TROUBLE SHOOTING

GUIDE

Ax 700LE

SECTION NINE

AX700 SERIES

TROUBLE SHOOTING GUIDE

Itemized Sub-Sections

I 9.1 Mechanical
- 9.1.1 Main Drive Motor
- 9.1.2 Main Drive Chain
- 9.1.3 Adjustment Blocks
- 9.1.4 Main Drive Shaft Assembly
- 9.1.5 Infeed Rollers
- 9.1.6 Transport Racks
  - 9.1.6.1 Film Jams
  - 9.1.6.2 Roller Tension

II 9.2 Plumbing
- 9.2.1 Water Solenoid
  - 9.2.1.1 No Water Flow
  - 9.2.1.2 Water Flow During Standby
- 9.2.2 Water Flooding
- 9.2.3 Recirculation
- 9.2.4 No Solution In Tanks
  - 9.2.4.1 Drain Valves
  - 9.2.4.2 Siphoning
- 9.2.5 Replenisher Pump
  - 9.2.5.1 Pump Does Not Activate
  - 9.2.5.2 Pump Runs But Chemistry Is Not Replenished

III 9.3 Electrical
- 9.3.1 15 Amp Breaker
  - 9.3.1.1 Immediate Tripping
  - 9.3.1.2 Delayed Tripping
- 9.3.2 Micro Switch
- 9.3.3 No Replenishment
- 9.3.4 Continuous Replenishment
- 9.3.5 Processor Will Not Come Out Of Standby
- 9.3.6 Processor Will Not Go Into Standby
- 9.3.7 Processor Goes Into Standby Too Soon
- 9.3.8 Jog Cycle Operation
- 9.3.9 Main Drive Motor

9.3.10 No Water Flow
9.3.11 Developer Temperature Control Circuitry
9.3.11.1 Too Much Heat
9.3.11.2 No Developer Heat
9.3.12 No Dryer Heat
9.3.12.1 Dryer Display/Thermostat
9.3.12.2 Dryer Heating Elements
9.3.12.3 External Dryer Relay
9.3.12.4 Microprocessor Board
9.3.13 Too Much Dryer Heat

IV 9.4 Film Artifacts
9.4.1 Scratches
9.4.1.1 Identification/Isolation
9.4.1.1.1 Top Or Bottom
9.4.1.1.2 Spacing Identification
9.4.1.1.3 Isolation of Artifacts to an Individual Rack
9.4.1.2 Solution
9.4.1.2.1 Top Crossover Guides
9.4.1.2.2 Inner Rack Guides
9.4.1.2.3 Bottom Turnaround Guides
9.4.1.2.4 Dryer Feed Guide
9.4.1.2.5 Dryer Rack Guides
9.4.1.2.6 Ladder Guides
9.4.1.2.7 Random Scratches
9.4.2 Water Spots
9.4.3 Drying Patterns
9.4.4 Roller Marks
9.4.5 Static Marks
9.4.6 Wet Films

9.1 MECHANICAL

This section incorporates all moving components and their adjustment requirements for the AX700 Series Processor.

Some components are mechanical as well as electrical and troubleshooting the component(s) may require cross-referencing another section. This will be noted within this section.

9.1.1 MAIN DRIVE MOTOR

The Main Drive Motor is powered and regulated by the Microprocessor Board Assembly.

If the motor fails to run properly when the micro-switch is activated (replenishment pump is working), follow this procedure to isolate problem(s):

Disconnect wires #3 and #4 from 12 pin connector on Microprocessor board and attach one to any open neutral line on the terminal strip and the other to any open hot line on the terminal strip. (See Wiring Diagram)

If the motor begins to operate, replace the Microprocessor Board Assembly. If board replacement is required, leaving the wires attached as described above will allow the end user to continue to process films until the board is replaced.

> **NOTE: The motor will now run continuously as you have bypassed the Microprocessor Board. Also, since the Water Solenoid is wired parallel to the motor you will also have continuous water flow.**

If the motor does not operate after re-wiring, the drive chain may be too tight and may cause motor's internal gearing to seize. Remove chain from main drive motor gear. If, after removing chain from the motor sprocket the motor still does not start, replace motor.

If removing of the chain from the motor sprocket allows the motor to start, see Section 9.1.2 and 9.1.3.

> **NOTE: The motor is thermally protected. If the motor should overheat, the motor will turn itself off.**

9.1.2 MAIN DRIVE CHAIN

The drive chain is connected from the Main Motor to the Main Drive Shaft. The proper tension for the chain should allow you to squeeze the chain almost together without much effort. If the chain tension is too tight, it may cause the motor to bind. If the chain is too loose, a "thumping" noise/"Chain-Slap" may occur.
NOTE: It is important when adjusting the chain that the alignment of the driveshaft gear and the motor gear be adjusted "in line" with one another. If the chain is on an angle, excessive vibration and/or "thumping" may occur.

9.1.3 ADJUSTMENT BLOCKS

There are two Adjustment Blocks at each end of the Main Drive Shaft. Inside each Adjustment Block is a bronze bearing suspended between two set-screws (allen screws). The Main Drive Shaft sits inside these bearings. The bearing height is adjustable by changing the setting of the allen screws. This height setting will allow you to properly engage the Main Drive Shaft Gears with the Rack Drive Shaft Gears.

When making adjustments to the bearing height, be sure not to over tighten the setscrews into the bearing. If set too tight the bearing's "floating action" might be restricted and cause possible binding with the Main Drive Shaft.

Without the transport racks or Main Drive Chain engaged, the Main Drive Shaft should spin freely when rotated in the adjustment blocks.

Once the proper setting of the main drive bearings are achieved within the Adjustment Blocks, tighten the top and bottom jam nuts on the set-screws.

> **NOTE: Ensure Adjustment Blocks are square and not on an angle as this will cause the Drive Shaft to bind.**

9.1.4 MAIN DRIVE SHAFT ASSEMBLY

This assembly has four worm gears, which drive the transport racks. The vertical position of the shaft relative to the rack drive gears of each transport rack is adjustable as mentioned in Section 9.1.3.

It is important that these mated gears are properly aligned. If too tight, the gears will squeak. If too loose, the racks will jump. If squeaking or jumping occurs, determine which rack meshes with the drive shaft too tightly by lifting each rack individually (Developer, Fix, Wash & Dry) until the problem area is found. Adjust Drive Shaft accordingly.

9.1.5 INFEED ROLLER

This phenolic roller is suspended on a stainless steel shaft and is mounted above the infeed tray just before the entrance of the Developer Rack. This roller is designed to spin "freely" on its shaft. If this roller is bowed for any reason, random scratching may occur.

NOTE: For film artifact troubleshooting, refer to the film artifact Section 9.4

9.1.6 TRANSPORT RACKS

Each transport rack is a direct gear driven system consisting of opposed rollers. These rollers are suspended between the side plates by either a bearing or a bearing/rubber grommet combination. All Alphatek transport racks share the majority of the same parts.

9.1.6.1 FILM JAMS

A variety or combination of reasons may cause film jams. Listed below are some of the more common reasons and their solutions:

9.1.6.1.1 LOW CHEMICAL LEVELS

If chemical levels have fallen below the top of the over flow tubes, check Replenishment Tanks for solution. If no solution in the Replenishment Tanks, fill replenishment tanks accordingly and processing tanks to the top of the overflow tubes. Run clean-up film. If Replenishment Tanks have chemistry, check Micro-switch and Replenisher Pump (See Section 9.2.5 and 9.3.2) for proper operation.

Also, chemical activity levels will fall from oxidation. Make sure replenishment rates are sufficient to offset any oxidation, especially in low volume accounts. Check if "Jog Cycle" is operating properly (See Section 9.3.8.). Chemical level might also drop if chemicals are siphoning into replenishment tanks or if there is a leak (See Section 9.2.4.).

9.1.6.1.2 DEPLETED CHEMISTRY

Lack of chemical strength in either the developer or fixer might cause film jams. Be sure both chemicals are at proper working strength.

9.1.6.1.3 GEAR BREAKAGE

Each rack should turn freely by hand. If any rack does not turn freely gear breakage will occur. Inspect any "tight" rack for obstructions or foreign materials. If an idler gear mounting has been over tightened, this will cause a binding in the rack. Problems will persist if either an adjustment or replacement of the bad component does not isolate the cause of the tightness. Discoloration and/or flaking of some gears in the fix rack are normal. Their mechanical integrity has not been compromised by either of these conditions.

9.1.6.1.4 GUIDE MISALIGNED

There are various guides throughout the film transport system. Guides may need to be replaced or repositioned as a normal maintenance function. For film scratch identification and elimination refer to Sec. 9.4.

Remove each rack from processor and hand-feed a film through each rack. Look for any kink or unusual bending/binding of film. Listen for any unusual "snapping" or "buckling" noises. If any of these conditions occur, check the following for proper positioning.

A.) ***INNER RACK GUIDE***

This guide is located just below the entrance rollers of each of the wet racks. This guide directs the film from the entrance rollers to the interior rollers of the rack. This guide should be positioned straight up and down for best results.

B.) ***LADDER GUIDES***

These guides are located in the Developer Rack to ensure the film doesn't "waver" from its designated path. These guides are very flexible. Be sure the guide is properly set in its respective mounting holes in the side plates. If "bowing" has occurred, replace the ladder guide. Proper mounting of the guide will always have the ribs of the guide positioned toward the inside of the rack.

C.) ***STAINLESS STEEL TURNAROUND GUIDE***

These guides can be found at the turnaround at the bottom of each solution rack and at the "turn-up" and "turn-out" of the Dryer Rack. These guides are suspended by support blocks, which are attached to the side plates. Repositioning the crossover support blocks to the side plates makes adjustment. The clearance holes in the side plates for mounting the support blocks are over size, which will allow slight adjustment of these guides. Set guide with the exit edge of the guide as close to the next small roller (without touching it) as possible.

D.) ***CROSSOVER GUIDES***

These guides transport film from one rack to another in the solution section. Processors manufactured prior to November 1993 have either "Insert and Snap" or slide on Crossover Guides. These guides slide over the rack support pins on the Developer & Fix and Fix &Wash Racks. If the guide is bowed, cocked, twisted etc., remove from processor and set on "flat-even" surface. Ensure "ribs" are sitting flat and guide is square and doesn't "rock" on surface. Loosen bolts and reset. If a guide cannot be squared, replace the assembly. Processors manufactured after November 1993 have a fixed setting. There is a conversion kit, which allows the fixed crossovers to be installed on older processors.

E.) ***DRYER FEED GUIDE***

This guide "feeds" the film from the wash exit to the dryer entrance. If the guide is set too low or too high, scratches will occur, or the film may jam at this location. (See Fig. 3-5 in the LE Instruction Manual)

F.) ***DRYER RACK GUIDE***

The Dryer Rack Guide may cause scratches or "Dog Earring" of the film.
The Dryer Rack is positioned by the location and mounting of the Lower Blower Assembly. The blower assembly is adjustable side-to-side.

If a film has been folded over (usually on lead edge/drive side), remove Upper Blower Assembly and Dryer Rack. Loosen the four screws/nuts that mount the Lower Blower Assembly to the main frame. Move/slide the blower assembly slightly toward the Main Drive Shaft. Run film through the processor with the Upper Blower removed; observe film transport through the Dryer Rack. Film should clear the Dryer Guide brackets.

9.1.6.2 ROLLER TENSION

9.1.6.2.1 Each outside 1" acrylic roller is suspended between the side plates by a bearing that "floats" inside a rubber grommet. (Exception to this is the entrance and exits of each transport rack.) The rubber grommet absorbs the increased tension created by the passage of a film. It is important that the grommet maintains its resiliency to perform its designed function. Rubber grommets should be checked semi-annually and replaced if necessary.

9.1.6.2.2 The exits of the solution transport racks and the entrance of the Fix and Wash have adjustment screws that determine the tension of rollers at these locations. These screws should be adjusted to ensure that squeegee rollers "just" touch each other at both ends of roller. Do not over-tighten; damage may occur. The bearings will wear over time, possibly causing gaps between the rollers. Check the tension periodically.

9.2 PLUMBING

This section incorporates all the components used in the plumbing of the AX700Series Processor.

9.2.1 WATER SOLENOID (P/N 4180.700.02)

During the "full-on" condition 120V or 240V is supplied to the solenoid. The valve opens allowing a maximum flow rate of 1/2-gallon (1.9L) per minute. This flow is restricted by a rubber diaphragm located behind the sediment screen at the input port of the valve. The solenoid will generate some noise during normal operation. If the solenoid is dry, there will be an excessive amount of noise.

9.2.1.1 NO WATER FLOWING INTO PROCESSOR

If no water flows during the "full-on" condition, check for voltage at solenoid. (120V/240V operation) If you measure line voltage across the solenoid, check screen for sediment build-up and/or the rubber diaphragm for foreign obstructions. If there isn't any voltage across the solenoid see Section 9.3.10.

9.2.1.2 WATER FLOWING DURING STANDBY

Water will run constantly during standby if the unit has the continuous drain feature. If the unit does not have this feature, there should be no water flow during standby.

9.2.2 WATER FLOODING

If the water level has risen within wash tank and is overflowing the tank wall check the drain lines. There are three drain lines incorporated into the Wash Tank. One drain line is connected to the drain valve and two are for the overflows. The two overflow lines should never be "hooked-up" together, as this will reduce the drain capacity by 50%. Most drain problems occur when "air locks" form due to poor gravity feed to the floor drain. Ensure a gradual slope of the drain lines to the floor drain. All hose connections should be checked on a regular basis to ensure there is not any leaking at those locations.

CAUTION: The water inlet hose is always under pressure when the wall valve is opened. This valve must be turned off when power to the processor is turned off. This should be done nightly as part of the "shut-down" procedure. The water inlet hose fittings must be checked monthly for corrosion. The rubber washers and the hose itself must be checked for drying or cracking. If these problems are spotted, the hose must be replaced.

9.2.3 RECIRCULATION

The 700 Series Processor has recirculation pumps for both the developer and fixer chemicals. The recirculation pumps are magnetically driven impeller pumps. The racks should be removed to check for turbulence within the developer and fix tanks. If no agitation is noted, check back of pump for shaft rotation. If pump shaft is turning, check for "air locks" in the recirculation lines. If air locks are observed lift and wiggle vinyl tubing at the input side of pump until fluids begin to pump. If pump is not operational, check interior of pump for obstructions. If obstructions are noted, clean interior of pump, re-assemble and power-up. If still no operation, disconnect insulated male/female connections at the pump and check for voltage. If voltage is present at pump, pump is faulty and should be replaced.

9.2.4 NO SOLUTION IN TANKS

9.2.4.1 DRAIN VALVES

The three drain valves should be checked for closure. When valve is closed, the handle will be perpendicular to body of valve. If valve is closed and you see liquid still draining, replace valve.

9.2.4.2 SIPHONING

If the level is decreasing overnight, check for "siphoning "through the replenishment pump to the holding tanks. Mark the holding tank prior to leaving and check to see if solution level has increased by morning.

NOTE: Due to evaporation, the levels in tank(s) will drop overnight. If the processor has not been used for several days, the chemical levels will drop below the top rollers on each rack. Chemicals must be brought back to their proper level, otherwise roller marks/artifacts will occur.

9.2.5. REPLENISHER PUMP

Upon initial start-up the pump will activate for 4 seconds. The pump will also activate when the micro-switch is depressed or when the "jog cycle "has been activated. After the micro-switch lever has been released, the pump will run an additional four seconds and the developer and dryer temperature displays will re-illuminate

9.2.5.1 PUMP WILL NOT ACTIVATE

If pump will not operate when micro-switch is activated/depressed, ohm-out switch for fault. If switch is found to be working, check for voltage across #1 and #2 on the 12 pin connector on the microprocessor. If proper voltage is present (120V\240V) replace the replenisher pump. If there is no voltage, replace the board.

9.2.5.2 PUMP RUNS BUT CHEMICAL WILL NOT REPLENISH

The pump works on a vacuum principle. If the vacuum pressure is violated, the chemicals will just "float" within the vinyl tubing with no advancement. If this occurs:

Check the clamps at tubing hook-up for tightness.
Is there chemical in the holding tanks? Refill if lower than 2 gallons.
Check for leaks around bellow and elbows. If leak is found, replace failed component.
Check the poppet valves that are internal to the pump bellows. They may need to be cleaned of foreign artifacts that will not allow them to seat thus causing loss of vacuum.
If poppet valves have been cleaned, but problem persists, replace the poppet valves.

9.3 ELECTRICAL

Prior to referring to this section for assistance, refer to Section 4 on "Circuit Function". Section 4 will explain the "Theory of Operation" for each component. This will make it easier to troubleshoot component failure.

NOTE: Each service technician must have a digital meter and amprobe to properly diagnose any electrical problem.

9.3.1 20 AMP BREAKER (10 Amp for 240V Rated Processors)

The 700 Series processors are rated for 20 amps. If current draw is greater than 20 amps, the breaker will trip.

9.3.1.1 BREAKER TRIPS IMMEDIATELY

If the breaker trips immediately once the unit has been turned on, one of the electrical components has shorted. Check the resistance's of the major components (to ground) to determine faulty part. Once isolated, replace component.

9.3.1.2 BREAKER TRIPS AFTER A SHORT PERIOD OF TIME

Check total amp draw by attaching amprobe around the incoming "hot" wire from the power cord which is attached at terminal #21 on the power-strip. If amp draw is less than 20 amps (10 amps for 240V), and the breaker continues to trip, replace the circuit breaker.

If amp draw is greater than 20 amps (10 amps for 240V), check individual components to determine which part(s) is drawing excessive amps. The following is a list of components and their normal amp draws at 120V and 240V: (continued next page)

800 Watt Developer Heater – 5.6 Amp
800 Watt Developer Heater (240V units)- 2.8 Amp
600 Watt Dryer Heater – 4.8 Amps each Upper and Lower
600 Watt Dryer Heater (240V units) 2.4 Amp each Upper and Lower
All other Fans and Motors Combined – 1.2 Amp (.6 amps 240V)

9.3.2 MICRO-SWITCH

The micro-switch is an electro-mechanical component that senses film insertion to the processor. This switch closes the circuit for the replenisher pump. In addition, this switch activates the Main Drive Motor and Water Solenoid from the "Standby" mode. When the switch is working correctly, you will hear a "clicking" noise each time you depress and release the arm of the switch. This switch may be bent by the removal/insertion of the Developer Rack. Also, the operator trying to correct a mis-fed film which has already entered the Developer Rack can damage the activator arm of the switch. If the operator pulls a film back, which has developer chemistry on its surface, the chemical may rollback on the activator of the micro-switch and may cause the plunger of the switch to stick. The cross-section of micro-switch adjustment is shown in the parts section. The contact plunger is under the activator arm. When the arm is depressed it will also depress the plunger. This action will close the circuit. If arm is set too low, the plunger will be pushed down continuously, causing the pumps to run continuously and the temperature displays to remain extinguished. If the micro-switch arm does not sense a film, the arm is not adjusted high enough. To adjust arm, hold finger on top of micro-switch and gently bend-up arm's overhang. An ohmmeter should be used to confirm correct electrical operation of the switch if there is any doubt.

9.3.3 NO REPLENISHMENT

The replenisher pump completes its circuit through the Microprocessor Assembly. The micro-switch closes the circuit on the P/C Board and activates the pump.

With the micro-switch closed, there should be 120/240V across terminals #1 & #2 on the 12 pin conector on the Microprocessor Board. (See Section 9.3.2) If voltage is present at these connections, check wiring to pump. If wiring is correct, replace pump.

If there is no voltage across terminals #1 & #2, as described above, replace Microprocessor Board Assembly.

9.3.4 CONTINUOUS REPLENISHMENT

Either a faulty micro-switch (See Section 9.3.2) or a bad Microprocessor Board Assembly creates this condition. If micro-switch operates properly, replace Microprocessor Board Assembly.

9.3.5 PROCESSOR WILL NOT COME OUT OF STANDBY

Either a faulty micro-switch (Section 9.3.2) or a bad Microprocessor Board Assembly creates this condition. If micro-switch operates properly, replace Microprocessor Board Assembly.

9.3.6 PROCESSOR WILL NOT GO INTO STANDBY

The Microprocessor Board Assembly will start "counting" after the microswitch circuit has "opened" (See Section 9.3.2). The timing of the Standby circuit is based on the setting made in Service Mode #2. (See Section 5). If processor does not go into Standby after the time dictated in Service Mode #2, replace the Microprocessor Board Assembly.

9.3.7 PROCESSOR GOES INTO STANDBY TOO SOON

Check microswitch setting to ensure it is activated for the film's entire length. (See Section 9.3.2)

9.3.8 JOG CYCLE OPERATION

Each AX700 Series processor has an optional jog cycle. The processor will go through one complete "run cycle" if no films have been processed in the last 30 minutes if the jog cycle has been activated in Service Mode #6. If you have activated Service Mode #6 and the processor has not started a jog cycle after 40 minutes, replace the Microprocessor Board Assembly.

9.3.9 MAIN DRIVE MOTOR

The motor completes its circuit through the Microprocessor Board Assembly. (See Section 9.1.1 & 9.3.2.)

9.3.10 NO WATER FLOW

The Water Solenoid is wired parallel to the Main Drive Motor (See Section 9.2.1 & 9.3.2)

9.3.11 DEVELOPER TEMPERATURE CONTROL CIRCUITRY
(SEE SECTION 4.5 PRIOR TO PERFORMING THE FOLLOWING)

9.3.11.1 TOO MUCH DEVELOPER HEAT

NOTE: Prior to troubleshooting this circuit, check for proper chemical recirculation. (See 9.2.3)
NOTE: The small red light connected in parallel with the Developer Heater on #28 and #29 on the terminal strip will advise when there is power to the heater.

1) **THERMOMETER**
Place a calibrated thermometer in the Developer Tank and compare the reading with the Developer Temperature Display. The Developer Temperature should always be measured on the non-drive side between the tank wall and the rack sideplate. To calibrate the display, use Service Mode #3. (See Section 5)

2) **DEVELOPER THERMISTOR**
Check the resistance of the thermistor with an ohmmeter, attached to wires #9 & #10 on the 10 pin connector to the Microprocessor Board. Be sure to disconnect the wires from from the connector. (See values below).

Thermistor Resistance Values:
1894 ohms @85°
1667 ohms @90°
1471 ohms @95°
1301 ohms @100°

3) **DEVELOPER HEATER**
Check for a short to ground on each lead of the Developer Heater. If a short is detected, replace the heater.

4) **MICROPROCESSOR BOARD**
Check developer temperature setting in Service Mode #1. If the developer temperature is exceeding the setting in Service Mode #1, and #'s 1, 2 and 3 above have checked okay, measure the voltage at #10 on the 12 pin connector to ground. If the correct voltage exists at #10, replace the Microprocessor Board. If there is no voltage on #10 to ground, proceed to #5 below.

5) **EXTERNAL DEVELOPER RELAY**

If #'s 1, 2, 3, and 4 above check out, measure the voltage to ground at pin #0 on the external Developer Relay (4 pin) located above the exhaust fan in the electrical section. If the correct voltage exists at pin #0, the relay should close which will complete the circuit for the Developer Heater. To determine if the relay has closed, remove the wire from pin #6 on the Developer Relay and check for voltage between pin#6 on the relay and any hot terminal on the terminal strip. If line voltage is present, replace the relay. NOTE: Replace this relay only if there is no voltage to the coil (pin #0 on relay) and line voltage is present between pin #6 on the relay and a hot terminal.

9.3.12 NO DRYER HEAT (ALSO SEE SECTION 4.4)

NOTE: The dryer temperature will not rise with any of the external panels removed.

NOTE: The unrestricted airflow from the blowers will cool the heating element. This will make the air feel cool even with heat present. You must restrict the incoming air by briefly placing your hand over the fan. Place your hand on the output side, closest to the heater and then feel for heat.

9.3.12.1 DRYER DISPLAY/THERMOSTAT

The dryer display on the front of the Control Panel. To the right of the display are the Up and Down arrows. Pressing either of the arrows momentarily will display the thermostat setting. Continuing to hold either arrow down will change the setting.

NOTE: This setting controls the Dryer temperature only during the "Full-on" or "Run" mode. When the processor is in "Stand-by", the Dryer temperature is regulated by the setting in Service Mode #5. (See Section 5). Therefore, it is important that the Dryer temperature be checked against the setting for the respective "run" mode.

9.3.12.2 DRYER HEATING ELEMENTS

Check for line voltage across the terminals of the heating elements. If voltage is present, replace the heating elements. Each element is 600 Watts. For 120V the resistance should be 24 ohms, and for 240V the resistance should be 96 ohms. The amp draw should be 4.8 and 2.5 amps respectively.

9.3.12.3 EXTERNAL DRYER RELAY

If no voltage is present at the elements, check the external Dryer Relay (6 pin) located above the exhaust fan in the electrical section. Check line voltage at pin #0 to ground. If there is no voltage at the elements and voltage is present at pin #0 of the relay, replace the relay. If there is no voltage present at pin #0, proceed to the Microprocessor Board.

9.3.12.4 MICROPROCESSOR BOARD

If there is no voltage at pin #0 of the relay, check for line voltage at pin #8 on the 12 pin connector to ground. If voltage is present at pin #8 and no voltage at pin #0 of the relay, replace wire from pin #8 of the connector to pin #0 of the relay. If no voltage is present at pin #8, check voltage at pin #5 on the 12 pin connector to ground. If voltage is present at pin #5 and not present at pin #8, replace the Microprocessor Board. If no voltage is present at pin #5, replace wire from pin #5 to terminal #24 on the terminal strip.

9.3.13 TOO MUCH DRYER HEAT

Too much Dryer heat is caused by either the relay on the Microprocessor Board, or the External Dryer Relay (6 pin) being stuck in the closed position. Isolate by measuring voltages, and replace faulty component.

9.4 FILM ARTIFACTS

9.4.1 SCRATCHES

Scratches are caused by the film staying in contact with one of the various guides located within the transport section. All guides should be adjusted to allow the film to pull away from the guide.

9.4.1.1 IDENTIFICATION/ISOLATION

To assist in isolating the area, from which the scratch is originating, follow the below procedure:

9.4.1.1.1 TOP OR BOTTOM

Determine if scratch is on the Top or the Bottom of the film as it is processed. Remember the film turns over in the Dryer Rack prior to exiting. If scratch is on top of film as it exits, then scratch is on bottom of film as it is processed.

9.4.1.1.2 SCRATCH SPACING IDENTIFICATION

Each guide if mis-aligned, will leave a distinct, measurable mark on film.

Crossover Guides leave scratches 1-7/16" (3.6cm) apart on the top of the film as it is processed.

Inner Rack Guides leave scratch 1-1/2" (3.8cm) apart on the top of the film as it is processed.

Bottom Turnaround Guides leave scratches 1-1/2" (3.8cm) apart on the bottom of the film as it is processed.

Dryer Feed Guide leaves scratches 3/8" (.5cm) apart on the top of the film as it is processed.

Dryer Rack Guides leave scratches 2" (5.1cm) apart on the top or the bottom of film as it is processed.

Ladder Guides leave scratches 2" (5.1cm) on the bottom of film as it is processed.

With a ruler you can now determine which type of guide is creating the scratch.

9.4.1.1.3 ISOLATION OF ARTIFACTS TO AN INDIVIDUAL RACK

If determining where the marks are originating from (i.e. Developer, Fix or Wash Rack) is not certain, process one 8"x 10" film (18cm x 24cm).

Process film the "long-way" (10" or 25.4cm) through the Developer Rack. Grab film as it exits from the Developer Rack and rotate the film 90ø and run the film the short-way (8") through the Fix Rack. Grab Film as it exits the Fix Rack and run the film diagonally through the Wash and Dryer Racks. This rotation will determine where the scratch is originating. (i.e. Developer, Fix, Wash & Dry Racks).

If the scratch is running (as film travels) the long-ways (10") then the scratch is originating from the Developer Rack.

If the scratch is running the short-ways (8") then the scratch is originating from the Fix Rack.

If the scratch is running on an angle, then the scratch is from the Wash/Dry area.

9.4.1.2 SOLUTION

Once it has been determined which side of film is marked and which rack (i.e. Developer, Fix, Wash & Dryer) is at fault, the following will list proper adjustments for any particular guide:

9.4.1.2.1 TOP CROSSOVER GUIDES

Processors manufactured prior to November 1993 have a Crossover Assembly, which has a gray PVC end plate. The entrance end of this guide should be adjusted as close as possible-without touching-the top exit Squeegee Roller of the Developer Rack for the Developer/Fix crossover.

For the Fix/Wash crossover, the entrance edge of the guide should be as far away as possible from the Fix exit, but still able to transport the film without it catching on the lead edge of the guide. Also, make sure the guide is "square" by placing it on a flat surface. The end plates should also be square.

If after everything is properly aligned, and the scratches have not been eliminated, check for gaps between the entrance rollers of the rack after the guide which is causing the problem. If there are gaps, replace the bearings. If there is still a gap, place a second squeegee roller at the entrance. If after all the above has failed, replace guide assembly. If the scratches are starting approximately 1/3 of the way from the lead edge of the film, the guide alignment is ok, but the film is not being held in place because of lack of tension on the entrance rollers of the rack after the guide. Replace bearings or add a Squeegee Roller as needed.

Note: Processors manufactured after November, 1993 have Crossover Assemblies which are suspended by a tie bar that is attached to the large and small Rack Support Pins located at the entrance of the Fix and Wash Racks. These guides "flip" down into the preceding racks and the slide pins snap into their proper positioning holes. If guide is properly positioned and scratches are still occurring, check for gaps between the entrance rollers of Fix or Wash Racks depending on where the scratch is originating.

Isolate marks (Is it occurring Developer/Fix or Fix/Wash) by removing one Crossover Guide at a time and hand feeding the film between racks.

Scratches coming from Crossover Guides on processors manufactured since November1993 usually occur from mis-adjusted tension at the entrance or exit rollers of any of the transport racks. This roller tension is determined by set-screws in the side plates. The proper adjustment has the rollers just touching one another with no gaps visible end to end. You should rotate the rack manually and observe for any gaps prior to re-installing the rack into the processor. If scratches still occur after rollers and guide has been adjusted or properly positioned, replace the guide and\or Squeegee Rollers which may have swollen.

9.4.1.2.2 INNER RACK GUIDE

This guide should be positioned almost straight up and down. Remove rack from processor and transport a film manually. Observe if the film is pulling away from the guide. If not, adjust guide accordingly.

9.4.1.2.3 BOTTOM TURNAROUND GUIDES

These guides are suspended between two plastic blocks (one at each end of the guide). The blocks are mounted to the side plates. The guide's exit edge should be positioned as far away as possible from the Large Roller without touching the Small Roller.

9.4.1.2.4 DRYER FEED GUIDE

This guide should have its exit edge (closest to dryer entrance roller) approximately 1/8"above intersecting point of entrance rollers of the Dryer Rack.

9.4.1.2.5 DRYER RACK GUIDES

These guides are suspended on the drive side of the Dryer Side Plate by an off set bracket and attached into the non-drive side by screws. These guides should be positioned so that the exit edge of the guide is slightly outside the normal film path. If guide is too low, jamming may occur. If set too high, scratches will occur.

9.4.1.2.6 LADDER GUIDES

These guides insert into the side plates. If guide is not seated properly, scratches and/or jamming will occur.

9.4.1.2.7 RANDOM SCRATCHES

These are either caused by improper handling of the film or by the infeed roller. The infeed roller should be free spinning. Check this roller and repair or replace as necessary.

9.4.2 WATER SPOTS

Spots are a result of a drying pattern, which is caused by the water level touching the exit Silicone Rollers of the Wash Rack. With the processor in the "Full-On" mode, remove the Wash Rack by lifting straight up out of the water. Feel the underside of the Silicone Rollers. If they are wet, turn down the water flow so they remain dry. This should eliminate the water-spotting problem. Also, check for gaps between the silicone rollers. If there is a gap, increase tension on the rollers by turning "in" the set-screws in the side plates. The rollers should be just touching one another. Too much tension will cause the rack to bind. Inspect each roller.

9.4.3 DRYING PATTERNS

These patterns are wavy in appearance (like a "shoreline") and can be observed in reflected light. To verify, turn off dryer heaters using the Dryer Thermostat and process another film. If pattern is now gone, check the following to isolate problem area(s).

Silicone Roller tension too loose (exit of Wash Rack)
Water level in tank too high (must be below Silicone Roller surface)
Dryer Temperature too high. The dryer heat (temperature) should always be as low as possible and still process dry films.

9.4.4 ROLLER MARKS

Roller marks usually are repetitious and occur either 3.14" (8cm) or 6.28"(16cm) apart. These marks usually occur due to a dirty roller or an "out-of-round roller". If the marks are 3.14" (8cm) apart the problem is being caused by a 1" diameter roller (1" acrylic or Squeegee Roller). A 2" diameter (5cm) roller causes a mark that is 6.28" (16cm). Use the described method for isolation as found in the Section 9.4.1.1.2. After problem has been isolated to a particular rack, clean and inspect each roller in that rack. Check for buildup and/or "out of round" rollers.

9.4.5 STATIC MARKS

Static marks can come in a variety of shapes. They will always be a plus density. They will be caused by excessive dryness (low humidity) in the darkroom. See installation specifications for proper humidity requirements. If static persists after raising the air moisture levels, install two acrylic rollers at the entrance of the developer rack.

9.4.6 WET FILMS

A variety or a combination of factors may cause wet or tacky films. Listed below is a checklist of items, which should be investigated:

Check Dryer Thermostat setting
Check both fixer and developer chemical strength
Check amperage for both upper and lower heating elements (See Section 9.3.1.2)
Check Replenishment rates
Check relative humidity (See Section 2.2)
Check Feed Sensor (Microswitch)
Try a different type of film