

USERS MANUAL



Welcome to digital die-cutting

The Intelligent Cutting Utility Tool (i-cut) is an electronic processing package that imports files from standard design programs for the purpose of cutting, scoring or otherwise converting them. It is specifically engineered to optimize the speed and accuracy of Zund and Wild flatbed cutting plotters as well as MultiCam CNC routing systems.

I-cut can be completely customized to meet the requirements of any cutting blade, laser, creasing or drawing application. It supports both sheet and automatic roll feeding.

The program is also available with the i-cut Vision camera option, which facilitates near perfect registration when cutting printed materials. We call this process Digital Die Cutting™. This option enables the system to compensate for material distortion that might have occurred during printing or finishing. Both with and without the camera option, i-cut advanced technology offers the highest accuracy and productivity, in an intuitive user-friendly environment.

About this users manual.

Before reading this manual, it is recommended that you familiarize yourself with the *Installation and Setup Guide* document that accompanied the i-cut program. This manual is divided into four sections. The first is an overview of i-cut's key screens and menus. [Section Two](#) is an introduction to basic system operations, from setup to production. In the [third section](#), we focus on the workings of the optically guided Vision Registration system. The [final section](#) deals with automating and customizing i-cut to further improve results and maximize throughput. Because there are many levels of operation possible with i-cut, you will find some settings and procedures described in more than one place in this manual.



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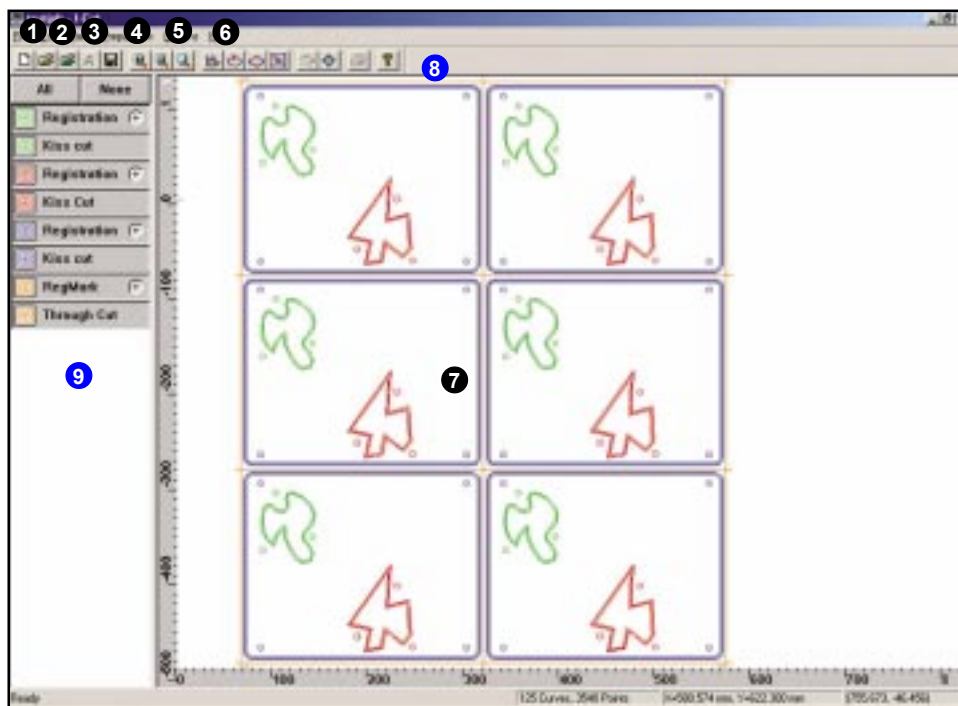


Illustration 1A: Main Screen












9 Layer Buttons Column



Layer buttons allow you to select specific layers within a job file, and provide important information about each layer. The layer button indicates the *type* of layer (registration or curve), the *color* in which it is displayed and the *tool* or operation associated with that layer. Selecting and editing layers is described in more detail on [page 9](#).

The **All** and **None** buttons at the top of this area reset all layer buttons. The **All** button selects all layers and the **None** button deselects all layers. See [page 9](#) for more on selecting layers.

8 Tool Bar Icons





-  **NEW** clears all files and settings
-  **OPEN** opens an existing job
-  **IMPORT** imports a new customer file.
-  **SAVE** saves file.
-  **SCALE** sizes the on-screen image.
-  **FIT TO DATA** enlarges the image to fit the screen
-  **SHOW STARTPOINT** arrow displays curve startpoint
-  **SHOW POINTS** displays curve and regmark points
-  **EDIT POINTS** adjust curves using individual points
-  **OPTIMIZE CURVE** enhance curve performance
-  **LAUNCH PRODUCTION MANAGER** Window

OVERVIEW MAIN SCREEN

- 1 FILE MENU:** Offers the functions typical of most Windows based programs. From the **File** menu you can open new or existing jobs, save jobs under existing or new names, and print image pages. Also launch the *Production Manager* window from here. See more on [page 3](#).
- 2 EDIT MENU:** This menu allows you to make important modifications to layer settings and also provides access to several setup and preference submenus. See more on [page 4](#).
- 3 VIEW MENU:** The **View** menu settings control the appearance of the working screen, zoom in and zoom out features, and special controls for curves and points. See complete details on [page 3](#).
- 4 PREPARATION MENU:** Opens submenus to optimize curves, change tool offset, change lead in / lead out dimensions, set-up glue line ([page 30](#)) and initiate the check regmark feature.
- 5 OPTIONS MENU:** Access to a series of system controls, including *Production Options*, system preferences and others ([page 7](#))
- 6 HELP MENU:** Access to online documentation and the MGE website.
- 7 IMAGE AREA:** Displays cutting contours and registration marks for existing jobs. Each curve or registration mark group is displayed in the color that corresponds to the button in the layer bar to the right of the image area. When a specific layer button is selected, only the curves or registration marks corresponding to that button will be displayed in the image area.




OVERVIEW **FILE MENU:**

The primary functions of the **File** Menu are file access and management.

- 10 **New:** Open a new blank job (also accessed from the Tool Bar) 
 - 11 **Open:** Open an existing job from your files (also accessed from the Tool Bar) 
 - 12 **Save:** Save to file folder (also accessed from the Tool Bar) 
 - 13 **Save As:** Save to file folder under a new name or as a template.
-
- 14 **Production Manager:** Key menu provides settings for how the plotter will run the job (also accessed from the Tool Bar). 
See full menu on page 1-6.
-
- 15 **Merge:** Accesses an existing **.cut** or **.prm** file from your records and adds it to the current job on screen. An imported job can't be merged with an existing job while on screen.
 - 16 **Import:** Accesses a new customer file and opens it in i-cut (also accessed from the Tool Bar).
 - 17 **Statistics:** Displays key data for the current job in the window shown in Illustration 2C. Data generated by i-cut can be exported in Microsoft Excel format for later analysis.

OVERVIEW **VIEW MENU:**

The **View** menu controls many aspects of the main i-Cut viewing screen.

- 18 **Toolbar On/Off:** Toggle on, toggle off toolbar.
 - 19 **Status Bar On/Off:** Toggle on, toggle off toolbar.
 - 20 **Split:** Click to reposition dividing line between the layer bar column and the image area. Line can also be re-positioned by double-clicking.
 - 21 **Ruler On/Off:** Toggle ruler on and off.
-
- 22 **Curve Direction:** Displays arrows to indicate starting point of all selected curves. Also available on the Toolbar as *Show Startpoint*. 
 - 23 **Curve Points:** Shows points defining all selected curves. Also available on the Toolbar as *Show Points*. 
-
- 24 **Sizing Features:** Zoom in or out, or launch magnifying glass tool. The Zoom tool creates an on-screen magnifying glass tool that allows closer views of specific image areas. These features also available on the Toolbar. 

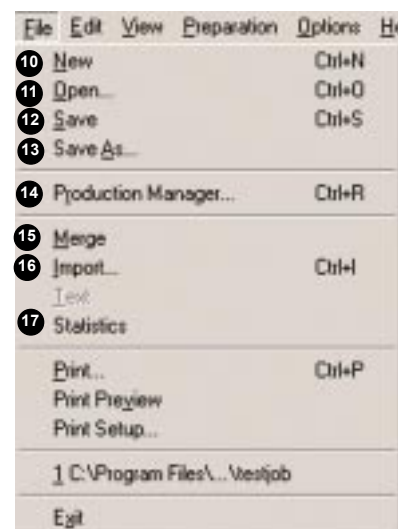


Illustration 1B: File menu

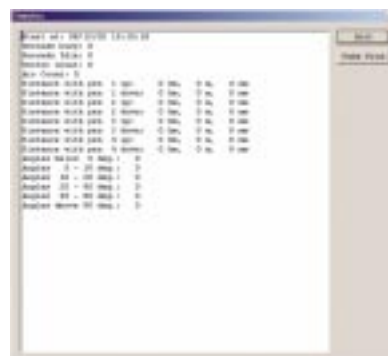


Illustration 1C: Statistics window

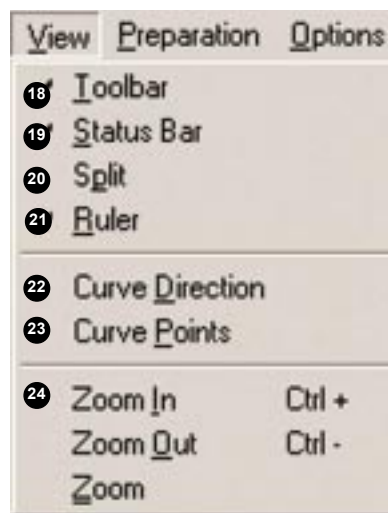


Illustration 1D: View window



Illustration 1E: Edit Menu



Illustration 1F: New layer button shows that no tool has yet been selected.



Illustration 1G: Add regmark layer selection automatically creates a button on the column.

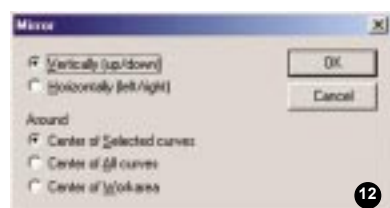


Illustration 1H: Mirror dialog box.



Illustration 1i: Rotate dialog box.

OVERVIEW EDIT MENU:

The **Edit** menu offers a series of settings and submenus that control job setup and modifications. This spread provides a summary of the most important of these features.

- ❶ **Edit Layer:** Make changes to selected layer, including name, display color, tool description, pressure and other operating parameters. The **Edit Layer** menu is also launched by double clicking in the center of any layer button. See details on [page 9](#).
- ❷ **Add Layer:** Add a new empty layer; specify name, color and tool when the layer is opened, or edit the settings later using the **Edit Layer** menu. Illustration 1F shows a new unnamed layer for which no display color or tool has been selected. When *I-Cut Camera* is selected as the tool, the new layer button will show a + on the right side.
- ❸ **Add Regmark Layer:** Launches a menu that automatically creates a registration mark layer and button. The **Add Regmark Layer** menu offers additional functionality for controlling registration marks. See more on [page 20](#).
- ❹ **Copy Layer:** Copies any selected layer button with all attributes and adds it to the bottom of the layer button bar. If multiple layers are selected, they will all be added to the bottom of the bar.
- ❺ **Copy Layer with Curves:** Copies any selected layer button or buttons along with the artwork or regmarks related to it/them.
- ❻ **Remove layer:** Removes all selected layers and related curves from the layer button bar and image viewing area.
- ❼ **Select all Layers:** Selects and illuminates all buttons on the lefthand layer button bar. All curves and regmarks will be displayed. Same function as the All button at the top of the lefthand layer button bar.
- ❽ **Deselect all Layers:** Deselects and turns off all buttons on the lefthand layer button bar. However, all curves and regmarks will be displayed. Same function as the None button at the top of the lefthand layer button bar.
- ❾ **Remove Unused Layers:** Removes layer buttons from the layer button column that have no curves attached to them (more on [page 10](#)).
- ❿ **Invert Curve Direction:** When active, clicking on this selection will reverse the curve processing direction.
- ⓫ **Remove Curves:** Deletes selected curves.
- ⓬ **Mirror:** Flips selected image vertically or horizontally (See Illustration 1-H)
- ⓭ **Rotate:** Rotates selected image according to numerical setting, clockwise or counter-clockwise (see Illustration 1-i)
- ⓮ **Move:** Specify X and Y distances for image re-positioning.
- ⓯ **Edit Points:** Activates the point editing feature, which offers several point by point controls of curve attributes, including moving, smoothing, deleting, etc. Menu is launched by right-clicking on any point. See more on [page 22](#).
- ⓰ **Edit Job** Change size and position of selected job components.
- ⓱ **Fit to Data:** Enlarges onscreen image to fit viewing space. Also available on ToolBar.
- ⓲ **Edit Tools:** Add and remove tools for selected layer, plus controls for advanced features. See [page 21](#) for more.

OVERVIEW **OPTIONS MENU:**

The Options Menu launches several submenus which are important in setting system configurations.

- 19 **System:** A preferences menu controlling measurement units and various tolerances (see Illustration 1K).
- 20 **Production:** Launches the **Production Options** menu, which allows customization of .opt files; also measures and checks camera offset. This menu is accessed from the *Options* button of the **Production Manager** window. More on [page 7](#) and [page 23](#).
- 21 **Locator:** Controls various camera settings used during registration (see [page 19](#)).
- 22 **Plotter Connection:** Used in system setup, see more in separate setup guide.
- 23 **File location:** Sets up default paths for key file locations used when importing and opening files; accessing tools and .opt files.
- 24 **Language:** Selects English, Spanish, French or German.
- 25 **Configuration:** Provides interface for activating optional features.

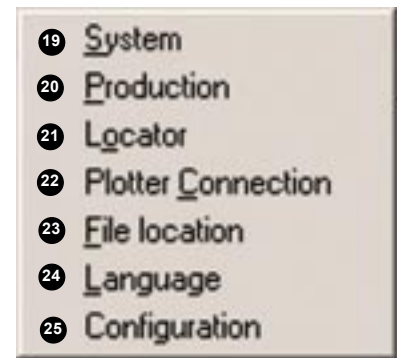


Illustration 1J: Edit > Options menu 1



Illustration 1K: Options > System menu 19

OVERVIEW **EDIT LAYER/ADD LAYER MENUS:**

These two similar menus provide settings for key layer properties. The settings may be entered when a new layer is added (**Add Layer** menu), or changed later (**Edit Layer** menu).

- 26 **Name:** The name corresponds to the function of the layer and generally indicates either a cutting tool function or registration mark.
- 27 **Tool:** Selects either Pen (for tools) or I-Cut Camera (for Regmarks).
- 28 **Pen:** Specifies tool position.
- 29 **Color Palette:** Select color of curves or regmarks displayed in a layer, which corresponds to the color displayed on the left side of the layer button.
- 30 **Operating Parameters:** Settings for velocity, acceleration and knife pressure as well as other tool-specific values. The fields change to correspond to the selected tool (cutting, routing, laser, etc.).

More [page 20](#).

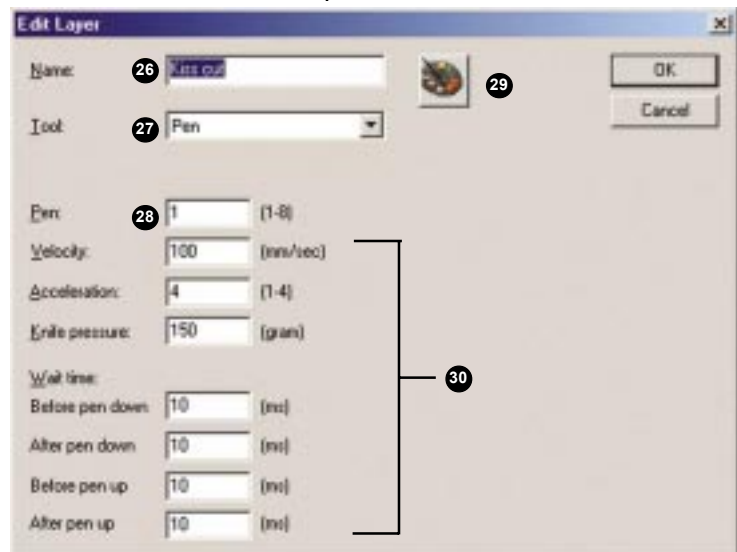


Illustration 1L: Edit Layer menu

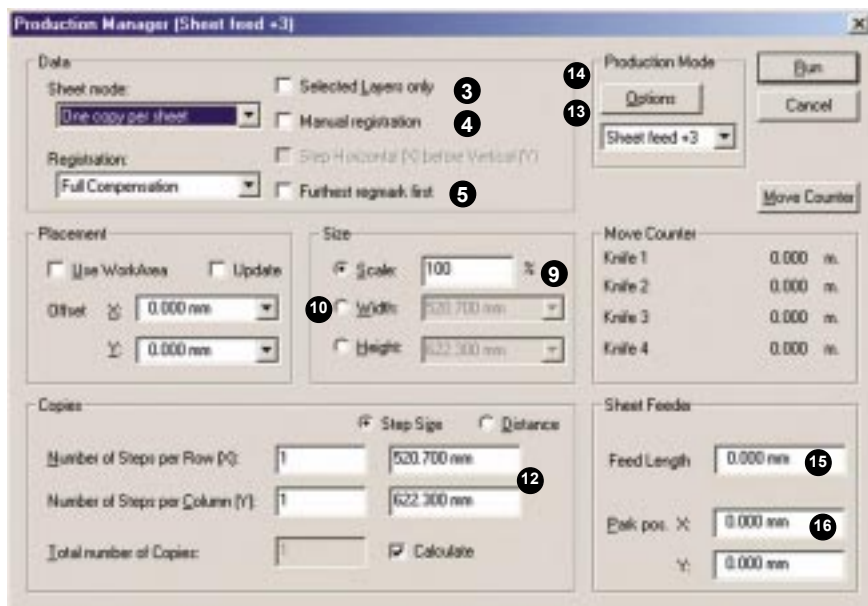


Illustration 1M: Production Manager menu

OVERVIEW **PRODUCTION MANAGER MENU:**

The **Production Manager** menu is accessed directly from the “crosshairs” icon on the Tool Bar, or from the **File** menu. The settings on this menu control the operation of the plotter when running a job and also display important data. This page describes only the basic settings on this menu. Full details on these settings are found in [Sections 2 and 4](#).

DATA AREA:

- ❶ **Sheet Mode:** Process a single copy on each sheet or multiple copies (see [page 23](#) for more).

- ❷ **Registration:** Select from 5 registration compensation options (see [page 14](#) for more).
- ❸ **Selected layers only:** Check box processes only the layers selected when check, or all layers in the file when unchecked (see [page 9](#) for more).
- ❹ **Manual Registration:** Checking this box allows you to manually accept the center of a registration mark. This feature can also be used when no i-cut register marks are printed (see [page 29](#) for more).
- ❺ **Furthest Regmark first:** Used primarily with large jobs, selecting this feature causes the camera to change the order in which it reads regmarks (see [page 29](#)).

PLACEMENT AREA

- ❻ **Use Workspace:** When the box is checked, this feature causes the system to reference the entire bounding box of the job, even if only a portion of the curves are being cut or processed. This box is usually not checked when Vision registration is in use.
- ❼ **Update:** When the box is checked, this feature directs the system to remember the job location settings from the original setup. When X and Y offset settings are changed, the system will update these settings and use them for the remainder of the job. The update feature is used in conjunction with Vision registration.
- ❽ **Offset Settings:** Enter new X and Y coordinates here when you want to begin cutting at a location other than 0.

SIZE AREA

- ❾ **Scale:** Images can be scaled up when job requirements change. The scale feature allows the entire job to be enlarged or reduced by entering a new percentage. Individual dimensions can be changed using the dimension settings below.
- ❿ **Dimension settings:** Change job size using numerical values.

COPIES AREA

- 11 **Steps per Row/Column (X and Y):** Used in conjunction with the *Sheet Mode* and *Production Sequence* settings, enter the number of copies of a file on a sheet or the number of sheets on a table (more on [page 11](#)).
- 12 **Distance settings:** Sets the size of a step (step and repeat) or the distance between sheets, depending on the operating mode set in *Sheet Mode*.

PRODUCTION MODE AREA

- 13 **Drop down menu:** Provides access to the last 10 .opt files loaded or saved.
- 14 **Options Button:** Provides access to the *Production Manager* menu.

SHEET FEEDER AREA

- 15 **Feed Length:** Sets feed distance for multiple sheet jobs when using the *i-cut Auto Feeder*. This setting determines how far forward the sheet is placed on the table surface.
- 16 **Park Position:** Sets coordinates for head position after processing.

OVERVIEW **PRODUCTION OPTIONS MENU:** *Production Manager > Options or Options > Production*

Production Options is an auxiliary window that works with the **Production Manager** menu to control key plotter operation.

- 17 **Plotter:** Selects plotter model to correspond to the unit in use.
- 18 **Length/Height:** Displays maximum table dimensions of plotter model in use.
- 19 **Camera Offset Measure:** Measures Camera Offset (see [page 18](#)).
- 20 **Camera Offset Check:** Checks Camera Offset (see [page 18](#)).
- 21 **Extended Search For Regmarks:** Checking the enabling box initiates an extended search for the first two regmarks of each copy (see [page 19](#) for more).
- 22 **HPGL Command Strings Area:** Send HPGL commands for four stages of processing. Commands are accessed from the arrow at the end of each line. See [page 27](#) for details on this feature.



Illustration 1N: Production Options menu

SECTION 2: BASIC OPERATION

FILE PREPARATION AND CONVERSION

Because every file format has advantages and disadvantages, there may be reasons to convert from one format to another. Most programs like Adobe Illustrator™ and Corel Draw™ create line images using a Bezier spline, while programs such as AutoCAD™ use lines and arcs. However, converting a file from one program into another often adds points to the file, thereby slightly changing the original geometry. (Also see Optimizing Curves, [page 30](#))

In order to avoid problems related to format conversion, and to allow designers to work with their preferred programs, i-cut is compatible with multiple formats. This means that when you import a file from, for example, Adobe Illustrator™, i-cut continues to use Bezier curves; conversely, when you import a .dxf file from AutoCAD™, i-cut continues in the line and arcs mode, with exactly the same points and geometry it had in the original program.

When saving files for use in i-cut, please follow these guidelines:

- If your artwork is created in a Bezier-based program (e.g. Adobe Illustrator™), always save as .ai (also see margin note).
- If your artwork is created in a program based on lines and arcs (e.g. AutoCAD™), always save as .dxf.

IMPORT/OPEN/SAVE FILES

File > Import • File > OPEN • File > Save Files

To import an original .ai or .dxf format job from customer files, go to: **File > Import** or use the *Import* icon on the toolbar. Select the file type you want to import (.ai or .dxf). Select the file, and click on **Open**.

- 1 Only files with either the extension .ai or .dxf are shown by default. To show files with all extensions, enter "*. *" as the file name and hit ENTER.

Once a job has been imported into i-cut, it is automatically saved in the .cut format. Existing jobs can be opened from your files in the standard way by going to **File > Open** or clicking on the *Open* icon on the toolbar.

You can also save a "Template File" by going to **Save As** and selecting the file type .prm. A template file contains all the different layers with all the applicable tool settings but no actual data to cut (no art work). You could, for example, save a template for each of the material types you will be cutting. When artwork is imported into a template, it is essential to ensure that the cut lines are placed on layers with the correct tool parameters. (Also see [page 29](#).)

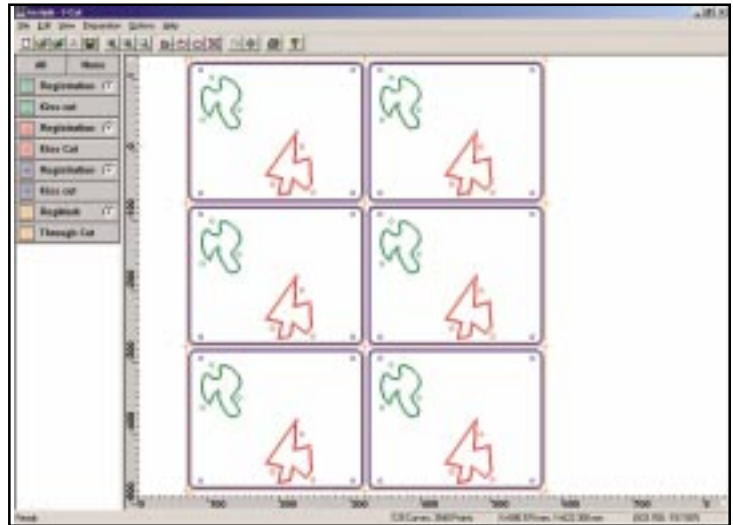


Illustration 2A: Main screen displays imported artwork on the right side, with corresponding layer buttons on the left.

Note: ILLUSTRATOR FILES

When .ai files are imported into i-cut, the program ignores the stroke weight and fills settings. Therefore, when preparing .ai files for i-cut, it is recommended that you use specify black stroking with no fills. **It is recommended that all .ai files be saves in the 6.0 version.**



Illustration 2B: I-cut will import files in the .ai (adobe illustrator) or .dxf (Autocad) formats.



Illustration 2C: The *Edit Layer* menu allows basic layer properties to be set.



Illustration 2D: Layer buttons:

TOP: Registration layer paired with Kiss Cut layer beneath it.

MIDDLE: Kiss Cut layer.

BOTTOM: New layer has been added. The red **Tool** prompt shows that no tool has been assigned to that layer. The open box to the left show that no curves have been assigned to the layer.

JOB SETUP

Edit > Edit Layer

Once a job has been imported or opened, the artwork and registration marks (regmarks) will be displayed on the main screen as shown in Illustration 2A. The buttons related to the layers shown in the artwork are displayed on the left layer button column (2D). I-cut has provided a wide range of features that allow you to adjust all layer properties according to the needs of the job.

Selecting Layers: Single layers are selected by clicking on the appropriate button. When a layer is selected, only the curves or registration marks in that layer are displayed on-screen. A gray shadow border also appears around selected layer buttons. Multiple layers can be selected and displayed using standard

Windows practices: hold down the CTRL key to select multiple individual buttons, or hold down the SHIFT key to select a sequential row of buttons.

To select all layers, press the *All* button at the top of the layer button column. To deselect all layers, press the *None* button. Whichever setting you choose, all curves will be displayed on screen.

Editing Layers: To set or change the basic properties of a layer, double-click on the appropriate layer button, or select **Edit > Edit Layer**. In the **Edit Layer** window (Illustration 2C) you may select:

- ❶ **Layer Name:** The layer name generally matches the plotter operation or tool that corresponds to that specific set of lines or curves: Kiss Cut, Crease, Through Cut, etc. Layers that contain registration marks are usually named Registration or Regmark. Registration layers that have been added using the *Add Regmark Layer* selection on the **Edit** menu are automatically named Regmark. Registration mark layers are also identified by the + mark on the right side of the button.
- ❷ **Tool:** Select either *Pen* or *I-Cut Camera* from this window. If you have previously loaded tools into the system, they will appear on this list. If no tool is selected, the layer button will display a red **Tool** prompt in the right hand part of the button (Illustration 2D).
- ❸ If you select *Pen* you must also specify the position of the type of cutting tool the plotter will use to cut or otherwise process that layer (see #5 below).
- ❹ Selecting *i-cut Camera* from this window will automatically create a regmark button for that layer.
- ❺ **Pen:** Select the cutting tool position in this window (further details on tool selection and change are found in Section 4).
- ❻ **Cutting Parameters:** Specify tool velocity, acceleration, pressure and wait time settings. The menu will change to correspond to the selected tool.

7 Layer Color: Choose layer color by clicking on the icon in the *Edit Layer* menu, or by double-clicking in the square to the left of the layer button. Choose a standard color or create a custom color using the palette shown in Illustration 2E. When pairing regmark layers with curve layers, assign the same color to both layers (more below).

When processing multiple curves, use contrasting color for specific layer sets whenever possible.

Unused Layers: Imported .dxf files often include layers that contain no data. It is recommended that these layers be removed prior to production. To remove any layer, select it and go to **Edit > Remove Layer**.

Order of processing: I-cut will process the job from the top down according to the order in which you have listed the layer buttons. To change the order of the layer buttons, drag and drop the button to a new position.

Organizing Files for Vision Registration: Organize the images so that the register marks are in a separate layer from the curves they are related to. Choose the *I-Cut Camera* tool for the registration layer and locate the new layer directly above the related curves layer. It is recommended that related registration mark/curves pairs be assigned the same colors (see Illustration 2F).

If your job involves multiple layers, it is very important to make sure that corresponding registration mark/curves pairs be positioned correctly and assigned the same color.

Separating and modifying artwork: Once you have defined the desired cutting parameters for each layer, you can move artwork components and regmarks into any layer. The lines or curves associated with any layer will be processed according to the setup parameters established in that layer.

- Individual lines can be moved by selecting and dragging to the appropriate layer button.
- Multiple lines can be moved by holding down the CTRL key while selecting them or by dragging a square marquee around them.
- Select all lines or curves by holding down the ALT key while selecting them
- Select a closed curve and all curves inside it by holding the SHIFT key while selecting it.

In addition, curves and arcs can be modified using the image editing tools provided in i-cut. See [Section 4](#) for more details.



Illustration 2E: Layer color selection palette.

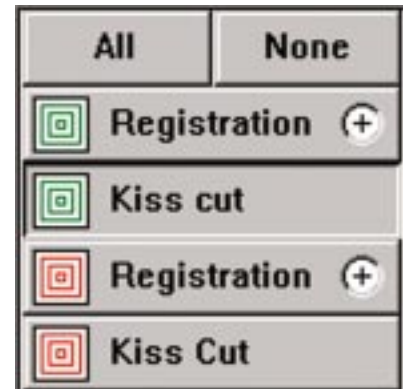


Illustration 2F: Pairing registration layers and curves.

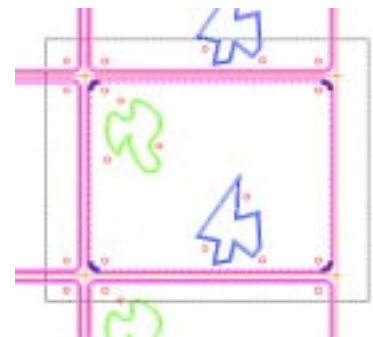


Illustration 2G: Selecting multiple curves using a marquee box.

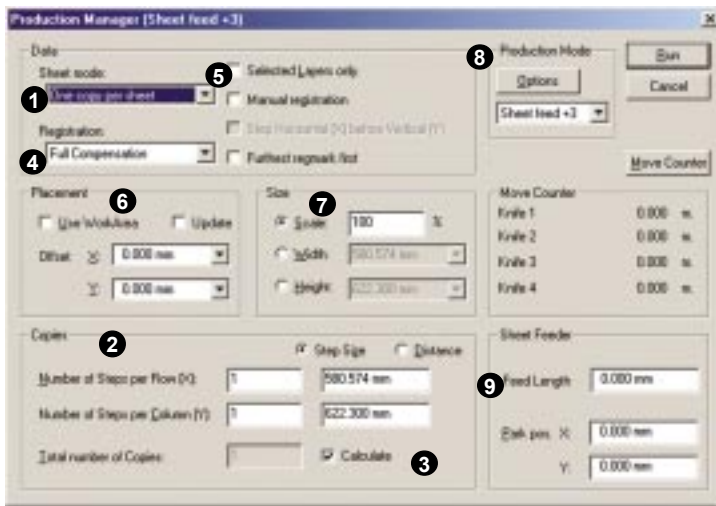


Illustration 2H: The *Production Manager* menu

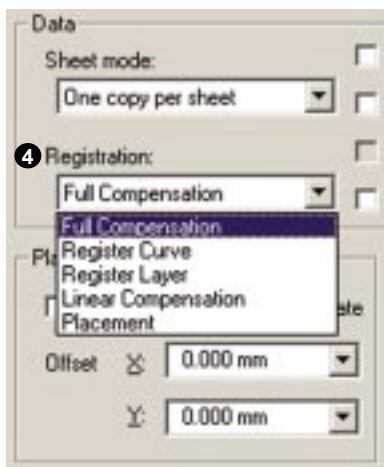


Illustration 2I: The *Registration* drop down menu selects the type of compensation used by the i-cut system.

RUNNING THE JOB

File > Production Manager or

Following job setup, select **File > Production Manager** or click on the icon on the toolbar. This will launch the *Production Manager* menu, which also displays the *Sheet Mode* selection in the header. The *Production Manager* menu controls most of the key variables that affect job cutting and production. The basic controls are explained here, with more advanced features covered in [Section 4](#).

1 Sheet Mode: I-cut allows you to run single or multiple copies on the same sheet of material, or to run multiple sheets or roll fed material on the plotter table. In the *Sheet Mode* window, the default setting is *One Copy Per Sheet*. This mode is used when there is one copy of the art file per printed sheet, but can also be used when printing multiple sheets on the plotter (see below). *Multiple Copies per Sheet* should be selected if your file is *repeated* on the same printed sheet. *Roll Feed with register marks* allows you to run jobs longer than the plotter. Sheet mode settings work in conjunction with the settings in the *Copies* area and the *Production Mode* menu (.opt files). See [page 23](#) for more.

2 In the *Copies* area of the menu, enter the number of copies you wish to step and repeat on a sheet, or the number of sheets you wish to run on the plotter (depending on the Sheet Mode selected). Also enter step and repeat distances for multiple copies on a sheet, or distances between sheets when printing multiple sheets on the plotter. Each “step” corresponds to the dimensions of the individual job displayed on the monitor.

3 If the *Calculate* box is checked, i-cut will calculate the number of copies per sheet or the total number of sheets per table. If the *Calculate* box is unchecked, you may enter a total number of copies for the job.

Make sure you have the appropriate *.opt file loaded in the *Production Mode* drop down menu (see more next page and [Section 4](#)).

4 Registration Options: I-cut offers several choices with regard to how it compensates for distortion in artwork. It is important to select the option that matches your production and quality requirements. A more detailed explanation of registration compensation issues is found in [Section 3](#).

5 Selected Layers On/Off: In the *Production Manager* menu, you can choose whether you want to cut all layers in the file or only selected layers. If one or more layers are selected when you open the *Production Manager* menu, the program will default to the selected layers setting and the box will be checked. If no layers or all layers are selected when you open the *Production Manager* menu, the default is to process all layers.

6 Placement: If you do not want the plotter to begin cutting from the default zero point, you may enter X and Y offset value in these windows.

- 7 Size:** The **Size** area of the **Production Manager** menu allows you to specify the cutting size as a percentage relative to the size of the original file. You may also specify the actual size of the file by entering dimensions in the **Width** and **Height** windows.
- 8 Production Mode:** This feature allows you to select a standard or customized production mode to correspond to the desired material feeding scenario. These modes are stored in the **.opt** format and can be further customized in the **Production Options** menu. This menu is launched by clicking on the **Options** button located above the drop down window on the **Production Manager** menu or from the **Options** menu.
- It is important to choose or customize an **.opt** file that corresponds to your production scenario. I-cut will remember the last 10 **.opt** file settings saved or loaded, allowing you to recall job parameters for re-runs. See [page 26](#) for details on using this feature.
- 9 Feed Length:** Controls the feed length setting when using the *i-cut Auto Feeder*. This value determines how far forward onto the cutting table each new sheet is placed by the Auto Feeder. Proper placement can help to maximize production. See [page 24](#) for a complete explanation.

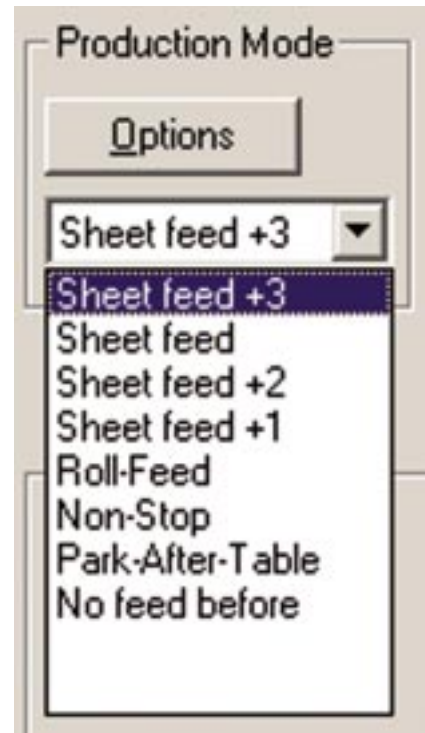


Illustration 2J: *Production Mode options (see Section 4)*

Positioning the Camera

When you click on **Run**, the plotter will move the camera to the location of the first registration mark (normally located at the bottom left of the artwork file), according to the information on size and offset given in the **Production Manager** menu. If the actual location, size, or orientation of the sheet differs from the settings, two windows will appear on the screen. One shows all the register marks in the first layer (the register mark it is looking for is shown in red), the other shows live video from the camera. Using the arrow keys on your keyboard, move the camera to the location of the register mark shown in red in the first window. When you see the register mark on the video, make sure that the cross hairs on the screen is inside the register mark, and click **OK**. You do not need to be completely accurate in positioning the cross hairs. As long as it is inside the circle, the program will automatically calculate the exact center point.

Next the plotter moves the camera to the second register mark (usually at the bottom left). Again, if the program is unable to locate the mark, position the camera using the arrow keys and click **OK**.

Based on the location of the first two register marks, the system has now learned the location, orientation, and scaling of the sheet, and it should be able to find the remaining register marks on its own. If you are producing multiple sheets one by one, this information will also be used to locate subsequent sheets. Setting up placement guides on the table will improve the ability of the system to locate regmarks on subsequent sheets. Operation of the Vision Registration system is described in much more detail in [Section 3: Using the Vision Registration Feature](#).

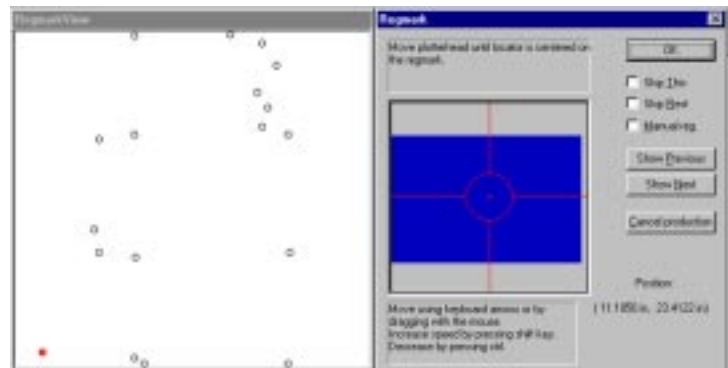


Illustration 2K: *Showing the camera the first registration mark.*

Note: Orientation When laying out multiple sheets on the plotter, all sheets should have the same orientation. If necessary, rotate the file on the screen to match the sheet orientation.

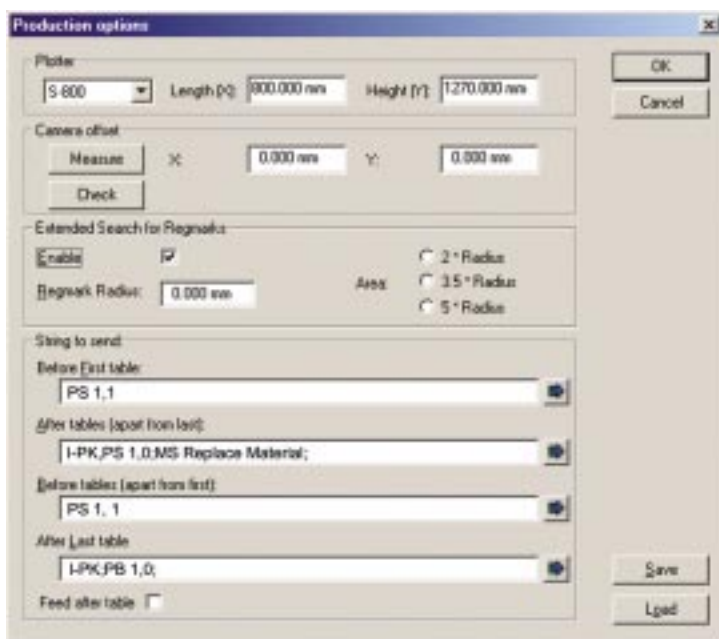


Illustration 2L: The Measure button on the Production Options menu initiates the calibration process.

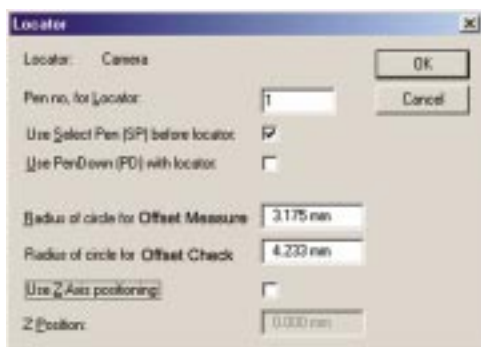


Illustration 2M: The Options > Locator window allows you to change regmark diameter.

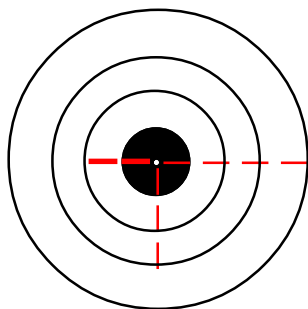


Illustration 2N: Extended Search for Regmarks define the search area as a multiple of the regmark radius. change regmark diameter.

CALIBRATING THE CAMERA

MEASURING AND CHECKING CAMERA OFFSET *Production Manager > Options*

The Camera Offset represents the actual physical distance between the center of the camera lens and the center of the tool. The system has a built-in feature to measure this distance; normally, the following procedure is only necessary after the camera has been removed or the tool-head has been exchanged.

Open the *Production Options* window from the **Options > Production Options** menu or from the **Production Manager > Options** button. Make sure the plotter is online. Click on the *Measure* button in the *Camera offset* section, and the plotter will move to its calibration position. Place a dark piece of vinyl, or if available, Rubylith, under the blade. Alternately, you may move the cutting head with the arrow keys on your keyboard to a calibration position of your choice, but again make sure there is a dark piece of vinyl or Rubylith in that location large enough to

accommodate a 1/4" / 6 mm circle. When you are ready, click on OK, and a circle will be cut. The cutting head will move out of the way, allowing you to weed the circle. Click OK when done. Now move the center of the camera (again using the arrow keys on your keyboard) to the center of the circle you just cut, and click OK. You do not need to be completely accurate in positioning the cross hairs. As long as they are inside the circle, the program will automatically calculate the exact center point.

At this point you should make sure that the camera f-stop and focus are properly adjusted. Turn the lower part of the camera lens (f-stop) until the register mark appears on the screen in proper contrast to the background. When the lightest color appears as light gray on the screen, the adjustment is OK. A bright white background should appear as light gray on the screen. Adjust the upper part of the camera lens (focus) until the image is in focus.

To check if the Camera offset is correct, select the *Check* function in the Camera offset section. Using the arrow keys on your computer keyboard, position the camera above either a printed registration mark or the circle cut with the measure function. Then click OK. The plotter will cut a circle centered on the mark you just showed it with the camera. If the two circles are perfectly centered, the *Camera offset* is correct.

Changing regmark size: You can change the circle radius for the purpose of the Camera Offset Measuring and Check procedures by launching **Options > Locator**. Changing the radius of the circle in Offset Measure defines the size of the test circle that will be cut during the Measure process.

Extended Search for Regmarks: Activate this feature by checking the *Enable* box in the Extended Search for Regmarks area. The radius of the regmark is display in the window beneath the box.

The search area itself is defined as a multiple of the regmark circle radius and is centered on the point where the system "expects" the regmark to be (as shown in Illustration 3N). This selection is made on the right hand side of the *Extended Search for Regmarks* area by choosing 2, 3.5 or 5 X the regmark radius.

SECTION 3: USING THE VISION REGISTRATION SYSTEM

LEVELS OF COMPENSATION

File > Production Manager > Registration or 

Registration compensation is an important setting that dictates how i-cut's Vision option processes each job. This setting is chosen in the **Production Manager** menu. You may select one of five settings, which are explained below:

Full Compensation: This high performance mode provides the closest possible match of cut line to print. Full compensation adjusts each individual point in all cut lines according to the 3 register marks closest to each curve point. This process includes (but is not limited to) offset, scale, rotation, and skew of all curves in the layer. In comparison to traditional die-cutting, we may think of this as making a new die for each printed graphic on every sheet. Each die will match the graphic perfectly regardless of any printing or material distortions, and will be reregistered automatically for each graphic.

Register Curve: When you choose *Register Curve*, i-cut maintains the size and shape of each cut-line and simply positions and rotates each cut line to match the print as closely as possible. For example, a perfect circle would remain a perfect circle, but i-cut may shift the entire circle for better registration. This process is guided by the two register marks closest to the center of each cut-line. This would be equivalent to making a die and re-registering the same die for each cut-line. This setting is often selected for Point-of-Purchase jobs. Positioning register marks for *Register Curve* is explained on [page 16](#).

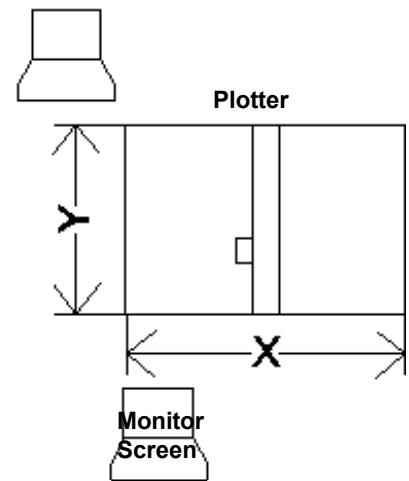
Register Layer: This selection is similar to *Register Curve*, but treats all curves in the layer as one. This means that the size and shape of each curve is kept intact along with the relation and distance between the cut lines in that layer. This is done according to the two register marks closest to the center of the complete layer. This method is somewhat comparable to traditional die-cutting without any compensation for material or print distortions. Nevertheless, the die is registered automatically and perfectly for each print. It is often used for converting membrane switches and overlays.

Linear Compensation: Linear compensation (as opposed to non-linear distortion), applies an average distortion factor when computing compensation.

Placement: This mode is virtually identical to a physical steel rule die and produces similar results. In this mode, all layers are rotated identically to match a "virtual" steel rule die. The entire graphic is treated as one piece, with registration achieved by referencing the two regmarks closed to the center of the complete job.

Both linear compensation and placement have been generally used with de-featured versions of i-cut and do not produce the accuracy possible with complete systems. In most cases you can ignore these options.

Locating and using registration marks is greatly influenced by the type of registration compensation selected. See [page 15](#) for more.



IMPORTANT: When using the camera option, we strongly recommend a monitor orientation identical to that of the plotter, in other words: the X-axis on the plotter should correspond to the horizontal axis on the monitor, the Y-axis on the plotter to the vertical axis on the monitor. For info on how to rotate curves, see [page 30](#).

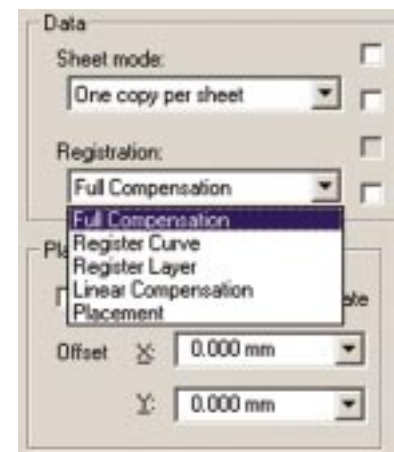


Illustration 3A: The Registration drop down menu sets the compensation mode

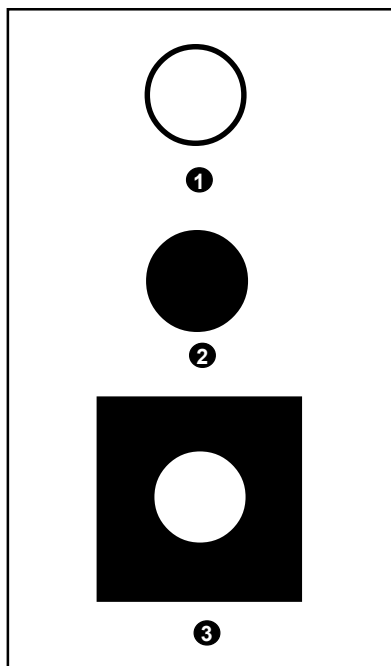


Illustration 3B: Three types of registration marks.

NOTE: Please refer to Large Graphics on page 4-6 for details on how to register and cut graphics longer than the plotter.

NOTE: To change the size of regmarks, see page 3-6.

DEFINING AND PRINTING REGISTRATION MARKS

File > Production Manager > Registration or 

A registration mark is defined as a circle of approx. ¼" or 6 mm in diameter. Be sure to print the registration mark in a color that contrasts with the background; if this isn't possible, a contrasting background color must be printed underneath the mark. Color combinations with poor contrast should be avoided, for example, yellow marks on a white background or pink marks on a green background.

For digital printing applications, we recommend you always print registration marks in solid black. Do not print registration marks as a halftone.

See Illustration 3B:

- ❶ Type 1 is generally recommended for screen printing with good contrast and non-textured surfaces.
- ❷ Type 2 is recommended for poor contrast and digital prints with non-textured surfaces.
- ❸ Type 3 is recommended for pre-masked and textured surfaces as well as reflective and chrome-like materials.

The position and number of register marks required by the system depends on the nature and size of the artwork, the type of compensation you choose, and the amount of distortion for which you need to compensate. *For optimal compensation, you generally want to have registration marks printed in the area where the distortions occur.* Because you often don't know where that will occur until after the job is printed, we recommend that you print more marks than you think you will need! You can decide later on which ones you actually need to use to obtain the desired accuracy.

Please refer to the Large Graphics discussion on [page 25](#) for a detailed discussion of registering graphics longer than the plotter.

USING REGISTER MARKS

Registration marks are selected by placing them on a registration layer, that is, a layer for which the Tool selection is I-Cut Camera. These layers are generally identified as *Regmark* or *Registration*. The number and placement of registration marks depends on the amount and type of distortion associated with the particular job. For example, many screen printed substrates shrink inwards, from the corners towards the center of the sheet. In most of these cases, it is sufficient to use one mark in each corner of the sheet, with a third one located in the center for extra insurance. When a cut does not meet your tolerances, simply add more registration marks in the areas where the cut does not match the print. In case of extreme distortion or very tight tolerances, it may be necessary to use the register marks more carefully, depending on the level of compensation chosen.

Full Compensation:

Three register marks are used by the system to position each point in all cut lines. The program will adjust the position of each point in the cut lines according to the 3 register marks closest to that point. For best possible compensation, registration marks should be placed around the printed graphic in a triangular relationship to each other. A series of such imaginary triangles will provide best coverage.

In Illustration 3C, all the marks are used, but only 3 at a time for each point in the cut lines. To achieve the highest degree of compensation, the distortion must be uniform within any of the imaginary triangles created by the registration marks. The more marks, the smaller the triangles and the more accurately the camera can feed back the distortion in that particular area.

More registration marks create smaller imaginary triangles and thereby higher accuracy (see Illustration 3D)

Register Curve:

Two registration marks are used by the system to position each cut-line. The program will adjust the position and rotation of each cut-line according to the 2 registration marks closest to the center of that cut-line. To achieve best possible registration, you should use 2 marks placed close to the outer limits of each cut-line. In Illustration 3E, the system will use all registration marks, but only 2 at a time for each cut-line.

Register Layer:

2 registration marks are used by the system to position all cut lines on the layer. The program will adjust the position and rotation of the complete layer according to the 2 registration marks closest to the center of that layer. To achieve the best possible registration, you should use 2 marks placed close to the outer limits of the layer (see Illustration 3F). Only the two marks closest to the center of the layer will be used, regardless of how many you choose.

COLOR REGISTRATION

The system can compensate for imperfect registration in color prints, for example, in screen printed graphics. By printing register marks in the color to which you want to register your cut lines, you can ensure accurate registration of your cut lines in each individual color.

Organize the layers so each registration layer is right above the corresponding cut layer. For example, the layer containing the blue register marks must be directly above the layer containing the blue cut lines. Remember that the order of the layers determines the production sequence. In the example shown in Illustration 3C, the blue register marks will be read first, and then the blue cut lines will be cut. Next the black register marks are read and the black lines cut, and so on

In general, saving cut lines and register marks in separate layers for each individual color makes it easier to set up the file to cut.

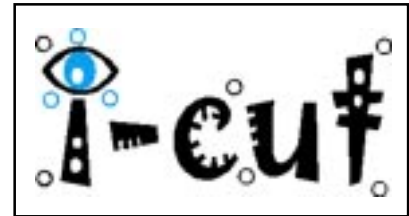


Illustration 3C: For full compensation, register marks should be placed in triangular configurations.

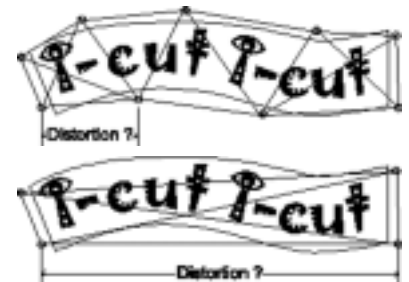


Illustration 3D: Full compensation Depending on its dimensions, there is a chance that distortion in this graphic is not uniform in the X direction; more than 4 registration marks are probably needed.

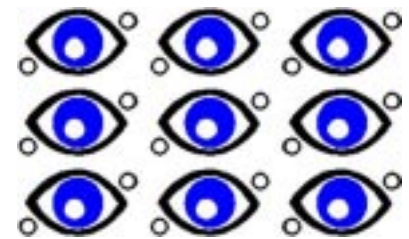


Illustration 3E: Register Curve System uses two registration marks at a time for each cut line.

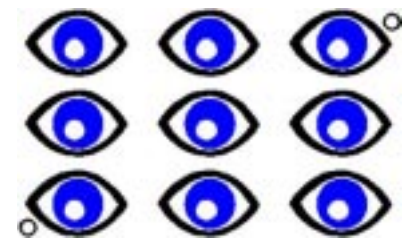
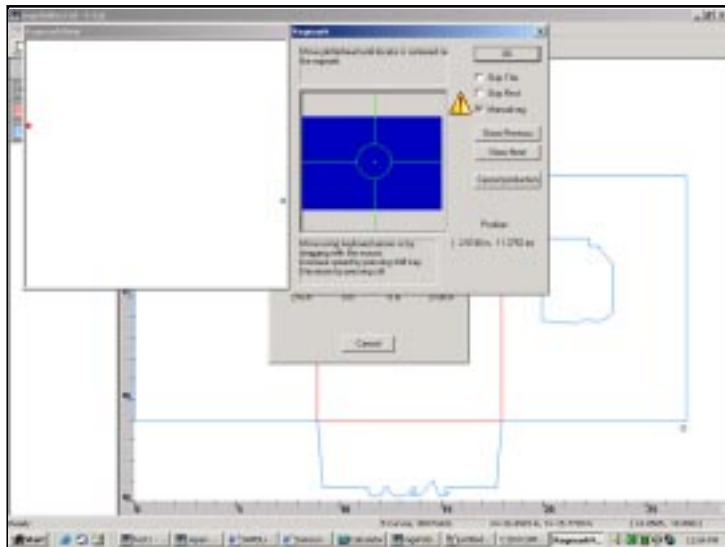


Illustration 3F: Register Layer Use two marks close to the outer limits of the layer.



CUTTING WITH VISION REGISTRATION

File > Production Manager > Run

Before running a job on the plotter, make sure the job has been set up properly. First, import the file you need to cut, then assign tool and cut parameters to the layers containing cut lines. Assign the i-cut camera tool to the layer containing register marks or move the applicable register marks to a layer with the i-cut camera tool selected.

Organize the layers so the registration layer is right above the cut layer. For more on Basic Operations, see [Section 2](#).

Go to **File > Production Manager > Run**. Make sure the plotter is on-line, and click OK. The plotter will now move the camera to the position of the registration mark furthest to the right in the first layer. If the material is positioned correctly according to the plotter's zero point and the specified offset in the production menu, the system should recognize the mark and continue on to the position of the lower left registration mark, and so on. However, if a registration mark is not detected, the plotter will stop and launch the regmark location screen shown in Illustration 3G. This view is "live video" from the camera, which will enable you to manually find the regmark the system has missed. Using the overall view screen on the left as guidance, find the register mark and position the camera over it by using the

Illustration 3G: The i-cut system uses two registration marks at a time for each cut line. When a register mark is not detected, the screen shown here is launched to allow you to manually locate the mark.

NOTE: Holding down the shift key while positioning the camera over a registration mark makes the plotter move in bigger steps.

NOTE: You can also position the camera by dragging the image of the register mark to the bull's eye.

arrow keys on the keyboard. Make sure that the bull's eye on the screen is inside the register mark.

In order to speed up processing or ignore a bad regmark, you can check *the skip this* or *skip rest* boxes in the *Regmark* screen. Bear in mind, however, that the number of marks ignored affects the compensation for material distortion.

Adjusting the camera

It is good practice to adjust the f-stop and focus of the camera. First, turn the lower part of the camera lens (f-stop) until the register mark appears on the screen in proper contrast to the background. When the lightest color appears as light gray on the screen, the adjustment is OK (as shown in illustration 3H). When adjusting the camera, a bright white background should appear as light gray on the screen. Adjust the upper part of the camera lens (focus) until the image is in focus. Click on OK, and the plotter will continue on to the next registration mark. When all the registration marks on the first layer are read, the plotter will start processing the second layer, and so on.

Fine tuning the camera: If you are dealing with colors of poor contrast, textured surfaces, reflective or chrome-like materials, it may be necessary to adjust the camera lens more carefully than usual. Position the camera over a registration mark and go to the **Production Options > Check Regmark** menu.

On the screen you will now see “live video”, the way the software interprets the black & white signal from the camera. At the top of the screen, you see two values for Variation and Contrast. The blue circle in the center of the image represents the center of the lens and should be positioned approximately in the center of the registration mark. Adjust the F-stop (lower part of the camera lens) and the Focus (upper part of the camera lens) till you get the lowest possible value for variation and the highest possible value for contrast.

Normally you would want to have the image in focus, but on some materials you can get a lower variation by adjusting the image out of focus.

When a registration mark is recognized by the software, a green square is drawn at the edge of the registration mark (see Illustration 3H). Try moving the camera around to check that the green square is drawn correctly as long as the blue circle is well inside the register mark.

CALIBRATING THE CAMERA

MEASURING AND CHECKING CAMERA OFFSET

Production Manager > Options

The Camera Offset represents the actual physical distance between the center of the camera lens and the center of the tool. The system has a built-in feature to measure this distance; normally, the following procedure is only necessary after the camera has been taken off or the tool-head has been exchanged.

Open the *Production Options* window from the **Options > Production Options** menu or from the **Production Manager > Options** button. Make sure the plotter is online. Click on the *Measure* button in the *Camera offset* section, and the plotter will move to its calibration position. Place a dark piece of vinyl, or if available, Rubylith, under the blade. Alternately, you may move the cutting head with the arrow keys on your keyboard to a calibration position of your choice, but again make sure there is a dark piece of vinyl or Rubylith in that location large enough to accommodate a ¼" / 6 mm circle. When you are ready, click on OK, and a circle will be cut. The cutting head will move out of the way, allowing you to weed the circle. Click OK when done. Now move the center of the camera (again using the arrow keys on your keyboard) to the center of the circle you just cut, and click OK. You do not need to be completely accurate in positioning the cross hairs. As long as they are inside the circle, the program will automatically calculate the exact center point.

At this point you should make sure that the camera f-stop and focus are properly adjusted. Turn the lower part of the camera lens (f-stop) until the register mark appears on the screen in proper

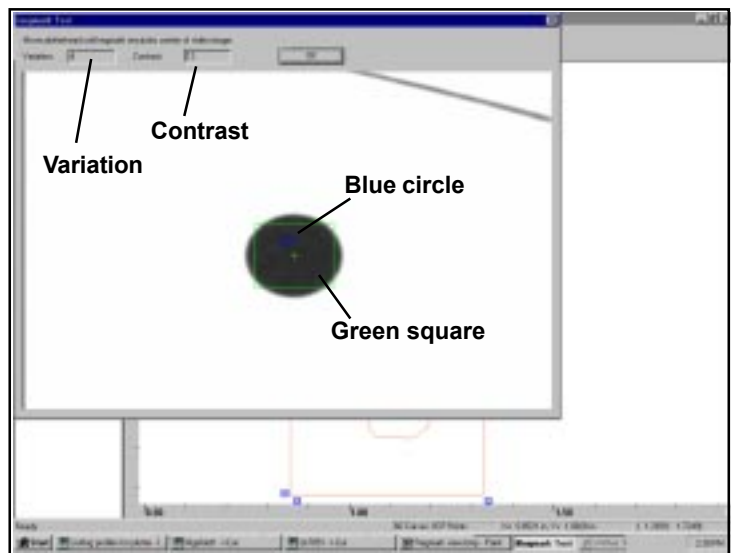


Illustration 3H: Check regmark screen.



Illustration 3I: Poor contrast .

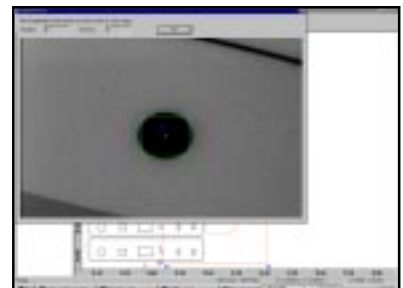


Illustration 3J: Good contrast.

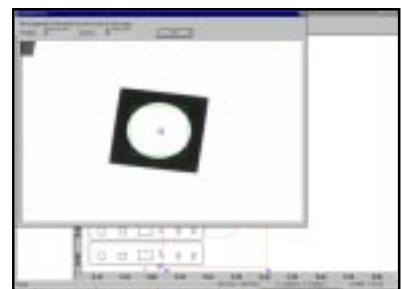


Illustration 3K: Good contrast for chrome mylar material.

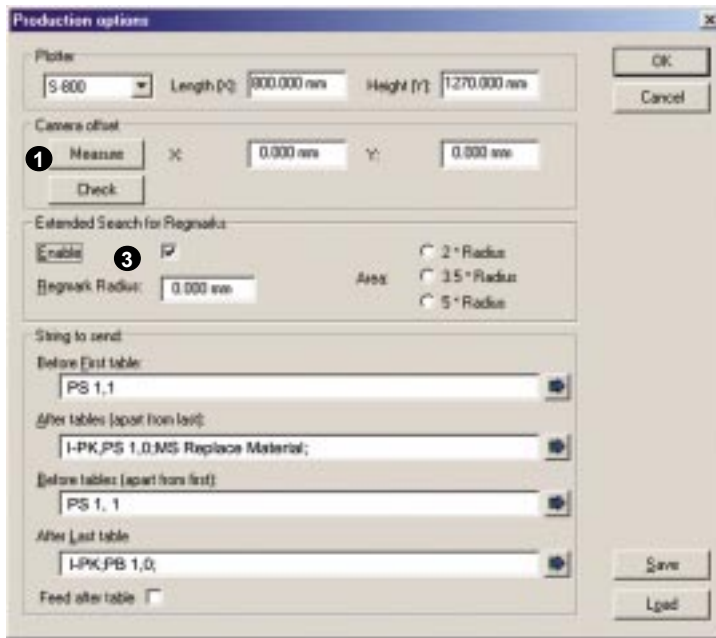


Illustration 3L: The Measure button on the Production Options menu initiates the calibration process. ①

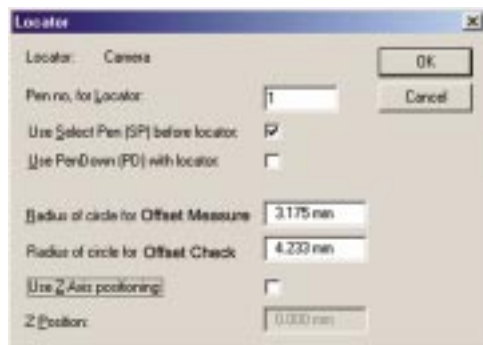


Illustration 3M: The Options > Locator window allows you to change regmark diameter. ②

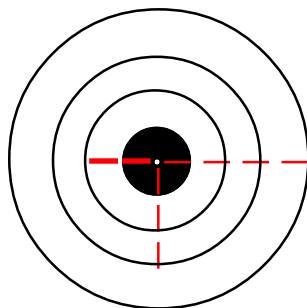


Illustration 3N: Extended Search for Regmarks define the search area as a multiple of the regmark radius. change regmark diameter.

CALIBRATING THE CAMERA

MEASURING AND CHECKING CAMERA OFFSET (CONTINUED)

contrast to the background. When the lightest color appears as light gray on the screen, the adjustment is OK. A bright white background should appear as light gray on the screen. Adjust the upper part of the camera lens (focus) until the image is in focus.

To check if the Camera offset is correct, select the *Check* function in the Camera offset section. Using the arrow keys on your computer keyboard, position the camera above either a printed registration mark or the circle cut with the measure function. Then click OK. The plotter will cut a circle centered on the mark you just showed it with the camera. If the two circles are perfectly centered, the *Camera offset* is correct.

② Changing regmark size: You can change the circle radius for the purpose of the Camera Offset Measuring and Check procedures by launching **Options > Locator**. Changing the radius of the circle in *Offset Measure* defines the size of the test circle that will be cut during the Measure process.

③ Extended Search for Regmarks: Activate this feature by checking the *Enable* box in the Extended Search for Regmarks area. The radius of the regmark is display in the window beneath the box.

The search area itself is defined as a multiple of the regmark circle radius and is centered on the point where the system “expects” the regmark to be (as shown in Illustration 3N). This selection is made on the right hand side of the *Extended Search for Regmarks* area by choosing 2, 3.5 or 5 X the regmark radius.

SECTION 4: MAXIMIZING I-CUT PERFORMANCE

ADDING AND CHANGING LAYERS

Edit > Add Layer

In this menu you can open up a new layer button and assign a set of standard properties to the process performed on that layer. Name the layer according to the type of operation that will be performed on the associated artwork: Through-cutting, Kiss-cutting, Scoring, Drawing, Cut Fast, Cut Slow, etc. Select the desired tool. For example: If you are going to cut vinyl, you can select C-2 in the Tool selection list. If the tool you want to use does not show up in the tool list, please refer to [Adding and Changing Tools on page 21](#). Using the color palette, you can assign a specific color for this set of parameters (layer); it will then show up on the main screen in the color you have chosen.

Click OK, and the newly configured button will appear on the left side of the screen in the Layer Button Column. If you are going to cut with more than one set of parameters in the same job, e.g. for both kiss-cutting and through-cutting, repeat the above procedure until you have created a layer to match each set of properties.



Illustration 4A: Add Layer Menu The Z-Axis up and down parameters only apply to Z-axis controlled tool heads; the values are in 1/1000 of millimeter or 1/1000 of an inch.

NOTE: To set the properties in multiple layers, make your selections then go to Edit > Edit Layer.

ADDING A REGMARK LAYER:

Edit > Add Regmark Layer

Regmark layers can be added to the left Layer Button Column by selecting the *Add Regmark Layer* from the **Edit** menu. This menu allows you to customize regmark locations according to X and Y coordinates and to specify the size of the regmark.

The new regmark layer can be paired with a curves layer to aid in improving cutting accuracy, as described on [page 11](#).

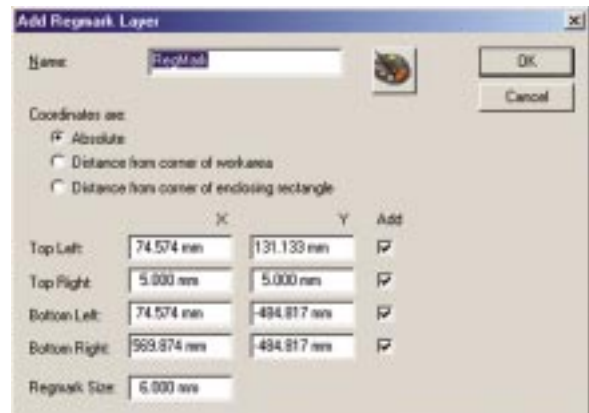


Illustration 4B: Add Regmark Menu



Illustration 4C: Edit Tools Menu

ADDING AND CHANGING TOOLS:

Edit > Edit Tools

In this menu you can add and remove tools from the standard tool list available in the Tool window on the various layer control menus. You can also customize tools for your job requirements. The attributes available at the bottom of the window will change according to the type of tool selected.

- ❶ A number of tools are predefined in the software; these can be accessed via the *Load* button.
- ❷ In the *String to send* section, you can specify HPGL commands to be sent to the plotter before and after each curve and before and after each layer. Clicking on the blue arrow on the right side of each command line brings up a list of predefined commands for you to choose from. Please refer to the HPGL Short Reference section on [page 28](#) for a detailed description of commands.

CAUTION: It is recommended that you not change any of the default tool settings without first consulting your plotter supplier.

CONTROLLING CURVE BEHAVIOR:

View > Curve Direction or

Selecting **Curve Direction** under the **View** menu or the **Show Startpoint** icon on the toolbox will show the direction of curves or regmarks displayed on the screen. If multiple layers are displayed, curve direction arrows will be displayed for all of them.

Edit > Invert Curve Direction

To change the cutting direction for a selected curve or regmark, click on **Edit > Invert Curve Direction**. Note that this feature operates only on job components that have been selected (see [page 11](#)) and not on components that are only displayed.

Options > System

- ❸ Check *Set curve direction after import* if you want the program to automatically assign a cutting direction to each line when a file is imported.
- ❹ Choose between clockwise and counterclockwise.
- ❺ Check *Invert direction for inside curves* if you want curves inside other curves to be cut in the opposite direction. This automatically inverts the cutting direction for inner curves.

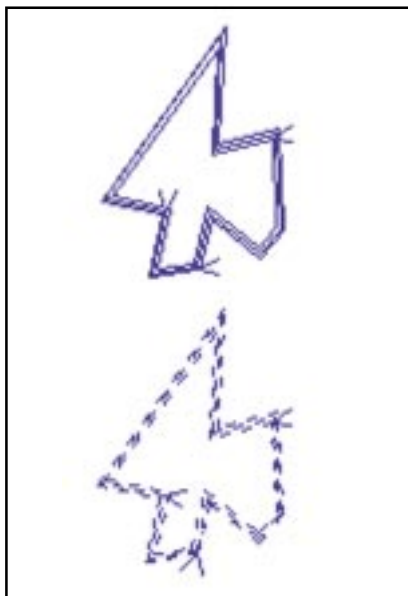


Illustration 4D: In the lower curve, the cutting direction has been changed using the Invert Curve Direction command.

CURVES AND POINTS (EDIT OPTIONS): Options > System

- ⑥ **Connect Open Curves:** Files, particularly in .dxf format, often contain open curves when exported. Although the curves may appear closed on screen, they are actually separated and will be produced this way. I-cut can merge line segments into closed cutting paths: in the *Edit Options* menu, check the *Connect open curves* box and specify a threshold value defining a maximum distance between the end points of the line segments to be closed.
- ⑦ **Reject Small Curves:** You may also remove stray points or unwanted small cut paths by specifying *Reject Small Curves* with a threshold value defining a maximum size for curves to be removed.
- ⑧ **Tolerance on Screen:** Determines how small a curve or line the screen will display. Processing time for a job with complex curves may be improved by raising this value. Default is 5 pixels.
- ⑨ **Tolerance when producing:** Sets the smallest line segment the system will attempt to process.

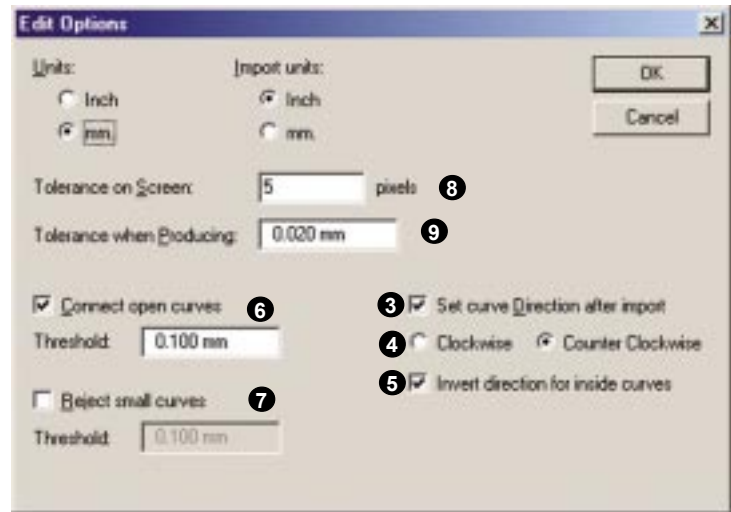



Illustration 4E: Edit Options Menu

Edit > Edit Points or

Curves may also be manually edited by using i-cut editing tools.

 **Show Points:** Curves and artwork components are selected by clicking on the individual curve, or by drawing a “marquee” box around groups of curves. Clicking on the *Show Points* icon on the Tool Bar displays the points for all of the images shown on the screen. The points and arcs that make up individual curves can be displayed by double-clicking on the object.

When the Edit Points mode has been selected, the user can make point-by-point changes to individual curves in order to facilitate cutting accuracy. This is a toggle feature that is turned on and off using the icon on the Tool Bar or the *Edit Points* command on the **Edit** menu.

When you select an individual colored point on a curve and left click, you will launch the special menu shown in Illustration 4F. The selections on this menu provide additional options for editing the curve. When you position your cursor on a line (between points) and left click, you will launch the menu shown in Illustration 4G.

Deleting curves: To delete a curve, select it and then use the delete button on your keyboard, or choose **Remove Curve** from the **Edit** menu.

Rotating and mirroring: Any curve or group of curves can be rotated or flipped using these two features. See [page 30](#) for more details.

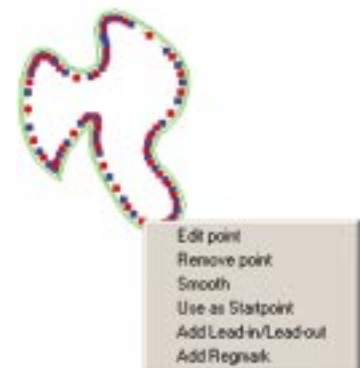


Illustration 4F: Left click on a point to launch this edit menu.

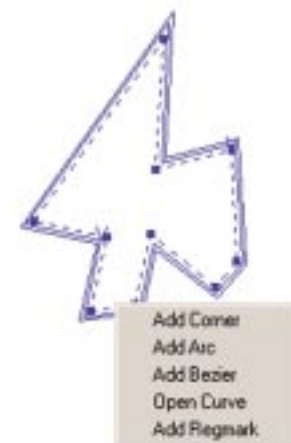


Illustration 4G: Left click on a path to launch this edit menu.



Illustration 4H: Sheet Mode drop down list in the Production Manager menu.

CHOOSING SINGLE OR MULTIPLE COPIES:

File > Production Manager > Sheet Mode or 

Sheet Mode drop down menu: The *Sheet Mode* drop down menu allows you to run multiple sheets on the plotter at the same time, or step and repeat multiple copies of a job on the same sheet or roll. The drop down menu provides three selections, as shown in Illustration 4H.

The menu works in conjunction with the settings in the *Copies* area located in the lower left of the Production menu. Various scenarios are explained below:

- ❶ **One copy per sheet:** If the job file in i-cut is identical to what is printed on each physical printed sheet, you must select *One Copy Per Sheet* from the *Sheet Mode* drop down menu. Make sure that the correct .opt file is loaded in the *Production Mode* drop down window (see [page 26](#))

If you plan to cut more than one sheet on the plotter, first determine how many sheets will fit on the plotter. In this case, the number of sheets and copies will be identical.

- ❷ Next, specify the number of sheets that fit on the plotter by entering the appropriate numbers in the X and Y windows in the *Copies* area. Specify the approximate distance between sheets by selecting the *Distance* radio button and entering the numbers in the windows. Also make sure you have selected the correct .opt file in the *Production Mode* drop down window. The *One Copy Per Sheet* setting is also used when you are auto-sheet feeding multiple copies in the Y-Axis.

- ❸ **Multiple Copies Per Sheet:** If the job file is repeated on the same sheet, check the *Multiple Copies Per Sheet* selection. Next, enter the number of copies that will fit on the plotter at the same time. Using this setting allows the system to “learn” the X and Y step distances when it is shown the first register mark in the second copy. Make sure that the correct .opt file is loaded in the *Production Mode* drop down window.

- ❹ **Roll Feed with Register Marks:** Select this mode when you are running jobs (with register marks) longer than the table (also see [page 13](#)), i-cut will automatically place the feed lines for each table. Placement of the feed line is determined by the sheet location on the X-axis and the last two register marks on each table. When i-cut is “shown” the first register mark of the second copy, the system will “learn” the X-axis step distance between jobs longer than the plotter. When subsequent copies are produced, i-cut will automatically feed the correct amount of material to allow the system to find the next curve.

FEED LENGTH SETTING:

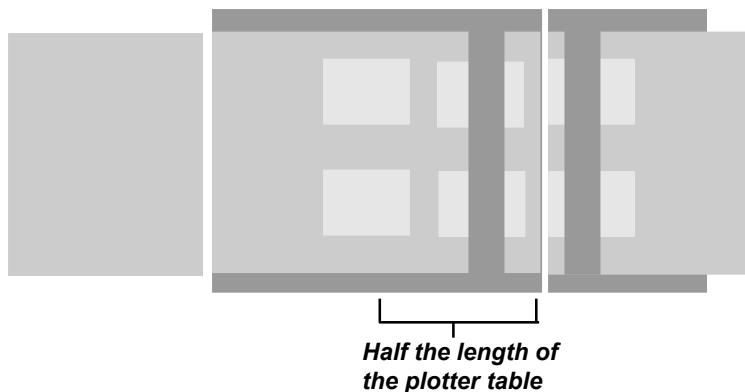
File > Production Manager > Sheet Feeder or 

- ⑤ This key input window is important when you have set up to process more than one sheet on the plotter. The *Feed Length* setting controls the feed length for auto sheet feeding, which allows you to maximize vacuum and minimize feed time. In general, the feed length should be equal to the sheet length in the X axis.

EXAMPLE:

When a sheet is less than half the length of the plotter's X-axis, the system is able to load two sheets before processing the first table. In this case, you would select *Sheet Feed +1* from the *Production Mode (.opt)* drop down menu. In this scenario, the first sheet is loaded onto the plotter, then the plotter waits for the sheet feeder to present the second sheet. Once the second sheet is loaded, i-cut will look for the first sheet loaded on the plotter.

Setting a feed length shorter than the actual sheet size allows you to overlap sheets. This strategy can be useful in situations where sheets will not lay flat, or with materials that lift when cutting close to the edge.



- ⑥ **Park Position Setting:** Controls the X and Y location of the tool head after each table or at the end of a job.



Illustration 4I: Bottom right corner of the **Production Manager** menu.

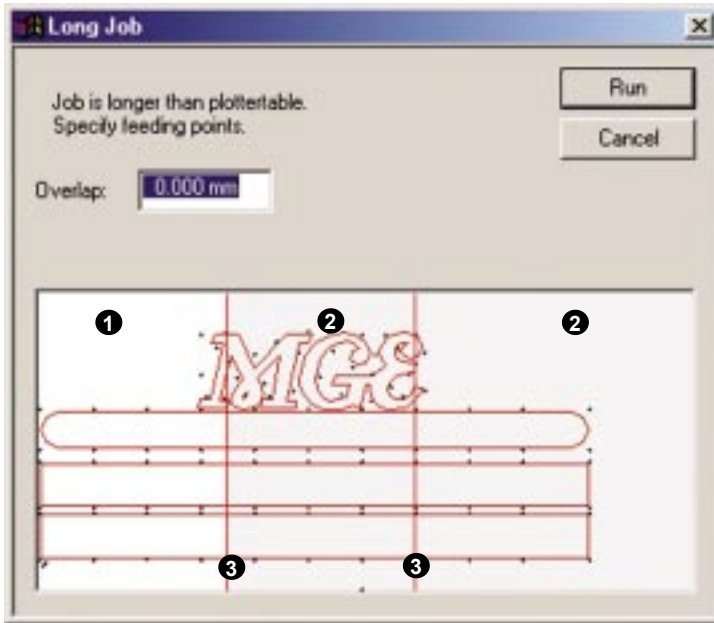


Illustration 4J: *Long Job* menu appears when a job longer than the table is imported and either One or Multiple Copies per sheet is selected. The menu will not appear when RollFeed with Registermarks is selected.

To further compensate for inaccuracies in the material advance, you can specify an overlap that will be added to the feed length. Note that material advance normally is accurate and overlap is rarely needed.

Vision Registration for Long Jobs: To use the Vision registration with jobs longer than the plotter, make sure that all register marks are printed within the dimensions of the plotter (see below).

Place the red feed-lines to the left of the vertical row of registration marks, but still within the plotter size. The feed-line should not be more than app. 2-in. or 50 mm away from the mark. This will cause the system to reread the marks near to the feed-lines before cutting the second and third sections. In the example shown in Illustration 4J, the system will first read the 4 marks in the white area. Then it will

cut everything to the left of the first red line and advance the material. The two register marks to the right of the white area will now be placed at the front of the plotter and read again together with the two marks to the right of the middle section. Following that, the middle section will be cut, and so on.

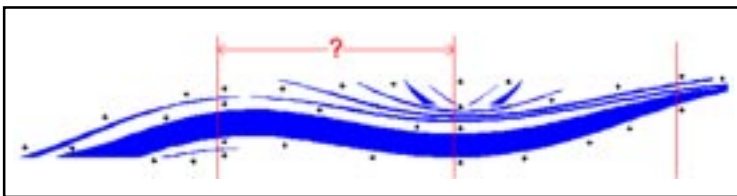


Illustration 4K: *Placing register marks on a vertical line for each cutting section.*

NOTE Graphics wider than the plotter can not be processed. If you accidentally try, the program will warn you that the graphic exceeds the plotter size in the Y direction.

When cutting fleet markings or other graphics longer than the plotter, it is highly recommended that you to place register marks on a vertical line for each cutting section as shown in Illustration 4K. The size of each section depends on the plotter size. The distance between each vertical line of register marks should be at least 8 inches (app. 200 mm) less than the maximum cutting distance in the X direction. For example, a M-1600 plotter has a maximum cutting area in the X direction is of 63 in. (app. 1600 mm). The spacing of the vertical lines of register marks should then be a maximum of 55 in. (app. 1400 mm). The total number of marks required depends on the degree of distortion for which you wish to compensate. The system requires a minimum of 3 marks per section.

GRAPHICS LONGER THAN THE PLOTTER: **Production Manager > Run or**

Graphics Larger than the Plotter: When a graphic is imported longer than the length of the plotter, the *Long Job* menu appears.

- ❶ The bright white area to the left represents the size of the plotter.
- ❷ The gray areas to the right show the sections that exceed the length of the plotter surface.
- ❸ The red lines indicate where the material will be advanced. You can adjust these feed-line positions by grabbing the red lines. Placing the red feed-lines between curves, rather than through curves, helps minimize inaccuracy in the material advance.

PRODUCTION MODES (.OPT FILES):

File > Production Manager or 

Production Mode: This feature allows you to select from standard production modes, which can be used to streamline production. These sequences are stored as .opt files and are accessed in the upper right of the *Production Manager* menu. These sequences can be used as they are or customized according to the job requirement. When you have created a new .opt file, it can be stored under a new name in the **Production Options** menu (see Customizing Production Modes [page 27](#)). I-cut will save the last 10 .opt files for later recall.

The production modes shown in Illustration 4L are shipped with i-cut. In order to access them, go to **Production Manager** and click on the *Option* button in the upper right hand corner of the menu. Select *Load* to access your hard drive. In the I-cut folder, open the Prod Options folder and select a standard Production Mode. When you click on the OK button, the sequence will be added to the drop down window on the **Production Manager** menu.

- ④ **Sheet feed** automatically advances one sheet from the sheet feeder before the first table. Distance advanced is controlled by the feed length set in the *Production Manager* menu.
- ⑤ **Sheet feed + 1 (+2, +3)** automatically advances the specified number of additional sheets from the sheet feeder before the first table.
- ⑥ **Roll-Feed** automatically advances the roll for each table. Use this option for continuous cutting of graphics on rolled materials.
- ⑦ **Non-Stop** continues to feed cutting tables without stopping for sheet changes. This option is used for cutting continuously and working with two vacuum zones.
- ⑧ **Park-After-Table** parks the cutting head out of your way and reverses the vacuum for each table, making sheet change between tables easy. Use this option for cutting sheets in only one vacuum zone.
- ⑨ **No feed before** does not advance any sheets before the first table, but will then automatically advance all sheets after all subsequent tables.

The *.opt file loaded in the *Production Mode* menu determines the order in which the individual plotter operations will take place. For example, if you specify 3 copies in X and 2 copies in Y, the total of 6 Copies will be considered one table. If you are producing a total of 600 copies, the process will be repeated 100 times. Your selection of production sequences will determine what operations the plotter performs at various stages of the operation with relation to each table. These operations can be specified in the *String to Send* area of the *Production Options* menu (see [page 27](#)).

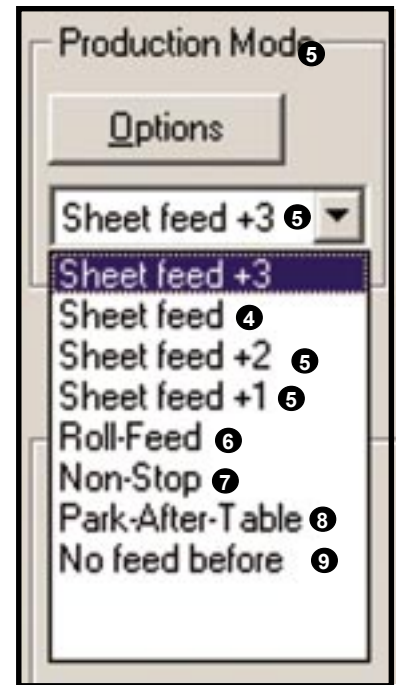
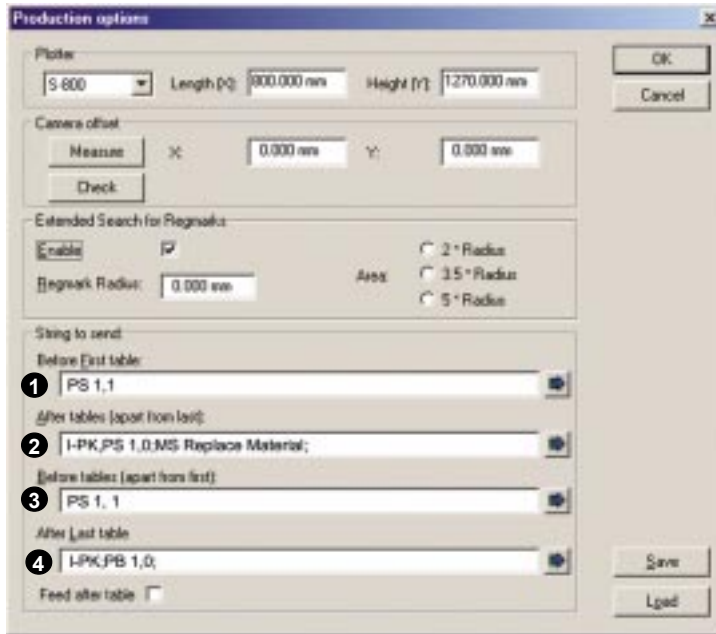


Illustration 4L: *Production Mode drop down menu*

AUTOMATING PRODUCTION MODES (.OPT FILES):

Production Manager > Options > Production Options



String To Send Options: In the *String to Send* section of the **Production Options** menu, you can define HPGL commands to be sent to the plotter before and after tables. These commands can be sent in the following scenarios:

- ❶ Before the plotter starts processing number 1 of X tables.
- ❷ When the plotter has completed processing any of X tables
- ❸ Before the plotter starts processing any of X tables.
- ❹ When the plotter completes cutting all of X tables.

In each of the 4 command lines, you can specify any HPGL command for the plotter to interpret. Clicking on the blue arrow on the right side of each command line brings up a list of predefined commands for you to choose from (see [page 28](#)).

Illustration 4M: *Production Options menu*

NOTE One “table” is defined as the total number of step & repeats in X and Y

EXAMPLE In Illustration 4M, the following actions will take place according to the HPGL code in each of the four windows.

- ❶ Before the plotter starts number 1 of X, the command that starts the vacuum pump will be sent.
- ❷ When the plotter is finished cutting table number 1, the head will go to a park position out of the way and reverse the vacuum valve for easy sheet changes.
- ❸ Before the plotter starts cutting table number 2, the vacuum hold down will be reactivated to hold the new sheet.
- ❹ When the plotter is finished cutting X of X copies, the vacuum pump will be shut off and the head will go to a park position out of the way.

You can save a set of commands for each of your production workflows and load the one appropriate for your current application.

Caution: Not all commands apply to all plotter configurations. If you have any doubts, please consult your plotter supplier.

HPGL COMMAND REFERENCE:

Production Manager > Options

The following list is a summary of the HPGL commands available for the *String to send* sections of the *Production Options* and *Edit Tool* menus. These commands are available by clicking on the blue arrow at the right end of each window. You can save an *.opt file with a set of commands for each of your production work flows and load the one appropriate for your current application. If you have defined tools on one PC and want to install them on another PC, you can use the Save and Load functions on the two menus. Note that not all commands apply to all plotter types or configurations. Also, not all commands make sense in all situations, so use this list as a guideline only.

- ❶ **Rotation Off** disables knife rotation.
- ❷ **Rotation On** enables knife rotation.
- ❸ **Penup Angle** sets the angle at which the plotter lifts the tool. Default is 45°.
- ❹ **Penup Disable** sets a penup angle of 360°, meaning that the tool never lifts. Use this command, for example, when pen plotting or cutting thin soft vinyl to speed up processing.
- ❺ **Pump On** turns the vacuum pump on.
- ❻ **Pump Off** turns the vacuum pump off.
- ❼ **Vacuum On** sets the vacuum valve to suction.
- ❽ **Blow Back** sets the vacuum valve to blow back. Use this setting, for example, for easy sheet placement.
- ❾ **Vacuum Width 500mm** sets the width of the vacuum zone to 500 millimeters. The width must be entered in 1/100 millimeters. SV 100000 sets the width to 1 meter.
- ❿ **MGE Sheet Feeder** enables the i-cut *Auto Feed* system option.
- ⓫ **Message** sends a text message to the display on the plotter. The message could, for example, be "Replace Material". The operator is then required to hit ENTER on the keyboard before production continues.
- ⓬ **Offline** sets the plotter offline. Note that the plotter will still receive data when it is offline.
- ⓬ **Feed 1000mm** advances the material 1 meter. FL sets the feed length. The distance must be entered in 1/100 millimeters.
- ⓬ **Foil Cut** can be used with sheet rolled material.
- ⓬ **Park** moves the tool head to a given coordinate. The position must be entered in 1/100 millimeters; 100000,100000 equals 1 meter in X and Y.
- ⓬ **Delay 5 sec.** causes the plotter to pause for 5 seconds before continuing. The delay period can be specified in 1/1000th of a second.
- ⓬ **Select Job** selects a predefined set of cutting parameters from the plotter's internal memory.
- ⓬ **External Gas On** turns on compressed air for use with laser cutting tools.
- ⓬ **External Gas Off** turns off compressed air.
- ⓬ **(Wild) Feeder On** activates roll feed unit.
- ⓬ **(Wild) Feeder Off** de-activates roll feed unit.

- ❶ Rotation Off
- ❷ Rotation On
- ❸ Penup Angle(45)
- ❹ Penup Disable
- ❺ Pump On
- ❻ Pump Off
- ❼ Vacuum On
- ❽ Blow Back
- ❾ Vacuum Width (500mm)
- ❿ MGE Sheet Feeder
- ⓫ Message
- ⓬ Offline
- ⓬ Feed (1000mm)
- ⓬ Foil Cut
- ⓬ Park
- ⓬ Delay (5sec)
- ⓬ Select Job (1)
- ⓬ External Gas On
- ⓬ External Gas Off
- ⓬ (Wild) Feeder ON
- ⓬ (Wild) Feeder OFF

Illustration 4N: HPGL Command list

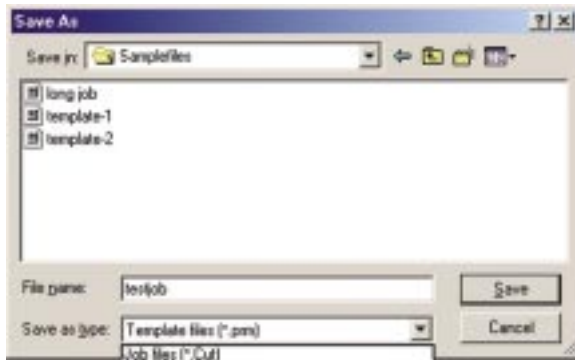


Illustration 40: Selecting the Template format.

NOTE: If you name the layers in the file to match the layer names in a predefined template, tool assignment and organization are performed automatically when you import the file.

in the "save as type" window, and name the file according to the work description. Click OK.

Whenever you need to cut with a specific set of parameters, go to **File > Open** and access your hard drive. In *Files of type*, select Template Files and the file you want to open. You can also start i-cut by double-clicking on the template file, or create Windows short cuts to your favorite templates. Once you have imported a customer file, you need only move the cut lines to the appropriate layer in the template. *If the file you want to cut contains layer names that match your template layer names, the cut lines will be imported directly to the correct template layer.*



Illustration 4P: Check the manual reg box in the Regmark menu.

USING TEMPLATES:

File > Save as

Templates are useful if you are using the same cutting parameters over and over again. You can create templates that contain all settings for materials you commonly encounter, or for different combinations of tools you expect to use (slow cut and fast cut, or kiss-cut and through-cut, or cutting and drawing).

Arrange and modify the layers in the correct order and set up the required properties. Select **File > Save as**. Choose *Template files*

MANUAL REGISTRATION

Regmark menu Production Manager > Run

Manual registration can be used for two types of functions.

1. To manually override acceptance of the center of a register mark. When i-cut can't determine the center of a regmark, the Regmark window appears (see Illustration 4-P). Check the *Manual reg* box on this window and move the crosshairs to the center of the registration mark. When you click the OK button, i-cut will accept the center and move to the next registration mark. The Regmark window will appear again, allowing you to either accept the center for the new regmark, or uncheck the *Manual reg* box.

2. Check the Manual Registration box in the Production menu when no i-cut register marks are printed.

FURTHEST REGMARK FIRST OPTION Production Manager Menu

Under normal circumstances, the first registration mark read by i-cut is the closest to 0,0 in the lower left corner of the screen image area. However, when processing a large job with only a few regmarks, the system may have difficulty locating the marks near the end of the job. Checking the *Furthest Regmark First* box in the upper left of the *Production Manager* menu often resolves this problem.

OPTIMIZING CURVES:

Preparation > *Optimizing Curves* or

This feature analyzes selected curves and makes automatic modifications according to the settings you choose.

- ❶ **Tolerance:** The value in the *Tolerance* window determines how closely any newly modified curve you specify will follow the original.
- ❷ **Break Long Lines:** Checking this box adds control points to line segments longer than the value specified in the Sheet Length window. This procedure allows i-cut to connect the curves accurately for jobs longer than the table. This in turn helps ensure that a control point is close to a feed line.
- ❸ **Make Sharp Corners/Round Corners:** Selecting on of these boxes will define how *Optimize Curves* modifies curves. Curve radius tolerance is set in the window to the right.
- ❹ **Replace existing curves/Generate new layer:** the two radio buttons at the bottom of the *Optimize Curves* menu allow you to choose whether to create a new layer for your optimized curves or replace the existing curves.

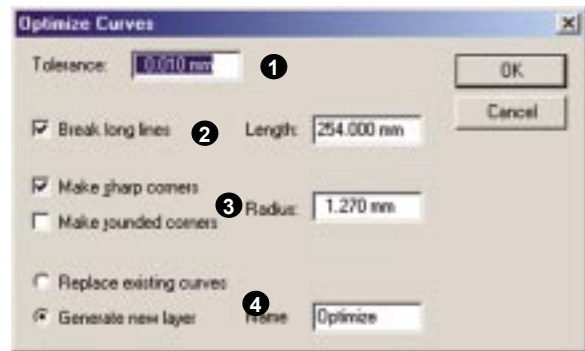


Illustration 4Q: *Optimize Curves* menu

ROTATING AND MIRRORING:

Edit > *Rotate* or *Mirror*

The Rotation feature is often used for the purpose of matching the XY orientation of the monitor to the XY orientation of the plotter (see page 3-1). An entire job may be rotated by pressing the *All* button (to display all art components), then pressing ALT and doing a right mouse click to select all curves. Selecting the **Rotate** feature from the **Edit** menu will launch the dialog box shown in Illustration 4-R.

You may select any degree of rotation, but the angle will generally be 90° when orienting the table to the monitor. You may select clockwise or counterclockwise. You may also select any individual art component and rotate it.

When using the **Rotate** dialog box, the user can select the center around which the artwork will rotate. This choice will depend on the reason for the rotation. The *Center of Selected curves* computes the points based on the area you have chosen and can vary according to the curves chosen. The *Center of All Curves* may be different than the *Center of the Work Area* choice if any offset has been specified in the **Production Manager** menu.

Mirroring an image flips the selected art component either vertically or horizontally (Illustration 4S). The **Mirror** dialog box is also accessed from the **Edit** menu and functions similarly to the rotate feature.



Illustration 4R: *Rotate* dialog box

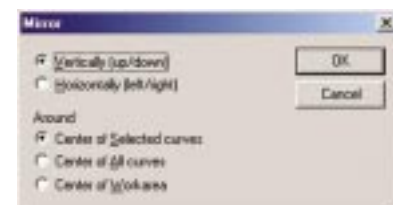


Illustration 4S: *Mirror* dialog box.

NOTE on orientation. The purpose of orienting the job to the monitor is to avoid confusion on the part of the operator. Once i-cut has found the first registration mark on a job, it will automatically rotate the entire job accordingly.

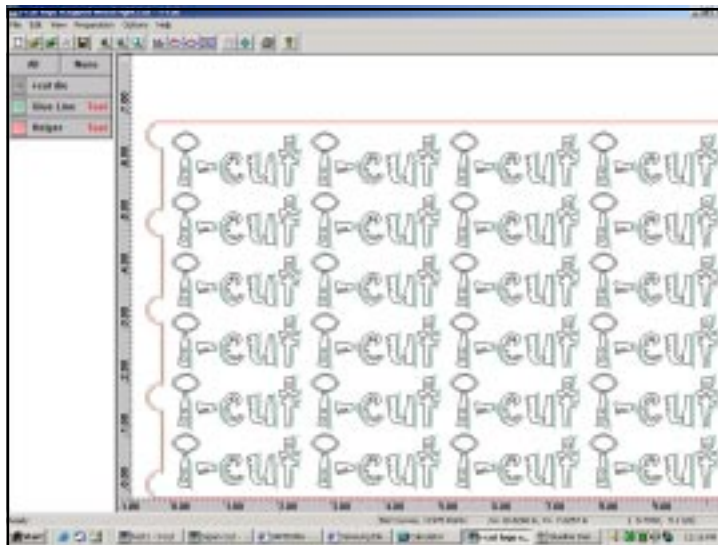


Illustration 4T: Glue line layer applied after selecting parameters.

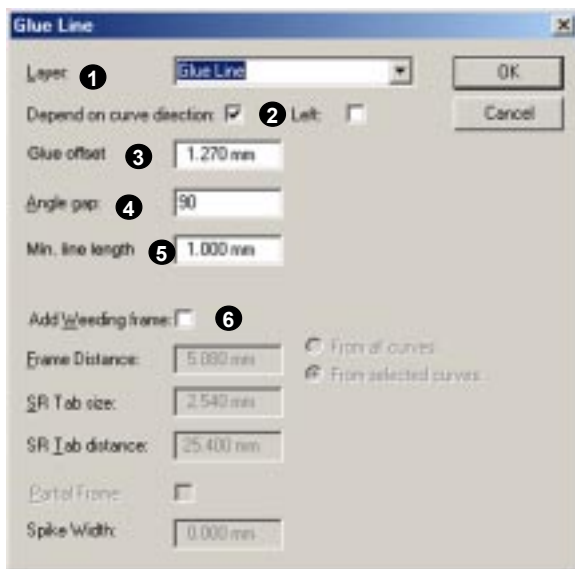


Illustration 4U: Glue line menu.

GLUE LINE SETTINGS FOR AUTO WEEDING Preparation > Glue Line

Glue line settings are used in conjunction with the optional *i-cut Auto Weed* waste removal system. The *Glue Line* selection on the **Preparation** menu will be activated when the Auto-Weeder has been installed and the activation code has been entered in the **Preparation > Configuration Options** menu.

The glue line menu sets the parameters for laying down a pattern of adhesive beads in areas where waste material will be removed. The glue line is defined in a layer which is imported with the job.

- ❶ **Layer:** The glue line layer should generally be named to differentiate it from other processes. When a new layer named *Glue Line* is specified in the *Add Layer* menu, a new layer and button will be created in the left column (Illustration 4T).
- ❷ **Curve Direction:** When the *Depend on curve direction* box is checked, i-cut will lay down the glue line according to the default curve direction as described in the layer data. Checking the *Left* box will cause the line to be laid down counter-clockwise. Counter-clockwise is generally used for inside curves.
- ❸ **Glue Offset:** Sets the glue dot offset dimension.
- ❹ **Angle Gap:** Determines how far “out” from the straight application path the adhesive will be applied. The value in the window is the angle of divergence from the straight path or 0°. This value can range from +/- 45° to +/- 90°. For most applications, a +/- 70° is a good default. In general, the higher the angle setting, the more adhesive will be applied. A smaller value may be used for rectangles and other less demanding shapes.
- ❺ **Minimum Line Length:** This value determines the minimum length of the adhesive bead that will be applied on the glue line.
- ❻ **Add Weeding frame:** When checked, this feature provides an outside frame to make waste removal easier.

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