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- An abstract graphic design on a dark red background. It features several light-colored rectangular blocks and white arrows. On the left, two large white arrows point right towards two light-colored rectangular blocks. A smaller white arrow points right from the top block to a larger light-colored rectangular block on the right. Below this, a white arrow points right from the bottom block to a large white rectangular area. In the top right corner, there are several horizontal white lines of varying lengths, suggesting a stack of papers or a staircase.
- **Introduction to Microcomputer Systems**
 - **More Adventures in TV Servicing**
 - **. . . And More Profitable Spare-Time Servicing**

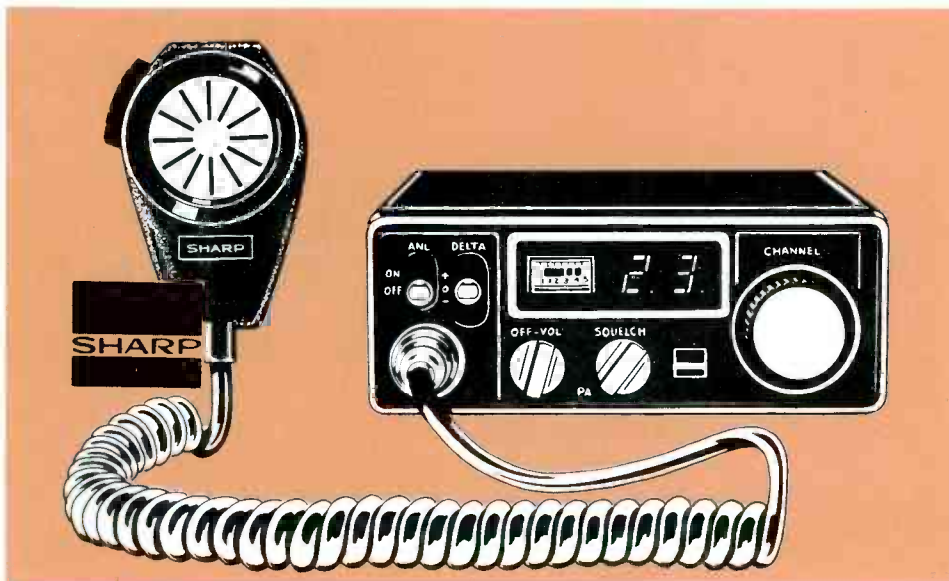


journal
November/December 1976

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journal

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In this issue, long-time Journal stalwart Joe Turner introduces us to the world of the microcomputer hobbyist, the Journal's inimitable J. B. Straughn adds still more adventures to his annals of practical TV servicing, and NRI development engineer James Crudup gives us some more pointers in the elusive art of capturing the spare-time TV servicing dollar.

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Introduction to



Microprocessing Systems



Harold J. Turner Jr.

If you have scanned through a copy of "Popular Electronics" or "Radio-Electronics" at any time during the past year or so, I don't need to tell you that the age of personal computing is here. Now we must add to the list of electronics-related hobbies, along with amateur radio, CB-ing, and circuit experimenting, the *computer hobbyist*.

The growth of this area of electronics is nothing short of phenomenal. From its beginning only two years ago until now, personal computing has attracted some 100,000 devotees, and several professional publications have sprung up in response.

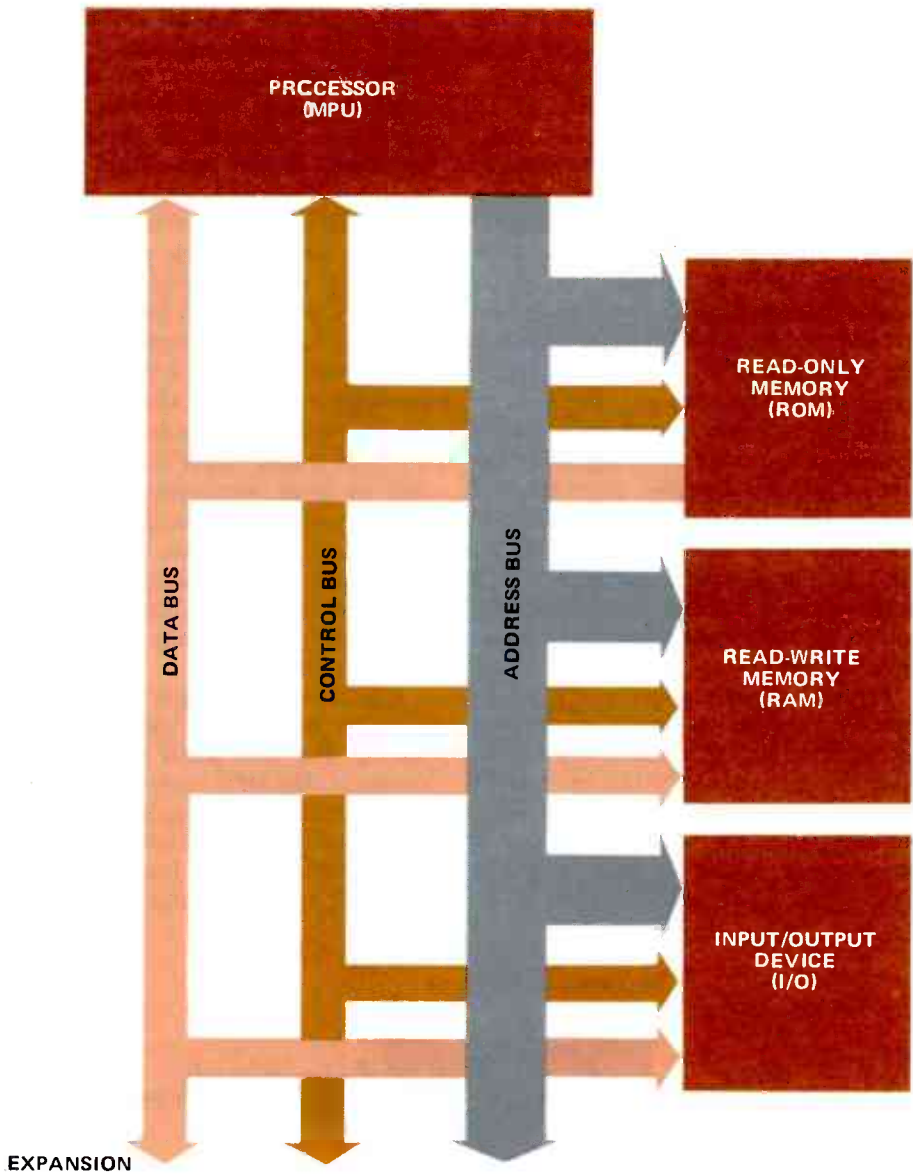
A microcomputer is, simply, a computer whose central processing unit is a microprocessor, sometimes called micro-processing unit, or MPU. Although the typical microprocessor is nowhere near as powerful as the central processing unit of

a large computer system, the fact that the MPU is capable of performing many different types of arithmetic and data-handling operations makes the small computer an affordable reality.

Just about every major semiconductor manufacturer produces one or more microprocessor "chips" or chip families. Some of the more popular ones are: the 8080, made by Intel Corporations; the 6800, made by Motorola Semiconductor Products, Incorporated; and the Z-80, made by Zilog Corporation. All of these devices are also manufactured by other companies.

These MPUs are all eight-bit machines. That is, they operate on and transfer data in groups of eight data bits. This is the "word" size used by the MPU and such a word is sometimes called a "byte" of data.

The large block diagram shows how the



various building blocks of the 6800 computer system are interconnected. Note that the signal-carrying conductors are placed in three groups called buses; the data bus, address bus, and control bus.

The data bus is a group of eight lines which connects eight pins on the MPU chip to eight corresponding pins of the

memory and input/output devices. The data bus is bidirectional; that is, information is transferred both to and from the MPU over a single group of conductors. During a memory store operation, for example, data is transferred from the MPU to the input of a read-write memory location. During a load-from-memory

operation, data is transferred over the same eight wires from a memory location to the MPU.

The address bus is a group of 16 conductors which transmits a 16-bit address from the MPU to all other devices in the system. Note that this bus is unidirectional; that is, all information transferred is in one direction only – from the MPU to memory or input/output devices. Since there are 16 lines in the address bus, the MPU can address any one of 65,536 (2^{16}) memory and input/output devices together.

The control bus cannot be so neatly defined as the other two. Signals on the control bus include reset, interrupt, and bus disable inputs to the MPU, and read/write and enable outputs of the MPU. In general, each one of these lines is unidirectional; however, some carry signals to the MPU while others carry signals from the MPU.

Figure 1 shows the relationship of the data bus, address bus, and control signals to the MPU chip. In addition to the other control signals, the MPU requires a clock signal of between 100 kHz and 1 MHz. Actually, the 6800 requires two out of phase clock signals in this frequency range. Both are furnished by a single

clock oscillator through appropriate inverter and time delay circuits.

The reset input to the MPU does exactly what its name implies. Placing a logic 0 on the reset line causes all MPU operations to halt and all internal registers to be reset. The reset line is normally used only when the system is first turned on to ensure that the processor starts operating at the correct address. The interrupt input is used to alert the MPU to the occurrence of some external event.

For example, in a typical system an interrupt is generated when the operator types any key on the control terminal. The bus disable input is generally used only in larger microprocessor-based systems using two or more processors. Placing a logic 0 on this line essentially disconnects the address bus and the data bus from the MPU so that another processor can control any other devices hooked to these buses.

The read/write output of the MPU is used to tell memory and I/O devices whether the MPU wants to send data or receive it. The MPU receives data during a read operation and transmits data on the data bus during a write operation.

Although the MPU is a very powerful device, it will do nothing at all until it is

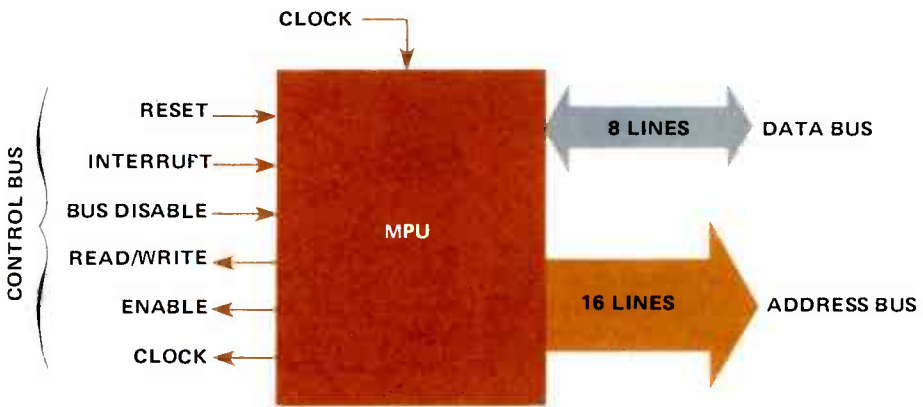


FIGURE 1. A TYPICAL MICROPROCESSOR (MOTOROLA MC6800).

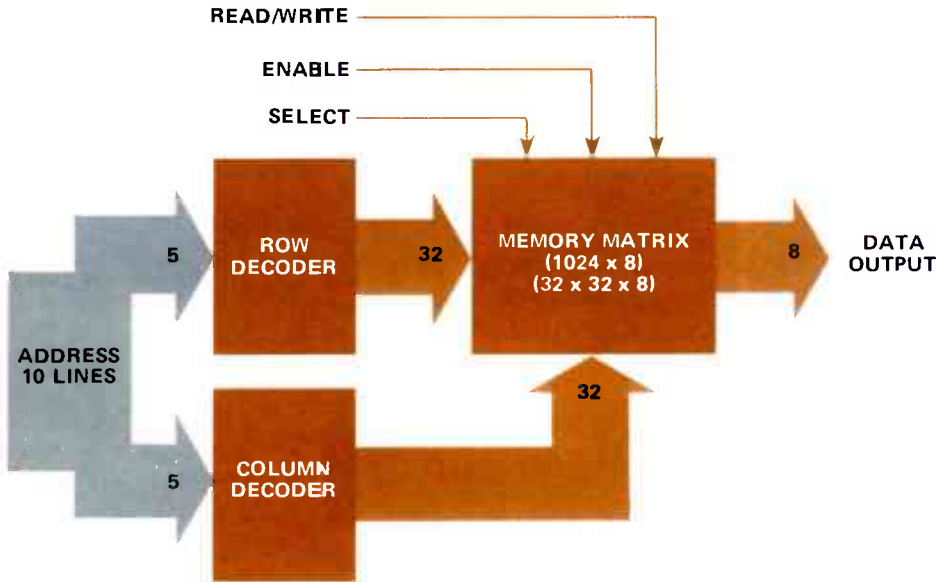


FIGURE 2. A TYPICAL 1 K-BYTE ROM.

given instructions. These instructions must be stored in some type of memory so that the MPU can call them up and execute them. A group of instructions placed in sequence in memory is called a *program*. The MPU begins at a particular memory location, reads the data in that location, performs the operation demanded by the instruction, and then goes to the next instruction in the sequence.

Some instructions cause the sequence of instructions to be altered. These instructions are called branch or jump instructions. When the MPU receives such an instruction, it goes to a new memory location and continues sequentially from there.

Memories associated with micro-computer systems are divided into two broad categories: read-only memories and read-write memories. The MPU can access any memory location of both classes at random with equal ease. Such a memory is called a random-access memory. Unfortunately, read-write memories are usually called random-access memories,

or RAM's, while read-only memories are called by their proper name, frequently with the abbreviation ROM, although both types of memory are really random access.

Figure 2 is a block diagram of a typical read-only memory containing 1024 eight-bit words or bytes. Note that there are ten address lines input to the memory. These are normally the least significant ten of the 16-bit address bus from the MPU. The other six bits are externally decoded to generate the *select* signal. The ten address lines are divided in half, and each group of five goes to a decoder which selects one of 32 output lines when the required five-bit binary code is applied to its input ($32 = 2^5$). The memory matrix itself is made up of 8192 cells arranged in a 32 by 32 by 8 pattern. Since $32 \times 32 = 1024$, the ten address lines will select any one of the 1024 groups of eight bits.

When an address is present, along with an enable signal, a select signal, and a logic 1 on the read/write line, the data

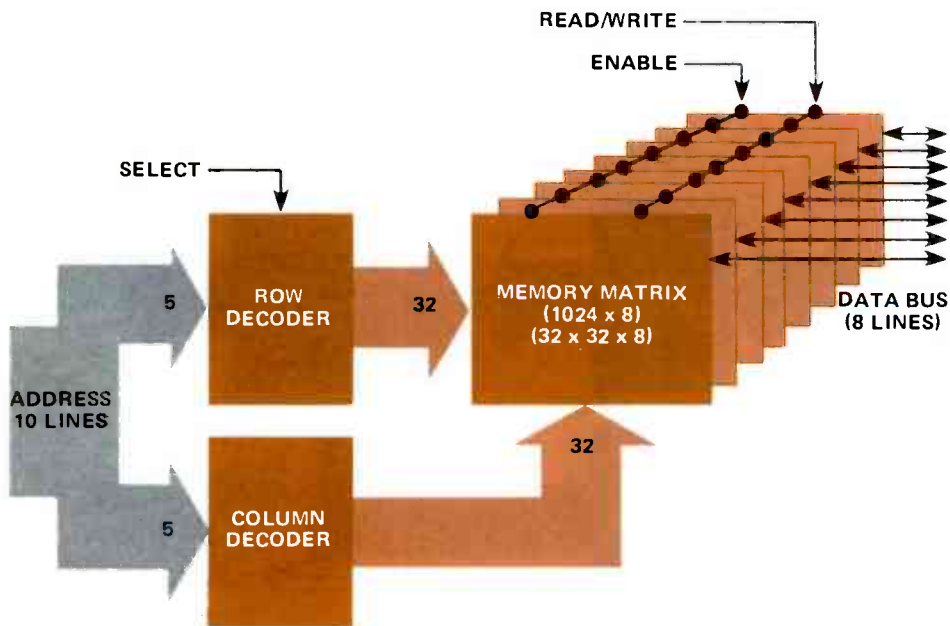


FIGURE 3. A TYPICAL 1 K-BYTE RAM.

stored in the selected memory location is placed on the data bus and is read by the MPU. Since this is a read-only memory, it is not possible to modify any of the data by storing new data from the MPU. A write command (a logic 0 on the read/write line) would be disregarded by the ROM.

Present technology limits the size of an ROM to no more than 2048 eight-bit bytes. The ROM shown in Figure 2 is only half this size, and thus does not represent the most sophisticated memory available. However, memories of this type, such as the MC6830, are widely used and relatively inexpensive. One particular version of this chip, the MC6830L7, is factory programmed with a basic operating system known as MIKBUG®, which is a very effective operating system which allows the com-

puter to “talk” to a Teletype® or other terminal device.

Since a read-write memory cell must consist of an alterable flip-flop, instead of just a metal link, it takes more chip area to contain a RAM than a ROM of a given size. Although there are larger memory devices available, currently the most popular for hobbyist use is the 1024-word, single-bit memory chip, such as the 2102. Eight of these memory devices are connected together to form a 1024 word by eight-bit memory, as shown in Figure 3.

To accomplish this, all equivalent pins of each integrated circuit are paralleled with equivalent pins of each of the other chips, except that the data inputs and outputs are kept separate, to be fed to and from the data bus. In operation, the only difference between this type of memory and the ROM is that the MPU is

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Teletype® is a registered trademark of the Teletype Corp.

allowed to store data into selected memory locations. Whenever a logic 0 is applied to the read/write line, data on the data bus is stored in the selected memory location.

Since the fabrication of a metalization mask for an ROM is very expensive and beyond the range of most hobbyists, most computer hobbyists store their own programs in read/write memory. Initially, programs are keyed in one byte (eight bits) at a time from the system terminal, and are subsequently stored on paper tape or cassette tape for later reuse.

There is another class of memory that is gaining widespread acceptance in the hobby computer field: the programmable read-only memory, or PROM. This type of memory can be programmed by the user and used as read-only storage for the microcomputer system. Some types of PROM's, called EROM's, or erasable read-only memories, can be erased with a strong ultraviolet light and used over again.

Theoretically, a system could be built with only an MPU, RAM, and ROM, to actually run programs. However, this would not be a very useful system because the user could not communicate with the processor and could not be informed of what the processor is doing. To allow such things requires some type of input/output, or I/O device.

A typical I/O unit is a Teletype® machine (TTY), which consists of a typewriter-like keyboard, a printing mechanism, and sometimes a paper-tape punch and reader for storage and reloading of programs to and from paper tape.

To allow connection of the TTY to the rest of the MPU system, a device Motorola calls an asynchronous communications interface adapter, or ACIA, is used. The ACIA (Figure 4) is assigned a pair of memory addresses, just as though it were a pair of memory locations, and the MPU can read from and write to these locations. One of the addresses of the ACIA is for data to be sent to and from the TTY,

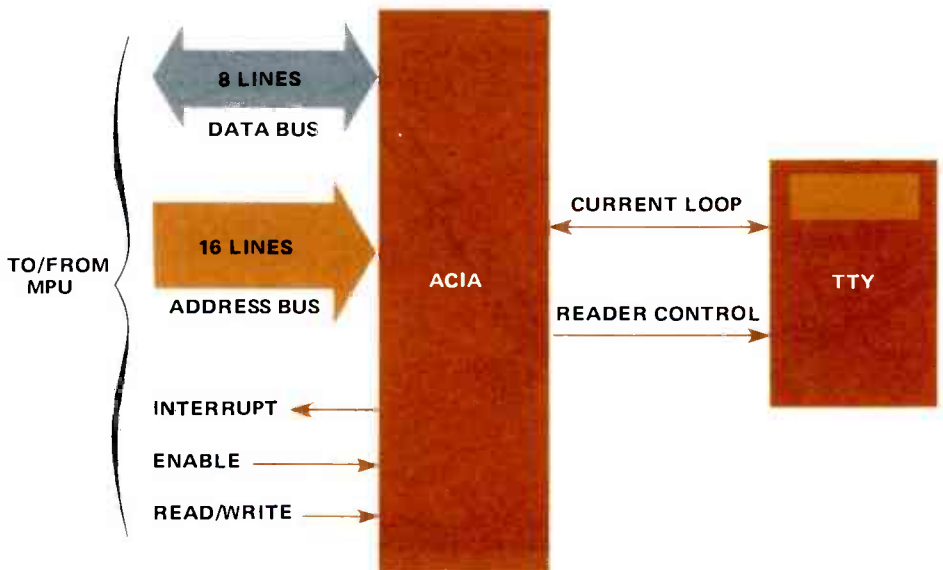


FIGURE 4. A TYPICAL I/O DEVICE – A TELETYPE®

and the other one is for control purposes.

The primary task that must be performed by the ACIA is to change the data supplied eight bits at a time by the MPU (called parallel data) to a single stream of 1's and 0's to be fed to the Teletype® machine. Of course, this conversion must also take place in the opposite direction when characters are typed on the keyboard or when a paper tape is being read. Serial data from the TTY is converted into parallel data by the ACIA, and is then transferred to the MPU through a series of memory load instructions.

From this discussion, it should be obvious that anyone interested in personal computing could put together a 6800 based system with a handful of integrated circuits and other components and, of course, a Teletype® machine. Unfortunately, a new Teletype® is

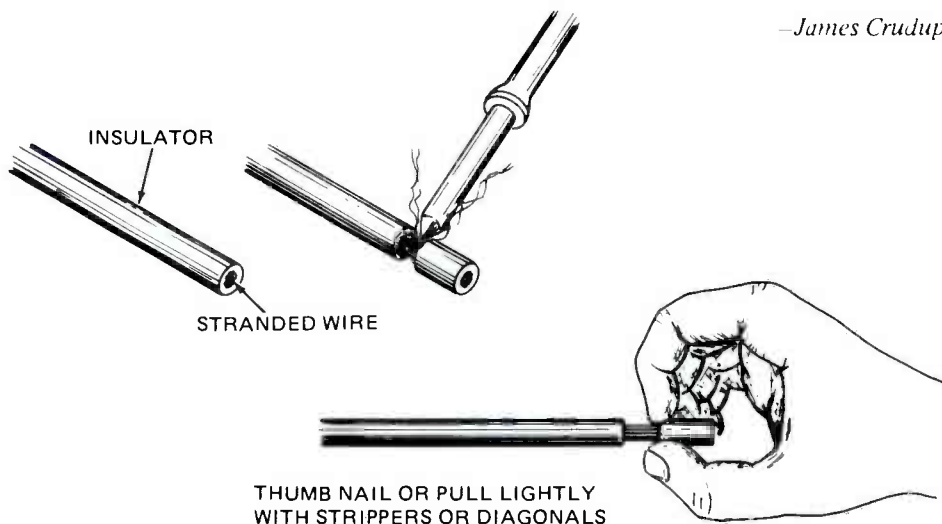
priced at well over \$1000, but don't despair. Used machines are available, although somewhat scarce, and several companies lease TTY's for approximately \$60 per month.

One question that should never be asked of a computer hobbyist is "Yeah, but what do you do with it?" Applications are limited only by one's imagination. Some frequently-encountered uses are mathematical games, automatic operation of amateur radio equipment, alarm and security system operation, self-instruction, and just plain fooling around. Scores of computer hobbyist clubs have formed, and every week a new retail computer store opens somewhere in the United States. If you are at all interested in this fantastic new hobby, pick up a copy of "Byte," "Interface Age," "Micro-Trek," or "Kilobyte" from your local electronics parts dealer.

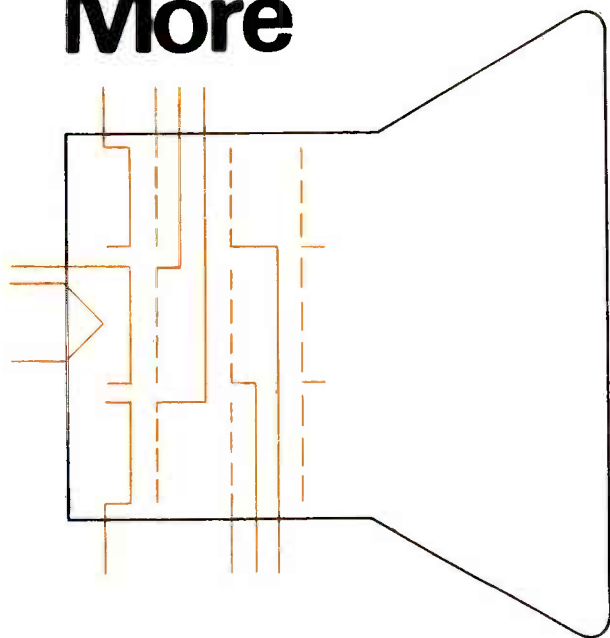
Helpful Hints 7

Sometimes, it is extremely difficult to remove the insulation from stranded wire and some cheap grades of twin lead with wire strippers or diagonals without breaking or weakening strands. A method that I have found to be very successful involves using my soldering iron, as shown in the figure below. Don't forget to wipe the tip of the iron clean when you are finished.

—James Crudup



More



Adventures in TV Servicing

J.B. Straughn

MAGNAVOX COLOR SET

This set belongs to a restaurant owner where I often get a bite to eat. He told me that his color was “all mixed up.” Questioning brought out the fact that he had passed a permanent magnet over the face of his picture tube to “remagnetize” it. Where he got this idea is beyond me.

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I told him that the tube would have to be demagnetized, and for that purpose he would need a degaussing coil. A few days later he informed me that this hadn't worked and would I please come to his house and give it a look.

The following Saturday, armed with an assortment of screw and nut-drivers, I went to his house and found the set as described. The degaussing coil he had bought was about one foot in diameter and didn't weigh very much compared to my two-foot heavy-duty model. For those who may not have used a degaussing coil, here is the procedure I employ:

Plug the coil into a wall outlet and stand about six feet from the front of the set. With the coil at right angles to the face of the picture tube, press the coil switch to energize the coil, then turn the coil so its diameter is parallel to the face of the picture tube. Slowly bring the coil close to the picture tube and move the coil in circles over the picture tube face.

Now gradually move away with the coil, continuing to move the coil in a circular fashion. When you are about six feet away from the set, turn the coil so it is again perpendicular to the picture tube face and release the switch. The whole operation should not take over three minutes. The tube is now demagnetized, as was the case with the Magnavox.

With the dot/crosshatch generator you can produce a dot pattern on the screen. Work with the center dot and if necessary adjust the yoke-mounted controls for the three guns to produce a white dot at the center of the screen.

After that, adjust the purity. To do this, loosen the wing nuts at the side of the yoke. Pull back on the wing nuts, which will move the yoke in its housing away from the rear of the tube. Turn the blue and green guns off with their screen controls and there should be a red "fireball" in the center of the screen.

If it is not so positioned, move the

fireball to the center with the magnets attached to the blue lateral adjustment. This is the thing at the rear of the picture tube neck and the controls look just like the centering magnets on a black-and-white set. With the fireball properly centered, push in on the wing nuts to move the yoke back against the flare of the picture tube.

As you move the yoke in, the red should spread over the entire raster so only red is seen. The red gun is now turned off by means of its screen control and the blue gun turned on. The raster should be completely blue without any contaminating colors. Repeat for the green gun, with the blue and red turned off. If there is still contamination present on either the blue or green rasters, go through the complete procedure again, starting with degaussing.

To reset the screen controls, locate the service switch on the rear chassis apron and throw it to the service position. A thin horizontal line should be visible. Turn all screen controls down and advance the red control so a red line is just visible. Then advance the blue and green controls one at a time so that the line becomes white. Throw the rear chassis switch to the raster position to produce a complete raster. Adjust the green and blue drive controls for a white raster. Return the switch to the normal position. The set is now ready to operate and should give a good color picture.

I had the same thing happen to an RCA color set in which I had recently installed a new picture tube. When I saw the set, the tint could be adjusted to give good face tones at the top half of the picture but peoples' hands near the bottom would be a deep purple.

With the yoke withdrawn for the purity adjustment, a good red fireball could be obtained. Use of my degaussing coil at a later visit cleared up the condition. What caused the purity to be lost—who knows? I do know that the

female owner of this set would not have been playing around with a permanent magnet.

RCA MODEL AH-130

When this black-and-white set came in, my wife did not take the complaint. I fired it up and got a beautiful picture, but after a short time I heard a hissing sound coming from inside (not through the speaker).

When I looked through the cabinet louvers, I saw a red spot which made me think something was burning. I quickly turned the set off and removed the back cover.

With the set on again, I heard the hissing as soon as the raster appeared, showing that there was high-voltage arcing. I looked carefully for a visible arc but couldn't see anything. I decided the red spot I had seen was just the heater of the picture tube glowing!

In looking the set over, I discovered that someone had taped over the anode cap insulator on the back of the picture tube and had sealed it up with something. This was not the point from which the arcing was coming. A screwdriver in contact with the chassis and held near the anode lead produced visible arcing. To me this meant that either the high voltage was excessive or that the lead insulation had deteriorated.

Next I took the shield cap off the base of the plastic high-voltage socket and found that the leads of the filament current-limiting resistor and the current-limiting resistor in series with the anode lead of the picture tube were corroded quite badly.

The next time I visited the wholesaler I got a new filament limiting resistor (an oddball value not in my stock) and a new anode lead. I hadn't yet checked the anode voltage, but I promised myself to do so after the new parts were installed.

If I found it to be excessive, I thought of ways of lowering this voltage and decided I would try a larger resistor in series with the screen of the horizontal output tube to lower its voltage and thus the anode voltage of the picture tube. Excessive anode voltage might cause arcing.

With the new parts installed in the high-voltage rectifier socket, I found that the anode socket on the bell of the picture tube envelope was rusty. I think this was due to the electricians tape which had been used to seal the anode lead to the picture tube in an effort to avoid arcing. I cleaned out the rust with a toothbrush and tuner contact spray. This stopped the arcing and I never got around to checking the anode voltage.

No arcing took place when a grounded screwdriver blade was near or even touching the anode lead. Nevertheless, I keep my cottonpicking fingers off such leads!

I found that there was a width control on the rear chassis apron which worked by varying the resistance in the output tube screen circuit and the screen voltage. The control was turned all the way up for maximum screen and anode voltages. I turned it down to the point where horizontal over-scanning did not occur.

One thing I relearned was not to try to remove crimped, soldered leads from a plastic high-voltage socket. The heat will soften the socket material every time, and if you don't watch it, the lug on which you are working may pull right out of the socket. This, of course, would necessitate the installation of a new high-voltage socket. It is better to clip off the old leads and install the new ones over the remains of the old ones, making sure there are no sharp points left where arcing would occur. The parts for the job came to \$3.50 and I charged \$18 with everyone happy.



**James Crudup
C.E.T.**

...and more Profitable Spare-Time Servicing

Although the symptoms that you will encounter repairing televisions are limited, there is nothing dull or boring about the work. As a matter of fact, each new problem can bring with it a new challenge.

High on the list of frequent troubles is the symptom of no picture and no sound. However, according to statistics from a recent electronics servicing poll, the no picture but good sound symptom is the most common. Another symptom, no color, but a good black-and-white picture, is also very high on the list. This symptom used to be my favorite trouble to fix. My mind was changed just recently when I ran into a real "tough dog" set with this symptom.

The term "tough dog" means different things to different technicians. To some technicians, every set is a dog. The results of a recent survey by the National Electronic Service Dealers' Association showed that most

technicians considered a set a dog if it took more than three hours to fix. I concur with this finding wholeheartedly.

Now, let's take a look at three sets that I have repaired recently and see which defective parts caused the symptoms of no picture and no sound, intermittent color, and no picture but good sound.

NO PICTURE, NO SOUND

The set with no picture and no sound belonged to a retired major general. It was one of three sets that I noticed as I made my way from the front door to the bedroom where this portable (ha!) color set was kept.

I already knew the symptoms and I had the schematic for this set because I had requested this information when I had talked to the customer on the phone prior to making the service call. Getting this information before I make the service call allows me to go out on the job prepared. In addition, when I call customers to verify the symptoms I can get the directions to their houses. I could write a story about the time I have wasted driving around trying to find a customer's house because I failed to ask directions.

The general and his wife watched as I turned on the set. Nothing happened, so I reached around the back of the set and pushed the circuit breaker button. The sound came on momentarily, and then the set went dead with a click. When the breaker trips this quickly, it generally means the trouble is in the power supply. It could be a shorted diode, a defective capacitor, or in some cases, a defective circuit breaker. I have repaired sets that have had a weak circuit breaker (wouldn't hold its rated current) and sets that have had circuit breakers that were shorted to ground through the case.

As I started removing screws from the back of the set, I noticed a few were

missing. About then, the general explained that he had had a technician from the service shop in his neighborhood come out and check the set and had dismissed him because he felt he was dishonest. Explaining, he said that the technician wanted to take the set to the shop for repair, which was all right with him. The thing that the general objected to, however, was the estimated repair bill which the technician had computed to the last penny. The general felt that if the technician could estimate the job down to the very last penny, then he could do the work there in his home. Of course, the technician had his reasons for not being able to fix the set at home. It was then that the general informed the technician that his services were no longer needed. I had been recommended to the general by one of our mutual friends.

With the back cabinet off the set, I didn't see anything visibly wrong so I attached my cheater cord, pushed in the circuit breaker again, and turned the set on. In a matter of seconds (before the tubes could warm up) the circuit breaker kicked out so I disconnected the cheater cord. I thought I had detected a wisp of smoke, so I turned on my flashlight and looked more closely at the components in the cabinet. It was then that I spotted a partially disintegrated fuse resistor (R502 in Figure 1). Just touching it caused it to crumble apart. Generally, when a fuse resistor overheats, it is a sure sign of a current overload caused by a defective rectifier or filter capacitor in the power supply.

Since the breaker kicks before the tubes have a chance to warm up, it's unlikely that the trouble is elsewhere. It was strange that the resistor had been ruined so quickly. I don't reset a circuit breaker more than twice when I have this symptom for fear of damage to several parts. I asked if the other technician had held the reset button and the general replied no, but he said that his wife had.

AN INTERMITTENT COLOR PROBLEM

I really dislike the “tough dog” problem. Not only do most “tough dogs” try my patience, but they also take a big bite out of my profit.

Most intermittent problems turn out to be “tough dogs” and this particular Motorola TS914 was a dog of the worst kind. My son had told his baseball coach that I had owned a television shop a few years ago and that now I fix TV receivers on a part-time basis. Well, guess what was waiting for me when I dropped my son off for practice one hot afternoon? The coach nicely asked if I could take a look at the television that just happened to be in the back seat of his car. Since I liked the idea of my boy being the first string left fielder for the Langley Park Oakland A's, I loaded the set into my car and took it home with me.

On the bench it played fine. I couldn't find anything wrong with it, although he had described the trouble as intermittent color. It played fine sometimes, he said, but every so often (about twice a night), the color would just drop out and a good black-and-white picture

would remain. Since this was an intermittent problem, I tapped on the set and moved parts with an insulated alignment tool trying to create the symptom. Then I inspected the circuit board for hairline cracks and looked for visible damage. After watching the set for a half hour, I thought maybe the color killer was turned down too low, causing the color on some of the weaker stations to be intermittent. I reset the color killer. I selected the weakest channel and adjusted the color killer. The color was acceptable on the weakest channel.

I had spent about an hour watching the set and was about to declare it fixed. But, before I did, I tapped on the tubes that could cause this trouble and turned the set on its side, hoping to make an intermittent problem show itself, but the set continued to work perfectly. It was about time to pick up my boy from practice, so I decided to let the set play until I returned. I couldn't have been gone more than ten minutes; however, when I returned, the color was gone although a good black-and-white picture was present.

I readjusted the color killer on an unused channel and there was no colored

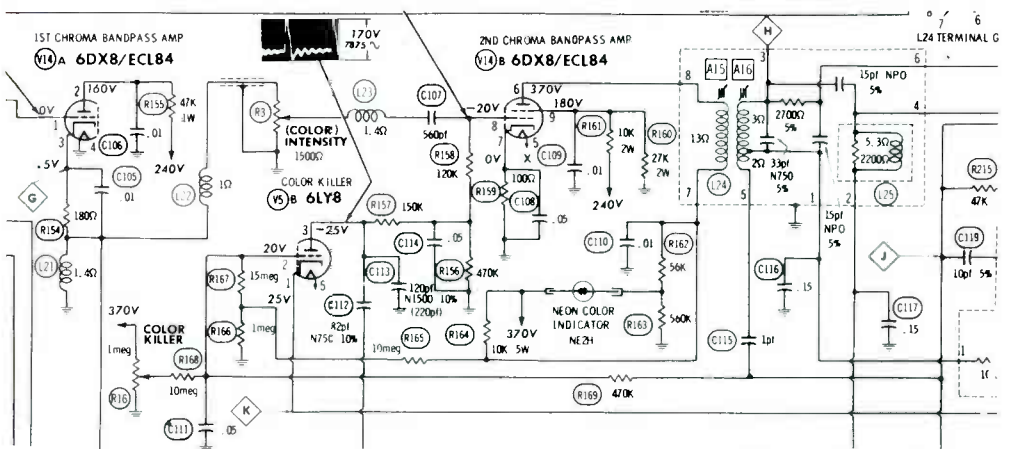


FIGURE 2. A MOTOROLA TS914.

Courtesy Howard W. Sams

snow, only black-and-white snow. This meant that the trouble was in the color circuits. There was no barber pole effect on the TV screen, so the trouble was probably not in the color sync circuits. Since there was a good monochrome picture, the trouble was not in the color demodulator or difference amplifiers. If it had been there, the condition would have been incorrect colors.

First, I checked the dc voltages in the bandpass amplifiers (Fig.2). The plate, screen, cathode, and control grid of the second chroma bandpass amplifier V14B all read exactly what the schematic required for a color picture. Next, I checked the first chroma bandpass amplifier. The plate, cathode, and control grid of the triode section of the 6DX8 tube also all read correctly. All this added up to the fact that the bandpass amplifiers must be working properly! There wasn't anything simple about this problem, I thought to myself.

I attached my color bar generator to the antenna terminals, and turned on color bars with about 100 percent modulation. The color bars appeared strong and in perfect order. I turned off the generator and disconnected it. With the antenna back on the set, the picture was in color again. I switched channels and the color went away. I had been on this problem for over two hours and wanted to call it quits for the night, but I decided to continue working a little longer.

I turned on my extra-bright trouble light and moved components with an insulated alignment tool in hopes of finding the intermittent, but no such luck. Then, I inspected the color board for cold solder connections but found none. This was it for the night. I had been working on this set for over three hours and that was enough.

The next day was Saturday and I started working on the set before breakfast. I turned on the set and it displayed a color picture. Then I turned on my scope

and let it warm up while I thought about what to look for next. Tapping the set caused the color to disappear, leaving it with only a black-and-white picture. I attached a low-capacitance probe to the scope and started looking for the color signal at the cathode of the first chroma bandpass amplifier. I picked up a good color signal that was about 12 volts peak-to-peak.

As I varied the color control on the color bar generator, the color level of the signal varied. I crossed over an RC network (R154 and L21) in the cathode and the signal was still good. Then I crossed over a peaking coil which connected to one end of the color intensity control and all was still good.

Next, I tried the center tap of the control. The signal attenuated down to about 3 volts peak-to-peak, but it was still pure color bars and exactly what the schematic called for.

I crossed over another peaking coil (L23) and what do you know? The scope picture disappeared into a straight line.

I read the peaking coil resistance in-circuit. Instead of 1.4 ohms, it was wide open! As a double check, I shorted the peaking coil. A beautiful picture in color appeared on the screen. The wire wrapped around to the body of the coil was not loose. It looked like a cold solder connection. I attempted to resolder it but failed.

I didn't have the exact replacement but that was a minor problem; it was still early and I could pick up one later from the wholesaler.

Jobs like this are touchy because your bill can give the wrong impression. If I had used my straight-charge method, which is \$15 an hour, this job would have cost the coach \$60, plus the \$2 retail cost of the coil.

If I gave the coach a bill for \$62 of which only \$2 was for parts and the rest labor, I was sure my boy would ride the bench. Instead, I elected to take a loss on

this job. This is something that most technicians will have to do when they run into a rough one.

I wrote the bill out this way:

2-1/2 hours labor \$37.50
 Adjust, troubleshoot, and resolder board, 1/2 hour. Found and replaced defective coil 7.50
 Part: (1) coil 1.4 ohms 2.00
 Total \$47.00

To me the bill looked a lot better than one like this:

Troubleshoot set 4 hours . . . \$60.00
 (1) coil 2.00
 Total \$62.00

Although I lost over \$10 on this one, I was satisfied that I was giving the coach a good deal, one that he would be satisfied with.

NO PICTURE BUT GOOD SOUND

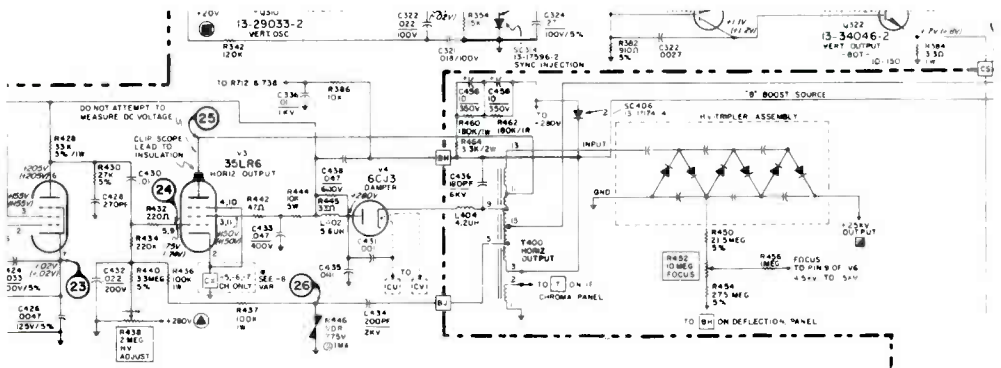
This set was a Sylvania color portable with a D19 chassis. I was familiar with this set because the general's set was just like it except with remote control.

Since I had requested a description of the trouble, which was "good sound but no raster," I thought I was prepared for

this service call. I had a copy of the schematic and I had a new horizontal output tube and damper in my tube caddy, although the horizontal output tube was an oddball. Oddball tubes are those that you don't use too often. In about 60 percent of the service calls that I have made with this symptom, the trouble turned out to be a defective tube. Generally, it was the horizontal output, damper, or high-voltage rectifier which failed.

I arrived at the customer's house on time and I tried to be as cheerful as possible, although it was 95° outside and the house wasn't air conditioned. As I worked on the set, the lady of the house mentioned more than once that she hoped it wasn't the picture tube. I told her that I didn't think the picture tube was defective but I would let her know something very shortly.

Once I had the back off the set, I visually inspected for overheated parts and burned-out tubes but found none. I connected my cheater cord and turned on the set. When I didn't hear the high-voltage crackle within a minute, I turned the set off. I replaced the horizontal output tube first, but no luck. Then, I installed a new damper and was surprised when the set still failed to work. I informed the customer that I would have



Courtesy Howard W. Sams

FIGURE 3. A SYLVANIA MODEL D19 HIGH VOLTAGE SECTION.

to take the set back to my shop where I had more test equipment which I needed to fix the set.

This set was easy to work on. Just about everything was accessible and only two screws had to be removed to pull out the chassis. It was also much lighter without the remote control section. I removed the screws and pulled out the chassis so I could reach the entire chassis.

I knew the horizontal oscillator was running because I could hear it and an insulated screwdriver held near the plate cap of the horizontal output tube drew a fairly good arc. The signal from the plate of the horizontal output tube drives the flyback which provides a signal between 8 and 10 kv to the high-voltage tripler.

My meter would not measure the input voltage to the tripler because it's greater than 5 kv and a pulse. Instead, I measured the focus voltage which was dc and I used my high-voltage probe. It was O.K. — I measured about 4.5 kv. There was no voltage at the second anode, and I didn't expect to measure any since I had not heard the hv crackle. I used a test lead with an alligator clip on each end and a screwdriver to discharge the second

anode. I connected one alligator clip to chassis ground and I connected the other alligator clip to the blade of the screwdriver which I shoved under the second anode cap. There was a loud snap. Then, I disconnected the second anode cap from the picture tube and rechecked the voltage, but it was still zero.

Sometimes a problem in the picture tube or video circuit will pull the high voltage down. Removing the second anode lead from the tube isolates the problem.

Everything pointed to a defective tripler, and, sure enough, a replacement corrected the problem. I called my customer and told her that it wasn't the picture tube and that her set was fixed. The retail price on the tripler was \$22, the service call was \$12.50, and 1-1/2 hours labor was \$22.50. The bill came to \$57 and I netted \$40.

From these three repair jobs, you will probably agree that there's nothing boring or dull about television repair. The best of us will run into a tough dog every now and then, but if we use logical troubleshooting techniques and keep plugging, we can fix the hard ones as well as the easy ones.

Job Ops

HELP WANTED: Openings available for technicians and engineering personnel with backgrounds in industrial communications, audio visual, and TV. Contact Bruce Simon, International Visual Products, Inc., 111 Galway Place, Teaneck, New Jersey 07666.

BENCH MAN NEEDED: Magnavox experience preferred, but not necessary. Contact Elmer Stephens, Columbus TV Service Company, 3509 Cusseta Road, Columbus, Georgia 31903.

TECHNICIAN WANTED: TV and appliance dealer requires a qualified technician (preferably bilingual) with chauffeur's license. The salary ranges from \$150 to \$225. Apply in writing stating qualifications, expected salary, and date available to J. P. Latour, Latour Radio and TV, 7 Queen Street, P. O. Box 356, Kapuskasing, Canada.

HAM NEWS



By Ted Beach **K4MKX**

Well, at the present time K4MKX is totally QRT. This sad state of affairs came about quite gradually. The first thing that happened was that the Genave 2-meter rig started acting up on receive shortly after I took it out of mobile service and hooked it up as a base station. All of the symptoms point to an oscillation in the second i-f, but so far I haven't been able to track it down.

The demise of the Genave didn't upset me too much since I did most of my operating from the car with the new Wilson. One of these days I'll get around to looking over the Genave, and then I'll probably sell it since I don't do too much operating from the home QTH on two meters anyway.

Then, shortly after Field Day, I started noticing the FPM300 doing strange things also. I had had a couple of schedules during the summer, so I did quite a bit more operating on the low bands than I had been doing in the past. Then one day I started to hear all sorts of funny sounds coming from the speaker on receive — a sort of weird rushing noise that was most apparent with no signal input, and particularly bothersome on 10 meters. I thought perhaps I had blown the rf

amplifier as I had left the antenna connected (without an arrestor) during a particularly bad thunderstorm one evening.

The peculiar noise soon made its way to 40 and 20, so I decided that perhaps something was dying in the receiver. Turning the rf gain control down would help, but, of course, this drastically reduces the sensitivity (which is not too good on 10 meters to begin with). The transmitter still works fine, but I can't stand to tune the receiver! There hasn't been any spare time to tear into the rig, so as a result it stays off for the most part.

At least, thought I, the good old reliable Wilson would keep me in touch with the Ham community. Alas! Almost one year to the day after I bought it, it gave up the ghost too! Several other Wilsons in the area had suffered similar fates, and I had been secretly gloating that mine was the "oldest surviving Wilson" around. I guess I shouldn't have done that.

Anyway, we know what the problem is (dead output transistor in the transmitter and two bad antenna switching diodes), and one of these days we'll send off to

Wilson for replacement parts (very expensive!). In the meantime, the receiver works as well as ever, and I have managed to get a *little* power out of the transistor (50 mw) through a couple of substitute switching diodes so I am not *totally* QRT even if the repeater can't hear me too well. The 50 mw is not enough drive to even tickle the power amplifier, so there is no simplex operation possible. Hohum!

As you are probably aware, the latest "buzz word" in the electronics field (ham radio being no exception) is Micro-processor. Elsewhere in this issue is a short article on these fantastic devices, and I too have been exploring the field somewhat in recent months. After doing a lot of reading in the magazines and getting some of the manufacturer's literature, I decided that it would be a lot of fun to build my own computer. It began to look less like fun as I got more and more into the hardware required to keep a microprocessor fed and cared for — RAM and ROM and I/O ports and lights and switches and power supplies and so on. Wow! It would take a year to get the parts and make the boards for even the simplest system.

So I waited and did some more reading, and found some kits that looked interesting, but expensive. And all that soldering! And testing for bugs. Yuck! I still wanted to "get into microprocessors," and had even set aside a few dollars for parts, but I didn't really want to go through all that assembly and testing. I wanted to get a system up and running that I could use right away.

About this time prices started to tumble for the various ICs, and some of the manufacturers began to announce special "kits" that were really complete operating systems, ready to go with only the addition of a power supply and a terminal of some sort. This really began to look interesting. The most interesting to me was the KIM-1 system by MOS Tech-

nology in Pennsylvania which I finally bought.

This is a complete computer on an 8" x 12" circuit board and has a built-in keypad, six 7-segment LED display read-outs, 1024 words (bytes) of read-write memory, two I/O ports, 2048 words of ROM that contain an operating system program that allows the user to talk to a Teletype® and a cassette/tape recorder. All I had to supply was a real simple power supply to make it go, and \$245. Then the fun of programming the beast began.

This can be fun or frustration, depending on one's attitude. I think it is fun. The computer is a very stupid machine, and does only what you tell it to do, so after only several days I had taught it to add two numbers and show me the results in the display (I can't afford a Teletype® yet). Great. I now had a \$245 calculator that can't multiply — just add (in hexadecimal?). I'm working on that now, as well as other things.

One program causes the computer to generate tones in response to some simple switch inputs. Another makes it operate as an automatic keyer for CW, producing a keying signal for the transmitter as well as an audio sidetone signal. I have already done these things, and right now I am working on a program that will let the computer sample Morse code, hand or machine sent, and print out the correct characters with proper spacing and so on. It is a long program, and I haven't finished it yet, and indeed I won't even be able to use it until I get a terminal that will be able to display the characters. But by the time I finish writing the program, I am sure that I will also have a terminal to hook up to the computer.

After that, I'll probably work on a program to keep logs and dupe sheets for contest work and print out the results when the contest is over. Oh, there are lots of good things one can do with a microprocessor — the sky's the limit! Try

Don	WN2GKG	N	Old Bridge NJ
Irvin	WN2ZRH	N	Medford Lakes NJ
Charles	WN3CPW	N	Blue Bell PA
Gary	WN3DAW	N	Silver Spring MD
Malcolm	WN4HDX	N	Merritt Island FL
T.L.	WN4KKI	N	Waycross GA
Gene	WN5UZU	N	Hatfield AR
Walter	WN5VAU	N	Valdez AK
Clem	WN5VDL	N	Kerrville TX
John	WN6OXM	N	Sandiego CA
Jim	WB8PSR	G*	Proctor WV
Bob	WN9UFM	N	Harvey IL
Jim	WNØULH	N	Scottsbluff NE
Arne	WA1ZBN	C	Topsham ME
John	WB6CKN	A	Gonzales CA
Wynn	WA7MFJ	—	Ashton ID
Bob	WA7SFE	G*	Albany OR
Lynn	WD8CDQ	G	Droop WV
Archie	WN9USD	T	Schaumburg IL

*Just upgraded — congratulations!

one sometime — you might like it.

Now, let's see who we have heard from since last time. As usual, the names and calls in the early part of the list are from the ranks of students and graduates of our Amateur courses, while those listed last are students and graduates of other NRI programs.

Gary, WN3DAW, writes that he is going on the air with a Heath DX60B and will probably work mostly on 80 and 40 meters using a trap vertical. He has a backup inverted vee, but says the apex isn't quite as high as he would like to have it. In addition to his own activities, Gary is busily working on a club station, WA3VVK, in Rockville MD.

WN4KKI got his ticket back in April, has finished the course, and planned to go to Savannah in August to take the General test. I suppose by now that N has been changed to a B (or D?) but we haven't gotten the latest word.

WN5UZU writes that he also just received his ticket and snagged WN4QUA the first time he tuned up his Heath

HW16. Gene drives the rig with a VFO and uses an inverted vee on 80 and 40 with a dipole for 15 meters. The dipole is soon to be replaced with a pair of beams atop a 60-foot tower. I sure wish I had the wherewithal for such a venture! Good luck, Gene.

I did a double-take as I was recording the call WN5VAU. It just didn't look right to see a 5 call with an Alaska address, but sure enough, I looked Walter up in our records and that's where he is. That ought to be a good for a few calls, signing "portable KL7."

WN5VDL got his ticket sometime late in August and is busy studying to upgrade to Technician or General in the near future. Shoot for General, Clem, all you need is that 13 words per minute along with the same written test, and you'll be much better off in the long run. Do it!

Jim, WNØULH, took his test on May 20, and got the license back from the FCC on July 2, for a turnaround time of less than two months. Maybe there is some end in sight for the backlog now

that the CB licenses are virtually "self-assigning." I certainly do hope so. Congratulations, Jim, and keep up the good work.

WA1ZBN is a graduate of the Color TV course and has followed the Ham News in the Journal for two years. Arne says that he was perhaps one of the last to get a Conditional License as he took his test June 27 and the new rules went into effect in July. Previously, he had held Novice licenses at two different times and places as he travels around a lot on Navy duty. His next tour will take him to Athens, Greece and he would like very much to operate there, although he doesn't know if the United States and Greece have reciprocal licensing. Neither do I, Arne, but I'm sure it won't be too difficult to find out once you get there.

WB6CKN says he took the Communications Course primarily to learn enough to get his Amateur license, since at the time he enrolled NRI did not have an amateur program. Looks as if you've done real well, John, and I'm sure you'll have no difficulty getting ready for the Extra real soon. John uses Heath gear, an HW101 on the low bands and an HW202 on 2 meters.

WA7MFJ really had a rough summer of it this year. Back in June a dam near Wynn's home collapsed and flooded four counties, cutting off all normal communications, destroying major roads, and separating families for weeks at a time. During this disaster, there was a 2-meter amateur repeater that was in continuous operation to provide the only communications for civil defense, police, and other services. A net was formed very quickly that handled more than 3000 messages during the emergency, a feat possible only because there were trained people who knew what to do and how to do it.

For this and other reasons, Wynn says he is very glad that he is in electronics and was able to be a part of the great effort put forth by the amateurs this summer.

WD8CDQ is the first "D" that I've seen so far, but from the looks of things there will soon be lots around. Lynn is already working on the Advanced test and hopes to be able to try for it before Christmas. After that and some more code practice, the Extra is the next goal.

Speaking of D calls, I know several people who have B calls who are upset, to say the least, about the new Novice calls. How, pray tell, is anyone going to tell who's who? The Novice with the ssb rig will probably be very tempted to "slide" out of the novice segments and grab the microphone, and who has the time to go around checking calls? Admittedly, most people are honest, but I just wonder if the temptation might not get some of the new Novices to try something with their shiny new transceivers that is not exactly legal? Here's hoping we don't end up with a CB-type mess on the ham bands (no offense intended to real CBers).

The last item for 1976 is the explanation of the "T" notation beside the WN9USD call. Archie passed his Technician test in August but had not received the new call yet, so until the ticket arrives, he must settle for the Novice call. Probably by the time he gets the new ticket, Archie will be ready for the Advanced test as he has been studying real hard on the theory and code.

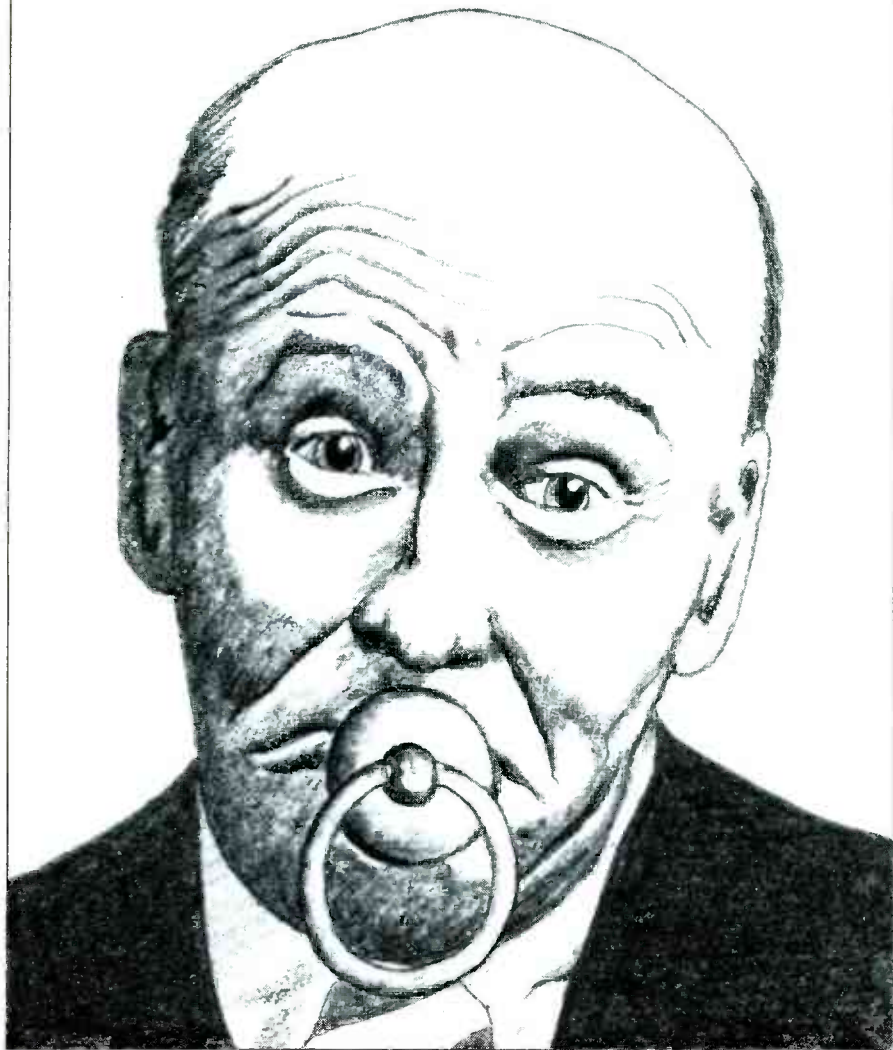
And that about wraps it up for another year, gang. As always, it has been alot of fun hearing from all of you, and I look forward to more QSL cards, notes, and letters in 1977.

Very 73 – Ted K4MKX

**IF YOU HAVE TO PUT SOMETHING IN YOUR MOUTH,
MAKE IT A PACIFER.**

**YOU MAY FEEL SILLY, BUT IT WON'T HARM YOU
THE WAY CIGARETTES DO.**

Give Heart Fund
American Heart Association



NRI HONORS PROGRAM AWARDS

For outstanding grades throughout their NRI courses of study, the following July and August graduates were given Certificates of Distinction with their NRI Electronics Diplomas.

WITH HIGHEST HONORS

Jimmie R. Adair, Evergreen CO
Thomas E. Bainbridge, Belle Vernon PA
Gori P. Bruno, APO New York
Roger Lange, Green Lane PA
Lawrence W. Lindner, Huntington Station NY
Robert J. Lundy, Warren MI
Philip H. Marcoux, Enfield CT
Ronald L. Mendell, Foxboro, MA
Guy G. Miller, San Antonio TX
Stewart Moffatt, Owen Sound ON
Lucian Nowicki, Chicago IL
John Owens, Takoma Park MD
Dewayne Pattison, Perryton TX
James W. Standley, Plymouth IN
Donald J. Thorne, Jr., Chicago IL

WITH HIGH HONORS

Richard P. Allers, Portage MI
Edward J. Anderson, Burtonsville MD
Robert Andree, Kenai AK
Eugene Antle, Grand Falls NF Canada
Steven J. Belezny, Fairfield CT
Richard R. Benedict, Jr., Columbus MS
S. F. Bowditch, Knoxville TN
Richard G. Boyce, Carlsbad NM
Robert L. Briand, Regina SK Canada
Craig W. Brun, Honeoye Falls NY
Roger W. Butler, Mendota IL
Edward M. Chausz, Wallingford CT
Robin A. Cole, Arlington, WA
Kenneth Collenborne, Big Timber MT
Arvil G. Conk, Dover DE
Bernard P. Cymanowski, Crystal Lake IL
David L. De Mann, Sewickley PA
Edward M. Earing, Albuquerque NM
Edwin J. Ewing, Madras OR
John Gider, Poughkeepsie NY
Rolando G. Gonzalez, Miami FL
Earl B. Harbot, APO New York
David L. Helget, Hugoton KS
Waymon Hertzler, Festus, MO
Francis A. Hrubovcak, Pittsburgh PA
William H. Jones, Washington DC
Leonard M. Kebrich, South Beach NY
Theodore S. Kruppa, Jr., Camden DE
Anthony A. Lattanzio, Rensselaer NY
Timothy C. Laughrin, Cleveland OH
James D. Lenn, Plainview MN

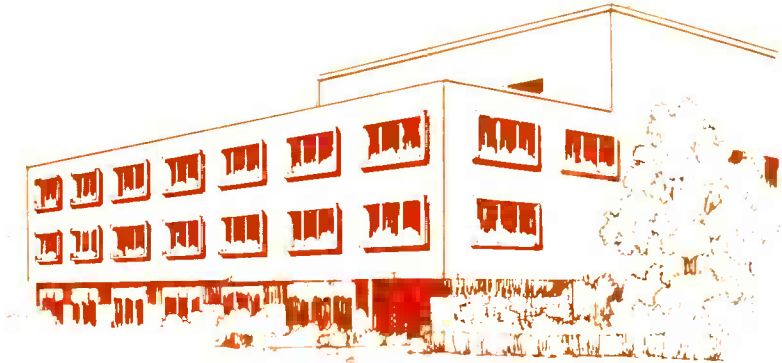
Paul B. Lewis, Hyattsville MD
Glenn E. Morgan, APO New York
Arthur Myles, Grand Falls NF Canada
Marvin L. Neilson, Modesto CA
Robert L. O'Neal, Woodbridge VA
Willie E. Painter, Stuarts Draft VA
Mitchell E. Pitcock, Shelbyville IN
Jerry D. Pitts, Kingsville TX
Ralph A. Porcell, Staten Island NY
David M. Richards, Cherry Hill NJ
Armando Rodriguez, New York NY
Felix R. Sanchez, Mayaguez PR
Robert J. Schmitt, Midland MI
David E. Slocum, Roanoke VA
Charles T. Spraggins, Fort Bragg NC
Michael W. Tauson, Pittsburgh PA
L. E. Therrien, Gales Ferry CT
Dennis Tretiak, Regina SK Canada
O. C. Tweedt, Huxley IA
William J. Velten, Florissant MO
Theophilus A. Waithe, Toronto ON
James A. White, Warsaw IN
Paul Sayka, Montgomery AL

WITH HONORS

Charles I. Agena, Honolulu HI
Manfred E. Albach, Jacksonville FL
Barry G. Appleby, Burin NF Canada
Ylo Aring, Toronto ON Canada
David C. Boone, Mesa AZ
Russell W. Bush, APO New York
J. R. Chamberlin, Lone Jack MO
Ted G. Davidson, Walden NY
Harry Deel, Carlisle OH
Owen M. Denham, Provo UT
Robert P. Elliott, Silver Spring MD
Harry A. Evans, Huntsville AL
Donald D. Ferguson, Glen Gardner NJ
Drue W. Folk, Fort Worth TX
Lawrence D. Gagne, Fitchburg MA
Jeffrey Gottschalk, St Marys OH
Myles F. Greene, Broxton GA
Robert J. Hale, Kingsport TN
Richard E. Hamacher, Deer Trail CO
Stanley Hecker, Raleigh NC
Robert L. Hedke, Empire CO
Dean Herbkersman, Cleveland OH
Dwight K. Hoffman, Hoopeston IL
Robert L. Hurst, New Holland PA
Donald E. Hutchins, Pasadena TX
James L. Jefferson, Milton WV

Phillip Kellerby, FPO New York
John M. Kelly, College Park MD
Wesley Kersey, Memphis TN
Juan T. Kokiong, Lasalle ON Canada
George Kourliouros, Waynesboro PA
Adolf Kroeber, Bethel Park PA
Emery Kuhn, Euclid OH
William D. Landaeta, Champaign IL
Betty J. Leitz, Ilion NY
Harvey B. Luce, Berwyn PA
Jack Mayer, Raytown MO
Brendan P. McFadden, New Bedford MA
Laverne O. Mehls, Estevan SK Canada
Angelo Miceli, Detroit MI
John R. Monroe, Jr., Grayson LA
Bryce W. Montgomery, Portersville PA
Arthur H. Moorhead, Jr., Marietta GA
Robert J. Morgan, Seattle WA
Robert J. Pardoe, CFB Borden ON
Roger Parker, Springfield OH
John J. Quinn, APO San Francisco
Royal E. Purcell, Bloomington IN
Donald Reaka, Highland IL

Lino Redondo, Denville NJ
Kenneth Rehmeier, Laramie WY
Gerald A. Romanow, St Paul L'Ermite PQ
Daniel Rosario, Bronx NY
Rodney E. Russell, Sugar Hill NH
Ralph O. Safford, Belton MO
Fernand Seguin, Kapuskasing ON
Jack Sigler, New Castle PA
Ronald G. Toller, Ft Lauderdale FL
Keith H. Vandewark, Jamestown NY
James W. Vann, Huntsville AL
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Russell W. Stallings, Raleigh NC
Kevin Steiner, Bridgeton MO
John P. Taylor, Vienna VA
Tim Verellen, Snover MI
James O. Ward., Jr., Tutusville FL
Robert W. Watson, Wilson NC
Chris Westfall, Great Falls MT
Thomas R. Wick, Duluth MN
Albert L. Wietharn, Arvada CO
John M. Zupancic, Waldorf MD
C. Kenneth Hedrick, Lexington NC



DIRECTORY OF ALUMNI CHAPTERS

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

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

NEW YORK CITY CHAPTER meets at 8:30 p.m., first Thursday of each month, at 1669 45th Street, Brooklyn, New York. Chairman: Sam Antman, 1669 45th Street, Brooklyn, New York.

NORTH JERSEY CHAPTER meets at 8 p.m. on the second Friday of each month at the Players Club, located on Washington Square in Kearny, New Jersey. Chairman: Al Mould. Telephone 991-9299 or 384-8112.

PHILADELPHIA-CAMDEN CHAPTER meets on the fourth Monday of each month at 8 p.m. at the home of Chairman Boyd A. Bingaman, 426 Crotzer Avenue, Folcroft, Penna. Telephone LU 3-7165.

PITTSBURGH CHAPTER meets at 8 p.m. on the first Thursday of each month in the basement of the U.P. Church of Verona, Pa., corner of South Ave. and Second Street. Chairman: James Wheeler.

SAN ANTONIO (ALAMO) CHAPTER meets at 7 p.m., fourth Thursday of each month, at the Alamo Heights Christian Church Scout House, 350 Primrose St., 6500 block of N. New Braunfels St. (three blocks north 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 at 8 p.m. on the 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. on the second Saturday of each month at the shop of Norman Charest, 74 Redfern Drive, Springfield, Mass. 01109. Telephone (413) 734-2609. Chairman: Preston Atwood.

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



SPRINGFIELD'S CHAPTER STARTS FALL SEASON

At the September meeting, an RCA color set had a problem of high voltage. Al Dorman demonstrated a B&K Analyst Model 1077B and found a bad flyback transformer in the above RCA color receiver.

Future meetings will be devoted to troubleshooting the Chapter's Zenith Color Receiver and also teaching the use of new color test equipment.

The Chapter is looking for information on repairing remote control units for TV and transmitters for garage door openers.

SOUTHEASTERN MASSACHUSETTS CHAPTER ENTERTAINS EXECUTIVE SECRETARY

At the September 23 meeting, Tom Nolan, Executive Secretary from Washington, D.C., gave a talk on CB radios. There are so many CB radios around today, that this is quite a lucrative service field, and the information presented was very timely.

NRI AA OFFICERS

Ray Berus	President
Earle B. Allen, Jr.	Vice President
J. S. Bartlett	Vice President
Homer Chaney	Vice President
Branko Lebar	Vice President
Tom Nolan	Executive Secretary

Alumni News

SAN ANTONIO CHAPTER HAS INTERESTING PROJECTS

During a recent meeting, San Antonio members found an apparent horizontal output problem in a color TV chassis. It was really a tricky damper tube. They also looked at an intercom which has been plugged into 120 volts when it only needed ten volts. This presented quite a few problems. Three transistors and all of the rectifiers were damaged.

At the next meeting, they worked on a Motorola Color Chassis with no red chroma. It turned out to be a bad resistor.

The Chapter is looking forward to a good fall season.

NORTH JERSEY CHAPTER HEARS RECORDED INSTRUCTION

North Jersey Chapter members listened to an RCA prerecorded talk on troubleshooting transistor circuits during their September meeting. After the talk, the members went to work on two troublesome TV receivers, one color and one black-and-white.

The Chapter welcomes any students and graduates in the northern New Jersey area to attend their meetings, which are held the second Friday of every month.

NEW YORK CHAPTER WELCOMES STUDENTS AND GRADUATES

Sam Antman, Chairman of the New York City Chapter, would like to stress the fact that students as well as graduates are welcome at the Chapter meetings.

Mr. Antman had had many calls in the past from new students who had problems and asked if they could come to a chapter meeting for help. Sam's standard answer has always been "that's what we are here for and you are more than welcome." The title "National Radio Institute Alumni Association" seems to give the student the impression that only graduates of NRI are eligible. Sam would like very much to alter this fallacy and to welcome all new students and graduates to their meetings. The meeting place is 1669 45th Street, Brooklyn, New York. The meeting time is 8:30 p.m., the first Thursday of each month. Again, students as well as graduates are always welcome.

TORONTO CHAPTER SEES EXHIBIT

At the fall meeting of the Toronto Chapter, an exhibit of old time radios was presented by the "Canadian Vintage Wireless Association" which was established in 1970 to preserve yesterday's wireless for tomorrow.

Mr. N. C. Batsch, the secretary of the association, gave a talk and explained each of these pieces of equipment.

- 1933 MARBLE Mantle Radio AC DC Super
- 1945 Addison Toronto Ontario
- 1923 Northern Electric Company Peanut Tube Set
- 1925 Mercury Super Ten
10-R-215A Peanut Tubes
Tower Meistersinger Horn Speaker
- Early radio receiving licensing form
- 1930 Philco Cathedral Radio
- 1922 SRC Regenerative Standard Radio Corporation with Radiola Horn Speaker
- 1925 Westinghouse Mod 55
UV1992 Red Cone Speaker
- 1924 CGE Radiola 16 Battery
Stirling Baby Horn Speaker
- 1923 CGE Battery Set UV201A-S
Dancing Girl Speaker
- 1925 Fada Canadian NEUTRODYNE
5-201A-S Atwater Kent Cone Speaker

Peter Cameron gave a talk on "how to start your own service business." Mr. Cameron is the owner of Cameron Television Service in Allister, Ontario. He has been in business many years, and knows the ins and outs of both technical and administrative television servicing.

Finally, the Executive Secretary of NRIAA, Tom Nolan, of the Washington D.C. office of McGraw-Hill CEC, gave a talk to the Chapter and demonstrated Citizen Band radios. Matching antennas

to CB units and scope patterns of signals were shown by Tom. It was pointed out that the service business in CB radios could be very extensive as there are so many units on the streets today.

Refreshments were served by the McGraw-Hill CEC staff, comprised of Mrs. Carol Foster and Mrs. Gail Gonzales. Carol was also the official receptionist.

A guest at the meeting was Harold Reeb, comptroller and vice-president of McGraw-Hill CEC, Washington, D.C.

DETROIT CHAPTER HEARS DISCUSSION

James Kelley, Detroit Chapter Chairman, discussed the picture flip problem on color television sets cause by weak filter capacitors in the low-voltage supply. He explained that the vertical section operates at a fraction less than 60 Hz.

He went on to say that small variations of frequency do not affect operation, but improper filtering can disrupt the circuit. With this condition, there will be a picture flip that will occur about every 16 or 17 seconds.

The October meeting will be held one week later than usual to accommodate Executive Secretary Tom Nolan, who will give a lecture on CB radios.

FLINT/SAGINAW VALLEY CHAPTER CONTINUES STUDENT PROGRAMS

At the August meeting, Andy Jobbagg conducted a service shop for four of the new students. He had them remove an RCA black-and-white television receiver from its cabinet and return it to the cabinet, just as if they were doing a service job in someone's home. When they had finished the job, the students were told where they had made

mistakes and how to correct them. They were also told to make notes when doing a job so that no mistakes will be made since mistakes cost money.

Also at the August meeting, Joseph A. Madar from Holly, Michigan was initiated as a member. Mr. Madar is taking a Communications Course and is very interested in our meetings and the way that he is able to learn by doing actual service work with us.

All of the summer meetings for the students emphasized elementary electronics. The Chapter is fortunate to have a shop where they can meet and a teacher like Andy Jobbagy who can give some very tried and tested advice as well as new

ideas.

At the September meeting, the new students had lessons on how to read the voltmeter scale and how to make four different adjustments of the meter so that high voltages can be read.

Dale Keys purchased a new tube tester and Mr. Jobbagy explained the best way to use this tester.

Dennis Besser had a problem in a Magnavox color TV. It had no raster, but it did have high voltage. The boost voltage was okay, but when they measured the focus voltage it was absent. A new focus rectifier cured the problem.

The chapter is looking forward to Tom Nolan's annual visit in October.

The following ballot lists the names of those nominated to serve as officers of the NRI Alumni Association for the 1977 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):

J. B. Straughn
Shorter, Alabama

Earle B. Allen, Jr.
Corona, California

For Vice President (vote for four):

Gerald R. Watson
Bryan's Road, Maryland

Branko Lebar
Ontario, Canada

Eldred M. Breese
Pineville, Ohio

Alphord Hays
Modesto, California

Joseph A. Crusco
Waldwick, New Jersey

J. S. Bartlett
Washington, D.C.

Richard G. Moore
North Grafton, Mass.

Les Lederna
New York, N.Y.

Your Name _____

Address _____

City _____ State _____ Zip _____

Mail your completed ballot to:

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

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FEATURES

RECEIVER SECTION: The Fanfare 100 is designed to transmit AM signals in the 26.965-to-27.255-MHz Citizens Band. Highly sensitive and selective dual-conversion superheterodyne-type circuitry. Full 23-channel crystal-controlled operation is provided by a frequency-synthesized circuit consisting of 12 crystals. The receive section includes an S/RF meter for reading signal/power strength, an adjustable squelch control to eliminate background noise when no signal is being received, and an automatic noise limiter to suppress atmospheric and manmade interference.

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