Issue 1 December 1978

TRS-80 USER GROUP NEWSLETTER

1. Cheap memory

Stanley Houghton has been in touch with Airamco Ltd., of 30 Witches Linn, Ardrossan, Ayrshire. They have been advertising 16K of RAM for the TRS-80 for about £108 excluding carriage and VAT.

Stanley tells me that they would be prepared to reduce this to about £55 for orders of 100 chips or more. We have about nine people interested and need another three or so to make up the numbers. Could anyone interested contact Stanley at 215 Woodlands Road, Batley, WF17 0QS.

The modification is quite straight forward; merely dissassemble the unit, change two DIL jumpers (these are different for Level-1 and -2), remove the 4K chips and substitute the 16K chips. I modified my machine some months ago without any difficulty.

I would advise anyone doing this to have the Level-2 conversion done first. Tandy might get a bit upset otherwise, although I had no problems getting mine upgraded. Bear in mind that the Warranty could be invalidated by adding your own memory.

2. Machine language monitors.

I have been using T-BUG for a long time now and have found it rather limited. A much better monitor is RSM-2 from Small System Software, PO Box 366, Newbury Park, CA 91320, USA. I shall shortly be obtaining this and will let you know what I think of it. It has lots of 'goodies' such as a Dissassembler (of sorts), binary arithmetic, hex dump, search routines, etc. Cost is $ 30 or so. RSM-1S is a simpler version for 4K machines.

If you have been using T-BUG with a Level 2 machine you might have been surprised to find that the technique for modifying register contents described in the T-BUG manual does not work. TANDY forgot to mention that the Level 2 register storage area starts at 4825H, not 43B7H! The Level 2 register display format and RAM locations are as follows:

A' (4826H)	F' (4825H)	B' (4828H)	C' (4827H)
D' (482AH)	E' (4829H)	H' (482CH)	L' (482BH)
A (482EH)	F (482DH)	B (4830H)	C (482FH)
D (4832H)	E (4831H)	H (4834H)	L (4834H)
1XH (4836H)	1XL (4835H)	1YH (4838H)	1YL (4837H)
SPH (483AH)	SPL (4839H)	PCH (483CH)	PCL (483BH)

Did you know that T-BUG can copy itself? Set up the recorder in the usual way and PUNCH the start and end addresses as given in the manual.

T-BUG can also be used to debug and modify object code produced by the Editor/Assembler. Load the object code program first, then load T-BUG and enter T-BUG. Jump to the start of your program after setting a breakpoint if needed.

4. Chess on the TRS - 80

I obtained "Microchess 1.5" from the States sometime ago. It is rather tricky to load and the graphics take some getting use to, but it is a nice way to impress people with the capabilities of your machine! It does not play a particularly good game, however; I can beat it every time and I am not much of a player. $ 19.95 from: Personal Software, P.O. Box 136 - B11, Cambridge, MA 02138 USA.

4. Another use for the cassette interface.

The cassette interface output port is located at FFH or 255 decimal. The cassette output is on bit 0 of this port, on pin 5 of the DIN plug. This pin can therefore be used as a rudimentary output line for music generation, switching things on and off etc.

Try this little program (Level-2 only):

```
 10 OUT 255,0
 20 GOSUB 100
 30 OUT 255,1
 40 GOSUB 100
 50 GOTO 10
 99 REM DELAY SUBROUTINE
100 FOR I=1 TO 300 :NEXT I
110 RETURN
```

Note: pin 5 on the DIN plug is the second pin from the left, when viewed from the front.

A voltmeter on the output line should indicate the pulses.

5. Short cassettes.

You might be experiencing difficulty in obtaining the recommended short cassettes. Suitable cassettes are those sold by PET distributers. They work very well on TRS-80s!

6. Other newsletters.

An excellent newsletter can be obtained from :

TRS-80 Users Group,
7554 Southgate Road,
Fayetteville, NC 28304
USA

Cost is about $13 for a year (12 issues).

We estimate that this newsletter will cost about £2 for 6 issues.
If you like the idea, could you send a cheque or P.O. for £2.00 to Mr. B. Pain 40a, High Street, Stony Stratford, Milton Keynes.
This will cover costs for a trial 12 month period.

This is your news letter. Send any interesting hardware or software items you think could be of interest to other members to:

Leon Heller,
8, Morris Walk,
Newport Pagnell,
Bucks. MK16 8QD.

If you have any problems with your TRS - 80 send those too, someone might be able to help.

If anyone has a printer connected to their TRS - 80 let me know. It would enable us to publish listings much more efficiently.

Leon Heller.

TRS - 80 USERS GROUP NEWSLETTER

ISSUE 2 FEBRUARY 1979

Edited by:

Leon Heller,
8 Morris Walk,
Newport Pagnell,
Bucks. MK16 8QD

Published by:

Brian Pain,
40a, High Street,
Stony Stratford,
Milton Keynes.

EDITORIAL

We would like to apologise for an error in the first issue. The subscription for the newsletter should have read £2. 00. for six issues, one every two months. If you wish to continue receiving the newsletter please send your subscription to Brian Pain as soon as possible, if you have not already done so. This will enable us to judge how many to get printed. (Cheques payable to: "TRS-80 Users Group") Please send us material for inclusion. One member sent me six pages plus a program listing - too much for this issue but it will gradually be made use of.

If you do not feel like putting pen to paper and have a Level - 2 machine you can send me your contribution on tape! Just enter AUTO mode and head each line with REM or '(the abbreviation for REM) and treat the text as a program consisting entirely of remarks. You can use the EDIT facility of Level-2 for correcting mistakes. We can then List your "program" on a printer. Programs for inclusion can also be sent on tape. This will enable us to make sure they run.

The newsletter also includes a membership list, giving names, addresses, telephone numbers and areas of interest. This might enable users who have similar interests to get in touch with one another.

LEON HELLER

Software Distribution

Would anyone like to undertake to set up a "clearing house" for software? This would greatly speed up the dissemination of software (games, applications and system software). Could anyone who feels willing to undertake this service on behalf of members get in touch with me. We could perhaps get a software exchange scheme going; members could send in a blank cassette, or one bearing a program, and have the cassette returned with a whole range of programs on it.

Leon Heller

RSM-2: an improved machine language monitor.

As memtioned in the first issue of the newsletter, I have now been using RSM-2 for some time now and my findings might be of interest. Like T-BUG, RSM-2 enables the user to examine and change memory locations, set a single break point, display all the Z-80 internal registers when a breakpoint is encountered, jump to the start of a machine language program and commence execution and punch and load machine language tapes. However, RSM-2 also has a disassembler, which converts machine language or object code to Zilog assembly language source code and displays the source code on the screen or outputs it to a printer. RSM-2 also displays blocks of memory in hexadecimal or ASCII, moves blocks of memory around in RAM, and allows one to set blocks of memory to any value. It also writes and reads from cassette in two different formats - standard Level - 2 System tape format, and a special RSM-2 format. Those of you who are into Assembler and machine language should find it very useful. It even disassembles the ROM!

Leon Heller

Cassette Interface Modification

Tandy have designed a modification to the TRS-80 which greatly improves the reliability of the cassette interface. If you are having problems loading programs from cassette it could be worth your while getting your machine modified. This would probably be of interest to most of you as it would greatly ease the exchange of software. HI-VU Electronics of Milton Keynes ((0908) 312808) can carry out this modification over a weekend given prior notification.

LEON HELLER

Using the TRS-80 as a word-processor

The "Electric Pencil" is now available for the TRS-80. This is a very interesting piece of software that enables you to use your system for text processing. You also need a printer, of course. With a small hardware modification to your keyboard/computer unit you can have a lower case capability; this is really essential for word-processing applications. I am told it is available from the Byte Shop in Ilford, but it can probably be obtained somewhat cheaper from Small System Software in the States (address in the December issue). Because of the particular character generator used in the TRS-80, lower case letters do not have descenders below the base line. This is rather unsatisfactory from a Human Factors viewpoint, but you can't have everything. The following section was produced using the text editor in the Editor/Assembler as a rudimentary word processing system. I would like to thank Messrs. D.J. Gurney and J.W. Adams of Electron Systems, (Sandy) Ltd., Sandy, Beds. for letting me use their printer. Unlike most Tandy dealers they have a considerable amount of software and hardware expetise. (They can also carry out the cassette mod.) We can now produce printed listings from Level-2 tapes, so send in any programs you think might be of general interest and we can publish the listings. The cassettes will be returned as soon as possible.

LEON HELLER

* * * BASIC AND MACHINE LANGUAGE ROUTINES * * *

If you have tried to follow the level-2 manual when it describes how to utilise machine language routines from within BASIC programs, you have probably experienced some difficulty when passing data from the BASIC program to the routine. The following technique seems to work.

1. Place the machine language routine in memory using POKE, T-Bug or the Editor/Assembler. If you wish to pass a 16 bit signed integer from BASIC to the machine language routine, the first statement must be:

```
CALL   ØA7FH
```

2. Poke the low and high order bytes of the machine language routine into locations 16526 and 16527 respectively (in decimal, of course).

3. The instruction:

```
X=USR(N)
```

Where N is a 16 bit signed integer (-32768 to 32767) will commence execution of the machine language routine. Following the call ØA9AH statement N will be in the HL register pair.

4. If you do not wish to pass a value from the machine language routine back to BASIC, place RET at the end of the routine. To pass A 16 bit signed integer back to BASIC load it into the HL register pair and then execute:

```
JP   ØA9AH
```

On returning to basic the contents of HL will be assigned to the variable X used earlier in the USR call.

Here is a trivial program that illustrates the technique:

```
1Ø   FOR I = 2Ø48Ø TO 2Ø486
2Ø   READ P
3Ø   POKE I,P
4Ø   NEXT I
5Ø   INPUT A
6Ø   POKE 16526,Ø  :  POKE 16527,8Ø
7Ø   X=USR(A)
8Ø   PRINT X
9Ø   DATA 2Ø5, 127, 1Ø, 35, 195, 154, 1Ø
1ØØ  END
```

The machine language routine poked into 5ØØØH is:

```
CALL ØA7FH  ;  PLACE DATA IN HL
INC  HL     ;  INCREMENT HL
JP   ØA9AH  ;  RETURN TO BASIC
```

Programs

Nigel Libben of 97 Worth Clough, Poynton, Cheshire SK12 1SH has the following programs available. He says that anyone interested can send a tape for a copy. Please enclose a SAE of a suitable size and bearing sufficient postage.

1 NIM Mathematical game

3 MASTERMIND Game. A bit slow in working out computer moves, I intend to write a machine code routine for that part soon.

5 MATRIX MANIPULATOR Useful programme to create, manipulate a 13x36 matrix of product sales, evaluate revenue, expenses etc by multiplying columns by constants. Includes statistical summary, sorting, etc.

6 PLOTTER Histograms and graphs. Written but not debugged.

7 MULTIPLE REGRESSION Written, not tester. This and the plotter use data from the keyboard or from matrices set up by no: 5

9 MINOTAUR Game, graphic version of a game that was described recently in Personal Computing World.

11 SUB CHASE As 9 above.

12 NIM Game. A variation on no: 1

14 DATE Game. The old favourite, day of the week for any date 1900-2099 AD.

16 & 24 TESTERS Function testers written to show the errors in my TRS-80!

17 EDITOR Line editor. Mentioned under SYSTEM above. Useful to load before starting entering a new programme. Lines numbered from 25600 on.

18 MAZE Game. Based on the monster game in recent Pract. Comp.

19 FINANCIAL ANALYSER Rate of return, Present value, Annuities etc. Has a scratch pad memory to enable data to be stored or recalled temporarily, Scratch pad can be dumped to tape and is compatible with file format used by no: 5 above.

20 GRAND PRIX Game. Adaption of recently published game in Pract. Comp.

22 SPY Will list object code of BASIC ROM

NIGEL DIBBEN

A proposed standard for data files

If anyone is thinking of setting up a programme to handle and save data, may I suggest a standard for data filing: it is aimed to be flexible but economical. Each file is headed by a record containing:

"NAME", "NUMBER OF ROWS", "NUMBER OF COLUMNS" (alpha, numeric, numeric)

Subsequent records contain two strings:

"/value/value/value/.....", "C"

The values are strings concatenated into the single data string. If the value is zero, "//" will appear (saving 3 bytes). "C" stands for "Continues". The data continues from record to record and ends with another "/". The last record will then be:

"value/value/","E" (E for "End") Hence there will be (Rows*Columns) values and (RowsXColumns+1) slashes. NB Most important although there is nothing to say so in the Reference Guide, the length of the first string must not exceed about 246 characters. If it is 254 (as I originally tried), data will be lost. Following the data are two optional records containing row and column names as strings of 246 characters being 6 for each of rows 0 to 40 and columns 0 to 40. Eg: the final record could be:

"COLØ05ØAØØØØFEBØØØMARCHØAPRILØ ..... COLØ40"

Evaluation is by byte-by-byte analysis which is rather slow but saves tape and recording time. If checking a tape, beware! Just because you wrote say J = 1.234567 to file, when you read it back it will be 1.25457. Therefore, to check the value, one should evaluate ABS (actual date - recorded data) and compare with say .0005.

Another idea for filing matrices which I am going to work on is to Peek them from memory and print, byte by byte. Then every value will take 4 bytes of record and can by poked back into memory or rereading. The data record will of course be a string of the ASCII character equivalent. This way, no dividers "/" will be necessary and every record except the last one can be the same length, say 248 bytes of data + a "C". In the programme, a "VARPTR(M(Ø,Ø))" will locate the first byte. The head record and tail two records would stay the same.

NIGEL DIBDEN

As I am developing new markets for our lecturing material at Luton College of High Education (eg. Inspector of Taxes' Staff), I have pushed the college to allow us to set up a weekend workshop commencing Friday evening and finishing on say Sunday. As we are a new group, using my aeromodelling experience, more progress will be made by setting up regular working sessions. At the moment a weekend in the Spring is to be the first attempt to try the idea out. Assuming this to be a success, we should be considering at least 4 meetings a year. Obviously these can be organised at various places, but Luton being on the M1, will make an excellent try out. Quite simply, the concept is to allow interested (mad!) enthusiasts to enjoy the pure atmosphere of Tandy and more Tandy!. At least two rooms and various equipment will be available, and accomodation can be arranged for overnight members.

Perhaps some information on the User Group. Leon and I have set up the group with himself as Chairman and myself Secretary. I will publish the constitution next issue, to give you an idea of how this is being set up, to ensure the regular production of this newsletter and organise any events of interest.

A few notes about your "publisher" I met TRS-80 in the Luton branch of Tandy. The salesman wanted me to land a moon craft on the surface. I apologised and explained I only had one purpose, to maintain a clients ledger and associated tasks. Several weeks later the same person had devised a private ledger program, with a nice line in enquiry facilities. On the second visit I took the client along to see the marvel, and as a result he is now the Tandy dealer in Milton Keynes! His first order was mine, a Level II 4K and since its acquisition, it has knocked my radio control modelling into the background! At the moment, my colour T.V. is in one corner of my living room, with the Tandy in the other and has at last put paid to my nocturnal activities in the office.

My present projects are Balance Sheet, Profit & Loss, Journal and Private Ledger plus several others at the College. Having to teach accountancy students with varying success, the Tandy appears an excellent "self teach" aid. I have prepared a source and application statement program which awaits modifying by Leon and currently I am trying to put Deferred Tax, ACT and Corporation Tax on to a program.

BRIAN PAIN

Mr. D. Adams,
Ellis Guildford Comprehensive School,
Bar Lane,
Basford,
Nottingham.

Mr. I. Addinsell,
'Top of the Hill'
Windmill Lane,
Preston on the Hill,
Nr. Warrington,
Lancs.

Mr. P.C. Allen,
46 Slade Avenue,
Chase Terrace,
Walsall, Staffs, WS7 8EL

Mr. D. Austin,
'Heligan',
14a High Street,
Oakley,
Nr. Bedford.

Mr. D. Barrington,
Culmington Manor,
Craven Arms,
Salop.

Mr. S. Berry,
Old Rectory,
Tunworth,
Basingstoke,
Hampshire, RG25 2NB — 025 681 Long Sutton 436

Boraworth Ltd.,
56/58 Clarence Street,
Kingston, Surrey, KT1 1NH — 01-546-6885

Mr. D. Dallos,
22 West End Avenue,
Pinner,
Middx. HA5 1BJ.

Mr. L.H. Davies,
Glanmor,
Brynna Road,
Pencoed,
Bridgend,
Mid. Glamorgan,
CF35 6PD — 0656-8603[illegible]8

Mr. N.J. Dibben,
97 Worth Clough,
Poynton,
Cheshire SK12 1SH — 09967-77598

Dr. H.J. Eleina,
Room G54,
University of Bristol,
H.H. Wills Physics Laboratory,
Royal Fort,
Tyndall Avenue, Bristol, BS8 1TL

Mr. A.O. Ellefsen,
121 The Furlongs,
Ingatestone,
Essex CM4 0AL

Mr. E.A. Hardy,
16 Whitehouse Crescent,
Sutton Coldfield,
West Midlands,
B75 6ER

Mr. S. Houghton,
215 Woodlands Road,
Batley, WF17 0QS
West Yorkshire

Mr. T.S. Johnson,
78 Park Street,
Camberley,
Surrey GU15 3PF 0276-28333

Mr. S.M. Kendall,
7 Grant Gardens,
Stewart Road,
Harpenden, Herts. (05 8 27) 60218

Mr. E.C. Kilpatrick,
3a Gainsborough Street,
Sudbury,
Suffolk, CO10 6ET

Mr. J. Langdon-Shreeve,
45 Sussex Drive,
Chatham,
Kent

T.R. Martin A.C.A.,
8 Bovingdon Road,
Fulham,
London, S.W.6. 01-736-6582

Mr. N. Mukherjee,
71 Deepdale Drive,
Rainhill,
Liverpool, L35 4NN

Mr. B. Morris,
Holborn Hill Farm,
Oving,
Nr. Aylesbury

Mr. J. Morris,
"Criffel"
Cwrt Bryn-y-Bia,
Craigside,
Llandudno, Gwynedd 0492-47623

Mr. M.J.A. Roots,
10 Tosthill Gardens,
Bishopbriggs,
Glasgow

Mr. J. Seifert,
Associated British Consultants (Computes) Ltd.,
100 College Road,
Harrow,
Middx. HA1 1EW 01-863-8555

Miss A.M. Sutton,
Electron Systems (Sandy) Ltd.,
6 Park Road,
Sandy,
Beds. SG19 1JB 0767-81195

Mr. P.C. Thompson,
The Waltham Roll Bar School,
New Waltham,
Grimsby,
South Humberside,
DN36 4RZ 0472-825508

Mr. B.C. White,
'Windrift'
Edgreave Lane,
Astwood Bank,
Redditch,
B96 6BX Astwood Bank 2909

Issue 3

TRS--80 USERS GROUP NEWSLETTER

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EDITOR'S PAGE

Well, here is the third issue of your newsletter. You will notice an improvement in the quality of reproduction, I hope; we are now having it printed using offset litho.

We are still in need of your contributions! They seemed somewhat conspicuous by their absence, so I took the liberty of publishing a letter by one member explaining why he could send us anything! In fact it made a very good article.

We are sending copies of this publication to PCW and Practical Computing, so that we can get a bit of publicity. We are also sending copies to Tandy, so if you feel that any of your requests to Tandy seem to be disappearing into a black hole, let us know, and PCW or Practical Computing might mention the problem in their pages. A little adverse publicity might shake them out of their complacency!

SOFTWARE EXCHANGE SCHEME

Dear Leon,

Many thanks for your letter and phone call, I was most pleased to hear that my offer has been accepted, I have now been thinking about the system for running the service, I would therefore suggest the following:

1. Members should at first send to the Library any programs they wish to donate (Level 2 only) recorded on one side twice ie. PROGI : PROGI. to ensure correct recording. (This procedure only to start the library going).
2. They should print on the cassette their name and address (so they get their own tape returned)
3. They should enclose a list of the programs on the tape for index and catalogue purposes (separately).
4. They should enclose stamps to the value of the return postage (I repeat STAMPS !!!!!!!)
5. Cassettes should be sent in either small size "Jiffy" bags or cassette mailers which can be re-used so I can return cassettes in the same to reduce packaging costs.
6. Until I have sufficient programs to warrant a catalogue, they should indicate on their own list of programs the type of program they would like sent to them. Such as games - Business What Type - etc This program will then be sent to them on the other side of their own tape, if they do not want the programs they sent me returned I will use both sides of the tape with each program recorded twice.
7. When catalogue is produced each program will be numbered, and described, members will send me a tape indicating if there's a program for the library for filing, and the number/s of the program/s required. These will be recorded twice as I mentioned before, check loaded, then despatched to the member as soon as possible.

Leighton Davies,
Glanmor, Brynna Road,
Pencoed, BRIDGEND.

MEMBERS' NEWS

Nigel Dibben seems to be having a lot of trouble with his system. Tandy delivered an allegedly repaired unit to his home one evening. The cassette interface relay which had just been replaced failed again and Tandy left taking the recorder with them! Apparently it was drawing too much current. Later the same evening the system failed due to overheating, as had the previous two units.
Dick Foden is currently on his third keyboard unit also: Is this a record?

Brian Pain has purchased a UHF modulator from Newbear. When connected, this £3.50 device should enable him to use an ordinary TV for display, with a few adjustments to the vertical and horizontal hold controls because the American video standards differ from ours. Contact him for further details.

Dear Mr Heller,

Thank you for taking the trouble to contact me direct. You caught me at time when I was rather tied up, at present I am not quite in a position to write articles.

I have a program to design an 8th Order Low Pass Butterworth filter that reduces the calculation time from 3 hours to 10 minutes for a fully optimised circuit and an accounting program that collates and analyses the time spent on behalf of a client by several employees but suspect that neither of these would be of general interest.

The ROM programmer is in the building stage and is not properly thought out in that I am undecided as to whether to go for a stand alone unit with its own memory or to interface it with the Tandy.

In due course I would be pleased to contribute to your newsletter but with evening classes, an OU course, a Tandy that is giving trouble, a printer that is blowing fuses, I have to get these thing sorted out first.

I enclose a listing that may be of interest; this allows examination of the Tandy ROM by display of a Hex dump. The address is in decimal.

HEX DUMP

```
5     CLS
10    PRINT : PRINT
15    INPUT " STARTING ADDRESS IN DECIMAL"; T
20    CLS
25    FOR I = T TO 12500
30    IF I = 60 + T THEN 100
35    N = PEEK (I)
40    A$ = " "
45    FOR J = 1 TO 2
50    Q = INT (N/16)    :R = N - 16 * Q +48
55    IF R>57 THEN R = R + 7
60    A$ = CHR$ (R) + A$   :N=Q
65    NEXT J
70    PRINT I ; "    ";A$;,
75    NEXT I
80    END
100   INPUT "ADD 1 " ;T
105   CLS
110   GOTO 25
120   END
      £ = £
```

David Dallos

LOW COST MEMORY

Stanley Houghton tells me that he now has sufficient people interested to enable the bulk-buying scheme for 16K RAMS to get off the ground. However, we have decided that members will probably be better off buying their memory individually from the States. One problem with the bulk-buying method is what happens if a faulty part is received. The faulty chip will have to be returned to Stanley for return to the supplier, as he will have been the customer, in effect. This could introduce a considerable delay in the replacement of the faulty item.

The cheapest source in the UK is:

V and T Electronics,
82 Chester Road,
London N 19 £56 + VAT (8%) + 40p postage.

The cheapest source in the States appears to be:

California Digital,
Post Office Box 3097 B,
Torrance,
California 90503,
USA $ 65 + 10% carriage.

They accept Barclaycard/Visa and Access/Master Charge; just quote the number when ordering. Be prepared to pay about 20% duty and VAT, however! Duty might be reduced if you ask that the parcel be labelled: "Computer Parts".

In the next issue we will tell you how to install the chips and modify the jumpers.

Leon Heller

The workshop date has been fixed **for Saturday, 28th April.**

We have been given three lecture rooms by Luton College of Higher Education. These room are available from 10am to 4pm, on Saturday, and refreshments will be available. These will consist of coffee (am) tea(pm) with a buffet for lunch. The cost will be £6 for the day, and cheques should be made payable to "TRS-80 Users Group". For those members who will be travelling down on the Friday evening, we can book you into a hotel at Luton where perhaps an informal meal can be arranged to establish common points of interest.

As we have three rooms available for our first workshop, a series of short presentations will be set up in one room, where there is a 4 board - blackboard and overhead projector available. Any suggestions on presentations will be most welcome. One or two guests will be along on the Saturday, and possibly one or two suppliers may be persuaded to either make a presentation or bring some equipment along.

Brian Pain

David Alletson has a 4K Level 2 Machine which is used purely for personal amusement at present. He is however, in the process of writing some programs relating to his work in the Dealing Room of an American Bank (Money and Foreign Exchange). He is also interested in low-cost memory expansion and economical hard-copy print out; two items dealt with in this issue.

DISCOUNT SOFTWARE

A.J. Harding of:
28, Collington Avenue,
Bexhill - on - Sea.
E. Sussex.

distributes an interesting range of TRS-80 software and offers members a 10% discount. Contact him for further details.

MACHINE LANGUAGE PROGRAMMING. (PART 1)

Many members have said that they would like to learn how to use machine language with their TRS-80. Over the next few months we shall be producing a series of articles on this subject, starting from first principles. Commencing this issue with an introduction to number systems we shall then describe the operation of a simple hypothetical computer, and how to program it in machine language. You might ask why we don't start off with the Z-80, but the Z-80 is rather difficult to use if you are a beginner, hence the hypothetical machine. I hope to write a simulator in Level 2 BASIC for this machine, which should make the learning process relatively painless. We will then progress to the Z-80 and deal in detail with the instruction set and the use of T-BUG, the machine language monitor. Finally, the Editor/Assembler will be discussed and the process of developing, assembling, running and debugging a complex program will be described. If any other members can help with this series I would be very grateful.

Leon Heller

A Low-Cost Serial Interface

Using a few inexpensive components an RS-232 serial interface can easily be constructed for the TRS-80 enabling the machine to be used as a terminal for connection to another computer (either directly or via a modem). The unit also allows a printer to be connected without the need for the Expansion Interface. Appropriate software will also be required and this will be covered in the next issue. The circuit connects to the Expansion Port of the keyboard/computer unit via a 40 - way connector.

Circuit Description.

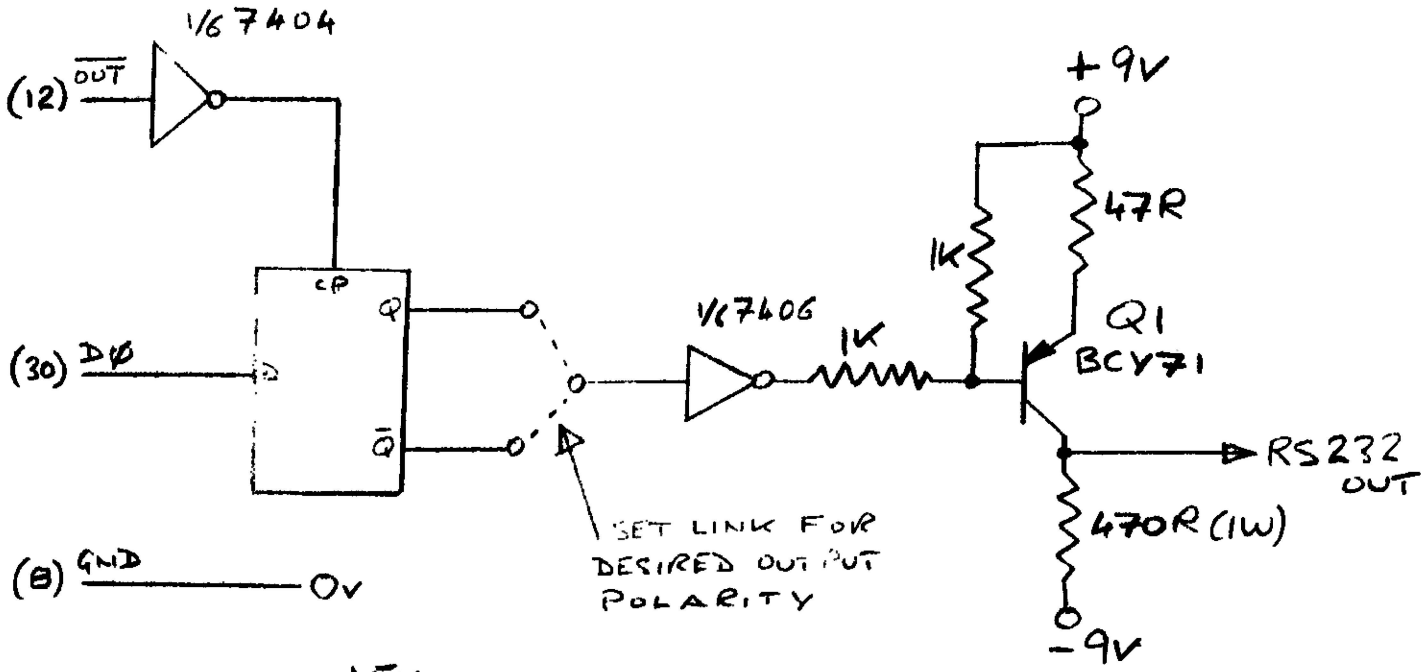
The power supply delivers a nominal +12v, -12v and +5v to the interface circuitry. Q1 and Q2 perform the necessary conversion from TTL to RS-232 and vice-versa. A 74125 tri-state buffer is used for serial input and one of the latches in a 7475 is used for serial output. To keep the circuit as simple as possible no address decoding is used, so the circuit can be used with software like the 'Electric Pencil' and RSM - 2 which use bit 0 of port FFH or 255 decimal for serial output to a printer (the cassette output line,in fact).

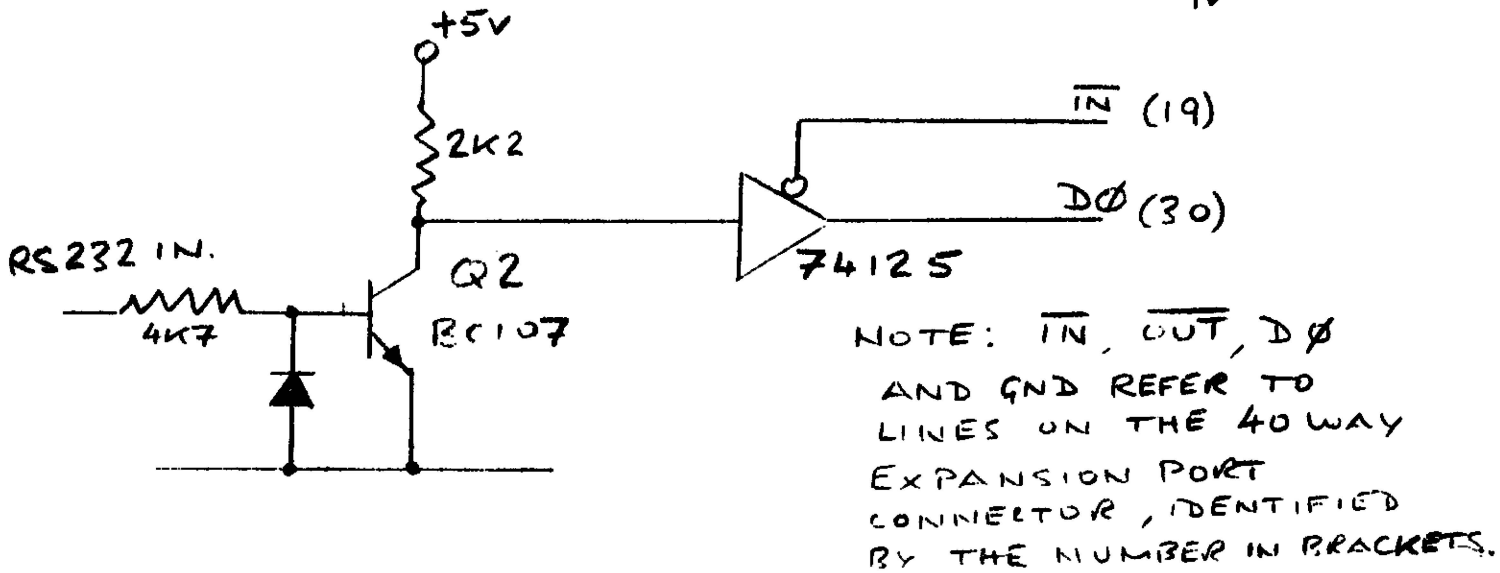
Construction

Any convenient construction method may be used as layout is non-critical. I used wire-wrap for the prototype but will eventually be constructing a small printed circuit. A DB-25 connector will be needed with the pins connected as follows:

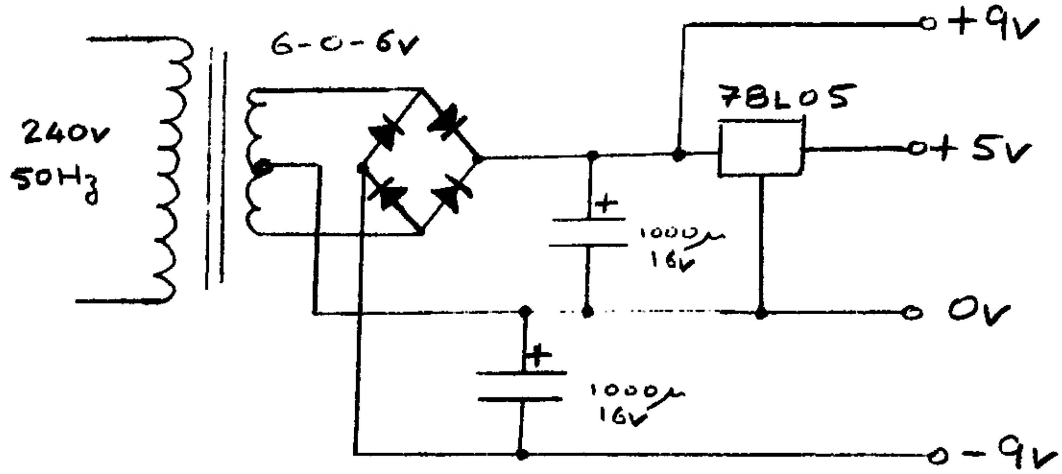
pin 1	Chassis ground
pin 2	Data to TRS-80
pin 3	Data from TRS-80
pin 7	Common return (signal ground)

Leon Heller





POWER SUPPLY.



KEYBOARD BOUNCE

Here is a keyboard debounce routine for Level 2, originally published in the US TRS-80 Users Group newsletter.

```
1Ø  FOR N = 16488 to 16492
2Ø  READ K : POKE N, K : NEXT
3Ø  FOR N = 16435 TO 16437
4Ø  READ K : POKE  N, K: NEXT
5Ø  POKE  16405, Ø
6Ø  DATA 2Ø5, 227, 3,183, 2ØØ, 14, 4Ø
70  DATA 16, 254, 13, 32, 251, 2Ø1, 195, 96, 64
80  NEW
```

The last data item in line 60 determines the delay period. Run this program after switching the system on. It will run and then delete itself, introducing a delay loop into the ROM keyboard scan routine, which Tandy should really modify free of charge.

LEON HELLER.

TRS-80 USERS GROUP CONSTITUTION (DRAFT)

1. The name of the Groups shall be "TRS-80 USERS GROUP".

2. The affairs of the group shall be administered by an executive committee consisting of three persons - Chairman, Secretary and one other.

3. The aim of the Group is to further those interests which relate to the TRS-80 Home Computer.

4. The Group's AGM shall be held during the fourth weekend of September (before the winter, after the holidays).

5. Any amendment to the constitution shall require a majority of 75% of those entitled to vote at the meeting.

6. Any amendment needs to be published at least 30 days before the proposed meeting, and the proposed resolution advised to paid up members 21 days before the meeting.

7. A member shall be a person who has paid the current subscription.

8. The Publisher of the Groups newsletter shall have his agreed costs reimbursed by the Group.

9. A quorum shall consist of four persons.

10. The Chairman shall have a casting vote.

11. Members attending the AGM shall decide on the need for a committee during the forth-coming year and it's composition.

PROJECT TO DRAFT ACCOUNTS FROM A TRIAL BALANCE

This is for those of us who have to prepare accounts and then make alterations before finalizing those accounts.

At the time of writing I only have two trial balances on the following system. In essence each trial balance entry occupies one line. When I "RUN" my trial balance, the new trial balance column totals are printed with the profit, so the TB sheet can then be altered. Next, parts of the balance sheet (Fixed Assets) can be 'RUN' and the necessary schedules completed.

It can be seen that various stages of the accounts can be kept economically without recourse to copiers or typing facilities. I have incorporated into the journal schedules, a before and after balance to keep a record of a figure that has changed when preparing the accounts.

From the trial balance structure the lines are well spaced out but this can be varied to suit the user. The equations do all the "Hard Grind" of recasting the trial balance and transferring of figures from the TB to balance sheet (BS) or profit & loss (PL). The timer sub-routines enable the user to delay the clearing of the screen between schedules once finalised can then be used by a typist (with the appropriate delays between each schedule) or just print out direct.

If anybody wants to have a chat about the above please contact me and we can swop notes on short cuts and use of printers.

Brian Pain.

TRIAL BALANCE PROGRAM STRUCTURE

1st COLUMN	0-200
2nd COLUMN	201-300
3rd COLUMN	301-500
4th COLUMN	501-700
TB AGREEMENT EQUATIONS	1000-1200
PRINT TB	1201-1299
STOP	1300
BUDGET INFORMATION	1300-2000
FIXED ASSETS	2201-2221
CURRENT ASSETS	2222-2240
CURRENT LIABILITIES	2241-2300
CAPITAL	2301-2340

TRADING ACCOUNT TO FOLLOW

PROFIT & LOSS TO FOLLOW

Brian Pain

NUMBER SYSTEMS

In the decimal numbering system everyone is familiar with, the location of each digit has a weighted value, the weight being unity for the least significant digit, and increasing by a factor of ten for each successive digit to the left. Thus the number 132 is equal to:

$$(2 \times 1) + (3 \times 10) + (1 \times 100)$$

ie. 2+30+100=132

The decimal system, however, is not really suitable for computers, and the binary system is generally employed internally, although this might not be apparent to the user, especially if he is using a high level language such as BASIC.

The binary system uses two symbols, conventionally 0 and 1, whereas the decimal system uses ten symbols; 0 - 9. As in the decimal system, the location of each digit (binary digits are generally referred to as bits, by the way) has a weighted value which increases by a factor of two for each more significant bit, the least significant bit having a weight of unity. The binary number 10110 can be represented as:

$$(0 \times 1) + (1 + 2) + (1 \times 4) + (0 \times 8) + (1 \times 16) = 22$$

in decimal.

Binary numbers can be added, subtracted, multiplied and divided just as easily as decimal numbers, easier in fact; as there are only two symbols the relevant tables are extremely simple and require virtually no learning. The most important operations are addition and complementing as all other operations can be performed by repeated application of these two, although shift operations are generally employed in multiplication and division.

0 + 0 = 0

0 + 1 = 1

1 + 1 = 10

The complement of 1 is 0, and the complement of 0 is 1.

Here is a typical addition in binary:

$$\begin{array}{r} 10110 \\ +\ \underline{101} \\ 11011 \end{array}$$

Note the carry from the third digit (1 + 1 = 10).

To complement a binarynumber change all the 1s to 0s, and all the 0s to 1s.

Here is a typical subtraction:

```
  10110
- 101
-----
  10001
```

You might like to convert the binary numbers to decimal and check these sums.

Binary is fine for computers, but strings of 0s and 1s are rather difficult for human beings to remember. Hexadecimal notation (usually abbreviated to HEX) enables binary numbers to be recoded in a much more memorable form. Whereas the decimal system uses the ten digits 0 - 9, HEX uses 16 digits: 0 - 9 and A, B, C, D, E and F, the digits A - F representing the decimal numbers 10 - 15. Binary numbers can readily be converted to HEX; split the number into groups of four bits from the least significant bit (the right-most one) and then convert each group into a decimal number between 0 and 15 as described earlier. Then convert the decimal values of each group intp HEX. For instance, 10111100 can be split to form 1011 1100. 1011 = B and 1100 = C, hence 10111100 is BC in HEX. It is quite easy to convert HEX directly into decimal using powers of 16 as weights. The least significant digit of BC is C or 12 decimal with a weight of unity. The next digit is B or 11 decimal with a weight of 16. BC in decimal is therefore 12 + 11 X 16 or 188. Converting 10111100 directly we get:
0 + 0 + 4 + 8 + 16 + 32 + 128 = 188.

Leon Heller

TRS--80 USERS GROUP NEWSLETTER

Issue 4 May 1979

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6. BASIC hints
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Editorial.

As you will no doubt notice, this fourth issue of the newsletter is considerably larger than the last. I hope you find it interesting and informative. I would greatly appreciate some feedback from members as to what they think of the publication, and any ideas you might have for improving it. I would also like to implore members to let me have more material for inclusion, as I feel that I am writing too much of it. It is not really that I object to doing this because of the work involved (although it does take up rather a lot of my time that could be used for playing with my system) but because it is somewhat "incestuous" if the Editor writes most of the copy himself.

I have had some problems with the software for the serial interface; I should have sorted things out for the next issue.

Editor:

Leon Heller,
8 Morris Walk,
Newport Pagnell,
Bucks. MK16 8QD

Publisher:

Brian Pain,
40a High Street,
Stony Stratford,
Milton Keynes.

LUTON WORKSHOP

Luton College of Higher Education kindly provided three rooms for the workshop. One was for presentations, the second for equipment demonstrations and the third, most important of all, was for the food and drinks provided by Jackie Pain.

One thing that became apparent is that our members are a little thin on the ground, so most members would have to travel some distance to attend a workshop wherever we held one. On this point the Hull Users Group and a 6502 Group (Based in Luton) were contacted and a current proposal is to hold a joint workshop; the College have offered rooms if we would like to use Luton again.

Due to the initial lack of an audience, we delayed the first presentation by Leon on word processing until a few more arrived. In the meantime those present enjoyed a coffee and introductions were made and common areas of interest found and explored. Before we go any further, I can assure any interested member, it was an accident finding myself locked in the lift, and not an excuse found to duck out of preparing any food or wash up the coffee cups. The thought never occurred to me!

Eventually Leon did present his current work on word processing and using the "Electric Pencil", he outlined various features available to the user. Later John Harding demonstrated another type of program similar to the "Electric Pencil", but in BASIC, whereas the "Electric Pencil" is in machine language.

The session on word processing showed that the workshop approach was valuable, as the formalities were kept to the minimum and each person could interupt Leon and put a question while the matter was being explained and/or displayed on the screen.

Leighton Davies then showed how he uses his TRS-80 to either send morse using his keyboard or receive morse which is then shown on the screen. He explained that he can now display on the screen news agency messages eg. Reuters. It became obvious to members that this could be output as hard copy and given to the local press for their own scoop (Ed. - This might be illegal!). Another point to be emphasised by this presention is the possibility of TRS-80s communicating via the telephone line (acoustically coupled of course). This could interestmembers in developing low cost information transfer systems between themselves without incurring the wrath of the Post Office.

We then had Electron Systems and Tony Blaskowski putting their equipment on show, with the latter demonstrating some programs currently available. I thoroughly enjoyed the interchanges of ideas, most were quite beyond my own current experience and knowledge. About this time Mr. Kilpatrick proved that his expansion interface did infact work, although at on stage he could not see the unit being tested, no one wanted to switch off.

Lunch time arrived and here we had a sit down running buffet(!) A buffet was available and so were convenient tables and comfortable chairs. The lunch time was spent with members again discussing common interests and developing ideas or explaining solutions to various problems. Again this is where the workshop was enjoyable

with constant technical exchanges at various levels. Having first put the idea forward, I sat at the lunch tables seeing a germ of ideas bear fruit.

In the afternoon John Harding who markets a wide range of software put some programs on display and then went into more detail about current programs available. He explained that interest in games was possibly waning and more interest was being shown in business applications. Here he explained that we could turn our hobby into something that would help to finance further equipment acquisitions or even the housekeeping. It might be of use to members to have a precis on John Harding's latest additions with each issue of this newsletter.

The final formal presentation was by myself on my current application of the TRS-80 to my everyday work in the small office. Run by using the blackboard the specific accounting problem was outlined preparing a Trial Balance and drafting accounts. Then the next applications were outlined - Income Tax forecasting - from the Trial Balance - Budget compared to actual - and a standard costing! Reporting routine where poor results are the only variances reported. We did have two members who were interested in small business accounts and demonstrated how easy it was to build up a Balance Sheet Structure from the initial program. Subsequent to this explanation, another three businesses have been put on the TRS-80 and has now become part of the office routine.

Personally the day was worth setting up, and members will be canvassed before we finalise future workshops. We have been offered the use of the College again and possibly with more notice (say 6 weeks) members can make arrangements to come and enjoy the College facilities and each others enthusiasm for their hobby.

BRIAN PAIN

High-resolution graphics.

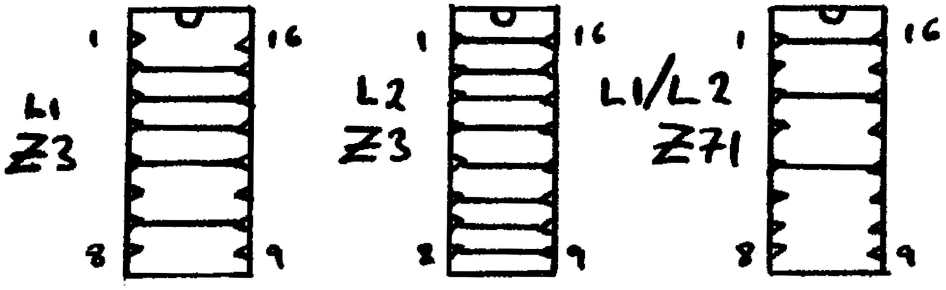
Stanley Houghton is having some fun interfacing a high-resolution graphics board to his TRS-80, using a dedicated Acorn micro (6502 based) communicating with the TRS-80 via an eight bit output port. To aid him in the process of writing 6502 code he is writing a cross-assembler to run on the TRS-80. He is also in the process of constructing an EPROM programmer which will interface to the TRS-80.

LOW-COST MEMORY EXPANSION

As promised in the last issue, here are the details of how you expand your keyboard unit to 16K. Most of the memory expansion kits contain detailed instructions, but some members might like to see what is involved before spending their hard-earned cash.

First of all, the unit must be dissassembled. Turn it upside-down and remove the six screws securing the two halves of the case. The screws are not all the same type so make sure you are able to put them back in the right positions. Turn the unit over and remove the top half of the case. If your LED is mounted in the top of the case, push it out of the holder from the top, leaving it attached by its leads to the keyboard assembly. Later models have the LED mounted on the keyboard assembly. Carefully lift out the keyboard assembly - it is mounted on pillars - taking care not to damage the flexible cable between the keyboard assembly and the main PCB and remove the spacers between the keyboard and the main PCB. Lift out the keyboard and main PCB as a unit and place them so that the component side of the main PCB is uppermost.

Locate the two DIL jumpers (Z3 and Z71) and replace with two jumpers made up as shown:



Using an IC extraction tool, remove the 4K RAMs (Z13-Z20) and insert the new 16K RAMs. To prevent any damage that could be caused by static it would be advisable to touch the large power transistor whilst holding the new ICs in their protective packaging, before inserting the new RAMs. This will ensure that you, the PCB and the new chips are all at the same potential. Reverse the sequence to reassemble.

Make sure the ICs are correctly orientated, and check carefully that all the leads are located in the sockets and that none are bent under the IC body.

Leon Heller

BASIC hints

The following are a few hints in BASIC use, not (as far as I know, mentioned in the reference guide:

1. Editing

By using the 'C' command, control characters can be edited into statements: eg: try the following:

```
Type:  10 PRINT"TITLE*====="   +        (+ means enter)
       EDIT.   +
       S* C+   +              (search for '*'; change to 'enter')
```

The line will now RUN as: TITLE
=====

Each time this is done, it can save a byte of memory compared with ':PRINT' and can also be done with the other control characters as follows:

ASCII value	Edit in as follows	Prints out as
8	back-arrow	backspace, erase
9	forward-arrow	no effect
10	down-arrow	carr return
13	enter and (enter)*	" "
24	(back-arrow)	backspace
25	(forward-arrow)	forward space=32
26	(down-arrow)	feed down
27	(up-arrow)	up feed

* () means shift-.

These facilities affect listing so that the line 10 above lists as:

```
10 PRINT"TITLE
=====
```

This can appear a bit confusing but makes entry of blocks of text easier and can be used to put a fancy heading on a listing!*

2. Print statements

Enough about editing. Have you noticed that semicolons can frequently be left out of print statements as long as the items in the list are distinguishable to the computer: eg:

10 PRINT"VARIABLE 1 ="V1" VARIABLE 2 = "X(J+2)Z$J

where Z$ could be "VARIABLE 3 =" and so on. Variables appear to be distinguishable provided they end with a bracket or one of the definition characters. Also, USING can be placed anywhere in a PRINT, even after @:

eg: 10 PRINT@64,A;B;USINGF$;C;D; Only C & D will be formatted. There can only be one USING in any one PRINT. @ must follow PRINT

NB. Clear gives ASCII'31' so:

10 IFINKEY$<>CHR$(31) THEN 10 is a handy "holding" loop for a display. Press (CLEAR) to continue else wait.

NIGEL DIBBEN

A point to watch.

Happy Memories, one of the suppliers of low-cost memory for the TRS-80, tell me that Texas Instruments 16K RAMs are unsuitable for the Expansion Interface, due to their speed characteristics. Motorola and NEC devices are suitable, however. Stanley Houghton confirms that this is a problem, and tells me that if you mix the Texas and NEC devices there will be no difficulties.

Leon Heller

Tape formats.

I have managed to analyse the structures on tape as:

1. System tape.

Following the sync byte (A5) readable bytes are:

U	1 byte (55H)
file	6 bytes space filled
<	1 byte (3CH) flag
count	1 byte representing 01H to 100H (as 00H)
load addr.	2 bytes (LSB and MSB)
data	<count> bytes
checksum	1 byte (adds to zero)

(< to checksum is repeated as necessary)

X	1 byte (78H) flag
entry point	2 bytes (LSB and MSB)

Note: assembler entry point is 468AH and storage is from 4300H to 5BFFH).

2. Source tape.

D3H	1 byte file marker
file	6 bytes space filled
line number	5 bytes (see below)
space	1 byte
line data	arbitrary length
0DH	1 byte EOL marker

(line number to 0DH flag repeated as often as necessary)

1AH	EOF flag 1 byte

The line number is in BCD with bit 6 set

3. BASIC tape.

D3H	)
D3H	) 3 byte file marker
D3H	)
name	1 byte file name
line	as in core (see below)

(line is repeated)

0000H	2 byte EOF flag

Keyboard debounce routine.

In the last issue we published a BASIC program that alleviates the keyboard bounce problem. Here is a machine language version that works somewhat better. It is virtually identical to one due to A.J. Harding that was recently published in Practical Computing; his program had an error in the assembled object code that has been corrected in this version. I assembled it to start at 7FC9H for a 16K machine.

```
7FC9: AF 11 ØA ØØ CD ØB ØØ 19 22 16 4Ø CD 61 1B C3 19
7FD9: 1A 21 36 4Ø Ø1 Ø1 38 16 ØØ ØA 5F AE 73 A3 2Ø Ø8
7FE9: 14 2C CB Ø1 F2 E2 7F C9 5F C5 Ø1 DC Ø5 CD 6Ø ØØ
7FF9: C1 ØA A3 C8 C3 FB Ø3
```

You will need T-BUG or RSM-2 to enter this into memory; you will then be able to save it on cassette so that you can load it when required as a SYSTEM tape. Alternatively you could work out the decimal equivalents of the Hex code above and POKE the program into memory using a BASIC program. I will be sending Leighton Davies a copy of the program on cassette for inclusion in the software library he is organising; get in touch with him if you would like a copy.

Leon Heller

line format is:

pointer to next line in core	2 bytes LSB and MSB (eg. first is 42E9H + line length + 5)
line number of BASIC line	2 bytes LSB and MSB
line data	arbitrary
00H	1 byte EOL flag

Stanley Houghton

Useful ROM routines.

I have been examining the Level 2 ROM with the aid of the RSM-2 disassembler, and came up with two subroutines that might be of interest to anyone using machine language. CALL 49H will scan the keyboard and return with the ASCII representation of the key pressed in the A register. The character is not displayed, of course. CALL 60H calls a 16 bit delay subroutine, the delay being dependent upon the contents of the BC register pair. The delay is 26 machine cycles per loop, plus the time for the return from the subroutine.

Examples:

```
        CALL  CLS
LOOP    CALL  49H
        CALL  33H
        JR    LOOP
```

This little program will clear the screen (assuming you have a screen clear subroutine called CLS) and then display anything typed on the keyboard on the screen.

```
        LD    BC,0FFFFH
        CALL  60H
```

This trivial pieee of code gives a delay of around one second.

Leon Heller

MACHINE LANGUAGE PROGRAMMING. (Part 2)

Last time we dealt briefly with the different numbering systems that are used by digital computers. We shall now learn how a simple computer operates, and you will be introduced to the architecture of the hypothetical machine which you will, hopefully, learn to program in machine language.

All digital computers function by executing a limited number of operations. These operations might be, for example, moving information from one part of the computer to another, or taking in information from an input, doing something to it , and then transferring the modified information to an output. Or, logical and arithmetical operations such as adding two numbers together can be performed. The computer is ordered to execute a particular operation by giving it an instruction; each instruction is coded as a sequence of binary digits or bits, and can be represented as a sequence of 1s and 0s as described in the previous article.

Only one of these instructions can be executed at a time, and therefore to perform any given task a whole sequence of these instructions must be executed. Such a sequential list of instructions is called a machine code or object code program. The BASIC interpreter in your TRS-80 in fact examines each line in your program, and then carries out an appropriate sequence of instructions that are stored inside the Level 1 or Level 2 ROM in the form of machine code. Languages like FORTRAN use a compiler to convert a source program into machine code which is then executed, rather than executing the FORTRAN program direct.

Obviously it is not feasible for these instructions to be fed to the computer one at a time by an operator, and they are contained in a store inside the machine; program memory in Figure 1.Each instruction is transferred from the memory to the CPU where it is decoded by the control unit and executed.

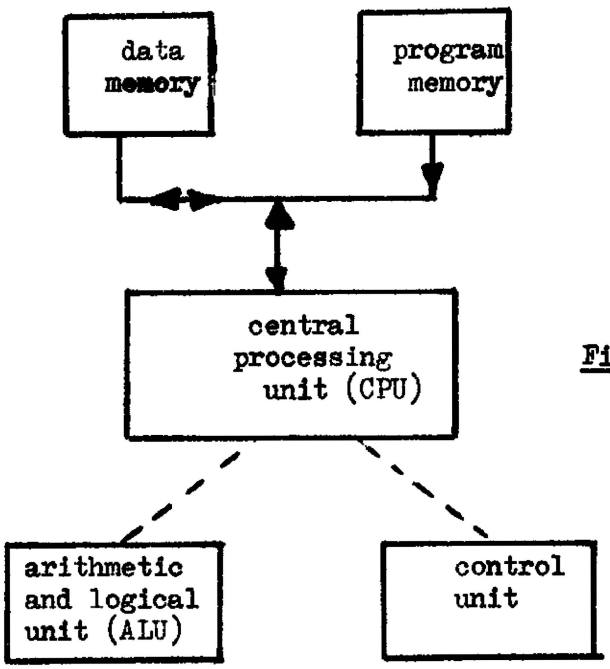
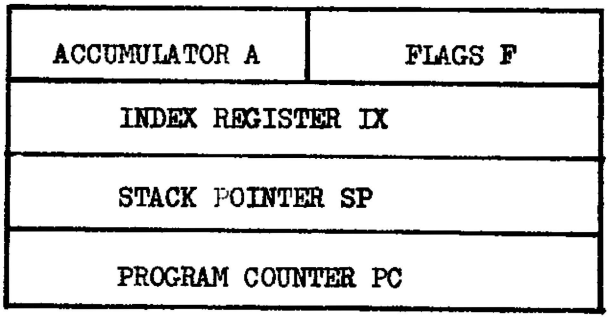


Figure 1

The arithmetic and logical unit (ALU) actually carries out the desired operations upon the data. The ALU contains a number of registers that are used for holding data during arithmetic or logical processing.

Our hypothetical machine (which I have christened DUM, an acronym for Digital Useless Machine) has a very simple architecture consisting of a stripped-down Z-80, the CPU used in the TRS-80. DUM (Figure 2) is an 8-bit machine with a 16-bit address capability. That is, it can act upon units of data 8 bits in length, and 16 bits are available to identify memory locations.



The accumulator is an 8 bit register that is used for arithmetic, logical and memory transfer operations. For instance, addition of two 8 bit numbers is done by placing one of the numbers in the accumulator, and then adding a number contained in a specified memory location to the number in the accumulator. The sum of the two numbers will then be in the accumulator, and can then be transferred to a memory location, or used in a further operation. Transferring data from one memory location to another is done by placing the data in the accumulator first, and then transferring the data in the accumulator to the desired location.

The flags register is an 8 bit register; only the first three bits are in fact used. These bits indicate whether certain operations result in a zero or non-zero result in the accumulator, a carry from the most significant bit, or a result that is positive or negative. These flags, as they are termed, are of considerable use in transfer of control within a program. For instance, if a jump is needed to a different part of the program if the result of an addition is zero, the zero flag can be tested and an appropriate jump made if it is set (logical one).

The index register is used as a pointer to memory. The contents of a memory location pointed to by IX can be, for instance, loaded into the accumulator. This type of operation is very useful for manipulating tables, for instance. IX can be incremented or decremented by appropriate instructions.

The stack pointer can be used to point to a dedicated portion of memory that can be used as a stack or Last In First Out (LIFO) store. When a subroutine is called, the program counter is pushed onto the stack. When a return from the subroutine ocurrs, the PC is popped off the stack and normal program execution is resumed. The stack pointer also comes into use when registers are saved on the stack, for instance, when a subroutine is called that makes use of the accumulator the contents of the accumulator often have to be saved.

The program counter always points to the location in memory where the next instruction is to be found. Unlike the other registers

the program counter cannot be manipulated by the programmer. When the CPU is reset, the PC is set to 0000H; the first memory location.

The next article will introduce the DUM instruction set, and some examples of DUM machine code programming will be given. Concepts discussed in the above article will be much clearer if some actual code can be examined.

Leon Heller

For sale:

4K Level 1: £325
16K Level 2: £490

Further details from:

Richard Mortimore,
73 Park Road,
Hampton Hill,
Middx. TW12 1HU

Telephone: 01-979 4546

TRS--80 USERS GROUP NEWSLETTER

Issue 5 July 1979

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EDITORIAL

This fifth issue is the biggest yet, with something for everyone, I hope. Please let me know what you think of the material we are including, and send in contributions on any TRS-80 topics.

Leighton Davies has suggested we give the newsletter a proper name; have any of you got any bright ideas?

Please note Leighton's plea for programs for inclusion in the software exchange scheme. Youdo not have to send him a program to make use of the scheme, but it would help if you did.

We hope to hold another Tandy Workshop in Luton on the 14th September. Brian will be sending out the details soon. We will also be publicising it in the computing magazines.

Leon Heller.

CHEAP MEMORY EXPANSION

Comp Computer Components are selling 16K expansion kits for the TRS-80 for £49.00 plus VAT. I have just installed one of these in my expansion interface, giving me a total of 32K, and it works perfectly. John Gardener told me of this special offer, and I understood from him that the chips had been salvaged from some circuit boards. However, when I received the kit I was very pleased to find that it was one of the standard Ithaca Audio chip sets. Contact Comp on 01-441 2922.

Leon Heller.

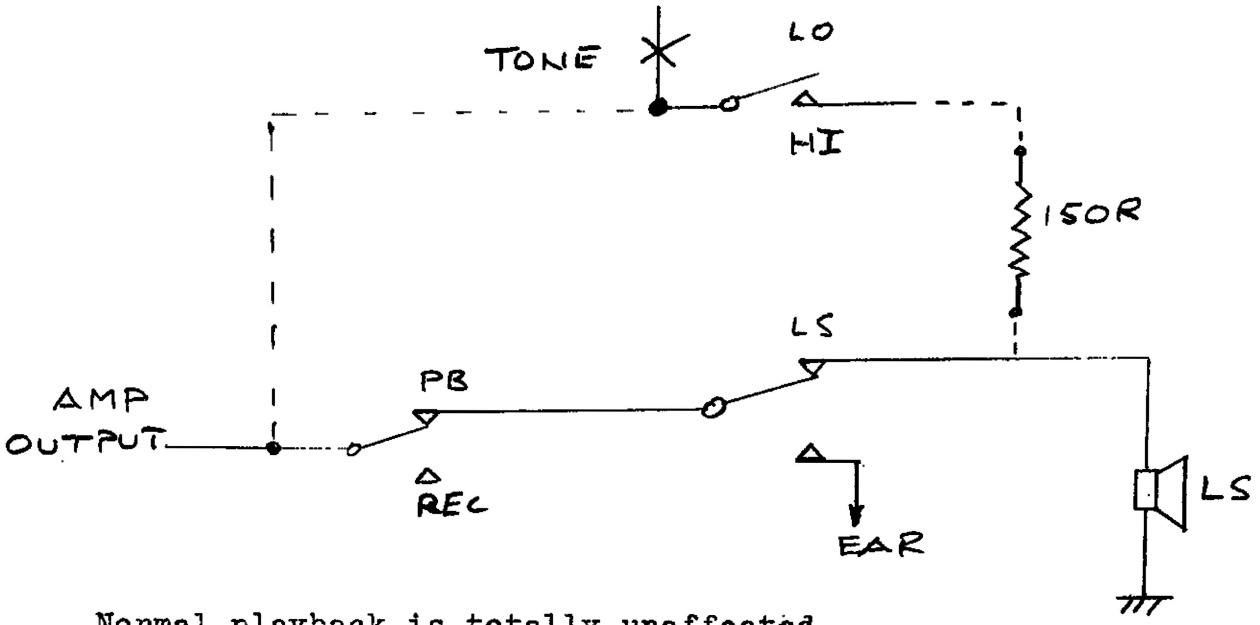
CASSETTE MOD

Anyone with a CTR 41 can consider mounting a push-to-make switch on the top in parallel with the computer controlled remote. There is space between the logo: CTR 41 and the opening door for a mini pushbutton. Using this, one can wind forwards fast and slow.

Also, you can cut out the tone switch (leaving it in the HIGH state) and use it in series with a resistor (anything between 75 and 180 has worked) to provide low volume switchable monitoring of CLOAD and CSAVE. You can soon learn to recognise different types of data and also can cue up (using the push button mentioned above) on the program leader. Another advantage while loading long programmes is to be able to go away from the machine to do something else and hear when loading is complete.

Diagrammatic circuit:

____ Existing X cut -.-. new



Normal playback is totally unaffected.

Nigel Dibben

DISK OPERATING SYSTEMS

Tandy appear to be having a lot of trouble with TRSDOS. They have held up the release of the 2.2 version as it is apparently not much better than 2.1! I managed to acquire a copy of TRSDOS 2.2 and it certainly does some rather strange things at times. NEWDOS+, developed by Apparat in the US and obtainable from A.J.Harding and Rostronics appears to work properly and has a lot of very useful utilities such as a disassembler, EDTASM modified to give access to disc files for source and object code, and LMOFFSET to read in a system file from tape or disk and produce a relocatable module which is initially loaded clear of the RAM used by TRSDOS, then moves itself back to low RAM when executed. The only drawback is the cost, around £50, but I would rather pay £50 for something that works properly and does not cause me to lose important files, than waste £11 or so on TRSDOS.

Leon Heller

NEW LANGUAGES FOR THE TRS-80

I have had an interesting language called FORTH running on my system for some time now. FORTH is a unique high-level language originally developed for real-time applications with minis, and has recently become available for a wide range of micros. FORTH is an extensible, user-defined language most of which is written in FORTH (most of the better languages such as Pascal and C are written in themselves!). The FORTH system includes an interpreter and compiler, and an editor/assembler, all in about 6K! The implementation for the TRS-80 has a few bugs in it, and the documentation is appalling, but it is extremely useful for doing things like hardware control. It runs very fast, 10 times faster than BASIC, and critical inner loops can be written in machine code using the assembler for maximum speed. FORTH is obtainable from Programma Consultants in the US for about $40. The address is :

Programma International, Inc.,
3400 Wilshire Boulevard,
Los Angeles, CA 90010,
USA

I will shortly be getting a 'tiny' Pascal which runs on a 16K disk-based system, and will let you know what I think of it. With 32K one can recompile the source (written in Pascal, of course) thus extending the language.

MEMBERS' NEWS

As you can see from this letter I have now got a printer, an 'Anadex' which I bought from Computrade of Leatherhead. I have not had time to fit the lower-case mod. yet as I have spent the last two weekends with two other TRS-80 users: Michael Dean and Leo Knaggs.

I have also bought two 'bare' Shugart disk drives, built my own power supplies, and ended up with two perfectly good drives for the price of one at Tandy prices. I think the main problem Tandy had with the Shugarts was heat; as I have built my power supply to one side of the drives that problem does not arise. I admit that the Micropolis drives are more robust but I shan't use them to the extent that they will fall apart in a hurry.

Whilst I was with Leo Knaggs we went to the Tandy shop in Bristol and picked up the big DOS reference manual that has just arrived, and a copy of DOS 2.2 which has some useful improvements on it that include a renumbering routine and the ability to go back to BASIC after 'RESET' without losing the current program in RAM. All the 'fixes' have been included also, however some of the additions listed in the fact sheet are not on the disk; Leo is going to look into that. This means, of course, that several of the programs I bought are no longer necessary: PROLOAD and DCV to name a couple. It is also possible to transfer machine language programs from tape to disk, at least, that's how I read it, I haven't tried it yet. It is also possible to field all 256 bytes in random file buffers. There are several others-its a 21 page document.

I have also moved the transformer out of my monitor and it makes even my previously fairly stable display better. I have also moved my monitor away from my interface and placed the board with my drives and their supply on top of it and joined the keyboard to the interface with the short strap; this now puts the display where I want it without the long connecting cable to the interface which was causing lots of 're-boots'. I only use my mains filter in the interface power lead as that is reputed to be the most liable to mains interference.

I have not had a lot of use out of my printer yet as I only got it running on Wednesday but I like it; the chap at Computrade has offered me a discount on any printers that I recommend to anyone else which I think is very nice of him. Mind you, he had to change the first machine he supplied as it had a piece of metal jammed in the print mechanism. Although it

worked after I removed the metal he thought it best to change it and came along himself to do the change. I don't like the colour of this type, though (it was blue. Ed.) so if I can find a suitable black ribbon I shall change it, although Anadex are very emphatic about the sort of ribbons that should or shouldn't be used.

John Kilpatrick.

LOW-COST DISK DRIVES

I have just purchased a Shugart SA-400 drive for my system at a cost of £190. I had to construct a power supply, and will also have to make a case for the unit, but the total cost will only be about £230 with most of the additional expense being due to the special 34-way ribbon cable and connectors needed. John Kilpatrick has also adopted this approach, and I can recommend it if you have some knowledge of electronics. It certainly beats paying Tandy around £400 for one of their drives. If any other members are interested in 'rolling their own' I can let them have details of the power supply if they send me a SAE.

If you do not have much faith in your electronic ability you can obtain a ready made drive complete with case and power supply from Rostronics (01-870 4805) for £290. These use the Pertec unit which has been available for some months in the US, so they are probably reliable.

You can get the Shugart drives from Newbear.

Leon Heller.

SOFTWARE EXCHANGE SCHEME

Glanmor,
Brynna Road,
Pencoed,
Bridgend.

20/6/79

Just a few lines to let you know what is going on down here in Pencoed. First the bad news. Still no donations for the library except the ones you sent me and the ones I have typed in myself. Anyway, I have listed all I have available for the next issue of the newsletter. Next the good news. I now have an expansion interface unit (ØK) so I will be shopping around for some RAMs to fit in it. I found out by the way that the cassette wiring instructions were wrong in the details with mine.

Library list (all Level 2).
Memory size given is for program storage only.

1.	18 hole golf + Sink 'em	10.2K
2.	Draughts + Horse-Race + Splatt	10.5K
3.	Moon Lander (added lower-case)	2.3K
4.	Shoot It	Ø.8K
5.	Bounce (see your L2 book)	1.4K
6.	Submarine chase	3.2K
7.	Car Race (Brands Hatch)	4.4K
8.	Drag Race (design your own)	4.2K
9.	Fruit Machine	2.5K
10.	Quad antenna design (radio)	2.4K
11.	Calendar (Gregorian)	1.3K
12.	Atomic orbital plotter (fascinating)	3.4K
13.	Sine wave addition	2.5K
14.	Ball bounce plotter	1.ØK
15.	Conway's game of L.	2.1K
16.	LIFE (not fully debugged)	1.2K
17.	Wilcoxon Test	Ø.7K
18.	One sample Chi-squared test	Ø.5K
19.	Kolmogorov-Smirnov test	Ø.5K
20.	RENUMBER (lines only, no GOTOs)	
21.	T-BUG (insructions being prepared)	
22.	Lower-case (in BASIC-uses poke)	

Donations desperately needed, please!!!

By the way, have we decided what we are going to call the newsletter yet? I cannot remember my original idea but a competition could be used to get a bit more interest going with possibly a little prize for the winner as an incentive to get some suggestions.

I am working on an article at the moment with accent on my rallying escapades and how I used the TRS-80 for results computation etc. I will send it off to you when it is finished along with the house painting, car re-building and all the other jobs I have as well.

Leighton Davies.

USEFUL ROM ROUTINES

Nigel Dibben has found a screen clear routine at 1C9H. Just CALL 1C9H anywhere in your program and the screen will be cleared and the cursor placed in the top left-hand corner of the screen. You will have to turn the cursor on, of course, if you want the cursor to be displayed:

```
        CALL    1C9H    ;clear screen
        LD      A,ØEH   ;cursor
        CALL    33H     ;on
LOOP    CALL    49H     ;scan keyboard
        CALL    33H     ;display byte
        JR      LOOP    ;loop back
```

This routine first clears the screen and displays the cursor. Then any character typed on the keyboard is displayed on the screen at the cursor position. Interestingly, screen editing can be carried out using the cursor movement controls and overtyping the character at the cursor position. By turning the cursor on and off rapidly a simple screen-based editor could be produced with a lot more programming.

Leon Heller

Level 3 is written by the authors of levels 1 and 2 and provides three broad functions:

1. Use of commands that are otherwise available only on disc : (USRs, FN, TIME$, &H, LINEINPUT,MID$ etc)

2. new instructions and commands for graphics and for Basic renumbering, RS232 output etc.

3. improved operating system with reduced LOAD problems, single key word entry, keyboard debounce, long error messages and reset via BREAK.

To the user, especially with expansion interface, the additional commands mean that some of the facilities otherwise restricted to disc only are available at a fraction of the cost. These commands are as listed on page 10/4 of the reference manual. This is particularly true in the case of TIME$ which is physically present in the expansion interface byt unattainable to the non-disc-owner. The graphic commands that are new to Basic do not fundamentally do anything that could not be laboriously contrived in Basic. Nowever, after watching Level 3 cover the screen with X's or flash past of it in milliseconds instead of 'maxi'seconds, you soon appreciate the difference !

The operating system changes are a certain improvement especially the shift key entries of which 26 are set by the programme (shift A to shift Z). These can all be changed by the user so that for example:

LSET C= "CONT" + CHR$(13) will mean that every time shift C is pressed, the word CONT will appear and the computer will continue. Interestingly, one can make up graphic words in this way. For example:

LSET A= CHR$(191)+ CHR$(140)+CHR$(191)

will display and assign: whenever shift A is pressed. Reset through BREAK means that tapes can be stopped during load and save operations. Thus, an incorrect tape can be stopped loading with the interface, the use of BREAK does not lose the BASIC programme - a thoroughly useful piece of software.

To look on the other side, there are naturally some disadvantages: the first is that Level 3 resides from 43ØØ to 57EØ so cannot be used with 4k (1.) and leaves the 16k user with only 10k of store. Even the economies in Level 3 can never recoup the lost 6k. Extra memory is therefore desirable. Secondly, while Level 2 programmes run in Level 3, programmes with Level 3 functions in them will not run in Level 2 (or, I believe TRS DOS BASIC). There is however no problem in using Level 3 to write, edit and save a programme without special functions and then running it in Level 2. Thirdly ther is a disc Level 3 supplied on the cassette but this is still supplemental to Level 2 and not to DOS BASIC. Lastly, a personal point, renumbering lines will not economise on space in programme text as every line number is assigned 5 bytes of which the blanks would have to be editted out; also, print statements containing ENTER bytes (ie: ASC II '13') are messed up by the renumber routine. Beware!!

In summary, whilst there are disadvantages, there are by far outweighed by the advantages and, in no small degree, by a good reference booklet and quick reference card covering all level 2 and Level 3 commands, instructions, error codes, control characters etc. If you are expanding slowly, you will particularly appreciate spending about 1/10th of the cost of a disc unit for at least ½ the advantages.

Nigel Dibben

EXPANSION INTERFACE MEMORY

If you are adding 32K of RAM to your expansion interface you merely fill up all the empty sockets, ensuring that the chips are correctly oriented, of course. If you are just putting in 16K, however, you must put the chips into positions 9 to 16. For some reason best known to themselves Tandy used the low-numbered sockets for the top 16K. Perhaps it was an attempt to discourage people from adding their own RAM; the system does not work with the chips in the wrong sockets.

Leon Heller

DATA SAVE

This article gives a short routine to save, load or check an array of variable (integer, single precision or double precision) in one operation.

The routine takes the variable pointer as its argrument with a preloaded code. The pointer is backspaced to give the array length. Varying the backspacing (XX in the listing) allows for 1, 2 or more dimensional arrays. It is the Basic programmer's responsibility to emsure the following:

* that the correct array is loaded or saved
* that the dimensions of the array in memory match the array being loaded
* that the correct file is prepared
* that the USR routine is prepared

Flow sheets for loading and saving are also given.

In the programme, the following must be used:

every time required

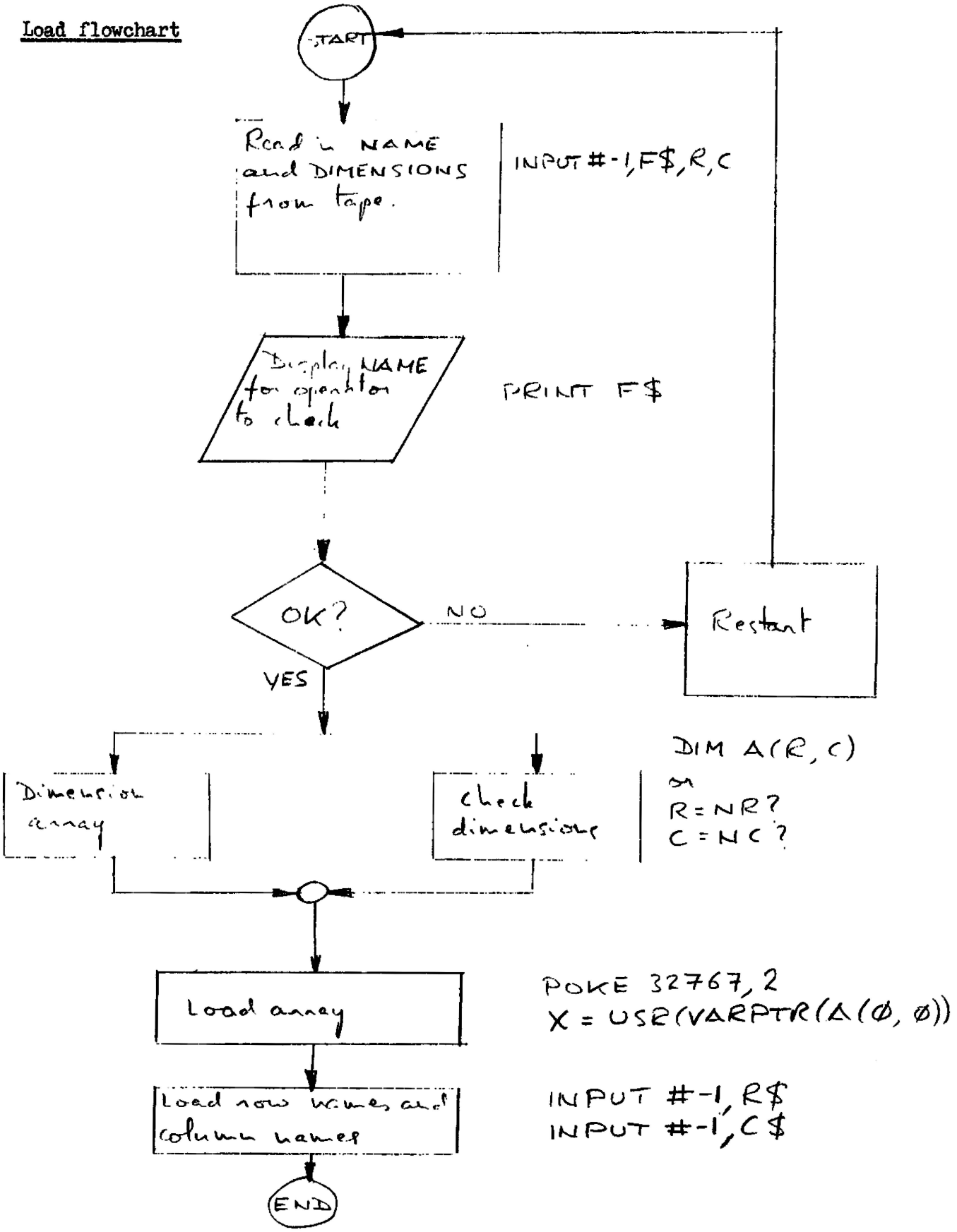
```
1Ø POKE 16526,149 : POKE 16527, high order: 127 etc
2Ø POKE 32767 etc , code :X=Ø
3Ø variableX= USR (VARPTR(array(Ø[,Ø...])))
```

It is advisable to declare X=Ø to ensure VARPTR is correct. The variable (X above) is returned with the code if everything runs correctly or else 5 if no code is loaded in 32767 etc, 4 if a check fails. (3 and 6 are used in a longer version to show if a string pointer is given or if the VARPTR is not an array).

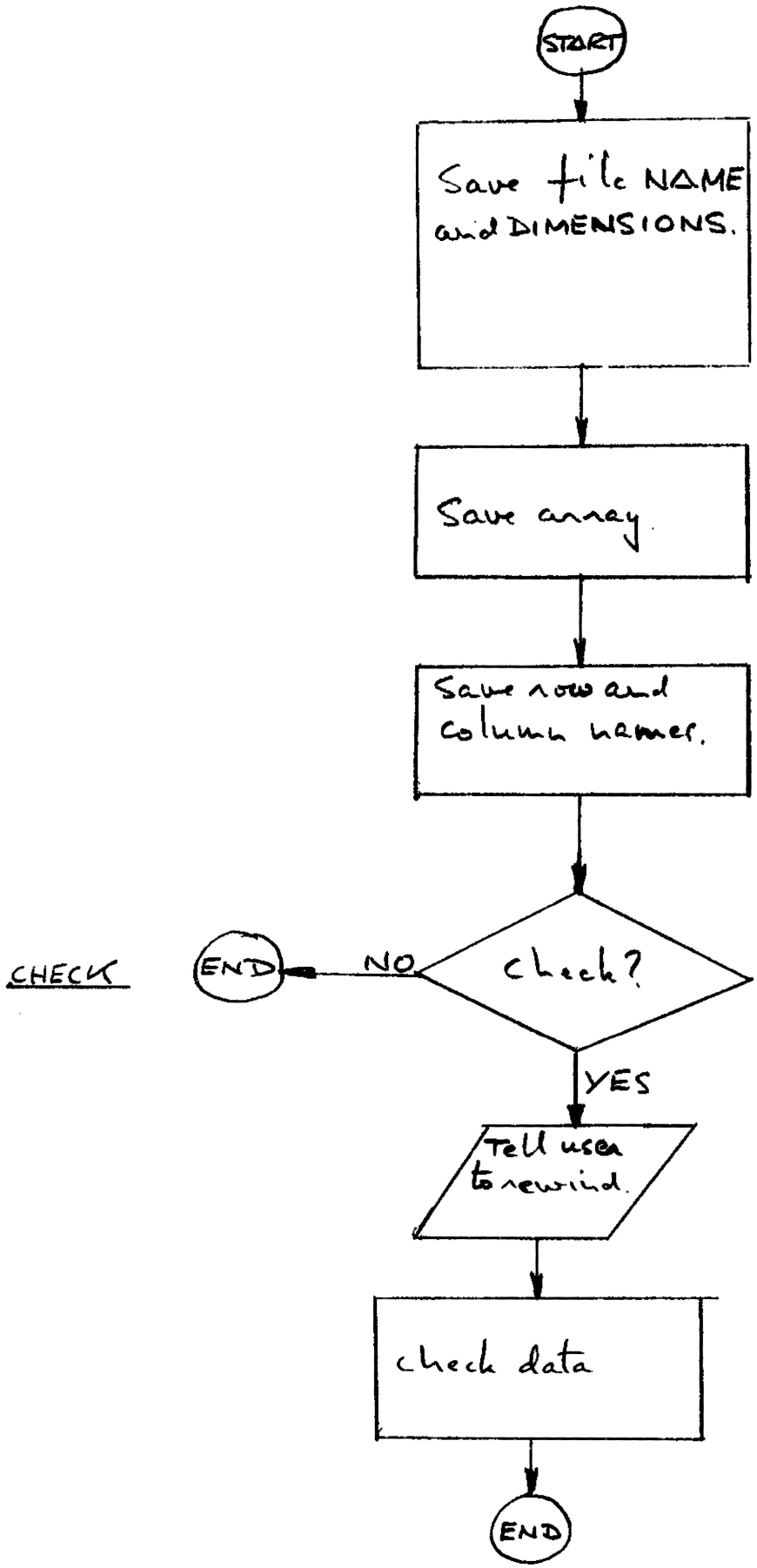
The codes used are:

Ø	Save on cassette	= CSAVE
1	Check load	= CLOAD?
2	Load	= CLOAD

Load flowchart



Save flowchart




```
PRINT #-1, F$, R, C

POKE 32767, Ø
X = USR(VARPTR(A(Ø, Ø)))

PRINT #-1, R$
PRINT #

INPUT #-1, A$, X, Y
? = F$, R, C
POKE 32767, 1
X = USR(VARPTR(A(Ø, Ø)))
? = 1
INPUT #-1, A$
? = R$
INPUT #-1, A$
? = C$
```

MACHINE CODE LISTING

NB: for XX put : Ø5 for 1 dimensional array
Ø7 for 2 dimensions
Ø9 for 3 dimensions etc.

for XX put high order byte of location
ie: 4F for 4k
7F for 16k
BF for 32k
FF for 48k

start location is (YY)95H end (YY)FFH entry YY95H

```
CD  7F  ØA  11 (XX) ØØ  ED  52
46  23  4E  23  3A  FF (YY) B7
28  ØC  FE  Ø2  28  1B  FE  Ø1
28  17  2E  Ø5  18  4Ø  CD  F9
(YY) CD 87  Ø2  7E  CD  64  Ø2
23  1Ø  F9  ØD  FA  ED (YY) 18
F3  CD  F9 (YY) CD  96  Ø2  3A
FF (YY) 1F  Ø8  CD  35  Ø2  Ø8
38  Ø4  Ø8  77  18  Ø4  Ø8  BE
2Ø  Ø9  23  1Ø  EF  ØD  FA  ED
(YY) 18 E9  2E  Ø4  18  Ø4  3A
FF (YY) 6F  CD  F8  Ø1  26  ØØ
C3  9A  ØA  3E  ØØ  CD  12  Ø2
C9  FF
```

Nigel Dibben.

SERIAL OUTPUT PRINT DRIVER

I have now written a simple subroutine which prints a character in the accumulator on a printer with a 110 baud serial interface. It would be easy to modify the subroutine for 300 baud operation if you know what you are doing by changing the delay subroutine from 9.09ms to 3.33ms. You might also need to change the number of stop bits if your printer requires it. A cassette with the source and object code: 'PRINT' will be placed in the library. Contact Leighton Davies if you would like a copy. This subroutine will form the basis of a program to configure the TRS-80 as an intelligent terminal that I hope to have running soon. I have access to a P.O. modem at work, and I want to investigate the transfer of files between our university twin PRIME installation and my TRS-80.

Leon Heller.

DIGITAL TO ANALOGUE CONVERSION

I have built a simple digital to analogue converter (DAC) for my system which interfaces to the 40-way expansion port. A DAC is needed if one wishes to obtain an analogue output such as a voltage from a digital system. DACs are very useful in many fields; music synthesis, synthesised speech, and as part of an analogue to digital converter (ADC) (by the addition of a digital comparator) which in turn has uses in speech recognition, measurement and control.

The circuit diagram in Figure I should be fairly self-explanatory. The two quad latches (74LS75) constitute a latched 8 bit output port (address decoding has not been included) connected to a Ferranti ZN425E DAC. The analogue output of the DAC is buffered by the 741 op. amp., The 10K pot. is a set zero control and the 5K pot. sets the full-scale output of the circuit, and corrects for the offset voltage of the ZN425E.

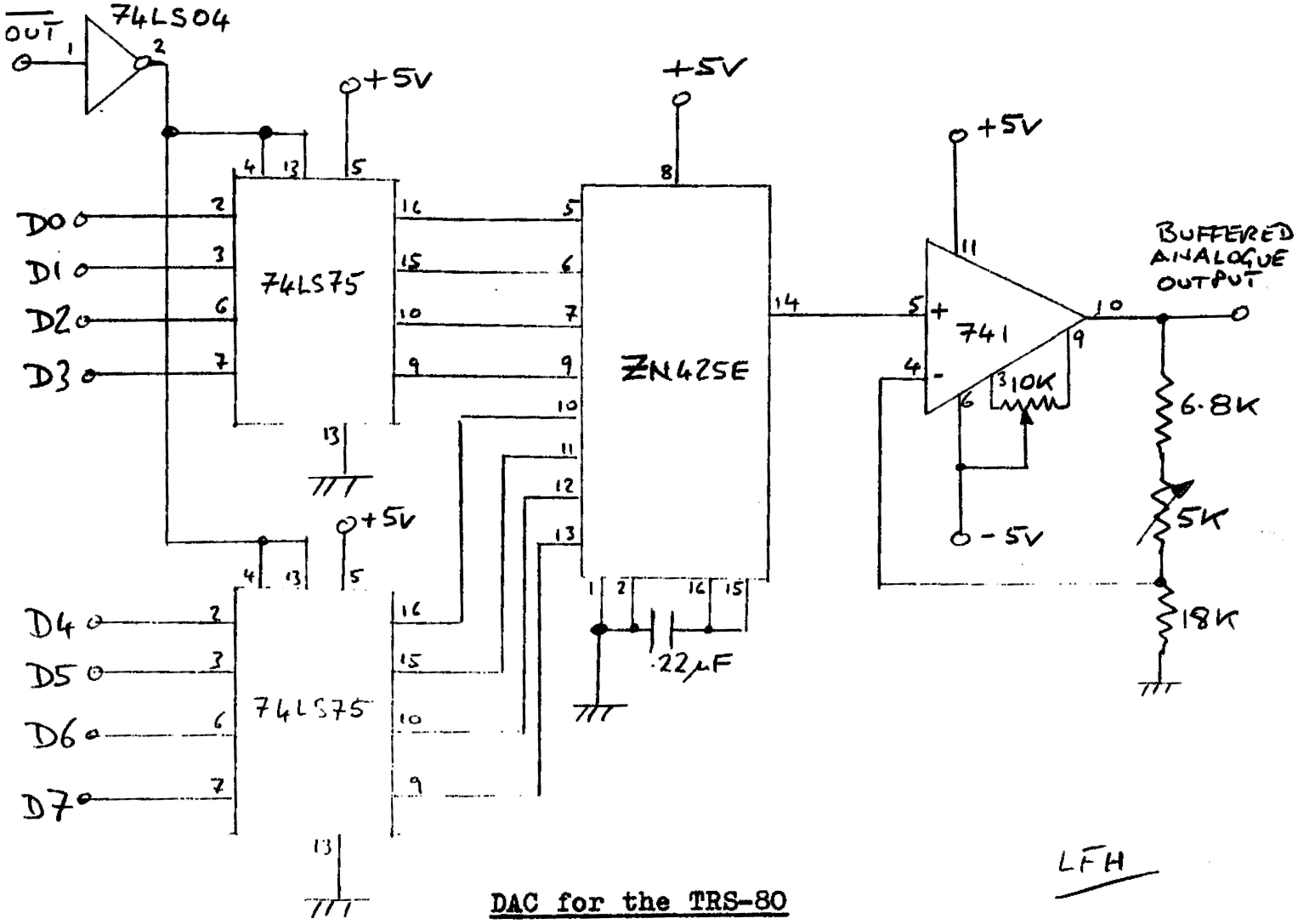
Any convenient construction technique may be used as the layout is not critical ; I used a small piece of Veroboard.

Appropriate software will be needed, of course. If the DAC is at port zero the following BASIC program will generate a ramp:

```
10 FOR I = 0 TO 255
20 OUT 0,I
30 NEXT I
40 GOTO 10
```

The period of the ramp can be changed by inserting a delay loop between lines 20 and 30. BASIC is really too slow for any useful d DAC applications; Assembler or FORTH are really more suitable. A FORTH program equivalent to the above BASIC code is:

```
: RAMP 255 0 DO 0 OUT LOOP ;
```



LFH

DAC for the TRS-80

Leon Heller.

TRS-80 SOFTWARE

All types of Software for the TRS-80. Imported and U K written! Business, games and general programs stocked for same day shipment. A few examples: -

User Programmable File Handling	£14.95
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Send SAE for full listing and addition to our mailing list.

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Supplied on cassette with manual £39.95 + 50p p&p

A. J. HARDING

28 Collington Ave, Bexhill, E Sussex
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MACHINE CODE - some Comments

The TRS software I have (TBUG and Editor Assembler) play back very badly on my CTR 41. To resolve this and to protect the originals, I have relocated the TBUG (using a BASIC written programme!) and can now use it load and punch TBUG and EDTASM. I will supply a copy to anyone interested.

When using an interface and machine language there is no problem when it gets hung up - you will not lose machine code programmes in memory and can soon re-enter them by typing 'SYSTEM', '/' and the entry address.

Another problem with memory over 32k (total) is that POKE will only work with locations up to 32k. To avoid this, the error routine can be used to "cross the join.

```
 5   ON ERROR GO TO 5Ø
1Ø   K = START
2Ø   POKE K, something
3Ø   K = K + increment : GOTO 2Ø
5Ø   IF ERR = 16 AND ERL = 3Ø THEN K = 65536 - K : RESUME 2Ø
```

Nigel Dibben

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SMALL BUSINESS ACCOUNTS BRIAN PAIN

My contribution this month is rather short. Still something is better than nothing. I recently gave a short lecture at a " micro- day" put on by Luton Chamber of Trade and Luton College of Higher Education at the Futteridgebury College. My subject was financial accounts and the small business. In my office here in Milton Keynes we use a standard program to hold a current trial balance which is then used to produce the Balance Sheet and Profit & Loss account. At the lecture I suggested that a tax forecasting program would be a useful tool to the accountants and interested users. This was on the Wednesday afternoon, and by the following Monday the first client's forecast tax bill has been calculated using a brand new addition to the trial balance program.

The lecture attracted around 15-18 people, as the subject was rather limited in its appeal. The idea of the lecture was to show the history of the TRS 80 application in my office since the first trial balance was put on, back in March. One member of the audience commented he was hoping to hear how incomplete accounts were being put onto a Micro. Once analysed, his own business became a simple program. Since speaking to him, we have now devised a program in my office for a small business employing a part-time book-keeper. There would be no change in the system and an excellent audit trail would be provided. It is assumed the books are kept on a monthly basis. The program is Cassette orientated but I am sure Leon can modify this, for a disk system to be employed.

Again during the lecture the use of TRS 80 in standard costing was mentioned, and in the last week of June a start has been made on the structure of a company's costing system. The eventual aim is to have production of variances by the input of data into a program that is holding standard costs, previous actual costs and raw material cost histories. If a user of this program goes onto management by exception, the managing director can stay in bed until an unacceptable variance is reported, which will then "ring his bell" (top twenty plug) and cause him to investigate the reasons for the variance. For those into

Standard costing, any saving in the time between the occurrence of a bad variance and its investigation can only benefit the user

TRS NEWSLETTERS OBTAINABLE FROM THESE STORES.

Tandy Corporation,
22, London Street,
Basingstoke,

Bilston Road,
Wednesbury.

528, The Bridge,
Bull Ring,
Shopping Centre,
Birmingham.

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Witney.

1, Market Street,
Wolverhampton.

TRS--80 USERS GROUP NEWSLETTER

Issue 6 September 1979

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Editorial

Well done! Several members have sent in contributions for this issue; please keep them coming.

I am sorry about the machine language tutorial series, I have just not had time to work out the DUM instruction set. I will make every effort to continue the series in the next issue.

I get the impression that members with disk-based systems have difficulty with direct-access or random-access file handling. It is really very straightforward but the examples in the manual are not all that easy to follow if you are new to disk-based files. I feel that a short article or two on this topic could be valuable to many people; would anyone be prepared to write something on this?

Leon Heller

Editor:

Leon Heller
8 Morris Walk
Newport Pagnell
Bucks. MK16 8QD

Publisher:

Brian Pain
40a High Street
Stony Stratford
Milton Keynes

Members' News

I learned Fortran II many years ago and have hardly used it since. My son Duncan is doing A levels in Maths, Physics and Chemistry and recently started using the school terminal (Time sharing). His interest was such that I felt justified in buying a 'Micro' and after much rather distressing thought, decided on the TRS 80 Level I, 4K. And we bought one a month ago.

Duncan and I quickly mastered level I language and my first programme, (designed to get my daughter to improve her maths) over flowed the memory. So I ordered the 16K chips from 'ROSTRONICS' (£80) using Access and 3 days later and after 15 minutes work we were up to 16K memory.

Duncan has written a couple of programmes but he will insist on thinking of uses which require arrays, so I have ordered a level II upgrade kit from 'TV Johnson', which I will fit myself (if and when they can prise one out of Tandy). Upgrading in this way will allow me to retain a level I and II option, although I am not sure there is any advantage to having it.

As a raw newcomer to the Micro world my knowledge is sparse and I hope you will forgive my telling you what I hope to get from your newsletter.

1. A section for the beginner explaining how the TRS 80 works i.e. what 'Basic' actually does, why the display graphics are limited, what is an assembler / disassembler.
2. A section describing commerical programmes i.e. what they do and what they can be used for e.g. what on earth is T-Bug (see Tandy price list Cat No. 262001)
3. A section for good uses for our Micro other than playing games.
4. Reviews of books, or readers recommendations for books i.e. I would like to have a bash at getting at the Micro Processor language, but need a layman's guide.
5. I would be interested in other peoples views about, the various ways of adding printers and examples of actual printouts showing merits, limitations actual costs ect.,
6. Some advice on the need for and merits of floppy discs would be welcome.
7. I would expect a system for exchanging user written programmes, and the Tandy Forum in P.C. for May indicates

that Nigel Dibben would be a useful name to know for hints and tips.

8. I would particularly like to know what is involved in the following and whether they are worth while.
(a) Keyboard Bounce Remedy (I am not sure if this is hardware or not).
(b) The use of the automatic level control for cassette loading.
(c) The use of lower case characters - eg. do you get them on the screen or are they only useful for a printer?
(d) The use of a television modulator, types available etc.,

Well that must be more than enough to be going on with. All I can contribute at present is to offer to fit the memory upgrade chips for anyone in my area who is scared to do it themselves. Maybe I will be able to fit Level II Basic soon. They would have to supply the chips of course.

DENNIS LONG.

New Software

ST80

ST80 is a smart terminal program for the TRS-80 that enables it to emulate a computer terminal. The Tandy RS-232-C interface is needed, and a modem or acoustic coupler for remote operation of a time-sharing system, or any other compatible system. It is very much more flexible than the software Tandy supply with their interface, and although rather expensive at about $50, from TSE in the US, it works very well and I can thoroughly recommend it. I see from a recent BYTE that an upgraded version is available that enables disk files to be transferred between the TRS-80 and the remote system. This is about $80. I have used ST80 to transfer binary data from my Motorola system to my TRS-80, using the ACIA in the Motorola module for serial output to the RS-232-C interface on the TRS-80. I have also used ST-80 in conjunction with a P.O. modem to log-on to our university twin PRIME installation from my office with the TRS-80. As it stands, the Tandy interface is not compatible with a British modem, so you have to make-up an adaptor with a couple of appropriate 25-way Cannon connectors, and only connect across pins 1,2,3, and 7. Pin 1 is the electrical ground, pins 2 and 3 the signal connections, and pin 7 the signal ground. You can forget about all the other signals Tandy provide!

Tiny Pascal

I have been playing with a 'tiny' version of Pascal, the language that will probably replace BASIC for personal computing in a couple of years. The implementation is rather limited in that it only supports integer (16 bit) arithmetic and the only data structures are single dimensional arrays. Like all the best languages, Pascal is written in Pascal, and is a compilable language, unlike BASIC which is interpretive. In fact, Pascal compiles (as a rule) to a pseudo-code* simulating a hypothetical stack machine. The pseudo-code or p-code as it is usually termed, is then interpreted into the machine language instructions that actually carry out the program. All this is quite transparent to the user who merely writes his Pascal program in source form using the built in Editor. The Pascal source code is then compiled and the resultant p-code object program is then run, assuming that the compiler did not detect any errors. It runs about five times faster than BASIC and I have found that if my programs compile correctly, they usually run first time, due to the highly stuctured nature of the language.
To give you an idea as to what a Pascal program looks like, here is a program to calculate Ackerman's function, a beast beloved of computer scientists as it has an extremely recursive definition. By recursion is meant the process of defining something in terms of itself.

```
(* ACKERMAN'S FUNCTION IN TINY PASCAL *)
FUNC ACK(M,N)
BEGIN IF M=0 THEN ACK:=N+1
      ELSE IF N=0 THEN ACK:=ACK(M-1,1)
      ELSE ACK:=ACK(M-1,ACK(M,N-1))
END;

PROC TRY(A,B)
BEGIN WRITE(A ,' ',B ,' ',ACK(A,B) ,13,10)
END;

BEGIN TRY(3,6)
END.
```

* There are implementations that compile direcly into machine language.

Tiny Pascal is obtainable from Supersoft, PO Box 1628, Champaign, IL 61820, USA. The cost is about $40.

Assembly language development system

Microsoft (they were responsible for Level 2 BASIC) have adapted one of their software packages to run on the TRS-80. The assembly language development system comprises a Text Editor, Macro-Assembler and a Linking Loader. The Macro-Assembler produces relocatable object modules that can be linked to form executable load modules with the Linking Loader. The package is disc-based and you need a minimum of 32K. It will run with one disc, but things are much easier with two drives; as TRSDOS 2.2 and the Assembly language system do not leave much space for your files on the same disc. It does not seem to work properly with NEWDOS+, by the way. I have been getting the hang of this piece of software for a couple of weeks now, and can recommend it to anyone who is into Assembler. It costs about $80 in the States and you can get it in this country from Lifeboat Associates who have just set up shop in Neal Street, London. FORTRAN is also available, and has to be used in conjunction with this package. Stanley Houghton has been using the FORTRAN for some time now and tells me it is very good.

Other languages

A Tiny C interpreter and a full Pascal implementation are available for the TRS-80 in the States. I am not really interested in the Tiny C, although I have read some very favourable reviews of it (a full C compiler will probably be along soon; very useful for system software development), but the full Pascal compiler would be a very nice thing to have. C, by the way, is a concise structured language (Pascal tends to be a bit verbose) that was developed by Bell Labs. to run under their UNIX operating system for the PDP-11. I have used UNIX and it is about the best operating system going. A UNIX-like system for the TRS-80 would be very desirable!

Let me know if you would like more details of the above software.

Leon Heller

LEVEL 2 BASIC INFORMATION

Location	
16620-21	Last line entered or edited. The line number stored her will replace the "stop" in: LIST. etc
16624-25	Location of line containing error routine. Ie ON ERROR GOTO 300 will put the LSB of the first character of line 300 in 16624 and the MSB in 16625
16633-34	Location of type marker of first variable (eg: the 4 that precedes each floating point variable).
16635-36	Location of first array variable.
16637-38	First free memory location. MEM is the difference between the Stack Pointer and this value.
16639-40	First programme location.
16641-64	Type markers of variable letters. Eg if 16641 contains 2 then all A's are integers or DEFSTR P will set 16656 to 3. Types are 2 Integer 3 String 4 Single precision 8 Double precision
16598-99	Last memory location. This will be 255,127 or 32767 if the MEMORY SIZE was not set at the beginning.
16548-49	First programme location (changing this value will "protect" the resident Basic programme and the variable pointers will be automatically adjusted).
16607-08	Entry point of machine code programme; set by the machine code load and used by SYSTEM / ENTER.
14308	Cassette latch: if Bit 0 is 1 then cassette 2 (relay operated) if Bit 0 is 0 then cassette 1 (relay released)
16445	32 cpl; if Bit 3 is set then computer in 32cpl mode. if Bit 3 is reset then computer in 64cpl mode. Try: POKE 16445, 8 then POKE 16445, Ø.

Nigel Dibben

NUMERIC PAD FITTING INSTRUCTIONS.

Lay the Computer upside down on a soft surface, ie: a folded towel, back towards you. Remove the 6 screws, 2 of which are 'self-tapping', note where each one goes.
Turn the Computer up the right way and lift off the top half.
NOTE:
There are 2 types of LED mounting, one which is connected to the key board by 2 wires and secured by a ring on it's body and the other which mounts directly on the keyboard PCB and is a push fit in the case top. To remove the first type take a small pair of pliers and remove the ring then push the LED out of it's hole with the eraser end of a pencil, make sure the ring does not slide too far down the wires, the second type stays on the PCB.
Take hold of the keyboard, lifting it slightly to clear the locating plugs and turn it over away from you, make sure not to damage or distort the connecting strap on the right hand side, remove all the white spacers and put them to one side.
Unpack the Numeric Pad, new keyboard surround and plastic bag with the following items in it:-
1. 4 Plastic spacers the same as the ones removed from the PCB.
2. 2 Squares of double sided adhesive foam.
3. 4 Small 'standoff' spacers.
4. 1 Length of Plastic ribbing with a 'cutout' on one side.
Take the piece of ribbing and slide the cutout side on to the keypad PCB the same side as the '0' key so that the cutout is centered on the middle small hole.
Fit a 'standoff' spacer into each small hole making sure the centre one fits the ribbing cutout.
Turn the Keypad upside down and slide the other side of the ribbing on to the keyboard PCB, you will notice that the keypad is tilted in relation to keyboard PCB, this will straighten up during final assembly, the top of the ribbing should line up with the top of the keyboard PCB for correct fitting to the new keyboard surround. The keypad is now ready for wiring up.
There are 12 wires on the keypad, no 12 is not used.

1. PURPLE, to common trace of 0,1,2,3,4,5,6, & 7 keys on Keyboard PCB.
2. YELLOW, to the other No 7 Key pin.
3. DARK BROWN, to the other no 4 key pin.
4. BLUE, to the other no 5 key pin.
5. RED, to the other no 2 key pin.
6. GREEN, to the other no 3 key pin.
7. ORANGE, to common trace of 6 & '.' key pins only.
8. GREY, to common trace of 8,9,& '.' key pins.
9. WHITE, to common trace of 1 & 9 key pins only.
10. BLACK, to common trace of 'ENTER', 8 & 0 key pins.
11. PINK, to the other 'ENTER' key pin.
12. LIGHT BROWN , NOT CONNECTED.

If the colours on your PCB wires are not in the same order then follow the numbers, no 1 on the right.

This concludes the wiring up.

If you have a LEVEL II machine it will be necessary to move the small PCB with the 'BASIC' ROMs on it down a little to make way for the bottom edge of the keypad PCB.

The 24 pin DIL connector must first be removed, the pins on it are very fragile, using 2 screwdrivers, one at each end, ease it gently up, evenly. When it is clear of it's socket press the pins carefully into a piece of Polystyrene foam to protect them and fold the cable away from the case.

Take an 'EXACTO' or similar cutting knife & carefully cut horizontaly through the plastic foam that secures the ROM PCB to the Computer PCB, then with equal care peel away the foam from both boards, not with a knife, your thumb nail is much better.

Remove the protective paper off one side of the new plastic foam squares and stick them firmly in the middle of each end of the ROM PCB, do not remove the protective paper from the other side of the foam at this stage, trim off any projecting pieces from the ROM PCB so that all edges are level.

Turn the top half of the Computer case upside down, you will see that the keyboard surround is held by 6 little lugs, with the aid of a screwdriver or similar tool gently ease these lugs down through their slots, don't break them off, you may need that surround one day.

You are now ready for re-assembly.

Do NOT fit the new surround yet, it must be left to the end. Put a spacer on ALL the lugs sticking up through the computer PCB replacing any damaged ones with new ones supplied. Fold the Keyboard & Numeric pad PCBs (now joined together) over the main PCB fitting the holes in the keyboard PCB over the lugs with spacers on, some slight adjustments will have to be made to the fit of the Keypad PCB at this stage as it is not possible to alter anything after the case is assembled. Turn the whole machine round so that the spacer bar is nearest you.

* This part only concerns LEVEL II machines.

Take the small PCB with the ROMs on it & fit it into position in the space left at the bottom right corner making sure that the connecting ribbon fits snugly between the main PCB & the case, when you are perfectly satisfied with the fit, with the bottom edge against the case & the top edge just under the keypad PCB take the protective paper off the foam pads & press the ROM PCB firmly down on the main PCB*

Take the top half of the case still without the new surround & fit it over the bottom half, lining up all the lugs with their holes. A lot of trial & error may be experienced here to make everything fit due to the angle between the new PCB & the keyboard PCB, time spent here will NOT be wasted, the new surround should also be offered up to ensure the Numeric Pad fits. Once you are satisfied that everything fits the screws may be replaced, slide the right hand side of the case off the bench so that the right hand screw can be put in from underneath whilst still holding everything together with one hand & screw it up finger tight, repeat with the left hand screw, the case may now be turned over & the rest of the screws fitted, tightening them all right up but remember it's only PLASTIC you screwing into, DO NOT FORCE ANYTHING, Slacken off & try again & again if necessary.

The new surround can now be fitted, (if you have the LED on wires it must be fitted now), the top three lugs of the surround first & then with aid of a small screwdriver ease the bottoms ones in. THAT'S IT.

John Kilpatrick

John Gardener has fitted a very low-cost surplus keypad to his keyboard. Contact Brian Pain if you would like John's instructions for doing this.

Ultra-simple serial printer interface

If you wish to use RSM-2 or the Electric Pencil with a serial, RS232 printer, and do not want to spend £30 or so on the Small Systems Hardware interface, here is a very simple, low-cost circuit that does essentially the same thing. It derives its power from the TRS-80 power supply via a bridge rectifier and capacitor combination delivering about +9 and -9 volts. The actual interface consists of a 741 operational amplifier connected as a comparator with the 100K pot. providing the threshold adjustment. It would be advisable to use a 10-turn cermet trimpot for this function as the adjustment is a little tricky. To set the circuit up merely connect in line with the power supply and keyboard and plug in the cassette output lead from the keyboard unit. Do not connect the printer at this stage. Use the appropriate command to activate the printer and monitor the output from the interface with a voltmeter or a 'scope. Adjust the 100K trimpot until you get the output swinging between + and - nine volts, ensuring that when the output is between characters (a mark condition) and idling, -9V is on the output from the interface. Connect up the printer and there you are!

Construction is non-critical and any convenient construction technique can be employed. Mine is built upon a small printed circuit board and mounted in a small box. I cannot guarantee that the RS232 specification is met 100%, but it drives my Tandy RS232C interface from my other computer (a Motorola 6800 based system) quite happily.

Leon Heller

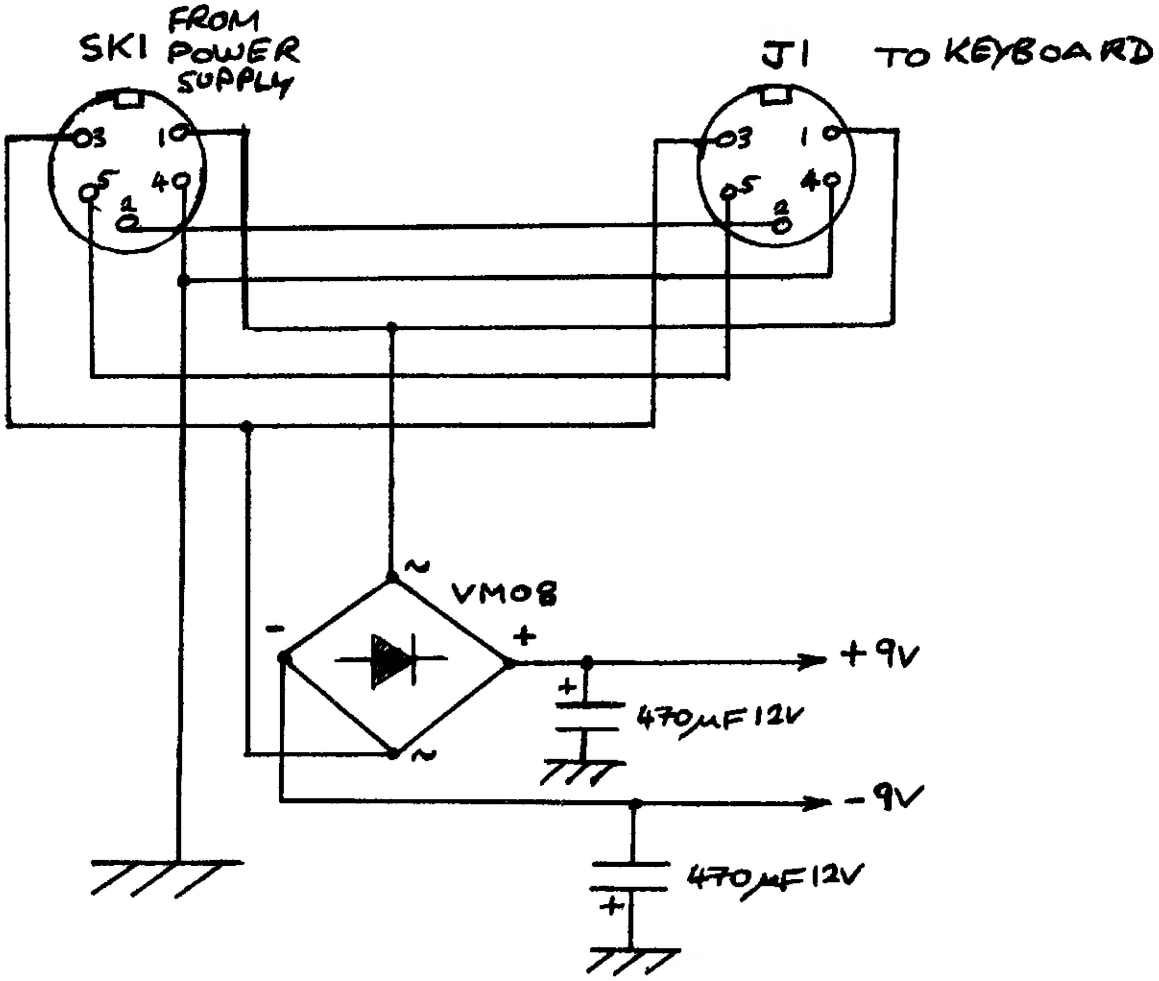


FIG. 1 - Power supply

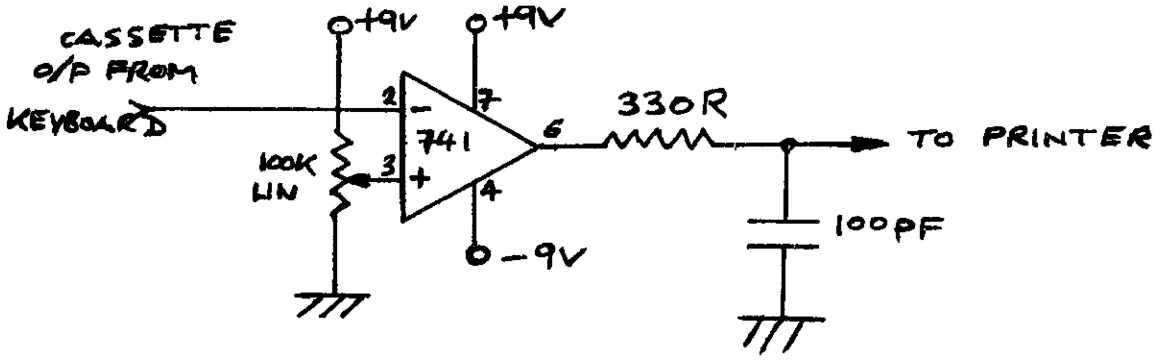


FIG. 2 - Interface circuit

MAKE YOUR HOBBY PAY

Leon Heller has asked me to write a few words with regard to our policy regarding English written programmes.

Let me first of all say that all other things being equal we would far prefer to publish English programs than we would American. Apart from the patriotic viewpoint, there is an entirely selfish advantage to us, namely that we do not have to import the software. The complications in bringing in software from the United States are not, in a technical sense, great but they can, believe me, be extremely frustrating. The number of TRS-80 owners in the United States is of course far greater than in England, or for that matter in any other country, and hence there is bound to be more software available from that source. However there are now sufficient machines in the UK and certainly, in my opinion, sufficently qualified programmers, for there to be a substantial source of software

Our terms are quite simple. We prepare all of the documentation, we do all of the advertising and we manufacture the actual cassettes or disks. The author supplies us with either a cassette or a disk with his program on it and rough notes (we do not insist on them being type-written but it is nice if they can be) of any necessary documentation. The author receives 20% of the retail sale price of the software concerned. This is paid regardless of whether we sell the software to our dealers at a lesser price or whether we sell them at retail ourselves. The copyright to the software is retained by the author, it does not transfer to us in any way shape or form. The only stipulation that we make in this regard is that once an author has sold a particular program to us, or rather come to an agreement with us to publish it, then he does not seek to publish that program or any similar program to other sources. An agreement with us to publish a particular program does not stop the author from selling or publishing his other programs elsewhere. We are now publishing a new list every few weeks of the new programs that are available so frequently a

programis published within a few weeks of our accepting it.

The subject matter of a proposed program is entirely up to the author. The market for games, unless they are unique or extremely good, is slowly drying up and the likelihood of a simple games program being accepted is now fairly remote. In the list we are going to press with very shortly (early August 1979) there are two new games from English authors so there is still some room for games programs but as I've said they either have to be unique, extremely good in graphics or in the general appeal of the software. For those of you who are adept at machine code language programming the field is really wide open in England. As you probably all know there are some extremely good utilities written in the States in machine code but there are very few coming out in England from English authors. Machine code utilities therefore is a field in which a well written program is almost bound to be accepted. There is also a need for middle market business programs. The bottom of the market programmes are available from the U.S. and top market programs are available in England, particularly from Tridata Micros Limited. There is no reason of course why other top market programmes shouldn't be written but if they are going to command the very high prices that really good business software can command they have to be extremely complex programmes and I would be inclined to doubt whether authors who are only able to write in the evenings and weekends would be able to produce this sort of software. Needless to say I would be very happy to be proved wrong. However there is a large blank space in the middle of the market for business program that would retail between, say £20 and £50. Whenever people think of business programs, for some reason or other they seem to automatically think of accountancy programs for various types of book-keeping or payroll. There are however many other businesses that are literally crying out for reasonable

software for the TRS-80. Almost any type of business can use a micro-computer to advantage and it is at this market that I would suggest that authors direct their attention. An author should have some knowledge of the business or profession about which he is going to write or he should have a friend who has such knowledge and can co-operate with him by supplying the information necessary for the program. It is really only necessary to run one's eye over the Yellow Pages of the Telephone Directory in order to come up with literally hundreds of professions or businesses for which programs can be written.

We are available at all times to give any help or advice on selecting suitable subjects and we will certainly advise on the projected marketability of any proposed software. If an author decides to write for publication then his best method of approach is to decide on a particular subject, make sure that either he himself has the necessary knowledge of the subject or is able to obtain it from a friend, make a very generalised sketch either mentally or on paper as to the general outline of the programme and then, prior to flow-charting or coding, contact us with the suggested program and we will do the best we can to advise on whether or not it will be easily marketable.

Let me finish on this subject more or less as I started. We have manufacturing rights to almost all of the program that we produce, in other words we manufacture the program ourselves and pay royalties to the author or the copyright holder. We would far prefer this money to stay in this country than to be paid out to the United States, as the majority of it is at the moment.

Whilst writing this article there are a couple of points of general interest in which members may be interested. Probably by the time this appears in print everybody will know about them if they do not already!

2.2 TRSDOS

Although the 2.2 clears up a number of the errors in the 2.1 it has got one bug of its own of which members should be aware. When the DOS boots into BASIC it uses some of the top bytes of memory regardless of whether or not that section of memory has been protected under MEMORY SIZE. In other words if there is some user machine code present at the top of memory when DOS boots into BASIC that code will be corrupted regardless of the fact that the user stipulates the appropriate memory size. The extent of the corruption seems to vary. When I first heard of this bug I was told that it ~~is~~ was about 51 bytes but some experiments that I've done indicates that it may extend to well over a hundred bytes. It therefore seems that user machine code must end within say 200 bytes of the top of memory when using the 2.2 DOS.

CTR-80 RECORDER

As we stated in a bulletin a few weeks ago this recorder definitely will damage program in certain circumstances which I think are probably well known. We have now been able to do some experiments with the suggested fix in the recent bulletin and we are pleased to say it seems to work. For those who are not aware of the fix all that it is necessary to do is to solder a diode of say 1 amp 50 volt capability across the motor to absorb the back EMF generated by the motor when it is switched off. If you wish to carry out the modification it is only necessary to remove the back by means of three screws, one of them is hidden away in the battery compartment. Trace the brown sleeving from the motor to the printed circuit board and you will see that it terminates in a white wire and metal sleeving. Solder the diode so that the cathode (that is to say the banded

end of the diode) is soldered to the white wire and the other end of the diode goes to the metal sleeving or to ground. It is wise to put a little piece of insulating tape on the board and then bend the diode over so that it rests on this insulating tape, so that when the back is put on, the diode will not be pressed down onto the printed circuit board. This is a very simple modification and as I've said seems to work. Although we are not in the hardware business if anybody is short of a diode to use we will be happy to supply it upon receipt of an S.A.E..

John Harding

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Heathkit printer

Heathkit of Tottenham Court Road, London, are selling a very nice comparatively inexpensive printer fitted with a RS232 serial interface. In kit form it is about £100 cheaper than the Anadex, and the print quality is superior. It uses a dot matrix print head, so it is not really suitable for word-processing applications, although it does have lower-case capability. It could be driven by my RS232 interface described elsewhere in this issue, although a BASIC serial print driver routine would have to be developed. Alternatively, the Tandy RS232C serial interface could be used if you have the expansion interface. This unit is supplied with a suitable print driver program. I recently called in at the Heathkit showrooms and they demonstrated the printer to me. It looks quite well made, and is very fast; almost as fast as the Centronics 779 sold by Tandy.

Leon Heller

Useful ROM routines

```
LD HL,first location in buffer
LD B,length of buffer
CALL Ø5D9H
```

prints cursor, accepts B characters from keyboard and places them in buffer; obeys backspace,clear etc. End with ENTER (carry flag clear) or BREAK (carry flag set)., returns no. of chars in buffer as B and start of buffer as HL. VERY useful.

NB: it may be necessary to CALL 2BH before using this routine to clear down the keyboard.

Nigel Dibben

SMALL BUSINESS Brian Pain

Looking at my contribution in issue 5, mention was made of a standard costing program for a specific company. This has now been finished and the user can now have the following printed out:-

Column 1. Details of product and the standard cost of production ie: material cost, labour cost, time taken and materials used.

Column 2. Details of "this week's particular production run" with comparisons against standard showing selling price variance, margin variance, and material cost percentage.

Column 3. Another production run can be shown alongside the previous columns.

The program has the facility of calling up a particular product's standard, and past actual costs for comparison purposes. Another requirement is entering a revised cost into the product's standard cost where there has been a major price revision. The recent price increase in petrol based products is an example of a situation where automatic product standard cost are required to give management meaningful comparisons between standard and actual.

It is certainly going to be an exercise persuading senior management to allow micros to encroach on to their skilled management tasks. So far users review routine and repetitive tasks for potential micro applications, but are reticent to consider their own skilled workloads as potential applications. Having now put through several jobs regularly, here in the office my own feelings are that certain skilled persons can increase their throughputs or maintain standards by eliminating those repetitive skilled tasks required of them. This does not mean that redundancy is coming up next week or next year, but the job can consist of various parts. Some of these parts can now be assisted by a micro, either operated by somebody else or by that the skilled person. Again, from our own experience the Tandy's are used irregularly that is when a job required their help. We have one for trial balances, and the other for printing and systems development work. Certain routine work is now done only on the Tandy, and to lose this facility would then create pressure on our existing skilled accounting capacity.

Another program written in the office (by a Group Member) for me is the facility of entering my own monthly Bank and Petty cash summaries and the printing of quarterly summaries from the screen to the printer (using J,K,L).

The program is a simple device, but rather useful for an accountant. Here we use our skills in considering presentation of information to the user of the end result and design a routine form to assist in the collation of information. The, using the Tandy we have up to date summaries of the year as it has progressed, with past results stored on Disks for immediate retrieval.

On a lighter vein, we have printed my personal college time table, a local jumping competition results sheet, a product specification and finally a garage weekly cash sheet. If any members would like to use the office system, Leon and myself normally meet on Sundays - morning or evening- and welcome anybody who would Like to drop in. If in any doubt please ring on a Friday or Saturday to confirm the time.

Communications with the TRS-80

I now have the Tandy RS232C interface fitted to my system. Would any other members who have this item and would like to experiment with computer communications via the telephone system get in touch with me. I have access to a PO modem and acoustic couplers at work, but I would like to have a go at developing a low-cost acoustic coupler that would enable members to use their systems for electronic mail, transfer of programs and data, etc. I think that a 300 baud acoustic coupler could be made for a parts cost of about £40, using some of the new chips that are available. How about it? Apart from the hardware development which is fairly straightforward, system protocols will have to be worked out. For instance, one system has to indicate to the other when it is ready to start transmission. Some interesting work along these lines has already been done in the US.

Leon Heller

Modification to Microsoft Level 3

```
46D4  FE 23           CP  5ØH
46D6  CA 96 46        JP  Z,4696H
46D9  C3 AD 46        JP  46ADH

47AE  2A C4 46        LD  HL, (PREV)
47B1  7C              LD  A,H
47B2  B5              OR  L
47B3  2Ø Ø6           JR  NZ, PROT
47B5  2A A4 4Ø        LD  HL, (LOC)
47B8  22 C4 46        LD  (PREV), HL
47BB  2A F9 4Ø PROT   LD  HL, (LOD)
47BE  2B              DEC HL
47BF  2B              DEC HL
47C0  22 A4 4Ø        LD  (LOC), HL
47C3  E1              POP HL
47C4  C9              RET
47C5  FE 4D           CP  4DH
47C7  C2 4A 1E        JP  NZ, 1E4AH
47CA  2A C4 46        LD  HL, (PREV)
47CD  7C              LD  A,H
47CE  B5              OR  L
47CF  28 Ø9           JR  Z,PASS
47D1  22 A4 4Ø        LD  (LOC), HL
47D4  21 ØØ ØØ        LD  HL,Ø
47D7  22 C4 46        LD (PREV), HL
47DA  E1              POP HL
47DB  C9              RET
47DC  ØØ ØØ
```

To save the modified Level 3 using a monitor, use these addresses,
Start 43ØØH End 57D7H
Entry point 43ØØH

NB: THIS ROUTINE RESIDES WITHIN LEVEL 3 AND OTHERWRITES THE AUTHORS' COPYRIGHT TEXT. AS SUCH, THE SPACE IS THEREFORE ENTIRELY UNUSED IN BASIC BUT I WISH TO MAKE CLEAR THAT NO BREACH OF COPYRIGHT IS INTENDED BY THE REUSE OF THIS AREA OF MEMORY.

NB: Level 3 relocates by - 118H bytes on start-up, hence the addresses in the listing above refer to Level 3 before start-up while the addresses in the statements themselves are post-start-up. Viz: 47DC-118=46C4, the address of "PREV".

To protect a programme in memory, simply use CMD"P" in command mode. A new programme can then be typed or loaded in entirely separately while the previous programme remains dormant.

To recover the first programme, type CMD"M" and the two will be joined together. The numbers of lines should not be allowed to overlap (use the NAME command to renumber the lines of the appended programme) but if they do, the programmes will not be merged, ie: if prog 1 reads:

```
10 REM FIRST LINE
20 REM SECOND LINE
```

and prog 2 reads: 15 REM ANOTHER

then the listing after CMD"M" will read:

```
10 REM FIRST LINE
20 REM SECOND LINE
15 REM ANOTHER
```

Programmers wanting to add other functions can extend the routine by replacing the JP NZ, 1E4AH (which gives ILLEGAL FUNCTION CALL).

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TRS--80 USERS GROUP

NEWSLETTER

Issue 7 November, 1979

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Editorial

Thanks to everyone who has sent me contributions for this issue; please keep them coming in.

The latest issue of Leighton Davies' library list is included. There is a lot of interesting stuff there, and I hope members are making use of the facility. It would obviviously be nice if everyone who made use of the service sent in a program, but you can obtain programs from Leighton without necessarily making a contribution. Now he has a disk drive we will be able to provide programs on disk to people who send in a disk (complete with TRSDOS or NEWDOS to avoid copyright problems). Check with Leighton first, though, to make sure he is all geared-up to do this.

I have just purchased a Texas Instruments 'Speak and Spell' unit, which includes a speech synthesiser, and I am investigating the interfacing of this to my system so as to provide a low-cost program controlled speech synthesiser. It will not be as flexible as the Tandy unit, but very much cheaper. My main purpose in doing this is to see if a low-cost aid for the severely mentally handicapped can be developed. Many of these kids in a local special school have no speech capability, and are also spastic, but a purpose-built interface and appropriate software might enable them to achieve some form of communication.

John Gardener gave me a copy of an article in Kilobaud which described a program and some hardware for the PET which enables it to transcribe Morse code into ASCII, so that the received code can just be read off the screen. I have adapted this program to run on the TRS-80, and whils I have not connected it up to a receiver, I have built a little circuit enabling me to send Morse to my system. This would be a very good way to learn the code for those members who are also interested in amateur radio, as the keying has to be fairly good for the program to work properly. I'll put details on this in the next issue, but if anyone is interested and sends me a cassette they are welcome to a copy of the program, and the interface circuit.

Leon Heller

Edited by:

Leon Heller
8 Morris Walk
Newport Pagnell
Bucks. MK16 8QD

Tel. 613004

Published by:

Brian Pain
40a High Street
Stony Stratford
Milton Keynes
Bucks.

Tel. 566660

I am very much an amateur when it comes to computing. My main interests are in computing as a hobby which I can also use to benefit in my job in education. So far, I have only been able to write programs for simple uses - games, repetitive calculation jobs like exam results, etc., but I am finding that I am improving every day. There are a few points which I would be grateful if someone in the know could answer for me:

1. Is it possible in Basic to record one program and then add another from the cassette without deleting the first? In other words, to combine programs. This would be useful to me as I have the line renumber program. This would save a lot of typing of routines.

2. Is it possible with a POKE command(!) to slow down the listing speed as is possible on the PET (sorry about that!)? I know one can list chunks at a time but, if you want to check through a program on the screen the scrolling is a bit hard on the eyes.

3. Is it possible to write data lines with a program? I have tried keeping children's exam results using a cassette file but, it is dreadfully slow even recording them as long strings. It does not take long though to load a program complete with data lines. Perhaps it is also possible to edit these data lines within the program.

4. Finally, my last scrounge is for information on the construction of a parallel interface (of the Centronics type) which would be suitable for driving a SWTPC PR-40 or a Trendcom Printer:* I haven't a lot of space (or cash!) and I think that one of these machines would be sufficient for me.

I have just finished converting my keyboard unit (Level 2-16K) to 50Hz working using a Comp Shop 'Cure Video Shakes' kit. For your £8.50 you get a specially made crystal and a short piece of wire - oh, and a Xerox sheet telling you what to do with it! I have carried this mod. out and it appears to be a great improvement. If you white out the screen it doesn't break up now. I was a little concerned about changing the crystal but,

Comp Shop assure me that they have only changed the frequency a couple of KHz and that when divided down it only affects the cassette rate by 1.1 cycle and I have found that my previously recorded tapes load OK.

With the winter coming up now you might care to try this piece of silly nonsense. I call it Random Lines but, it does show how clever little TRS-80 is capable of designing its next generation of microprocessors! It's a sort of auto etch-a-sketch but, it does test out the random number generator - if you keep getting a small white square in one corner of the screen send the ROMs back to Tandy! and if anyone ends up with the Mona Lisa I would like to hear from them.

** Directly from the Keyboard Expansion Port without the need for the Expansion Interface.

Graham Cousins

Sequential files and other matters

Enclosed is a note covering some hints on both our experience with service/support and a way of minimising disc space requirements of sequential files.

Since implementing the disc drive modification there have not been any I/O errors on our system and this is with heavy use of sequential files under BASIC and regular saves of some 16 pages of closely typed A4 (The workspace maximum), with the Electric Pencil.

No mention has been made of random files as i) Sequential Files are certainly the easiest to program and may often be more appropriate. ii) The Tandy Random commands are horrendous. In my view, the best approach is to forget the Tandy commands, field the whole buffer as one string 255 bytes long and then use MID$, STR$, VAL to perform the manipulation required.

Reliability

The TRS-80 provides one of the cheapest disc based computing systems. The surprising fact is that not only does it work but moreover it can be made to operate with the near 100% reliability of a true mainframe computer.

No software will operate if the hardware or operating environment is suspect. For serious users the following is a must:-

Filter all power leads
Use the latest upgrade - buffered expansion interface
- additional cable link
- modified Micropolis drive
Don't use cheap RAM - better to buy as complete system
Keep out dust and sticky fingers from the drives and discs
Use the latest release of DOS - 2.3 or much better NEWDOS+
Use a cooling fan - certainly for the drives and possibly also for the keyboard

Evaluate the consequences of using non-standard parts, or purchasing from a 'dealer' as opposed to someone who can offer a complete software/hardware backup. A good example of such pitfalls is provided by an intrinsic error with all versions of DOS. This manifests itself by file I/O errors with sequential type file writes as found in both BASIC and the Electric Pencil or anything else which uses the same DOS routines. Even worse these errors may not be detected by the DOS and appear to leave permanent parity error glitches on the discettes. Even NEWDOS suffers from this bug.

A simple and reliable solution is obtained via the Tandy hardware modification to the Micropolis disc drive. This sort of after sales support can not be ignored. If your supplier is not in a position to provide this sort of service then at best you will have an inferior system and at worst it may never function.

With the correct approach the TRS-80 should be reliable all day and every day. If you drop out of BASIC, meet unexpected syntax errors or meet disc I/O errors then it is a malfunction as opposed to any design weakness.

NEWDOS represents a 'better' operating system - One example of its advantages is that users of NEWDOS+ can use SUPERZAP (a BASIC program provided with NEWDOS+) to detect parity error glitches (VERIFY DISK SECTOR) and then repair the disc (SCOPY after DD). Users of TANDY DOS have had it. Moreover unlike NEWDOS+ users, they will not be able to BACKUP the disc due to SOURCE DISC READ ERRORS - those nasty glitches once again

File Concepts - Sequential Files v Random

Sequential files are by far the simplest to program and for some data structures, Sequential techniques may represent the most efficient use of disc space.

The choice of I/O technique must rest upon a determination of the most appropriate logical grouping of the relevant data. For example a mailing list might comprise:- Name, Address, Type of product supplied. This group can be called a record and each constituent part a field.

Efficient and Effective Disc Management

The relevant design factors are the inherent system limits:-

a) File Space - Random files can contain any number of records subject to available disc space. Records of more than One buffer (255 characters) may be tricky to program. For sequential files the record is equal to the whole file and thus can be of any size and each field of any length. The number of records is limited to the number of files that can be created on a disc. Random files can thus hold say 1400 records as against the 48 with sequential except that the sequential file has no intrinsic limit to the record size.

b) Access Speed - Under Random I/O there is almost instant access to a record. However, Sequential files can operate very quickly with say 200 fields and are especially relevant if these are numeric and of variable length. Typically these could be matrices of business or statistical data. In this case the use of Random File structures would result in much higher programming effort and a significant waste of disc space.

Programming Techniques

Consider the problem of storing 100 numeric items. The following examples show that a slight change in approach may halve the amount of disc space required:-

```
            a  b  c                    a O = Output
110 OPEN "O",1,"TEST/SEQ"                I = Input
                                         E = Extend NEWDOS+ only
                                       b Buffer number
                                       c File Name
120 FOR I=1 TO 100
          b                            b links with file in 110
130 PRINT £1,I
140 NEXT I
150 CLOSE
160 END
```

This program should write data as follows (Users of NEWDOS+ can issue a CMD "LIST TEST/SEQ" from BASIC):-

```
S1S<CR><LF>     S=Space <CR>=Carriage Return <LF>=Linefeed
S2S<CR><LF>
S3S<CR><LF>
.... etc
```

In addition to the numbers 1 through 100 the discfile will also contain 2 spaces and the line terminators carriage return and linefeed. Thus for each number there are 4 separators!

The use of a ; after the PRINT£ will eliminate the <CR><LF> terminators:-

```
130 PRINT £1,I;
```

The resultant file will now contain:-

S1SS2SS3...through to SS100S

The TRS-80 BASIC converts positive numbers to strings with a leading space.

A similar concept applies to the writing of numeric data to files. However one space is sufficient to read the data via INPUT£.

A further improvement can therefore be gained:-

```
125 Z9$=STR$(I)
126 IF I>=0 THEN Z9$=MID$(Z9$,2)
130 PRINT £1,Z9$+" ";
```

This will write data as:-

```
1S2S3.... S100S
```

Likewise with fractional data it can be worthwhile to round off to the required degree of accuracy. For 2 decimal places then:-

```
124 I=INT(I*100+.5)/100
```

For 3 Decimal Places use *1000 /1000

String data can require an exacting knowledge of delimiters. It is simplest to print each string by a seperate PRINT£ statement:-

```
130 PRINT£1,A$   not PRINT£1,A$,B$
```

Note:- For clarity the coding for the number to string conversion has been made more obvious than neat. A better way is to define and use the following function:-

```
100 DEF FNST$(NV)=MID$(STR$(NV),INSTR(STR$(NV)," ")+1)+" "
130 PRINT£1,FNST$(I);
```

Derrick Rowe

Disk file formats

As I will be using EDIT-80* to produce general-purpose text files, I wrote a short program in Assembler which dumps a disk file in its entirety into a section of RAM, enabling me to examine the format used. EDIT-80 produces files with the following format:

line number	5 bytes*
89H	TAB**
line data	arbitrary length
ØDH	1 byte EOL marker
(line number to ØDH repeated as often as necessary)	
E5H	EOF flag, 1 byte

* BCD with MSB set

** TAB character with MSB set

The Editor/Assembler modified by Apparat for use with NEWDOS+ uses the same format as does the standard Tandy tape-based version. Details are in the May issue of the newsletter.

* Part of the Microsoft package described in the last issue.

Leon Heller

Displaying Graphics Characters

Here is a little program to display all the graphics characters:

```
1Ø X=129
2Ø PRINT CHR$(26)
3Ø FOR Y=Ø TO 9
4Ø PRINT X;: PRINT CHR$(X);
5Ø X=X+1
6Ø IF X>191 THEN 9Ø
7Ø NEXT
8Ø GO TO 2Ø
9Ø END
```

Blick Morris

Luton Workshop

Can I first remind members that on Sunday mornings we are continuing to hold informal sessions from 9 to 1 p.m. Members have come from Epson, Norfolk, South London, to mention a few. Various problems have been solved or created by these sessions, and so far the regulars seem to thoroughly enjoy the relaxed atmosphere and free coffee! 40a High Street, Stony Stratford, is eight minutes from the M1 (use the service area exit at Newport Pagnell) and a simple run from there to the Stony Stratford High Street. If enough interest is shown the afternoons are also used to develop any particular project or idea.

It seems a long time ago, but the second workshop went very well at Luton College of Higher Education, where 32 members attended during the day. Four members gave presentations in one room, with equipment in another and food in the third. The presentations seem to be best when informal, and plenty of "question and answer" seems to develop from this approach. Leon's on languages was going to be for 40 minutes but infact over ran by one hour as the subject developed with plenty of "question and answer".

Tony Plackowski of Tridata Micro followed Leon and outlined problems encountered when writing programs, investigating the need for a Computer Assisted System, communicating with potential users. Here I noticed an experienced background coming through the points being made. Possibly we can persuade Tony to put this experience, and possibly little stories, into print. Obviously names can be changed to protect the innocent.

John Harding, who needs no introduction to TRS-80 Users, in the afternoon went through one or two utilities. I enjoyed seeing Comproc demonstrated and feel this sort of program will be very useful where operators are required to just enter information, and then Comproc can then do the rest. The members really enjoyed this session, picking up one or two throw-aways from John. His non-destructive line in testing caught the imaginations. He also reminded us that the market has plenty of games but he feels the U.K. is crying out for good business programs.

I explained to the members what is currently going on in my office. By breaking the office routine down into modules, it could be seen that not all routine office work was worth putting on to a micro. By using the consideration "it has to save or make money" then only a few tasks are worth spending time on software. Currently certain financial accounts automatically are now prepared by TRS-80 - they are either monthly or quarterly. The costing program now runs every Monday with a proper log which records time started/completed with operator's comments. My own bank account and petty cash have their own program, and the clients ledger will shortly go on to my second back up TRS-80 using the Electric Pencil Disk version on TRS DOS 2.3.

While we are still on the workshop, many members expressed their thanks to Jackie, for putting on the refreshments at Luton. I hope she can come along on to the next workshop (19/20 January, 1980) and sit back this time, and enjoy the College's catering see application form Issue 8.

This contribution cannot exclude mention of my current system problems. When we first set the disk and printer facilities up, there were no problems after many hours of use at 32K. Since moving the system into another room and going up to 48K, problems we have had. Fitting a suppressor, going back to 32K, and changing keyboards seem to have helped but the 100% reliability still eludes us. As it was there, I am determined to track the problem/source down. At this stage thanks to Leon and John Gardener for assistance to date, and this assistance has proved the usefulness of the group to date.

Since our mentions in computing, the membership has jumped quite nicely and the numbers just exceed 150. We propose to go north for a Sunday workshop and would welcome suggestions for a suitable location. We require catering facilities and three rooms all day with plenty of plugs (minus spikes of course). The hire fee can be around £25 - £35 and members can be "booked into" the refreshments, by myself prior to leaving for the workshop. Numbers would be around 30 - 50.

We propose to hold the Group's Annual General Meeting on 20th January, 1980. It is hoped this formal meeting can confirm that the group is going in a direction that is agreeable to those who

feels 'formality' is useful in keeping a small organisation in fine fettle and attuned to the membership needs. On the last point please consider putting forward suggestions either for the Newsletter, attending the Sunday meetings, ringing Leon at the weekend, or myself on my office number. We do need feedback over the weeks to judge what sort of articles are going to be of interest and whether some members are currently working on interesting projects.

Brian Pain

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```
10 REM *** RANDOM LINES ***
15 RANDOM
20 CLS
30 INPUT "ENTER START POINT REFERENCE X,Y";X,Y
35 CLS
40 SET(X,Y)
50 H=RND(48):V=RND(16):R=RND(2):P=RND(2)
80 IF R<>1 THEN 100
90 H=-H
100 IF P<>1 THEN 120
110 V=-V
120 F=X+H
130 G=Y+V
140 IF F<=127 THEN 160
150 F=254-F
160 IF F>=0 THEN 180
170 F=-F
180 IF G<=47 THEN 200
190 G=94-G
200 IF G>=0 THEN 220
210 G=-G
220 REM VALUES FOR F & G SHOULD NOW BE ON THE SCREEN
230 S=1
240 IF F>=X THEN 260
250 S=-1
260 FOR J=X TO F STEP S
270 SET(J,Y)
280 NEXT J
290 S=1
300 IF G>=Y THEN 320
310 S=-1
320 FOR K=Y TO G STEP S
330 SET(F,K)
340 NEXT K
350 X=F
360 Y=G
370 C=C+1
380 IF C<>100 THEN 400
390 C=0
395 FOR A= 1 TO 2000:NEXT A
396 GOTO 35
400 GOTO 50
999 END
```

Graham Cousins

Merging BASIC programs

Graham Cousins has asked if there is a way to merge one program with another with a cassette-based system. The following program enables this to be done; the program was published in TRS-80 Computing Issue 3 complete with acouple of mistakes which I have corrected.

```
1 CLS:PRINTPEEK(16549);" ";PEEK(16548):E=17129
2 S=E:E=PEEK(S+1)*256+PEEK(S):IFE>ØGOTO2
3 POKE16549,INT(S/256):POKE16548,S-INT(S/256)*256:END
```

To Append a program or subroutine (line numbers should not conflict with the program already in storage) the following procedure should be followed:

1. Key in the above program.
2. RUN the program.
3. Save the PRINTed Peek addresses (they should be 66,233).
4. CLOAD the BASIC program to be appended.
5. From the keyboard: POKE 16549,66:POKE 16548,233
6. LIST your program and check that the two original programs have been merged.

From: TRS-80 Computing, Box 158, San Luis Rey, CA 92068, USA.

Expansion Interface Problems

If you have experienced inexplicable syntax errors and funny things happening to your program when using the Expansion Interface with 16K or 32K of RAM fitted, Tandy have a modification that should solve your problems. The trouble is apparently caused by the multiplexing and column and row strobe signals for the RAMs, and the modification mainly consists of three twisted pairs joined by a DIN connector running between the keyboard unit and the Expansion Interface. Some tracks are also cut so that the signals bypass the multi-way ribbon cable. If you are having problems of this nature insist that your Tandy dealer return the units for modification which should be free of charge, even if your system appears to be out of warranty; you are still covered by the Sale of Goods Act. If you have added your own memory it might be as well to take it out before you send it off, as Tandy are insisting that users provide proof that they purchased their RAM from them before doing memory related repairs free.

Leon Heller

Using SUPERZAP to disable or enable the password protection on disk files.

In the SUPERZAP documentation provided with NEWDOS+, the procedure for removing the password protection on disk files is described in a somewhat unclear manner. If you would like to be able to delete unwanted files such as FORMAT/CMD or BASIC/CMD, here is a simple explanation of how to go about it. This removal of unwanted files will probably be of most use if you are using alternative languages like FORTRAN or PASCAL, but it could give you a lot more file space if you are using the Electric Pencil. Just remove the password protection as described below and then delete the unwanted files, then restore the password protection. The process works with TRSDOS as well, provided you have SUPERZAP. Be warned, if you slip up and modify the wrong byte you could make your disk unusable. Make sure you have a backup copy and double check every operation.

1. From Disk BASIC, run SUPERZAP.
2. When SUPERZAP initialises (it takes a bit of time) press Enter to display a disk sector.
3. Select the drive on which the diskette you wish to operate is mounted and press Enter.
4. Select track 1Ø and press Enter.
5. Select sector 6 and press Enter.

To disable password protection.

1. Key in MOD63 (do NOT press Enter).
2. Key in 1 and press Enter. This will change byte 63 of the sector from 2 to 1 and write the sector back to the diskette. All password protection is now removed and you can delete system files and BASIC if you wish, to make room for your own files.

To enable password protection.

1. Key in MOD63 (do NOT press Enter).
2. Key in 2 and press Enter. This will change byte 63 of the sector from 1 to 2 and write the sector back to the diskette. Password protection is now restored.

Library list

PROG £	PROG NAME(S)	MEMORY
LC	GOLF + SINK 'EM	10 2K
	DRAUGHTS+HORSE RACE+SPLATT	10 5K
LC	MOON LANDER	2 3K
	SHOOT IT (LEVEL 2 BOOK)	0.8K
	BOUNCING DOT (ORIGINAL)	1.4K
D	BOUNCING DOT (MUCH MODIFIED)	1.9K
LC	SUB CHASE	3.2K
LC	CAR RACE (BRANDS)	4.4K
D	" " (MONZA)	2.6K
D	" " (MONACO)	2.6K
	DRAG RACE (DESIGN YOUR DRAGSTER)	4.2K
	FRUIT MACHINE	2.5K
D	4 REEL SLOT	3.5K
D	3 REEL SLOT	2.3K
D	WUMPUS	1.9K
D	SNARK	0.7K
D	CRAPS (THE CARD GAME)	1.6K
D	ZOMBIE (VERY GOOD, FAST GAME)	3.1K
D	RANDOM DRAWER (WEIRD MAN, WEIRD)	3.1K
D	JIGSAW	5.7K
	HAMMURABI (PLAY KING)	3.4K
	WAVY MESSAGE DISPLAY	0.5K
LC	FIELD GUN+10 PIN BOWLING	4.7K
LC	POEM	1.3K
	CHOMP	2.9K
	CASTLE SHOOT (MODIFIED L1)	1.5K
	MINE FIELD (VERY TOUCHY !!)	3.3K
	CALENDAR (GREGORIAN)	1.3K
D	DATE FINDER	0.6K
D	PRIME FINDER	0.4K
	ATOMIC ORBITAL PLOTTER	3.4K
	SINE WAVE ADDITION	2.5K
	BALL BOUNCE PLOTTER	1.0K
D	NUMBER SORT	0.5K
	QUAD ANTENNA DESIGN (RADIO)	2.4K
D	WILCOXON TEST	0.7K
D	ONE SAMPLE CHI SQUARED TEST	0.5K
D	KOLMOGOROV-SMIRNOV TEST (NOT VODKA!)	0.5K
MCD	RE-NUMBER (RENUM)	
MCD	DE-BOUNCE ROUTINE 16K	
MCD	LIFE (VERY FAST)	
MCD	MACHINE MONITOR	
D	FROGGIE	2.4K
D	PHANTOM	1.8K
D	STOCK-CAR RACE	2.2K
D	MAGIC NUMBER FINDER	1 1K
	SOLITARE	2.9K
	CHECKER SWIPE	2.4K
MCD	COPY (COPIES MACHINE CODE PROGS)	
D	OTHELLO	3.3K
D	HEX-DEC-HEX CONVERTION	1.3K
D	PI (NUMBER CRUNCHER ! TAKES DAYS)	0.6K
D	STAR TREK VERTION + MC SUB	13.7K
D	RS232 DRIVER (USES POKE)	2.1K

LC-lower case

MC-machine code

D-donated

eg MCD-machine-code & donated.

Leighton Davies
Glanmor
Brynna Road
Bridgend Mid-Glamorgan

CP/M software for the TRS-80

Whilst the CP/M disk operating system has been adapted for the TRS-80, not all CP/M software will run on the Tandy system due to differences in the memory map. I had a chat with the Lifeboat Associates people at the P.C.W. show about this and they ticked off for me all the items in their catalogue that are TRS-80 compatible. The list is as follows:

MAC	Digital Research
SID	
TEX	
DESPOOL	
Disk Extended BASIC	Microsoft
BASIC Compiler	
FORTRAN-80	
MACRO-80	
EDIT-80	
CBASIC2	Software Systems
tiny C	Other
C Compiler	
Z-80 Development Package	
TEXTWRITER II	
Selector III	

Leon Heller

January Workshop

Many members have expressed an interest in attending another workshop, and we have decided to hold a two day event (Saturday and Sunday) on the weekend 19th/20th January 1980.

The venue will be Milton Keynes College of Education, Wolverton, and single room accomodation will be available at a cost of about £12 (full board). If you would like to attend just for one of the days, the cost will be around £5. The A.G.M. will be held at some time during the weekend.

Further details and an application form will be sent out shortly.

Machine Language Programming

It appears that my series on machine language programming, which I have not really had the time to produce, has been overtaken by events, in that Tandy have brought out an excellent book on the subject entitled TRS-80 Assembly Language Programming. This book, written by William Barden Jnr., who has also produced a very good book on programming the Z-80, is only £2.29, and is very good value for money. It deals in detail with the Z-80 instruction set, the use of T-BUG and the Editor/Assembler. Several useful subroutines are also described which you will find can be used in your own programs.

There is not really much point in my "re-inventing the wheel" and I therefore urge anyone interested in machine language and Assembler to get this book.

Leon Heller

New developments from Tandy

The TRS-80 Model 2 was formally unveiled for the UK market at the P.C.W. show. This machine, unlike the TRS-80 we all know and love (?) which will henceforth be known as the Model 1, is not really aimed at the hobbyist market, and is a very nice looking small business system with an 80 character wide display, upper and (legible) lower-case, a 4MHz Z-80 CPU, 32K or 64K of RAM, and one to four 8" floppy disk drives. It will sell for around £2000 in basic form, and is extremely good value for money, compared with machines like the IBM 5100, and the desk-top Hewlett-Packard systems, if not quite as sophisticated.

The Model 1 has not been forgotten, and there is a new display on the latest systems; it's green and does not wobble! The problems with the Expansion Interface have been solved, and it looks like high resolution graphics and lower-case with proper descenders on the characters will also be available.

Leon Heller

Table of key codes

Doctor Dobb's Journal for October had the following table of key codes in a letter contributed by Arne Rohde of Denmark:

Position (relative to 14336)	Value 1	2	4	8	16	32	64	128
1	@	A	B	C	D	E	F	G
2	H	I	J	K	L	M	N	O
4	P	Q	R	S	T	U	V	W
8	X	Y	Z					
16	Ø	1	2	3	4	5	6	7
32	8	9	:	;	,	-	.	/
64	Ent	Clr	Brk					Space
128	Shift							

Using these codes direct access to the keyboard is feasible using PEEK.

For example:

```
1Ø IN%=PEEK(14336+64)
2Ø IF IN% AND 8 THEN PRINT "UP"
3Ø IF IN% AND 16 THEN PRINT "DOWN"
4Ø GOTO 1Ø
```

From: Dr. Dobb's Journal of Computer Calisthenics and Orthodontia,
P.O. Box E,
Menlo Park,
CA 9402,
USA

Disabling the BREAK key

The US Users Group has published a useful technique for disabling the BREAK key; a good way to make your programs even more 'crash-proof' for inexperienced users. Merely POKE 16396,23 and the only way a program can be interrupted is by pressing RESET or by switching off the power. POKE 16396,25 to restore the BREAK function. This does not seem to work with disk BASIC.

Leon Heller

Binary search routine

Sorting and searching are perhaps the most important techniques to get right when programming, especially when you are manipulating large files. Choosing the correct algorithm can make a tremendous difference in program execution time compared with an inefficient procedure. Most inexperienced programmers tend to use serial search techniques, but if the file has been sorted, as is often the case, a binary search is very much faster.

In BASIC, the algorithm is somewhat difficult to follow, so I will express it first in what the professionals call structured pseudo-code, an English-like way of describing a program that is easier to follow than a flow-chart. Incidentally, this is a very good way to develop a complex program, even if you are using an impoverished language like BASIC, although you will gain most from using this technique with a language with decent control structures such as Pascal.

```
procedure BINSRCH(A,n,x,j)
   initialise lower and upper
   while there are more elements to check do
       let A(mid) be the middle element
           case
           : x>A(mid): set lower to mid + 1
           : x<A(mid): set upper to mid - 1
           : else: found
           end
   end
   not found
end BINSRCH
```

Taken from: Fundamentals of Data Structures, Horowitz and Sahni.

Here is a simple BASIC program that you can adapt for your own purposes:

```
1Ø FOR I=1 TO 1Ø:READ A(I):PRINT A(I);:NEXT I
2Ø INPUT "KEY";X
3Ø L=1:U=1Ø
4Ø M=INT(L+U)/2)
5Ø IF X>A(M) THEN L=M+1
6Ø IF X<A(M) THEN U=M-1
7Ø IF X=A(M) THEN PRINT "FOUND AT";M:GOTO 1ØØ
8Ø IF L<=U THEN 4Ø
9Ø PRINT "NOT FOUND"
1ØØ END
11Ø DATA 1,4,5,7,1Ø,3Ø,4Ø,45,5Ø,7Ø
```

As one would expect, the larger the list, the more time is saved compared with a straight sequential search. For a list of 50,000 items, the sequential search would, in the worst case, need 50,000 comparisons, whilst the binary search would never require more than $\log_2(50,000)$ or about 16!

Incidentally, there is a pressing need for BASIC routines to carry out other sorting and searching tasks in an efficient manner. Many of these algorithms are available in the computer science textbooks, usuall expressed in ALGOL or Pascal, and should be relatively easy to code in BASIC. How about someone producing routines for searching using hashing techniques, or ways of utilising linked lists.

Leon Heller

TRS-DOS 2.3

TRS-DOS 2.3 has now been released. Tandy seem to have forgotten about the 2.2 version, although copies of it are floating around. All purchasers of TRS-DOS 2.1 should have been sent the 2.3 version, I understand, but I for one am still waiting to get it via official channels.

Included on the diskette are a couple of test programs, one to test the ROMs and RAMs, and another which is intended to test the disk drives. I think that is what the second program is supposed to do, anyway, no documentation is provided and it displays lots of incomprehensible rubbish on the screen. Tandy have told one user that these programs have bugs in them and do not work properly! I wonder why they released them???

Somewhat more useful are a couple of utilities to save and load any disk file (data, programs etc.) to or from cassette for back-up purposes.

Two versions of Disk BASIC are provided- BASIC and BASICR. The latter has a renumbering facility. I still prefer NEWDOS, although I need TRS-DOS for the Microsoft Macro-Assembler.

Leon Heller

Problems with the RS232C unit

It is very annoying that every time one wants to change from using the system as a terminal to using a printer that the the top has to come off the Expansion box, that switch in miniature size could so easily be mounted on that horrible great connecting block, thay is the worst part of a very badly designed board. To think of it, about 60 spring contacts, any of which might not be making proper contact, which was what was wrong with mine.

It was no sweat for me, all I had to do was take the Expansion box to pieces, but for anyone whose interface was still in warranty, a lot of hassle!

A question: having entered that Assembler printer driver program how do you get a print-out like the one in the book and how can it be loaded onto disk or made into a system tape to transfer to a CP/M disk? I have not had any luck yet; obviously I am doing something wrong when I assemble it (using NEWDOS).

My eventual aim is to have a 'TERM' and a 'PRINT' program on my CP/M dosk so that I can interface with the Modata system my friends have, they are quite interested in the idea of using a Tandy as a support system for the systems they market.

John Kilpatrick

Please note that your subscription is now due as the subscription covered six issues. Please tear off the form below and return to:-
B.C. Pain, 40a High Street, Stony Stratford, Milton Keynes

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TRS--80 USERS GROUP

NEWSLETTER

ISSUE 8 JANUARY 1980

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Editorial

Well, here we are with the first issue of the new desade. I hope you find it interesting.

We now have over 160 members. I wish I could say "paid-up" members, but Brian tells me that in spite of the reminder and renewal form in the last issue around half the members are still in arrears. Please send in your subscriptions as soon as possible.

You should all have received notification of the January workshop at Milton Keynes College of Education. It really is excellent value at £12 including accomodation and meals, and we have tried to arrange an interesting programme with something to suit everyone. During the course of the Saturday, I hope to be able to demonstrate the use of my system as an intelligent terminal on line to one of our university computers via an acoustic coupler I shall borrow for the occasion. My "home-brew" unit will probably not be ready in time.

There should be some very exciting developments in personal computing in the next year. The sixteen-bit CPUs should start to be incorporated in personal systems, and whilst initially such systems will be rather expensive, before long they will be available at similar prices to the presently available systems like the TRS-80. You might question the need for sixteen-bits, but apart from the advantage of being able to address several megabytes of RAM directly (if you can afford it) a much more powerful instruction set becomes possible, with nice things such as hardware multiplication and division, position-independent code and many other features aiding the production of compilers and interpreters.

Leon Heller

Edited by:-
Leon Heller
8 Morris Walk
Newport Pagnell
Bucks. MK16 8QD
Tel. 613004

Published by:-
Brian Pain
40a High Street
Stony Stratford
Milton Keynes
Bucks.
Tel. 566660

Editor/Assembler and NEWDOS+

Many thanks for your very helpful tip on the phone last week. The question concerned the use of the Tandy "Editor Assembler", the problem and your solution is given below plus one or two trivial tips that might interest readers of the TRS 80 News letter.

This is a very handy utility in Newdos plus but beware of the following snag. When entering a programme be sure that on completion the starting address is given as shown below, after entering 'END'

```
260        END        9300H
```

'260' Is the line number at the end of a typical programme
'END' Is the statement in the opcode column
'9300H' Is a typical programme starting address which would also appear at the begining of the programme after 'ORG'

Like most of these problems no mention of this requirement is made in the Radio Shack Editor/Assembler users manual and is not shown in the example on page 6 of same. When loading machine language programmes onto tape everything is O.K. however if you put a programme on to disk without the starting address at the end you will find that it will not be possible to load your programme from disk to memory at a later date. The only programmes I have been able to load into memory so far are those that have been written to disk with the 'W' command, these will not execute of course but are stored for debugging or inspection purposes. Just in case the routine is not obvious this is what you do.

```
W D=TEST/TXT
```

Don't forget to put in the 'space'
Next

```
A
```

and the programme assembles, then all you have to do is to answer the various questions as they appear on the screen. The 'FILESPEC' in this example would be 'TEST/CMD' so as not to confuse it with 'TEST/TXT'. Like most of these things it all appears so obvious once you know how.

* This is in fact mentioned in the manual. See page 11. Ed.

Angus Ellefsen

Tandy - Datapoint Link Up

Tandy Corp. and Datapoint Corp. have formed a joint company on a 50-50 basis to produce low-cost peripherals for both companies' products. Initially, floppy disk drives will be produced, and printers will eventually be manufactured. Interestingly, Datapoint have recently attracted some attention in the U.S electronic press as the latest company to enter the 'Electronic Office' market place, although this venture would appear to be completely separate from the tie-up with Tandy.

Leon Heller

THE HEATHKIT H14. LINEPRINTER.

I HAD TO WAIT SOME TIME FOR MY LINEPRINTER KIT TO ARRIVE, JUST OVER TWO MONTHS IN FACT. BUT I ARRIVED HOME ONE DAY TO FIND A LARGE PACKAGE WAITING FOR ME ,OBVIOUSLY FROM HEATHKIT.

I HAVEN'T GOT AN EXPANSION INTERFACE SO NO DISC EITHER, BUT FOR SOME TIME, IT HAD OCCURRED TO ME THAT A LINEPRINTER WOULD PROBABLY BE MORE USEFUL TO ME, SINCE I COULD USE 'THE ELECTRIC PENCIL' (WHICH IS HOW I WROTE THIS) AND ALSO SIT AND CHEW OVER MY WORST EFFORTS AT PROGRAMMING WITH HARD COPY. I FIND SCROLLING BACKWARDS AND FORWARDS ON ANY VIDEOSCREEN IS FRUSTRATING AFTER AWHILE, ONE ENDS UP MAKING NOTES ANYWAY. A LISTING IS EASIER ,SINCE ALL THE PROGRAM OR WHATEVER IS LAID OUT NEATLY ON PAPER, DOUBLE SPACED AND READY FOR HOPEFUL CORRECTION. CURIOUSLY ENOUGH I FIND THAT OBVIOUS MISTAKES SEEM TO STAND OUT MORE, PERHAPS BECAUSE WE ARE MORE USED TO THE PRINTED MEDIUM THAN A V.D.U.

HOWEVER, BACK TO MY PACKAGE! OPENING IT WAS RATHER LIKE PANDORAS BOX SINCE I DIDN'T KNOW WHAT TO EXPECT. EVERYTHING WAS PACKAGED AND STAMPED VERY NEATLY AND ALL THE LARGER PIECES OF HARDWARE CAREFULLY WRAPPED IN PAPER WADDING. TWO MANUALS ARE INCLUDED. ONE FOR THE ACTUAL BUILDING AND AN OPERATION MANUAL. BOTH SEEMED REASONABLY CLEAR, BUT LOOKED RATHER COMPLICATED.

THE NEXT EVENING, I SET TO , WITH THE CONSTUCTION MANUAL AND THE PRINTED CIRCUIT BOARD, WHICH IS PLATED THROUGH ,DOUBLE SIDED AND SCREEN PRINTED WITH ALL THE COMPONENT NUMBERS. AFTER AN INITIAL PANIC ,SINCE I COULDN'T FIND 37 RESISTORS ANYWHERE, I WAS ABOUT TO BLAME HEATHKIT, UNTIL I DISCOVERED THEM IN A PACKET I HAD OVERLOOKED!

THE MANUAL IS VERY WELL LAID OUT AND IT IS ESSENTIAL TO FOLLOW THE STEPS ONE BY ONE, SINCE THERE IS VERY OFTEN A GOOD REASON FOR LEAVING BITS OUT OF THE WAY DURING CONSTRUCTION. THERE IS ALSO ANOTHER BOOKLET WITH EXPLODED DRAWINGS TO SHOW WHAT EACH PART IS SUPPOSED TO LOOK LIKE AND ALSO EACH UNIT AS IT IS BUILT. THE 'SOFTWARE' REALLY IS EXTREMELY GOOD AND NOT NEARLY AS DIFFICULT AS IT LOOKS AT FIRST. PARTS ARE REFERRED TO BY NUMBER(S) AND DESCRIPTION AND SHOWN PRECISELY WHERE THEY SHOULD GO IN THE CIRCUIT OR MODULE THAT IS BEING WORKED ON. IF YOU ARE ABLE TO BUILD A 'TRANNY' RADIO KIT, A BIT OF HEAD SCRATCHING EVERY NOW AND THEN WOULD ENABLE YOU TO BUILD THE LINEPRINTER.

TOOLS REQUIRED ARE VERY FEW BUT A GOOD SOLDERING IRON WITH A SMALL PENCIL BIT IS ESSENTIAL. THERE ARE A NUMBER OF I.C. HOLDERS TO SOLDER AND NUMEROUS OTHER DISCRETE COMPONENTS WHICH DON'T LEAVE A LOT OF ROOM FOR MANOEVURE.

ABOUT 25 HOURS AFTER STARTING THE CONSTRUCTION OF THE KIT I WAS READY TO START THE TEST PROCEDURES OUTLINED IN THE MANUAL. THERE ARE TWO RED LED'S WHICH ARE USED AS TEST LAMPS AND THESE TOGETHER WITH AN OHMMETER (NOT ESSENTIAL) AND A COUPLE OF PIECES OF WIRE ENABLE THE BASIC CIRCUITS TO BE CHECKED. THESE APPEARED TO BE O.K. SO WITH SOME EXCITEMENT THE 'TEST PRINT' BUTTON WAS PUSHED, AND THE PRINTERS REPETOIRE OF CHARACTERS APPEARED ON THE PAPER.

INTERFACING THE UNIT WITH THE TANDY WAS NOT TOO MUCH OF A PROBLEM. THE CIRCUIT DIAGRAM THAT LEON HAD PUBLISHED IN THE NEWS LETTER (ISSUE 3) WAS FAIRLY EASY TO BUILD. THIS WAS CONNECTED UP AND AN ATTEMPT MADE TO PRINT FROM 'PENCIL'.---NOTHING!! EXCEPT ALL 35 PINS IN THE PRINTHEAD HIT THE PAPER AND THE RIBBON DROPPED OFF! AFTER TWO OR THREE HOURS OF THIS I BEGAN TO REGRET KIT BUILDING TO SAVE MONEY. CLOSE EXAMINATION OF THE BOARD REVEALED NOTHING UNTOWARD. SOMETIMES IT APPEARED THAT SOMETHING WAS GETTING THROUGH ,BUT IN A LANGUAGE THAT THE TANDY AND PRINTER WERE KEEPING TO THEMSELVES! AFTER LOOKING AT THE CIRCUIT DIAGRAM AND THE PRINTOUT CLOSELY IT SEEMED TO HAVE A PATTERN OF SORTS. THE MEMORY IN THE PRINTER USES TWO 4 BIT RAMS, ONE FOR THE FIRST FOUR BITS AND THE OTHER FOR THE REMAINDER.

I RANG UP HEATHKIT AND THEY WERE QUITE GOOD ON THE 'PHONE WITH MY QUERY. THEY AGREED THAT THE FAULT COULD BE IN ONE OF THE RAMS, BUT THEY COULDN'T REPLACE IT FOR ABOUT A MONTH DUE TO MEMORY SHORTAGES. I GOT ONE AT A LOCAL SHOP AND REPLACED THE ONE I THOUGHT WAS FAULTY-- IT WAS! THE PRINTER WORKS FINE AND FOR 410 POUNDS INCLUDING VAT IS,I THINK, GOOD VALUE.

I ENJOYED BUILDING THE KIT AND CERTAINLY KNOW A LOT MORE ABOUT LINE PRINTERS GENERALLY AND THE HEATHKIT IN PARTICULAR. THE PRINTER IS ABLE TO VARY THE LINE WIDTH AND HENCE THE SIZE OF THE CHARACTERS BY USING CONTROL CODES. THESE ARE THE ASCII CONTROL CODES WHICH ARE AVAILABLE ON THE TRS.80, BUT USED AS GRAPHICS CHRACTERS. CHR$(128) TO CHR$(160) ARE THE CODES FROM "CTRL @" TO "CTRL DEL" OR IF YOU PREFER 00H TO 20H. SO IT IS POSSIBLE TO GENERATE A FORMFEED WITH CHR$(140).

AT THE MOMENT I AM RUNNING THE PRINTER AT 600 BAUD WHICH IS FAST ENOUGH, BUT I AM UNABLE TO GET IT TO TO PRINT AT 1200 BAUD OR MORE. ANYONE GOT ANY IDEAS? POSSIBLY THE HANDSHAKING IS TOO SLOW OR SOMETHING.

Shaun Kendall

RS-232-C Interface

If you have a 48K system and you would like to use your RS-232-C interface to drive a serial printer using the program on page 29 of the RS-232-C manual, here are the changes to make so that the driver resides at the top of your memory (starting at FFØØH). Memory size should be set to 65279.

Line no.	Change to:
2Ø	POKE 16421,2:POKE 16422,Ø:POKE 16423,255
4Ø	FOR X=6528Ø TO 65352
6Ø	POKE (X-65536),Y
8Ø to 110	127 to 255 (four places)

Leon Heller

Memory Saver

Like many people I started off with a 4K system (in my case, level 2) and as my ambitions grew I found myself entering programmes, particularly games, where the introductory text and instructions were enormous and very quickly devoured my small amount of memory. Here is an example of a short Basic programme that leaves you with more memory at the end of execution than you started with.

Put your programme on tape in two sections. The first section being text and consisting mostly of print commands, the second section being the 'working' part of the programme eg.

```
10 CLS
20 PRINT "LOTS OF TEXT"
30 PRINT MEM
40 DELETE 10-40
50 'REST OF PROGRAMME
```

Run this programme then type in

```
PRINT MEM
```

Next type

```
LIST
```

and hopefully you will see what I mean

Angus Ellefsen

Slide Projector Control

I have been using my TRS-80 to control a slide projector with a circular magazine to give a repetitive programme suitable for exhibitions, shop window displays etc. Slides are projected on a back-projection screen, with the TRS-80 moniter at the side of the screen showing captions for the slides. The cassette control relay can be used to pulse the slide-change contacts on the projector. A suitable subroutine is:-

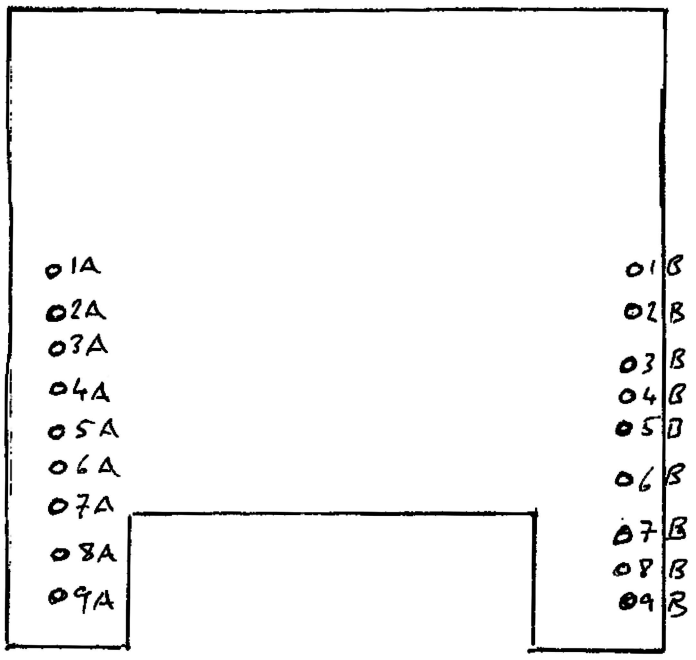
```
1000 OUT 255,PEEK(16445)+4
1010 OUT 255,PEEK(16445)
1030 RETURN
```

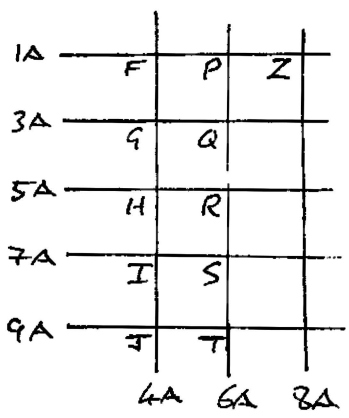
The PEEK ensures that the characters-per-line-setting is not changed.

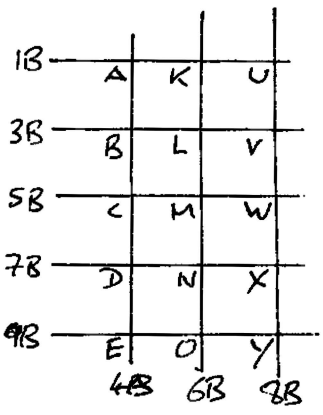
John Wood

Low-Cost Speech Synthesis

As I mentioned in the last issue, I have been investigating the possibility of interfacing the Texas Instruments Speak and Spell unit to the TRS-80. The Speak and Spell has a total of 26 alpha keys (of course) and what is needed is some means of actuating these keys under program control from the TRS-80, using appropriate hardware and software. On disassembling the unit, I found that the keyboard is scanned by rows and columns, and the first task was to work out how the scanning was done, in terms of the connections required for a particular character. I ascertained that the keyboard is divided into two independent sections, with the rows and columns brought out to printed circuit pads on the left and right of the P.C.B. The connections are as follows:-







The next problem is how to simulate someone pressing the keys. One way to do this is to utilise CMOS analogue switches such as the 4066. The number of switches can be reduced by connecting the left hand rows to the right hand rows, producing a 5X6 matrix that will require 11 switches, and 11 outputs from the TRS-80. The output requirements can be reduced considerably by using CMOS analogue multiplexers which are essentially banks of switches any one of which can be selected by an appropriate digital word. Using five inputs to an eight-bit multiplexer for the rows, and six inputs to another eight-bit multiplexer for the columns, we only need six outputs from the TRS-80, which can conveniently be taken from the Centronics printer output connector on the expansion interface.

The software to drive the unit should be quite trivial. A look-up table to convert from ASCII to the appropriate six-bit codes for the multiplexers will obviously be needed, and, for initial testing purposes, a routine to scan the keyboard, display characters, and output the appropriate character via the "Speak and Spell".

I have yet to build the interface circuitry described above, but it should work. Full details of the hardware and software will be in the next issue.

Leon Heller

Another Use For 'DEBUG'

If you have TRS DOS or NEWDOS a tip that may be useful when debugging a programme is to see what is actually stored in memory right at the begining of a Basic programme. With my system, programmes I write start at about memory address 68B9. Have a good look at the first two or three hex entries and make a note of them. If you lose your programme by typing NEW or having to press the reset button you will notice that although you cannot now run or list your programme it still resides in memory apart from the first few statements which can be re entered via the 'M' command in 'DEBUG'. I should think that it is quite possible to do the same thing directly from Basic using PEEK and POKE statements or possibly you could write some form of retrieval programme using TRUG and a USR command which would display the first four or five entries in RAM for later reinsertion.

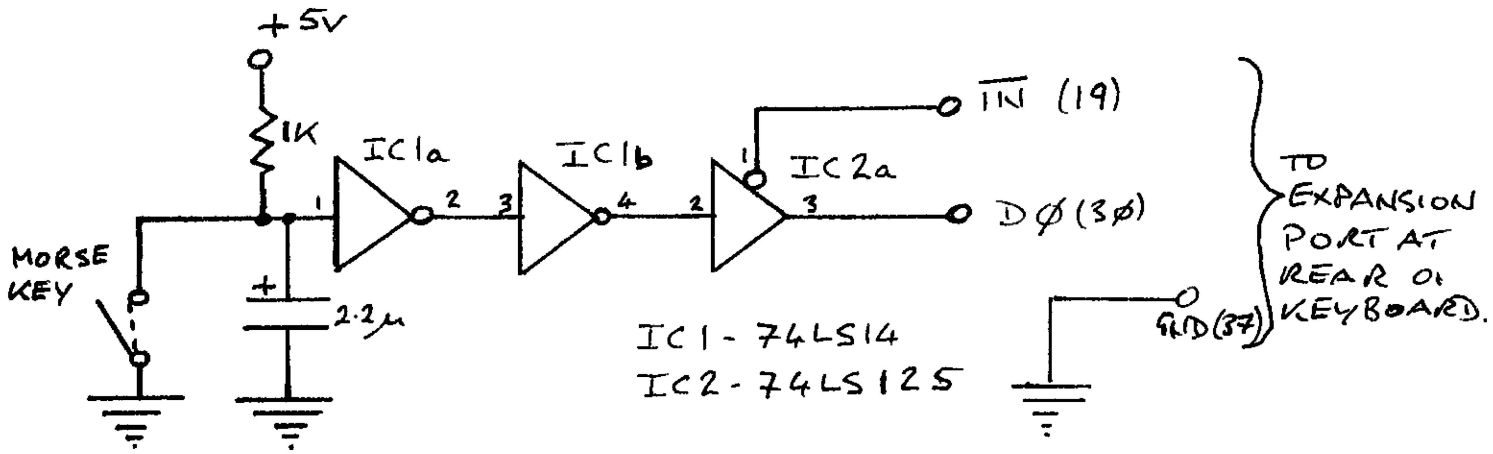
Angus Ellefsen

Morse Code Reception

As I mentioned in the previous issue, I have adapted a program written for the KIM1 in Microsoft BASIC that decodes and displays Morse code messages. The program was published in an American magazine, and was brought to my attention by John Gardener. The original program made use of a memory mapped input port, and I have assumed that a standard input port at ØØH will be used. This is accessed via the INP(Ø) command in lines 4Ø, 7Ø etc. Input to the port is via the MSB, hence the AND 1 to mask off all the other bits.

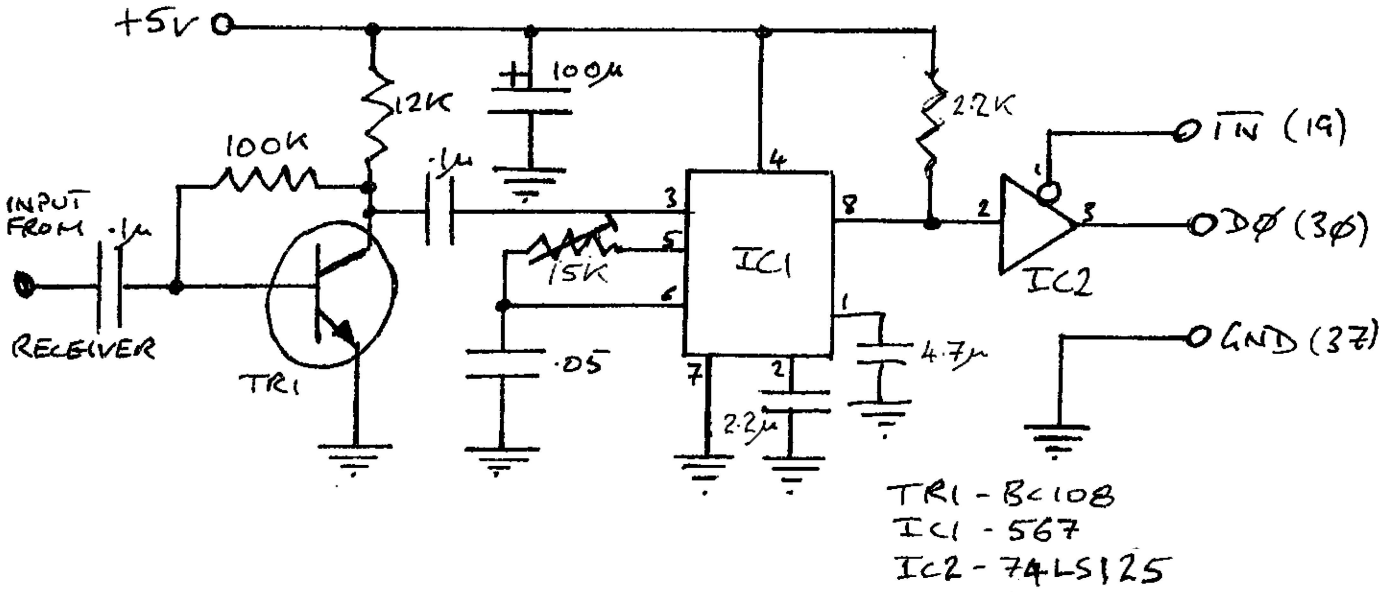
```
10 CLS:PRINT CHR$(14)
20 DIM A$(100)
30 FOR N=1 TO 100:READ A$(N):NEXT N
40 A=INP(0) AND 1
50 IF A=1 THEN 40
60 B=0
70 A=INP(0) AND 1:B=B+10
80 IF A=1 THEN C=((5*C)+(2*B))/6:D0=2*D0:DA=2*DA:D0=D0+1:GOTO 140
90 IF B<( 5*C) THEN 70
100 D0=2^D0:DA=2*DA.DA=DA+1
110 A=INP(0) AND 1:B=B+10
120 IF A=0 THEN 110
130 C=((1*C)+B)/5
140 B=0
150 A=INP(0) AND 1
160 B=B+10
170 IF A=0 THEN 60
180 IF B<(.5*C) THEN 150
190 GOSUB 260
200 A=INP(0) AND 1
210 B=B+10
220 IF A=0 THEN 60
230 IF B<(2*C) THEN 200
240 PRINT " ";
250 GOTO 40
260 DA=DA*2
270 D=DA+D0
280 IF D>100 THEN D=100
290 PRINT A$(D);
300 DA=0:D0=0
310 RETURN
320 DATA E,T,I,A,N,M,S,U,R,W,D,K,G,O,H,V,F,-,L,-,P,J,B,X,C
330 DATA Y,Z,Q,-,-,5,4,-,3,-,-,-,2,-,-,-,-,-,-,1,6,-,/,-
340 DATA -,-,-,-,7,-,-,-,8,-,9,0,-,-,-,-,-,-,-,-,-,-,-,?
350 DATA -,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-,-
```

The following circuit can be used to try out the program if you have a suitable morse key. A push button can be used but it is rather difficult to send morse satisfactorily in this manner, although it will prove that things are working. Incidentally, whilst this program does a very good job, it will not tolerate sloppy sending, so it is an excellent way to learn the code if you are interested in amateur radio, at least from the sending point of view.



IC1a, one section of a hex schmidt trigger, debounces the key, in conjunction with the resistor-capacitor combination. IC1b then inverts the signal, which is strobed onto the data bus via the tri-state buffer IC2a when $\overline{IN}$ goes low, on receipt of an INP(Ø) command. No address decoding has been employed, hence the circuit will respond to any port number between Ø and FFH (Ø and 255 decimal).

If you have a suitable receiver (it must have a BFO and should be reasonably stable, a communications receiver would be ideal) the following circuit will enable you to decode received morse. This has been adapted from the one in the original article which, if it was used "as is", would stand a good chance of blowing the buffer chip needed to interface the circuit to the TRS-80.



TR1 amplifies the signal from the receiver which can conveniently be taken from the headphone jack. IC1 is a tone decoder phase locked loop chip, which can be adjusted for a centre frequency of 2KHz by means of the 15K trimpot. Not having a suitable receiver I have not been able to try this circuit, although I do have one of the 567 chips. There is no reason why anyone building it should have any trouble.

Leon Heller

T-BUG/MON3 Tip

If you wish to work on a Basic programme and transfer to, say MON/3 or TBUG this is easy,
type

SYSTEM enter
then enter a slash mark followed by the entry address in decimal to the machine language programme you are using, thus

*?/28672

The number 28672 happens to be the entry point to my MON/3 and is merely used as an example.
What may be of more interest is that you should jump back to Level 2 Basic using the address 012F this avoids bringing up the MEMORY SIZE? message and loss of your Basic programme. If you have MON/3 this is what the screen will show

COMMAND?J012F enter

Angus Ellefsen

New Hardware.

Tandy have now made available a voice recognition system to add to the synthesiser that has been available for some time now.

A new relatively low-cost printer, the Microtek, has been available for a couple of months in the States, and I see from the latest issue of P.C.W. that it is now being sold over here. It has most of the features of the Anadex, and sells for $240 less in the States, $750 in fact.

Corvus Systems in the States are selling a 10 Megabyte hard disk system. Up to four drives can be interfaced to the TRS-80, so you can have 40 Megabytes on line if you wish! Now for the bad news: the first drive and controller costs $5350 and subsequent drives are $2990 each. Keen Computers of Nottingham are selling them in this country if you have a few thousand pounds to spend. The system has a few disadvantages, chief amongst which is the fact that as things stand there is no capability for floppy disks in addition to the hard disk(s), so back-up copies of files cannot be made, and software cannot easily be exchanged with other users.

Houston Instrument, a U.S. company, have available a digital plotter and a digitiser; HIPLOT and HIPAD respectively. They plug staight into the TRS-80 and cost $1085 and $795

Digitus Corp. appear to be producing a colour graphics sub-system for the TRS-80, as well as other systems, which rejoices in the name "Rainbow 2000". Unfortunately, unless you happen to have an NTSC colour monitor, you will not be able to use it over here.

Henry's Radio of Edgware Road are selling the Centronics Microprinter for £195. I do not know if these are still available from Tandy, but I believe they used to sell them for around £400. Whilst they are very fast and silent they use narrow aluminised paper which might be a disadvantage.

Leon Heller

New Software

In the December issue of BYTE magazine, some interesting new software for the TRS-80 was advertised. Microsoft have what looks like a very nice Editor/Assembler; it is cassette-based and includes lots of features missing from the standard Tandy Editor/Assembler (also produced by Microsoft). For instance, macros and conditional assembly are supported, and the source code is assembled directly into memory. Also included is a debug package with single step capability, and up to eight breakpoints can be set. The Editor has several extra commands: Substitute, Copy, Move and Extend. It looks like good value at $29.95.

Also from the same stable is a version of Adventure for a 32K disk-based system at $29.95, and a typing tutor for $14.95.

Soon to be available for our systems will be the "Pencil Sharpener" from MicroDaSys. This is already available for CP/M based systems and extends the Electric Pencil so that personalised form letters can be created. That is, a standard letter or document can have selective insertions made from another file.

Supersoft's Tiny Pascal can now be obtained in disk-based form for $45.

A LISP interpreter is available from another company in the States, but when I made some enquiries about it the company responsible said that they were negotiating marketing rights with another company, and I would have to wait until the second company started selling it. They also have a very nice looking symbolic maths system and a language called MuSimp which could be extremely useful for teaching purposes.

Lifeboat Associates are selling the Microsoft BASIC compiler which runs under CP/M on the TRS-80. This compiler produces Z-80 object code which is relocatable and can be linked to modules produced by the standard Microsoft Macro-Assembler, FORTRAN and COBOL sytems. It is also compatible with the Microsoft interpreter, which means that programs can be developed and debugged interactively. The source file (in ASCII form) can then be used as input to the compiler. I would expect this item to become available under TRSDOS before long.

Addresses:-

Microsoft Consumer Products,
10800 Northeast Eighth,
Suite 819,
Bellevue,
WA 98004,
USA.

MicroDaSys,
P.O. Box 36051,
Los Angeles,
CA 90036,
USA.

Lifeboat Associates,
32 Neal St.,
London WC2H 9PS.

Supersoft,
P.O. Box 1628,
Champaign, IL 61820.
USA.

Leon Heller

Acoustic Coupler

I mentioned in a previous issue that I was working on the design of a low-cost acoustic coupler that would enable users to communicate via the telephone system. I have now obtained a Motorola modem chip that contains a lot of the circuitry needed. Whilst this chip is expensive, around £12, it should cut the development time down cosiderably. I have breadboarded the chip, together with some of the outboard components, and it seems to work satisfactorily. I now have to design a couple of filter circuits, and a pair of amplifiers, one to output the signal to the handset microphone,and the other to amplify the signal delivered to the earpiece. A possible problem with this project will be getting Post Office approval. Next month's Practical Electronics will have a design for an acoustic coupler, also. It will be interesting to see the approach they will adopt, and how they get over the approval problem.

Leon Heller

RESERVED WORDS ON THE TRS-80

It is generally known that commands, functions and operations in TRS-80 BASIC are stored as single bytes with a decimal value in the range 128 - 255. Attempts to access these codes directly through the use of conventional means leads to the graphics symbols, so other methods need to be sought.

The method I have used is not elegant but it works.

```
10    INPUT X1,Y1,Y2
20    Y4 = 0
30    FOR Y3 = 128 TO 255
40    POKE X1,Y1
50    POKE X1+1,Y2
60    POKE X1+2,Y3
65    POKE X1+3,Y4
70    POKE X1+4,Y3
80    POKE X1+5,Y4
90    X1=X1+6
100   Y2=INT((X1 + 6)/256)
110   Y1=(X1+6)-(Y2*256)
120   NEXT Y3
130   FOR Z= X1 TO X1 + 6
140   POKE Z,0
150   NEXT Z
```

How to use the program

i) Type in program

ii) RUN Input X1,16968 : Y1,6 : and Y2,78

iii) After the program has RUN there is no output - merely the READY and prompt sign

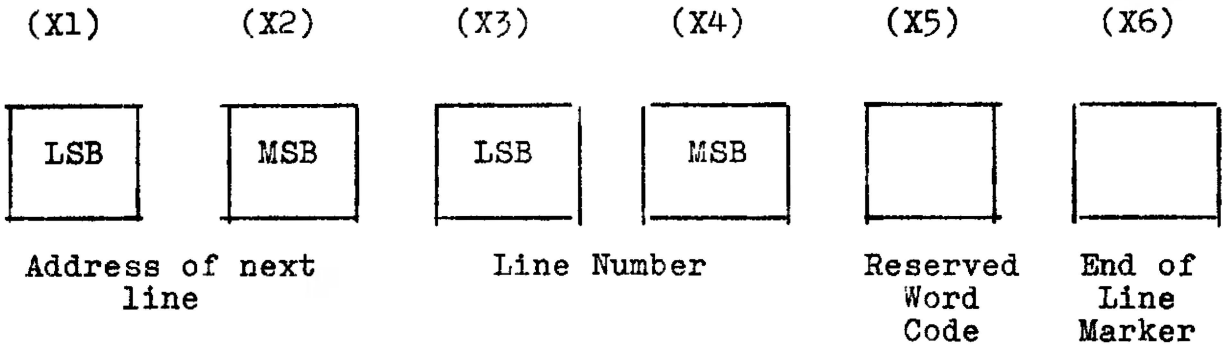
iv) PEEK 17129 and record contents, PEEK 17130 and record contents (They should be 247 and 66 respectively)

v) Type in POKE 17129,0 (and enter)
POKE 17130,78 (and enter)

vi) Type LIST (Toggle with use of SHIFT @ if required)
OR for an individual value type LIST n (n = 128 to 255)

vii) To revert to original program POKE 17129,247 and 17130,66 (see step iv)

How does it work?
The program POKEs six-byte lines
The six bytes are:



Thus the first line to be poked is:

06	78	128	0	128	0

etc.

Comments:

i) 169 NAME : not mentioned in the LII Basic Manual.
It appears to have similar properties to the USR(Ø) command in that it can be used to call machine code programs. In order to use it the machine code address (in decimal) must be POKE'd into 16783(LSB) and 16784(MSB). Then the machine subroutine can be called by the NAME command from anywhere in the BASIC program.

ii) If line 30 is changed to far 0 to 127 all the ASCII codes can be examined. (Compare how 43+, and 205+ are used differently).

iii) Single codes can be referenced by changing line 30 (e.g. 30 FOR Y3=255 TO 255).

iv) Care needs to be exercised when referencing 251,252,253, and 254 in order to avoid confusion.

Some queries:
What are codes 252, 253, 254 and 255 used for?
255 can be put in a program thus: 255 PRINT ISA and the value Ø is returned it can be subscripted thus 255 PRINT ISA(5), again a Ø is returned.

PAUL HORBURY

TRIP TO WEDNESBURY - TANDY HQ

For those who have not made the visit to Tandy UK Headquarters, it is simplicity itself. The warehouses and offices are five minutes from the M6 and are located off the Holyhead Road with the signs clearly visible from the road.

The reason for my visit, was to see a demonstration of the Voxbox as this is now shown in current Tandy literature. Normally I would have waited for a member to have outlined what this voice recognition device could do, but as the office's cost program is operated by a person not having full control over the hand movements, a trip to Wednesbury was a must.

The staff at Tandy could not have been more helpful, with Ted Russell saying hello and Martin Hutchins doing the demonstration, showing the necessary patience when gremlins appear. Once the electrics had been sorted and all units receiving their juices (either UK or US). The software that was tried out consisted of a moon landing game where a series of burns had to be made, before successful touch down could be achieved.

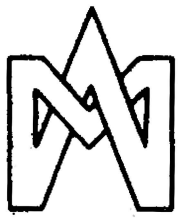
A system tape is first entered followed by the game (in BASIC). The user is then asked to speak into the microphone the digits 0 to 9, fire and backspace, twice. The message "trained" is then shown on the screen before going to the burn input required. The user inputs the digits for the burn rate, and then "fires" the engine. An error can be taken out with backspace.

When Martin or myself tried to input the digits for the burn, the instruction was ignored, but when the user, Jim, took the microphone then the response was immediate. 100% reliability was not achieved, but at least we had spoken to the TRS-80 on an equal footing, and for Jim, not through the keyboard which on occasions can be wearisome.

The Voxbox has immediate uses within the games field, and upon the increase in reliability, which is going to come, many uses within commerce by users with/without handicaps. Before going I was sceptical of the units ability to recognise my voice, but down the M6 the question was, can it be used now in my office even with a question mark over its reliability.

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TRS--80 USERS GROUP NEWSLETTER

ISSUE 9 MARCH 1980

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Editorial.

We appear to have done rather well for contributions again; please keep them coming.
Due to ill-health I have been unable to continue my work on the Speak and Spell interfacing. Until the Post Office relax their requirements on acoustic couplers, it might be as well for me to discontinue any mention of the work I am doing in these pages.
Richard Jacobs suggested that it might be good idea to publish the various tips and useful ROM routines as a supplement that can be updated from time to time, and this has been done, thanks to Richard, who typed them up for us.

Leon Heller.

Edited by:-
Leon Heller
8 Morris Walk
Newport Pagnell
Bucks. MK16 8QD

Tel. 613004

Published by:-
Brian Pain
40a High Street
Stony Stratford
Milton Keynes
Bucks.

Tel. 566660

READERS' LETTERS.

I have a Level II, 16K machine which I have recently had upgraded from 4K Level I. Is there a really inexpensive way of fixing up a line printer? (Ed. Yes, get the Tandy Printer Interface - about £40, or make yourself a printer interface - about three chips, and the cables, of course.)
Is there any way I can list a program while it is loading so as to see just what is being read from the cassette? (A.J.Harding has a program called 'VISION LOAD' that does this. Ed.)
Is there a way that I can use my machine to decode the morse code that the short waves seem so full of? (See the previous issue of the newsletter. Ed.)
Lastly, whilst I admit that I have still got a long way to go, it would be nice if I could put my machine to some challenging or worthwhile use. We hear about amateur astronomers doing useful work, what about our TRS-80s?

D.E.Haines.

I have two queries for you. The first concerns the lower-case modification for the display which is mentioned in the Newsletters. From whom is this available , and is there anyone in the North West who has a modified system? (Ed. No kit is available, as far as I know. Rostronics and TVJ can modify your system for you. If you feel capable of doing it yourself send me an s.a.e and I'll let you have the details.)
The second concerns printers. I hope to acquire a used IBM 735 output writer. Can I enquire through the newsletter if any member has made the attachment described in Practical Computing a year ago, or can offer me any advice. (Acculab of Leighton Buzzard make a unit to do just this. Ed.)

P.L.White,
65 Grappenhall Road,
Stockton Heath,
Warrington,
Cheshire.

I have started a "User Group" for the TRS-80 in the North East (Newcastle upon Tyne area, Durham) and would be grateful if you would mention this in the newsletter. if anyone is interested they can contact me at the address below.

Barry Dunn,
8 Ettrick Terrace North,
Crashead,
Stanley,
Co. Durham DH9 6BE.

I would re-iterate the comment about re-inforced centred discettes - there seems to be just that extra resilience which avoids 'crunching/wear' problems or that slight misalignment which can lead to read difficulties. We are also using a double density quality as provided by Verbatim's MD-577-01.

There is a serious weakness with the new expansion interface if discs are left during power on/of - a number of directory tracks are de-formatted! Apart from some initial RAM errors, we have had a new interface in continous use without finding any other problems.

We did have trouble with the RS232C board which we think was due to overheating. It is quite easy to drill cooling holes in the top of the expansion interface and in the base for the RS232.

I enclose a program to control the Backup operation. The program must run under NEWDOS as it employs a combination of BASIC and DOS commands. The program is self documenting but in overall terms the principle involves creation of a control file COPY/COP which contains:-

disc name — a reference common to both source & destination

a reference giving S or D plus TIME$ plus the users NAME — S on source, D on destination

As written, the source disk is on drive 1 & destination on drive 2 but the logic could easily be altered to allow for dual or single drive systems.

Additional points are:-

Line 140 and others employ the embedded ENTER obtained by changing say space to ENTER via the line editor as explained in an earlier TRS-80 newsletter.

Line 100 & 1300 - For those systems using the High Speed Mod the system is switched to normal speed (not strictly necessary on our system). Any one using TSHORT should also remember to de-activate the shorthand facility before performing backup.

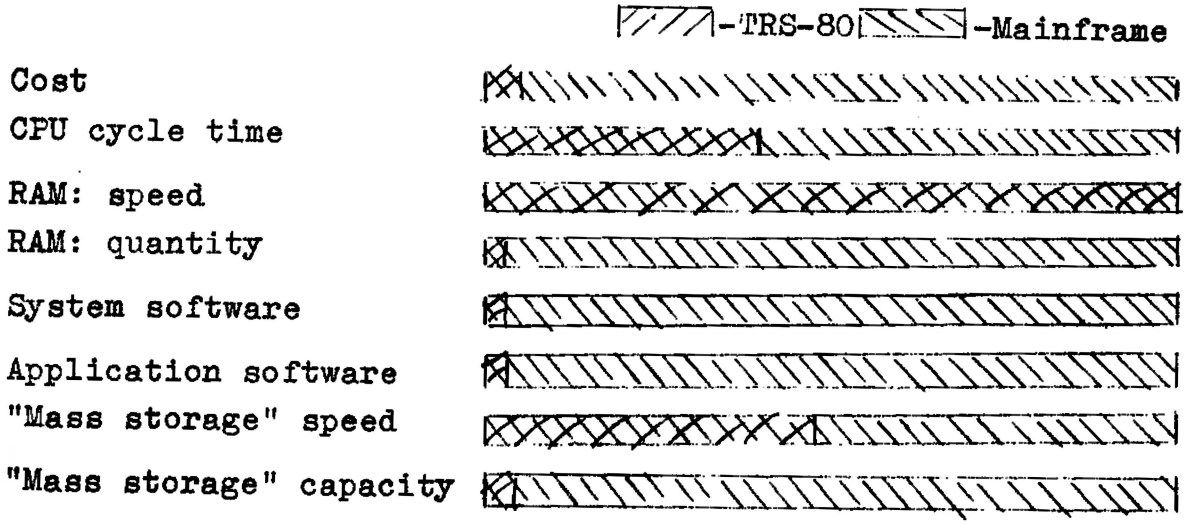
The 'High Speed' modification gives quite a useful increase in speed - about 1/3 in that a 30 second task now takes 20. Our version has a link to the expansion interface to automatically revert to normal speed for disc accesses - earlier versions without this link are NOT recommended. We have also opted to just use a software poke to activate the high speed. While we can not access the slow speed switch (useful for de-bugging), we have eliminated the need for any mechanical switches.

(This program has been placed in the Library. Ed.)

Derrick Rowe

So...You Think You Own A Computer.

The purpose of this short article is in broad terms, to:-
1) Indicate the value for money represented by the TRS-80.
2) Point to some of its limitations.
The comparison below is between the TRS-80 and a (typical?) medium-sized mainframe computer. I reiterate that the relative values represented below are indicative only. How this comparison might look in 1982 is a brave man's guess.



There are many other criteria upon which a comparison could be made.
Comments, constructive or otherwise are welcomed.

Ric Ingram.

Flashing Cursor Routine.

```
10 CLS
20 A$=INKEY$:T=T+1:IF T/5=INT(T/5) THEN ? CHR$(14);ELSE ?
   CHR$(15);ELSE IF A$="" THEN 20
30 ? A$;GOTO 20
```

CHR$(14) turns on the cursor.
CHR$(15) turns off the cursor.
T/n=INT(T/n) n = rate of flash.
n*24 gives approx. 1s.
CHR$(13) is <ENTER>.
Line 25 could be added to get out of the loop:

```
25 IF A$=CHR$(13) THEN 50
50 REM OUT OF LOOP
```

This short routine , mainly line 20, reminds you that the computer is still waiting for an input.

Barry Dunn.

Computer Generated Video Captions.

Blean Video Systems of:-
4 Mount Pleasant,
Blean Common,
Canterbury,
Kent CT2 9E2.
Tel. Blean (0227 74) 471.
Contact: Andrew Emmerson.
are importing a device from the States which allows you to run a closed circuit video camera as a slave of the TRS-80, with mixing of the video outputs. Thus the TRS-80 becomes the central sync. pulse generator, enabling you to superimpose computer-generated captions and graphics onto the output from the camera or any other video source such as a VCR. It is available in kit form or ready-built: wired and tested it costs £15.
This looks like a very useful "add-on" for anyone who uses video a lot; caption generators can be purchased but they cost as much as the TRS-80 and you do not get a computer into the bargain!

OKI Microline Printer.

I have been using the new OKI Microline 80 printer and am very pleased with it. It has got upper and lower case, graphics, three sizes of print (5,10 and 16 ch/inch) and selectable long and short line printing; all under software control.
It prints at 80 cps uni-directional, is very compact and beautifully quiet.
At £499 + VAT I would recommend it to anyone.

ZEN Editor/Assembler.

I have also acquired the Avalon ZEN Editor/Assembler and Debugger marketed by Newbear and am very pleased with it as well.
It is the first assembler I have used but for a tape-based system it has a lot of facilities. Briefly:-
1. A very good editor.
2. Free-format source entry.
3. Cassette read, write and validate for source and object fils.
4. Assemble to cassette, printer or into memory - no need to tape object file and SYSTEM load.
5. Resident debugger with breakpoint, register display, memory modify etc.
Here is a Printer Driver routine for the OKI printer. I have pched this into ZEN using the 32 bytes of sub-routine space which was thoughtfully provided for this purpose by Avalon.

```
                        ;* * * * * * * * * * * * * * * * * * * * * * *
                        ;* LINE PRINTER DRIVER FOR  Z E N            *
                        ;*                 BY                        *
                        ;*       LAURIE       SHIELDS                *
                        ;* * * * * * * * * * * * * * * * * * * * * * *


                        EXTERN: EQU  4943H
                                ORG  EXTERN+2
                        ;LOAD  EXTERN+2   GOES HERE
                        LF:     EQU  0AH
                        FF:     EQU  0CH
                        ROM:    EQU  05D1H  ;L2 STATUS TESTING S/R

4945 FE0A                       CP   LF     ;MY LPRINTER LINE
4947 C8                         RET  Z      ;FEEDS ON CR
                              ;IF LF REQUIRED REPLACE
                              ;BYTES 4945-4947 WITH 00

4948 FE0C                       CP   FF     ;TOP OF FORM
494A 200B                       JR   NZ,PRINT;IF NOT SKIP 7 L.FEEDS

494C C5                         PUSH BC     ;SAVE BC
494D 0605                       LD   B,6    ;6 COUNT IN REG B

494F 3E0A               LOOP:   LD   A,LF   ;LF IN REG A
4951 CD5749                     CALL PRINT  ;EXECUTE 1 LINEFEED

4954 10F9                       DJNZ LOOP   ;MORE TO DO ?
4956 C1                         POP  BC     ;RESTORE BC

4957 F5                 PRINT:  PUSH AF     ;SAVE AF. STATUS USES AF

4958 CDD105             STATUS: CALL ROM    ;IS PRINTER READY
495B 20FB                       JR   NZ,STATUS ;IF NOT CHECK AGAIN

495D F1                         POP  AF     ;A HAS CHR. FOR PRINTING
495E 32E837                     LD   (37E8H),A;SEND TO PRINTER
4961 C9                         RET
                                END
```

```
EXTERN  4943 FF      000C LF      000A LOOP    494F
PRINT   4957 ROM     05D1 STATUS  4958
```

Laurie Shields

UCSD Pascal.

There is currently a great deal of interest in Pascal as a replacement for BASIC. The pros and cons of adopting Pascal have been discussed at great length in various Journals, and I will not deal with them now. Suffice it to say that if you want to write large programs quickly, that are easy to debug and maintain, and that someone else can understand, Pascal is the language to use.
UCSD Pascal (UCSD stands for University of California at San Diego) is an implementation of Pascal that was developed at UCSD specifically to run on a very wide range of microcomputers. Currently there are versions for most of the leading systems, including the TRS-80. Since Pascal compiles to an intermediate, machine-independent object code which is then interpreted into the machine language of the system it is running on, configuring Pascal to run on a new system is quite easy, and just takes a couple of weeks.
Tony Rundle of Starbase, who will be importing the TRS-80 version of UCSD Pascal, has loaned us the software and documentation for evaluation.
The software is excellent. It is provided on three disks and is highly modular. 48K is essential, and whilst one can get along with one drive, things are very much easier with two. It has its own operating system which is completely different from TRSDOS and takes some getting used to. The system is extremely powerful and provides a great many facilities. A nice feature is that it is "menu" driven via a prompt line at the top of the screen. When you do anything that might have drastic consequences like deleting files using a "wild character" in the file descriptor, the system always checks to make sure that is what you really intended to do.
I liked very much the concept of a workfile which holds the source code when you have finished entering it with the aid of the text editor. You can also compile the source code into the workfile, and then run the resulting object code without forming a new file. Only when your program is running correctly do you need to form new files for the object and source code, freeing the workfile for your next program.
Error checking is very comprehensive, and the compiler stops when a syntax error is detected, giving you the option of returning to the Editor. If you do this the source code is displayed with the cursor at the position where the error ocurred, generally speaking. The error messages are very imformative, so debugging is a joy.
The system also comprises a macro-assembler, which can be used to develop Z-80 code that can be linked into your Pascal programs for increased speed or hardware control.
The documentation, unfortunately, is simply appalling. I had a great deal of difficulty backing up the disks provided and gave up in the end and used NEWDOS! Whilst NEWDOS or TRSDOS do not recognise the UCSD disks, BACKUP and COPY do work - the recording format is the same.
Due to the limited TRS-80 keyboard, special control characters

used by the UCSD system involve three key depressions. For instance: ETX (Control C) is obtained by pressing <SHIFT> and the down arrow, simultaneously with the C key.
Generally, the system is excellent, but I think that unless you are prepared to put in a great deal of work, not really suitable for newcomers to computing
Tony anticipates that the cost will be $90 - $95.

Leon Heller.

Video Wobble.

Tandy have supplied the group with a number of kits to rectify the wobbly video that troubled the early systems. These are obtainable on a 'first come, first served' basis from Brian. Please enclose a s.a.e.

The kit comprises a replacement crystal and three capacitors. Some circuit modifications are needed so do not ask for the kit unless you are handy with a soldering iron.

Leon Heller.

LIBRARY

HERE IS THE LATEST LIBRARY LIST FROM LEIGHTON DAVIES. IT MIGHT BE WORTH REPEATING THE REQUIREMENTS FOR USING THIS SERVICE.
SEND LEIGHTON DETAILS OF THE PROGRAMS YOU REQUIRE, TOGETHER WITH A SUITABLE CASSETTE OR DISKETTE, SECURELY PACKED IN A JIFFY BAG OR SOMETHING SIMILAR THAT CAN BE RE-USED. ALSO ENCLOSE SUFFICIENT RETURN POSTAGE. WHILST IT WOULD BE APPRECIATED IF MEMBERS MAKING USE OF THIS SERVICE SEND IN PROGRAMS IN RETURN, THIS IS NOT ESSENTIAL AND YOU CAN USE THE FACILITIES EVEN IF YOU NEVER SEND IN ANYTHING!

LEON HELLER

```
"LIBRARY LIST AS OF 9/2/1980 ALL PROGRAMS ARE LEVEL 2"

"PROGRAM AND DESCRIPTION"
"GOLF *              18 HOLE GOLF GAME"
'SINK'EM  *          BATTLE-SHIPS TYPE GAME"
"DRAUGHTS            THE GOOD OLD BOARD GAME"
'HORSE RACE          UP TO 8 PLAYERS CAN BET"
'SPLATT              DELAYED DROP PARACHUTE GAME"
 MOON-LANDER *       LAND YOUR CAPSULE ON THE MOON"
 "SHOOT IT            LEVEL 1 BOOK GAME"
 "BOUNCING DOT         ''      ''      ''   ORIGINAL"
 "   ''    ''          ''      ''      ''   MODIFIED"
 'SUBCHASE            DEPTH-CHARGE A SUBMARINE"
 'BRANDS HATCH *      RACE AROUND A CIRCUIT"
 'MONZA                     DITTO"
 'MONACO                    DITTO"
 'DRAG RACE          DESIGN YOUR OWN DRAGSTERS"
 "BANDIT             SLOT MACHINE"
 "4 REEL SLOT        SLOT MACHINE WITH GRAPHICS"
 "3 REEL SLOT         ''     ''      ''     ''"
 'WUMPUS             FIND A BEASTY IN A GRID"
 'SNARK               ''      ''      ''  ''"
 'CRAPS              CARD GAME"
 'ZOMBIE             ESCAPE FROM THEM, VERY FAST GAME"
 'RAMDOM DRAWER      BETTER THAN WATCHING GOLDFISH"
 'JIGSAW             FIT THE PIECES IN ORDER"
 'HAMMURABI          PLAY KING, QUITE GOOD, SNEAKY GAME"
 'WAVY MESSAGE       DISPLAYS YOUR MESSAGE ON SCREEN"
 'FIELD GUN  *       DESTROY ENEMY POST BY GUNFIRE"
 'BOWLING *          10 PIN BOWLING"
 'POEM *             AN ODE TO WINTER"
 'CHOMP              WHO GETS THE POISONED BITE"
 'CASTLE             MODIFIED LEVEL 1 BOOK GAME"
 'MINE FIELD         GET HOME THROUGH MINES"
 'CALENDAR           PRINTS GREGORIAN CALENDAR"
 'DATE FINDER        GIVES DAY E.T.C. "
 'PRIME FINDER       CHECKS FOR A PRIME NUMBER"
 'ATOMIC PLOTTER     PRINTS ATOMIC ORBITALS"
 SINE WAVE ADDER     GIVES RESULTANT SHAPE"
```

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"BALL PLOTTER       PLOTS BALL BOUNCE CURVE"
'NUMBER SORT        UP OR DOWN SORT OF NUMBERS"
"QUAD DESIGN        DESIGNS RADIO ANTENNA"
"WILCOXON TEST      MATHS TEST"
'CHI SQ TEST          ''     ''"
'KOLMOGOROV SMIRNOV TEST      MATHS TEST"
'RENUM  (MC)        RENUMBER PROGRAMS"
'BOUNCE (MC)        DE-BOUNCE ROUTINE FOR TRS-80"
'LIFE   (MC)        VERY GOOD VERSION OF THE GAME"
'MONITOR (MC)       TRS-80 MONITOR"
'FROGGIE            REVERSE SYMBOLS BY JUMPING"
'PHANTUM            FIND THE NUMBERS GAME"
'STOCK CAR          RACE AROUND OBSTACLES"
'MAGIC NUMBER       MAGIC NUMBER SQUARE CALCULATOR"
'SOLITARE           PEG BOARD GAME"
'CHECKER SWIPE      A SORT OF SOLITARE"
'COPY (MC)          SYSTEM TAPE COPYER"
'OTHELLO            GOOD GAME, BUT BEYOND ME!"
'HEX-DEC-HEX        DECIMAL-HEX-DECIMAL CONVERTER"
'PI                 GOES ON FOR DAYS!!!!!"
'DRIVE (MC)         LEON'S RS232 DRIVER ROUTINE"
'SURROUND 1         BUILD A WALL GAME"
'SURROUND 2         DITTO BUT MODIFIED"
'BASE CONVERTER     OCTAL-BINARY-HEX-DECIMAL CONVERTER"
'OHMS CONVERTER     ENTER RESISTOR COLOURS, GIVES VALUE"
'BACKGAMMON         POPULAR BOARD GAME"
'BLACKJACK          THE OLD CARD GAME"
'RADMATHS           VARIOUS RADIO FORMULAE"
'TREKIII            GOOD OLD STAR TREK"
'ANAGRAM            CROSSWORD PUZZLE AID, QUITE GOOD"
'PAYROLL (DISK)     3 PROGRAMS FOR EMPLOYEE PAYE, NHS, PAY
'ENTRAP             TRAP YOUR OPPONENT"
'BRIDGE             BUILD A BRIDGE OVER RAVINE"
'COLLISION          DRIVE ZIGZAG TO AVOID CRASHING"
"SCI-FI             PRINTS WIERD SCI FI STORIES"
'GRAPH              PRINTS OUT VARIOUS GRAPHS"
'AMAZING            GET OUT OF A MAZE, GOOD GRAPHICS"
'LOW-CASE           FOR MODIFIED TRS-80 UNITS"

"PROGRAMS MARKED ( * ) ARE AVAILABLE IN LOWER-CASE"
'THIS LIST SUPERCEDES ALL OTHER LIST PUB
'SUPPLIMENTS WILL BE ISSUED TO THIS LIST AS PROGRAI
'ARE DONATED TO THE LIBRARY. "
```

SOFTWARE REVIEW

I HAVE FOR THE LAST TWO OR THREE WEEKS BEEN DELVING INTO THE MYSTERIES OF "LEARNING LEVEL II" A BOOK BY DAVID LIEN. HE SHOULD NEED NO INTRODUCTION SINCE HE WROTE THE "USERS MANUAL FOR LEVEL I", A WORK THAT MANY OF US HAVE COME TO LOVE OR HATE, DEPENDING ON ONES POINT OF VIEW! THE STYLE OF "LEVEL II", IS VERY SIMILAR TO "LEVEL I" AND IF YOU DISLIKED THAT, THEN YOU WILL NOT APPRECIATE THIS LATEST OFFERING. HOWEVER, MR. LIEN HAS AN EASYGOING WAY OF PUTTING OVER THE INTRICACIES OF ADVANCED BASIC THAT TENDS TO OUTWAY THE SLIGHTLY FLIPPANT ATTITUDE HE ADOPTS.

THE FIRST PART (ABOUT SIXTY FOUR PAGES) DEALS WITH ALTERATIONS TO THE LEVEL I MANUAL. AN APPENDIX IN THE BOOK IS AVAILABLE FOR CUTTING OUT AND PASTING TO THE FIRST MANUAL AND THIS IS COMPREHENSIVE IF A LITTLE FIDDLY IN PARTS. THIS EXERCISE UPDATES THE LEVEL I MANUAL TO LEVEL II. I PERSONALLY FOUND THE BOOK INSTRUCTIVE AND -DARE I SAY- AMUSING. IT SHOULD FORM A PART OF MOST TRS 80 USERS LIBRARY AND IS AVAILABLE FROM ROSTRONICS LTD. PRICED AT #11.00. ALTERNATIVELY FROM THE PUBLISHERS, COMPUSOFT PUBLISHING, ST. DIEGO, CALIFORNIA.

ANOTHER BOOK BY THE SAME AUTHOR, WHICH HAS HAD CONSIDERABLE PUBLICITY, IS THE "BASIC HANDBOOK", ALSO BY DAVID LIEN. THIS REALLY LISTS ALMOST ALL BASIC STATEMENTS USED BY PET, APPLE, TRS.80 AND MANY OTHER POPULAR MICROS TOGETHER WITH ALTERNATIVES. IF TRS-80 BASIC DOESN'T HAVE A PARTICULAR FUNCTION THE BOOK ENABLES THE USER IN MOST CASES TO LOOK UP THE ALTERNATIVE STATEMENT. THIS IS REALLY USEFUL, WHEN ONE WANTS TO USE A PROGRAM WRITTEN FOR ANOTHER MACHINE AND YOU HAVE A "DIALECT" PROBLEM. THE COST OF THIS BOOK IS #11.00 AND SHOULD BE AVAILABLE FROM YOUR FAVOURITE MICROSHOP.

RADIO SHACK HAVE ISSUED A DISK INSTRUCTION COURSE, NATURALLY ENOUGH ON DISK! THIS CONSISTS OF FOUR MINIS AND A SMALL INSTRUCTION BOOK ON HOW TO GET THE PROGRAMS LOADED. THE LESSONS COVER DISK BASIC COMMANDS AND FUNCTIONS, DOS COMMANDS, UTILITES AND SUBROUTINES, SEQUENTIAL AND RANDOM FILES. THE PATTERN OF LEARNING IS SIMILAR TO "LEARNING LEVEL II" BASIC (ON TAPE) AND IS REASONABLY INTERACTIVE. THE COST OF THE COURSE IS #15.95 - BEAR IN MIND THE COST OF FOUR DISKS IS ABOUT #12.00 AND THE SOFTWARE IS PRETTY ECONOMICAL. IF YOU GET FED UP WITH THE LESSONS YOU STILL HAVE FOUR DISKS!

THE LAST PIECE OF SOFTWARE IS THE "TRS-80 ASSEMBLY LANGUAGE PROGRAMMING BOOK THAT LEON HAS MENTIONED IN THE NEWSLETTER. THIS IS WRITTEN IN CASE YOU HAVE FORGOTTEN BY WILLIAM BARDEN JNR. WHETHER ASSEMBLY PROGRAMMING IS YOUR BAG OR NOT, THE BOOK DOES GIVE A GOOD INSIGHT INTO THE ARCHITECTURE OF THE Z-80 CHIP. THE BOOK STARTS FROM FIRST PRINCIPLES AND GOES THROUGH FAIRLY EASILY TO THE MORE INTRICATE DETAILS OF ASSEMBLY PROGRAMMING. IT IS NECESSARY TO HAVE THE EDITOR/ASSEMBLER PROGRAM AND ALSO T-BUG (LEON PREFERS RSM-2). THERE ARE, ACCORDING TO LEON, SOME BUGS IN SOME OF THE PROGRAM LISTINGS, PERHAPS IT MAKES IT MORE FUN FINDING THEM! CERTAINLY THE BOOK IS WORTH READING AND HAVING A STAB AT ASSEMBLY LANGUAGE PROGRAMMING. REMEMBER, ALL THE FANCY LANGUAGES BOIL DOWN TO GOOD OLD MACHINE CODE, WHICH IS THE ONLY THING ANY COMPUTER WORKS WITH. THE BOOK IS AVAILABLE FROM TANDY OUTLETS AND COSTS #2.95.

INFO BITS

IF YOU HAVE A TRACTOR FEED PRINTER, SUCH AS THE HEATHKIT IT MAY BE POSSIBLE TO USE LETTERHEADING PAPER. SOMEONE BORROWED M/ TYPEWRITER THE OTHER DAY AND I HAD TO WRITE SOME LETTERS. ATTACHING A LETTERHEAD TO THE NORMAL PINFEED PAPER WITH SELLOTAPE -LIGHTLY AT THE HEAD OF THE SHEET- FUNCTIONED PERFECTLY. THE LINES WERE STRAIGHT AND THE FEED WORKED FINE. ONCE THE USUAL 'PENCIL' PARAMETERS WERE WORKED OUT, IT IS NOT MUCH MORE DIFFICULT TO USE THE WORD PROCESSOR THAN A TYPEWRITER, WITH CONSIDERABLE BENEFITS. IT SAVES A LOT OF TIPPEX, (IF YOUR TYPING IS AS BAD AS MINE!), LETTERS CAN BE FILED ON TAPE OR DISK, PAPER FILE

COPY CAN BE RUN OFF AT THE TIME OR LATER (NO MORE CARBON). LETTER COMPOSING IS MUCH EASIER WITH 'PENCIL', NO MORE GETTING TO THE EDGE OF THE PAPER WITH STRANGE HYPHENATIONS ,IF YOU JUSTIFY THE TEXT. THESE ARE A FEW BENEFITS AND I AM SURE YOU CAN THINK OF OTHERS.

IT MAY BE WORTH CHECKING YOUR VIDEO DISPLAY TO SEE IF YOU ARE GETTING THE BEST DEFINITION. A GREEN LEAD COMES UP FROM THE P.C.B TO PIN TWO OF THE VIDEO TUBE INSIDE THE MONITOR. INSERTED IN THE LEAD IS A 1500 OHM RESISTOR. THIS LEAD SHOULD BE KEPT AWAY FROM ANY OTHER LEADS OR PARTS OF THE SET AS MUCH AS POSSIBLE. IT CARRIES THE VIDEO SIGNAL AND CAN SUFFER FROM HIGH FREQUENCY LOSS IF IT COMES CLOSE TO ANYTHING. IT IS POSSIBLE TO 'PEAK' THE H.F. RESPONSE ARTIFICIALLY BY INSERTING A SIMPLE H.F. COIL IN THE LEAD. THIS SHOULD HAVE A VALUE OF ABOUT 100 MICROHENRIES. DONT OVER DO IT, OR THE DISPLAY WILL START TO SMEAR. NOTE::: THE CHASSIS OF THE MONITOR IS 'HOT' AND IT IS ADVISABLE TO UNPLUG THE UNIT BEFORE YOU TAKE THE BACK OFF EVEN THOUGH THE POWER SWITCH IS A DOUBLE POLE.

I HAVE BEEN BUGGED WITH A LACK OF RELIABILITY WITH MY TRS-80 FOR SOME TIME, STRANGE SYNTAX ERRORS AND INNUMERABLE RE-BOOTS (AUTO-RESETS). THIS IS MOST ANNOYING ,PARTICULARY WHEN FEEDING IN A LOT OF INFORMATION.

AT THE RECENT WORKSHOP, (WHICH WAS MOST ENJOYABLE) I WAS STRUCK BY THE NUMBER OF PEOPLE COMPLAINING ABOUT THE SAME THING. THERE IS NO DOUBT, THAT THE MAINFRAME BOYS GO TO ENDLESS TROUBLE TO PREVENT DOWNTIME FROM HARDWARE CAUSES - NEVE MIND THE SOFTWARE!- AND SPEND CONSIDERABLE TIME AND MONEY PREVENTING 'BROWNOUTS'.

FROM MY INVESTIGATIONS INTO MY SYSTEM, WHICH CONSISTS OF 32K WITH A SINGLE DISK DRIVE, COUPLED TO A HEATHPRINTER, IT SOON BECAME APPARENT THAT MAINS AND INTER-UNIT INTERFERENCE WAS A MAJOR SOURGE OF TROUBLE.

I STARTED BY BUILDING A MAINS FILTER UNIT, (I BUILT MY OWN, BUT THERE ARE PLENTY OF GOOD UNITS AVAILABLE). WHERE POSSIBLE EACH UNIT SHOULD BE INDIVIDUALLY SUPPRESSED TO HELP PREVENT INTER-UNIT INTERFERENCE. THIS APPROACH CERTAINLY IMPROVED THINGS, BUT I STILL HAD SOME TROUBLE.

I FINALLY FOUND SOME LOW VOLTAGE VERY HIGH SPEED SUPPRESSORS. THESE ARE SOLDERED ACROWS THE SUPPLIES ON THE INDIVIDUAL P.C.B.'S AND EFFCTIVELY PREVENT SPIKES GETTING ONTO THE SUPPLY LINES. THESE WERE ALSO FOUND TO BE PRETTY USEFUL. IN THE END I ALSO DISCOVERED THAT THE MONITOR WAS A SOURCE OF INTERFERENCE. THIS WAS CURED BY FITTING A LARGE (15 MICROFARAD) MAINS CAPACITOR, ACROSS THE TRANSFORMER INPUTS INSIDE THE MONITOR. I NOW FIND, THAT EVEN WITH LARGE 'BUMPS' ON THE MAINS, WHICH CAUSE THE LIGHTS TO DIM, THE TRS-80 SEEMS TO 'HANG ON'. SO IT IS OBVIOUSLY WORTH WHILE SUPPRESSING THE SYSTEM AS MUCH AS POSSIBLE, IF YOU ARE HAVING THE KIND OF PROBLEMS OUTLINED ABOVE.

SHAUN KENDALL.

SUPPLEMENT

MACHINE CODE ROUTINES

MERGING BASIC PROGRAMS

```
1 CLS: PRINT PEEK(16549); " "; PEEK(16548): E= 17129
2 S=E: E= PEEK(S+1)*256 + PEEK(S): IF E Ø GOTO 2
3 POKE 16549, INT(S/256): POKE 16548, (S-INT(S/256)*256): END
```

RUN THIS PROGRAM AFTER INPUT OF INTIAL PROGRAM
SET UP CASSETTE
CLOAD 2nd PROGRAM
POKE 16549,66: POKE 16548, 233
Note 2nd program must have higher line numbers than first

KBD Bounce

BASIC routine

```
1 FOR N= 16480 TO 16492
2 READ K: POKE N,K: NEXT N
3 FOR N= 16435 TO 16437
4 READ K: POKE N,K: NEXT N
5 POKE 164Ø5, Ø
6 DATA 2Ø5, 227, 3, 183, 2ØØ, 14, 4Ø, 16, 254, 13, 32, 251, 2Ø1, 195, 96, 64
```

The underlined DATA item is the amount of delay.

M/C routine

START ADDRESS:- 7FC9 (Hex)

```
AF 11 0A 00 CD 0B 00 19 22 16 40 CD 61 1B C3 19
1A 21 36 40 01 01 38 16 00 0A 5F AE 73 A3 20 08
14 2C CB 01 F2 E2 7F C9 5F C5 01 DC 05 CD 60 00
C1 0A A3 C8 C3 FB 03
```

REWIND Enable

To allow rewind without removing REM plug;-

```
5 OUT 255, 4: GOTO 5
```

After REWIND complete press break.

POKE AND PEEK POSITIONS AND THEIR EFFECTS

KBD DISABLE

POKE 164Ø5, Ø

POKE 164Ø5, 1 Enables KBD again

This helps to speed up program execution as well.

BREAK DISABLE

POKE 16396, 23

POKE 16396, 25 Enables BREAK again

PRINTER STATUS

PEEK(14312)

63 means printer ready

233 means printer on but unready

255 means printer off

KBD SCAN- some positions enabled when key depressed

POSITION	VALUE							
14336+	1	2	4	8	16	32	64	128
1	@	A	B	C	D	E	F	G
2	H	I	J	K	L	M	N	O
4	P	Q	R	S	T	U	V	W
8	X	Y	Z					
16	Ø	1	2	3	4	5	6	7
32	8	9	:	;	,	-	.	/
64	ent	clr	brk					space
128	shift							

ROM ROUTINES

Number Transfer

To get a 16 bit signed integer from BASIC to M/C lang.-

First Program command should be CALL ØA7F

in Program in basic call should be -

X=USR(N)

N will be transfered to HL

To reverse this process -

put value in HL and then execute JP ØA9A

This returns value to X.

CALLS

Ø1C9	Clear Screen
ØØ33	Print Character in ASCII form in A
ØØ49	Gets ASCII representation of Character into A (A loop should be used as this only scans KBD once)
ØØ6Ø	Gives a DELAY using BC registers (FFFF gives a one second delay)
Ø5D9	Gets B characters in ASKII into a buffer pointed to by HL (B is the register)
ØØ2B	Ensures KBD buss clear.

OPEN UNIVERSITY (OU) MICRODAY - TUESDAY 26TH FEBRUARY, 1980

HELD IN THE MAIN HALL ON THE OU CAMPUS

AT WALTON, MILTON KEYNES

AS A RESULT OF THE OU RINGING TANDY AT WEDNESBURY AND THE ORGANISER BEING PUT ONTO THE USER GROUP, I FOUND MYSELF BEING INSTRUMENTAL IN ORGANISING A STAND FOR TRS-80. THE ORGANISERS HAD DECIDED TO SET UP A MICRODAY FOR THE CAMPUS AND SURROUNDING SCHOOLS, TO COME IN AND VIEW THE EQUIPMENT ON SHOW AND MEET THE VARIOUS EXHIBITORS

AS I HAVE A CLIENT WHO IS A TANDY FRANCHISE DEALER AND HAS A SHOP IN MILTON KEYNES, HE WAS THE OBVIOUS BUSINESS TO STOCK AND MAN THE STAND. AFTER SEVERAL TELEPHONE CALLS AND TWO TRIPS TO WEDNESBURY HE MANAGED TO OBTAIN SOME HARDWARE AND SOFTWARE. AS HE WAS DOING TANDY QUITE A SERVICE BY SETTING UP THE STAND HE HAD RESERVATIONS ON THEIR SERVICE TO DEALERS WITH A PROBLEM - WHICH I SUPPOSE IS ATTITUDE AND EXPERTISE. IT MUST BE EMPHASISED THAT THESE WERE ORIGINAL CONCLUSIONS - AS DURING THE TUESDAY MORNING JOHN LYNCH, WHO SPECIALIZES IN TRS-80 AND EDUCATION, TURNED UP AND GAVE SEVERAL VISITORS SOME HELP ON VARIOUS ENQUIRIES THEY WANTED CLEARING.

THE EQUIPMENT BEING USED WAS THE FOLLOWING:

A) 16K LEVEL KEYBOARD WITH MODULATOR
THIS USED A LARGE MONITOR SUPPLIED BY THE OU

B) 48K LEVEL 2 WITH THE NEW INTERFACE 2 MICROPOLIS DISK DRIVES AND THE VOICE SYNTHESISER

THE SOFTWARE CONSISTED OF VARIOUS PROGRAMS FROM TANDY - MATHS, STATISTICS, STOCK CONTROL, AND PASCALL - UCSD - SUPPLIED BY TONY RUNDLE OF STARBASE. FOR THOSE WORRIED ABOUT RECENT REPORTS OF INTERFACE PROBLEMS, THE EQUIPMENT WORKED 100% ALL DAY ALONGSIDE THE OTHER EXHIBITORS, INCLUDING THE PASCAL.

THE ENQUIRIES RECEIVED FROM CAMPUS SEEMED TO BE ON PASCAL IN PARTICULAR AND OTHER LANGUAGES AVAILABLE ON THE TRS-80. FOR MANY OF THOSE INTO PROGRAMMING, THE REQUIREMENTS APPEAR TO BE EASE OF PROGRAMMING, AND SPEED OF RUNNING. AFTER MANY MONTHS OF SLOWLY ADDING RECORDS TO MY STANDARD PROGRAMS I HAVE NOW CONCLUDED THAT FOR MY OWN WORK BASIC CAN BE SLOW. THE ENQUIRIES FROM THE SCHOOLS WERE ONE OF PRESENTATION IN THE CLASSROOM - USE OF PACKAGED PROGRAMS WITH NOTES FOR THE TEACHER AND USE OF THE LARGE MONITORS. THE LARGE MONITOR CERTAINLY CREATED INTEREST, AND I EXPECT SOME LOCAL TEACHERS AND PTA'S TO TRY THE TRS-80 IN CLASS SITUATIONS. I HAVE USED MY OWN AT LUTON COLLEGE H.E., AND DRAWN EXCELLENT PARTICIPATION FROM MATURE STUDENTS.

I MISSED JOHN'S DISPLAY OF THE SYNTHESISER, BUT APPARENTLY IT DREW SOME ATTENTION LATE IN THE AFTERNOON. ONCE I HAD A PLAY AT IT, IT BECAME OBVIOUS THIS IS WHERE WE ARE GOING. SUPERMARKETS, POINT OF SALE DISPENSERS, WORD PROCESSORS, AND STOCK CONTROL WILL INCORPORATE CONTROLS WITH THE VOICE SYNTHESISER GIVING ASSISTANCE, WARNINGS, DIRECTIONS ETC., AND IN THE WORDS OF KEITH BEDFORD A NEW MEMBER FROM CHESTERFIELD "I MUST HAVE ONE".

ONE OF MY OWN CLIENTS CAME ALONG AND QUIZZED JOHN ON OFF THE SHELF SOFTWARE AND EQUIPMENT AVAILABILITY, WHILE I PERSUADED A MEMBER OF HIS STAFF

SUBSEQUENT TO 26TH FEBRUARY, WE FOUND THAT A DISKETTE'S CONTENTS CAN BE DAMAGED ON POWER DOWN - LEON DID THIS ON 1ST MARCH, AND DURING THE WEEK A COMMERCIAL USER RANG TO CONFIRM. TODAY - 5TH MARCH - THIS WAS CONFIRMED BY A MEMBER OF STAFF AT WEDNESBURY, .SO PLEASE CONSIDER SOME SORT OF REMINDER ON YOUR INTERFACE BUTTON - TO THOSE TRADING IN A UNIT OR BUYING A NEW ONE FORGETFULNESS COULD BE EXPENSIVE!

TO TO BE CONTINUED

BRIAN PAIN

Notes.

KBD **means** KEYBOARD

Sources- TRS-80 NEWSLETTERs **and** PRACTICAL COMPUTINGS 1979(TANDY FORUM)

TRS--80 USERS GROUP NEWSLETTER

ISSUE 10 APRIL 1980

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EDITORIAL

I have just had another spell in hospital, the second this year, and although things seem to be gradually improving, for health reasons I shall be unable to carry on working at Loughborough University. I hope to be able to keep myself in the style to which I have become accustomed by working from home doing microcomputer and human factors consultancy, and selling TRS-80s for a local Tandy dealer.

I shall, of course, endeavour to remain unbiassed despite having a direct financial interest in the continued success of the TRS-80 and I trust that this will be acceptable to members of the Group.

As I shall be at home most of the time, feel free to 'phone me if you have any problems. If I can't help I should know of someone who can. I will also be able to devote more time to the newsletter, so please keep the contributions coming.

Please, if you send me contributions that are typed or produced on a printer, make sure that they fit comfortably on A4 size paper. I find it rather tiresome retyping material that could be just pasted up if it was in the correct format.

Leon Heller

Edited by:

Leon Heller,
8 Morris Walk,
Newport Pagnell,
Bucks. MK16 8QD.

Tel. 613014

Published by:

Brian Pain,
40a High Street,
Stony Stratford,
Milton Keynes.
Bucks.

Tel. 566660

MEMBERS' LETTERS

I've just received the latest TRS Users' Group Newsletter and thought that some comments may be useful. So that I don't lose my place, I'll work through the newsletter from the start. Fistly, regarding lower case, this is produced on Electric Pencil and as you see it contains lower case although I have not modified any hardware. In fact I have modified the program so that it still displays in upper case but the cursor shows which characters are in caps. Also, the control is implemented by shift and down arrow. On the last point, note that the TRS-80 already creates control characters that way, try INKEY$-ing CTRL-A to CTRL-Z and you will get ASCII 1 to 26 (ASCII 1 is of course BREAK to the TRS-80). On a recent visit to the US I saw a Tandy mod for lower case which gives true descenders on a Model 1. (See the article on SCRIPSIT. Ed.). I think this will be well worth waiting for. I also got an RS232 for $99 and numeric keypad for $79; the latter is quite easy to install oneself. Indidentally, comparative prices are interesting: Level 2 4K is $619 against $515.20. Some conversion rate!!

On page 4 there is a reference to disks being damaged during power-up. In practise, one should always open the drive doors before power-up to prevent head loads.

On page 5, I personally prefer to use a flashing block cursor CHR$(143) alternating with DELETE CHR$(8).

Next, I still have video wobble problems, especially when my neighbour puts the TV on, so I would appreciate one of Tandy's mod kits.

I've been carrying on my work with disassembling the Level 2 and DOS BASICs and I could give you a useful list of routines. However, as it is never too easy to describe the routines fully, I would prefer not to try, but rather to make a general offer to provide routines "to order". In other words, if anyone can state a specific need, I will help him find the routine he requires. The DOS programs have also come under my hammer, including several additions to the DOS Library such as DIR printing, disk renaming, removal of the invisible attribute, etc. Another is the debugging of the DIR and PROT commands (try "DIR :") and of the error overlay SYS4. Another useful mod is to provide full protection to BASIC programs with attribute EXEC so that once loaded, the only direct commands active are RUN, NEW and BYE. The latter pair will wipe the program from memory and return to BASIC or DOS respectively.

Nigel Dibben,
97 Worth Clough,
Poynton,
Cheshire SK12 1SH.

A very good new book is available from the USA called:-

TRS-80 Disk and other Mysteries.
by H.C.Pennington.

and is one of a series of books that provide information on the TRS-80.

Basically the book describes in a light-hearted manner what the organisation of the DOS is, and relies quite heavily upon the use of SUPERZAP, which incidentally is described in great detail.

I see the principal use of this book as a text on how to retrieve data from disks and general repair of files, rather than a description of what each file does, but it is definitely worth getting, even if only for the few tips given in the various appendices (it makes password protection a Joke!).

I personally would recommend this book to any user of the TRS-80.

Other books expected in the series are:-

Volume II BASIC LIsted and Commented.
Volume III DOS Listed and Commented.
Volume IV Guide to Hardware Expansion and Modification.

At present I have not seen any of these volumes (I wish I could!) but they are planned for release in 1980.

The book is currently available in the US from:-

Apparat Inc.,
7310 East Princeton,
Denver CO 80237. (303) 758-7275.

ISJ Inc.,
569 North Mountain Ave.,
Upland CA 91786. (714) 982-7829.

Miller Microcomputer Services,
61 Lake Shore Road,
Natick MA 01760. (617) 653-6136.

Also available in the UK from:-

G Max Research Co. Ltd.,
8 Tate Road,
Sutton, Surrey.
01-642 8971. (No callers.)

I suggest members call the distributors before ordering as supplies are very scarce!

Well, I hope this is all going to be useful to someone. If you want any more information give me a call on 01-540 3346 after 7p.m.

Tony Seel.

Many thanks indeed for all your hard work in putting out the Newsletter. It is very informative for newcomers

to computing such as myself.(Blush, blush Ed.)

Would it be worth starting a "good Tandy dealers' Guide"? Tandy Oxford provide an excellent service and good back-up - my original Level 2 blew up a RAM chip and they have lent me the shop machine until my machine is repaired/replaced. However the manager complains that although he wants to sell computers, Tandy HQ tell him not ot bother. This is because they can sell all they can import, and extra effort is not required! Perhaps this explains the poor software sold by Tandy.

I've sent some 'Softside programs (typed in with many broken fingernails) to the software library to try and expand the offerings.

Nigel Robinson.

Thanks for the "anti-wobble" kit, it works a treat!

Ref. P4 Newsletter No. 9, have you any details concerning the "High Speed" modification? (See this issue Ed.)

Ref. new Expansion Interface, what is new about it? Should I change mine? Does Tandy do a part-exchange or trade-in, and if so, how much?

D.Large

The new Expansion Interface is a completely re-designed unit incorporating the modifications that have been found to be necessary in some cases when using the full RAM complement. That is, all lines are buffered, and probably, the one-shot in the disk drive interface is modified, also. The twisted-pair modification for the RAM RAS, CAS and MUX signals is not needed due to improved circuit board layout (I think). With all the modifications incorporated, there is probably not much point in changing, and I do not think that Tandy would allow a part-exchange or trade-in. You could always sell the old unit privately and buy one of the new ones. Ed.

NEW SOFTWARE

A Monopoly playing program is available for Level 2 16K systems (if you like that sort of thing) from:-

Ritam Corporation,
P.O. Box 921,
Fairfield,
Iowa 52556,
USA.

The cost is $24.95.

It appears that the LISP interpreter mentioned in a previous issue will be marketed by Microsoft. I will endeavour to get further details.

The Bottom Shelf Inc., of:-

P.O. Box 49014,
Atlanta GA 30359,
USA.

are selling some very interesting items such as "information System" (a database manager) and a Text Merge program that can merge a data base with an Electric Pencil file to produce what they call form letters in the US.

NEW HARDWARE

Axiom Corp. have a pair of low-cost printers - $695 and $795 respectively - called the IMP 1 and IMP 2. They look very similar to the much advertised but hitherto unobtainable NASCOM IMP that is at last on sale.

I actually saw one of the NASCOM printers working in Henrys Radio, Edgware Road, a couple of weeks ago. It is not very well made but appears to be very good value.

Tandy are selling a daisy wheel printer for $2999 in the US. This is primarily intended for word processing applications in conjunction with the official lower case modification which has proper descenders, and the SCRIPSIT package which is reviewed in this issue. I have heard that Tandy will be selling the Ricoh daisy wheel printer for £1000 in the UK. This looks like a good buy; they normally retail at around £1250.

TANDY LINE PRINTER II

I have just acquired a Tandy Line Printer II and my impressions might be of interest. It is in fact a Centronics 730 in Tandy livery.

All the low-cost printers such as the 730, the Anadex and the Heath have their good and bad points. The main reason why I chose the 730 was the fact that it can take cut sheets, unlike the others, so I can use it for low-cost word processing. The print quality is not very good, but I cannot afford a dsisy wheel printer at the moment, and it is relatively fast (100 chars/sec). 9 1/2" fanfold or paper in roll form can also be used; it is quite versatile.

A feature I have not yet tried is the capability of printing double width characters under software control.

One annoying problem I have encountered is the slop in the connector onto the Expansion Interface. Unless the connector is positioned exactly right, which can take some fiddling, the printer either prints garbage, or just doesn't work. Once the correct position is found it is quite alright, however.

The unit is compact, not much bigger than a portable typewriter, and looks quite attractive. On opening it up I wondered why it cost over $500; there is next to nothing inside! All the work is done by a single chip microcomputer courtesy of Intel, a few interface chips, some transistors and a simple power supply. I suppose the print head, stepper motor and tooling for the plastics case account for most of the cost.

Anyway, I am quite happy with it! Incidentally, for program development or rough Pencil or SCRIPSIT drafts, I save money by using both sides of the paper, feeding it through a second time after turning it round.

Leon Heller.

THE TSR-80 AS A LOW-COST DEVELOPMENT SYSTEM

I have just purchased a "Softy" kit. Softy is an intelligent EPROM programmer that can be interfaced to the TRS-80 via the RS232 unit, enabling object code prepared using the Editor/Assembler, Macro-80 or even the FORTRAN compiler to be downloaded into the Softy where it can be executed on an alien Z80 system, tested, and an EPROM programmed if the code is satisfactory. If suitable cross-assemblers were available, the TRS-80 could be used to develop firmware for any of the microprocessors on the market!

A Softy kit costs about $100, enabling something approaching the power of a full development system from Zilog or Intel to be obtained at a fraction of the cost!

Leon Heller

FAST SORT

I enclose a copy of a program written in TRS-80 Basic designed for the speedy sorting of integers in a sparse array over the full range of 0-32767. It employs the method of sorting by the least significant digit(1) and in this case uses only two "digits" (on a scale of 256) which are the two bytes constituting the integer.

Lines 30-40 are not part of the program but generate a test array of N random integers JU(I), here arbitrarily limited to 800.

Line 50 counts the number of times each value of the least significant digit occurs; JN(JL) is the array of counts(2). In line 70 this array is overwritten, to save memory space, and the values of JN(JL) become the location for the first occurrence of the digit JL in the partially assorted array JS(I). The process is then repeated for the second, most significant, byte(3) and the final sorted list is written back again as JU(I).

The operation seems relatively fast and is linear in time with the number of integers to be sorted. For example, for 800 integers the time required is 77 sec. (T=7+.0875N secs). The storage memory required is twice that necessary to store the raw data, plus 257 integers.

One important use of this routine is in the alphabetisation of lists, since each 2-byte integer can represent a three letter string. Alphabetisation of strings, using the TRS-80, is not recommended because of the occurrence of very long hold ups, but these are a subject on their own.

(1) See, for example, Donald E.Knuth, Sorting and Searching, Addison-Wesley (1973).

(2) The addition of 1 after the PEEK instruction is not obvious; it facilitates the later overwriting in line 70.

(3) This never exceeds 127. In line 100, the addition of 1 inside the argument of the PEEK instruction points to the most significant byte of JS and the addition of 1 after the PEEK is for the same reason as above.

SORTING BY LEAST SIGNIFICANT DIGIT SCALE OF 256 25/3/80

```
10 DEFINT I-O
20 DIM JN(256),JU(800),JS(800)
30 INPUT "N= ";N
40 FOR I=1 TO N:JU(I)=RND(32760)-1:PRINTJU(I);:NEXT I
50 FOR I=1 TO N: JL=PEEK(VARPTR(JU(I)))+1: JN(JL)=JN(JL)+1: NEXT I
60 JN(0)=1
70 FOR I=1 TO 256: JN(I)=JN(I-1)+JN(I): NEXT I
80 FOR I=1 TO N: JL=PEEK(VARPTR(JU(I))): JS(JN(JL))=JU(I): JN(JL)=JN(JL)+1: NEXT I
90 FOR I=0 TO 128: JN(I)=0: NEXT I: PRINT "CLEARED"
100 FOR I=1 TO N: JL=PEEK(VARPTR(JS(I))+1)+1: JN(JL)=JN(JL)+1:NEXT I
110 JN(0)=1
120 FOR I=1 TO 128: JN(I)=JN(I-1)+JN(I): NEXT I
130 FOR I=1 TO N: JL=PEEK(VARPTR(JS(I))+1): JU(JN(JL))=JS(I): JN(JL)=JN(JL)+1: NEXT I
140 FOR I=1 TO N: PRINT JU(I);: NEXT I
```

Aubrey Jaffe

PASCAL

Stanley Houghton has modified the Supersoft Tiny Pascal system so that source and code files can be stored on disk. He has also written a new text editor in Pascal, which is much better than the original, together with some other improvements.

I have been getting the hang of the UCSD Pascal system which I have now purchased. Other users of this system might be interested in how to achieve output to the line printer from within a program. The manuals are not very explicit on how to do this, so the following little program should explain matters.

```
PROGRAM TEST;
BEGIN
  CLOSE(OUTPUT);
  RESET(OUTPUT,'PRINTER:');
  WRITE('THIS IS A STRING!');
  WRITELN;
  WRITE('THIS IS ANOTHER STRING!');
  WRITELN;
  CLOSE(OUTPUT);
  RESET(OUTPUT,'CONSOLE:')
END.
```

Leon Heller

SCRIPSIT REVIEW

SCRIPSIT is a word processing package that has just been released by Tandy. It is intended to be used in conjunction with the official Tandy lower case modification which has true descenders but I have found that it works perfectly with the standard Electric Pencil type of modification.

SCRIPSIT is somewhat similar to Pencil, but is much more powerful. It is also much more difficult to use. The key is used as a control key, in conjunction with 13 of the other keys (for which stick-on labels are provided) to give functions such as: DELETE, WORD, LINE, PARA, INSERT etc.

The video display can be formatted so that you can get a good idea as to what your text will look like when it is printed, and in WINDOW mode text with a line width of 132 characters can be displayed with horizontal scrolling.

A very nice feature is the use of "invisible" format lines that are inserted in the text. These can be saved as part of the text, so that you do not have to key in a lot of formatting commands each time you print a file.

Blocks of text can be moved, deleted and even exchanged. Centering is provided, the omission of which from Pencil I found very annoying. What are missing, however, is underlining, which is essential in my opinion, and proportional spacing on a suitable printer.

A comprehensive manual is provided, and three audio cassettes, which, in conjunction with the manual and some sample files on the disk, provide a training course for the newcomer to word processing.

All in all, an excellent piece of software, and very good value at around $60.

Most of this issue of the Newsletter was produced with SCRIPSIT, and my new printer.

Leon Heller

A SAD STORY

When I received my keyboard unit following the Level 2 upgrade, I suffered from occasional total memory loss when the keyboard was knocked. The unit was returned to Tandy for repair, together with some faulty Tandy program tapes (they would not load), and was returned with the fault still there, and a rather large bill. I refused to pay for the alleged repair and the Leicester Tandy dealer refused to return the tapes until the bill was settled!

Being rather fed up with Tandy's service department, I disassembled the keyboard and found to my amazement that the CPU chip was loose in it's socket! I pressed it home and have had no further trouble. To miss a simple fault like this and then to charge for doing nothing reflects badly on the efficency of the Tandy service organisation.

I did eventually get the replacement tapes without having to pay the repair bill.

David Hedges.

I had a similar experience when I had my Expansion Interface fitted with the buffered cable and disk drive interface one-shot modifications. Tandy returned it with the disk controller chip inoperative. When I received it back the second time, together with two large bills that I have not paid, I found that there was an intermittent power supply fault. Like David, I took the Interface apart, and found that one of the power supply smoothing capacitor leads was making intermittent contact with one of the heat sinks (I think that was the problem, it was some time ago), rectified the fault and have had no trouble since. Perhaps Tandy do not test units they repair!

Ed.

NEW KEYBOARD: A WARNING

If you have one of the new keyboards, whatever you do, do NOT use Electolube on the switches!! One of the Tandy dealers (I think they had better remain nameless Ed.) advised the use of Electrolube to improve the feel, and the keyboard is now virtually unusable; the keys responding to the slightest touch.

I shall try using a solvent to remove the Electrolube but might have to replace the keys if this does not work. Take care this does not happen to you.

Alan Fortune.

SPEEDING UP THE CLOCK

Whilst I have not tried this modification myself, it should work. The TRS-80 Users Group can accept no responsiblity for the accuracy of the following information; you modify your system at your own risk!

The TRS-80 master clock crystal frequency is about 10.64 MHz. IC Z56 divides this by six to give about 1.78 MHz to the CLOCK input on the Z80 CPU chip. If we divide by four instead, the CPU runs at 2.66 MHz. A switch enables instant changeover from one speed to the other.

1. Cut the trace leading from Pin 8 of IC Z56 to the PC pad next to it.
2. Install a small SPDT switch on the keyboard bottom plate. Ensure that the switch will not foul anything upon re-assembly.
3. Run a wire from the movable pole of the switch to the PC pad. This is now connected to the Z80 CLOCK input.
4. Run another wire from either side of the switch to Pin 12 of IC Z56. This is the 1.78 MHz output.
5. Run another wire from the other switch contact to Pin 11 of IC Z56. This will be the 2.66 MHz output.
6. Run a short (50mm) wire from IC Z43 Pin 2 to Pin 14 of IC Z56.

That's it! Remember to return the switch to the normal position when using the cassette or disks.

(Taken from TRS-80 Computing, Vol. 1, No. 2, Box 158, San Luis Rey CA 92068, USA.)

Leon Heller

LOW-COST DISKS AND MEMORY

Happy Memories of 19 Bevois Valley Road, Southampton, Tel: (0703) 39267 are selling Memorex diskettes at £19.95 for 10 including VAT and postage! The price even includes cases when they get them in stock. I have just received a box virtually by return of post and they seem OK.

John Gardener is negotiating a Group bulk purchase price with them at the moment, and it looks as though we might be able to supply them even cheaper to members!

They are also advertising memory upgrade kits at £42.50.

Happy Memories accept telephone orders if you have a Barclaycard or Access Card.

Leon Heller

STOP PRESS

I have just received the latest issue of Byte, and there is a lot of information in it that will be of interest to members.

Microsoft are advertising their BASIC compiler to run under TRSDOS. This includes some features of Version 5.0 Microsoft BASIC, such as WHILE...WEND, long variable names, CALL etc. It compiles to Z80 code, which will run very fast, and looks like a good buy at $195. Royalty information is available, if you wish to sell programs compiled with the compiler. COBOL-80 and BASIC compilers are also available for the Model II for $750 and $395 respectively.

They are also selling the muMATH symbolic maths. system I mentioned in the last issue, for $74.95, together with muSIMP which is a LISP superset. I shall be ordering this immediately, and will let you know what I think of it.

Tandy have now sold nearly 150,000 TRS-80s, and are thought to have around 35% of personal computer sales worldwide. The PET is still the UK market leader of course. Apparently, the market for the Model 1 is becoming saturated in the US, and it looks like a low-cost colour system is being designed. Tandy anticipate selling 15,000 Model IIs in 1980.

Satelite tracking software for the Model I can be obtained from a US firm. Contact me for further details!

Leon Heller

TRS--80 USERS GROUP NEWSLETTER

Issue 11 May 1980

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EDITORIAL

The main bit of news since the last issue is the success of the Workshop. I managed to make it this time and everybody seemed to find it very enjoyable and worthwhile. I definitely enjoyed myself.

The proceedings were somewhat marred by someone (accidentally, I trust) walking off with a copy of one of G. Catlin's american TRS-80 magazines. These are rather hard to obtain, and he obviously would like it back. The address is:-

62 St. Leonards Road,
Chesham Bois,
Amesham,
Bucks.
Tel. Amersham 4601

Please keep the contributions coming. I would prefer it if you sent them straight to me, rather than to Brian, as I get them that much sooner. If possible send them on cassette or disk, either prepared with one of the word-processors, or in the form of BASIC 'programs' with text on each line. You need not bother about REMs if you wish. I can then save them as ASCII files, and convert upper-case to lower-case, ready for editing and printing with SCRIPSIT. Tapes and disks will be returned as soon as possible.

Leon Heller

Edited by:-

Leon Heller,
8 Morris Walk,
Newport Pagnell,
Bucks. MK16 8QD.
Tel. (0908) 613004

Published by:-

Brian Pain,
40a High Street,
Stony Stratford,
Milton Keynes.
Tel. (0908) 566660/564271

MEMBERS' LETTERS

From Derrick Rowe

If a disk is removed without a CLOSE instruction being obeyed then it will not be possible to GET data from any file extension from a previous CLOSE. This can be remedied as follows:-

Work out the highest buffer number that contains data.
OPEN your random file.
PUT data to the next buffer number up.
CLOSE the file.

e.g.

```
10 OPEN "R",1,"RANDOM"
20 PUT 1,200 ' last buffer accessed was 199
30 CLOSE ' the disk directory has now been corrected
```

If in doubt use the highest buffer number that does not produce a disk full error.

The lesson is NEVER take any disks out without a CLOSE. It is a good idea to prompt disk removal from the program after a CLOSE of the file.

Now for an obscure tip:- ST80D by Lance Miklus is certainly the most impressive terminal software around and we have used this program on a number of time-sharing systems (asynchronous) without any problems. It will run under NEWDOS except for transmitting data from the TRS-80's disks to the remote system when the file data may not be read completely. This problem does not ocurr when using 2.1 as supplied with ST80D. Does anyone have any thoughts on this?

VOXBOX - all the programs work well under NEWDOS with recognition around 90% reliable. It should be possible to save recognition patterns by PEEKing the relevant memory locations. Again, any ideas?

We are about to look at double density disks and Tandy DOS 2.4, together with compiling BASIC. SCRIPSIT, the Tandy word-processor has come our way and a first reaction is that there are some very nice features, but with the usual trade-off of increasing complexity for the user. Saving and loading text is much safer and print formatting can be built in. It will also cater for a screen 130 characters wide - a virtual VDU!

Derrick Rowe

From Anthony Haddock

First, a big thanks for the Newsletter. Look forward to each one.

I have just upgraded my TRS-80 from 32K to 48K. The extra 16K cost just $36 from Happy Memories, a very low price from what I have seen.

I have a copy of Tandy's Debounce/Real Time Clock, but no instructions. I have asked Tandy, but no luck. Can the Users Group help?

Here are some notes that may be of interest:-

When typing a program line using Auto mode only 243 characters may be entered, but in manual or Edit mode 255.

Tape output port is 255 as in the Newsletter, but it is a latch, and can therefore be used with an INPUT statement or INKEY$.

```
1 OUT 255,4:INPUT X:OUT 255,0
```

or

```
1 X$=INKEY$:IF X$="" THEN 1
2 IF X$="S" THEN OUT 255,4:GOTO 1
3 IF X$=" " THEN OUT 255,0:GOTO 1
4 rest of program
```

This can be used to CSAVE a program twice with a delay between the saves:-

```
1 CSAVE "X"
2 FOR A=0 TO 1000:OUT 255,4:NEXT
3 CSAVE "X"
4 (as above INKEY$) (Rewind)
5 CLOAD?
```

You can also latch up the port with:-

```
1 OUT 255,4:DELETE 1
```

The port will then stay latched until Reset or the 80 is switched off, or a NEW command is used.

Codes 192 - 255 = Tabs for 0 to 63 spaces respectively.

```
PRINT CHR$(192).....prints 0 blanks
PRINT CHR$(193).....prints 1 blank
PRINT CHR$(194).....prints 2 blanks
PRINT CHR$(255).....prints 63 blanks
```

From Second Edition of the Level II Manual. Also listed in the Second Edition are :-

Bit pattern codes.
Control codes.
Internal codes for BASIC keywords.
A program for storing a machine language routine.
inside a string.

Anthony C. Haddock,
14 Portia Close,
Nuneaton CV11 6NY.
Tel. 386238

From Mike Costello

I acquired a TRS-80 16K Level 2 quite recently, and am now looking around for other members in my area.

One way to do this is to start-up a User Group for the East Midlands. I wonder what role such local groups play in the context of the National Group.

Mike Costello,
17 Langbank Avenue,
Rise Park,
Nottingham.

We do not hear very much about the activities of any local groups, but many TRS-80 Users belong to their local computer club. There is one in Nottingham, and the Leicestershire Personal Computer Club has several members of our Group in it. Contact Dick Foden on Rearsby 247 for details. LFH.

PROBLEMS WITH PORT

My system recently stopped working after being left on all night. The keyboard unit was returned to Tandy, and they sent it back with the message that a sticky red substance was shorting out the some of the PC tracks. Apparently some port had been spilt into it, causing the trouble.

Nick Robinson

One Christmas, a colleague of mine who was somewhat the worse for wear, poured most of a mug of beer into a computer whilst it was playing carols. It still worked OK, though! LFH.

RANDOM NUMBER GENERATION

At the recent workshop, someone asked me if there was a way of generating the same sequence of random numbers time after time. You might question the need for this, but the ability to produce the same pseudo-random sequence repeatedly can be very useful in certain types of simulation, and can help when debugging a program using randomisation.

The built-in random number generator cannot easily be made to do this, so an alternative random number generation scheme must be used. The following generator, which I obtained from one of my Hewlett-Packard HP-41C calculator manuals, is ideal:

$$s_{n+1} = FRC(9821 \times s_n + .211327)$$

This generator is claimed to pass the tests mentioned in Knuth's monumental work on the Art of Computer Programming.

A program using this generator is:-

```
10 INPUT "SEED";R
20 TEMP=9821*R+.211327
30 R=TEMP-FIX(TEMP)
40 PRINT R
50 GOTO 20
```

Incidentally, before using the built-in random number generator for any serious work, it would be advisable to subject it to some of the tests mentioned in Knuth. Has anyone done this?

Leon Heller

A MEMBER'S MODEL II SYSTEM

I have a 64K Model II, which I am only using under CP/M at the moment. The CP/M is from Lifeboat and I am using Wordstar and Selector III (the latter with CBASIC-2). I have a Ricoh RP-40 daisywheel printer. I also have a second complete system which is for sale at £4000 as a word-processing system.

Ian Litterick,
57 Carleton Road,
London N7 0ET.
Tel. 01-607 6061.

SERIAL INTERFACE CORRECTION

A mistake was made in the circuit diagram for this unit.

The connections to the op. amp. pins 2 and 3 should be

interchanged. Thanks to Dusty Miller for pointing this out.

Dusty tells me that the circuit works very well now!

Leon Heller

WEEKEND WORKSHOP

Over 60 members and wives attended the Workshop, held on 19/20 April 1980 at Milton Keynes College of Education. The following report is intended to encourage new members to come along and enjoy what was for me the "unforgettable enjoyment of a challenging subject".

At the January Workshop, Charles Davies suggested something was done for the wives. This was their weekend:-

Saturday morning	Buckingham Market
Saturday afternoon	Milton Keynes Shopping Centre
Saturday evening	Northampton Repertory Theatre
Sunday morning	Finmere Market
Sunday afternoon	Woburn Safari Park

They thoroughly enjoyed themselves, and their men-folk could then get down to their own activities at the College without feeling guilty!

Saturday commenced with the Librarian arriving from Wales at 08.15. Os House from Blandford Forum (somewhere in Dorset), Michael Dean from Chelmsford and John Christie from Gloucester had arrived by 09.00 and from then on members kept arriving. We started at 09.30.

It soon became apparent that two rooms were mainly in use: one for presentations, and the other for various fringe activities such as swapping programs, playing games etc. The Library was a significant part of this fringe activity, and Leighton is to be thanked for doing a marvellous job - he seemed to spend all his time making copies of the Library software for members.

The fringe activities seemed to be greatly appreciated by members, and the next Workshop will consist of a series of short presentations on utilities and business applications with more time given to the fringe activities and the Library. I envisage a short presentation recorded on video followed by an informal question and answer session. Once this runs out of steam members participate in the fringe activities.

What may not be appreciated by those who have not attended one of these Workshops is the very friendly atmosphere. This has been even more in evidence at the week-end

Workshops than at the one-day sessions we have held.

Members' systems:-

Leon Heller MK	48K, Line Printer II, 2 drives
Adrian Hancock MK	16K (new keyboard), TV, Philips recorder
Michael Dean Chelmsford	48K, keyboard mods, 2 drives
Nick Robinson Oxford	16K and lots of games
John Christie Gloucester	16K, Golfball printer, Aculab interface
Os House Blandford Forum	two customised systems, 3 drives, Oki printer
Peter Norman Swansea	3x8" drives, Omicron Mapper, full CP/M
John Kilpatrick Suffolk	48K, 2 drives, Anadex printer, much software
Leo Knaggs Bristol	48K, 2 drives
Ron Wellsted MK	Z80 home-brew, modified TV, recorder
Leighton Davies Wales	48K, 1 drive, Library
Laurie Shields Chesterfield	16K, Expansion Interace, Oki printer
Charles Davies Epsom	48K, Golfball printer, Aculab interface, tape punch
Dusty Miller MK	Olivetti teletype - interfaces to 4K keyboard

If the above is typical of group members, there is evidence of considerable enthusiasm, expertise and buying power. We are investigating:-

(a) bulk-buying of diskettes and tapes
(b) lending fees for Library programs
(c) royalty arrangements for programs especially written for the Library
(d) a multi-user group meeting (PETs, Apples etc.

and ourselves) in the next six months

(e) for (d) we envisage 150 - 250, formal presentations, many fringe activities, accomadation on Friday evening. Any comments/views would be welcomed

Here is a short resumé of each presentation given at the Workshop:-

SATURDAY

Leon Heller	Leon discussed the various languages available, and their applications
Rick Ingrams	Rick, having strong views on programming standards, volunteered to put his main points to the members formally. Feedback indicated that the points were well received, and many members decided to review their techniques.
Bob Privett	Bob passed on his experiences of using 8" drives. Many members might have considered these out of their reach. Bob showed that their use was a practical proposition.
John Harding	Many thanks to John for coming. This was his third visit. He outlined his entry into firmware (my hobby horse at the moment) and may have gone away with some useful feedback.
Dusty Miller	As a result of feedback from the January Workshop (John Williamson - Selmec) Dusty was asked to take a BASIC program apart and explain the working of various routines. A session that will be repeated at future Workshops.
Laurie Shields	Laurie gave a talk on elementary machine code/assembly language programming. As I joined the session a lively interchange was going on. Only food could stop them!
Leon Heller	Leon volunteered to take members through the UCSD Pascal system, and explained its many features via the large monitor.
Leo Knaggs	Leo gave an extremely interesting session on the use of Superzap.

As at the January Workshop, things were still happening into the early hours of Sunday morning. Some hardy individuals resumed activities before 07.00!

SUNDAY

Leon Heller	Review of TRS-DOS, NEWDOS+ and various utilities. Comments on some new offerings for the TRS-80.
Os House	How to build the system into a self-contained unit without trailing cables.
Charles Davies	Paper tape punch interfaced to the TRS-80 for the preparation of TELEX tapes. Examples shown were for production of standard invoices/paperwork prior delivery to carriers and subsequent freight.
Peter Stenning	Demonstration of Electric Pencil. Its use in company systems.
Leon Heller	Review of SCRIPSIT word-processor.
Michael Dean	Disk file handling. Extensive coverage of various techniques.
Tony Rundle	UCSD Pascal - introduction to Pascal, its features and advantages.
Peter Norman	Model II, low-cost 8" drives for Model I and II. CP/M software available.

It is anticipated that at future workshops, some of the presentations will be recorded on video, enabling the Group and members to set up special tutorial sessions. Subjects will include BASIC, Pascal, file handling, SUPERZAP and CP/M.

Brian Pain

LOWER-CASE MODIFICATION

There appears to be quite a lot of interest in adding lower-case capability to the TRS-80, so I thought a description of how to achieve this might be of interest. The TRS-80 Users Group can accept no responsibility for the correct functioning of a system following any modifications, you do them at your own risk.

You will need a low-power 2102 RAM, and some fine wire - wire-wrap wire is ideal. A SPDT switch will also be needed.

1. Carefully disassemble the keyboard unit and place the circuit boards component side up.

2. Mount the switch in a convenient place.

3. Bend up pins 11 and 12 of the 2102, and place it over Z45, ensuring that it is oriented the same way.

4. Using a fine tipped soldering iron, solder corresponding pins together (except pins 11 and 12, of course) so that the new chip is piggy-backed onto Z45. We will call the new chip Z45A.

5. Using a short piece of insulated wire, connect pin 11 of Z45A to pin 13 of Z44.

6. Locate Z29 and Z30, and cut the narrow PC track between them.

7. Attach two pieces of insulated wire to the track on both sides of the cut, and connect these to the centre and one of the other contacts on the SPDT switch.

8. Connect the other contact on the switch to pin 12 of Z45A.

9. Put everything back together again.

You will need a software driver, otherwise all that will be displayed will be lots of funny characters. Leighton has a copy in the Library. This modification works with SCRIPSIT, the new Tandy word-processor.

Leon Heller

B.C. PAIN - AN UPDATE

When I first encountered the TRS-80 the only job I wanted it for was nominal ledger accounting. As a result of our workshops, newsletters and Sunday morning meetings I now use two programs as a matter of course:-

a) This is in BASIC and can handle ledger accounts numbered up to 1150, with up to 20 entries per account.

It can be customised to improve the specification, but it is used in its basic form.

Data are read in using DATA statements, and when a new client is started, the old DATA lines are deleted and new data typed in by a member of staff.

Very little training has been needed, and no special paperwork is required. We put in "raw prime entry data" and obtain balanced "by account" balances.

b) This was written in Assembler and is menu driven with seven options:

1. Enter data into accounts.
2. Change an amount in an account.
3. List the contents of an account.
4. List the balances on accounts in numerical order.
5. Total all the entries so far entered.
6. Cancel all entries in the program.
7. Record the program and data to a file.

The program can accept accounts numbered up to 9983 and will accept entries totalling up to 500 in any account. It is very fast and is rather like Electric Pencil in handling. With a numeric keypad use is very "smooth".

An eighth option is envisaged where a large company using standard pro-formas will receive the monthly, quarterly and annual reports from subsidiaries on diskettes which will be read by this program, thus producing consolidated accounts.
The program can be customised so that read data will be given a prefix, enabling it to be identified later during interpretation and auditing.

Before anybody throws up their hands in horror at the implications of the above, the need will still be there for skilled work, as companies decide to produce more information and not less, with the costs becoming more economic when going for full accounts more often.

The Electric Pencil is now in use four out of five days every week, and the office is on the look-out for a printer with friction-feed and lower-case. So far we have had no

complaints from the recipients of our upper-case letters, but we do need the lower-case and friction-feed.

TRS-DOS 2.3 seems to have settled down with Pencil and we have not experienced any difficulties in saving text. In fact, both sides of a disk are used for text storage, but of course, this is not really to be recommended.

At last the office has two disk drives (both Micropolis) and this has helped the storage and retrieval of text files. The single Shugart will now be used for the office accounts receivable and clients VAT programs.

Management accounts/Costing

The former has now been in use for over 12 months, the costing for about nine months. My college at Luton has in fact requested that students studying from September 1980 be given some information on how a micro can be used in the production of financial and management accounts. This teaching will be done using both my management accounts and nominal ledger programs. The management accounts program first produces four column trial balance totals, then the balance sheet, cumulative P/L with %, this month with %, followed by the balance sheet schedule of debtors and creditors. By September, the detailed expense schedule will be produced.

We have a VAT program that I use for receivables, and a client uses for payables, but only in my office.

Under development is a sales ledger program for this client, whose writing is illegible (he admits it). It is envisaged that many small businesses can use the program and drop off a disk or cassette so we can print out the month's invoices. The invoices can be posted direct or returned to the business for review.

That covers the current situation. If anyone has any queries please ring me and ask away. Either Clive or I will try to explain what we are doing.

Brian Pain

```
***** ***** ***** ***** ***** ***** ***** ***** ***** *****

**     RRRRR   EEEEE  W       W    AAA    RRRRR   DDDD     **
**     R   R   E      W   W   W   A   A   R   R   D   D    **
**     RRRRR   EEEEE   W  W  W    AAAAA   RRRRR   D   D    **
**     R R     E       W W W W   A     A  R R     D   D    **
**     R   R   EEEEE   WW   WW   A     A  R   R   DDDD     **

***** ***** ***** ***** ***** ***** ***** ***** ***** *****
```

```
 ££££          111        00000        00000
£    £       11 11      0    00      0    00
£              11      0   0 0      0   0 0
£££££          11      0  0  0      0  0  0
£              11      0 0   0      0 0   0
£     £        11      00    0      00    0
£££££       111111      00000        00000
```

A REWARD of £100 (One Hundred Pounds) is offered for the return or - information leading to the return , of one TANDY TRS-80 Keyboard.

DESCRIPTION (When last seen)

SERIAL NUMBER :- BO 12218

* 16k RAM * NO NUMERIC KEYPAD * Level 1/2 SWITCHABLE *

TWISTED-PAIR MODIFICATION (6-pin DIN plug hanging from back of unit)

UNUSUAL IDENTIFICATION FEATURES

LOWER CASE MODIFICATION (slide switch on righthand side of unit)

HIGH-RESOLUTION GRAPHICS MOD (only accessable through software)

Both these mods done by :- APPLEGATE INTERFACES , BRISTOL.

When last seen it had the owners name and address written on the bottom

:- ALAN E GREENHALGH
GILWELL PARK
CHINGFORD
LONDON E4 7QW Telephone 01-524-2765

If you come across this keyboard during the course of your business , either offered for sale , or in for repair/mods , please contact me at the above address or report the matter to your nearest Police Station.
No questions will be asked , if prefered .....

Thank You

AEG.

ALAN E. GREENHALGH

```
10 REM ***********************************************
       ***  KEYBOARD DEBOUNCE AND DISPLAY DELAY  ***
20 REM ***                                       ***
       ***           BY  KEITH BEDFORD           ***
30 REM ***                                       ***
       *** FIRST  SET  MEMORY  SIZE  AS  FOLLOWS ***
40 REM ***                                       ***
       ***          4K = 20462          **********
       ***         16K = 32750          ***
       ***         32K = 49134          ***
       ***         48K = 65518          ***
50 REM ***                               ***
       ***********************************
60 REM
70 DATA 33 , 245 , *1* , 34 , 30 , 64 , 197 , 1 , 0 , 1
80 DATA 205 , 96 , 0 , 193 , 195 , 88 , 4
90 REM
100 REM *****    (*1*) =  79  IF   4K  MEMORY    *****
        *****          = 127  IF  16K  MEMORY    *****
        *****          = 191  IF  32K  MEMORY    *****
        *****          = 255  IF  48K  MEMORY    *****
110 REM
120 A= MEM SIZE +1
130 FOR I = 1 TO 17
140 READ B
150 POKE A , B : A = A + 1
160 NEXTI
170 REM ****   PROGRAM  IS NOW IN   ****
180 REM
190 REM ****  IF  YOU  HAVE  DISK  YOUR  NEXT  LINE  IS   ****
        ****  20 DEFUSR1= MEM SIZE +1                    ****
200 REM
210 REM **** IF  YOU  DON'T  HAVE  DISK  YOUR  NEXT  LINE IS *
        ****  20 POKE 16526 , 239 : POKE 16527 , *1*         *
        ****     I.E  *1*  IS  79 IF YOU HAVE A 4K MACHINE   *
220 REM
230 A=USR1(X)
240 REM
250 REM ****  YOU CAN NOW TYPE NEW  IF YOU WISH   ****
260 REM
270 REM ****   TO  ALTER  THE  DELAY  TIME              ****
        ****    POKE  A NUMBER  INTO  MEM SIZE + 9 OR 10  ****
280 REM
290 POKE MEM SIZE + 10 ,50 :REM ***   NOW  TYPE  LIST ****
300 REM
310 REM  ****  YOUR  PROGRAM  STARTS  HERE            ****
320 REM  ****  YOU  CAN  ALTER  THE  SPEED  ANYTIME   ****
         ****  THROUGHOUT  YOUR  PROGRAM             ****
```

TRS--80 USERS GROUP NEWSLETTER

Issue 12 June 1980

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EDITORIAL

As we seem to be doing quite well for contributions, the Newsletter will probably be coming out on a monthly basis from now on.

I have received a lengthy letter from one member that appears somewhat critical of the Group, which I have published in full, together with my comments. What do the rest of you think about the points that are raised? Please bear in mind that the Group is run on a purely voluntary basis by Brian and myself, and any additional facilities such as a beginners section will have to be provided by one or more of you, the members. In fact, I get the impression that everyone is quite satisfied with the way things are going - if anyone thinks they can do a better job they are quite welcome to "have a bash"!

This is the 12th issue, and to celebrate the occasion, we are including an index to the first 12 issues.

Leon Heller

Editor:-

Leon Heller,
8 Morris Walk,
Newport Pagnell,
Bucks. MK16 8QD.
Tel. (0908) 613004

Publisher:-

Brian Pain,
40a High Street,
Stony Stratford,
Milton Keynes.
Tel. (0908) 566660/
564271

MEMBERS' LETTERS

From C.T.Dempsey

After some months' membership of the TRS-80 Users Group I thought you might be interested in my comments regarding the Group and its Newsletter.

It has been apparent to me for some time that the Group is a small organisation that is geared towards those who have considerable experience in operating the TRS-80, and its more advanced functions. I feel that it does not cater for beginners and those, like myself, who have very little experience of basic programming techniques.

** I publish everything that is sent to me and we get very few contributions from or for beginners. Is the teaching of elementary programming a desirable function for the Newsletter or would it not be better to join your local computer club - some of them run courses for beginners? If anyone is prepared to write a section for beginners I will be delighted to publish it. LFH**

It is quite amazing to the beginner, like myself, how experts seem to forget that others have not the same degree of knowledge, and blithely talk about RS-232 interfaces, DOSs, disassemblers, machine code, telephone modems etc., expecting everyone else to understand their meanings. I fully realise that everyone must be catered for, but feel that the Newsletter caters more for the advanced enthusiast than for the beginner.

** The monthlies publish glossaries of technical terms in easy to understand language. Alternatively, Penguin publish a computing dictionary. Again, will anyone prepare a glossary? LFH**

A few examples and suggestions:-

1. There must be many beginners who have been left with many queries after reading the Level II handbook: i.e. the PEEK and POKE statements, the PRINTUSING statement and the transposition of arrays took me personally a long time to understand and I am sure others are in the same situation.

** My first comment applies. LFH**

2. The program library is a fine idea which I have used many times, but I feel that for those of us without a printer it is very difficult to learn programming techniques from these, and would have preferred to see some programs printed in the Newsletter wih explanations as in most commercial magazines.

** The Newsletter costs quite a lot to produce, and I do not really feel we can justify the inclusion of lengthy program listings. The commercial magazines get most of their income from advertising, not from sales, and they can afford to publish lengthy listings. Leighton Davies now has a printer and I am sure he will provide you with a

printed listing, if you re-imburse him for the cost of the paper and ribbon usage. LFH**

3. I feel that the Group should be able to give more information on such matters as upgrading memory, what floppy disks are and do, more information on commercial software and more reviews, and at fuller length, of the various hardware items and modifications that abound both here and in the USA.
** We are dependent upon members like yourself for contributions. If members (and that includes YOU) will send me lengthy, detailed reviews I will of course publish them. It is YOUR Newsletter after all! LFH**

4. I would have hoped to have gained from the Newsletter more hints and tips regarding operating and programming, and feel that there is a great deal of expertise within the Group which could be made available to the beginner.
** Again, this is in Members' hands. Maybe Members with such expertise would be prepared to answer queries over the 'phone. I for one am generally available. Could anyone else prepared to provide such a service let me know. LFH**

5. There are quite often complaints in the Newsletter regarding Tandy's attitude and lack of co-operation, and I would ask who is promoting the TRS-80 in this country. Surely the Users Group should be doing this, but there appears to be little attempt to get new members and we appear to be leaving the field open to Commodore and PET Users Groups etc. Also, with the introduction of Model II and the news of a colour system being developed I wonder if somebody should be looking to the future to prevent Model I becoming obsolete.
** Unfortunately, we seem to get more negative letters regarding Tandy than letters praising them (see this issue, though). I publish everything I am sent, and can only hope that the publicising of Members' problems will stir Tandy into doing something about them. Tandy belong to the Group, and we have a very good relationship with them, but they have never tried to refute any of the adverse comments made by Members!

Should not Tandy themselves be promoting the TRS-80? They have the staff and money available to do this. Brian and I do not have the time or the resources to do this, perhaps one of our members would take it on.

I do not understand your comment about lack of effort in getting new members, we cannot afford to advertise, but the monthlies include us in their club lists. What would you suggest? We have over 200 members, anyway.

Regarding the Model I, I am afraid it is already obsolescent - the design is about three years old, and there are some much better processors than the Z-80 available and being incorporated in the new systems. Would anyone like to ensure that the Model I is not forgotten? LFH**

6. I realise the difficulties that are faced in making the Group a viable organisation, and it is easy to criticise when one is not involved oneself. However, I am willing to help in any way necessary. This does not in any way alter my opinion that the Group is a nice cosy little organisation dedicated to the benefit of a few "experts".
** I have indicated a few areas. LFH**

7. I realise that the scope is greater in the USA but can see no reason why the Group and Newsletter cannot aim for the standard and content of magazines like 80-US, and also aspire to a formal constitution (implemented) and organisation which allows members some say in what goes on.
** We just do not have the facilities to produce anything like 80-US. This is merely a newsletter and I produce it virtually single-handed.

We have a formal constitution that was agreed at the A.G.M. held earlier, and all our activities are in line with that constitution (copies available from Brian Pain). Any Member is at liberty to call an Extraordinary General Meeting at any time, in accordance with the Constitution, if he or she would like to change things. LFH**

I hope you find my comments useful and understand that they are given in the hope that the service to TRS-80 Users can be improved, as I feel that we are in danger of being swamped in this country by the "dreaded" PET, especially if the ration of programs for the PET as opposed to the TRS-80 publishd in the commercial magazines continues. The three main magazines in this country seem to be very much PET orientated.
** Probably because there are a lot more PETs around in the UK. LFH**

C.T.Dempsey

From Bill Cowhig

As you see I have embarked upon Scripsit and I find it extremely good and I am immensely pleased with it. However, all was not well at first, and it may be of interest to have an account of my experiences. First of all, having read the dire warning about lower case, I felt I had to have it done by Tandy. Alas, they took twice the time they had promised,but that was a minor matter. Ever since having it back, I have experienced a most irritating loss of screen lock from time to time (the whole screen races upwards); it is doing it now and the only cure is to tap the keyboard case (TAP! TAP!) which invariably stops it for a time.It is obviously some kind of bad contact (I note the experience of other readers who have had things done by Tandy). However, having had the lower-case mod fitted, I bought Scripsit.....

Quite clearly, Scripsit would not operate with my Anadex and RS232 serial interface via the output cassette port. Having tried all things, I took it to Tandy, who suggested that the only way it would work serially would be via the type of serial interface they fit in the Expansion Interface, needless to say at an unacceptably high cost. The alternative was to use the Anadex via a parallel cable, and since this could well have advantages anyway, I left my equipment with them to try. Alas their attempts led to nothing except weird print-outs, and they concluded that the Anadex was one of the printers with which the Scripsit would not work. They referred to a Memo from the U S A office which said that Scripsit would not work with certain printers.

I felt doubtful about this conclusion and hence I obtained a parallel cable, and spent some time at home studying the Anadex manual, checking contacts etc , and finally got it to work quite satisfactorily. Except of course for the screen instability, and at this moment I feel I have lost so much computor time that I do not want to return it to Tandy. I should have added that I use a normal TV set for Monitor and the usual R F modulator interface. The instability never seemed to appear when the keyboard was being used at Tandy, where the output went straight into video. Any ideas ? The additional snag is that Tandy have sealed the case with a label which makes the comment that the Warranty is lost if one looks inside!

I agree with you wholeheartedly that it is a pity that such an excellent package does not include the ability to underline. Is this a basic limitation related to TRS80 graphics ? Are ther some word processors which do underline - presumably so.

I am sorry that it does not appear possible to print double size characters as one can do with the Anadex by 'LPRINT CHR$(14)"VVVV"'. I have used a double sized heading, but only by printing it in BASIC and then switching over to Scripsit for the main text - a messy and timeconsuming procedure. On one occasion ,I omitted to cancel the double size by CHR$(15) and found somewaht to my surprise that when Scripsit printed out, it printed wholly in double size. Food for thought! But I feel it is of doubtful practical value.

Another snag is that it is not possible to obtain the number of lines in the document one is typing (by ?C) because this does not add in the spaces between paragraphs. This is a great pity becasuse if it did, one could arrange to print out on exactly the right length of page and hence economise in paper. The result of '?C' does of course help in this respect since one can guess the addition needed for spaces. But it would have been nice to do it exactly.

One thing which is not discussed explicitly in the manual is the corruption of the text which can occur. I enclose an example of it, and you will see that letters can be altered and spaces between words can at times be filled by random junk. I have not found out exactly under what circumstances it happens, but it seems to correlate with inserting a large amount of extra text. Certainly, it does not seem to happen if one is typing straightforwardly as in a letter or report. It would have been helpful if the manual had included more 'do not.....'s.

I found the diagram on page 14 confusing, or rather the description of the BM equal to 60. BM is obviously the distance from the top of the page, and the actual width of bottom margin is (PL-BM) which is (66-60)=6 in this example. In practice, I feel that the variable is most often going to be the text area length (at any rate for those of us who find paper expensive) and this text length is in fact (BM-TM). All is well if one understands what is being talked about!

I certainly hope that Scripsit will form the central core of a Word Processing system which will be added to and expanded in scope.

Postscript

The most definite circumstance which leads to corruption of the text arises if one returns to some point in the text and then uses CONTROL/INSERT/LINE and then adds a lot extra. Everything then becomes a terrible mess. All is well if one uses the INSERT BlOCk procedure. This obviously is not the complete story, and I feel a useful thesis could be written about corruption of the text and how to avoid it.

For some time, I have contemplated changing my Anadex for a 'golf ball' type of printer. The Anadex has been quite perfect and has never let me down in any way. But the oddity of the type is a bit of a disadvantage, particularly when printing out various things for my wife, who is an English literature lecturer. Hence I have looked longingly at the adverts by the Bristol firm for the I B M printer, 'second hand but checked by I B M engineers'. Do you know anyone who has one ? And I wonder how reliable they are! I am certainly thinking of trying to sell my Anadex and to buy one of the I B M s to replace it. But I hesitate! Comments would be welcome.

I note that some people have chosen their printer because of the accessories it can possess. For example, the abilityto print out on separate sheets of paper. This surprises me, since I would not have thought it needed a great inventor to design accessories for the Anadex which would enable it to accept sheets of paper and the like. Perhaps I should write to Anadex, but any information on this topic would be welcome. I would like to type envelopes on the computor instead of writing them by hand.

**** The memory corruption problem is dealt with in this issue. One or two other Members have mentioned it, and my solution seems to work. LFH****

Bill Cowhig

From Peter McCormack

HALF THE FUN OF BEING A TRASH-EIGHTY OWNER SEEMS TO BE IN USING HARDWARE, MEDIA AND UTILITIES FROM SOURCES OTHER THAN TANDY.

IN THE YEAR AND A HALF I'VE HAD MY COMPUTER, IT HAS GROWN FROM MINIMUM LEVEL 1/4K TO IT'S RECENTLY ATTAINED CONFIGURATION OF 48K, 2 DRIVES PLUS PRINTER. I CAN'T SAY THAT MY EXPERTISE HAS GROWN AT THE SAME RATE ALTHOUGH MY CONFIDENCE CERTAINLY HAS.

WHAT I'M GETTING AROUND TO IS THAT, IF I KNEW AT THE OUTSET WHAT I KNOW NOW, I COULD HAVE SAVED A LOT OF CASH IN EXPANDING MY SYSTEM.

WHEN YOU DON'T REALLY KNOW WHAT A DISK OPERATING SYSTEM IS, YOU CAN'T SERIOUSLY CONSIDER NON-TANDY SOURCES FOR LOW COST DISK DRIVES.

HOWEVER, BY THE TIME I WAS READY TO BUY A PRINTER, ALL THAT WAS HAPPILY BEHIND ME AND THAT'S HOW I CAME TO BE WRITING TO TELL YOU ABOUT MY OKI MICROLINE 80 PRINTER.

FOR #499.00 PLUS V.A.T. IT HAS PIN AND PINCH FEED, CAN HANDLE 8.5IN. ROLLS, 9.5IN. FAN-FOLD, SINGLE SHEETS AND HAS AN OPTIONAL TRACTOR UNIT.

IT PRINTS 5, 10 OR 16.5 CHARACTERS PER INCH (16.5 CPI GIVING 132 COLUMNS), AND CAN PRINT AT 6 OR 8 LINES PER INCH. ALL THESE ARE UNDER SOFTWARE CONTROL. THERE IS A 96 ALPHA NUMERIC CHAR. SET AS WELL AS 64 GRAPHIC SYMBOLS AND 64 KANA CHARACTERS (I DON'T KNOW WHAT THEY ARE BUT THAT'S WHAT IT SAYS).

I WAS SURPRISED AT THE CONNECTION DIFFICULTIES YOU DESCRIBED IN THE NEWSLETTER WITH YOUR 730 - I BOUGHT THE PRINTER FROM A LOCAL EXIDY DEALER AND, ALTHOUGH I HAD EXPECTED TO HAVE TO MEDDLE A BIT, IT TURNED OUT TO BE "PLUG-IN AND GO." WHEN I GET A LOWER CASE MOD. I'LL BE ABLE TO EXPLOIT THE PRINTER MORE FULLY FROM WITHIN SCRIPSIT.

Peter McCormack

**** Kana characters, are, I think, a simplified Japanese script. LFH****

From John Berry

I am writing to say three things. Firstly how much enjoyed the weekend workshop, and how valuable I found it Secondly to enclose a cheque for #8.50 for the six back issues of the Newsletter, and the current issue. Thirdly to extend my offer to the Group of the High Speed clock board (advertised in this month's PCW) at #20.00 + VAT instead of the advertised price of #30.00 + VAT, for whic I enclose a descriptive leaflet.

John Berry,

16 The Green,

Epsom KT17 3JN

From Alan Farr.

Following your "Sad Story" in the April Newsletter, I feel that it may be appropriate to record the courtesy and friendly service at Tandy Coventry. In passing, may I add that Ted Russel at Wednesbury has been extremely helpful and patient with telephone queries.

Alan Farr.

From Derek Cowton.

I have had my TRS-80 for a little over a year now, starting with Level I - 4K and over the past year upgrading myself to Level II - 48K. The only problem with upgrading and getting new bits to plug in is, for me, I get completely lost each time. Therefore, when I attended the recent Workshop which Brian so kindly organised, and as a last act of defiance to my wife, I bought my first floppy disk, it came as no real surprise to me to find that I am now completely lost. Does anybody know of a book which will take me step by step on how to use a floppy? No doubt when I get round to writing my little bit for next month's Newsletter I may have fathomed a little bit of it out, but at this moment nothing works.
** Try the Tandy Disk BASIC Instructional Course - on diskette. LFH**
Another problem I have is when I try to autoload using my cassettes, if there is anything wrong with the data I sometimes cannot get out of this mode. Before getting my interface I could of course press the Reset button which meant I still kept the resident program, however, now that I have the interface this doesn't work - what can I do?
Is there anybody out there who can help me?

** It is possible to modify the Expansion Interface to obviate this problem; send a SAE for details. LFH**

Derek Cowton,
14 Fitzwilliam Gate,
Sheffield, S1 4JH.

From D.F.Booth

We have recently found a need to interface directly into a Tandy from a terminal via an RS-232 interface. We have bought a Tandy RS-232 and it runs successfully using a terminal program, but what we would like to do in fact, is to input and output via the RS-232 through the terminal but still actually do the computing within the Tandy. I feel

sure this is a relatively simple modification of the terminal program, and wonder if any of the Members has attempted something similar or whether you could put me in touch with somebody who might be prepared to write a suitable program.

D.F.Booth,
Computer Manager,
Paper and Board Division,
PIRA,
Randalls Road,
Leatherhead,
Surrey KT2 7RU.

FURTHER COMMENTS ON SCRIPSIT

Following my favourable remarks concerning SCRIPSIT in the last issue, a member with a serial printer driven by the Small System Software serial interface purchased the package, and was rather annoyed when the printer did not function. Without appropriate patches SCRIPSIT will only drive a serial printer via the Tandy RS-232 interface

SCRIPSIT will only run under TRSDOS. I suppose this is to be expected - the Electric Pencil will only run under TRSDOS also, unless it is modified.

If you open a block and then try to delete the marker without closing the block you will get an error message. This puzzled me for a while into I realised that I had to close the block first before deleting the marker. I cannot see the reason for this, but I suppose whoever did the programming had their reasons, and wasn't bothered about the unfortunate user. There is no mention of this in the documentation.

Apparently, SCRIPSIT will not work with all parallel printers. Tandy have a memo from the States to this effect.

Leon Heller

UNUSUAL PROBLEM

I recently experienced occasional RAM corruptions which were most apparent when using one of my text editors, or SCRIPSIT. The symptoms were strange substitutions of characters or assembly errors flagged when there was obviously nothing wrong with the code I was assembling.

Memory tests showed nothing was wrong with the RAM and I originally put it down to electrical interference, until I found that it could sometimes be prevented by wiggling the expansion interface connector to the keyboard before using the system. What was causing the trouble was

oxidation of the pads on the expansion interface where it mated with the connector. Gentle cleaning of the pads with an eraser removed the oxide coating and cured the problem. Tandy really ought to use gold plating on these pads, rather than tin, as connectors are a weak point of any system at the best of times.

Brian Pain's new Expansion Interface was also giving problems, and the treatment mentioned above cured those, also.

Whilst I am on the subject of connectors, if you look at the expansion interface cable you will notice a silvery wire running along one edge. This is an earth connection on to a ground plane, and the connector should be placed so that the earth connection is on the RIGHT, otherwise the ground plane will not be grounded! This does not apply to the buffered cable, only to the cables fitted to the new interfaces.

Leon Heller

ADVENTURE CORNER

Nick Robinson would like to start a section of the Newsletter for Adventure fans, enabling devotees of the game to exchange information about the various games. Something along the lines of : "I'll tell you how to summon the medium if you will tell me how to climb the chimney." I suppose. Nick's address is:-

Dr. N.D.P.Robinson,
7 St. Barnabas St.,
Jericho,
Oxford OX2 6BG.

Leon Heller

Eight inch disk drives on TRS-80

Firstly let me say I am sorry for the delay. This came about due to an intermittant hardware fault and the pressure of work that prevented me from solving it.

I will break this into two parts, the first of which will list the modifications needed and a cross reference of Tandy signals and disk signals.

Modifications

1. Replace C48 in expansion interface with 47 mf
2. Modify drive so that when it is selected the head is loaded. i.e. actuated
3.

DSI-4	Disk select 1 - 4
Motor On	Not used by 8" drives as motor is syncronous a/c motor and is on all the time.
Step	Tells head stepper motor to step
Direction	Tells head stepper motor the direction to step i.e. forward or reverse
Write Gate	Enables write logic on drive
Write data	This is the data that is written but only when the write gate is active
Read Data	This is the composite data that comes from the disk drive, this signal consists of a clock and data pulses intermixed this is then decoded by the 1771B chip in the expansion interface
Write protect	This input tells the 1771 if the write protect notch is covered or uncovered
Index pulse	This is the reference point on the disk that is used to initiat the starting point of each track.
Track zero	This indicates that the head is positioned over the out-side track.

DS1-4	Pins 10,12,14 & 32
Motor On	Pin 16
Step	Pin 20
Direction Sel	Pin 18
Write Gate	Pin 24
Write Data	Pin 22
Read Data	Pin 30

Write Protect	Pin 28
Index Pulse	Pin 8
Track Zero	Pin 26
Ground Earth	Pins 33,15,13,11,17,21,19,23,25,1,3, 5,7,31,29,9 & 27

Pins 2,4,6 & 34 are not used

N.B. Most 8" disk drives rotate at 360 R.P.M. Unless you wish to re-write your D.O.S. you must reduce this to 300 R.P.M.

Second part, most 8" drives require an external power supply that will deliver 24 volts for the stepper motor and head actuation solenoid, ± 12 volts for the read/write electronics and + 5 volts for the logic functions, the current rating will be specified by the drive manual.

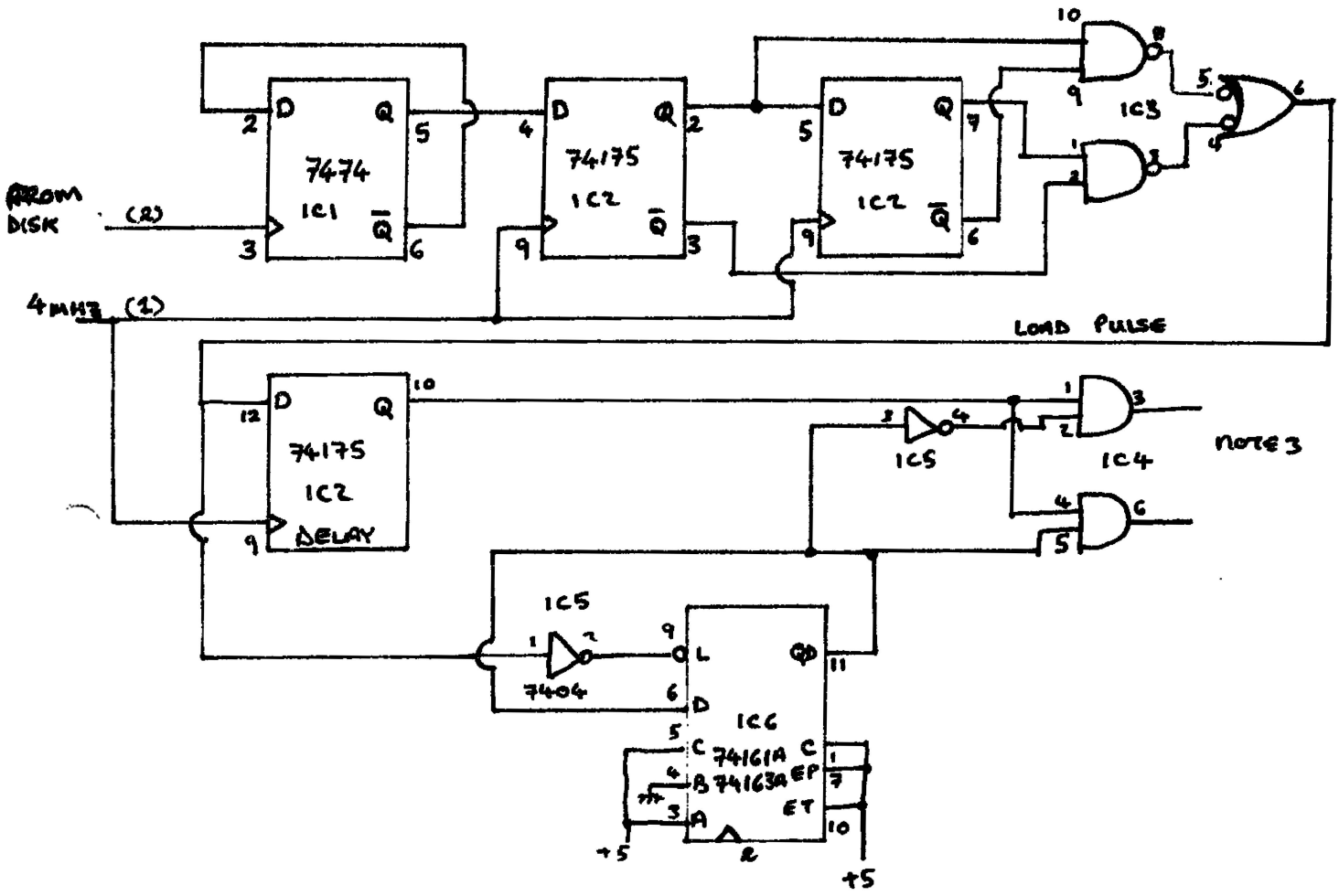
If you wish to fit on external data seperator to your disk system the following circuit maybe of interest to you.

(see attached sheet)

The intermittant fault that I mentioned at the start was caused by the Tandy RS232 interface. The symptoms of the fault were intermittant memory errors and disk errors usually when making a copy of a disk, it was found that the 5 volts in the expansion interface was spiking down to 2.5volts this was caused by the dc to dc conventer on the 232 interface board this device was hot enough to remove the skin from the end of my finger, this is the second time this device has gone bad on my system and it seems to be a common fault with this board and can be deviated by improved cooling of this interface board.

BOB PRIVETT

DATA SEPERATOR FOR 5" or 8" DRIVES.



1/ for 5" disk drives use 2MHZ clock Z27 pin 1

1a/ for 8" disk drives use clock = 2 times clock on pin 24 Z34

2/ from Z23-10

3/ to Z34 pins 26, 27

For further information I can be contacted via Brian Pain

Bob Privett.

A NEW PRINTER FROM CENTRONICS

Centronics (they make the various Tandy printers) have just announced the 737 printer. This is a compact, low-cost matrix printer that is claimed to provide letter-quality output at 100 cps, and at a cost of about $1000 - perhaps $600 in the UK!

Several of the printer manufacturers have been rumoured to be working on this type of printer, but Centronics appear to be the first to actually go into production with one.

The quality will not be quite up to daisy-wheel or golf-ball standards, of course, but it looks like a winner for general correspondence, report writing etc.

Leon Heller

SCREEN TO MEMORY AND MEMORY TO SCREEN TRANSFER

These two programs enable one to send pre-written text from screen to memory and 'zap' it back to the screen again in a flash.

To record the entire contents of a TRS-80 screen requires 1024 bytes, however it is not really necessary to record spaces " " or blanks (Hex codes 80 or 20). My program only records visible data from the screen plus its location, thus, in most cases, saving a considerable amount of memory.

By the way, I have a 32K Level II Newdos system. If there is any difficulty in understanding how these programs work or how they can be tailored to suit your own system, I shall be pleased to provide enlightenment in future issues.

One thing I would find really useful, and which might provide some of our members with an interesting intellectual exercise is a program which would convert a machine language routine to a BASIC program with a FOR/NEXT statement to read the decimal equivalents of the M/C language routine from a DATA entry. Line numbers would have to be entered and the whole shooting match executable from a BASIC program.

Any takers?

Angus Ellefsen.

```
                00100 ;          ********************************
                00110 ;          *  SCREEN TO MEMORY TRANSFER   *
                00120 ;          ********************************
                00130 ;
                00140 ;           PROGRAMME NAME - SCRNMEM/CMD
                00150 ;
                00160 ;          BY A. O. ELLEFSEN.  4TH MAY '80
                00170 ;
                00180 ;
B000            00190            ORG     0B000H  ;START OF PROGRAMME
B000 CD7F0A     00200            CALL    0A7FH   ;USR LINK
B003 110000     00210            LD      DE,00H  ;ZERO BYTE COUNT REGISTER
B006 21FF3B     00220            LD      HL,3BFFH        ;PREPARE 1ST SCRN. LOC.
B009 DD210090   00230            LD      IX,9000H        ;1ST LOC. MEMORY AREA
B00D 23         00240 LOOP1      INC     HL      ;ADVANCE SCREEN LOCATION ADDR.
B00E 7C         00250            LD      A,H     ;HI BYTE TO CHECK FOR FULL SCRN.
B00F FE40       00260            CP      40H
B011 2009       00270            JR      NZ,LINK
B013 3E01       00280            LD      A,01H   ;RESET ZERO FLAG IF SET
B015 C601       00290            ADD     A,01H   ;  "     "    "   "   "
B017 7D         00300            LD      A,L     ;2ND CHECK FOR END OF SCAN
B018 FE00       00310            CP      00H
B01A 281B       00320            JR      Z,FINISH
B01C 7E         00330 LINK       LD      A,(HL)  ;SEE IF SCREEN LOC. IS " "
B01D FE20       00340            CP      20H     ;=" "
B01F 28EC       00350            JR      Z,LOOP1 ;IGNORE IF " "
B021 FE80       00360            CP      80H     ;DITTO
B023 28E8       00370            JR      Z,LOOP1
B025 13         00380            INC     DE      ;INCREMENT BYTE COUNT
B026 DD7400     00390            LD      (IX),H  ;HI BYTE SCRN. LOC. TO MEM
B029 DD23       00400            INC     IX
B02B DD7500     00410            LD      (IX),L  ;LO BYTE SCRN. LOC. TO MEM
B02E DD23       00420            INC     IX
B030 DD7700     00430            LD      (IX),A  ;SCRN. DATA TO MEM
B033 DD23       00440            INC     IX      ;INCREMENT MEMORY LOCATION
B035 18D6       00450            JR      LOOP1
B037 62         00460 FINISH     LD      H,D     ;PREPARE TO TRANSFER BYTE COUNT
B038 6B         00470            LD      L,E     ;  VIA HL TO USR ARGUMENT
B039 C39A0A     00480            JP      0A9AH   ;JUMP BACK TO BASIC
                00490 ;NUMBER OF BYTES ON SCREEN IN REGISTERS HL.
B000            00500            END     0B000H
00000 TOTAL ERRORS


FINISH B037 00460   00320
LINK   B01C 00330   00270
LOOP1  B00D 00240   00350 00370 00450
```

```
                00100 ;          *********************************
                00110 ;          *  MEMORY TO SCREEN TRANSFER    *
                00120 ;          *********************************
                00130 ;
                00140 ;           PROGRAMME NAME - MEMSCRN/CMD
                00150 ;
                00160 ;          BY A. O. ELLEFSEN.  4TH MAY '80
                00170 ;
                00180 ;
B100            00190           ORG     0B100H
B100 CD7F0A     00200           CALL    0A7FH    ;USR LINK
B103 44         00210           LD      B,H      ;INSERTS BYTE COUNT RETURNED FROM
B104 4D         00220           LD      C,L      ;BASIC FROM HL TO BC REGISTERS
B105 DD210090   00230           LD      IX,9000H         ;START OF MEM. LOC.
B109 DD6600     00240 LOOP      LD      H,(IX)   ;GET HIGH ORDER BYTE OF SCREEN
B10C DD23       00250           INC     IX       ;  LOCATION
B10E DD6E00     00260           LD      L,(IX)   ;GET LOW ORDER BYTE OF SCREEN
B111 DD23       00270           INC     IX       ;  LOCATION
B113 DD7E00     00280           LD      A,(IX)   ;GET DATA FROM MEMORY
B116 77         00290           LD      (HL),A   ;SEND CHARACTER TO SCREEN
B117 DD23       00300           INC     IX
B119 0B         00310           DEC     BC       ;DECREMENT BYTE COUNT
B11A 79         00320           LD      A,C      ;(CHECK TO SEE IF
B11B FE00       00330           CP      00H      ;(BYTE COUNT IS ZERO
B11D 20EA       00340           JR      NZ,LOOP  ;(
B11F 3E01       00350           LD      A,01H    ;(RESET ZERO FLAG IF REQU.
B121 C601       00360           ADD     A,01H    ;(   "      "    "   "   "
B123 78         00370           LD      A,B      ;(
B124 FE00       00380           CP      00H      ;(
B126 20E1       00390           JR      NZ,LOOP  ;(
B128 C9         00400           RET
B100            00410           END     0B100H
00000 TOTAL ERRORS


LOOP   B109 00240   00340 00390
```

```
10 ' ************************************************************
20 ' * PROGRAMME TO DEMONSTRATE MEMSCRN AND SCRNMEM ROUTINES *
30 ' ************************************************************
40 '
50 '
60 '
70 DEFUSR1=&HB000
80 A=USR1(X)
90 CLS
100 PRINT"BYTE COUNT =";A;"   MEMORY USED = ";A*3
110 INPUT"BYTE COUNT REQUIRED";A
120 Q$=INKEY$
130 IFQ$=""THEN120
140 IFQ$()"@"THEN120
150 DEFUSR2=&HB100
160 CLS
170 Y=USR2(A)
180 GOTO180
```

AN INTERESTING APPLICATION

MY AQUISITON OF THE TRS-80 WAS PROMPTED BY A GENERAL INTEREST IN MICRO-COMPUTERS AND NOT BY A NEED SEEKING A SOLUTION. STARTING WITH A 4K LEVEL 1 MACHINE THE SYSTEM GREW SOMEWHAT TO A 48K LEVEL II MACHINE, TWIN DISCS AND PRINTER.

IT QUICKLY BECAME APPARENT THAT IT WOULD BE AN IDEAL TOOL TO DEAL WITH MANY OF MY DAILY PROBLEMS INVOLVING REPETITIVE CALCULATIONS USING MULTIVARIABLE GRAPHS OR STANDARD OFFICE PROCEDURES INVOLVING LONG PERIODS OF BASICALLY BORING PAPERWORK.

I SHOULD EXPLAIN THAT I AM INVOLVED IN THE MANAGEMENT AND DAILY OPERATION OF AN EXECUTIVE AIRCRAFT OPERATING THROUGHOUT EUROPE & UK. THE PROFESSIONAL OPERATION OF A RELATIVELY SOPHISTICATED AIRCRAFT INVOLVES, IN SMALLER MEASURE, THE SAME PROBLEMS AS AN AIRLINE OPERATION BUT LACKS THE MANY DIFFERENT DEPARTMENTS DEALING WITH MAINTENANCE PROGRAMMING, FLIGHT DISPATCH, COSTING, FLIGHT OPERATIONS ETC.

THE RESULT IS OF COURSE, THAT TO DO AN EFFICIENT JOB THE COMPANY CHIEF PILOT BECOMES A VERY BUSY 'JACK OF ALL TRADES' STRUGGLING WITH VARYING SUCCESS WITH THE USUAL GENERAL OFFICE PROBLEMS PLUS THE DAILY TECHNICAL PROBLEMS ASSOCIATED WITH THE FLYING SCHEDULE.
IT WOULD NOT BE DIVULGING COMPANY SECRETS TO SAY THAT THE OPERATION OF A COMPANY AIRCRAFT IS NOT A CHEAP UNDERTAKING. AIRCRAFT OF ALL TYPES ARE HEAVY CONSUMERS OF EXPENSIVE ENERGY IN THE FORM OF FUEL. THIS CAN BE WORSENED CONSIDERABLY BY INADEQUATE FLIGHT PLANNING. FORTUNATELY AIRCRAFT PERFORMANCE IS VERY FULLY DOCUMENTED IN GRAPHICAL FORM. FOR A PARTICULAR FLIGHT THE MANUAL COMPUTATION OF THE BEST FLIGHT LEVELS FOR MAXIMUM ECONOMY CAN TAKE AN HOUR OR MORE AND BECAUSE OF THE MANY OTHER PRIORITY COMPUTATIONS TO BE DONE , THESE CALCULATIONS TEND TO BE DONE BY 'RULE OF THUMB'.

ONE OF MY FIRST EFFORTS WAS TO WRITE A PROGRAM WHICH, USING DATA FROM THE AIRCRAFT PERFORMANCE GRAPHS AND FUEL AND MAINTENANCE COST DATA ENTERED FROM THE KEYBOARD, CALCULATES THE MOST ECONOMIC FLIGHT LEVELS TO FLY. THIS PROGRAM WORKS VERY WELL AND AFTER BEING GIVEN TEMPERATURES, WIND COMPONENT, FUEL AND MAINTENANCE COST, IN A FEW SECONDS WILL PRODUCE A HARDCOPY OR SCREEN PRINTOUT OF THE OPTIONS AVAILABLE TOGETHER WITH THE TOTAL COST FOR THE TRIP. THERE WOULD NEVER BE THE TIME FOR THIS 'BEFORE FLIGHT' WORK IN THE NORMAL WAY.

OF COURSE, THE ABOVE PROGRAM DEPENDS TO A LARGE EXTENT ON ACCURATE UP-TO-DATE COST INFORMATION. THIS REQUIREMENT CAN NEVER BE MET BY THE COMPANY'S LARGE COMPUTER OR ACCOUNTS DEPARTMENTS. I THEREFORE DEVISED A PROGRAM WHICH SIMPLY REPLACED THE INVOICE CLEARING BOOKKEEPING SYSTEM WE OPERATED AND ANALYSES IN A MULTIPLICITY OF WAYS THE INFORMATION FED IN. AS A RESULT I CAN IN A FEW MINUTES COME UP WITH AVERAGE FUEL AND LANDING FEE COSTS OVER ANY PERIOD SPECIFIED, COMPARE COSTS PERIOD AGAINST PERIOD, CALCULATE MAINTENANCE COSTS PER HOUR AND SO ON. IN ADDITION, ARE MANY OTHER FACILITIES WHICH ENABLE A THOROUGH ANALYSIS OF THE COSTS OF THE WHOLE OPERATION. I AM QUITE SURE I HAVE RE-INVENTED THE WHEEL SEVERAL TIMES IN THE PROCESS BUT I DO NOT REGARD THIS AS TIME WASTED SINCE SOLVING THE INHERENT PROGRAMMING PROBLEMS PROVIDED ME WITH A WAY OF LEARNING 'BASIC' SECOND TO NONE. MARKS OUT OF TEN CANNOT COMPARE WITH THE SATISFACTION OF A SUCCESSFUL PROGRAM AS A RESULT OF A PROBLEM SOLVED.

THE TRS-80 ALSO PROVED IDEAL FOR RELATIVELY SIMPLE PROGRAMS WHICH COULD SAVE UNEXPECTED AMOUNTS OF TIME.
SUCH A PROGRAM WAS ONE I WROTE FOR CALCULATING THE CENTRE OF GRAVITY AND LOADING INFORMATION FOR OUR AIRCRAFT. THIS WOULD NORMALLY BE DONE BEFORE EVERY FLIGHT TO ENSURE THE AIRCRAFT IS CORRECTLY TRIMMED AND LOADED.THE CALCULATIONS ARE QUITE STRAIGHT FORWARD BUT SOME ITEMS SUCH AS FUEL HAVE A MOMENT ARM WHICH VARIES NON-LINEARLY AS THE AMOUNT CHANGES. THE APPROPRIATE DATA HAVE TO BE EXTRACTED FROM THE AIRCRAFT DOCUMENTS AND INCLUDED IN THE PROGRAM WHICH INTERPOLATES THE RESULTS WITH ACCURACY. IN A FEW SECONDS IT,IS POSSIBLE TO TRY OUT VARIOUS WAYS OF LOADING THE AIRCRAFT TO CHECK THE C OF G POSITION AND TO ADJUST DISPOSABLE ITEMS OF LOAD UNTIL A SATISFACTORY BALANCE IS ACHIEVED, AN OPERATION WHICH IN CRITICAL CASES COULD TAKE AN HOUR OR MORE USING USUAL METHODS.

BECAUSE OF THE NEED TO FULLY UNDERSTAND ALL AIRCRAFT SYSTEMS BOTH FROM THE NORMAL AND EMERGENCY VIEWPOINTS AIRCREW ARE, AMONGST THEIR MANY OTHER REGULAR CHECKS,REQUIRED TO DEMONSTRATE THEIR CURRENT TECHNICAL KNOWLEDGE OF THE AIRCRAFT THEY FLY.THIS USUALLY TAKES THE FORM OF REGULAR TECHNICAL EXAMINATIONS.THE EXAM CONSISTS OF PERHAPS 100 QUESTIONS WITH MULTICHOICE ANSWERS. IT SEEMED TO ME THAT THIS MIGHT BE ANOTHER OPPORTUNITY FOR THE TRS-80, THIS TIME AS INVIGILATOR. A PROGRAM WAS WRITTEN STORING THE QUESTIONS ON DISC,WITH QUESTIONS AND ANSWERS BEING OFFERED IN RANDOM ORDER TO THE EXAMINEE. AT THE END OF THE EXAM THE NUMBER OF CORRECT ANSWERS AND PERCENTAGE MARKS ARE SCREENED AND CAN BE STORED ON DISC FOR EACH PERSON. SINCE THE EXAMINEE CAN SEE WHICH ANSWERS WERE WRONG,BUT IS UNABLE TO HAVE AN IMMEDIATE SECOND CHANCE HE IS ENCOURAGED TO RE-STUDY THOSE AREAS IN WHICH HE IS WEAK.I CHECK MYSELF USING THIS SYSTEM AND FIND IT QUITE AN ENJOYABLE WAY OF KEEPING 'AU FAIT'.

IN ADDITION TO THE ABOVE,I'VE WRITTEN SEVERAL OTHER PROGRAMS CONNECTED WITH MY WORK.BUT THOSE MENTIONED GIVE SOME IDEA OF THE USEFULNESS OF THE TRS-80 IN THE SMALL TECHNICAL/COMMERCIAL OFFICE. I HAVE CERTAINLY BEEN VERY IMPRESSED BY IT'S PERFORMANCE.

ON THE DOMESTIC SCENE, MY CHILDREN ARE HIGHLY COMPUTER ORIENTED AND GREATLY ENJOY PLAYING WITH 'DAD'S TOY'. I NEVER CEASE TO BE AMAZED AT THE VARIETY OF INTERESTS OF OUR TRS-80 GROUP MEMBERS AND THE EXTREMELY CLEVER WAYS IN WHICH MANY USE AND PROGRAM THEIR COMPUTERS.THERE SEEMS TO BE ALWAYS SOMETHING NEW TO LEARN ABOUT THIS INCREDIBLE 'BOX OF TRICKS' AND I LOOK FORWARD TO THE NEXT FEW YEARS WITH INTEREST,HOPING TO MEET AND PICK THE BRAINS OF COMPUTER BOFFINS AND AMATEURS ALIKE.PERHAPS,CONTRIBUTING SOMETHING TO THE GROUP ALONG THE WAY.

David Allerton-Austin

SUPER GRAPHICS EDITOR

IF ANY-ONE HASN'T YET HEARD ABOUT THE AMAZING

S U P E R G R A P H I C S E D I T O R

THEN YOU'RE NOT UP TO DATE WITH THE S-80

ITS A GREAT LITTLE PROGRAM
WRITTEN IN BASIC THAT ALLOWS YOU TO EDIT
GRAPHIC CODES DIRECT INTO YOUR BASIC PROGRAM
WITHOUT THE HASSLE OF PEEKS POKES MONITOR3
OR WHAT EVER TECHNIQUE YOU'VE USED BEFORE

AS ISSUED IT IS SET UP FOR LEV2 ONLY BUT
WITH THE MODS GIVEN BELOW IT WILL WORK
IN LEVEL3 OR 4 OR EVEN DOS

TO USE IT. EITHER HAVE IT IN MEMORY BEFORE YOU
KEY IN YOUR PROGRAM
OR USE THE MERGE FACILITY IN LEV4 OR DOS TO
TACK IT ONTO YOUR PROGRAM

YOU'RE THEN SET UP TO TELL IT WHICH BASIC LINE NO
YOU WISH TO EDIT; AND IT WILL FIND THAT LINE
TELL YOU WHAT'S THERE AND ALLOW YOU TO EDIT

THE ALTERED AND NEW LINES GIVEN BELOW WILL ADD THE
FACILITY TO KEY IN HEX IN THE FORMAT 9FH

```
60010 INPUT"WHICH LINE NUMBER";N:E=PEEK(16548)+PEEK(16549)*256:I
FN)59999THEN60030


60080 X$="":INPUTX$:IFX$=""THEN60120ELSEIFASC(X$)=91ANDI)E+4 THE
N I=I-1 ELSE60095


60095 IFRIGHT$(X$,1)()"H"THEN60100ELSEX$="0"+X$:L=LEN(X$):X1=ASC
(MID$(X$,L-2,1)):X2=ASC(MID$(X$,L-1,1))
60096 IFX1(58THENX1=X1-48ELSEX1=X1-55
60097 IFX2(58THENX2=X2-48ELSEX2=X2-55
60098 X$=STR$(X1*16+X2)
```

Laurie Shields

IT'S GREAT FOR REM PACKING

THE FIRST FOUR MONTHS

Equipment: Level II, 48K, 2 Disc Drives, Line Printer III, Voxbox

My previous experience with computers was eight years ago when I was programming the then new generation of mini machines.

Even after four months I am still impressed by the TRS-80 in terms of speed, capacity, and hardware reliability.

I am less impressed with the lack of information concerning interesting and sometimes vital areas of the software operating system.

However I have seen this as a challenge and discovered a lot about the system as a result.

I am self-employed (my business is not connected with computers at present) and my first project was an accounts package for my business.

I wrote this in BASIC making full use of the disk filing system. I hold the full text of every input and output on disk and I found the random access system very easy and economic to use.

I have also been experimenting with the VoxBox. The manual with the device says nothing about the technical operation and less about the driver routine.

I wanted to construct a series of trained driver modules saved on disk and called into core under BASIC. Apart from going to TRSDOS and LOADing manually there seemed no speedy way of doing this. So I wrote an assembly level disk Read/Write routine which can be called from BASIC to transfer any System Routines to and from Disk. The Technical information in the TRSDOS manual proved excellent for this purpose.

The VoxBox driver is supplied in a 16/32/48K form, but there are dangers in writing into the top of core which is used for string space and I think the USR routine return address stack (and many other things for all I know). I examined the drivers and have now written a short BASIC program which examines two in-core drivers (say sp32 and sp48) and then generates a third version anywhere required with all the correct absolute addresses.I can now have more than one driver in core at a time(with different trained vocabularies) and I can call through Basic for other trained drivers from Disk.

I am now experimenting with simple arithmetic and sentence construction entirely under voice control.

The next step is to bring the accounts package under voice operation.

The VOXBOX is a simple device and it is easily fooled. Also it can be unpredictable (or perhaps it is my voice which is unreliable) and it is necessary to build in commands like 'ENTER' and 'DELETE' to avoid entering incorrect data.

I can display the text of any driver and selectively re-train phrases which get consistently misunderstood. Also I am learning to use words which have good characteristics for the VoxBox e.g. I say 'minus' and not 'subtract' and emphasise the 'v' in five to make it different from nine.

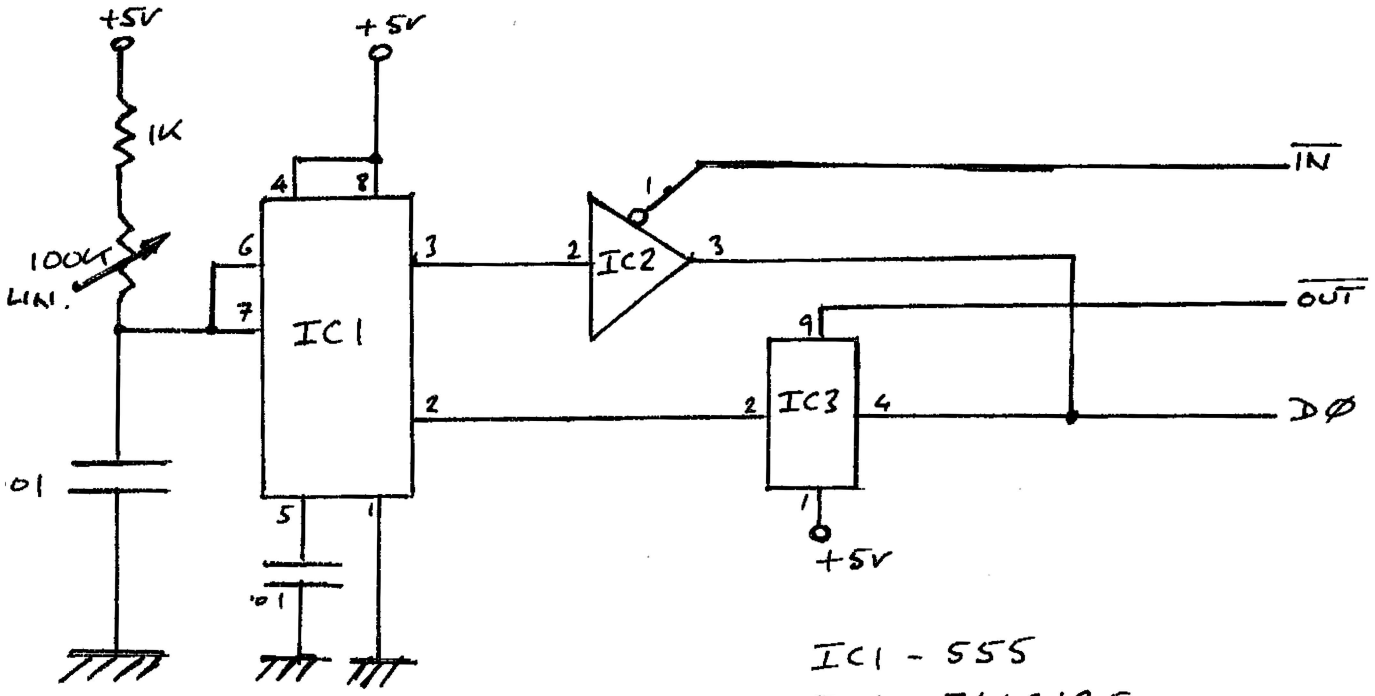
If anyone would like further technical details they are welcome to contact me.

P. J. Norris 053-183-428

GAMES PADDLE INTERFACE

The following circuit (with appropriate software) enables one to control a graphics block on the screen via a potentiometer. Two such circuits would enable two players to have a control each, or, if a joystick is available, allow full two-dimensional control.

The operation of the circuit is quite simple. IC1, a 555 timer connected as a one-shot or monostable, is triggered by an output from the computer. The output pulse width depends upon the setting of the potentiometer, and can be measured by monitoring the input to the TRS-80 until it goes low, whilst incrementing a counter. The value of the counter when the input goes low is proportional to the setting of the potentiometer.



IC1 - 555
IC2 - 74LS125
IC3 - 74LS175

A machine language sub-routine is needed to use this circuit effectively, but a BASIC program that is suitable for test purposes is as follows:-

```
10 DEFINTC,T,I,P:CLS
20 C=0:OUT0,1:OUT0,0
30 IF(INP(0)AND1)=1THEN40ELSE50
40 C=C+1:GOTO30
50 IFT<>CTHENCLS:T=C:P=C*6
60 PRINTP
65 Y=RND(48)-1
70 FOR I=127 TO 0STEP-4:SET(I,Y):FORJ=1TO10:SET(0,P):SET(0,P+1):NEXT:NEXTI
80 CLS
90 GOTO20
```

USE A 1M POT. WITH THIS PROGRAM.

Leon Heller

COMPUTERS IN EDUCATION - THE COPYRIGHT ISSUES

CET, The Council for Education Tecnology, are organising a one day event on the above subject at the Mid-Herts Teachers' Centre, Wellfield Road, Hatfield on Thursday, 3 July 1980..

The cost will be £11.50 including lunch and VAT.

Please contact me for further details.

Brian Pain

NEWS FROM B.C. PAIN

My contribution this month is in three parts - the current Newsletter situation - workshop policy - local group development.

In this issue we have evidence of some excellent feedback from members, with answers from Leon. My broad observation is that all sorts of expertises are currently available to any member. Many have rung in over the last year and have been put in touch with somebody, and every so often we get a thank you, or a further request for help. It has always been a disappointment to see an expertise go rusty, but just the reverse where an expertise develops. Please remind new members I am just an Accountant and Lecturer who discovered TRS-80 one day in downtown Luton and has been hooked ever since. By no means am I an expert, just very keen and willing to put in as much time as is required - this maybe personally or through my office. The Newsletter has reached this stage due to the responsibilities being split executively - editorial Leon, publishing myself. At the workshops I button hole members and demand opinions! When new members ring, again opinion is sought and this is borne in mind for the future. Ever since this Newsletter started my own concern has been for the beginner, not necessarily the newcomer who may be a main frame specialist joining micro for the sheer fun.

When embarking on the production of this Newsletter and group, my aim was to go for authority and usefulness to the members, new and existing newcomer and expert alike. Issues 1 to 12 have been put to bed, now let us make the next 12 more authorative and useful. As Kitchener once suggested "We need you"

As discussed and reported in other issues, we have organised 2 one day, and 2 weekend residential workshops. As far as can be gauged, they have served a purposes and speakers enjoyed giving their presentations.

From the responses to those organised so far, more workshops are required but held in various places in the UK. As a start you now have meetings in Sheffield, North London, Poole and back to Milton Keynes in September. The formula for the one day workshops is very simple, around 30 - 40 members spend the day either hearing short presentations - some formal others very informal. What must be emphasised that an established feature of the workshops is the exchange of Software, Hardware detail and discussion of Software techniques. This exchange cannot be detailed of course, but when we do a "debrief" views are expressed on the importance of this exchange. Being at the centre of the group, the ties and contacts made at workshops are quite noticeable, and normally continue for quite some time. One final feature that must be explained is our library. This is in the hands of Leighton Davies who sets himself up at the workshop, where members can than browse over programs and take copies from the group's library. It is envisaged that there will have to be a lending fee, along with a royalty fee for original programs. While the group is at the present level the present arrangement works very well, but a view has been put forward that original programs should be encouraged and formally rewarded. Your views please.

Finally local group development. At the January workshop one idea was that every assistance and encouragement be given to this line of development. Frequently we receive notification of a new group, or a member wanting to act as a "convenor" or "instigator". First things first. As far as I can see, formal empire building in our field is not on. We do not appear to be a group of individuals hell bent on running the greatest group since silicon ship became the hottest in thing. What we appear to be is a group of very inquisitive individuals eager for assistance, challenges, cries for help and that sort of thing. So instead local groups should consider using the Newsletter as a springboard and a source of enthusiasm and experiences to assist in the forming and developing of groups. From our experience in Milton Keynes there must be a guaranteed meeting place and time. We have not developed a programme, but other groups have, and found this necessary and successful for thier own activities. Weekly meetings appear a must, with informality around keyboards essential to allow mutual interests to be discovered and developed. From various reports numbers can vary, with Michael Dean or Katanna reporting 30's, with us always around 10 - 12 every Sunday morning and Tuesday evening. Try something in your own area and give it a serious go, with some thought as to the format of the meeting.

That is about all on the three topics, and in the next issue there will be a report on one or two marketing forays. See you in Sheffield.

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Just in case anyone has visions of me doing this cumulative index the hard way (you will no doubt notice that where articles can come under several headings, eg. Hardware AND Software, that has been done) I in fact used a little program - I still had to type the titles and page numbers and issue numbers, of course - which examined a record in a random access file for a key which I had entered as part of a descriptor string, and then produced all the records with that particular key. This program will form the basis of a simple information retrieval system that will replace the small card index system that people often use for suppliers. I intend to use it to keep a record of journal references under various headings for use in connection with my research interests.
Send me an SAE if you would like a copy of the listing - it is not really suitable for inclusion in the Library yet.

Leon Heller