CNC-1215

INSTRUCTION MANUAL **AUGUST 2017**

CNC QUILTER

INSTRUCTION MANUAL

ABM International, Inc.

Revision - 0
Approved By:

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1. OPERATOR SCREENS

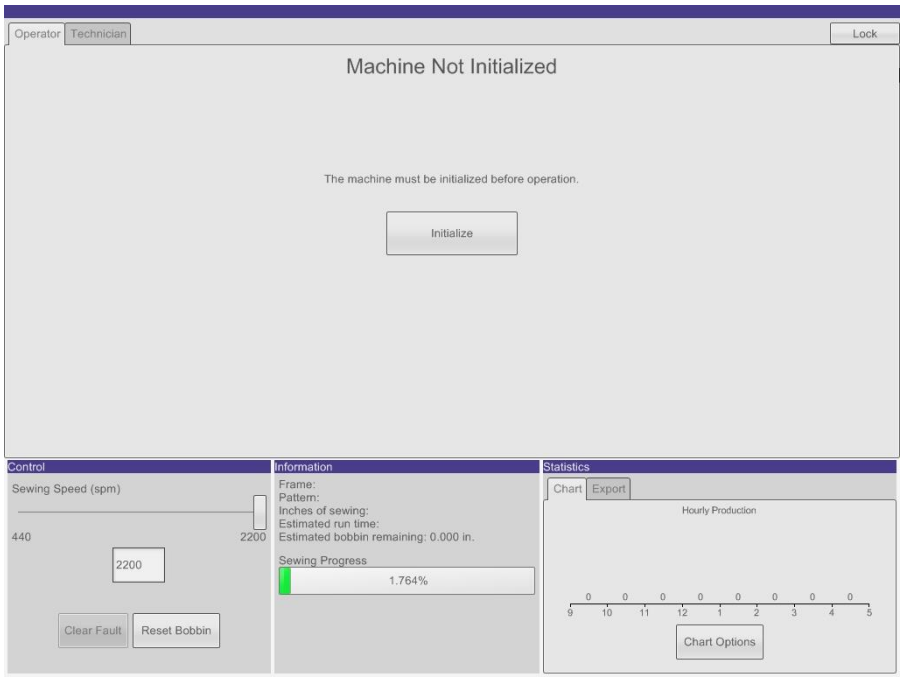

Figure 1.1 – Initialize Screen

When the machine is started the first screen is the initialize screen. The machine must be initialized prior to operation. When the Initialize button is pressed the machine will find the zero position for each axis. First the foot motor will move to find its proximity sensor and set zero. The needle will cycle to find an encoder marker and move to the up position. The X and Y axis will move to the front left most point where the proximity sensors are located. Once the X and Y sensors are tripped the X and Y axis will move to the offset position and set zero. Any sewing fixtures need to be removed from the clamps prior to initializing the machine.

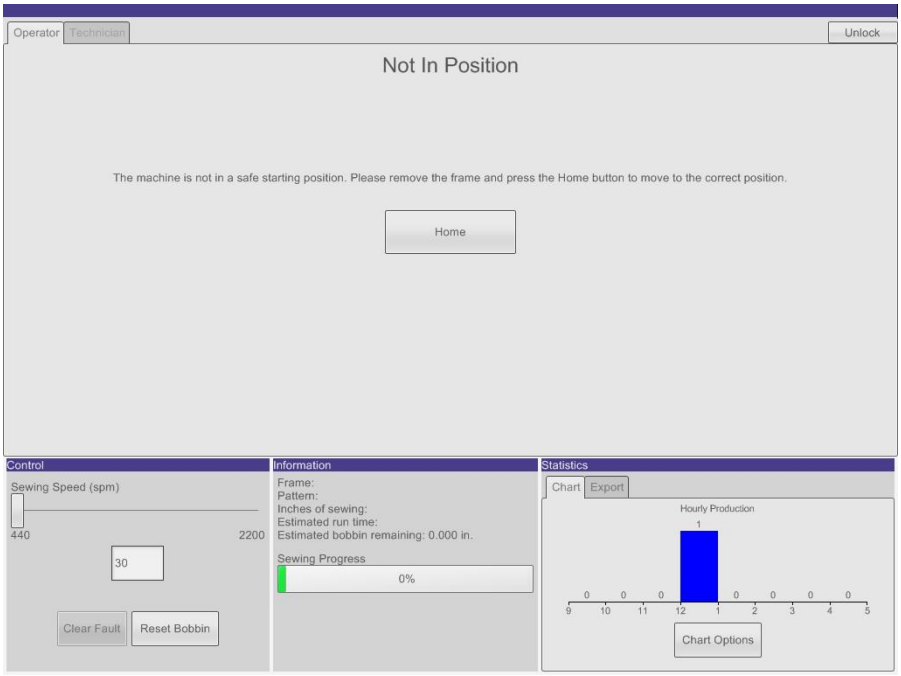

Figure 1.2 – Not In Position Screen

The machine must be moved to the common starting point prior to starting sewing. This position where the needle is half way between the frame lock clamps and the clamps are seven inches back from the needle. A sewing fixture must not be in the clamps when making this move.

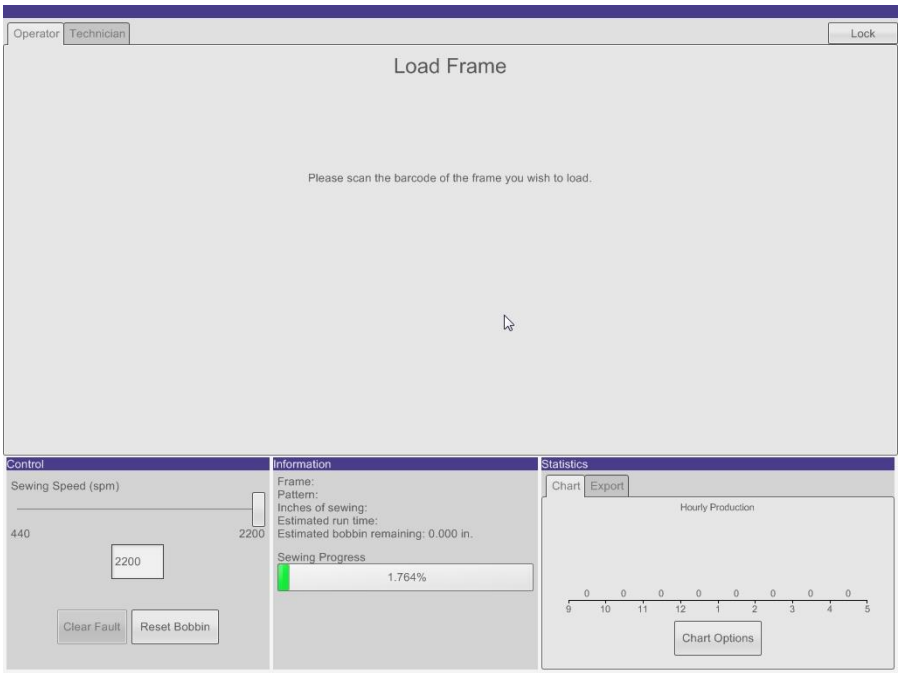

Figure 1.3 – Load Frame

Once the machine is initialized and in the starting position a fixture can be loaded. Scan the fixture then place it into the clamps and press the frame lock button. If there is only one pattern assigned to the frame it will automatically be loaded. If there are multiple patterns assigned to a frame the operator will be prompted to select one.

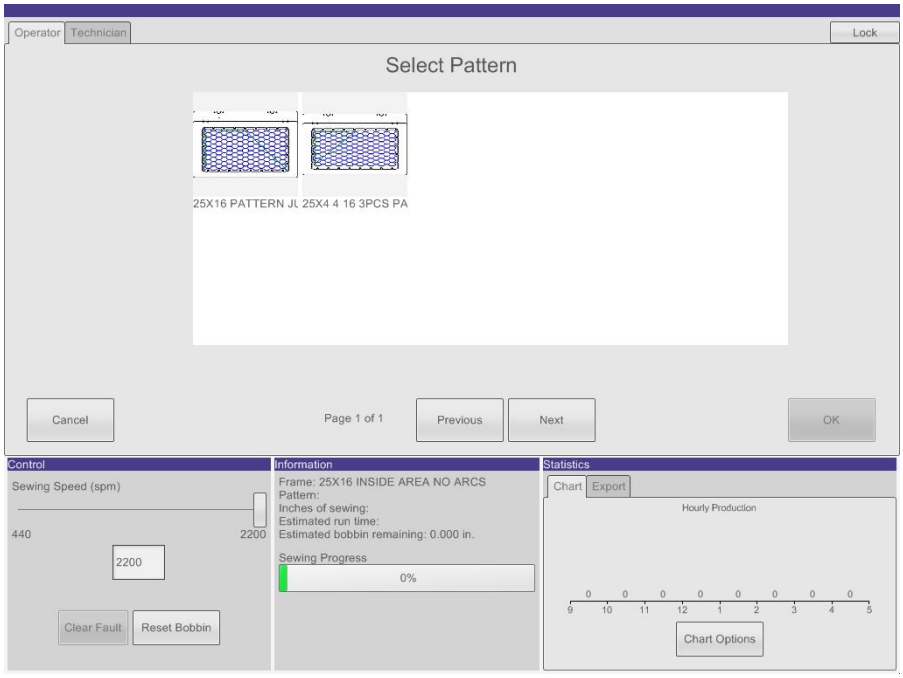

Figure 1.4 – Select Pattern

All of the patterns that have been imported to the scanned frame will be displayed. A pattern is selected by pressing it then pressing OK.

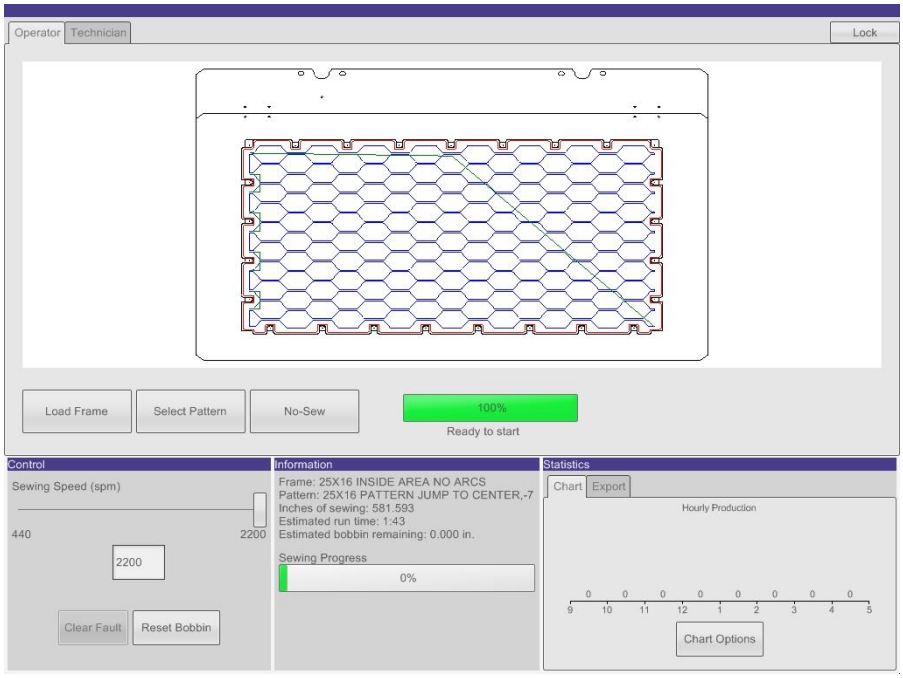

Figure 1.5 – Sew Screen

After the pattern is done loading the machine can be started using the start button and stopped with the stop button. The Load Frame button will take make the Load Frame screen appear allowing for a new frame to be scanned and loaded. The select pattern button can be used to choose a different pattern if there is more than one assigned to the current frame. The No-Sew button can be used to disable the sew head. The slider in the lower left of the screen adjusts the sewing speed. By pressing on the sewing speed box a speed can be typed in using an onscreen keypad. The Reset Bobbin button can be used if the bobbin check is setup. The Information box shows basic information about the current frame, pattern and sewing progress.

Fault Recovery

A fault can occur for reasons such as: an estop button is pressed, a limit is exceeded, an axis goes down, or a connection is lost between the controller and a drive. In the event of a fault the machine will stop all motion and turn off all of the outputs. A message will be displayed in the Information section of the screen. In order to recover from a fault the condition causing the fault must be fixed and the Clear Fault button in the lower left Control section of the screen must be pressed. After recovering from a fault the machine must initialize again.

Statistics

In the lower right corner of the screen is the Statistics section. Pressing the Chart Options button can configure the chart. The chart can be grouped by Hour, Day or Week. It can either display all patterns sewn or just one based on a selection and the completion status. The data can also be exported to a USB drive using the Export option.

2. TECHNICIAN SCREENS

To enter the technician screens the machine must be unlocked by pressing the lock/unlock button in the upper right corner of the screen. An onscreen keyboard will appear to type in the password. By default there is no password. To lock the machine the lock/unlock button is pressed again.

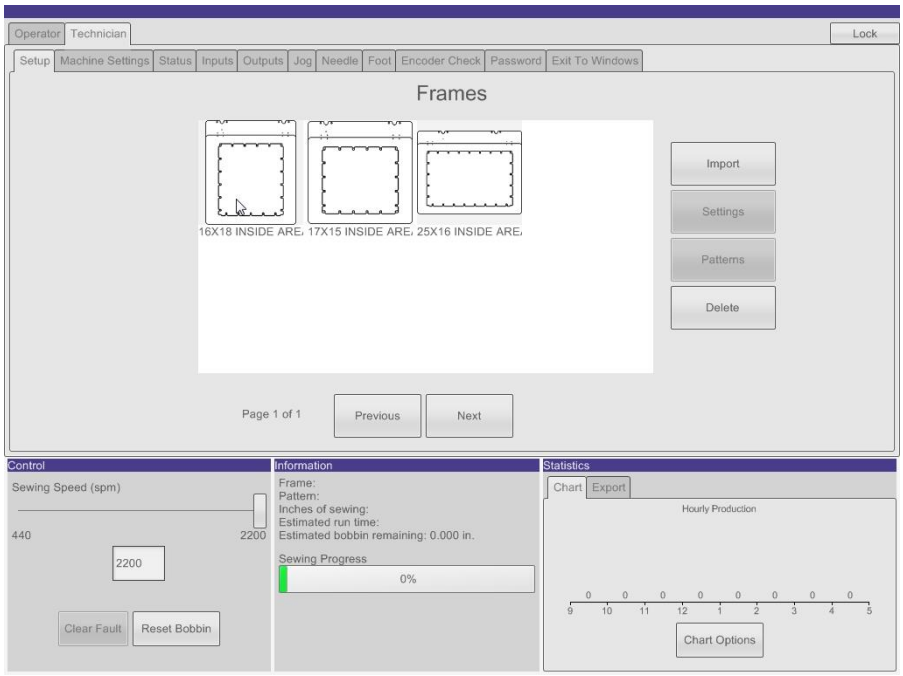

Figure 2.1 – Frames

The frames screen is used to manage the frames on the machine. A frame can be selected by highlighting it. The settings button can be used to change the settings of the selected frame. The patterns button will switch to the pattern management screen for the selected frame. The delete button can be used to delete selected frames. The Import button will switch to the import frames screen.

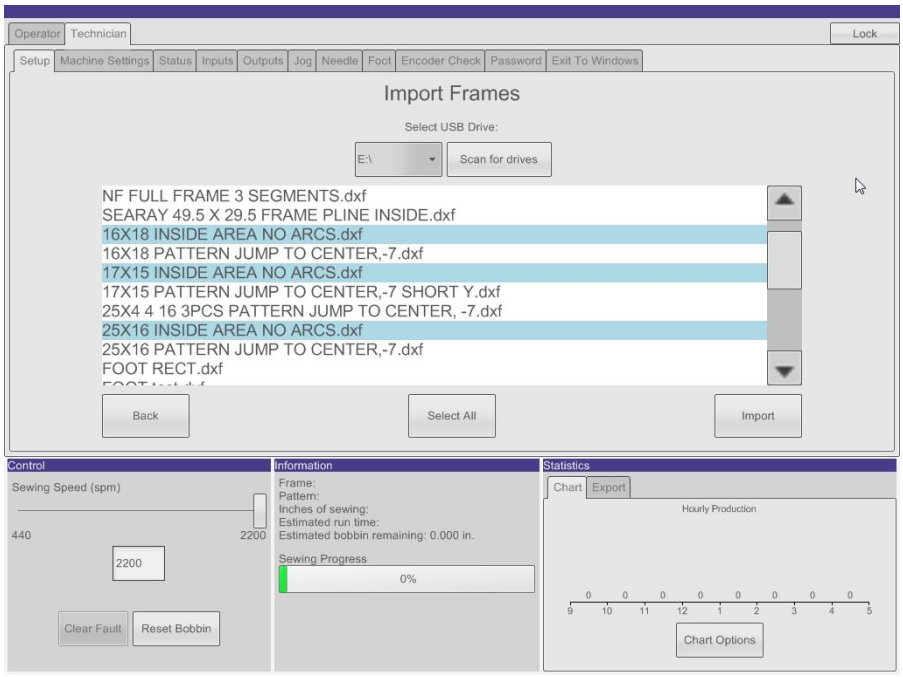

Figure 2.2 – Import Frames

A USB drive can be placed in the port on the right side of the operator panel. The drawings must be placed directly on the root of the drive (not in any folders). The drive letter is selected using the drop down menu. The .dxf files on the drive will be displayed and multiple files can be selected at once by tapping on the file name. Files can be unselected by tapping them a second time. When the import button is pressed the selected frames will be imported. If a file fails to import a message will appear along with the files name.

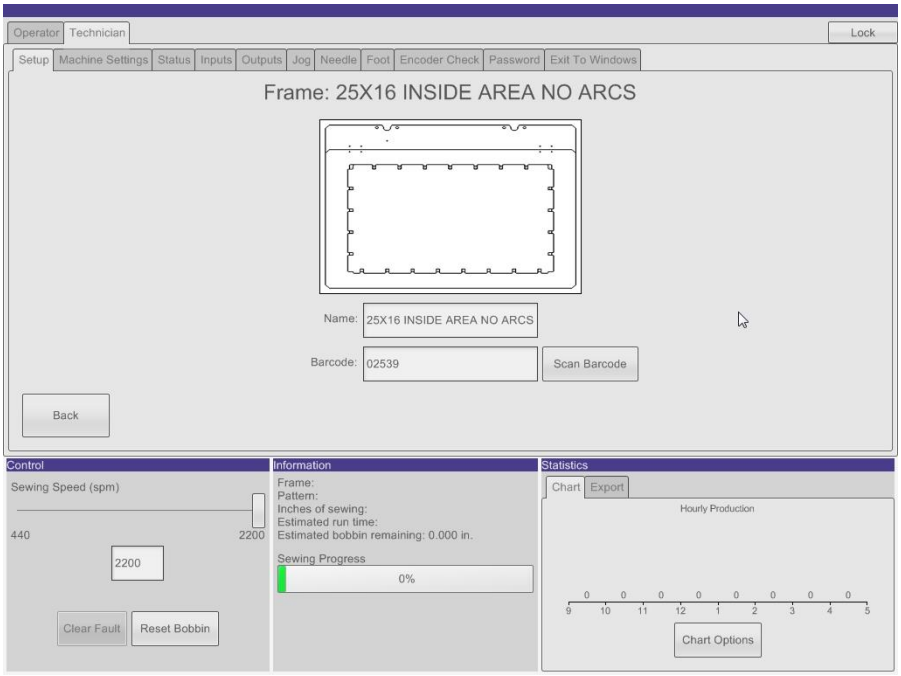

Figure 2.3 – Frame Settings
From the frame settings screen the name of the frame and the barcode can be changed. The barcode can be typed in manually or scanned by pressing the Scan Barcode button and scanning the barcode.

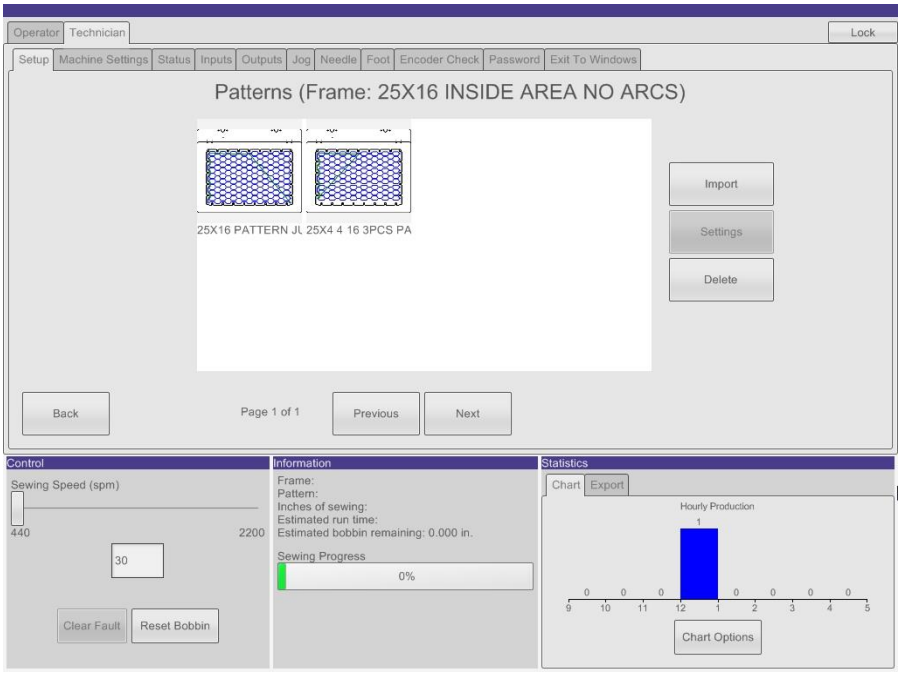

Figure 2.4 – Patterns
The patterns screen is used to manage the patterns assigned to each frame. The import button will open the Import Patterns Screen. The import patterns screen operates the same way that the Import Frames screen does. The settings button will open the Pattern Settings screen. Settings for the back tack, back tack length and ***(the other setting)*** can be changed here or set to use the machine setting. The delete button can be used to delete selected patterns.

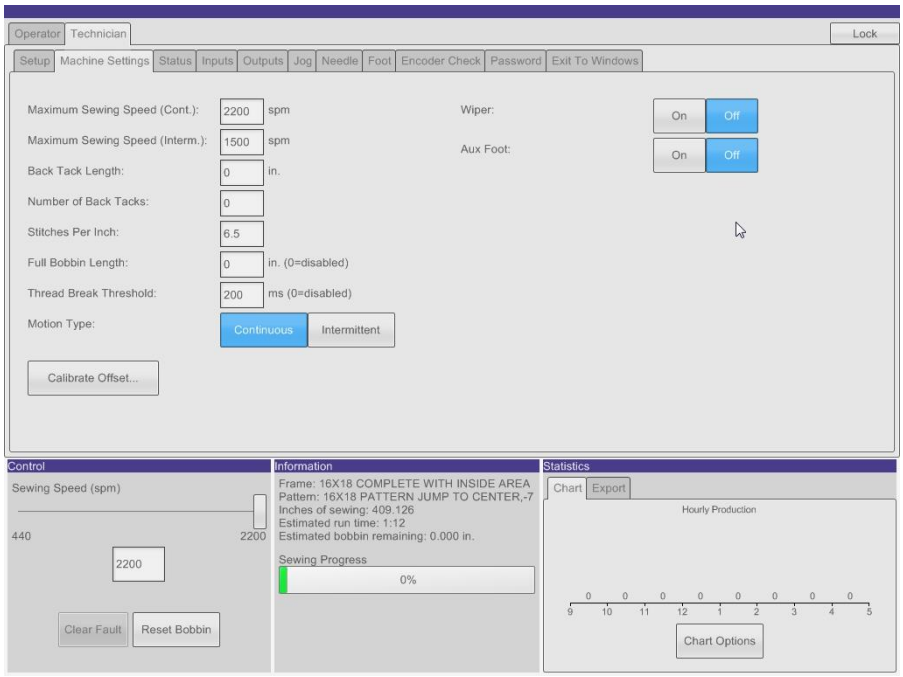

Figure 2.5 – Machine Settings
Continuous or Intermittent motion can be selected from this screen. Using intermittent motion the frame will only move when the needle is out of the material. The Maximum sewing speed can be set for both types of motion. The minimum speed that the machine will run is 150 SPM. Settings for stitches per inch, back tack, bobbin check and thread break can also be set here. The outputs for the Wiper and Aux Foot can be enabled or disabled here.

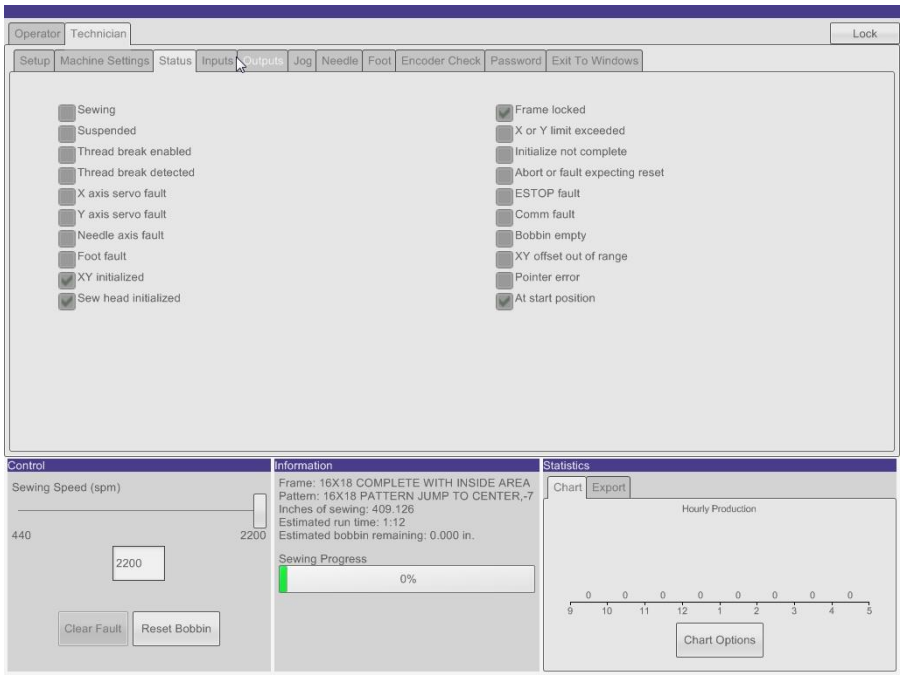

Figure 2.6 – Status
The status screen shows the current state of the bits in the status register.

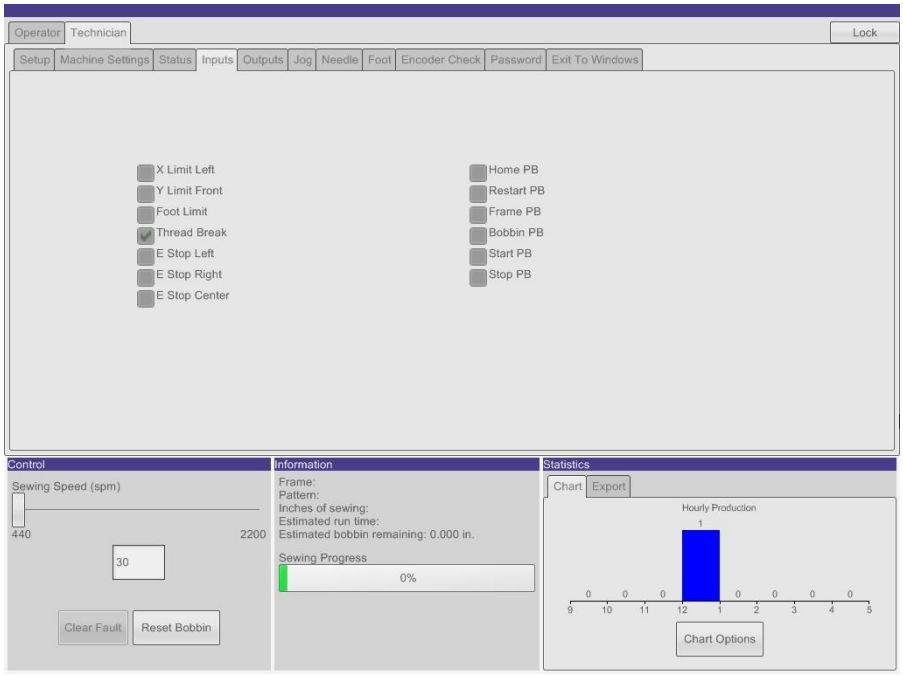

Figure 2.7 – Inputs
The Inputs screen shows the state of the inputs.

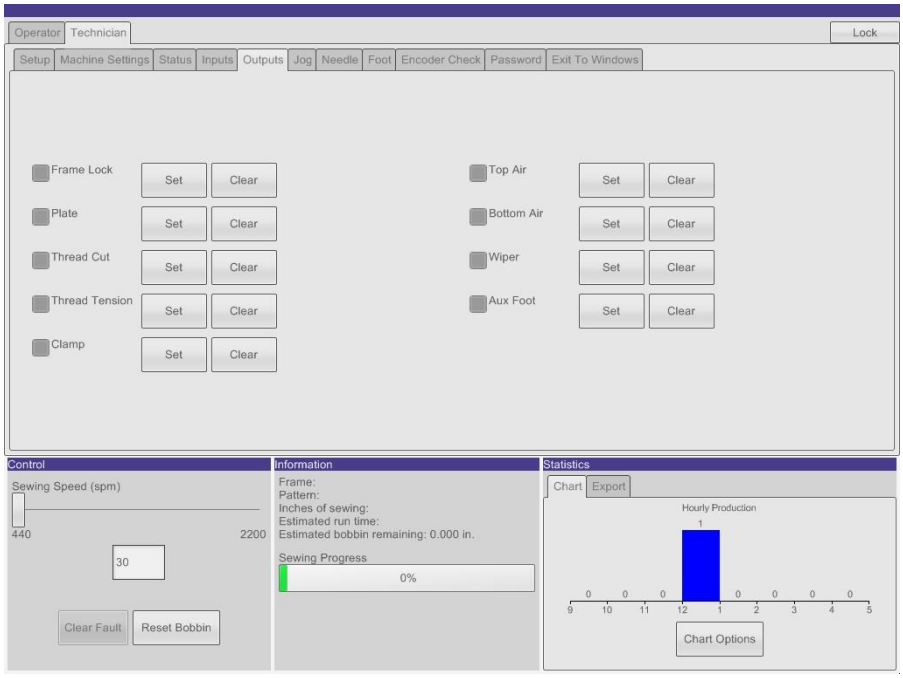

Figure 2.8 – Outputs
The Outputs screen has buttons to set and clear each of the outputs. The check boxes indicate the status of the output.

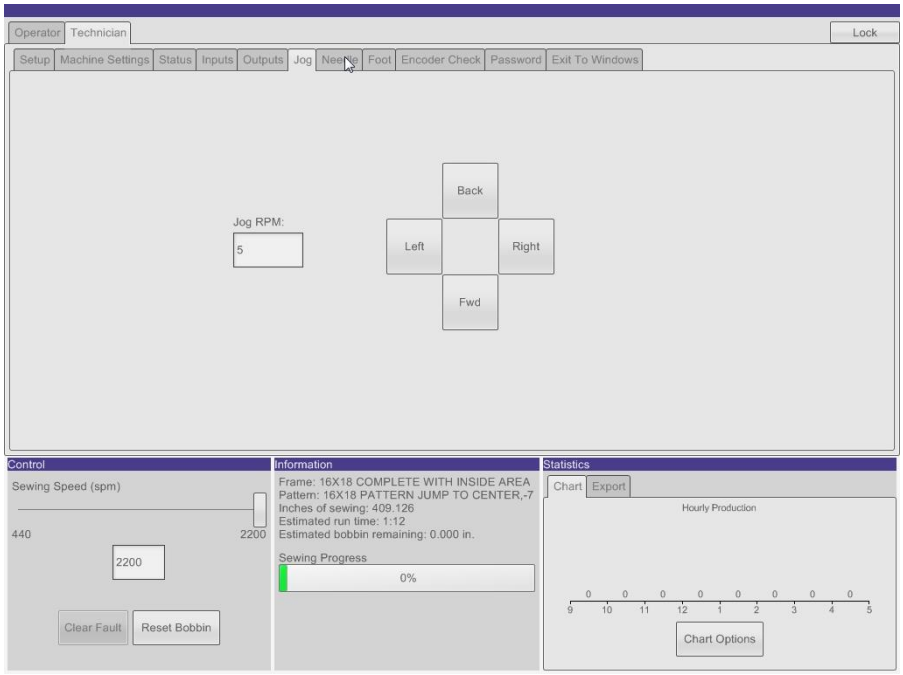

Figure 2.9 – Jog
The jog screen consists of controls to jog the frame. The speed can be changed by tapping the Jog RPM box and typing in a new speed.

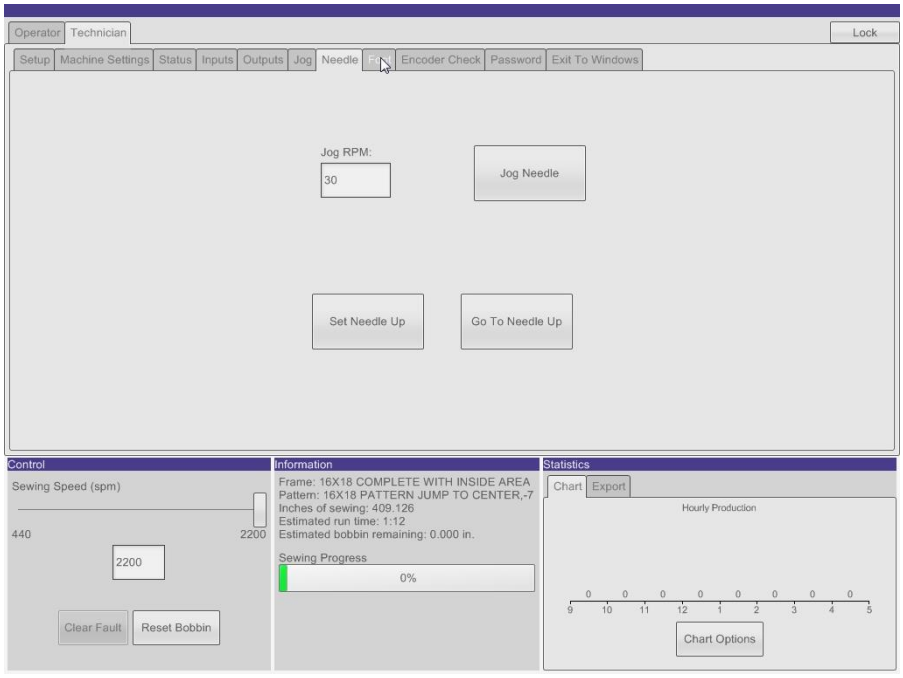

Figure 2.10 – Needle
Consists of controls to jog the needle, go to needle up and set needle up. The set needle up button will make the current position of the needle the up position.

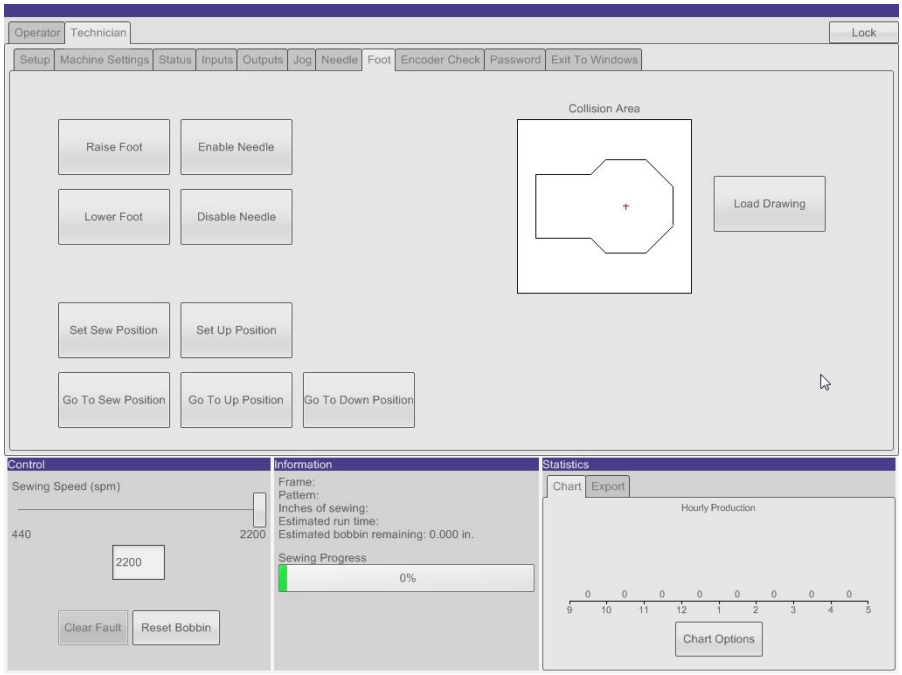

Figure 2.11 – Foot

The foot screen has controls for moving the foot, positioning the foot, setting the positions, and loading a drawing for the outline of the foot. The sew position is the position that the foot will be in when sewing, up position is where the foot is at its highest position.

To set the sew position the foot should be jogged to the expected position and then the Set Sew Position button is pressed. This will overwrite the previous sew position setting.

To set the up position the Set Up Position button is pressed. The needle will be moved to the up position and the foot will be moved to zero and disabled. The cover over the foot servomotor is removed. The shaft of the motor then needs to be rotated to the mechanical maximum height for the foot. With the shaft is held at the highest position the Set Up Position button is pressed. This sets the maximum foot height for the machine and overwrites the old setting.

A drawing of the outline of the foot can be imported using the Load Drawing button. The procedure for loading the foot outline is the same as loading frames and patterns.

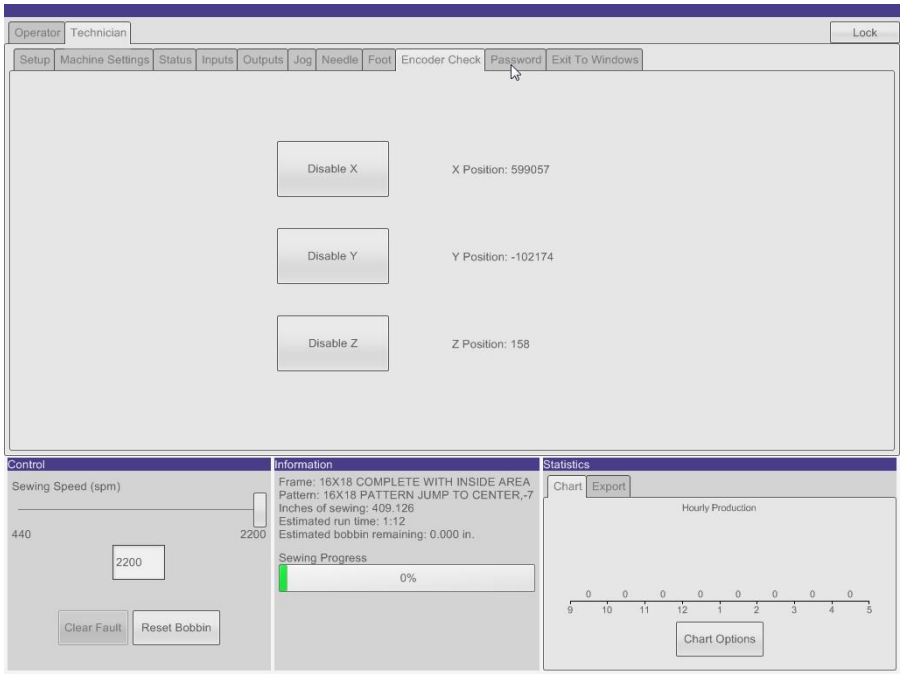

Figure 2.12 – Encoder Check
In this screen the X, Y, and Needle motors can be disabled and enabled. The value of the encoders is displayed.

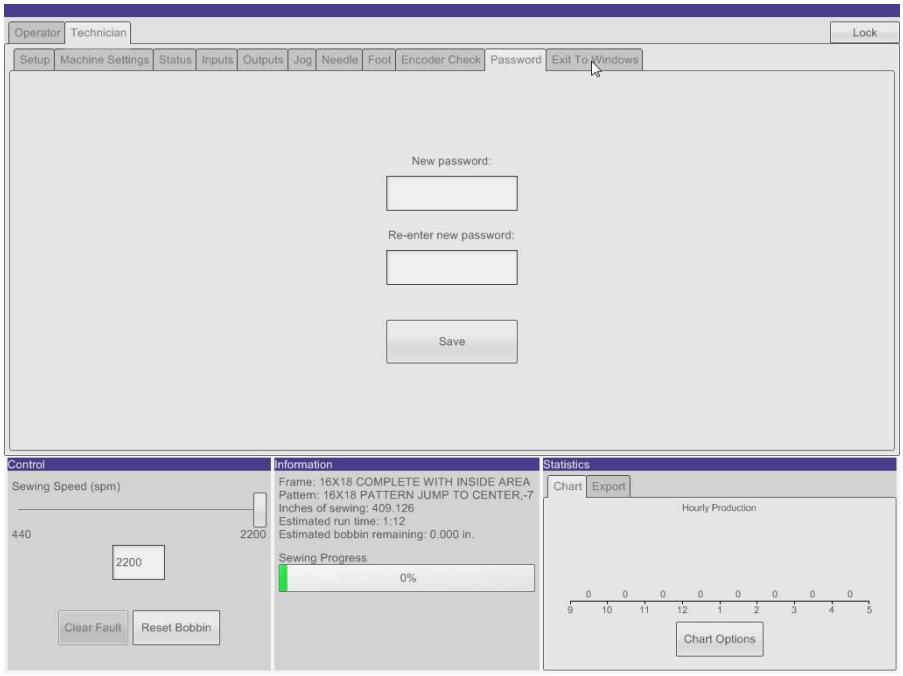

Figure 2.13 – Password
The technician password can be changed.

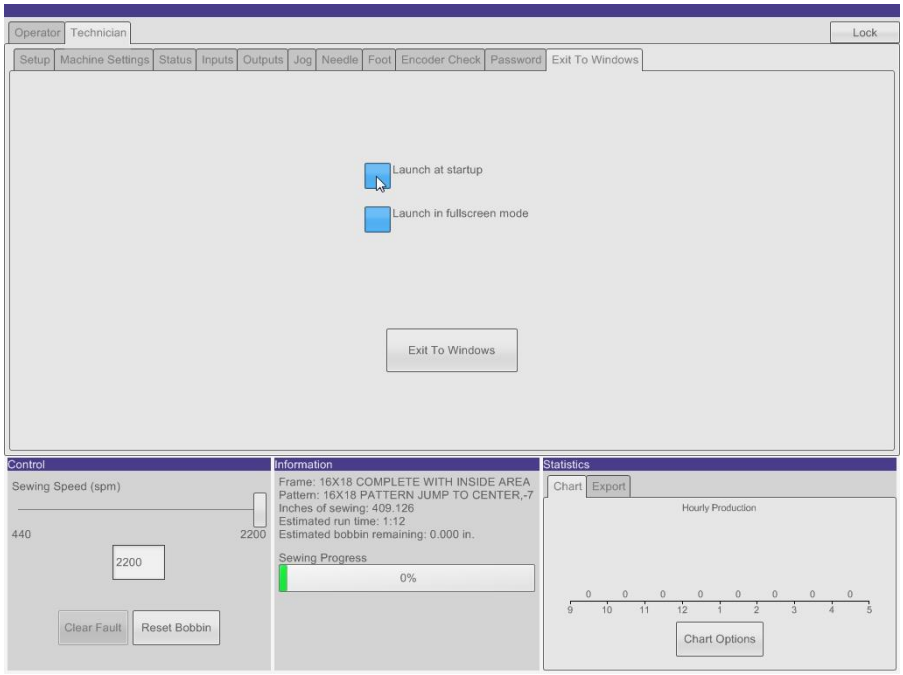

Figure 2.14 – Exit To Windows

In the exit screen the settings for launching the program on startup of the computer and launching in full screen mode are present. The application can be closed from this screen.

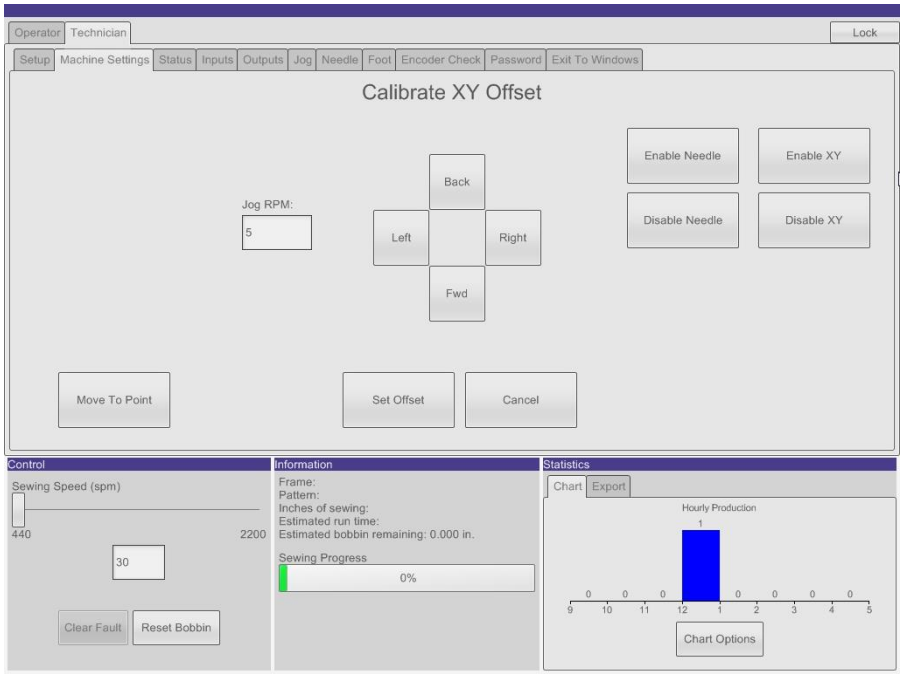

Figure 2.15 – Calibrate XY Offset

The Calibrate XY Offset screen is accessed from the Machine Settings screen. Using this screen and the calibration plate the offset can be reset. There is a hole in the center of the calibration plate located directly between the clamps in X and 4 inches from the clamps in Y. With this fixture in the clamps the jogging controls can be used to place the hole in the plate directly below the needle. It is recommended to use a low jog speed when the hole is close to make small adjustments. The Enable and Disable XY buttons can be used to disable the X and Y axis and to move them manually. The Move To Point button will move the fixture to the point based on the current offset. The X and Y axis must be enabled and the frame locked to use the Move To Point and the Jog functions. Once is the hole is directly below the needle the Set Offset button is pressed. After setting the offset the machine must be reinitialized.

3. FRAME CREATION

Frame drawings must: be in the form of R2000 through R2013 ASCII .dxf drawing files, have the origin located at center of the left clamp, have a layer named INSIDE_AREA and be drawn to scale in inches. The INSIDE_AREA layer can have only one closed POLYLINE that represents the inside of the frame. The closed POLYLINE must be the only entity on this layer. The POLYLINE can be closed using either the closed property or by making the start and end point the same. The machine will use the inside of the closed POLYLINE on the INSIDE_AREA layer to check if a pattern will fit in the frame before running.

Any other layers and the entities on them will be used for display purposes only. The supported entities that can be used for display purposes are listed below. TEXT can be included but will not be displayed.

Supported entities for Frame drawings:
LINE
ARC
POLYLINE
SPLINE
ELLIPSE
CIRCLE
BLOCKS

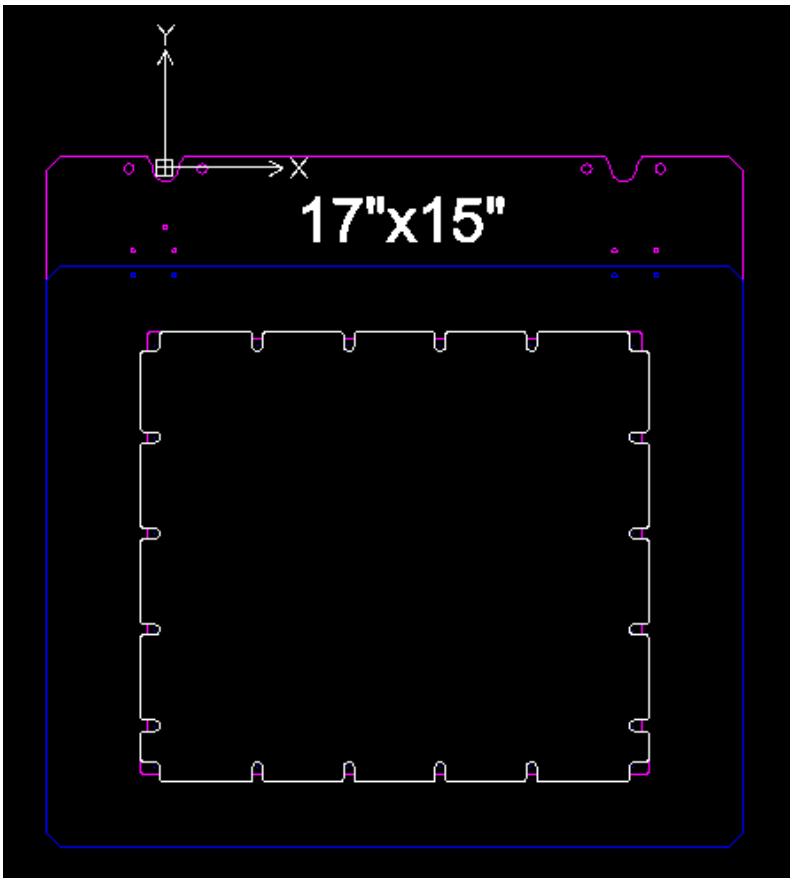

Figure 3.1 – Frame Example
The white shape in the center of the frame is the polyline on the INSIDE_AREA layer. All of the other entities are on separate layers and are only used for display purposes on the machine. The TEXT will not be displayed on the machine. All frames must be in this orientation. The complexity of the INSIDE_AREA

layer will dictate how long the keep out zone check will take. On a frame like the one shown in Figure 3.1 the arcs on the inside area layer could be converted into straight lines as shown in Figures 3.2 and 3.3.

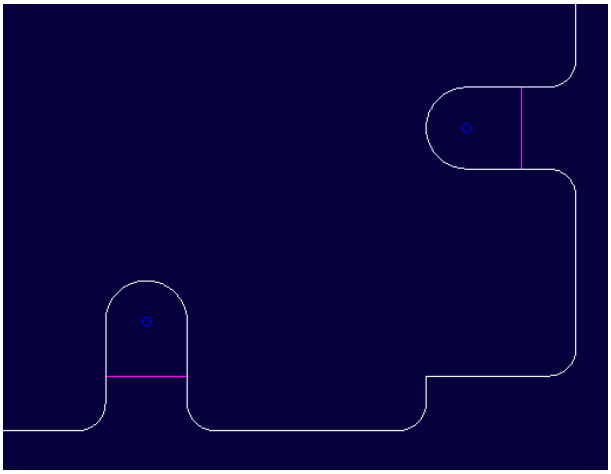

Figure 3.2 – Outline with arcs

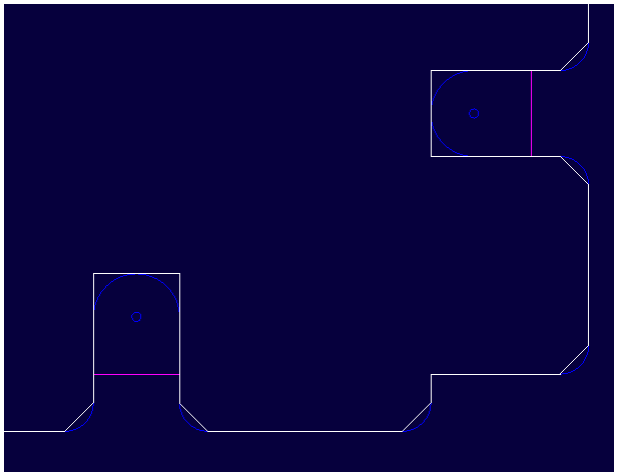

Figure 3.3 – Outline without arcs

The outline in Figure 3.2 is the original layout for the INSIDE_AREA layer. The INSIDE_AREA in Figure 3.3 was edited to remove all of the small arcs and decrease the keep out zone check time.

4. PATTERN CREATION

Patterns must: be in the form of R2000 through R2013 ASCII .dxf drawing files, have the origin located at center of the left clamp and be drawn to scale in inches. All patterns must be a complete loop originating from a starting point. Patterns consist of two layers: SEW and NO_SEW. The SEW layer contains the pattern that will be sewn. The NO_SEW layer consists of jump movements that will connect the sew segments and move to the common starting and ending point. The NO_SEW layer can consist of only LINE entities. The .dxf can contain other layers however they will be used for display purposes only.

The supported entities for the SEW layer are:
LINE
ARC
POLYLINE
SPLINE
ELLIPSE – ELLIPSES must be open (Elliptical Arc)
BLOCKS

Any other types of entities must be converted to the supported types in order for the pattern to be imported. An example conversion is with a TEXT entity: in AutoCAD and DraftSight text can be converted to a closed POLYLINE using the command TXTEXP and can then be converted to LINES and ARCS using the EXPLODE command.

Entities on the SEW layer can be connected point to point at their start and end points to construct a single sew segment. A thread cut will occur at the end of the sew segment. Sew segments can be stacked on top of one another to sew a segment multiple times. The NO_SEW jumps must start and end on the same points as the segments they are connecting. Back tacks are configured in the machine and pattern settings and do not need to be included in the drawing.

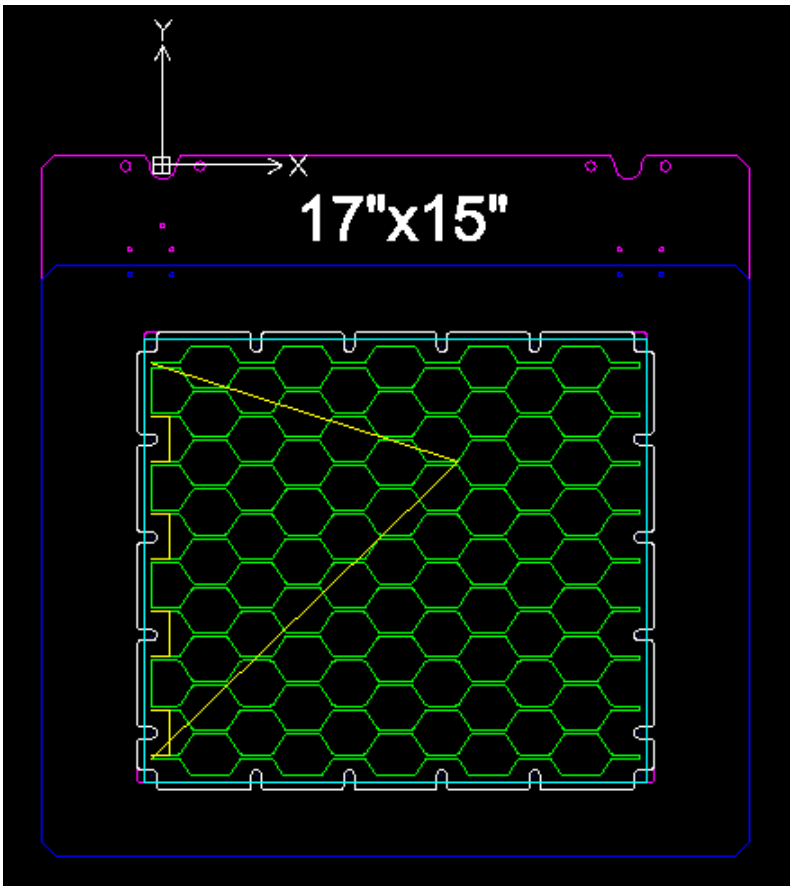

Figure 4.1 – Pattern Example
The green entities make up the sew segments on the SEW layer. The yellow lines define the jumps on the NO_SEW layer. Note how the NO_SEW moves are used to move around the protrusions in the frame.

5. FOOT OUTLINE CREATION

Foot Outline drawings must: be in the form of R2000 through R2013 ASCII .dxf drawing files, have the origin located at the needle and be drawn to scale in inches. The outline must be a closed POLYLINE. The POLYLINE can be closed using either the closed property or by making the start and end point the same. The POLYLINE must be the only entity in this drawing. The layer that the outline is on can have any name.

Note: The number of intersections of the outline will dictate how fast the pattern keep out zone will be checked. While the keep out zones only have to be checked once for each pattern and foot combination using a complex foot outline may be prohibitive due to the increased keep out zone check time. Arcs will significantly increase the time needed for the check. It is recommended to keep the Foot Outlines relatively simple. Refer to Figures 5.1 through 5.3 for an example of how to reduce the complexity of the foot outline.

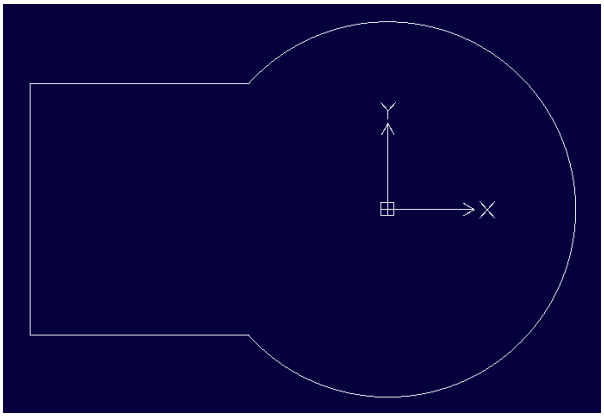

Figure 5.1 – Foot outline
This is a drawing of a foot that represents the actual outline of a foot. Because of the large circular arc section this outline may take a large amount of time to check the keep out zones.

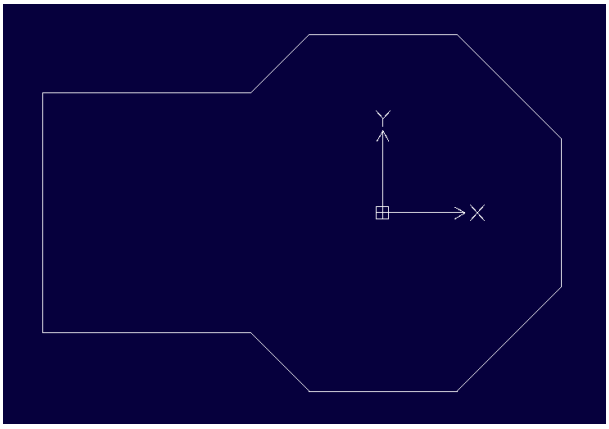

Figure 5.2 – Foot outline without arcs
In this outline the circular portion of the foot was converted to an octagon. This reduces complexity of the outline and the time required to check the keep out zones.

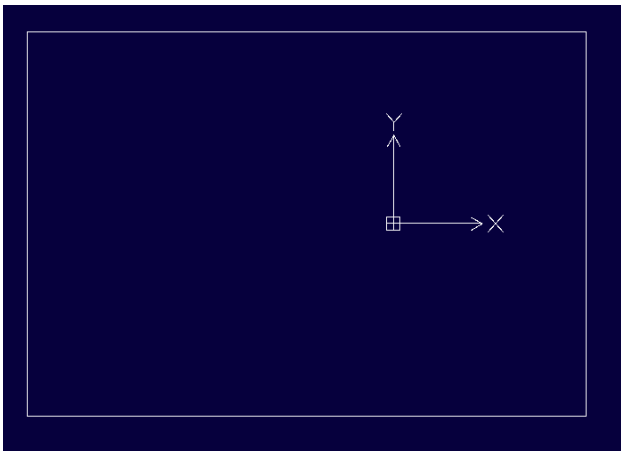

Figure 5.3 – Foot outline rectangle
Here the outline was expanded to be a rectangle, which further reduced the complexity of the drawing and the time required to check the keep out zones. This type of a drawing should work for most configurations.