

SCREEN COPY UTILITY PROGRAM  
for  
ATARI(R) PERSONAL COMPUTER  
and  
EPSON(R) MX-80 LINE PRINTER  
with  
GRAFTRAX OPTION  
by  
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INTRODUCTION

The Screen Copy Utility Program is designed to allow easy screen copy for all of the standard Atari(R) text and graphical display modes to an Epson(R) MX-80 line printer with the GRAFTRAX option installed. The Screen Copy Utility Program is written in Basic but it loads an assembly language program into memory at a location specified by the user. After loading the assembly language program, which we will call the screen copy program, you can produce copies of the Atari(R) screen on the line printer with simple one-key commands which do not interfere with your regular keyboard operations. The screen copy program can be used with Basic, the Assembler Editor, the Disk Operating System, and even the Screen Editor. The Screen Copy Utility Program can create screen copy programs which can be stored on cassette or disk. A screen copy program requires approximately 1,700 memory locations anywhere in memory plus 44 memory locations in either page 4 or page 6.

LOADING THE PROGRAM

Use your Basic cartridge to load the Screen Copy Utility Program from disk with a LOAD"D1:SC4.BAS or LOAD"D1:SC6.BAS depending on whether you choose to use page 4 or page 6 for the 44 fixed memory locations required by the screen copy program you are about to create and load into memory. If you are loading the Screen Copy Utility Program from cassette, use a CLOAD which will load the page 6 version of the program. The page 4 version of the program follows the page 6 version on the cassette and is loaded with another CLOAD.

There are two versions of the Screen Copy Utility Program which allow the user a choice between giving up the first 44 locations in page 6 or worrying about using the first 44 locations in page 4 which is part of the cassette buffer. If you do not have an assembly language program in page 6, use the page 6 version, and you won't have to worry about cassette operations overwriting your fixed 44 locations in memory. If your



application requires page 6, then you have the option of using the page 4 version of the Screen Copy Utility Program, but you must worry about cassette operation.

#### RUNNING THE SCREEN COPY UTILITY

Once you have located the Screen Copy Utility Program, type RUN. You will be asked by the program where you would like to load a version of the screen copy program into memory. The options are as follows:

##### TYPES:

1. Loads the screen copy program beneath the display list of any graphical or text mode you desire. Only input modes 0,5,6,7,8, 21, 22, 23, or 24 when asked by the program for the largest memory using mode you will be using. Input mode 0 for modes 1,2,3,4,17,18,19, or 20 since they use less memory than mode 0 which is the mode you are using now. If you have plenty of memory, you can input mode 24 and you can use it with any mode since it creates the largest display list.

2. Loads the screen copy program beneath an altered Operating System MEMLO address. You must POKE 744 with a PEEK (744) + 7 and type NEW before you even LOAD the Screen Copy Utility Program. If you are planning on using this version of the screen copy program under DOS after you have created and loaded it into memory, you will have to POKE 744 with a PEEK(744) +31 or DOS will wipe it out when you type DOS. It is recommended that the type 2 mode be used with caution, but it is included for flexibility. If you are going to use a version of the screen copy program with DOS, I recommend that you use the type 1 or type 3 mode.

3. Loads the screen copy program anywhere you want it to go. The user must keep track of the Screen Copy Program once it is loaded into memory so that it is not overwritten by the user's application. After you have selected one of the three types for loading the Screen Copy Program and answered any questions required, the program will take some time to load itself into memory. After it has completed this operation, the program will print on the screen a summary of how this version of the screen copy program was created. At this time turn on your printer and hit a SHIFT S on the keyboard, and you will get a copy of the screen on your printer. This will document this version of the screen copy program and test it also. The screen copy program will stay in effect until you hit a SYSTEM RESET or overwrite the program by accident.

A screen copy program of type 1 or 3 can be easily reactivated after a SYSTEM RESET by a Z=USR (starting address in decimal) under BASIC or a G (starting address in hexadecimal) under the DEBUGGER of the Assembler



Editor. A type 2 version of the screen copy program will also require that you reset location 744 with a POKE with the same number you used originally since a SYSTEM RESET also resets the MEMLO address. This is another reason for avoiding the type 2 version of the Screen Copy Program.

There is one last question to answer before leaving the Screen Copy Utility Program and that is: Do you want to make a cassette version of the screen copy program which you can load with a LOAD#C using Assembler Editor cartridge? If yes, follow the instructions on the screen. This version of the screen copy program when loaded from cassette under the Assembler Editor cartridge, will require that you use a G(starting address in hexadecimal) under the DEBUGGER to activate the program.

#### GOING TO DOS AND BEYOND

After you have created and loaded a version of the screen copy program into memory and made your printout to document the version, you can go to the Disk Operating System by typing DOS. Don't do a SYSTEM RESET or you will have to reactivate the program again. Once under DOS you can make a copy of the DOS MENU or anything else that is on the screen. You can also make a binary load file of this version of the Screen Copy Program using the K command of DOS. Convert the starting and ending addresses from your printout to hexadecimal. This is easy since you have the high and low bytes of the starting and ending addresses on the printout. You can use Appendix C of the BASIC Manual or Appendix 7 of the Assembler Editor manual to convert from decimal to hexadecimal numbers. An example is STARTL=160, STARTH = 121, ENDL = 112, and ENDH = 127. The starting address would be 79A0 and the ending address would be 7F70. You can also see that  $121*256 + 160 = 31136$  and  $127*256 + 112 = 32624$ . Under the K command you can name the file anything you want like S31136.PG6, which reminds you where it's going, followed by the starting and ending addresses 79A0,7F70. You can then load this file from DOS at a later time using the L command and activate it from BASIC with the Z=USR(starting address in decimal) or from the DEBUGGER of the Assembler Editor with the G(starting address in hexadecimal). Note that the difference between the starting and ending address is 1489 memory locations. You need an extra 200 memory locations beyond this value for a buffer used by the Screen Copy Program. These are the 1689 memory locations needed by the program which start at the starting address and end at the starting address + 1688.

#### KEY COMMANDS

The following keys control the Screen Copy Program once it is activated and stored in memory.



SHIFT S - Produces a small screen copy using the 480 points per line modes of the printer.

SHIFT D - Produces a large screen copy using the 480 points per line mode of the printer.

SHIFT X - Produces a small screen copy using the 960 points per line mode of the printer.

SHIFT C - Produces a large screen copy using the 960 points per line mode of the printer.

SHIFT R - When hit before one of the first four keys above, it clears the inverse - the- display flags used by the program.

SHIFT I - When hit before one of the first four keys above, it inverts the display for graphical modes and text modes.

SHIFT T - When hit before one of the first four keys above, it inverts the four lines of text below the mixed modes and all of the text of text mode 0.

SHIFT Q - Stops a printout and resets the printer. This key should be used to abort all printouts.

#### NOTES

1. For other than the small 480 points per line mode (SHIFT S) the Epson(R) printer will make multiple passes to print one line. This is apparently caused by the slow serial bussing scheme used by Atari in transferring data to the 850 Interface.

2. The CAPS\LOWR Key must be in the locked position for the KEY COMMANDS to operate. This is the position the key is in when the computer is turned on.

3. The inverse-the-display keys SHIFT I, SHIFT T, and SHIFT R do not produce a screen copy themselves but are used before hitting the four display producing keys.

4. If you are using the page 4 version of a Screen Copy Program, you will have to reactivate the program after any cassette operation or the program will bomb in an unpredicted manner.

5. The Screen Copy Utility Program was designed for both easy use and flexibility. For an application requiring the use of a type 2 version of the Screen Copy Program, you may have to scratch your head a little, but you may find its use worth the trouble.



## SCREEN COPY UTILITY PROGRAM (REVISION 4)

Revision 4 of the SCREEN COPY UTILITY PROGRAM uses 1981 memory locations as compared to the 1689 memory locations used by the original version. You will have to add one more to the POKE of location 744 in the creation of a TYPE 2 version of the program because of this increase in memory size. This means 7 increases to 8 and 31 increases to 32 in the instructions.

\*\*\*\*\* IMPORTANT \*\*\*\*\* HIT SYSTEM RESET EACH TIME BEFORE RUNNING THE SCREEN COPY UTILITY PROGRAM. THIS RESETS AN INTERRUPT VECTOR WHICH GETS ALTERED EACH TIME YOU RUN THE PROGRAM. \*\*\*\*\*

### HOW TO MAKE A SELF ACTIVATING FILE

To make a self activating file under the DOS K command you only have to add an initialization address to the procedure described before. That earlier procedure created a file which could be loaded from DOS but it had to be activated from BASIC with a USR command or from the ASSEMBLER EDITOR DEBUGGER with a G command. The initialization address which you will add is the starting address you used before plus one.

#### EXAMPLE:

Under DOS type K and fill in the following information which you must get from the printout you made when you created the present screen copy program. All of the addresses must be in hexadecimal.

FILENAME, STARTING ADDRESS, ENDING ADDRESS, INITIALIZATION ADDRESS

From our earlier example the following addresses would be used.

FILENAME=S31136.PG6

STARTING ADDRESS=79A0

ENDING ADDRESS=7F70

INITIALIZATION ADDRESS=79A1

The final response to the K command would look like the following:

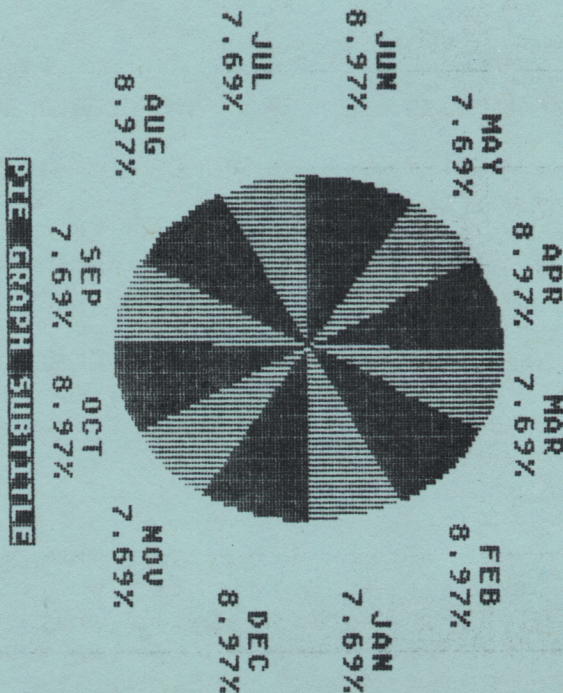
S31136.PG6,79A0,7F70,79A1

The file S31136.PG6 can now be loaded from DOS with the L command and it will not have to be activated from BASIC or the ASSEMBLER EDITOR DEBUGGER. You can still reactivate the program from BASIC or the ASSEMBLER EDITOR DEBUGGER if you accidentally hit a SYSTEM RESET and do not want to go back to DOS to reload the file.

The file S31136.PG6 can also be renamed AUTORUN.SYS if you have DOS II and will self activate when you turn on your system.

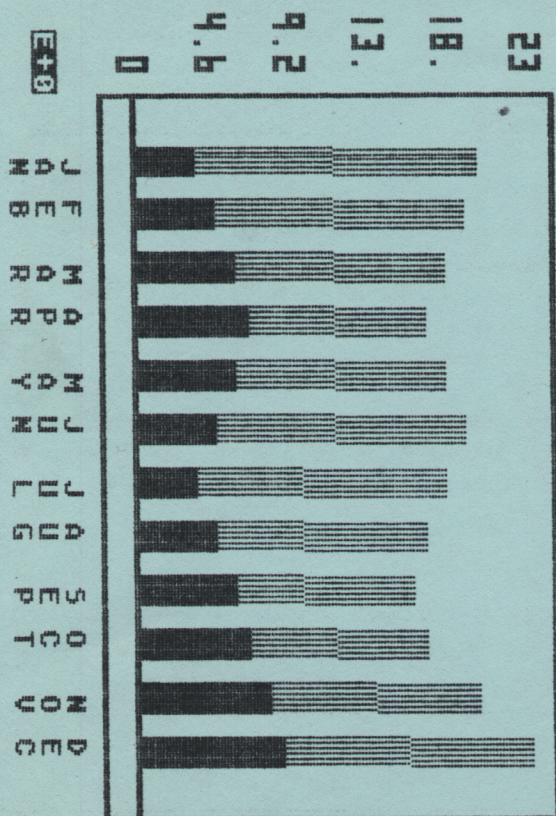


PIE GRAPH EXAMPLE ZZ



PIE GRAPH SUBSTITUTE

BAR CHART EXAMPLE ZZ



SCREEN COPY UTILITY PROGRAM WITH PIE-BAR IMPROVEMENT

The following three key commands have been added to the SCREEN COPY UTILITY PROGRAM to allow the complete copy of both the PIE GRAPH and BAR CHART of the ATARI(R) GRAPH IT(R) PROGRAM to the line printer.

- KEYS
- SHIFT P - When hit before one of the four print keys, it allows a complete PIE GRAPH to be copied to the printer.
  - SHIFT B - When hit before one of the four print keys, it allows a complete BAR CHART to be copied to the printer.
  - SHIFT K - Will reset a flag set by the SHIFT P and SHIFT B keys to allow normal copies to the line printer. This key will have to be hit only if a PIE GRAPH or BAR CHART is not printed out after a SHIFT P OR SHIFT B has been hit. The flag is normally reset when the PIE GRAPH or BAR CHART is copied to the line printer. The SHIFT P and SHIFT B keys must be hit before each PIE GRAPH or BAR CHART is copied to the line printer.

THE FOLLOWING PATCHES TO THE ATARI(R) PIE GRAPH AND BAR CHART PROGRAM CREATE A BETTER LOOKING LINE PRINTER COPY.

- \*CHANGE THE COLOR IN LINE 2050 FROM Z1 TO Z3.
- \*CHANGE THE ZZ IN LINE 2400 TO Z3. IT IS RIGHT BEFORE THE NEXT U1.
- \*CHANGE THE COLOR IN LINE 2080 FROM QZ TO 4-QZ. ALSO IN LINE 2080 CHANGE THE QZ IN THE POKE COMMAND RIGHT BEFORE THE COLOR COMMAND TO 4-QZ. YOU WILL HAVE TO PUT THE LAST HALF OF LINE 2080 IN ANOTHER LINE SUCH AS 2085 WHICH YOU WILL HAVE TO CREATE TO FIT THIS PATCH INTO THE PROGRAM.
- \*CHANGE THE COLOR IN LINE 2140 FROM QZ-Z1+YF TO 4-QZ+YF.
- \*THE FIRST TWO CHANGES SHOULD BE DONE TO GIVE A BETTER PRINTOUT.
- \*THE LAST TWO CHANGES REVERSE THE COLORS OF THE BARS WHICH IS AN OPTION YOU MAY NOT WANT.