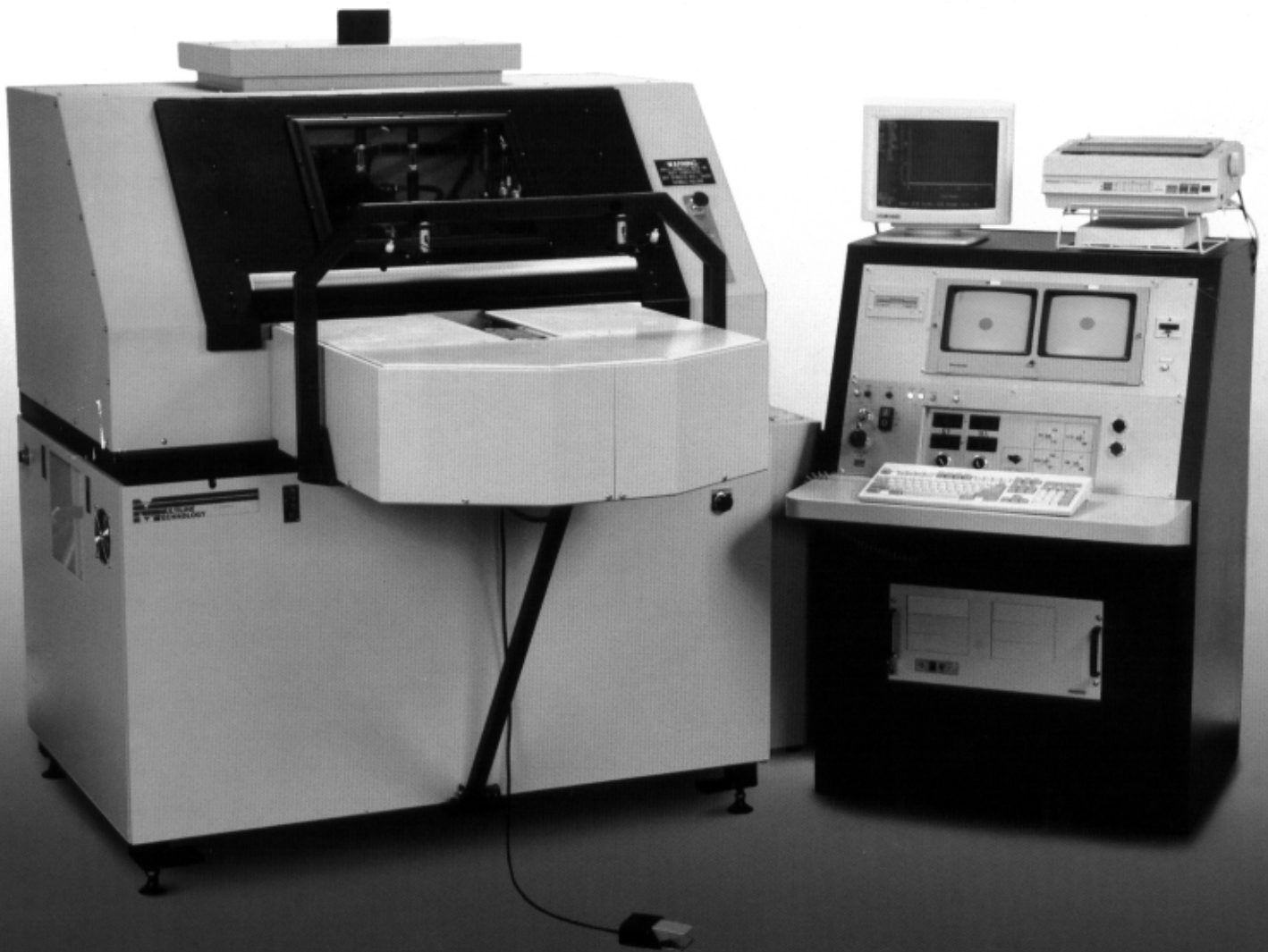


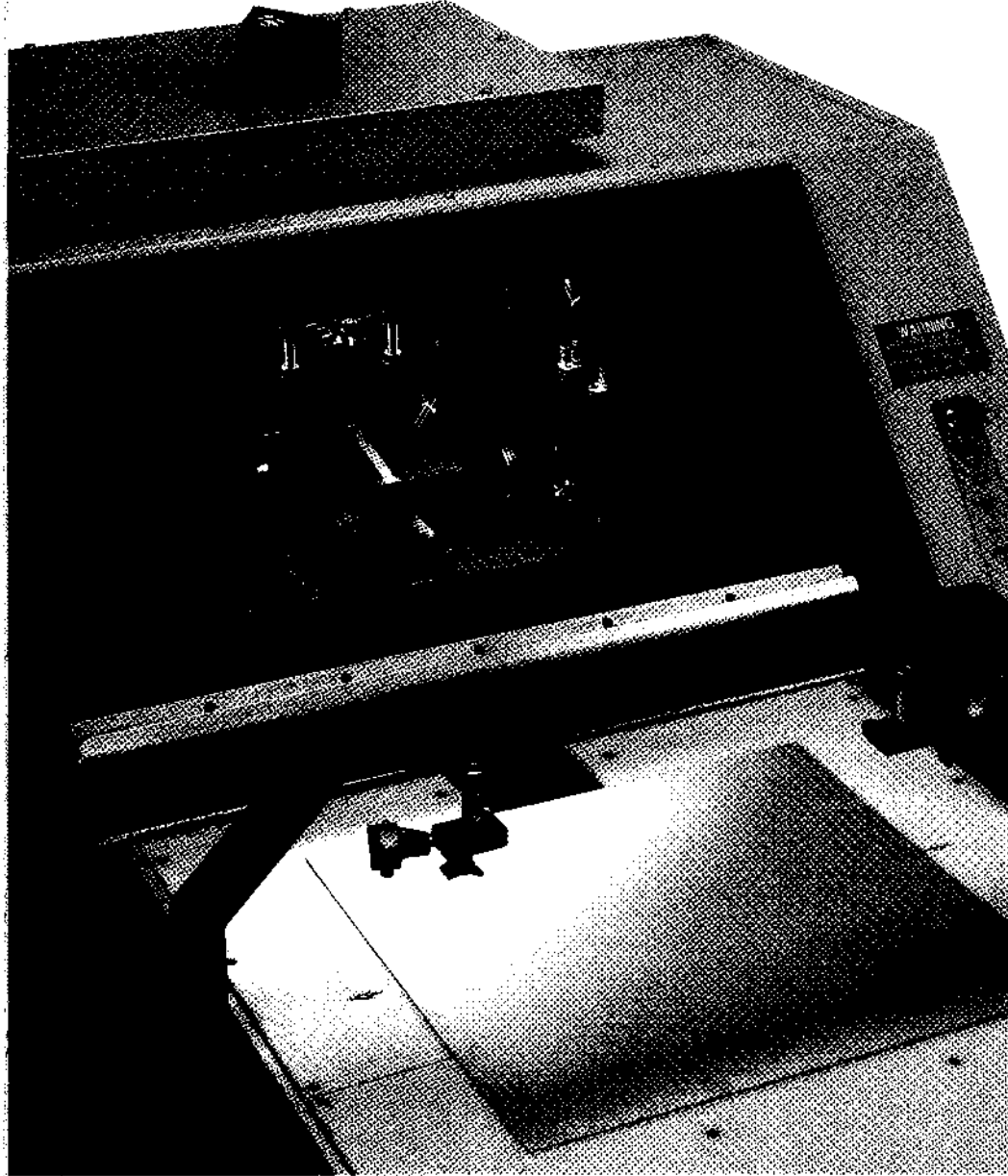
OPTILINE PL

from MULTILINE TECHNOLOGY

*A centerline X-ray system
for high volume
drill tooling
of laminated boards.*



The OPTILINE PL 2-camera Post-Lamination Drill provides a fast and accurate method of tooling laminated boards for final drilling.



The OPTILINE PL X-rays and drills new tooling holes for pinning to the drill machine thereby eliminating the need for conventional X-ray methods previously used to calculate drill offsets. Quality and yield is greatly improved since every panel has been compensated and tooled to produce the best possible results. In effect, every panel is custom drilled.

The OPTILINE PL utilizes an algorithm which is based on a two-position centerline optimization. The two X-ray cameras examine the target pad or stack up of target pads, and the vision system computer calculates the center of the left and right positions. If any error is found in the distance between the center of the pad stack and the machine reference zero, the system automatically splits the error before drilling in the tooling holes. Centerline optimization enhances the thruput of the machine since only a two-position "split the difference" calculation must be made.

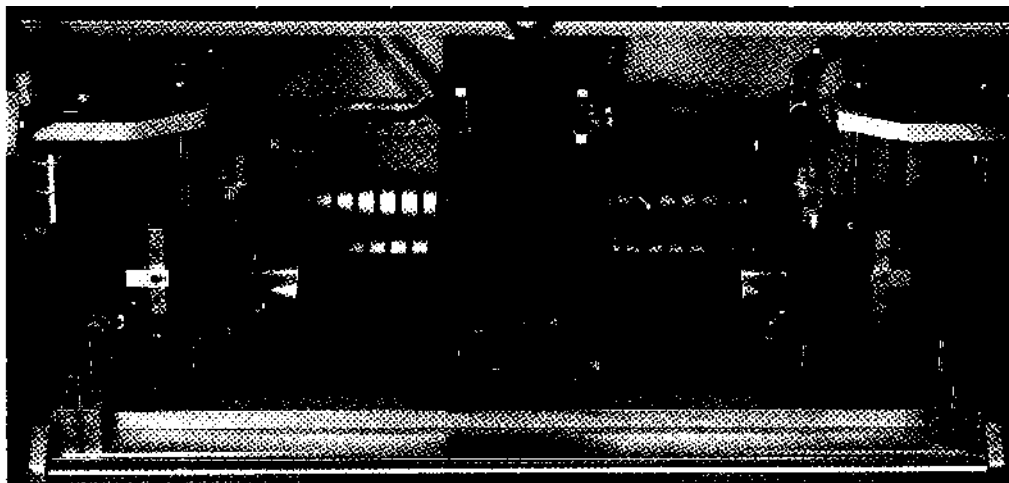
The OPTILINE PL is designed and built to handle all types of production needs. Small lot sizes are easily accommodated since the machine set-up and change over time for different panel sizes is typically only two to three minutes. This quick set-up is due to a built-in reference target system which eliminates the need to pin templates into the machine to establish the zero reference. Greater thruput for high volume multilayer production is accomplished by using a pre-alignment stage to initially locate the panel in conjunction with a high speed loading and unloading device. The locating system used is derived from the well proven programming logic and panel alignment methods of Multiline's OPTILINE PE innerlayer punch.

In pinless lamination or eyelet lamination the OPTILINE PL has the added advantage of eliminating two operations; spot-facing and bottom drilling. The thruput of 200 to 240 panels an hour makes the OPTILINE PL a valuable cost-saving machine to companies producing high volume mass lamination. The quick set-up time between jobs makes the OPTILINE PL the perfect choice for companies producing many different part numbers or working in small lot sizes.

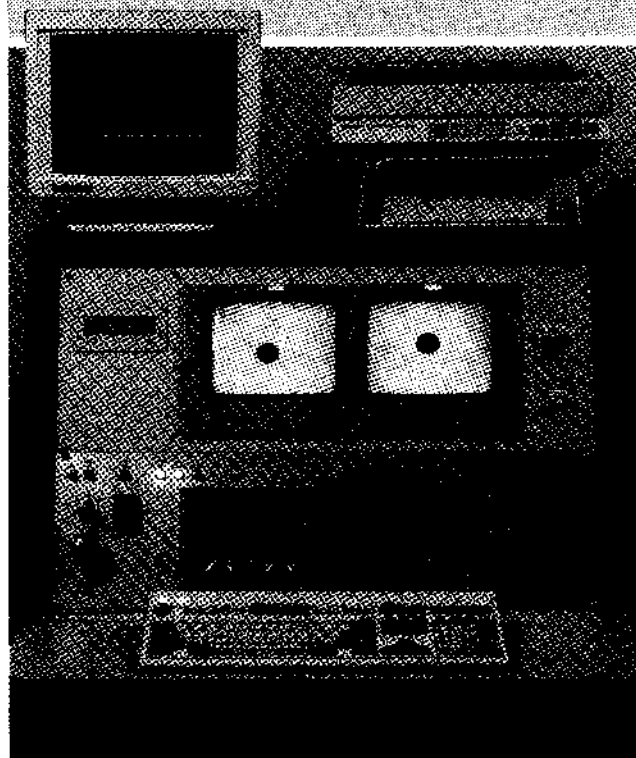
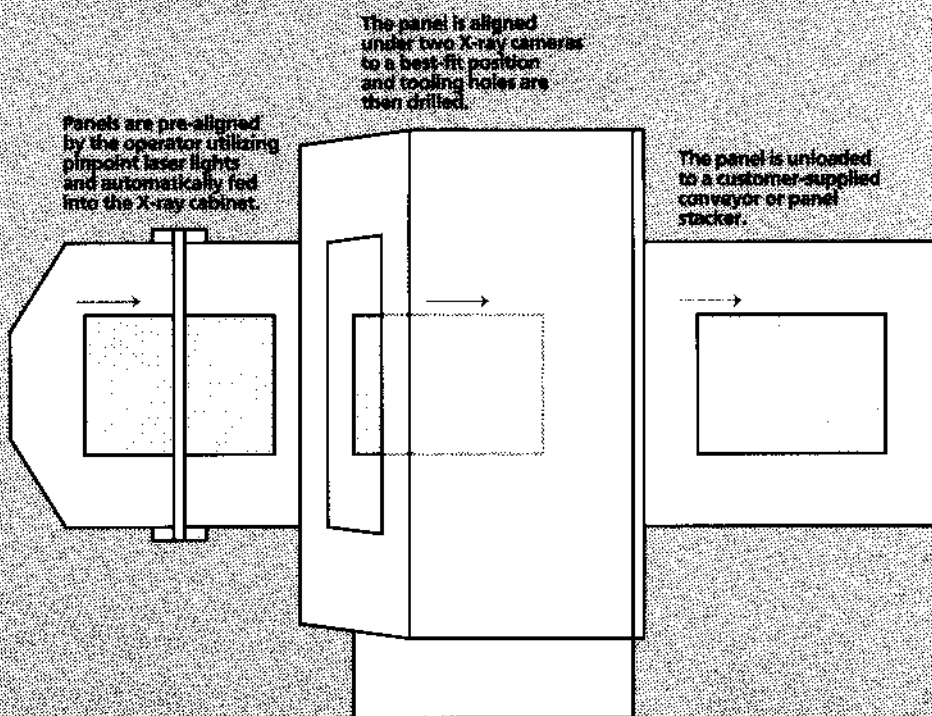
The machine is infinitely adjustable to any panel size from 12"x12" to 24"x30". The glass feedback from the positioning of the tooling modules not only eliminates the need for set-up templates but makes changing panel sizes as easy as only a few keyboard entries. Drill and camera positions are set automatically.

The OPTILINE PL provides Statistical Process Control Data which indicates the spread value (growth or shrinkage) from the actual target pads in the panel to the zero reference in the machine. This data is presented to the operator on the separate SPC monitor which plots the spread data on a graph, and shows its relationship to the tolerance limits set for that job. Control variables can also be established from the current or previous runs of the same part number. All the data can be recorded and stored by part number, customer name, type of material, thickness, construction, or other variables important in tracking and improving the quality of the product.

The OPTILINE PL achieves optimum production capability by reducing operator requirements to machine set-up and rough panel alignment. Each panel is placed on a prealignment table and positioned to two indicator lights. The panel is then automatically shuttled into the machine and placed under the X-ray cameras. The shuttle then moves back out, thus allowing the operator to prealign the next board while the board inside the machine is simultaneously being registered and drilled. The panel inside the machine is then unloaded through a door to the rear of the machine, onto a panel stacker or conveyor. The combination of quick set-up with the ability to do concurrent prealignment and processing allows the OPTILINE PL to achieve yields previously unrealized in X-ray tooling for the multilayer industry.



OPTILINE POST-LAMINATION X-RAY TOOLING SYSTEM



OPTILINE PL

2-CAMERA POST-LAMINATION DRILL

SPECIFICATIONS

Panel Sizes	12"x12" (305mm x 305mm) to 24"x30" (610mm x 762mm)
X-ray Vision System and Panel Positioning Accuracy	$\pm 0.001"$ (0.025mm) Repeatability: $\pm 0.0005"$ (0.0125mm)
Tooling Hole Position Accuracy	$\pm 0.001"$ (0.025mm) X or Y position to panel datum Repeatability: $\pm 0.0005"$ (0.0125mm)
Drill Type	Air spindle
Video Monitors	(2) 9" B&W format 480 lines
Line Voltage	120/220 \pm 10% VAC 50/60HZ
Pneumatic Requirements	100 PSI regulated
System Weight	Approximately 1500 lbs. (680kg)



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