SYDNEY TRS-80 USERS GROUP NEWSLETTER

Meeting News

As always the first and second monthly meetings will be held at the rear of Pattersons Florists, Botany Rd, BOTANY (entrance from Chegwyn St) while the third meeting (on the fourth Saturday of the month), will be held at 1st Sefton Scout Hall, 2 Waldron Rd, SEFTON.

The April Special Interest Group meeting sees the continuation of Dan Lawrence's Basic Programming course at 1 PM, followed at 2 PM, by demonstrations and comparisons of various Word Processing programs, including Allwrite, Lazywriter, SuperSCRIPSIT and Typitall.

All meetings commence at 1 PM on the following dates :-

April 13th	Botany	May 11th	Monthly General Meeting
April 20th	Botany	May 18th	Special Interest Meeting
April 27th	Sefton	May 25th	South West Meeting

Who's Who

President	(Vacant)	
Vice President & Sysop	Michael Cooper	331-7136
Treasurer	Denis Pagett	773-4433
Secretary	Darrell Hegarty	624-2824
CBBS Secretary	Peter Wignell	759-8024
Membership Secretary	Algis Bizys	77-9966
Hardware Co-ordinator	Errol Rosser	709-7646
Newsletter Editor	Gary Bryce	628-5058

SYDTRUG Bulletin Board

CLUB-80 Bulletin Board operates for members, seven days a week twenty four (24) hours a day on (02) 332-2494. The data format used is as follows :- 8 data bits, 1 stop bit, No parity, Full duplex, CCITT V21 modem standard 300 bps (set your modem to ORIGINATE mode). Limited access is granted for visitors.

Editor's Soapbox
by Gary Bryce

Well you have probably noticed the new format of the newsletter this month. The original is printed on an "A3" size page before being photo-reduced 50% to "A4", this allows the use of clearer font styles with proper decenders while coupled with the double column format gives approximately twice as much text per page. By printing the newsletter in this format the total cost will be reduced due to the reduced number of pages, while it should be easier to read because of the clearer print style. All comments on the format (and content) are appreciated.

Our Treasurer (Denis Pagett) has left for his well deserved holiday in the States, and will be away until the end of June. In his absence I have been coerced into acting as Treasurer with the help of Al Bizys. So, please bare with me if any delays occur (I apologise in advance) as the newsletter takes a considerable slice of my available free time.

Modem Raffle

The Raffle for the Avtek Modem was drawn at the Special Interest Group Meeting on Saturday March 16th. It was won by Tony Domigan (one of our Victorian Members) and the second prize of a box of Xidex diskettes was won by Steve Drewett of Toongabbie.

Membership Renewals

Members are reminded that if your membership expires (your expiry date is on the newsletter wrapper label) and is more than one month overdue, you will be removed from the group membership list and the normal joining fee of $10 will apply if you subsequently wish to renew. This procedure has been adopted to try and reduce the number of tardy renewals (which were often taking up to four months). Renewal notices are included with the newsletter one month before, on the month due and one month after the due date, so there are no valid excuses.

Newsletter Articles

I thank all contributors to this months' issue both new and old, for without contibutions there would be no newsletter. If the newsletter is not catering to your needs let me know, but don't expect me to write on subjects of which I have no knowledge, think about writing one yourself, even if it consists of a list of questions to which you would like answers, it hopefully may prompt someone with the answers to reply. Articles can be left in the News room of the group BBS (Club-80), given to me on disk (any format, except 100TPI Micropolis) as an ASCII file or for short bits, on a sheet of paper if legibly written.

Next Month

Time permitting, I hope to begin a series of articles on using Dotwriter. The basic format will be based on taking on page of the current issue, listing and explaining the commands used to arrive at the finished page. So if you have any questions that you would like answered get in touch and I will try to answer them via the column.

Secretary's Sayings
by Darrell Hegarty (02) 624-2824

Hello again for the month of April - hope that none of you were caught by any April fool jokes, which reminds me - I saw a message on the Micro Design Lab BBS quite a while ago, about a nasty April fool joke, and since then I have been in the habit of thoroughly checking all programs I download from any BBS.

It would appear that some smart idiot (for want of a better word), uploaded a program called "FROGGER" to the BB, and then left a message for all and sundry, that the version of FROGGER in the library, is the absolute best! Well - at least one person fell for it, downloaded the program, and ran it, only to find that it had wiped out the directories from all his drives. USER BEWARE!!

The modem raffle was well received by you, the members, with over 115 tickets being sold. Further raffles are under consideration by the Committee, owing to the good response to this one.

Don't forget that the "theme" for the April special interest meeting will be WORD PROCESSING, with demonstrations of such programs as Allwrite, Lazywriter, Typitall and SuperSCRIPSIT. Others will be welcome, if someone will volunteer to demonstrate them.

The theme for May will be "Pretty Printing". This will entail demonstrations of DOTWRITER and LAZYFONT. If you know of any other good printer programs, please contact the Committee with details.

The Committee has decided that we, as a Group should endeavour to build a library of Public Domain software (such as that available from the CP/M users group). One or more volunteer(s) are thus called for to build up such a library of software and to catalogue it into some logical groupings for distribution on diskettes. These diskettes will be available for sale to all members at about the cost of a floppy, and to ensure compatability, will be recorded in 35 track, SINGLE density. There may be a need to use FLIPPY format also.

The Constitution has been discussed at length by the Committee, and some suggested changes will be put to the Annual General Meeting. Consequently, both the Constitution as it now stands, and the proposed alterations, will soon be published in the newsletter for all to study before the AGM.

There is to be an exhibition of Computer Users Groups at Strathfield during the long weekend in June (Queens Birthday weekend). Each User Group will have a room in which to set up an exhibit. We are looking for members to set up exhibits, man the SYDTRUG room and generally be of assistance for the weekend. We would not expect anyone to give up the whole weekend, but assistance for one, or even part of a, day would be really appreciated. We hope to set up a Model III running the Club-80 BBS, controlled by another computer within the room as one exhibit, others are yet to be finalised.

Well that seems to be all I can muster for this month, so I'll see you all in May.

The Comm Line

by Michael Cooper (CLUB-80 BBS Sysop)

Hello again and welcome to the Comm Line. This column covers issues in computer to computer communications, either directly or via phone. In response to several requests from CLUB-80 BBS users I will deal with some aspects of the MODEM80 Terminal program this month, but first the BBS News.

BBS NEWS

Club-80 BBS is conducted by SYDTRUG to provide a means for members who wish to explore the potentials of computer to computer linkups. The system is a complex series of data storage modules all interfacing with each other. To simplify the user interface, modules are designed to appear as individual "Rooms" within an "Electronic Clubhouse". This has proved most successful in allowing novice users to achieve proficiency in using the software within a short time. The service runs on a Model 3 machine which was purchased with group funds. A charge of $10 per year for SYDTRUG members applies to get FULL access. Non-members are allowed Public (Visitor) access which precludes them from using many of the system features. To access the system you must have a "MODEM" to allow connection over the phone, a RS-232C Serial Port and Terminal software (eg. MODEM80, LCOMM).

One of the features of the BBS is the ability to communicate with other members via E-Mail (Electronic Mail). Each message can hold up to 16 lines of 60 characters each and can be addressed either to the Public (ALL) or someone by name. To make the message private you can add a password so no-one but you or the receiver can read it. The BBS always checks for E-Mail addressed to you each time you logon. If you go into the Mail Room, the system will automatically retrieve your E-Mail. Passwords are used to tell the system to make the message invisible except to 3 people ie. Sender, Receiver and Sysop. If addressed to "ALL" then you use the password to protect the message from deletion by someone else.

Several new BBS systems commence operation each month now. At the moment both Brisbane and Canberra are experiencing a high growth, with 3 systems appearing in February. To keep your listing of phone numbers up to date merely requires a call to CLUB-80. The "Notice Board" in Reception has an online PAMS (Public Access Message System) listing. Just turn on your printer first so you will get a hardcopy. I am constantly updating this list as new systems go live.

The last month has seen steady use of the BBS. CLUB-80 now boasts over 100 members, with callers up to 4500 by mid March. Many of the Special Interest Groups in the "Discussion Room" are filling up with valuable tips and hints.

MODEM80 TERMINAL PROGRAM

MODEM80 is a Terminal program for use on a TRS-80 Model 1/3/4 disk based machine and provides a fairly sophisticated way to communicate with other computers via the Serial Port.

Prior to microcomputers appearing in the 70's, most computers were able to service several users simultaneously. These users sat in front of a "Terminal" which consisted of a Video Screen, which is a "glass printer", and a keyboard. That provided the input and output and was connected via a cable to the computer.

The cable consisted (in its most basic form) of three wires (much like the 240V supply), one wire is ground (Earth) and the other two are Transmit and Receive. Data is sent bit after bit in a long stream between computer and terminal. The speed at which it is sent is called the "Baud" rate and they range from 50 Baud for Teletypes to 19200 Baud for VDU's.

. By using MODEM80 you can make your computer act like a terminal with several powerful abilities (such as saving to disk, sending to the printer, file transfers). You can vary the Baud rate at which the transfer takes place, the number of bits sent and several other Serial options.

File transfers can take place in two ways. The most common is called XON / XOFF which is used to send ASCII text files (Word Processor). The receiving computer controls the sending computer by telling it when to stop and start, this is done using the Control codes XON (Start) and XOFF (Stop). One drawback of this technique is the inability to send Binary (/CMD) files, so the other method is employed. This sends each file in a numbered block of 128 bytes, with a checksum to provide error correction, and is named after its inventor Ward Christensen (Christensen Protocol).

MODEM80 uses the <CLEAR> key to control various fuctions in the Terminal mode, as well as the <BREAK> key to display the Main Menu. Major options in the Main Menu are :-

<T> - Terminal Mode
<D> - Disk Access Mode
<L> - Change Comms Parameters
<C> - Accept DOS commands
<R> - Receive a file (Christensen Protocol)
<S> - Send a file (Christensen Protocol)
<X> - Exit to DOS

Whilst in Terminal mode you can toggle your printer ON/OFF using <CLEAR> <4>, send a TEXT file (WP) using <CLEAR> <2> and receive a TEXT file (WP) using <CLEAR> <3>.

You can set the Baud Rate, Word length, Parity by using the <L> option of the Main Menu. Additionally if the word length is set at 8 bits it is possible to send and receive TRS-80 graphics. Other functions allow you to add a Linefeed after a CR and add nulls after each CR.

Well that's it for now, see you again next month.

PDRIVE (Understanding by Necessity)

by Phill Walsh (02) 630-8361

I have recently had to 'tidy up' a friends Model III discs which brought me to a documentation study of the PDRIVE functions of NEWDOS80 as I found myself faced with the problem of compatibility between TRSDOS, DOSPLUS, LDOS and (my favourite) NEWDOS80 V.2. This document examines SOME of the methods NEWDOS80 V.2 uses to overcome these problems with its library command 'PDRIVE'.

I have been helping a friend with a 80 track drive complimenting my three 40 trackers, I had not experienced an 80 track drive on my Model III until now. I shall endeavour to clearly explain some PDRIVE setup tables that I've been forced to learn.

The reason we can't read DOSPLUS and LDOS double density discs is that they have strayed from the norm. The 'norm' in the computer industry appears to be whatever the programmer/designer decides that it will be at the time of their current project. It would take approximately 5K of program to allow NEWDOS80 to read their type of double density directory. Whilst either one will read between a double or single density Model I or Model III of their own type, they do not have the ability to read one of the others. Therefore if you have some DOSPLUS or LDOS files and wish them on NEWDOS80, copy them to single density discs and then set up the PDRIVE table as example #1 in the following table. This will allow NEWDOS80 to read and copy them onto a NEWDOS80 system or formatted data disc.

One thing that you may not be aware of at first is that you are not limited to two letters in the 'TI' spec of PDRIVE. The manual states :-
"TI = etc., Where TI consists of one or more alphabetic letter flags chosen from, etc."

This means one or MORE alphabetic letter flags can be used in the 'TI' spec. Even though all the examples given therein consist of one or two - you can have three if so required. Example 6 in the manual displays :-
PDRIVE,dn1,dn2,TI=AK,TD=E,TC=39,SPT=18,TSR=3,GPL=2,DDSL=17,DDGA=2

This specification is for the Model III for 13.3cm disc, 40 tracks, double density, single-sided disc that has track zero formatted in single density. Now by just altering the TI=AK to TI=AKL, you have the same specification except that you can read that same 40 track disc in an 80 track drive.

Some examples of PDRIVE tables:

Example #1.
PDRIVE,0,9,TI=A,TD=A,TC=40,SPT=10,TSR=3,GPL=2,DDSL=17,DDGA=2

This spec allows you to read LDOS single density discs as is, and DOSPLUS single density discs (after WRDIRP) that are 40 tracks.

Example #2.
PDRIVE,0,8,TI=AM,TD=E,TC=40,SPT=18,TSR=3,GPL=6,DDSL=17,DDGA=2

This spec will allow you to copy any known file from a Model III TRSDOS disc. You still will not be able to read the directory, as the TRSDOS directory is not compatible with any other marketed system. You can read the TRSDOS directory in one of two methods. Boot up the TRSDOS disc and call up the directory, or better

still, call up 'SUPERZAP' go into 'DD' that contains the TRSDOS disc and (display drive relative sector 306), you can even MOD sectors. This will display the directory and other sectors whilst in NEWDOS80 using the above PDRIVE setup.

Example #3.
PDRIVE,0,7,TI=AK,TD=E,TC=39,SPT=18,TSR=3,GPL=2,DDSL=17,DD6A=2

This spec tells your Model III that you are looking at a Model I NEWDOS80 disc that is double density with track zero in single density.

Example #4.
PDRIVE,0,6,TI=AL,TD=E,TC=40,SPT=18,TRS=3,GPL=2,DDSL=17,DD6A=2

This is the standard Model III setup except that you can read the 40 track disc in an 80 track drive.

Example #5.
PDRIVE,0,5,TI=AL,TD=A,TC=40,SPT=10,TSR=3,GPL=2,DDSL=17,DDGA=2

This spec is the same as example #1 (LDOS read) except that you can read it in an 80 track drive.

Example #6.
PDRIVE,0,4,TI=ALM,TD=E,TC=40,SPT=18,TSR=3,GPL=6,DDSL=17,DDGA=2

This one is the same as example #2 (TRSDOS III) except that the disk is read in an 80 track drive.

Example #7.
PDRIVE,0,3,TI=A,TD=E,TC=80,SPT=18,TSR=3,GPL=2,DDSL=17,DDGA=2

This is the standard setup for an 80 track drive on the Model III.

Example #8.
PDRIVE,0,2,TI=A,TD=E,TC=40,SPT=18,TSR=3,GPL=2,DDSL=17,DDGA=2

This is the 40 track standard setup.

One small pointer. If you have two drives on your system, set up the 'SYSTEM' options command of 'AL=2'. This will give you use of the other seven PDRIVE tables as a storage area for the tables that you are likely to be using at different times. If you have three drives, set 'AL=3'. When you need a different drive option, you only type <PDRIVE,0 1=7' and presto, you are ready. By resetting the 'AL' function, you not only gain the extra storage space, but your system need not go looking for a file on a drive that doesn't exist. This actually increases your disk I/O time - sure not by much, but every nanosecond counts.

By using ADR/CMD from The Alternate Source (Automatic Density Recognition utility) or by applying the following zap (published by CINTUG U.S.A.) you can quickly look at a variety of disc formats (ED. Note:- Or get a copy of Alan Johnstone's mods to NEWDOS/80 ver 2.0 if you really want versatility.).

ZAP 086 (Cincinnati TRS-80 User Group) March 2 1984)
SYS16/SYS,02,E8 change 7E FE 41 12 20 to 7E C3 CB 51 20
SYS16/SYS,04,DF change all zeroes to:
FE 41 12 20 03 C3 E0 4F 3D FE 41 20 F8 C5 E5 01 00 07 21 D3 4D 71 23
10 FC E1 C1 18 E3 02

This zap allows 'temporary in memory' change of the PDRIVE table thereby not altering the disc record. Use PDRIVE as normal except ,B is substituted instead of the regular ,A in the PDRIVE command viz:

PDRIVE,0,1=7,B<ENTER>

This will alter the PDRIVE configuration in memory (you can leave the write-protect tab on) and you can do this as many times as required for the next time you RESET your PDRIVE table will not have been affected. You could then copy SYS16/SYS onto other work discs in use. Hope this item will be of some use. If you have any queries leave a message on the BBS or feel welcome to 'phone me on 02-630-8361. Good PDRIVEing.

(ED. Note:- Refer to the June 1984 issue of SYDTRUG NEWS for detailed information on the PDRIVE table on the disk.)

Moving the Mod 4 ROM into RAM

Reprinted from "NORTHERN BYTES", VOL. 5, NO. 6 ·

If you have a Model 4 or 4P, you can move the ROM code into RAM, where it can then be patched, changed, or otherwise diddled with. I (Jack Decker, Editor, Northern Bytes) had previously published a method to do this, but as usual, someone else has a better way. The "someone else" in this case is Lyman Epp of Omaha Nebraska, and this is the code he uses to accomplish the task:

```
01000 ;Name: MOVE/SCR, assembled as MOVE/CMD
01010 ;By :Lyman Epp - Date 04/12/84
01020 ;
01030 ;This program moves ROM into RAM on a Model 4
01040 ;or 4P computer. When this program is done,
01050 ;it is in the 'RAM' mode. This program is six
01060 ;bytes shorter than the shortest method that
01070 ;I have found (using LDIR and moving the all
01080 ;ROM image into the high memory, etc.) This
01090 ;method takes .229 seconds (at 4MHz) to run
01100 ;and 917,522 T states to execute all but the
01110 ;final RET statement. The other method (LDIR)
01120 ;took .151 sec & 602,232 T states to execute.
01130 ;
01140         ORG     5200H
01150 START   DI
01160         LD      HL,37FFH    ;START LOCATION
01170 LOOP    XOR     A
01180         OUT     (84H),A     ;PUT IN ROM MAP
01190         LD      B,(HL)      ;GET BYTE
01200         INC     A
01210         OUT     (84H),A     ;PUT IN ROM MAP
01220         LD      (HL),B      ;SAVE BYTE
01230         DEC     HL          ;AND DO IT AGAIN
01240         OR      H           ;UNTIL YOU GET TO
01250         JP      P,LOOP      ;LOCATION 0000H
01260         EI
01270         RET
01280         END     START
```

An Offering in Terse Verse

by John Pearce

I get a feeling I should shoot a
Bloke who told me a computer
Would broaden me, make me astuter,
And alter me from beaut to beauter.

I really didn't take much selling,
Wrote prose and verse that was compelling,
(Electric Webster checked the spelling,
Where from here? There's just no telling.

I've worked these years for many bosses,
I count success, forget the losses;
Employment means you carry crosses,
But, who'd have thought I'd work for DOSs?

And so, tonight I'll make amends,
Instead of drinking wine with friends,
I wish you, through this magic lens,
"Well met, ladies and gentlemens."

SuperSCRIPSIT & NEWDOS Queries

Reprinted from "Northern Bytes",
Volume 6, Number 1, Page 2

Dear Jack,

I have a few questions for you (or Northern Bytes) :- If I save a BASIC program in ASCII and I wish to read the file in SuperScripsit (with the A option), I will get an END OF FILE ENCOUNTERED error. So now read the file with Scripsit and save it again in ASCII. Then SuperScripsit can read the whole file. Is there a patch for SuperScripsit so it will work properly?

I am trying to figure out some NEWDOS routines. Most of the routines need the PDRIVE setting and the SYSTEM setting. Do you know where exactly in memory (which address) those parameters are stored?

- Paul Fransen, Havikhoek 48,3201 SH Spijkenisse, HOLLAND.

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Unfortunately , I don't use SuperSCRIPSIT, so I passed that question along to Greg Small, and he came up with the following:

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"SuperSCRIPSIT is expecting a 00H byte as a terminator. This IS what Scripsit uses but it is NOT what BASIC uses during an ASCII save. So, loading the file into Scripsit and resaving it will allow SuperScripsit to now work on the program. The solution is simple". Using the NEWDOS/80 CREATE command, enter the following :-

        CREATE ZEROBYTE/TXT LRL=1 REC=1 <ENTER>

"This will create a one byte file that is, interestingly enough, a 00H byte. To fix a file that SuperScripsit didn't like simply use the following:

        APPEND ZEROBYTE/TXT filespec <ENTER>

which will fix the file for SuperScripsit use."

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As for the NEWDOS/80 PDRIVE tables, they are stored in memory starting at 4371H in the Model I or at 4291H in the Model III. Starting at that address is a 10 byte table containing the PDRIVE specification for Drive 0 in coded form. The next 10 bytes, starting at 437BH (Mod I) or 429B (Mod III) are the table for Drive 1, the next 10 bytes for Drive 2 and so on.

As for the SYSTEM command I could be wrong about this, but I think that executing the SYSTEM command (in such a way that SYSTEM flags are changed) actually modifies portions of the DOS itself - in other words, I don't think the SYSTEM table is stored in memory as such during DOS operation. One of the articles I've been planning to reprint from another newsletter describes how the SYSTEM flags are stored on a NEWDOS/80 disk, and I have sent you a copy of that article. I hope it helps! (ED. Note:- Refer to the June and July 1984 issues of SYDTRUG NEWS).

Around the Matrix in 80 moves

by Ross Pont
and Simon Cobcroft
Dedicated to adventure fans everywhere.

"Argh!
I feel
I shawda picked another profession!"
                Scott Adams #10, Version 1.23

The disk spins around and suddenly I'm elsewhere.... The world according to Scott Adams. A world of sickly bears and saved games, of hidden passages and hideous logic, of winding corridors and witty remarks. It's seat of power lives in Longwood Florida - the home of Scott Adams, Chief Adventurer. Here Scott created the world in 12 days - "and Scott saw everything he had made and behold it was very good."

As weary adventurers through Scott's universe we have encountered our fair share of Scott's wrath and behevolence. Take for instance our friend the mongoose who was cruelly butchered because of a mistaken identity, or the friendly man died as soon as we tried to help him. On the other hand Scott's kindness does occasionally shine through - the helpful parrot in Pirate Adventure, or the mirror in Adventureland. But on the whole Scott works against you.

Nevertheless the adventures are solvable and contrary to popular belief contain no bugs (well not many). The mirror can be repaired, the purple worm can be killed, stone statues can crumble, the consoles will work, and the bear can be put out of it's misery.

The inhabitants of Scott's world are a motley crew, there's the drunk pirate who turns out to be a robotic catalyst in a large alien conspiracy, or there's the health conscious Count, the rude, pesky nomad who doesn't like to be touched, the arrogant King, or the ghost of Geronimo. They are all men of few words just like the dumb-waiter in the Count. But then again so are you with a vocabulary of 120 words (which you took a whole year to learn).

Before you can get anywhere with Scott certain items must be collected, and their purposes discovered. Stock Scotty items include torch, shovel, flint and steel, knife, and goggles. With these items you can seek out new locations, strange objects and boldly go where few adventurers have gone before.

Scotty's adventures are written using a split screen format (ie. the location, objects and exits are continually described and updated in the top part of the screen, while the users input is entered in the lower portion). This is definitly the best structure for text adventures. His verb-noun input is simple, but effective, and these writers personally prefer it to the longer more time consuming adventure languages. All of his current adventures are written in 16K. Many would scoff at this but again these writers prefer tighter, well planned adventures to sprawling epics.

And now a few words from the Chief.
Scott: Don't accept a "pirated" copy
        Read all messages carefully
        Try examining things
        Adventures 1 to 12 are now available from all good computer dealers

Coming soon - # 13 Return to Pirates Cove
                # 14 Sorcerer of Claymorge Castle

Following is an assessment of how enjoyable the first 12 adventures in the Scott Adams series are. The more symbols, the more rewarding and satisfying a game is to play. The type of symbol also reflects the difficulty of the adventure (ie. Adventureland is as enjoyable to play as Mystery Fun House even though it is a simpler adventure).

1.	Adventureland	★★★★★
2.	Pirate Adventure	♀♀♀
3.	Mission Impossible	♀♀♀
4.	Voodoo Castle	♀♀
5.	The Count	♀♀♀♀
6.	Strange Odyssey	★★
7.	Mystery Fun House	◮◮◮◮◮
8.	Pyramid of Doom	◮◮◮◮◮
9.	Ghost Town	♀♀♀♀
10.	Savage Island	★★★★★
11.	Savage Island-Part Two	★★★★
12.	Golden Voyage	◮◮◮

Key - ♀ Easy, ★ Moderate, ♀ Above Average, ◮ Hard,
      ★ Scott Adams Standard.

Boot NEWDOS on the 4P (cont)

by Mark McDougall

It appears that the article on booting NEWDOS on the 4P in last month's newsletter may have suffered from a few typo's. (ED.NOTE :- Most were in the original article.) There appears to be five sources of error. they are :-

1. STEP 1. COPY,0,1,,CBF,FMT,NDN=NEWDOS4P,DPDN=1
2. STEP 4. Directory is relative sector 360 not 3600.
3. STEP 6. FPDE bytes are 21-24, not 20-24.
4. STEP 7. FRS 53 relative byte A9, not 39.
5. Do not do STEP 6. until after STEP 8.

I haven't had any trouble running NEWDOS from powerup. (NOTE :- This procedure will only work if a stock standard NEWDOS system disk is used. My disk was nearly full, so I stripped all but the SYS files after STEP 2. and copied STEP 8. before filling the disk with files. I then undid STEP 8. and continued as per text.)

WARNING :- SuperUtility seemed to ignore thr GAT table after zapping it, so I copied all files from DOS.

For Sale

AVTEK Multi Modem II, Telecom approved in perfect working order with all manuals - a bargain at $310 (ono).

Contact - Geza Dujmovich (047) 74-1685.

Double Speed for Your Computer!

by Stefan Keller 533-1612
and Chris Tinney 759-5052

Greetings fellow hackers and other peoples addicted to the smell of solder and associated sinful smokes. All of you are no doubt aware that the speed of the Model 1 is (by todays standards) less than fast. Many speed up circuits have been implemented in various forms in many CPUs, however a speed up places heavy demands on certain parts of a computer's circuitry and to get one working requires a certain amount of experience in the field of digital electronics.

The speed up presented here has been installed as printed into 3 Japanese CPUs and 1 American one. If you own a Jap CPU, the news is all good! The soldered RAMs in them are fast enough to cope with double speed with no hassles. (They have the part number uPD 416C) The Z-80s in the Jap units also seem good enough to cope with the extra speed. (They are a NEC chip with part number uPD 780C CPU written on them).

If however you have a yank unit (or a SCRAP-80) then a little brainpower is needed. The Z-80s in these computers may or may not work at double speed (there is really only one way to find out if your one will.......) and the RAMs in them (particularly in SCRAP-80s) tend to be a little on the slow side.

The speed up has been tested with 3 types of expansion interface. Two home built jobs worked perfectly, one LNW interface also worked perfectly with no RAM changes or memory mods and one TRS-80 interface also worked after a few minor mods to the memory circuitry and a new set of RAMs. (The mod is outlined later in this article.) Incidentally, now might be a good time to mention the speeds of RAM required for a double speed mod. The RAMs within the CPU must have no more than 250ns access time and any external RAM in an interface must be no more than 200ns.

The reason for the difference is that the data path for external RAM is a good 40ns longer than for internal RAMs. (The addresses are buffered on their way to the RAMs in the interface, and all data coming back from the interface is also buffered. Thus an external RAM doesn't have as long to output data.) If you are really unlucky, you will have to buy some faster RAMs to replace slower ones. If you shop around, you can expect to pay less than $2 each for them but be careful to specify EXACTLY what speed RAMs you require. They are known as "4116"s and there are 24 of them in a 48K system. When you do buy them MAKE SURE that you get RAMs with speeds equal to or better than those speeds mentioned above. If you end up with a handfull of spare & slow RAMs, make a mobile out of them (etc) and hang it on top of your computer. It will be a real conversation starter among hackers! Enough of the long winded introduction and words of discouragement, on with the circuit description!

CIRCUIT DESCRIPTION

In the circuit shown here, the chips that are already in your computer are marked with a "x". Note that the pin outs and IC numbers in the circuit shown are for the Jap CPU only. If you have a Yank job or a SCRAP-80, please consult the technical manual FOR YOUR COMPUTER. You will find that the actual circuits for non-Jap CPUs are almost identical to the Jap ones; only numbering is changed. The circuit also shows decoding for port FEH (254). SCRAP-80s have this already done for you and Yank TRS-80s have most of it. If you have a PCG, it will be there somewhere on the PCG board. Only Jap owners without a PCG need to include the circuit as shown, you others can use your heads.

The system clock in a TRS-80 or SCRAP-80 is a 10.6445 MHz crystal controlled oscillator and a few dividing chips. In the computers' original forms, this clock is divided by 6 to give the required clock rate of 1.7741 MHz for the Z-80. The chip that does this is a 74LS92 in each type of computer and it also has two divided by 3 outputs (3.5482 MHz) with different phases relative to the 1.7 MHz waveform. Of these two faster waveforms, we can only use one safely. This is because the two faster waveforms have 33% duty cycles while the slower one has 50%. If you try to change CPU speed then you must be careful that the change is done smoothly and without spurious spikes, otherwise your Z-80 will @%&$#x? crash! (Substitute suitable expressions as your mind thinks of them)

The correct faster speed waveform, along with the original slow speed's waveform are passed to an AND gate which is then fed to a flip flop. The speed setting is sampled 1.77 million times every second and the Z-80 clock speed changed accordingly. The electronic switching of speed is done using a 74LS367 :I won't bother explaining: those of you that are capable of understanding the circuit's operation will see at a glance the way in which it works.

MUX and CAS MODIFICATIONS

The circuit diagram also shows a mod to the MUX and CAS generation circuitry. If you have a Jap TRS-80 then IT IS ESSENTIAL that you include this mod as it is shown. If you own another type of CPU, then you will only have to cut a track and make a link as it is shown in the circuit. As I suggested earlier, the TRS-80 and SCRAP-80 computers were designed to work at 1.77 MHz so 3.55 MHz is driving the circuits beyond their intended limits. A little fiddling may be necessary to make those chips do what you want them to.

The mods to the MUX and CAS circuits simply change their timing so that RAM speed requirements are not impossible to attain. The mod brings MUX and CAS forward by around 94ns. It is easy to see that this is a significant time change. As to why the Jap computer will not work without the extra gates in the mod, who knows? My box powered up OK without it, but crashed after about 5 minutes. This does suggest that RAM timing requirements are adversly affected by heat. (If you know the reason, please let me know so that my curiosity may be satisfied.

SOFTWARE SPEED CHANGE

The remainder of the speed up mod consists of decoding for port FEH (already there if you have a PCG or non Jap machine) and flip-flops in which to store the current speed. Speed is changed either manually (by use of a centre off toggle switch) or by executing an instruction sequence to send the values 0 or 1 to port FEH (254 decimal). If you have a PCG, don't worry! These instructions will not put it into some esoteric display

mode; try them and see!

I have included the software change facility for two reasons. Firstly (and most importantly) if you include a TRI coloured LED, obtainable from TANDY for around $2, then you can make it go all sorts of funny colours by sticking your Z-80 in a tight loop changing speeds. It is quite easy to get your TRI coloured LED to change slowly from red to orange to yellow to green and (along with a deep masculine voice) is a certain "chick getter"! (If you are into that sort of thing!). Those puritan electrical engineers out there may be "shocked" to see that I have used LSTTL logic beyond spec to drive the LED! If you are concerned about this, you are probably not the type that would enjoy an LED changing colour anyway, so leave it out and slander me in private! Any normal hacker would include the LED with relish to see how far they could make their chips go!

The second reason for the port's presence in the circuit is so that LDOS will work properly with the speed up ON. (LDOS will not boot at high speed) The LDOS system command "SYSTEM (FAST)" will use port FEH to change speed when it needs to. Newdos is much better in this respect. A "SYSTEM,0,BJ=2" will fix everything up (even booting). Whatever you do, don't try to use the Newdos SYSTEM command at double speed to change the BJ option. Newdos will work fine while READING disks even if the BJ option has not been set, however, much detrement will be experianced around your directory if Newdos tries to WRITE anything! By the way, as far as I know, LDOS is the only dos that changes CPU speed automatically, the others must be performed by your own software or by yourself manually.

The system control line "SYSRES" is taken to the speed latch so that when rebooting, the Z-80 is forced to go at slow speed. This will ensure that LDOS will boot anytime, regardless of the CPU speed before the reset. If you are silly enough to leave the speed switch in the manual fast mode, then not even an endless string of resets will force the speed to slow, so keep this in mind when using a DOS that will not boot at double speed.

SPEED-UP RESULTS

When you have verified that your speed up works, I suggest that you try a quick game of Rally Racer at double speed, followed by a zip through the air with Flight Simulator. You will be surprised at how much better FS2 is at double speed! Then you can assemble a few programmes in half the time before using your word processor and marvelling at how much quicker the responses to the various commands are. BASIC will no longer seem quite as slow anymore, however it will forever remain a language of kludges. The speed up will in no way affect the real time clock, flashing cursor or auto repeat (in most programmes) as these are all interrupt driven. The extra speed will give you a new difficulty level in any game and even Galaxy Invasion becomes interesting (a little anyway)!

After a while you may notice that certain disk operations are a little faster with the speed up ON. This may puzzle you if you know anything about the functioning of the disk controllers in the TRS-80. They run off a totally separate clock to the CPU and CPU speed shouldn't really affect their operation. BUT, consider this. The CPU asks the disk controller to locate and load a sector. The disk controller obeys and

passes the sector to the CPU byte by byte. Once fully loaded, the CPU might have to do something with that sector before loading in the next, so if this extra CPU function takes longer than it takes the disk to rotate to the next logical sector on that track, the disk will have to undergo another complete revolution before the next sector can be read from or written to. Find yourself an 80 track double sided double density disk that is full and get a DIR; you'll soon beleive me when I say certain disk operations are MUCH faster!

INTERFACE MODS

As mentioned earlier, if you own a TRS-80 interface with RAM in it, you may have to modify it to speed it up a little but only interfaces without a "buffered cable" need this modification. A friend carried it out on one such interface and found it to work well, so here it is should you need it:-

1) Isolate Z-37 pin 4 by cutting a track.
2) Isolate Z-38 pin 9 by cutting a track.
3) Connect the non Z-37 pin 4 end of the cut track to Z-38 pin 9.
4) Isolate Z-38 pin 8 by cutting a track.
5) Connect the non Z-38 end of this track to Z-37 pin 4.
6) Connect the non Z-38 pin 9 end of the cut track to Z-38 pin 11.

Take care when carrying out this mod as I have been told that one of these "chips" is not really a chip but an inductor and the pin outs are confusing. Z-37 and Z-38 are of course in the interface; if you try to modify your CPU then you'll stuff your video output (jap CPU) by rewiring the character generator and graphics generator; or you'll stuff everything (yank CPU) by rewiring the address lines! Remember that all interface RAMs need to be 200ns or better.

FAULT FINDING

In the event that your speed up does not work first go, (quite possible considering the nature of the hardware mod.. mine didn't but the others did) then the following information might help you a little. To test the speed up REMOVE ALL PERIPHERAL DEVICES including the expansion interface.

Turn the power to the CPU on. If at this early stage you detect a fizzling sound, a red glow or a rising column of white smoke from the depths of your expensive computer, trust your emotions and pull the plug! Please don't blame me because you soldered one of the piggy back chips in back to front, the speed up mod does not have inherent lunacy protection! If your video display (if connected) shows a clear screen and "MEM SIZE?" (or whatever perversion of this your ROM contains) then reach for a Tooheys - but don't open it yet.

Press <ENTER> and check that all internal memory is functioning properly. Now get your computer to do some inane thing like print "hello" all over the screen. While it is doing this, toggle the speed manually as fast as you can. If your computer does not put on a pyrotechnic display, and it does not crash, then leave it in double speed mode and grab the ring pull on your tooheys and lift it slowly... After a tooheys or two, make sure that your computer is still printing "hello". Toggle the speed and leave it run slowly for a while. If the computer passes this test, continue your way

through the carton of cans next to your soldering iron but if it doesn't, read on.

If your computer never got to clearing the screen and printing "MEM SIZE?" then either you have made a wiring error, one of the chips you installed is faulty or your Z-80 and/or RAMs can not cope with double speed. Try powering up with the toggle switch in the manual slow position. If the computer works (try the above software test at slow speed) then you can be sure of RAM/Z-80 troubles. Consult someone that knows (as opposed to thinks he knows) what he is doing for help. (Our phone numbers are at the top of this article if you don't now anyone who fits the bill)

If your computer cleared the screen (or part of it) and possibly printed the "MEM SIZE?" message (or part of it) before crashing, then suspect the Z-80. Before buying a Z-80A CPU swap yours with one known to work in a speed up in another computer. If the other Z-80 works you have the answer to your problem, but if it doesn't, consult a knowledgable person. You may have memory problems. With your old Z-80 (if you needed to buy another) find a sharp drill bit and an electric drill. Drill a hole through the chip towards one end (chips are HARD and it may take more than one bit to complete the task) and fit a small key ring chain to it. Now you have another conversation starter. I admit that the job of key ring is more fit for a processor like a 6502, but then the 6502 costs 5 times more than a Z-80!

Now it is time to test the software speed change function. In BASIC, type "OUT 254,1": The speed should be FAST. Now type "OUT 254,0". The speed should be SLOW. You may now (at your discretion) compose some sort of inane programme to slowly change the LED from one colour to the other and back again. This activity is not recommended for those of you with weak hearts as longevity can not be guaranteed. If your speed fails to change when you do the above software test, first check to see if you have the toggle switch in the automatic position. (dummies If you have checked to see if you are in fact a dummy and verified that you are not, then check the wiring in the address decoding section of your modifications. You have probably proven your drunkeness by wiring the thing up incorrectly. Do not attempt to drive for the next few hours!

Once you have your CPU functioning on its own at double speed, wire up the system completely (if you haven't had too many Tooheys) and repeat the above software test for both speeds. (Don't try to boot yet, use non-disk BASIC) If the test fails, suspect external RAM. Check its speed and make sure that your interface has been modified if necessary. (consult somebody if you are unsure)

Now you can try to boot. (Make sure you have the mod switched to manual slow dummies.. you were warned Configure your system for double speed operation and change to manual fast. Using an unimportant disk, write a file to it and verify that all is OK. If so, you can assume your speed up to be fully operational! Go and obtain another case of Tooheys and celebrate even more. (Observing the 0.05 road limit)

CONCLUSION

It is now time to get on that blower and inform all of your friends that are too gutless to try to install a speed up that they are MUGs. This post-hacking activity also leads to an inflated ego and loss of superfluous friends. You will now have joined the growing ranks of people that no longer think that the TRS-80 is turtle slow. It now coasts along at about the speed of traffic on the harbour bridge during peak hour! If you want a faster computer, go and buy a VAX!

Around a year ago, I created a circuit for those that have built all circuits! This device I christened the "Track Counter" and it hangs out the end of the drives' daisy chain. It consists of a set of numeric displays which show what track the drive(s) are currently on. A FORMAT of an 80 track double sided double density disk is no longer the boring thing it used to be and LDOS's head stepping becomes amusing in a totally new way! You can look forward to a traditional hacker's article in the future telling you how this marvel can be constructed; so keep your soldering irons smoking!

Surname		Phone	Sys	Ei	Drives	Print	Int/Exp	BBS
AGAPITOS	JOHN	349-1288	C48	A	D2	E	GENERAL	Y
ALLGOOD	BARRIE	(047)35-4534	K48	B	D2	H	MODS H/W S/W PROGRAM	
ANDERSON	GRAEME	498-3348	A48	A	D	C		Y
ANDERSON	VAL	451-1673	K48	B	D4	H	HOBBIES,PHOTO,EDUCAT	Y
ANDREW	NICK	427-2386	K48	B	O,F	H	HACKER,MODEM	Y
ANSELL	RUSSILL	525-8809	D44,G		K	G	FINANCIAL CONSULTING	Y
ARTHUR	GEOFF	457-9947	K48	B	O2	B	ELECTRONICS PROGRAMS	Y
ATKINSON	SCOTT	628-9893	A48		A		BEGINNER	
AVERY	ALAN	969-6721	A48	C	D2,G	H	H/W	Y
BACON	RAY	528-9679	A48	A	D,H	C	INDUSTRIAL INSTR'S	Y
BARAT	BEN		A48,M	C,B	D,G	E	CPM,CBBS,APPLE	Y
BARKER	DAVID	534-2659	A48	A	D	D	DISASSBLY,MATHS	Y
BARNES	BOB	587-3491	C48	A		C	RCS RADIO P/L	Y
BARRIE	SANDY	(07)221-1868	C48,D44	C	D3	E	BUSINESS,PHOTOGRAPHY	Y
BEBBINGTON	GRAHAM F.	528-3526	A32	B	D2,E2	B	HOBBY,BUSINESS	Y
BECKETT	RON	(047)35-1286	K48	B	E,G2	A	H/WARE,BUS,UTIL,W/P	Y
BIRCH	TERRY	(047)39-1361	C48	C	D2	H	DATA PROCESSING,EDUC	Y
BIRKLE	PETER	(043)24-5519	A48		D2	A	HIRES H/W UTILITY	
BIZYS	ALGIS	77-9966	K48	B,E	D2,6	A	BUSINESS & GRAPHICS	Y
BLACK	KEITH	516-3673	A48	A,B	E2,62	C	GAMES - BASIC & CMD	Y
BLAKEMORE	KEN	819-9731	K48	B	D2	A	BUSINESS	Y
BLANTER	HENRY	80-2813	D128		D2	F	BUSINESS	Y
BOHRINGER	BEVIN	681-5638	A48	F	D,F	C	M/L,ASSN,H/WARE	Y
BONGERS	KEITH	644-5930	K48	B	D2	I	BUSINESS, GENERAL	Y
BOOTH	GREG	644-0861	K48	B	D,6	H	ADVENT, GAMES	
BOSETTI	ROBERT	728-7174	K48	B	D2	A	BEGINNER	Y
BOYS	ROSS		C16,K48				COMS, GENERAL, ASSM	Y
BRAIN	PETE	661-2671	K48	C	D,6	E	BEGINNER	Y
BRAMWELL	GRAEME		A48	A	E2	F	BEGINNER	Y
BRIAN	TED	412-4856	A48	A	D2,E	H	BASIC, I/O CONTROL	Y
BRUNO	ANDREW		A44		D2	A	BULLETIN BOARDS	Y
BRUSKE	JOHN	(09)44-7777	D128	A,E/B	A,D2,E2,F4	E	H/W MOD,ASS,LDOS,DAT	Y
BRYCE	GARY K.	628-5858	A64,K64	B	A,K64	E	BASIC,ASSM,DBMS,VC	Y
BUCKLE	HUGH	B88-3634	A48,M	B	A48,M	I		
BYRNES	JIM	649-1089	A48	A	D2	E	PHOTO,READING,MODEM	Y
CALVO	JOSEPH	597-2279	A48	B	D2	H	BUSINESS	Y
CAMERON	BRONTE		L	A	0	B	RADIO & TELEVISION	Y
CARR	STEVEN L.	(08)256-3275	K48	A	A,0	I	WORD PROCESSING	Y
CARSELDINE	DON	(046)28-1867	C48	B	D2	E	BEGINNER	Y
CARTER	WILLIAM	387-1343	K48	E	D,F	A	BAS,CDBOL,M/L,RS232	Y
CHARD	JOHN	(042)71-5858	K48	B	C,0	H		
CHAUNCY	MARTIN	(047)54-1968	K48	F	D,6	A	MODEM,H/W	Y
CHENG	YEE HOY	88-3822	A48	A	F2,E	H		Y
CLAGUE	STEPHEN	398-5793	C48					
COLE	MICHAEL	685-8128	A16		A			
CONDIE	ROBERT TERRY		D,K48	B	D2	A	DOS'S, LANGUAGES	Y
COOK	GREG	631-4879	A48	C	D,F	H	HACK M/L GRAPHICS	Y
COOPER	MICHAEL	331-7136	A48,D128,6		D2	A	PROG,CBBS	Y
COOPER	PAUL		D128		A	I	BASIC,ASSN	
CORKHILL	KEN	599-7225	K48	B	D2	E	VP EDUC FILING	Y
COSTA	ALEX	349-8837	A48	U	A	B	LANGUAGES (PASCAL)	Y
COUNTER	JOHN	622-7668	K16		A		AMATUER VK2RC	
CRAIG	ALBY	519-9682	K16	A	0	H	SALES/EDUC SFTWRE	Y
CROUDACE	ARTHUR	456-1229	A48		D,6	E	BUSINESS	Y
CURLY	RICHARD	682-2491	C48	A	D4		BEGINNER	Y
CURTIS	STEVE	637-5798	A48	A	D,F2	A	LEARNING PLAYING	Y
DAMIANI	PAUL	747-2114	A48	B	D,E	I	MODEMS,GAMES	
DANIEL	JEREMY	76-8516	K48	E	D2	E	HOBBY	
DARVILL	PAUL R.	628-3982	A48	A	D4		BEGINNER	Y
DAVIS	JOHN		K48	E	A,0	E	GENERAL	
DAWSON	DOUG	44-4974	A48	A	C	E	GAMES	

DOUBLE SPEED MOD

Raw Clock (10·6445 MHz)

LS92 (Z65 jap)

3·55 MHz — 1·77 MHz

exists in CPU already

Centre off switch — MAN FAST / AUTO / MAN SLOW

SYSRES of System control bus (Pin 13 Z-45 jap)

Must be included for Jap CPUs — Z68 jap front

½ LS74 — ¼ LS74

LS08, LS27, LS367

old connection (Cut track for speed up mod.)

from A0 (Z68 jap Pin 9)

from OUT (230 pin 7 jap)

From D0 of system data bus (Pin 17 Z-23 jap)

Tri Colour LED — 470R

Note: make this connection if you are NOT including the two LS367 buffers

To CAS generator — (MUX) to DRAM multipleers

Z63 jap — ½ LS74

Raw Clock 10·6445 MHz

exists in CPU already

To Z-80 CPU (Pin 6)

Surname		Phone	Sys	Ei	Drives	Print	Int/Exp	BBS
JOSEPH	EMIL	77-8583	K48	B	D	H	COMUNICATIONS	Y
KAHL	HERBERT		L64		A		HOBBY	
KALOPEDIS	JIM	939-2616	K48		F,H		CONTROLING DEVICES	Y
KEEGAN	BRIAN	785-5845	A16,C48		D2	H	SYS/MODEM EXPANDING	Y
KEEGAN	PHILLIP	629-2445	A,B,C,D,L	A,B	D,E,F,I,K	A,E,G,I	BUSINESS	Y
KEEP	ROSS	533-2823	K16		A		T.V. TECH.	
KELLER	STEFAN	533-1612	A48	F	E	I	H/WARE,ASSEM, RADING	Y
KELLY	DAMIAN	(053)34-0415	A48,624	A	D2,E	H	D/BASES,EDUC,BASIC	Y
KENNEDY	DAVID	(047)77-4577	A48	A	D3	H	H/W MODS	
KIRBY	RONALD	759-7259	A48	A	D3	C	HOBBY	Y
KLAFAS	CON	687-0119	A48	A	F4	F	EVERYTHING	
KLUMPP	DENNIS	(045)71-1124	D			C	CHEM. INSTR.	
KOLODZIEJ	HARALD		K48	B	A,D,G	I	BUSINESS LANGUAGES	
KROPICH	VINKO	(042)61-5216	A48	A	E,63	C	HARDWARE	
KUHNE	MICHAEL	772-3535	K48	F	D,6	C	PROG,BUS,EDUC,CPM	Y
LAWRENCE	DAN	665-7822	A48	A	D2,H2	B	BEGINNER	
LEDSON	TED	400-6985					VARIOUS	
LEE	JOHN		C48		D2	E	DATABASE,GAMES,EDUC	Y
LEFFLER	WAYNE	642-3238	K48	B	D2	I	BUS,LDOS,COBOL,BASIC	Y
LEWIS	LARRY	628-0962	A48,C,D12B	A,B	ACD6HK	A,E,I	DIGITAL ELECTRONICS	
LLOYD	BERNARD	578-4143	C48		D		COMP,RADIO,KITTY	Y
LUTHER	BOB		K48		D2,E	A	H/WARE, ASSM.	
LYNCH	GARY	(063)66-3215	K16	C	D4	A	BUSINESS, GAMES	Y
LYONS	PETER		D12B		D2	B	GEN. INT. AND EDUC.	
MARTIN	PHILLIP	546-7090	K48	B	D2	H	M.P. D.B. BEGINNER	Y
MATUSKA	MARTON		A48	A	D2		BASIC	
MATZ	TONY	728-2190	A48	A	A,C		BEGINNER	
MAURO	IVAN	546-7723	C48		D2		GAMES UP EVERYTHING	
MAYFIELD	NEIL	523-4693	K48	B	D		BEGINNER	Y
McCLELLAN	IAN	451-6299	K16		A		BUS. PROG.	
McCULLOCH	ROY	524-9286	K48	B	C,D	I	LEARNING	Y
McDONALD	REGINALD K.	773-4824	A48,J	A		E	STUDENT	
McDOUGALL	MARK	529-8322	D64		D2		HARDWARE	Y
McDOUGALL	BILL	529-8322	A48,L64		D4		BUSINESS APPLICATION	
McFARLANE	ROGER TREVOR	(049)52-4680	K48	C	D2	C	SYSTEMS ADMINIS.	
McGEE	ELIZABETH	797-7300	K16		A	I	GENERAL	
McILHATTON	WAYNE	681-1315	A48	A	D		BBS	Y
McLEAN	BRUCE	989-1648	A48	A	D	6	GS9,IV,L, BASIC 89	Y
McQUEEN THOMSON	RICK	(058)03-1744	L64	A,B	F,62	F	BASIC PROGRAMING	
MERCER	JOHN	579-2915	A48,D12B		C2,D4	E		Y
MEREDITH	GEOFFREY	646-8815 B.H.	L		C,D	F	LDOS	Y
MILES	LESLIE	(043)24-5612	A48		D,6	H		
MILLER	RICHARD	887-3122	A48,D12B		C2,D2	E	D/BASE,BARCODES,H/W	Y
MILLER	EWAN	449-4451	K48	A	C3	H	VK2-YTC,KITTY	
MILLER	DAVID	(07)399-8672	L	B	A,D	I	FLEX,OS9, H/W MODS	
MOLONEY	STEPHEN	88-2970	K48		A		BEGINNER	
MORRALL	ERNEST	425-5869	A48	E	D	I	PROGRAMING	
MORRISON	ALAN	419-3496	A32,C48	A	D3		BASIC	Y
MUDGE	STEWART	534-2995	L	A	E2	C		Y
MUHLBOCK	HUBERT					I		
MULLINS	DEREK		K48	A	D2	A	BUS,TECH CALCS,M.P.	Y
NEALE	KEVIN	623-7327	C48	B	D2	I	BUSINESS SOFTWARE	
NELSON	BARRY	95-4464	L	A	D2	A	BEGINNER	
NEWLAN	LES		616					
NEWLAND	KEITH	533-5458	A48	E	D	I	GAMES H/W TINKERING	
NILAND	GEOFFREY		A48	A	C,D	I	GAMES,BASIC PROG	
NORTH	GREG	635-1438	A16		A	F	BUS, GRAPHICS	
OBRIEN	ROY		C48	C		C	HARDWARE	
OSBORNE	BRIAN	(042)84-3558	K48	B	D2	A	BEGINNER	
PAGETT	DENIS J.	773-4433	K48	A,D,E	D4,62	A	LDOS,DOTWRITER	Y
PAINE	MARK	(042)28-6154	K48	B	E	A	GAMES, ASSM	

Surname		Phone	Sys	Ei	Drives	Print	Int/Exp	BBS
DE STIGTER	JOHN	94-2996	K48	F	E	H	ANYTHING	
DEJONG	WALTER		A16		A		LEARNING & EXPANDING	Y
DELVECCHIO	DON	636-9463	C48	A	D2		BEGINNER	
DOBIE	RICK		A48,K48	A,B	A,D2,E2	H,I	ASSM,BASIC,COBOL	Y
OONIGAN	TONY		D128		D2,E2	C	HACKER-NEWDOS	
DOUGLAS	LINDSAY	(03)466-1738	K48	C	D3	C	H/W (VK20N)	
DOWLGERIS	CON	(043)25-2254	C48	A	D2	I	DATA PROC	
DREWETT	RAYMOND	669-3991	K48	B	D	A	LEARNER	
DUNGWICH	CON	816-5595	K48				H/W MODS, CASS. PROG	Y
DILUNGWICH	GEZA	(047)74-1685					BEGINNER CHESS	
DUNN	PETER J.	428-7879	A48	A	D2	C	BUSINESS	
EATON	KEN	669-1957	C48	A	E4,61	I		
EDMONDS	PETER	(047)21-4715	K48	A	D2	D,H	HOBBY	Y
EDWARDS	OWEN	451-5758	K48	B,B	D3	A	PROGRAMING TELECOMP	
ELLIS	KIM	661-4383	C48	B	F2,K	C	HORSE RACING	Y
ELPHICK	COLIN	543-1634	A,D	A	D2	I	EDUCATION	Y
ELWELL	PETER		K48	A	D2	A	ASSEMBLY	
ENEBERG	BERNARD	524-0982	K48	B		A	BEGINNER	
EVANS	ROHAN C.	419-3164	A48,D12B	A	D2,62	A,E	LDOS,LANGUAGES,UTIL.	Y
FABIEN	ANTOINE	78-3724	L			F	ASSEMBLY	
FAULKNER	LESLIE	798-6767	A48		D2	F	HOBBY	
FERNANDO	VINCENT	764-4530	A48	A	C2,D	I	MODEM,BUS,EDUCATION.	
FICI	BENNY	669-3128	A48	A	C2	E	HOBBY,IV/L,BASIC,FILE	
FISICARO	JOHN	745-3666	A48	A	C2		BEGINNER SUPERSCRIPS	
FRANCUZ	STAN	(05)354-9189	A48	A	D3		MATHEMATICS	
FREER	BRETT		C48		D2	B,H,I	PROG. BUS. APPL.	
GADD	VICTOR WILLIAM	(049)73-2274	A48,L	A	D4	E	DATA PROC,WORD PROC	
GAMMAGE	CHRIS	622-9763	K48	A	D2		EDUC,WORD PROC	
GAREB	ROBERT	30-8261	A48	B	D2	C	MODEM,H/W DESIGN	
GBNDI	KAMAL	344-8658	A48	A	D2	C	ELECTRONICS TELECOMU	
GILLIAN	PHILLIP	95-4298	K48	B	D	E	ADVENT, D/BASES	
GIRDO	ROBERT	644-9193	A48	A	D3	E	VK2 RG AMM RADIO	Y
GLAVANITS	MICHAEL		C48		D4	F	PHOTOGRAPHICS	Y
GORDON	NEIL	77-7288	K48	E	D	C	ELECTRONIC DESIGN	Y
GREEN	PAUL	772-1430	K48	C	D,6	I	BUS,HOBBY,DRAFTSMAN	Y
GRESSER	PETER		K48	B	D2	H	BEGINNER	Y
GROSZ	DAVID	95-4298	M	B	E2	A	H/W,DOS,PASCAL PRGM	
HABER	HARRY	327-7744	A32	A	C,D	H	MEDICAL	Y
HANCOCK	GERALD	(047)51-1880	C48	C	C2,E2	A	GENERAL	
HANN	OWEN	(044)72-4975	A48	A	C2	I	LANG,PLOTTING GRAPHS	Y
HARRIS	MICHAEL	78-3900	K48	B	D,E	H	FORTH,"C",MODEMS	Y
HARRISON	ALAN THOMAS		L		D,E	F	DB'S,XENIX,MS DOS	Y
HARVEY	DAVID		A48	C	B,E	A	BUSINESS SYSTEMS	Y
HAYNE	PHILLIP		K48	B	B	I	BUSINESS & GAME PRGM	Y
HEGARTY	DARRELL	624-2824	K48	B	C2,62	B	ASSEM,HARDW,TELECM.	Y
HINVEST	ARTHUR	427-3340	K48		D	F	BUSINESS	
HITCHENS	TREVOR	685-2859	L		D	A	HOBBY BASIC	
HO	MORGAN	57-4597	A48	C	D,F	I	C ASSY H/W HACKING	
HO	HENRY	449-2847	A48	C	D2	B	H/WARE,ASS/MACH LANG	Y
HOLMWOOD	OWEN	92-4025	A48	A	D2	B	MODEMS HM RADIO	
HOLT	TIM	(046)55-2351	A48,064	A	D,E	E,C	YATCHING,RADIO COMMS	
HOWARTH	GARRY	53-8623	K48	B	D2	I	HARDWARE	
HUMPHRIES	ELLIOT ARTHUR	(067)79-7593	K48	B	D2	A	PROPERTY MANAGEMENT	
HYLAND	JOHN	687-8397	C48	F	F2	H	DBMS BASIC N/C LANG	
JANCZUK	GEORGE		A48		D2		H/W MODS, ASSEM LANG	
JARRETT	ROBERT	371-8539	D64			H	ASSM, H/WARE	
JEON	HYOUNG	636-0043	A48,C	A,C	C,D	C,H		
JOHNSTONE	ALAN						REWITING DOS'S	
JONES	BRUCE	969-1819	A48	A	C		TEACHER/MICROBEE	
JONES	KENNETH	529-6244	K16		A		CHARTERED ACCOUNTANT	Y
JORDAN	DAVID	528-8431	K48		A		BEGINNER	

Surname	Name	Phone	Sys	Ei	Drives	Print	Int/Exp	BBS
URBANIK	NICK	665-4465	K32	B	A	A	ELECTRONICS	Y
VIAGGIO	LOUIS	788-3845	K48	B,E	D,E	H	BUSINESS SOFTWARE	
VIRGO	DAVID	389-4925	K48	B	D2	A	WAR GAMES GEOLOGY	
WALES	DAVID	888-9323	K48	B	D3	H	H/W,N/L,ANTR RADIO	Y
WALLS	CHRISTOPHER	(047)31-3482	A48	A	D2	A	ADVEN. GAMES	
WALSH	PHILLIP	630-0361	A,C	A,B,C	A,D,E,F	C	MODEM,EDUC,HACKER	
WARDROP	BOB	524-5376	A48	A	E2,1	A	H/W ASSEM.BUSINESS	
WATHEN	NEIL	433-3772	A48	A	D2	I	BEGINNER	
WATTS	RODNEY	605-5057	C48	A	A	F	EDUCATIONAL	
WEBB	MOSS	560-0862	C48		D2		Man (VK2DP)	Y
WEBSTER	BRUCE	644-5925	K48	E	D		HOW TO WRITE M/L	Y
WEISS	ADALBERT	(067)22-3882	D64		D2	G		
WELCH	GORDON	(877)821-0251	K48	F	F		SOFTWARE/HARDWARE	
WHITBY	PETER	685-2647	K48	B	D	E	SOFTWARE DESIGN	Y
WHITE	ERNEST	799-2679	C48		D2	F	PERSONAL HOBBY	Y
WHITTAKER	JAMES	772-2009	C48		A,D2	H		Y
WIBLEN	ROYCE	745-3731	K16				COMM. INTEREST	Y
WIGNELL	PETER	759-0824	D128	A	D2	E	H/W,ASTRON,H/W,S/W	Y
WILKINSON	HILDEGARDE	(043)92-1516	C48		D2	6	W/P,BUS,AGRICULTURE	
WILLIAMS	MARK		D128		D2	I	CPA/TRS,DRIVES,S-100	
WILSON	GRAHAM	726-0851	A48	A	E3,H2	C	BEGINNER	
WILSON	STEVE	642-4826	A48	E,B	A,D3		C UNIX PASCAL	
WONG	CHRIS	(842)67-3999	K48	F	C		H/WARE, TELECOM	Y
WOOLFORD	DAVID		K48	B,A	C,D,G	I		
WRAKE	JAMES	70-3285	K48	B	D2	I	SOFTWARE	
WYATT	PETER	46-3628	K48	B	D,G	I	N/L, ASSEM PROG	
YATES	LEONARD	84-2749	C48	B	D2	H	CONTROLS	
YEOMANS	GEOFF	419-0628	K48	B	D		SOFTWARE PROGRAMMING	
YOUNG	GEOFF	(04)26-4796	K48	C	D2		MODEM GENERAL USE	Y
ZAKKA	KENDALL	674-5214	A48	A	A	E	GAMES	
ZUI	VICTOR	89-0185	A48	F	D,F		H/W,N/L,HIRES,UTIL	
	ALEX	727-0440	K48	F	F			

Membership List Legend

Computer (Sys)
A. Model 1
B. Model 2
C. Model 3
D. Model 4/4P
E. Model 12
F. Model 16
G. Model 100
H. Tandy 1000
I. Tandy 200
J. Tandy 2000
K. System 80
L. Co Co
M. Other
N. LNW

Exp Interface (Ei)
A. Tandy
B. System 80
C. LNW
D. LOBO
E. Rosser
F. Other

Storage (Drives)
A. Cassette
B. Stringy Floppy
C. 35 Trk Floppy
D. 40 Trk Single Sided
E. 40 Trk Double Sided
F. 80 Trk Single Sided
G. 80 Trk Double Sided
H. Micropolis (100TPI)
I. 8" Single Sided
J. 8" Double Sided
K. Hard Disk
L. Other

Print(er)
A. C.Itoh
B. Centronics
C. Epson
D. Microline
E. Tandy LP.
F. Tandy DMP
G. Tandy DWP
H. Epson Compatible
I. Other

Surname	Name	Phone	Sys	Ei	Drives	Print	Int/Exp	BBS
PEARCE	JOHN	419-7414	D48		D3	C	W/P, BUSINESS	Y
FERMINOW	ROMAN	637-7129	C48		D2	E	BEGINNER	
PERRIN	GUY	389-4925	K48	B	D	A	DATABASE,COBOL,ASM	
PHILLIPS	TONY	(042)41-3968	K48	B	D2	E	BEGINNER	
PHILPOTT	STUART	543-4461	A48	A	C	E	SOFTWARE	
PILLING	NASH	663-3497	A48	A	D2	C	BUS/PROG,MODEM,LA34	
PLACING	ROSS	(043)72-1308	A48,G32	A	A,E,F,G	I	DOS+3.5 W/P PROG	Y
POLLETT	ROBERT	747-3714	K48	A	A		FIXING SYSTEMS	
PONT	ROSS	661-4932	K48	B	A		BEGINNER	
POWELL	ROGER	(046)27-2038	A,C	A	C	E	ENG, RADIO, SCIENCE	
PRIOR	GARY	628-9217	K32	F	A		ASSY HDWARE	
PRUSCINO	JOSEPH	810-1984	A48	A	D,G2	C,H	BASIC,PROG,CHESS	Y
RADCLIFFE	GEOFFREY	498-2399	A48	A	D	E	PACKET RADIO	Y
RALPHS	JOHN	632-8251 B.H.	K48	E	E	I	COM. AIDED MANUFACT.	Y
RAMSAY	BRUCE	660-2852	K48		B		BEGINNER	
RANDALL	CHRIS	771-1421	K48	B	E2	A	STK CNTL,MODS,BASIC	Y
REIDSEYS	JOHN	666-9389	C48		D	F	BASIC, H/WARE	
RICHARDS	CLIFFORD	389-2733	D128	A	E2,G2	C	BUSINESS S/W CPM	Y
RIEPER	MAX	868-1131	A48	A	D,H2	A	SOFTWARE,H'WARE	Y
ROLPH	PHILIP	(053)52-3426	K48	B	D2	A	BUS,GENERAL,MOD-3	Y
ROMER	TED	498-2399	C64,D128,G	A,A	D,F,K	A,B	MICROS & SYSTEM LANG	Y
ROSSER	DOUG	587-4989	K48	B	C4	I	GAMES,H/W & S/W MODS	Y
ROSSER	ERROL	769-7646	A64,K48,M	B/E,E	ABCDEFGI	H	HOBBY	Y
ROGNO	BRUCE	85-5392	A48	A	C,D	E	HACKER	
RODNEY	MICHAEL G.	666-4716	A48	A	D2,G2	C	BBS	
RUBENSSON	BENGT OLOF	547-1261	A48	A	C4	B		
RYAN	DARCY	81-3119	E				BEGINNER	
RYAN	REGINALD	523-6489	C48		E2	I	BUS,ADVEN,NEWDOS-80	
SALOMON	PHILLIP	(042)29-9117	C48,D128	B	D,F	H	BUS,PROG,FISHING	Y
SAMUEL	CHARLIE		K48	A,A	E7,F1	H,I,I,I	HOBBY,ACCOUNTING	
SANTA-IWA	GILBERT	626-8558	K48		A	I	BUSINESS,DOS,ASMBLY	Y
SCHEMBERA	SEPP	427-2713	D128,K48	B	D4,K	A	BUSINESS, HOME	
SCHUCK	PETER	628-3286	K48	A	A,D2	H	HARDWARE	
SEDGWICK	CRAIG		K48	A,B	C	H	ASM	
SERGEANT	IAN	525-2054	K48	B	D	I	HACK,ASSEN	
SNIEL	KEVIN	888-5684	A48		D,E	E	COMPUTERS, FLYING	
SHIELDS	ISAAC		C		D2	C	PASCAL	
SHORTLAND	COLIN	74-1991	A48	A	E2		ASSN,HACKER,GRAPHICS	Y
SIMPSON	CAMERON	466-3488	A48	A	D	H	BUSINESS	Y
SINCLAIR	ALLAN	498-6243	K48	B	A,B,C	A	MSDOS CPM SYS80'S	Y
SMITH	CHRIS	546-1243	K48	B	D2	I		Y
SMITHY	PERRY	637-8429	K48	B	D2,E	I	BEGINNER	
STANDINGFORD	COLIN	635-4868	A48,K16	A	C,F	A	ELECTRONICS,COMPUTER	Y
STEAD	SCOTT	759-0336	C48	B	D	E	MODEM,BUSINESS,GEN	Y
STEPHENSON	BILL	569-7112	K48	B	D2,G2	A	BUSINESS MANAGEMENT	
STRAND	JOHN	53-7483	K48	B	D	I	BASIC, HACKER	
STRINACH	EWART		C,K48	A,B	D,E	I	HOBBY, ALL DOS'S	
SUTHERLAND	PETER		K48	B	C2,G	E	GAMES,HOBBY	
SUTTON	DAVID	587-3617	K48		A,D,G		BASIC, Z-80	
SWEETING	STEVEN	525-2385	A16	A	A		BEGINNER	
SYMONDS	GORDON	74-1991	A48	A	E2	H	RADIO HAM	
SYMSTRA	EDDY	(047)51-3941	K48		D	A	BEGINNER	
SYRATT	DAVID	(047)36-1161	A48		D2		PROGRAMMING GENERAL	
TAYLOR	RICHARD	621-1232	A48	A	A,D2	E	VK2-OTB	
TAYLOR	THOMAS	451-0826	A48	A			ALL	
THOMPSON	ROB							
THOMSON	ROBERT	(062)58-1853	K48	B	D,G2	A	HAM VK2-OFY	Y
THREADGATE	JIM	(049)33-5878	C		D2	E	H/W,ASSEM,UTILITIES	Y
TINNEY	CHRISTOPHER	759-5852	A48	F	F2	I	BASIC	
TRITTON	DAVID	(043)41-9526	A48	A	F	I	HOBBY	Y
TUHETH	JAMES		A48	A	D4	F		