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CURSOR

World Wide Professional Guide



GToschencompufer conquer the world News
from CeBit J989 Glnfrorotschni0stelle for PCs

Technical and scientific computers from Hewlett-Packard

"Finally, a high-end computer I can afford!"



Ayer Frankfurt

"During my studies, I constantly have to analyze complex problems and perform difficult calculations. My HP tablet computer is indispensable for this. It allows me to solve tasks that were previously only possible on a PC. And all this with maximum user comfort and super-fast graphics functions!"

Alexander Ebert,
4th semester mechanical engineering, RWTH Aachen University.

Whether you are a scientist or engineer, or aspire to be one, HP has the right pocket calculator for you, e.g. the the entry-level model HP-205 with algebraic input and 150 functions, which costs just over \$100, or the HP-22S with equation solver, the HP-32S with numerical integration and UPN, right up to the HP-285 with its unrivalled performance. HP pocket calculators — programmed for success

 **HEWLETT
PACKARD**

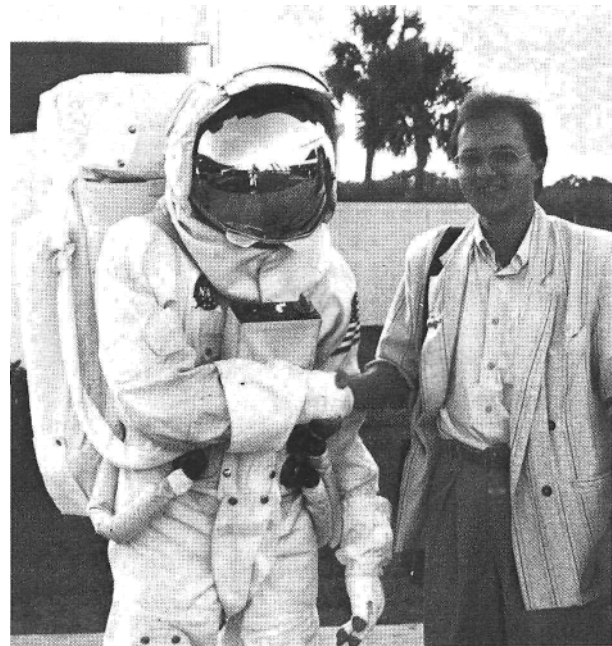
/89 CURSOR

News from CeBit '89

1989 will be a quiet year in terms of developments on the pocket computer market. At least, that was the impression gained during a visit to CeBit '89. Hewlett Packard only had the new HP-10B on display, which is briefly presented in this issue. Hewlett Packard did not announce any new products or enhancements to its existing computer systems. On the contrary, upon inquiry, we learned that the magnetic card reader and barcode reader for the HP-41, as well as the IL strip printer HP 82162AD, would no longer be available as of the end of March of this year due to discontinued production. There was no mention of a new calculator that could replace the HP-71 or HP-41. However, there were rumors that a new calculator would be available at the earliest in the next at CeBit.

Sharp and Casio, on the other hand, had more to show. Visitors were initially impressed by the size and design of the exhibition stands. In addition to new and older devices, a wide range of accessories was also on display. Several software partners also had the opportunity to present their solutions. Test reports on the new devices also begin here in this issue.

Pocket calculators and computers have their place everywhere: deep underwater, in freezing cold, in the hot and humid tropical rainforest, in the scorching sun of the Sahara, and even in space. I was particularly interested in the latter. So I took a trip to Florida to find out more about this topic for our readers. Read what my interviews revealed on page 18. However, my research on this topic is not yet complete. I hope to find out soon how pocket computers are used in German space travel and report back to you in one of the next issues of CURSOR!



Incidentally, our cover photo shows astronaut Sally Ride aboard the space shuttle Challenger on June 21, 1983. As you can see, the HP-41 was already being used in space travel back then.

Yours

Wilfried Kötz

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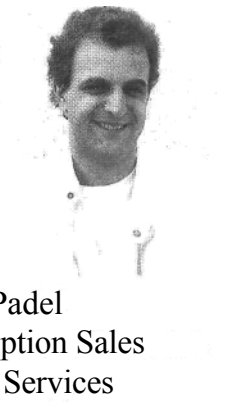


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INHALT



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Mathematics/statistics module for HP—41, used, for sale, DM 60, K. Sengebusch, Christophorus-Str. 24a, 5060 Bergisch Gladbach 2, Tel.: 02202/33932

HP-41 CV TURBO with built-in X-F module (four free ports) for sale, including CCD module A, DM 680, H.W. Schoppa, Mittlerer Weg 54, 7180 Crailsheim, Tel.: 07951/6456 from 7 p.m.

Card reader (original packaging) for HP-4 1 with 3 pockets, each holding 40 magnetic cards, for sale. Price negotiable, DM 220, Tel.: 07131/80747

Thinkjet incl. IL module, VB DM 1100,-, M. Strobel, Ringstr. 33 5102 Wiirselen, Tel. 02405/3092 after 6 p.m.

HP-4 IC with quad memory, X-Function module, RAMBOX 32K and battery for sale. Asking price €700. M. Hons, Tel. 02405 / 94203

Texas Instruments TI 99/4A with Extended BASIC and several games (price negotiable); X-Function module HP 82 180AD for HP-41 (100 DM); Magnetic card reader HP 821 04AD for HP-41 (220 DM); Tel. 02202 / 50297

16K RAMBOX from Eramco, DM 350; ThinkJet printer HP2225 B, DM 800; floppy disk drive HP 9114B, DM 900; Grabau video controller, DM 1100; HP-110 portable with built-in modem, ann. Keyboard, LOTUS 1-2-3 etc. iTi ROM, DM 800; 4K memory expansion modules for HR-71, DM 80; text editor module for HP-71, DM 90; finance module for HP-71, DM 90.

All devices are used and in very good condition. They are being sold on commission. Please direct inquiries to W&W Software Products GmbH, Mr. Kötz, Tel.: 02202/42021

1 HP-IL module for HP-41 and HP ThinkJet for sale, tel.: 02405/3092 evenings

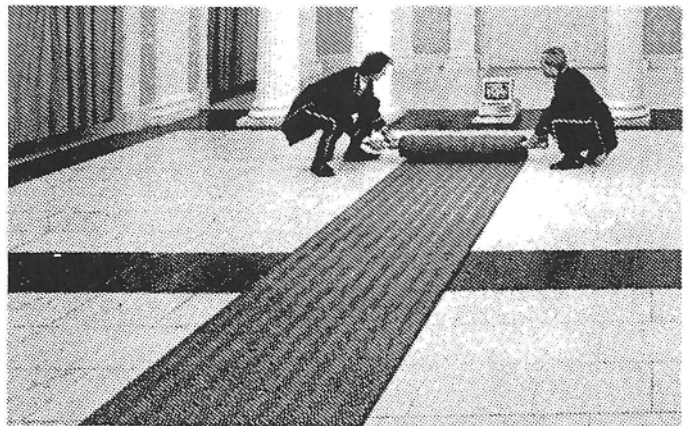
Wanted

2 IL acoustic coupler HP 82168, 1 HP 71 from year of manufacture

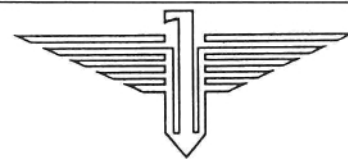
86, with memory expansion if necessary, 1 IL floppy disk drive and 1 IL Thinkjet printer, Tel 04202/61418

For new orders, we will accept HP 28C calculators in trade for DM 200 per unit until further notice. W&W, Tel: 02202/42021

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We will review the latest trade fair news for you. Right in your neighborhood. No hassle. And live, of course. Just stop by. Not only are the new Vectra PC family and the latest peripheral products from Hewlett-Packard in a class of their own, but so too are the expert advice and technical support provided by your authorized HP dealer.



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HP-41 CY TURBO and the HEPAX Operating system

Some of you may be **wondering whether the flagship in its series – the HP-41 CY TURBO – is an operating system upgrade by the HEPAX module for manage its huge memory. Basically, the answer should be "no," since the HP-41 CY TURBO already has all the functions for internal memory management. If it weren't for the !**

E There are certain subtleties that make the HEPAX module in combination with the HP-41 CY TURBO as an operating system extension interesting for users.

I would now like to go into these subtleties in a little more detail, focusing exclusively on the interaction HEPAX module with the HP-41 CY TURBO. The same applies to users of the RAMBOX in the card reader housing, depending on the model of the calculator. First of all, I would like to explain the most significant differences to the operating system of the HP-41 CY TURBO.

1. With the HEPAX module, you now also have the option of creating ASCII files with a length of up to 577 registers in the additional memory of the HP-41 CY TURBO and editing them with a wide range of commands.

The command set is roughly equivalent to that of the X-FUNCTION module and is also closely based on it in terms of nomenclature (note the leading "H" in the function names!), which naturally reduces the learning curve for the HEPAX module.

2. In contrast to the normal RAMBOX operating system, data files can now be created across blocks with a maximum length of 4569 registers (HP-41 CY TURBO: maximum 670 data registers in one piece). This makes the HP-41 CY TURBO an even more powerful data acquisition device.

3. Another new file type allows the entire computer contents (except for X-MEMORY) to be stored in the additional memory, similar to what you may be familiar with from external mass storage devices.

4. All file types of the HEPAX module can be read directly from an external mass storage device (only cassette or diskette drive, RAM disk) or written to it without having to go through the main memory of the pocket calculator.

5. The HEPAX module manages program files dynamically. This means that any program can be removed from the additional memory at any time, regardless of its rank within the file system. At the same time, however, it also means that all XROM numbers of the subsequent programs change. This inevitably leads to difficulties with previously saved key files in which programs have been assigned to certain keys.

. Far more annoying is access to such programs by other programs that only have the XROM number (speed and space advantage) and not their full program name.

All in all, this module provides users with a host of new and powerful functions that make using the HP-41 CY TURBO – with the appropriate configuration – a real pleasure and open up many new possibilities.

Installation of the HEPAX module in the HP-41 CY TURBO

When installing the HEPAX module, you can run both operating systems side by side at the same time. However, you must observe a few very important rules, as otherwise valuable data could be destroyed very quickly by accidental access by some functions of the RAMBOX operating system can very quickly destroy valuable data. However, there is a simple trick that allows both systems to work together perfectly. To do this, you need to know that the HEPAX operating system accesses all pages that have not been initialized by the RAMBOX function "INITPG" and classifies them as HEPAX MEMORY (if all pages have already been initialized by RAMBOX, you can use the "CLPG" function to free up a corresponding number of pages for the HEPAX module).

If you now start the HEPAX module in the

computer for the first time, please select port 1. Then switch on the computer and use the "HEPROOM" function to check the memory space available in the HEPAX file system by dividing the value obtained by "HEPROOM" by the number of pages previously freed up. The result should be slightly greater than or equal to (if only one page) 651.

Now remove the HEPAX module from the computer and execute the RAMBOX command "ENDPG" (possibly with a corresponding ROM revision - e.g. HX01, HX02, etc. - with which you can mark the order of the file group). This ensures that the RAMBOX operating system can no longer make any changes to the HEPAX file system.

You can then insert the HEPAX module into any port on the pocket calculator, provided that the upper page of the respective port does not belong to the HEPAX file system (for subsequent removing a page from the HEPAX file system, please refer to the relevant instructions in your HEPAX module manual).

In general, you should never insert any plug-in module (except for the HP-IL module, which can be left in port 3 in all cases) a page that is assigned to the HEPAX file system, as long as the HEPAX module is in your HP-41 CY TURBO or the entire

HEPAX file system!

Otherwise, the system would be destroyed immediately when the computer is turned on and later by the HEPAX module itself after removal the other module - no longer be restored to its original form!

The same effect may also occur under certain circumstances if the two RAMBOX functions "PG01" and "PG10" are used carelessly. It is therefore advisable to switch the two 32 kByte memories using the "PG" function. If you do add another module or reinitialize a page via the RAMBOX operating system, you must also pay attention to the respective XROM number. This is because the HEPAX module assigns XROM numbers independently for its system

- , unlike the RAMBOX operating system, independently assigns XROM numbers for its system (see HEPAX manual) that were not yet assigned within the computer during its initialization.

Tips - Tricks - Bugs In the course of working with the HEPAX operating system, proved useful to provide the HEPAX module with only one page per 32 kB of memory, unless you are forced to create a single large data file for data acquisition. The advantages of this are obvious:

1. The mass storage functions of the HEPAX module enable fast data transfer for less frequently used programs.

2. Programs that are still in the development stage can be edited or even removed at any time without much effort and without having to "shovel" an entire page.

3. You don't have to worry too much about the HEPAX file system, which gives you a much better overview of the entire memory.

4. Proven programs located on other pages of the RAMBOX retain their XROM number and thus their value, and can be used as subroutines at any time.

subprogram by programs can be called up.

Even in this minimal configuration, all the strengths of the HEPAX module (which are not limited to an operating system extension) can be fully exploited.

With the help of a small M-code routine (see below), the HEPAX module can even be switched to the computer's internal page 7, thus taking up no more memory space and still providing all functions, in particular the very convenient and powerful HEX editor. There are basically two small M-code routines that can be used to switch the HEPAX module. The first routine automatically ensures that the HEPAX module is moved to page 7 every time the HP-41 CY TURBO is switched on (this function should already be implemented in newer versions; in the version available here - revision number: HI-IC - this was not yet the case). Of course, this only works if no module is plugged in that claims this page for itself (e.g., the IL module HP82160A). In this case, the program has no effect and the HEPAX module remains on the page where it was originally plugged in. With the second routine, you can switch the module to any other page during operation, as long as it does not belong to the HEPAX file system and is not the page in which the program was saved. Here are the two M-code programs that can be easily written to the HP-41 CY TURBO using the HEX editor integrated in the HEPAX module:

9FE2 1D8 C< > M ALL
 9FE3 04E C= 0 ALL
 9FE4 15C PT= 6
 9FE5 190 LD@PT- 6
 9FE6 330 FETCH S&X
 9FE7 2E6 ?C#0 S&X
 9FE8 04F JC 9FF1+ 09
 9FE9 15C PT= 6
 9FEA 110 LD@PT- 4
 9FEB 330 FETCH S&X
 9FEC 2E6 ?C#0 S&X
 9FED 027 JC 9FF1+ 04
 9FEE 130 LDI S&X
 9FEF 007 CON: 7
 9FF0 030 ROM BLK
 9FF1 1D8 C M ALL
 9FF2 3CD ?NC GO
 9FF3 09E -27F3
 9FF4 000 NOP
 9FF5 000 NOP
 9FF6 000 NOP
 9FF7 000 NOP
 9FF8 000 NOP
 9FF9 34B JNC 9FE2 -17
 9FFA 000 NOP
 9FFB 031 "1"
 9FFC 030 "0"
 9FFD 012 "R"
 9FFE 00C "L"
 9FFF 03B CHKSUM= 03B HEX

Save the contents of register C to register M. Clear register C.
 9FE4-9FED: Check whether addresses 6000 hex and 4000 hex are equal to zero. If not, the IL module is plugged in and the HEPAX module is not switched over.

9FEE-9FE0: Switch HEPAX module to page 7.

9FF1-9FF3: Reload the contents previously saved in register M to register C and return control to the CPU.

Start program with interrupt xFF9!

9FFb-9FFF: Revision number and checksum of the module

Attention!

Only program interrupt xFF9 when you are absolutely certain that no errors have occurred at addresses 9FE2 to 9FF3. Otherwise, the following could happen

an endless program loop that can only be eliminated by deleting the Rambox! The second routine is called "HPG" (HEPAX-Page). It is programmable

and requires an input (between 8 and 15) in the X register.

9090 087 "G"
 9091 010 "P"
 9092 008 "H"
 9093 0F8 READ 3(X)
 9094 38D ?NC XQ
 9095 008 -> 02E3
 9096 106 A= C
 S&X
 9097 086 B= A
 S&X
 "9098 04E C= 0 ALL
 9099 35D ?NC XQ
 909A 000 -> 00D7
 909B 17C RCR 6
 909C 366 ?A#C
 S&X
 909D 0B5 ?NC GO
 909E 0A2 -> 282D
 909F 130 LDI S&X
 90A0 008 CON: 8

9090-9092: Function name

9093-9095: Convert the number from the X register to hexadecimal and transfer it to the S&X field of register C.

9096-9098: Save the contents of register C to registers A and B and then delete register C

9099-909C: Load the current, own page address into nibbles 6 to 3 of register C, shift nibble 6 to nibble 0 and check whether the entered page address is the same as your own address.

909D-909E: If so, abort the program and jump to the DATA ERROR routine.

909F-90A2: Load 8 to S&X from register C and check whether the entered value was less than 8

90A1 306 ?A< CS &X
 90A2 3DF JC 909D -05
 90A3 1E&C= C + C
 SkX
 90A4 306 ?A< C S&X
 90A5 381 ?NC GO
 90A6 00A-> 02E0
 90A7 0C6= B S&X
 90A8 13C RCR 8
 90A9 09C PT= 5
 90AA 3D0 LD@PT-F
 90AB 3D0 LD@PT-F
 90AC 0D0 LD@PT-3
 90AD 330 FETCH
 S&X
 90AE 0A6 A <> C
 S&X
 90AF 130 LDI S&X
 90B0 200 CON:512
 90B1 366 ?A#C S&X
 90B2 35B JNC 909D -15
 90B3 0E6 C <> B
 S&X
 90B4 030 ROM BLK
 90B5 3E0 RTN

If yes, return to DATA ERROR start

90A3-90A6: If the entered value was greater than 15, program termination and jump to the NONEXISTENT message

90A7-90B2: Check whether the word at address xFF is equal to 200 hex (x stands for the entered page address). If so, this is a page of the HEPAX file system and therefore an illegal entry. The program therefore jumps back to 909D to the DATA ERROR entry point!

Transfer the entered value from register C after S&X
 Switch HEPAX module! End
 of program.

Note: Both routines were written with the HEX editor of the HEPAX module and transferred to the PC with the disassembler via the HP-IL interface card. The documentation was added later with the help of a word processing program.

Finally, I would like to draw your attention to a few more or less serious errors. First of all, a less tragic issue. If the program pointer (e.g., after processing a program) is in any ROM and you execute the "HSAVEA" function to save the computer contents, the HP-41 CY TURBO displays the error message "ROM.". It does not matter whether you execute the function via the keyboard or via a program located in ROM. However, this bug does not cause any damage.

The situation is completely different if the program pointer is in ROM and you try to save a program to HEPAX memory using the "HSAVEP" function! The least of your problems is that the program is displayed in "HEPDIR" () as " ."

but was not saved in the first place and therefore cannot be executed. It can then be removed later using "HPURFL." However, it can also lead to a SUPER-GAU, in which the entire computer crashes. This can result in endless program loops that cannot even be eliminated by a forced MEMORY-LOST, but can only be brought under control by partially or even completely deleting the RAMBOX! In such a case, proceed as follows:

Remove the batteries and the HEPAX module from the computer and press the ON button a few times. Then reinsert the batteries and perform a MEMORY LOST. Answer the question "CLR RAMBOX?" with "NO" and the question "TEST RAMBOX?" with "YES." If this does not help, repeat the above steps, but answer the question "CLR RAMBOX?" with "YES."

If none of this works, please contact W&W Software Products

GmbH. If you are not sure whether a program has been saved correctly, always check all pages of the two 32 kB of memory using the "PGSUM" function. If anything seems strange, delete the relevant page. Also check all catalog functions (especially catalogs 1 and 4) to ensure they are working properly!

Therefore, always make sure that the program pointer is set to "HSAVEP" in the menu before starting the program (e.g., at the beginning of catalog 1, or after a "GTO..." command).

One more thing to note about the "PGSUM" function: After each time the HEPAX module accesses the HEPAX file system (even through "HEPDIR"), any checksums previously entered by "PGSUM" for the pages assigned to the HEPAX module will change.

If your HP-41 CY TURBO ever suffers a MEMORY-LOST, for example due to incorrect synthetic programming, respond to the

MEMORY-LOST queries " CLR RAMBOX?" probably also your complete RAMBOX? RAMBOX?" with "NO", as you with the HEPAX file system. be sure that previously correct checksums have been entered. When testing the RAMBOX (see RAMBOX manual), all pages whose checksums

me is not correct, automatically will be deleted, and thus and probably also your entire HEPAX file system.

Despite these errors, it can be said in summary that the HEPAX module with its many functions (see article in issue 2-3/88) is an excellent addition

for the HP-41 CY TURBO. This module allows you to expand the already remarkable capabilities of the HP-41 CY TURBO even

and can increase productivity considerably.

Herrmann Schiaab

NEWS

MASTERFACE Price reduction from May 1, 1989

Thanks to new production processes and , a rationalized Production due to major The recommended price

The recommended retail price for the MA-

STERFACE , have been significantly reduced. will be implemented. Starting May 1, 1989, the MASTERFACE instead of as previously recommended quantity of 1540 for only DM 1169 in stores

. If an order is placed the delivery date will be 1.5.89. given, the new price.

S a f t i m car:

Zigarettenanzünder-Adapter für HP-Geräte

This new product from W&W Software Products GmbH allows various HP devices that are otherwise operated with the HP-82066B charger to be operated or charged from the cigarette lighter socket in your car. Special electronics stabilize the 12V car voltage, which can have voltage peaks of up to 400V due to the effects of the ignition system, to exactly 8V. The price for this accessory is currently DM 69 including VAT. The adapter is available from HP dealers or directly from W&W.



AECROM

The AECROM is a module with a size of 8 kB. It offers various mathematical functions from the areas of curve fitting, hyperbolic functions, and conversion functions. It also includes a powerful program generator.

The Functions of AECROMs are divided into six groups:

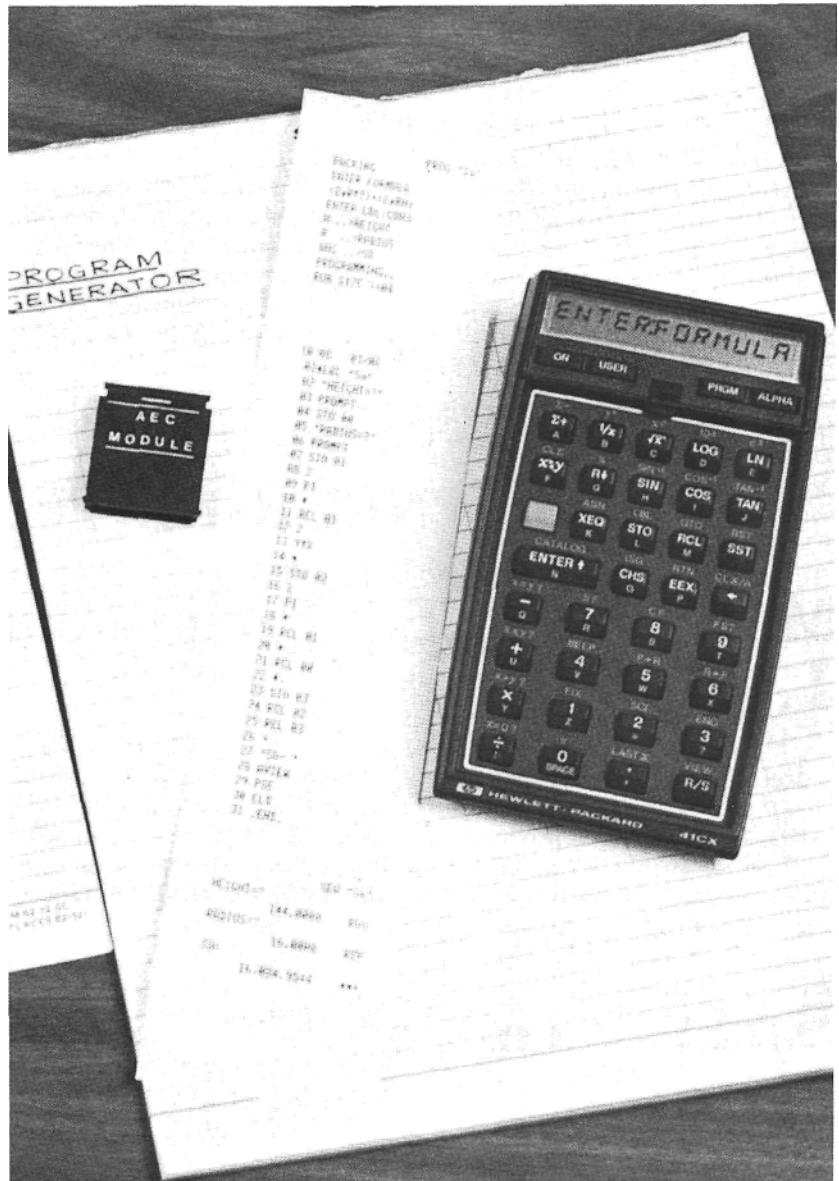
- Choice of length units
- The program generator
- Curve adjustment
- Geometric Solution pro
- Hyperbolic functions
- Hyperbolic functions
- Auxiliary functions

The individual function groups are presented here one after the other.

length units AECROM

The AECROM equips the HP-41 with the ability to display the numbers in the stack in different length units on the display. All functions work for input and output, the values are always converted correctly, stored in decimal foot format, and displayed according to the set mode.

DF switches to decimal foot mode, which is also the normal display mode.



fractions (tenths, hundredths, thousandths).

DI switches to decimal inch mode; register contents are displayed in inches with decimal fractions.

F switches to fractional inch mode; fractions of an inch are displayed as whole numbers.

M switches to decimal meter mode.

division in decimal foot and decimal meter mode. Normal multiplication and division with integers produces incorrect results because the values displayed do not correspond to the actual values.

*CONV multiplies the contents of the Y register by the contents of the X register, taking into account the correction factor.

/CONV divides the contents of the Y register by the correction factor.

by that of the X register, taking into account the correction factor.

The program generator

107

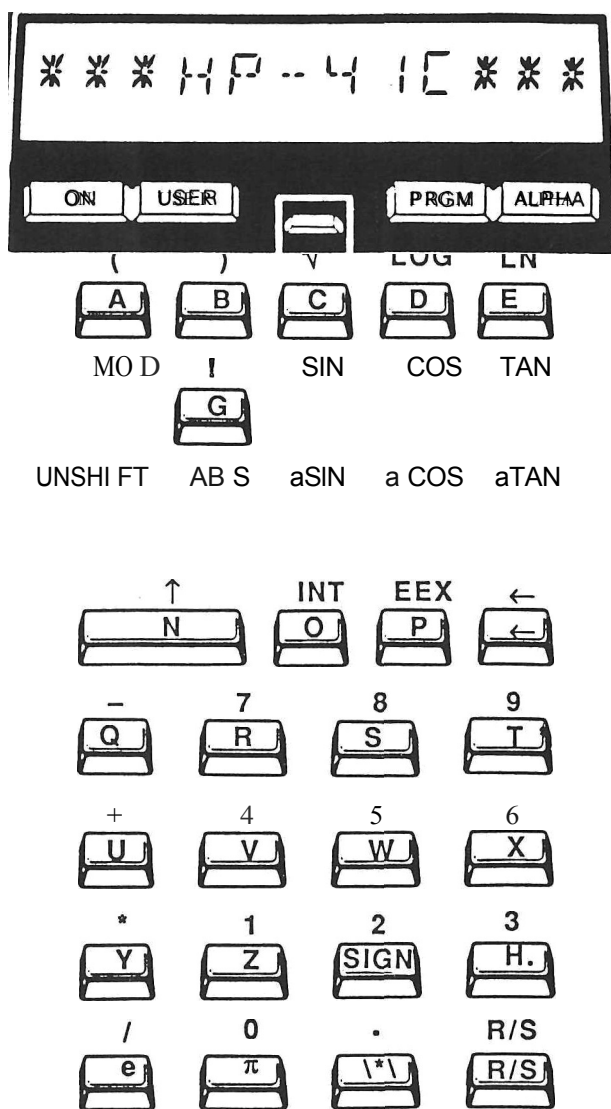
The program generator is easy to use: After calling the PROG function, first enter the desired program name. Then the modified keypad becomes active as shown in Figure 2, and the formula is entered. Press R/S to end the formula entry, and then the variables are queried.

Variable names. This is answered for each variable and concluded with R/S. After entering the last name, the program is created automatically.

The calculation of value added tax is shown here as an example:

Price * 0.14 = Value added tax
er.

Fig. 2: Key assignment in the program generator



The necessary inputs are:

Input	Display
XEQ	
ALPHA	
PROG	
ALPHA	PROG
ALPHA	
14	
ALPHA	ENTER.
A*0.14	
R/S	ENTER:LBL, CONS
	A.. =
PRICE	
R/S	ANS —
TAX	
R/S	PROGRAMMING. PACK RUN SIZE — 01

The AECROM generated the following program steps from this:

- 01 LBL '14%
- 02 'PRICE=?
- 03 PROMPT
- 04 STO 00
- 05 0.14
- 06 *
- 07 'TAX =
- 08 AVIEW
- 09 PSE
- 10 CLD
- END. REG now

Storing the price in memory 00 seems unnecessary, but this programming tactic is unavoidable for more complicated formulas.

Curve shapes:		
No.	Formula	Designation
0.	$y = a + b x$	linear
1	$y = \frac{1}{(a + b x)^2}$	reziprok linear
2.	$y = a + \frac{b}{x}$	hypothetical
3.	$y = \frac{x}{(a x + b)}$	reziproke Hyperbola
4.	$y = a x^b$	Potenz
5.	$y = a \cdot b^x$	modifizierte Potency
6.	$y = a \cdot b^x$	Wurzel
7	$y = a \cdot e^{b x}$	exponentiell
8.	$y = a + b \ln x$	logarithmisch
9.	$y = a + b x + \frac{c}{x}$	linear hyperbolsch
10.	$y = a + \frac{b}{x} + \frac{c}{x^2}$	hyperbolsch 2nd order
11	$y = a + b x + c x^2$	Paraboli
12.	$\frac{a + W}{e^{(x-b)^2}}$	linear exponentiell
13.	$y = a + e^{-c} \cdot e^{-\frac{(b - \ln x)^2}{c}}$	Normal distribution
14.	$y = a + e^{-c} \cdot e^{-\frac{(b - \ln x)^2}{c}}$	Logarithmic normal distribution
15	$\frac{1}{a(x + b)^2 + c}$	Cauchy

Figure 3: Kurvenformeln

Kurvenanpassung

The CURVE framework program is used to determine the most favorable curve shape for given pairs of values. The number of value pairs is not limited; each value pair is accumulated in the corresponding data register using the CRVF function. Their number is quite impressive at 34, and 16 different curve shapes are checked for the best match and their coefficients determined.

A list of the available waveforms can be found in Figure 3.

Geometric solution programs

The geometric solution programs SARR, TRIA, and CIRC offer convenient functions for entering known quantities and then determining the unknowns. Right-angled triangles, arbitrary triangles, and circles can be determined.

Hyperbolic

Functions

ions

The hyperbolic functions are currently only available as user programs, e.g. in the mathematics module from Hewlett-Packard. In AECROM, SINH, COSH, TANH, ASINH, ACOSH, and ATANH are now available as functions in machine language. The results are therefore available much faster.

Auxiliary functions

The group of auxiliary functions includes print and output aids. The functions are described below:

Print functions:

ACD accumulates the display content in the print buffer

CLBUF prints the contents of the print buffer and clears the print buffer (similar to ADV, but without line feed).

PLC prints the first character of the ALPHA register 24 times in a line. If flag 12 (wide print) is set, only 12 characters are sent.

PRAD prints the contents of the ALPHA register left-aligned and the display contents right-aligned.

PRD prints the display content during program execution.

Display functions:

DMS displays angles, angle minutes, and seconds. This is a faster and improved version of the calculation

HMS command, which rounds incorrectly. The value 44.9999 is displayed as 45 0' 0"; HMS returns the value 44.5960! However, DMS only displays this; the X register remains unchanged.

LPS displays fractions of a second. The number of digits displayed depends on the selected display format (FIX). LPS also does not change the X register.

WAIT interrupts program execution for approximately 0.5 seconds. This function replaces the PSE function of the HP-41 and is used for correct display in conjunction with VIEWX. The PSE function changes the display content.

VIEWX displays the contents of the X register in the current unit mode during program execution. This function does not print.

The authors report compatibility problems with the ZENROM and the CCD module. These problems arise in the case of the CCD module due to the simultaneous use of system interrupts. The AECROM uses these interrupts, but its subroutines do not branch back to query other modules. This means that the system extensions of the CCD module are not activated (CAT', RCL c ...). However, this disadvantage can be circumvented by a simple measure: if the CCD module is plugged into a lower slot than the AECROM, all interrupts are processed correctly.

The 100-page English manual (DIN A5 ring-bound) contains an introduction and table of contents, followed by six chapters on the individual function groups. The appendix contains program listings with corresponding barcodes.

In addition to several utility functions, the AECROM offers two very powerful functions with the program generator and curve adjustment functions. This is precisely where the strength of this module lies: the program generator provides even inexperienced programmers with a useful tool. The program generator makes it easy to overcome any reluctance to quickly enter a small problem into the HP-41 as a program.

AM

AECROM-function #	Module name
DF	18.01 Decimal foot mode
D	18.02 Derive in inch mode
F	18.03 Fractional calculation mode
M	18.04 Metric mode
ACD	18 Display output to printer
ACOSH	18.06 Inverse hyperbolic cosine
ASINH	18.07 inverse hyperbolic sine
ATANH	18.08 inverse hyperbolic tangent
CRVF	18.09 Curve fitting
'CIRC	18.10 Circular solution program
CLBUF	18.11 Delete print buffer
COSH	18.12 Hyperbolic cosine
DMS	18.13 Display of angle fractions
LPS	18.14 Display of angle seconds on the display
PLC	18.1 Printing of 24 identical characters
PRAD	18 Printing ALPHA register and display content
PRD	18.17 Printing the display contents
PROG	18 Program generator
"CONV	18 Multiply with conversion factor
'SARR	18 Solution program for right-angled triangles
SINH	18 Hyperbolic sine
TANH	18.22 hyperbolic tangent
'TRIA	18.23 Triangle solution program
/CONV	18.24 Divide durch conversion factor
VIEWX	18.25 Display the X register in the current mode
WAIT	18.2 0.5 seconds wait time (PSE)
'CURVE	18 Curve adjustment program

The
bäsä bääb
mit
TRANSSFPR.

dec Transfer system f o r HP
pocket calculators 7B, 19B, 275,
28C/S, 41C/V mlt IR module and
42S.

Can be elneai l8FRAR OT interface
used to programs. Data or
Data can be transferred to IBM-AZ/3B6
compatible computers or ATARI-ST
computers.

Dies , and similar transfer systems. For
example, for SHARP pocket calculators or
the CASIO PZ
630P, are available from:

Packheiser Hardware Products
Rechtstraat 39
B-J770 ¶claeer / Belgium
Tel. 0J)2-12 1§§617

oder
Hangweg 4
D-1800 üageo 8

Händleranfragen erwünscht !

FOLLOW-UP: Function lists for the HEPAX and EXTENDED-IL modules

In the last issue of *BCURSOR*, issue 2-3/88, the function lists for the HEPAX- , and EXTENDED-IL modules. We are therefore printing them here.

here. In addition, an incorrect specification had crept into the HEPAX module: the maximum possible program length is 320 registers,

which is limited by the size of the main memory.

HEPAX module

HEPAX module function list:

Name	XROM-#	Brief description
HEPAX 1A	7.00	Module name
HAPPCHR	7.01	Appends characters to a record Appends
HAPPREC	7.02	a record
HARCLRC	7.03	retrieves a record
HASROOM	7.04	Specifies the space still available in a text file Deletes the
HCLFL	7.05	contents of a file
HCRFLAS	7.06	Creates a text file
HCRFLD	7.07	Creates a data file
HDELCHR	7.08	Deletes a character
HDELREC	7.09	Deletes a record
HEPDIR	7.10	Displays a list of all files in HEPAX memory S.O.
HEPDIRX	7.11	Displays the available space in HEPAX memory
HEPROOM	7.12	Displays the size of a file
HFLSIZE	7.13	recalls the specified computer content recalls
HGETA	7.14	key assignments
HGETK	7.15	recalls data to
HGETR	7.16	recalls a record
HGETREC	7.17	recalls the specified data outputs a
HGETRX	7.18	value to the X register inserts a character
HGETX	7.19	Inserts a record
HINSCHR	7.20	Specifies the position of a search term Deletes
HINSREC	7.21	a file
HPOSFL	7.22	Outputs the value of the file pointer
HPURFL	7.23	S.O.
HRCLPT	7.24	Reads a file from mass storage
HRCLPTA	7.25	Renames
HREADFL	7.26	saves the computer contents
HRENAME	7.27	
HSAVEA	7.28	

HEPAX module (continued)

HSAVEK	7.29	Saves key assignments Saves
HSAVEP	7.30	programs Saves data register
HSAVER	7.31	contents See above
HSAVERX	7.32	Saves the contents of the X register
HSAVEX	7.33	Saves a file against accidental deletion Sets the file
HSEC	7.34	pointer
HSEKPT	7.35	see above
HSEKPTA	7.36	Releases a saved file for deletion Saves a file to mass
HUNSEC	7.37	storage
HWRTFL	7.38	protects program files from unauthorized access deletes
PRIVATE	7.39	memory areas
CLRAM	7.40	Encodes in hexadecimal form
CODE	7.41	Copies memory areas Decodes in
COPYROM	7.42	hexadecimal form See above
DECODE	7.43	decrypts machine commands
DECODYX	7.44	Multifunction call, see below
DISASM	7.45	see above
HEPAX	7.46	Calls up the hexadecimal editor, used to enter machine programs.
HEPAXA	7.47	programs
HEXEDIT	7.48	sedezimal input function changes the
		write permission reads modules from
HPROMPT	7.49	mass storage saves modules to mass
RAMTOG	7.50	storage Multifunction call, see below
READROM	7.51	S.O.
WRTROM	7.52	
XF	7.53	
XFA	7.54	

Functions of the multifunction call XF and X

Name		Brief
ALENG	# 0	Determines the number of characters in the ALPHA
ANUM	1	register Converts a character string into a numerical value
AROT	2	Rotates the contents of the ALPHA register
ATOX	3	Specifies the character code of a character
CLKEYS	4	Deletes all key assignments
CLRGX	5	Deletes the specified registers Queries
GETKEY	6	the computer keys
GETKEYX	7	Queries the computer keys for the specified duration

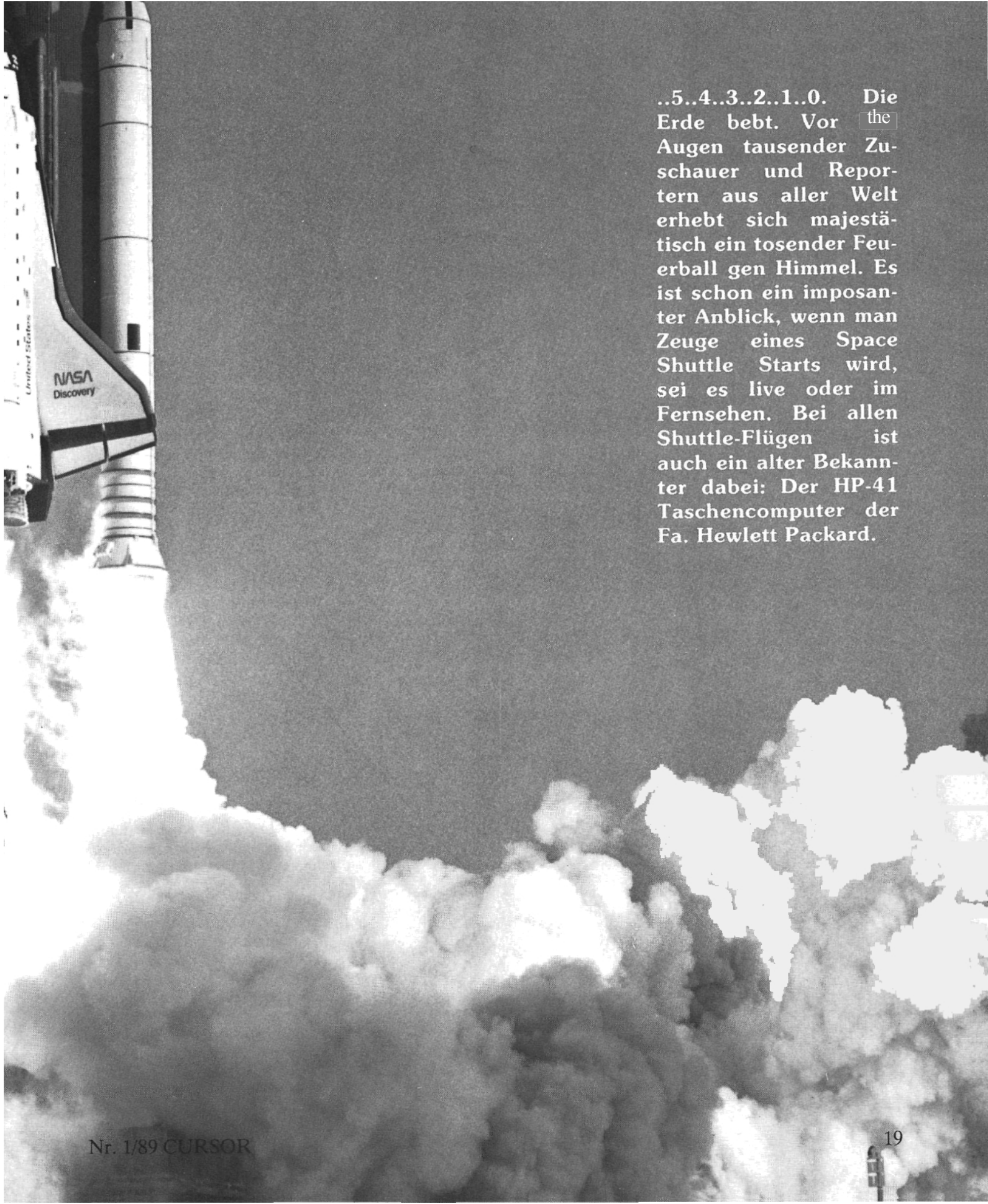
Continued on page 22!

Taschencomputer er

Der HP-41CV im Orbit

Start des Space Shuttles DISCOVERY zum Jungfernflug von der Abschußrampe des Kennedy Space Centers in Florida. (Foto: NASA)

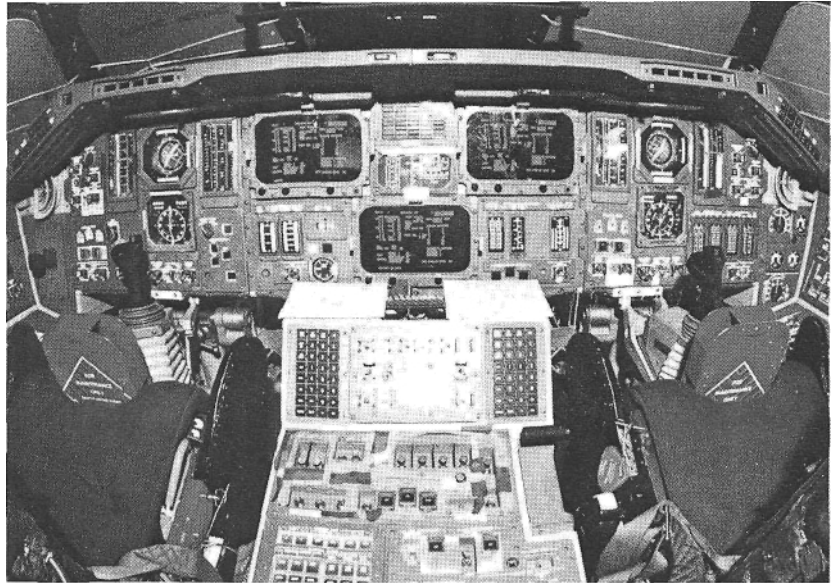
ern den Weltraum



..5..4..3..2..1..0. Die Erde bebt. Vor the Augen tausender Zuschauer und Reportern aus aller Welt erhebt sich majestätisch ein tosender Feuerball gen Himmel. Es ist schon ein imposanter Anblick, wenn man Zeuge eines Space Shuttle Starts wird, sei es live oder im Fernsehen. Bei allen Shuttle-Flügen ist auch ein alter Bekannter dabei: Der HP-41 Taschencomputer der Fa. Hewlett Packard.

Es ist klar. It's no secret that the HP-41 computer is space-tested. However, no one has been able to say exactly what the HP-41 does in space. There were even rumors that the shuttle could be brought back to Earth safely with the HP-41 in the event of a total failure of all on-board computers. To find out what truth there is to these stories, our editorial team sought out some interviews with the people responsible. people responsible.

Our editor-in-chief visited the NASA Space Center in Florida and spoke with astronauts and James Hartfield, who explains below what the HP-41 is used for on space shuttle flights:



A look inside the shuttle's flight deck with displays and control instruments. Photo: NASA

"The HP-41 pocket calculator has been on every Space Shuttle mission. Currently, the latest model is used, the HP-41CV. The calculators on board the shuttle are commercially available calculators with hardware that can be obtained anywhere. The only change made by NASA is a change in the volume of the beeper and the use of programs created by NASA personnel.

The latest standard for the Shuttle Portable Onboard Com-

puters (SPOCs), which is part of the basic equipment of every shuttle flight, has replaced many of the HP-41's former tasks. Six NASA programs are still used by shuttle crews in addition to the usual use as a calculator. Two HP-41CVs are part of the standard equipment of every space shuttle.

The six programs include

1. An alarm program that generates different sound sequences when certain crew

the crew, e.g., an on-board experiment.

This is currently the most frequently used program and will also be used on the next shuttle flight, Mission STS-30. The alarm sequence for the various activities can be entered on Earth or in orbit by the crew. This program also includes a hexadecimal-to-octal conversion program.

2. An approach program is used to assist with shuttle maneuvers that serve to prepare for the transfer of an object using the shuttle remote manipulator system (the mechanical gripper arm), e.g. satellite recovery.

3. A RADAC program is capable of translating m50 coordinates into correct ascent/inclination coordinates and vice versa.

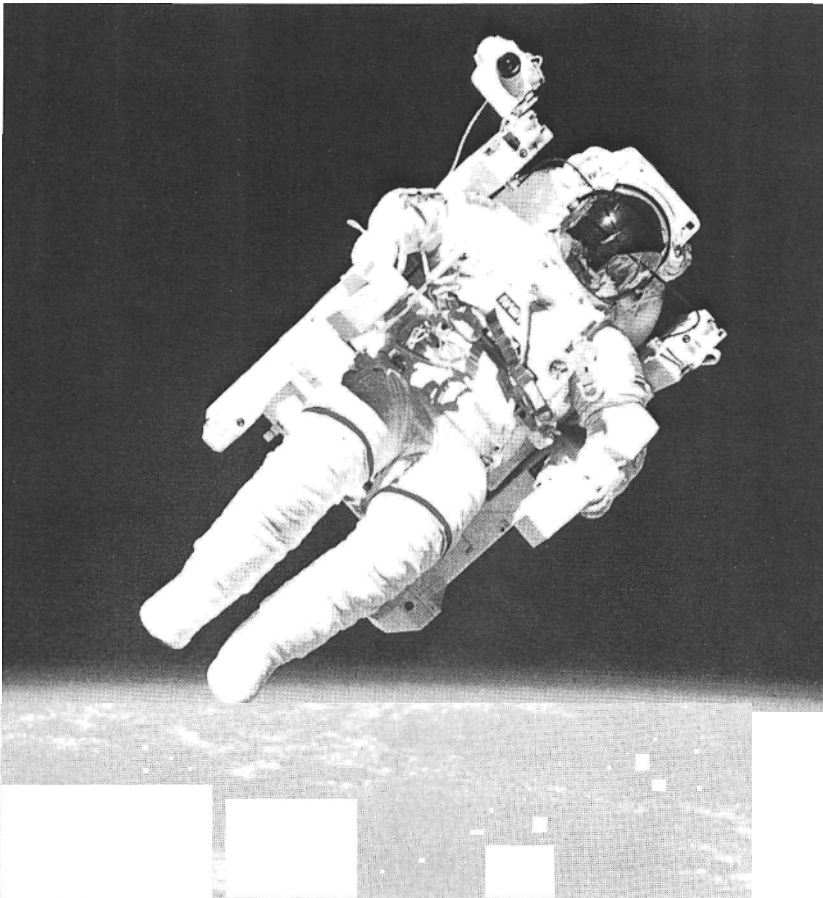
4. With a distance measurement program, it is possible to calculate the speed at which the shuttle is moving toward an object in orbit.

5. A search program is capable of calibrating the shuttle's inertial reference frame.

. If the crew searches for this



view of the assembly building at the Kennedy Space Center



are located in the mid-deck (*Fig. 1*), next to the 'portable laptop computers'.

So much for James Hartfield. Of course, the HP-41 was also taken along on the German D1 mission. With the help of a modified W41 interface from Walcher, the computer was used to record the astronauts' body values and store them for further evaluation. We are currently trying to arrange an interview with the people responsible at DLR to find out exactly what was calculated with the HP-41 and whether the calculator will also be part of the second German mission.

As you can see, the HP-41's field of application is not limited to Earth. The little HP-41 is even helping to conquer space!

WK

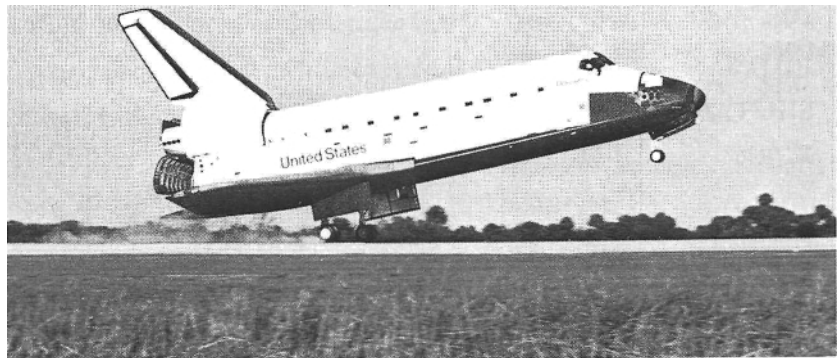
Lautlos im Weltall: Astronaut im Raketenstuhl (Foto: NASA)

support. When the crew searches for stars needed for this operation, the program outputs coordinates in ascending/declination from nine different fields of view.

Many other programs have been used on the HP-41 in the past, but these are the only ones that remain. The two computers

6. A 'Tail-to-Sun' program can calculate a position in m50 that the shuttle needs to determine its direction to the sun during maneuvers.

Only one of these programs can be loaded and used in the HP-41CV at a time. The program that is mainly used during the flight is selected and loaded by the crew before the flight. All six programs are on cassette on board and can be loaded by the crew for use in orbit.



Mission completion: Precise landing at the Kennedy Space Center (Photo: NASA)

HEPAX module (Continued from p. 17)

PnSN	8	Performs program-controlled key assignments. Deletes the
PCLPS	9	specified program in a program-controlled manner.
POSA	10	Specifies the position of a character to be searched for.
PSIZE	11	Changes the program/data register distribution program-controlled. Retrieves
RCLFLAG	12	parts of the status register.
REGMOVE	13	Moves data register contents. Swaps data
REGSWAP	14	register contents.
REG?	15	Displays the selected sum registers.
SIZE?	16	Specifies the selected distribution between program and data memory. Saves parts
STOFLAG	17	of the status register back.
XF	18	Manipulates flags 0 to 7.
XTOA	19	Outputs a character with the specified character code.
X= NN?	20	Compares the contents of the X register with the contents of the address
		specified in the Y register.
X#NN?	21	s.o.
X< NN?	22	s.o.
X<— NN?	23	s.o.
X> NN?	24	s.o.
X >= NN?	25	s.o.

Functions of the HEPAX and HEPAXA multifunction call

Name		Brief
AND	#	Links the contents of the X and Y registers with the logical AND Outputs
BCAT	2	the directory of blocks 3 to F
BCD-BIN	3	Converts the number in the X register from BCD to binary representation
BIN-BCD	4	Converts the number in the X register from binary to BCD representation
CTRAST	5	Adjusts the display contrast
DELETE	6	Deletes machine program steps Inserts
INSERT	7	machine program steps
NOT	8	Forms the complement of the X register contents
OR	9	links the contents of the X and Y registers with the logical OR
ROTYX	10	Rotates the contents of the X register by multiples of 4 bits (nibbles)
SHIFTYX	11	Shifts the contents of the X register bitwise
XOR	12	Combines the contents of the X and Y registers with the logical
		EXCLUSIVE OR
X+ Y	13	adds at the bit level
X\$	14	converts the contents of the X register into a character string
Y-X	15	subtracts at the bit level

EXT-IL module

EXT-IL function list:

Name	XROM-#	Brief description
EXTIL ROM	27	Module name
CLRBUF	27.01	Deletes buffers in main memory
DIRLEFT	27.02	Indicates the number of directory entries still available on the mass storage medium Specifies the number of possible directory entries on the mass storage medium
DIRSIZE	27.03	Renames the mass storage medium
NAMEMED	27.04	Reads the specified buffer content from the mass storage device
READBUF	27.05	Reads the main memory contents with EXTENDED MEMORY from the mass storage device
READCAL	27.06	Reads the contents of EXTENDED MEMORY from the mass storage device
READXM	27.07	Specifies the number of unused records on the mass storage device Copies files between mass storage devices
RECLEFT	27.08	Creates a directory entry for data files on the mass storage medium
SCOPYFL	27.09	Displays the directory of the mass storage device; new file types are recognized correctly
SCREATE	27.10	
SDIR	27.11	
SNEWM	27.12	Formats and names the mass storage medium Saves the contents of the main memory to mass storage
SWRTA	27.13	
SWRTK	27.14	Saves the key assignments to mass storage Saves a program to mass storage
SWRTP	27.15	
SWRTPV	27.16	Saves a program protected to mass storage Saves the computer status to mass storage
SWRTS	27.17	Saves the specified buffer contents to mass storage
WRTBUF	27.18	
WRTCAL	27.19	Saves the main memory contents with EXTENDED MEMORY to mass storage
WRTXM	27	Saves the contents of EXTENDED MEMORY to mass storage. Group name
PRINT FCNS	27	Creates an entry in a character conversion table for the printer Creates a multi-column program printout
ATOBUF	27.22	
MCLIST	27.23	see above
MCPRP	27.24	Selects a printer
PRTAID	27.25	Sends characters to the printer using the conversion table Creates a character with the specified character code
SACA	27.26	
X&gt;AR	27.27	

An obituary for the discontinuation of the production

On November 1, 1988, the HP-71B was declared obsolete

(outdated) and production was discontinued. This marked the disappearance from the market of an HP calculator that was praised upon its release for being powerful, portable, expandable, and BASIC-based.

In the lists of leading retailers However, it had not been available for quite some time. Due to its high price, it simply could not be sold in the quantities desired. But those in the know will praise it for the rest of their lives as the best programmable pocket calculator of the 1980s. With 17.5 KB of memory, a 64 KB operating system, and a programmer-friendly ANSI BASIC, it was fast and very accurate.

In conjunction with the peripherals available for the HP-41 system, a strip printer and a magnetic tape cassette drive, and also in conjunction with a ThinkJet printer, it represented a complete computer system that could be used for a lot of things, both then and now. All programs developed on the HP-41 system could be transferred to the HP-71B via a translator module and ran much faster there than on the HP-41 computers. But with so much more memory available, it was possible to make the programs developed on the HP-41 a little more user-friendly.

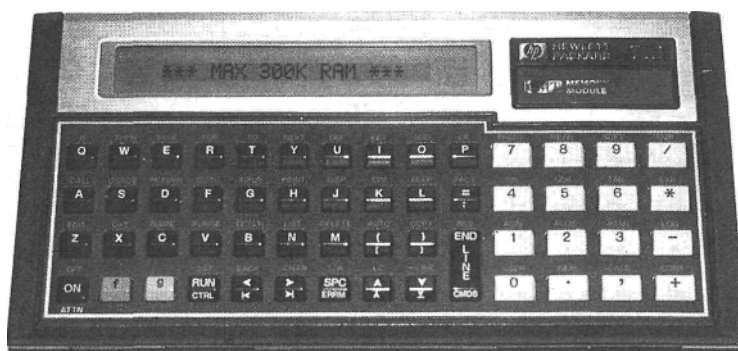
In any case, this led me to develop completely new and significantly expanded programs on the subject of "road construction and engineering geodesy." I haven't yet converted all the programs developed on the HP-41 system to the HP-71B, but I'm continuing to program on the HP-71B in order to round off the program package and possibly offer enthusiasts of the HP-71B a mature and practical

oriented program package.

In the programs published in various books to date, I have repeatedly noticed that individual program manufacturers have their own unique technology and often do not take into account the initial difficulties of a first-time user. However, the program design must go so far as to take into account all of a customer's potential wishes and also provide for all possibilities for correcting incorrect entries. The end result must be documentable. This must be verifiable, which means that all input values must also be output again.

In this case, it makes sense to include the mathematical formulation in the table headers. Where intermediate results are important, these should also be output. For me as a university lecturer, this was a matter of course for checking manual calculations. The program description must be so precise that a user cannot actually make a mistake. I have also gotten into the habit of not optimizing programs to the last possible detail with corresponding subroutines. With such maneuvers, which are of course necessary with limited memory capacity, I no longer understood my own program or needed a considerable amount of time to familiarize myself with the problem again.

To show the reader how I developed a program, I have chosen an easily understandable problem, a mass calculation from prisms. First, there is the description of the problem, followed by the mathematical formulation. I then have to work out



Production was started: the scl1eiicchner, which became Şebuiii.

a printout image becomes clear, so that the values I entered are also output again. The question arises as to whether intermediate values should be output so that the program can be interrupted at any point and resumed later. Then I need to consider what I can do to correct an incorrect entry at a specific point, either immediately or at a much later stage, as I may only discover it when reviewing the list again.

Furthermore, I have to think about whether I want to create clean documentation as the final product. Should the option of text input be provided at the beginning of the program or at any point? I could go on, but that should suffice for the problem at hand.

Of course, test examples are an essential part of any program.

Since programs sometimes fail to transfer correctly, whatever the cause may be, you should first run through the test example if you notice any incorrect outputs. If this also leads to the wrong result, you will have to reload the program, possibly from a spare cassette.

Unfortunately, the card reader for long magnetic strips that comes with the HP-71B does not feed them in automatically. You have to develop a certain skill to pull the magnetic strip through at a steady speed, both for recording a program and for later re-reading. A digital cassette drive is therefore essential for the proper operation of the computer.

In order to be able to use the computer without a tape printer or THINK-IET printer and without combining it with a digital cassette drive, all programs were

designed so that they can run on the computer alone. The memory expansion modules manufactured and distributed by W&W Software would prove to be the ideal addition to the computer, because you can have a certain standard set of programs permanently stored and then only need to select the desired file from the current file using the 'EDIT filename' command.

When printing via the THINKJET printer, you can of course select a different printout format in DIN A4. This just needs to be programmed accordingly.

(Editor's note: The program and the instructions have not been approved. If you wish to use them, please contact the publisher.)

Prof. Dipl.-/ng. Heinrich Oberste-Brink-Bockliolt



ZE ITG LOCKEN LAUBE 4 3000 B E RN 7

Any questions?

Come and see your HP specialist in Switzerland.

Bärtschi & Co., Zeitglockenlaube 4, CH-3000 Bern 7

Tel. 031 22 77 44 Fax

New interface for MASTERFACE

W&W has now introduced another interface for the already generously equipped MA-STERFACE. **Zu-** In addition to the existing equipment features (text, graphic and Centronics interface), it is now possible to connect an RS232 (V24) interface.

The RS232 extension is plugged into the existing Centronics socket and does not require a separate power supply. As soon as the RS232 is connected, the MA-STERFACE provides various new Communication options are available. With an HP-IL controller (HP-41, HP-71, or HP-75), any data can be transferred between an HP-IL device and the device connected to the RS232 interface. For example, you can send measurement data to a PC or use your HP-IL printer as a PC printer by connecting the HP-IL controller as a simple transfer unit. Here is a small sample program (Fig. 1) for the HP-71 that receives data from the PC and prints it on the HP-IL inkjet printer.

The program is terminated by pressing the ON button. As this example clearly shows, the RS232 interface has its own device identifier (Device ID: WWRS232). The new accessory ID (Accessory ID: 66) of the interface allows it to be addressed the same in in the same way as the original HP-IL/RS232 interface. The transmission parameters are set

are made using switches directly on the RS232 extension. The following transmission parameters can be selected:

7 bits - even parity - 2 stop bits

7 bits - odd parity - 2 stop bits

7 bits - even parity - 1 stop bit

7 bits - odd parity - 1 Stop bit

8 bits - no parity - 2 stop bits

8 bits - no parity - 1 stop bit

8 bits - even parity - 1 stop bit

8 bits - odd parity - 1 Stop bit

Flow control is generally performed via hardware handshake.

Although the RS232 interface to the MASTERFACE cannot be programmed with 'REMOTE' commands, it can still be used with all existing programs that use 'REMOTE' commands, as these commands are 'swallowed' and not passed on to the connected device.

However, the new RS232 extension can not only be operated with an HP-IL controller (see above). If no such device is connected, all data coming from the RS232 is routed to either the text or plotter interface of the MASTERFACE. This allows the MASTERFACE to be used as a plotter or second text screen from a PC, for example. All control characters for the MASTERFACE that can be used via the HP-IL can also be sent from the RS232 in this operating mode. Since only a CR (no LF) is usually sent as a line termination character from a PC, it is possible to have the MASTERFACE automatically generate an LF after each CR.

Finally, here is a little tip. The options mentioned in the last section can also be used if an HP-71 is connected but has been switched off. When switched off, the HP-71 sends an LPD (Loop Power Down) command via the HP-IL, which causes the MASTERFACE to route data coming from the RS232 to the text or plotter interface. When the HP-71 is switched back on, it regains control of the MASTERFACE.

AA

```

10 INTEGER D1,D2
20 RESET HPIL @ RESTORE IO @ SFLAG 23
30D1= DEVADDR('WWR232')@D2= DEVADDR('HP2225B')
40 SEND UNT UNL MLA LISTEN D2 TALK D1
50 ENTER :LOOP USING '#,9999X'
60 GOTO 50

```

Fig. 1

Infrared receiver for PCs

After its release the Infrared interface for the ATARI ST, is this now also for IBM-PC and -compatible computer.

The infrared receiver consists of a small aluminum housing with dimensions mm * 40 mm * 30 mm. The receiving opening is located on the front. A approx. 60cm long round cable with a 25-pin SUB-D socket provides the connection to serial transfer interface of the PC. a suitable adapter, the connection to 9-pin plugs connector strips possible possible DATA on these adapters must be selected separately

Hardware requirements
The requirements for connecting the computer to the PC are minimal: all AT computers are incompatible.

depending on the clock frequency. A serial interface as COM1 or COM2 is required to connect the infrared receiver. All screen resolutions are supported by the

Reception program supported.

HP Transfer is for receiving data from HP 17B, HP 19B, HP 28C, HP 28S, HP 28X, HP 28Xt, HP 28Xt2, HP 28Xt3, HP 28X HP 275, HP 28C, HP 28S, HP 41C/CV/CX and HP 425.

This means that path to HP Transfer for all HP pocket computers that have an infrared interface.

After starting the program, the GEM-like user interface immediately appears. The file User interface. The Selecting individual menu items Selection is made using the keyboard. The following options are available in program version 1.03 dated March 19, 1989:

DESK

< Info> : shows the version number
< Receive >

FILE

< Load> : loads an HP file
< Save> saves emp-
Data captured
< Rename > .- There 75
file a new
name

< Delete> : deletes a file

< Quit> : terminates the HP

< Receiving> : reads data from
HP pocket computer

< XT and

< Text > shows the
current text file without
graphics

< Graphics> : Displays the
current text file with
graphics

< printer> : changes the print status
status

OPTIONS

supported < Bild Pfad> : sets the
image storage on

< Settings> : changes the
default settings

<> : displays the help
An

<> : starts the specified
Editor

After selecting the item < Receive > the data reception can be interrupted using the ESC key. The received data can be saved as text or as text with

graphic display. This selection is made in the " < " display menu "> ". The received data can also be stored in files. When displaying the received " " data, the " " infrared receiver must be connected to the infrared port of the printer. formation scale in the X direction between 4:1 and 1:1 and in the Y Direction selectable between 2:1 and 1:1.

The interface is designed for reception over a maximum distance of 1.5 meters. The transmission speed of the HP computer should be as low as possible, otherwise data may be lost. In practice, however, no data loss has been observed even at

high transfer speed
not determined . We
used a
xml-ph-0000@deepl.internal
XT computers
with a clock
frequency of 4.7 MHz
and a high-speed HP-41 CY
TURBO.

The infrared receiver is a useful tool for using the portable pocket computers as

data collector with subsequent transferring this data to the PC. Furthermore, the large PC memory can be used inexpensively via this interface. For PC owners, HP Transfer is certainly an interesting alternative to the infrared printer from Hewlett-Packard at a price of around DM 300.

Future updates of the software are included in the purchase price; the user only needs to send the original diskette in a stamped envelope to their dealer.

AM

The new "little ones" from HP - Part II

HP-325

The HP-325 is a programmable pocket calculator for demanding tasks in technical and scientific fields. Its price and performance are convincing arguments for its use in higher education.

Over 180 built-in functions (located in menus, see Fig. 1), 390 bytes of user memory, and 27 registers support the user in a variety of ways.

The HP-32S displays inputs and results on a single-line, 12-character LCD dot matrix. The display brightness can be adjusted at the touch of a button. Unfortunately, there is no option to output data to a printer (e.g. via infrared transfer). The UPN input logic, which was developed by engineers and scientists and is often preferred, ensures fast and efficient input of arithmetic operations.

UPN input logic, which is often preferred by engineers and scientists, ensures quick and efficient input of calculations. The UPN input logic takes some getting used to for new users.

The UPN input logic is also used in the area of (key) programming. When programming, 260 program steps are possible, with 27 program marks that can be set and branched to 7 subprogram levels. The option of indirect addressing rounds off the extensive programming routines.

A 'SOLVE' routine is used to calculate any unknown variable within an equation. It is located in a menu in the calculator. An existing function is set to zero for the calculation with the 'SOLVE' routine and written to the program memory as an alphanumeric equation. The variable to be found can now be specified in the menu of this routine and calculated numerically. 'SOLVE' solves for one unknown at a time and prompts the user for the values of the remaining variables. Numerical integration is also available as a menu item in the 'SOLVE' routine and can be used in the same way.

Operations with complex numbers, the use of numbers in polar notation, and calculations in different number systems are further functions integrated into the HP-32S.

A 'STAT' menu offers functions for statistical analysis of data sets with one or two variables. The menu offers 16 different parameters for calculation, including the calculation of the mean value of x values, whereby the y values serve as weighting or frequency of the x values. Unfortunately, it is particularly noticeable here that the number and multiple assignment of the

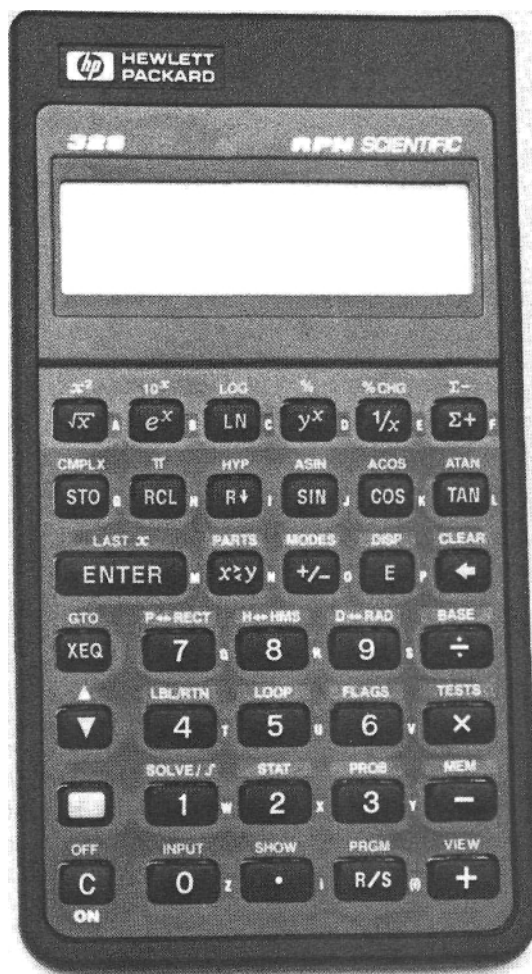
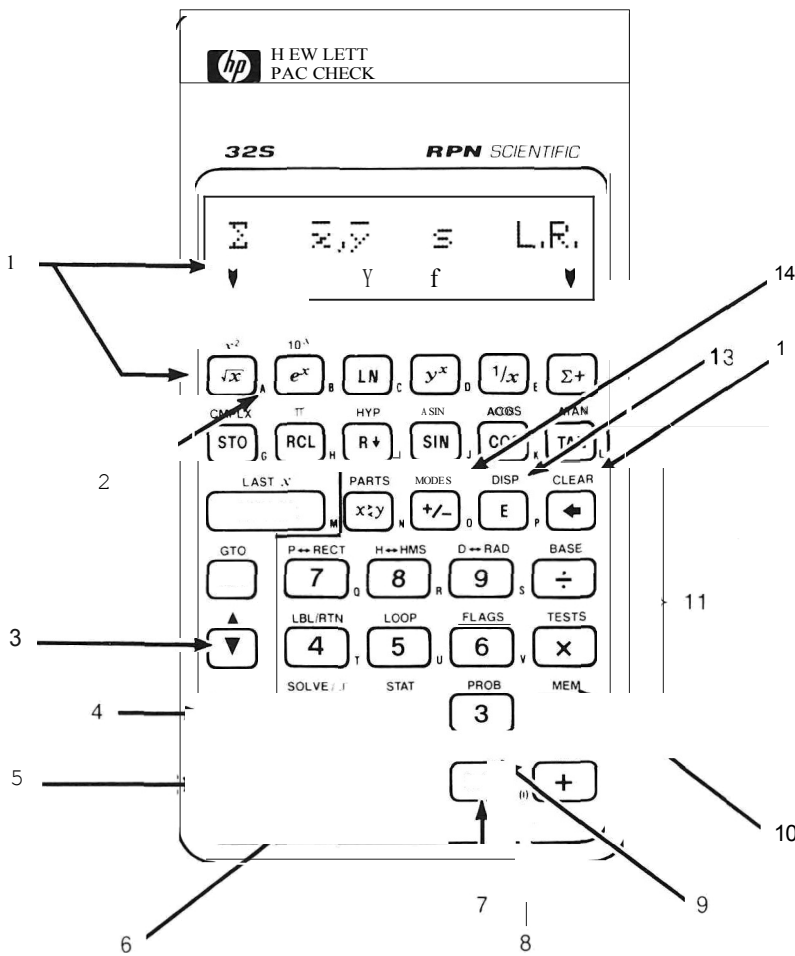


Fig. 1: HP-325



- | | |
|--------------------------------------|--|
| 1. Menu and menu buttons. | 8. For indirect addressing via i. |
| 2. Letter keys for variables | 9. Switching labels on and off. Program input mode. |
| 3. Browsing programs and | 10. User memory; stored lists. Variables and programs. |
| 4. Shift key. | 11. Menu keys (framed area) |
| 5. On; clearing display, menu, area. | 12. Delete the program input memory (all or part). |
| 6. Display all decimal places. | 13. Specify the display format. |
| 7. Start/stop for programs. | 14. Specifying angle mode and decimal sign |

Although the number of keys is reduced with the help of menus, the operation of individual functions is quite cumbersome in many cases. A total of 16 different menus (see Figure 2) are stored in the calculator. Each menu must be accessed in the first step by pressing two keys.

. As a rule, two further key presses are then required
 key presses are required to
 (variable, label, etc.)
 (variable, label, etc.)
 .

For statistical calculations, this means, for example, that

for each characteristic value (mean value of x , standard deviation s_x , etc.) at least four, if not 5 keys need to be pressed. However, this is also justified by the fact that the format of this calculator, like that of the other 'small' HP models, is quite handy at 15x8 cm and has a very clear layout.

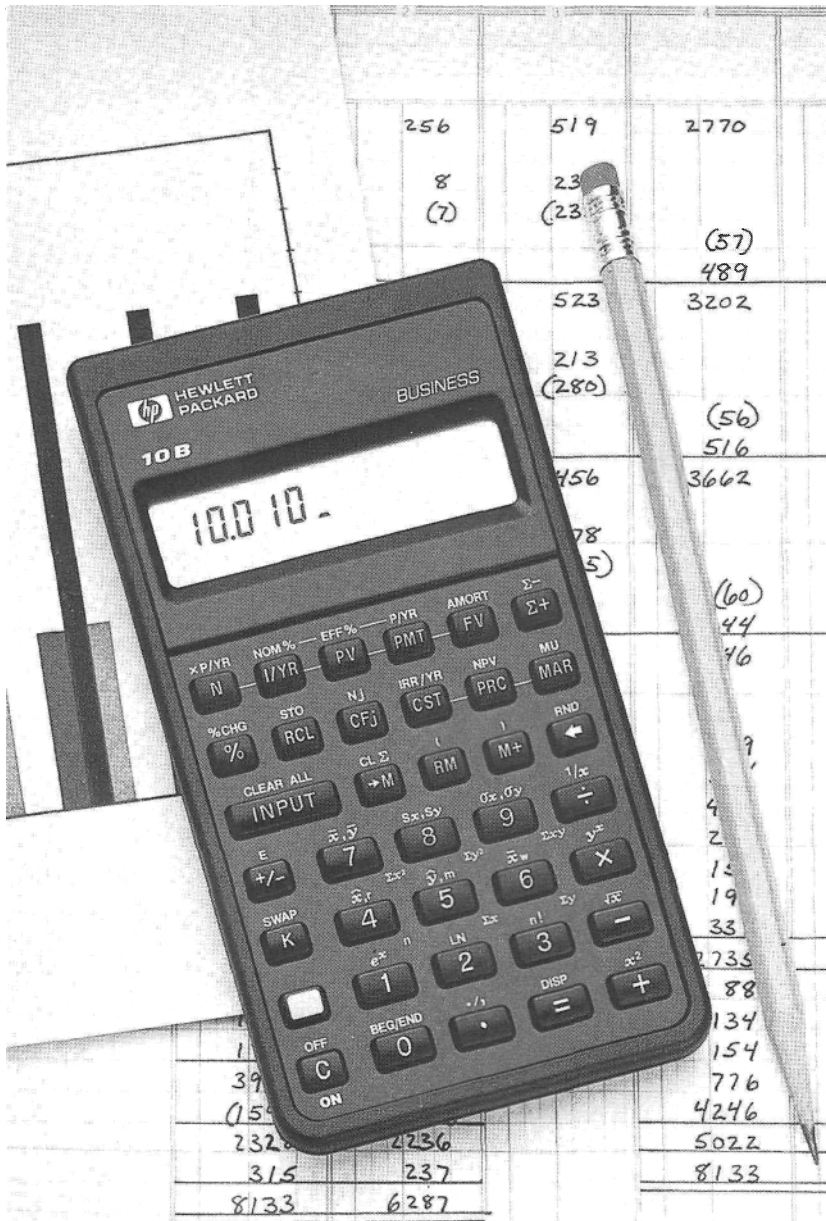
The user manual for this HP calculator is also noteworthy. It is written for beginners, but naturally requires standard mathematical knowledge. In addition to a function overview, a subject index, and other general information, the appendix contains a small 74-page program library.

This program library contains 10 detailed program descriptions. The program issues are discussed in relation to both mathematics and programming technology. Sketches and comments on programming technology and solutions supplement each description.

All in all, the HP-325 is a calculator for those who are looking for an inexpensive solution for smaller programming tasks. The HP-325 works with sophisticated HP programming technology, but 260 program steps also set limits.

For users with fewer programming ambitions, the 'SOLVE' function of the HP-325 may be just the thing. Functions can be entered into the program memory in a rational manner and solved numerically for an unknown variable.

BT



Hardware

Single-line LCD liquid crystal display with twelve digits

- 10 kB ROM
- 256 bytes RAM
- 3 memory keys: > M; RM; M +
- Constant memory
- Dimensions: 7.9 x 14.7 x 1.4 cm

Three replaceable button batteries are included.

"The introduction of an HP calculator in this price range is significant because it now makes the quality and performance that Hewlett-Packard calculators are known for available to a wider range of customers," said John Santantoniou, marketing manager for calculators in Europe.

According to Mr. Santantoniou, HP is only able to offer such inexpensive calculators because its research, development, and production departments cooperate with each other from the early stages of development in order to design high-quality products at the lowest possible cost. HP calculators are manufactured in the US and Singapore.

Specifications for the HP-10B commercial calculator:

The device offers all the basic functions that students and businesspeople need for business and financial calculations and analyses. A three-key memory system and automatic constants simplify and speed up use for routine problems.

Intermediate results (e.g., when calculating value added tax) are automatically displayed.

HP-10B

Hewlett-Packard introduces a new, affordable pocket calculator for commercial use.

Hewlett-Packard is introducing a new pocket calculator for commercial use under the name HP-10B.

Designed for businesspeople and students, the HP-10B offers the same quality and reliability as the more sophisticated HP-17B and HP-19B models. The HP-10B has all the essential commercial and mathematical functions, such as credit calculation and cash flow analysis.

mathematical functions, such as credit calculation and cash flow analysis.

A number of features make the HP-10B convenient to use. For example, all functions of the new calculator are always available; the user does not have to switch modes for special functions. Routine problems can be solved quickly and easily with the function key for chain calculations and the "M" keys for temporary storage of numerical values.

Hardware magic HP-28C upgrade DIY

The drawback of the **HP-28C is its low memory of only 1.7 kB. This shortcoming was remedied with the release of the HP-Z8S with 32 kB, but owners of the old HP-28C calculators were left out in the cold. However, the HP-28C can also be upgraded!**

Different HP-28 calculators use the same CPU as the HP-71. A detailed analysis of the HP-28 design revealed that the calculator can be upgraded with the same memory modules as the HP-71. The difficulty, however, is that the HP-28 case cannot be opened. It must be milled open at the location indicated below. The plastic wall is also thick enough to easily accommodate the additional soldered module.

The following materials are required:

- Grounded workstation
- Electronic soldering iron with a fine tip (e.g., ERSA Minor SW)
- Milling machine
- 4K or 32K memory expansion module for the HP-71
- Fine insulated wire

Before starting work, you should be aware that if you trade in your HP-28C (e.g. for \$150) to buy a new HP-285, this calculator will be cheaper than converting the HP-28C with a new 32K module! In principle, the conversion is only worthwhile if you can get a used HP-71 module very cheaply or if you simply enjoy tinkering.

1. Opening the calculator

A square hole must be milled into the back of the calculator (preferably with a milling machine) (see sketch below). Be careful not to mill or cut too deeply, so as not to damage the components or conductor tracks underneath. After opening, a component labeled "1LP3-0015" should be visible.

2. Opening the memory module

Use a screwdriver or knife to open the memory expansion module (4K or 32K). After opening, you will be holding a small circuit board in your hand, which will later be soldered into the HP-28. The gold-plated contact tabs of the module must now be carefully desoldered. But be careful! All components are very sensitive to static electricity! Therefore, it is very important to ensure that your work area and tools are properly grounded.

3. Space check

Before you start soldering the module, it is best to check whether the module physically fits into the recess milled into the computer. If this is the case, you can start wiring. The wires should be long enough so that

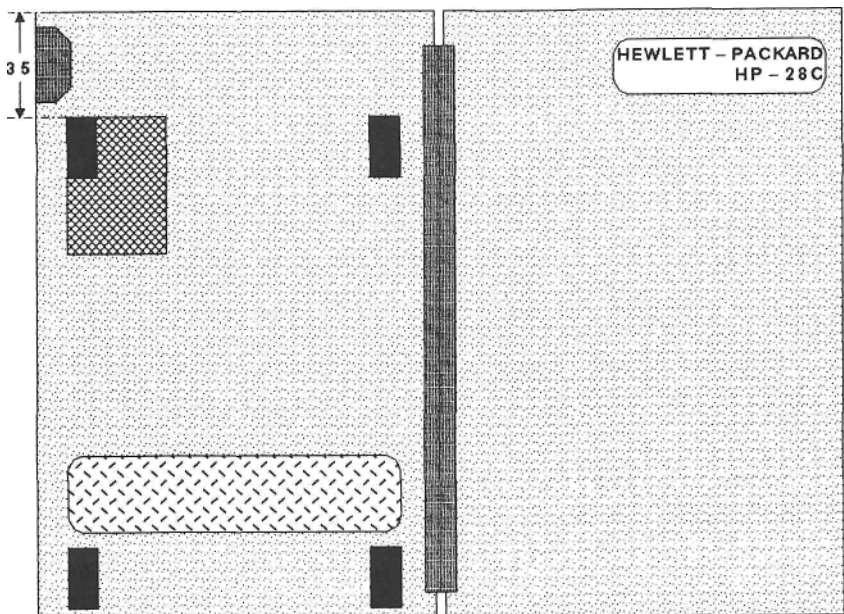


Fig. 1: The double-hatched area must be milled out

so that the module can be placed in its final position without the wires being stretched.

4. Soldering the memory expansion

The memory expansion

The memory expansion and the built-in memory chip 1LP3-0015 have the following pin assignments:

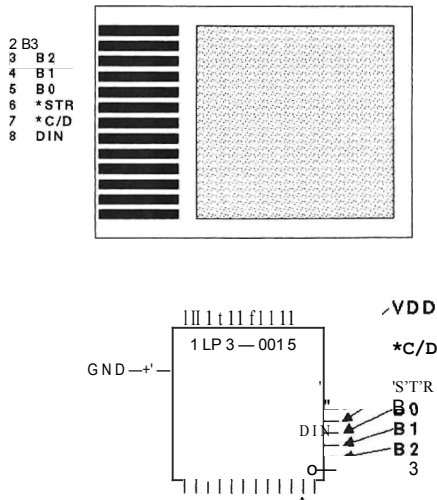


Fig. 2: The pin assignments of the memory clips

In the illustration below, the flat side of the memory module is at the bottom.

The wire connections are now made using a fine soldering iron (e.g., ERSA-Minor, SW). Of course, the batteries are removed first. First, GND is soldered on, followed by V+. Then

, all other connections are made as shown in Figure 3.

Once all connections have been made and the batteries are back in the computer, the additional memory should be available immediately. This can be checked directly using the "MEM" function on the computer.

5. Closing the computer

Finally, the milled area of the computer just needs to be sealed. A plastic film, such as those available from model making shops, is stuck over the milled area. The film should be slightly larger than the opening, but not too thick, as otherwise the computer may not stand securely on the desk pad. The rubber foot that was removed earlier can be discarded or stuck to another location.

Good luck!

WK

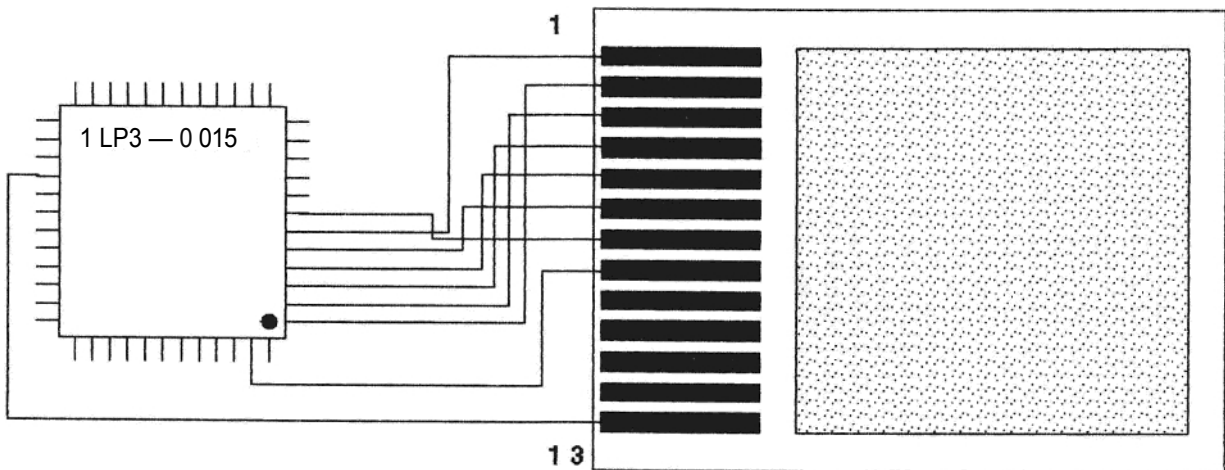


Fig. 3: Wiring diagram for the memory module

SHARP IQ- 7000

Sharp presents the IQ-7000, a new "personal database" in pocket format. It can communicate with a personal computer via the RS-232C interface. This solution will be available on the market in the middle of the year.

A communication package is now available from Sharp at under the name "Ortganizer-Link." It consists of

two program disks (3.5" and 5.25"), the level converter (RS-232C) and documentation in three languages (German, English and French).

This makes it possible to feed data to the IQ-7000 via an IBM-compatible computer, or vice versa. Three different address/telephone registers, notes and other memos, scheduling and alarm functions, and a long-term scheduler with monthly, weekly, or daily overviews are available. A memory capacity of 32 KB is available for this purpose.

Data transfer is menu-driven on the PC. Further processing is possible in WordStar, Sidekick, and Lotus 1-2-3. Three IC cards available from Sharp expand the database's range of applications.

1. Project organization with deadline and account monitoring as well as time account management

This program card helps to organize and systematize important project data. Variables can be entered into a "blank form," which the IQ-7000 then calculates and works with independently. Project data can be broken down according to various search criteria. Individual areas can be displayed according to different criteria.

2. English Synonyms and spelling

This card contains an extensive list of synonyms for English keywords. The spelling help, which is based on the American Heritage Dictionary, covers approx. 87,000 words.

3. Translation module for eight languages

Around 460 idioms help you make yourself understood more easily when abroad. An additional dictionary with approx. 780 words per language helps you with the most important vocabulary when traveling. After selecting the base language, the symbol key opens a area , e.g. hotel, health, restaurant, etc. The translation can be selected in German, English, French, Italian, Spanish, Swedish, Japanese, and Chinese.

IQ 7000 Trans

The IQ-Trans program enables two-way data transfer between the Sharp IQ-7000 and an IBM-compatible personal computer. Menu control makes the program extremely easy to use and can be used immediately even by non-experts.



New developments in programmable pocket calculators

The new FX-4200 P and FX-690 shows Casio shows the direction in which comfort features are developing, even in small calculators.

FX-4200 P

The FX-4200 P is already a remarkable calculator with 150 technical and scientific functions. What makes it interesting is its programmability with the function memory. Formulas can be programmed with up to 279 steps by simply writing them down.

PX-690

The FX-690 is slightly smaller, can be programmed with 30 steps, and still draws all of its energy from light. Casio's C-Power technology provides enough energy to operate the calculator even in low light or no light at all.



Casio's electronic time schedule and management systems now DFU-compatible

For a series of new time management systems on electronic basis at the Cebit '89 trade fair in Hanover.

The "C" model was recommended as the smallest model

was the one recommended, which was introduced last year and has been very successful.

The SF-4000 is richly equipped. Even this smallest Casio database can store up to 32,000 characters (32 KB) in the form of telephone entries (sorted alphabetically), appointments (from January 1901 to December 2099) or free memo entries. A large display (4 x 16 characters), the QWERTY keyboard (typewriter layout) and extremely handy format (14x126x74 mm) round off this small device. Brand new at the Cebit trade fair in Hanover, the SF-7000, SF-7500 and SF-S000 data banks were introduced as the big brothers of the SF-4000.

A key new feature of the SF-7000 and SF-7500, which are also only the size of a cigarette packet, is the business card function and integrated world clock/alarm. Appointments can be displayed on the twice as wide display with a two-month overview. A separate alarm can be set for each appointment to remind you in good time. The highlight, however, is probably the data transfer to another device in the SF series using the cable supplied or to the

MS-DOS PC via FA-100 interface.

The SF-7000 is available as a 32 KB and 64KB version.

"C" in your pocket PB-2000 C

The completely new MK

Casio presents its new PB-2000 C pocket computer. This pocket PC has two new features:

Firstly, the entire system area – including the normally integrated program language – is located on a ROM card that can be easily replaced by the user.

Also new and absolutely remarkable for devices of this size is the integrated program language. Casio supplies "C," the professional language in which the UNIX operating system was programmed, as the initial ROM. Other languages available on ROM cards are planned:

BASIC, PASCAL, LISP. The accessories for the PB-2000 are already known.

The MD-100 floppy disk drive (320 KB, 3.5") and the Fa-7 interface box (Centronics, RS-232, cassette/Kansas City standard) are already used in the PB-1000. The PB-2000 C can be expanded to 64 KB.



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