



# **Extreme Series**

# **Operators Manual**

Version 4.7

**Advanced Plotting Devices**

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### **NOTICE OF PROPRIETARY INFORMATION**

This document contains proprietary information owned by *APD*. This document is provided to the owner of the Extremes Series plotter for the purpose of setup and operation of the *APD Extremes Series* plotter. Information contained in this document is not to be duplicated or given to a third party without the expressed written permission of *APD*.

### **NOTICE OF FCC CLASSIFICATION**

Warning: This equipment has been tested and found to comply with the limits for Class A digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction's manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his or her own expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

It is suggested that the user use only shielded and grounded cables to ensure compliance with FCC rules.

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# Introduction

*APD Extreme Series* was developed for the main purpose of reliability, cutting quality and performance at an affordable price for our customers. This series is the pinnacle of HPGL open architecture and is compatible for many of your sign-making software's. Capable to cut through many substrates such as your high performance and intermediate vinyl films, reflective films, fluorescent film, silk screen films, Rubylith, Amberlith, sandblast stencil, fabric, heat transfer flock and film. The *Extreme Series* is also versatile in plotting and pouncing by just easily swapping your tool to satisfy your desired feature.

Within this manual contains all pertinent information for your *APD Extreme Series* Plotter. At this time we have to offer five models.

***PD-2400***

***PD-3000***

***PD-4000***

***PD-4800***

# Surveying Your Plotter

When finished unpacking your *APD Extreme Series* plotter, survey your plotter for any shipping damages or any further discrepancies. Contact your dealer or *APD's* Customer Service dept. at 714-964-9611 if you found any. Below is a check list of misc. items that will be shipped with your plotter.

- (1) 60-Degree Blade
- (1) 45-Degree Blade or 30-Degree Blade
- (1) Spare fuse for main Board
- (1) Spare fuse for Power Entry Module
- (1) Plotter Pen
- (1) Power Cable
- (1) Communication Cable (RS232)
- (1) Blade holder assembly
- (1) CD ROM User Manual
- (1) Warranty Card
- (1) Media Stand Roll for non-stand model
- (1) Stand for stand model
- (1) Vinyl catching basket (optional)
- (1) Stand Assembly Instructions if machine comes with stand

# Connecting Your Plotter

## CONNECTING TO POWER

**CAUTION:** Your *APD Extreme Series* plotter is shipped as a 115 or 230-volt unit. Please check the power module on the Left side enclosure to verify what the voltage setting is. If the voltage indicated is incorrect for your area or country, please refer to appendix B for instruction on changing voltage.

- 1- Make sure the switch of power entry module is in the off position
- 2- Plug female end of the supplied power cord into the receptacle of the power entry module located on the left side enclosure.
- 3- Plug male end of the power cord into a **GROUND**ED AC power source.
- 4- Plug the male end (25 pins) of the data cable into the connector located at the right side enclosure.
- 5- Plug the female end (9 pins) of the data cable supplied with your plotter into the serial communication port (RS232) of your computer.

**WARNING:** Your *APD Extreme Series* Plotter is only supported by a Serial Communication Protocol and is supplied with either 9 pins Male to 25 pin Female data cable. Make certain that you do not connect the plotter to the parallel port of your computer. Permanent damage to the serial port of your plotter may occur if connection to the serial port is not properly made. Use the serial cable provided for connecting your *APD Extreme Series* plotter to your computer. Do not use a female to female or a male to male adapter to connect the cable provided to your plotter and computer.

# Loading Materials

Following the 6 listed steps and using material advance feature will produce good tracking.

## **Step #1**

Push down the pinch roller lever located nears the back of the Right Side Cover. The pinch mounts will then lift the pinch rollers off the grit roller.

## **Step #2**

Load the material through the rear of the plotter, pulling it under the lifted pinch rollers towards the front of the plotter.

## **Step #3**

Line up the edge of the material with two of the marks on the alignment strip that are equal distance from the edge of the platen where the platen contacts the side plate.

## **Step #4**

While holding the material aligned and move the right pinch roller mechanism until the right side of the roller is about 6mm (.25in) left of the right edge of the material.

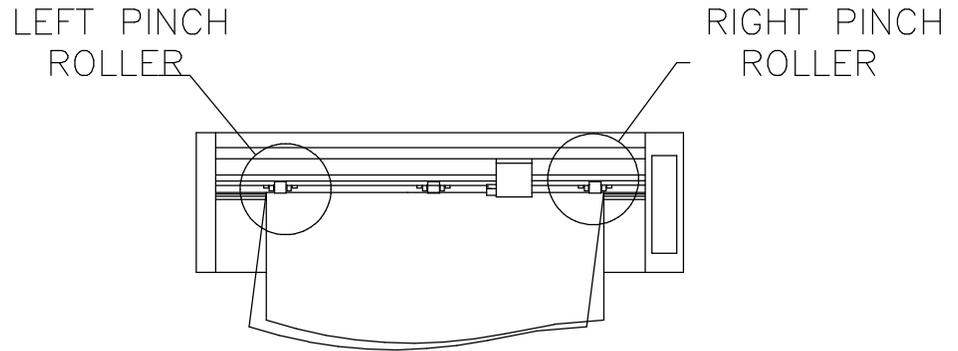
## **Step #5**

Move the left pinch roller mechanism until the left side of the roller is about 6mm (.25in) right of the left edge of the material, while holding the material tight, lift the pinch roller lever to lower the pinch rollers onto the material.

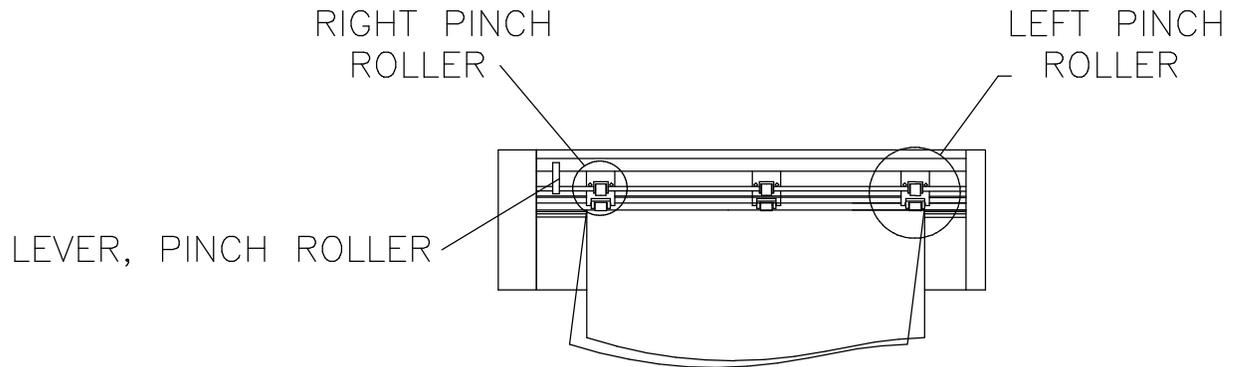
## Loading Materials (Continued)...

### Step #6

Press the down arrow keys on the keypad to move the material forward about 150cm (60in). If tracking is good, no additional adjustment is necessary unless you plan to plot 300cm (120in) of material or more. If tracking is no good, make adjustment by skewing the media either to the right or left depending on how off the media is.



FRONT VIEW



REAR VIEW

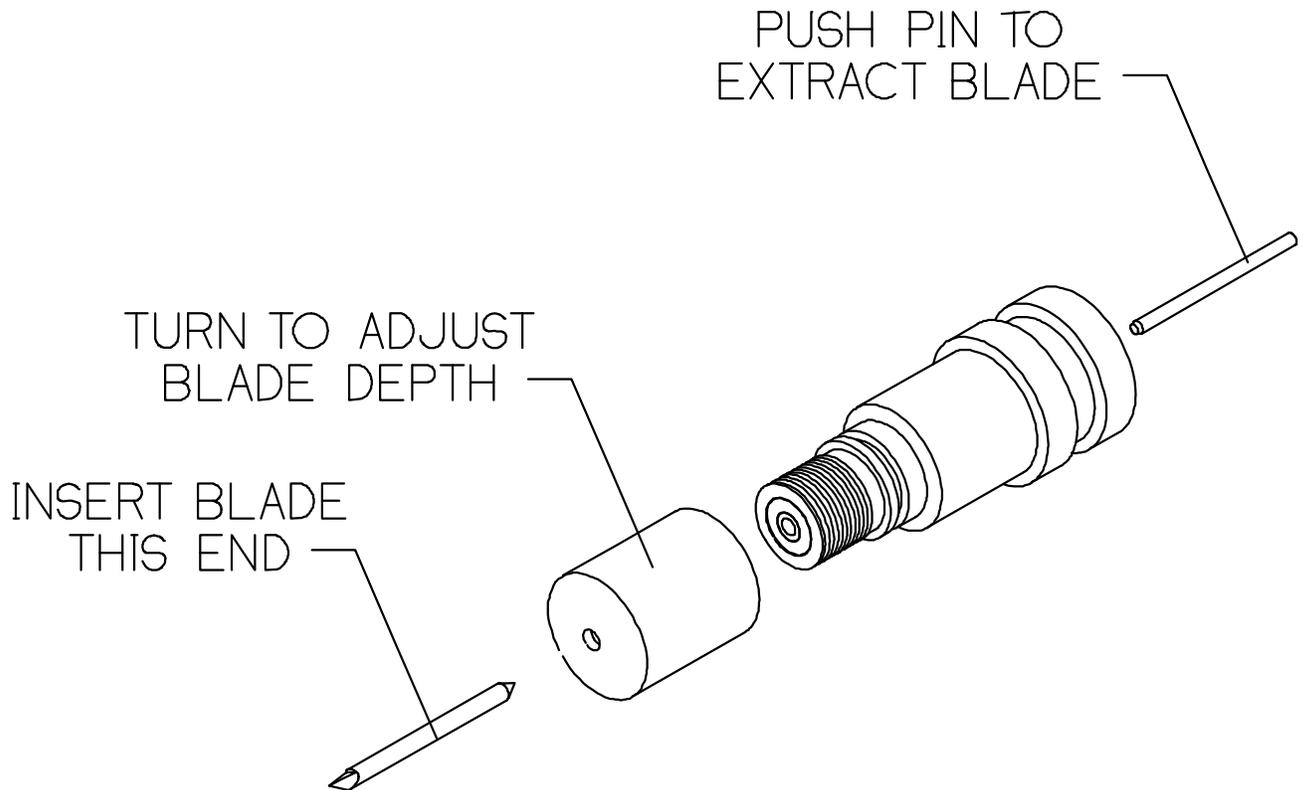
# Blade Installation & Adjustment

## LOADING BLADES

Take the blade supplied with the plotter and push the conical end into the blade holder until a small click indicates that it is all the way in the blade holder. The blade is now being held in place by a magnet.

## UNLOADING BLADES

To remove the blade, push the steel pin protruding at the top of the blade holder in towards the bottom. The exposed blade can now be removed.



## Blade Installation & Adjustment (Continued)...

### **ADJUSTING BLADE DEPTH**

**Caution:**

**It is not necessary to adjust blade depth unless cutting special materials. For normal cutting expose the blade fully.**

- 1) Turn the bottom end of the blade holder until a small amount of the blade is exposed.
- 2) Test the cutting depth by laying down a piece of the material to be cut onto a flat surface and cutting the material with the blade holder by hand.
- 3) If the material is cut too deep, turn the end of the blade holder a small amount counter clock-wise.
- 4) If the material is cut too shallow, turn the end of the blade holder a small amount clockwise.
- 5) Re-adjust the blade depth until the material is cut slightly deeper than needed. Further depth adjustments also may be needed on the plotter after tool pressure adjustments are made.

### **INSTALLING THE BLADE HOLDER**

- 1) Unscrew the small black thumbscrew on the blade holder a few turns counter clock-wise.
- 2) Press the blade holder into the blade holder, blade end first until the collar on the blade holder is firmly in contact with the top of the blade holder mount.
- 3) Tighten the thumbscrew to about 1/4 to 1/2 turn after screw starts to tighten. Do not over tighten the thumbscrew.

# Control Panel Functions

From the keypad there are a number menu functions available for you to use. With these menu functions you can adjust the performance of the plotter for cutting, drawing, pouncing, contour cut, tangential cut, and cut through on different types of materials.



The following functions are available:

- Moving the cutting head position
- Toggling the Tool
- Plotting Area
- Re-Plotting
- Homing the Plotter
- Clearing the Buffer
- Running Test Patterns
- External Command Toggle
- Unit Changing
- Saving Defaults
- Loading Defaults
- Advancing the Material
- Normal/Contour cutting
- Data Format
- Tool Offset
- Selecting cut mode
  - Pen drawing
  - Vinyl cutting (30, 45, 60 degree blades)

Pouncing

Paper cutting

Sandblast stencil cutting (tangential cutting)

Fabric cutting

Changing Cutting Pressure

Changing the Speed

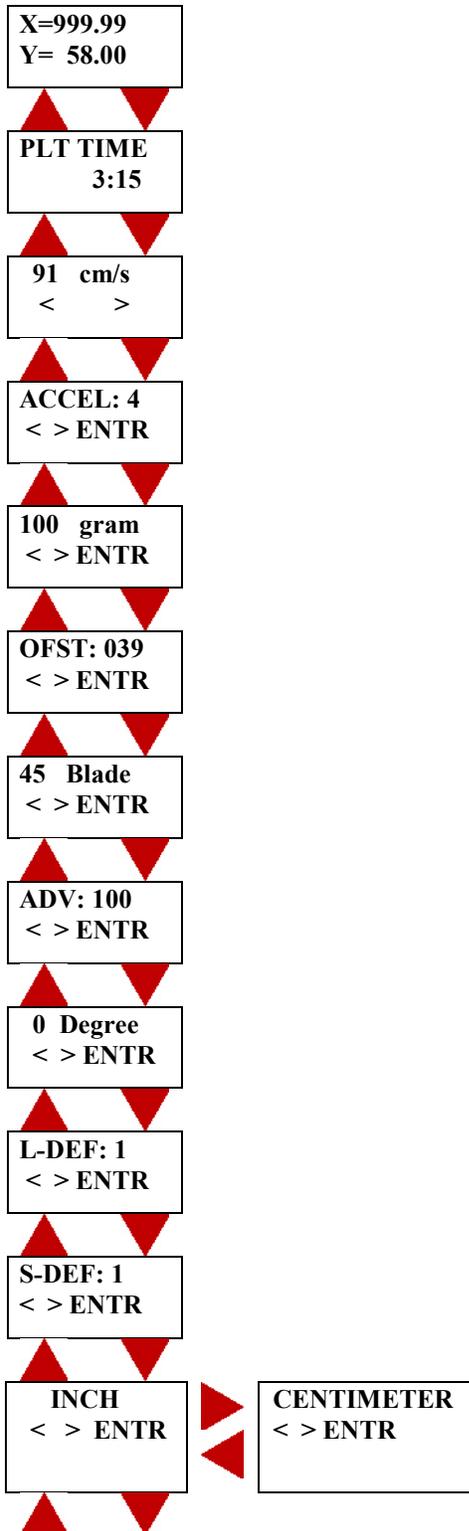
Changing Serial Communications

Cutting on a Sheet or Roll Material

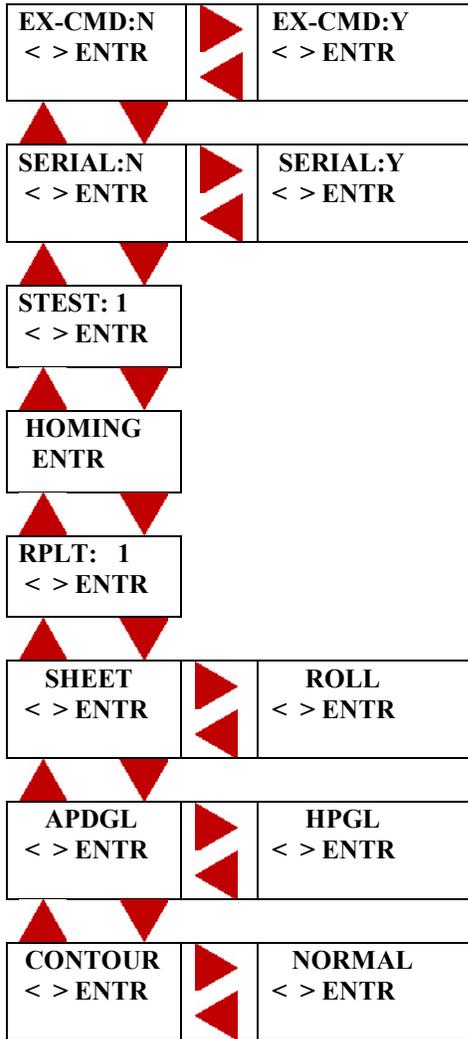
Cutting time

The following pages contain a flow chart (menu tree) that shows the menu functions available. While all menu functions are available while not cutting, only some menu functions are available while cutting.

# Function Menu Flow Charts



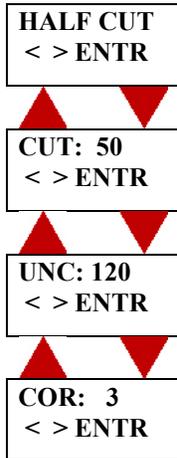
Menu tree (Continued)...



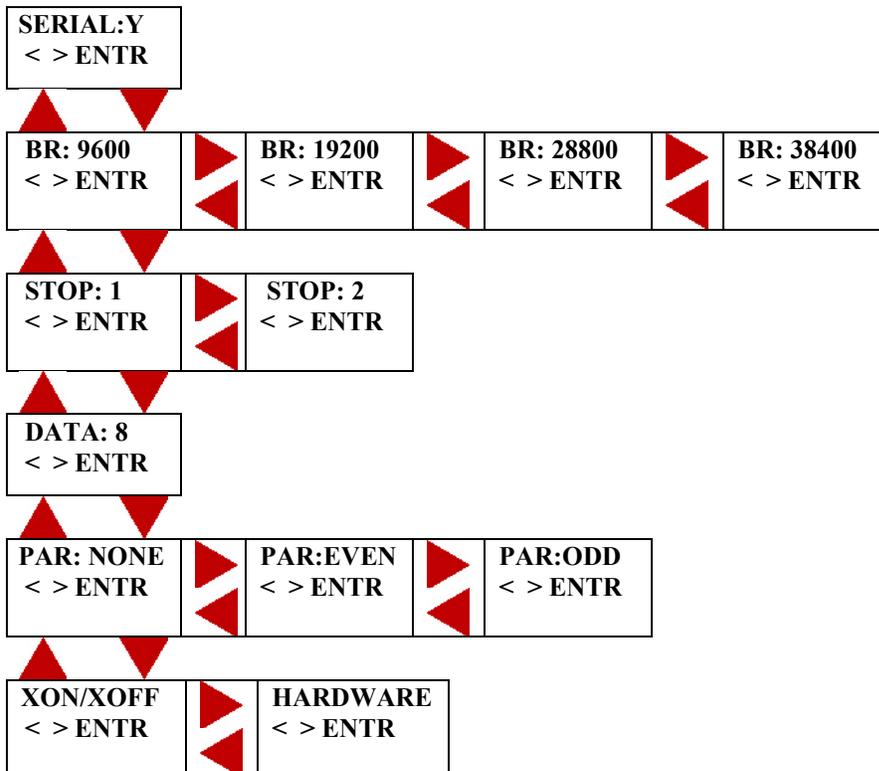
**Pouncing Sub-Menu**



## Half Cut Sub-Menu



## Serial Communication Setting Sub-Menu



Menu tree (Continued)...

### Tool Select Sub-Menu

<b>30 Blade</b> < > ENTR		<b>45 Blade</b> < > ENTR		<b>60 Blade</b> < > ENTR		<b>PEN</b> < > ENTR		<b>POUNCE</b> < > ENTR
-----------------------------	---	-----------------------------	---	-----------------------------	---	------------------------	---	---------------------------

<b>TANGENT</b> < > ENTR		<b>HALF CUT</b> < > ENTR		<b>FABRIC</b> < > ENTR				
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## CONTROL PANEL FUNCTIONS

JOG ^ V < >
Tog ENTER

This menu allows you to jog the pen/knife and material to a new starting position. Also, to “JOG “ and view any portion of the job while the plotter is in pause mode. When the plotter resumes plotting it will return to where it left off and finish the plot. Jogging can only be done while the plotter is not running. As soon as you release the arrow key, plotter will display the X and Y current positions compared to the homing positions. If you like to measure the material, you can re-home plotter and perform jogging.

Press the  key on the keypad to move the material forward.

Press the  key on the keypad to move the material backward.

Press the  key on the keypad to move the cutting head to the left.

Press the  key on the keypad to move the cutting head to the right.

Press the  key on the keypad to toggle the cutting head up and down.

Press the  key on the keypad while in the idle mode to go to additional menu functions; and while in the PAUSE mode to go to RESUME menu.

## Control Panel Functions (Continued)...

$$\begin{array}{l} X = 999.99 \\ Y = 58.99 \end{array}$$

This menu allows you to view the current plotting area in current unit either centimeter or inches. Whenever your plotter is homed the menu will display the current plotting area. It is also the first menu displayed after pressing the  key while in the jogging menu.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

Control Panel Functions (Continued)...



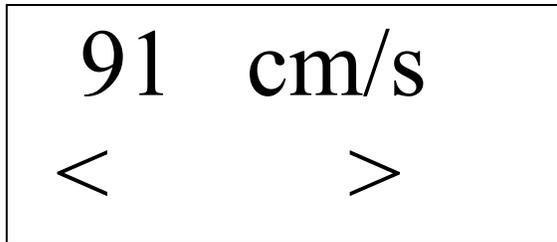
This screen display how many hours and minutes cutter/plotter has been cutting/drawing.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to change the cutting speed of the cutting head between 4-101 centimeters per second (1.6-40 inches per second) for PD2400; and between 4-115 centimeters per second (1.6-45 inches per second). You can change the cutting speed while the plotter is cutting as well as while it is not cutting. Speed settings sent by your computer software may override settings made at the keypad.

Press the  key on the keypad to decrease the speed.

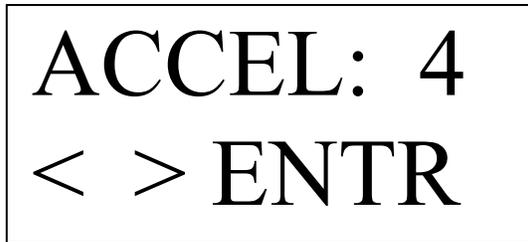
Press the  key on the keypad to increase the speed.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to change the cutting acceleration of the pen/knife between 1-4. You can change the acceleration while the plotter is cutting as well as while it is not plotting. Acceleration setting sent by your computer software may override setting made at the keypad.

Press the  key on the keypad to decrease the speed.

Press the  key on the keypad to increase the speed.

Press the  key on the keypad to go to the previous menu function.

Control Panel Functions (Continued)...

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to change the cutting pressure of the cutting head between 30-400 grams (1-14 ounces). You can change the tool pressure while the plotter is plotting as well as while it is not plotting. Tool pressure setting sent by your computer software may override setting made at the keypad.

Press the  key on the keypad to decrease the tool pressure.

Press the  key on the keypad to increase the tool pressure.

Press the  key on the keypad to confirm the tool pressure you have selected.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

<p>OFST: 0.28</p> <p>&lt; &gt; ENTR</p>
---

This menu allows you to change the tool offset which is automatically set when you select the tool. You should only change this setting only to improve the corner cutting quality with a dull blade. Note: if you select the tool after changing the offset, the preset offset will take placed.

Press the  key on the keypad to decrease the tool offset.

Press the  key on the keypad to increase the tool offset.

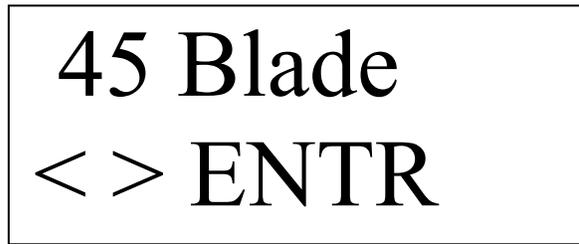
Press the  key on the keypad to confirm the tool offset you have selected.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to select the different tool 30 degree, 45 degree, 60 degree, Pen, Pounce, Tangent (for sandblast material), Half Cut (to cut through paper), or Fabric. You can select the tool while the plotter is plotting as well as while it is not plotting. Note: if you change the tool while plotting, unexpected result may happen.

Press the  key on the keypad to decrease the tool select value.

Press the  key on the keypad to increase the tool select value.

Press the  key on the keypad to confirm the tool select value you have selected.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to “ADVANCE” the material a specified length while plotting. Material advance length setting sent by your computer software may override setting made at the keypad. This feature is useful in improving media tracking of plotter. The number display is in plotter current unit, which is either Inches or Centimeters

Press the  key on the keypad to decrease the material advance value.

Press the  key on the keypad to increase the material advance value.

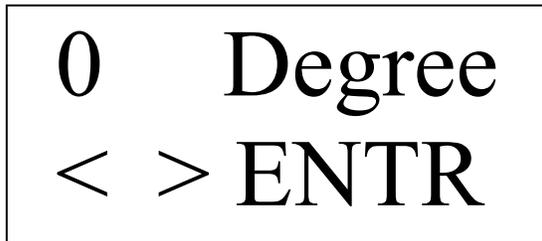
Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to rotate the job 90 degree. By changing the rotation, plotter will move to the new origin which is upper right corner for 0 degree selection or lower left corner for 90 degree selection.

Press the  key on the keypad to select 90 degree

Press the  key on the keypad to select 0 degree.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

**L-DEF: 1**  
**< > ENTR**

This menu will allow you to “LOAD” a speed, pressure and tool select from a default setting between 0-6. Loading default #0 will return your plotter to the factory setting. Default #1 is automatically loaded at power up.

Press the  key on the keypad to decrease the default number.

Press the  key on the keypad to increase the default number.

Press the  key on the keypad to load from the default you’ve selected.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

**S-DEF: 1**  
**< > ENTR**

This menu will allow you to “SAVE” the current speed, pressure and offset to a default setting between 1-6. Saving your current settings to default #1 will allow you to automatically return to them at power up. Saving any default number will change the values for vinyl advance, units, and external commands in all default settings. Note: As soon as machine plot, the current setting will be saved into default # 1.

Press the  key on the keypad to decrease the default number.

Press the  key on the keypad to increase the default number.

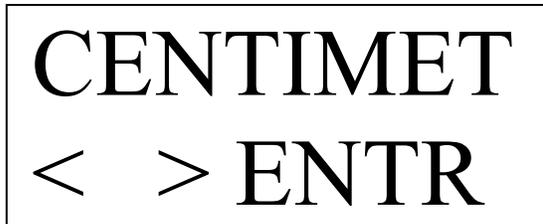
Press the  key on the keypad to save to the default you have selected.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu will allow you to change the plotter display to either metric or inch units.

Press the  key on the keypad to toggle to inch units.

Press the  key on the keypad to toggle to centimeters.

Press the  key on the keypad to confirm the unit setting you have selected.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

<p>EX-CMD:Y &lt; &gt; ENTR</p>
------------------------------------

This menu will allow you to control the speed, pressure, tool select locally from the plotter. Any of the commands sent from the host computer that would modify these settings will be ignored.

Press the  key on the keypad to choose external commands off.

Press the  key on the keypad to choose external commands on.

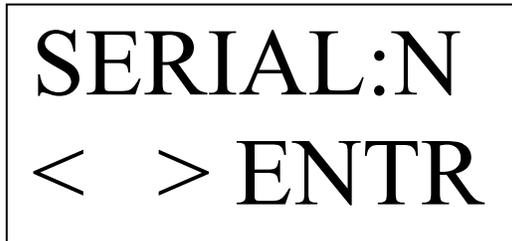
Press the  key on the keypad to confirm the setting you have selected.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu will allow you to change the SERIAL COMMUNICATION (RS232) protocol. Selecting YES will cause the menu to branch to sub menus from which to change the baud rate, data bits, stop bit and parity of the plotter to match the software communication protocol.

Press the  key on the keypad to select NO.

Press the  key on the keypad to select YES.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

<b>BR: 9600</b>
<b>&lt; &gt; ENTR</b>

This menu will allow you to change the “BAUD RATE” of the plotter communications to match the software communication protocol. This menu is only available if YES is selected in the SERIAL: Y menu.

Press the  key on the keypad to decrease down to 9600 baud.

Press the  key on the keypad to increase up to 38400 baud.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

**STOP: 2**  
**< > ENTR**

This menu will allow you to change the “STOP” bits of the plotter communications to match the software communication protocol. This menu is only available if YES is selected in the S-COMM menu.

Press the  key on the keypad to select 1 stop bit.

Press the  key on the keypad to select 2 stop bits.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu will allow you to change the “DATA” bits of the plotter communications to match the software communication protocol. This menu is only available if YES is selected in the SERIAL:Y menu.

Press the  key on the keypad to select 7 data bits.

Press the  key on the keypad to select 8 data bits.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

<p>PAR:NONE</p> <p>&lt; &gt; ENTR</p>
---------------------------------------

This menu will allow you to change the parity of the plotter communications to match the software communication protocol. This menu is only available if YES is selected in the SERIAL:Y menu.

Press the  key on the keypad to change to even or no parity.

Press the  key on the keypad to change to even or odd parity.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to change the handshaking protocol between “HARDWARE” and “XON/XOFF” for software handshaking. This menu is only available if YES is selected in the SERIAL:Y menu.

Press the  key on the keypad to select the xon/xoff.

Press the  key on the keypad to select hardware.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...

<p><b>STEST: 1</b></p> <p><b>&lt; &gt; ENTR</b></p>
---

This menu will allow you to plot four different test patterns. If you wish to draw the test patterns with a pen, select pen in the tool selection menu before drawing. Be sure to select the tool back before cutting. Use test pattern #1 to cut a square, triangle, and circle to help you with pressure and tool select adjustments.

Press the  key on the keypad to decrease the test pattern number.

Press the  key on the keypad to increase the test pattern number.

Press the  key on the keypad to run the test pattern number you have selected.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to home the plotter. Homing should be redone anytime the pinch wheel positions have been changed.

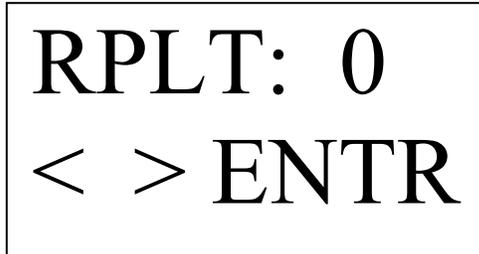
Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to re-plot the last job up to 999 copies. If the last job plotted was larger than the buffer then a re-plot will not be possible.

Press the  key on the keypad to decrease number of re-plot

Press the  key on the keypad to increase number of re-plot

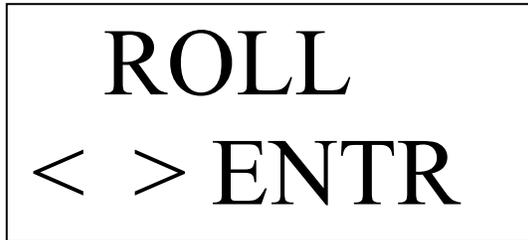
Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to return to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to home for roll or sheet materials. If “ROLL” is selected then the plotter will home only the y-axis carriage. If the “SHEET” is selected then the plotter will home the y-axis carriage and the x-axis material length. The result will be displayed in the plotting area menu.

Press the  key on the keypad to select sheet.

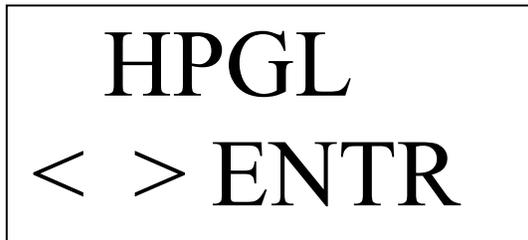
Press the  key on the keypad to select roll.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

## Control Panel Functions (Continued)...



This menu allows you to switch between HPGL (Hewlett Packard Graphic Language) or APDGL (Advanced Plotting Devices Graphic Language). Select HPGL for communication with most of the Sign Software and APDGL for communication with Corel Draw, MicroSoft Word, and Adobe Illustrator.

Press the  key on the keypad to select APDGL.

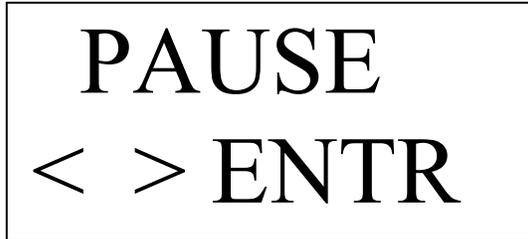
Press the  key on the keypad to select HPGL.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

## Control Panel Functions (Continued)...



This menu allows you to pause or abort the current plot. This menu will appear when the plotter is in a plot mode.

Press the  key on the keypad to select pause.

Press the  key on the keypad to select abort.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

## Control Panel Functions (Continued)...



This menu allows you to resume the current paused plot.

Press the  key on the keypad to select resume.

Press the  key on the keypad to select abort.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to go to the jogging menu.

## Control Panel Functions (Continued)...



This menu allows you to “ABORT” abort a current plot that is in pause mode.

Press the  key on the keypad to select resume.

Press the  key on the keypad to select abort.

Press the  key on the keypad to confirm your selection.

Press the  key on the keypad to go to the previous menu function.

Press the  key on the keypad to go to the following menu function.

Press the  key on the keypad to go to the jogging menu.

# Plotting From Software

Your *APD Extreme Series* plotter will respond to standard HPGL lower left origin commands (Refer to HPGL Commands).

You can cut or draw from HPGL files sent from any computer, which has been set up for the following default configuration:

Baud Rate..... 9600  
Data Bits ..... 8  
Stop Bits..... 2  
Parity..... None  
Handshake..... Hardware

These parameters are usually set up in your driver software. If your software cannot be operated at these settings then you may change the plotters default communication protocol. Refer to the menu functions on how to do this.

# Material Advance

The material advance function of your *APD Extreme Series* plotter will allow you to plot long jobs and do more than one job unattended. The material advance function will automatically advance material while the job is being plotted.

## **Material Advance Operation**

The material advance function automatically advances a specified distance of material as the plotter plots so you do not have to feed out material before beginning to plot. This allows the plotter to gently pull the material off the roll as the job is being plotted. This also aids the alignment of the material being plotted and makes it possible to do very long jobs without feeding all of the material for the job out at one time.

For instance, if you have a job 300cm (118 in) long, you can set it to only plot 100cm (39in) at a time. The plotter will advance the material 100cm (39 in) at the start and then begin to plot. As the plotter comes to the end of the material it will roll additional material off the roll and continue again and again until the job is completed.

## **Software Operation**

The material advance length can be set at the plotter menu or it can be sent from software.

If you are using a software program that does not control the material advance length then the plotter will use the advance length set in the plotter menu. If the material advance length is set to 0 the material advance will be shut off.

# Print & Cut

With the optional APD light indicator device, you can accurately locate and position printed media for cutting on the Extremes Series Plotter. With the APD lighted indicator, you can easily locate the image registration mark by using jog keys.

Many of the sign design software programs that support inkjet or thermal printing have limited special functions that support the APD lighted indicator use for locating registration mark. Other sign design software programs have additional enhanced functions designed to automatically adjust the output by rotating the image to match the mis-aligned image on the media already on the plotter. These enhanced functions are designed to work with the “Digitize Point” feature found in the firmware for the APD Extremes Series Plotters.

- 1- Follow the steps in your software’s documentation to create a cutting job and add the contour cut lines around the objects in that job.
- 2- Follow the print instructions in your software documentation to print the job with the contour cut lines.
- 3- After printing the image load the image into the plotter and orient the job as described in your software’s documentation. The image does not need to be perfectly square loaded into plotter; the plotter is able to handle any possible skew, shrink, and stress of the images.
- 4- Place the APD light indicator into the tool holder and adjust the light indicator to be in focus if it is not.
- 5- The EX-CMD in the menu must be set to Yes. Vinyl Advance must be set to 0 in the ADV: menu
- 6- From the software, use the instructions to send the job to the plotter to cut the contour lines.
- 7- At this point the software should have sent the “PC” command (stand for print and cut), the plotter LCD should display the following

**DIG.<>^v**  
**#1 ENTR**

- 1- Use the arrow keys on the plotter keypad to move the indicator light to the center of the first image registration mark, which is in the upper left hand corner as you are looking at the plotter. Once this point is located, press ENTER key to enter coordinate of this point into plotter's memory.
- 1- Continue to move the indicator light by pressing the arrow keys to the center of second registration mark which is below the first registration mark (lower left corner). Press ENTER to confirm the coordination of this second point.
- 2- Continue to move the indicator light by pressing the arrow keys to the center of third registration mark which is on the right of second mark (lower right corner). Press ENTER to confirm the coordination of this third point.
- 3- After entering all three points, the LCD should display the following:

**START: Y**  
**< > ENTR**

- 1- At this point, if you need to re-enter any registration mark, you must press left arrow key to change from "Y" to "N" and press ENTER key to go back to step 7. If you do not need to re-enter the points, go to step 13 without pressing ENTER key
  - 2-
- 8- Replace the indicator light with knife and press the ENTER key to start cutting.

# Pouncing

With the optional APD ounce kit you can make perforated paper patterns that used with a charcoal or chalk pounce bag will allow you to transfer an image to a surface for hand painting or cutting. Typical applications for using a pounce pattern include wall or rough surface lettering, bulletin lettering, large sandblast stencil cutting, etc.. on large plastic faces before spraying painting, etc...

A pounce pattern is a paper pattern with perforated holes through the surface. These are located along the outline of the image to be transferred. The pattern is then aligned and taped temporarily to the surface where the pattern is to be transferred, then a small cloth bag filled with chalk or charcoal is “pounced” and rubbed over the holes to transfer the image through to the surface. After the pattern is removed there will be many small dots of powder on the surface of the patterned area indicating the shape of the image. After the surface is cut or painted (and it has dried), the charcoal or chalk can be easily wiped away.

## Plotter Setup

- 1- In the plotter menu, go to the pounce function by pressing the MENU key to enter the menu functions and then pressing the up arrow key until the following menu appears:

<b>45 Blade</b> <b>&lt; &gt; ENTR</b>
--

- 1- Press the right arrow key until the following menu appears and press the ENTER key to confirm

<b>POUNCE</b> <b>&lt; &gt;ENTR</b>
---------------------------------------

Pouncing (Continued)...

- 1- After press ENTER key to confirm, the following menu appears:

FINE < >ENTR
-----------------

- 1- Press the Left and Right arrow key to change MEDIUM and COARSE pouncing. Use FINE for small letters and COARSE for large letters.

### **Final setup and pouncing operation**

- 1- Place the magnetic pounce strip over the front platen so that the Teflon strip is covered by one edge of the magnetic pounce strip. This will protect the Teflon strip during plotting. If the pounce strip is worn, you can shift the strip to a new location or reserved it to expose a new fresh surface.
- 2- Replace the cutting blade or pen with pounce tool and tighten the thumbscrew to secure the tool.
- 3- Load the paper to be pounced just like loading vinyl for cutting.
- 4- Adjust the pressure between 250 – 3350 grams and start pouncing
- 5- Remove pattern from plotter, turn over and sand the back side lightly with 100 – 120 grit sand paper. This will open up the holes for better transfer of the image.
- 6- Position and tape the pattern to the surface to be created and pat lightly with the charcoal or chalk pounce bag along the outline of the pounced image. Rub the loose charcoal or chalk on the surface of the pattern over the surface of the pattern to distribute through the holes.
- 7- Remove the pattern from the face of the applied surface.

# Paper Cutting

The half cut function of your APD Extremes Series plotter will allow you to cut paper or card. Some uses for this function includes cutting out vinyl decals, individual vinyl letters, paper patterns for clothing prototype and head transfer papers for cloth banner manufacturing.

## Cutting paper using half cut

- 1- Use APD part #xxxx-xx (roll foam protective strip) and cut a strip the length of the platen. Install the foam strip by pressing the adhesive back along the platen surface. This strip will protect the platen from any blade damage while cutting through paper.
- 2- Adjust the blade holder cap until the tip of the cutting blade is just protruding through enough to cut through the paper.
- 3- Load the paper to be cut and put the cutting tool in the tool holder
- 4- Cut self test pattern 1 to test the depth of the blade. Adjust the blade holder cap until the blade just cuts through the surface of the paper.
- 5- In the plotter menu, go to select Half Cut function by pressing the MENU key to enter the menu functions and hit the up arrow key until the following menu appears:

**45 Blade**  
**< > ENTR**

- 1- Press Right arrow key until the following menu appear

**HALF CUT**  
**< > ENTR**

- 1- Press ENTER key to confirm and the following menu will appear. This menu allow you to enter the cut length in millimeters

**CUT: 50**  
**< > ENTR**

- 1- Press the down arrow key will bring up the following menu. This menu allow you to enter the uncut length in millimeters

**UNC: 1.20**  
**< > ENTR**

- 1- Press the down arrow key will bring the following menu. This menu allows you to specify the corner length (both direction) in millimeters.

**COR: 3**  
**< > ENTR**

10- You can change these value and test result until the cutting quality is satisfactory. Normally thinner paper requires higher settings for the uncut and corners value and lower setting for the cut value. Thicker paper requires lower settings for the uncut and corner values and higher setting for the cut value.

# Engraving

With the optional *APD* engraving tool you can scribe on the surface of thin metals and plastics. By using fill patterns and decorated lines in your software you can create very professional looking engravings.

As the *APD* engraving tool is a scribe, only materials designed for scribe engraving may be used. The best materials to use are the kinds that are designed for trophy engraving. Trophy engraving materials are thinner than the heavier materials designed for milling engravers and they have thinner coating on the top surface that is designed to be “scribed” off to expose a different colored surface below (usually the metal itself).

There are several different types of trophy engraving materials that are compatible with the *APD* engraving tool. Generally these are made of aluminum or brass and they have either a painted or anodized top surface. They are also very thin (usually 0.020” – 0.030” or 0.5 – 0.75 mm) although thicker materials may be evaluated and tested for use.

## **Materials preparation and plotter setup for engraving**

- 1- Apply polyester shipping tape to the back of the engraving material in several strips along the axis that the engraving material will be moving across the platen of the plotter. Make sure that you have a strip under each pinch wheel as well as additional strips to protect the platen from damage as the metal passes back and forth over the platen. This also improves the tracking with soft metals such as aluminum.
- 2- Load the engraving material on the plotter so that the front edge of the engraving material is located even with the front edge of the Teflon cutting strip and lower the pinch wheels of the engraving to secure. You may move the pinch wheels very close to the left and right edges of the engraving material if the material is square on the plotter. Be sure to allow about 1.25” or 32mm extra engraving material in the rear so the engraving material will not come out from underneath the pinch rollers before the job is completed. To get best usage out of your material you can try homing the plotter with the

pinch wheels at a wider setting than the material and then moving them in and on to the engraving material before scribing. Caution must be used when doing this to avoid sending a job larger than the engraving material as the plot window will allow the tool to scribe right off the edge.

- 3- **Turn off the vinyl advance function** both on the plotter and software.
- 4- **Select the PEN in the tool selection menu.** The normal offset that produces square corners when cutting vinyl will produce small arcs at the corners when engraving. With some software you may also need to set the External Command to No, so that the software will not override the pen selection setting.
- 5- Set the plotter speed to 5 – 10 cm per second and the tool pressure between 180 – 400 grams. You should test the speed and pressure on any new material you use.
- 6- Insert the *APD* engraving tool into the tool holder and tighten the thumbscrew.
- 7- Create an engraving jog using line and hatching fills. The scriber will need hatching spacing set to about 0.005” or 0.125 mm for a solid fill. Use wider hatching fills for gray scale type effects.
- 8- Send the job to the plotter to engrave.

# Material Applications

The following pages give recommendations on the proper settings for the cutting of various materials on your *APD Extreme Series* plotter.

## **High Performance Vinyl**

These are high quality cast films available in a wide variety of colors. They are about 2 mils thick with either a paper or polyester backing. Light pressure is used to ensure the vinyl is cut through without cutting through the backing.

*Blade= 45 degree APD Part # PD-1222*

*Speed= 101cm or lower*

*Pressure= 60-100 grams*

*Depth=Expose blade fully*

## **Intermediate Vinyl**

These are medium quality calendared films available in a wide variety of colors. They are about 3-4 mils thick with either a paper or polyester backing. Medium pressure is used to ensure the vinyl is cut through without cutting through the backing.

*Blade= 45 degree APD Part # PD-1222*

*Speed= 101cm or lower*

*Pressure= 90-180 grams*

*Depth=Expose blade fully*

## Material Applications (Continued)...

### **Reflective Vinyl**

These are medium duty films with a high rate of light reflectivity. They are a little heavier than normal vinyl films and they have a paper or polyester backing. Medium pressure is all that is needed to ensure a good cut.

*Blade= 45 degree APD Part # PD-1222*

*Speed= 91cm or lower*

*Pressure= 120-180 grams*

*Depth=Expose blade fully*

### **High Intensity Reflective Film**

These are heavy-duty films with a extremely high rate of light reflectivity. They are much heavier than normal vinyl films and they have a thin backing that is softer than the film itself. Heavy pressure is needed to ensure a good cut. Precise depth adjustment is necessary to ensure that the backing is not cut trough while the film is being cut.

*Blade= 60 degree APD Part # PD-1224*

*Speed= 50cm or lower*

*Pressure= 250-350 grams*

*Depth=Adjust blade depth so that the exposed blade will only cut the reflective film, but not the backing material.*

## Material Applications (Continued)...

### **Sandblast Stencil**

These are thick materials used as stencils on the surface of a material that is being sandblasted. They come with either paper or polyester backings. The paper backed types require depth adjustment so that the backing is not cut through while the film is being cut. The polyester backed materials can be cut without depth adjustment but depth adjustment increases blade life.

*Blade= 60 degree APD Part # PD-1224*

*Speed= 50cm or lower*

*Pressure= 250-350 grams*

*Tool = Tangent*

*Depth=Adjust blade depth so that the exposed blade will only cut the reflective film, but not the backing material.*

### **Rubylithe & Amberlithe**

These materials are used for making film positives for the silk-screen process. They are thin translucent materials with a polyester backing. Light pressure is used to prevent cutting through the backing. If the pressure is too light then the blade will not swivel properly in the material while cutting.

*Blade= 45 degree APD Part # PD-1222*

*Speed= 101cm or lower*

*Pressure=50-90grams*

*Depth=Expose blade fully*

## Material Applications (Continued)...

### **Silk Screen Stencil Films**

These water or lacquer based materials are used for making stencils for the silk-screen process. They are thin translucent materials with a polyester backing. Light pressure is used to prevent cutting through the backing. If the pressure is too light then the blade will not swivel properly in the material while cutting.

*Blade= 30 degree APD Part # PD-1223*

*Speed= 101cm or lower*

*Pressure=50-100 grams*

*Depth=Expose blade fully*

### **Heat Transfer Films**

These materials are heat transferred to fabrics. The recommended type for cutting by the *APD Extreme Series* plotter is similar to vinyl in nature. Ink based heat transfer films are not recommended because the bond of the film to the backing is not strong enough to allow good cutting and weeding.

*Blade= 45 degree APD Part # PD-1222*

*Speed= 91 cm or lower*

*Pressure=100-150 grams*

*Depth=Expose Blade Fully*

Material Applications (Continued)...

### **Heat Transfer Flocks**

These materials are heat transferred to fabrics. The recommended type for cutting by the *APD Extreme Series* plotter has the flock side toward the backing while the transfer side is exposed towards the top of the film. The blade need only cut through the top glue or transfer layer and not the whole thickness of the film in order get a good quality cut. Depth adjustment is necessary in order to only cut through the glue or transfer surface.

*Blade= 60 degree APD Part # PD-1224*

*Speed= 91cm or lower*

*Pressure=100-150 grams*

*Depth=Adjust Blade Depth*

### **Paper**

You can draw patters on your *APD Extreme Series* plotter. In order to get a good quality drawing you will need to set the tool offset to 0.

*Pen= APD Part # PD-20BU-A (blue) & PD-20RD-A (red)  
& PD-20BK-A (black)*

*Speed= 101cm or lower*

*Pressure=80-100grams*

*Tool = Pen*

*Depth=Not Applicable*

## **Pounce Pattern**

You can pounce paper patterns on your *APD Extreme Series Plotter*. Refer to the pounce instructions and the pounce function in the control panel section of the manual.

*APD Pounce Kit Part # PD-7000*

*Speed= 101cm or lower*

*Pressure=250-350grams*

*Tool = Pen*

*Depth=Not Applicable*

## **Paper Cutting**

You can cut paper on your *APD Extreme Series plotter*. Refer to the paper cutting instructions and the half cut function in the control panel section of the manual

*Blade=45 degree APD Part # PD-1222*

*Foam Strip=Cut from APD Part # PD-7001*

*Speed= 50cm or lower*

*Pressure=70-100grams*

*Depth=Adjust blade depth so that the exposed blade will just cut through the paper*

## **Engraving**

You can scribe engraving sheet of material on you *APD Extreme Series* plotter. In order to get a good quality engraving you will need to select PEN in the tool selection menu.

*APD Tool Part # PD-7002*

*Speed= 10cm or lower*

*Pressure=200-400grams*

*Tool = Pen*

*Depth=Not Applicable*

## HPGL Commands

The *APD Extreme Series* will respond to a generic type of lower left origin HPGL. The following sample program in the Basic language draws a square 1000 plotter units square.

```
Open "Com2:9600,n,8,1" For Output As #1
Print #1, "IN;VS 91;SP1;PA;"
Print #1, "PU 0,0;PD1000,0,1000,1000,0,1000,0,0;PU 0,0"
Close #1
```

For a quick reference of the HPGL commands, see Appendix B. The *APD Extreme Series plotter* responds to the HPGL type commands listed on the following pages...

HPGL Commands (Continued)...

## **"IN" Initialize**

**Format:** IN;  
**Output:** none  
**Input:** none

Initializes the plotter and resets for the start of a job.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random As #1  
Print #1, "IN;"
```

## **"OH" Output Hard Clip Limits**

**Format:** OH;  
**Output:** none  
**Input:** xmin, ymin, xmax, ymax

Returns the minimum and maximum plotting area in units per millimeter. X and Y min are always 0. X max is always 999999 or infinity, while Y max is the width between the friction rollers.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;OH;"  
Input #1, xmin, ymin, xmax, ymax  
Print xmin, ymin, xmax, ymax
```

HPGL Commands (Continued)...

## **"OF" Output Factor**

**Format:** OF;  
**Output:** none  
**Input:** xfactor, yfactor.

Returns the current plotter factor. The internal factor is the plotter resolution based on a 1mm x 1mm (.3937" X .3937) square.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1
Print #1, "IN;OF"
Input #1, xfactor, yfactor
Print xfactor, yfactor
```

## **"VS" Velocity Select**

**Format:** VS n;  
**Output:** n 0 - 91 (default = 91)  
**Input:** none

Changes the maximum plotting speed in centimeters per second.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random As #1
Print #1, "IN;VS 91;"
```

HPGL Commands (Continued)...

## **"SP" Select Pen**

**Format:** SP n;  
**Output:** n 0 or 1 (default = 0 )  
**Input:** none

Sending any value other than 0 will put the plotter into draw mode.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;SP 0;"
```

## **"RS" Resolution**

**Format:** RS n;  
**Output:** n 39.37, 40, 100, 236.22 or 393.7 (default = 39.37)  
**Input:** none

Changes the output factor in units per millimeter. Affects all input and output dimensions.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;RS 2540;"
```

HPGL Commands (Continued)...

## **"TP" Tool Pressure**

**Format:** TP n;  
**Output:** n 30 - 400grams (default = 100)  
**Input:** none

Changes the cutting and drawing tool pressure in grams.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;TP 120;"
```

## **"TO" Tool Offset**

**Format:** TO n;  
**Output:** n in current factor (default = 11)  
**Input:** none

Changes the blade offset for cutting. This produces sharp corners from the swivel knife output.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;TP 20;"
```

HPGL Commands (Continued)...

## "AO" Angle Offset

**Format:** AO n;  
**Output:** n in degrees (default = 30)  
**Input:** none

Changes the angle at which blade offset for cutting is applied. Offset is not applied to vector angles below this angle.

### EXAMPLE:

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;AO 45;"
```

## "PA" Plot Absolute

**Format:** PA; or PA x,y;  
**Output:** x, y in current output factor  
**Input:** none

Sets the plotter for absolute mode for all subsequent PU or PD moves. All subsequent moves are absolute to the origin.

### EXAMPLE:

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;PA;"
```

## HPGL Commands (Continued)...

### **"PR" Plot Relative**

**Format:** PR; or PR x,y;  
**Output:** x, y in current output factor  
**Input:** none

Sets the plotter for relative mode for all subsequent PU or PD moves. All subsequent moves are relative to the current position.

#### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;PR;"
```

### **"PU" Pen Up**

**Format:** PU; or PU x,y;  
**Output:** x, y in current output factor  
**Input:** none

Lifts the tool to the up position. This command affects all subsequent PA or PR moves. Also moves the tool to the position x, y with the tool in the up position.

#### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;PU 1000,1000;"
```

## HPGL Commands (Continued)...

### **"PD" Pen Down**

**Format:** PD; or PD x,y;  
**Output:** x, y in current output factor  
**Input:** none

Lowers the tool to the down position. This command affects all subsequent PA or PR moves. Also moves the tool to the position x, y with the tool in the down position.

#### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;PD 1000,1000;"
```

### **"VL" Advance Length**

**Format:** VL;  
**Output:** none  
**Input:** 0-10000000 Per current unit

Sets the distance that material is advanced automatically while being plotted. Setting the value to 0 will shut off the material advance function.

#### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;VL 10000;"
```

## "IW" Input Plotting Window Area

**Format:** IW xmin, ymin, xmax, ymax;

**Output:** none

**Input:** xmin, ymin, xmax, ymax

Sets the window area that the plotter will be allowed to plot within. The X and Y min are the coordinates of the lower left corner of the window. The X and Y max are the coordinates of the upper right corner of the window. All values are in the units of the plotters current resolution settings measured from the plotter origin or absolute position. Values can not exceed the homed limits of the plotter.

If the plotter receives data that is outside the window area the tool moves from its current position toward the specified point, but stops and raises when reaching the border of the window. If additional data moves the tool to a point within the window area, the tool restarts plotting from where that line would intersect the border of the window

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1
Print #1, "IN;IW xmin,ymin,xmax,ymax;"
```

HPGL commands (continued)...

## **"OW" Output Plotting Window Area**

**Format:** OW;  
**Output:** xmin,ymin,xmax,ymax  
**Input:** none

Return the coordinates of the current plotting window area (see the IW command to set the window area). The X and Y min are the coordinates of the lower left corner of the window. The X and Y max are the coordinates of the upper right corner of the window. All values are in the unit of plotter current resolution settings measured from the plotter origin or absolute position.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1
Print #1, "OW;"
Input #1, xmin,ymin,xmax,ymax
Print xmin,ymin,xmax,ymax
Close #1
```

## **"OD" Output Digitize Point**

**Format:** OD;  
**Output:** none  
**Input:** X-position, Y-position

Return a digitized point generated by the "DP" command

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1
Print #1, "IN;OD;"
Input #1, X-position,Y-position
Print X-position,Y-position
```

HPGL Commands (Continued)...

## "OA" Output Actual Tool Position

**Format:** OA;  
**Output:** X-position,Y-position,tool position  
**Input:** none

Returns the current X and Y positions and the tool status. The X and Y position values are in the units of the plotters current resolution settings and correspond to the current position from the last homing position of the plotter. The tool status will be either 0 for up or 1 for down.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1
Print #1, "OA;"
Input #1, xpos,ypos,ztool
Print xpos,ypos,ztool
Close #1
```

## "PC" Print and Cut Contour Lines

**Format:** PC;  
**Output:** X-size,Y-size  
**Input:** none

Sends the job dimensions in the plotters current resolution units and puts the plotter into the Contour Cut function mode.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1
Print #1, "PC x,y;"
Close #1
```

HPGL Commands (Continued)...

## **"DP" Digitize Point**

**Format:** DP;  
**Output:** none  
**Input:** none

Enters the Digitize mode. Pressing the ENTER key on the plotter menu will store the current X and Y position for output by the "OD" command.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;DP;"
```

## **"DC" Digitize Clear**

**Format:** DC;  
**Output:** none  
**Input:** none

Exits the Digitize mode.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1  
Print #1, "IN;DC;"
```

HPGL Commands (Continued)...

## **"AS" Acceleration**

**Format:** AS n;  
**Output:** n 1-4 (default = 4)  
**Input:** none

Changes the maximum acceleration while plotting.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1
Print #1, "IN;AS 3;"
```

## **"MM" Output Machine Model**

**Format:** MM;  
**Output:** EXTREME SERIES PLOTTER  
**Input:** none

Return the machine model name "EXTREME SERIES PLOTTER". All letters are upper case.

### **EXAMPLE:**

```
Open "COM2:9600,n,8,1" For Random as #1
Print #1, "MM;"
Input #1, model
Print model
Close #1
```

# Maintenance

## **IMPORTANT:**

**Keep your *APD Extreme Series* plotter in a clean environment. Do not allow metallic filings to come in contact with the plotter. Do not let any conductive material get into Electronics through vacuum holes.**

## **Maintenance**

Your *APD Extreme Series* plotter is designed to operate reliably with only minor attention to the following details:

- 1) Keep the plotter clean and dry. You can clean the plotter with a soft cloth dampened with a mild detergent diluted with water (rubbing alcohol is OK). Never spray liquid directly on the plotter.
- 2) Regularly clean the rail supporting the head (Y Axis Rail). Clean the top and bottom surfaces that the head bearings run on with rubbing alcohol. Do not oil the rail.
- 3) Do not attempt to oil any bearings or surfaces on the plotter. All bearings are sealed with internal grease. All friction surfaces have been designed with low friction materials for long life.
- 4) If the cutting strip imbedded in the platen is worn or damaged by the normal operation, contact *APD* for replacement strips.

# Testing Your Plotter

## PLOTTER TEST

After loading material and adjusting the pressure, you are ready to test cut. Refer to the Control Panel section for test patterns.

## COMMUNICATION TEST FOR DOS SYSTEMS

1) Enter the following file into text file. You can use the DOS Editor program or any word processing program that can save a DOS text file.

```
IN;  
VS 91;  
SP1;  
PA;  
PU 0,0;  
PD1000,0,10000,10000,0,10000,0,0;  
PU 0,0;
```

2) Save this file as TEST.TXT and exit the editor.

### **IMPORTANT:**

**If your output port is COM1, 2 or 3 then substitute the proper COM port into the following MODE and COPY commands.**

3) If your communications output port is COM2 then enter at the DOS prompt: "MODE COM2:9600,n,8,1" and press ENTER. This will set up COM2 for direct output.

4) Enter at the DOS prompt: "COPY TEST.TXT COM2" and press ENTER. This will copy the file out through COM2 to the plotter.

# Troubleshooting

## **PLOTTER WILL NOT BOOT UP**

- |                                       |                          |
|---------------------------------------|--------------------------|
| 1) Power switch not on.               |                          |
| 2) Power cord not connected properly. | (See Connecting Plotter) |
| 3) Bad fuse.                          | (See Appendix B)         |
| 4) Faulty power source.               | (Check with Electrician) |

## **PLOTTER WILL NOT PLOT**

- |  |                           |
|--|---------------------------|
| 1) Data cable not connected properly.                | (See Connecting Plotter)  |
| 2) Software communication protocol not set properly. | (See Plotting from Soft.) |
| 3) Software language not compatible.                 | (See HPGL Commands)       |
| 4) Communications board faulty.                      | (Check with Vendor)       |

## **MATERIAL CUTTING TOO SHALLOW**

- |   |                      |
|---|----------------------|
| 1) Blade dull.  |                      |
| 2) Cutting pressure too low.                            | (See Material Apps.) |
| 3) Blade depth adjusted too low.                        | (See Blade Adjust.)  |
| 4) Material too thick or too tough to cut with plotter. | (See Material Apps.) |

## **MATERIAL CUTTING TOO DEEP**

- |                                  |                      |
|----------------------------------|----------------------|
| 1) Cutting pressure too high.    | (See Material Apps.) |
| 2) Blade depth adjusted to high. | (See Blade Adjust.)  |

## **MATERIAL NOT WEEDING PROPERLY**

- |  |                      |
|--|----------------------|
| 1) Blade offset wrong.                   | (See Material Apps.) |
| 2) Material cut too shallow or too deep. | (See Material Apps.) |
| 3) Wrong blade angle.                    | (See Material Apps.) |
| 4) Cutting speed too fast for material.  | (See Material Apps.) |

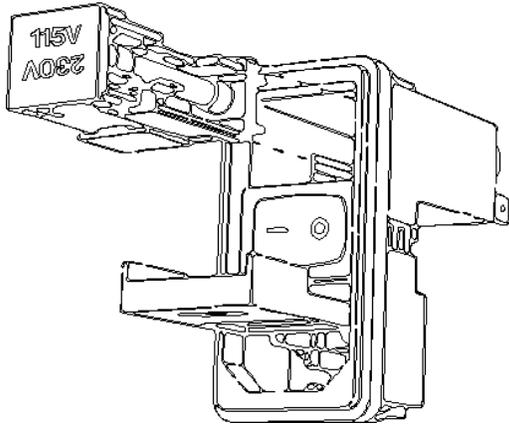
# Appendix A

## HPGL Command Listing

IN	Initializes the plotter
OH	Returns xmin, ymin, xmax, ymax (current factor)
OF	Returns current factor (39.37, 40, 100, 236.22, 393.7)
VS n	Velocity select (0 - 101)
SP n	Pen select (0=Cut, 1=Draw)
RS n	Resolution or current factor (39.37, 40, 100)
TP n	Tool pressure (30-400 grams)
TO n	Tool offset (current factor)
AO n	Offset Angle (10 - 45 degrees default 30)
PA x,y	Plot absolute (current factor)
PR x,y	Plot relative (current factor)
PU x,y	Pen up (current factor)
PD x,y	Pen down (current factor)
VL n	Advance Length (current factor)

# Appendix B

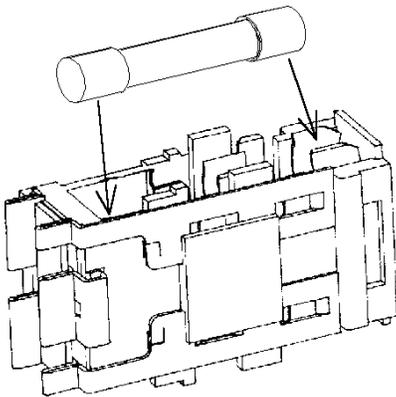
## CHANGING VOLTAGE



To change selected voltage:

Remove the fuse cartridge by using a small screwdriver or similar tool to open the fuse compartment cover, then lift out the fuse cartridge by gently prying it out with screwdriver. Turn the cartridge 90 degrees and slide it back inside the compartment. The desired voltage should read through the window when the cover is closed.

## CHANGING FUSES



To change the fuse:

Remove the fuse cartridge (refer to changing voltage). Remove the fuse with small screwdriver. Insert the fuse by pushing it firmly into holder until locked into place. Re-insert the fuse holder with the proper voltage showing through the windows (refer to changing voltage).

# Appendix C

## ERROR MESSAGES (LCD Display), Possible causes, and Corrective action.

	<b>Error Message</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
<b>1</b>	<b>M-ERR: Y &lt; &gt; ENTR</b>	Media punched up or rear media sensor is not working properly.	<ul style="list-style-type: none"> <li>- Check Media to make sure media stays flat.</li> <li>- Contact APD Service department for sensor replacement</li> <li>- Changing from Y to N and continue to operate plotter.</li> </ul>
<b>2</b>	<b>EEPROM-F ENTER</b>	The eeprom which holds all the default values is either flaky or gone bad	<ul style="list-style-type: none"> <li>- Turn off plotter, wait for 1 minute, then on plotter.</li> <li>- If problem persist, call APD technical support department for further instructions</li> </ul>
<b>3</b>	<b>JOB:EMPT ENTER</b>	Plotter internal buffer does not contain a job to replot.	Send a new job to plotter from host computer
<b>4</b>	<b>JOB:LARG ENTER</b>	The last job sent to plotter from host is more than plotter available memory	Send a new job to plotter from host computer

<b>5</b>	<b>CLIP X &lt; &gt; ENTR</b>	The plotted data for current job is fall outside X window. This only happen when <b>sheet</b> is selected	Either change to ignore or abort the current job and send new job, which fit into current sheet setting.
<b>6</b>	<b>TIME-EXP</b>	The leased time for plotter is expired	Contact your dealer or distributor for further instruction and/or agreement.
<b>7</b>	<b>ZERO-ERRR RE-START</b>	Possible caused by invalid data sent from host computer	Turn off both plotter and host computer. Wait 1 minute and turn on both
<b>8</b>	<b>X-ERROR RE-START</b>	<ul style="list-style-type: none"> <li>- Media jammed.</li> <li>- Pulling media from heavy roll at high speed.</li> <li>- Cutting speed is too high for heavy material.</li> </ul>	<ul style="list-style-type: none"> <li>- Correct media</li> <li>- Enable Media Advance feature, so media can be slowly pulled from roll.</li> <li>- Slow down cutting speed for heavy material</li> </ul>
<b>9</b>	<b>Y-ERROR RE-START</b>	<ul style="list-style-type: none"> <li>- Media punched up</li> <li>- Some physical interference on the movement of carriage head</li> </ul>	<ul style="list-style-type: none"> <li>- Correct media</li> <li>- Make sure there is no physical interference with the movement of head carriage.</li> </ul>
<b>10</b>	<b>INV DATA RE-START</b>	<ul style="list-style-type: none"> <li>- Data sent from host are invalid</li> <li>- Serial communication is not reliable</li> </ul>	<ul style="list-style-type: none"> <li>- Turn off both plotter and host computer, and turn on both</li> <li>- Check serial communication cable and make sure the communication protocol is same for both plotter and host PC.</li> </ul>

11	<b>COMM-ERR RE-START</b>	- Possibly caused by bad RS232 cable	<ul style="list-style-type: none"> <li>- Turn off both plotter and host PC, and turn on both.</li> <li>- Check serial communication for any visual defect</li> <li>- If problem persist, contact APD Technical Support.</li> </ul>
12	<b>MEM-ERR RE-START</b>	- Possibly main PCB gone bad	- Turn off plotter, wait 1 minute, and turn it back on.

