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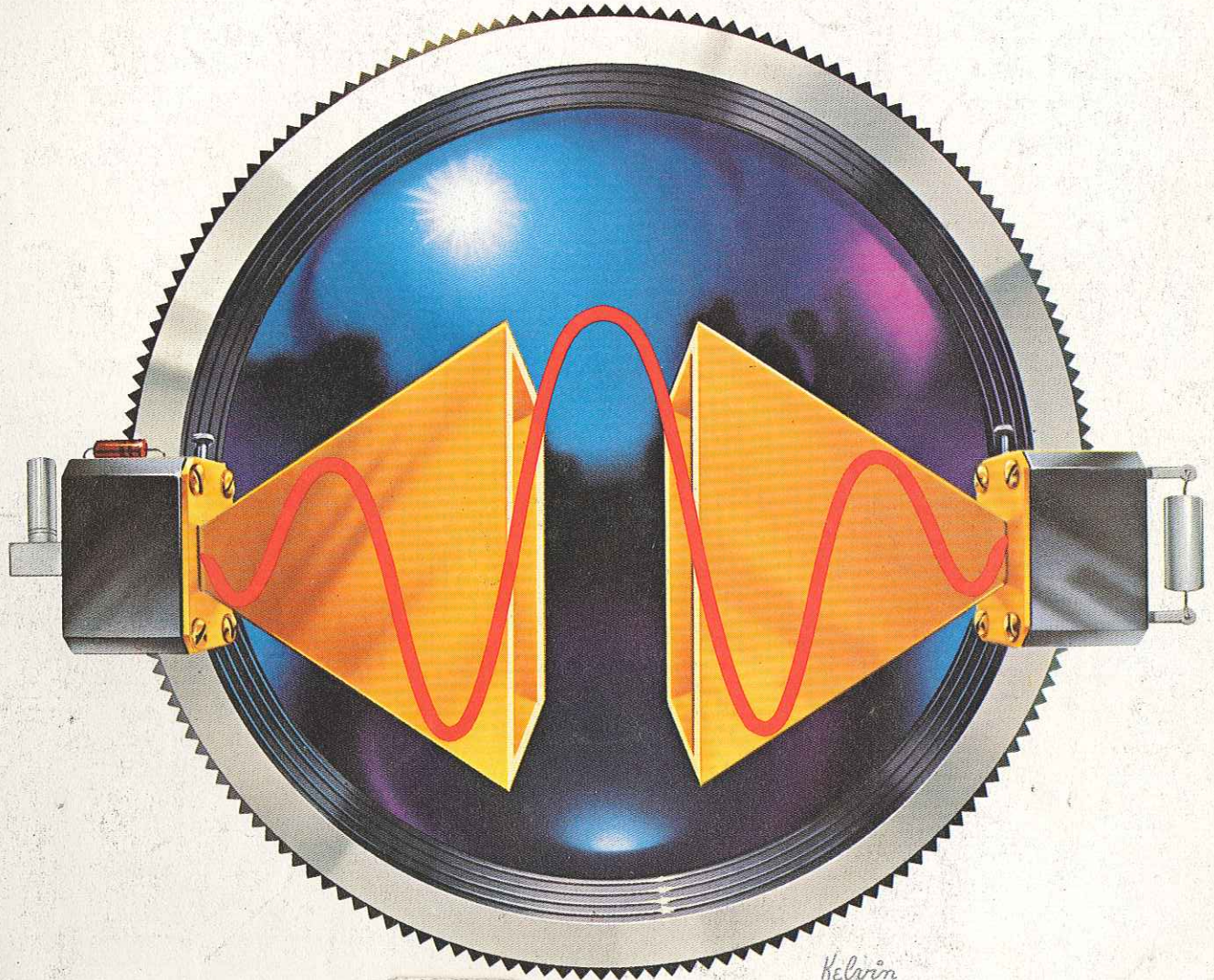
WORLD'S LARGEST-SELLING ELECTRONICS MAGAZINE

OCTOBER 1978/\$1

Energy Leak Detector Reveals Home Heat Losses
Secrets of the New Amateur Code Exams
Designing Circuits for "Worst-Case" Performance

BREAKTHROUGH PROJECT!

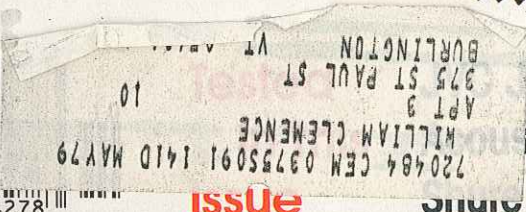
A Personal Microwave Communications System



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T-V77 Stereo FM Tuner
Acoustic Research AR-9 Speaker System
SME 3009 Series III Tonearm



Letters

AUDIO COMPANDER ENHANCES RECORDING

I have always prided myself on making the fullest possible use of my home tape recorder. But with the addition of the "Audio Compander" (November 1977) to my taping system, I discovered that I had fallen short of my goal. I found that the Audio Compander's ability to accommodate a wide range of levels obviates the need to "pot up and down." One of the simplest and most dramatic rewards is realized when using the compander with a simple cassette deck and a stereo system. But recording from discs or off-the-air FM programs is not enough of a challenge.

One way to demonstrate the dynamic range and noise-reduction properties of the compander is to make a recording of at least a couple of people placed around a room, with one person very far from and another very close to the microphone. If you can then arrange to A-B compare the recording with and without the Audio Compander, you will immediately hear the superiority of the recording with the compander. —David J. Malinaric, Pittsburgh, PA.

PATENT INFRINGEMENT POSSIBILITY

With reference to "Experiments With Programmable Logic Arrays" (June 1978), I would like to inform your readers of possible patent infringement if the circuit described in the article is used commercially. A very similar circuit forms the basis of the waveform control circuitry used in our new digital polyphonic synthesizer that can generate a virtually unlimited spectrum of waveshapes, with variable resolution (16 to 4096 points), up to 2 MHz. Our American patent has been pending since April 1977.

It may also be of interest to readers who build this project that inexpensive 8223 programmable read-only memory chips can be used as an alternative to the PLA and IC4 through IC6. Of course, the 8223 PROM's must be connected to a +5-volt source through R1. —Charles D. Kellner, Director, R&D, Syntauri, Inc., Salem, OR.

TWO-SIDED COIN

I wish to thank POPULAR ELECTRONICS for the Operation Assist column. I have received several replies to my request for a schematic diagram. —John H. Taylor, Glen Mills, PA.

As a long-time reader of POPULAR ELECTRONICS, I am always on the lookout for

someone in the Operation Assist column to whom I might be of some help. Having offered to help several individuals who were listed in the column and receiving not even one "thank you," I've become disillusioned. —C.A. Harvey, Sturbridge, MA.

We're sure that anyone aided in this manner appreciates it, but it would be a nice gesture to send a "thank you" note. —Ed.

PART AVAILABILITY

POPULAR ELECTRONICS readers interested in building the project in "Listen to a New World of Sounds With Ultrasonic Detector" (July 1978) may have trouble finding a source for the TBA231 dual operational amplifier specified for IC1. If so, (in Canada and U.S.) they can obtain it from us for \$3.50 postpaid. —D. Rost, Northern Bear Electronics, Box 7260, Saskatoon, Saskatchewan, S7K4J2, Canada.

CB SIDEBANDERS' REBUTTALS

I greatly enjoyed your coverage of a sideband CB club meeting in the July 1978 issue (CB Scene). However, so as not to give the general public the wrong impression, I feel I must present some of my own observations. First, the failure to use official FCC call signs must be a local phenomenon because practically all sidebanders I hear give call signs to begin and end a transmission. Secondly, the use of linears is not nearly as widespread as you would have your readers believe. Except when the DX is really bad, the average sidebander needs no more than 10 to 12 watts PEP to communicate 25 to 50 miles with an inexpensive omnidirectional antenna.

Your statement about the five-minute talk limit also deserves comment. Due to the general cooperation with slow keying, most people feel that as long as no one asks for a QSK, the frequency is clear and they are not inconveniencing anyone. I have never found a situation where someone did not give way to a QSK in a minute or so. —Jerry Brown, Δ505, KAIT-5860, Louisville, KY.

Convenience or pragmatism still isn't a valid reason for breaking the law. We're pleased to hear that some illegal practices cited are not spread throughout the country. —Ed.

After reading the July 1978 CB Scene, I felt I had to write in to tell you that I have been a member of the Whiskey group for almost three years. I use my W number, first name, and license information number at the end of all transmissions. There are almost 7000 members in the Chicago-area W group. I know that a lot of CB'ers on AM and a few even on SSB operate in an illegal manner, but not me. I am no fool. —Richard W. Bailey, W-3862, Chicago Area W Group, Chicago, IL.

MIXED FEELINGS

Overall, the February 1978 issue of POPULAR ELECTRONICS was good. The hi-fi articles were excellent, especially the Stereo Scene

on digital electronics in hi-fi. However, on the articles on computers, it appears that a reader must already know all there is to know about computers to understand them. There are a lot of us who do not understand computer jargon. —Donald D. Capodanno, Vinton, VA.

There are many low-cost computer "buzz word" books available so that one may enter the field more smoothly. —Ed.

IMPROVING THE IMPROVEMENT

"How to Upgrade a Basic ELF Microcomputer" was a delight (Feb 78). However, the usefulness of the TAPE OUT and TAPE IN programs (Tables I and II) would be greatly improved if they contained a provision for specifying the end of the read routine. The following "fix" adds this feature to the TAPE OUT programs; a similar modification applies to the TAPE IN program.

Original			
Loc.	Instr.		Remarks
0000	E1		
01	7A		
02	F8 68 A1		Start addr
05	F8 00		
07	A6 A7		
09	F8 10 A2		
0C	F8 01 A3		
	.		
5D	64		Display byte
5E	81		Get next byte
5F	32 01		If end, goto mark
61	30 36		Else return

Modification			
Loc.	Instr.		Remarks
0000			
02	F8 B1		Start PAGE addr
05	F8 A1		First byte addr
08	F8 B8		MSB } of total bytes + 1
0B	F8 A8		LBS }
0E	F8 00 A6 A7		
12	F8 A2		} See note
15	F8 A3		
	.		
68	64		Display byte
69	88 FF 01 A8		R(8),0 - 1 into R(8),0
6D	32 72		If end LSB, goto MSB
6F	81		Get next byte
70	30 41		and return
72	98 FF 01 B8		R(8),1 - 1 into R(8),1
76	32 01		If end MSB, goto mark
78	30 6F		else get next byte

This fix will now permit one to dump any contiguous section of memory (up to 65K), provided the starting address and total number of bytes plus one in hex are specified. The



The C2-4P

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- The CPU's direct screen access, coupled with its ultra-fast BASIC and high resolution, makes the C2-4P capable of spectacular video animation directly in BASIC.
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CIRCLE NO. 33 ON FREE INFORMATION CARD

MSB of the total number of bytes should have a nominal value of 01 to prevent the program from going into an infinite loop. Bear in mind that the additional instructions will affect program timing. It will be necessary, therefore, to adjust the values of R(2),0 and R(3),0, based on the system clock, to reflect the added timing. —Henry H. Tolbert, Tallahassee, FL.

TAPE HEADS DO WEAR

I recently read with interest Craig Stark's article "Selecting the Best Cassette Tape for Your Recording Needs" (November 1977). It was very informative and helpful. However, I was quite surprised when I read "A better known CrO₂ disadvantage—rapid head wear—is actually a myth at cassette speeds and pressures. Believe it only when you find someone who has actually worn out a cassette head using any kind of tape."

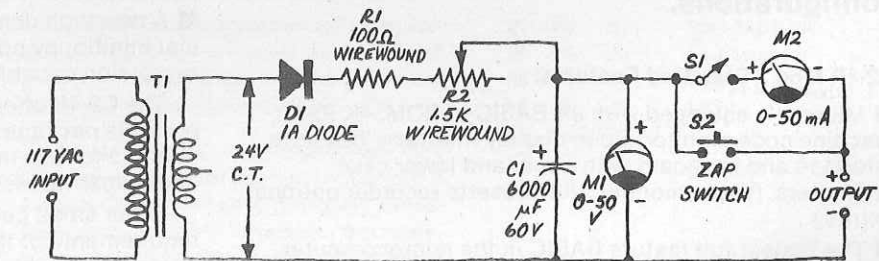
I have a deck that is one year and nine months old with a worn playback/record head (high density, Permaflux) that makes listening to tape intolerable. I would estimate the total playing time of the deck to be 2500 hours. The heads have been cleaned and demagnetized regularly and it is not operating in a dusty atmosphere. I have also seen many cheaper tape decks with severely worn tape heads. So, tape head wear does occur and can be a serious problem to the recordist who uses his machine as often as I do. —M. F. Amiraault, New Glasgow, Nova Scotia, Canada.

TYPICAL PE READER

From your March 1978 Editorial, I've concluded that I'm a typical POPULAR ELECTRON-

MODIFIED NI-CD CELL ZAPPER

"Zap" New Life Into Dead Ni-Cd Batteries" (July 1977) was of great interest to me. After building the project, I decided to modify it as shown in the schematic diagram to add what I feel is an extremely desirable feature. My battery "zapper" both zaps and charges Ni-Cd



Out of Tune

In "Build an Electronic Voltage Regulator for Your Car" (July 1978), on page 57, the quantity n is stated to be 3; it should be 5. This would make the actual value of R5 2700

ohms, for an output of 14 volts, instead of 2000 ohms, which would yield a 13.5-volt output.

ICS reader. I'm close to the norm in age, education, and income, and most of your other survey demographics. So, I've decided to join your vocal minority as well. I would like to see the Amateur Radio column become a monthly feature.

POPULAR ELECTRONICS has been a pioneer in educating us in microcomputers and all kinds of other fine things. And I hope this leadership continues. However, I don't see any reason to scrap the Amateur Radio column in deference to the CB service.—Mary M. Cappuccilli, WBBRRG, Toledo, OH.

AUDIO AUTO ALARM NEEDS COMPARATOR FOR METER CIRCUITS

In regard to my article "Audio Alarm Backs Up Car Warning Lights or Meters" (August, p 64), it should be pointed out that the circuit won't work directly with most car metering systems. In such cases, a simple comparator would have to be added so that its limit point could be set to indicate a fault condition. The comparator output could go high or low at the limit point, assuming it were connected to the correct point in the circuits as printed. Included should be a low-pass filter (20-V, 5-μF electrolytic capacitor to ground and series 220,000-ohm resistor) between the meter output and the comparator input to provide a 1-second time constant. Also the trace between pins 13 and 14 on the Autotel (see Parts List) board will have to be opened for input C to function properly. —Gene Nelson.

cells. The 1500-ohm wirewound potentiometer (R2) is in the circuit to accommodate the charging current required and to allow the charge rate to be varied for different size cells. The milliammeter is required to provide a means for monitoring the charge current. —Clifford D. Dorman, La Habra, CA.

In "Build a Fail-Safe Timer" (May 1978), it was stated that a 556 dual-timer IC could be substituted for the two 555 timers. This is not the case. Both halves of the 556 share a common internal ground, which renders it useless for this application.

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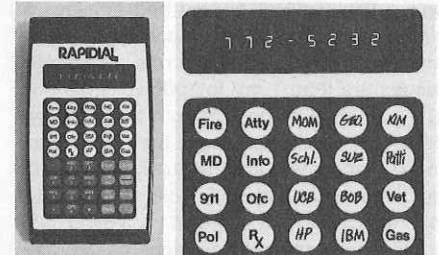
Here's the speed and convenience the industry said couldn't and wouldn't be available at this low price until sometime in the future. A highly sophisticated, full capacity, solid state microprocessor made to the most exacting standards and warranted for one full year against defects in quality and workmanship.

Some Favorable Comparisons

The closest you can come to the Rapidial™ is the Telephone Company's Touch-a-matic®, which handles 15 numbers compared with Rapidial's 20, and must be leased for \$9.00 a month plus tax plus installation of \$105.00. (The 32 memory unit is almost \$20 a month plus \$132.00 to install.)

The next lowest price is \$130.00, for a 16 number dialer with no keyboard, so it has to be programmed through the telephone. A cumbersome technique that limits the use of the unit to numbers put in memory.

You can go up the line, from \$150 to \$400, and you won't find an easier to use, more efficient or versatile unit. Rapidial, for example, has a built-in speaker to tell you if the line's busy, and when your party's on the line. So, with Rapidial you only pick up the receiver when someone answers.



Some Surprising Uses

Frequently Called Numbers We always assumed you'd put your 20 most frequently called numbers into memory — including, probably, your emergency numbers. And that's exactly the way many people use it. Delighted with the time and trouble they save with automation.

Numbers You Always Look Up Others find using it in exactly the opposite way even more advantageous. They store important but less frequently used numbers. Numbers they almost always had to look up before.

Inter-Office For many, the greatest convenience is using Rapidial primarily for inter-office calls—so they don't have to stop to look up the extensions.

Daily Schedule Caller Still others use Rapidial as a memo caller. Each morning they pencil in the names of the people they have to call that day, and enter their numbers into memory. When the call's completed, they just wipe off the name, erase the number. Adding new ones, if necessary, as the day progresses.

Emergency calls are always dialed correctly; and you save the time of looking up the number of Police, Fire Department, Doctor or anyone you need to reach immediately.

For All Your Calls

Actually, you'll probably use Rapidial in all these ways—and more. It's so easy to program and reprogram. Can be set to pause, access WATS lines and PABX systems. What's more, calling is incredibly fast. A digit is "beeped" in a tenth of a second, so a 10-digit number is dialed in just one second!

Of course, if you don't have a Touch-Tone phone, you'll use the Rapidial keyboard for all your calls. It's so much faster and easier.

An Important Addition To Your Home

While Rapidial has been designed for the office, it's priced for the home. Besides family, friends, the police and fire departments, you'll use it to store the number where the baby sitter can reach you in an emergency, and for the numbers you always have to look up—like the hardware, drug and local department store, the take-out restaurant, your bank, barber, the hairdresser. And you'll be amazed at how many 20 numbers seem when you go through your directory.

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Rapidial comes complete with adapters that fit either a 4-prong wall jack or the newer

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For multiple line office phones, there's a special optional adapter that fits the Rapidial and connects in seconds. With this Anphenol adapter Rapidial will dial on any line on your multi-line phone. Should you have any further technical questions about use or installation of the Rapidial, call toll-free 800-227-8363 (in CA. call 415-494-9402).

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