I/O UTILITY PACKAGE

for SUPER-FORTH 64™

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Available at the Vintage Volts website

http://www.vintagevolts.com

INTRODUCTION

The SUPER-FORTH I/O UTILITY PACKAGE is a collection of utility words designed to aid in Input/Output operations. The package covers three main areas:

1. RS232 utilities.

2. COMMODORE PRINTER/PLOTTER utilities.

3. KOALA PAD utilities.

RS232 WORD SET

for SUPER-FORTH 64™

By Bruce Jordan

INTRODUCTION

The RS232 Word Set is a group of utility words designed to used with SUPER-FORTH 64. The RS232 Word Set is intended to ease the creation of RS232 communications programs, by supplying program modules that that take care of many of the more tedious problems associated with programming for the RS232 channel on the COMMODORE 64.

LOADING INSTRUCTIONS

To load the RS232 WORD SET,

1. Load and run SUPER-FORTH

2. Insert the SUPER-FORTH EXTENDED MATH-I/O UTILITY DISK into your disk drive.

3. Type:

   ```
   101  LOAD
   ```

   When your computer is finished loading the screens, the RS232 words are ready to use.

USING THE RS232 WORD SET

Probably the best way you can learn to use the SUPER-FORTH RS232 words is by using them. For this reason, We will construct a simple terminal program that can be used with the COMMODORE 1600 MODEM. However, for further information on the subject of data communication, I strongly recommend the book: THE RS232 SOLUTION, by Joe Campbell and published by SYBEX Inc. Also, I recommend the RS232 section in the C-64 PROGRAMER'S REFERRENCE MANUAL.

When you open a channel on the COMMODORE 64, usually, you do three things:

1. Specify the channel number, device number and secondary address.

2. Give a file name.

3. Call the open routine.

In SUPER-FORTH, as you probably know, opening a channel looks like this:

```
10  4  0  " SPOT"  OPEN
```

Opening an RS232 channel is done much the same, except for one important difference: The name of the file is a two character name that is used to tell your C-64 how to configure the data for

I/O.

When you use the SUPER-FORTH configuration words (BAUD, WORDLENGTH, PARITY...), they setup this two character name in a special system variable called PARAMS. Then, when the command RS232-OPEN is called, it uses what´s in PARAMS as the file name.

As a general setting, we will set the terminal for the following configuration:

```
300  BAUD
EVEN PARITY
1 STOPBIT
7 BIT WORD LENGTH
FULL DUPLEX
REAL ASCII OUTPUT
AND 3-LINE CONFIGURATION.
```

Let´s create a word called SETUP that will configure our terminal the way we stated above.

EXAMPLE :

```
: SETUP                    ( CONFIGURE THE TERMINAL )
  300  BAUD                ( SET BAUD RATE )
  EVEN´  PARITY            ( SET EVEN PARITY )
  1-STOPBIT                ( SET FOR 1 STOP BIT )
  7  WORDLENGTH            ( SET 7 BIT WORD LENGTH )
  FULL-DUPLEX              ( SET FULL DUPLEX MODE )
  3-LINE  ;                ( SET 3 LINE CONFIG. )
```

Next, we´ll create the terminal program itself.

EXAMPLE :

```
: TERMINAL
  SETUP                    ( CONFIGURE TERMINAL )
  10  RS232-OPEN           ( OPEN AN RS232 CHANNAEL USING PARAMS )
  BEGIN                    ( START A LOOP )
        RECEIVE            ( GET CHAR. FROM RS232 )
        A->C               ( CONVERT IT )
        0 PUT#             ( PRINT IT ON THE SCREEN )
        ?KEY               ( CHECK THE KEYBOARD )
          ?DUP  IF  C->A       ( IF >0 CONVERT IT... )
                    TRANSMIT   ( AND SEND TO RS232 )
                THEN
  AGAIN ;                  ( DO IT ALL AGAIN )
```

To work the above example, type: TERMINAL and hit RETURN. Then, dial the number of some data base, or bulletin board. When you hear the carrier signal over the phone, un-plug the hand set cord from the hand set, and plug it into the back of the COMMODORE 1660 MODEM. In a few moments, you should see the sign-on message of the data base appear on the screen. You can now communicate.

THINGS TO REMEMBER

1. The configuration of the RS232 channel must be set before the channel is opened.

2. The configuration words (BAUD, WORDLENGTH, 1-STOPBIT, 2-STOPBIT PARITY, FULL-DUPLEX, HALF-DUPLEX, X-LINE and 3-LINE) will work only with RS2332-OPEN. Otherwise they have no effect on the system.

3. SET-INBUFF and SET-OUTBUFF must be called after the channel is opened.

4. Be careful not to set your buffers at a location that might interfere with SUPER-FORTH.

5. While we're on the subject, never open more than one RS232 channel. When an RS232 channel is opened, two two hundred and fifty six byte areas in high memory are allocated for input and output buffers, $9FOO and $9E00 respectively. Opening two channels will probably screw things up.

RS232 WORD SET

The following is a list of the words contained in the SUPER-FORTH RS232 Word Set.

RS232-OPEN : OPEN AN RS232 CHANNEL

(LFN ---)

This word opens an RS232 channel for I/O. LFN specifies the logical file number of the channel. Before this word is called, the RS232 parameters (baud rate, wordlength...) should be set.

EXAMPLE :

```
10  RS232-OPEN
```

This example opens an RS232 channel with logical file number of 10.

RS232-CLOSE : CLOSE THE RS232 CHANNEL

(---)

This word closes the previously opened RS232 channel.

EXAMPLE :

```
10 RS232-OPEN    ( OPEN RS232 CHANNEL. )
RS232-CLOSE      ( CLOSE RS232 CHANNEL. )
```

<RS232-OPEN> : OPEN ROUTINE

(---)

This word is the machine language portion of RS232-OPEN. Generally, it is not intended for use by the user.

RECEIVE : RECEIVE A CHARACTER IN

(--- CHAR)

This word GET's a character in from the opened RS232 channel and places it on the stack.

EXAMPLE :

```
10  RS232-OPEN
   RECEIVE  0  PUT#      ( RECEIVE A CHAR AND PRINT IT. )
10 RS232-CLOSE
```

TRANSMIT : SEND A CHARACTER OUT

(CHAR ---)

This word PUT's a character out on the opened RS232 channel.

EXAMPLE :

```
10  RS232-OPEN
   65  TRANSMIT          ( SEND A CHAR TO RS232 CHANNEL)
10 RS232-CLOSE
```

BAUD : SET BAUD RATE

(N ---)

This word sets the variable PARAMS with a specific BAUD rate value. For this word to work, it must be used with RS232-OPEN.

EXAMPLE :

```
300  BAUD        ( SET 300 BAUD RATE.)
10  RS232-OPEN   ( OPEN CHANNEL )
```

Only specific BAUD rates are supported by this word. Any attempt to set a BAUD rate other than a valid value will cause a default setting of 300 BAUD.

VALID BAUD RATES

50
75
110
134
150
300
600
1200
1800
2400

WORDLENGTH : SET WORD LENGTH

(N ---)

This word is used to set the word length of data transmitted and received over the RS232 channel. For this word to work properly, it must be used with RS232-OPEN.

EXAMPLE :

```
7  WORDLENGTH    ( SET 7 BIT WORD LENGTH. )
```

Only specific word lengths are valid, and an attempt to use a non-valid value will result in a default setting of 8 bit word length.

VALID WORD LENGTHS

8
7
6
5

1-STOPBIT : SET ONE STOPBIT

(---)

This word sets the RS232 parameters for one stopbit to be sent. For this word to work, it must be used with RS232-OPEN.

2-STOPBIT : SET TWO STOPBITS

(---)

This word sets the RS232 parameters for two stopbit to be sent. For this word to work, it must be used with RS232-OPEN.

HALF-DUPLEX : SET HALF DUPLEX MODE

(---)

This word sets the RS232 parameters for half duplex mode. For this word to work, it must be used with RS232-OPEN.

FULL-DUPLEX : SET FULL DUPLEX MODE

(---)

This word sets the RS232 parameters for full duplex mode. For this word to work, it must be used with RS232-OPEN.

X-LINE : SET X-LINE CONFIGURATION

(---)

This word sets the RS232 parameters for X line configuration. For this word to work, it must be used with RS232-OPEN.

3-LINE : SET 3-LINE CONFIGURATION

(---)

This word sets the RS232 parameters for 3 line configuration. For this word to work, it must be used with RS232-OPEN.

PARITY : SET PARITY

(N ---)

This word when used with the parity constants sets the parity for the RS232 channel to be opened. For this word to work properly, it must be used with RS232-OPEN.

PARITY CONSTANTS

```
NONE´   =0
ODD´    =32
EVEN´   =96
MARK´   =160
SPACE´  =224
```

EXAMPLE :

```
EVEN´  PARITY  ( SETS EVEN PARITY)
```

A->C : CONVERT CHARACTER

(CHAR --- CHAR)

This word takes a true ASCII value on the stack and converts it COMMODORE ASCII.

EXAMPLE :

```
16  A->C  .  146
```

C->A : CONVERT CHARACTER

(CHAR --- CHAR)

This word converts a COMMODORE ASCII value on the stack and converts it to real ASCII.

?KEY : READ KEYBOARD

(--- CHAR)

This word reads the keyboard for a pressed key. The ASCII value of the key is returned to the stack. If no key is being pressed, then a 0 (zero) is returned to the stack.

SET-INBUFF : SET LOCATION OF INPUT BUFFER

(ADDR ---)

This word is used to change the default setting of the input buffer address of the RS232 channel. Care should be taken when using this word not to assign an area as the input buffer that might conflict with SUPER-FORTH. This word should only be called after the RS232 channel is opened.

EXAMPLE :

```
HEX
A000  INBUFF     ( SET INPUT BUFFER TO $A000.)
```

SET-OUTBUFF : SET LOCATION OF OUTPUT BUFFER

(ADDR ---)

This word is used to change the default setting of the output buffer address of the RS232 channel. Care should be taken when using this word not to assign an area as the output buffer that might conflict with SUPER-FORTH. This word should only be called after the RS232 channel is opened.

EXAMPLE :

```
HEX
A100 SET-OUTBUFF          ( SET OUTPUT BUFFER TO $A100.)
```

RST : GET STATUS BYTE

(--- N)

This word returns the value in the I/O STATUS Register to the stack.

RS232-WAIT : WAIT FOR ROOM IN OUTPUT BUFFER

(---)

When this word is called, it will check the RS232 output buffer for a full condition. If the buffer is full, execution is suspended until room for more characters opens up in the output buffer.

PRINTER/PLOTTER WORD SET

for SUPER-FORTH 64™

By Bruce Jordan

INTRODUCTION

The SUPER-FORTH PRINTER/PLOTTER WORD SET is a collection of words that make using the COMMODORE 1525 PRINTER and the 1520 PRINTER/PLOTTER easier and more efficent. Each word is clearly described, and includes an example of the word's use. For this reason, the best way to learn how to use these words is to use them.

LOADING INSTRUCTIONS

To load the SUPER-FORTH PRINTER/PLOTTER WORD SET,

1. Load and run SUPER-FORTH.

2. Insert the SUPER-FORTH EXTENDED MATH-I/O UTILITY DISK into your disk drive.

3. Type:

   116 LOAD

When your computer is finished loading, the PRINTER/PLOTTER words are ready to use.

SUPER-FORTH PRINTER/PLOTTER WORD SET

These words can be used in either immediate, or program mode, and the command OPEN need not be given for their use.

BLACK-PEN : ROTATE TO BLACK PEN.

(---)

Sets the black pen as the pen to be drawn with.

BLUE-PEN : ROTATE TO BLUE PEN.

(---)

Sets the blue pen as the pen to be drawn with.

GREEN-PEN : ROTATE TO GREEN PEN.

(---)

Sets the green pen as the pen to be drawn with.

RED-PEN : ROTATE TO RED PEN.

(---)

Sets the red pen as the pen to be drawn with.

CHAR-COM : CHANGE PLOTTER CHARACTERISTICS.

(N SA ---)

This word sends a command to the plotter effecting the printing style, such as character size, character rotation, pen color, scribe mode and upper/lower case mode. Here, N is a number effecting the particular characteristic of printing, and SA is the secondary address used to call for the change (See 1520 Printer/Plotter manual.).

EXAMPLE 1 :

```
3 2 CHAR-COM
```

Causes the pen holder to rotate to the red pen. Here, 3 is the number value for red, and 2 is the secondary address used for change color.

EXAMPLE 2 :

```
1 4 CHAR-COM
```

Causes 90 degree rotation of characters. Where, 1 is the number value for character rotation and 4 is the secondary address used to rotate characterrs.

PLOTTER SECONDARY ADDRESSES AND CONTROL NUMBERS.

COMMAND	SA	CONTROL NUMBERS
CHANGE COLORS	2	0-3
CHARACTER SIZE	3	0-3
CHARACTER ROTATION	4	0-1
SCRIBE LINE	5	0-15
UPPER/LOWER CASE	6	0-1
RESET	7	ANY NUMBER

PLOT-COM : SEND PLOTTING COMMAND TO PLOTTER.

(X Y " COMMAND LETTER" ---)

This word allows easy use of the plotting commands for the 1520 Plotter. To use this word, specify the X and Y of the plot and the command letter to be used, where X = 0 to 479, Y = -998 to 998, and the command letters are: H, I, M, D, R and J.

EXAMPLE 1 :

```
100 500 " D" PLOT-COM
```

This will draw a line upwards form the origin to the point X = 100 and Y = 500.

EXAMPLE 2 :

```
200 -750 " M" PLOT-COM
```

Moves the pen, without drawing, downwards from the origin to the point X = 200 and Y = -750.

EXAMPLE 3 :

```
: TRIANGLE  ( DRAW A TRIANGLE.)
200 500 " D" PLOT-COM
200 -500 " D" PLOT-COM
0 0 " D" PLOT-COM ;
```

EXAMPLE 4 :

```
0 0 " H" PLOT-COM
```

Homes the pen.

COMMAND LETTERS

The following is a list of command letters and there effect. Again, consult your 1520 PRINTER/PLOTTER manual.

LETTER	FUNCTION
H	HOME THE PEN
I	SET RELITIVE ORIGIN
M	MOVE TO POSITION (PEN UP)

D	DRAW TO POSITION (PEN DOWN)
R	MOVE TO POSITION RELITIVE TO ORIGIN
J	DRAW TO POSITION RELITIVE TO ORIGIN

PRINT# : SEND CHARACTER STRING OUT TO DEVICE.

(DEV# SA FORMAT# " CHARACTER STRING" ---)

This word allows easy printing of text out to the 1525 Printer, or 1520 Printer/Plotter. Here, DEV# is the device number (4 or 5 for the 1525 Printer, 6 for the 1520 Printer/Plotter), SA is the secondary address, and FORMAT# determines whether the string is sent ending in a comma, semicolon, or carriage return; where 0 = a carriage return, 1 = a colon and ANY OTHER NUMBER = a semicolon.

EXAMPLE 1 :

```
6 0 2 " THIS IS A 1520 PRINTER TEST." PRINT#
```

This will cause the 1520 Printer/Plotter to print; "THIS IS A PRINTER TEST." on the 1520 Printer/Plotter. Because the string was sent with the FORMAT# number for a semicolon, the pen remains positioned at the end of the string.

EXAMPLE 2 :

```
4 7 0 " This is a 1525 Printer test." PRINT#
```

This will print the message; "This is a 1525 Printer test.", followed by a carriage return, on the 1525 Printer. Note that the secondary address of 7 caused the string to be printed in lower case.

CHR# : SEND COMMAND STRING.

(DEV# COMMAND# ---)

Many of the printing modes of the 1525 Printer are set using non-printing ASCII codes, e.g. (In BASIC) CHR$(18) causes printing in the reverse mode. CHR# allows the sending of these control codes to external devices.

EXAMPLE 1 :

```
4 18 CHR#
```

Sets the 1525 Printer to REVERSE PRINT MODE

EXAMPLE 2 :

```
4 27 CHR# 4 16 CHR# 4 0 CHR# 4 15 CHR#
```

Sets DOT ADDRESS MODE, and moves the printer head of the 1525 PRINTER to dot row 15.

KOALA PAD
UTILITY WORDS

for SUPER-FORTH 64™

By Bruce Jordan

LOADING INSTRUCTIONS

To load the KOALA UTILTIY WORDS,

1. Load and run SUPER-FORTH.

2. Insert the SUPER-FORTH EXTENDED MATH-I/O UTILITY DISK into your disk drive.

3. Type:

   96 LOAD

When your computer is finished loading, the KOALA UTILITY words are ready to use.

KOALA UTILITY WORD LIST

The following is a set of words to be used with pictures generated with the KOALA PAD. These words will allow you to load, view and use KOALA PAD pictures with SUPER-FORTH.

KLOAD : LOAD A KOALA PAD PICTURE

(ADDR NAME ---)

This word allows you to load a KOALA PAD picture into memory. Where ADDR is the address in memory to load the picture to, and NAME is the name of the KOALA picture on the disk.

NOTE :

The bothersome reverse spade and trailing spaces of KOALA PAD picture names is automatically taken care of with this word. The reverse spade and trailing spaces in the pictures file name should not be included.

EXAMPLE

```
HEX

7000 " PIC B VAN" KLOAD
```

Causes KOALA picture: PIC B VAN to be loaded into memory at location $7000.

Again, note that although the name of the picture on the KOALA PAD disk is "{REVERSE SPADE} PIC B VAN ", the reverse spade and leading spaces were not used in the file name by KLOAD.

Once the KOALA PAD picture has been loaded into memory, it can be stored back onto the disk as a program file under any name desired, by the use of the SAVE routine.

```
EXAMPLE :
HEX
7000 " PIC B VAN" KLOAD ( LOAD KOALA PICTURE)

SAVENAME $CLR
SAVENAME " VANPICTURE" $CONCAT
70000 9711 SAVE ( SAVE PIC B VAN UNDER NEW NAME OF VANPICTURE)
```

CAUTION : KOALA PAD pictures take ten thousand and one bytes of memory. Always make certain there's enough room in memory before attempting to load your Koala picture.

KVIEW : VIEW PICTURE

(LOAD-ADDR VIEW-ADDR NAME ---)

This word loads a KOALA PAD picture into memory at LOAD-ADDR, then displays it at VIEW-ADDR on a hi-res graphics screen.

EXAMPLE :

```
HEX
7000 E000 " PIC B VAN" KVIEW
```

VAN picture appears on screen from $E000 bitmap area. As with KLOAD, this word automatically takes care of reverse spade and trailing spaces in the KOALA PAD picture's file name.

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Errata

1.3 Getting Started (p 3.)

Note: The Master disk has two sides to it... a system side and a source code side. The System side is to be Loaded First.

Whenever the instructions in the manual requests that you list a source screen # or Load a source screen # (ie. 10 LIST, 10 LOAD or 10 20 THRU) then you insert the Source Code Side of the master disk into your drive and type the appropriate command.

To make a complete backup of the master disk you will need 2 blank disks, one for the system side and one for the source code side. Follow the instructions on page 3 to copy the system, and page 72, 73 to make a backup copy of the source code.

Your working copy should consist of <u>two additional</u> disks, one system disk and one blank formatted disk. Your program listings are stored on the blank formatted disk and your compiled program becomes part of the system disk.

To make a backup copy of the AI and Math Modules follow the instructions on pages 72 & 73.