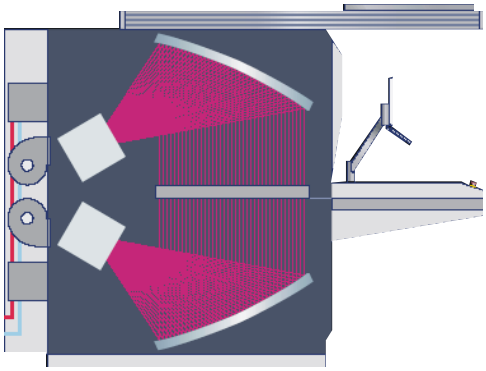
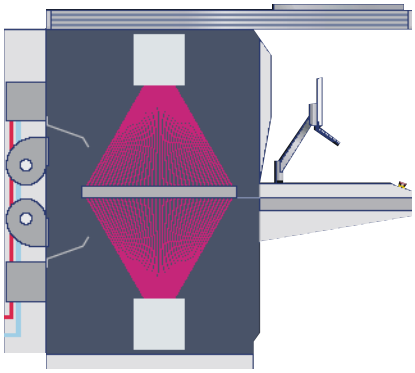
AccuTray
AutoAlign Imaging Platform

Automatic Alignment Semi-Automated Circuit Imaging
AT30, ATH30, AT38, AT42





94MU39 S/W Ver. 2.06

NOTE:
The AccuTray software that is installed at the factory will operate for 90 days from the time of machine installation. A permanent registration code must be obtained from the OLEC Corporation prior to the end of the 90 day period.
Please call 800-874-6532 for details.

To insure proper operation and full value from your light source, please read this instruction manual and the warranty carefully.

This Operation Manual must be read and clearly understood by all operators, supervisors and maintenance personnel. It must be stored with the unit for reference at any time. All new operators and personnel should be trained and be made familiar with its safe use.

Contents

1. Safety

Declaration of Conformity 1-1
Explanation 1-1
General 1-1
Electrical 1-1
Operating Safely 1-2
The Nature of Light 1-2
Spectramatch Lamps 1-3
Maintenance and Service 1-3
Environmental 1-3

2. Product Overview

General 2-1
Registration 2-2
Theory of Operation 2-3
Applications 2-3
Targets 2-5
Panel Registration Tooling 2-6
Quality Control Tool 2-6
Maintenance 2-7
Shimming 2-7
Statistical registration option 2-8
Features 2-9
Hybrid Collimation 2-10

3. Specifications

AT30 3-1
Crated Dimensions 3-1
Shipping Weight 3-1
Actual Dimensions 3-1
Effective Exposure Frame Area 3-2
Applications 3-2
Exposure Light Source 3-2
Capability 3-3
Registration System 3-3
Glass Tooling 3-3
Temperature Control 3-4
General Points 3-4
Utilities 3-4
Typical Room Requirements 3-4
AT42 3-5
Crated Dimensions 3-5
Shipping Weight 3-5
Actual Dimensions 3-5
Effective Exposure Frame Area 3-6

Applications 3-6
Exposure Light Source 3-6
Capability 3-7
Registration System 3-7
Glass Tooling 3-7
Temperature Control 3-7
General Points 3-8
Facilities 3-8
Typical Room Requirements 3-8
Standard AccuTray Glass 3-9
CCD Camera Alignment Targets - Outer Layer Version 3-10

4. Installation

Removing the AT30 printer from its pallet 4-1
Worklight Installation 4-6
Removing the AT42 printer from its pallet ..... -7
Electrical Connections ..... -9
Cooling Requirements 4-10
Connecting the Chiller 4-10
Filling and Bleeding the Closed Loop System 4-11
Verify the Temperature Setting 4-11
Closed Loop System Troubleshooting. 4-13

5. Integrator Functions and Features

Integrator 5-1
Feature Quick Reference 5-3
Operator Control Panel 5-4
Table Showing the 12 Calibration Positions 5-4
Calibration Procedures 5-4
Changing the Calibration Number 5-6
Matching Exposure Surfaces 5-7
Splitting Steps 5-8
Matching with a meter 5-8

6. Integrator Program Set Up

To Enter the Select Mode 6-1
Lock Level Feature 6-1
Lock Level Description and Operation 6-2
Setting or Changing your Lock Code feature 6-3
To Clear Lamp Statistics 6-3
To Clear Memory and Exposure Statistics 6-3
Two Value Exposure Mode 6-4
Split Exposure Mode 6-4
Single Surface Mode 6-5
Board Count Display Mode 6-5
Frame Control Interface Mode 6-6
Automatic Vacuum Mode 6-6
Auto Step Mode 6-7
Set Default Vacuum Delay 6-7

Tray Mode 6-8
High Temperature Alarm Point 6-8
Set Point Temperature 6-9
Hysteresis Setting 6-9
Type Mode 6-10
Exposure Statistics (Elapsed Hours) 6-11
Exposure Statistics (Total Exposures) 6-12
Selecting a Memory Location 6-13
Quick Keypad 6-13
Entering an Exposure Time 6-13
Setting the Light Intensity 6-13
Blank frame cycle 6-14

7. Operating the AccuTray

User Interface 7-1
Operational Overview 7-1
Power Up Sequence 7-3
Password Protection 7-4
Operator and Supervisor Access 7-4
Setting Up Passwords 7-4
Adding Operators 7-5
Deleting Operators 7-6
Changing Passwords 7-7
Logging On to the System 7-8
Initializing the AccuTray 7-10
Selecting Jobs 7-11
Loading Films and Panels 7-13
Film only retry for double-sided soldermask 7-15
Glass Cleaning 7-16
Changing PD -Tolerance or Tolerance during a job. 7-17
Alignment Results 7-18
Tolerance and Alignment Tolerance Calculations and Display 7-19
Maintenance Screen 7-22
Lo Level Maintenance 7-24
Preferences 7-25
Init Machine 7-26
Settings 7-26
Adjust Camera On 7-27
Drivers 7-27
Password 7-29
Cameras Out 7-29
Error Log 7-29
Camera Settings 7-30
Camera Settings - Device Control Screen 7-31
Cemera Settings - Illumination Screen 7-32
Camera Settings - Device Save/Restore Settings Screen 7-33
Store Camera Settings 7-34

8. Jobs

Creating Jobs 8-1
Job Screen 8-2
Job Parameters 8-5
X and Y Coordinates 8-7
Use Top Film Vacuum For Single Sided Alignment. 8-9
Process Deviation Tolerance Instructions 8-10
Setting up a job: 8-11
The Result Screens: 8-12
Failed alignment due to PD tolerance: 8-13
Failed Alignment due to Alignment Tolerance: 8-15
Changing PD -Tolerance or Tolerance during a job. 8-15
Targets 8-16
Archiving Jobs 8-18

9. Absolute Measure Option

Absolute Measure for Two and Four Camera Systems 9-1
Absolute Measure Theory of Operation 9-1
Glass Targets Screen 9-2
Loading Glass Target Coordinates 9-3
Installing Absolute Measure glass tools and software 9-3
Setting Up Artwork for Absolute Measuring 9-8
Measuring the Artworks 9-8
Results Screen 9-10

10. AccuTray Diagnostics

Ors98 Messages 10-1
Warning Messages 10-1
Error Messages 10-2
Error Logging 10-6
Low Level Maintenance 10-7
Activating Motors Manually 10-8
Inputs/Outputs 10-9
AT30 Data Analysis Program 10-10
Highlights 10-10
Operation Instructions 10-10
Extracted Data File Sample 10-13
Troubleshooting 10-14
Saving Images That the Processor Failed. 10-15
Help Videos 10-17
Changes to the ORS98.ini file 10-17

11. AT 30 Diagnostics

Output Diagnostics 11-1
Output Functions Check 11-1
Functions Table 11-2
Input Diagnostics 11-3
Typical values that you will see when all switches are good. 11-3
Error Handling System 11-4
Typical values that you will see when a fault occurs. 11-5
Wiring Diagrams 11-6

12. Lamp Changing Instructions

Lamp Changing Instructions 12-1

13. Preventive Maintenance

Preventive Maintenance Daily 13-1
Preventive Maintenance Monthly 13-1
Preventive Maintenance Semi-Annually 13-1
ATH30 Optics Cleaning 13-2
Filter Replacement 13-3
Vacuum/Pressure Line Replacement 13-3

14. Warranty

Limited Warranty 14-1

1. Safety

Declaration of Conformity

The Exposure Station conforms with the Safety Requirements of the EU. Relevant data is inscribed on the ID Plate near the power cable inlet.

Explanation

This manual uses the following terms and symbols to indicate important information regarding safety. Should you have difficulty understanding information preceded by these terms and symbols, please contact your OLEC representative before proceeding.

WARNING = **Risk of injury and/or property damage**.

CAUTION = **Risk of damage.**

Note: = Special information regarding efficient use of the Exposure Station.

General

This Operation Manual must be read and clearly understood by all operators, supervisors and maintenance personnel with special attention to safe operation. It must be located near the unit for ready reference. All new operators and personnel should be trained and be made familiar with its safe use. The manufacturer and supplier shall not be liable for any damage arising out of improper or unauthorized use.

WARNING **Report any malfunction or irregularity in operation to supervisor!**

Electrical

The Exposure Station is connected to the electrical power line. It must be installed in accordance with local safety codes and kept dry and clean at all times. It is equipped with interlocks and protective devices to assure operator safety.

WARNING **Service must be performed by authorized personnel only!**

WARNING **Never disable or disconnect electrical interlock safety devices**!

Operating Safely

- Power Switching:

  By pressing the power button on the Integrator, the High Resolution printer will go into warm-up. When it is turned off, the unit will go into a cool-down cycle. In the event of momentary power loss or accidental switch off, the information stored in the integrator memory will be retained. It may be turned on again immediately, without any damage. However, it will go through the short, forced cool-off cycle before the lamps restrike.

- Saftey Features:

  The exposure units are designed with operator protection in mind. The operator is protected from any direct light and UV coming from the exposure lamp by the cabinet and light shields. You can remove the side doors or slide them forward on the unit to access all electrical components, the exposure lamp, power supply, and the vacuum pumps. The exposure unit side doors have electrical interlock switches, which will suspend operation if a door is opened while the unit is in operation.

The Nature of Light

- Ultra Violet Rays (UV):

  Before operating the high resolution printers, please become familiar with the characteristics of UV exposure lights. The unit is enclosed in order to remove any exposure to UV. However, never look directly into a UV light source and avoid overexposures to the direct rays coming from the lamp and reflector.

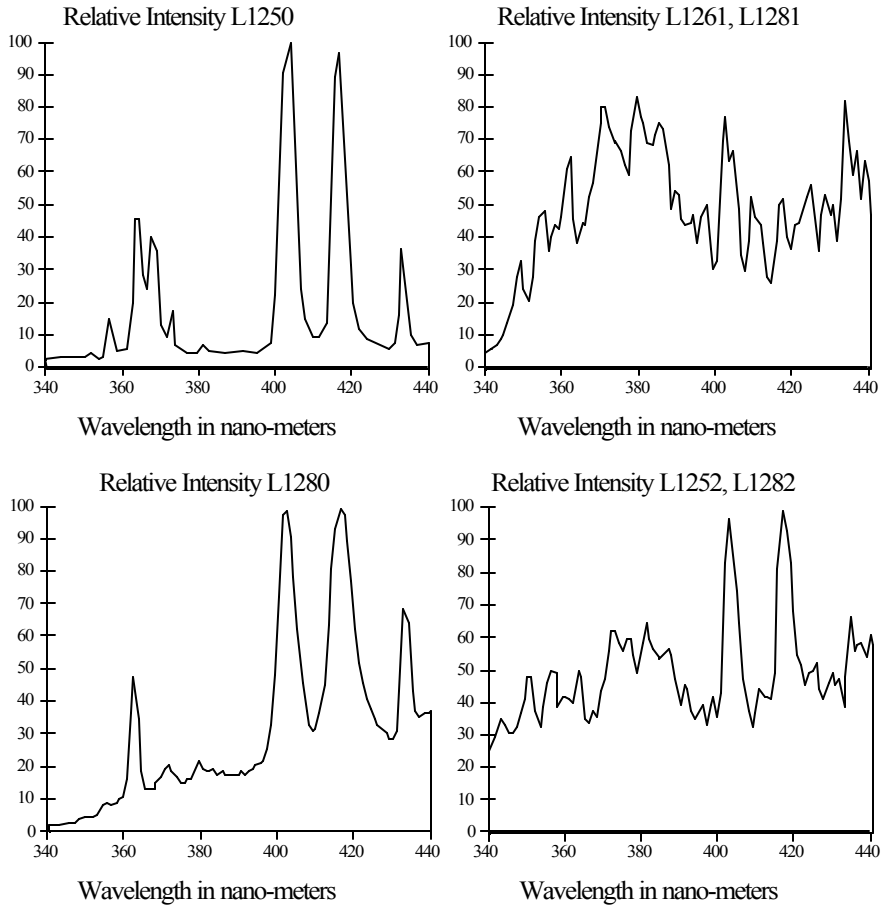
- Electromagnetic Spectrum:

  Visible light and Ultra Violet (UV) are electromagnetic waves which exist in a continuous spectrum of energy. They only differ in wavelengths. Visible energy or light is that part of the spectrum between 700 nanometers (red) through 400 nanometers (violet). UV energy ranges between 400 nm to 10 nm. For maximum safety the lights filter wavelengths of UV energy below 320 nm.

- Spectramatch Lamps:

  The high resolution printers use the unique L1250/L1252/L1261 for the 5kW and L1280/L1281/L1282 for the 8kW metal halide lamps. The additives in the lamps are carefully selected to generate spectral emissions that are matched for most photo resist materials. The lamps provide the optimum energy for exposure of most films and resists. In addition, the L 1250/L1280 is also suitable for Diazo materials, sensitive in the 410 nm range as well as Photopolymer materials most sensitive in the 365 nm area with the L1252/L1261/L1281/L1282. The energy spectrograph on the next page illustrates the wide coverage of the high resolution printer lamps. This efficient conversion of electrical energy into effective wavelengths, accounts for the exceptionally short exposures at great power savings.

Spectramatch Lamps



Maintenance and Service

It is safe to open the front door to clean the glass from underneath.

WARNING **When it becomes necessary to replace a lamp or to remove the transom the power line must be disconnected. Remove plug from the wall outlet or from the back of the unit!**

WARNING **Repair service must only be performed by authorized personnel!**

WARNING **Never disable or disconnect electrical interlock safety devices**!

Environmental

The Exposure Station is manufactured with great care to protect the environment. The lamps are specifically designed to eliminate emission of Ozone.

CAUTION **Only original OLEC replacement lamps must be used!**

2. Product Overview

General

High tech, state-of-the-art imaging is introduced to the printed circuit industry in the new fine line high resolution printers for resists, films, screens, and solder masks. The High Resolution printers expose photopolymer film resists, dry film solder mask, and liquid photoimageables to high ultraviolet light. The printer has two exposure lamps and two exposure frames, allowing the operator to expose both sides of the panel in one frame, while loading the other frame.

- Separate vacuum pumps for each frame provide rapid vacuum drawdown. Adjusting valves are provided below the frames for special applications requiring lower vacuum levels. Separate gauges on the control panel indicate the vacuum pressure for each frame.
- Metal halide lamps concentrate all the effective energy into the precise spectral range required to obtain the highest resolution and sharpest image. A large dynamic intensity range is another reason for greatly improved yields. The printer operates at three light intensity levels:

  AT 30-5K 1,000 low, 2,500 medium and 5,000 high.

  AT 30-8K 2,000 low, 5,000 medium and 8,000 high.

  The low and medium intensity modes give finer exposure control for resists requiring short exposure times. The high intensity mode gives rapid, accurate exposure for high productivity. The lamps automatically switch to the idle intensity mode between exposures to conserve power and extend lamp life.
- The computerized design of the lamp reflectors provides the highest resolution and sharpest image.
- Exposure times are controlled by a microprocessor controlled integrator and frame mounted photocell. This system automatically regulates the exposure on each side of each frame to compensate for differences in lamp-to-frame distance, providing precise and repeatable exposures. A "seconds" mode on the integrator allows exposures by time. Both shutters open and close simultaneously in this mode.
- Motor-driven frames and switch locations offer unequaled ease of operation.
- Water cooled, closed-loop cooling, in combination with long-life, service-free shutters, guarantee low maintenance cost and long lamp life.

Registration

OLEC Corporation, with established sales, factory-trained and certified service technicians, and parts distribution in 25 countries, is considered the largest manufacturer of contact exposure systems in the world.

Through the strength of our separate divisions, Exposure Systems, Imaging, Screen Graphics, Metal Fabrication, Registration Systems, and Glass Tools, OLEC is capable of providing total production solutions.

Increased circuit density is leading to constantly greater demands for registration, with the industry forced to deal with the constant build of tolerances.

These include:

- Film dimensional accuracy
- Panel distortion
- Drill positional error
- Environment - Temperature / Humidity
- Operator influence

In conventional registration, there is the added tolerance of the film punch, and the required clearance between the pins and the film. Some tooling systems radiate this error from a reference point in the corner or the leading edge. The AccuTray™ minimizes error by radiating all tolerances from center to reduce errors by half compared with corner tooling systems.

Made possible through the development of a number of new technologies and miniaturization, OLEC is introducing new registration capabilities to circuit fabricators. The AccuTray™ is an automatic camera based registration system designed for use on drawer-type machines. It can be configured with up to 10-axes of motion. The tray is able to align in a best-fit manner top-to-bottom-film, and panel-to-film. There are three fundamental applications: through-hole outerlayer registration, non-tooled innerlayer registration and fiducial registration.

Theory of Operation

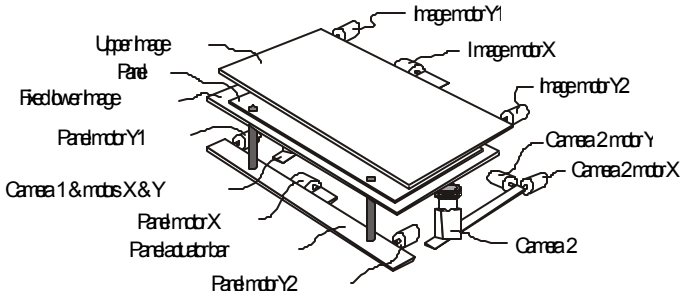
The following mechanical schematic shows the basic operation of the AccuTray™.

The upper image is aligned using the three image motors, Y1, Y2 and X. This allows for correction of X, Y and angle.

The panel is aligned using the panel motors Y1, Y2 and X, which drive the panel actuator bar. Through pins to the panel, this provides X, Y and angle movement of the panel.

Each of the cameras has an X and Y motor to position the cameras to target positions suitable for the panel size and tooling type.

Each of the motors has an optical encoder to monitor and feedback it's speed and position.



Applications

Versatility is the key feature of the AccuTray™. It is designed to align a large variety of alignment applications and panel formats. This is accomplished with motion control of the upper phototool master image relative to the lower image, as well as the capability to align a panel in relationship with the phototool masters. The ability to automatically program and recall the camera positions provides versatility in panel formats and applications. Reflection and transmission illumination provides for versatility in the targets to observe films, through holes and surface features.

The capabilities are suitable for innerlayer, outerlayer, soldermask, sequential build, and micro via applications. The configurations are stored in "job" memories for instant recall.

(a) Non-tooled innerlayer and chemical machining registration

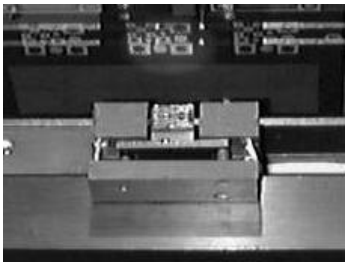
For the exposure of innerlayers that will be punched after etching, the system is capable of providing upper-to-lower-film alignment. The cameras are directed to a location outside of the panel, to align the upper and lower phototool master images.

(b) Outerlayer Registration

By looking at the lower and upper artwork through a drilled reference hole in the panel, it is possible for the system to optimize the alignment of all three surfaces. On starting the alignment cycle, the targets are observed and the camera positions are optimized. The system will identify the location of the lower film, the upper film and the panel. With this information the system will move the panel and upper film to optimize the alignment.

(c) Fiducial Registration

In the event that it is desirable to image relative to a previous image, such as soldermask following circuit patterns, or laser vias, the system utilizes reflective illumination to compare the film position of the feature with the panel. The panel is then aligned to best match the film.



The image shows a miniature camera with the illuminator enabled.

(d) Combination registration

The system has a provision for registration of top and bottom image relative to an etched fiducial. This is valuable when the outerlayer front to back registration is well controlled and/or the case where the fiducial registration is more critical on one surface.

Targets

The AccuTray™ incorporates unique and simple targets to ensure ideal registration. These targets provide several benefits. They contain large sample areas to ensure accuracy even when the target is partially obscured. Some targets allow for multiple surfaces to be read with a single image.

Front to back registration targets

The lower film has a cross pattern with a round border. The upper film has a diagonal cross.

Bottom film Top film All

Outerlayer registration targets

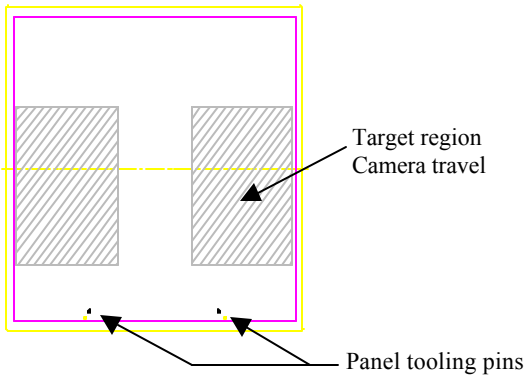
The lower film has a cross pattern. The upper film has a diagonal cross, and the diameter of the reference hole provides the positional information for the panel.

Panel Bottom film Top film All

In operation, a job is selected and the camera moves to a pre-programmed target location. Within the movement range of the camera, the user can choose the location for the tooling holes considering optimized accuracy and compatibility with current tooling.

Panel Registration Tooling

The AccuTray™ standard tooling for panel registration requires little change in process. In addition to the two target holes, there are two additional holes to secure locate and position the panel. Located on the leading edge of the panel the standard tooling has a spacing of 381-mm (15"). These locations are also used to position the films for tray setup.

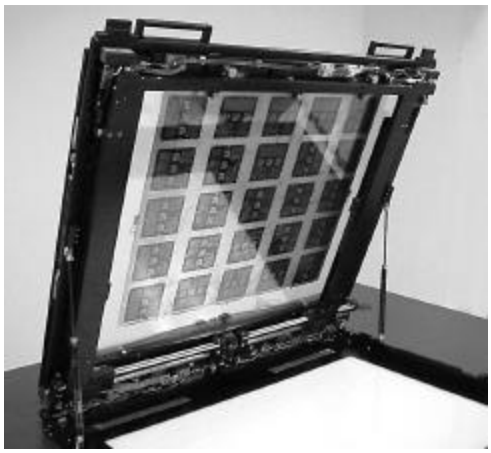


Quality Control Tool

The AccuTray™ system has the potential to be a powerful quality control tool. Registration limits are programmed into each stored job. This can be used to prevent the exposure of an out-of-tolerance panel. Since each panel is measured and results recorded, there is the potential for the registration accuracy of each panel to be used in a statistical manner. SPC data can be generated and control limits programmed. Information collected automatically by the AccuTray™ may also be used to characterize the current production registration capability and become a strong tool to implement and measure process improvement.

Maintenance

The AccuTray™ opens easily to allow operator access to clean the lower glass surface. There is minimal preventive maintenance with the system. Glass can be changed in minutes in the event of a scratch or damage. In the open position there is access to all of the motors, electronics and pneumatics. Diagnostics built into the control allow easy verification of the function of all components.



Shimming

For fine line applications and the exposure of small panels, it may be necessary to provide glass support outside of the panel. The recommendations for shimming are:

(a) Shim thickness

For critical line spacing, the shims should be 0 to 125µ (5 mil) thicker then the combined thickness of the panel plus resist.

(b) Location

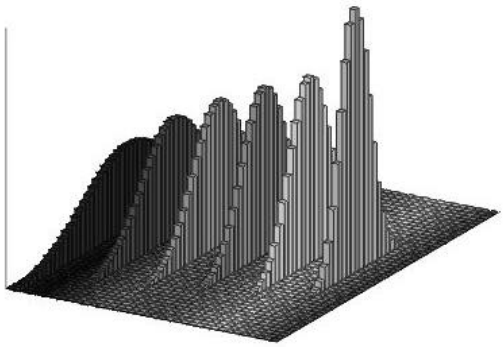
The shims should be between 12mm (0.5") to 25 mm (1.0") from the panel in regions where there is unsupported glass.

(c) Air Flow

The shims must provide for air evacuation from the panel. This can be done with open sections when shim sections are used. In the event that shim frames are used, the surface texture or machined relief channels may provide for airflow.

Statistical registration option

An enhancement of the AccuTray™ is the discovery of a system to improve outerlayer registration. The Statistical-Register™ patent pending utilizes a cluster of holes to position the panel. This significantly reduces the contribution of drilling tolerance to the ultimate position of the panel. Even the best drilling machines used today may produce a positional inaccuracy of ±20 microns, and many companies use drills that could produce *greater than ±50 microns* of positional variability. The Statistical-Register™ system can deliver accuracy double that of conventional camera systems that rely on individual holes to position a panel.



The bell curves illustrated show the benefit of statistical register. The left two curves show the relative accuracy of a system that registers with two holes. The right two bell curves show the relative accuracy of statistical registration.

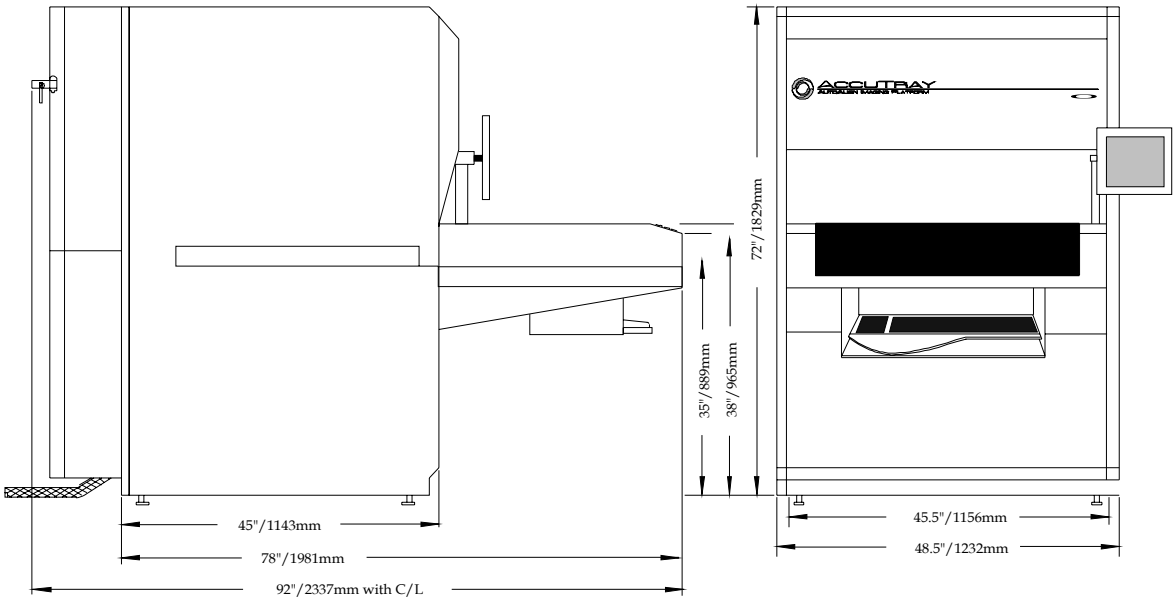
An additional benefit of the Statistical-Register™ is the data provided by the sampling of holes. The data collected about film, panel, and drilling accuracy, can produce comprehensive process capability data. It is also possible to identify drilling machine defects without adding costly inspection steps.

Features

- Fine line imaging
- Quick Memory location
- Long lamp life design
- Selectable power
- Low operating and maintenance cost
- Low installation costs
- Small footprint
- Double-sided exposure, 25” x 30”
- Built for high production
- User friendly
- Frame cooling during exposure and loading
- Excellent service and backup
- Microprocessor controlled light integration
- Sliding side panels for easy access
- Reliable motor-driven, double drawers
- Exposure programming and analysis
- Memory backup, in case of power failure
- Components are UL and TUV approved
- Manufactured in the U.S.A.

3. Specifications

AT30 - (ATH30 add 6" to depth)



Crated Dimensions

Length	Width	Height
102"	60"	80"
2590 mm	1524 mm	2032 mm

Shipping Weight

Crated	2400 lbs.	1089 kg.
Uncrated	1500 lbs.	681 kg.

Actual Dimensions

Cabinet welded heavy gauge steel construction with access doors on both sides.

Length	Width	Height
92"	48.5"	72"
2337 mm	1232 mm	1829mm

Note: The AT30 cannot be disassembled to pass through any doorways or hallways. Please make sure there is adequate room for its passage.

Effective Exposure Frame Area

Width	30"	762 mm
Depth:	24"	610 mm

Applications

	Inners(Post or Pre etch).
	Lead Frame.
	Outers
Resist Type	Dry film or liquid etch resist - Inners & Lead-frame
	Dry film - Outers

Exposure Light Source

Type employed	OLEC Point Source Optics.
	Double-sided exposure.
Vacuum	Soft contact, typically 8 - 12 inches Hg, monitored and alarmed.
Lamp unit	Two 5 or 8 kW lamp units. Selectable low, medium and high power.
	Lamp change time typically 5 minutes per lamp.
Uniformity	+/- 10%.
Intensity	For example approximately 25 mW/cm2 for 8 kW unit. See note 1 below.
Integrator range	0 to 999 units, selectable. Normally calibrate 1 unit = 1 mJ/cm2.
Exposure time	0 to 999 seconds, selectable.
Spectra	3 OLEC Spectramatch Halide Lamp options available. See OLEC Spectramatch information
Lamp cooling	Forced air cooling. Minimum blower voltage control.
Exposure window	24" x 30" (610mm x 762mm).
Resolution	<= 2 mil line and space. See note 2 below.

Note 1: Intensity depends on factors such as lamp height, lamp type, reflector type and type of light meter used.

Note 2: Resolution capability depends on resist type, exposure energy and other process conditions e.g pre-clean, lamination or coating and developing.

Capability

Panel size	Minimum 9" x 16" (229mm x 406mm) [2 PIN SYSTEM]
	Maximum 24" x 30" (610mm x 762mm), Outers and 24" x 29" (610mm x 737mm) Inners.
Panel thickness	Inners. Min. .004", Max. .059". (Min. 0.1mm, Max. 1.5mm).
	Outers. Min. .030", Max. .118". (Min. .762mm, Max. 3mm)
	Note depending on panel size may need to employ shims.
Capacity	Dependant upon exposure time, vacuum delay time etc. Mechanical cycle 3 second alignment and
	4 second tray transport.

Note: Maximum capacity depends upon panel quality, machine parameters selected, vacuum delay time, exposure time and reflector/lamp age.

Registration System

Panels	Two hole leading edge tooling system. Tooling hole diameter .118" (3 mm). Pitch between tooling
	holes 15" (381 mm). Outers require two 3mm diamater holes on the panel within camera capture range.
General	Two point CCD camera system. Post main vacuum confirm mode.
	X, Yand theta control via pulsed stepper motor assemblies.
	Bottom artwork is employed as a reference. Inner mode frame top (including glass) articulates.
	Outer mode frame top articulates along with panel pin bar.
Target definition	Inner - using special pair of over-lapping film alignment targets.
	Outer - using special pair of over-lapping film alignment targets along with a pair of 3 mm
	diameter drilled holes in the panel.
Repeatability	Inner Film +/- .0004" (+/- 10 microns) best fit.
	Outer Panel +/- .001" (+/- 25.4 mircons) best fit.
	"Best fit" = must also consider all other tolerances which may affect registration e.g. drill, artwork etc.

Glass Tooling

General	Standard tooling is available. Two pin leading edge configuration. 3 film sizes: 20" x 26", 23" x 26",
	26" x 30".
	6mm thick "Optiwhite" A grade standard. Other grades available.
Setup time	Artwork setup time < 1.5 minutes

Temperature Control

System	Closed loop feedback system.
Accuracy	Setpoint +/- 2 C. Note Setpoint is typically 16 C - 25 C depending on customer.

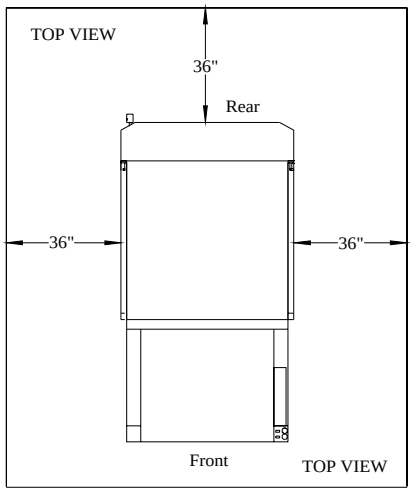
General Points

Cleanliness	N/A
Control	PC based Windows environment. Touch screen user interface.
	AP unit is controlled via OLEC proprietary system.
Heat Loading	No heat loading to exposure room as closed loop cooling is employed.
Safety	Safety interlocks on all doors and operator E-stop fitted.
	Meets UL, CE and Ontario Hydro approval.
Footprint	Closed Loop Unit 92.5" x 48.5" x 72" (2350mm x 1232mm x 1829mm)

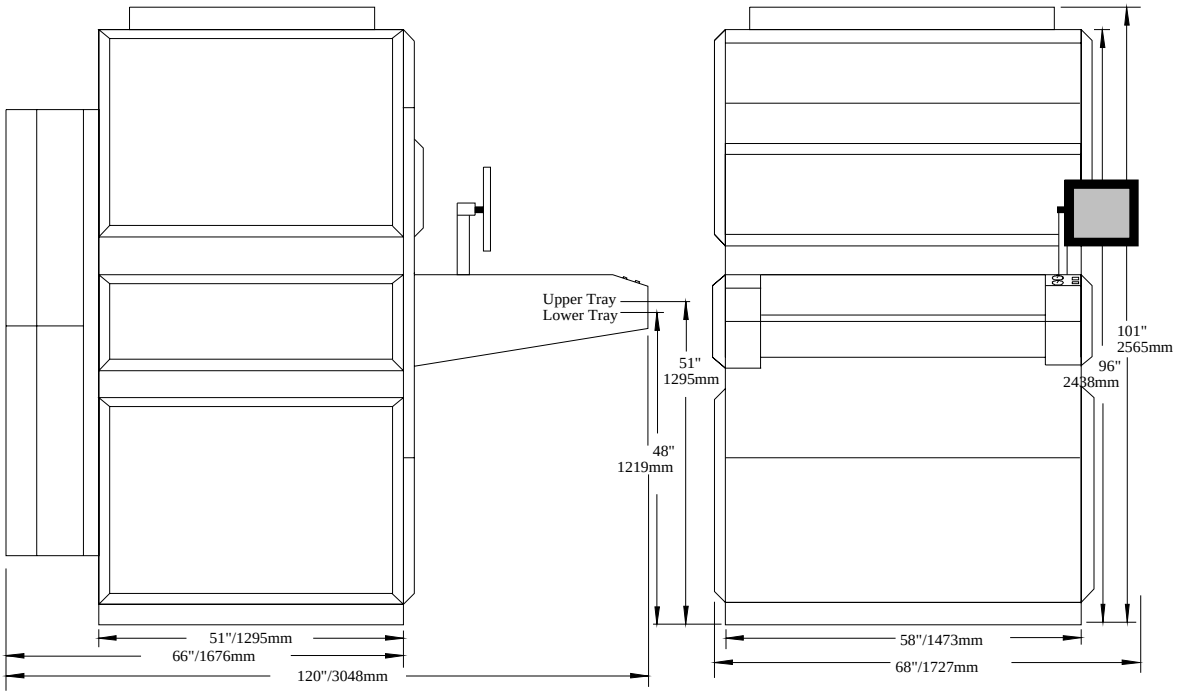
Utilities

Compressed Air	90 psi @ 12 cfm.
Chilled water	20 gpm @ 50 F (75.7 lpm @ 10 C) or 10 gpm @ 45 F (37.9 lpm @ 7.2 C)
Power	200/208, 240, 480 VAC 3 phase @ 60 Hz, 380/415 VAC 3 phase at 50 Hz.
Weight	2400 lbs (1089 kg) crated.
Exhaust	None

Typical Room Requirements



AT42



Crated Dimensions

Length	Width	Height
130"	78"	85"
3302mm	1981mm	2159mm

Shipping Weight

Crated	2,400 lbs.	1089kg
Uncrated	2,000 lbs.	907kg

Actual Dimensions

Cabinet welded heavy gauge steel construction with access doors on both sides.

Length	Width	Height
120"	68"	101"
3048mm	1727mm	2565 mm

Note: The AT42 can be disassembled (see Base Assembly Diagram) into 4 pieces if required to pass through most doorways or hallways. Please make sure there is adequate room for its passage.

Effective Exposure Frame Area

Width	42"	1066 mm
Depth:	34"	863 mm

Applications

	Inners.
	Chemical Machining and Lead Frame.
	Outer-Layer.
Resist Type	Dry film or liquid etch resist – Inner-layer, chemical machining & Lead-frame
	Dry film – Outer – layer.
	Liquid soldermask.

Exposure Light Source

Type employed	OLEC Point Source Optics.
	Double-sided or single-sided exposure.
Vacuum	Soft contact, monitored and alarmed.
Lamp unit	8 or 12kW, 3 intensities, selectable.
	Lamp change time < 5 minutes.
Uniformity	+/- 10%.
Intensity	Approximately 13 mW/cm2 for 8 kW unit. See note 1 below.
Integrator range	0 to 999 units.
Exposure time	0 to 999 seconds.
Spectra	3 OLEC Spectramatch Halide Lamp options.
Lamp cooling	Servo cooled, closed chamber.
Exposure window	34" x 43" (863mm x 1092mm).
Resolution	Capability to 3 mil line and space. See note 2 below.

Note 1: Intensity depends on factors such as lamp height, lamp type, reflector type and type of light meter used.

Note 2: Resolution capability depends on resist type, exposure energy and other process conditions e.g pre-clean, lamination or coating and developing.

Capability

Panel size	Minimum 12" x 22" (305mm x 559mm). [Custom tooling possible].
	Maximum 34" x 42" (863mm x 1066mm).
Panel thickness	.002" - .197" (.05mm – 5.0mm). Special option 5mm–10mm
	Templates/shims will be required depending on panel size and area of unsupported glass.
Production Capacity	Varies depending on process. Typically up to 60 panels per hour for large format. See Note below.

Note: Throughput depends on a number of factors such as: exposure time, vacuum delay time, alignment tolerance selected along with number of repeat steps and the cleaning regime adopted. Other factors may include panel quality and reflector/lamp age.

Registration System

Panels	Two hole on 20" (508mm) centers. Leading edge.
	Outer layers require two holes drilled in the panel within camera capture range.
General	Two point CCD camera system. X, Yand theta control.
	Film to panel to film alignment and film to film alignment.
Target definition	Film to film: over-lapping upper and lower film targets.
	Film to panel to film: over-lapping upper and lower film targets and drilled target hole.
Repeatability	Inner Film +/- .008" (+/- 20 microns) best fit.
	Outer Panel +/- .002" (+/- 50 microns) best fit.
Tolerance	User programmable.

Glass Tooling

General	Configurations based on maximum panel size.
Setup time	Artwork setup time < 1.5 minutes

Temperature Control

System Accuracy	Closed loop feedback system.
	Setpoint +/- 2 C. Note Setpoint from 16 C - 25 C.

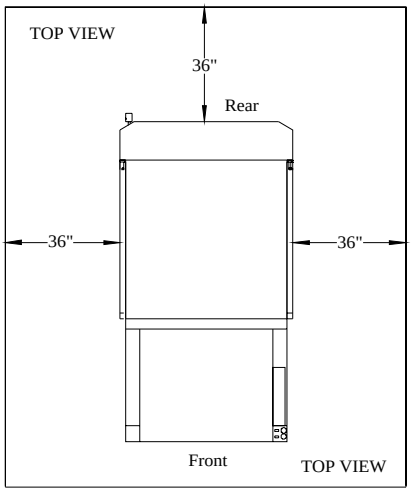
General Points

Cleanliness	Closed loop system.
Control	PC based Windows environment. Integrated AP interface.
Safety	Safety interlocks on all doors and operator E-stop.

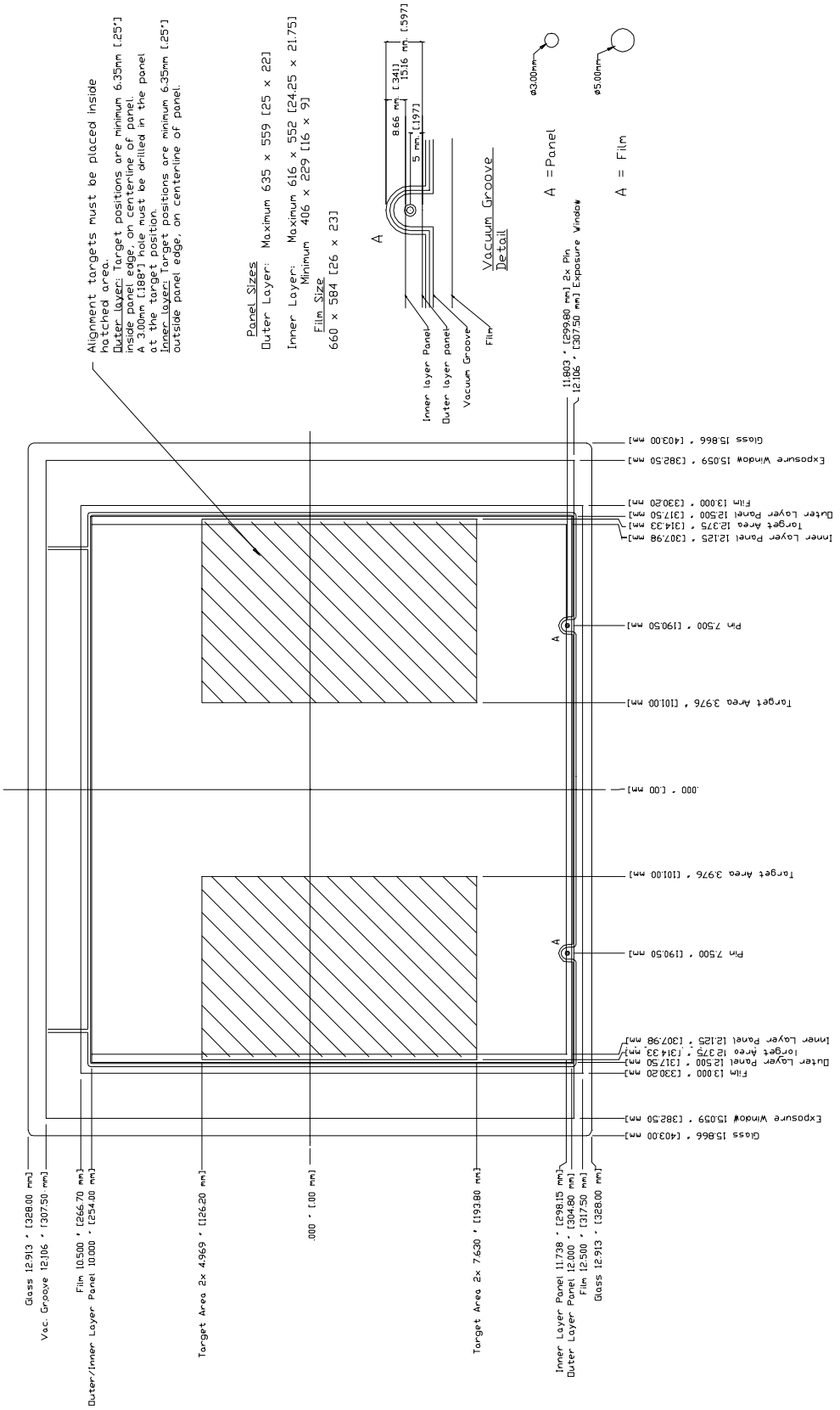
Facilities

Heat Loading	No external heat loading. Closed loop cooling control.
Compressed Air	90 psi @ 12 cfm.
Chilled water	20 gpm @ 50 F (75.7 lpm @ 10 C) or 10 gpm @ 45 F (37.9 lpm @ 7.2 C)
Power	208/240V 3 phase 60Hz 65A, 480V 3 phase 60Hz 30A, 380/415V 3 phase 50 Hz 34A.
Weight	1600 lbs (730 kg).
Exhaust	None
Footprint	120” deep x 68” wide x 101” high (3048mm x 1727mm x 2565mm).

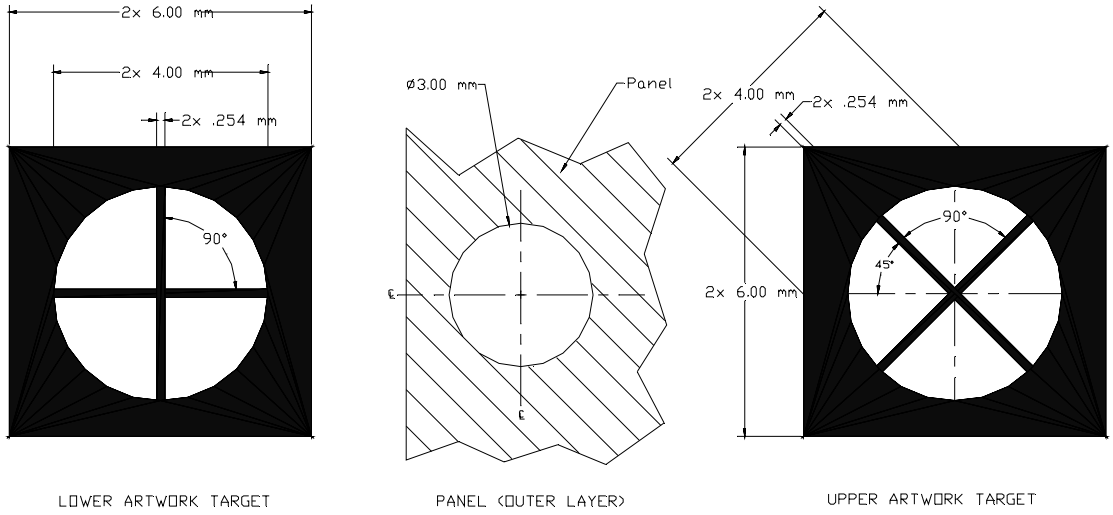
Typical Room Requirements



Standard AccuTray Glass



CCD Camera Alignment Targets - Outer Layer Version



LOWER ARTWORK TARGET

PANEL (OUTER LAYER)

UPPER ARTWORK TARGET

1. Plot upper film right reading emulsion down.
2. Plot lower film right reading emulsion up.

4. Installation

Removing the AT30 printer from its pallet

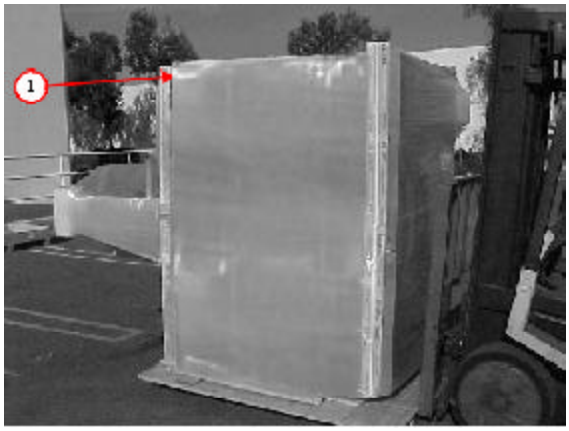
The printer weighs approximately 1375 lbs (625 kg) to 2000 lbs. (907 kg) unpacked depending upon exact model. It is recommended, for your safety and to prevent damaging the equipment, that you have an authorized person or professional riggers unpack the unit and remove it from the shipping pallet. Check clearances and obstructions along the route to the installation site.

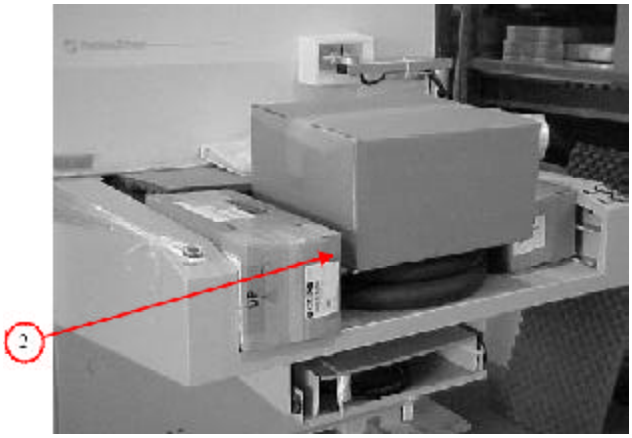
CAUTION Remove inside packing and strapping material before operating printer

- Remove the four (4) 1/2" shipping bolts under the pallet that secure the printer to the pallet.
- Remove the lower rear panel of the printer by unscrewing the 5/32" Allen head screws.
- Using a fork lift from the rear of the printer, raise it off the pallet and install the four adjustable feet from the parts box.
- Position the printer in place and level it, using the four adjustable feet.
- Allow at least 1-1/2" (38 mm) of clearance from the floor to the bottom of the printer to allow for efficient cooling.

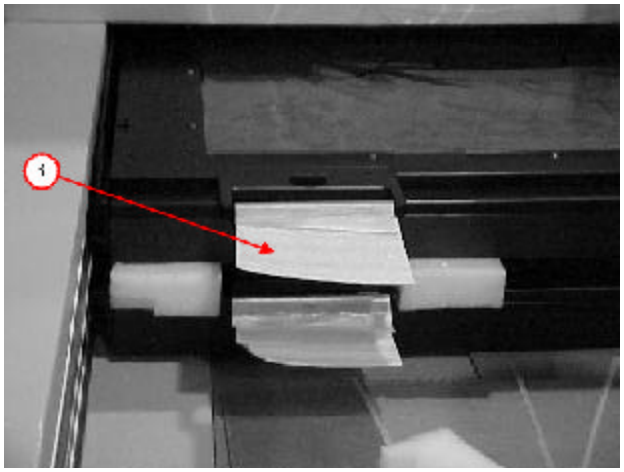
Note: Position the printer so as to leave 36 inches (914 mm) to the nearest wall on both sides and to the rear.

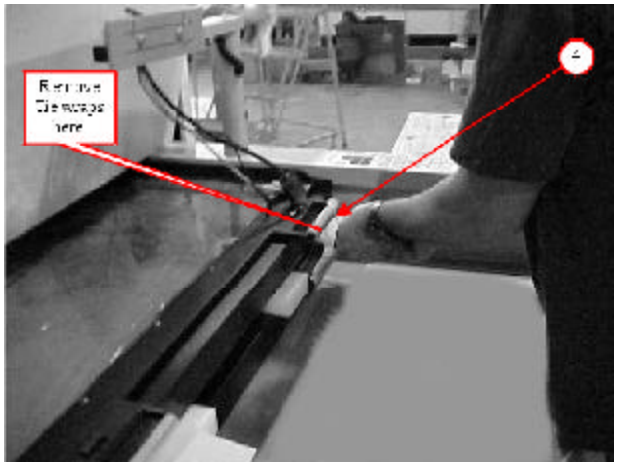
1. Remove wrapping from printer.
2. Remove boxes from nose piece.



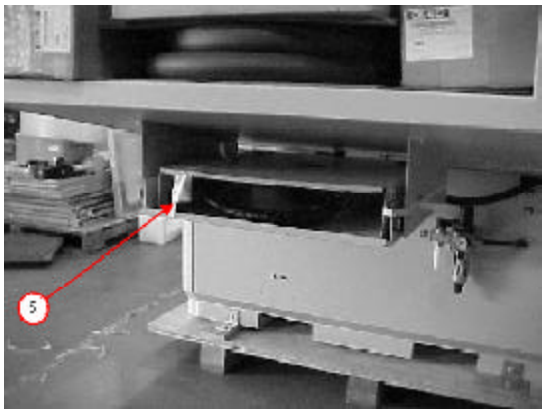


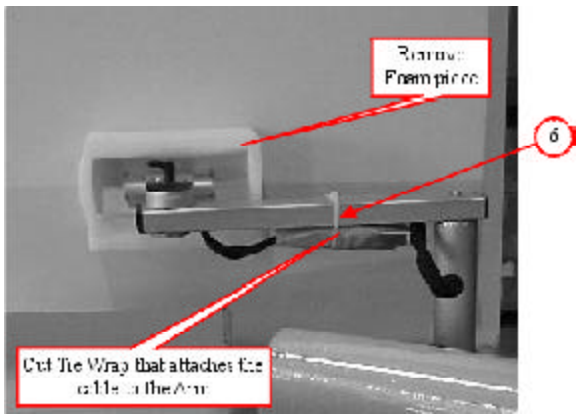
3. Remove the foam blocks and wrapping from the frame handles.
4. Cut Tie-Wraps that attach the upper and lower frame handles.



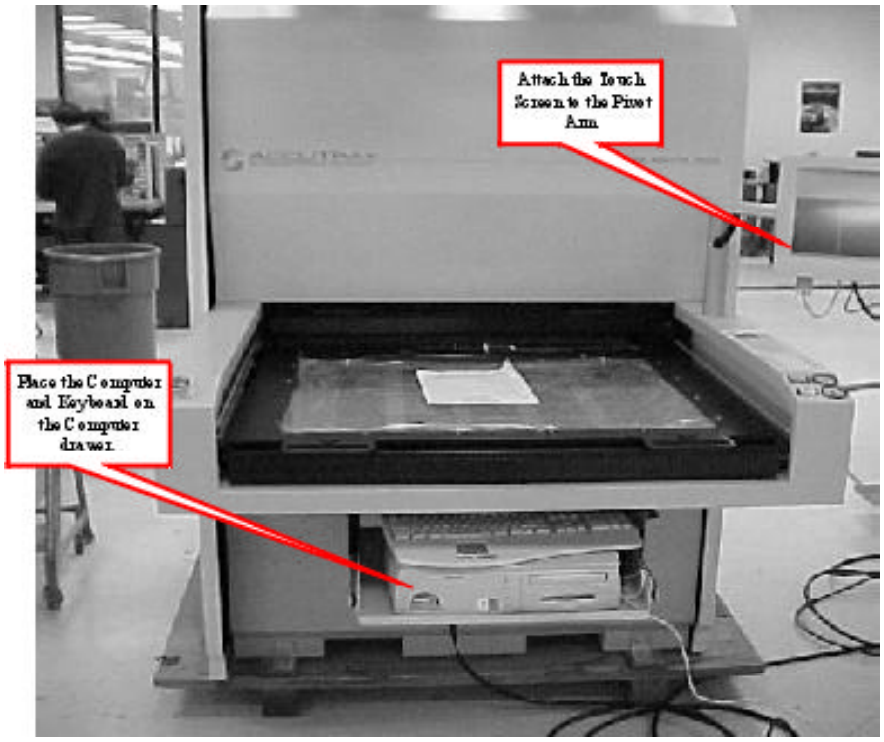


5. Remove tape that secures the upper and lower computer covers.
6. Cut the Tie Wrap and remove the foam from the Touch Screen pivot arm.

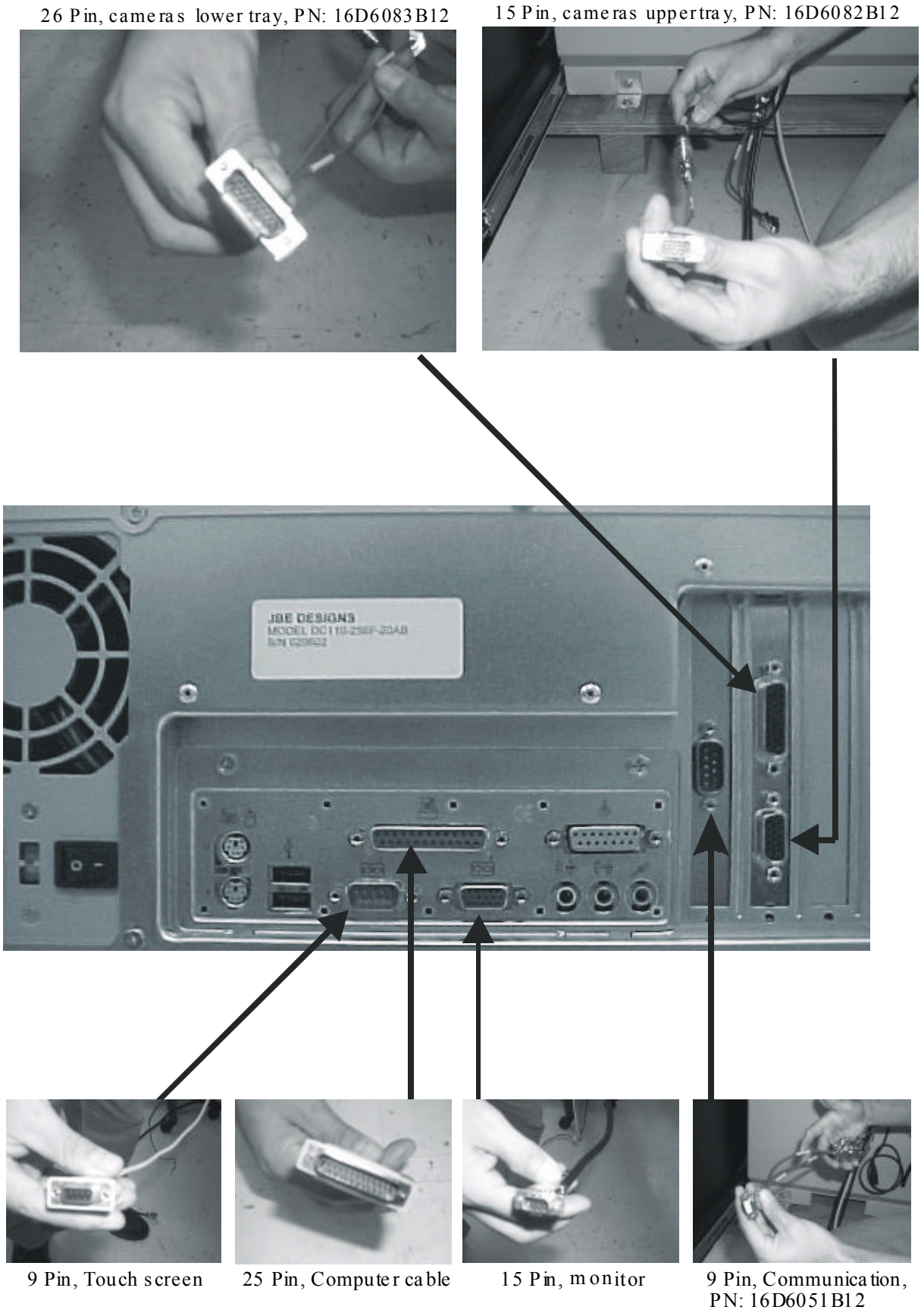




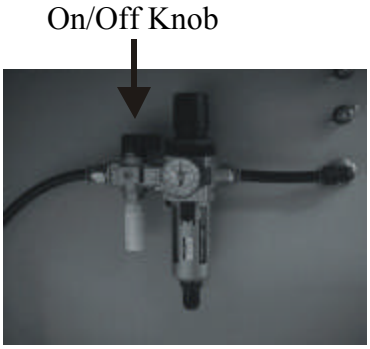
7. Attach the Touch Screen to the pivot arm. Place the computer and the keyboard on the computer drawer.



8. Connect Main Power, cameras, keyboard, touch screen, and optional mouse to the PCU as shown below.



9. Turn the airflow from the AT30 to the Accutray **ON** by turning the large black knob on the flow meter a quarter of a turn. The airflow should be as high as possible without exceeding 90 Psi.



10. Remove shipping security screws from topside of each tray. 2 each tray.

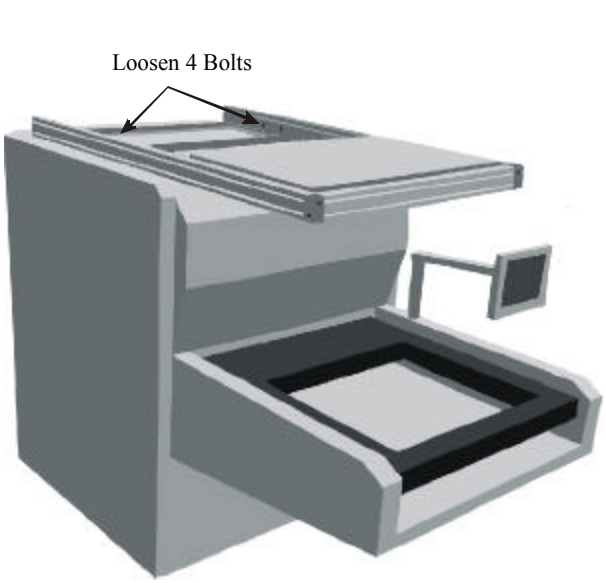
11. Cut tie wrap from camera arm belts. 2 each tray.

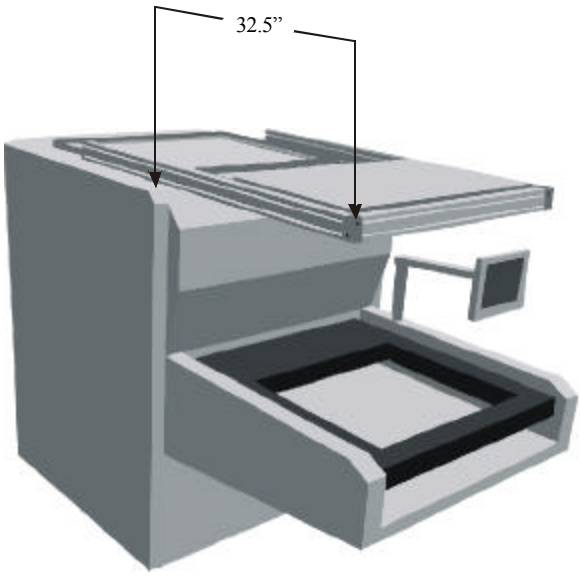
12. Remove shipping material and protective cover from glass surface.
13. Install blue lifting pins inside tray. 4 each tray.

Worklight Installation

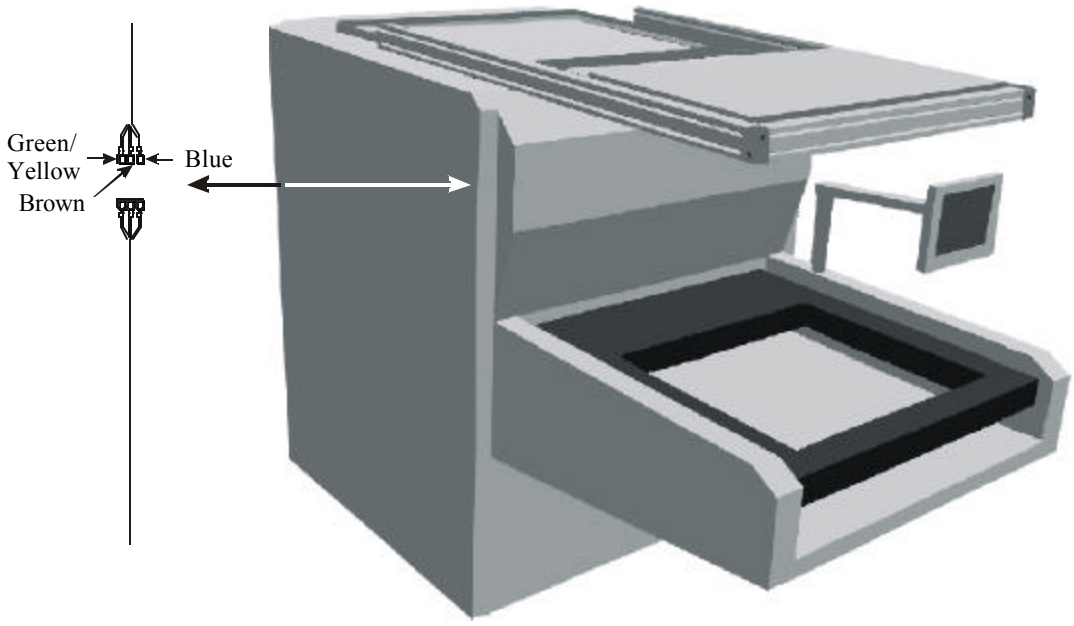
Placement of the worklight is critcal in providing proper illumination for the cameras.

1. Loosen (don't remove) the 4 mounting bolts.
2. Slide the worklight out until it is 32.5" from the top corner of the cabinet.
3. Tighten the mounting bolts to lock the light fixture into place.





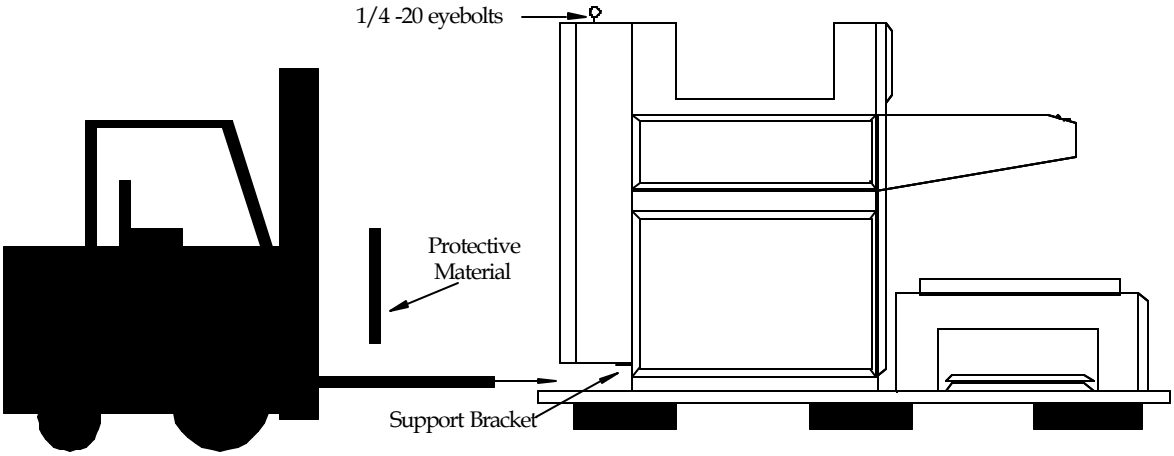
4. Route the power cable through the hole in the top of the cabinet, and connect to the corresponding cable inside.



Removing the AT42 printer from its pallet

Remove the Base section First

- Remove the four bolts holding the unit onto the pallet.
- Lift the unit from the rear with a fork lift and place it where there is room to work (make sure to place protective material between the forklift and the unit.



- Remove the Top Section from the Pallet.

Note: The following step is made easer if the base of the unit is leveled first.

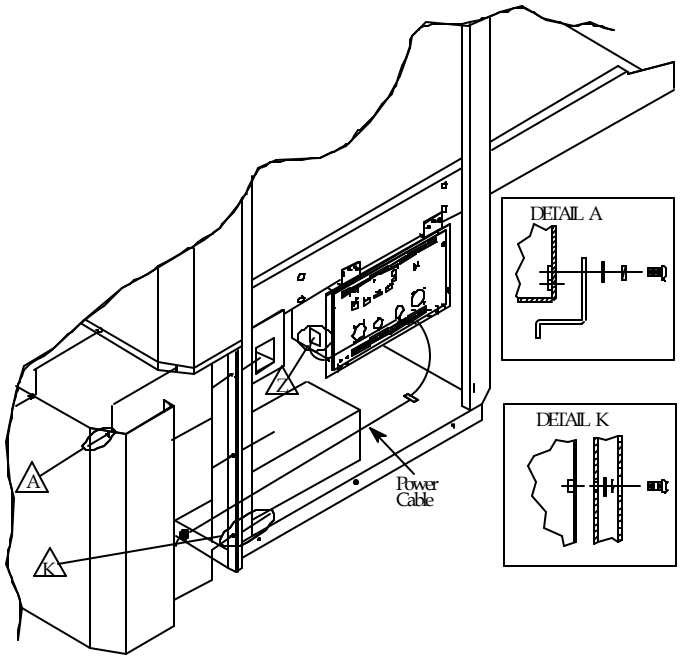
- Mount the top section onto the unit, align all bolt holes and insert the bolts and nuts then tighten them down.
- Make all wiring and vacuum connections between the top section and the
- Move the Heat Exchanger up to Operating Position

Note: This will now place the heat exchanger about a foot higher up on the unit than it was when shipped.

- Install eyebolts into the top of the heat exchanger and attach chain or heavy duty rope to the eyebolts for lifting. Or lift the heat exchanger from the bottom but make sure not to lift on the support bracket.
- While supporting the heat exchanger from the top or bottom remove the $^{1}/_{4}$ - 20 bolts from the support bracket.
- Install the support bracket onto the unit and tighten it down.
- Use the support bracket to balance the heat exchanger on the back of the unit.
- Insert and start all 10 mounting bolts then tighten them down.
- Level the AP42 / AP38 by using the 4 leveling feet.
- Connect the chiller hoses see section Cooling Connections.
- Have your Electrician hook up power see section Electrical Connections.

Connecting power to printer:

- Run the main power cord through the strain relief and into the tube on the lower right rear of the printer and up to the power control box on the left side (see diagram on right).



- Connect the main leads to the 4 position or 6 position terminal block and connect the ground lead to the single ground terminal (see next page for hook up).
- Reinstall the lower side door.
- Energize the main power circuit. You should hear the lamp head and power supply cooling fans go into a cool-down cycle. Ensure that the voltage select switch on the hinged control panel is switched to the lit LED.
- Install the lower front and rear black trim pieces over the forklift channels, using a $^{5}/_{32}$" Allen wrench.

Electrical Connections

3 phase (Wye)	See Figure A	3 wires + neutral + ground	380/415V~ 50 Hz, 24 amp.
3 phase (Delta)	See Figure B	3 wires + ground	208/240V~ 60 Hz, 44 amp.
3 phase (Delta)	See Figure C	3 wires + ground	480V~ 60 Hz, 18 amp.

We recommend installing a circuit breaker box within easy reach of the operator.

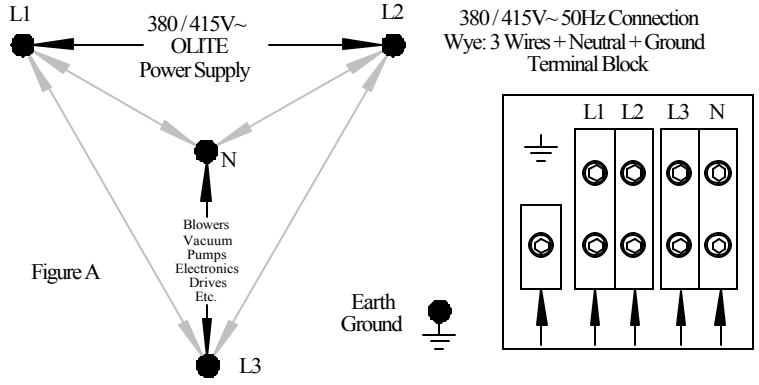


Figure A

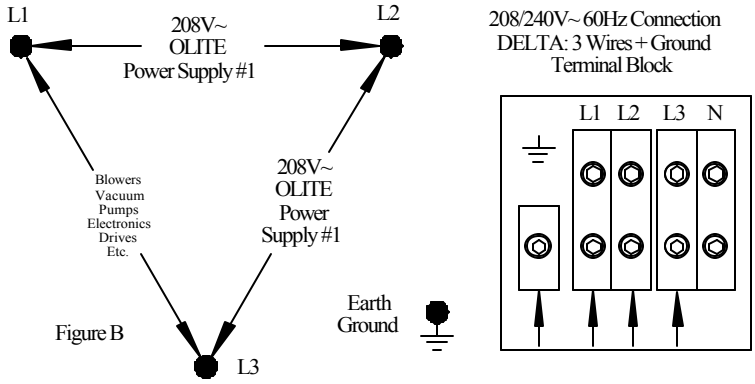


Figure B

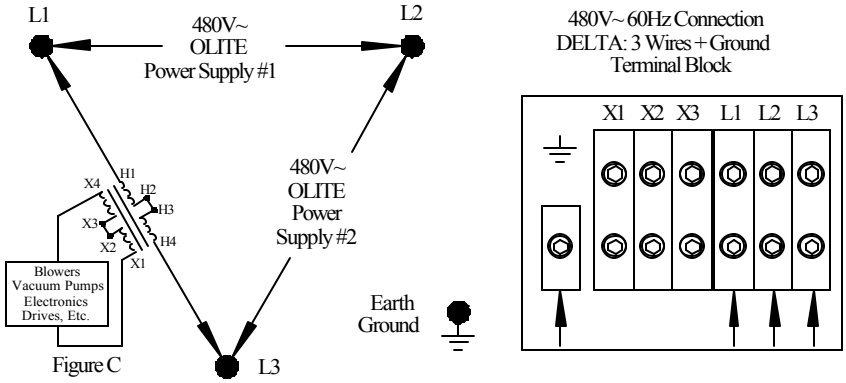


Figure C

Cooling Requirements

Minimum pressure and flow rate of the chilled water depends on input temperature. For proper cooling system selection, contact OLEC.

CAUTION

If water temperature and water flow do not meet the following specifications the unit will overheat, one or both lights sources will shut themselves off randomly under heavy usage and damage to the unit will be the result.

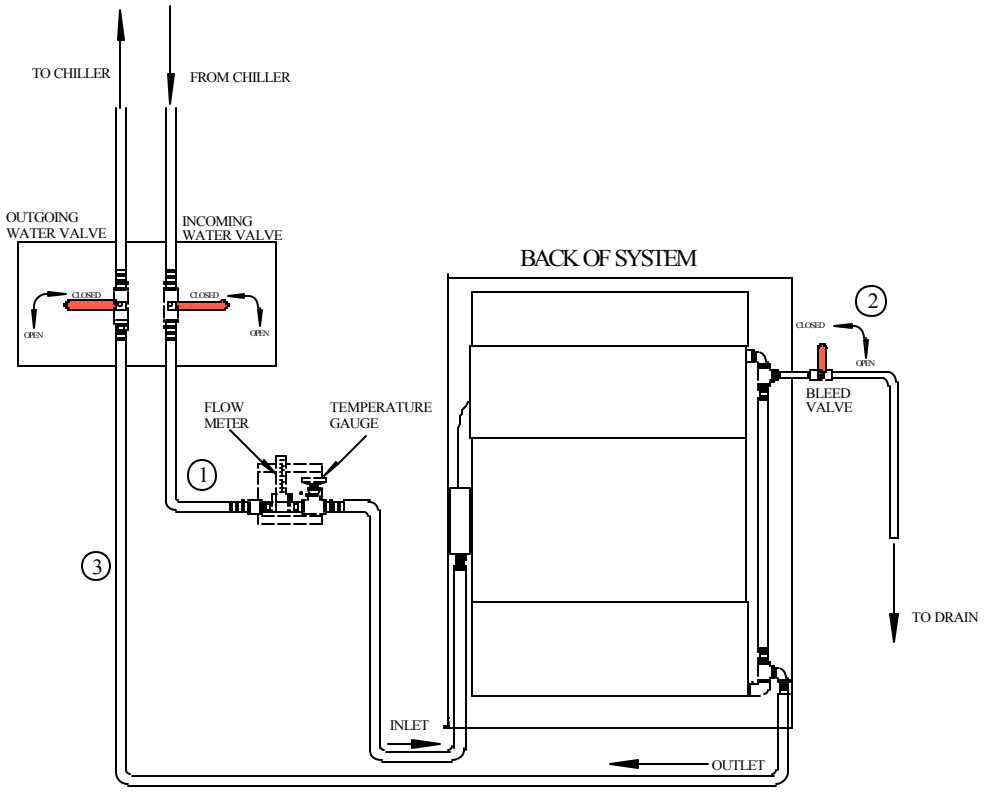
Cooling Requirements:	24,000 BTU / hr at idle	65,000 BTU / hr at full load
Compressed Air:	90 psi @ 12cfm	
Water Pressure:	26 PSI - 20 GPM @ 50°F (75.7 LPM @ 10°C)	10 PSI - 10 GPM @ 45°F (37.9 LPM @ 7°C)

Connecting the Chiller

- Mount the Flow Meter and Temperature Gauge assembly on a wall in the upright position.

CAUTION The Flow Meter and Temperature Gauge assembly must be mounted level or the Flow Meter will not function properly.

1. Connect the hose from the chiller outlet to the to the flow meter.
2. Connect another hose from the temperature gauge to the Closed Loop inlet.
3. Connect the hose from the Closed Loop outlet to the chiller inlet.



Filling and Bleeding the Closed Loop System

Make sure that all hoses and fittings are tight before proceeding. When filling and bleeding the closed loop system, it is recommended that the chiller be bypassed, so as not to deplete the water level in the chiller reservoir. Once the air is bled out of the system, the chiller should be activated.

CAUTION If the Closed Loop System is not filled properly the unit will overheat, one or both lights sources will shut themselves off randomly under heavy usage and damage to the unit will be the result.

Verify the Temperature Setting

Turn the main power on.

Turn the integrator power on.

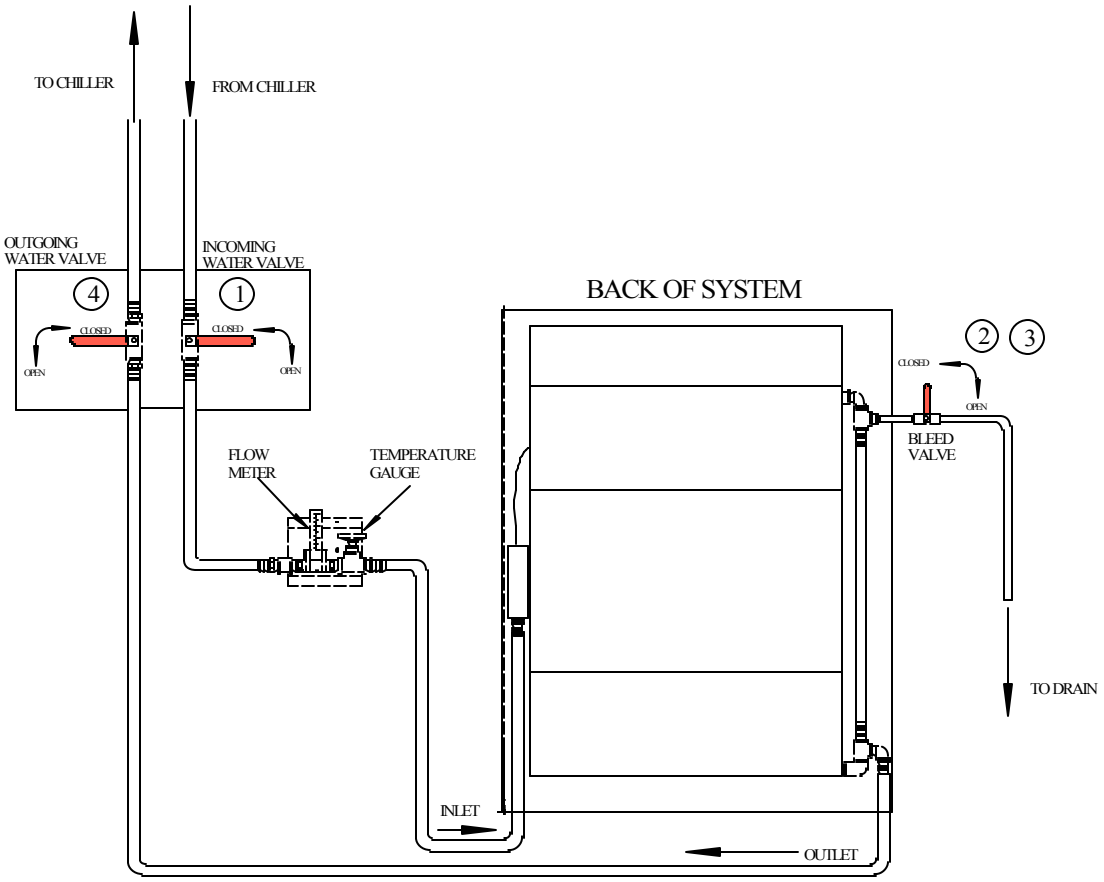
On the integrator, adjust the temperature setting from 20º Celsius to 12º Celsius. Doing this will open all three of the closed loop valves.

- Press 1 2 3 4.
- Press .
- Press repeatedly until the temperature setting mode is selected.
- Press to make a change to the current value.
- Enter a value of 12º Celsius for the temperature setting.
- Press to save the change in memory.
- Press to exit the Setup Mode.

Verify that all three of the valves are open by checking the LED indicators on the cooling control PCB.

1. Open the incoming water valve. Leave the outgoing water valve closed.

   The system will fill with water.
2. Slowly open the bleed valve. Check the flow of the water until it flows evenly from the bleed valve (no air bubbles).
3. Close the bleed valve.
4. Open the outgoing water valve.
5. Activate the chiller.



6. Returning to the integrator, reset the temperature from 12º Celsius to 20º Celsius. Installation complete.

Closed Loop System Troubleshooting.

- Make sure temperature and pressure in the system meets those in the Cooling Requirements section.
- Make sure the air in the system is properly bled.
- Make sure the four blowers in the back of the unit are all spinning.

  Turn the unit off and wait for the cool down cycle to finish.

  Remove the upper and lower rear panels.

  Remove the rear plate and turn the unit on to inspect the blowers.
- Check the 3 flow solenoids feeding the heat exchangers to make sure they are operating.

  Turn the unit off and wait for the cool down cycle to finish.

  Open each side door and unplug the 5 pin din plug in the front of each light source power supply then close both doors.

  Remove the bottom rear panel in the back of the unit.

  When looking at the back of the unit locate the 3 flow solenoids on the left side just at the bottom of the top rear panel .

  Pull the solenoid coils off the solenoid valve base. The coils are retained by a spring clip and should pull off easily. Do not remove the spring clip from coils.

  Set the temperature of the unit to 100°F (20°C) and turn the unit on. The flow meter should read no flow.

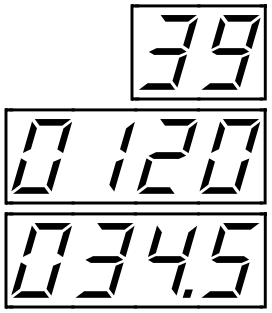
  Turn the unit off and reconnect one of the coils and turn the unit back on. The flow meter should show water flowing through the unit. Turn the unit off and disconnect the coil. Repeat for each of the other two coils.

  If water does not flow with any of the coils connected, go to the J1 connector on the 64AX501V01 PCB and measure for 240V~ from pin 6 (white) to pin 3 (black) for valve #1, pin 6 (white) to pin 2 (green) for valve #2, and pin 6 (white) to pin 1 (red) for valve #3.

5. Integrator Functions and Features

Microprocessor-controlled light integrator with LED display, 40 memories, battery backup, single button control, lamp statistics and self-diagnostics. The operator control panel is composed of two sections, the display board and the memory board.

Note: The number of digits in each window.

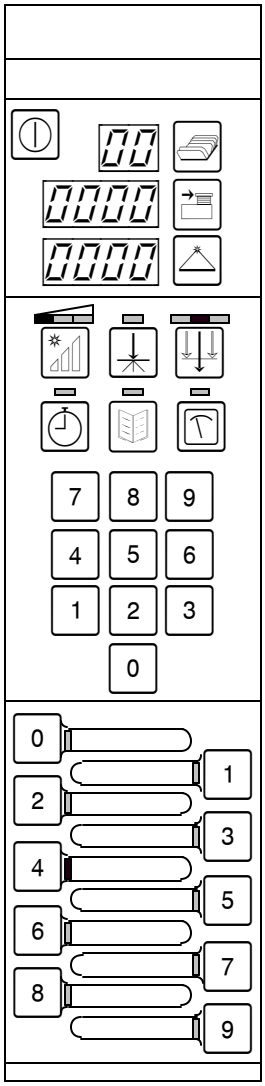


Memory Window

Vacuum Window

Exposure Window

Integrator



POWER

Press the power button on the integrator to turn the AT30 on or off. When the unit is off, the light system blowers will run for about two minutes to cool the lamp.

MEMORY

Pressing the memory key will advance the memory location. The display will show which memory is selected.

VACUUM

Press the vacuum key and use the numerical keypad to enter a vacuum delay time. The window shows the delay in seconds.

EXPOSURE

Press the exposure key and use the numerical keypad to enter an exposure. The window shows the exposure units selected. This key can also be used to move forward through the selectable features in the setup mode.

INTENSITY

Press this key to select Low, Medium or High power. LEDs lit will indicate the level selected.

DIFFUSER

Press this key to select the motorized diffuser option.

FILTER

Press this key to select the motorized filter option.

SECONDS

Press this key to expose by time, not integrated light units. This key also can be used to move backward through selectable features in the setup mode.

MENU

This key is used as the autostep indicator and for the continuous vacuum feature.

Note: **MENU** Special Function

The key has the optional function to be used to set auto-step and continuous vacuum per memory in normal operating mode. The frame control switch feature must be turned ON and the automatic vacuum feature must be turned OFF. Press the key the memory window will read AC and the exposure window will read ASEP. Press the key to turn auto-step function ON or OFF. Press the key the memory window will read AC and the exposure window will read CUAC. Press the key to turn continuous vacuum function ON or OFF.

MEASURE

This key is used to check the lamp intensity.

0 - 9 **NUMERICAL KEYPAD**

These keys are used to enter the vacuum time, exposure units, and to access a particular memory location.

0 - 9 **INSTANT MEMORY KEYPAD**

The AT30 has 40 independent memory locations, the first ten of which are on the lower section of the integrator for instant access. There is a space provided to write down the application of these memories. Simply press the lower 0 through 9 key that corresponds to the most commonly used applications.

Feature Quick Reference

The following feature descriptions appear in the exposure window while setting each feature. In order to select or setup the following features you must first be in the setup mode.

Lock Level Feature

Lock Code Feature

2 (two) Value Exposure Feature

Motorized Filter Feature

Single Surface Exposure Feature

Exposure Count Feature

Frame Control Switch Feature

Automatic Vacuum Feature

Auto Step Feature

Vacuum Delay Feature

Frame Speed Feature

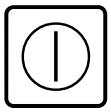
High Temperature Alarm Point Feature (Optional Feature)

Set Point Temperature of the Cooling System (Optional Feature)

Hysteresis in the Temperature Control System (Optional Feature)

System Type Setting Feature

Operator Control Panel



The AT30 heavy duty exposure system has a power key on the integrator.

- Press the ⏻ key to turn on the unit.
- Press the ⏻ key again after use, and the system will run through a 2 minute cool down cycle and then turn off all blowers.

STOP Button

- Press the STOP button once. Frame movement will stop.
- Press the STOP button once more, the frame will return, at slow speed, to the original position and vacuum will turn off.
- Press the STOP button twice to cancel an exposure.
- Holding the STOP button down then pressing the GO button starts a blank cycle - no vacuum or exposure.

GO Button

- Press the GO button once to initiate vacuum drawdown on the exposure frame.
- Press the GO button a second time to move the frame into the unit and start an exposure.
- If frame switch FrC1 and auto vacuum AUAC are turned on, press the GO button once to move the frame into the unit and start an exposure.
- If frame switch FrC1 and auto vac AUAC are turned on, press the GO button once without opening the upper or lower frame will start a blank frame cycle - no vacuum or exposure.

Note: If a vacuum delay dUAC is used, the exposure will not begin until the vacuum delay time has counted down.

Table Showing the 12 Calibration Positions

UE Upper Frame, Top Surface	1st	5th	9th
Ub Upper Frame, Bottom Surface	2nd	6th	10th
LE Lower Frame, Top Surface	3rd	7th	11th
Lb Lower Frame, Bottom Surface	4th	8th	12th

Calibration Procedures

Note: TheAT30 high resolution printer has been calibrated at the factory.

Note: The following calibration procedures can be applied to all three light intensities, if starting calibration from scratch. To adjust existing calibration set the integrator to 500 mj and make the exposure. Increase or decrease the calibration number the same percentage the 500 mj is off.

- Press the ⏻ key on the integrator to power up the lights, the front switches, and the printer's computer system.

Note: Allow the printer a 5 minute warm-up period before any calibration procedures. This will allow for complete and accurate light level stabilization.

- Press the integrator key to select the desired light level to be calibrated, always start at Low Intensity.

For 8kW	Low 2000 W	Medium 5000 W	High 8000 W
For 6kW	Low 2000 W	Medium 3500 W	High 6000 W
For 5kW	Low 1000 W	Medium 2500 W	High 5000 W

- In order to prevent possible damage to the high resolution printers Mylar® while calibrating we recommend you set the no vacuum feature.
- Press the key on the keypad, the Memory and Exposure windows will dim.
- Press the 9 key three times.
- Press the key once. This will prevent vacuum while calibrating. The Vacuum window will read ---.
- The high resolution printer's calibration has been set at the factory.

Upper frame top surface

Upper frame bottom surface

Lower frame top surface

Lower frame bottom surface

Note: Preset all 12 calibration factor numbers to 500 units. Place a slim UV meter facing up on the center of the top frame, below the Mylar®.

- Enter a 500 unit exposure into the integrator. Be sure the seconds mode is off.
- Press the GO button twice. This will send the frame into the unit and start the exposure.
- After the exposure, retrieve your frame by holding down the STOP button and press GO button. When the frames start to move, release both buttons.
- Record the resulting mj reading from the meter.

Example: Let's say our 500 unit exposure gave us 600 mj. That means we got 1.2 mj per unit or a 1.2:1 ratio. The objective is to get a 1:1 ratio. To get that we would multiply our current calibration number of 500 by 1.2, 500 x 1.2 = 600.

- Since we are working with the Upper Tray Top Surface or [UE], we have to change the preset 500 to 600.
- Change to 600 as described earlier in Calibration Procedures Section.

Remember: The lower the CAL number, the longer the exposure and the higher the mj reading.

- Now make a 500.0 unit exposure with the UV meter and record the resulting mj reading. It should be 500 ±3%. Perform this procedure on the remaining three surfaces.

Press [1],[2],[3] then [4] on the numerical keypad. The Vacuum window will read [SEL]. This places you in select mode.

- Press the [⇥] key once and press the [0] key to clear, then [⇥] key, then the [0] key to activate the vacuum after being turned off earlier in this procedure.

Changing the Calibration Number

- Press the [↑] key on the integrator. The Memory window will read [UE], the Exposure window will show the existing calibration number for the top surface of the upper frame at the selected intensity.
- Press the [⇥] key to select frame surface ([UE], [Ub], [LE], [Lb]).

Remember: For top frame calibration use [UE] and [Ub] and for bottom frame calibration use [Lb] and [LE]. Also, the larger the calibration number the faster that surface will count and the less accumulated energy will result on the frame.

- Enter the new calibration number on the desired surface by pressing [△] key to open the program, then use numerical keypad.

Example: To change [UE] from 500 to 650 simply press [6],[5],[0],[0].

- Press the [△] key to close the program.
- Press the [0] key twice to return to the operating mode.

Matching Exposure Surfaces

- Do a test exposure in the frame being calibrated to the reference frame.
- Determine the correction necessary to make each surface the same at the reference surface. If this is done with a step scale the correction is as follows.

.15 Density Scale	
Step	Correction
-2.00	0.50
-1.75	0.55
-1.50	0.60
-1.25	0.65
-1.00	0.71
-0.75	0.77
-0.50	0.84
-0.25	0.92
0.00	1.00
0.25	1.09
0.50	1.19
0.75	1.30
1.00	1.41
1.25	1.54
1.50	1.68
1.75	1.83
2.00	2.00

.05 Density Scale	
Step	Correction
-2.00	0.79
-1.75	0.82
-1.50	0.84
-1.25	0.87
-1.00	0.89
-0.75	0.92
-0.50	0.94
-0.25	0.97
0.00	1.00
0.25	1.03
0.50	1.06
0.75	1.09
1.00	1.12
1.25	1.15
1.50	1.19
1.75	1.22
2.00	1.26

Press [1],[2],[3] then [4] on the numerical keypad. The Vacuum window will read [SEL]. This places you in select mode.

- Then press the [⏉] key and the exposure window will show previous calibration number. There is a separate number for each intensity. Select the intensity to be adjusted with the [☼] key.
- Read the current calibration number and multiply it times the correction. For example if you double the calibration number, the integrator will count twice as fast consequently the exposure energy will be cut in half.

Press [1],[2],[3] then [4] on the numerical keypad. The Vacuum window will read [SEL]. This places you in select mode.

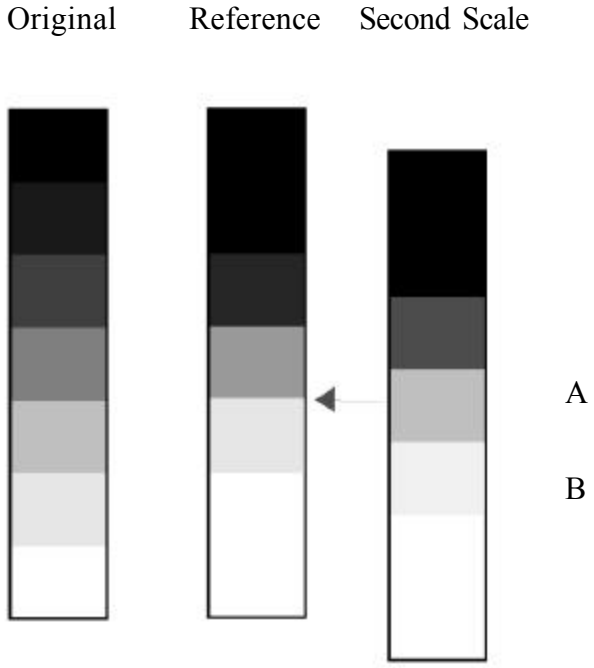
Then press the [⏉] key and the exposure window will show previous calibration number. (for example [1063.]).

- Press the [⏢] key, the memory window will dim and you will be able to enter the new calibration number by pressing the new number into the key pad.

Splitting Steps

A densitometer can be used to assist in determining a fractional difference in step scales. When measuring density, make several measurements to avoid being influenced by pinholes.

Example



- Pick a step from the reference with a density greater than .15 and less than 2.0.
- Find the steps on the second scale that straddle the first. In the example the reference is .30, step "A" is .24 and step "B" is .40. (Ref. - A) / (B - A) = .06 / .16 = .375. The example step is .375 steps under the reference.

Matching with a meter

If an integrating meter is available that has a photocell that matches the film, it can be used to match the surfaces. We recommend that the results be verified on film.

- Make a reading on the reference surface and then the surface to be adjusted.
- Divide the reading on the surface to be adjusted by the reading from the reference surface.
- Multiply the current calibration number by the result above.

6. Integrator Program Set Up

To Enter the Select Mode

Note: This step must be followed in several of the program set ups.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1, 2, 3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

Lock Level Feature

The lock levels are provided to keep operators from accessing any features and functions that should be left alone. There are five different lock levels available. Lock levels 1 - 3 allow the locking of individual memory locations, while lock levels 0 and 4 apply to all of the memory locations.

- Level 0 - No locks. Most of the features and functions can be accessed by any operator.
- Level 1 - Locks functions per memory (seconds, exposure, vacuum, intensity, filter, diffuser) to prevent accidental changes to these settings. Locks on individual memories may be turned ON and OFF without the need to enter a code.
- Level 2 & 3 - Locks functions per memory similar to lock level 1, except once lock is turned ON for a particular memory, it may not be turned OFF again without entering the lock code. Also locks the parameters on the set up menu so they cannot be changed without entering the lock code.
- Level 4 - Locks all functions. A code is required to change any operating parameters.

Note: You *must* ensure the lock level is set to 0 before continuing with the Integrator Program Set Up Features and the exposure memory options detailed below in Lock Level Description and Operation. When programming is completed return to Lock Level Feature and set the desired lock level.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1, 2, 3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

Press the ▤ key once, the Exposure window will read LocK.

- Press the ⇥ key once.
- If the Lock Level is set at 0 or 1 the Memory and Exposure windows will dim. Enter the lock level desired.

- Press the [→≡] key to set entry.
- If the Lock Level is set for 2, 3 or 4, the Exposure window will read [codE]. Enter your 3 digit code.
- Press the [→≡] key.
- Press the [0] key.
- Press the [→≡] key.

Note: If you want a higher Lock Level after you have completed the Integrator Program Set Up and/or made any changes return to Lock Level Feature and set the lock level described in Lock Level Description and Operation).

Lock Level Description and Operation

Lock Level 0

The Vacuum window will read [0000].

Lock Level 1

The Vacuum window will read [000 1]. Locks functions for seconds, enter, vacuum and intensity per memory. Once this mode is turned ON and the set up programing has been completed, enter all needed information into a memory location. Then press the [📖] key, the Memory window will read [Ac] and the Exposure window will read [LocK]. Press the [→≡] key to turn the lock for this memory ON or OFF, then press the [📖] key. When the lock is turned ON, a decimal point will be displayed after each digit in the Memory window.

Lock Level 2, 3

The Vacuum window will read [0002] or [0003]. Locks functions for seconds, enter, vacuum and intensity per memory and Integrator Program Set Up Features. Before this mode is turned ON, enter all needed information into a memory location. Then press the [📖] key, the Memory window will read [Ac], the Vacuum window will read [oFF] and the Exposure window will read [LocK]. Press the [→≡] key to turn the lock ON or OFF for this memory. When the lock is turned ON a decimal point will be displayed after each digit in the Memory window. Once this level is turned ON you will not be able to unlock the features described above without the Lock Code. See Setting or Changing your Lock Code Feature.

Lock Level 4

The Vacuum window will read [0004]. This locks all functions. When the lock is turned ON, a decimal point will be displayed after each digit in the Memory window. Once this level is turned ON and the set up programing has been completed, before you can change any programed features or the exposure statistics you must use the Lock Code to set the Lock Level back to 0, see Setting or Changing your Lock Code Feature.

Setting or Changing your Lock Code feature

Note: If you are setting the code you must know the existing code.

Note: Lock Level *must* be set to 0 to program this step and reset when finished see Lock Level feature.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1,2,3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the ▭ key once. The Memory window will read Su.

Press and release the △ key until the Exposure window reads codE.

- Press the ↵ key the Memory and Exposure windows will dim. Enter your new 3 digit code
- Press the ↵ key to set entry.
- Press the 0 key twice to exit this mode.

To Clear Lamp Statistics

CAUTION This step clears all lamp statistics explained in sections Lamp Statistics.

Note: You can abort clearing the lamp statistics by pressing the 0 key before the display counts down to SEL and you will not change any memory and exposure statistics.

Note: Lock Level *must* be set to 0 to program this step and reset when finished, see Lock Level feature.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1,2,3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the 7 key five (5) times.
- Press the 0 key once to exit this mode.

To Clear Memory and Exposure Statistics

CAUTION This step clears all information stored in the memory.

Note: You can abort clearing the memory by pressing the 0 key before the display counts down to SEL and you will not change any memory and exposure statistics.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1,2,3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the 9 key five (5) times.
- Press the 0 key once to exit this mode.

Two Value Exposure Mode

Note: The two value mode enables the operator to run a different job or resist on each frame. With this feature turned ON, a value entered in the Vacuum window becomes an exposure value. For instance, if you enter 800 in the Vacuum window and 450 in the Exposure window, during an exposure both surfaces on the upper frame will receive 800 mj while both surfaces on the lower frame will receive 450 mj. To activate this option:

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1, 2, 3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the ▤ key once. The Memory window will read Su.

Press and release the △ key until 2UAL is displayed in the Exposure window.

- Press the ⇥ key to cycle mode ON or OFF.
- Press the 0 key twice to exit this mode.

Split Exposure Mode

The split exposure mode works in conjunction with the previously mentioned two value mode. It enables the user to select separate exposure values for the upper and lower surfaces of each frame, in case different exposures are required for each surface of the panel. An exposure can be entered in the center display which will be used on the top surface of each frame and a separate exposure value can be entered in the lower display which will be used on the bottom surface of each frame.

Note: The two value mode MUST be selected ON for the split exposure mode to function.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1, 2, 3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the ▤ key once. The Memory window will read Su.

Press and release the e key until SPLIT appears in the Exposure window. This places you in the split exposure option.

- Press the ⇥ key to cycle the split exposure mode ON or OFF.
- Press the 0 key twice to exit this mode.

Single Surface Mode

The printer may be programmed to use the top light only, the bottom light only, or both lights. For exposing phototools or single sided exposures, you may want to use only one light. Each of the 40 memories is independent, to allow for any combination you wish on a particular memory. While programming:

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1,2,3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the ▤ key once. The Memory window will read Su.

Press and release the e key until SSur appears in the Exposure window. This places you in the single surface mode.

- Press the ⇄ key to turn the single surface option ON or OFF.
- Press the 0 key twice to exit this mode.

Note: Press the 📖 key to activate feature in operating mode so that the Memory display reads Ac and the Exposure display reads [SUrF]. Press the ⇄ key to select bottom bot, top toP or both both. Now press the 📖 key. If you have selected both lamps, the left memory digit is complete and means upper and lower lamps are selected. If you have top lamp only, the left memory digit displays upper segment only and means only the upper lamp is selected. If the left memory digit displays lower segment only it means only the lower lamp is selected.

Board Count Display Mode

The printer will constantly display all the exposure information. With the board count display option turned ON, the Vacuum window will show a running total of the number of exposures that have taken place. This can be very useful in verifying that all exposures were made for a particular job.

Note: It is recommended to leave this feature OFF when the two value or split features are activated. To activate the board count display option:

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1,2,3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the ▤ key once. The Memory window will read Su.

Press and release the e key until bcnt appears in the Exposure window. This places you in the board count option.

- Press the [≡] key to cycle the board count ON or OFF.
- Press the [0] key twice to exit this mode.

Frame Control Interface Mode

The frame control interface works in conjunction with each frame's magnetic switch. If either frame is open, motorized transport will not function. This prevents inadvertent frame movement with the outer frame open. It is recommended that this safety feature be turned ON at all times. In the event of a switch failure or a unit without switches, it can be bypassed.

Note: This safety feature will always be ON unless you turn it OFF. To deactivate the frame control interface mode:

- Press the [①] key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press [1],[2],[3] then [4] in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the [▭] key once. The Memory window will read Su.

Press and release the [△] key until FrCL appears in the Exposure window. This places you in the frame control interface mode.

- Press the [≡] key to cycle the frame control interface mode ON or OFF.
- Press the [0] key twice to exit this mode.

Automatic Vacuum Mode

The automatic vacuum mode allows the printer to start vacuum automatically by closing the frame. If a preset vacuum delay is used, such as default vacuum delay, the center display will show the vacuum countdown. The [◇GO] button then only needs to be pressed once to start frame movement. With this feature turned ON, a blank frame cycle will be initiated simply by pressing the [◇GO] button once when the frame has not been opened. To activate this option:

- Press the [①] key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press [1],[2],[3] then [4] in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the [▭] key once. The Memory window will read Su.

Press and release the e key until AUAC appears in the Exposure window. This places you in the automatic vacuum option.

- Press the [≡] key to cycle the automatic vacuum mode ON or OFF.
- Press the [0] key twice to exit this mode.

Auto Step Mode

Note: This feature allows you to run a series of exposures in sequence.

Note: If Auto Step is selected, the LED over the [book] key will indicate if the feature is ON or OFF. If ON, press the [→≡] key to turn it OFF.

- Press the [ⓘ] key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press [1],[2],[3] then [4] in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the [≡] key once. The Memory window will read Su.

Press and release the [△] key until ASTP appears in the Exposure window. This places you in the autostep option.

- Press the [→≡] key to cycle the Auto-Step mode ON or OFF.
- Press the [0] key twice to exit this mode.

Set Default Vacuum Delay

Note: This feature is used to provide sufficient vacuum drawdown time before exposure. The time begins when the frame lid is closed with the VAC turned ON, or when you press the [◇GO] button for the first time. If you press the [◇GO] button again before the vacuum delay counts down, the frame will move into the cabinet, but the exposure will not start until the time is completed.

Note: This default delay time will be ignored if a delay time other than 0 has been programed into the memory location being displayed.

- Press the [ⓘ] key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press [1],[2],[3] then [4] in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the [≡] key once. The Memory window will read Su.

Press and release the [△] key until the Exposure window reads dVAC.

- Press the [→≡] key and enter the time you wish the vacuum turned ON before the exposure begins. The time you selected has now been programed for all memories.
- Press the [0] key twice to exit this mode.

Tray Mode

CAUTION The default tray speed is set at the factory to 5 seconds. OLEC does not recommend changing this setting without consulting the OLEC factory. Damage to the transport can occur.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

  Press 1, 2, 3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.
- Press the ▤ key once. The Memory window will read Su.

  Press the △ key until trAY appears in the Exposure window.
- Press the ▤ key once. The Vacuum window will read ---- and the Exposure window will read code. If lock mode was turned ON, enter your code now, then press the ▤ key, (If the lock code has never been changed *section 4.3*, the default code is 000).
- Enter the time you wish to have the tray speed set for. For example, for a 5.0 second travel time, press 5, 0 and then press the ▤ key again the Memory window and Exposure window will return to normal brightness.
- Press the 0 key twice to exit this mode.

High Temperature Alarm Point

There are three parameters in the setup menu to control the operation of the cooling system.

Press 1, 2, 3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the ▤ key once. The Memory window will read Su.

  Press the △ key until ALAt appears in the exposure window. This is the high temperature alarm point. If the measured temperature exceeds this setting (in degrees Celsius), the controls will beep and the

Vacuum window will read error Err and the Exposure window will read 0012. This message must be cleared before any other operation may be performed.

Note: No exposure may be done as long as the temperature remains above the high temperature alarm point.

The error message will be displayed about every 30 seconds as long as the temperature remains above the alarm temperature.

Set Point Temperature

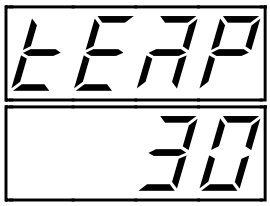
The second parameter is tEMP.

This determines the set point temperature of the cooling system and is entered in degrees Celsius.

To enter the desired temperature:

Press the keys [1],[2],[3] then [4] in sequence. The Vacuum window will read SEL. This places you in the select mode.

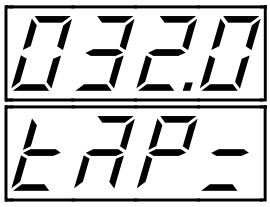
- Press the [▤] key once, the Memory window will read Su.



Press the [△] key until tEMP appears in the Exposure window. This places you in the Set Temperature mode.

To enter a new temperature setting, press the [→≡] key and then the desired temperature (such as 30º Celsius)by pressing the [3] then [0] keys in sequence, then press the [→≡] key again.

To display the actual current temperature:



Press the [✳] key and the temperature inside the unit will be displayed in ºCelsius in the vacuum window.

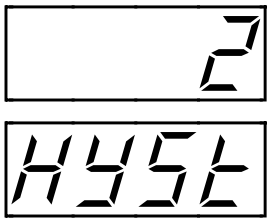
Hysteresis Setting

This determines the amount of hysteresis in the temperature control system, or how much the temperature must change between the point where the cooling system turns on, and the point where the cooling system turns off again. It also determines how far the temperature must rise above the set point before the cooling system automatically changes from medium cooling to high cooling.

Note: This is factory set to 2º Celsius in order to keep the cooling system from cycling on and off too often.

Press [1],[2],[3] then [4] in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the [▤] key once. The Memory window will read Su.



Press and release the [△] key until HYSt appears in the Exposure window. This places you in the set hysteresis option.

To enter a new hysteresis setting, press the [→≡] key and then the desired hysteresis (such as 2º) by pressing the [2] key, then press the [→≡] key again.

- Press the [0] key twice to exit this mode.

Type Mode

CAUTION The type has been set at the factory and should not be changed. Proper operation of the unit will be affected if changed.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

  Press 1, 2, 3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

- Press the ▤ key once. The Memory window will read Su.

  Press the △ key until TYPE appears in the exposure window. This places you in the System Type option.

- Press the ▤ key once. The Vacuum window will read ---- and the Exposure window will read CodE. If lock mode was turned ON, enter your code now, then press the ▤ key, (If the lock code has never been changed, the default code is 000).

  Press the ▤ key to cycle the Vacuum window to read AP30. This setting applies to both the AP30 5kW and AP30 8kW, air conditioned and closed loop models.

- Press the 0 key twice to exit this mode.

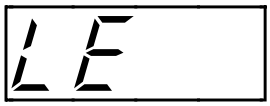
Exposure Statistics (Elapsed Hours)

Note: The exposure statistics should be reset to zero when the lamps are changed.

Note: This provides the operating hours on the lamps in total and at each intensity since the last reset. This function should be used whenever the exposure lamps are replaced.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

Press 1,2,3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.



Press the 1 key. The letters LE will appear in the Vacuum window. The Exposure window will display the exposure time, in seconds, of the last exposure, regardless of its memory position or intensity.

Press the 1 key a second time, the letters tot will appear in the Vacuum window. The total elapsed time, in hours, that the unit has been ON will be displayed in the Exposure window.

Press the 1 key a third time. The letters tCr will appear in the Vacuum window. The elapsed time, in hours, that the lamp has been used at medium power will show in the Exposure window.

Press the 1 key a fourth time. The letters tLo will appear in at the Vacuum window. The elapsed time, in hours, that the lamp has been used at low power will show in the Exposure window.

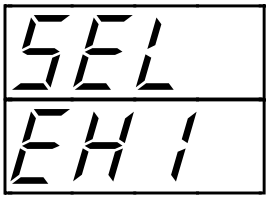
Press the 1 key a fifth time. The letters tH1 will appear in the Vacuum window. The elapsed time, in hours, that the lamp has been used at high power will show in the Exposure window.

- Press the 0 key twice to exit this mode.

Exposure Statistics (Total Exposures)

Note: To find out how many exposures your system has made since the last reset.

Note: The exposure statistics should be reset when the lamps are changed.



- Press the ① key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

  Press 1, 2, 3 then 4 in sequence. The Vacuum window will read SEL. This places you in the select mode.

  Press the 2 key. The letters EH1 will appear in the Vacuum window. The Exposure window will display the number of exposures made at high power.

  Press the 2 key a second time. The letters ELo will appear in the Vacuum window. The Exposure window will display the number of exposures at low power.

  Press the 2 key a third time. The letters ELr will appear in the Vacuum window. The number of exposures at medium power will be displayed in the Exposure window.

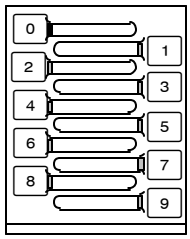
- Press the 0 key twice to exit this mode.

Selecting a Memory Location

- Press and release the key on the operator control panel to cycle through the 40 memory locations (0-39).
- You may go to a particular memory by entering the desired memory number on the numerical keypad on the integrator.

  EXAMPLE: Enter a desired memory number, e.g. 12. Press the corresponding keys, [1] then [2] on the numerical keypad, then press the key.

Quick Keypad



Instant access by pressing any of the memory locations from 0 to 9.

Entering an Exposure Time

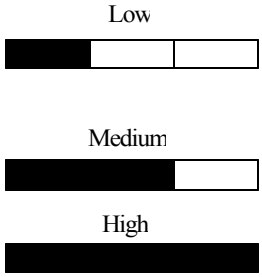
Press the key on the integrator.

Note: The Memory and Vacuum windows will dim.

Enter desired exposure time by depressing corresponding number on key pad. For example [1],[8],[2],[5]

- Press the key to confirm the entry.

Setting the Light Intensity



- Press the key to set intensity. Press for the first time. The first LED on the left indicates the intensity is set to low (1kW on 5kW units, 2kW on 8kW units).
- Press: I for the second time. The first two LEDs light to indicate the intensity is set to medium (2kW on 5kW units, 4kW on 8kW units).
- Press: key for the third time. All three LEDs light to indicate the intensity is set to high (5kW on 5kW units, 8kW on 8kW units).

Optional: Press the key to set for time or integrate mode. The LED ON indicates a timed exposure and OFF an integrated exposure.

Note: During operation, ensure that the mode is OFF.

Blank frame cycle

To change frame position with no vacuum or exposure:

Note: If FrCL is turned ON and you do not open the frame, press the GO button and the frame will move in without vacuum or exposure.

Front right arm of operator control panel

- Press and hold the STOP button.
- Press the GO button.
- Release both buttons when the frames start moving

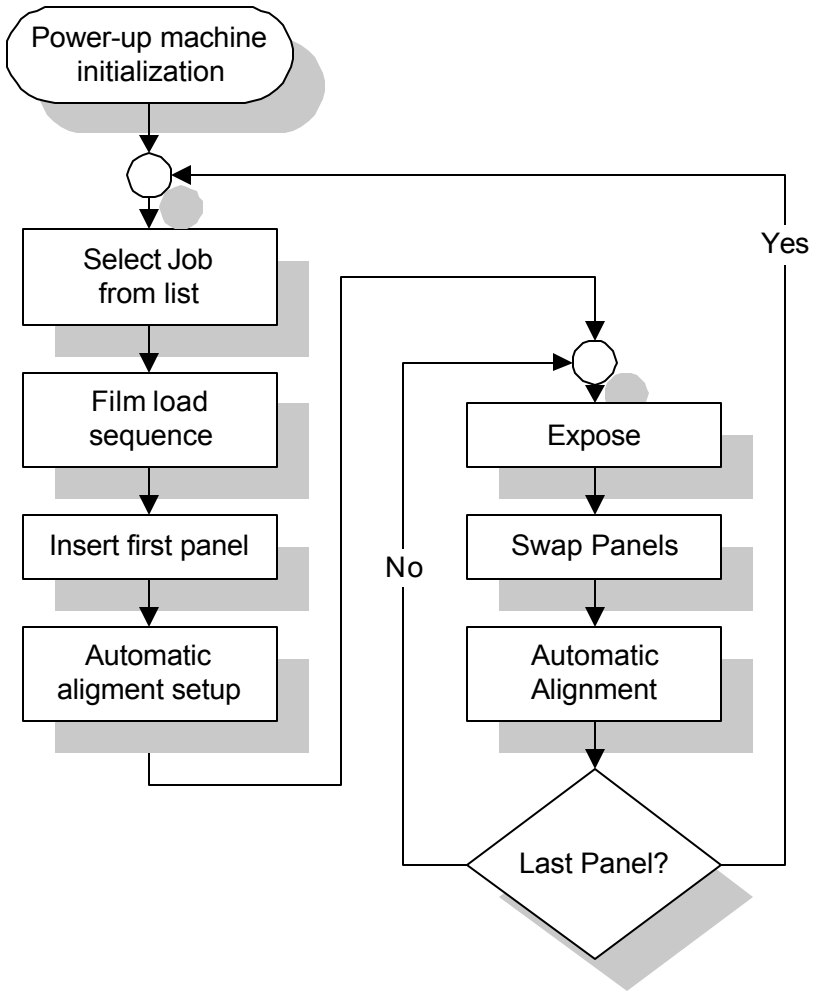
7. Operating the AccuTray

User Interface

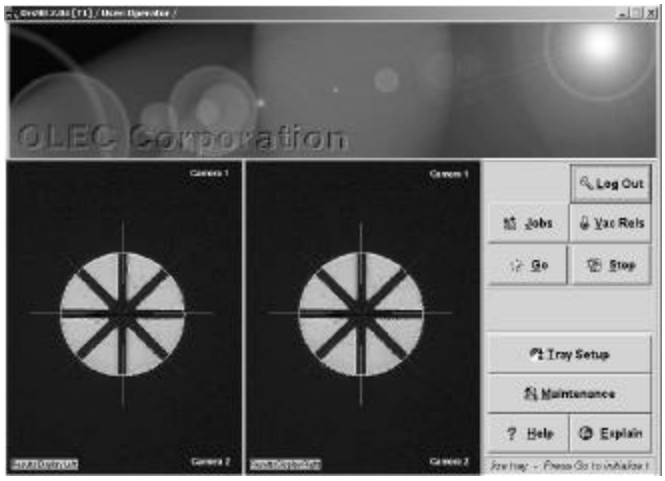
The AccuTray™ is controlled with a LCD touch screen display. The graphical user interface allows the operator to select previously stored "jobs" and operate the machine with step by step prompts. The supervisor or lead can setup presets "jobs" by type or part number. The stored presets contain type of registration, dimension and tolerance information. Data is maintained by "job" preset so that the QC department can view the historical alignment and optimize production by scaling. Setup diagnostic and maintenance functions can be performed directly from the user display.

Operational Overview

The operation the AccuTray™ is similar to a conventional glass tool. The powerful alignment functions are performed by the computer. The operator is assisted by the informational display with graphics prompts and even built in instructional videos. Basic operation is illustrated by the following flow chart.



The control system will guide and prompt the operator through the film load procedure. The scrolling message at the lower righthand corner of the touchscreen describes the next action to be taken.



Scrolling Message

The sequence and delays are programmed to ensure simplicity and security. The pop-up window shows the sequence as the film is loaded. The computer will monitor the operator by sensing the operator motions on the frame.

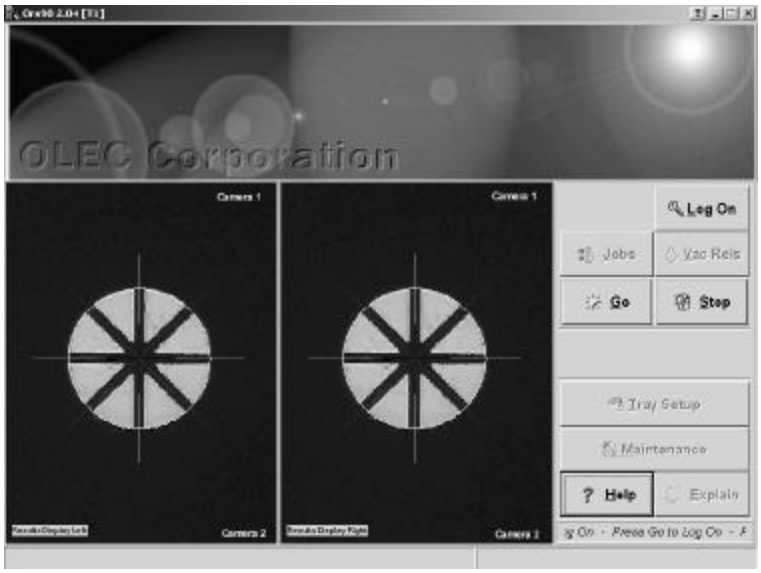
Power Up Sequence

1. Press the ⏻ button on the integrator control panel. This will apply power to the AT30.
2. Press the bottom button on the computer located underneath the AT30 nose piece. Press the "Power" button on the computer touchscreen.

3. Wait for Windows to start up.
4. The "ORS98" program will activate automatically.

Note: If the program needs to be re-started at any point, simply double click on the icon shown above (from the Windows desktop).

When the start-up sequence is complete, the screen will appear as below.



Password Protection

There are two kinds of users; operators and supervisors. There are separate passwords for each.

Operator and Supervisor Access

Operators have access to all functions needed to run the AT30. The operators select their own passwords, but only the supervisor can change passwords and create new logon names. Supervisors also have access to create new jobs or edit existing jobs, and to the maintenance mode.

Setting Up Passwords

After the ORS98 program is started for the first time, the supervisor must press the "Log On" button in the upper right side of the screen. Note that most of the buttons on the screen are disabled.

The Log On dialogue box will appear. Click on the arrow next to the word "operator" and the "supervisor" prompt will appear.

Select "supervisor".

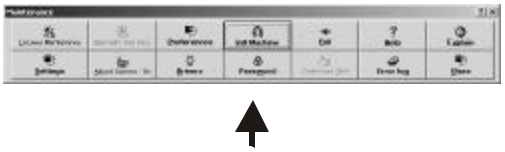
You will be asked to enter a password. The **default supervisor password is *OLEC17112**. Enter the password and click on OK or press enter.

Note that the buttons that were disabled become active.

Adding Operators

Note: This function can be performed by the supervisor only. The supervisor password must be entered to gain access to the Password Maintenance screen.

Press the Maintenance button on the main screen.



Press the password button on the Maintenance screen.

Enter the name of the new user, then enter the password for that user.

Re-enter the password for verification, then press the Create button.

The system confirms the creation of the new user. This name will now appear in the list of users displayed at the “Log On” prompt.

Deleting Operators

Note: This function can be performed by the supervisor only. The supervisor password must be entered to gain access to the Password Maintenance screen.

Press the Maintenance button on the main screen.

Press the password button on the Maintenance screen.

Select the user name to be deleted.

Press the delete button.

The system asks you to confirm the deletion. Once the user is deleted, the name will no longer appear in the list of users displayed at the "Log On" prompt.

Changing Passwords

Note: This function can be performed by the supervisor only. The supervisor password must be entered to gain access to the Password Maintenance screen.

Press the Maintenance button on the main screen.

Press the password button on the Maintenance screen.

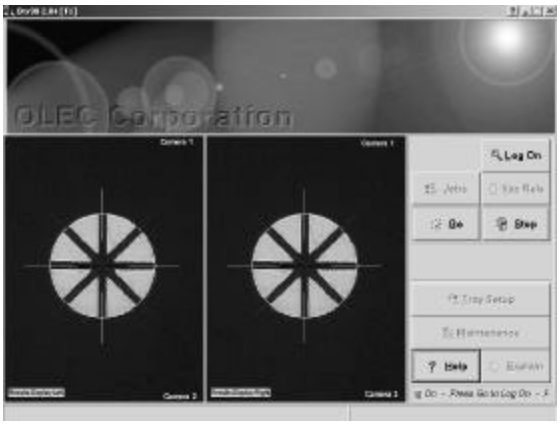
Select the user or supervisor name that requires the password change.

Type the new password in the password box, then re-enter the password for confirmation. Press the "Change" button.

The system confirms the password change for that user. Once the user's password has changed, the old password will no longer be valid when logging on.

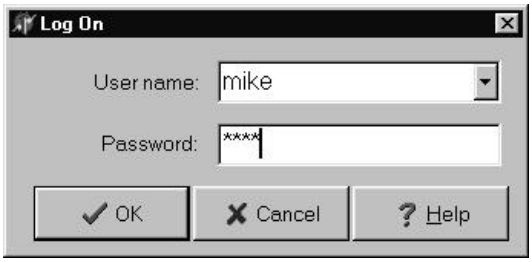
Logging On to the System

After the ORS98 program is started, the user must press the "Log On" button in the upper right side of the screen. Note that most of the buttons on the screen are disabled.



The Log On dialogue box will appear.

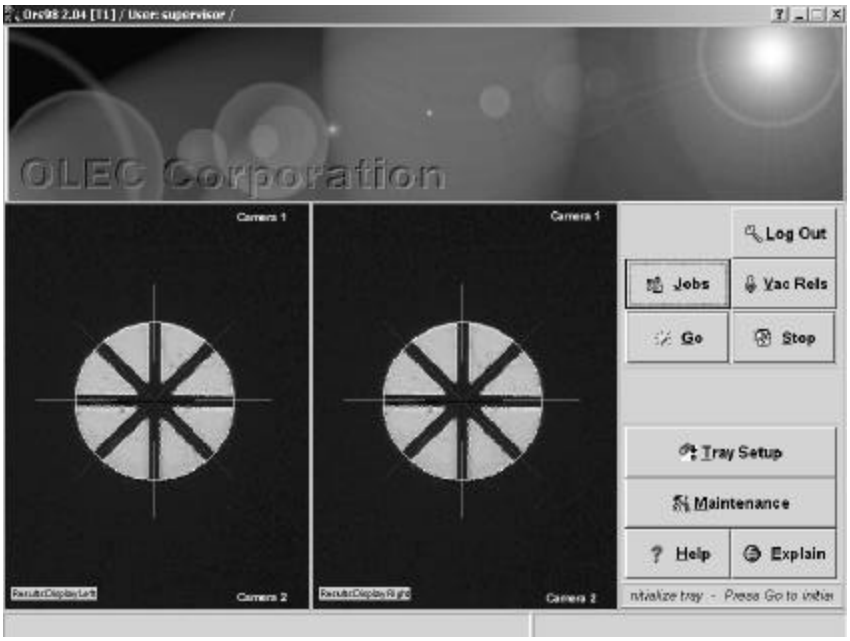
Click on the arrow next to the word "operator" and select your name from the list that is shown.



The user will be asked to type their name and their password. Click "OK" or press the Enter key. Note that the buttons that were disabled become active.

Note: Initially, the user name will display "operator". The default password for this is also **operator**. This will remain in the user list until the supervisor removes or changes it.

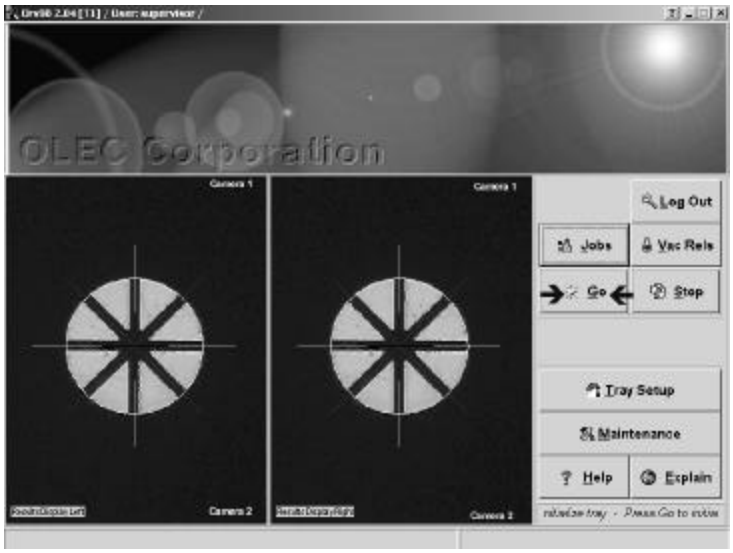
Once the proper password has been entered, the display should look as it does below.



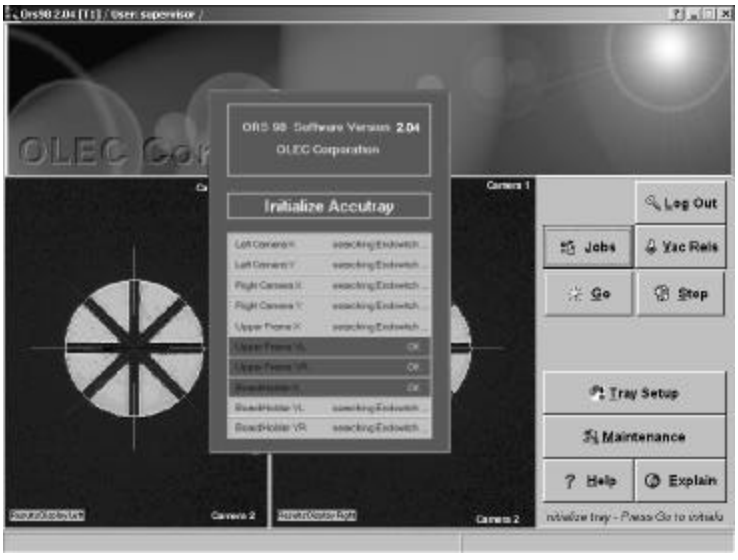
Initializing the AccuTray

Note: Remember to refer to the scrolling message in the lower righthand corner of the touchscreen.

1. **Press the** button on the touchscreen, or the GO button on the AT30 to initialize the AccuTray.



2. The cameras will move to their home position. A window displays the initialization sequence.



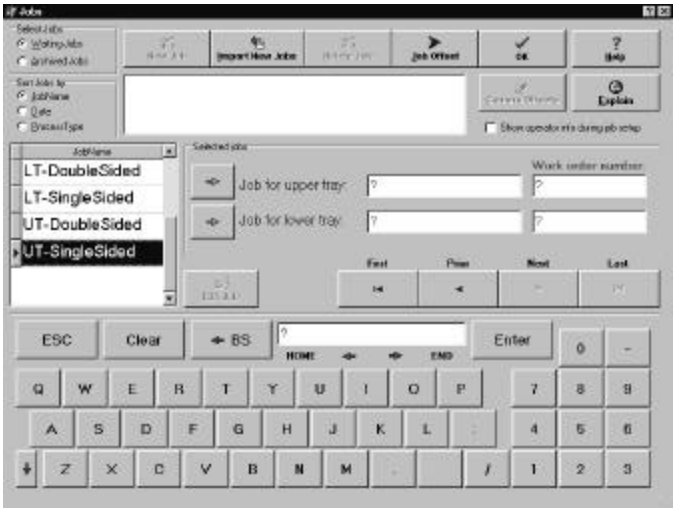
3. Once the initialization sequence is complete, the dialogue box will dissappear.

Selecting Jobs

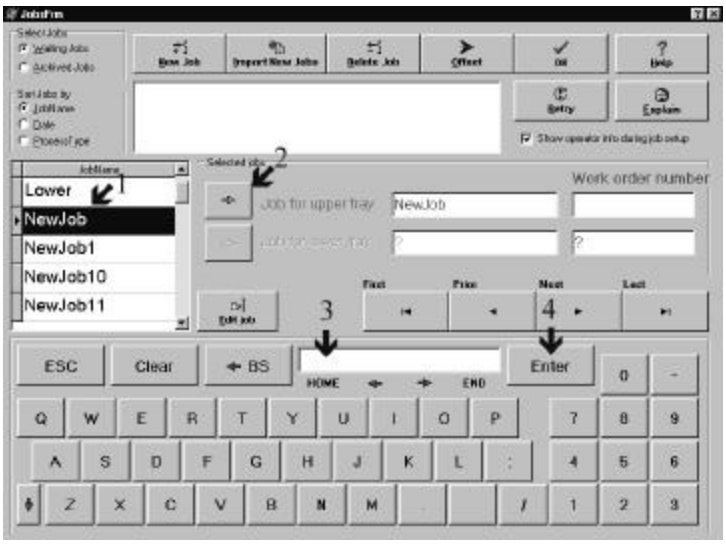
Press the [ ] button on the touchscreen, or the [GO] button on the AT30 to select a job and work order number.

Note: Each job has its own set of parameters that must be assigned when the jobs are created. Refer to Chapter 8 - "Creating Jobs".

Select a job from the list on the left side of the touchscreen. You can select a job for the upper tray only, lower tray only, or both trays, depending on where the AccuTray(s) is installed.



1. Select the job from the job table on the left of the touchscreen and click on it. It will be highlighted in blue.



2. Assign the job to the proper tray by pressing the arrow next to the upper or lower tray text box.
3. Assign a Work Order number in the text box.
4. Press Enter. The touchscreen will automatically return to the Main Screen, and the cameras will move into place. The Job Title and Work Order number assigned will appear in the upper left hand corner fo the display.

You are now ready to load film into the AccuTray.

Loading Films and Panels

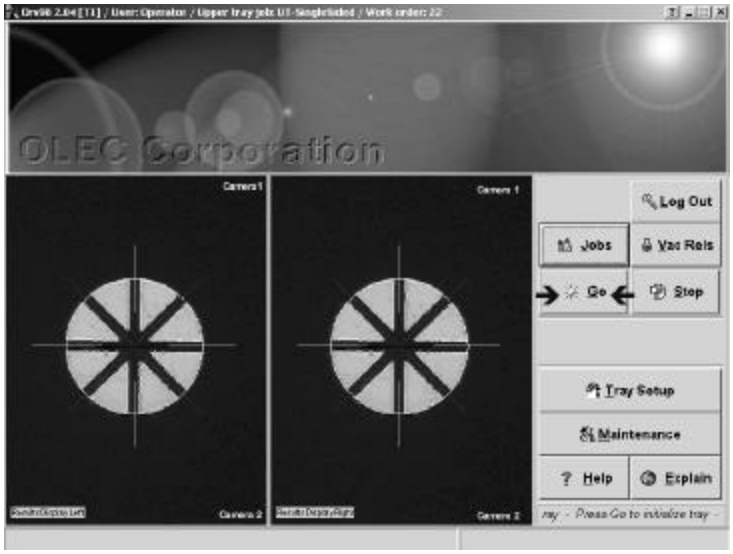
Once the appropriate Job and Work Order has been selected, the Film can be loaded into the AccuTray.

1. Press the [ ] button on the touchscreen, or the [GO] button on the AT30 to begin the film installation procedure.

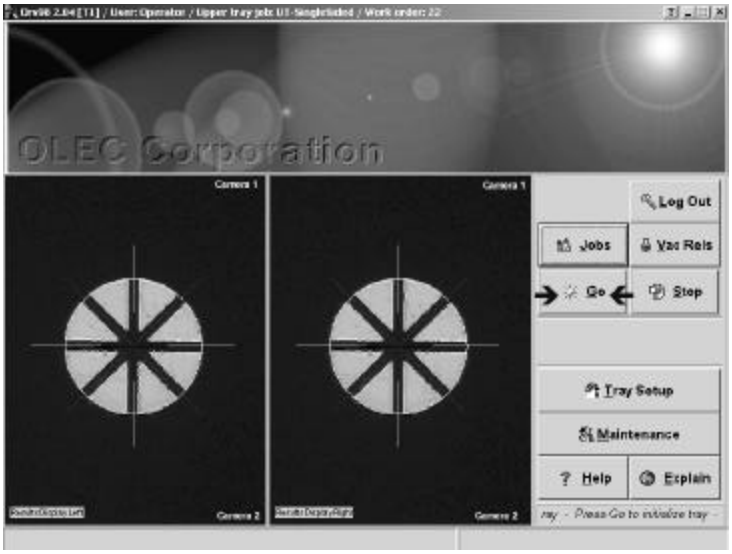
2. The alignment pins on the AccuTray will raise up. Open the frame.
3. Place the bottom piece of film ⊕ on the alignment pins, emulsion side up. Place the top piece of film ⊗ on the alignment pins, emulsion side down.
4. Close the frame.
5. Press the ✍Go button on the window, or the [GO] button on the AT30 to start the film setup procedure.

6. The main vacuum and film vacuum will turn on at this point.
7. Once vacuum has been successfully achieved, the main vacuum will release. The window prompts you to open the tray.
8. Load a panel onto the alignment pins. Close the frame.

9. Press the Go button on the touchscreen, or the GO button on the AT30 so the AccuTray can prepare the new job.



10. Press the [ ] button on the touchscreen **or** the [GO] button on the AT30 to align the films with the panel.



The AccuTray goes through an alignment routine that is specific to the first panel.

a) Aligns
b) Mis-aligns
c) Re-aligns
d) Draws vacuum
e) Calculates alignment distances
f) Re-aligns

Film only retry for double-sided soldermask

Note: If, in an attempt to align a double-sided soldermask panel the alignment fails due to a misalignment between the lower artwork and the panel, an error message reading "Open tray and release panel from lower artwork" will appear. The operator must at this point open the tray, replace the panel. When the tray is closed again the alignment will automatically restart. If the alignment fails due to film to film misalignment, the panel to lower artwork alignment position will stay the same, but the film to film alignment will be retried.

---

11. Once successful alignment has been achieved, press the [ ] or [GO] button to move the frame into the cabinet for exposure.

Note: Pressing the [ ] button twice at step #11 will automatically send the frame in once alignment is achieved. This action can be stopped at any time by pressing the Cancel button on the touchscreen.

12. Repeat the above process on the other frame (if used) at this time.
13. Once the exposure is complete, press the [GO] button to send the other frame into the cabinet.

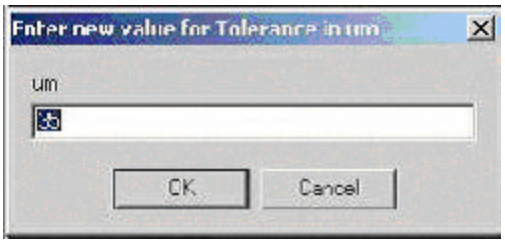
Glass Cleaning

During a job it is possible to move the cameras outside the image area and have easy access for cleaning of the bottom glass surface. In the maintenance screen by pressing the "camera out" button the cameras will move out of the way and allow the operator to clean the bottom glass surface. After the glass is cleaned the operator can place the next panel in the tray and press the "go" button to align the panel. The cameras will at this point automatically move back to their desired positions.

Changing PD -Tolerance or Tolerance during a job.

If a situation arises during production where one panel in a lot is not aligning because it is off by microns, the Tolerance value needs to be changed. It is no longer necessary to go to the jobs screen to change the PD Tolerance or the Tolerance during production. To change the tolerance value, press Ctrl+T and a dialog box will appear. Type in the new PD-Tolerance or Tolerance number in this box. This new number will be used until the next time the jobs screen is accessed or the software is turned off. The new number is not being stored permanently with the job.

Note: The Ctrl+T function can only be used in the supervisor mode or on machines that are not using the supervisor/operator log in feature.



Type the new Tolerance number in the provided space. If the job is created in um the information must be entered in um. If the job is set up using mils, the change must be entered in mils.

Alignment Results

The alignment results are displayed in a box located on the lower right side of the screen.

It will display the results calculated from both the left and right cameras.

Example: BF[X7 L-8 R-9] UF[X3 L-4 R-6]

X means in the X-axis.

L means left camera Y-axis.

R means right camera Y-axis.

Result numbers can be positive or negative.

Numbers preceded by a "-" are negative and mean to the left in the X-axis and down in the Y-axis.

The type of job selected determines the information that is shown.

For Double-Sided (Outer Layer) jobs,

BF is the result between the board and bottom film.

UF is the result between the board and the upper film.

For Single-Sided or Single Sided Soldermask jobs,

BF is the result between the board and bottom film.

For Inner Layer jobs,

F is the result between the top film and bottom film.

Tolerance and Alignment Tolerance Calculations and Display

This part of the result is displayed in the upper right side of the main screen if the operator selects to view the result screen as the machine is aligning.

"T/B Film Board Deviation" means the deviation between the board and bottom film. It is measured after alignment and before vacuum is drawn.

"Film Film Deviation" means the deviation between the top film and the bottom film. It is measured after alignment and before vacuum is drawn and the number displayed is an average value of the last five alignments.

In the above case the largest deviation between the Top film and the panel is location "D" which is 88um too large. The largest deviation between the Bottom film and panel is location "B" which is 80um too large, and so on.

FilmFilmDeviation = -73 is the location where the difference in size between the two films is largest. In this case the largest deviation between the two films is between the two adjustable cameras, where the difference between the films is 73um. The top film is 73um smaller than the bottom film.

Since both of these numbers are before vacuum is drawn, you cannot calculate them from the after vacuum camera results.

The deviation is used to show a trend during a production lot, and is plotted on the graph at the top of the display screen.

Film Board Deviation is graphed as lower film / panel.

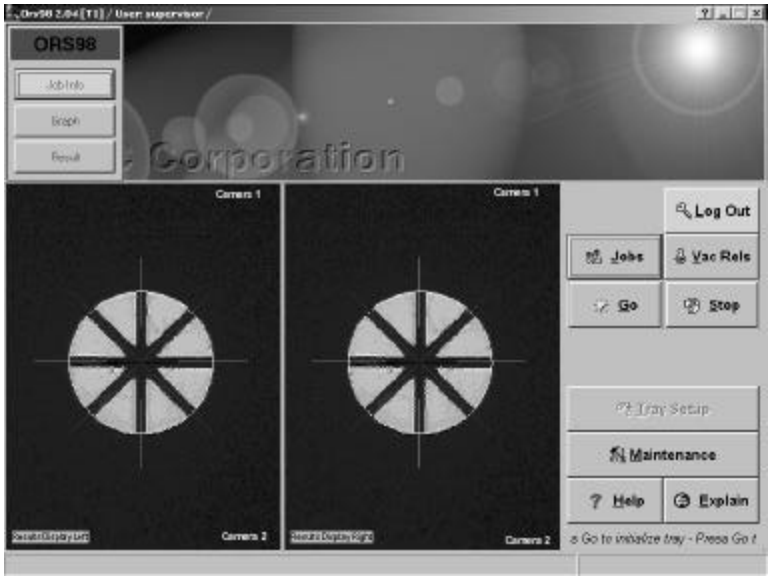
Film Film Deviation is graphed as upper / lower film.

Upper film / panel on the graph is calculated from the two.

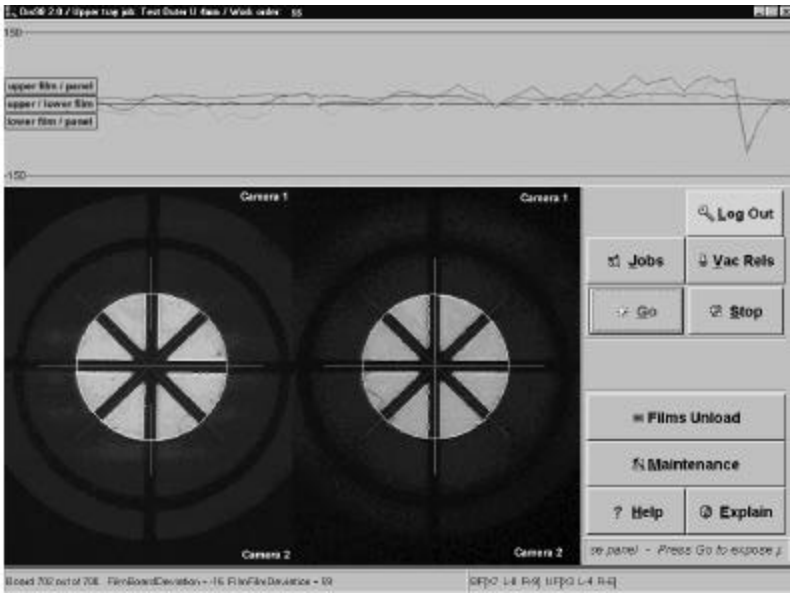
The deviation must be less than "Tolerance" set in the job edit screen.

The reference point for all measurements is the bottom film.

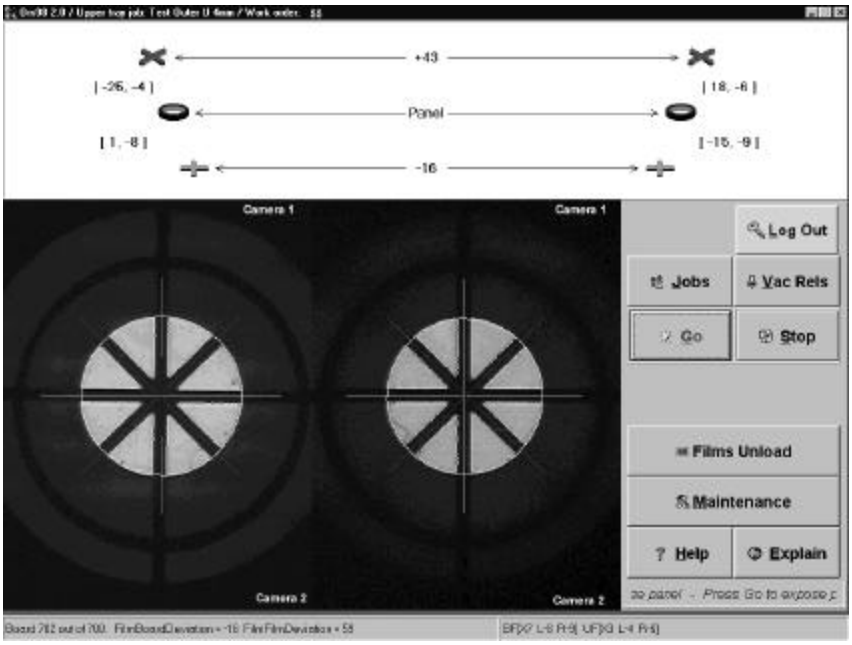
The alignment results can be viewed graphically. Double click on the upper third portion of the touchscreen. A menu will appear on the left.



Press the"Graph" button to display the graph shown below.



Press the"Result" button to display the graph shown below.

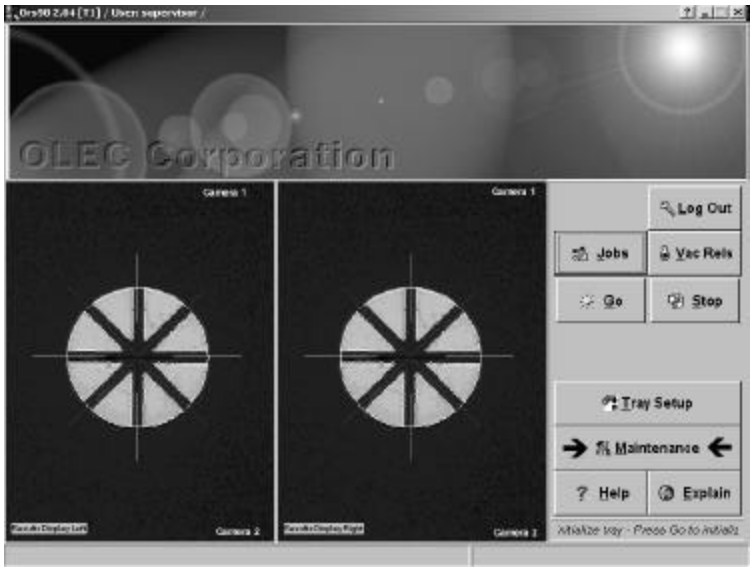


The result of each alignment can be viewed on the top part of the main screen. By double clicking the OLEC Corporation area on the main screen and selecting the result button, an image of the last alignment will appear on the top part of the screen. For all panel alignment process types the results includes the deviation between the panel and the top film, the deviation between the panel and the bottom film, right and left camera positions relative alignment in [x, y] coordinate style. For inner-layer the results includes film to film deviation, and relative alignment for both camera positions. For single sided and single sided solder mask the results includes panel to bottom film and relative alignment for both camera positions.

Maintenance Screen

Note: The supervisor password must be entered to gain access to the Maintenance screen.

Press the Maintenance button on the main screen.



Lo Level Maintenance

Used to activate Camera Motors, Valves, Vacuums, Pins, and Stop/Go buttons manually.

Remote Service

Not used at this time.

Preferences

Shows a listing of all Accutray setup parameters. This screen is "read only" - settings cannot be changed from this screen.

Init Machine

Used to initialize the Accutray.

Settings

Selected parameters can be set from this screen.

Adjust Cameras - On/Off

This button must be **On** to perform the following adjustments: camera, perpendicularity, focus, pixel, and blackout/rotation. See Chapter 5 of Service manual for details on these adjustments.

Password

Used to assign and change operator and supervisor passwords. See the page 7-4 for details.

Cameras Out

Press this button to move the cameras to their outermost position. This allows easier access to the glass for cleaning.

Error Log

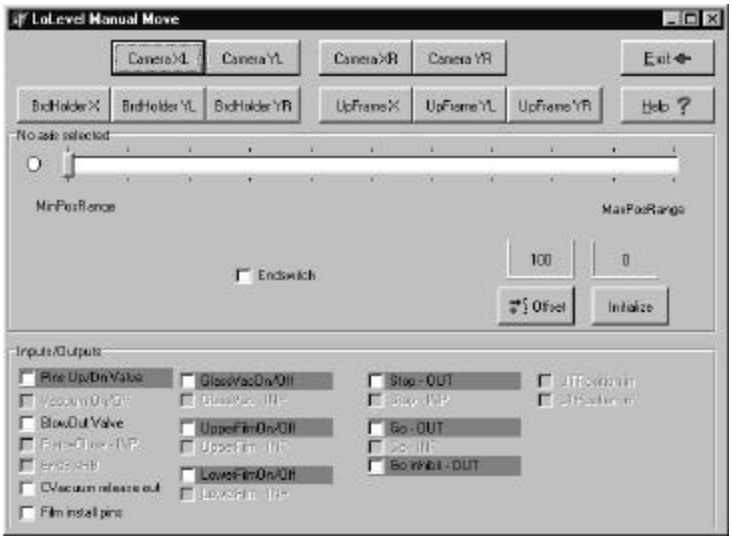
Used to keep a record of errors for analysis.

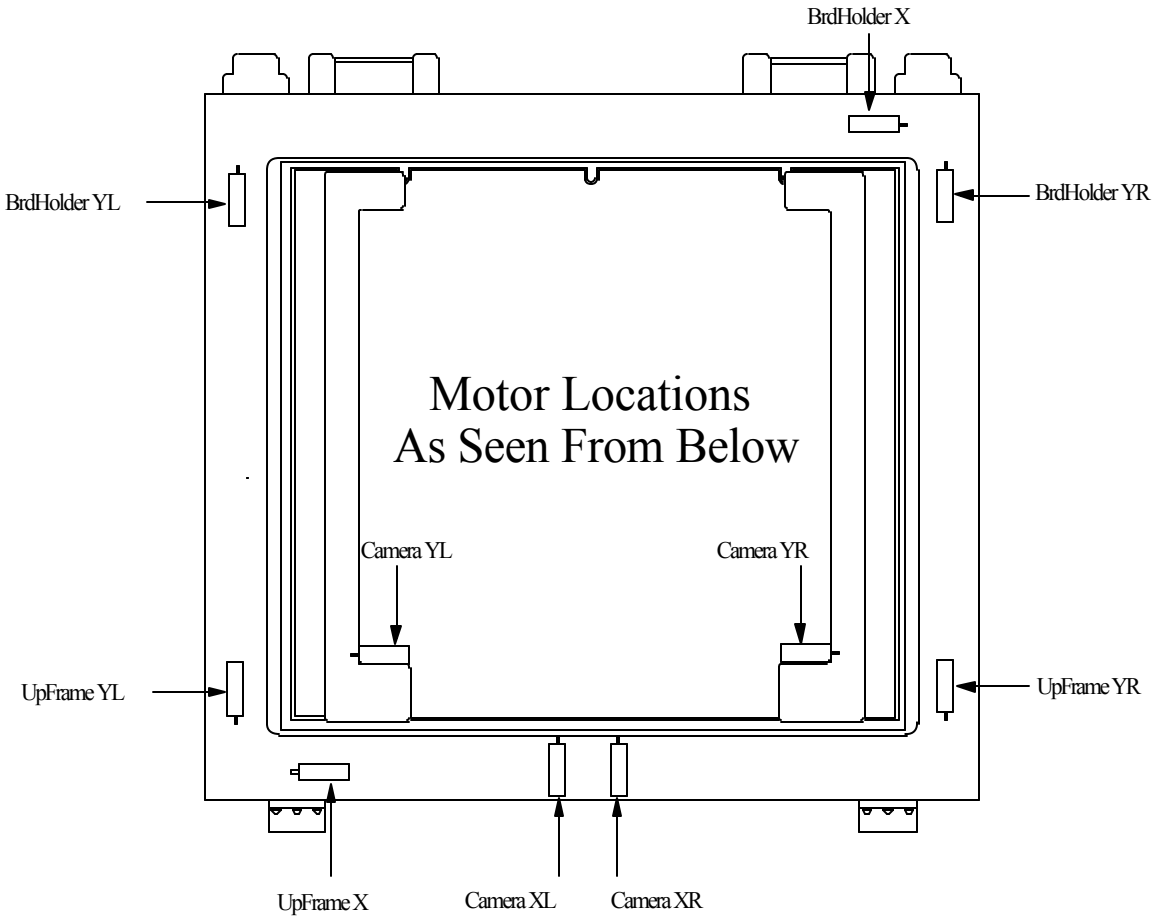
Glass

Lo Level Maintenance

Activating Motors Manually

The 10 motors in each AccuTray can be moved manually. Select the motor to be moved by clicking on the appropriate button (see diagram below for actual motor locations). Click on the Min/Max Pos Range indicator and slide left and right to move the selected motor. The Endswitch box will light whenever the motor reaches the end of it's range.



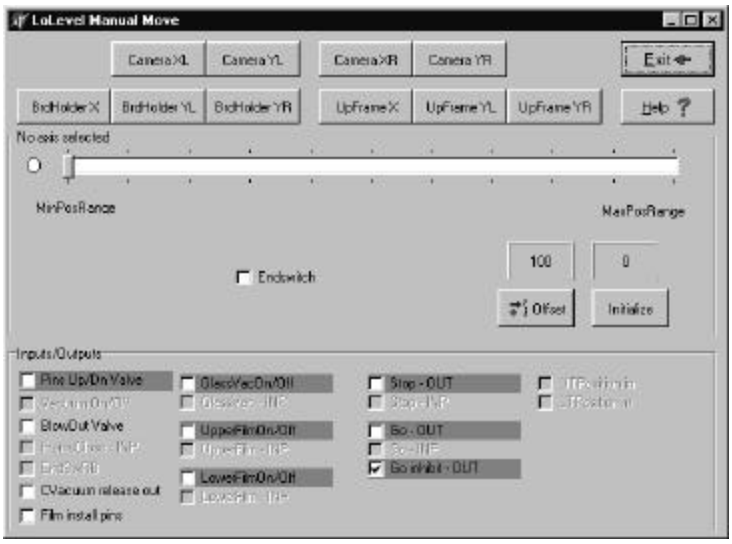


Inputs/Outputs

Activate Valves, Vacuums, Pins, and Stop/Go buttons by clicking on the highlighted indicators in the Inputs/Outputs section of the touchscreen.

Click again to turn off.

The unhighlighted boxes are status indicators. A check mark will appear in the box whenever that feature is active.



The **Go inhibit - OUT** indicator should always be activated. Deactivating this will disable the Stop and Go buttons in normal operation.

Press the Settings button on the Maintenance screen.

Preferences

Shows a listing of all Accutray setup parameters. This screen is read only - settings cannot be changed from this screen.

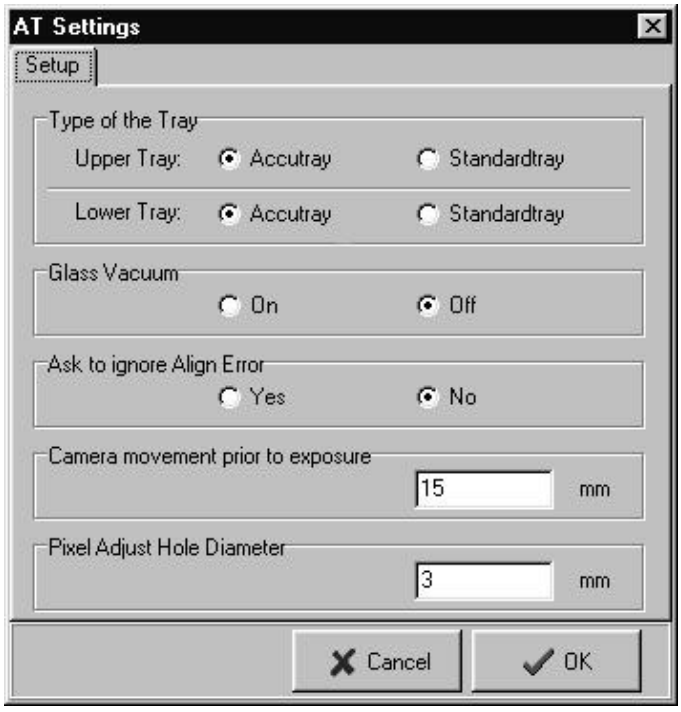
Init Machine

Press this button to re-intizialize the ORS 98 program.

Settings

Type of Tray - Select Accutray or Standard tray.

Note: ORS98 must be restarted when changing Tray Types.



Glass Vacuum - Enable/Disable glass vacuum.

Ask to ignore Align Error - Allows a panel to be printed even though it is not aligned within the alignment error settings in the job menu.

Camera Movement prior to exposure - Once alignment is complete, the cameras move out a specified distance prior to exposure. Once exposure is complete, the cameras move back to their original position (distance in millimeters only - default value is 15mm).

Pixel Adjust Hole Diameter -

Specifies the hole diameter that is used to adjust pixel size. The diameter is in millimeters only (default value is 3mm).

Note: ORS98 does not need be restarted for Glass Vacuum, Ask to ignore Align Error, Camera Movement prior to Exposure and Pixel Adjustment Hole changes to take effect..

Adjust Camera On

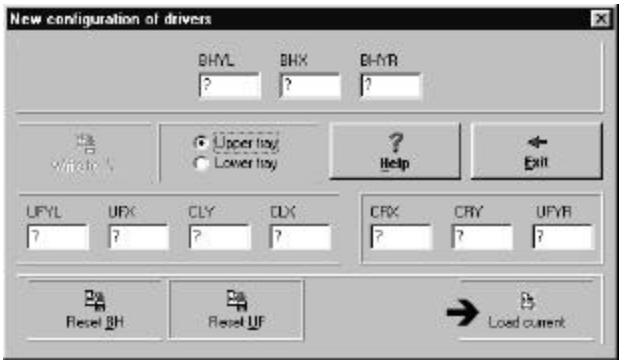
Press this button to activate the "Camera Adjust Mode". See the AccuTray Service Manual for details on Camera Adjustments.

Drivers

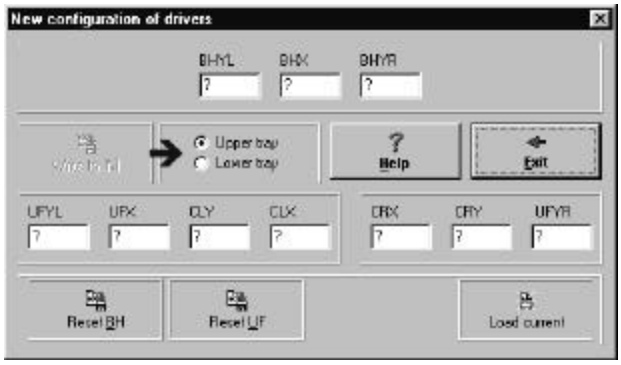
Each motor driver board has a unique value. These values can be viewed and maintained using the following procedure.

The driver board value must be updated whenever a driver board is replaced.

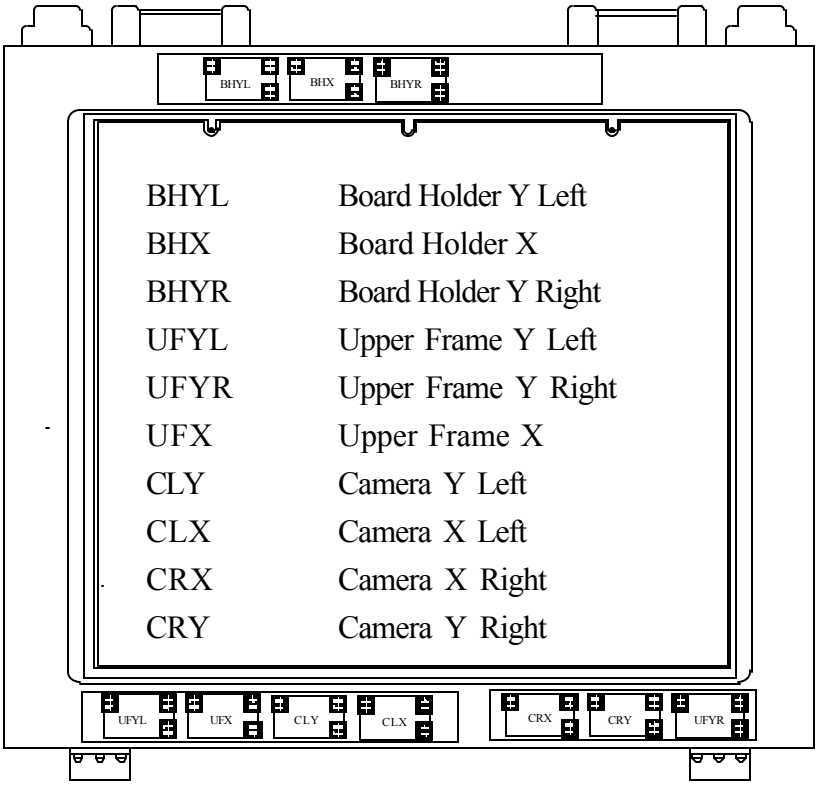
1. Press the **Drivers** button and the driver configuration screen will appear..



The touchscreen will display "?" values for all drivers. To display the driver numbers for the upper tray, press the **Load Current** button.

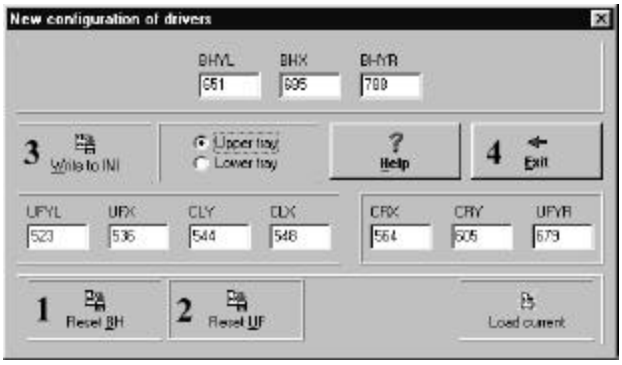


To display the driver numbers for the lower tray, click on the Lower Tray indicator.



BHYL	Board Holder Y Left
BHX	Board Holder X
BHYR	Board Holder Y Right
UFYL	Upper Frame Y Left
UFYR	Upper Frame Y Right
UFX	Upper Frame X
CLY	Camera Y Left
CLX	Camera X Left
CRX	Camera X Right
CRY	Camera Y Right

The driver board serial number is written on the board itself. Once the new driver is installed, enter the driver serial number into its appropriate position on the touchscreen.



1. Press the **Reset BH** button.
2. Press the **Reset UF** button.
3. Press the **Write to INI** button.
4. Press the **Exit** button.
5. Press the **Exit** button on the menu bar.
6. Exit the ORS98 program and reopen to activate the new driver numbers.

Password

Used to issue or change passwords for Supervisors and Operators. See page 7-4 for details.

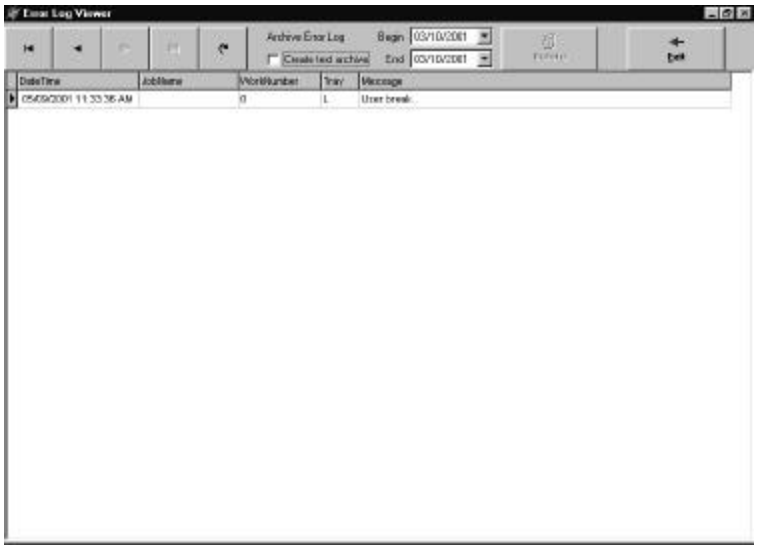
Cameras Out

Press this button to move the cameras to their outermost position. This allows easy access to the glass for cleaning.

Error Log

This screen displays a list of all errors, with the latest error listed on top. Information displayed:

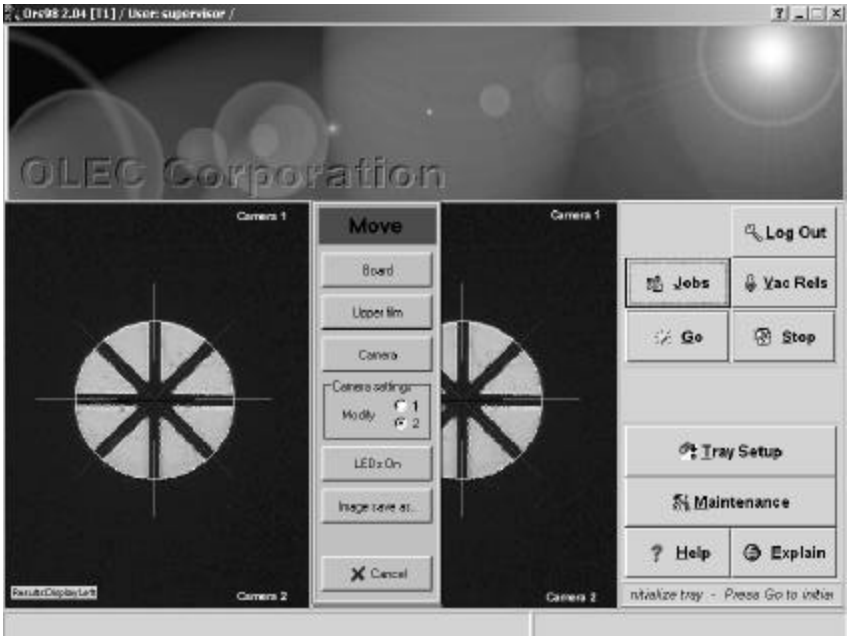
- Date and Time that the error occured
- Job Name
- Work Order Number
- Tray - (upper or lower)
- Error message



Camera Settings

The cameras can be moved manually and the camera settings can be altered by doing the following:

Double click on the upper lefthand corner of the left or right target. The "Move" menu will appear.

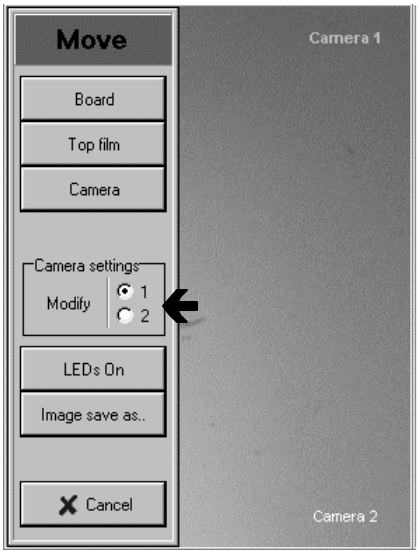


The cameras can be moved manually with the mouse by clicking and dragging the camera into position. The cameras can also be moved by touching and dragging the camera into position on the touchscreen.

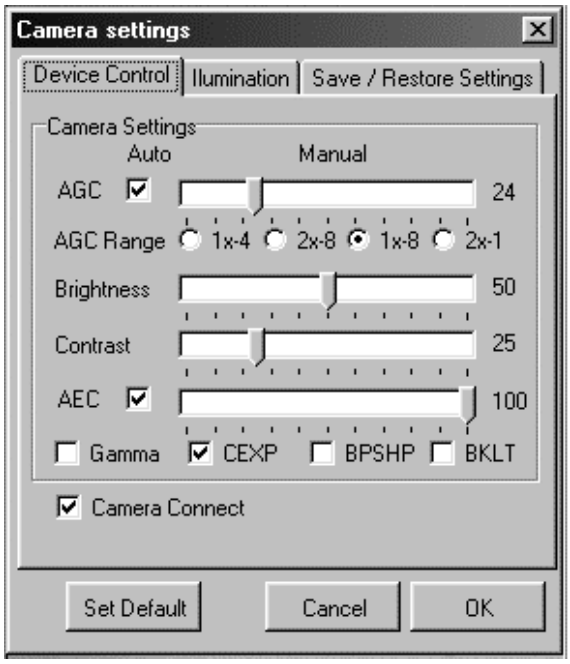
The camera settings can be modified and the modifications can be saved by clicking on the "Modify" button.

Check "1" and press Modify to change configuration for the adjustable camera.

Check "2" and press Modify to change configuration for the fixed camera.

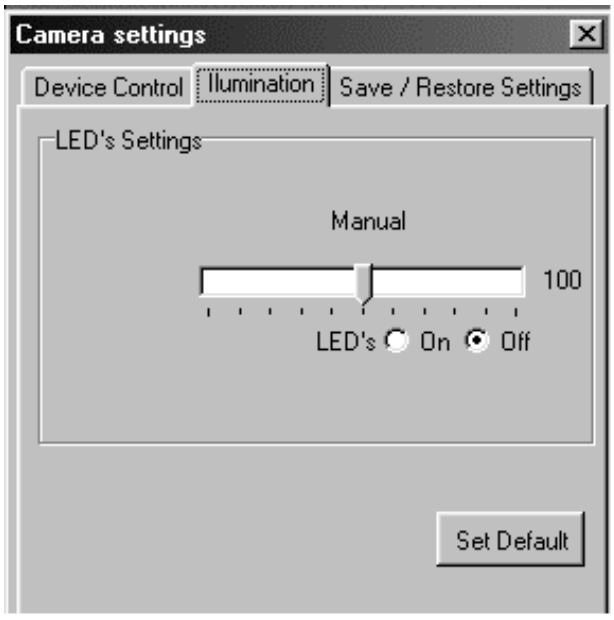


Camera Settings - Device Control Screen



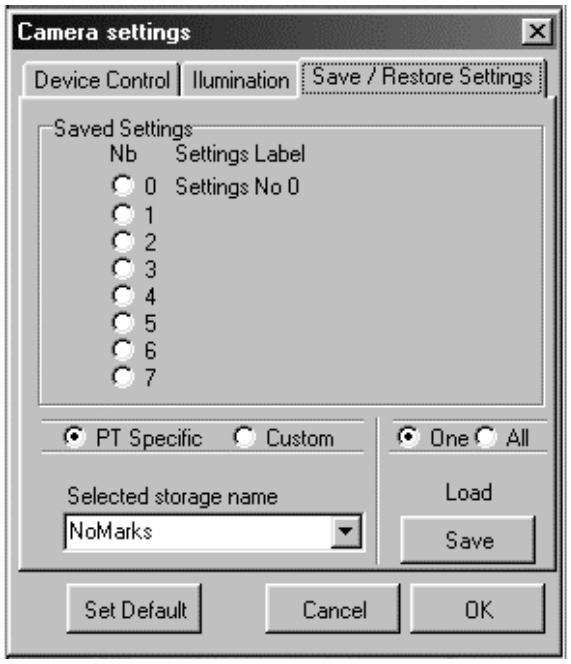
AGC	Auto Gain Control. Check the AGC box to use auto gain. If the box is not checked use the track bar to control the gain. Default value is 18.
AGC Range	Four ranges for the auto gain control - (1x-4, 2x-8, 1x-8, 2x-1)
Brightness	Track bar to control brightness. Currently inactive. Default value is 50.
Contrast	Track bar control contrast. Default value is 25.
AEC	Auto Exposure Control. If the box is checked, the adjustment is automatic. If the box is not checked, the setting is controlled by the customer with the track bar.
Gamma	Gamma on/off. Default value is 0.
CEXP	Central Exposure. The center area of the image is used for camera settings. Default value is 1.
BPSHP	Bypass Sharpness. Currently inactive. Default value is 0.
BKLT	Back Light. Backlight compensation. Default value is 0.
Camera Connect	Check this box to activate the camera.
Set Default	Press Set Default and the default settings from the ORS98.ini file are used.

Cemera Settings - Illumination Screen



Manual	Track bar to control the intensity of the LED's.
LED's	LED's on/off buttons.
Set Default	Use default setting from ORS98.ini. LED Default Brightness = 25.

Camera Settings - Device Save/Restore Settings Screen

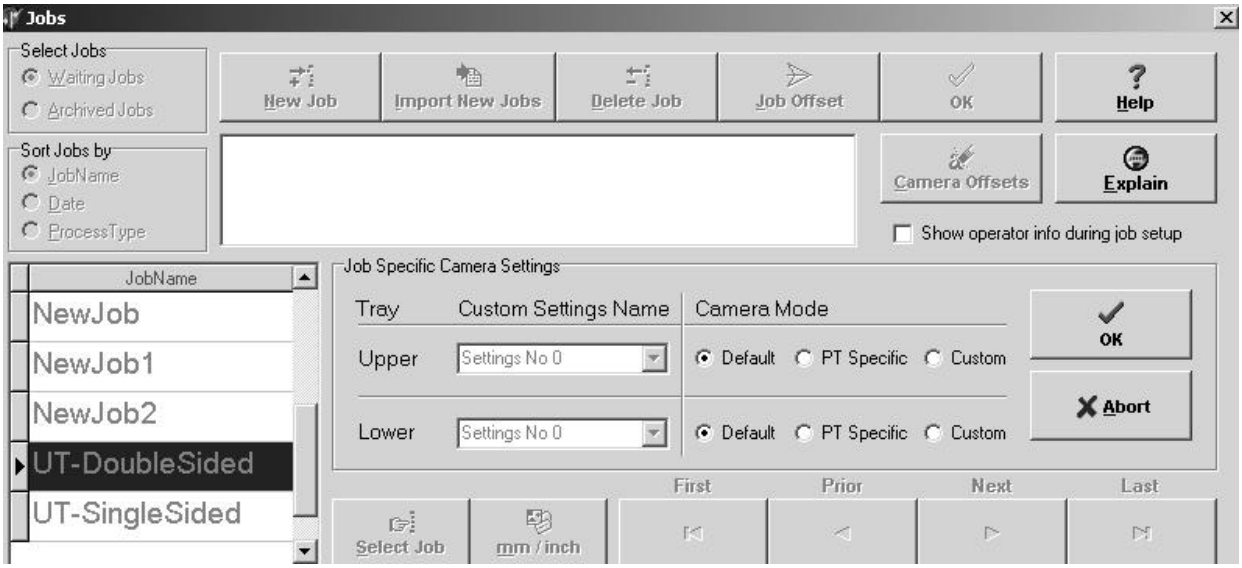


Settings Label	The name for each custom setting is saved in the Saved Settings Log. It is possible to save 8 different settings.
PT Specific	Process Specific setting
Custom	Customer setting. Use the names and settings from the Saved Settings field.
One/All	Save the setting for one camera or all of the cameras on the tray in the front position.
Selected storage	For Process Type specific settings use the scroll down menu to select what process type the setting is to be used with. For Custom settings use the scroll down menu to select or change a name for a camera configuration.
Load	Load a current setting.
Save	Save a setting.
BPSHP	Bypass Sharpness. Currently inactive. Default value is 0.
BKLT	Back Light. Backlight compensation. Default value is 0.
Set Default	Returns to the default setting in the ORS98.ini file.

Store Camera Settings

The settings for each camera can be stored in two different ways. A camera setting can be stored as a process specific setting or a custom setting. First the camera must be adjusted using the camera settings Device Control and Illumination screens. After the desired camera adjustment is reached the setting must be saved using the Save / Restore Settings screen.

After the settings for each camera is stored and it is decided if the setting is a process specific setting or a custom setting, in the Jobs Edit screen it is necessary to specify for what job the setting is to be used.



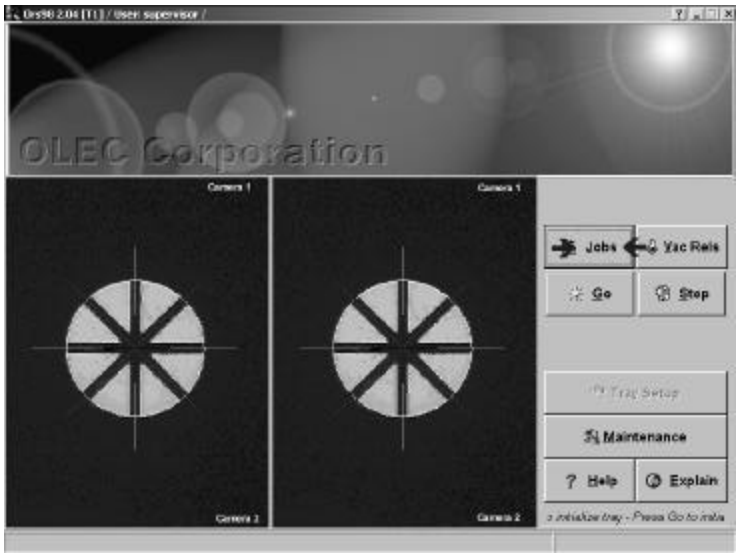
Select the job in the jobs screen, press the Target button, then press the Camera Mode button. The screen will appear as above. If the Custom or the PT Specific box is checked, it is necessary to use the scroll box to select the process or setting name that is to be used for the job.

8. Jobs

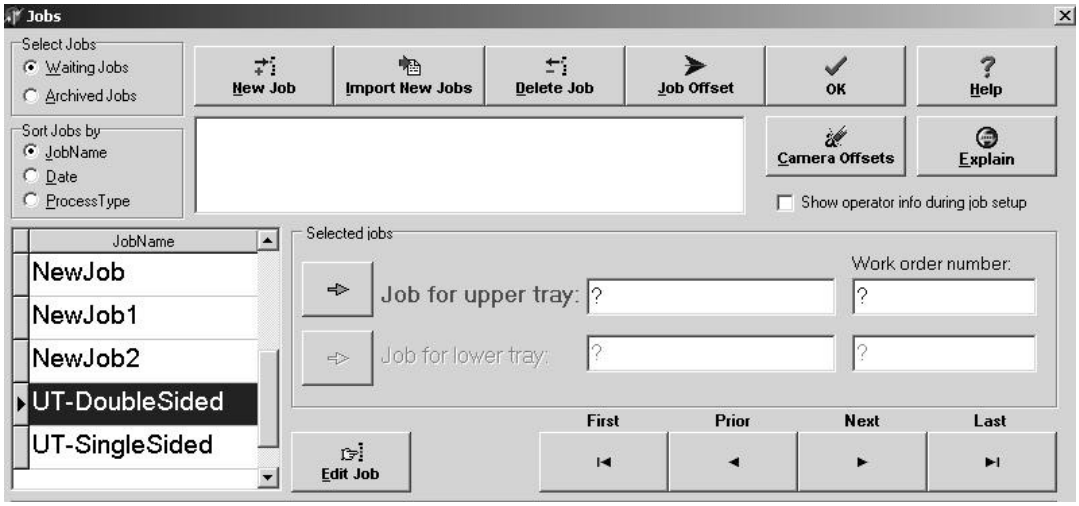
Creating Jobs

This section will explain how to create a job, and how to assign the parameters which make up each job.

When the power up sequence is complete, the screen will appear as below. Press the Jobs button on the touchscreen.



Job Screen



Waiting/Archived Jobs Select whether the jobs in process or all archived jobs should be listed.

Sort Jobs Select whether the jobs be listed by name, creation date, or process type.

The selected job is copied and is inserted in the job table as new entry with the new name "new job".

If jobs were prepared as text files, you can import these text files into the job table by using this button.

Press this button to delete old jobs, or change job status from "Waiting" to "Archived", or "Archived" to "Waiting".

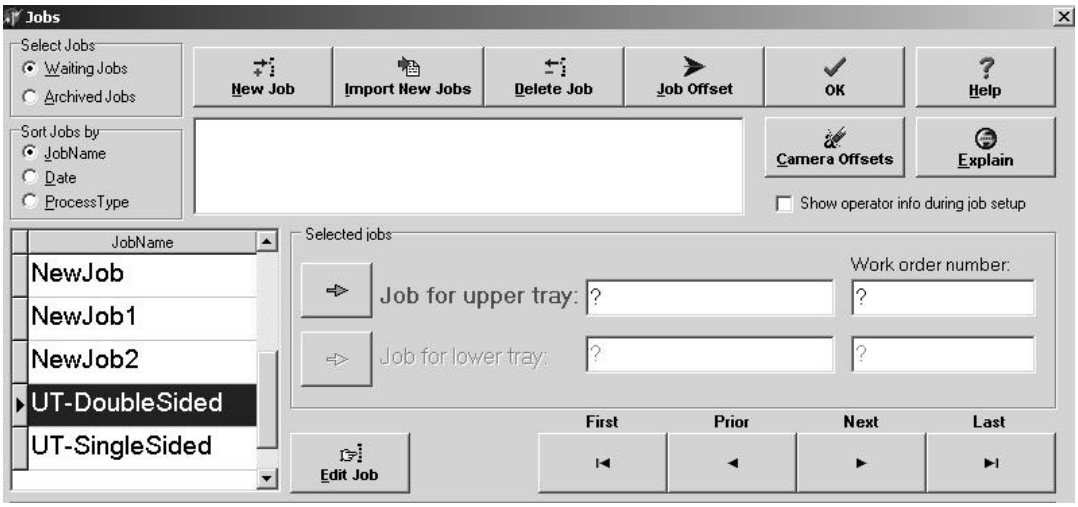
Press this button to open the offset input field.

Press this button to store changes and return to the main screen.

Press this button to open the Help Program. See chapter 10.

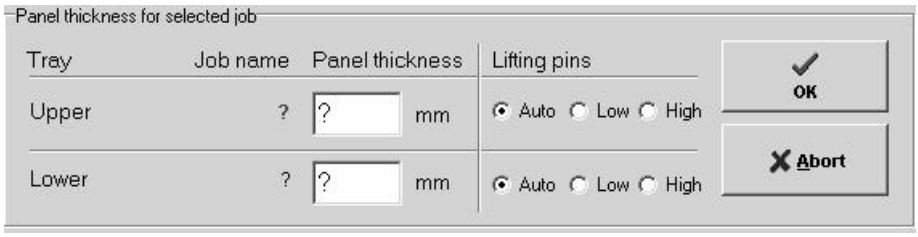
This feature is not accessible form this screen.

The memo field in the job edit screen can be used to convey process information to the operator, i.e. lamp setting, vacuum delay, mj / cm^2, etc. If the memo field has information written in it and the "show operator info during job setup" button is marked, the information from the memo field will be displayed in the upper part of the main screen. If the button is marked but the memo field does not have any information written in it the OLEC Corporation image will be displayed. It is possible to import information to this field same time as importing a new job.

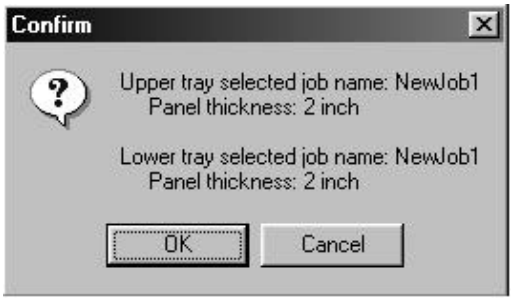


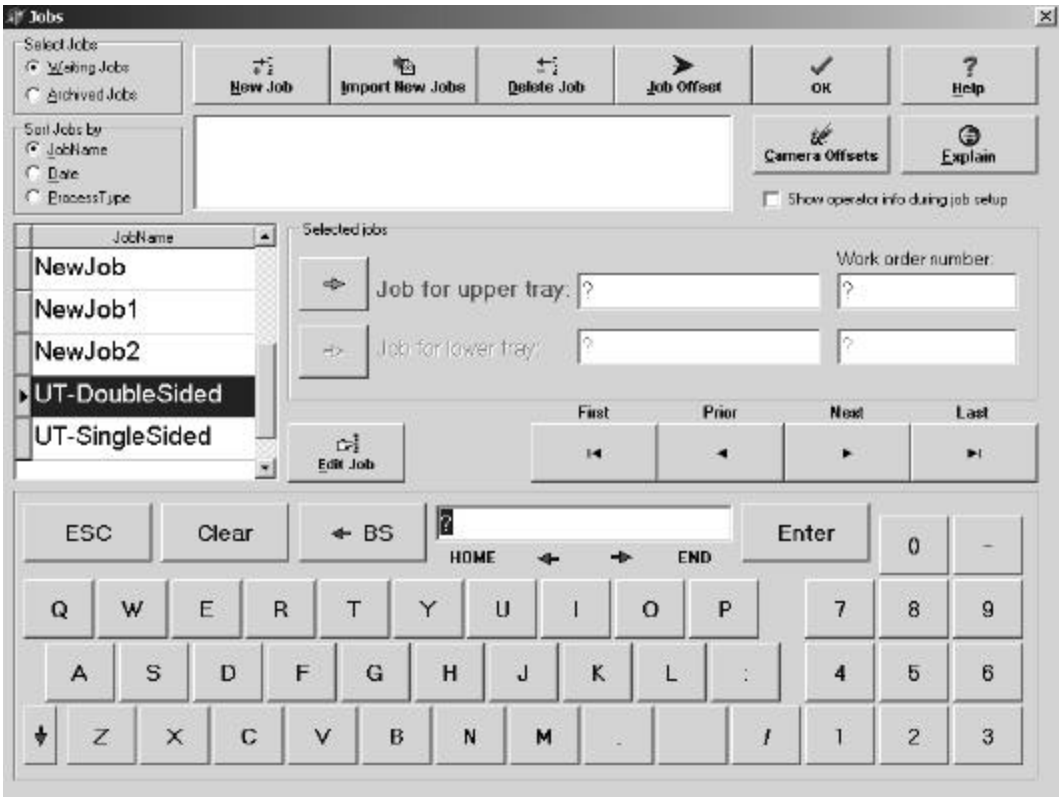
Press this button to go to the Edit Job screen

Used on the AT42 only. The panel thickness must be entered for each job. There are 2 sets of lifting pins on the AT42. Depending on the panel thickness, the low or high pins can be selected. Its is recommended that the Lifting Pins be set to "Auto".



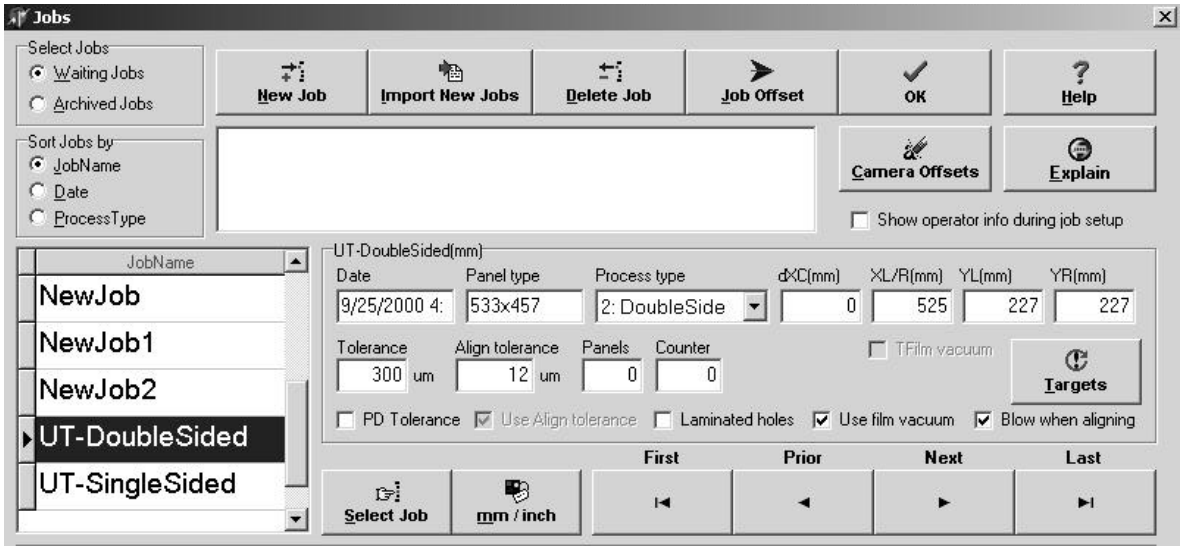
For operator log-on, if a panel thickness is not specified, the program will display a panel thickness confirmation box.





⏮	**First -** Press this button to move to the first job in the job table.
◀	**Prior -** Press this button to scroll backward through jobs in the job table.
▶	**Next -** Press this button to scroll forward through jobs in the job table.
⏭	**Last -** Press this button to move to the last job in the job table.
ESC	Press this button to deselect any field on the screen
Clear	Press this button to clear all text in the text box.
⇦ BS	Press this button to backspace the cursor in the text box.
Enter	Press this button to enter information in the text box.
✍✍✍	Press the arrow keys to move the cursor forward or backward one space.
HOME	Pressing HOME sends the cursor to the beginning of the text box.
END	Pressing END sends the cursor to the end of the text box.

Job Parameters



Press this button to reset Film/Board/Camera Position offsets to zero.

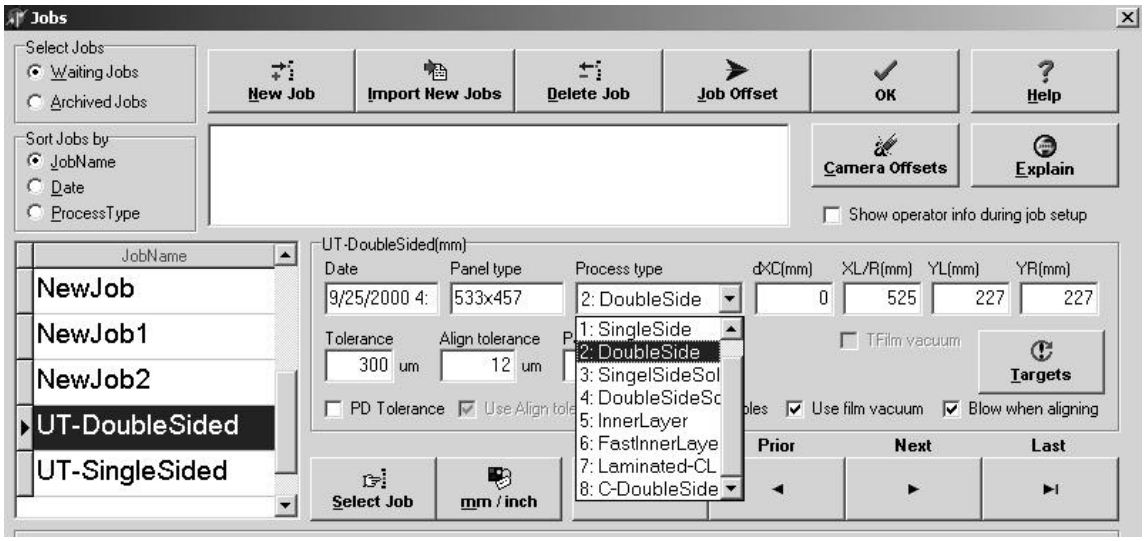
Press this button to select the highlighted job in the job table.

Press this button to select millimeters or inches as the unit of measure.

Date The date and time that a job is created.

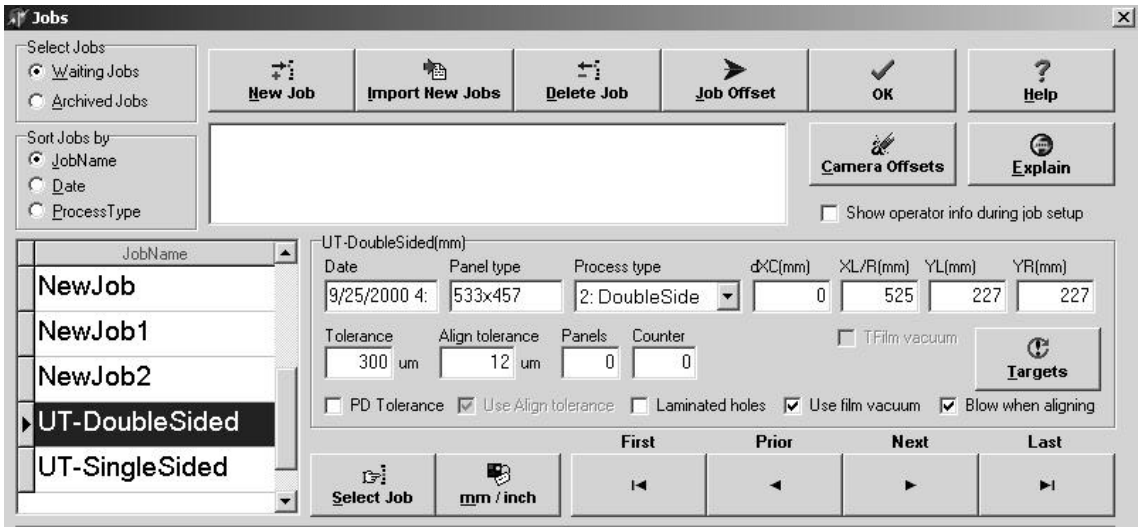
Panel Type Dimensions of the panel.

Process Type



Number	Process Type	Description
0	No Marks	Does not align to anything.
1	Single Sided	Aligns the panel to the Bottom Film only. It aligns a copper pad on the panel to the Bottom Film Target X.
2	Double Sided	Aligns the Top Film Target x to the Bottom Film Target X through a hole in the panel.
3	Single Sided/Soldermask	Aligns the panel to the Bottom Film only. It aligns a copper pad on the panel to the Bottom Film Target X.
4	Double Sided/Soldermask	Not available at this time.
5	Inner Layer	Aligns the Top Film Target x to the Bottom Film Target X only.
6	Fast Inner Layer	The fast inner layer process will align the top and bottom artwork during the first production panel alignment segment. For subsequent panels, after the go button is pressed to align the films, the upper frame will move to the position of the prior alignment, draw main vacuum, and check if the film-to-film alignment is within the alignment error tolerance. If it is the tray will move in to the exposure area. If the film-to-film alignment does not meet the alignment error tolerance, main vacuum will be released and the alignment will be repeated. When the alignment is achieved the tray will move in to the exposure area.
7	Laminated - CL	Standard double sided alignment with LED's on. This feature can be used if the alignment holes are partially obscured i:e partially filled with glue or some other obstrcution.
8	C-DoubleSide	Combination of Fast inner layer and Single/Double sided solder mask. The films are aligned looking through the alignment holes, after the film-to-film alignment is done the LED's will turn on and the panel is aligned to the bottom film. After the first panel the film-to-film alignment works as Fast inner layer. Only aligning if the film-to-film alignment is no longer within the specified alignment tolerance. This process type can be used for both outer layer panels and statistical alignment.

X and Y Coordinates

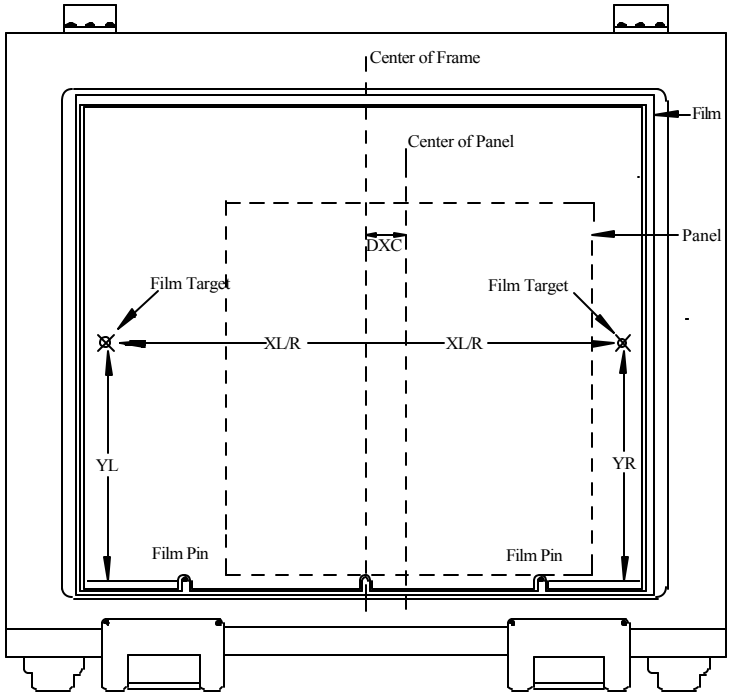


dXC Distance between the center of the frame and the center of the panel.
Enter a (+) value for panels that are right of center.
Enter a (-) value for panels that are left of center.

XL/R Distance between the left film target and the right film target (X-Axis).

YL Distance between the left film target and the left film pin (Y-Axis).

YR Distance between the right film target and the right film pin (Y-Axis).



Tolerance "Tolerance" is the allowable difference between the board and the bottom film, and between the top film and bottom film. The machine has no control over these factors. They are determined by how well the panels are drilled, the film is plotted, and the stability of the environment. The machine simply uses this number to accept or reject a board or set of film. The number entered here will also be used as the upper and lower limit on the graph chart.

Align Tolerance The allowable difference from best-fit alignment between the board and the bottom film, and between the top film and bottom film. This is checked after alignment, and after vacuum is drawn, to determine if it is OK to expose. Use lower numbers for tight registration jobs, and higher numbers for shorter cycle time. The AccuTray will not expose a panel when the alignment results are greater than the align error tolerance. See page # for an explanation of alignment results.

Panels Number of panels in the job.

Counter Actual number of panels exposed in job.

PD Tolerance Process Deviation Tolerance - see next page.

Use Align Tolerance Check this box to use the Tolerance setting as a dimensional deviation between films and panel, and the Alignment Tolerance as Alignment accuracy. Note that when the new version of ORS98 is installed, all existing jobs will default to this setting.

Thickness Panel thickness in mm (AT42 only).

Laminated Holes Select laminated holes if you are using holes covered by dry film and deselect laminated holes if the holes are not covered by dry film. Accuracy is higher without tented holes. This is because the camera does not as precisely define the hole edge when looking through two layers of dry film.

Use Film Vacuum Enables/Disables Film Vacuums.

Blow When Aligning Air is blown back into the frame to assist in the alignment process.

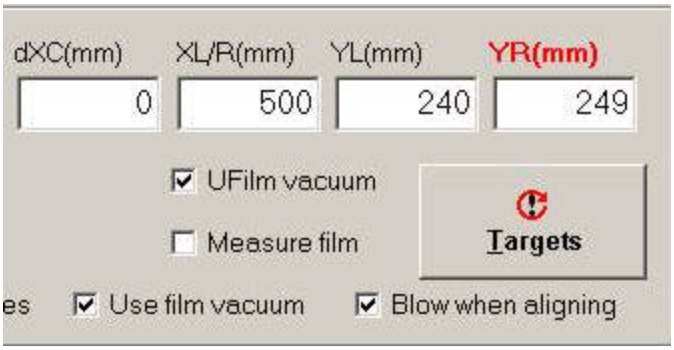
Statistical Targets The statistical target button can only be activated on systems that are outfitted with the statistical alignment option. On all other systems the button is visible, but inactive. A special target must be used to align panels using statistical targets.

Measure Film Optional feature not used at this time.

Panel Type Dimensions of the panel.

Use Top Film Vacuum For Single Sided Alignment.

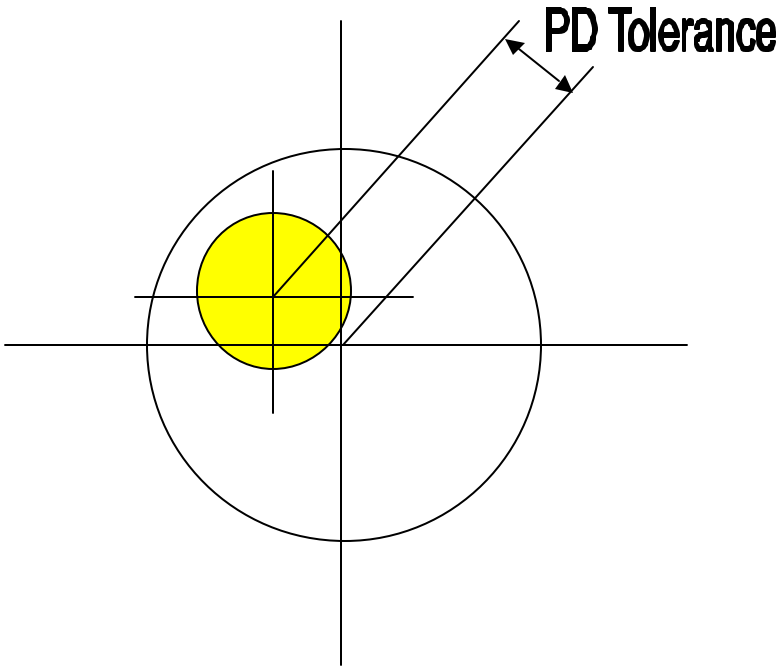
By checking the U-Film Vacuum box in the Jobs edit screen, the program will use upper film vacuum when a single process type is selected. The alignment and exposure is still single sided only. Expose bottom side. This can help not leaking main vacuum.



When a job with a single sided process type is selected, the UFilm vacuum check box is active. It is at this point possible to check the box if it is desired to use upper film. The upper film does not have any target.

Process Deviation Tolerance Instructions

Process deviation (PD Tolerance) allows the user to specify the maximum distance between the center of the drilled alignment hole in the panel to the center of the alignment target on the film.

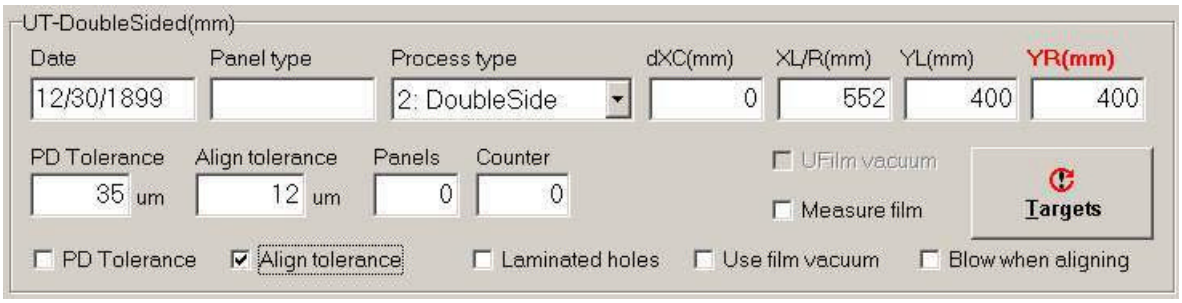


The following instructions are to familiarize users of ORS98 how to use the new PD Tolerance with both new and existing jobs. It is also an instruction on how to read the applicable result screens and error messages.

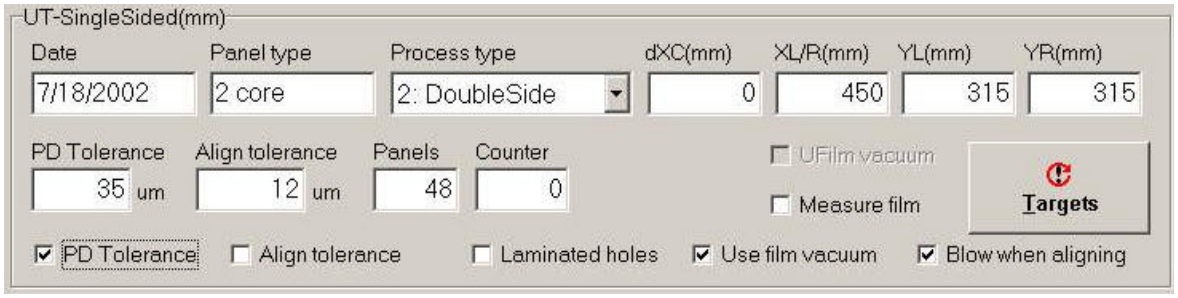
1. For existing jobs the Alignment Tolerance box must be checked for the job to run without any changes. This will use the Tolerance setting as a dimensional deviation between films and panel, and the Alignment Tolerance as Alignment accuracy. Note that when the new version of ORS98 is installed, all existing jobs will default to this setting.
2. If an existing job or a new job is to be run using the PD Tolerance and the Alignment Tolerance, both the PD Tolerance box and the Alignment box must be checked.
3. If an existing job or a new job is to be run using PD Tolerance only the PD Tolerance box must be checked and the Alignment Tolerance box must be unchecked.

Note: All existing jobs will default to the standard Tolerance and Alignment tolerance process. Jobs created using ORS98 V2.04b and older will run with no changes. However, it is possible to change the alignment parameters for existing jobs.

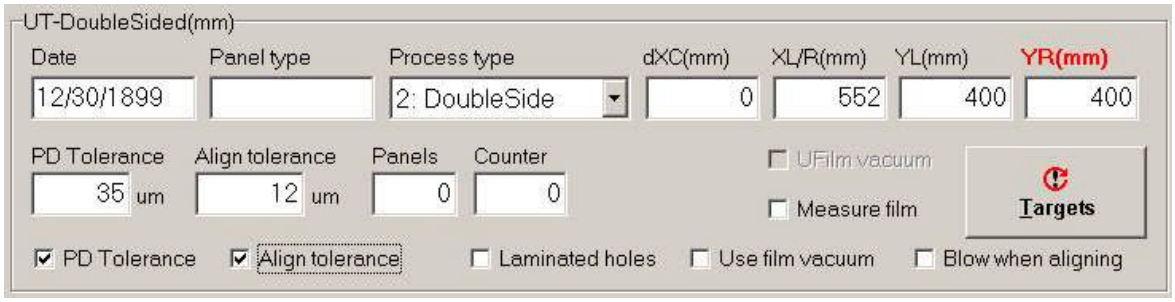
Setting up a job:



To use the existing alignment parameters (Tolerance and Alignment Tolerance) the Alignment Tolerance box must be checked. Using this option, the AT30 will work the same as in software versions ORS98 v2.05 and older.

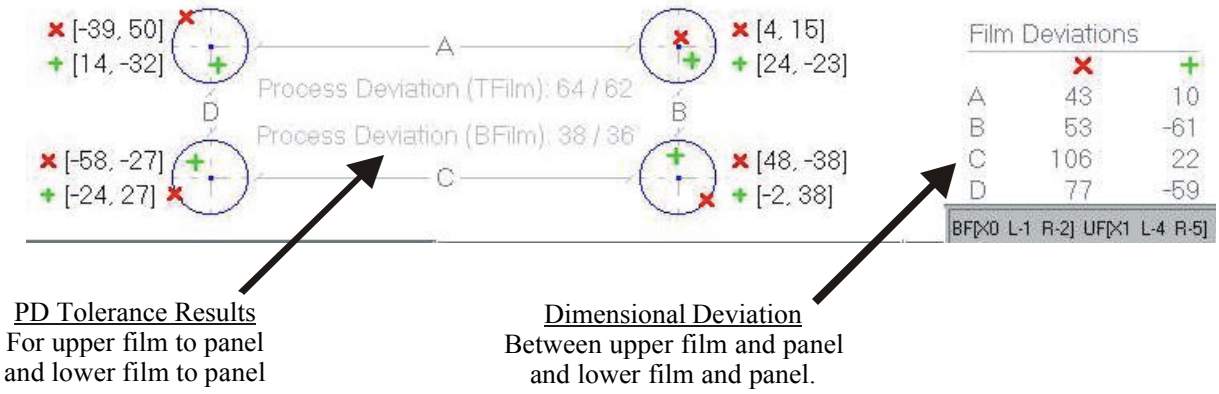


On the Job screens, Edit Job menu it is necessary to have a check mark in the PD Tolerance box to use the PD Tolerance as the alignment acceptance criteria. If the PD Tolerance is checked, and the PD Tolerance is set at, for example 35um, a successful alignment will only be achieved if at all the camera positions the distance between the drilled hole and the alignment target(s) on the film(s) are less than or equal to 35um. In this case the Alignment Tolerance is not considered.



To consider both the PD Tolerance and the Alignment Tolerance as alignment criteria, both the PD Tolerance box and the Alignment Tolerance box must be checked. If for example the PD Tolerance is set at 35um, and the Alignment Tolerance is set at 12um, a successful alignment will only be achieved if the distance between the drilled hole and the alignment target(s) on the film(s) are less than or equal to 35um, and the Best-Fit are less than or equal to 12um. This means that the alignment between for example the upper and lower film can not be further apart than 12um from a Best-Fit alignment.

The Result Screens:



PD Tolerance Results
For upper film to panel
and lower film to panel

Dimensional Deviation
Between upper film and panel
and lower film and panel.

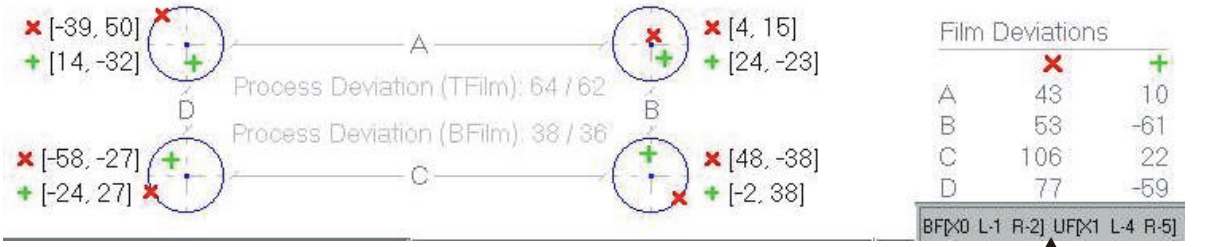
PD Tolerance:

- Process Deviation (TFilm) 64/62. The first number, 64, is the process deviation result for the upper film to the panel. It shows that the largest distance between the center of the hole in the panel to the center of the alignment target on the upper film is 64um. The second number, 62, shows the best possible process deviation considering the size and shape of both the upper film and the panel.
- Process Deviation (Bfilm) 38/36. The format of the result for the bottom film to panel is the same as for the upper film to panel. Achieved process deviation equals 38um. Possible process deviation equals 36um.

Dimensional deviation:

- The first row of letters corresponds to the distances between the alignment targets, or the camera positions. For example, "A" is the distance between the two back, or adjustable cameras. "B" is the distance between the two cameras in the right side, the right fixed and adjustable camera, and so on.
- The firs row of numbers is the dimensional deviation between the upper film and the panel. Note that the panel alignment holes are used as the reference points. For example, at "A", the distance between the two alignment targets on the upper film is 43um further apart than the alignment holes on the panel. Note, for customers not using the Absolute Measure option, the deviation result shows that there is a difference between the upper film and the panel, it does not provide information if the film is over sized or if the panel is undersized.
- The second row of numbers shows the dimensional deviation between the lower film and the panel, using same format as for upper film to panel deviation.

Alignment Tolerance:



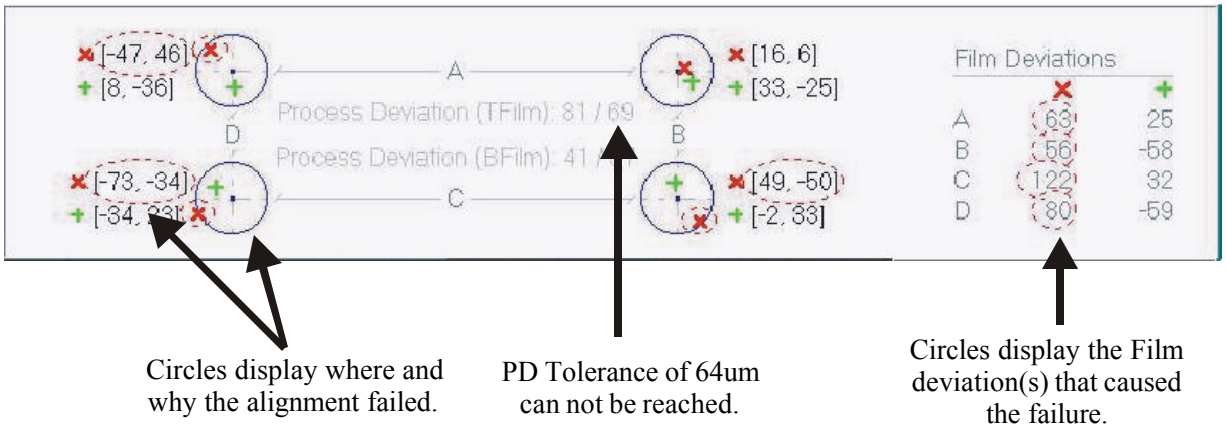
Alignment Tolerance Result
For upper film to panel
and lower film to panel.

Note: The alignment tolerance is displayed in the lower right corner of the main screen, not as shown in this document. The alignment tolerance result will only be displayed if the alignment tolerance check box in the jobs screen is checked.

- The BF(X0 L-1 R-2) part of the result shows the alignment error from a Best-Fit alignment between the lower film and the panel. In the X-axis the alignment is Best-Fit considering the film and panel size and shape differences. In the Y-axis in the left side the error is 1um, meaning to achieve Best-Fit alignment the panel should been moved down by 1um. In the Y-axis in the right side the panel should have been moved down by 2um for Best-Fit alignment
- The UF(X1 L-4 R-5) part of the result shows the alignment error from a Best-Fit alignment between the upper film and the panel, using same format as for upper film to panel.

Failed alignment due to PD tolerance:

In this case the PD Tolerance is set at 64um.



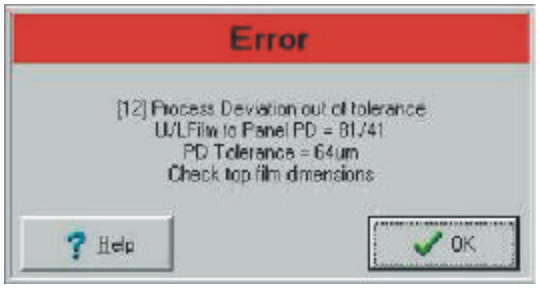
Circles display where and why the alignment failed.

PD Tolerance of 64um can not be reached.

Circles display the Film deviation(s) that caused the failure.

In this case the PD tolerance and the deviation between the upper film and panel caused the alignment to fail.

When the alignment failure is caused by the PD Tolerance being set to tight in consideration to the measured film deviations the error message shown below will be displayed.

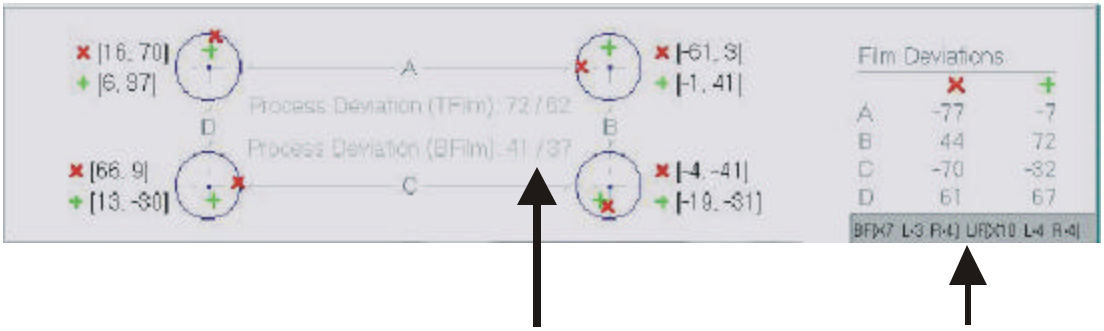


Line 1: Reason for error.
Line 2: Achieved Film(s) to panel PD.
Line 3: PD Tolerance from job screen
Line 4: Hint

- If the PD Tolerance that is specified in the Jobs setup screen can not be achieved due to dimensional deviations, the above error will be displayed after the first alignment attempt.
- If both PD tolerance and Alignment Tolerance is used and the PD tolerance can be reached, but the alignment tolerance was not reached after first alignment attempt, the program will retry the alignment up to five times. After the fifth attempt, if the alignment tolerance and or PD tolerance is not meet, the program will error out. The error will be specific to the reason for why the alignment failed. For example, if the Alignment Tolerance is set at 10um and the result from the last attempt is misaligned by 13um, the error will display a message stating so.
- If only the Alignment Tolerance is used, the program will work as on all existing units. Only if the film-to-film deviation or the upper or lower film to panel deviation is larger than specified in the Jobs menu screen the program will stop and display an error message stating what the Tolerance was set at, and how much either of the films are larger or smaller than the allowed deviation.

Failed Alignment due to Alignment Tolerance:

PD Tolerance is set at 100um, Align Tolerance is set at 2um.



PD Tolerance results passed.

Align Tolerance set at 2um failed in all places.

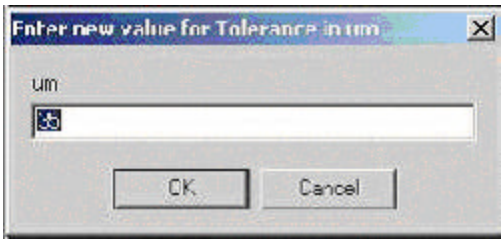
Line 1: Hint as to why the alignment failed.

Line 2: Position of the worst case of alignment failure. The result at that position and the alignment tolerance set by the user.

Changing PD -Tolerance or Tolerance during a job.

If a situation arises during production where one panel in a lot is not aligning because it is off by microns, the Tolerance value needs to be changed. It is no longer necessary to go to the jobs screen to change the PD Tolerance or the Tolerance during production. To change the tolerance value, press Ctrl+T and a dialog box will appear. Type in the new PD-Tolerance or Tolerance number in this box. This new number will be used until the next time the jobs screen is accessed or the software is turned off. The new number is not being stored permanently with the job.

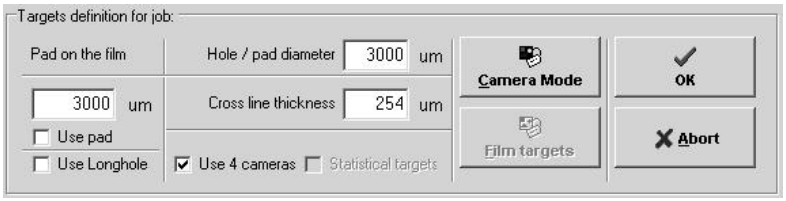
Note: The Ctrl+T function can only be used in the supervisor mode or on machines that are not using the supervisor/operator log in feature.



Type the new Tolerance number in the provided space. If the job is created in um the information must be entered in um. If the job is set up using mils, the change must be entered in mils.

Targets

Press this button to define target sizes.



Hole/pad diameter — Hole/Pad diameter in µ.

Cross line thickness — Cross Line Thickness in µ

Use pad — Click the Use pad box when aligning to a pad on the film instead of the cross hairs (for Single Sided and Single Sided Solder Mask job types only).

Use Longhole — It is possible to do double sided alignment using oblong holes in the panel. This option is available for double sided and double sided solder mask alignment only. The default hole size is 5mm x 7mm. **Note:** The oblong/longhole must have straight sides. This option is not available for slotted holes with round ends.

From ORS98.ini file [General]

OblongXSize=7000

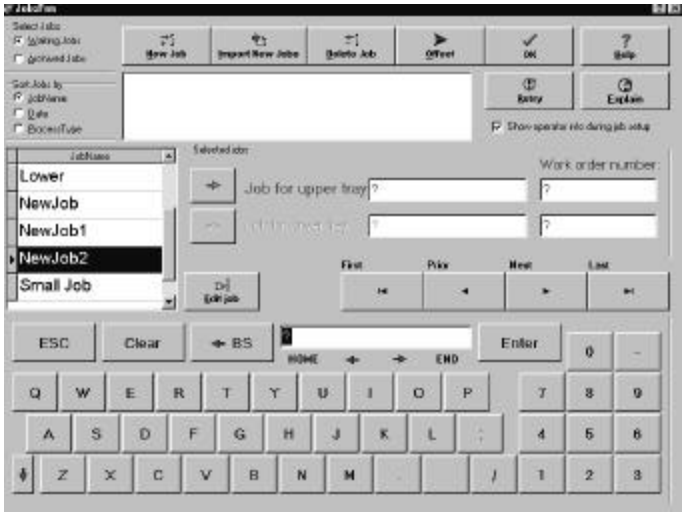
OblongYSize=5000

Use 4 Cameras — This box can be selected if the Accutray is outfitted with the 4 camera system. For all 2 camera systems, the box will be visible, but inactive.

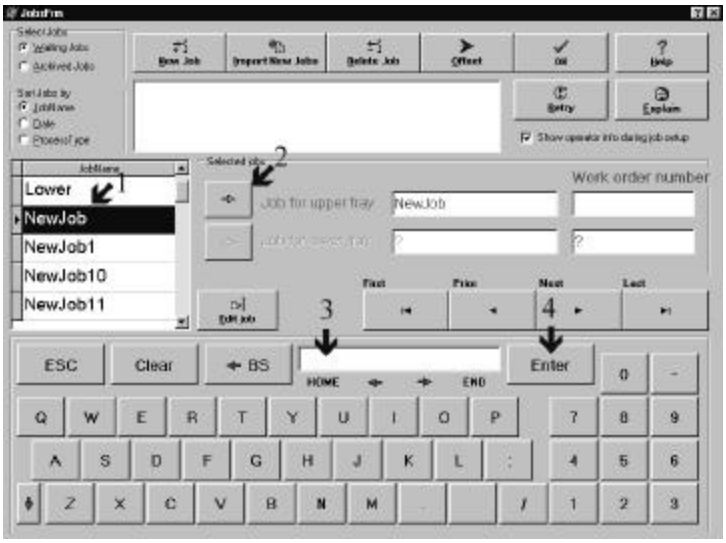
Statistical Targets — The statistical target button can only be activated on systems that are outfitted with the statistical alignment option. On all other systems the button is visible, but inactive. A special target must be used to align panels using statistical targets.

Selecting a Job and Adding a Work Order Number

Select a job from the list on the left side of the touchscreen. You can select a job for the upper tray only, lower tray only, or both trays, depending on where the AccuTray(s) is installed.



1. Select the job from the job table on the left of the touchscreen and click on it. It will be highlighted in blue.



2. Assign the job to the proper tray by pressing the arrow next to the upper or lower tray text box.
3. Assign a Work Order number in the text box.
4. Press Enter. The touchscreen will automatically return to the Main Screen, and the cameras will move into place. You are now ready to load film into the AccuTray.

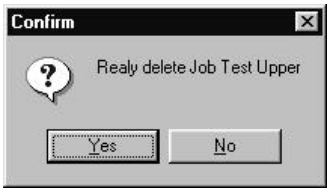
Archiving Jobs

Once a job has been created and named, the job parameter information can be stored in two areas: Waiting Jobs, and/or Archived Jobs. Waiting Jobs are jobs that are currently in use, or are used frequently. Archived jobs are a "library" of jobs to be used at a later time. Select the type of jobs to be viewed by pressing either the "Waiting Jobs" or "Archived Jobs" prompt as shown below. The contents of the Waiting Jobs list and the Archived Jobs list can be viewed in the Job Name table.

Moving a Job From the Waiting Jobs List to the Archived Jobs List

1. Select the job to be moved from the Job Table. In this example, we will use the "Test Upper" job. Press the Delete Job button.

2. A prompt will appear asking weather you want to store the job in archive. Pressing YES will save the job to the Archived Job list. Pressing NO will delete the job entirely. A confirmation prompt will appear to verify that the job is to be deleted.

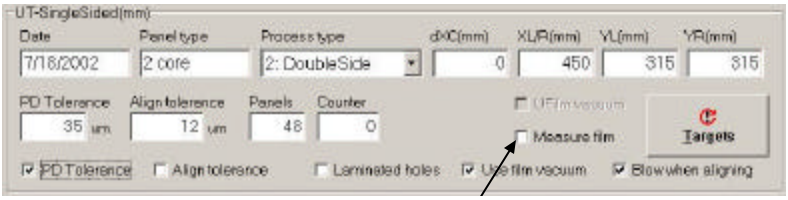


3. Pressing YES on the confirmation prompt will delete the job from the Waiting Jobs list, and move it to the Archived Jobs list. Pressing NO will retain a copy of the job in both the Waiting and Archived Job lists.
4. Follow the same procedure when retrieving Archived Jobs for the Waiting Jobs list.

9. Absolute Measure Option

Absolute Measure for Two and Four Camera Systems

The Absolute Measure option is only activated if purchased by the customer. For customers not purchasing this option, the buttons related to Absolute Measure will appear on the jobs screen, but will not be active.



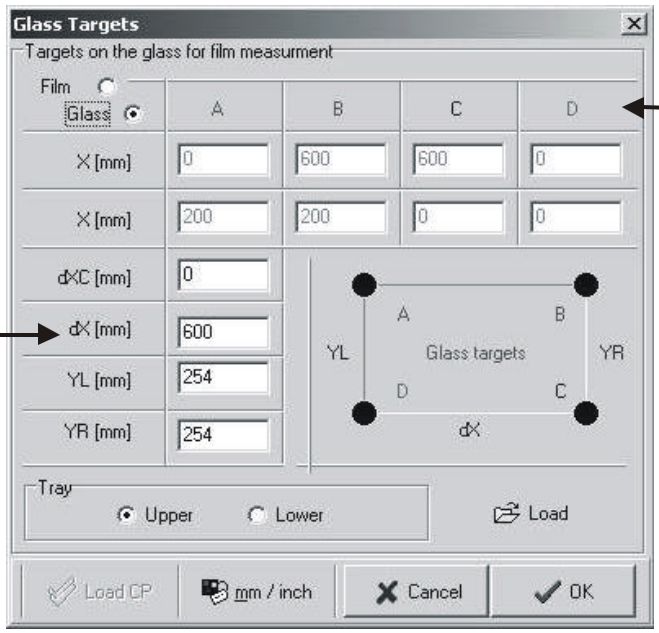
To measure the film, the Measure film box must be checked

Absolute Measure Theory of Operation

Tha absolute measure target style is the same as those used for inner layer alignment. The absolute measure glass tool will have four targets engraved in the glass. The upper and lower films will have targets that match the position of the glass targets. When a job with the Measure film feature selected (see above) is started, the absolute measure program will (prior to the first job set-up):

1. Move the cameras to the absolute measure targets.
2. Draw main vacuum.
3. Measure the real distance between the targets on the film.

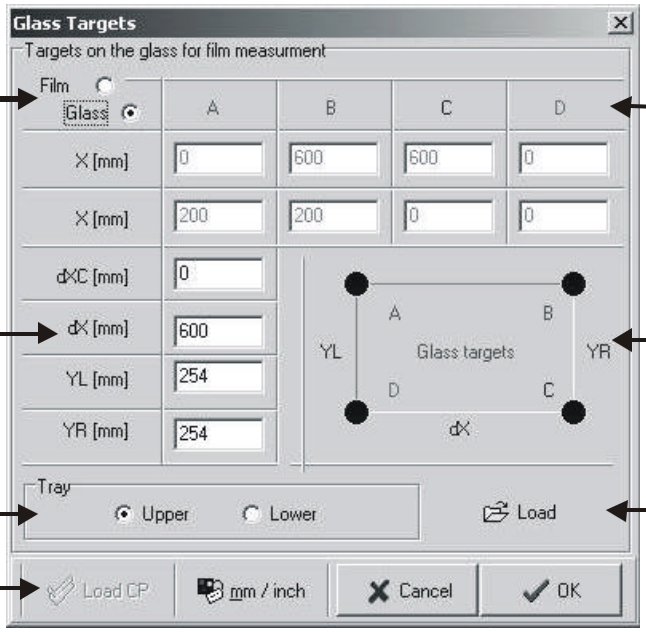
The measured distance will be compared to distances in the glass screen (see below). After the measurement the result will be displayed on the top part of the main ORS98 screen.



X-Y coordinates for absolute measure targets

Camera positions for when the cameras are directly below the absolute measure targets.

Glass Targets Screen



Check box for glass or film target position.

Camera positions for when the cameras are directly below the absolute measure targets.

Tray selection

Load the camera position to the program.

X-Y coordinates for absolute measure targets

Visual aid for setting up target position for the film.

Load new dimensions for glass tool targets. Used only when the glass is replaced or targets are moved from their original position.

Loading Glass Target Coordinates

Note: The glass target X-Y coordinates are loaded using a glass tool specific data file created at OLEC when the glass is measured. These coordinates can only be changed by loading a new file.

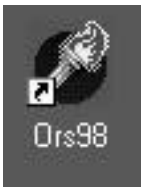
Note: The settings are tray specific, so it is necessary to do the original setup for both trays. After the setup is completed it is not necessary to make any further changes. To use the feature however, it is necessary to check the Measure Film check box in the Jobs Edit screen.

Installing Absolute Measure glass tools and software

1. The installation of the absolute glass tool is the same for all types of bottom glass (see the glass installation instructions).

   Note: There is a Glass Signature number written on the outside of the floppy disk. Write this number down and have it ready, as it will need to be entered in as part of the loading procedure.

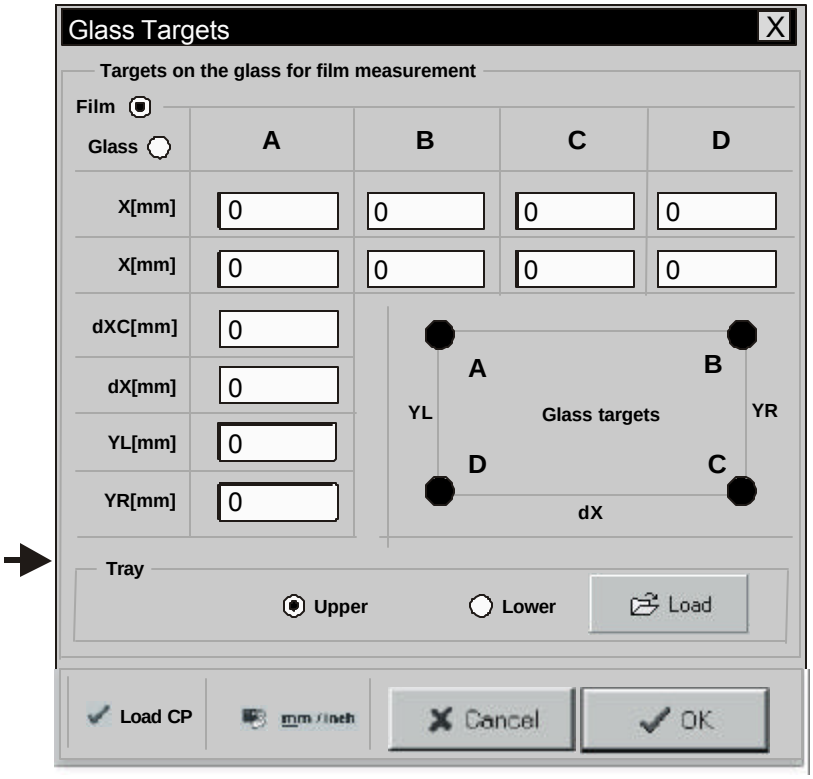
2. After the glass tool is installed, insert the floppy disk in the disk drive.

3. Start ORS98 

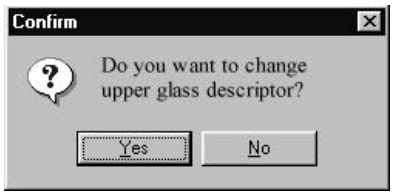
4. From the main screen, press the maintenance button, and in the maintenance screen select "Glass".

This error screen will appear. Press **OK**.

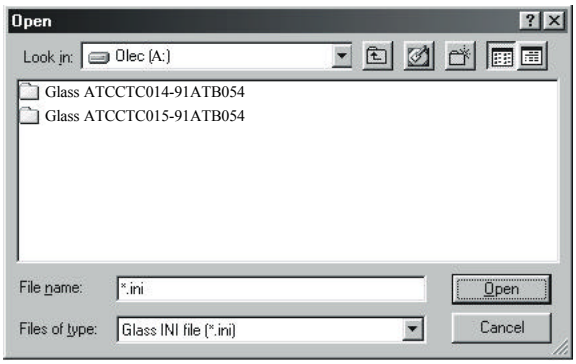
5. In the "Glass Targets" screen, select the upper or lower tray (whichever tray is in the out position).



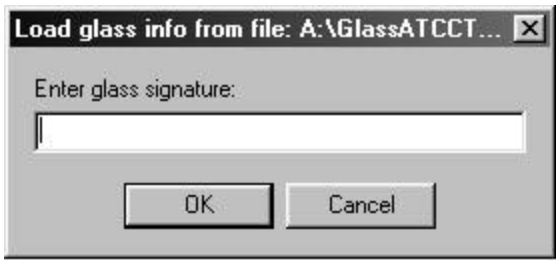
6. Press the **Load** button. Press the **Yes** button on the confirmation screen.



7. An "open file" screen will appear. Go the the "**A**" drive and select the proper file for the frame that's being used. Top file is for upper frame, bottom file is for bottom frame. Press the **Open** buttton.



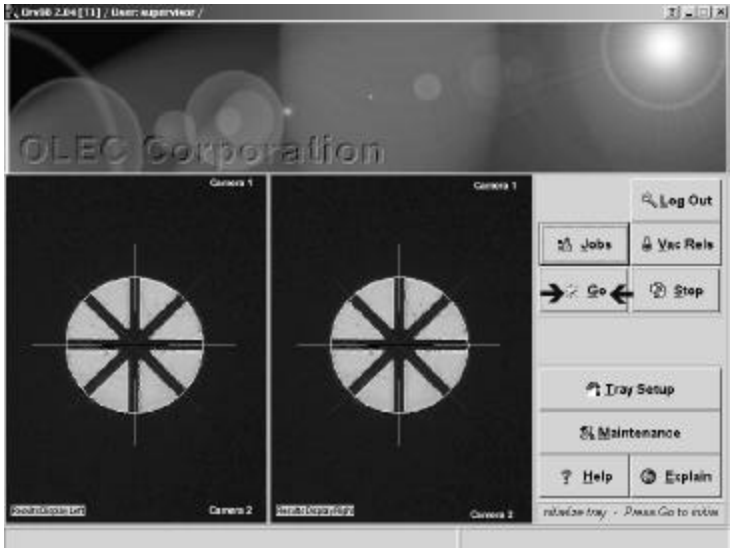
8. A Glass Signature screen will appear. Enter the Glass Signature number in the space provided. This is the number that is written on the diskette. Press OK.



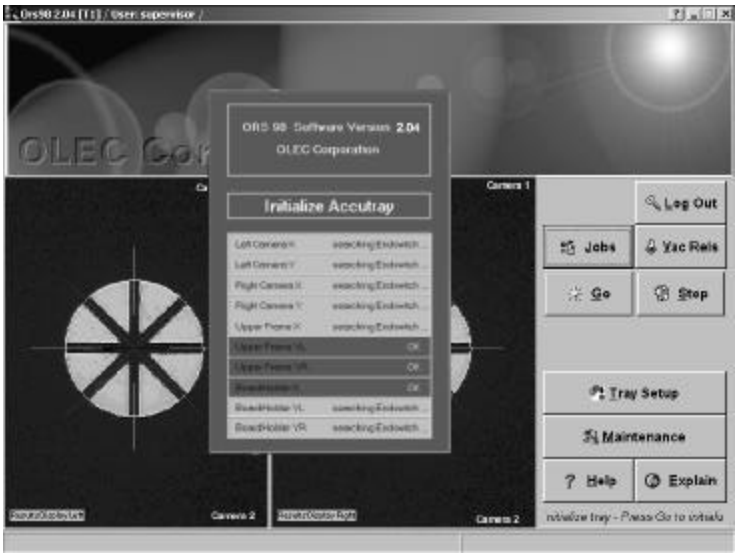
9. Select **Glass** on the Glass Targets screen (if it's not already selected).The values in the windows are the actual locations of the Absolute Targets on the glass. Press **OK**.

10. Press **Exit** on the Maintenance screen.

11. Press the button on the touchscreen, or the GO button on the AT30 to initialize the AccuTray.



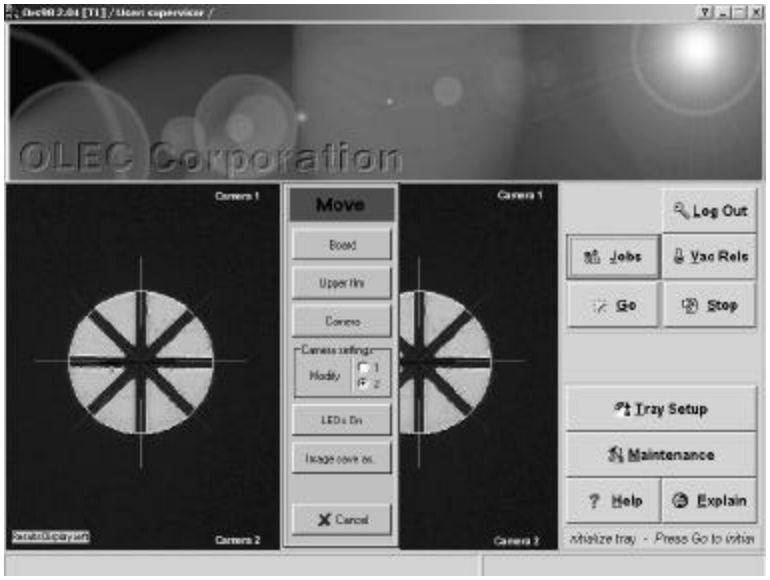
12. The cameras will move to their home position. A window displays the initialization sequence. Once the initialization sequence is complete, the dialog1ue box will dissappear.



13. The camera positions are loaded by moving the cameras directly below the glass tool targets, and then press the Load CP button. For a two (2) camera system the cameras should be moved to the rear absolute measure target positions and then the Load CP pressed. During the measurement the cameras will move first to the rear targets and then to the front targets.

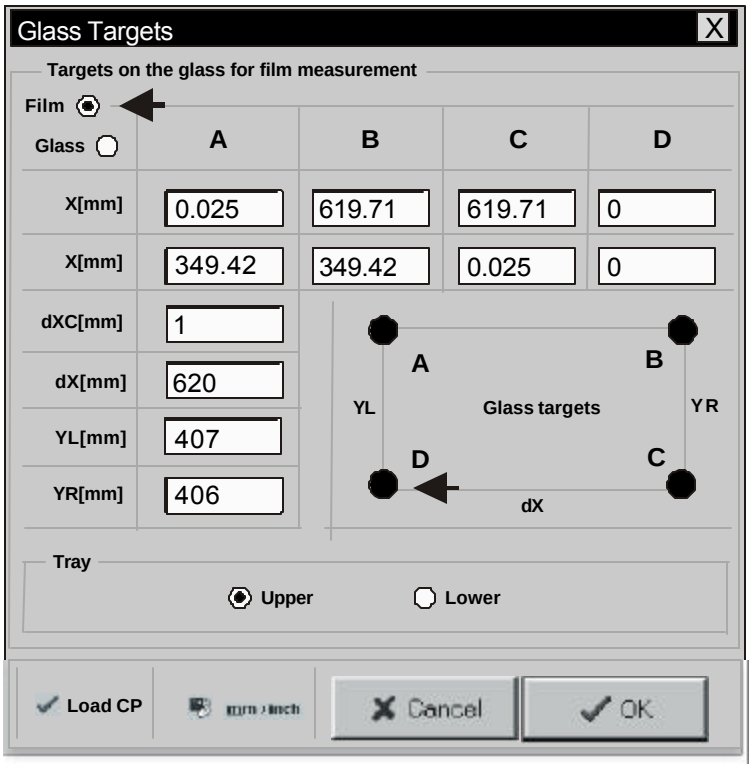
    Move the cameras manually to the Absolute Targets on the glass by doing the following: Double click on the upper lefthand corner of the left or right target screen. The "Move" menu will appear. Press the **Camera** button. The cameras can be moved manually with the mouse by clicking and dragging the camera into position. The cameras can also be moved by touching and dragging the camera into position on the touchscreen.

    Manually move the cameras to the Absolute Targets on the glass.



14. Press the maintenance button, and in the maintenance screen select “Glass”.

15. Press the **Load CP** button. This will calibrate the Absolute Measure target position to match the camera position.
16. The Film dimensions are input by the customer when they receive the glass tool. The X-Y coordinates for the film are the positions where the targets are plotted on the film. In most cases the coordinates can be taken from the Gerber Data. In the upper left corner of the glass screen, select the **Film** option. Select the “D” target as the 0,0 point in a standard X,Y coordinate system. From the Gerber data for the film, input the X,Y coordinates for the targets that are used for Absolute Measure.



17. Press the **OK** button to exit the Glass Targets screen. Change tray positions and perform steps 4 through 17 on the other tray.

Setting Up Artwork for Absolute Measuring

1. **Lower artwork must have four targets as for inner layer alignments** ⊕

   The targets must be placed at the same location as the Absolute Measure targets engraved on the bottom glass tool.

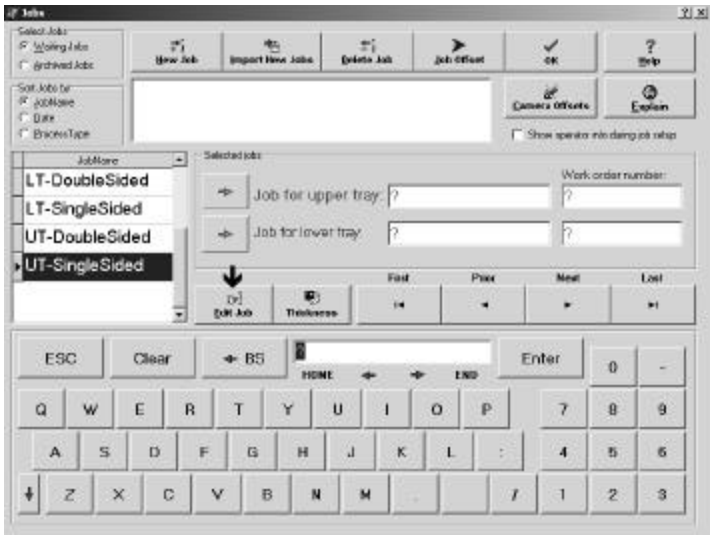
2. Top artwork must have four targets as for inner layer alignments ⊗

   The targets must be placed at the same location as the Absolute Measure targets engraved on the bottom glass tool.

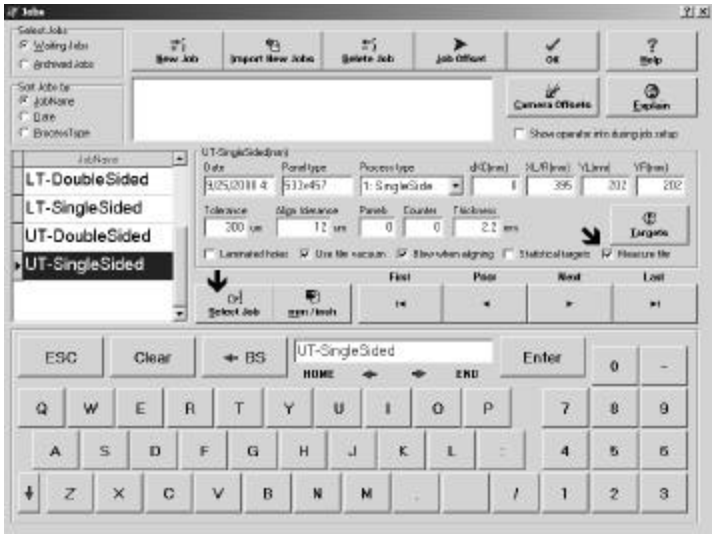
Note: If the artworks are used for inner layer production it is possible to use the same targets as for the Absolute Measure targets.

Measuring the Artworks

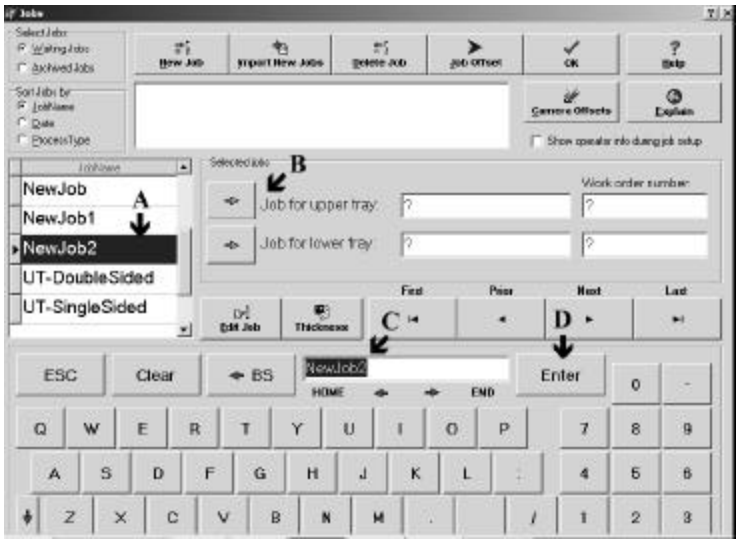
1. Start ORS98 and initialize the tray that's in the front (out) position.
2. Select a job and then press the **Edit Job** key.



3. Check the **Measure Film** box, then press the **Select Job** key.



4. Use the steps below to assign a job to the proper tray. You can select a job for the upper tray only, lower tray only, or both trays, depending on where the AccuTray(s) is installed.



A. Select the job from the job table on the left of the touchscreen and click on it. It will be highlighted in blue.

B. Assign the job to the proper tray by pressing the arrow next to the upper or lower tray text box.

C. Assign a Work Order number in the text box.

D. Press Enter. The touchscreen will automatically return to the Main Screen, and the cameras will move into place. You are now ready to load film into the AccuTray.

Note: If asked to confirm the panel thickness, press **OK** if the panel thickness is correct, press **Cancel** if the panel thickness is incorrect. Once the panel thickness ic corrected, press **OK** again. See pages 8-3 for details on panel thickness.

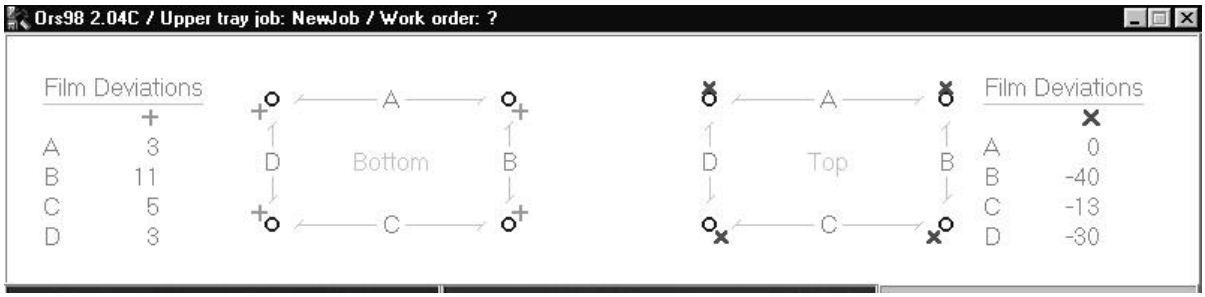
---

5. The cameras will move to the target position for the job, and NOT for the Absolute Measure targets. If the job targets and the Absolute Measure targets are at the same location, the cameras will move to the target positions.

6. Place the first panel in the tray, press **GO**, and the cameras will move to the Absolute Measure targets. For a 4 camera system, the cameras will move to the Absolute Measure targets and draw main vacuum. It then measures all 4 targets at once and displays the results on the results screen. For a 2 camera system, the cameras will move to the back targets first, draw main vacuum, move to the front targets, and then display the results on the results screen.

7. Press the **GO** button to do the first panel setup. The AT30 is now ready for production.

Results Screen



Film deviation result for bottom film Film deviation result for top film

After the film is measured, the result will be displayed in the top part of the main screen. The first half of the screen is the deviation between the expected distances to the absolute distances; the second half of the screen is the results for the top film.

There are four parts to the result screen. From left to right, they are:

1. Deviation between the expected and actual distance between the Absolute Measure tragets on the lower film. The A, B, C, and D in the first column correspond with the A, B, C, and D in the visual result area. "A" is the absolute distance between the two rear targets; "B" is the absolute distance between the two right targets, and so on.
2. A visual display of the lower film to Absolute Measure targets on the glass tool. To help the user recognize if the film is oversized or undersized, the targets on the image part of the screen will move further apart if the film is over sized and closer together if the film is undersized.

Note: The image is not to scale, but the position of the green plusses ⊕ indicate if the film is larger or smaller in each direction.

---

3. A visual display of the upper film to Absolute Measure targets on the glass tool. To help the user recognize if the film is oversized or undersized, the targets on the image part of the screen will move further apart if the film is over sized and closer together if the film is undersized.

Note: The image is not to scale, but the position of the red crosses ⊗ indicate if the film is larger or smaller in each direction.

---

4. Deviation between the expected and actual distance between the Absolute Measure tragets on the top film. The A, B, C, and D in the right hand column correspond with the A, B, C, and D in the visual result area. "A" is the absolute distance between the two rear targets; "B" is the absolute distance between the two right targets, and so on.

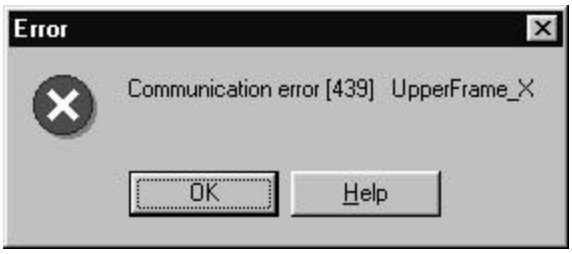
10. AccuTray Diagnostics

Ors98 Messages

Warning Messages

Warning Message	When does the message occur?	What does the message mean?	What is the course of action?
Close tray before aligning	If the GO button is pressed with the tray open, or if the tray switch is bad.	Alignment will not occur if the tray is opened.	Close the tray, press the GO button. Check tray switch SW11.
Close tray before replace	If you try to send the tray into the exposure cabinet while in the open position.	The tray will not move in the open position.	Close the tray, then press GO.
Replace panel before aligning	If the GO button is pressed without first opening the tray and replacing the previously aligned panel.	Panel must be replaced before alignment occurs.	Open the tray and replace the panel.
Store all offsets in current job?	After manual camera alignment using the touchscreen.	Do you want to store all offsets in current job file? Doing so will overwrite the existing offsets for that job.	Press YES to store offset data. Press NO to not store offset data.
Video file... not found	If the EXPLAIN button is pressed and the video file selected is not found.	There are currently no embedded AVI files installed on the AccuTray.	Press CANCEL to return to main screen
ORS98 will be terminated	A fatal error has occured while running ORS98.	The program will be terminated.	Call OLEC service department.
Restart program to make changes become effective	When editing preferences.	The changes made when editing the preferences will not become effective unless the program is restarted.	Close the program and restart.
User break...	During initialization.	Initialization sequence was stopped (operator intervention)	N/A

Error Messages



Error Message	When does the message occur?	What does the message mean?	What is the course of action?
Axis out of range	During alignment, the movement required to achieve alignment is greater than the axis' maximum range.	Offsets are too large	Reset the camera and job offset values to zero and re - initialize tray.
		Film setup wrong	Check to make sure the artwork is properly punched.
		Bad panel	Check to make sure the tooling hole size is not too large.
Bad 135 degree mark	During alignment or setup.	Software cannot recognize the top film image - ⊗	Check camera illumination, alignment, and focus.
Bad 45 degree mark	During alignment or setup.	Software cannot recognize the top film image - ⊗	Check camera illumination, alignment, and focus.
Bit active state must be 0 or 1 for... [Parallel Port]	During start-up (reading of the tray's INI file).	There is a bad setting for the parallel port output bit in the INI file.	Edit the INI file.
Bad holes or marks	During setup or alignment	Poor target or hole image or incorrect hole size.	Confirm hole quality. Confrim hole diameter matches job setup targets. Confirm that the hole is not partially tinted. Confirm illumination.
Bad horizontal marks	During alignment or setup.	Software cannot recognize the bottom film image - ⊕	Check camera illumination, alignment, and focus.
Bad vertical marks	During alignment or setup.	Software cannot recognize the bottom film image - ⊕	Check camera illumination, alignment, and focus.
Cannot open Comport	During setup.	Conflict of Com devices on Com 2 preventing communication between computer and tray.	Check Com port 2. Exit program, reboot.
Communication error	During initialization.	Bad driver or incorrect driver serial number entered. Driver number and axis is displayed.	Check INI file, or low level maintence for driver settings.
DC Drivers communication error	During loading or unloading of film.	Software does not see axis.	

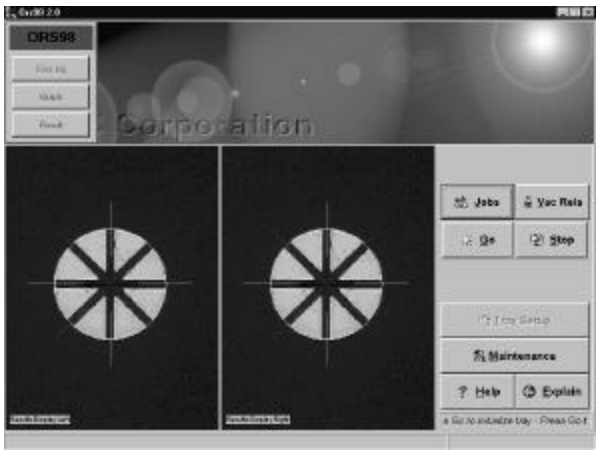
Error Message	When does the message occur?	What does the message mean?	What is the course of action?
End of Axis not found	Any time motors are moving.	Driver position is < 768 or > 64788.	
Error in TextFile:...	"Import New Job" button. Feature not available.	N/A	N/A
File...not exists..., Startup error	During ORS98 startup	INI file missing.	Find the correct INI file and replace it in the ORS directory. Restart program.
Hole/Marks undefined	During alignment	Cameras can't see both target centers.	
Incorrect data for selected field	Any editing.	Wrong type of data entered.	Review and reenter data.
Incorrect job definition	Data base operation.	X/O bad calculation.	Call OLEC.
Job definition not found	When selecting jobs on the Job screen.	A job has been selected that is not defined.	Define the job or select another.
Jobname already exists	When editing jobs on the Job screen.	You've attempted to assign a new job name that is already used elsewhere.	Create a different job name.
Limit switch not found	During tray initialization.	Driver position is < 768 or > 64788.	Check for: Faulty or misadjusted switch. Broken wire. Bad driver. Mechanical obstruction.
Lower Tray: No films vacuum	During the loading of film.	Sensor does not detect vacuum for film.	Check: Vacuum sensor. Broken or loose wires. Loose film. Vacuum generator. Low incoming pressure. Leaks in air line.
Lower Tray: No glass vacuum	During the loading of film.	Sensor does not detect vacuum for the frame.	Check: Vacuum sensor. Broken or loose wires. Vacuum generator. Low incoming pressure. Leaks in air line.

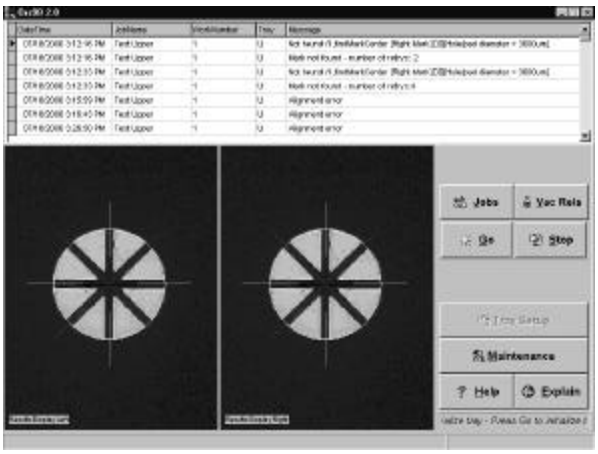
Error Message	When does the message occur?	What does the message mean?	What is the course of action?
Right or Left Marks not found	During job setup and alignment.	The image recognition system does not recognize the upper and/or lower film marks, or the panel hole.	
Motor stall error...	Initialization or alignment.	The motor/driver displayed on the error message has stalled before it has reached its endpoint after 100 attempts.	Check for mechanical resistance. Go into Low Level Maintenance mode and manually activate the motor in question.
New Position too large. No change.	When entering Offset values in Low Level Maintenance.	Offset values entered are greater than the maximum axis position values.	
New Position to small. No change.	When entering Offset values in Low Level Maintenance.	Offset values entered are smaller than the minimum axis position values.	
New Position must be a number	When entering Offset values in Low Level Maintenance.	Offset value must be a number only.	Enter numeric value.
No Driver found for...	During start up of ORS98.	Axis assigned to parallel port is bad.	
No more JobFiles	When importing job files.	There are no more job files to import.	N/A
No PCVision installed	At the end of initialization.	Video card is not installed, or the software and/or drivers not installed properly.	Call OLEC service department.
Not allowed when in Fixed Offset Mode	When entering Offset values in Low Level Maintenance.	Offset values must be typed in when in the Fixed Offset mode.	Type values in the dialogue box provided.
Not allowed when in Visual Control Mode	When entering Offset values in Low Level Maintenance.	Offset values are determined visually by clicking and dragging the provided "camera".	
Not found/1, find Mark Center			
Not found/2, find Mark Center			
Not found/1, find Mark Center			

Error Message	When does the message occur?	What does the message mean?	What is the course of action?
Number out of range!	During any parameter change.	The number entered falls outside the specified parameters.	Enter a number that falls within specified parameters.
Offset must be a number; Not Accepted	During Job offset editing.	An alpha charecter was entered in a field that accepts numbers only.	Enter a numeric value.
Only numbers allowed for offset			
Out of align error tolerance	After alignment failure.	Unable to meet alignment tolerance.	Check artwork and panel. Increase retries by 1. Verify Align Error Tolerance setting.
Out of range:...			
Out of tolerance - Film/Film	After alignment attempt.	Film-Film mismatch.	Correct film plotting error. Verify tolerance setting.
Out of tolerance - Lower Film/Board	After alignment attempt.	Panel - Lower Film mismatch.	Check panel hole drilling or film plotting. Verify tolerance setting.
Out of tolerance - Upper Film/Board	After alignment attempt.	Panel - Upper Film mismatch	Check panel hole drilling or film plotting. Verify tolerance setting.
Search object too big for view window			Call OLEC.
Unable to initialize tray	After initialization attempt.	This message will be displayed after a more specific error message.	Correct the previous error message to eliminate this one.
Upper tray: No glass vacuum	During the loading of film.	Sensor does not detect vacuum for glass.	Check: Vacuum sensor. Broken or loose wires. Vacuum generator. Low incoming pressure. Leaks in air line.
Upper tray: No films vacuum	During the loading of film.	Sensor does not detect vacuum for the film.	Check: Vacuum sensor. Broken or loose wires. Loose film. Vacuum generator. Low incoming pressure. Leaks in air line.

Error Logging

All errors associated with ORS98 are logged in a database. The error log can be displayed by double clicking the image area on the top part of the main screen. A menu where Error Log can be selected will appear in the left side of the screen. If the Error Log button is selected the complete error log for the AT30 is displayed.





The error log displays the following error information:

- Date/Time
- Job Name
- Work Order Number
- Tray
- Nature of the error

The log can be sorted and displayed by any of the column names.

The data is stored in a standard dB format and can be read by any program that is able to read dB files (Excel 2000, for example, can be used to print the error log).

It is also possible to open the error log from the OLEC directory:

- select all
- copy file
- paste file onto Notepad or Wordpad and print from there.

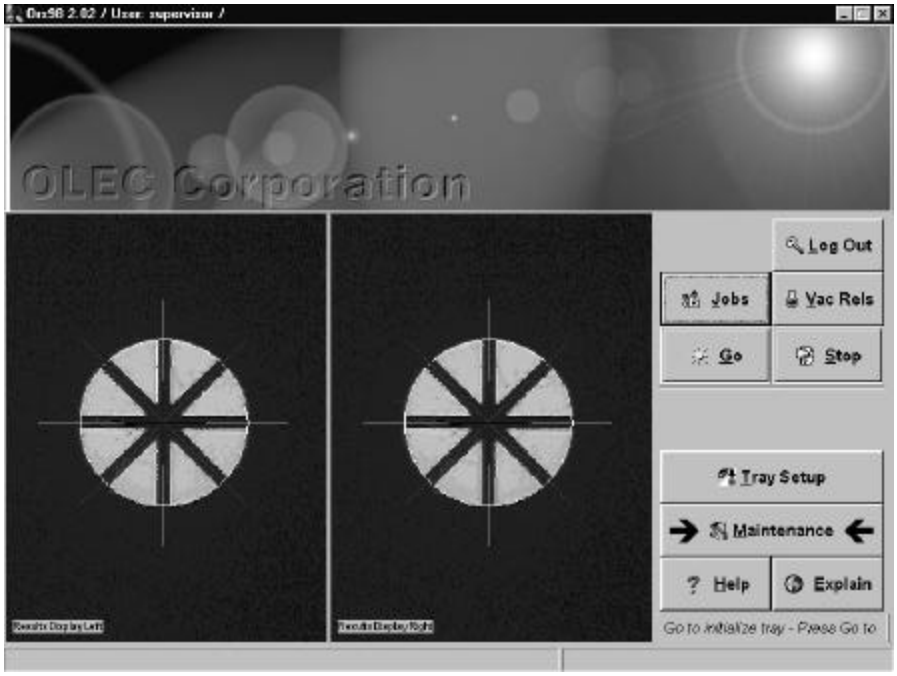
Low Level Maintenance

The Low Level Maintenance Mode allows for manual activation of the various motors, vacuums, and pins within each AccuTray.

Note: Low Level Maintenance can only be accessed from the Supervisor Mode.

---

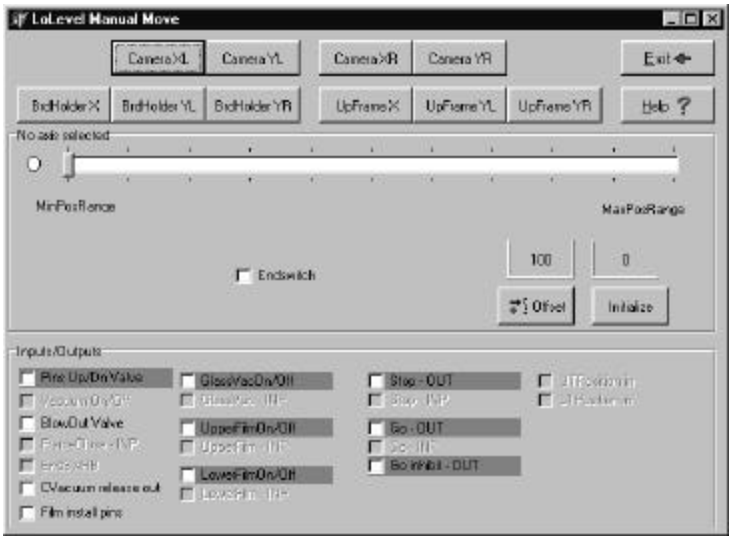
1. Log into the computer using the Supervisor password.
2. Press the Maintenance button on the touchscreen.

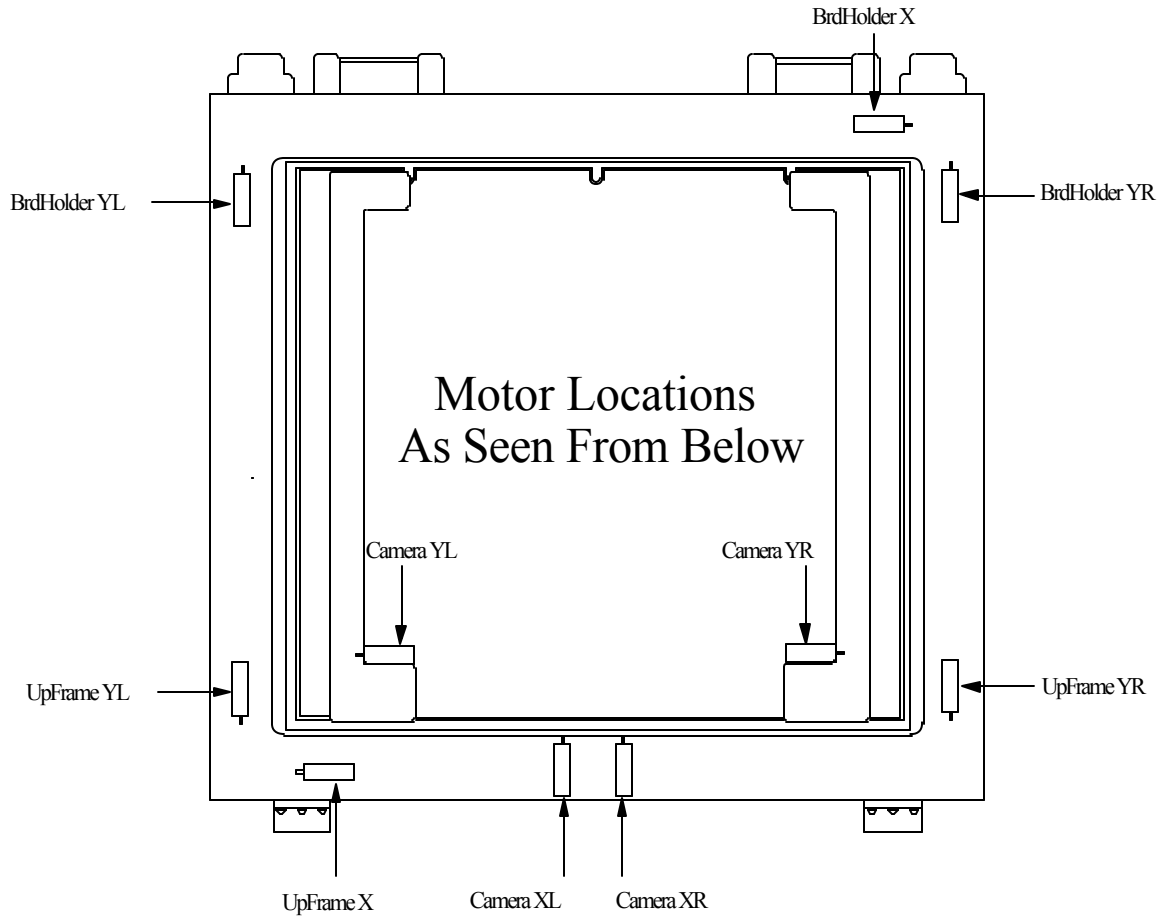


3. Press the LoLevel Maintenance button.

Activating Motors Manually

The 10 motors in each AccuTray can be moved manually. Select the motor to be moved by clicking on the appropriate button (see diagram below for actual motor locations). Click on the Min/Max Pos Range indicator and slide left and right to move the selected motor. The Endswitch box will light whenever the motor reaches the end of it's range.



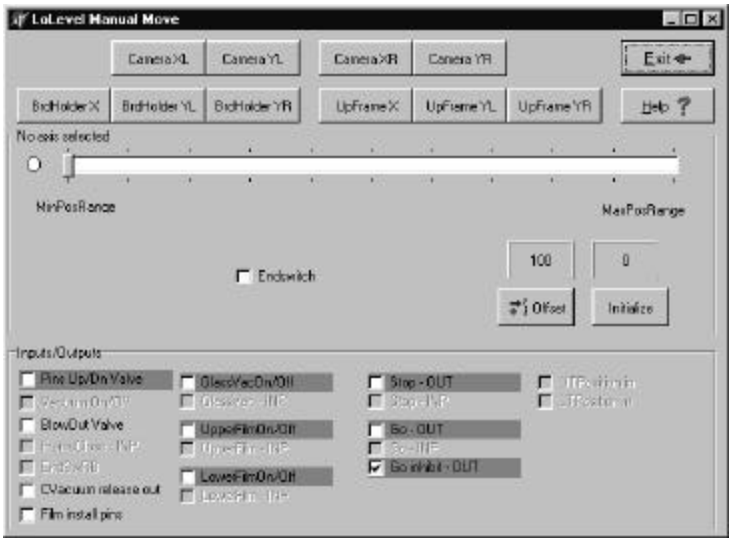


Inputs/Outputs

Activate Valves, Vacuums, Pins, and Stop/Go buttons by clicking on the highlighted indicators in the Inputs/Outputs section of the touchscreen.

Click again to turn off.

The unhighlighted boxes are status indicators. A check mark will appear in the box whenever that feature is active.



The **Go inhibit - OUT** indicator should always be activated. Deactivating this will disable the Stop and Go buttons in normal operation.

AT30 Data Analysis Program

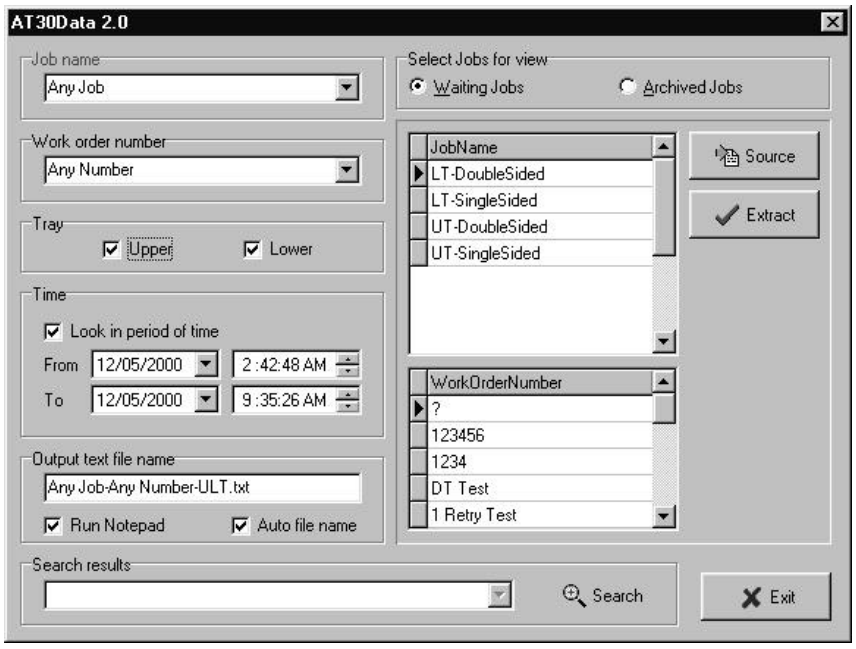
The AccuTray Data Analysis program is a utility designed to aid in displaying, analyzing, printing or archiving the data acquired by the OLEC AccuTray exposure frame.

Highlights

- Display all recorded exposure data in a line format.
- Save exposure data to disk file. This allows for historical analysis of data.
- Apply simple statistical formulas to data.

Operation Instructions

1. Turn on computer.
2. Exit from ORS98.
3. On the desktop double click the At30Data icon. At this point the menu screen for the At30 Data program will appear.



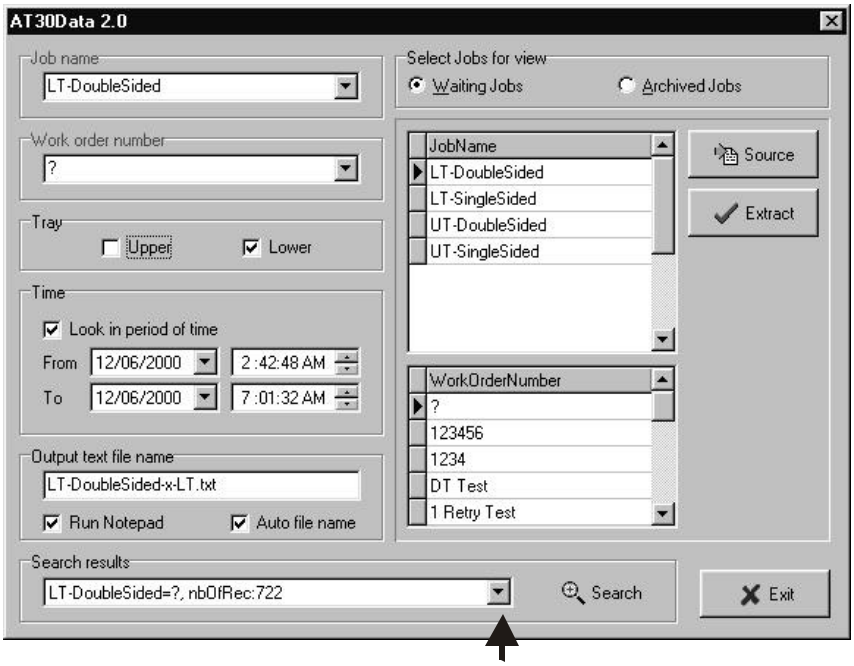
4. To select a job press the **Source** button.
5. On the pop-up screen select the directory where the results from the ORS98

are stored.

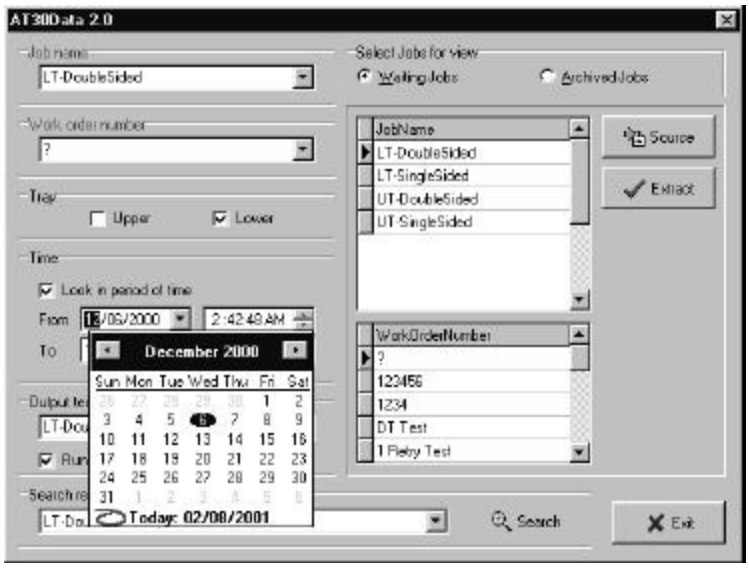
Most commonly **C:\olec\Ors98 v2.02\PublicDb\Results.db**

Double click on the **Results.db** file.

6. In the **Job name** and **Work order number** fields you should see all current job names and all possible work order numbers. To have the computer sort possible combinations of jobs and work orders press the **Search** button.

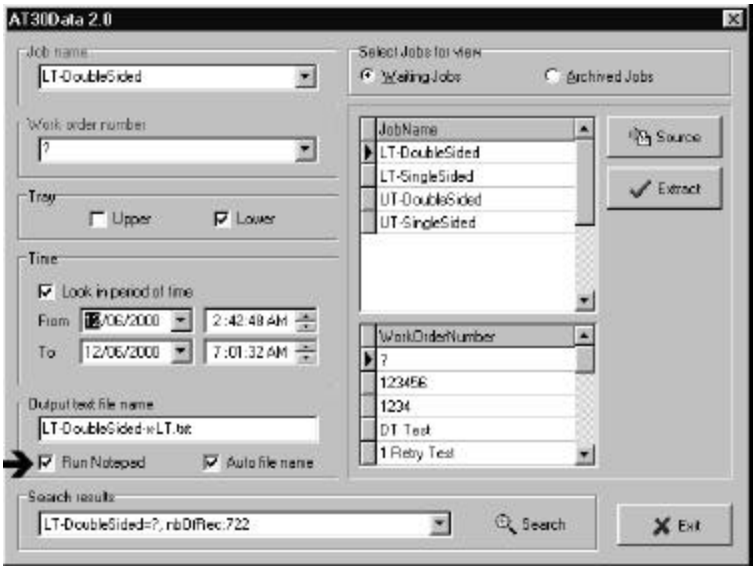


7. Now press the arrow in the **Search results** field to view all possible combinations. To select a job/work order click the job on the role down menu.
8. It is possible to select jobs over a specific time period. In the **Time** box select the beginning and ending times and dates of the jobs to be viewed.



Note: If a time frame is used instead of a job name and work order number, the **Job name** box in the upper left corner must be changed to Any Job, and the **Work order number** field must be changed to Any Number.

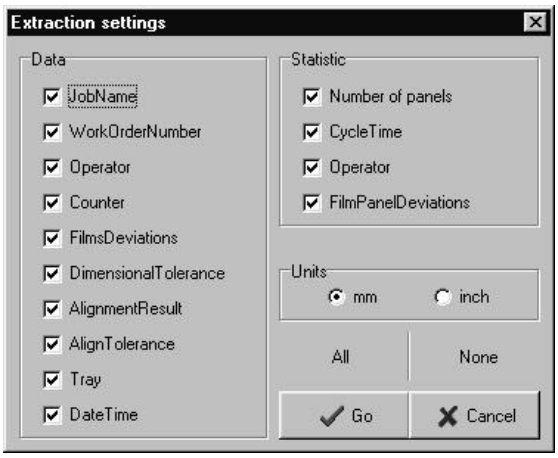
9. Select Upper and/or Lower tray in the **Tray** box.
10. Select either Waiting Jobs or Archived Jobs in the **Select Jobs for view** box. This selection must match the location of the job in ORS98.
11. In the **Output text file name** box check the Run Notepad and the Auto file name boxes if you want the program to create a txt file and if you want to view the file in Notepad. It is possible later to import the file to excel.



12. Press the **Extract** button. In the pop-up window there are two types of information that can be extracted - Raw data and Statistical data. Data can be extracted in either mm or inches. Select **All** in the lower right side of the

window to extract all possible data (Raw + Statistical).

Note: It is recommended that the first time a job result is extracted, select **All** to get a feel for what kind of data you are interested in. Otherwise, select **None** to clear the screen and choose the parameters you want.



13. Last, press the **Go** button. An information screen will pop up.

To view all the extracted data press the **OK** button. If at this point get a File is to large… Message, press the **OK** button and the file will be displayed on your screen.

Extracted Data File Sample

Data extracted using: AT30Data 2.0
Settings:
Job Name: LT-DoubleSided
Work order number: ?
Data Source: C\Olec\Results\PublicDB\results.db
Time: 02/07/2001 11:38:45 AM

Film Deviations					Panel				Upper Film					Tray	Date	Time	Job Name
NB	FF	UFP	LFP	TOL	XL	YL	XR	YR	XL	YL	XR	YR	TOL				
0	-27	-31	-4	300	9	12	13	4	4	-12	-23	-18	20	L	12/06/2000	6:37:00 AM	LT-Double Sided
309	-49	-44	5	300	15	4	10	-1	28	-4	-21	-15	20	L	12/06/2000	6:37:17 AM	
310	-36	-41	-5	300	-10	1	-5	-11	8	-12	-28	-20	20	L	12/06/2000	6:37:59 AM	
311	-19	-43	-24	300	0	0	24	-5	13	-11	-6	-11	20	L	12/06/2000	6:38:42 AM	
312	-39	-43	-4	300	-3	-3	1	1	7	-11	-32	-8	20	L	12/06/2000	6:39:24 AM	
313	-55	-43	12	300	15	-3	3	6	23	-4	-32	1	20	L	12/06/2000	6:40:07 AM	
314	-47	-45	2	300	11	1	9	-8	21	-3	-26	-1	20	L	12/06/2000	6:40:50 AM	
315	-33	-50	-17	300	6	3	23	-2	22	-4	-11	1	20	L	12/06/2000	6:41:32 AM	
316	-28	-52	-24	300	-9	-1	15	11	12	4	-16	6	20	L	12/06/2000	6:42:15 AM	
317	-57	-56	1	300	8	0	7	10	27	-3	-30	1	20	L	12/06/2000	6:42:57 AM	
318	-53	-52	1	300	8	8	7	1	18	5	-35	8	20	L	12/06/2000	6:43:39 AM	

Results statistic:
Number of records: 722
Number of job setups: 12
Number of exposed panels: 637
Number of retrys: 97

LT-DoubleSided / ?	Min	Max	Avg	Std Deviation
Deviations - Film to film:	-68	24	-30	20
UFilm to panel:	-133	42	-51	34
LFilm to panel:	-105	64	-21	34

Number of panels:		No. of panels	Time-> Min	Max	Average	Std Deviation
		637	20	3274	51	131
Operators:	Unknown	581	20	3274	49	135
	Supervisor:	56	42	428	74	66

Troubleshooting

If there is a problem aligning the panels, check the following

1) Is the artwork punched so that when it is placed on the artwork pins, the upper and lower targets are reasonably aligned? If not, re-punch the artwork that seems to be out of alignment.
2) Does the alignment target on the touch screen seem crisp? If not, redo step 3, 4, or 5 from above.
3) Are the alignment holes in the panel perfectly round? If not, the panel can not be used.
4) Are the panels scrubbed before they were laminated? If not, the panels must be scrubbed before they are laminated.
5) Are there any tooling marks overlapping the alignment holes? If so, the panels can not be used. Either the tooling marks must be replaced or the alignment holes must be moved.
6) Are there any rough edges that could stick to the bottom glass and stop movement of the panel? If so, the panels must be scrubbed before lamination or the panel must be scraped.
7) Is the deviation between the top and bottom artwork greater than the specified tolerance from the job menu? If so, adjust the tolerance or re-plot one or both of the artworks.
8) Is the deviation between the artwork and the panel greater than the specified tolerance from the job menu? If so, plot the artwork to a fitting scale, or redefine the tolerance in the job menu.
9) Does the alignment error message persistently show up? A) Redo step 3, 4, or 5 from above. B) Check the align. tol. In the job menu. If unreasonable small for the job, change to a better-suited number for the job.
10) Does the computer lock-up after the job is selected? Reboot the computer, start ORS98, and follow the scroll bar when setting up the job. (In some instances the computer lock up if a job is selected before the tray is initialized.
11) Does the Motor stall error box appear? If so, note the driver number shown in the Motor stall error box. Turn off ORS98. Start the Pcom program. Test the driver in Pcom. If there is no communication between the tray and the computer install a new driver. Don't forget to update the .INI file. If the driver communication is working check if the flat part of the pin protrude through the artwork and prevents the pin from moving. Spacing out the pin assembly can solve this problem.

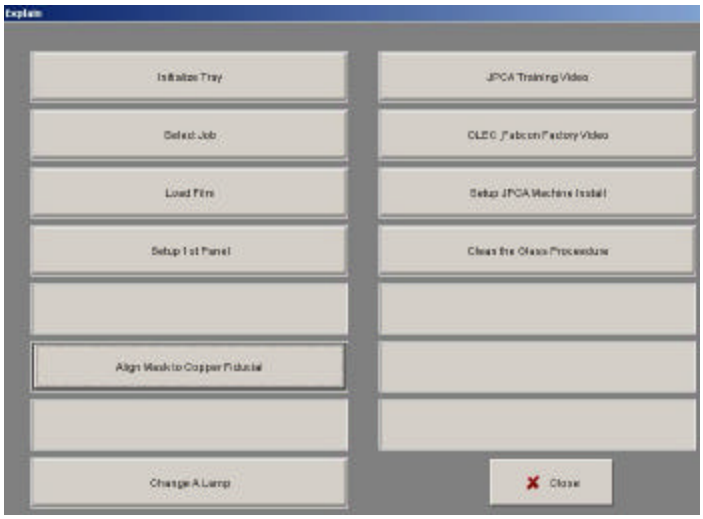
Saving Images That the Processor Failed.

For trouble shooting it is important to have images of what the processor can not process. To capture images as the machine is running it is necessary to press Ctrl+S.

When Ctrl+S are pressed, "Save images is ACTIVE" will be displayed in the lower left corner. The program will now save all the images that the processor can not process. The images will be saved in the same folder as the ORS98 program is stored in. It will save up to 15 images. When it reaches 15, it will start to replace the oldest saved images with the latest. The feature will stay active until the program is turned off or the Ctrl+S are pressed again.

Help Videos

When the Explain button is pressed, the video selection screen will appear. Press any of the buttons that contains a text and a short video with the subject selected will be played.



Changes to the ORS98.ini file

[VideoExplain]
VideoButton-0=Initialize Tray
VideoFile-0=C:\Video\AT-Init.avi
VideoButton-1=Select Job
VideoFile-1=C:\Video\AT-Job.avi
VideoButton-2=Load Film
VideoFile-2=C:\Video\AT Film Load.avi
VideoButton-3=Setup 1st Panel
VideoFile-3=C:\Video\AT-1stPanel.avi
VideoButton-5=Align Mask to Copper Fiducial
VideoFile-5=C:\Video\AT-2S-Mask.avi
VideoButton-7=Change A Lamp
VideoFile-7=C:\Video\LampChange.avi
VideoButton-8=JPCA Training Video
VideoFile-8=C:\Video\JPCA-Training.avi
VideoButton-11=Clean the Glass Proceedure
VideoFile-11=C:\Video\AT-CleanGlass.avi

Note: The video folder must be added to the C drive. It is possible to change location of the video folder, and then the location in the ini files must also be changed.

11. AT 30 Diagnostics

Output Diagnostics

One of the many advancements OLEC has introduced to the field is the ability of its equipment to run a self-diagnostic check. All integrator-activated functions and all internal and external switches can be checked out on the integrator display by using the numerical keypad.

Output Functions Check

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

  Press 1, 2, 3, then 4 in sequence. The Vacuum window will read SEL. This places you in select mode.

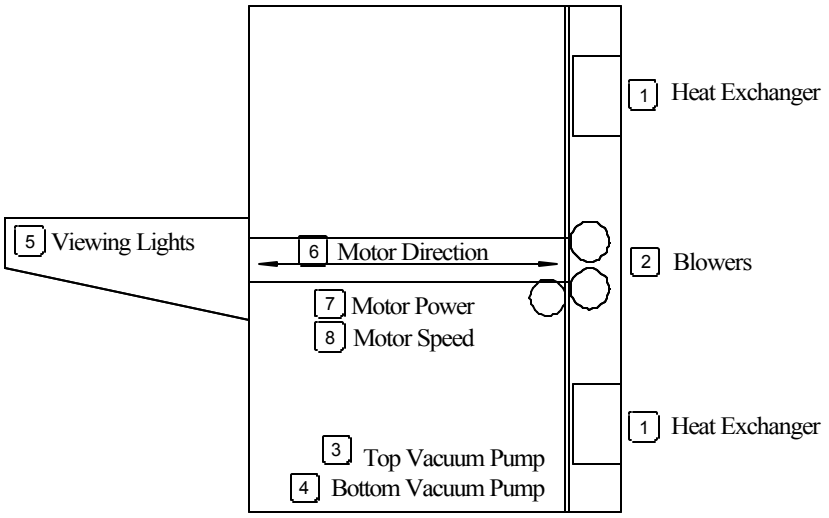
- Press the 6 key to enter the Diagnostics mode. The number in the Vacuum window will be the sum of all values for peripherals that are turned On.

  Press the 9 key to reset the Diagnostics mode. This turns Off all peripherals. Therefore the Vacuum window will indicate o000.

- Refer to the Functions Table.
- Press the number key to actuate the desired function. The numerical value shown in the table should appear in the Vacuum window.
- Press the function key number again to turn off the function. Press the 9 key to turn off all functions.
- Press the 0 key twice to return to normal operation.

Functions Table

	Function	Value
1	Heat Exchanger Solenoids	0001
2	Blower On/Off	0002
3	Upper Vacuum Pump On/Off	0004
4	Lower Vacuum Pump On/Off	0008
5	Work Light and Nose Section Fans On/Off	0016
6	Motor Direction Control	0032
7	Frame Motor On/Off	0064
8	Motor Fast/ Slow	0128
9	All controls off	0000
0	Return to Select mode	SEL



Input Diagnostics

- Switch Check

  The switch check can be done while in the Select mode.

- Press the ⏻ key on the integrator to power up the light, the front remote switches, and the exposure unit's computer system.

  Press 1, 2, 3, then 4 in sequence. The Vacuum window will read SEL. This places you in select mode.

- Press the 6 key. The Exposure window on the integrator will show various numbers as the switches or keys are closed.

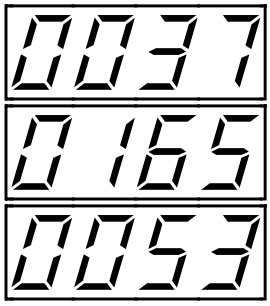
Examples: With the upper frame moved in, the side access door switches closed, and the GO key pressed on the nose section, the lower integrator display should read 0165. With the lower frame in, the display should read 0172.

GO	DOOR	FRAME SWITCH	FRAME	NUMBER DISPLAYED
128	+32	+4	+1	= 0165 (Upper Frame In)
128	+32	+4	+8	= 0172 (Lower Frame In)

- Switch Table

Switch Value	Function
1	Upper frame in (labeled "frame")
4	Frame switch
8	Lower frame in (labeled "frame")
16	STOP key, nose section
32	Door/emergency STOP switch
128	GO key, nose section

Typical values that you will see when all switches are good.



- Upper tray in, Frame switch closed, Door and Emergency switches closed. The bottom display should read 0037.

  When the GO button is pushed the value should change to 0165.

  When the STOP button is pushed the value should change to 0053.

- Lower tray in, Frame switch closed, Door and Emergency switches closed.

The Exposure window should read 0044.

When the GO button is pushed the value should change to 0172.

When the STOP button is pushed the value should change to 0060.

Error Handling System

If an error occurs, the machine displays an error code to aid in troubleshooting. The error codes defined are:

The message Err will appear in the Vacuum window, and a number in the Exposure window. Look up the number below for a description of the condition.

Description

Frames did not reach intended position after the maximum amount of time.

Solution: Determine why. Were the frames moving at all? Did they get close? Is something obstructing their movement?

See I/O test mode for instructions on how to test motors and switches.

Not used.

Internal error. Please call your service rep.

Solution: Cycle the power switch.

Please note the circumstances under which this error occurred; was the machine exposing? Calibrating? Idle? Were new exposure values being entered? What was the last button pressed? How long ago?

Frames not in position at start of exposure.

Solution: Put the frames in position by cycling the power switch. If the frames don't move, check the wiring to the frame motor and the frame position sensing switches. If everything is OK, and this error still occurs, call your service representative. See also the I/O test mode description.

Switch error. The machine thinks both frames are at the exposure position.

Possible causes are: Bad cable between master board and memory board, switches have failed, bad or no connection to switches.

Communication error. Remote board is not communicating with the master board.

Possible causes are: no power to remote board, bad or disconnected communication cable.

Remote board has reset or temporarily lost power. After clearing the error, normal function should continue.

At least one lamp intensity/frame/surface has not been calibrated.

Solution: Ensure the unit has been completely calibrated.

Vacuum has not reached desired levels.

Solution: Determine why. Does the vacuum pump turn on? Do you have vacuum at the pump itself without anything else connected? Does the blanket seal have any cuts? Do all hoses and fittings seal tightly? Is integrator programmed correctly?

Temperature has exceeded set limits.

Solution: Determine why. Does the water temperature and flow meet specification? Is there air in the system?

Typical values that you will see when a fault occurs.

Indicates neither frame in position, magnetic frame switches closed, and does not have the correct reading from either the door switches or emergency STOP button.

Indicates upper frame in position, magnetic frame switches closed, and does not have the correct reading from either the door switches or emergency STOP button.

Indicates lower frame in position, magnetic frame switches closed, and does not have the correct reading from either the door switches or emergency STOP button.

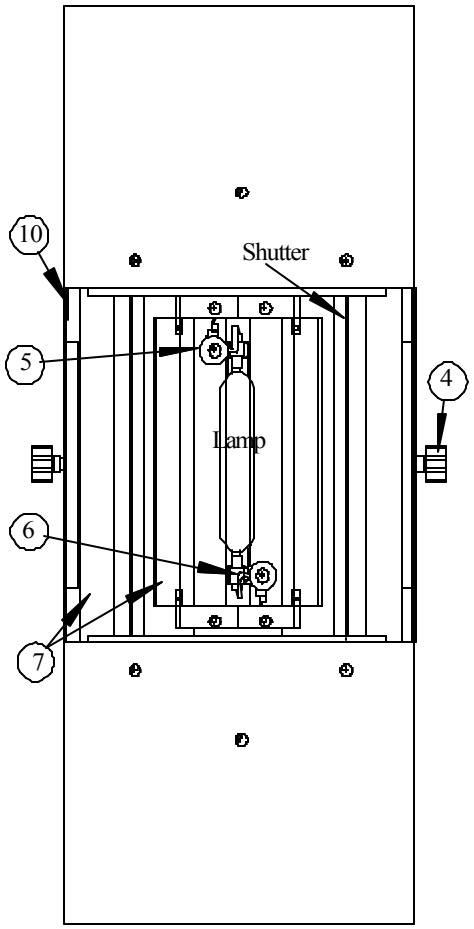
- Whatever the switch value display reads when the GO button is pressed and the value does not increase by a value of 128 the GO switch is bad.
- Whatever the switch value display reads when the STOP switch is pressed and the value does not increase by a value of 16 the STOP switch is bad.

12. Lamp Changing Instructions

WARNING The lamps and safety glass may be very hot and cause burns. Prior to changing the lamp, ensure the lamp head is turned off and allowed to complete its cooldown cycle.

OLEC recomends that every year you unplug your light, remove the safety glass, and clean the glass and reflector with denatured alcohol and a soft cloth. Lamps should be checked for excessive exposure times and should be replaced if exposure time has become too long.

- Support the safety glass on the lamp head and loosen the two thumbscrews to release the glass. Carefully slide the holding brackets up or down. The safety glass will slide from either side of the lamp head.
- Loosen the thumbscrews for both lamp wire spade lugs.
- Disconnect and remove the lamp by removing the spade lugs and wires from under the thumscrews.
- Carefully lift each end of the lamp (one end at a time) out of the holders and remove the lamp from the lamp head.



- Clean the reflector with a mild solvent, such as denatured alcohol, and a clean soft cloth. Use glass cleaner to clean the safety glass. Dirty reflectors and glass can substantially reduce light output.
- Wear the white lightweight fabric gloves that are provided and unpack the new lamp. Clean the lamp with the alcohol wipe included.
- Place each end of the new OLITE lamp (one end at a time) on the holders. DO NOT touch the lamp with your hands. Contamination of the quartz tube of the lamp with skin oils will shorten the life considerably and may lead to failure.
- Reconnect the lamp by fully inserting the spade lugs on the connecting wires under BOTH thumbscrews and tighten. Ensure the wires are positioned so they do not touch the lamp body or the reflector and cooling tube.
- Insert the safety glass into the holders and push against the housing. Ensure the safety interlock lever is positioned firmly underneath the glass towards the lamp and not squeezed to the side. Also, ensure the safety glass is loose enough to allow for heat expansion during an exposure. The light will not operate unless the safety glass is installed properly. When the safety glass is properly installed, it will be able to move slightly. If the safety glass is installed too tight, it may be damaged during use.

Note: OLITE Lamps are specifically designed for OLEC and undergo careful testing and preperation before shipment. They carry the OLEC Warranty of Satisfaction. Substitutes and copies of lamps are not approved by OLEC, nor do they carry our Warranty. Use approved OLEC replacement parts ONLY!

---

13. Preventive Maintenance

Preventive Maintenance Daily (Approximately 15 minutes required)

- Clean exposure frame glass. The exposure frame glass should be kept meticulously clean. Dirt and resist flakes on these surfaces will cause exposure defects.

Preventive Maintenance Monthly (Approximately 1 hour required)

Perform daily maintenance steps plus the following:

CAUTION Do not use silicone spray lubricants in the printer.

- Lightly oil frame tracks. Lightly oil the upper and the lower exposure frame tracks every month. Wet a small piece of cloth or paper towel with a lightweight machine oil and rub it on the linear bearing surface. Keeping the linear bearings oiled will ensure smooth and quiet operation.

CAUTION Do not use silicone spray lubricants in the printer.

- Lubricate gas strut mounts. Apply a light coat of oil on the retaining ball mountings for the gas struts that support the upper half of each exposure frame.

Preventive Maintenance Semi-Annually (Approximately 2 hours required)

Perform daily and monthly maintenance steps plus the following:

- Inspect exposure frame vacuum seals for cracks. Cuts or nicks in the seals could cause vacuum leaks and slow frame evacuation. Replace the seals as necessary. Replacement procedures are in the Service section of this manual.
- Clean unit and power supplies. The inner cabinet and power supply areas should be cleaned to prevent dust buildup.
- Turn the printer off and allow the internal blowers to run through their cool-down cycle. Disconnect the power and lock it out.
- Open both side cabinet doors. Remove both power supply covers by removing the two top forward screws and lift the covers up and forward. Using a vacuum or compressed air, remove all accumulated dust and debris from the cabinet and the power supplies.
- Clean reflectors and lamp head safety glass. Clean the lamp reflectors and the safety glass on the upper and lower lamp heads. Refer to the lamp replacement procedures in the Service section of this manual for disassembly information.

CAUTION Do not use silicone spray lubricants in the printer.

- Lubricate frame drive chain and check tension.
- Apply a light coat of machine oil to the exposure frame drive chain by rubbing an oil wetted rag along the chain. Do not wet the chain enough to cause the oil to run or drip.

- The chain tension adjustment is along the inner left hand side of the nose section. Turning the adjuster nut clockwise tightens the chain; counterclockwise loosens it. Adjust the chain to allow no more than a 1 inch (25 mm) flex between the drive motor and the adjuster wheel.

CAUTION Do not use silicone spray lubricants in the printer.

- Lubricate upper and lower light block mechanisms. Apply a light coat of machine oil to the piano-style hinges on the on the upper and lower light blocks. Apply a light coat only otherwise excess oil will drip on the exposure frames during operation.
- Clean vacuum pump filters. Remove and clean the filters in each vacuum pump. Replace the filter if plugged with debris. Refer to "Vacuum System" in the Service section of this manual for more detailed information.

Optics Cleaning (ATH30)

The Collimated Exposure System should be installed in a clean room, with the cleanliness level maintained at class 10,000 or lower. All personnel using the equipment should strive to maintain that cleanliness level.

If any chemicals, such as chlorothanes, trichloroethylene, solvents, inks, ammonia, or any acids are found in the area of the ATH30 Exposure System, these special precaution are necessary as these chemicals can damage the coated surfaces of the optics; i.e., the mirrors, the collectors, etc. Air from other working areas containing fumes of these chemicals must not be used for cooling and re-circulation. The fumes as well as direct contact with the chemicals will attack the surface coatings of the optics.

The dichroic mirror, integrator, beam-splitter, and collimator mirrors should be cleaned as seldom and as little as possible. The sensitive surface coatings of these precision optical devices can be easily damaged during cleaning. Therefore, cleaning should be held to a minimum. If proper cleanliness is maintained and checked periodically minor dust particles or other accumulations on the optical surfaces can be removed by blowing clean, dry nitrogen gas or filtered air across the optical surfaces. If dirt or contamination is not removed by blowing, proceed as follows:

WARNING During cleaning, all electrical power must be OFF. Make sure that the Main

Line Disconnect switch is OFF.

CAUTION Finger prints have oils and acids in them, and will etch any mirrored surface.

Remove any finger prints as soon as possible.

a. Place a clean cloth or a small container under the mirror or glass to be cleaned, and rinse the mirrored surface with a solution of isopropyl alcohol and de-ionized water (use a 50:50 mix of alcohol and water). Remove all loose dirt and dust.

Note: Isopropyl alcohol and de-ionized water shall be analytical reagent grade.

b. Wait a few seconds, and rinse again to remove any dissolved dirt or dust.

Note: Do not use lens tissue to dry the collimator mirrors in the top and bottom of the exposure cabinet. Blow-dry the collimator mirrors with dry nitrogen gas or clean, moisture-free compressed air.

Refer to the SAFETY SUMMARY at the beginning of this manual for the precautions to be taken before performing any maintenance or repair procedures.

Filter Replacement

The two separate pneumatic systems of the ATH30 use disposable filters. Each should be changed every six months to a year, depending upon use.

Vacuum/Pressure Line Replacement

If any accessible vacuum or pressure line is broken or leaking, replace the complete line with a new length of tubing; use the same size, type, and color as the original tubing to insure proper operation of the pneumatic systems of ATH30. Do not attempt to patch vacuum/pressure tubing.

14. Warranty

OLEC

Limited Warranty

OLEC equipment is warranted against defects in material for SIX (6) Months from date of purchase. Faulty parts will be repaired, replaced, or purchase price refunded at OLEC's option, for the original Buyer, provided the parts have been replaced by authorized personnel and are returned prepaid to the OLEC factory in Irvine, CA. Shipment must be accompanied by proof of purchase and the Dealer/Distributor name.

This Warranty applies only to equipment which was installed and used according to instructions and in the way it was intended to be used by the manufacturer. Unauthorized repairs, use of non-OLEC parts and lamps, modification, or Serial Numbers that have been removed or defaced, void this Warranty. Glass parts are not included in this Warranty. Lamps are covered according to the Warranty below.

The OLEC Corporation and/or the Seller shall not be liable for any loss, damage or injury arising out of the improper use of, the failure of, or the inability to use the equipment. It is the Buyer's responsibility to ascertain the suitability of the equipment for the application. The Buyer assumes all risk and responsibility for the proper installation, for reading the Instruction Manual and retaining it with the equipment for the safe use of the OLEC product. All operators must be made familiar with the proper use and safe operation upon installation and periodically thereafter.

No one is authorized to assume any obligation, either on behalf of the OLEC Corporation or the Seller, which is not in accordance with the above.

Lamp Warranty

Should any original OLITE Lamp fail prematurely when used in OLEC lights, it should be returned promptly to OLEC, prepaid. It should be accompanied by proof of purchase, explanation of the type of failure incurred, and the approximate useful life of the lamp prior to failure. If it is determined by OLEC that the failure or shortened life has been caused by faulty material or workmanship, full or partial replacement will be extended to the Buyer.

IMPORTANT: The use of any lamp, other than those purchased or approved by OLEC will void this Warranty.

All Warranty Service should be handled through the Distributor through whom the equipment was purchased.

Corporation

1850 East St. Andrew Place, Santa Ana, CA. 92780
U.S.A. (714) 258-5600 Fax: (714) 258-5601