers specify capacitor values, they should take into account the current and voltage that a particular capacitor will see. That, in turn, will dictate the type of capacitor to be used in that circuit. At Vector Technology, we use a minimum of 1.8 times the RMS current and 4.5 times the RMS voltage. That is the minimum value we employ in choosing capacitors values. In practice, we use more, but company standards are the ones given here. This 1.8 times current and 4.5 times voltage allows ample margin for 125% positive peak modulation.

You can check this yourself in your equipment (and you should), before ordering a replacement or spare. Also, it is a good practice to note just what the RMS currents are, that the capacitors are seeing. Just because some engineer designed it the way you see it, does not mean it is correct. All too often we have seen manufacturers skimp in order to save a dollar. Sometimes the circuit is tuned so that the actual current exceeds the design current value. So it is a good idea to check actual RMS currents before you have problems.

The RMS current through a capacitor is measured with an RF ammeter. We do not recommend this procedure if you know beforehand that the current will be high. Furthermore, most of

you do not have the equipment to measure high currents. Generally, just measure the current (no modulation) through the capacitor and that will be the RMS current. The capacitor should be rated to at least 1.8 times this value for current.

To determine the RMS voltage, just use this simple formula:

$$X_c = \frac{159.2}{FC} \quad \text{and} \quad V = I X_c$$

where:

F = Frequency in kHz

C = Capacitance in uF

I = RMS current

X<sub>c</sub> = Capacitive reactance

V = RMS voltage

For example, say you measured 5 amperes RMS through a 0.002 uF capacitor at 1000 kHz; the RMS voltage would be 398 volts.

$$X_c = \frac{159.2}{1000 \times .002} = 79.6$$

$$V = 79.6 \times 5.0 = 398$$

Employing our standard of protection of 4.5 times the RMS voltage, the peak RF working voltage of that capacitor should be at least 1791 volts. Again, using our RMS current protection, the capacitor should be rated at 9 amperes. In the real world of what is available, a 0.002 uF capacitor capable of at least 9 amp. will be rated for 11 amperes with a working voltage of 6,000 volts. In this case, more is better.

On a regular basis, capacitors should be cleaned by wiping with a cloth (naturally the power is off). This applies to vacuum as well as mica capacitors. As dust and dirt collects on the body of the capacitor, the possibility for a path from end to end across the capacitor increases and so does the possibility for arcing. Another note: someone once complained that the mica capacitors in our equipment were deficient in that there was only one mounting plate, and that the mounting

plates are needed to dissipate heat. This is absolutely incorrect. The mounting plates on a capacitor are for mounting - nothing more, and nothing less. The capacitor manufacturer has designed his components so that the connection to the capacitor is to be made via the center-tapped screw hole. There should be no heat. In fact, if you do have heat, the circuit is improperly tuned or the capacitor is underrated and should be investigated immediately.

Vacuum capacitors have additional considerations. In a vacuum capacitor, the vacuum is the dielectric, and the spacing between the parts is critical and must be maintained. Remember, a vacuum capacitor is basically a series of copper cylinders fitted within another series of cylinders. The degree of meshing and the spacing of the cylinders determine the capacitance and voltage ratings. Also contributing to the voltage rating is the degree of vacuum, but that is another story. Changing the spacing will alter the capacitance. Therefore, it is important to prevent installed vacuum capacitors from being torqued in such a way as to deform the spacing between cylinder sets. If the capacitor mounts are improper, undue stresses could be placed on the device and cause problems.

In a glass capacitor this is more readily noticeable than in a ceramic type. The use of ceramics has given us stronger capacitors with the ability to hold a higher vacuum over glass types, although glass does allow one to see what is happening inside. In glass, visible arcing or discoloration is a clue to overcurrent, as is warm glass. Unfortunately, since ceramic is a better insulator, overheating does not show up as soon as with glass. Because ceramic is opaque, visible inspections of the cylinders are impossible. The best maintenance advice we can give is to keep all capacitors clean and tight.

## Concrete in the Station Ground System

Frequently, articles appear in the trade publications on station grounding, but there is one common component of a facility that is seldom addressed. That component is concrete. It's almost everywhere. Tower piers and guy anchors are concrete. Often the floors walls and roof of a building are concrete. All kinds of other structures are concrete.

Since we have to live with it to such an extent, we sometimes assume that it must somehow be adequate. After all, it usually has reinforcing steel in it that is conductive, so why be concerned with it? At any rate, we just kind of ignore it and hope for the best. However, it might help if we have a basic understanding of its electrical characteristics so we can have an overall better picture of how it fits into the entire station ground system.

Much of the information in this article is taken from a paper that was presented at the 8th International Aerospace and Ground conference on Lightning and Static Electricity, which was held in 1983. The paper was presented by Aleksandar Vorgucic, Dr. Sc. of the University of Nis in Yugoslavia. Extensive testing had been done over a five year period to compile the data for the paper. The results are very interesting and quite surprising.

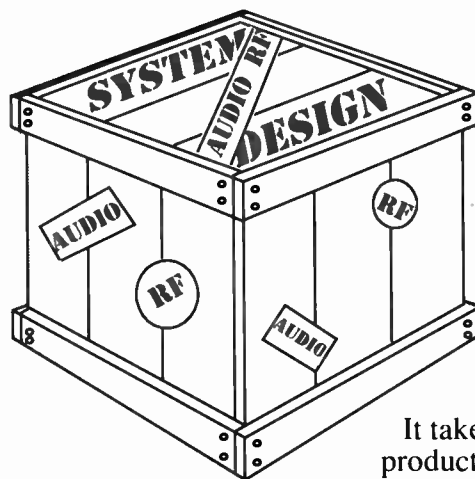
### The Components of Concrete

There are three components of concrete, each of which has its own electrical characteristics: 1) The aggregate, which comprises from 80 to 85 percent of the solids by volume, is sand and gravel. Its conductivity may vary depending on what part of the country it comes from, but is usually very low because much of the material is silica, a good insulator. 2) The cement paste, which we usually refer to as "Portland" and which constitutes the balance of the solids, is much more conductive due to its chemistry. However, we will see that its conductivity changes mark-

edly with time. 3) The last component is water, which can vary greatly in its conductivity due to the local electrolytes (usually salts) found in it.

The tests conducted by Dr. Vorgucic found that fresh concrete has

relatively low resistance in the beginning. However, the resistance begins to increase immediately due to several reasons. Since the evaporation of water would obviously have an effect, (continued on page-14)



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## Lien For Your Green

If you can't say anything nice about pay-delinquent station managers, let's talk. And, be sure the GM leaves the room.

In at least one state it is legal to file a lien against equipment when debts are owed, according to an RG reader. The result is a modest amount of protection for engineers. Such a collection instrument suggests splendid potential for those engineers clutching overdue receivables.

For instance, an engineer filing such a lien would have the first opportunity to retrieve the named equipment in the event of bankruptcy. Also, the lien would stall any station sale pending a resolution. And a little embarrassment may garnish the deal as local newspapers publish news of the lien filing itself. One or all of these annoyances might be sufficient to move a delinquent manager to the company checkbook. Or, in the future, you might end up owning a transmitter.

Such a law, known in this case as "the mechanics lien," may not be on the books in other states. However, if it is an option, engineers should consider this caliber of protection in all contractual situations.

### Start Writing

A few considerations are important. Write down the manufacturer, model, serial number and similar information on all pieces of owned equipment; the best choices may be the particular items on which you are working. However, liens are not possible on leased equipment, since the station is not its owner. Thus, the preferred protection is accurate knowledge of which equipment is owned and leased. If in doubt, gather the information from all of the most expensive equipment, skipping PCP-filled components.

The engineer who called with this account had not heard of anyone in our field using the lien technique, but did know of a painter who "liened" a house he had painted but not been compensated for. A decade later the sale of the house was halted, pending resolution of the matter. The painter soon received a sum consisting of the original debt plus ten years' worth of inflationary increases (tied to the consumer price index of each year).

It would be helpful to the entire engineering community to find out about this possibility in our own states. With more of us facing contracting each year, we need to explore ways to assert our billing rights. Let me know what you discover so that we can carry the discussion forward. While we deserve to be treated as professionals, we may not always achieve this level of respect. But, we will be paid!

### GM Twist 'n Shout

This beastly little payment problem would certainly dissipate if we could only read the minds of managers. Digital sampling techniques developed by "Interconnect Speed Limit Pirates, Inc." now permit us to capture the innermost thoughts of a few managers.

Here is the first in a series of DC-to-daylight reports from the sacrosanct sanctums.

- That station in Texas sounds good. Besides, they toss in a free S&L with the sale.

- I wonder if the IRS knows my work phone number.

- I can't believe that engineer bought my sound signature act in lieu of a check signature. What a country!

- I wonder if the FCC will be so easy. Or, the insurance company. Or, the IRS.

- Someday the press will forget about that teenage girl incident. But, I don't know about my wife.

- I wonder if people can make it on less than \$50,000 a year any more.

- Taxes? Taxes? We don't need no more stinking taxes! Read my badges.

- Oh God, grant me patience. And, do it right now.

- If you're talking about the alcohol that destroys lives and devastates families, I'm against it. But, if you're talking about the alcohol that makes you feel warm after a hard day's work, I'm for it.

- Mark Twain bothers me. He described some guy as "a good man in the worst sense of the word."

- Well, I could Iaccoca-this and Iaccoca-that.

- I'll memo my staff encouraging them to read my memos.

- In the Big Rock Candy Mountain, all the cops have wooden legs. What a country!

- I wonder which is better: a heck of a deal or a pretty good deal?

- Politics? No, the ethical requirements are too high. Besides, what if I ran unopposed and lost?

### Just Say No

While such jabs are difficult to resist in this column (for comic relief I hope), I still believe firmly that it is extremely important to cooperate with station management. Engineering professionalism is appropriate more than ever.

I truly respect engineers who consistently know when to refute inappropriate manager advances on matters

(continued on page-18)

# EXPERIENCE COUNTS . . .

## Continental Electronics Installations At Master Antenna Facilities.

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KIKK 27.5 kW (2)  
KKBQ 27.5 kW (2)  
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### TELETOWER PROJECT Houston, Texas 2 OF 2 STATIONS

KLTR 27.5 kW / 21.5 kW (Aux)  
KMJQ 50 kW

### BRODIE LANE TOWER SITE Austin, Texas 2 OF 2 STATIONS

KHFI 35 kW  
KPEZ 21.5 kW

### MILLER TOWER SITE Dallas, Texas 6 OF 6 STATIONS

KKDA 40 kW  
KLTY 40 kW  
KLUV 40 kW  
KOAI 45 kW  
KZPS 40 kW  
WRR 40 kW

### LOADSTAR TOWER PROJECT New Orleans, Louisiana 4 OF 4 STATIONS

WEZB 35 kW  
WLNG 35 kW  
WMXZ 35 kW  
WQUE 35 kW

### GANNETT TOWER PROJECT Miami, Florida 8 OF 10 STATIONS

WEDR 50 kW  
WHQT 25 kW  
WLVE 25 kW (2)  
WPOW 25 kW  
WQBA 21.5 kW  
WSHE 25 kW  
WTMI 25 kW (2)  
WZTA 25 kW (2)

### LOADSTAR TOWER PROJECT Ft. Lauderdale, Florida 2 OF 2 STATIONS

WJQY 40 kW  
WKQS 50 kW

### BITLOW TOWER PROJECT Orlando, Florida 3 OF 3 STATIONS

WHTQ 50 kW  
WSSP 50 kW  
WSTF 50 kW

### LOADSTAR TOWER PROJECT Orlando, Florida 3 OF 3 STATIONS

WJHM 25 kW  
WJYO 55 kW  
WOCL 55 kW

### LOADSTAR TOWER PROJECT Jacksonville, Florida 3 OF 4 STATIONS

WAIV 40 kW  
WFYV 27.5 kW  
WQIK 35 kW

### OLDSMAR TOWER PROJECT Tampa, Florida 2 OF 2 STATIONS

WKRL 40 kW  
WUSA 40 kW

### SUMMIT TOWER PROJECT Atlanta, Georgia 2 OF 3 STATIONS / 4 OF 5 TRANSMITTERS

WSTR 35 kW (2)  
WVEE 40 kW

### LOXLEY TOWER SITE Mobile, Alabama 3 OF 3 STATIONS

WBLX 27.5 kW  
WGCX 27.5 kW  
WJLQ 27.5 kW

### SHOREVIEW TOWER PROJECT Minneapolis, Minnesota 6 OF 8 STATIONS

KDWB 25 kW  
KEEY 25 kW  
KLXK 25 kW  
KQRS 25 kW  
WLOL 25 kW  
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WLWI 35 kW  
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including money, hours, and safety. Nice engineers sometimes see their eagerness to cooperate backfire.

When contracting several years ago, a manager asked me to attend an important meeting and attached a condition. I would be paid for the first hour only, but it would be nice if I remained for the entire session. Believe it or not, I bought the pitch, sat in on a two hour discussion, and billed the station for one hour. What a sap! Lavish cooperation led to exploitation. Upset not only that he made such an insulting offer, I remain bothered by my acquiescence.

In stark contrast, another encounter with the same manager produced a dramatically different result. The GM asserted that, after 20 years of contracting, he had not been billed for time spent discussing projects. Thus, he reasoned, the meter should be off during our meetings. This time my "rage switch" closed, I vehemently challenged his ludicrous argument, and the crotchety topic never resurfaced. Just say no forcefully! Out of curiosity, I compared notes with a contract engineer with whom this manager had worked, only to learn what I expected: all hours worked, including meetings, were being billed and paid.

## Nerd!

Since this manager appeared to be a decent person, the treatment led to some soul searching. I was suspicious that he viewed me as some sort of technical hermit, void of human interaction capabilities, and best kept out of sight.

I wanted to remind him that, by most counts, I had exceeded his level of societal acceptance: I was better educated, had spent seven years managing radio stations before studying engi-

neering, was/am married, lived something akin to a normal life, and greatly outranked him on the honesty scale.

Today I regret sparing him this sermon.

## Nothing on Me

If being stiffed by deadbeat managers is not sufficiently degrading, we are sometimes asked to surrender the remainder of our self-respect by co-conspiring for additional ill-gotten gains.

Too many engineers have been asked by management to exaggerate insurance claims for lightning-induced transmitter damage. The manager's request may actually be a command. When we are guilty of such complicity, most of us would not so admit, which is reason enough to avoid all illegal involvement. Or, said another way, "don't put that thing on me."

## Sing!

If a manager breaks the law, why serve as camouflage? A manager who favors the bottom line over truth does not deserve your protection.

When serious violations occur, warn the boss in writing and retain several copies for yourself. If nothing happens to correct the violation, blow the whistle. This may mean writing the FCC, EPA, IRS, or other appropriate regulatory/enforcement agency. Such action serves as self-protection from being "set up" to take the fall when the manager is later caught. So, by coming forward first, you are generally off the hook and on record. Tell it all and let the chips fall where they may.

Despite the fact that your integrity will be questioned, you know the truth. And, after some time and investigation, whistle blowing should prove advantageous. A reputation for actively resisting illegalities not only boosts your self-

image, but it also scares off unethical and pay-delinquent managers.

Turning in the boss poses the obvious dilemma: is it better to be out of work or treated unethically? Such a tough choice is left to the individual. Eventually, complicity with illegal actions will chew away at your insides and you will pay, regardless. I am incensed when I hear of crooks not only being let off the hook, but rewarded!

## Lien 'n Mean

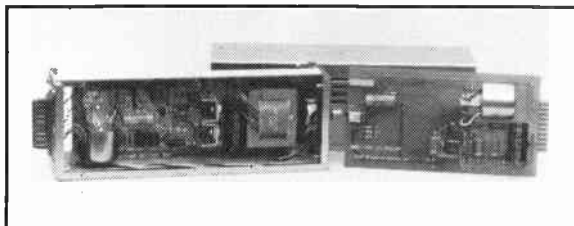
Unless you can come up with a magic bag stuffed with subpoenas, why not look into the legalities of the lien approach in your state? It may turn out to be an effective device.

I'm finished now, so you can let the GM back in the room. And, if you don't have anything nice to say about unethical, pay-delinquent managers, lean on me. Lien on them.

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## A Few Words About Synchronous AM

Here at KSSA we have been experimenting with synchronous broadcasting for some time now and have reached some definite conclusions. First of all, we are satisfied that it is the thing for us. Secondly, it is not a practical thing for just any station.

In a series of articles I would like to share with you the information we have accumulated.

Synchronous broadcasting is the operation of two transmitters on the same frequency within a distance that allows overlap of the signals emanating from the respective transmitters. There are approximately a dozen stations currently authorized for experimental synchronous operation.

There are some stations operating synchronous transmitters day and night. However, we operate ours only at night. At KSSA we have the problem that our nighttime power will not allow coverage of Ft. Worth. During the daytime, when we are 5,000 watts, our pattern puts a good signal in Ft. Worth. However, at night we change to 1,000 watts and completely lose that area. We were dropping approximately 1.5 million people from our listening area when we switched to night pattern.

By placing a synchronous transmitter in Ft. Worth proper, we are able to regain about 600,000 of that number.

The area between the two transmitters becomes what is known as a zone of interference. The object of the

current experimental operation by KSSA, and the other stations involved with sync, is to determine if the impact of this zone on listeners can be lessened.

The simpler truths of radio theory will tell you that these zones can not be eliminated. However, a gentlemen got a patent back in the sixties for a system that, on paper anyway, appears to solve the problem. I'll tell you about that in a later article. After we've laid the groundwork.

What happens in the zone is that a beat between the two transmitters will exist every half wavelength. If the transmitters are truly locked together these beats will stand still and will create a situation such that, on one side of the street, a listener will get a perfect signal while his neighbor across the street would never be able to listen. In the real world these beats are going to move around some as the conditions vary slightly.

At least that is my opinion. I may be proved wrong on that point somewhere, but, I haven't personally observed, or read a paper reporting that this has been achieved. I will be the first to admit that we are still learning what can and can't be done.

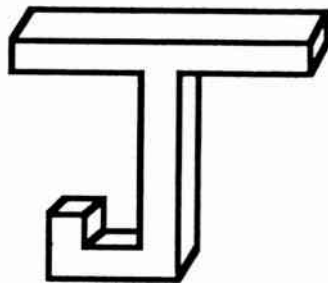
At any rate, this beat is not detectable throughout most of the overlap area since one signal will take precedence over the other to the point that the beat, although it exists, is not perceptible. In subjective tests we have concluded that a signal strength difference of 4:1 begins to produce a noticeable effect. However, at this point we feel most listeners would ignore it and stay with you. As you approach a 1:1 ratio the interference is such that Joe Listener would bail out.

It is in this 1:1 area that the monitoring point for the experiment should be located. We have rented an office in Arlington to use as our monitoring lab. We also do listening tests in a moving vehicle and at different points around

the zone. However, the recorder, scope, timer and other items are located in this central area office.

Through experimentation, which I will describe later, it is possible to alleviate the effects of a beat to the point that the actual unlistenable area becomes relatively small.

In part 2 of this series we will take a look at the setup and operation of our system.



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## Using Vectors to Understand Directional Patterns

How do all these towers make a directional pattern? I have had station owners, managers, program directors, and laymen ask me that question countless times over the years. How can you answer a question like that? With a bunch of technical mumbo jumbo (remember what they taught you in college ... either dazzle 'em with brilliance or baffle 'em with ...). You can do that, but mostly what that will get you is a lot of blank stares. Or you can get out a pen and paper and sketch out a simple vector diagram of a two tower array in which complete cancellation occurs along one axis. This is what your college instructor most likely used to introduce you to the principles of directional antenna operation, and it works!

Beyond the curiosity of the non-technical people who are exposed to, or otherwise involved in some way with a directional antenna, I have gotten a lot of blank stares from station engineers over the years. These people are supposed to know exactly how all this stuff works, right? Well, not necessarily. I have found that most engineers with an associate level or trade school education are not really exposed to the complexities of directional antenna theory. Many station engineers have this level of education, and are extremely capable and qualified individuals in their fields. Some are even responsible for the maintenance and well-being of complex directional AM antenna systems. They do a

bang-up job of the day-to-day maintenance of the array. However, when something goes awry, they call in the consultant.

There isn't anything wrong with calling in a consulting engineer; personally, I would encourage every station engineer to maintain a working relationship with a reputable and qualified consultant. But, it could save the station owner a chunk of change if the station engineer could diagnose a DA problem before the consultant is called in; perhaps he could even fix the problem himself. When one or more of the monitor points goes a little high and stays there, is it really necessary to pay

a consultant to travel to your site and bring the array back into adjustment? In some instances, yes. But in many others, perhaps not. An understanding of complex numbers, some basic directional antenna theory, and skill in the use of vectors can point you in the right direction.

### Vector Formulas That Nobody Really Understands

As a first step to understanding the use of vectors, let's take a look at the vector formula in its entirety. The equation to express vectors for a directional array is the same equation that can be used to calculate the pattern shape for a directional array of n towers. This equation is:

$$E = \sum_{k=1}^n E_k r_k (\theta) \quad \beta_k$$

Where:

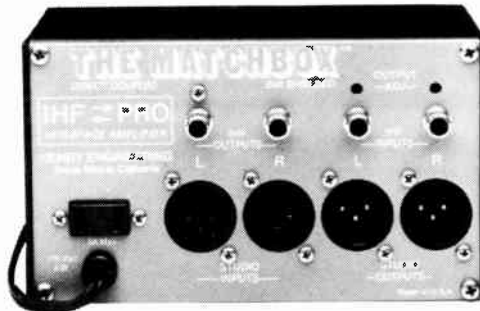
E = the total effective field strength vector at unit distance (P) for the antenna array with respect to the voltage vector reference axis.

k = the k<sup>th</sup> tower in the directional antenna system.

n = the total number of towers in the array.

E<sub>k</sub> = the magnitude of the field strength at unit distance in the horizontal plane produced by the k<sup>th</sup> tower acting alone.

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$f_k(\Theta)$  = vertical radiation characteristic of the  $k^{\text{th}}$  antenna.

$\Theta$  = elevation angle of the observation point (P) being measured up from the horizon in degrees.

$B_k = S_k \cos(\bar{\Phi}_k - \bar{\Phi}) + W_k$   
(phase relation of the field strength at the observation point (P) for the  $k^{\text{th}}$  tower taken with respect to the voltage vector reference axis.  $S_k \cos(\bar{\Phi}_k - \bar{\Phi})$  is the space phasing portion of  $B_k$  due to the location of the  $k^{\text{th}}$  tower and  $W_k$  is the phasing portion of  $B_k$ .)

$S_k$  = electrical length of spacing of the  $k^{\text{th}}$  tower in the horizontal plane from the space ref. point.

$\bar{\Phi}_k$  = true horizontal azimuth, orientation of  $k^{\text{th}}$  tower with respect to the space reference axis.

$\bar{\Phi}$  = true horizontal azimuth angle of the direction to the observation point (P) (measured clockwise from true north).

$W_k$  = time phasing portion of  $B_k$  due to the electrical phase angle of the voltage (or current) in the  $k^{\text{th}}$  tower taken with respect to the voltage vector reference axis.

### Whew! Got all that? Right ... Me Too.

This equation, when applied to a directional array, will yield a complex number that gives the field strength and phase arriving at a particular observation point from the array from each tower in the array. We won't try to explain the use of the formula in its entirety

in this month's column, but rather we will learn to use part of it to plot vectors.

### An Easier Way

To see the vectors for a particular azimuth, all we need to really know is the theoretical DA parameters and the following formula:

$$B_k = \bar{\Phi}_k + [S_k \cos(\bar{\Phi} - \bar{\Phi}_k)]$$

Where:

$B_k$  = the phase relation of the field from tower  $k$  on the specified azimuth.

$\bar{\Phi}_k$  = the phase of tower  $k$  with respect to the reference tower.

$S_k$  = electrical length spacing of tower  $k$  from the reference tower.

$\bar{\Phi}$  = the true horizontal azimuth angle for which the vector is being calculated.

$\bar{\Phi}_k$  = the true horizontal azimuth orientation of tower  $k$  from the reference tower.

If you look closely, you will see that this is actually the rotational portion of

the other formula. At first glance, it looks a lot easier, but what are all those variables? Let's look at a typical set of DA theoretical parameters and see if things start to make sense. Look at Table 1.

Look familiar? It should. These are the theoretical parameters of a typical four-tower directional pattern. Every DA has a set that includes the same variables. The values listed under the Field heading are ratios. All other values are in electrical degrees.

Before we take the tower variables one at a time and plug them into our formula, let's look at how the numbers in the DA parameter table are referenced.

There are, in most sets of DA parameters, two reference towers. The first is typically the first tower in the list, or tower 1. This is the reference from which the spacing and bearing for all other towers is measured. This is not the same as the array reference tower,

Table-1

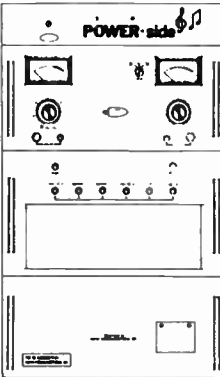
Tower	Field	Phase	Spacing	Orient.	Height
1	0.957	93.9	0.0	0.0	0.0
2	1.000	0.0	90.0	246.0	80.0
3	0.879	-164.0	90.0	309.0	80.0
4	0.919	102.1	153.5	277.5	80.0


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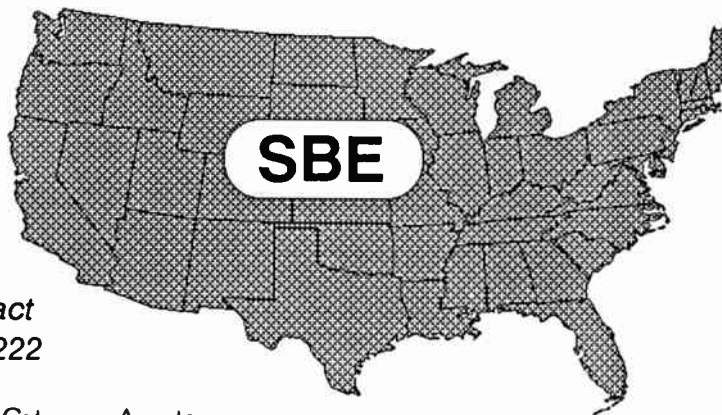
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(continued on page-22)

## FCC Adopts SBE "Congested Area" Rulemaking Petition



For additional information, contact  
Richard Farquhar at (614) 837-9222

The FCC has adopted a rulemaking petition filed by the Society of Broadcast Engineers, Inc. (SBE) proposing a definition for the term "frequency congested area." New fixed Broadcast Auxiliary microwave stations located in frequency congested areas have been required to utilize spectrum-efficient, category A, transmitting antennas since as early as 1981. New television STL and ICR microwave stations not located in areas subject to frequency congestion, are allowed to install less directive category B transmitting antenna.

In general, Category A antennas require dish diameters of eight feet or greater in the 2 and 7 GHz bands and dish diameters of six feet or greater in the 13 GHz band.

Fixed-link microwave stations authorized prior to 1981 were given a 10-year "grandfather" period in which to upgrade their transmitting antennas to category B in non-frequency congested areas, and to Category A in frequency congested areas. Stations which have not upgraded by the expiration of the grandfather period on October 1, 1991, will not be renewed.

Although the FCC rules have the "areas subject to frequency congestion" term since 1981, the FCC had never provided, for Broadcast Auxiliary purposes, and unambiguous criteria for determining whether an area is, in fact, "frequency congested." The SBE rulemaking petition was filed to eliminate that uncertainty.

The Notice of Proposed Rulemaking (NPRM), Docket Number 90-500, adopted October 16th and released November 14th, proposes adoption of the SBE criteria. That criteria presumes that all Standard Metropolitan Statistical Areas (SMSA's), as defined by the current U.S. Census, are "areas subject to frequency congestion." In addition, the NPRM also proposes adoption of the SBE suggestion that the FCC establish a list of specific sites to deal with the situation where a mountain-top site or tall structure located outside and SMSA has become heavily congested because of its favorable location and height.

The SBE proposed that this list be maintained under delegated authority to Chief, Mass Media Bureau, and that the list be updated annually. One set of geographical coordinates would be assigned to the "center" of such site, and any microwave station within 3 kilometers of those coordinates would be considered subject to "congested areas" antenna requirements.

The NPRM agrees with the SBE belief that there should be a "safety valve" provision to ensure that no microwave stations install Category A antennas if frequency congestion does not truly exist. This could be the case in the smallest SMSA's (there were 309 SMSA's in the United States as of the 1980 Census. The NPRM asks whether the previously described list, to be created and maintained by the FCC, might also contain a list of excluded SMSA's. Such excluded SMSA's could presumably include the smallest SMSA's, where frequency congestion might not yet exist.

In response to the new NPRM, the SBE is canvassing all 115 of its affiliated frequency coordinating committees nationwide. Those committees are being asked to identify candidate sites outside of the SMSA areas, and whether any SMSA's should be placed on a list of excluded SMSA's. The results of the SBE survey of its frequency coordinating committees will be included in its comments to the FCC, which were due by January 4, 1991.

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# Tips From The Field

## Satellite Reception

By Neal Arman - WPTT-TV  
Pittsburgh, Pennsylvania

1. Is the dish round? After sitting in the weather for any length of time, most earth station antennas begin to warp. To test your dish, cross two pieces of string across the dish. One string should go top to bottom, and the other left to right. At the point where the two strings meet, there should be almost no space between them. The larger the gap is, the more out-of-round the dish is. Depending on the type of dish, normally a re-tightening of mounting bolts can fix this problem.

2. Is the feedhorn in the right place? The formula to determine feedhorn location is quite simple. First measured the distance across the dish (don't take the spec sheet's word for this, even a 1/4-inch is a big deal). Now measure the depth of the dish. Next square the diameter, then multiply the depth by 16. Finally, you should divide the squared diameter by the result of the depth times 16. This is the theoretical focal length of your dish.

3. Are you using a single LNB with a polarization device? Most of these devices have at least 1dB of insertion loss. For very little, you can replace the feedhorn with a dual-port horn and two LNB's and gain back that 1dB. Remember that 1dB could put you over the threshold of the receiver.

4. How rusted is your feedhorn? After a few years, most feedhorns do indeed have some corrosion. Don't bother cleaning and scraping; a new feedhorn can be had for under \$75. If it shows any sign of rust, replace it. The rust causes the surface to become uneven, and you will see cross polarization problems.

5. Are you using LNB's or LNA's. If you are still using LNA's, it is time for a change. The consumer market has driven the satellite market for years, and all the technology is in the LNB's. By using LNB's over the LNA's, you can pick up the loss you have in that 100-foot run of cable.

6. Is your dish on a polar mount? Polar mounts make life a lot easier, but they do have problems. If your dish is not sitting right on True North (check the FAA for magnetic vs. true compensation degrees for your area) the arc will be off slightly, and the dish will not perform to specs. Remember it's been moved a thousand times and been through hundreds of winds storms.

A look at all the basics will make your dish work like it should. Don't forget to check all the little things like RF-fittings. A little rust can kill reception. Also take a look around the dish. Trees and wooden fences hold water during and after a rain and can degrade your reception.

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# Tips From The Field

Equipment Technical Tips  
From Radio Guide Readers

## FM-10K "Audio" Problem

**Timothy Raymer & Doug Waugh**  
KSMU-FM - Springfield, Missouri

We recently experienced a hairy problem with our Harris FM-10K transmitter. We use the Harris MX-15 exciter and have had very good service out of these units since their installation in 1986. Recently, a problem developed that had us climbing the walls for days. An audible whine had developed on soft passages. Eventually, through trouble shooting, we isolated the problem to the transmitter site.

Upon firing up our backup transmitter, the noise disappeared entirely. We pulled the exciter on the main and patched the backup transmitter's exciter to our main transmitter and headed back to the studio.

The exciter performed perfectly on the test bench. Back to the site we went, for more tests. Once again, we hooked up the MX-15 and, once again, the problem appeared.

This went on for some time before the problem was found. The coax supplied with the FM-K series, to connect to the exciter output, is a piece of RG-213 coax with two type-N connectors. Since the exciter has a BNC female for an RF output, Harris supplies an N-to-BNC adapter for the connection. We replaced the lead with another RF test lead, and the noise disappeared. Our solution to the problem was to replace the RG-213 with RG-223, which is double silver shielded RG-58 sized coax. We terminated it with silver plated connectors - one N, and one BNC ... no more problems

Upon further investigation, the type N connectors on the factory-supplied RG-213 were found to be loose. Tightening them should do it, if you have no aversion to adapters. Another solution proposed by Kevin Brooks of KZIM, was to replace the BNC on the MX-15 with a type-N connector.

Check your RF leads in your transmitters. It may save you a lot of grief.

## More On Datacells

**By Tom Lange - TECS Electronics**  
Kohler, Wisconsin


The saga of dealing with the SMC datacells is never ending. It would appear that these things can be patched together forever, thanks to readily available CDS photocells. I have been replacing the broken photostrips with these photoresistors with success.

I have been using a 5-pack of Radio Shack stock #276-1657 which, until recently, have all been the same type. Although now a mixed variety, most are even smaller, which will make replacement easier. You may want to subject the cell to the light from the lamp to get an "on" resistance measurement.

Most of the cells I have been using will render approximately 50 ohms with the lamp on. This would result in a theoretical insertion loss of about 0.67dB. The name of the game here is to find photocells small enough to fit two in the datacell case.

Pull out the old strips (or the remaining bits and pieces) and solder the leads of the CDS photocells to the exposed terminals. You will have to position the cells to avoid shorts, etc. If the existing insulating material hampers reassembly, remove it and apply clear tape to the inside of the cover. Good luck!

**Send Your Tech-Tips  
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

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

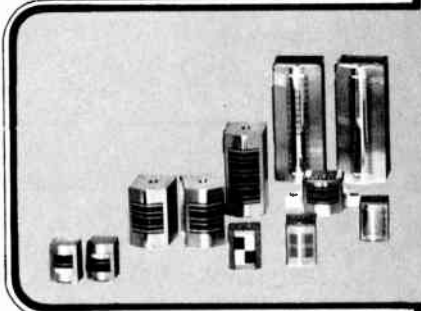
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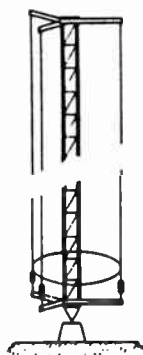
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## Ahh ... The Good Old Days. Or Were They?

### The Negative Side

In the mid sixties, I was employed as Chief Engineer by a small town FM station. It was the most ill-equipped station that I have ever seen. The inventory list consisted of:

1. One old, semi-operating GEL 5KW FM transmitter.
2. One tiny stereo mixing console, manufacturer unknown.
3. Two Rek-O-Kut Rondine turntables.
4. Two Ortofon tonearms and cartridges.
5. One Reslosound ribbon microphone.
6. One Scott stereo tuner (air monitor).
7. One McMartin frequency monitor without crystal.
8. One McMartin mono modulation monitor without meters.
9. One 5-bay Jampro antenna system (horizontal) and associated feedline.
10. About 300 LP's in poor condition.
11. Two old Roberts 192 reel machines with worn heads.

### The station did not own:

Limiting Amplifiers (two for stereo), Remote Control System (even though they did operate with remote studios), a Stereo Modulation Monitor, spare tubes or parts of any kind, handtools, test equipment, production equipment, cart machines, etc.

The station's studio (there was only one) was located in a storefront, next

door to a TV and Appliance dealership (the landlord) and had an arrangement with the dealership to run spots in trade for emergency replacement parts and our monthly rent. "Production" was done through a four pot, battery operated, high impedance mixer located in the control room (because the console did not have an Audition buss) and was recorded on one of the Roberts tape machines.

The station was in dire financial and technical straits. At one point, I was compelled to patch the output of the transmitter's IPA into the antenna because the PA tube had failed and the owner could not afford to purchase a replacement tube. The station was forced to operate at a power level of under 250 watts. It remained at that power for over *ONE YEAR* and nobody noticed! In 1969 or 1970, following an inspection by the FCC, the station was sold to an individual with "means" and the transmitter was repaired and returned to its full operating power.

### The Positive Side

It was true ... this station was a toilet. Working under these miserable conditions, however, got my creative juices flowing and forced me to learn

"Real World Engineering" as it applies to broadcasting. I learned how a remote control system interfaces the transmitter metering and control systems to telco loops and then built one using parts which I shamelessly begged from a local ham radio operator.

I learned about "real" mixing consoles and added an Audition buss to ours. I learned how a limiting amplifier operates and built a pair of cheap, stripped copies of the Gates model 38 limiters (Pentagrid tubes were amazing!). When the stereo generator (an entire rack nearly filled with electronics) failed due to a bad audio transformer in the L+R matrix, I learned why it is necessary to have identical transformers in the L+R and L-R chains and then replaced them both with identical though not original parts (I think they were the output transformers from an old Scott stereo amp).

When the owner eventually moved the studios to the transmitter site, boy did I learn about RFI and the importance of proper grounding techniques! It was a good learning experience. The early years helped me develop the keen interest in design and construction that has kept me in the business of broadcasting. If only the paychecks hadn't bounced...

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World Radio History



# Broadcast BBS

By Mark Shander - KNXV/Fox-15  
Phoenix Arizona - (602) 243-4151

## Speedmodem Combo Update

Last month's column was essentially a review of CompuCom's 9600 baud FAX/modem SpeedModem Combo. The company reports that sales are at an all-time high, and that dissatisfaction with the performance of their 9600 baud FAX/modem card combo is not common. Although the SpeedModem did not perform adequately in my IBM-compatible 80386SX, evidently there are a number of people who are satisfied with the product. One word of caution - if you order the SpeedModem Combo and are dissatisfied with it, CompuCom advertises a money-back guarantee. However, CompuCom is extremely slow at processing refund requests. It took CompuCom more than a month to send a refund check for the return of the SpeedModem Combo purchased for use on The Broadcaster's BBS.

## Prodigy Updates Software, and Adds Fees

Prodigy Services Company, a partnership of IBM and Sears has updated the software necessary to access the Prodigy on-line system. Users from major cities may access the Prodigy service for a monthly charge \$12.95. The Prodigy start-up kit is available at most computer software stores, or may be bundled with a variety of hardware or software packages. Prodigy is even giving away a limited number of start-up kits. Contact Prodigy at 1-800-776-4439 to find out if the free start-up kit offer, as well as a free month of Prodigy is still available. Use the Prodigy technical support line, at 1-800-284-5933 to find out if your city has a local Prodigy access number. If a number is not available to you, you may still use the service, but you will have to pay long distance as well as monthly fees.

Prodigy offers some of the services that are available on the more expensive, more established on-line commercial information service, CompuServe. Unfortunately, the amount of time necessary to access these services, the speed at which information is displayed, and the limited ability to print acquired information really prohibits use of the system for anything other than for light recreational use.

Another thing that may drive you a little crazy is the amount of advertising you're subjected to. With every screen change that happens on-line, another advertisement is drawn at the bottom of your monitor. Some of the ads are cute, but they're very distracting. If you're the type that goes to the bathroom when you see commercials on television, the Prodigy service is not for you - you'll be in there all day!

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Power "BBS'ers" will have trouble with the messaging system that Prodigy offers. Though the Prodigy software offers resolution up to Super-VGA, the message and text editor is about 40 columns wide by about 12 lines or so. You can type up to 4 "pages" per message. Since most of the processing of the Prodigy service takes place on your own computer, the only time you're actually sending data over your modem is after you've composed the message, and select the SEND option from the Prodigy menu. If you take longer than a half-hour to compose a message, Prodigy will disconnect you. Prodigy also surcharges users who send more than 30 messages per month at a rate of 25 cents per message. This surcharge can add up quickly if you plan to use the system as often as you probably use your favorite BBS.

Moving around Prodigy is easy, though the time lag getting from one place to another is enough to drive you crazy. However, if you're new to commercial on-line systems, Prodigy is a great way to get started. It's mouse or keyboard driven, and allows other members of your family to use the system, under their own user accounts, at no additional charge. Also, Prodigy is in full color if you have an EGA graphics display or better. It's sure to fascinate the kids, and keep them entertained for hours.

Prodigy also features an on-line encyclopedia, a headline news wire, and on-line games. The artists responsible for some of the elaborate Prodigy graphics displays also work on a monthly entry to the art gallery, which is interesting to watch.

If you're new to commercial information services, Prodigy is a great way to become accustomed to them. If you're a CompuServe user, Prodigy is worth a peek. Though there are no support forum for broadcasters as of this writing, there are enough technical topics to make things interesting, and who knows? Prodigy could be an affordable replacement for your on-line commercial services addiction!

## PC BuyerBase To Become Available In Early 1991

PC BuyerBase, operated by InfoWorld Magazine, is an on-line service scheduled to be available early next year. The service, which is now staffed by live PC product specialists, offers callers answers to questions concerning computer equipment and peripherals. Product and design recommendations, as well as networking solutions and product evaluations are all available from PC BuyerBase.

Though the call to 1-800-624-3301 is free, use of the service is not. Callers are charged a one-time fee of \$49.95, which includes 15 minutes of talk time. Additional time is assessed at \$1.75 per minute, or \$1.25 per minute with a 2-hour minimum.

PC BuyerBase product reviews and comparisons will date back to August 1st, 1989, and will be updated daily. More than 1,000 hardware, software, networking and peripheral products are tested and evaluated each year by InfoWorld's Test Center.

## Second Opinion BBS (SBE Chapter 28) Moves 10 Blocks, Has New Number

Second Opinion BBS has moved from Wauwatosa to Milwaukee, and is now being operated by Terrance Baun. Mark Timpany, former SysOp of Second Opinion, is moving out of the country for a few years. Please make note of the new number: 1-414-873-7807.

## SpectroNet BBS Network Serves Broadcast/Production

If you're a SysOp and you're running FIDOnet-compatible software, consider contacting David Musick at Electronic Arts BBS (FIDOnet address 1:363/61) to join SpectroNet!

SpectroNet consists of a group of industry-related message bases (or "echoes"), which are made available for industry professionals only. It's an ideal way to keep up with broadcasters from all over the country!

Echoes available on SpectroNet:

ACTORNET - Actor/Actress conference, acting related  
MODELNET - Professional Modeling  
AGENTNET - Representation  
VIDEONET - Video Production & Post  
AUDIONET - Audio Production & Post  
RADIONET - Radio Broadcasting  
FILMNET - Motion Picture Production & Post  
PHOTOGRANET - Still Photographer's Conference  
VOICEOVERNET - Announcing and Voiceover Talent  
FREELANET - Production Freelancer's Conference  
MANAGENET - Facilities Management and Operations  
TVNET - Television Broadcasting  
ADDNET - Advertising Conference  
STAGENET - Live Theater  
ENGINET - Engineering Pool  
JOBMARKETNET - Media Job Offerings & Resume's  
CABLENET - Cable Television Conference  
GRIPNET - Lighting and Grip Conference  
TWOWAYNET - Connection and Frequency Coordination  
MUSICIANET - Musician's Conference  
MIDINET - MIDI Conference  
UNIONET - Media Union Topics  
DEMOGRANET - Demographics & Marketing  
DIRECTORNET - Director's Conference  
LPTVNET - Low Power Broadcast Television  
CHITNET - General Media Chit-Chat  
CHATNET - "Ask The Media"  
PRINTNET - Journalist and Writer's Conference  
SCREENET - Screenwriter's Conference  
SPECSYS - Network SysOp's Conference  
GRAPHNET - Animation and Computer Graphics Conference  
PUBLISHNET - Publishing Topics  
DTPNET Desktop Publishing  
ARTNET Artist's Conference

In addition to Electronic Arts, The Broadcaster's BBS in Phoenix will be carrying all of the SpectroNet echoes. Many other BBS's are involved in SpectroNet - ask your local FIDOnet SysOp to join us so that you can access many of these new conferences.

# BBS Listing

## Broadcast Oriented BBS Listings

Special thanks to Mark Leff of CNN/Atlanta for the original list.

**201 769-1779**

Visions Infoline II  
Sysop(s): Jeff Morgan  
Plainfield, NJ  
BBS Type: Wildcat - Speed: 3/12/24  
PC-Pursuit Code: NJNEW

**201 857-8880**

Rockboard  
Sysop(s): Adam Curry  
Verona, NJ  
BBS Type: Hermes (Mac) - Speed: 3/12/2400  
PC-Pursuit Code: NJNEW

**203-438-9908**

Orion's Nebula  
SysOp: Ward Carpenter  
Ridgefield, CT  
BBS Type: OPUS - Speed: 1200/2400

**205 859-3030**

Traveler  
Sysop(s): Mike Bennett  
Huntsville, AL - Company: WAHR-FM  
BBS Type: Phoenix - Speed: 3-2400

**206 443-6170**

W. Wash. Freq Coord  
Sysop(s): Walt Jamison  
Seattle, WA  
BBS Type: OPUS - Speed: 3/12/24  
PC-Pursuit Code: WASEA

**206 566-1155**

AmoCat  
Sysop(s): Rich Langsford  
Tacoma, WA  
BBS Type: Wildcat - Speed: 3-9600 HST

**212 415-3500**

HyperCube Systems  
Sysop(s): Mike Oswald  
New York, NY  
BBS Type: PCBoard - Speed: 3/12/24  
PC-Pursuit Code: NYNYO

**212 645-8673**

Communication Specialties  
Sysop(s): Rich Brooks  
New York, NY  
BBS Type: Searchlight - Speed: 12-9600HST  
PC-Pursuit Code: NYNYO

**214 647-0670**

DFW Freq Coord Counc  
Sysop(s): Darryl Doss  
Allen, TX - Company: SBE Chapter 67  
BBS Type: OPUS - Speed: 3-96 HST  
PC-Pursuit Code: TXDAL

**215 364-3324**

Satalink  
Sysop(s): Ron Brandt  
Huntingdon Vly, PA  
BBS Type: PCBoard - Speed: 12/24/9600

**216 529-0121**

Signal BBS  
Sysop(s): Lynn Laymon  
Rocky River, OH  
BBS Type: PCBoard - Speed: 3/12/2400  
PC-Pursuit Code: OHCLE

**219 256-2255**

Radio Daze  
Sysop(s): Mike Shannon  
Mishawaka, IN  
BBS Type: GAP - Speed: 3/12/2400

**301 725-1072**

FCC Public Access  
Sysop(s): Bob Weber  
Suburban DC, MD - Company: FCC  
BBS Type: custom - Speed: 300/1200  
PC-Pursuit Code: DCWAS

**303-341-0129**

Colorado Broadcast Frequency Coordinating Committee (CBFCC)  
SysOp: Jeff Brothers  
Aurora, CO  
BBS Type: OPUS - Speed: 2400 Baud

**303-949-3253**

Master Control  
SysOp(s): Lynn Osburn  
Avon, CO  
BBS Type: OPUS - Speed: 300-9600v.42

**305-828-7909**

Telcom Central  
SysOp: Ray Vaughn  
Miami Lakes, FL  
BBS Type: OPUS - Speed: 300/1200/2400/9600HST

**315 474-5070**

SBE Chapter 22  
Sysop(s): Steve Hines  
Syracuse, NY - Company: SBE  
BBS Type: RBBS - Speed: 3/12/2400

**317 935-0531**

Allied-Radio World  
Sysop(s): Bob Groome  
Richmond, IN - Company: Allied  
BBS Type: Michtron - Speed: 3/12/2400

**402 289-2515**

KFMQ 102 Connection  
Sysop(s): Dan ?  
Lincoln, NE - Company: KFMQ Radio  
BBS Type: WWIV - Speed: 1200/2400

**404 320-6202**

AV-Sync Atlanta (tm)  
Sysop(s): Bill Tullis  
Atlanta, GA  
BBS Type: PCBoard - Speed: 12-9600HST  
PC-Pursuit Code: GAATL

**404 982-0960**

Rock & Roll Atlanta  
Sysop(s): Bob Helbush  
Atlanta, GA  
BBS Type: PCBoard - Speed: 1200-2400  
PC-Pursuit Code: GAATL

**407 239-2607**

Producer's Circle  
Sysop(s): Skeeter Durham  
Orlando, FL  
BBS Type: GT Power - Speed: 3/12/2400

**407 649-9834**

Electronic Arts Info  
Sysop(s): Jeff Alwin  
Orlando, FL  
BBS Type: QuickBBS - Speed: 3/12/24

**408 985-8675**

KOME Silent Side  
Sysop(s): Greg Argendeli  
San Jose, CA - Company: KOME-FM  
BBS Type: Michtron(Atari) - Speed: 300/1200  
PC-Pursuit Code: CASJO

**412 981-3151**

Mabel's Mansion  
Sysop(s): Charles Ring  
Sharon, PA  
BBS Type: OPUS - Speed: 12-9600HST

**414 873-7807**

Second Opinion  
Sysop(s): Mark Timpany  
Milwaukee, WI  
BBS Type: Wildcat - Speed: 12-96HST  
PC-Pursuit Code: WIMIL

**415 391-2657**

NCFCC  
Sysop(s): Tim Pozar  
San Francisco, CA - Company: Northern Calif. Freq. Coord. Cmte.  
BBS Type: RBBS - Speed: 3-2400  
PC-Pursuit Code: CASFA

**415 571-6160**

Production World  
Sysop(s): Wes Dorman  
San Mateo, CA - Company: Film/Tape World Magazine  
BBS Type: Red Ryder Host - Speed: 3/12/24  
PC-Pursuit Code: CAPAL

**415 641-4373**

Information Radio  
Sysop(s): Dave Evans  
San Francisco, CA  
BBS Type: Wildcat - Speed: 3-2400 v42  
PC-Pursuit Code: CASFA

**419 228-7236**

Black Hole BBS  
Sysop(s): Fred Vobbe  
Lima, OH  
BBS Type: TBBS 2.1 Multiline (8 Lines) - Speed: 3-14.4

**501 753-6536**

N.L.R.-80  
Sysop(s): James Padgett  
Little Rock, AR  
BBS Type: Spitfire - Speed: 12-2400

**518 283-4067**

Northeast Networks  
Sysop(s): John Nelsen  
Albany, NY  
BBS Type: PCBoard - Speed: 12/24

**601 373-0160**

Net-Works  
Sysop(s): Herb Jolly  
Jackson, MS - Company: Myers Bdcst Svcs/  
J&J Software  
BBS Type: Galacticomm - Speed: 1/24

**602 438-0459**

CRL  
Sysop(s): Hank Langlinas  
Phoenix, AZ - Company: CRL  
BBS Type: RBBS - Speed: 12-2400  
PC-Pursuit Code: AZPHO

# BBS Listing

## Broadcast Oriented BBS Listings

**602 482-1001**

Catalyst  
Sysop(s): David Kidder  
Phoenix, AZ - Company: Take 3 Inc.  
BBS Type: TBBS - Speed: 3/12/24  
PC-Pursuit Code: AZPHO

**602 872-9148**

Broadcasters BBS  
Sysop(s): Mark Shander  
Phoenix, AZ  
BBS Type: RemoteAccess - Speed: 3/12/2400  
PC-Pursuit Code: AZPHO

**608 274-7776**

Communications Exch  
Sysop(s): David Willow  
Madison, WI  
BBS Type: GT Power - Speed: 12-9600HST

**616 530-0821**

Trillion  
Sysop(s): Dick Castanie  
Grand Rapids, MI  
BBS Type: Wildcat - Speed: 3/12/24

**617 439-5699**

Boston CitiNet  
Sysop(s): JAE/Koch  
Boston, MA - Company: Applied Videotex Systems  
BBS Type: Yellow - Speed: 300/1200  
PC-Pursuit Code: MABOS

**619 298-4027**

So. Calif. MediaLine  
Sysop(s): Steve Tom  
La Jolla, CA  
BBS Type: PCBoard - Speed: 12/24/96H  
PC-Pursuit Code: CASDI

**703 455-1873**

VideoPro  
Sysop(s): Tom Hackett  
Burke, VA  
BBS Type: PCBoard - Speed: 3/12/24  
PC-Pursuit Code: DCWAS

**703 538-6540**

East Coast Pub Net  
Sysop(s): Charlen Kyle  
Suburban DC, VA  
BBS Type: PCBoard - Speed: 3-2400  
PC-Pursuit Code: DCWAS

**707 553-8452**

KDA Message System  
Sysop(s): Keith Davidson  
Vallejo, CA  
BBS Type: PICS - Speed: 3-2400

**713 997-7575**

Ed Hopper's  
Sysop(s): Ed Hopper  
Houston, TX  
BBS Type: PCBoard - Speed: 3/12/24  
PC-Pursuit Code: TXHOU

**713 855-4382**

Cloud Nine  
Sysop(s): David Armstrong  
Houston, TX  
BBS Type: PCBoard - Speed: 3-96HST  
PC-Pursuit Code: TXHOU  
Second node at 859-8195.

**713 974-3912**

SBE Chapter 105  
Sysop(s): John Harvey  
Houston, TX - Company: SBE  
BBS Type: PCBoard - Speed: 3-12-2400  
PC-Pursuit Code: TXHOU

**717 731-8966**

Cat's Castle  
Sysop(s): Dale Fedorchik  
Harrisburg, PA  
BBS Type: Wildcat - Speed: 3/12/2400

**719 634-5661**

ColoSprgs Broadcast  
Sysop(s): John Anderson  
ColoradoSprings, CO  
BBS Type: TBBS - Speed: 3/12/2400

**800-766-1720**

Idiot Box BBS  
SysOp: Michael White  
Hemet, California  
BBS Type: RBBS - Speed: 1200/2400

**800-283-5313**

The Spin-Off BBS  
SysOp: Michael White  
Hemet, California  
BBS Type: RBBS - Speed: 1200/2400

**801 967-9716**

Planet Vulcan  
Sysop(s): Chuck Condron  
Salt Lake City, UT  
BBS Type: Wildcat - Speed: 3-14.2KHST  
PC-Pursuit Code: UTS LC

**804 393-6390**

Tidewater Media Link  
Sysop(s): George Randell  
Portsmouth, VA  
BBS Type: PCBoard - Speed: 12/2400

**804 550-3338**

Flamethrower  
Sysop(s): Jeff Loughridge  
Richmond, VA  
BBS Type: Binkley/OPUS - Speed: 3/12/24

**804 973-8235**

Broadcasters BBS  
Sysop(s): Pat Wilson  
Charlottesville, VA  
BBS Type: PCBoard 12 - Speed: 3/12/24

**806 352-2482**

Radio Online  
Sysop(s): Ron Chase  
Amarillo, TX  
BBS Type: PCBoard - Speed: 12-96HST  
Second node at (806) 352-9365.

**813 527-5666**

St Pete Pgm Exchange  
Sysop(s): Bill Blomgren  
St Petersburg, FL  
BBS Type: PCBoard - Speed: 12-96HST

**818 248-3088**

Hot Tips  
Sysop(s): Mike Callaghan  
Glendale, CA  
BBS Type: Wildcat - Speed: 1200/2400  
PC-Pursuit Code: CAGLE

**818 363-3192**

Call Sheet  
Sysop(s): Wayne Parsons  
Los Angeles, CA  
BBS Type: TBBS - Speed: 300/1200  
PC-Pursuit Code: CAGLE

**818 567-6564**

Hotline  
Sysop(s): Jon Badeaux  
Glendale, CA  
BBS Type: PCBoard - Speed: 12-19.2HST  
PC-Pursuit Code: CAGLE

**916 338-5227**

KBBS  
Sysop(s): Mark Stennett  
Sacramento, CA  
BBS Type: QBBS - Speed: 3/12/24  
PC-Pursuit Code: CASAC

**916 646-3600**

FM102  
Sysop(s): Les Tracy  
Sacramento, CA - Company: KFSM Radio  
BBS Type: QuickBBS - Speed: 300/1200  
PC-Pursuit Code: CASAC

**916 646-9358**

Scratching Post  
Sysop(s): Stacy Rothwell  
Sacramento, CA  
BBS Type: QuickBBS - Speed: 3/12/24  
PC-Pursuit Code: CASAC

**916 728-5700**

Entertain-Net  
Sysop(s): Les Tracy  
Citrus Heights, CA  
BBS Type: TBBS multiline - Speed: 3/12/24  
PC-Pursuit Code: CASAC

**918 437-9004**

The Radio BBS  
Sysop(s): Clark Dixon  
Tulsa, OK  
BBS Type: QuickBBS - Speed: 2400

**919 481-2947**

Recording Studio  
Sysop(s): Greg Nowak  
Cary, NC  
BBS Type: WWIV - Speed: 3/12/24  
PC-Pursuit Code: NCRTIP

## Don't Be Invisible

If you have a BBS, and it's not listed here, call Radio Guide at (507) 280-9668 and we'll get it on the list.

If you discover any errors or problems with any of the boards listed here, let us know that too.

It's funny how the engineer at a radio (or TV) station gets to be the jack-of-all-trades, and master of none in my case. I guess it just goes with the territory...it's kind of a necessity in most cases. If the transmitter goes off the air, the engineer gets it back on. If the sidewalk is icy, the engineer gets the Ice-melt and spreads it around. If the toilet overflows, the engineer gets out the mop and cleans it up, then fixes it so it won't do it again, until next time. When the sales department needs a way to keep a list of the station's clients separated in one place, the sales manager asks the engineer to come up with something.

Well, since the engineer is usually the resident computer expert, why not? In my case, I came up with an application in Paradox 3, the database from Borland Intl., the manufacturers of such classics as Turbo Basic, actually *all* the turbo languages including C, Pascal and others. I realize the original Paradox was not the brainchild of Borland, but rather Ansa Software which later sold Paradox to Borland.

I originally purchased Paradox 1, but never really took the time to sit down and learn it. When I did, however, I discovered it was a unique and powerful database program, which seemed to break away from the normal way of doing things. It even comes complete with its own programming compiler.

My mission at KEZJ was to see if I could come up with a database application that was easy to operate (so the sales manager could do it) and yet powerful enough so just about anything could be done with it.

My application program in Paradox 3 contains a good bit of information about each client of the station, including the business name, person to contact, post office address and physical address, two phone numbers, city, state, zip, and of course some space for the ever-popular "remarks." It also keeps the name of the sales person for each account as well as the previous

sales person, if any. We also have a baby sister business at the radio station called the "Bargain News." It is a tabloid size weekly shopper. The same application program has a space for the name of the sales person for the clients. That way, we don't have to keep separate databases for both the radio station and the newspaper.

Of course as with any database program worth its salt, you can sort and extract the one thousand plus clients any way you want. If you want to pull out the clients for any particular sales person, it can be done just by entering the search criteria in any of the categories listed above. You can find all clients with a certain zip code; only P.O. box numbers; only businesses in a certain town or phone prefix area plus many more possibilities and a combination of all the above.

There are a couple of good things about creating something like this, as well as a few negative things. The sales manager, as well as any one else who knows what is going on, thinks you are a "god." He thinks the world rises and sets upon you, the lowly engineer, and that you can do no wrong. And, of course, we all know that contributes to job security! Naturally though, there is always the down side in that if anything ever happens to the list of clients, and any of us who have worked with computers know it's not "if" but "when," you are the one responsible.

If you don't have a good explanation as to just why the computer lost *all* the clients information (which ours did just recently), you are not only responsible for the loss, but you are also responsible for the Persian Gulf fiasco and for his dog's recent miscarriage of the prize Golden Retriever pups. And, as we all know, that doesn't do a lot for job security.

I must say, it is a great addition to the station to have such a database, and if your clients are not on one, maybe you should check out the possibility. Paradox 3 is rated as one of the best, if not *the* best programmable-relational database on the market.

It does seem though, that databases are somewhat like actual programming languages. Some are better for certain tasks, and others are better for still a different kind of task. In my experience with Paradox 3, (version 3.5 is out now) I found myself working around some of its apparent limitations. But after I achieved my goal of a certain task within Paradox, I was better able to understand some of the so-called limitations that were actually there for a reason.

Paradox would be a natural for cataloging parts in the engineering department. Once you catch on to the Lotus-like menu structure, you will be surprised at just how quickly you can start doing some fairly sophisticated programming. Once you have the database part down, you can go into the Paradox Personal Programmer and turn the application into a full-blown, self-contained compiled program.

Borland also sells, for a mere pittance of \$29.95, a Paradox Runtime package which allows you to sell your application programs to others if you wish, or to at least run your applications on several computers at once without being in violation of copyright laws.

If you need an excellent database program, Paradox 3 can do just about anything you can dream up. Paradox 3, and the new 3.5 version, are available from Borland Intl., 1800 Green Hills road, PO Box 660005, Scotts Valley, CA., 95067-9985. Order number is 1-800-331-0877. Retail price is around \$700 but mail order is somewhat less.

System requirements include 640K of memory and a hard disk. However, you will find that Paradox is very disk-intensive, and that expanded memory and a faster chip such as the 80286 or higher will greatly enhance the speed of the program.

Don't forget to send me your ideas for articles...things you have done in your engineering department with your computer, etc. Our FAX number is 1-208-733-7525.





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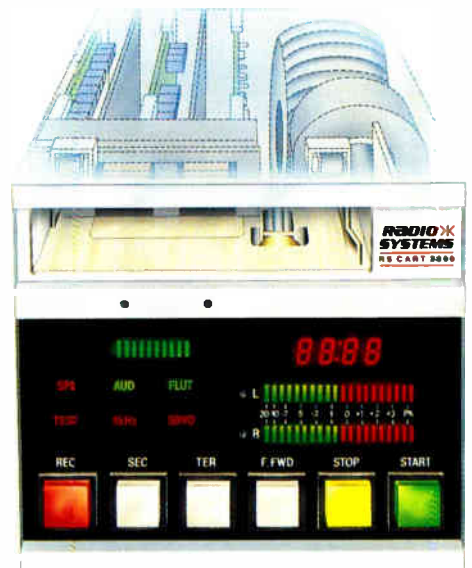
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