PORT FE

SORCERERS USERS' GROUP

(Toronto)

P.O. Box 1173 Sta. 'B'
Downsview, Ontario,
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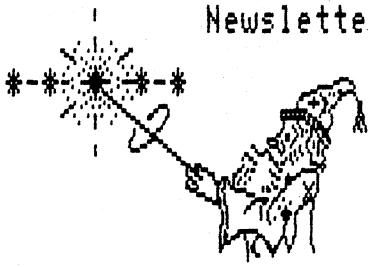
SORCERER

Newsletter



The Toronto Sorcerer Users' Group was founded in the Spring of 1979, a handful of willing and eager to learn members.

This newsletter shall at all times keep in mind the goal at its conception. To spread the seeds of knowledge.

Articles printed in this newsletter shall be free for all Sorcerer Users' groups to reprint or comment on as they see fit.

Articles submitted for this newsletter must be in no later than the beginning of the 1st of every month.

December 1981 ISSUE

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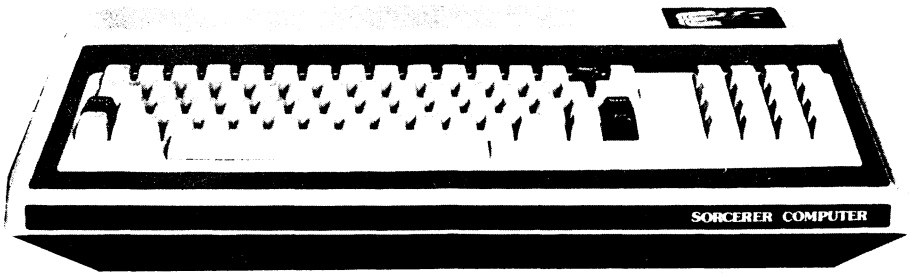
MEETING PLACE

Location : Bathurst Heights Library - Date: Wed. Dec. 16 - 7:00 PM
3170 Bathurst St.

One block north of Lawrence on the west side of Bathurst.



Merry Christmas to All

We wish you a Merry Christmas, we wish you a Merry Christmas & a Happy New Year

From all of us to all of you

We are pleased to announce the following new Excecutive for the 1982 season.

1982 OFFICERS

President.....	Tony Lautenbach	223-9238
Vice-President.....	Ed McLean	749-0691
Treasurer.....	Duncan E Lang	461-2224
Corresponding Dir..	Frank Aylesworth	488-5299
PORT FE Director...	Heinz Benedikt	483-5642
PORT FE Editors....	Tony Lautenbach	
	Jacques Giraud	
PORT FE Publisher..	Heinz Benedikt	
Software Chairman..	Tony Bagshaw	881-1532
Awards Chairman....	Bob Simpson	225-6193

We trust that should anyone have any inquires, that they will call or write. All inquiries should be sent to PORT FE attention - Corresponding Director. All membership renewals should be to the attention of - Membership Chairman.

Outcome of the Elections were not too surprising, but one aspect was.

ALL OFFICERS WERE VOTED IN BY ACCLAMATION

We are glad to see that EXIDY has been running some current ads in some of the magazines. Mind you, as I pointed out to you all in past issues of PORT FE they have geared this advertisment toward the business sector.

SMODEM UPDATES

To all of you that have been following the modem program information and are running Micropolis disk systems There have been attempts made to run SMODEM Ver. 3.4 without the external serial port. To date it has been somewhat of a limited success. Hopefully soon we will have it running on the Sorcerer Serial port. To date the external serial program has been running very well. We have been able to implement an external program for the fifty two telephone numbers. This has allowed for external editing and changes to the directory, plus the added features of calling and creating as many (52) entry directories as one wishes

The current vers. available is in the works for the next library tape, unfortunatly it was not possible to include this on the second library tape release. The program is just too long in the ASM file format. This file is approximately 70K in length.The compiled program is down to 12K machine language and will be on the next library tape. This program will only run with the Thinker Toys DISCUS system OJII controller board, and utilizing the on board serial interface. Other versions may be available on the library tape at a later date, so keep posted.

The Editor

This example shows the PIP patching procedure by entering the source code for the custom I/O drivers as an assembly language source file. This file is then assembled into a ".HEX" file. The program listing below shows the MCS 8009A serial port patching example. Note that the equate "PIPENTRY" in the file must be set to the address presently at locations 0101H and 0102H in your version of PIP. The example shown is fully compatible with the PIP programs supplied with both CP/M Versions 1.4 and 2.2.

```
;--------------------------------------------------------------------
; DIRECT PIP I/O PATCH PROGRAM FOR PIP 1.4 AND PIP 2.2 INP: AND OUT:
;--------------------------------------------------------------------
;
;       THIS PATCH FILE IS USED TO OVERLAY THE FIRST PORTION OF THE
;       DIGITAL RESEARCH "PIP.COM" FILE TO PERMIT THE BUILT-IN PIP
;       PHYSICAL DEVICE REFERENCE NAMES "INP:" AND "OUT:" TO BE
;       USED. THE ENTRY INFORMATION IS AS FOLLOWS:
;
;       A) INITIAL EXECUTION ENTRY OF PIP FROM ADDRESS 0100H PASSES
;          CONTROL INITIALLY TO AN INITIALIZATION ROUTINE TO INITIALIZE
;          THE CUSTOM I/O DEVICE(S). COMPLETION OF INITIALIZATION PUTS
;          CONTROL TO THE NORMAL PIP ENTRY POINT.
;
;       B) IF PIP COM IS CALLED WITH A COMMAND LINE LIKE:
;
;               A)PIP FILENAME.TYP=INP:(cr)
;
;         PIP WILL EXPECT INPUT FROM AN I/O ROUTINE PATCHED INTO
;         PIP.COM BY CALLING I/O ROUTINE ENTRY POINT AT ADDRESS 0103H.
;         THE INPUT CHARACTER IS PASSED BACK TO PIP IN LOCATION 0109H.
;         PARITY MUST BE STRIPPED FROM INPUT CHARACTERS.
;
;       C) IF PIP.COM IS CALLED WITH A COMMAND LINE LIKE:
;
;               A)PIP OUT:=FILENAME.TYP(cr)
;
;         PIP WILL SEND OUTPUT TO ROUTINE PATCHED INTO PIP.COM BY
;         BY CALLING I/O ROUTINE ENTRY AT ADDRESS 0106H. THE OUTPUT
;         CHARACTER IS PASSED FROM PIP IN THE (C) REGISTER.
;
;
;       THIS DEMONSTRATION VERSION OF CUSTOM PIP PATCHING ASSUMES THAT
;       IT IS DESIRED TO PATCH PIP TO UTILIZE THE SECOND SERIAL I/O
;       PORT OF A MONOLITHIC SYSTEMS INC MSC-8009A Z-80 CPU CARD. THIS
;       PORT IS AN 8251A USART WITH BAUD RATE CONTROLLED BY ONE OF THE
;       COUNTERS IN AN 8253 CHIP. THE OPERATION HERE DEMONSTRATES USE
;       OF THE PORT FOR BOTH INPUT AND OUTPUT FUNCTIONS. IT IS INITIAL-
;       IZED TO 300 BAUD, 8 BITS NO PARITY, AND ONE STOP BIT.
;
;--------------------------------------------------------------------


;MSC 8009A SECOND SERIAL CUSTOM PORT CONFIGURATION
;
;   RS 232 PORT EQUATES FOR MSC 8009 Z-80 BOARD
;
;
CCTRL   EQU     0CFH            ;CUSTOM 8251A CONTROL PORT
CSTAT   EQU     0CFH            ;CUSTOM 8251A STATUS PORT
CDATA   EQU     0CEH            ;CUSTOM 8251A DATA PORT
```

```
;
TCC     EQU     0DFH            ;CUSTOM 8253 TIMER CONTROL PORT
TCR     EQU     0DDH            ;CUSTOM 8253 TIMER REGISTER PORT
TCCW    EQU     076H            ;CUSTOM 8253 TIMER CONTROL WORD
;
SRRDY   EQU     002H            ;8251A RECEIVER CHARACTER READY MASK
SRVAL   EQU     002H            ;8251A RECEIVER READY VALUE
STRDY   EQU     001H            ;8251A TRANSMITTER EMPTY READY MASK
STVAL   EQU     001H            ;8251A TRANSMITTER READY VALUE
;
INITC1  EQU     040H            ;8251A INITIALIZATION ...
INITC2  EQU     04EH            ;...
INITC3  EQU     037H            ;... ALL THREE OF 'EM
;
DCBR    EQU     416             ;DEFAULT FOR CUSTOM PORT AT 300 BAUD
;
;SET PIP JUMP ADDRESS FROM YOUR COPY OF PIP.COM AS VIEWED BY DDT.COM
;AT ADDRESS 0100H.  THE FOLLOWING EQUATE IS SET TO THE JUMP ADDRESS
;FROM LOCATION 0102H/0103H.
;
PIPENTRY EQU    00000H          ;SET BEFORE ASSEMBLYR
;
;ESTABLISH ENTRY POINTS FOR OVERLAY OF PIP.COM PATCH FILE
;
        ORG     0100H           ;BEGINNING OF PIP.COM
        JMP     INITIALIZE      ;GO HANDLE INITIALIZATION OF SIO
;
        JMP     CI              ;CUSTOM INPUT PORT ENTRY LOCATION
        JMP     CO              ;CUSTOM OUTPUT PORT ENTRY LOCATION
;
RETCHAR:
        DB      01AH            ;PIP INPUT RETURN CHARACTER LOCATION
;
;HERE TO SETUP OUR SERIAL PORTS AND THEN PASS CONTROL DOWN INTO PIP.COM
;
INITIALIZE:
        CALL    SINIT           ;SUBROUTINE TO INITIALIZE USART
                                ;  AND TIMER.
        JMP     PIPENTRY        ;OFF TO PIP
;
;
;CUSTOM SERIAL I/O INITIALIZATION ROUTINE
;
SINIT:
;
;SETUP TIMER COUNTER CHIP FOR BAUD RATE CLOCKS
;
        LXI     H,DCBR          ;GET CUSTOM PORT BAUD RATE CODE
        MVI     A,TCCW          ;GET CUSTOM PORT TIMER MODE WORD
        OUT     TCC             ;SEND IT TO TIMER
        MOV     A,L             ;GET LSB'S OF BAUD RATE CONSTANT
        OUT     TCR             ;SEND
        MOV     A,H             ;HIGH BYTE
        OUT     TCR             ;SEND THAT ALSO
;
;
;INITIALIZE THE 8251A WITH TRIED AND TRUE METHOD
;
        MVI     B,020           ;LOOP COUNT
        XRA     A               ;NULL
```

```
INITLP:
        OUT     CCTRL           ;RESET 8251A'S
        DCR     B
        JNZ     INITLP          ;  ... 'TILL THEY'RE GOOD AND DEAD
;
        MVI     A,INITC1        ;SEND THREE ...
        OUT     CCTRL           ;   .  INITIALIZATION CHARACTERS ...
        MVI     A,INITC2        ;   .. TO 8251A'S
        OUT     CCTRL
        MVI     A,INITC3
        OUT     CCTRL
        IN      CDATA           ;PURGE UART GARBAGE
        IN      CDATA
        RET                     ;FINALLY DONE WITH ALL THAT
;
;
;CUSTOM PORT INPUT ROUTINE
;       GETS CHAR TO PIP RETURN LOCATION AT (0109H)
;
CI:
        IN      CSTAT           ;GET READY STATUS
        ANI     SRRDY           ;MASK RECEIVER READY
        CPI     SRVAL           ;COMPARE WITH READY VALUE
        JNZ     CI              ;REPEAT TILL INPUT READY
        IN      CDATA           ;GET INPUT IF READY
        ANI     07FH            ;STRIP PARITY
        STA     RETCHAR         ;PUT INTO PIP RETURN LOCATION
        RET
;
;
;CUSTOM PORT OUTPUT ROUTINE
;       SENDS CHAR IN (C) REGISTER
;
CO:
        IN      CSTAT           ;GET READY STATUS
        ANI     STRDY           ;MASK XMITER READY
        CPI     STVAL           ;COMPARE WITH READY VALUE
        JNZ     CO              ;REPEAT TILL XMITER EMPTY
        MOV     A,C
        OUT     CDATA           ;PUT DATA OUT NOW THAT READY
        RET
;
        END
;
;
;+++...END OF FILE
```

NOTE TO MEMBERS

The up and coming meetings are listed below for your convenience.

January	:	Thurs. 21st	7.00 p.m.
February	:	Wed. 17th	7.00 p.m.
March	:	Thurs. 18th	7.00 p.m.
April	:	Wed. 14th	7.00 p.m.
May	:	Thurs. 13th	7.00 p.m.
June	:	Wed. 16th	7.00 p.m.

The location will be as for 1981 at the Bathurst Heights Library. 3170 Bathurst St. - one block north of Lawrence on the west side of Bathurst.

******* CP/M AUTOSTART *******

METHOD OF ALTERING A CP/M SYSTEM TO ENABLE THE AUTOMATIC EXECUTION OF A PROGRAM UPON START-UP.

You will need MOVCPM.COM,SYSGEN, and DDT.COM to effect the autostart System. These may be removed after the operation has been completed.

Let us assume you have a BASIC program named 'TESTPROG.BAS'. Normally, after loading CP/M you would respond to the prompt A> by typing 'MBASIC TESTPROG' to load BASIC and run the program. In order to use the auto facilities provided in CP/M you need to convert this instruction to Hexadecimal so it would look like:-

```
M  B  A  S  I  C     T  E  S  T  P  R  O  G
4D 42 41 53 49 43 20 54 45 53 54 50 52 4F 47
```

You will need to calculate the length of the instruction - also in hex. In this case 15 characters (the maximum permitted) or 0FH.

Having performed these two procedures all that remains is to insert this information into the relevant part of the CP/M. The following instructions will do this.?

1. Load CP/M
2. Type 'MOVCPM 47 *'<
3. Type 'SAVE 40 AUTO47.COM'<
4. Type 'DDT AUTO47.COM'<
5. Type 'SA07'<

The Sorcerer will respond with each current location as follows (underlined) and I would answer with the hex values previously calculated e.g.

```
0A07 20 0F<   Instruction Length
0A08 20 4D<   M
0A09 20 42<   B
0A0A 20 41<   A
0A0B 20 53<   S
0A0C 20 49<   I
0A0D 20 43<   C
0A0E 20 <
0A0F 20 54<   T
0A10 20 45<   E
0A11 20 53<   S
0A12 20 54<   T
0A13 20 50<   P
0A14 20 52<   R
0A15 20 4F<   O
0A16 20 47<   G
0A17 20 00<   Terminator
```

Type control C

6. Type 'SAVE 40 AUTO47 COM'
7. Type 'SYSGEN'
8. Respond to first question with (CR)
9. Respond to second question with destination drive.
   The disk should now autostart from the GO Address.

Key points:-

The instruction must start with the length of the instruction and must finish with the terminator 00H

This article is by the courtesy of E.S.C. of October 1981 and was written by Geof. Wilkinson.

********* RELOCATING ROM PAC BASIC *********

Why relocate ROM PAC Basic? Owners of disk systems which have non-relocatable controllers which occupy memory in the C000-DFFF range must do this if they wish to write and run programs in ROM PAC Basic. There are probably other good reasons also. The following procedure will enable Basic to be relocated lower in memory. It has been used on both versions of Basic (1.0 and 1.1) to generate Basics starting at 5000,6000,A000,A800 and B000.
The relocation is carried out in the following way. First move the code to a convenient spot in RAM. Then use a disassembler to find all code which refers to memory locations and then use some method to change these to the new positions (or alternatively use MOVER published in a previous issue of ESC9. This operation will disturb jump tables and other data areas. These may be corrected by the following procedure. Note that the following addresses are given as if Basic was still at C000-DFFF.

ADDRESS	CHANGE	ADDRESS	CHANGE
CC0B-CC0D	ENter 00 00 00	D071-D073	ENter 00 00 00
D0C0	ENter 00	CCE2	Hand relocate byte CC
D8D0	Hand relocate byte CA		
D3AB	ENter D1	D4EB	ENter D1

C0C6-C0F5 Hand relocate address table
C1E1-C21C Hand relocate address table
C21D-C231 Hand relocate second and third bytes of each three byte group
CF2E-CF41 Hand relocate bytes at CF30,CF33,CF36,CF3A,CF41 if in range of C0-DF

Note that you will also need to change the code in the cold start region of Basic (C01D-C02F). The easiest way to do this is to insert at C01D the code 21 xy XY 8LD HL, XYxy) followed by C3 2F C0 (JP C02F) where XYxy is the address of the top of RAM you want to use for the Basic stack/string area. C02F of course refers to addresses as if Basic was still at C000-DFFF. Others as well as myself find that it is handy to refer to a disassembly of the original Basic (C000-DFFF) when carrying out the alterations listed above.

The above article by courtesy of ESC November 1981 issue and written by Bob Stafford.

****

MOVER a program to move machine code routines (modifications by Roy Bunford)

This program allows machine code to be moved in the following way:-
The move can be made using the monitor MO command but all non relative labels have to be changed. The program asks for the start and end addresses of the routine and the required start address of the relocated routine Also requested is the start and end addresses to be checked.(For example to copy the monitor it can be moved to 2000 say and then if it is to reside at 6000 then the start and end addresses for the search are 2000,2FFF and the new start address is 6000.

The possible changes however have codes between E000 and EFFF and so these are the addresses for the check.)

MOVER then steps through the routine looking for possible bytes which could be addresses rather than code. When it finds one it prints out the location and the three bytes starting at the byte preceding the possible address. If it is valid then pressing RETURN adjusts the address to the new position. If it is just coding then pressing any key will ignore that byte. When finished the MO command can be used to place the routine at the required address.

****

```
10 PRINTCHR$(12):FORI=1TO10:PRINT:NEXT
20 PRINTTAB(8);"**************************************************"
30 PRINT
40 PRINTTAB(8)"         MACHINE CODE MOVER by MIKE ATKINS
50 PRINT
60 PRINTTAB(8);"**************************************************"
70 PRINT:PRINT"(Modified by Roy Bunford)"
80 FORI=1TO2000:NEXT:PRINTCHR$(12)
90 POKE318,195:POKE320,224
100 PRINT:PRINT:PRINT:PRINT"DO YOU NEED INSTRUCTIONS Y/N "
110 ZZ=INP(9):IFZZ=0THEN110
120 IFZZ=89THENGOSUB700
130 IFZZ<>78THEN110
140 PRINTCHR$(12)
150 INPUT"ENTER START ADDRESS,END ADDRESS AND NEW START";D$,E$,C$
160 PRINT:INPUT"ENTER START AND END OF CHECKING ADDRESSES";A$,B$
170 PRINT:PRINT
180 X$=A$:GOSUB580:A=X:IF F=1 THEN 150
190 X$=B$:GOSUB580:B=X:IF F=1 THEN 150
200 X$=C$:GOSUB580:C=X:IF F=1 THEN 150
210 X$=D$:GOSUB580:D=X:IF F=1 THEN 150
220 X$=E$:GOSUB580:E=X:IF F=1 THEN 150
230 A1=INT(A/256):B1=INT(B/256):C1=C-A
240 IFD<2 THEN D=2
250 FORI=D TO E
260 D1=PEEK(I):IFD1<A1 OR D1>B1 THEN 430
270 PD=PEEK(I-1)+256*D1
280 IFPD<AORPD>BTHEN430
290 K=I-2:K1=INT(K/256):K2=K-256*K1
300 X=K1:GOSUB480
310 X=K2:GOSUB480
320 PRINT":";
330 FOR L=K TO I
340 X=PEEK(L):GOSUB480:PRINT" ";
350 IF F=1 THEN PRINT"ILLEGAL NUMBER":STOP
360 NEXT L
370 ZZ=INP(9):IFZZ=0THEN370
380 PRINT
390 IFZZ<>13THEN430
400 PD=PD+C1
410 D1=INT(PD/256):D2=PD-256*D1
420 POKEI,D1:POKEI-1,D2
430 NEXTI
440 PRINT
450 PRINT"OPERATION NOW COMPLETE. TYPE BYE AND ISSUE COMMAND"
460 PRINT:PRINT"NO ";D$;" ";E$;" ";C$:PRINT
470 PRINT:END
480 REM S/R TO PRINT NO(0 TO 255) IN HEX
490 REM NUMBER IN X
500 F=0:IF X<0 OR X>255 THEN F=1:RETURN
```

```
510 X(1)=INT(X/16):X(2)=X-16*X(1)
520 FOR J=1 TO 2
530 IF X(J))9 THEN X(J)=X(J)+7
540 X(J)=X(J)+48
550 PRINTCHR$(X(J));
560 NEXT J
570 RETURN
580 REM S/R TO CONVERT HEX TO BINARY
590 REM INPUT IN X$:OUTPUT IN X
600 X1=0:F=0
610 FOR I=1TOLEN(X$)
620 X=ASC(MID$(X$,I,1))-48
630 IF X<0 OR X>22 THEN F=1:RETURN
640 IF X>9 AND X<17 THEN F=1:RETURN
650 IF X>9 THEN X=X-7
660 X1=16*X1+X
670 NEXTI
680 X=X1
690 RETURN
700 POKE322,0:PRINTCHR$(12):PRINT:PRINT
710 PRINT"THIS PROGRAM SEARCHES A BLOCK OF MEMORY FOR ANY BYTES"
720 PRINT"WHICH COULD BE AN ADDRESS  WHICH REQUIRES CHANGING SO"
730 PRINT"THAT THE ROUTINE MAY BE MOVED TO A NEW START ADDRESS."
740 PRINT"WHEN A POSSIBLE LOCATION HAS BEEN FOUND THE ADDRESS"
750 PRINT"OF THE LAST BUT ONE BYTE IS DISPLAYED TOGETHER WITH"
760 PRINT"THE THREE BYTES WHICH MAY NEED CHANGING. IF IN FACT"
770 PRINT"THE BYTES FOUND ARE JUST CODE THEN PRESSING ANY KEY"
780 PRINT"WILL ADVANCE THE SEARCH. IF THE BYTES SPECIFY AN ADDRESS"
790 PRINT"WHICH REQUIRES CHANGING THEN PRESSING RETURN DOES THIS."
800 PRINT"WHEN THE ROUTINE ENDS IT PRINTS THE MOVE COMMAND REQUIRED"
810 PRINT"TO COMPLETE THE MOVE."
820 PRINT:PRINT"PRESS ANY KEY TO CONTINUE"
830 IF INP(9)=0THEN830
840 POKE322,63:ZZ=78:RETURN
```

The above article by courtesy of E.S.C. November 1980 Issue and written by Mike Atkins.

****

POLICY OF PORT FE REGARDING ADVERTISEMENT

It has been the policy of the membership that any advertisements requested in PORTFE will not be done on a 'gratis' basis. The objects of PORTFE are to spread information as quickly as possible amongst the Sorcerer users around the world. This entails its monthly publication. Any additional costs incurred will have to be charged. Our rates are kept reasonable because this is not a profit making endeavour, however we cannot support and run free advertisement for profit seeking endeavours.

The following are our rates.

$ 10.00 per 1/4 page. $ 40.00 per full page.

******* S U B S C R I P T I O N R E N E W A L S *******

Members are reminded to complete the attached application form for 1982 to maintain their current membership status in PORT FE. Christmas mail takes longer to be delivered and we are hoping to receive your renewal within the next few days. If you have not already done so, kindly complete your renewal form and forward with appropriate amount to S.U.G.T. Thank you.

Technical Tips

2716 vs 2716's

Well here we go again Whether this is in EXIDY's favor or not, we shall let you be the judge. Ultimate wisdom and foresight could have resided at the EXIDY design department at one time or another.

We have been doing some testing with the EXIDY ROM PAC to modify various things, and the outcome is succeeding. In the trials & tribulations that we all must face at some time in our lives a little sun should shine.

EXIDY using some of that ultimate wisdom did in fact think a little ahead or shall we say sideways. This brainstorm led to the availability of the following possible things to happen to QUOTE

1/ Use developmental stages in ironing out any last minute bugs, by initially using EPROMS in some of the Sorcerers.

2/ After some time just using PROMS, much cheaper this way.

3/ The circuit boards were configured for both EPROMS & PROMS also TWO types of EPROMS could be used depending on the availability of the two.
One type was the Texas Instrument TMS 2716JL. GOOD CHIP but requires two supply voltages and is twice the price of the competition. The pinouts for this chip is NOT industry standard, it is only standard to T.I.

4/ The most common 2716 EPROMS that are availible are from National, Fairchild, Intel, Motorola, and many others. These chips require only a single supply voltage and are more common.

CAUTION - Should you wish to make changes by replacing the PROMS with EPROMS be very careful to reconfigure the pin-out jumpers so that they match the chip that you are using. Make careful note of which type of EPROM is used also. If Texas Instrument EPROMS are in the Sorcerer now , other manufactures EPROMS will NOT just be direct replacement.

This could first blow the EPROMS that you have inserted and also cause further power supply problems and then watch the chips go marching to never never land two by two. So CAUTION is the order of the day when 'playing' games with YOUR Sorcerer.

T.I.
TMS2716JL

A7	O	1	24	O	VCC(PE)
A6	O			O	A8
A5	O			O	A9
A4	O		21	O	VBB
A3	O		20	O	A10
A2	O		19	O	VDD
A1	O			O	CS(PROGRAM)
A0	O			O	Q8
Q1	O			O	Q7
Q2	O			O	Q6
Q3	O			O	Q5
VSS	O	12	13	O	Q4

STANDARD
2716

A7	O	1	24	O	VCC
A6	O			O	A8
A5	O			O	A9
A4	O		21	O	VPP
A3	O		20	O	OE
A2	O		19	O	A10
A1	O			O	CE
A0	O			O	O7
O0	O			O	O6
O1	O			O	O5
O2	O			O	O4
GND	O	12	13	O	O3

As you can see only pins 21,20 & 19 are affected. When changing to industry standard EPROMS make sure that these three pins have the correct inputs. Refer to the manufacturers spec sheets before you do anything.

Texas Instruments 2716 was only designed in this fashion to make the pinouts the same as their 2708. In this way a 2708 could be upgraded to a 2716 without changes.

By: H.A. Lautenbach