TPUG Newsletter

Views and News of Toronto Pet Users Group, Inc.

Volume 6, Number 1   **Winter 1998**

From the President -

As the new year stretches in front of me, I search my soul and decide that its time for the hard sell. Back when TPUG had over a thousand members, we published a full colour magazine. We are now scrambling to cut the cost of printing this newsletter. Having lots of members meant that just a small part of everyone's yearly dues covered all our publishing costs. These days, we spend a much larger portion of your dues getting this newsletter out. You can look back at the previous issue to see our financial report.

We need more members, folks. If you enjoy getting this newsletter, if you enjoy coming to our meetings, of you appreciate timely on-line Internet help, if you appreciate cheap software and free advice and good prices on hard-to-get Commodore equipment, then get us some new members. It is in your own best interest.

You can also volunteer your services. Its not as painful as it sounds. Donald Dalley, who is not even a current TPUG member has given us several helpful demonstrations on things he learned to do on his Amiga. By the time you read this, he will also have demonstrated his interface to the stock analysis program AmiBroker.

Ron Anderson, formerly with Commodore, will regale us with Tales of Commodore at the Central C64/128 meeting on January 27. (Door prizes of C64/128 and Amiga programmes will be awarded.) Frances Clee, a long-time TPUG member, will demonstrate how she produces graphics with the LOGO programming language at the Central Amiga meeting, February 10.

If you have learned something about your computer that you think is interesting, or have done some project using your computer, share it with the rest of us. Don't be shy. None of us that I know of are public speakers. Speak with the person who runs your meetings. He/she will be more than happy to schedule your demonstration, discussion, or bull session.

Don't forget our Winter Swap 98 at Alderwood United Church on January 24. Look for our booth at the Computer Flea Market February 1, and at the upcoming ComputerFest, February 13 - 15.

Tom Luff

For users of all
Commodore Computers :

* **PET/CBM**
* **SuperPet**
     * *B-128*
* **VIC 20**
* **Commodore 64**
     * *PLUS-4*
     * *C-16*
* **Commodore C 128**
* **AMIGA**
     PC/MS-DOS

* Registered products of Commodore Business Machines, International and/or their assignees.

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Voice Info (416) 253-9637
Please leave a message

e-mail : tpug@icomm.ca

Membership Rates

Canada	$25
USA	US $25
International	US $25

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Newsletter

Editor John Easton (416) 251-1511
. . . . jeaston@idirect.com

Meeting Schedule

Amiga Central: Second Tuesday of the month.
Contact - George Cripps (416) 255-1436
C-64/128: Fourth Tuesday of the month.
Contact - Ernie Chorny (905) 279-2730
The above meetings commence at 7:30 p.m. in the York Public Library, 1745 Eglinton Ave. W. (just east of Dufferin), in the Auditorium or Story Hour Room.

Westside and Amiga West: Third Thursday of the month at Alderwood United Church, 44 Delma Drive. Delma Drive is just west of and parallel to Browns Line, south of the Queen Elizabeth Highway, north of Horner Avenue. From the west, exit QEW at Evans Avenue, east on Evans to 2nd stoplight, south on Gair to Delma Drive. From the north or east, follow signs from QEW or Hwy. 427 to Browns Line, exit right to Evans Avenue, turn south on Gair (first stoplight) to Delma.
Contact - Ernie Chorny - (905) 279-2730
or George Cripps (416) 255-1436

TPUG BBS	**PunterNet Node 2**

(905) 273-6300   14.400 (8N1)
24 hours a day, 7 days a week

Internet

http://www.icomm.ca/tpug
e-mail: tpug@icomm.ca

Well campers ... it would appear that President Tom's promise of more Newsletters is becoming a reality. Granted, we still have some difficulty with the inevitable deadlines for timely announcements (for instance, most will read of our annual Winter Swap Meet after the fact), however, the overall picture *does* look brighter.

Tom Luff and John Buller are fast becoming local 'technical gurus' and they both promise more for our next issue.

We still encourage article submissions (and they certainly don't have to be super-tech) from others. To make that easier, keep in mind that e-mail to our www site is a simple procedure. And, as a corollary, articles from recent Newsletters are available from the site for use by other clubs - just remember to credit the source.

Notice to new owners of SuperPet and CBM 8296 machines

TPUG has copies of the Waterloo LANGUAGE DISKS (3 in 4040 format) as supplied with the SuperPet on original purchase.

TPUG has the EXECUDESK disk (8050 format) as supplied with the CBM 8296 on original purchase.

These disks are an integral part of the operating systems of the above machines and since Commodore insisted on referring owners of these machines to TPUG for service, we have added these somewhat proprietory (and also virtually unobtainable) disks to our library - all part of the TPUG mandate of service to our members.

We also will attempt to search out copies of original program disks to replace corrupted disks. In this category you will find such programs as VISICALC, WordPro, and PaperClip.

Classified

Another member-service!
For Sale:

2 - C64s, 2 - 1541 disk drives, colour monitors, joysticks, printers, and printer interfaces.
Call Tom Luff (416)503-0753.

Miscellaneous Commodore Hardware and Software is available from :
D.L. Johansen
Box 912, Troy, MT, 59935

COMMODORE GAZETTE
Magazine-on-Disk
Christopher Ryan
5296 Devonshire Rd.
Detroit, MI, 48224-3233
(313) 882-0811 (4thru 10 PM EST)
chris.ryan@metro-1.station-1.com
$25.00 for a one-year subscription.

TPUG News

Central Amiga Meetings

The November Central Amiga meeting was held at VideoLink, since York Public Library was closed for Remembrance Day.

VideoLink is at 53 Lucy Ave, a block south of Danforth and between Victoria Park and Pharmacy. Maybe this should be called the East Side Amiga meeting, to counterbalance the West Side ones?

The major topic was John Buller's presentation on simple ARexx programming. The Rexx control language is available on other operating systems (MVS, VM, OS/2, Unix) and ARexx is the Amiga version. ARexx is mostly used to run and control other programs. John showed how to write scripts to create variables and arrays, deal with numbers and strings, input and output, access memory, convert to binary or hex, check port and library status, add libraries, and so on.

Those at the meeting were the first to receive the latest newsletter, and saw a tower version of the A1200. Attendance was good - about double normal.

The December Amiga meeting was back at the library. Since there was no December West Side meeting, this was a combined one. Once again the main subject was ARexx programming, this time presented by Donald Dalley.

The January Amiga meeting will be our second at VideoLink. Topics include Donald Dalley's use of an ARexx script to combine a terminal program and a stock market analysis program, and a look at TPUG's web pages using an Amiga browser.

The January, March and May Central Amiga meetings will be at VideoLink; the February, April and June ones will be at York Library.

- Ian McIntosh TPUG Secretary and WebMaster

The Joys Of The Joystick Port

The Joystick Ports or the Control Ports as the USER GUIDE refers to them, are a simple input connector so your computer can be interfaced to the outside world. The 'D' shaped connector contains 9 pins, pins 1 to 4 are for the 4 basic directions of the joystick, pin 5 is for the paddle's y-axis, pin 6 is for the Fire button, pin 7 supplies the +5 volts dc to whichever device is plugged in, pin 8 is GND, and pin 9 is for the paddle's x-axis. There are 5 basic devices that will interface through these ports, they are the paddles, the pressure tablet (i.e. Koala Pad), the light pen, the mouse, and of course the joystick. The first four devices all use a similar principle to communicate with the computer. The principle is Analog to Digital Conversion (A/D for short).

Basically anolog to digital conversion is the changes in voltage converted into information represented by a series of on and off bits which form a byte, the form for which a computer can handle information. Paddles are the easiest example to explain. Paddles for those of us who can remember the earlier video games like Pong, a TV version of tennis, where we turned a knob and a flat line moved so we could deflect a bouncing dot back towards our opponent on our TV screen. That knob was nothing more then a resistor with a slider for changing the resistance. As the resistance changed so did the voltage through the paddle. In the C64 the voltage across the paddles would be sampled by the inputs of the SID chip (Sound Interface Device). The SID chip would do the A/D conversion, giving the software a digital value to represent where across the screen your playing piece should be moved to.

Unfortunately I do not know enough to explain fully the other 3 devices but I am sure of the following. Light pens are not all equal, INKWELL's light pen uses one of the axis as it obtains info from the screen, McPEN's light pen uses both axis, and other pens will use the other axis. Somewhere they all must compare their location with that of the video chip's information. The mouse out puts a fixed frequency, and as it is moved, the duty cycle of the signal. Although I have not researched the tablet, I do believe it uses two pressure plates (one on the other) one for each axis. In the future I may research these further.

Lets get back to the simple joystick. What is a joystick? A joystick is a hunk of plastic which contains 5 switches, 4 of them control direction and the fifth is the fire button. Each switch connects to GND on one side and the other side of each switch goes to its own pin. In the computer, each trace which connects to these pins is artificially held high via a resistor tied to +5 volts, as the switch(es) are closed (tilt handle) the traces are now shorted to GND (low). The CIA chip (Complex Interface Adapter) is the chip which interfaces the keyboard and joysticks to the CPU, it also stores the numbers in its registers (port 2=56320, port 1=56321). The number generated by the joystick is inverted when outputted by the CIA chip. (i.e. 11101 at the joystick, becomes 00010 or decimal 2 after the CIA chip).

As you tilt the stick (ie. North) a switch closes, if the stick is tilted between the main axises there are two switches closed (ie. N.E.), so at best we usually test for 8 possible directional condition and whether or not the fire button is pressed. In my early programming days I constructed a box with 9 push buttons to simulate the above conditions (see fig.1). I used 1N914, general purpose diodes to decode the corner buttons, this is referred to as Diode Logic. As described earlier there are 5 switches or address lines we can access, using diode logic we can decode up to 31 active switches. If we look at fig. 1, we can see the corner switches use two diodes each to activate both directions at the same time. The diodes are a polarized component which always current to flow in one direction only, thus when the other switches are pressed they do not short back to the other switches, but when the corner switch is pressed it will activate both directions. Fig. 1 gives us NE, NW, SE, SW (why not NS, or WE, or SE+Fire?), as long as the band on the diode is connected to the switch you are decoding (and the other side of the switch connects to GND) all 31 positions can be decoded.

FIG. 1
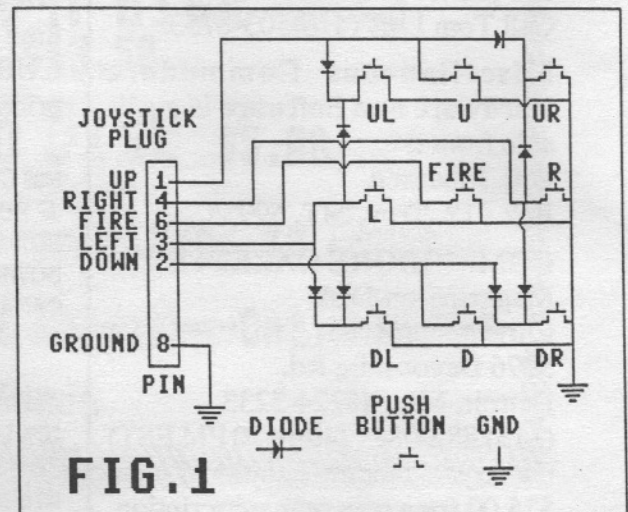
Where did I get 31 positions? If we look at the present five switches as being five address lines, we can assume each line represents an exponent of 2. (2 E0=2 to the exponent 0) Therefore the following is true:

```
2 E0 = 1 This shows us 1 to 31, yet 0 is also a
2 E1 = 2 valid number, which should make it 32.
2 E2 = 4
2 E3 = 8
2 E4 =16
      31 total
```

The reason we can use only 31 out of 32 numbers is when the joystick is in the neutral position all the switches are open but if we check the register with the following program we will see one number present and will not be able to use that value in our software.

```
10 A=peek(56320)and 31 :REM or 56321 for the
other port
20 print A
30 goto 10
```

Line 10 assigns 'A' with the value of the lower 5 bits found in register 56320. On the screen you will see a value printed over and over till you press on the joystick's shaft or the fire button. I am not going to tell you the number or the numbers you get as you change directions, I want you to find out yourselves and maybe tell me.

Another project that is commonly done is installing an auto-fire to the joystick. Fig.2 is a schematic of a auto-fire circuit which continues to fire as long as the fire button is pressed. The heart of the circuit is a 555 timer chip which is constantly generating a square waveform. The frequency is controlled by the components R1, R2, and C1. By changing their values you can change not only the frequency but the duty cycle (time on and time off of the waveform) as well. R1 is a potentiometer which you may want to have accesable, this is the easiest way to alter the frequency, I have found it necessary to change the frequency from one game to another. For more information Radio Shack(tm) offers a small booklet 'Engineer's Mini-Notebook: 555 Timer IC Circuits' (cat # 62-5010) for about $ 3.50 CAN. The second IC is a 74LS00, Quad Nand Gate. Only two of the four gates are used, one is an invertor to change the fire button's signal to a form require by the second gate so it will allow the waveform to pass only when the fire button is pressed. R3 is a 4700 ohm (4.7k) pull up resistor, so when the button is not pressed the signal going to the invertor gate is held HI and does not float causing false signals farther on. SW1 allows you to choose autofire or regular fire button mode. P1 and P2 are 9 pin 'D' shell connectors, P1 mates to the computer it should be a female, and P2 mates to the joystick so it should be a

male connector. These two connectors are wired one to one or as a pass through, with the exception of pin 6, it is wired through SW1 so you can select autofire or pass through. In other words you never need to unplug it.

To identify the pins on the ICs locate the U shaped divet so when you look at it, it is at the top. The pin at the top left will be pin 1, just below it is pin 2, followed by pin 3 and so on to the bottom of the left side, the next pin will be the one at the bottom right, the next is the one above it and so on till you are at the upper right corner, this is the last or highest numbered pin. So locate pin 1, count down one side then up the other. Some ICs use a dot to identify pin 1, but all the rest of the pins follow the same pattern.
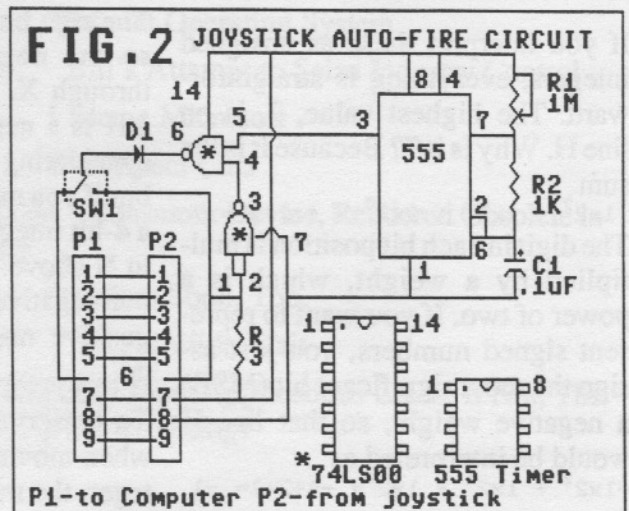
The D-shell or D-sub solder type connectors are marked on the back for each pin, these numbers correspond with the numbers in fig.2.

```
AUTOFIRE Parts List          Radio Shack part#
C1    .1 uF capacitor        272-109     5/ 2.99
D1    1N914   optional       276-1122   10/ 2.69
IC1   555 Timer              276-1723      2.99
IC2   74LS00                 276-1801      2.99
P1 9 pin D-sub conn.female   276-1538      4.99
P2 9 pin D-sub conn.male     276-1537      4.99
R1 1 meg potentiometer       271-211       2.59
R2 1k ohm 1/4 w resistor     271-1321    5/ .89
R3 4.7k 1/4 watt resistor    271-1330    5/ .89
SW1 SPDT Toggle Switch
```

First timers to these sort of projects may want to check out the following titles from Radio Shack:

```
Engineer's Mini-Notebook: 555 Timer IC Cir-
cuits     62-5010  3.39
Engineer's Mini-Notebook: Digital Logic Cir-
cuits     62-5014  3.39
Getting Started in Electronics
62-5003  4.99
```

These books have a lot of circuits and information in simple to understand terms, ideal for the beginner.

FIG.2 JOYSTICK AUTO-FIRE CIRCUIT

P1-to Computer P2-from joystick

Representing Signed Numbers in Binary Arithmetic
John Buller

This is a variation on a message I wrote for someone asking about representing negative numbers on an Amiga listserv. I didn't send it, because in the time it took me to compose it, three or four people sent answers that seemed to satisfy him. I have expanded the letter into this article. Maybe it will help someone else.

There are several ways of representing signed integers in binary, but this is the way it's done in most computer languages. Sometimes if you're reading numbers from a hardware device like an analog to digital converter, another method will be used, but the numbers will most likely be converted into the form explained here if any arithmetic has to be done.

Note that I'm only considering integer (whole number) data types. Methods of representing fractional numbers are more complicated.

Consider a 3-bit example for simplicity. All possible values are listed below:

```
A. 000
B. 001
C. 010
D. 011
E. 100
F. 101
G. 110
H. 111
```

If you interpret these as unsigned integers, everything is straightforward. The highest value, 7, is on line H. Why is it 7? Because it is the sum

$$1\times2^2 + 1\times2^1 + 1\times2^0 = 4+2+1 = 7$$

The digit in each bit position is multiplied by a weight, which is a power of two. If you want to represent signed numbers, you just assign the most significant bit (MSB) a negative weight, so that line H would be interpreted as

$$-1\times2^2 + 1\times2^1 + 1\times2^0 = -4+2+1 = -1$$

The lowest, or most negative, number you can have is the negative weight without any positive weight to offset it. This is the case in line E, which is

$$1\times2^2 + 0\times2^1 + 0\times2^0 = -4+0+0 = -4$$

Line D shows the largest, or most positive, number you can have. This is all the positive weight with no negative weight, or

$$-0\times2^2 + 1\times2^1 + 1\times2^0 = -0+2+1 = 3$$

Notice that all the numbers in which the most significant bit is 1 *must* be negative, because the negative weight is greater than all the possible positive weight. That's why the MSB is called the sign bit.

If you try this for other sizes of integer (try 4 bits and 8 bits) you will see that the absolute value of the most negative number is always one more than the value of the most positive number. Remember that only the most significant bit has a negative weight.

Let's write out all the possible values of a 4-bit number. There will be twice as many combinations as for a 3-bit number.

```
I. 0000    Q. 1000
J. 0001    R. 1001
K. 0010    S. 1010
L. 0011    T. 1011
M. 0100    U. 1100
N. 0101    V. 1101
O. 0110    W. 1110
P. 0111    X. 1111
```

The sign bit here is 1 starting at Q, so the negative numbers are Q through X. The point here is that 101 is a negative number if we're considering 3-bit signed integers, but if you moved the value 101 into a 4-bit integer, it would be 0101, as in N above. Since the sign bit is 0, our negative number has become a positive number! This will never do.

To preserve the sign of a number when moving it to a larger size integer, the number must be sign-ex-

tended. This means that the value of the most significant bit in the small size integer has to be copied into all the extra bit positions of the larger integer. 101 copied into a 4-bit integer would be 1101. Copied into an 8-bit integer, it would be 11111101. If you do the arithmetic, you will find that the weighted sums of the three numbers are all equal to -3.

This system is not an accident. It makes computer arithmetic possible. The way most computers subtract b from a is to make b negative and add the two numbers. Let's take a concrete example, again using 3-bit numbers. Say we want to subtract 2 from 3. Not much choice with these small numbers :-)

```
  3    011
- 2   -010
  -    ---
```

The number 2 is represented in 3-bit binary as 010. To make it negative, we first change all zeros to ones and all ones to zeros, giving us 101. Then we add one to the result, giving 110, which is -2 in this system. Adding the two numbers gives us

```
   3       011
+(-2) +    110
  --      ---
   1      1001
          ^------ carry
```

We get a carry out. Since we have only 3-bit registers, the carry out is discarded, and we're left with 001, which is the right answer.

When you reverse the ones and the zeros of a number N, you're said to be taking the one's complement of N. If you then add one to that number, you have the two's complement of N. Signed integers represented in the way I've just discussed are often called two's complement signed numbers.

Proper Diskette Usage and Care ...

(please disregard ... its only humour)

Never leave diskettes in the drive, as the data can leak out of the disk and corrode the innermechanics of the drive. Diskettes should be rolled up and stored in pencil holders.

Diskettes should be cleaned and waxed once a week. Microscopic metal particles may be removed by waving a powerful magnet over the surface of the disk. Any stubborn metal shavings can be removed with scouring powder and steel wool. When waxing a diskette, make sure the surface is even. This will allow the diskette to spin faster, resulting in better access time.

Do not fold diskettes unless they do not fit into the drive. 'Big' diskettes may be folded and used in 'little' drives.

Never insert a diskette into the drive upside down. The data can fall off the surface of the disk and jam the intricate mechanics of the drive.

Diskettes cannot be backed up by running them through a photocopy machine. If your data is going to need to be backed up, simply insert two diskettes into your drive. Whenever you update a document, the data will be written onto both disks. A handy tip for more legible backup copies: Keep a container of iron filings at your desk. When you need to make two copies, sprinkle iron filings liberally between the diskettes before inserting them into the drive.

Diskettes should not be removed or inserted into the drive while the red light is on or flashing. Doing so could result in smeared or possibly unreadable text. Occasionally, the red light remains flashing in what is known as a 'hung' or 'hooked' state. If your system is hooking, you will probably need to insert a few coins before being allowed to access the slot.

If your diskette is full and needs more storage space, remove the disk from the drive and shake vigorously for two minutes. This will pack the data enough (data compression) to allow for more storage. Be sure to cover all openings with Scotch tape to prevent loss of data.

Data access time may be greatly improved by cutting more holes in the diskette jacket. This will provide more simultaneous access points to the disk.

Periodically spray diskettes with insecticide to prevent system bugs from spreading...

You can keep your data fresh by storing disks in the vegetable compartment of your refrigerator. Disks may be frozen, but remember to unthaw by microwaving or briefly immersing in boiling water.

'Little' diskettes must be removed from their box prior to use. These containers are childproof to prevent tampering by unknowledgeable youngsters.

You can recover data from a damaged disk by using the DOS command FORMAT/U, or alternately by scratching new sector marks on the disk with a nail file.

Diskettes become 'hard' with age. It Is important to back up your 'hard' disks before they become too brittle to use.

Make sure you label your data. Staples are good way to permanently affix labels to your disks.

Useful Acronyms

People Can't Memorize Computer Industry Acronyms

ISDN	It Still Does Nothing
APPLE	Arrogance Produces Profit-Losing Entity
SCSI	System Can't See It
DOS	Defunct Operating System
BASIC	Bill's Attempt to Seize Industry Control
IBM	I Blame Microsoft
DEC	Do Expect Cuts
CD-ROM	Consumer Device, Rendered Obsolete in Months
OS/2	Obsolete Soon, Too.
WWW	World Wide Wait
MACINTOSH	Most Applications Crash; If Not, The Operating System Hangs

The Land of Games

Andrew McIntosh

Hi! ... I'm Andrew.

I go to Marc Garneau CI. I am currently in grade 9. I love Customizable Card Games and play the Star Trek TNG CCG along with other including the Star Wars CCG, Netrunner, Galactic Empires and Sim City. I enjoy Role Playing Games, for instance - Advanced Fighting Fantasy and Advanced Dungeons & Dragons. I also play Star Fleet Battles and I'm looking for someone to play with (I love Tholians, Romulans and Lyrans). The SFB modules I have are:

The Basic Set,
Advanced Missions,
C1 New Worlds,
C2 New Worlds II,
D3 Booms and Saucers,
K Fast Patrol Ships,
M Star Fleet Marines,
T Tournaments.

My Internet address is andrew.mcintosh@ablelink.org.

My favorite TV shows are Star Trek (all incarnations), Babylon 5, Simpsons and most anything else.

Here are some links to other Web sites:

http://www.decipher.com
- Decipher card games

http://www.kli.org
- Klingon Language Institute
http://www.babylon5.com - Babylon 5 site

My top 10 favourite Hobbies and Interests are:
10. Most anything else
9. Web Browsing
8. Using BBS's
7. Playing online games
6. Reading Anything (mostly Sci-Fi)
5. Star Fleet Battles
4. Computer Games (anything)
3. Babylon 5
2. Star Trek (all kinds)
1. Customizable Card Games (all kinds)

Crashing

Tom Haslehurst

Hello everyone. I hope everyone had an enjoyable Holiday Season. Now we can go back to relaxing in front of our Commodore computers.

I had planned to write an article about the use of Light pens, but due to circumstances, I have decided to write something different in this issue. You see, I had my C128 crash on me. I turned it on and by golly if the space bar and shift keys did not work any longer.

As an enthusiast I have acquired a small collection of equipment, and therefore was able to hook up my C64 as a replacement. This will become an inconvenience though, when I decide or need to access my software that is only for the 128. Like most commodore users, a large majority of my software is 64/128 compatible and luckily I was able to use the C64 to help out a member who was having some minor difficulty with his GEOS. The question now arises, what to do about getting my 128 fixed up or replaced?

Here is where my membership with TPUG becomes an advantage, and can be advantageous to all Commodore users. We as members have the luxury of having a pool of other members with whom we can brainstorm over our problems. We can deal with problems like mine or lesser problems as they occur. When a hardware problem happens, you can feel a little helpless. If you happen to be like me and are not a 'techie' and feel a little insecure about opening up your computer without some friendly backup, or not having all the proper tools to even tackle the job if you knew how, then becoming a member of TPUG is extremely useful. The club has members who have a great working knowledge of the insides of the Commodore machines. They also have diagnostic equipment which can check over your

machine and tell you within minutes what is the cause of your problem. Then it can be quickly determined what it is that needs to be done to get you back up and running. I talked with the president the other day and he will have the diagnostic tester at the next meeting, so we can check out my machine. Hopefully it will only be a minor problem such as a good cleaning :) but if not, I will still have options open to me by being a member of TPUG. If my problem turns out to be a burned out chip, then we have people in the club who carry spare parts and can also replace the necessary chips needed. If the problem is more serious than that, there is also the opportunity to pick up used hardware from individuals who may have extra hardware available to sell. In fact I was chatting with another member over the holidays and was mentioning my dilemma to him. He informed me that he had a spare 128 available if I should be in the market for another machine. We also have the luxury of Joe Palumbo being a member of the club. As you may know Joe is the owner and operator of JP PBM Products by Mail. Joe has probably the largest selection of Commodore equipment in the Greater Toronto Area, see his advertisement in the newsletter.

To all you Commodore users who are using your equipment on a regular basis, or may have important files you need constant access to, try and talk your better half into allowing you some storage space for extra backup equipment. The alternative though is to keep up your TPUG membership for those times when your machine fails which inevitably it will. Then you will never have to worry about how you are going to carry on without your dear Commodore.

Using Zip Drives on the Amiga – Part Two

John Buller

In the last issue I wrote about connecting Iomega zip drives to your Amiga. This time I'll explain how to format and mount zip disks. I'm going to tell you what works for me. There is a lot more to this than I'm going to cover here, and if any of you readers have additions or corrections, please write us a letter, or better still, an article on the subject.

Most of you format floppy disks all the time, but if you're like me, you don't format hard drives often enough to remember the process between one time and the next. Because zip disks are removable media, you have to format each disk you use, just like a floppy disk. Fortunately, you won't have to format very many zip disks because they hold so much data.

Use your HDToolBox to format a zip disk. In my A3000, the path is System2:Tools/HDToolBox. The pathnames on your machine may differ. I'll try to describe the formatting process from beginning to end in the right order. This is the description for the A3000 SCSI controller. If you have a different SCSI controller, the user interface may be different, but the steps are essentially the same.

With the zip drive connected and a zip disk in the drive, boot your Amiga. Open the Tools drawer and double-click on the HDToolbox icon. You will see the program check for any SCSI devices connected. After a few seconds, the program will display a table of all the SCSI devices it found on the bus. If the zip drive is connected correctly, one of the lines in the table will describe it. My table had two lines, and looked roughly like this:

```
              Hard Drives in System
Interface Address LUN  Status      Drive Type
-----------------------------------------------------
SCSI      0       0 Not Changed QUANTUM EP52S
SCSI      6       0 Unknown
```

The top line is my hard drive. The line marked "Unknown" is the zip drive. Usually the only "Unknown" device is the one you want to format. In this case, notice that the Address column for the unknown device has the number 6. This is the SCSI device number I mentioned in the previous article. Remember that the zip drive device number can be either 5 or 6. Use the mouse to select the 'Unknown' line. This is important, since you don't want to format your hard drive by mistake. There are a bunch of buttons below the device table. Use the Help button for a reality check. It will supply some of the information I'm giving you here, but in a sketchy form. Press 'Change Drive Type'. (You get a new window). Press 'Define New' (Another new window). Press 'Read Configuration'. The program will read some information from the drive itself, and it will guess at a few things. Agree with all its choices unless you have a good reason for doing otherwise. Press 'OK' (window closes), press 'OK' again (window closes), and you are back in the main window of HDToolBox. Now the selected line will look something like this:

```
SCSI   6      0 Changed    IOMEGA ZIP100 rev.no.
```
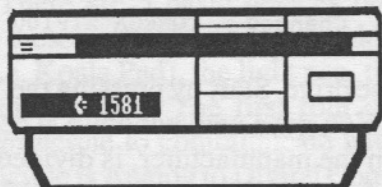
Now partition the drive. Start by pressing the 'Partition Drive' button. (You get a new window). The zip disk, as it comes from the manufacturer, is divided into two partitions, both formatted for either Mac or MS-DOS. The bar across the top of the window shows the space occupied by each partition. You should use the Help button and play around with this window to get the feel of it. To make one big partition, select the partition on the right and delete it. Then drag the arrowhead below the bar all the way to the right to enlarge the remaining partition to fill the whole disk. When you're satisfied, press 'OK' and return to the main window. Now press 'Low-level Format Drive'. This process takes a few minutes. When that's done, press 'Verify Data on Drive'. It also takes a little while, but it checks the integrity of the disk, and isolates any bad blocks. Now press "Save Changes to Drive". At this point, the program will tell you that a reboot is necessary. After you reboot, You will notice that you have a new icon labeled 'IDH0:NDOS'. Click once on this icon, and choose 'Icons | Format Disk' from the workbench menu, just as though you were formatting a floppy disk.

It seems that if you format the zip disk this way, you don't have to do anything special to mount it. If you have the drive connected and a disk loaded when you boot, it is mounted by the same program that mounts your hard drive. If you just want to store data in Amiga format, this may be all you need.

If you want to read or write PC-formatted disks or do anything fancy, you will have to sit through my disjointed, rambling discussion of mount files, which - you guessed it - isn't finished, so you can read about it in the next issue.

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