

- Home TV Games Are Here
- Profitable Part-Time Servicing



journal
January/February 1976



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Specifications subject to change without notice.

Every Sharp transceiver is individually performance-tested before shipment. From the date of purchase, this warranty covers both parts and labor for a period of one year. Authorized Sharp Service Stations are located throughout the United States.



journal

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In this issue, veteran Journal author Joe Turner tells us about those burgeoning home television games, James Crudup gives us some insight into the part-time TV servicing field, and old NRI hand J. B. Straughn provides us with two mini-adventures in TV servicing.

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Home TV Games Are Here

(beep!)

Harold J. Turner, Jr.

As this article is being written, manufacturers are preparing for the 1975 Christmas buying season by offering the biggest selection yet of video games for use in the home. If these pioneering manufacturers are successful, no doubt next year will bring many more such games, and no doubt they will be much more sophisticated and entertaining than those available now. But let's take a look at what *is* available now, and get a brief glimpse of how they work.

First of all, just what *is* a video game? In most cases, it amounts to a control box that the purchaser must connect to the antenna terminal of any standard TV set, black-and-white or color. An rf oscillator inside the control box generates a carrier signal which is tuned to the frequency of an unused TV channel, so the TV set can pick up the signal without any interference from regular broadcasts. The set's regular antenna is isolated from the locally generated carrier, by means of a switching device, to prevent undesired rf radiation which might cause interference to other nearby sets. Okay so far—any student or technician who has ever used a color bar generator knows this much already. What about the rest?

The Magnavox "Odyssey" shown in the lead photo is a typical example of games available this year. As shown, a game of *hockey* is in progress; the unit is also set up for *tennis* and *smash* (a cross between handball and jai-alai).

This current version of the Magnavox game is vastly improved over the original version which appeared a few years ago, in that the current model electronically



Courtesy the Magnavox Company

Odyssey, the home video game, has been completely redesigned to give an exciting dimension to the on-screen action. The Magnavox electronic game simulator now features TV tennis for four, automatic scoring, and sound.

generates *all* the information that is required to be put on the screen. No plastic screen overlays are necessary, as was the case with the original Odyssey. To allow the user to play a game, *hockey*, for example, the control box must generate several patterns to appear on the TV screen.

First and perhaps most important, it must generate vertical and horizontal sync pulses, which serve as the timing reference for all operations, and which cause the TV set to give a steady display of the patterns generated. The machine must generate a definite playing area: a rectangular boundary inside in which all the action must take place. Each player, and there may be either two or four, can control the vertical and horizontal positions of a spot on the screen which represents a participant in an actual hockey game. The hockey puck takes the form

of a continuously moving spot that is allowed to bounce off the fixed walls and the moveable players, whenever they meet.

In addition to generating these patterns on the screen, the control box senses each bounce that takes place and creates an audible "beep." Also, an automatic score-keeping device is included. In games produced by some other manufacturers, the score appears as actual numbers on the TV screen. In the Magnavox game, however, an analog readout is used instead. In either case, a digital counter accumulates each player's score, and in the Magnavox machine, the counter's output is converted into an analog voltage which determines the height on the screen of the score-indicating marker. The first player whose marker reaches a fixed reference marker wins the game; scoring is from zero through fifteen.

The Odyssey game, typical of the games offered at this point in time, uses a number of custom-made special-purpose integrated circuits to generate the waveforms required to put patterns on the TV screen. In contrast, some of the commercial video games—those seen in hotel lobbies, bars, and so on—use microprocessors to control their operation. The microprocessor, often touted as the "computer-on-a-chip," is a universal logic device whose characteristics are controlled by a program which is contained in the device's memory. To change from one type of game to another, one need change only the program stored in the unit's memory; thus high-volume production becomes a reality, even though the nature of the game played can change from time to time. Clearly, this is the wave of the future. In all likelihood, the next generation of home video games will incorporate microprocessors, which may make them less expensive, and will certainly allow them greater flexibility, so more games and more interesting games can be played on your TV screen.

Also available this year is the "Pong" TV Game from Sears, which is set up to allow two players to play a version of table tennis. The Magnavox and Sears units each sell at retail in the neighborhood of \$100. Another unit, made by Broadmoor Industries, is somewhat more expensive, but includes a built-in TV monitor and is therefore a self-contained unit, and it does not have to be connected to an external TV Receiver.

So now, if you tire of watching the Redskins lose football games or "I Love Lucy" reruns, you can throw the switch and get into the action yourself.

A Reminder

Always be sure to include your student number whenever you contact NRI. This will help to ensure that we can serve you promptly and efficiently.



Profitable Part-Time Servicing

by James Crudup, C.E.T.

In these inflationary times the money from an extra income often comes in handy. If you are enrolled in the TV servicing course, you are in a good position to make some extra money. Have you thought about part-time television servicing? You set your own rates and name your own hours. Compare these advantages to other possible part-time jobs and I'm sure you'll find them hard to beat.

Because I am busy with other projects during the week, most of my service work is done on Saturday. A few weeks ago I had a very profitable day. Although every Saturday isn't quite as profitable, they are often just as busy. Let's take a look at that Saturday and maybe it will help you decide whether you want to try part-time servicing to make extra income.

I left the house about 9 o'clock and my first stop was the wholesalers. There, I restocked my tube caddy to the tune of \$30, bought an indoor antenna for a customer, and got a free cup of coffee. My wholesaler sells coffee for a nickel and compared to some of the other places, his coffee is just about free.

I had a Sears black-and-white portable in the car that I had to deliver. It was the second thing on my list of things to do. I don't like to leave sets in the car while I'm on service calls because I never know if I'll see the set again.

The first stop was to service a Philco color console. The characteristic symptom was no raster, good sound. I made the necessary adjustments to the front panel controls with negative results. I turned the set off. Since the back cover used snap-lock connectors instead of quarter-inch squared-head screws, I had the back off in a couple of seconds. I turned on my trouble light so I could see better and visually inspected the chassis. I did not see anything abnormal. I attached my cheater cord and applied power. After you have fixed a few sets you get used to listening for the high voltage to crackle. It generally takes less than 30 seconds. In this set it didn't, and I was about to turn the set off when I noticed the absence of a filament light in the horizontal output tube. A new tube solved the problem. I checked the high voltage to make sure it was correct and it was. The new horizontal output tube listed for \$9, but with my wholesale discount it cost me only \$4.25. I charged \$12.50 for the service call since I was in the house less than thirty minutes. The bill came to \$21.50.

Six years ago when I started out repairing television receivers, I charged \$12.50 for a service call which included the first half hour. I haven't gone up since, although most of the large shops are charging between \$15 and \$22.50 just for a service call.

It was about 10:15 a.m. when I arrived at the house where I had to deliver the Sears set. I had picked up the set earlier in the week. After troubleshooting it I determined that it needed a new yoke and that the uhf knob was cracked. The bill for the job was \$48.50. The wholesale cost of the yoke was \$14 and I marked it up 40 percent, but I included the knob at cost. The service charge to check and pick up the set was \$12.50 and the labor to install the new yoke and make the necessary adjustments was \$15. I charge a flat \$15 an hour after the first half hour in the house and a straight \$15 an hour for my bench time up to \$60. If I can't fix a set in four hours I seek help from one of my buddies.

My system for marking up parts is simple. On tubes I sell them at list price although I buy most of them at 60 percent off list. The list price is the retail price or what a customer would pay for the tube in the drugstore. I mark most other parts up between 20 and 50 percent depending on my discount. The mark-up profit covers the cost of my parts inventory, gas, travel time and possible callbacks. Consumer-wise I feel it justified because I am only charging the customer what he would pay if he were to buy the part. Most repairmen, once they have established trade with a wholesaler, will get between a 10 and 60 percent discount.

I plugged in the set and demonstrated to the customer that it worked properly. I presented the bill as I explained the guarantee. I guarantee all parts that I replace for 90 days. I had been paid and was about to leave when the customer told me about his neighbor with a set that needed adjusting. Although this set was not in my schedule I decided to look at it now since the customer had sort of promised I would.

It was a Motorola hybrid color portable with vertical foldover. I tried the vertical controls but no such luck. Previous experience led me to believe that the trouble was a bad vertical output tube or a defective electrolytic capacitor in the cathode of the vertical output tube. A new tube didn't do the trick so I looked for an



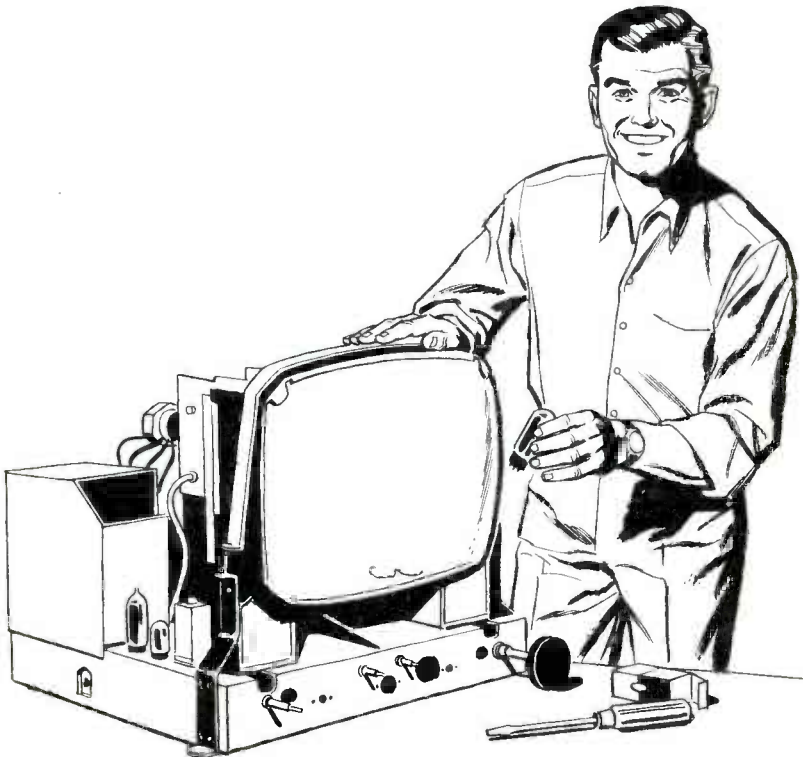
Your own part-time servicing business can provide you with an additional source of income, increase your technical ability through experience, and benefit your customers through lower servicing charges.

electrolytic close to the vertical output tube but couldn't find one. Since some manufacturers provide schematics with their sets when they are purchased, I asked the customer if he had one. He went off and came back with a Motorola package that indeed contained a schematic. From the schematic I determined that the 50- μ f 150-volt electrolytic for the cathode of the vertical output stage was on the convergence board. I had to remove the board to get to the capacitor. With my VOM I compared the charge on a good 50- μ f 200-volt electrolytic that I had in my tool box with the one on the board. There was a very noticeable difference so I replaced the capacitor on the board and turned the set on. I now had full vertical deflection and the picture looked pretty good. I put the cover on the set and wrote out the bill. The service call was \$12.50 and labor was just over an hour so I charged \$15. I charged \$4 for the capacitor although I had forgotten what I paid for it. I presented the bill for \$31.50 to the customer.

He didn't like it too much because he couldn't understand why it cost \$27 to replace a \$4 part. I explained how I charged and I also pointed to my equipment and tube caddy. Together I would estimate their worth at close to \$500 and that is a conservative estimate. I told him about the plumber who had unstopped my sink for \$18.50 and how it took him longer to write out the bill than to do the work. He seemed a little more friendly and revealed that he was a plumber. He gave me his card and I left one of mine with him. I believe we parted friends.

By this time it was noon and I wanted to make one more call before I had lunch. The next set was a 25-inch RCA color set with a CTC 38X chassis. The sound came on but no raster. I pulled the back and checked for obvious things but found nothing. No high-voltage crackle and no unlit tubes. This symptom is often caused by a bad horizontal output tube. I put in a new tube but it started to glow cherry red. I immediately unplugged the set. A check inside the flyback cage revealed a badly burned and melted flyback. It was quite hot. A hot flyback is an almost certain sign of a shorted flyback. Since this one had been melted by the overload, it had to be replaced.

Before going further I informed the customer that this was going to be a major repair and that I needed to pull the chassis. He wanted to know how soon I could have it fixed. I said a week or two depending on how soon I could obtain the necessary parts. That wasn't soon enough. He wanted the set working so he could watch the football game the next day. I told him the job was going to run about \$75 and if I could get the part I would do the job today. He agreed.



Courtesy, cheerfulness, sincerity, and honesty are as much a part of your spare-time servicing business as your technical expertise.

I had two problems, I had two more customers waiting for me and my wholesaler closed at 1 p.m. It was now 12:45. I called the wholesaler and he had a direct replacement in stock. One of the customers that was waiting for me was my father-in-law, so I called him and made a deal. If he would pick up my part I wouldn't charge him to fix his set. He agreed and went to pick up the part for me. I informed the owner of the RCA color set that I was going to pick up the parts, have lunch, and would be back in about an hour and a half.

When I arrived at my father-in-law's he was already back with the part. I reimbursed him for the cost and turned on his set. Earlier in the week he had explained the symptoms to me on the phone. I thought it was a fine-tuning problem and gave him instructions over the phone on how to correct it. He said it didn't help, so I had told him that I would be out to look at it Saturday afternoon. His set was a Motorola Quasar with Instamatic. One channel wasn't coming in but the others were excellent. The symptoms looked exactly like the fine tuning was misadjusted so I started adjusting. After about four complete turns the picture came in. He was surprised but I wasn't.

After stopping off for lunch, I arrived back at the RCA owner's house with the necessary parts. I had to remove four bolts to take the chassis out and of course I had to disconnect the front panel mounted parts.

I took my time because I know how easy it is to make mistakes. I labeled every wire I disconnected and drew a pictorial just in case. I checked for damaged components but found none. It took about an hour to put in the new flyback. I made sure I rounded off all connections and properly dressed all wires to prevent arcing. I put in a new horizontal output tube, damper, high-voltage rectifier, and regulator. I always replace these tubes if I replace a flyback. Heavy current flow may have damaged these parts and replacing them decreases the chances of a callback. Before turning on the set I checked the resistance of the yoke and inspected it. Then I connected my VOM in the cathode of the horizontal output to measure current and turned the set on. The cathode current came up to 225 ma, which was right in the ballpark. I heard the high voltage crackle and then I had sound and the picture looked good. I checked the high voltage and it was okay. Everything looked good so I buttoned up the set and wrote out the bill. It came to \$74.50 with a total of \$32 for parts. I collected my money and headed for the last service call.

It took me all of five minutes to connect the indoor antenna I had purchased for the customer. I collected \$16 and headed home. I made only \$6 profit on this job. This was one of my best customers and I wasn't going to charge him for a service call. I had planned to deliver and connect the antenna at a time when I had to be in the area on other business anyway.

A tally of receipts for that Saturday showed that I made over \$100 after deducting the cost of parts. My rates are fair but less than most full-time shops because I don't have to bear the expense of rent, physical plant, insurance, etc. that they do. My part-time job provides me with extra income, it doesn't take up all of my leisure time, and I enjoy doing it.

By no means should you consider the jobs that I have explained a typical Saturday. Most Saturdays are about as busy but not quite as profitable. Some weeks you will run into some rough ones and you won't make as much, but if you want a good part-time job that pays well and lets you set your own hours, try part-time servicing.

In closing let me say that to be successful in television servicing you must have the proper training. Your NRI course does this extremely well. Experience is also important. It can be gained through part-time servicing while you make extra money. Act like a professional, work like a professional, and charge like a professional. If you are thinking about part-time servicing, check with the local and state governments in your area first to find out about taxes and licenses.

It takes time to build a large following of customers but if you advertise with business cards and do good work, you will soon have more business than you can handle, and you will also have a nice part-time income.

The Gernsback Award

Once again NRI will cooperate with RADIO-ELECTRONICS Magazine in making an annual scholarship award of \$125 to a deserving student currently enrolled in NRI. The award will be applied toward furthering the selected student's education in electronics. NRI is one of eight home-study schools chosen to perpetuate the scholarship established by RADIO-ELECTRONICS in memoriam to Hugo Gernsback, its founder and a notable pioneer in electronics. In addition, through the generosity of RCA Electronic Components, there will be an award for the second most deserving student from each of the schools, an item of RCA test equipment.

If you wish to nominate a student for this award (and you may certainly nominate yourself), send a letter outlining the reasons for your choice to:

Gernsback Award
National Radio Institute
3939 Wisconsin Avenue
Washington, D.C. 20016

Entries must be postmarked by April 15, 1976 to be considered. A panel of judges chosen by NRI will select the winner, and their decision will be final. (Sorry, previous winners of the Gernsback Award do not qualify for the 1976 awards.)

Written notification will be sent to the winner and announced in the September/October issue of the Journal.

Helpful Hints 4

Novice technicians should be informed of a few do's and don'ts about solid-state repair. These tips will help prevent unnecessary damage to parts in solid-state sets. The most sensitive portion of a receiver is the horizontal output system. With normal signal drive, the stages operate satisfactorily, of course. With no drive signal, the stages are cut off and there is no problem. The difficulty arises when there is insufficient drive or when the drive frequency or duty cycle are incorrect. Under such conditions, extremely high power dissipation in the output transistors may occur, damaging the junction. The following precautions are recommended:

1. Do not check the high voltage by shorting the second anode to ground. The output transistors may be damaged.
2. Make sure the power supply voltage is correct. Too much or too little voltage may cause component damage.
3. When you replace power transistors that use mica washers, check them. If the washers are cracked or damaged, replace them. Make sure that insulated transistor grease is used and that the transistor is firmly attached to the heat sink.
4. Do not add capacitance or short circuit elements in the horizontal oscillator, driver, or buffer circuit. The resulting change in frequency may damage the output stage.
5. When work in the horizontal section is necessary, disconnect the output transistor collector where possible. When replacing components, avoid excessive heating of the transistor. Where possible, remove the transistor from the circuit (if plug-in type), or use pliers for a heat sink when soldering near a transistor.
6. Do not operate a set for a prolonged period with a change in the horizontal oscillator frequency beyond the range of the horizontal hold control.
7. Do not short voltage supply points to ground. Temporary interruption of the oscillator may change its frequency and damage the output transistor. The regulator and filter transistors may also be damaged.
8. Do not operate transistor circuits with an open base connection. The breakdown voltage is reduced under this condition, and the transistor may be damaged.
9. Do not short emitter resistors. They limit transistor current, and the transistor may be damaged from overheating if excessive current flow occurs.
10. Generally, do not perform any shorting or disconnect tests on the operating receiver unless it is known to be a safe procedure.

—James Cruclup

further adventures in tv servicing

J.B. Straughn

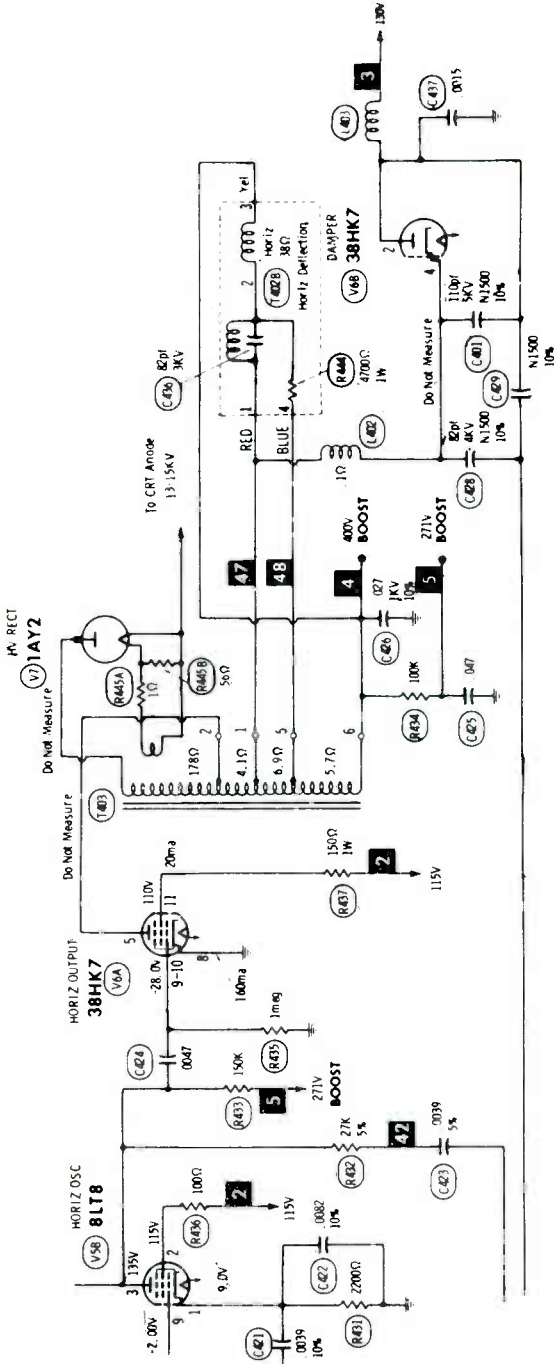
EMERSON CHASSIS T12K3-1B

This set belonged to a very nice lady who runs the local cable TV office. She said it would not turn off with its regular switch and that they had to use a cheater cord with a switch built into the cord to control the set. There was no raster or sound.

I concluded that there was no high voltage or boost voltage because the latter is often used as the B supply voltage for the sound detector if a quadrature circuit is employed. In such a case, lack of boost voltage would not only kill the sound but would also result in lack of a raster. The fact that the regular switch would not turn off the set pointed to a probable breakdown in an instant-on diode shunting the switch.

On going into the set I located a diode across the on-off switch, and sure enough it was shorted. I installed another diode, and the on-off switch then controlled the set, as it should. I didn't bother to install a new cheater cord because the old one worked fine; I just left its switch turned on all the time.

I checked the tubes in the horizontal and high-voltage section shown in Figure 1. The 8LT8 and 381K7 checked okay but I replaced the 1AY2, after experiencing a little trouble in determining its condition. This tube has only the two heater prongs



Courtesy Howard W. Sams

FIGURE 1. HORIZONTAL SWEEP CIRCUIT, BOOST AND HIGH-VOLTAGE SYSTEM OF EMERSON T12K3-1B.

on its base and they are supposed to fit into a couple of holes in the nine-pin socket of my tube tester. The only object of this is to provide filament voltage for test purposes and any holes on any socket would do if the correct levers were thrown to apply heater voltage.

The trouble was that the tube pins wouldn't fit into any two holes on any of the test sockets. I solved the problem by attaching clip leads to the two pins on the tube and attaching small pieces of solder to the free ends of the clip leads. These pieces of solder were pushed into holes one and eight of the octal socket. Lever eight on the tester was then thrown to the heater position, and with filament voltage applied to the tube I completed testing it and found it to be weak. Either lever 1 or 8 could have been thrown to the heater position for the test.

The new 1AY2 didn't help matters and a neon bulb on the end of a fiber insulating rod did not light up when held near the horizontal output transformer. The lack of a glow showed that no horizontal energy was being developed in the transformer. I pulled the chassis after removing the anode lead from the picture tube so there would be enough leeway to invert the chassis. I arranged the anode lead so it would not arc to anything if high voltage suddenly appeared.

I started checking voltages and found that when the set was first turned on there was plate voltage on pin 3 of the 8LT8, but that this at once dropped to zero. I then checked all plate circuit components, which proved to be okay. I tried another 8LT8 just in case the tube had a short which had not showed up on the tube tester, but the result was the same — no plate voltage.

As a mind twister, note that the boost voltage furnishes voltage to pin 3 of the 8LT8. If there is no drive from the 8LT8 horizontal oscillator to the input of the 38HK7, there will be no boost voltage, and without boost voltage the 8LT8 cannot provide drive to the 38HK7. In good working condition there is no boost voltage when the set is first turned on and no plate voltage for pin 3. So, which comes first, boost voltage or plate voltage, and how does it get there?

Getting back to the set, I thought that perhaps there was a defect in the flyback or in the yoke, either of which would prevent boost or high voltage from being produced. I set up my trusty Conar Model 250 scope as a resonant circuit checker and found that an excellent damped wave was produced on the scope screen, showing that there was nothing wrong with the flyback (horizontal output transformer) or yoke. To me this feature alone makes it worthwhile to purchase the scope, but I may be prejudiced because I was the one who insisted this feature remain in the scope when I engineered it at NRI. Note that this feature has been retained in the new transistorized Conar scope.

With the flyback/yoke cleared, I checked the capacitors in the horizontal/yoke circuit for leakage without avail. All this left me up a tree, so to speak, because I could see no reason why there was no high voltage or boost voltage. I had normal screen voltage on the 38HK7 and the tube tested good. Then I remembered some advice I had often given, during my days as chief of the NRI consultation service, about tube testers. "If a tester says a tube is bad throw the tube away. If it says the

tube is good, maybe it is and maybe it isn't. If the symptoms observed could be due to a defective tube, try another even if the tube tests good."

I didn't have another 38HK7 but I did have a 38HE7. I seemed to remember that the tubes were interchangeable in one direction but not in the other. In other words, you might be able to use a 38HE7 to replace a 38HK7 but not the other way around. I looked over the two tubes as shown in my RCA tube manual and saw no reason why they shouldn't work in either direction, so with nothing much to lose I inserted my 38HE7 in place of the 38HK7. I was lucky because the set took off and produced a fine picture and sound along with normal boost and high voltages. The HE sells for only 20 cents more than the HK so I didn't bother to buy a new 38HK7 at that time. I usually have two each of these tubes in stock.

I think that if I had found a 38HK7 in my stock, I would have tried it when I tried the 8LT8 and thus saved myself much time and trouble. In addition to the two tubes mentioned above, be quick to try new 33GY7 and 21GY5 tubes. Such tube substitution is a good idea when checking out any defective horizontal output circuit.

I charged list price for the tubes, \$1.50 for the diode, and \$4.20 for the Sams Manual plus a labor charge of \$5 (really too little). The total bill came to \$31.15, so I made some money and made the customer happy.

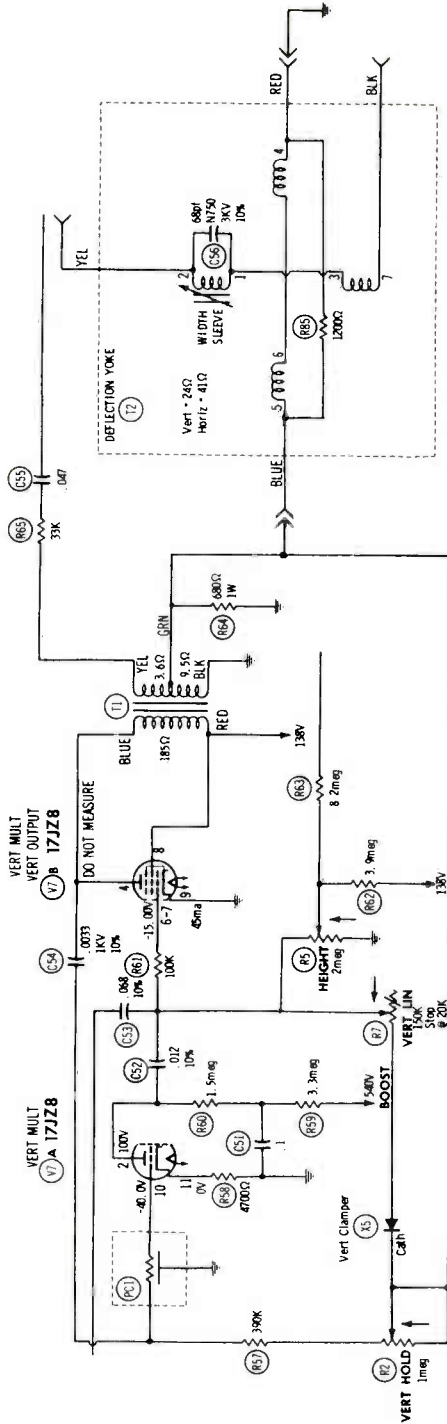
Getting back to the plate voltage versus the boost voltage on the 8LT8, remember that when the set is first turned on, 130 volts is applied to the plate of the 38HK7 damper tube. When its cathode heats up, it will conduct heavily so almost the full 130 volts of B+ will appear at the cathode. Thus at first, the boost voltage will be about 125 volts, which is enough voltage to allow the horizontal oscillator to start oscillating, even if it is at the wrong frequency. With the oscillator operating, the 38HK7 output will drive the flyback and eventually the whole system will come up to speed. This usually only takes a few cycles of the horizontal oscillator, which is only a fraction of a second.

ZENITH CHASSIS 13A16

This black-and-white receiver shown in Figure 2 came in with the complaint that there was only a thin white line across the picture tube face (no vertical sweep). Sound was present but had a buzz.

A look at the schematic showed the vertical sweep system to be quite different from those usually encountered, although the 17JZ8 was a more-or-less standard multivibrator. The thing that stuck out was the diode clamper, so for no good reason I decided it was probably bad. I removed it and found that it tested okay with an ohmmeter.

As you may know, the two ohmmeter leads connect to an internal voltage source; therefore, one lead is positive and one negative. This is important when testing



Courtesy Howard W. Sams

FIGURE 2. VERTICAL SWEEP OF ZENITH CHASSIS 13A16, 13A16M, AND 13A16S.

diodes. Use the 1K range of the ohmmeter and connect the negative lead of the ohmmeter to the cathode of the diode and touch the positive lead to the anode of the diode. The polarity of the test leads is correct for the diode to conduct and a reading of 4000 ohms or so is to be expected. Now reverse the test leads. This shows the reverse rather than the forward resistance previously measured. It should be very high—not readable on the 1K range. If the forward resistance is 3 kilohms to 4 kilohms and the reverse resistance very high or unreadable, the diode is okay.

This one was, so I followed the usual test procedures for no vertical sweep and came up with two defective capacitors— C_{54} and C_{51} . When replaced, the sweep worked but sync was poor (the circuit tested okay), the buzz was still present in the sound, and there were white lines at the top of the screen. This was not due to a retrace defect because when the lead from the vertical output transformer was opened at R_{65} , normal retrace lines became visible. I noted that when the volume was turned down, no sound came from the loudspeaker but that a buzzing of a mechanical nature came from the vertical output transformer. This led me to believe that there was a breakdown in the transformer when the sweep voltage was highest, at the start of the sweep or the top of the screen.

I decided that the transformer must be bad. All my addresses were in a notebook at the office, so I got the long distance operator to give me the number of Hart Greer, the Birmingham Zenith distributor. She had two numbers and I called the one which seemed the most likely and was told it was not the parts department and that I should call the other one. Without too much trouble I talked the lovely on the switchboard into relaying the message to the other number. The very next day, to my great surprise, the transformer arrived via UPS.

When it was installed, the lines at the top of the picture had disappeared along with the mechanical buzz. Also, the vertical sync was “solid.” The transformer checked okay with an ohmmeter so only a few turns were involved. I charged \$36.53 for the job. My costs were \$1 for the telephone call, \$7.78 for the transformer, and 75 cents for the capacitors, for a total of \$9.53. The complete bill figured markup on parts and labor. I did a lot of hunting on this one.

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Stop smoking.**

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A New Year's Message from the President

This is a different kind of New Year's greeting.

Instead of urging you to try harder

For a better job . . .
for increased earnings . . .
for prestige and power . . .

I simply want to wish you
personal happiness during the New Year.

For if a man isn't inwardly happy, if he isn't
at peace with himself,
any other kind of success can be
meaningless and empty.

There is no guarantee that material things—money, success,
friends, and possessions—will make you happy.

But there IS reasonable certainty that anyone who
lives a well-rounded life, keeps his mind attuned to learning,
and who strives for self-improvement,
will not only find a good measure of personal happiness,
but will, in all probability,
enjoy some of the material benefits as well.

They go together . . .
. . . like your enthusiasm,
the close friendships I have had with many of you,
and—your loyalty.

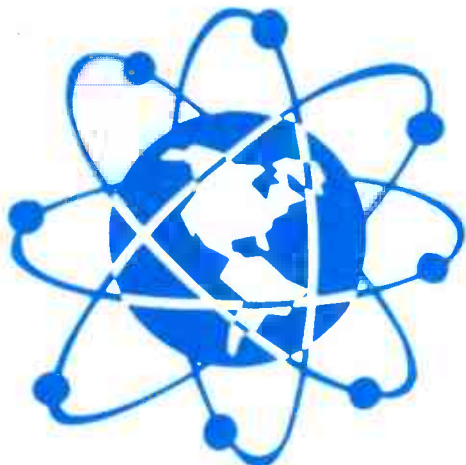
Please continue to visit with us,
to give us your suggestions and ideas . . .
to work with us to make your NRI training the very best
For you.

Then
we'll both be happy.



President
National Radio Institute

HAM NEWS



By Ted Beach K4MKX

Even with the fairly recent acquisition of the Hallicrafters FPM300 sideband rig, I find most of my operating these days is confined to two meters FM from the Volkswagen. It's a sad state of affairs, but now that the cold season is upon us, I don't have much ambition to get out and string antennas. I have found out that, while my vertical works okay on 40 and 15 (which is dead most of the time), it would sure be nice to get on 75/80 and 20. The antenna was not designed for 75/80, and as anyone can tell you, there is no substitute for a beam or quad on 20.

Anyway, when the warmer weather arrives, maybe I'll get out and string up an inverted vee for 75/80 and top it off with a wire quad. I've got a couple of ideas on how to make a fairly simple mechanical structure to hold a monoband three-element quad atop the center support for the inverted vee. At the present time it's all on paper and I've got most of the materials sitting in the workshop just waiting.

This time of year is both a glad and a sad time for us here at NRI. We have just lost one of our finer development engineers, Phil Deem—WB4EGA, who did most of the work on the latest NRI course in Communications including the design of the brand-new 220-MHz synthesized transceiver kit which you've probably seen in recent NRI ads. Phil resigned to take a position in his family's business in Illinois and we'll all miss him around here.

The "glad" part is that another fine young engineer, Jim Lytle, has taken over Phil's project and has taken his Technician exam. Jim should have his license by the time you read this, and if I don't miss my guess he's going down to the FCC very soon and pass the Advanced test. This guy went from ground zero on the code to well over 13 wpm in the course of about two months. That just shows what one can do if one has the desire. He worked alone and listened to and studied the NRI code records, faithfully tuning in W1AW on a CONAR Model 500 re-

ceiver at home. Very nice going, Jim, and welcome to Ham Radio.

I think probably in future issues of the Journal we'll have Jim write a few words about the new NRI Communications Course in general, and the 220 rig in particular. Incidentally, this rig has been designed so that with only a few parts changes it can be put on two meters instead of 220. More about that at a future date.

Now lets' see who we've heard from since last year. Not too many, as you can see from the short list this time.

As usual, those listed first (eight names) are students and graduates of the NRI Amateur courses. The last three are students and graduates of other NRI courses.

George, K2IVG, has been a cw operator since 1954 and just last Labor Day graduated from the old "hand pump" to an electronic keyer. George says he treated himself to a new Heath squeeze keyer on his sixteenth birthday, and his first "victim" after finishing the job was an 8 in Ohio who was "kind enough to bear with me." George runs an SB102 at home into a 40-meter folded dipole, an attic mounted 20-meter dipole and an

18AVT vertical, all fed by a Johnson Matchbox. The only time he grabs a mike is when mobile on 40 meters with an HW22A. For QRP, George also uses a Ten-Tec PM3A. Sounds real good, George, and I'll be looking for you on 40.

WA2YSK had to wait three months after taking the General test last July to grab up his trusty D104 mike and get on phone. Jim likes to play with antennas and has discovered that they are somewhat of a science all by themselves. Jim says he would also like to see some information in this column on antennas. We'll try to do something along that line real soon, Jim, and we'll be careful to make sure that it isn't "super-technical."

WA3WMJ has got to be unreal. Billy's full name is William A. Hamm. With a handle like that, you've got it made, Billy! Congratulations on the General and welcome aboard.

I'm not sure but what the K7VLC call belongs not to Bill Bailey, but to the V.A. Domicilliary club station in White City. He writes that he does have a license, but the card he enclosed with his note showed the V.A. "radio shack" so we're listing that call along with his name anyway. Nice to hear from you, Bill.

George	K2IVG	A?	Haledon NJ
John	WA2UNO	G	Tuxedo Park NY
Jim	WA2YSK	G	Poughkeepsie NY
Billy	WA3WMJ	G	Clinton MD
G.B.	W5NZZ	G	Abilene TX
Charles	WNGQX	N	Oakland CA
Bill	K7VLC	-	White City OR
Marvin	WN8VNP	N	Okemos MI
Bill	WN4QQM	N	Virginia Beach VA
Frank	WN0QPJ	N	Dacono CO
Fred	K5CK	E	Dallas TX

Marvin, WN8VNP, has been a science teacher for about 30 years and says that the ability of the FCC to write clear and concise examinations leaves something to be desired. I couldn't agree more, Marvin. They are masters of confusion and obfuscation in my book. Marvin got his ticket anyway, and presently runs a Drake R4B and 2NT to an 18AVT vertical. After much pruning and tuning he finally got a decent load on 15, 40, and 80 meters, and is enjoying the whole scene. We'll look forward to hearing from you again real soon, Marvin.

WN4QQM is a graduate of the Communications course, and when he decided to go for his Novice ticket he dusted off the old 80-meter kit transmitter that came with the course to get it on the air. Bill had already built an HR10B receiver so he was just about ready to work cw—after getting up an 80-meter antenna. After much

frustration, Bill strung up a 60-foot wire and built a very simple coupler from junkbox parts, finally getting on the air. His first QSO was with a VE2 so he is quite pleased with the setup although he feels a little more power would be a help. Bill plans to do some experimenting with antennas and has lots of home-brew projects in the works, just because he likes to build things himself and not go out and spend a lot of money on "store-bought" gear. You are almost a vanishing breed, Bill—welcome to amateur radio!

That's about it this time, gang. Hopefully by the next column we will have some more information on Restructuring and will pass it along to you. In the meantime, I trust that 1976 has started well for you and that you will have a fine Bicentennial year. Very 73—

Ted — K4MKX



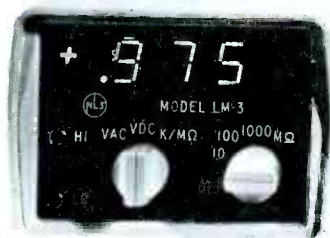
Well, it looks as if Mind Bender Number 1 in the last issue of the Journal bent a few more minds than was intended—including that of Ye Olde Editor. Seems as how not enough checking was done on said problem and only the submitted solution checked for validity. The solution checked out very nicely, but of course $2\sqrt{3}$ is most certainly *not* 6.46 inches as indicated two times. Indeed, $2\sqrt{3}$ is 3.46 inches, as about fifty eagle-eyed readers hastened to point out. Now we'll have to bang a few heads to make sure such goings on do not recur.

While we're at it, only one reader noticed the discrepancy in the Ham News column regarding the power transformer shown in Figure 1. The text referred to a 15-volt transformer while Figure 1 showed a 25-volt transformer. As K4MKX intended, the transformer is indeed a 15-volt transformer, scrounged from goodness knows where—15 volts? Good grief!

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Model LM-4

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FEATURES

Range selection: Manual. **Polarity selection:** Automatic. **Decimal:** Automatically positioned by range switch. **Zero stability:** Automatic zero. **Overload indication:** 10,000 (LM-4), 1000 (LM-3) with the numeral "1" flashing, is displayed for all inputs exceeding full scale. **Operating temperature range:** 0° to 45° C. **Overload protection in kilohm mode:** Up to 120 V dc or rms ac may be applied (not to exceed 30 seconds). **Power:** Battery operation, 3.6 V (nominal) at approximately 200 ma, <1 w (less than 3 w when batteries are being charged). **Batteries:** Either rechargeable or nonrechargeable. **Rechargeable:** Three type-AA nicad cells. Capable of over 2000 readings or over two hours of continuous operation from full charge. Recharge from a discharged state is less than 14 hours. Continuous charging will not damage batteries. **Nonrechargeable:** Three type-AA zinc carbon cells. (Alkaline batteries may also be used.) Typically capable of over 2000 readings from a set of batteries or over two hours of continuous operation.

SPECIFICATIONS

MODE	RANGE	ACCURACY (LM-4)	RESOLUTION (LM-4)	ACCURACY (LM-3)	RESOLUTION (LM-3)	INPUT RESISTANCE	TEST** CURRENT
VOLTS DC*	1 10 100 1000	±0.02% of Full Scale	100 μV 1 mV 10 mV 100 mV	±(0.1% F. S. + 1% Rdg.)	1 mV 10 mV 100 mV 1 V	10 MΩ	
VOLTS AC*	1 10 100 1000	±(0.1% F. S. + 0.2% Rdg.); 50-400 Hz (All ranges) ±(0.1% F. S. + 1% Rdg.); 400-50 KHz (1V range) ±(0.2% F. S. + 10% Rdg.); 400-5 KHz (10V & higher ranges)	100 μV 1 mV 10 mV 100 mV	±(0.3% F. S. + .8% Rdg.) 50/400 Hz ±(0.3% F. S. + 10% Rdg.) 400/5000 Hz	1 mV 10 mV 100 mV 1 V	10 MΩ, 20 pF	
KILOHMS	1 10 100 1000 10000	±0.1% of Full Scale	100 mΩ 1 Ω 10 Ω 100 Ω 1 kΩ	±(0.1% F. S. + 1% Rdg.)	1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ		1 mA 100 μA 10 μA 1 μA 100 nA

* 1000 VDC or peak AC maximum any range.

**5 VDC maximum test voltage in K/MΩ mode.

NRI HONORS PROGRAM AWARDS

In the tradition of NRI's pursuit of excellence in training, the following graduates who earned NRI electronics diplomas in September/October also earned unusual recognition under the NRI Honors Program. On the basis of their grades, these graduates distinguished themselves by earning the right to honors listed below and to the appropriate Certificate of Distinction in addition to their regular NRI Diploma. This distinction is made part of their permanent NRI records.

WITH HIGHEST HONORS

Paul V. Bennett, Riverside, RI
E. W. Brizendine, Spokane, WA
Mary Jo Connell, Austin, TX
Gilbert J. Eifler, New Canaan, CT
Regis F. Forester, Saint Louis, MO
Walker Hallenbeck, Albany, NY
Michael M. Keil, Evansville, IN
Jan Ford Miller, Austin, TX
Rosalio Ochoa, Vivian, LA

WITH HIGH HONORS

James Arndt, Jr., Giddings, TX
Louis W. Behrendes, Flint, MI
Robert L. Bragg, San Jose, CA
Jerry H. Brown, Arlington, TX
Durward L. Calliccoat, Proctorville, OH
Harry Campbell, Jr., Fairchance, PA
Edwin D. Frazer, Portland, OR
James A. Gagne, East Otis, MA
Royce Griffin, III, Gillsville, GA
Thomas C. Heil, Jr., Massillon, OH
Frances A. Jackson, Autin TX
Charles A. Kendall, Opelousas, LA
James M. Kenny, Clifton Springs, NY
Joseph J. Leibzeit, Coplay, PA
Charlie C. Lyon, Gilbertsville, KY
Johnny C. Madden, Trenton, TN
Rovert Newman, Buttonville ON, CANADA
Frederick D. R. Parsons, Stephenville NF,

CANADA

Patrick J. Patten, Millington, TN
Thaddeus Rusin, Melbourne, FL
Lionel Russell, Jr., Westbury, NY
John Sagal, Jr., Rochester, NY
Florindo Salas, Albuquerque, NM
Armando Severo, Arlington, VA
Larry E. Synder, Charleston, SC
Ray A. Swain, Bath, NY

Kenneth L. Tinker, Hastings, MI
James P. Vasilion, Lansing, MI
Donald O. Wilkins, Montgomery, PA
Glen P. York, Tempe, AZ
John F. Taylor, San Mateo, CA

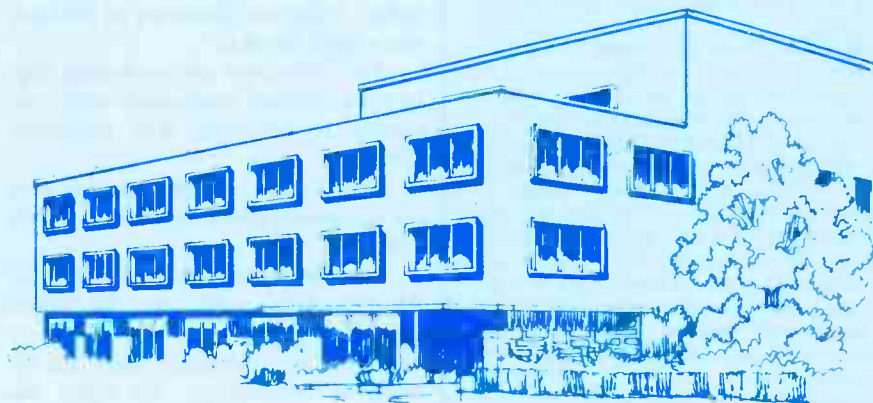
WITH HONORS

Charles R. Bayne, Fort Walton Beach, FL
Louis P. Berini, Leominster, MA
Gerard R. Vevilacqua, Rochester, NY
T. J. Bird, North Augusta, SC
Donald Blanchard, Thibodaux, LA
Eric O. Blomberg, Big Mountain, AK
William G. Buche, Wappingers Falls, NY
Michael D. Byus, Salinas, CA
James E. Chaney, San Antonio, TX
John F. Coffey, Santa Maria, CA
John M. Conley, Sherrill, IA
DeWayne E. Cusick, Glendale, NY
George J. Dlugosz, South Bend, IN
David H. Emery, Fergus Falls, MN
Andrew W. Garrett, Jr., Concord, VA
Michel Gelinus, Sheet Harbour NS,
CANADA

Jonathan George, Dalton, MA
James C. Glasser, Regent, ND
Roberto Gonzalez, Jr., Ingleside, TX
James P. Graham, III, Fort Benning, GA
Gary E. Gundlach, Madison, WI
Francis T. Gunther, Owego, NY
Dorothy Helm, Fort Collins, CO
Ernest K. Hesse, APO New York
John C. Hillerich, Louisville, KY
William B. Johanson, Parma, MI
Jerry M. Johnson, Kokomo, IN
Kenneth A. Johnson, Duluth, MN
William E. Johnson, Jr., Garland, TX
John P. Kissner, New Ulm, MN
Ronald Kwang, Palo Alto, CA
Bennett H. Luedtke, Jr., Fargo, ND

Anthony J. Mabile, Plaquemine, LA
Warren D. Martin, Phenix City, AL
Edward Martinez, Greenwich, CT
Gabriele Merola, Rochester, NY
Raymond C. Miller, Monroeville, OH
Warren L. Miller, Annadale, VA
Ken Murphy, Welland ON, CANADA
Richard R. Novotny, III, Countryside, IL
Paul J. Nowak, Buffalo, NY
Thomas H. Nygaard, Las Vegas, NV
F. T. Obrochta, E Hartford, CT
David S. O'Neil, Lake Worth, FL
William T. Ota, Monterey Park, CA
Daniel L. Paulsen, Chicago, IL
John W. Porter, Peru, NY
Earl D. Quirey, Glenn Dale, MD
Bruce D. Riffel, Martinsville, IN
Ronald D. Schmitz, Oak Harbor, WA

John D. Schroeder, Aptos, CA
Joseph Serra, Thiells, NY
Wayne Shaneyfelt, Aurora, NE
Bradley J. Smith, St. Louis Park, MN
Joseph M. Solomon, Bowie, MD
Thomas J. Spencer, Virginia Beach, VA
John M. Spurgeon, Natchitoches, LA
James D. Stewart, Circleville, OH
Jerry S. Strunk, Stroudsburg, PA
Ralph H. Sundquist, Seattle, WA
Frank L. Swett, Pine Bluff, AR
Mark E. Warnock, Burney, CA
Roger Weidman, Pigeon, MI
Frederick J. Wiedemann, Avon, NY
George Wilder, Kansas City, MO
Robert E. Williams, Kingston, PA
Ervin A. Winter, New Brighton, MN
Thomas E. Wood, FPO Seattle WA



DIRECTORY OF ALUMNI CHAPTERS

CHAMBERSBURG (CUMBERLAND VALLEY) CHAPTER meets at 8 p.m., 2nd Tuesday of each month at Gerald Strite's TV-Radio Service Shop, RR2, Chambersburg, Pa. Chairman: Gerald Strite.

DETROIT CHAPTER meets 8 p.m., 2nd Friday of each month at St. Andrews Hall, 431 E. Congress St., Detroit. Chairman: James Kelley, 1140 Livernois, Detroit, Mich. 841-4972.

FLINT (SAGINAW VALLEY) CHAPTER meets 7:30 p.m. second Wednesday of each month at Andy's Radio and TV Shop, G-5507 S. Saginaw Rd., Flint, Michigan. Chairman: Larry McMaster, (517) 463-5059.

NEW YORK CITY CHAPTER meets 8:30 p.m., 1st and 3rd Thursday of each month at the home of Chairman Sam Antman, 1669 45th St., Brooklyn, N.Y. 11204.

NORTH JERSEY CHAPTER meets at 8 p.m. on the second Friday of each month at The Players Club, located on Washington Square.

PHILADELPHIA-CAMDEN CHAPTER meets 8 p.m., 4th Monday of each month in RCA Building, 204-I, Route 38 in Haddonfield Rd., Cherry Hill, New Jersey 08034. Chairman: Joe Szumowski.

PITTSBURGH CHAPTER meets 8 p.m., 1st Thursday of each month in the basement of the U.P. Church of Verona, Pa., corner of South Ave. and 2nd St. Chairman: George McElwain.

SAN ANTONIO (ALAMO) CHAPTER meets 7 p.m., 4th Thursday of each month at Alamo Heights Christian Church Scout House, 350 Primrose St., 6500 block of N. New Braunfels St. (3 blocks N. of Austin Hwy.), San Antonio. Chairman: Robert Bonge, 222 Amador Lane, San Antonio. All San Antonio area NRI students are always welcome. A free annual chapter membership will be given to all NRI graduates attending within three months of their graduation.

SOUTHEASTERN MASSACHUSETTS CHAPTER meets 8 p.m., last Wednesday of each month at the home of Chairman Daniel DeJesus, 12 Brookview St., Fairhaven, Mass. 02719.

SPRINGFIELD (MASS.) CHAPTER meets at 7:30 p.m. the second Saturday of each month at the shop of Norman Charest, 74 Redfern Dr., Springfield, Mass. 01109. (413) 734-2609.

TORONTO CHAPTER meets at McGraw-Hill CEC, 330 Progress Ave., Scarborough, Ontario, Canada. Chairman Branko Lebar. For information contact Stewart J. Kenmuir (416) 293-1911.



DETROIT MICHIGAN CHAPTER HAS TROUBLESHOOTING NIGHT

At the October meeting Tom Nolan, Executive Secretary of NRIAA, was a guest speaker.

Tom this year demonstrated digital-type readout equipment which included a voltmeter and frequency counter.

The Chapter was very pleased with the extremely good turnout for Tom's visit.

At the November meeting a GE AM-FM clock radio was the service project.

Using a signal tracer with the GE servicing information, the signal was traced from a volume control through a resistor and a capacitor and there the signal stopped. It was determined that a 2.2-microfarad capacitor was bad. After installing a new capacitor the radio worked fine.

At this meeting Mr. John Zelman was admitted to membership.

Annual elections coming up! Be sure to see the ballot at the end of the Alumni News.

NRI AA OFFICERS

Richard G. Moore..... Vice President
Homer Chaney..... Vice President
Angelo J. Colombo... Vice President
William D. Harris..... Vice President
Tom Nolan..... Exec. Secretary

Alumni News



Executive Secretary Tom Nolan shown on his visit to the Flint-Saginaw Valley Chapter in October.

FLINT-SAGINAW VALLEY CHAPTER ENJOYS GOOD MEETING

The chapter was invited to the RCA seminar of solid-state servicing techniques and a modular troubleshooting session in September. The seminar was held on September 23 in Frankenmuth, Michigan, at the Bavarian Inn, and was sponsored by the Taylor Electronic Supply Company in Flint and Saginaw.

At the October meeting the fall season was opened by Tom Nolan bringing along all of the latest test equipment.

Along with the equipment, Tom

had his usual quiz and answer session and Tom had to answer all of the questions that the boys asked.

At the October 22 meeting Larry McMaster brought in some TV sets to troubleshoot. The first one had a bad series string and would not light up. The second set also had two open circuits due to being hit by lightning.

Andy Jobbagy had an RCA Color TV on the bench with no high voltage, and it turned out to be a trace diode. Andy recommended that whenever replacing this diode to always use the manufacturer's specifications as you will keep from having call-backs.

At the November 5 meeting we took care of student problems. One of the problems brought in by a student was a substitution box which he had built, and we checked it out and found some poor solder joints.

The second student had an intermittent problem in a radio which needed a resistor and a transistor. Both students were taken care of promptly.

We expect to start a new project concerning SCR regulators which is a three-part series of fundamentals by RCA.



Tom Nolan shown during the October meeting of the Southeastern Massachusetts Chapter, during which he gave a talk on digital readout systems.



Members signing in at the October meeting of the Southeastern Massachusetts Chapter. Chapter Treasurer Frank Sarro is shown on the right.

SOUTHEASTERN MASSACHUSETTS ENTERTAINS EXECUTIVE SECRETARY

Tom Nolan, Executive Secretary of NRIAA, paid us his annual visit in October. He displayed a digital-type frequency counter and a digital voltmeter.

A homemade digital frequency counter was displayed along with Model LM3 Nonlinear systems volt-

meter. He also showed a spot heat gun for localizing defective transistors and components and a battery-operated cordless soldering gun with its own charger stand.

As usual his talk was appreciated by all of the membership.

NORTH JERSEY CHAPTER HEARS TV SERVICEMAN

Mr. Al Mould, a full-time serviceman and member of the North Jersey Chapter, gave a talk on the new Zenith IC control tuner explaining the principle of its operation. The members discussed the possibility of advertising for old TV's and radios to be used for troubleshooting purposes.

PITTSBURGH CHAPTER STUDIES FREQUENCY COUNTERS

Mr. William E. Fisher, Jr. gave a talk on digital frequency counters at the October meeting. He continued his discussion from last month's meeting and he knows the subject very well. In December we will have our annual party and election.

SPRINGFIELD CHAPTER WELCOMES NEW STUDENTS

At the September meeting three new students were welcomed into the chapter. These students enrolled with NRI after they had been told of the Springfield Chapter and were much impressed by the fact that they could get personal help if they needed assistance.

At the November 10 meeting new officers were elected and they are Preston Atwood, Chairman; Al Dorman, Secretary; and William Planzo, Treasurer.

The chapter's RCA transistor radio demonstrator had a motorboating problem which was solved by adjusting the oscillator coil.

The following ballot lists the names of those nominated to serve as officers of the NRI Alumni Association for the 1976 term. Please fill out your ballot and return it to NRI as soon as possible. The names of those elected will be announced in the next issue of the Journal.

Alumni Election Ballot

For President (vote for one):

Eldred M. Breese
Pineville, Ohio

Ray Berus
Detroit, Michigan

For Vice President (vote for four):

Alphord Hays
Modesto, California

Homer Chaney
Branson, Missouri

Joseph A. Crusco
Waldwick, New Jersey

Richard G. Moore
North Grafton, Massachusetts

J. S. Bartlett
Washington, D.C.

Les Lederna
New York, N.Y.

Branko Lebar
Ontario, Canada

Earle B. Allen, Jr.
Corona, California

Your Name _____

Address _____

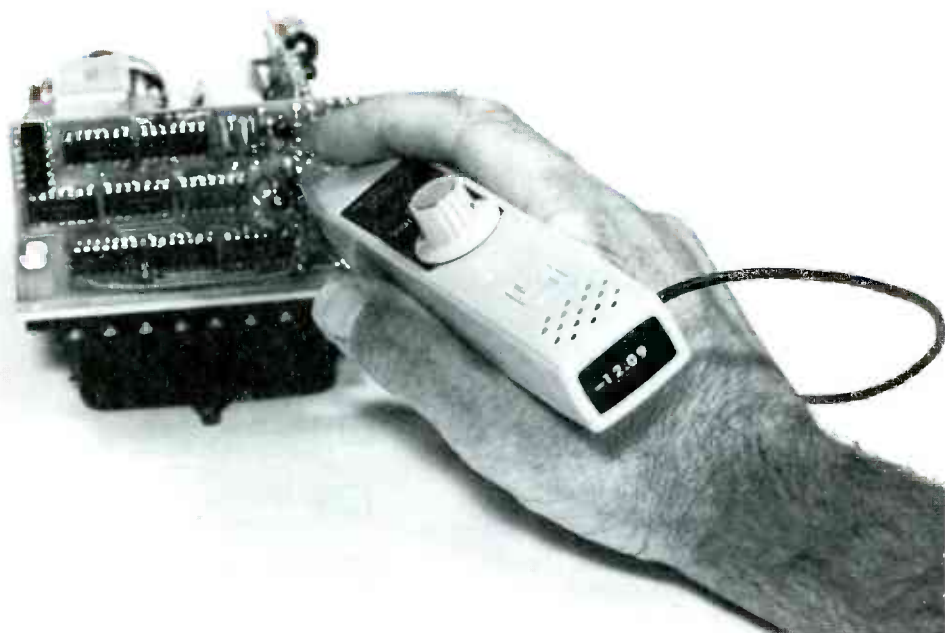
City _____ State _____ Zip code _____

Mail your completed ballot to:

Tom Nolan
Executive Secretary
NRI Alumni Association
3939 Wisconsin Avenue
Washington, D.C. 20016

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11. Unpaid Balance <small>(Amount to be financed) (Item 9 plus item 10)</small>		
12. Finance Charge <small>(See schedule on back)</small>		
13. Total of Payments <small>(Item 11 plus item 12)</small>		
14. Deferred Payment Price <small>(Items 6, 10 and 12)</small>		

Please do not write in this space

RETAIL INSTALLMENT CONTRACT & SECURITY AGREEMENT

CONAR SELECT-A-PLAN

SELECT YOUR TERMS TO FIT YOUR BUDGET

CONAR FINANCIAL RATES:

STANDARD PLAN—The ANNUAL PERCENTAGE RATE is 17.75%

EXTENDED PLAN—The ANNUAL PERCENTAGE RATE is 15.50%

TO SPEED SHIPMENT

1. Complete other side of this sheet.
2. Use Select-A-Plan Schedule on the right to find your Finance Charge and your Monthly Payment.
3. Insert amount of down payment (at least 10% of total order) and other information in Payment Agreement below.
4. Sign Payment Agreement and fill in Credit Application.

IMPORTANT: When you have made three monthly payments, you can "add-on" purchases with no down payment. If you are under 21, please have the Payment Agreement and credit application filled out and signed by a person over 21. He can make the purchase for you and will be responsible for payment. If you have a CONAR account open or recently paid-in-full, just sign the Payment Agreement.

NOTICE TO THE BUYER: (1.) Do not sign this agreement before you read it or if it contains any blank space. (2.) You are entitled to a copy of this signed agreement. (3.) The Finance Charge will be waived if the unpaid balance is paid within 30 days. If paid within 60 days, the Finance Charge will be reduced by 2%; if paid within 90 days, the Finance Charge will be reduced by 1/2. Accounts extending beyond 30 days will pay up to \$3 in Credit Service Charges before the above reductions are made.

HOW TO DETERMINE THE NUMBER AND AMOUNT OF MONTHLY PAYMENTS TO REPAY THE "TOTAL OF PAYMENTS"

Use the Select-A-Plan Schedule to find out what your monthly payment is. Then divide your monthly payment into your "Total of Payments" to find out how many monthly payments you must make. The amount which is left over is your final payment. **FOR EXAMPLE:** if your unpaid balance is \$95, then your monthly payment is \$8.75 (using the Standard Plan). If your "Total of Payments" is \$104, then your monthly payment of \$8.75 divides into that number 11 times with \$7.75 left over. This means you make 11 payments of \$8.75 each, plus a final payment of \$7.75.

PAYMENT AGREEMENT

Enclosed is a down payment of \$ _____ on the merchandise I have listed on the reverse side. Beginning 30 days from date of shipment, I will pay CONAR \$ _____ each month for _____ months, plus a final monthly payment of \$ _____. Title to and right of possession of the merchandise shall remain in you until all payments have been made. If I do not make the payments as agreed, you may declare the entire balance immediately due and payable. In satisfaction of the balance, you may at your option, take back the merchandise, which I agree to return at your request. I understand that a 1% accounting charge will be added to my unpaid balance if my payments become 60 days or more in arrears. I agree that the above conditions shall apply to any add on purchases to my Select-A-Plan account. The statements below are true and are made for the purpose of receiving credit.

DATE _____

BUYER SIGN HERE _____

IT'S AS EASY AS A - B - C TO OPEN A CONAR ACCOUNT

PLEASE ALLOW ADEQUATE TIME FOR NORMAL ROUTINE CREDIT CHECK. ONCE YOUR CREDIT IS ESTABLISHED, ONLY YOUR SIGNATURE IS NEEDED TO ADD ON PURCHASES

WHERE DO YOU LIVE?

PRINT FULL NAME _____ Age _____

HOME ADDRESS _____ CITY _____ STATE _____ ZIP CODE _____

HOME PHONE _____

() OWN HOME () RENT

WIFE'S NAME _____

RENT OR MORTGAGE PAYMENTS \$ _____ PER. MO.

MARITAL STATUS () MARRIED () SINGLE

NUMBER OF DEPENDENT CHILDREN _____

PREVIOUS ADDRESS _____ HOW LONG? _____

WHERE DO YOU WORK?

YOUR EMPLOYER _____ POSITION _____ MONTHLY INCOME \$ _____

EMPLOYER'S ADDRESS _____ HOW MANY YEARS ON PRESENT JOB? _____

Street _____ City _____ State _____

PREVIOUS EMPLOYER _____ HOW LONG? _____

Name _____ Address _____

WIFE'S EMPLOYER _____ MONTHLY INCOME \$ _____

Name _____ Address _____

WHERE DO YOU TRADE?

BANK ACCOUNT WITH _____ () CHECKING

Street _____ City _____ State _____ () SAVINGS

CREDIT ACCOUNT WITH _____ () LOAN

Street _____ City _____ State _____

CREDIT ACCOUNT WITH _____

Street _____ City _____ State _____ TOTAL OF ALL MONTHLY PAYMENTS INCLUDING CAR \$ _____

SELECT-A-PLAN SCHEDULE				
PLEASE CHECK ONE <input type="checkbox"/> STANDARD PLAN <input type="checkbox"/> EXTENDED PLAN				
IF UNPAID BALANCE IS	STANDARD PLAN		EXTENDED PLAN	
	Financial Charge	Monthly Payments	Financial Charge	Monthly Payments
20.01- 25.00	1.05	3.50		
25.01- 30.00	1.50	4.00		
30.01- 35.00	2.05	4.50		
35.01- 40.00	2.65	4.75		
40.01- 50.00	3.00	5.00		
50.01- 60.00	4.15	5.50		
60.01- 70.00	5.50	6.00	6.40	4.50
70.01- 80.00	7.00	6.50	8.00	5.00
80.01- 90.00	8.00	7.75	10.10	5.00
90.01-100.00	9.00	8.75	12.60	5.25
100.01-110.00	10.00	9.75	14.80	5.50
110.01-120.00	11.00	10.75	16.20	6.00
120.01-130.00	12.00	11.75	17.60	6.50
130.01-140.00	13.00	12.75	19.40	7.00
140.01-150.00	14.00	13.75	21.60	7.50
150.01-160.00	15.00	14.75	23.20	8.00
160.01-170.00	16.00	15.75	24.80	8.50
170.01-180.00	17.00	16.75	26.20	9.00
180.01-200.00	18.00	17.00	27.90	10.00
200.01-220.00	20.00	18.50	29.80	11.00
220.01-240.00	22.00	20.00	32.40	12.00
240.01-260.00	24.00	22.00	35.20	13.00
260.01-280.00	26.00	24.00	38.20	14.50
280.01-300.00	30.00	24.50	41.20	15.50
300.01-320.00	32.00	25.50	44.20	17.00
320.01-340.00	35.00	27.00	47.80	18.00
340.01-370.00	38.00	28.00	52.40	18.50
370.01-400.00	42.00	29.50	57.20	20.00
400.01-430.00	46.00	31.50	62.20	21.00
430.01-460.00	49.50	34.00	69.00	22.00

ON ORDERS OVER \$460.00 THE FINANCIAL CHARGE ON THE EXTENDED PLAN WILL BE 15% AND PAYMENTS WILL BE IN PROPORTION TO AMOUNTS SHOWN ON ABOVE SCHEDULE

U. S. POSTAL SERVICE
STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
(Act of August 12, 1970; Section 3685, Title 39, United States Code)

1. TITLE OF PUBLICATION NRI Journal	2. DATE OF FILING October 1, 1975
3. FREQUENCY OF ISSUE Bimonthly	3A. ANNUAL SUBSCRIPTION PRICE \$2.00

4. LOCATION OF KNOWN OFFICE OF PUBLICATION *(Street, city, county, state and ZIP code) (Not printers)*
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5. LOCATION OF THE HEADQUARTERS OR GENERAL BUSINESS OFFICES OF THE PUBLISHERS *(Not printers)*
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6. NAMES AND ADDRESSES OF PUBLISHER, EDITOR, AND MANAGING EDITOR

PUBLISHER *(Name and address)*
William F. Dunn, 8802 Fox Hills Trail, Potomac, Maryland 20854

EDITOR *(Name and address)*
Same

MANAGING EDITOR *(Name and address)*
Thomas H. Beadling, 1650 Harvard Street, N.W., Washington, D.C. 20009

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B. PAID CIRCULATION		
1. SALES THROUGH DEALERS AND CARRIERS, STREET VENDORS AND COUNTER SALES	None	None
2. MAIL SUBSCRIPTIONS	40,982	41,422
C. TOTAL PAID CIRCULATION	40,982	41,422
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