SERVICE MANUAL
for the

*Kodak Ektascan 1120 LASER PRINTER*
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This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

⚠️ Important
Use qualified personnel to service this equipment.

⚠️ Warning
DANGER - Infrared Laser Beam is not visible. Laser radiation when open, avoid direct exposure to infrared beam. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
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Safety

Use the following figures to locate the LASER SAFETY LABELS on the LASER PRINTER. For your safety, warnings are also included in the adjustment and removal procedures.

⚠️ Warning
When doing a removal procedure, de-energize the LASER PRINTER.
## Special Tools

### Table 1–1 Special Tools for the LASER PRINTER

<table>
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<td>TL-3590</td>
<td>BNC TEE</td>
</tr>
<tr>
<td>*</td>
<td>* Epson NB3 PORTABLE COMPUTER</td>
</tr>
<tr>
<td>*</td>
<td>* Epson NB3 Power Adapter</td>
</tr>
<tr>
<td>TL-4219</td>
<td>RS-232 Cable (9-25DB)</td>
</tr>
<tr>
<td>TL-4238</td>
<td>RS-232 Null Modem Adapter</td>
</tr>
<tr>
<td>TL-4368</td>
<td>DENSITOMETER X331</td>
</tr>
<tr>
<td>TL-4371</td>
<td>Tool Kit, PORTABLE COMPUTER Compartment and Tools</td>
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* To be supplied before training class.

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<td>P/N 263632</td>
<td>Air Brush</td>
</tr>
<tr>
<td>TL-1216</td>
<td>Lens Paper</td>
</tr>
<tr>
<td>Cat# 116-8277</td>
<td>Spectro•Grade Acetone (Lens/Mirror Cleaner)</td>
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### Table 1–3 Metric Tools

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<tr>
<td>TL-3450</td>
<td>Metric, Largest</td>
</tr>
<tr>
<td>TL-3523</td>
<td>Metric Chapman Set</td>
</tr>
<tr>
<td>TL-3789</td>
<td>Metric Hex Wrench (Ball) Set</td>
</tr>
<tr>
<td>TL-3833</td>
<td>Metric, (50 mm)</td>
</tr>
<tr>
<td>TL-3834</td>
<td>Metric, (77 mm)</td>
</tr>
<tr>
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<td>TL-2074</td>
<td>10X Probe</td>
</tr>
<tr>
<td>TL-2094</td>
<td>Red Test Lead, banana to mini•grabber</td>
</tr>
<tr>
<td>TL-2095</td>
<td>Black Test Lead, banana to mini•grabber</td>
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<tr>
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<td>Air Flow Meter</td>
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<td>IR Phosphor Probe</td>
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<td>TL-3349</td>
<td>Anti•Static Bag 18X18</td>
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<td>TL-3832</td>
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<td>TL-3942</td>
<td>Touch•up Paint, Greige</td>
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<td>TL-3972</td>
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<td>TL-4603</td>
<td>Protective Eyewear</td>
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<td>TL-4586</td>
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<td>TL-4587</td>
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<td>TL-4715</td>
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<td>Plastic Ruler, 6 inch</td>
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* To be supplied in training class.
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Covers

Right, Left and Back Control Unit Covers

⚠️ Warning

Dangerous Voltage.

[1] De-energize the LASER PRINTER.

[2] Loosen the 2 SCREWS for the COVER being removed by rotating each SCREW 90° counterclockwise.

[3] Pull out on the top of the COVER and lift the bottom of the COVER to disengage it from the LASER PRINTER.

[4] Remove the COVER.

Front Control Unit Cover

⚠️ Warning

Dangerous Voltage.

[1] De-energize the LASER PRINTER.


[3] Disengage the FRONT CONTROL UNIT COVER from the LATCHES.

[4] Lift up and remove the FRONT CONTROL UNIT COVER.
Right and Back Image Unit Covers

**Warning**
Dangerous Voltage.

1. De-energize the LASER PRINTER.
2. Loosen the 2 SCREWS for the COVER being removed by rotating each SCREW 90° counterclockwise.
3. Lift the bottom of the COVER to disengage it from the LASER PRINTER.
4. Remove the COVER.

Left Image Unit Cover

**Warning**
Dangerous Voltage. Possible damage to eyes from invisible laser beam.

1. De-energize the LASER PRINTER.
2. Remove the 4 BLIND COVER SCREWS.
3. Disconnect the CONNECTOR J750.
4. Loosen the 2 SCREWS for the LEFT IMAGE UNIT COVER by rotating each SCREW 90° counterclockwise.

**Caution**
Do not remove the LEFT IMAGE UNIT COVER until J750 has been disconnected.

5. Lift the bottom of the COVER to disengage it from the LASER PRINTER.
6. Remove the COVER.
Sequence Board Shield

⚠️ Warning
Dangerous Voltage.

[1] De-energize the LASER PRINTER.
[2] Remove the BACK IMAGE UNIT COVER.
[3] Open the SEQUENCE BOARD SHIELD.

Supply Magazine Door, Receive Magazine Door and User Access Door
Top Cover

[1] Open the RECEIVE MAGAZINE DOOR and the USER ACCESS DOOR.

⚠️ **Warning**
Dangerous Voltage. Possible damage to eyes from invisible laser beam.

(a) Energize the LASER PRINTER.
(b) Wait about 1 minute for the PRINTER to complete a system self-check.

➡️ **Note**
If no magazines are present, proceed to Step (e).

(c) Press the MAGAZINE DOOR OPEN/CLOSE SWITCH.
(d) Wait until the LATCH SOLENOID releases.
(e) Open the RECEIVE MAGAZINE DOOR.
(f) Press down the USER ACCESS DOOR LATCH to open the USER ACCESS DOOR.

[2] De-energize the LASER PRINTER.

[3] Remove the BACK IMAGE UNIT COVER. If necessary, use the procedure on Page 2–3.

[4] Remove the 2 SCREWS from the front of the TOP COVER and the 2 SCREWS from the back of the TOP COVER.


[6] Lift and remove the COVER.
Right Inside Cover

1. Remove the RIGHT CONTROL UNIT COVER. If necessary, see the procedure on Page 2–2.
2. Loosen the 14 SCREWS.
3. Lift and remove the RIGHT INSIDE COVER.

Left Inside Cover

1. Remove the LEFT CONTROL UNIT COVER. If necessary, see the procedure on Page 2–2.
2. Loosen the 14 SCREWS.
3. Lift and remove the LEFT INSIDE COVER.
Circuit Boards

Memory Board/6MB or 20MB

⚠️ Warning
Dangerous Voltage.

⚠️ Note
This board is called the Memory Management Board in the Wiring Diagrams.

[1] De-energize the LASER PRINTER.
[2] Remove the FRONT CONTROL UNIT COVER. If necessary, see the procedure on Page 2–2.

⚠️ Caution
Possible damage from electrostatic discharge.

[3] Loosen the 2 SCREWS of the Kodak Ektascan 1120 MEMORY BOARD/6MB or 20MB located in SLOT 2.
[4] Remove the MEMORY BOARD/6MB or 20MB by sliding it forward.
System Controller Board

**Warning**
Dangerous Voltage.

[1] De-energize the LASER PRINTER.

[2] Remove the FRONT CONTROL UNIT COVER.
   If necessary, see the procedure on Page 2–2.

**Caution**
Possible damage from electrostatic discharge.

[3] Disconnect the CONNECTOR from the SYSTEM CONTROLLER BOARD.

[4] Loosen the 2 SCREWS.

[5] Remove the SYSTEM CONTROLLER BOARD.

**Note**
A white dot is silk-screened on the circuit board next to pin position 1 for each jumper.

**JUMPERS**

[6] Check that the following Jumpers have been be installed:
- J1-1 to J1-2
- J2-1 to J2-2
- J3-3 to J3-4
- J4-3 to J4-4
- J5-1 to J5-2, J5-4 to J5-5, J5-7 to J5-8, J5-10 to J5-11
- J8-2 to J8-3
- J9-1 to J9-2
- J11-1 to J11-2
- J12-1 to J12-2
- J14-3 to J14-4
- J15-1 to J15-2, J15-3 to J15-4
- J16-1 to J16-2, J16-3 to J16-4, J16-5 to J16-6
- J17-1 to J17-2
- J18-1 to J18-3, J18-4 to J18-6, J18-5 to J18-7
- J19-3 to J19-5, J19-4 to J19-6
- J21-1 to J21-2
Install EPROMS

⚠️ Caution
Possible damage from electrostatic discharge. Use correct procedures and equipment to prevent damage.

[1] Move the 2 EPROMS from the existing SYSTEM CONTROLLER BOARD to the new SYSTEM CONTROLLER BOARD.
Print Controller Board

⚠️ Warning
Dangerous Voltage.

[1] De-energize the LASER PRINTER.

[2] Remove the FRONT CONTROL UNIT COVER. If necessary, see the procedure on Page 2–2.

⚠️ Caution
Possible damage from electrostatic discharge.

[3] Disconnect the CONNECTOR from the PRINT CONTROLLER BOARD, located in SLOT 3 of the CARD RACK.

[4] Remove the 2 SCREWS.

[5] Remove the PRINT CONTROLLER BOARD by sliding it forward.
SWITCHES

[6] When installing a new PRINT CONTROLLER BOARD, check the following SWITCHES:

S1: Positions 1, 2, 3, 4, 6, and 8 are ON.
S2: Position 2 is ON.
S3: Position 7 is ON.

PRINT CONTROLLER BOARD
 Driver Board

⚠️ **Warning**

Dangerous Voltage.

1. De-energize the LASER PRINTER.
2. Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
3. Open the SEQUENCE BOARD SHIELD.
JUMPERS

When installing a new DRIVER BOARD, check that the following JUMPERS are installed in the normal position:

JP1
JP2
JP3

SWITCHES

When installing a new DRIVER BOARD, check the following SWITCHES:

DSW1: Position 1 is ON
RSW1: Position 8 is ON
RSW2: Position 8 is ON
RSW3: Position 8 is ON

DRIVER BOARD
The Replacement of a Driver Board with a Universal Driver Board

When there is a need for a replacement for the DRIVER BOARD, install a UNIVERSAL DRIVER BOARD 696120. Use the following table and figures to check for the correct JUMPER positions on the UNIVERSAL DRIVER BOARD.

**Note**

If the DAUGHTER BOARD is removed from the UNIVERSAL DRIVER BOARD, return the DAUGHTER BOARD to Part Services.

<table>
<thead>
<tr>
<th>Printer Serial Number</th>
<th>Daughter Board</th>
<th>Jumper Pin P302 Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>500025 - 500248</td>
<td>Used</td>
<td>No Jumper</td>
</tr>
<tr>
<td>500259 - 500480</td>
<td>Not Used</td>
<td>1 to 2</td>
</tr>
<tr>
<td>600001 - 600003</td>
<td></td>
<td>3 to 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 to 6</td>
</tr>
<tr>
<td>500481 and Up</td>
<td>Not Used</td>
<td>No Jumper</td>
</tr>
<tr>
<td>600004 and Up</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
UNIVERSAL DRIVER BOARD with DAUGHTER BOARD
2-Phase Pulse Motor Driver Boards (2PMD)

Installation Notes
The LASER PRINTER has 2, 2-PHASE PULSE MOTOR DRIVER BOARDS (2PMD):
- the BEAM SPLITTER BOARD (2PMD-B)
- the SLIDE BASE MOTOR BOARD (2PMD-F)
- When replacing the BEAM SPLITTER BOARD, remove the HEAT SINK.
- When replacing the SLIDE BASE MOTOR BOARD, do not remove the HEAT SINK.

Install JUMPERS
[1] Check that the following JUMPERS are installed:
(a) BEAM SPLITTER BOARD
   1. J1-1 to J1-2
   2. J2-1 to J2-2
(b) SLIDE BASE MOTOR BOARD
   1. J1-2 to J1-3
   2. J2-1 to J2-2

2-PHASE PULSE MOTOR DRIVER BOARD (2PMD)
5-Phase Pulse Motor Driver Boards (5PMD)
The LASER PRINTER has 3, 5-PHASE PULSE MOTOR DRIVER BOARDS (5PMD):
• the TRANSPORT ROLLER MOTOR BOARD (5PMD-T)
• the RECEIVE ROLLER MOTOR BOARD (5PMD-R)
• the SUPPLY ROLLER MOTOR BOARD (5PMD-S)

Install JUMPERS
[1] Check that the following JUMPERS are installed for each of the boards being installed:
   1. J1-2 to J1-3
   2. J2-2 to J2-3


5-PHASE PULSE MOTOR DRIVER BOARD (5PMD)
Sequence Board

**Warning**

Dangerous Voltage.

1. De-energize the LASER PRINTER.
2. Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
3. Open the SEQUENCE BOARD SHIELD.

**Important**

JUMPER information is subject to change with software updates and hardware changes.
JUMPERS

[4] Check JUMPER locations listed below with the board being replaced to ensure that no changes have been made.

[5] When installing a new SEQUENCE BOARD, check that the following JUMPERS are installed:

- SJ1-1 to SJ1-2
- SJ2-1 to SJ2-2
- SJ3-1 to SJ3-2
- SJ4-2 to SJ4-3
- SJ5-2 to SJ5-3
- SJ6-1 to SJ6-9, SJ6-2 to SJ6-10, SJ6-3 to SJ6-11, SJ6-4 to SJ6-12, SJ6-5 to SJ6-13, SJ6-6* to SJ6-14,
  SJ6-8 to SJ6-16
- SJ7-1 to SJ7-2.

*For printers with serial number 500369 and above, SJ6-6 is open, along with the NEW GUIDE PLATE.
Install EPROMS

⚠️ Caution
Possible damage from electrostatic discharge. Use correct procedures and equipment to prevent damage.

[6] Move the 2 EPROMS from the existing SEQUENCE BOARD to the replacement SEQUENCE BOARD.

⚠️ Important
When installing a new SEQUENCE BOARD, do the setup procedure on Page 4–22.
**Slow Scan Motor Board**

**Warning**
Dangerous Voltage. Possible damage to eyes from invisible laser beam.

1. De-energize the LASER PRINTER.
2. Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
3. Open the SLOW SCAN FAN ASSEMBLY.
4. Open the SLOW SCAN FAN ASSEMBLY COVER.

**SWITCHES**

5. When installing a new SLOW SCAN MOTOR BOARD, check that the S1 SWITCH Positions 1, 2, 3 and 4 are OFF.
Laser Diode Power Supply Board

Note
Use this procedure to remove the LASER DIODE POWER SUPPLY BOARD in printers with serial numbers between 500085 and 500200.

[1] Remove the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY with separation unit. If necessary, see the procedure on Page 2–42.
[3] Remove the 6 SCREWS to remove the FAN/POWER SUPPLY BRACKET.
[5] Remove the LASER DIODE POWER SUPPLY BOARD.
[6] Install the new LASER DIODE POWER SUPPLY BOARD.
[7] Install the FAN/POWER SUPPLY BRACKET connecting the GROUND WIRE with one of the SCREWS.
[8] Install the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY with separation unit.
Backplane Board

Use the following table when installing the CP Network Interface in the *Kodak Ektascan* Laser Printer, Model 1120. The JUMPERS that are listed below must be changed on the BACKPLANE BOARD.

<table>
<thead>
<tr>
<th>VME</th>
<th>Board</th>
<th>≤S/N 500820 600165</th>
<th>≥S/N 500821 600166</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 1</td>
<td>SYSTEM CONTROLLER</td>
<td>All JUMPERS On</td>
<td>Only j.iack* JUMPER On</td>
</tr>
<tr>
<td>Slot 2</td>
<td>MEMORY (6 or 20 MB)</td>
<td>All JUMPERS On</td>
<td>All JUMPERS On</td>
</tr>
<tr>
<td>Slot 3</td>
<td>PRINT CONTROLLER</td>
<td>All JUMPERS On</td>
<td>Only iackin* JUMPER Off</td>
</tr>
<tr>
<td>Slot 4</td>
<td>EK Interface</td>
<td>All JUMPERS On</td>
<td>All JUMPERS On</td>
</tr>
<tr>
<td>Slot 5</td>
<td>EK Interface</td>
<td>All JUMPERS On</td>
<td>All JUMPERS On</td>
</tr>
<tr>
<td>Slot 6</td>
<td>EK Interface</td>
<td>All JUMPERS On</td>
<td>All JUMPERS On</td>
</tr>
<tr>
<td>Slot 7</td>
<td>EK Interface</td>
<td>All JUMPERS On</td>
<td>All JUMPERS On</td>
</tr>
<tr>
<td>Slot 8</td>
<td>EK Interface</td>
<td>All JUMPERS On</td>
<td>All JUMPERS On</td>
</tr>
<tr>
<td>Slot 9</td>
<td>EK Interface</td>
<td>All JUMPERS On</td>
<td>All JUMPERS On</td>
</tr>
</tbody>
</table>
Control Unit Components

Exhaust Fans

⚠️ Warning

Dangerous Voltage.

1. De-energize the LASER PRINTER.
2. Remove the BACK CONTROL UNIT COVER. If necessary, see the procedure on Page 2–2.
3. Loosen the 14 SCREWS to remove the BACK INSIDE COVER.
4. Disconnect J121.
5. Loosen the 4 SCREWS to remove the PLATE from the FRAME.
6. Remove the 8 SCREWS to remove the EXHAUST FAN from the PLATE.
Intake Fans

![Diagram of Intake Fans]

**Warning**

Dangerous Voltage.

1. De-energize the LASER PRINTER.
2. Remove the FRONT, RIGHT and BACK CONTROL UNIT COVERS. See the procedures if necessary.
3. Remove the RIGHT and BACK INSIDE COVERS. See the procedures if necessary.
4. Disconnect the FAN CONNECTOR, J120.
5. Remove the 4 SCREWS from the CARD RACK.
6. Move the CARD RACK toward the back of the LASER PRINTER.
7. Loosen the 4 SCREWS to remove the FAN PLATE and 2 FANS.
8. Remove the 8 SCREWS to remove both FANS.
Main Power Supply

**Warning**
Dangerous Voltage.

1. De-energize the LASER PRINTER.
2. Remove the FRONT CONTROL UNIT COVER. If necessary, see the procedure on Page 2–2.

**Caution**
The GROUND WIRE must be replaced in the same configuration when the MAIN POWER SUPPLY is installed.

3. Remove the SCREW and disconnect the GROUND WIRE.
4. Disconnect the BLACK WIRE and the WHITE WIRE from the POWER SUPPLY.

**Important**
Make a note of the position of the wires. You must install the wires in the same position on the new POWER SUPPLY.

5. Disconnect the wires from the back of the POWER SUPPLY.
6. Loosen the 4 SCREWS and pull the POWER SUPPLY toward the front of the LASER PRINTER.
Image Unit Components

Optical Unit

[1] Energize the LASER PRINTER.
[2] Press the MAGAZINE DOOR OPEN/CLOSE SWITCH.
[3] Open the RECEIVE MAGAZINE DOOR.
[4] Pull down the LATCH and open the USER ACCESS DOOR.

⚠️ Warning

- Dangerous Voltage.
- Possible damage to eyes from invisible laser beam. Wear protective eyewear.
- Do not wear jewelry.

[5] De-energize the LASER PRINTER.
[6] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[7] Remove the TOP COVER. If necessary, see the procedure on Page 2–5.

[9] Loosen the 5 SCREWS to remove the LASER DIODE CONTROL BOARD COVER.
[10] Remove the FIBER OPTIC CABLE

(a) For LASER PRINTERS with serial numbers 500024 - 500085, disconnect P/J402.

(b) For LASER PRINTERS with serial numbers 500086 - 500200, disconnect P/J803
(c) For LASER PRINTERS with serial numbers 500201 and up, disconnect P/J461

[11] Loosen the 5 SCREWS to remove the OPTICAL UNIT COVER.
[12] Disconnect J402 on the LASER DIODE CONTROL BOARD.

LASER DIODE CONTROL BOARD

[13] Remove the 3 ALLEN SCREWS.
[14] Lift and remove the OPTICAL UNIT.
**Important**

If installing a new OPTICAL UNIT, do the following steps.

1. Energize the LASER PRINTER.
2. Use the PORTABLE COMPUTER to display the CES Main Menu.
5. Press [ENTER].
6. Enter [0] for the number of Laser on hours.
7. Select [S] to save.
8. Press [ESC] 4 times to exit diagnostics.

**Note**

For information about installing a UNIVERSAL OPTICAL UNIT, see “Installing a Universal Optical Unit” in the Installation Instructions.
## Optical Unit Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Replacement Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVER</td>
<td>Do not allow dust on the COVER to enter the OPTICAL UNIT.</td>
</tr>
<tr>
<td>BEAM SPLITTER MOTOR</td>
<td>Remove the MOTOR from the BASE by removing the 4 SCREWS.</td>
</tr>
<tr>
<td>BEAM SPLITTER POSITION SENSOR</td>
<td>Remove the BEAM SPLITTER POSITION SENSOR by removing 2 SCREWS.</td>
</tr>
<tr>
<td>POLYGON MOTOR UNIT</td>
<td>Place the PROTECTIVE COVER over the POLYGON before removing the unit. The PROTECTIVE COVER is shipped with the replacement unit.</td>
</tr>
</tbody>
</table>

![Diagram of optical unit components](image-url)
R Transportation Roller Assembly

[1] Remove the OPTICAL UNIT, SLOW SCAN ASSEMBLY, OUTLET GUIDE PLATE ASSEMBLY and RECEIVE MAGAZINE OPEN/CLOSE ASSEMBLY. See the procedures in this section if necessary.

[2] Loosen the 2 IDLER SPROCKET ASSEMBLY SCREWS.

[3] Remove the ROLLER CHAIN from the ROLLER SHAFT.

[4] Loosen the 4 SCREWS on the MOTOR BRACKET.

[5] Remove the MOTOR CHAIN from the GEAR.

[6] Remove the 4 SCREWS and 2 BEARING RETAINERS.

[7] Slide the ROLLER through the groove in the FRAME.
S Transportation Roller Assembly

[1] Remove the LEFT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.


[3] Loosen the 2 IDLER SPROCKET ASSEMBLY SCREWS.

[4] Remove the ROLLER CHAIN from the ROLLER SHAFT.

[5] Loosen the 4 SCREWS on the MOTOR BRACKET.

[6] Remove the MOTOR CHAIN from the SPROCKET.
[7] Remove the 4 SCREWS and 2 BEARING RETAINERS.

[8] Slide the ROLLER through the groove in the FRAME.
Outlet Guide Plate Assembly

[1] Open the RECEIVE MAGAZINE DOOR.
[2] Pull down the LATCH and open the USER ACCESS DOOR.

⚠️ Warning
Dangerous Voltage. Possible damage to eyes from invisible laser beam.

[3] De-energize the LASER PRINTER.

[4] Remove the TOP COVER. If necessary, see the procedure on Page 2–5.

[5] Remove the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.


[7] Mark the position of the GUIDE PLATE BRACKET on the FRAME.

[8] Remove the 4 SCREWS.

[9] Lift and slide the GUIDE PLATE out of the PRINTER.
[10] Mark the position of the GUIDE PLATE BRACKET on the FRAME.
[11] Remove the 4 SCREWS.
[12] Lift and slide the GUIDE PLATE out of the PRINTER.

⚠️ Important
Do not allow the GUIDE PLATE to slide against the frame of the LASER PRINTER.
Slow Scan and Encoder Assembly

[1] Open the RECEIVE MAGAZINE DOOR.
[2] Pull down the LATCH and open the USER ACCESS DOOR.

⚠️ Warning
Dangerous Voltage. Possible damage to eyes from laser beam.

[3] De-energize the LASER PRINTER.
[4] Remove the TOP COVER. If necessary, see the procedure on Page 2–5.
[5] Remove the OPTICAL UNIT. If necessary, see the procedure on Page 2–29.
[6] Remove the OUTLET GUIDE PLATE ASSEMBLY. If necessary, see the procedure on Page 2–37.
[7] Remove the 2 SPRINGS.
[8] Loosen the 2 REGISTRATION PLATE SCREWS.

[9] Rotate the REGISTRATION PLATE upward.

[10] Install the 2 REGISTRATION PLATE SCREWS removed in Step 8 to hold the REGISTRATION PLATE in the up position.

[11] Disconnect the SLOW SCAN MOTOR CONNECTOR.

[12] Disconnect the ENCODER CABLE from the SLOW SCAN DRIVER BOARD. Remove the WIRE TIES if necessary.

[13] Remove the 4 SCREWS.

[14] Lift and hold the PINCH ROLLER away from the SLOW SCAN ROLLER.

[15] Lift and pull out the ENCODER ASSEMBLY.
**Slow Scan Assembly Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Replacement Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGISTRATION PLATE</td>
<td></td>
</tr>
<tr>
<td>GUIDE PLATE</td>
<td></td>
</tr>
<tr>
<td>FREE ROLLER</td>
<td>Do not drop the BEARINGS or scratch the ROLLER.</td>
</tr>
<tr>
<td>LIGHT SHIELD PLATE AND SLOW SCAN FILM SENSOR</td>
<td>Disconnect the CONNECTOR before removing the SENSOR.</td>
</tr>
<tr>
<td>PINCH ROLLER</td>
<td>• Remove the 2 SPRINGS.</td>
</tr>
<tr>
<td></td>
<td>• Remove the WASHERS and E RINGS from the LEVER.</td>
</tr>
<tr>
<td></td>
<td>• Remove the PINS.</td>
</tr>
<tr>
<td></td>
<td>• Remove the WASHERS and E RINGS from the ROLLER.</td>
</tr>
<tr>
<td></td>
<td>• Do not scratch the PINCH ROLLER.</td>
</tr>
<tr>
<td></td>
<td>• Clean the NIP ROLLER before assembly.</td>
</tr>
</tbody>
</table>
Supply Magazine Open/Close Assembly with Separation Unit

[1] Remove the SUPPLY MAGAZINE.

⚠️ Warning
Dangerous Voltage. Possible damage to eyes from invisible laser beam.

[2] De-energize the LASER PRINTER.

[3] Remove the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[4] Disconnect the following connectors from the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY:
   - J320
   - J321
   - J322
   - J302
   - J303.

⚠️ Caution
The SUCKER PADS must be in the up position.

[5] Remove the 3 SCREWS.

[6] Lift the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY a small amount, and pull the unit out.

⚠️ Caution
The assembly will contact the S-MAGAZINE DOOR LOCK SOLENOID if lifted too high.
Installation Notes:

[7] Check that the SUCKER ASSEMBLY is in the up position before installing the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY with SEPARATION UNIT.

Note

The GUIDE FLANGE on the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY with SEPARATION UNIT slides into the LOWER SLOT of the BRACKET.
Supply Magazine Open/Close Assembly Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Replacement Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTROMAGNETIC PUMP</td>
<td>Remove the HOSE and CONNECTOR before the ELECTROMAGNETIC PUMP.</td>
</tr>
<tr>
<td>ELECTROMAGNETIC VALVE</td>
<td></td>
</tr>
<tr>
<td>SUCTION DETECTING MANIFOLD</td>
<td></td>
</tr>
</tbody>
</table>
| S-MAGAZINE WINDOW CLOSE SENSOR    | • Make a mark to indicate the position of the SENSOR BRACKET on the FRAME before removing it.  
                                       • Remove this part when the SEPARATING ASSEMBLY is fastened to the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY. |
| S-MAGAZINE WINDOW OPEN SENSOR     | • Make a mark to indicate the position of the SENSOR BRACKET on the FRAME before removing it.  
                                       • Remove this part when the SEPARATION ASSEMBLY is fastened to the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY. |
| MOTOR                             | Remove this part when the SEPARATION ASSEMBLY is fastened to the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY. |

Separation Assembly

[1] Remove the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY. If necessary, see the procedure on Page 2–42.

[2] Disconnect the following CONNECTORS:
   J330
   J331
   J332
   J333
   J334

[3] Remove the HOSE.

[4] Mark the SEPARATION ASSEMBLY with a line to indicate the correct position.

[5] Remove the 6 SCREWS to remove the SEPARATION ASSEMBLY from the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY.
SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY with SEPARATION ASSEMBLY
## Separation Assembly Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Replacement Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIDE BASE MOTOR</td>
<td></td>
</tr>
<tr>
<td>SLIDE BASE SOLENOID</td>
<td></td>
</tr>
<tr>
<td>SEPARATION ARM SOLENOID</td>
<td>It is not necessary to remove the SEPARATION ASSEMBLY from the BASE PLATE to remove these components.</td>
</tr>
<tr>
<td>FILM SUCTION SENSOR</td>
<td></td>
</tr>
<tr>
<td>SLIDE BASE POSITION SENSOR</td>
<td></td>
</tr>
<tr>
<td>GUIDE ROLLER</td>
<td>Remove both GUIDE ROLLERS.</td>
</tr>
<tr>
<td>SLIDE BASE</td>
<td>• Remove the LINK MECHANISM with the SLIDE BASE.</td>
</tr>
<tr>
<td></td>
<td>• Keep the WASHERS.</td>
</tr>
<tr>
<td>SUCTION PAD</td>
<td>It is not necessary to remove the SEPARATING UNIT to remove the SUCTION PAD.</td>
</tr>
</tbody>
</table>
FILM SEPARATION UNIT

S-MAGAZINE WINDOW CLOSE SENSOR (PHS2)

SEPARATION ARM SOLENOID (SL3)

SLIDE BASE SOLENOID (SL4)

P/J 331

SLIDE BASE MOTOR DRIVER BOARD (2PMD-F)

P/J 321

P/J 332

P/J 333

S-MAGAZINE WINDOW OPEN SENSOR (PHS1)

SEPARATION ARM SENSOR (CHS2)

S-MAGAZINE WINDOW OPEN/CLOSE MOTOR (MSM)

P/J 350

ELECTROMAGNETIC PUMP (MVP)

SEPARATION SLIDE BASE MOTOR (PMF)

P/J 340

ELECTROMAGNETIC VALVE (MSV)

FILM SUCTION SENSOR (PHF)

SLIDE BASE POSITION SENSOR (CHS1)
Receive Magazine Open/Close Assembly

**Warning**
Dangerous Voltage. Possible damage to eyes from invisible laser beam.

1. Remove the TOP COVER.
2. Remove the OUTLET GUIDE PLATE ASSEMBLY.
3. Remove the RECEIVE MAGAZINE.
4. Disconnect the following from the RECEIVE MAGAZINE OPEN/CLOSE ASSEMBLY:
   - J301
   - J304
   - J310
   - J311
   - J312

5. Remove the 3 SCREWS.

6. Lift the assembly a small amount and move it toward the right to remove it from the LASER PRINTER.

**Important**
The assembly will contact the R-MAGAZINE DOOR LOCK SOLENOID if lifted too high.

**Installation Notes:**
The assembly must be in the closed position.
R Magazine Storing Case

Note
Use this procedure when replacing the SPRING.

Warning

- Dangerous Voltage.
- Possible damage to eyes from invisible laser beam.
- Wear protective eyewear.
- Do not wear jewelry.

[1] Do the removal procedures for the OUTLET GUIDE PLATE ASSEMBLY and RECEIVE MAGAZINE OPEN/CLOSE ASSEMBLY. See the procedures if necessary.


[3] Make a mark to show the location of the BRACKET.

[4] Remove the BRACKET and 2 SCREWS of the R MAGAZINE DOOR LOCK SENSOR.
Important

Keep the washers for each GUIDE BLOCK with that GUIDE BLOCK.

[5] Remove the 5 SCREWS to remove the RIGHT GUIDE BLOCK.
[6] Remove the 3 SCREWS to remove the LEFT GUIDE BLOCK.
[7] Rotate the CLAW forward and fasten it to the COVER with TAPE.

[8] Remove the 6 SCREWS.

[9] Lift the R MAGAZINE STORING CASE and move it toward the front of the LASER PRINTER.

Note

Check that the bottom of the R MAGAZINE STORING CASE does not touch the TRANSPORT ROLLER.
Locating Film Transportation Components

The following figure shows the location of all the Film Transportation Components:
Receive Roller Motor

⚠️ Warning

Dangerous Voltage. Possible damage to eyes from invisible laser beam.

[1] De-energize the LASER PRINTER.

[2] Remove the TOP COVER of the IMAGE UNIT. If necessary, see the procedure on Page 2–5.


[4] Remove the 4 SCREWS fastening the MOTOR BRACKET to the FRAME.

[5] Remove the 4 SCREWS fastening the MOTOR to the MOTOR BRACKET.

[6] Install WIRE TIES to prevent WIRES from contacting moving parts.
Transport Roller Motor

⚠️ Warning
Dangerous Voltage. Possible damage to eyes from invisible laser beam.

[1] De-energize the LASER PRINTER.
[2] Remove the TOP COVER. If necessary, see the procedure on Page 2–5.
[4] Remove the BACK IMAGE COVER. If necessary, see the procedure on Page 2–3.
[5] Loosen the SCREW and open the FAN DOOR.
[6] Remove the 4 SCREWS fastening the MOTOR BRACKET to the FRAME.
[7] Remove the 4 SCREWS fastening the MOTOR to the MOTOR BRACKET.
[8] Install WIRE TIES to prevent WIRES from contacting moving parts.
Supply Roller Motor

⚠️ Warning
Dangerous Voltage. Possible damage to eyes from invisible laser beam.

[1] De-energize the LASER PRINTER.

[2] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[3] Loosen the SCREW and open the SLOW SCAN FAN ASSEMBLY DOOR.


[5] Remove the 4 SCREWS fastening the MOTOR BRACKET to the FRAME.

[6] Remove the 4 SCREWS fastening the MOTOR to the MOTOR BRACKET.
## Section 3: Diagnostic Check Procedures

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Setting up the Optical Power Meter

After setting up the Optical Power Meter, the meter should look like the illustration shown below.

Note
The OPTICAL POWER METER function keys are set up to operate in 2 modes. The [SHIFT] key changes the function of each key. Shift functions are labeled in blue and normal functions are labeled in white on the meter panel. An icon appears on the meter for each function that has been selected.
[1] Connect the CALIBRATION MODULE to the BNC CONNECTOR on the OPTICAL METER PROBE.

[2] Insert the PROBE with the CALIBRATION MODULE into the OPTICAL METER input.

[3] Energize the OPTICAL POWER METER.

[4] Press the [SHIFT] key to return to normal function mode if the OPTICAL POWER METER is in the shift function mode.

[5] Press the [H] key to remove the “H” icon displayed on the meter.

[6] Press [SHIFT] and then press the [AUDIO] key to turn off the audio.

[7] Press the [STORE REF] key to turn off the RECALL.

[8] Press the [WAVE LENGTH] key to set the wavelength to 830 nm.

[9] Press the [ATTENUATOR] key to turn off the ATTENUATOR.

[10] Press the [SHIFT] and then press the [BACKGROUND] key to turn off the background.


[12] Press [SHIFT] and then press the [REF-dB] key to set the scale to µW.

[13] Press [AVG/P-P] to turn off the P-P measurement.

[14] Press the [SHIFT] key to restore functions to normal mode.


Note
“Auto” will be displayed on the meter.

[16] Press the [TIME] key to set the time constant to S.

[17] Expose the probe ATTENUATOR.
Measuring the Laser Power

If the film density appears to be out of specification and the processor and chemistry are functioning normally, use this procedure to check the laser power. Use this procedure to troubleshoot density variations by checking the original BEAM SPLITTER density value for D-MAX.

Note
There are 2 styles of the LASER DIODE CONTROL BOARD. These BOARDS are STYLE A and STYLE B. STYLE B does not have a PORCH BOARD.

Warning

- Dangerous Voltage.
- Possible damage to eyes from invisible laser beam.
- Wear protective eyewear.
- Do not wear jewelry.

[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.

[2] Remove the TOP COVER. If necessary, see the procedure on Page 2–5.

[3] Loosen the 5 SCREWS and remove the LASER DIODE CONTROL BOARD COVER.

Note
For the STYLE A LASER DIODE CONTROL BOARD, the ROTARY SWITCHES should be factory-set to F. This setting represents D-MAX.

[4] For the STYLE A BOARD, if necessary, set the 3 ROTARY SWITCHES DSW1, DSW2 and DSW3 to F.

[5] For the STYLE A BOARD, set SW1 and SW2 to position 3.

For the STYLE B BOARD, set SW2 and SW3 to position 3.
Energize the LASER PRINTER.

Use the PORTABLE COMPUTER to display the CES Main Menu.

Input ‘HLP’ to know commands.

Enter command:


Note

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

Style A

Enter Command: LDO

Style B

Enter Command: OLT
Linear or constant (0/1)[0]:1
Look up table data (0 to 4095)[0]:4095
error=0
Enter command:

Important

The BEAM SPLITTER must be reset to the original alignment value to measure laser power. If the alignment value was changed to meet customer needs, that value must be re-entered after the laser power measurement has been taken.

Enter Command: CBS
Density? (-3 to 3)[-3]:

Enter Command: CBS
Density? (-3 to 3)[-3]:0
Current Density: 0

error=0
Enter Command: SET
Density? (-3 to 3)[-3]:0
Old pulse number: XXX
Pulse number[B]? (0 to 200):XXX

[10] For the STYLE A BOARD, enter [L] [D] [O] to energize the laser.
For the STYLE B BOARD, enter [O] [L] [T], [1], and [4095].

[11] Enter [C] [B] [S] to set the BEAM SPLITTER density settings.

[12] Enter [0] for density setting 0.

[13] Enter [S] [E] [T].

[14] Enter [0].
[15] Compare the pulse count values displayed on the PORTABLE COMPUTER with the values on the ALIGNMENT VALUE LABEL.

(a) Check the old pulse number for density setting 0 displayed on the PORTABLE COMPUTER.

(b) Check the pulse number for the density setting 0 value on the ALIGNMENT VALUE LABEL located on the front of the OPTICAL UNIT.

[16] If the pulse number for density setting 0 value displayed on the PORTABLE COMPUTER is different than the setting 0 value on the ALIGNMENT VALUE LABEL:

(a) record the value displayed on the PORTABLE COMPUTER to be re-entered later

(b) enter the label value at the “How many pulses?” prompt and press the [ENTER] key again.
[17] Check that the laser is energized. Use a PHOSPHOR PROBE TL-2579 to locate the laser beam.

⚠️ **Important**
Do not touch the POLYGON MIRROR.

[18] If necessary, use a pencil tip to rotate the POLYGON MIRROR to locate the laser beam.

[19] Set up the OPTICAL POWER METER. See the procedure on Page 3–2 if necessary.
Important
The laser power measurement obtained in the following step should be 1.49 mW ± 0.10 mW. Call TAC if this value is not obtained.

[20] Insert the OPTICAL POWER METER PROBE in the laser beam path, and move the probe until the value displayed on the METER is maximum.

[21] Record the maximum power value on the ALIGNMENT VALUE LABEL.

[22] For STYLE A BOARD, enter [L] [D] [F] to turn off the Laser Diode.

[23] For STYLE A BOARD, reset SW1 and SW2 to position 1.

For STYLE B BOARD, reset SW2 and SW3 to position 1.

[24] Enter [S] [E] [T].

[25] Enter [0].

[26] Enter the pulse number recorded in Step .

[27] Press [ESC] 3 times to exit diagnostics.

[28] Install the LASER DIODE CONTROL BOARD COVER.
Checking Vacuum Pressure

Use this procedure to troubleshoot film transport problems related to film suction.

[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.
[2] Remove the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[3] Remove the CAP.
[5] Energize the LASER PRINTER.
[6] Load exposed film into the SUPPLY MAGAZINE.
[7] Use the PORTABLE COMPUTER to display the CES Main Menu.


**Note**

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[10] Enter [M] [G] [O] to open the SUPPLY MAGAZINE WINDOW.

[11] Enter [I] [T] [R] to place the TRANSPORT ROLLERS in the initial position.

[12] Enter [F] [D] [A] to lower the SUCKER ASSEMBLY to lift a sheet of film.

[13] Enter the correct number corresponding to the size of the film loaded into the SUPPLY MAGAZINE.
   - 0: 8x10
   - 1: 11x14
   - 2: 35x35
   - 3: 35x43


[15] Read the pressure on the VACUUM GAUGE.
   
   *(a)* The pressure should be between 310 mm Hg and 330 mm Hg (between 10 in. and 13 in. Hg.)
If the pressure is not correct, check the frequency of the ELECTRONIC PUMP. See the procedure on Page 5–4.

**Note**
The following steps are provided to complete the film transport cycle.

1. **Enter command:** FDB
2. **Enter command:** TRS
   - **Film size? (0-3):** X
3. **Continue or step? (0 or 1):** 0
4. **Default parameters or set again? (0 or 1):**

[16] **Enter [F] [D] [B] to move the film to the SUPPLY ROLLER.**

[17] **Enter [T] [R] [S] to transport the film to the RECEIVE ROLLER.**

[18] **Enter the correct number corresponding to the size of the film loaded in the SUPPLY MAGAZINE.**
   - 0: 8x10
   - 1: 11x14
   - 2: 35x35
   - 3: 35x43

[19] **Enter [0] to continue.**

[20] **Press [Enter] for defaults.**

[21] **Enter [P] [O] [N] to energize the POLYGON MOTOR.**

[22] **Enter [P] [R] [I] to print an image.**

[23] **Enter [0] for yes.**

[24] **Enter the correct number corresponding to the size of the film loaded in the SUPPLY MAGAZINE.**
   - 0: 8x10
   - 1: 11x14
   - 2: 35x35
   - 3: 35x43

[25] **Press [Enter] for defaults.**
[26] Enter [R] [E] [C] to move the film to the RECEIVE MAGAZINE.

[27] Enter the correct number corresponding to the size of the film loaded into the SUPPLY MAGAZINE.

- 0: 8x10
- 1: 11x14
- 2: 35x35
- 3: 35x43

[28] Press [ESC] 3 times to exit diagnostics.

[29] Remove the VACUUM GAUGE.

[30] Install the CAP.

[31] Install the RIGHT IMAGE UNIT COVER.
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Calibration

Overview

Calibration is a method of ensuring consistent image appearance despite differences in film emulsions and variations in the chemistry for the processor. Calibration also provides consistent filmed images regardless of which PRINTER or processor is used.

The LASER PRINTER can store 11 calibration settings. When the PRINTER is taken off-line, the CONTROL PANEL displays the calibration number of the previous calibration.

The user calibrates at any time and stores and prints images during calibration. If the user calibrates while the LASER PRINTER is printing, the new calibration takes effect only when all copies of the current page are printed.
When to Calibrate
In general, the LASER PRINTER provides consistent output. For optimal quality assurance, however, it is suggested that the LASER PRINTER be calibrated when you change:

- the film emulsion
- the processing environment—for example, the chemistry or temperature of the processor
- the density setting
- the battery on the SEQUENCE BOARD
- the SEQUENCE BOARD.

**Note**
To determine if the emulsion number has changed, locate the label on the side of the box of film.
Calibrating the Printer

The PRINTER can store up to 11 sets of 9 density values under Calibration numbers 1-11.

⚠️ Important

- Use this procedure to set new density values and to store those values under a calibration number 1-11.
- To check and select previously stored density values under calibration number 1-11, see “Checking Stored Calibration Settings” on Page 4–11.

[1] Check that the LASER PRINTER and the processor are warmed up.

⚠️ Note
The CONTROL PANEL displays the message [00 PRINTER READY].

1. CALIBRATION #
1A SET DENSITY

-3 -2 -1 0 +1 +2 +3


[3] Press the [▼] and [▲] keys to change the calibration number.


⚠️ Important
The default value is 0, density setting 0. Changing the value from 0 will increase or decrease D-MAX by a density factor of 0.10 for each increment. Example: entering -2 would change a D-MAX value previously set at 2.8 to 2.6.

⚠️ Caution
All previously entered data under the calibration number selected will be lost.

[6] Press the [▼] and [▲] keys to move the cursor to the desired value.


[9] Press the MAGAZINE DOOR OPEN/CLOSE SWITCH.
[10] Open the RECEIVE MAGAZINE DOOR.
[11] Remove the RECEIVE MAGAZINE.
[12] Process the Calibration Image. Use the same processor that will be used to process film printed by the LASER PRINTER.

Note

If you have installed Modification 5 for the Laser Printer, the printer will produce a new type of calibration image. Look at the illustration at right to determine which type of calibration image you have.


(a) If the density of the darkest step is too light, do Steps 2 through 13 again, changing the density to a higher setting.

(b) If the density of the darkest step is too dark, do Steps 2 through 13 again, changing the density to a lower setting.

(c) If the density settings do not provide enough range to meet customer needs, see “Setting Film Density - Beam Splitter Pulse Settings” on Page 4–16.

Measuring and Entering Density Data

Using a Stand-alone DENSITOMETER

Old-Type Calibration Image

Use the following method to measure and enter the density data.

1. Prepare a stand-alone DENSITOMETER for use.
2. Measure the density at the center of each gray step on the Calibration Image.
   - (a) Check that the notch on the edge of the film is at the upper right corner for 35 x 43 cm, 35 x 35 cm, and 8 x 10 in. For 11 x 14 in., the notch should be at the lower right corner.
   - (b) Read the 9 gray steps on the calibration image.

Note
If you have an “old-type” calibration image, read either side strip of 9 gray steps, but read all the steps from the same side.

New-Type Calibration Image

3. Record the data.
4. Press [SELECT] on the CONTROL PANEL to display the screen for the first gray step value.
   
   ![ENTER STEP 1: x.xx](image)

5. To change the density value for a step,
   - (a) press the [▼] key on the CONTROL PANEL to decrease the density value.
   - (b) press the [▲] key on the CONTROL PANEL to increase the density value, or

Note
The minimum density value that can be entered is 0.00, and the maximum density is 3.99.

6. Press [NEXT] to enter the density value and display the next density step.
7. Do Steps 5 and 6 for gray steps 2 through 9, sequentially.
Check the density values by pressing [NEXT] and reviewing each of the 9 density values.

Press [SELECT].

Press [SELECT] again to begin the calibration.

Note

- The PRINTER will compute the calibration table. Calibration will take about one minute. When the calibration has been calculated successfully, the LASER PRINTER displays:
  [ 00 PRINTER READY ].
- If calibration is not successful, the CONTROL PANEL will display error 54. See the Calibration Errors procedure below.

Calibration Errors

If calibration is unsuccessful, the LASER PRINTER displays an error message.

54 ERROR:
CALIBRATION

Check that the LASER PRINTER and the processor are warmed up completely.
[2] Check that the Calibration Image was used and not the Test Image.

**Old-Type Calibration and Test Images**

![Old-Type Calibration and Test Images](image1)

[3] If the Test Image was used, do the procedure Calibrating the Printer beginning on Page 4–4.

**Important**
The density of each step must be greater than or equal to the density of the previous step.

[4] Check that the DENSITOMETER is calibrated correctly.

[5] If calibration is still unsuccessful, call TAC.
Using the *Kodak* Process Control DENSITOMETER as a Stand-alone DENSITOMETER

The *Kodak* PROCESS CONTROL DENSITOMETER can also be used to read the 9 density values. To do so, use the following procedure:

1. Prepare the DENSITOMETER for use.
2. After passing the self-test, the DENSITOMETER will display:
3. Simultaneously press [MENU] and [MENU].
4. Position the film tightly up to the Stop of the DENSITOMETER, then insert the film until it rests against the drive rollers and the motor is activated.

**Note**

Always read the densities with the emulsion side of the film facing up. The notch should be in the upper right hand corner.

5. While the film is measured, hold the film against the Stop, guiding the film to prevent skewing.
6. Press the right-side [MENU] key that is under the displayed word “go”.
7. Press the right-side [MENU] key again when the DENSITOMETER displays “go”.
[8] Press the left-side [CHAN] key under the “P1” three times when the DENSITOMETER displays the screen at the right, with a “P1” at the bottom left corner.

Note
The third time the [CHAN] key is pressed, the DENSITOMETER will display:

Important
The DENSITOMETER is ready to display the densities for all 21 steps that it has read from the Calibration Image. The Kodak Ektascan 1120 LASER PRINTER uses only the densities of steps 7 through 15. To read and record the required densities:

[9] Press the right-side [CHAN] key and scroll through the densities.

[10] Record the values when of density steps 7 through 15.

[11] Check the values by scrolling through density steps 7 through 15 again.

[12] Simultaneously press [MENU] and [MENU].

Note
The PORTABLE COMPUTER will display the Main Menu.

Checking Stored Calibration Settings

1. CALIBRATION #: X

1A SET DENSITY
-3 -2 -1 0 +1 +2 +3

1B PRINTING CAL IMAGE

1C ENTER DATA

1. CALIBRATION #: X

ENTER STEP 1: X
ENTER STEP 9: X

1D BEGIN CALIBRATION

CALIBRATING

00 PRINTER READY

[1] Press [ON-LINE].

[2] Press [▼] and [▲] keys to select the desired calibration number.


[5] Check that the stored density is underscored.

Note
If the stored density is not underscored, a new calibration must be done. See Calibrating the Printer on Page 4–4.


[9] Wait one minute for the PRINTER to compute the calibration table.

[10] Press and release [NEXT] to check each of the density values.


Recovering from a Calibration Error

Perform this procedure if you receive a calibration error when energizing the 1120 Laser Printer.

⚠️ Important
When the printer displays “54 ERROR: CALIBRATION,” you must perform this procedure before you can enter offline mode to calibrate the printer.


[3] Enter the following 9 raw data values:
   1. 0.15
   2. 0.22
   3. 0.42
   4. 0.79
   5. 1.25
   6. 1.73
   7. 2.12
   8. 2.46
   9. 2.71


Note
At this point, you can set CAL DATA to either “NORMAL” or “OK”.

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<td>2. Exit from CES HIDDEN MODE.</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>3. Enter off-line mode.</td>
<td></td>
</tr>
<tr>
<td>4. Calibrate the printer.</td>
<td></td>
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</tbody>
</table>

Note
After calibrating, the value for CAL DATA in HIDDEN MODE changes to “OK”.

Note
The printer displays “07 PRINTER WARM UP”

⚠️ Important
When you set CAL DATA to “OK”, the printer calibrates itself. You can continue to use the printer, but you should enter off-line mode and perform a manual calibration as soon as possible to ensure maximum image quality.
Tone Scaling

Important

- Before doing a Tone Scale adjustment, check that the Imaging Device Monitor has been correctly adjusted. This Monitor adjustment should not be changed once the Tone Scaling has been completed.
- Tone Scale adjustments should only be done by trained personnel.

Tone Scaling is a technique of making printed images match the images on the input monitor. To adjust the tone scale, use the following procedure:

[1] Check that the Density is set for the desired maximum density using the Setup Procedure beginning on Page 4–22.


[3] Use the Keypad [Program] key to adjust the Curve Shape. If necessary, see the User Manual, 5B9622.

[4] Use the Keypad [Program] key to adjust the Contrast. If necessary, see the User Manual, 5B9622.
Checking Film Transport

Note

- Use exposed film for this procedure.
- Use the service key to allow operation of the PRINTER with the doors open.

[1] Check that the LASER PRINTER and the processor are warmed up.

Note

The CONTROL PANEL will display the message [07 PRINTER WARM-UP] followed by [00 PRINTER READY].

Note

The messages shown in the left hand column are displayed on the CONTROL PANEL after doing the corresponding step in the right hand column.

1. CALIBRATE PRINTER
2. PRINT TEST IMAGE
3. FILM OUTPUT


⚠️ **Important**

Either the “3A RECEIVE MAGAZINE” or “3B PROCESSOR” message will be displayed after doing the last step. The “3A RECEIVE MAGAZINE” message must be displayed to check film transport for PRINTERS attached to a processor. The “3B PROCESSOR” message must be displayed to check film transport for PRINTERS attached to a processor.

[6] If necessary, press [NEXT] to display either the “3A RECEIVE MAGAZINE” message or the “3B PROCESSOR” message.


Setting Film Density - Beam Splitter Pulse Settings

⚠️ Important
If you do this procedure, you must do the procedure “Calibrating the Printer” on Page 4–4.

Use this procedure to set density values other than those set at the factory.

1. Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.
2. Load customer film into the SUPPLY MAGAZINE.
3. Energize the LASER PRINTER.
4. Use the PORTABLE COMPUTER to display the CES Main Menu.
5. Enter [1] for “Monitor Mode”.
7. Enter [1] to print gray scale.
8. Enter the correct number corresponding to the size of the film loaded into the SUPPLY MAGAZINE.
   - 0: 8x10
   - 1: 11x14
   - 2: 35x35
   - 3: 35x43
11. If using 35 x 43 cm film, press [ENTER] for default at the “Each pulse?” prompt.
12. If using other than 35 x 43 cm film, press [2] [0] at the “Each pulse?” prompt.


Note
If using 35 x 43 cm film, a 10-step grey scale will print at this time.

Note
If using 35 x 35 cm (8 x 10 in) film, a 6-step grey scale will print at this time.

Note

- The following steps show density settings for the 35 cm x 43 cm film size.
- For film sizes other than 35 cm x 43 cm, the first pulse value will be 50 and there will be 20 pulses between settings with 6 pulse settings rather than 10.
Use a DENSITOMETER to measure and record density values of each pulse value (grey scale).

(a) The first value must be $\leq 2.55$. An error will occur if the value is $> 2.55$.
(b) The last value must be $\geq 3.15$. An error will occur if the value is $< 3.15$.

**Note**
If the first and last density values are not in range, repeat Steps 7 through 15. Select a different value for the initial pulse in Step 10:
- less than 50 for the condition in Step 15 (a).
- greater than 50 for the condition in Step 15 (b)


Density values shown are for example only.

50 Dens. (0.00x100 to 3.99x100) = 91
60 Dens. (0.91x100 to 3.99x100) = 139
70 Dens. (1.39x100 to 3.99x100) = 188
80 Dens. (1.88x100 to 3.99x100) = 228
90 Dens. (2.28x100 to 3.99x100) = 260
100 Dens. (2.60x100 to 3.99x100) = 285
110 Dens. (2.85x100 to 3.99x100) = 304
120 Dens. (3.04x100 to 3.99x100) = 319
130 Dens. (3.19x100 to 3.99x100) = 325
140 Dens. (3.25x100 to 3.99x100) = 334

**Note**
Multiply the 50-pulse density value measured by 100. Example: if the density value measured is 2.50, multiplying that number by 100 would equal 250.

[17] Enter the initial density value multiplied by 100.

[18] Repeat Step 17 for the remaining 9 gray scale density readings.

**Note**
If standard density values are desired, proceed to the next step. If other density values are desired, go to Step 22.


**Note**
The pulse number for each density value will be displayed.
[20] Record the pulse number displayed on the PORTABLE COMPUTER onto the ASSIGNMENT VALUE LABEL located on top of the CARD RACK.

[21] Enter [0] to save the pulse numbers.

[22] If alternate density levels are needed, select [4] to show pulse.

[23] Multiply the desired D-MAX value by 100 and enter that value. Example: if the density value measured is 2.50, the value entered would be 250.

[24] Record the pulse value displayed.

[25] Repeat Steps 23 and 24 for 3 density increments above D-MAX, and 3 density increments below D-MAX. Example:

(a) If the desired D-MAX value is 3.2, enter 320 in Step 23 and record the pulse value displayed.
   1. If 0 (D-MAX) = 3.2, then enter 320
   2. Record pulse value

(b) For each of the 3 increments above the desired D-MAX, enter the D-MAX value + 0.10, multiplied by 100. Record the pulse value displayed.
   1. If +1 = 3.3, then enter 330
      If +2 = 3.4, then enter 340
      If +3 = 3.5, then enter 350
   2. Record pulse values displayed for each increment.

(c) For each of the 3 increments below the desired D-MAX, enter the D-MAX value - 0.10, multiplied by 100. Record the pulse value displayed.
   1. If -1 = 3.1, then enter 310
      If -2 = 3.0, then enter 300
      If -3 = 2.9, then enter 290
   2. Record pulse values displayed for each increment.
[26] Press [ESC] to return to the Beam-splitter menu.


[28] Enter each of the new pulse values recorded in Steps 24 and 25.

[29] Press [ESC] 4 times to exit diagnostics.
Printing a Flat Field Image

Use this procedure to check the image quality and to identify light leaks or film scratches.

1. Press [NEXT], [SELECT], [▼] and the ACCESS SWITCH at the same time.

2. Press the [▼] and [▲] keys to change the print count.

3. Press [SELECT] to select a print count and start the print cycle.
CES Hidden Mode Setup Procedure

Use this procedure to enter parameters close to those obtained during calibration whenever:

- installing a new BATTERY
- installing a new SEQUENCE BOARD
- installing a new software version

1. Press the [▼] key, the [▲] key, and the POWER SWITCH to 1 at the same time.

2. Release the switches, and then press the ACCESS SWITCH within 5 seconds.

**Note**

The CONTROL PANEL will display messages as they are shown in the table on the opposite page.

3. Check the ALIGNMENT VALUE LABEL located in front of the CARD RACK to determine a value for the parameter being entered or changed.

4. Use the [NEXT] key to step through the options displayed on the CONTROL PANEL while entering the parameters required.

5. When entering values, do the following:
   - Press the [▼] and [▲] keys to select a value.
   - Press [NEXT] to advance to the next parameter when the correct value is displayed.
   - Press [SELECT] to enter changed values and return to normal operating mode.
### Operation Adjustments

The following is a list of parameters in the sequence in which they are displayed:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Enter this value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>“BS PULSE xx:yyy:”</td>
<td>To set the beam splitter pulses from 0 to 200.</td>
<td>See LABEL for values.</td>
</tr>
<tr>
<td>“FILM SIZE: xxxxx”</td>
<td>To set the film size.</td>
<td>35x43/35x35/14x11/8x10</td>
</tr>
<tr>
<td>“FILM OUTPUT: xxxxx”</td>
<td>To set the film output.</td>
<td>Proc/R-Mag</td>
</tr>
<tr>
<td>“MAX RECEIVE: xxx”</td>
<td>To set the maximum number of film sheets for the Receive Magazine.</td>
<td>80/100 *</td>
</tr>
<tr>
<td>“R-MAG FILM: xxx”</td>
<td>To read the number of film sheets in the Receive Magazine.</td>
<td>0</td>
</tr>
<tr>
<td>“FST: xx.xxmm”</td>
<td>To set the film start position.</td>
<td>See LABEL for values.</td>
</tr>
<tr>
<td>“IMST (8x10): xx.xxmm”</td>
<td>To set the 8x10 image start position.</td>
<td></td>
</tr>
<tr>
<td>“IMST: xx.xxmm”</td>
<td>To set an image start position other than 8x10.</td>
<td></td>
</tr>
<tr>
<td>“PEST: xxx.xxmm”</td>
<td>To set the Polygon edge start position.</td>
<td></td>
</tr>
<tr>
<td>“PEEND: xxx.xxmm”</td>
<td>To set the Polygon edge end position.</td>
<td></td>
</tr>
<tr>
<td>“SLOW: xx.xxmm”</td>
<td>To set the Slow Scan direction position.</td>
<td></td>
</tr>
<tr>
<td>“PRINT COUNT: xxx”</td>
<td>To set the number of test prints.</td>
<td>1</td>
</tr>
<tr>
<td>“JAM ERROR: xx”</td>
<td>To store the jam error.</td>
<td>0</td>
</tr>
<tr>
<td>“ACTIVE CAL: X”</td>
<td>To set the permission/inhibition for calibration.</td>
<td>1-11</td>
</tr>
<tr>
<td>“DENSITY: xx”</td>
<td>To set the density. (-3 to +3)</td>
<td>0</td>
</tr>
<tr>
<td>“RAW DATA x:y_yy”</td>
<td>To enter data for calibration</td>
<td>(1)0.15, (2)0.22, (3)0.42, (4)0.79, (5)1.25, (6)1.73, (7)2.12, (8)2.46, (9)2.71 **</td>
</tr>
<tr>
<td>“CAL DATA: xxxx”</td>
<td>To use the previously entered raw data to calibrate the PRINTER when calibration error occurs. See the procedure on Page 4–12 for more information.</td>
<td>OK</td>
</tr>
<tr>
<td>“CONTRAST: xx”</td>
<td>To set the contrast for test prints.</td>
<td>0</td>
</tr>
<tr>
<td>“LOW STEP: xxx”</td>
<td>To set the number of pulses for the “Film Supply Low” message. (162 - 222)</td>
<td>Enter desired value, See label, default=192</td>
</tr>
<tr>
<td>“USER CAL: xxxxxxx”</td>
<td>To set the permission/inhibition for calibration.</td>
<td>PERMIT</td>
</tr>
<tr>
<td>“TRANSPORT: NORMAL/SPECIAL”</td>
<td>To correct vertical banding.</td>
<td>NORMAL ***</td>
</tr>
<tr>
<td>“PROC TYPE:”</td>
<td>To choose the PROCESSOR that is docked to the PRINTER.</td>
<td>Choose “M35/270RA” or “M7B”. ****</td>
</tr>
</tbody>
</table>

* If using 8 x 10 in. FILM, select “80” for the maximum receive value. If using 35 x 43 cm. select either “80” or “100”, depending on the particular needs of the customer.

** Do not enter new values for Raw Data after Calibration has been completed.

*** Changing “TRANSPORT” from “NORMAL” to “SPECIAL” will correct vertical banding artifacts.

**** Used only on new PRINTERS, or old PRINTERS that have had Modification 6 installed.
Adjustment of the Right and Left Film Guides

If there is damage to the TABS that are located on the bottom of the MAGAZINES, adjust the RIGHT and LEFT MAGAZINE GUIDES on the SUPPLY or RECEIVE DOOR. Use the following specifications:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Receive Door</th>
<th>Supply Door</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>56.8 to 57.2 mm (2.24 to 2.25 in.)</td>
<td>57.8 to 58.2 mm (2.28 to 2.29 in.)</td>
</tr>
<tr>
<td>B</td>
<td>367.0 to 368.0 mm (14.45 to 14.49 in.)</td>
<td>417.0 to 418.0 mm (16.42 to 16.46 in.)</td>
</tr>
</tbody>
</table>

Note

It may be easier to make a gauge from a used film that is cut to the above dimensions.
# Section 5: Electrical Adjustments

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</tr>
</tbody>
</table>
Circuit Boards

Driver Board - Versions 1, 2, & 3 and Serial No. Range 500025-500389

DC/DC Converter Output Voltage

Use this procedure to correct timing malfunctions and to restore dropped pixels on film. If the output voltage is less than -2 Vdc, the PORTABLE COMPUTER displays the “no beam detected error”.

⚠️ Caution
Close the MAGAZINE WINDOWS or remove the MAGAZINES before doing this adjustment.

To Check:

[1] De-energize the LASER PRINTER.
[2] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[3] Open the SEQUENCE BOARD SHIELD.
[4] Connect the DIGITAL MULTIMETER TL-3386:
   (a) + side to CPM5 on the DRIVER BOARD
   (b) COM side to CPG5 on the DRIVER BOARD.
[5] Energize the LASER PRINTER.
[6] Check that the voltage is -5.2 ± 0.05 Vdc.

To Adjust:

[7] Rotate VR5 until the voltage is correct.
[8] Close the SEQUENCE BOARD SHIELD COVER.
[9] Replace the BACK IMAGE UNIT COVER.
Clock Frequency for Electromagnetic Pump

Use this procedure to check the vacuum pressure and the clock frequency for the ELECTROMAGNETIC PUMP when the film suction is malfunctioning.

⚠️ Caution
Close the MAGAZINE WINDOWS or remove the MAGAZINES before doing this adjustment.

To Check:

[1] De-energize the LASER PRINTER.
[2] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[3] Open the SEQUENCE BOARD SHIELD.

[5] Set the Volts/Div. to 2.0 V.
[7] Connect the GROUND CLIP of the OSCilloscope PROBE in Channel A to CPG5 on the DRIVER BOARD.
[8] Connect the 10X OSCilloscope PROBE in Channel A to CPCK on the DRIVER BOARD.
[9] Energize the LASER PRINTER.
[10] Observe the waveform on the OSCilloscope. The clock frequency should be 55 ± 3 Hz. One cycle should be between 17 ms and 19 ms.

To Adjust:

[11] Rotate POTENTIOMETER VR6 until the wave cycle is within specification.
Electrical Adjustments

DRIVER BOARD

POTENTIOMETER VR6
CPCK
CPG5

Approx. 18.00 ms.

Approx. 5V
GND
Film Sensor Adjustments

⚠ Important
After energizing the PRINTER, wait at least 10 minutes before adjusting the SENSORS. Film jam errors will occur if the voltages for the FILM SENSORS are not within the correct specification. Use this set of procedures to eliminate film jam errors caused by manufacturing changes in film, other film manufacturers, misadjusted or newly installed FILM SENSORS.

⚠ Important
To check and adjust PHT 1,2,3, use the procedures on Pages 5–7 through 5-12. If you achieve the signals shown on Pages 5-11 and 5-12, the procedure is complete. If necessary, see the Diagnostics Manual DG3226.

Do all the FILM SENSOR Adjustments in the sequence indicated in this section.
Electrical Adjustments

Emitter Intensity of Film Sensors IL1, IL2, and IL3

To Check:

⚠️ **Warning**
Dangerous Voltage.

[1] De-energize the LASER PRINTER.

[2] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[3] Open the SEQUENCE BOARD SHIELD.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Sensor/ Emitter Symbol</th>
<th>To measure resistance, place meter between COM and +</th>
<th>To adjust resistance, rotate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Scan Sensor</td>
<td>PHT2/IL1</td>
<td>CP5, P213, pin 7</td>
<td>VR3</td>
</tr>
<tr>
<td>Processor Adapter Sensor</td>
<td>PHT3/IL2</td>
<td>CP5, P211, pin 7</td>
<td>VR4</td>
</tr>
<tr>
<td>Transport Sensor</td>
<td>PHT1/IL3</td>
<td>CP5, P212, pin 9</td>
<td>VR13</td>
</tr>
</tbody>
</table>

[4] Disconnect CONNECTORS J211, J212 and J213 from the DRIVER BOARD.

[5] Connect the DIGITAL MULTIMETER, TL-3386, to the following test points on the DRIVER BOARD:
   IL1: Between CP5 and P213 - PIN7 for the SLOW SCAN FILM SENSOR
   IL2: Between CP5 and P211 - PIN7 for the FILM PROCESSOR ADAPTER FILM SENSOR
   IL3: Between CP5 and P212 - PIN9 for the TRANSPORT GUIDE PLATE JAM SENSOR

[6] Check that the resistance is 600Ω ± 10Ω.
Important
If necessary, do the adjustment procedure in the following step.

DRIVER BOARD

To Adjust:

[7] Rotate the correct POTENTIOMETER for each sensor until the value is within specification.
   IL1: VR3 for the SLOW SCAN FILM SENSOR
   IL2: VR4 for the FILM PROCESSOR ADAPTER FILM SENSOR
   IL3: VR13 for the TRANSPORT GUIDE PLATE JAM SENSOR

Output Voltage for Receivers PT1, PT2, and PT3

Perform this procedure to ensure the output voltages of RECEIVERS PT1, PT2, and PT3 are correct for the DRIVER BOARD to convert to a TTL level used at the SEQUENCE BOARD. It will be necessary to check this output when changing film manufacturers, replacing sensors and/or DRIVER BOARD.

To Check:

[1] Connect the Channel A and the Channel B GROUND CLIPS to CPG5.
[2] Connect the Channel A OSCILLOSCOPE PROBE to the correct TEST POINT:

Note
This gives the analog output of each FILM JAM SENSOR.
• PH2 for the SLOW SCAN FILM SENSOR
• PH3 for the FILM PROCESSOR ADAPTER FILM SENSOR
• PH1 for the TRANSPORT GUIDE PLATE FILM SENSOR

[3] Set the Sec/Div to 2 ms/division.
[4] Set the Volts/Div to 1.0V for both Channel A and Channel B.
[5] Connect the Channel B OSCILLOSCOPE PROBE to the correct TEST POINT:

Note
This shows the TTL levels for each FILM JAM SENSOR as converted by the DRIVER BOARD.
• PHT2 for the SLOW SCAN FILM SENSOR
• PHT3 for the FILM PROCESSOR ADAPTER FILM SENSOR
• PHT1 for the TRANSPORT GUIDE PLATE FILM SENSOR
Set the Time Base to 2 ms/division.

Set the voltage to 1 volt/division.

**Note**

Use unprocessed film supplied by the customer.

Observe the height of the waveforms on the OSCILLOSCOPE first without FILM and then with FILM inserted between the EMITTER and RECEIVER of the SENSOR. If necessary, see the Component Locator for each SENSOR location.

- **Channel A**
  - With no film: More than +3.5 V p-p
  - With film: Less than +1.5 V p-p

- **Channel B**
  - With no film: 0 Vdc
  - With film: 5 Vdc

---

**NO FILM PRESENT**

Analog output of Film Jam Sensors with no Film Present

Channel A

3.5 - 4.0 Vp-p

Channel B

0 Vdc

TTL Logic level Low (0 Volts)

8-10 ms
To Adjust:

[9] Rotate the correct POTENTIOMETER for each sensor until the value is within specification.

- PHT2: VR1 for the SLOW SCAN FILM SENSOR
- PHT3: VR2 for the FILM PROCESSOR ADAPTER FILM SENSOR
- PHT1: VR14 for the TRANSPORT GUIDE PLATE JAM SENSOR

[10] Check that Channel B SENSORS show a steady DC level with no pulses. If the Channel B SENSORS show a steady DC level, the film SENSORS are adjusted correctly. If pulses are present, do the Pulse Cycle Adjustment procedures beginning on Page 5–13.


[12] Remove the OSCILLOSCOPE PROBE.

**Oscilloscope Connection to Driver Board**

<table>
<thead>
<tr>
<th>Oscilloscope Connection to Driver Board</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel B</td>
<td>Channel A</td>
</tr>
<tr>
<td>PHT2</td>
<td>PH2</td>
</tr>
<tr>
<td>PHT3</td>
<td>PH3</td>
</tr>
<tr>
<td>PHT1</td>
<td>PH1</td>
</tr>
</tbody>
</table>
**Temporary Emitter Pulse Cycle**

[13] Disconnect J218 from the DRIVER BOARD.

[14] Set the Volts/Div. to 2.0 V for both Channel A and Channel B.

[15] Set the Sec/Div. to 5 ms.

[16] Connect the Channel A OSCILLOSCOPE PROBE to the correct TEST POINT:
   - IL1: LD2 for the SLOW SCAN FILM SENSOR
   - IL2: LD3 for the FILM PROCESSOR ADAPTER FILM SENSOR
   - IL3: LD1 for the TRANSPORT GUIDE PLATE JAM SENSOR

[17] Connect the Channel B OSCILLOSCOPE PROBE to the TEST POINTS:
   - PHT2 for the SLOW SCAN FILM SENSOR
   - PHT3 for the FILM PROCESSOR ADAPTER FILM SENSOR
   - PHT1 for the TRANSPORT GUIDE PLATE FILM SENSOR

[18] Energize the LASER PRINTER.

[19] Observe the waveform on Channel A of the OSCILLOSCOPE.

**Note**

The period of the waveform must be changed to 25-30 ms so that the next adjustment can be done. The period will be readjusted to 8 - 10 ms in the Permanent Emitter Pulse Cycle adjustment on Page 5–17.

[20] Rotate the correct POTENTIOMETER for each sensor until the period is 25-30 ms.
   - IL1: VR7 for the SLOW SCAN FILM SENSOR
   - IL2: VR8 for the FILM PROCESSOR ADAPTER FILM SENSOR
   - IL3: VR9 for the TRANSPORT GUIDE PLATE JAM SENSOR
No Film Signal Holding Time

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Symbol</th>
<th>To observe waveform, place oscilloscope between GND and PROBE</th>
<th>To adjust waveform period, rotate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Scan Sensor</td>
<td>IL1</td>
<td>CPG5, PHT2</td>
<td>VR10</td>
</tr>
<tr>
<td>Film Processor Adapter Sensor</td>
<td>IL2</td>
<td>CPG5, PHT3</td>
<td>VR11</td>
</tr>
<tr>
<td>Transport Sensor</td>
<td>IL3</td>
<td>CPG5, PHT1</td>
<td>VR12</td>
</tr>
</tbody>
</table>

To Check:

[21] Observe the wavelength on Channel B of the OSCILLOSCOPE. The pulse width should be between 20 ms and 22 ms.

![Waveform Diagram]

To Adjust:

[22] Rotate the correct POTENTIOMETER for each sensor until the value is within specification.

IL1: VR10 for the SLOW SCAN FILM SENSOR
IL2: VR11 for the FILM PROCESSOR ADAPTER FILM SENSOR
IL3: VR12 for the TRANSPORT GUIDE PLATE JAM SENSOR
**Permanent Emitter Pulse Cycle**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Symbol</th>
<th>To observe waveform, place oscilloscope between GND and PROBE</th>
<th>To adjust waveform period, rotate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Scan Sensor</td>
<td>IL1</td>
<td>CPG5</td>
<td>LD2</td>
</tr>
<tr>
<td>Film Processor Adapter Sensor</td>
<td>IL2</td>
<td>CPG5</td>
<td>LD3</td>
</tr>
<tr>
<td>Transport Sensor</td>
<td>IL3</td>
<td>CPG5</td>
<td>LD1</td>
</tr>
</tbody>
</table>

[23] Adjust the correct POTENTIOMETER for each sensor until the value is within the above specification.
- IL1: VR7 for the SLOW SCAN FILM SENSOR
- IL2: VR8 for the FILM PROCESSOR ADAPTER FILM SENSOR
- IL3: VR9 for the TRANSPORT GUIDE PLATE FILM JAM SENSOR

*Note*

- The Channel B signal should be a constant low.

[24] Insert a FILM between the emitter and receiver of each sensor to see that the signal on Channel B goes high as FILM is detected.

[25] De-energize the LASER PRINTER.

Emitter Pulse Duty Ratio for IL1, IL2, and IL3
Duty Cycle Ratio is defined as percent of time the SENSORS are on divided by the percent of time the SENSORS are off.

Lower the Duty Cycle Ratio if film fogging has occurred. Adjusting the 3 SWITCHES changes the ratio of emitter time per cycle. The Duty Ratio may need to be changed when non-Kodak films are used.

Note
The switches RSW1 and RSW2 on the DRIVER BOARD are factory-set to 8 for a Duty Ratio of 60%. RSW3 is factory set to 3 for a Duty Ratio of 28 percent.

PHT2, IL1 - RSW2: for the SLOW SCAN FILM SENSOR
PHT3, IL2 - RSW3: for the FILM PROCESSOR ADAPTER SENSOR
PHT1, IL3 - RSW1: for the TRANSPORT GUIDE PLATE FILM JAM SENSOR

Note
If changing the Duty Ratio, select one of the following switch settings to select the percent shown:

<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Duty Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>*0</td>
<td>9.4%</td>
</tr>
<tr>
<td>*1</td>
<td>16%</td>
</tr>
<tr>
<td>2</td>
<td>22%</td>
</tr>
<tr>
<td>3</td>
<td>28%</td>
</tr>
<tr>
<td>4</td>
<td>34%</td>
</tr>
<tr>
<td>5</td>
<td>41%</td>
</tr>
<tr>
<td>6</td>
<td>47%</td>
</tr>
<tr>
<td>7</td>
<td>53%</td>
</tr>
</tbody>
</table>

Not recommended.

Important
If you change the Duty Ratio, the Output Voltage for Receivers will need to be checked. Adjust as necessary.
[27] Change the switch settings for each sensor by trial and error until the film-fogging problem is cleared. Use the Flat Field procedure on Page 4–21 to check the image after setting the duty ratio.

[28] Check the receiver output voltage for PT1, PT2, or PT3 after changing the switch setting. See the procedure on Page 5–9.
Driver Board - Versions 4, 5, 6 & Universal and Serial No. Range 500390-500898, 600133-600306

DC/DC Converter Output Voltage

Use this procedure to correct timing malfunctions and to restore dropped pixels on film. If the output voltage is less than -2 Vdc, the PORTABLE COMPUTER displays the “no beam detected error”.

Caution

Close the MAGAZINE WINDOWS or remove the MAGAZINES before doing this adjustment.

To Check:

1. De-energize the LASER PRINTER.
2. Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
3. Open the SEQUENCE BOARD SHIELD.
4. Connect the DIGITAL MULTIMETER TL-3386:
   (a) + side to CPM5 on the DRIVER BOARD
   (b) COM side to CPG5 on the DRIVER BOARD.
5. Energize the LASER PRINTER.
6. Check that the voltage is -5.2 ± 0.05 Vdc.

To Adjust:

7. Rotate VR5 until the voltage is correct.
8. Close the SEQUENCE BOARD SHIELD COVER.
9. Replace the BACK IMAGE UNIT COVER.
Clock Frequency for Electromagnetic Pump

Use this procedure to check the vacuum pressure and the clock frequency for the ELECTROMAGNETIC PUMP when the film suction is malfunctioning.

⚠️ Caution
Close the MAGAZINE WINDOWS or remove the MAGAZINES before doing this adjustment.

To Check:

[1] De-energize the LASER PRINTER.
[2] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[3] Open the SEQUENCE BOARD SHIELD.

[5] Set the Volts/Div. to 2.0 V.
[7] Connect the GROUND CLIP of the OSCILLOSCOPE PROBE in Channel A to CPG5 on the DRIVER BOARD.
[8] Connect the 10X OSCILLOSCOPE PROBE in Channel A to CPCK on the DRIVER BOARD.
[9] Energize the LASER PRINTER.
[10] Observe the waveform on the OSCILLOSCOPE. The clock frequency should be $55 \pm 3 \text{ Hz}$. One cycle should be between 17 ms and 19 ms.

To Adjust:

[11] Rotate POTENTIOMETER VR6 until the wave cycle is within specification.
Approx. 18.00 ms.
Film Sensor Adjustments

⚠️ Important
After energizing the PRINTER, wait at least 10 minutes before adjusting the SENSORS.

Film jam errors will occur if the voltages for the FILM SENSORS are not within the correct specification. Use this set of procedures to eliminate film jam errors caused by misadjusted, newly installed FILM SENSORS, manufacturing changes in film or other film manufacturers.

⚠️ Important
To check and adjust PHT 1,2,3, use the procedures on Pages 5–25 through 5-28. If you achieve the signals shown on Page 5-28, the procedure is complete. If necessary, see the Diagnostics Manual DG3226.

Do all the FILM SENSOR Adjustments in the sequence indicated in this section.
Emitter Intensity of Film Sensors IL1, IL2, and IL3

To Check:

⚠️ Warning
Dangerous Voltage.

[1] De-energize the LASER PRINTER.

[2] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[3] Open the SEQUENCE BOARD SHIELD.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Sensor/ Emitter Symbol</th>
<th>To measure resistance, place meter between COM and +</th>
<th>To adjust resistance, rotate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Scan Sensor</td>
<td>PHT2/IL1</td>
<td>CP5</td>
<td>VR3</td>
</tr>
<tr>
<td>Processor Adapter</td>
<td>PHT3/IL2</td>
<td>CP5</td>
<td>VR4</td>
</tr>
<tr>
<td>Transport Sensor</td>
<td>PHT1/IL3</td>
<td>CP5</td>
<td>VR13</td>
</tr>
</tbody>
</table>

[4] Disconnect CONNECTORS J211, J212 and J213 from the DRIVER BOARD.

[5] Connect the DIGITAL MULTIMETER, TL-3386, to the following test points on the DRIVER BOARD:
   IL1: Between CP5 and P213 - PIN7 for the SLOW SCAN FILM SENSOR
   IL2: Between CP5 and P211 - PIN7 for the FILM PROCESSOR ADAPTER FILM SENSOR
   IL3: Between CP5 and P212 - PIN9 for the TRANSPORT GUIDE PLATE JAM SENSOR

[6] Check that the resistance is 600Ω ± 10Ω.
Important
If necessary, do the adjustment procedure in the following step.

DRIVER BOARD

To Adjust:

[7] Rotate the correct POTENTIOMETER for each sensor until the value is within specification.

   IL1: VR3 for the SLOW SCAN FILM SENSOR
   IL2: VR4 for the FILM PROCESSOR ADAPTER FILM SENSOR
   IL3: VR13 for the TRANSPORT GUIDE PLATE JAM SENSOR

Output Voltage for Receivers PT1, PT2, and PT3

This procedure is done to ensure the necessary output voltages are correct for the DRIVER BOARD to convert to a TTL level used at the SEQUENCE BOARD. It will be necessary to check this output when changing film manufacturers, replacing sensors and/or DRIVER BOARD.

To Check:

1. Connect the Channel A and the Channel B GROUND CLIPS to CPG5.
2. Connect the Channel A OSCILLOSCOPE PROBE to the correct TEST POINT:

   **Note**
   This gives the analog output of each FILM JAM SENSOR.
   - PH2 for the SLOW SCAN FILM SENSOR
   - PH3 for the FILM PROCESSOR ADAPTER FILM SENSOR
   - PH1 for the TRANSPORT GUIDE PLATE FILM SENSOR
3. Set the Time Base to 2 ms/division.
4. Set the voltage to 1 volt/division.
5. Connect the Channel B OSCILLOSCOPE PROBE to the correct TEST POINT:

   **Note**
   This shows the TTL levels for each FILM JAM SENSOR as converted by the DRIVER BOARD.
   - PHT2 for the SLOW SCAN FILM SENSOR
   - PHT3 for the FILM PROCESSOR ADAPTER FILM SENSOR
   - PHT1 for the TRANSPORT GUIDE PLATE FILM SENSOR
6. Set the Time Base to 2 ms/division.
7. Set the voltage to 1 volt/division.

**Note**
Use unprocessed film supplied by the customer.

8. Observe the height of the waveforms on the OSCILLOSCOPE first without FILM and then with FILM inserted between the EMITTER and RECEIVER of the SENSOR. If necessary, see the Component Locator for each SENSOR location.
   - Channel A
     - With no film: More than +3.5 V p-p
     - With film: Less than +1.5 V p-p
   - Channel B
     - With no film: 0 Vdc
     - With film: 5 Vdc
To Adjust:

[9] Rotate the correct POTENTIOMETER for each sensor until the value is within specification.

PHT2: VR1 for the SLOW SCAN FILM SENSOR
PHT3: VR2 for the FILM PROCESSOR ADAPTER FILM SENSOR
PHT1: VR14 for the TRANSPORT GUIDE PLATE JAM SENSOR

[10] Check that Channel B SENSORS show a steady DC level with no pulses. If pulses are present, do the Pulse Cycle Adjustment procedures beginning on Page 5–31.


[12] Remove the OSCILLOSCOPE PROBE.
No Film Signal Holding Time

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Symbol</th>
<th>To observe waveform, place oscilloscope between GND and PROBE</th>
<th>To adjust waveform period, rotate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Scan Sensor</td>
<td>IL1</td>
<td>CPG5</td>
<td>PHT2</td>
</tr>
<tr>
<td>Film Processor Adapter Sensor</td>
<td>IL2</td>
<td>CPG5</td>
<td>PHT3</td>
</tr>
<tr>
<td>Transport Sensor</td>
<td>IL3</td>
<td>CPG5</td>
<td>PHT1</td>
</tr>
</tbody>
</table>

To Check:

[1] Disconnect J218 from the DRIVER BOARD. J218 is the flat cable that connects to the SEQUENCE BOARD.


Note

- U14 pin 1 and pin 6 must be connected to the TL-4715 capacitor.
- You must use TL-4715 to obtain 30 ±5 ms. at TP L:D1, LD2, and LD3.
- The tool consists of an 8-PIN DIN CLIP with a 0.01µf CAPACITOR across pin 1 and pin 6.

[3] Connect the Channel A OSCILLOSCOPE PROBE to the correct TEST POINT:
   IL1: PHT2 for the SLOW SCAN FILM SENSOR
   IL2: PHT3 for the FILM PROCESSOR ADAPTER FILM SENSOR
   IL3: PHT1 for the TRANSPORT GUIDE PLATE FILM SENSOR

[4] Energize the LASER PRINTER.
[5] Observe the wavelength on the OSCILLOSCOPE. The pulse width should be between 20 ms and 22 ms.

To Adjust:

[6] Rotate the correct POTENTIOMETER for each sensor until the value is within specification.

PHT2: VR10 for the SLOW SCAN FILM SENSOR
PHT3: VR11 for the FILM PROCESSOR ADAPTER FILM SENSOR
PHT1: VR12 for the TRANSPORT GUIDE PLATE JAM SENSOR

[7] Connect J218 to the SEQUENCE BOARD.

Permanent Emitter Pulse Cycle

⚠️ Important

This is a check only. There is no adjustment for the printers in this serial number range.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Symbol</th>
<th>To observe waveform, place oscilloscope between GND and PROBE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Scan Sensor</td>
<td>IL1</td>
<td>CPG5, LD2</td>
</tr>
<tr>
<td>Film Processor Adapter Sensor</td>
<td>IL2</td>
<td>CPG5, LD3</td>
</tr>
<tr>
<td>Transport Sensor</td>
<td>IL3</td>
<td>CPG5, LD1</td>
</tr>
</tbody>
</table>

To Check:

[1] Connect the Channel B OSCILLOSCOPE PROBE to the correct TEST POINT:
   - IL1: LD2 for the SLOW SCAN FILM SENSOR
   - IL2: LD3 for the FILM PROCESSOR ADAPTER FILM SENSOR
   - IL3: LD1 for the TRANSPORT GUIDE PLATE FILM JAM SENSOR

[2] Observe the wavelength on the OSCILLOSCOPE. The period should be between 10 ms and 12 ms.

[3] Insert a FILM between the emitter and receiver of each sensor to see that the signal on Channel A goes high as FILM is detected.

[4] De-energize the LASER PRINTER.

Note

Channel A signal should be a constant low.

DRIVER BOARD (Version 5)
Emitter Pulse Duty Ratio for Sensors IL1, IL2, and IL3

Duty Cycle Ratio is defined as percent of time the SENSORS are on divided by the percent of time the SENSORS are off.

Lower the Duty Cycle Ratio if film fogging has occurred. Adjusting the 3 SWITCHES changes the ratio of emitter time per cycle. The Duty Ratio may need to be changed when non-Kodak films are used.

**Note**
The switches RSW1 and RSW2 on the DRIVER BOARD are factory-set to 8 for a Duty Ratio of 60%. RSW3 is factory set to 3 for a Duty Ratio of 28 percent.

- PHT2, IL1 - RSW2: for the SLOW SCAN FILM SENSOR
- PHT3, IL2 - RSW3: for the FILM PROCESSOR ADAPTER SENSOR
- PHT1, IL3 - RSW1: for the TRANSPORT GUIDE PLATE FILM JAM SENSOR

**Note**
If changing the Duty Ratio, select one of the following switch settings to select the percent shown:

<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Duty Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>*0</td>
<td>9.4%</td>
</tr>
<tr>
<td>*1</td>
<td>16%</td>
</tr>
<tr>
<td>2</td>
<td>22%</td>
</tr>
<tr>
<td>3</td>
<td>28%</td>
</tr>
<tr>
<td>4</td>
<td>34%</td>
</tr>
<tr>
<td>5</td>
<td>41%</td>
</tr>
<tr>
<td>6</td>
<td>47%</td>
</tr>
<tr>
<td>7</td>
<td>53%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Duty Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>60%</td>
</tr>
<tr>
<td>9</td>
<td>66%</td>
</tr>
<tr>
<td>*A</td>
<td>72%</td>
</tr>
<tr>
<td>*B</td>
<td>78%</td>
</tr>
<tr>
<td>*C</td>
<td>84%</td>
</tr>
<tr>
<td>*D</td>
<td>91%</td>
</tr>
<tr>
<td>*E</td>
<td>97%</td>
</tr>
<tr>
<td>*F</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Not recommended.
Important
If you are changing the Duty Ratio, the Output Voltage for Receivers will need to be checked. Adjust as necessary.

UNIVERSAL DRIVER BOARD
[1] Change the switch settings for each sensor by trial and error until the film-fogging problem is cleared. Use the Flat Field procedure on Page 4–21 to check the image after setting the duty ratio.

[2] Check the receiver output voltage for PT1, PT2, or PT3 after changing the switch setting. See the procedure on Page 5–27.
Driver Board - Versions 6 & Higher and Serial No. Range 500899-present, 600307-present

Note
Some Version 6 BOARDS may require SENSOR adjustments as described in the previous section.

DC/DC Converter Output Voltage
Use this procedure to correct timing malfunctions and to restore dropped pixels on film. If the output voltage is less than -2 Vdc, the PORTABLE COMPUTER displays the “no beam detected error”.

Caution
Close the MAGAZINE WINDOWS or remove the MAGAZINES before doing this adjustment.

To Check:
[1] De-energize the LASER PRINTER.
[2] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[3] Open the SEQUENCE BOARD SHIELD.
[4] Connect the DIGITAL MULTIMETER TL-3386:
   (a) + side to CPM5 on the DRIVER BOARD
   (b) COM side to CPG5 on the DRIVER BOARD.
[5] Energize the LASER PRINTER.
[6] Check that the voltage is -5.2 ± 0.05 Vdc.
Film Sensor Adjustments

**Important**
After energizing the PRINTER, wait at least 10 minutes before adjusting the SENSORS.

Film jam errors will occur if the voltages for the FILM SENSORS are not within the correct specification. Use this set of procedures to eliminate film jam errors caused by misadjusted, newly installed FILM SENSORS or manufacturing changes in film or other film manufacturers.

**Important**
To check and adjust PHT 1,2,3, use the procedures on Pages 5-43 through 5-46. If you achieve signals shown on Page 5-45, the procedure is complete. If necessary, see the Diagnostics Manual DG3226.

Do all the FILM SENSOR Adjustments in the sequence indicated in this section.
Output Voltage for Receivers PT1, PT2, and PT3

This procedure is done to ensure the necessary output voltages are correct for the DRIVER BOARD to convert to a TTL level used at the SEQUENCE BOARD. It will be necessary to check this output when changing film manufacturers, replacing sensors and/or DRIVER BOARD.

To Check:

[1] Connect the Channel A and the Channel B GROUND CLIPS to CPG5.

[2] Connect the Channel A OSCILLOSCOPE PROBE to the correct TEST POINT:

Note
This gives the analog output of each FILM JAM SENSOR.
- PH2 for the SLOW SCAN FILM SENSOR
- PH3 for the FILM PROCESSOR ADAPTER FILM SENSOR
- PH1 for the TRANSPORT GUIDE PLATE FILM SENSOR

[4] Set the voltage to 1 volt/division.
[5] Connect the Channel B OSCILLOSCOPE PROBE to the correct TEST POINT:

Note
This shows the TTL levels for each FILM JAM SENSOR as converted by the DRIVER BOARD.
- PHT2 for the SLOW SCAN FILM SENSOR
- PHT3 for the FILM PROCESSOR ADAPTER FILM SENSOR
- PHT1 for the TRANSPORT GUIDE PLATE FILM SENSOR
Note

Use unprocessed film supplied by the customer.

[6] Observe the height of the waveforms on the OSCILLOSCOPE first without FILM and then with FILM inserted between the EMITTER and RECEIVER of the SENSOR. If necessary, see the Component Locator for each SENSOR location.

- Channel A
  - With no film: More than +3.5 V p-p
  - With film: Less than +1.5 V p-p
- Channel B
  - With no film: 0 Vdc
  - With film: 5 Vdc

**NO FILM PRESENT**

![Graph showing waveforms for Channel A and B without film](H129_2714BC)

- **PH1 (2, -3)**
  - Channel A: 3.5 - 4.0 Vp-p
- **PHT1 (2, -3)**
  - Channel B: 0 Vdc

**FILM PRESENT**

![Graph showing waveforms for Channel A and B with film](H129_2715BC)

- **PH1 (2, -3)**
  - Channel A: < 1.5 Vp-p
- **PHT1 (2, -3)**
  - Channel B: ~ 5 Vdc

Analog output of Film Jam Sensors with no Film Present

TTL Logic level Low (0 Volts)

8-10 ms

Analog output of Film Jam Sensors with Film Present

TTH Logic Level High (5 Volts)
To Adjust:

[7] Rotate the correct POTENTIOMETER for each sensor until the value is within specification.

PHT2: VR1 for the SLOW SCAN FILM SENSOR

PHT3: VR2 for the FILM PROCESSOR ADAPTER FILM SENSOR

PHT1: VR14 for the TRANSPORT GUIDE PLATE JAM SENSOR

[8] Check that Channel B SENSORS show a steady DC level with no pulses.

[9] De-energize the LASER PRINTER.

[10] Remove the OSCILLOSCOPE PROBE.

<table>
<thead>
<tr>
<th>Oscilloscope Connection to Driver Board</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel B</td>
<td>Channel A</td>
</tr>
<tr>
<td>PHT2</td>
<td>PH2</td>
</tr>
<tr>
<td>PHT3</td>
<td>PH3</td>
</tr>
<tr>
<td>PHT1</td>
<td>PH1</td>
</tr>
</tbody>
</table>
Emitter Pulse Duty Ratio for Sensors IL1, IL2, and IL3

Duty Cycle Ratio is defined as percent of time the SENSORS are on divided by the percent of time the SENSORS are off.

Lower the Duty Cycle Ratio if film fogging has occurred. Adjusting the 3 SWITCHES changes the ratio of emitter time per cycle. The Duty Ratio may need to be changed when non-Kodak films are used.

Note

The switches RSW1 and RSW2 on the DRIVER BOARD are factory-set to 8 for a Duty Ratio of 60%. RSW3 is factory set to 3 for a Duty Ratio of 28 percent.

- PHT2, IL1 - RSW2: for the SLOW SCAN FILM SENSOR
- PHT3, IL2 - RSW3: for the FILM PROCESSOR ADAPTER SENSOR
- PHT1, IL3 - RSW1: for the TRANSPORT GUIDE PLATE FILM JAM SENSOR

Note

If changing the Duty Ratio, select one of the following switch settings to select the percent shown:

<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Duty Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>*0</td>
<td>9.4%</td>
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<tr>
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<tr>
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<tr>
<td>3</td>
<td>28%</td>
</tr>
<tr>
<td>4</td>
<td>34%</td>
</tr>
<tr>
<td>5</td>
<td>41%</td>
</tr>
<tr>
<td>6</td>
<td>47%</td>
</tr>
<tr>
<td>7</td>
<td>53%</td>
</tr>
</tbody>
</table>

* Not recommended.

Important

If you are changing the Duty Ratio, the Output Voltage for Receivers will need to be checked. Adjust as necessary.

DRIVER BOARD

[1] Change the switch settings for each sensor by trial and error until the film-fogging problem is cleared. Use the Flat Field procedure on Page 4–21 to check the image after setting the duty ratio.

[2] Check the receiver output voltage for PT1, PT2, or PT3 after changing the switch setting. See the procedure on Page 5–43.
Sequence Board

Beam Detector Signal Offset Voltage

Use this procedure when receiving 53 Beam Detect errors and/or replacing the SEQUENCE BOARD.

Note

This adjustment has been discontinued for SEQUENCE BOARDS labeled with Cannon Part No. BH8-1266-03I to M (1120 Serial No. Range 500895-502079 and 600307-602025) and BH8-1266-04 (1120 Serial No. Range 502080-present and 602026-present).

To Check:

[1] De-energize the LASER PRINTER.
[2] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.
[3] Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[4] Open the SEQUENCE BOARD SHIELD.

[5] Connect the DIGITAL MULTIMETER TL-3386 as follows:
   • + side to CP14 on the SEQUENCE BOARD
   • COM side to CP8 on the SEQUENCE BOARD.

[6] Energize the LASER PRINTER.
[7] Check that the voltage on the DIGITAL MULTIMETER is 0.75 Vdc ± 0.02.

To Adjust:

[8] Rotate POTENTIOMETER VR2 until the voltage is within specification.
[9] Remove MULTIMETER PROBES.
Use the PORTABLE COMPUTER to display the CES Main Menu.

Enter [1] for “Monitor Mode”.

Note

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[13] Enter [L] [D] [O] to energize the laser.

[14] Enter [P] [O] [N] to energize the POLYGON MOTOR.

[15] Connect a 10X PROBE TL-2074 to the Channel A input of the OSCILLOSCOPE TL-3348.

[16] Connect the GROUND CLIP of the OSCILLOSCOPE PROBE in Channel A to CP5 on the SEQUENCE BOARD.

[17] Connect the 10X OSCILLOSCOPE PROBE in Channel A to CP10 on the SEQUENCE BOARD.

[18] Set the Channel A to 1.0 Volt/Div.

[19] Set the Sec/Div.:

(a) To measure the low pulse width, set the knob to 1 μs/Div.
(b) To measure the high pulse width, set the knob to 1 ms/Div.

[20] Check that the waveform on the OSCILLOSCOPE is the same as the waveform below.
To Adjust:

[21] Rotate the POTENTIOMETER VR2 until the voltage and waveform are correct.

[22] Enter [L] [D] [F] to turn off the Laser Diode.

[23] Enter [P] [O] [F] to turn off the Polygon Motor.


[25] Remove the OSCILLOSCOPE PROBE.

[26] Close the SEQUENCE BOARD SHIELD COVER.

[27] Replace the BACK IMAGE UNIT COVER.
5-Phase Pulse Motor Boards for the Transport Motor Voltages (5PMD)

Use this procedure after installing a new TRANSPORT ROLLER DRIVER BOARD, SUPPLY ROLLER DRIVER BOARD, or RECEIVE ROLLER DRIVER BOARD. The 3 FILM TRANSPORT MOTORS in the LASER PRINTER operate with the same type of circuit board, the 5-PHASE PULSE MOTOR BOARD.

Note

There are four versions of the 5-Phase MOTOR BOARD. The version illustrated here contains checks and adjustments and may be interchanged between the TRANSPORT ROLLER DRIVER BOARD, SUPPLY ROLLER DRIVER BOARD, and/or RECEIVE ROLLER DRIVER BOARD with correct adjustment. The three new versions contain no adjustments and are specific to each BOARD. They cannot be interchanged. Service Parts Management will stock the adjustable style for a universal approach.

To Check:

[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.

[2] De-energize the LASER PRINTER.

[3] Remove the correct COVERS for the CIRCUIT BOARD being adjusted.

(a) Remove the TOP COVER for the TRANSPORT ROLLER DRIVER BOARD and RECEIVE ROLLER DRIVER BOARD.
(b) Remove the BACK IMAGE UNIT COVER for the SUPPLY ROLLER DRIVER BOARD.
Electrical Adjustments

[4] Disconnect CN3 from the 5-PHASE PULSE MOTOR BOARD.

5-PHASE PULSE MOTOR BOARD

[5] Check that a JUMPER is installed from J1-2 to J1-3.

[6] Check that a JUMPER is installed from J2-2 to J2-3.


[8] Connect the + side of the DIGITAL MULTIMETER, TL-3386, to CP2 (REF) and the COM side to CP1 (GND).

[9] Energize the LASER PRINTER.

[10] Use the PORTABLE COMPUTER to display the CES Main Menu.


[13] Enter the number for the MOTOR being checked:
   2: T-roller PM
   3: S-roller PM
   4: R-roller PM

[14] Enter [1] to energize the MOTOR.


[16] Enter [1][0] for the speed.

**Important**
Be sure to use the appropriate voltage specification given in Step 17 for the board being replaced.

[17] Check that the voltage is within specification:
   - TRANSPORT ROLLER MOTOR BOARD: +0.14 Vdc to +0.15 Vdc
   - SUPPLY ROLLER MOTOR BOARD: +0.20 Vdc to +0.25 Vdc
   - RECEIVE ROLLER MOTOR BOARD: +0.26 Vdc to +0.31 Vdc

**To Adjust:**

[18] Rotate POTENTIOMETER R8 until the voltage is correct.

[19] Enter [2] to de-energize the MOTOR.


[21] De-energize the LASER PRINTER.

[22] Replace CN3 on the CIRCUIT BOARD.

[23] Replace IC4 on the CIRCUIT BOARD.

[24] Replace the COVERS.
2-Phase Pulse Motor Board (2PMD), Slide Base Motor Voltage

Use this procedure after installing a new SLIDE BASE MOTOR BOARD. The SLIDE BASE MOTOR and the BEAM SPLITTER MOTOR operate with the same type of circuit board, the 2-Phase Pulse Motor Board. There are no electrical adjustments for the BEAM SPLITTER MOTOR BOARD.

**Note**

There are three versions of the 2PMD. The version depicted here contains checks and adjustments. This version can also be used for the SLIDE BASE MOTOR and BEAM SPLITTER MOTOR. The other two versions do not have adjustments and cannot be interchanged between the SLIDE BASE MOTOR and BEAM SPLITTER MOTOR.

**To Check:**

1. Remove the SUPPLY MAGAZINE.
2. De-energize the LASER PRINTER.
3. Remove the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
4. Disconnect the following connectors:
   - J320
   - J321
   - J322
5. Remove the 3 SCREWS and pull the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY forward until the SLIDE BASE MOTOR BOARD is in view.
6. If installing a new SLIDE BASE MOTOR BOARD, check that the following JUMPERS have been installed:
   - J1-2 to J1-3
   - J2-1 to J2-2.

   ![Diagram](image_url)

7. Disconnect P102 on the SLIDE BASE MOTOR BOARD.
8. Connect the + side of the DIGITAL MULTIMETER, TL-3386, to CP2 (REF) and the COM side to CP1 (GND).
9. Energize the LASER PRINTER.
[10] Use the PORTABLE COMPUTER to display the CES Main Menu.


[16] Enter [1] [0] for the speed.
[17] Check that the voltage is between +1.15 and +1.20 Vdc.

To Adjust:

[18] Rotate potentiometer R8 until the voltage is correct.

[19] Enter [2] to de-energize the MOTOR.

[20] Replace P102 on the SLIDE BASE MOTOR BOARD.

[21] Replace the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY and 3 SCREWS.

[22] Replace the following connectors:
- J320
- J321
- J322

[23] Replace the RIGHT IMAGE UNIT COVER.
Laser Diode Control Board

Setting Laser Diode Control for D-Min

Use this procedure when the Internal Test Print contains random, black dots in the D-MIN area, or if horizontal black lines appear on the test print. This adjustment is required to set D-Min to just above the threshold current of the Laser Diode, which is seen at TP17.

\[\text{Note}\]

There are 3 styles of the LASER DIODE CONTROL BOARD. These BOARDS are STYLE -02/-03 and STYLE -07. STYLE -07 does not have a PORCH BOARD.

To Check:

[1] De-energize the LASER PRINTER.
[2] Remove the TOP COVER. If necessary, see the procedure on Page 2–5.

[3] Loosen the 5 SCREWS and remove the LASER DIODE CONTROL BOARD COVER.

[4] Connect one 10X Probe TL-2074 to the Channel A input of the Oscilloscope TL-3348.
[7] Set the Voltage to 500 mV/div.
[8] Set the Trigger to Ch. A, +slope.
[9] Set the LDC Board Switches as noted in the table at the right.

<table>
<thead>
<tr>
<th>STYLE -02/-03</th>
<th>STYLE -07</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1: 3</td>
<td>SW2: 3</td>
</tr>
<tr>
<td>SW2: 3</td>
<td>SW3: 3</td>
</tr>
<tr>
<td>DSW1: 0</td>
<td></td>
</tr>
<tr>
<td>DSW2: 0</td>
<td></td>
</tr>
<tr>
<td>DSW3: 0</td>
<td></td>
</tr>
</tbody>
</table>
[10] Connect the GROUND CLIP of the OSCILLOSCOPE PROBE in Channel A to TP1 on the LDC BOARD.
[11] Connect the 10X OSCILLOSCOPE PROBE in Channel A to TP18 on the LDC BOARD.
[12] Connect the GROUND CLIP of the OSCILLOSCOPE PROBE in Channel B to TP1 on the LDC BOARD.
[13] Connect the 10X OSCILLOSCOPE PROBE in Channel B to TP17 on the LDC BOARD.
[14] Energize the LASER PRINTER.

[15] Use the PORTABLE COMPUTER to display the CES Main Menu.
Monitor Mode Menu

1 Motors  6 Seq Board Diag
2 Solenoids  7 Enter Commands
3 Relay  8 Set Beam-Splitter
4 Miscellaneous  9 Auto Sensor Test
5 Sensors  10 Semi-Auto Sensor Test

Enter Menu Item:

Input ‘HLP’ to know commands.

Enter command:

16] Enter [1] for “Monitor Mode”.


Note

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

18] For the STYLE -02/-03 BOARD, enter [L] [D] [O] to energize the laser.

For the STYLE -07 BOARD, enter [O] [L] [T], [1], and [0].

19] Observe the waveforms on the OSCILLOSCOPE.
   (a) The TP17 DC level should be about 400mV. This is the threshold level of the Laser Diode.
   (b) The TP18 peak level should be between 1.2V and 1.5V. TP18 is the output of the Laser Diode. 1.2V to 1.5V is the range to set the Laser Diode for the D-Min exposure levels.
To Adjust:

[20] Rotate POTENTIOMETER VR4 on LASER DIODE CONTROL BOARD until the TP17 DC level is within specification.

[21] For the STYLE -02/-03 BOARD, rotate POTENTIOMETER VRZ1, in the center of the PORCH BOARD, until the TP18 peak level is within specification.

For the STYLE -07 BOARD, adjust the SWITCH DSW4 for a coarse adjustment until the TP18 peak level is within specification. Adjust the SWITCH DSW5 for a fine adjustment.

[22] Type LDF using the PORTABLE COMPUTER.

[23] Set the LASER DIODE CONTROL BOARD SWITCHES to the following:

<table>
<thead>
<tr>
<th>STYLE -02/-03</th>
<th>STYLE -07</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1: 1</td>
<td>SW2: 1</td>
</tr>
<tr>
<td>SW2: 1</td>
<td>SW3: 1</td>
</tr>
<tr>
<td>DSW1: F</td>
<td>DSW2: F</td>
</tr>
<tr>
<td>DSW3: F</td>
<td></td>
</tr>
</tbody>
</table>

[24] Press [ESC] as many times as needed to exit Diagnostics.

[25] Remove the OSCILLOSCOPE PROBES.

[26] Replace the LASER DIODE CONTROL BOARD COVER.

[27] Replace the TOP COVER.
Fluctuation of the Laser Diode Reference Current

Use this procedure when noise is present in flat field images and/or images appear grainy shadowing patterns at density transitions.

There are 3 styles of the LASER DIODE CONTROL BOARD. The BOARD contains a silk-screened Canon Part No. with the last two digits:

1. -02
2. -03
3. -07

Note
Versions -02 and -03 are identical in the adjustment and will be referenced as -02/-03 BOARD. Version -07 is referenced as -07 BOARD.

[1] De-energize the LASER PRINTER.

[2] Remove the TOP COVER.

[3] Loosen the 5 SCREWS and remove the LASER DIODE CONTROL BOARD COVER.


[5] Connect the other PROBE TL-2074 to Channel B input of the OSCILLOSCOPE TL-3348.

[6] Set the time base to 50 nsec or .05 µsec.

[7] Set the voltage levels for each channel to 50 mV/div.

[8] Set the trigger to Channel A, +slope.

[9] Set the LASER DIODE CONTROL BOARD SWITCHES to the following:

<table>
<thead>
<tr>
<th>-02/-03</th>
<th>-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1: 3</td>
<td>SW2: 3</td>
</tr>
<tr>
<td>SW2: 3</td>
<td>SW3: 3</td>
</tr>
<tr>
<td>SW3: 3</td>
<td></td>
</tr>
<tr>
<td>DSW1: F</td>
<td>DSW2: F</td>
</tr>
<tr>
<td>DSW3: F</td>
<td>DSW1: F</td>
</tr>
</tbody>
</table>
[10] Connect the ground CLIP of the Channel A PROBE to TP2 (Analog Ground).

[11] Connect the Channel A PROBE to TP13. TP13 monitors the reference current required to drive the LASER DIODE.

[12] Connect the ground CLIP of the Channel B PROBE to TP16 (Analog Ground).

[13] Connect the Channel B PROBE to TP18. TP18 is a clipped representation for LASER DIODE power output.

[14] Energize the LASER PRINTER.

[15] Use the portable computer to display the CES MAIN MENU.


[18] For the -02/-03 BOARD, enter [L][D][O] to energize the LASER DIODE.

[19] For the -07 BOARD, enter [O][L][T]. When prompted, enter [1] for “Constant”. When prompted, enter 4095 for “Look Up Table Data”. This value turns the LASER DIODE on to 100% power.
[20] Refer to Figure 1, Time Delay Setting to the Turn Laser Diode On. Verify the end of the falling edge for TP13 (LASER DIODE Reference Current) and the start of the rising edge of TP18 (LASER DIODE Output Power) is 80-90 nsec.

Figure 5–1  Time Delay Setting to Turn On Laser Diode

[21] If necessary, adjust VR6 of the LDC BOARD.

[22] If the ringing continues on TP13, adjust VR6 to reduce ringing. Adjust VR7 to achieve the required Time Delay setting of 80-90 nsec.

[23] Refer to Figure 2, Pulse Width of the LASER DIODE light power. Verify the end of the falling edge for TP18 (LASER DIODE Output Power) and the end of the falling edge of TP13 (LASER DIODE Reference Current) is 10-15 nsec.

Figure 5–2  Pulse Width of Laser Diode Light Power
If necessary, adjust VR3 of the LDC BOARD.

Make sure the portable computer is in the “Enter Commands” mode. Enter [L][D][F] to de-energize the LASER DIODE.

Set the LASER DIODE CONTROL BOARD SWITCHES to the following:

<table>
<thead>
<tr>
<th>-02/-03</th>
<th>-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1: 1</td>
<td>SW2: 1</td>
</tr>
<tr>
<td>SW2: 1</td>
<td>SW3: 1</td>
</tr>
<tr>
<td>SW3: 1</td>
<td></td>
</tr>
<tr>
<td>DSW1: F</td>
<td></td>
</tr>
<tr>
<td>DSW2: F</td>
<td></td>
</tr>
<tr>
<td>DSW3: F</td>
<td></td>
</tr>
</tbody>
</table>

**Note**
Set the SWITCHES DSW 1, 2, and 3 by aligning the arrow on the BOARD with the long indentation along the side of the SWITCH. The F,F,F setting energizes the LASER DIODE to its maximum power output.

The film densities will change. Do the calibration procedure.
Use this procedure to adjust the contrast of the Control Panel display.

1. Energize the LASER PRINTER.
2. Press the MAGAZINE DOOR OPEN/CLOSE SWITCH.
3. Open the RECEIVE MAGAZINE DOOR.
4. Open the USER ACCESS DOOR.
5. De-energize the LASER PRINTER.
6. Remove the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
7. Remove the 4 SCREWS from the TOP COVER.

**Note**
Do not disconnect connectors.

8. Lift the front of the TOP COVER and hold it upright so that the CONTROL PANEL BOARD is accessible.

9. Remove the CONTROL PANEL BOARD COVER and 2 SCREWS.
10. Energize the LASER PRINTER.
11. Check that the lighting conditions of the customer site are the same as under normal operating conditions.
[12] Rotate VR1 until the desired contrast is displayed on the CONTROL PANEL.
[13] Install the CONTROL PANEL BOARD COVER and 2 SCREWS.
[14] Install the TOP COVER and 4 SCREWS.
[15] Install the BACK IMAGE UNIT COVER.
[16] Close the USER ACCESS DOOR.
[17] Close the RECEIVE MAGAZINE DOOR.
Sensors

Sucker Pad Height

Note
Do this adjustment after installing the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY.

To Check:
[1] Energize the LASER PRINTER.
[2] Connect the PORTABLE COMPUTER.

Warning

- Dangerous Voltage.
- Possible damage to eyes from invisible laser beam. Wear protective eyewear.
- Do not wear jewelry.

[3] If present, remove the SUPPLY MAGAZINE.
[4] Rotate the KEY SWITCH.
[5] Remove the LEFT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[6] Loosen the 2 SCREWS to remove the GUIDE PLATE.
[8] Use the PORTABLE COMPUTER to display the CES Main Menu.


MAIN MENU
1 Monitor Mode  4 System Params
2 System Logs  5 Debug Utility
3 Boards Diag  6 Exit

Enter Menu Item:

MONITOR MODE MENU
1 Motors  6 Seq Board Diag
2 Solenoids  7 Enter Commands
3 Relay  8 Set Beam-Splitter
4 Miscellaneous  9 Auto Sensor Test
5 Sensors  10 Semi-Auto Sensor Test

Enter Menu Item:
Enter command:

<table>
<thead>
<tr>
<th>Command</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGO</td>
<td>error=0</td>
</tr>
<tr>
<td>ITR</td>
<td>error=0</td>
</tr>
<tr>
<td>IFD</td>
<td>error=0</td>
</tr>
<tr>
<td>VPO</td>
<td>error=0</td>
</tr>
<tr>
<td>PMS</td>
<td>Error=0</td>
</tr>
</tbody>
</table>

### Note

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.


[11] Enter [M] [G] [O] to open the SUPPLY MAGAZINE WINDOW.

[12] Enter [I] [T] [R] to place the TRANSPORT ROLLERS in the initial position.

[13] Enter [I] [F] [D] to move the SUCKER PADS into the initial position.

[14] Enter [V] [P] [O] to start the ELECTROMAGNETIC PUMP.

### Note

The next 3 steps will move the SUPPLY ROLLER out of the way.

[15] Enter [P] [M] [S].

[16] Enter [-] [5] [0] [0] for the pulse number.

[17] Enter [3] [0] [0] for the speed.
[18] Press the PLASTIC RULER against the SUCKER PADS.

[19] Use the RULER to measure the distance between the PLASTIC RULER and the ROLLER. The distance should be 3-5 mm (0.12-0.20 in.).

[20] Enter VPF to turn the ELECTROMAGNETIC PUMP off.
To Adjust:

[21] De-energize the LASER PRINTER.

[22] Remove the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY. If necessary, see the procedure on Page 2–42.

[23] Loosen the SCREW.

[24] Remove the front SHIMS to increase the distance. Remove the back SHIMS to decrease the distance.

[25] Install the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY.

[26] Check that the adjustment is correct.
PHF Film Suction Sensor

Note
Use the PORTABLE COMPUTER to check if the sensor is malfunctioning before doing this procedure. If necessary, see the Diagnostics Manual DG3226.

To Check:

[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.

[2] Use the PORTABLE COMPUTER to display the CES Main Menu.


Note

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[5] Remove the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[6] Measure the distance between the FLAG and the edge of the SENSOR. The distance should be 1 mm (.04 in.).

[7] Enter [V] [P] [O] to start the ELECTROMAGNETIC PUMP.

[8] Install a PLASTIC RULER or small piece of film under the SUCKER PADS.

[9] Measure the distance between the FLAG and the edge of the SENSOR. The distance should be 2 mm (.08 in.).

[10] Enter [V] [P] [F] to turn off the ELECTROMAGNETIC PUMP.

To Adjust:

[12] Loosen the 2 SCREWS.

[13] Move the SENSOR BRACKET until the measurement is within specification.

[14] Tighten the 2 SCREWS.
PHS1 S Magazine Open Sensor

To Check:

[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.

[2] Use the PORTABLE COMPUTER to display the CES Main Menu.


**Note**

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[5] Open the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[6] Enter [S] [M] [O] to open the SUPPLY MAGAZINE WINDOW.

---

**MAIN MENU**

<table>
<thead>
<tr>
<th>1 Monitor Mode</th>
<th>4 System Params</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 System Logs</td>
<td>5 Debug Utility</td>
</tr>
<tr>
<td>3 Boards Diag</td>
<td>6 Exit</td>
</tr>
</tbody>
</table>

Enter Menu Item:

**MONITOR MODE MENU**

<table>
<thead>
<tr>
<th>1 Motors</th>
<th>6 Seq Board Diag</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Solenoids</td>
<td>7 Enter Commands</td>
</tr>
<tr>
<td>3 Relay</td>
<td>8 Set Beam-Splitter</td>
</tr>
<tr>
<td>4 Miscellaneous</td>
<td>9 Auto Sensor Test</td>
</tr>
<tr>
<td>5 Sensors</td>
<td>10 Semi-Auto Sensor Test</td>
</tr>
</tbody>
</table>

Enter Menu Item:

Enter Command: SMO

error=0
[7] Check that the distance between the END OF THE SLIDE TRACK and the SLIDE MECHANISM is 1 mm (0.04 in.).

To Adjust:

[8] Loosen the SCREW.
[9] Move the SENSOR BRACKET until the distance is correct.
[10] Enter [S] [M] [C] to close the SUPPLY MAGAZINE WINDOW.
[11] Enter [S] [M] [O] to open the SUPPLY MAGAZINE WINDOW.
[12] Check that the distance between the END OF THE SLIDE TRACK and the SLIDE MECHANISM is 1 mm (0.04 in.)
[13] Tighten the SCREW.
[14] Check that the adjustment is correct.
PHS2 S Magazine Close Sensor

To Check:

[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.

⚠️ Warning

- Dangerous Voltage.
- Possible damage to eyes from invisible laser beam. Wear protective eyewear.
- Do not wear jewelry.

[2] Open the LEFT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[3] Loosen the 2 SCREWS to remove the GUIDE PLATE.


[5] Use the PORTABLE COMPUTER to display the CES Main Menu.


➡️ Note

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[8] Enter [S] [M] [C] to close the SUPPLY MAGAZINE WINDOW.

[9] Remove the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY with TRANSPORTATION UNIT. If necessary, see the procedure on Page 2–42.
[10] Check that the distance between the SPRING and the SLIDE MECHANISM is 1-2 mm (0.04-0.08 in) with the SLIDE MECHANISM fully extended against the SPRING.

To Adjust:

[11] Loosen the SCREW.

[12] Move the SENSOR BRACKET until the distance is correct.

[13] Tighten the SCREW.

[14] Check that the adjustment is correct.
PH3 S Magazine Door Sensor

Note
This procedure cannot be done on machines after S/N 500249. DETECTORS were changed from PHOTO DETECTORS to MICROSWITCHES to comply with European standards.

To Check:
[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.
[2] Use the PORTABLE COMPUTER to display the CES Main Menu.

[5] Remove the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[6] On the PORTABLE COMPUTER, check that the S MAGAZINE DOOR SENSOR PH3 reads 0 when the DOOR is closed, and 1 when the DOOR is open.

To Adjust:
[7] Loosen the 2 SCREWS.
[8] Move the SENSOR BRACKET until the SENSOR reads 0 when the DOOR is closed and 1 when the DOOR is open.
[9] Tighten the 2 SCREWS.
CHS1 Slide Base Position Sensor Reference Position

To Check:
[1] Set up the PORTABLE COMPUTER.
[2] Open the USER ACCESS DOOR.

⚠️ Warning

- Dangerous Voltage.
- Possible damage to eyes from invisible laser beam. Wear protective eyewear.
- Do not wear jewelry.

[3] Rotate the KEYSWITCH to the ON position.
[4] Remove the LEFT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[5] Remove the 2 SCREWS to remove the GUIDE PLATE.
[7] Use the PORTABLE COMPUTER to display the CES Main Menu.


Nota

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[10] Enter [M][G][O] to open the SUPPLY MAGAZINE WINDOW.
[11] Enter [I] [T] [R] to place the TRANSPORT ROLLERS in the initial position.

[12] Enter [I] [F] [D] to move the SUCKER PADS into the initial position.

[13] Check that the distance between the SLIDE BASE and the ROLLER is 1.5 mm (0.06 in.).
To Adjust:

[14] Enter [P] [M] [F].

**Note**

In the next step, enter a + pulse to move the SLIDE BASE toward the ROLLER. Enter a - pulse to move the SLIDE BASE from the ROLLER.

[15] Move the SLIDE BASE until the distance is correct:

(a) Enter [+] or [-] [2] or [3] for the pulse number.

(b) Enter [1] [0] for the speed.

(c) Repeat until the distance between the SLIDE BASE and the ROLLER is 1.5 mm (0.06 in.)

[16] Enter [P] [M] [F] to retract the SLIDE BASE.


[18] Enter [3] [0] [0] for the speed.

[19] Remove the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[20] Disconnect the following connectors:

   J320
   J321
   J322.

**Caution**

The SUCKER PADS must be in the up position.

[21] Remove the 3 SCREWS.

[22] Move the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY forward 25 - 51 mm (1 - 2 in.) to allow access to the SLIDE BASE POSITION SENSOR FLAG.
Enter Command: PHT
error=0

[23] Enter [P] [H] [T] to observe sensors.

Note
The state of CHS-1 displayed on the PORTABLE COMPUTER should change between 0 and 1 during the next step.

Important
Do not loosen FLAG SCREWS for the next step.

[24] Observe the state of CHS-1 displayed on the PORTABLE COMPUTER while trying to move the sensor flag without loosening the mounting screws.

Important
If the state of CHS-1 changes from 0 to 1, the adjustment is complete. Go to Step 33. If the state of CHS-1 does not change, do the following step.

[25] Enter [P] [M] [F].
[26] Enter [-] [1] [0] for the pulse number.
[27] Enter [1] [0] for the speed.

[28] Enter [P] [H] [T] to observe sensors.
[29] Observe the state of CHS-1 displayed on the PORTABLE COMPUTER while trying to move the sensor flag without loosening the mounting screws.

⚠️ **Important**

If the state of CHS-1 changes from 0 to 1, the adjustment is complete. Go to Step 33. If the state of CHS-1 does not change, do the following step.

[30] Loosen the 2 SCREWS.

[31] Adjust the position of the FLAG at the position where CHS-1 just changes from 0 to 1.

[32] Tighten the 2 SCREWS.

[33] Replace the SUPPLY MAGAZINE OPEN/CLOSE ASSEMBLY and recheck using Steps 7 and 13.
PHR1 R Magazine Open Sensor

To Check:

[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.
[2] Open the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

[3] Use the PORTABLE COMPUTER to display the CES Main Menu.

<table>
<thead>
<tr>
<th>MAIN MENU</th>
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<tbody>
<tr>
<td>1 Monitor Mode</td>
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<td>3 Boards Diag</td>
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<tr>
<td>Enter Menu Item:</td>
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<tr>
<th>MONITOR MODE MENU</th>
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<tbody>
<tr>
<td>1 Motors</td>
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<td>3 Relay</td>
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<tr>
<td>5 Sensors</td>
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<tr>
<td>Enter Menu Item:</td>
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</table>

Input ‘HLP’ to know commands.
Enter command:
Enter Command: RMO
error=0


Note

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[6] Enter [R] [M] [O] to open the RECEIVE MAGAZINE WINDOW.
[7] Check that the distance between the END OF THE SLIDE TRACK and the SLIDE MECHANISM is 1 mm (0.04 in.).

To Adjust:

[8] Loosen the SCREW.

[9] Move the SENSOR BRACKET until the distance is correct.

[10] Tighten the SCREW.

[11] Check that the adjustment is correct.
PHR2 R Magazine Close Sensor

To Check:

1. Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.

**Warning**

- Dangerous Voltage.
- Possible damage to eyes from invisible laser beam. Wear protective eyewear.
- Do not wear jewelry.

2. Open the LEFT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

3. Remove the 2 SCREWS to remove the GUIDE PLATE.

4. Disconnect J514.

5. Place SUCKERS in the up position.

6. Use the PORTABLE COMPUTER to display the CES Main Menu.

7. Enter [1] for “Monitor Mode”.


**Note**

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.
[9] Enter [R] [M] [C] to close the RECEIVE MAGAZINE WINDOW.

[10] Remove the RECEIVE MAGAZINE OPEN/CLOSE ASSEMBLY. If necessary, see the procedure on Page 2-48.

[11] Check that the distance between the SPRING and the SLIDE MECHANISM is 1mm (0.04 in.) to 2mm (0.08 in.) deflection with the SLIDE MECHANISM fully extended against the SPRING.

To Adjust:

[12] Loosen the SCREW.

[13] Move the SENSOR BRACKET until the distance is correct.

[14] Tighten the SCREW.

[15] Check that the adjustment is correct.
PH4 R Magazine Door Sensor

Note
This procedure cannot be done on machines after S/N 500249. DETECTORS were changed from PHOTODETECTORS to MICROSWITCHES to comply with European standards.

To Check:
[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.
[2] Remove the RIGHT IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.

1 Monitor Mode  4 System Params
2 System Logs   5 Debug Utility
3 Boards Diag   6 Exit

To Adjust:
[7] Loosen the 2 SCREWS.
[8] Move the SENSOR BRACKET until the SENSOR reads 0 when the DOOR is closed and 1 when the DOOR is open.
[9] Tighten the 2 SCREWS.
Receive Side Stopper Position

To Check:
[1] Connect the PORTABLE COMPUTER.
[2] Open the RECEIVE MAGAZINE DOOR.
[3] Open the USER ACCESS DOOR.
[4] Rotate the KEYSWITCH to the ON position.
[5] Use the PORTABLE COMPUTER to display the CES Main Menu.


Note
- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[8] Enter [I] [T] [R] to initialize the TRANSPORT ROLLER.
[9] Enter [P] [M] [R].
[12] When the ROLLER hits the STOPPER, check that the ROLLER SHAFT is centered in the FRONT and REAR MECH PLATE holes and contacts the TRANSPORT ROLLERS.
To Adjust:

[13] Enter [P] [M] [R].
[14] Enter a [-] pulse number to move the ROLLER SHAFT toward the STOPPER and a [+] pulse number to move the roller away from the STOPPER.

Note
The STOPPER may need to be loosened to allow the ROLLER SHAFT to reach the correct position.

[16] Repeat Steps 13 - 15 until the ROLLER SHAFT lines up with the holes in the FRONT and REAR MECH PLATES and contacts the TRANSPORT ROLLER.

[17] Loosen the 2 SCREWS.
[18] Move the STOPPER until it is against the ROLLER SHAFT.
[19] Tighten the 2 SCREWS.
[20] Go to Step 18 on Page 5–100 to check the RECEIVE ROLLER POSITION SENSOR.
CHT1 Supply Roller Position Sensor

Note
Do this procedure when:
- replacing the SUPPLY ROLLER ASSEMBLY
- replacing the SUPPLY ROLLER POSITION SENSOR
- experiencing transportation film jams.

To Check:
[1] Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.
[2] Open the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
[3] Open the SLOW SCAN FAN ASSEMBLY.

[4] Energize the LASER PRINTER.

[5] Use the PORTABLE COMPUTER to display the CES Main Menu.


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<tbody>
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<td>3 Relay</td>
<td>8 Set Beam-Splitter</td>
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<tr>
<td>Enter Menu Item:</td>
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▶ Note

- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.

[8] Enter [I] [T] [R] to initialize the roller.

[9] Enter [P] [M] [S].


[12] Check that the SUPPLY ROLLER is resting against the STOP BRACKET and in contact with the TRANSPORT ROLLERS. If the SUPPLY ROLLER is not in the correct position, go to Step 21.

▶ Note
The following steps allow the SUPPLY ROLLER STEPPER MOTOR to be rotated in incremental steps equal to the number of pulses entered. The number of pulses entered will depend on how far away the edge of the flag is from the sensor. The flag should activate the sensor within 10 pulses after the initial -64 pulses are entered.

[13] Enter [P] [M] [S] to start the SUPPLY ROLLER MOTOR.


[15] Enter [3] [0] [0] for the speed.

[16] Check that the LED indicator on the underside of the SUPPLY ROLLER POSITION SENSOR is on. If the LED indicator is off, go to Step 21.

[17] Enter [P] [M] [S] to start the SUPPLY ROLLER MOTOR.

[18] Enter [-] [1] [0] for the number of pulses.

[19] Enter [1] [0] for the speed.
[20] Check that the LED indicator on the underside of the SUPPLY ROLLER POSITION SENSOR is off.

Note
If the LED indicator is off after the previous step, STOP, this procedure has been completed.

[21] Press the [ESC] key on the PORTABLE COMPUTER 2 times to return to the MAIN MENU.

[22] Manually, align the SUPPLY ROLLER shaft so that the SUPPLY ROLLER rests against the STOP BRACKET and TRANSPORT ROLLERS. The ROLLER will remain in place.


MONITOR MODE MENU

1 Motors       6 Seq Board Diag
2 Solenoids    7 Enter Commands
3 Relay        8 Set Beam-Splitter
4 Miscellaneous 9 Auto Sensor Test
5 Sensors      10 Semi-Auto Sensor Test

Enter Menu Item:

Input ‘HLP’ to know commands.

Enter command:
[25] Enter [P] [M] [S].


[27] Enter [3] [0] [0] for the speed.

[28] Loosen the 2 SET SCREWS on the SUPPLY ROLLER POSITION SENSOR FLAG.

**Note**

The LED indicator on the underside of the sensor is on when the sensor is not blocked, and off when the sensor is blocked. The flag should be set at the point just before the LED indicator goes off. The LED indicator should be on.

[29] Rotate the FLAG counterclockwise so that the flag edge is located where it just blocks the sensor beam.

[30] Check the LED indicator on the underside of the sensor and rotate the flag clockwise to the position just after the LED goes on.

[31] Carefully tighten the 2 SET SCREWS.

[32] Enter [P] [M] [S] to start the SUPPLY ROLLER MOTOR.

[33] Enter [-] [1] [0] for the number of pulses.

[34] Enter [1] [0] for the speed.

[35] Check that the LED indicator on the underside of the SUPPLY ROLLER POSITION SENSOR is off. If the LED indicator is off, go to Step 8. If the LED indicator is on, go to Step 21.
CHT2 Receive Roller Position Sensor

**Note**
Do this procedure when:
- replacing the RECEIVE ROLLER ASSEMBLY
- replacing the RECEIVE ROLLER POSITION SENSOR
- experiencing transportation film jams.

**To Check:**

1. Energize the LASER PRINTER.
2. Install the PORTABLE COMPUTER. See “Using the Portable Computer” in the Diagnostic Section.
3. Use the PORTABLE COMPUTER to display the CES Main Menu.
4. Enter [1] for “Monitor Mode”.
5. Enter [7] for “Enter Commands”.
6. Open the BACK IMAGE UNIT COVER. If necessary, see the procedure on Page 2–3.
7. Open the SLOW SCAN FAN ASSEMBLY DOOR.

**Note**
- Commands must be entered using capital letters.
- See the Diagnostics section to clear any error messages displayed on the PORTABLE COMPUTER during this procedure.
8. Enter [I] [T] [R] to initialize the ROLLER.
[9] Enter [P] [M] [R].

[12] Check that the ROLLER SHAFT lines up with the holes in the FRONT AND REAR MECH PLATES and contacts the RECEIVE TRANSPORT ROLLERS.

⚠️ Important
If the ROLLER SHAFT is not in position, continue with the next step. If the ROLLER SHAFT is in position, go to Step 17.
[13] Enter [P] [M] [R].

Note
The number of pulses entered depends on the distance the ROLLER SHAFT must be moved.

[14] Enter a negative pulse number to move the ROLLER toward the STOPPER and a positive pulse number to move the roller away from the STOPPER.


[16] Repeat Steps 13 - 15 until the ROLLER SHAFT lines up with the holes in the FRONT and REAR MECH PLATES and contacts the TRANSPORT ROLLER.
[17] Check that the RECEIVE ROLLER is resting against the STOP BRACKET.

⚠️ **Important**

If the RECEIVE ROLLER is in position continue with the next step. If the RECEIVE ROLLER is not in position do the Receive Side Stopper Adjustment procedure beginning at Step 13 on Page 5–92.

[18] Enter [P] [M] [R] to start the ROLLER MOTOR.


[21] Check that the LED INDICATOR on the SENSOR is off.

⚠️ **Important**

If the LED INDICATOR is on, go to Step 26.

[22] Enter [P] [M] [R] to start the ROLLER MOTOR.


[24] Enter [1] [0] for the speed.

[25] Check to see that the LED INDICATOR on the SENSOR is on. If it is on, STOP, this adjustment is completed. If it is off, go to Step 30.

[26] Loosen the 2 SETSCREWS.

[27] Rotate the FLAG counterclockwise until the LED INDICATOR on the SENSOR just turns off.

[28] Carefully tighten the 2 SETSCREWS.

[29] Go to Step 8 to repeat the check procedure.

[30] Loosen the 2 SETSCREWS.

[31] Rotate the FLAG clockwise until the LED INDICATOR on the SENSOR just turns on.

[32] Carefully tighten the 2 SETSCREWS.

[33] Go to Step 8 to repeat the check procedure.
Section 6: Preventive Maintenance Checklist

- Read the Error History and Error Frequency Logs. Look for trends and possible problems. Clear both logs.

- Print test patterns. Compare to test patterns made at installation. Check for artifacts.

⚠️ Caution
Do not touch the POLYGON MIRROR surface.

- If artifacts show on the film, clean the OUTPUT MIRROR and LENSES with Spectro•Grade Acetone, Part No. 1C8068 and LENS PAPER TL-2278.

- If necessary, calibrate the LASER PRINTER using the procedure on Page 4–2.

- Use a soft cloth to clean the surfaces of the 2 film SUCKERS.

- Use alcohol to clean the following rollers:
  - UPPER TRANSPORT ROLLER
  - LOWER TRANSPORT ROLLER
  - RECEIVE ROLLER
  - SUPPLY ROLLER
  - PINCH ROLLER.

- Clean or replace the following filters:
  - IMAGING UNIT INTAKE FAN FILTER, located under the SUPPLY MAGAZINE.
  - CARD RACK INTAKE FILTER
  - FRONT COVER FILTER

- Clean the SLOW SCAN MOTOR FAN COVER.
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