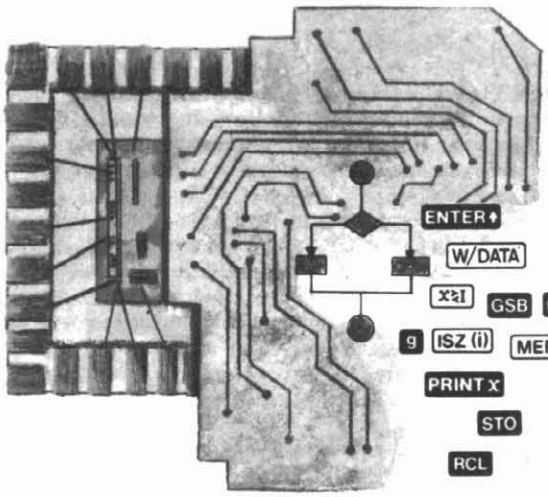


Always keep your feet dry! 5-13-84

Featuring, this last issue:

HEWLETT PACKARD

August 1983 Vol. 8 No. 2

HP Key Notes

Published Quarterly | By Subscription: $5/yr. | $2.00

My Last "Editorial"

If you have ever received a letter from me, you know I like to use a friendly, informal, "personal" touch. And since this is the last time I shall write to all of you, I'll make it friendly, informal, and, once again, "personal."

A long time ago I lost count, but I am certain that there are *well over* 2 million copies of KEY NOTES scattered far and wide across this planet Earth. For me, they represent more than just over 30 million pages to which I have put my hand — and name. To me, they represent a legacy you have given to me: rarely does anyone every destroy a copy of KEY NOTES. That is quite a compliment, and I shall forever cherish it. Thank you — every one of my loyal readers. It's been quite an interesting time. . . .

In the past 9½ years of producing KEY NOTES, quite a large number of you have asked me, "Why don't you every publish a photo of yourself, so we can "know" you better?" So, since this is my last KEY NOTES, I thought I'd grant you that small favor; now, aren't you sorry you asked?

And if you're still wandering, yes, the column title is correct. I am retiring very soon from Hewlett-Packard, and this is the last issue of KEY NOTES that I will write. I cannot predict that it will be the *very last* issue of KEY NOTES, but that *is* a possibility. People like me seem to be a scarce item, and the Company has not found a replacement for me. So I cannot foresee the future of KEY NOTES. I can tell you only that HP knows the value of staying in touch with you. I am sure an alternative to this newsletter will be found.

Second question: "Why are you retiring?" For three reasons: (1) I *always* wanted to retire "young" (I'm 55); (2) I want to pursue some personal writing projects, travel a bit, etc.; and (3) I *finally* can afford to do it. Maybe the first two reasons aren't important, but the last one sure is! Probably, I will take a long rest, first, and move back to my first love: San Diego. After that, who knows? It is a very small world, and it is brimming with opportunities, challenges, and adventures.

Henry Horn (alias—Ed.) and Friends

When you've done what I've done all these years and this time for departure looms suddenly before you, you realize that there is still a lot you've never done, hundreds of routines you've never printed, thousands upon thousands of readers you've never met and never will. So many unfinished ideas, articles, plans. But nothing lasts forever; tomorrow, after all, is the *beginning* of the next day of my life, and yesterday is but a memory. You have given me *many good memories* for the years ahead, and I am grateful for the wonderful experience of being able to be a part of your life, however small it was. You might not believe it — and I'm sure my co-workers *don't* — but I've enjoyed every minute of KEY NOTES . . . except *these* last 20 minutes.

Keep on pressing those keys and thinking of good routines and programs. And if you *can't* program your HP-67/97/41 or whatever, stick with it. I guarantee you it is a lot easier than writing this last "editorial."

May all your problems be keystroke-solvable, and may you never run out of memories. I shall not.

Finis coronat opus—Ed. (Alias: Henry C. Horn)

All prices in this newsletter are suggested retail prices excluding applicable state and local taxes—Continental U.S.A., Alaska, and Hawaii.

Library Corner

NOTE: All information in this column pertains to the HP Users' Library in Corvallis, Oregon. All orders, questions, or program submittals should be addressed to:

The HP Users' Library
Dept. 39UL
1000 NE Circle Boulevard
Corvallis, OR 97330 U.S.A.

GOOD NEWS!

After an almost unbelievable avalanche of program submittals, brought on by the Library Contest, life in the Library is returning to normal. By the time you read this, the Library will again be providing a prompt turnaround for all requests. And remember, all orders telephoned directly to the Users' Library are shipped *the same day.*

The $20 Library membership fee ($35 outside the U.S. and Canada) entitles members to:

The Programmer's Reference Guide	$10
2 HP-41 Solutions Books*	$25
2 Series 40 Catalog Issues	$10
TOTAL =	$45

You have to admit that this is still one of the best buys you can find.

*HP-41 Structural Design *Solutions Book is excluded from this offer.*

SERIES 70 USERS' LIBRARY NEWS

Complimentary memberships in the Series 70 Users' Library are still being sent to every customer who returns the "We Need Your Help" questionnaire included in the HP-75 boxes. Membership includes a catalog of available programs, with a documentation guide; two sets of program submittal forms; and one Users' Library program. These members will also receive future information about the Series 70 Library.

USERS' LIBRARY PROGRAM SUBMITTAL CONTEST WINNERS ANNOUNCED

Congratulations to the *Grand Prize Winners* of the HP-75 Portable Computers!

But, before you read their names, we want to thank each one of you who so enthusiastically promoted the Contest. You nearly buried us in paper and, although this caused a huge backlog, we are sure that, in the long run, everyone will profit from a lot of excellent submittals.

The Grand Prize Winners are:

- **Jen-Chien (Jeffrey) Huang,** for his programs: "Calculation for Cryogenic Processing" and "Calculation for Head Loss and Centrifugal Pump."
- **Douglas L. Pearson, M.D.,** for his "Medical/Dental/Service Business Revenue Analysis."
- **John L. Gilby,** for his "41/82905B Word Processor."
- **Patrick Imbimbo,** for his "DCOMP."

And last, but certainly not least, Lewan Associates of Pueblo, Colorado, also won an HP-75 for being the HP Dealer through whom Douglas Pearson submitted his winning program.

Congratulations once again, and enjoy those fantastic HP-75s!

About Orders—And Postage

If you order anything listed in KEY NOTES (or in the Library *Catalog*), and you live outside the U.S. and Canada, **be sure to make your payment in U.S. dollars.** It is also far better to use checks or money orders drawn on a U.S. bank, and *please* make sure your paymentaccompanies your order. This small action can save you much time on delivery and prevent many headaches.

Because of postage and packaging costs for overseas shipments, we impose a 10% surcharge on *all* orders sent to addresses outside the U.S. and Canada. Again, in order to speed delivery, be sure you add the overseas 10% surcharge to the total price of your order. This does not apply for Solutions Books purchased from the Corvallis Users' Library; they require only the normal $3.50 postage and handling charge levied for *all* Solutions Books purchased from the Library.

Also, if you are unsure about charges from publishers or third-party manufacturers listed in KEY NOTES, call them or write to them and determine the correct charges. To do otherwise will only cause serious delays in your order delivery.

Neither Snow Nor Rain Nor . . .

From that heading you might deduce that this is about Oregon . . . in a way, perhaps it is. The heading refers to the inscription above the entrance to the main post office in New York City. It is: "Neither snow nor rain nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds." It was paraphrased from a similar statement made by Herodotus, a 5th Century B.C. Greek historian, who was actually describing the mounted Persian "postal system."

But why are we even mentioning this? Well, we thought it might be of interest to you that you aren't the only ones who buy and like and use HP-41s. At the begining of 1983 we shipped over 4,000 HP-41CVs, and over 3,200 card readers and over 3,500 thermal printers to the U.S. Postal Service. They not only found that their application was successful but also that they wanted even *more* of them. This month we received an order for another 3,000 HP-41CVs, card readers, and thermal printers, and also some battery packs.

The U.S. Postal Service uses the HP-41 system to measure mail (in feet, believe it or not!), and then they use the gathered data to redistribute the work load more evenly per mail carrier in order to gain efficiency in that operation. They also use the HP-41 system to gather data about how much time the mail carriers spend on "sorting" their mail load. If too much time is spent on that, the data will soon prove the need to hire a clerk and free-up carriers for the actual distribution channel.

That this application is a huge success is very evident by the receipt of a second large order for HP-41 systems. And, although the U.S. Postal Service is a very large organization and needs such tools to make repetitious jobs more efficient, even a smaller sales, service, or manufacturing operation can benefit from the use of HP-41 systems that can prevent mistakes and gather highly useful data.

And if you have a repetitious operation that requires each person to do something exactly like all others doing it, then maybe you need not only multiple systems but also custom ROMs. Give it some thought; you can call your local HP Sales Office for more information on custom products, or you can call **Sten Andersson** here at Corvallis, (503) 757-2000, extension 3016 (not a toll-free call!).

HP-41 systems have proven invaluable in parking-lot applications, in gasoline service stations, in market forecasting applications, in hydraulic engineering applications, heating and ventilation—and many more. Think about *your* needs; maybe you are missing a chance to save large sums of money by becoming more efficient.

Where Do I Go From Here?

When the KEY NOTES newsletter was discontinued late in 1982—and ever since then—people asked me, "What else is there for us?" Well, as far as HP calculators and handheld computers are concerned, the only source of information other than KEY NOTES is dispensed by PPC*, an independent user's club headquartered in Santa Ana, California, and having branches or chapters all over the United States and the rest of the world.

PPC, or as it is now known: Personal Programming Center, was founded by **Richard J. Nelson** in June 1974. He first edited and published a newsletter called *65 Notes,* and it pertained largely to the first programmable HP machine, the HP-65. Since then PPC has grown and grown, and today there are 5,300 active members worldwide, and it continues to grow.

Recently, the club became a not-for-profit corporation, registered in the state of California, and they have their own board of managers and so on. Richard J. Nelson, the founder, is still the editor, and he is also the club's president and main motivating force. They now print both the *PPC Calculator Journal* and the *Computer Journal of PPC.*

PPC is dedicated to gathering and disseminating users information related to personal programming. As noted above, these activities cover both personal calculators and personal computers, and each has its own reg-

ularly published *Journal*. PPC also serves the need for timely information related to the selection, evaluation, care and application of personal products for computing. The basis of PPC is the operating philosophy that only a priceless idea is proper exchange for another priceless idea. Programming techniques, algorithms for solutions to problems, programs, hardware innovations, and machine characteristics are representative of the many topics of interest to the users of personal calculators and computers.

Any activity that helps users and members to better understand their personal product for computing is suitable for PPC. Local chapter or community meetings for classes, or conferences for formal presentations at an advanced level, are common PPC activities.

There is even a "clubhouse" at the headquarters for the Personal Programming Center in Santa Ana. The "Center" is used as a publication production work area in which to produce the two *Journals* and other publications, and it also serves as a member meeting place and as a "museum" for the artifacts of the modern personal calculator/computer age. An extensive library, office, conference room, and publications storage area complete the "Center." Probably the most active day/evening/night is when members show up to join-in for the regular "stuffing party;" a sort of "social event" during which their *Journal* is inserted in envelopes and prepared for mailing.

PPC has even contracted with HP for a custom HP-41 ROM known as the PPC ROM. The manual for this unusual ROM is an absolute work of art, easily worth the price of the ROM itself. The list of routines (some using Synthetic Programming) in this outstanding 8K ROM would require an entire page. Well over 8,000 of these ROMs have been sold worldwide.

But there's more to PPC than journals and ROMs and a "Center." If you have been a steady reader of KEY NOTES, you will recognize the desire that other readers have to just discover what others are doing with *their* personal computation products. It is the camaraderie of the PPC members, then, that makes it "work" as an information-gathering and disbribution service that is incomparable. Members *know* each other and *help* each other. There is a free-flow of ideas and knowledge, and everyone *learns* from the "whole" of the entire group.

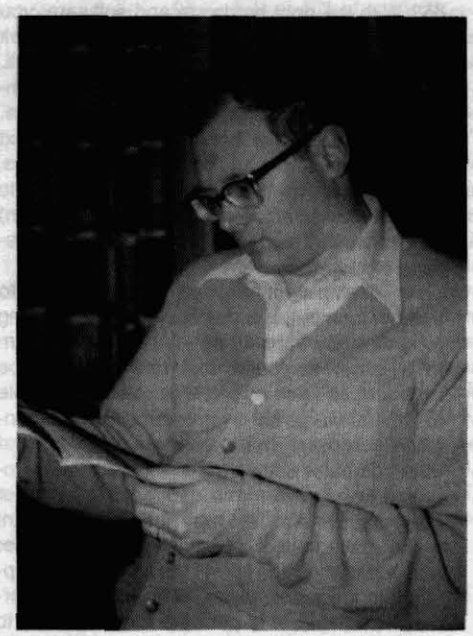
Although I am the editor of *this* "company" newsletter, I am also a long-time member of PPC, having been given member number 2001 long before the membership ever came near that total (probably because of my "out-of-this-world" prediction about eventual membership!). I have watched PPC struggle through some difficult times, and I have offered a helping hand on many occasions. Many of you who read KEY NOTES also are PPC members, and I have been privileged to know you through that association. And since this is my last KEY NOTES (see "Editorial"), I want you to know that there is at least one alternative. That is why this article is titled, "Where Do I Go From Here," with "Here" meaning KEY NOTES. I cannot officially sanction PPC, but, after a 9-year personal assocation with them, I certainly can recommend that you look into PPC as an alternative to KEY NOTES. However, you can decide for yourself. For more information about PPC, and a sample issue of the club's newsletter, send a self-addressed, large (folded) envelope (9 x 12 inches; 23.8 x 30.5 cm) with first-class postage for 2 ounces (56.7 grams) to: PPC Dept. KN; 2545 West Camden Place; Santa Ana, California 92704 U.S.A. If you live outside the U.S., make sure you include a legible address label and international postal coupons for 56.7 grams (2 ounces). A letter is not necessary and will only slow the response.

(Note: PPC is not sponsored, nor in any way officially sanctioned by Hewlett-Packard Co.—Ed.)

®PPC is a registered trademark of the Personal Programming Center, Incorporated.

The HP-41 and PPC . . . 4 Years Later

[A long time ago (in V6N4), I promised to you an article from **Richard J. Nelson,** *founder and President of PPC (see article elsewhere in this issue) and editor of the two PPC journals. I am very pleased to be able to print that promise in this—my last—issue of KEY NOTES. It is a follow-on to his original impression of the HP-41, when we released that machine in 1979 (V3N3), and it is an interesting history of PPC's interface with the HP-41 system. I think you will like what he has to "say"—Ed.]*



Richard J. Nelson (also alias—Ed.)

In the August 1979 issue of HP KEY NOTES, I had an opportunity to describe my reactions to the newly introduced HP-41. Now I have an opportunity that is very unusual. I get to report on the same subject—four years later!

First, some background. When the HP-65 was introduced in January 1974, I was one of many thousands of customers who became "dedicated users." In fact, I became so involved that I started a club for such users; it was called the HP-65 Users Club. I edited and published a newsletter that described what other dedicated users were doing with their machines. That was in June 1974. Much has happened in the last nine years. We have seen the HP-67 and HP-97 improve on the HP-65, and the HP-41C further improve on those models. The HP-65 Users Club is now called PPC[1] and has grown to 5,300 members in 55 countries, and with over 50 local chapters. We edit and publish two Journals, one dedicated to programmable calculators and one to personal computers. PPC has over 3,000 square feet of space dedicated to a library, museum, computer center, and publication production space. We are the oldest, non-commercial, personal-computer users group. We are independent and supported by our membership.

The purchase of an HP-65 nine years ago has certainly changed my life. PPC is now legally known as the Personal Programming Center, and we sponsor regional conferences[2] and local meetings in addition to producing our two regular Journals. As you can imagine, I talk to a lot of HP users every day, seven days a week. I have probably written, edited, and published more material on the HP-41 than any person outside of HP. The comments that follow are mine, but I must also admit that I have had thousands of other users "educating me," and their inputs are also included.

When the HP-41 was introduced, it was described by HP as "A Whole New Standard." How has the HP-41 been received? What are users doing with their HP-41s? How long will the HP-41 be around? What new applications of the HP-41 can be expected? I will try to answer these questions with an overview of the HP-41 as it is used today.

In my first article, in August 1979, I made mention of the HP-41 as part of a system. At that time we had no idea of what HP had in store for us—with HP-IL. The HP-41 had four ports and several devices to plug into these ports. Whenever you get a large number of components in a system, the system becomes more complicated. The HP-41 is no exception. Because the HP-41 was designed as a system component, it was almost guaranteed a long life. It is the system concept that makes the HP-41 the mind-boggling product that it is. When the HP-67 came along, I set my HP-65 aside to pick up the HP-67. I used the two machines together for about six months before my HP-65 was finally left at home. When I set aside my HP-67 to pick up the HP-41, I never touched my HP-67 again. It was like going from a bubble-gum machine into a giant candy store.

The HP-41 is the only machine of its type on the market. When I say of its type, I am referring to its being designed to be used handheld. I describe this kind of machine as a vertical format machine. The HP-41 is a go-anywhere, do-anything machine.

I won't repeat the long list of accessories that are available for the HP-41, but it is probably useful to describe what the HP-41 user has available today. Let's divide this topic into Support Documentaiton, Hardware, Software, and Accessories.

(Continued)

Support Documentation consists of the books and publications available to help the users improve their understanding and application of the machine. There are many books on programming and applications. There are books in French, German, and Spanish that I am aware of, and many of these books have been reported on the pages of HP KEY NOTES. In addition to the programming books for beginners, and the tips and techniques books, there are even books on new languages for the HP-41. The most famous, of course, is one developed by PPC members. It is called Synthetic Programming, and it allows the user to program on the systems level. The latest techniques involve what might be called machine language programming. PPC members call this MCODE programming. This is the very same type of programming that the original designers of the HP-41 used when they "created" the HP-41. There are no learning books on this topic as yet, but I hope that there will be by years' end. One 17-year-old young woman from the PPC Orange County Chapter has even written LISP for the HP-41. FORTH is another computer-type language that could be added in the future. PPC has even written a 500-page book that covers programming techniques on the HP-41. It is called the *PPC ROM User's Manual*. In addition to the dozen or so books that support the HP-41, there are many technical articles on almost any subject that includes programs as part of the article.

Hardware that is used with the HP-41 includes such items as EPROM Boxes, MLDL-type RAM boxes, Port Extenders, and battery chargers, to name the more important items. When a number of independent manufacturers start their companies making support hardware for a product like the HP-41, you know that they think highly of the product. The EPROM box is a plug-in Read-Only Memory (ROM) that runs up to 32K of your own programs. The EPROMs may be erased and reprogrammed with special equipment. The EPROM box is as expensive as the HP-41 but well worth the money if you run large data bases or long programs on your HP-41. It takes it power from the HP-41 and does not contain batteries. Programs in an EPROM box run just as if they were program application modules. The MLDL-type devices allow 4, 8, or 16K of RAM (Random Access Memory) to be added to the HP-41. This type of memory requires special programs to transfer MCODE (machine code) into and out of memory. They are much like extended memory. These devices are used to develop MCODE and run user-written MCODE. (MLDL is short for Machine Language Development Laboratory.)

Software for the HP-41 is as diverse as you can imagine. Everything from ultra sound measurements of the unborn to landing the Space Shuttle has been programmed for the HP-41. One of the newest topics is Data Processing on the HP-41, and there are several books now available or soon to be released. In many of the books, these programs are available in bar code, cassette tape, and in some cases magnetic cards. The cost of HP-41 commercial software is in the range of 5 to 15% of machine cost. There are thousands of "free" programs available from the articles mentioned above. All this is in addition to HP's Library, Pacs, and ROMs. There are many custom ROMs available, covering everything from stock market analysis to hydraulics.

Accessories include carrying cases, magnetic card holders, programming forms, and even special battery holders. One of the most interesting items that I group in this category is multiple modules in one package. There are people who open modules and rewire up to two additional modules into the same case. This requires skilled work and is very labor intensive, but when you want to put more software in your machine, this "trick" helps. Some people will even modify HP-41s to speed them up, wire modules internally, etc. This, of course, voids HP's warranty. I am only reporting on what many users are doing with their HP-41s.

The HP-41 system is strongly supported by Hewlett-Packard. The Extended Modules give more memory and more functions, especially those dealing with Alpha handling. The Extended Functions Module, for example, is one of the most important modules a user can have in his or her machine. Another universal module is the Time Module. Having automatic time and date is a feature that, once you get used to having, you wonder how you got along without it. These modules add power to the HP-41, but the real powerhouse is the HP-IL Module.

The HP-IL Module allows the HP-41 to be a controller in an HP-IL loop. This is necessary for such items as the HP 82161A Digital Cassette Drive and the HP 82162A Thermal Printer.

When average people look at HP-IL and all the modules available for the HP-41, they may believe that the HP-41 has an infinite capacity to absorb money—there is so much that you could spend money on. But that is the beauty of the system! You may expand your system as your needs and skills grow. Why would you buy a machine that couldn't do what you want it to do? With the right hardware and software, you can make the HP-41 do just about any task reasonable for a handheld computer. HP-IL opens the door to the whole world of other computers and peripherals. The RS-232C Interface, for example, allows the HP-41 to transfer text and programs to other computers, terminals, printers, etc. The Video Interface allows you to display your data on as big a CRT (TV screen) as you wish. This is great for group presentations or classroom work.

An example of interfacing the HP-41 to another computer is not only in documenting programs. By transferring your HP-41 program to a larger computer that has a touch-type keyboard and text editing features, it is possible to annotate large HP-41 programs for documentation purposes. There are even suppliers that offer computer software that allows HP-41 programs to be written and debugged on another computer system. This may not seem important to the average user, but it illustrates the power and capability of the HP-41, as well as its acceptance in the marketplace. With the HP-IL interfaces available, it is possible for the HP-41 to communicate with almost any "smart" electronic device. You can even drive the largest HP bed plotter with the HP-41! It may not win any speed records, but with the HP-41 HP-IL/HP-IB interface, *it is possible!*

The HP-41 is well known by the user community. There is very little that is not known by skilled and long-time users. The writing of MCODE programs is a good example. MCODE programming is done by only a very few people, but their output is increasing every day. Imagine sorting 20 registers in less that one second or storing ten alpha characters in one register!

The HP-41 may be as simple or as complex as you wish to make it. You can get into programming the machine at three levels, including standard user language. The HP-IL provides so much power that it will take another year for the user community to write all the obvious programs. The HP-41 is competitive in the marketplace and is rapidly becoming the "students" computer. Visit any college campus, and you will be amazed at the number of HP-41s there are, and most of them will have at least a Math Pac in them.

Will the HP-41 have a long life? I believe that answer is obvious. The HP-41 will be with us for several more years. HP-IL insures a long life, especially for any peripherals that you buy for the loop. If a small, portable machine is needed, the HP-41 will fit the bill. There is nothing on the market that can match it.

To me, the HP-41 is, today, just as exciting as it was over four years ago. My only problem is getting enough time to write programs for all the ideas I have. The HP-41 has no peer; yet, isn't it marvelous when a college student can have the very best?

(1) PPC is a registered trademark of the Personal Programming Center, Incorporated.

(2) The next PPC Regional Conference is August 27 and 28 at the Airport Sheraton Hotel in Orlando, Florida, USA. Any HP user is welcome.

Can an HP-41 Change Your Life?

[It was exactly one year ago (today) that I first "met" (in a letter) the extraordinary man I now bring to your attention. You've heard *of him before, notably as the "computer Picasso" who "painted" the Nantucket printer picture that was published on page 9 in V6N3 (also one year ago). Since then, it has been my fondest desire to print this article for you; and now, since this is my last KEY NOTES (see Editorial), it makes me happy that I have this opportunity to give this gentleman the recognition I think he deserves. I asked him to supply some information, and he did. I rewrote it twice, but soon gave up and decided to print his letter just as he sent it to me. It is priceless . . . so is he. Here, then, is his letter; you'll love it—Ed.]*

Dear Henry,

Thank you for your interest in my love affair with the HP-41CV. Since your telephone call, I have been pondering how best to supply the information you want. I have decided to give you my general statistics and then ramble on about what I do, what I think, and why. This way, you should know me pretty well by the end of this letter, and then you can take it from there. Before I begin, let me say that you are free to quote me or to make any reference you wish as to my age, health, education, etc. You have a free hand.

I am 66 years of age *[now 67—Ed.]*, wear a hearing aid, am legally blind, and have a bad heart. Other than that I am in tip-top shape. So much for the sob-story. My life's vocation was that of a printer. In my prime years I worked for the *Chicago Daily News* and later for Rand McNally. I am a World War II veteran and all that sort of thing. More sob-story coming, so get out your handkerchief. In 1973 I was forced into early retirement because of failing eyesight,

and I returned to my home town of Anamosa, Iowa. For the first 8 years I was lost, and I am afraid that I became quite a dull old fellow — and then . . .

Well—first let me go back a bit and say that, due to my own indolence, I do not have much formal education, having been an eleventh-grade dropout in 1933. Since then, I have endeavored to somewhat improve my education at home and, when the electronic calculators came out a few years ago, I was soon trying them all out. But that wasn't enough. There was so much talk about computers that I decided that I didn't want to live through the computer age and never understand what they were all about. So I made the first move, and **John Jorgensen** and **Brad Jenkins** of the Iowa Book Store in Iowa City did me the great favor of introducing me to the HP-41CV. And so now I repeat—and then . . .

Love at first sight? You can just bet your bottom dollar that it *wasn't!* I wondered what I had let myself in for. I could see that it was a powerful tool, but I didn't know what I was going to do with it. The manual was enough to send a guy into delirium tremors. However, I had spent the money, so I thought I had better make some use of it.

So I started in, word by word, page by page. Pressing every key the manual told me to press, and working-out every example until I was sure that I understood it. One month later, I came to page 275. That was last February of 1982. From then on, I knew that I was on to something. You see—I found that with a computer I could solve a complex problem (or a simple one for that matter) *once*, and then I never had to solve that problem again. Just key-in different values (variables). How brilliant can a guy be? This is all there was to that difficult thing known as programming. I was now a **Computer Programmer!** I was pretty proud of myself, I can tell you. I might add here that I have since examined many computer manuals and now consider the one for the HP-41CV to be a masterpiece. I have failed to find one error in it, technical or typographical.

At this point, I joined the Users' Library, ordered several programs, and decided that I wanted to write a program of my own. So I looked around and found the equation for compound interest, and then altered it to accommodate continuous compounding. Well—what do you know, the darn thing matched the computer at the Savings and Loan Company *to the penny!*

By this time, I was truly in love and often worked straight through the night. So far, I have written 39 programs and am working on the 40th. I have submitted 7 of them; 6 are in review; and 1 has been accepted and is in the new *Catalog Addendum*. The programs cover a variety of subjects from calculus to video games. And, of course, "Nantucket" and "Solid Bar Graph." [*Note: This was one year ago—Ed.*]

I have been adding steadily to my system and am now saving for the HP-75C. Imagine what new worlds that is going to illuminate for me.

Now, all this sounds like I must be some sort of brain. No so. For instance, in calculus, I can't get to first base without my HP-41CV. I think that people tend to overrate me (God bless them) and are impressed with what I do, when they should be impressed with what the HP-41CV is doing.

My wife says that programming has brought me out of the doldrums that I have been in for the last 8 years, and that I am my old self again. She forgot to tell me whether that was good or bad. As far as I am concerned, it is certainly for the good. Thank heaven for HP. I've written enough. I've got to get back to my programming now. Thanks again for your interest.

Robert L. (Keystroke) Gardner
Anamosa, Iowa

(There is much more to this story. Mr. Gardner has even appeared during "HP Days" at local HP Dealer locations and has often assisted our HP Field Sales personnel. And, although I have not personally met Mr. Gardner, I think that my 9+ years on KEY NOTES qualifies my assessment of him as an "amazing" person. But, if I ever get even remotely near Anamosa, you can be sure that I will stop to meet him. Since I last talked with "Keystroke," he has acquired an HP-75C, and he is already doing amazing things with it. Right after getting the HP-75C, he sent to me a cassette tape that contained "The Flight of the Bumble Bee," "Clarinet Polka," "Hello Dolly," and "Somewhere My Love," and that is "old hat" for him by now. Also, now that he has a new printer for the HP-75C, we may soon see the Mona Lisa via his programming. I wouldn't be surprised! He has, by the time you read this, undergone an open-heart surgery, and I can only hope that it will make him healthier so he can go on pursuing his new love. Just learn a lesson from all of this: just over 2 years ago, Mr. Gardner was a rank amateur in programming. He can barely see, even with the aid of powerful lenses, yet he mastered the art of programming. You can, too; just do what "Keystroke" Gardner did, and you'll soon be an "amazing" person yourself—Ed.)

Book Reviews

Books are reviewed or announced in KEY NOTES only as a service to our readers. A review here does **not** represent an endorsement by Hewlett-Packard Company. If you are unsure about the contents or usefulness of a book, we suggest you first check with a local bookstore or your HP Dealer; many of them stock these books. If that fails, write to the publisher, not to KEY NOTES. Availability problems also should be addressed to the publisher, not to KEY NOTES.

AN EASY COURSE IN PROGRAMMING THE HP-41 is a new 256-page, spiral-bound book, published in July 1983, and the size is 8.5 x 11 inches (21.6 by 28 cm). It was written by **Ted Wadman** and **Chris Coffin,** both former employees of Hewlett-Packard's Corvallis Division. Both are recent graduates of Oregon State University. Ted, as you will remember, was the Technical Editor of KEY NOTES for a while (he's now in Cameroon, in the Peace Corps). Chris formerly worked in the Customer Support department, answering a lot of your questions about our products. So they both have considerable "hands-on" experience with the HP-41.

When you attempt to document anything about the HP-41, you soon realize that the myriad symbols involved in the code present a real challenge to "normal" typesetting. One of the big surprises you'll find in this book is that, in order to circumvent the typesetting problem, *they simply hand-printed the entire book!* It is truly a work of art, with illustrations by **Robert Bloch** and with many easy examples to follow.

Although the subject matter is serious enough, the authors have taken a new, light, easy-going approach in their presentation of this self-paced course in learning what programming is all about on the HP-41. If you are a beginner, *this is the book for you,* and if you can't learn to program your machine from this book, you'll wonder how you ever learned to read. Even if you *can* somewhat program an HP-41, you will find this book an excellent brush-up course.

The book is actually a "programmed" course in learning what the HP-41 is all about, how to use its "controls" and functions, and how to write programs for it. You are led, step by step, from the beginning to the end. If you know a subject, you are directed to go *ahead.* If you fail to answer some questions, you are sent *back* for a review of the subject. As you progress, you learn more and more until, suddenly, eureka! you have written your very own program. Examples abound, and you are even led through them.

It is a cinch that: if you read the book, if *you follow the directions,* if you work the examples, and if you are familiar with the HP-41, you **will** learn to program it. And, as a real bonus, I guarantee that you'll have fun doing it. An amazing book . . . read the "Editorial" on page 250, first, and I think you will agree.

Check with your local HP Dealer, at your local college bookstore, or at the EduCALC Bookstore (27953 Cabot Road, Laguna Niguel, California 92677) for copies or write to:

Grapevine Publications, Inc.
P.O. Box 25724
Portland, Oregon 97225

The list price is $15 plus $2 postage and handling in the U.S. In Canada, the book is $15 plus $3.50 for air mail. For all other countries the price is $15 plus $6 postage (air mail) and handling. All payments must be in U.S. dollars. Send only money orders or checks, which *must* be drawn on a U.S. bank. Payments *must* include stated postage and handling. Allow up to 5 weeks for delivery.

DATA PROCESSING ON THE HP-41C/CV, written by **William C. Phillips,** is a new 147-page, spiral-bound book in 8.5-by-11-inch format (21.6 x 28 cm), recently published by EduCALC Publications.

This book is actualy Volume 1 of a *series* on data processing on the HP-41C/CV. It is more appropriately: "Fundamentals of Program Design and File Processing." The book opens with some basic surveys of HP-41 hardware, RPN, and simple programming. Then the author leads you into the real "meat" of this book: the structural techniques of program design. When you have absorbed and mastered that, File Creation and File Processing are explained.

The book winds up with a study of two large programs, and they are studied in detail as examples of what the book is all about. The programs are not only excellent examples but also very useful as the basis for your own "cash register" and "running inventory" setup in *your* business.

This book assumes that you are familiar with the basic commands for the HP-41C/CV and that you know how to program it. It also assumes that you have more than a basic HP-41, although it is still very useful if that's all you own.

The author, William C. Phillips, is currently employed at Plan Services, Inc. (a Dunn and Bradstreet company in Tampa, Florida) as a Senior Systems Analyst, working on insurance cash and billing applications. He has a BS degree in mathematics and physics from John Brown University (Arkansas, 1979) and is married and has two daughters. In 1979 he was selected as "Outstanding Young Man of America" by the U.S. Jaycees. He is a U.S. Army veteran (Viet Nam) and a member of PPC, having founded the Suncoast Chapter in 1982. No stranger to handhelds, he's owned the HP-35, HP-25, HP-25C, HP-67, and HP-41C.

This book really grew from the sales, inventory, and receipt programs Mr. Phillips wrote for his wife's dough art business. After successfully implementing those applications, he realized that the HP-41C had much more capability than most people knew. And because of this, he decided to write a series of books, the first of which is reviewed here. From this first effort, it is easy to see that he knows his art well and knows how to write about it.

To obtain the book by mail order, write to:

EduCALC Mail Store
27953 Cabot Road
Laguna Niguel, CA 92677

or telephone: (714) 831-2637. The price is $16.95 plus $1 for surface shipping in the U.S. For UPS add $3 per order and $2.50 per item for U.S. air mail. For Canada and Mexico the book is $20.45 by air mail. For all other countries it is $22.95 by air mail. Allow at least 3 weeks for overseas areas, and all payments must be in U.S. dollars, preferably by checks drawn on a U.S. bank.

TRAMP SHIPPING ARITHMETIC, by **John Weale,** is a 120-page softbound book available from the EduCALC Mail Store for $27.00 (see postage and shipping details above, under "Data Processing" book).

This is a series of well-tried calculator programs written by a practicing ship operator concerned with everyday problems of commercial ship operation. While they are written for the HP-67 calculator, these programs can easily be adapted to other models of equal capacity (such as the HP-41C)

The book is divided into sections relating to voyage estimating, speed and fuel consumption, and financial calculations. For more information about the book, other books in the series, or for availability in Europe, etc., write to: Fair Play Publications; 52/54 Southwark Street; London, SE1 1UJ, England.

A CHRONOLOGY OF HP-41C PROGRAMS FOR USE AND EXAMPLE, by **Thomas W. Beers** (see KN V3N3p9), is a new 299-page manual in 8.5-by-11-inch format (21.6 x 28 cm), and it is comb-bound.

Forestry Professor Beers (Purdue University, Indiana) now offers his personal notebook of 29 programs in manual form with complete documentation, including directions, examples, program listings, formulas, and even references to U.S. Forest Service Technical Reports, etc. These programs include such useful topics as: Timber Volume and Inventory, Sawmill Log Profit Margin, Log Volumes, Tree Heights, Statistics/Probability, Log Scaling, and much more (a total of 5,527 program lines). With these programs you can save time (like, sorting by grade within species), you can avoid looking through tedious tables, and you can minimize errors. However, you will need either an HP-41CV or an HP-41C with a Quad Memory Module (and a printer is optional).

If you are a beginner with the HP-41, these programs (written over a 3-year period) can guide you through the learning process in a profitable manner, because they reflect the growing knowledge of the author as his expertise developed. More experienced users should be able to find immediate applications for many of the programs. Although slanted toward the forestry field, numerous statistical and other general programs are included.

The book can be ordered from EduCALC at the address listed above for the "Data Processing" book. The list price is $31.95 and postage and handling is the same as that listed above for the "Data Processing" book. You also can purchase a magnetic tape (mini-cassette for the HP 82161A) for $125, and it contains all the programs. Postage for the tape is the same as for a book.

HP-41/HP-IL SYSTEM DICTIONARY

This book, written in 1982 by **Cary Enoch Reinstein,** was recently "donated" to PPC (See "Where Do I Go From Here?" elsewhere in this issue), the independent users club headquartered in Santa Ana, California. This second printing includes all corrections made since the book was originally published. It is now universally available to HP-41 users all over the world.

This 91-page, 8.5-by-11-inch (21.6 by 28 cm) format book is unique in that it is a sort of glossary/quick-reference guide to the HP-41 system and some of the HP-IL devices. It includes over 900 of the most-used functions—in alphabetical order—and each function is described, outlined, and cross-referenced to other functions it might affect or those that can be used with it. Also included in the book is an execution timing chart for HP-41 functions, a subroutine decision table, special "synthetic" instructions to use to assign any function to any key and to produce 128 tones from 0.05 to 5 seconds in 16 frequencies, reference charts for the printer and timer module, and lots more. It is a very useful and very "handy" book, especially if you have a complete HP-41 system and have trouble remembering all the functions that are available and what they are for.

The book is available from PPC (see below), and all proceeds from the sale of the book go toward helping to make PPC a better source of information to a wider range of users.

If you live in the U.S., Canada, or Mexico, the price is $11.70 postpaid. (Californians be sure to include your 6 or 6½ sales tax!) Elsewhere in the world, the price is $13.45, and you must pay by check, in U.S. dollars, drawn on a U.S. bank. Allow at least 3 weeks for delivery. Order books from:

PPC "Dictionary"
2545 West Camden Place
Santa Ana, CA 92704 U.S.A.

(Note: Make sure, for all the above books, that you include in your remittance, any state or local taxes you are required to pay. Failure to do so may cause a long delay in receiving your purchase. Make sure, also, that all payments are in U.S. dollars; it is far better to use checks drawn on a U.S. bank—Ed.)

More HP-75 Software Released

If you own the new HP-75C Portable Computer, you will want to read through the following announcements and then visit your local HP Dealer for a demonstration or for further information.

HP-75 VISICALC®

The new 00075-15014 *HP-75 VisiCalc* provides you with a truly portable, electronic worksheet that is more powerful than many "desktop" versions. With it, you may identify and define column/row headers as well as call data from one worksheet to another in memory and then use it in calculations.

Applications for HP-75 VisiCalc vary, including:

- Finance—Analyze stock and bond portfolios, organize rental property records.
- Business—Calculate break-even points and income; analyze cash flow, planned expenses and professional service fees; compute depreciation.
- Sales—Calculate sales vs. overhead and retail markup; forecast sales.
- Statistics—Analyze tabular data gathered in the field.
- Science/Engineering—Perform experimental data reduction and engineering design analysis.

Especially designed for the single-line display, the HP-75 VisiCalc has added features and benefits that enhance its versatility.

- Column/row headers may be defined by the user—with descriptive title. A typical "A6" cell, for example, may be [January^Taxes].
- One worksheet may call data from another worksheet in memory and use this data in calculations.
- Cell formulas in a worksheet may access BASIC programs.
- Variable column widths allow greater flexibility in designing worksheets.
- The built-in HP-75 editing feature allows the user to easily *edit* data entries and long formulas *without* unnecessary reentering.

The HP-75 is also expandable with HP-IL peripherals—add an HP-IL compatible interface/monitor and printer, and view VisiCalc on a full screen with hard copy output.

The value of the electronic worksheet has already been proven. HP-75 VisiCalc, maximized for the portable environment, provides all the features of VisiCalc, plus advanced features that enhance the power and versatility of both this product and the HP-75 itself. HP-75 VisiCalc began shipping in July, with a U.S. list price of $195.00.*

®VisiCalc is a trademark of Visicorp.

HP-75 TEXT FORMATTER PAC

Now available, Text Formatter (00075-15019), U.S. list price—$95.00*, complements the built-in, text-editing capabilities of the HP-75. Text Formatter allows the production of short, formatted memos and documents anytime, anyplace—a must for the business professional on the go.

By inserting simple commands throughout the text, the copy is automatically formatted when printed—margins, paragraphs, pagination, headings, and justification—all to the user's specifications. A help file is provided for reviewing all commands and their functions, and a custom overlay highlights redefined keys that can be used as typing aids.

Additional features include a distribution list function, merge file, and slide command. With the distribution list capability, documents are easily customized—names, addresses, etc., can be inserted automatically at predetermined lines.

The Merge file feature allows the user to insert often-used text in letters—facilitating the production of form letters. Letter size and slant can be adjusted with the slide command for plotting on the HP 7470A Plotter on either paper or acetate for overhead transparencies.

HP-75 SURVEYING PAC

The HP-75 Surveying Pac (00075-15012) is a portable tool to aid surveyors and engineers in solving many common surveying problems. The pac consists of one integrated program (rather than a collection of individual routines) that provides a versatile and sophisticated tool for use in the field.

Traverse, inverse, curve layout, and radial staking calculations are made easily and quickly. The unique data entry system allows you to select one of a variety of input modes, regardless of the output mode desired. If entries are unknown, the program will ask additional questions until enough data has been gathered to compute the answer. The HP-75 Surveying Pac was released in July, with a U.S. list price of $295.00.*

NEW HP-75 DATA COMMUNICATIONS PAC

Released August 1, the HP-75 Data Communications Pac (00075-15035) enables you to transfer data and information to other computers. With a modem and the Data Communications Pac, an HP-75 can access other computers and commercial time-sharing systems such as THE SOURCE℠, and *Dow Jones News/Retrieval Service®* to obtain armchair access to stock quotes, send or receive mail, and access complete libraries of information — anytime, anywhere.

This HP-75 pac provides some versatile features not commonly found in data communications software for portable computers. The Data Communications Pac allows the HP-75 to be configured with either the HP 82168A Acoustic Coupler or any RS-232C compatible modem (with the HP 82164A HP-IL/RS-232C Interface). Incoming or outgoing information can be displayed in three different ways: scroll information across the liquid-crystal display, view a full page of text using a video interface and monitor, or receive hard-copy output with a printer. A 500-character buffer is provided to review received information. Also, using this package, text files may be transferred to and from a host computer.

The Data Communications Pac provides many user-friendly features for nontechnical customers. For example, it's menu-driven, allowing easy access to commands via a single keystroke. Clear, concise prompts make user input easy. A HELP file is provided to let the user instantly review the commands when necessary. And two setup files included with the product equip your modem with special code words for logging-on to your account with THE SOURCE℠ and the *Dow Jones News/Retrieval Service®*.

The Data Communications Pac provides HP-75 users with a versatile, yet friendly, terminal emulation capability. It is available *now* at your local HP Dealer, and the price is only $175*.

®Dow-Jones News/Retrieval Service is a registered trademark of Dow-Jones & Company, Inc.

℠THE SOURCE is a service mark of Source Telecomputing Corp., a subsidiary of Reader's Digest Association.

HP-75 MATH PAC

The HP-75 Math Pac (00075-15015) is a powerful, versatile software package that solves a wide range of mathematical problems, from simple numeric and base conversion to sophisticated polynomial rootfinding. The range of mathematical capability provided is unprecedented in a portable computing product.

The Math Pac function set includes:

- Real scalar functions
- Base conversions
- Convenient input and output of arrays
- Explicit and implicit array redimensioning
- Extensive real and complex matrix operations
- Complete set of complex functions
- Sophisticated polynomial rootfinder
- Solution to $f(x) = 0$
- Definite integrals
- Finite Fourier Transform

These functions are provided as a set of BASIC statements or keywords. With the Math Pac ROM plugged into the HP-75, these keywords are instantly available to be used in programs or may be executed directly in calculator mode.

The ROM is coded in machine language, ensuring optimal numeric accuracy, reliability, and speed. The HP-75 Math Pac began shipping in June, wtih a U.S. list price of $145.00.*

**U.S. dollars. See note at bottom of cover.*

HP-75 Math Pac Review

If you read KEY NOTES cover to cover, you know about the new Math Pac for the HP-75. We are pleased that we have permission from PPC (see article elsewhere in this issue) to print this review of our new pac; it was written for the *Computer Journal of PPC* by **John Kennedy,** a Director on the Board of PPC. And, because we think very highly of this new pac, we are very glad to see that an expert agrees with *our* assessment. A short "biography" on John Kennedy follows the article.

The HP-75 Math Pac ROM plugs into any one of the three ports on the HP-75 and acts as a language extension file that adds many mathematically sophisticated keywords to the BASIC language. More precisely, the 16K Advanced Math ROM adds 89 new keywords to the already powerful HP-BASIC. The following is a list of a few of the more significant capabilities/functions in the ROM.

1. Rounding and truncation to any specified place value.
2. Hyperbolic functions and their inverses.

(Continued)

3. Logarithms to any base.
4. Binary/Octal/Hex number-base conversions.
5. Gamma function (factorial).
6. Matrix products and determinants.
7. Matrix maximum/minimum and row/column norms.
8. Vector dot products.
9. Complex arithmetic operations.
10. Complex transcedental functions and their inverses.
11. Matrix input/output including redimensioning.
12. Complex matrix operations.
13. Matrix LU decomposition.
14. Matrix inverse and system of equations solution.
15. Zeros of polynomials with real coefficients.
16. Zeros of any real-valued function.
17. Definite integrals of a real-valued function.
18. Finite Fourier transform.

To keep this review to a reasonable length, we will limit the discussion to the last eight items listed. These are the more powerful functions that, when combined with the many other utility functions, make for a very capable problem-solving "tool kit" as described in the owner's manual. Owners of previous models of HP programmable calculators will find many functions from the HP-34C, HP-15C, and HP-16C calculators present in the HP-75 Math ROM, and much more.

The emphasis is on matrix operations, but the speed and accuracy of the HP-75 will make it painful for calculator users to go back to their old machines. In fact, the HP-75 Math ROM compares favorably with the Math Pacs available for the HP-85 or HP-86/87 computers. Since there are many matrix operations in the ROM, HP has provided functions that make matrix input/output natural and convenient.

Matrices can be composed of either real or complex numbers, and a clever use is made of a redimension statement (REDIM) that, essentially, allows you to switch back and forth between a real and a complex matrix. A real-valued matrix can be considered as a matrix of complex numbers, where each adjacent pair of real numbers represent the real and imaginary parts of a complex number. Thus, any matrix with an even number of columns (or rows with the transpose function) can be considered as a complex matrix.

In BASIC, a matrix is given a maximum size in a dimension (DIM) statement. The REDIM statement allows the row and column sizes to be made larger or smaller as long as the total number of elements does not exceed the row × column product of the original dimension statement.

The Math ROM automatically provides complex matrix multiplication, complex conjugate transpose, complex inverse, complex determinant, and complex system of equations solutions. By combining the REDIM function and real number matrix operations, you can perform any other complex operation on a complex matrix.

A powerful matrix function is the LU decomposition (lower/upper triangular factorization). The LUFACT function is fundamental in computing determinants, finding inverses, and solving systems of equations. Other techniques use row operations (Gaussian elimination), but the LU decomposition accomplishes an equivalent result using the CROUT method, with partial pivoting and extended precision arithmetic. This accounts for the HP-75's unusual ability to find an LU decomposition or an inverse for a singular matrix! If that sounds contradictory, get the ROM and see how it treats singular matrices as nearly singular.

Finding a matrix inverse or solving a system of equations couldn't be simpler. The ROM keywords that perform these functions are INV and SYS. Both INV and SYS operate on square matrices only. Although other versions of BASIC have similar functions, the HP-75 Math ROM does these with care. Again, the LU decomposition is the key. The SYS keyword can also be used to find a matrix inverse. This is more accurate and faster than the INV function, but the SYS keyword does consume more memory than INV. As an example, the 3x3 matrix

5	0	1
8.001	4	−6
−4	−2	3

is nearly singular and the HP-75 Math ROM calculates its inverse as

5.0042612E-13	1000	2000
.999999999997	−5000	−1000
.666666666666	−2000	−3999.66666667

Multiplying $A \times A^{-1}$ yields:

1	0	0
−3.99609061388E-12	1	.00000002
1.99829552E-12	0	.99999999

This performance is nothing short of excellent.

My favorite function in the ROM is the polynomial root solver called P-ROOT. If you need to find the zeros of any polynomial with real coefficients, this function alone justifies the cost of the ROM. Both real and complex zeros are found in order of increasing magnitude, given as complex entries in a complex matrix. I used this function to locate the zeros of the Lengendre polynomials and checked the answers against the 15-place tables in the National Bureau of Standards Handbook and found every solution accurate within one digit in the last place. This is indicative of the mathematical performance of the HP-75 Math ROM.

The two functions called FNROOT and INTEGRAL were innovative when introduced on the HP-34C calculator. FNROOT will find a zero of any equation in the form $f(x) = 0$. If no solution exists, FNROOT will find the next best thing. The INTEGRAL function will find the definite integral of f(x) over a finite interval. These two functions are improved in the HP-75 Math ROM. Both FNROOT and INTEGRAL allow the user to specify a tolerance factor for the function f(x). Thus, the accuracy of the solution can be made to match that of f(x). If you haven't used a numerical integrator or root solver before, you'll appreciate the power provided by these two functions that solve certain problems that can only be solved by numerical methods. If you have been using functions similar to these, you'll appreciate the speed and increased precision of the HP-75. For many users, FNROOT and INTEGRAL, together with SYS, will be the most-often-used functions in the ROM.

The FOUR keyword is the Finite Fourier transform. The owner's manual discusses the relationship between the finite and continuous Fourier transforms and also discusses using the FOUR keyword to compute the inverse Finite Fourier transform. This will be very useful for those users who need to re-scale data and optimize parameters that involve problems whose solution depends on Fourier series. The FOUR function requires that the number of data points be an integral power of 2.

Overall, I found the functions provided in the HP-75 Math ROM useful and powerful. The owner's manual is very clear and well-organized, considering that this is an Advanced Math ROM. I found no problem at all in reading and understanding the purpose, scope, syntax, etc. with any of the functions. The manual contains appendices that cover memory requirements, error conditions/messages, and a keyword index. If your application requires sophisticated numerical processing, you'll find the HP-75 Math ROM is a well-designed and very worthwhile easy-to-use product.

(John Kennedy has an MA degree in mathematics from UCLA. He teaches Mathematics at Santa Monica College and is involved in running the College Math Lab. He has had an interest in computing for six years and started with an HP-25. John has written several articles on number theory and numerical methods as applied to programmable calculators and was Math Coordinator for the PPC ROM—Ed.)

Can "Handhelds" Aid High Technology?

A lot of you who own high-technology calculators and handheld computers and read this newsletter must often wonder if these instruments *really* are put to the test in the world of high technology. By and large, a lot of you use your personal-computation "tool" to make your job easier or more productive, or you use it for your own business or just for pleasure. But, to get back to the leading sentence—yes, our esoteric products *are* often used in developing new, advanced technology, and here is the story of one such incident and the person behind the machine.

It was approximately one year ago that I went down to the lobby at the Corvallis site to meet an engineer/inventor from Washington. He was visiting here to discuss some equipment configurations with one of our HP-IL engineers and wanted to be certain of various interface possibilities before attempting them. The visitor was **Dave Stedman**, and his "invention" was a super-efficient furnace. He was using the HP-41 and the HP-75C to monitor data from the prototype device and even to control some functions. I have stayed in touch with him and with progress on this radical new furnace so we could report to you in KEY NOTES how it is possible to stretch the boundaries of technology using the "tools" that many of you already own.

The device, presently in the patent-pending stage, is a quiet, high-efficiency furnace type of heater that burns diesel fuel or home heating oil. It is being developed by a research team named Sea-Labs, Inc. in Bellevue, Washington; Dave Stedman is a vice president of the firm. Combustion efficiencies exceeding 85% have been attained by this microprocessor controlled burner.

Configured in the small size of the development test unit shown in the photos, the 10,000 BTU/hr. burner consumes only 290 milliliters

(less than ⅓ of a quart) of diesel fuel per hour, and in this size it is suitable for heating modern, small, energy-efficient housing or trailer-type housing. It is also suitable for augmentation of solar home heating, electric heating, and heat pumps. Using a 12-volt power supply, the small unit can heat live-on-board boats, sail or fishing boats, and cabin cruisers. In larger sizes, the design provides a far more efficient oil burner for home heating furnaces.

Evolution of the burner began in 1979 when a member of the Sea-Labs team was involved in marketing a kerosene burning heater for boats. Service problems that developed when the heater was fueled with anything but high quality illumination kerosene resulted in the start of a search for solutions. A team of specialists in the technologies involved was assembled, and that team became Sea-Labs, Inc. Designs were developed that would operate satisfactorily on all grades of kerosene, but it became apparent that a burner that would digest diesel fuel efficiently would have broader applications. Accordingly, work on a kerosene burner was dropped and attention directed solely toward use of diesel oil as fuel.

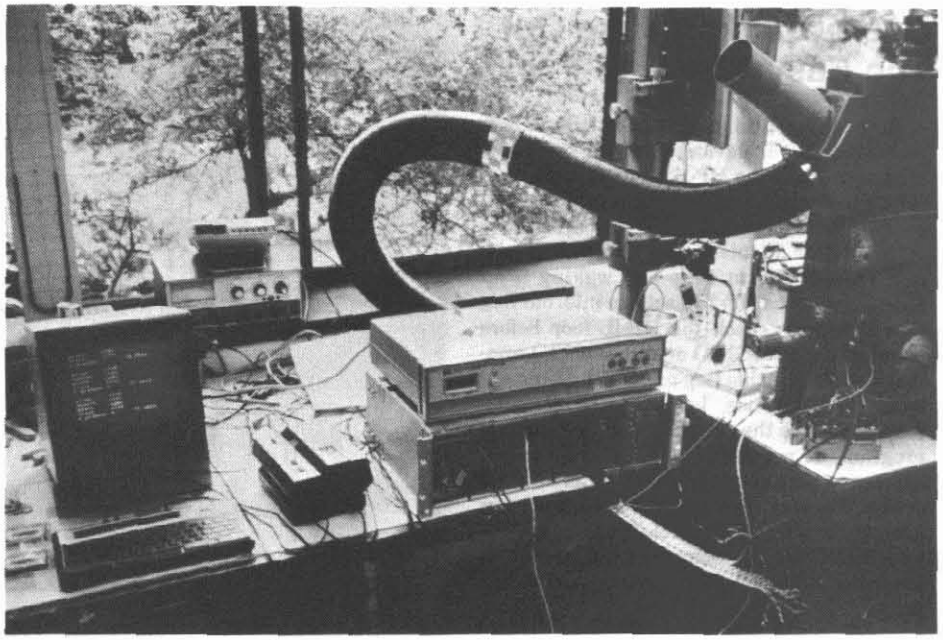
At that time it was determined that there was a significant market for a relatively low-heat-output forced-air furnace supported by the needs existent in both the marine industrial and recreational areas. For these applications, safety and fuel storage volume were judged to be dominant design requirements and were imposed upon the furnace design, in addition to assuring simplicity of operation, durability, minimal electric power demand, and low fuel consumption.

As the development progressed, other fruitful markets were perceived; however, the design requirements noted above were actively maintained throughout the development, and dictated the component choices now represented in the demonstration unit. In addition, the gains in safety realized by the use of diesel fuel are amplified in many of the applications where storage of this fuel already exists. This eliminates the complexity of separate fuel storage and the need for additional safety procedures incurred by the use of a second fuel type.

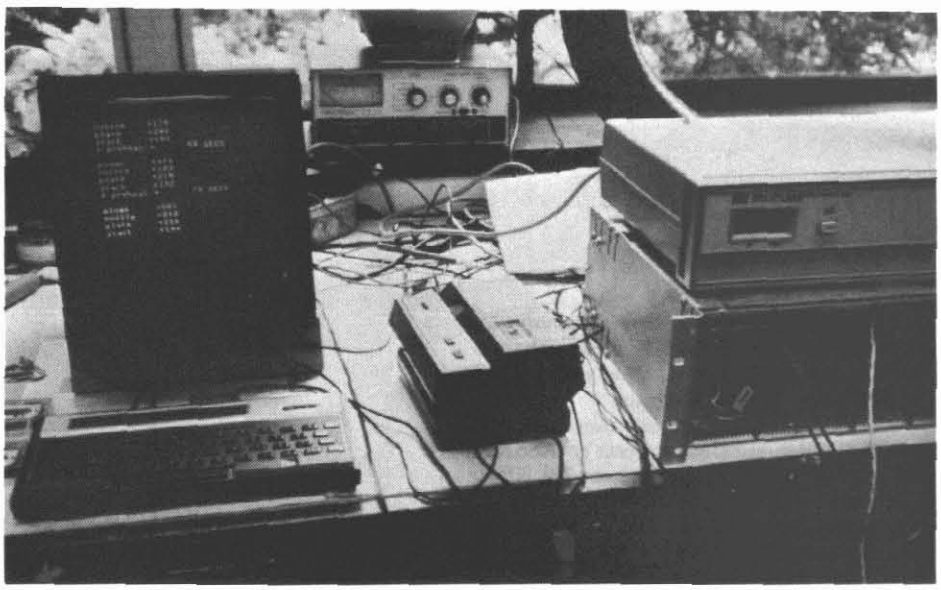
The use of the microprocessor temperature and burner control eliminates the need of special knowledge or training by the user. The thermostat is set to the desired temperature and the microprocessor controls to that temperature and monitors the burner to assure that any deviation or malfunction is responded to automatically.

After extensive development and test work by the Sea-Labs team of engineers, thermodynamicists, and microprocessor control design personnel, a simple reliable design requiring few critical parts has evolved. The unit burns the fuel cleanly to a new high level of thermal efficiency, offering high reliability and long component life. This design is continuing to undergo further testing for materials evaluation, packaging improvements, reliability, and long-term operational capability.

As you can see in the photos, personal-computation devices such as the HP-41 and the HP-75, along with the use of HP-IL, measurement devices, and transducers, really *can* be used to not only instigate high-technology research but also form the basis for development tools, monitoring facilities, and output data "collectors" and interpreters. These small computers can also handle the tasks of debugging and of establishing parameters. As "controllers," they also permit easy and accurate dynamic change capabilities when dealing with the thermal characteristics that were being researched in this application.



An overall shot of the development test setup. That's the HP 3421A Data Acquisition/Control Unit in the center. The prototype furnace at right.



Here's a close-up of the HP-75C doing some data acquisition chores and monitoring the preheat phase. Temperature and time are displayed on the TV monitor.

Even though you might never fully utilize the enormous potential in your HP-41 or HP-75, isn't it nice to know that such projects as the one Dave Stedman has shared with us are entirely possible with that powerful little "tool" you carry around with you? I'm sure you know the answer to that question—as well as the question atop this article.

Get Rid of Your Time-Out The Easy Way

We have received several questions on how to wake-up HP-IL devices that have been powered-down with the HP-IL Loop Power-Down (LPD) command, without having to wait 10 seconds for the HP-75C time-out period.

One way to do this is shown below. By putting the HP-75C to sleep and waking it up with a timer, the HP-75C sets an internal flag that tells it to check the HP-IL loop before using it. An ASSIGNIO or RESTOREIO command will clear this flag and set the time-out back to 10 seconds, but other HP-IL commands, such as the CLEAR LOOP used in this program, do not reset the flag until a frame has been sent out successfully.

The program assumes that the user has already done an ASSIGNIO. The DISPLAY IS and PRINTER IS commands are needed to keep the SENDIO from getting a time-out error.

Program to power loop down and up

```
10 DISPLAY IS * @ PRINTER IS *
20 SENDIO ",'unl,tl+,lpd',"
   Loop is now powered down. Initialize timer
   file, and set a time to wake us up in .01
   seconds.
30 ON TIMER # 999,1000000000 RETURN
40 ON TIMER # 2,.01 OFF TIMER # 2
50 BYE
   The timer wakes us up here. Send the
   CLEAR LOOP until it makes it around the
   loop.
60 ON ERROR GOTO 70
70 CLEAR LOOP
80 DISP 'loop up'
```

HP-75 AUTOLOOP Program Makes "Looping" Easy

Let's face it: it is easier to *automatically* assign peripherals in the HP-IL loop than to do it manually each time. That's why you'll like this new Library program.

AUTOLOOP is a language extension (LEX) file that automatically performs an ASSIGN IO when the HP-75 is turned on. All HP-IL devices connected to the HP-75 are assigned predetermined device names, and the first display and printer devices are automatically made into DISPLAY IS and PRINTER IS devices. AUTOLOOP therefore greatly simplifies the process of being able to assign and use peripheral devices, since all you have to do is simply turn on the HP-75.

The AUTOLOOP magnetic card also provides an auto-start capability that allows the user to define a series of commands (such as RUN "PROGNAME") that will be executed when the HP-75 is turned on.

The program number is: 75-0104; the size is: 1 track of a magnetic card; the price is $10*; and availability is: September 1, 1983.

**U.S. dollars. See note at bottom of cover.*

HP-IL Acoustic Coupler Introduced

The ability to perform HP-IL-based data communications over voice-quality telephone lines has been realized with the introduction of the HP 82168A Acoustic Coupler (Modem). Now, HP-IL-based systems, using the HP-41* or HP-75, can transfer information to and from other computers at remote locations.

The 300-baud, battery-powered, portable acoustic coupler meets the Bell 113 standard and is suited for conventional (G-type) telephone receivers. The fully automatic HP-IL command, controlled operation of the coupler includes an automatic power-down feature that assures minimal power drain. Control protocols include ENQ/ACK and XON/XOFF, while data error detection is accomplished by parity bit selection as odd, even, zero, or one.

For remote data communication applications where portability and compact size are needed, an HP-IL system using the HP 82168A Acoustic Coupler provides a lightweight alternative that easily fits in a briefcase.

The U.S. list price of this modem is $495** and it is available now: see your local HP Dealer.

**Extended I/O Module required.*

***U.S. dollars. See note at bottom of cover.*

Graphics For The HP-75C

The new *HP-75 Graphics* Users' Library Solutions book is a friendly software solution to generating graphical plots using the HP-75C and the HP7470A Plotter. This Users' Library Solutions book contains three separate BASIC language utilities by which the HP-75C can generate line, bar, and pie charts. These programs take advantage of the HP-75C's native ability to be an HP-IL loop controller to drive the plotter via HP-GL (HP Graphics Language) low-level commands. No additional hardware, ROMs, or binary programs are required.

ADDITIONAL CAPABILITIES

This graphics software, organized similarly to graphics presentations software for desktop computers, provides a friendly method for generating good quality, multicolor plots. It is also compatible with mass storage and external display via the HP 82161A Digital Cassette Drive and any HP-IL video interface*.

GRAPHICS CAPABILITIES

The line-chart plotting program allows the generation of one-plotter-page, multiple-line graphs. Seven line types and two pen colors can be used, allowing a large variety of high-contrast plots. The bar-chart plotting program provides for multiple bars, a variety of hatch types, and two pen colors. The pie-chart plotting program produces a single pie whose sections may be "pulled" and hatched.

MEMORY CAPACITY

Each program utility consists of two programs (averaging 9Kb per pair) that, with the generated file, can be used within the 16K RAM capacity of the HP-75C.

ORDERING INFORMATION

The *HP-75C Graphics* Users' Library Solutions book (P/N 00075-13016) comes with complete documentation, commented program listings, and magnetic cards, and it is available *now* at your local HP Dealer. Price is $45**. This solutions book also may be ordered on cassette for use with the HP 82161A Digital Cassette Drive, but must then be ordered from the Users' Library in Corvallis; be sure to add $12** for the cassette—and $3.50** postage and handling for the book. The individual programs also may be ordered independently through the Users' Library.

**Some HP-IL video interfaces do not have graphics capabilities.*

***U.S. dollars. See note at bottom of cover.*

Routines, Techniques, Tips, Etc.

The routines, techniques, and tips furnished in this column are contributed by people from all walks of life, and with various levels of mathematical and programming skills. While the routines might not be the ultimate in programming, they do represent new ideas and solutions that others have found for their applications. You might have to modify them to fit your personal application.

Let's start the ball rolling with a fairly easy but useful routine from the pen of **Wyman W. Trotti, Jr.**, who lives in Cayce, South Carolina, and works in the real estate and insurance business.

(41) I use my HP-41C primarily for financial analysis, so it generally stays in FIX 2 mode. However, sometimes I like to peek at some more decimal places. So I have assigned the enclosed program to the FIX key. If the machine is in the FIX 2 mode, the program executes FIX 6. If it is set for anything other than FIX 2, it executes FIX 2. I picked FIX 6 because six are usually enough decimal places for my purposes.

```
01♦LBL "FX"      09 GTO 02
02 FS? 36        10♦LBL 01
03 GTO 01        11 FIX 2
04 FS? 37        12 RTN
05 GTO 01        13♦LBL 02
06 FC? 38        14 FIX 6
07 GTO 01        15 RTN
08 FC? 39        16 END
```

From South Carolina, let's travel far north to Lively, Ontario, Canada, to the home of **Sean M. Hill** and his HP-41. His contribution is short but useful.

(41) In one of my HP-41 programs, I needed to clear the stack and LASTX but preserve a number in the X-register. The following routine, labelled KEEPX, does the trick!

```
01♦LBL "KEEPX"
02 X<> L
03 CLST
04 X<> L
05 RTN
06 END
```

If you own an HP-41 with a card reader and do a lot of calculating in a program and use only the stack, this tip will help you keep track (or keep stack!) of what you are doing. Just prior to a portion of your program where you are doing a lot of stack manipulation, place a 7PRSTK. When program execution reaches this line, the stack will be reviewed for you, and you can tell if your data is in the correct position(s) for your following manipulations. After your program is debugged, you can delete all the 7PRSTKs to save memory and speed execution.

[That 7PRSTK is explained in the card reader manual: Print stack HP-67/97 compatibility function. If printer is attached, prints the contents of T, Z, Y, X. If no printer, views the contents. (If printer is not present or disabled, stack lift is enabled.) — Ed.]

Overseas, in Mühlacker, West Germany, there is an HP-41 that holds a Time Module, but does it keep **Erwalt Philipp** on time? Let's see . . .

(41) For more than ten years I have been an RPN fan, and I want to thank you very much for that interesting KEY NOTES. By the way, there's a little mistake in that routine, "TFUNK" (V6N4P5) for the Time Module: line 2 should be 1.1 and not just .1, as this loops 101 times. Try it.

I also enclose another routine for the Time Module. It runs the stopwatch the same way as the clock. The routine is very easy to understand, and it is very useful for many purposes.

```
01♦LBL "CAL"     16 RDN
02 1 E-5         17 HMS+
03 STO 00        18 RDN
04 RUNSW         19 HMS+
05♦LBL 00        20 R↑
06 ST+ 00        21 -
07 RCL 00        22 2
08 TIME          23 /
09 HMS+          24 FIX 8
10 SETSW         25 VIEW X
11♦LBL 01        26 X≠0?
12 TIME          27 GTO 00
13 RCLSW         28 SW
14 RCLSW         29 END
15 TIME
```

Meanwhile, in Grosse Pointe Woods, Michigan, **James W. Montgomery** is developing routines for his HP-41. Here's one he wants to share with KEY NOTES. It requires the Extended Functions/Memory Module and is useful only for the HP 82143A printer.

(41) The enclosed subroutine is a "device-independent" output-formatting routine. If you program it as shown — without a printer attached — the instructions will resolve themselves at execution time, later. Thus, the ALPHA register is left-justified and the X-register is right-justified in the buffer, and the contents are "printed" to the attached printer. Otherwise, sensing the absence of any printer device, the subroutine will concatenate the stated register contents around an equals sign and stop, displaying them in the HP-41 "window." Notice that line 23 returns the original x to the x-register.

```
01♦LBL "*OUT"    12 CLA
02 SF 21         13 ARCL Y
03 FS? 55        14 ALENG
04 GTO 01        15 X<>Y
05 "├="          16 +
06 ARCL X        17 24
07 AVIEW         18 -
08 RTN           19 ABS
09♦LBL 01        20 XEQ "SKPCHR"
10 XEQ "ACA"     21 XEQ "ACA"
11 ALENG         22 XEQ "PRBUF"
                 23 X<>Y
                 24 END
```

(Continued)

Travelling almost due east from Corvallis, over halfway across the U.S., we come to Ann Arbor, Michigan, a beautiful "college" town I remember from the early 1950s, when I attended General Motors Institute in Flint, Michigan. It is also the home of **M. Douglas Reeves'** HP-41CV, which uses the following routine.

(41) I have been an HP user since the HP-35 first came out *[me, too!—Ed.]* and currently have an HP-41CV, with which I am very impressed. However, I have had the same problem, as mentioned by **Dr. Keith Bernstein** in V4N3P12C, with specifying a format field. Below is a modified version of subroutine "FA" that uses fewer steps and reduces the problem when the number to be accumulated is longer than the field specified. This routine requires that the number, or alpha-data, to be accumulated must be in the Y-register, and the length of the field must be in the X-register. It also requires the HP 82180A Extended Functions/Memory Module and a printer.

```
01♦LBL "FA"
02 CLA
03 ARCL Y
04 ALENG
05 -
06 X>0?
07 SKPCHR
08 ACA
09 END
```

Here is another input from Ann Arbor, Michigan — I wonder if these two HP-41s know each other? Anyway, this tip is from **Jack Warner,** who writes about a recent article in V7N1.

(41) The concern of **Mr. Peraino** (V7N1p7a), running out of battery power in the middle of a long program, does not seem to be a problem in actual practice. I have an HP-41C program that runs for about 30 hours, and my computer has run out of power on several occasions during the run. Each time, I turned the HP-41C back on, saw the low battery message in the display, viewed the ALPHA-register to see if the program came to a normal stop, then turned the machine off, plugged in the AC adapter, turned the machine on again, pressed R/S to resume the run where it had stopped, and the results of the program were unaffected. It appears that, in situations where there is insufficient power to keep a program running, there is still enough power to maintain *Continuous Memory,* plus a little extra so that you can turn the HP-41 on and check the program status.

P.S. The HP-41C is a great machine. And the Users' Library a great service. I'll challenge a [Censored!] *computer any day to "crunch" numbers like my HP-41.*

(Thanks for the input, Mr. Warner and for the compliments. For those who don't know about it, V7N1 was an 8-page issue that was printed inside the cover of the last Library Catalog. If you want a photocopy, it costs $2.50 postpaid in the U.S., Canada, and Mexico; it is $3.00 elsewhere. U.S. dollars or a check drawn on a U.S. bank, please—Ed.).

If you are interested in column-formatted printer outputs but do not have the HP 82180A Extended Functions/Memory Module, this input by **Ken Dawson** of Alpine, California, is for you.

(41) Here is a subroutine I often use to provide a column-formatted printer output without the X-Functions Module. This routine is 22 bytes shorter than the routine submitted by **Mr. Vasallo** in V6N4p11a, and it permits the sign to precede the printed value rather than placing it in a trailing position.

```
01♦LBL "CPX"
02 STO Z
03♦LBL 00
04 DSE Y
05 10
06 /
07 INT
08 X≠0?
09 GTO 00
10 RDN
11 SKPCHR
12 RDN
13 ACX
14 RTN
```

To use the routine, place the desired number of spaces to the left of the decimal point in the Y-register, the value to be printed in the X-register, and then XEQ "CPX." This procedure should be repeated until the desired number of columns has been generated, at which point, the PRBUF or ADV commands should be given.

Are you a TV fan? Do you try all the many programs now available via cable and/or satellite? Then you'll want to try this routine from **Robert D. Lowmaster,** who watches TV in **Palmerton, Pennsylvania.**

(41) Maybe some of your readers may find this routine useful if they have, or plan on getting, an earth station. The routine computes the look azimuth and elevation angle to any domestic satellite. The factor on line 30 is obtained by dividing the earth's radius by the satellite's orbit radius.

```
01♦LBL "DOM/SAT"
02♦LBL A
03 "SITE LAT"
04 PROMPT
05 HR
06 STO 00
07 "SITE LONG"
08 PROMPT
09 HR
10 STO 01
11♦LBL B
12 "SAT LONG"
13 PROMPT
14 RCL 01
15 -
16 STO 02
17 TAN
18 RCL 00
19 SIN
20 /
21 ATAN
22 180
23 +
24 STO 03
25 RCL 03
26 COS
27 RCL 00
28 COS
29 *
30 .1507773
31 -
32 RCL 02
33 SIN
34 RCL 03
35 SIN
36 /
37 /
38 ATAN
39 CHS
40 "AZ="
41 ARCL 03
42 "├:EL="
43 ARCL X
44 AVIEW
45 ADV
46 END
```

In V6N4p14c, we printed a SORT routine that had a "bug" or two in it. Of the many "personal" versions sent to us, this routine by **Gerhard Kruse** of Drosselpfad, West Germany, seemed to most aptly correct the original routine.

(41) Using the same method as **Hans Aspenberg** in V6N4, here is my sorting program. It does not use any data registers, just the stack! Key in the block of data registers to be sorted, using the format bbb.eee (as for PRREGX), where bbb is the begin-address and eee is the end-address of the block. Then XEQ "SORT." The data registers will be sorted in ascending order, If you change line 11 to X > Y?, you'll get a sort in descending order. The program uses only 48 bytes.

```
01♦LBL "SORT"
02 SIGN
03♦LBL 00
04 LASTX
05 ENTER↑
06 ENTER↑
07♦LBL 01
08 CLX
09 RCL IND Z
10 RCL IND Y
11 X<Y?
12 GTO 02
13 X<> Z
14 RDN
15 X<> Y
16♦LBL 02
17 RDN
18 ISG Z
19 GTO 01
20 RCL IND L
21 X<> IND Z
22 STO IND L
23 ISG L
24 GTO 00
25 CLST
26 TONE 8
27 END
```

And, now, one more "problem," this one from V7N1p5b. The original routine was submitted by **Ed Keefe,** who *did* send me a much better version last week. However, I think it pertinent that we point-out why the original didn't work properly. Here's a "fix" from **Donald Beaty,** who is in the Department of Physics at the College of San Mateo in San Mateo, California.

(41) Ed Keefe's base-translation routine published in KEY NOTES for January-March 1983 (V7N1) has an important defect. When converting from HEX to DECIMAL, some values are processed incorrectly. For example, converting $7 to decimal yields a 0. Converting 8DDB to decimal results in 7643 rather than the correct value of 36315. With the added steps below, the program works correctly and is quite useful.

```
07 58
08 X>Y?
09 GTO 06
10 RDN
11 55
12 MOD
13 GTO 07
14♦LBL 06
15 RDN
16 48
17 MOD
18♦LBL 07
```

(Mr. Beaty also included a very "friendly" and very neat routine he often uses for translations. I wish I had more space. . . . Now, here's one for you to figure out! I've done most of the work for over 9 years, but this time, I leave the work to you. If the above "fix" works, think

about the next letter. It is my last "problem" for you—Ed.).

Here's another "fix" for the above problem. It's from **Peter Galvin** of the Weslyan University Computing Center in Middleton, Connecticut.

(41) The XD routine by **Ed Keefe** in the latest issue of KEY NOTES returns incorrect values if the string it is converting contains the characters "7", "8", or "9". This is because of the MOD 55 done on each character. This MOD correctly returns the number corresponding to the characters "A" through "Z", but produces the incorrect values 0, 1, and 2 for "7", "8", and "9". Enclosed is a listing of my modifications to the program to correct this oversight. The code is a little convoluted to keep it short, but essentially it makes sure it has something > = "A" before doing the MOD.

P.S. Thanks for the great newsletter.

```
01♦LBL "XD"
02 CLX
03♦LBL 01
04 ATOX
05 X=0?
06 GTO 02
07 64
08 X>Y?
09 GTO 06
10 RDN
11 55
12 MOD
13 GTO 07
14♦LBL 06
15 RDN
16 48
17 MOD
18♦LBL 07
19 +
20 RCL 06
21 *
22 GTO 01
23♦LBL 02
24 RDN
25 RCL 06
26 /
27 STOP
```

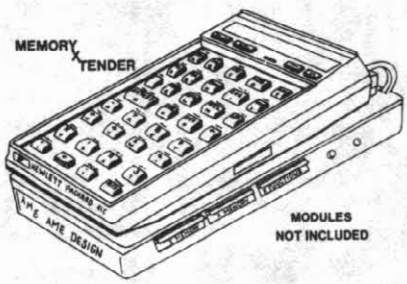
(Thank you, Peter, I've enjoyed every minute of it. Now I leave you to figure out who is right — or are they both right? What a way to go! But at least you'll remember me for this one, eh?—Ed.) (Whoops! X—Ed.).

Third-Party Hardware

Over the years, many entrepreneurs, manufacturers, private parties, and even calculator/computer owners have asked us to "advertise" their products in KEY NOTES. For legal and other reasons, we chose not to do so *in this newsletter*. However, with the advent of HP-IL for the HP-41, plus the awesome capabilities of the HP-75, we've recognized that it will benefit the readers of KEY NOTES to have at least a partial listing of what is available, today, for their personal-computation products.

Please remember: **These products are presented in KEY NOTES for your convenience, and KEY NOTES reserves the right to exclude any product. Also, the listing of a product in this column does NOT constitute an endorsement by Hewlett-Packard Company.**

The listed specifications and prices have been taken from the pertinent manufacturer's literature. If you have questions or need further information about anything in this column, do NOT contact HP; direct your inquiry to the manufacturer.



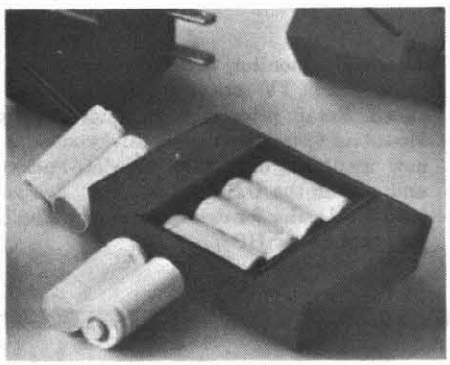
PORT & MEMORY EXTENDERS

These two devices are flat, thin boxes that fit under the HP-41 and are held in place with fabric fasteners. A short cable at the top end has a plug that connects directly into a port. The Port-X-Tender provides seven more plug-in positions (six are switchable) and, with three left in the HP-41, gives a total of 10 plug-in positions. It will accept the HP-IL Module. A lithium battery maintains not only memory for modules plugged into the device, but also time, if the Time Module is installed. No modifications are required to your HP-41. Carrying case to hold the HP-41 and Port-X-Tender is available. U.S. list price is $149.95.

The Memory-X-Tender is very similar to the Port-X-Tender, except that one switch selects Bank A or B, and each bank can hold one Extended Functions and two Extended Memory Modules. The seventh slot is provided for the HP-IL Module. U.S. list price is $99.00

Add $5 handling and postage for each device. For further information:

AME Design
2554 Lincoln Blvd.
Suite 5000
Marina Del Rey, CA 90291
Telephone: (213) 306-1249



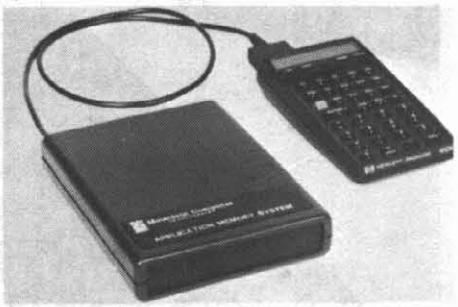
GORDON ELECTRONICS BATTERY PACKAGE

This product consists of a charger for four N-size nickel-cadmium rechargeable batteries. The unit is simple to operate; a "fail-safe" red LED glows only when the batteries are charging. Advantages of this system are stated as, "The batteries are charged *outside* the HP-41, so the computer never needs to be plugged-in if a reserve set of batteries are used; plus, these batteries have more than twice the capacity of present half-size cells. Also, one charger can serve more than one HP-41."

U.S. list price is $35 for the charger and four batteries, and $11 for an extra set of four batteries; both prices postpaid. Available in U.S. only. For more information:

Gordon Electronics
27933 Briones Way
Los Altos Hills, CA 94022

EPROM (Erasable Programmable Read-Only Memory) technology permits you to erase a chip's memory image and re-use it with a new program image. This erase and re-program function can be repeated hundreds of times. The process of putting a new image into an EPROM is often referred to as "burning" the chip. This process requires not only sophisticated equipment but also "sophisticated" knowledge of what takes place.



MOUNTAIN COMPUTER, INC. PRODUCTS

Mountain Computer of Scotts Valley, California, a firm that developed peripheral products for micro-computers, is now offering a series of peripherals for HP products.

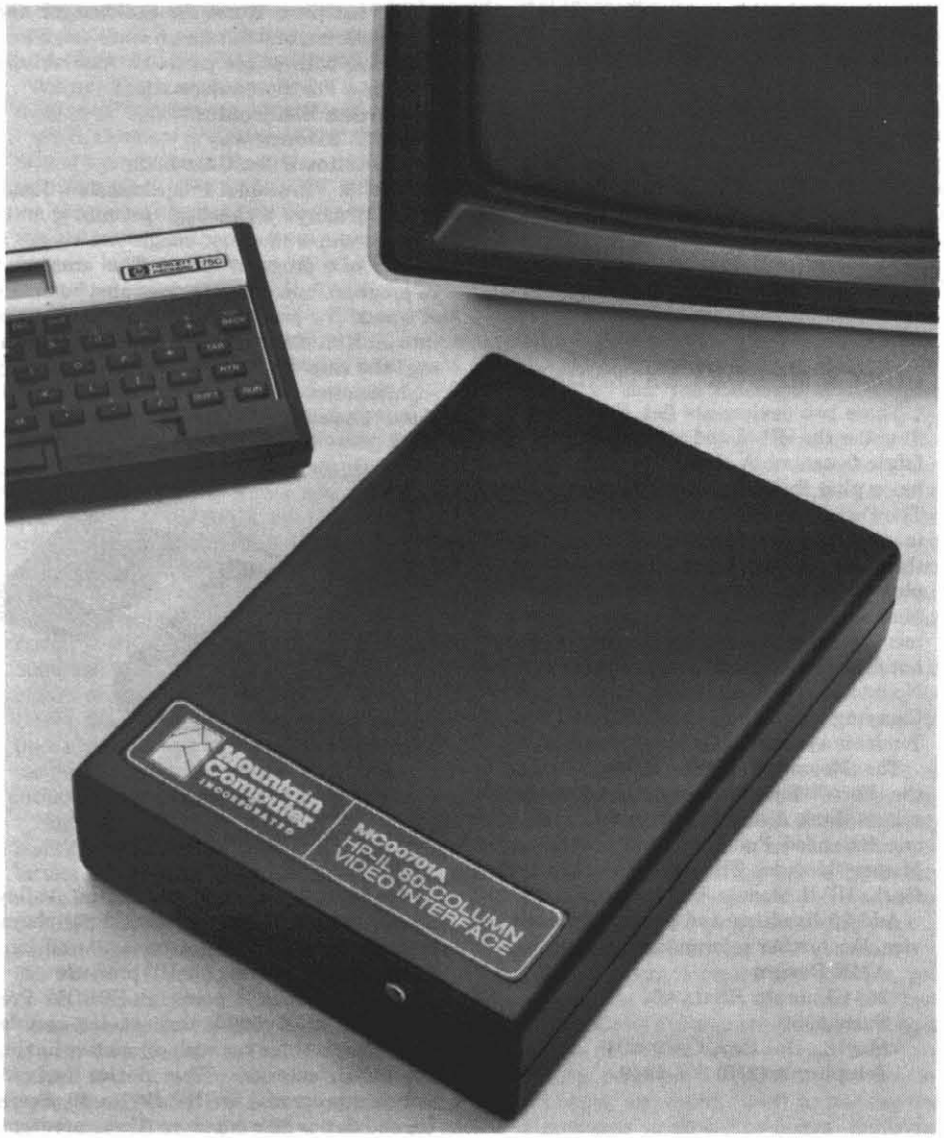
One product is a powerful EPROM Programmer (MC000506A) that is a low-cost development tool for use with computers having the HP-IL interface. This device includes software programs for HP Series 40, Series 70, and Series 80 computers. These programs will read a byte of data, write a byte of data, verify that the EPROM has been erased, create a data file from an EPROM, and write a data file to an EPROM. Virtually all current 24- and 28-pin EPROMs may be read, programmed, and duplicated. Retail price is $450, and it is available now (see address below).

Another Mountain Computer product is the EPROM and RAM add-on unit for the HP-41C.

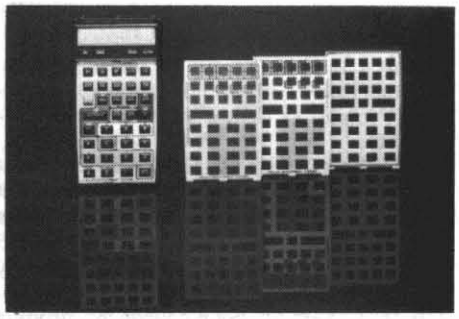
The MC00550A Applications Memory System (AMS) is a low-cost peripheral that adds program and data space for the HP-41C/CV handheld computers. Three EPROM sockets are provided to hold up to 16K bytes of information. The optional RAM unit (MC00590A) plugs into the AMS and adds up to 16K bytes of RAM (with battery backup). The EPROM supplied with the unit provides a powerful software package, including a user-code, program-to-ROM translator; EPROM burn software (using the MCI MC00506A); and more.

The AMS MC00550A retails for $195, and the optional RAM MC00590A retail price is $95. They were available as of July 1, 1983 (see address below).

Mountain Computer, Inc.
300 El Pueblo Road
Scotts Valley, CA 95066
Telephone: (408) 438-6650



The third product from this company is an MC00701A HP-IL 80-Column Video Interface. This video interface provides 24 rows by 80 columns or 20 rows by 40 columns and is fully compatible with the HP 82163A Video Interface. It can be used with HP-IL and the HP-41C/CV, HP-75C, and Series 80 computers. This product will connect to any standard video monitor, or it can be used with conventional TV sets if an RF modulator is added. Retail price is $325, and, although Mountain Computer makes this product, it is now available only from Hewlett-Packard, and only in the U.S. (at this time). See your local HP Dealer for details or orders. The HP part number is: HP 92198A.



CUSTOM KEYBOARD OVERLAYS

Custom overlays are produced by a number of manufacturers. Some do the entire job, some require *your* artwork. They are produced in up to seven colors and up to four can be used on the keyboard at one time, and since some are reversible, this allows using eight surfaces — at one time — for user instructions.

There are usually quantity restrictions, probably starting at minimum orders of 100. So if you are in the market for such products, here are three manufacturers to query.

Dallas Development Systems
7410 Stillwater Drive
Garland, TX 75042
Telephone: (214) 238-1776

Horizons Technology, Inc.
7830 Clairemont Mesa Blvd.
San Diego, CA 92111
Telephone: (619) 292-8331

Profit Management Systems
3637 — 4th Street N., Suite 350
St. Petersburg, FL 33704
Telephone: (813) 822-1793

CUSTOM CASES FOR HP-41

These products range from a "saddle-leather" case for just the HP-41 to a briefcase that holds the whole system. Too diverse to describe in detail, we'll list what's available and you can check for yourself.

Custom Leather Case. Hand-crafted russet cowhide, heavy stitching, positive tuck catch. Also fits Series E.

J. A. Gendron and Company
N. 1012 Washington Street
Spokane, WA 99201
Telephone: (509) 326-4490

(Continued)

PORTABLE EPROM UNIT FROM HANDHELD PRODUCTS, INC.

This new portable EPROM unit — the first of its kind — features the capability of 32K EPROM memory for custom application programs and fixed data storage and is the size of the HP-41 card reader. It attaches to the HP-41 in the same manner as the card reader prices, availability, and further information, write or call:

Hand Held Products, Inc.
6401 Carmel Road, Suite 110
Charlotte, NC 28211
Telephone: (704) 541-1380

HP-41 Language Contest

In V6N3, we initiated a contest to name the "language" used by the HP-41. And, by the way, the contest was long ago closed, so please do not submit more entries. Since the end of the contest, we've tried to legally clear several names you seemed to favor, but they already were registered trademarks. Also, it is very difficult to do this on a *worldwide* basis.

However, be patient. We are confident we have a winner in process, and we will notify that person soon. We haven't forgotten you.

Professional Briefcase. A vacuum-molded, premium-quality case with gravity key-locks (will not open when upside down) and magnetic divider holders. Holds an astonishing assortment of hardware and supplies.

Hand Held Products
(see address above)

41 System Case. Weighs only 2.9 pounds and features sturdy aluminum shell and key-locking hasps plus personalized plate for engraving. In two sizes. Holds a whole system.

Marketing Systems International
18516 Mayall Street
Suite G, Box NP
Northridge, CA 91324
Telephone: (213) 885-5966

HP-41 System Carrying Case. Called the "RPN-41 Work Station," this is a system package designed to consolidate, integrate, and secure the HP-41, card reader, and printer; and it will also carry software and supplies. Soft carrying case, shoulder strap, anodized aluminum extrusions; very compact, professional design.

Capital Calculator Company, Inc.
701 East Gude Drive
Rockville, MD 20850
Telephone: (301) 340-7200

These are not all the many products that are available to you today. Your local HP Dealer is kept up-to-date on such products, so you should stop in to see what is available. A lot of HP Dealers now stock these products in their stores, or they can help you order what you desire.

Remember, none of these products, except where specifically stated, is endorsed by Hewlett-Packard. For information, prices, and delivery, consult the listed manufacturers.

"Old Soldiers" Never Die...

The following letter is true. I've had it for a long time, always wondering if people would believe this story. Maybe, *now*, they will. But read the letter first; the editorial remarks that follow will prove to you, once and for all time, that HP builds THE best calculators you can buy, and that "old soldiers" never die, they just "retire."

Dear Sir:

Enclosed are the remains of Henry P.I, a calculator which has been my constant companion for about 4 years. When new, Henry was a handsome fellow without peer among calculators. He was greatly in demand and I had to wait about 8 weeks for the pleasure of his company. In a very short time, Henry proved he was more than a looker. In four years he demonstrated unmatched integrity and never reported in too ill to work. He proved his mettle in the cities, in the mountains, and in dust bowls. His performance in the U.S., Canada, Virgin Islands, and in Europe was exemplary.

On May 1, 1975, while performing in his usual capable manner, Henry P.I. died violently. He accidentally fell into a bucket of 1200°F char in the city of Pretoria, Republic of South Africa.

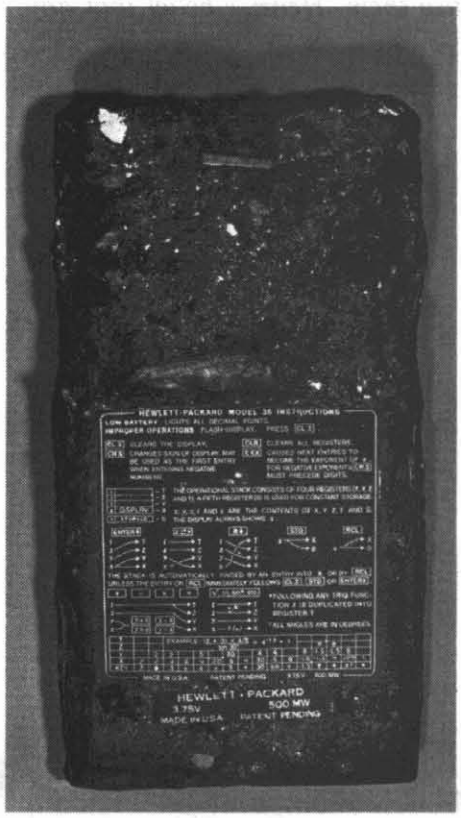
Upon returning to the states I considered courses of action. One neither mourns an old friend forever nor tosses him in the trash can.

I send Henry to you in hopes that Hewlett-Packard has a hall of fame for old calculators which have given distinguished service above and beyond that expected and which have died with their boots on.

If such an honor is not available to Henry, please give him a decent burial. After all, he is family.

Very Truly Yours,
William Solano
Monroeville, Pennsylvania

(When I received "Henry P.I," in the mail, "he" was sent to me "for a decent burial." But the more I looked at that poor incinerated blob of plastic, the more curious I became. I telephoned Mr. Solano and verified that it was true that the HP-35 not only had fallen into a charcoal brazier, but also had stayed there overnight until the fire cooled. The keys seemed to operate, so I dug away the mess where the recharger pins protrude at the back of the case, and I took it to the R & D Lab to put some current on it. I know you won't believe this, but it's true! The HP-35 still "worked." At least most of it did! "Henry" was NOT dead, only...sort of "retiring" from a heat stroke. I'll bet you think I invented all of this, just for this last issue of KEY NOTES. Well, you're wrong. The letter is genuine, the HP-35 did work, and I took the photos myself. I needed one more article to "fill-up" this issue, and I thought it appropriate to tell you about "Henry's" demise. And yes, we gave "Henry" a proper and decent "retirement."—Ed.)



We Get Letters...

The following letter as sent to our Company headquarters in Palo Alto, California. As you can see, it is addressed to the two founders of this Company. I've had it since March of 1982 but never had the space to print it. In this last issue of KEY NOTES, however, I think it fitting that it appears here.

To Bill Hewlett and Dave Packard, THANKS,

I felt you might like to know that one of your products "literally" changed the course of my life before I actually owned it.

Originally a Physics major in college, I left prematurely because of a death in the family. Without that degree I struggled through several jobs unfulfilled and unmotivated. Finally I landed a job, writing for a daily paper. While covering a news story at a local pawn shop, I began a conversation with a young engineering student who happened to be looking for a used HP calculator. He told me that it was a futile effort, because no one ever parted with an HP calculator. I really didn't know what he was talking about, but it sparked my interest. I came from the days of sliderules, and a calculator was a "toy" to me.

The following day I visited an electronics store and viewed the line of programmables. The salesman, saving the best for last, brought out an HP-41C. After a short demonstration, I was speechless. More importantly, when I asked him to rate his selection, he stated very simply, "There is nothing like an HP anywhere for any price."

The price was beyond a writer's means, but I began saving everywhere I could. The incredible beauty and power of the 41C and the loyalty of its owners rejuvenated my interests in technology, and I made up my mind to go back to school.

I now have a 41C, a degree, and 20 credits toward a Masters in Computer Science (with a 3.8 average). I left the writing job and have recently been hired as a Computer Consultant to Yale University and an EDP Auditor for the same company.

Salesman – Writer – Computer Consultant

Thank you, gentlemen, for a new career. With the family growing, I doubt if I'll get the many accessories for a few years, but for right now the 41C keeps me more than happy. Hewlett-Packard will always have a very special place in my life, and I assure you that you will never be without at least one East Coast spokesman. Keep up the great work!

Sincerely,
Richard Dorozenski
Waterbury, Connecticut

A FINAL NOTE ON A KEY PERSON

As Henry indicated in his editorial, this is his last issue as Editor of Key Notes. Over the past 9 years he has provided a valuable two-way channel of information between those who make Hewlett-Packard products and those who use them. Henry's belief that anyone can learn to program Hewlett-Packard programmable calculators resulted in a publication that has been informative, stimulating and fun. As Henry retires from Hewlett-Packard, I'm sure you'll join me in thanking him for his many years of dedicated service to both HP and it's customers, and wish him every success in his future efforts.

Dan Terpack
General Manager
Portable Computer Division