![Eastman® logo]

THE EASTMAN ®
SLS 2 Stack Labeling System
Model: ETS-SLS-2

Instruction Manual

Preliminary

Please read completely before attempting
to operate your **EASTMAN SLS 2 Stack Labeler**

![Eastman® logo]

Table of Contents

IMPORTANT

The purchaser must instruct all operators on the proper use of the equipment. All standard industrial safety measures and equipment should be provided to protect the operator. Operators must be cautioned that improper or careless use of this equipment may cause personal injury. If you do not have qualified operators to instruct new persons, contact your Eastman sales representative or Eastman factory direct.

Disconnect electrical power form source before proceeding with any installation, adjustment or repair of the SLS 2 Stack Labeler.

Your Eastman SLS 2 Stack Labeler is designed to travel at high speed in both directions. Equipment should be set up with a minimum 3 foot (1 meter) clear path at front and rear of machine. All personnel should be instructed to wear safety glasses and stand well clear of the SLS 2 Stack Labeler when in operation.

Safety Information

Throughout this manual, safety information is presented by the use of the terms **WARNING, CAUTION,** and **NOTE**. These terms have the following meanings:

⚠️ **WARNING**

A warning contains critical information regarding potential safety hazards that can occur during proper use or misuse of the machine. Failure to follow these procedures may result in serious personal injury to the user.

⚠️ **CAUTION**

A caution contains instructions for the use or maintenance of the machine. Failure to follow these procedures may result in damage to the machine. Supplementary information may be given in a Note.

⚡ **ELECTRICAL HAZARD**

An electrical hazard calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a Electrical Hazard.

Safety and Indemnification

During the life of the machine, the purchaser agrees to provide to all machine users (including its own employees and independent contractors) all relevant safety information, including warning labels and instruction manuals. The purchaser also agrees to maintain the safety features and working condition of the machine, and to adequately train all users in the safe use and maintenance of the machine. The purchaser agrees to defend, protect, indemnify, and hold Eastman Machine Company and its subsidiaries harmless from and against all claims, losses, expenses, damages, and liabilities to the extent that they have been caused by the purchaser's failure to comply with the terms and instructions of this manual.

General Safety Precautions

⚠️ **WARNING**

- This machine is equipped with fast moving labeler head. Keep hands, arms, and hair away from the labeling area and drive system at all times. Safety gloves, glasses, and appropriate clothing may prevent serious personal injuries.

- Disconnect the power supply to the machine and turn off battery back-up when it is not in use or during routine maintenance, including cleaning and lubrication.

- The purchaser must instruct all operators in the proper use of the machine according to the instructions in this manual. This training must include instruction on the potential safety hazards arising from the use or misuse of the machine. In addition to such training, the purchaser should provide written work instructions as necessary to ensure correct use of the machine for specific cutting applications.

- Do not modify this machine or disable safety features. Unauthorized modification may result in serious personal injuries to the user. Electrical connections to this machine must be made by a qualified electrician familiar with applicable codes and regulations.

- Safety labels must be kept clean and legible at all times. Call the Eastman Machine factory to order replacement labels.

⚡ **ELECTRICAL HAZARD**

- This machine is equipped with a battery pack power supply. Disconnect main power & turn off (O) UIT Power Supply (battery backup) before performing service or maintenance to this machine.

Eastman®

The Eastman **SLS 2 Stack Labeler** is shipped partially disassembled with all the necessary parts for proper setup and operation. To get the best performance, familiarize yourself with all the functions and adjustments of this equipment. Before any operation can take place, it is important that you carefully read and follow the instructions in this manual in the same sequence in which they are presented.

INSTALLATION

Table Preparation
The spreading table required to operate your SLS 2 Stack Labeler must be smooth and level. A minimum clearance of 24 inches (61 cm) is required from the table surface to the floor and a minimum 3 feet (1 m) around the machine. If Magna or Z-Track is required, install track at this time.

To Level Table
Use carpenter's level to check spreading table. Be especially careful to make sure table joints mate closely. Adjust table feet as necessary to level table.

Tracking Installation
The SLS 2 Stack Labeler requires Magna Track, Z-Track or Guide Wheels to guide the machine.

Magna Track or Z- Track Installation
Place track sections along table top, end to end, on the operator's side of the table as they will be mounted. Mount the track as shown. Make sure the joints in track are even and DO NOT align with seams in table. Be sure track is mounted firmly to table.

Place Machine on Table
The **SLS 2 Stack Labeler** weighs approx. 400 lbs. (180 Kg.) uncrated for a 60" machine. Wooden braces are strapped across the underside of its cross channels and the forklift arms should be raised to those braces when machine is lifted.

⚠ **CAUTION**
When placing forklift arms under cross channels, use care not to damage tension rods or cover.

When the **SLS 2 Stack Labeler** is shipped the Stop Wands, Stop Cams, Cable Carrier Kit and Guide Wheel Assemblies are removed and must be installed upon installation.

Place the **SLS 2 Stack Labeler** on table between end markers (marks designating left and right end of spread). Machines equipped with grooved wheels must be placed on the lip of Magna or Z- Track.
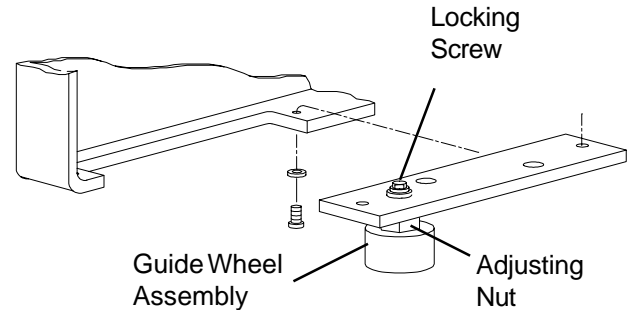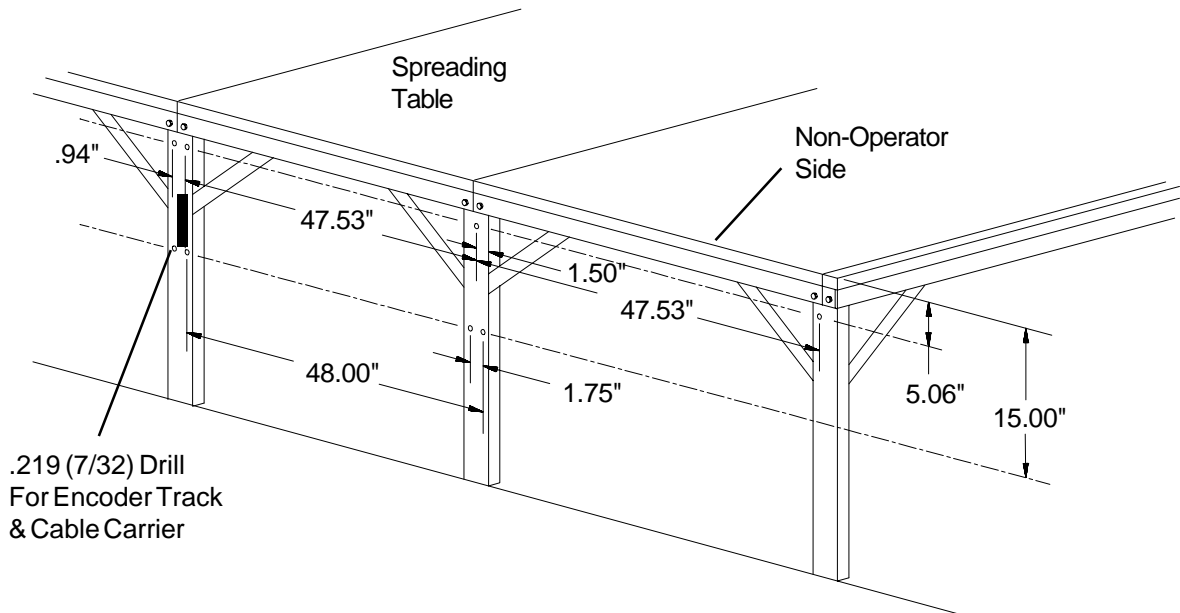

Guide Wheel Installation
Before installation can take place the covers must be removed for access to the mounting holes. Remove the mounting screws on the covers. Carefully remove the covers. Mount the guide wheel assemblies as shown. To Adjust Guide Wheels, Loosen the locking screw and turn the adjusting nut until guide wheel makes contact with table. Do not over tighten. If more adjustment is required, relocate guide wheel in next hole. Tighten locking screw when adjustment is complete.
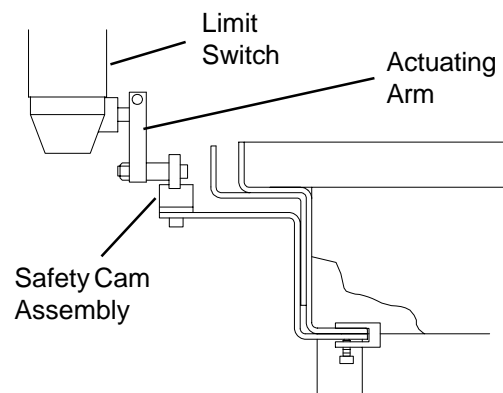
Safety Cam & Home/Limit Switch Installation
The Safety Cams, Limit Switch, and Home Limit Switch Assemblies should now be installed for safety. Mount the Safety Cams as shown at each end of the spreading area. Loosen the limit switch actuating arm and swing into position. Secure actuating arm. Loosen the limit switch adjustment plate and lower assembly to allow the actuating arm to make contact with safety cam. If actuating arm does not make contact with safety cam replace arm with longer arm provided. Replace covers and secure the flat head screws.

Spreading Table

Non-Operator Side

.94"

47.53"

1.50"

47.53"

48.00"

1.75"

5.06"

15.00"

.219 (7/32) Drill
For Encoder Track
& Cable Carrier

Encoder Track Installation

Proper installation of the encoder rail is very important for accurate machine performance. The encoder track must be level along its entire length. Drill (3) 7/32" diameter holes for each 8' section of track, as shown. Mount encoder track to table legs. When ALL sections of track are mounted, the rubber encoder gear belt is then adhered IN ONE PIECE to underside of track. Belt must be undamaged along its entire length. If belt must be spliced, make sure that ribs of belt remain at consistent spacing, otherwise microprocessor will not function properly.

Encoder Assembly

Stop Wand

Cable Carrier Mounting Bracket

Encoder Assembly Installation

Mount Encoder Assembly on the rear frame as shown. The encoder gear wheel must roll smoothly along encoder gear belt. Fasten bracket with hardware provided. Adjust tension so gear wheel remains in continuous contact with gear belt as the SLS 2 moves.

Cable Carrier Installation

Before the Cable Carrier Kit can be installed the table legs on the non-operator side must be modified. Drill two (2) 7/32 diameter holes in each table leg as shown. Locate the cable carrier, trough, mounting brackets and mounting screws. Assemble each section and mount to the table legs.

Mount the cable carrier between the two middle trough sections. The SLS 2 requires 25 - 30 PSI compressed air. Locate the air line on the cable carrier. Connect air line to pressure regulator located on the non-operator side frame and air supply.

Once the cable carrier is secured, connect the power plug to the socket on the back frame. Check voltage rating with electrical rating stamped on serial number plate. If compatible, connect cable carrier cord to wall outlet.
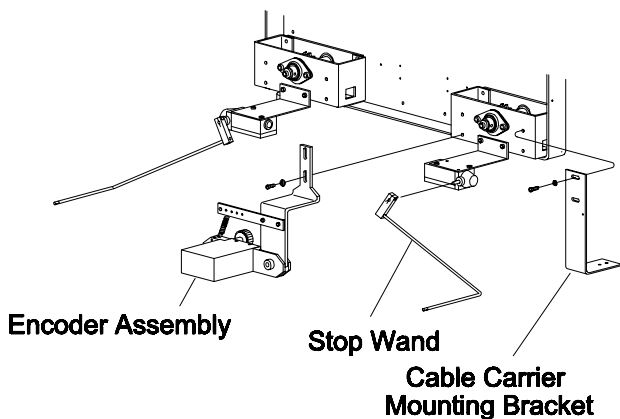
⚠ **Note:** Voltage varying more than 10% (11V for 110V machine, 22V for 220V machine) may damage your system's electronics.

Eastman®

SLS 2 Stack Labeling System Familiarization

Emergency Stop

Computer

Battery Back-up

On Board Control Components

Emergency Stop

Computer Display

Machine Stop Wand

Home Limit Switch

Stop Limit Switch

Labeler Tool Head

Machine Stop Wand
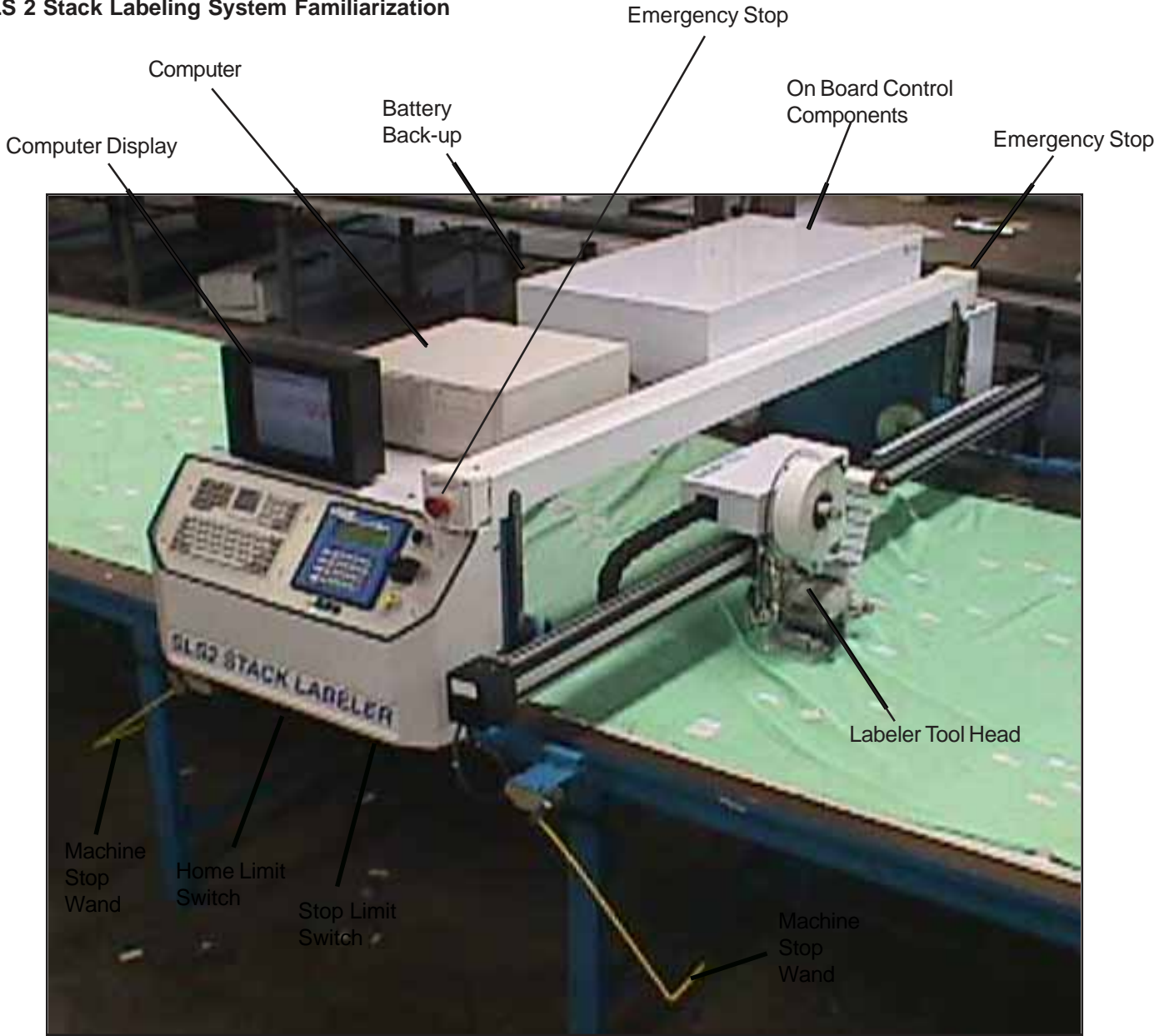
Machine Familiarization

Computer Display: Display used for setup and run of your SLS 2 labeling system.

Computer: Stores running programs and user labeling files. Disk drive available for loading labeling files.

Battery Back-Up: Reserve power in the event main power is interrupted (10 minute minimum supply).

Emergency Stop: Activates power to all drive circuits. Pull on, push off.

On Board Control Components: Electrical components used to control the SLS 2 labeling system.

Labeler Tool Head: Tool used to apply labels to material.

Machine Stop Wands: Deactivates power to all drive circuits when wand strikes object in its path.

Stop Limit Switch: Switch is activated by cams located near each end of labeling area.

Home Limit Switch: Switch is activated by cam to set zero location on table.
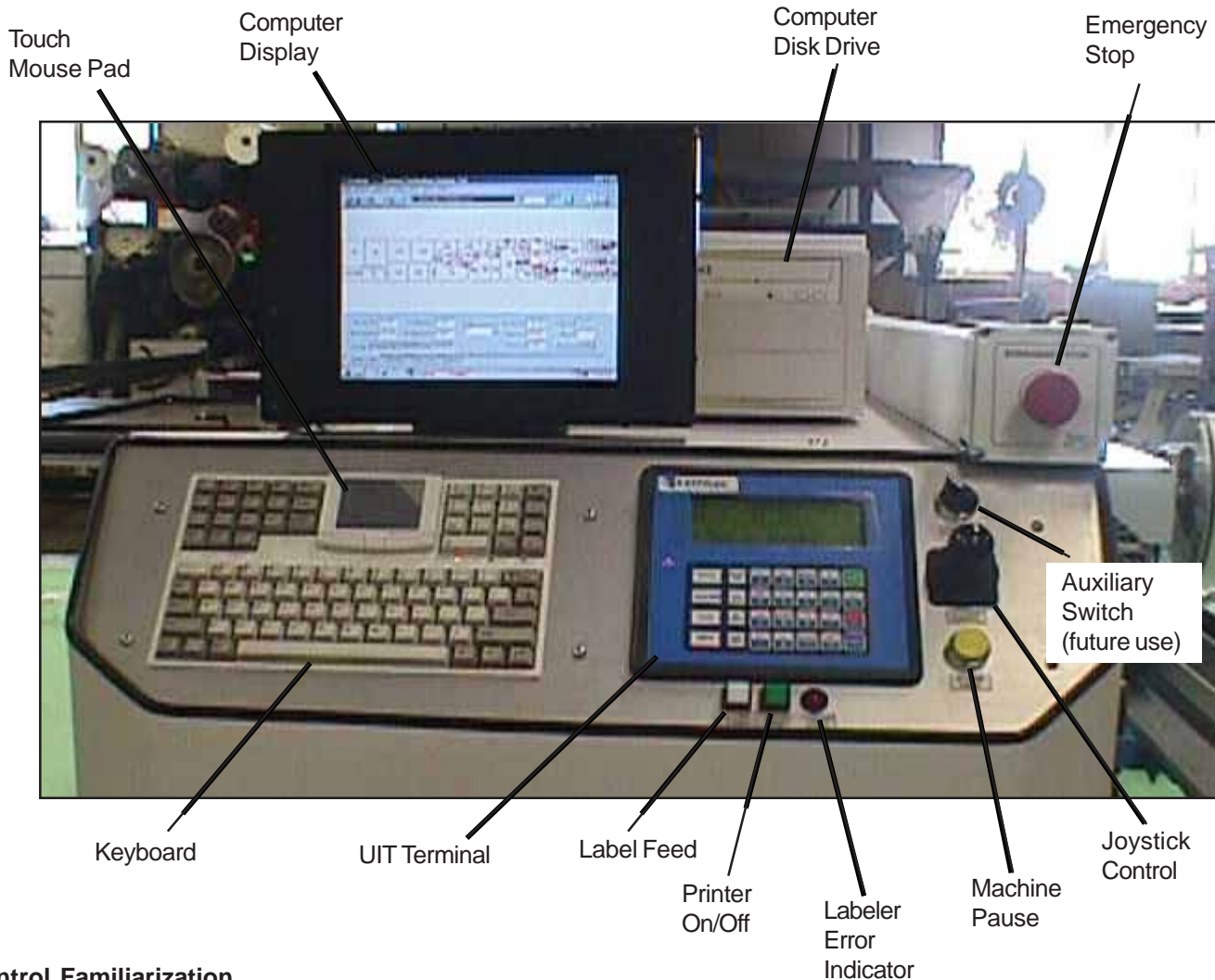
Control Familiarization

Touch Mouse Pad: Used to control the cursor on the computer display.

Computer Display: Display used for setup and run of your SLS 2 labeling system.

Computer Disk Drive: Disk drive used to down load labeling files.

Emergency Stop: Activates power to all circuits. Pull on, Push off.

Auxiliary Switch: Available for future use.

Joy Stick Control: For manual movement of machine and labeling head.

Machine Pause: Push to stop machine when in automatic labeling mode. Press NEXT on UIT to resume.

Labeler Error Indicator: Indicates error in label position. Press label feed to reset.

Printer On/Off: Press to activate labeler tool head.

Labeler Feed: Press to manually feed label.

UIT Terminal: Used for operator interface of machine. See operating instructions for more details.

Keyboard: Used to enter labeling data on the computer display.

UIT Terminal

User Interface Terminal Familiarization

The UIT (User Interface Terminal) features a 33 key membrane keypad and a four line display. Commands are issued via the keypad and information is communicated back to the user through the display. Through the UIT the operator may position the plotter carriage, enable automated movement, and manually cut and mark.

Commands are sent to the computer by pressing specific keys or key sequences on the UIT. Each key on the UIT can have a function and characters related to that key (note that not all keys have both a function and characters). Commands that require data entry following the pressing of a FUNCTION key the UIT will automatically set itself in anticipation of the expected type of input.

Some commands require only one key to be pressed while other commands require multiple keystrokes and may sometimes prompt the operator for input.

A description of commands follows:

SET ORIGIN: Press to set the first label position on the table. The laser pointer marks the origin position. To adjust offset, see software section.

ZERO TABLE: Press to activate the zeroing function on the carriage. The carriage will move to the home limit switch cam. This point is set as home position.

SPEED: Press to set fast/slow machine movement.

/6: Press to move labeler head away from operator.

/9: Press to move Labeler head toward the operator.

MOVE: Press to access menu.
  Press 1 to send SLS 2 to home position.
  Press 2 to send SLS 2 to label origin position.

UP: Pressing UP causes the elevator to move up.

DOWN: Pressing DOWN causes the elevator to move down.

LEFT: Pressing LEFT causes the SLS 2 Labeler to move to the left.

Right:: Pressing RIGHT causes the SLS 2 Labeler to move to the right.

START: Press START to begin automatic labeling mode.

NEXT: Press to resume automatic labeling when machine pause is pressed.

ABORT: Press to abort command.

ENTER: Press ENTER to accept command.

Operation

After setup is complete and the power and airline is connected, the SLS 2 is now ready for Initialization.

⚠ **Important**
  To stop the SLS 2 at any point during operation, either:
  -Press the Emergency Stop button (Red).
  -Hit Machine Sop Wands.
  -Press Machine Pause button (yellow) on main control panel.

⚠ **WARNING:** Safety cams should always be checked for proper operation with the SLS 2 before any automatic labeling takes place.

Activate battery back-up to ON (I) position. Activate the computer by pressing the ON (I) button. The computer display will run through the computer start-up program.

Pull the Emergency Stop button to activate power to the drive circuit. Start the EASICUT software by double clicking the EASICUT software icon on the computer display. This will load the default test.cmd file. Enter label text for the required fields using the keyboard. Select OK.

The log in screen will appear. Enter the user name and password. Select OK when complete. The UIT Display will show DESIGN LOADED. Press ENTER on UIT Terminal to continue.

Zero Table (Machine Home Position)

Press ZERO TABLE on UIT Terminal to locate the "machine home position" of the table. This will raise the elevator to the top position and accelerate machine to the "machine home position".

⚠ Note: The "Machine Home Position" is created when the Home Limit switch strikes the Stop Cam mounted on the table.

The UIT display will show TABLE ZERO OK when task is complete. Press enter on UIT terminal to except. The UIT display will show ready.

Set Origin (location of first label)

Press the Printer ON/OFF (Green) button to activate labeler tool head. Using the joystick, move the SLS 2 to the first label position. The red laser should be in the center of the first label. Press Set Origin to except. The elevator will lower to locate the table surface. The SLS 2 Labeler is now ready to begin labeling.

⚠ Note: Labeling area must be clear of all personnel and objects before starting the labeling process.

Labeling

To begin labeling press Start on the UIT Terminal. The SLS 2 will begin labelling. After the final label is applied the machine will return to the original label origin position.

Loading New Files for Labeling

Load a file by opening the **file** menu and clicking on the desired file. Enter label text and press enter on the keyboard to accept. Select the "PLOT" icon on the computer display to load design. Press ENTER on the UIT Terminal to accept new design.

Note: Files are organized by type and are displayed on the menu according to which type is selected. For example, if you wish to use a file generated in CMD format, open the **list files of type** menu and select CMD. The **file** menu will then display all files with a CMD extension.

Raising the Labeling Tool Head

Press the UP or DOWN on the UIT terminal to raise or lower the labeling tool head.
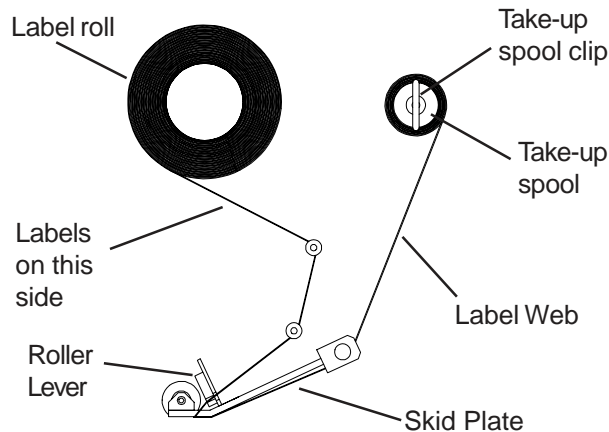
Threading Diagram

Label roll · Labels on this side · Roller Lever · Skid Plate · Take-up spool clip · Take-up spool · Label Web

Label Threading

Press Printer ON/OFF (green) button to turn off printer. Remove take-up spool clip. Lift the roller lever to separate the printer rollers. Discard used label web material and label roll core. Load new label roll as shown. Release roller lever. Press Printer ON/OFF button to continue.

Optional: Label web material may be threaded above the skid plate as required to prevent pushing material or interfering with take-up spool performance while labeling.

Operating Adjustments

This machine is adjusted and tuned at the factory for optimal performance. No Adjustments other than normal setup are necessary. However, if after continued use the performance level becomes unacceptable, the following procedures should be carried out before repairs are considered.

Label Tension Adjustment

The label tension adjustment is located under the labeler tool head cover. Remove the cover to access the take-up clutch. Rotate the knurled adjusting knob clockwise to increase and counterclockwise to decrease tension.

Label Air Pressure Adjustment

The labeler pressure regulator is located on the back side frame. To adjust, remove back cover. Locate the regulator valve. Pull the "Adjust" knob up and turn clockwise to increase pressure and counter clockwise to decrease pressure. After adjustment is made, push knob down to lock in place.

Eastman®

Service and Maintenance

Daily
-Blow off entire machine and Cable Carrier using low pressure compressed air (required twice a day depending on material).
-Check safety cams for proper location.

Weekly
-Check for unusual wear and determine why.

Bi-Monthly
-Check all chains, tighten and lubricate.
-Inspect all wheels, remove all lint, etc.
-Check entire machine for loose nuts and bolts.
-Check table and track for loose or damaged parts.

Monthly
-Inspect Cable Carrier loose nuts, bolts or worn parts.
-Check oil level in gear reducer; fill if necessary.

Recommended Spare Parts List

Item	Description	Qty.
9013-006	Encoder Belt	A/R
65-11-1168	Limit Switch, Printer Head Down Limit	1
54-26216	Roller Quick Release Pin	1
54-26031	Spring Clip, Label Take-up Roller	1
67-26060-1	Printer	1
31-26165	Printer Control Board	1
10-26036	Labeler "Y" Board	1
10-26034	Control Board	1
10-26033	"X" Axis Board	1

A/R -As Required

Easicut Software Section
Software File Relationships
Easicut is Eastman Technology's Windows 95 based plotter software. When opened, Easicut reads in several data files to initialize the plotter's settings. These data files are ASCII text files with specific formats, which must be correct to be read. Some files are edited through the Easicut Windows 95 interface, while others may be accessed in MS-DOS. All are located in the PLOTTER\PLOTTER directory. Following is a short description and a chart of the various files.

PLOTTER.KEY: required on all machines using a UIT, required on some older M90 models. Maps the keypad data coming from the UIT.

DESIGN.CMD: the file containing a pattern's coordinates and commands read by PLOTTERW. Easicut updates DESIGN.CMD every time the plotter operator loads a new cut pattern. CMD is Eastman Technology's proprietary file format. Easicut to CMD automatically converts files generated in other formats when the plotter operator selects them.

MACHINE.INI: contains values pertaining to calibration, velocity profiling, table dimensions, and layer to tool mapping. Easicut writes to this file as changes are made in the Machine Setting window. MACHINE.INI is read by Easicut, modified as necessary (for example, to accommodate a change in material) and sent to PLOTTERW.

PLOTTER.SRV: optional. Used only on plotters with laser cutting device. Contains default values for laser test firing and troubleshooting.

PLOTTER.DRL: required only when <DRIL> function is called by CMD file. Contains default values used by <DRIL> function when specified in CMD file.

MATERIAL.INI: contains tool control information relating to different material types. Written to and accessed by Easicut.

ETS motion control software functions

13. Repeat File
(Not Shown)
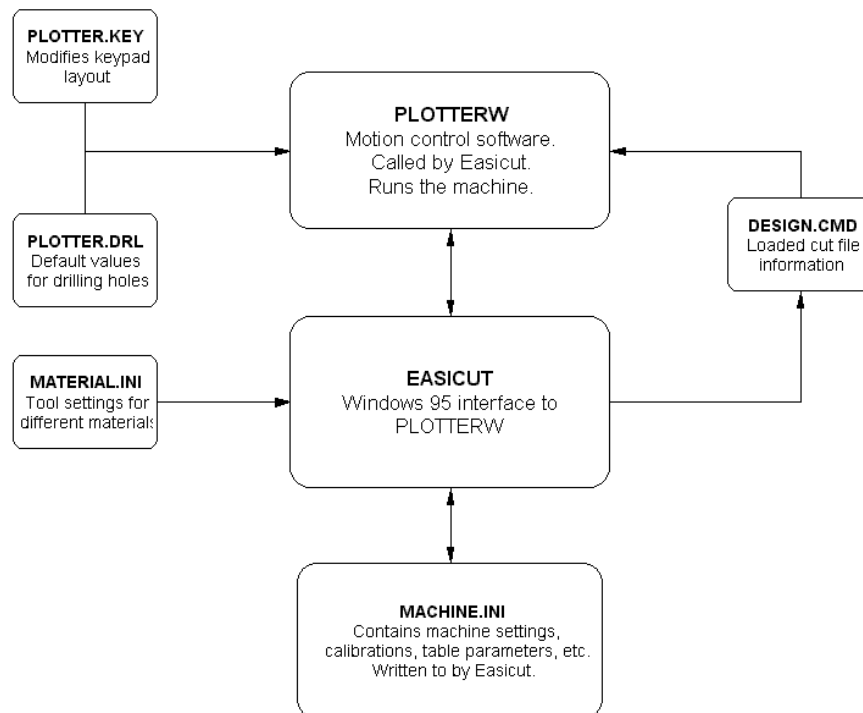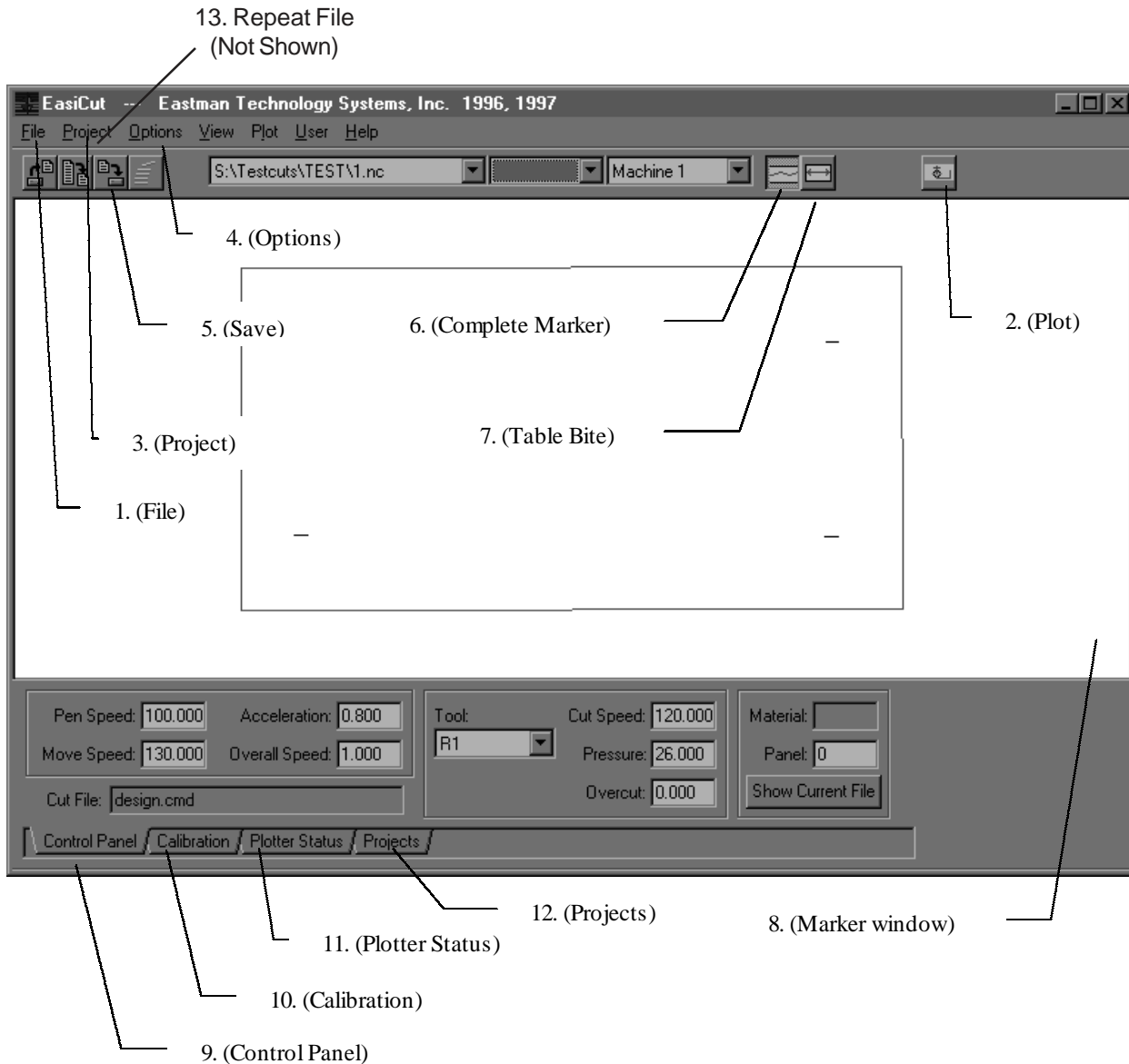
The main screen displayed when Easicut is running.
(Easicut Version 1.04H)

EASICUT Software

Easicut is Eastman Technology's Windows 95 based operating software. It is used to run the machine as well as setting tuning parameters. Following are a sample of Easicut menus and screens with brief descriptions of their use.

1. The **File** menu is used to open, close, and save cut files. Its **Save As** feature allows easy renaming of files. **Exit** closes Easicut and returns you to the desktop.

2. **Plot**- this button sends the file currently open to the plotter. You may open another file for viewing without changing the plotted file. Likewise, closing a file does not remove it from the plotter. To determine which file is currently plotted, look at the **Control Panel** or the **Plotter Status** in the lower part of the main screen.

3. The **Project** menu is similar to the **File** button except that it works with groups of files called projects. The user specifies projects with the **Project Manager.** Typical projects

might include files, which are frequently used together, or files cut with the same material.

4. The **Options** menu features screens for general machine settings, specific project settings, and settings for different materials. There is also a utility to select file extensions for file types.

5. **Save**- saves parameter changes made on the Control Panel.

6. **Complete Marker**- displays the entire file currently open.

7. **Table Bite**- If the entire file will not fit on your cutting table, Table Bite displays it in sections.
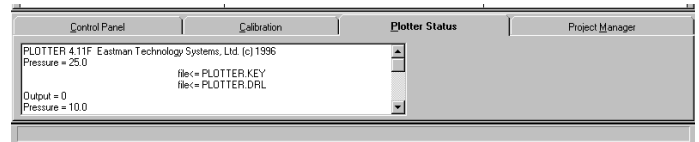
8. Marker window.

9. **Control Panel**- Displays speed, acceleration, and tool settings. May be used to edit these settings with the **Save** button.

10. The **Calibration** screen features a drop-down menu to select tools and run calibration patterns. Tool calibration is described in depth in Chapter 4, Plotter Maintenance.

11. **Plotter Status** - shows which file is currently plotted. It also shows which panel is being cut when the machine is running.

12. The **Project Manager** screen contains all project editing features. Add, delete, and select files for projects.
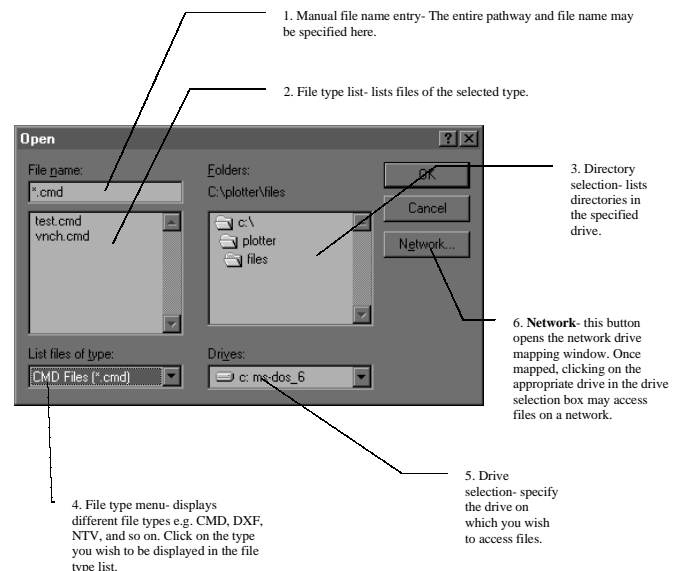
13. The Repeat File feature repeats the label pattern continuously on the table

The **Project Manager** tab.

The Project Manager is used to edit projects. Files may be added to or deleted from a project. Preview will display the selected file in the marker window. The Edit button features a file name editor, a material type selection, and comments.
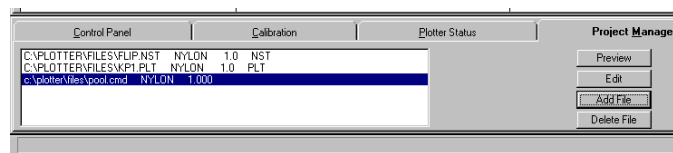

The **Plotter Status** tab.

The Plotter Status tab is essentially a more detailed read-out of the display on the User Interface Terminal. Continually updated information such as machine position, air pressure, current cut file, and so on is found here. If the machine should crash or develop any fault while running, error messages will be displayed here.

File Open Menu

1. Manual file name entry- The entire pathway and file name may be specified here.

2. File type list- lists files of the selected type.

3. Directory selection- lists directories in the specified drive.

6. **Network**- this button opens the network drive mapping window. Once mapped, clicking on the appropriate drive in the drive selection box may access files on a network.

5. Drive selection- specify the drive on which you wish to access files.

4. File type menu- displays different file types e.g. CMD, DXF, NTV, and so on. Click on the type you wish to be displayed in the file type list.

The **File** menu **Open** screen.

The **Open Project** screen. This screen works the same way as the **Open File** screen, but with entire projects instead of individual files. As with the **Open File** window, projects will be displayed according to the selected type.


The **New Project** window. Specify a new project file name and pathway with this screen. Project file names may typically have a **.prj** suffix but you may use another type if you wish.

Note: For more information on the uses of the Project feature, see the description of the **Project Setting** window at the end of this chapter.

Machine Settings

This section is used to calibrate the fine tuning of your machine.
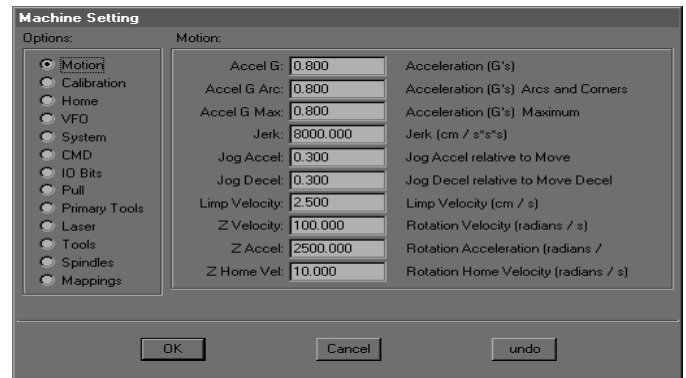
The **Machine Setting Motion** screen from the **Options** menu.

There are 12 **Machine Setting** screens to select from. The **Motion** screen shown here covers the following settings:

Accel G: This is the base acceleration and deceleration number, controlling how fast the plotter gets up to full speed and how fast it comes to a stop. Larger numbers increase acceleration and deceleration.

Accel G Arc: This number controls how fast the plotter goes around corners. If the plotter crashes while making a turn, this number must be decreased. Conversely, throughput may be slowed if Accel G Arc is set too low.

Accel G Max: Controls acceleration on short movements where the plotter won't be reaching its maximum velocity. These movements may be made a higher than normal acceleration. Generally speaking, this number can be about 50% greater than Accel G. however, should the plotter crash or shake on short moves, reduce this number. Accel G Max controls motion for the Abort and Limit switches.

Jerk: Jerk is defined as the change in acceleration. Normally, the plotter accelerates and decelerates at a constant rate. When Jerk is used, the plotter begins moving at a lower acceleration rate, increasing acceleration until reaching the level set in Accel G (or Accel G Max, whichever is appropriate to the movement being made). Then the plotter's acceleration decreases as it approaches its maximum velocity. This results in smoother motion, particularly if the cut path is intricate. Jerk is typically set somewhere between 100 and 1000, depending on the application. The smaller the number, the smoother the motion. Setting Jerk to zero disables the feature.

Jog Accel: Controls acceleration of the plotter while manually jogging it with the joystick or the arrows on the keypad. This setting is a multiplier of the acceleration value in Accel G. For example, if Accel G is .4 and Jog Accel is .8, the jog acceleration will be .4 times .8, or .32.

Jog Decel: Similar to Jog Accel but controls motion of the plotter after the joystick or keypad arrow is released.

Limp Velocity: This is the maximum velocity of the machine while in limp mode. Limp mode is toggled on and off by the Jog key on the keypad.

Z Velocity: Maximum rotational velocity for the cutting (marking, notching, etc.) devices. Radians per second.

Z Accel: Rotational acceleration for cutting devices. Expressed in radians/sec/sec.

Z Home Vel: Sets the rotational velocity for the machine's table home, table zero, and panel zero functions. This number is normally much lower than the Z Velocity. Expressed in radians per second.

**Y Calibration**: Operates the same way as the X calibration.

Z Calibration: Operates in the Z axis and is specified in radians.

X Direction: Determines the rotational direction of the X motor. This may only be set to -1 or 1. This is preset at the factory and should not be changed.

**Y Direction**: Operates the same way as the X Direction. Preset at the factory and should not be changed.

Z Direction: Operates the same way as the other axis direction settings. Should not be changed.

X Link: This setting is for dual X-motor machines. When two motors are used to drive the machine on the X axis (for instance, in most M9000 machines), they must be commanded to rotate in opposite directions. Under no circumstances should this setting be changed.
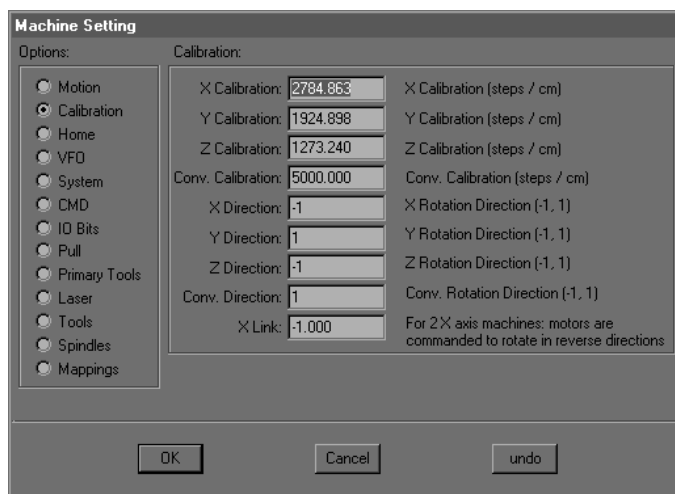
The **Machine Setting Calibration** screen.

The **Machine Setting Home** screen.

X Calibration: Controls the accuracy of the plotter in the X axis. Expressed in steps per centimeter, this variable will be preset from the factory and should not need adjustment. A greater number will cause the computer to output more steps to travel one centimeter, causing inaccuracy in the length of cut panels. The correct number for this calibration may be determined from the machine's gear ratios or by measuring the distance the machine travels compared to the distance it was commanded to travel in a file or by jogging.
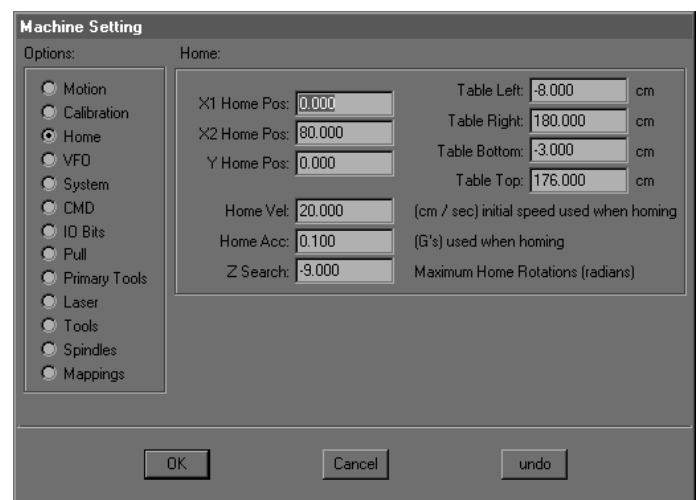
X1 Home Pos: Specifies an offset in cm. from the X1 home switch. X1 Home Pos is used only on twin motor X drive machines such as the M9000. In conjunction with X2 Home Pos, it is used to square the machine to the table. The machine's position resulting from the homing sequence with these numbers is regarded as the table's X-axis origin (0.0)

X2 Home Pos: X2 Home is used on all machines, and is the only home reference for single motor X drive machines (M9200 with torque tube). Like X1 Home Pos, X2 is an offset in cm. from the X axis home switch. Set this number to where you want your table origin to be.

Y Home Pos: Works the same way as the X Home offsets, but for the Y-axis. You may wish to adjust Y Home Pos for different material widths or wear on the table surface.

Home Vel: Maximum speed of the machine during the homing sequence. This should always be a relatively slow speed.

**Home Acc**: Acceleration in G's used for the homing sequence.

Z Search: Maximum number of radians allowed to search for the Z Home sensor. (9 radians is approximately one and a half rotations.) This number may be negative or positive, depending which direction you want the motor to spin during its search. Note: If for any reason you change the search direction, the Z offset must be recalibrated for each tool in the Machine Setting Spindles window.

Table Left: Limits the travel of the machine to your left as you face the operator keypad. If your system includes an Easipull gripper, the Table Left limit must allow for travel beyond the home switches. This means that your Table Left limit will be a negative number. Take care that the Table Left number allows sufficient travel for the gripper to reach the material, but also stops travel before the machine's X axis limit switch is clicked. Specified in cm. Jogging the machine with the joystick is a good way to determine the correct number.

Table Right: Operates the same way as the Table Left setting, but down the table to the right. This number should be set to allow the furthest travel down the table without activating the machine's X-axis limit switch. Also specified in cm.

Table Bottom: Limits the travel of the Y car towards the operator side of the table. Again, this must be set so that the machine does not click its Y axis limit switch.

Table Top: Works on the far side of the table for the Y-axis. Set Table Top to stop the machine's travel before it clicks its limit switch. Jog the machine to help find the appropriate setting.
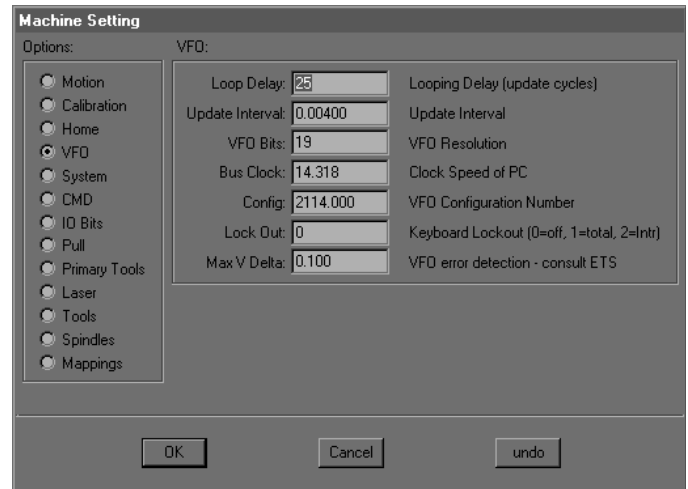
The **Machine Setting VFO** screen.

Loop Delay: Adjusts the amount of noise filtering applied to the keypad. This is necessary as electrical noise can create signals to the computer, causing the machine to crash or move by itself. To prevent this problem, the Loop Delay specifies how many samples to average together to determine if a keypad command has been given. If the Loop Delay is set too low, electrical noise may cause false input from the keypad to be read by the computer. If set too high, the plotter will take longer to respond to the operator's keypad commands. This variable is set at the factory. Do not under any circumstance change it without consulting Eastman Technology Systems Technical Support.

Update Interval: Specifies the time interval at which the computer updates the velocity command to the motors. If this interval is too short, the computer will not be able to calculate and load the next velocity, resulting in a ?VFO COUNT ERROR? message. A 33 MHz 486 computer should use an update interval of 0.002. Slower computers such as a 386 require a larger interval. If this number needs to be set to .01 or greater to prevent the error, it is likely that something else is wrong.

VFO Bits:
This number is used to calculate the proper factor for controlling the frequency divider on the VFO board. This is usually set to 19. Do not change the VFO bits without consulting Eastman Technology Technical Support.

Bus Clock: The input frequency to the VFO board is the PC bus clock. This should be set to 14.318. The computer uses this number to keep time, so changing it would cause inaccuracy in cutting velocity. Do not change this number without consulting Eastman Technology Technical Support.

Config: Different configuration values are used for different types of motor drives. Do not change this number without consulting Eastman Technology Technical Support.

Lock Out: if severe electrical noise is interfering with the operation of the keyboard, setting the lockout to 1 can disable it. Setting the lockout to 2 will turn off all interrupts while the plotter is moving. Since interrupts steal CPU time from the plotter software, an occasional VFO COUNT ERROR message can be ignored by disabling the interrupts.

Max V Delta: VFO error detection function. If the message AVFO CORRECTION GREATER THAN MAXIMUM@ appears, increase Max V Delta. If increasing the number to 10 does not eliminate the error, contact Eastman Technology Technical Support.
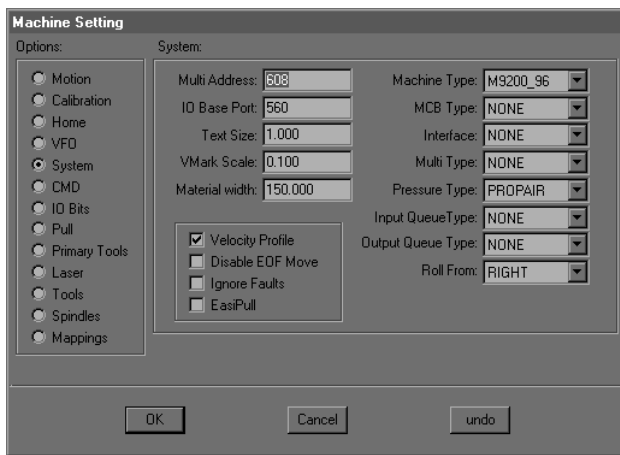
The **Machine Setting System** screen.

Multi Address: the address in the computer's memory occupied by the multifunction board. This address is shown as a reference only. If another peripheral device (for example, a video or sound card) is installed which uses this address, the plotter will not run.

IO Base Port: the address for the I/O card. Again, the I/O card must take priority. Do not attempt to change this address.

Text Size: refers to text specified in a design file. Setting this to 1 makes plotted characters 1 cm long by 2 cm high. Increase or decrease Text Size to make characters larger or smaller.

SEGA Distance: A SEGA is a command used in CMD files to specify polylines with fillets at each corner point. The radius of the fillet is determined by fitting a circle tangent to

the lines connecting the points of the polyline at the SEGA Distance from the corner point.

VMark Scale: a VMark is used to mark the local origin of a cut file as set by the plotter operator. It is drawn with the pen. Setting the VMark Scale to 1 makes a mark 2cm by 2cm. Reduce or increase this number to make smaller or larger VMarks.

Machine Type: selects software configuration for several different Eastman Technology machines. Allows Easicut to be used on obsolete machines.

MCB Type: selects Motion Control Board Type. VFO boards are typically used on machines with stepper motors such as the older M90 machines. Servo motor machines (M9000-95 and on) use MEI boards. Select None if you wish to run Easicut on a computer, which is not set up as a machine control computer (i.e. has no motion control board).

Interface: selects the type of user interface. Choose Keypad if your machine uses a 16 key interface, commonly used on older M90 machines. Select UIT if the machine has a User Interface Terminal. Click None if you are running Easicut on a computer, which is not connected, to a machine.

Multi Type: selects the version of multifunction board. Revisions after Rev. 1 are labeled as such on the board itself.

Pressure Type: click Manual if your machine has a manually operated air pressure regulator. Click Propair if it uses the computer controlled Proportion Air device.

Velocity Profile: has the effect of turning Accel G Arc on or off. This is normally used for testing only, and should be left clicked on for any production application.

Enable DTR: refers to Data Terminal Ready circuitry, used on only a very few Eastman Technology machines. Unless your machine is one of those which use DTR, this should not be enabled. If incorrectly selected, the user interface terminal will not function.

Disable EOF Move: files generated with Eastman Technology Pool software contain SKIP commands at the end, which automatically return the plotter to the global origin. Clicking Disable EOF Move may ignore these commands.

Ignore Faults: to be used only on a stepper motor machine in conjunction with an MEI board.

⚠ **CAUTION**
DO NOT UNDER ANY CIRCUMSTANCES CLICK IGNORE FAULTS ON A STANDARD PRODUCTION M9000 OR M9200 MACHINE. THIS COMMAND ALLOWS THE MACHINE TO OPERATE AFTER AN AMP FAULT OR AMP FAULT MESSAGE OCCURS. THIS SITUATION CAN CAUSE SERIOUS AND EXPENSIVE DAMAGE TO THE MACHINE AND WILL VOID THE WARRANTY.

**Roll From**: selects the direction from which Table Bites on the marker window are displayed.
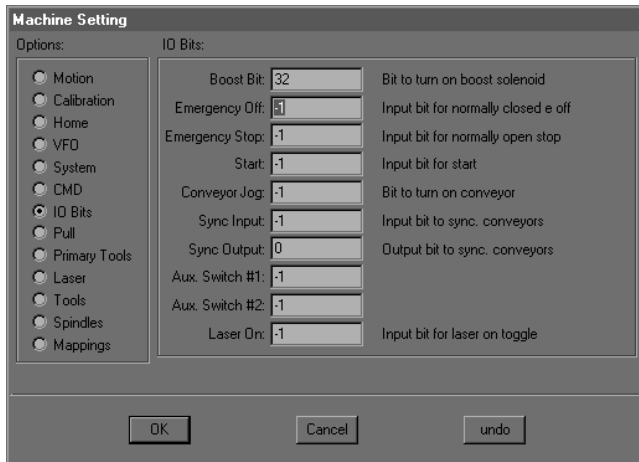
The Machine Setting I/O Bits screen.
The I/O bit settings are preset at the factory and should not be changed. Altering the bit settings will cause improper functioning of the machine.

⚠ **WARNING**
If the I/O bit settings are tampered with, the emergency stop switches may not operate.
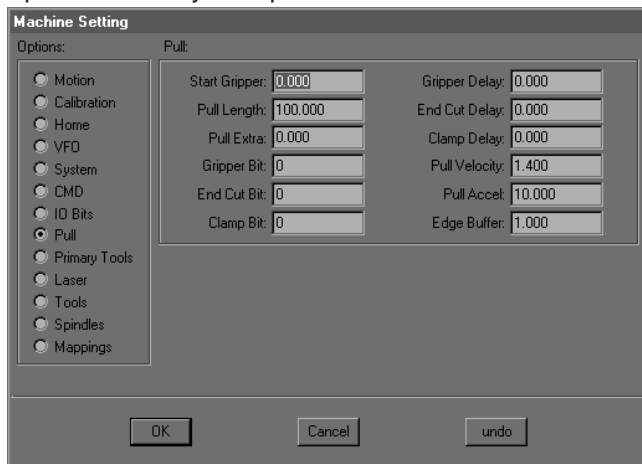
The **Machine Setting Pull** screen.

Start Gripper: Sets the distance from Table Home (X=0.00) the machine will move to start the gripper. This number will be negative in order to move the machine backward from Table Home.

Pull Length: Default pull length used if no cut file is loaded. Note: if a cut file is loaded, Easicut will automatically calculate how much material to pull based on the table length (Table Right in the Machine Setting Home screen) and the length of the patterns in the cut file.

Pull Extra: Accommodates the distance from the end cutter to Table Home. After the material is cut, the machine will pull the material this specified distance.

Gripper Bit: Address used for the gripper in the computer's memory. Do not change this number.

End Cut Bit: End cutter address. Do not change it.

Clamp Bit: Memory address used for the clamp. Don't change this number.

Gripper Delay: Time in seconds the machine allows for the material to be gripped before starting to pull.

End Cut Delay: Time in seconds allowed for the end cutter to cut the material, after which the machine pulls the Pull Extra length.

Clamp Delay: Time allowed for the clamp to actuate before starting the knife.

Pull Velocity: Maximum speed of the machine while pulling.

Pull Accel: Acceleration of the machine while pulling. Specified in cm/sec/sec, this acceleration rate should be relatively slow.

Edge Buffer: Adds this specified length to the ends of the pulled material beyond the edges of the cut file. This feature is helpful to control material movement on the edges.

Label Setting

*(Screen Not Shown)*
The **Machine Setting Label** screen.

X-Offset:Sets offset in X direction between laser pointer and center of label.

Y-Offset: Sets offset in Y direction between laser pointer and center of label.

Velocity: Sets velocity of label head movement when applying label.

Acceleration: Sets acceleration of label head movement when applying label.

Label Type: Choose label size.
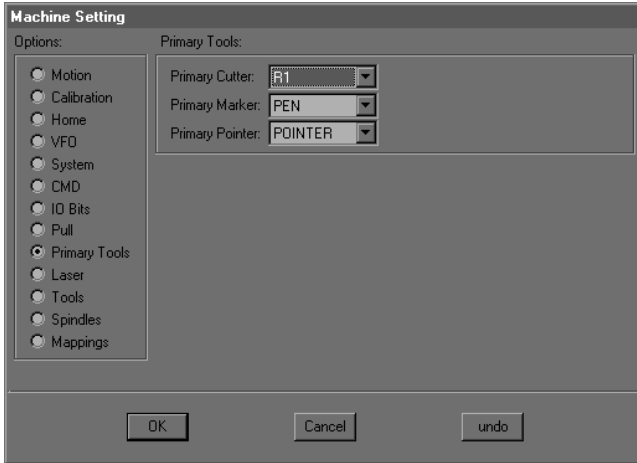
The **Machine Options Primary Tools** screen.

Primary Cutter: Specifies the Primary Cutter. This feature is necessary in order to access the Options Mode from the user interface terminal on each cutting tool. Since Options Mode commands reference the Primary Cutter, click the appropriate tool in the drop-down menu that you wish to use. Tools may be added to the list through the Machine Setting Tools window.

Primary Marker: If your machine has more than one marking device, you may specify one as the Primary Marker.

Primary Pointer: Operates the same way as the Primary Marker.
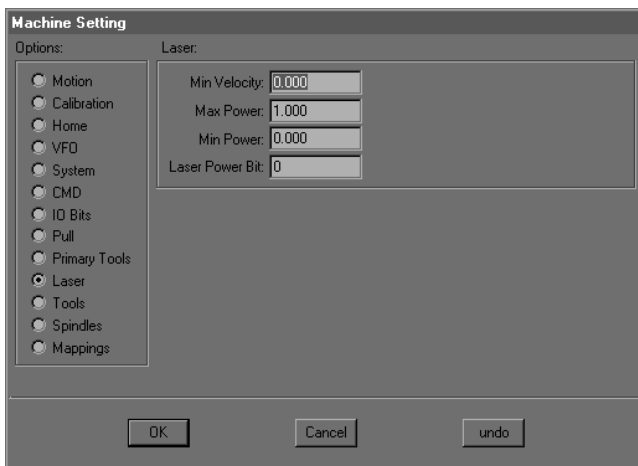
The **Machine Setting Laser** screen.

Min Velocity: Minimum velocity in cm/sec at which the laser will fire. This reduces kerf at the beginning and end of cuts.

Max Power: Sets the maximum power of the laser. You may wish to adjust this for cutting different types of materials. Expressed as a percentage from 0 to 1.0.

Min Power: The software incorporates a laser power ramping system which adjusts the power in relation to the machine's speed. Min Power sets the minimum power which will be used to fire the laser. A typical laser will not fire below 20% of its maximum power.

Laser Power: Laser on/off bit.
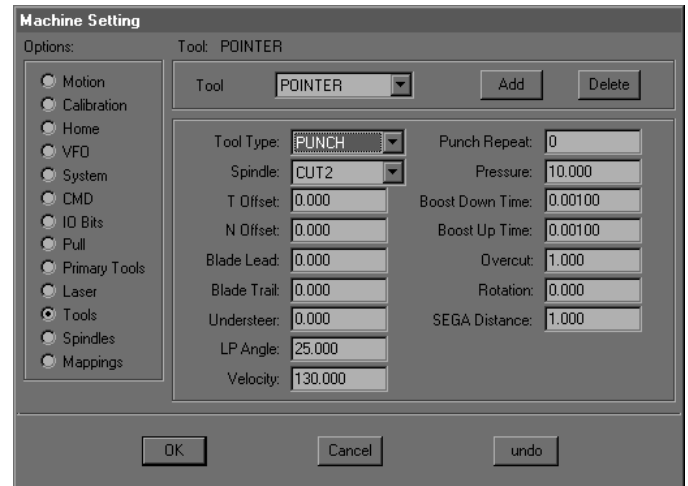
The **Machine Setting Tools** screen.

Tool: Select the tool whose parameters you wish to change by clicking on it in the Tool drop-down menu. Tools may be added or deleted by clicking the appropriate tab.

T Offset: Sets the tangent offset for the selected cutting tool. Tangent offset is the distance between the actual cut line of a tool and the center of the spindle it is mounted to. Most tool types, properly mounted, will not require tangent offset adjustment. If you find it necessary to adjust T Offset, note that changes to three decimal places (.001 cm) are significant.

Eastman®

N Offset: Sets the Normal Offset. This is the offset between the cutting tool and the center of the spindle it is mounted on, perpendicular to the cut line. Most tool types, properly mounted, will not need N Offset adjustment.

Note: Blade Lead and Blade Trail should be adjusted so as to give no overcut. Cutting a small square (SQUARE.CMD) is very useful for this.

Blade Lead: Adjusts the leading edge travel of a tool at the end of a cut, thereby controlling overcut. A greater number will reduce overcut while a smaller number will increase it. Blade Lead is frequently a negative number.

Blade Trail: Works the same way as Blade Lead, but for the trailing edge of a tool. Controls overcut at the beginning of a cut. Larger numbers reduce trailing edge overcut.

Understeer: Controls the behavior of a cutting tool as it travels around curves. Understeer is specified as a blade length whose endpoints are steered around curves. Varying Understeer opens or closes the trailing end of the blade to make more accurate cuts around curves.

A good test to see the effect of Understeer is to cut a 10 or 15 cm diameter circle at a cutting speed of 5 cm/sec. As the tool finishes each quarter (90 degrees) of the circle, press ABORT on the keypad, causing the tool to lift. Press NEXT to drop the tool back down and continue the circle. Examine the lift and plunge points created on the circle. If the trailing edge of the blade falls outside the circle, increase Understeer. Conversely, if the trailing edge of the blade falls inside the circle, reduce Understeer.

LP Angle: The Lift/ Plunge Angle sets the angle at which a tool will be lifted, turned, and plunged to continue a cut rather than being turned while on the table. This setting is necessary in order to minimize table wear while maintaining throughput. In other words, the machine takes longer to perform a tool lift/ plunge than to simply steer around a tight arc. However, a tool going around a tight arc (particularly a round knife) will tend to scrape the table surface. LP Angle for a round knife should typically be between 25 and 35 degrees. Drag knives, being far less damaging to the table while going around an arc, may be set around 170.

Velocity: Specifies the maximum velocity of the selected tool in cm/sec.

Overcut: If overcut is desired, specify it here. Overcut will add the indicated amount to the beginning and end for each cut of the selected tool.

On Bit: Command bit for a switchable tool such as a cold wheel cutter or an ultrasonic knife.

On Time: Wait time to start a switchable tool after it is plunged to the table.

Off Time: Wait time for machine motion after lifting a switchable tool.

Pressure: Pressure in psi applied to the tool while in use. The pressure should be set as low as possible to minimize table surface wear. However, the pressure must be sufficient to ensure complete cutting of the material.

Boost Down/ Boost Up Time: In order to speed up and down tool motion, a short burst of high pressure is applied as the tool is lifted and plunged.

Spindle: Specifies which spindle the selected tool is mounted on. Spindle 1 is nearest the laser pointer, 2 is nearest the penlift, and 3 is behind the Z motor.

Tool Type: Select cut tool, pen tool, punch tool, or no tool.
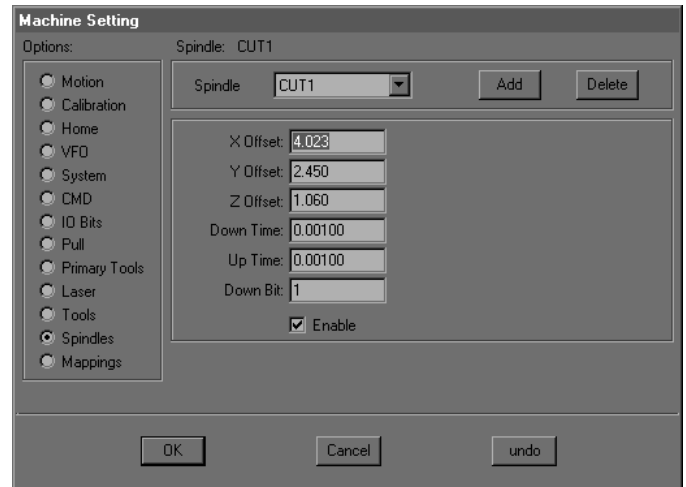
The **Machine Setting Spindles** screen.

Note: For detailed instructions on adjusting spindle offsets, see the section on plotter calibration.

Spindle: Refers to the spindles, which the tools are mounted on. On a single tool machine, select Spindle 1 (CUT1). On a Multi-Tool machine, Spindle 1 is nearest the laser pointer. Spindle 2 is nearest the pen holder, and Spindle 3 is directly behind the Z axis motor.

X Offset: Spindle offsets relate to a common point, usually referring to the laser pointer. These offsets are necessary due to the spindles' physical distance from each other. X Offset is a measure of the selected tool's distance from the laser point in the X-axis.

Y Offset: A measure of the selected tool's distance from the laser point in the Y-axis.

Z Offset: The Z Offset specifies how far the selected tool will move from the Z sensor during the Table Zero or Panel Zero functions. Z Offset is used to center a tool's rotational direction.

Down Time: Specifies a wait time after the selected tool drops to the cutting table. The machine will pause this time before moving.

Up Time: Wait time after the tool has lifted for the machine to move.

Down Bit: Command bit to drop the tool.

Enable: Turns the selected tool on or off. You may wish to use this feature if, for example, you want to make only pen markings on material.

The **Machine Setting Mappings** screen.

The Mappings screen is used to map layers in cut files to appropriate tools. For example, in a CMD file, lines to be drawn are labeled PENME. As shown above, PENME has been mapped to the PENN. CUTME, again a CMD format layer name, indicates lines which are to be cut. Therefore, CUTME should be mapped to a cutting tool such as R1 (1" round knife) or DRG1 (drag knife).

Different file formats have different layer names, all of which need to be mapped to tools, so users who work with several file formats may require a lengthy mapping menu.

The On/Off button may be used to ignore mapped layers if desired. Each layer in the Mapping menu may be turned on or off when selected. Note that only a layer may be turned off. If a tool is mapped to two different layers, turning off one layer will not prevent the tool from being used on the other one.
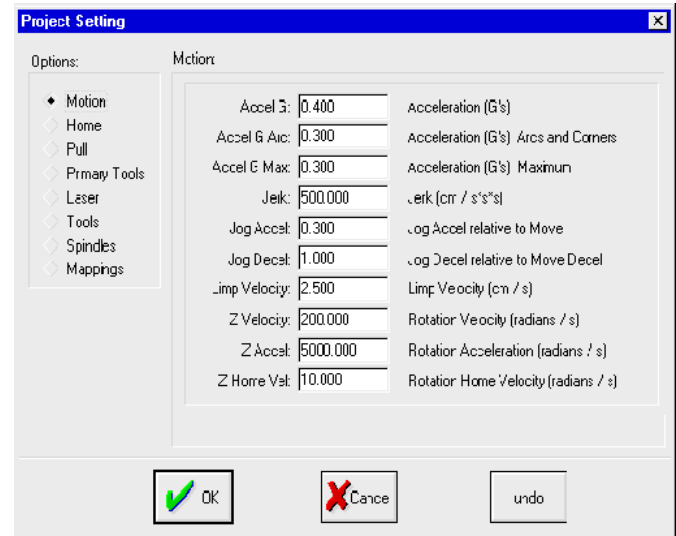
The **Options** menu **Project Setting** screen.

This screen is accessed only after opening a project in the **Project** drop-down menu. **Project Setting** allows you to override machine setting parameters in order to handle, for example, the different requirements of different materials. Certain materials may need more overcut, air pressure, etc. to achieve efficient, accurate cutting. Changes made to these machine settings will be applied only to the selected project. Each project, therefore, may have its own unique parameters.

The project feature may be useful in other ways as well. You can create a project to group together files, which are frequently used together, or for any reason you wish. When a project is created, its initial parameters are copied directly from **Machine Settings**, so you don't have to go through and enter all the settings.

![Eastman logo]®

GLOSSARY

CMD File
A CMD file is a drawing file format proprietary to Eastman Technology Systems, Ltd. All files loaded into the SLS 2 are first converted to a CMD file format.

Dialogs Area
The dialogs area of the Easicut main application window refers to an area at the bottom or the left edge of the window that is allocated for display of the Layers, Tools and/or Status dialog boxes. The location of the dialogs area may be set using the Dock Left and Dock Bottom options. The dialogs area may be resized by moving the splitter bar that separates it from the drawing area. The dialogs area can never be deleted.

Drawing Area
The drawing area refers to that part of the Easicut main application window not occupied by the dialogs area, tool bar, status bar or menu bar. All drawing files are opened in windows that appear within the drawing area. If drawing windows are maximized, the entire drawing area is filled with a single drawing file. Otherwise, one or more drawing file windows may be visible within the drawing area.

Drawing File
A drawing file is a file containing a description of a geometric pattern that corresponds to the cutting, punching, drawing, Labeling, etc. functions to be performed by the cutting machine. Drawing files are generally created by a separate CAD application. Easicut 1.06y supports the cutting of CMD, DXF, HPGL, GCODE, NST, and NTV drawing files.

Hardware Key
A hardware key is a programmable device containing a code that must be read by the Easicut 1.06y application before it will initiate normal operations. Without the hardware key, the Easicut 1.06y application will not load files into the cutting machine nor will it save modified or converted drawing files to disk. The hardware key attaches to the LPT1 printer port of the system computer.

Job File
A job file consists of a list of drawing files, their associated material types and a set of file processing and system configuration parameters that are shared by all the drawing files. Job files are used to group drawing files that share a common processing environment. Job files are identified by a JOB file name extension. The default job file is EASICUT.JOB. Other job files may be created and accessed using the Job Menu. The contents of a job file are modified using the Job Options dialog box.

Layer
A layer is used in a drawing file to define a set of features or characteristics that may be shared by more than one drawing entity. When an entity is added to a drawing file and placed on a specific layer, the entity inherits the characteristics defined for that layer. The layers are initially defined in the CAD application used to create the drawing file. Within the CAD application a layer specifies graphics characteristics such as line style and line color.

Layout Mode
In the layout mode, the currently active drawing file window is opened for viewing and editing the drawing. When a drawing file is opened, it is always opened in layout mode window. A layout mode window may be transformed into a simulate mode window by selecting the Simulate Mode option. A layout mode drawing file may be copied to the cutting mode window by selecting the Cut option. Any number of drawing files may be opened in layout mode windows. The layout mode refers only to the Easicut application and not to the machine itself. The cutting machine can cut a file regardless of the Easicut application mode.

MACHINE.INI File
The MACHINE.INI file is a text file that contains system configuration and calibration settings as well as definitions for all available tools. The Machine Options dialog box and the Calibration Options dialog box are used to view and modify the contents of the MACHINE.INI file. The MACHINE.INI file should never be edited directly using a text editor.

Mapping
A mapping refers to the association of a drawing layer with a particular machine tool. When a layer is mapped to a tool it means that all drawing entities on that layer will be cut/labeled by that tool. The tool settings associated with the mapped layer will override the default settings included in the tool definition. A layer may be mapped to a tool graphically using mouse drag-and-drop actions in the Layers and Tools dialog box. A layer may also be mapped to a tool in the Layers tab of the Job Options dialog box. All layer mappings are specified for the current job only.

MATERIAL.INI File
The MATERIAL.INI file is a text file that contains definitions for all available material types and the layer mappings associated with each material. The Material Options dialog box is used to view and modify the contents of the MATERIAL.INI file. The MATERIAL.INI file should never be edited directly using a text editor.

Motion Control Software
Easicut communicates with the cutting machine through separate motion control software which resides in a program named PLOTTERW. Easicut controls the cutting machine by sending messages to the PLOTTERW program which in turn executes the control commands. Similarly, Easicut is informed of the current machine status through messages received from PLOTTERW. The process of loading a file into the cutting machine actually consists of several steps. Easicut converts the drawing file to a CMD file and sends the name of the CMD file to the PLOTTERW program. The PLOTTERW program reads the CMD file, converts the contents of the file to cutting machine control commands and then executes those commands.

Mount
See Tool Mount.

Plotterw
See Motion Control Software.

Simulate Mode
The simulate mode is active any time the currently active drawing file window is opened for cutting simulation. A drawing file must first be opened in the layout mode before it can be changed to the simulate mode. A simulate mode drawing window may be transformed back into a layout mode drawing window by selecting the Layout Mode option. A simulate mode drawing file may not be placed in the cutting mode window. Any number of drawing files may be opened in the simulate mode windows. The simulate mode refers only to the Easicut application and not to the machine itself. The cutting machine can cut a file regardless of the Easicut application mode.

Supervisor
The supervisor user is the Easicut 1.06y security system manager or system administrator. This user has the highest available privilege level and is the only user authorized to access the Calibration and the User Management options. There is one and only one supervisor user in the authorized user list. If the security system is disabled, the supervisor user is not recognized.

Table Bite
If the pattern in a drawing file is longer than the available length of the cutting table, the drawing is divided into two or more table bites. Each such bite is processed as an individual pattern and table bites are processed sequentially from the beginning of the drawing file to the end.

Tool
A tool refers to a physical cutting, punching or marking implement which may be attached to a tool mount of the cutting machine.

User Interface Terminal
The User Interface Terminal (UIT) is the operator control console for the labeling machine. It is located at the front of the machine. The UIT includes a keypad, four line display and a joystick.

Eastman®

Eastman®

Notes:

Notes:

Eastman®

Notes:

Service Record

Machine Serial No.: _____ **Machine Size:** _____

Machine Voltage: _____ **Table Width:** _____

Date of Purchase: _____ **EasiCut Version:** _____

Date	Type of Service Performed

≡Eastman®

TECHNICAL DATA
EASTMAN® SLS 2 Stack Labeling System

SLS 2 Stack Labeler

Maximum Labeling Speed* .... 15 Labels/Minute
Maximum Length of Labeling Zone .... 50 ft. (1524 cm)
Maximum Labeling Ply Height .... 8.5" (216 mm)
Label Accuracy* .... +/- 1/4" (+/- 6 mm)
Machine Weight .... Approx. 400 lbs. (180 kg)
Operating Voltage .... 110V/220V; 50/60 cycles
.... 110V/220V; 50/60 HZ
Power Requirement 110V/15A
.... 220V/8A
Minimum Operating Pressure .... 25 PSI
Volume of Air Service .... 10 SCFM

* Relative to the type and quality of fabric, Label Locations, Label Sizes, Track Guidance, etc.

Working Width	Table Width	Overall Machine Width
60" (1530 mm)	66" (1680 mm)	89" (2260 mm)
66" (1680 mm)	72" (1830 mm)	95" (2413 mm)
72" (1830 mm)	78" (1980 mm)	101" (2565 mm)
78" (1980 mm)	84" (2130 mm)	107" (2717 mm)

* For all other sizes consult factory

Eastman®