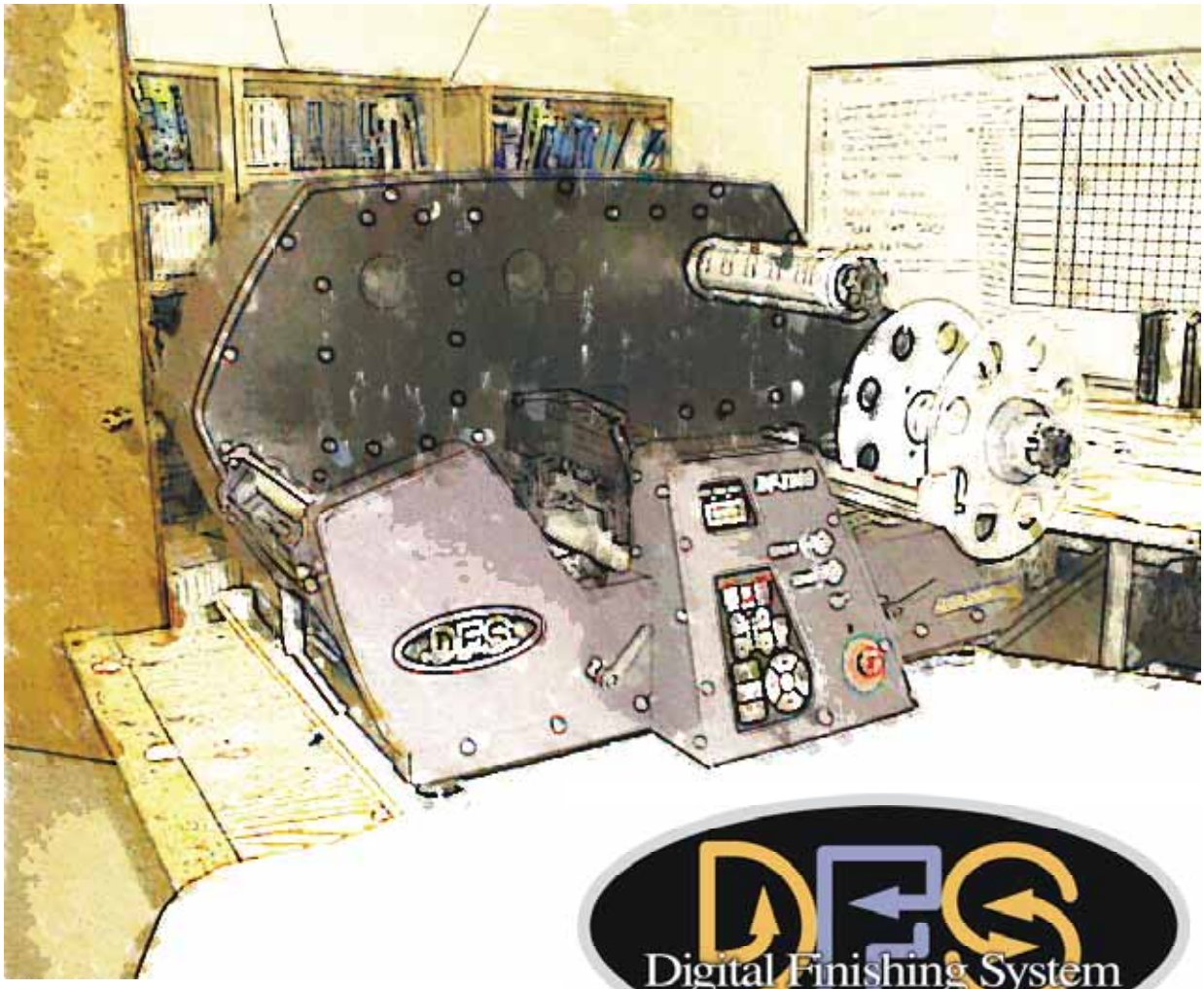


Digital Finishing System

U S E R ' S

M A N U A L

This document is designed to be compatible with build 23 of the DFS software. Other versions of DFS software may show minor differences in menus. Dated 8-10-6

Limited Warranty Agreement

ALLEN DATAGRAPH Digital Finishing Systems 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 one (1) year from the date of installation. All warranty services are performed at the Allen Datagraph factory. Replacement parts not installed at the factory 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 that 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.

Technical Support

Up to 4 hours of calls in technical support is available at no charge during the warranty period. Technical support is available during business hours based on Eastern Time Monday thru Friday. Technical support outside the limits stated will be billed at current rates.

For Technical support call: 603-893-1983

There are many online documents available to help you to use the DFS at our technical support page at http://www.allendatagraph.com.

Installation

Setup

Some Allen Datagraph products require specialized installation in order for the limited warranty to remain in effect, ask your dealer or contact technical support at Allen Datagraph for details. Unpack all accessories from the unit. See installation and assembly instructions in Appendix A.

POWER CONNECTION

Important Note: Use of a HIGH QUALITY surge protector or uninterruptible power supply (600 watts) is REQUIRED by Allen Datagraph Systems. Failure to do so could affect your warranty coverage if a problem arises due to improper power connection.

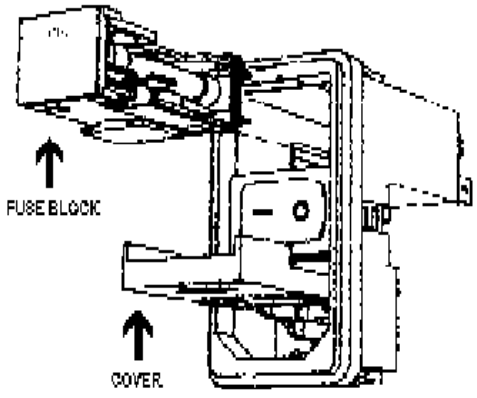
CAUTION: The power cord is a three-conductor cable that incorporates a safety (earth) ground connection. For the machine to operate safely and correctly, the power cord *must* be plugged into an outlet that has an earth ground contact. *Never* plug the power cord into a two-prong outlet by using a 3=2 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!
Allen Products can be configured to operate from any of the following power sources:

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

ALLEN DATAGRAPH products 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

STAND REQUIREMENTS

The DFS requires a special stand or table for proper operation to allow for the dancer bar assemblies to protrude thru the tabletop. A drawing for the cutouts for the table is included in Appendix B. Alternately an optional stand is available for the DFS. Assembly instructions for the optional stand are included in Appendix C.

Computer Connection

SYSTEM INTERFACING

All Allen Datagraph products utilize serial (RS-232) interface or optionally USB (universal serial bus) interface. Use of the USB requires a USB to Serial converter. The recommended USB to serial converters are described in TSB Title: Recommended USB devices Web Site Copy / CD Copy on the technical support page of the Allen Datagraph web site.

The serial interface is factory preset for 9600 baud, no parity, 8 bits, 1 stop bit. The DFS, when used with the supplied plotter cable, automatically supports both HARDWIRE and XON / XOFF software handshaking.

Connect the plotter cable supplied with the DFS to serial port and to the communications port on the host computer. A "null modem" cable may be used on serial XON / XOFF communications only and is available at computer supply stores.

Because of the high degree of bi-directional communications required by the DFS and the SmartMark™ system we recommend the use of the supplied communications cable and one of the com ports on the host computer.

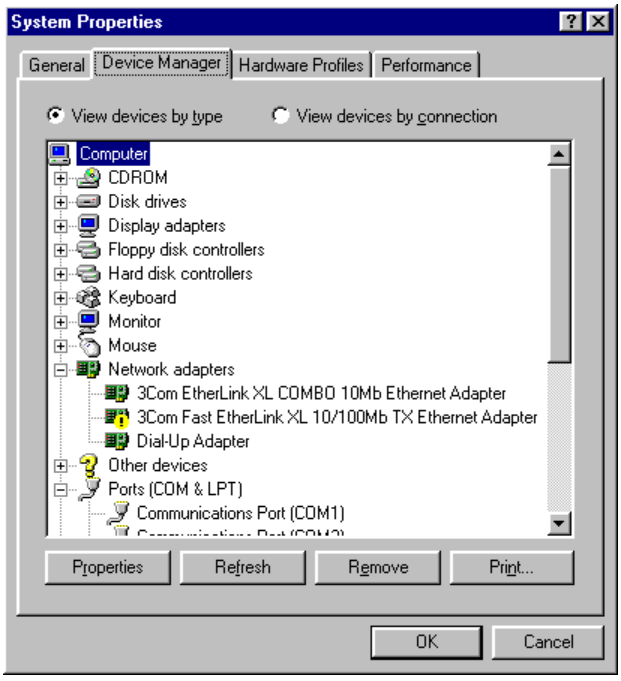
See your computer documentation for proper set-up of the communications port.

In general the communications port should be set up as follows:

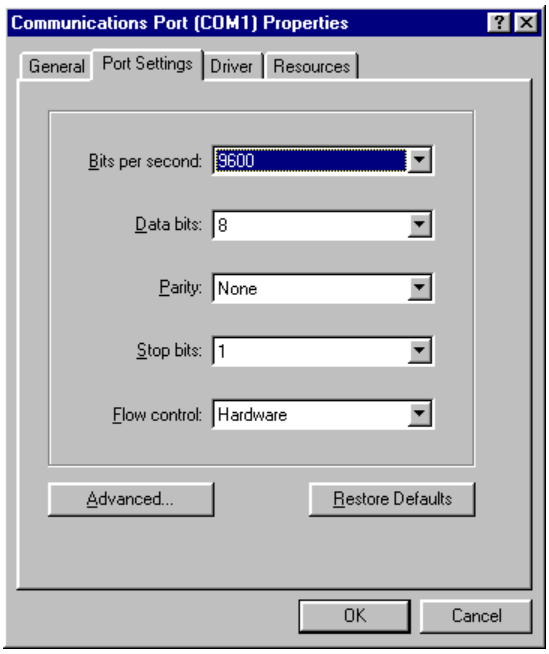
Communications Port Setup

Setup for Windows 95/98

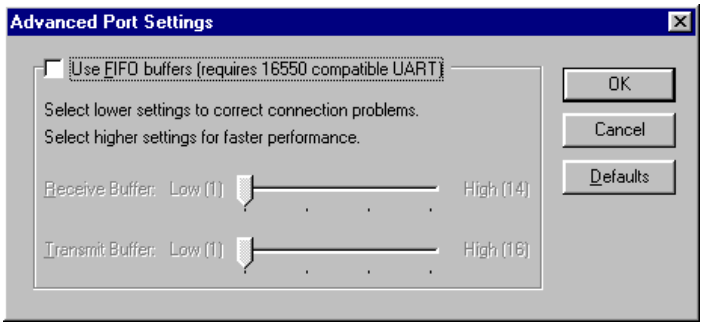
Right click on My Computer icon on desktop and select properties. Select Hardware page. Click on + in front of Ports (COM & LPT). Click on Communication port connected to cutter.
Click on Properties button



Select Port Settings page
Select bits per second = 9600
data bits = 8
Parity = none
stop bit 1
flow control hardware
Click on advanced



UnCheck use FIFO buffers
click on OK
click on OK
click on OK

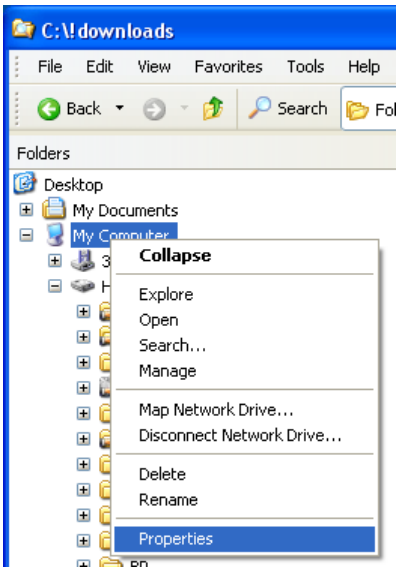


Setup for Window XP

Windows XP default for communications port connected to cutter causes E56 errors. You need to change this default before cutter will operate properly.

Start Window Explorer

Right click on properties

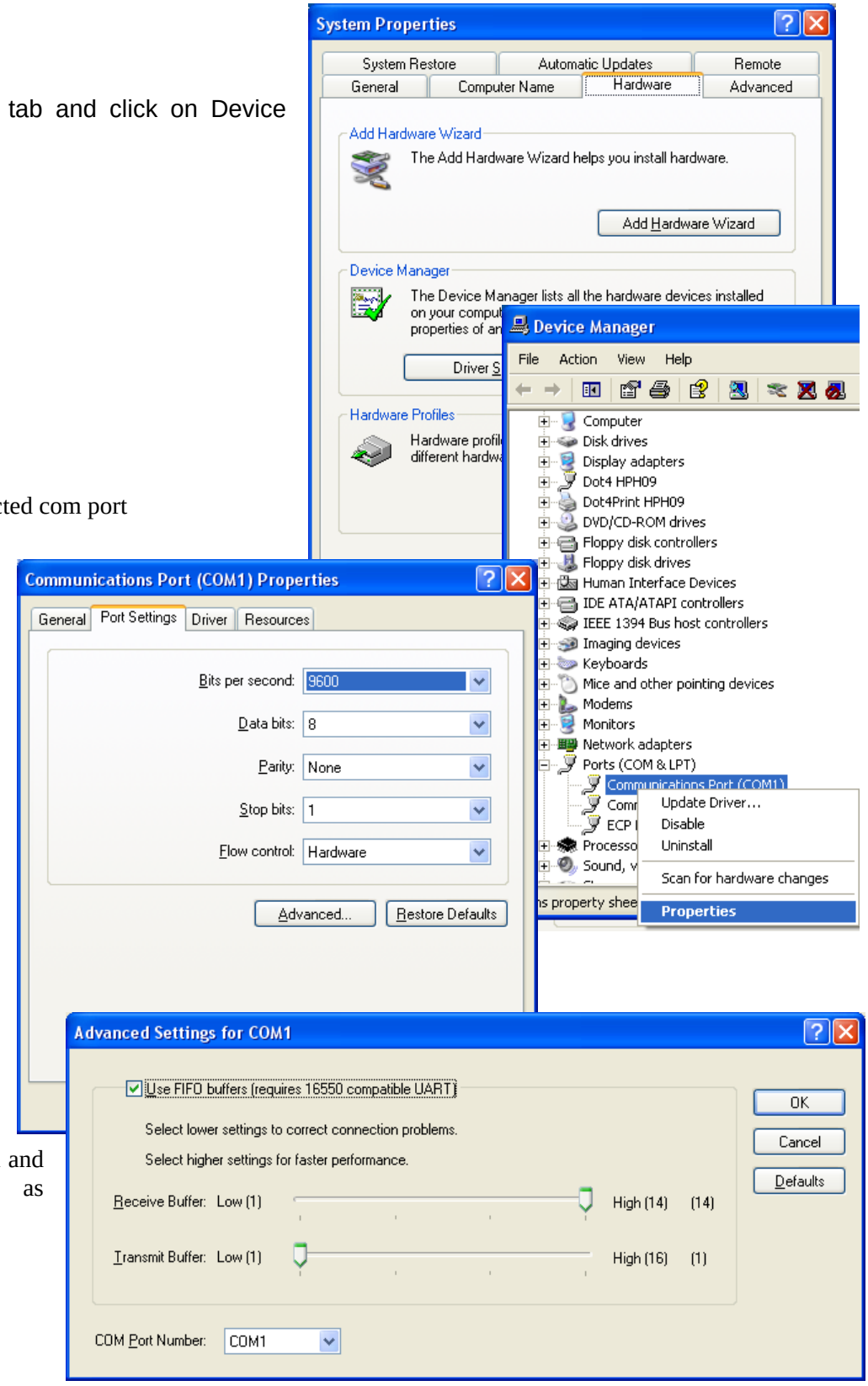


Select Hardware tab and click on Device Manager.

Right click on selected com port

Select port settings and configure port as shown.

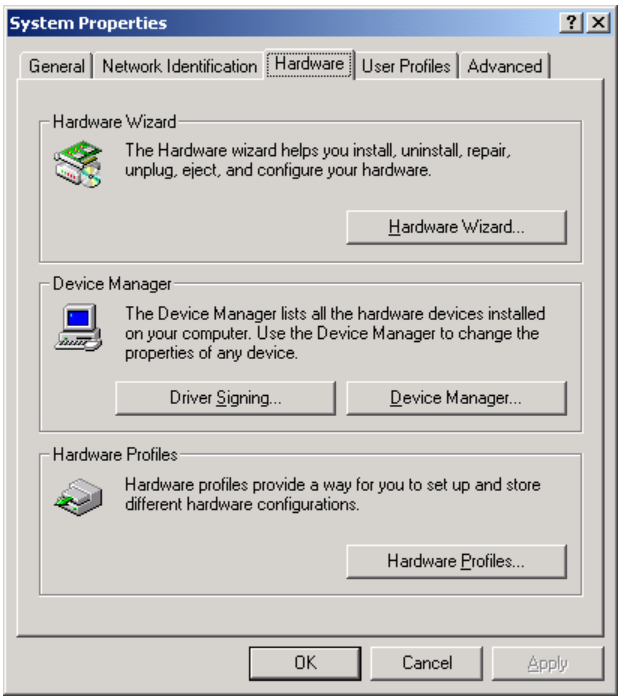
Click on Advanced and configure port as shown.



Setup for Windows 2000

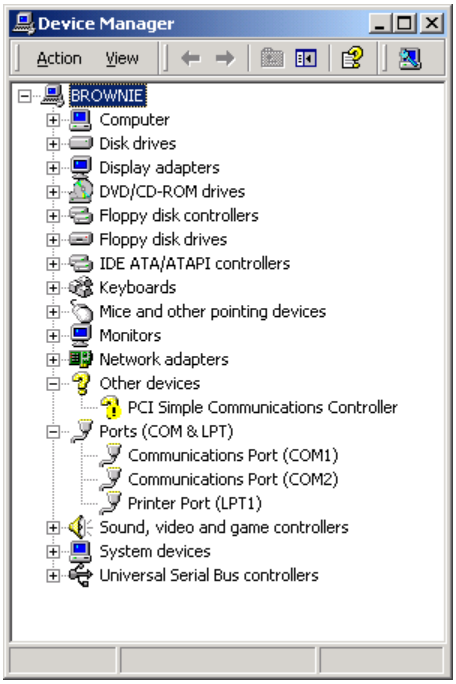
Right click on My Computer icon on desktop and select properties
Select Hardware page

Select device manager

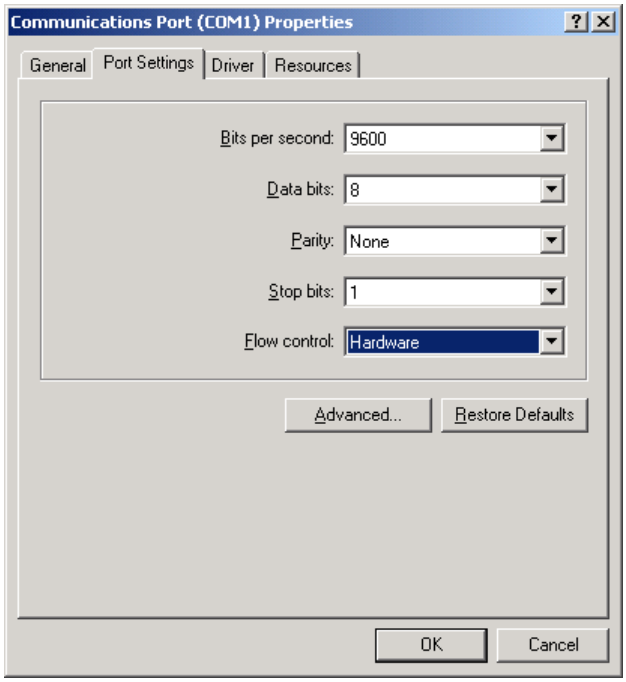


Click on the + in front of Ports (COM & LPT)

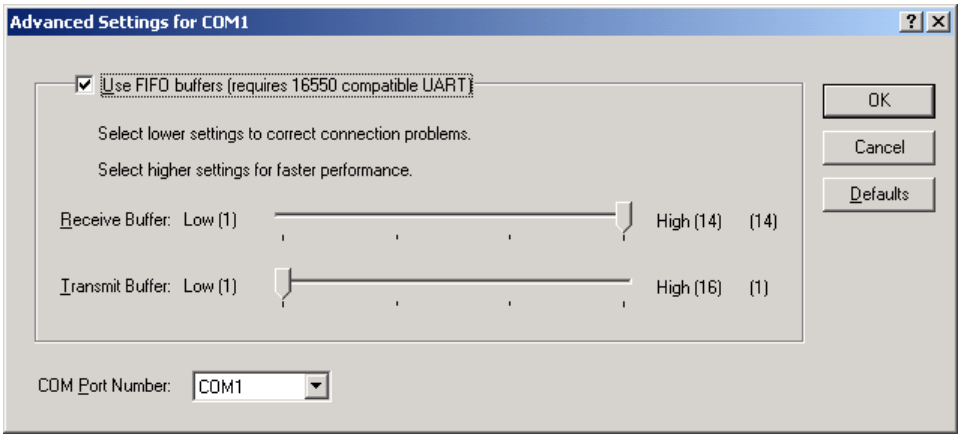
Right click on com port that is connected to cutter and select properties



Select Port Settings page
Select bits per second = 9600
data bits = 8
Parity = none
stop bit 1
flow control hardware
Click on advanced



Check use FIFO buffers
Set Receive buffer = 14
Set Transmit buffer = 1
click on OK
click on OK
close device manage (click on x in top right corner)
click on OK



Loading Allen DFS Software

The Firmware Utility CD contains:

1. The Remote Panel Utility program for managing machine settings.

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.***

3. Manual and sample jobs.

4. Cutter driver for Window XP or Windows 2000.

The Remote Panel Utility Program

In order to easily control the many settings of the DFS, it is necessary to install the Remote Panel Utility Program.

If connected to a computer running under the Windows operating system, your Allen Datagraph product has many settings for machine control that can be accessed by the Remote Panel Utility program.

To install and run the Remote Panel Utility program - Open Windows Explorer by right clicking on the Start Button. Find the CD-ROM drive and find the setup file SetupDFSBuildXX.exe (the XX reflects the numeric version number of the software and firmware e.g. SetupDFSBuild23.EXE). Run the setup program by double clicking on the file. Follow the onscreen prompts.

Installing Firmware

The firmware on this disk is provided for update purposes only and should not be installed on new machines. In general you should not install a firmware update unless directed by a member of the technical support staff. *Firmware updates are available on the technical support page of the Allen Datagraph web site at http://www.allendatagraph.com.*

This procedure details the firmware upgrade procedure. Normally firmware is only sent to customers when a software problem is reported that has been fixed in a later version of the software.

From time to time Allen Datagraph will recommend that you upgrade your firmware in your Allen Datagraph DFS. A file can be downloaded from the Allen Datagraph web site and saved to the desktop.

Before running the setup program be sure to exit the older version of the Remote Panel.

XP INSTRUCTIONS

The downloaded file is a .zip file. You can run the setup program just by double clicking on the *.zip file then double click on the setup *.exe file.

OTHER WINDOWS OPERATING SYSTEMS

If you have not already installed Winzip on your computer, download and install the Winzip program from http://www.winzip.com. Then you can open the zip file by double clicking on it. Drag and drop the contents of the zip file to your desktop.

The setup program will run to install the Remote Panel and the firmware on your Windows computer. If instructed by the factory to upgrade your firmware, follow the firmware upgrade

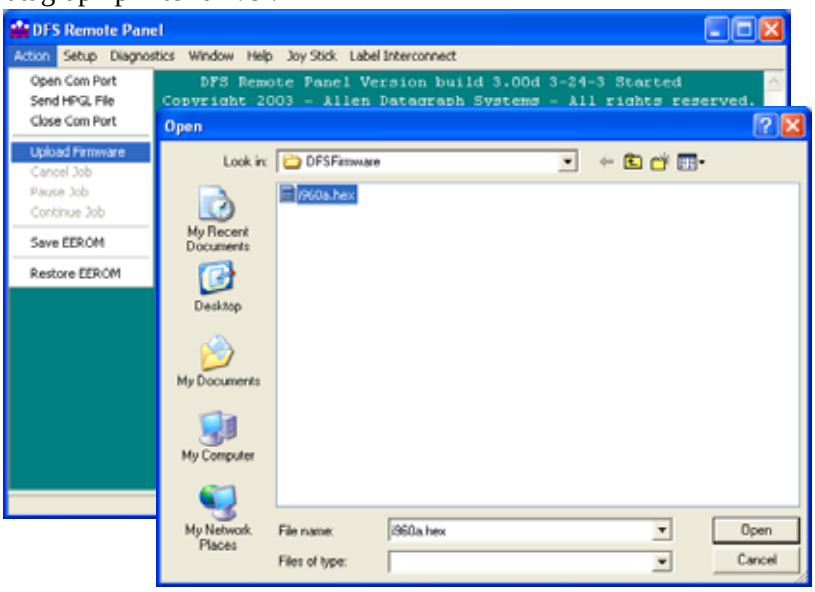
instructions below. If you were only instructed to upgrade to a new remote panel you have already completed this task and do not need to install the firmware.

FIRMWARE INSTALLATION INSTRUCTIONS:

Only install new firmware if instructed to do so by Allen Datagraph.

Refer to TSB: Print Driver Conflict Web Site Copy / CD Copy if you have installed some other printer driver other than the Allen Datagraph printer driver.

Turn on the Allen Datagraph equipment to be upgraded and connect it to your computer with the supplied serial cable. Start the Remote Panel by clicking on start, program, Allen Datagraph, Remote Panel. Click on Setup, Com Port and verify that the correct Com port has a check next to its name. Click on Action, Upload Firmware. Select I960a.hex file and click Open. If the upload fails, you will be given a backup procedure to follow on the computer screen.



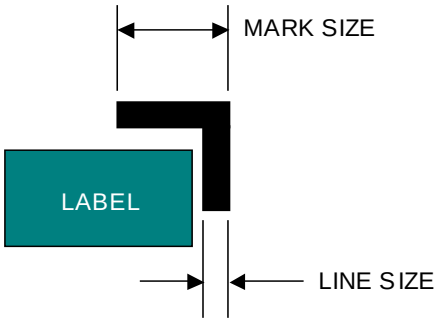
Windows XP / Windows 2000 Driver

This printer driver has been tested with CorelDRAW, Adobe Illustrator, Flexisign, and PowerCAD. It should work with any program that sends vectors rather than bitmaps to the printer. Allows cutting directly from windows graphics programs without requiring additional software purchases. **Note:** Driver requires ownership of Allen Datagraph Equipment to use. Requires: Windows XP or Windows 2000. The setup program for the printer driver is available on the supplied CD or on the tech support page at the Allen Datagraph web site at http://www.allendatagraph.com/.

INSTALLATION INSTRUCTIONS

Run Setup. The setup is named SetupCutterDriverxx.EXE on the supplied CD. A shortcut to the installation instructions will be placed on the desktop. (DirectCut Help File). Documentation for the printer driver is included in the help file.

SmartMark™ Sensor
Registration Mark

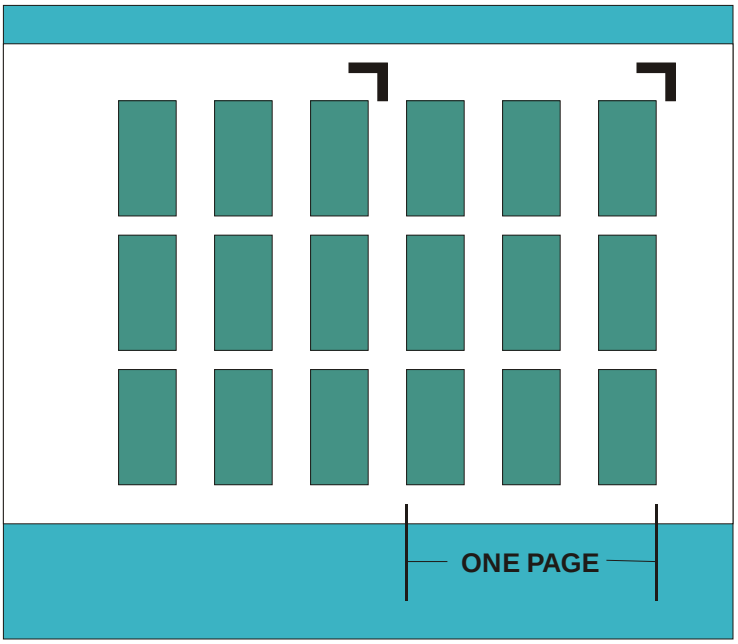


Standard SmartMark™ Registration Mark Origin Point

The recommended target is available for Adobe Illustrator and CorelDraw for download on the technical support page of the Allen Datagraph web site (http://www.allendatagraph.com). When designing a target for scanning, read the TSB: Why can't I use a thick line for a target Web Site Copy / CD Copy. The recommended Mark Size is 0.5 inch (12.7mm) the size can be as small as 0.25 inch (6.35 mm) or as large as 1 inch (25.4mm) The recommended line size is 0.13 (3.3mm) and can be as small as 0.07 inch (1.8mm). The registration mark should be printed with as high a contrast as possible. The sensor relies on reading the change in intensity of the reflection of the red LED pointer. When printing process colors on white media the best color is usually black. Certain spot colors are difficult. For example silver spot on white, while to the eye there is contrast the reflectivity of the two is sometimes nearly the same. Different medias also have different reflectivity and will on occasion require adjusting the sensor sensitivity (see below). If there is trouble with certain materials detecting the target you can print the target in a yellow or white field. The size of the yellow field should be double the scan distance. (**Note:** in order to get an accurate scan no other printed marks may appear in the yellow or other high contrast colors scan area. The sensor sees Red as White so Red can be used as a background color. The printer color alignment marks can appear on the inside edge of the target or the other side of the media.)

The mark should be placed at least 0.5 inches (12.7mm) from the edge of the media and the spacing between jobs should be at least 0.5 inch (12.7mm). (Advanced usage: You can place the target closer to the edge of the material if the area of the platen that is scanned by the sensor is covered with the same color material as the background material.)

The number of rows and columns of labels between registration marks defines a set or page of labels. A page of labels can be one row or several rows of labels. There are several aspects to consider when deciding on how many rows of labels to print on one page. The main consideration is the trade off between speed (it takes a couple of seconds to perform the FO command and scan the registration mark) and registration accuracy. The more often you scan the registration mark (the closer the marks) the more accurate the cut registration will be. If the job allows for overprinting the cut line, then registration may be less critical and eliminating some of the registration marks can speed the job. Generally registration marks should be placed at least every 24 inches (610mm). Most users print registration marks for each row then adjust the cut job to skip one or more marks if desired. This procedure also insures equal spacing of the labels and gives complete flexibility for cutting. The distance between the last cut line of the previous page and the target on the next page must be between 0 and 1 inch (2.54 cm). If the distance between frames is less than the scan length, then the target must be outside of the area where the labels are printed. (**Note:** every page of a label run must be identical or you won't be able to use the copy command).

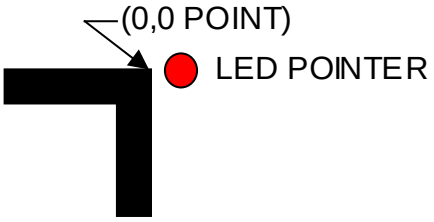


OPERATION

The theory of operation relies on the sensor sending a signal to the DFS embedded computer when the SmartMark™ senses a change in reflected light from the media as it would when the sensor scans the printed registration mark. The DFS scans the mark in both directions and registers the intersection of the mark. The DFS computer then assigns that intersection as the 0,0 point of the cutter coordinate system and matches that to the origin point of the HPGL cut file.

The DFS uses a special HPGL command, FO, to start the registration mark sensing function. It can automatically re-register the coordinate each time the FO HPGL command is received. As part of the setup a "x move between jobs" is input via the remote panel which moves the sensor to the approximate position of the next copy's or next job's registration mark. The space between jobs in the printer driver also affects the where the next target is located. These two parameters are added together. The DFS expects the target for the next frame to be within ½ the scan distance of the end of the job.

The Red LED pointer must be manually positioned with the joystick buttons at the approximate 0,0 coordinate position prior to sending the first job. The SmartMark™



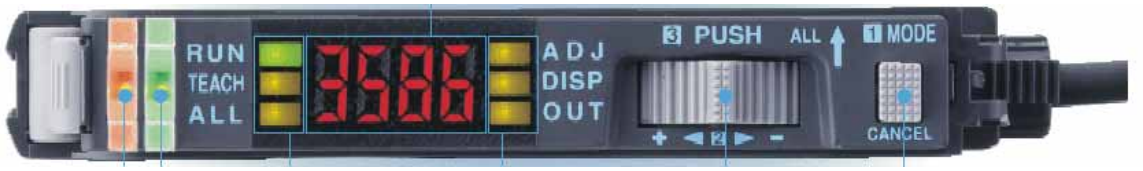
system automatically repositions the sensor for subsequent copies.

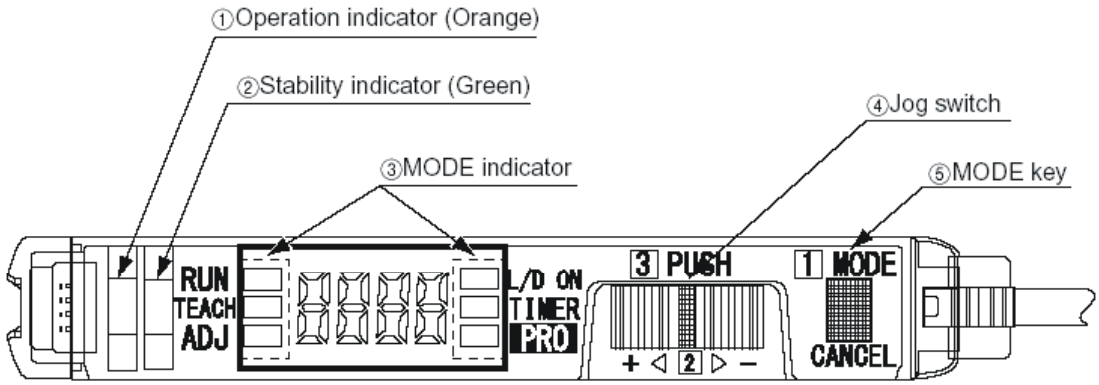
The positioning process must be repeated if the joystick buttons are used. This is helpful because it allows the system to be reinitialized when needed. Some printers require a leader between jobs and this feature is a very easy way to deal with the issue.

Once the LED pointer is positioned as shown, the SmartMark™ is ready to operate and will scan the registration mark when it receives a FO command in the job stream whether on the first copy or on subsequent copies. Since the FO command is embedded in the beginning of the cut file the scan of the registration mark is performed at the beginning of each copy or set of labels and on subsequent copies.

SmartMark™ Setup

There are several adjustable parameters built in to the SmartMark™ sensor that give the system its extreme flexibility. Some of the parameters can be automatically set by the microprocessors embedded in the system and some require manual intervention.





Sensitivity

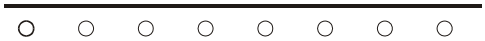
1. In order to accurately sense the registration mark the SmartMark™ System operates using very fast signals at fairly low signal levels. All systems operating in this manner are subject to interference from outside electro magnetic sources. In order to limit the effects of outside interference the SmartMark™ system uses a high logic signal when the sensor is off the mark and a low logic signal when the sensor is on the mark. In normal operation the sensor sends a high logic signal when the sensor is on a light background and a low logic signal when on a dark registration mark (L on). The sensor allows for sensing light registration marks on dark backgrounds by

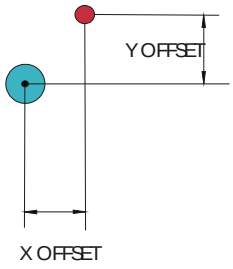
changing its state so that the sensor sends a high logic signal when on a dark background and a low logic signal when on a light registration mark (D on). The (L / D On) operation is set by pressing the mode key 3 times. The current setting will be displayed. If the jog switch is moved, the opposite setting for the output operation will be displayed. If the jog switch is pressed, the digital display will blink quickly 3 times and the selected output operation will be confirmed. Press the "MODE" key 3 times or keep it pressed for 2 seconds or more to return to "RUN" mode.

2. The sensor changes its logic state when the reflective value passes the set threshold level. The sensor utilizes a self-teaching program to set this threshold level. There are multiple methods for setting the threshold level. The preferred is the Two Level Teaching Mode, which will allow you to set a middle ground threshold value. Select the "TEACH" mode by pressing the Mode Key once. Press the jog switch when the red dot is on the material background. The display will blink then the "TEACH" (yellow light) will blink. This indicates that the second point is now ready for input. Move the sensor over the registration mark and press the jog switch, again the display will blink. The display will either indicate the word "GOOD" which indicates that stable sensing can be performed or "HARD" indicating stable sensing cannot be performed. The threshold value setting will be displayed then the display will blink with the characters "——". The incident light intensity will again be displayed, indicating that configuration is now complete. Press the "MODE" key 5 times or keep it pressed for 2 seconds or more to return to "RUN" mode.
3. The performance you are looking for should be: As the LED moves into the registration mark from the background area the Operation Indicator (orange light) will activate (ON), and then deactivate (OFF) when moved back into the material background area, all the while the green light (Stability Indicator) will remain lit. If you have the "L-off" selected on the operation selection, the operation of the orange Operation Indicator will be opposite.
4. Additional information regarding advanced programming and operation of the sensor can be found in Appendix D "SmartMark™ setup".

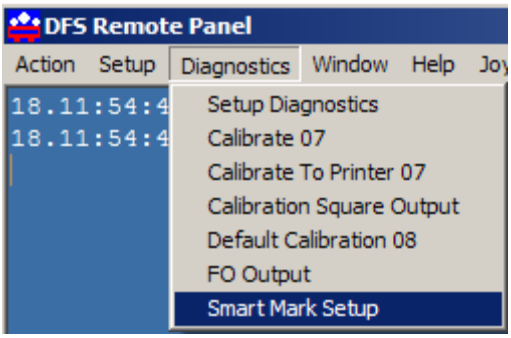
Sensor Offsets

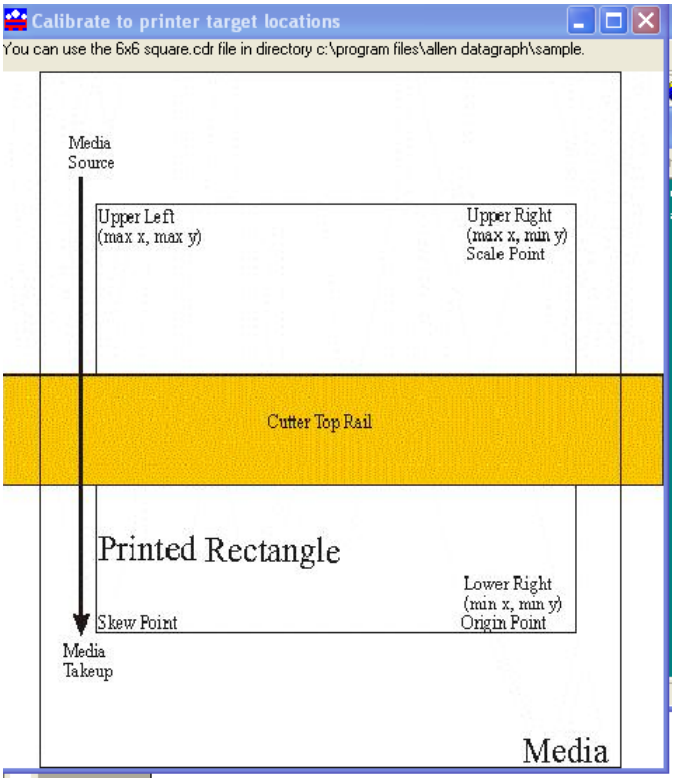
The SmartMark™ sensor is offset from the center of the knife. The red dot indicates the LED point and the blue circle represent the knife. This value is normally setup at the factory or during installation of the DFS. The offset distance is preset at the factory, but may need to be adjusted on occasion. You may follow this procedure only if you own a digitizing site (Allen p/n PL-00-11-500). Otherwise you must follow the manual procedure described in the TSB Calibration Web Site Copy / CD Copy.

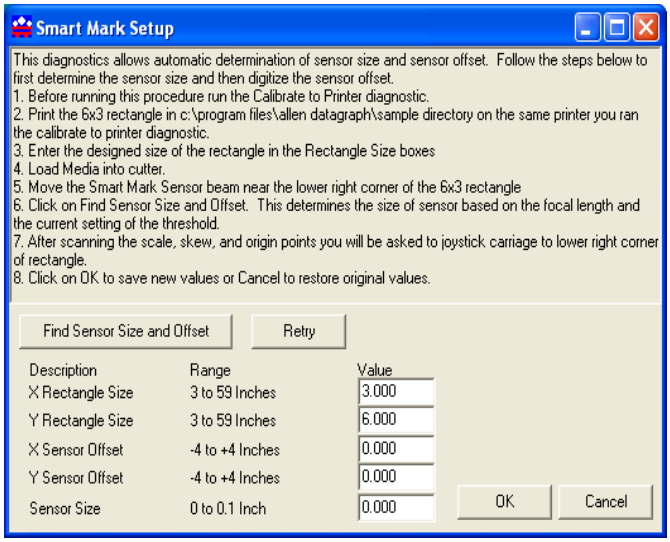




To automatically reprogram the SmartMark™ sensor offset and sensor size parameters: Open the DFS Remote Panel. Open the Diagnostics Menu and click on SmartMark™ Setup





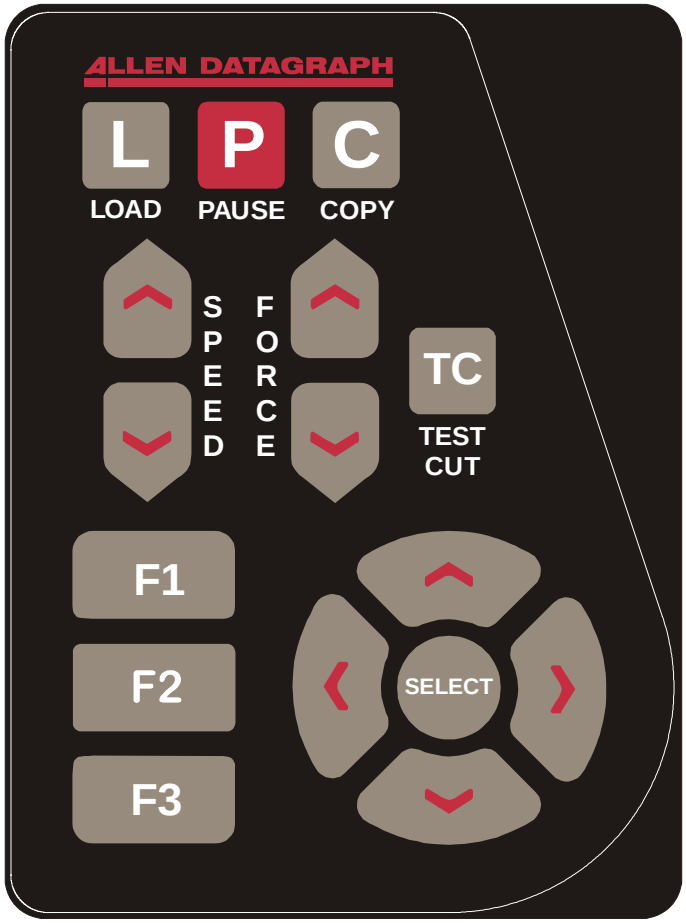


1. Before running this procedure run the Calibrate to Printer diagnostic.
2. Print the 6x3 rectangle in c:\Program Files\Allen Datagraph\Sample directory on the same printer you ran the “calibrate to printer diagnostic”.
3. Enter the designed size of the rectangle in the Rectangle Size boxes
4. Load Media into cutter.
5. Move the SmartMark™ Sensor beam near the lower right corner of the 6x3 rectangle
6. Click on Find Sensor Size and Offset. This determines the size of sensor based on the focal length and the current setting of the threshold.
7. After scanning the scale, skew, and origin points you will be asked to joystick the carriage to the lower right corner of the rectangle. Use either the optional fiber optic bombsite so that the center of the bombsite is directly above the lower right hand corner of the printed rectangle.
8. Click on OK to save new values or Cancel to restore original values.

You can review the numbers by opening the Setup Menu, click on Line Sensor Menu. See section describing the line sensor menu.

Control Panel

The front control panel is the primary user interface for the DFS. It is used for input of speed and force as well as several other functions.



LOAD The load key is used to initialize the system and to load or automatically fill the supply dancer bar. Once the material is fed thru the media path and the nip rollers are engaged (see media loading section), press the load key and the supply roller will start feeding media into the supply dancer bar and will automatically stop once the supply dancer bar reaches the bottom and the loop is full. If the media height sensor is off, the load light will then come on to indicate the system is ready to operate. If the media height sensor is turned on, the system will scan the digital die cutter station pinch rollers to determine the media width (see Label Remote section). Be sure that the label frame you want to cut is at least 2 inches behind the knife blade before pressing load.

PAUSE The pause key will halt the operation of the system at any point. It is used to pause the system for inspection, media jams or to pause the machine for any other reason. Press the pause key to re-start the system. The system can be jogged while paused and will remember where it was and restart from where it was stopped regardless of where it was jogged. This is very helpful for inspecting the cut. You can pause the system and joystick the media or cut head away from its position to inspect the cutting or registration. After inspecting the media, simply press the pause key again and the DFS will return to the point where it was paused and resume cutting. The pause light will flash while the system is paused. You can also use the pause button to enter the unload state (press Pause followed by Load).

COPY The copy key is used to input the quantity of copies the DFS will digitally die cut. It is used after the first copy of the job is cut. Once the first copy is cut and you are happy with the results, press the copy key. The display will read `0002.` The number represents the total number of copies including the first one run. Increase the number of copies by pressing the up arrow key of the joystick or the force up button. Hold the key down and the numbers will start moving slowing then more quickly. Press the down arrow key to lower the number. Alternatively the force keys will increment the single digits and the speed keys will increment the 10's digits. Remember the number displayed includes the first copy run before the copy key was pressed. Input the copy quantity and start the cutting by pressing the **SELECT KEY**.

SPEED The speed keys are used for controlling the cut speed (the speed the knife travels around the periphery of the items being cut). Increase the speed by pressing the up arrow key. Decrease the speed by pressing the down arrow key. Hold the key down and the numbers will start moving slowing then more quickly. The DFS will also self adjust the speed within certain limits based on the speed of the device feeding the unit. The range for speed is 1 to 100.

FORCE The force key is used in conjunction with the test cut key to set the depth of cut. The factory default for cutting is set at 12. The range of force is 1 to 100 when the system is in the normal force range and 1 to 1000 when in the 1000 step mode. For most applications the normal force range is adequate (see dynamic force and 1000-step mode in the Remote Panel section). In the normal force range mode, the force is adjustable between 10 and 550 grams of force in 100 steps.

The force is set by test cutting the media to be cut using the test cut function. Using the joystick, position the knife in an unused portion of the media and press the **TEST CUT** key. The system will cut a test cut pattern similar to the diagram to the right. With a sharp knife or tweezers you should be able to individually remove each part of the test cut pattern working from the ring to the triangle without affecting the remaining parts. A properly set force will leave a very slight scratch or mark on the liner.

The force may need to be adjusted due to blade wear during use if problems with weeding occur. Simply increase the force setting by one until satisfactory weeding occurs. If the knife blade is changed, revert back to the original setting or perform the test cut procedure again. The blade may need to be replaced if the force is increased by more than 20 percent from when the blade was new.

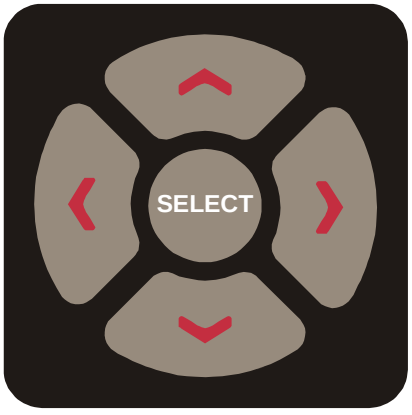
F1 This key puts the pen up or down during digitizing mode.

F2 This key turns on/off the supply nip roller

F3 This key turns on/off the take up nip roller

RESET the cutter by pressing the F1, F2 and F3 keys in order.

JOYSTICK The joystick is used for positioning the knife and media in the die cutting station and for several other functions.



The four **ARROW KEYS** are used to jog the material or cutter carriage that holds the knife blade and the SmartMark™ sensor. Press the key once to move the material or carriage slowly and press it a second time within ½ second to move at a faster speed. Tap the key to jog the cutter a fixed distance. The distance is adjustable (see Joy section below or joystick in the Remote Panel section).

SELECT The select key is used to invoke the menu system. Press the select key and the display will change to indicate the last used menu item. To select a menu item press the select key and then press the right or left arrow key to scroll thru the various menu items. With the desired menu item displayed, press the up or down arrow key to select the state. When the desired state is displayed press the select key to input the menu item and state. The menu items are: ACCL, CAd, diA, FILL, indE, JOY, OPEr, and Set.

Menu Items:

ACCL allows setting the acceleration in ¼ G increments. Acceleration is the rate of increase/decrease of speed of the motors along a vector. Higher G values increase throughput however higher G values also increase the likelihood of experiencing repeatability problems. Recommended values are (2-8) for standard labels.

CAd override menu function enables or disables the CAD override function. With the function `On` the cutter will ignore some HPGL control commands sent from the cutting software. With the function `Off` the CAD software can control these HPGL commands.

The commands affected by CAd override are:

AS	set acceleration
FS	set force
KA	set minimum angle
KN	set knife offset
IP	input P1/P2
RO	rotate
SC	set scale
SP	select pen
ST	select tool
UV	up velocity (move speed)
VS	down velocity (cut speed)

Press the select key to initiate the menu function. Press the left or right arrow key to display `CAd`, then press the up or down key to toggle between `off` and `on`. Press the select key to lock in the desired menu setting.

diA is used for entering into the diagnostic mode. Press the select key to initiate the menu function, then press the left or right arrow key to display `diA`. Press the up or down key to scroll thru the diagnostic numbers (0002 – 0099). Press the select key to start the diagnostic. (see diagnostics section) . To exit from a diagnostic mode select 0099 and press select.

FILL is used to fill the supply dancer bar loop at any time during the operation of the DFS. Press the select key to initiate the menu function, then press the left or right arrow key to display `FILL.` Press the select key and the Cutter station will pause and the supply nip roller drive will start to fill the supply dancer bar loop. Once full the supply nip roller drive will automatically stop and the cutter will resume. This is useful if for some reason either of the dancer bar loops have insufficient material.

IndE indexes the x-axis. One of the uses for this function is for metering material. Press the select key to initiate the menu function, then press the left or right arrow key to display `IndE.` Press the select key. Press the up or down arrow to toggle between inches (`InCH`) or centimeters

(cEnt). When the desired unit of measure is displayed press the select key. The display will read 0001. The number represents the number of inches or centimeters to be metered in the x-axis. Increase the number by pressing the up arrow key of the joystick. Hold the key down and the numbers will start moving slowing then more quickly. Press the down arrow key to lower the number. Alternatively the force keys will increment the single digits and the speed keys will increment the 10's digits. Input the length and start by pressing the select key.

JOy allows changing the joystick parameters: of jog distance or slew speed. Press the select key to enter the menu system. Press the left or right joystick buttons until JOy is displayed. Press up or down on the joystick to select (Sped or Jog). Press select. Press up or down on the joystick to select a value for joystick speed (1-100%) or jog distance (0.01 inch increments). Press select to save the displayed value.

This menu item has 2 sub-menus:

Sped- Allows the user to set the maximum speed that the joystick will move the material or head when pressed twice. Range 1-60.

Jog- Allows the user to set the distance that the head or material will move when a joystick button is pressed and released. Range is 1-100 in 1/1000th inch increments.

i.e., 1=.001", 100=.100"

OPEr is used to select the operation mode between cutting (CUt), pen plotting/drawing (drA) or pouncing (POUn). Press the select key to initiate the menu function, then press the left or right arrow key to display OPEr. Press the up or down key to select the desired function. Press the select key to lock the desired menu setting.

SEt loads or saves a custom set-up or power up default. Press the select key to initiate the menu function. Press the left or right arrow key to display SEt. Press the up or down key to scroll thru (LOAd, Save), press select, press the up or down key to scroll thru the settings (1 – 6). Press the select key to load or are save the setting. Setting #1 is loaded when the machine is powered up. (see also factory and custom set-up section)

The **set** menu item has 2 sub-menus:

Load- loads a setup.

To load a setting:

Press select
Press left or right arrow until **SET** menu is displayed.
Press up or down arrow to display **Load**.
Press select
Press up or down arrow to display the number of the setting you want to load (1-6)
Press select.

Save- saves a customized setting.

To save a setting:

Adjust force, speed, acceleration as needed.
Press select
Press left or right arrow until SET menu is displayed.
Press up or down arrow to display Save.
Press select
Press up or down arrow to display the number of the setting you want to

customize (1-6) (# 1 is the setting that is loaded on power up.)
Press select.
The display will blink FFFF, and then return back to your setting.

Remote Panel

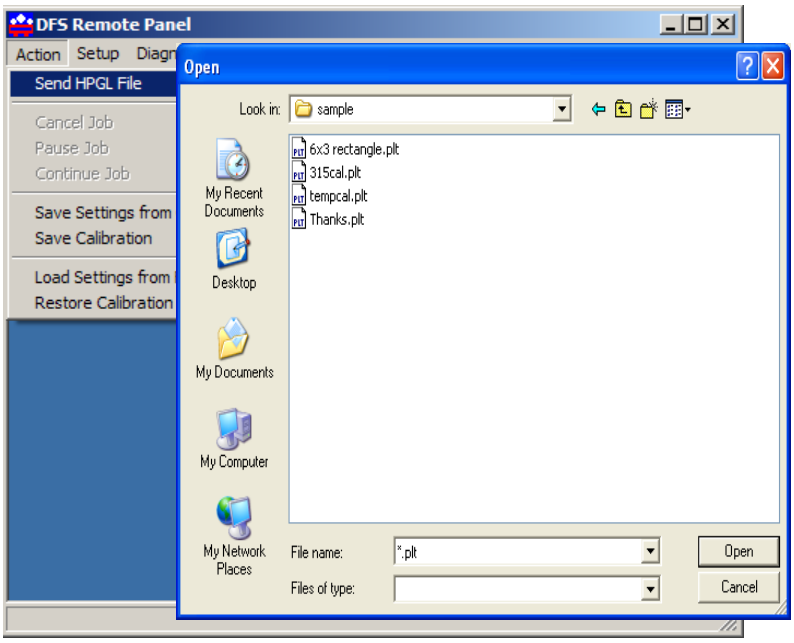
The Remote Panel program is used to address all DFS functions. It should be loaded onto the computer that is directly connected to the DFS. It can be run in the background with most cad programs.

If running a design program that utilizes a compliant windows printer driver or when using the Allen Datagraph Windows XP / 2000 driver, be aware that all windows printer drivers can grab hold of the COM port and keep programs that talk directly to com port from working. Symptoms: E56, funny characters on LCD display, plots not finishing, slow send. To eliminate the problem read the TSB Title: Communication Failure with Remote Panel Caused by Printer Driver Web Site Copy / CD Copy.

Remote Panel Functions

Action menu

Send HPGL File



Send HPGL File will send a HPGL plotter file directly to the DFS. Typical origins HPGL files include the Allen Driver, CorelDraw or some other design software. To send a HPGL plotter file from the remote panel program click the Send HPGL File menu item to open the select file window. Select the files desired and click the Open button. This will send the file directly to the DFS.

Cancel, Continue, Pause

These commands will cancel, continue, or pause a job being sent by the Send HPGL command. For jobs sent by other programs you can use the Pause button on the cutter and the (F1, F2, F3) combo to cancel the currently cutting job.

Save Settings from Cutter to File, Load Settings from File To Cutter

These commands save the settings (see setup settings menu) and some line sensor parameters that are in the DFS to a disk file or loads settings saved by this command from a file and sends them to the DFS. This allows you to have more than 6 setups for different materials and it allows backing up your settings to your hard drive in case of failure of the CPU board.

Save Calibration/Restore Calibration

This command saves line sensor parameters that depend on the calibration and calibration of the cutter or allows loading the calibration parameters from a file. This command allows calibration of the DFS to multiple printers.

Advanced menu items (These menu items appear if you select the advanced menu on the Setup Option menu)

Open Com Port

Will initialize the communications port.

Close Com Port

Closes the communications port so that other programs can use the port. The remote panel program will automatically close the port in most instances when it is not actively communicating with the DFS.

Upload Firmware

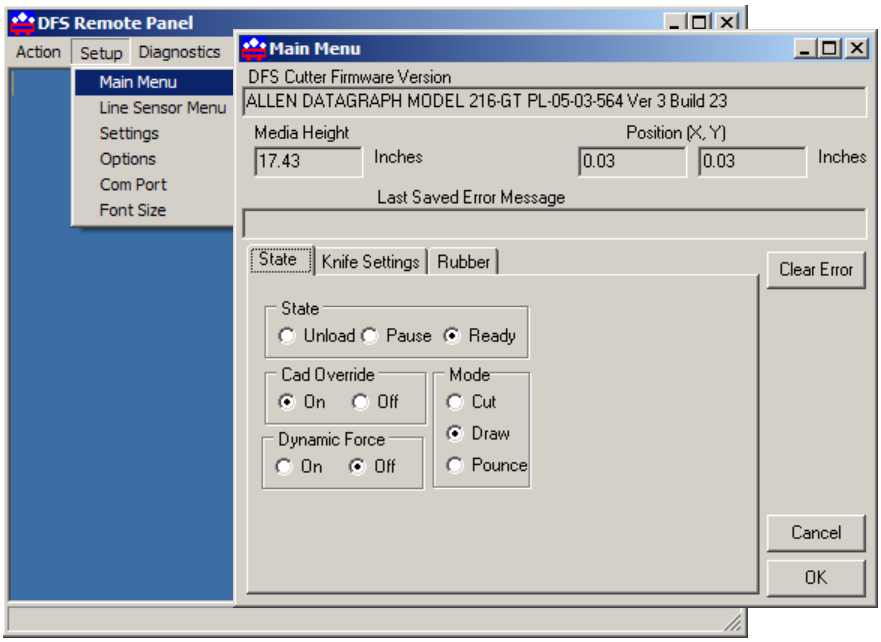
Should your firmware ever need to be updated, this command will locate the firmware file and send it to the DFS.

Save to EEROM and Restore from EEROM

These commands are used to save custom settings and factory settings to the computer when certain electronic components need to be replaced.

Setup Menu

Main Menu



The Main menu opens the main menu window. The top window shows the model number and firmware version (build 23 in the sample). The media height window shows the maximum dimension the DFS is set to cut. With the media height sensors enabled, the DFS will scan the pinch wheel magnets to determine the loaded media size and will calculate the maximum cut size. The DFS will send this dimension (called the clip limits) to many software programs so that the software program can determine if the specified cut file will fit. If a file with dimensions larger than the clip limit is sent to the DFS, the cut will be truncated. If the media height sensor is disabled, the default clip limits will be used and it is possible to cut off the edge of the media. The position window shows the current location of the knife in the cutter coordinate system. The Last Saved Error Message window displays the last error. Errors displayed here may be old. The error may have occurred earlier in the cutters life. The Clear Error button clears the memory of the saved error notification.

State Tab

The State radio buttons allow the user to set the condition of the cutter. **Unload** means the cutter is not loaded and is not ready to receive a cut file. The **Pause** radio button means the cutter is currently paused and the **Ready** button means the cutter is loaded and ready to receive the cut file and proceed with cutting. This set of buttons duplicates the Load and Pause buttons on the front panel.

The CAd Override radio buttons enables or disables the CAD override function. With the function On, the cutter will ignore some of the HPGL control commands sent from the cutting software. With the function Off, the software can control these HPGL functions. Some CAD systems will work correctly only when this feature is set to on.

These commands include:

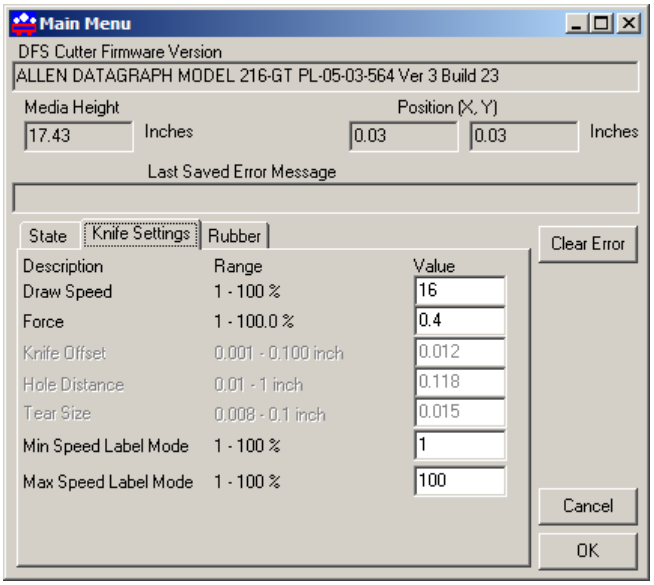
AS	set acceleration
FS	set force
KA	set minimum angle
KN	set knife offset
IP	input P1/P2
RO	rotate
SC	set scale

SP select pen
ST select tool
UV up velocity (move speed)
VS down velocity (cut speed)

The Mode radio butons sets the operation. Select cutting, pen plotting/drawing or pouncing. The DFS will normally only use the Cut function.

The Dynamic Force radio buttons (an advanced option) engages the dynamic force function, which instantaneously adjusts the force on the fly based on the actual velocity of the knife blade. All cutters must accelerate and decelerate as they cut around corners. Some medias require different force settings for different speeds. This parameter allows for building a database for these materials and when enabled will greatly improve the cutting on these materials. (See the Dynamic Force Section for more details).

Knife Settings Tab



Draw Speed displays and sets the velocity of the knife when it is actually drawing or cutting. The draw speed is the speed the knife travels around the periphery of the items being cut. The DFS will also self adjust the speed within certain limits based on the speed of the device feeding the unit. The range for speed is 1 to 100%.

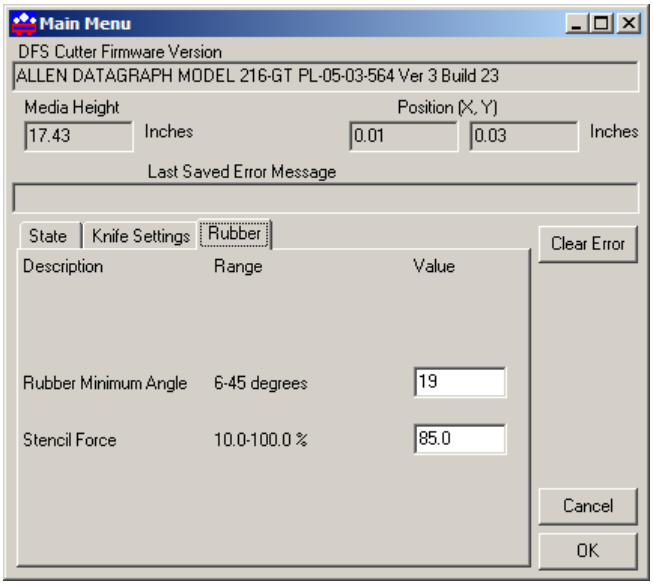
Force displays and sets the cutting force. The default force for cutting is set at 12. The range of force is 1 to 100%.

Knife Offset is the distance between the center of the knife blade and the knife tip. Standard blades have a 0.012 inch (.030 cm) offset. If you have objects that do not close correctly, you might have to adjust the knife offset to correct the problem.

Hole Distance and Tear Size are used when the cutter is in the Pounce Mode. The hole distance setting is the distance between holes and the tear size is the distance the cutter moves with the pounce tool down to tear the media and enlarge the pounced hole.

Min Speed Label Mode and Max Speed Label Mode are used to set the limits for the automatic speed setting function of the DFS. The cutting speed will automatically increase or decrease, within the limits set here, to keep pace with the in feed device. Normally you set the Max to 100 and the min to 1.

Rubber Tab



Rubber Minimum Angle displays and sets the angle between consecutive vectors that when exceeded will invoke the tangential emulation mode. At angles less than the value set in this parameter the cutter will move between vectors without evoking the tangential emulation mode.

Stencil Force is the force separation between drag knife mode and tangential emulation cut mode. Tangential emulation cut mode is normally used for rubber or very heavy material. The DFS will normally not cut this type of material so this value should be set to a high force %.

Advanced menu items (These menu items appear if you select the advanced menu on the Setup Option menu)

Rubber Scratch Force displays and sets the down force used during tangential emulation. This is primarily used when cutting thick materials such as sandblast rubber. Tangential emulation simulates a tangential or servo controlled rotating knife by moving to a position short of the vector to be cut and putting the knife blade down with a very light force while moving toward the direction of cut to align the knife before applying the full cutting force. This improves the cut quality in thick materials. (default 0.1%)

Rubber Backup Multiplier (default 20) displays and sets the distance the knife will be dragged at the light force used to align it. This parameter is used with and is additive to the Rubber Backup Offset (default 0.02). The Rubber Backup Multiplier is based on the change of angle between vectors and the Rubber Backup Offset is a constant added to the distance calculated based on angle.

Rubber Minimum Angle (default 19) is the rotation angle between two vectors that enables tangential emulation. Subsequent vectors that have angle between them exceeding this parameter cause the pen to be picked up, dragged along the surface to align the knife and plunged into the media at the beginning of the next vector. Subsequent vectors that have angle between them less than this parameter will perform a drag rotation.

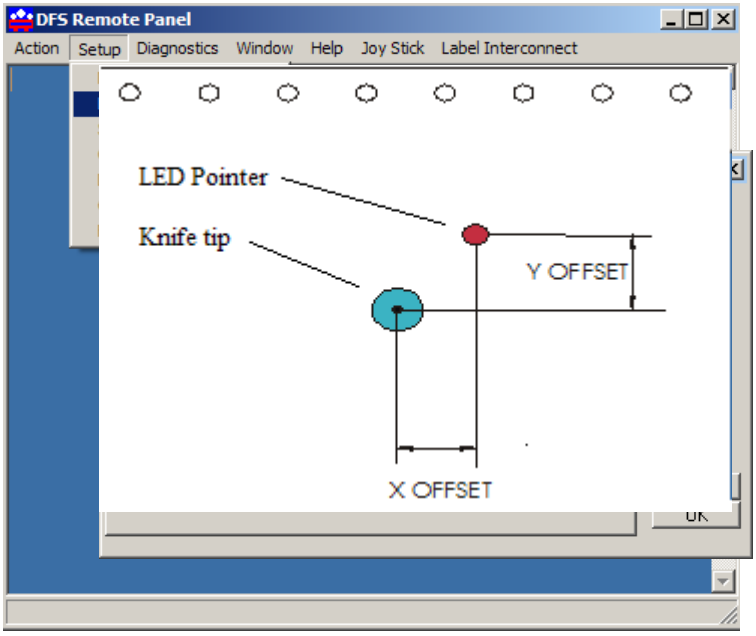
Max Motion Vector Length (default 0.001) (Named after the driver that outputs very small vectors) Allen Cutters very accurately replicate the vectors in the HPGL plot file. Some design programs output vectors that are very short. It is sometimes desirable to combine some of these vectors into a longer vector to eliminate jagged edges or slow cutting. This parameter works like a curve-smoothing algorithm and is used to improve poor HPGL files.

Anticipation Rubber (default 0.002) and Anticipation Vinyl (default 0.0004) is a parameter that adjusts the backlash compensation in the cutter. The Anticipation Rubber is the parameter used when the cutter is in tangential emulation mode and the Anticipation Vinyl is the parameter used when not in tangential emulation mode. Heavier materials require more backlash compensation. These numbers are individually set at the factory and should not require adjustment except when cutting heavy materials. If you are experiencing thick and thin lines or misshaped letters, adjust the anticipation parameter to obtain satisfactory results.

Line Sensor

Clicking on Setup Line Sensor menu opens the SmartMark™ Menu.

Line Sensor Tab

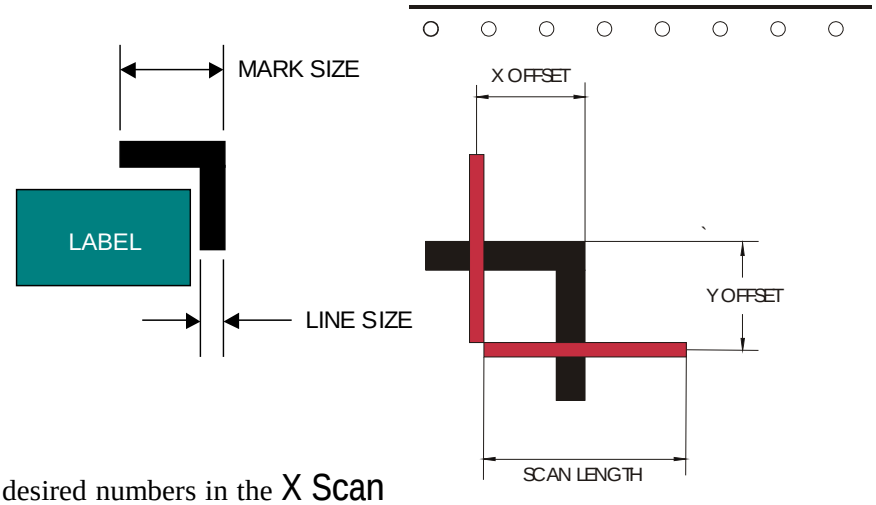


Sensor Offsets - The SmartMark™ sensor is offset from the center of the knife. The offset distance is preset at the factory or during installation, but may need to be adjusted on occasion. The DFS will automatically calculate and set the SmartMark™ offset and sensor size parameters. See drawing for definition of sensor offsets. See TSB Title Calibration Web Site Copy / CD Copy

Sensor size is the offset from the exact center of the red dot of the SmartMark™ sensor to the sense radius and may change based on sensor sensitivity or media reflectivity. This parameter is best set using the procedure in the TSB. The Sensor Size parameter is only useful in three target scanning. If you are not using three-target scanning you can set the size to 0 and the sensor size is included in the sensor-offset parameter.

SCANNING PARAMETERS

The DFS SmartMark™ system has adjustable scanning parameters to allow for different size and style of registration marks. The primary parameters are the scan offset and length. The ideal X and Y offsets are one-half the mark size and the ideal scan length is two times the scan offset.



To set the parameters type in the desired numbers in the X Scan Offset, Y Scan Offset and Scan Length. When you have entered the desired values click on OK. (see also registration mark section)

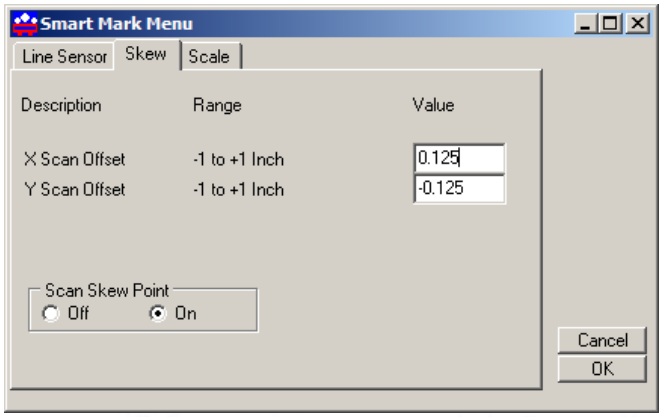
Scan Velocity (default 10) sets the speed of the scanning. Depending on the media and registration mark contrast, this parameter may need to be adjusted. The better the contrast in reflectivity the faster the scan velocity can be set. If you are experiencing missed registration marks, you may need to reduce the scan velocity.

X move between **jobs** is the distance after the farthest excursion of the x-axis during a frame that the DFS should advance to find the target in the next frame of labels. This item is duplicated in the DirectCut printer driver as the space between jobs. These two parameters are added together so if the printer driver is normally used, the parameter is set to 0. Since the two parameters are added together you can also use this parameter to allow cutting labels whose distance between frames is between 1 and 2 inches.

Advanced menu item (This menu item appears if you select the advanced menu on the Setup Option menu)

Target Scan Direction sets the direction of the scanning operation. For single mark origin scanning the default target scan direction is +X, +Y. There may be circumstances where it might be desirable to reverse the scan direction. For instance, the mark might be printed to close to the trailing edge of the preceding labels limiting the distance available for scanning. In this instance, it might be desirable to reverse the scan direction in the X-axis. Consideration must be given in the cut file because the inside edge of the mark will be considered as the 0,0 point for the cutter coordinate system.

Skew Tab

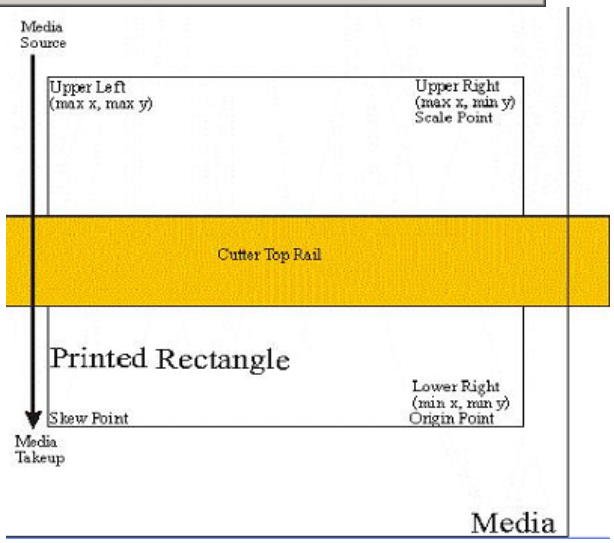


The SmartMark™ system can use one, two or three registration marks. In standard operation the DFS only requires one registration mark to accurately cut the die lines of most labels. If, however, there is a problem with the printing it may become desirable to use multiple registration marks. (see also discussion about marks in Tutorial Using Adobe Illustrator section)

When using two registration marks the embedded computer in the DFS will automatically scan both the Origin Point and the Skew Point. This is helpful if the printing is skewed in relationship to the media.

When using multiple registration points it is helpful to understand the FO command and its parameters.

Note: scaling without skew is not implemented.



X, Y Scan offset. This is the distance from the skew point to perform the Y and X scans to find the skew point. With the targets defined as above, the -X, +Y is the correct signs for the scan offset for the skew mark.

Scan Skew Point - A fourth scanning mode is implemented that performs scaling and skewing by scanning only two marks (origin and scale). This method assumes there is no scaling error in the Y-axis. (Specify the Origin, Skew, and Scale mode in the printer driver). By checking the scan skew mark off, the DFS will only scan the Scale and Skew mark and perform X-axis scaling and skew correction.

Advanced menu items (These menu items appear if you select the advanced menu on the Setup Option menu)

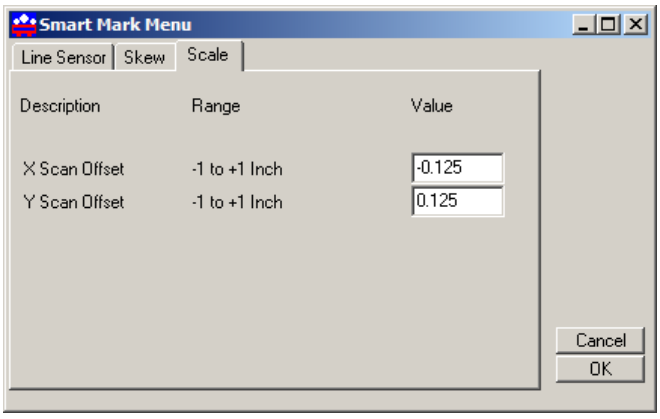
Y Target Location. This is the distance between the origin target and the skew target when the 2nd parameter of the FO command is –1. This command is used on CAD systems that do not emit the FO HPGL command. You set up the initialization string to have

BJ1;FO-1,-1; <for origin skew and scale processing>
or
BJ1;FO0,-1; <for origin and skew processing>

This causes the cutter to look at the Y Target Location parameter from this menu item.

Target Scan Direction sets the direction of the scanning operation. The skew mark is normally scanned +X,-Y. Changing the direction of the skew scan direction is beyond the scope of this document.

Scale Tab



X, Y Scan Offset. This is the distance from the scale point to perform the Y and X scans to find the scale point. With the targets defined as above, the -X, +Y are the correct signs of scan offset for the scale target.

Advanced menu items (These menu items appear if you select the advanced menu on the Setup Option menu)

X Target Location. This is the distance between the origin target and the scale target when the 1st parameter of the FO command is –1. This command is used on CAD systems that do not emit the FO hpgl command. You set up the initialization string to have:

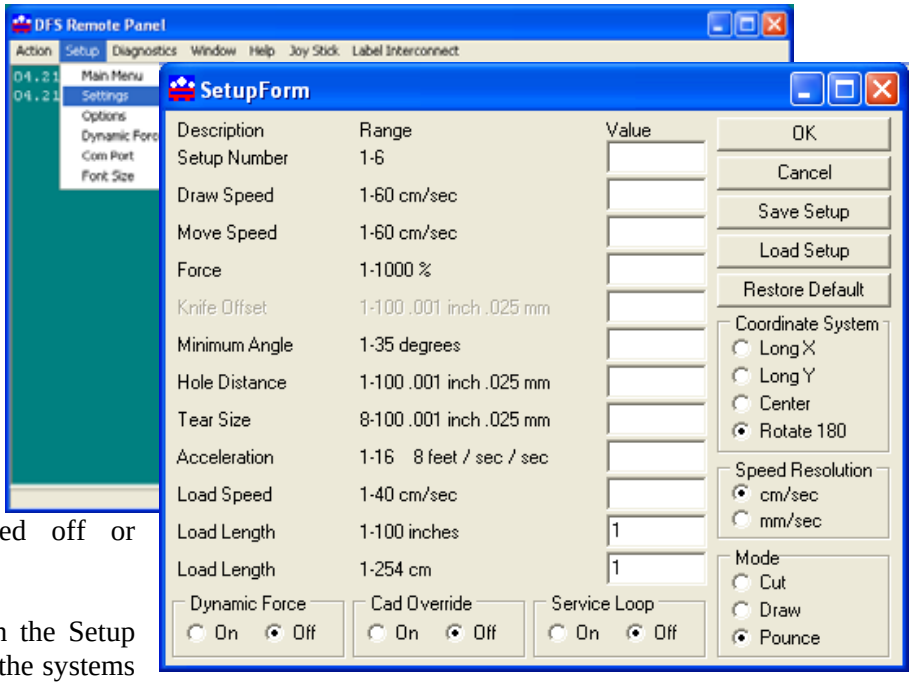
BJ1;FO-1,-1; <for origin skew and scale processing>

This causes the cutter to look at the X target location parameter from this menu item.

Target Scan Direction sets the direction of the scanning operation. The scale mark is normally scanned -X,+Y. There may be circumstances where it might be desirable to reverse the scan direction. Changing the scale scan direction is beyond the scope of this document.

Settings Menu

The DFS allows six factory or custom 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 the control panel, CAS software, the unit is turned off or reloaded.



Any of the features shown in the Setup Form may be saved to one of the systems 6 memory locations.

To save a custom set-up simply fill in the desired value(s) in the appropriate window, including the Setup Number, click on the Save Setup button.

To load the edit boxes with the current system parameters, input the setup number in the Setup Number window and then click the Load Setup button.

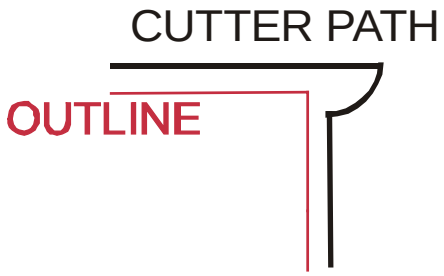
Setup Number sets the memory position.

Draw Speed is the velocity of the knife when cutting (e.g. while the knife is down).

Move Speed is the velocity of the knife when in the up position (not cutting).

Force controls the down force or pressure on the knife.

Knife Offset All drag knife cutters use a knife blade with the tip offset from the center of rotation. As the cutter moves the knife trails behind it, just like a caster on an office chair. In order to accurately cut the outlines, the computer embedded in the cutter compensates for the offset of the knife. This parameter sets the offset for those calculations. The figure to the right shows the path the knife follows; the radius move at the corner allows for the knife offset. The standard blade (Allen P/N H20-007) available at our online store at http://www.allendatagraph.com has a knife offset of (0.012 inch or 0.0304 cm).



Minimum Angle The cutter must stop and then accelerate whenever it makes a sharp turn. At shallow angles the cutter can continue at the cut velocity without decelerating then accelerating. This parameter sets the angle where below which the cutter can continue without stopping. High values increase throughput and lower value increase quality. Good quality can be obtained at reasonable speed at the default value of 12°.

Hole Distance displays and sets the distance between holes when the cutter is used in the pounce mode.

Tear Size displays and sets the hole size created when the cutter is in the pounce mode.

Acceleration displays and sets the servo acceleration. The unit of measurement is 1/4 g's or 8 feet per second. This parameter is more important in small graphics than in large labels or text. A setting of 2 to 8 is generally the best for most label cutting. This parameter does affect throughput speed on graphics with short vectors. As the graphics get larger the effect of higher acceleration diminishes. Higher acceleration can degrade cut quality.

Load Speed displays and sets the speed of the material loading and the speed of the material pull off in the service loop mode.

Load Length displays and sets the length of the material that is pulled during the load cycle and service loop if the cutter service loop mode is on. This should be turned off on the DFS when the cutter is in the Label Mode.

Dynamic Force (an advanced feature) engages the dynamic force function that instantaneously adjusts the force on the fly based on the actual velocity of the knife blade. All cutters must accelerate and decelerate as they cut around corners. Some medias require different force settings for different speeds. This parameter allows for building a database for these materials and when enabled will greatly improve the cutting on these materials. (See the Dynamic Force Section for more details)

CAd Override On or OFF enables or disables the CAD function. With the function **On (disabled),** the cutter will ignore some of the HPGL control commands sent from the cutting software. With the function Off, the software can control these HPGL functions.

These commands include:

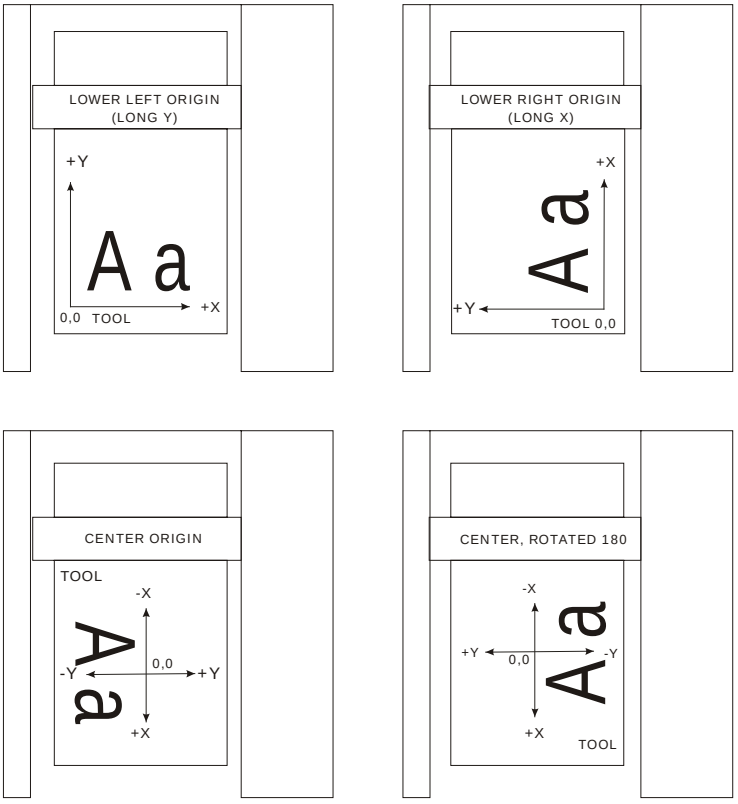
AS	set acceleration
FS	set force
KA	set minimum angle
KN	set knife offset
IP	input P1/P2
RO	rotate
SC	set scale
SP	select pen
ST	select tool
UV	up velocity (move speed)
VS	down velocity (cut speed)

Mode sets the operation mode. Select the operation mode cutting, pen plotting/drawing or pouncing.

Coordinate System

Allen Systems have four origins to allow for flexibility when using various CAD/CAS systems. The DFS is shipped with the Long X coordinate system in all factory set-ups and is compatible with most plotter or printer drivers. The choice of coordinate systems other than Long X is beyond the scope of this document.

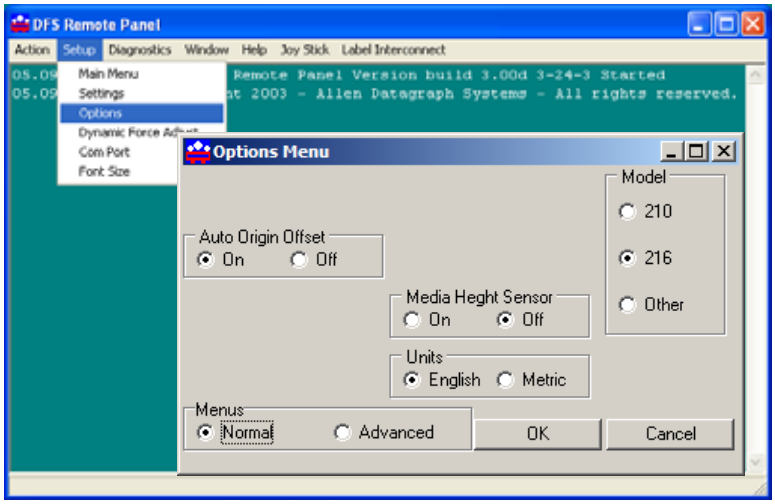
To restore the factory default to all setups click the **Restore Default** button.



DFS COORDINATE SYSTEMS

Options Menu

The options menu displays and sets the following parameters:



Auto Origin Offset determines whether moving the joystick automatically sets the origin to (0,0). Most CAD systems and the Allen DirectCut printer driver require this option to be set On. Set to Off when cutting from a CAD system that does not use the SmartMark™ sensor such as the Gerber Omega software.

Language determines which language the cutter uses. Select HPGL for most cad systems and the Allen Printer Driver. If you are using Gerber Omega select Gerber. If your cad system only output dmpl you can select this language.

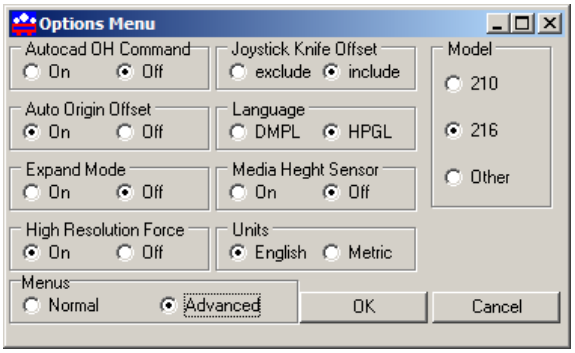
Media Height Sensor turns on or off the load function that senses the width of the media based on the set up of the pinch wheels. With this function enabled, the cutter head will scan a

magnet on the pinch wheels to establish the height of the media. With the function off, the cutter is loaded with the maximum width. This option is normally set to Off for label cutting.

Units sets the units of measure to English or Metric units.

Model sets the model number 216 for the DF-1600 and 210 for the DF-1000.

Menus option offers the more advanced features of the software. It is recommended this be set to Normal until a more advance feature is understood or is required by your operation. The menu items below are displayed when the menus is set to Advanced.



Autocad OH Command determines how the system will respond to the HPGL OH command.

Expand Mode allows the cutter to cut past the normal clip limits in the Y-axis. This function allows cutting and extra 1/2 inch wide.

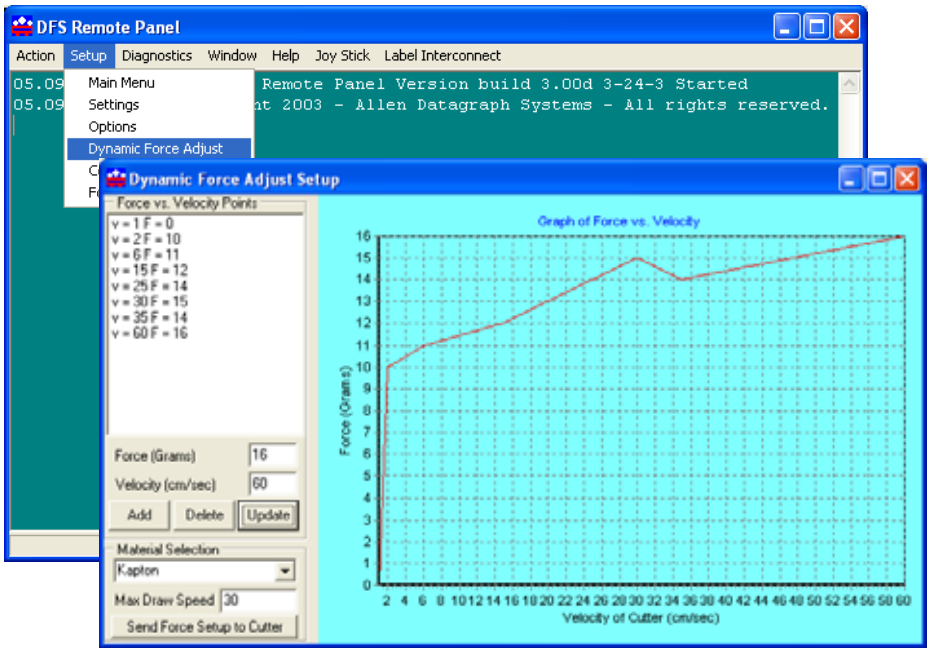
High Resolution Force sets the force resolution to 1 to 1000 steps instead of 1 to 100 steps. It is useful when cutting very hard to cut medias. It allow setting the force between two of the standard force settings. A force of 112 is equivalent to 11.2 % force. (also see the Dynamic Force Section)

Joystick Knife Offset this option controls whether the cutting data point includes or excludes the knife offset. The normal setting is include. Exclude is used for CadLink's SignCad program when digitizing only. The SmartMark™ system ignores this setting and properly calculates the location regardless of the setting.

Language sets the computer to either the HPGL (normal) or DMPL language for the plot file.

Dynamic Force Adjust

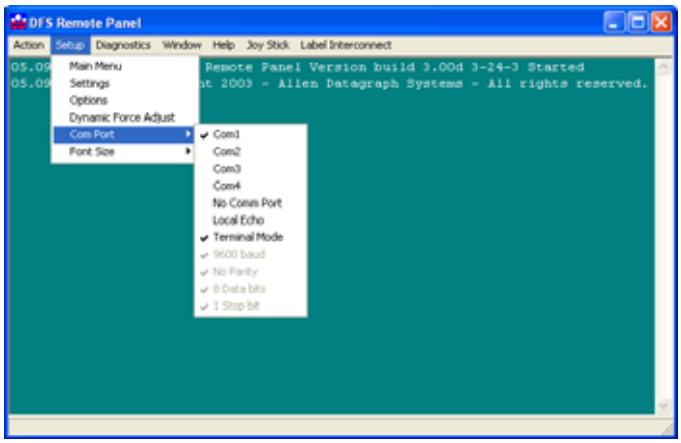
Dynamic Force Adjust This feature is considered an advanced feature and does not appear on the Setup menu unless the menu is set to advanced on the option page. Dynamic Force Adjust sets up the dynamic force parameters and database. To establish a new material database type in the name of the new material



in the Material Selection box and click Add. In the Force and Velocity Window, type in the desired force vs. velocity that you have established for the material. The recommended method for establishing the various force vs. velocity numbers is to run the test cut at various velocities and record the results for entry here.

Enter the Maximum cut speed for the media in the Max Draw Speed window.

Before using Dynamic Force Adjust, it is necessary to send the force setup to the cutter memory by clicking the Send Force to Cutter button. This needs to be done after each time the cutter is loaded or reset.

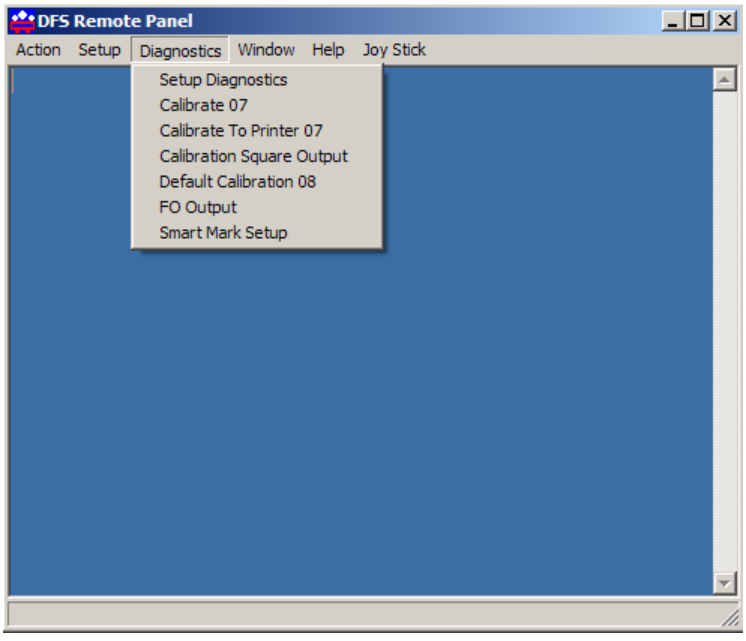


Com Port menu is used to set the communications port to the Remote Panel only. It does not set the communications port for the design software or Allen Windows Driver. The Local Echo mode is used in communicating directly from the remote panel while in Terminal Mode.

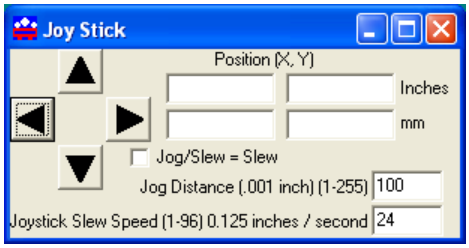
Font Size sets the font size for the Remote Panel Program.

Diagnostics

See the diagnostics section of this manual. Additional diagnostics are available if advanced menus are used.



Joy Stick

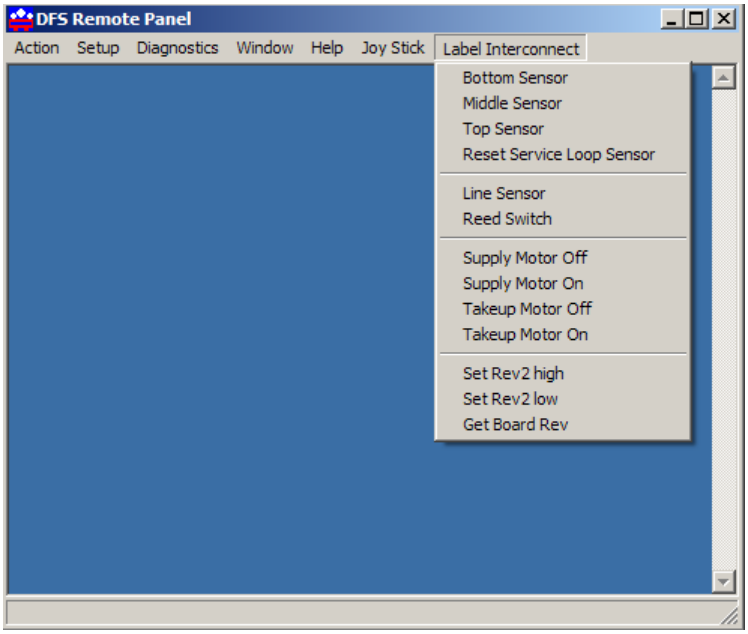


JOYSTICK The joystick is used for positioning the knife and media in the die cutting station.

The four **ARROW KEYS** are used to jog the material or cutter carriage that holds the knife blade and the SmartMark™ sensor. With the Jog/Slew box unchecked so that Jog/Slew = Slew, the joystick speed will be the speed set in the Joystick Speed Window. Left Click and hold the arrow button to move the material or carriage. With the Jog/Slew box checked so that Jog/Slew = Jog, the arrow buttons will jog the cutter that fixed distance each time the button is clicked.

The setting in the Jog Distance Window also sets the jog distance for the Front Panel Joystick buttons.

Label Interconnect



This menu item is considered an advanced feature and does not appear unless advanced menus are enabled on the Options menu. The Label Interconnect tab is used for testing various sensors on the DFS and for controlling certain functions.

Bottom, Middle and Top Sensor buttons are used to determine if the signal from the Hall Effects Transistor in the Supply Dancer Bar Loop Sensors are reaching the embedded CPU. Hall Effects Transistors are essentially magnetic switches. The Supply Dancer Bar contains a very powerful rare earth magnet at each end. As the Dancer Bar passes each of the loop sensors a signal is passed to the cutter CPU.

With no magnet present the correct clicking on any of the three sensor keys will return a “0” on the screen. If a magnet has been present the sensor keys will return a “1” on the screen.

The embedded CPU always lock the signal service loop sensors on when triggered. The Reset Service Loop Sensor clears this “lock”.

Line Sensor button is used to test the SmartMark™ Sensor. It should return a “1” when on the media color and a “0” when on the registration mark color. If the signals are reversed the L/D mode of the SmartMark™ Sensor may be set incorrectly. (see SmartMark™ Setup Section – Sensitivity)

Reed Switch button tests the reed switch. The reed switch is located on the cutter head and is the sensor that senses the magnets during the Media Height Sensing Function.

Set **Rev2 high/low** and **Get Board Rev** are used in manufacturing to verify operation of circuits on the label interconnect board work in detecting the revision 2 circuit board.

Media Mandrel Controls

To the right of the control panel are two knobs (four with laminator option) and one switch. The knobs control the torque on the mandrel, which in turn controls the tension of the web as influenced by the mandrel that the knob controls. Each knob is labeled with the name of the mandrel it controls. Turn the knob clockwise to increase the tension or counterclockwise to decrease the tension.

There is a learning curve involved in setting the mandrel tension and the type of media and gutter width between labels affects the settings. A fair amount of trial and error is required to get the setting correct for certain difficult medias. The following will give you basic guidelines for setting up the mandrel controls

TAKE-UP MANDREL If not slitting set the tension as low as possible while maintaining adequate roll tension and tracking. The setting of this mandrel is the most important as it effects tracking and weeding. If slitting the tension must be set somewhat higher to insure there is enough tension on the web to allow for the slitting knife to penetrate the media.

WEED MANDREL Set the tension as high as possible without breaking the weed material. As the percentage of weeded material gets smaller, the gutters get smaller, the less tension is required to pull the weed material off the backing while at the same time the smaller gutters can not stand as much tension without breaking.

LAMINATION MATERIAL MANDREL Set the tension low or off. It requires a very slight back tension on the lamination material to prevent wrinkles

LAMINATION WEED MANDREL Set the tension only high enough to insure the interlayer is pulled off the lamination material.

DFS Loading Instructions

1. Power on DFS unit. Allow system to initialize.
2. Insert the loading assistant (a 3 to 4 foot piece of black polycarbonate supplied with unit) through the rollers from back to front along the media path as shown in the Appendix E. It is not necessary to feed polycarbonate down loop chutes. This will aid in feeding the material through at the beginning of a job. Once material has passed through the necessary path remove loading assistant from machine. Pull through enough material for weed to reach take-up mandrel.
3. Squaring of material is vital to proper tracking. Line up material edge against gear side tracking guides and far side edge of entrance chute. These guides are factory set for square and should not be relocated. Lower tracking guides will be checked once material has been loaded.
4. Slide operator side tracking guides to material width.

5. If laminating, place laminating material roll onto Lam Feed mandrel. Also place empty cores onto Lam Waste, Weed and Takeup mandrels and tighten. Note rotation of mandrels in routing diagram.
6. Peel off start of weed and tack onto Weed Mandrel. Tape beginning of label material onto finish goods core on the Take Up Mandrel.
7. Position the cutter station pinch wheels to material width, locating outside pinch wheels approximately ½ inch from each edge and (DF-1600 only) center the middle pinch wheel.
8. Close pinch wheels.
9. Forward material with joystick and allow looping approximately half way down second loop chute, and placing second Dancer Bar (non-magnetized) into material. Make sure material is running on the right side of the tracking guide bar. At this point close second nip roller.
10. Peel lamination material from roll on Lam Feed Mandrel. Separate enough backing to attach to core on the Lam Waste Mandrel. Tack a twelve-inch long piece of scrap release liner, same width as lamination material to the end of lamination material approximately one inch up. This will act as a leader to aid in the start of the lamination process. Open laminator and feed material over handle and between rubber rolls over label material and through first nip roller. Keeping lamination material centered and parallel to labels. It may be necessary to loosen Lam Feed Mandrel and adjust the position of laminate to avoid wrinkles.
11. Once lamination material is beyond first nip roller, close and tighten nip roller, laminator and entrance chute. Laminator has adjustable pressure. You may want to experiment with various pressures to see what works best for you.
12. Confirm power to Mandrels is off by checking the four dials on front console. Turn toggle switch up into the on position.
13. Press load button and allow material to begin to move down first loop chute. As material is pulled from the lamination roll turn power on Lam Feed and Lam Waste Mandrel and adjust back motor torque. Little to no power is applied to Lam Feed Mandrel. When material has moved down a few inches place dancer bar with magnetic ends into material from the top and allow it to travel down until it trips lower the sensor and stops. At this time unit is loaded and load light is on. Make sure material is on the left side of the tracking guide bar down the chute.
14. Check once again that the tracking is running parallel. This is important to a successful outcome.
15. Confirm SmartMark™ is reacting properly by manually moving LED over mark with joystick. See SmartMark™ Setup. Also confirm scan length and scan offset is properly set for size of crop mark.
16. Position SmartMark™ LED to corner of first mark (See SmartMark™ operation section). If cutting multiple patterns of labels set your “X-Move between jobs” in the Label Remote Panel (See Label Remote Panel Menu Descriptions) or printer driver space between jobs to the distance between patterns. The distance being from the last cut line of one job to the target of the next.
17. Send job to DFS unit. SmartMark™ will scan the mark and based on the edges it locates it will begin to run the cut file sent.
18. When material advance is activated adjust the motor torque on Weed and Take Up Mandrels.
19. If slitting, install the slitting blade holder bar into the brackets and tighten the screws. Pop knife blades through material prior to moving media through slitter by manually rotating Take Up Mandrel.

20. If all parameters are set correctly, cut file will run without incident. If tracking begins to skew, press pause button and adjust tracking. If SmartMark™ misses correct scan location, check sensitivity setup and that it is not being triggered by debris, wrinkles or edge of laminating material.
21. Material will advance automatically as it is used up. Before the end of the roll is pulled through, pause and cut remaining lamination material from the roll and allow unit to finish processing.

SEE APPENDIX E FOR LOADING DIAGRAMS

Installing Knife Blades

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.
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.*

INSTALLING REPLACEMENT BLADES

The knife blade should be replaced when the force has been increased by more than 20 percent or the cut quality has degraded. The first sign of blade degradation usually occurs in the corners of the cut and may lead to poor weeding.

New blades slide into the holder to a preset height and are held in magnetically. No tools or adjustments are required. To replace the blade, first remove the blade holder from the tool holder by loosening the brass thumbscrew and pulling up on the silver knife holder. To remove the used blade, grasp it with a pair of tweezers and pull it out of the knife holder (discard the blade safely). Remove the new blade from the plastic case and remove the protective cap. Insert the blade into the holder and let the magnet pull it into the preset position. Reinsert the knife holder into the tool holder and tighten the brass thumbscrew.

Replacement blades are available from several sources including from Allen Datagraph Systems, Inc. They can be purchased online @ http://www.allendatagraph.com/ or by calling 603-893-1983. (Allen P/N H20-007 45° for vinyl, H20-008 60° for thick materials and heavy laminates)

TOOL HOLDER BLOCK

The knife blade holder is installed in the tool holder block with a thumbscrew. The tool holder block is held to the cutting head by two hex drive screws.

KNIFE BLADE HOLDER 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 DFS Unit are made with tungsten carbide and are designed specifically for digital die 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 or thick over-laminates. For best cutting results, protect the knife tip from damage when not in use.

KNIFE BLADES DEPTH GUIDE

Allen Datagraph's controlled depth knife holder has a depth guide that is adjustable to control the depth of cut the cutter makes. Correct adjustments allow the blade to cut the 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 media difficult.

Use the cut test, force and depth adjustment to establish good cutting (see setting cut force – cut depth section)

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*

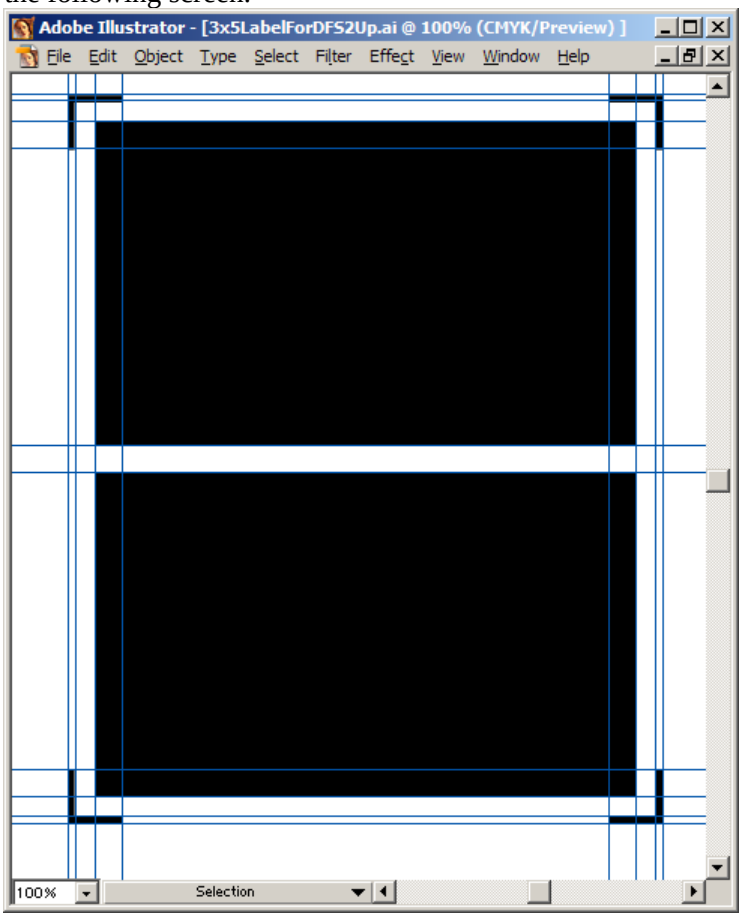
See Control Panel Section of document to set the force.

Tutorial Using Adobe Illustrator

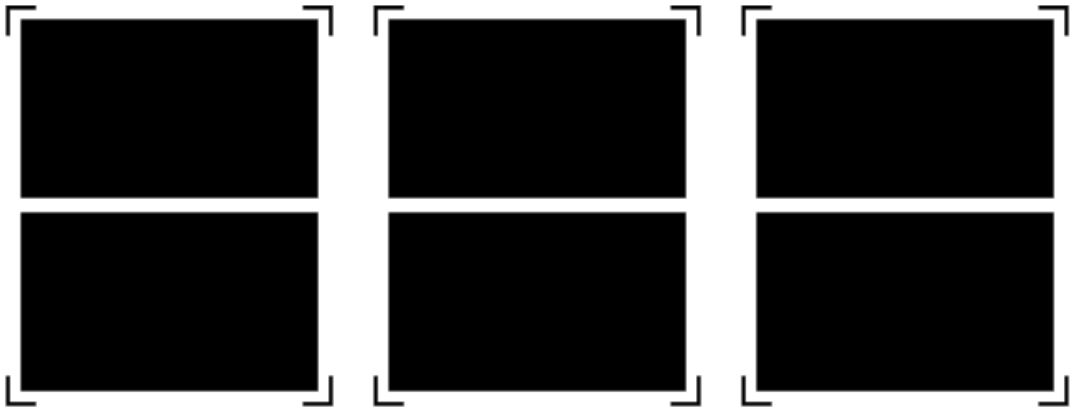
Several additional documents have been written for using the printer driver with various CAD programs. They are on the tech support page of the Allen Datagraph web site. http://www.allendatagraph.com.

The most common CAD program used by our customers for label design and cut line preparation is Adobe Illustrator 10. Other programs can be used as well as long as they send vectors rather than raster images to the printer driver. Allen Datagraph has implemented the Allen Print utility for Adobe Illustrator. You can download a sample label from the Allen Datagraph web site. The

Sample Labels (Web Site Copy / CD Copy) contains several examples of labels and targets for Adobe Illustrator and Corel Draw. Opening the file 3x5LabelForDFS2up.ai with Adobe Illustrator we see the following screen.



This file can be printed to your graphics printer. There are 2 labels and 4 targets. The file is completely symmetrical so it does not matter which way you print the labels. To test the setup, print about 20 copies of the pair of labels. Print the labels with a 0.5-inch gutter between the labels. After printing your printed media should look as follows:



Connect the power cord and the communications cable as described earlier in the document. Turn on the power and/or emergency stop switch. Load the media as described in DFS Loading instructions.

Press the Load button on the remote panel. The DFS should fill up the front service loop and turn on the Load LED on the front panel. Move the Red laser pointer near the gear side target (outside edge).

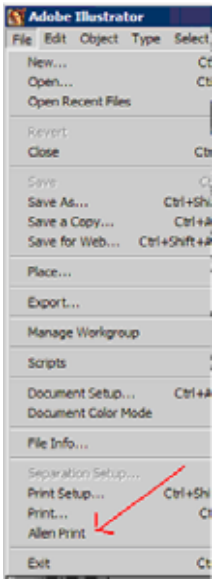
You now have to decide whether you will use scan one target, two targets or three targets to cut your labels. **One target** can track drift of media (right/left/front/back). It does not correct for skew (rotation) or scale (differences in the dimensions of the printed label and the cut image). One target should be sufficient for most label jobs as the amount of area surrounding a label is somewhat flexible.

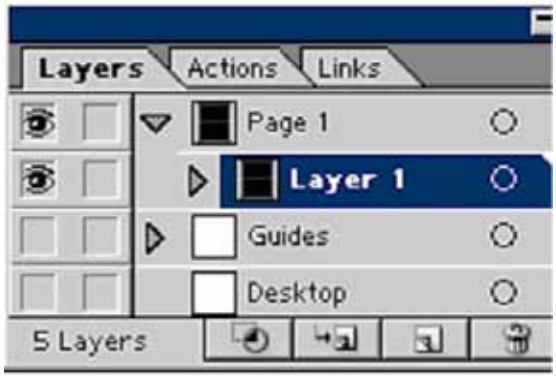
Two target scanning while this mode has to scan two targets rather than one, it corrects for rotation in the printed image. This mode gives more accurate results than one target scanning. You should use this mode when you have to maintain a very accurate narrow border. (E.g. You are cutting around a printed star and you want exactly 0.06 inch white border around the image.) With this type of white border even small errors in cut line location are visible to the naked eye. As this type of label requires more care and accuracy you should charge more for them.

Three target scanning is normally only required when you have multiple printers that do not scale images exactly the same. Three target scanning corrects for location, skew and scale in both the X and Y axes. This mode is the most complex to get working and should not be attempted without understanding the SmartMark™ system.

Normally the DFS is calibrated at the factory or during installation. If you are having trouble printing and cutting the correct size refer to the TSB on Calibration Web Site Copy / CD Copy.

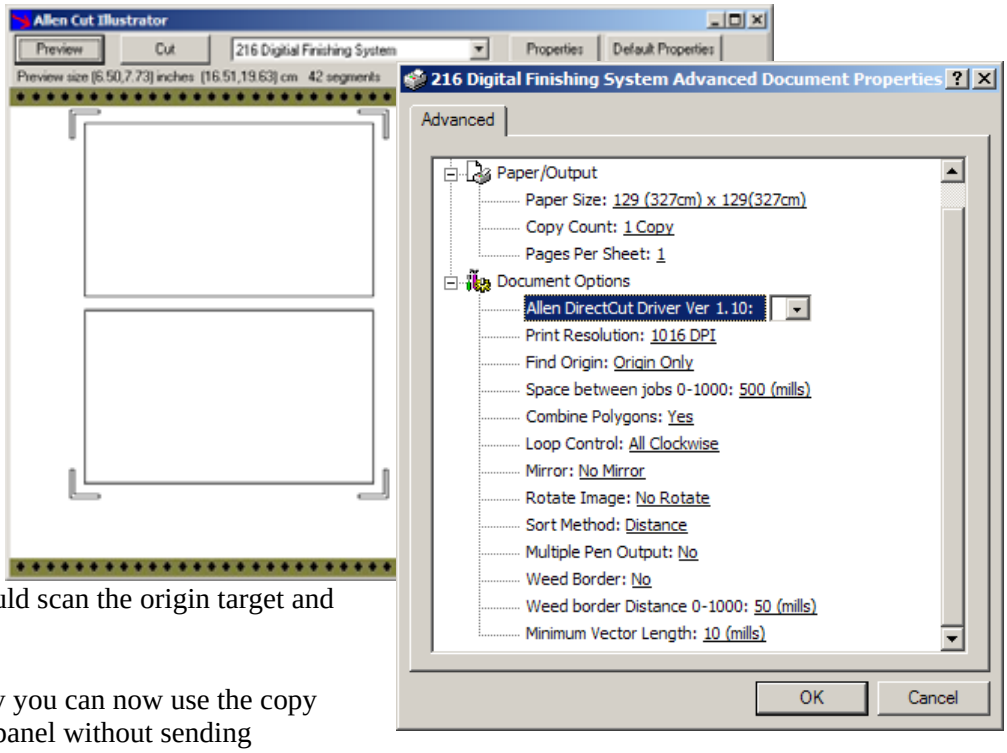
Let us assume you have chosen one target. Select Layer 1 from the layer menu as the Allen Print only outputs the currently selected layer.





Select Allen Print from the File Menu. If Allen print does not appear you either installed the printer driver incorrectly or you do not have Adobe Illustrator 10.

After clicking the Preview button the Allen Cut Illustrator screen will appear as follows:



Select Properties Button

Set printer properties as shown. Click on OK. Then Click on the Cut button. This will send the cut lines to the DFS with the SmartMark™ command at the beginning. The DFS should scan the origin target and cut the two labels.

If the image cuts correctly you can now use the copy command from the front panel without sending additional data to the DFS. Select COPY button. Use Up arrow, Down Arrow, Force Up/Force Down to select copy count. Then press select to start the copy operation.

Calibration

Cutter calibration for SmartMark™ is beyond the scope of this document. Please read TSB on Calibration Web Site Copy / CD Copy available on the technical support page of the Allen Datagraph web site at http://www.allendatagraph.com.

Maintenance

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 three grit wheel surfaces with a stiff bristled (not wire) brush to remove any media particles that may have built up during cutting. 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**. Wipe media-related dust from the set of polyurethane pinch wheels by using a soft cloth.

3. **Monthly**. 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. **Yearly**. 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 safety glasses to protect eyes. Remove rear cover and use compressed air to remove dust and debris. Replace cover to original location and make certain that the boards and any connectors are well seated.

Pinch Wheel Maintenance

Pinch wheels are critical to the DFS unit's 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, trying to move them when they are in the down position can damage them. 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.

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 DFS servomotors 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, remove the back of the DFS. This can be done by removing about 20 large screws along the edge of the rear cover. (see also TSB: Mechanical Adjustments to Restore Cut Quality to Normal Web Site Copy / CD Copy)

Y-AXIS

The Y-axis short belt runs between the Y-axis servomotor 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.

The long belt is adjusted using a lead screw located behind the control panel. To set the long belt's tension:

1. Position the carriage to the far side.
2. Remove the control panel housing as follows
    a. Remove the rear cover
    b. Remove the top rail cover over the carriage by removing the two screws at each end of the cover.
    c. Remove the 4 screws that attach the control panel housing to the outer side plate.
3. Adjust the lead screw so that the belt will deflect 0.125 or feels taut.
4. Set the lead screw lock nut.
5. Verify belt path and tension.
6. Replace the control panel housing, top rail cover and rear cover.

X-AXIS

The belt inside the rear cover 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.

Diagnostics

The DFS firmware contains a set of resident diagnostics. When the DFS 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 three-digit error number will be displayed in the display window. The error numbers and the corresponding malfunction descriptions are given in the error code 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 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 that 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 display window on the control panel.

Diagnostic Operation

The diagnostics in the DFS exist at several levels:

1. POWER-ON
2. CONTINUOUS HARDWARE AND SOFTWARE MONITORING
3. 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 MONITORING** 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 and for making certain adjustments to the DFS such as calibration.

To Run Diagnostics if the DFS unit is displaying an error code on the front panel display, press any key to enter the diagnostic mode.

Control panel operation

STARTING THE DIAGNOSTICS FROM CONTROL PANEL

Turn unit on and allow initialization to complete. If the DFS is displaying a flashing error code on the front panel display, press any key to enter the diagnostic mode.

Press the select key to initiate the menu function, Press the left or right arrow key to display `diA`. Press the up or down key to scroll thru the diagnostic numbers (0002 – 0099). Press the select key to start the diagnostic.

TO STOP A DIAGNOSTIC

Press the reset key sequence F1, F2, F3.

TO EXIT THE DIAGNOSTIC MODE

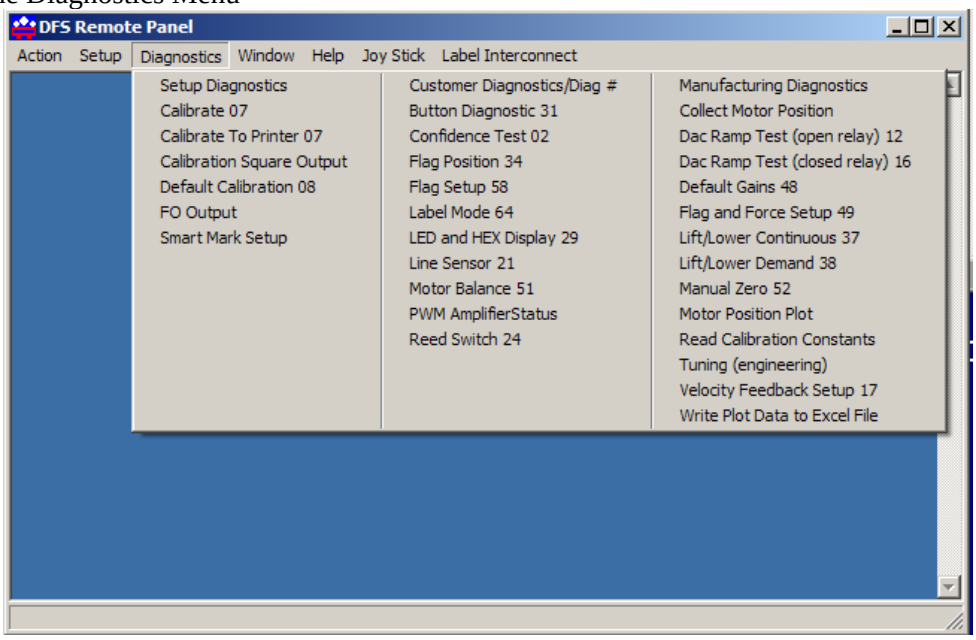
To return to normal operation, run diagnostic 99 or cycle the cutter power off and on.

Remote panel operation

Certain diagnostics are easier to run from the remote panel, most of which require the advance option on the option page. To run the customer diagnostics from the remote panel program:

Open the remote panel

Open the Diagnostics Menu



It is not recommended that the Manufacturing Diagnostics be run unless instructed by direct contact with Allen Datagraph Technical support. Damage to the system is possible.

Setup Diagnostics

Calibrate 07, Calibrate To Printer and SmartMark™ Setup have been described in other sections of this document or the SmartMark™ Setup Document.

Calibration Square Output prompts for a square size and sends an HPGL command to output the square. This is useful when calibrating the cutter to a ruler rather than a printer and is normally not required. Specifying 10 inches for the size will send the HPGL command er10160,10160;

Default Calibration 08 diagnostic sets the calibration constants back to the factory defaults prior to initial calibration. After running this diagnostic you will have to either restore the calibration constants or rerun the procedure described in TSB on Calibration Web Site Copy / CD Copy available on the technical support page of the Allen Datagraph web site at http://www.allendatagraph.com. As this is a rather involved procedure Diagnostic 08 should be avoided unless you have received an E37 error, which requires this diagnostic to be run.

FO Output command sends the <esc>.vfooutput: command which displays software debug information about the last FO command. The first line output indicates the location of the three targets and whether they were found. The last two lines indicate the amount of scaling and rotation calculated that need to be applied to the HPGL commands to cut the image.

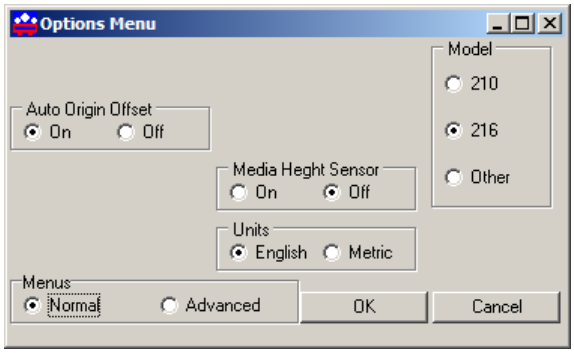
The "Customer Diagnostics" are designed for use by the customer to aid in trouble shooting the DFS.

To run a customer diagnostic, click on the menu item and the diagnostic will automatically start. Some require intervention after starting and you will be given instructions on the screen.

Customer Diagnostics

Set Model Number 03

From the control panel scroll to `0003` and press the select key. Enter model 210 for the DF-1000 10 inch Digital Finishing System or 216 for the DF-1600 16 inch Digital Finishing System then press the Select Key.



From the remote panel open the Set-up menu then the Options Menu. Click on the desired Model Radio Button, 210 for the DF-1000 10 inch Digital Finishing System or 216 for the DF-1600 16 inch Digital Finishing System.

Button Diagnostic 31

Test the operation of each of the buttons on the front panel. Buttons must be pressed in the following order: Load, Pause, Copy, Speed Up, Speed Down, Force Up, Force Down, Test Cut, F3, F2, F1, Select, Left, Right, Up, Down. If the wrong code is received the error code E036 is displayed otherwise the requested button is requested with B0?? prompt.

Confidence Test 02

The confidence test is used to verify the operation of the cutting station of the DFS. It fully tests the capability of the cutting CPU and Servo control system.

First Load paper at least 36 inches long into the cutter station. There is no need to fully load the DFS. After loading the media into the cutter station do not press the load key. Insert a Pen into the tool holder.

From the front panel scroll to `0002` press the Select Key. The DFS will start by sensing the media width and then will draw a sample file. The file is distorted to fit the media width.

From the remote panel click on Confidence Test 02. The DFS will start by sensing the media width and then will draw a sample file. The file is distorted to fit the media width.

Flag Monitor / Adjust 34

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 circuit 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.

Slightly move the flag to obtain the above reading at each of the three locations.

Check that the flag screws are tight and recheck Bottom and Down.

To start the diagnostic

From the front panel scroll to `0034` and press the Select Key.

From the remote panel click on Flag Position 34.

Flag Setup - Z Axis 58

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.

From the Front Panel scroll to `0058` then press the Select Key.

From the Remote Panel click on Flag Setup 58.

Phase 4: Set Tool Bottom - Remove the tool from the holder and press the Select Key.
Phase 5: Set Tool Down - Adjust knife depth guide to equal the blade length. Place knife tool in holder. Press the Select Key.
Phase 8: Balance X and Y Servos. See diagnostic 51
Power Down Cutter to continue.

Label Mode 64

Set to on to operate the DFS normally. Set to off to operate the DFS as a cutter.

LED and Hex display 29

Exercises the LEDS and the 4-character display.

Line Sensor 21

Continuously displays the result of the SmartMark™ Line sensor.

Motor Balance 51

The motor balance is a feature that automatic finds the servo balance DAC value for both the X and Y-axes.

From the front panel first joy stick the Y-axis to the center of the workspace. Then scroll to `0051` and press the Select Key. The display will change to read 0008. At that point press the Select Key a second time. The carriage and the grit roller will oscillate back and forth multiple times, first slowly and then more rapidly. It is possible that the carriage may bump the sidewall; this is normal and will not affect the outcome. When the diagnostic is complete the cutter will reinitialize and the carriage will return to the home position.

From the remote panel first joy stick the Y-axis to the center of the workspace. Click on "Motor Balance 51". The screen will change to the front panel simulator. Follow the instructions on the screen. The carriage and the grit roller will oscillate back and forth multiple times, first slowly ant then more rapidly. It is possible that the carriage may bump the sidewall; this is normal and will not affect the outcome. When the diagnostic is complete the cutter will reinitialize and the carriage will return to the home position.

PWM Amplifier Status

This displays the power amplifier status if the PWM power amplifier is installed.

Reed Switch 24

This diagnostic continuously displays the result of the media height sensor. As the reed switch passes in front of a pinch wheel with a magnet installed, the output will change from 1 to 0.

Trouble Shooting

Problem	Solutions
Cut through/poor weeding	• Is your knife blade sharp? You can check condition of blade by examining the blade tip under a 30x microscope. The blade tip must be present. • For very thin (less than 0.002 inch, (0.05 mm)) media you might need to use the controlled depth adjustment on the end of the knife holder. Partially unscrew the black cap until just enough knife blade is exposed to cut through the media but not the backer. Test by drawing knife across media by hand. You can then use a higher force with no cut through. • It is important that the groove filler be installed fully and evenly, otherwise material cut through may occur in some sections across the plotter. • Tracking must work correctly • Insufficient backer weight. • Check mechanical adjustments Web Site Copy / CD Copy
Tracking	• Perfect leveling is not required in steps below but adjustments need to be close. • Machine loaded per Web Site Copy / CD Copy • Machine Level (place level on cut strip) level with machine / table legs. • Rear media guides set correctly. (Measure distance between gear panel to media guide. They should all be same distance from gear panel.) • The service loop guides are adjusted differently. With a set of labels installed in cutter align media edge to same distance as above and square printed labels to cut strip. Lay a scale across media. Adjust service loop media guides to 1/16th inch (1.5 mm) away from media edge. • Adjustable bars level. Set level on Web guide 3, exit roller and adjust until level. • Mandrels Level (to adjust remove back of machine and loosen 4 mandrel leveling bolts. Align with Square. Check with level. Tighten bolts.)

Problem	Solutions
Tracking Lamination	• Machine loaded per Web Site Copy / CD Copy • Machine Level (place level on cut strip) level with machine / table legs. • No tension is required on Laminate feed mandrel. Set tension control to off position. • Unwind stand inadequate. A suitable unwind stand must be used with the DFS. It should supply a small amount of back pressure and not drift from side to side. • Printed media must be wound on core evenly • Laminate same width or larger than printed stock. Laminate with should be 1/16" to 1/8" smaller than printed stock. • Too much pressure on laminate roller (blue rubber roller). Only a light pressure is required on laminate roller. • Uneven pressure on laminate roller. To set pressure loosen two nuts on each pressure control. These are the hinged cam latches that supply the pressure on the blue roller. To measure the pressure you need to create two sandwiches of three pieces of the unlaminated printed media. Place one sandwich under operator side latch and one under gear side latch. Adjust the pressure the latch applies to the blue roller until both centerpieces of the sandwiched media can be pulled with the same amount of force. Test tracking. After laminate tracking works correctly tighten lock nuts.
Skewing	• Verify both front and rear dancer bars are not bouncing on bottom or top of service loop. Bouncing will cause the media to slip between the grit wheel and the pinch roller.

Error Codes

If the internal microprocessor detects an error condition, the letter E0 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.

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.

8.8:8.8

000 __ power up display - check PCBs loose in socket,+ 5 volts, + 15 volts, + 32 volts, micro PCB dead.

E01 __ Incorrect flash image

E02 __ Joystick disabled

E03 __ pause switch on

E04 __ Paper sensors must be on

E05 __ sheet not loaded

E06 __ media height sensor disabled
E07 __ buffer too small or cutter busy
E09 __ waiting for first vector to complete
E10 __ Too much ambient light
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
E32 __ reed switch sensor malfunction – D024. Or pinch wheel under carriage too close to side plate. Move pinch wheel away from side plate. See options menu to disable the media height sensor.
E35 __ The pinch wheel positioned on an uncoated section of grit wheel. Reposition movable pinch wheel. Right hand pinch wheel may be improperly situated or pinch wheel under carriage too close to side plate. Move pinch wheel away from side plate.
E36 __ bad control panel key received – D031.
E37 __ bad calibration constants Must run diagnostic D008, then calibrate DFS.
E39 __ pounce out of limits
E40 __ HPGL command parser error
E56 __ RS-232 device overrun (broken cable, wrong handshake, broken serial hardware in computer/DFS)
E57 __ RS-232 framing error. Plotter communications default for serial A port is 9600,n,8,1. set software to match these parameters.
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. Normally caused by paper jam. Check servo pot adjustment.
E63 __ Excessive current found in voice coil.
E65 __ EPO latch failure check seating of servo and CPU Board
E66 __ timeout latch failure check seating of servo and CPU Board
E67 __ voice coil current sensor failure check seating of servo and CPU Board
E68 __ servo motor over-current sensor failure check seating of servo and CPU Board
E69 __ EPO latch or EPO reset failure check seating of servo and CPU Board
E70 __ motor over-current - power amp failed check seating of servo and CPU Board
E71 __ voice coil over-current - pwr amp failed check seating of servo and CPU Board
E72 __ motor over-current, DAC or analog failed check seating of servo and CPU Board
E73 __ X-axis position counter failed check seating of servo and CPU Board
E74 __ Y-axis position counter failed check seating of servo and CPU Board
E75 __ X-axis encoder failed check seating of servo and CPU Board
E76 __ Y-axis encoder failed check seating of servo and CPU Board
E77 __ X-axis encoder detector failed check seating of servo and CPU Board
E78 __ Y-axis encoder detector failed check seating of servo and CPU Board
E79 __ position initialization error; either carriage didn't move or reed switch failed. Try with media height sensor disabled

E80, 81 Excessive position error - X axis, Y axis. Reference motor position too far from actual motor position. This can be caused by speed or acceleration too high, jerking material from a heavy roll, media jam, bad calibration constants, power surge, servo motor / encoder failure, servo PCB failure, power amplifier pcb failure, relay on motherboard.

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

Appendix A – Installation and Assembly Instructions

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Appendix B - A Drawing for the Cutouts for the Table

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Appendix C - Assembly Instructions for the Optional Stand

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Appendix D - Advanced Programming for SmartMark™ Sensor

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Appendix E – Loading Diagram

Web Site Copy / CD Copy

Appendix F – Radio and Television Interference

NOTE: This equipment has been tested and found to comply with the limits for a 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 manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

In order to maintain compliance with FCC regulations shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television reception.

This device complies with part 15 of FCC Rules. Operation is subject to the following two conditions; (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.