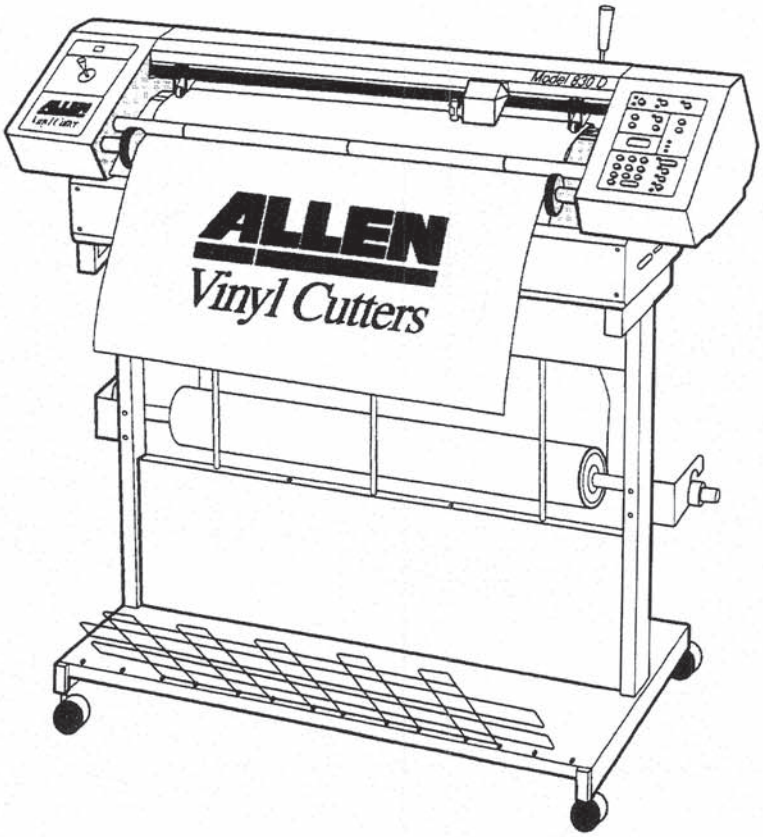
800 Plus Series Vinyl Cutters

FAST PATH™ TECHNOLOGY



ALLEN DATAGRAPH

USER MANUAL

PL-00-40-800 rev. December 2000, ver A 1.91

ALLEN DATAGRAPH

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INTRODUCTION

DESCRIPTION

The Allen Datagraph 800 Plus Series Vinyl Cutters are high performance cutters designed for the graphics professional to cut, pounce and draw on a wide variety of materials. The 800 Plus Series cuts with a swivel knife or a hot tip. Alternatively, the 800 Plus Series may be fitted with a pounce tool or various pens and markers.

The 800 Plus Series utilizes a precision grit wheel system for positive tracking and movable pinch wheels for handling punched or unpunched materials in standard and nonstandard sizes. The guide system is present so that unpunched vinyls up to 150 feet (50 m) may be cut unattended. A thumb screw tool holder allows tools to be quickly and easily changed. The 800 Plus Series uses HPGL command language for widespread compatibility and emulates the Roland CAMM-1, the Hewlett Packard 758x, Ioline and the Gerber GS/HS 15 and 750 plotters. The front panel provides extensive and direct user control.

800 Series Vinyl Cutters		
824	24 inch	61 cm
830	30 inch	76 cm
836	36 inch	91 cm
840	40 inch	101 cm
848	48 inch	121 cm
860	60 inch	153 cm

FEATURES

Cut, Draw, Pounce - Modes Of Operation

The 800 Plus Series Vinyl Cutter has three modes of operation: Cut, Bounce (pounce) and Draw. The modes may be activated from either the control panel or by software command. The letter **C** is displayed on the control panel when in the CUT MODE, the letter **D** when in DRAW MODE, and the letter **B** when in BOUNCE MODE (Pouncing). Pen plotting, marker drawing and hot tip cutting are performed in the draw mode.

Flexible Material Type and Size

A wide variety of vinyls, films, papers, stencil, sandblast mask and banner materials can be handled by the 800 Plus Series for cutting, drawing, pouncing, plotting and banner making.

The 800 Plus Series will handle sheets or rolls of material in widths from 4 inches (10 cm) to the machine width. The minimum width for model 848 is 5 inches (13 cm). The 800 Plus Series automatically detects material width during the Load cycle by sensing the magnet located in the left pinch wheel bracket and will not attempt to move beyond this width. The frame length on roll media is not limited by software in the plotter. For use without the guide system, it is suggested that the frame size be limited to 20 feet (6 m).

Long Tracking Vinyl Guide System

The Long Tracking Vinyl Guide System option enables tracking and cutting of 150 yard (50 m) rolls of unpunched vinyls. It is adjustable for material widths of 4 inches (10 cm) to the width of the machine. The guides have limited use for paper and punched vinyls because the edges of these materials are not as strong as unpunched vinyl and therefore can not be edge guided with the same reliable results.

Limited Warranty Agreement

ALLEN DATAGRAPH 800 PLUS SERIES VINYL CUTTERS are warranted to be free of defects in both materials and workmanship. Should any part of this equipment be defective, it will be repaired or replaced, at the option of the manufacturer, at no charge for parts or factory labor for a period of two (2) years from the date of installation. Replacement parts will be billed to the customer at regular prices and credit will be issued when the defective parts are returned. The customer is responsible for freight on warranty parts and repairs.

This warranty is void if:

1. the equipment has been damaged by negligence, accident or mishandling, or has not been operated in accordance with the procedures described in the operating instructions;

or

2. the equipment has been altered or repaired by other than an approved service station or factory service center, or adaptations or accessories have been attached to the equipment which shall have adversely affected the performance, safety, or reliability of the equipment.

NO OTHER WARRANTY, EXPRESSED OR IMPLIED, APPLIES to the equipment. Allen Datagraph does not assume any responsibility for consequential damages occasioned by the equipment, or inconvenience or interruption in operation.

In case of unsatisfactory operation, Allen Datagraph or its Dealer should be notified immediately.

Gold Touch[II] Cutting Head

The Gold Touch[II] Cutting Head offers a wide range of cutting forces to handle a wide variety of materials. This feature gives the user 100 steps of control from 10 grams of force at step 1 to 550 grams of force at step 100. The force may be controlled from either the front panel or by software control.

Note: NEW feature for 2001- 1000 step force mode for cutting of specialty materials such as Capton and window tint films. See "Key Command Summary" for details on activating this feature.

Fast Path Technology™

The 800 Plus Series uses advanced motion control algorithms and a faster microprocessor than the original 800 Series to perform fast and accurate cuts on curves, straight lines and small detail. Fast Path Technology greatly increases job throughput times.

Service Loop

The 800 Plus Series Vinyl Cutter is capable of a top speed of 24 in/sec (60 cm/s) but material can not be pulled off a large supply roll at this speed. The 800 Plus Series can maintain a service loop of material so that the cutter does not pull directly off the supply roll during cutting. The service loop feature is disabled by default. See "Key Command Summary" at back of manual for activation key sequence.

Custom Set-Ups

The 800 Plus Series has six programmable SET-UPS which can be customized for convenient use of a variety of software, material and tool combinations. Most settings on the cutter can be saved in a SET-UP and then recalled. This feature allows simple control of machine parameters. For instance, SET-UP 1, which is the power up default, is set for cutting high performance vinyl with a knife, but can be customized for any user application.

CAD/CAS Override

The CAD/CAS Override feature insures front panel control of the cutter. While CAD/CAS software typically sets speed and force at the beginning of a cut, it is not always convenient or possible to change machine parameters from the software. The machine default is CAD Override set to ON, and is indicated by the BYPASS LED being on. To allow software control of cutting parameters, set CAD Override to OFF.

Joystick Position Control

The joystick on the 800 Plus Series Vinyl Cutter is used to quickly and accurately move the cutting head to the starting position (origin) for a new plot. In this way, the operator can and maximize the use of material. The joystick is also used to inspect machine output during a job and to set alignment for contour cutting of images preprinted on vinyl.

Serviceability

The 800 Plus Series utilizes a modular design to provide rapid fault diagnosis and component replacement, which insures minimum downtime and replacement cost. The firmware gives the 800 Plus Series an extensive built-in self test capability to assure continuously high quality output.

OPTIONS

HOT TIP CUTTING TOOL

The Hot Tip Cutting option provides a thermostatically controlled hot tip cutting tool. This tool will cut vinyls, reflectives, twill and Daktak with fine detail in letter sizes down to ¼ inch (6 mm). Although the cutting speed is slow compared to knives, hot tip cutting has two main advantages: the carbide tip is especially long lived when cutting abrasive reflective materials and secondly, the hot tip seals the edges of material. When sealed, reflective materials do not delaminate in weather and material fibers do not fray.

Wide Marker Holder

The wide marker holder allows the 800 Plus Series to hold a variety of wide markers to make paper banners, or mark directly on vinyl and other banner materials such as Tyvek. CAD/CAS software is required to fill letters and other graphics.

INSTALLATION

INSPECTION

IMPORTANT: Inspect your shipping container for evidence of excessive rough handling that may have caused machine damage. If you suspect shipping damage, contact ALLEN DATAGRAPH or your sales representative and report the condition immediately. Do not discard the shipping container.

UNPACKING THE CUTTER

Remove the cardboard/styrofoam cover. Next, remove the plotter chassis by lifting the plotter from each end, and place the plotter on a flat surface. Remove the remaining parts and accessories from the shipping container and check against the packing list. *If there is any damage or part shortage, please report it immediately to ALLEN DATAGRAPH or the organization that sold you your cutter.*

STANDARD ACCESSORIES

The following standard accessories are supplied with the 800 Plus Series.

1 cart with roll feed
1 knife holder assembly
1 pounce tip holder assembly
2 knife blades, 45 degrees
1 pounce tip
1 pounce pad
1 fiber tip pen
1 9 to 25 pin serial plotter cable for IBM compatibles (MACINTOSH cable must be ordered)
1 25 to 9 pin serial adaptor
1 AC power cord
1 hex wrench kit
2 spare 2.5 amp fuses (115 VAC)
1 Sensor cleaning brush

POWER CONNECTION

Important Note: Use of a HIGH QUALITY surge protector or uninterruptable power supply is REQUIRED by Allen Datagraph Systems. Failure to do so could affect your warranty coverage if a problem arises due to improper power connection.

CAUTION: The vinyl cutter power cord is a three conductor cable that incorporates a safety (earth) ground connection. For the machine to operate safely and correctly, the power cord *must* be plugged into an outlet that has an earth ground contact. *Never* plug the power cord into a two prong outlet by using a 3=2 cord adapter.

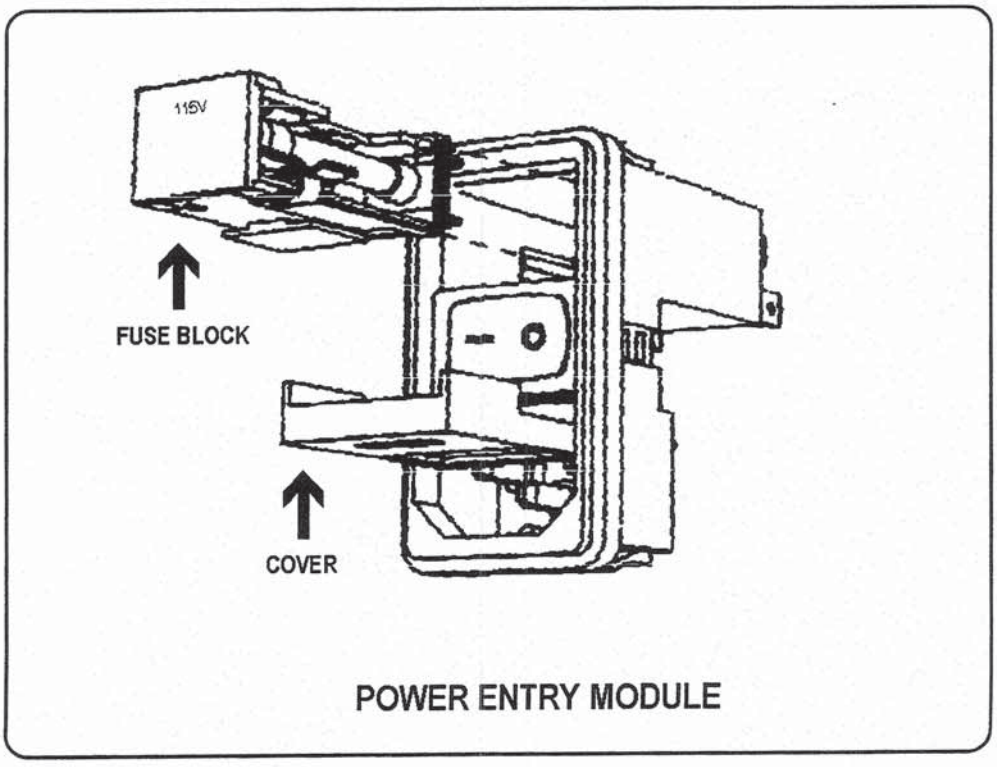
CAUTION: *Never* allow roll or sheet goods to rub on the power cord because the material can cut the cord causing an electrical fire hazard!

The 800 Plus Series can be configured to operate from any of the following power sources:

115 VAC / 48-66 Hz
230 VAC / 48-66 Hz

ALLEN DATAGRAPH 800 Plus Series vinyl cutters are normally factory preset for the power requirements of the destination country. The machine's configuration is indicated on the power input module as either 115V or 230V. To change the configuration:

a. Disconnect the AC power cord from the fuse block on the power input end panel.
b. Open the fuse block cover with a small flat screwdriver.
c. Orient the fuse block so that the desired voltage appears in the fuse block cover.
d. Close the fuse block cover and verify that the desired voltage is showing.



POWER ENTRY MODULE

COMPUTER CONNECTION

System Interfacing

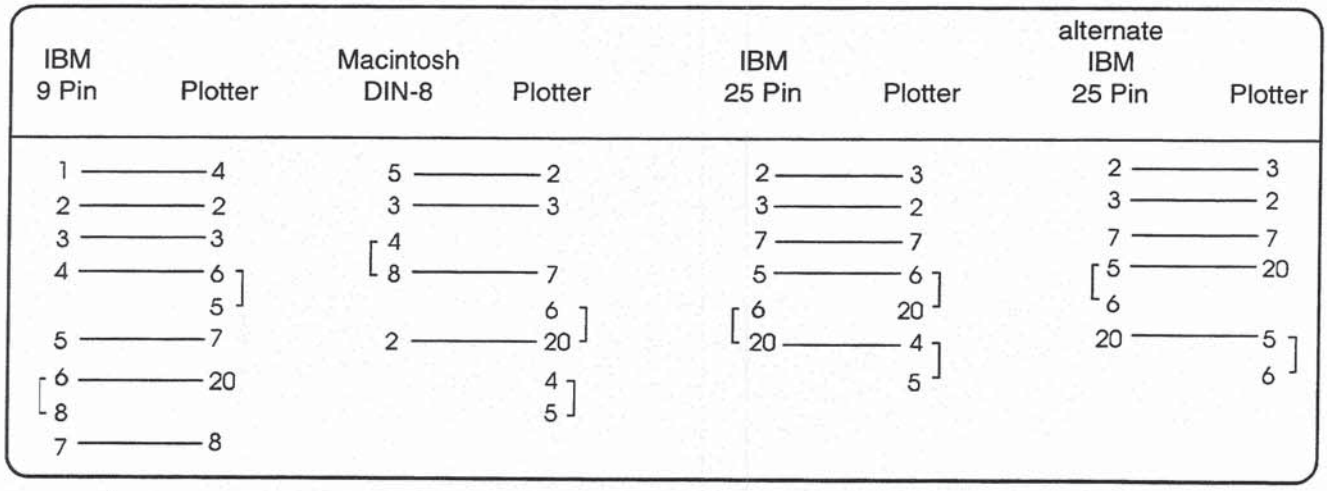
There are two types of interface for the 800 Plus Series, serial and parallel. The serial (RS-232) interface is used in the majority of CAD/CAS systems. The parallel interface is used to interface with the parallel printer port of most IBM compatible personal computers. At this time, refer to the CAD/CAS software package to determine the interface requirements particular to that package and for the interfacing requirements to the ALLEN DATAGRAPH vinyl cutter. If the ALLEN DATAGRAPH is not listed on the software menu, refer to requirements for the Ioline, CAMM-1 or HP 758X series, as the 800 Plus Series uses identical settings / cable.

Serial (RS-232) Interfacing

The serial interface is factory preset for 9600 baud, no parity, 8 bits, 1 stop bit but may be altered with diagnostic 04. The 800 Plus Series, when used with the supplied plotter cable, automatically supports both HARDWIRE or XON / XOFF software handshaking. Connect the plotter cable supplied with the 800 Plus Series to serial **port A** for HPGL commands. A "null modem" cable may be used on serial **port A** for XON / XOFF communications only and is available at computer supply stores.

A serial interface trouble shooting diagnostic is provided. See Diagnostic 06 in this manual.

Plotter Cable Configurations (RS-232 Serial)



Parallel Interfacing

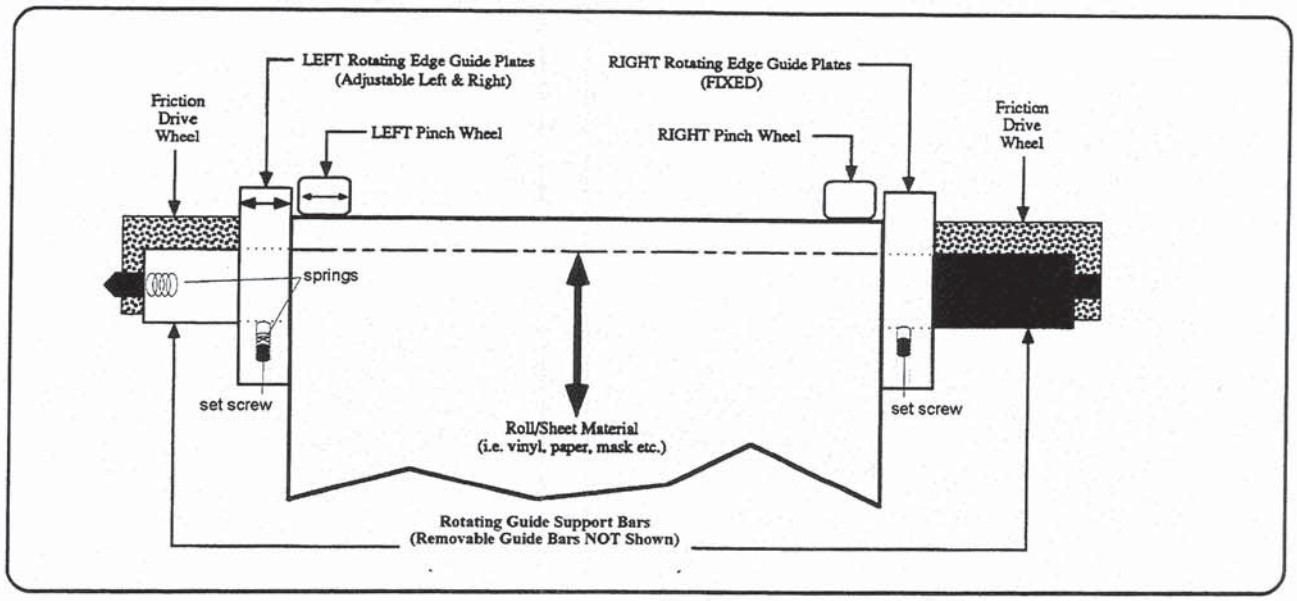
The 800 Plus Series parallel interface uses commonly available parallel printer cables with a 25 pin to Centronics connector configuration. It is the type used with most dot matrix printers. While parallel transmission is normally faster than serial, the cable length is limited to 10 feet (3.3 m) in length and is unidirectional.

Gerber Graphix Advantage Interface

The 800 Plus Series has provision to connect directly to the Gerber Graphix Advantage CAD/CAS system. For use with new versions of Graphix Advantage, the Allen Datagraph plotter driver may be used. Connect the Allen Datagraph serial plotter cable provided with the plotter to Serial **port A** on the vinyl cutter when using the Allen Datagraph plotter driver.

OPERATION

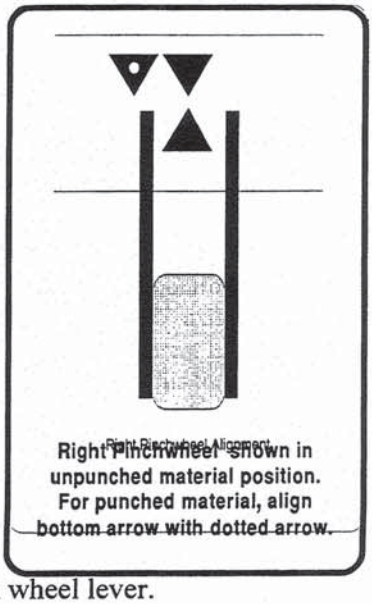
LOAD MATERIAL



Roll and Sheet Goods

Before loading media, turn the cutter on. The cutter will initialize, energize the vacuum fan and turn on the UNLOAD, DSR and Pen Up lights on the control panel. The display will read C41 (factory default). The cutter is now ready for media loading.

1. Place roll material on the roll supply and feed the material from the back of the machine, over the guide bar with edge guides, under the plain guide bar and then under the pinch wheels until it is inserted 1-2 feet (30-60 cm). A material path diagram follows. Position the right edge of the material against the front and rear edge guides. Also, visually align the roll of goods with the edge guides. NOTE: *Proper alignment with the guides will give the best results when making long images.*
2. Position the left pinch wheel at the left edge of the material. It may be necessary to use two hands (one in front and one in the rear) to move the pinchwheel. This pinch wheel should be positioned so that its edge is about 1/4 inch (6 mm) in from the edge of the material. Do not place the pinchwheel on a smooth section of the gritwheel. (Models 830 and larger.) *The material must be at least 4 inches wide (10 cm).*
3. For punched materials, position the left pinch wheel further in so that the wheel does not run on the holes of the material. Move the right pinchwheel in so that it does not run over the holes of the material. Do not place the pinchwheel on a smooth section of the gritwheel. (Models 830 and larger.) (For 848, position the center pinchwheel at the material center.)
4. Lower the pinch wheel lever.
5. Use the joystick to position the tool to the desired plot start point. The user may want this point to be at the leading edge of the material or at a position that allows the leading edge to be threaded through the guide system.
6. Press the LOAD button on the control panel. The tool holder moves left and right to measure the material width (Y-axis) and then the material moves back and forth (X-axis) 1 INCH, unless a different Load Length has been set. Verify that the material is tracking straight at this time. The tool will position to the starting point of the current coordinate system. (See ORIGIN LOCATION Section of this guide.) Additional joystick positioning may be made now. The cutter should be in ON-LINE to plot images sent from the computer.
7. For cutting, perform the cut test pattern FUNCTION, FORCE. Make any changes, if necessary.



Right Pinchwheel shown in unpunched material position. For punched material, align bottom arrow with dotted arrow.

To unload material, Press PAUSE and then UNLOAD. Raise the pinch wheel lever.

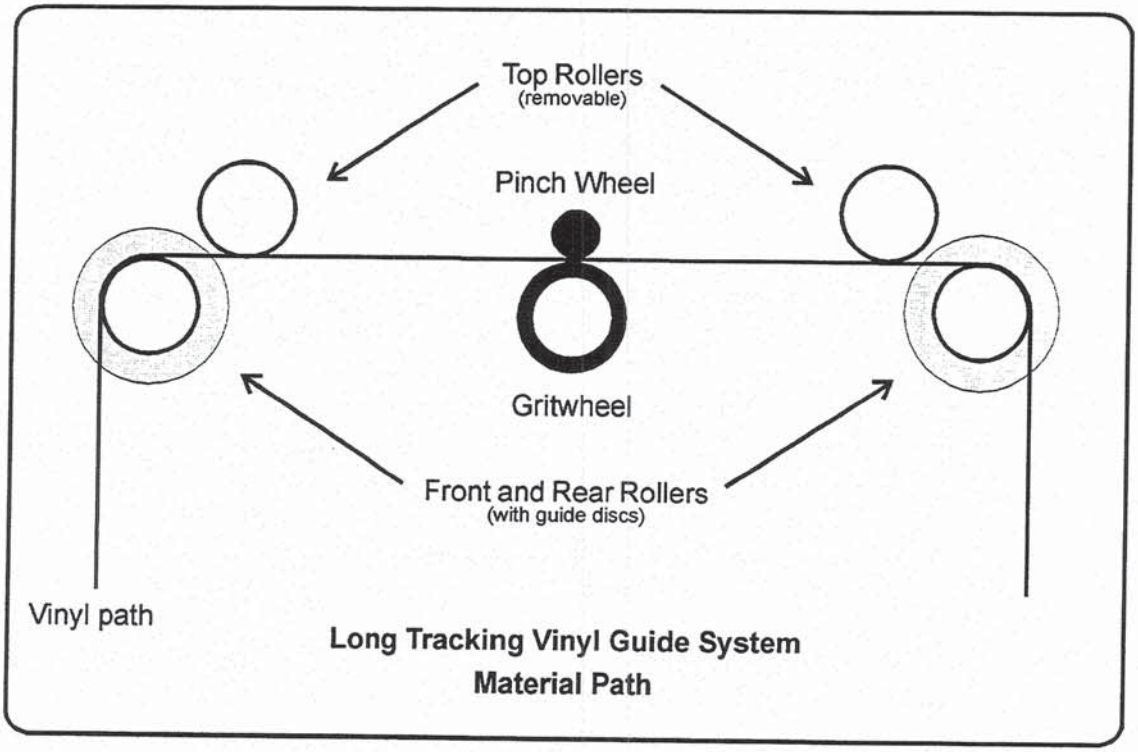
Long Tracking Vinyl Guide System

The Long Tracking Guide System is designed to enable the tracking and cutting of up to full rolls of material wider than 4 inches (10 cm). Vinyl rolls without sprocket holes are best suited for use in this system. Light weight paper and material with too many holes have weak edges and do not work as well. The following points should be noted:

1. a) Right front and rear edge guide discs are factory preset, do not alter their position.

   b) Left front and rear edge guide discs are movable.

   c) All front and rear rollers are removable. When reinstalling, be sure that the spring loaded ends are at the joystick side of the machine.
2. Place material against right guide discs front and rear.
3. Adjust left front and rear guides to material edge. Left guide discs move with moderate pressure. No tools are required. Allow approximately 1/16 inch (1 to 1.5 mm) space for material variation.
4. Lower the pinch wheel lever.
5. Press the LOAD button.
6. Test tracking with the joystick as first 2-3 feet (60 to 100 cm) of vinyl may be wider than balance of roll. Material going in and out of the guide system should be aligned with the guide discs and not bind. Adjust the material position and the left guide discs as necessary. Right guide discs do not normally require adjustment unless it is found that several rolls of unpunched vinyl do not track properly with the guide system. The right front and rear guide discs need to be an equal distance from the side plate the guide bars mount in. *Do not attempt adjustment of the right guide discs without consulting the factory.*
7. With the joystick, move the tool to the desired cut start position.
8. Ensure that the material supply roll is square and aligned to the guide discs.



Long Tracking Vinyl Guide System
Material Path

Tracking Adjustments (Material Alignment)

The Model 800 Plus Series allows the user to adjust material alignment at any time. This is sometimes necessary when working without the long tracking guide system. To adjust tracking while the Model 800 Plus Series is in operation, simply press the VIEW button on the control panel. Plotting action will stop, the tool will move to the right margin. Next, raise the pinch wheel lever. Align the material against the front and rear media edge guide discs (and/or the black vinyl on the machine's front and rear stainless steel covers). Check that the roll supply is also aligned with the edge guides. To resume plotting, press the REMOTE button. ***For best results**, make this interruption while the tool is in between letters or better between words of a sign.*

Service Loop

A service loop is slack in the material coming off the supply roll. The plotter needs this slack to maintain accurate cutting and tracking. The Model 800 Plus Series can automatically maintain a service loop when this feature is activated. A speed reduction will be in effect during the supply advance but allows fast cutting over long lengths. *Note that the material may be dropped at the end of the media with the service loop software switch set to off.*

The service loop feature may be deactivated three different ways.

1. Use the service loop software switch: Function, 8, #, Enter. (# = 1 is on, # = 0 is off)
2. Use the joystick to jog the size of an entire job.
3. Set a Media Load Length the size of an entire job before loading media.

Example: To cut a 10 foot sign *without* the service loop, the user may a). set a MEDIA LOAD LENGTH of 10 feet 3 inches or b). load the standard 2 feet (61 cm) and then spool the material with the joystick until the 10 feet 3 inches have been reached. With the joystick method, the user must return the tool to the cut start position after the desired cut length has been spooled.

Frame Length / Media Load Length

The 800 Plus Series Vinyl Cutter has a flexible framing system. While the default FRAME LENGTH is 2 feet (61 cm), this size may be changed. It is <u>not</u> necessary to change FRAME LENGTH in order to perform framing or to cut panels longer than 2 feet (61 cm). This is because the cutter automatically supplies material as requested by the CAD/CAS software, including framing (paneling).

The FRAME LENGTH is also the MEDIA LOAD LENGTH and may be set to any size from 1 to 3000 inches (250 feet) or from 1 to 7620 cm. For example, with a 48 inch MEDIA LOAD LENGTH, the cutter pulls out 48 inches (122 cm) of material during loading and will FRAME ADVANCE 48 inches (122 cm) when the CAS program commands the plotter to frame advance (HPGL command AF;). For long runs of material, tracking can be verified before cutting by setting the LOAD LENGTH equal to the entire image output length. Alternately, tracking may be checked with the joystick to move material beyond the MEDIA LOAD LENGTH.

A FRAME LENGTH/MEDIA LOAD LENGTH value may be customized or changed temporarily for SET-UPS 1-6. See FACTORY and CUSTOM SETUPS. The FRAME LENGTH may be set from the control panel in either inch or centimeter units.

For FRAME LENGTH / MEDIA LOAD LENGTH in INCHES, use this key sequence in UNLOAD state:

FUNCTION,PAUSE, #, #, ... #, ENTER (#, #, ...# are inches from 1 to 3000)

For FRAME LENGTH / MEDIA LOAD LENGTH in CENTIMETERS, use this sequence in UNLOAD state:

FUNCTION, ENTER, PAUSE, #, #, ... #, ENTER (#, #, ...# are centimeters from 1 to 7620)

EXAMPLE: For a 20 foot LOAD LENGTH, determine the number of inches (20 feet x 12 = 240 inches). Next, with the cutter on and in the UNLOAD state, use the key sequence FUNCTION, PAUSE, 2, 4, 0, ENTER. Now load the material as above. The plotter will load the entire 240 inch LENGTH. The service loop will not be activated until after the 240 inch distance has been traveled.

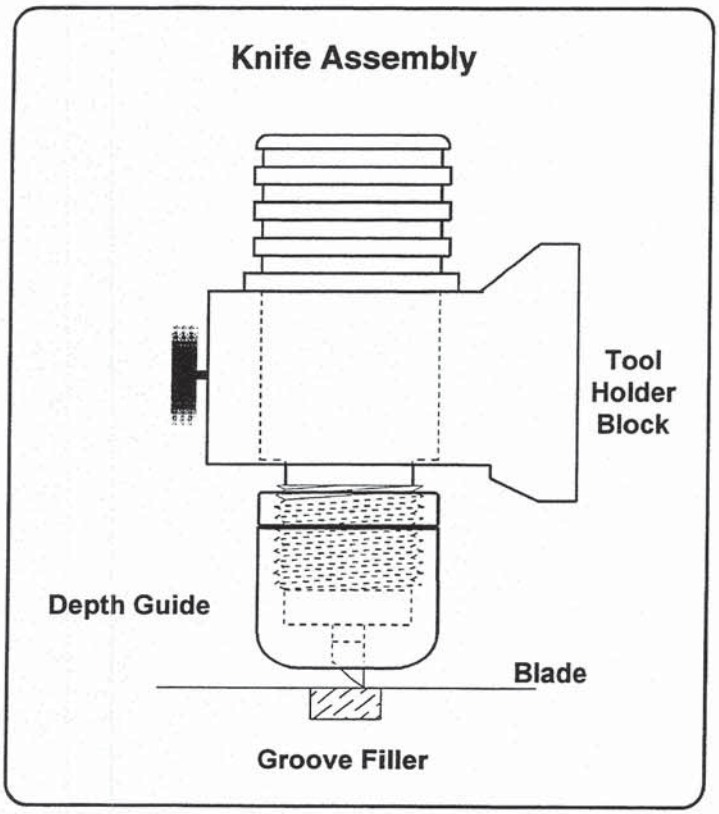
LOAD TOOLS

Knife

Summary

1. Insure plastic groove filler is in.
2. Install knife blade in knife holder.
3. Insure blade is out from depth guide.
4. Load material.
5. Install knife assembly.
6. Set machine to CUT MODE.
7. Perform cut test pattern. (Function, Force)
8. Adjust force, offset and depth guide.

CAUTION: To avoid personal injury, keep hands, hair, clothing and jewelry away from the cutter's moving parts at all times.



Tool Holder Block

This tool holder block is used for knife and hot tip cutting, pouncing and drawing. The thumb screw secures these tools. The tool holder block is held to the cutting head by two hex drive screws.

Knife Assembly

The blade holder is designed for use with Allen Datagraph's 45 and 60 degree blades. Solvents and lubricants should not be used as they will diminish cutting accuracy.

Knife Blades

Knifes blades for the Allen Datagraph Model 800 Plus Series Cutters are made with tungsten carbide and are designed specifically for offset cutting. The tip is offset from the center of the shaft so that the blade has a caster action when pulled. Blades are available in 45 and 60 degree tip angles. The 60 degree is intended only for thick materials such as sandblast mask. For best cutting results, protect the knife tip from damage when not in use. New blades slide into the holder to a preset height and are held in magnetically. No tools or adjustments are required.

Depth Guide

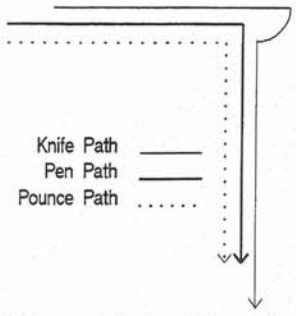
Allen Datagraph's controlled depth knife holder has a depth guide which is adjustable to control the depth of cut the vinyl cutter makes. Correct adjustment allows the blade to cut the vinyl material and lightly mark the backer (carrier) material. Too much cut depth can cause cut through and premature blade wear. Not enough cut depth will make "weeding" of vinyl difficult.

Use the cut test, force and depth adjustment to establish good cutting.

Groove Filler

Clean any debris from the groove before installing the groove filler. The filler simply snaps into and out of place with no special tools required. **It is important that the groove filler be installed fully and evenly, otherwise material cut through may occur in some sections across the plotter.** *The groove filler should be installed for knives and pen plotting, but* ***must*** *be removed for Pouncing.*

Knife Offset



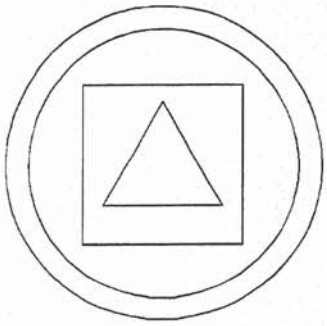
Paths are displaced for clarity.

This figure shows the path the pen takes and the path the knife takes at a corner. Since the knife follows behind the pen by the knife offset amount, the vector starts late and finishes late. To rotate the knife, an arc is drawn with a radius of the knife offset. Then the next vector is drawn. *If pen plots have the characteristic of the knife path, it is likely that the cutter is in the CUT MODE.* The Pounce path, like the Pen path, has no offset compensation.

To toggle between CUT, DRAW and BOUNCE modes:

FUNCTION, ROTATE

Cut Test Pattern

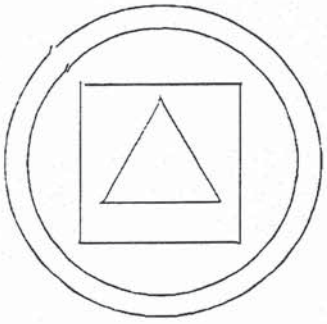


offset correct

A test pattern is provided to verify cut quality. The pattern can be positioned with the joystick (cutter in Remote). Repeat the test as necessary to fine tune speed, force and offset values. When set properly, the cutter should produce a test pattern which has accurate corners, smooth curves and is easy to "weed" out.

To make the test pattern, load material and then press:

FUNCTION, FORCE

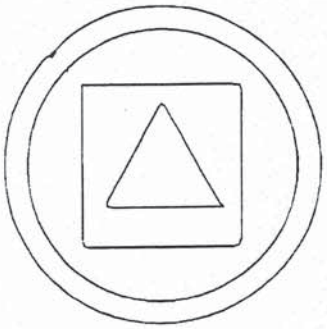


offset too high

If the corners of the test pattern (or lettering) have misshaped corners when knife cutting, adjust the knife offset.

When the blade offset is too high, the corners will be extended and the circles will have bumps. In that case, reduce the knife offset. For example, if the original offset is 12 and the output shows signs of too much offset, try an offset of 10 (or less) with the key sequence:

FUNCTION, ENTER, ROTATE, 1, 0, ENTER



offset too low

When the blade offset is too low, the corners will be rounded and the circles will have nicks. In that case, try an offset of 14 (or more) with the key sequence:

FUNCTION, ENTER, ROTATE, 1, 4, ENTER

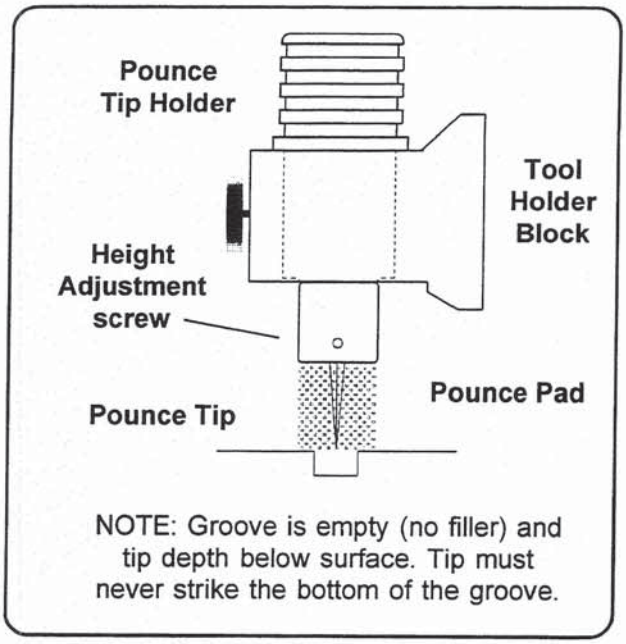
If a good test pattern cannot be achieved in this manner, inspect the knife blade and replace as necessary.

Pounce Tool

Summary

1. Remove groove filler from platen.
2. Load paper material.
3. Set machine to BOUNCE MODE.
4. Install pounce assembly in tool holder.
5. Perform cut test pattern.
6. Adjust hole distance and size.

CAUTION: To avoid personal injury, keep hands, hair, clothing and jewelry away from the cutter's moving parts at all times.



NOTE: Groove is empty (no filler) and tip depth below surface. Tip must never strike the bottom of the groove.

Tool Holder

This tool holder block is used for knife and hot tip cutting, pouncing and drawing. The thumb screw secures these tools. The tool holder block is held to the cutting head by two hex drive screws.

Pounce Tip Holder

The pounce tip holder is very different from the knife assembly. Do not to use the knife assembly in the BOUNCE MODE as DAMAGE WILL OCCUR!

The pounce tip depth setting is important for good pounce quality. When installed in the Model 800 Plus Series and the groove filler removed, the tip in its full down position should be halfway between the platen surface and the bottom of the groove. See illustration above.

A simple way to set the tip depth is to turn the cutter off, loosen the pounce holder set screw so that the tip moves freely. Install the pounce tip holder in the machine, press down on the tool holder and tighten the set screw. *The Pounce Tip must not strike the bottom of the groove as this will destroy the Pounce Tip.*

Pouncing (BOUNCE MODE)

The BOUNCE MODE is also called the POUNCE MODE because of the tool action and because **B** is displayed on the control panel while in the pounce mode. Proper tool set up and good tip condition will provide holes that are uniform and not torn and which will pass charcoal freely without sanding.To enter the BOUNCE MODE, load factory SET-UP 3 with the front panel key sequence: FUNCTION, LOAD, 3.

To set pounce distance between holes: FUNCTION, ENTER, ROTATE, #, ENTER.

For this command, # is 5 to 99 and represents 1/100 inch. The factory default is 20 or 1/5th inch. In the Cut mode, this command controls knife offset. This command is inactive in the draw mode.

To set pounce hole size (tear): FUNCTION, ENTER, AXIS ALIGN, #, ENTER.

For this command, # is 8 to 100 and represents 1/1000 inch. The factory default is 15 or 15/1000 inch.

New distance and size settings may be saved as a CUSTOM SET-UP. *See Command Summary and Set-Up Table for more detail.*

Hot Tip

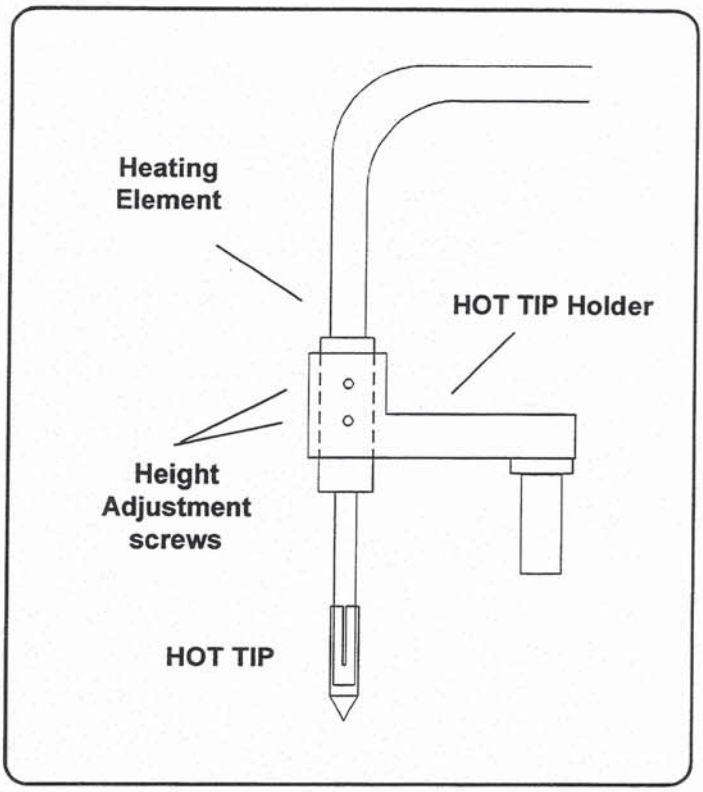
Summary

1. Install hot tip adapter.
2. Install heating element in adapter.
3. Load Factory Set-up 4.
4. Load material.
5. Perform cut test pattern.
6. Adjust force, speed, temperature.

CAUTION: Never operate the Hot Tip tool unattended.

CAUTION: To avoid personal injury, do not attempt to adjust any hot tip parts while controller is on or tip is hot.

CAUTION: To avoid personal injury, keep hands, hair, clothing and jewelry away from the cutter's moving parts at all times.



Hot Tip Tool Holder

The Hot Tip adapter (optional equipment) is used to hold the Hot Tip heating element. This adapter fits in the tool holder block and connects to the carriage cover. Position the hot tip tool to cut on the stainless steel surface, not the knife cutting strip (groove filler). Adjust the height so that when the hot tip is held in the full down position, the hot tip lightly contacts the stainless steel surface. Tighten but DO NOT OVER-TIGHTEN the height adjustment set screws on the hot tip holder.

Heating Element

The hot tip heating element is used with the hot tip tool holder. The element's 4 prong connector plugs into the mating connector located on the pen carriage cover. For best results and long life, care should be taken when handling the element assembly.

NOTE: *Turn Hot Tip power control to the **OFF** position when cutter is idle for any length of time. Failure to do so will result in premature failure of element.*

Hot Tips

For best results and long life, care should be taken when handling tips. CAUTION: *Temperatures beyond 700°F may cause the carbide to fall out of the tip therefore destroying the tip.*

Material	Speed*	Gold Force	Temperature
2 mil vinyl	30 mm/s	6	55
4 mil vinyl	30 mm/s	12	75
Scotchlite	20 - 30 mm/s	25	80
High Intensity	20 mm/s	35	75
Diamond Grade	4 mm/s	25 - 35	75 - 85
Twill Fabric	20 mm/s	12 - 25	50 - 65

*Speed is in mm/sec. See Factory Set-ups and the Key command summary for more information.

Wide Marker Holder

Mounting the optional Marker Holder

The marker holder is mounted by first removing the knife tool holder block (two hex head screws). Install the wide marker holder using the same hex screws. The marker will draw over the stainless steel, not the groove filler. Use the front panel Up / Down button to lower the pen (it will raise automatically in 3 seconds). In the down position, adjust the wide marker in the holder vertically so that it touches the material lightly.

Wide Marker Drawing

Wide marker drawing is done in the Draw mode. Align the pen so that rectangular tip is perpendicular to the fill lines of the marker. In the pen up position, the tip should be as close as possible (no more than 1/8 inch or 3 mm) to the surface. If it is more or less than this, the nib may be adjusted by screwing the nib in or out of the pen body with needle nose pliers.

Test a stroke of the pen by pushing PEN DOWN and then move the joystick. If the stroke is not smooth, adjust the height or lightly sand the face of the tip.

Pen speed and proper background material are critical elements to a good plot. The suggested range of speed for wide marker pens is from 8 to 30 cm/sec (5 to 15 inches/sec) depending on the type of material and the amount of ink left in the pen. A speed of 25 cm/s (10 inch/sec) should produce satisfactory results on most surfaces. If satisfactory results are not produced, you may need to slow the speed down, replace / refill the pen, or lightly sand the nib. The background material should be calendered smooth paper, vinyl or coated TYVEK II.

Drafting Pens

In the Draw Mode, the 800 Plus Series is a high performance drafting plotter capable of producing professional architectural and engineering drawings. HP style pens used by the 800 Plus Series are available as drafting, felt tip and roller ball type. Speed and force requirements vary for these pens and a chart is provided for your reference.

Drafting pens are held in the tool holder block or the wide marker block.

Pen Type	Speed in cm/sec.	Recommended Force
Fiber Tip	20-30	10-12
Roller Ball	40	19-25
Drafting	20	6-8

MODES OF OPERATION

The Model 800 Plus Series has 3 *modes* of operation for control of its corresponding tools: knife, pounce tip, hot tip and pen. THE CUT MODE is used for knife offset cutting, THE BOUNCE MODE for pouncing and THE DRAW MODE is used for pen plotting, wide marker drawing and hot tip cutting.

The control panel indicates the current mode with the first character in the display. The letter **C** is displayed in the CUT MODE, the letter **B** in the BOUNCE MODE (pouncing) and the letter **D** in the DRAW MODE.

Knife Cutting (CUT MODE)

Knife offset cutting is performed in the CUT MODE and the letter 'C' is displayed on the control panel. The CUT MODE provides the OFFSET a swivel knife needs to cut corners and curves accurately. The offset is nominally 0.01 inches (0.25 mm) which is expressed as an offset of 10. The knife offset can be set from 0 to 100 plotter units.

The recommended knife cutting speed is 40 and the recommended force is 2 for cutting 2 mil vinyl. A Speed of 40 is 40 cm/sec (16 inches/sec) and is indicated as "4" in the middle digit of the control panel display. A Force of 2 is approximately 60 grams and is indicated by a "2" in the third digit of the panel display.

If the Model 800 Plus Series is in the CUT MODE and the CAD/CAS package is also providing a swivel knife offset, the user will have unsatisfactory cut quality.

Pouncing (BOUNCE MODE)

Pouncing is performed in the BOUNCE MODE and the letter 'B' is displayed on the control panel. Pouncing with the 800 Plus Series will provide holes in bond or craft paper at a user defined distance apart along the image outline. This is useful for making patterns for hand painting, neon layout or for making computer generated patterns in general. The CAD/CAS program should be set to pen (no offset) for this mode.

To perform pouncing, the center platen groove filler must be removed. The standard distance between pouncing holes (pounce pitch) is 0.2 inches (5.1 mm) and can be varied from 0.01 to 1.00 inches (0.254 to 2.54 mm).

Wide Marker and Pen Plotting (DRAW MODE)

Pen plotting is performed in the DRAW MODE and the letter 'D' is displayed on the control panel. Check plots or colorful graphics may be made with either HP (Hewlett Packard) style roller ball or felt tip pens. Pen plotting may be performed at high speeds, such as SPEED of 60 cm/sec (24 inches/sec) and a FORCE of 4 for sheets of paper. For plotting on rolls of paper, it is necessary to reduce the LOAD SPEED to 20 cm/sec (8 inches/sec) or less in order to "track" well. If new pens skip, reduce speed and/or increase force.

For banner making, the wide marker holder (optional) is required. Wide marker speeds are typically 30 cm/s. It is possible to increase the SPEED and ACCELERATION for greater through-put, but tracking may suffer for some materials.

Hot Tip Cutting (DRAW MODE)

To perform Hot Tip cutting, the Model 800 Plus Series must be equipped with a factory installed thermostatic control, a hot tip adaptor, a heating element and a hot tip. Hot Tip cutting is similar to pen plotting in that there is no offset compensation for tip position as in knife cutting. Therefore, Hot Tip cutting is done in the DRAW MODE. **D** is displayed in the control panel when the DRAW MODE is active. Recommended speed and force varies with material and thickness.

Machine Operating States

Refer to the control panel drawing during the discussion of the control panel operation that follows. The Model 800 Plus Series will always be in one of three operating states.

NOT READY	In this state, the media may be removed or inserted. Upon power up the plotter is in the NOT READY state.UNLOAD LED is lit.
PAUSE	Plotting is suspended, but programming commands from the host computer will be received. Pinch wheels may be raised and lowered (to adjust media position). LOAD is lit, Pause blinks 2 times per second.
ON-LINE	The media loaded state in which programming commands are received and executed. LOAD, ON-LINE LEDs are lit. The Joystick sets plot origin.

Two control buttons on the control panel (UNLOAD/LOAD and PAUSE/ONLINE) allow the user to switch between these operating states. Four LEDs located near these two buttons (LOAD, UNLOAD, PAUSE and ON-LINE) indicate the current operating state.

Control Panel Indicators

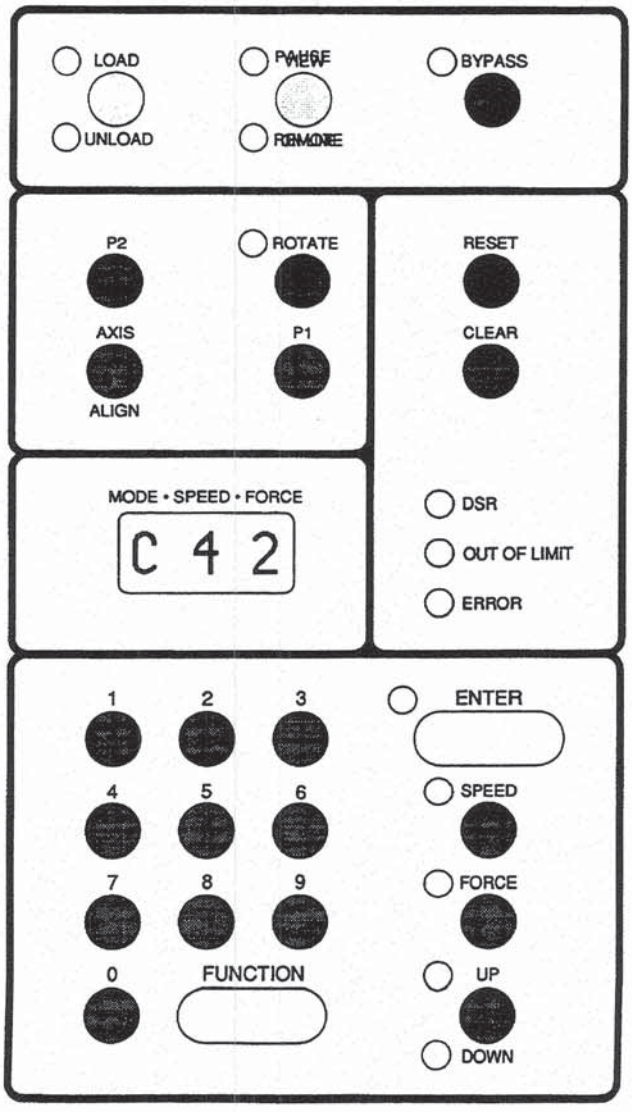
The control panel has several indicators to aid in its use.

BYPASS	Illuminates when CAD/CAS override is on. (CAD speed, force, offset ignored)
DSR LED	Illuminates when the plotter is available to accept data when using the hardwire hand shake protocol. The 800 Plus Series automatically accepts XON/XOFF protocol.
ENTER LED	Illuminates during certain push button key sequences.
ERROR LED	Illuminates solid when an invalid programming command is received; flashing when a communication error occurs. If the plotter responds at all to the commands it receives the flashing ERROR LED normally means a buffer overflow has occurred. This overflow is caused by bad handshaking between the computer and the plotter (normally caused by incorrect cable configuration). If the plotter does not respond, it normally means the baud rate or parity setting is incorrect. If the tool bounces up and down, the parity should be turned on.
FORCE LED	Illuminates during force change key sequence.
LOAD LED	Illuminates when the machine is in the REMOTE State.
OUT OF LIMIT LED	Illuminates when the pen is commanded to plot outside of the clipping window.
DOWN LED	Illuminates when the tool is down.
FORCE DIGIT	Displays the force when the tool is down. Force 1 is lowest, 8 highest.
MODE DIGIT	Displays the Cut, Draw, or Bounce Modes or current pen number in use. Also can indicate Diagnostic, Activation or Error status.
SPEED DIGIT	Displays the tool down speed. The units of the display are decimeters per second.
UP LED	Illuminates when the tool is up.
ON-LINE LED	Illuminates when the plotter is in ON-LINE mode. The plotter only processes programming commands when the plotter is in ON-LINE mode.
ROTATE LED	Illuminates when the plotter is in the 90 degree rotate mode.
SPEED LED	Illuminates during down speed change key sequence.
UNLOAD LED	Illuminates when the plotter is in the NOT READY state.
PAUSE LED	Blinks when in PAUSE mode. Plotter will not process programming commands in the input buffer while in PAUSE mode. Flickers while data is being received.

800 PLUS SERIES CONTROL PANEL

Force Adjust	FORCE, FUNCTION, #, ENTER (1 to 100)
Cut Speed	SPEED, FUNCTION, # #, ENTER (1 to 60)
Move Speed	FUNCTION, SPEED, # #, ENTER (1 to 60)
Load Setup	FUNCTION, LOAD, # (1 to 6) 1 = Cut Premium 3 = Pounce 5 = Draw roll 2 = Cut Intermediate 4 = Hot Tip 6 = Draw sheet
Knife Offset	FUNCTION, ENTER, ROTATE, # #, ENTER (1 to 99) (Pounce Pitch)
Load Length	(UNLOAD) FUNCTION,PAUSE, # #.. #, ENTER (1 to 3000 inches)
or	(UNLOAD) FUNCTION, ENTER, PAUSE, # #.. #, ENTER (1 to 7630 cm)
Load Speed	FUNCTION, 5, LOAD, # #, ENTER (1 to 40)
CAD Override	FUNCTION, BYPASS (BYPASS LED ON = CAD OVERRIDE ON)
Cut Test	FUNCTION, FORCE
Copy	BYPASS, ENTER

Key Command Summary



CUTTER STATES
Load / Unload
Pause / On-Line

Control Panel Key Commands

The preceding summary of the most common key commands are attached to the control panel of your vinyl cutter for reference. This page includes a complete list of key commands.

The current value of any setting is flashed on the control panel display during the key sequence prior to entering a new value. Example: To determine the knife offset the cutter is presently set at, use the key sequence FUNCTION, ENTER, ROTATE to display the current value. To change the value, continue with the sequence (#, #, ENTER), or keep the current value by simply pressing ENTER.

PARAMETER	KEY SEQUENCE	VALUE	HPGL Command
Down Speed	Speed, Function, #, #, Enter	1-60 (at speed mode cm/sec or mm/sec)	VS##
Up Speed	Functin, Speed, #, #, Enter	1-60 (cm/sec)	UV##
Force	Force, Function, #, Enter	1-8 White; 1-100 Gold	FS# *
Load Setup	Function, Load, #	1-6	
Save Setup	Function, Enter, #	1-6	
Cut/Bounce/Draw	Function, Rotate	C, B or D	ST# (0=D, 1=C, 2=B)
Knife Offset (Cut mode) Pounce Pitch (Pounce Mode)	Function, Enter, Rotate, #, #, Enter	1-100 (0.01 - 1 inches)	KN##
Pounce Hole Size (Pounce Mode)	Function, Enter, Axis Align, #, #, Enter	8-100 (0.008 - 0.1 inches)	KA##
CAD Override	Function, Bypass	ON (led on), OFF (led off)	
Coordinate System	Function, Axis Align, P2	Lower Right Origin	
	Function, Axis Align, P1	Center Origin	
	Function, Axis Align, Rotate	Center RotateD 180 degree Origin	
	Function, Axis Align, Axis Align	Lower Left Origin	
Speed Mode	Function, 6, #	0, 1 (cm/sec, mm/sec)	
Media Load Speed	Function, 5, Load, #, #, Enter	1-40 (cm/sec)	<esc>.F;##:
Media Load Length **	Function, View, #, #, . . #, Enter	1-3000 (inches)	<esc>.F##:
	Function, View, Enter, #, #, . . #, Enter	1-7630 (centimeters)	
Service Loop ***	Function, 8, #, Enter	0, 1 (off, on)	
Vector Mode	Funtion, Enter, Force, #, Enter	0, 1, 2, 3 (off, lo filter, hi filter, fast curves)	
Acceleration	Function, 4, #, Enter	1-16 (0.25-4g)	AS##
Minimum Angle (Cut Mode)	Function, Enter, Axis Align, #, Enter	1-50 (degrees)	KA##
Copy	Bypass, Enter	Plots buffer contents	
Clear Buffer	Clear	Clears buffer contents	BJ *
Gerber Multiply by 2	Function, 7, #, Enter	1, 2 (1 is 1x scale, 2 is 2x scale)	
System Restart	Function, Function, Clear	Warm boot	
Confidence Test*	Function, 3, 0, 2, Enter	Verify Machine Operation	
Run diagnostic	Function, 3, #, #, Enter		
Exit Diagnostic	9, 9, enter		

* BJ0 at the beginning of a job clears buffer and sets force range for FS to 1-8 on all models
BJ1 at the beginning of a job clears buffer and resets force range to 1-100 on Gold Touch cutting head models
** Media Load Length and Confidence Test are entered in the UNLOAD state.
*** Machine can drop media with Service Loop turned off.

Computer Control

Most of the front panel key commands can be controlled by popular CAD/CAS software via HPGL commands. For a complete list of HPGL commands, refer to the HPGL Command Language Summary in this manual. An HPGL programmer's manual is available from Allen Datagraph with more information on software control of the 800 Plus Series Vinyl Cutters.

See the Software Notes section of this manual for information regarding the CAD Overrride feature which prevents certain kinds of computer control.

Joystick Operation

The 800 Plus Series joystick provides quick and easy positioning of the cutting head on the material loaded in the machine. When the joystick is moved left and right the cutting head goes left and right. This movement is referred to as the machine's Y axis. When the joystick is moved up, the head "moves forward" and material is pulled off the roll. This movement is referred to as the machine's X axis. When the joystick is moved down, the head "moves back" and material goes into the machine until the Load Edge is reached (On-Line State) or until the front media sensor is uncovered (Pause State). The Load Edge is set by the X axis position of the head when the load button is pressed.

Joystick movement may be made in both the "Pause" and "On-Line" operating states of the machine but the effect will be different. (See the Machine Operating States section of this manual for more information about Pause and ON-LINE.)

Pause State

In the Pause state, the joystick provides a temporary tool position to inspect machine output. When returning to the On-Line mode, the cutting head will automatically resume at the position it was working when Pause was pressed. The Pause light cycles on and off 2 times a second when the cutter is paused.

On-Line State

In the On-Line state, the joystick sets the starting position (origin) for the next job plotted. In this way, the operator can quickly and accurately setup new jobs and maximize the use of material loaded.

In the On-Line state, the joystick can be used to pull material off a roll (before a job is sent to the cutter) and thus override the machine's automatic Service Loop. See the Service Loop section of this manual for more information.

In the On-Line state, the joystick is also used for positioning the digitizing sight (bomb sight) When doing contour cutting of color graphics. Refer to you CAS software manual for information on contour cutting.

FACTORY AND CUSTOM SET-UPS

Loading Set-Ups

The table below shows the six FACTORY SET-UPS for the 800 Plus Series Vinyl Cutter as shipped from the factory. Each SET-UP is a combination of variables (such as speed and force) designed for various tool, software and material combinations. A user can modify and save the values of a SET-UP to suit personal preferences. FACTORY and CUSTOM SET-UPS are recalled (loaded) in the same way.

To load a SET-UP: FUNCTION, LOAD, # (# is 1 to 6)

#	GROUP	PANEL DISPLAY (WHITE)	PANEL DISPLAY (GOLD)	CUT DRAW POUNCE	DOWN SPEED	WHITE FORCE	GOLD FORCE	UP SPEED	OFFSET / PITCH*	CAD OVER-RIDE	LOAD SPEED	LOAD / FRAME LENGTH	SERVICE LOOP	COORD. SYSTEM	SPEED MODE
1	Cut 2 mil	C42	C41	C	40	2	12	40	12	ON	20	24 inch 61 cm	ON	Long X	cm/sec
2	Cut 4 mil	C44	C42	C	40	4	25	40	12	ON	20	24 inch 61 cm	ON	Long X	cm/sec
3	Pounce	B66	C63	B	6	6	37	40	20	ON	20	24 inch 61 cm	ON	Long X	cm/sec
4	Hot Tip	D34	D32	D	30**	4	25	40	12	ON	20	24 inch 61 cm	ON	Long X	** mm/sec
5	Draw roll	D44	D42	D	40	4	25	40	12	ON	20	24 inch 61 cm	ON	Long X	cm/sec
6	Draw sheet	D64	D62	D	60	4	25	40	12	ON	20	24 inch 61 cm	ON	Long X	cm/sec

* Knife offset in effect when CUT MODE activated, Pounce distance in effect when BOUNCE MODE activated.

Factory Set-Ups 1-6

Creating and Saving New Set-Ups

Set-Up 1, whether standard or modified, is automatically loaded at power up. A user may modify the speed, force, (or any feature) on the control panel. See key command summary. Changes to a Set-Up, *unless saved*, will be in effect only until changed from either the control panel or from CAS software or until the unit is turned off.

To save the current values of all features as a CUSTOM SET-UP, use the key sequence: FUNCTION, ENTER, #, where # is 1 to 6. The plotter will flash "FFF" on the control panel display to indicate completion. The CUSTOM SET-UP(s) may now be recalled, as above, with the key sequence: FUNCTION, LOAD, #.

Examples: If the cutters's most common application is cutting intermediate vinyl at a reduced speed, then a new SET-UP could be programmed as follows.

a. Load the closest setting from the table, setting 2 which has the cut mode and a force of 6.
b. Modify speed to 20 with SPEED, FUNCTION, 2, 0, ENTER. The display now reads C26.
c. Reduce Force to 5 with FORCE, FUNCTION, 5, ENTER. The display now reads C25.
d. Save as SET-UP 1 with FUNCTION, ENTER, 1. The display reads FFF and then C25.

The user is still free to make "on the fly" adjustments to speed, force and other machine parameters.

Reset Factory Set-Ups with Diagnostic 43

The FACTORY SET-UPS may be restored by running diagnostic 43. Use the key sequence FUNCTION, 3, 4, 3, ENTER, 9, 9, ENTER to perform this diagnostic and exit the diagnostic mode. The cutter is now ready for use with the FACTORY SET-UPS installed.

WINDOWS 95 REMOTE PANEL

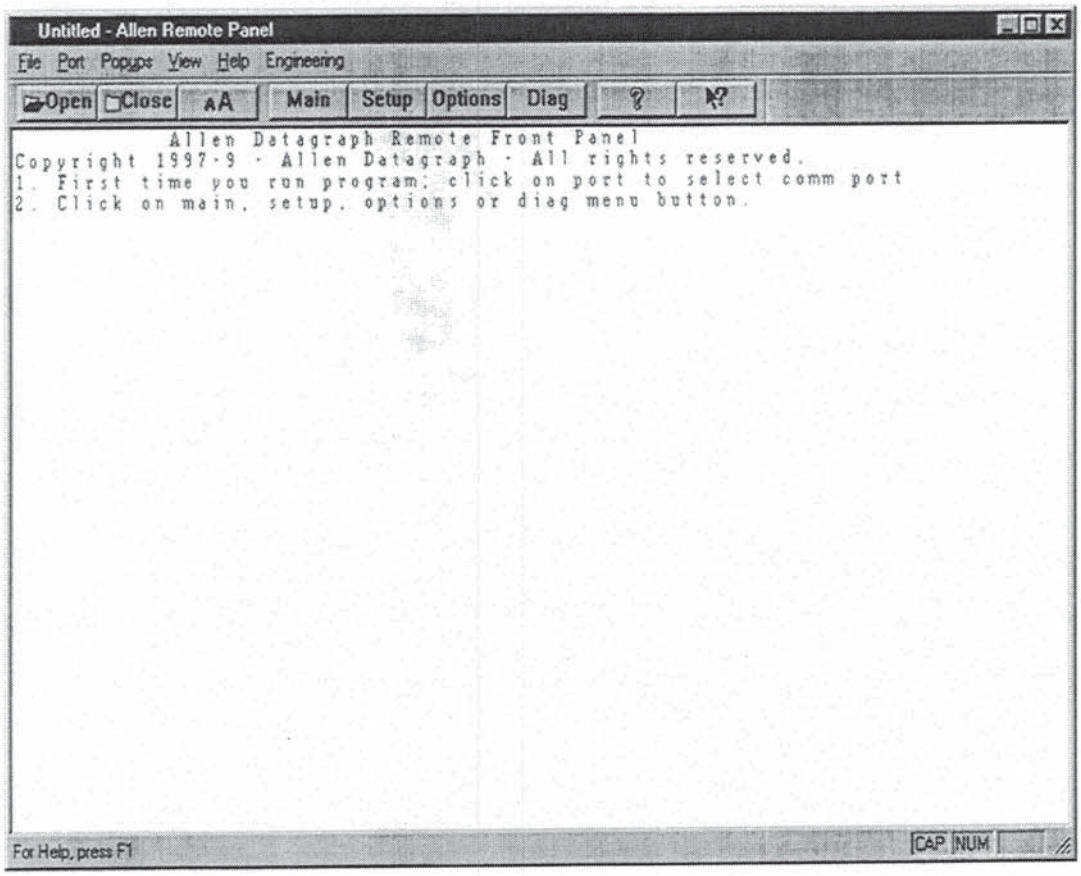
Cutters are supplied with a Windows 95 program for remote control of most cutter functions. The program is installed on your Windows 95 computer using Start, Settings, Control Panel, Add/Remove Programs. Insert The Allen Remote Panel (Allen Vinyl Cutter diskette part number PL-00-03-533) in the computer diskette drive (normally A:) and follow the computer prompts. The blue and red ALLEN icon to run the program with be under Start, Programs, Accessories. Alternately, you may double click on the Setup file listed on the diskette.

The cutter must be on and connected to the computer with a serial cable such as the one supplied with the cutter. Use cutter port Serial A. *The Remote Panel will not work with parallel communications.*

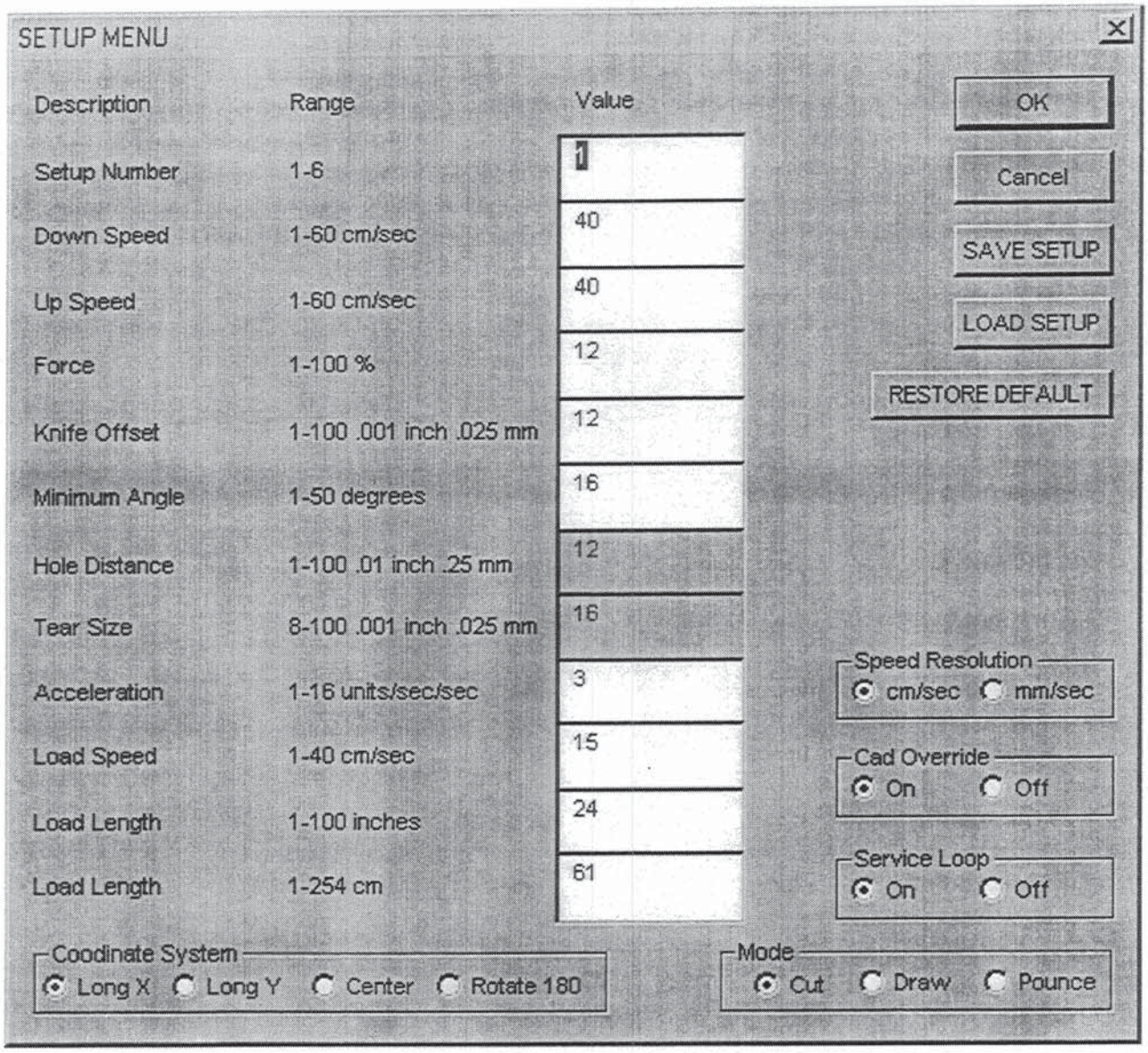
The first time you run the Allen Remote Panel, select Port on the menu bar to assign the correct computer com port. From there, you may select Main, Setup, Options or Diagnostics.

For non-Windows 95 computers such as Windows 3.1 and Macintosh, a second utilities disk is provided. See the Firmware utilities disk topic in the Service section of this manual.

Main Menu



Setup Menu


SETUP MENU
Description
Range
Value
Setup Number
1-6
1
Down Speed
1-60 cm/sec
40
Up Speed
1-60 cm/sec
40
Force
1-100 %
12
Knife Offset
1-100 .001 inch .025 mm
12
Minimum Angle
1-50 degrees
16
Hole Distance
1-100 .01 inch .25 mm
12
Tear Size
8-100 .001 inch .025 mm
16
Acceleration
1-16 units/sec/sec
3
Load Speed
1-40 cm/sec
15
Load Length
1-100 inches
24
Load Length
1-254 cm
61
OK
Cancel
SAVE SETUP
LOAD SETUP
RESTORE DEFAULT
Speed Resolution
cm/sec
mm/sec
Cad Override
On
Off
Service Loop
On
Off
Coodinate System
Long X
Long Y
Center
Rotate 180
Mode
Cut
Draw
Pounce

CUTTER PERFORMANCE

The 800 Plus Series Vinyl Cutter's performance is controlled by many parameters including Force, Up Speed, Down Speed, Load Speed, Acceleration and Offset. The values of these parameters are determined in the Set-Ups and have been optimized for the various tool and material combinations. *See either the Key Sequence or Function Command Summary in this guide for changing parameters.*

Down Speed The Down Speed (cut speed) is movement when the tool is in the down position (down led lit on the control panel). Low down speed is necessary for hot tip cutting. The maximum recommended down speed for roll material is 40. The down speed range may be set from 1 to 60 in cm/sec. *In most cases cutting and plotting will be increased when the CAD/CAS program is set to send ARCS.*

Up Speed The Up Speed is tool movement when the tool is in the up position (up led lit on the control panel). The maximum recommended up speed for roll material is 40. The up speed range may be set from 1 to 60 in cm/sec.

Load Speed The load speed is the rate at which material is transported during the load cycle and the service loop. The maximum recommended load speed for roll material is 20. The load speed range may be set from 1 to 40 in cm/sec.

Acceleration Acceleration is the rate at which a given speed is achieved. High acceleration will produce faster cutting when a graphic image has many short vectors (line segments). The maximum recommended acceleration rate for rolls is 04 because rates greater than 1 tend to cause tracking problems on roll material. The acceleration range may be set from 01 to 16. Setting 04 is equal to 1 g or 384 inches/sec/sec (975 cm/sec/sec).

Minimum Angle The Minimum Angle between vectors at which knife offset compensation (rotation) is performed. If this angle is below the minimum angle, no rotation is performed. If the angle is at or above the minimum angle, then compensation at the current offset value is performed. The lower this threshold (minimum angle) is, the more blade rotations the cutter will perform for a given image. Since blade rotations require time, the higher the minimum angle, the faster the machine will cut for a given image. Cut quality may suffer at high minimum angle settings. The machine default is 12°. The minimum angle range is 1 to 30°. This value can be saved in the programmable SET-UPS.

Arc Support Many CAS programs support output of arcs in their plotter driver. This feature may increase plotting speed of curves in text and graphics. Testing should be done to verify cut quality with your software and a typical cut job.

SOFTWARE NOTES

Paneling (Framing)

Model 800 Plus Series users have the choice to output drawings as a series of frames, or as one continuous drawing. To make a continuous drawing, simply set the frame size, in the design program, to be as large as the entire drawing size. For example, if a sign is 20 feet long, make the drawing size, *and* the frame (panel) size 20 feet long in the design software. For longer lengths, framing (paneling) is recommended.

Force Control - Gold Touch Cutting Head

Gold Touch Cutting Heads which are *not* factory installed must have flag byte 256 set in diagnostic 05. See diagnostic 05 for details on how to properly configure a machine's flag bytes.

Allen Datagraph Vinyl Cutters with the *Gold Touch Cutting Head* support software control of either 100 or 9 force steps. Your CAS software may not have the latest plotter driver to support this feature. In most cases, you can modify the CAS software to support 100 Steps of force control. If your CAS software does not support 100 steps of control, you may want to contact your dealer for information on software updates.

If your CAS software allows you to define the cutter "initialization commands", you can add the following information for 100 step control by software. (The front panel always allows 100 steps of control. You may need to set Cad Override On to maintain front panel control of force.) By sending the HPGL command BJ1 in the initialization string, the cutter supports FS 1-100 for 100 steps of control. Alternately, by sending the HPGL command BJ0 (B-J-zero) in the initialization string, the cutter supports FS 0-8 for 9 steps of control. Allen Datagraph 800 Plus Series Vinyl Cutter plotter drivers normally use force commands for 8 steps (FS 1-8). See the HPGL command summary for more detail on the command BJ - begin job. For more information on initialization strings, see the Setup Screen section that follows in this manual.

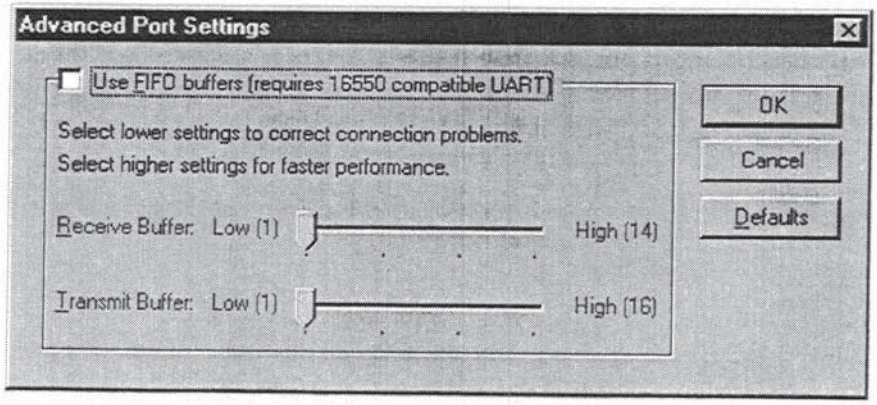
	grams	10	41	73	104	135	166	198	229	260	350	450	550	grams
Gold Head	FS 1-100	1	6	12	19	25	31	37	44	49	66	85	100	FS 1-100

Windows 95

Windows 95 by default enables the transmit fifo on the 16550 chip that controls the computer's serial interface. This setting can result in data loss during transmission to the cutter.

Symptoms of this problem include: cut jobs that stop before completed, cut jobs that cut random irregular patterns, and cut jobs that have cut lines in all directions from a single point

To change the setting: Click on Start; Drag to Settings; Click on Control Panel; Double Click on System; Click on Device Manager; Double Click on Ports (COM & LPT); Select port cutter is connected to; Double Click on Communications Port (Com1) Properties or Double Click on Communications Port (Com2) Properties; Click on Port Settings page; Click on Advanced; Click on the Use fifo buffers box so that there is no check in the box; Click OK, OK, Close, etc. to exit the dialog boxes.



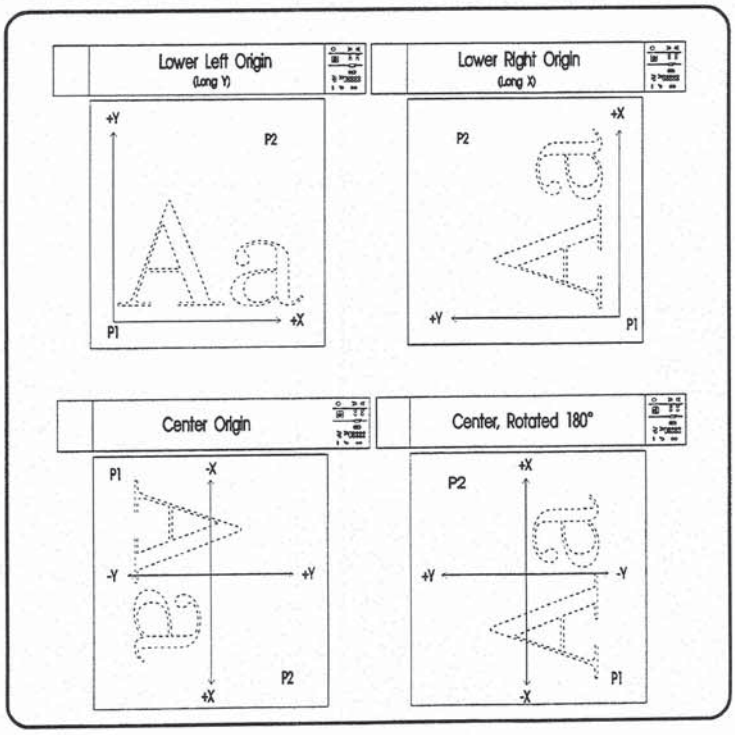
Cutter Driver Emulation

The 800 Plus Series Vinyl Cutter is designed to work with a wide variety of software. In general, if a Model 800 Plus Series plotter driver is not provided with your CAD/CAS package, the machine is compatible with software configured for the Roland CAMM-1, Hewlett Packard 7585/86, Gerber GS/HS 750 or Ioline. Refer to the following table for software setup guide lines.

Software	Driver	Normal Origin	Notes
AutoCad	HP7585,6 (MS Windows)	Center, Rotated 180	Set 9600,e,7,1 Set old OH plotter response (diagnostic 4, 5)
CASMate	Allen Datagraph	Lower Right (Long X)	
CorelDRAW	HP7585,6 (MS Windows)	Center	Use standard media sizes only
FlexiSIGN	Allen Datagraph	Lower Right (Long X)	ARC support on speeds plotting
Graphix Advantage	Allen Datagraph	Lower Right (Long X)	Use Cad override to adjust speed
LetterArt	Allen Datagraph	Lower Right (Long X)	May use CAMM-1 driver
SignLab (Cadlink)	Allen Datagraph	Lower Right (Long X)	ARC support on speeds plotting
SignPost	Ioline, use Allen macros	Lower Right (Long X)	Set DMPL on. (diagnostic 5, add 64 to flag byte)
Sign Wizard	Allen Datagraph	Lower Right (Long X)	ARC support on speeds plotting

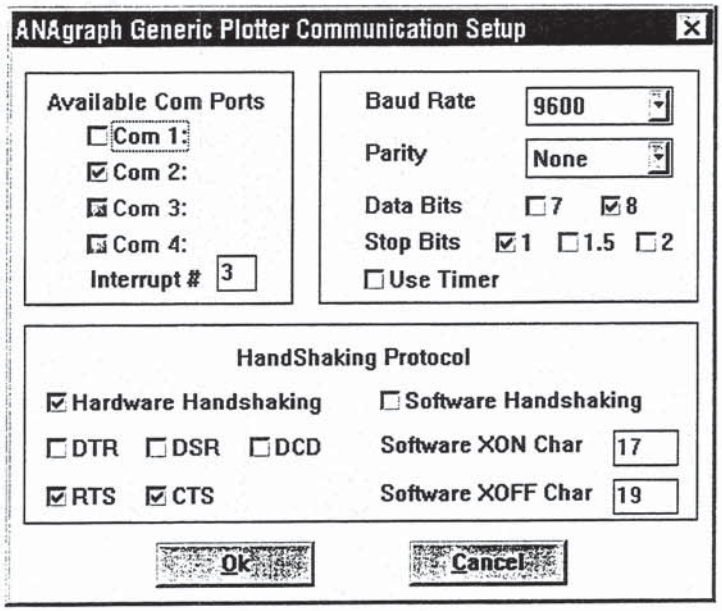
Plot Origin (Coordinate Systems)

The 800 Plus Series Vinyl Cutter has four origins to allow flexibility when using various CAD/CAS systems. The Model 800 Plus Series is shipped with the LONG X coordinate system in FACTORY SET-UPS 1-6 and is compatible with CAMM-1 plotter drivers. The FACTORY SET-UPS must be modified to be compatible with the HP 7585/86 plotter drivers which use the CENTER or the CENTER ROTATED 180° coordinate systems. Any coordinate system may be loaded and saved from the control panel. "P1" is tool position when material LOAD is done.

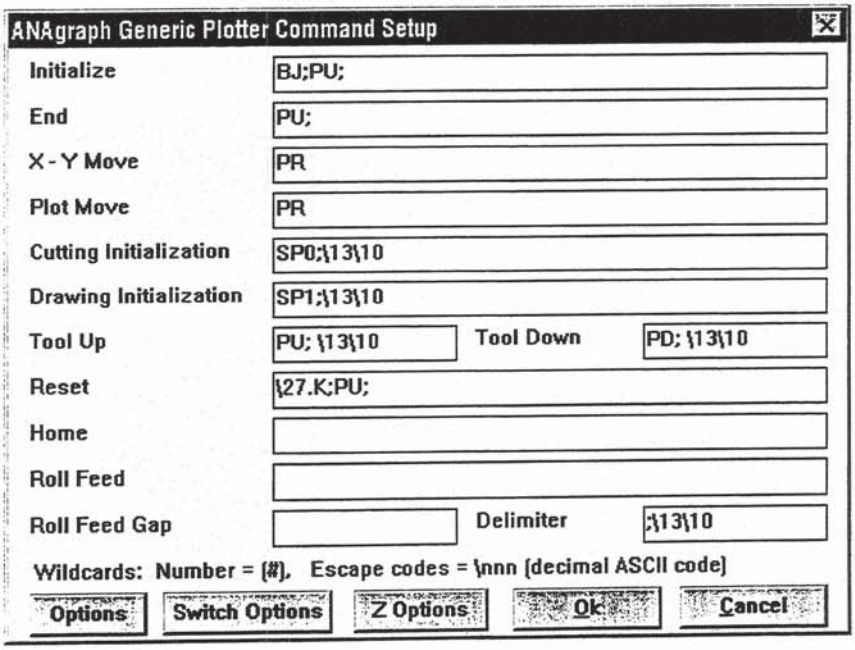


800 Plus Series Coordinate Systems

Anagraph Design Art Setup Screens



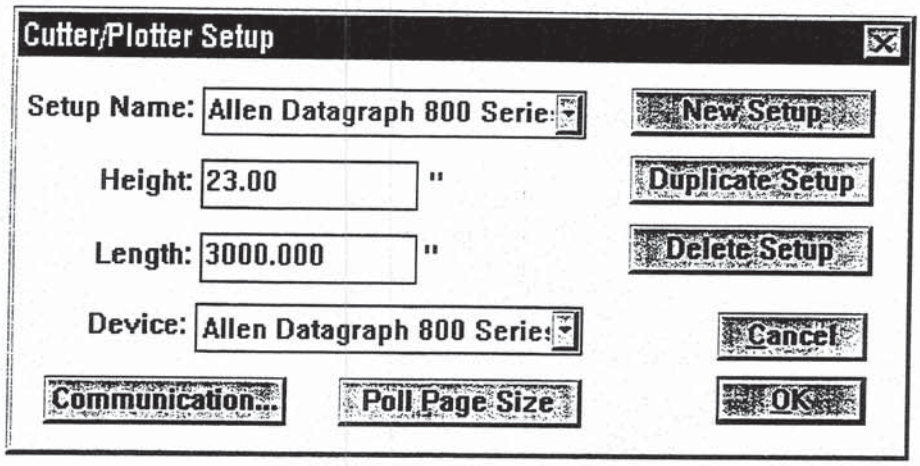
Use **Comm 1** instead of **Comm 2**, if appropriate.



For Gold touch models, use **BJ1** instead of **BJ** in order to control 100 steps of machine speed.

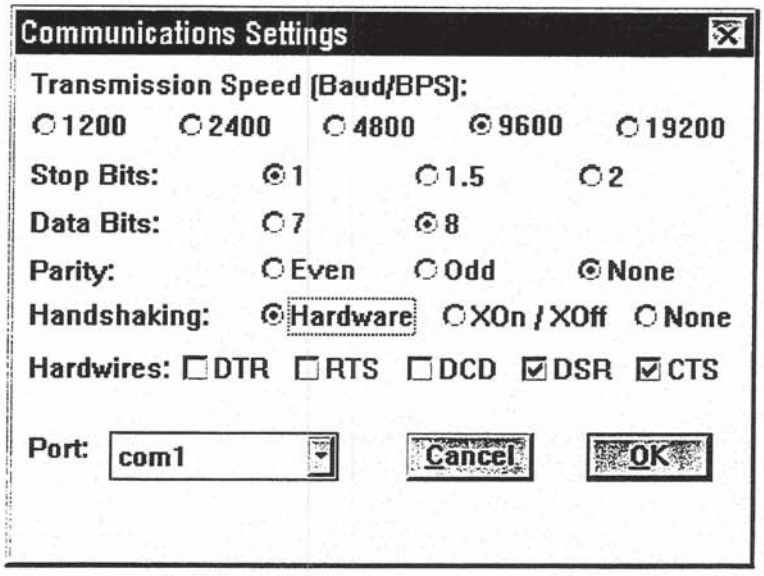
FlexiSign PRO Setup Screens

On the computer keyboard, hold the "Ctrl" key and select the cutter setup icon from the cutting tool palette for the following screen.



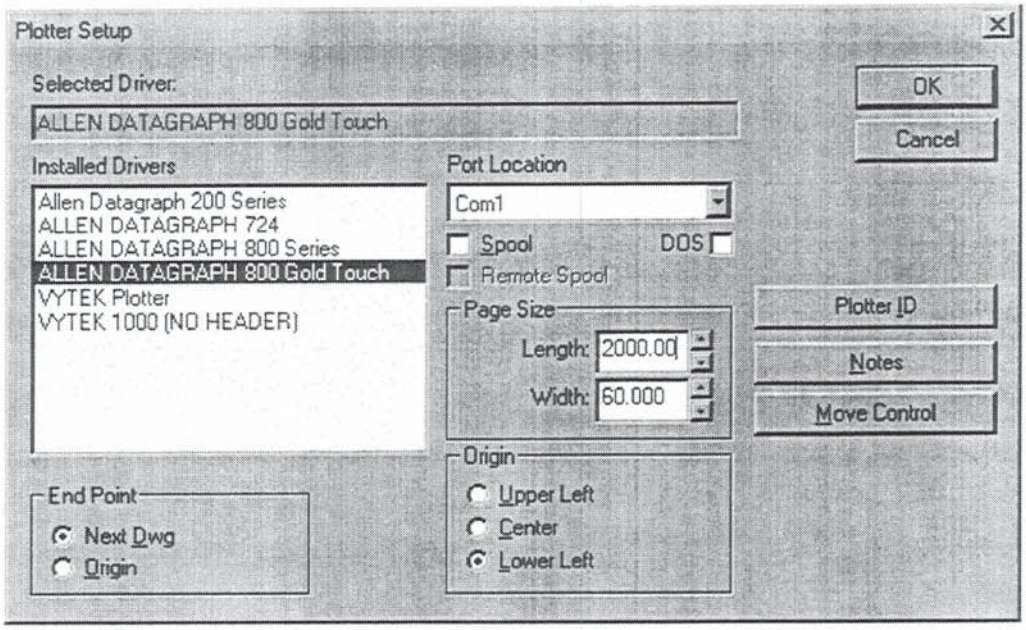
Set Height according to model size less 1 inch.

"Poll Page Size" will change the value of the "Length". The "Length" determines the panel size FlexiSIGN will use. For a panel (frame) size greater than 24 inches (the plotter's default), manually enter a value in the "Length" field and do not use the "Poll Page Size" feature.

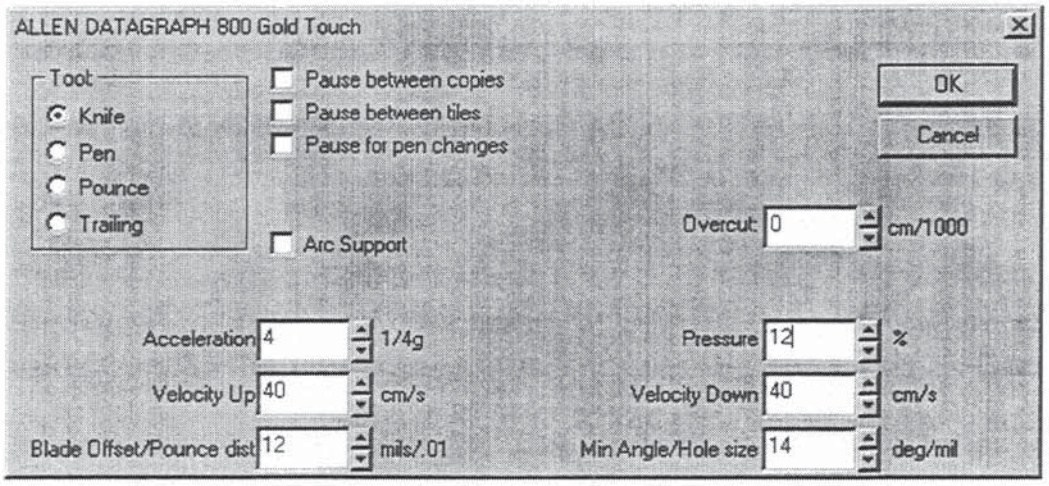


SignLab (Cadlink) Setup Screens

From the menu bar select "CUT". From the CUT menu select "Plotter Setup" for the following screen. *If you have a Gold Touch Cutting Head, select the Allen Datagraph driver labeled "100 Step Force."*



Set Y page size to be at least 1 inch (25 mm) less than the size of the material loaded in order to accommodate the pinch wheels.



The Tool selection will toggle the cutter's front panel MODE for cut (C) with Knife, draw (D) with Pen and pounce (B) with Pounce. Trailing is not normally used since the 800 Plus Series Vinyl Cutters perform trailing blade offset in the Cut Mode.

Arc support may increase cutting speed with some files. Test should be done for cut quality.

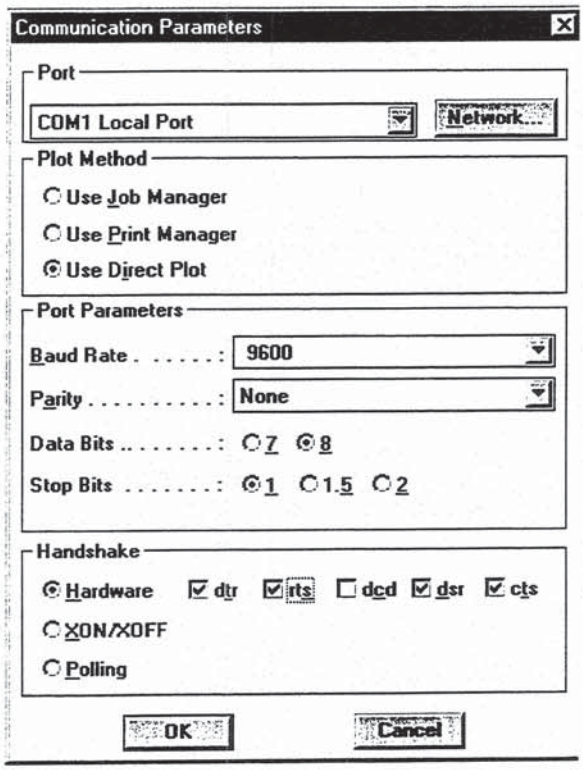
Presure is the cutter front panel "force" value. Velocity Down is the cutter front panel "Speed" value.

CASMATE Setup Screens

Select the ALLN8xx or ALN8xxGT driver from the list of available plotters. Set as the default plotter if this is the primary or only plotting device that you will be using.

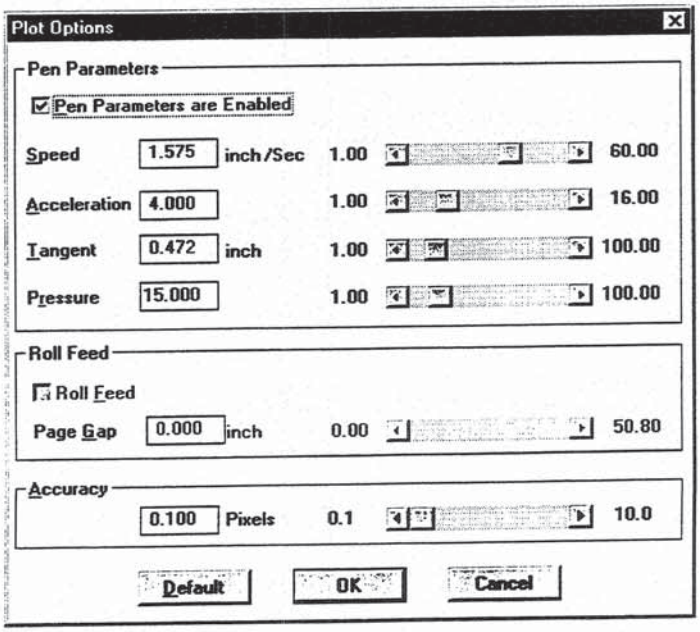
Communications button

Set the port to match your computer/plotter configuration.

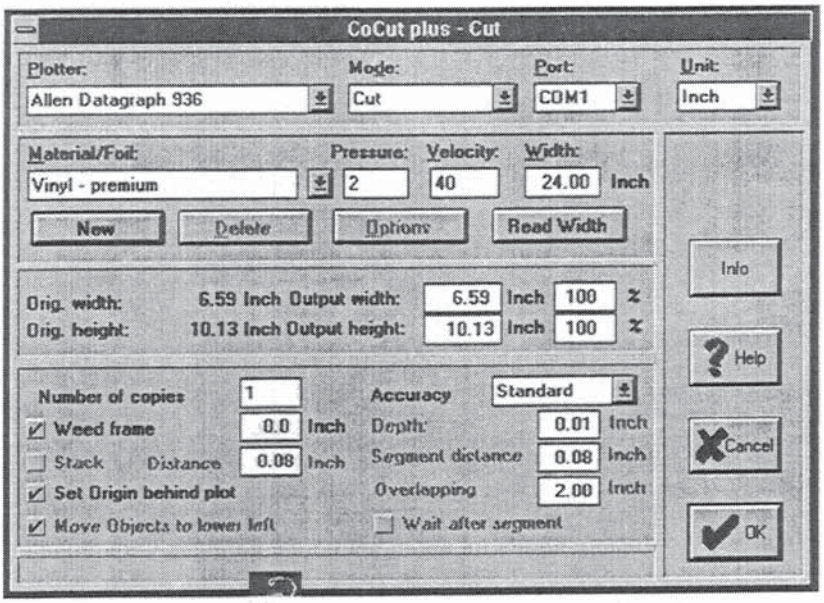


Plot Options

For computer control of the 800 Plus Series Vinyl Cutters, CAD Override must be turned Off. Below, Speed is actually 15.75 inches per second for this setting. Tangent refers to knife offset and the default value of 0.472 inches corresponds to the cutter's default of 12. The Pressure of 15 below is for an 800 Plus Series "GT" (Gold Touch) model.

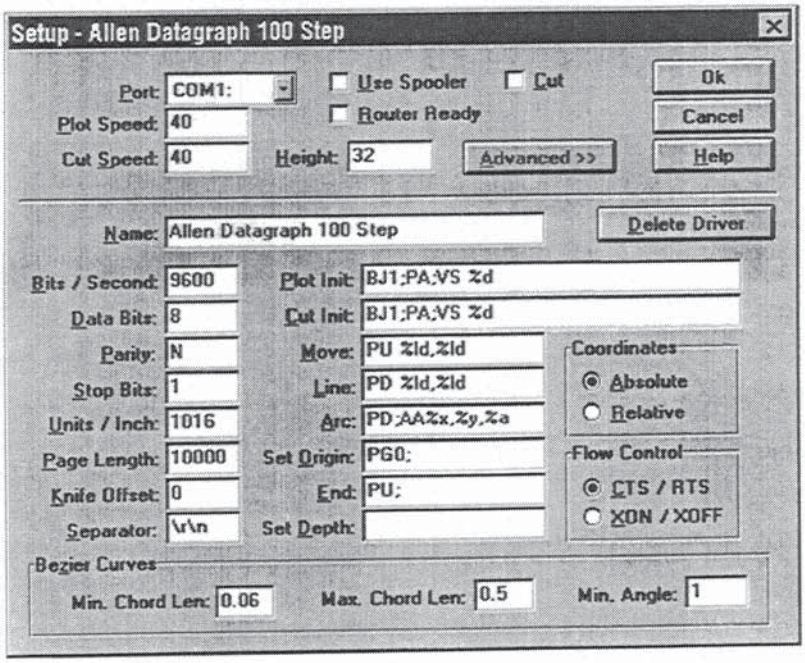


CoCut Setup Screen



Set the port to match your computer/plotter configuration. Set the width to match your 800 Plus Series model size.

Sign Wizard Setup Screen



Set the height to be at least one inch smaller that the size material you have loaded in order to allow for the pinch wheel margins and to ensure correct vertical paneling. Set the port to match your computer/plotter configuration.

Cad Override

The following hpgl commands are ignored when the cad override feature is enabled (Bypass LED on):

AS	set acceleration
FS	set force
KA	set minimum angle or pounce hole size
KN	set knife offset or pounce distance
IP	input P1/P2
RO	rotate
SC	set scale
SP	select pen
ST	select tool
UV	up velocity
VS	down velocity

In addition the speed, velocity, and acceleration are not changed at the beginning of the confidence test.

If a user loads a setting with Cad Override on. The only way to change any of the above settings is to change the setting from the front panel, reset cad override or load a new setting with cad override disabled.

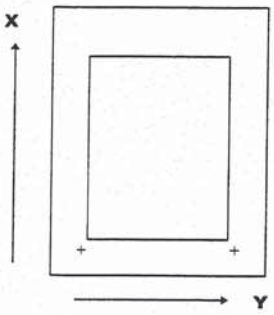
CALIBRATION FOR CONTOUR CUTTING

This procedure can be used to improve the accuracy of contour cutting. Color printers are not as accurate as the cutter. This procedure matches the cutter calibration to the color printer calibration so that contour cuts are correct. Steps 1-4 create a printed page used to measure the calibration of the printer. Step 5 draws around the contour to allow measuring the calibration of the cutter. Steps 6 and 7 measure the rectangles printed and drawn. Steps 8 and 9 change the cutter calibration to match the printer. *See Diagnostic 07 and 08 for more information on calibration your vinyl cutter.*

This procedure is not necessary if using a CAS program such as SignLAB 5.0 which digitizes 3 alignment points in order to perform "triangulation." Triangulation allows the CAS/Cutter system to correct for both scaling (calibration) and skew (loading of material) without additional calibration of the printing or cutting devices.

If you have access to a modem and you are using SignLAB, you can down load the SignLAB drawing instead of making the drawing as described in steps 1-3. The file printcal.cdl is made as follows:

1. Set blank size or frame size of a new drawing 8.5 inches wide and 11 inches high. Using your CAS program to draw a rectangle that is exactly 6.5 inches wide and 7.5 inches high. Position rectangle so that lower left corner is and (1, 1).
2. Add registration marks that are sized .25 x .25 in lower right and lower left of square with a 0.25" offset. This will put the registrations marks exactly 0 inches apart in x and 7 inches apart in y.
3. Draw a second rectangle that is 10 inches high by 7.5 inches wide positioned at (.5,.5). Use a different color. Your drawing should look something like this.



4. Print the drawing. If you are using SignLAB, set options as follows: (Set print margins to zero. Set print options: clip separate colors only. Set print mode to all.)
5. Load a piece of 8.5 x 11 inch piece of paper with long part of rectangle going in and out of cutter. Use your CAS program to draw the above drawing using the cutter.
6. Measure the square output by the printer. These will be the requested values. In my case I measured width of 6.5 and height of 7 7/16 or 7.4375.
7. Measure the square drawn by the cutter. These will be the actual values. In my case I measured 6 7/16 or 6.4375 wide and 7 9/16 or 7.5625.
8. Next start calibration diagnostic 7. On model 8xx press the following keys: function, 3, 0, 7, enter. On model 724 or model 2xx use a terminal program to bring up remote panel. Select 8 for setup, 19 for diagnostics, and 0, 3, 0, 7, enter.
9. Enter calibration correction factors into diagnostic 7. The order of entry is as follows: (request x, actual x, request y, actual y). So for the example you would enter the four numbers: (74375, 75625, 65000, 64375). Follow each number by the enter key. Ignore decimals and enter same number of decimal digits for each number.

Notes:

Type 99, enter to exit diagnostics. **1.)** If you get an E37 (invalid calibration constants) you made a mistake. Run diagnostic 8 to reset calibration and restart procedure at step 4. **2.) When** placing registration marks they should be both on the bottom or both on the side. This allows correct rotation to be performed.

Communications Trouble Shooting

Communications Tests

See Diagnostic 06 for testing the cutter's serial communications and the RS-232 Serial plotter cable provided by Allen Datagraph with your cutter.

Alternately, this test checks the vinyl cutter (or pen plotter) serial communicates with a PC (IBM type). Your machine was supplied with a serial cable as well as the diskette "Firmware Utilities" which contains the (2) files needed for this test: *SEND* and *THANKS*.

To run the test, make sure the plotter cable supplied with your machine is plugged into the computer serial port and into the vinyl cutter. The cable is about 25 feet long and has a 9 pin connector on the computer end and a 25 pin connector on the cutter end. A 9 to 25 pin adapter is supplied to connect to computers that have only a 25 pin port available. Note which computer COM port you are using. If your computer has an mouse plugged in to a COM port via a 9 pin adapter and a fax/modem or a digitizing tablet, you probably do not have a COM port available. If this is the case, arrange to remove one of those devices to make room for the cutter. (A bus mouse or removal of a fax/modem are the usual solutions). **Connect the cable to the SERIAL A connector.**

With the cable plugged in, power on your cutter and allow it to initialize. Load paper or vinyl as well as a pen or knife blade. Press the LOAD button. The machine will scan the material and indicate the sequence is complete by lighting the LOAD LED. The ON-LINE LED will also light to indicate that the machine is ready to receive data.

Next, exit Windows to a DOS prompt. For Windows 95, it is best to "restart the computer in MS-DOS" mode rather than running the program in a window. After the machine is restarted in the MS-DOS mode, you should see a c:\ prompt. Insert the Firmware Utilities diskette in the A drive of the computer. **Type the following lines, each followed by ENTER:**

```
a:\
send thanks com1
```

or if the cutter is on com2, type

```
a:\
send thanks com2
```

The diskette light will light and the PAUSE LED on the cutter front panel will blink to indicate data is being received. The following 5.5 x 18 inch (14 x 46 cm) plot will be produced.

Thank you for your business!

We would like to hear from you.

800-258-6360

SERVICE

CLEANING

The regularity with which the plotter needs to be cleaned is dependent on the usage, as well as the climate and contaminants in the plotter's environment. It is recommended that the following cleaning steps be done at least as often as indicated for each procedure.:

1. **Biweekly**. Clean the grit wheel surface with a stiff bristled (not wire) brush to remove any media particles that may have built up during plotting. Brush the surface of the grit wheel while turning the grit wheel by hand so the entire surface of the grit wheel is cleaned. CAUTION: Be sure to disconnect the plotter from the power source while cleaning the unit. Keeping the grit wheel clean is important so the plotter will hold the media accurately.

2. **Biweekly**. Clean the paper sensors located by the right pinch wheels. There is a front paper sensor and a rear paper sensor located several inches from each other. Each of these paper sensors should be wiped with a clean, dry cotton swab to remove any dust. If these paper sensors are not kept clean, the plotter may fail to accurately sense the size of the material and drop it.

3. **Biweekly**. The outer surfaces should also be kept clean. If necessary, a mild cleaning solution on a damp cloth can be used to gently wipe the surfaces clean. It is suggested that a mild soap and water be used with a soft cloth. This solution works well on all painted surfaces . CAUTION: Do not use any abrasive cleaners as they will cause the paint to blister.

4. **Biweekly**. Wipe media-related dust from the set of polyurethane pinch wheels by using a soft cloth.

5. **Monthly**. Inspect the internal circuit board assemblies and clean accumulated dust as necessary. Be certain that the plotter power is off. Observe static discharge safety procedures that may damage sensitive electronic components. Wear a grounding strap connected to earth ground. Wear saftey glasses to protect eyes. Open front panel and remove circuit board assemblies and clean one at a time and use compressed air to remove dust and debris. Replace to original location and make certain that the boards and any connectors are well seated. Replace the front door so that the foam on the chassis cover applies pressure to the circuit cards in the rack.

FIRMWARE UTILITY DISKETTE

The Firmware Utility diskette contains two main features:

1. The Utility program for managing machine settings.

   All the functions of the Utility program can also be performed from the 800 Plus Series Control Panel.

2. A current revision of firmware.

   "Firmware" is software that controls the machine functions. *The firmware on this disk is provided for update purposes only and should not be installed on new machines.*

The Utility Program

The 800 has many settings for machine control which can be accessed by the machine's control panel or the Utility program (file name front.trm). *Use the serial cable supplied with the cutter and connect it to the Serial port A.*

To run the Utility program on a Windows PC, follow the installation instructions in the next section of this manual. The READ.ME file on the diskette provided with your vinyl cutter has a copy of these instructions. Windows 3.1 Terminal.exe is required.

For a non-Windows computer or a Windows PC running a communications program other than the Utility program, the Utility menus may be accessed with any RS-232 serial communications program. The following commands have keyboard equivalents as shown. The commands "esc" and "control" are single keys on the computer keyboard.

Initialize	esc.a esc.)
Terminate	esc
Reset	control c
Exit diagnostics	control b

Machine Control by the Utility Program

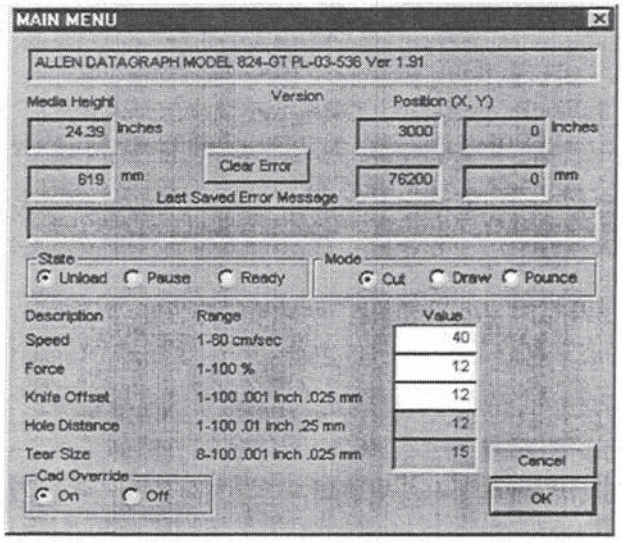
The Utility program is divided into three menus for control of all functions; The Main Menu, Setup Menu and Diagnostic Menu.

Main Menu

The Main Menu is accessed by beginning the Utility program.

Press the MAIN button on the top of the window to generate the screen below.

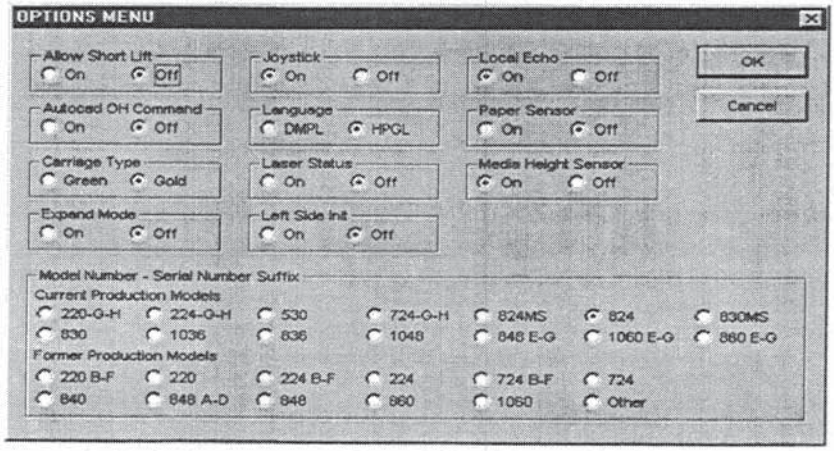
It is necessary to close the Utility Program to return to normal cutter operation. Select File and then Exit from the Window Menu Bar.



OPTIONS Menu

The Options Menu allows the user to activate or deactivate certain features within the machine. These features include the Media Height Sensor(Reed Switch), Media sensors, and Joystick.

This menu is important in case one of the features listed above should happen to become damaged or fail. For example, if your media height sensor should get damaged, you would go into your options menu and click the OFF button next to MEDIA HEIGHT SENSOR. This will allow you to keep working until the problem can be repaired.



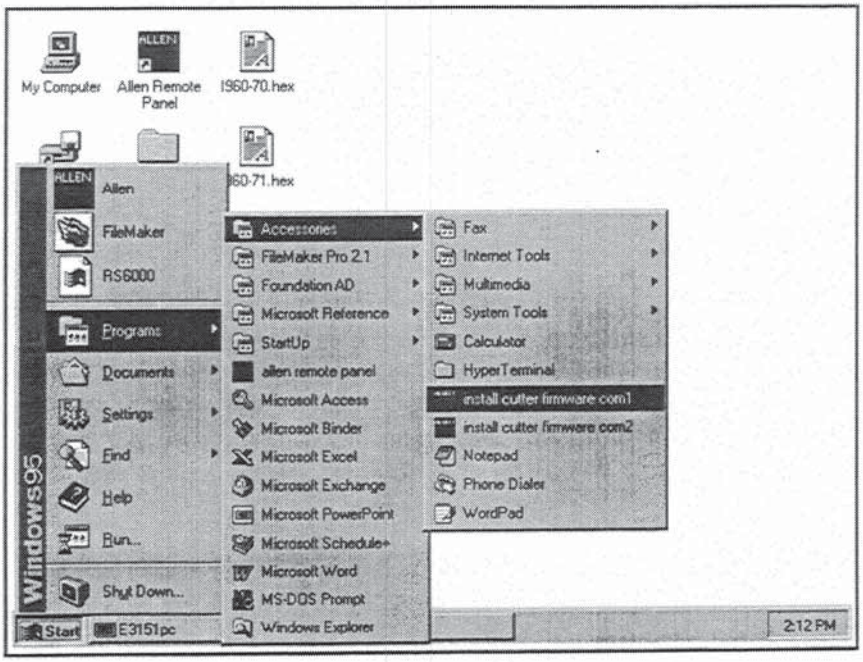
FIRMWARE UPDATE FOR WINDOWS 95/NT

Your Allen Datagraph Vinyl Cutter was supplied with a diskette (p/n) PL-00-03-533). The label on the diskette indicates a version, such as A1.72. The diskette is to be used with the Windows 95/98 "Add/Remove Programs" program located on the Windows 95/98 Control Panel. Install the Allen diskette in your computer and run Start, Settings, Control Panel, Add/Remove, Install, Next. Follow the Install Wizard instructions and choose Typical. Select Next until the installation to computer is complete.

An alternative method to install is to insert the diskette, show a file listing for your floppy drive (usually a:\) using the My Computer icon. Next, Double click the Setup icon with the computer and diskettes. Again, choose the custom and select all items.

When installation of the diskette is complete, you will find that the Start, Accessories choice contains "install cutter firmware com1" and install cutter firmware com2". With the Allen Datagraph Serial cable attached to the cutter Serial A and to your computer, turn the cutter power off. Hold down the LOAD button while turning the cutter power back on. Your display will read A38 at the end of its power up sequence. Now select either "install cutter firmware on com1" if your cutter is attached to your computer's com1 port (or select "install firmware on com2" if your cutter is installed on com2.

Your computer will launch "txflash" in a DOS window and display information about the upload process, including a progress monitor. The monitor indicates how many of the total blocks have been sent. An example of the progress monitor is 100/5200 where 100 blocks have been sent out of a total of 5200. When the process is complete, the cutter will reinitialize and be ready for use.



* Cutters must have a "-A" serial number suffix, or higher for this procudure.Cutters whose serial number does not have a "-A" or higher suffix need to request the Windows 3.1 firmware update diskette from Allen Datagraph's Technical Support.

Firmware Update Procedure - Windows 3.1, DOS, MAC

Firmware updates will be available for the 800 Plus Series of vinyl cutters from time to time. These updates will either provide additional features as they are implemented or correct a problem in the machine function. The update can be in the form of a diskette or may be "downloaded" from Allen Datagraph's BBS (bulletin board service) via modem with the use of a terminal program such as the one provided with Microsoft Windows 3.1. The BBS is 9600 baud, no parity, 8 bits and 1 stop bit (9600,n,8,1) at 303-363-0692. Once the firmware revision has been downloaded by modem and if necessary uncompressed using pkunzip (or comparable program), the information (firmware) is then copied from a computer to the vinyl cutter's FLASH memory by the following procedure:

1. Determine your cutter's serial number. For Machines with a serial suffix "-A" or higher, you will use the file i960a.hex. *For older machines with out a letter suffix, you will use the file i960.hex.*
2. Power on cutter with the LOAD button pressed.
3. When the cutter displays A37 or A38, connect the plotter serial cable from computer to B port.
4. Copy the diskette to the computer hard drive. On DOS computers, change to the directory where software was copied. Run the TXFLASH program for the appropriate hex file (see step 1). The command syntax is: **txflash com1 i960a.hex** *(txflash com1 i960.hex)*

or 4. On MAC computers, use a terminal emulator. Set the baud rate to 38400, no parity, 8 data bits, and 1 stop bit. *A baud rate of 19200 is also supported by pressing VIEW instead of Function at power up.* Use **Xmodem protocol** to upload the file **i960a.hex** *(i960.hex)*to the cutter.

5. Auto programming sequence should take place. At question (Is it ok to erase flash memory?) Verify that the number of records and blocks on the computer screen are correct before pressing "y" to question.

NOTE: If 824 is flashing after firmware upgrade, enter the cutter model number and press ENTER. The installation of new firmware will not change the user parameters stored in the EEROM. These parameters include the Setups 1-6, model type, load length, etc.

Pinch Wheel Maintenance

Pinch wheels are critical to the 800 Plus Series' material handling performance. They should be inspected for wear regularly and cleaned as needed. To clean adhesive off the pinch wheels, simply use a soft cloth and denatured alcohol.

In normal use, the pinch wheels will need to be replaced in time. Also, they can be damaged by trying to move them when they are in the down position. The 800 Plus Series vinyl Cutter's confidence test (diagnostic 02) gives a good indication of pinch wheel performance. If material does not track well and guide alignment has been verified, the pinch wheels may need to be replaced. For best tracking results, replacement pinch wheels should be replaced as a SET.

If your machine has 3 pinch wheels, the center one may not have to be replaced at the same time as the others, as this wheel has a lighter duty spring than the outer ones and tends not to wear as fast.

To Check condition of pinch wheels:

1) Inspect condition of rubber- The rubber wheel should not have any cracks and should be securely adhered to the aluminum hub of the wheel. The transition from the flat surface of the wheel to the "sidewall" edges of the wheel should be sharp and not rounded.

2) Inspect integrity of pinch wheel bearing- This is done by having the pinch wheels in the up position. Spin wheel with finger, and observe whether the bearing has a dry sound or not. If it appears to be dry, the wheels should be replaced.

MECHANICAL ADJUSTMENTS

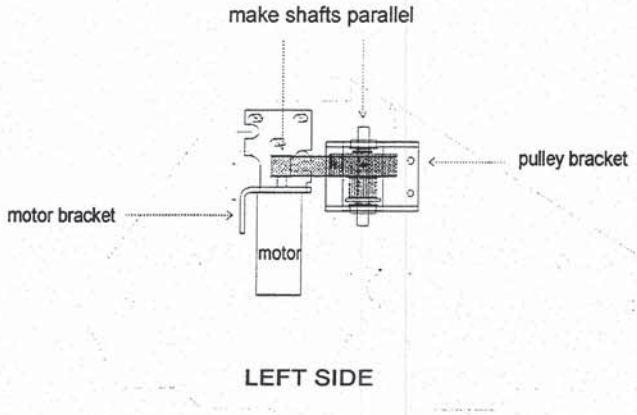
Belt Tension

The 800 Plus Series servo motors use timing belts to control the material (X axis) and tool (Y axis) positions. The belt tension and wear should be inspected if cut quality deteriorates. To inspect the belts, move the pods to the service position by removing each pod and reattaching the two inside pod screws to the two outside base tray positions.

Left Pod Belt

The Y axis short belt runs between the Y axis servo motor and a gear assembly. To adjust the tension of this belt, it is necessary to reposition the motor bracket.

1. Loosen the three Phillips head motor bracket screws and apply hand pressure to tighten the belt so that the belt will deflect 0.050 inches at the center when 23 ounces are applied. (1.3 mm when 660 grams are applied).
2. When the belt is tight and the motor shaft is **parallel** to the bearing shaft, tighten the three Phillips head motor bracket screws. *Premature belt failure will occur if these two shafts are not parallel .*
3. Verify tension.



Right Pod Belt

The belt inside the right pod drives the grit wheel (X axis). To adjust the tension of this belt, it is necessary to reposition the motor.

1. Loosen the two motor bracket screws and apply hand pressure to tighten the belt so that the belt will deflect 1/16 inch at the center when 23 ounces are applied. (2 mm when 660 grams are applied). (Replace belt if damaged or worn).
2. When the belt is correctly tensioned, tighten the two motor bracket screws.
3. Verify belt path and tension.Check that the large gear turns freely.

Long Belt

The long belt is adjusted using a lead screw located in the right pod. To set the long belt's tension:

1. Move the left pinch wheel at least 12 inches (30 cm) away from the left side plate (black).
2. Position the carriage so that the center of the knife is 5 5/8 inches (143 mm) from the left side plate (black).
3. Adjust the lead screw so that the belt will deflect 0.035 inches at the center when 7 ounces are applied. (0.9 mm when 200 grams are applied).
4. Set the lead screw lock nut.
5. Verify belt path and tension.

POWER UP SEQUENCING CODES

To aid in diagnosing problems on CPU boards the BOOT loader will display on the front panel an auto power up sequence code as it runs diagnostics on the CPU. The codes below are displayed in the mode, speed, and force display.

A01 Set upon power up.
A02 Set after zero of BSS
A03 Set after move of constants to RAM
A04 Set after copy of interrupt table from ROM to RAM
A05 Set after copy of PRCB from ROM to RAM
A06 Set after reinitialize with RAM copy or interrupt table and PRCB
A07 Set after call to IO_INIT
A08 Set after call to disable all interrupts
A09 Set after start to execute not in interrupt mode
A10 In boot main
A11 After keyboard scan
A12 After flash init
A13 After CRC computed on flash memory
A14 Dram diagnostic running
A15 Dram diagnostic failed
A16 Flash diagnostic running
A17 Flash diagnostic failed
A18 Eprom diagnostic running
A19 Eprom diagnostic failed
A20 Serial diagnostic running
A21 Serial diagnostic failed
A22 Console opened (flash crc does not match or key pressed during power up)
A23 Diagnostics complete
A24 Diagnostics complete starting code in flash memory
A25 NMI interrupt occurred during boot
A26 Servo interrupt occurred during boot
A27 Parallel interrupt occurred during boot
A28 Reserved fault occurred during boot
A29 Trace fault occurred during boot
A30 Operation fault occurred during boot
A31 Arithmetic fault occurred during boot
A32 Real arithmetic fault occurred during boot
A33 Constraint fault occurred during boot
A34 Protection fault occurred during boot
A35 Machine fault occurred during boot
A36 Type fault occurred during boot
A37 Flash CRC does not match waiting for hex file containing correct flash memory image.
A38 Operator requested to down load new flash memory code by pressing key during power up.
A39 Flash code running
A40 Flash code zeroed BSS
A41 Flash code moved constants to RAM
A42 Flash code moved interrupt table to RAM
A43 Flash code moved PRCB table to RAM
A44 Flash reinit executed the Flash copy of interrupt table and PRCB in RAM
A45 Flash completed I/O init
A46 Flash disabled all interrupts
A47 Flash executing not in interrupted state
A48 Starting main routine in flash.

ERROR CODE LISTING

If the internal microprocessor detects an error condition the letter E and a 2 digit code will be displayed on the control panel. Any key pressed after the error is displayed will place the machine in the diagnostic mode, indicated by a flashing "D" on the control panel. Recommended diagnostic procedures (D##) are listed in the error description.

Panel Display	Error Description
NONE _	all panel lights off - check PCBs loose in socket, fuses on main and power amp PCB, 115/230 VAC switch in wrong position, front panel PCB disconnected, loose cable from power supply to motherboard PCB.
000 ___	power up display - check PCBs loose in socket,+ 5 volts, + 15 volts, + 32 volts, micro PBC dead, boot eprom not valid (U6, 13).
E03 ___	pause switch on
E09 ___	waiting for first vector to complete
E12 ___	buffer overflow; communication, escape, down loadable character, or polygon buffer
E13 ___	too many parameters in the escape command
E14 ___	invalid character in escape command
E15 ___	escape command not implemented
E16 ___	escape command parameter out of limits
E29 ___	pinch wheel motor or switch malfunction - D25.
E30 ___	no media covering paper sensorsor media sensors dirty. Clean front and rear media (paper) sensors with soft swab.- D26, 27. See D05, Flag byte 512 - Emergency mode.
E32 ___	reed switch sensor malfunction - D24. Or pinch wheel under carriage too close to side plate. Move pinchwheel away from sideplate. See D05, Flag byte 512 - Emergency mode.
E33, 34	front, rear paper sensor malfunction - D26, 27. See D05, Flag byte 512 - Emergency mode.
E35 ___	(Models 830 and higher) Pinchwheel positioned on an uncoated section of gritwheel. Reposition movable pinchwheel. (All Models) Right hand pinch wheel may be improperly situated or pinch wheel under carriage too close to side plate. Move pinchwheel away from sideplate.
E36 ___	bad control panel key received - D31.
E37 ___	bad calibration constants D08, then D07 (optional).
E40 ___	HPGL command parser error
E56 ___	RS-232 device overrun
E57 ___	RS-232 framing error. Plotter communications default for serial A port is 9600,n,8,1. set software to match these parameters of change plotter with D4. For Gerber emulation, use Serial Port B.
E58 ___	RS-232 parity error
E59 ___	EEROM checksum error
E61 ___	servo timeout.Cutter software error or servo PCB failure - D10. Check earth ground. Prevent electrostatic discharge.
E62 ___	servo motor over-current. Check servo adjustment, Power amplifier pcb and servo motors - D11. Reed switch may not have been detected on first move after power up. Reposition carriage between pinch wheels and repower - D24.
E63 ___	voice coil over-current - D11, 38. Check earth ground. Prevent electrostatic discharge while cutting.
E65 ___	EPO latch failure - D10.
E66 ___	timeout latch failure - D10.
E67 ___	voice coil current sensor failure - D10.
E68 ___	servo motor over-current sensor failure - D10.
E69 ___	EPO latch or EPO reset failure - D10.
E70 ___	motor over-current - power amp failed - D10.
E71 ___	voice coil over-current - pwr amp failed - D10.
E72 ___	motor over-current, DAC or analog failed - D10.
E73 ___	X-axis position counter failed - D10, 14.
E74 ___	Y-axis position counter failed - D10, 14.
E75 ___	X-axis encoder failed - D14.
E76 ___	Y-axis encoder failed - D14.
E77 ___	X-axis encoder detector failed - D14.
E78 ___	Y-axis encoder detector failed - D14.
E79 ___	position initialization error; either carriage didn't move or reed switch failed - D24. See D05, Flag byte 512 - Emergency mode.
E80, 81	Excessive position error - X axis, Y axis. This can be caused by speed or acceleration too high, jerking material from a heavy roll, bad calibration constants, power surge, servo motor / encoder failure - D14, servo PCB failure, power amplifier pcb failure, relay on motherboard or joystick failure. If joystick, see D05, Flag byte 512 - Emergency mode.
E82 ___	servo interface bus error
E83 ___	unexpected arithmetic fault
E84 ___	unexpected constant fault
E85 ___	unexpected interrupt
E86 ___	unexpected nmi Interrupt
E87 ___	unexpected machine fault
E88 ___	unexpected operation fault
E89 ___	unexpected parallel interrupt
E90 ___	unexpected protection fault
E91 ___	unexpected real arithmetic fault
E92 ___	unexpected reserved fault
E93 ___	unexpected servo interrupt
E94 ___	unexpected trace fault
E95 ___	unexpected type fault

DIAGNOSTICS

The 800 Plus Series firmware contains a set of resident diagnostics. When the 800 Plus Series is powered up, it automatically performs a self-test program to check all operating parameters. If a malfunction is detected, the letter "E" and a two digit error number will be displayed in the display window. The error numbers and the corresponding malfunction descriptions are given in the previous section. When an error is displayed and no obvious damage was done to the plotter, power off the cutter and repeat the procedure that caused the error display. If the error reoccurs, the user may push any key on the control panel to enter the diagnostic mode. Many errors automatically place the cutter in the diagnostic mode when a key is pressed. The user may need to call the ALLEN DATAGRAPH Service Department.

The fail safe system is designed to detect failures in the operation of the electromechanical system in the plotter and to prevent such failures from causing other damage. The plotter contains circuits which continuously monitor power supply voltages and the microprocessor system clock. The plotter will go to a hardware reset condition if these are not within normal limits. Over current conditions on X and Y axis drive motors, and the pen-lift and pen-force electromagnet (voice coil) are also monitored. An over current condition will cause a relay to open, cutting off power amplifiers from the drive motors and voice coil. In addition, a number of internal sensors are continually checked. If any potentially damaging errors are detected, the system will cause the fail safe circuits to open the relay and idle the plotter. The appropriate error code will appear, as mentioned above, in the pen display window on the control panel.

Diagnostic Operation

The diagnostics in the 800 Plus Series Plotter exist at several levels:

a. POWER-ON

b. CONTINUOUS HARDWARE AND SOFTWARE MONITORING

c. OFF-LINE

The POWER-ON diagnostics are performed at power-on or reset of the microprocessor and test the microprocessor, memory, servo analog and digital hardware, and some of the testable sensors.

After initialization, continuous hardware and software check the sensors and fail-safe monitors for machine malfunctions. If a malfunction is detected, an error code is displayed on the control panel display, the protection relay is opened, and the plotter ceases operation.

OFF-LINE testing is used for manufacturing and field service testing.

To Run Diagnostics

1. If the plotter is displaying a flashing error code on the front panel display, press any key to enter the diagnostic mode.

or

1. Turn plotter on and allow to initialize.
2. Press FUNCTION, 3 on the control panel.
3. To change diagnostics, press RESET on the microprocessor PCB.
4. Enter the Diagnostic # at flashing D, then press ENTER.

Diagnostic mode preempts normal cutter functions.

To Stop a Diagnostic

Press the key sequence FUNCTION, FUNCTION, CLEAR or press the reset button on the microprocessor PCB.

To Exit the Diagnostic Mode

To return to normal operation, run diagnostic 99 or press RESET on the Microprocessor PCB or restart the cutter power.

Customer Diagnostic Number Listing Table

02	Confidence Test Plot
03	Set Model Number
04	Communications initialization diagnostic
05	Set Flag Byte
06	RS-232 Serial communications diagnostic
07	Calibration of plotter
08	Write unity calibration constants in EEROM
12	DAC ramp generator with power amp disabled
24	Reed switch sensor test
26	Front paper sensor pair test
27	Rear paper sensor pair test
29	Control panel LED test
30	Control panel display test
31	Control panel button switches test
34	Display current knife height, Gold cutting head.
35	X-axis joystick test
36	Y-axis joystick test
37	Pen up/down test 1 - continuous
38	Pen up/down test 2 - on demand
43	Set Factory Default cutter Set-Ups
49	Set X, Y and Z servo balance values
58	Z axis field setup procedure

Diagnostic Descriptions

D02 - CONFIDENCE TEST

This diagnostic checks the plotting functions by means of an internal test pattern. The confidence test is an excellent way to test the stand alone functions of the cutter before interfacing it into the CAD/CAS system.

Before turning on the power to do the confidence test, it is a good idea to check the movement of the pen carriage. Slide the pen carriage completely to the right and then back to the left. It should slide consistently throughout the length without binding or rubbing. Move the pen carriage between the left and right pinch wheels before power on so that the sensors may be detected correctly.

Turn the plotter power ON and place a sheet of D (22x34 inch) or A1 (59.4 x 84.1 cm) paper in the plotter against the right side edge indicator. Position the movable pinchwheel as necessary. Lower the pinch wheel lever and use the joystick to position the front edge as far back as the sheet will go and still be held by the pinch wheels and cover the paper sensor cut out (oval hole) on the right side. Next, place a pen in the pen carriage.

Next, press the key sequencefor diagnostic 02:

(Function 3, 0, 2, Enter)

The CONFIDENCE TEST will begin and run until completed. Wait until the test plot is finished. Raise the pinch wheel lever to remove the test plot.

Registration

The confidence test just completed should duplicate the example in this book. The stars in each of the four corners check for registration accuracy. Only one line in each star should be seen and all lines of the star should be the same width, even though each star was drawn twice, once at the start and once at the end of the plot.

Also 3 registration boxes are drawn in each corner. The outer and inner boxes are drawn at the start of the test. The center box is drawn at the end of the test. This is a demanding test on the plotter. Even minor registration errors will show up in these boxes.

Line Quality/Backlash

The next item to check for is line quality. The lines on the circles should be smooth and have very little, if any, jitter.

Letter Quality

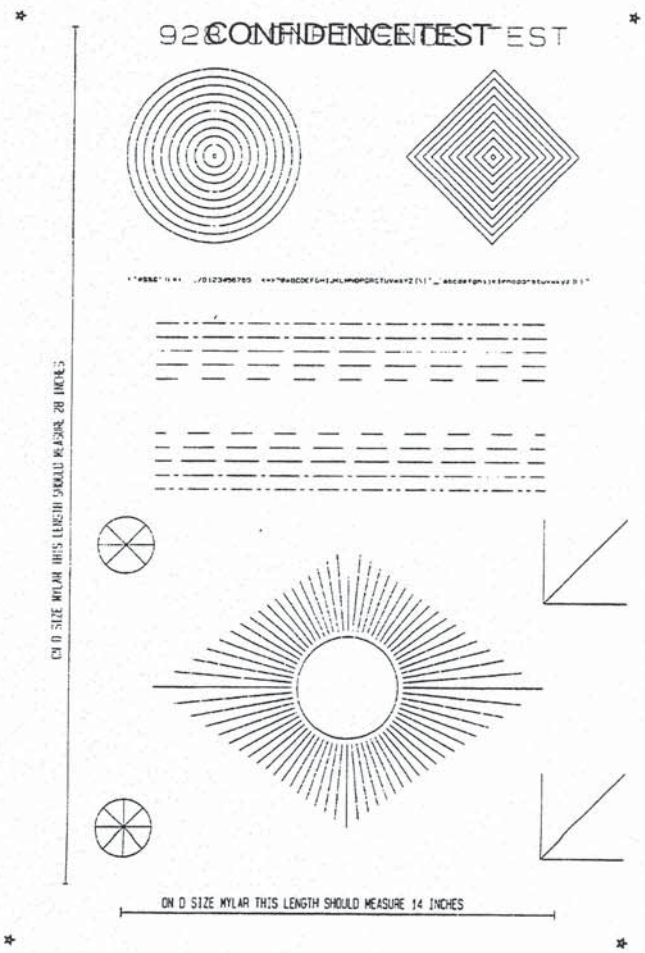
The sequence of letters and numbers should be examined next. Again, the letter quality should coincide with the quality of the test plot shipped with the plotter.

Pen Up/Down

Next, check the line patterns in the middle of the test plot. This checks the accuracy and adjustment of the pen up and down. Each row should be consistent throughout with no pen skipping. Check the bottoms of the circles and diamonds for closure. Also check the closure of the letters.

Straight Lines

Lay a steel rule against the two calibration lines. These lines should have no more than a 0.1% bow. E.g.. The middle of the 28 inch line must be less than 28/1000 of an inch from true straight.



D03 - SET MODEL NUMBER

Valid models are (824, 830, 836, 840, 848, 860 and 1824). Example key sequence to set model 824: Function, 3, 0, 3, Enter, 8, 2, 4, Enter.

D04 - SET COMMUNICATION PARAMETERS

Sets baud rate, parity, data bits, stop bits for RS-232 serial communications for Serial A only.

Supported baud rates: 200, 300, 600, 1200, 2400, 4800, 7200, 9600 and 19200.
Supported parities: None (code 0), Even (code 1), Odd (code 2).
Supported data bits: 5, 6, 7, 8
Supported stop bits: 1 or 2.

Diagnostic 04 will display present values for each parameter and prompt for the four parameters in order. Baud rate, parity, data bits, stop bits. Baud rates are displayed and entered divided by 100. Parity is entered by code. Example key sequence to set communication parameters to default settings of 9600 baud, no parity, 8 data bits, 1 stop bit.

Function, 3, 0, 4, enter <starts diagnostic>
9, 6, enter, 0, enter, 8, enter, 1, enter

D05 - SET FLAG BYTE

NOTE: The flag byte is the **sum** of the flags you want to set.

Function	Flag	Notes
Material handling mode flag		
Normal operation (default)	1	
Expand cut area flag		
normal margins (default)	0	
reduce margin 0.4 inch (10 mm)	2	
Plotter hardclip response		
OH command response for CAS (default)	0	
OH command response for ACAD	4	
Pen lift in draw mode flag		
normal pen lift (default)	0	
short pen lift for high speed pen plotting	8	Does not support wide markers.
Load orientation flag		
right side load sequence (default)	0	
left side load sequence	16	Paper sensors must be mounted on the left side.
Material Sensor flag		
Material Sensors ON	0	
Material Sensors OFF	32	
Plotter instruction language flag		
HPGL instruction language (default)	0	1016 units / inch ; 40 units / mm
DMPL instruction language	64	1000 units / inch ; *See Command Cross Reference.*
Cutting Head type flag		
Gold Touch cutting head (default)	256	GOLD Allen Logo on cover
Sensor Monitor flag		
Sensors monitored (default)	0	Media sensors and joystick active
Emergency operation mode	512	No media sensors or load cycle

Examples: The key sequence for setting flags to the default total value of **289** for 800 Plus Series Models is Function, 3, 0, 5, Enter, 289, Enter. This sequence enters diagnostic 05 (Function, 3, 0, 5, Enter) and sets normal margins, paper sensors OFF, right side load, computer aided sign making software (CAS) OH response, HPGL language and a **Gold Touch** carriage. The next keys (289) is the sum of the flag bytes (1+0+0+0+0+32+0+256+0=289). Enter completes the sequence.

D06 - RS-232 SERIAL COMMUNICATIONS DIAGNOSTIC

This diagnostic can determine whether the cutter's serial port is working without depending on a host computer. Using the supplied cables and adapters for the serial port and the minimum of additional widely available materials create a serial diagnostic This test can be run from the front panel will determine if the cutter's serial ports can talk to each other. If the diagnostic is successful the front panel display will count passes. Any errors detected will be displayed using the Exx format on the display.

The test cable will consist of 3 parts all plugged together as shown in the table below. Part 1 is the 25 pin to 9 pin AT cable as shown in column 1 of the table below that is shipped with each cutter. Part 2 is the 9 pin male to 25 pin female that we ship with each cutter as shown in column 2 of the table below. Part 3 can be purchased from a source such as Radio Shack p/n 26-243(a 25 pin male to 25 pin male) gender changer. This part is also available from most Computer stores.

Connect one end of test cable below to serial A and one end to serial B. Power on cutter. Press FUNCTION, 3, 0, 6, ENTER. Wait for pass count to increment or error to occur.

Tests to be performed in each pass: Turn off all LED's; Display pass count; Basic communication polling protocol; Open port A and B with 9600, n, 8, 1, no handshake; Send all chars from port A and verify all chars received from port B; Send all chars from port B and verify all chars received from port A; After send first char on serial a turn on load led; After send first char on serial b turn on unload led; After check if first char is present on serial b turn on pause/view led; After check if first char is correct on serial b turn on remote led; After check if first char is present on serial a turn on bypass led; · After check if first char is correct on serial a turn on rotate led; Hardwire hand shake; Open port A and B with 9600, n, 8, 1, hardwire handshake; Send random sequence of chars to port A which will cause buffer overflow. Then receive all chars from serial B and verify all chars received; Send random sequence of chars to port B which will cause buffer overflow. Then receive all chars from serial A and verify all chars received; After 1st transmit on serial A turn on out of limit led; After 1st receive on serial B turn on error led; After all receives on serial B turn on enter led; After all transmits on serial A turn on pen speed led; After all receives on serial B turn on pen force led; Xon-Xoff hand shake; Turn on pen up led; Open port A and B with 9600, n, 8, 1, xon-xoff handshake; Send random sequence of chars to port A which will cause buffer overflow. Then receive all chars from serial B and verify all chars received; Send random sequence of chars to port B which will cause buffer overflow. Then receive all chars from serial A and verify all chars received; Auto handshake; Turn on pen down led; Open port A and B with 9600, n, 8, 1, auto handshake; Send random sequence of chars to port A which will cause buffer overflow. Then receive all chars from serial B and verify all chars received; Send random sequence of chars to port B which will cause buffer overflow. Then receive all chars from serial A and verify all chars received; Increment pass count; Repeat all tests until Function, Function, Clear or cutter power off; Each pass will take about 10 seconds.

Errors: On occurrence of an error the diagnostic will stop and display error code in display. It will then wait for a keystroke from the front panel before restarting the current pass of the diagnostic.

E6A – incorrect character received from serial port A
E6B – incorrect character received from serial port B
E6C – timeout no character received from serial port A
E6D – timeout no character received from serial port B
E6E – rs232 device overrun serial b
E6F – rs232 framing error serial b
E55 – rs232 parity error serial b
E56 – rs232 device overrun serial a
E57 – rs232 framing error serial a
E58 – rs232 parity error serial a

If errors occur during the diagnostic one of the following hardware problems exist:

- The loop back cable is not connected to the serial ports.
- The loop back cable is not configured as shown above
- The 60 pin ribbon cable is not connected to the CPU board
- The 60 pin ribbon cable is defective
- The CPU board needs to be reseated
- The CPU board is defective.

Communications Diagnostic Cable Assembly

Plotter Cable		Adaptor, 9 male to 25 female		Adaptor, 25 male to 25 male	
25 Pin male	9 Pin female	9 Pin male	25 Pin female	25 Pin male	25 Pin male
2	2	2	3	3	3
3	3	3	2	2	2
5 6	4	4	20	20	20
7	5	5	7	7	7
20	8 6	8	5	5	5
		6	6	6	6

Grouped pins are jumpered

D 07 - CALIBRATION

This diagnostic is used to compute the scaling constants needed to compensate for mechanical inaccuracies. These constants are stored in eerom and will subsequently not be altered until this diagnostic is invoked again or diagnostic 08 is run to restore calibration unity constants.

To use this calibration routine first draw a large square of known dimensions using the cad/cas software of your choice. Units of measure are not critical (inches, cm, mm etc. work equally well).

Example:

1) Draw a 20inch by 20 inch squareusing your design package. These are reffered to below as the **requested** dimensions.
2) Measure the square carefully. **Assume** you measure 20.050in the X (material travel) direction and 20.940 in the Y (head travel) direction. These are reffered to below as the **actual** dimensions.
3) Start diagnostic 7 by pressing: Function, 3, 0, 7, Enter.

   a) The panel will flash 0 asking for the **requested X** dimension (material travel). Enter the dimension with same number of decimal places as the measurement:

      2, 0, 0, 0, 0, Enter

   b) The panel will flash 0 again asking for the **actual X** dimension. Enter the dimension (substitute your own actual numbers):

      2, 0, 0, 5, 0, Enter

   c) The panel will flash 0 asking for the **requested Y** dimension (tool travel). Enter the dimension with same number of decimal places as the measurement:

      2, 0, 0, 0, 0, Enter

   d) The panel will flash 0 again asking for the **actual Y** dimension. Enter the dimension (substitute your own actual numbers):

      2, 0, 9, 4, 0, Enter

4) The panel will then flash "D". Press 9, 9, Enter to exit the diagnostic mode.

Note: when performing this diagnostic, fractional measurements MUST be converted to DECIMAL measurements prior to entering dimensions.
Example: 20 1/16 fractional = 20.062 decimal

D 08 - STORE UNITY CALIBRATION CONSTANTS IN EEROM

RUNNING THIS DIAGNOSTIC WILL ERASE THE CALIBRATION CONSTANTS STORED BY DIAGNOSTIC 07. Run this diagnostic when installing a new Micro PCB or when replacing U23 on the Micro PCB. This diagnostic also needs to be run if starting Diagnostic 07 or loading paper results in an E80, E81 or E37 error when the pen does its initial move. If this diagnostic is run and the machine is not recalibrated, then plotted line lengths may not be within plotter specifications. This diagnostic flashes "D" when complete. Press 9, 9, Enter or turn the plotter power off to complete the process.

D 24 - REED SWITCH SENSOR TEST

This diagnostic tests the integrity of the reed switch sensor which is used to sense left and right pinch wheel locations. The display will read D24 for three seconds and then either 000 or 111, depending on whether the magnet on the right pinchwheel has opened or closed this reed switch. If the display does not toggle as a result of carriage movement back and forth across the right pinchwheel, there is a malfunction with either the reed switch, its associated circuitry located on the Internal I/O PCB, or the interconnections between the two.

If this diagnostic fails, it is possibly that the machine will continue to be operational in the Emergency mode. See Diagnostic 05, Flag byte 512 - Emergency mode.

D 26 - FRONT PAPER SENSOR PAIR TEST

This diagnostic tests the integrity of the front paper sensor pair . See CLEANING AND MAINTENANCE Section of this manual. The display will read D26 for three seconds. The front paper sensor will be enabled. The display will read either 000 or 111, depending on whether there is paper over this sensor. If the display does not toggle as a result of moving paper on and off this sensor pair, there is a malfunction with either the sensor pair, its associated circuitry located on the Internal I/O PCB, or the interconnections between the two. Use mylar when running this diagnostic for best results.

If this diagnostic fails, it is possibly that the machine will continue to be operational in the Emergency mode. See Diagnostic 05, Flag byte 512 - Emergency mode.

D 27 - REAR PAPER SENSOR PAIR TEST

This diagnostic tests the integrity of the rear paper sensor pair. See CLEANING AND MAINTENANCE Section of this manual. The display will read D27 for three seconds. The rear paper sensor will be enabled. The display will read either 000 or 111, depending on whether there is paper over this sensor. If the display does not toggle as a result of moving paper on and off this sensor pair, there is a malfunction with either the sensor pair, its associated circuitry located on the Internal I/O PCB, or the interconnections between the two. Use mylar when running this diagnostic for best results.

If this diagnostic fails, it is possibly that the machine will continue to be operational in the Emergency mode. See Diagnostic 05, Flag byte 512 - Emergency mode.

D 29 - CONTROL PANEL LED TEST

This diagnostic exercises all the LEDs and hex displays on the control panel. The display reads D29 for two seconds and then the following sequence of events occur: the display is set to 000; one by one all the LEDs will begin to flash until all are flashing in unison; as each additional LED begins to flash, the display is indexed by 111, 222, 333, etc., until all the LEDs are flashing and the display reads BBB; at this point, all the LEDs remain lit and do not flash, while the display continues its progression (EEE, FFF). The test will recycle.

D 30 - CONTROL PANEL DISPLAY TEST

This diagnostic exercises the control panel hex displays and the bank of test LEDs on the MICROPROCESSOR PCB. The display will read D30. The control panel LEDs will be lit and stay lit. After two seconds, the display will read 000 and start counting up indexed by 111 (222, 333,...) up to FFF. After the display reaches FFF, the diagnostic recycles.

D 31 - CONTROL PANEL BUTTON SWITCHES TEST

This diagnostic tests all the control panel switches to assure that all the switches toggle and generate the correct key code. When entering the diagnostic, the display will read Bxx where xx is the button number from the list below. This is a prompt to begin the key sequence below. During this sequence, the plotter (and LEDs) should blink FFF after each key to indicate that the key is functioning correctly. If a key malfunctions or is pressed out of sequence, the plotter will display E36, Error 36. If a key is pressed in sequence but the switch malfunctions, the display will not change from Bxx. This indicates a malfunction in either that key, or in its associated circuitry located on the Internal I/O PCB. If all 22 keys are pressed in the correct sequence and there are no malfunctions, the diagnostic recycles.

0. LOAD/UNLOAD
1. ROTATE
2. P1
3. P2
4. AXIS ALIGN
5. Pause/On-Line
6. RESET or #9
7. CLEAR
8. PEN UP/DOWN
9. ENTER
10. SET FORCE
11. SET SPEED
12. BYPASS
13. FUNCTION or #0
14. #1
15. #2
16. #3
17. #4
18. #5
19. #6
20. #7
21. #8

D 34 - FLAG MONITOR / ADJUST - Gold Touch Cutting Head

This diagnostic is used to verify the correct flag position on the cutting head. It displays the knife height on the display. The flag is a small, flat, angled piece of metal which moves up and down between a pair of cicuit board mounted sensors. The flag is held on to the knife holder by 2 allen screws which are loosened slightly if adjustment is necessary. There are 3 locations the knife holder can be in. They are:

Bottom (remove the knife from the holder and press the holder down to the bottom) The display should read between 000 and 006. Adjust flag position if necessary.

Down (press the knife down with a knife in the holder) The display should read 024 to 026 pressing down with a knife in the holder (no media present). Adjust flag position if necessary.

Top (hold the knife up) The display should read 060 or more.

The display should change immediately as you move the knife up or down.
Check that the flag screws are tight and recheck Bottom and Down.

D 35 - X-AXIS JOYSTICK TEST

This diagnostic tests and exercises the X component of the joystick and its associated A-D converter. The display will read D35 for two seconds, at which point the display will periodically sample the X component of the joystick every 100 ms. Any joystick position change in the X direction should be directly indicated on the display. When the joystick is in its resting position, the display will read range 88 to 98 hexadecimal. Similarly, when the joystick is displaced fully upward, the display should read 0F8 to 0FF hexadecimal. Finally, when the joystick is displaced fully downward, the display should read range 000 to 015 hexadecimal.

If this diagnostic fails, it is possibly that the machine will continue to be operational in the Emergency mode. See Diagnostic 05, Flag byte 512 - Emergency mode.

D 36 - Y-AXIS JOYSTICK TEST

This diagnostic tests and exercises the Y component of the joystick and its associated A-D converter. The display will read D36 for two seconds, at which point the display will periodically sample the Y component of the joystick every 100 ms. Any joystick position change in the Y direction should be directly indicate on the display. When the joystick is in its resting position, the display will read range 88 to 98 hexadecimal. Similarly, when the joystick is displaced fully left, the display should read range 0F8 to 0FF hexadecimal. Finally, when the joystick is displaced fully right, the display should read range 000 to 015 hexadecimal.

D 37 - PEN UP/DOWN TEST 1 continuous

This diagnostic exercises the pen up/down hardware and circuitry. The display will read D37 and the pen force LED will blink. This blinking LED is to prompt the user to press any of the pen force buttons 1-8. As soon as a pen force number button is pressed, the pen will lower and raise repetitively every 400 ms. (200 ms. to lower and 200 ms. to raise). When the pen lowers, its force, when it reaches the bottom, will be equal to the force value as set by the particular button pressed.

To restart this diagnostic while in progress, press any key on the control panel. The pen will first lift itself to the raised position, then will start again from the beginning. To perform "short pen lifts", press the UP key. To resume normal pen lift, press 1, 1 for force 1, etc.

D 38 - PEN UP/DOWN TEST 2 on demand

This diagnostic exercises the pen up/down hardware and circuitry. The display will read 003 and the pen force LED will blink. This blinking LED prompts the user to enter the desired force and then press the enter key. When the enter button is pressed, the pen will lower. When the pen lowers, its force at bottom, will be equal to the force value set by the value entered. To restart this diagnostic, press any key on the control panel. The pen will lift before restarting the test. To perform a "short pen lift", press the UP key.

D 43 - SET FACTORY DEFAULT CUTTER VALUES

This diagnostic resets the six custom setups on 800 Plus Series Cutter plotters to the factory values. *Existing settings will be overwritten.* These setups govern the following cutter parameters; Pen up speed, pen down speed, force, acceleration, knife/pounce offset, cut/draw/pounce mode, coordinate system, load speed, CAD/CAS override.

Factory Set-Ups 1-6

#	GROUP	PANEL DISPLAY (WHITE)	PANEL DISPLAY (GOLD)	CUT DRAW POUNCE	DOWN SPEED	WHITE FORCE	GOLD FORCE	UP SPEED	OFFSET / PITCH*	CAD OVER-RIDE	LOAD SPEED	LOAD / FRAME LENGTH	SERVICE LOOP	COORD. SYSTEM	SPEED MODE
1	Cut 2 mil	C42	C41	C	40	2	12	40	12	ON	20	24 inch 61 cm	ON	Long X	cm/sec
2	Cut 4 mil	C44	C42	C	40	4	25	40	12	ON	20	24 inch 61 cm	ON	Long X	cm/sec
3	Pounce	B66	C63	B	6	6	37	40	20	ON	20	24 inch 61 cm	ON	Long X	cm/sec
4	Hot Tip	D34	D32	D	30**	4	25	40	12	ON	20	24 inch 61 cm	ON	Long X	** mm/sec
5	Draw roll	D44	D42	D	40	4	25	40	12	ON	20	24 inch 61 cm	ON	Long X	cm/sec
6	Draw sheet	D64	D62	D	60	4	25	40	12	ON	20	24 inch 61 cm	ON	Long X	cm/sec

*** Knife offset in effect when CUT MODE activated, Pounce distance in effect when BOUNCE MODE activated.**

To modify table values, see text on Factory and Custom Set-ups

D 49 - Z AXIS SETUP DIAGNOSTIC - Gold Touch

It is necessary to run Diagnostic 34 to verify carriage flag setting before performing this diagnostic. This diagnostic is for 800 Plus Series Vinyl Cutters with either the Gold Touch cutting head. Remove carriage cover and machine front cover. Connect a DVM (digital voltmeter) to TP6 (vcoil current) and TP8 AGND on the top board. Start diagnostic 49 (function, 3, 4, 9, Enter).

Phase 1: Set Zero Current - Use keys 2, 4, 6, 8 to raise or lower the voltmeter reading to 0 VDC. Press Enter.

Phase 2: Set Maximum Force - Read label on carriage for MAX *F8*. This is *2 times* the voltage required to obtain Maximum Force (550 grams). Use keys 2, 4, 6, 8 to raise or lower the voltmeter reading to MAX ÷ 2. Press Enter.

Phase 3: Set Minimum Force - Read label on carriage for MIN *F1*. This is *8 times* the voltage required to obtain Minimum Force (10 grams). Use keys 2, 4, 6, 8 to raise or lower the voltmeter reading to MIN ÷ 8. Press Enter.

Phase 4: Set Tool Bottom - Remove the tool from the holder and press Enter.

Phase 5: Set Tool Down - Adjust knife depth guide to equal the blade length. Place knife tool in holder. Press Enter.

Phase 8: Balance X and Y Servos - Center a 24 x 48 inch (61 x 122 cm) sheet of vinyl material in the machine. Lower the pinch wheels and press Enter. The machine will now move the vinyl and the carriage while measuring speed. *Power Down Cutter to continue.*

D 58 - Z AXIS FIELD SETUP DIAGNOSTIC - Gold Touch

It is necessary to run Diagnostic 34 to verify carriage flag setting before performing this diagnostic. This diagnostic has the parts of diagnostic 49 necessary for field setup of the Z axis without opening the machine.

Phase 4: Set Tool Bottom - Remove the tool from the holder and press Enter.

Phase 5: Set Tool Down - Adjust knife depth guide to equal the blade length. Place knife tool in holder. Press Enter.

Phase 8: Balance X and Y Servos - Center a 24 x 48 inch (61 x 122 cm) sheet of vinyl material in the machine. Lower the pinch wheels and press Enter. The machine will now move the vinyl and the carriage while measuring speed. *Power Down Cutter to continue.*

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Appendix/Specifications

Media width
- *Model 824* ..... 4 to 24 inches (10 to 61 cm)
- *Model 830* ..... 4 to 30 inches (10 to 76 cm)
- *Model 836* ..... 4 to 36 inches (10 to 91 cm)
- *Model 840* ..... 4 to 40 inches (10 to 100 cm)
- *Model 848* ..... 5 to 48 inches (13 to 122 cm)
- *Model 860* ..... 5 to 60 inches (13 to 153 cm)

Maximum frame size ..... Maximum Media width less 1 inch (2.5 cm) x 250 feet (76m)
Media handling ..... microgrit with edge guide system
Media type ..... vinyls, masking, Rubylith®, Tyvek®, paper

Resolution, addressable (HPGL) ..... 0.000984 inch (0.025 mm)
Resolution, mechanical ..... 0.000120 inch (0.003 mm)
Endpoint accuracy* ..... 0.009843 inch (0.25 mm) or 0.1% of total
Repeatability ..... 0.004 inch (0.10 mm)
Speed ..... *Model 824,830, 836...* 24 in/s (60 cm/s); *840,848,860...*20 in/s (50cm/s)
Force, selectable, white logo ..... 10 to 250 grams, 8 steps
Force, selectable, Gold logo ..... 10 to 550 grams, 100 steps
Plot origin, selectable ..... long X, long Y, center or center rotated 180°
Command language ..... HPGL, DMPL, Grapix Advantage
Interfaces (3) ..... RS-232-C(2), parallel
Buffer ..... *Model 824* is 512 KB; Other models..1.25 MB; 848/60 are 2 MB; all expandable to 8 MB
Emulation ..... CAMM-1, Gerber GS/HS 750, HP 7585/86
Microprocessor ..... Intel RISC 80960i
Knife blade ..... pivoting carbide tip, 45° and 60°
Knife offset, selectable ..... 0 to 0.1 inch (2.5 mm)
Pounce tip ..... tool steel
Pounce pitch, selectable ..... 0.01 to 1.0 inch (0.25 to 25 mm)
Pounce hole size, selectable ..... 0.008 to .01 inch (0.025 to .25 mm)
Pens, number ..... 1 (multipen simulation is selectable)
Pen types ..... felt, roller ball, or drafting (HP)
Wide markers (optional) ..... 0.2, 0.1 inch (5 mm, 2.5 mm)
Hot tip (optional) ..... 0.003 inch (0.075 mm)
Operating temperature ..... 32 to 117° F (0 to 40° C)
Operating humidity ..... relative, 5% to 95%

Physical size and weight
- *Model 824* ..... 43 x 17 x 13 inches (110 x 43 x 33 cm); 55 lbs (24.8 kg)
- *Model 830* ..... 49 x 17 x 13 inches (125 x 43 x 33 cm); 60 lbs (27.0 kg)
- *Model 836* ..... 55 x 17 x 13 inches (140 x 43 x 33 cm); 65 lbs (29.3 kg)
- *Model 840* ..... 59 x 17 x 13 inches (150 x 43 x 33 cm); 70 lbs (31.5 kg)
- *Model 848* ..... 67 x 17 x 13 inches (170 x 43 x 33 cm); 90 lbs (40.5 kg)
- *Model 860* ..... 79 x 17 x 13 inches (201 x 43 x 33 cm); 110 lbs (49.5 kg)

* After Calibration.

Specifications subject to change.

HPGL COMMAND LANGUAGE SUMMARY

aa x-coord,y-coord,arc angle[,chord tol]; Arc absolute
af; Advance frame
ah; Advance half frame
ap[n]; Auto-pen. 0=off, 1=lift, 2=auto put away, 4= smart pen.
ar x-coord,y-coord,arc angle[,coord tol]; Arc relative
as[acc[,pen#]]; acceleration select.
bl[label string ...]<etx>; Buffered label.
bj[n]; Begin Job. 0=VS is cm/sec, FS 0-8; 1=FS1-100; 2=VS is mm/sec; 3=VS is mm/sec, FS 1-100: also sets the present buffer position as the beginning of a plot for the copy function.
ci radius[,chord tolerance]; Draw circle.
cp spaces,lines; Move spaces,lines from present position.
cs n; Select primary set
ct[n]; Chord tolerance mode. 0=degrees, 1= deviation.
dc; Digitize clear.
df; Default.
di run,rise; Character generator absolute label direction.
dl char#[,pen control],x-inc,y-inc, ...; Down load char
dp; Place plotter in digitize mode.
dr run,rise; Character generator relative label direction
dt n; Select label command character terminator.
fr; Frame advance
ec [cut]; Enable/disable cut line
es[spaces[,lines]]; Character generator extra space.
fs[pen force[,pen #]]; Select pen force. [1-8].
im e-mask[,s-mask[,p-mask]]]; input mask.
in; Initialize.
ip[p1x,p1y[,p2x,p2y]]; Input p1, p2.
iw[x1,y1,x2,y2]; Input clipping window.
ka[angle]; Set min angle for knife rotate
kn[offset]; Set offset from center line of knife
lb[label chars ...]<etx>; Label plot.
lo[n]; Character generator label origin.
lt [pattern[,length]; Select line type pattern.
nr; Not ready.
oa; Output actual pen position.
oc; Output commanded pen position.
od; Output digitized point.
oe; Output error.
of; Output factors.
oh; Output hard clip limits.
oi; Output plotter identification.
ol; Output Buffered label length.
oo; Output features.
op; Output p1, p2.
os; Output status.
ot; Output carousel type.
ow; Output window.
pa[x-coord,y-coord[, ...]]; Plot absolute.
pb; Print buffered label.
pd[x,y[, ...]]; Pen down;
pg[code]; Advance page, 0= Set X origin to current position
pm n; Polygon mode instruction.
pr[x-inc,y-inc[, ...]]; Plot relative;
pu[x,y[, ...]]; Pen up;
ra x-coord,y-coord; Rectangle fill absolute.
ro[n]; Rotate 0 or 90 degrees.
rr x-inc,y-inc; rectangle fill relative.
sc[xmin,xmax,ymin,ymax]; Scale.
si[width,height]; Absolute character size.
sl[tan angle]; Character generator slant.
sm[char]; Symbol mode on/off and character selection.
sp[n]; Select pen.
sr[width,height]; Relative character size.
st[tool]; Select tool. 0=draw, 1=cut, 2=pounce
tl[tp[,tn]]; Tick length instruction.
uc[[pen control,]x-cor,y-cor ...]; User defined character.
uv[velocity]; Specify pen up velocity.
vs[velocity[,pen #]]; Specify pen down velocity.
wa; Wait for plotter
xt; X tick mark.
yt; Y tick mark.

Escape commands:
<esc>.(or <esc>.Y Programmed on.
<esc>.) or <esc>.Z Programmed off.
<esc>.@[logical buffer size];[hand-shake status]:
<esc>.a Output plotter identification.
<esc>.b Output bytes remaining in logical buffer.
<esc>.e Output extended error code.
<esc..f[frame size];[load speed]: Set frame size
<esc>.h[[data block size];[enq char];[ack string; ...]]: Mode 1
<esc>.i[[data block size];[enq char];[xon/ack string; ...]]: Mode
<esc>.j Abort device control instruction.
<esc>.k Abort hp-gl instruction.
<esc>.l Output logical buffer size.
<esc>.m[turn delay];[Out trig];[echo term];[out term];[out init]:
<esc>.n[delay between characters];[x-off string ...]:
<esc>.o Output extended status.
<esc>.p[n]: Handshake mode 0=no, 1=xon/off, 2=enq/ack, 3=hardwire (defaulat auto detect xon/xoff or hardwire)
<esc>.q[n]: Monitor mode 0=disable, 1=parse, 2=reception.
<esc>.r Reset.
<esc>.s[n] Output memory size. 0=ram, 1=i/o buffer, 2=polygon, 3=downloadable character buffer.
<esc>.t [i/o buffer size];[polygon buffer size];[downloadable character buffer size]:

The following 7586 commands are recognized but not acted upon. GP and SG. commands.

KEY COMMAND SUMMARY

PARAMETER	KEY SEQUENCE	VALUE	HPGL Command
Down Speed	Speed, Function, #, #, Enter	1-60 (at speed mode cm/sec or mm/sec)	VS##
Up Speed	Functin, Speed, #, #, Enter	1-60 (cm/sec)	UV##
Force	Force, Function, #, Enter	1-8 White; 1-100 Gold	FS# *
Load Setup	Function, Load, #	1-6	
Save Setup	Function, Enter, #	1-6	
Cut/Bounce/Draw	Function, Rotate	C, B or D	ST# (0=D, 1=C, 2=B)
Knife Offset (Cut mode) Pounce Pitch (Pounce Mode)	Function, Enter, Rotate, #, #, Enter	1-100 (0.01 - 1 inches)	KN##
Pounce Hole Size (Pounce Mode)	Function, Enter, Axis Align, #, #, Enter	8-100 (0.008 - 0.1 inches)	KA##
CAD Override	Function, Bypass	ON (led on), OFF (led off)	
Coordinate System	Function, Axis Align, P2	Lower Right Origin	
	Function, Axis Align, P1	Center Origin	
	Function, Axis Align, Rotate	Center RotateD 180 degree Origin	
	Function, Axis Align, Axis Align	Lower Left Origin	
Speed Mode	Function, 6, #	0, 1 (cm/sec, mm/sec)	
Media Load Speed	Function, 5, Load, #, #, Enter	1-40 (cm/sec)	<esc>.F;##:
Media Load Length **	Function, View, #, #, . . #, Enter	1-3000 (inches)	<esc>.F##:
	Function, View, Enter, #, #, . . #, Enter	1-7630 (centimeters)	
Service Loop ***	Function, 8, #, Enter	0, 1 (off, on)	
Vector Mode	Funtion, Enter, Force, #, Enter	0, 1, 2, 3 (off, lo filter, hi filter, fast curves)	
Acceleration	Function, 4, #, Enter	1-16 (0.25-4g)	AS##
Minimum Angle (Cut Mode)	Function, Enter, Axis Align, #, Enter	1-50 (degrees)	KA##
Copy	Bypass, Enter	Plots buffer contents	
Clear Buffer	Clear	Clears buffer contents	BJ *
Gerber Multiply by 2	Function, 7, #, Enter	1, 2 (1 is 1x scale, 2 is 2x scale)	
System Restart	Function, Function, Clear	Warm boot	
Confidence Test*	Function, 3, 0, 2, Enter	Verify Machine Operation	
Run diagnostic	Function, 3, #, #, Enter		
Exit Diagnostic	9, 9, enter		

* BJ0 at the beginning of a job clears buffer and sets force range for FS to 1-8 on all models
BJ1 at the beginning of a job clears buffer and resets force range to 1-100 on Gold Touch cutting head models
** Media Load Length and Confidence Test are entered in the UNLOAD state.
*** Machine can drop media with Service Loop turned off.

COMMAND CROSS REFERENCE

HPGL	1016 units / inch	PAPD	PRPU	PRPD	PAPU	PG	PA	PD	FS	PU	PR	AA or AR	AS	VS	diag 5 flag 64 reset
Roland	1016 units / inch	D	R	I	M	F									diag 5 flag 64 reset
Ioline DMPL	1000 units / inch					F	D	A	P	U	R	CA	SA	V	diag 5 flag 64 set

ERROR CODE LISTING

If the internal microprocessor detects an error condition the letter E and a 2 digit code will be displayed on the control panel. Any key pressed after the error is displayed will place the machine in the diagnostic mode, indicated by a flashing "D" on the control panel. Recommended diagnostic procedures (D##) are listed in the error description.

Panel Display	Error Description
NONE _	all panel lights off - check PCBs loose in socket, fuses on main and power amp PCB, 115/230 VAC switch in wrong position, front panel PCB disconnected, loose cable from power supply to motherboard PCB.
000 ___	power up display - check PCBs loose in socket,+ 5 volts, + 15 volts, + 32 volts, micro PBC dead, boot eprom not valid (U6, 13).
E03 ___	pause switch on
E6x ___	See diagnostic 06.
E09 ___	waiting for first vector to complete
E12 ___	buffer overflow; communication, escape, down loadable character, or polygon buffer
E13 ___	too many parameters in the escape command
E14 ___	invalid character in escape command
E15 ___	escape command not implemented
E16 ___	escape command parameter out of limits
E29 ___	pinch wheel motor or switch malfunction - D25.
E30 ___	no media covering paper sensorsor media sensors dirty. Clean front and rear media (paper) sensors with soft swab.- D26, 27. See D05, Flag byte 512 - Emergency mode.
E32 ___	reed switch sensor malfunction - D24. Or pinch wheel under carriage too close to side plate. Move pinchwheel away from sideplate. See D05, Flag byte 512 - Emergency mode.
E33, 34	front, rear paper sensor malfunction - D26, 27. See D05, Flag byte 512 - Emergency mode.
E35 ___	(Models 830 and higher) Pinchwheel positioned on an uncoated section of gritwheel. Reposition movable pinchwheel. (All Models) Right hand pinch wheel may be improperly situated or pinch wheel under carriage too close to side plate. Move pinchwheel away from sideplate.
E36 ___	bad control panel key received - D31.
E37 ___	bad calibration constants D08, then D07 (optional).
E40 ___	HPGL command parser error
E56 ___	RS-232 device overrun
E57 ___	RS-232 framing error. Plotter communications default for serial A port is 9600,n,8,1. set software to match these parameters of change plotter with D4. For Gerber emulation, use Serial Port B.
E58 ___	RS-232 parity error
E59 ___	EEROM checksum error
E61 ___	servo timeout.Cutter software error or servo PCB failure - D10. Check earth ground. Prevent electrostatic discharge.
E62 ___	servo motor over-current. Check servo adjustment, Power amplifier pcb and servo motors - D11. Reed switch may not have been detected on first move after power up. Reposition carriage between pinch wheels and repower - D24.
E63 ___	voice coil over-current - D11, 38. Check earth ground. Prevent electrostatic discharge while cutting.
E65 ___	EPO latch failure - D10.
E66 ___	timeout latch failure - D10.
E67 ___	voice coil current sensor failure - D10.
E68 ___	servo motor over-current sensor failure - D10.
E69 ___	EPO latch or EPO reset failure - D10.
E70 ___	motor over-current - power amp failed - D10.
E71 ___	voice coil over-current - pwr amp failed - D10.
E72 ___	motor over-current, DAC or analog failed - D10.
E73 ___	X-axis position counter failed - D10, 14.
E74 ___	Y-axis position counter failed - D10, 14.
E75 ___	X-axis encoder failed - D14.
E76 ___	Y-axis encoder failed - D14.
E77 ___	X-axis encoder detector failed - D14.
E78 ___	Y-axis encoder detector failed - D14.
E79 ___	position initialization error; either carriage didn't move or reed switch failed - D24. See D05, Flag byte 512 - Emergency mode.
E80, 81	Excessive position error - X axis, Y axis. This can be caused by speed or acceleration too high, jerking material from a heavy roll, bad calibration constants, power surge, servo motor / encoder failure - D14, servo PCB failure, power amplifier pcb failure, relay on motherboard or joystick failure. If joystick, see D05, Flag byte 512 - Emergency mode.
E82 ___	servo interface bus error
E83 ___	unexpected arithmetic fault
E84 ___	unexpected constant fault
E85 ___	unexpected interrupt
E86 ___	unexpected nmi Interrupt
E87 ___	unexpected machine fault
E88 ___	unexpected operation fault
E89 ___	unexpected parallel interrupt
E90 ___	unexpected protection fault
E91 ___	unexpected real arithmetic fault
E92 ___	unexpected reserved fault
E93 ___	unexpected servo interrupt
E94 ___	unexpected trace fault
E95 ___	unexpected type fault

TROUBLE SHOOTING GUIDE

PROBLEM	SYMPTOM	REMEDY
Cutter does nothing	No panel lights on	Cutter plugged in, power on.
		Check main fuse in power input panel.
	Panel lights on, fan off	Relay open, restart power.
	Panel displays A## or E##	See start up display or error code listing
	Joystick operates but cutter does not respond to computer	Cutter in View state. Press View / Remote button to select Remote state.
		Correct cable type used; serial plotter cable attached to computer Com 1 or 2; parallel cable attached to Lpt1.
		View light fickers when file is sent. Data is being received but is outside the limits of the material loaded as indicated by the Out of Limit light on the control panel.. Check that design is inside the material width and that plotter plot origin matches the plotter driver in the design software ie. cutter needs to be set for "center origin" with AutoCad, etc. and/or HP7585 plotter emulation.
	Cutter does not load or does nothing when load is pressed	Clean front and rear paper sensors with soft swab
	Parallel Communications Used	The 800 requires "AT" lpt port configuration in the computer bios. The 800 does not supporrt ECP or PS/2 configurations.
	Display reads 000	Check for proper electrical grounding. Reduce exposure to static electricity. Check power supply voltages. Contact factory if problem persists.
	Display reads A37	Reduce exposure to static electricity. Reload firmware (See firmware update procedure). Contact factory with serial number if problem persists.
	None of the above	Perform diagnostic 02 - Confidence Test to verify machine functions
Cutter starts and then stops	Error light blinks	Check for correct cable. Hardwire or XON/XOFF protocol for serial "plotter" cable; XON/XOFF only for null modem cable.
		Communications parameters on computer match plotter. See CAS setup and cutter confidence test for settings (9600,n,8,1 is typical).
	Out Of Limit light on.	Design larger than available material or CAS/CAD frame size information incorrect.
	Windows for Workgroups and Pentium computer	Obtain WG1001.EXE serial communications bug fixfrom Microsoft or Allen Datagraph BBS.
	Windows 95	Turn off fifo buffers at Settings, Control Panel, System, Comm Port, Properties, Advanced.
	None of the above	Perform diagnostic 02 - Confidence Test to verify machine functions
Cutter will not load material	Erratic movement of material durring Load cycle.	Clean front and rear media sensors (oval holes in stainless steel near cutting groove on right).
	Material is clear or has clear backer material and has been weeded	Try putting scotch tape over media sensors to reduce sensitivity.
Grinding noise	When material is moved front and back with joystick.	Clean front and rear media sensors (oval holes in stainless steel near cutting groove on right).

Cut Quality Trouble Shooting

PROBLEM	SYMPTOM	REMEDY
Poor cut quality	Hard to weed vinyl.	Check blade for smooth, sharp point, correct length.
		Increase cut force value (Function, Force, #). Verify with cut test pattern (Force, Function).
		Check knife offset (Function, Enter, Rotate, #, #, Enter). Verify with cut test pattern (Force, Function).
		Check that controlled depth knife holder allows a deep enough cut. Verify with cut test pattern.
	Too much cut force or Cut through the vinyl backer.	Decrease force value (Function, Force, #). Verify with cut test pattern (Force, Function).
		Adjust controlled depth knife holder so that less blade protrudes. Verify with cut test pattern.
		For Gold Cutting Head, if CAS initialization string does not contain "BJ1" then force command "FS8" will produce 100% cutting force. Use BJ1 initialization to get 100 steps of force control with "FS" command. Or, try front panel control with CAD Override ON.
	Uneven cut force.	Check that the groove filler is in good condition (smooth) and evenly installed (no waves).
		Check for tool holder "freedom of motion" up and down by hand when cutter power is turned off.
		Run confidence test with good pen (Function, 3, 0, 2).
		Adjust I/O PCB voltages for pen height (flag adjustment) in I/O PCB Setup procedure.
	Low cut force.	Rreview the I/O PCB voltages for force adjustment in the I/O PCB Setup procedure.
		For Gold Cutting Head, if CAS initialization string contains "BJ1" then force commands "FS1 to FS8" will produce 1 to 8% cutting force. Change to FS1-100 or use BJ0 initialization. Or, try front panel control with CAD Override ON.
	Objects do not close properly or have "nicks" at cut start/stop point.	Check blade for smooth, sharp point.
		Check knife offset (Function, Enter, Rotate, #, #, Enter). Verify with cut test pattern (Force, Function).
		Knife blade holder must be in good working condition.
		Ensure knife comes down in center of groove filler.
		Check that the groove filler is in good condition and evenly installed (no waves).
		Reduce cut speed value (Function, Speed, #, #, Enter). Verify with cut test pattern (Force, Function).
		Reduce acceleration value (Function, 4, #, #, Enter). Verify with cut test pattern (Force, Function).
		Increase resolution/quality of image output from CAS.
		Check cutter belt tension with procedure in the book.

Tracking Trouble Shooting

PROBLEM	SYMPTOM	REMEDY
Material does not track straight	Material is punched.	Move pinch wheels to unpunched area of material on both left and right side. 3 pinch wheels must be used at all times on 840 and 848.
	Not straight with tracking guide bars removed.	Align media to black edge marks. Verify with joystick.
		Ensure that a service loop is present.
		For punched (sprocket) material, move pinch wheels to unpunched area of material on both left and right side.
		Inspect pinch wheel quality. Replace as necessary. Verify with confidence test (Function, 3, 0, 2).
		Clean gritwheel with soft bristle brush (toothbrush) as necessary.
		Inspect pinch wheel orientation for newly installed pinch wheels. Small mold gates should be towards outside. See Pinch Wheel Maintenance in this book.
		3 pinch wheels must be used at all times on 840 and 848.
	Not straight with tracking guide bars installed.	Verify that edges of material are straight and not damaged.
		Verify that the edge guide discs are set no more than 1/16th inch (1 to 2 mm) wider than the material.
		Verify that the fixed edge guide discs are at an equal distance from the machine side plate.
		For punched (sprocket) material, move pinch wheels to unpunched area of material on both left and right side.
		3 pinch wheels must be used at all times on 840 and 848.
		Check that fixed guide disks (right side) on tracking bars are equal distance from end of bar for both the front and rear.
	Material bunches on long tracking guides.	Verify that the edge guide discs are set no more than 1/16th inch (1 to 2 mm) wider than material.
Material slippage	Image elements are shifted in the X axis (material direction).	Clean pinch wheels with denatured alcohol and a soft cloth. Replace as necessary.
		Clean gritwheel with a soft bristle brush (toothbrush) if the grit is "clogged" with paper particles at the pinch wheel points.
		For punched (sprocket) material, refer to item above.
		Reduce acceleration and, if necessary, speed. Stripes and designs with long back and forth movement on large material can slip at standard acceleration.
		For Model 848, 3 pinch wheels must be used at all times.