

INTRODUCTION

DRAW7 is a unique graphics drawing program containing many useful features, particularly for the creation and manipulation of screen images. These screen images are compatible with other popular eight-bit Atari drawing programs. This XE version is designed exclusively for the Atari 130XE or similarly configured machine. It fully utilizes extended memory (as ramdisk) and the (RAM) memory that resides under both the ROM operating system and BASIC. The result is the ability to support a wide variety of special graphic operations beyond those offered by other Atari drawing programs. An example is the automatic recording of all drawing and text operations which can be immediately played back or saved to disk for later recall.

DRAW7 (XE) is a shareware product for distribution in the public domain. No charge or fee is to be associated with its duplication or use. Your appreciation of this product is welcomed, especially in the form of a contribution to the author who is listed below:

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Those making a nominal contribution will receive a disk of playback and graphic files that highlight many interesting and colorful DRAW7 capabilities.

Three separate modes of operation are available with DRAW7. These are Graph Mode for drawing full screen pictures in Atari Graphics 15 (Antic mode 14); Zoom Mode for drawing within a window portion of the full screen; and Text Mode for adding text to Graph and Zoom mode screens from a variety of character sizes, colors, and patterns. Text Mode also works with user supplied character fonts.

DRAW7 is easy to use, you need only plug in a joystick and pick the program menu "Run" option after booting the DRAW7 disk. Drawing control is through the joystick, keyboard and console keys. A list of DRAW7 commands can be displayed or printed through the initial DRAW7 menu. A Help Menu containing these commands can also be displayed during program execution by use of the question mark (?) key (in Graph or Zoom mode). A list of DRAW7 capabilities follows:

- Joystick and keyboard control of drawing and cursor functions.
- Console key control of color changes.
- Save and load screen files compatible with Micro Painter, Micro Illustrator, Computereyes and others.
- Record, save and playback drawing operations.
- Ability to undo the last screen operation and undo the undo.
- Enter text from a selection of different character sizes, colors and patterns.
- Precisely align text anywhere on screen.
- Load and use your own 9 sector character fonts.
- Display disk directories and select screen files to save and load.
- Rubber band line drawing and special effect ray drawings.
- Draw dotted and wide lines.
- Draw circles, ellipses, rectangles and points.
- Draw by inverting screen colors.
- Inverse colors within a specified screen area.
- Clear or erase rectangle screen areas in any color.
- Quickly shift entire screen up, down, left or right.
- Horizontally or vertically mirror, duplicate or invert half of display screen.
- Mirror or duplicate chosen quarter of display screen.
- Flip screen over top to bottom or left to right (can use to make iron-ons).

- Move a saved Zoom mode screen into different areas of a Graph mode screen (like rubber stamping).
- Replicate a Zoom mode screen throughout a Graph mode screen.
- View Graph mode screen in Atari Graphic modes 8, 9, 10 and 11; also supports color changes while viewing.
- Overlay screen with loaded screen file while allowing current drawing color to dominate.
- Erase selected color from screen and erase screen.
- Change, rotate and fill screen colors.
- Remember colors for directly comparing to changed screen colors.
- Print displayed screen file (for Prowriter 8510 printer only).
- Control size and speed of cursor.
- And other features.

Interesting and exceptional results can be obtained by experimenting with these capabilities which are explained below.

OPERATIONS

DRAW7 commands are used to control and call upon its many features. The majority of commands are issued through the keyboard. Some are in combination with the joystick. The joystick will move the blinking cursor that is available in all DRAW7 modes. By Pressing the joystick trigger in Graph or Zoom mode, and moving the joystick, you will be able to perform freehand drawing in one of the four available draw colors (numbered 1, 2, 3 and 0).

Console keys are used to assist in selecting a draw color to draw with and to control associated draw color values which will be described later. While console key commands will operate in all DRAW7 modes; most keyboard commands will not, particularly in Text mode. The primary reason is that most keyboard keys are dedicated to typing in Text mode, not issuing commands. In general, all keyboard commands will work in Graph and Zoom modes, unless specified mode unique.

Switching DRAW7 Modes (Space Bar and Tab Key)

The most important commands for moving between the three DRAW7 modes are the space bar and Tab key. The space bar will switch or toggle you from Graph to Zoom mode or from Zoom to Graph mode. It will also reset certain command functions in progress as will be covered later. The Tab key will toggle you in and out of Text mode from either Graph or Zoom mode. It will also reset command functions like the space bar. Use of the space bar in Text mode will only produce a space character on the screen.

COMMANDS

An explanation of DRAW7 commands is divided into major subject areas for best in introducing the program's many capabilities. These subject areas are as follows:

- Cursor
- Colors
- Atari Inverse Key
- Undo Command
- Text Mode
- Drawing Modes
- Save and Load Screen Files
- Filename Change
- Print

- Record/Playback
- Special Effects

Cursor

In all modes, a flashing cursor is used to indicate your location on the screen and the color value of the current draw color being used. There are four draw colors numbered 1, 2, 3 and 0. Only one can be active at a time. The active or current draw color is selected through the keyboard or by the console Start key, the details of which will be described in the following section. If draw color 0, the background color, is selected (only available through the keyboard), the cursor will continuously flash the colors associated with draw colors 1, 2 and 3 in succession to indicate its chose.

For Text mode, the cursor is heart shaped and takes on the size of the current text size selected. In Graph mode, the default cursor is a medium size plus (+) sign which can be toggled to a small dot by pressing the L key. The advantage of using the dot cursor is that it will generally respond faster to drawing commands. The advantage of the plus cursor is that it is easier to find on the screen, especially when the screen gets "busy". In Zoom mode, the cursor is a square and the L key, which is not needed in this mode, has no effect.

If the Atari Inverse key is toggled on in either Graph or Zoom mode, a small plus (+) sign cursor is used. The same key toggled on in Text mode changes the cursor's appearance and causes text to be typed in inverse.

Another operation that affects the cursor is the less than (<) and the greater than (>) keys. They not only slow down and speed up the drawing in Graph and Zoom modes, they respectively decrease or increase the speed of the flashing cursor. The effects of these keys are also carried over into Text mode. They will not affect the speed of the flashing cursor in Text mode but they will slow down or speed up joystick movement of the cursor. These keys have no functionality in Text mode other than to display their respective < or > symbol. These keys will also effect the speed of color changes which will be covered in the section on "Colors".

In general, the joystick is used to move the cursor in all modes. For Graph and Zoom modes, the arrow keys without the CTRL (control) key will also move the cursor. When used, they will advance the cursor three positions at a time in the direction indicated by the arrow key pressed. In Text mode, use of the arrow keys alone will cause a text character (+, *, -, or =) to be displayed.

The arrow keys used with the CTRL key provides a special screen movement function which operates the same in all DRAW7 modes. Any arrow key used in combination with the CTRL key will cause the whole screen image to move one position according to the direction of the selected arrow key. A screen wraparound effect will result though the cursor position will remain stationary. This feature is very useful in aligning screen drawings and in the precise placement of text characters in Text mode.

The Home cursor command (X key) provides another cursor function. The first four times this command is issued after entering Graph or Zoom mode (not available in Text mode), the cursor will be automatically moved (homed) to a different corner of the screen. The next time issued it will home to the center of the screen. Homming the cursor is a fast way to move the cursor around to any of the four corners and center of the screen. The resulting homming pattern is an imaginary "X", hence the X key command.

More for alignment than cursor movement is the W key Window command. Valid only in Graph mode, it permits you to see the exact size of the Zoom mode screen in relation to the current cursor position. The command causes a rectangle area to be marked off on the screen by four blinking points to indicate that portion of the screen you would zoom into if you entered Zoom mode. Pressing the W key a second time or changing DRAW7 modes will end the Window command. Joystick movement

ent is supported while this command is active.

Colors

Four colors including the background screen color are available in all modes from a chose of 256 different colors. Default colors are red, white, blue and black represented by draw colors 1, 2, 3 and 0 respectively. Only one draw color can be active at a time. Draw colors and the values of draw colors can be changed through the keyboard or console keys. The current draw color, as indicated by the color of the cursor, can be changed by pressing keyboard keys 1, 2, 3 or 0; with 0 being the background screen color. The current draw color can also be changed by pressing the console Start key. Each press of the Start key rotates to the next draw color (1, 2 or 3) to draw or type with. An exception is background draw color 0 which can only be selected through the keyboard and only in Graph or Zoom modes.

Console keys are also used to change the color value (brightness and hue) represented by a draw color. The use of the Select or Option key will change the color value associated with the current draw color and any matching screen color displayed. The Select key advances to the next available color (from a palette of 256 colors). The Option key moves back to the previous color. Use of the Select and Option keys together will advance the value of all screen colors made with draw colors 1 to 3. Pressing the Start, Select and Option keys together advances all draw color values including draw color 0. Console key color changes are available in all modes.

The rapidness of console key color changes can be altered in Graph and Zoom modes through the less than (<) and greater than (>) keys. The results will be carried over to Text mode. These keys respectively slow down or speed up color changes made through the console keys. They also effect cursor movement speed. Use of these keys in Text mode will only display their respective < or > symbol.

A note of special interest. Drawing with background draw color 0 will blank out or erase screen colors previously drawn with other draw colors. You can use this feature to erase undesired sections of a drawing or you could create a background in draw colors 1, 2 or 3 and then produce an inverted drawing in this area by drawing on top with draw color 0. Drawing with draw color 0 against the background screen color will produce no results. If your drawing and nothing happens, this could be the reason.

The Following are additional commands directly related to colors:

- Rotating Colors (O and CTRL-O keys)

Use of the O key will rotate the values of the existing screen colors represented by draw colors 1, 2, and 3. Screen colors for draw color 3 will be moved into screen colors for draw color 1, screen colors from draw color 1 will be moved to 2, and 2 will be moved to 3. The use of the CTRL-O key combination will also include the background screen color, draw color 0, in the rotation process.

- Memorize Colors (CTRL-M and M, CTRL-N and N)

Existing screen colors can be remembered (for later recall) by using the CTRL-M or CTRL-N keys. Two separate sets of screen colors can be saved, one with CTRL-M, the other with CTRL-N. Once saved, they can be individually recalled at any time by pressing the M key (to recall colors saved with CTRL-M) and N key (for restoring those saved with CTRL-N). Use of the M and N keys will always restore the last set of screen colors saved respectively by CTRL-M and CTRL-N. This is a useful screen color comparison tool.

- Default Colors (CTRL-F)

A displayed screen image can be returned to DRAW7 default colors by pressing CTRL-F. Draw colors and matching screen colors will revert back to red, white, blue and black regardless of screen origin.

- Erase Screen Color (Shift-Clear)

The Shift-Clear key combination will erase just those screen colors referenced by the current draw color. This does not apply to background draw color 0 which of course can not be erased. The Undo (ESC) command can restore an erased color if used as the next command.

- Erase Screen (CTRL-Clear)

Use of CTRL-Clear will erase all colors from the screen except the background color. Use of Undo (ESC) as your next command will restore the erased screen.

Atari Inverse Key (/|\)

This is an on and off type toggle key. The first time pressed it will be toggled on and cause certain functions to work differently. When pressed again it will be toggled off and have no further effect. In Text mode, this key simply permits the typing of inverse characters. In Graph or Zoom mode, it will effect line drawings, the creation of ellipses and rays, and the rectangle function. For line drawings, ellipses and rays, existing colors at the affected screen areas will become the drawing color by being inversed in place. The current draw color will not be used directly. For the rectangle function (R key), the marked off rectangle will have the screen colors of its entire enclosed area inversed, creating an inversed rectangle. Proceeding use of Shift-CTRL-R will continue to inverse the colors within the rectangle until the next rectangle is drawn or another function is performed that ends the affect of Shift-CTRL-R. A complete description of the rectangle command function is presented in the "Drawing Modes" section.

In Graph and Zoom mode, a small plus sign type cursor is used to indicate the inverse key is toggled on. The key will automatically be toggled off by changing DRAW7 modes or by starting the record function.

Undo Command (ESC key)

This command cancels the most recent drawing or text operation by returning the screen back to a previous image. If this command is used twice in a row, it will bring back the results just cancelled. In essence, it will undo itself. The screen (and color) restore performed by Undo is based on the last significant action that modified the screen. A significant action includes the following commands and functions:

- Circle, Ellipse, Rectangle, Fill and Erase operation
- Mode change, Overlay, Load, Mirror, Duplicate and Invert
- Drawing of Rays and Last memory recall of colors
- Replicating the Zoom mode screen

The Undo command is basically designed to restore the screen to the point just before the last significant action was taken. Excluded from being a significant action are the following:

- Joystick line drawings (including rubber band lines)
- Screen saves, printing and filename changes
- Screen flipping and color changes (except memory recall)
- Screen movement, cursor movement and cursor size changes
- Typing of text in Text mode

- Changing of draw colors and calling on Help Menu
- Viewing the screen in other graphic modes
- The start of record/playback operations

If desired, you can force Undo to remember your screen image at any time by toggling back and forth between any of the DRAW7 modes. Then when Undo is used, it will return the screen back to the point you last toggled between modes (or last used a significant action). If you are not satisfied with the restored image, you can bring back the replaced image by issuing Undo as the next command, before any further movement of the joystick. Further keyboard input (other than those below) or joystick movement will automatically confirm your last Undo choice.

Repeated use of Undo without intervening commands or joystick movement will continue to permit you a choice between the last remembered screen image and the current screen image.

Keyboard input that will not automatically confirm your last Undo choice is the Undo command itself and the Playback Pause command covered later. Both of these commands are purposely ignored for the sake of confirming your last Undo screen choice.

Text Mode (Tab, CTRL-Tab, Shift-Tab)

This mode permits the typing of six different size text characters in various draw color values and character fonts. It will also allow the typing of multicolor and 3-D type text. Entering and exiting Text mode is done by the on and off toggling of the Tab key. The CTRL-Tab key combination will change the size of the current text characters being typed and the Shift-Tab key combination provides a menu and means to change the character font being used. The default character font is the standard Atari character set which can be replaced with a standard 9 sector font loaded from disk.

Using Shift-Tab presents a menu for allowing a disk resident font to be automatically loaded for immediate use in Text mode. It also allows you to return back to the standard Atari character set. This menu can be called in Graph and Zoom modes with the same command or with the A key for changing file names. The CTRL-Tab command, which only works in Text mode, immediately changes the character size as can be noted by the change in cursor size. Continued pressing of CTRL-Tab will rotate through all six character sizes without effecting the screen image.

Movement of the cursor around the screen in Text mode is through the joystick. Atari Editor keys such as Clear, Insert, Delete and Backspace will display a character instead of performing their stated function. Backspacing, forward spacing and up and down cursor movement are done with the joystick and does not effect the screen image. A wraparound effect, instead of scrolling, will occur when the typing of text or cursor movement is advanced beyond the ends or top of the screen. Upper and lower case letters, inverse letters and Atari graphic symbols can be displayed with the normal use of the Atari CTRL (Control), Shift, Caps and inverse keys.

Arrow keys in combination with the CTRL key can be used to move the screen up, down, left and right one position at a time. This will allow you to override the pre-alignment of typed text and permit you to type them anywhere on the screen.

When typing is completed, the appropriate arrow CTRL key combination can be used to move the screen back to its original position if desired.

Text colors and the pattern of text can be changed by using the console keys. Pressing the Start key changes the color of the text to be typed. It will also provide different patterns. The change is reflected in the flashing cursor. Combinations of the Option, Select and Start keys will change existing screen colors as they do in Graph and Zoom modes.

Drawing Modes

Screen drawing is performed in Graph and Zoom modes and is mainly accomplished through use of the joystick and keyboard. The position where drawing is to occur is indicated by the flashing cursor. The drawing color is indicated by the color of the cursor. Freehand drawing is done by pressing the joystick trigger and moving the joystick. To control line drawings and the creation of basic shapes and special effects, the keyboard is generally used with the joystick. These drawing operations are explained below.

- Rubber Band Line Drawing (D key)

Pressing the D key calls on the rubber band line function. Pressing the D key a gain, or the space bar, takes you out of this function. Changing DRAW7 modes also ends this function. By pressing the joystick trigger after entering this function, you establish a starting point for your line drawing. Movement of the stick after pressing the trigger produces a pulsating line from the starting point to the current cursor position. The created line follows the cursor movement and automatically lengthens and shortens as the cursor is moved around the screen, hence the name rubber band line. Pressing the trigger a second time makes the line permanent in the color represented by the current draw color (1,2,3 or 0). Of course if you're not satisfied with the results, you can use the Undo (ESC) command to erase your rubber band lines since last started with the D command.

Additional assistance in drawing rubber band lines is provided by the space bar. After starting your rubber band line and deciding it is not worth finishing (by pressing the trigger a second time), you can cancel the line by pressing the space bar. The results will be that the line you were drawing will be erased and the cursor will be returned to its starting position so that you may start over again in the same vicinity of the screen. For detailed line drawing, you will find this feature very useful.

-Ray Drawing (CTRL-D)

Closely akin to the rubber band line is the decorative ray drawing. The ray starts out like a rubber band line but its end result, as controlled through movement of the joystick, is more like a pin wheel or star burst of rubber band lines squeezed together. Many colorful effects can be created in making a ray with DRAW7. This can be accomplished by changing draw colors and toggling the dotted line (. key) and inverse (Atari inverse) key while drawing a ray. These ideas and others can be experimented with after learning how to make a ray which is explained below.

To establish the ray function, press CTRL-D; to disengage the function also press CTRL-D or the space bar. Pressing the joystick trigger after entering the function sets the ray's starting point or center. Like the rubber band line, joystick movement following the first press of the trigger produces a line from the starting point to the current cursor position; the difference with the ray is that the line is permanent. Further sideways movement of the stick creates a new line for each position moved from the starting point. The more the joystick is moved in a rotational basis the more lines created, each taking on the current draw color value. The resulting shape of the ray depends on your movement of the joystick. To end the ray drawing, press the joystick trigger a second time or press the space bar. Then you can start drawing your next ray with the joystick. Pressing CTRL-D will take you out of the ray function entirely. So will the changing of DRAW7 modes. Mastering ray drawings will take some practice but the results are worthwhile. Try executing other commands, such as fast cursor advance, while making a ray; the results could be surprisingly interesting.

-Circle and Filled Circles (C and CTRL-C)

To create a circle, move the cursor to where you want it centered. Press the C key once to mark this position. A single point will be displayed to confirm you

r location. Next move the cursor to where you want the outside of the circle. Pressing the C key a second time will produce the circle. You can stop the actual drawing of the circle by pressing the space bar. You can also remove the last circle created by using Undo (ESC) as your next command. Changing DRAW7 modes will disengage the circle drawing function.

To create a filled circle, follow the above procedure using CTRL-C instead of the C key.

-Ellipse and Filled Ellipse (E and CTRL-E)

The method for drawing an ellipse and a filled ellipse is the same for drawing a circle and a filled circle. For drawing an ellipse, use the E key; a filled ellipse is drawn using CTRL-E. The use of the space bar and the changing of DRAW7 modes will have the same ending effect as described for drawing circles.

-Rectangle and Filled Rectangle (R and CTRL-R)

A rectangle, of any size, is easily drawn by using the cursor and R key to mark two diagonal corners of the rectangle area to be drawn. This can be the upper left and lower right corners, or the upper right and lower left corners in any order. Once the cursor is positioned at the second corner and the R key pressed a second time, the rectangle is automatically drawn.

A filled rectangle is drawn in the same manner as an (unfilled) rectangle, except you use the CTRL-R command. The color of the filled rectangle will be the same as the current draw color (1,2,3 or 0). This command is useful in clearing a designated area for drawing or text. It avoids the need to erase the entire screen.

If desired, the resulting (filled or unfilled) rectangle can be erased by using Undo (ESC) as the next command. As with the circle and ellipse commands, changing DRAW7 modes will take you out of an incompletd rectangle drawing (where only one area was marked). The space bar has no effect on halting the creation of rectangles as it does with creating circles and ellipses.

-Inverse Rectangle (Atari Inverse Key and R)

Creating an inverse rectangle is similar to creating a plain rectangle. You even mark both diagonal corners with the R key. The major difference is that the Atari Inverse key must first be toggled on, at least before the second corner is marked. The end result is that all screen colors within the marked rectangle area are inversed according to a formula based on the current draw color (1, 2, 3 or 0). What happens is that the color value referenced by the draw color will dominate. It is best to try this command yourself for a better explanation. Change the draw color before making each inverse rectangle to obtain varied results. Also try overlapping inverse rectangles to obtain more interesting displays. If you make your rectangle big enough, you can inverse the whole screen.

Remember to toggle off the Atari Inverse Key when your finished or you may get some unexpected results when using other commands. A small plus sign cursor is used to indicate the Atari Inverse Key is toggled on. Changing DRAW7 modes or starting the record function will turn off all inverse drawing functions. Immediate use of the Undo (ESC) command after creating a rectangle will erase it

-Rotate Colors in Last Filled or Inversed Rectangle (Shift-CTRL-R)

Right after creating a filled or inversed rectangle, Shift-CTRL-R can be used repeatedly to change and rotate this rectangle's color(s), at least until the next command is issued. Changing DRAW7 modes will reset or turn off this function until another filled or inverse rectangle is created.

-Fill (F key)

This command is used to fill in an enclosed background area on the screen. The color of the fill will be that of the current draw color. The F key is used to mark the top and bottom of the selected area. After the F key is pressed a second time, the fill will take place. This is not a smart fill. Several attempts may be necessary to complete the entire fill. The fill only works against a clear background; an attempt to fill in an area already colored will not work. The area being filled must be entirely enclosed by a non-background draw color (1, 2 or 3) or else the fill will attempt to leave the enclosed area. For this function, the space bar will not halt the actual fill once started.

The Undo (ESC) command can be used to restore the screen to the point before the last fill command was issued. Changing DRAW7 modes will turn off any started fill operation (F key pressed only once).

- Dotted Line and Wide Line (Period(.) and Slash (/) Keys)

Joystick drawing can be performed with a dotted line or a wide line, or both. To start dotted or wide line drawing, press the period (.) key or the slash (/) key respectively. Press each of the keys separately to perform both drawing functions together. These are toggle key commands; to turn them off, press the same key that turned them on. Another way to turn them off is by using the space-bar which will also change drawing modes. The current draw color will be used for both types of line drawings.

There is an exception in color when using the dotted line. The use of draw color 0, the background color, will produce an interesting multicolor result, especially with the wide line command in effect.

Unlike the dotted line drawing, use of the wide line command will be ignored while doing rubber band line drawings.

-Plot Point (P Key)

This command, called on with the P key, simply draws a dot or point at the current cursor position. The color of the point is that of the current draw color.

Save and Load Screen Files (CTRL-S and CTRL-L)

DRAW7 provides the ability to save and load both Graph and Zoom mode screen files. Graph mode files, representing Graphic 15 (Graphic 7 1/2) screens, are compatible with Micro Painter, Computereyes, and Micro Illustrator (e.g. Koala Painter, Atari Artist) files. Zoom mode files, representing 2 sector Graphic 3 screens, are only intended to be compatible with DRAW7.

The command to save a file is CTRL-S; to load a file it is CTRL-L. These commands can be issued in either Graph or Zoom mode and will save or load the respective mode's screen file, as indicated by the file names found in the filename (A key) command menu.

While special file naming conventions are not required, except as explained below, it is advised that Graph mode files end with an extension name of .7 or .G, and Zoom mode files end with .3 or .Z to avoid confusion. DRAW7 default file names are PIC.7 for screens saved or loaded in Graph mode and PIC.3 for those saved or loaded in Zoom mode. To change screen file names, use the filename (A key) command and follow the menu prompts before performing the intended save or load operation. Remember, saving or loading a screen file in Graph mode will save or load a Graph mode screen; in Zoom mode, a Zoom mode screen.

To protect the integrity of the DRAW7 Disk, it is recommended that a separate fo

Formatted disk be used for saving DRAW7 screen files. Either Atari DOS 2.0 or 2.5 formatted disks are acceptable on drive 1 or 2.

All files are saved with their current screen colors which are restored when the file is loaded.

With one exception, all Graph mode files are saved in a 62 sector (uncompressed) Micro Painter format that is compatible with Computereyes and other popular graphic programs. The exception is Graph mode files ending with an extension name of .PIC. These files are saved in Micro Illustrator (62 sector horizontal compressed) format and will be able to be directly loaded by Micro Illustrator software with screen colors intact.

For the loading of screen files, regardless of format, any legitimate Atari DOS file name is valid. In loading a Graph mode file, DRAW7 first opens the file to see if it is a Micro Illustrator (vertical or horizontal compressed) file. If it is, the file is loaded as a Micro Illustrator file. If it is not, it is loaded as a Micro Painter type file. No consideration is given to the name of the file on a load; it can have any name.

Any 62 sector screen file can be loaded (in Graph mode) including those produced in Atari graphic modes 8, 9, 10 or 11. To view these files in their original form, use the G key which is described later under the Special Effects section.

The Undo (ESC) command can not "unsave" a saved file.

If a file can not be saved or loaded, use the disk directory option of the filename (A) command to assure there is room to save a file, or the file is available to load. Also make sure the disk is not write protected if saving a file. The program will not be harmed if a file can not be saved or loaded.

Filename Change (A or Shift-Tab Keys)

This command is used to change the separate Graph and Zoom mode file names for save, load and overlay commands. It is also used to specify record/playback memory usage, a playback file name for record/playback, and a standard 9 sector character font file name for Text mode. Additionally it can be used to inform DRAW7 to return to the standard Atari character font (the default font). Another purpose is to list a specified drive's disk directory.

The command is invoked with the A key in Graph and Zoom modes or the Shift-Tab key in any DRAW7 mode. The command provides a menu informing you of your current file names and font and prompts you for any changes. It also displays the number of "Record/Playback Memory" bytes used and left (for the record/playback function). If the word "Record" is in inverse letters, the record function is active. The menu is exited by pressing the Return key by itself to most any prompt.

When changing a font file name, it is loaded immediately for Text mode use, providing the file exists and is online. If it can not be loaded, the old font file name will remain unchanged on the menu to indicate you should try again if you so desire. Once a font is loaded, it will remain available for Text mode use until changed. A loaded font has no effect on the text used to display the menu.

For Graph and Zoom mode file name changes, only the menu filename is updated, no attempt is made to check for its availability at this time. Availability is determined only when you return to the respective DRAW7 mode and access the file.

For whatever reason, if the file can not be accessed, DRAW7 will ignore further processing of the command requesting access. If your command to save, load or overlay a screen file fails, return to the filename command and check the current DRAW7 filenames. If necessary, list your disk directory to assure the filename is present and that no unusual conditions (e.g. disk full) exist. Changing and accessing playback file names are basically the same as described for Graph

and Zoom mode files.

Be aware that DRAW7 permits you to save using an existing disk file name, in which case the existing file will be overwritten during the save without special notice. One other note, it is not necessary to supply the disk drive designator (D:) for files located on drive 1.

Print (CTRL-P)

Those having a C. Itoh (8510) Prowriter will have the ability to print Graph and Zoom mode screens by using the CTRL-P command. When used in Graph mode, it will print the present Graph mode screen; in Zoom mode, the Zoom mode screen. The printer must be turned on and ready before issuing the print command or the command will be ignored. Printing in progress can be ended by pressing the space bar.

Graph mode screen files saved by DRAW7, in either Micro Painter or Micro Illustrator formats, can be printed offline using graphic print programs available commercially and in the public domain.

Record/Playback

This capability allows you to record your drawing operations and play them back automatically as if you yourself were drawing at the terminal. Recorded operations can also be saved to disk as a "playback" file for later playback through DRAW7. Once recording is started, all keyboard, joystick and console key input is monitored and saved in memory for later recall. Over 4000 characters (bytes) of recorded data covering all modes of operation can be stored. If this data is saved as a playback file, it is stored with the status of the drawing program when the recording was started. The size of the saved file can be from a minimum of 2 to a maximum of 35 single density disk sectors, depending on the amount of recorded data in memory. Any number of playback files can be created with this program.

The major features offered by the record/playback capability are as follows:

- Record a drawing session for immediate and repetitive playback.
- Save a recorded drawing session to disk as a playback file for later recall.
- Load or load and automatically start a playback file.
- Start, stop and restart both record and playback functions.
- A playback file can be added to and resaved.
- A playback file can automatically call (chain to) another playback file.
- Playback can be automatically paused to accent viewing attention.
- A playback file or recording can contain one or more screen images.
- Recording of drawing and/or text screens are fully supported.
- One or more playback files can be used to present a slide show type of presentation.
- Drawings or parts of drawings can be reproduced by tracing.
- Recorded drawings can be played back over other screen images.
- Recorded drawings can be used to create special effects and unusual images.

- Screen flashing is used to confirm many record/playback commands.

The playback of your recorded drawing operations can be used to create many new and interesting images. This would include the creation of complex drawings otherwise difficult to produce by other means. The major ingredients for producing exceptional pictures are experimentation and a basic understanding of how record/playback works. Regardless, it takes very little effort to produce fascinating images.

Record and playback operations, which are described next, are controlled with the following commands:

Record Commands:

- Shift-CTRL-4 Start
- CTRL-4 Start or restart
- 4 Halt or end

Playback Commands:

- Shift-CTRL-5 Start
- CTRL-5 Start or restart
- 5 Start continuous playback
- Any keyboard key Halt or end

Save/Load Playback File:

- Shift-CTRL-6 Save (memory to disk)
- CTRL-6 Load (disk to memory)
- 6 Load and start playback

Other Commands:

- Shift-CTRL-7 Halt playback & restart recording where stopped
- CTRL-7 Record pause for playback

The record and playback functions are programmed to be mutually exclusive. This means only one of the functions can be active at a time. If you are recording, you can not be playing back and vice versa.

Record (Shift-CTRL-4, CTRL-4, 4)

A recording session is started with the Shift-CTRL-4 command. When this initialization action is taken, most command functions are reset as if changing modes.

Next, the status of the drawing program is saved in a special place in memory shared for record and playback data. Saved status consists of current drawing information such as drawing mode, drawing colors, cursor position and type, cursor speed, font and file names, and other information later needed to start (but not restart) playback.

After the record function is initialized, the screen will flash to indicate that the program is prepared to record all keyboard, joystick and console key input in record/playback memory. All periods of inactivity, when no input is occurring, are not recorded. The record function will remain active until the "4" key is pressed (in Graph or Zoom mode) to halt or end recording, or until memory for recording is exhausted. In either case, the screen will flash again to indicate recording has stopped.

If you use the "4" key to stop recording, you can "restart" it at any time by using the CTRL-4 command. If a recording had not previously been started, it will be by this command. If recording had been started, all further input will be appended (added) to the already started data in record/playback memory. If memor

y is full, the CTRL-4 command will be ignored.

On restart, the status of the program will not be saved as it was when the record function was started. The program status that was saved when the record function started will continue to be preserved. It will remain preserved until a new recording is started with the Shift-CTRL-4 command. A load playback file command (covered later) will also replace the currently saved program status.

The Shift-CTRL-4 command will always start the record function from the beginning. It will also, in effect, erase any previous recording in record/playback memory. The CTRL-4 command will only start a recording from the beginning if none had been previously started; otherwise, it will restart the last recording stopped (with the 4 command) or restart recording at the end of the last playback file loaded, whichever is most current.

The record function will be unaware of drawing changes made between the halting and restart of record operations. The same applies for font and file name changes. For example; changes in mode, color, cursor position or speed, that were made during non-recording periods (when record operations were halted), will not be known to the record function. While this does not effect record operations, changes of this type will most likely be noticeable during playback. In the case of a non-recorded cursor position change, playback of recorded cursor data after the change would no longer be relative to the last recorded cursor data before the change. This will not harm the program but the playback results may not be what is expected. To assure relative cursor position, home the cursor (X command) to a fixed location, such as the upper left screen corner, both before halting and before restarting record operations. Of course an alternative is to not move the cursor between halting and restarting. It is also suggested that you halt and restart in the same mode and draw color to avoid confusion.

Halting record operations, making drawing changes, then restarting the record function can be used to your advantage. An example would be slowing down the cursor speed between halting and restarting. The result would be slower, more manageable, cursor drawing control when continuing to record and faster cursor drawing movement during playback.

Record/Playback Memory Usage.

The amount of record/playback memory in use can be obtained by entering the file name change function (via the A or Shift-Tab command). When entering this function, the number of memory bytes used and left available are displayed. Additionally, if the word "Record" in the "Record/Playback" title is in inverse letters, it indicates record operations are in progress.

Use of the above command during record operations is useful to avoid running out of memory before you are done recording. You can prevent the monitoring of memory usage from showing up in playback by first halting the record function with the 4 command. Make sure you have completed any drawing function in progress. Then use the A or Shift-Tab command to display record/playback memory usage. Afterwards, exit this function normally with the Return key; then restart your recording with the CTRL-4 command. This sequence of commands will only add a few bytes to memory for halting and restarting. Make sure you do not change your cursor position or anything else during this monitoring activity; if you do, your playback results could be affected.

Please note that there is not always a one-to-one relationship between a drawing command or action and record/playback memory usage. Some keyboard, joystick and console key input may take two or more memory bytes for recording purposes. In general, most keyboard input for drawing uses one memory byte; for text, three memory bytes. Each cursor (pixel) movement by joystick can take up to two bytes; add another byte if the joystick trigger is pressed at the same time. Drawing lines with the rubber band line (D) command is a more economical way to draw, and in general, provides better drawing control. Also more economical is cursor movement with the arrow keys for non-drawing moves.

Console key commands will use one or more memory bytes. The amount used depends on how long you keep a key pressed. To economize on memory usage, do not press a keyboard key, console key or joystick trigger longer than needed. Pressing a key or trigger under one second should be sufficient for a single command or action.

Playback (Shift-CTRL-5, CTRL-5, 5)

Providing record/playback memory is not empty, playback can be started with the Shift-CTRL-5 command. It can also be started with the CTRL-5 command providing playback has not already been started. When playback is started, the drawing program status saved at the beginning of the recording session is restored. Except for the screen image, all drawing information is returned to what it used to be at the time the recording was started. This includes a return to the saved drawing mode, cursor position, drawing speed, draw colors, font and file names. After the program status is restored, the screen will flash and playback will commence.

Playback will continue until the end of record/playback memory is reached, or until any keyboard key is pressed to "halt" playback. In either case, the screen will flash again when playback stops. If halted, playback can be restarted with the CTRL-5 command from where it stopped. When restarted, the saved program status is not restored.

Any changes to the drawing program after it was halted and before it is restarted is not known to the playback function. Any such changes will not harm the program but the results following the restart of playback may not be what was intended. This especially may be the case if you changed drawing modes or cursor position while playback was halted. If changes were made, restarted playback data would not be relative to previously halted playback data. This condition is similar to that described for halting and restarting record operations.

Another way to start playback (like Shift-CTRL-5) is with the 5 command. The difference is that when playback ends, it will start again automatically. The repeating of playback operations will continue until stopped in the normal manner by pressing any keyboard key. The 5 command is useful for automatically repeating the playback of recorded drawings and text, something like a repeating slide projector show. If used this way, it is suggested you use the erase screen (CTRL-Clear) command as your first recorded command. Using continuous playback with recordings not initially erased and ending with screen movements (via CTRL-arrow commands) can also make interesting images.

To accommodate repeated or long playbacks, the Atari attract feature is turned off during playback; otherwise it is always on. Normally the attract feature rotates screen colors to protect your screen if no keyboard input is received after 7 to 9 minutes. Having attract mode go on during extended playback can be annoying. It is even more annoying to have to press a key to stop it when this will also stop playback.

Playback can also be started or restarted while in the record function. If done this way (via a playback command) the record function is ended as if the 4 command was issued first. After playback ends, the record function can be restarted normally with CTRL-4 if desired.

Restarting the record function assumes room exists to add data to record/playback memory. Even a loaded playback file (covered later) can be appended with new recorded data. The new data will be added to the end of record/playback memory, regardless of where any previous playback was halted or ended. If no room exists in memory, the screen will not flash and the record function will not restart. If playback is requested to be restarted at the end of data in memory, it also will not restart. For restarting the record function at other than the end of recorded data in memory, see the Shift-CTRL-7 command below.

Saving and Loading Playback Files (Shift-CTRL-6, CTRL-6, 6)

Recorded drawing operations in record/playback memory can be saved to disk as a playback file. This can be done using the Shift-CTRL-6 command. Just make sure you have sufficient room on disk. Saving a file does not effect record/playback memory.

The CTRL-6 or 6 command will load a playback file from disk to record/playback memory. The difference between using CTRL-6 and 6 is that the 6 command will not only load the saved playback file, it will also start playback as if Shift-CTRL-5 was used as the next command.

Loading a playback file will replace whatever recorded data was in record/playback memory. If this data is wanted, it should first be saved in a separate playback file before being replaced.

Playback files are saved and loaded according to the current playback file name assigned. The program's starting playback file name is PLAYBACK.PB. To change this name, use the A or Shift-Tab command which allows for file name changes.

A request to load an unavailable playback file or a file not in playback format will be ignored.

Halt Playback and Restart Record (Shift-CTRL-7)

The Shift-CTRL-7 command is only valid during playback; otherwise the command is ignored. It will halt playback like any other keyboard input. Additionally, it will automatically restart the record function where playback was halted. The current draw color will flash to confirm the command was accepted and recording was restarted.

The purpose of this command is to allow you to restart the record function at other than where the last record operation was halted or ended. It permits you to playback to a point where you would like to record over again. You can use this command to recreate the ending portion of any recorded data or playback file in record/playback memory. All memory after the point playback is halted becomes free. Recorded data that was occupying this freed space will be overwritten and no longer available.

Playback Pause (CTRL-7)

Each press of the CTRL-7 command during record operations will cause an approximate 2 1/2 second pause during playback; otherwise this command is ignored. The command can be issued in any mode. When issued during record operations, the current screen draw color will flash to confirm the command was recorded. At no other time, including playback, will this command cause the screen to flash.

For playback, other than this pause command, there is only a delay for cursor and color changes controlled by the less than (<) command. This command slows down rather than pauses. Pausing playback allows time for a drawing or text image to be viewed without change or interference. The total amount of time for a playback pause is dependent on the number of consecutive CTRL-7 commands issued in a row for the total pause.

A less economical pause can be created during recording by holding down a non-command key. Hold this key a few seconds or longer where a pause is wanted. This might be the Return key in Graph or Zoom mode. No key is available for this purpose in Textmode. You could also simulate a pause by recording back and forth cursor movement. Regardless, these methods use much more record/playback memory than CTRL-7 which only uses up to two memory bytes per key press.

This command is purposely ignored for confirming a screen choice that follows the use of an Undo command. Undo screens can then be paused during playback for better viewing while flipping between previous and current displays.

Chaining Playback Files

A playback file can be created so that when it ends, it will automatically load and start a second playback file. The second file, in turn, can load and start a third; when it ends, the third can call on a fourth, and so on and so on. The process of having one playback file call on another is called chaining. You can also have the last playback file in a chain call on the first to produce a continuous playback loop. This continuous playback can be halted normally at anytime by pressing any keyboard key. Use of the CTRL-5 command will restart playback providing record/playback memory remains intact.

Be aware that drawing information (program status) is not passed between playback files. Each file is independent of the other, only the image left on the screen is common between files (chained or otherwise). To help assure relative program information between playback files (if desired), the following is suggested:

- End a file in the same mode, cursor speed and color you start the next.
- Start the next file with all font and file names "needed" from the previous.

A preloaded playback file or a playback file being created with the record function can be made into a chain file. Only about 25 unused bytes in record/playback memory are needed. These bytes would be used to hold the following commands and information:

- Use CTRL-4 to place the program in the record function (if you are not already in this function).
- Use the A or Shift-Tab command to enter the file name change function.
- Enter a P to request a playback file name change.
- Enter the name of the playback file that this memory resident file will call (or chain to). You should not use the name of the file in memory unless you want it to call on itself.
- Use the Return key to normally exit the file name change function.
- Next do the following to prevent the above named file from being called at this time. If the file does not yet exist or is not online, skip the following step.
- Put your disk that your called file will be on offline for the next step (open the disk door or remove the disk)
- Use the 6 command, then wait a few seconds (the disk may whirl looking for a file that is not there). Now use the 4 command to end the record function.

Record/playback memory with chaining data added is now ready to be saved to disk. First be sure your disk is back online, then use the A or Shift-Tab command to provide the playback name of your current file or data in memory. This will replace the name of the called file entered above. Now exit the file name change function and use the Shift-CTRL-6 command to save record/playback memory in the file just specified.

Repeat the above process for each file in the chain. Only the last in the chain needs no chaining information unless you are creating a continuous loop of playback files.

Starting the playback of chained files is the same as starting a single playback file. For chained files, you need only provide the file name of the first playback file (prior to playback) with the A or Shift-Tab command. The easiest way to start playback after providing the file name is with the 6 command.

Special Effects

Within this category are several capabilities that should make your screen drawings more interesting. They also will add more flexibility in your control of screen images. The results of the commands that follow, unless otherwise noted, can be undone by use of the Undo (ESC) command.

-Replicate Zoom Mode Screen (CTRL-Z)

Valid only in Zoom mode, this command replicates the current Zoom mode screen throughout its associated Graph mode screen. After the command is executed, via CTRL-Z, the screen returns to Graph mode and will contain 32 replicated copies of the Zoom mode display covering the entire screen. If this command is followed by the filled rectangle (CTRL-R) command to make a large window in the middle of the screen, exotic and interesting borders can be created, especially if the replicated result is "busy" looking.

-Viewing Other Atari Graphic Modes (G Key)

Graph mode screens can be viewed in Atari Graphic modes 8, 9, 10 and 11 by repeated use of the G key. Use of any intervening keyboard input other than the G key or CTRL-7 (for playback pause) will terminate the viewing process. The process will also be ended after viewing all Graphic modes, at which time the flashing cursor will return. Though you can not draw during the viewing process, you can change screen colors by use of the console keys. This action will not have any permanent effect on the original screen colors. As explained under the subject of "Colors", the Start key will change the draw color and the other console keys will change the values associated with draw colors. Since the original image and its colors are restored at the end of this function, the Undo command is not applicable here. This command is very useful in viewing compatible Computereyes files in Graphics mode 9.

-Overlay Screen (CTRL-Y)

This command will load in the current Graph or Zoom mode screen file in a special way. It will not replace the existing screen but will overlay it like it was transparent. The current draw color of the loaded screen file will dominate. This means that the color represented by the current draw color in the loaded file will, in this case, replace any screen color it overlays. The same screen file loaded over an unchanged screen will give somewhat different results with a different draw color active. You can experiment and note the differences. The Undo (ESC) command can be used after each overlay to return the screen to its original contents.

There is one exception to the type of file that can be called to overlay the screen. The exception applies to a Micro Illustrator file in vertical compressed format (the type that loads in sideways). While DRAW7 can load this file with the CTRL-L load command, it can not call on it as an overlay file. If the overlay command detects a vertical compressed file, it will end the command. To permit overlaying, the file must first be converted to a horizontal compressed format or a Micro Painter file. Horizontal conversion can be done by first loading the file with CTRL-L. Next use the A command to give it a new name with a .PIC extension for saving; now save it with the CTRL-S command. The newly saved file can now be called (via CTRL-Y) for overlaying your choice of screen image. Conversion to a Micro Painter format is similar. First load the file, then change its

name to one without a .PIC extension. Next save it to any disk and then call on it with the overlay command when ready.

You can terminate an overlay at any time by using the space bar. Overlaying the screen will not change the value of the current screen colors.

-Moving Screen (CTRL-Arrow Keys)

Use of the CTRL-arrow key combination will move the entire screen one position in the direction of the arrow key selected (up, down, left or right). This command works in any DRAW7 mode. Please note that the results can not be reversed with the Undo command. You will have to move the screen back to its original position yourself if so desired. As an alternative, you could force the Undo function to first save your screen (for later recall) before the move as explained under the Undo command.

-Flipping Screen (U and CTRL-U)

Use of the U key, in either Graph or Zoom mode, will quickly flip the entire screen upside down. The CTRL-U key combination will flip the entire screen from left to right (good for printing and making iron-ons). Repeating the use of either key will flip the screen back to its original position.

-Mirroring, Duplicating and Inverting

The following command keys in Graph and Zoom modes will produce results as stated below:

Key	Result
---	-----
H	Mirror horizontal half of screen
CTRL-H	Duplicate horizontal half of screen
V	Mirror vertical half of screen
CTRL-V	Duplicate vertical half of screen
Q	Mirror quarter of screen
CTRL-Q	Duplicate quarter of screen
I	Invert horizontal half of screen
CTRL-I	Invert vertical half of screen

These individual commands horizontally or vertically divide up an existing screen image and create either a mirrored, duplicated or inverted display of the existing drawing. After any one of the above commands are issued, screen dividing lines will appear for you to choose a portion of the screen to act on. Pressing the same command again causes the screen dividing lines to move to another portion of the screen to choose from. The prompt for which screen portion to choose will continue with repeated presses of the same command key. Pressing any other key, other than the Return key, will terminate the command operation. Pressing the Return key confirms your choice of screen section to mirror, duplicate or invert after which the appropriate action is performed. The Undo (ESC) command, if called on, will restore the screen to its original content when issued immediately after any one of the above commands.

Additional Information

The Break key has been disengaged; only the System Reset key or turning off the computer will end the program.

In addition to changing modes, the space bar will terminate many Graph and Zoom

mode commands in progress. This can be an easy way for ending many functions started but unwanted.

Zoom mode drawings will produce wide screen images in Graph mode. Graph mode images will appear compressed in Zoom mode.

It is recommended that drawings taking a long period of time to produce be periodically saved to disk. This precautionary measure provides protection against unforeseen problems and permits you to return to an earlier stage of your drawing, over and above the restore capabilities of the Undo command.

A sample Graph and Zoom mode screen file, respectively named PIC.7 and PIC.3, come with the DRAW7 Disk. These files, which use default file names, can be loaded with CTRL-L or called as overlay files with CTRL-Y from their respective mode.

In addition, a sample (9 sector) public domain character font comes with DRAW7 under the file name of DRAW7.FNT. It can be loaded with the filename (A or Shift-Tab) command. Just follow the menu prompts for loading a text font.

A sample pre-recorded playback file under the default name PLAYBACK.PB is also available. It can be loaded from drive 1 with CTRL-6 and executed with the Shift-CTRL-5, CTRL-5 or 5 command. It can also be automatically loaded and executed in one operation by using the 6 command. Another playback file named DEMO.PB is additionally available.

A pre-recorded set of chained playback files is included prefixed with the name EAGLE. To start playback, first use the A or Shift-Tab command to name the starting playback file as EAGLE1.PB. Then use the 6 command to automatically load and start playback. You can halt playback at any time by pressing any keyboard key.

Technical -----

When the DRAW7 program starts, it will first test for extended (ramdisk) memory. If not present, the program will terminate with an appropriate error message. If present, it will store and load all program files to and from this ramdisk area as disk drive 8. Undo files for restoring screen images are also stored here. There are four of these files, all of which start with the letter U. They all do not get created until the Undo command is used in both Graph and Zoom modes.

You are not prevented from using the ramdisk area, but if you do, you should use it with care. For example, there should be room for you to save one 62 sector Graph mode file and several Zoom mode files safely. To place a file in ramdisk, prefix the name with D8: using the filename change (A or Shift-Tab) command. This command can also be used to get a directory listing of drive 8. Just remember though, if DRAW7 can not access its programs, or save and load its own files in this ramdisk area, it could prematurely terminate.

DRAW7 source code is written in BASIC. It also contains several assembly language routines for adding speed and efficiency. Most of these routines are stored and accessed in RAM beneath the BASIC ROM program. This "hidden" RAM is also used for the record/playback feature.

In addition to a few BASIC programs for initialization, the DRAW7 disk contains a compiled version of the main program and subprogram that comprise DRAW7. Both programs were compiled with Monarch Data Systems's ABC Compiler. A modified ramdisk initialization program is also used to provide special support for extended memory.

The slight delay experienced in calling on certain commands is due to the swapping of memory space between the main DRAW7 program and its subprogram. This delay

y is accompanied by the blanking of the screen which is used to expedite processing.

The initial concept for the development of DRAW7 was adopted from a program by Steven Chanin in the November 1983 issue of Softside Magazine. Comments and questions on DRAW7 can be directed to its author listed at the beginning of this document.

END OF DRAW7 (XE) DOCUMENTATION