ROBO

BiT STiK 1.1

Interactive Graphics System for Apple II

Reference Manual

APPLE lle USERS

Please note that if you are installing the
Controller in an Apple lle, you should
connect the single socket to the right pin
of the 4-pin video connector.

THE BIT STIK SYSTEM

The BIT STIK is a graphics input and control device, which, together with its dedicated graphics software, provides the core of an interactive computer graphics system, based on the Apple II computer. Used in conjunction with a compatible X-Y plotter for output and additional disk storage, a powerful and flexible facility can be created.

The process of generating, manipulating, storing, retrieving and viewing drawings is performed with interactive BIT STIK control and requires minimal keyboard input.

The BIT STIK System includes interface options for the Apple Graphics Tablet, a colour matrix printer and an X-Y plotter.

It is recommended that after installing the BIT STIK and loading the software, as described in "STARTING", the new user reverts to the QUICK DRAW Guide to familiarise himself with the controls and some of the features of the system. The full range of BIT STIK functions can then be explored.

THIS MANUAL

STARTING   First time information to get the system going.

SCOPE   An overview of the system, what it can do and how it can be used. The terms used in this text are introduced, plus a note about memory, storage, and colour.

ELEMENTS   The components of the system are presented, their use and function described, and a symbolic notation introduced for use in the FUNCTION instructions.

FUNCTIONS   The BIT STIK functions are descibed and instructions presented for the use of the controls and "cursors" to perform the function.
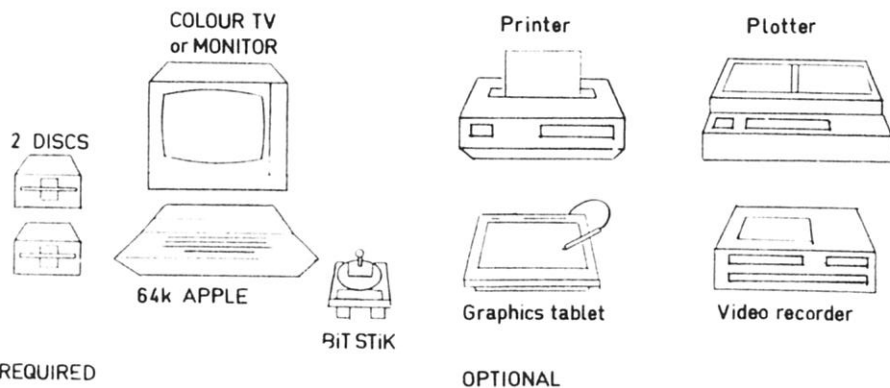
REQUIRED and OPTIONAL EQUIPMENT

The minimum configuration required to use the BIT STIK System is as follows:

An APPLE II computer with 48K bytes RAM and DOS 3.3

A 16K RAM EXTENSION card or APPLE LANGUAGE card.

Two APPLE II Disk Drives plus controller.

A Colour TV receiver or monitor and interface card if specified.

COLOUR TV or MONITOR

2 DISCS

64k APPLE

BiT STiK

REQUIRED

Printer

Plotter

Graphics tablet

Video recorder

OPTIONAL

The Apple Graphics Tablet can be used in conjunction with the system.

The Epson MX 80 Printer (with Graphics option) can be added for generating hard copy output.
Special software versions are available for the Integrex CX 80, Grappler and Silentype interfaces.

A range of X - Y plotter interfaces are available for quality hard copy output.

See Appendix B for Peripherals Interfacing.

INSTALLING THE BIT STIK

Turn off the power to the computer.

Remove the computer cover by pulling up at the rear edge until the corner fasteners release, then slide cover back until free.
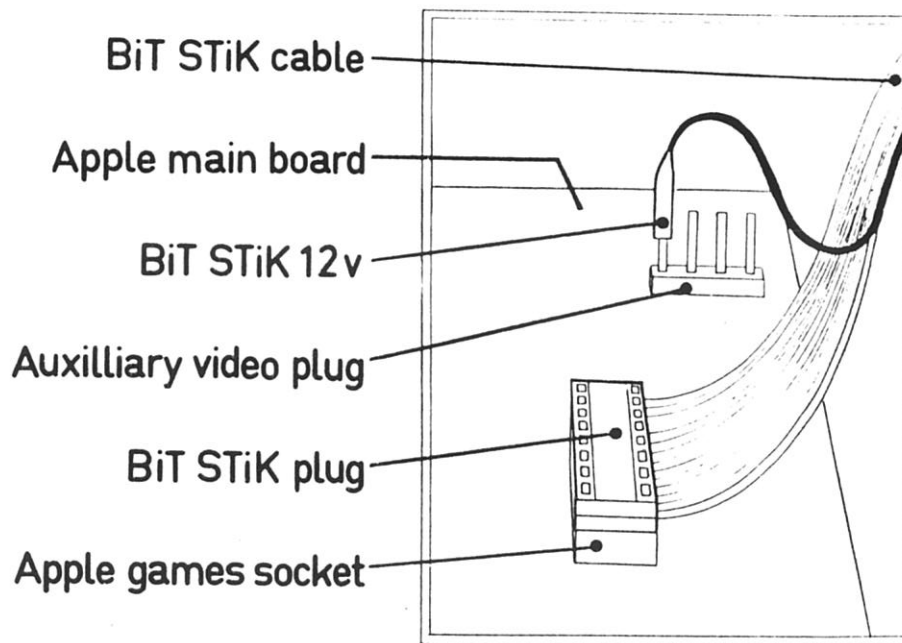
Insert the 16-way connector into the games port on the right hand side of the main computer board. Take care to properly align the pins.

Identify the 4-pin Video Connector on the main board and fit the single socket on the left pin (+12V line).

Locate the cable as shown, or alternatively it can come over the back edge of the computer case.

Replace the cover of the computer front first, then press down on the back corners to lock, clamping the cable at the same time.

THE CONNECTIONS: Note position and orientation.

BiT STiK cable

Apple main board

BiT STiK 12v

Auxilliary video plug

BiT STiK plug

Apple games socket

See Appendix A for BIT STIK touch control adjustment.

DISKS

The System Disk supplied contains the software, or programs, which run the system.

It is essential that a security or back-up copy is made of the System Disk prior to use. Follow the instructions given for the COPYA Program supplied on the Apple System Master disk.

The BIT STIK System also use two types of Data Disks to store the generated drawings for later use.

The two types of Data Disks are the 'Library Disks', which are used to build Libraries of frequently used 'Picture Units' (e.g. component symbols, etc.), and 'Work Disks' which contain finished drawings and sequences of drawings.

Up to 192 Library Disks, numbered from 1 to 192 can be allocated by the user. A further 64 Volume Numbers (193-256) are reserved for pre-programmed libraries and therefore these numbers should not be used.

Before they are used, the Data Disks must be 'Formatted'. It is advisable to keep a supply of pre-formatted Data Disks ready in case a disk becomes full in the middle of a drawing session.

LOADING AND SYSTEM MENU

When you want to use the BIT STIK system in the normal way, it is necessary only to insert the System Disk, switch on the Apple II and press <RETURN> when prompted.

However, various "System Controls" are provided - for formatting Data Disks, trimming the BIT STIK controls, and using the Replay Module.

If you are newly installing the system, some of these tasks need to be performed (see below: 'Formatting Data Disks' and 'Trimming the BIT STIK'). In this instance, you should press 'S' when prompted, instead of 'RETURN', for 'System Controls'.
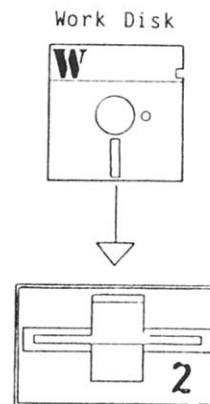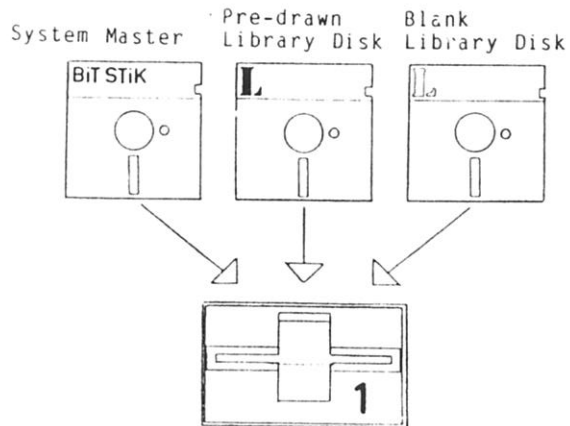
1. Insert the System Disk in Disk Drive 1 and close the flap.

2. Switch on APPLE II.

3. The Disk Drive will run for a few seconds and the Title page will be displayed.

    Press <RETURN> to run the BIT STIK System or S for 'System Controls'.

4. From 'RETURN', the Disk Drive will again run for approximatly 50 seconds with the following message displayed:

    'BIT STIK SOFTWARE NOW LOADING'

    The 'MAIN MENU' is then displayed. Continue from 5 below.

System Master   Pre-drawn   Blank   Work Disk
                 Library Disk   Library Disk

LOADING AND SYSTEM MENU   /cont'd

From 'S', the Disk Drive will run for a few seconds, and the System Menu will be displayed listing the System Controls available.

```
  SYSTEM MENU

 1 FORMAT NEW LIBRARY DISK
 2 FORMAT NEW DATA DISK
 3 TRIM BIT STIK
 4 RUN REPLAY MODULE
 5 RUN BIT STIK SYSTEM
 6 COMRESS WORK DISK



ENTER NUMBER AND PRESS RETURN
```

Select the option required and follow the prompts given.

5. Remove the System Disk from the Disk Drive 1, insert the Library Disk and close the flap. Insert the Work Disk in Disk Drive 2 and close the flap.

6. The BIT STIK System is now ready for use.

FORMATTING DATA DISKS

As mentioned above, it is necessary to pre-format both the Library Disks and the Work Disks. Option 1 on the System Menu enables you to format Library Disks and Option 2 formats Work Disks.

FORMATTING LIBRARY DISKS

1. Select Option 1 on the System Menu and press <RETURN>.

2. Insert a pre-initialised disk in Disk Drive 1 and close flap.

3. When prompted, type the Volume Number you wish to allocate to the Library (from 1 upwards) and press <RETURN>.

4. The disk drive will run for approximately 35 seconds.

5. When done you can format another Library Disk by following the prompts given.

6. Remember to label the formatted disk with the Volume Number that you have allocated.

7. Press any key to return to the System Menu.

FORMATTING WORK DISKS.

1. Select Option 2 on System Menu and press <RETURN>.

2. Insert a pre-initialised disk in Disk Drive 2 and close flap.

3. When ready, press <RETURN>.

4. The Disk Drive will run for a few seconds.

5. When done, you can format another Work Disk by inserting a new Pre-initialised disk and pressing <RETURN>.

6. Press any other key to return to the System Menu.

TRIMMING THE BIT STIK

In order to optimise on the resolution of the BIT STIK, a simple way of adjusting the ranges has been provided.
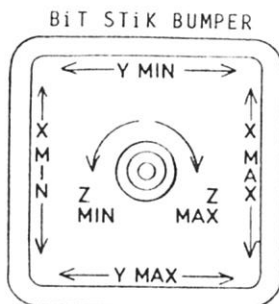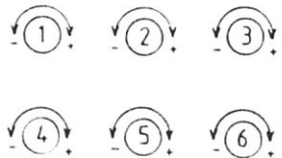
Select Option 3 on the System Menu and press <RETURN> to run the TRIM PROGRAM.

A trimming diagram is presented, with the following prompt at the bottom of the screen:

'MOVE CONTROL UP AND DOWN X-MAX BUMPER.
 IF ALL OK PRESS <RETURN>

(The X-Max bumper is the right hand edge).

TRIMMERS ON UNDERSIDE OF BiT STiK
(follow number sequence)

BiT STiK BUMPER

Tip the BIT STIK backwards onto its end, and you will see 6 holes on the underside. These give access to the trim controls which can be adjusted carefully with a small screwdriver.

Move the BIT STIK Control, as directed, up and down the right-hand bumper. If correctly trimmed, the message 'OK' will be displayed. Otherwise the message 'TURN +' will be displayed - in which case, slightly turn the top left screw clockwise, and repeat the up an down movement of the BIT STIK Control. If necessary, repeat the trimming until the 'OK' message is displayed for the entire right bumper travel. When 'OK', press <RETURN>

The following prompt is then presented:

'MOVE CONTROL ALONG Y-MAX BUMPER.
 IF ALL OK PRESS<RETURN>

Follow the procedure, as above, for the bottom bumper, adjusting the top centre trimming screw if necessary. Press <RETURN> when 'OK'.

The same procedure is repeated for the Left Hand bumper (X-MIN), adjusting the bottom left trimming screw; and then for the Top

TRIMMING THE BIT STIK   /cont'd

bumper (Y-MIN), adjusting the bottom centre trimming screw. For these two, however, if 'TURN-' is displayed, adjust the trimming screw.

Finally, adjust the rotatable BIT STIK Z Control, first turning it fully clockwise for the Z-MAX adjustment, and then anti-clockwise for the Z-MIN adjustement, adjusting the top right and bottom right trimming screw respectively.

The BIT STIK is now correctly trimmed.

SYSTEM FACILITIES

The BIT STIK system allows you to perform the following operations:

1. -Create pictures with DRAW, PAINT, TEXT and TRACE (from a Graphics Tablet). Precision aids (DIGIT) and editing facilities (ERASE and FIND) are provided.
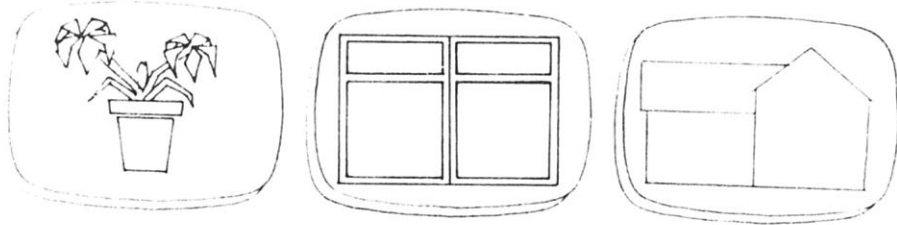

The picture is created as a sequence of graphics operations ('Entries') using the various functions and options available under BIT STIK control. The computer retains this sequence of operations in memory as the 'New Data'.

2. -Store the New Data as generated in 1 as a 'Picture Unit', for subsequent use. The Picture Units are placed on a 'Graphic Index' for storage on the Library Disk using the FILE function.
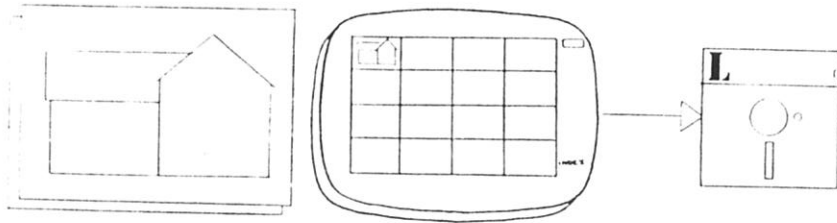
There are 3 Graphic Indexes (A, B & C) on each Library Disk, containing 64, 16 and 16 'slots'. You can thereby build libraries of frequently used sub-drawings: component symbols, architectural fittings and type faces are some examples.
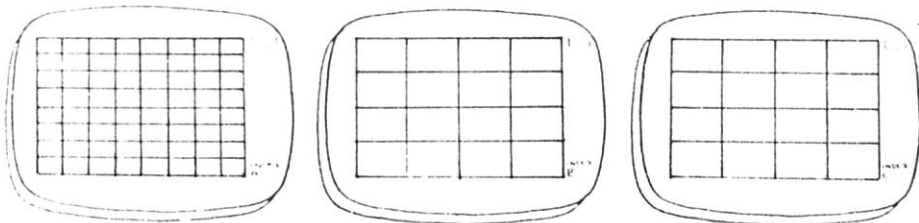
3. -Retrieve a Picture Unit from a Graphic Index using the COPY function, to build up drawings. The Picture Units can be scaled, rotated and compressed before depositing and may be repeatedly planted.
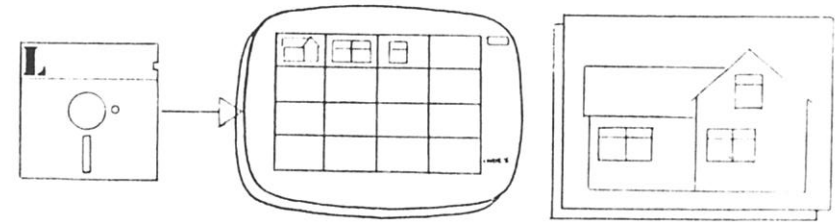
You can erase, reposition or repeat the overlaid Picture Units using the MOVE funtion. The combination of New Data Entries with Picture Units enables you to rapidly generate complex drawings that incorporate frequently used Picture Units.

The "Work Page" is composed of the New Data with any Picture Units overlaid.

Picture Units   New Data   Work Page

4. -Store the Work Page (the New Data with the sequence of Picture Units planted) on the Work Disk, using the SAVE PAGE function.
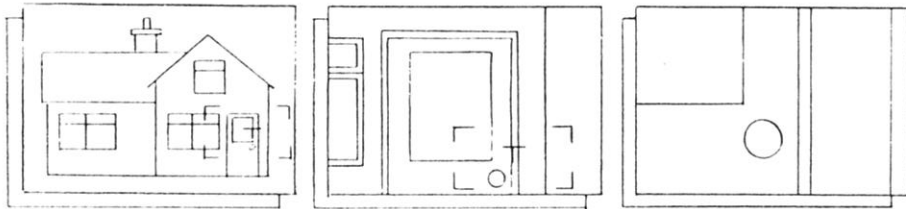

IO MENU

SAVE PAGE

5. -Retrieve a Work Page saved on the Work Disk, using the LOAD PAGE function.


The Work Page is redrawn in the same sequence as which it was compiled.

6. -View the Work Page at different magnifications and from any origin on the screen, using the ZOOM function. This View can be repeatedly magnified.
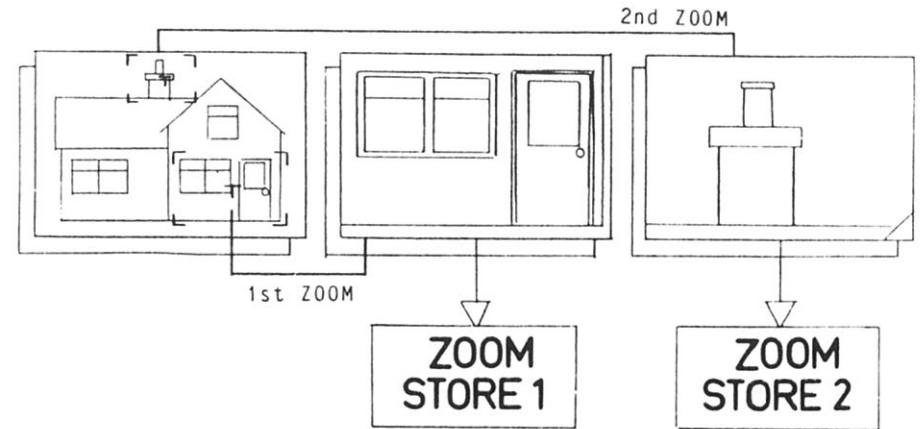

7. -Use ZOOM to add detail at magnification. This powerful feature overcomes the limitation of the screen resolution and enables you to generate precise and complex Picture Units and Work Pages.
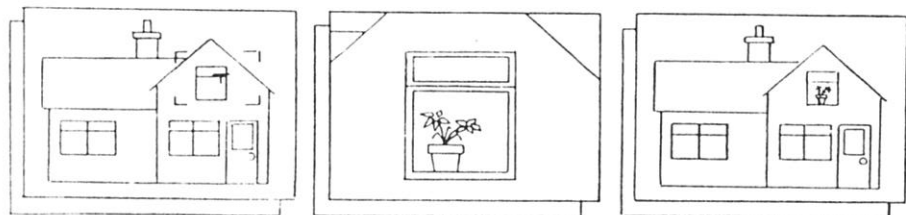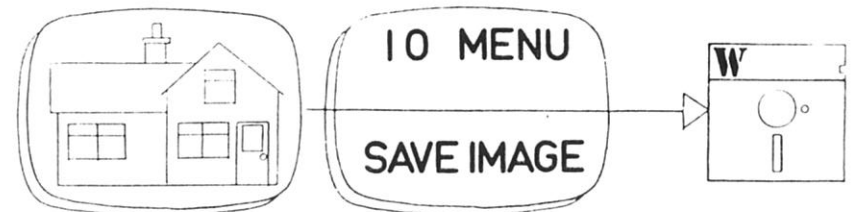

Add new data

You can temporarily save the Views generated by using the ZOOM STORE function.
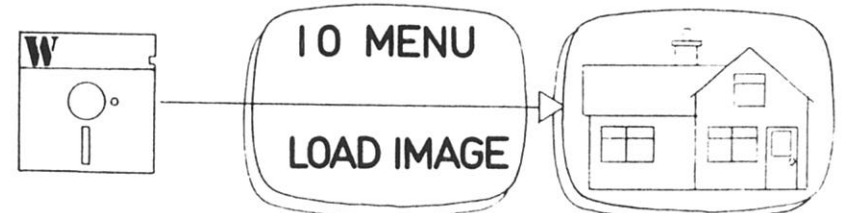

You can also restore the original Work Page using the PAGE function.

8. -Store the "Screen Image" on the Work Disk, using the SAVE IMAGE function.

The Screen Image can be retrieved from the Work Disk using the LOAD IMAGE function.

9. -Print the Screen Image at any stage using the PRINT IMAGE function. The BIT STIK System incorporates a built-in interface to output to the recommended printer. Interfaces are also optionally available to PLOT the Work Page on a recommended X-Y Plotter.

10. -Service the Work Disk with the EDIT WORK DISK utility.

The complexity and detail of drawings produced with the BIT STIK System is limited only by the availability of memory in the computer.

The amount of memory remaining (in "Bytes") when a Work Page or Picture Unit is being assembled is indicated in the bottom right hand corner of the screen: 8192 bytes of memory is available.

An audible prompt warns you when no more data will be saved.

The FILE function automatically clears the New Data from memory, whilst depositing the New Data as a Picture Unit, to allow you to compile another Picture Unit. The WIPE function also erases the New Data to clear memory. If you want to clear the Work Page, use the NEW SESSION function.

The Screen Image, however, can be added to without limit.
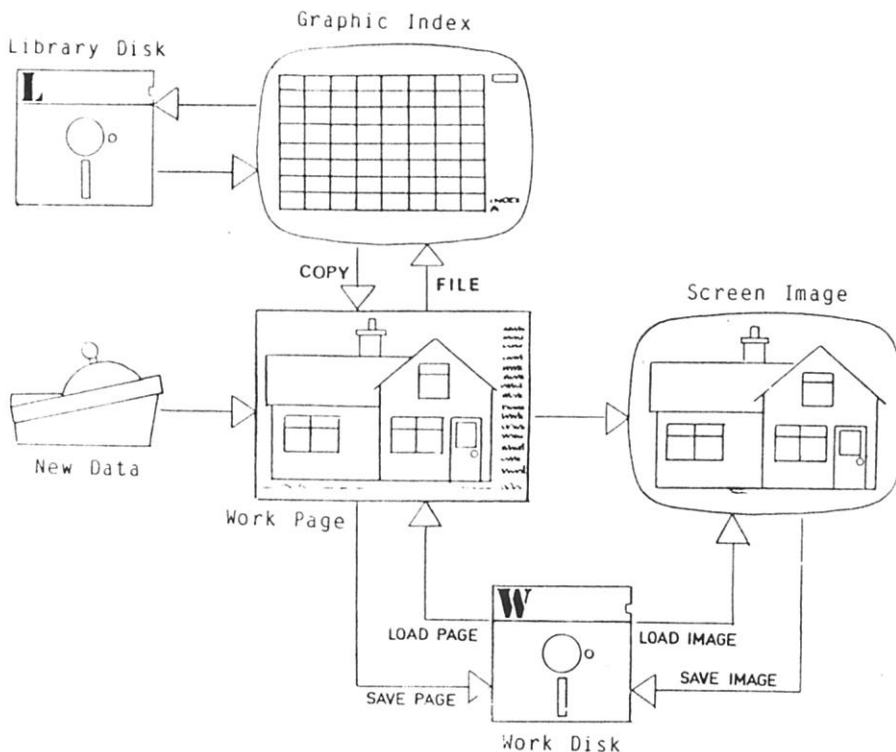
STORAGE

Disk storage is also limited, and although the Picture Units are stored in a compressed format, a large Unit composed of a large number of Entries will invariably take up a lot of space. The maximum number of Picture Units storable on one Library Disk (64 + 16 + 16 = 96) is available only if their combined size does not exceed the disk limit.

You should be cautious with the use of SAVE IMAGE since this function stores every point of the screen image rather than the sequence of drawing operations, and is consequently "expensive" at 8k bytes per image.

If you attempt to add a new Picture Unit, Work Page or Screen Image and the Library or Work Disk is full, the following message will be displayed:

"LIBRARY DISK FULL" or "WORK DISK FULL"

You should ensure that preformatted Library Disks and Work Disks are available.

DISK MAINTENANCE

Option 6 on the System Menu enables you to 'COMPRESS WORK DISK'. This function performs 'housekeeping' on the Work Disks by erasing any unnecessary data. Periodic use of this function on your Work Discs will ensure that the available disk storage capacity is used in the most efficient manner.

COLOUR

Unexpected results in the display of colour may occur due to the unusual way in which the Apple II handles "Screen Memory" - the BIT STIK System must work with this constraint. The considered use of BIT STIK Functions can minimise these effects.

It is stressed that these are display effects and do not reflect disruption to the internal representation of the picture. When printed or plotted the results will be as expected.

The PAINT function can cause the most serious of these effects: when horizontally adjacent colour areas are used, the "paint" may "run" between the two areas. Use isolated areas of paint when possible, to avoid this undesirable result. Vertical lines plotted in white may also appear coloured.

CONTROLS

The BIT STIK Controls consist of a two axis joystick (X-Y Control), with a rotatable Z Control, and three Button Controls - Left, Right, and Top.
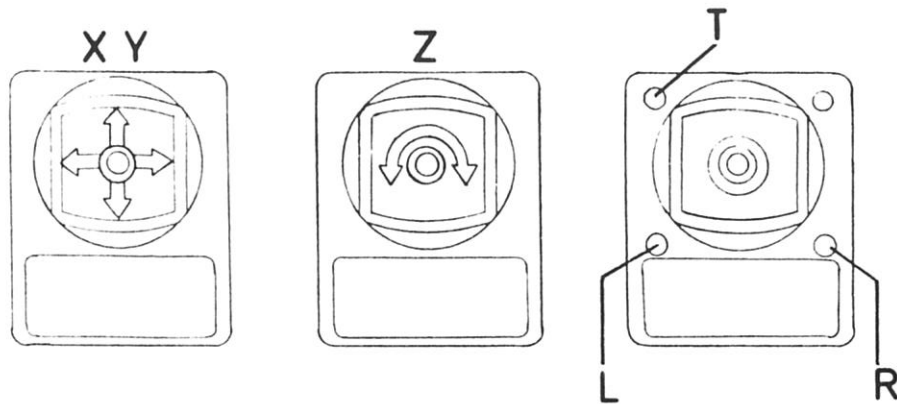
The X-Y Control is used to control the "Cursors" on the screen; the Z Control for variable input, and the three Button Controls are dynamic function switches.
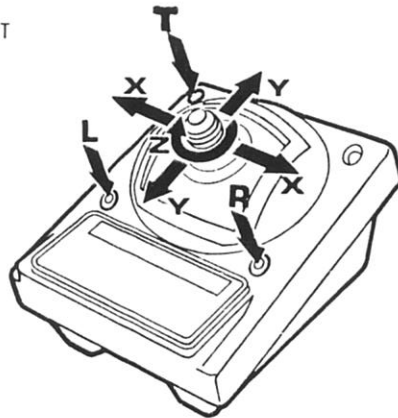
As an indicator in the FUNCTION descriptions, the following symbols will be employed to represent the BIT STIK controls:

BIT STIK CONTROLS

    ⊡ :   LEFT/RIGHT BIT STIK MOVEMENT

    ⫲ :   UP/DOWN BIT STIK MOVEMENT

    ⬙ :   ANY BIT STIK MOVEMENT

    ⟲ :   ROTATE Z CONTROL

BUTTON CONTROLS

    Ⓛ :   LEFT BUTTON

    Ⓡ :   RIGHT BUTTON

    Ⓣ :   TOP BUTTON

    ⊕ :   PRESS ONCE

    ⊙ :   PRESS AND HOLD

    ⊕ :   RELEASE

CURSORS

A "Cursor" is a visual marker that either indicates a position on the screen, or defines an area to be controlled using BIT STIK FUNCTIONS. Only one type of cursor is active at one time.

The System Cursors, with the symbols used to represent them, are as follows:

┼	DYNAMIC CURSOR	- Marks the position of the X-Y Control on the screen
╳	ORIGIN CURSOR	- Marks source position of plot or previous point
•	STREAM CURSOR	- "Pen point" when drawing in STREAM mode (follows X-Y position of BIT STIK)
—	NIB CURSORS	- Defines "nib stroke" when drawing in NIB mode
◯	CIRCLE CURSOR	- Dynamic circles can be positioned by X-Y Control and adjusted in size
⌢ ◡	ERASE/FIND CURSORS	- Indicates position of start and end points of Entries
⌐▪⌐	COPY CURSOR	- Defines and manipulates Picture Units
⌐▪⌐	ZOOM CURSOR	- Defines area of Work Page to be expanded

MENUS, PALETTES & SCALE WINDOW

The Menus & Palettes present the available functions and drawing options. Choices are selected by Cursor control.

There are two menus - the Main Menu and the Digit Menu, and two palettes - the Draw Palette and the Paint Palette.
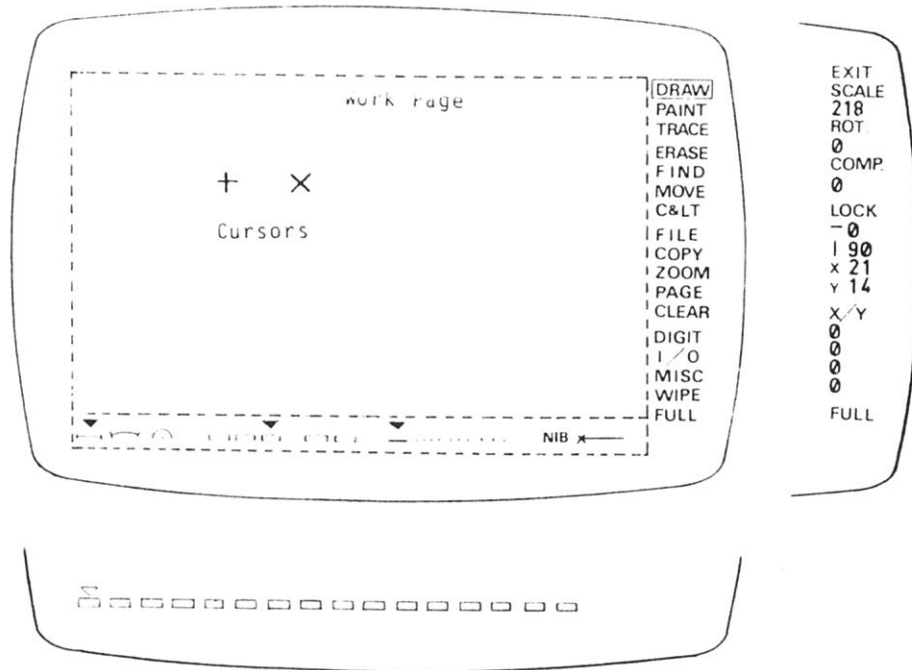
MENUS

The MAIN MENU displays the main FUNCTIONS available, and enables you to select the function required. DRAW is the default and "home" function.

TO SELECT: Move the Dynamic Cursor to the required option. The legend strobes when selected. Press L to confirm the selection. The legend then remains lit while the FUNCTION is in operation.

The Digit Menu (selected via the DIGIT option on the Main Menu) presents precision controls over certain functions.

. . . . . . a SPACE COUNTER is displayed: this . . . . . . of memory remaining (in bytes).

PALETTES

The Draw Palette provides the basic options for generating drawings, and consists of the following facilities:

MODE   -LINES
               ARCS
               CIRCLES
               STREAM (not displayed)
               NIBS

COLOURS   -GREEN: PURPLE: WHITE: BLACK: ORANGE: BLUE

LINE TYPE   -SOLID: DOTTED 1, 2 & 3

NIB TYPE   -SOLID TO 32 POINTS
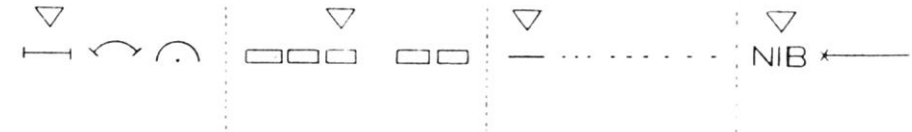
The "default" palette selection is LINES, White, Solid. Each class of palette option can be used in any combination.

TO SELECT: Move the Dynamic Cursor along the bottom edge to the Mode, Colour or Line Type symbol to be selected. The arrowhead marker will jump to that selection. Move the Dynamic Cursor vertically away from the palette to avoid altering the selection.

All Modes, Colours and Line Types can be freely mixed in a drawing.

The palette can be removed to extend the drawing space by selecting the FULL option on the Main Menu.

THE SCALE WINDOW

The SCALE WINDOW enables you to define an area on the screen over which the BIT STIK operates at full resolution, effectively scaling down the movement of the X-Y Control and thereby providing further precision. To action the SCALE WINDOW, press R and hold down. A frame appears around the Dynamic Cursor, adjustable in size by rotating the Z Control. The SCALE WINDOW can be steered by X-Y Control to the area within which fine control is required. Release R and the Dynamic Cursor will be rescaled with the result that complete movement of the BIT STIK will effect movement of the cursor only within the confines of the SCALE WINDOW.

To exit SCALE WINDOW mode, rotate the Z Control fully clockwise. The frame will be erased and the X-Y Control regains full screen resolution.
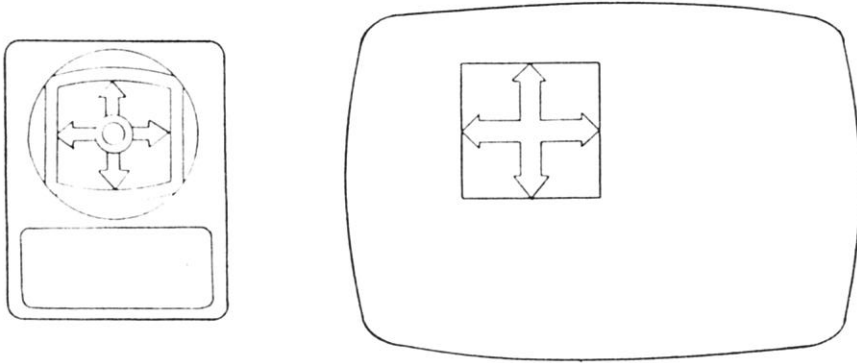
NOTE: The SCALE WINDOW is not available when drawing in NIB mode, or when using the LOCKS precision function.

TEXT MENUS

Two Text Menus are generated, the I/O Menu and the Misc Menu, by selecting the I/O and MISC functions respectively.

The Text Menus enable text input from the keyboard, which is required for some of the functions.

I/O MENU
1 CHANGE LIBRARY DISK
2 CHANGE WORK DISK
3 LOAD PICTURE UNIT
4 SAVE PAGE
5 LOAD PAGE
6 SAVE IMAGE
7 LOAD IMAGE
8 PRINT IMAGE
9 EDIT WORK DISK
10 EXIT
ENTER NUMBER AND PRESS RETURN

MISC MENU
1 TEXT
2 ZOOM STORE
3 NEW SESSION
4 EXIT
ENTER NUMBER AND PRESS RETURN
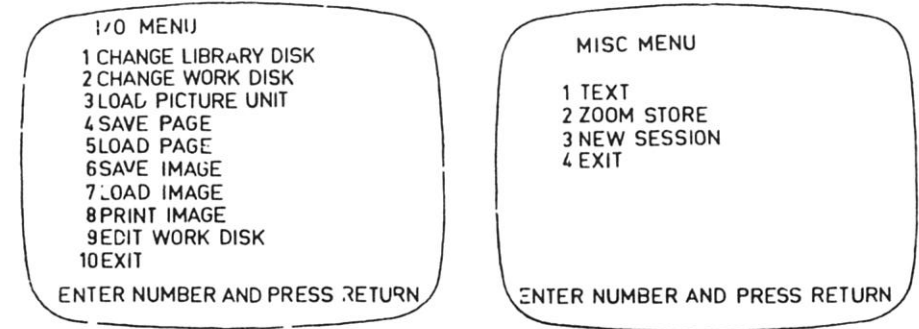
GRAPHIC INDEXES

Each Library Disk contains 3 Graphic Indexes ("A","B" and "C"), which contain 64, 16 and 16 Picture Units respectively.

The Graphic Index operates as a visual store of previously assembled and saved Picture Units.
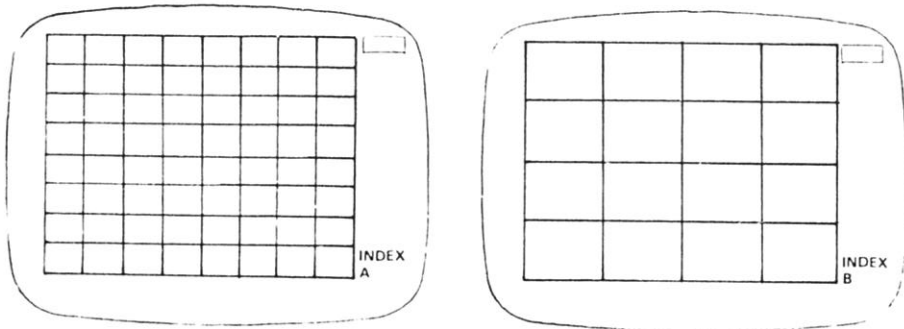
The Picture Units are deposited onto the Graphic Index with the FILE function, and picked up from the Index via the COPY function, using the Copy Cursor to "handle" the item.

At the side of the Index, the following information is presented:

INDEX =   A, B or C   -   Index identifier

FILE/COPY/LOAD   -   Indicator showing access function
                                   being used.

You can step forward or backwards through the three Indexes by pressing R or L respectively.

DRAW

The DRAW function provides the basic drawing operations - lines, arcs and circles can be plotted in different colours and with different line types; freehand drawing ("STREAM") can be entered and "NIBS" - definable pen strokes - can be used. The DRAW function is used in conjunction with the Draw Palette.
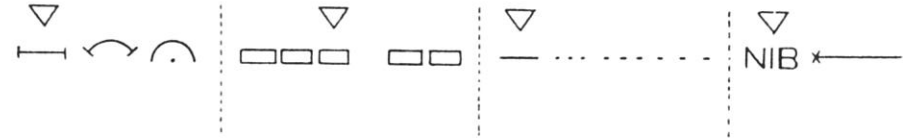
SELECTION

The DRAW function is the "default" - when the system is loaded and the Main Menu is displayed, this function is automatically selected. Similarly, after exiting the other functions, DRAW will become active.
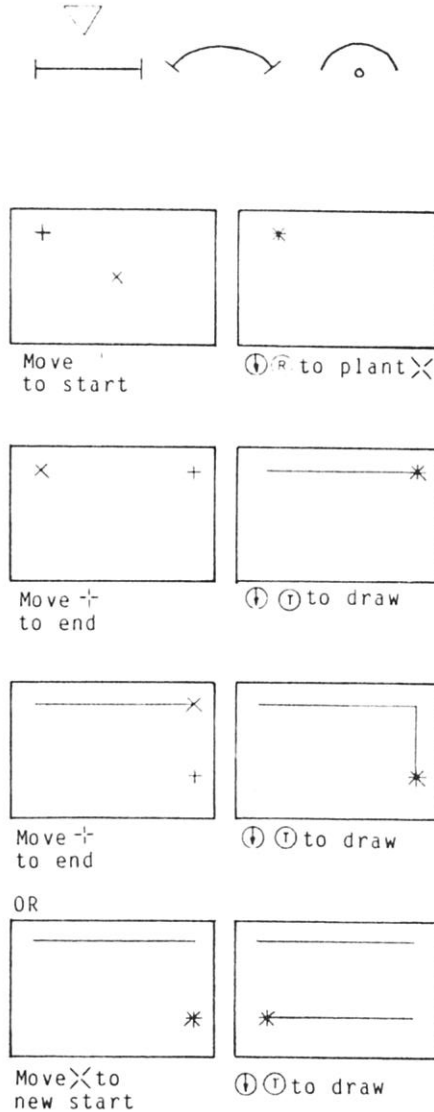

| Move to DRAW | ⊕⊙ to confirm | Move away |
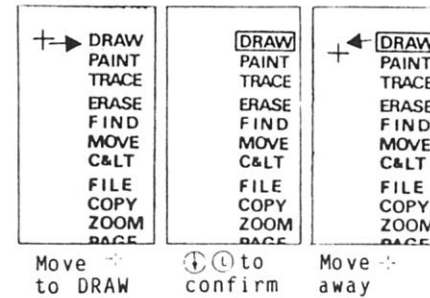
DRAWING LINES

Just as "DRAW" is the default FUNCTION, "LINES" is the default MODE on the Draw Palette. (To select another mode, move the Dynamic Cursor to the required option and the indicator will jump to that choice. Move the cursor away vertically.).

To plot a line, first position the Dynamic Cursor at the point from which the line is to originate. Then press L , which causes the Origin Cursor to jump to the selected position: this establishes the origin of the line.

The Dynamic Cursor can then be moved to the position to which the line should plot. Press T and the line will be plotted in the Colour and Line Type specified on the palette.

The Origin Cursor automatically updates to the new position of the Dynamic Cursor. Therefore to continue drawing from a new point, move the Dynamic Cursor before updating the position of the Origin Cursor.

Move
to start

(↓)(R) to plant ✕

Move ╪
to end

(↓)(T) to draw

Move ╪
to end

(↓)(T) to draw

OR

Move ✕ to
new start

(↓)(T) to draw

DRAWING CIRCLES

Select CIRCLES mode from the Palette.

The Dynamic Cursor is replaced by the Circle Cursor: a circle whose diameter can be varied by rotating the Z Control.

The Circle Cursor can be moved to the required position by the X-Y Control, the diameter set with the Z Control, and a circle of identical size to the Cursor deposited by pressing T. The Origin Cursor will be repositioned at the centre of the circle.

If circles are required of a larger diameter than provided by the Z Control, it is possible to construct them from two ARCS.

Exit CIRCLES mode by selecting another mode. The Dynamic Cursor will replace the Circle Cursor.

Move ◯
with ✛

Scale ◯
with ▣

(↓)(T) to draw

(↓)(T) to draw
again
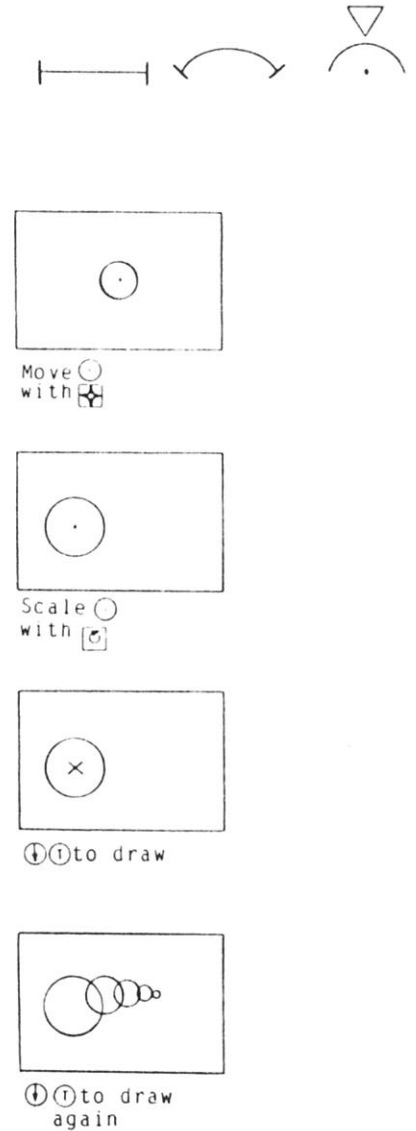
DRAWING ARCS

Select ARCS mode from the Palette.

To plot an arc it is first necessary to establish a vector, or direction from which the arc plots. The arc is constructed as a blending radius with the preceding arc or line. Thus for the first arc to be drawn, an "imaginary line" must first be plotted to set up the initial vector. To define the starting direction, position the Origin Cursor (as described above in "DRAWING LINES") at the start of the "imaginary line". Move the Dynamic Cursor to the end point of the "line" and press L to again update the Origin Cursor. A starting direction has now been established for the first arc.

Move the Dynamic Cursor from the previously established start point of the arc to the required end point. Press T to plot the arc. The Origin Cursor will be updated to the new end point. This procedure can be repeated to continue the curve, each arc generated as a blending radius with the preceding arc.

In the same way, an arc can follow a vector whose direction has been established by a previously plotted line - LINE and ARC Entries may be mixed in any combination.

CAUTION! If no initial vector is established, or if a vector established in the opposite direction to the defined point, a time delay may occur whilst the computer "clips" the "off screen" trajectory. It is therefore essential to carefully establish the vector.
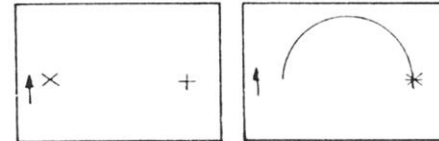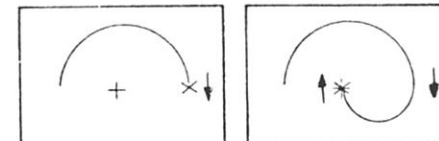
Exit ARCS mode by selecting another mode.
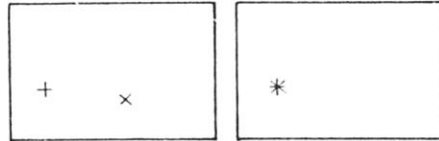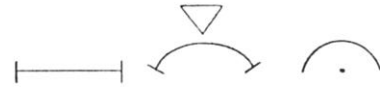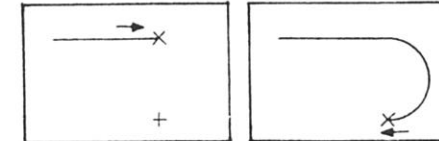
Move -|- behind start
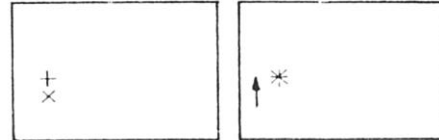
(↑)(L)to plant ✕

Move -|- to start

(↑)(L)to plant ✕

Move -|- to end

(↓)(T)to draw

Move -|-to new end

(↓)(T)to draw

After a line Move -|-to end
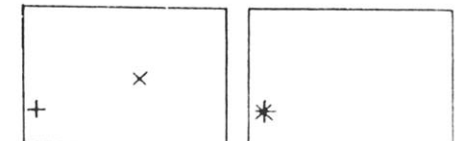
(↓)(T)to draw

DRAWING IN STREAM MODE

STREAM mode is the means of plotting a continuous freehand line which follows the movement of the X-Y Control.

To use STREAM mode, move the Dynamic Cursor to the required start position. Press L and hold down, then press T and hold down. A continuous line will be generated as the X-Y Control is moved. Release T and L to exit STREAM mode.
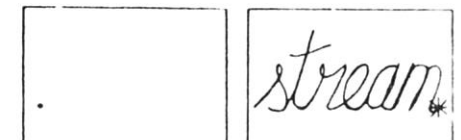
The Stream Cursor is a single point which indicates the current position of the X-Y Control.

STREAM mode is best used for drawing fine detail, particularly in conjunction with the SCALE WINDOW. STREAM can be used with any Colour.
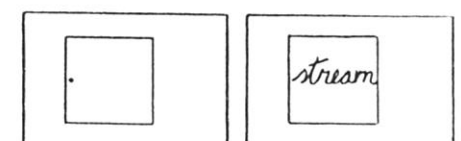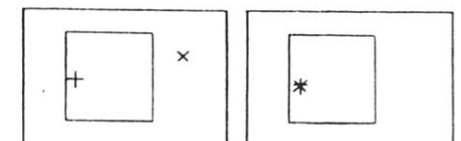
CAUTION! STREAM mode uses a lot of memory and should be employed sparingly.

Move -|- to start
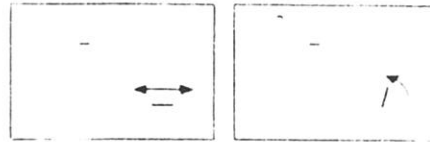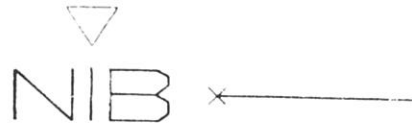
(T)(L) to plant ✕

(↑)(T) to enable .

Move [⊞] to draw

DRAWING WITH NIBS

Select NIBS mode from the Palette.

The Origin and Dynamic Cursors are replaced by two Nib Cursors. A Nib Cursor is a single line whose length can be adjusted by rotating the Z Control. The angle of the Nib Cursor can be adjusted by pressing R and holding down whilst rotating the Z Control. Release R to set the angle.

The cursors work similarly to the Origin and Dynamic Cursors: the Origin Nib can be updated to the Dynamic Nib's position by pressing L . This now defines the start position and angle of the nib stroke. The Dynamic Nib is then moved to the required position (adjusting length and rotation if wished). The area between the two cursors will be infilled by pressing T , with the stroke being drawn at the prevailing Colour and Line Type.
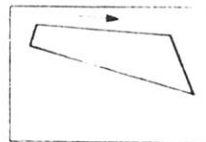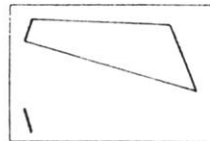
By using different Line Types, the spacing across the width of the stroke can be varied. The spacing along the length of the stroke ("Nib Type") can also be adjusted by moving the X-Y Control to the "NIB" legend on the Palette, pressing L and holding down.

Rotate the Z Control to adjust the line to the right of the "NIB" legend from Solid (the default) to a maximum spacing of 32 points. Release L to set the length spacing.

A variety of Nib textures can be achieved using combinations of Line Type and Nib Type, from a solid area of colour to a field of dots.

Exit NIBS mode by moving the Dynamic Nib to the Nib legend. When the marker switches off, the Origin and Dynamic Cursors are replaced. Move the Dynamic Cursor away vertically.
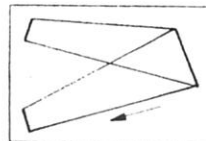

NIB

⊙ to scale —

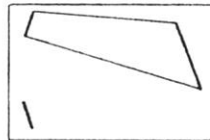⌓ Ⓡ and ⊙ to rotate —

⌀ Ⓛ to plant start

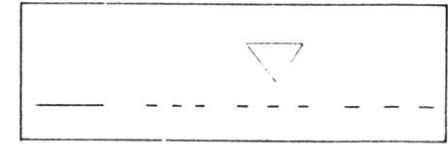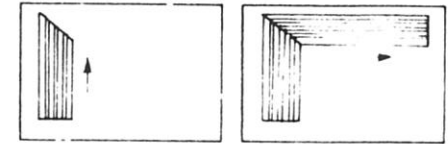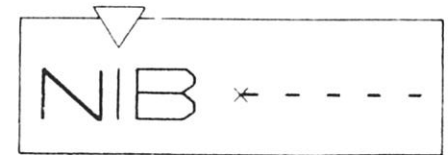position end and ⌀ Ⓣ to draw

position new end

⌀ Ⓡ to draw

OR

⌀ Ⓛ to position new start

position end and ⌀ Ⓡ to draw

Select NIB
⌓ ⌀ and ⊙ to alter spacing
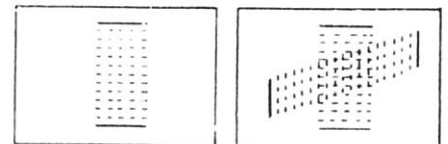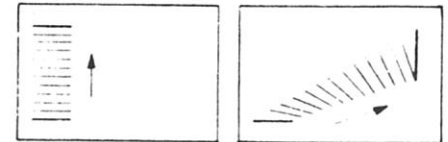
USING THE SCALE WINDOW

The SCALE WINDOW can be used at any time when using the preceding modes, except for NIBS, as an aid to precision control.

To use the SCALE WINDOW press R and hold down. The window can be adjusted in size with the Z Control. Release R to set the window.
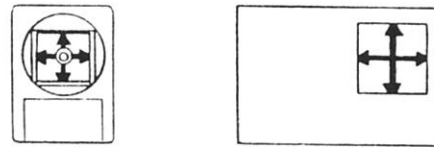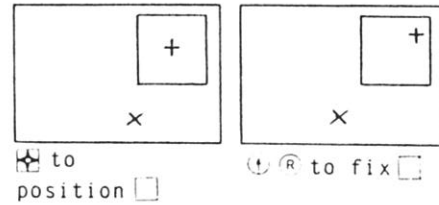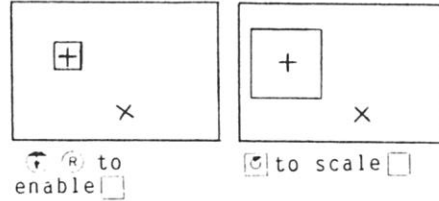
The X-Y Control is now confined to the window area.

Switch off the SCALE WINDOW by rotating the Z Control fully clockwise.

USING OTHER FUNCTIONS

USING DIGIT

The DIGIT functions provide further aids to precision: an X/Y Readout of the locations of the cursors on the screen to assist exact positioning, and the facility to establish grids and locks to control cursor movement.

EDITING

The New Data generated by the use of the various DRAW modes can be edited. Use ERASE to delete any part of the drawing and use FIND to get back to a specific point in the drawing.

OTHER INPUT FUNCTIONS

Other originatation facilities are available via the PAINT function which colour fills enclosed areas and the TRACE function which enables input from a Graphics Tablet.

OTHER VIEWS

The Work Page created with the preceding features, can be viewed without the menu and palette, using the CLEAR function, and at expanded resolution, using the ZOOM function.
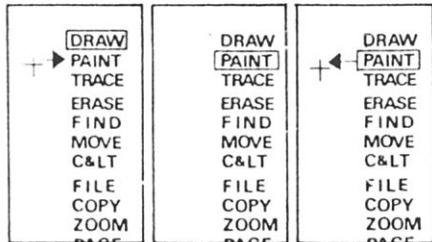
PAINT

The PAINT function enables you to colour-fill any completely enclosed area using the special Paint Palette of 16 Colours.
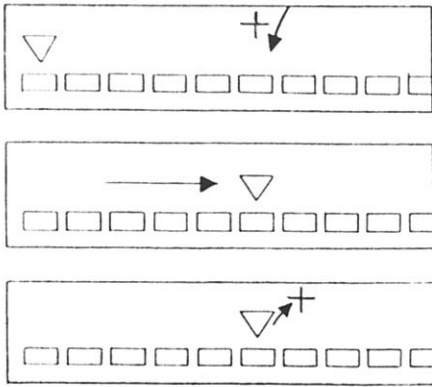
SELECTION

Move the Dynamic Cursor to the "PAINT" legend on the Main Menu, and press L. The legend illuminates when selected.

The Draw Palette is replaced by the Paint Palette.

| Move to PAINT | $\downarrow$ $\circlearrowright$ to confirm | Move away |

USING "PAINT"

Select the required colour from the Palette with the Dynamic Cursor.

Move the Dynamic Cursor into the area to be painted and press T . The enclosed area will be filled with the selected colour. PAINT fills horizontally through a gap of a single point and vertically through a gap of two points: a "bottleneck" may prevent the spread of colour in a particular shape. Reposition the Dynamic Cursor over any unpainted areas and press T to complete the colouring.

CAUTION! An attempt to fill any area not fully enclosed causes a "leak" of colour through the gap.

If BLACK has been selected, the PAINT will erase the entire shape including anything connected to it by a horizontal line at least one point wide and a vertical line at least three points wide.

You should attempt to avoid creating adjoining colour areas: the APPLE II may cause spurious colour effects.

You should also avoid the use of PAINT when assembling Picture Units: the PAINTed areas will not overlay when subsequently planted on another PAINTed area ('NIBS', however, can be used).

Exit PAINT function by moving the Dynamic Cursor to the "DRAW" legend and pressing L . The "PAINT" legend will switch off.
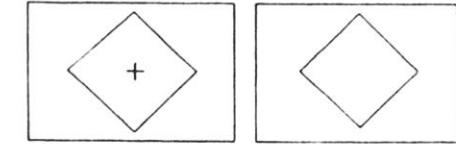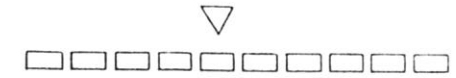
Position in enclosed space   to colour fill
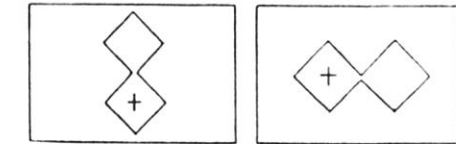
Fill passes through 3 points vertically   Fill passes through 1 point horizontally

BEWARE OF LEAKY SHAPES

TRACE

The TRACE function enables the use of a Graphics Tablet as an additional drawing source.

SELECTION

Move the Dynamic Cursor to the "TRACE" legend on the Main Menu, and press L. The legend illuminates when selected.

The X-Y Control of the Dynamic Cursor now responds to the position of the Tablet Stylus, and the Origin Cursor can be updated in the normal way by pressing L.

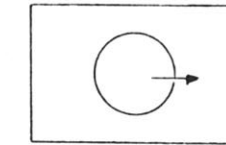When in TRACE the following functions cannot be used concurrently: PAINT, MOVE, FILE, COPY and ZOOM.

USING 'TRACE'

Since the Tablet and Stylus emulate the BiT STiK X-Y Control, the normal drawing modes and palette options are all available and can be selected with the Tablet Stylus.

Follow the instructions given for DRAW, ERASE and FIND for the origination and editing of New Data.

Move to TRACE

(L) to confirm

Move with stylus

Positon with stylus

Control & draw with BiT STiK buttons.

STREAM mode is selected by pressing the Stylus tip on the Tablet, and is switched off on raising the Stylus.

stream
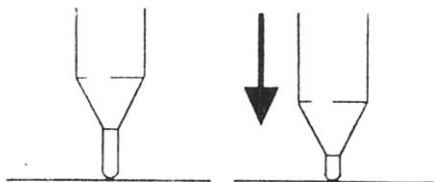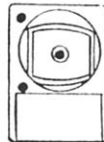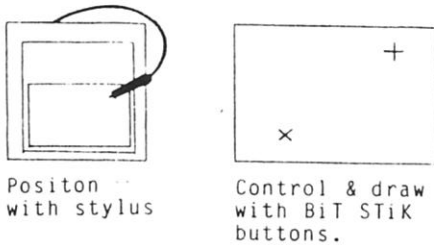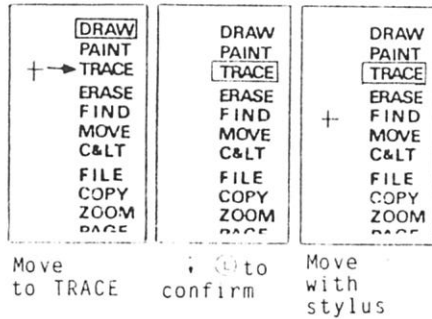
The maximum useable area of the Tablet corresponds to the screen proportions.

When the Stylus is outside of this 'window', the Dynamic Cursor is positioned at the edge of the screen.

The Tablet Window can be set with the ZOOM function. Select the area on the screen with the ZOOM Cursor that corresponds with the area on the Tablet over which you want precision control. The active area of the Tablet is reduced to the area of the base view defined by the Zoom window. This enables you to digitise input at the current Zoom resolution.

Exit TRACE temporarily by selecting another function with the Tablet Stylus and pressing L. This enables you to COPY, MOVE, FILE and ZOOM, and to return from these functions directly to TRACE.

Exit TRACE fully by selecting the DRAW function with the Tablet Stylus and pressing L.

Tablet area = Workpage area
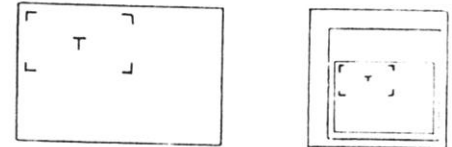
Position on Workpage

Defines usable Tablet area

zoom

ZOOM

Select PAGE to return to base scale.

zoom
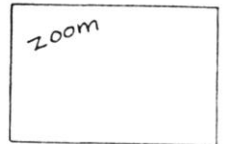
ERASE

The ERASE function enables you to erase the last Entry or to step back through the sequence of New Data Entries to erase any that are not required.

SELECTION

Move the Dynamic Cursor to the "ERASE" legend on th Main Menu and press L . The legend illuminates when selected.

The Origin and Dynamic Cursors are replaced by the two Erase Cursors, indicating the start and end points of the last Entry. If the last Entry was a NIB stroke, four Erase Cursors will define the two start and two end points of the NIB stroke. If the last Entry was a PAINT, a single Erase Cursor will denote the location of the cursor that had initiated the colour fill.

Move to ERASE

to confirm

is inactive

Line & Arc

Nib
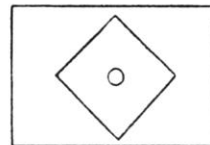
Paint
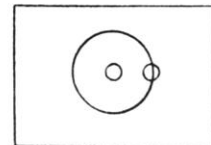
Circle

USING "ERASE"

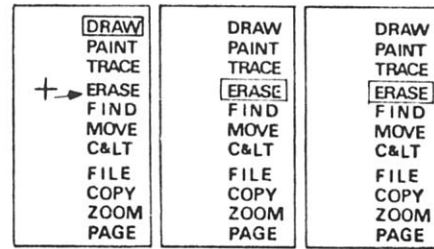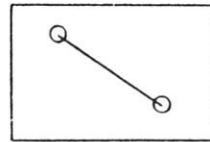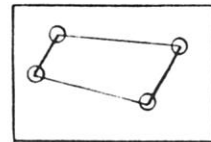To ERASE the last Entry, press T . The entry will be permanently erased from memory . If the last entry was a PAINT, the colour area will be erased from memory but will remain on the screen, until the Work Page is viewed with PAGE or ZOOM.

To ERASE earlier Entries prior to the final entry, it is possible to step back through the sequence until the required entry is reached. To step back, press L and hold down and the two Erase Cursors will successively define each preceding entry. Release L to freeze the Erase Cursors. The entry can be erased by pressing T . Similarly, to step forwards, press R and hold down, releasing when the required entry is indicated, and erasing by pressing T .

If all entries have been erased in this manner, the ERASE function will be automatically exited.

Continuous ERASE can be achieved by holding down both L and T for a "reverse erase", or with R and T for a "forward erase".

If, when using ZOOM, both end points of an Entry are not on screen, the Erase Cursors will not be displayed: pan across with ZOOM to include both ends for erasing.

ERASE 'paints' out the erased Entries with black. When this causes an underlying Entry to be partially erased, the picture can be restored with PAGE or ZOOM.

Exit ERASE function by pressing both L and R. The "ERASE" legend will switch off and the Erase Cursors replaced by the Origin Cursor at the last selected Entry.
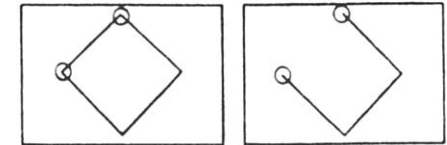
o o marks the line
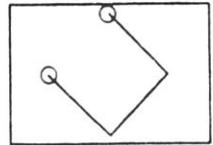
to Erase
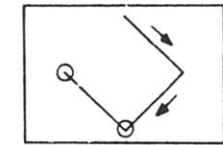
to step back through drawing
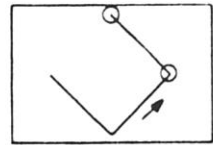
to step forward.

FIND

The FIND function enables you to determine the precise co-ordinates of the end points of New Data Entries, and to make a new Entry at a chosen point.

SELECTION

Move the Dynamic Cursor to the "FIND" legend on the Main Menu and press L. The legend illuminates when selected.

The Origin and Dynamic Cursors are replaced by the Find Cursor which indicates the start or end point of previous Entries.
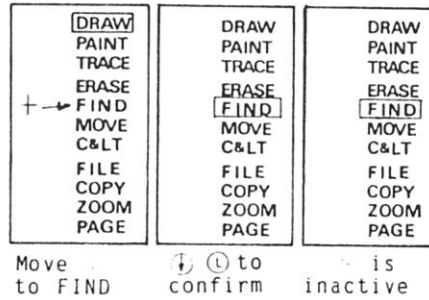
USING "FIND"

The "FIND" function operates in a similar way to ERASE: you can step back through the New Data Entries by pressing L and holding down, and can step forward by pressing R and holding down. Release when the required location is reached and press T to establish the Origin Cursor at that point.

(When using ZOOM, it is necessary to display both end points of an entry to FIND one end point: pan with the Zoom Cursor to include both ends.).

Exit FIND function is automatic when the location has been selected.

Move to FIND | ⊥ Ⓛ to confirm | is inactive

○ marks last point | ○ ○ marks last nib

⊥ Ⓛ to step back through drawing | ⊥ Ⓡ to step forward.

⊥ Ⓣ when at required point | goes to found point

marks circle centre | ⊥ Ⓣ to plant at circle centre.
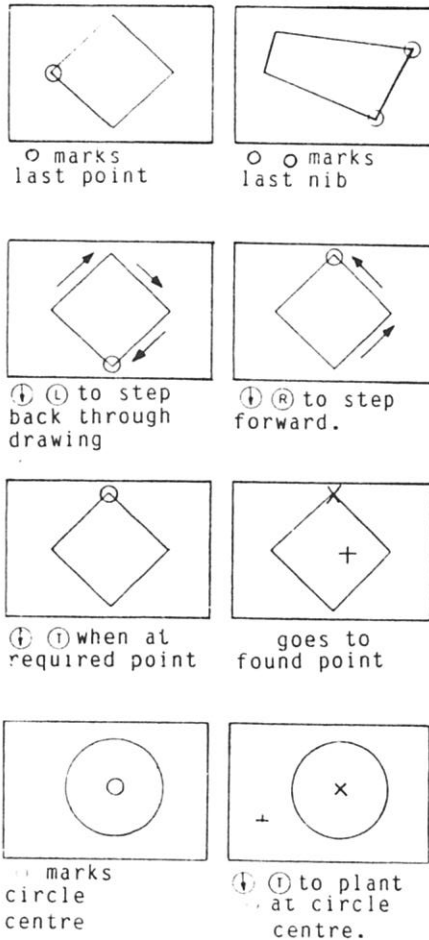
MOVE

The MOVE function enables you to move, copy or erase Picture Units which have been planted on the Work Page with the COPY function.

SELECTION

Move the Dynamic Cursor to the "MOVE" legend on the Main Menu, and press L. The legend illuminates when selected.

The Dynamic Cursor is replaced by the Copy Cursor, which will frame the last Picture Unit placed on the Work Page.

Move to MOVE | ⊥ Ⓛ to confirm
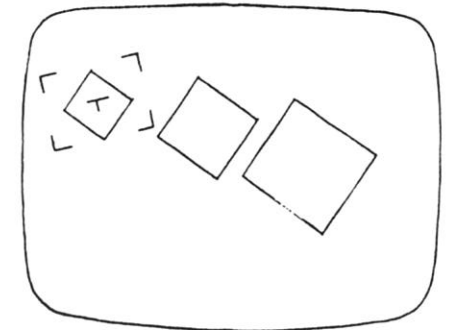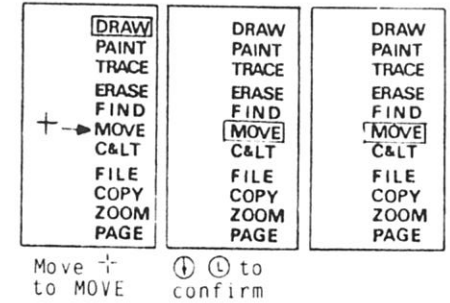
[ ] Marks last planted picture unit.

USING "MOVE" TO ERASE

To erase the last Picture Unit planted, as framed by the Copy Cursor, press T . You can also step back or forward through the sequence of previously planted Picture Units to erase any that are unwanted, by pressing L and holding down to step backwards or pressing R and holding down to step forward. Release the button when the unit is framed and press T to erase.

Exit MOVE function by pressing L and R simultaneously.

USING "MOVE" TO COPY OR MOVE

The MOVE function can also be used to move a Picture Unit by erasing and replanting it, or to copy a Picture Unit by erasing, regenerating and replanting.

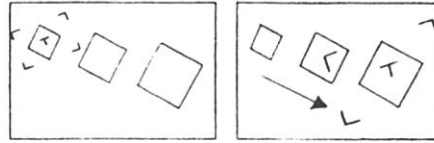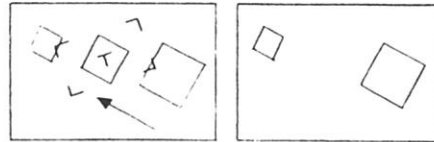Erase as described above but do not exit. If a copy is required, regenerate the Picture Unit by pressing T . The Copy Cursor can then be moved to a new location and the Picture Unit re-drawn by pressing T . This operation can be performed at as many locations as required.

You can step back or forward through the sequence of previously planted Picture Units as described above for erasing, to select a Picture Unit to copy or move.

This gives you the ability to use a Picture Unit directly from the page, if it has been already used, rather than having to copy from the Graphic Index every time the unit is required.

Exit MOVE function by pressing both L and R simultaneously.

[�ᵥ] marks last picture unit

⊕ Ⓛ to step back through picture units

⊕ Ⓡ to step forward.

⊕ Ⓣ then ⊕ Ⓛ Ⓡ to erase unit

OR
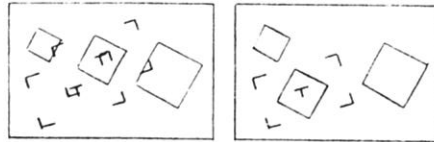
⊕ Ⓣ to mark unit

reposition [ᵥ] and ⊕ Ⓣ to move unit
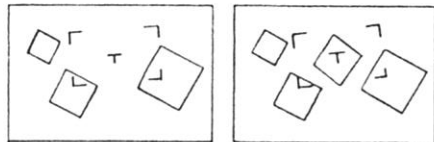
[ᵥ] now holds unit copy

⊕ Ⓣ to draw unit again.

FILE

The FILE function enables you to store the New Data as a Picture Unit on a Library Disk for later use.

SELECTION

Move the Dynamic Cursor to the "FILE" legend on the Main Menu and press L . The legend illuminates when selected.

The Work Page is replaced by the current Graphic Index, and the Copy Cursor becomes active. If another Graphic Index is required press R for next index or L for the previous index.

USING "FILE"

The Copy Cursor can be moved around the Graphic Index to select a slot for filing the Picture Unit. Press T to deposit the Picture Unit on the index. The unit is stored at full resolution for subsequent use. An existing Picture Unit can be overwritten by a new unit if it is no longer required: it will be erased from the Library Disk.

If the Library Disk is full (even though all the Index slots may not have been used), the following message is displayed:

"LIBRARY·DISK FULL"

If this occurs, perform 'CHANGE LIBRARY DISK'

Remember! FILE only stores the New Data. If you want to save a Work Page (New Data with planted Picture Units), you should use the SAVE PAGE function.

The FILE function is automatically exited on filing the Picture Unit, and the New Data is cleared from memory to enable you to compile another Picture Unit.

Move ✛ to FILE

⊕ Ⓛ to confirm

Workpage is replaced by Index.
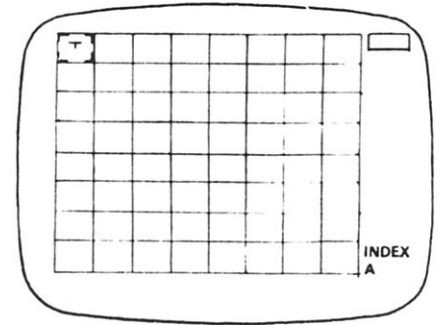
Move [ᵥ] to required box
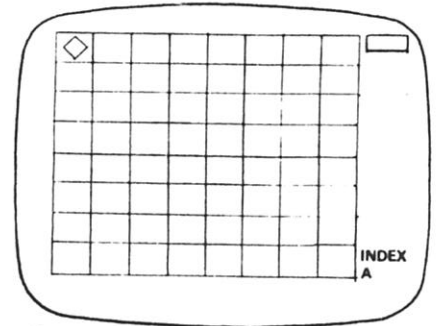
⊕ Ⓣ to file drawing.

COPY

The COPY function enables you to retrieve a previously - stored Picture Unit from a Graphic Index in the assembly of a Work Page.

SELECTION

Move the Dynamic Cursor to the "COPY" legend on the Main Menu, and press L . The legend illuminates when selected.

The Work Page is replaced by the current Graphic Index, and the Copy Cursor becomes active. If another Graphic Index is required, press R for next Index or L for previous Index.

DRAW	DRAW	
PAINT	PAINT	
TRACE	TRACE	
ERASE	ERASE	
FIND	FIND	
MOVE	MOVE	
C&LT	C&LT	
FILE	FILE	
+ → COPY	[COPY]	
ZOOM	ZOOM	Workpage is
PAGE	PAGE	replaced by
CLEAR	CLEAR	Index.

Move ·÷·
to COPY

⊕Ⓛ to
confirm
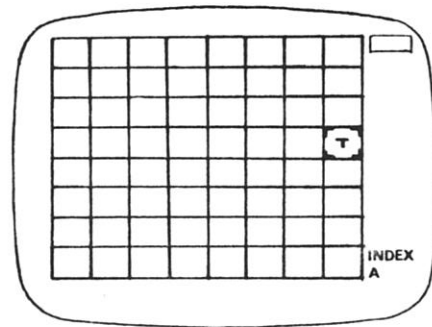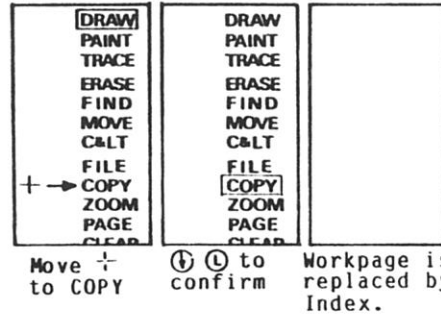
USING COPY

The Copy Cursor can be moved around the Graphic Index to select the Picture Unit required. Press T to pick up the unit. The Graphic Index is replaced by the Work Page and the Digit Menu is automatically selected. The Picture Unit can then be placed at any location on the Work Page by X-Y Control and planted by pressing T . The unit can be repeated in as many instances as wished.

The Picture Unit can also be manipulated prior to planting - the SCALE can be adjusted by rotating the Z Control; COMPRESSION can be adjusted by pressing R and holding down while rotating the Z Control; and ROTATION can be adjusted by pressing L and holding down while rotating the Z Control.

If you want to pre-set the values for SCALE, COMPRESSION or ROTATION, the values must be set before COPY function is selected. (See DIGIT function).

If the planting of the Picture Unit would exhaust the memory, the following message will be displayed: 'FILE NEW DATA'. By adding the NEW DATA to the Graphic Index with the FILE function, memory becomes available for planting the Picture Unit. (Additionally, you should ensure that if another Library Disk is selected, you perform the 'CHANGE LIBRARY DISK' function, otherwise the message 'WRONG LIBRARY DISK' will be displayed when you attempt to COPY a Picture Unit from the new disk.).

Exit COPY function by pressing both L and R simultaneously. The Main Menu is automatically replaced.
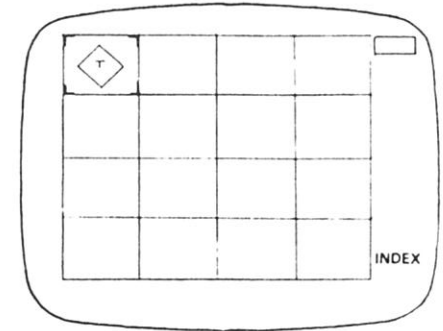
Position cursor over
Picture unit and ⊕ ⓉⓉ

Position cursor
with ✛

⊕ Ⓣ to
draw unit

Ⓩ to
scale

⊕ Ⓛ and Ⓩ
to rotate

⊕ Ⓡ and Ⓩ
to compress
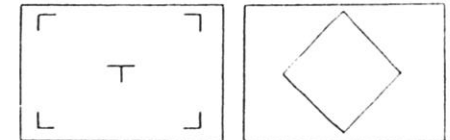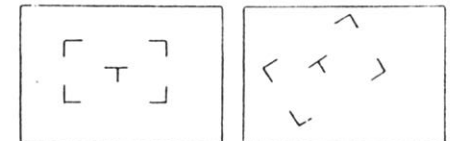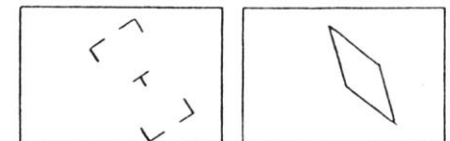
⊕ Ⓣ to
draw unit

ZOOM

The ZOOM function enables you to select an area on the Work Page and expand it to full screen size.

SELECTION

Move the Dynamic Cursor to the 'ZOOM' legend on the Main Menu, and press L . The legend illuminates when selected.

The Origin and Dynamic Cursors are replaced by the Zoom Cursor, and the Main Menu is replaced by the Digit Menu.

Using 'ZOOM'

Move the Zoom Cursor to the area of the Work Page to be expanded. Set the zoom window by rotating the Z Control. Press T and the area defined by the Zoom Cursor will be displayed at full resolution. Using the X-Y Control and Z Control, the Zoom Cursor can effectively pan, tilt and zoom.

You can successively apply the ZOOM function to a Work Page without any degradation of the picture structure.

The zoom scale is displayed under the SCALE legend on the Digit Menu.

The ZOOM function can be used to assemble a Picturé Unit at high magnification to incorporate greater detail than is displayable at reduced size (but which is nevertheless capable of being printed out on a plotter).

Any view generated by ZOOM can be temporarily saved in memory for later use by selecting MISC and requesting the ZOOM STORE function. To return to the Work Page base view select the PAGE function.

Move ‑¦‑
to ZOOM

Ⓛ Ⓛ to
confirm

Menu replaced
by digit Menu

Position ⌐˅┐
with ✛

Ⓒ to scale

Ⓛ Ⓣ to
enable
ZOOM
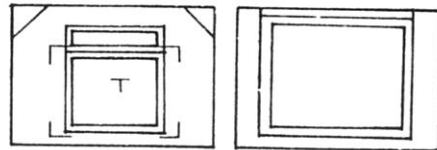
Repeat at will
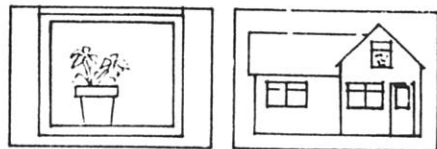
Add new Data
at any time

Select PAGE to
return to base
view.

CAUTION ! If you ZOOM on a page that contains PAINT Entries it is possible that the colour will leak if gaps, which were small enough to contain the PAINT at the original size, become enlarged under ZOOM. Restore the base View with PAGE and correct the offending portion of the drawing.

NOTE. The use of the ZOOM function offers the potential to include very large amounts of visual and text information embedded within Picture Units.

Exit ZOOM function by pressing L and R simultaneously. The Main Menu is automatically replaced.

Alternatively, ZOOM can be terminated at any stage, by pressing the Keyboard SPACE bar.

PAGE

The PAGE function redraws the Work Page (at Base View if a ZOOM has been used).

SELECTION

Move the Dynamic Cursor to the 'PAGE' legend on the Main Menu and press L .

USING 'PAGE'

On selection, the Work Page is redrawn at its original scale.

Exit PAGE is automatic when the Work Page has been regenerated.

Alternatively, PAGE can be terminated at any stage, by pressing the Keyboard SPACE bar.
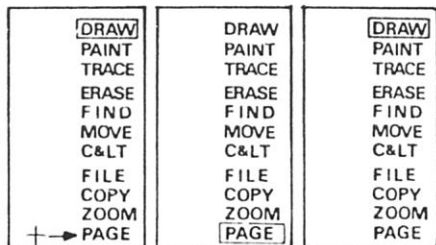
Move ✛ to PAGE   ⊕ ⓛ to confirm   DRAW reselects after PAGE
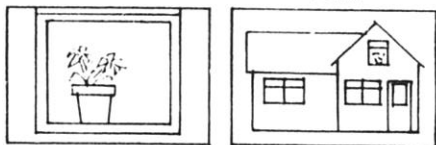
Workpage redraws at base view.

CLEAR

The CLEAR function enables you to view the Work Page without the Menu and Palette overlays.

SELECTION

Move the Dynamic Cursor to the 'CLEAR' legend on the Main Menu and press L .

USING 'CLEAR'

On selection, the menu and palette are erased.

To store the Screen Image using the 'SAVE IMAGE' option, or to print the Image using the PRINT IMAGE option, you can directly enter the I/O function by pressing R .

Exit CLEAR function by pressing T . The Main Menu and Draw Palette will be regenerated.
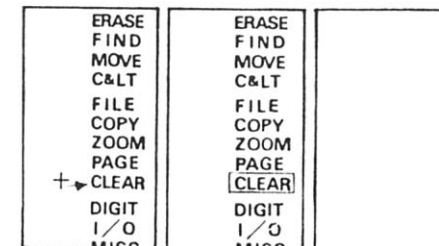
Move ✛ to CLEAR   ⊕ ⓛ to confirm   Menu clears

CLEAR removes Menu and Palette from the screen.

⊕ ⓡ for I/O Menu   ⊕ ⓣ to bring Menu & palette back

C & LT (COLOUR AND LINE TYPE)

The C & LT function allows you to override the Colour and Line Type settings for viewing New Data on the Work Page or when planting Picture Units. This function can be used concurrently with COPY, ZOOM and PAGE.

SELECTION

Move the Dynamic Cursor to the "C & LT" legend on the Main Menu and press L . The legend will illuminate when selected.

Select a new Colour, Line Type and Paint Colour as with normal palette selection.

USING 'C & LT'

When C & LT is switched on, the New Data on the Work Page will be plotted in the Colour and Line Type as set rather than in the stored settings, when viewed with ZOOM or PAGE.

If C & LT is set when the COPY function is being used, the Colour and Line Type settings will permanently override the previously stored settings for the Picture Unit.

CAUTION! When the Picture Unit contains PAINT areas, the Line Type should not be altered to dotted lines : the colour would leak out when the Picture Unit is plotted.

Switch off C & LT by reselecting with the Dynamic Cursor and pressing L .

DRAW	DRAW	DRAW
PAINT	PAINT	PAINT
TRACE	TRACE	TRACE
ERASE	ERASE	ERASE
FIND	FIND	FIND
MOVE	MOVE	MOVE
+ ▶ C&LT	[C&LT]	+ ◀ C&LT
FILE	FILE	FILE
COPY	COPY	COPY
ZOOM	ZOOM	ZOOM
PAGE	PAGE	PAGE

Move ⊹   ⊕ Ⓛ to   Move ⊹
to C&LT   confirm   away

Set required colour & line type

MOVE
C&LT
FILE
COPY
ZOOM
[PAGE]
CLEAR

Select 'PAGE'   New Data Redraws at new C & LT

MOVE
C&LT
FILE
[COPY]
ZOOM
PAGE
CLEAR
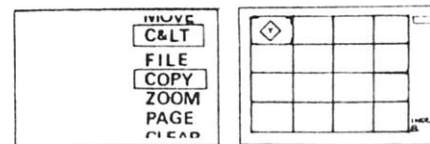
Select 'COPY'   Select picture unit

position ⌐▾⌐ and ⊕ Ⓛ to draw at new C & LT

49
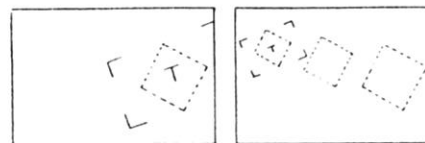
DIGIT

The DIGIT functions provide three precision aids. DIGIT, like C & LT, can be used concurrently with certain other functions, and is selected automatically with COPY and ZOOM. The three DIGIT functions are : SCALE, COMPRESS & ROTATE: LOCKS and X/Y.

SELECTION

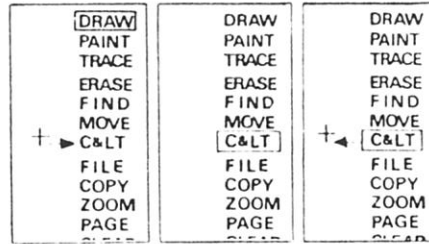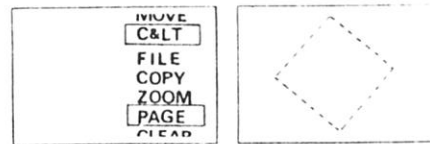Move the Dynamic Cursor to the "DIGIT" legend on the Main Menu, and press L . The Main Menu will be replaced by the Digit Menu.

USING 'SCALE, COMPRESS and ROTATE'

When using COPY, this option allows you to set the three Copy Cursor parameters precisely (as opposed to employing the Z Control directly). The parameter(s) must be set before the COPY function is selected.

Select the parameter to be adjusted by moving Dynamic Cursor to the "SCALE" "COMPRESS" or "ROTATE" legends and press L . The legend will illuminate when selected and the Copy Cursor will be displayed at the centre of the screen. The value can be altered by pressing L and holding down, whilst rotating the Z Control until the required value is displayed.

Release L to establish the new value for the Copy Cursor. Any combination of parameter overrides is allowable.

SCALE is adjustable between 1 and 256.

COMPRESSION is adjustable in the range 90 to 0 to 140, with a default of 0. This represents a scale from full X compression through normal to full Y compression.

ROTATION is adjustable from 0 to 255 with a default of 0.

Exit by moving the cursor to the "EXIT" legend. When the cursor is moved away, the Digit Menu is replaced by the Main Menu.

MOVE	MOVE	EXIT
C&LT	C&LT	SCALE
FILE	FILE	218
COPY	COPY	ROT.
ZOOM	ZOOM	0
PAGE	PAGE	COMP.
CLEAR	CLEAR	0
+ ▶ DIGIT	[DIGIT]	LOCK
I/O	I/O	– 0
MISC	MISC	I 90
WIPE	WIPE	x 21
FULL	FULL	Y 14

Move ⊹   ⊕ Ⓛ to   Digit Menu
to DIGIT   confirm   displays

+ ▶ SCALE   + ◀ SCALE
   218   109

Move ⊹ to Legend

SCALE
218
ROT.
0
COMP.
0

50
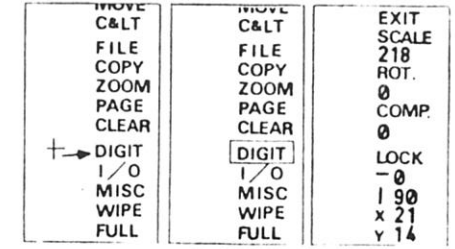
DIGIT
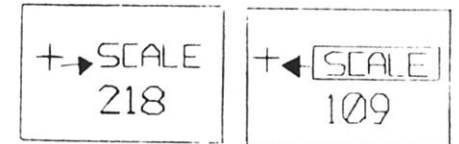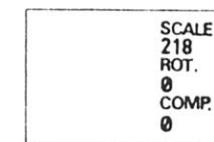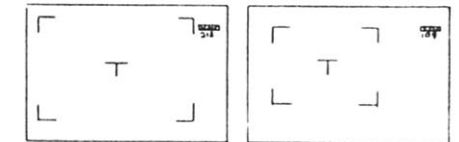
USING 'LOCKS'

The LOCK function is a composing aid which acts like a set square, a ruler or variable graph paper, when using DRAW or COPY. Two types of LOCK are provided. Angle Locks (2) and Grid Locks (2). When an Angle Lock is set, the Dynamic or Copy Cursor can move only along the selected angle path from the Origin Cursor. When a Grid Lock is set, the movement of the Dynamic or Copy Cursor is restricted to the defined Grid locations. Angle Locks and Grid Locks can be used separately or in combination.

If used to accurately plant Picture Units the parameter(s) must be set and the LOCK switched on before the COPY function is used. The 'default' Grid matches the size of the Picture Units on the Graphic Index for ease of use. If you want to change the values of the parameter(s), they must be set before the LOCK function is switched on.

DIGIT   /cont'd.
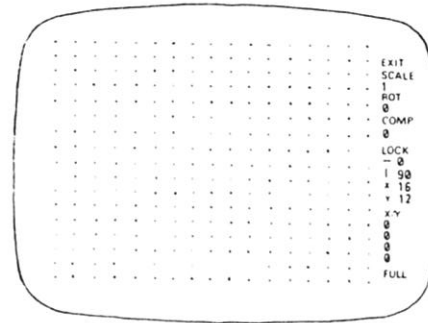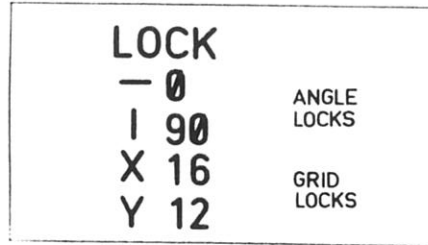
SINGLE ANGLE LOCK

Select the X axis Angle Lock by moving the Dynamic Cursor to the horizontal marker (—) on the Digit Menu, or the Y axis Angle Lock by moving the Cursor to the vertical marker (I) on the Menu. The marker illuminates when selected.

The angle is specified by the value displayed. To alter this value, press L and hold down, whilst rotating the Z Control until the required angle value is displayed. Release L to establish the new value. The X axis Angle Lock can be varied in the range 45 to 0 to 45, and the Y axis Angle Lock in the range 45 to 90 to 45.

Position the Origin Cursor at the point from which the Angle Lock should emanate, and switch on the LOCK function by moving the Dynamic Cursor to the 'LOCK' legend on the Digit Menu and pressing L . The legend illuminates when selected.

The Dynamic Cursor then jumps to the nearest 'locked' location and will be restricted in its movement to the specified angle.

The LOCK can be temporarily overridden by pressing R and holding down.

Therefore, to exit the LOCK function, move the Dynamic cursor, using the R Button override, to the 'LOCK' legend on the Digit Menu, and release R . Move the cursor leftwards to switch off the function.

DIGIT   /cont'd.

SINGLE ANGLE, SINGLE GRID LOCK

Select an X or Y axis Angle Lock as described above.

A spaced set of locations along that angle plane can then be defined with the Grid Lock. The two values displayed beneath the X and Y (horizontal and vertical) Angle locks, are respectively the X and Y spacing values (Grid Locks) in 'screen points'.

To override the default spacing, select Grid Lock by moving the Dynamic Cursor to the X (or Y) spacing indicator. The indicator illuminates when selected.

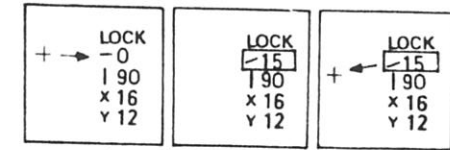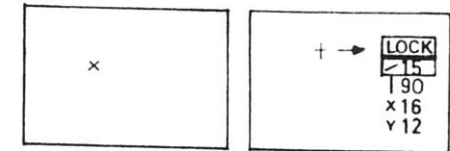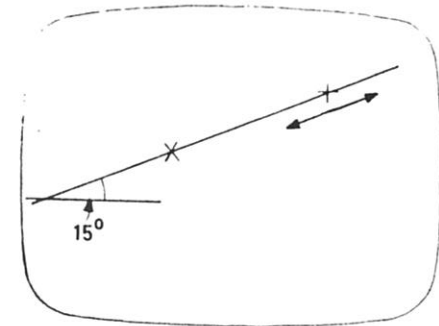The spacing is specified by the value displayed. To alter this value press L and hold down, whilst rotating the Z Control until the required spacing value is shown. Release L to establish the new value. The Grid spacing can be varied from 4 to 32 points between each location. Position the Origin Cursor at the start point on the locked line and switch on the 'LOCK' function as described above.

A single Grid line is then plotted over the Work Page, and the Dynamic Cursor will jump to the nearest locked location. The Cursor is now restricted in movement to the fixed locations along that angle. Override with the R Button as descibed above, and exit by moving the Dynamic Cursor to the "Lock" legend on the Menu and releasing R . Move the Cursor leftwards to switch off the function.

Move + to Grid setting

(t) (L) and (C) to adjust

Move + away
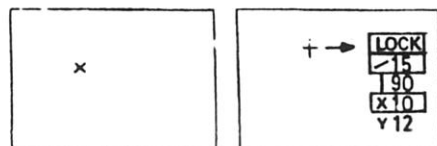
Plan origin

Move + to LOCK then away

15°
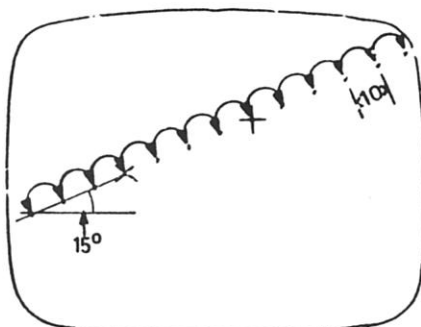
+ Moves between Locked points

(t) (R) to Release

FULL GRID LOCK

This option sets up a full Grid with independently variable X and Y planes and independently definable X and Y plane spacings. The default full Grid lock is set to the same size as the Graphic Index slots, for convenient use of the COPY function.

Select both X and Y Grid locks as above, altering the default values if a different sized Grid is required. Select at least one Angle Lock and alter the angle value if a non-standard Grid is required. If only one Angle Lock is specified, the other will be assumed.

Position the Origin Cursor at the point from which the Grid is to be sourced (the screen centre is X = 128, Y = 96). Switch on the LOCK function by moving the Dynamic Cursor to the "LOCK" legend on the Digit Menu. The legend illuminates when selected.

The specified Grid is then displayed over the Work Page.

The cursor becomes restricted in movement to the defined locations, although the LOCK can be overridden at any time by pressing R and holding down. When R is released, the cursor will "lock" onto the nearest Grid point.
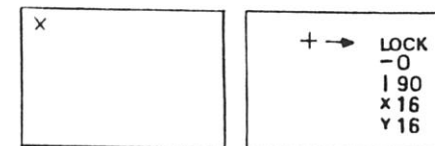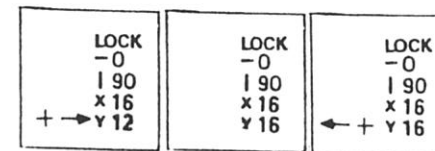
SQUARE LOCK 0 - 90 16.16
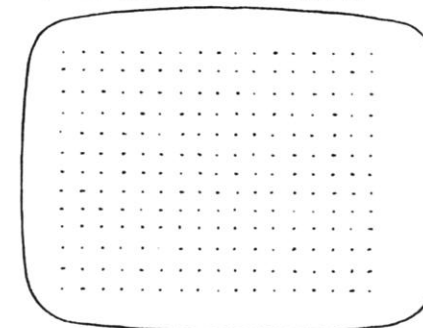
ISOMETRIC LOCK 0 - 60 16.16
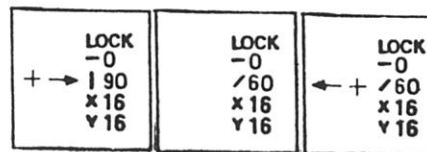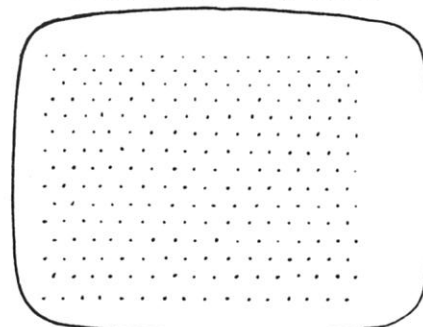
DIGIT   /cont'd.

To reposition the Grid at a
different offset, switch off the
'LOCK' function under override
using the R button.
Move the Dynamic Cursor to the
new position and update the
Origin Cursor by pressing L.
Reselect the 'LOCK' function
with the Dynamic Cursor.
The Grid will be displayed from
the new source.
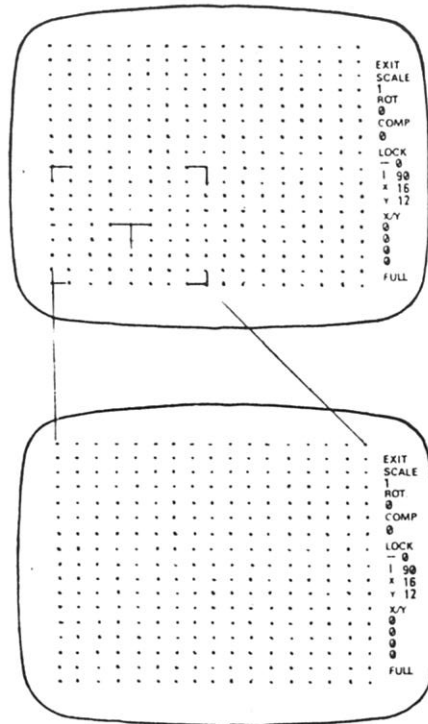
The Zoom Cursor can also lock onto
a grid lock. This enables you to
zoom up on a fixed proportion of the
Work Page. The process can be repea-
ted as many times as necessary to
enable you to construct complex
symbol based drawings at high
resolution. When used with COPY the
Copy Cursor will be locked to the
grid settings. Rotation is enabled
in 180° steps. Scale can be adjusted
in fixed grid increments (i.e. the
Copy Cursor enclosing 2x2, 4x4 etc.
grid blocks).

The Copy Cursor and Zoom Cursor are
only locked onto the Grid when
using the default Grid spacing
(16 . 12), and sourced from
(0,0): i.e. Top left or
(128,96): i.e. Screen centre.

To access the Graphic Index
directly from 'LOCK' when using
Copy or Zoom, simply press R.

Exit 'LOCK' by selecting the 'LOCK'
legend with the Dynamic Cursor.
Tou can then erase the Grid by
switching off the Lock parameters;
select and then deselect the 'LOCK'
function with the Dynamic Cursor.

Exit by moving the cursor to the
"EXIT" legend on the Digit Menu.
When the cursor is pulled away, the
Digit Menu is replaced by the Main
Menu.

USING "X/Y"

The X/Y utility displays the
precise co-ordinates of the cursors
on the screen. The top two values
displayed indicate the X and Y
co-ordinates of the Origin Cursor
and the bottom two values indicate
the X and Y co-ordinates of the
Dynamic Cursor.

The X axis range is 0 - 254, and the
Y axis range is 0 - 191.

Select the X/Y function by moving
the Dynamic Cursor to the "X/Y"
legend on the Digit Menu. The
legend illuminates when selected.

To switch off X/Y, re-select with
the Dynamic Cursor.

Exit by moving the cursor to the
"EXIT" legend on the Digit Menu.
The Digit Menu is replaced by the
Main Menu when the cursor is moved
away.
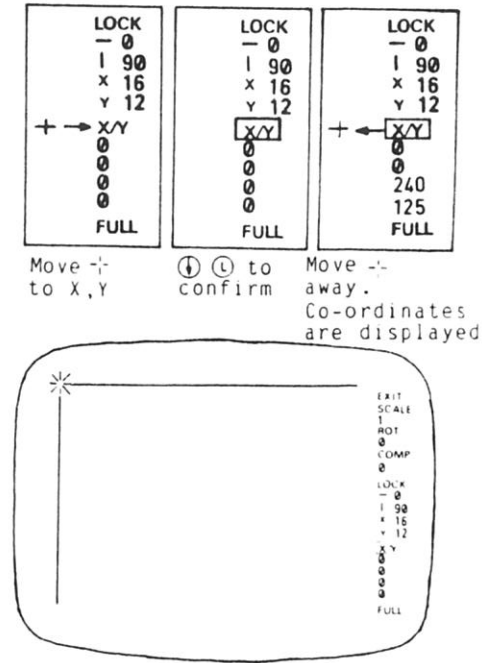
I/O (INPUT/OUTPUT)

The I/O Functions enable you to perform various INPUT and OUTPUT tasks: to change a Library or Work Disk; to directly load a Picture Unit; to save or load a Work Page; to Save, Load or Print a Screen Image; and to edit the Work Disk. These options are presented on the I/O Menu.

SELECTION

Move the Dynamic Cursor to the "I/O" legend on the Main Menu, and press L. The legend illuminates when selected.

(I/O can be selected directly from the CLEAR function, by pressing R.).

When selected, the Work Page is replaced by the I/O Menu, which displays the following available options:

```
FILE          FILE
COPY          COPY
ZOOM          ZOOM
PAGE          PAGE
CLEAR         CLEAR

DIGIT         DIGIT
+ → I/O        I/O
  MISC          MISC
  WIPE          WIPE
  FULL          FULL

Move          ⬇ Ⓛ to    Workpage is
to I/O        confirm    replaced by
                         I/O Menu
```

```
  ╭─────────────────────────────╮
  │  I/O MENU                    │
  │                              │
  │  1 CHANGE LIBRARY DISK       │
  │  2 CHANGE WORK DISK          │
  │  3 LOAD PICTURE UNIT         │
  │  4 SAVE PAGE                 │
  │  5 LOAD PAGE                 │
  │  6 SAVE IMAGE                │
  │  7 LOAD IMAGE                │
  │  8 PRINT IMAGE               │
  │  9 EDIT WORK DISK            │
  │  10 EXIT                     │
  │                              │
  │  ENTER NUMBER AND PRESS RETURN│
  ╰─────────────────────────────╯
```

Use keyboard to follow instructions.

1: CHANGE LIBRARY DISK
2: CHANGE WORK DISK
3: LOAD PICTURE UNIT
4: SAVE PAGE
5: LOAD PAGE
6: SAVE IMAGE
7: LOAD IMAGE
8: PRINT IMAGE
9: EDIT WORK DISK
10: EXIT

Select the function required by following the prompt on the screen.

NOTE: If you attempt to SAVE onto a Library or Work Disk that has a Write Protect Tab, the following message will be displayed:

'WRITE PROTECT ERROR'

Either remove the tab or replace the disk. Press <RETURN> to continue. Likewise, if the disk drive flap has not been closed, or the disk has not been properly inserted, the following message will be displayed:

'I/O ERROR'

Re-insert the disk, close the flap and press <RETURN> to continue.
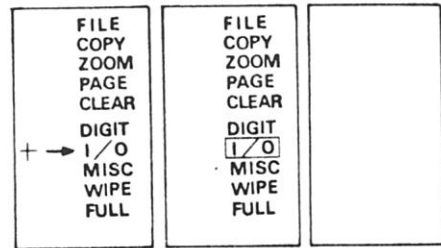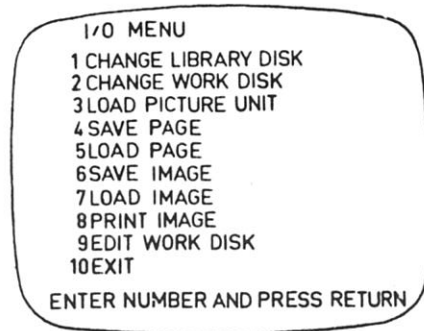
I/O: CHANGE LIBRARY DISK

This function enables you to change the Library Disk for another, in order to retrieve Picture Units previously filed on the other disk or to add Picture Units to the new disk.

If a brand new Library Disk is to be used, ensure that it has already been pre-formatted.

SELECTION

On selection of this function, you are first requested to remove the current Library Disk from Drive 1 and insert the selected Library Disk.

You are then reqested to type in the Volume Number of the new Library Disk.

Press < RETURN > and the disk will run for a few seconds.

The new Library Disk can then be used for retrieving or saving Picture Units.

I/O: CHANGE WORK DISK

This function enables you to change
the Work Disk for another, in order
to load Pages or Images from the
other disk or to save Pages or
Images on the new disk.

If a brand new Work Disk is to be
used, ensure that it has already
been pre-formatted.

SELECTION

On selection of this function, you
are first requested to remove the
current Work Disk from Drive 2 and
insert the selected Work Disk.

The new Work Disk is then ready for
use.

If you wish to view the contents of
the Work Disk, select the EDIT WORK
DISK function as described below.

I/O: LOAD PICTURE UNIT

This function enables you to get a
Picture Unit from a Graphic Index in
order to edit or amend that unit.

SELECTION

On selection of this function, the
current Graphic Index is displayed
and the required Picture Unit can be
selected with the Copy Cursor.

The selected unit is then fetched
from the Graphic Index and deposited
automatically on the Work Page as
New Data at full screen resolution.
You can then amend the unit as
required, saving the new version
with FILE.

I/O: SAVE PAGE

This function enables you to store
the Work Page that has been
assembled with Picture Units and
New Data. The Work Page is stored
in the sequence of assembly.

SELECTION

On selection of this function you
are requested to enter a name for
the Page, as a 'tag' for subsequent
reference, e.g.

TEST PICTURE   <RETURN>

The first character of the name must
not be a numeral.

The PAGE will then be stored on the
Work Disk and can be retrieved using
the LOAD PAGE function with the
given name.

NOTE. If you use the name of an
existing Page on the Work Disk, the
previously stored Page will be
overwritten.

If the Work Disk is full when you
attempt to SAVE PAGE, the following
message will be displayed:

'WORK DISK FULL'

If this occurs, perform 'CHANGE WORK
DISK' and recompile the Page.

Alternatively, you are given the
opportunity to delete any unwanted
pages on the work disk to provide
space for the newly generated Page

I/O: LOAD PAGE

This function enables you to
retrieve a previously saved Page
from the Work Disk. The Page will
be redrawn in the same sequence in
which it was compiled before saving.
Multiple Pages can be retrieved in
sequence.

SELECTION

On selection of this function you
are requested to enter the name
of the required Page(s), e.g.

TEST PICTURE   <RETURN>

To review the list of previously
saved Pages, use the EDIT WORK DISK
function.

When you have entered the names of
all the Pages you require press T .

The Page(s) will be plotted onto
the Work Page in the stored
sequence on selection of PAGE.

If the Page cannot be found on the
Work Disk, the following message
will be displayed:

'WRONG WORK DISK'

If this occurs, perform 'CHANGE WORK
DISK'.

By loading two or more Pages consec-
utivly, you can assemble a composite
Page which can itself be saved as
another Page.

If you want to compile a new Page,
the ' NEW SESSION ' function should
be performed. This will clear the
Work Page from memory (as opposed
to 'WIPE', which merely clears the
New Data).

I/O: SAVE IMAGE

This function enables you to store a Screen Image on the Work Disk for future use.

Since the SAVE IMAGE function simply stores the entire screen contents rather than the picture structure, it uses a great deal of storage space (8K bytes to be exact) and should therefore be used sparingly.

Unwanted Images can be deleted from the Work Disk using the EDIT WORK DISK function described below.

SELECTION

On selection of this option, you are requested to enter a name for the Image for subsequent reference.

The naming procedure followed is identical to the SAVE PAGE procedure described above.

NOTE: The advantage of using SAVE IMAGE is that more complex drawings can be generated than the available user memory can accommodate, and the reloading of the IMAGE may be faster than the 'replay' of a complex Page.

If the Work Disk is full when you attempt to SAVE IMAGE, the following message will be displayed:

'WORK DISK FULL'

If this occurs, perform 'CHANGE WORK DISK'.

I/O: LOAD IMAGE

This function enables you to retrieve a Screen Image from the Work Disk for viewing and output, if required, to PRINT IMAGE.

SELECTION

On selection of this option you are requested to enter the name of the required Image (reviewing the names via EDIT WORK DISK if necessary).

If the Screen Image cannot be found on the Work Disk, the following message will be displayed:

'WRONG WORK DISK'

If this occurs, perform 'CHANGE WORK DISK'.

Press <RETURN> and the selected Image will be displayed.

I/O: PRINT IMAGE

This function enables you to output
the Screen Image to a compatible
         matrix printer. If this
option is selected via CLEAR, the
image printed will not contain the
Menu   and   Palette   overlays.

  Two aspects of the printer output
can be varied :

1. NORMAL or DOUBLE size print.

2. NORMAL or WHITE on BLACK print.

You are requested to enter these
parameter   selections,   and   the
following message will   then   be
displayed :

'PLEASE ALIGN PAPER -
 PRESS <RETURN> TO PRINT'

The   Image is   then printed. On
completion, this   function   is
automatically exited.

I/O: EDIT WORK DISK

This function enables you to review
the contents of the Work Disk and
delete any Pages or Images on the
Disk.

SELECTION

On selection, the Work Disk Catalog
is displayed and you are invited to
delete any Pages or Images that are
no longer required, by following
the screen prompt.

Ignore any prefixes added to your
filename when the directory is
displayed - just enter the name of
the file that you want to delete,
e.g.

TEST PICTURE <RETURN>

MISC (MISCELLANEOUS)

The MISC Functions provide a further type of input - TEXT; a temporary storage facility for Zoomed views - ZOOM STORE; and the utility for clearing the Work Page - NEW SESSION.
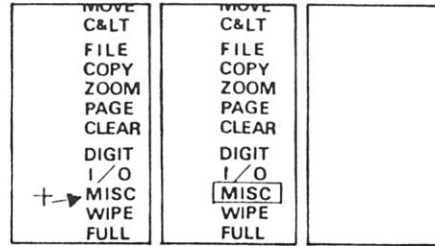
SELECTION

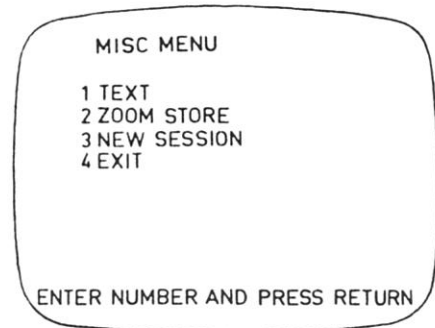Move the Dynamic Cursor to the 'MISC' legend on the Main Menu, and press L. The legend illuminates when selected.

When selected, the Work Page is replaced by the Misc Menu, which displays the following available options:

1: TEXT

2: ZOOM STORE

3: NEW SESSION

4: EXIT

Select the function required by following the prompt on the screen.

Move ⊹   ⓞ ⓛ to   Workpage is
to MISC   confirm   replaced by
                        MISC Menu

```
┌─────────────────────────────┐
│                             │
│      MISC MENU              │
│                             │
│    1 TEXT                   │
│    2 ZOOM STORE             │
│    3 NEW SESSION            │
│    4 EXIT                   │
│                             │
│                             │
│  ENTER NUMBER AND PRESS RETURN │
└─────────────────────────────┘
```

Use keyboard to follow instructions.

MISC: TEXT

This function enables you to include text as another type of Entry.

On selection of this function, you are first requested to set the line length.

Use the back and forward space arrows on the keyboard to set the tab width and press <RETURN>.

You can then type in the text required from the keyboard. When a line has been filled, you will automatically continue from the start of the next line.

Lower case is the default condition. Press the ESCAPE key for Upper Case, and press ESCAPE again for continuous Upper Case: characters entered as Upper Case are displayed in inverse, but are plotted on the Work Page correctly.

Use SHIFT M for moving the Cursor downwards and SHIFT N for moving upwards.

Press ESCAPE to revert to Lower Case. The Backspace and Forward space keys may be used.

When the line or block of text has been entered, press <RETURN>. The Work Page is redisplayed with the Text Cursor active. The text line or block can be positioned with X-Y Control, and scaled by rotating the Z Control.
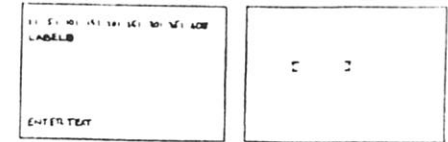
Press T to deposit the text on the Work Page, and revert to the text input mode for another line or block.
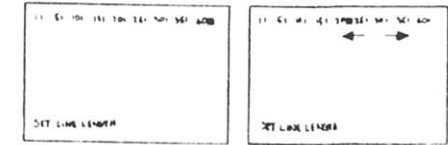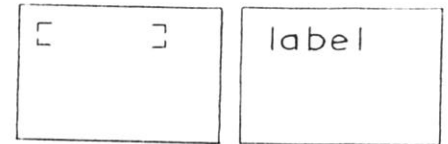
Set line length with ◄── ──► keys.
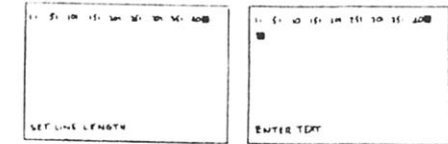
For single line   Press
leave tab at 40   <RETURN>

Type in text   Text cursor
Press   appears on
<RETURN>   Workpage

⊙ to   ⓞ ⓣ to
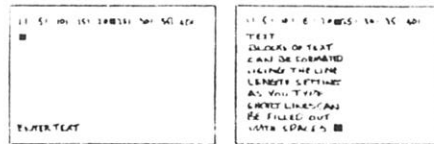scale   write text

MISC: TEXT   /cont'd

Text responds to the colour specified on the palette, but the line type is fixed as solid.

If text is subsequently viewed under ZOOM, any text greater than four times original scale will not be displayed. Similarly, any text will be displayed as dotted lines if it is too small to be legible.

To exercise further manipulations over text and characters, any character or string can be FILE as a Picture Unit, which can subsequently be adjusted prior to planting.

Exit TEXT by pressing L and R simultaneously.

For text blocks Type continuously then press RETURN
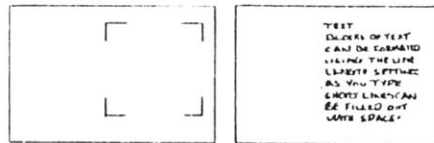
Position cursor   ① ⊤ to write text

OR
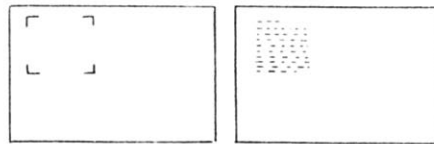
⊙ to scale cursor   ① ⊤ to write text

MISC: ZOOM STORE

This function enables you to temporaily save two zoom views and to subsequently restore them.

This provides an alternative to the PAGE function, by redrawing the Work Page at the stored Zoom View, rather than the Base View.

On selection of this function, you must select SAVE ZOOM or LOAD ZOOM, using either STORE 1 or STORE 2.

When SAVE ZOOM is used, the current zoom view is stored in the designated store and will be available for subsequent viewing with the LOAD ZOOM option.

When LOAD ZOOM is used, the Work Page will be replaced by the zoom view from the selected store.

Exit is automatic.

MISC: NEW SESSION

This function enables you to clear the Work Page: both the New Data and the planted Picture Units are cleared from memory.

On selection, the Work Page is cleared.

CAUTION! This function clears all memory and resets all defaults.

Exit to the DRAW function is automatic.

WIPE

The WIPE function clears the New Data.

SELECTION

Move the Dynamic Cursor to the 'WIPE' legend on the Main Menu and press L .

USING 'WIPE'

WIPE clears the memory of the sequence of Entries added since starting or from the last WIPE or NEW SESSION, enabling you to start compiling a new Picture Unit.

NOTE : Only 'NEW DATA' is cleared when this function is used. To clear the planted Picture Units from memory as well, use NEW SESSION.

FILE		DRAW
COPY		PAINT
ZOOM		TRACE
PAGE		ERASE
CLEAR		FIND
DIGIT		MOVE
I/O		C&LT
MISC		FILE
WIPE		COPY
FULL		ZOOM

Move ┼ to WIPE

Ⓛ Ⓛ to confirm screen clears

DRAW is reselected
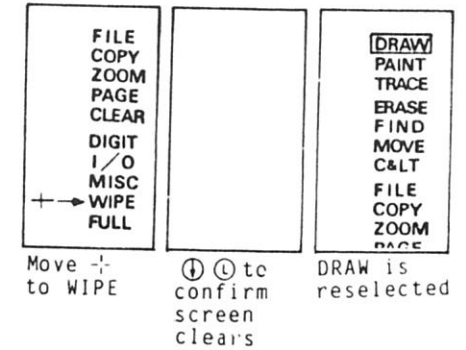
FULL

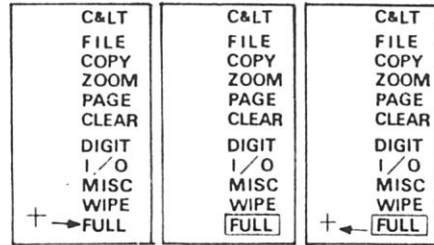The FULL function temporarily removes the Palette from the screen to enable drawing over the full Y axis range.

SELECTION

Move the Dynamic Cursor to the 'FULL' legend on the Main Menu and press L . The Palette will be erased.

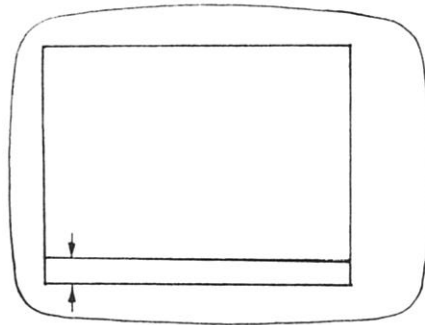'FULL' is particulary useful when drawing with Grid Lock.

To redisplay the Palette, move the Dynamic Cursor to the illuminated 'FULL' legend and press L.

C&LT	C&LT	C&LT
FILE	FILE	FILE
COPY	COPY	COPY
ZOOM	ZOOM	ZOOM
PAGE	PAGE	PAGE
CLEAR	CLEAR	CLEAR
DIGIT	DIGIT	DIGIT
I/O	I/O	I/O
MISC	MISC	MISC
WIPE	WIPE	WIPE
+→FULL	[FULL]	+←[FULL]

Move -|-
to FULL

(↓) (L) to
confirm

Move -|-
away

TOUCH CONTROL ADJUSTMENT

This has been preset.

The BIT STIK mechanism is capable of almost inertialess motion about any axis and yet still be able to "park" positively at any set position. However you may prefer a control with some back pressure and this is provided for in the BIT STIK by adjusting the height of the top casing. This in turn alters the pressure of a felt eyelid against the hemisphere.

Four adjustment screws are provided so the "drag" on the hemi-sphere can be adjusted in all quadrants.

The height is pre-set to provide a light drag. Should you want to change this, take a medium cross-head screwdriver and:

1.   Unclip screw covers.

2.   Slacken but DO NOT REMOVE all four screws.

3.   Adjust the height of the case whilst moving the X-Y Control all over the window area checking for even pressure.

4.   When the pressure suits you, hold the case firmly and tighten the screws, checking the X-Y Control drag as you go.
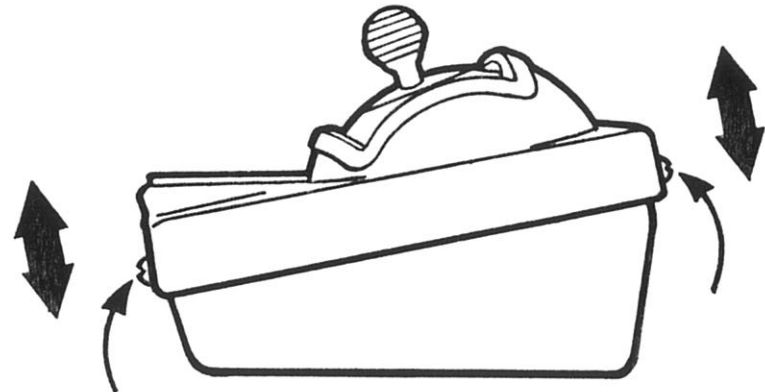
APPENDIX B: PERIPHERALS INTERFACING

Slot 0 = 16K RAM memory or language card

Slot 1 = Printer interface card (Epson)

Slot 2 = Plotter interface card

Slot 3 =

Slot 4 =

Slot 5 = Graphics Tablet interface card

Slot 6 = Disk Drive controller card

Slot 7 = ... colour card

APPENDIX C: THE REPLAY MODULE

The 'Replay Module' enables BIT STIK generated graphic sequences to be replayed 'externally' to the BIT STIK program.

USING THE REPLAY MODULE

1. Load the system in the usual way, specifying 'S' for System Controls.

2. Select Option 4 - 'RUN REPLAY MODULE'.

3. The 'Replay Menu' and Controls will be displayed.

4. Select the option required from the menu and enter the name of the Page to be replayed.

B I T S T I K   S Y S T E M : PRINTER OPTIONS

The built in printer software is configured for the EPSON
Grahpics Interface Card.

If you want to reconfigure the software to support other cards,
follow this procedure:

1. Remove WP tag from System Master Disk.

2. Load BS.OPT

3. Amend line 290 (see below)

4. Save BS.OPT

5. Apply the WP tag to the System Master Disk.

PRINTER INTERFACES

Integrex CX-80 :

    290 GOSUB 310

PKASO :

    290 GOSUB 320

Printmaster III :

    290 GOSUB 330

Silentype :

    290 GOSUB 340

Grappler :

    290 GOSUB 350

OTHER CARDS :

    290 GOSUB 360

    365 (command string for printer card)