



RADIO GUIDE

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A Forum for Radio Broadcast Engineers

Ray Topp - Editor/Publisher

(507) 280-9668

May 1990

Volume 3 - Issue 5



KNXR Radio Studio - Rochester, Minnesota

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Letters & Help Needed

Harris Sentinel 16 Remote Control

John Oelke, of KSHE in St. Louis, needs to know how to modify a Harris Sentinel 16 remote control system. He wants to be able to access the remote control from home with a computer and modem. Is it possible? Call John at (314) 621-0095 or Fax (314) 621-3428 . . . Editor

Non-Polarized Capacitor Substitutes

By Jim Trapani - JT Communications
(904) 622-2779

This is in reference to the Oct/Nov issue of **Radio Guide** (page-9), specifically the article titled "Non-Polarized Cap Substitute." This is not a recommended practice when trying to substitute for polarized caps. Several problems occur:

1. Any diodes in a circuit produce distortion. A diode is inherently a non-linear device. Any non-linearities produce distortion.
2. Variation in signal level will cause the distortion to change.
3. The diode non-linearity will cause the circuit to produce different distortion at different frequencies.

My recommendation is to eliminate the diodes, and just connect the capacitors back to back. You should also add a small (0.1 to 1 uF) cap in parallel with the circuit. This will eliminate the high impedance effect that occurs in electrolytics at high frequencies.

Coming in June The "New" Radio Guide

Radio Guide

Volume 3, Issue 5
May 1990
Editor-Publisher: Ray Topp



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Eraser Tips

By Joe Schloss - KICD
Spencer, Iowa
(712) 262-1240

On page 16 of the December issue of **Radio Guide**, a point of caution. Some of the erasers have sulphur compounds in them and will eat the plating away, making the problem worse. A better way may be to get some Scotch-Brite -- it comes in different "roughnesses." If you combine this with some Cramolin R-2, you can't beat it. Don't rub too hard or you will remove the plating.

The Radio Guide Fax Machine



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Solid state quality and efficiency. TTC's new FMS-Series FM Transmitters are available in 1kW, 2kW, 4kW and 8kW models. Broadband, efficient power amplifiers are transparent to the high-spec TTC Exciter.

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Micro Controls STL Update

MICRO CONTROLS, INC. of Burleson, Texas thanks Radio Guide for the opportunity to respond regarding FCC Rule 74.550 on our STL systems. It might interest your readers to know that all our STL systems manufactured since late 1973 meet and exceed every requirement of FCC Rule 74.550 with absolutely no modifications to the equipment required.

In early December, 1989, we spoke to FCC engineers in Washington, DC and Columbia, MD, who specifically advised us as manufacturers, that STL transmitters should be tested and verified at the factory for FCC specification compliance as well as manufacturer specifications. The reason for this safety measure, as explained by these officials, is many units have changed hands, and possibly have been modified; thus, units may or may not meet original specs.

As of May 1, '90 thru August 1, '90, for a fee of \$150.00, all STL transmitters meeting original specifications may be returned to the factory for certification testing and issuance of FCC ID label.

We try to give our utmost service to our customers and give them peace-of-mind that our equipment meets all standards.

You receive an important extra with every quality TTC transmitter...

We're there with Total Support if you need us. Our 24-hour Total Support Hot Line lets you call for technical, engineering, or maintenance support at any time. All our transmitters and translators are made with strict attention to quality control.

Get to know TTC and our full line of AM and FM Transmitters, made in the U.S.A.—FM from 10 Watts to 40,000 Watts, AM from 500 Watts to 50,000 Watts. For more information, call TTC: Television Technology Corporation (303) 665-8000 • FAX: (303) 673-9900

The Quality is TTC

TTC TOTAL SUPPORT

The Last Issue ?

This is the last issue you will receive in this tabloid size. It's great for newspapers, but not very well suited for long-term storage and copying. I would hope that the **Radio Guide** is a publication that retains a value for you, for a long while -- we've done everything we can to create and keep it that way. And so, we'll take another step and make it easier to be able to save your issues of **Radio Guide**.

The **Radio Guide** will grow in content to reach into other areas of Radio Broadcasting that we've left out in previous issues. The new equipment side of Broadcasting is important. After all, most of you (at some time) be responsible for the specification or purchase of new gear. It's nice to know what's out there.

One the other hand, the **Radio Guide** was not created to become a news magazine. It simply will never happen. Yes, there's been a lot of pressure to do that, but what's the point, if all that can be accomplished is to emulate another publication. So, even though we'll be changing our size, and adding to and expanding our content, we won't be alienating those who helped to create **Radio Guide** in the first place.

As **Radio Guide** grows, I would like to see a balance between advertising and editorial copy. This is the time to sit down, write down, and submit that technical article you've been thinking about. Nobody likes to write about something they've just spent hours (at 2:00 a.m.) fixing, but it's going to help **Radio Guide** do its job, and your own article can be an excellent reference for your trouble logs. Imagine if the engineer who follows you finds technical articles, in the files, written on every problem you've encountered and fixed during your tenure. You'd be a legend! And all because you took the time to write for **Radio Guide**.

Of course, while you're becoming a legend, it's nice to be paid for it. We do that too. As of March 1, 1990, we are paying for all articles submitted to **Radio Guide**. I say submitted, because we pay you even before they are published. I'll have to admit, before that, payment was sporadic, at best. But thanks to your continued support, we've reached a point that we can pay you for your efforts.

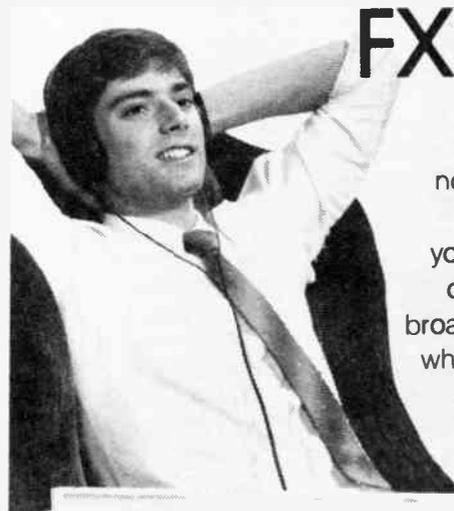
**The "New" Radio Guide
Coming June - Better Than Ever**

Engineers . . . Grab Your Cameras

On this month's cover, is a photo of the control studio at KNXR in Rochester Minnesota. By now, you're probably bored to death of my ramblings on the front cover, so . . . I'll move my comments to the inside and let your stations take center stage. Send in your photos of your studios. We'll pick the best ones (whatever that means) and print them on the cover of **Radio Guide**. If your station is selected, you'll get a walnut (simulated) framed cover of **Radio Guide** for your shop or office. Just the thing to remind you of all the hours you've spent there. Of course it's not very practical, so we'll throw in a Maglite flashlight so you can find your keys in the "soon to be mowed" grass below the doghouse . . . *Editor*

SPOIL YOUR LISTENERS.... Not Your Audio

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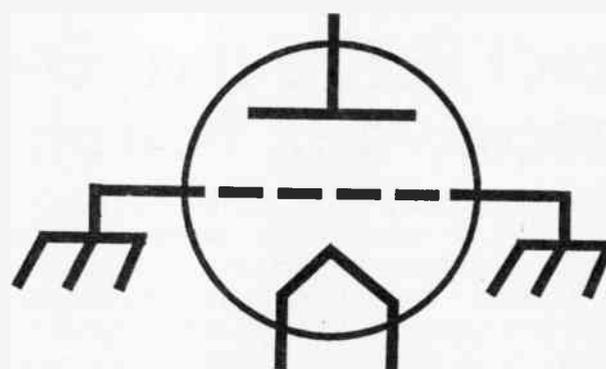
FX 50 Exciter

No matter what your format is . . . no matter which processing you run; your entire system is no better than your exciter. So why limit the potential of your signal? Join the hundreds of broadcasters that have already realized what a difference the FX50 can make. Call BE now at 217-224-9600.



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**If Your Only Excuse For Not Buying
An ITC Cart Machine Has Been Money,
You Just Ran Out Of Excuses.**



Introducing the Series 1 cart machine from ITC. As the world's leading cart machine manufacturer, we understand how to make

a superior cart machine. And the new Series 1 cart machine is superior.

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Pound the buttons. Flip the switches, jam a cart in and yank it out a few

hundred thousand times. We've built the new Series 1 to take anything you can dish out, 24 hours a day, 365 days a year.

So before you

mortgage your program director or settle for something of less value than ITC, check out the new Series 1 today.

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SBE Certification "Tech Tip"

From Jim Wulliman
SBE Certification Chairman
(602) 648-1250

The SBE Certification Committee has revised the 20 year Professional Broadcast Engineer level of Certification to be an upgrade from Senior Broadcast Engineer level, after January 1, 1991. This means that any applicant, after that date, must already be certified at the Senior level.

We are now in the grace period for those who wish to apply under the current provisions, which do not require an examination.

Under the revised rules, all of the current requirements will continue, with the added requirement that the applicant must hold a valid Senior Broadcast Engineer certificate to be eligible for the Professional level after January 1, 1991.

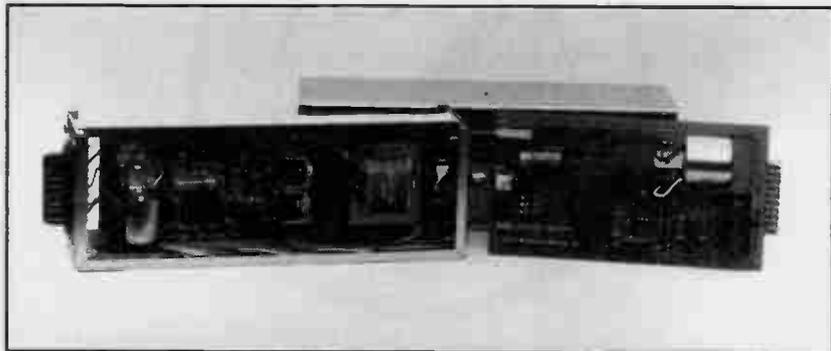
The intent of this change is to insure that, at some future date, everyone who is certified will have taken a certification exam. This is consistent with our original "Grandfathering" provision which required recertification either through examination or by earning credits in at least four different categories of continuing education or service to our industry.

For information and application forms, call (317) 842-0836 or write to Mary Brush at the SBE office, 7002 Graham Road, Suite 216, Indianapolis, IN 46220.



Don't Retire that Old Executive ... Retrofit!

With Broadcast Devices' field proven 10-minute retrofits you can make your old sturdy Harris Executive console perform like today's top of the line. These affordable retrofit electronics are modern plug-in replacements for the old technology mic preamps and line amps. They also will retrofit other Harris consoles including the Diplomat, President and Ambassador series. It makes good sense to retrofit -- you save thousands over the purchase of a new console and studio redesign, improve your sound and eliminate the maintenance headaches that cause embarrassing downtime. If you ever plan to sell your console, our retrofits can dramatically increase its resale value. Contact Broadcast Devices or your local broadcast distributor today for more details.



Suggested list prices: Line amp: \$360
Mic Preamp: \$165

Coming soon: Retrofit modules for the Harris Stereo Statesman, Gateway II and Dualux II series consoles!

Affordable solutions for the broadcaster ...

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bdi Broadcast Devices, Inc.

SBE Presidential Candidate Establishes Toll-Free Input Line for Member Comments

SBE Member Hot-Line (800) 767-1052

SBE presidential candidate Andy Butler has established a toll-free "800" number to allow members to reach him at no cost. In announcing the new line, Butler said "There are more critical issues facing the Society than ever before in its 25 year history. I have developed a series of position statements that address a number of these including increasing chapter support, bolstering regional conventions, restructuring our national convention, fostering Broadcast Engineering education, promoting the validity of the Society and our profession, expanding our relationship with the FCC, locating and staffing our National Office for future growth, insuring the Society's financial viability, enhancing the Certification program, improving Member to Member communications and expanding our membership services.

"I would like to discuss my ideas on these issues with every SBE member before September," Butler said. "More importantly, I am anxious to know what the other issues are, causing concern. I hope that each SBE member will take the time to call 1-800-767-1052."

Butler indicated that he will keep a detailed log of each conversation. These suggestions will be made available to the Board of Directors as they formulate the Society's five year strategic plan.

Mighty Mean Machines Made for Modest Money! Just ask Maynard Meyer of Madison Minnesota...

Q92
KLQP-FM

P.O. BOX 70
MADISON, MINNESOTA 56256

January 5, 1990

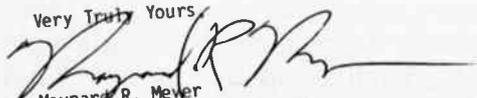
Dear Sirs:

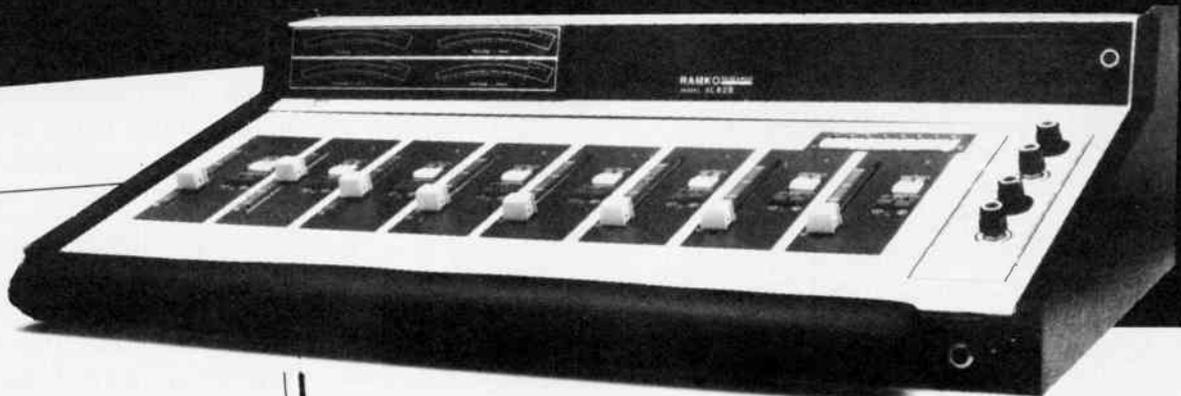
Just a note to let you know how much we like the Ramko xL62S stereo console we installed in our FM broadcast operation a few months ago. The audio quality is excellent and our announcers like the ease of operation. It's amazing that you can offer a console of that quality for the low price tag that was on it.

I had one occasion to call your service department for an answer to a question I had on a minor problem and I received some friendly and accurate advice. Incidentally, the minor problem resulted from a severe lightning strike at our studios, the Ramko board survived it nicely!

I would recommend the xL SERIES audio consoles to anyone with a small budget who is looking for "big" quality.

Very Truly Yours


Maynard R. Meyer
General Mgr/Chief Engineer



THANK YOU KLQP-FM!

We could not have said it better. Ultimately there is no higher authority than you, the broadcaster, on how well we've done our job. How the equipment performs, stands up to every day use or abuse, looks & feels to the operator, plus delivering the features needed for the dollar spent. No less important is how we respond if a problem should ever occur.

OUR DIRECTOR OF ENGINEERING DIDN'T HAVE JUST A HAND IN THE DESIGN, HE HAD HIS WHOLE ARM IN IT.

Before one PC board was laid out or pencil put to paper for any part of the metal structure, our Engineering Manager sat down and measured the most critical parts of the console's operation. The arm, the hand and fingers, & the operator's line of sight. The arm had to rest comfortably when at the controls; the input & output select switches had to be reachable while simultaneously controlling the faders; the selectors had to be illuminated and clearly discernable at any angle; and the meters had to be properly angled for normal seated operation and clearly show the levels, even across the room. What he finally designed in was a layout that is exceptionally easy to control without operator strain or unusual manipulations. Science calls this ergonomics; we call it just good common sense and a concern about you, the user.

IT GETS EVEN BETTER AS YOU GO ALONG.

Dramatic new developments in IC technology have taken place that allowed us to design a console with fewer components, less manufacturing labor and higher performance than previously

possible. The end results are *significant* price reductions for the features provided and a quality of sound reproduction unsurpassed by units costing thousands of dollars more. Huge expanded scale -40dB to +3dB, multi-color VU meters - Four individual meters on dual channel units - Nine input selects on the last channel - Mono sum output - Plug-in modules for ease of service - Optional switch programmable remote start/stops Double shielding for total RF protection - Optional mix/minus buss with balanced out and much, much, more.

YOU'RE INVESTING IN A CONSOLE...NOT PLAYING THE LOTTERY.

As you are reading this, the xL SERIES is proving itself in numerous installations across the country. "No RF problems of any kind".... "Our sound has noticeably improved since installing your boards".... "Our people really enjoy the ease of operation" ... "Our console actually tested out better than your spec's".

THE ULTIMATE INSURANCE POLICY.

All RAMKO products are shipped on a two week free trial basis. No ifs, ands, or buts! If at any time within two weeks of receipt, you are not entirely satisfied, ship it back. Upon receipt & verification of condition, an immediate refund or account credit (less shipping charges) will be issued. What more could anyone ask? Pricing that will save you hundreds of dollars Unsurpassed quality & performance...two weeks to make sure this is what you want to live with for years to come... *and* everything we manufacture is backed by a *2 year warranty*.

DON'T DELAY - CALL, FAX, OR WRITE TODAY!

Contact RAMKO RESEARCH direct, toll free, or your RAMKO dealer for further information or to place your order. You have nothing to lose except perhaps some preconceived notions about how much quality *really* costs.

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FAX (916) 635-0907

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COMMON FEATURES:

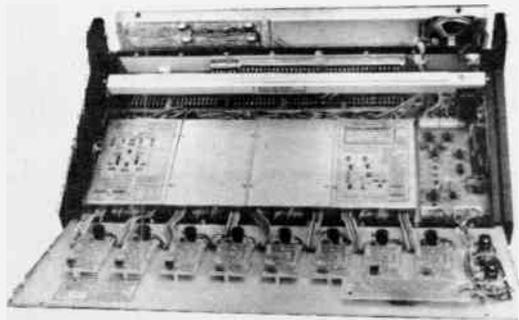
- Mic/line select jumpers on each channel
- Mono/stereo feed selects on each channel
- Gain select patch panel on each input
- Programmable muting on each input
- Nine inputs on last mixer
- Two inputs on all mixers except the last
- 2 watt internal CUE amp & speaker
- 20 watt stereo external monitor amp.
- Padded arm rest
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- Illuminated, 5 million operation, input/output select switches
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- Plug-in ICs throughout
- Optional remote equipment start/stop
- Optional 9 input, programmable mix/minus buss with balanced out
- Unique internal decals & labels for complete installation without referring to the manual

PARTIAL SPECIFICATIONS

INPUTS: 2 per channel except last channel which has nine. Balanced bridging 1k ohms in mic mode & 150k ohms high level. Input A of each mixer programmable mic thru high level & strappable for mono or stereo feed. Input B is programmable for low thru high levels. OUTPUTS: Balanced low impedance, +24 dBm max into 600 ohms. Additional stereo sum balanced out. Main channel outputs factory set for +8dBm @ 0 VU. METERING: Expanded scale, multi color, solid state. 2 each on single channel models & 4 each on dual channel models. MONITOR: Stereo, muted monitor outputs @ +4dBm. External 20 watt stereo amp. included. S/N: Mic level in @ -50dBm & +8dBm out; -68db. High level @ 0 dBm in; -75dB. DIST: Below noise floor. Typically 0.009%. RESP: 10Hz-20kHz, +0.00, -1.5dB. FINISH: Polyurethane Carbide black, Linear white & RAMKO grey.

STEREO CONSOLES: Models & accessories

xL41S	4 mixer, single channel	\$1,995
xL42S	4 mixer, dual channel	2,295
xL61S	6 mixer, single channel	2,395
xL62S	6 mixer, dual channel	2,695
xL81S	8 mixer, single channel	2,895
xL82S	8 mixer, dual channel	3,195
xL12/1S	12 mixer, single channel	3,850
xL12/2S	12 mixer, dual channel	4,150
RSS2	2 mixer, 4 machine start/stop	250
RSS4	4 mixer, 8 machine start/stop	325
MMB 1/9	9 input mix/minus buss, bal. out	175
SLF	Super long life linear faders(per chnl)	75



Interior view of the xL82S

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Our PA tube warranty is the longest in the business — 15,000 hours.

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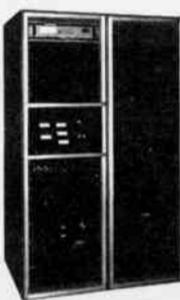
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W H Y Q E I ?

Single Phase 30 kW.



Our new FMQ 30000B is the only 30 kW transmitter available with a single phase power supply.

Call us toll free at 800-334-9154 for

all the facts on QEI "New Reliables" FM transmitters from 1kw to 30 kw.

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Megger Can Be A Mugger

By Bob Schnieder - Broadcast Technical Services
Lubbock, Texas
(806) 798-2601

Most anyone who is in electronics, from student to engineer, is knowledgeable about an ohmmeter. We know that it will measure resistance in ohms, and that it operates by placing a small voltage at the terminal leads and is calibrated to read the resistance in ohms. Most ohmmeters measure up to 10 or 30 megohms, and can help to solve many problems. We know that a fuse will be either zero ohms or infinite -- good or bad. We can use the meter to check diodes, transistors, and even some capacitors.

Many technicians who own an ohmmeter never have heard of a Megger. A Megger is an ohmmeter that measures resistance in the 1,000 to 2,000 megohm range. Instead of the low test lead voltages of the ohmmeter, the Megger voltages are 500 to 1,000 volts. A Megger is a useful instrument when working on high-power transmitters, transmission lines and antennas. When used on a regular preventive maintenance schedule, you will be able to detect a problem long before it creates off-air problems.

I have used a Megger for years and was glad to see that Heathkit is offering one in their latest catalog. It is described as an insulation tester, but for the broadcast engineer, it is more than that.

Meggers can be used to test coaxial cables for leakage. The proper procedure for testing is to remove the connections from the ground and center conductors at each end of the cable and then measure the resistance between center and outer conductors. With the high voltage applied to the cable, a faulty insulation will show as either a short or lower megohm reading. A normal ohmmeter could show the cable to be good, and you would not even see the problem. Testing your transmission lines on a semiannual basis, and logging your readings, will tell you if your transmission line is deteriorating. A leaky transmission line has caused many a problem in a directional array.

Meggers can be used to check high voltage capacitors. When your high voltage capacitors go to a dead short, you won't usually need a meter. The obvious bulge or tar that greets you, when you open the back of the transmitter, clearly shows the shorted capacitor. Normally, though, the capacitor was leaky long before it shorted out. A monthly or bi-monthly check with a Megger will probably alert you well before the off-air catastrophe.

To test high voltage capacitors, simply remove the leads from the capacitor, and attach the Megger. I personally get little exercise, so I have a hand cranked Megger to keep me in tip-top physical shape. As the capacitor comes to full charge, you will be able to read the resistance in megohms -- it should be at least 1,000 megohms. Now remember that you have just charged this capacitor to 500 or 1,000 volts. This capacitor is **LETHALLY CHARGED**. Use your grounding stick or other method to short out both terminals of the capacitor to each other before you remove the Megger leads. Logging your resistance measurements will usually let you know when your capacitors are becoming leaky.

You can also use the Megger for those capacitors that are breaking down under load, but you can't see with your regular ohmmeter. I have found many bad mica capacitors fast with a Megger. The only other way was to replace them one at a time, to see which was breaking down.

You can use the Megger to test plate blockers, power transformers, modulation transformers (you name it). The list goes on and on.

A Megger is a useful piece of equipment, but must be used with great caution because of the high voltages involved. Improper operating procedure with a Megger can make it a real mugger and cause you injury.

CARTING CD'S?



BUY ONE, GET ONE FREE!

WHILE SUPPLY LASTS

\$ 395.00

YOU NEED SYNCHROSTART! Synchrostart will synchronize your CD player and cart recorder to make carting a one button operation. Eliminate those annoying "clipped intros" that often happen because your CD player starts quicker than the cart recorder. Whether your dubs are done by the PD or by the "nighttime college kid," they'll be tight and consistent. Synchrostart makes CD dubbing fast, accurate, and one-button easy!

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Fix Something?

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Harris Satellite RX Fix

By **Bill Rett, CE - KXBX/KWTR**
 Lakeport, California
 (707) 263-6113

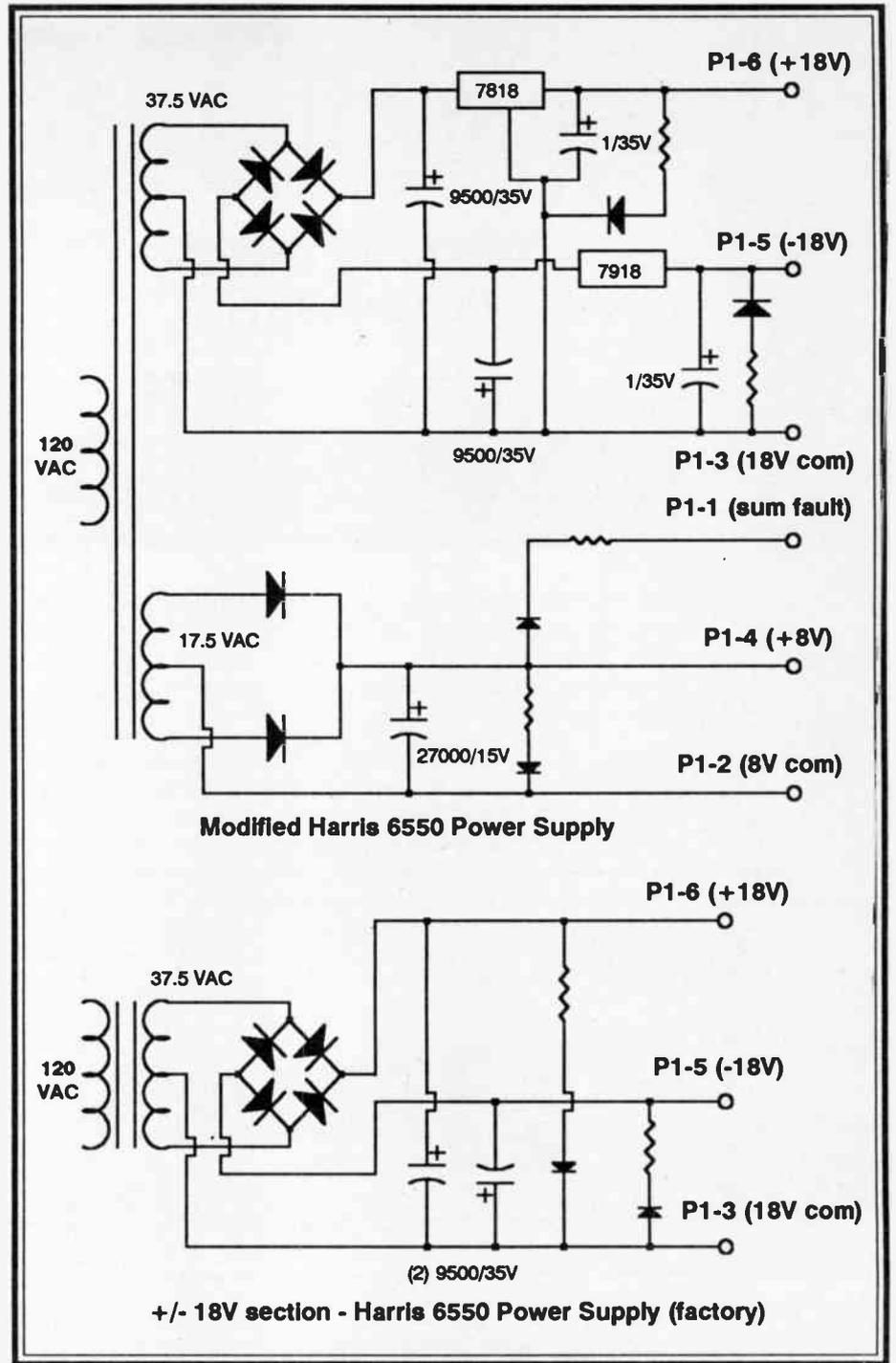
In 1984, we acquired on a lease/purchase plan through UPI Radio News, a Harris satellite receiver model 6550. At the end of the lease, we dropped UPI but kept the receiver, took it off line and stored it.

This Spring we became an Oakland A's affiliate, and decided to use the Harris receiver for the network SCPC feed. Since all that was required in the receiver to receive the feed, was the original Harris down converter card and a tuneable baseband demod card, we purchased a Scientific Atlanta tuneable direct plug-in replacement for the original fixed-tuned Harris baseband demod. The result was that the receiver was now operating with only 2 plug-in cards instead of the original four.

The unit initially worked fine but, after about 8 hours of operation, the downconverter would fail, and the receiver would squelch up. After being shut down for an hour or so, it would then work OK for several hours and fail again. I noticed that the downconverter card was running extremely hot, and when I measured the +/- volt rails, I found them running +/- 25.5 volts. Upon removing the power supply module, I found that the supply outputs are totally unregulated! The lack of load on the supply output (due to only using 2 cards) allowed the output to go to this value. Our primary AC voltage here usually runs around 125 volts, which makes the situation even worse. Luckily the power supply has ample room to add two 18 volt regulators on the heat-sink, which has solved the problem. I used 7818 and 7819 3-terminal regulators in a TO-3 case. Apparently, one of the regulators in the downconverter card was overheating due to the high supply voltage and going into thermal shut down.

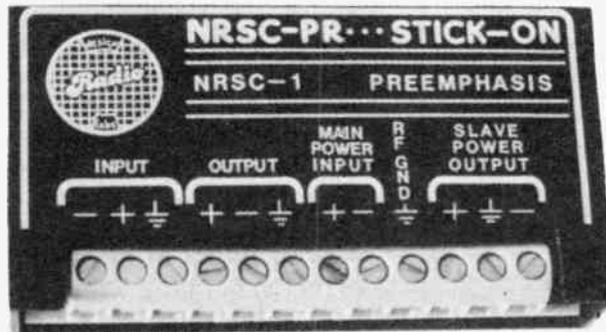
I found out that Harris still supports this and other early satellite equipment of theirs. I found them very helpful and they can also supply new cards and repairs at a reasonable cost.

If anyone needs their help, they can contact: Mr. Dan Powlas, Harris Corp., Business Comm. Systems Div., P.O. Box 1700, Melbourne, Fl. 32901, (407) 724-3958.



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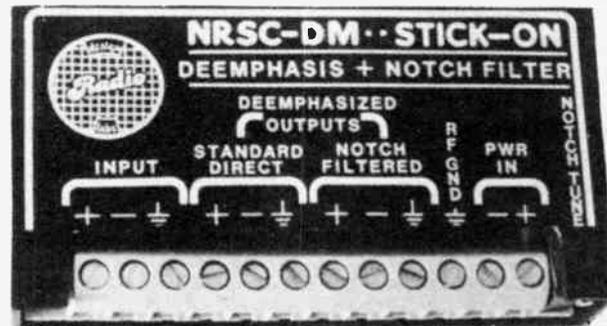


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Audio in a Pinch

By Gary Wachter - Digitronics
Tempe, Arizona
(602) 831-5051

In the December issue of Radio Guide, Ray Jenkins was running down his experiences with the infamous AEL transmitter. This brought back many "fond" memories of the two AM-5KDs we went through at KTSA, San Antonio.

At one point, a long holiday weekend was about to start up, and the spare set of Sanken audio drivers had just become history. Not really wanting to stay on the old RCA hulking giant for an extended period of time, I proceeded to find a temporary solution.

A Sansui 35 watt AM/FM stereo amplifier was procured from a local store (trade, of course) and placed behind the transmitter cabinet. The Sankens were removed and the audio feed was run to the auxiliary input of the Sansui. The speaker output was then used to drive the transmitter. You know what? It sounded better than ever! We just had to make sure that no one played with the tuner section of the Sansui and unintentionally simulcast another station through our transmitter.

Anyone contemplating replacing the Sankens with another type of small amplifier should, of course, install it inside the transmitter cabinet. At KTSA, we finally solved all of the AEL problems permanently -- we replaced them with a pair of transmitters from a "well known" manufacturer in Dallas!

TFT 7700 STL Fix

By Lennie DuPree & Woodie Fryer
Cenla Broadcasting Inc.
Alexandria, Virginia
(318) 445-1234

We purchased a TFT 7700 composite STL system in 1980. While still in warranty, the A-4 power supply board failed and a replacement was sent from the factory. The new A-4 board was installed and the transmitter seemed to function properly.

The transmitter operated fine until one day recently, when the final RF amplifier failed. Voltage measurements taken on the A-5 RF amplifier revealed an excessive voltage of 19.2 volts where 13.8 should have been.

At this point, the first thing was to correct this discrepancy. Looking at the schematic, it soon became apparent that our A-4 power supply board did not agree with the schematic in the manual. Sure enough, the schematic was for a 6601-2790, and the A-4 board we had was a 6608-2080 rev.

A call to TFT verified the discrepancy, and they faxed me the correct schematic which revealed that a wiring change had to be made and a different A-5/U2 voltage regulator would be necessary. After making these changes, the proper A-5 RF amp voltage was present.

At this point, we checked the A-5 transistors Q1 and Q2, and found them both to be defective. They had finally given up after years of being over-voltaged. The driver output transistor was also gone.

A Note From TFT

The replacement board is Revision F of drawing 6601-2790; the replaced board is Revision C. The drawing 6608-2080 referenced is the associated assembly drawing.

Only Q1 on the A-5 board would have been affected by over-voltages, since Q2 is connected to the variable supply.

Just as a reminder, the 7700 (no suffix letter) STL transmitters are those which are subject to Type Notification or replacement by July 1993.

Jesse Maxenchs - TFT

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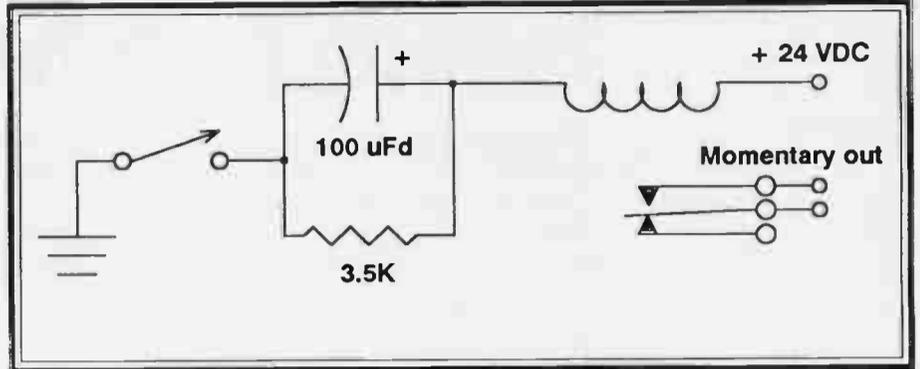


Tips From The Field

By Robin O'Kelly - KORE
Springfield, Oregon
(503) 747-5673

Relay Pulse Circuit

This circuit takes an on/off contact closure and outputs a momentary pulse.



STL Check

If you ever have doubts about whether an STL microwave transmitter is operating, try bringing a car radar detector near it. If it is radiating at all, the detector will go off. This seems to work on systems from 10 GHz to 24 GHz, and possibly others, depending on the detector.

RF Interference Solution

We recently had complaints of RF interference to TV audio in a mobile home complex located behind our tower site. We had interference reports from three different homes, and I checked on a few others. After checking my station ground strapping, harmonics, etc., I went to one home to work on the problem. I discovered that the local cable company had installed an underground cable system and had decided that grounding the system was unnecessary because, "lightning doesn't hit things that run underground."

I ran a ground wire from the cable entry point at ONE home to the telephone ground rod and cleaned up the problem for the entire complex. They have not had a problem since.

At another station, I had AM interference into an electronic phone system. It was so bad that the telephones "sang" while still in the box! I solved this one by running a small diameter additional ground lead from inside each telephone to a bolt on each of the metal desks on which the telephones sat. The desks were not grounded to anything, so don't ask me why it worked.

Revox A-77 Motor Tip

One of our Revox A-77 machines liked to wind down its capstan motor and stop, every now and then. This machine has tape drive board 1.077.725 which is different than our other machines. Of course all of the signals on the tach board are developed by the motor turning, so no real troubleshooting was effective.

Replacing all of the components on the board and the tach sensor was equally ineffective. What did work was adding a 1.0 uF capacitor across the tach input leads to the board. The machine has not "died" for a year now, and it seems to suffer no ill effects such as wow and flutter.

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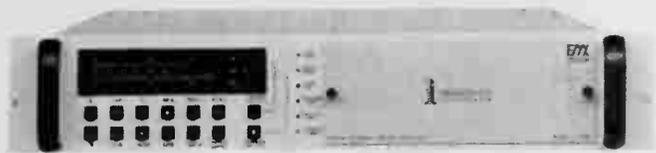
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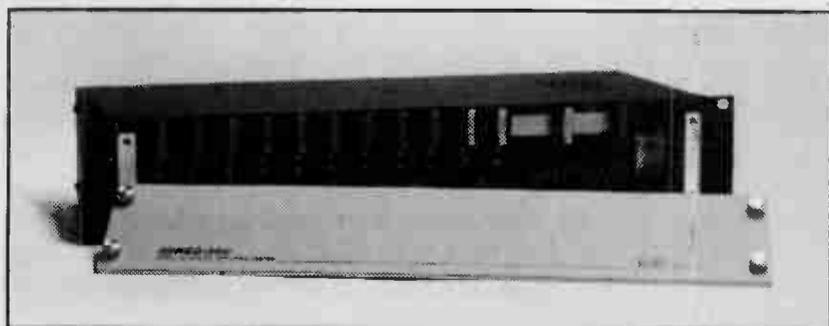
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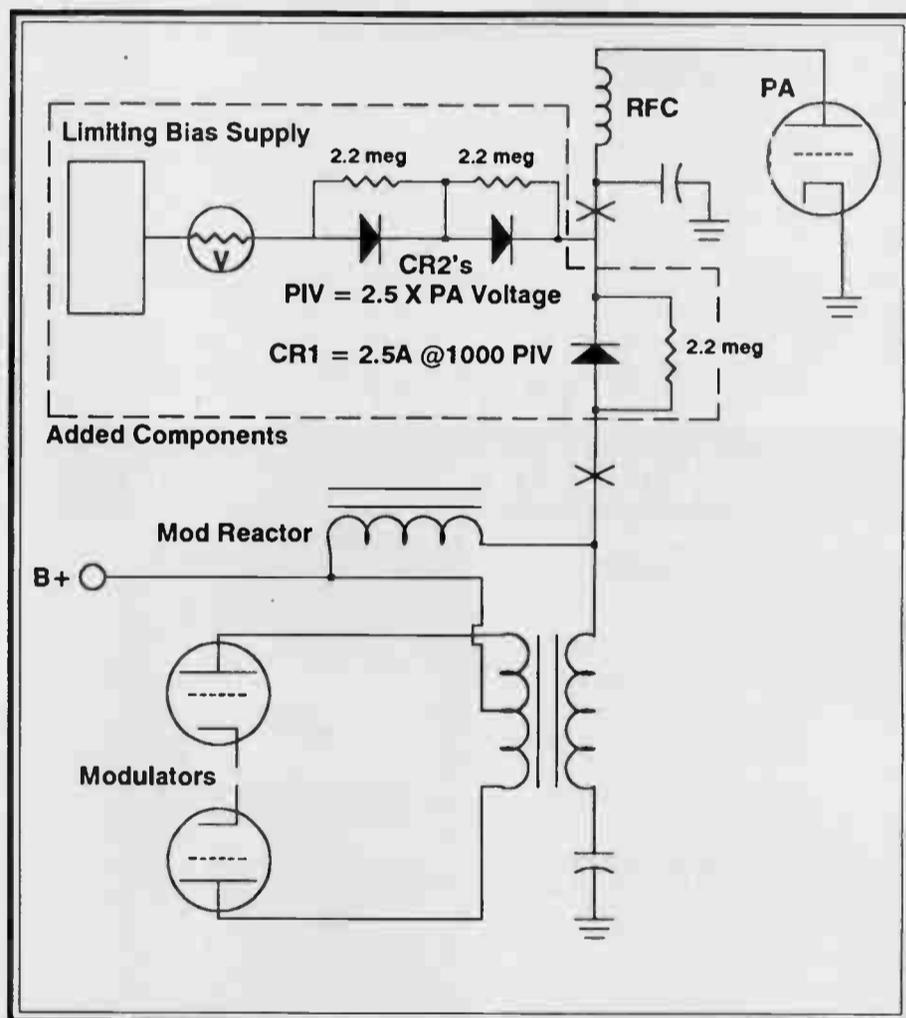
AM Transmitter Tilt Remedy

By Jim Sliger - WJSQ/WLAR
Athens, Tennessee
(615) 745-1000

Here's a simple and easy modification for older plate modulated AM transmitters -- especially those with more than one transformer coupled audio stage.

These units usually exhibit severe low frequency tilt, possibly robbing up to 6 dB modulation in extreme cases, caused by their inability to pass the clipped audio (square waves) produced by many audio processors. With this mod, it's possible, in many cases, to eliminate negative peak clipping entirely and wind up with a louder and better sounding signal to boot. Also, in most older rigs, you don't have to worry about exceeding 125% positive peaks, because at rated power, they won't make them anyway.

Just a few notes of interest, the total PIV rating of diodes CR2 (as many as required) should equal 250% of the plate supply voltage, and equalizing resistors of 2.2 meg are fine. The bias supply for 95% peak limiting should equal approximately 5% of the normal PA voltage for the transmitter in question. The VDR, which is used to soften the switching action of CR1 and CR2, can be found at your local TV repair shop, as it was used in virtually all color TV's in the 65-75 vintage. Should you have further interest or questions, I'd be happy to discuss this mod with you.



Satellite Bugs

By Dean Sever - WLBE
Leesburg, Florida
(904) 787-7900

One drawback of year-round good weather in Central Florida is a year-round insect problem.

I was frequently being called in for noisy satellite network receiving problems. The source of the problem usually was found to be wasps nesting inside the LNA housing of our Scientific Atlanta 2.8 meter dish.

The problem has been eliminated by covering the open end of the LNA housing with fiberglass screen mesh and secured with a plastic tie-wrap. No deterioration of the received signal was noted, and the the bugs are no longer a problem.



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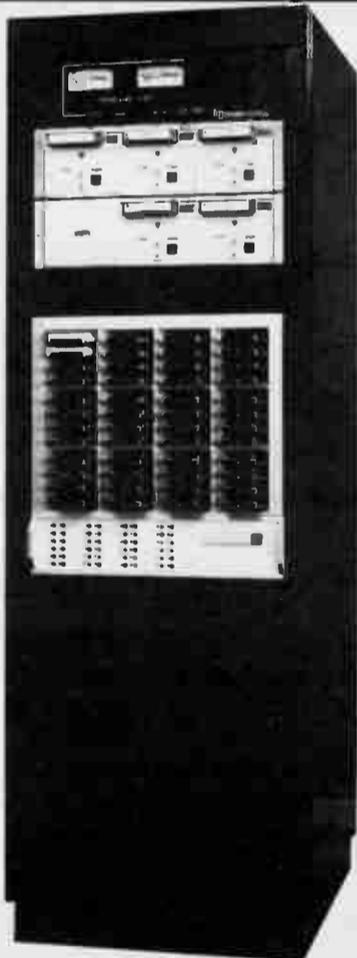


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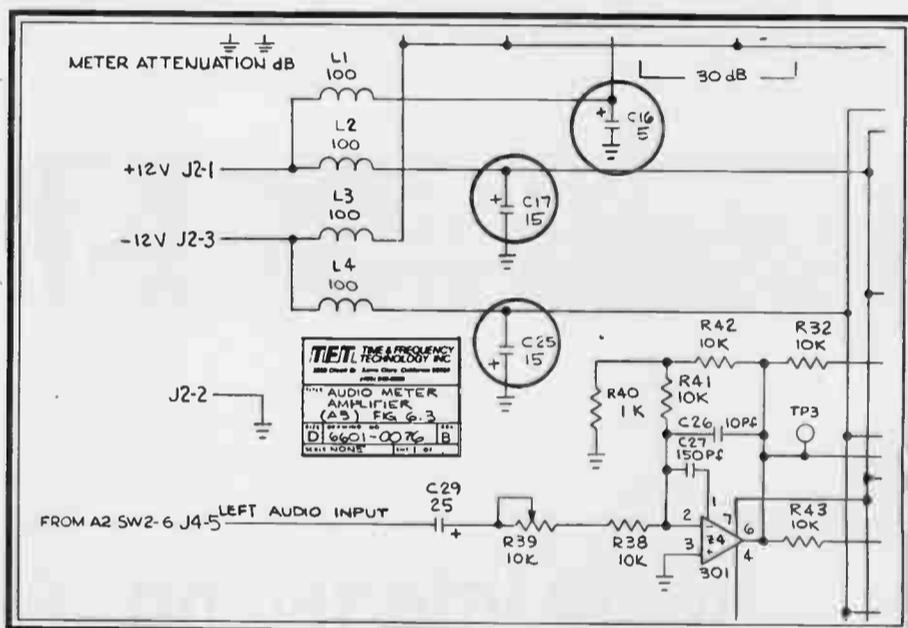
By Robin Cross - WNIU

DeKalb, Illinois

(815) 753-9648

In the January issue of Radio Guide, Bruce Macmillan had an article on left channel clicking in a TFT 724 Stereo Mod Monitor. About two months ago I had the same problem in a 724 of similar vintage. The symptoms were, clicking in the left channel and the left meter going to full scale in sync with the clicking. I used a different attack in repairing the Mod Monitor. If it worked once, then by replacing exact value parts, it should work again. I tried replacing every component in the metering and left channel circuits. No effect.

What cured the problem was replacing the filter caps on the Audio Meter Amp Board (A3). It seemed to me that, after 10 years or so, the filter caps could have dried out and lost their effective capacitance. After replacing, C-16 (5 mF), C-17 (15 mF), and C-25 (15 mF), all symptoms went away. By using exact replacements in the original circuit, you can be assured that the equipment will still meet factory specs and should be within calibration tolerances.



Continental Transmitter Shorted Bias Transformer

By Richard Eagan - WIZM

LaCrosse, Wisconsin

(608) 785-7914

I was recently working on our Continental 828E-1 5kw AM. The Switchmod bias power supply transformer A7T3 had shorted and burned up. The short was caused by the failure of a diode on the power supply board, A7A3.

I replaced the transformer and the shorted diode; all other diodes checked good. The transmitter came up fine, and all readings were normal.

Early the next morning, the transmitter failed again. Much to my dismay, I found it had burned out the second bias transformer. Two power supply diodes had shorted this time, though they had checked good just the day before! Technicians at Continental told me that these diodes are sometimes weakened by a failure, but won't go bad right away. It's best to replace all of them if one fails. I went one step further, by placing fuses in series with each leg of the secondary of the transformer to provide some protection from future shorts. Just break the traces and solder them on the back side of the board.

Another word of caution on this transmitter -- try to keep it as clean as possible. This goes for all transmitters, but this one in particular. Supply voltages are very high (-13,000V) and have a tendency to really attract dust which could cause arcing if allowed to build up.

Telephone Detector Interface

By Joel Clark Humke - J.C. Humke & Associates
Aurora, Colorado
(303) 367-1515

Once in a great while we all find ourselves in desperate need of a circuit that will transform the ringing telephone into a stimulus that is loud enough or bright enough to wake up the control room operator. I'm sure a few of you have plotted to interface with a cattle prod in the operators chair -- this circuit could do that too. It can also be used to start cart machines on listen lines and similar domestic uses.

There have been many homebrew designs of similar circuits, and many of them use optos, with DC isolation from the phone line being provided by electrolytic capacitors. The disadvantage of a direct LED interface is that the capacitors have to have a large operating voltage and a large enough capacitance to pass the current necessary to light the LED. The use of an old fashioned (outdated?) neon bulb in this circuit provides the advantages of:

1. Nearly infinite line shunt impedance
2. Over 33 K ohm ringing impedance
3. No coupling capacitors required
4. Low construction cost and parts count

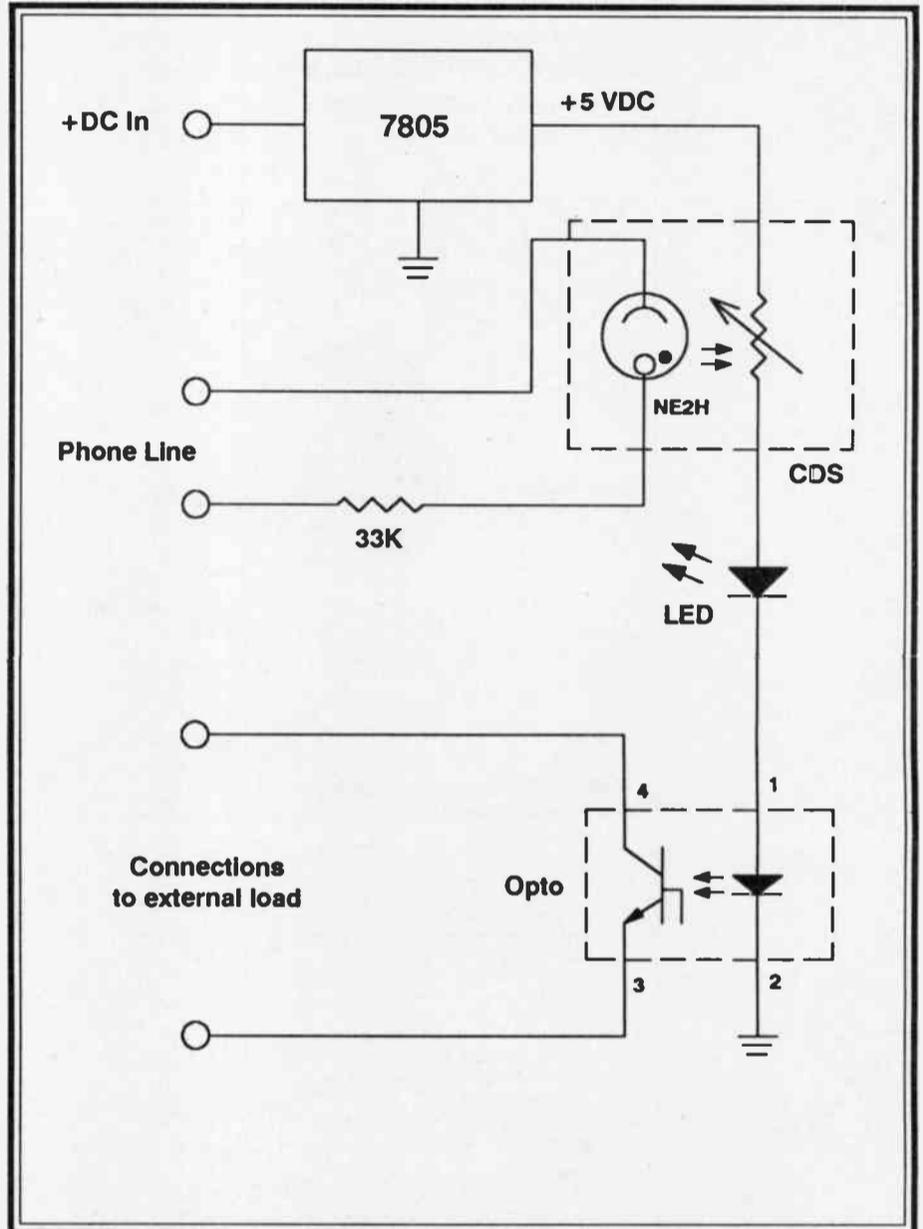
At first I experimented with the standard NE-2 bulb (RS 272-1101) which can operate with a 220k series resistance, but I found that the firing voltage was just too low and this bulb would light just from the 48 VDC on the phone line. I found the NE-2H operation with a 33 K series resistance to be stable and dependable.

To make this "roll your own" neon-CDS ring detector module, is simple. Just carefully glue the neon bulb to the face of the CDS photo cell, then slide a little insulation over the leads and bend the leads so the photocell leads exit the package in one direction, and the neon bulb leads exit in the other. Then carefully wrap the unit in black electrical tape, and make sure that no light is getting into the photocell. To make the unit look like "factory," you can use some heat shrink tubing over the assembly, as long as you use extreme care not to heat the components inside to the "crispy" state.

I found that the current through the photocell, LED and optoisolator was just about 10 mA. So with a 5 volt supply voltage, and an automatic voltage drop across both the opto and LED of 1.85 volts each (and if Kirchoff was right), that leaves only 1.3 volts across the photocell for it to switch from near zero current, when dark, to about 10 mA when it is lit up and it has a resistance of about 130 ohms. That is a power dissipation of about 13 mW in the "on" state, which it handles quite easily.

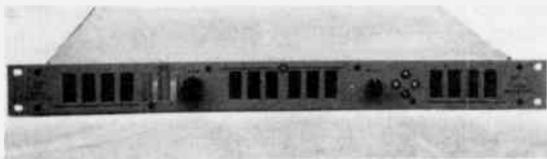
When you wire in your external load, to be switched by the optoisolator, I suggest that you use a small series resistance and a capacitor across the load (between 22 and 220 uFd). This can be used to insure that your circuit will not be triggered by short term line spikes provided by Mother Bell or by inductance spikes caused by rotary dial telephones.

This same circuit, using larger resistors and larger capacitors, can even make the circuit see more than one or two rings before it activates. You may use a large range of supply voltages on your secondary load circuit, thanks to the optoisolator. Even the "name brand" manufacturers have trouble with the spikes caused by rotary dial phones. If you have that problem you can experiment with increasing the value of series resistance to the bulb, upward from 33k.



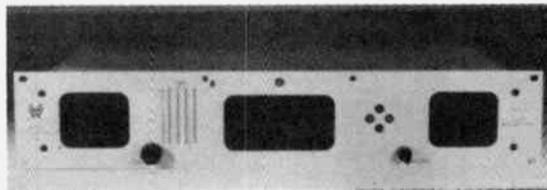
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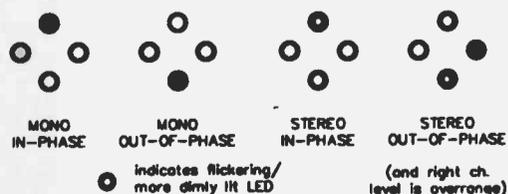
AMP-1A shown with optional level meters and phase indicator

2 R.U. STEREO AUDIO MONITOR



AMP-2 includes phase indicator and extended-range level meters

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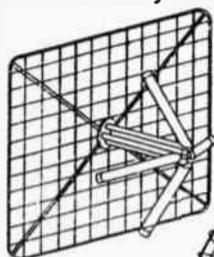
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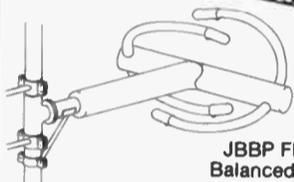
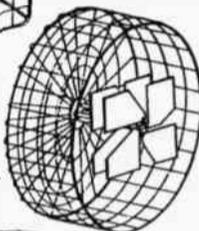
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Standby Generator Tips

By John Almon - Nashville Network
Nashville Tennessee
(615) 871-6947

The tips by Ralph Hartwell II, on standby generator maintenance, were a welcome sight, and brought out a few thoughts on often neglected diesel generator sets and ways to eliminate problems before they happen. Diesel engines are more expensive than gasoline engines, and a little extra care is necessary to keep them in top condition.

Unless you are in the sunny tropics, chances are you'll need a block heater to allow easier cranking of diesels. We run our block heater set to 100 degrees (F) all year long, even in Nashville. Pacific Transducer Corp of Los Angeles sells a magnetic surface thermometer which can be stuck on the engine block and will let you know if the heater is working properly at a glance. (model 313-FRR).

Diesel mechanics say it is rough on an engine to be shut down before it reaches operating temperature. Avoid putting undue strain on the engine by setting automatic switches to run the engine for at least 20 minutes each time it cranks, and keep this in mind when operating manually.

Nothing upsets a diesel quicker than contaminated fuel! Be sure to use a water separating fuel filter sized for total gallonage at the inlet of a day-tank and another on the outlet of the day-tank. Don't use fuel consumption as the figure for flow on these filters. Often 50 percent of the total flow is returned to the storage tank by the fuel block, so check with a filter or engine salesman for proper sizing to keep filters from clogging before they should.

If engines are operated less than once a month or a fuel problem exists, check into a fuel circulator system. This system consists of a timer-operated pump which circulates fuel from the bottom of the tank at one end back into the top of the other end. While flowing, two or more large water separating fuel filters trap water, tank scale, trash, and other contaminants. Circulation also prevents fuel separation where the different fuel components settle into distinct layers.

For remote sites, a water presence detector can be added to a water separator bowl to alert operating personnel of a potential fuel problem.

Critical Cable Connectors Connected Quickly

By Gerald Wakayama - TFT Inc.
Santa Clara, California
(408) 727-7272

Since more radio stations are switching from phone lines to microwave STL, the situation will arise where the engineer does not have all the connectors and adaptors necessary to complete the RF plumbing. Especially if there are equipment additions or just installing the new STL system.

Where did type "N" come from when we already have PL-259 UHF connectors? Well, in this world of Gigahertz, a dB and a half connector loss is just too much for a system that relies on every dB to obtain every bit of dBm.

Thus, the type "N". But rather than carry \$10.00 to \$20.00 worth of adaptors, take note of the BNC connector. It will do in a pinch. When you can't find the "N" cable that connects the ANT to the RX or TX, use your BNC cable. Just cut off the knurled twist lock and you have an "N" adaptor cable. On the female BNC, file off the twist locking tabs, and the match is perfect to an "N" male.

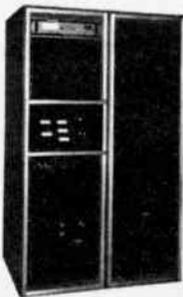
Now that you have temporarily remedied the situation, you can address your other emergencies.

However, please note that you must replace the quick fix cable with one with the correct connectors. Just like using the right tool for the right job, use the right connector where it belongs.

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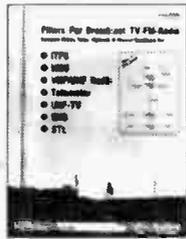
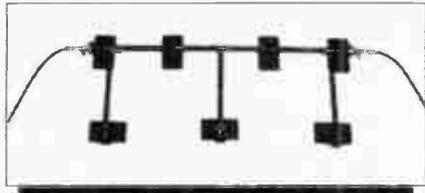
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Tom Jones Recording Studios
220 South Broadway
Rochester, Minnesota 55904

TE-3 Exciter Frequency Drift

By Paul Salois - KPCR AM/FM

Bowling Green, Missouri

(314) 324-2283

There are a great many Harris FM transmitters out there with TE-3 Exciters. The following problem became very frustrating since my copy of the tech manual on this unit stated, "NOTE: L3 is Factory adjusted and should not be adjusted in the field." After trying everything else I could think of, I talked to some people at the factory and the following is what I came up with.

ADJUSTMENT OF THE MODULATED OSCILLATOR

The symptom is that the AFC Alarm light comes on, and the transmitter plate circuit goes off. The Modulated Oscillator operates with the cover off but starts to act up when it is screwed on. The trouble is that L3, the Coarse Frequency adjustment, has drifted.

When the Modulated Oscillator gets out of adjustment, the procedure to bring it back in, is as follows: With the cover off, the Modulated Oscillator and the AFC switch off, turn the 10-turn AFC control to the middle of its range. Set the multimeter on the AFC unit to the AFC position (the middle position). Then, with a non-metallic alignment tool, adjust L3 until the multimeter swings slowly from minimum to maximum and back (about one swing per second or even slower if it will do it). Turn on the AFC switch and adjust L3 to bring the reading on the meter to 25 or so. Put the cover on the Mod-Osc and see that the meter now reads 27 exactly. If it does not, note the amount it did rise, remove the cover and readjust L3 so that, when the cover is on, the reading is exactly 27. Verify and readjust the transmitter frequency if necessary using an accurate counter.

**We Need Your Help
Write for Radio Guide**

ITC Cart Motor Bearings

By Kirck Harnack - Kranack Engineering

Memphis, Tennessee

(800) 366-7618

Most motors in the ITC "Premium" cart machines can be easily rebuilt. If the motor is making noise, the problem is usually bad bearings. New bearings for motors labeled "ITC" or "BEAU" can be easily obtained from your local bearing supply house. "Nidec" bearings are a little harder to find but can usually be ordered from the same supply house.

Taking the motor apart is easy, once you get the hang of it. Take the motor out of the cart deck. Remove the "E" clip, or whatever device captures the shaft, and gently tap the shaft out through the bottom of the motor.

Sometime removing old bearings from the motor is a trick. It's OK to mess up the old ones in the process of removal; just try not to score the surfaces where the new bearings will rest. While you have the motor shaft out, clean it thoroughly. We use carburetor cleaner, but any good solvent will work OK. Also, clean out the wells where the new bearings will rest.

Reassembly is straight forward. Gently tap the new bearings into place. Be sure to replace any compression washers you took out with the bearings. Reinsert the shaft, replace the clip and dust cap.

When putting the motor back into the cart machine, be sure to align it properly so that the pressure roller hits the capstan squarely, head on, and that the pressure roller shaft is exactly vertical when the roller is engaged. ITC sells gauges to aid with this, although it can be done by careful observation.



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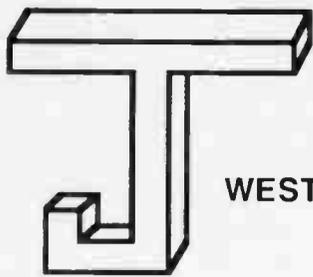
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E-Z ESE Automation

By Dave Seavy - KROC AM/FM
Rochester, Minnesota
(507) 286-1010

About a year ago, we decided to automate our AM station, since we carry Larry King all night. A board operator was really a waste of resources. Since our FM is live full time, I wanted a system that was simple enough to be supervised by the FM jocks, yet be adaptable enough to handle our special needs.

The pricing of automation was going up, since it has again become a popular way of delivering programming. And I found that you had to settle for either "bare bones" or the "Cadillac." So I decided to "build" my own system.

The heart of "Otto" is the ESE 790 timer. Many stations use ESE for unattended recording, lighting control, etc. But I found that, when used as programming control, it performs as well as any commercially made system, if you want to spend a little time piecing together other control equipment.

I purchased two tone decoders from Mutual. One for turning on the network, the other for starting a cart deck during local avals. I had to be able to defeat the decoders, however, to accommodate inserting the local news at the bottom of each automated hour. This was done by programming the ESE to turn off the power supply to the decoders at the specified times, then restore power when the decoders are needed. With two outboard relays, the decoder either turns the console channel on for Mutual, or turns the channel off, and fires the "spot" cart deck.

I then had to dedicate a cart deck for weather forecasts. That was no problem, as I could program the ESE to fire that deck after the pre-determined time that the local commercials would end. This eliminated the need for secondary cue tones. Another situation that I had to overcome, was weekend programming. We stop taking Mutual at 0500, but our weekend announcer does not go on the air until 0600. Using two Revox PR-99's, we run pre-recorded programming on Saturday mornings.

The ESE is programmed to roll the first deck at 05:05:31, right after ABC news and the local weathercast. At 05:29:00, the ESE kills the audio from reel one, fires the local revenue, then transfers to and rolls reel two. Slick! Sunday mornings are just as easy. The ESE turns on ABC for Perspectives, then rolls an Otari to record the show while it is being aired (for rebroadcast at a later time).

It would take two month's of Radio Guide to cover all the functions that the ESE does for KROC. It has proven to be a very reliable method of automating, and I have spent less than \$4000 setting the system up. Of course the commercials and newscasts have to be pre-recorded, but our evening board operator handles that while he rides herd on the controls during the network shows.

Lights Out

By Roy J. Humphrey
Pittsburgh, Pennsylvania
(412) 921-8254

The DJ on the other end of the phone mentioned something about one of the "lights" being out inside the transmitter. Also, the sound was very distorted. Assuming a simple 4-400 replacement, I installed a new one but was startled to see no filament glow. A second tube change -- still the same symptoms.

I measured the AC at the filament terminals, with the the tube removed, and it showed the correct voltage. The filament leads appeared to be corroded at the point where they entered the crimp-on connectors. In fact, the individual strands had a crystalline appearance. Installing new leads returned the system to normal. Even though the filament voltage was normal, the tube had failed to light because of the high resistance, corroded connections.

You can usually anticipate this problem, if you notice unequal brightness among the 4-400 tubes. The best plan, at that point, would be to replace all the filament leads.

FM Harmonic Low Pass Filters 500 - 50,000 Watts

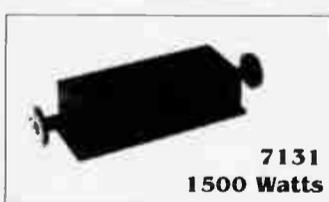
Delivery: 30 Days (Faster For Your Emergencies)



7123
500 Watts



6612



7131
1500 Watts

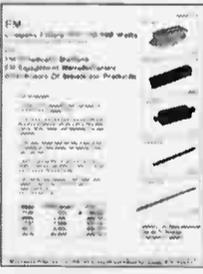
Model #	Watts
6612	6,000
6516	15,000
7772	30,000
7455	50,000

Full Details In Bulletin #14!

Also, request BTV/87 which describes TV/FM/MMDS Broadcast Filters & Combiners for service radio bands.



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Bulletin #14

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Why is the Motorola AM Stereo System a Failure?

Certainly not for lack of trying or marketing expertise. No radio broadcasting system ever enjoyed a larger advertising budget, cleverer promotion or a more powerful group of co-sponsors... Motorola, General Motors and Chrysler. The problem is its technical characteristics... fatal stereo flaws; platform motion, rain noise, excessive bandwidth. And crucial for small and medium sized stations (and even "clears" serving listeners more than 25 miles away), reduced mono coverage to the typical narrow IF bandwidth receiver.

That is the mono coverage problem that will limit a station's "bottom line". *It is THE technical problem no AM broadcaster can ignore or compromise.*

Smart broadcasters will give any new technology a fair try, but they will never stay with technology that degrades such coverage because that means loss of "bottom line" profits.

MOTOROLA LOST, BUT WE HAVEN'T WON...YET

Motorola has lost the marketplace competition, but to be frank, *that does not mean we have won it...* how could we win when there are no mass produced AM stereo receivers available for the Kahn/Hazeltine system. Motorola heaped scorn on these high quality multi-system AM Stereo receivers, and threatened at least one of their manufacturers. I wonder why Motorola so feared high quality multi-system receivers.

Not only were these great stereo radios, but do you remember their superb mono sound... some with notch filters and frequency response out to 12 kHz. Do you know there were some 20 models of multi-system AM stereo receivers manufactured by Sony, Sansui, and Sanyo.

Never fear, quality AM stereo radios will be back. There is still one way to cure this problem - *through the Federal Court system*, and that is where we are right now in Kahn vs General Motors. When we succeed in the Federal Courts, you have my assurance that not only will you have AM Stereo receivers for the Kahn/Hazeltine system (the system that will survive in the free marketplace), *but there will be quality AM receivers that will help you to compete with FM stereo.*

General Motors, Chrysler and other manufacturers of 3 kHz AM radios are the real reason for AM broadcasting's sorry state. This pitiful situation has been going on for a quarter of a century, and your ratings dropped accordingly. (Can you imagine, some people actually blame AM stereo competition for this old problem. And some Americans actually have the nerve to suggest to other Americans that are competing too vigorously. Competition and innovation made our country strong and the sooner GM, Chrysler and Motorola stop whimpering about competition, the sooner we will be back where we belong, leading the world industrially.)

From an engineering standpoint, AM Stereo, in the car, can significantly outperform FM stereo because of its greater coverage and lack of multipath. But it requires *quality AM receivers and the AM stereo system that does not lose coverage.*

Whose Fault is Motorola's "Marketplace" Failure?

Can you believe it, some people actually blame our small firm. Can anybody seriously believe that Kahn Communications could block Motorola + General Motors + Chrysler + the largest media blitz ever targeted at radio broadcasting.

(Even where Motorola somehow convinced a government to protect it from Kahn competition, Motorola failed. A Nov. 1989 report states that Australia's AM radio industry "has reached such a perilous state that strong rumors suggest several [Melbourne] stations may be forced to surrender their licenses within a year", and points out that the [Motorola] AM stereo has not helped, and that music on AM "has had its day". Seems like AMers in Australia are paying dearly for their Government's lack of faith in free enterprise.)

The most powerful companies even with "big brother" governments are no match for the marketplace and the laws of physics. Nobody killed Motorola stereo - it died of natural causes.



GOOD NEWS POWER-side... ...POWER-side...POWER-side

There is new Single-Sideband technology off and running that can immediately improve your "bottom line" by increasing your coverage. This new technology will allow AMers to compete more vigorously by reaching more of the same type of audience they presently cover. *You don't have to wait for new receivers*, nor the years it will take to convince young listeners to accept AM radio.

The day you install POWER-side™ is the day you enter the age of sideband broadcasting, enabling you to reach new listeners in troublesome areas by concentrating your broadcast power in a dominant sideband... POWER-side reduces fading and distortion in weak signal areas, directional antenna null distortion, and areas of reradiation interference. *You can even select which sideband is dominant so that inexpensive, manually tuned radios, with poor selectivity, are inherently tuned away from your worst interference.* Thus, significant advantages are instantly available for listeners with digital car radios and tunable portables and home radios. POWER-side, for more coverage, more listeners, more "bottom line".

Engineering information is available so that you can see why 5 of the 16 New York City AM stations have installed POWER-side.

More Good News

Speaking of the POWER of free market competition and POWER-side, the POWER of the Federal Judiciary will solve the AM Stereo standoff; caused by the lack of mass produced sideband AM stereo receivers.

In April of 1988 litigation was initiated; i.e., Kahn vs General Motors.

General Motors, and its indemnifier Motorola, attempted to block the litigation. Motorola filed a suit in the Federal Court in Chicago seeking to have my patent declared invalid, or if not invalid, not infringed, or if not infringed at least I waited too long to sue etc. etc.

In June of 1988, GM was temporarily successful in staying the New York suit while Motorola attempted to invalidate my patent in Chicago. While Motorola/GM succeeded in delaying matters, the result finally came in October of 1989 when a Federal Judge in Chicago dismissed the Motorola suit stating:

"...the court is of the opinion that this suit does not serve a useful purpose and may serve to harass an individual [Kahn]."

Then, more good news, on November 17, 1989 a three judge panel of the Court of Appeals for the Federal Circuit in Washington (for all practical purposes, "the court of last resort" in patent matters) unanimously reversed the New York Court in the Kahn vs. General Motors suit, concluding that:

"...the district Court exceeded its discretionary authority in creating the stay. The stay is vacated, and the case is remanded to the District Court for proceedings on the merits. Costs in favor of Mr. Kahn."

Thus, after 22 months of delay and harassment by GM/Motorola the matter is back in New York. The patent is valid, literally and willfully infringed and, according to patent law, not only am I entitled to substantial damages, but also to have GM enjoined from manufacturing and selling the type of AM Stereo radios that have so interfered with the AM Stereo marketplace.

Even General Motors is subject to the laws of this country, as was Kodak in the Polaroid/Kodak instant film case.

Stay tuned, while it is once again proven that the free market competition really does work.

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But they only gave us one page!

To find out more about the CTR-10 Series, and the other Dynamax cartridge recorder/reproducers, give us a call.

New Equipment Guide

With this issue, Radio Guide introduces the New Equipment Guide.

From now on, you can look to Radio Guide to offer you information on the newest equipment offerings available from the manufacturers and distributors in the broadcast industry . . . Editor

New AUDIOMAX 4000 Broadcast Audio Cartridge

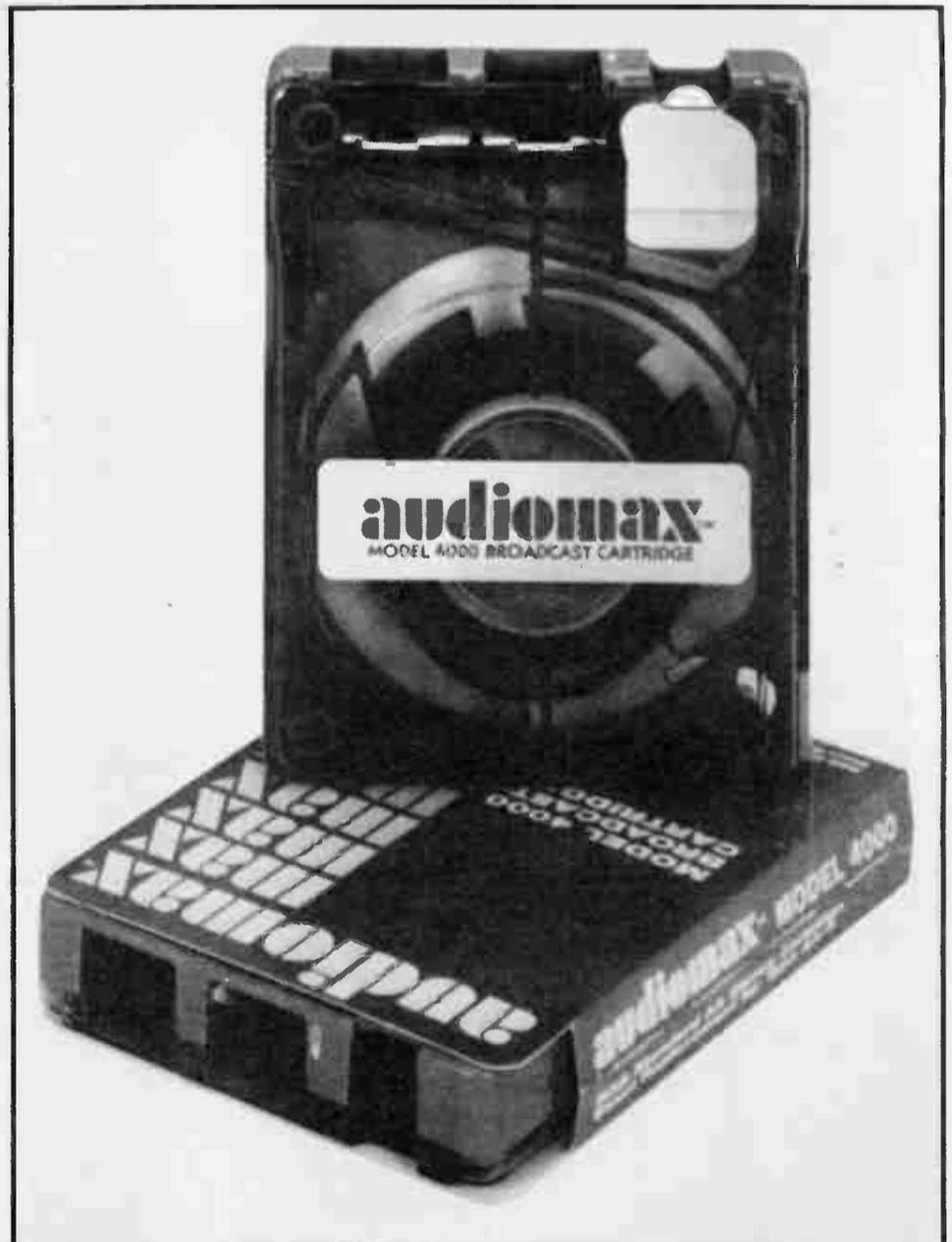
AUDIOMAX 4000 has been developed as a premium quality stereo cartridge for use at elevated recording levels, and is completely bias and phase compatible with existing type AA-4 cartridges. It utilizes a new and highly refined cartridge shell design molded in the latest composite engineering-grade plastics, and a new tape formulation, DYN-600X, developed specially for AUDIOMAX.

The advantages of AUDIOMAX 4000 include improved audio quality, excellent high-frequency response, and extended headroom, as well as a very rugged and high tolerance shell for superb tracking unit to unit. The new tape formulation utilizes cross-linked urethane binders to insure both minimum oxide shedding and a low coefficient of abrasion to protect valuable cartridge machine heads and guides.

Each AUDIOMAX 4000 cartridge is provided with an individual protective storage sleeve and carries a 100% guarantee of user satisfaction. Standard loaded lengths vary from 10 seconds to 10-1/2 minutes. Complementary samples are

For complementary samples or further information on AUDIOMAX 4000 and other Fidelipac products, contact:

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Housed in the slope-faced rack pods and center console over-bridge, is more standard countertop rack space than our closets competitors offer. These are the lowest profile and most easily accessible rack bays available.

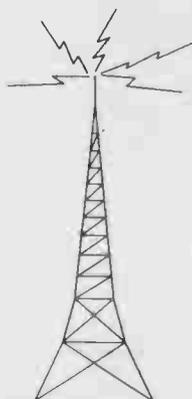
It is designed with generous vents to maximize passive air flow for efficient equipment cooling. The unique center over-bridge is cantilevered over the console. It positions a full 14 inches of rack space, in two bays, directly in front of the operator -- where it is most usable. It can easily accommodate six cart machines, all of which can continue to function even in its unique 90 degree tilt-

back position. This feature allows quick and easy access to the interior workings of the console, for maintenance. Like all Express Group systems, each module is designed with large access panels and quick quarter-turn fasteners as standard equipment.

Another unique feature of the Series 6000 is its corner storage pods. Their sloped faces complete the special wraparound design and offer quick and easy access to cart and CD storage. No other system offers this kind of accessible storage capacity.

The Series 6000 also offers polysturadial corners to eliminate the scratching and splitting that can occur with simple laminate. The hazards of every day studio life such as chair casters, vacuum cleaners, etc., are no longer a threat. Our unique beveled edges around the base of our floor cabinets eliminate any problems.

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Coming in June
The "New" Radio Guide
Nothing Less - Something More



QEI's "CAT/LINK" Digital STL/TSL System

Brings Stations in All Formats Into the 90's

By Charles H. Haubrich - QEI Corporation

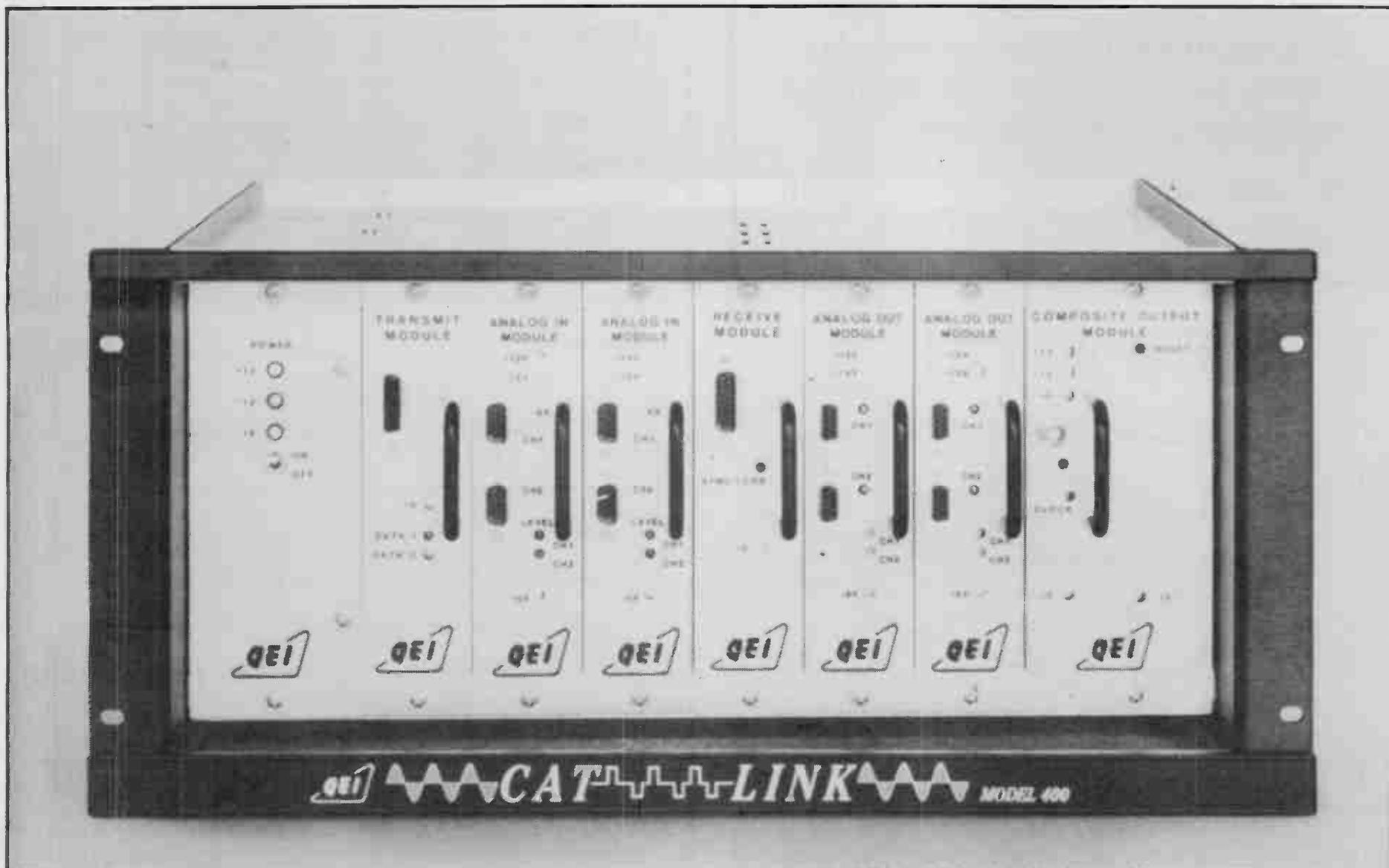
This system uses a proprietary sampling scheme to encode the analog Composite Stereo signal to 14 bits without using any compression. Referring to quantization basics, 14 bits will provide 84 dB of dynamic range and less than 0.01% distortion. Since the Composite signal from the stereo generator has already been processed and peak limited, very little headroom is needed to transmit it. This is a significant advantage over discreet left and right transmission, since it allows almost the entire dynamic range of the transmission facility to be utilized.

In the "CAT/LINK" system, the 100% LED lights about 3 dB below clipping, which yields a signal to noise ratio of 81 dB. Although current CDs use 16-bit (96 dB) quantization, the two most significant bits generally are used for "headroom" (12 dB). This places the noise and distortion floor 14 bits (84 dB) below most of the program. The "CAT/LINK" Composite Stereo channel is DC coupled. This means that there are no low frequency phase shifts to degrade low frequency separation. There are also no "overshoots" such as those caused by AFC instabilities on 950 MHz STL radios.

The "CAT/LINK" system is a "real time" system which uses a very high-speed DSP computer. There are no error correction routines to cause annoying audio delays. Error correction may be necessary for CDs or VCRs, but our testing has shown no noticeable degradation with bit error rates of 1 in 10,000,000 or better and only occasional "pops" (similar to multipath) with rates of 1 in 1,000,000 (1.4 logic errors per second). Most transmission paths are orders of magnitude better than this.

Since the Composite Stereo does not use the entire 1.544 Mbit stream, auxiliary channels can be provided. The sampling rates (analog bandwidth) and quantization (dynamic range) of these channels can be customized by firmware (EPROM) to the customer's requirements (up to the 1.544 Mbit channel constraint). The customer may also opt for less composite stereo dynamic range and use the bits saved to improve the performance of an auxiliary channel.

Digital transport of programming between broadcast studios and transmitter sites is a technology whose time has come. By its nature, digital (PCM) transmission may be repeated indefinitely without degradation of the encoded programming. The "CAT/LINK" system allows the broadcaster to digitally transmit processed composite stereo, without perceptible delay, over a variety of transmission media. Since DS1 (T-1) is a North American telephone standard, there are DS1 circuits available on microwave and satellite carriers as well. All of these options offer alternatives to the crowded 950 MHz band.



QEI's CAT-LINK multi-channel STL/TSL is already giving stations across the county the advantages of transparent digital transmission with no audible delays, along with bidirectional capability and exceptional reliability. Broadcaster's in a wide range of formats and with a variety of studio-transmitter links are making use of CAT-LINK's advanced digital technology.

Contact: Jeff Detweilwer - QEI Corporation
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1) 4008 program line equalizer and card cage. \$75

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Alan Garren

KPDQ

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Art Freeman

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(1) Magnecorder 1021 transport electronics in good shape and (1) Magnecorder 1021 transport electronics for parts. \$450 or B.O.

Commodore 64 computer with monitor and FSD-1 floppy disk drive. \$150 or B.O.

Stereo monitor amplifier. Good shape, 30 watts, tube type. \$75

Gra-lab photo electric timer. \$25

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RG-8/U coaxial cable (several hundred ft.) on 2 reels (new). \$50 ea.

Gates #14425 audio transformer (condition ??). Offer

#10 bare copper wire. 10,000 feet on 1000 foot rolls. \$125 per roll.

Many electron tubes. Condition ?? \$2.00 each. Call for list.

Plate transformer. 210/240 VAC primary, 3000 VAC 1A secondary. Condition ?? \$250 or B.O.

"George Sturley" plate transformer. 240 VAC primary, 3000 VAC secondary.

Shipping not included.

Marsh Johnson

Evergreen/Pacific Communications

503-926-3994 or

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Schafer 903 automation system. Includes three carousels, dual cart machine, network card for satellite, plus extras. Recently gone through and is in operation. Perfect for satellite programming. \$6000

Call Tom at 509-522-5412

RCA RT21 reel recorder with manual. \$150

Gates CB-77 turntable with Gates stereo pre-amp. \$75

Hewlett Packard 205AG audio oscillator and HP 330B distortion analyzer. \$125 for both.

Daven Type 6E transmission set. \$50

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1976	RCA BTF-20E1	20 kW FM
1978	Collins 828E1	5 kW AM
1984	McMartin 3.5K	3.5kW FM
1976	CCA AM-50,000D	50 kW AM
1974	RCA BTA-5L	5kW AM
1972	Harris BC10-H	10Kw AM

201 Old York Rd.
York Plaza Suite 207
Jenkintown, PA 19046
215-884-0888

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Gary Fullhart

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Martl RR-50/450 repeater receiver. Good physical condition, but need some work. \$400 or B.O.

3.7 meter SMATV satellite dish. AZ/EL king post type mount. Dual feed horn and 2 LNAs included. Manufactured by Prodelin. Installation instructions included. Best offer.

Kevin Ruppert

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Madison, WI

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(2) RCA 4-deck cart machines. One good, the other for parts.

(3) Spotmaster Model 500C R/P.

(1) Spotmaster Model 500C PB.

(2) Tapecaster Model 700. One RP, and one play only.

CCA/QRK Futura-6 console. Slide pots, fair to good condition.

(5) Model 270 Scully reel to reel decks. Used very little.

RCA BTA-250M transmitter. Good condition, best offer.

Gates BC1-J (standby).

Lou Maierhofer

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Power One HD28-4-A solid state power supply with output of 28 VDC/4A. \$75

Spotmaster turntable pre-amp model BETMS-200. Solid state stereo. \$150

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Harris MW-1A AM transmitter on 1300 kHz. Excellent condition.

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300 Reels of 10" - high quality, quarter-inch tape. Plastic reels and boxes, good condition. Best offer.

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814-432-2188 Fax 814-437-WARA

Gates BC-250T AM transmitter. Tuned to 1190 kHz, complete with manuals. Includes (6) 808s, (16) 810s, (10) 807s, plus various other parts. Taken out of service and used for backup. Kintronics switching relay part of package.

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803-275-4444

Trade your 2-2.5 kW FM power amplifier for my RCA 5 kW unit. The RCA is available immediately. Has single phase conversion and many spare parts.

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218-722-3017

Collins 831 1 kW FM transmitter. New in 1970, excellent updated exciter, great condition. Tuned to 107.1 MHz. \$7,500 FOB Ogden.
Eventide H-949 Harmonizer. Excellent condition. \$2,250
(2) Revox PR-99 playback only decks. Near new condition. \$900 ea.
CD disc players. Century 21 auto-seg, automatic sequencer for CD players. Complete system includes (4) PD-M6000 players that hold 6 CDs per machine. Use with "Gold Disc" or "Hit Disc" service. Used only two months, six hours a day. Includes cables, manuals, etc. Sacrifice at \$3,250.

Wooly Waldron
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Layton, UT 84041
801-546-1722

Rohn 50-foot STL tower. 18" face, heavy duty, never used.

John Glynn
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4609 Dale Rd.
Modesto, CA 95356
209-545-1152

Phelps Dodge CP-1000-4 circular polarized antenna. Tuned to 102.3 MHz. 4-bay with all connectors. Just taken down due to frequency change.

Tom Donnelly
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(6) rolls of 1" copper. 600 lbs. \$250 per roll.
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(1) roll #10 or #12 copper wire. 134 lbs. \$335 per roll.
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400 feet of 1/2" Hellax (used).

Richard Myers
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Shawnee Mission, KS 66205
913-677-8944

Scully 2-track heads for model 270. Minneapolis Magnetics, (1) new, (8) used, plus (3) not sure of. \$80 for all.
(4) Luxo LM-1 mike holders. All for \$60.

Tom Devine
WVLK
300 West Vine St.
Lexington, KY 40507
606-253-5900

Harris FM-2.5 transmitter. 1984 vintage with new tube.
Harris 3-bay FM antenna. Tuned to 99.3 MHz, 6 years old.
170 feet used 1-5/8" Cablewave pressurized transmission line.

Thomas Ferebee
KLLR AM/FM
P.O. Box 70
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Walker, MN 56484
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Rust RC-1600 remote control. Working when removed from service. \$600 or B.O.
6 foot equipment racks. Offer Sono-Mag Cart Carousel. Good condition. \$600 or B.O.
Will trade above items for cart recorder in decent condition.

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Rohn 65G 90-foot guyed tower. (4) 20-foot sections and (1) 10-foot section. Complete with all guy wire, anchors, insulators, bolts, etc. Will sell or trade for self-supporting tower. Call me, let's talk!

Clay Freinwald (K7CR)
KBSG
1730 Minor Ave. 20th Floor
Seattle, WA 98101
206-343-9700

(5) Otari ARS-1000 playback decks with 25 Hz sensors. Recently removed from service at WILN, Panama City, Florida. \$650 each, or discount for all five!

Jim Broaddus
WILN
P.O. Box 1790
Panama City, FL 32402
904-233-6606

Avcom Model Com-20T satellite receiver.

Wegner Communication model 1601 mainframe with (1) 1601 power supply card, (1) 1621 card, (1) 1645 card, (1) 1646 card, (1) 1683-08 card. These cards set the Wegner up for the Satellite Music "AC" Network. Like new condition, very well maintained.

Gary Street
WMJD-FM
P.O. Box 1060
Gruncy, VA 24614
703-935-7227 or 703-935-2816

BE Cart Machines:

(1) 2100 RPS stereo record/playback. \$1,650
(3) 2100 PS stereo playback. \$950 each.

(1) 3200 RP/DL mono record/playback with delay option. \$1,250

All low hours, "like new" condition.

UMC cart splice finder/bulk eraser. Excellent condition. \$425

Marti RPT-15 dual frequency UHF transmitter. Marti CR-10-2 dual frequency UHF receiver. 450.700 and 450.925 MHz. Used on only a few remotes. \$1,700 for both.

(10) Reels of Ampex 406 tape. 10-1/2" metal reels, new in sealed factory cartons. \$100

Gary Jones
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3-bay Phelps Dodge FM antenna with radomes. Tunes to 105.5 MHz. \$1,300

Rick Martin
KWYD
P.O. Box 5668
Colorado Springs, CO 80931
719-392-4219



RCA-8A FM antenna. Tuned to 102.5 MHz, 8-bay horizontal, with heaters. \$1,500 or B.O.

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Extel AH11R printer with dozens of new ribbons. \$100 or B.O.

Ampex AG-440 2-track stereo reel to reel recorder with electronics. \$650

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Energy Onix 25 kW FM transmitter. Tuned to 100.7 MHz., uses grounded grid triodes. Unit is only 2 years old and in excellent condition. Includes a brand new final PA tube. Available in 30 days. Will sell for a reasonable price.

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154 Guajatrca St.
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809-751-8947

CCA 10-channel studio console.

Roger
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Tucson, AZ 85712
602-886-1853

Schafer 7000 automation system - satellite format. (2) Audiofiles, (1) triple-deck, (2) single play decks, (4) ITC 750 reel decks, Level one memory complete with terminal encoder and four racks. Best offer over \$4,500. FOB Clinton, IA.

Harris/Gates FMC-4A Antenna. Circularly polarized 4-bay antenna, tuned to 97.7 MHz, taken out of service in excellent condition.

Bill Dieckman
KCLN
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Clinton, IA 52732
319-243-1390

Versa-Count model V-322 FM translator. 10 watts output, tuned for 99.5 MHz input and 92.1 MHz output. Crystals available form good source for any frequencies. AM code identifier built in, unit uses "F" connector on input and "N" connector on RF output. New cost \$2,400. Asking \$1,800. Good condition.

Scala CA-4V 2-bay antenna consisting of two CA-2 antennas and matching harness for vertical polarization spacing. Tuned low-band group, original 92.1 MHz, 50 ohms each bay, 50 ohms harness input. New cost \$600. Asking \$450 complete. Good condition.

(2) Hammond REFK19035-24 rack cabinets with locking solid front door. Has air intake at bottom with two squirrel-cage blowers and filter for clean cabinet pressurization. Blowers are Hammond RAVB-290 (290 CFM). Racks have 35 inches of vertical panel space and threaded rails. Overall 40"W x 21"H x 24"D. New \$450 each. Asking \$350 each. Both in good condition.

Buyer to send cashier's or certified company checks only. Buyer to arrange packing and transportation for racks and antennas. All shipments will be sent insured for replacement value and freight collect unless prepaid by buyer.

Inquiries to: SATCOM Associates
6903 Spring Garden Dr.
San Antonio, TX 78249
512-696-5615

340 used Scotchcart I and II, various lengths. \$1.00 each, you pay freight.

Call Sam Mooney
919-727-8826

RCA 10-bay antenna tuned to 92.9 MHz. Approx. 300 feet of 4-inch coax. Both on ground, ready to ship. Will sell independently. \$12,000 for both.

Mark O'Brien
KTGL-FM
3201 Pioneer's Blvd #203
Lincoln, NE 68502
402-483-6814

Gates (ERI) Cycloid 3-bay circularly polarized antenna. Complete with input and interbay sections and decoders. Tuned to 95.3 MHz. Best offer.

Friend S. Weller
KVNU Radio
P.O. Box 267
Logan, UT 84321
801-752-5141

Microwave Associates VR-3X satellite receiver with one audio subcarrier card. \$300

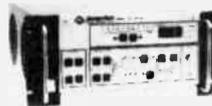
Recordex model CS-4000 stereo high speed cassette duplicator. Up to 5 copies simultaneously, both sides. Includes GT-4A reel to reel cassette transport. Reasonably good condition. \$800

Robert Jones FM translator. Input Channel 296, output channel 288. \$1,300

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Medium transmitters with broadband solid state drivers and one zero bias grounded grid triode in their PA are available at 1.5KW, 3.5KW, 5.5KW, 7.5KW, and 12KW. Higher power transmitter utilizing two grounded grid triodes (one as a driver) are available at standard outputs of 15KW, 22KW, 25KW, 30KW, 40KW, and 53KW.



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A Wise Enterprise

Elgar HIT-H7.5 120/220 volt isolation transformer. 7.5 kVA, perfect condition, never used. \$2,600 firm.

Art Reis
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New Lenox, IL 60451
815-485-7388

Magnecord 1021 mono reel to reel recorder. Is later vintage with momentary switches. Good condition.

Harris System 90 automation system. Controller, program console and brain only. No source equipment. Best offer.

Schafer 903 automation system and programmer with (4) Schaffer reel to reel decks in two racks. Has extra source cards. Needs a little work but working when removed from service.

Call Pat Delaney at 507-895-2065

IGM Stereo Instacart. 48-tray. \$4,000 or B.O.

IGM 90 cart. 42-tray stereo. \$1,200 or B.O.

(2) SMC 250 Carousels. \$800 each or B.O.

(1) SMC 350 Carousel. \$800 or B.O.

Broadcast Products 2000 event automation system with all cables and spares. \$500 or B.O.

This equipment was removed from service about 1-1/2 years ago. It works, but sold as-is.

Bob Maxwell
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(2) Telex MC series cart machines mono record amps.

Marti RR30-150 dual frequency receiver.

Mark Young
WJON/WWJO
St. Cloud, MN
612-251-4422

IGM 78-cart Go-Cart. \$2,500

Adcom Model 7550 satellite receiver. For Transtar Adult Contemporary. \$3,000

Colorado Magnetics SC-400 switcher. For use with Transtar operation. \$500

You pay freight.

Monty Ivey - KPAY
2654 Cramer Lane
Chico, CA 95928
916-345-0021

Orban OptiMod 8000A with manuals and factory test specs. Good condition.

Technics M85 MKII cassette deck with manual. Fair Condition.

Nakamichi 700 II cassette deck with manuals. Needs record head.

Telex Copyette 1&1 fast dubber with manual. Needs record head.

Hewlett Packard 461A wideband amplifier with manual. Good condition.

HP 5100B frequency synthesizer with manual. Good condition.

HP 5110B synthesizer driver with manual. Good condition.

Terecoder 2-channel tube type reel to reel. ????

Susan Newstead GM
KOPN-FM
915 East Broadway
Columbia, MO 65201
314-874-5676

Howe 2300A Phase Chaser. New, unopened box. \$800

Technics SL1200 MKII turntable. New, unopened box. \$300

Above items purchased for new studio, but never used. Would con-

sider trade for working Revox PR-99 or Otari MX-5050B or cart recorder.

Andrew 1-5/8" wall/roof feedthru. \$50

100 feet 7/8" foam Hellax with "N" males. \$125 + shipping.

Marty Hijmans
KYSL
P.O. Box 77 719 Ten Mile Dr.
Frisco, CO 80443
303-668-0292

Elcom Bauer 5 kW FM transmitter. New, 605C never used. Minor shipping damage. Must sell. \$27,000 or B.O.

Victor Michael
WHTO-FM
575A Montgomery Pike Route 15
S. Williamsport, PA 17701
717-323-8200

NEC NEAX-12 telephone PBX. Recently removed from service. Will handle 12 incoming lines and 90 extensions. Includes receptionist console but not individual telephone sets. Make offer.

Ray Miller
WGBY
44 Hampden St.
Springfield, MA 01103
413-781-2801

250 Audlopak A-2 carts. New and almost new. 40s and 70s. \$450

Greg Jablonski
WHMI
P.O. Box 887 1372 W. Grand River
Howell, MI 48844
517-546-0860

Rohn SS-170 170-foot self support tower. Just a few years old. Had 3-bay antenna attached to it. Best offer over \$3,500.

John Lackness
6550 Lexington
Beaumont, TX 77706
409-866-6072

MEI Digisound digital hard disk cart machine. Great for automation! Includes (2) 332 meg hard drives, (2) remote keyboards, tape drive, software and manual. System configured for 15 kHz (32 kHz sampling) stereo/mono. 75 minutes of stereo, 152 minutes of mono storage, or any combination. Product is now supported by Gentner. \$10,000

Contact: Jim Addle - WFMT
312-565-5033

Marti Red Tag Sale!

Move up to Marti at a fraction of the new cost.

We have dozens of pre-owned STL and RPU systems that were taken in trade for new Marti Equipment. These units are completely rebuilt and carry a full 1 year warranty.

Call Marti now!
(817) 645-9163

Fairchild DART-384 digital audio satellite receiver with (1) 15 kHz dual audio card, (1) 7.5 kHz dual audio card, one voice sue card. Includes antenna mounted downconverter, 200 feet of cable, connectors, manual. receives ABC, CBS, NBC, Mutual, Unistar, etc. Changing networks, used only four months, mint condition. \$5,700.

Mike Martin
KQAL
Winona State University
Winona, MN 55987
507-457-5226

Autogram IC-10 stereo 10-pot console. With some spares and manual, about 9 years old but in good shape. \$900

Mark Meyer
WWCK Radio
3217 Lapeer Road
Flint, MI 48503
313-744-1570

Revox PR-99 reel to reel machine. \$750

Mike Shafer
KEKB-FM
315 Kennedy
Grand Junction, CO 81501
303-243-3699 Fax 303-243-0567

Pyramid 6-channel mixer. Used in small studio for two years. 6 line inputs, 2 phono, 2 mikes, EQ. Works good, being replaced with larger console. \$200

Brian Pitts
WZPQ
P.O. Box 251
Winfield, AL 35594
205-487-6400

Collins 21-E 5kW AM transmitter. A very popular old box, now made available by yours truly.

Also have an RCA BTA-5L1 5kW AM transmitter. C'mon, this is a 5kW box, not a 50kW. Ampliphase got a rather bad rep in the big 50s, due to the unstable exciter, but this 5L is a great transmitter and it's only 15 years old. It can sound great at your station. I also have a few emergency generators from 15kW single-phase to 40kW three-phase.

Smokey King
KIXZ/KMML/KQIZ & others
13310 Cisco
Amarillo, TX 79111
806-355-9777

3CX15000H3 tube. Rebuilt by Econco, but never used. "0" time on it. \$600

Marti RMC-15S studio unit of Marti remote control. Mechanical problem with channel select buttons, otherwise it looks and works well. \$350

(continued on page-27)

Shure M-267 mixer. Refurbished, looks and works great. \$250

(2) BE Model 2000 mono cart decks. In rack mount shelf, they work fine. \$550 for both with rack shelf.

ABC Radio Network tone decoder. No manual, working when removed. \$200

Kirk Harnack

Harnack Engineering Inc.

1385 Lamar Ave. Suite 5

Memphis, TN 38104

800-366-7618

Sonomag RAS-PRO Automation System. Includes (4) 350RS carousels, (2) racks with doors, power supply, remote control, DS-20 audio switcher, RP-1000 memory, PDC-3A clock, extender cards, spare cards, all books and drawings, battery backup, (1) carousel for parts, spare switches, bulbs, mechanical parts. Clean and in service. \$8,000

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Minot, ND 58702

701-852-4646

Telescoping heavy duty 35-foot Wilbert Mast model 7-30-357 with Dodge Custom van and 12-volt compressor for mast operation. Van interior is customized with deluxe RV front seats and carpeting. Equipped with automatic transmission, cruise control, power steering, tilt wheel, AC, power heavy duty disk brakes, AM/FM radio.

All above in good condition. Asking \$8,000.

Contact: Mr. Sam Garfield

WYED-TV

919-553-1700

Equipment Wanted

Wanted: Dead or alive. Pultec EQs; Fairchild & Teletronix limiters; Neumann, Telefunken, AKG, RCA, and Scheps microphones. Tube Macintosh or Marantz amps and pre-amps. Sontec, ITI, and Lang EQs. Neve or API equipment. Boxes of old tubes. UREI, Orban, United audio, dBx, and other outboard gear. Ampex ATR-102 or 104. Parts for MCI JH-110/114 recorders. Altec 604s/crossovers/Tannoy speakers. JBL 2231; Altec 288-H driver; misc. equipment of all types.

Please call Dan Alexander

2944 San Pablo Ave.

Berkley, CA 94702

415-644-2363

Fax 415-644-1848

Wanted: Professional record cutting equipment such as Presto, Rek-O-Kut, Scully, Fairchild, etc. I also need one good system for cutting stereo 45s. Need manuals, blank discs, catalogs, leadscrews, cutting heads, needles, anything related. I also buy 50s records in quantity, jukeboxes and coke machines.

Kim Gutzke

7134 15th Ave. S.

Minneapolis, MN 55423

612-866-6183

Wanted: ITC 750/770 mechanical spares parts Especially roller brakes and brake straps.

Rotron blower. High velocity, used in some 20kW FM transmitters.

Mike Shafer

EKEB-FM

315 Kennedy

Grand Junction, CO 81501

303-243-3699 Fax 303-243-0567

Wanted: Instacart, stereo or mono.

Perry St. John

KQEG-FM

LaCrosse, WI 54601

608-784-1027

Wanted: Cart Machine. Mono playback with output transformer. Can be out of broadcast specs, but must be operational.

James Steele

WKBK-FM

20 N. Grove Blvd.

P.O. Box 2525

Kingsland, GA 31548

800-533-5229

Wanted: Daven pot. 10K, 38dB and off. 2 dB per step, #7530. Used as master in an RCA BN-17A portable remote amplifier . . . HELP!!!

Robert H. Sauber

WFRA

P.O. Box 908

1411 Liberty St.

Franklin, PA 16323

814-432-2188

Wanted: Amplifier Corp. of America model 610 "Magnemite" (with external flywheel) reel to reel tape recorder.

Broadcast Equipment Specialties Corp. Tapak series "Duplex Newscaster," "Triplex Newscaster," "Simplex Newscaster," "Pocketape," "Tapette," reel to reel tape recorders.

Tape Recorders Inc. "Tri-FY Carousel."

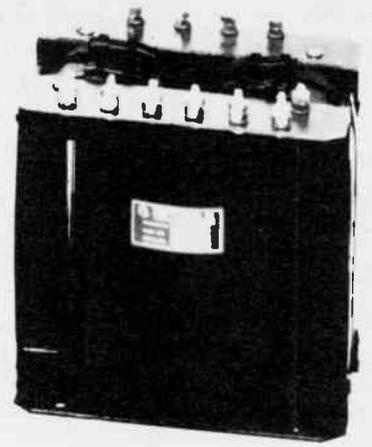
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Save \$\$

Heavy Duty Replacement Transformers, DC Filter chokes and capacitors for AM & FM transmitters manufactured by: AEL, CCA, CSI, COLLINS, CONTEL, CONTINENTAL, BAUER, GATES, GE, HARRIS, ITA, McMARTIN, RAYTHEON, RCA, SINGER, SINTRONIX, WILKINSON. Many other models also available.



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FAX: (915) 751-0768

Nagra IIC

Collins Audio Products Co. "Custom Special" AM/FM tuner.

Bob Pearlstein

17 Vine St.

Medford, MA 02155

617-391-3026

Wanted: Belar FMM-1

Belar FMS-1

Belar FM-RFA-1

J. Boyd Ingram - WBLE

P.O. Box 73

Batesville, MS 38606

601-563-4664 Fax 601-563-9002

Wanted: 8 (or more) channel mono or stereo broadcast console. Prefer rotary faders, especially step attenuators. Ampro, Gatesway, or LPB are possibilities. Nothing over \$1,000

Robin O'Kelly - KORE-AM

2080 Laura St.

Springfield, OR 97477

503-747-5673 Fax 503-746-0680

Wanted: 400 feet of 3-1/8" rigid transmission line.

Call Jim Caoursolle at WGGQ 414-324-4441

or Bruce Herzog at 414-426-2961

Wanted: 1kW UHF LPTV transmitter, tuneable to Channel 43.

Moseley MRC-1600 remote control.

Joseph Bahr

154 Guajatra St.

Crown Hills

Rio Piedras, PR 00924

809-751-8947

Wanted: Need a schematic for a Bearcat scanner model BC-20/20. Could also use a PC board layout and any other technical info. Will pay reasonable amount and shipping.

Jerry Mathis

WCSI/WKKG

3212 Washington St.

Columbus, IN 47203

812-372-4448

Wanted: (2) 810 triode tubes in good condition. For Johnson kilowatt amp.

Gary Hilebrand

KQTV

Box 247

St. Joseph, MO 64506

816-364-222 Ext-32 days

816-279-4992 nights

Wanted: Schematic for B&W model 210 oscillator.

Front panel meter for B&W 410 distortion meter.

Schematic for Shure M67.

R.F. Butler

KTAI-FM

P.O. Box 178

Texas A&I University

Kingsville, TX 78363

512-595-3497

Wanted: FM transmitter. Late model, 500-1000 watts, stereo, with or without exciter. Remote control.

STL electronics, dishes, hardware, etc. Marti preferred.

Marti remote receives, transmitters, antenna. 161 and 450 bands.

Community repeater transmitters, receivers, repeaters.

(continued on page-28)

Equipment Wanted

(continued)

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