MICRO-80

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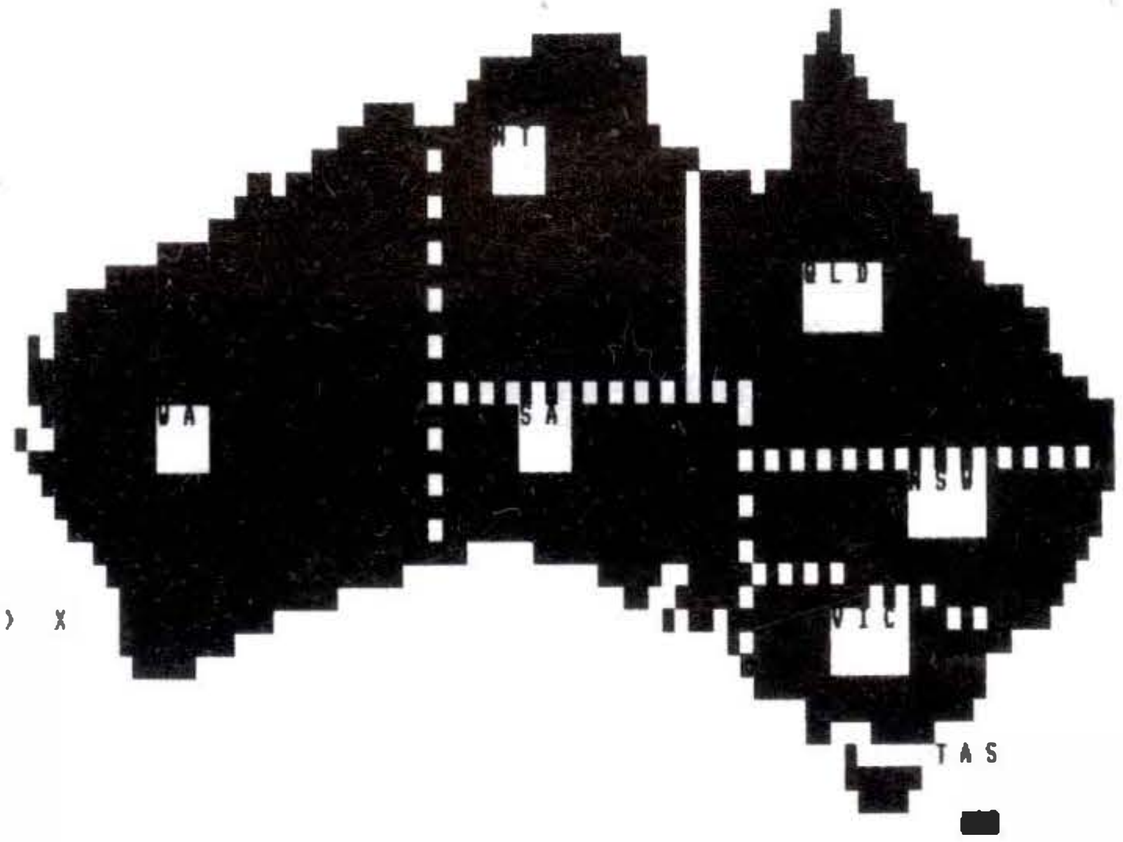
AUSTRALIA'S CUP



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Also in this issue:

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Peek, Poke and USR Statements Explained

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The Adventure System
The TRS-80 MC-10 Computer

SOFTWARE:
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ABOUT MICRO-80

EDITOR: IAN VAGG

MICRO-80 is an international magazine devoted to the Tandy TRS-80 Model 1, Model III and Colour microcomputers, the Dick Smith System 80/Video Genie and the Hitachi Peach. It is available at the following prices:

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HONG KONG/SINGAPORE	Aus$58.00	Aus$122.00	Aus$157.50
INDIA/JAPAN	Aus$64.00	Aus$129.00	Aus$165.00
USA/MIDDLE EAST/CANADA	Aus$73.00	Aus$140.00	Aus$177.00

Special bulk purchase rates are also available to computer shops etc. Please use the form in this issue to order your copy or subscription.

The purpose of MICRO-80 is to publish software and other information to help you get the most from your TRS-80, System 80/Video Genie or Peach and its peripherals. MICRO-80 is in no way connected with any of the Tandy, Dick Smith or Hitachi organisations.

WE WILL PAY YOU TO PUBLISH YOUR PROGRAMS: Most of the information we publish is provided by our readers, to whom we pay royalties. An application form containing full details of how you can use your microcomputer to earn some extra income is included in every issue.

CONTENT: Each month we publish at least one applications program in BASIC for each of the microcomputers we support. We also publish Utility programs in BASIC and Machine Language. We publish articles on hardware modifications, constructional articles for useful peripherals, articles on programming techniques both in Assembly Language and BASIC, new product reviews for both hardware and software and we printer letters to the Editor.

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EDITORIAL

Welcome to our new-look MICRO-80 magazine. We hope you find the new layout more readable than the old. For those interested in the mechanics of magazine production, our type setting is now being done on a Compugraphic 80 Electronic phototypesetting machine. This is effectively a multi-user computer/word processor which produces its output photographically. The equipment is pretty much state-of-the-art and is another product of the microprocessor revolution. Just in case you think we must have won the lottery, the type setting equipment is not ours but is the property of Formgraphic, a very progressive type setting house located nearby.

Quite apart from making the magazine easier to read, the new type setting fits double the amount of information on each page thus enabling us to reduce the paper used by almost 25% (the Listings still occupy the same space as before). So when future issues look a little slimmer, don't fret, you will still be receiving the same amount of information. The reduction in paper content is aimed at reducing the magazine's production costs. It is now 2 years since the price of MICRO-80 was last set. In that time, production costs have increased dramatically. Even with the reduction in material costs we have now effected, we must reluctantly increase the selling price of MICRO-80. The new rates which become effective immediately, are published on the index page. The price increase is modest and will enable us to continue to improve our magazine and adapt it to meet the changing requirements of our readers. Of course, you will not be required to pay the new rates until your subscription comes up for renewal. Incidentally, we do send Reminder Notices when your subscription nears its expiry date.

There have been several changes in key staff at MICRO-80. Ryzard Wiwatowski, the Editor for the past 12 months has resigned as has Charlie Bartlett, the Software Editor for the past 2½ years. Charlie is moving to sunny Queensland. I am sure we all wish both men well in their future careers. Ian Vagg has assumed the role of Editor once more whilst Ed Grigonis who operates a Model 1 system with disk drives and is an active member of the Adelaide Micro Users Group, has become Software Editor. The departure of Ryzard and Charlie caused no small disruption in our production schedule. The result is the issue you are reading now. It is a double-sized issue (after allowing for type setting) and encompasses both November and December 1983 editions. It is also rather late. The delayed production ran us slapbang into the Christmas season and the subsequent annual close down of our printers. It will take a month or two until we are once more back on schedule so please accept our apologies for any inconvenience caused.

Much has been happening of late in the '80 field. Tandy has announced several new products including a portable Model 4 known as a Model 4P. This is essentially a Model 4 in a more compact package with 9" monitor, half-height disk drives and separate keyboard which all packs away into a large carrying case. The complete unit weighs in at about 12kg and with 2 disk drives and 64K of RAM sells in the U.S.A. for $US1,799.00. Since the 4P has not yet been announced in Australia its price here is unknown but will probably be $2,600-$2,700, now that the Model 4 itself has been reduced to $3,000. There seems little doubt that like radios and calculators before them, computers are going to become portable. The main impediment to this process is the bulk and weight of a readable sized display. Once flat screen or large liquid crystal displays become available at a suitable price the desk-top microcomputer as we know it today is certain to become a quaint relic of the past. The only question now seems to be, how quickly will it all happen?

On a less buoyant note, we have heard form a usually reliable source that EACA, the Hong Kong firm that manufactured System 80/Video Genie, has ceased trading altogether. This will mainly affect those System 80/Video Genie owners who are planning to upgrade their systems to include disk drives or a printer, since printer interfaces and expansion interfaces are no longer available. Fortunately, here at MICRO-80 we had already commenced design work on a new expansion interface and also a printer interface, when the news broke. The interfaces will be available for sale towards the end of February 1984. The expansion interface (there is also a TRS-80 version) includes a printer port, RS232 port, floppy disk controller and up to 32K of static RAM. The use of static RAM gives high noise immunity and removes many sensitive timing problems associated with the dynamic RAM used in the early designs. The printer interfact is decoded to both port FD (standard System 80/Video Genie printer port) and also to memory address 37E8H, the address used in the TRS-80 Model 1. In this way Tandy software which drives the printer port directly will operate satisfactorily on the System 80. The expansion interface has the same arrangements for its printer port, too.

The demise of EACA is somewhat symptomatic of the changes taking place in the '80 world. The proliferation of different brands of microcomputer, each more dazzling and spectacular than the last, has reduced the total amount of support available for any one brand. In particular, older machines such as the TRS-80/System 80 are suffering badly. There are many fewer organisation catering for these machines and even their original distributors Tandy and Dick Smith have markedly reduced their levels of support in favour of later models or different machines altogether. At the same time, these computers still have a good deal of useful life left in them and there are literally tens of thousands of owners who have a large personal investment in them through acquired knowlede and programs, both written and purchased. We believe that the TRS-80/System 80 computers are far from finished and it is time that owners drew together to assist each other even more as commercial support wanes. MICRO-80 intends to become an even more important focal point for this support. The development of new expansion interfaces for the TRS-80 and the System 80 and the distribution of Molymerx software in Australia are just two of the ways in which we have increased our support for the owners of '80 computers. MICRO-80 itself will also change to better reflect the interests of its readers. We will for the first time encourage the placement of advertisements for relevant products in our magazine. Rates will be much lower than in the general computing magazines so that small, specialist suppliers will be able to afford to advertise. We will shortly launch a New Products column containing information about relevant new products for '80 computers. In these ways, MICRO-80 will become a more complete reference to all things '80 and help maximise the diminishing support. While some of this may not be of great relevance to overseas readers we are sure that the changes in content which are planned will be very appealing.

Over the years we have received many comments from readers, both positive and negative. Analysis of these comments indicates that whilst the newer computer owners find the material in MICRO-80 to be pretty much what they want, the more experienced owners find fewer articles and programs to suit their tastes. One of the most consistent complaints is that we publish too many games (usually expressed by the disgruntled as, "All you publish is games"). There are two interesting observations to be made here. Firstly, we do publish many other types of programs besides games. Secondly, the programs we publish represent a fair cross-section of those being written (and presumably used) by Readers so we are probably catering to the "average" taste. That said, we accept that we do not publish many "Serious" programs in terms of relatively complex applications such as Accounting Systems, Data Management etc. Certainly, those of our critics who suggest we should publish full-featured working accounting systems for example, are being somewhat unreasonable. Such software sells for $2,000 or more. It seems a little much to expect to be given it for the price of a magazine subscription. The reason these programs cost so much is the very considerable amount of work, often amounting to man-years, required to write, test, debug and maintain them. Speaking personally, if it were my business at stake, I would make sure that I paid the full rate for a properly supported program because, when things go wrong I want them fixed quickly. Nevertheless, there is considerable scope to increase our coverage in the serious applications area. We will therefore, introduce a number of changes over the next few issues. Firstly, we will support two data base programs, the Tandy Profile series and ENbase from Southern Software. The first because they are useful programs that are very widely used, the second because we believe ENbase to be the most powerful data base available for the '80 computers. Our support will take the form of articles to assist you to understand the concepts behind the programs and how to get the best form them and also "Listings" of specific applications which you can use just as you would a BASIC program. We would welcome (and pay for!) submissions by our readers.

In a similar vein, we will support VISICALC and SUPER VISICALC with articles, templates etc.

We will publish more in-depth reviews of serious applications software such as word processors, graph generators, data bases etc. Games playing can also be a serious business for the real enthusiast so Ed Grigonis has undertaken to write a series of detailed reviews on many of the better quality games. Ed's first contribution on the Adventure System is in this issue from which you will see that he writes very high standard reviews indeed.

One of the more neglected fields in computer magazines of all kinds, is that of utilising the graphics capababilities of dot-matrix printers. The ubiquitious Epson

MX-80 has spawned a host of cheap compatibles in its wake. There seems to have been few articles published anywhere to assist the owner unravel the Jinglish in the instruction manuals, let alone make use of the extremely versatile bit-graphics capabilities of these printers. MICRO-80 will attempt to rectify these omissions by publishing articles, programs etc which will assist the very many owners of such printers to improve their usefulness.

Even with the increased emphasis on "Serious" computing planned, we will not neglect our less experienced readers and will continue to provide articles and programs to suit the new and intermediate owner.

We hope you will find reading our "New-Look" MICRO-80 as exciting and interesting as we find the prospect of producing it. We believe that, whatever your background and experience, each issue will contain something to interest and challenge you.

DEPARTMENTS KALEIDOSCOPE

A major drawback in using the high resolution screen on the Colour Computer is the difficulty encountered when you try to mix the text with the graphics. One way of solving this problem was presented in last month's issue, but the WRITER program in this issue by Geoffrey Williamson demonstrates a much more flexible and useful solution to the problem. Those of you with Tandy's Editor/Assembler Plus who wish to type in the source code from the magazine will notice that a 'few lines' have been left out between lines 1500 and 12,040. This omission is quite deliberate and in the interest of saving space — the source lines omitted are simply the multitude of FCB's that define the bytes of the character table and these can be just as easily read from the Hex Dump. For reference, source line 1410 corresponds to the Hex Dump at $30C0. For those of you entering the Hex Dump, the memory addresses commencing at $3000 are only a suggestion since you cannot place the code starting at zero in reserved RAM. However, the program is written in position independent code and you can locate the program anywhere you find it convenient.

WATCH BASIC AT WORK

Normally, the text video display memory on the Colour Computer is located at $400-$5FF. The actual values stored here determine which characters are displayed on the screen of your T.V. set. However, the combination of SAM and VDG potentially allow you to set the location of display memory to anywhere in memory aligned on a 512 byte boundary. For those of you who are interested in how a BASIC program or the interpreter itself works, this capacity provides a rather unique opportunity for a visual demonstration.

In the September '83 issue, the piece on conserving memory mentioned the frivolous and extravagant use of the CLEARed string space by the BASIC interpreter. The following program provides a graphic illustraiton of how the string space is managed by the BASIC interpreter.

```
10 CLEAR 200,&H3F00
15 DIM B$(26)
20 A=&H3F00 : DEFUSR0 = A
30 FOR I=0 TO 26 : READ A : POKE A+I,D : NEXT I
40 A=USR0(&H3E00) : A$=""
50 FOR I=0 TO 26
60 A$=A$+CHR$(I+63) : B$(I)=CHR$(32) : GOSUB 90
70 NEXT I
80 A=USR0(&H400) : END
90 FOR J=0 TO 750 : NEXT J : RETURN
100 DATA 77,38,23,189,179,237,70,198
110 DATA 7,142,255,198,70,36,6,48
120 DATA 1,167,128,32,2,167,129,90
130 DATA 38,242,57
```

The program, first of all, reserves some high memory for a machine language subroutine and POKEs it into memory. The subroutine modifies the display offset register in the SAM chip and allow you to display any portion of the 16K RAM. The routine is called in line 40 and sets the display memory to addresses $300 — $3FF (in fact, any parameter in this range would set the display to this page of memory). Lines 50 to 70 do some string manipulation which you can watch on your screen (the subroutine at line 90 is used to slow the process down to a pace with which the eye and brain can cope).

You should see that the interpreter uses up free string space at a rather rapid rate until it runs out of space. When this happens a garbage collection routine compacts all the currently active strings at the top of string space and then releases the remainder and returns to running the program. With a very large amount of string space, this garbage collection routine can sometimes take several minutes to executive and if the actual amount of free string space is small, then it will take place frequently, slowing down the speed at which the BASIC program is running.

The machine language subroutine is completely relocatable but does use one ROM call to retrieve the parameter passed by the USR function. This address ($B3ED) may need to be changed in future revisions of the Colour BASIC ROMs. You can use this technique to look at the operation of other BASIC statements by changing the program lines 40-80 and you will probably need to look at different areas of memory to see where the action is taking place. The only limitation so far seems to be that when the interpreter uses the normal text page, it sets the display offset register in the SAM to show the normal text page. However, with a little trial and error, you can use this method to explore the workings of your Colour Computer and its BASIC interpreter.

PEACH BOWL

If you own a Peach and are a new subscriber or have renewed your subscription with or subsequent to the first issue of Volume 4, then you are entitled to the new free software offer. However, the SOFTPAK program library is not suitable for the Hitachi Peach — instead, we offer our Peach readers the choice of one of three commercial games, viz. Peach Invaders, Ghost Gobbler or Scrambler. We are now at the stage where we wish to prepare and distribute this software gift but have encountered two difficulties:

1. Our mailing list does not identify all of our Peach subscribers.
2. We have no record of which particular game you wish to receive.

If you are a Peach owner already entitled to receive the new free software or who will become eligible by renewing your subscription at some stage during Volume 4, then please drop us a line as soon as possible with the following information:

(i) Your name and address
(ii) Your subscription expiry issue
(iii) Your selection of one of the following:
A—Peach InvadersB—Ghost Gobbler
C—Scrambler

Please direct this information to:
PEACH FREE SOFTWARE,
MICRO-80,
P.O. BOX 213,
GOODWOOD, S.A. 5034

GROUP ONE

Many of our readers with disk systems will appreciate the GRAFX utility in this month's issue. A number of people have recently pointed out that many Level 2 BASIC programs utilizing machine language subroutines more often than not do not work with Disk BASIC (see Input/Output and below). The reasons for this are fairly obvious. Most Z80 machine code contains local absolute address references and cannot be easily relocated. Secondly, on 16K Level 2 machines, these subroutines are usually placed at the top of memory (i.e. below address 8000 Hex) which usually conflicts with the program storage area in Disk BASIC in the case of all but the smallest of BASIC programs. The program RECALL on the SOFTPAK disk offers one type of solution to this problem. Another approach is the following from one of our readers, Mr. Wilson of Toronto:

MODIFICATION OF 'GOLF' FOR DISK USAGE

I recently added a disk drive to my System 80 and then, of course, set about transferring all my tape based programs to disk. With most BASIC programs this

presents no problem at all. However, any such program which contains a machine language subroutine will require some modifications. One program of this type which I have converted is GOLF which was published in the July 1983 issue of MICRO-80. The changes I made may be of interest to some other readers. This is particularly true because, although articles are often published which point out that changes are needed and some describe the disk instruction DEFUSR, I have not seen any which explain in any detail all the changes needed to convert a given program.

The DEFUSR function was described in the August 1983 issue of MICRO-80. However, a brief recap of its use is given here again for completeness.

In tape-based Level 2 BASIC the entry address of a machine language subroutine is divided into its least and most significant bytes which are POKEd into locations 16426 and 16527 before the routine is called using the A=USR(O) call.

In disk BASIC the entry address is defined by DEFUSRn = address where address is decimal or hexadecimal. The number n in the DEFUSRn statement can be 0 to 9 thus allowing up to 10 machine language subroutines to be defined. The calls to the subroutines are made by A=USRn(x). More details on DEFUSR and USR will be found in your DOS manual.

In the GOLF program there is a short machine language subroutine defined in statements 10 to 60. This routine actually stores the screen image of the GOLF hole so that it can be restored to the screen later in the program. The machine language statements are stored in the dummy string LL$. The address of LL$ is then POKEd in line 60.

The machine language routine works by storing the 1024 screen data values from addresses 15360 to 16383 into memory locations 30720 onwards. In a 16K machine the locations are above the addresses needed for the BASIC program so they are in a safe location. However, when disk BASIC such as DOSPLUS 3.4 is used, space up to about 21K is used by disk BASIC and GOLF then stores up to about 35K. Thus the machine language routine uses locations in which BASIC program statements are stored. This will cause chaos to say the least! The solution is to change the routine so that it uses much higher locations in memory.

The address which must be changed in the machine language routine is given by the sequence 0,120 which appears in line 10 and line 20 DATA statements. In line 10 it is items 14 and 15 and in line 20 it is items 7 and 8. 0,120 defines a hex location 7800 (or decimal 30720). My machine has 48K RAM and thus addresses up to 65535. I therefore decided to place both the machine language routine itself and the storage locations used by the routine above 63000. I used location FAOO (or decimal 64000) in the routine as a storage location. The value FAOO translates into data values 0,250. Thus, to effect the change, alter the value 120 in item 15 of line 10 and item 8 of line 20 to 250.

The routine itself I decided to locate at 63500 (F80C in hex). This is achieved by replacing lines 30 to 60 of the original program by:

```
30 FOR I=63500 TO 63529
35 READ LO
40 POKE I-65536,LO
45 NEXT I
50 DEFUSR=63500
```

The final point to note is the POKE address in line 40. Because the System 80 can only handle integers up to 32767 it is necessary to use negative integers for the addresses above this value in POKE and PEEK statements.

With these two changes GOLF Now runs as it used to on tape.

WHAT YOU HAVE MISSED

Set out below is a list of some of the programs published in early issues of MICRO-80 magazine. Back issues are available for $2.50 each or at the annual subscription rate for 12 or more copies. Cassette editions are available for all issues for $4.00 each whilst DISKS are available for all issues FROM SEPTEMBER 1981 onwards. For 12 or more magazines with cassette/disks ordered at the same time, the relevant annual subscription rate applies. Programs for the Hitachi Peak/TRS-80 Colour Computer were first published in the April 1982 issue. Complete indices to the first three volumes of MICRO-80 magazine are included in the December 1980, December 1981 and the August 1983 edition.

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L1—Level 1
L2—Level 2
CC—Colour Computer
HP—Hitachi Peach

*Issue incorrectly labelled August.

The following back issues of MICRO-80 magazine are still available:

	'79	'80	'81	'82	'83
Jan	—	✓	✓	✓	—
Feb	—	✓	X	✓	—
Mar	—	✓	✓	✓	—
Apr	—	X	✓	✓	—
May	—	✓	✓	✓	—
Jun	—	X	✓	✓	—
Jul	—	✓	✓	✓	✓
Aug	—	X	✓	✓	✓
Sep	—	✓	✓	✓	✓
Oct	—	X	✓	X	✓
Nov	—	X	✓	—	
Dec	✓	✓	✓	—	

— means never published
✓ means issue available
X means issue out of print

FORM THREE

NEWDOS 80 provides a copy of the original Radio Shack Editor/Assembler modified so that source files can be saved to or loaded from disk. However, on the Model 3, Apparat chose to drop support for cassette tape so that you cannot load source files from cassette at all. This can be quite frustrating if you wish to modify a source file you may only have on tape. The Source utility in this month's issue will overcome this problem and save you having to tape the source code in a second time.

BMON ON THE MODEL 3

A number of readers have enquired about using BMON on the Model 3, without much success. Interestingly, the Adelaide Micro User Group published in their October newsletter some patches developed by one Tony Domigan to make BMON work on the Model 3. His item is reproduced here with permission for the benefit of our readers.

Eddy Paay's BMON will not work on the Model 3 because it uses the Model 1's keyboard caller address (03E3H), and jumps to BASIC via 06CCH. Rather than just patch the old caller with 3024H I have reworked some of Eddy's code to patch the current keyboard caller thus allowing BMON to work in Newdos, Ldos and TRSdos Disk BASICs as well as Model 3 BASIC. Furthermore, all cassette routines will prompt you for the baud rate to use and the ASCII character will now be displayed alongside the hex character in the edit mode.

Edit characters (below) enclosed in brackets, e.g. (FX) are for the 48K version only. If you are using a 32K BMON then substitute 'BX' and for the 16K version use '7X'.

1. (a) Reserve Memory
   (b) Load BMON thru SYSTEM . . . BMON
   (c) In place of answering '/ENTER' substitute . . . /64464 (48K), /48090 (32K), /31696 (16K)
2. Edit address FB99/BB99/7B99 and enter . . . CD, C9, 01, 21, 25, (FB), CD, 1B, 02, 2A, 16, 40, 22, C7, (FB), 21, C6, (FB), 22, 16, 40, 01, 18, 1A, C3, AE, 19, CD, C9, 01, CD, 42, 30, C9, CD, 33, 00, E5, 7E, 2A, 20, 40, C3, OC, FC, CD, 24, 30, B7, C8, FE, 02
3. Edit FB4E/BB4E/7B4E and enter 43, 54, 52, 4C, 3E, 20, 20, 42
4. Edit FB60/BB60/7B60 and enter 29, OD
5. Edit address FBFB/BBFB/7BFB and enter . . .
   21, E8, (FB), CD, 1B, 02, 21, 00, 50, CD, 60, 00, CD, 42, 30, 18, OC, 77, 23, 3E, 20, 77, 23, 22, 30, 40, E1, C9, 00
6. Edit address FD6E/BD6E/7D6E and enter CD, A8, (FB)
7. Edit address F9C1/B9C1/79C1 and enter CD, B4, (FB)
8. Select (B)asic and execute the BASIC line applicable to your BMON version.
   10 POKE – 2558, 187: POKE – 2557, 251' (48K)
   10 POKE – 18942, 187: POKE – 18941, 187' (32K)
   10 POKE 30209, 187: POKE 30210, 123' (16K)

9. Cassette users enter CTRL-B (shift/down arrow/B) to enter BMON and create a system tape of the modified BMON.

BMON	Start	End	Entry Addresses
16K	7210	7EFE	7B99
32K	B210	BEFE	BB99
48K	F210	FEFE	FB99

Disk users should re-boot DOS and transfer the program using the 'DUMP' command.

—Adelaide Micro User News, October, 1983.

DEFUSR PROBLEM

Some programs intended for Level 2 systems will cause problems when you try to run them on the Model 3. For example, Andre Marino reports the following difficulty:

"I am writing about a program you have already published two months ago (August, 1983). The program is DEFUSR. I am having problems in getting the program to load. The program loads for a brief second and then the screen scrolls up with a continuous flow of question marks. I have a TRS-80 Model 3 48K cassette based computer. My belief, through some experimentation, is that the program is in a bad area of memory, but have found no way to make the program work. I would appreciate it if you could help me out with this problem."

The memory from 4040H to 404FH is not a good place to put machine language programs on the Model 3. Although the Level 2 scratch pad areas used by the Model 1 and Model 3 are the same, most of the reserved RAM area used by the Disk Operating System is quite different. Parts of the Model 1 DOS reserved RAM is used to implement other features in the basic Level 2 mode of the Model 3 and more low memory is reserved for use by the DOS. This means that those machine language programs residing in Model 1 DOS reserved RAM locations will probably not work on a Level 2 Model 3. There are two solutions to this problem. The first involves protecting some high memory and moving the program to high memory (suggested in the Form Three column of the same issue). The second is to 'hide' the program between the reserved RAM and the start of the BASIC program storage area by moving the latter to a higher memory location.

If the particular machine language program is not relocatable and contains local absolute address references, then these must all be changed to reflect the program's new location in memory. If the source code is available then this is best done by reassembling the program at the new memory location by changing the ORG statement. If only the object machine code is available, then this can be a long and complex task which must be done by hand. Fortunately, the DEFUSR program does not require any such changes as it is relocatable. The first method has the additional disadvantage that you must protect high memory each time before using the program.

The second method is more elegant in the case of **relocatable** machine language programs and can be achieved by the following code:

```
                00100 ; DEFUSR for the Model 3
4F00            00110           ORG     4F00H           ; Entry /20224
4F00 2AA440     00120 START     LD      HL,(40A4H)      ; Start of BASIC pointer
4F03 225C41     00130           LD      (415CH),HL      ; Disk BASIC exit for DEFUSR
4F06 11194F     00140           LD      DE,DEFPRC       ; The DEFUSR code address
4F09 1A         00150 LOOP      LD      A,(DE)          ; Move the code to where
4F0A 77         00160           LD      (HL),A          ;  BASIC programs normally
4F0B 13         00170           INC     DE              ;    start
4F0C 23         00180           INC     HL
4F0D B7         00190           OR      A
4F0E 20F9       00200           JR      NZ,LOOP         ; Loop until finished
4F10 22A440     00210           LD      (40A4H),HL      ; Set new Start of BASIC
4F13 CD4D1B     00220           CALL    1B4DH           ; Do a 'NEW' to setup the
                00230                                   ;  remaining BASIC pointers
4F16 C3191A     00240           JP      1A19H           ; Return to BASIC
4F19 CF         00250 DEFPRC    RST     8               ; DEFUSR code
4F1A C1         00260           DEFB    0C1H
4F1B CF         00270           RST     8
4F1C D5         00280           DEFB    0D5H
4F1D CD3723     00290           CALL    2337H
4F20 E5         00300           PUSH    HL
4F21 CD7F0A     00310           CALL    0A7FH
4F24 228E40     00320           LD      (408EH),HL
4F27 E1         00330           POP     HL
4F28 C9         00340           RET
4F29 00         00350           NOP                     ; Mandatory terminator
4F00            00360           END     START
```

This program will tuck DEFUSR between reserved RAM and the BASIC program storage area. This technique could also be used to place other programs here with some precautions. The program should be relocatable and must not contain a zero within its code (since the particular loop that moves the program code terminates when a zero is encountered — a different loop structure could be used). If you don't have an assembler then the following BASIC program will load the program into memory and run it:

Be warned, this will destroy any resident BASIC Program so CSAVE the program ***before*** *you RUN it.*

```
10 'DEFUSR for the Model 3
20 POKE 16526,0 : POKE 16527,79 ' Set USR entry point
30 A=20224 'Start Address
40 FOR I= 0 TO 41 : READ D :POKE A+I,D : NEXT I
50 X=USR(0)
60 DATA 42,164,64,34,92,65,17,25,79,26,119,19,35,183,32,249
70 DATA 34,164,64,205,77,27,195,25,26,207,193,207,213,205,55,35
80 DATA 229,205,127,10,34,142,64,225,201,0
```

PROGRAMMING

AN EXPLANATION OF HOW TO MAKE FULL USE OF THE PEEK, POKE AND USR STATEMENTS

by Gordon S. Thomas

The object of this article is to explain the use of the PEEK, POKE and USR statements and functions in Level 2/Model 3 BASIC following a request in the "Readers' Requests" section in Micro-80 Vol. 3 No. 10 (September 1982). The article assumes no previous knowledge of the uses of these statements.

Unless otherwise stated, all information contained herewith is equally applicable to TRS-80 Models 1 and 3 cassette and disk systems (and all other software compatible computers) with any memory size. It is not applicable to Level 1 BASIC computers since they do not have these statements.

The computer's memory is made up of two main types of memory, which are Read Only Memory (ROM) and Random Access Memory (RAM). ROM is where the Level 2/Model 3 BASIC interpreter is stored. ROM cannot be changed by any software (i.e. written to).

RAM, on the other hand, can be changed and it is here that all user programs and data are stored (until the power is disconnected). Therefore, to modify the computer's operation in any manner by software requires that the contents of RAM be changed.

The Z80 microprocessor contained in the computer is capable of interacting with 65536 memory locations. Depending on the computer, anywhere between 12K and 14K of these memory locations are used by the ROM with the rest being used by the RAM. Each one of these memory locations is assigned a number, called an "address". It is these addresses which the PEEK function and the POKE statement require in their respective syntax.

There are various, different ways of referring to these addresses. They can be numbered using the decimal system (which is just our normal everyday counting system) or they can be numbered using the hexadecimal system, which is what the computer uses. (This is not strictly correct but is adequate for the purposes of this article).

The hexadecimal system uses the digits 0-9 and the letters A-F to designate the decimal numbers 0-15 respectively. Instead of each place in a number being a power of 10 (as it is in the decimal system) the hexadecimal system has every place representing a quantity of a power of 16.

e.g. 38 (decimal) = $(3\times10^1) + (8\times10^0)$
30 (hex) = $(3\times16^1) + (8\times16^0)$
= 56 (dec)
38 (dec) = $(2\times16^1) + (6\times16^0)$
= 26 (hex)

PEEK: If we want to know what value is stored in a particular address all we have to do is type: PRINT PEEK (address)
e.g. to find out what is stored in the top left hand corner of the screen (address 15360) we would type
PRINT PEEK (15360)

This will return a decimal number which represents what is contained in address 15360. Therefore if the top left hand corner of the screen contains the letter "B" then the decimal value 66, which is the ASCII code for the letter "B", will be returned.

Any address in the computer's memory can be PEEKed (i.e. from 0 to top of RAM). The top of RAM addresses for the various memory sizes are as follows:

Mem Size	Hex	Dec
16K	7FFF	32767
32K	BFFF	49151
48K	FFFF	65535

In order to PEEK any address above 32767 it is necessary to subtract 65536 from the address in question.
e.g. to display the contents of 40000, type
PRINT PEEK (−25536)
since 40000 − 65536 = −25536. The hexadecimal equivalent of 40000 is 9C40H since 9C40H = $(9\times16^3) + (12\times16^2) + (4\times16^1) + (0\times16^0)$ = 40C00 where H indicates that it is hexadecimal quantity.

However, if you type (for Disk BASIC only)
PRINT &H9C40 (syntax for 9C40 hex) the computer will respond with −25536, i.e. the computer takes care of the conversion process. This is why many programmers prefer to use hexadecimal when referring to memory addresses — it requires no additional calculations to determine what number to use to designate a particular address. In general, to PEEK any address in the computer's memory, type
PRINT PEEK (X+65536 * (X>32767)

For X>32767 the expression (X>32767) will be TRUE, resulting in −1. This effectively subtracts 65536 from the address.

For X<=32767 the expression (X>32767) will be FALSE, resulting in 0. This will not affect the address in any way.

The same rules apply for the addresses in the POKE statement.

POKE: If we want to change the contents of a particular memory location we use the POKE statement. Its syntax is
POKE address, value
e.g. to store a "1" in the top left hand corner of the screen we would type
POKE 15360, 49
(49 is the ASCII code for the number "1")

The POKE statement is useful for loading small machine language routines into memory to be accessed from BASIC. It also has many other uses. Some of the most common are:

1. setting memory size from BASIC (addresses 16561 − 16562)
2. loading graphics character onto the screen (addresses 15360 − 16383)
3. disabling the (BREAK) key in Cassette BASIC (addresses 16396 − 16397)
4. pointing to a USR routine in Cassette BASIC (addresses 16526 − 16527)

In order to be able to fully utilize the capabilities of the POKE statement it is necessary to have a basic understanding of the terms "least significant byte" and "most significant byte". When we see the number 327 in everyday life we all know what it represents, since we are used to dealing with decimal quantities. The 3 can be thought of as the most significant digit and the 7 can be thought of as the least significant digit. In hexadecimal we group two digits together and call it a byte.
e.g. for 9C40H (40000 decimal) the most significant byte is 9CH with the least significant byte being 40H. The decimal equivalents of 9CH and 40H are 156 and 64 respectively. There is an alternative way of determining these numbers. Note that 156 is actually stating how many whole lots of 256 (decimal) that there are in 40000, and that 64 is stating how many lots of 1 there are left over.
i.e. 40000 = (156 × 256) + (64 × 1)

Therefore we can arrive at the same numbers using the following procedure:
MSB = INT (40000/256) = 156
LSB = 40000 − (256 × MSB) = 64

Either of these methods may be used to determine the LSB and MSB of any address for which they are required.

Many settings require this exact format to be used in order to change them. For example, the memory size is stored in addresses 16561 − 16562 in the format LSB,MSB.
i.e. 16561 contains the LSB, and
16562 contains the MSB.

This is true in general for all two byte quantity storers. The first address contains the LSB and the second address contains the MSB. Therefore to set a memory size of 40000 we would have to type
POKE 16561,64
POKE 16562,156
CLEAR xxxx
where xxxx is the string space required.

The CLEAR forces BASIC to recognize the new top of memory. This technique for setting the memory size can be used on both cassette and disk systems and saves the operator from having to enter the memory size at power-up in response to the "Memory Size?" question. The program included with this article provides an example of the use of this facility.

POKE is also used on the model 3 to set values for a whole range of different features, e.g. to prevent the top two lines of the screen from scrolling, type
POKE 16916,2
or, to set the special characters mode, type
POKE 16420,1
(This saves using PRINT CHR$(22) which can be a nuisance since it is effectively only a toggle switch and the programmer can never be certain which mode is set).

For other useful addresses on the Model 3, refer to the Model 3 BASIC Reference Manual, pp. 83-84.

USR: The USR function is used to provide an interface between a BASIC program and a machine language subroutine to be called from the BASIC program. Once a machine language subroutine has been poked into memory (see later) BASIC needs a way to call it. The USR function caters for this requirement.

Before BASIC can call a machine language subroutine, it needs to know where the entry point is located in memory, i.e. where to start executing from. In Cassette BASIC this is achieved by POKEing the address in LSB, MSB format into memory locations 16526-16527. For Disk BASIC it is achieved by typing
DEFUSRx = address
where x is a number from 0 to 9 indicating which USR routine is being used (since Disk BASIC provides the choice of 10 possible USR routines).
e.g. If the entry point is 40000,
For Cassette BASIC, type
POKE 16526,64 (LSB)
POKE 16527,156 (MSB)
For Disk BASIC, type
DEFUSR0 = 40000
or DEFUSR0 = &H9C40 to use USR routine 0

The machine language subroutine can then be accessed by typing
X = USR (arg) for Cassette BASIC
and X = USR0 (arg) for Disk BASIC
(Note: The Disk BASIC call will function correctly without the 0 but it is always safest to include it so you don't forget which routine you're accessing).

The number enclosed by the parentheses, (arg), is an integer argument which can be sent to the machine language routine. For example, if we had a routine to scroll a certain number of lines up the screen, the argument would be the number of lines that we wanted to scroll. The argument sent to the routine may be any integer in the range −32768 to +32767 inclusive. If the programmer does not wish to send an argument then the number enclosed by the parentheses is considered to be a dummy argument and is only there to satisfy the syntax requirements of the USR function.

The variable assigned to the USR routine (in this case X) will contain the argument sent from the machine language routine, if any.

LOADING MACHINE LANGUAGE SUBROUTINES INTO MEMORY: There are several ways of loading machine language subroutines into memory. The easiest and the most obvious way is to load it via the SYSTEM mode in a cassette system or via the DOS command LOAD In a disk system. However, these two methods are only any good if you have an assembled version of the subroutine stored on disk or tape, whatever the case may be.

For other methods of loacing machine language subroutines into memory, I thoroughly recommend a copy of Lewis Rosenfelder's book "BASIC

Faster and Better & Other Mysteries", which is available from MICRO-80 for $39.95 and is also listed in Tandy's RSC-9 Catalogue for $39.95.

The method that I will use is the one which I consider to be the easiest to understand and modify for the various memory sizes. This method involves POKEing the values into memory byte by byte from DATA statements.

I have included two sample programs with this article. The first of these programs provides a substitute for the BASIC INPUT statement. It is superior to the statement it replaces in the following respects:

1. *The BREAK, CLEAR and all arrow keys except the back arrow are all locked out.*
2. *The ENTER key will be ignored if the current length of the input is zero.*
3. *It provides a flashing cursor (for both Models 1 and 3).*
4. *The cursor may be changed to any character available in the computer's character set with a simple POKE statement.*
5. *It will only accept a predetermined length of input (specified by the programmer in the USR call) and then the cursor is changed to a non-flashing program-definable character indicating that no more input will be accepted.*
6. *Because it is written in machine language, it cannot be out-typed as can so many of the equivalent BASIC routines.*
7. *It shows the operator how many characters may be entered by displaying a number of characters on the screen corresponding to the maximum length of the input.*
8. *It will accept all delimiters (e.g. commas) without ignoring the characters which are entered after them.*

In summary this routine effectively gives BASIC a super-powered LINE-INPUT function. It can be used on both cassette and disk systems, as can the BASIC program which enters the routine and demonstrates how to use it in your program.

Program Listing 1 is the documented source code for the USR routine to replace the INPUT statement. This routine only makes use of four ROM routines all of which are located in the same place on Models 1 and 3. These are the 49H ROM routine which waits for a character to be entered from the keyboard, and the 2BH ROM routine which accepts a character from the keyboard if a key has been pressed. Both of these ROM routines are documented in the technical information section of the Model III Reference Manual. I checked with the Memory Map for Level II in '80 Micro — a Wayne Green Publication (Dec. 82 pp. 298-311) and found these same ROM routines for the Model I. The other ROM routines referred to are the ones for accepting and sending arguments from and to BASIC. These routines (0A7FH and 0A9AH) are documented under the USR function in both the Level II and Model 3 BASIC Reference Manuals. They are the same for both computers. Therefore I foresee no problems with getting this routine to work on either computer.

The source listing as shown has been assembled for a 48K computer with an origin of FFOOH. However, this should be changed to BFOOH for a 32K computer and 7FOOH for a 16K computer. The source code may then be entered into a computer via an editor/assembler such as EDTASM.

```
                00010 ;*************************************************
                00020 ;*                                               *
                00030 ;*                PROGRAM LISTING 1              *
                00040 ;*                                               *
                00050 ;*   USR ROUTINE TO REPLACE THE 'INPUT' STATEMENT *
                00060 ;*                                               *
                00070 ;*        COPYRIGHT (C) 1983 BY G.S.THOMAS       *
                00080 ;*                                               *
                00090 ;*************************************************
                00100 ;
FF00            00110          ORG     0FF00H
4020            00120 CURPOS   EQU     16416          ;CURSOR POSITION ADDRESS
0A7F            00130 BASARG   EQU     0A7FH          ;ARGUMENT FROM BASIC
0A9A            00140 ALARG    EQU     0A9AH          ;ASSEMBLY LANGUAGE ARG
0049            00150 KBWAIT   EQU     49H            ;WAIT FOR CHAR FROM KB
002B            00160 KBCHAR   EQU     2BH            ;GET CHARACTER FROM KB
FF00 1841       00170          JR      START          ;SKIP STORAGE AREA
0040            00180 INPUT    DEFS    64             ;ROOM TO SAVE TEXT
0001            00190 CHAREN   DEFS    1              ;CONTAINS CHAR ENTERED
FF43 CD7F0A     00200 START    CALL    BASARG         ;GET ARG FROM BASIC
FF46 45         00210 BEGIN    LD      B,L            ;B CONTAINS MAX LENGTH
FF47 0E00       00220          LD      C,0            ;C CONTAINS CURRENT LENGTH
FF49 C5         00230          PUSH    BC             ;SAVE LENGTH INFORMATION
FF4A 2A2040     00240          LD      HL,(CURPOS)    ;GET CURSOR POSITION
FF4D E5         00250          PUSH    HL             ;SAVE IT
FF4E 3688       00260 PROMPT   LD      (HL),136       ;PRINT CHR$(136) AT CURPOS
FF50 23         00270          INC     HL             ;NEXT SCREEN POSITION
FF51 10FB       00280          DJNZ    PROMPT         ;UNTIL MAX LENGTH
FF53 3620       00290          LD      (HL),32        ;BLANK ONE CHAR AFTER
FF55 E1         00300          POP     HL             ;RETRIEVE OLD CURPOS
FF56 D1         00310          POP     DE             ;LENGTH INFO INTO DE
                00320 ;
FF57 7A         00330 READKB   LD      A,D            ;GET MAXIMUM LENGTH
FF58 BB         00340          CP      E              ;COMPARE CURRENT LENGTH
FF59 282C       00350          JR      Z,MAXLEN       ;GO IF MAX = CURRENT
FF5B 0E02       00360 FLASH    LD      C,2            ;NO. OF TIMES THROUGH LOOP
FF5D 065A       00370          LD      B,90           ;DELAY TIME
FF5F 368F       00380 CURON    LD      (HL),143       ;GRAPHICS BLOCK
FF61 D5         00390          PUSH    DE             ;SAVE LENGTH INFORMATION
FF62 CD2B00     00400          CALL    KBCHAR         ;GET CHAR IF AVAILABLE
FF65 D1         00410          POP     DE             ;RETRIEVE LENGTH INFO
FF66 FE00       00420          CP      0              ;KEY PRESSED ?
FF68 2024       00430          JR      NZ,KEY         ;IF YES THEN GO
FF6A 10F3       00440          DJNZ    CURON          ;ELSE TRY AGAIN
FF6C 0D         00450          DEC     C              ;ONE LESS LOOP
FF6D B9         00460          CP      C              ;ANY LOOPS LEFT?
FF6E 20EF       00470          JR      NZ,CURON       ;IF YES THE GO
FF70 0E02       00480          LD      C,2
FF72 065A       00490          LD      B,90
FF74 3688       00500 CUROFF   LD      (HL),136       ;DOT PROMPT
FF76 D5         00510          PUSH    DE
FF77 CD2B00     00520          CALL    KBCHAR
FF7A D1         00530          POP     DE
```

```
FF7B FE00     00540          CP      0
FF7D 200F     00550          JR      NZ,KEY          ;ETC
FF7F 10F3     00560          DJNZ    CUROFF
FF81 0D       00570          DEC     C
FF82 B9       00580          CP      C
FF83 20EF     00590          JR      NZ,CUROFF
FF85 18D4     00600          JR      FLASH           ;KEEP FLASHING
FF87 363C     00610 MAXLEN   LD      (HL),60         ;PRINT "<"
FF89 D5       00620          PUSH    DE              ;SAVE LENGTH INFORMATION
FF8A CD4900   00630          CALL    KBWAIT          ;WAIT FOR CHAR FROM KB
FF8D D1       00640          POP     DE              ;RETRIEVE LENGTH INFO
              00650 ;
FF8E 3242FF   00660 KEY      LD      (CHAREN),A      ;SAVE THE CHAR ENTERED
FF91 3E00     00670          LD      A,0
FF93 BB       00680          CP      E               ;CURRENT LENGTH ZERO?
FF94 3A42FF   00690          LD      A,(CHAREN)      ;RESTORE THE CHARACTER
FF97 2811     00700          JR      Z,LETTER        ;IF E=0 THEN GO
FF99 FE0D     00710          CP      13              ;<ENTER> ?
FF9B 2831     00720          JR      Z,ENTER         ;IF YES THEN GO
FF9D FE08     00730          CP      8               ;<ERASE> ?
FF9F 281F     00740          JR      Z,ERASE         ;IF YES THEN GO
FFA1 FE18     00750          CP      24              ;<SHIFT-ERASE> ?
FFA3 2005     00760          JR      NZ,LETTER       ;IF NOT THEN GO
FFA5 6A       00770          LD      L,D             ;MAX LENGTH BACK INTO L
FFA6 2600     00780          LD      H,0             ;RESET H
FFA8 189C     00790          JR      BEGIN           ;START INPUT AGAIN
FFAA 7A       00800 LETTER   LD      A,D             ;GET MAXIMUM LENGTH
FFAB BB       00810          CP      E               ;COMPARE CURRENT LENGTH
FFAC 28A9     00820          JR      Z,READKB        ;IF MAX=CURRENT THEN GO
FFAE 3A42FF   00830          LD      A,(CHAREN)      ;RESTORE THE CHARACTER
FFB1 FE20     00840          CP      32              ;LOWER ASCII LIMIT
FFB3 FA57FF   00850          JP      M,READKB        ;IGNORE CHAR IF LOWER
FFB6 FE7B     00860          CP      123             ;UPPER ASCII LIMIT
FFB8 F257FF   00870          JP      P,READKB        ;IGNORE CHAR IF GREATER
FFBB 77       00880          LD      (HL),A          ;PRINT THE CHARACTER
FFBC 1C       00890          INC     E               ;INCREMENT THE LENGTH
FFBD 23       00900          INC     HL              ;NEXT SCREEN POSITION
FFBE 1897     00910          JR      READKB          ;GO BACK
              00920 ;
FFC0 7A       00930 ERASE    LD      A,D             ;GET MAXIMUM LENGTH
FFC1 BB       00940          CP      E               ;COMPARE CURRENT LENGTH
FFC2 2006     00950          JR      NZ,NOTMAX       ;GO IF MAX <> CURRENT
FFC4 3620     00960          LD      (HL),32         ;PRINT A SPACE
FFC6 1D       00970 PROCES   DEC     E               ;DECREMENT LENGTH
FFC7 2B       00980          DEC     HL              ;PREVIOUS SCREEN POSITION
FFC8 188D     00990          JR      READKB          ;GO BACK
FFCA 3688     01000 NOTMAX   LD      (HL),136        ;PRINT DOT PROMPT
FFCC 18F8     01010          JR      PROCES          ;PROCESS THE SPECS
              01020 ;
FFCE 7A       01030 ENTER    LD      A,D             ;GET MAXIMUM LENGTH
FFCF 93       01040          SUB     E               ;SUBTRACT CURRENT LENGTH
FFD0 2004     01050          JR      NZ,CLINE        ;IF DIFFERENCE<>0 THEN GO
FFD2 3620     01060          LD      (HL),32         ;PRINT A SPACE
FFD4 1806     01070          JR      BASIC           ;BACK TO BASIC
FFD6 47       01080 CLINE    LD      B,A             ;DIFFERENCE INTO B
FFD7 3620     01090 BLANK    LD      (HL),32         ;BLANK OUT SCREEN POSITION
FFD9 23       01100          INC     HL              ;NEXT SCREEN POSITION
FFDA 10FB     01110          DJNZ    BLANK           ;UNTIL ALL DONE
FFDC 4B       01120 BASIC    LD      C,E             ;CURRENT LENGTH INTO C
FFDD D5       01130          PUSH    DE              ;SAVE LENGTH INFORMATION
FFDE 2A2040   01140          LD      HL,(CURPOS)     ;GET ORIGINAL CURPOS
FFE1 1102FF   01150          LD      DE,INPUT        ;DESTINATION
FFE4 0600     01160          LD      B,0             ;RESET B
FFE6 EDB0     01170          LDIR                    ;SAVE THE TEXT
FFE8 D1       01180          POP     DE              ;RETRIEVE LENGTH INFO
FFE9 2600     01190          LD      H,0             ;RESET H
FFEB 6B       01200          LD      L,E             ;FINAL LENGTH INTO L
FFEC C39A0A   01210          JP      ALARG           ;PASS IT TO BASIC
0000          01220          END
```

For those who do not have an editor/assembler, Program Listing 2 is the BASIC program which will enter the routine into memory. This program will work on either a disk system or a cassette system with any memory size. The numbers contained in the DATA statements are the decimal equivalents of the hexadecimal numbers in the second column on the left of the source listing.

```
10 '*****************************************
20 '*                                       *
30 '*            PROGRAM LISTING 2          *
40 '*                                       *
50 '*  BASIC PROGRAM TO POKE USR ROUTINE INTO *
60 '*  MEMORY TO REPLACE THE INPUT STATEMENT  *
70 '*                                       *
80 '*    COPYRIGHT (C) 1983 BY G.S.THOMAS   *
90 '*                                       *
100 '*****************************************
```

```
110 '
120 'NOTE:  The routine will work as is without changing any
130 '       of the settings. The settings are there purely and
140 '       simply for the programmer's convenience.
150 '
160 ' To save memory, all the REM statements can be removed
170 ' and the smaller lines can be compounded together using
180 ' the colon (":").
190 '   For example, see line 360
200 '
210 DATA24,65,205
220 DATA127,10,69,14,0,197,42,32,64,229,54,136,35,16,251,54,32
230 DATA225,209,122,187,40,44,14,2,6,90,54,143,213,205,43,0,209
240 DATA254,0,32,36,16,243,13,185,32,239,14,2,6,90,54,136,213
250 DATA205,43,0,209,254,0,32,15,16,243,13,185,32,239,24,212,54
260 DATA60,213,205,73,0,209,50,66,255,62,0,187,58,66,255,40
270 DATA17,254,13,40,49,254,8,40,31,254,24,32,5,106,38,0,24,156
280 DATA122,187,40,169,58,66,255,254,32,250,87,255,254,123,242
290 DATA87,255,119,28,35,24,151,122,187,32,6,54,32,29,43,24
300 DATA141,54,136,24,248,122,147,32,4,54,32,24,6,71,54,32,35
310 DATA16,251,75,213,42,32,64,17,2,255,6,0,237,176,209,38
320 DATA0,107,195,154,10
330 TM=PEEK(16561)+PEEK(16562)*256   'Get Top of Memory
340 N2=INT(TM/256)   'Calculate Most Significant Byte
350 IFTM-256*N2<172THENN2=N2-1   'Make room for routine
360 POKE16561,255:POKE16562,N2-1   'Set NEW Top of Memory
370 CLEAR50   'Make BASIC recognize new Top of Memory
380 NT=PEEK(16562)+1   'MSB of Start of Routine
390 SA=NT*256   'Starting Address for Routine
400 IFSA>32767THENSA=SA-65536   'Prevent OVERFLOW Error
410 READA:POKESA,A:READA:POKESA+1,A   'POKE first two bytes
420 FORI=0TO171   '174 bytes in the DATA statements
430 READA   'Read them
440 IFA=255THENA=NT   'Change the NON-RELOCATABLE instructions
450 POKESA+I+67,A   'Put the byte into memory
460 NEXTI   'Do the next one
470 'Point to the USR routine:
480 ONERRORGOTO3020:DEFUSR=SA:GOTO500   'DISK Systems
490 POKE16526,0:POKE16527,NT   'CASSETTE Systems
500 MS=NT*256   'Reference address as stated in article
510 IFMS>32767THENMS=MS-65536   'Adjust if necessary
1000 '
 Your program starts here
1010 'This is a demonstration program
1020 CLS:PRINT"What is your name? ";   'Question
1030 L=20   'Maximum permitted length
1040 POKEMS+115,45   'Halve period for which cursor is "off"
1050 POKEMS+136,191   'CHR$(191) at end of input
1060 POKEMS+117,42   'Set cursor "off" character to "*"
1070 GOSUB2000   'Call subroutine to accept input
1080 N$=I$ 'Save contents of input - I$ will be wiped next time
1090 PRINT:PRINT"Your name is "N$"."
1100 PRINT"How old are you, "N$"? ";   'New question
1110 L=2   'Maximum length
1120 POKEMS+96,35   'Set cursor "on" character to "#"
1130 POKEMS+136,60   'End of input char to "<"
1140 POKEMS+94,180   'Double the original "off" delay
1150 POKEMS+117,32   'Set cursor "off" character to " "
1160 POKEMS+79,46:POKEMS+203,46   'Length of input char to "."
1170 GOSUB2000   'Call subroutine to accept input
1180 AGE=VAL(I$)   'Save numeric value of I$
1190 PRINT:PRINTN$" is"AGE"years old."
1200 END   'End of Program
1999 '
 Subroutine to accept input from the keyboard and set up
  I$ to point to this input.
2000 I$=""   'Clear the variable to contain the input
2010 X=USR(L)   'Call routine - set max length of L
2020 POKEVARPTR(I$),X   'Set length of I$
2030 POKEVARPTR(I$)+1,2   'LSB of address to I$
2040 POKEVARPTR(I$)+2,NT   'MSB of address to I$
2050 RETURN   'Return from the subroutine
3000 '
 Error trap to catch BASICs which have no DEFUSR statement
3010 'Resume execution only if error is in line 430
3020 IFERL=480THENRESUME490ELSEONERRORGOTO0:END
```

The program operates in the following manner:

It obtains the current tup of memory from the addresses 16561-16562 and allocates room for itself just below the top of memory. This is done in 256 byte increments so as to make relocating the routine easy. Unfortunately, I could not make the routine truly relocatable (I had to include two JP instructions which are not relocatable) and therefore I had to have the BASIC program which POKEd the routine into memory do the relocating for me. It then resets the top of memory to protect itself and prevent BASIC from storing data up there and writing over the routine. It then proceeds to POKE the data into memory and once this has been completed, the routine is ready for use. The program then sets up the USR routine pointers using the addresses 16526-16527 or the DEFUSR statement, whichever is applicable.

To access the routine from BASIC, insert a line of the following form in your program:

```
1000 I$ = '' ''          'Clear the variable to
                                contain the input
:X = USR(L)              'Make the call
:POKE VARPTR(I$),X       'Set the length
                                of I$
:POKE VARPTR(I$) + 1,2'LSB of address
                                to I$
:POKE VARPTR(I$) + 2,NT  'MSB of
address                  to          I$
```

The argument L is the maximum length of input to be enforced by the routine. It may be a variable, a constant or an expression. Therefore if L = 15 then the routine will only accept 15 legal characters of input from the keyboard. On return from the routine the actual number of characters entered by the operator is stored in the variable X.

This demonstrates a very powerful use of the POKE statement in conjunction with the VARPTR (or variable pointer) function. If you have a string variable, for example A$, and you type

PRINT VARPTR(A$)

the address where the length of the string contained in A$ is stored in memory will be returned. Therefore it follows that if you type

PRINT PEEK(VARPTR(A$))

then the length of the string contained in A$ will be returned. Similarly,

PRINT PEEK(VARPTR(A$) + 1)

will return the LSB of the starting address of the contents of A$ in memory and

PRINT PEEK(VARPTR(A$) + 2)

will return the MSB of the same address. Proceeding further on this idea, if you let

*F = PEEK(VARPTR(A$) + 1 + PEEK(VARPTR(A$) + 2) * 256*

and then type

PRINT PEEK(F)

then the ASCII value of the first character in A$ will be displayed.

The program uses this idea in the last three POKE statements. Since I$ is the variable set up to contain the input and X is the actual number of characters entered by the operator, it seems reasonable that the length of I$ should be X. This is the purpose of the first POKE statement. It merely POKEs X in the memory location where the length of I$ is stored. The purpose of the next two POKEs is to point I$ to the input entered by the operator which is located in a known buffer set up in the machine language routine. The BASIC program to enter the routine is set up in such a way as to always have the LSB of the address containing the input as 2. The MSB of the address is the MSB of the memory size + 1 (since the input is stored in the address which is 2 bytes above the max-

imum memory address accessible by BASIC i.e. the memory size). The variable NT contains the MSB of the memory size and it is this value which is POKEd into the MSB location. On completion of these three POKEs, the variable I$ will contain the input entered by the operator and may be processed in the same manner as any standard string variable (because that's all it is). To process numeric data, the VAL function of BASIC can be used.
e.g. if $1 = "23" then PRINT VAL(I$) will return the number 23 as distinct from the string "23".

The routine should be POKEd into memory very early on in your program since it adjusts the memory size and clears all variables on initialization. It only uses about 250 bytes of top memory and once it has been entered into memory the data lines can be deleted if memory is precious.

In order to be able to make use of the many features of the routine, it is advantageous to set up a variable just after the initialization sequence as follows:
MS = NT * 256

Once this has been done POKEing different numbers into the following addresses allows you to change the settings of the routine:

SETTING	ADDRESS	DEFAULT
Character to be displayed indicating length of input	MS+79, MS+203	136
Cursor character (when "on")	MS+96	143
Cursor character (when "off")	MS+117	32
Character to be displayed indicating end of input	MS+136	60
Cursor flashing speed—"on" delay	MS+94	90
—"off" delay	MS+115	90

All settings listed here require integer values in the range 0-255. In the case of characters to be displayed, ensure that the number you choose has a character corresponding to it which is displayable by your computer. Where two addresses are listed, this means that both addresses must be changed for the feature to function properly.

There are two states in which the cursor can be. It can either be "on" (like it is for the length of time that you can see it while it is flashing) or it can be "off". If these states change at regular time intervals (e.g. every half a second) the effect of a flashing cursor is created. This is what is meant by the cursor being "on" and "off". We usually associate a flashing cursor with a CHR$(143) graphics block blinking on and off. In this case, the "on" character is CHR$(143), the graphics block, and the "off" character is a CHR$(32), a blank. This routine allows you to define what the cursor's "on" and "off" characters are and by POKEing values into the specified addresses you can change these characters to what every you like.

By POKEing different values into the addresses specified above for the "on" and "off" delay, you can increase or decrease the flashing speed of the cursor according to your requirements. To see which values are currently set, all you have to do is PEEK the addresses corresponding to the feature about which your require information and this will tell you the value of the setting. Always remember that just because you have a machine language routine stored up there in protected memory, that doesn't mean that you cannot modify its operation to suit your own ends by using the POKE statement.

In conclusion, I hope that this article has fulfilled the needs of those people who requested it, and since this is my first article, I would appreciate any feedback on it (whether positive or negative) so that I will know whether I have covered the requested material adequately.

58 Warnbro Beach Road,
SAFETY BAY, W.A. 6169

I will be happy to try and answer any queries that readers may have. Please include a self-addressed stamped envelope.

THE ADVENTURE SYSTEM

A SOFTWARE REVIEW

by Ed Grigonis

Those of you who have ever considered writing an Adventure would know that there are a number of ways of achieving this objective. These various methods may be summarised as follows:—

(a) Dig into an existing Adventure and change the existing data. The major flaw with this method is that you are restricted to the original Adventure format.

(b) Write a BASIC Adventure. This is OK but you will find that memory limitations (particularly in a 16K computer) will prove frustratingly restrictive. The process of actually coding the Adventure will also detract from the task in hand.

(c) Use the Adventure Generator included in "The Captain 80 Book of Basic Adventures" to get rid of the drudgery. This is OK as well, but you may still be hampered by memory limitations.

(d) Learn machine language. If you want the latest fantastic graphics Adventure then this is the way to go. Be prepared to devote a lot of time to the task!

If, on the other hand, your only objective is to write a great Adventure and you aren't particularly interested in graphics then you can always take the easy way out. This will still involve learning a new computer language but the effort required is minimal when stacked up against the alternatives.

What I am talking about is the Adventure Language as contained in "The Adventure System" from the Alternative Source.

First, a bit of history. Hands up all those who think Scott Adams actually sat down and wrote a completely new machine language program for each of his Adventures? Sorry, folks! 'Taint so!!! What he actually did do, very early on, was to sit down and write himself an Adventure Editor in machine language. Most of his Adventures were actually written by feeding data into this program and letting it do all the hack work. I suspect that similar methods were used to get his Adventures onto other computers.

Unfortunately, the Adventure Editor used by Scott Adams has never been available via the commercial market. Into the picture stepped Allan Moluf, well known author of programs for the TRS-80, and Bruce Hansen, author of "Tasmon". Allan Moluf produced a BASIC Adventure Editor as well as a companion BASIC Driver program to use the generated data base. Subsequent machine language enhancements were added by Bruce Hansen. This first effort evolved into what became known as "The Adventure System".

Current versions of "The Adventure System" have been fully implemented in machine language by Bruce Hansen and are, so far, fully compatible with the Scott Adams effort. "The Adventure System" is available to anyone who cares to send The Alternative Source enough money to buy it.

I mentioned that this system requires you to learn a new language. What follows is a discussion of the language and how it is used to create an Adventure which looks just like a Scott Adams' original.

"The Adventure System" requires you to specify the following details when entering your data:
(a) Objects.
(b) Messages.
(c) Rooms.
(d) Vocabulary.
(e) Actions.
(f) Header information.

OBJECTS

Each object specified in the data must contain three parameters: object number, starting location and object description.

The object number is specified by the Adventure Editor when you first enter the information. The first object will always be numbered 0 (zero) and the last object will always be numbered one less than the total number of objects.

The starting location is the number of the room in which the object will be placed at the beginning of the Adventure, i.e. if you specify 3 then the object would initially be located in Room 3.

The object description tells you what the object actually is, whether it can be manipulated and whether or not it is a treasure.

Consider the following three objects:
0: 3 Pile of rocks
1: 5 Large rock/ROCK/
2: 4 *SPARKLING DIAMOND*/DIAM/

Object number zero will be found when the adventurer goes into Room 3 with the above description displayed by the Adventure Driver. The object cannot be manipulated.

Object number one will be found in Room 5. The provision of the short description between slashes tells the Adventure Driver that this object may be manipulated, i.e. picked up, thrown, whatever.

Object number two will be found in Room 4. This object can be manipulated. The leading asterisk in the object description tells the Adventure Driver that this object is a Treasure. Object two would be taken into account for scoring purposes if you placed it in the Treasure Room.

As you can see, there is nothing difficult about specifying objects.

Object number 13 is reserved for the artificial light source, viz. lamp, matches, etc.

MESSAGES

Specifying messages is even simpler than objects. The Adventure Editor will specify suitable numbers when you first enter the messages. Message 0 is reserved so your messages will always start at number one.

A sample message would appear as follows:
1: There is a fly in my soup.

This message would be printed

whenever the driver was required to print message number one.

ROOMS

The parameters required when entering Room details into the Editor are Room Number (given by the Editor), allowable directions and Room description.

When entering Room details the Editor will ask for six Room numbers corresponding with Rooms which may be entered from the current Room. These numbers will also correspond with the directions North, South, East, West, Up and Down.

The Room description determines what the Driver will print when you are in a particular Room.

Consider the following two Room descriptions:

1: 0 5 23 0 0 0 large crate
2: 0 0 0 12 6 0 *I'm outside the shop

Room number one leads into Rooms 5 and 23 by going South and East respectively. The Driver would show South and East as obvious when you are in Room 1. The actual Room description would be preceded by the phrase "You're in a".

Room number two leads into Rooms 12 and 6 by going West and Up respectively. The leading asterisk in the description prevents the default phrase being printed.

It is important to note that the allowable directions can be overridden by allowing the adventurer to move to another room by specifying a suitable command, i.e. GO SHED.

If the adventurer moves in an illegal direction when a light source is available, he will receive the message "I can't go in that direction". If he moves in an illegal direction in the dark, he will be killed.

The last Room is reserved for a "Limbo" state when the person has been killed, and may or may not have exits into other rooms.

VOCABULARY

The vocabulary details all verbs and nouns which may be used in the Adventure.

Predefined Verbs are as follows:

0 AUTO
1 GO
10 GET
18 DROP

Predefined Nouns are:

0 ANY
1 NORTH
2 SOUTH
3 EAST
4 WEST
5 UP
6 DOWN

Primary vocabulary words may have as many synonyms as required but these must follow the relevant primary word and must each be preceded by an asterisk, i.e.

7 DOG
8 *HOUND
9 *BASSET

ACTIONS

Actions are the heart of an Adventure and are where newcomers to "The Adventure System" will have the most difficulty.

Action entries contain the following information:
Verb, Noun, Conditions, Commands and Action Titles.

Action Titles simply document the function of a particular entry. They act as comments and may be omitted, although as with any programming language, it is a good idea to liberally comment source code.

The verb and noun entered by the adventurer are used to determine which conditions and commands will be acted on. For example, if the adventurer were to enter "CLIMB TREE", the Driver would only consider those Action entries with the verb, noun combination of "CLIMB TREE". Of course, if "CYPRESS" had been defined as a synonym of "TREE", then "CLIMB CYPRESS" would also be acceptable in the example given.

The "conditions" of an Action entry provide a list of test which must be passed in order for the "commands" of the Action entry to be carried out. The "commands" of the Action entry are only carried out if all the "conditions" are met.

Before describing a few Action entries I will discuss the available "conditions" and "commands".

CONDITIONS

PAR	This condition always passes and is used to pass a parameter onto a commend. The analogy with BASIC is the 'DATA' statement.
HAS	This conditions passes if the adventurer is carrying the object referred to, i.e. HAS 15.
IN/W	passes if the adventurer is in the same Room as the numbered object, i.e. IN/W 15.
AVL	passes if the adventurer is in the same Room as the object or is carrying the object.
IN	passes if the adventurer is in the numbered Room, i.e. IN 5.
—IN/W	passes if the numbered object is either held by the player or is in another ROOM, i.e. —IN/W 15
—HAVE	passes if the player is not carrying the numbered object.
—IN	passes if the player is not in the numbered Room.
BIT	passes if the numbered bit flag is set.
—BIT	passes if the numbered bit flag is cleared.
ANY	passes if any objects are being carried.
—ANY	passes if no objects are being carried.
—AVL	passes if the numbered object is in any other Room.
—RMO	passes if the numbered object is not in Room zero.
RMO	passes if the numbered object is in Room zero.
CT< =	passes if the counter is less than or equal to the number specified.
ORIG	passes if the numbered object is in the same room it started in.
—ORIG	passes if the numbered object is not in the same Room it started in.
CT =	passes if the counter is equal to the number specified.

(Any numbers input with a condition must be in the range 0-1600)

COMMANDS

0	This is a "null" command.
1-99	Display messages 1-99.
GETX	If this followed a PAR 5, then object number 5 would be picked up.
DROPX	If this followed a PAR 5, then object number 5 would be dropped.
GOTOY	If PAR 22 was specified, the player would be moved to Room 22.
X-RMO	PAR 5 would cause object 5 to be moved to Room zero.
NIGHT	Sets the light/darkness bit flag (15). If the artificial light source is unavailable the Room will be dark and no Room description will be given.
DAY	Clears the light/darkness flag.
SETZ	PAR 4 would cause bit flag number 4 to be set.
X—>RMO	PAR 5 would cause object 5 to be moved to Room zero.
CLRZ	PAR 4 would cause bit flag number 4 to be cleared.
DEAD	Clears the light/darkness flag, moves the player to the last Room and tells him he is dead.
X—>Y	PAR 5 PAR 22 would cause object number 5 to be moved to Room number 22.
FINI	Indicate that the game is over and enquire about a replay.
DSPRM	Display current room if it is light or the artificial light source is present, else display "It's too dark to see".
SCORE	Display number of treasures in the Treasure Room and the percentage of treasures stored.
INV	List inventory.
SETO	Set bit flag zero.
CLRO	Clear big flag zero.
FILL	Refill the artificial light source.
CLS	Has no effect but was included to maintain compatibility with the original BASIC system.
SAVE	Save the game to disk or tape depending on the version.
EXX,X	PAR 5 PAR 15 would cause the location of object number 5 to be swapped with the location of the object number 15.
CONT	Allows continuation of an Action entry.
AGETX	PAR 5 would enable object number 5 to be obtained even if the carry limit has been exceeded.
BYX—>X	PAR 5 PAR 15 would cause object number 5 to be placed in the same Room as object number 15.
CT-1	Subtract one from the counter value.
DSPCT	Display current value of the counter.
CT<—N	PAR 100 would set the counter to a value of 100.
EXRMO	Exchange the current Room number with the Room number held in Alternate Room Register zero.
EXM,CT	PAR 5 would cause the value of the current counter to be exchanged with counter number 5.
CT+	PAR 60 would add 60 to the current counter.
CT—N	PAR 10 would subtract 10 from the current counter.
SAYW	Display the noun (second word) input by the player.
SAYCR	Start a new line on the display.
EXC,CR	PAR 2 would cause the current Room number to be swapped for the Room number currently held in Alternate Room Register number 2.
DELAY	Pause for about 1 second before going on to next command.

EXAMPLES

To discuss all of the possibilities inherent in the above would take a year's issues of this magazine so I will just give a few examples from the Manual.

0: AUTO 100 —BIT 1 PAR 1 0 0 0
MSG 1 SETZ — — INTRO

The 0: shows that this is Action 0. AUTO 100 causes this action to be considered all of the time. When the Adventure is started, all bit flags are clear. In this case —BIT 1 would therefore be true. PAR 1 passes the parameter 1 to the

commands. The 0's indicate that there are no more conditions to be met. MSG 1 causes Message Number 1 to be printed. SETZ obtains the parameter of 1 from the PAR 1 condition and therefore sets bit flag number 1. Unless bit flag number 1 is cleared at a later stage by a different command, this is the last time this command will be executed. The dashes indicate that there are no more commands in the Action entry. INTRO is simply a comment.

11: GET KEY IN/W 12 PAR 12
0 0 0 GET MSG 5 — —

If the player were to enter "GET KEY" this Action entry would be considered. If the player is in the same Room as the key (IN/W 12) the parameter of 12 (presumably the object number of the key) would be passed to the GETX command which would cause the player to pick up the key. Message 5 would then be printed. Note that if the player was already carrying the key he would automatically get the message "I'm already carrying it".

14: GO DOOR IN 2 PAR 3 0 0 0
GOTOY MSG 5 — —

If the player was to enter "GO DOOR" then, provided he was currently in Room 2, the parameter of 3 would be passed to the GOTOY command and the player would be moved to Room number 3. Message number 5 would be printed.

These are only three examples. However, by studying these examples and also the conditions and commands summarised earlier, you will see that the scope provided within "The Adventure System" is indeed comprehensive.

HEADERS

The best way to explain the header is to give an example from the manual.

Adventure Z Version 1.01 14500 bytes free
Bytes under 16K = 7523

#OBJ	#ACT	#VOC	#RM
14	41	22	8
MAX	BEG	#TR	WLEN
5	1	1	4
TIME	#MSG	TR-RM	
999	16	7	

The name of the Adventure is "Adventure Z" and the version number is 1.01. There are currently 14,500 bytes free, although for any particular Adventure this would depend on your computer's configuration and the presence of any high memory drivers. There would be 7523 bytes free if this Adventure was entered as a SYSTEM tape in a 16K computer. There are 14 objects and 41 actions. There are 22 verbs and 22 nouns (although one might be less). There are 8 Rooms. The adventurer can carry a maximum of 5 objects. The adventurer will begin in Room number 1. There is only one treasure. The number of significant letters in nouns and verbs is four. The time limit is 999 moves. There are 16 messages. The treasure room is Room number 7.

All of this information is entered when you commence compiling the Adventure.

ADVEDT LIMITATIONS

The following limitations (if you can call them that) are imposed on the data entered into the ADVEDT program:

(1) Maximum of 500 Action entries.
(2) Maximum of 150 vocabulary entries (150 verbs and 150 nouns).
(3) Maximum of 100 rooms.
(4) Maximum of 99 messages.
(5) Maximum of 250 objects.
(6) Maximum characters in description of object, room or message is 255.
(7) Maximum word length of vocabulary words is 7 characters.
(8) Maximum length of Action titles is 20 characters.

To give you a comparison, the following are the maximums from the Scott Adams Adventures:
270 Action entries.
80 Vocabulary words.
100 Objects.

WHEREDAYAGEDDIT???

As far as I am aware, "The Adventure System" is only available from The Alternate Source, 704 N. Pennsylvania, LANSING, MI. 48906 U.S.A. The cost of the program is $US49.95 plus postage. If you write to them to ask about the cost of airmail, make sure you enclose some international reply coupons.

WADDAYAGET???

Before I tell you what you get, I should point out that you will need to have 48K of RAM available. There are versions, however, for both disk and tape.

If you order the tape version you will get two programs. ADVEDT — the actual Adventure Editor and ADVTT which will enable you to create a SYSTEM tape from any Adventure data base you create. The disk version also includes ADV which is a disk based Adventure driver. ADVEDT in both versions contains ADV so when you are writing Adventures you can jump back and forth between the Editor and Driver.

Each version also includes a short Adventure which is fully explained in the documentation as well as two full length Adventures.

The documentation is supplied in a sturdy black vinyl binder. The original manual was somewhat hard to follow in parts. However, there is now a much more detailed manual which just about ranks alongside Bruce Hansen's excellent "TASMON" documentation for ease of use and clarity.

WHAT? IS THERE MORE?

Also included is Issue No. 1 of the Auggies newsletter "Augment". If you buy "The Adventure System" you are entitled to join the Auggies (Adventure User Group). For $US12.00 per year (extra for airmail) you receive the "Augment" quarterly which includes at least one Adventure. You are eligible to market your Adventures through The Alternate Source, provided they are suitable, and thereby derive royalties. You can also purchase any Adventures created with "The Adventure System" at a discount.

The Alternate Source also have the following Adventure utilities available for purchase. ADVTAPE is similar to ADVTT and will create a SYSTEM tape from a disk data base. This avoids having to save the data base to tape first. ADVCOPY will take the Adventure off a protected Scott Adams Adventure disk and place it on an unprotected disk. ADVDUMP will read in a tape Adventure and dump the data base to disk. You have to be an Auggie to get these utilities.

I could quite easily go for a lot longer. There is so much that I haven't even touched on.

To summarise, if you like playing Adventures or if you are at all interested in writing Adventures, then you should definitely buy "The Adventure System". You won't regret it!

A REVIEW OF THE TRS-80 MC-10

(COLOUR COMPUTER)

by Charlie Bartlett

It never ceases to amaze me how computers are getting smaller all the time. When the Model 1 TRS-80 came out, it was thought to be incredible that a computer was actually crammed underneath the keyboard. Now we have the TRS-80 MC-10 upon us and it makes the Model 1 TRS-80 look like an Elephant or maybe a Dinosaur would be more appropriate considering that the Model 1 is out of production.

The MC-10 is 2 inches high, 8½ inches long and 7 inches wide, (51mm x 216mm x 178mm), and weighs in at 29½ ozs (836.32 grams). The Microprocessor is an 6803 and is not fussy about spaces around keywords as is the 6809E in the Colour Computer, which is just as well considering the 3142 bytes of memory available in the MC-10. I was quite surprised at the number of commands that such a small machine supports, in fact it has NEARLY as many commands as the unextended Basic in the Colour Computer. After some digging around in the memory I also found some commands that it supports that are NOT in the manual, more on this in a minute. Listed below are commands that are available, (as listed in the manual).

ABS	Computes absolute value.
ASC	Returns ASCII code of first character of string.
CHR$	Returns character for ASCII or graphics code.
CLEAR	Reserves bytes of string storage.
CLOAD	Loads Basic program from cassette.
CLOAD*	Loads numberic data into an array from cassette.
CLS(x)	Clears display to specified colour "x".
CONT	Continues program execution if BREAK has been pressed.
COS	Returns cosine.
CSAVE	Saves a Basic program to tape.
CSAVE*	Save contents of a numeric array to cassette.
DATA	Stores data in your program.
DIM	Dimensions an array.
END	Ends program.
EXP	Returns natural exponential
^	Exponentiation character.
FOR	: Creates
TO	: a loop
NEXT	: in a program.
STEP	: with step to increment.
GOSUB	Sends computer to subroutine.
GOTO	Sends computer to a line.
IF/THEN	Test a relationship.
INKEY$	Strobes the keyboard and returns the key being pressed.
INPUT	Computer waits for input from the keyboard.
INT	Converts a number to an integer.

LEFT$ Returns left portion of string.
LEN Returns the number of characters in a string.
LET Assigns value to variable (optional).
LIST Lists program lines on screen.
LLIST Lists program lines to printer.
LOG Returns natural logarithm.
LPRINT Prints an item on the printer.
MEM Returns the amount of free memory.
MID$ Returns a substring of another string.
NEW Erases memory contents.
ON × GOSUB
Multi-way branch to specified subroutines.
ON × GOTO
Multi-way branch to specified lines.
PEEK Returns contents of a memory location.
POKE Puts value into specified RAM location.
POINT Tests whether a graphic cell is on or off.
PRINT Prints to screen, abbreviation of ? is available.
TAB Moves cursor to specified column.
PRINT @ Print at specified location.
READ Reads the next item in a DATA line.
REM Remark.
RESET Erase dot that was SET.
RESTORE
Resets DATA pointer.
RETURN Returns computer from a subroutine.
RIGHT$ Returns right portion of string.
RND Return pseudo random number.
RUN Executive a program.
SET Sets a dot at a specified location to a specified colour.
SGN Return sign of specified number.
SKIPF Skips to end of next program on cassette.
SIN Returns sine.
SOUND Sound specified tone for specified duration.
STOP Stops execution of program.
STR$ Converts a number to a string.
SQR Returns the square root of a number.
TAN Returns tangent.
VAL Converts a string to a number.

Quite a powerful Basic for its size isn't it, the following command are not listed in the manual or anywhere else for that matter.

VARPIR This command has the normal syntax of A = VARPTR (B$) and it works, so I don't know why it was not mentioned.
USR This command is supported by the Basic interpreter though at the moment it is not much use until some technical information becomes available to find out where to poke the entry points.
EXEC This command also has the normal syntax of EXEC addr where "addr" is the entry point of a machine language program or subroutine.
CLOADM This command will load a machine language program into memory and has the syntax of CLOADM "filespec" or CLOADM "filespec", addr where "addr" is the position in memory that the routine is to be loaded to.

As far as I could determine the command CSAVEM is NOT supported, (that is unless it has a very different syntax from normal), I tried several variations on the syntax and nothing worked. If that is the case it would seem that Tandy have been very crafty, you can load a machine language tape but you cannot save one. Now you ask, if that is the case how did I determine that CLOADM works, since there are no machine language programs for the MC-10 at this time.

Well for a start CLOADM does not return a syntax error, it switches on the cassette, clears the screen and prints an "S" at the top of the screen indicating that it is searching. If a BASIC program is encountered it returns an FM error (file mode). If a machine language tape from the Colour Computer is encountered it happily loads in the file name and only fails with an I/O error when the 6809E code is encountered. Which leads me to believe that given a MC-10 machine language file, it would load.

What use are VARPTR, EXEC and USR, well even if you cannot save a pure machine language program, there is no reason why you could not have a BASIC program with machine language poked into the lines with the help of VARPTR or you could have your machine language in DATA statements and poke this into memory and then EXEC to execute.

Video Memory is from 16384 to 16895, other addresses also work in tandem, the reason for this is not understood. Some keyboard addresses are in the region of 16940 and up, for example the address 16952 is used by the space bar and returns a value of 247 when the space bar is pressed, if you write a program where you want something to happen — FOR AS LONG AS the key is held instead of IF the key is pressed then you can read this memory location for the value and if the value is found poke zero into it so that on the next pass, if the key is still held down it will return the original value and if not it will return zero, this procedure applies to the other memory locations in this area.

Blindly poking into various memory locations brought interesting responses that would seem to indicate that with some detailed information higher resolution graphics might be possible. Try poking location 20 (decimal) with different values to see what I mean, (it locks the machine up though and you will have to press the reset button).

Having a Colour Computer here, I thought I could save some typing time by loading a Colour Computer Basic program, I thought I was on to a good thing for a while since the Colour Computer and the MC-10 will both load each other's tapes. However, unfortunately different values are used for the keywords in both machines so what is loaded in has the same line numbers but all of the keywords are swapped around, pity!!

The MC-10 has a DIN socket for a cassette, no cassette cable is supplied, but if you have a Model 1 or a Colour Computer you can use the same cable as the pin connections are the same. It also has an RS232 DIN socket, this also has the same pin configuration as the Colour Computer.

To sum up, it is a very nice little machine at a reasonable price, the only thing lacking at the moment seems to be the software.

INPUT/OUTPUT

FROM: R.J. Mclean-Formartin, Qld.

I own a System-80 on which I am using a Tandy green screen monitor. At times the display shivers and this makes it difficult to read. However, if a key is pressed (a character entered), or the NEWLINE key is depressed the shivering stops. Would you have any idea of a solution to this problem?

(It sounds like you have an intermittent fault of some sort and you should refer the problem to a qualified technician for repair. — Ed.)

FROM: Mr. G. Whitcher—Yunderup, W.A.

It would be helpful if programs that use USR calls were printed with the necessary information to convert from Level 2 BASIC to Disk BASIC for those of us who are too mean to buy the Disk subscription for the sake of a few programs which may be of interest. I only subscribe to the casette subscription for the ease and not having to type the programs that interest me.

(Your point is well taken and we would like to include the information needed to modify Level 2 programs with USR routines so that they will work with Disk BASIC but we do not have the time to dissect machine language routines that are only provided in object format or the BASIC equivalent. If the program author would supply commented assembly language source code for the USR routine, we would be happy to publish that along with the program listing and any relevant suggestions for disk users.

RECALL on the disk version of SOFTPAK is intended to overcome this difficulty in most cases by running the Level 2 program in the Level 2 environment. However, there are those cases where modifying the program for disk BASIC is the preferred solution.—Ed.)

FROM: Mr. J. Linton—Malabar, N.S.W.

As the SYSTEM 80 is going out of production, is there an alternative expansion system to allow update to disk drive or do I have to buy a SYSTEM 80 expansion unit before they go out of production?

(By now you will probably know the answer to this question as it is discussed in the Editorial. Briefly, MICRO-80 will have expansion interfaces for the System 80 available about the end of February, 1984. — Ed.)

SOFTWARE

AUSTRALIA'S CUP —L2/16K

by Carl Cranstone

Australia recently won the America's Cup which the Americans had held for 132 years. The Australian yacht "Australia II" broke the longest winning-streak in sporting history by defeating the American yacht 'Liberty' four wins to three. Every Australian can now relive that day (or should I say, early morning!) by playing the Australia's Cup game!!! Up to six people can play and place bets on the outcome of the races. Complete instructions on how to play are included in the program.

HOW TO GET THE PROGRAM RUNNING(?)

To get the program 'Australia's Cup' running, those of you who are entering the

program from the magazine will have to follow my instructions below to the letter (or at least to the word!). There are three programs that I have written for this game. The first AUSCUP/LST is the Australia's Cup program in its raw form (i.e. it contains no graphics). The second is AUSCUP/DAT which is a program that creates the program lines that contain the graphics. The third is AUSCUP/LNW which is an LNWBASIC Program to enable LNW-80 owners to see Australia's Cup in colour.

1. AUSCUP/DAT

This program reads in the data for the graphics and POKEs it into memory — creating assembled strings. (Exactly the same as those created by Charlie Bartlett's Graphic Assembler program — issue 5 April 1980).
***STEP ONE: Type in the AUSCUP/DAT program and RUN it
***STEP TWO: delete lines 1 & 2
***type LIST:— you should see something resembling a garbaged program. Don't worry! This garbage is really assembled strings.
***SAVE or CSAVE the strings immediately!!!

2. AUSCUP/LST

This is the program which uses the strings.
***STEP THREE: LOAD OR CLOAD the strings and type in this program around the strings. You will notice that lines 1350 and 1560 in this program are reserved for the strings.
***STEP FOUR: When you have typed in the program around the strings SAVE or CSAVE it immediately. (This program will now be known as AUSCUP/BAS).
WARNING: BE VERY CAREFUL THAT YOU DO NOT ACCIDENTALLY ERASE A LINE WITH AN ASSEMBLED STRING IN IT OR EDIT IT. THIS CAN RUIN ALL OF YOUR HARD WORK!!!
***STEP FIVE: LOAD or CLOAD the program in and RUN it. The first thing you should see is a large map of Australia. You must press ENTER to continue into the game. If you don't, the game will go into Demo Mode. To start the game you must press ENTER from the map. If you press ENTER from the Demo Mode, you will return to the map.

3. AUSCUP/LNW

This is for the benefit of LNW-80 owners who want to see Australia's Cup in colour.
***STEP SIX: Type in the AUSCUP/LNW program and RUN it.
***STEP SEVEN: Press Break and then type in the following line:
FLS:SAVE"AUSCUP/GRF:d":
PLOAD"AUSCUP/GRF:d"
where :d is drive number.

This will fill the screen enabling you to see the colour. The /GRF file will be saved and reloaded again so that you can verify that you have a good save.

For those who don't want colour, you will have to delete the following statements from the program:
Line 10 'OUT254,0:'
Line 140 'OUT254,116:'
Line 530 'OUT254,0:'
Line 630 'OUT254,0:'

A typical chain file to load in the colour would be as follows:
(Newdos80 2.0 users use CHAINBLD/BAS)
LNWBASIC PLOAD"ASUCUP/GRF"
CMD"S=BASIC"
RUN"AUSCUP/BAS"
NOTE: AUSCUP/BAS is the resulting program when AUSCUP/DAT and AUSCUP/LST have been merged into one program.

GRAFX
L2/32K Disk

by Bob Wilson

WHAT IS GRAFX?

GRAFX is a tool for use in generating bold titles or graphics for incorporation in programs.

Once you have designed your titles or graphics, GRAFX will write a BASIC program to reproduce them.

INITIAL SET-UP

If you are typing this program in from the magazine, you must first type in the INIT program and run it. The INIT Program creates a disk file called BIGLTRS. This file gives GRAFX the ability to produce the big letters. GRAFX will require the BIGLTRS file to be on disk before it will run; once the INIT program has been run you will not need it again. If you are a disk subscriber you will not need to run INIT as the BIGLTRS file is already on your disk. The INIT program is also on the disk in case you should want to use it.

Make sure you have plenty of free disk space for the programs that GRAFX will write for you. Better still, prepare a disk containing only your operating system, GRAFX and BIGLTRS and initialize your AUTO command as BASIC RUN"GRAFX".

If you use NEWDOS 80 Ver 2 as your DOS you can run the program as it is. If you use another DOS, you will need to delete the last statement from line 80 of the program. The statement to delete is CMD"F",DELETE 10-70

Your Disk is now ready to run GRAFX on power-up or RESET.

USING GRAFX

Power-up or RESET with your GRAFX Disk in Drive 0.

GRAFX will grab as much of your memory as possible for use in string manipulation when it writes programs. It will do this calculation for itself. The program writing operation will take longer on a 32K '80 than on a larger machine, because the string area management functions (when string space becomes full) will operate more often.

Fifteen lines of your screen will be available for you to use in designing your titles or graphics. The bottom line is used for prompting you and to advise you of the current mode of operation.

After the initialization routine, the program will display the COMMAND MODE prompt line on the screen.

GRAFX COMMANDS

In COMMAND MODE the prompt line displayed is:
(C)lear (G)rafx (H)uge (S)lave (R)ecall (P)rogram (E)nd

The appropriate letter (C G H S R P or E) will select the various functions:
GRAFX mode

In GRAFX MODE you have several options available:
(C)ursor Mode
: Use the arrow keys to move the cursor
(D)raw Mode
: Use arrows to draw lines
(E)rase Mode
: Use arrows to erase lines
(T)ext Mode
: Enables text to be entered starting at the current cursor position
e(X)it
: Returns you to COMMAND MODE.

HUGE LETTERS MODE:

Enables HUGE letters to be entered for titles.

Screen capacity is 80 characters and the Character Set available is:
ABCDEFGHIJKLMNOPQRSTUVWXYZ
123456789!?;:,.

NOTES

Input always starts at the top left of the screen.

If you reach the bottom of the screen, the top line will be scrolled off the screen and lost.

The screen will be cleared on entering this mode. Enter HUGE LETTERS BEFORE entering GRAPHICS.

To exit this mode enter SHIFT/BACKSPACE.

SAVE and RECALL MODES:

On selecting either of these modes you will be asked for a screen number.

The screen contents (15 lines) will be SAVED to, or RECALLED from, the screen memory you select and you will be returned to command mode.

PROGRAM MODE

You will be asked for one letter to be included in the FILESPEC. Your letter will appear as the 'x' in the followiing filespec:
TITLEx/GFX

A BASIC program will be written to reproduce the current screen constants, and will be dumped to disk in ASCII format.

The program created will contain 4 lines which will create and print a series of strings from data contained in the subsequent lines.

The END command terminates the running of GRAFX.

SOURCE UTILITY
Model 3 Disk

by T. Domigan

SOURCE/BAS is a program to transfer EDTASM source files between tape and disk for Model 3 users of NEWDOS80 V2.0.

APPARAT discontinued support for Tape I/O in EDTASM for the Model 3 as they were concerned with the unreliability of tape. Whilst object code can be moved between tape and disk with LMOFFSET, source files cannot. SOURCE/BAS fills this gap and also allows the copying of source tapes.

To use SOURCE/BAS enter the command "BASIC IV" from DOS. This special command is necessary as a non-standard logical record length is used to get the code from disk. Once you have entered BASIC, "RUN" the program.

The machine language section resides in the bootstrap stack area and therefore does not require memory size to be set. However, memory is protected by the program in line 20, from 8000H to F000H for the storage of up to 26K of text.

This program is fully-menu driven and is self-explanatory.

Tape I/O can be made at high or low speed as desired. Disk I/O will tend to be slow so have patience with large files.

Always exit the program via menu option 6 as this ensures that the disk file is closed and BASIC is correctly restored.

LVAR
L2/32K

by Tim Fish

This is an extremely useful debugging tool for BASIC programs. The program resides at the top of memory but, on first being run, it initialises the DOS exit for the Disk BASIC verb NAME to a jump instruction to its own start address. Type NAME from ROM BASIC now, instead of giving you an L3 ERROR, gives you a list of all the single precision, double precision, integer and string variables used in your program and their values. So when your BASIC program fouls up press BREAK (if necessary) and type NAME. The variables are displayed in "pages" of 15. Press any key for the next page. Array variables are not listed.

LOADING INSTRUCTIONS:
MEMORY SIZE ***32320***
SYSTEM** *? **LVAR
****? /ENTER** or **/32321***
> – load your BASIC program (tape contains a daft demo program)
***RUN ENTER** . . .*
. . . ***(BREAK) NAME ENTER***

TRACK RACER
Hitachi Peach

by D.C. Kelly

In this race game you must steer your racing car down the track while avoiding the oncoming cars. You will crash if you run off the track or hit an oncoming car. The further you travel the greater your score. You steer the car using the left and right arrow keys. After you have crashed the program will display:
CRASH INS = PLAY AGAIN
DEL = FINISH
If you want another game press the INS key, otherwise press the DEL key.

HI-RES TEXT
Colour Computer

by Geoffrey D. Williamson

One of the most annoying features of the CoCo is its lack of a true lower case display. It does not take too many hours in front of the monitor to become thoroughly annoyed with Tandy's excuse for lower case!

Unfortunately, this is fixed by hardware, and one may resort to alternative hardware lower case drivers to overcome this problem. Alas, these are expensive; yet there is a cheap way out of this dilemma, thanks to MICRO-80; Just type in the following program and you will be able to have true upper and lower case on the screen at the same time. Not only that, but this text is usable at the same time as graphics — here come some graphic adventures!!

One final feature of this program is its relocatability — by this. we mean it can live anywhere in memory quite happily, as it is written in position-independent code which is much easier to do on the 6809 than most 8 bit microprocessors.

Because of this relocatability you can 'hide' the machine code program behind the BASIC program — this is achieved by a little driver attached to the program proper. The advantage of all this is that once the whole program is set up, it can ALL be loaded with one (C)LOAD, as if the machine code where not there!

This program is fully compatible with disk systems and 16K or 32K of memory. With it, you can use the PRINT@ command as you would on the text screen normally if the graphics screen is PMODE 4.

You can also use it with any start page, and there are some interesting effects in the coarser PMODE's — how about video titles using PMODEO or 2?

However, the PRINT@ statements will not work normally except in PMODE 4. If you crash out of the program abnormally, and are still on the graphics screen, just type A = USR1(0) to get back to the text screen.

Type in the demo BASIC program — it is certainly simple, but does give you an idea of what is possible.

PROGRAM DESCRIPTION

As the program is written in machine code it is very fast, and you would be hard up to find any slow down from that of the BASIC interpreter acting normally.

The source code is well commented and the remarks here are only intended for amplification.

The source code from line 120 to line 270 is all for relocating the machine code invisibly behind the BASIC program — invisible to the BASIC interpreter that is. Once that relocation is done the loader is dispensed with — in fact, it cannot be re-used — see line 250.

Lines 330 to 550 are for keeping tabs on the USR calls from the BASIC program. There is provision for two USR calls. The first (USR0) turns on the graphics display, and the second (USR1) turns it off. The code in this section is there to make sure that all errors from errant BASIC programmers are properly trapped!

The main code starts at line 610, and is commented extensively in the listing. You will note that no control characters are allowed in the listing, but these could be easily added if yo uwished to work out their parameters for the look up table.

SET UP

1. *Take very careful note of the addresses in the object code in the first twenty or so lines of code. If you are using Tandy's EDTASM+ to assemble this program you MUST force the assembler to use the direct page mode of addressing by using the < symbol. If you do not, the assembler will default to extended page addressing. This will slightly slow the code down, but more importantly, the addresses I have given in the demonstration program for the USR calls (and for the loader program) will be incorrect.*
   There is nothing sacrosanct about the values in the program, but be prepared to spend a fair bit of time in debugging if you do not stick slavishly to them!
2. *Once you have the machine code safely assembled (and backed up) CLEAR some space at the top of RAM — if you have 16K try CLEAR200,&H3000: or CLEAR200,&H7000 for 32K. (C)LOADM the machine code into this area with the APPROPRIATE OFFSET. Remember, it is ORG'd at zero. If you forget the offset, you will bring down your whole system!*
3. *Now that the machine code is safely tucked away in protected RAM you can load in your BASIC program. Once you are happy with the latter you can go to the next step.*
4. *EXEC the machine code program. This places it behind the BASIC program and the WHOLE program can now be (C)SAVE'd like a normal BASIC Program.*
5. *RUN you new creation — I hope it works!!*

THE KILLER SATELLITE
(COLOUR)

by Scott Edwards

"The Killer Satellite" is an original action game for the 16K, extended basic, colour computer. It should run oin all colour computers with extended colour basic.

A war satellite in space has malfunctioned and is sending its deadly cosmic rays at Earth. You must protect Earth by destroying these rays until the satellit runs out of energy.

The cosmic rays are represented by a random sequence of coloured squares, all rapidly approaching your ship. The "colour" of your ship can be varied by pressing the space bar. By matching the colour of your ship to the components of the beam, portions of the beam (or ray) can be destroyed. If you destroy the whole ray, you go to the next level where a new ray moves faster. If the deadly beam reaches your ship, you are destroyed.

To begin the game you have 3 ships, and extra ships are obtained as you progress through the various levels. If all of your ships are destroyed before the satellite fails, the satellite destroys the Earth and you lose. On the other hand if you can protect the Eart for 11 rounds, the satellite runs out of power and the Earth is saved.

All this makes for an entertaining game which becomes quite difficult at the higher levels. For added interest a score is displayed at all times. If a ship is destroyed you continue on the same level until you are successful or otherwise.

To use the program simply type RUN, read the introduction, then hold down any key until the game begins. From then on simply use the spacebar to match the colours — Good Luck.

The functioning of the program is explained below:

Line 60, 70:
Generate initial display
Line 90, 100:
Generate the strings for the number of ships left, and the colour sequence of your ship.
Lines 110, 120:
Complete initial display
Lines 130-150:
Print scenario
Lines 160, 170, 180:
Flash screen, wait for continue
Line 200:
Initializes variables
Line 210:
Go to round generation
Lines 240-290:
Loops for colour mate between ship and ray by using INSTR ( ), then uses the MID$ ( ) functions availble in BASIC to manipulate the ray string.
Lines 310, 320:
Update display, and makes sound effects.
Line 340:
If 1st character of A$ = blank, ray is destroyed, you win this round.
Line 370:
Update variables, if ray at your ship you lose round.

Line 390:
Go to beginning of loop — continue round.
Lines 420-480:
Check for spacebar being pressed, and change ship colour, if necessary. Also controls speed of ray.
Line 500:
New round, if you complete 11 rounds then you've won, otherwise generate stars.
Line 510:
If 5 successful rounds, get extra ship.
Line 520:
Print satellite
Line 530:
Print score, print round, generate ray.
Line 540:
Time delay and colour sequence.
Line 560:
Print remaining ships.
Line 580:
Destroy ship, same round again.
Line 590:
If last ship you lose
Lines 600-680:
You lost, wait for key.
Line 690, 700:
Another Game?
Line 720:
You Won.

Variable List:

A$	Cosmic Ray
B$	Colour sequence of ship
Q$	Displayed portion of A$ (usually)
X	Position of left portion of Q$ on screen
SH	Number of ships
R	Number of rounds
M	Score
G, SV, S	Determines speed of ray
S1	Used to determine when to get new ship
E	Length of Q$
C	Determines colour of ship
Y1, X1	Position of starts
Z, T, ZZ, V	Variables used for — next loops. N.B. The use of INSTR$ ( ) and MID$ ( ) = . . . , both functions of extended BASIC allow this program to run at a reasonable speed. Therefore this program would be difficult to modify for computers without these special string handling routines.

HOUSEHOLD ACCOUNTING VER 4.2 & VER 5.0

This is an all new version of the earlier Household Accounts program published in MICRO-80 magazine. Input has been simplified, all bugs eliminated and, the program will load and save to disk or tape as required. The program will carry out many of the bookkeeping functions for a small business.

LOADING FROM CASSETTE

The program is written in BASIC. Simply position the tape to the start of the program, type LOAD, press RETURN and press the PLAY key on the recorder. The program will then load. When loaded, type RUN and press RETURN. The Household Accounting copyright message will be displayed together with the program menu.

FUNCTIONS

The following MENU is displayed when the program starts:

```
* * *  H O U S E H O L D  A C C O U N T I N G   VER 4.0  * *
* * *  (C)  07/07/83     M I C R O - 8 0   P T Y  L T D  * *

                        MENU

1 = KEYBOARD INPUT      :  5 = SAVE DATA
2 = LOAD DATA           :  6 = PRINT JOURNALS
3 = READ MEMORY         :  7 = LINEPRINTER UTILITY
4 = EDIT MEMORY         :  8 = LEDGER ACCOUNTS
```

1. KEYBOARD INPUT

*This function is for the input of data and starts from record 1 and works up to the maximum record number for your system. Re-entry to this function when data is still resident in memory will cause the program to resume at the next record after your last entry (this also applies where a file is loaded from disk or tape). Your input is displayed next to the request for details. The cursor is displayed at the point where your entry is going to take place. The asterisks in each input field indicate the maximum number of characters that the field will accept. When a field has been filled, your input will move to the next field. You do not have to fill each field. When you have entered the information you require simply press RETURN and the program will move on to the next field. The only exception to this is the first input of DATE **/**/**. If RETURN is pressed in response to the first input field the program will return you to the menu.*

The field "PREFIX" is used to indicate to the program the ledger into which the record is to be placed. This should be one of the following:

CP = Cash Payments Journal
CR = Cash Received Journal
GJ = General Journal
SJ = Sales Journal

Input to the numeric field of DEBIT and CREDIT must have leading zeroes, or blanks.
i.e. enter:
$10.10 as 00010.10
$10.01 as 00010.01
$1.10 as 00001.10
$101.10 as 00101.10

When all fields have been filled the program will respond with:
CORRECT (Y/N)

If 'N', the program will return you to the start of input for that record. If 'Y', the program, will respond by going to the next record. To return to the menu press RETURN in response to the DATE field input.

2. LOAD DATA

This function enables you to load a complete set of data. The program will display a menu giving you the choice of loading from cassette or disk, or of returning to the main menu should you have selected this function by mistake.

For either type of load the program will request an 8 character filename. In the case of a disk load the program will search all available drives for the file starting with drive 0.

In the case of a cassette load the program will read in the name of the first file found on the tape, if this does not match the filename you supplied the program will display the filename read from tape and abort the function.

After a successful load from either disk or cassette the program will return to the LOAD MENU.

3. READ MEMORY

This function scrolls ALL data stored in memory, up the screen.

4. EDIT MEMORY

This function is used to add new records, or to change the data stored in any one record. It uses the same input and display format as the keyboard input mode except that it gives several extra options:

Respond to the prompt SELECT with one of the following:

E	This will put you into edit mode. The input format is the same as the Keyboard input function EXCEPT that this time if the RETURN key is pressed at the start of an entry field, that field will remain unchanged and input will move to the next field.
;	This will increase the record count by one and display the next record.
+	This will increase the record count by ten and display a higher record.
–	This will decrease the record count by one and display the preceding record.
=	This will decrease the record count by ten and display a lower record.

*RETURN in response to the SELECT * prompt will return you to the main menu.*

5. SAVE DATA

This function enables you to save a complete set of records. The program will display a menu giving you the choice of saving to cassette or disk, or of returning to the main menu should you have selected this function by mistake. For either type of save the program will request an 8 character filename, write the file and return to the SAVE MENU. (You should make a note of the filename you use, particularly when saving to cassette, as the program requires the name when you wish to reload the data).

6. PRINT JOURNALS

This function enables you to print the four journals to the screen and to a printer (optional). Follow the instructions on the screen. Note: Do not attempt to use the printer option unless there is a printer connected to the computer. Pressing RETURN in response to the DATE prompt will cause all dates for that journal to be printed.

IMPORTANT NOTE

Before the Ledger Balances are calculated and printed, the records in memory are sorted according to Account No. This destroys the normal DATE-order sequence of the record in memory, which is the preferred order for all other printouts. ***Make sure that you SAVE a copy of your data before using this function.***

7. LINEPRINTER UTILITY

This function allows direct interface between the keyboard and the printer, i.e. whatever is typed onto the screen will be printed as soon as the RETURN key is pressed. This utility is useful for setting up headings on reports. Note: Do not attempt to use this function unless there is a printer connected to the computer.

8. PRINT LEDGER ACCOUNTS

This function allows you to print the ledger accounts to the screen and to a printer (optional). Follow the instructions on the screen. Note: Do not attempt to use the printer option unless there is a printer connected to the computer.

USING THE PROGRAM

The program has the capacity to handle both single entry and double entry accounting systems. The benefit of the double entry system is that it provides a checking mechanism to indicate accuracy of input and processing and is the preferred system in maintaining financial records. However, the double entry system uses more records in recording the data thereby reducing the total capacity available for recording transactions.

For the purposes of this illustration the double entry system has been used.

Prior to using the program, it is necessary to establish a Chart of Accounts to accumulate transactions appropriate for the purpose of recording. Adequate allowance has been made for the number of ledger accounts (998) that may be used. The following example has been used to illustrate how the program can be used to record personal income and expenditure.

CHART OF ACCOUNTS

Balance Sheet of Items

Assets

1. Land
2. Buildings
3. Household Furniture & Appliances
4. Motor Vehicles

6. Public Co. Shares
7. Bank Accounts

Liabilities

11. 1st Mortgage
12. 2nd Mortgage

14. Credit Charge Accounts
15. Friendly Finance Corp
16. Other Liabilities

99. Owner's Equity.

Income and Expenditure Items

Income
51. Husband's Salary
52. Wife's Salary
54. Dividends Received
55. Interest Received
58. Health Refunds
59. Other Income

Expenditures
General
71. Entertainment
72. Household Repairs
73. Housekeeping
74. Insurance
75. Motor Vehicle Costs
76. Subscriptions
77. Interest paid
78. Health Insurance

Taxation Deductions
81. Education
82. Medical Costs
83. Rates & Taxes
84. Trade Subscriptions

To commence processing the transactions shown in the example the opening balances need to be entered. This is done via the keyboard input. For this purpose the General Journal (GJ) prefix is used.

(N.B. The print out of the General Journal processing demonstrates the self checking mechanism of the double entry system in showing that the total of debits and credits agree and that there is no imbalance. If a figure other than $0.00 is shown as the balance this indicates an error in processing has occurred and requires investigation and editing).

CASH RECEIPTS JOURNAL

CASH RECEIVED JOURNAL FOR ALL (DATE)'S

DATE	REF	DETAILS	ACC NO	DEBIT	CREDIT
15/07/83		MR. SALARY	CR051	0.00	1050.00
31/07/83		MRS. INCOME	CR052	0.00	600.00
01/08/83		DIV. A CO. LTD.	CR054	0.00	150.00
15/08/83		MR. SALARY	CR051	0.00	1050.00
17/08/83		HEALTH REBATE	CR058	0.00	10.60
27/08/83		BEQUEST NELLY	CR059	0.00	10000.00
31/08/83		INT. X CO. LTD.	CR055	0.00	450.00
31/08/83		MRS. INCOME	CR052	0.00	600.00
31/08/83		TOTAL RECEIPTS	CR010	13910.60	0.00
TOTAL				13910.60	13910.60
BALANCE		$0.00-			

Normally for each receipt an entry is required to the Bank Account (debit entry) and the ledger account to record the nature of the income (credit entry). In this example only one entry has been made to the Bank Account for the total of the records processed. This has been done to demonstrate a way in which maximum availability of records can be maintained. To carry out this function return to the menu and select the "Print Journals" function and list the transactions to obtain the total of the input. Once obtained, return to the "Keyboard Input" function and process this total to the Bank Account using the "CR" prefix.

The comments noted above for Cash Receipts also apply here, except that the entry to the Bank Account for cash payments is a credit and entries to the expense accounts, etc. a debit.

CASH PAYMENTS JOURNAL

CASH PAYMENTS JOURNAL FOR ALL (DATE)'S

DATE	REF	DETAILS	ACC NO	DEBIT	CREDIT
01/07/83	0001	CAR SERVICE	CP075	43.24	0.00
10/07/83	0002	ENT-BILL MARY	CP071	75.40	0.00
15/07/83	0003	MICRO-80	CP076	85.00	0.00
15/07/83	0004	HOUSEKEEPING	CP073	400.00	0.00
31/07/83	0005	BUILDING INS.	CP074	230.63	0.00
31/07/83	0005	CONTENTS INS.	CP074	250.00	0.00
31/07/83	0006	A BANK - PRIN.	CP011	80.00	0.00
31/07/83	0006	A BANK - INT.	CP077	718.75	0.00
31/07/83	0007	A SBANK - PRIN.	CP012	100.00	0.00
31/07/83	0007	A SBANK -INT.	CP077	533.00	0.00
31/07/83	0008	FRIENDLY FINAN.	CP015	1000.00	0.00
01/08/83	0009	DR. WHO	CP082	10.60	0.00
01/08/83	0010	FRIENDLY FINAN.	CP015	9000.00	0.00
01/08/83	0011	A SBANK - PRIN.	CP012	1000.00	0.00
10/08/83	0012	SCH. FEES - ANN	CP081	100.00	0.00
15/08/83	0013	COUNCIL RATES	CP083	212.10	0.00
15/08/83	0014	HOUSEKEEPING	CP073	400.00	0.00
31/08/83		TOTAL PAYMENTS	CP010	0.00	14238.72
TOTAL				14238.72	14238.72
BALANCE		$0.00			

LEDGER BALANCES (TRIAL BALANCE)

ACC NO.	DEBITS	CREDITS	TOTAL
001	10000.00	0.00	10000.00
002	65000.00	0.00	65000.00
003	25000.00	0.00	25000.00
004	19000.00	0.00	19000.00
006	5000.00	0.00	5000.00
007	15000.00	0.00	15000.00
010	14135.76	14238.72	102.96-
011	80.00	25000.00	24920.00-
012	1100.00	40000.00	38900.00-
015	10000.00	10000.00	0.00
051	0.00	2100.00	2100.00-
052	0.00	1200.00	1200.00-
054	0.00	150.00	150.00-
055	0.00	450.00	450.00-
058	0.00	10.60	10.60-

059	0.00	10000.00	10000.00-
071	75.40	0.00	75.40
073	800.00	0.00	800.00
074	480.63	0.00	480.63
075	43.24	0.00	43.24
076	85.00	0.00	85.00
077	1251.75	0.00	1251.75
081	100.00	0.00	100.00
082	10.60	0.00	10.60
083	212.10	0.00	212.10
099	0.00	64225.16	64225.16-
TOTAL	167374.48	167374.48	0.00

This facility summarises the balances of all active ledger accounts showing the total debit and credit entries and the balance of each account. Validation of the processing is ascertained when the total debits and credits are the same amount and the total equals 0.00. If the total does not equal 0.00 an imbalance has occurred which requires checking and correction.

Normally, each of the four journals would be individually checked prior to performing a trial balance to ensure that each journal is itself balanced. The trial balance is then merely a formality and should show no imbalance.

IMPORTANT NOTE

Before the Ledger Balances are calculated and printed, the records in memory are sorted according to Account No. This destroys the normal DATE-order sequence of the records in memory, which is the preferred order for all other printouts. ***Make sure that you SAVE a copy of your data before using this function.***

LEDGER ACCOUNTS

This function enables each individual account to be printed showing all the transactions processed to that account. For the purposes of illustration the Bank Account (#10) and the Interest Paid Account (#77) are listed below.

To obtain a complete print out of ledger accounts it is necessary to input each account number in response to the "Which Account Number do you require" question.

In c ses where the record maximum is reached this can be overcome by obtaining a print out of all journals and ledger accounts for retention as a permanent record and repeating the procedural functions outlined above.

This commences by clearing the memory and inserting the closing balances for each ledger account via the General Journal prefix.

The program provides great flexibility as to the types of accounts that may be incorporated into the chart of accounts. Your requirements can be specifically designed for your own particular circumstances. The design and allocation of account numbers should be thoughtfully considered prior to commencement as any subsequent change in account numbers for particular purposes will require the editing of prior transactiuons to accounts affected.

SALES JOURNAL

The Sales Journal will often not be applicable in the normal household situation. It is, of course, useful for a small business.

Version 4.2 has been modified to run on the Hitachi Peach.

Version 5.0 has been modified to run on the TRS-80 Model 4.

Instructions for the Model 4 version are the same as those for the Hitachi Peach, the program has however been further modified to make use of the Model 4 features: the description field has been expanded to 31 characters and the program has been broken up into modules to gain maximum use of the memory. Model 4 owners should type in each module from the magazine and save it to disk as an ASCII file using the filename that is listed in the module, ie:

SAVE "MODULE0/BAS",A

When the program is run, MODULE0 must be the first program that is loaded and run, this module initializes the sytem. The program will load the other modules as required.

Model 4 users should ignore any references in the main text to cassette I/O, these functions are not supported by your machine. Model 4 owners MUST be in the Model 4 mode to run this program.

BOLD PRINTING ON LINE PRINTER VII

This 1 line subroutine which enables owners of a Lineprinter VII to use bold type. The subroutine may also work on other Printers, but I have not tried them.

To use the subroutine, simply LPRINT your normal text, and when you want to use bold type, put the tex in P$ and use GOSUB 1000 (or wherever you put the subroutine). The text must not go over on to the next line, or an error will result. On returning from the subroutine, the Printer's carriage will be placed just after the last character of P$. The routine will work in normal and double size Print mode, but if both are mixed on one line, problems will result.

The subroutine works by simply printing P$ in the same place three times. The control code 26 executes a carriage return with no line feed. ZS$ is a string of blanks, which will return the carriage to the start of P$ after each carriage return. ZP is used to check that P$ will fit on one line and to calculate the length of ZS$. If you want the bold type darker, increase the length of the FOR . . . NEXT loop.

SIRIUS ADVENTURE
for the Colour Computer and Hitachi Peach

This Adventure was originally written to run on the Model 1.

It has mainly been converted to take advantage of the HI-RES WRITER published elsewhere in this issue. If you are typing this program in from the magazine, follow the instructions for merging the HI-RES WRITER with this program and then save it. If you have a cassette subscription you only to load the program and the HI-RES WRITER will load into memory as well.

The adventure is fairly small by normal standards, though it will still provide you with a challenge. The Hitachi Peach version is essentially the same program, but without the need for the HI-RES WRITER. As is usual with Adventures, no further clues to its operation will be given here, you'll just have to sweat it out!!!

SPACE UTILITY DISC BASIC
by D. Bereis

This utility will go through a Basic program and insert spaces around all of the keywords, this not only makes the listing easier to read on a Model 1, but if you have purchased a Model 4 and still have your Model 1 it will be essential if you want to convert your old Model 1 programs, since the Model 4 WILL NOT run a program that does not have spaces between the keywords. Using this utility will save you hours of typing. To use it simply load your Basic program then type:

CMD"S"

Then type:

SPACE and press ENTER/NEWLINE

Then type:

*BASIC * and press ENTER/NEWLINE*

Then save the program. If you have a Model 4, all you have to do now is put the disk in your Model 4 and run the conversion program on it. Remember you will still have to check for things like PEEK's and POKE's before you run it.

YAHTZEE L2/16K
by T. Domigan

YAHTZEE is based on the popular poker-like 5-dice game of the same name.

AIM

The aim of the game is to score in each of 13 categories and the winner is the player with the highest total score.

ROLLING THE DICE

Each player is allowed 3 rolls of the dice to maximise the score in each of the 13 turns. The first roll changes all 5 dice whilst the remaining 2 players allow selective rolling of any of the 5 dice, e.g. if Rolls 1 gives 4, 3, 6, 1, 4, to maximise the score by rolling more 4's, then "R234" would be suitable. If a good score results after the first or second roll then you may immediately score by entering "S" instead of "R". When scoring it is only necessary to enter the category number e.g. 13.

SCORING

Categories 1-6: Sum of that category dice in hand.
Category 7: 3 of a kind. Score total of dice.
8: 4 . . . . . .
9: Full house. . . 25 pts
10: Small Straight (sequence of 4 dice) 30 pts
11: Large Straight (sequence of 5 dice) 40 pts
12: YAHTZEE (5 of a kind)score 50 pts
13: CHANCE = anything score sum of dice

If a second or later YAHTZEE (5 of a kind) is scored and the appropriate category 1-6 has been filled, it may be used in categories 7-11.

Sound is available but memory need not be protected as the m/l will reside in the REM statement of line 10.

NOTE: Although written for a Model 3, this program will run on a Model 1 without modification.

SPACE INVADERS
for the TRS-80 MC-10

This short Space Invaders game is included in case any of you have bought an MC-10 for Christmas, the program is short and simple, (out of necessity due to the limited memory). To move your laser cannon left and right press the "A" or the "S" keys respectively, these keys were chosen because they have the left and right arrow symbols on them as well. Press the Space Bar to fire. Ten points are given for each Invader that is destroyed. If you shoot all the Invaders before they land you get a bonus of 30 points. If any Invaders land, you lose.

```
**** VER 4.2  HOUSEHOLD ACCOUNTING ****

            HITACHI PEACH


10 REM      WRITTEN BY
       SUNBURST SOFTWARE SERVICES
                    FOR
                MICRO-80  PTY LTD
20 CLEAR 16100:SCREEN0,,1:VV=350:POKE&H2
3C,16:POKE164,10
30 DIM A$(351),LB(351):F3$="  ########.##
":F4$=" $$###,###.##-":F5$="       "+F3$+"
 "
40 W=1:SO$="PRESS ANY KEY TO CONTINUE *"
:Z0$="TOTAL":Z1$="MEMORY":Z2$="ACCOUNT":
Z3$="SELECT FUNCTION *":Z4$="JOURNAL":Z5
$="CREDIT":Z6$="DEBIT":Z7$="DATE"
50 GOSUB230:LOCATE10,10:PRINT"MAXIMUM NU
MBER OF RECORDS = ";VV:LOCATE10,13:PRINT
SO$;:PA=868:LN=1:GOSUB60:GOTO250
60 AD$="":WX=INT(PA/64):WY=PA-(WX*64)
70 FORT=1TOLN
80 GOSUB150:IFIN$=CHR$(13)THEN130ELSEIFI
N$=CHR$(8)THEN110ELSEIFIN$=CHR$(32)THENG
OSUB170
90 AD$=AD$+IN$:LOCATE WY,WX:PRINTAD$;:NE
XT:RETURN
100 NEXT:RETURN
110 IFT<=1THEN80ELSET=T-1
120 AD$=LEFT$(AD$,LEN(AD$)-1):LOCATE WY,
WX:PRINTAD$;"**";:GOTO80
130 IF FL=0 THENBL$=STRING$(LN-LEN(AD$),
" "):AD$=AD$+BL$:LOCATE WY,WX :PRINTAD$;
:RETURN
140 BL$=STRING$(LN-LEN(AD$),"0"):AD$=AD$
+BL$:LOCATE WY,WX :PRINTAD$;:RETURN
150 IN$="":IN$=INKEY$:GOSUB160:IFIN$=""T
HEN150ELSERETURN
160 LOCATE WY,WX :PRINTAD$;CHR$(134);:RE
TURN
170 IFFL=0THENRETURN
180 IN$="0":RETURN
190 T=1
200 IFT>5THENAD$="     0":RETURN
210 IFMID$(AD$,T,1)="0"THENT=T+1:GOTO200
220 AD$=STRING$(T-1,32)+RIGHT$(AD$,6-T):
RETURN
230 CLS:LOCATE0,0:PRINT"* * *   H O U S
E H O L D   A C C O U N T I N G  VER 4.2
   * * *";:LOCATE0,1:PRINT"* * *  (C)
07/07/83    M I C R O - 8 0   P T Y   L
T D   * * *";
240 LOCATE1,3:RETURN
250 P=0:GOSUB230:LOCATE28,3:PRINT"MENU"
255 LOCATE1,6:PRINT"1 = KEYBOARD INPUT
       : 5 = SAVE DATA":LOCATE1,7:PRIN
T"2 = LOAD DATA                : 6 = PRI
NT JOURNALS"
260 LOCATE1,8:PRINT"3 = READ MEMORY
       : 7 = LINE PRINTER UTILITY":LOC
ATE1,9:PRINT"4 = EDIT MEMORY
  : 8 = PRINT LEDGER ";Z2$;"S"
270 LOCATE0,13:PRINTZ3$;:PA=848:LN=1:GOS
UB60
280 AD=VAL(AD$):IFAD<1 OR AD>8 THEN270
290 ON AD GOTO480,1450,500,600,1350,740,
1150,1180
300 LOCATE18,3:PRINT"KEYBOARD INPUT"
310 LOCATE0,5:PRINTZ7$;"     **/**/**";:L
OCATE0,6:PRINT"REF NO. ****";:LOCATE0,7:
PRINT"DETAILS **************";:LOCATE0,
8:PRINT"PREFIX  **";:LOCATE0,9:PRINT"ACC
 NO. ***";:LOCATE0,10:PRINTZ6$;"  *****.
**";
320 LOCATE0,4:PRINT"RECORD NO. ";I;
330 LOCATE0,11:PRINTZ5$;" *****.**";:LOC
ATE0,13:PRINT"CORRECT (Y/N) *";:RETURN
340 GOSUB230:GOSUB300
350 FL=1:PA=328:LN=2:GOSUB60:DT$=AD$:IFD
T$="00"THENRETURN
360 GOSUB370:GOSUB380:GOSUB390:GOSUB400:
GOSUB410:FL=1:GOSUB420:GOSUB430:GOSUB440
:GOSUB450:FL=0:GOTO460
370 PA=331:GOSUB60:DT$=DT$+AD$:PA=334:GO
SUB60:DT$=DT$+AD$:RETURN
380 PA=392:LN=4:FL=0:GOSUB60:RF$=AD$:RET
URN
390 PA=456:LN=15:GOSUB60:DE$=AD$:RETURN
400 PA=520:LN=2:GOSUB60:PR$=AD$:RETURN
410 PA=584:LN=3:GOSUB60:PR$=PR$+AD$:RETU
RN
420 PA=647:LN=5:GOSUB60:GOSUB190:DB$=AD$
+".":RETURN
430 PA=653:LN=2:GOSUB60:DB$=DB$+AD$:RETU
RN
440 PA=711:LN=5:GOSUB60:GOSUB190:CR$=AD$
+".":RETURN
450 PA=717:LN=2:GOSUB60:CR$=CR$+AD$:FL=0
:RETURN
460 PA=846:LN=1:GOSUB60:IFAD$="N"THEN340
ELSEIFAD$<>"Y"THEN460
470 A$(I)=DT$+RF$+DE$+PR$+DB$+CR$:RETURN
480 FORI=WTO VV:GOSUB340:IFDT$="00"THENW
=I:GOTO250
490 NEXTI:GOTO250
500 GOSUB230:GOSUB510:GOSUB550:GOTO250
510 LOCATE25,3:PRINT"CONTENTS OF ";Z1$;
520 LOCATE0,4:PRINTZ7$;"      REF   DETAI
LS          ACC NO      ";Z6$;"       ";Z5$
530 IF P THEN PRINT#3,Z7$;"      REF   DE
TAILS          ACC NO      ";Z6$;"       ";
Z5$
540 RETURN
550 L=1:FORI=1TOW-1
560 GOSUB1570:GOSUB1620:PRINTVX$
570 L=L+1:IFL=11THENL=1:LOCATE0,15:PRINT
SO$;:PA=986:LN=1:GOSUB60:GOSUB230:GOSUB5
10
580 NEXTI
590 LOCATE0,15:PRINT"END OF DATA - ";SO$
;:PA=1000:LN=1:GOSUB60:RETURN
600 I=1:FL=0
610 LOCATE28,3:PRINT"EDIT ";Z1$;
620 GOSUB230:GOSUB310:LOCATE0,13:PRINT"
              ";:LOCATE0,15:PRINT"SELECT
 *";
630 LOCATE0,4:PRINT"RECORD NO. ";I;
640 GOSUB1570
650 IFV1$=""THENGOSUB310:LOCATE0,13:PRIN
T"                ";
660 LOCATE8,5:PRINTV1$;:LOCATE11,5:PRINT
V2$;:LOCATE14,5:PRINTV3$;:LOCATE8,6:PRIN
TV4$;:LOCATE8,7:PRINTV5$;:LOCATE8,8:PRIN
TV6$;:LOCATE8,9:PRINTV7$;:LOCATE7,10:PRI
NTV8$;:LOCATE7,11:PRINTV9$;
670 PA=967:LN=1:GOSUB60:IFAD$=";"THENLOC
ATE0,15:PRINT"ADVANCE";:I=I+1:IF I>VV TH
EN I=VV
680 IF AD$="+"THENLOCATE0,15:PRINT"ADVAN
CE";:I=I+10:IF I>VV THEN I=VV
690 IF AD$="-"THEN I=I-1:LOCATE0,15:PRIN
T"REVERSE";:IF I<=0 THEN I=1
700 IF AD$="="THEN I=I-10:LOCATE0,15:PRI
NT"REVERSE";:IF I<=0 THEN I=1
710 IFAD$=" "THEN250
720 IF AD$="E"THENLOCATE0,15:PRINT"* EDI
T *";:GOSUB840:GOTO620
730 GOTO630
740 GOSUB230:LOCATE18,3:PRINTZ4$;"S AVAI
LABLE"
745 LOCATE0,5:PRINT"1 = PRINT LEDGER BAL
ANCES       :  4 = GJ GENERAL ";Z4$;:LOC
ATE0,6:PRINT"2 = CP CASH PAYMENTS ";Z4$;
"    :  5 = SJ SALES ";Z4$;:LOCATE0,7:PR
INT"3 = CR CASH RECEIVED ";Z4$;"    :  6
 = RETURN TO MAIN MENU"
750 LOCATE0,13:PRINTZ3$;:PA=848:LN=1:GOS
UB60:AD=VAL(AD$)
760 IFAD<1 OR AD>6 THEN750
770 ON AD GOTO 1630,780,790,800,810,250
780 PT$="CASH PAYMENTS":KA$="CP":GOTO820
790 PT$="CASH RECEIVED":KA$="CR":GOTO820
800 PT$="GENERAL":KA$="GJ":GOTO820
810 PT$="SALES":KA$="SJ"
820 GOSUB980:GOSUB1010:GOTO1030
830 PRINTSO$:PA=1022:LN=1:GOSUB60:GOTO25
0
840 FL=1:PA=328:LN=2:GOSUB60:IFAD$="00"T
HENDT$=V1$+V2$+V3$:LOCATE8,5:PRINTV1$;"/
";V2$;"/";V3$;:GOTO860
850 DT$=AD$:GOSUB370
860 GOSUB380:IFRF$="     "THENRF$=V4$:LOC
ATE8,6:PRINTRF$;
```

```
870 GOSUB390:IFDE$="                "THEN
DE$=V5$:LOCATE8,7:PRINTDE$;
880 GOSUB400:IFPR$="  "THENP1$=V6$:LOCAT
E8,8:PRINTV6$;:GOTO900
890 P1$=AD$
900 GOSUB410:IFAD$="    "THENPR$=P1$+V7$:
LOCATE8,9:PRINTV7$;:GOTO920
910 PR$=P1$+AD$
920 FL=0:GOSUB420:IFAD$="      "THENDB$=V
8$:LOCATE7,10:PRINTV8$;:GOTO940
930 GOSUB190:GOSUB430
940 FL=0:GOSUB440:IFAD$="      "THENCR$=V
9$:LOCATE7,11:PRINTV9$;:GOTO960
950 GOSUB190:GOSUB450
960 GOSUB470
970 FL=0:RETURN
980 LOCATE0,13:PRINT"IS THE PRINTER REQU
IRED (Y/N) *";:PA=862:LN=1:GOSUB60
990 IF AD$<>"N" AND AD$<>"Y"THEN980
1000 P=(AD$="Y"):IF P THEN OPEN"O",#3,"L
PT0:"
1005 RETURN
1010 ZK$="":LOCATE0,14:PRINT"WHICH ";Z7$
;" DO YOU REQUIRE **/**/**";:FL=1:PA=922
:LN=2:GOSUB60:E$=AD$:IFE$="00"THENE$="'S
":ZK$="ALL ":GOTO1030
1020 PA=925:GOSUB60:E$=E$+AD$:PA=928:GOS
UB60:E$=E$+AD$:RETURN
1030 GOSUB230:LOCATE0,3:PRINTPT$;" ";Z4$
;" FOR ";ZK$;"(";Z7$;")";E$:IF P THEN PR
INT#3," ":PRINT#3,PT$;" ";Z4$;" FOR ";ZK
$;"(";Z7$;")";E$
1040 DT#=0:CT#=0:BL#=0:GOSUB520
1050 FORI=1TOW
1060 IFMID$(A$(I),26,2)<>KA$THEN1110
1070 IFE$="'S"THEN1090
1080 IFE$<>LEFT$(A$(I),6)THEN1110
1090 GOSUB1570:GOSUB1620:PRINTVX$:IF P T
HEN PRINT#3,VX$
1100 DR#=VAL(MID$(A$(I),31,8)):CR#=VAL(M
ID$(A$(I),39,8)):DT#=DT#+DR#:CT#=CT#+CR#
:BL#=BL#+DR#-CR#
1110 NEXT
1120 PRINT:PRINTZ0$;TAB(36);:PRINTUSINGF
3$;DT#;CT#:PRINT"BALANCE ";:PRINTUSINGF4
$;BL#
1130 IF P THEN PRINT#3," " :PRINT#3,Z0$;
TAB(36);:PRINT#3,USINGF3$;DT#;CT#:PRINT#
3,"BALANCE ";:PRINT#3,USINGF4$;BL#:CLOSE
#3
1140 LOCATE0,15:PRINT"PRINTOUT COMPLETE
- ";SO$;:PA=1006:LN=1:GOSUB60:GOTO740
1150 GOSUB230:AD$="Y":GOSUB1000:LOCATE8,
3:PRINT"LINEPRINTER UTILITY":LOCATE0,5:P
RINT"TYPE HEADINGS OR NOTES AS REQUIRED"
:LOCATE0,6:PRINT"TYPE ";CHR$(34);"EXIT";
CHR$(34);" TO RETURN TO MAIN MENU"
1160 M$="":INPUTM$:IFM$="EXIT"THEN CLOSE
#3:GOTO250
1170 PRINTM$:PRINT#3,M$:GOTO1160
1180 GOSUB230:LOCATE18,2:PRINT"LEDGER ";
Z2$;"S":LOCATE0,5:PRINT"TYPE ";CHR$(34);
"999";CHR$(34);" TO EXIT"
1190 GOSUB980
1200 LOCATE0,15:PRINT"WHICH ";Z2$;" NO.
DO YOU REQUIRE ***";:PA=993:LN=3:FL=1:GO
SUB60:N=VAL(AD$)
1210 IFN<10RN>999THEN1200
1220 BL#=0:DT#=0:CT#=0:IFN=999THENCLOSE#
3:GOTO250
1230 GOSUB240:LOCATE0,3:PRINTZ2$;" NO. "
;AD$;:IF P THEN PRINT#3," ":PRINT#3,Z2$;
" NO. ";AD$
1240 LOCATE0,6:GOSUB520:FORI=1TOW
1250 IFN<>VAL(MID$(A$(I),28,3))THEN1280
1260 GOSUB1570:GOSUB1620:PRINTVX$:IF P T
HEN PRINT#3,VX$
1270 DR#=VAL(MID$(A$(I),31,8)):CR#=VAL(M
ID$(A$(I),39,8)):DT#=DT#+DR#:CT#=CT#+CR#
:BL#=BL#+DR#-CR#
1280 NEXT
1290 PRINT:PRINTZ0$;TAB(36);:PRINTUSINGF
3$;DT#;CT#
1300 IF P THEN PRINT#3," ":PRINT#3,Z0$;T
AB(36);:PRINT#3,USINGF3$;DT#;CT#
1310 PRINTZ2$;" BALANCE";:PRINTUSINGF4$;
BL#
1320 IF P THEN PRINT#3,Z2$;" BALANCE";:P
RINT#3,USINGF4$;BL#
1330 PRINT:PRINT:IF P THEN PRINT#3," ":P
RINT#3," "
1340 GOTO1200
1350 X1$="SAVE TO":GOSUB1580
1360 GOSUB1590
1370 IF SF=3THEN250
1380 GOSUB1600
1390 GOSUB1610:IF AD$="E" THEN GOTO1350
1400 IF SF=1 THEN N1$=RIGHT$(NM$,8):OPEN
"O",#2,"CAS0:DATA":PRINT#2,N1$,W
1410 IF SF=2 THEN OPEN"O",1,NM$
1420 IF SF=1 THEN FOR I=1 TO W STEP4:PRI
NT#2,A$(I),A$(I+1),A$(I+2),A$(I+3):NEXT:
CLOSE#2
1430 IF SF=2 THEN PRINT#1,W:FOR I=1 TO W
:PRINT#1,A$(I):NEXT:CLOSE
1440 GOTO1350
1450 X1$="LOAD FROM":GOSUB1580
1460 GOSUB1590
1470 IF SF=3THEN250
1480 GOSUB1600
1490 GOSUB1610:IF AD$="E" THEN GOTO1450
1500 IF SF=1 THEN N2$=RIGHT$(NM$,8):OPEN
"I",#2,"CAS0:DATA":INPUT#2,N1$,W:IFN1$<>
N2$THENGOTO1550
1510 IFSF=2THENOPEN"I",1,NM$
1520 IF SF=1 THEN FOR I=1 TO W STEP4:INP
UT#2,A$(I),A$(I+1),A$(I+2),A$(I+3):NEXTI
:CLOSE#2
1530 IF SF=2 THEN INPUT#1,W:FOR I=1 TO W
:INPUT#1,A$(I):NEXT:CLOSE
1540 GOTO1450
1550 LOCATE0,13:PRINT"THIS IS FILE ";N1$
;" NOT FILE ";N2$;:CLOSE#2
1560 LOCATE0,14:PRINT"PRESS ANY KEY TO A
BORT *";:PA=919:LN=1:GOSUB60:GOTO1450
1570 V1$=LEFT$(A$(I),2):V2$=MID$(A$(I),3
,2):V3$=MID$(A$(I),5,2):V4$=MID$(A$(I),7
,4):V5$=MID$(A$(I),11,15):V6$=MID$(A$(I)
,26,2):V7$=MID$(A$(I),28,3):V8$=MID$(A$(
I),31,8):V9$=MID$(A$(I),39,8):RETURN
1580 GOSUB230:LOCATE23,3:PRINT"DATA ";LE
FT$(X1$,4):LOCATE0,5:PRINT"1 = ";X1$;" T
APE":LOCATE0,7:PRINT"2 = ";X1$;" DISK":L
OCATE0,9:PRINT"3 = EXIT TO MENU":RETURN
1590 LOCATE0,13:PRINTZ3$;:PA=848:LN=1:GO
SUB60:SF=VAL(AD$):IF SF<1 OR SF>3THEN159
0ELSERETURN
1600 FL=0:GOSUB230:LOCATE0,7:PRINT"ENTER
 FILENAME ********";:PA=463:LN=8:GOSUB60
:NM$="1:"+AD$:RETURN
1610 LOCATE0,8:PRINT"PRESS ANY KEY WHEN
DEVICE READY OR  (E)SCAPE  *";:PA=558:LN
=1:GOSUB60:RETURN
1620 VX$=V1$+"/"+V2$+"/"+V3$+" "+V4$+"
"+V5$+"  "+V6$+V7$+"   "+V8$+"    "+V9$:
RETURN
1630 GOSUB230:GOSUB980:GOSUB230:GOSUB178
0:LOCATE15,7:PRINT"* * *  W A I T  * * *
":FOR I=1 TO W-1:GOSUB1570:LB(I)=VAL(RIG
HT$(V7$,3)):NEXTI:J=0:DT#=0:CT#=0:BL#=0
1640 GOSUB230:PRINT:PRINT"ACC NO.";TAB(1
6);Z6$;"S";TAB(34);Z5$;"S";TAB(55);Z0$
1650 IF P THEN PRINT#3," ":PRINT#3,"ACC
NO.";TAB(16);Z6$;"S";TAB(34);Z5$;"S";TAB
(55);Z0$
1660 TT#=0:DR#=0:CR#=0:J=J+1
1670 VF=LB(J):FORI=1TOW:IFLB(I)=VF AND L
B(I)<>0THENGOSUB1770
1680 NEXTI:LB(J)=0:IFJ=WTHEN1740ELSE1690
1690 IFVF=0THEN1660
1700 TT#=DR#-CR#:DT#=DT#+DR#:CT#=CT#+CR#
:BL#=BL#+TT#
1710 PRINT"  ";MID$(A$(J),28,3);:PRINTUS
INGF5$;DR#;CR#;TT#
1720 IF P THEN PRINT#3,"  ";MID$(A$(J),2
8,3);:PRINT#3,USINGF5$;DR#;CR#;TT#
1730 GOTO1660
1740 PRINT:PRINTZ0$;:PRINTUSINGF5$;DT#;C
T#;BL#
1750 IF P THEN PRINT#3,:PRINT#3,Z0$;:PRI
NT#3,USINGF5$;DT#;CT#;BL#:CLOSE#3
1760 LOCATE0,15:PRINTSO$;:PA=986:LN=1:GO
SUB60:GOTO250
1770 GOSUB1570:DR#=DR#+VAL(V8$):CR#=CR#+
VAL(V9$):LB(I)=0:RETURN
1780 LOCATE15,7:PRINT"* * *  SORTING  *
* *":FOR SC=1 TO W-1:FOR SA=1 TO W-1
1790 SA$=MID$(A$(SA),28,3)
1800 SB$=MID$(A$(SA+1),28,3):IF SB$=""TH
ENGOTO1810ELSE IF SA$>SB$ THEN SB$=A$(SA
):A$(SA)=A$(SA+1):A$(SA+1)=SB$
1810 NEXTSA:NEXTSC:RETURN
```

**** SIRIUS ADVENTURE ****

HITACHI PEACH

```
10 REM    SIRIUS ADVENTURE
20 REM (C) MAY 1983 MLADEN BAUK.
30 REM
40 REM MODIFIED FOR THE HITACHI PEACH
      BY -- MICRO-80
60 CLS:SCREEN0,,0
70 LOCATE7,4:PRINT"  S I R I U S ":LOCAT
E7,5:PRINT"   ADVENTURE":FOR X=1TO2000:N
EXT:CLS
80 CLEAR 200: VB=22: ND=26: L=21: OB=6:
LN=337
90 CLS: LOCATE15,3:PRINT"Sirius Adventur
e": PM$=">": PF$=" "
100 LOCATE9,5:PRINT"Press:  <I> nstructi
ons  or"
110 LOCATE17,6:PRINT"<B> egin.": CL$="
          "
120 DIM A$(VB), B$(ND), L$(L), B(OB): GO
SUB 1430
130 A$= INKEY$: IF A$="" THEN 130
140 IF A$="I" THEN 1720
150 IF A$< >"B" THEN 130
160 CLS
170 IF LO=OL THEN 270
180 OL=LO:CLS: LOCATE15,3:PRINT"Sirius A
dventure"
190 IF LO>4 AND B(1)< > -1 THEN PRINT: P
RINT"     It's too dark to see!": GOTO 2
70
200 PRINT"I am ...":PRINTL$(LO)
210 LINE(0,100)-(656,100),PSET
220 TR=0: LOCATE7,20:PRINTCL$;: LOCATE7,
20:PRINT"Visible objects >>> ";
230 FOR I=1 TO OB
240 IF B(I)=LO THEN PRINTB$(I);".  ";: T
R= -1
250 NEXT I
260 IF TR< > -1 THEN LOCATE27,20:PRINT"N
one.";
270 LOCATE0,15:PRINT"What should I do?";
CL$;: C$="":GOSUB 1900: PRINT: PRINT
280 IF C$="" THEN PRINT"Huh?": GOTO 270
290 FOR I=1 TO LEN(C$): IF ASC( MID$( C$
, I, 1))=32 THEN 310
300 NEXT I: GOTO 320
310 LE$= LEFT$( C$, I-1): RI$= MID$( C$,
 I+1, LEN(C$)- LEN(LE$)-1):GOTO 330
320 LE$= LEFT$(C$, I): RI$=""
330 L= LEN(LE$): IF RI$="" THEN R= -1 EL
SE R= LEN(RI$)
340 FOR I=1 TO VB: IF L> LEN(A$(I)) THEN
 360
350 IF LE$< > LEFT$(A$(I),L) THEN 360 EL
SE 380
360 NEXT I
370 IF C$< >"" THEN PRINT"I don't unders
tand "CHR$(34);C$;CHR$(34)", check my vo
cabulary.": GOTO 270
380 IF R= -1 THEN 420
390 FOR J=1 TO ND
400 IF RI$< >B$(J) THEN NEXT J ELSE 420
410 PRINT"I don't understand "CHR$(34);R
I$;CHR$(34)", check my vocabulary.": GOT
O 270
420 ON I GOSUB 450,450,450,450,830,880,8
80,880,950,950,950,950,980,1050,980,1230
,980,1120,1160,1290,1360,2010
430 IF I>4 AND I<13 THEN 210
440 IF I=22 THEN 180 ELSE 170
450 IF J<OB+1 THEN PRINT"I can't "CHR$(3
4);A$(I)+" ";RI$;CHR$(34)"!": GOTO 270
460 J=J-OB: ON J GOTO 550,640,710,750,55
0,640,710,750,470,490,510,530,470,490,51
0,530,790,810,790,810
470 IF LO=13 THEN LO=11 ELSE GOSUB 1860
480 RETURN
490 IF LO=12 THEN LO=11 ELSE IF LO=14 TH
EN LO=15 ELSE GOSUB 1860
500 RETURN
510 IF LO=11 THEN LO=12 ELSE IF LO=15 TH
EN LO=14 ELSE GOSUB 1860
520 RETURN
530 IF LO=11 THEN LO=13 ELSE GOSUB 1860
540 RETURN
550 IF LO=2 THEN LO=1 ELSE IF LO=5 THEN
LO=4 ELSE IF LO=6 THEN LO=5
560 IF LO=7 THEN LO=9 ELSE IF LO=11 THEN
 LO=7
570 IF LO=16 AND B(4)= -1 THEN GOSUB 187
0
580 IF LO=16 AND B(4)< > -1 THEN LO=17
590 IF LO=18 AND B(5)= -1 THEN LO=19
600 IF LO=18 AND B(5)< > -1 THEN GOSUB 1
870
610 IF LO=15 THEN LO=16
620 IF LO=OL THEN GOSUB 1860
630 RETURN
640 IF LO=1 THEN LO=2 ELSE IF LO=4 THEN
LO=5 ELSE IF LO=5 THEN LO=6
650 IF LO=9 THEN LO=7 ELSE IF LO=7 THEN
LO=11 ELSE IF LO=16 THEN LO=15
660 IF LO=17 THEN LO=16
670 IF LO=19 AND B(5)= -1 THEN LO=18
680 IF LO=19 AND B(5)< > -1 THEN GOSUB 1
870
690 IF LO=OL THEN GOSUB 1860
700 RETURN
710 IF LO=3 THEN LO=2 ELSE IF LO=4 THEN
LO=3 ELSE IF LO=10 THEN LO=7
720 IF LO=7 THEN LO=8 ELSE IF LO=19 THEN
 LO=20 ELSE IF LO=20 THEN LO=21
730 IF LO=OL THEN GOSUB 1860
740 RETURN
750 IF LO=2 THEN LO=3 ELSE IF LO=3 THEN
LO=4 ELSE IF LO=7 THEN LO=10
760 IF LO=8 THEN LO=7 ELSE IF LO=20 THEN
 LO=19 ELSE IF LO=21 THEN LO=20
770 IF LO=OL THEN GOSUB 1860
780 RETURN
790 IF LO=7 THEN LO=6 ELSE IF LO=18 THEN
 LO=17 ELSE GOSUB 1860
800 RETURN
810 IF LO=6 THEN LO=7 ELSE IF LO=17 THEN
 LO=18 ELSE GOSUB 1860
820 RETURN
830 IF J=0 THEN J=3
840 IF J< >2 THEN PRINT"I can't eat that
, stupid.": RETURN
850 IF J=2 AND B(J)=0 THEN PRINT"I alrea
dy ate it.":RETURN
860 IF J=2 THEN PRINT"Munch, chomp, <BUR
P> - the creambun was delicious!": B(2)=
0: RETURN
870 PRINT"ERROR": STOP
880 IF J>OB THEN PRINT"I can't "CHR$(34)
;C$;CHR$(34)".": RETURN
890 IF B(J)= -1 THEN PRINT"I already hav
e it!": RETURN
900 IF B(J)< >LO THEN PRINT"I can't see
the ";B$(J);" here.":RETURN
910 IT=1: FOR I9=1 TO OB: IF B(I9)= -1 T
HEN IT=IT+1
920 NEXT I9:IF IT>3 THEN PRINT"I am carr
ying too much, check inventory.";:RETURN
930 PRINT"Ok. I add a "B$(J)" to my inve
ntory."
940 B(J)= -1: RETURN
950 IF J>OB THEN PRINT"I can't "CHR$(34)
;C$;CHR$(34)".": RETURN
960 IF B(J)< > -1 THEN PRINT"I don't hav
e a "RI$: RETURN
970 B(J)=LO: PRINT"Ok": RETURN
980 IF J>OB THEN PRINT"I don't see anyth
ing special.": RETURN
990 IF B(J)< > -1 THEN PRINT"I am not ca
rrying a "B$(J): RETURN
1000 ON J GOTO 1010,1020,1030,1030,1030,
1040
1010 PRINT"It burns brightly.": RETURN
1020 PRINT"It looks tasty!": RETURN
1030 PRINT"Magic seems to emanate from t
he "B$(J): RETURN
1040 PRINT"Its beautiful!": RETURN
1050 IF J>OB THEN PRINT"You are being si
lly.": RETURN
1060 IF B(J)< > -1 THEN PRINT"I don't ha
ve the "B$(J)".": RETURN
1070 IF J< >3 THEN PRINT"Waving the "B$(
J):PRINT" is not very rewarding.": RETUR
N
```

```
1080 PRINT"The room dims and blurs, and.
..";
1090 FOR I=1 TO 1000: NEXT I
1100 IF LO=13 THEN LO=14 ELSE IF LO=14 T
HEN LO=13 ELSE PRINT"nothing happens.":
RETURN
1110 PRINT"I am magically transported!":
 FOR I=1 TO 1000: NEXT I: RETURN
1120 PRINT"Confirm  <Y/N> ?";: C$="": LO
CATE7,3:PRINTN,CL$: GOSUB 1900
1130 IF C$="Y" THEN A=USR1(0):CLS: END
1140 IF C$< >"N" THEN 1120
1150 PRINT:PRINT:PRINT"Confirm  <CANCELL
ED>": RETURN
1160 IN=0: FOR I9=4 TO 6
1170 IF B(I9)=1 THEN IN=IN+20
1180 NEXT I9
1190 IF IN=60 THEN PRINT"Fantastic!
     you have solved the adventure!"
1200 PRINT"You have"IN"points out of a p
ossible 60."
1210 IF IN=60 THEN A=USR1(0):CLS: END
1220 RETURN
1230 PRINT"I am carrying >>> ";
1240 IN=0: FOR I9=1 TO OB
1250 IF B(I9)= -1 THEN PRINT"A "B$(I9);"
.  ";: IN= -1
1260 NEXT I9
1270 IF IN< > -1 THEN PRINT"Nothing at a
ll.": RETURN
1280 RETURN
1290 PRINT"Ready tape...press <ENTER>"
1300 IN$= INKEY$:IFIN$=""THEN1300
1310 OPEN "O",#1,"CAS0:URLORD"
1320 FOR I9=1 TO OB: PRINT#1,B(I9);: NEX
T I9
1330 PRINT#1,LO
1340 CLOSE #1
1350 RETURN
1360 PRINT"Ready tape...press <ENTER>"
1370 IN$= INKEY$:IFIN$=""THEN1370
1380 OPEN "I",#1,"CAS0:URLORD"
1390 FOR I9=1 TO OB: INPUT#1,B(I9): NEXT
 I9
1400 INPUT#1,LO
1410 CLOSE #1
1420 RETURN
1430 LO=1
1440 FOR I=1 TO VB: READ A$(I): NEXT I
1450 FOR I=1 TO ND: READ B$(I): NEXT I
1460 DATA GO,WALK,RUN,CRAWL,EAT,GET,TAKE
,GRAB,DROP,THROW,PUT,LEAVE,LOOK,WAVE,EXA
MINE,INVENTORY,INSPECT,QUIT,SCORE,SAVE,L
OAD,VOCABULARY
1470 DATA LAMP,BUN,ROD,RING,STATUE,CROWN
,N,S,W,E,NORTH,SOUTH,WEST,EAST,NW,NE,SW,
SE,NORTHWEST,NORTHEAST,SOUTHWEST,SOUTHEA
ST,UP,DOWN,U,D
1480 DATA 1,6,9,8,12,21
1490 FOR I=1 TO OB: READ B(I): NEXT I
1500 FOR I=1 TO L: READ L$(I): NEXT I: R
ETURN
1510 DATA "at a plateau near a cliff. A
rocky path leads south. Some  obvious ex
its: South."
1520 DATA "on a rocky path leading north
 and        curving to the east. Some obv
ious        exits: North. East."
1530 DATA "at the entrance to a dark cav
e. A rocky path to the west curves north
. There is a slight breeze.Some obvious
exits:      West. East."
1540 DATA "just inside a dark cave. Ligh
t comes     from an entrance to the west.
 There is adank,mouldy smell. A tunnel l
eads south.Some obvious exits: West. Sou
th."
1550 DATA "in a low north/south tunnel.
Some        obvious exits: North. South"
1560 DATA "in an oval cavern. There is a
 forbiddingstone staircase here. Some ob
vious       exits: North. Down."
1570 DATA "in a high, square cave with w
alls of     frozen ice. There are passage
s in many   directions. Some obvious exit
s: North.   South. West. East. Up."
1580 DATA "in a triangular side-chamber.
 Some       obvious exits: East."
1590 DATA "in a musty-smelling alcove. S
ome obviousexits: South."
1600 DATA "in an eerie chamber - small s
quealing    sounds come from the walls. S
ome obviousexits: West."
1610 DATA "in an enormous cave. There is
 a double   pillar of green stone down th
e centre.   Some obvious exits: North. So
uthwest.    Southeast."
1620 DATA "in a malodourous tunnel. Some
 obvious    exits: Northeast."
1630 DATA "in a room in which the only V
ISIBLE exitis the way I came in. Some ob
vious       exits: Northwest"
1640 DATA "in a secret room,reached only
 by magicalmeans. Some obvious exits: No
rtheast."
1650 DATA "in a octagonal room. Some obv
ious exits:North. Southwest."
1660 DATA "in an enormous misty cavern.
Mist        obscures the ceiling. Some ob
vious       exits: North. South."
1670 DATA "in a tiny box-shaped room. Do
or leads    south and stairs lead down. S
ome obviousexits: South. Down."
1680 DATA "in a strange room. There's a
faint whiffof chlorine. Some obvious exi
ts: North. Up."
1690 DATA "in a steamy chamber, with war
m walls.    Some obvious exits: West.Sout
h."
1700 DATA "in a large room, littered wit
h alabasterslabs. Some obvious exits: We
st. East."
1710 DATA "in the throne room of the evi
l  Urlord! A low door leads east. Some o
bvious      exits: East."
1720 CLS:LOCATE7,3:PRINT"";:PRINT"Your q
uest is to explore the cave of the";
1730 PRINT"evil Urlord, and bring back t
o the edge of the cliff the following va
luables:"
1740 PRINT"1. The white gold ring."
1750 PRINT"2. The sacred silver statue."
1760 PRINT"3. The jewelled crown of the
Urlord.";
1770 PRINT:PRINT
1780 PRINT"Be careful...":PRINT:PRINT:PR
INT
1790 PRINT"Press  <C> ontinue."
1800 FOR I=1 TO 4000
1810 A$= INKEY$: IF A$="" THEN 1840
1820 IF A$< >"C" THEN 1810
1830 GOTO 170
1840 NEXT I
1850 GOTO 170
1860 PRINT"You cannot go in that directi
on.": RETURN
1870 PRINT"An invisible force prevents y
ou from passing."
1880 FOR I=1 TO 1000: NEXT I
1890 RETURN
1900 LOCATE18,15:PRINTC$;PM$;"  ";
1910 A$= INKEY$: IF A$="" THEN 1910
1920 LOCATE18,15:PRINT,PF$;: A=ASC(A$)
1930 IF A>31 THEN 1990
1940 IF A=8 AND LEN(C$)>0 THEN C$= LEFT$
(C$,LEN(C$)-1): LOCATE18,15:PRINTCL$;:LO
CATE18,15 :PRINTC$;: GOTO 1900 ELSE IF A
=8 THEN 1900
1950 IF A=13 THEN GOSUB2040:FOR X=15 TO
23:LOCATE0,X:PRINT"
                    ":NEXT:LOCATE0,15:RETU
RN
1960 IF A=10 THEN A$= CHR$(92) ELSE IF A
=27 THEN A$="@"
1970 IF A=9 THEN A$= CHR$(187) ELSE IF A
=31 THEN A$="%"
1980 IF A=24 THEN C$="": LOCATE18,15:PRI
NTCL$;: GOTO 1900
1990 C$=C$+A$: IF LEN(C$)>20 THEN RETURN
2000 LOCATE18,15:PRINTC$;: GOTO 1900
2010 CLS:LOCATE15,3:PRINTA$(22):LOCATE7,
4:PRINT;
2020 FOR I9=1 TO VB: PRINT A$(I9),: NEXT
 I9
2030 A$= INKEY$:IF A$="" THEN 2030 ELSE
RETURN
2040 X=(PEEK(39)*256+PEEK(40))-(PEEK(33)
*256+PEEK(34)):RETURN
```

**** KILLER SATELLITE ****

COLOUR COMPUTER

```
10 REM THE KILLER SATELLITE
20 REM     VERSION  1.1
30 REM       15/8/83
40 REM ** BY N.S.EDWARDS **
50 REM INITIAL DISPLAY
60 CLS0:FOR T=1 TO 15:SET(RND(64
)-1,RND(32)-1,5):NEXT:PRINT@262,
"the"CHR$(128)"killer"CHR$(128)"
satellite";
70 PRINT@340,CHR$(249);:PRINT@37
3,CHR$(175);:PRINT@404,CHR$(246)
;
80 REM SET UP STRINGS
90 FOR T=1 TO 5:SH$=SH$+CHR$(183
)+CHR$(187)+CHR$(128):NEXT
100 FOR T=1 TO 7:B$=B$+CHR$(143+
16*T):NEXT
110 PRINT@365,B$;
120 FOR T=1 TO 8:PLAY"O1L20CP10"
:NEXT
130 CLS:PRINT"A SATELLITE ORBITI
NG FAR ABOVE  THE EARTH HAS MALF
UNCTIONED.    IT HAS BEGUN SENDI
NG DANGEROUS  COSMIC";
135 PRINT" RAYS TOWARDS THE EART
H.    YOU MUST PROTECT THE EARTH
    FROM THE COSMIC RAYS BY MATC
HINGTHE COLOURS OF THE APPROACHI
NG  RAYS";
140 PRINT" WITH YOUR SHIELD UNTI
L THE SATELLITE RUNS OUT OF POWE
R (11 ROUNDS).":PRINT:PRINT"TO D
O THIS USE THE <SPACE BAR> .":PR
INT"  BE WARNED THE RAYS TRAVEL
AT  EVER INCREASING SPEEDS."
150 PRINT@484,"PRESS <ENTER> TO
BEGIN";
160 T=-1
170 IF INKEY$="" THEN IF T THENP
LAY"O1L10GP8":SCREEN0,1 ELSE PLA
Y"O1L10CP8":SCREEN0,0 ELSE 190
180 T=NOT(T):GOTO 170
190 REM INITIALIZE VARIABLES
200 CLS0:X=270:S=110:SH=3:E=1:S1
=0:M=0:R=0
210 GOTO500
220 REM CONTROL LOOP
230 GOSUB 430
240 REM FIND COLOUR MATCH
250 F=0
260 F=INSTR(F+1,Q$,D$):IF F=0 TH
EN 290
270 MID$(A$,F)=MID$(A$,F+1)
280 X=X+1:M=M+10:E=E-1
290 Q$=MID$(A$,1,E)
300 REM UPDATE DISPLAY
310 PRINT@X,Q$;:PRINT@463,M;
320 PLAY"L20O1C"
330 REM CHECK FOR WIN
340 IF LEFT$(A$,1)=CHR$(128) THE
N M=M+100*R:GOTO 500
350 GOSUB 430
360 REM CHECK FOR LOSS
370 X=X-1:E=E+1:IF X=<259 THEN M
=M-400:GOSUB580:GOTO500
380 GOSUB 430
390 GOTO230
400 REM END CONTROL LOOP
410 REM
420 REM CHANGE SHIP COLOUR
430 FOR V=1 TO G
440 IF PEEK(345)=247 THEN C=C+1:
IF C>7 THEN C=1
450 D$=CHR$(143+16*C):PRINT@258,
D$;
460 FOR I=1 TO SV:NEXT
470 NEXT V
480 RETURN
490 REM NEW LEVEL
500 R=R+1:S1=S1+1:IF R>11 THEN 7
20 ELSE CLS0:FOR Z=1 TO 10:X1=RN
D(64)-1:Y1=RND(32)-1:SET(X1,Y1,5
):NEXT
510 IF S1>=5 THEN S1=2:SH=SH+1:I
F SH>5 THEN SH=5
520 PRINT@244,CHR$(249);:PRINT@2
77,CHR$(175);:PRINT@308,CHR$(246
);
530 PRINT@457,"SCORE ";M;:PRINT@
11,"ROUND ";R;:X=275:E=1:S=S-10:
A$="": FOR T=1 TO 40:A$=A$+CHR$(
RND(7)*16+143):NEXT:A$=A$+STRING
$(20,128)
540 IF R<5 THEN PRINT@480,B$;:G=
2:SV=S/2-5 ELSE G=1:SV=S
550 REM PRINT SHIPS LEFT
560 PRINT@496+(5-SH)*3,LEFT$(SH$
,3*SH);:GOTO 230
570 REM  SHIP DESTROYED
580 FOR Z=1 TO 10:PRINT@258,CHR$
(RND(7)*16+RND(14)+128);:SOUND12
0-Z*10,1:FOR ZZ=1 TO 50:NEXT:NEX
T:SH=SH-1:S=S+10:R=R-1:S1=S1-1
590 IF SH<1 THEN 610 ELSE RETURN
600 REM YOU LOST
610 CLS0:PRINT@96,"all"CHR$(128)
"your"CHR$(128)"ships"CHR$(128)"
were"CHR$(128)"destroyed";:PRINT
@128,"before"CHR$(128)"the"CHR$(
128);
615 PRINT"satellite"CHR$(128)"ce
ased"CHR$(128)"to";:PRINT@160,"f
unction";:PRINT@230,"earth"CHR$(
128)"was"CHR$(128)"destroyed";
620 A=359
630 REM FINAL SCORE
640 PRINT@A,"your"CHR$(128)"scor
e"CHR$(128);M;
650 REM NEXT GAME
660 PRINT@500,"continued";
670 Q$=INKEY$
680 IF INKEY$="" THEN 680
690 CLS0:PRINT@106,"ANOTHER GAME
 ?";
700 Q$=INKEY$:IF Q$="" THEN 700
ELSE IF Q$="Y" THEN 200   ELSE I
F Q$="N" THEN END ELSE 700
710 REM YOU'VE WON
720 CLS0:PRINT@170,"congratulati
ons";:PRINT@234,"earth"CHR$(128)
"was"CHR$(128)"saved";:A=361:GOT
0640
```

```
**** SIRIUS ADVENTURE ****

      COLOUR COMPUTER


10 REM    SIRIUS ADVENTURE
20 REM (C) MAY 1983 MLADEN BAUK.

30 REM     HI-RES WRITER 1.1
       (C) 1983 G.D. WILLIAMSON

40 REM MODIFIED FOR THE COLOUR
       COMPUTER BY -- MICRO-80

50 A=PEEK(&H1B)*256+PEEK(&H1C)-&
H4CD
60 DEFUSR0=A:DEFUSR1=A+&H1D:A=US
R0(0):PMODE2,1:PCLS:SCREEN1,1
70 PRINT@64,"  S I R I U S ":PRI
NT@128,"   ADVENTURE":FOR X=1TO2
000:NEXT:PMODE4,1:PCLS:SCREEN1,1
80 CLEAR 200: VB=22: ND=26: L=21
: OB=6: LN=337
90 CLS: PRINT@8,"Sirius Adventur
e": PM$=">": PF$=" "
100 PRINT@130,"Press:  <I> nstru
ctions  or"
110 PRINT@170,"<B> egin.": CL$="
                "
120 DIM A$(VB), B$(ND), L$(L), B
(OB): GOSUB 1430
130 A$= INKEY$: IF A$="" THEN 13
0
140 IF A$="I" THEN 1720
150 IF A$< >"B" THEN 130
160 PCLS
170 IF LO=OL THEN 270
180 OL=LO:PCLS: PRINT@8,"Sirius
Adventure"
190 IF LO>4 AND B(1)< > -1 THEN
PRINT: PRINT"      It's too dark
to see!": GOTO 270
200 PRINT"I am ...":PRINTL$(LO)
210 LINE(0,100)-(256,100),PSET
220 TR=0: PRINT@448,CL$;: PRINT@
448,"Visible objects >>> ";
230 FOR I=1 TO OB
240 IF B(I)=LO THEN PRINTB$(I);"
.  ";: TR= -1
250 NEXT I
260 IF TR< > -1 THEN PRINT@468,"
None.";
270 PRINT@320,"What should I do?
";CL$;: C$="":GOSUB 1900: PRINT:
 PRINT
280 IF C$="" THEN PRINT"Huh?": G
OTO 270
290 FOR I=1 TO LEN(C$): IF ASC(
MID$( C$, I, 1))=32 THEN 310
300 NEXT I: GOTO 320
310 LE$= LEFT$( C$, I-1): RI$= M
ID$( C$, I+1, LEN(C$)- LEN(LE$)-
1):GOTO 330
320 LE$= LEFT$(C$, I): RI$=""
330 L= LEN(LE$): IF RI$="" THEN
R= -1 ELSE R= LEN(RI$)
340 FOR I=1 TO VB: IF L> LEN(A$(
I)) THEN 360
350 IF LE$< > LEFT$(A$(I),L) THE
N 360 ELSE 380
360 NEXT I
370 IF C$< >"" THEN PRINT"I don'
t understand "CHR$(34);C$;CHR$(3
4)", check my vocabulary.": GOTO
 270
380 IF R= -1 THEN 420
390 FOR J=1 TO ND
400 IF RI$< >B$(J) THEN NEXT J E
LSE 420
410 PRINT"I don't understand "CH
R$(34);RI$;CHR$(34)", check my v
ocabulary.": GOTO 270
420 ON I GOSUB 450,450,450,450,8
30,880,880,880,950,950,950,950,9
80,1050,980,1230,980,1120,1160,1
290,1360,2010
430 IF I>4 AND I<13 THEN 210
440 IF I=22 THEN 180 ELSE 170
450 IF J<OB+1 THEN PRINT"I can't
 "CHR$(34);A$(I)+" ";RI$;CHR$(34
)"!": GOTO 270
460 J=J-OB: ON J GOTO 550,640,71
0,750,550,640,710,750,470,490,51
0,530,470,490,510,530,790,810,79
0,810
470 IF LO=13 THEN LO=11 ELSE GOS
UB 1860
480 RETURN
490 IF LO=12 THEN LO=11 ELSE IF
LO=14 THEN LO=15 ELSE GOSUB 1860
500 RETURN
510 IF LO=11 THEN LO=12 ELSE IF
LO=15 THEN LO=14 ELSE GOSUB 1860
520 RETURN
530 IF LO=11 THEN LO=13 ELSE GOS
UB 1860
540 RETURN
550 IF LO=2 THEN LO=1 ELSE IF LO
=5 THEN LO=4 ELSE IF LO=6 THEN L
O=5
560 IF LO=7 THEN LO=9 ELSE IF LO
=11 THEN LO=7
570 IF LO=16 AND B(4)= -1 THEN G
OSUB 1870
580 IF LO=16 AND B(4)< > -1 THEN
 LO=17
590 IF LO=18 AND B(5)= -1 THEN L
O=19
600 IF LO=18 AND B(5)< > -1 THEN
 GOSUB 1870
610 IF LO=15 THEN LO=16
620 IF LO=OL THEN GOSUB 1860
630 RETURN
640 IF LO=1 THEN LO=2 ELSE IF LO
=4 THEN LO=5 ELSE IF LO=5 THEN L
O=6
650 IF LO=9 THEN LO=7 ELSE IF LO
=7 THEN LO=11 ELSE IF LO=16 THEN
 LO=15
660 IF LO=17 THEN LO=16
670 IF LO=19 AND B(5)= -1 THEN L
O=18
680 IF LO=19 AND B(5)< > -1 THEN
 GOSUB 1870
690 IF LO=OL THEN GOSUB 1860
700 RETURN
710 IF LO=3 THEN LO=2 ELSE IF LO
=4 THEN LO=3 ELSE IF LO=10 THEN
LO=7
720 IF LO=7 THEN LO=8 ELSE IF LO
=19 THEN LO=20 ELSE IF LO=20 THE
N LO=21
730 IF LO=OL THEN GOSUB 1860
740 RETURN
750 IF LO=2 THEN LO=3 ELSE IF LO
=3 THEN LO=4 ELSE IF LO=7 THEN L
O=10
760 IF LO=8 THEN LO=7 ELSE IF LO
=20 THEN LO=19 ELSE IF LO=21 THE
N LO=20
770 IF LO=OL THEN GOSUB 1860
780 RETURN
790 IF LO=7 THEN LO=6 ELSE IF LO
=18 THEN LO=17 ELSE GOSUB 1860
800 RETURN
810 IF LO=6 THEN LO=7 ELSE IF LO
=17 THEN LO=18 ELSE GOSUB 1860
820 RETURN
830 IF J=0 THEN J=3
840 IF J< >2 THEN PRINT"I can't
eat that, stupid.": RETURN
850 IF J=2 AND B(J)=0 THEN PRINT
"I already ate it.":RETURN
860 IF J=2 THEN PRINT"Munch, cho
mp, <BURP> - the creambun was de
licious!": B(2)=0: RETURN
870 PRINT"ERROR": STOP
880 IF J>OB THEN PRINT"I can't "
CHR$(34);C$;CHR$(34)".": RETURN
890 IF B(J)= -1 THEN PRINT"I alr
eady have it'": RETURN
900 IF B(J)< >LO THEN PRINT"I ca
n't see the ":PRINTB$(J)" here."
:RETURN
910 IT=1: FOR I9=1 TO OB: IF B(I
9)= -1 THEN IT=IT+1: NEXT I9 ELS
E NEXT I9
920 IF IT>3 THEN PRINT"I am carr
ying too much, check  inventory
.":RETURN
```

```
930 PRINT"Ok.  I add a "B$(J):PR
INT"to my inventory."
940 B(J)= -1: RETURN
950 IF J>OB THEN PRINT"I can't "
CHR$(34);C$;CHR$(34)".": RETURN
960 IF B(J)< > -1 THEN PRINT"I d
on't have a "RI$: RETURN
970 B(J)=LO: PRINT"Ok": RETURN
980 IF J>OB THEN PRINT"I don't s
ee anything special.": RETURN
990 IF B(J)< > -1 THEN PRINT"I a
m not carrying a "B$(J): RETURN
1000 ON J GOTO 1010,1020,1030,10
30,1030,1040
1010 PRINT"It burns brightly.":
RETURN
1020 PRINT"It looks tasty!": RET
URN
1030 PRINT"Magic seems to emanat
e from the "B$(J): RETURN
1040 PRINT"Its beautiful!": RETU
RN
1050 IF J>OB THEN PRINT"You are
being silly.": RETURN
1060 IF B(J)< > -1 THEN PRINT"I
don't have the "B$(J)".": RETURN
1070 IF J< >3 THEN PRINT"Waving
the "B$(J):PRINT" is not very re
warding.": RETURN
1080 PRINT"The room dims and blu
rs, and...";
1090 FOR I=1 TO 1000: NEXT I
1100 IF LO=13 THEN LO=14 ELSE IF
 LO=14 THEN LO=13 ELSE PRINT"not
hing happens.": RETURN
1110 PRINT"I am magically transp
orted!": FOR I=1 TO 1000: NEXT I
: RETURN
1120 PRINT"Confirm  <Y/N> ?";: C
$="": PRINT@LN,CL$: GOSUB 1900
1130 IF C$="Y" THEN A=USR1(0):CL
S: END
1140 IF C$< >"N" THEN 1120
1150 PRINT:PRINT:PRINT"Confirm
<CANCELLED>": RETURN
1160 IN=0: FOR I9=4 TO 6
1170 IF B(I9)=1 THEN IN=IN+20
1180 NEXT I9
1190 IF IN=60 THEN PRINT"Fantast
ic!  you have solved the adventu
re!"
1200 PRINT"You have"IN"points ":
PRINT"out of a possible 60."
1210 IF IN=60 THEN A=USR1(0):CLS
: END
1220 RETURN
1230 PRINT"I am carrying >>> ";
1240 IN=0: FOR I9=1 TO OB
1250 IF B(I9)= -1 THEN PRINT"A "
B$(I9);".  ";: IN= -1
1260 NEXT I9
1270 IF IN< > -1 THEN PRINT"Noth
ing at all.": RETURN
1280 RETURN
1290 PRINT"Ready tape...press <E
NTER>"
1300 IN$= INKEY$:IFIN$=""THEN130
0
1310 OPEN"O",#-1,"URLORD"
1320 FOR I9=1 TO OB: PRINT#-1,B(
I9);:NEXT I9
1330 PRINT#-1,LO
1340 CLOSE#-1
1350 RETURN
1360 PRINT"Ready tape...press <E
NTER>"
1370 IN$= INKEY$:IFIN$=""THEN137
0
1380 OPEN"I",#-1,"URLORD"
1390 FOR I9=1 TO OB:INPUT#-1,B(I
9):NEXT I9
1400 INPUT#-1,LO
1410 CLOSE#-1
1420 RETURN
1430 LO=1
1440 FOR I=1 TO VB: READ A$(I):
NEXT I
1450 FOR I=1 TO ND: READ B$(I):
NEXT I
1460 DATA GO,WALK,RUN,CRAWL,EAT,
GET,TAKE,GRAB,DROP,THROW,PUT,LEA
VE,LOOK,WAVE,EXAMINE,INVENTORY,I
NSPECT,QUIT,SCORE,SAVE,LOAD,VOCA
BULARY
1470 DATA LAMP,BUN,ROD,RING,STAT
UE,CROWN,N,S,W,E,NORTH,SOUTH,WES
T,EAST,NW,NE,SW,SE,NORTHWEST,NOR
THEAST,SOUTHWEST,SOUTHEAST,UP,DO
WN,U,D
1480 DATA 1,6,9,8,12,21
1490 FOR I=1 TO OB: READ B(I): N
EXT I
1500 FOR I=1 TO L: READ L$(I): N
EXT I: RETURN
1510 DATA "at a plateau near a c
liff.      A rocky path leads so
uth. Some  obvious exits: South.
"
1520 DATA "on a rocky path leadi
ng north   and curving to the ea
st. Some   obvious exits: North.
 East."
1530 DATA "at the entrance to a
dark cave. A rocky path to the w
est curves north. There is a sli
ght breeze.Some obvious exits: W
est. East."
1540 DATA "just inside a dark ca
ve.   Lightcomes from an entranc
e to the   west.  There is a dan
k, mouldy  smell.  A tunnel .oad
s south.   Some obvious exits: W
est. South."
1550 DATA "in a low north/south
tunnel.    Some obvious exits: N
orth. South"
1560 DATA "in an oval cavern.
There is a forbidding stone stai
rcase here.Some obvious exits: N
orth. Down."
1570 DATA "in a high,square cave
 with wallsof frozen ice.There a
re passagesin many directions.So
me obvious exits: North.South.We
st.East.Up."
1580 DATA "in a triangular side-
chamber.   Some obvious exits: E
ast."
1590 DATA "in a musty-smelling a
lcove.Some obvious exits: South.
"
1600 DATA "in an eerie chamber -
 small     squealing sounds come
 from the  walls.Some obvious ex
its: West."
1610 DATA "in an enormous cave.
 There is  a double pillar of gr
een stone  down the centre.Some
obvious    exits: North. Southwe
st.        Southeast."
1620 DATA "in a malodourous tunn
el. Some   obvious exits: Northe
ast."
1630 DATA "in a room in which th
e only     VISIBLE exit is the w
ay I came  in.Some obvious exits
: Northwest"
1640 DATA "in a secret room,reac
hed only bymagical means.Some ob
vious      exits: Northeast."
1650 DATA "in a octagonal room.S
ome obviousexits: North. Southwe
st."
1660 DATA "in an enormous misty
cavern.    Mist obscures the cei
ling. Some obvious exits: North.
 South."
1670 DATA "in a tiny box-shaped
room. Door leads south and stair
s lead downSome obvious exits: S
outh. Down."
1680 DATA "in a strange room.  t
here is a  faint whiff of chlori
ne. Some   obvious exits: North.
 Up."
```

```
1690 DATA "in a steamy chamber,
with warm  walls. Some obvious e
xits: West.South."
1700 DATA "in a large room, litt
ered with  alabaster slabs. Some
 obvious   exits: West. East."
1710 DATA "in the throne room of
 the evil  Urlord!  A low door l
eads east. Some obvious exits: E
ast."
1720 PCLS:PRINT@0,"";:PRINT"Your
 quest is to explore the    cave
 of the evil Urlord, and"
1730 PRINT"bring back to the edg
e of the   cliff the following v
aluables:"
1740 PRINT"1. The white gold rin
g."
1750 PRINT"2. The sacred silver
statue."
1760 PRINT"3. The jewelled crown
 of the       Urlord.";
1770 PRINT:PRINT
1780 PRINT"Be careful...":PRINT:
PRINT:PRINT
1790 PRINT"Press  <C> ontinue."
1800 FOR I=1 TO 4000
1810 A$= INKEY$: IF A$="" THEN 1
840
1820 IF A$< >"C" THEN 1810
1830 GOTO 170
1840 NEXT I
1850 GOTO 170
1860 PRINT"You cannot go in that
 direction.": RETURN
1870 PRINT"An invisible force pr
events you from passing."
1880 FOR I=1 TO 1000: NEXT I
1890 RETURN
1900 PRINT@LN+LEN(C$),PM$;
1910 A$= INKEY$: IF A$="" THEN 1
910
1920 PRINT@LN+LEN(C$),PF$;: A=AS
C(A$)
1930 IF A>31 THEN 1990
1940 IF A=8 AND LEN(C$)>0 THEN C
$= LEFT$(C$,LEN(C$)-1): PRINT@LN
,CL$;:PRINT@LN,C$;: GOTO 1900 EL
SE IF A=8 THEN 1900
1950 IF A=13 THEN GOSUB2040:PRIN
T@320,"";:FOR Q=1TO8:PRINT"
                          ";:PRI
NT@320,"";:NEXT: RETURN
1960 IF A=10 THEN A$= CHR$(92) E
LSE IF A=27 THEN A$="@"
1970 IF A=9 THEN A$= CHR$(187) E
LSE IF A=31 THEN A$="%"
1980 IF A=24 THEN C$="": PRINT@L
N,CL$;: GOTO 1900
1990 C$=C$+A$: IF LEN(C$)>20 THE
N RETURN
2000 PRINT@LN,C$;: GOTO 1900
2010 PCLS:PRINT@8,A$(22):PRINT@6
4,;
2020 FOR I9=1 TO VB: PRINT A$(I9
),: NEXT I9
2030 A$= INKEY$:IF A$="" THEN 20
30 ELSE RETURN
2040 X=(PEEK(39)*256+PEEK(40))-(
PEEK(33)*256+PEEK(34)):RETURN
```

****** MC-10 VADERS ******

MC-10

```
10 ' (C) 1/11/83
     SUNBURST SOFTWARE SERVICES

20 GOSUB520
30 CLEAR500
40 OK=-1:GO=-1:Y=29
50 KK=1
60 K1=16946:K2=16948:K3=16952:PO
KEK1,0:POKEK2,0:POKEK3,0
70 CLS(0)
80 O=0:GOSUB300:V1$=TF$:O=16:GOS
UB300:V2$=TF$:O=32:GOSUB300:V3$=
TF$:O=48:GOSUB300:V4$=TF$:O=64:G
OSUB300:V5$=TF$:O=80:GOSUB300
90 V6$=TF$:O=96:GOSUB300:V7$=TF$
100 BL$=CHR$(128)+CHR$(128)
110 GN$=CHR$(247)+CHR$(242)
120 GP=490
130 P=1
140 GOSUB150:GOTO170
150 DL$=BL$+BL$+BL$+V1$+BL$+BL$+
V2$+BL$+BL$+V3$+BL$+BL$+V4$+BL$+
BL$+V5$+BL$+BL$+V6$+BL$+BL$+V7$+
BL$+BL$+BL$
160 RETURN
170 PRINT@GP,GN$;
180 I=I+1:IFI=50THENI=0:CLS(0):K
=K+32:KK=KK+2:Y=29:F=0:GO=-1:IFK
=448THENGOTO460
190 PRINT@K,MID$(DL$,P,32);
200 IFOKTHENP=P+1:IFP+20=LEN(DL$
)THENOK=0
210 IFNOTOKTHENP=P-1:IFP=1THENOK
=-1
220 IFPEEK(K1)=254THENPRINT@GP,B
L$;:GP=GP-1:POKEK1,0:IFGP=479THE
NGP=480
230 IFPEEK(K2)=251THENPRINT@GP,B
L$;:GP=GP+1:POKEK2,0:IFGP=510THE
NGP=509
240 IFGOTHENIFPEEK(K3)=247THENM=
GP-480:M=M*2:M=M+1:GO=0:F=-1:POK
EK3,0
250 POKE17023,0:SOUND100,1:SOUND
200,1
260 IFFTHENY=Y-1:IFY<KK+2THENGOS
UB310
270 IFFTHENSET(M,Y,1):RESET(M,Y+
1)
280 IFY=KKTHENGO=-1:F=0:Y=29
290 GOTO170
300 TF$=CHR$(137+O)+CHR$(136+O):
RETURN
310 S=POINT(M,Y-1)
320 ONS+1GOTO330,340,350,360,370
,380,390,410
330 RETURN
340 V1$=BL$:GOTO430
350 V2$=BL$:GOTO430
360 V3$=BL$:GOTO430
370 V4$=BL$:GOTO430
380 V5$=BL$:GOTO430
390 V6$=BL$:GOTO430
400 CLS(0)
410 V7$=BL$
420 F=0:GO=-1
430 GOSUB150:SOUND20,2:SOUND10,4
:SC=SC+10:IFSC=70THENGOTO450
440 RETURN
450 CLS:PRINT"YOU WIN. YOUR SCOR
E WAS 100":GOTO470
460 CLS:PRINT"YOU LOST. YOUR SCO
RE WAS ";SC
470 PRINT"PLAY AGAIN (Y/N)"
480 IN$=INKEY$:IFIN$=""THEN480
490 IFIN$="Y"THENRUN30
500 CLS:PRINT"BYE"
510 END
520 CLS:PRINT"****** MC 10 MICRO
 VADERS ******";
530 PRINT:PRINT"SHOOT DOWN ALL O
F THE INVADERS  BEFORE THEY LAND
 TO WIN.         10 POINTS FOR EA
CH INVADER THAT"
540 PRINT"IS DESTROYED. A BONUS
OF 30      POINTS IS AWARDED FOR
DESTROYINGALL THE INVADERS. MAXI
MUM SCORE IS 100"
550 PRINT"PRESS <A> TO MOVE LEFT
           PRESS <S> TO MOVE RIGH
T          PRESS THE SPACE BAR TO
 FIRE"
560 PRINT:PRINT"PRESS ANY KEY TO
 BEGIN"
570 IN$=INKEY$:IFIN$=""THEN570
580 RETURN
```

**** L2/4K BOLD TYPE FOR THE LPVII ****

TRS-80/SYSTEM-80

```
10 LPRINT"THIS IS A ";:P$="TEST":GOSUB1000
20 LPRINT" OF THE ";:P$="BOLD TYPE":GOSUB1000
30 LPRINT" SUBROUTINE":END
999 STOP:'
*****************************************
* THIS SUBROUTINE PRINTS P$ IN BOLD TYPE. *
* WRITTEN BY GEORGE DAU.  19-3-83 FOR THE *
* LINE PRINTER VII.                       *
*****************************************
1000
  ZP = PEEK(16539):
  IF LEN(P$)+ZP > 80 THEN
    PRINT CHR$(13);"P$ TOO LONG.":
    END
  ELSE
    ZS$ = STRING$(ZP,32):
    FOR Z = 1 TO 3:
      POKE 16539,0:
      LPRINT CHR$(26);ZS$;P$;:
    NEXT Z:
    POKE 16539,PEEK(16539)-1:
  RETURN
```

**** 48K/DISK SPACE UTILITY ****

TRS-80/SYSTEM-80

```
00100 ;              SPACE/ED  48K DISK
00110 ;
00120 ;       DENNIS BAREIS (C)
00130 ;       286 LENNOX ST
00140 ;       MARYBOROUGH,4650.
00150 ;
00160 ;       THIS PROGRAM WILL ADD SPACES TO A BASIC PROGRAM
00170 ;       TO MAKE IT READABLE. IT WILL NOT ADD SPACES IF
00180 ;       THERE IS ALREADY A SPACE. SPACES ARE INSERTED
00190 ;       AROUND BASIC KEYWORDS.
00200 ;       SINCE SOME PROGRAMS HAVE M/L AFTER REM STATEMENTS
00210 ;       IT WILL NOT ADD SPACES TO A LINE AFTER IT HAS
00220 ;       FOUND A REM STAT., BUT ANY SPACES ADDED BEFORE
00230 ;       THE REM WILL HAVE TO BE REMOVED.
00240 ;
00250 ;       YOUR BASIC PROGRAM WILL STILL RUN AFTER YOU
00260 ;       HAVE PUT THE SPACES IN.
00270 ;       THIS PROGRAM SHOULD NOT BE USED TO SPACE OUT
00280 ;       BASIC PROGRAMS WITH VERY LONG LINES, AS THEY
00290 ;       MAY BECOME TOO LONG WITH THE EXTRA SPACES.
00300 ;       ## NOTE-CMD"SPACE" DOES NOT WORK FROM NEWDOS-80,
00310 ;       BUT MUST BE RUN WHILE IN DOS.
00320
00330 ; ##    TO USE FROM DISK BASIC
00340 ; ##    1/LOAD BASIC PROGRAM
00350 ; ##    2/TYPE CMD"S"
00360 ; ##    3/TYPE SPACE (TO RUN PROGRAM)
00370 ; ##    4/TYPE BASIC *
00380 ; ##    TO MOD FOR LEVEL2 CHANGE THE ORIGIN IN
00390 ; ##    LINE 290 TO SAY 7500H,AND CHANGE LINE 330
00400 ; ##    TO ' DOS  EQU  06CCH '
00410
00420         ORG     0F000H
00430 SBASIC  EQU     40A4H          ;START OF BASIC PTR
00440 EBASIC  EQU     40F9H          ;END OF BASIC PTR
00450 FIXPTR  EQU     1AF8H          ;ADJUSTS PTRS
00460 DOS     EQU     402DH          ;RETURNS HERE AT END.
00470
00480 NBYTES  LD      DE,(SBASIC)
00490         LD      HL,(EBASIC)
00500         OR      A
00510         SBC     HL,DE
00520         INC     HL
00530         PUSH    HL
00540         POP     BC             ;NO. BYTES TO MOVE
00550         RET
00560 MOVE    CALL    NBYTES
00570         LD      HL,(EBASIC)    ;SOURCE
00580         LD      DE,CUT-1       ;DESTINATION
00590 CUT     LDDR                   ;BLOCK MOVE
00600         INC     HL             ;POINTS TO START BASIC
00610         INC     DE             ;PTS TO START BAS PROG.
00620         RET
00630 START   DI
00640         CALL    MOVE           ;MOVE BASIC PROG
00650 LOOP1   LD      B,4H
00660 LOOP8   XOR     A
00670         LD      (COUNT),A      ;ZERO COUNT OF "
00680         LD      (REM),A        ;ZERO REM
00690 LOOP3   LD      A,(DE)
00700         LD      (HL),A
00710         INC     HL
00720         INC     DE
00730         DJNZ    LOOP3          ;MISS LINE NO. & PTR
00740 LOOP2   LD      A,(DE)         ;GET BYTE OF BAS PROG
00750         CP      22H            ;TEST FOR "
00760         JR      NZ,SKIP
00770         PUSH    AF
00780         LD      A,(COUNT)
00790         XOR     01H            ;COUNTS (EVEN , ODD)
00800         LD      (COUNT),A
00810         POP     AF
00820 SKIP    CP      80H            ;TEST FOR KEYWORD
00830         JR      NC,KEYWRD
```

```
00840           CP      3AH             ;WANT SPACE AROUND :
00850           JR      Z,COLON
00860           CP      0H              ;POSSIBLE END OF PROG
00870           JR      Z,ENDPRG
00880 LOOP6     LD      (HL),A          ;STORE BYTE
00890           INC     HL
00900           INC     DE
00910 LOOP7     INC     B               ;IF B=0,FIRST BYTE IN LN
00920           JR      LOOP2
00930
00940 KEYWRD    LD      A,(COUNT)
00950           CP      0H
00960           LD      A,(DE)
00970           JR      NZ,LOOP6        ;DO NOT ADD SPACE, " ODD
00980           CP      93H             ;REM TOKEN
00990           JR      NZ,NOTREM
01000           LD      A,0FFH
01010           LD      (REM),A
01020 NOTREM    CP      95H
01030           JR      Z,ELSE          ;NO SPC BETWEEN : & ELSE
01040           LD      A,(REM)
01050           CP      0H              ;ZERO IF NO REM IN LINE
01060           LD      A,(DE)
01070           JR      NZ,LOOP6        ;COULD BE M/L AFTER REM
01080           LD      A,B
01090           CP      0H
01100           JR      Z,SKIP2         ;NO SPACE AT START LINE
01110           DEC     HL
01120           LD      A,(HL)
01130           CP      20H             ;TEST IF SPACE BEFORE
01140           JR      Z,SPACE1        ;ALREADY SPACE BEFORE KWRD
01150           INC     HL
01160           LD      (HL),20H        ;NO SPACE,ADD ONE
01170 SPACE1    INC     HL
01180 SKIP2     LD      A,(DE)          ;GET KEY WORD
01190           LD      (HL),A
01200           INC     HL
01210           INC     DE
01220           CP      0D7H            ;NO SPACE AFTER THESE KEY
01230           JR      NC,LOOP2        ;NO SPACE BEFORE BRACKET
01240           CP      0BCH            ;NO SPACE AFTER TAB(
01250           JR      Z,LOOP2
01260           LD      A,(DE)
01270           CP      20H             ;TEST SPC AFTER KEYWORD
01280           JR      Z,LOOP2
01290           LD      (HL),20H        ;NO SPACE, ADD SPACE
01300           INC     HL
01310           JR      LOOP7
01320
01330 ELSE      DEC     HL
01340           JR      SKIP2
01350
01360 ENDPRG    DEC     HL
01370           LD      A,(HL)
01380           CP      ' '             ;SEE IF SPACE AT END LN
01390           JR      Z,SPC           ;DEL SPC(LEAVE HL AS IS)
01400           INC     HL
01410 SPC       LD      A,(DE)
01420           LD      (HL),A
01430           INC     HL
01440           INC     DE
01450           LD      A,(DE)
01460           CP      0
01470           JP      NZ,LOOP1
01480           LD      (HL),A
01490           INC     HL
01500           INC     DE
01510           LD      A,(DE)
01520           CP      0H
01530           JR      NZ,LOOP5
01540           LD      (HL),A
01550           INC     HL
01560           LD      (EBASIC),HL     ;ADJUST END BAS PTR
01570           LD      (40FBH),HL      ;ADJUST ARRAY PTR
01580           LD      (40FDH),HL      ;ADJUST FREE SPACE PTR
01590           CALL    FIXPTR
01600           EI
01610           JP      DOS
01620
01630 LOOP5     LD      B,3H
01640           JP      LOOP8
01650 COLON     XOR     A
01660           LD      (COUNT),A       ;ZERO COUNT OF "
01670           JR      KEYWRD
01680 COUNT     DEFB    0H              ;0=EVEN ,1=ODD
01690 REM       DEFB    00H             ;0=NO REM IN LINE
01700           END     START
```

SPACE DUMP

START	END	ENTRY
F000	F0CC	F01C

```
F000:  ED 5B A4 40 2A F9 40 B7 ED 52 23 E5 C1 C9 CD 00
F010:  F0 2A F9 40 11 16 F0 ED B8 23 13 C9 F3 CD 0E F0
F020:  06 04 AF 32 CB F0 32 CC F0 1A 77 23 13 10 FA 1A
F030:  FE 22 20 0A F5 3A CB F0 EE 01 32 CB F0 F1 FE 80
F040:  30 0E FE 3A 28 7F FE 00 28 4B 77 23 13 04 18 DF
F050:  3A CB F0 FE 00 1A 20 F2 FE 93 20 05 3E FF 32 CC
F060:  F0 FE 95 28 2D 3A CC F0 FE 00 1A 20 DD 78 FE 00
F070:  28 0A 2B 7E FE 20 28 03 23 36 20 23 1A 77 23 13
F080:  FE D7 30 AB FE BC 28 A7 1A FE 20 28 A2 36 20 23
F090:  18 BB 2B 18 E7 2B 7E FE 20 28 01 23 1A 77 23 13
F0A0:  1A FE 00 C2 20 F0 77 23 13 1A FE 00 20 12 77 23
F0B0:  22 F9 40 22 FB 40 22 FD 40 CD F8 1A FB C3 2D 40
F0C0:  06 03 C3 22 F0 AF 32 CB F0 18 85 00 00
```

**** YAHTZEE ****

MODEL 3

```
10 REM.............YAHTZEE/BAS.............................
.............(c) 1982 by Tony Domigan.....................
.............m/l is entered into this line.................
20 CLS:CLEAR700:DEFINTA-Z:RANDOM:DIMP1(15),P2(15):BV=13150:C=-1
```

```
30 BX=1760:BW=25550:TEST=PEEK(16548)+PEEK(16549)*256+5:GOTO1780
40 YP=1:IF(Z$=P1$ANDP1(12)>C)OR(Z$=P2$ANDP2(12)>C)THEN50ELSEYF=1
50 IF(Z$=P1$ANDP1(I)=CANDP1(12)>C)THENYG=1:RETURN
60 IF(Z$=P2$ANDP2(I)=CANDP2(12)>C)THENYG=1ELSEYG=0
70 RETURN
80 SC=S(1)+S(2)+S(3)+S(4)+S(5):RETURN
90 PRINT@752,K$;:PRINT@880,K$;:PRINT@948,K$;
100 N=N+J:IF(N=1)THENZ$=P1$ELSEIF(N>3ANDN<6)THENZ$=P2$
110 PRINT@948,T1$;Z$;T2$;:IFN=7THENN=0:GOTO100
120 PRINT@337,S$;:JZ=JZ+1:PRINT@370,"Roll No";JZ;
130 IF(JZ=1)THEN250ELSEIF(JZ=3)THENJZ=0
140 Y$="":H$="":GOSUB1030:L$=LEFT$(H$,1)
150 LH=LEN(H$)+C:Y$=RIGHT$(H$,LH):H$=Y$
160 IFL$="R"THEN170ELSEIFL$="S"THEN1210ELSEPRINT@337,S$;:GOTO140
170 P=121
180 FORJ=1TO5:K(J)=0:NEXTJ:FORDI=1TOLEN(Y$)
190 Y1$=LEFT$(Y$,1):Y$=RIGHT$(Y$,LEN(Y$)+C)
200 Y2=VAL(Y1$):K(Y2)=Y2:NEXTDI
210 FORZZ=1TO5
220 IFK(ZZ)<>0THENP=(121+(K(ZZ)*12)):GOSUB1170
230 NEXTZZ
240 FLAG=0:GOTO480
250 PRINT@467,A1$;:PRINT@491,A1$;
260 GG=1:HH=6:WP=0:IF(Z$=P1$)THENSU(1)=0ELSESU(2)=0
270 GOSUB1490
280 GG=7:HH=13:WP=1:IF(Z$=P1$)THENTU(1)=0ELSETU(2)=0
290 GOSUB1490
300 P=121:FORW=1TO5:P=P+12:PRINT@P,D7$;:NEXTW:GOSUB1030
310 P=121:FORK=1TO5:P=P+12
320 GOSUB340
330 R=RND(6):S(K)=R:ONRGOTO380,390,400,410,420,430
340 GOSUB1480:PRINT@P,D7$;:GOSUB1480:PRINT@P,D5$;
350 GOSUB1480:PRINT@P,D7$;:GOSUB1480:PRINT@P,D2$;
360 GOSUB1480:PRINT@P,D7$;:GOSUB1480:PRINT@P,D4$;
370 GOSUB1480:PRINT@P,D7$;:GOSUB1480:RETURN
380 PRINT@P,D1$;:E=USR(BX):GOTO440
390 PRINT@P,D2$;:E=USR(BX):GOTO440
400 PRINT@P,D3$;:E=USR(BX):GOTO440
410 PRINT@P,D4$;:E=USR(BX):GOTO440
420 PRINT@P,D5$;:E=USR(BX):GOTO440
430 PRINT@P,D6$;:E=USR(BX)
440 IF(K=5)THEN450ELSEX=50:GOSUB1410
450 IF(FLAG=1)THENFLAG=0:RETURN
460 IF(ST=0)THENRETURN
470 NEXTK
480 Q=Q+1:GOSUB1640
490 IF(Q=3)THENQ=0:GOTO1210ELSEGOTO100
500 M=0:O=0
510 FORW=1TO4:IF(S(W)<=S(W+1))THEN530
520 W1=S(W):S(W)=S(W+1):S(W+1)=W1:M=M+1
530 NEXTW
540 IFM>0THEN500ELSEO=0
550 FORF=1TO4:FORG=F+1TO5:IF(S(F)=S(G))THENO=O+1:H=S(F)
560 IF(O=6ORO=3ORO=1)THENI=HELSEIF(O=2)THENII=H
570 NEXTG,F
580 SC=0:SV=VAL(H$):IF(SV<1)THEN1210
590 IF(SV>0ANDSV<7)THEN610ELSEIF(SV=13)THEN630
600 IF(SV<13)THEN670ELSEGOTO1210
610 FORW=1TO5:IF(S(W)=SV)THENSC=SC+SV:NEXTWELSESC=SC:NEXTW
620 RETURN
630 IF(O=1)0THENGOSUB40ELSEGOTO660
640 IF(YPANDNOTYG)THEN660:ELSEIF(YG)THENRETURN
650 IF(YF)THENRETURN
660 GOSUB80:RETURN
670 SQ=SV-6:ONSQGOTO690,720,750,790,940,1010
680 GOTO1210
690 IF((O=3)OR(O=4)OR(O=6))THENGOSUB80:RETURNELSEGOTO700
700 IF(O=10)THENGOSUB40ELSESC=0:RETURN
710 IF(YPANDNOTYG)THENGOSUB80:RETURNELSEIF(YG)THENRETURN
720 IF(O=6)THENGOSUB80:RETURNELSEIF(O=10)GOSUB40
730 IF(YPANDNOTYG)THENGOSUB80:RETURNELSESC=0:RETURN
740 IF(YF)THENRETURNELSESC=0:RETURN
750 IF(O=4)THENSC=25:RETURN
760 IF(O=10)THENGOSUB40ELSESC=0:RETURN
770 IF(YPANDNOTYG)THENSC=25:RETURNELSEIF(YG)THENRETURN
780 IF(YF)THENRETURNELSESC=0:RETURN
790 IF(O=10)THENGOSUB40ELSE820
800 IF(YPANDNOTYG)THENSC=30:RETURNELSEIF(YG)THENRETURN
810 IF(YF)THENRETURN
820 IF(O<>1)THEN900ELSEW=0
830 W=W+1
840 IF(S(W)=S(W+1)ANDW=4)THEN900ELSEIF(S(W)<>S(W+1))THEN830
850 W1=S(W+1):IF(W=1)THENS(2)=S(3):S(3)=S(4):S(4)=S(5):S(5)=W1
860 IF(W=2)THENS(3)=S(4):S(4)=S(5):S(5)=W1
870 IF(W=3)THENS(4)=S(5):S(5)=W1
880 FORW=1TO5:PRINT@260+W*2,S(W);:NEXTW
890 V1=0:V2=0
900 IF(S(1)+1=S(2)ANDS(2)+1=S(3)ANDS(3)+1=S(4))THENV1=1
910 IF(S(2)+1=S(3)ANDS(3)+1=S(4)ANDS(4)+1=S(5))THENV2=1
920 IF(V1ORV2)THENSC=30ELSESC=0
930 RETURN
940 IF(O>0)THENGOTO970
950 IFS(1)=S(2)+CANDS(2)=S(3)+CANDS(4)=S(5)+CTHENSC=40ELSESC=0
960 RETURN
970 IF(O=10)THENGOSUB40ELSESC=0:RETURN
980 IF(YPANDNOTYG)THENSC=40:RETURNELSEIF(YG)THENRETURN
990 IF(YF)THENRETURN
1000 SC=0:RETURN
1010 IF(O=10)THENSC=50:RETURN
1020 SC=0:RETURN
1030 DE=0:PRINT@257,STRING$(60," ");
1040 PRINT@275,"**** ";Z$;" To Go ****";
1050 IF(JZ=1)THENPRINT@338,N$;
1060 DE=DE+1:IF(DE<>1)THEN1070ELSEE=USR(BV+10)
1070 J$=INKEY$
1080 IFJ$<>CHR$(13)THEN1120
1090 IF(LEN(J$)=1ANDJZ=1)THENPRINT@337,S$;:E=USR(BV):RETURN
1100 IF(LEN(H$)>0)THENE=USR(BV):RETURN
1110 GOTO1070
1120 IF(J$<>"")THENE=USR(BV)
1130 IF(LEN(H$)=1)THENPRINT@337,S$;ELSEIF(J$="")THEN1070
1140 IF(J$<>CHR$(8))THEN1160
1150 IF(LEN(H$)>0)THENH$=LEFT$(H$,LEN(H$)+C):PRINT@347,H$;" ";:G
OTO1070ELSEJ$="":H$="":GOTO1030
1160 H$=H$+J$:IF(LEN(H$)>7)THENH$="":GOTO1030ELSEPRINT@347,H$;:G
OTO1070
1170 IF(JZ=1)THENPRINT@,337,S$;
1180 R=RND(6):S(ZZ)=R:FLAG=1:GOSUB340
1190 ONRGOTO380,390,400,410,420,430
1200 RETURN
```

```
1210 YF=0:YP=0:YG=0:PRINT@337,S$;
1220 PRINT@275,Z$;I$;:E=USR(BV+35)
1230 H$="":J$="":GOSUB1070
1240 Y3$=LEFT$(H$,1):IF(Y3$="R"ORY3$="S"ORY3$=CHR$(13))THEN1210
1250 GOSUB500
1260 IF(YFANDNOTYG)THENE=USR(BW):PRINT@337,F$;:GOTO1770
1270 IF(YG)THENE=USR(BW):PRINT@337,"*";I;G$;:GOTO1770
1280 IF(Z$=P1$)THENIF(P1(SV)=C)THENP1(SV)=SCELSEGOTO1400
1290 IF(Z$=P2$)THENIF(P2(SV)=C)THENP2(SV)=SCELSEGOTO1400
1300 GG=1:HH=6:WP=0:IF(Z$=P1$)THENSU(1)=0ELSESU(2)=0
1310 GOSUB1490
1320 GG=7:HH=13:WP=1:IF(Z$=P1$)THENTU(1)=0ELSETU(2)=0
1330 GOSUB1490
1340 IF(N<3)THENN=3:JZ=0ELSEIF(N<6ANDN>3)THENN=6:JZ=0
1350 J$="":H$="":Q=0:S(W)=0:FORW=1TO5:S(W)=0:NEXTW
1360 PRINT@338,E$;:PRINT@260,Q$;:E=USR(BV+20)
1370 RE$=INKEY$:IFRE$=""THEN1370
1380 PRINT@337,S$;:QE=QE+1:IF(QE=26)THEN1720
1390 GOTO90
1400 PRINT@337,M$;:E=USR(BW):PRINT@337,S$;:GOTO1220
1410 FORJ=1TOX:NEXTJ:X=0:RETURN
1420 'OUT 254,16     REM SYSTEM 80 EXT CASSETTE
1430 FORA=TEXTTOTEXT+28:READB:POKEA,B:NEXT
1440 ONERRORGOTO1450:DEFUSR0=TEXT:RETURN
1450 POKE 16526,TEXT AND 255 : POKE 16527, INT(TEXT/256) :RETURN
1460 DATA205,127,10,229,193,197,65,16,254,58,61,64,246,2,203
1470 DATA215,211,255,65,16,254,230,253,211,255,193,16,233,201
1480 NZ=1600+RND(55):E=USR(NZ):GOSUB1710:RETURN
1490 FORPQ=GGTOHH:IF(WP=0)THENPR=403+PQ*64ELSEPR=427+((PQ-6)*64)
1500 IF(Z$=P1$)THEN1540
1510 IF(P2(PQ)=C)THENQ8=0:GOTO1520ELSEPRINT@PR,USINGU$;P2(PQ);:Q
8=P2(PQ)
1520 IF(WP=0)THENSU(2)=SU(2)+Q8ELSETU(2)=TU(2)+Q8
1530 GOTO1560
1540 IF(P1(PQ)=C)THENQ8=0:GOTO1550ELSEPRINT@PR,USINGU$;P1(PQ);:Q
8=P1(PQ)
1550 IF(WP=0)THENSU(1)=SU(1)+Q8ELSETU(1)=TU(1)+Q8
1560 NEXTPQ
1570 IF(Z$=P1$)THENQ4=1ELSEQ4=2
1580 IF(WP)THEN1620ELSEPT(Q4)=0
1590 IF(SU(Q4)>=63)THENBS(Q4)=35ELSEBS(Q4)=0
1600 PT(Q4)=SU(Q4)+BS(Q4)
1610 PRINT@851,USINGU$;BS(Q4);:PRINT@913,USINGV$;PT(Q4);:RETURN
1620 PRINT@937,USINGV$;TU(Q4);:TS(Q4)=PT(Q4)+TU(Q4)
1630 PRINT@885,USINGV$;TS(Q4);:RETURN
1640 FOREE=1TO5:R(EE)=S(EE):NEXTEE
1650 M=0
1660 FORW=1TO4:IF(R(W)<=R(W+1))THEN1680
1670 W1=R(W):R(W)=R(W+1):R(W+1)=W1:M=M+1
1680 NEXTW
1690 IF(M>0)THEN1650
1700 FORW=1TO5:PRINT@752+W*2,R(W);:NEXTW
1710 RETURN
1720 PRINT@275,"====  Game Finished  =="
1730 IF(TS(1)>TS(2))THENPRINT@328,P1$;P$;TS(1);X$;TS(2);O$;P2$;
1740 IF(TS(2)>TS(1))THENPRINT@328,P2$;P$;TS(2);X$;TS(1);O$;P1$;
1750 IF(TS(1)=TS(2))THENPRINT@330,PP$;TS(1);PX$;TS(2);PO$;
1760 RE$=INKEY$:IFRE$=""THEN1760ELSERUN
1770 PRINT@337,S$;:YG=0:GOTO1210
1780 GOSUB1430
1790 ONERRORGOTO2310
1800 P=858:GOSUB2120
1810 PRINT@275,TI$:GOSUB320:ST=1
1820 E=USR(BV):PRINT@466,;:INPUT"First Players Name ";P1$
1830 E=USR(BV):PRINT@593,;:INPUT"Second Players Name ";P2$
1840 IF(LEN(P1$)>5)THENP1$=LEFT$(P1$,5)
1850 IF(LEN(P2$)>5)THENP2$=LEFT$(P2$,5)
1860 A2=LEN(P1$):IF(A2<5)THEN P1$=P1$+CHR$(32):GOTO1860
1870 A3=LEN(P2$):IF(A3<5)THEN P2$=P2$+CHR$(32):GOTO1870
1880 E=USR(BV):FORZ2=1TO13:P1(Z2)=C:P2(Z2)=P1(Z2):NEXT
1890 X=400:GOSUB1410:CLS
1900 A$=CHR$(188)+STRING$(7,140)+CHR$(188)+CHR$(193)
1910 A$=A$+A$+A$+A$+A$+A$+CHR$(196)
1920 B$=CHR$(191)+CHR$(199)+CHR$(191)+CHR$(195)
1930 B$=B$+B$+B$+B$+B$+B$+CHR$(196)
1940 C$=STRING$(9,131)+CHR$(195)
1950 C$=C$+C$+C$+C$+C$
1960 A$=A$+B$+B$+C$
1970 PRINT@3,A$;
1980 PRINT@199,"1";:PRINT@211,"2";:PRINT@223,"3";:PRINT@235,"4";
:PRINT@247,"5";
1990 PRINT@384,R$;:PRINT@448,;:
2000 PRINT"<1> Aces.....      < 7> 3/Kind....."
2010 PRINT"<2> Two's.....     < 8> 4/Kind....."
2020 PRINT"<3> Three's.....   < 9> F/House....."
2030 PRINT"<4> Four's.....    <10> S/Strt....."
2040 PRINT"<5> Fives.....     <11> L/Strt....."
2050 PRINT"<6> Sixes.....     <12> Yahtzee....."
2060 PRINT"    Bonus.....     <13> Chance....."
2070 PRINT"    Subtotal.....       Subtotal...."
2080 PRINTR$;:PRINT@496,"Y A H T Z E E";
2090 PRINT@560,"Rnnnn=Roll Dice";:PRINT@624,"S    =Score Dice";
2100 PRINT@688,"Sorted Die Below";:PRINT@816,"   Total Score";
2110 GOTO90
2120 D1$=STRING$(5,128)+CHR$(27)+STRING$(5,24)+STRING$(2,128)+CH
R$(176)+STRING$(2,128)
2130 D2$=STRING$(4,128)+CHR$(140)+CHR$(27)+STRING$(5,24)+CHR$(13
1)+STRING$(4,128)
2140 D3$=STRING$(4,128)+CHR$(140)+CHR$(27)+STRING$(5,24)+CHR$(13
1)+CHR$(128)+CHR$(176)+STRING$(2,128)
2150 D4$=CHR$(140)+STRING$(3,128)+CHR$(140)+CHR$(27)+STRING$(5,2
4)+CHR$(131)+STRING$(3,128)+CHR$(131)
2160 D5$=CHR$(140)+STRING$(3,128)+CHR$(140)+CHR$(27)+STRING$(5,2
4)+CHR$(131)+CHR$(128)+CHR$(176)+CHR$(128)+CHR$(131)
2170 D6$=CHR$(140)+STRING$(3,128)+CHR$(140)+CHR$(27)+STRING$(5,2
4)+CHR$(179)+STRING$(3,128)+CHR$(179)
2180 D7$=STRING$(5,128)+CHR$(27)+STRING$(5,24)+STRING$(5,128)
2190 E$="Press <ENTER> To Clear "
2200 F$="* YAHTZEE Not Yet Scored *"
2210 G$="'s Must Be Scored First "
2220 I$=" Enter Score Please":K$=STRING$(13,32)
2230 M$="   Incorrect  Category":N$="Press  <ENTER> To Start"
2240 P$=" WINS With":X$="Points vs":O$=" Points For "
2250 PP$="** DRAWN GAME **  ":PX$=" VS ":PO$=" Points "
2260 Q$=STRING$(40,32):R$=STRING$(63,140):S$=STRING$(32,32)
2270 T1$=CHR$(143)+CHR$(32):T2$=CHR$(32)+CHR$(143)
2280 U$="##":V$="####":TI$="**** Yahtzee v1.5 ****"
2290 FORA1=1TO8:A1$=A1$+"**"+CHR$(24)+CHR$(24)+CHR$(26):NEXTA1
2300 W$="**":RETURN
2310 PRINT"Error Occurred In ";ERL;" Code";ERR/2+1
```

```
**** VER 5.0   HOUSEHOLD ACCOUNTING ****

                MODEL 4



10 CLEAR 50 : VV = INT(( MEM - 2000) / 69) : VV = - VV * (VV < 6
98) - (VV > 697) * 697:REM
MODULE0/BAS
  THE LARGEST MODULE, (MODULE6/BAS), IS 4203 BYTES LONG

20 CLEAR 62 * VV + 700 : VV = INT(( FRE(Z0$) - 700) / 62) : DIM
A$(VV + 1),LB(VV + 1) : F3$ = "  ########.##" : F4$ = " $$###,###.
##-" : F5$ = "       " + F3$ + "-"
30 W = 1 : SO$ = "Press any key to continue *" : Z0$ = "Total" :
 Z1$ = "Memory" : Z2$ = "Account" : Z3$ = "Select Function *" :
Z4$ = "Journal" : Z5$ = "Credit" : Z6$ = "Debit" : Z7$ = "Date"
40 PRINT CHR$(15)
50 GOSUB 230 : PRINT @400,"Maximum number of records = ";VV : PR
INT @800,SO$; :PRINT@1840,"..................... Written by  Sunb
urst Software Services .....................";: PA = 826 : LN = 1
: GOSUB 60 : GOTO 250
60 AD$ = ""
70 FOR T = 1 TO LN
80 GOSUB 150 : IF IN$ = CHR$(13) THEN 130 ELSE IF IN$ = CHR$(8)
THEN 110 ELSE IF IN$ = CHR$(32) THEN GOSUB 170
90 AD$ = AD$ + IN$ : PRINT @PA,AD$; : NEXT : RETURN
100 NEXT : RETURN
110 IF T < = 1 THEN 80 ELSE T = T - 1
120 AD$ = LEFT$(AD$, LEN(AD$) - 1) : PRINT @PA,AD$;"**"; : GOTO
80
130 IF FL = 0 THEN BL$ = STRING$ (LN - LEN(AD$)," ") : AD$ = AD$
 + BL$ : PRINT @PA,AD$; : RETURN
140 BL$ = STRING$ (LN - LEN(AD$),"0") : AD$ = AD$ + BL$ : PRINT
@PA,AD$; : RETURN
150 IN$ = "" : IN$ = INKEY$ : GOSUB 160 : IF IN$ = "" THEN 150 E
LSE RETURN
160 PRINT @PA,AD$;;CHR$(143);: RETURN
170 IF FL = 0 THEN RETURN
180 IN$ = "0" : RETURN
190 T = 1
200 IF T > 5 THEN AD$ = "    0" : RETURN
210 IF MID$(AD$,T,1) = "0" THEN T = T + 1 : GOTO 200
220 AD$ = STRING$ (T - 1,32) + RIGHT$(AD$,6 - T) : RETURN
230 CLS : PRINT @0,"***              Household Accounting   Ver
5.0  for the Model 4             ***"; : PRINT @80,"***         (
C)  1st November 1983      M i c r o - 8 0   P t y  L t d
 ***";
240 PRINT @160, CHR$(31); : RETURN
250 COMMON VV,A$(),LB(),F3$,F4$,F5$,W,SO$,Z0$,Z1$,Z2$,Z3$,Z4$,Z5
$,Z6$,Z7$,PA,LN,AD,AD$,DT$,RF$,DE$,PR$,DB$,CR$,P
260 P=0:GOSUB 230:PRINT@196,"MENU":PRINT:PRINT:PRINT"1 = Keyboar
d Input                    :       5 = Save Data"
270 PRINT:PRINT"2 = Load Data                          :       6 =
 Print Journals"
280 PRINT:PRINT"3 = Read Memory                        :       7 =
 Lineprinter Utility"
290 PRINT:PRINT"4 = Edit Memory                        :       8 =
 Ledger Accounts"
300 PRINT @1200,Z3$; : PA = 1216 : LN = 1 : GOSUB 60
310 AD = VAL(AD$) : IF AD < 1 OR AD > 8 THEN 300
320 ON AD GOTO 330,400,340,350,390,360,370,380
330 CHAIN "MODULE1/BAS",ALL
340 CHAIN "MODULE3/BAS",ALL
350 CHAIN "MODULE4/BAS",ALL
360 CHAIN "MODULE6/BAS",ALL
370 CHAIN "MODULE7/BAS",ALL
380 CHAIN "MODULE8/BAS",ALL
390 CHAIN "MODULE5/BAS",ALL
400 CHAIN "MODULE2/BAS",ALL
410 REM WRITTEN BY
SUNBURST SOFTWARE SERVICES


10 REM                        MODULE1/BAS
20 COMMON Z0$,Z1$,Z2$,Z3$,Z4$,Z5$,Z6$,Z7$,A$(),LB(),DT$,DE$,RF$,
PR$,DB$,CR$,AD$,AD,VV,W
30 GOTO 410
40 AD$ = ""
50 FOR T = 1 TO LN
60 GOSUB 130 : IF IN$ = CHR$(13) THEN 110 ELSE IF IN$ = CHR$(8)
THEN 90 ELSE IF IN$ = CHR$(32) THEN GOSUB 150
70 AD$ = AD$ + IN$ : PRINT @PA,AD$; : NEXT : RETURN
80 NEXT : RETURN
90 IF T < = 1 THEN 60 ELSE T = T - 1
100 AD$ = LEFT$(AD$, LEN(AD$) - 1) : PRINT @PA,AD$;"**"; : GOTO
60
110 IF FL = 0 THEN BL$ = STRING$ (LN - LEN(AD$)," ") : AD$ = AD$
 + BL$ : PRINT @PA,AD$; : RETURN
120 BL$ = STRING$ (LN - LEN(AD$),"0") : AD$ = AD$ + BL$ : PRINT
@PA,AD$; : RETURN
130 IN$ = "" : IN$ = INKEY$ : GOSUB 140 : IF IN$ = "" THEN 130 E
LSE RETURN
140 PRINT @PA,AD$;CHR$(143);: RETURN
150 IF FL = 0 THEN RETURN
160 IN$ = "0" : RETURN
170 T = 1
180 IF T > 5 THEN AD$ = "    0" : RETURN
190 IF MID$(AD$,T,1) = "0" THEN T = T + 1 : GOTO 180
200 AD$ = STRING$ (T - 1,32) + RIGHT$(AD$,6 - T) : RETURN
210 PRINT @160, CHR$(31); : RETURN
220 CHAIN "MODULE0/BAS",250,ALL
230 PRINT @190,"KEYBOARD INPUT"
240 PRINT @320,Z7$;"    **/**/**"; : PRINT @400,"REF NO. ****";
: PRINT @480,"DETAILS ********************************"; : PRINT
@560,"PREFIX  **"; : PRINT @640,"ACC NO. ***"; : PRINT @720,Z6$;
"  *****.**";
250 PRINT @240,"RECORD NO. ";I;
260 PRINT @800,Z5$;" *****.**"; : PRINT @880,"CORRECT (Y/N) *";
: RETURN
270 GOSUB 210 : GOSUB 230
280 FL = 1 : PA = 328 : LN = 2 : GOSUB 40 : DT$ = AD$ : IF DT$ =
 "00" THEN RETURN
290 GOSUB 300 : GOSUB 310 : GOSUB 320 : GOSUB 330 : GOSUB 340 :
FL = 1 : GOSUB 350 : GOSUB 360 : GOSUB 370 : GOSUB 380 : FL = 0
: GOTO 390
300 PA = 331 : GOSUB 40 : DT$ = DT$ + AD$ : PA = 334 : GOSUB 40
: DT$ = DT$ + AD$ : RETURN
310 PA = 408 : LN = 4 : FL = 0 : GOSUB 40 : RF$ = AD$ : RETURN
320 PA = 488 : LN = 31 : GOSUB 40 : DE$ = AD$ : RETURN
330 PA = 568 : LN = 2 : GOSUB 40 : PR$ = AD$ : RETURN
340 PA = 648 : LN = 3 : GOSUB 40 : PR$ = PR$ + AD$ : RETURN
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350 PA = 727 : LN = 5 : GOSUB 40 : GOSUB 170 : DB$ = AD$ + "." :
 RETURN
360 PA = 733 : LN = 2 : GOSUB 40 : DB$ = DB$ + AD$ : RETURN
370 PA = 807 : LN = 5 : GOSUB 40 : GOSUB 170 : CR$ = AD$ + "." :
 RETURN
380 PA = 813 : LN = 2 : GOSUB 40 : CR$ = CR$ + AD$ : FL = 0 : RE
TURN
390 PA = 894 : LN = 1 : GOSUB 40 : IF AD$ = "N" THEN 270 ELSE IF
 AD$ < > "Y" THEN 390
400 A$(I) = DT$ + RF$ + DE$ + PR$ + DB$ + CR$ : RETURN
410 FOR I = W TO VV : GOSUB 270 : IF DT$ = "00" THEN W = I : GOT
O 220
420 NEXT I : GOTO 220


10 REM                        MODULE2/BAS
20 COMMON VV,A$(),LB(),F3$,F4$,F5$,W,SO$,Z0$,Z1$,Z2$,Z3$,Z4$,Z5$
,Z6$,Z7$,PA,LN,AD,AD$,DT$,RF$,DE$,PR$,DB$,CR$,P
30 GOTO 230
40 AD$ = ""
50 FOR T = 1 TO LN
60 GOSUB 130 : IF IN$ = CHR$(13) THEN 110 ELSE IF IN$ = CHR$(8)
THEN 90 ELSE IF IN$ = CHR$(32) THEN GOSUB 150
70 AD$ = AD$ + IN$ : PRINT @PA,AD$; : NEXT : RETURN
80 NEXT : RETURN
90 IF T < = 1 THEN 60 ELSE T = T - 1
100 AD$ = LEFT$(AD$, LEN(AD$) - 1) : PRINT @PA,AD$;"**"; : GOTO
60
110 IF FL = 0 THEN BL$ = STRING$ (LN - LEN(AD$)," ") : AD$ = AD$
 + BL$ : PRINT @PA,AD$; : RETURN
120 BL$ = STRING$ (LN - LEN(AD$),"0") : AD$ = AD$ + BL$ : PRINT
@PA,AD$; : RETURN
130 IN$ = "" : IN$ = INKEY$ : GOSUB 140 : IF IN$ = "" THEN 130 E
LSE RETURN
140 PRINT @PA,AD$;CHR$(143);: RETURN
150 IF FL = 0 THEN RETURN
160 IN$ = "0" : RETURN
170 T = 1
180 IF T > 5 THEN AD$ = "    0" : RETURN
190 IF MID$(AD$,T,1) = "0" THEN T = T + 1 : GOTO 180
200 AD$ = STRING$ (T - 1,32) + RIGHT$(AD$,6 - T) : RETURN
210 CLS : PRINT @0,"***              Household Accounting   Ver
5.0  for the Model 4             ***"; : PRINT @80,"***         (
C)  1st November 1983      M i c r o - 8 0   P t y  L t d
 ***";
220 PRINT @160, CHR$(31); : RETURN
230 X1$ = "LOAD FROM" : GOSUB 310
240 GOSUB 330
250 IF SF = 2 THEN 360
260 GOSUB 340
270 GOSUB 350 : IF AD$ = "E" THEN 230
280 IF SF = 1 THEN OPEN "I",1,NM$
290 IF SF = 1 THEN INPUT #1,W : FOR I = 1 TO W : INPUT #1,A$(I)
: NEXT : CLOSE
300 GOTO 230
310 GOSUB 220 : PRINT @190,"DATA "; LEFT$(X1$,4);"
320 PRINT:PRINT"                                1 = ";X1$;" DISK":PRINT
:PRINT"                             2 = EXIT TO MENU" : RETURN
330 PRINT @832,Z3$; : PA = 848 : LN = 1 : GOSUB 40 : SF = VAL(AD
$) : IF SF < 1 OR SF > 3 THEN 330 ELSE RETURN
340 FL = 0 : GOSUB 220 : PRINT @428,"ENTER FILENAME *******"; :
 PA = 443 : LN = 8 : GOSUB 40 : NM$ = AD$ : RETURN
350 PRINT @492,"PRESS ANY KEY WHEN DEVICE READY OR (E)SCAPE   *"
; : PA = 538 : LN = 1 : GOSUB 40 : RETURN
360 CHAIN "MODULE0/BAS",250,ALL


10 REM                        MODULE3/BAS
20 GOTO 220
30 AD$ = ""
40 FOR T = 1 TO LN
50 GOSUB 120 : IF IN$ = CHR$(13) THEN 100 ELSE IF IN$ = CHR$(8)
THEN 80 ELSE IF IN$ = CHR$(32) THEN GOSUB 140
60 AD$ = AD$ + IN$ : PRINT @PA,AD$; : NEXT : RETURN
70 NEXT : RETURN
80 IF T < = 1 THEN 50 ELSE T = T - 1
90 AD$ = LEFT$(AD$, LEN(AD$) - 1) : PRINT @PA,AD$;"**"; : GOTO 5
0
100 IF FL = 0 THEN BL$ = STRING$ (LN - LEN(AD$)," ") : AD$ = AD$
 + BL$ : PRINT @PA,AD$; : RETURN
110 BL$ = STRING$ (LN - LEN(AD$),"0") : AD$ = AD$ + BL$ : PRINT
@PA,AD$; : RETURN
120 IN$ = "" : IN$ = INKEY$ : GOSUB 130 : IF IN$ = "" THEN 120 E
LSE RETURN
130 PRINT @PA,AD$;CHR$(143);: RETURN
140 IF FL = 0 THEN RETURN
150 IN$ = "0" : RETURN
160 T = 1
170 IF T > 5 THEN AD$ = "    0" : RETURN
180 IF MID$(AD$,T,1) = "0" THEN T = T + 1 : GOTO 170
190 AD$ = STRING$ (T - 1,32) + RIGHT$(AD$,6 - T) : RETURN
200 CLS : PRINT @0,"***              Household Accounting   Ver
5.0  for the Model 4             ***"; : PRINT @80,"***         (
C)  1st November 1983      M i c r o - 8 0   P t y  L t d
 ***";
210 PRINT @160, CHR$(31); : RETURN
220 COMMON VV,A$(),LB(),F3$,F4$,F5$,W,SO$,Z0$,Z1$,Z2$,Z3$,Z4$,Z5
$,Z6$,Z7$,PA,LN,AD,AD$,DT$,RF$,DE$,PR$,DB$,CR$,P
230 GOSUB 210 : GOSUB 240 : GOSUB 280 : GOTO 340
240 PRINT @190,"Contents of ";Z1$;
250 PRINT @240,Z7$;"     REF   DETAILS                              A
CC NO      ";Z6$;"       ";Z5$
260 IF P THEN LPRINT Z7$;"     REF   DETAILS
     ACC NO      ";Z6$;"       ";Z5$
270 RETURN
280 L = 1 : FOR I = 1 TO W - 1
290 GOSUB 330 : GOSUB 350 : PRINT VX$
300 L = L + 1 : IF L = 20 THEN L = 1 : PRINT @1840,SO$; : PA = 1
866 : LN = 1 : GOSUB 30 : GOSUB 210 : GOSUB 240
310 NEXT I
320 PRINT @1840,"END OF DATA - ";SO$; : PA = 1880 : LN = 1 : GOS
UB 30 : RETURN
330 V1$ = LEFT$(A$(I),2) : V2$ = MID$(A$(I),3,2) : V3$ = MID$(A$
(I),5,2) : V4$ = MID$(A$(I),7,4) : V5$ = MID$(A$(I),11,31) : V6$
 = MID$(A$(I),42,2) : V7$ = MID$(A$(I),44,3) : V8$ = MID$(A$(I),
47,8) : V9$ = MID$(A$(I),55,8) : RETURN
340 CHAIN "MODULE0/BAS",250,ALL
350 VX$ = V1$ + "/" + V2$ + "/" + V3$ + "  " + V4$ + "  " + V5$ +
 "  " + V6$ + V7$ + "   " + V8$ + "    " + V9$ : RETURN
```

```
10 REM                          MODULE4/BAS
20 GOTO 220
30 AD$ = ""
40 FOR T = 1 TO LN
50 GOSUB 120 : IF IN$ = CHR$(13) THEN 100 ELSE IF IN$ = CHR$(8)
THEN 80 ELSE IF IN$ = CHR$(32) THEN GOSUB 140
60 AD$ = AD$ + IN$ : PRINT @PA,AD$; : NEXT : RETURN
70 NEXT : RETURN
80 IF T < = 1 THEN 50 ELSE T = T - 1
90 AD$ = LEFT$(AD$, LEN(AD$) - 1) : PRINT @PA,AD$;"**"; : GOTO 5
0
100 IF FL = 0 THEN BL$ = STRING$ (LN - LEN(AD$)," ") : AD$ = AD$
 + BL$ : PRINT @PA,AD$; : RETURN
110 BL$ = STRING$ (LN - LEN(AD$),"0") : AD$ = AD$ + BL$ : PRINT
@PA,AD$; : RETURN
120 IN$ = "" : IN$ = INKEY$ : GOSUB 130 : IF IN$ = "" THEN 120 E
LSE RETURN
130 PRINT @PA,AD$;CHR$(143);: RETURN
140 IF FL = 0 THEN RETURN
150 IN$ = "0" : RETURN
160 T = 1
170 IF T > 5 THEN AD$ = "    0" : RETURN
180 IF MID$(AD$,T,1) = "0" THEN T = T + 1 : GOTO 170
190 AD$ = STRING$ (T - 1,32) + RIGHT$(AD$,6 - T) : RETURN
200 CLS : PRINT @0,"***              Household Accounting   Ver
5.0  for the Model 4              ***"; : PRINT @80,"***          (
C)  1st November 1983      M i c r o - 8 0   P t y  L t d
 ***";
210 PRINT @160, CHR$(31); : RETURN
220 COMMON VV,A$(),LB(),F3$,F4$,F5$,W,SO$,Z0$,Z1$,Z2$,Z3$,Z4$,Z5
$,Z6$,Z7$,PA,LN,AD,AD$,DT$,RF$,DE$,PR$,DB$,CR$,P:GOTO 360
230 PRINT @320,Z7$;"    **/**/**"; : PRINT @400,"REF NO. ****";
: PRINT @480,"DETAILS ****************************"; : PRINT
@540,"PREFIX  **"; : PRINT @640,"ACC NO. ***"; : PRINT @720,Z6$;
"  *****.**";
240 PRINT @240,"RECORD NO. ";I;
250 PRINT @800,Z5$;" *****.**"; : RETURN
260 PA = 331 : GOSUB 30 : DT$ = DT$ + AD$ : PA = 334 : GOSUB 30
: DT$ = DT$ + AD$ : RETURN
270 PA = 408 : LN = 4 : FL = 0 : GOSUB 30 : RF$ = AD$ : RETURN
280 PA = 488 : LN = 31 : GOSUB 30 : DE$ = AD$ : RETURN
290 PA = 568 : LN = 2 : GOSUB 30 : PR$ = AD$ : RETURN
300 PA = 648 : LN = 3 : GOSUB 30 : PR$ = PR$ + AD$ : RETURN
310 PA = 727 : LN = 5 : GOSUB 30 : GOSUB 160 : DB$ = AD$ + "." :
 RETURN
320 PA = 733 : LN = 2 : GOSUB 30 : DB$ = DB$ + AD$ : RETURN
330 PA = 807 : LN = 5 : GOSUB 30 : GOSUB 160 : CR$ = AD$ + "." :
 RETURN
340 PA = 813 : LN = 2 : GOSUB 30 : CR$ = CR$ + AD$ : FL = 0 : RE
TURN
350 A$(I) = DT$ + RF$ + DE$ + PR$ + DB$ + CR$ : RETURN
360 I = 1 : FL = 0
370 PRINT @213,"EDIT ";Z1$;
380 GOSUB 210 : GOSUB 230 : PRINT @832,"                  "; : PRIN
T @960,"SELECT *";
390 PRINT @240,"RECORD NO. ";I;
400 GOSUB 640
410 IF V1$ = "" THEN GOSUB 230 : PRINT @832,"                  ";
420 PRINT @328,V1$; : PRINT @331,V2$; : PRINT @334,V3$; : PRINT
@408,V4$; : PRINT @488,V5$; : PRINT @568,V6$; : PRINT @648,V7$;
: PRINT @727,V8$; : PRINT @807,V9$;
430 PA = 967 : LN = 1 : GOSUB 30 : IF AD$ = ";" THEN PRINT @960,
"ADVANCE"; : I = I + 1 : IF I > VV THEN I = VV
440 IF AD$ = "+" THEN PRINT @960,"ADVANCE"; : I = I + 10 : IF I
> VV THEN I = VV
450 IF AD$ = "-" THEN I = I - 1 : PRINT @960,"REVERSE"; : IF I <
 = 0 THEN I = 1
460 IF AD$ = "=" THEN I = I - 10 : PRINT @960,"REVERSE"; : IF I
< = 0 THEN I = 1
470 IF AD$ = " " THEN 650
480 IF AD$ = "E" THEN PRINT @960,"* EDIT *"; : GOSUB 500 : GOTO
380
490 GOTO 390
500 FL = 1 : PA = 328 : LN = 2 : GOSUB 30 : IF AD$ = "00" THEN D
T$ = V1$ + V2$ + V3$ : PRINT @328,V1$;"/";V2$;"/";V3$; : GOTO 52
0
510 DT$ = AD$ : GOSUB 260
520 GOSUB 270 : IF RF$ = "    " THEN RF$ = V4$ : PRINT @408,RF$;
530 GOSUB 280 : IF DE$ = "                                   " THEN
DE$ = V5$ : PRINT @488,DE$;
540 GOSUB 290 : IF PR$ = "  " THEN P1$ = V6$ : PRINT @568,V6$; :
 GOTO 560
550 P1$ = AD$
560 GOSUB 300 : IF AD$ = "   " THEN PR$ = P1$ + V7$ : PRINT @648
,V7$; : GOTO 580
570 PR$ = P1$ + AD$
580 FL = 0 : GOSUB 310 : IF AD$ = "     " THEN DB$ = V8$ : PRINT
 @727,V8$; : GOTO 600
590 GOSUB 160 : GOSUB 320
600 FL = 0 : GOSUB 330 : IF AD$ = "     " THEN CR$ = V9$ : PRINT
 @807,V9$; : GOTO 620
610 GOSUB 160 : GOSUB 340
620 GOSUB 350
630 FL = 0 : RETURN
640 V1$ = LEFT$(A$(I),2) : V2$ = MID$(A$(I),3,2) : V3$ = MID$(A$
(I),5,2) : V4$ = MID$(A$(I),7,4) : V5$ = MID$(A$(I),11,31) : V6$
 = MID$(A$(I),42,2) : V7$ = MID$(A$(I),44,3) : V8$ = MID$(A$(I),
47,8) : V9$ = MID$(A$(I),55,8) : RETURN
650 CHAIN "MODULE0/BAS",250,ALL


10 REM                          MODULE5/BAS
20 COMMON VV,A$(),LB(),F3$,F4$,F5$,W,SO$,Z0$,Z1$,Z2$,Z3$,Z4$,Z5$
,Z6$,Z7$,PA,LN,AD,AD$,DT$,RF$,DE$,PR$,DB$,CR$,P
30 GOTO 230
40 AD$ = ""
50 FOR T = 1 TO LN
60 GOSUB 130 : IF IN$ = CHR$(13) THEN 110 ELSE IF IN$ = CHR$(8)
THEN 90 ELSE IF IN$ = CHR$(32) THEN GOSUB 150
70 AD$ = AD$ + IN$ : PRINT @PA,AD$; : NEXT : RETURN
80 NEXT : RETURN
90 IF T < = 1 THEN 60 ELSE T = T - 1
100 AD$ = LEFT$(AD$, LEN(AD$) - 1) : PRINT @PA,AD$;"**"; : GOTO
60
110 IF FL = 0 THEN BL$ = STRING$ (LN - LEN(AD$)," ") : AD$ = AD$
 + BL$ : PRINT @PA,AD$; : RETURN
120 BL$ = STRING$ (LN - LEN(AD$),"0") : AD$ = AD$ + BL$ : PRINT
@PA,AD$; : RETURN
```

```
130 IN$ = "" : IN$ = INKEY$ : GOSUB 140 : IF IN$ = "" THEN 130 E
LSE RETURN
140 PRINT @PA,AD$;CHR$(143);: RETURN
150 IF FL = 0 THEN RETURN
160 IN$ = "0" : RETURN
170 T = 1
180 IF T > 5 THEN AD$ = "    0" : RETURN
190 IF MID$(AD$,T,1) = "0" THEN T = T + 1 : GOTO 180
200 AD$ = STRING$ (T - 1,32) + RIGHT$(AD$,6 - T) : RETURN
210 CLS : PRINT @0,"***              Household Accounting   Ver
5.0  for the Model 4             ***"; : PRINT @80,"***        (
C)  1st November 1983      M i c r o - 8 0   P t y  L t d
 ***";
220 PRINT @160, CHR$(31); : RETURN
230 X1$ = "SAVE TO" : GOSUB 310
240 GOSUB 330
250 IF SF = 2 THEN 360
260 GOSUB 340
270 GOSUB 350 : IF AD$ = "E" THEN 230
280 IF SF = 1 THEN OPEN "O",1,NM$
290 IF SF = 1 THEN PRINT #1,W : FOR I = 1 TO W : PRINT #1,A$(I)
: NEXT : CLOSE
300 GOTO 230
310 GOSUB 220 : PRINT @190,"DATA "; LEFT$(X1$,4);"
320 PRINT:PRINT"                              1 = ";X1$;" DISK":PRINT
:PRINT"                          2 = EXIT TO MENU" : RETURN
330 PRINT @832,Z3$; : PA = 848 : LN = 1 : GOSUB 40 : SF = VAL(AD
$) : IF SF < 1 OR SF > 3 THEN 330 ELSE RETURN
340 FL = 0 : GOSUB 220 : PRINT @428,"ENTER FILENAME ********"; :
 PA = 443 : LN = 8 : GOSUB 40 : NM$ = AD$ : RETURN
350 PRINT @492,"PRESS ANY KEY WHEN DEVICE READY OR (E)SCAPE   *"
; : PA = 538 : LN = 1 : GOSUB 40 : RETURN
360 CHAIN "MODULE0/BAS",250,ALL


10 REM                      MODULE6/BAS
20 GOTO 220
30 AD$ = ""
40 FOR T = 1 TO LN
50 GOSUB 120 : IF IN$ = CHR$(13) THEN 100 ELSE IF IN$ = CHR$(8)
THEN 80 ELSE IF IN$ = CHR$(32) THEN GOSUB 140
60 AD$ = AD$ + IN$ : PRINT @PA,AD$; : NEXT : RETURN
70 NEXT : RETURN
80 IF T < = 1 THEN 50 ELSE T = T - 1
90 AD$ = LEFT$(AD$, LEN(AD$) - 1) : PRINT @PA,AD$;"**"; : GOTO 5
0
100 IF FL = 0 THEN BL$ = STRING$ (LN - LEN(AD$)," ") : AD$ = AD$
 + BL$ : PRINT @PA,AD$; : RETURN
110 BL$ = STRING$ (LN - LEN(AD$),"0") : AD$ = AD$ + BL$ : PRINT
@PA,AD$; : RETURN
120 IN$ = "" : IN$ = INKEY$ : GOSUB 130 : IF IN$ = "" THEN 120 E
LSE RETURN
130 PRINT @PA,AD$;CHR$(143);: RETURN
140 IF FL = 0 THEN RETURN
150 IN$ = "0" : RETURN
160 T = 1
170 IF T > 5 THEN AD$ = "    0" : RETURN
180 IF MID$(AD$,T,1) = "0" THEN T = T + 1 : GOTO 170
190 AD$ = STRING$ (T - 1,32) + RIGHT$(AD$,6 - T) : RETURN
```

```
200 CLS : PRINT @0,"***              Household Accounting   Ver
5.0  for the Model 4             ***"; : PRINT @80,"***        (
C)  1st November 1983      M i c r o - 8 0   P t y  L t d
 ***";
210 PRINT @160, CHR$(31); : RETURN
220 COMMON VV,A$(),LB(),F3$,F4$,F5$,W,SO$,Z0$,Z1$,Z2$,Z3$,Z4$,Z5
$,Z6$,Z7$,PA,LN,AD,AD$,DT$,RF$,DE$,PR$,DB$,CR$,P:GOTO 260
230 PRINT @320,Z7$;"     REF    DETAILS                          A
CC NO      ";Z6$;"       ";Z5$
240 IF P THEN LPRINT Z7$;"     REF    DETAILS
     ACC NO      ";Z6$;"       ";Z5$
250 RETURN
260 GOSUB 200 : PRINT @190,Z4$;"s Available":PRINT:PRINT"1 = Pri
nt Ledger Balances              :  4 = GJ General ";Z4$:PRINT"2 =
 CP Cash Payments ";Z4$;"           :  5 = SJ Sales ";Z4$:PRINT"3
 = CR Cash Received ";Z4$"          :";
270 PRINT"  6 = Return To Main Menu"
280 PRINT @832,Z3$; : PA = 848 : LN = 1 : GOSUB 30 : AD = VAL(AD
$)
290 IF AD < 1 OR AD > 6 THEN 280
300 ON AD GOTO 560,310,320,330,340,530
310 PT$ = "CASH PAYMENTS" : KA$ = "CP" : GOTO 350
320 PT$ = "CASH RECEIVED" : KA$ = "CR" : GOTO 350
330 PT$ = "GENERAL" : KA$ = "GJ" : GOTO 350
340 PT$ = "SALES" : KA$ = "SJ"
350 GOSUB 360 : GOSUB 390 : GOTO 410
360 PRINT @832,"IS THE PRINTER REQUIRED (Y/N) *"; : PA = 862 : L
N = 1 : GOSUB 30
370 IF AD$ < > "N" AND AD$ < > "Y" THEN 360
380 P = (AD$ = "Y") : RETURN
390 ZK$ = "" : PRINT @896,"WHICH ";Z7$;" DO YOU REQUIRE **/**/**
"; : FL = 1 : PA = 922 : LN = 2 : GOSUB 30 : E$ = AD$ : IF E$ =
"00" THEN E$ = "'S" : ZK$ = "ALL " : GOTO 410
400 PA = 925 : GOSUB 30 : E$ = E$ + AD$ : PA = 928 : GOSUB 30 :
E$ = E$ + AD$ : RETURN
410 GOSUB 210 : PRINT : PRINT PT$;" ";Z4$;" FOR ";ZK$;"(";Z7$;")
";E$ : IF P THEN LPRINT : LPRINT PT$;" ";Z4$;" FOR ";ZK$;"(";Z7$
;")";E$
420 DT# = 0 : CT# = 0 : BL# = 0 : GOSUB 230
430 FOR I = 1 TO W
440 IF MID$(A$(I),42,2) < > KA$ THEN 490
450 IF E$ = "'S" THEN 470
460 IF E$ < > LEFT$(A$(I),6) THEN 490
470 GOSUB 540 : GOSUB 550 : PRINT VX$ : IF P THEN LPRINT VX$
480 DR# = VAL( MID$(A$(I),47,8)) : CR# = VAL( MID$(A$(I),55,8))
: DT# = DT# + DR# : CT# = CT# + CR# : BL# = BL# + DR# - CR#
490 NEXT
500 PRINT : PRINT Z0$; TAB(36); : PRINT USING F3$;DT#;CT# : PRIN
T "BALANCE "; : PRINT USING F4$;BL#
510 IF P THEN LPRINT : LPRINT Z0$; TAB(36); : LPRINT USING F3$;D
T#;CT# : LPRINT "BALANCE "; : LPRINT USING F4$;BL#
520 PRINT @960,"PRINTOUT COMPLETE - ";SO$; : PA = 1006 : LN = 1
: GOSUB 30 : GOTO 260
530 CHAIN "MODULE0/BAS",250,ALL
540 V1$ = LEFT$(A$(I),2) : V2$ = MID$(A$(I),3,2) : V3$ = MID$(A$
(I),5,2) : V4$ = MID$(A$(I),7,4) : V5$ = MID$(A$(I),11,31) : V6$
 = MID$(A$(I),42,2) : V7$ = MID$(A$(I),44,3) : V8$ = MID$(A$(I),
47,8) : V9$ = MID$(A$(I),55,8) : RETURN
550 VX$ = V1$ + "/" + V2$ + "/" + V3$ + " " + V4$ + "  " + V5$ +
 "  " + V6$ + V7$ + "   " + V8$ + "    " + V9$ : RETURN
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560 GOSUB 200 : GOSUB 360 : GOSUB 200 : GOSUB 710 : PRINT @463,"
* * *  W A I T  * * *" : FOR I = 1 TO W - 1 : GOSUB 540 : LB(I)
= VAL( RIGHT$(V7$,3)) : NEXT I : J = 0 : DT# = 0 : CT# = 0 : BL#
 = 0
570 GOSUB 210 : PRINT : PRINT "ACC NO."; TAB(16);Z6$;"S"; TAB(34
);Z5$;"S"; TAB(55);Z0$
580 IF P THEN LPRINT : LPRINT "ACC NO."; TAB(16);Z6$;"S"; TAB(34
);Z5$;"S"; TAB(55);Z0$
590 TT# = 0 : DR# = 0 : CR# = 0 : J = J + 1
600 VF = LB(J) : FOR I = 1 TO W : IF LB(I) = VF AND LB(I) < > 0
THEN GOSUB 700
610 NEXT I : LB(J) = 0 : IF J = W THEN 670 ELSE 620
620 IF VF = 0 THEN 590
630 TT# = DR# - CR# : DT# = DT# + DR# : CT# = CT# + CR# : BL# =
BL# + TT#
640 PRINT "  "; MID$(A$(J),44,3); : PRINT USING F5$;DR#;CR#;TT#
650 IF P THEN LPRINT "  "; MID$(A$(J),44,3); : LPRINT USING F5$;
DR#;CR#;TT#
660 GOTO 590
670 PRINT : PRINT Z0$; : PRINT USING F5$;DT#;CT#;BL#
680 IF P THEN LPRINT : LPRINT Z0$; : LPRINT USING F5$;DT#;CT#;BL
#
690 PRINT @1840,SO$; : PA = 1866 : LN = 1 : GOSUB 30 : GOTO 530
700 GOSUB 540 : DR# = DR# + VAL(V8$) : CR# = CR# + VAL(V9$) : LB
(I) = 0 : RETURN
710 PRINT @463,"* * *  SORTING  * * *" : FOR SC = 1 TO W - 1 : F
OR SA = 1 TO W - 1
720 SA$ = MID$(A$(SA),28,3)
730 SB$ = MID$(A$(SA + 1),28,3) : IF SB$ = "" THEN GOTO 740 ELSE
 IF SA$ > SB$ THEN SB$ = A$(SA) : A$(SA) = A$(SA + 1) : A$(SA +
1) = SB$
740 NEXT SA : NEXT SC : RETURN
```

```
10 REM                          MODULE7/BAS
20 ON ERROR GOTO 100
30 GOTO 50
40 PRINT @160, CHR$(31); : RETURN
50 COMMON VV,A$(),LB(),F3$,F4$,F5$,W,SO$,Z0$,Z1$,Z2$,Z3$,Z4$,Z5$
,Z6$,Z7$,PA,LN,AD,AD$,DT$,RF$,DE$,PR$,DB$,CR$,P
60 GOSUB 40 : PRINT @190,"LINEPRINTER UTILITY":PRINT:PRINT"TYPE
HEADINGS OR NOTES AS REQUIRED":PRINT:PRINT"TYPE "; CHR$(34);"EXI
T"; CHR$(34);" TO RETURN TO MAIN MENU":PRINT CHR$(14)
70 M$ = "" : INPUT M$ : IF M$ = "EXIT" THEN PRINT CHR$(15):GOTO
90
80 PRINT M$ : LPRINT M$ : GOTO 70
90 CHAIN "MODULE0/BAS",250,ALL
100 IF ERR = 57 THEN PRINT"Device I/O error":PRINT"PLEASE CONNEC
T PRINTER OR TYPE EXIT":PRINT:RESUME 70
```

```
10 REM                          MODULE8/BAS
20 GOTO 220
30 AD$ = ""
40 FOR T = 1 TO LN
50 GOSUB 120 : IF IN$ = CHR$(13) THEN 100 ELSE IF IN$ = CHR$(8)
THEN 80 ELSE IF IN$ = CHR$(32) THEN GOSUB 140
60 AD$ = AD$ + IN$ : PRINT @PA,AD$; : NEXT : RETURN
70 NEXT : RETURN
80 IF T < = 1 THEN 50 ELSE T = T - 1
90 AD$ = LEFT$(AD$, LEN(AD$) - 1) : PRINT @PA,AD$;"**"; : GOTO 5
0
100 IF FL = 0 THEN BL$ = STRING$ (LN - LEN(AD$)," ") : AD$ = AD$
 + BL$ : PRINT @PA,AD$; : RETURN
110 BL$ = STRING$ (LN - LEN(AD$),"0") : AD$ = AD$ + BL$ : PRINT
@PA,AD$; : RETURN
120 IN$ = "" : IN$ = INKEY$ : GOSUB 130 : IF IN$ = "" THEN 120 E
LSE RETURN
130 PRINT @PA,AD$;CHR$(143);: RETURN
140 IF FL = 0 THEN RETURN
150 IN$ = "0" : RETURN
160 T = 1
170 IF T > 5 THEN AD$ = "    0" : RETURN
180 IF MID$(AD$,T,1) = "0" THEN T = T + 1 : GOTO 170
190 AD$ = STRING$ (T - 1,32) + RIGHT$(AD$,6 - T) : RETURN
200 CLS : PRINT @0,"***              Household Accounting   Ver
5.0  for the Model 4              ***"; : PRINT @80,"***        (
C)  1st November 1983      M i c r o - 8 0   P t y  L t d
 ***";
210 PRINT @160, CHR$(31); : RETURN
220 COMMON VV,A$(),LB(),F3$,F4$,F5$,W,SO$,Z0$,Z1$,Z2$,Z3$,Z4$,Z5
$,Z6$,Z7$,PA,LN,AD,AD$,DT$,RF$,DE$,PR$,DB$,CR$,P:GOTO 290
230 PRINT @320,Z7$;"     REF   DETAILS                          A
CC NO     ";Z6$;"      ";Z5$
240 IF P THEN LPRINT Z7$;"     REF   DETAILS
     ACC NO     ";Z6$;"      ";Z5$
250 RETURN
260 PRINT @832,"IS THE PRINTER REQUIRED (Y/N) *"; : PA = 862 : L
N = 1 : GOSUB 30
270 IF AD$ < > "N" AND AD$ < > "Y" THEN 260
280 P = (AD$ = "Y") : RETURN
290 GOSUB 210 : PRINT @190,"Ledger ";Z2$;"s":PRINT:PRINT"Type ";
 CHR$(34);"999"; CHR$(34);" To Exit"
300 GOSUB 260
310 PRINT @960,"Which ";Z2$;" No. Do You Require ***"; : PA = 99
3 : LN = 3 : FL = 1 : GOSUB 30 : N = VAL(AD$)
320 IF N < 1 OR N > 999 THEN 310
330 BL# = 0 : DT# = 0 : CT# = 0 : IF N = 999 THEN 480
340 GOSUB 200 : PRINT : PRINT Z2$;" NO. ";AD$; : IF P THEN LPRIN
T : LPRINT Z2$;" NO. ";AD$
350 GOSUB 230 : FOR I = 1 TO W
360 IF N < > VAL( MID$(A$(I),28,3)) THEN 390
370 GOSUB 460 : GOSUB 470 : PRINT VX$ : IF P THEN LPRINT VX$
380 DR# = VAL( MID$(A$(I),47,8)) : CR# = VAL( MID$(A$(I),55,8))
: DT# = DT# + DR# : CT# = CT# + CR# : BL# = BL# + DR# - CR#
390 NEXT
400 PRINT : PRINT Z0$; TAB(36); : PRINT USING F3$;DT#;CT#
410 IF P THEN LPRINT : LPRINT Z0$; TAB(36); : LPRINT USING F3$;D
T#;CT#
420 PRINT Z2$;" BALANCE"; : PRINT USING F4$;BL#
430 IF P THEN LPRINT Z2$;" BALANCE"; : LPRINT USING F4$;BL#
440 PRINT : PRINT : IF P THEN LPRINT " " : LPRINT " "
450 GOTO 310
460 V1$ = LEFT$(A$(I),2) : V2$ = MID$(A$(I),3,2) : V3$ = MID$(A$
(I),5,2) : V4$ = MID$(A$(I),7,4) : V5$ = MID$(A$(I),11,31) : V6$
 = MID$(A$(I),42,2) : V7$ = MID$(A$(I),44,3) : V8$ = MID$(A$(I),
47,8) : V9$ = MID$(A$(I),55,8) : RETURN
470 VX$ = V1$ + "/" + V2$ + "/" + V3$ + " " + V4$ + "  " + V5$ +
 "  " + V6$ + V7$ + "    " + V8$ + "     " + V9$ : RETURN
480 CHAIN "MODULE0/BAS",250,ALL
```

```
00010 *************************
00020 *     WRITER 1.1          *
00030 *(C) 1983 G.D. WILLIAMSON*
00040 *************************
00050 *
00060 *
00070 *This program is in two parts
00080 *
00090 *This is the loader
00100 *
00110 *
00120 SCRST   EQU     $BA       Basic's pointer to screen start
00130 ENDBAS  EQU     $1B       End of Basic program pointer
00140         ORG     0
00150 START   LDX     <ENDBAS   Get end of Basic pointer
00160         TFR     X,U       Keep it in U
00170         LEAX    $4CD,X    Length of our program
00180         STX     <ENDBAS   Redirect end of program pointer
00190         LEAX    BEGIN,PCR       Point to start of program
00200         LDY     #$4CD     Counter
00210 LOOP    LDA     ,X+       Get byte
00220         STA     ,U+       Reposition it
00230         LEAY    -1,Y      Counter down
00240         BNE     LOOP      ?Go again
00250         LDA     #$39      RTS code
00260         STA     START,PCR       Do not allow to be exec'd again
00270         RTS               Back to Basic
00280 *
00290 *
00300 *This is the entry point for USR0
00310 *
00320 *
00330 BEGIN   PSHS    CC,X      Save them
00340         ORCC    #$50      Disable interrupts
00350         TST     <FLAG,PCR       ?already set
00360         BNE     BACK1     If set, exit
00370         INC     <FLAG,PCR       If not, set it
00380         LDX     $168      Get Basic's return address
00390         STX     1+RET1,PCR      And save it
00400         LEAX    <CHROUT,PCR     Point to our routine
00410 BACK    STX     $168      Direct Basic to our patch
00420 BACK1   ANDCC   #$AF      Enable interrupts
00430         PULS    X,CC,PC Back to Basic
00440 *
00450 *
00460 *This is the entry point for USR1
00470 *
00480 *
00490         PSHS    X,CC      Save them
00500         ORCC    #$50      Disable interrupts
00510         TST     <FLAG,PCR       ? set
00520         BEQ     BACK1     Back if so
00530         CLR     <FLAG,PCR       If not, clear it
00540 RET1    LDX     #$1111    Dummy address - see line 390
00550         BRA     BACK      Reset RAM hook for Basic
00560 *
00570 *
00580 *Start of our main routine
00590 *
00600 *
00610 CHROUT  PSHS    U,D,X,Y,CC      Save all
00620         CMPA    #8        ?Backspace
00630         BNE     CRTRNG    If not look for more controls
00640         LDA     #$20      ASCII for space
00650         BSR     DSPLY     Go show it
00660         LEAX    -1,X      Back one pos
00670         BSR     SHOW      Rub out charac
00680         BRA     STOP      Exit
00690 CRTRNG  CMPA    #$20      ?Control charac
00700         BLO     STOP      Exit if so
00710         CMPA    #$7F      ?Graphics charac
00720         BHI     STOP      Exit if so
00730         BSR     DSPLY     Go show it
00740         BSR     SHOW
00750         BRA     STOP      Exit
```

```
00760 DSPLY   PSHS    A         Save charac
00770         LDD     <$88      Basic's cursor pos
00780         PSHS    B         Save LSB
00790         LSRA              MSB of A into carry bit
00800         RORB              And into MSBit of B
00810         LSRB              Shift into lower nybble
00820         LSRB
00830         LSRB
00840         LSRB
00850         LDA     #$0C      12 bytes/charac
00860         MUL               Modify position
00870         LDA     #$20      32 bytes/row
00880         MUL               Get row position
00890         TFR     D,X       Swap for later
00900         PULS    B         Retrieve it
00910         ANDB    #$1F      Clear bits 5-7
00920         ABX               Get column position
00930         LDD     <SCRST    Get screen start
00940         LEAX    D,X       Get position on screen
00950         PULS    A         Retrieve charac
00960         RTS
00970 SHOW    SUBA    #$20      Adjust for table
00980         LDB     #$0C      12 bytes/charac
00990         MUL               So modify
01000         LEAU    TABLE,PCR       Point to start of table
01010         LEAU    D,U       Point to charac
01020         LDB     #$0C      12 bytes/charac
01030 DSPLY1  LDA     ,U+       Get byte from table
01040         STA     ,X        Display it
01050         LEAX    $20,X     Down one row
01060         DECB              Counter down
01070         BNE     DSPLY1    ?Get more
01080         RTS               Back to sender
01090 STOP    PULS    U,D,X,Y,CC,PC   Back to Basic
01100 *
01110 *
01120 FLAG    FCB     0         Store to show which USR routine is invoked
01130 *
01140 *
01150 *Start of character table
01160 TABLE   FCB     0         SPACE
01170         FCB     0
01180         FCB     0
01190         FCB     0
01200         FCB     0
01210         FCB     0
01220         FCB     0
01230         FCB     0
01240         FCB     0
01250         FCB     0
01260         FCB     0
01270         FCB     0
01280         FCB     0         !
01290         FCB     8
01300         FCB     8
01310         FCB     8
01320         FCB     8
01330         FCB     8
01340         FCB     8
01350         FCB     8
01360         FCB     0
01370         FCB     8
01380         FCB     0
01390         FCB     0
01400         FCB     0         "
01410         FCB     $24
01420         FCB     $24
01430         FCB     0
01440         FCB     0
01450         FCB     0
01460         FCB     0
01470         FCB     0
01480         FCB     0
01490         FCB     0
01500         FCB     0
```

```
12040           FCB     $7E
12050           FCB     0
12060           FCB     0
12070           FCB     0
12080           FCB     0
12090           FCB     0
12100           FCB     0
12110           END     START
```

```
3000: 9E1B 1F13 3089 04CD 9F1B 308D 0012 108E
3010: 04CD A680 A7C0 313F 26F8 8639 A78C E139
3020: 3411 1A50 6D8C 7F26 106C 8C7A BE01 68AF
3030: 8D00 1730 8C18 BF01 681C AF35 9134 111A
3040: 506D 8C62 27F3 6F8C 5D8E 1111 20E8 3477
3050: 8108 260A 8620 8D14 301F 8D30 2046 8120
3060: 2542 817F 223E 8D04 8D22 2038 3402 DC88
3070: 3404 4456 5454 5454 860C 3D86 203D 1F01
3080: 3504 C41F 3ADC BA30 8B35 0239 8020 C60C
3090: 3D33 8D00 1233 CBC6 0CA6 C0A7 8430 8820
30A0: 5A26 F639 35F7 0000 0000 0000 0000 0000
30B0: 0000 0000 0808 0808 0808 0800 0800 0000
30C0: 2424 0000 0000 0000 0000 0000 0024 247E
30D0: 2424 7E24 2400 0008 3E49 281C 0A09 493E
30E0: 0800 0000 7051 7204 0810 2745 0700 000C
30F0: 1212 0C18 2542 4639 0000 0000 1810 0000
3100: 0000 0000 0000 0000 0008 1010 1010 1010 1008
3110: 0000 0008 0404 0404 0404 0408 0000 0000
3120: 0000 4122 147F 1422 4100 0000 0000 0008
3130: 087F 0808 0800 0000 0000 0000 0000 0018
3140: 1808 1000 0000 0000 7F00 0000 0000 0000
3150: 0000 0000 0000 1818 0000 0001 0102 0408
3160: 1020 4040 0000 003E 4143 4549 5161 413E
3170: 0000 0008 1808 0808 0808 083E 0000 003E
3180: 4101 0204 0810 207F 0000 003E 4101 010E
3190: 0101 413E 0000 0002 060A 1222 7F02 0202
31A0: 0000 007F 4040 407E 0101 413E 0000 003E
31B0: 4140 407E 4141 413E 0000 007F 0101 0204
31C0: 0810 2020 0000 003E 4141 413E 4141 413E
31D0: 0000 003E 4141 413F 0101 413E 0000 0000
31E0: 0000 0018 1800 1818 0000 0000 0000 0018
31F0: 1800 1818 0810 0000 0204 0810 2010 0804
3200: 0200 0000 0000 007F 007F 0000 0000 0000
3210: 2010 0804 0204 0810 2000 003E 4101 0204
3220: 0808 0008 0000 003E 4140 404E 5151 493E
3230: 0000 0008 1422 417F 4141 4141 0000 007E
3240: 2121 213E 2121 217E 0000 003E 4140 4040
3250: 4040 413E 0000 007E 2121 2121 2121 217E
3260: 0000 007F 4040 407E 4040 407F 0000 007F
3270: 4040 407E 4040 4040 0000 007F 4040 4341
3280: 4141 417F 0000 0041 4141 417F 4141 4141
3290: 0000 001C 0808 0808 0808 081C 0000 0004
32A0: 0404 0404 0404 441C 0000 0041 4244 4870
32B0: 4844 4241 0000 0040 4040 4040 4040 407F
32C0: 0000 0041 6355 4941 4141 4141 0000 0041
32D0: 4161 5149 4543 4141 0000 003E 4141 4141
32E0: 4141 413E 0000 007E 4141 417E 4040 4040
32F0: 0000 003E 4141 4141 4945 423D 0000 007E
3300: 4141 417E 4844 4241 0000 003E 4140 403E
3310: 0101 413E 0000 007F 0808 0808 0808 0808
3320: 0000 0041 4141 4141 4141 413E 0000 0041
3330: 4141 4141 4122 1408 0000 0041 4141 4141
3340: 4955 6341 0000 0041 4122 1408 1422 4141
3350: 0000 0041 4141 2214 0808 0808 0000 007F
3360: 0102 0408 1020 407F 0000 003C 2020 2020
3370: 2020 203C 0000 0040 4020 1008 0402 0101
3380: 0000 003C 0404 0404 0404 043C 0000 0000
3390: 1C2A 4908 0808 0808 0800 0000 0008 1020
33A0: 7F20 1008 0000 0000 0000 0000 0000 0000
33B0: 0000 0000 0000 3C02 3E42 423C 0000 0040
33C0: 4040 7C42 4242 427C 0000 0000 0000 3C42
33D0: 4040 423C 0000 0002 0202 3E42 4242 423E
33E0: 0000 0000 0000 7C44 7C40 407C 0000 000A
33F0: 0808 081E 0808 0808 0000 0000 0000 3C42
3400: 4242 423E 0242 3C40 4040 7C42 4242 4242
3410: 0000 0000 1000 3010 1010 107C 0000 0000
3420: 0002 0006 0202 0202 0242 3C40 4044 4870
3430: 4844 4242 0000 0010 1010 1010 1010 1010
3440: 0000 0000 0000 7749 4941 4141 0000 0000
3450: 0000 5C62 4242 4242 0000 0000 0000 3C42
3460: 4242 423C 0000 0000 0000 7C42 4242 427C
3470: 4040 4000 0000 3C42 4242 423E 0202 0300
3480: 0000 4C52 6040 4040 0000 0000 0000 3E40
3490: 3C02 027C 0000 0008 0808 3E08 0808 0A04
34A0: 0000 0000 0000 4242 4242 463A 0000 0000
34B0: 0000 4242 4242 2418 0000 0000 0000 4141
34C0: 4149 4977 0000 0000 0000 4224 1818 2442
34D0: 0000 0000 0000 4242 4242 423E 0242 3C00
34E0: 0000 7E02 0418 207E 0000 0000 0000
```

****** TRACK RACER ******

HITACHI PEACH

```
10 REM TRACK RACER BY D.C. KELLY,20 RUTH
 ST. CORINDA,BRISBANE,4075
20 WIDTH40:INPUT"DO YOU WANT DIRECTIONS
(Y/N)";DR$:IFDR$="Y"THEN220
30 RANDOMIZE(PEEK(&HFFE0)*255+PEEK(&HFFE
0)):Z=20:B$=CHR$(254):D$=CHR$(94):S$=CHR
$(92):TIME$="00:00:00":SCREEN 0:WIDTH40
40 FORY=0TO24
```

```
50 PRINTTAB(15)B$;:PRINTTAB(25)B$
60 NEXT
70 X1=INT(RND*9+1)+15
80 PRINTTAB(15)B$;:PRINTTAB(X1)D$;:PRINT
TAB(25)B$
90 X=POS(0):Y=CSRLIN
100 LOCATEZ,11:PRINT" "
110 K$=INKEY$:IFK$=""THEN140
120 IFASC(K$)=28THENZ=Z+1
130 IFASC(K$)=29THENZ=Z-1
140 IF SCREEN(Z,12)<>32THEN 180
150 LOCATEZ,12:PRINTS$:LOCATE0,0:PRINTTI
ME
160 LOCATEX,Y
170 GOTO70
180 LOCATE0,0:BEEP(1):PRINT"CRASHED  INS
=PLAY AGAIN  DEL=FINISH":PRINT"TIME=";TI
ME
190 K$=INKEY$:IFK$=""THEN190ELSEIFASC(K$
)=18THENCLS:RUN
200 IF ASC(K$)=8THENCLS:END
210 GOTO190
220 PRINTTAB(14)"TRACK RACER":PRINT"The
object is to steer a car (";CHR$(92);")
for as long as possible,without       hi
tting any obstacles,or going off the  tr
ack.You control it with the left and  ri
ght arrows of the cursor control keys.":
FORI=1TO9000
230 NEXTI:GOTO30
```

****** L2/16K AUSTRALIA'S CUP (AUSCUP/DAT) ******

TRS-80/SYSTEM-80

```
1 REM            ***************
                 * AUSCUP/DAT  *
                 ***************
2 CLS:CLEAR3000:DEFINTT:DIMA$(13):REM
DELETE THIS LINE BEFORE TYPING IN THE REST OF THE PROGRAM!!
1350 AC$="123456789 123456789 123456789 123456789 123456789 1234
56789 123456789 123456789 12345"
1360 T$(1)="123456789 123456789 123456789 123456789 123"
1370 T$(2)="123456789 123456789 123456789 123456789 123"
1380 T$(3)="123456789 123456789 123456789 123456789 123"
1390 SR$="123456789 123456789 123456789 123456789 123456789 1234
56789 123456789 123456789 "
1400 RR$="123456789 123456789 123456789 123456789 123456789 1234
56789 123456789 123456789 "
1410 CS$="123456789 123456789 123456789 123456789 123456789 1234
56789 123456789 123456789 "
1420 SL$="123456789 123456789 123456789 123456789 123456789 1234
56789 123456789 123456789 "
1430 RL$="123456789 123456789 123456789 123456789 123456789 1234
56789 123456789 123456789 "
1440 A$(1)="123456789 123456789 123456789 123456789 123456789 "
1450 A$(2)="123456789 123456789 123456789 123456789 123456789 "
1460 A$(3)="123456789 123456789 123456789 123456789 123456789 "
1470 A$(4)="123456789 123456789 123456789 123456789 123456789 "
1480 A$(5)="123456789 123456789 123456789 123456789 123456789 "
1490 A$(6)="123456789 123456789 123456789 123456789 123456789 "
1500 A$(7)="123456789 123456789 123456789 123456789 123456789 "
1510 A$(8)="123456789 123456789 123456789 123456789 123456789 "
1520 A$(9)="123456789 123456789 123456789 123456789 123456789 "
1530 A$(10)="123456789 123456789 123456789 123456789 123456789 "
1540 A$(11)="123456789 123456789 123456789 123456789 123456789 "
1550 A$(12)="123456789 123456789 123456789 123456789 123456789 "
1560 A$(13)="123456789 123456789 123456789 123456789 123456789 "
5000 PRINTCHR$(23);
5010 AC=PEEK(VARPTR(AC$)+2)*256+PEEK(VARPTR(AC$)+1):FORT=0TO84:G
OSUB5390:POKEAC+T,X:NEXT
5020 DATA160,191,191,191,143,191,191,191,144,26,24,24,24,24,24,2
4,24,24,24,165,138,191,149,179,170,191,133,154,26,24,24,24,24,24
,24,24,24,24,32,131,139,191,191,191,135,131,32,26,24,24,24,24,24
,24,24,24,24,32,32,32,162,191,145,32,32,32
5030 DATA26,24,24,24,24,24,24,24,24,24,32,131,131,131,131,131,13
1,131,32
5040 T1=PEEK(VARPTR(T$(1))+2)*256+PEEK(VARPTR(T$(1))+1):FORT=0TO
42:GOSUB5390:POKET1+T,X:NEXT
5050 T2=PEEK(VARPTR(T$(2))+2)*256+PEEK(VARPTR(T$(2))+1):FORT=0TO
42:GOSUB5390:POKET2+T,X:NEXT:T3=PEEK(VARPTR(T$(3))+2)*256+PEEK(V
ARPTR(T$(3))+1):FORT=0TO42:GOSUB5390:POKET3+T,X:NEXT
5060 DATA152,137,144,149,32,149,150,131,132,131,151,129,151,131,
148,152,137,144,149,32,32,131,151,129,152,137,144,134,129,150,13
1,132,32,32,168,131,137,170,32,170,170,131,169
5070 DATA151,131,149,149,32,149,146,131,148,32,149,32,151,167,32
,151,131,149,149,32,32,32,149,32,151,131,149,32,32,146,131,148,3
2,32,170,32,160,170,32,170,170,131,129
5080 DATA129,32,129,130,131,32,130,131,32,32,129,32,129,32,129,1
29,32,129,131,131,129,131,131,129,129,32,129,32,32,130,131,32,32
,32,32,131,129,32,131,129,130,32,32
5090 SR=PEEK(VARPTR(SR$)+2)*256+PEEK(VARPTR(SR$)+1):FORT=0TO79:G
OSUB5390:POKESR+T,X:NEXT
5100 DATA32,32,32,160,190,170,168,144,32,32,32,26,24,24,24,24,24
,24,24,24,24,24,24,32,32,184,191,191,170,170,191,180,32,32,26,24
,24,24,24,24,24,24,24,24,24,32,178,179,179,179,186,178,179,17
9,177,32,26,24,24,24,24,24,24,24,24,24,24,24
5110 DATA32,32,131,131,131,131,131,131,131,32,32
5120 RR=PEEK(VARPTR(RR$)+2)*256+PEEK(VARPTR(RR$)+1):FORT=0TO79:G
OSUB5390:POKERR+T,X:NEXT
5130 DATA32,32,32,32,160,190,144,32,32,32,32,26,24,24,24,24,24,2
4,24,24,24,24,24,32,32,32,32,190,191,189,32,32,32,32,26,24,24,24
,24,24,24,24,24,24,24,24,32,32,32,178,179,187,179,177,32,32,32,2
6,24,24,24,24,24,24,24,24,24,24,24
5140 DATA32,32,32,130,131,131,131,129,32,32,32
```

```
5150 CS=PEEK(VARPTR(CS$)+2)*256+PEEK(VARPTR(CS$)+1):FORT=0TO79:G
OSUB5390:POKECS+T,X:NEXT
5160 DATA32,32,32,32,32,170,32,32,32,32,32,26,24,24,24,24,24,24,
24,24,24,24,24,32,32,32,32,32,170,32,32,32,32,32,26,24,24,24,24,
24,24,24,24,24,24,24,32,32,32,32,160,186,176,32,32,32,32,26,24,2
4,24,24,24,24,24,24,24,24,24
5170 DATA32,32,32,32,32,131,129,32,32,32,32
5180 SL=PEEK(VARPTR(SL$)+2)*256+PEEK(VARPTR(SL$)+1):FORT=0TO79:G
OSUB5390:POKESL+T,X:NEXT
5190 DATA32,32,32,184,170,170,180,32,32,32,32,26,24,24,24,24,24,
24,24,24,24,24,24,32,160,190,191,170,170,191,189,144,32,32,26,24
,24,24,24,24,24,24,24,24,24,24,160,179,179,179,186,178,179,179,1
79,144,32,26,24,24,24,24,24,24,24,24,24,24,24
5200 DATA32,130,131,131,131,131,131,131,129,32,32
5210 RL=PEEK(VARPTR(RL$)+2)*256+PEEK(VARPTR(RL$)+1):FORT=0TO79:G
OSUB5390:POKERL+T,X:NEXT
5220 DATA32,32,32,32,32,186,180,32,32,32,32,26,24,24,24,24,24,24
,24,24,24,24,24,32,32,32,32,168,191,191,148,32,32,32,26,24,24,24
,24,24,24,24,24,24,24,24,24,32,32,32,160,179,187,179,179,144,32,32,
26,24,24,24,24,24,24,24,24,24,24
5230 DATA32,32,32,32,131,131,131,131,32,32,32
5240 FORG=1TO13:AA=PEEK(VARPTR(A$(G))+2)*256+PEEK(VARPTR(A$(G))+
1):FORT=0TO49:GOSUB5390:POKEAA+T,X:NEXTT:NEXTG
5250 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,3
2,32,32,32,32,32,32,32,32,32,160,176,176,176,32,32,32,32,32,32,32,32,1
60,148,32,32,32,32,32,32,32,32,32,32,32
5260 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,3
2,32,32,176,176,32,160,190,191,191,191,191,191,191,32,32,32,32,32,3
2,160,191,191,180,144,32,32,32,32,32,32,32,32
5270 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,160,144
,176,188,191,191,191,183,191,191,78,84,191,191,191,191,189,156,1
76,176,160,186,191,191,191,191,191,144,32,32,32,32,32,32,32
5280 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,176,176,188,191,
191,191,191,191,191,157,191,191,191,191,191,191,191,191,191,191,
149,191,191,191,191,191,191,191,191,191,191,188,144,32,32,32,32,32
5290 DATA32,32,32,32,32,32,32,32,32,184,188,191,191,191,191,191,
191,191,191,191,191,191,191,191,183,191,191,191,191,191,191,191,191,191,
191,149,191,191,191,191,81,76,68,191,191,191,191,188,180,144,32,
32
5300 DATA32,32,32,32,32,32,32,32,189,191,191,191,191,191,191,191
,191,191,191,191,191,191,191,191,157,159,159,159,159,159,159,159,159
,159,149,159,159,191,191,191,191,191,191,191,191,191,191,191,191,189
,176,32
5310 DATA32,32,32,32,32,32,32,136,178,191,191,191,191,87,65,191,
191,191,191,191,191,191,191,191,183,191,191,191,83,65,191,191,191,19
1,191,191,157,159,159,159,159,159,159,159,159,159,159,159,159,15
9,191
5320 DATA32,32,32,32,32,32,32,32,130,175,191,191,191,191,191,191
,191,191,191,191,191,191,191,191,157,191,191,191,191,191,191,191,191,191
,191,191,191,183,191,191,191,191,191,191,78,83,87,191,191,191,19
1,151
5330 DATA32,32,32,32,32,32,32,32,32,32,130,175,191,191,191,191,1
91,191,191,191,143,143,135,131,131,32,32,130,131,131,143,191,135
,187,191,157,187,187,187,187,159,159,159,191,191,191,191,191,135
,32
5340 DATA32,32,32,32,32,32,32,32,32,32,32,32,138,191,191,159,143,13
1,129,32,32,32,32,32,32,32,32,32,32,32,32,32,32,130,130,129,157,
191,191,191,86,73,67,191,189,189,143,131,129,32,32
5350 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,3
2,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,131,131,191
,143,175,191,191,143,135,32,32,32,32,32
5360 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,3
2,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,13
8,188,188,132,84,65,83,32,32,32,32
5370 DATA32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,3
2,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32
,131,129,32,32,32,32,32,32,32,32
5380 DELETE5000-5430
5390 READX
5400 V=V+1:IFV<10THENPRINT@410,"         ";:RETURN
5410 IFV>=10ANDV<=20THENPRINT@410,"Standby!";
5420 IFV>20THENV=0
5430 RETURN



      **** L2/16K   AUSTRALIA'S CUP  (AUSCUP/LST) ****


10 OUT254,0:CLEAR400:DIMA$(13):GOSUB1010:CLS:PRINTTAB(15)"T h e
  A u s t r a l i a ' s   C u p":PRINTSTRING$(64,140)
20 MS$="How many are playing ?":PP=192:SL=1:GOSUB920:IFVAL(QQ$)<
1ORVAL(QQ$)>6THEN20
30 NP=VAL(QQ$):CLS:PRINT"Player's names are now required.":PRINT
STRING$(64,140):PP=192:FORZ=1TONP:MS$="Player "+STR$(Z)+", pleas
e enter name ?":SL=10:GOSUB920:PN$(Z)=QQ$:PP=PP+64:NEXTZ
40 CLS:PRINT"Please place bets ! (Max: $100)":PRINTSTRING$(64,14
0):GOSUB1580:PRINT"Defending yacht is ";DF$;" at ";DO$:PRINT"Cha
llenging yacht is ";CH$;" at ";CO$:PRINT
50 PP=384:FORZ=1TONP:MS$=PN$(Z)+", please make your bet ?":SL=3:
GOSUB920:PB(Z)=VAL(QQ$):GOSUB1810:PP=PP+64:NEXTZ
60 PRINT@384,CHR$(31);
70 PP=384:FORZ=1TONP:MS$=PN$(Z)+", who do you bet on, C or D ?":
SL=1:GOSUB920:IFQQ$="C"ORQQ$="c"ORQQ$="D"ORQQ$="D"THENPB$(Z)=QQ$
:PP=PP+64:NEXTZELSEZ=Z-1:NEXTZ
80 PRINT@832,"The challenging yacht comes from ";CN$;CHR$(31);
90 PRINT@979,"Press any key for the first race!";:FORT=1TO5000
100 IFPEEK(15359)=0THENNEXT:RUN
110 RN=0
120 RANDOM:DS=259:CS=579:DD=1:CD=1:CL=0:DL=0:CT=0:DT=0:MN=0:SE=0
130 RN=RN+1
140 OUT254,116:CLS:PRINT@0,"Race ";RN;" - Between ";DF$;" and ";
CH$
150 PRINT@266,SR$;:PRINT@266+89,DF$;:PRINT@586,SR$;:PRINT@586+89
,CH$;:FORG=1TO800:NEXTG:PRINT@64,CHR$(31);:FORT=1TO50:PRINT@RND(
896)+64,".";:NEXT
160 PRINT@DS,SR$;:PRINT@CS,SR$;
170 ONRND(2)GOSUB370,380
180 IFCL=5THEN530ELSEIFDL=5THEN630
```

```
190 IFCT>DTTHENPRINT@0,"The Challenger ";CHR$(34);CH$;CHR$(34);"
 leads.";CHR$(30);
200 IFDT>CTTHENPRINT@0,"The Defender ";CHR$(34);DF$;CHR$(34);" l
eads.";CHR$(30);
210 GOTO170
220 GOTO220
230 IFDS>=305THEN250ELSEDS=DS+DD
240 PRINT@DS,SR$;:RETURN
250 DC=DC+1:IFDC=1THENPRINT@DS,RR$;:RETURN
260 IFDC=2THENPRINT@DS,CS$;:RETURN
270 IFDC=3THENPRINT@DS,RL$;:RETURN
280 IFDC=4THENDC=0:PRINT@DS,SL$;:DD=-1:DL=DL+1
290 RETURN
300 IFDS<=260THEN320ELSEDS=DS+DD
310 PRINT@DS,SL$;:RETURN
320 DC=DC+1:IFDC=1THENPRINT@DS,RL$;:RETURN
330 IFDC=2THENPRINT@DS,CS$;:RETURN
340 IFDC=3THENPRINT@DS,RR$;:RETURN
350 IFDC=4THENDC=0:PRINT@DS,SR$;:DD=1:DL=DL+1
360 RETURN
370 DT=DT+1:IFDD=1THEN230ELSE300
380 CT=CT+1:IFCD=1THEN390ELSE460
390 IFCS>=625THEN410ELSECS=CS+CD
400 PRINT@CS,SR$;:RETURN
410 CC=CC+1:IFCC=1THENPRINT@CS,RR$;:RETURN
420 IFCC=2THENPRINT@CS,CS$;:RETURN
430 IFCC=3THENPRINT@CS,RL$;:RETURN
440 IFCC=4THENCC=0:PRINT@CS,SL$;:CD=-1:CL=CL+1
450 RETURN
460 IFCS<=580THEN480ELSECS=CS+CD
470 PRINT@CS,SL$;:RETURN
480 CC=CC+1:IFCC=1THENPRINT@CS,RL$;:RETURN
490 IFCC=2THENPRINT@CS,CS$;:RETURN
500 IFCC=3THENPRINT@CS,RR$;:RETURN
510 IFCC=4THENCC=0:PRINT@CS,SR$;:CD=1:CL=CL+1
520 RETURN
530 FORG=1TO600:NEXTG:CLS:OUT254,0:PRINT"The Challenging ship ";
CH$;" from ";CN$;" has won!"
540 PRINT:PRINT
550 CT=(CT-DT)*6:MN=INT(CT/60):SE=CT-(MN*60)
560 PRINT"The Challenger won by ";MN;" minutes & ";SE;" seconds.
"
570 PRINT
580 CW=CW+1:IFCW>=4THEN740
590 PRINT"The tally so far is:":PRINT"--------------------"
600 PRINT"Challenger has won ";CW
610 PRINT"Defender has won ";DW
620 PRINT:PRINT:INPUT"Press <ENTER> to start the next race";ZZ$:
GOTO120
630 FORG=1TO600:NEXTG:CLS:OUT254,0:PRINT"The Defending ship ";DF
$;" won!!!"
640 PRINT:PRINT"Australia will be celebrating !!"
650 PRINT:PRINT
660 DT=(DT-CT)*6:MN=INT(DT/60):SE=DT-(MN*60)
670 PRINT"The Defender won by ";MN;" minutes & ";SE;" seconds."
680 PRINT
690 DW=DW+1:IFDW>=4THEN750
700 PRINT"The tally so far is:":PRINT"--------------------"
710 PRINT"Defender has won ";DW
720 PRINT"Challenger has won ";CW
730 PRINT:PRINT:INPUT"Press <ENTER> to start the next race";ZZ$:
GOTO120
740 FORG=1TO800:NEXTG:WI$=CH$:GOTO760
750 FORG=1TO800:NEXTG:WI$=DF$
760 CLS:PRINT"The Australia's cup has come to an end !!"
770 PRINT:PRINT"The winning yacht was ";WI$;" from ";
780 IFWI$=DF$THENPRINT"Australia !"ELSEPRINTCN$
790 PRINT
800 IFWI$=DF$THENPRINT"Australia has defended the cup yet again
!!"ELSEPRINTCN$;" has won the cup from Australia !!"
810 PRINT@512,"                ";AC$:PRINT@512+30+64,"";
820 IFWI$=DF$THENPRINT"<-- Australia's Cup";ELSEPRINT"<-- ";CN$;
"'s Cup";
830 PRINT@896,"";:INPUT"Press <ENTER> to see betting results";ZZ
$
840 IFWI$=DF$THENX$="D":XX$="d":XV=DVELSEX$="C":XX$="c":XV=CV
850 FORZ=1TONP:IFPB$(Z)=X$ORPB$(Z)=XX$THENPB(Z)=PB(Z)*XV:Z$(Z)="
won"ELSEPB(Z)=0:Z$(Z)="lost"
860 NEXTZ
870 CLS:PRINT"The betting results for all players are below.":PR
INTSTRING$(64,140);
880 FORZ=1TONP:PRINTPN$(Z);" has ";Z$(Z);
890 IFPB(Z)=0THENPRINT" !"ELSEPRINT" ";PB(Z)
900 NEXTZ:PRINTSTRING$(64,140)
910 MS$="Press <ENTER> for another Australia's Cup":PP=960:SL=1:
GOSUB920:RUN
920 QQ$="":PRINT@PP,MS$;" ";
930 FORT=1TOSL:PRINTCHR$(95);:NEXT:FORT=1TOSL:PRINTCHR$(24);:NEX
T
940 AS$=INKEY$
950 IFAS$=""THEN940
960 IFAS$=CHR$(8)ANDLEN(QQ$)=0THEN940
970 QQ$=QQ$+AS$:IFAS$=CHR$(13)THENQQ$=LEFT$(QQ$,LEN(QQ$)-1):RETU
RN
980 PRINTAS$;:IFAS$=CHR$(8)THENQQ$=LEFT$(QQ$,LEN(QQ$)-2):PRINTCH
R$(95);CHR$(24);:GOTO940
990 IFLEN(QQ$)=SLTHENRETURN
1000 GOTO940
1010 GOTO1350
1020 CLS:FORT=1TO3:PRINT"           ";T$(T):NEXT:FORT=1TO12:PRINT
"    ";A$(T):NEXT:PRINT"        "A$(13);
1030 PRINT@769,"You     -->";:PRINT@833,"are";:PRINT@896,"here!";
1040 FORH=1TO25
1050 PRINT@780,"X";
1060 FORG=1TO90:NEXTG
1070 PRINT@780," ";
1080 FORG=1TO90:NEXTG
1090 IFINKEY$=""THENNEXT:GOTO1880ELSE1100
1100 CLS:MS$="Do you require instructions ?":PP=512:SL=1:GOSUB92
0:IFQQ$="N"ORQQ$="n"THENRETURN
```

```
1110 CLS:PRINT"  W e l c o m e  t o  t h e  ";CHR$(34);" A U S T
 R A L I A ' S  C U P ";CHR$(34):PRINTSTRING$(64,140);
1120 PRINT"On the 26th of September 1983, the America's Cup was
lost by theAmerican yacht 'Liberty' to the Australian yacht 'Aus
tralia II'"
1130 PRINT"This day will go down in history because a 132 year w
inning     streak finally came to an end. The people of Australi
a rejoiced in Australia II's triumph and celebrated the win for
many days  (and nights) after the glorious event."
1140 PRINT"The America's cup (affectionately known as The Auld M
ug) was    transported to Australia and to the Royal Perth Yacht
 Club whereit was gazed upon in wonder by all."
1150 PRINT"The Auld Mug's previous home had been the New York Ya
cht Club   which was renowned for its sly and devious tactics us
ed to stop the cup from leaving their shores.":PRINTSTRING$(64,1
40);
1160 PRINT@979,"Press any key to continue";
1170 IFPEEK(15359)=0THEN1170
1180 CLS:PRINT"              T h e   A U S T R A L I A ' S   C U
P"
1190 PRINTSTRING$(64,140);
1200 PRINT"The New York Yacht Club could not defeat Australia II
 neither   on shore or off and had to surrender the cup to syndi
cate head  Alan Bond and the Australian crew."
1210 PRINT"Australia II owed much of its success to the controve
rsial       'Winged Keel' as well as its sturdy management."
1220 PRINT"The Australian Yacht earned a good reputation as well
 as a few  nicknames - One of these being 'The wonder from Down
Under'."
1230 PRINT:PRINT"It is now some time after that glorious day and
 you must defend the Australia's Cup. Australia II will not be c
ompeting as it isnow in a museum, stuffed, along with other spor
ting greats such as Dennis Lillee & Robert de Castella."
1240 PRINTSTRING$(64,140);:PRINT@979,"Press any key to continue"
;
1250 IFPEEK(15359)=0THEN1250
1260 CLS:PRINT"              T h e   A U S T R A L I A ' S   C U
P":PRINTSTRING$(64,140);
1270 PRINT"The challengers for this years cup were from the Unit
ed States, England and New Zealand. The Australian trials have a
lready beenheld to decide the defender and the challengers have
all        competed to decide the challenger."
1280 PRINT"The Australias Cup will be awarded to the yacht that
wins the   best of seven races to be held in the forthcoming wee
k."
1290 PRINTSTRING$(64,140);
1300 PRINT"Up to 6 people can bet on the outcome of the seven ra
ces. The   names of the Challenging and Defending yachts will be
 displayed along with the odds for each."
1310 PRINT:PRINT"Australia's Cup (C) 10/83 by Carl Cranstone. Al
l Rights Reserved";
1320 PRINT@979,"Press any key to start.";
1330 IFPEEK(15359)=0THEN1330
1340 RETURN
1350 '*****************************************************
1360 '*                                                   *
1370 '*                                                   *
1380 '*                                                   *
1390 '*                                                   *
1400 '* THESE LINES WILL CONTAIN THE GRAPHIC STRINGS      *
1410 '*                                                   *
1420 '*                                                   *
1430 '*                                                   *
1440 '*                                                   *
1450 '*                                                   *
1460 '*                                                   *
1470 '*                                                   *
1480 '*                                                   *
1490 '*                                                   *
1500 '*                                                   *
1510 '*                                                   *
1520 '*                                                   *
1530 '*                                                   *
1540 '*                                                   *
1550 '*                                                   *
1560 '*****************************************************
1570 GOTO1020
1580 RESTORE:FORT=1TO1000:READS$:IFS$<>"AUSSIE"THENNEXTT
1590 FORT=1TORND(10):READS$:NEXT:DF$=S$:FORT=1TO1000:READS$:IFS$
<>"THEM"THENNEXTT
1600 U=RND(30):FORT=1TOU:READS$:NEXT:CH$=S$
1610 IFU<=10THENCN$="America"
1620 IFU>10ANDU<=20THENCN$="England"
1630 IFU>20ANDU<=30THENCN$="New Zealand"
1640 X=RND(7):ONXGOTO1650,1660,1670,1680,1690,1700,1710
1650 DO$="2/1":DV=2:GOTO1720
1660 DO$="5/1":DV=5:GOTO1720
1670 DO$="10/1":DV=10:GOTO1720
1680 DO$="20/1":DV=20:GOTO1720
1690 DO$="40/1":DV=40:GOTO1720
1700 DO$="50/1":DV=50:GOTO1720
1710 DO$="100/1":DV=100:GOTO1720
1720 X=RND(7):ONXGOTO1730,1740,1750,1760,1770,1780,1790
1730 CO$="2/1":CV=2:GOTO1800
1740 CO$="5/1":CV=5:GOTO1800
1750 CO$="10/1":CV=10:GOTO1800
1760 CO$="20/1":CV=20:GOTO1800
1770 CO$="40/1":CV=40:GOTO1800
1780 CO$="50/1":CV=50:GOTO1800
1790 CO$="100/1":CV=100:GOTO1800
1800 RETURN
1810 IFPB(Z)>=0ANDPB(Z)<=100THENRETURN
1820 PP=PP-64:PRINT@960,"Sorry ";PN$(Z);", but you're bet is ill
egal!!";:PRINT@PP+64,CHR$(30);:PB(Z)=0:Z=Z-1:RETURN
1830 RETURN
1840 DATA"AUSSIE",Australia III,Down Under,Kangaroo I,Kangaroo I
I,Koala I,Emu II,Aussie Crawl,Kookaburra I,Advance II,Wallaby I
1850 DATA"THEM",Yankee I,Yankee II,Liberty,Stars n' Stripes,Newp
ort,Yankee Doodle,Boston Strangler,Lost Angeles,Apple Pie,Titani
c I
```

```
1860 DATAUnion Jack,Royal I,Britannia II,Victorious,Unsinkable,B
odyline '32,Victory '83,Britain I,Britain II,England III
1870 DATAKiwi I,Kiwi II,Auckland I,Wellington II,New Zealand I,I
ntrepid II,Restless Native,N.Z. Challenge,KeelHaul,Deadly Weopon
1880 OUT254,116:DS=259:CS=579:DD=1:CD=1:CLS:PRINT@0," Australi
a's Cup (c) 1983 by Carl Cranstone ** Demo Mode **":PRINTSTRING$
(64,131);
1890 DE$="
        ** Australia's Cup **  -  ** Press <ENTER> to start **
  -  ** For up to six players **
                                "
1900 FORT=1TO50:PRINT@RND(832)+128,".";:NEXT
1910 X=RND(2):ONXGOSUB370,380
1920 IFPEEK(15359)<>0THENRUN
1930 ZZ=ZZ+1:IFZZ>=LEN(DE$)THENZZ=0ELSEPRINT@960,MID$(DE$,ZZ,62)
;:GOTO1910
1940 V=V+1:IFV=2THENRUNELSE1910
```

****** L2/16K AUSTRALIA'S CUP (AUSCUP/LNW) ******

```
10 MODE2:OUT254,116:PCLS5:FLS
20 COLOR4:LINE0,0,159,11,SET,BF
30 COLOR2:LINE0,48,159,79,SET,BF
40 COLOR1:LINE0,80,159,88,SET,BF
50 COLOR6:LINE0,104,159,139,SET,BF
60 COLOR3:LINE0,140,159,147,SET,BF
70 COLOR7:LINE128,0,159,191,SET,BF
80 GOTO80
90 REM PSAVE"AUSCUP/GRF"
```

****** 32K/DISK GRAFX INIT PROGRAM ******

TRS-80/SYSTEM-80

```
10 CLS:CLEAR3000:OPEN"O",1,"BIGLTRS"
20 FORX=1TO 414:READY:PRINT#1,Y;:NEXT:CLOSE:END
30 DATA 152, 137, 144, 157, 140, 149, 129, 32, 129, 151, 131, 14
8, 151, 131, 148, 131, 131, 32, 150, 131, 132, 149, 32, 144, 130
, 131, 32, 151, 131, 148, 149, 32, 149, 131, 131, 32, 151, 131,
129, 151, 131, 32, 131, 131, 129
40 DATA 151, 131, 129, 151, 129, 32, 129, 32, 32, 150, 131, 132,
 149, 136, 148, 130, 131, 32, 149, 32, 149, 151, 131, 149, 129,
32, 129, 130, 151, 32, 32, 149, 32, 130, 131, 32, 130, 131, 149,
 144, 32, 149, 130, 131, 32, 149
50 DATA 152, 129, 151, 164, 32, 129, 32, 129, 149, 32, 32, 149,
32, 32, 131, 131, 129, 157, 152, 149, 149, 32, 149, 129, 32, 129
, 181, 32, 149, 149, 137, 149, 129, 32, 129, 150, 131, 148, 149,
 32, 149, 130, 131, 32, 151, 131
60 DATA 148, 151, 131, 32, 129, 32, 32, 150, 131, 148, 149, 164,
 149, 130, 131, 129, 151, 131, 148, 151, 167, 32, 129, 32, 129,
150, 131, 132, 146, 131, 148, 130, 131, 128, 131, 151, 129, 32,
149, 32, 32, 129, 32, 149, 32
70 DATA 149, 149, 32, 149, 130, 131, 32, 149, 32, 149, 165, 160,
 133, 32, 129, 32, 149, 32, 149, 149, 148, 149, 131, 131, 129, 1
65, 160, 133, 152, 137, 144, 129, 32, 129, 149, 32, 149, 130, 15
0, 32, 32, 129, 32, 131, 163
80 DATA 133, 152, 129, 32, 131, 131, 129, 32, 32, 32, 32, 32, 32
, 32, 32, 32, 134, 163, 132, 32, 133, 32, 32, 32, 129, 32, 32, 149,
32, 32, 133, 32, 32, 129, 32, 32, 32, 32, 32, 32, 32, 32, 32, 131, 3
2, 32, 32, 32, 32, 140, 32, 32
90 DATA 131, 32, 32, 32, 32, 32, 140, 32, 32, 139, 32, 32, 32, 3
2, 32, 32, 32, 32, 139, 32, 136, 149, 32, 32, 149, 32, 130, 131,
 32, 134, 131, 148, 152, 131, 32, 131, 131, 129, 134, 131, 148,
144, 131, 148, 130, 131, 32, 160
100 DATA 174, 32, 141, 174, 132, 32, 130, 32, 183, 179, 129, 144
, 32, 149, 130, 131, 32, 152, 131, 129, 151, 131, 148, 130, 131,
 32, 131, 163, 133, 32, 149, 32, 32, 129, 32, 150, 131, 148, 150
, 131, 148, 130, 131, 32, 150
110 DATA 131, 148, 130, 163, 133, 131, 129, 32, 150, 163, 148, 1
57, 129, 149, 130, 131, 32, 184, 184, 144, 174, 174, 132, 128, 1
28, 128, 164, 181, 132, 155, 159, 145, 128, 129, 128, 156, 157,
132, 179, 183, 149, 128, 129, 32
```

****** 32K/DISK GRAFX ******

```
10 CLS:CLEAR2000:READL:DIML(L),T$(L)
20 FORX=1TOL:READL(X):NEXT:FORX=1TOL:FORY=1TOL(X):READC:T$(X)=T$
(X)+CHR$(C):NEXTY,X
30 FORX=1TOL:PRINT@(X-1)*64,T$(X);:NEXT
40 DATA3,19,19,19
50 DATA150,131,132,32,151,131,148,32,152,137,144,32,151,131,129,
32,165,160,133,149,136,148,32,151,167,32,32,157,140,149,32,151,1
29,32,32,152,137,144,130,131,32,32,129,32,129,32
60 DATA129,32,129,32,129,32,32,32,129,32,129
70 PRINT@192,STRING$(64,131):PRINT@108,"Bob Wilson Software";
80 PRINT@256,CHR$(31)"One moment please":CMD"F",DELETE 10-70
90 CLEAR50:CLEARMEM-8500:DEFINTA-Z:DEFSTRW,P:GOTO210
100 A$=INKEY$:IFA$=""THEN100ELSERETURN
110 CP=FIX(Y/3)*64+FIX(X/2)+15360:RETURN
120 SET(X,Y):FORZ=1TO8:A=PEEK(14400):B=PEEK(14368):IFA=0ANDB=0TH
ENNEXTZ:RESET(X,Y):FORZ=1TO8:A=PEEK(14400):B=PEEK(14368):IFA=0AN
DB=0THENNEXTZ:GOSUB190:IFA=0THEN120ELSERETURN
130 IFM=0THENSET(X,Y)ELSERESET(X,Y)
140 GOSUB150:GOTO120
150 IFAAND8THENY=Y+(Y>0)*1:RETURN
160 IFAAND16THENY=Y-(Y<44)*1:RETURN
170 IF(AAND32)OR(BAND16)THENX=X+(X>0)*1:RETURN
180 IF(AAND64)OR(BAND64)THENX=X-(X<127)*1:RETURN
190 A$=INKEY$:IFA$=""THENA$=" "
200 A=INSTR("CDETX",A$):IFATHENRETURNELSEA=INSTR("cdetx",A$):RET
URN
210 W1=CHR$(31):W3="[
"+CHR$(08)+CHR$(09)+",.":W2=W1+"GRAFX MODE : %      % : use ARRO
WS or < > ESC CTRL"
220 X$="ABCDEFGHIJKLMNOPQRSTUVWXYZ ?!.:;,1234567890#*$":X1$="abc
defghijklmnopqrstuvwxyz":DIMT$(LEN(X$),3),SS%(3360),G$(25),P(25)
,U(15)
```

```
230 OPEN"I",1,"BIGLIRS":PRINT"Initializing HUGE letters":FORX=1T
OLEN(X$):FORY=1TO3:FORZ=1TO3:INPUT#1,C:T$(X,Y)=T$(X,Y)+CHR$(C):N
EXTZ::NEXTY,X:CLOSE
240 FORX=0TO15:READU(X):NEXT:J=0:CLS:S$="S":FORSN%=1TO7:GOSUB790
:NEXT
250 PRINT@960,"<C>lear  <G>rafx  <H>uge  <S>ave  <R>ecall  <P>ro
gram  <E>nd";:GOSUB100
260 S=INSTR("CGHPSRE",A$):IFSTHENONSGOSUB300,310,470,620,770,780
,830
270 S=INSTR("cghpsre",A$):ONSGOSUB300,310,470,620,770,780,830
280 GOTO250
290 ONAGOTO320,360,370,380,250
300 CLS:RETURN
310 X=0:Y=0
320 PRINT@960,USINGW2;"CURSOR";
330 GOSUB110:CH=PEEK(CP)
340 POKECP,32:SET(X,Y):FORZ=1TO8:A=PEEK(14400):B=PEEK(14368):IFA
=0ANDB=0THENNEXTZ:POKECP,CH:FORZ=1TO8:A=PEEK(14400):B=PEEK(14368
):IFA=0ANDB=0THENNEXTZ:GOSUB190:IFA=0THEN340ELSE290
350 POKECP,CH:GOSUB150:GOTO330
360 PRINT@960,USINGW2;"DRAW";:M=0:GOSUB120:SET(X,Y):GOTO290
370 PRINT@960,USINGW2;"ERASE";:M=1:GOSUB120:GOTO290
380 PRINT@960,W1"TEXT Mode :  <ENTER> to Exit";:GOSUB110
390 CH=PEEK(CP):POKECP,140:FORZ=1TO10:A$=INKEY$:IFA$=""THENNEXT:
POKECP,CH:FORZ=1TO10:A$=INKEY$:IFA$=""THENNEXT:GOTO390
400 POKECP,CH:ONINSTR(W3,A$)GOTO430,440,450,460,450,460
410 IFA$=CHR$(13)THEN420ELSEPOKECP,ASC(A$):CP=CP+1:GOTO390
420 XY=CP-15360:Y=FIX(XY/64)*3+1:X=2*(XY-INT(XY/64)*64):GOTO320
430 CP=CP+(CP>15423)*64:GOTO390
440 CP=CP-(CP<16256)*64:GOTO390
450 CP=CP+(CP>15360)*1:GOTO390
460 CP=CP-(CP<16319)*1:GOTO390
470 L=0:GOTO580
480 GOSUB600:PRINT@Q+64,"XXX";:GOSUB100:S=INSTR(X$,A$):IFSTHEN55
0
490 S=INSTR(X1$,A$):IFSTHEN550
500 S=INSTR(CHR$(13)+CHR$(08)+CHR$(24)+CHR$(91),A$):IFS=0THEN480
ELSEGOSUB590:ONSGOTO510,520,590,530
510 L=INT((L+16)/16)*16-1:GOTO560
520 L=L+(L>0)*1:GOTO540
530 L=L+(L>15)*16
540 S=27:GOSUB600:GOSUB610:GOTO480
550 GOSUB610
560 L=L+1:IFL<80THEN480
570 DEFUSR=VARPTR(U(0)):J=USR(0):PRINT@768,W1:L=L-16
580 PRINT@960,W1"SHIFT/BACKSPACE to Exit";:GOTO480
590 PRINT@Q+64,"    ";:RETURN
600 Q=INT(L/16)*192+(L-INT(L/16)*16)*4:RETURN
610 FORY=1TO3:PRINT@Q+(Y-1)*64,T$(S,Y);:NEXT:RETURN
620 TL=0:C=15360:PRINT@960,W1"Enter 1 letter to identify program
";
630 A$=INKEY$:IFA$=""THEN630ELSES=ASC(A$):IFS<65ORS>90THEN630
640 F$="TITLE"+A$+"/GFX":PRINT@960,W1"LOCATING END OF DATA";:FOR
X=16319TOCSTEP-1
650 PRINT@988,X-C;:IF(PEEK(X)<>32ANDPEEK(X)<>128)THEN660ELSENEXT
X:PRINT@896,W1"Screen is empty : TRY AGAIN";:FORD=1TO500:NEXT:GO
TO250
660 B=X-C:L=INT(B/64):R=B-L*64:IFR=0THENR=64ELSEL=L+1
670 G=5:P(1)="1 CLS:CLEAR2000:READL:DIML(L),T$(L)"
680 P(2)="2 FORX=1TOL:READL(X):NEXT:FORX=1TOL:FORY=1TOL(X):READC
:T$(X)=T$(X)+CHR$(C):NEXTY,X"
690 P(3)="3 FORX=1TOL:PRINT@(X-1)*64,T$(X);:NEXTX":P(4)="4 DATA"
+STR$(L):P(5)="5 DATA"
700 FORX=1TOL:SB=C+(X-1)*64:G$(X)="":POKEVARPTR(G$(X))+2,INT(SB/
256):POKEVARPTR(G$(X))+1,SB-INT(SB/256)*256:POKEVARPTR(G$(X)),64
:NEXT
710 PRINT@960,W1"Writing program";:FORX=1TOL:PRINT@976,W1;X;:FOR
Y=64TO2STEP-1:PRINT@980,Y;:V$=MID$(G$(X),Y,1):IFV$=CHR$(32)THENN
EXTY
720 POKEVARPTR(G$(X)),Y:P(4)=P(4)+","+STR$(Y):FORZ=1TOY:TL=TL+1:
PRINT@984,USING"###";TL;:P(G)=P(G)+STR$(ASC(MID$(G$(X),Z,1)))+",
":IFLEN(P(G))>220THENGOSUB760:G=G+1:P(G)=STR$(G)+" DATA"
730 NEXTZ,X:GOSUB760:K=G:G=3:GOSUB760:S$="S":SN%=7:GOSUB790
740 CLS:PRINT@256,"PROGRAM COMPLETE:
Program is       : "K"lines Numbered 1 TO"K"
Graphics data    : "TL"elements
Filespec         :  "F$
750 PRINT"
DUMPING PROGRAM :":OPEN"O",1,F$:FORX=1TOK:PRINT#1,P(X):NEXT:CLOS
E:PRINT@960,"Hit any key";:GOSUB100:SN%=7:S$="R":GOSUB790:GOTO25
0
760 P(G)=LEFT$(P(G),LEN(P(G))-1):RETURN
770 PRINT@960,W1"Save as screen # <1-6>";:GOSUB100:SN%=INSTR("12
3456",A$):IFSN%THENS$="S":GOTO790ELSE770
780 PRINT@960,W1"Recall screen # <1-6>";:GOSUB100:SN%=INSTR("123
456",A$):IFSN%THENS$="R"ELSE780
790 DEFUSR=VARPTR(U(8)):IFS$="S"THENU(9)=15360:U(11)=VARPTR(SS%(
(SN%-1)*480))ELSEU(9)=VARPTR(SS%((SN%-1)*480)):U(11)=15360
800 J=USR(0):RETURN
810 DATA8448,15552,4352,15360,256,768,-20243,201
820 DATA8448,0,4352,0,256,960,-20243,201
830 CLS:CMD"DIR 0":END
```

```
                **** L2/16K   LVAR UTILITY ****

                        TRS-80/SYSTEM-80

00001 ;         **LVAR=NAME**
00002 ;
00003 ;         BY TIM FISH
00004 ;         9 CAVENDISH RD
00005 ;         COLLIERS WOOD
00006 ;         LONDON SW19 2ET
00007 ;         ENGLAND
00008 ;
```

```
00009 ;
00100          ORG     7E41H
00102 INIT     LD      A,0C3H  ;C3=JP OP
00104          LD      (418EH),A       ;ADRRESS OF "NAME" DOS EXI
T
00106          LD      HL,START
00108          LD      (418FH),HL
00110          JP      1A33H
00120 START    LD      BC,(40F9H)      ;START OF VLT
00122 NEXT     LD      A,(COUNT)
00124          CP      0
00126          JR      NZ,NOT15
00128 AGN      CALL    2BH
00130          OR      A
00132          JR      Z,AGN
00134          LD      A,15
00136 NOT15    DEC     A
00138          LD      (COUNT),A
00140          PUSH    BC
00142          POP     HL
00180          LD      DE,(40FBH)      ;END OF VLT+1
00200          SBC     HL,DE   ;TEST FOR END
00220          JR      Z,OUT
00240          INC     BC
00260          INC     BC
00280          LD      A,0DH   ;LINE FEED
00300          CALL    33H
00320          LD      A,(BC)
00340          CALL    33H
00360          DEC     BC
00380          LD      A,(BC)
00400          CALL    33H
00420          DEC     BC      ;POINT TO CODE LENGTH
00440          LD      A,(BC)
00460          LD      (40AFH),A
00480          CP      2       ;INTEGER?
00500          JR      NZ,NOTINT
00520 INT      LD      A,'%'
00540          CALL    33H
00560          LD      A,'='
00580          CALL    33H
00600          INC     BC
00620          INC     BC
00640          INC     BC
00660          LD      A,(BC)  ;VALUE MSB
00680          LD      (4121H),A       ;WRA1
00700          INC     BC
00720          LD      A,(BC)
00740          LD      (4122H),A
00760          LD      HL,(4121H)
00780          BIT     7,H     ;TEST FOR NEG VALUE
00800          JR      Z,POS
00820          LD      DE,0
00840          EX      DE,HL
00860          XOR     A       ;CLEAR CARRY
00880          SBC     HL,DE   ;TWOS COMPLIMENT IT
00900          LD      A,'-'
00920          CALL    33H
00940 POS      PUSH    BC
00960          CALL    0FAFH
00980          POP     BC
01000          INC     BC
01020 STEP     JR      NEXT
01040 OUT      HALT
01060 NOTINT   CP      04      ;SINGLE PRECISION?
01080          JR      NZ,NOTSNG
01100          LD      A,'='
01120          CALL    33H
01140          INC     BC
01160          INC     BC
01180          INC     BC      ;POINT  TO VALUE
01200          LD      D,4
01220          LD      HL,4121H
01240 LOOP1    LD      A,(BC)
01260          LD      (HL),A
01280          INC     HL
01300          INC     BC
01320          DEC     D
01340          JR      NZ,LOOP1
01360          LD      A,0     ;NO PRINT USING
01380          PUSH    BC
01400          CALL    0FBEH   ;CONVERT TO ASCII & STORE
01420          CALL    28A7H   ;PRINT IT
01440          POP     BC
01460 HALFWY   JR      STEP
01480 NOTSNG   CP      8       ;STRING?
01500          JR      NZ,STRING
01520          LD      A,'#'   ;MUST BE DBL
01540          CALL    33H
01560          LD      A,'='
01580          CALL    33H
01600          INC     BC
01620          INC     BC
01640          INC     BC
01660          LD      D,8
01680          LD      HL,411DH
01700          JR      LOOP1
01720 STRING   CP      3
01740          JR      NZ,OUT
01760          LD      A,'$'
01780          CALL    33H
01800          LD      A,'='
01820          CALL    33H
01840          LD      A,'"'
01860          CALL    33H
01880          INC     BC
01900          INC     BC
01920          INC     BC
01940          LD      A,(BC)
01960          PUSH    AF
```

```
01980           INC     BC
02000           LD      A,(BC)  ;MSB STRING ADDRESS
02020           LD      L,A
02040           INC     BC
02060           LD      A,(BC)
02080           LD      H,A
02100           POP     AF
02120           CP      0
02140           JR      Z,SKIP  ;IF NULL STRING
02160           PUSH    BC
02180           LD      B,A
02200 LOOP2     LD      A,(HL)
02220           CALL    33H
02240           INC     HL
02260           DJNZ    LOOP2
02280           POP     BC
02300 SKIP      INC     BC
02320           LD      A,'"'
02340           CALL    33H
02360           JR      HALFWY
02380 COUNT     DEFB    15
02400           END     INIT


START   END   ENTRY
7E41    7F2C  7E41


7E41:  3E C3 32 8E 41 21 4F 7E 22 8F 41 C3 33 1A ED 4B
7E51:  F9 40 3A 2C 7F FE 00 20 08 CD 2B 00 B7 28 FA 3E
7E61:  0F 3D 32 2C 7F C5 E1 ED 5B FB 40 ED 52 28 4A 03
7E71:  03 3E 0D CD 33 00 0A CD 33 00 0B 0A CD 33 00 0B
7E81:  0A 32 AF 40 FE 02 20 32 3E 25 CD 33 00 3E 3D CD
7E91:  33 00 03 03 03 0A 32 21 41 03 0A 32 22 41 2A 21
7EA1:  41 CB 7C 28 0C 11 00 00 EB AF ED 52 3E 2D CD 33
7EB1:  00 C5 CD AF 0F C1 03 18 99 76 FE 04 20 20 3E 3D
7EC1:  CD 33 00 03 03 03 16 04 21 21 41 0A 77 23 03 15
7ED1:  20 F9 3E 00 C5 CD BE 0F CD A7 28 C1 18 D9 FE 08
7EE1:  20 14 3E 23 CD 33 00 3E 3D CD 33 00 03 03 03 16
7EF1:  08 21 1D 41 18 D5 FE 03 20 BF 3E 24 CD 33 00 3E
7F01:  3D CD 33 00 3E 22 CD 33 00 03 03 03 0A F5 03 0A
7F11:  6F 03 0A 67 F1 FE 00 28 0A C5 47 7E CD 33 00 23
7F21:  10 F9 C1 03 3E 22 CD 33 00 18 B1 0F
```

****** MODEL 3 SOURCE UTILITY ******

TRS-80

```
10  REM                 SOURCE/BAS
    EDTASM SOURCE-TAPE UTILITY FOR MODEL III NEWDOS80 V2.0
              (copyright  1982  T. Domigan)
```

```
20 POKE&H40B1,&H00:POKE&H40B2,&H80:POKE&H407F,PEEK(&H40A0)
30 CLS:CLEAR50:DEFINTA-Z:CP=&H4023:CC=PEEK(CP):POKECP,32
40 PRINT@72,"EDTASM ASSEMBLER SOURCE UTILITY FOR MODEL III"
50 PRINT TAB(19);"NEWDOS80 Version 2.0"
60 PRINTTAB(15);"( Copyright 1982 T. Domigan )":GOSUB470
70 DEFUSR0=&H404E:DEFUSR1=&H4070:BU=&H8000:MD=&H4056
80 POKE&H4024,&H01:POKE&H4210,&H28:POKE&H4214,&H04
90 H$=CHR$(244)+CHR$(245)+CHR$(246)+CHR$(32)
100 CLS:PRINT:PRINTTAB(29);"MENU"
110 PRINT:PRINT"                1. DISK FILE TO MEMORY BUFFER
                2. CASSETTE FILE TO MEMORY BUFFER
                3. MEMORY BUFFER TO CASSETTE FILE
                4. MEMORY BUFFER TO DISK FILE"
120 PRINT"                  5. CLEAR MEMORY BUFFER
                6. EXIT PROGRAM AND REPAIR BASIC"
130 GOSUB460
140 IF(EQ<1)OR(EQ>6)THENGOTO130ELSEIF(EQ<6)THEN170
150 POKE&H4214,&H00:POKECP,CC:POKE&H40B1,&HFF:POKE&H40B2,&HFF
160 POKE&H40A0,PEEK(&H407F):POKE&H40A1,&HFF:CLEAR:CLOSE:CLS:END
170 ONEQGOTO180,240,300,350,430
180 ME=BU:CLS:PRINT@398,"DISK  FILE  TO  MEMORY  ROUTINE"
190 PRINT@582,"Enter Filespec ( with Extension ) ==> ";
200 LINEINPUTFS$:OPEN"R",1,FS$,1:PRINT@720,"OPENING FILE ";H$;FS
$
210 FIELD1,1ASA$
220 FORI%=1TOLOF(1):GET1,I%:Y=ASC(A$):ME=ME+1:POKEME,Y:NEXTI%
230 CLOSE:PRINT@855,"END OF FILE":GOTO290
240 CLS:PRINT@398,"CASSETTE  FILE  TO  MEMORY  ROUTINE"
250 PRINT@590,"Press ENTER when cassette is ready":GOSUB460
260 POKEMD,150:POKEMD+2,205:POKEMD+3,53:POKEMD+4,2:POKEMD+5,119
270 X=USR0(P)
280 PRINT@845,"Cassette file has been READ to memory"
290 FORT=1TO1000:NEXTT:GOTO100
300 CLS:PRINT@398,"MEMORY  TO  CASSETTE  FILE  ROUTINE"
310 POKEMD,135:POKEMD+2,126:POKEMD+3,205:POKEMD+4,100:POKEMD+5,2
320 PRINT@590,"Press ENTER when cassette is ready":GOSUB460
330 X=USR0(P)
340 PRINT@847,"Cassette file has been WRITTEN":GOTO290
350 CLS:PRINT@398,"MEMORY  TO  DISK  FILE  ROUTINE"
360 PRINT@585,"Enter Filespec ( with Extension ) ==> ";
370 LINEINPUTFS$:OPEN"O",1,FS$:SM=BU:SO=BU+1
380 PRINT@722,"OPENING FILE ";H$;FS$
390 S1=PEEK(SM):S2=PEEK(SO):PRINT#1,CHR$(S2);
400 IF(S2<>26)THENGOTO420ELSEIF(S1=13)THENCLOSE
410 PRINT@855,"END OF FILE":GOTO290
420 SM=SM+1:SO=SO+1:GOTO390
430 CLS:PRINT@400,"CLEAR  BUFFER  ROUTINE"
440 Y=USR1(Q)
450 PRINT@721,"BUFFER IS NOW CLEAN":GOTO290
460 EQ$=INKEY$:IFEQ$=""THEN460ELSEEQ=VAL(EQ$):RETURN
470 FORDT=&H404ETO&H407E:READD:POKEDT,D:NEXTDT:RETURN
480 DATA205,66,48,33,1,128,243,205,0,2,0,0,0,0,35,254
490 DATA 26,32,247,43,43,126,254,13,40,4,35,35,24,236
500 DATA205,248,1,201,33,1,128,17,2,128,1,0,112
510 DATA62,0,119,237,176,201
```

NEXT MONTH'S ISSUE

Next month's issue will contain at least the following programs plus the usual features and articles. An (80) after a program title indicates that the program will be for TRS-80 Model 1/3 or System 80/Video Genie. A (CC) indicates that the program will be for the TRS-80 Colour Computer and (HP) that the program is for the Hitachi Peach.

CRICKET (CC)

Join in the Summer fun and play your own World Series Cricket on your COCO. Complete with batsmen, bowler and fielders. A game for two players.

ALIEN CHASE (HP)

Another "get them before they get you" game for Peach users. You pursue the Aliens around the screen and are in turn pursued by them.

AUTOMATIC DIRECTORY (80) — 32K DISK

Some of the newer DOS's have a facility to speed up file manipulation from the Directory. AUTOMATIC DIRECTORY gives you this facility from earlier DOS's. You may KILL, LOAD or LIST a file simply by placing the cursor against that file name on the DIRectory display and pressing the appropriate key. In addition, you may assign keys to particular files so you may load such a file with a single keystroke.

DISK DIRECTORY RECORDER (MODEL 3)

About the time you start on your second box of diskettes, you run into the problem of keeping track of all those files. It seems a shame to use pen and paper to do this when you have a perfectly good computer there. Disk Directory recorder stores a sorted catalogue of all files showing the name of each file, its extensions and the name of the disk on which it may be found. It is thus a simple matter to update your catalogue as you add and delete new files.

FILM COSTING (80) L2/16K

Whilst we do not expect too many of our readers are involved in processing large quantities of photographic film, this program which calculates processing costs does illustrate some interesting programming points and could probably be adopted to a variety of similar uses.

CASSETTE/DISK EDITION INDEX

The cassette edition of MICRO-80 contains all the applicable software listed each month, on cassette. For machine language programs copies of both the source and object file are provided. All programs are recorded twice. Level 1 programs can only be loaded into a Level 2 machine if the 'Level 1 in Level 2' program from the MICRO-80 Software Library — Vol. 1 is loaded first.

Note: *System 80/Video Genie computers have had different tape-counters fitted at different times. The approximate start positions shown are correct for the very early System 80 without the volume control or level meter. They are probably incorrect for later machines. The rates for a cassette subscription are printed on the inside front cover of each issue of the magazine.*

The disk edition contains all applicable programs which can be executed from disk. Level 1 disk programs are saved in NEWDOS format. Users require the Level 1/CMD utility supplied with NEWDOS+ or NEWDOS 80 version 1.0 to run them.

				Approx. Start Position		
Side 1	***Type***	***I.D.***	***Disk Filespec***	***CTR-41***	***CTR-80***	***System 80***
GRAFX INIT PROG	32K DISK	I	INIT/BAS	18	10	6
GRAFX INIT PROG	32K DISK	I	INIT BAS	47	26	11

APPLICATION FOR PUBLICATION OF A PROGRAM IN MICRO-80

Date .....

To **MICRO-80**
SOFTWARE DEPT.,
P.O. BOX 213,
GOODWOOD, S.A. 5034

Please consider the enclosed program for publication in MICRO-80.

Name .....

Address .....

.....

.....

.....

Postcode .....

***** CHECK LIST *****

Please ensure that the cassette or disk is clearly marked with your name and address, program name(s), Memory size, Level I, II, System 1 or 2, Edtasm, System, etc. The use of REM statements with your name and address is suggested, in case the program becomes separated from the accompanying literature.

Ensure that you supply adequate instructions, notes on what the program does and how it does it, etc.

For system tapes, the start, end, and entry points, etc.

The changes or improvements that you think may improve it.

Please package securely — padabags are suggested — and enclose stamps or postage if you want your cassette or disk returned.

GRAFX	32K DISK	G	GRAFX/BAS	74	41	19
GRAFX	32K DISK	G	GRAFX/BAS	138	77	41
AUSTRALIA'S CUP	L2/16K	A	AUSCUP/BAS	180	101	56
AUSTRALIA'S CUP	L2/16K	A	AUSCUP/BAS	269	151	87
LVAR UTILITY	SYSTEM	LVAR	LVAR/CMD	348	196	122
LVAR UTILITY	SYSTEM	LVAR	LVAR/CMD	353	199	122
LVAR UTILITY	EDTASM	LVAR	LVAR/EDT	359	202	128
LVAR UTILITY	EDTASM	LVAR	LVAR/EDT	381	215	136
SOURCE UTILITY	MODEL 3	S	SOURCE/BAS	403	227	148
SOURCE UTILITY	MODEL 3	S	SOURCE/BAS	422	238	160
Side 2						
HI RES WRITER 1.1	COCO EDTASM	HIRES	—	18	10	—
HI RES WRITER 1.1	COCO BINARY	HIRES	—	251	141	—
HI RES WRITER 1.1	COCO BINARY	HIRES	—	307	173	—
TRACK RACER	HITACHI PEACH	TRACK	—	352	198	—
TRACK RACER	HITACHI PEACH	TRACK	—	364	205	—
		DECEMBER				
Side 1						
YAHTZEE	MOD 3/BASIC	Y	YAHTZEE/BAS	18	10	6
YAHTZEE	MOD3/BASIC	Y	YAHTZEE/BAS	101	58	39
BOLD PRINTING	L2/16K	B	BOLD/BAS	178	101	68
BOLD PRINTING	L2/16K	B	BOLD/BAS	188	107	72
SPACE UTILITY	SPACE	SPACE	SPACE/CMD	200	112	75
OBJECT CODE	SPACE	SPACE	SPACE/CMD	210	115	77
SPACE UTILITY	SPACES	SPACES	SPACE/EDT	220	120	81
SOURCE CODE	SPACES	SPACES	SPACE/EDT	260	144	97
SPACE UTILITY	L2/16K	SP16K	—	300	166	112
OBJECT CODE	L2/16K	SP16K	—	308	170	114
HOUSEHOLD ACCOUNTS						
MODULE 1	MOD4/DISK	1	MODULE1/BAS	316	176	—
MODULE 2	MOD4/DISK	2	MODULE2/BAS	336	187	—
MODULE 3	MOD4/DISK	3	MODULE3/BAS	352	196	—
MODULE 4	MOD4/DISK	4	MODULE4/BAS	370	206	—
MODULE 5	MOD4/DISK	5	MODULE5/BAS	398	222	—
MODULE 6	MOD4/DISK	6	MODULE6/BAS	413	231	—
MODULE 7	MOD4/DISK	7	MODULE7/BAS	444	249	—
Side 2						
HOUSEHOLD ACCOUNTS MODULE 8	MOD4/DISK	8	MODULE8/BAS	18	10	—
SIRIUS ADVENTURE	PEACH	SIRIUS	—	51	30	—
HOUSEHOLD ACCOUNTS	PEACH	ACCTS	—	159	92	—
KILLER SATELLITE	C.C.	KILLER	—	280	162	—
KILLER SATELLITE	C.C.	KILLER	—	293	170	—
SIRIUS ADVENTURE	C.C.	SIRIUS	—	308	180	—
SIRIUS ADVENTURE	C.C.	SIRIUS	—	342	200	—

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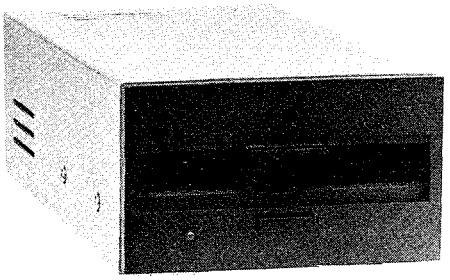

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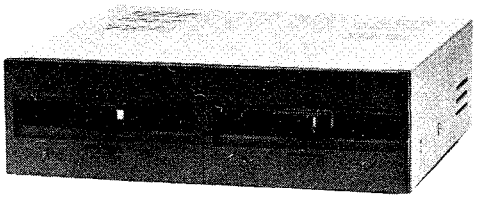

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2 x MPI B92	80 ea	2 ea	2 x 400K	3.4	$1454

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MPI B52 40 track, dual-head, 200K	$449	$5.00	Self-contained, dual-drive cabinet/power supply	$135	$5.00
MPI B92 80 track, dual-head, 400K	$619	$5.00	Two drive cable	$39	$2.00
Separate, dual-drive power supply	$85		Four drive cable	$49	$2.00

Prices are FOB Adelaide. Add $5.00 freight for single drive package, $10.00 for dual-drive package. Prices are in Australian dollars. Freight is road freight anywhere in Australia.

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LEVEL 2 ROM
ASSEMBLY LANGUAGE TOOLKIT
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- **A ROM REFERENCE** Manual which catalogues, describes and cross-references the useful and usable ROM routines which you can incorporate into your own machine language or BASIC programs.

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Part 1 of the ROM REFERENCE manual gives detailed explanations of the processes used for arithmetical calculations, logical operations, data movements etc. It also describes the various formats used for BASIC, System and Editor/Assembly tapes. There is a special section devoted to those additional routines in the TRS-80 Model 3 ROM. This is the first time this information has been made available, anywhere. Differences between the System 80/Video Genie are also described. Part 1 is organised into subject specific tables so that you can quickly locate all the routines to carry out a given function and then choose the one which meets your requirements.

Part 2 gives detailed information about each of the routines in the order in which they appear in the ROM. It describes their functions, explains how to use them in your own machine language programs and notes the effect of each on the various Z80 registers.

Part 2 also details the contents of system RAM and shows you how to intercept BASIC routines. With this knowledge, you can add your own commands to BASIC, for instance, or position BASIC programs in high memory — the only restriction is your own imagination!

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