



RADIO GUIDE

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

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The BBS Blues

Well, it seemed as though it was a pretty good idea at the time. Establish a nation-wide computer bulletin board with technical tips, equipment up-dates, etc. I only got a few calls on the subject.

I remember a specific transmitter that had a serious flaw in the audio driver section. Seems as though there had been an up-date sheet on this problem available for quite some time. After many man-hours and hundreds of dollars in spare parts, I finally found out about it. Yes, I had called the manufacturer quite a few times, regarding the problem. They were very helpful but they never did mention the up-date. Later on, I found the up-date sheet in the files at another station. I called the manufacture, referenced the sheet, and - - "Oh yes, we have that."

If the equipment people want to take part in this BBS, so much the better. We could use their information, but it really needs the support of the engineering community.

As soon as you read this, give me a call and let me know what your feelings are, regarding the BBS. If enough of you need it, then we'll do it . . . Editor

It's Up To You

Do you like the Radio Guide?
Do you want to see it continue?
Are you willing to help make it happen?

During the short time that the Radio Guide has been in publication, I have received nothing but praise from most of you. I think that the majority of you know, by now, what the real purpose of the Radio Guide is - - information.

Information rides on a two-way street. It's great to get it, but it has to come from somewhere. I know it's hard to sit down and come up with an article for publication. Why write it down when you already know it? It may even seem as though it's not very important or that "everybody" knows about it and will think you're something of a tyro. Radio Guide reaches 10,000 people every month. There's simply no way that 9,999 people can all be aware of your special technical information. So, please - - send it in.

The Radio Guide does not rely on the skills of monthly columnists. I would rather see a wide range of viewpoints. So far, most of you agree with that. If you do, and if you want to see the Guide continue, then it should be worth a few minutes of time . . . Editor



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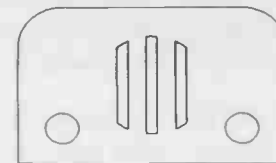
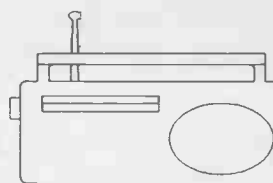
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Help Wanted

Mosely PCL-505 STL Help Needed

The following is a letter from Kelly Klass at KEZJ-AM/FM, in twin falls, Idaho.

I have had a nagging problem here at KEZJ-AM/FM for several years, with no apparent cure, although I do have my theories.

Our FM went on the air in 1976. We shoot our stereo signal via a Moseley PCL-505C STL running in the 950 MHz band. The STL signal path is about 18 miles and the signal at the receive site is way past saturation.

At least once every two or three months, we experience a signal fade between the studio and the transmitter site, resulting in a fail safe condition which takes the transmitter off the air. It can happen any time of the day or night, any time of the week, for no apparent reason. Other stations in the area are using STLs in the same band and shooting their signal much further than ours (as much as 40 miles) with no apparent problems. All these years I have blamed it on atmospheric conditions, but I'm not sure this is the case, since none of the other stations seem to experience it.

I did happen to be at the FM site one morning when the fade occurred. The signal strength meter on the Moseley receiver was way down and bouncing around, then slowly came back up. The STL transmitter is stable as a rock, and we just recently put three new modules in it, to the tune of \$1600, and I'm sure it's not the problem. Whenever the problems occurs, the AFC is right where it should be, and the power output is nearly full scale, with negligible reflected power. We just had the receiver rebuilt by Moseley, so everything should be up to snuff. However, the apparent fading still occurs once every two to three months for only a couple of minutes or so. It never lasts long enough nor happens often enough to track down what is happening. It acts just like atmospheric fading - - but why doesn't anyone else in the area experience it?

It's about to drive me crazy. Every other engineer I've quizzed about this has never had the problem, and we always end up blaming it on the gremlins. Does anyone out there have any ideas? I'm about to the point of committing myself to the psychiatric ward at the "Home for Broadcast Engineers!"

Kelly may be reached at KEZJ at 208-733-7512. Let's help out or the "Home" may have another occupant . . . Editor

Wilkinson LA2-C Limiter

Steve Weber of Fresno is looking for a schematic and other information on a Wilkinson LA2-C Audio Limiter. If anyone has this info, let him know . . . Editor

GE BF-1-A RF Amplifier


Larry Milliken of KEFR in LeGrande, California, has an old GE BF-1-A 1kW RF amplifier. He is in need of a schematic and any other information on this particular unit. He may be reached at 209-389-4659. Let's help him out . . . Editor

Your Help is Needed ...

If we're doing alright, let us know. If we're not serving your needs, let us know that too - - and at the same time be sure and tell us what you think needs correction, modification or expansion.

Remember, Radio Guide depends upon your suggestions for its content, direction and its very existence.

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CSI Transmitter RF Fix

By David E. Doughty - WTLB
Utica, New York
(315) 797-1330

I live in CSI country. There are six CSI FM transmitters operating in this area and I've worked on each one of them at one time or another. The CSI design is simple, stable and reliable. Some time before his unfortunate passing, however, CSI's Bernie Gelman admitted to me that some of his transmitters had been shipped with a manufacturing defect that can seriously affect their operation. The defect was found in at least two of the units in this area. Since they were purchased about four years apart from each other, I suspect that there are a good many CSIs out there with the same defect.

Mounted inside the RF final cabinet in conjunction with the output flange, is an aluminum plate with a hole cut in it to allow the output conductor to pass through to the "bullet" connector. The hole in this plate should be small enough to support just the edge of the Teflon bullet insulator, BUT NO SMALLER. Some transmitters were shipped with support plates having holes considerably smaller than this.

Problems in operating a CSI transmitter having a support plate with an incorrect hole diameter can manifest themselves in several ways; not necessarily all at once. They include:

- Occasional arcing from plate ammeter to cabinet.
- Lower than expected output efficiency.
- Shorter than expected tube life.
- Heating of output tuning components.
- Erratic operation of reflectometer.
- Unexplained damage, or arcing around the output blocking cap.
- Higher than expected incidental AM noise.
- Arcing at the twist locks holding the RF cabinet cover.
- Premature aging of the RF final tube socket.

I strongly recommend to anyone with a CSI transmitter, especially the higher power units, to check the hole diameter of this support plate and correct it if necessary. You will be rewarded with an ultra-stable, cool running, clean sounding transmitter and you'll hardly ever have to replace the final. (Well - - almost hardly ever)

AM Tower Lighting Tip

By Donald J. Larsen
Idaho Falls, Idaho

I once had a 3 tower AM antenna array with a total of twelve side lights and 6 beacon bulbs. It seemed that the lighting systems ate light bulbs for lunch. One year we replaced fifteen beacon bulbs and nineteen sidelights. Evidently, this situation had been going on for some time.

Upon investigation, it was found that (although the towers were shunted to DC ground through the tuning network) the lighting system was completely isolated from the tower structure due to the fact that the lights were fed through Austin transformers.

Bonding the lighting common conductor to the tower cured the problem. Evidently there was a static build-up on the lighting system and periodically it would discharge through the lamps, causing them to burn out.

Teac SX-3300 Tip

From Ralph Messer - WTZE
Richland, Virginia

Ralph called with this tip a couple of weeks ago. He was having problems with a Teac SX-3300 (10.5 inch reels). It seems that the unit would start and stop all by itself, at random times. Even though the power supply DC showed no ripple, he replaced the power supply capacitors anyway. Problem solved. Thanks Ralph . . . Editor.

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Cart Deck Timer Interface

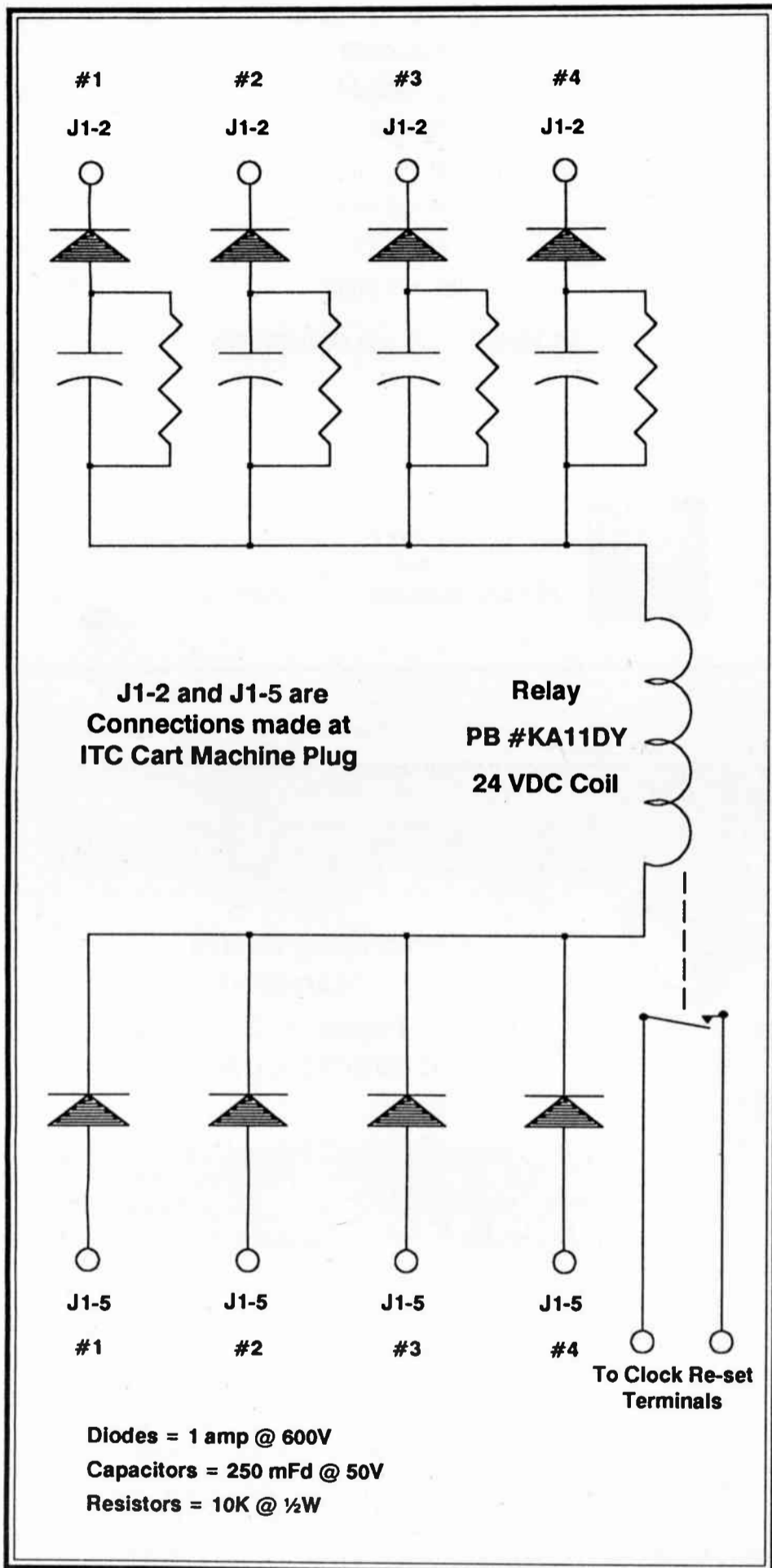
By Ken Abernathy - Technical Director

WFMX/WSIC

Statesville, North Carolina

Since practically all spots are 30 or 60 seconds, the announcers could run a tighter program if they knew exactly when a spot will end.

This timer interface circuit will provide the announcer with that information.



Each time a cart is started, a momentary pulse pulls in the relay and re-sets the timer to zero. The diodes serve to isolate the different voltages of the cart machines. Current flows only for an instant and the resistor discharges the capacitor. The control voltage of the run relay is used to start the counter at zero. The timer can be a Lauderdale LEL-510 or similar unit.

This circuit was designed for ITC SP and WP cart machines but can be used for other cart and recording machines.

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3. MIC/LINE SELECT JUMPERS ON EACH CHANNEL.
4. MONO/STEREO FEED SELECT ON EACH CHANNEL.
5. GAIN SELECT PATCH PANEL ON EACH INPUT.
6. PROGRAMMABLE MUTING SWITCHES ON EACH INPUT.
7. NINE INPUTS ON LAST CHANNEL.
8. 2 WATT CUE AMP.
9. ROCK SOLID, SHORT CIRCUIT PROOF SUPPLY WITH LED INDICATORS.
10. MONITOR SELECT/GAIN CONTROL. Prog1/Prog2/External.
11. PHONES SELECT/GAIN CONTROL. Prog1/Prog2/External/Cue.
12. INTERNAL CUE SPEAKER.
13. VCA CONTROLLED MIXERS.
14. PADDED ARM REST.
15. MONO SUM OUTPUT.
16. PLUG-IN IC'S THROUGHOUT.
17. FOUR INDIVIDUAL PWR. SUPPLIES. Meters, Cue amp., Power amp., Main audio.
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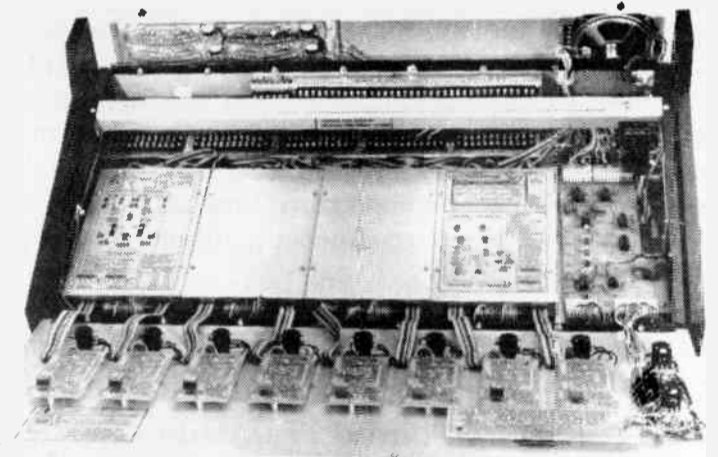
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INPUTS: Two per channel except the last channel which has nine. Balanced bridging 1k ohms in mic mode & 150k ohms high level. Input #1 of each channel programmable mic thru high level. Input #1 of each channel may be strapped for mono or stereo feed.
OUTPUTS: Balanced low impedance, +25dBm max into 600 ohms. May be used balanced or unbalanced. Stereo sum balanced out. Program outputs factory set for +8dBm but may be recalibrated for

any other level.

METERING: Expanded scale, 4" solid state tri-color with VU ballistics. 2 each on single channel units & 4 each on dual channel models.

MONITOR: Stereo, muted monitor outputs @ +4dBm. External 20 watt stereo amp included. Three position selector for PRO1, PROG2 & EXTERNAL in.

CUE: Mono-sum to 2 watt internal amp & speaker and phones. Switch programmable speaker muting.

S/N: Mic level in @ -50dBm & +8dBm

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RESP: 10Hz-20kHz; ±1dB
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Remote start/stop (xL6 & xL8)

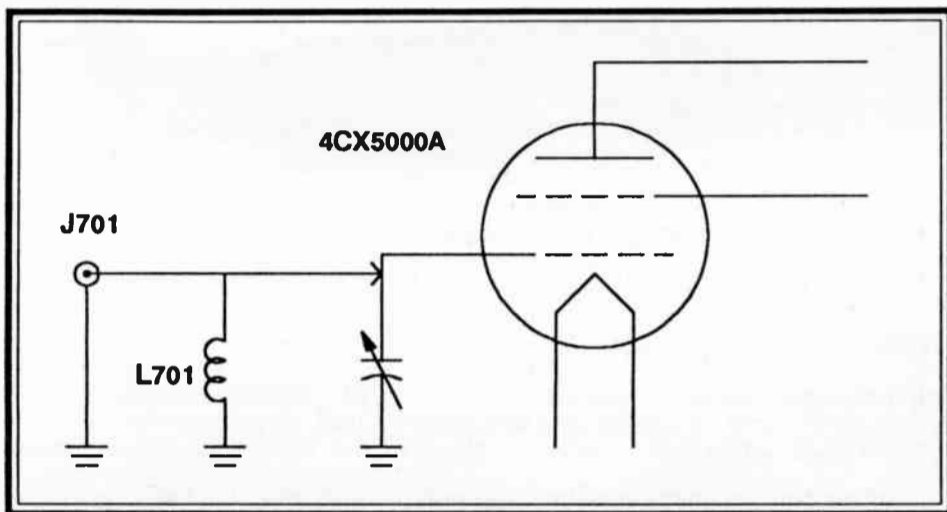
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Harris FM-5C Spurious Fix

By James Cunningham - KHKC
Atoka, Oklahoma
405-265-4496

At KHRC-FM, in Atoka, we have a Gates FM-5C transmitter for our 3kW stereo FM service on 103.1 MHz. In July of 1985, we received a complaint that our transmitter was putting out a spurious signal at 106.3 MHz. I was a little puzzled at first, but began my search using my digital DX-400 Realistic receiver. The spurious signal was strong and clear, and I wondered why I hadn't noticed it before.

I removed the exciter output cable from the IPA cavity, fed it into a 50 ohm dummy load and listened with my DX-400 receiver. No Spurious signal. I then re-connected the exciter to the IPA and fed the IPA output into the dummy load. Still no spurious signal. I felt pretty good about that; I was on the right track. I then connected the output of the IPA into the grid of the 4CX5000A PA final. With the PA plate voltage off, the signal appeared. Removal of this cable from the 4CX5000A also removed the spurious signal.



I went straight to the schematic diagram. It showed a grid bias choke (L-701) with a value of 1.8 micro-henries. Instantly, I could see that the choke in the transmitter was much larger than the required value. I removed the suspected choke coil and, due to a parts shortage, wound one by hand. My Heath Kit inductance checker really came in handy. I installed the newly wound coil and made the test over. The spurious signal was gone! I double checked everything, turned on full power, and scanned the dial looking for our spurious signal. It was nowhere to be found. In less than an hour I had cleared up a problem that could have taken an indefinite length of time. This demonstrates how what might have been a major problem, was overcome with simple, logical procedures and inexpensive test gear.

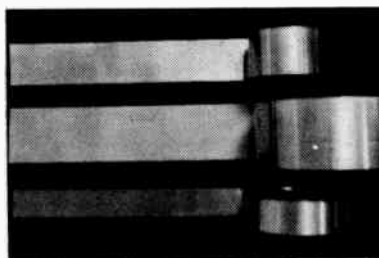
RPU Interference Fix

By Conrad Trautman - WSYR
Syracuse, New York
(315) 472-9797

When I took over at WSYR/WYYY, it seemed that the most important dilemma to be addressed was the Marti equipment. A beautiful system was in place and it just didn't work. Every time a reporter in the field would try to send something, it would be overridden by noise, birdies, and you name it.

The system was set up, originally, to be a repeater system, where the receive antenna was at our FM site on the hill outside the city. It would repeat to a tall building in the city, located in a valley. Most of our news stories were gathered downtown, so I initially concentrated on the downtown site. It turns out that the receiver downtown was picking up intermod from other transmitters on the roof and whether we used the repeater or did a talk around, the result would be the same.

Marti suggested the installation of bandpass filters, which allow only one frequency to pass, while blocking all others. We needed two in series to finally cure the problem. The insertion loss was about 3dB, but I installed a good antenna in place of a unity gain type, which helped maintain our coverage area. This also cured the repeater problem, since it also transmits to the downtown location.



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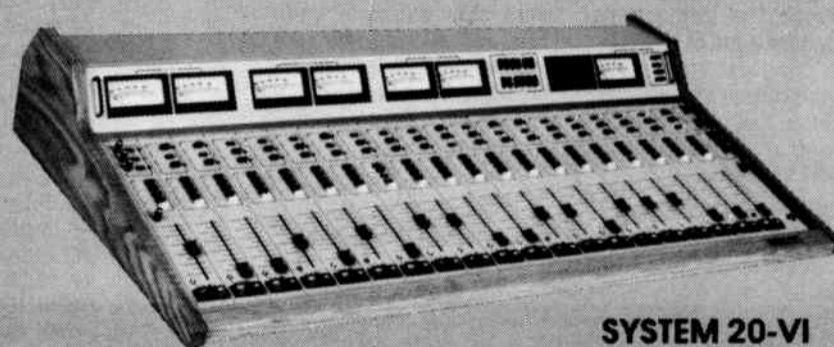
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IC Temperature Sensors

By David Graves - KMJX-FM/Magic 105
Little Rock, Arkansas
501-224-6500

So you want to measure the stack temperature of your transmitter and the temperature of the building to help keep an eye on transmitter efficiency? But neither you or the GM wants to spend \$100 or so per sensor? Enter the answer to your problems: the National Semiconductor LM-34 or LM-35 CAH. This nifty little device will solve your temperature monitoring problems at a cost of less than \$8.00 per sensor. The LM-34 is a linear device which outputs 10mV/degree Fahrenheit, when fed with DC of 5 to 30 Volts. Accuracy is ± 2 degrees or better, over a range of -40 to +230 degrees. Add to this a current drain of only 70 micro-amps, and you have thermo-sensor that will run for over a year on a 9-Volt battery, if no handy source of DC is available. The LM-35 is the Centigrade version of the device, with a range of -55 to +150 degrees. Accuracy is the same for both products. They come in a TO-46 package or the TO-92 epoxy package. The price and info I've given, is for the LM-34/LM-35 CAH, which is the metal TO-46 package. I chose it because I felt the heat transfer characteristics would be better.

Operation is simple - - just put +5 to +30 Volts DC on the +DC lead (denoted by the tab), ground the lead opposite, and read 10mV/degree off of the remaining lead. Using a single positive power supply means that the LM-34 will read 0 to +300 degrees. A bi-polar power supply is necessary in order to read temperatures below zero, but in my application, it was not needed. The factory recommends bypassing the device for RF, however I have operated for one year in an extremely hostile RF environment with no bypassing what so ever, and have experienced no problems. In fact, my stack sensor consists of an LM-35 soldered to some Belden cable, insulated with heat-shrink, and inserted into the exhaust duct - - 3 inches above a 25 kW cavity!

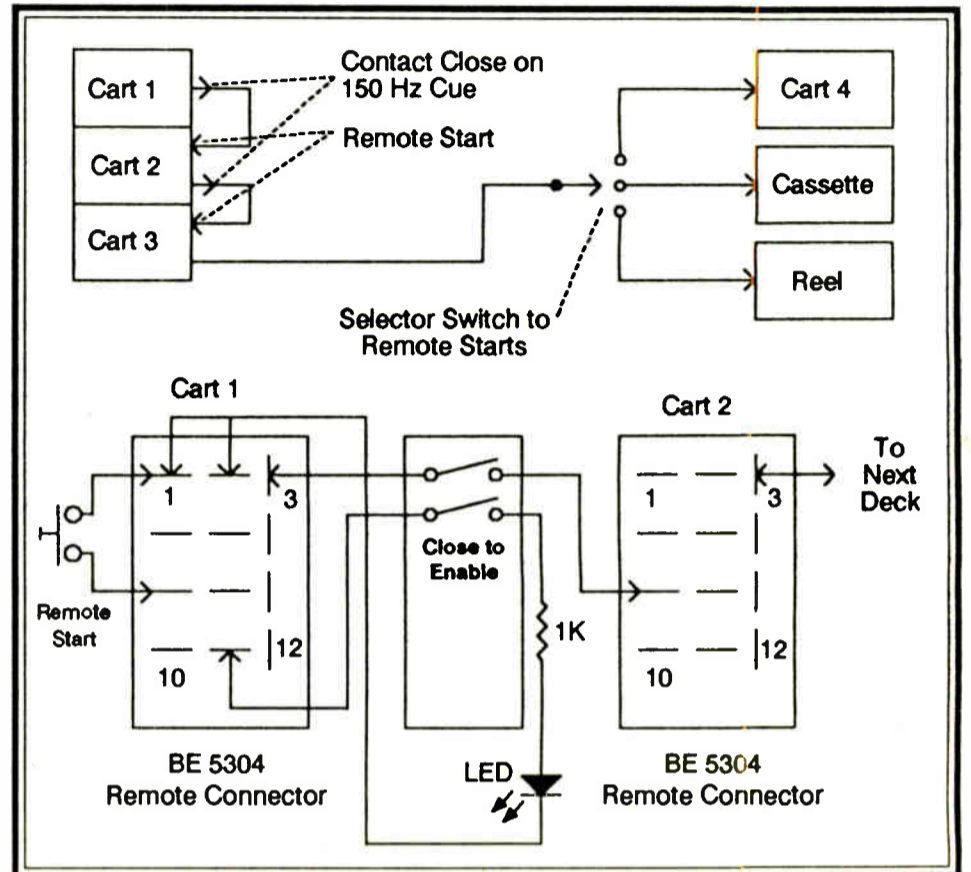
I found it particularly easy to interface with my Gentner VRC-1000 remote control. Just program in a calibration constant of 100, and your temperature is read out to 4 places. Current price is \$7.90 for the LM-34/LM-35 CAH.

For further info, contact Dave Graves, Engineering Manager, KMJX-FM/Magic 105, Little Rock, Arkansas 72212. Phone (501) 224-6500.

Mini-Automation

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

Operators like to have occasional extended breaks away from the board, for production work and other "necessities." I designed this setup for operator fill-in for up to one hour. The system consists of our BE-5304 triple deck cart machine, a standard cart machine, a reel-to-reel deck and a cassette deck. The system makes use of the 150 Hz cue tone contact closures.

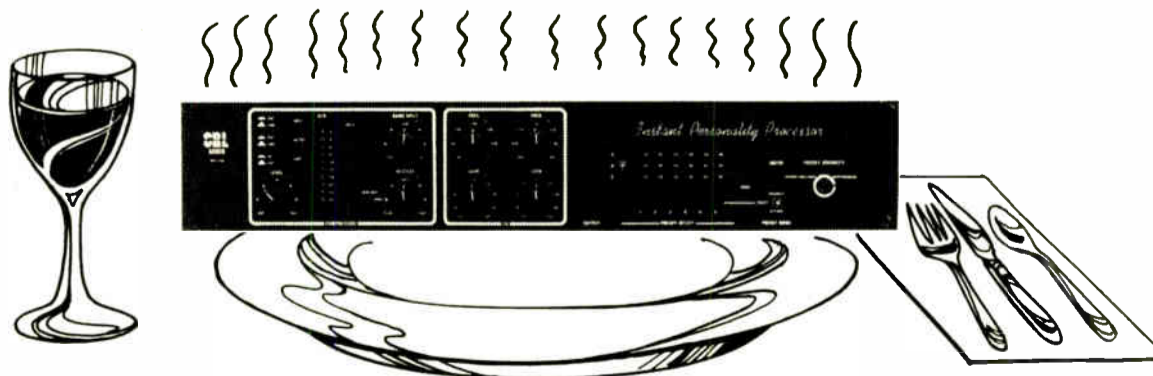


To use the system, a 150 Hz aux cue tone must be placed at the end of each of the carts to be used. Typical use is to load a station ID in cart-1, promo spots in carts 2 and 3, and either music or a program in the cassette, reel, or fourth cart deck. Depending on how long the material in the final deck is, the operator is free for up to one hour, to "take care of business" somewhere within the controllable range of the studio.

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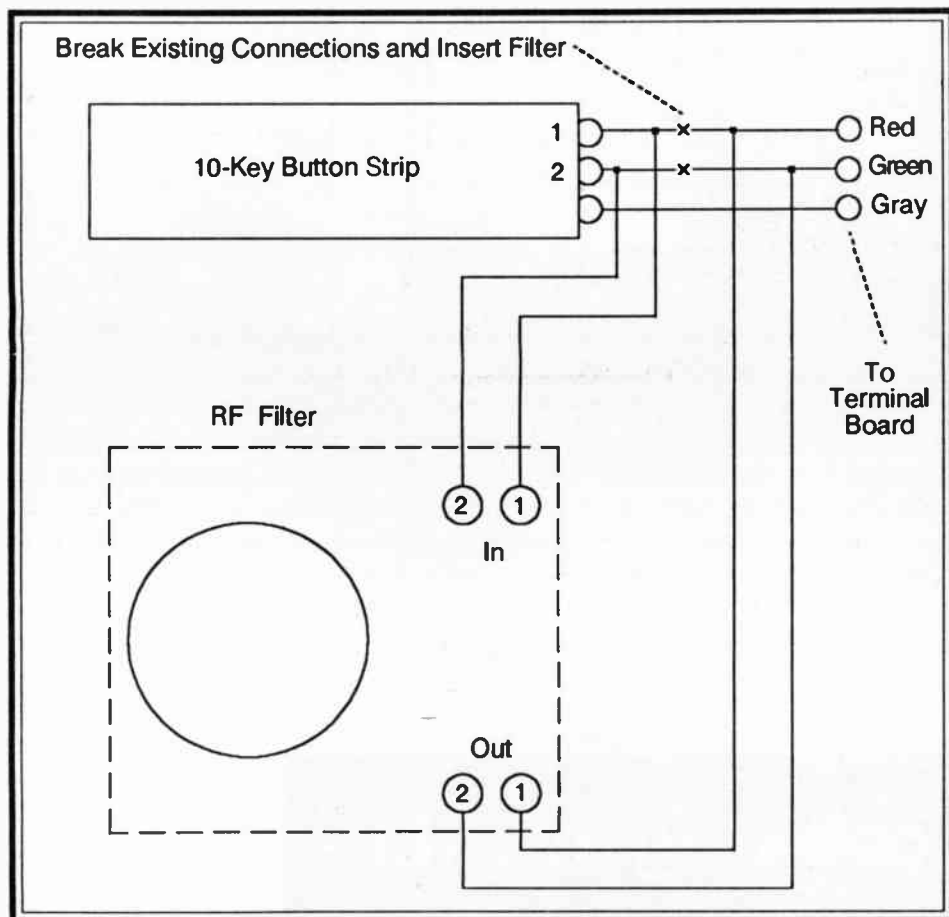
Telephone RF Protection

By Phillip H. Ramsey - KBLG
Billings, Montana
406-245-5000

How often has someone on your staff picked up the phone to record a "hot" interview, or maybe the daily stock market report - - only to find that when they tried to play it back, the recorded material is overwhelmed by your air signal, or even worse, a signal from the station down the street? It's that old bugaboo, RF!

You can hear the newspeople screaming about about their lost interviews, two blocks away. The salespeople are acting like the world is going to end if they can't record an agency spot over the telephone. Then, to top off your day, the GM is giving you those "looks" that say don't just stand there - - do something!

Here's something to try. I have been using a 10-key ITT telephone, but the principle is the same for any kind of phone. Pull the cover off, then remove the strip that has all the buttons on it. Actually, you'll just need to lift it up and turn it slightly so that you can see the underside. You'll usually see three wires. Leave the gray wire alone. Un-solder the other two, being careful not to break the little tabs off. Be sure to make a note of which wire went where. Add about 12 inches to the wires you just un-soldered. Then add a wire to each of the tabs. Run the wires out then bottom of the case and put the telephone back together again. Here's where we are going to add our "magic" box.



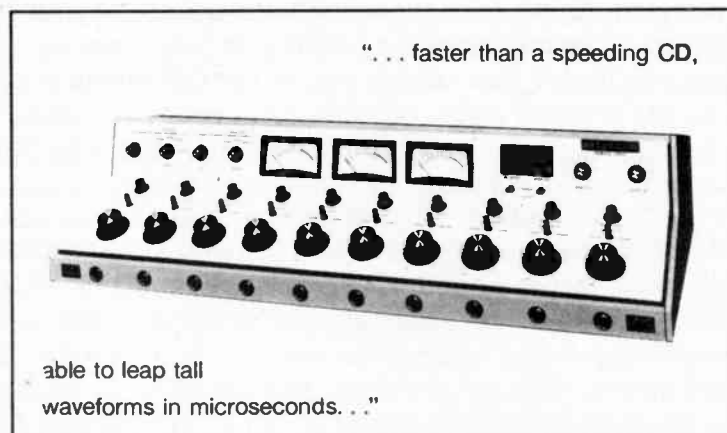
Scuttle Apparatus Corporation makes a nifty little filter designated as the SE-1542-A. To install this filter, just run the two wires you added to the tabs on the key strip, to the input of the filter. Run the other two wires to the output of the filter. I usually just screw the filter right to the case of the telephone. It is easier to trim the wires to length this way. To figure out which is the in and which is the out, hold the filter with the terminals away from your body. The left side is the input and the right side is the output. Simple! Be sure to keep your wires running straight. That is, from tab-1 to the filter and back to the terminal block inside the phone, and the same with tab-2.

You may have a strong enough RF field so that this unit won't totally eliminate your problem, but it sure will cut it down to a level you can live with.

The cost of this filter will range from just over \$16.00, to about \$20.00, depending on where you buy it. It can always be ordered from any local telephone repair person, or the one nearest you.

This may sound like a pitch for Suttle, but it's not. This is just the best thing I've found, in the past 25 years, that really does work to remove the RF from the phone lines.

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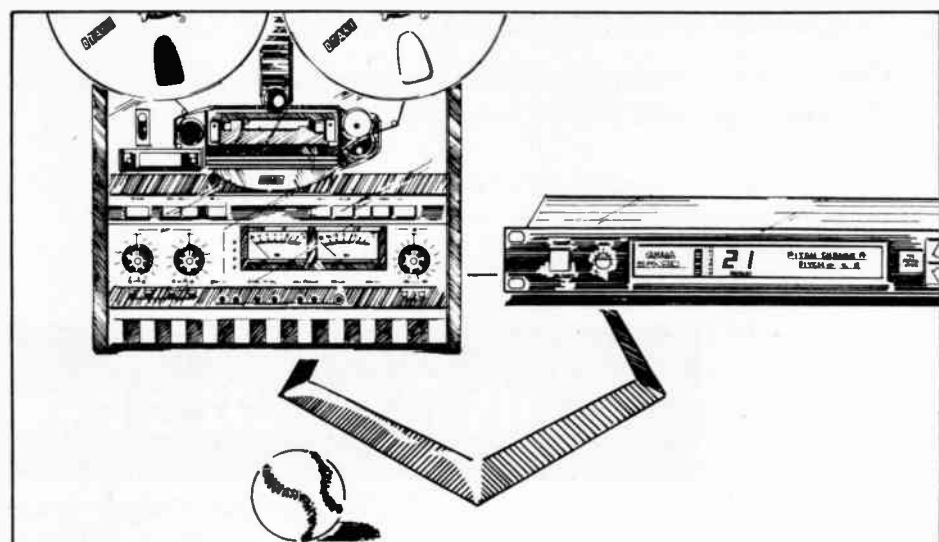


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When In Doubt: Re-solder

By Dan G. Peluso - KFM Radio
Las Vegas, Nevada
702-732-7753

In checking out the Tips From the Field, in the March issue of Radio Guide - - Harris TX Tip by Larry Schropp, I was having a grin to myself as I remembered my BC-1T, in 1970 in Kimball Nebraska. The transmitter would, now and again, have it's two 833s in the final section, glowing like two red apples. Quickly looking at the drive level, I saw nothing. Switching the crystal selector switch back and forth brought the drive back, and operation returned to normal.

After sign-off, I removed the exciter cage and cleaned up the selector switch and examined all parts and wiring - - all seemed OK. I replaced the exciter back into the transmitter, fired it up, and found no problems. All was well.

I wasn't but a few days later, the same thing happened again (tough on one's ego). Rocking the crystal selector switch back and forth again returned the lost drive to the finals. Hmmm... After sign-off, I pulled the exciter cage again, and re-soldered all printed circuit joints and wiring. As far as I know, it's still on the air, without this problem.

The Gates Dualux studio console, about every couple of months, would fade away into the silent zone. When I arrived, and after I got a cup of coffee (this would crack everybody up, except the boss), I would open up the board and replace the program output tube (a 12AU7 I believe); it seemed cold. The new tube would light up and the program would be back to normal.

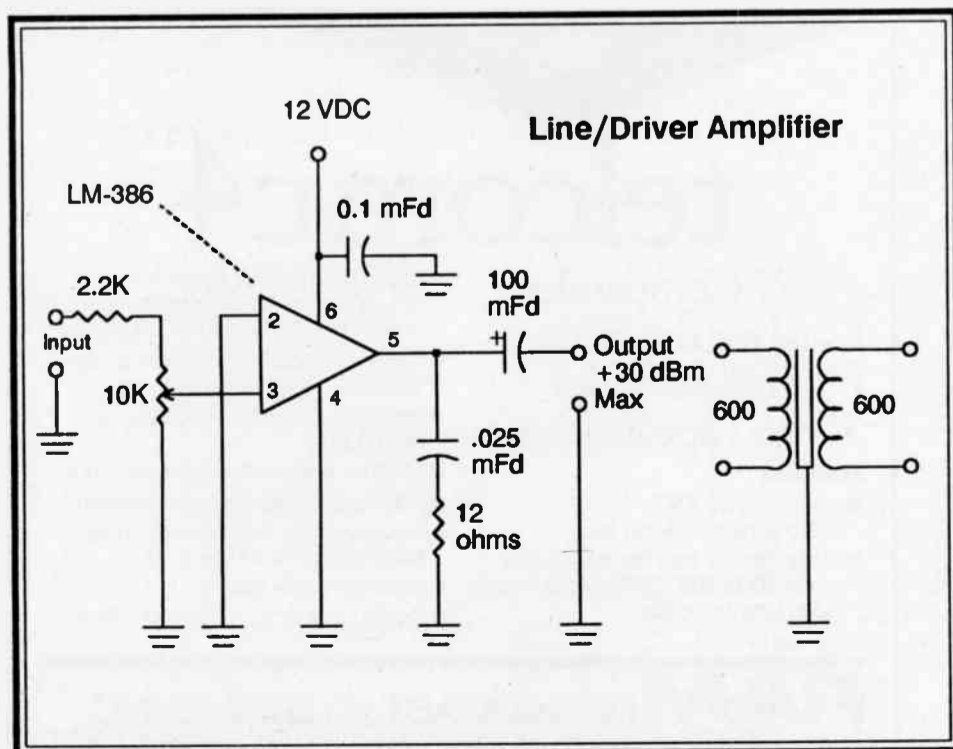
The next time it happened, I wiggled the tube around in it's socket and the program came back. After sign-off, I re-soldered all associated wiring around the tube. There must have been a crack, or poor solder joint, as this cured the problem here also.

Line Driver/Amplifier

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

This is a very simple circuit used for several different applications here at KORE-AM radio. It has been installed in a Realistic mixer, to provide sufficient output to drive a phone line coupler for remote broadcasts. The same circuit is used to drive a speaker for remote monitoring of the EBS receiver in our production room.

With the addition of a 600:600 transformer on the output, the circuit was added to our TFT-753 mod monitor to provide a balanced output with sufficient drive for our air monitor. Another of these transformer-output driver circuits takes a -10 dBm auxiliary program output from our production console, amplifies it to +4 dBm, and feeds it to a switcher which allows us to place the production room on the air for certain broadcasts.



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Re-lapping Tape Heads

By Ronald F. Balonis, CE - WILK
Wilkes-Barre, Pennsylvania

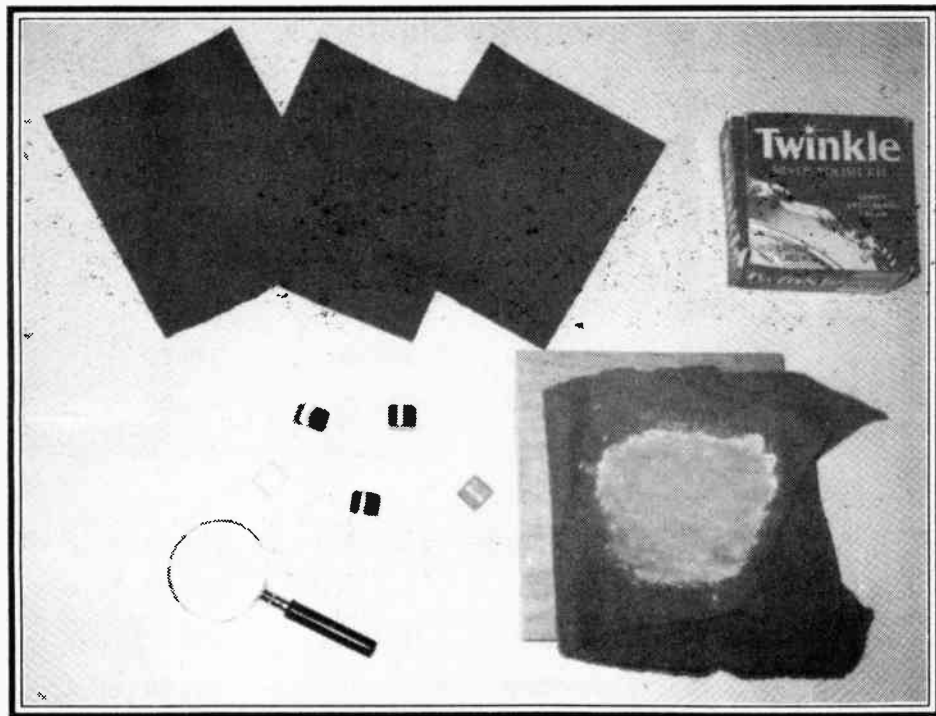
As a business, broadcasting has some things going for it that others do not. This is true mainly because of the kind of engineers who work in broadcasting. A station's equipment, with just a little tender use and loving care, can be made, or so it seems, to last forever.

A forever that adjusts to the realities of the differing radio markets and stations. Where sometimes it seems that there are as many engineering maintenance philosophies as there are engineers and stations, but no one knows for sure. However, everyone knows that they all have this in common: An innate desire to make things work and to keep them working. A subconscious need to tweak a few extra hours, days, or years out of equipment.

But there comes a time in the life and maintenance of all equipment, including the equipment of radio, when you must stand back and evaluate what it is worth. To consider if the cost of maintaining it "like-new" is really worth it, or if it is even possible. Tape recorders are a good example.

When new, the machines are full of vim and vigor -- they're clean, crisp, and responsive. However, as they age in time and in use, they all become "old" machines. The bearings in their motors knock a little, sometimes squeak; their response gets sluggish or dull, and even though they still can make technical and mechanical specs, they do so only with a groan or a gasp. And there comes a time when new parts can no longer make an old machine "like-new." There comes a time when the machine just isn't worth even a new set of heads.

For an old machine that's still able to work, but not like new anymore, or for a machine that you can't get heads for anymore, an easy (and cheap) way to keep it sounding as good as it can be is to "re-lap" the worn heads that you have. It's not too difficult to do, all it takes is a couple of things from your local hardware store and some "engineer" persistence and perseverance.



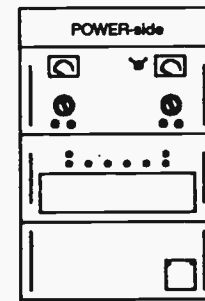
The things needed to re-lap tape recorder heads are shown in the picture: Three sheets of "wettable" emery paper, one of each grit -- 220, 400, and 600. A jar of silver polish, like Twinkle. A handkerchief-size piece of soft flannel cloth. A 6 inch square block of wood for use as a lapping block. A dime store magnifying glass to inspect the heads to check on your grinding progress. And, of course, some tape recorder heads with some life left in them. That is, heads with a groove of only one or two mills deep (thickness of tape) and a reasonably uniform gap showing under the magnifying glass.

The basic how-you-do-it grinding technique is relatively simple: Grinding is done wet by sprinkling a couple of drops of water on the emery paper before starting -- wet grinding produces a smoother result than dry.

(continued on page 11)

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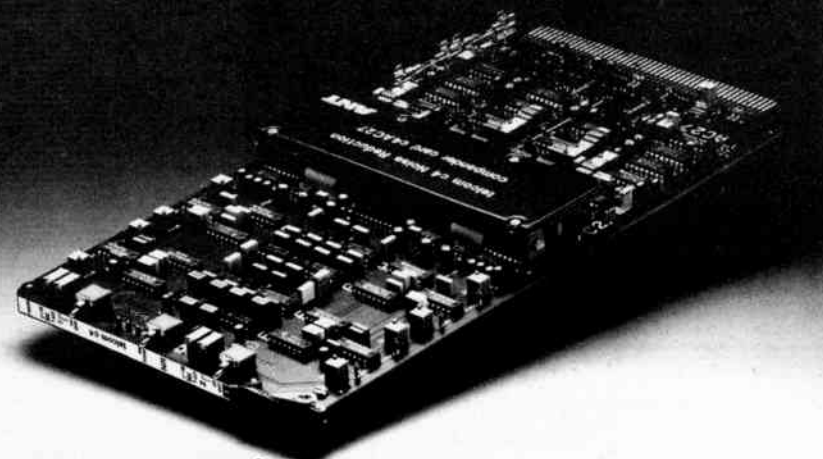


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Re-lapping Tape Heads . . . (continued)

Grinding is done with a light even pressure of a couple of ounces. Grinding is done by holding the head by its sides and pressing its face against the grit. Grinding is done using a rotary, looping or figure-eight-like, motion while rocking the head back and forth so that the entire face is exposed to the grinding action. And, to ensure even grinding, turn the head end for end regularly to randomize the grind, frequently examining the head with the magnifying glass to check the progress and your technique.

The wood block is used as a lapping block for holding the emery paper, and the grinding procedure is to start with the coarse grit, then the medium, and then the fine, ending up with the final polishing. Starting with the 220 grit paper, grind the head to the point where the wear grooves and traces of the old "polished" surface are nearly gone. Then use the 400 grit to grind out the wear grooves completely. Follow that with the 600 grit to grind out any trace of the grinding with the coarse grit papers. Periodically, as you grind, use the magnifying glass and light reflections on the head surface to monitor the re-lapping progress. How much grinding effort for each grit depends on the depth of the wear, the head material, and of course the skill of the grinder. Typically it might take 15 minutes to do a moderately worn head - - the best kind to practice on.

The final step is polishing the face to give it a mirror-like finish. Do this: Fold the flannel cloth, moisten it, and put a small dab of silver polish on it. Then use the same technique as for grinding with the emery paper. Polishing takes longer, and the progress will be slower. It takes time to achieve the mirror-like reflection and appearance of a "looks-like-new" re-lapped head.

The re-lapped head will not perform "like new", but it will work almost as well. Grinding and wear change the shape of the head. Grinding and wear also change the inductance of the head; this changes the optimum bias and the shape of the best equalization curves. Expect that it may be necessary to tweak the bias and the equalizations to compensate for the changes in the re-lapped head. Also, even though its frequency response may be "like" new, it'll probably have more ripple in it than a new one.

But consider the costs - - about \$5.00 and some time. Considering the overall condition of an "old" tape recorder, it is another way to keep it working until it has a major component failure and cannot anymore.

Bearings and Solder Guns

By **Pete Deets - WFHR/WWRW**
Wisconsin Rapids, Wisconsin
(715) 424-1300

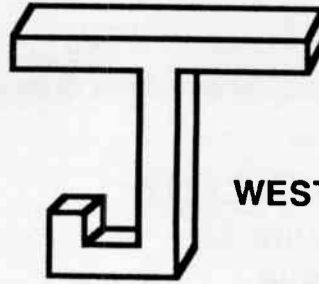
De-magnetizer

To demagnetize a solenoid core, screwdriver, pair of pliers or whatever, dig out and dust off that old soldering gun that uses a tip formed from a loop of wire. Plug it in, pull the trigger and pass the item to be degaussed, slowly through the loop. The tip actually forms a one-turn transformer and is quite effective.

Bearings

If you have a problem with intermittent flutter in an ITC-750 or 770 reel-to-reel deck, your solution may be only \$5 to \$10 away. I found that the roller bearings used in the tape path had worn out due to heat and oxide shedding and would induce flutter from time to time. The ten minute fix consists of taking off the bearing assembly, cleaning the oxide off all the parts and re-installing it all with a new bearing. Be sure to keep the plastic spacer, used between the inner bearing race and the mounting screw.

Locally available replacements were MRC bearing number 36FF H401. I took this step after replacing all other motor and pinch roller bearings. The bearings for the capstan motor are NSK bearing number 608ZZ MC2 ERP 5B32S. A good electric motor shop should be able to obtain and replace these for you. Our local shop has done so for me and also does a good job on the torque motors. If anyone needs to have work done and wants to try our local shop, give me a call.



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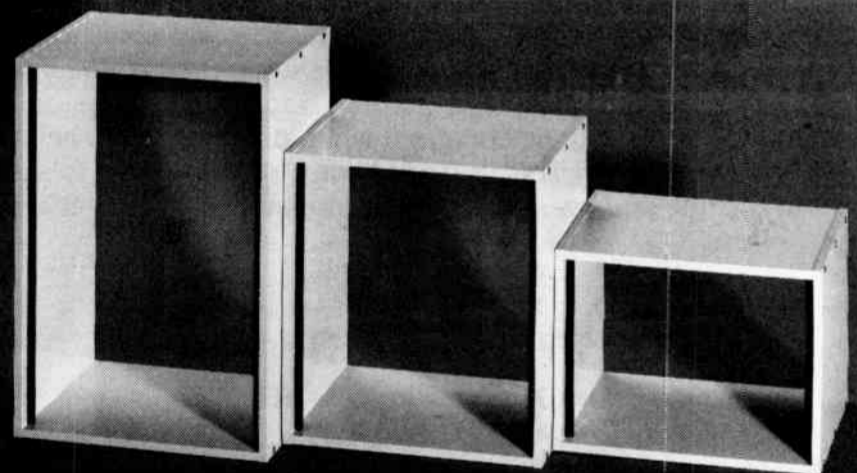
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Tips From The Field

Technical Tips From Around the Country

How Much Cable is Left?

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

Here's a neat way to determine how much cable is left in a Belden Un-reel box, or on a spool. If a capacitance meter or Z-Meter is available, either look up the capacitance per foot of the particular cable type (available from the manufacturer), or measure a one foot piece of cable for reference.

Measure the capacitance of the entire roll and divide by the capacitance per foot reference figure to find the length of the cable. This technique works on coaxial cable as well as multi-pair audio type cables. It can also be useful in finding hidden breaks in lengths of cable.

A True Interlock

By Jeol Belik - KIKX
Colorado Springs, Colorado
(719) 632-5800

If you have a main and backup transmitter, with a coax switch and a Bird Wattcher, you may want to try this. In a switch-over, you want to make sure that there is no RF on the line when the switch activates. If a plate contactor should stick, the transmitter may say it is off when it isn't.

The Bird Wattcher doesn't have an interlock for forward power, however it usually does for reverse power. If you put the high power slug backwards in the reverse power position, it will measure forward power on the reverse power meter. On the Bird Wattcher, the reverse meter has trip points for alarms. Hook one of these up to allow the coax switch to be energized when the power falls below a set level of a few watts. This way you have a real interlock to see if RF is on the line and avoid a confused transmitter control chain.

ITC 770 Motor Bearings

From Roger Bennet - KWMT
Fort Dodge, Iowa

Roger called a few days ago with this money saving tip for ITC 770 owners. He found that, occasionally, a motor in the 770 will developed a squeal. He had, at first, thought that the bearings were going bad. He subsequently found that the end of the motor shaft only required a drop of lubrication to eliminate the squeak.

Old Satellite Dish Fix

By George Schaller - WCOW
Sparta, Wisconsin

George called to tell us of a way he had found, to extend the usefulness of some of the older 4-section Prodelin fiber-glass dishes. These dishes were usually supplied with many of the early versions of network receiving systems.

He found that the performance of these older dishes could be vastly improved by doing two simply thing. The first is to adjust each one of the tri-mount legs individually to "warp" the dish slightly until best noise performance is obtained, by listening and AGC tests. The second and most effective tweak, is to adjust the focal length of the LNA. With focal-length adjustments of only $\pm 1/4$ ", George has found that these older dishes will perform quite well (even considering the closer bird spacing up there).



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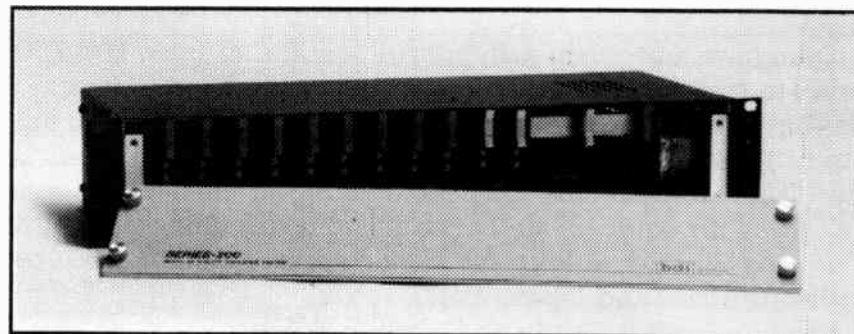


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Tips From The Field

Technical Tips From Around the Country

Misc. Tips

By Dave Stebbins - KZZN
Littlefield, Texas

Here's a rough and ready way I've used to verify that the filaments in mercury vapor rectifiers are working. Feel the tube for warmth. It beats using an ohmmeter when pressed for time. Be careful - - they can get hot. (Make sure that the high-voltage has been disabled, or it may get really hot! . . . Editor)

Getting live interviews and halftime entertainment from the field for remote broadcasts is easy with an inexpensive wireless telephone. It's not even necessary to patch it into your remote board. Just use a female duplex phone adapter. Many of these phones even have a paging feature that can alert your "field man" that your ready to broadcast. You can even use it around the station when it's not needed in the field. It's a great \$60 investment.

Moseley TRL-1 Spurious Fix

By Steven D. Crum - WARM
Cincinnati, Ohio
(513) 241-9898

Here is a tip that may help several people with Moseley TRL-1s that are intermittently spurious. I recently had one of these begin interfering with almost everything on the 450 MHz band. The unit worked fine for about four years, then developed spurs 10 MHz wide. I finally traced the problem to oxidation of the crystal pins. There are two ways to solve the problem. Clean the crystal pins and socket with a good contact cleaner (I prefer Cramolin) or solder the crystal in place. The unit has been working great ever since!

Watering Your Satellite Dish

By Ron Hudson - KKEY
Portland, Oregon
206-693-5407

Several years ago, we installed a new satellite dish. It was put into service in the middle of summer, when the weather was dry. Everything worked beautifully for a few months - - that is until it rained one day. The static was unbelievable; it took out everything on all transponders. After it stopped raining, everything was back to normal.

We checked the LNA and down-converter for leaks and no water was getting into anything. Next we tried grounding everything in sight. Another check with the garden hose still resulted in the same static. Let me tell you, I got some ribbing on that one - - "There's that crazy engineer out there watering his dish again."

Finally, I noticed that when the transmitter was off the air, the static was gone. OK, the trouble must be RF, as our dish is at the transmitter site and about 400 feet away from a three tower directional. The coax from the LNA to the down-converter box is about 12 feet long and was taped to one of the aluminum spars that supports the LNA away from the dish. With my small can of water (and more funny looks from the staff), I poured a small amount of water down the outside of the coax. Guess what? Static!

We mounted the coax on stand-off insulators, and the static was gone forever. If your dish is located in a high RF field, you might want to try what I did. It worked for me.

Please-We Need Your Help!

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



AUTOMATIC

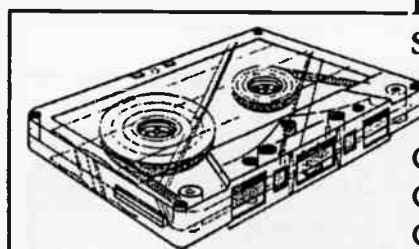
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FAX: (507) 288-4531

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Rochester, Minnesota 55904

Contract Engineers

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

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

Mike Brown
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Lee Freshwater
Blue Ridge Consultants
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704-693-1642

Chuck Gennaro
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Westport, Massachusetts
508-673-6831

John Ramsey
West Hartford, Connecticut
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Lee Soroca
Soroca Electronics
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Signal Specialists
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Dean Engineering
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Don Roden
Roden Engineering
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Don Haworth
Haworth Engineering
Fargo, North Dakota
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Jim Taylor
Jim Taylor Engineering Svc.
Augusta, Georgia
404-738-2911

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

Jeff Twilley
Ocean City, Maryland
301-289-4545

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

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

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

Thomas C. Taylor
Total Communications Tech.
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312-870-1463

Chris Scott & Associates
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Michael G. McCarthy
McCarthy Radio Engineering
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312-640-8965

J.R. Galbreath
Broadcast Technical Services
Colorado City, Texas
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Jim Stanford
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817-857-4296

Al Martin
Segue Services Inc.
Merrifield, Minnesota
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Jim Stitt & Associates
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Bob Biermann
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T. Michael Ezell
Audiotronics Tech Service
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205-793-6519

Dick Warren
Warren Engineering
San Diego, California
619-279-0759

Joe DeRosa &
Frank Bolognino
Brooklyn, New York
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Frank Baker
Towers & Ground Systems
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Paul Easter
D&E Broadcast Services
Corpus Christi, Texas
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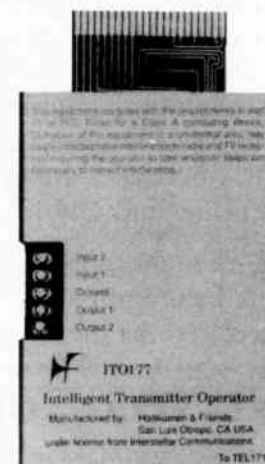
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Radio Guide
May, 1989 Volume 2 - Issue 5
Mail to: Radio Guide 511 18th Street SE
Rochester, MN 55904

Fill out the information below, and then circle the number of any manufacturer from which you would like additional information.

1 - Television Technology	17 - J-Squared
2 - Data World	18 - Bradely Broadcast
3 - Hnat Hindes	20 - Russco
4 - Econco	21 - Broadcast Devices
5 - CRL Systems	22 - Titus Technological Labs
6 - Titus Technological Labs	23 - Tom Jones Recording
7 - Eventide	24 - Hallikainen & Friends
8 - Audiopak	25 - Stanley Broadcast Engineering
9 - Ramko Research	26 - Communication Data Inc.
10 - Broadcast Audio	27 - Northern Magnetics
11 - Henry Engineering	28 - Ron Radio
12 - Audio Broadcast Group	29 - Owl Engineering
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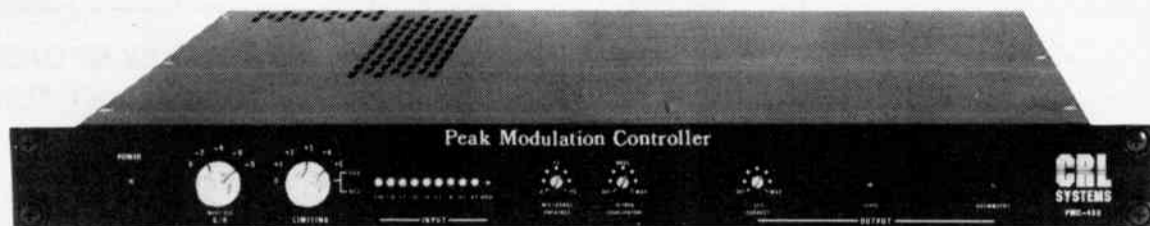
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NRSC Conversion Products from CRL

PMC-450 Tri-Band Peak Modulation Controller



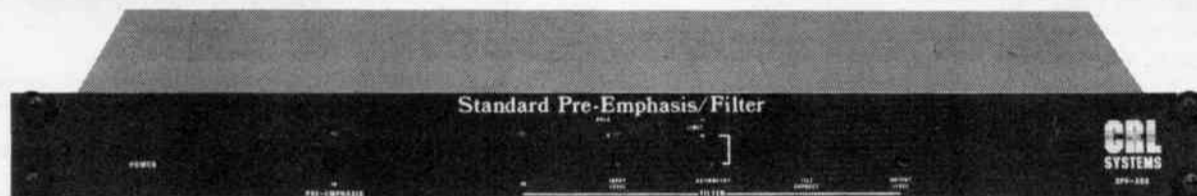
The CRL PMC-450 Tri-band peak modulation controller incorporates many unique designs originally developed for AM stereo. This unit offers state-of-the-art circuitry coupled with precise implementation of the NRSC standards for the loudest, cleanest signal on the AM dial. The PMC-450 consists of a powerful input compressor, followed by a tri-band limiter section and NRSC compliant low-pass filter. The flexible design of the PMC-450 allows it to be used as a stand alone processor, or in conjunction with various audio AGC's and pre-processors.

SMP-950 Tri-Band AM Stereo Matrix Processor



The CRL SMP-950 Tri-band AM STEREO MATRIX PROCESSOR offers state-of-the-art circuitry coupled with precise implementation of the NRSC standards for the loudest, cleanest signal on the AM dial. AM Stereo is quite different from FM and requires special techniques to provide full stereophonic fidelity while maintaining full monophonic compatibility. The CRL patented matrix processing circuitry is designed specifically to meet this criteria.

SPF-300 Standard Pre-Emphasis/Filter for AM Broadcast Transmission



The CRL Standard Pre-Emphasis/Filter contains all the functions necessary to convert virtually any monaural audio processing chain to meet the NRSC (National Radio Systems Committee) Voluntary National Standard of January 10, 1987. This transmission standard defines specific pre-emphasis and filtering requirements which are intended to help solve many of the technical concerns in AM broadcasting. The pre-emphasis curve was developed to allow receiver manufacturers to employ a complementary de-emphasis characteristic in wideband radios while improving the frequency response of narrower and medium-bandwidth radios. The filter specification, which limits transmitted audio bandwidth to 10 kHz, is intended to greatly reduce much of the interference between stations by reducing the conditions that cause "splatter" effects.

MDF-400/800 De-Emphasis/Filter for AM Monitors



The CRL Monitor De-Emphasis/Filter provides all the functions required to update any AM modulation monitor or wideband monitor receiver for the recently approved voluntary transmission standard. This allows easier setup of audio processing equipment by emulating the audio characteristic of the best-possible commercially produced radios. Additionally, the unit has features which can reduce interference typically heard in the station air monitor.

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

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1-IGM sequencer and master terminal

3-IGM instacarts

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1-Extel printer



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KQXY FM94

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CRL SEP400 Spectral Energy Processor - \$400

CRL PMC-300 Peak Modulation Controller - \$400

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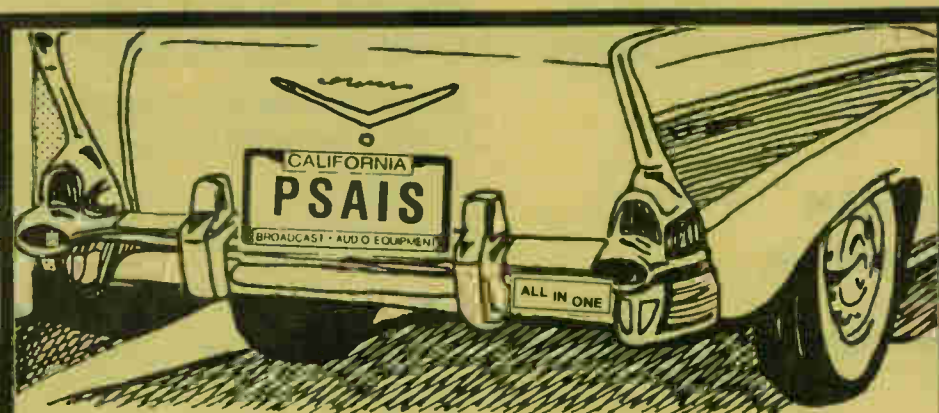
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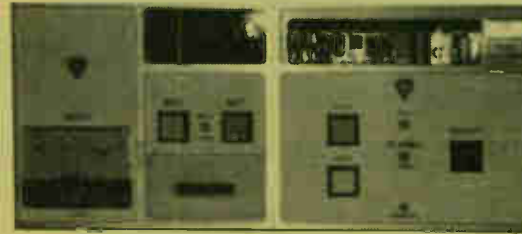
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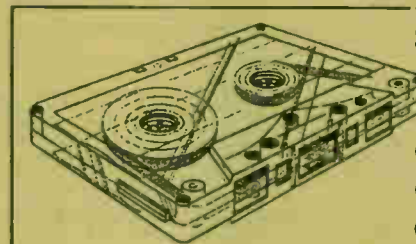
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