TOSIE Toronto Ohio Scientific Idea Exchange

July 31,1983
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# THE TOSIE PRINTOUT



## Club News by Paul C.

- Make sure you read about the soon to be ready 'Hacker'!! (I sure hope after all this that it works)

- We have booked the same room for our meetings this fall. The meetings are still the last Sunday in September,October and November from 12 to 5.
Please note, NO MEETING IN AUGUST!

- Still not much in the way of submitted articles, so, we have decided to do things the honourable way and bribe you. As of August 1, 1983 members will receive $1.00 credit towards membership and room dues for each typed page of articles or letters or whatever. I know it's not much but I can think of a couple of people who won't be laying out anymore cash.

- OSIO a user group in Virginia has announced a new disk operating system OS65Dv5.1 . This is not an official OSI operating system so we assume it doesn't have any of OSI's official BUGS. What it does have for example is a CALL statement, hex number inputs, expandable BASIC transient library, etc. The cost to OSIO members is $10 and $50 to non-members. I have already written their club to see what arrangement we can come to about the price, so if you are interested let me know.
Paul C. 519-925-5561

- Start saving your 'junk' for our annual electronic junk sale at the November meeting.

- Have a good summer and we'll see you in September.

## HELLO

The TOSIE PRINTOUT has a new EDITOR ,Paul Vail ,by the way that's me. As with all the previous editors my job is to go through all the articles mailed in by our members and assemble them into a newsletter. So much for theory, in practice the editor usually becomes the writer,due to the post office losing all those articles. So unless you want to here me ramble on about C2-8P DF's for the next year,when you mail out an article,send 8 to 16 copies just to be safe.

As you can probably tell by now I have a C2-8P with 8" drives , I also have a whole mess of OSI boards and a recently aquired Superboard rev.D ,and a Gemini 10X printer.If you have any questions on an OSI piece of hardware,or any questions , let me know and I'll write an article , if you know all about a board or have a great circuit send in an article. Most of my projects involve hardware for my 8P ,when posible I'll provide modifications for Superboards now that I own one again. If Paul C. doesn't beat me to it I'll be doing a review of the Gemini 10X printer but I have only had it running a few days and have not had a chance to play with all the features.( P.S. This part of the newsletter was printed on the 10X using WP6502)

## 101 USES FOR A DEAD MICROPROCESSOR

The following list was sent out to several MICROSOFT distributors and has been floating around ever since . The remaining 61 uses for a dead microprocessor ( origionally inspired by a pile of questionable NEC 8080A's ) will be printed as soon as someone thinks them up.

1 Mustache comb
2 Scarecrow for centipedes
3 Crampons
4 Cat brush
5 Doormat to scrape off mud
6 Jail for ants
7 Paper spindle
8 Back scratcher
9 Barretes for hair
10 Thumbtacks
11 Bed of nails for a fakir
12 Cleats
13 Booby traps
14 Aggregate for concrete
15 Cleaning finger nails
16 Fishing lure
17 Miniature lightning rods
18 Barbed wire for slugs
19 Self-piercing earings
20 Japanese torture instrument (NEC parts)
21 'Punk' jewellery
22 Trellis for fungus
23 Coffins for blown transistors
24 Cookies
25 Shingles
26 Temporary surgical sutures
27 Concurrent toothpicks
28 False eyelashes
29 Taps for shoes

02....

30 Toupee for marines
31 Lapel pins
32 Self adhesive bandages
33 Prosthetic cat claws
34 Headstone for dead EPROMS
35 Putting vent holes in pies
36 Poker chips that won't slide off the table
37 Dart like game (throw at flowcharts on a wall
38 Tire poppers for terrorists to spread on the road
39 Tiny harrow (pulled behind TONKA tractors)
40 State of the art cheese grater

## Baud Rate Generator

by Paul T. Vail

A few weeks ago I was attempting to calibrate the 555 Timer used as a baud rate generator for the serial port on my 430B I/O Board without a scope and gave up in disgust . While the stability of a 555 is adequate,it is annoying if you want to change the baud rate at a moments notice .

Rather than grabbing a handfull of TTL and a trusty 2.4576 MHz crystal I chose to use a COM 5016 Baud Rate Generator IC. The chip contains two * 16 output frequencies with on chip crystal oscillator.The output frequency is 16 times the baud rate as most UARTs and the 6850 ACIA will divide the clock input by 16 to permit internal syncronzation with the incoming data . A usefull feature about the 5016 is the 4 bit select for each output can be latched with a positive strobe or tied high . The strobe feature could be used write the desired baud rate into the chip with a minimum 150 nS pulse.

The anoying feature about the 5016 is that it requires +5V and +12V (the strobe and select inputs are still TTL levels). The two supplies is no problem if you have an 8P , if you only have +5V the COM 8116 is a single supply version of the 5016 ,to use it leave pin 9 unconnected . I used the 5016 not to annoy people with single supplies but because the chip and crystal cost me $5 on a scrap board .

The outputs could be used to drive separate transmit and recieve clock inputs of a 6850 or S1883 (UART on the 430B board) or have a common clock and drive two ACIAs or UARTs , that decision will have to be worked out by the user. Since club members have a wide variety of boards using the 6850 ACIA and a few own a 430B I'll only explain what pins to connect to .

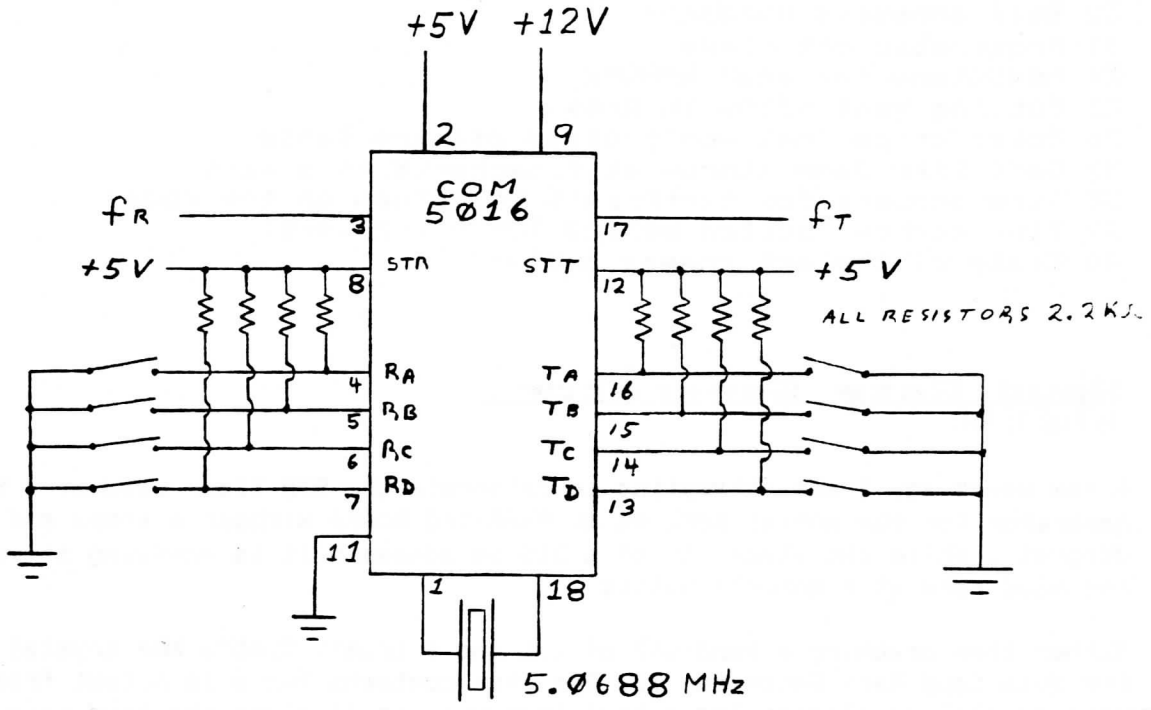
Connecting to a 6850 ACIA:
PIN 3 Recieve Clock
PIN 4 Transmit Clock
(used on 600B,600D,502,500,510,555,550,505A,and 505B boards)

Connecting to UART on 430B: An easy method of connection is to remove the 555 timer and connect to PIN 3 . If separate transmit and recieve clocks are desired;
PIN 40 of UART is TX clock
PIN 17 of UART is RX clock

SWITCH SETTINGS
(0=GND 1=+5V)

| DCBA | BAUD RATE |
|---|---|
| 0000 | 50 |
| 0001 | 75 |
| 0010 | 110 |
| 0011 | 134.5 |
| 0100 | 150 |
| 0101 | 300 |
| 0110 | 600 |
| 0111 | 1200 |
| 1000 | 1800 |
| 1001 | 2000 |
| 1010 | 2400 |
| 1011 | 3600 |
| 1100 | 4800 |
| 1101 | 7200 |
| 1110 | 9600 |
| 1111 | 19200 |

BAUD Rate Generator




## Relocating the OSI EXT. MONITOR

Anybody who has used the cassette version of the OSI Extended Monitor for any period of time has discoverred that it is located in a rather inconvenient location ,especially if you like to use the ASSEMBLER EDITOR .For those of you who are not used to this problem they occupy the same area of memory and each take over 10 minutes to load at 300 baud .The EM occupies $0800 to $0FFF which is great if you only have 4K of memory. It is usually preferrable to locate the EM to the top 2K of available memory ,in an 8K system this would be from $1800 to $1FFF.
The Em has a command to relocate machine code to a new area of memory adjusting all absolute addresses for the new block.The format to relocate a block of code is RNNNN=SSSS,EEEE .

The starting address of the block to be moved is SSSS ,the end of the block is EEEE ,and the starting address of the new block is NNNN .All addresses and numbers are in hex .

The EM once relocated cannot be used untill the jump table located from $0960 to $0999 is moved and adjusted for the new location .The table contains the jump values for the different instructions of the EM ,the value of each address is stored in the usual low byte high byte format ,so every other byte from $0961 to $0999 has to be adjusted by the new offset .One other location to be adjusted is the address stored at $0864/$0865 ,$0864 contains $09 and $0865 contains $08 ,the address stored is $0809.

To relocate the EM to the top of an 8K system load in the EM and type R1800=0800,0FFF . The contents of $0864/$0865 is change from $0809 to $1809 and stored at $1864/$1865 . So $09 is stored in $1864 and $18 is stored in $1865 . The table at $0960 to $0999 is moved in the same way .

To run the newly located EM start the program at $1800 ,press BREAK M . 1800 G .

# READ THE KEYBOARD WITHOUT POKE 530,1

Once POKE 530,1 is in executed in your program, you can no longer use control C to stop your program. This is a nuisance, but also makes a program more difficult to debug. For instance, you can't stop a program, check variables, and restart with the CONT command.

Beside this, the recommended way of polling the keyboard (OSI graphics manual p.13), requires you to POKE, then PEEK the keyboard. This is slow.

Here is a tidier way to look at the keyboard.

Early in the program (before reading the keyboard) execute the following line line. Note that the correct DATA must be read. Make sure that the DATA is not confused with other DATA statements.

```
100 FORI=576TO588:READK:POKEI,K:NEXT:POKE11,64:POKE12,2
6000DATA169,127,141,,223,172,,223,169,,76,193,175
```

NOTE the double commas are intentional, they read as if there were a 0 between them.

Now whenever you want to read row 7 (the 1 to 7 keys), enter:
200 K=USR(K)
Variable K now contains the value of the key pressed.

This is faster than the POKE and PEEK routine, and there is no need to POKE 530.

If you wish to read another keyboard row, change the second byte of the DATA statements. It now contains a 127, thus to poll row 0 (shift, esc ) change this to a 254. For further details on this see page 12 of the graphics manual.

If you are beginning in Assembler, you may want to know how it works.

The POKE to location 11 and 12 set the user vector (where P=USR(P) goes) to $0240. The loop READs the DATA and POKEs the following code into memory starting at $0240:

```
0240 A9 7F   LDA #$7F        load the accumulator with a 127 ($7F)
0242 8D 00 DF STA $DF00      store this value at 57088, the
keyboard-like POKE
0245AC 00 DF LDY $DF00       load Y at 57088 -like PEEK
0248 A9 00    LDA #$00        load the Accumulator with a 0
024A 4C C1 AF JMP $AFC1      Jump to the ROM routine that puts the
values of the Accumulator (high part) and the Y register (low byte)
into the variable used in the USR statement.
```

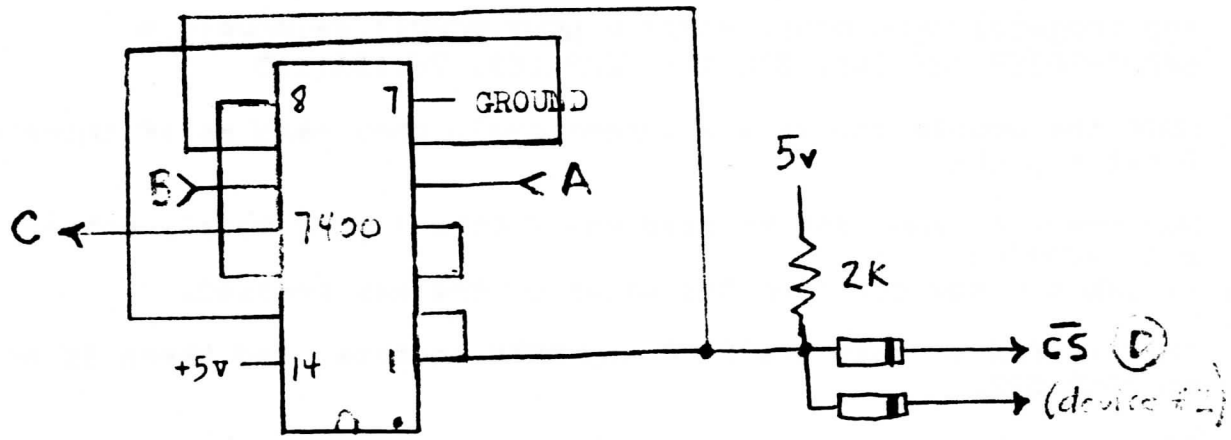
That's all there's to the whole routine!

## RUNNING THE AY3-8910 SOUND CHIP - WITH THE 2MHZ CLOCK

Firstly, do connect the AY3 clock (pin 22) to the 2 meg clock signal, whether the processor runs at 1 or 2 meg. You will get better control of the tones produced.

As you may have heard the AY3 does not run when the processor is running 2meg. The reason is that this chip is just too slow. The simplest way to still allow the processor to run full speed most of the time is to use a switchable clock. The circuit below does this using a single 7400 chip.

Several different devices can be attached, one diode for eah one. I have also tried to add a manual, debounced swithch. This worked, but hasn't been totally reliable. However when used as shown below, it has never failed me yet.




A - 2 MHZ clock in ( from u29 pin 8 Superboard rev. D)
B- 1 MHZ clock in ( from u29 pin 11 or original trace)
C - 1 or 2 MHZ clock out - to pin 37 of the 6502. Remember that the original trace will have to be severed.
D - To the chip select (active low) of the AY3 , if you used the design in the OCTOBER '82 issue of the printout, this is pin 24 of the AY3 chip.

NOTE; The eprom programmer must still run at 1 MHZ, unless the critical timing loop in the software is modified. Does anyone have the eprommer(described in the March and April 1983 issues) built? Let me know.

John Horemans.

PERSONAL NOTE; I am away on vacation during JJly and August. Since I will be in the U. K. I will be keeping a lookout for OSI related material. My wife, who is already there, tell me she has picked up some interesting magazines. I hpe to see a few more.

Space- Com International
22991 La Cadena St
Laguna Hills, CA 92653 (714) 951-4648

## OSI HARDWARE BARGAINS LIST

| Description | Status | Price |
|---|---|---|
| C1P 8K cassette based computer | demo | $175 |
| C4PMF 24K computer w/disk drive | demo | $500 |
| C4P 8K cassette based computer | as is | $250 |
| Tec model 501 CRT | demo | $300 |
| Hazeltine 1420 CRT | demo | $400 |
| Okidata SL125 parallel printer | demo | $1200 |
| Okidata SL160 parallel printer | demo | $1400 |
| Texas Instruments 825 RO printer | demo | $900 |
| Tally 1805 serial printer 200 cps | demo | $1200 |
| Siemens 8" S/S disk drive | as is | $150 |
| C8P 8 slot chassis w/power supply | demo | $250 |
| Tandon 5 1/4' disk drive | like new | $100 |
| OSI keyboard w/case & 10 key pad | new/like new | $50 |
| OSI keyboard w/case w/o 10 key pad | new/demo | $30 |
| OSI keyboard case | demo | $10 |
| 540 video board | as is | $49 |
| 502 CPU video based 8K ram / 8K rom | as is | $49 |
| 505 CPU w/disk controller | as is | $75 |
| 510C CPU 6502/Z80 | as is | $99 |
| CA-10-1 serial interface board | as is | $49 |
| CA-9 parallel interface board | as is | $49 |
| CA-15 telephone interface board | ~~DEMO IS~~ NEW | ~~$99~~ $299 |
| Tandon 5 1/4" disk drive s/s | demo | $99 |
| 5" & 8" disk drive ribbon cables | as is | $20 |

** We will also accept reasonable offers on all items listed **

# The T.O.S.I.E. Hacker #1

Yes Virginia, its almost done. The night I wrote this the art work was on its way to the blue print shop, and by the time you read this the negatives should be ready to produce our boards. In case you still don't know what we're talking about lets go over it once more.

- 40 to 48 pin connector, the board runs on the OSI 48 pin bus or the C1/Superboard 40 pin bus, while acting as an adapter between the two. (unbuffered)

- Two AY-3-8910 programmable sound generators, if you are not familiar with this chip visit an Arcade and listen, or try reading your TOSIE Printout back issues. $17.50 each

- 1024 programmable 8x8 characters in addition to the original 256 OSI characters. Read that again, *1024!*

- Optional external control will allow selection of any and or all of the 1280 characters on the screen in any combination at the same time!

- 1-2 MHz dual speed clock with hard and soft control to select speed. This clock allows switching speeds while running, without the CPU crashing.

- Compatible with any video system using an OSI style character generator rom. e.g. C1,Superboard,540,Seb-3,etc.

- 12k of addressable space for 2716 Eproms and/or 6116 style static rams. 6 chips 2K x 8

- Two sixteen bit I/O ports available to dip headers from the sound chips. Note: TOSIE has already published an EPROM programmer that runs from one of these ports!

- Low cost! This project is to be sold at cost to club members, slightly higher for non-members since support for this project will be printed in our newsletter.

- Estimmated cost $35.00 for the bare board. (Looks like it might go lower but we won't know till they're made)

- Cost of populating this board could be substantial, but it will work fine with limited parts leaving room for future expansion to the full features of this board.

Continued.....

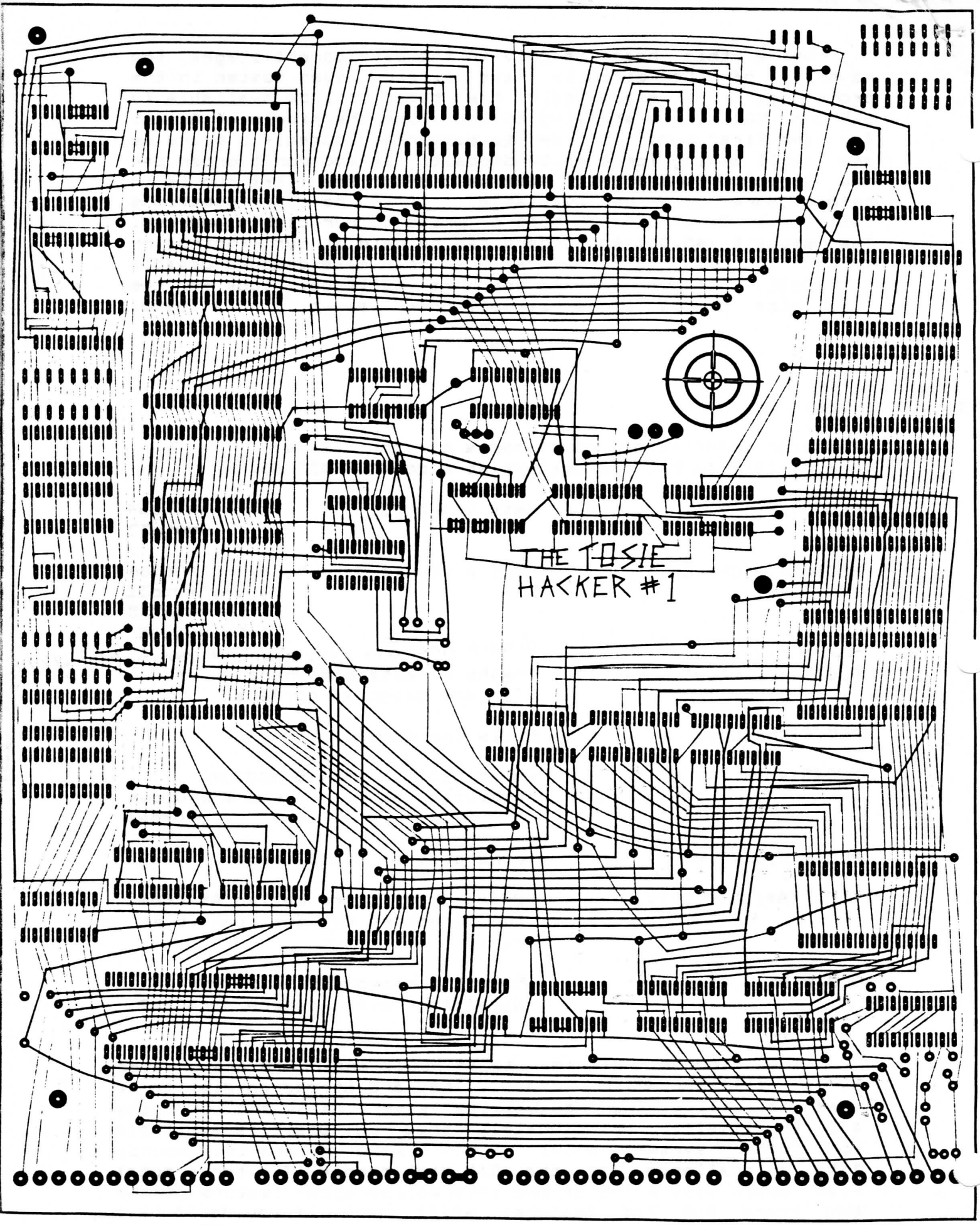
While this board is only in the development stages, the majority of the circuits have already been tested in the prototype. The exact date the board will be available is unknown but it is starting to look like the middle of August for the first run. In order to guarantee yourself a board we are still asking for a $5.00 deposit. If you don't order one now it could be a 6 to 10 week wait after the first run is in before more will be available. If you have any questions call Paul C. at 519-925-5561 or write to our club's address. The deposit ($5.00) for orders can be paid at our meetings or mailed (no cash) to our address, you can make cheques payable to TOSIE. If you want to see what you'll get, look for the full size double sided circuit board layout in this issue.

## Plot Basic

For your information, compliments of John Markle.
Available from OSI and dealers at a cost of $35 US.

| | | |
|---|---|---|
| PLOT0(x,y) | Sets the origin | where x=0to64<br>y=0to32 |
| PLOT1(x,y,Chr,Col) | Plot a square | where x+x'=0to64<br>y+y'=0to32<br>Chr=0to255<br>Col=0to15 |
| PLOT2(x,y,x',y',Chr,col) | draw a line from xy to x'y' with character (chr) and color | |
| PLOT3(x,y,x',y',Chr,Col) | Create a rectangle where xy and x'y' are diagonal corners. | |
| PLOT4(Chr,Col) | Fills the screen. | |
| PLOT5(x,y) | Point plot in 64x128 medium resolution mode | where x=0to64<br>y=0to64 |
| PLOT6(x,y,x',y') | Line plot in 64x128 mode. | |
| PLOT7(A$;B%(0,0);x,y) | Bring in a figure called A$ from the directory and position it at x,y. | |
| PLOT8(B%(0,0),dir) | Move the named figure in the direction 'dir' | where dir=0to9 |

The figures referred to in PLOT7 and PLOT8 are created by a utility called 'draw'. They are stored on disk to be used at will. The draw utility is very handy and worth the $35 in itself. Unfortunately this PLOT Basic is available for colour systems only. I don't know why and this sounds like a challenge for the C1P disk people. (Editor's note: Plot Basic uses a lot of the inverse character feature of the 540 board but the features still work if you don't have colour. If you would like to see it work ask Paul C. at one of the meetings.)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