

RADIO GUIDE

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A Forum for Radio Engineers
Ray Topp Editor/Publisher (507) 280-9668

March 1989

Volume 2 - Issue 3

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511 18th Street SE

Rochester, MN 55904

Sweet Sixteen

As you can see, the Radio Guide has expanded to sixteen pages. This was our final goal from the beginning and it's gratifying to see that it has happened long before it was due. The reason - - you've taken Radio Guide to heart and have assured me that it's on the right track. Best of all, and most importantly, many of you are contributing tech tips and articles.

Back in July, I wasn't all that sure Radio Guide was going to make it. I figured that engineers would appreciate a fresh nuts and bolts approach but, frankly, it wasn't going to go anywhere without advertising support. A paid subscription publication is a great idea, in principle, but it's a bear trying to make it work. The problem in the broadcasting industry is, that there just aren't enough potential readers to make that approach work.

At the very start, I decided to lay down a strict advertising policy. The advertisers you see in Radio Guide are there because they have paid for the space, and expect to sell more product with their advertisements. Furthermore, all the advertisers you see in the Guide realize that I will not prejudice any editorial copy because of it. Many of you have taken the time to call and write to compare the Radio Guide with the other trade publications. First of all, I do not consider the Radio Guide to be a true trade publication. We do not do product reviews or new equipment press releases, nor do we wish to! In my opinion, paid display advertising is the proper forum for that.

Now, straight to the point. What would any of us do without the other publications (one in particular - - do I have to say)? How have most of us learned about the AM Stereo "debate," the "engineer" controversy, FCC developments, and any one of a hundred topics affecting our industry. We read it - - and not necessarily in the Radio Guide. Every publication serves it's own purpose. We can only hope that pupose serves the readers, as well.

Radio Guide is not in competition with the other trade publications. I won't waste my time trying to outguess another publication's direction or content. This industry is too small and it's information needs too great, to let that happen. The end result, I think, would be redundancy. So, Radio Guide will stick to nuts and bolts. It's the reason for our success, and we will never disregard that.

As of this issue, we will be reaching all TV stations in the country. Take it easy now! It doesn't mean we're going to change our content one bit. We'll still be radio technology. It's just that many TV engineers have called to tell me that they would like to get their own copy of Radio Guide. Just because they deal with color bursts, rasters and back porches, doesn't mean they don't wish to know more about the real glamour industry. Hey - - we'll forgive them. There's 10,000 radio stations and only a couple of thousand TV stations, so who's big time? And besides, Radio doesn't have to worry about ratings (did I say that?) . . . editor

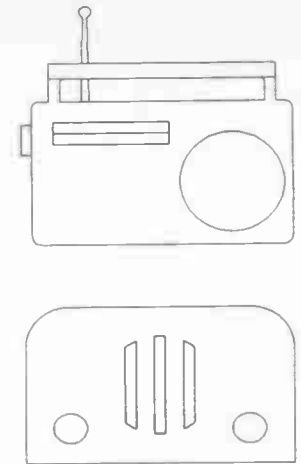
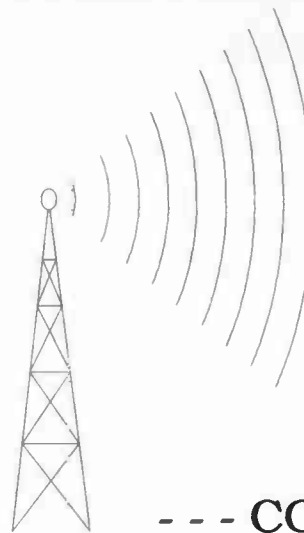
See The Used Equipment Guide Section

Please - Send Articles & Tips

Even though Radio Guide is in your mail each month, it doesn't mean we can let up. Please send those technical tips and articles in to the Guide. Don't think that it requires special talent to write for this publication. I think we can all agree that it's **what** you have to say, that's important. Radio Guide exists to solve problems. All of us are problem solvers - - it's our job. Tell us about one problem, and how you corrected it.

If you have a special hint or kink, test procedure, or anything of technical value, write it down and send it in. It will be published. Most of the articles are, by their nature, fairly brief; we need the participation of more engineers than you might think.

Starting with this issue, all of your articles and tech tips will be paid for. For an article of 2000 words, you will get \$30.00, for an article of 1000 words, you will get \$15.00, and for a tech tip, you will receive \$5.00. For odd length articles, we'll work something out.



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Do You Have the Answers?

Bauer 607 1 kW FM Parasitics

Robin McDaniel, of KDEZ Radio in Newton Kansas, has a severe parasitic oscillation problem with their transmitter. The plate overloads and the choke in the B+ line burns up. If you have the solution or can offer assistance, please call Robin at (316) 283-5150.

Technics SP10 Turntable Speed Trouble

David C. Wright at WUNC Radio, Chapel Hill North Carolina, has a Technics SP10 MKIII with a speed problem. The MKIII is the model with variable speed, and that appears to be part of the problem. The unit will indicate 33 rpm, but actually be rotating at some random speed. The problem is intermittent and he hasn't been able to test it - - as usual, the problem disappears when he starts working it. The unit has also been blowing fuses.

Anyone having similar problems with this turntable, please call David at (919) 966-5454.

CCA FM 3000D Info Needed

John T. Winkvist at WFPS, Freeport Illinois, has need of detailed information and schematics on the operating panel of the transmitter, as well as the whole transmitter. It seems that there have been numerous modifications to the control panel. The overload system has been completely bypassed and everything seems to be running on only four relays instead of all of them. He wants to know what the panel is SUPPOSED to do and what the original wiring was like.

He says the mounting plate for the 8122 IPA looks as though it was home-brewed. Whoever made it, seemed to have forgotten that a tube needs air-flow for cooling. If anyone out there has an original box, take the time to shoot a couple of Polaroids of the IPA mounting plate area, and send them to John; he'd like to get it back to original specs.

John's address is WFPS, Engineering Dept., Box 701, Freeport IL, 61032. His phone number is (815) 235-7191. Call him early in the morning, as he is the overnight jock as well.

Mistakes and Corrections

Phone Coupler Queries

In the January-89 issue of Radio Guide, on page 3, there was an article and schematic for a remote telephone coupler box. A couple of people have written to inquire how relay K2 will drop out when you are through using the device.

The relay is held in by the phone line voltage, during use. When you disconnect the studio end of the phone line, the telco company provides a momentary battery disconnect at the coupler end of the line. This is a normal function of the telephone system, and allows the relay K2 to drop out.

FCC Rules and Regs Info - - Again

A number of people have called to inform me that the info regarding the loose-leaf style, FCC rules and regs in the January-89 issue of Radio Guide, had listed incorrect stock numbers for the publications. Here is the "right stuff."



Publication	Stock Number	Price
Volume I (parts 0,1,19)	004-000-00460-4	9.00
Volume II (parts 2,5,15,18)	004-000-00459-1	11.00
Volume III (parts 73 & 74)	004-000-00471-0	17.00
Volume IV (parts 90 & 94)	004-000-00474-4	11.00
Volume V (parts 21,22,23,25)	004-000-00462-1	10.00
Volume VI-B (parts 41,42,43)	004-000-00463-9	2.25
Volume VII (parts 61-69)	004-000-00462-1	10.00
Volume VIII (parts 76 & 78)	004-000-00473-6	4.00
Part 13	004-000-00458-2	1.00
Part 17	004-000-00461-2	1.50
Part 80	004-000-00475-2	6.00
Part 87	004-000-00466-3	3.25
Part 95	004-000-00467-1	2.00
Part 97	004-000-00468-0	3.00
Part 99	004-000-00469-8	1.25
Part 100	004-000-00470-1	1.00

Jim Nelson of Greenville North Carolina informed me of the stock numbers of the smaller, book style, bound volumes. Each 6 x 9 volume is bound and contains a range of FCC parts.


Volume	Stock Number	Price
Parts 0-19	869-001-00164-0	17.00
Parts 20-39	869-001-00165-8	21.00
Parts 40-69	869-004-00174-6	9.00
Parts 70-79	869-001-00176-4	17.00
Parts 80-100	869-004-00176-2	19.00

All of these FCC rules and regs may be ordered from the GPO in Washington, DC. The phone number is (202) 783-3238. If you have any questions regarding these publications, please give me a call at (507) 280-9668. I'll be glad to help . . . editor


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Sans Mod Transformer

By Ron Schacht, CE, WNAK, Nanticoke PA

What to do when your one and only modulation transformer goes to ground, or worse, across the windings. First, generally, if it goes to ground, you can put it on a block of dry wood and get back on the air until a new transformer is obtained. Don't think this is a permanent cure, because usually whatever made it short to ground will ultimately cause a primary to secondary short.

Here is where old Heizing comes in. This modulation method has been used over the years in various communications equipment, such as aircraft, as the equipment is not as heavy without a modulation transformer. Here is how we can get back on the air without the old iron. You must remember that you won't modulate 100%, your positive modulation will be low and you may have a tad more distortion. But, you will be on the air, serving your listening public in radio land and making money to buy the new transformer.

First, as always, turn off the transmitter AC breaker and discharge all power supplies with "the stick". After the old transformer is disconnected, choose the plate lead from one of the modulator tubes (preferably the side with the best tube). Tie this line directly to the RF side of the modulation reactor. Normally the RF side of the choke goes to the PA stage plates. If you have no spare parts, leave it there.

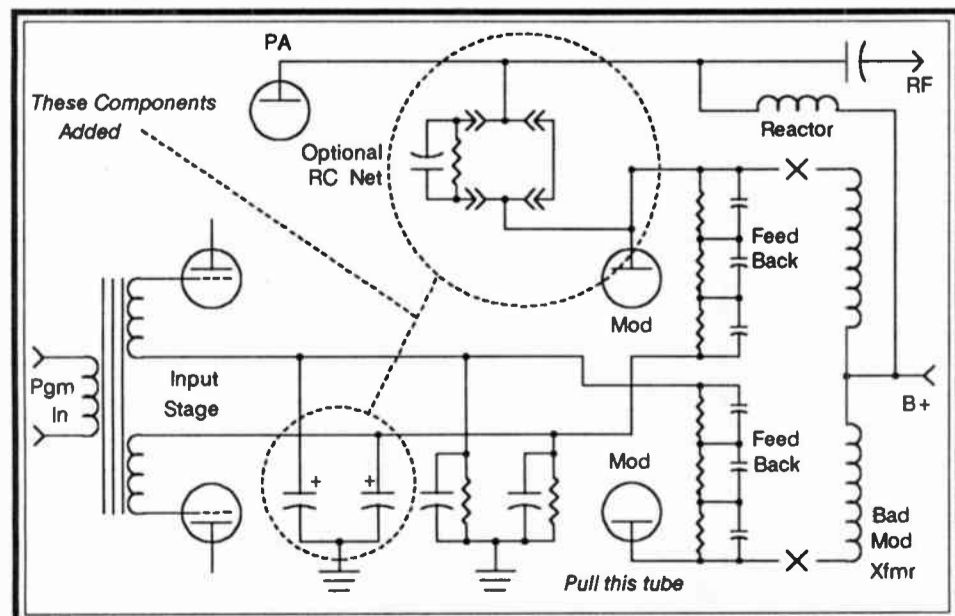
If you have some big resistors and capacitors, set up a parallel RC combination of a resistor and capacitor, in series with this line. The capacitor should be about 4uF rated at least at the transmitter plate supply. The resistor should drop about 500 Volts across it for 1 to 5 kW or about 1000 Volts for 10 kW and up, at a wattage rating according to its DC dissipation. For an average kilowatt, a 50 watt job will do. This will give a more symmetrical waveform, helping in the positive direction. But as I said, if you don't have the parts, don't waste time looking for them. Finally, pull the un-used modulator tube.

Locate the input transformer. In most transmitters, the feedback ladders return to the low side of the input transformer, in a 180 degree phase-shift. Generally, most transmitters will operate just fine with no DC returned to the fist audio grids. If this is the case with yours (RCA, ITA, Ratheon, Gates), take two trusty clip-leads and ground the two bottom ends of the input transformer secondaries. If you must preserve the DC on the input stage grids, ground the same points through a pair of 10uF 150V capacitors. This will eliminate the feedback but will let the DC through OK.

If you have a Raytheon, the feedback ladders can be completely disconnected, as they are on the second stage. Eliminating the DC and AC feedback will generally make the input stage operate closer to Class A, working on both sides of the AC cycle rather than either the positive or negative side, as it was used to.

Without audio applied, fire up the transmitter and check the idling plate current on the remaining modulator. Run it up to about one and one-half times its normal (again, we are trying to approach class A operation). Now, very carefully, bring up the audio. The transmitter will need much less audio with the feedback strapped out, so watch out. Basically, adjust the modulation so it "sounds OK", but usually 60-70% is good.

I hope this saves somebody some air time in an emergency as it has worked for me at numerous stations from 500 Watts to 25 kW.



From The ALLIED Technical Notebook

The Denon Cart Player® is the most popular machine in all of radio. Many ingenious methods have evolved to interface it with consoles of all types. Henry put them all in one box.

1. The Denon CD player uses 5 volt logic. Many consoles use 12 volts. Connecting the CD player directly to the console could cause lots of damage. LogiConverter solves this problem by isolating the console logic voltage from that of the Denon CD player. "LogiConverter provides double isolation. Opto-isolators on the inputs, and relays on the outputs."
2. Connecting the remote-control circuits of the Denon directly to the console will probably cause a ground loop, because the audio and control grounds will tie together in the console. LogiConverter prevents this from happening, to preserve S/N performance. "LogiConverter eliminates ground loops."
3. Many consoles use logic outputs for remote control. In many cases, a circuit goes "HI" (+12 v) for START. The Denon CD requires a logic LO. LogiConverter eliminates this problem.
4. Some consoles provide only a maintained closure for remote Start. The Denon CD needs a momentary. LogiConverter solves this problem, because it can convert maintained inputs to momentary outputs.
5. Many installations will require both Start and Stop from the console. Most consoles provide start-only outputs. LogiConverter will add the STOP function even if the console doesn't have it. "LogiConverter can be user programmed to add a STOP function even if the console has Start-only outputs."
6. Up to four CD players can be controlled by one LogiConverter, if Start-only operation is desired. (CD stops at end of track automatically.) If Start and Stop is desired, then two CD players can be controlled by one LogiConverter.



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THE "NFR" STORY

NFR is Noise Free Radio

Over the past year, I have been working on the simultaneous transmission of frequency and amplitude modulation on a standard AM Broadcast Band transmitter. This dual transmission is completely compatible with existing AM radios. And, when received on a new type of "Noise Free Radio," provides high fidelity, clean audio - - typical of FM.

I have prepared a 26-page booklet describing these experiments, and suggesting ways of implementing this new medium in the near future.

To cover the cost of further experiments and demonstrations of NFR at conventions and meetings around the country, I am offering the booklet for sale at \$12.00. If, after reading it, you feel it was not worth the investment, just return it within 30 days for a \$10.00 refund. Thanks!

George W. Yazell PE (retired)

Make your check or money order payable to "Noise Free Radio" and mail to:

Noise Free Radio
P.O. Box 8086
Lakeland, FL 33802

Be sure to include your name and mailing address!

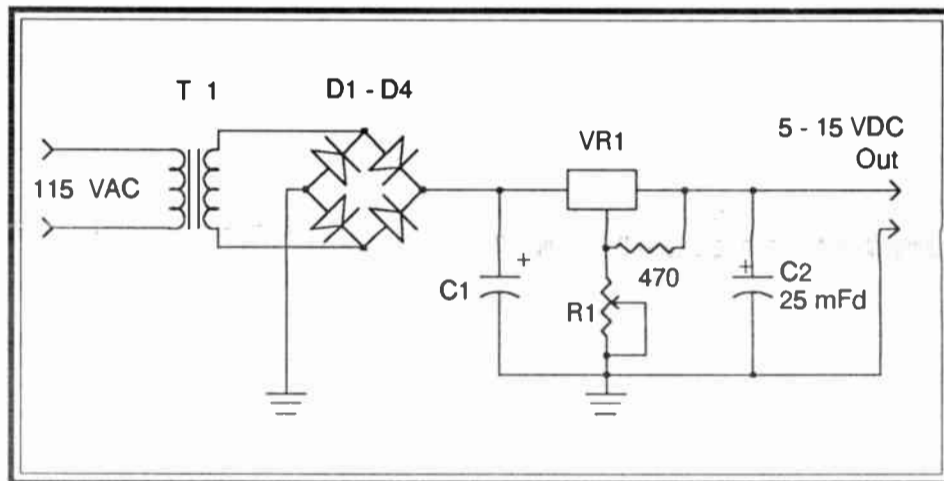
Adjustable Power Supply

*By Chuck Gennaro - WFHR
Wisconsin Rapids, Wisconsin*

An adjustable power supply is a handy item to have, whether for testing, construction or even keeping a piece of equipment running while its main supply is being repaired: As with many other things, a commercial unit can be expensive (translation: corporate bean-counter says no). Here's one that you can build from your junk-box.

T1 can be almost anything, within reason. 18 Volt transformers seem to be glutting the surplus market. A 35 Volt center-tap unit will work as well with a full-wave bridge rectifier; use whatever you have on hand. 1N4001, 1N4004 diodes, all work fine. One of those encapsulated, four-lead rectifier units is great. C1 and C2 are for filtering the DC output. Again, the exact values are not critical. 1000 uF TO 4000 uF for C1 will give satisfactory filtering. C2 should be around 25 uF. VR1 is a 7805 or other 3-lead IC voltage regulator. These little devils can supply up to 1 Amp, with proper heat-sink, and provide overload protection too. They will shut down and cool off, if overloaded. R1 is a 1k pot. It "fools" the regulator into providing up to 15 volts by shifting its ground reference.

This supply will produce regulated voltage from 5 to 15 Volts at up to 1 Amp., if the regulator is heat-sinked. More current can be supplied by adding a couple of series-pass transistors. 2N3055s will work as well as anything. Again, the type is not critical. Don't forget that the current output is also dependent on the capability of T1 and the rectifiers ratings.



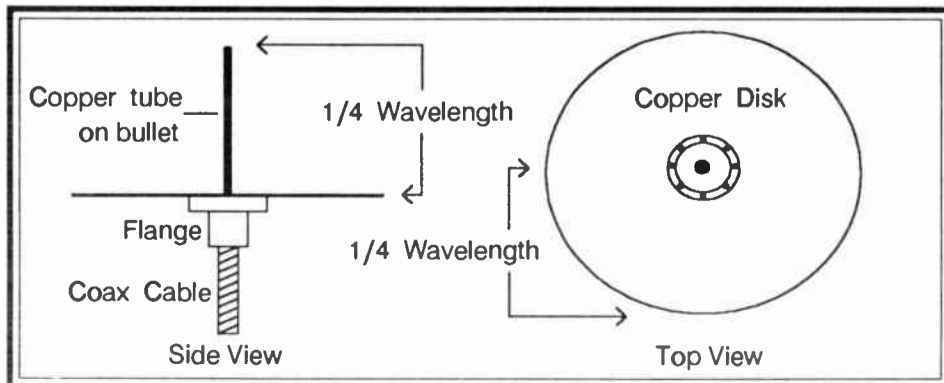
Emergency FM Antenna

*By David Stewart - KBNA
El Paso, Texas*

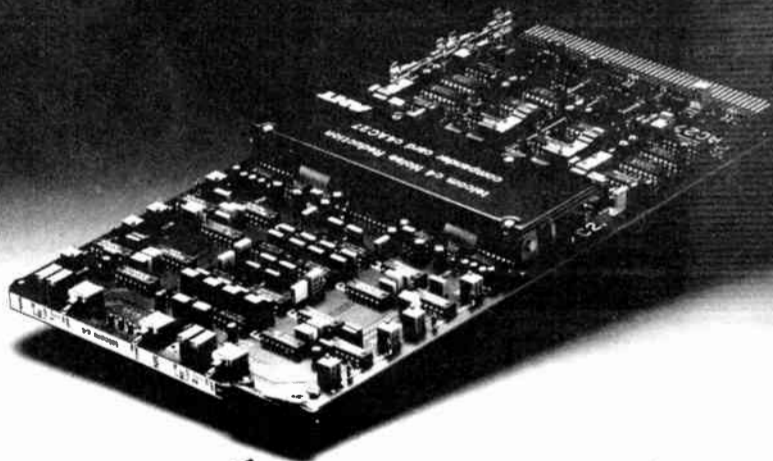
OK, you've smoked your FM antenna, perhaps melted the line down also. This stunt will help you to get back on the air quickly. It's real easy with rigid line because of the flange, but can also be done with flexible cable by adding a field flange.

As shown, the impedance will be about 40 ohms. If the ground plane consists of 1/4 wavelength rods oriented downward at 45 degrees, the radiation resistance will rise to 50 ohms.

Start with the transmitter power as low as possible, then raise power to some reasonable VSWR (1.5 or so). Your goal is to have something on the air.



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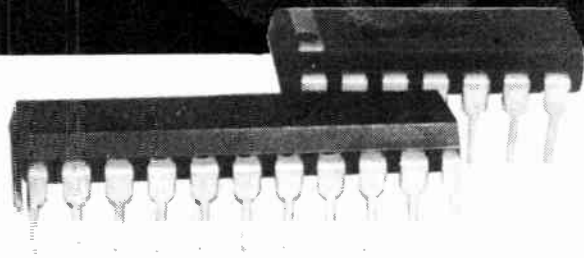
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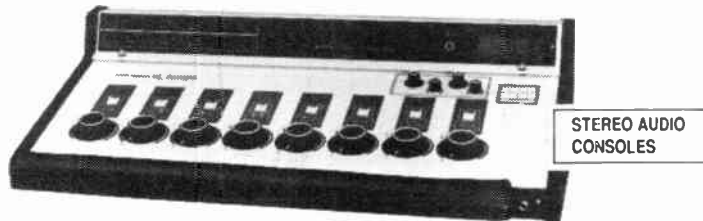
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CD Skipping Cure

**By Jerry Mathis - WSCI/WKKG
Columbus, Ohio**

Many radio stations are using consumer-type DC players in their studios and control rooms. They'll work fine for awhile, then they start having problems. One of the main problems I have encountered is that the music will "skip", much like a turntable stylus jumping one or more grooves of a record. I have found that cleaning the laser pickup lens will solve the problem, at least temporarily (until the lens gets dirty again).

To clean the lens, remove the player from the studio and take it to your bench. Plug the unit in, and open the CD drawer. Be careful so you don't damage the drawer while working on the machine. Unplug the unit and remove the cover. There are usually four or six screws on the sides (possibly one or more in the rear).

After removing the cover, you should be able to see the laser pickup assembly under, and about in the middle of, the drawer mechanism. On top of the assembly you should see a small (about 1/8" dia.) lens. You'll probably find it somewhat clouded by dirt and dust.

The lens and its mounting are rather fragile, so we want to be careful. Take a cotton swab and pull some cotton loose on the end, so it makes a rather fine and delicate brush. Use this to lightly brush the debris from the lens. You can gently blow on the lens as you clean it to be sure all particles are removed, and you don't leave any strands from the swab. Don't use any chemicals, not even alcohol or disc cleaner - - just the light cotton hairs from the swab.

Re-assemble the unit, plug it in, and retract the CD drawer. There's a good chance the machine will play perfectly. If it still skips, then it's time for a trip to the shop.

Don't overlook the possibility that you have some damaged CD discs that are causing your problem. CDs are touted as being practically indestructible (ha!). If you have a disc that always skips at one spot, try the disc on another machine (preferably one of the same model). If it skips in both machines, you may have a bad disc. If it skips just in the one machine, try the cleaning procedure described above.

Incidentally, you might want to check before you open the machine to see if doing so will void the warranty. If the unit is practically new, this might be a problem. If the machine is six months old, and your nearest repair depot is in South Podunk, you're probably not going to send it back to them anyway.

If anyone out there has some tips on troubleshooting and aligning CD player electronics, I'd like to see them. The consumer units almost never come with a schematic, and certainly not a service manual. Is there some basic troubleshooting that could be done with a DVM, 'scope, and maybe a frequency counter?

If anyone else has CD tips send them in. There's a lot of consumer style CD players out there - - are there a lot of problems? . . . editor

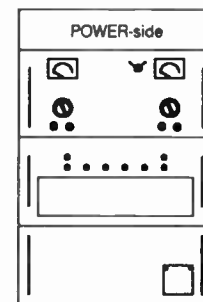
RCA BTF-5/10/20E TRANSMITTERS

We're still looking for articles, tips and information regarding this series of transmitters. There are still quite a few of these transmitters out there, providing reasonable service. In many cases it's taken a lot of work and ingenuity to keep them running, and to find parts (if any). Send those articles and tips to:

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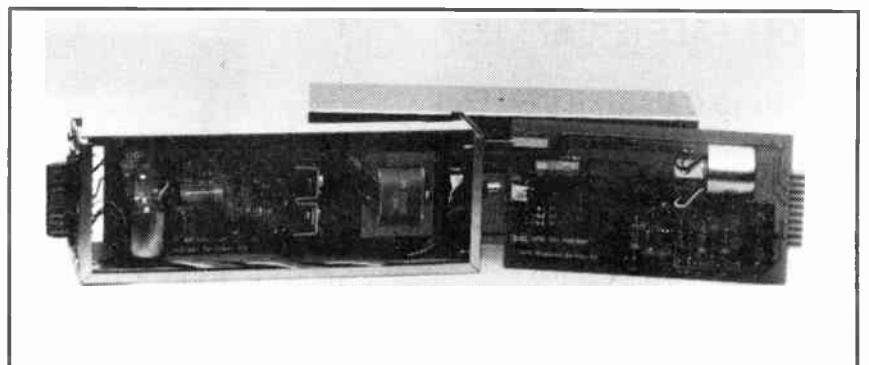
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"Pledge" Not to Clean Teflon-Coated Solenoid Plungers

By **Time McCartney - KBSU**
Boise, Idaho

A cart machine is supposed to fire every time. So, when it doesn't, the culprit frequently is a solenoid which fails to properly pull in the pinch roller.

A sluggish solenoid is usually improved by the dampening adjustment at the back of the can, since the speed of solenoid operation is directly proportional to the speed at which air is allowed to move through the small hole in the solenoid seat.

What to do if this adjustment fails to improve the sluggishness?

The ITC Customer Service Department maintains that its Teflon-coated plungers normally offer no resistance to the dampening action and, therefore, are not likely to be the source of the problem. However, if the plunger Teflon coating has worn or has been scratched, it is possible that dirt and dust have accumulated to offer resistance. It's time for a new solenoid. A plunger cannot be purchased alone, since the entire assembly is matched by the manufacturer.

ITC recommends limited solenoid cleaning. The screw and spring on the back of the can may be removed and blown out with an air hose. As for the plunger, it can be removed and wiped with a clean towel. Other efforts at plunger cleaning assure some trouble ahead.

Short-term hope does exist, while a replacement part is on order. The use of the furniture wax "Pledge" can sufficiently lubricate the plunger to restore the needed response. Using cotton swabs or a clean cloth, apply the wax to the exposed portion of the plunger.

ITC warns, however, that such lubricants will, in time, collect dust and re-introduce similar problems.

At KBSU, we tried the "Pledge" approach to extend solenoid life, with some success. After about eight months, another application was needed and, in a sense, our ITC cart solenoid plungers are now Johnson Wax junkies - - "hooked" for life.

These findings suggest that solenoid life might be extended a year or two with regular "Pledge" applications. But, there will undoubtedly be some on-air starting failures unless this maintenance technique is regularly followed.

We are glad not to have committed the cardinal sin of plunger lubrication errors, however. That would be an application of graphite - - its abrasiveness can quickly chew right through the Teflon coating.

Teflon Presidents may come and go, but Teflon solenoid plungers are here to stay. In theory, at least, nothing sticks to Teflon and trouble is avoided. But, then there's the real world . . .

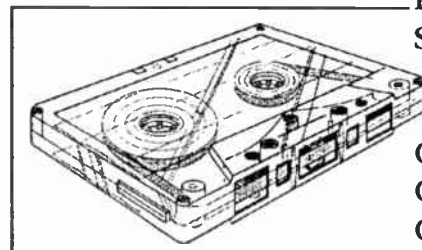
For Your Information . . .

A continuing feature of the Radio Guide, is the reader-service "coupon" located on page 15. Fill in all the information asked for, and circle any advertiser's number from which you wish to obtain more information. Along with the "coupon", feel free to send a couple of technical tips you may have lying around. We can use them!

You may also want to jot down your name and address if your not getting the Radio Guide at the location you wish.

As usual, if you have any questions or comments, please call me at (507) 280-8668 . . . editor.

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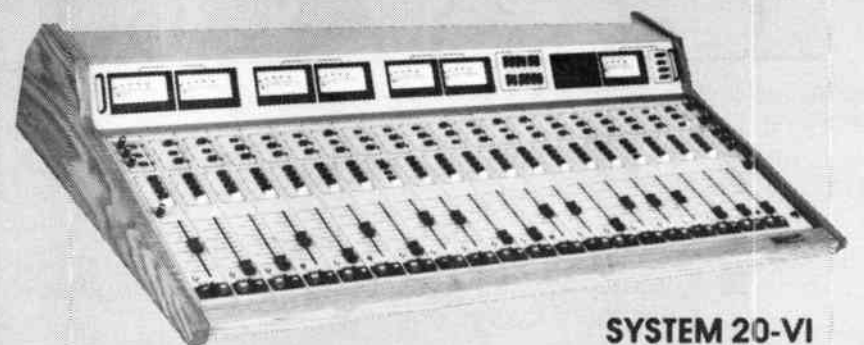
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Care and Feeding of McMartin BF-25M Transmitter

By Bruce Anderson - KIQX
Durango, Colorado

Once you learn the quirks of any transmitter, you can either modify it or learn to live with it. The McMartin BF-25M twenty-five kilowatt FM transmitter is no exception.

We've had one since the station went on the air in 1981. With a couple of quirks ironed out, we're living with it quite well, thank you.

The first major modification was a factory bulletin changing the final from the original tube to a 3CX-15000A7. After this modification, the BF-25M was very stable and quite tunable.

Our line power is at the end of a 3½ mile haul up the mountain-side. Although we have three-phase closed delta service, the line is susceptible to glitches - especially if something zaps in Tacoma Washington or Orange California. Add to that our abundance of electrical storms, and we have had over-loads and breakers tripping all the time. The solution was essentially three-fold. First, we super-grounded everything, and not just to the electrical service. Three-inch copper strap was run from a bond on each equipment rack and each cabinet of the transmitter and high voltage power supply to an outside buried grid around the building. The tower was also bonded to this grid.

Great Grounding Effort

B.G. (before grounding), we took many strikes, a couple of which wiped out various components in the building, including the remote control. In fact, you could follow the trail of destruction around the cabinets, from the power supply through a contactor and right to one of the blower motors in the PA - which from that point on insisted on running backwards (the starting winding got zapped). Since the great grounding effort, we've been hit by lightning quite a few times, and there's been no damage to the transmitter. In fact, we've hardly gone off the air due to the elements.

Second, we protected the line coming in with a gob of MOVs. and rectifier stacks have held together since then. Third, we added considerable regulation to the low voltage power supply. Until then, we were popping heads off transistors right and left, particularly Q1 through Q6 in the over-load protection assembly and Q2 and Q4 in the control ladder. Since the regulation, nothing has gone South.

We added a Bird Wattmeter to the output of the driver stage, which gives us a quick glance at what that section is feeding to the PA. It also lets us know precisely what's going out to the antenna (or coming back) if we ever experience a PA failure and run the driver straight into the harmonic filter, which the BF-25M is capable of doing with some re-plumbing.

Microphonics a problem

We drive the final with about 1200 watts, which lets the PA coast. All three of our tubes show absolutely no signs of dropping off, after about two and a half years of continuous service.

It is recommended that you remove the exciter from the driver/ IPA cabinet because of microphonics in the unit and its proximity to the blower. It's so sensitive, though, that we have it shock mounted in a rack away from the entire transmitter box. Before shock-mounting, it would pick up blower rumble through the concrete floor and metal rack!

We've moved some things around in the PA cabinet, mostly to keep sensitive components away from heat. The rheostats for the filaments are too close to the overload protection board for my comfort, especially when the hinged door they're on is closed. Moving them a couple of feet down the outside of the box might mess up McMartin's pretty contact-paper/wood-grain exterior, but it sure keeps things cooler.



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McMartin BTF-25 (continued)

I've considered installing a box fan to further circulate the air in that part of the cabinet, but it doesn't appear necessary at this time. Also, we felt no need for adjustment of the IPA filament voltage, so we un-ganged that rheostat from the driver filament rheostat and put a fixed twenty-five watt resistor in the circuit.

In the same area, the four bleeder resistors (R47 through R50) in series/parallel are subject to considerable stress and invariably fail within a few days of a new PA final installation, so we keep a set of spares.

So often transmitter manufacturers (and I include virtually all of them) have designed units for operation at or near sea level. A scant few have taken into consideration high altitude cooling in their original designs, and a few more have high-altitude kits available. Most of the rigs around here operate at eight thousand to ten thousand feet elevation, where the air is a fraction of what it is at sea level.

Whimpy Blowers

The poor little Centrimax blowers are kind of whimpy for moving the volume of air it takes to cool things at this altitude. The one in the IPA/driver section has a tough time keeping these tubes cool, but it manages. The two blowers below the PA cavity simply aren't enough, especially with the additional friction caused by a heavy-duty filtering system on the back of the transmitter. I'd like to see about a three-horsepower blower in the final, but we've added a one-horsepower in-line Dayton shop blower to the output duct. That makes for a much cooler operation.

The BF-25M is obviously designed to have the stack heat vented either straight up or toward the rear of the unit and out of the building. Ours goes back, which takes the duct-work of both cabinets right over their respective air intakes by about 6 feet. The radiated heat from these big square metal pipes goes right back into the intakes. So we wrapped the ducts with heavy insulation, and ended up reducing both stack temperature 5 to 10 degrees.

Electronic equipment doesn't like four basic things, I've learned: water, heat, bugs, and dust. Hopefully, you don't submerge your BF-25M and we've just discussed decreasing the heat factor. Bugs and other critters can be a royal pain if they're not controlled. Don't give them a reason to be there, and they'll go elsewhere. In other words, keep the munchies wrapped air tight, or out of the building entirely, and the critters will tend to forage somewhere else. But not letting them in, in the first place, is wise, and easily accomplished if you have control over even finer particles, such as dust.

We keep a positive pressure inside the building and (except when the door is open) the only way something can enter is through the filters. Regular furnace and air-conditioning filters suffice for the building, and they're relatively cheap to replace when they get dirty. But we have a couple of Space-Gard (tm) Model 2200 air cleaners attached to the back doors of the transmitter. Regular inspection every 3 to 6 months reveals that absolutely no dust has entered the RF cavities of our BF-25M, and the only dust in the rest of the rig has crept in from cracks in the cabinetry.

Keep Spare Parts Handy

We try to keep spare parts around, including plenty of Teflon rods for tuning controls (which tend to get brittle after a while and break) and sheet-stock which is used in the PA tube socket as a plate blocking capacitor. One early modification, which was done to our BF-25M, was to replace all the bulb indicators with LEDs. Another change was to re-route the tuning and loading controls for the IPA and driver sections so they come straight out of the cavities and through the front wall. This alleviated bends in the controls and gave a more positive feel to the functions. We ended up drilling a couple of additional holes in the front plates to do this, and ended up with an extra hole (the former IPA grid tuning control) which we slapped a dummy knob on and labeled FIDELITY CONTROL. It keeps the competition wondering! The chains that drive the driver and PA, tuning and loading mechanisms, stretch over time, and should be replaced (lubrication helps very little).

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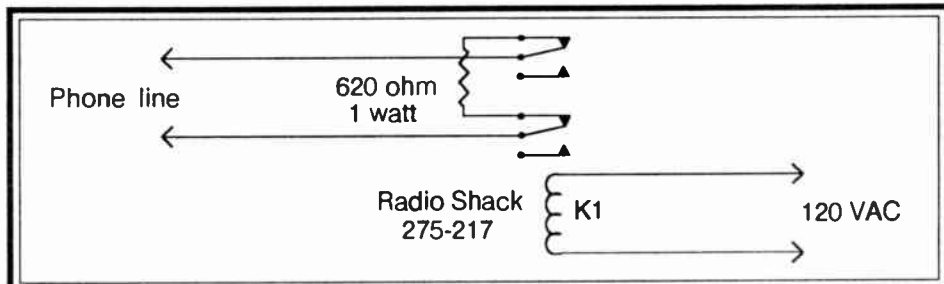
Tips From The Field

Technical Tips From Around the Country

Power Indication Tip

By Bill Rett - KWTR
Lakeport, California

If you have a dial-up telephone line at your transmitter, here is a method to indicate if there is primary power at the transmitter.



When you call the transmitter site telephone, if there is no power, you will get a busy signal. When the power fails, the relay de-energizes and takes the line off-hook.

AM ATU Tuning Tip

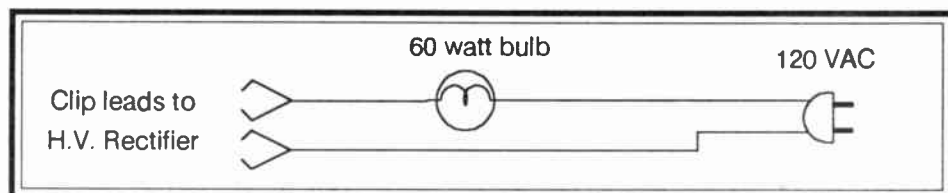
By Donald J. Larsen
Idaho Falls, Idaho

Mount a 25 or 40 Watt light bulb inside the antenna tuning unit cabinet. Preferably, it should burn twenty-four hours a day. If necessary, put it across the tower lighting circuit so that, at least, it will burn during the nighttime hours. The small amount of heat generated by the bulb will keep the moisture out of the cabinet. I have had moisture in the base meters freeze in the winter time without the bulb, but the problem was solved after the installation of the bulb. Also, this seems to minimize corrosion in salt or poor atmospheres.

HV Rectifier Tip

By Michael F. Ring - WTNV
Watertown, New York

Here is a cheap, fast and accurate solid state high voltage rectifier tester:



1. Disconnect leads to HV rectifier stack.
2. Connect UNPLUGGED tester across one section of stack.
3. Plug in tester.
4. If bulb lights full brightness, diode is shorted (most likely).

If bulb does not light, tester not connected properly or diode open (unlikely failure mode).

If bulb lights to around 1/2 brightness, diode is likely OK.

This circuit performs a reasonable voltage/current test (170V p-p @ 1/2 Amp) and will catch faults missed by VOMs or other low-power methods. Just remember, the leads have 120VAC on them - - treat them with respect. Also, if your eyes are sensitive, you may want some sun-glasses.

Please-We Need Your Help!

If you have any short tech-tips, send them in or better still, call me at (507) 280-9668 and we'll talk about them. Remember, it doesn't do anyone any good if you keep that information to yourself. Don't assume that everyone knows about your special technical tip. Send them in - - they'll be printed in the next issue.

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Tips From The Field

Technical Tips From Around the Country

Moth Balls or Mice

By William H. Payne - KTFX
Tulsa, Oklahoma

Buy yourself a couple of boxes of moth balls and spread them around the interior perimeter of your transmitter building. Mice don't like them or the smell and never will seek your building as a place of refuge from the cold.

As all of us know, mice can cause us down-time when they get fried! Many times we don't discover the cause until we un-cover their tiny carcasses.

A simple sprinkling of moth balls will do the trick. About every 30-40 days, you'll have to spread them again, as they dissolve with time.

Continental Exciter Tip

By Greg Hahn - WRKA
Louisville, Kentucky

When my Continental 802 Exciter lost all of its RF output, the front panel metering led me to believe that I might have a bad RF output transistor.

The meter reading labeled "I", had more than doubled its normal reading. I assumed this to be a reading of final collector current, and when I shorted the base/emitter junction of the final and the "I" reading didn't go down, I replaced the transistor, even though it checked good with my ohmmeter. I thought it must have been breaking down under load.

When that didn't fix my problem, I discovered that the "I" meter on an 802 exciter reads the current to BOTH the final and driver transistors, and it was the driver that had shorted.

A new driver transistor from my recommended spares kit fixed the problem. My unit was under warranty and Continental sent me a new spare for free.

Another note worth remembering is that "solder wick" is really indispensable in removing RF-38 style and other similar RF transistors.

Harris TX Tip

By Larry Schropp - Schropp Services
Charlotte, North Carolina
704-536-9812

Here's a tech tip that may be of interest to some stations still running the old Gates (Harris) BC-1T AM transmitter. If you have problems with the intermittent loss of RF drive causing overloads or tube damage to the 833s (if the overloads aren't set right), the problem could be a dirty crystal switch in the oscillator section.

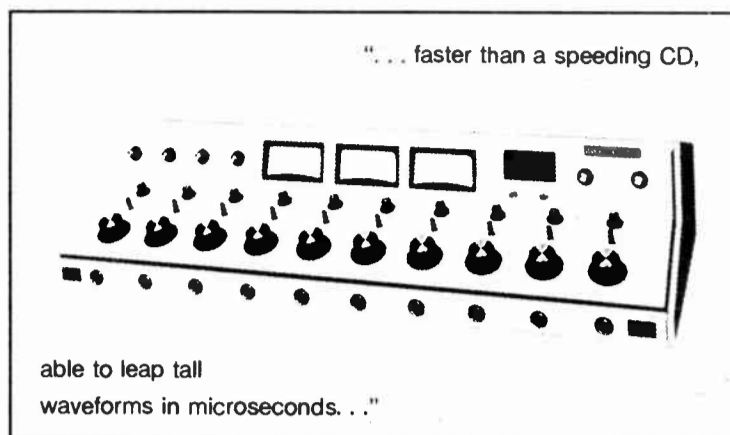
RCA BTF-20E Transmitter Tip

From Rich Egan - WIZM
LaCrosse, Wisconsin

Rich called in with this tip a few days ago. He has an RCA BTF-20E transmitter and, from time to time, he found that the plate overload would kick out for no apparent reason.

After inspection and troubleshooting, he found that the shunt resistor across the PA overload relay had opened up. With the resistor "gone", the relay became more sensitive and would trip out on current levels that normally would not have affected it. He replaced the shunt resistor, and operation was back to normal.

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Rip Off Calls

By David H. Solinske - WWRM
St. Petersburg, Florida

My first experience with telephone con-artists preying on radio stations and engineers, occurred in 1977, when they were still civil and acted like sales agents. I was low on fluorescent tubes, when the voice on the other end of the phone offered a Christmas gift with every order. Just one of the early inexpensive Timex LED watches. It was nice, I thought, to be appreciated by someone in the world. After all, if it weren't for sales people, the engineer would probably be the least liked person in a radio station. The fellow said his company usually supplied our station (and buying from him would save me a trip around the city). Our relationship was pleasant in that transaction, and I never needed to order any more before I left that station, although he called frequently, trying to drum up more business.

Just a couple of years later, in Philadelphia, I had another call from a high pressure phone type from California. It was nearing the end of the year and his company had to "unload audio cassettes before the California inventory tax hit them." Difficult to get him to accept a no, but indeed a no he finally had to realize.

The heat must have been turned up in the L.A. boiler rooms in the following eighteen months. New on the job in Chicago, I received a call: "Dave, we're ready to ship those cassettes to you; I just need the shipping address." I wondered what cassettes he was referring to. "Your last engineer ordered a thousand of them, just before he left," he said. When I informed him that I didn't need them, didn't want them, and knew nothing of them, he steadfastly refused to cancel the "order", and insisted he was going to ship them. I asked him the purchase order number - - he froze. I knew I had him. It was my turn to take this weasel to task and turn the pressure on him.

No Purchase Order

I coolly pointed out the shipping address in on the purchase order. He admitted that he hadn't been issued one and that the order was verbal. When I coolly informed him that no order from my company was valid without a purchase order, he became belligerent. He WAS Going to ship! I realized I was being a bit too generous with my time and the fun of the game was wearing thin. I simply reiterated that no order was valid without a purchase order, and that if he shipped, it would be considered as unsolicited merchandise and disposed of as such. I hung up - - he called back. I hung up again - - again he called back. The third time he stayed away.

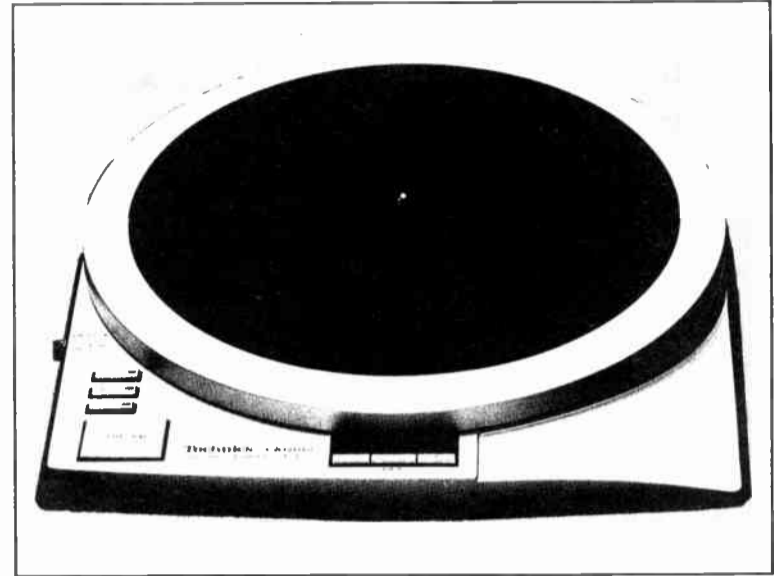
That call alerted me to the problem of these "sales persons." Every couple of months, I received a call about "white box cassette tapes," allegedly manufactured by BASF, that had to be disposed of for California inventory tax purposes or some other high pressure reason. No matter where I am, the calls seem to keep coming, much like the fraudulent invoices some boiler operations send to businesses for services or items not even rendered. I usually dispose of these calls quickly and quietly. No need, I felt, to bother anyone with the details of another crack solicitor. Now I realize that with the turnover in broadcast personnel, radio stations seem to be a prime target for these scams.

My assistant and I both left our jobs recently, and he went on to his first real chief engineer job. He called and said that he was going crazy with an order for cassettes his predecessor had placed, because he couldn't find the order or a place in the budget for them. He wasn't sure how to handle it with the GM. Upon hearing a few more details, I told him what to do after explaining the history of the pressure phone types.

At my new job, I had a call from a lighting salesman. It was a thrill hearing from one again, after all these years. He was telling me how my predecessor always purchased the fluorescent tubes from him and how he had a standing order and wanted to check the shipping address ... and on ... and on. "Very interesting," I told him. "How's that," he asked. "Well," I replied, "seems for the past fifteen years the station has been in an office complex that is in charge of, and replaces the fluorescent tubes." CLICK - - no explanation or apology from the jerk. Just a click.

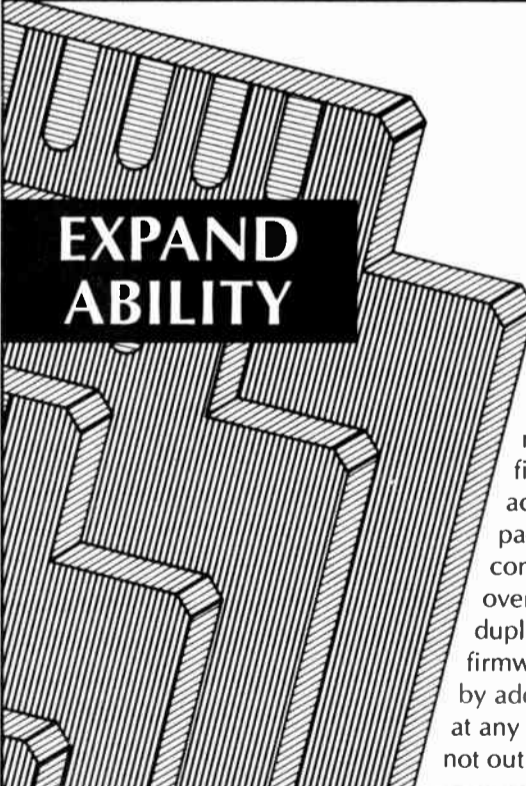
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(518) 793-2181



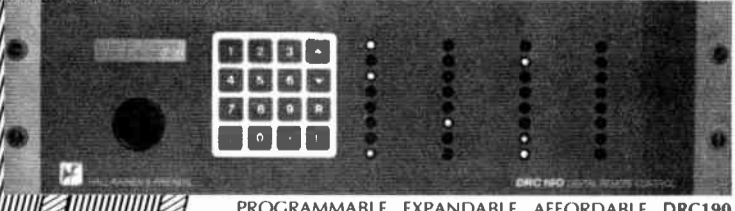
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Rip Off (continued)

Problems like this are spreading away from engineering, probably because there are more stations without engineers. Our news director was running in circles one day, when I caught him and pulled the nail out of his foot. He was concerned about a "standing order" for teletype ribbons from a supplier who was unable to provide any details of the order, other than he was ready to ship. The newsman had just picked up a batch of ribbons, and this would blow his monthly budget! Again, I explained the routine tactics and key phrases these rip-off artists use, and the problem became a non-problem.

To summarize, the new person on the job is the most likely to have the highest pressure applied by these types, with stories of orders by predecessors. Things can get rough in calls like these, and I suggest you simply ask for a purchase order number, even if you don't use POs. If the person at the other end makes up a number, simply say that is not in the sequence the station uses and he must have the order confused. Tell him if the merchandise is shipped, it will be considered unsolicited and disposed of.

Most of all, be sure and tell the rest of the staff to watch out for these types. They could cost your station a good bit of money, better used to increase an engineer's salary.

Although this deviates a bit from our nuts & bolts style, I feel that it has merit. I've been bit once by these guys and you sure feel stupid afterward. My gift was a light bulb with a dollar-bill inside ??? Also, watch out for the latest gimmick - - copier toner salespeople ... editor.

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Models TS-1 RM-As Shown
TS-1RMX-With Bal. Output



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Model TS-1RM . . . \$297

Model TS-1RMX . . \$367

Contract Engineers

Radio Guide will provide space here for contract engineers wishing to expand their business. To be listed here, just give me a call at (507) 280-9668. This list is not a recommendation of any particular engineer.

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305-775-1351

Peter C.L. Boyce
Midamerica Electronics Svc.
New Albany, Indiana
812-945-1209

James Boyd
Boyd Broadcast Tech. Svc.
Tualatin, Oregon
503-692-6074

Mike Brown
Portland, Oregon
503-245-4889

Lee Freshwater
Blue Ridge Consultants
Flat Rock, North Carolina
704-693-1642

Chuck Gennaro
Wisconsin Rapids, Wisconsin
715-423-6763

Kirk Harnak
Memphis, Tennessee
901-278-1366

Richard A. Hyatt
Maine Engineering Assoc.
Gardiner, Maine
207-582-4192

John Morton
Durango, Colorado
303-247-8734

Don Musell
Broadcast Engineering Svc.
Mouth of Wilson, Virginia
703-579-4461

Mark Pallock
Marandee Broadcast Eng.
Chatsworth, California
818-882-9475

Ransom Y. Place III
Danbury, Connecticut
203-798-9395

John Ramsey
West Hartford, Connecticut
203-243-4703

Christopher Scherer
Miami, Florida
305-667-5918

Lee Soroca
Soroca Electronics
Syracuse, New York
315-468-5123

Tom Toenjes
Signal Specialists
St. Marys, Kansas
913-437-6549

Dave Wrenn
Aiken, South Carolina
803-649-1663

Brad Johnson
Central California
209-526-6277

Scott Dean
Dean Engineering
Fresno, California
209-434-2358

Gary Smith
Advanced Technical Svc.
Abilene, Texas
915-672-5149

James A. Chase
Electro-Labs
Angola, Indiana
219-665-6427

Gary Reardon
Ware, Massachusetts
413-967-6156

James Droege
Electronic Engineering Svc.
Beatrice, Nebraska
402-228-0780

Michelle Hunt
Denver, Colorado
303-469-1293

Tim Pozar
Broadcast Engineering Cons.
San Francisco, California
415-695-7727

Mark Bohach
Columbus, Ohio
614-385-7583

Bob Ladd
Bellevue, Ohio
419-483-2511

Dave Hebert
Pasco, Washington
509-545-9672

Dave Biondi
The Radio Service Company
Houston, Texas
800-444-2301

Bud Stuart
STURADCO
Susanville, California
916-257-7820

Ronald J. Dot'o Sr.
Salem, Oregon
503-378-7024

John L. Nix
Salem, Oregon
503-581-4056

Steve Agnew
Broadcast Technical Svc.
Lincoln, Nebraska
402-475-8920

Marsh Johnson Sr.
Broadcast Operational Sys.
Albany, Oregon
503-928-8318

Carl Sampieri
Sampieri Engineering
Huntsville, Alabama
205-830-8300

Don Roden
Roden Engineering
Huntsville, Alabama
205-533-3676

Don Haworth
Haworth Engineering
Fargo, North Dakota
701-237-5346

Jim Taylor
Jim Taylor Engineering Svc.
Augusta, Georgia
404-738-2911

Mike Tosch
Interstellar Broadcast Eng.
San Diego, California
619-576-8239

Jeff Twitley
Ocean City, Maryland
301-289-4545

Howard M. Ginsberg
Communications Eng. Inc.
Essex Junction, Vermont
802-878-8796

Donald Frank White
Roanoke Rapids, No. Carolina
919-535-2599

Adam Perry
S&B Communications Inc.
Buffalo, New York
716-832-7090

Thomas C. Taylor
Total Communications Tech.
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Joe Bellis
RMF Associates
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314-651-4272

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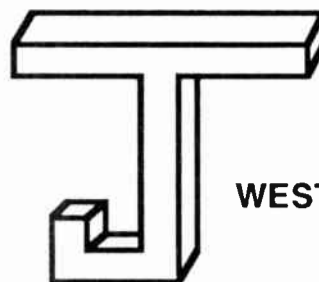
Jay Brentlinger
Broadcast Engineering Inc.
Phoenix, Arizona
602-867-0181

Ken Bartz
Bartz Engineering Services
Fargo, North Dakota
701-237-3006

Greg Blanchard
Avila Engineering
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Anyone Else?



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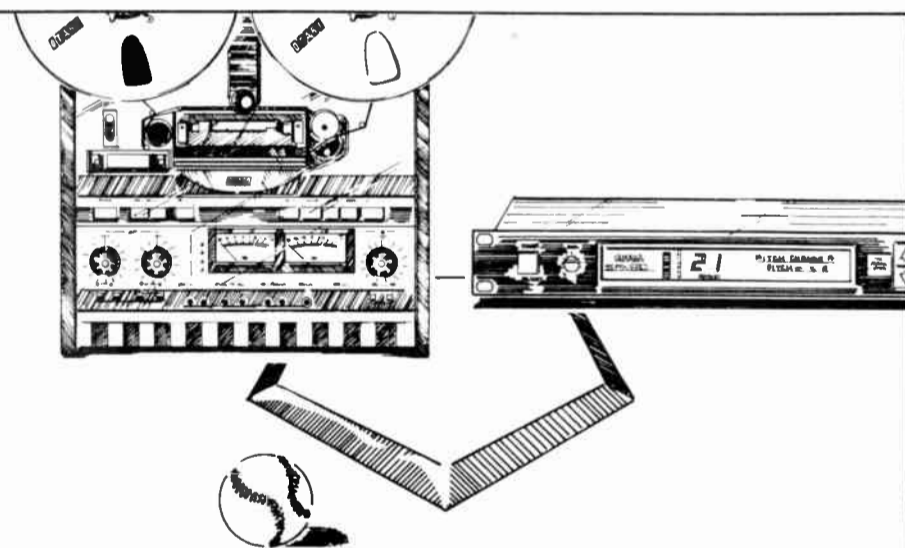
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Radio Guide

March, 1989 Volume 2 - Issue 3

Mail to: Radio Guide 511 18th Street SE
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But don't take our word, or anybody else's! Try it for yourself. We can arrange a two-week trial at your station.

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Call us now for straight answers
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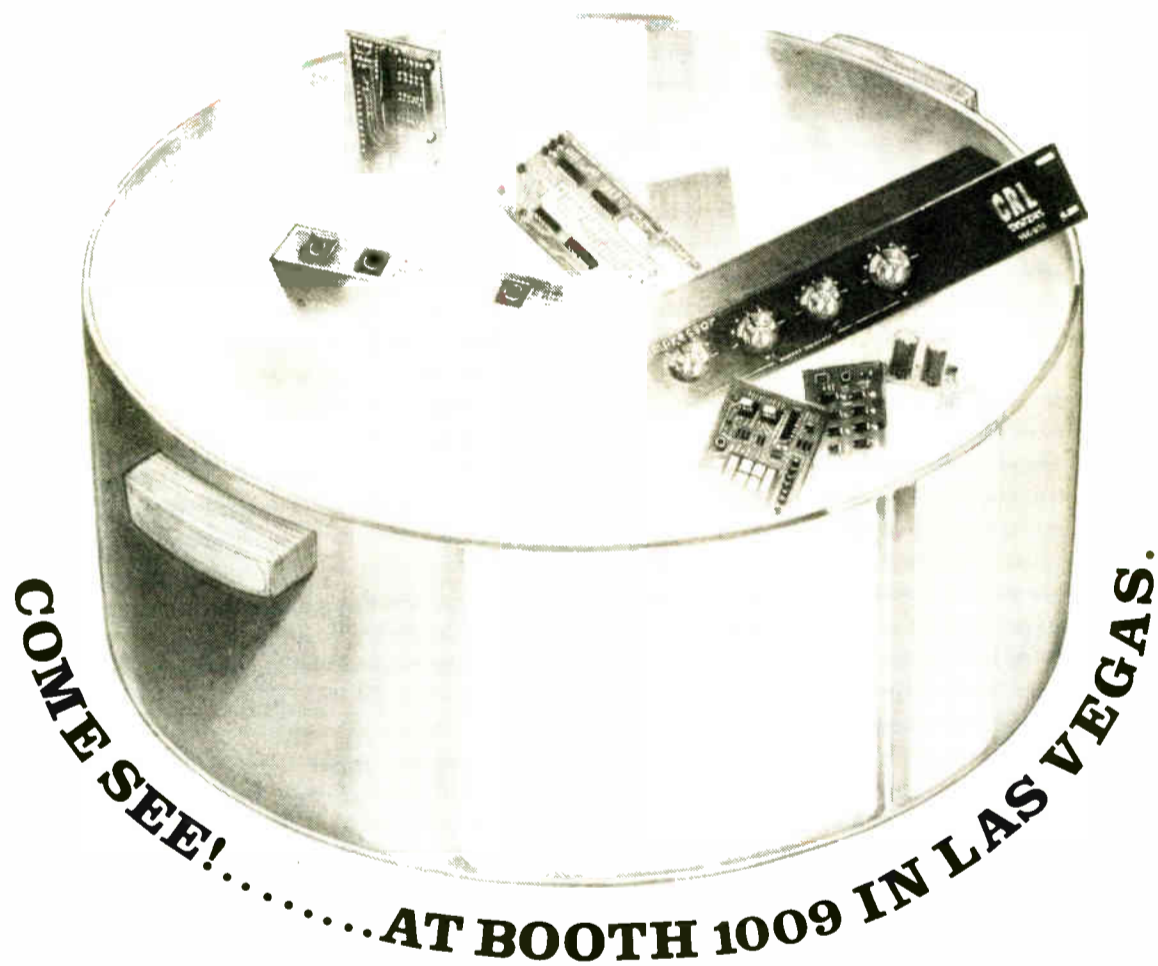
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Equipment Guide



Box 7001 Rochester, MN 55903 (507) 280-9668 Ray Topp - Editor

This is the new Used Equipment Guide. I took about three days to try to come up with a catchy name for this publication - - oh, well.

There are two reasons why I think used equipment publications and forums in the broadcast industry have failed. First, a large portion of the equipment you see in the classified section has already been sold by the time you call. There are a couple of reasons for that. When you have used gear for sale, you usually tell your friends and other nearby stations about it - - if you're lucky, it gets sold that way. Many times it does, and nothing wrong with that. The real problem seems to be with the classified ads that appear three or four months after the equipment is sold!

The second reason classified ads fail, is that not enough space is allowed to completely and properly describe the equipment for sale. I get pretty tired of all the acronyms used, to try to stay within the word limits imposed by other publications.

We will solve the first problem by charging \$3.00 per ad, per month. If you advertise your used lawnmower in your local want-ads for a few bucks, it stands to reason that it shouldn't be too much to ask for those same few dollars, to advertise your console worth \$800 or your transmitter worth \$8,000. It's simply a way to help to insure that dead ads will not continue month after month - - long after the equipment has already been sold.

The second problem is solved by allowing you to use as many words as you feel you need, to completely describe your equipment. We all know that a transmitter is not a transmitter. A used box in

prime condition (one that has had excellent maintenance in a climate-controlled environment), should definitely bring a better price than one in a dirty shed (home to generations of rodents). How do you describe the difference between these two transmitters in "25 words or less?" You can't! In the Used Equipment Guide, you will! All I ask is that you control yourself, and don't go on about how it would have been in better condition but for the fact that your lousy GM didn't give you the tools or the parts to keep it in shape. Of course, if you want to sell your lousy GM as used equipment . . .

The advertisers that you see in the Equipment Guide will be those that deal, a large part, in the used and reconditioned equipment field. In this way, you will, in one publication, be able to find out what's available in the used equipment area.

We will also publish help wanted and situations wanted for free. The job shortage in the radio technical community is pretty severe. Let's help each other out.

In this first issue the pickings are pretty slim. But you can change that! Just as the Radio Guide serves your technical information needs, let's help to make the Equipment Guide serve your used equipment needs.

I've done my best to create a Used Equipment Guide that will be of some use to you. I've tried to do it in a way that will eliminate some of the problems that have plagued other publications. Have I done the right thing in the right way? Do you think \$3.00 per ad is a fair price? Let me know! Your suggestions and comments will be used.

Here's What To Do:

1 - Describe your used equipment for sale, in as many words as you feel it takes to do the job.

2 - Describe your help wanted or position wanted.

3 - If you have equipment for sale, enclose \$3.00.

4 - If you have a help or position wanted ad - no charge.

Here's Where To Send It:

Equipment Guide
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Rochester, MN 55903

Name: _____

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1-SMC RAC-31 remote control -
\$200

1-SMC PDC-5 clock - \$100

1-SMC TAC-1 time announce
dual cart - \$300

1-SMC DS-20 audio switcher
(problems) - \$200

1-Marti RMC-2 remote control
system - \$500

1-Gates Stereo Statesman
audio console - \$400

1-Orban 621B parametric
equalizer - \$300

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Offer

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board) - Offer

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515-282-1033

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Truscon 350 foot guyed tower, 48-inch face, solid rod with lighting, guys, base insulator and 60 foot antenna pole - Call

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Gates Executive stereo console, 10 pots, good condition - \$1500

Harris ME-1 modulation enhancer for MW series transmitters - \$100

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Harris SC-90 automation controller with power supply, numeric logging, console and **SMC-250RS** carousel with interface - Best Offer

Gates ATC Criterion-1 cart machine, several available - Best Offer

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RF meters, used and tested
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Wanted

Old transmitting equipment catalogs, Collins and RCA, from the 1950s and 60s. I'll pay you for them or photocopies.

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Rochester, MN 55903

Risk...

buying used equipment and hoping it works.

Security...

buying reconditioned equipment with a 6 month warranty.

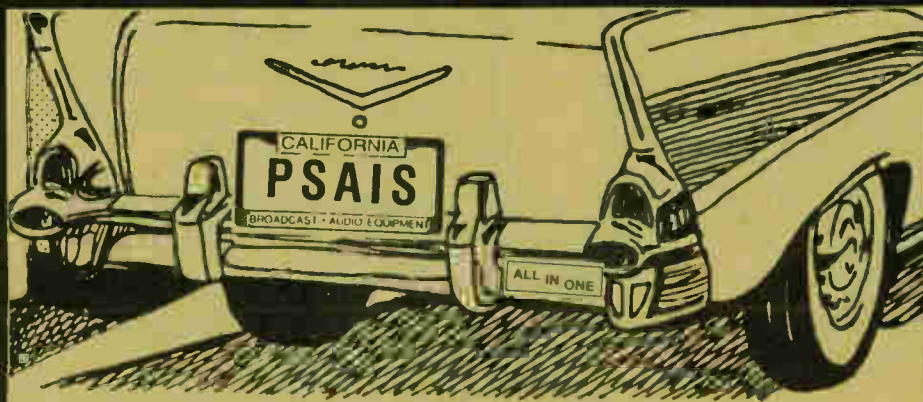


barrett associates, inc.
BROADCAST • AUDIO EQUIPMENT

(619) 433-5600

(800) 748-5553

We take the risk out of purchasing equipment.



PLAN:

Expert assistance in station planning

SUPPLY:

The only distributor giving you a choice.
New product or reconditioned & guaranteed

ASSIST:

Assistance in financing, technical problems,
even employee selection

INSTALL:

We can provide our expert engineers to
install all or part of your station

SERVICE:

After the sale verifying your satisfaction with
the simplest to the most complex equip-
ment. We pay attention to your needs after
the sale.



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