SYDNEY NEWS DIGEST

Newsletter of the TI 99/4A HomeComputer Users Group

programs

source

Users-Group

Special Interest Group

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P.E.B.

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Contents:

March, 1983.

Profile – with Shane (the editor)

You are invited to attend the most comprehensive COMPUTER SHOW ever
held in Sydney.Put on by the AUSTRALIAN PERSONAL COMPUTER MAGAZINE,
this show will feature new PERSONAL COMPUTERS,SELECTED COMPUTER RETAIL
OUTLETS,AND A COMBINED USERS' CLUB STAND. Yes that's right, for the
first time, Users' Groups have been given FREE SPACE at a computer show.
This should prove very interesting,in that APPLE,ATARI & TI.S.H.U.G.
groups will be at the same stand. HENCE...we need your held to staff the
stand.If you can assist,please get in touch with JOHN ROBINSON on
(02)8480956. Also...TI(AUSTRALIA) will be there at stand 1020,and plan to
show off both new software and hardware,which brings me to mention the
proposed TWO NEW COMPUTERS will TI will be coming out with,and may have
on show at the PERSONAL COMPUTER SHOW...

First there is the little sister,known as the TI-99/2 officially.
She will feature for half the price of the 99/4A. It is the Black & White
version that has 4.2K RAM *internal* and is expandable to 36.2K RAM>
The MPU is a TMS9995 sixteen bit unit. The keyboard is an "Elstomeric"
unit and is pressure senitive. It will run in either BASIC or ASSEMBLER
and will operate with solid state modules and special tape system.It comes
with a manual and a demonstration cassette tape.

SECONDLY the big brother the CC/40...it is a hand held computer and weighs
a mere twenty-two ounces! It is powered by 4 AA Alkaline batteries and
will operate with constant memory for up to two hundred hours! Impressive!
The display is a thirty-one character integrated LCD, although it may be
fed through the new HEX-BUS to a Black & White CRT.
IT FEATURES AN ENHANCED BASIC AND ASSEMBLER WILL OPERATE WITH SOLID STATE
MODULES AND SPECIAL TAPE SYSTEM. These modules,incidentally,can hold up to
128K ROM! This little powerhouse measures:9.5 by 5.75 by 1 inch. It has 6K
of RAM internal and is expandable to sixteen,it also contains 34K ROM!
The keyboard is a standard QWERTY,but is reduced in physical size to fit
the machine. It also has a 10 digit numeric keypad build-in! The MPU tis a
TMS70c20 eight bit. This little computer also sports both upper and lower
case on the keyboard!

I will also be giving you more details about other new TI peripherals in
the next issue of the SYDNEY NEWS DIGEST as more information is sent to me
HOWEVER, I WOULD LIKE TO KNOW WHY TI IS PRODUCING 2 NEW COMPUTERS,WHEN
THEY CAN'T COPE WITH THE DEMAND OF THE TI-99/4(A). One of the reasons TI
don't advertise the 'A' is becaulse they just don't have enough stock at
any given time to warrent advertising. But please feel rest assured that
TI(Australia)feel & share your frustrations. They are on the phone every
day asking TI(U.S.A)why they haven't supplied all of their stock.
I understand that their comment was..."BUT YOU'RE ONLY 1% OF OUR SALES..."
How do those yanks expect us to be any larger that 1% if they don't give
us more than 1% of their stock. TI in the States need to get their act
together,employ more people and start coping with the demand.

TODAY IS THE FIRST DAY OF THE REST OF OUR LIVES

(Design contributed by Ron Koziul)

**THE SMILE IS THE ONE WORD IN THE WORLD LANGUAGE THAT EVERYONE UNDERSTANDS.**

This months CLUB SOFTWARE include more of the winning entries to the recently conducted NATIONAL SOFTWARE AWARDS.However,most of which are written in Extended Basic,so for those still waiting for your Ex-Basic Module,you'll at least have some software to use when they finally arrive. As most of you are aware, there seems to be a world wide shortage with this valuable ROM PACK. So here we go with the listing...

MAZZO.....Written by Tony Constanidis(Manuel's Dad),this superb game is is designed to teach you your computer keys,and have a lot of fun at the same time(Ex-Basic).

RODEO RACES...Plenty of action on the screen with this fun version of a day at the races.(Ex-Basic)written by Merv Kroll of TI.B.U.G.

TOWER RESCUE...Another runner-up in the Awards and also Ex-Basic, by Ron Bruce of Sydney.You fly your craft to the top of a building to rescue people.But get them down before the building burns beneath you.

PAY RECORD KEEPER...(TI-BASIC)also by Ron Bruce,and designed to keep record of your weekly pay packet.

SWAMIBIN...(TI-BASIC)by Stuart Anderson.This brilliant program demonsrates the high resolution of the TI-99/4 Computer with artistic photograph-like graphics of some of his friends.

ALL CLUB SOFTWARE IS AVAILABLE MONTH OF ISSUE ONLY and can be obtained 3 ways...1:Bring a blank cassette along to the next club meeting on SATURDAY the 19th MARCH(2pm)St.Johns Church Hall,Victoria St,Darlinghurst. (but you had better get there early to obtain you tape). 2:If you are unable to make it to the meetings,simply send $3.00 to te the club address:POBox 149 Pennant Hills NSW(ATT:Elliott).The money will cover the cost of a blank cassette,postage & Jiffy bag. DO NOT SEND A TAPE TO US,as we are having problems in this area. 3:To promote SOFTWARE WRITERS, we will supply you with a list of our LIBRARY,and you can choose ANY THREE PROGRAMMES of your choice,if you send us a program you have written. If you can assist our Club Librarians with the down-loading of the many tapes each month,please contact either ANTONY:(02)6308428 or ELLIOT (02) As you may be aware, as of mid-February,we now have a membership of 260+. ###

Next Meeting:
MARCH 19

Yes,we've changed our meeting date... Due to the Elections of our Nations PRIME MINISTER, AND THE FORTH-COMING APC SHOW. We have had to push the meeting date to MARCH(Saturday)19th @ 2pm. to be held at St.Johns Church Hall, Victoria St,Darlinghurst.......see map... TOPICS:SPECIAL INTEREST GROUPS, PERSONAL & CLASS STYLE TUTORIALS NEW SWAP/SELL/BUY BULLETIN BOARD
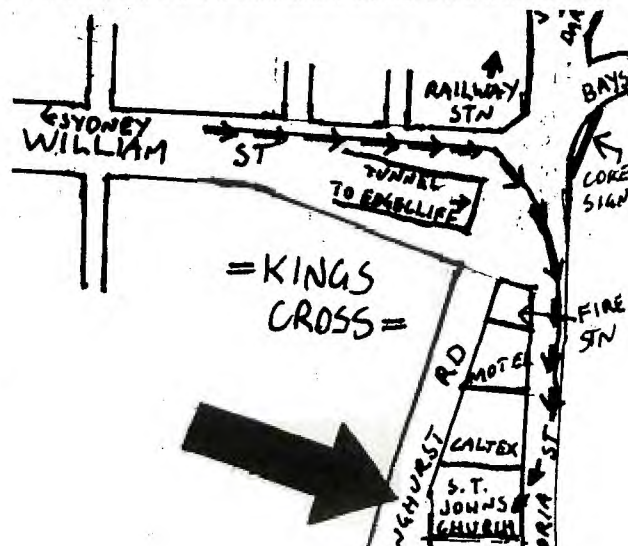
Good News

At last!!! TI Australia is to begin service contracts on the 99/4A computer and its peripheral equipment.It is envisaged that this will be in the form of a SERVICE CLUB. Members of this club will have to pay a fee for each item they wish to have covered by the scheme.This enables a service fee.discount of over 50% on the normal rates.You only pay for 3 calls per item per year,after that the service on a particular item is FREE. The offer extends to all hardware devices,including command modules, but excluding disk or tape software.

Members will also receive a regular bulletin with news of equipment & software as it becomes available.All members of this club will be advised of the activities of the TI 99/4 USERS GROUP ,of which you are already a part of!! It will be a Cash Only club,cards will be issued to members and to keep costs down,there will be no invoicing.

If you desire more information,please contact P.ENGLAND
Customer service Manager,TI Australia on (02)887-1122.

News TIt Bits

REMEMBER...at the next USER GROUP MEETING on Saturday the 19th MARCH(2pm), we'll be judging this groups' LOGO (or emblem) COMPETITION. You don't $have much more time left to design an emblem on either or both sub-program / art work. The winner will receive a copy of the Australian Award Winning "DIABLO" by Manual Constantinidis. So bring your entries along to the meeting. WE WILL ALSO BE CONDUCTING A SURVEY,AND WE NEED YOUR VIEWS ABOUT IT, IN REGARD TO TUTORIALS ETC.

ALSO:Do you have TI LOGO or LOGO II? Well Dr. Robert Pearson would like to hear from you. He has been programming in LOGO for some time now, and would like to communicate with others interested in LOGO. You can either call him on (062)543384 or write to him at: 38 Morton Street,
WEETANGERA, A.C.T.2614

ALSO:ATARI have now produced their REMOTE CONTROL JOYSTICKS, which consist of SIGNAL RECEIVER BOX and cable to the computer(which can be adapted to the TI-99/4(A), plus,2 special joysticks with battery operated trans- mitters. Each Joystick has it's own UHF Antenna. It sells for about $130 Australian,but surely some one in this group could make one up for a lot less. SPEAKING OF THAT...The EDITOR,(and I might add,a numbers of other members)has expressed a desire to obtain a NUMERIC KEYPAD fitted to his computer. Anyone out there interested in making one up,please contact Shane at our PUBLICATIONS ADDRESS:PO BOX KX101,Kings Cross,NSW 2011.

ALSO:NEW SKIN-THIN TEMPLETS are available for the TI-99/4A keys. For more information, contact MICHAEL HAYNES on 02.952332

ALSO:COMPUTE Magazine,as of January issue, now has regular feature articles for the TI-99/4(A) COMPUTER. In the FEBRUARY ISSUE,on page 138, you'll see a continuation of the series entitled "PROGRAMMING THE TI". On page 87,there is an article entitled "WRITING EFFECTIVE EDUCATIONAL PRO GRAMMES". Each of these reviews and articles are produced by REGENA,who has been well known for good programming in the 99'er MAGAZINE sold at the club meetings.

TI LOGO

WHAT A LAUGH ::::::::

"He's one of the greatest conductors of electricity!"

Younger Set with JENNY

his month we have a new feature which will be incorparted onto my page: The SYDNEY HALL OF FAME. This is where YOU get to have your high scores acknowledged. Please,if you submit a score,include VERIFICATION. This may be in the form of a SIGNATURE or SCREEN PHOTO.Unfortunately,I cannot accept scores without verification.

CONGRATULATIONS ARE IN ORDER FOR THE FOLLOWING MEMBERS :

	SCORE	RECORD HOLDER	COMMENTS	VERIFICATION
Car Wars	55240	Antony Lewis	Stage 7 Setting 2 &1	Signature
Munchman	140000	Lloyd Robinson	Stage 35	Signature
Pinball (VG#1)	1068460	Antony Lewis		Signature
TI Invaders	25000	Lloyd Robinson	Stage 16	Signature
Tombstone City	90650	Chris philips	Day 12	Signature

Now that PARSEC has arrived here in Sydney, I hope to hear from all of you with your latest scores on this and other games.
Please note the address to write to me with either your high scores or pro -grammes you've written...JENNY-YOUNGER SET,PO BOX KX101,Kings Cross,2011.

Tr ~this little program from Jim Peterson,which will permit you to move y cursor around the perimeter of the screen. It uses 416 bytes of memory and takes roughly twelve seconds. Thanks Jim!

```
100 CALL CLEAR  110 CALL CHAR(44,"FFFFFFFFFFFFFFFF")   120 R=1  130 C=3
140 CALL HCHAR(R,C,44)  150 CALL KEY(0,K,S)  160 IF S=0 THEN 150
170 IF K=68 THEN 210  IF K=69 THEN 230  190 IF K=83 THEN 250
200 IF K=88 THEN 270 ELSE 150  210 C=C+ABS(C<30)  220 GOTO 280
230 R=R-ABS(R>1)  240 GOTO 280  250 C=C-ABS(C>3)  260 GOTO 280
270 R=R+ABS(R<24)  280 CALL HCHAR(R,C,44)  290 GOTO 150
```

Shane has asked me to mention that there was a typing error in last months BIGGIE'S BITS.First program on page 8...line 100 should read 100 DIM S(28)

I look forward to hearing from you, remember this is your page if you're under 18 years of age so get those letters in.
See you next month.

JENNY
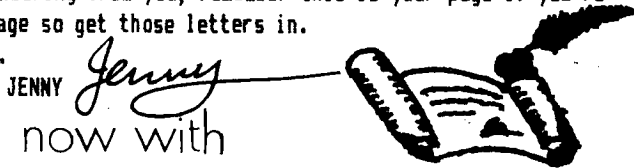
now with

Sydney Hall Of Fame

Warning!!

Those of you who have recently purchased the new Peripheral Expansion Box, or intend to purchase one in the near future, please be advised that the warning sticker located on the rear of the Peripheral Expansion Box, and the warning statement on page 5 of the Operations Manual is NOT to be taken lightly!

The warning to wait two minutes after turning off the unit before either inserting or removing one of the component cards means exactly what it says.

We have already heard of several cases in which an owner has damaged one of their component cards by either inserting or removing it without waiting the allotted time.

Although, generally speaking, the user cannot detect damage caused to his unit by this procedure, TI's engineering department can readily spot power surge damage with quick and reliable results. TI has informed us that users who return cards that are damaged in this fashion may jeopardize their warranty rights.

Where's me Buccaneers

You may have heard the comment:
"Don't cut your nose off to spite your face".

This group has strict rules regarding the blatant piracy of COMMERCIAL SOFTWARE,& we urge you not to reproduce Commercial software for your friends who happen to own the same computer as well. The reasons why:-

1/ The authors of these programs have worked hard and long hours to provide you with a program which is commercially viable so you may get enjoyment from it.
2/ If we all started to copy software without regard to those authors & retailers they would stop producing programs for us to enjoy.What would you do then????

Many complain about the cost of modules,but these have been produced to deter pirates. Unless you want to see ALL commercial programs in module form,please consider your actions before you dupl- cate a commercial program.Pass on some of the software provided by this group,& work at providing some software to share with both this group and your friends.

"Each individual must decide for himself what features he most prizes."

TEXED
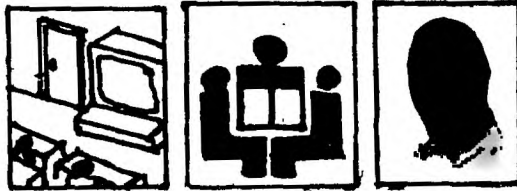
By Peter Lynden

SCHOOL COMPUTERS CHART

This month I have drawn up a comparison chart of three popular micros:
the Apple][Plus, the Microbee and the T.I. 994/A. Most school teachers
would be aware that Apple was recently supplanted as the Education
Department's computer supplier by Applied Technology's Microbee - the
reason being - you guessed it!!! - PRICE. Seems that even computers are
subject to cost-cutting measures!! Personally, I think it's a step back-
wards.

HERE IS THE TABLE:

	T.I.99/4A	Apple][	Microbee
Memory Size	16-48K	16-64K	16-64K
Languages Available	B,Pa,L,E,P	B,P,F,P,L,C	B,L,P,Pa,E
Colour?	Yes	Yes	No
Disk Op. System	T.I.	Apple	CP/M
Sprites in BASIC	Yes	No	No
Speech Capabilities	Yes	Yes	No
Graphics?	256x192	280x192	512x256
Software in ROM	Yes	No	No
Printer Interface	RS232	RS232	RS232
Price (R.R.P.)	$499	App.$1500	$399

NOTES:

(a) Apple has more memory available but it is not supplied by Apple.

(b) Microbee can be bought with BASIC in ROM for 16-32K or in 64K with no
BASIC in ROM Versions.

(c) CP/M is the recognised Business standard.

(d) I have included "Sprites in Basic" because students are encouraged
by graphical demonstration rather than screens full of text which
can be off-putting.

(e) Apple][uses a speech chip manufactured by T.I. and an external
speaker is required.

(f) T.I. has 256x192 resolution in 16 colours through character re-
definition.

(g) The Microbee's high resolution is available through P.C.G. (a type character-redefinition) but only in B & W.

(h) Microbee plans to introduce colour in the near future.

(i) Languages B=Basic, Pa=Pascal, P=Pilot, E=Editor-Assembler, L=Logo, F=Fortran, C=Cobol. T.I. will soon have Forth and Fortran too.

The Apple][is quite a good machine. My own experience (which was short) left me very impressed. It seems the Microbee has been chosen because it is cheaper. Recent reviews have left me rather 'cold' - for example, the power supply tends to overheat badly causing cassette loading problems through cumulative build-up of program traces.(See E.T.I. December,1982 for further details).

WHAT AM I GETTING AT I HEAR YOU ASK!!! Well, my point is this - why hasn't the T.I.994/A made it into our schools??? I've used mine at school on a number of occasions, in English and in History, and the kids loved it!!

I am sure that once the T.I. was placed on Government contract it would be lowered in price and thus become even more attractive.

If your a collector of Micro magazines like I am you might be interested in the following that can be picked up around Sydney's news-agencies:

1. Computer and Video Games - a great magazine, well presented with news and reviews of software. Has a regular T.I. listing too!!

2. Personal Computing Today - another good one that includes hardware reviews as well as software. Had T.I. listing in last issue (Dec.'82)

3. Popular Computing (from U.S. and usually available cheap at Dick Smiths - normally about $3-4 I bought 6 for $3 recently. Very good Education articles and general micro news.

4. Compute - The 1983 issues have a new T.I. column by Regena of "99'er" fame.

There are, of course, many more but I would recommend these as being value for money and good reading.

Thanks to Paul for his help in compiling the above table.   *Peter.L*

If you've any ideas
or views on COMPUTERS
in EDUCATION,
Please send them to:

PETER LYNDEN(Educ Co-ord)
at: 11 Toohey Ave,
WESTMEAD, 2145.

Division 1

Division 1, command module created by Scott Foresman and Company for Texas Instruments, will be an invaluable aid in the classroom as well as in the home. Because it is a complete text on division facts, its use will cover a wide range of ages and levels of ability. Division is commonly introduced in grade three, and the facts are reviewed through grade six. Grades three through six, then, are the levels at which this module will be used most extensively. It will also be useful to challenge a younger gifted student and as a remedial tool for those students above sixth grade who have not achieved mastery of division facts.

The nine activities available for selection are:
1. Meaning of Division
2. Divisors of 1, 2, 3
3. Divisors of 4, 5, 6
4. Divide Using ⌐‾‾
5. Practice and Paint
6. Divisors of 7, 8, 9
7. How Many Boxes?
8. Divide With a Remainder
9. Make a Picture

The activities proceed in sequence from least difficult to most difficult. Each activity may be worked independently of all others. However, the ability to work successfully at each activity depends upon the mastery of skills that have been introduced in the preceding activities.

By working through Activity 1, the student will receive an excellent explanation of what actually happens during the division process. This writer has known students who had memorized division facts and still lacked an understanding of the *concept* of division. The explanation on the module is made without using the words "divide" or "division", and without using either of the signs normally used to work division problems.

SOFTWARE REVIEW
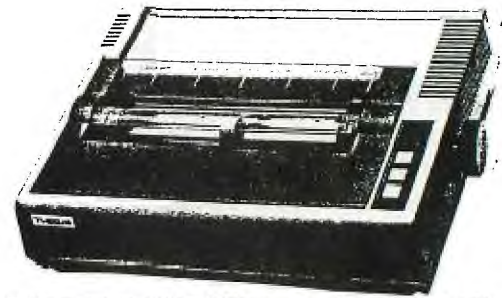
REVIEW OF TOUCH TYPING TUTOR

by STAFF REPORTER:RUSSELL WELHAM (Programmer extraordinaire)

Our Editor loaned me an advanced copy of the TOUCH TYPING TUTOR module
to review.
My method of typing is a two finger method with knowledge of the layout of
the keyboard. With the aid of the TOUCH TYPING TUTOR (to be released in
March),I improved my typing and started to learn to touch type, which I
will have to continue when I receive my copy of this module.

The module itself is easy to use, there are three main sections.

1.LESSONS: This section is divided into 8 lessons, each has either 1 or 2
sets of keys and a review, you work your way through each set with new
keys being added. The correct fingers to use are displayed on the screen.
A selection of letters are displayed on the screen which have to be typed
into the computer. After you have typed in the letters required, you are
told how you are going.

2.DIAGNOSTIC: In this section, your typing is checked, and you are
informed of your Words Per Minute rate, and what letters you require more
practice on. Also the set words per minute rate of 15 W.P.M. for you to
exceed can be changed up to your own rate, to improve your typing.

3.GAME: An aeroplane flies across the screen leaving a trail of letters
3 or 4 letters long, sometimes forming words. A cloud follows the plane to
make it harder to see the letters. You have to type the letters in
correctly which will cover the letters with an orange cloud, the plane
will then pass over the letters, and the score is increased. If you miss
covering the letters with the orange cloud,a mistake will be counted.
As the score increases, the plane travels faster, making it harder to
type in the letters.
The level of the game is set at the beginning, to your own level.

CONCLUSION: I have placed an order for the module. This speaks for itself.
If you are interested in improving your typing on the 99/4A ...
buy this module.
                    RUSSELL WELHAM
###

Wizard of Id

FRIMMIN ON THE JIM JAM... FRIPPIN AT THE KROTZ

ZAP

PARKER.

YOU have committed a SYNTAX ERROR...

...JIM JAM does NOT compute

...back UP and RESUME INCANTATION

THAT'S THE LAST TIME I BUY A VAT FROM THE COMPUTER SHACK
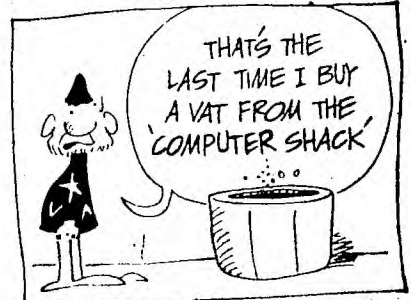
by Brant parker and Johnny hart

RESPONSE, GAME X2073!
NO WAY, JOSE!
YOUR SOLUTION IS
LAUGHABLE!
IV'E GIVEN YOU TOO
MANY CLUES ALREADY—
LET'S GET SERIOUS!
ARE YOU ON DRUGS
OR WHAT?
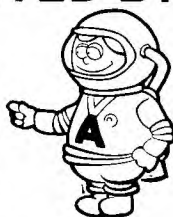
(on MINIMEM and 32K.Exp. Memory).

-by G.Patterson.

In endeavouring to learn the idiosyncrasies of TMS9900 assembly language as applied to the TI 99/4 and 4A,with the prior knowledge (that TI feel every home owner of their home computer should have) being obtained by reading through umpteen times,TI's manual, (which is worth its weight in gold) "TM990 Introduction to Microprocessors"-MPB30,together with the Ed./Ass. Manual, I adopted 99'er magazine program "LIFEA" (issue No. 4, page 59) for the Minimem,and jotted down a few points of interest.

*Due to the shortage of space in this publication,the printed program (ASSEMBLED LISTING)has had to be withheld,but can be obtained upon request by writing to the EDITOR,PO BOX KX101,Kings Cross,N.S.W. 2011.

In the Minimem Assembler there are:-

(1) Only a few directives available, namely AORG, EQU, BSS, DATA, TEXT, END and SYM but these seem to be sufficient.

(2) Labels can be only a maximum of 2 characters.

(3) If Utility Programs are used then these must be defined by a labelled "EQU" statement followed by the hexadecimal value of the respective vector address in the operand field.

(4) Similarly, variables or areas of memory, outside of your program, must be defined with an "EQU" statement followed by the respective hexadecimal address.

(5) If BYTE directives (in Ed/Ass.) are to be adopted for minimem and each byte is labelled separately, then in minimem use the DATA directive with the byte value in the high order end e.g. H$\emptyset$ to H2 in *LIFEA.

(6) If a string of byte values have only one label as "AF" in *LIFEA, then set these up in pairs in DATA directives.

(7) When defining the program workspace area, do not use the "BSS" directive but use the "DATA" directive followed by 16 decimal zeros as the operand. (See address ≥2102). If BSS were used, it only sets aside the area in memory and whatever is in these addresses at assembly time stays there. If you were to try debugging a program and were to look at the workspace registers you would not be sure what had been put there by your program and what may have been there at compilation. It is far safer, more positive and easier to zero the area with the DATA directive.

There are two additions I have made to this program, namely:-

(a) At the start of the program, the return address is saved for return to the calling program which in the case of minimem is selection "(2) RUN", in the minimem menu where the program would be called by typeing "*LIFEA". This is assuming you have entered "*LIFEA" and its start address in the Ref/Def table at 7FE8 or wherever space available downwards from 7FE8.

(b) To terminate the program by pressing any key on the keyboard. This is done by calling the Utility "KSCAN" at program address >2586 after the latest generation is displayed on the screen. If no key has been pressed then the G.P.L. status byte is zero. The MOVB instruction at >258A, in moving the G.P.L. Status byte to R6, automatically compares the destination contents to zero, therefore the Jump if Equal after the move byte instruction continues to processing the next generation, whereas if a key were pressed, the GPL Status byte would be 1 and the JEQ instruction would not be met, thus the program falls through to the exit.

Before an exit is made back to a calling program, the G.P.L. Status byte must be cleared, the return address, that was saved at the beginning of the program at address >2474, is moved to workspace register 11 and exit is made with a B *R11. (Program address from >2590 to 259E).

Incidentally, this call to KSCAN can be used as a delay loop.

This programme is a good illustration of how to display data on the screen, the principle of which had me quite confused for some time until reading this program. The screen image, as accessed by the V.D.P. processor, is situated in V.D.P. RAM at address 0000 to 02FF , which is 768 bytes. Looking at this in terms of rows and columns, the screen consists of 24 rows by 32 columns, which equals 768 bytes (or characters).

V.D.P. RAM cannot be accessed directly by machine language instructions. To write data to the screen image area in V.D.P. RAM , address 0000 to 02FF, a buffer (or work area) must be set up within your program in C.P.U. memory and then written to V.D.P. RAM using either VMBW(V.D.P. multiple byte write) or VSBW (V.D.P. single byte write). The reverse applies when reading V.D.P. memory into a buffer area within your program using VMBR (V.D.P. multiple byte read) or VSBR (V.D.P. single byte read).

In the program XLIFEA the buffer area which is written to V.D.P. RAM screen image area consists of 768 bytes labelled GN at address >2142. The work area where the calculations and records of each generation that is being assessed , are another 768 bytes labelled SC at address >2630. After an individual generation has been completed (program address >24BC to >2580) a Branch and Link (BL) at >2582 is made to subroutine SW at >2600 to display this current generation on the screen. Each byte in the work area (SC) is looked at and either a blank or an asterisk is placed in the respective byte in GN . When the 768 bytes have been treated then GN is written to the VDP screen image area with a BLWP @ MR (MR = VMBW) at >262A . Whenever a call is made to VMBW , registers R0 to R2 in your program work space must be set up with the following parameters :-

        (1) R0 must contain the VDP RAM address where the data is to be written.
        (2) R1 must contain your program buffer address that is to be written to
            VDP RAM.
        (3) R2 must contain the number of bytes to write.

Looking at these individually :-

(1) R0 :- As the whole 768 bytes are to be written then the start address in VDP
          RAM must be 0000 . Using the instruction "CLR R0 " (Clear Register to
          Zero), at program address>2620, is the quickest way to do so, but
          " LI R0,0 " would do the same job but take more machine cycles.

(2) R1 :- At address>2622 " LI R1,GN " places the address of the screen buffer
          in your program (labelled GN and whose address is>2142) into R1 .

(3) R2 :- At address>2626 " LI R2,768 " places >0300 (768 decimal) in R2 ,
          which is the number of bytes to write .

The above describes one method of displaying on the screen, but to display a message, it would be much faster to create the message by a "TEXT " directive in a labelled statement in your program area and load R0 to R2 with required parameters. Taking the example in the Minimem Manual , assume "HELLO" is to be displayed on the screen at Row 13 Column 15 , the text is labelled " HI " and VMBW is defined with an "EQU" directive under label name " MR " . A small calculation is needed to find V.D.P. RAM address from row and column numbers i.e. ;-

        Row number minus 1 , multiply by 32 (as there are 32 columns to a row) ,
        plus the column number minus 1, e.g.:-
            13-1 = 12 x 32 = 384 plus 15 minus 1 = 398 .
            (398 decimal = 018E hexadecimal).

The instructions required would be :-

        LI R0,398   VDP RAM address(Row13,Column.15).
        LI R1,HI   Program address of TEXT.
        LI R2,5   Number of bytes to write(1 byte per character)
    BLWP @MR   VMBW Display characters.
        .. ..
    HI TEXT 'HELLO'

The screen should be cleared beforehand otherwise whatever is in the rest of VDP RAM will also be displayed. One method of doing this would be to load the character to be written (a Blank,which is >20) into the most significant byte of R1 i.e:-

        LI R1, >2000   A Blank in MSB (most significant byte) of R1.

and write this blank 768 times to VDP RAM. Assuming VSBW (VDP single byte write) has been defined with an EQU directive labelled "SW" , the instructions to blank the screen would be :-

        SW EQU   >6024   VSBW(single byte write for Minimem)
           LI R6,768   Counter
           CLR RO   VDP RAM start address = zero
           LI R1,>2000   A Blank in MSB of R1
        LP BLWP @SW   Write Blank (VSBW)
           DEC R6   Decrement R6 by 1
           JGT LP   Loop if more
           ..   ..

Starting a count with its highest count and decrementing saves machine time as , if you went the other way, you would have to add a Compare Instruction before the Jump.
BYE....

```
100 REM  TIHOME LIBRARY E301
110 CALL CLEAR
120 PRINT ::
130 PRINT "    ***ARITHMAGRAPHS***"::
140 PRINT " DEVISED BY MIKE O'REGAN"
150 PRINT "ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ"::
160 PRINT " SYMBOLS REPRESENT NUMBERS!"
170 PRINT "  TRY TO FIGURE THEM OUT!":::
180 CALL CHAR(50,"AA55AA55AA55AA55")
190 CALL CHAR(51,"FF010204081020FF")
200 CALL CHAR(52,"F0F0F0F0F0F0F0F0")
210 CALL CHAR(53,"F0F0F0F00F0F0F0F")
220 CALL CHAR(54,"000103070F1F3F7F")
230 CALL CHAR(55,"80C0E0F0F8FCFEFF")
240 CALL CHAR(56,"003838003838")
250 CALL CHAR(57,"00383020081838")
260 CALL CHAR(48,"00103810101010")
270 CALL CHAR(49,"00103828101028")
280 RANDOMIZE
290 A=INT(RND*1000)+1
300 B=INT(RND*1000)+1
310 X=INT(RND*150)+1
320 C=A+B
330 E=A*B
340 F=B*X
350 G=E+F
360 H=B+X
370 A$=STR$(A)
380 E$=STR$(E)
390 LE=LEN(E$)
400 F$=STR$(F)
410 LF=LEN(F$)
420 G$=STR$(G)
430 LG=LEN(G$)
440 H$=STR$(H)
450 LH=LEN(H$)
460 LA=LEN(A$)
470 B$=STR$(B)
480 LB=LEN(B$)
490 X$=STR$(X)
500 LX=LEN(X$)
510 C$=STR$(C)
520 LC=LEN(C$)
530 M$="+"
540 N$="="
550 O$="X"
560 PRINT TAB(1-LA);A;TAB(8);O$;TAB(14-LB);B;TAB(18);N$;TAB(26-LE);E
570 PRINT
580 PRINT TAB(3);"+";TAB(13);"+";TAB(24);"+"
590 PRINT
600 PRINT TAB(1-LB);B;TAB(8);O$;TAB(14-LX);X;TAB(18);N$;TAB(26-LF);F
610 PRINT
620 PRINT "----------------------------"
630 PRINT
640 PRINT TAB(1-LC);C;TAB(8);O$;TAB(14-LH);H;TAB(18);N$;TAB(26-LG);G
650 PRINT
660 PRINT "----------------------------"
670 PRINT
675 PRINT "USE SHIFT 'C' FOR ANWSER"
676 PRINT "THEN TYPE RUN FOR NEXT "
680 GOTO 680
```

Programs to Type in

"I'LL TRY" Achieves Wonders!

```
100 CALL SCREEN(2)
110 CALL CLEAR
120 REM  "SPACE LASER"
122 REM  AS PRINTED IN THE
123 REM  COMPUTER & VIDEO GAMES
124 REM  MAGAZINE NOVEMBER ISSUE.
150 RANDOMIZE
160 SD=1000
170 XV=0
180 LAS=3
190 FUEL=32
200 AO=500
210 K$="BASES"&STR$(LAS)
220 FOR Y=1 TO LEN(K$)
230 CALL HCHAR(1,22+Y,ASC(SEG$(K$,Y,1)))
240 CALL SOUND(1,-3,0)
250 NEXT Y
260 FOR CHAN=1 TO 8
270 CALL COLOR(CHAN,7,1)
280 NEXT CHAN
290 CALL HCHAR(24,1,152,32)
300 VB=INT(RND*14)*2+4
310 X=32
320 CV=INT(RND*18)+5
330 CALL HCHAR(CV,VB,136)
340 FOR A=1 TO 30
350 CALL HCHAR(RND*20+1,RND*30+1,120)
360 NEXT A
370 CX=INT(RND*28)+4
380 NM=23
390 PO=INT(RND*13)*2+6
400 CALL CHAR(96,"7E7E3C3C18180000")
410 CALL CHAR(104,"1010101010101010")
420 CALL CHAR(112,"0000163066301800")
430 CALL CHAR(136,"EEEEEEEEEEEEEEEE")
440 CALL CHAR(120,"1")
450 CALL CHAR(128,"FE1EFE1EFE1EFE1E")
460 CALL CHAR(144,"F3F4500CA5E3F207")
470 CALL CHAR(152,"FFFFFFFFFFFFFFFF")
480 CALL COLOR(9,14,1)
490 CALL COLOR(15,7,11)
500 CALL COLOR(16,2,2)
510 CALL COLOR(14,11,1)
520 CALL COLOR(10,10,1)
530 CALL COLOR(13,7,1)
540 CALL COLOR(11,6,1)
550 CALL HCHAR(24,1,128,32)
560 CALL HCHAR(3,PO,96)
570 CALL HCHAR(NM,CX,32)
580 NM=NM-1
590 IF INT(RND*2)=1 THEN 1030 ELSE 1050
600 IF NM<=1 THEN 1070
610 IF CX<=2 THEN 1250
620 IF CX>=30 THEN 1270
630 CALL HCHAR(NM,CX,112)
640 F=INT(RND*16)+1
650 CALL COLOR(12,F,1)
660 CALL KEY(0,K,S)
670 IF K=32 THEN 710
680 IF K=83 THEN 950
690 IF K=68 THEN 990
700 GOTO 570
```

```
710 IF NM<=2 THEN 1070
720 CALL VCHAR(4,PO,104,NM-3)
730 CALL SOUND(-100,4000,0)
740 X=X-2
760 IF X=10 THEN 1710
770 CALL VCHAR(4,PO,32,NM-3)
780 CALL HCHAR(24,1,152,32-X)
785 IF X=0 THEN 2080
790 IF CX=PO THEN 820
800 IF PO=VB THEN 1480
810 GOTO 570
820 CALL SOUND(1000,-5,1,110,5)
830 CALL HCHAR(NM,CX,144,2)
840 CALL HCHAR(NM,CX,32,2)
850 CALL HCHAR(NM+1,CX,144,2)
860 CALL HCHAR(NM+1,CX,32,2)
870 CX=INT(RND*28)+4
880 NM=23
890 SC=SC+28.86
900 C$="SCORE="&STR$(SC)
910 FOR M=1 TO LEN(C$)
920 CALL HCHAR(1,2+M,ASC(SEG$(C$,M,1)))
930 NEXT M
940 GOTO 570
950 REM  LEFT
960 CALL HCHAR(3,PO,32)
970 PO=PO-2
975 IF PO>=2 THEN 980
976 PO=PO+3
980 GOTO 560
990 REM  RIGHT
1000 CALL HCHAR(3,PO,32)

1010 PO=PO+2
1015 IF PO<=32 THEN 1020
1016 PO=PO-3
1020 GOTO 560
1030 CX=CX+INT(RND*3)+1
1040 GOTO 600
1050 CX=CX-INT(RND*3)+1
1060 GOTO 600
1070 XV=XV+1
1080 IF XV<3 THEN 1790
1090 CALL SOUND(100,110,0)
1100 V$="  G A M E   O V E R"
1110 FOR A=1 TO LEN(V$)
1120 CALL SOUND(100,294,0)
1130 CALL HCHAR(12,3+A,ASC(SEG$(V$,A,1))
1140 CALL SOUND(100,330,0)
1150 NEXT A
1160 CALL SOUND(1100,110,0,4000,2)
1170 BN$="YOUR SCORE IS"&STR$(SC)
1180 FOR A=1 TO LEN(BN$)
1190 CALL HCHAR(16,6+A,ASC(SEG$(BN$,A,1)))
1200 NEXT A
1210 IF X=0 THEN 1670
1220 IF SC>=533.83 THEN 1380
1230 GOTO 1290
1240 STOP
1250 CX=CX+1
1260 GOTO 620
1270 CX=CX-1
1280 GOTO 620
1290 PRINT "  P L A Y  A G A I N"
1300 CALL KEY(0,K1,S1)
1310 KL=KL+1
1320 IF KL=500 THEN 1240 ELSE 1340
1330 IF S1=0 THEN 1300
1340 IF K1=32 THEN 1350 ELSE 1300
1350 SC=0
1355 KL=0
1360 GOTO 100
1370 STOP
1380 PRINT "    ** BONUS GAME  **"
1390 CALL CHAR(112,"183C7EFF183C5899")
1400 CALL SOUND(100,262,0)
1410 CALL SOUND(100,524,0)
1420 CALL SOUND(100,392,0)
1430 CALL SOUND(100,440,0)
1440 CALL SOUND(100,349,0)
1450 CALL SOUND(1000,110,0,-5,0,4000,0,500,0)
1460 SC=0
1470 GOTO 100
1480 CALL SOUND(1000,-1,0)
1490 X=32
1500 FUEL=FUEL-1
1510 CALL HCHAR(24,FUEL,128)
1520 AO=AO+10
1530 CALL SOUND(-50,AO,0)
1540 IF FUEL=1 THEN 1550 ELSE 1500
1550 SC=SC+167.45
1560 FOR DOWN=CV TO 20
1570 CALL HCHAR(DOWN,VB,136)
1580 CALL SOUND(1,SD,0)
1590 SD=SD-50
1600 CALL HCHAR(DOWN,VB,32)
1610 NEXT DOWN
1620 VB=0
1630 CALL CHAR(112,"FF186C7EFFFF5A99")
1640 CALL CHAR(96,"AAFF7EFFFF81818119")
1650 CALL CHAR(104,"8181818181818181")
1660 GOTO 900
1670 CALL SOUND(1000,500,0)
1680 CALL SOUND(1000,1000,0)
1690 PRINT "    * OUT OF FUEL *"
1700 GOTO 1290
1710 FOR O=6 TO 16
1720 CALL COLOR(13,0,0)
1730 CALL SOUND(1,-1,0)
1740 CALL SOUND(1,-2,0)
1750 NEXT O
1760 CALL COLOR(13,7,1)
1770 GOTO 770
1780 STOP
1790 CALL HCHAR(NM,CX,32)
1800 CALL VCHAR(4,PO,32,NM)
1810 IF XV>2 THEN 1090
1820 NM=23
1830 FOR SO=1000 TO 900 STEP -5
1840 CALL SOUND(-SO,SO,0)
1850 NEXT SO
1860 W=32
1870 JK=500
1880 CALL HCHAR(24,W,128)
1890 CALL SOUND(-50,JK,0)
1900 JK=JK+10
1910 W=W-1
1920 IF W=0 THEN 1930 ELSE 1880
1930 X=32
1940 LAS=LAS-1
1950 K$="BASES="&STR$(LAS)
1960 FOR Y=1 TO LEN(K$)
1970 CALL HCHAR(1,Y+22,ASC(SEG$(K$,Y,1)))
1980 NEXT Y
1990 CALL SOUND(10,-3,0)
2000 GOTO 660
2010 STOP
2020 W=32
2030 CALL HCHAR(24,W,128)
2040 W=W-1
2050 IF W=0 THEN 2060 ELSE 2030
2060 X=32
2070 GOTO 670
2080 IF XV<3 THEN 2090 ELSE 1100
2090 XV=XV+1
2100 GOTO 1790
2110 END
```

TO: ☐