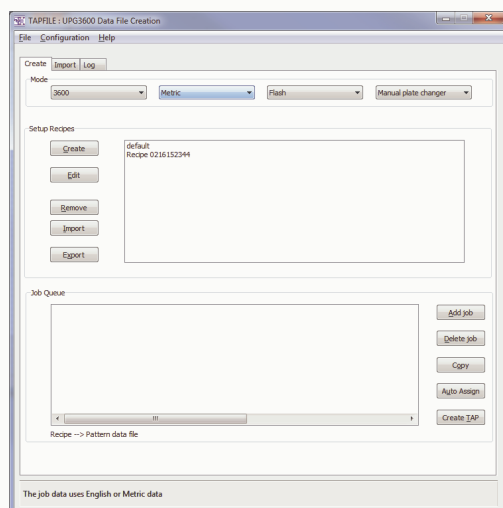


Help



This software is intended to simplify the creation of data files compatible with H&L Associates' UPG3600 upgrade kit for the GCA/D.W. Mann 3600 pattern generators. These data files usually have a '.TAP' extension and represent the emulation of a physical 9-track magnetic tape that was originally used on the equipment.

In the original pattern generator software, the user would start with a magnetic tape containing one or more files of exposure data with each file representing all the exposures to be made on a reticle. The user would typically then do following :

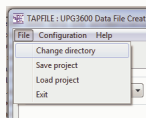
- run the 'MODE' command to define the format of the exposure data, the units assumed by the data (millimeters or inches), the kind of exposures to make and whether an automatic plate changer was to be used
- run the 'SETUP' command to specify shutter time or flash intensity, data transformation operations (scaling, mirroring etc.) to be applied to the data and any optional items to be added to the reticle (fiducial marks, labels etc.). A data file was selected, the settings defined by 'SETUP' were applied to the data file and the combination of the two (called a 'job') was entered into a job queue. The job queue might contain up to 30 jobs, with the user able to adjust the order and the number of jobs.
- run the 'RUNQ' command to start exposing the data stored in the job queue, one job at a time in the order specified.

For the purposes of this software, the result of running 'SETUP' is referred to as a 'recipe'. With this software, the user can accomplish the following:

- create a library of recipes to be used in the production of reticles
- organize the recipes
- easily create job queues which attach recipes (SETUP parameters) to exposure data files
- create .TAP files which are directly compatible with the UPG3600 upgrade kit

Menu

- **File**



- **Change Directory**

Selecting this menu item invokes the standard Windows change directory dialogue. Select the path where all the data and recipe files will be stored for this project. If the path doesn't exist then it can be created from within the dialogue. The current path will be changed to the selected path if possible.

- **Save Project**

The user can save some of the current global settings as a project. Project files normally have a '.hlprj' extension and are in XML format. The information that gets saved in a project file consists of the following :

- the current path which presumably stores all the exposure and recipe data for a particular photomask/product
 - [mode parameters](#)
 - [configuration settings](#)
 - the current contents of the [recipe list](#)
 - the current contents of the [job file list](#)

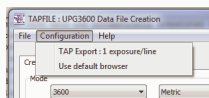
- **Load Project**

The user can load new global settings from a project file. The mode parameters will be changed, the current file path will be changed to the setting in the project file and configuration settings will be changed accordingly. The current lists of recipes and job files will be replaced with the contents of the project file. The project file normally has a '.hlprj' extension and is in XML format.

- **Exit**

Close the TAP job file creation application.

- **Configuration**



- **Tap Export:1 exposure/line**

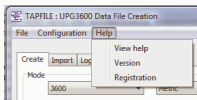
Check this option if you wish to have exposure data files written with one exposure per line when converted to simple ASCII files (typically with a 'hlj'

extension). If unchecked, the exposures will be consolidated with as many exposures as will fit in a line of 80 characters. With one exposure per line, the user can more readily find a given exposure and modify it if necessary. The conversion of job files to ASCII text occurs when .TAP files are [exported](#) i.e. converted from the EBCDIC coded format of a .TAP file to a standard ASCII text file.

- **Use default browser**

The TAP file creation software uses the standard Windows Internet Explorer (IE) web browser to present help information as well as to connect to the website that will graphically show the exposure data stored within a TAP file. Check this menu item if the default web browser (e.g. Firefox, Chrome etc.) should be used in place of IE.

- **Help**



- **View help**

Selecting this menu option brings up this browser page which provides context sensitive help for the operation of the TAPFILE software.

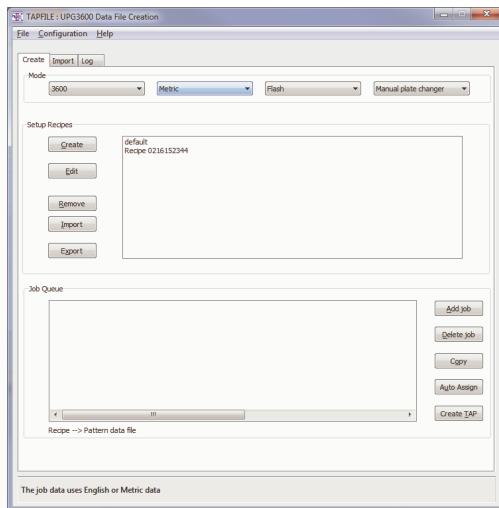
- **Version**

Show the current version of the TAPFILE software as well as the version of Windows (or the version as set in compatibility mode) that the software sees when running.

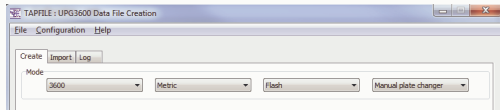
- **Registration**

Selecting this menu item will bring up a user dialogue showing the current registration information or showing how the user can get an activation code for the software as outlined under [Software registration](#)

Create



- **Mode**



- **Pattern Generator Type**

Select one of 3600, 3000 or 2600 from the list. This will indicate the format of the exposure data that are going to be used to create the TAP file.

The 3600 uses an improved tape format. The convention for mapping data onto the 3600 reticle makes the center of the reticle and the origin of the coordinate system coincide. The origin is at 0,0 which is also the location of the optical column when it's directly over the center of the glass.

The 3600 can also accept 3000 and 2600 formats. Pattern files compiled for the 3000 Pattern Generator use the same coordinate system, but have an origin at the lower left corner of the pattern. 3000 data are automatically translated to 3600 format when the user declares the input data format to be 3000. For such data, 3600 software adds an offset to each coordinate, corresponding to the distance between origins.

Data prepared for input to a 2600 Pattern Generator can be read by the 3600 Master Operating Program. Such data have no directory structure and are accessed by file number rather than file name.

- **Units**

Select the units used when defining the exposures in the data files. Metric data are measured in millimeters while English data are measured in inches.

- **Flash/Shutter/Laser**

Select the mode of operation from the list of flash, shutter or laser. The laser

option was available on only a few machines so the choice is typically between flash and shutter mode. This mode will apply to all the jobs being defined and stored in the TAP format data file.

Shutter mode is used in conjunction with the mercury arc lamp and photoresist coated plates. Flash mode is used with the xenon flash and emulsion coated plates.

- **Plate Changer**

Select either 'Manual plate changer' or 'Automatic plate changer'. A type 3700 Automatic Plate Changer (APC) is available as an option to cycle plates sequentially to the plateholder and return them after exposure to a cassette, without operator intervention. An APC equipped machine can be run in manual or automatic mode.

- **Setup Recipes**



- **Create**

Pressing this button brings up a multi-page dialog that is populated with the default values for the standard set of SETUP parameters as described in the original Mann/GCA 3600 pattern generator documentation. The default description for this recipe, which must be unique, defaults to 'Recipe' with the current time appended. This description can be changed as desired.

- **Edit**

The recipe description currently highlighted in the list of recipes can be edited by pressing this button or by double-clicking on the recipe in the list.

- **Remove**

Pressing this button, or pressing the [Del] key will remove the currently highlighted recipes from the list of recipes.

- **Import**

Recipes can be stored individually in a recipe file (.XML extension) or in groups in a cookbook file (.XML or .BOOK.XML extension). Pressing this button will present the user with a file selection dialogue. If the file is recognised as a valid recipe or cookbook file then the recipes will be added to the recipe list. If a recipe with the same description already appears in the recipe list then the user can choose to replace the current recipe or leave it unchanged.

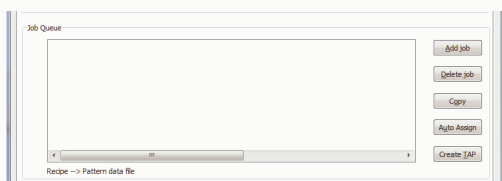
- **Export**

The currently selected recipes in the recipe list can be saved to an XML format file by pressing this button. If a single recipe is selected in the recipe list then the parameter settings within the recipe will all be saved to a recipe file. If more than one recipe has been selected in the list, then the recipe data will be saved in a cookbook file.

- **Recipe List**

This window shows a list of all currently defined recipes for the current project. Double-clicking on a recipe name will invoke the recipe editor. Pressing the [Del] key will delete the highlighted recipe or recipes from the list. Multiple recipes can be highlighted using the standard [Ctrl-LeftClick] and [Shift-LeftClick] controls.

- **Job Queue**



The job queue serves as a way to associate previously defined recipes with particular exposure data files, with the pair of items referred to as a 'job'. Once the jobs are configured in the order desired then a TAP format file can be created. This TAP file can be used with the UPG3600 pattern generator upgrade kit to create photomasks without having to use the SETUP and MODE commands of the pattern generator MOP (Master Operating Program) software.

- **Add Job**

The user will be presented with a file selection dialogue in order to choose a file containing photomask exposure data. Multiple files can be selected from the list of files presented in the dialogue. These data will be in a format that depends on the kind of [pattern generator](#) selected by [Mode](#). If the selected data file is in standard ASCII text format then it will be used directly. If the file is in EBCDIC format (as produced by some design software e.g. Artwork Conversion Software) then it will be cleaned up, converted to an ASCII format file and the ASCII format file (usually given a .hlj extension) will be used as the source of exposure data. A short name for the file will appear in the job queue list with a default recipe attached to it.

- **Delete Job**

Pressing this button or pressing the [Del] key will remove the currently highlighted job from the job queue.

- **Copy**

Pressing this button will duplicate the job name currently highlighted in the job queue. This allows the same exposure data to be used multiple times for a mask, with different recipes applied at different stages of the exposure process.

- **Auto Assign**

Recipes can be defined to have a [default file extension](#) associated with them. Pressing this button will cause each file name in the job queue to be examined and if the file extension matches the association defined for a particular recipe in the recipe list, then that recipe will be applied to the job file.

- **Create TAP**

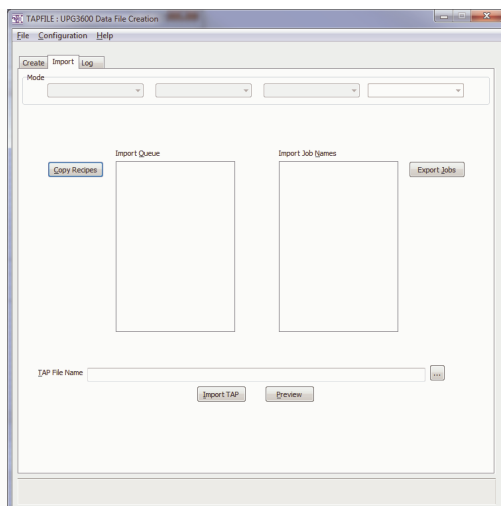
Pressing this button invokes a dialogue that allows the user to select a name for the TAP output file. Once selected, the job queue information, as defined by the exposure data files and the associated recipes, will be written to a file that is compatible with the UPG3600 Pattern Generator Upgrade Kit.

- **Data File List**

This Job Queue list allows for the manipulation of items in the job queue :

- Double clicking on a job name will show the full name of the exposure data file, the size of the file in bytes, the short name that will appear in the job queue when using the MOP software of the pattern generator and the number of times that this particular exposure data appears in the job queue.
- The position of a file in the queue can be altered by dragging the highlighted item to its new position using the mouse (left click, drag, release)
- The position of a file in the queue can be altered by moving the highlighted item to its new position using the [Shift-UpCursor] and [Shift-DownCursor] keys
- A recipe can be applied to a file by selecting and dragging the recipe from the recipe list and then dropping the recipe onto the job file
- The highlighted job can be deleted from the list by pressing the [Del] key

Import



This dialogue allows users with a number of TAP formatted files to import the information from them and to convert the information into recipe list entries and ASCII photomask data files.

- **Mode**

Each TAP file contains all the information necessary to produce a photomask consisting of global mode settings, a single job queue, the exposure data for each job in the queue and the SETUP parameters that are applied to the job data. The MODE specific information is imported from an existing TAP file and presented here. The information cannot be changed by the user but it will indicate the kind of exposure data that are stored in the file so that the user can be sure to set the correct mode parameters when creating a new TAP file from these data. A description of each item can be found in the previous sections of this help file that deal with the creation of a TAP file.

- Pattern Generator Type
- Units
- Flash/Shutter/Laser
- Plate Changer

- **Copy Recipes**

Once a TAP file has been imported, the SETUP information for each job in the job queue is extracted and added to the Import Queue. The entry in the Import Queue is named after the data file that the recipe information applies to. Pressing this button will cause all the selected entries in the Import Queue to be converted to recipes and added to the Setup Recipes list where they can be modified or saved separately in recipe files.

- **Import Queue List**

This list contains all the recipes that were extracted from an imported TAP file.

- **Import Jobs List**

This list contains the names of all the exposure data files that were extracted from an imported TAP file.

- **Export Jobs**

The exposure data that was imported from a TAP file can be converted and saved as one or more ASCII text files, with the name of the ASCII file given by the name of the item in the Import Job Names list.

- **TAP File name**

This input line contains the name of the TAP file that is to be imported. The name can be entered directly or the [Browse] button ([...]) can be pressed to invoke a file selection dialogue.

- **Browse**

Pressing this button will allow the user to select a TAP format data file for importing and conversion. Once the file has been selected, the information in it will be automatically read and the entered in the Import Queue and Import Job lists.

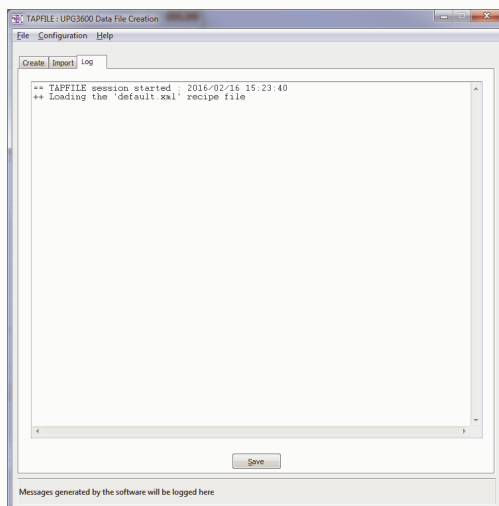
- **Import TAP**

Pressing this button will cause the file, named in the 'Tap File Name' input line, to be opened and the recipe and exposure data information to be read from it.

- **Preview**

Pressing this button will invoke the default web browser application and connect the user to the Trilicium website for viewing of the contents of a TAP file.

Log



- **Log file contents**

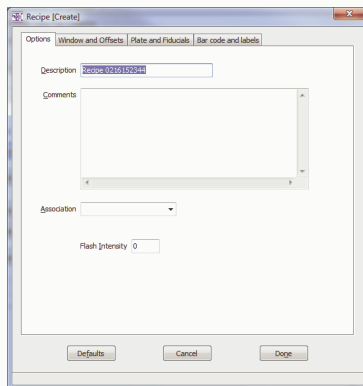
Tasks involving the reading and creation of data files, or tasks that experience

problems, will have progress or error messages copied to system log file that can be viewed here.

- **Save**

The user can optionally save the contents of the message/error log to a file by pressing this button.

Recipe



- **Defaults**

Pressing this button will cause all values of the SETUP parameters in the recipe to assume their default values. This may be useful if changes have been made to some parameters and the user wishes to revert to the default state and make different changes.

- **Cancel**

Pressing this button will cancel the recipe creation process and close the dialog without making any changes to the list of recipes.

- **Done**

When all changes to the recipe have been made, pressing [Done] will save the current state of the recipe, add the recipe to the list of recipes and then close the user dialogue.

- **Options**

These options apply to the current recipe. They allow the user to describe in detail what the recipe is being used for so that it can be properly applied to photomask data files.

- **Description**

Enter a unique descriptive name for this recipe. This name will appear in the list of possible recipes that can be applied to photomask data files. The name must be unique, no longer than 30 characters and will default to the name 'Recipe'

followed by the current date and time e.g. 'Recipe 1207171526' when the recipe is first created.

○ **Comments**

Enter a more detailed description of the current recipe if required. The descriptive text can be a maximum of 250 characters in length. The comments are entered using a standard memo field so standard methods of copying, pasting and editing the text will apply.

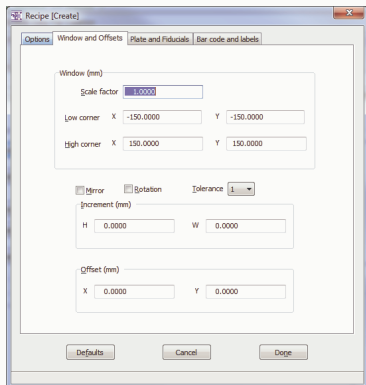
○ **Association**

Any recipe can be associated with a photomask data file extension. For example, it may be useful to associate a particular recipe 'Recipe1' with files of the form 'filename.lyr1' and to associate a different recipe 'Recipe2' with files of the form 'filename.lyr2'. When creating job queues, there is an 'Auto Assign' feature which can be used to automatically associate a recipe to a given job file based on the extension of the job file name.

○ **Intensity**

The text of this field will depend on the choice in Mode with regards to the kind of light source (Flash Intensity, Exposure Time or Laser Energy). The allowed range for the value will depend on the light source : 0 to 44 for flash and laser, 0 to 4000 for timed exposures.

● **Windows and Offsets**



○ **Window**

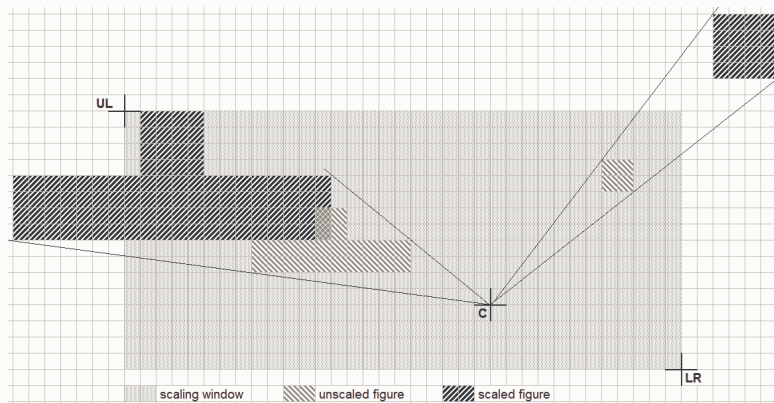
■ **Scale Factor**

Enter a decimal number from 0.5 to 2.0. This is a scale factor by which all values of X, Y, H and W will be multiplied at run time. Any offset will also be scaled, that is, the offset will be added before scaling. The default scale factor is 1.0. The scale factor is applied only to an area or window on the plate, as specified by the operator. The purpose of the window feature is to allow reference marks digitized outside the active pattern to be unaffected by scaling. Note that the Fiducials and the optional

alphanumeric label and closure test are never scaled.

- **Low corner X/Low corner Y**
- **High corner X/High corner Y**

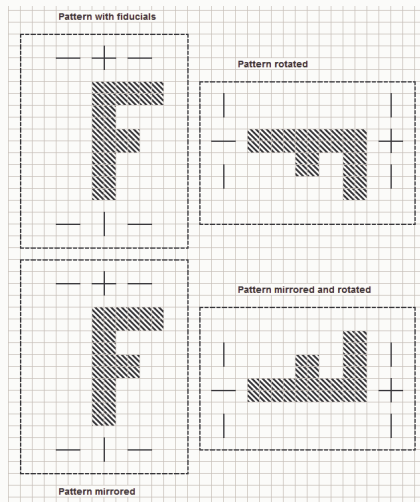
The scaling window is a rectangle specified by giving the X and Y coordinates of its lower right-hand corner and its upper left-hand corner. Only one scaling window is allowed for each job. The default scaling window covers the entire exposable area.



The adjacent figure shows a scale factor of 2.0 applied to two patterns, one lying in the first quadrant, the other lying in the second quadrant. The center of the stages is indicated by the crosshair marked 'C' and the scaling window corners are marked by the crosshairs 'UL'

(upper
left) and
'LR'
(lower
right).

- **Mirror and Rotation**



Check 'Mirror' if the pattern is to be mirrored about the Y-axis. The effect of mirroring is shown in the adjacent figure.

Check 'Rotation' if the pattern is to be rotated 90 degrees. This is a clockwise rotation about the center of the plate. See the figure above for the effect of the rotation on the pattern. Note that, since the 3600 uses the X-axis as the velocity axis in flash mode, rotation may affect the run time of the job.

- **Tolerance**

Select an integer value from 1 to 5. Tolerance refers to a position window for initiation of flash or shutter opening. Use of the lowest tolerance consistent with acceptable results should give the quickest job execution time. Small values specify closer tolerances while larger values give a wider margin of error. The default value is 1.

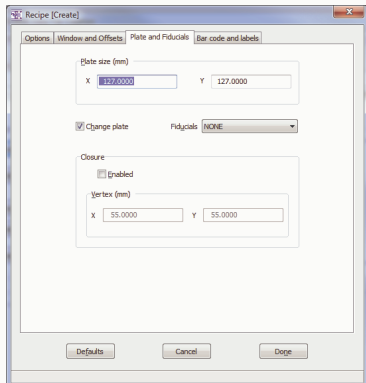
- **Increment H and W**

Enter the amount of increment to be applied to the H (height) and W (width) parameters of the exposure. Allowable values are decimal fractions between -0.020 and 0.020 millimeters. Negative values result in an aperture decrement. Aperture increments must be specified in millimeters, even if English units have been specified with the MODE option. Aperture increments are applied after aperture scaling, if any, has been performed.

- **Offset X and Y**

Enter the values of offsets to be applied to the X and Y parameters of the exposure. These offsets are added to all values of X or Y in the pattern data. Offsets are specified in millimeters or inches, depending on the units selected by the mode option. There are no limits, but care should be taken to avoid off-plate exposures. The default is no offset. Note that, if the pattern is scaled, the offset will also be scaled.

- **Plate and Fiducials**



- **Plate Size X x Y dimensions**

Enter the dimensions of the exposed plate in X and Y. Values from 63 to 164.5 millimeters, or 2.5 to 6.5 inches, are accepted. This information is used to identify off-plate exposures at run time. A 6 millimeter band of uncertainty is assumed at each edge of the plate. Exposures will not be accepted within this band. The default plate size is 164.5 millimeters (6 inches). Note that specifying a large plate size and then exposing a physically smaller plate defeats the detection of off-plate exposures. Also note that a 3600F using four-point auto-focus test will fail if too large a plate size has been specified.

- **Change plate**

Check the 'Change plate' option if the plate is to be changed (either manually or automatically) at the end of the job. If unchecked, the next job in the queue will be run on the same plate. The queue can contain up to 30 jobs while the APC (auto plate changer) cassette can hold 20 plates.

- **Fiducials**

Select one of the available fiducial types (A..J) or 'None' for no fiducials. Note that, if the pattern is rotated or mirrored, the fiducials are also rotated or mirrored appearing in different positions on the plate. Note also that these fiducials are not affected by scaling, offset, or aperture incrementing. See Appendix E of the original equipment documentation for a complete description of fiducial marks.

- **Closure**

The operator can determine whether errors in X,Y,H,W or A have accumulated during a job by checking the 'Closure' option. The figure, shaped like the letter 'L', will have the same orientation no matter where it is placed on the plate. The 'L' is made up of four rectangles exposed at job beginning and two additional rectangles exposed at job end. Together they form a figure which is 0.254 mm (0.01") high, 0.254 mm (0.01") wide, with a 0.0254 mm (0.001") line thickness. The closure test consists of inserting the two final rectangles into the vertical

and horizontal legs of the 'L' and accomplishing this without gaps.

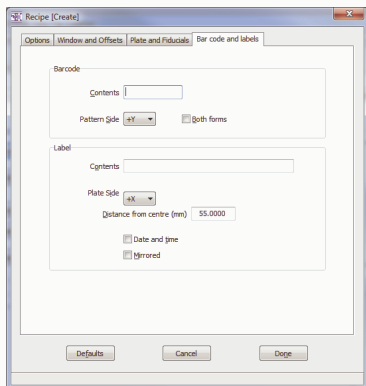
- **Enabled**

If the closure test is enabled, the operator can define the location of the vertex of a small L-shaped figure whose registration indicates instrument performance. Like fiducials, the 'L' is mirrored and rotated if the main pattern is mirrored or rotated.

- **Vertex X and Vertex Y**

The location coordinates in X and Y define the position of the closure figure before mirroring and/or rotation. Typically the vertex will be located at (X,Y)= (31.75,31.75) mm or (1.25,1.25) inches if the operator does not supply a location.

- **Barcode and Labels**



- **Barcode**

- **Contents**

Enter an optional barcode (maximum of ten characters) to be placed along one edge of the exposed plate. The barcode can use the standard characters A..Z, 0..9, period (.), colon (:), slash (/) and space.

- **Pattern side**

Select the side of the exposed plate on which to place the barcode. See 'Label - Plate side' for an explanation of the various side codes.

- **Both forms**

Check this box if both kinds of barcodes are to be applied to the plate.

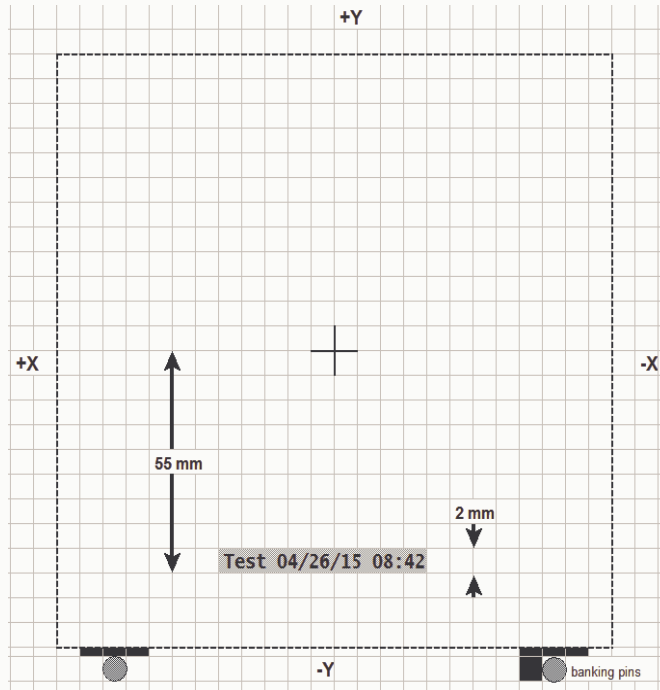
- **Label**

- **Contents**

Enter an optional plate label, up to 30 characters, using the characters A..Z, 0..9, period (.), colon (:), slash (/) and space. The characters typed,

either by themselves or with the optional time and date appended, will constitute the reticle label. If this input line is empty, and the 'Date and time' option is not checked, then the plate will have no label.

■ **Plate side**



The system will place the label on a line perpendicular to the X stage motions in the plus X direction, unless the user specifies a different side as shown in the adjacent figure. The other three sides of the plate, in clockwise order, are designated: +Y, -X and -Y.

■ **Distance from centre**

Enter a positive number in millimeters. The placement of the label, if located in the Y axis, should not overlay the fiducials which are at 51.5 mm from the center on a 5" plate.

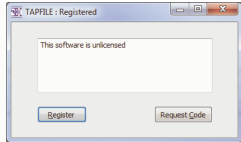
■ **Date and time**

Check this box if the reticle label is to include the current time and date. The time is taken at the beginning of a job before the pattern is started. If the label will contain text alone, or if the reticle will not be labelled, then leave this box unchecked. Notice that the time and date appendage uses 14 characters of the possible 30 used by a label.

■ **Mirrored**

Check this box if the label is to be mirrored. Mirroring is performed about a perpendicular through the label center.

Software Registration



- **Notes**

This memo field will contain the name of the licensee for this software. If a registration code is being requested by e-mail then the unique machine ID number will also appear in this memo field. The current registration state of the software (registered or unregistered) will appear in the title of window.

- **Register**

If the user has received an activation code by e-mail then it can be entered after pressing the [Register] button. If the code is valid for the current machine then all features of the software will become available.

- **Request**

Pressing this button will invoke the users default e-mail client software in order to request an activation code. An activation key will be sent to the user by e-mail. The activation code can be used in the Register step above in order to enable all features of the software. Generally, those features of the software that involve creating useful output files will be unavailable until the software is activated.