

# What You Get Out Of Your IBM Typewriter Depends On What You Put Into It.

Lexmark manufactured the ribbon that came with your IBM Wheelwriter Typewriter when it was new. Lexmark designs IBM ribbons in tandem with the machines that use them. The result is high-yield printing of the highest quality. Remember when it's time to replace your ribbon, buy IBM supplies by Lexmark.

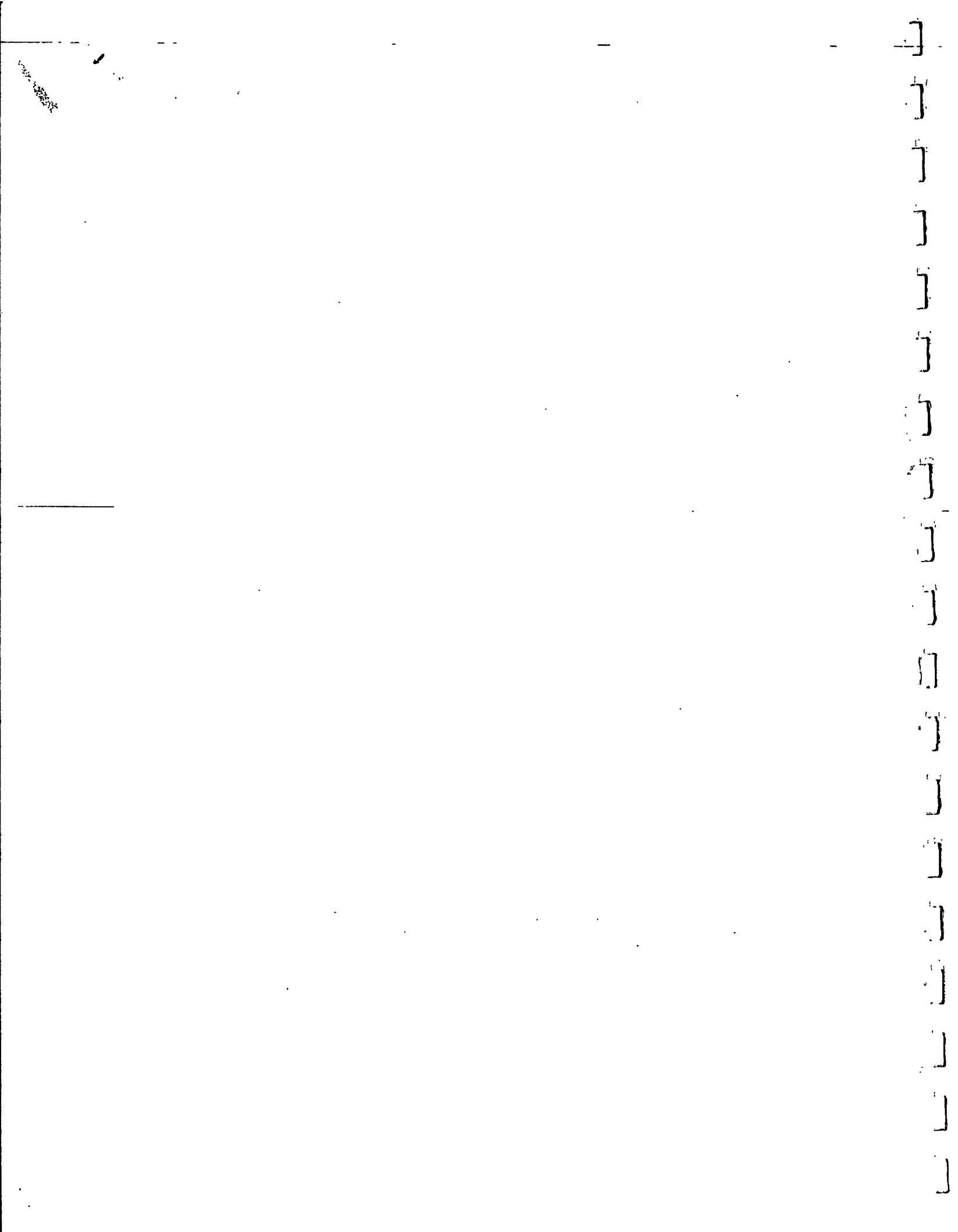
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IBM Supplies by  
**LEXMARK**

**SA40-0773-01**





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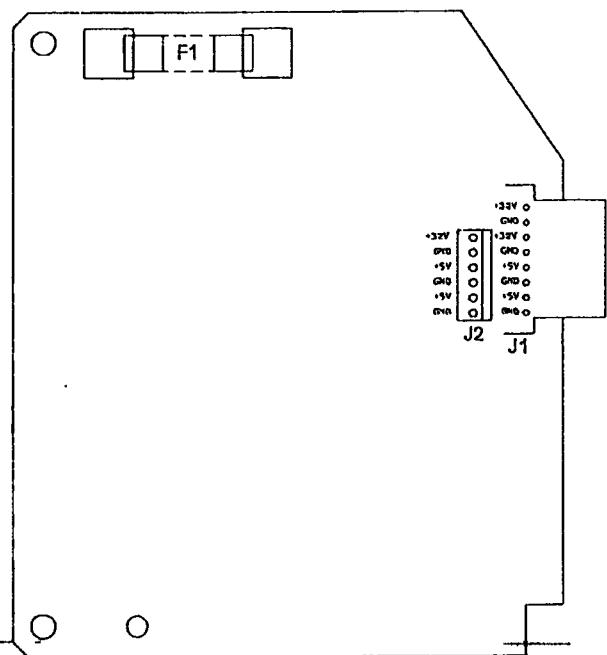
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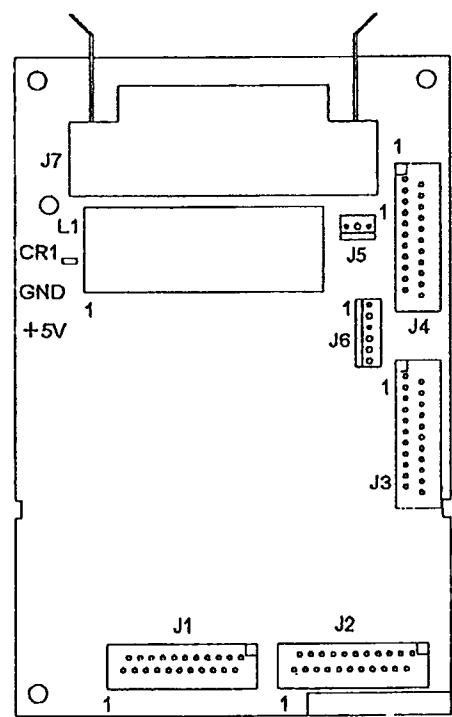




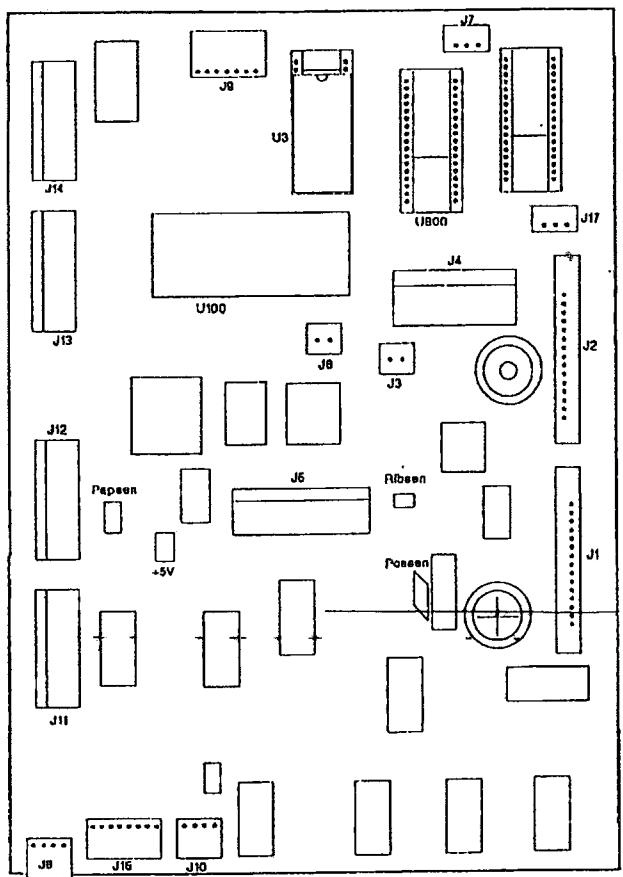
**Power Supply (Universal power supply does not have F1 fuse.)**



**Printer Option Board**

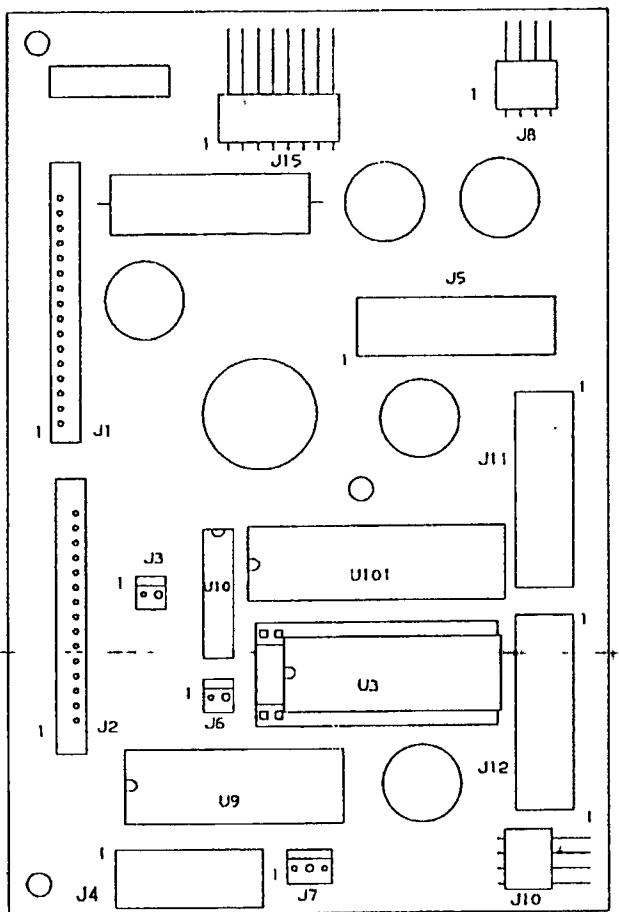


## Function Board, Wheelwriter (All Models Level 2)



Note: Depending on the machine type and country, some connectors and components may not be present.

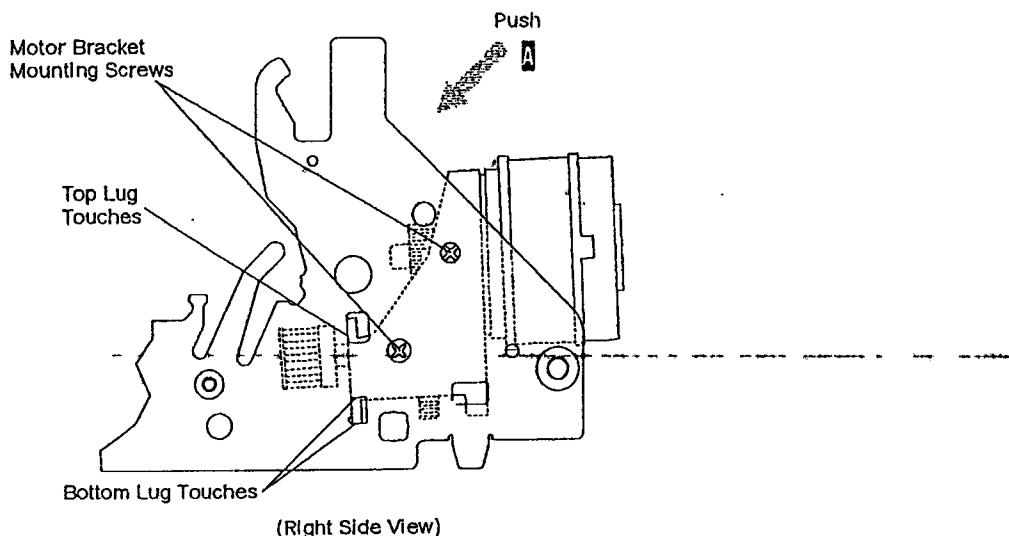
System Board, Wheelwriter 10, 15 Typewriter (Single Board Version, DCA)



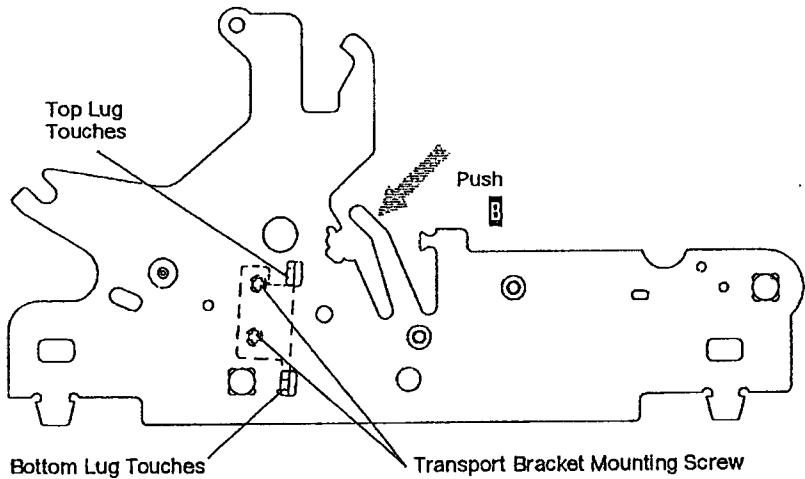


## Transport Bracket Installation

1. Position the right hand end of the transport bracket in the side frame **A** to meet two conditions:
  - a. Down so the bottom lug touches the bottom of the hole in the side frame,
  - b. Forward so the top and bottom lugs touch the front of the holes in the side frame.
2. Tighten the two motor bracket mounting screws.
3. Position the left end of the transport bracket in the side frame **B** to meet two conditions:
  - a. Down so the bottom lug touches the bottom of the hole in the side frame,
  - b. To the rear so the top and bottom lugs touch the rear of the holes in the side frame.
4. Tighten all the transport bracket mounting screws.



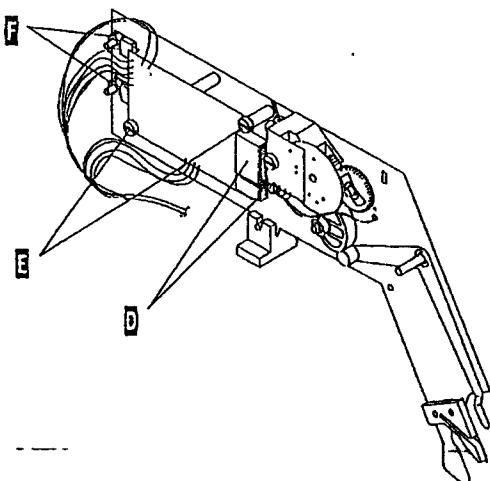
(Right Side View)



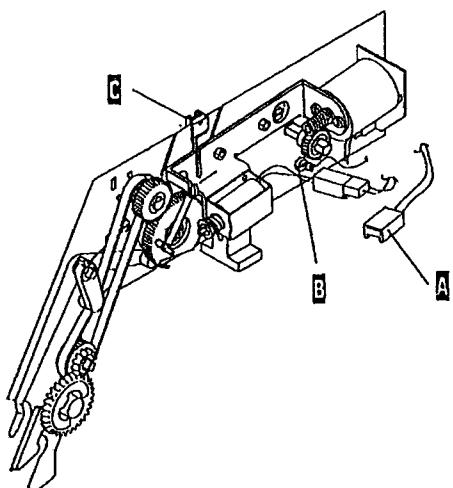
(Left Side View)

## Sheetfeed Logic Board/Power Cable Installation

1. Place the regulator module tabs over the screws studs and mount the logic board to the two standoffs **E** on the left side frame.
2. Install the regulator modules to the left side frame. be careful not to over-tighten the nuts **F** against the regulator modules.
3. Connect sensor connectors J1 and J2 **D** to the logic board.

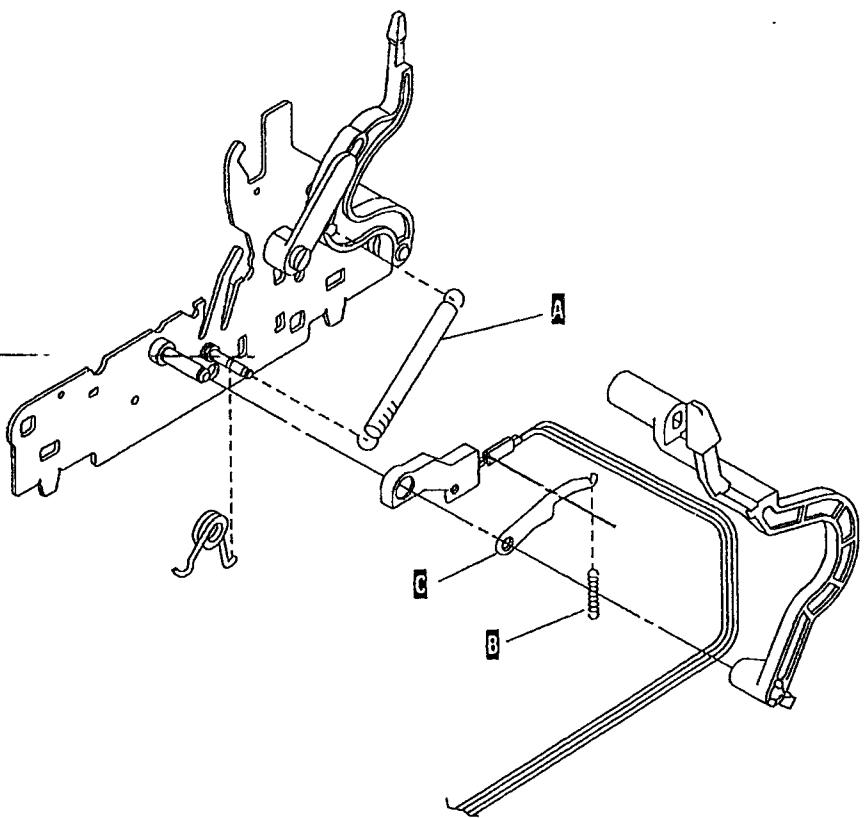


4. Route the power cable assembly through the cable clamp on the rear of the sheetfeed.
5. Mount the logic board/power cable assembly ground terminal **B** to the right side frame.
6. Connect the motor and solenoid connectors.
7. Mount the envelope feed connector **C** to the right side frame.
8. Route the cable through the cable clamps on the right side frame.
9. Install the bottom cover.
10. Connect the bin selector switch cable **A** to the power cable assembly and install the right side cover.
11. Install the left side cover.
12. Install the sheetfeed onto the typewriter.
13. Connect the sheetfeed power cable to the typewriter.



## SAPI Switch Removal

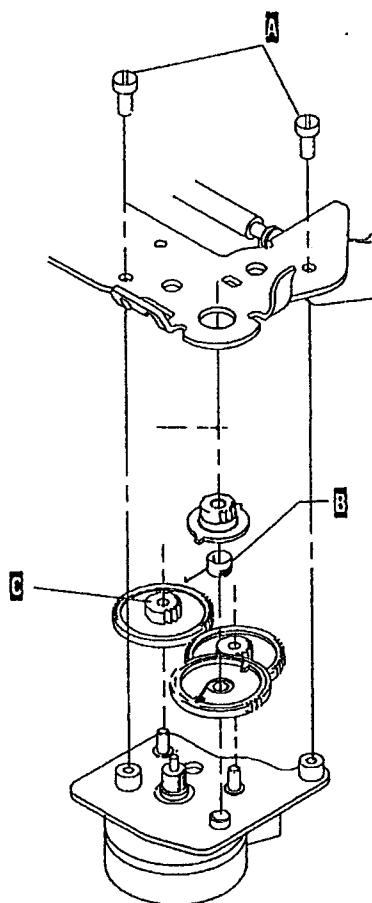
1. Remove the center cover.
2. Disconnect the SAPI cable from the SAPI switch.
3. Carefully remove the paper bail spring.
4. Remove the paper release lever spring **A**.
5. Disconnect the SAPI switch shunt arm spring **B**.
6. Remove the paper bail arm.
7. Remove the shunt arm **C**.
8. Remove the SAPI switch.



## Ribbon Motor Removal

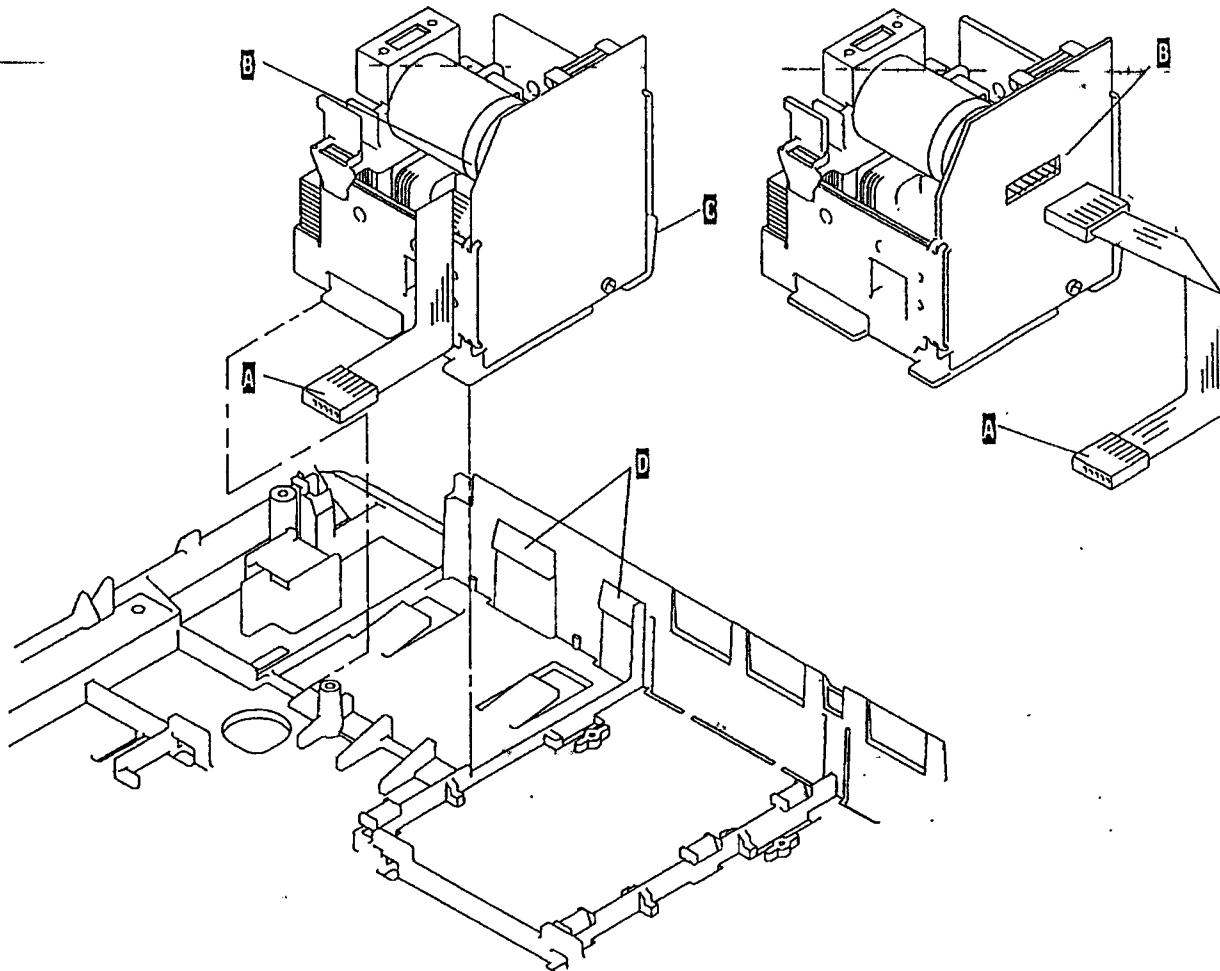
1. Remove the two motor mounting screws **A**.
2. The ribbon feed gear bias spring **B** is under tension and may fall out of the gears. Carefully remove the feed motor assembly from the ribbon plate.

Note: When you install the ribbon feed motor, the idler gears must be installed with the small gear **C** on top. You must also make the ribbon feed gear bias spring adjustment on page 3-8.



## Power Supply Removal

1. Disconnect the machine from the AC outlet.
  2. Remove the center cover.
  3. Remove the carrier cable clamp from the electronic board cover. See page 3-12.
  4. Disconnect the carrier cable from the motor control board.
  5. Remove the electronic board cover. See page 3-12.
  6. Disconnect the power supply connector **A** from the motor control board or function board.
  7. If anything is connected to J2 **B** on the power supply board, disconnect it.
  8. Remove the two on/off switch tower mounting screws.
  9. Insert a screwdriver blade through the slot in the bottom cover. Place the blade between the power supply latch **C** and the latching surface of the bottom cover **D**. Gently pry the bottom cover away from the power supply latch.
  10. Lift the power supply out of the machine.
- Note:** You may need to remove the platen, deflector, and left feed roller assembly in order to pivot the power supply toward the front of the machine.
11. Before you install the new assembly, remove the grounding strap from the left-rear transformer mounting screw and install it at the right-rear mounting screw.

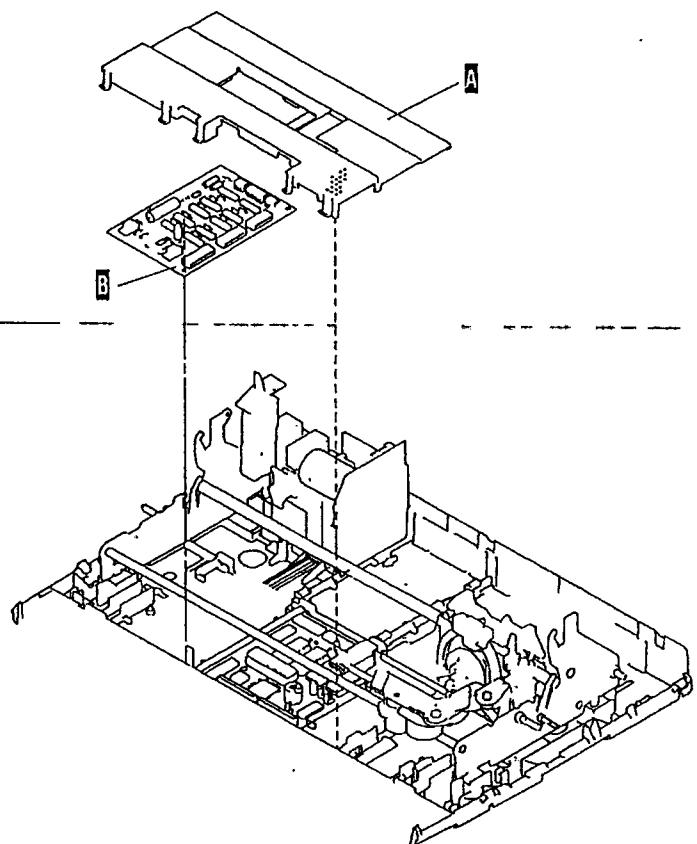


## **Motor Control Board Removal**

1. Turn the machine off.
2. Move the carrier to the right frame.
3. Carefully remove the carrier cable clamp from the electronic board cover. See page 3-12.
4. Remove the electronic board cover **A**. See page 3-12.
5. Disconnect all cables from the motor control board.
6. Lift the motor control board from the machine **B**.

**CAUTION:**

The carrier cable may easily be damaged if it is not installed correctly in the electronic board cover.



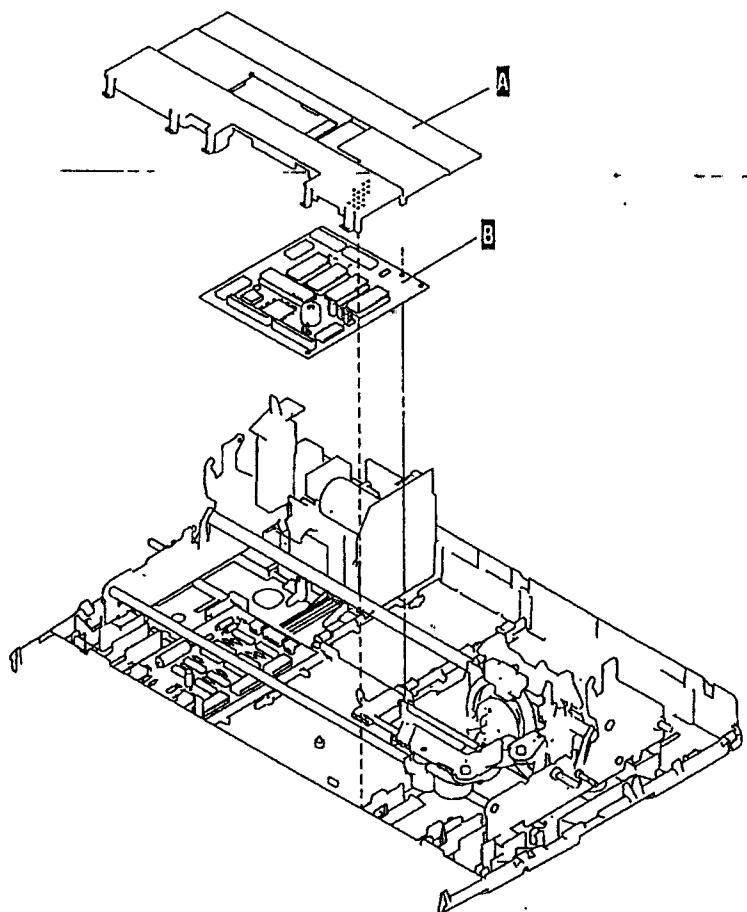
## Function Board Removal

**Note:** Leave the battery connected to the function board if you remove the board from a machine and then put it back into the machine. This will ensure that memory is not lost.

1. Turn the machine off.
2. Move the carrier to the right frame.
3. Carefully remove the carrier cable clamp from the electronic board cover. See page 3-12.
4. Disconnect the carrier cable.
5. Remove the electronic board cover **A**. See page 3-12.
6. *Do not disconnect the battery connector from the function board.* Disconnect all other cables from the function board.
7. Lift the function board from the machine **B**.

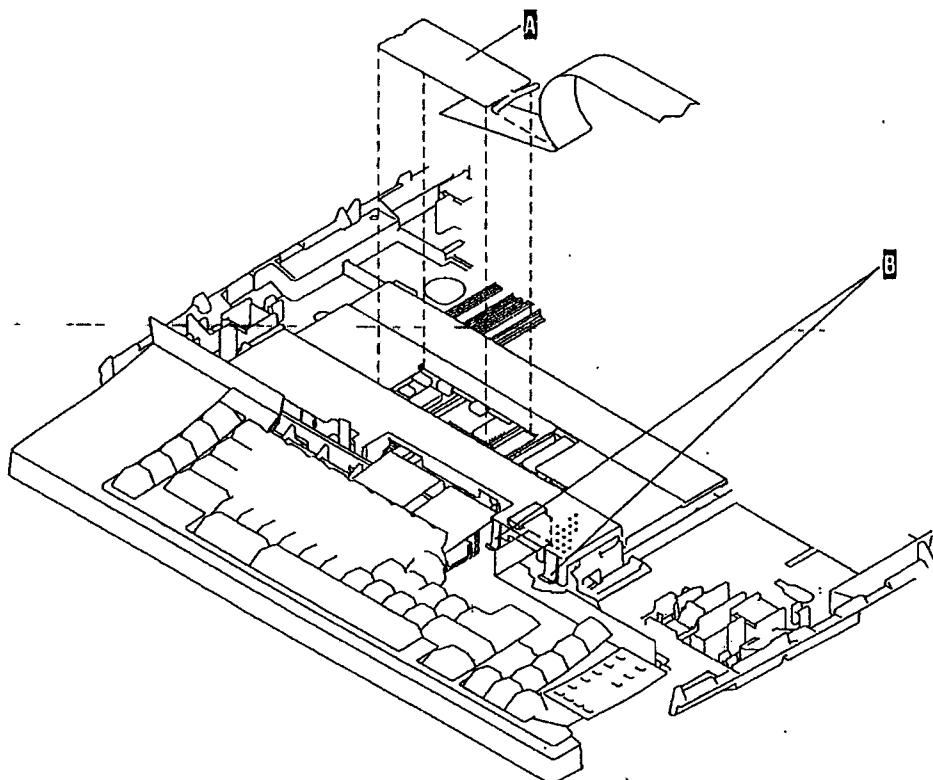
**CAUTION:**

The carrier cable may easily be damaged if it is not installed correctly in the electronic board cover.



## Electronic Board Cover Removal

1. Move the carrier to the right side.
2. Turn the machine off.
3. Remove the top cover.
4. Remove the platen and deflector.
5. Remove the carrier cable clamp **A** from the top of the electronic board cover.
6. Disconnect the carrier cable.
7. Gently squeeze the front and rear of the electronic board cover to release the tabs **B** from the slots in the bottom cover. There are nine tabs.
8. Pivot the rear of the cover up and remove from the machine.



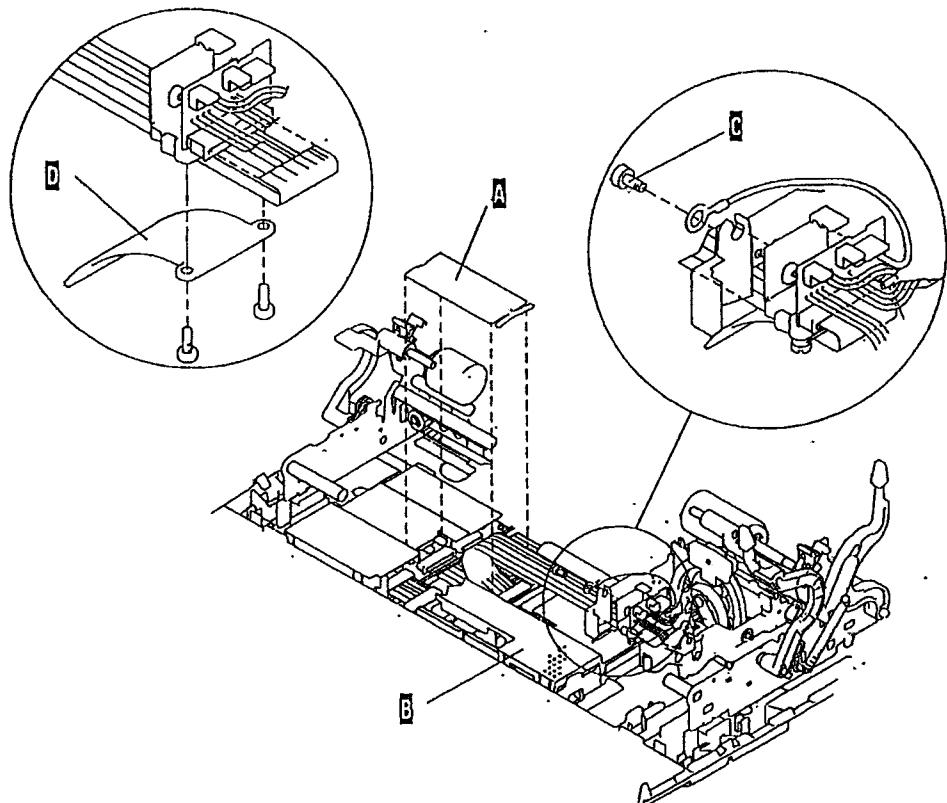
## Removal Procedures

### Carrier Assembly Removal

1. Remove the center cover.
2. Roll the transport belt from its pulleys. Do not use tools to do this.
3. Remove the folded part of the carrier cable from the electronic board cover. See page 3-12.
4. Disconnect the carrier cable from the function board/system board.
5. Remove the electronic board cover. See page 3-12.
6. Use a 1/4" wrench to rotate the carrier shaft about 1/8 turn top to rear to release it.
7. Push the shaft to the right far enough so it is away from the left side frame.
8. Lift and pull the left end of the carrier shaft to the front, then pull the shaft and carrier to the left to clear the right side frame.
9. Pull the carrier shaft out of the right side of the carrier.

### Carrier Cable Removal

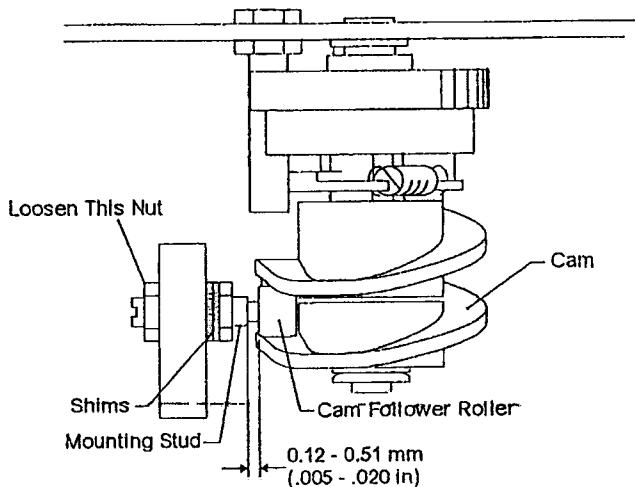
1. Move the carrier to the right frame.
2. Remove the carrier cable clamp **A** from the top of the electronic board cover. See page 3-12.
3. Disconnect the carrier cable from the function board/system board.
4. Remove the electronic board cover **B**. See page 3-12.
5. Remove the mounting screw **C** that holds the carrier cable board clip to the carrier frame.
6. Remove the cable board from the clip.
7. Remove the carrier cable clamp **D** from the carrier cable.
8. Disconnect the carrier cable from the cable board.



## Ribbon Lift Cam Follower Roller End-Play Adjustment

Note: Later level machines have a fixed cam follower stud instead of a cam follower roller and do not require this adjustment.

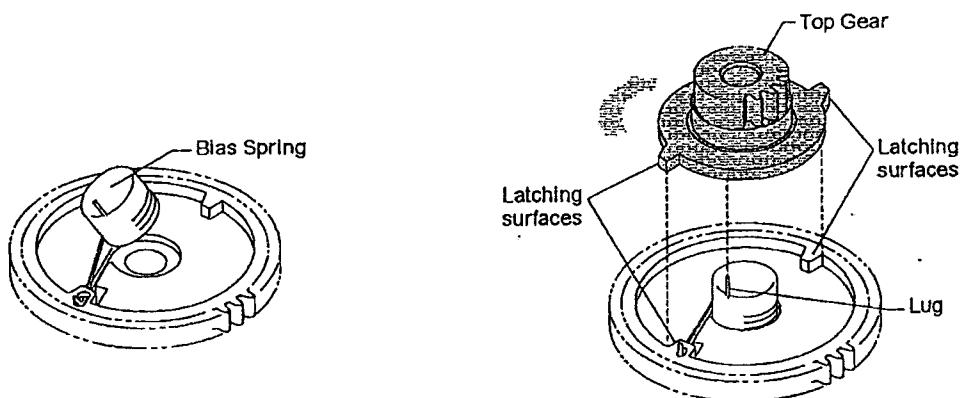
1. Push the ribbon lift cam follower roller to the right, against the ribbon lift cam.
2. Check for 0.12 - 0.51mm (.005 - .020 in) clearance between the roller and the mounting stud.
3. If the clearance is too great, loosen the mounting nut and install another shim. If you install another shim, recheck the Ribbon Lift Adjustment on page 3-4.



## Ribbon Feed Gear Bias Spring Adjustment

1. Install the spring in the bottom gear as shown.
2. Place the top gear over the bias spring as shown. The vertical lug on the spring must fit into one of the holes inside the top gear.
3. Rotate the top gear 1/2 turn clockwise and latch it in place. The spring should load the latching surfaces of the two gears against each other. Hold the gears in place until you have installed the ribbon feed motor in the machine. The spring will unwind if you do not hold the gears together.

Note: After you have installed the motor, rotate the top gear 1/4 turn clockwise and let go. The gear should return to the initial position.



## Ribbon Lift Adjustment for Thailand, Arabic, and Farsi Printwheels

These machines have a beige-colored ribbon cartridge latch with two cartridge latching surfaces:

- Front (highest) for Thailand, Arabic, and Farsi printwheels
- Rear (lowest) for other printwheels.

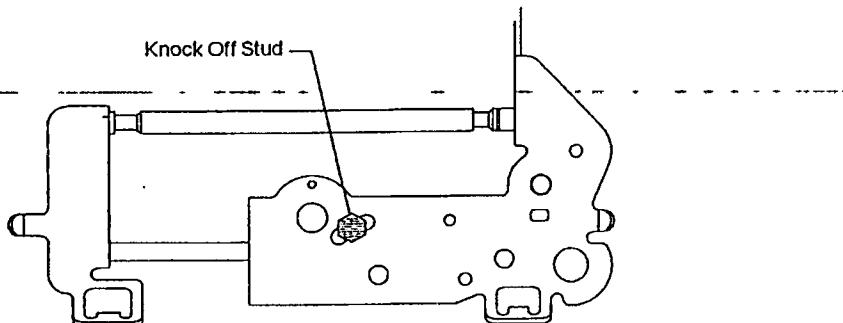
To adjust the ribbon lift:

- Install the ribbon/tape cartridge assembly under the front (highest) step of the latch.
- Type eight each of the highest and lowest characters.
- Adjust the ribbon lift eccentric so the distance between the bottom of the ribbon and the lowest part of the lowest character is equal to the distance between the top of the ribbon and the top of the highest character. This distance is measured on the ribbon and should be .8mm. **The highest point of the ribbon lift eccentric must be forward of the centerline of its mounting screw.**
- Check the ribbon lift knockoff adjustment and correct if necessary. See "Ribbon Lift Knock-Off Adjustment" on page 3-4.

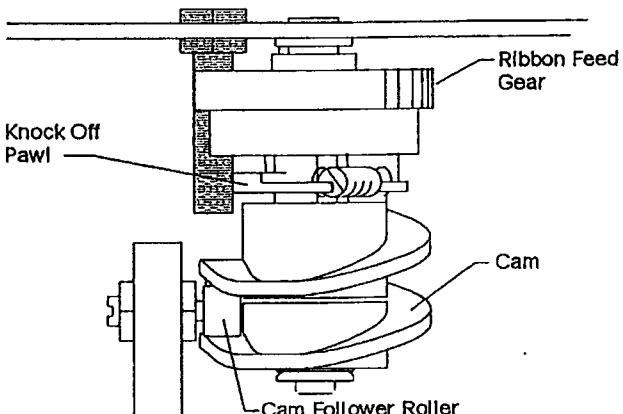
## Ribbon Lift Knock-Off Adjustment

The ribbon lift adjustment must be correct before making this adjustment. Make this adjustment with the ribbon plate installed.

1. Loosen the nut on the bottom of the knock-off stud. You may need to move the carrier position indicator to the side.
2. Hold the rear of the ribbon plate down and rotate the ribbon feed gear counterclockwise until the cam stops moving.
3. Adjust the knock-off to the left or right until the knock-off (black) pawl is clearly disengaged from the gear and there is a clearance of .5 to 1 mm (.020 to .04 in) between the cam follower roller and the end of the cam track. Rotate the cam by hand to check for this clearance.
4. Tighten the nut and check the adjustment. To check the adjustment, turn the ribbon feed gear counterclockwise. If it binds or stops turning, the adjusting stud is too far to the left in the slot. The white pawl will continue to ratchet as you rotate the gear. The black pawl must disengage. Readjust if necessary.
5. The gear should turn smoothly and the plate should not jump as you hold the rear of the ribbon plate down and rotate the gear. If it does not turn smoothly, the adjusting stud is too far to the right in the slot.



(Top View)

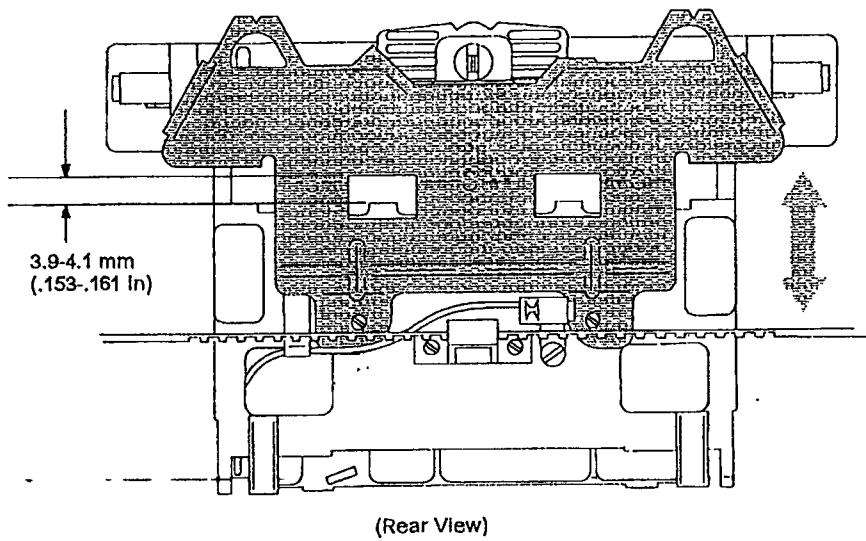


(Front View)

## Adjustment Procedures

### Cardholder Adjustment

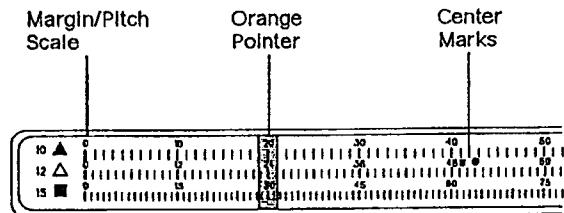
Position the cardholder so it clears the lugs on the back of the carrier by 3.9 to 4.1 mm (.153 to .161 in).



(Rear View)

### Carrier Pointer Adjustment

Form the pointer so the line on the front of it aligns with the zeros on the margin scale. Check positions 70 and 100 also. Distribute the tolerances between 0 and 70.



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WRITE-PROTECT — This test checks the write-protect function of the diskette drive. To run the test:

1. Select the Write-Protect function from the service menu.
2. Insert a prepared scratch diskette. Be sure the write-protect window in the diskette is open before you insert it.
3. Press the CRTN key.
4. If the diskette change line and write-protect line are active the test will complete and return you to the service menu. If either of these lines is not active a write-protect error code will display.

(error symbol) 003      Press crt<sub>n</sub> to continue

5. If error code 003 occurs do the following, verify the write-protect window was open for the test, then go to "MAP 0130: Diskette Option" on page 2-24.

- Manually depress the pinfeed sensor switch actuators until both switches activate.
  - CENTER should appear on the display as the switch is activated.
2. *When the pinfeed/sheetfeed sensor switch cable is connected to the function board.*
- Activate the switch and sensor test.
  - Manually depress the pinfeed sensor switch actuators until both switches activate.
  - PLAY should appear on the display as the switch is activated.

## Sensor and Switch Test, Wheelwriter 50, 70, 5000, 7000

### To run the test:

1. Press and hold the Code and Shift keybuttons then press the Tab Set keybutton.
2. A switch and sensor test menu will appear on the CRT.
3. Wheelwriter 50: Press any key to stop the test. Wheelwriter 70: Press EXIT to stop the test.

### To check the Homing Sensor: (ARTN)

- When you activate the sensor and switch test, ARTN should come on the CRT.
- Slowly push the homing sensor flag in. ARTN should go off and come on as you release the flag.

### To check the SAPI (Paper bail) switch: (KYBD)

- Activate the sensor and switch test.
- Pull the right paper bail all the way forward and KYBD should come on when the SAPI switch closes and go off as the paper bail is released.

### To check the End of Ribbon Sensor: (BOLD)

- Activate the switch and sensor test.
- Remove the ribbon cartridge from the machine.
- Pass a piece of paper between the ribbon LED and Sensor.
- BOLD should go on and off as the paper is passed between the LED and sensor.

### To check the Out of Paper sensor: (CONT)

- Activate the switch and sensor test.
- Pass a piece of white paper between the platen and the out of paper sensor.
- CONT should go off and on as you pass the paper between the platen and sensor.

### To check for Low Battery: (CAPS)

- Activate the switch and sensor test.
- Disconnect the battery from J4 on the function board.
- CAPS should appear on the display when you disconnect the battery, and turn off when you connect the battery.
- Reconnect the battery.

### To check the Pinwheel Form Feeder Present:

1. *When the pinfeed/sheetfeed sensor switch cable is connected to the printer option board.*
  - Activate the switch and sensor test.
  - Manually depress the pinfeed sensor switch (larger of the two) until you hear it activate.
  - TADJ should appear on the display as the switch is activated.
2. *When the pinfeed/sheetfeed sensor switch cable is connected to the function board.*
- Activate the switch and sensor test.
  - Manually depress the pinfeed sensor switch (larger of the two) until you hear it activate.
  - SUSPND should appear on the display as the switch is activated.

## **Sensor and Switch Test, Wheelwriter 10, 15, 1500, 3000**

### **To run the sensor and switch test:**

1. Press and hold the Code and Shift keybuttons then press the Tab Set keybutton.
2. Press any keybutton to stop the sensor and switch test.

### **To check the homing sensor: (A RTN LED)**

- When you activate the sensor and switch test, the A RTN LED should come on.
- Slowly push the homing sensor flag in. The A RTN LED should go off. The A RTN LED should come on as you release the flag.

### **To check the SAPI switch: (LANG LED)**

- Activate the sensor and switch test.
- Pull the right paper bail all the way forward. The LANG LED should come on when the SAPI switch closes and go off as the paper bail is released.

### **To check Spelling RAM: (WW10, 15 REPRT FULL LED), (WW1500 - CAPS LED), (WW3000 - PLAY LED)**

- If the LED indicated is on all the time during the sensor and switch test, the Spelling RAM is installed and working. If the Spelling RAM is not installed, or is defective, a system board failure error code will occur.

### **To check the Ribbon Sensor: (BOLD LED)**

- Remove the ribbon cartridge from the machine.
- Activate the switch and sensor test.
- Pass a piece of paper between the ribbon LED and sensor.
- The BOLD LED should go on and off as the paper passes between the LED and the sensor.

### **To check the Out-of-Paper Sensor: (CONT LED)**

- Remove any paper from the machine.
- Activate the switch and sensor test.
- Pass a piece of white paper between the platen and out-of-paper sensor.
- The CONT LED should go on and off as the paper passes between the platen and the sensor.

### **To check for Low Battery: (WW10, 15 - CAPS LOCK LED), (WW1500 - FULL LED), (WW3000 - NO PRINT LED)**

- Activate the switch and sensor test.
- Disconnect the battery from J7 on the function board.
- The LED indicated should turn on when you disconnect the battery, and turn off when you connect the battery.
- Reconnect the battery.

### **To check the Pinwheel Form Feeder Present: (Linespace 3 LED)**

- Activate the switch and sensor test.
- Manually depress the pinfeed sensor switch (larger of the two) until you hear it activate.
- The Line space 3 LED should come on.

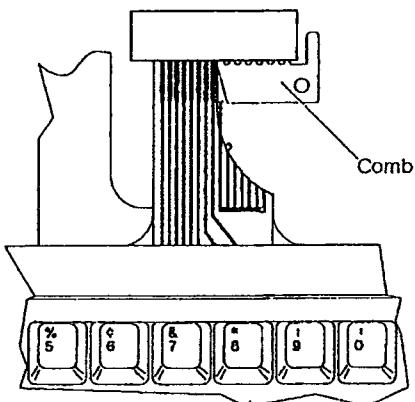
### **To check the Sheetfeed Option Present: (Linespace 2 LED)**

- Activate the switch and sensor test.
- Manually depress the sheetfeed sensor switch until both switches activate.
- The Line space 2 LED should come on as the switch is activated.

## **Power On Reset (POR) Sequence, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000**

<b>Power On Reset Sequence</b>
Turn the machine on.
The LCD display goes blank (all PELs off).
Keyboard is verified. An invalid keyboard will display an error code.
The printwheel moves approximately three revolutions.
Carrier moves.
Platen moves up and down one line.
Print hammer energizes. (May be difficult to see this.)
Carrier moves to the right.
Printwheel and ribbon home.
Carrier homes.
If a printwheel or transport sense error is detected an error code will be displayed.
Carrier moves to the left margin.
Machine beeps one time.
If spell check is installed and activated, the machine will beep two times. The sound will depend on how the operator has set Code + 4.
The machine will beep three times if the battery is low.
Cursor, linespace symbol, and linespace number is displayed (warm start). Storage cleared message, linespace symbol, and linespace number is displayed (cold start).
The diskette will initialize if it is installed.
LO-BATT will be displayed if the batteries are low.
Error code 161 will be displayed if the diskette control board is in the machine without the diskette option-drive cable being attached to it.

7. Install the flat cable and comb in the function board connector (as shown in the figure below).



- Place the remaining portion of the keyboard cable in the connector.

- Install the comb.

The large tab on the comb should touch the outer edge of the connector to properly align the comb in the connector.

- Push down the connector locking mechanism (if zero-insertion force type).

To check whether the keyboard is functioning properly:

- Place the proper country printwheel in the machine and turn the typewriter on.

If the machine beeps and the green linespacing LEDs (1, 1 1/2, 2) flash, then the country code is incorrect. Either the comb is installed incorrectly or the wrong tabs were removed.

- Place a blank sheet of paper in the machine and press every keybutton.

If a section or the complete keyboard is inoperative, the sense flat cable is not connected properly. As you press each keybutton, make sure that the appropriate character is typed or function performed.

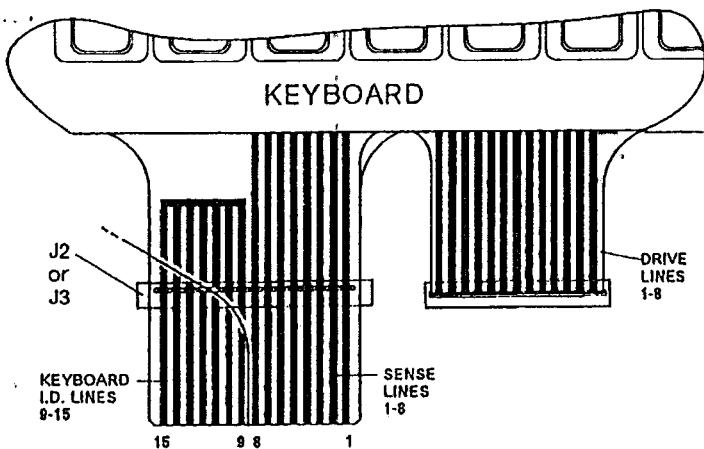
## Keyboard Country ID Modification

Every keyboard has keyboard ID lines with country punch codes located on the flat cable next to the sense lines.

To change the country code, or to avoid having to replace a keyboard with damaged ID lines, cut off the ID lines and replace them with a metal comb (P/N 1392956).

To cut and replace the ID lines:

1. Move the carrier to the left.
2. Disconnect the right-hand flat cable.
3. Turn the machine around until the back is facing you.
4. Using a pair of scissors, cut the country ID section (as shown in the figure below) between line 8 and 9, making a straight cut for 20mm (3/4 inch). Gradually turn the cut to the left until you reach the edge.  
**This must be one continuous cut from start to finish, with no sharp corners.**

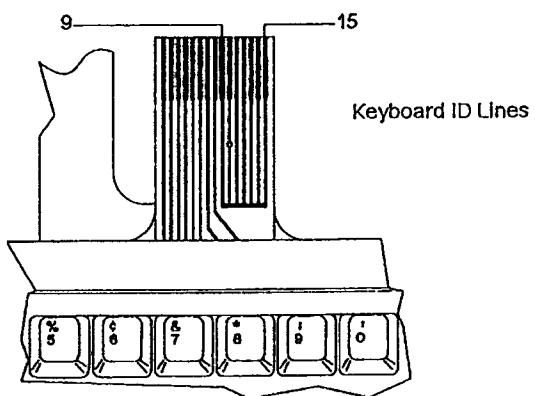


Keyboard Name	09	10	11	12	13	14	15
South Africa			O	O		O	
Spain		O				O	
Sweden/Finland			O	O			
Switzerland (French)			O			O	
Switzerland (German)		O	O			O	
Turkey		O	O	O		O	
United Kingdom				O		O	
United States							
Yugoslavia		O		O	O	O	

**Keyboard Identification Hole Chart, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000(\*)**

Keyboard Name	09	10	11	12	13	14	15
Brazil		O		O		O	
Bulgaria				O	O		
Croatia/Slovenia			O	O			
Canada (Bilingual)				O			
Czech-Republic	O		O	O			
France(Belgian/Dutch)			O				
France (Belgian-French)		O	O				
Denmark	O		O				
Finland			O	O			
Germany/Austria	O						
Greece (Greek)					O	O	
Hungary			O	O		O	
Italy (Metric index)	O				O		
Italy (Inch index)					O		
Japan (English)	O	O			O		
Latin American, Period				O	O		
Latin American, Comma	O		O	O			
Latin American, Period (English) (Philippines)			O		O	O	
Netherlands			O	O	O		
Norway		O	O	O	O		
Poland			O		O	O	
Portugal						O	

## Keyboard Identification Hole Charts



**Keyboard Identification Hole Chart, Wheelwriter 10, 15**

Keyboard Name	09	10	11	12	13	14	15
Belgium/France		O	O				
Brazil		G		O		O	
Bulgaria					O	O	
Canada (Bilingual)					O		
Czech Republic	O			O	O		
Denmark	O		O				
Germany/Austria	O						
Greece (Greek)					O	O	
Hungary			O	O		O	
Italy (Métric index)	O				O		
Italy (Inch index)					O		
Japan (English)	O	O			O		
Latin American, Period				O	O		
Latin American, Comma	O			O	O		
Netherlands			O	O	O		
Norway	O	O	O	O			
Philippines				O	O		
Poland			O		O	O	
Portugal						O	
Romania	O	O	O		O		
Russia Cyrillic			O		O		
Serbia			O	O			
Slovakia	O		O		O		
South Africa			O	O		O	

013

Go to "MAP 0580: Transport" on page 2-222.

014

**Single board machines:** The function board is failing.

**Two-board machines:**

The 16-pin cable between the function board and motor control board is failing.

— or —

The 22-pin cable between function board and motor control board is failing.

— or —

The motor control board is failing.

— or —

The function board is failing.

## MAP 0590: Transport Electrical

**001**

**Single board machines:** Go to Step 003.

**Two-board machines:**

- Check the 16- and 22-pin cables connecting the motor control board and the function board for alignment, correct fit, rolled edges and damaged corners. The cables may shift out of adjustment when you remove the board cover.

**Are the cables good?**

Yes   No

**002**

Correct the problem and go to "MAP 0100: Start" on page 2-4.

**003**

- Tab to the right frame, then carrier return.

**Does the transport motor operate correctly?**

Yes   No

**004**

Go to Step 006.

**005**

Go to "MAP 0580: Transport" on page 2-222.

**006**

(From step 004)

- Turn the machine off
- Disconnect the transport motor cable from the motor.
- Set the meter on X1.
- Carefully zero the meter.
- Measure the resistance of the transport motor (on the motor connector) between the points indicated in the chart below (these are critical measurements). To ensure accurate measurements, the motor should be at room temperature. The resistance may be higher if the motor is hot.

## MAP 0580: Transport

001

This chart lists the FRUs in the most probable order of failure.

SYMPTOM	1	2	3	4
Little or no carrier movement	D	C	B	
Transport is erratic or noisy Characters overlap Characters too close Selection poor Horizontal alignment not correct Margin changes	D	B	C	A
Noisy transport	D	C	B	

Note: Turn the machine off when you check for binds.

	<u>FRU</u>	<u>Action</u>
A	Bottom Cover	Check: <ul style="list-style-type: none"><li>• Cover. Is it bent or cracked?</li><li>• Frame latches. Are they damaged, cracked, or hard?</li></ul>
B	Carrier Bearings and Shaft	Check: <ul style="list-style-type: none"><li>• Bearings and shaft. Are they dirty, loose, or worn? Are they correctly lubricated?</li><li>• Carrier. Does it hit the feed rollers?</li></ul>
C	Transport Motor	If the motor is noisy or does not run correctly, go to "MAP 0590: Transport Electrical" on page 2-224. Check. <ul style="list-style-type: none"><li>• Shaft. Does it bind?</li><li>• Mounting screws. Are they loose?</li></ul>
D	Transport Assembly	Check: <ul style="list-style-type: none"><li>• Drive gear train and bearings. Do they bind, or are they worn?</li><li>• Idler pulley. Does it bind, or is it worn?</li><li>• Carrier bearings. Do they bind, or are they worn?</li><li>• Belt. Is it broken or worn. Is it correctly adjusted?</li><li>• Belt clamp. Is it loose, worn, or broken?</li><li>• Load spring. Is it missing or bent?</li><li>• Brackets. Are they loose?</li><li>• Idler stud. Is it loose?</li><li>• Cardholder. Is it binding against the platen?</li></ul>

## MAP 0570: Spell Check Option—Wheelwriter 10, 15, 1500, 3000

001

Check the machine Spell Check option configuration against the table below.

	WW1500, 3000 U800 Module Installed	WW10, 15 U3 Module Installed	WW10, 15 J6 Jumper Installed
US	No	No	No
UK	Yes	Yes	No
French	Yes	Yes	Yes
German	Yes	Yes	Yes
Spanish	Yes	Yes	Yes

**Note:** U.S. spell check is standard on all machines and is part of the U101 module on the system board. There is no J6 jumper on WW1500, 3000.

Any other combinations may cause a ROM scan error.

Is the Spell Check option configured correctly for your machine?

Yes No

002

- Configure correctly.
- Go to "MAP 0100: Start" on page 2-4.

003

- Enter the Spell Check function.

Does the machine enter the Spell Check function?

Three battery machines: Does the voltage measure between 3.3 V dc and 4.8 V dc?

Yes No

004

Does the code keybutton work with any other coded functions?

Yes No

005

Go to "MAP 0260: Keyboard" on page 2-96.

006

Go to Step 013 on page 2-221.

007

(Step 007 continues)

**019 (continued)**

- Check the spelling modules (U201, U801, U700—two board machines; U3 or U800—single board machines) for proper installation.

**Is the module properly installed?**

Yes   No

**020**

- Observe all ESD precautions.
- Disconnect the batteries.
- Correctly install the spelling module.
- Turn the machine on.

**Do you still have the same symptom?**

Yes   No

**021**

Go to "MAP 0100: Start" on page 2-4.

**022**

The spelling module is failing.

— or —

The function board is failing.

**023**

The spelling module is failing.

— or —

The function board is failing.

**024**

(From step 018)

**Does the code keybutton work with any other coded function?**

Yes   No

**025**

Go to "MAP 0260: Keyboard" on page 2-96.

**026**

The spelling module is failing.

— or —

The function board is failing.

## **MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000**

**Note:** If you disconnect the batteries from the function board, all data stored in the machine will be lost. If you need to remove the Spell Check module from the function board, you must disconnect the batteries. Discuss the problem with the customer before you disconnect the batteries.

**Note:** If your machine is a Wheelwriter 50, 70, 5000, or 7000, go to Step 017 on page 2-217.

**001**

Did you come here from "MAP 0170: Error Codes" on page 2-48?

Yes No

**002**

— Enter the Spell Check function.

Does the machine enter the Spell Check function?

Yes No

**003**

Go to Step 006.

**004**

Go to Step 014 on page 2-217.

**005**

Go to Step 014 on page 2-217.

**006**

(From step 003)

Does the code keybutton work with any other coded function?

Yes No

**007**

Go to "MAP 0260: Keyboard" on page 2-96.

**008**

Does the Supplemental Dictionary lose words?

Yes No

**009**

Go to Step 013 on page 2-221.

**010**

— Measure the voltage between J7-1 (black) and J7-3 (red) on the J7 plug.

(Step 010 continues)

**063 (continued)**

The sheetfeed drive motor is failing.

**064**

(From step 054)

- Disconnect the options power cable from J2 on the power supply and any option boards installed in the machine.
- Measure the voltage at J2-1 (+32VDC) on the power supply.

Does the voltage measure between 23 V d.c. and 41 V d.c.?

Yes    No

**065.**

The power supply is failing.

**066**

The option power supply cable is failing.

## 053 (continued)

- Measure the voltage on the bottom of the options power cable at the sheetfeed power jack.

**CAUTION:**

**Do not short the two leads together.**

**Does the voltage measure between 23 V d.c. and 41 V d.c.?**

Yes   No

**054**

Go to Step 064 on page 2-214.

**055**

The sheetfeed logic board assembly is failing.

**056**

The sheetfeed logic board assembly is failing.

**057**

(From step 022)

- Check the following chart for your *identical* condition and perform the required action.

Condition	Action
<ul style="list-style-type: none"> <li>• The correct bin is selected when Code + 8 is pressed.</li> <li>• The typewriter responds correctly when Code + 7 is pressed.</li> <li>• The sheetfeed motor does not turn.</li> <li>• The sheetfeed solenoid activates.</li> <li>• An out-of-paper indicator appears.</li> </ul>	Go to Step 061 on page 2-213.
<ul style="list-style-type: none"> <li>• The correct bin is selected when Code + 8 is pressed.</li> <li>• The typewriter responds correctly when Code + 7 is pressed.</li> <li>• The sheetfeed motor turns.</li> <li>• The sheetfeed solenoid does not activate.</li> <li>• The paper bail does not open.</li> <li>• The sheetfeed feeds paper but may try to feed more than one sheet at a time.</li> </ul>	Go to Step 058 on page 2-213.
<ul style="list-style-type: none"> <li>• The correct bin is selected when Code + 8 is pressed.</li> <li>• The typewriter responds correctly when Code + 7 is pressed.</li> <li>• The sheetfeed operates correctly when bin 1 is selected.</li> <li>• When bin 2 is selected:           <ul style="list-style-type: none"> <li>The sheetfeed motor does not turn.</li> <li>The sheetfeed solenoid does not activate.</li> <li>An out-of-paper indicator appears.</li> </ul> </li> </ul>	The feedtrip sensor is failing, or the logic board assembly is failing.

**016 (continued)**

- Turn the machine off.
- Install the sheetfeed onto the typewriter. Be sure the gears between the sheetfeed and platen mesh correctly. Also be sure the sheetfeed correctly activates the sensor assembly on the typewriter.
- Turn the machine on.
- Hold Code and press 7.

**Does the typewriter respond?**

Yes No

**017**

Go to Step 023.

**018**

**Does the sheetfeed respond (drive motor turns, solenoid activates)?**

**Note:** The sheetfeed exit shaft is driven by the typewriter and may rotate at this time.

Yes No

**019**

- Hold-Code and-press 8.

**Does the typewriter respond?**

Yes No

**020**

Go to Step 043 on page 2-210.

**021**

Go to Step 052 on page 2-211.

**022**

Go to Step 057 on page 2-212.

**023**

(From step 017) .

- Hold Code and press 8.

**Does the typewriter respond?**

Yes No

**024**

Go to Step 026.

**025**

Go to Step 040 on page 2-210.

**026**

(From step 024)

(Step 026 continues)

## MAP 0550: Sheetfeed, Electrical

001

Are you here because the typewriter primary fuse is blown?

Yes No

002

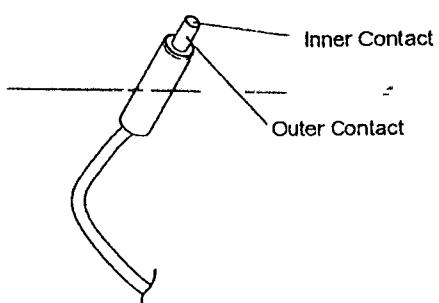
Go to Step 016 on page 2-207.

003

- Set your meter to the RX 1K scale.
- Set the meter polarity switch to +.

Note: To read the resistance of the sheetfeed power plug, the red meter lead (VOM) must be connected to the inner contact and the black meter lead (COM) must be connected to the outer contact of the sheetfeed power plug.

- Measure the resistance between the inner and outer contacts of the sheetfeed power plug.



Is the resistance less than 500 ohms?

Yes No

004

- Turn the machine off.
- Install the sheetfeed onto the machine.
- Turn the machine on.

Does the primary fuse blow again?

Yes No

005

Go to Step 016 on page 2-207.

006

- Replace the primary fuse.

Go to Step 010 on page 2-207.

007

- Unscrew the black plastic sleeve on the sheetfeed power plug and slide it up the cable.
- Check for a short (touching contacts or leads) between the inner and outer contacts in the plug.  
(Step 007 continues)

## MAP 0540: Sheetfeed

Note: Do a visual check of the machine before you continue with this MAP. Look for loose connections, broken wires, and loose or broken wires.

001

- Check the following chart for your *identical* condition and perform the required action. If you do not find an *identical* condition, go to "MAP 0540: Sheetfeed."

Condition	Action
The primary fuse in the typewriter blows only when the sheetfeed is installed.	Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206.
The typewriter functions properly but the sheetfeed is totally inoperative (No motor movement, solenoid does not activate).	Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206.
The typewriter functions properly but the sheetfeed will not feed from the correct bin.	Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206.
When Code + 7 is pressed the typewriter turns the platen until the 3.5-second typewriter timeout occurs. The sheetfeed does not respond and there is an out-of-paper indication.	Check the out-of-paper sensor for correct adjustment and operation. If the out-of-paper sensor is correct go to "MAP 0550: Sheetfeed, Electrical" on page 2-206.
When Code + 7 is pressed the typewriter responds correctly. The sheetfeed does not feed paper, but the sheetfeed drive motor rotates and the bin feed roller shaft rotates.	Mechanical, Check for: <ul style="list-style-type: none"><li>• Open load levers</li><li>• Weak load lever springs</li><li>• Slipping rollers</li><li>• Glazed or damaged rollers,</li><li>• Tight paper guides</li><li>• Paper curl, incorrect paper, high humidity</li></ul> Electrical, check: <ul style="list-style-type: none"><li>• Logic board assembly</li><li>• Feedtrip sensor assembly</li><li>• Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206.</li></ul>
When Code + 7 is pressed the typewriter responds correctly. The sheetfeed does not feed paper. The sheetfeed drive motor rotates, but the bin feed roller shaft does not rotate.	Mechanical, Check for: <ul style="list-style-type: none"><li>• Drive motor binding on bin gear</li><li>• Incorrect gear backlash</li><li>• Loose drive motor gear</li><li>• Drive motor gear and bin gear not engaging</li><li>• Loose or broken bin gear.</li></ul>
When Code + 7 is pressed the typewriter responds correctly. The sheetfeed does not feed paper. The sheetfeed drive motor and the bin feed roller shaft do not rotate.	Mechanical, Check for: <ul style="list-style-type: none"><li>• Broken or worn gears in gear train.</li></ul> Electrical: Go to "MAP 0550: Sheetfeed, Electrical" on page 2-206.

015 (continued)

Are any pins shorted to the motor housing?

Yes No

016

The selection plate assembly is failing.

017

**Single board machines:** The system board and selection plate assembly are failing.

**Two-board machines:** The motor control board and selection plate assembly are failing.

018

— Check the continuity between the carrier cable board and the selection motor cable.

Is there continuity?

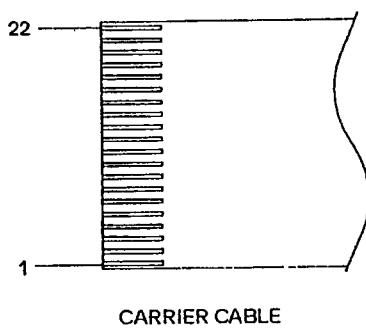
Yes No

019

The carrier cable board is failing.

020

— Check the continuity of the selection lines in the carrier cable. The lines are: 13, 14, 15, 16.



CARRIER CABLE

Is there continuity?

Yes No

021

The carrier cable is failing.

022

Were you sent to this MAP from "MAP 0520: Selection" on page 2-198?

Yes No

023

Go to "MAP 0520: Selection" on page 2-198.

024

**Single board machines:** The system board is failing.

(Step 024 continues)

## MAP 0530: Selection Electrical

**001**

Does the machine complete a POR?

Yes   No

**002**

Go to Step 005.

**003**

— Type several full lines of the lowercase characters "a n e" to test the motor coils.

Does this combination of characters print correctly?

Yes   No

**004**

Go to "MAP 0520: Selection" on page 2-198.

**005**

(From step 002)

Is a known good printwheel available?

Yes   No

**006**

Go to Step 010.

**007**

— Try a known good printwheel in the machine.

Does the machine operate correctly now?

Yes   No

**008**

Go to Step 012 on page 2-201.

**009**

The original printwheel is failing.

**010**

(From step 006)

- Check the printwheel.
- Ensure the homing, pitch, and impression holes are open, and the printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)

Is the printwheel good?

Yes   No

**011**

The printwheel is failing.

## MAP 0520: Selection

001

This chart lists the FRUs in the most probable order of failure.

Symptom	1	2	3
Printwheel does not rotate, is noisy, or its speed changes as it rotates	B	A	
Carrier miselects, splits characters, or makes print hammer marks	B	A	
Carrier drives against right side frame.	A	B	
Print hammer does not energize.	A	B	
Character substitution	A	B	C

	FRU	Action
A	Selection Plate Assembly	<p>Check:</p> <ul style="list-style-type: none"><li>• Motor. Does it bind? Does it have loose screws or a loose connector?</li><li>• Hub. Is it bent, broken, or loose?</li><li>• Hammer. Does it bind or have excessive end play? If the hammer solenoid does not energize, Go to "MAP 0460: Print Hammer Solenoid" on page 2-180.</li></ul> <p>For electrical failures, Go to "MAP 0530: Selection Electrical" on page 2-200.</p>
B	Printwheel	<p>Check:</p> <ul style="list-style-type: none"><li>• Printwheel. Does it bind? Is the cartridge broken?</li><li>• Printwheel petals. Are they bent or broken?</li><li>• Bias spring.</li></ul> <p>For electrical failures, Go to "MAP 0530: Selection Electrical" on page 2-200.</p>
C	Function board or system board	The function board or system board is failing

## MAP 0510: Semi-Automatic Paper Insertion

001

- Inspect the SAPI switch, spring, cable, and actuator.
  - Also inspect the paper deflector and feed rolls.
- Is the mechanical operation of the switch and paperfeed good?

Yes   No

002

Repair as necessary.

003

- Run the sensor and switch test (hold Code and Shift, press TSet).

WW10, 15, 1500, 3000 - Does the Lang LED go on and off when the switch is activated?

WW30, 35, 50, 70, 3500, 5000, 7000 - Does the KYBD indicator turn on and off when the switch is activated?

Yes   No

004

- Do not deactivate the sensor and switch test.
- Do not disconnect the SAPI cables from the SAPI switch.
- Short the SAPI switch contacts.

WW10, 15, 1500, 3000 - Does the LANG LED go on and off as you short the SAPI switch?

WW30, 35, 50, 70, 3500, 5000, 7000 - Does the KYBD indicator turn on and off as you short the SAPI switch?

Yes   No

005

Go to Step 008 on page 2-197.

006

The SAPI switch is failing.

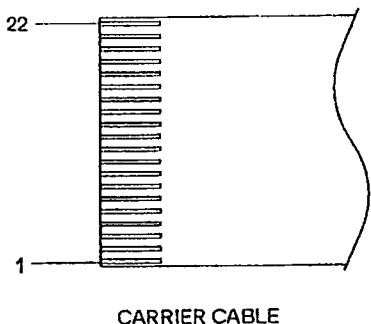
007

Go to "MAP 0390: Paperfeed" on page 2-156.

**015**

(From step 013)

- Check the continuity of the ribbon lift/feed motor lines in the carrier cable. The lines are: 5, 8, 9, 10, 11, 12, 17, 18.



CARRIER CABLE

**Is there continuity?**

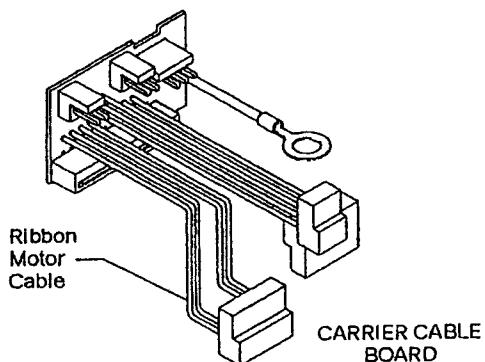
Yes   No

**016**

The carrier cable is failing.

**017**

- Check the carrier cable board and the ribbon lift/feed motor cable for continuity.



**Is there continuity?**

Yes   No

**018**

The carrier cable board is failing.

**019**

**Single board machines:**

The system board is failing.

— or —

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

**Two-board machines:**

The motor control board is failing.

(Step 019 continues)

## MAP 0500: Ribbon Electrical

**001**

- Type and correct a line of characters.
- Is the ribbon mechanism working correctly?**

Yes   No

**002**

**Do you have a problem with ribbon feed?**

Yes   No

**003**

Go to Step 006.

**004**

Go to Step 008.

**005**

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

**006**

(From step 003)

**Do you have a problem with ribbon lift or a problem with the correcting tape feed or lift?**

Yes   No

**007**

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

**008**

(From step 004)

- Turn the machine off.
- Set the meter on X1.
- Carefully zero the meter.
- Measure the resistance of the ribbon feed/lift motor between the points indicated in the chart below (these are critical measurements). To ensure accurate measurements, the motor should be at room temperature. The resistance may be higher if the motor is hot.

Meter Connections On the Motor Connector	Reading
Pin 1 to Pin 5	11 to 16 ohms
Pin 2 to Pin 6	11 to 16 ohms
Pin 1 to Pin 2 or 6	Infinity
Pin 2 to Pin 1 or 5	Infinity
Pin 1 to Motor Housing	Infinity
Pin 2 to Motor Housing	Infinity
Pin 3 to Motor Housing	Infinity
Pin 4 to Motor Housing	Infinity

## MAP 0490: Ribbon and Correcting Tape

**001**

This chart lists the FRUs in the most probable order of failure.

Symptom	1	2	3	4	5
Light or dark characters	I				
No lift	E	A			
Too much lift, not enough lift, feed is not correct	B	E	A	C	F
Too much feed, not enough feed, lift is not correct	G	C	F	A	
No ribbon feed	G	F	A		
No correction tape feed	F	D	E	A	H

	FRU	Action
A	Feed/Lift Motor/Cable	<p>Motor not running correctly, not turning, or noisy. Go to "MAP 0500: Ribbon Electrical" on page 2-192.</p> <p>Check the gear. Is it loose, broken, or worn?</p>
B	Ribbon Lift	<p>Check the stud. Is it worn or loose?</p> <p>See "Ribbon Lift Adjustment" on page 3-5.</p>
C	Cartridge Latch	Check the latch. Is it worn, loose, or broken?
D	Tape Feed Stud	Is the stud worn or loose?
E	Lift Cam Assembly	<p>Check:</p> <ul style="list-style-type: none"> <li>• Cam and roller. Are they worn?</li> <li>• Stud. Is it loose?</li> </ul>
F	Ribbon Plate Assembly	<p>Check:</p> <ul style="list-style-type: none"> <li>• Feed gear train. Does it bind?</li> <li>• Gears. Are they loose or broken?</li> <li>• Motor. Is it loose?</li> <li>• Tape feed slot. Is it worn?</li> <li>• Tape feed link. Is it worn?</li> <li>• Tape feed clutch. Is it worn?</li> <li>• Backcheck mechanism. Is it worn, loose, or broken?</li> </ul>
G	Ribbon/Correcting Tape Cartridges	Check the ribbon and correction tape. Are they broken or scratched? Do they wind correctly?
H	Cables and Electronics	<p>Check the connectors. Are they loose or worn?</p> <p>GO TO "MAP 0500: Ribbon Electrical" on page 2-192.</p>
I		Go to "MAP 0470: Print Quality" on page 2-184.

**015 (continued)**

— Press Code + 5.

**Does the printer option work correctly?**

Yes   No

**016**

Inform the customer the machine is operating correctly.

**017**

End the call.

## MAP 0480: Printer Option

001

- Turn the machine off.
- Check the cables for damage, proper alignment, and fit.

Are the cables good?

Yes No

002

Repair as necessary.

003

- Turn the machine off.
- Turn the machine on.
- Press Code + 5 to activate the printer option.

WW10, 15, 1500, 3000 - Does the line space 1.5, 2 and 3 LEDS come on solid?

WW30, 35, 3500 - Does the message panel appear on the display?

WW50, 70, 5000, 7000 - Does the message panel appear on the CRT?

Yes No —

004

- Turn the machine off.
- Disconnect the printer option board.
- Turn the machine on.

Does the machine operate correctly?

Yes No

005

Go to "MAP 0100: Start" on page 2-4.

006

### *Single board machines:*

The 22-pin cables between the system board and the printer option board are failing.

— or —

The printer option board is failing

— or —

The system board is failing

### *Two-board machines:*

The 22-pin function to printer option board cables are failing.

— or —

The printer option board is failing

— or —

The function board is failing

007

- Press the 6 keybutton.

(Step 007 continues)

## MAP 0470: Print Quality

**001**

This chart lists the FRUs in the most probable order of failure.

**Note:** Print can be lightened by adding up to a maximum of two hammer solenoid shims (P/N 1342475), or darkened by removing shims.

Symptom	1	2	3	4	5	6
Malselection, split characters, or hammer marks	F	I				
Missing character. Character impression is on the paper.	H	E	G			
Missing character. No character impression on the paper.	F	G				
Impression is dark	G	F				
Incorrect character alignment	F	G	D	C	A	
Characters are lighter have voids	E	F	C	H	G	B
Erase is not complete	H	E	F	G	D	C

	FRU	Action
A	Bottom Cover	Check: <ul style="list-style-type: none"> <li>• Bottom cover. Is it bent or cracked?</li> <li>• Frame latches. Are they damaged, cracked, or hard?</li> </ul>
B	Cardholder	See "Cardholder Adjustment" on page 3-2.
C	Paperfeed	Check: <ul style="list-style-type: none"> <li>• Feed rollers. Are they worn or loose?</li> <li>• Platen and platen latches. Are they worn?</li> </ul>
D	Transport	Check: <ul style="list-style-type: none"> <li>• Transport assembly. Does it bind?</li> <li>• Carrier bearings. Are they worn?</li> <li>• Front carrier shoe. Is it worn?</li> <li>• Transport belt. Is it loose or worn?</li> <li>• Transport pulley. Is it loose, worn, or broken?</li> <li>• Transport pulley motor mounting screws. Are they loose?</li> <li>• Idler stud. Is it loose?</li> </ul> For electrical failures, Go to "MAP 0590: Transport Electrical" on page 2-224.
E	Ribbon/Tape	Be sure you are using a known good ribbon and correcting tape.
F	Printwheel	Check: <ul style="list-style-type: none"> <li>• Printwheel Cartridge. Does it bind?</li> <li>• Petals. Are they defective or damaged?</li> </ul>

**012 (continued)**

**Single board machines:** The system board and the selection plate assembly are failing.

**Two-board machines:** The motor control board and the selection plate assembly are failing.

---

## MAP 0460: Print Hammer Solenoid

001

- Turn the machine off.
- Disconnect the print hammer solenoid cable from the carrier cable board.
- Set the meter on X1.
- Carefully zero the meter.
- Measure the resistance of the print hammer solenoid on the print hammer cable connector as indicated in the chart below.

Meter Connections	Reading
Pin 1 (HMR1) to Pin 2 (HMR2)	2 to 4 ohms
Pin 1 (HMR1) to solenoid housing	Infinity
Pin 2 (HMR2) to solenoid housing	Infinity

Are the measurements correct?

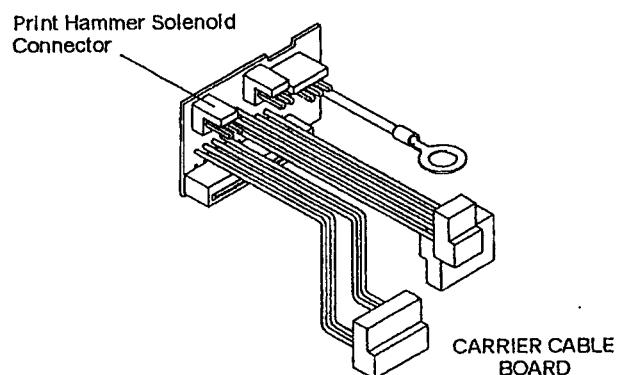
Yes   No

002

Go to Step 010 on page 2-181.

003

- Check the continuity of the print hammer solenoid lines at the print hammer connector on the carrier cable board.



Is there continuity?

Yes   No

004

The carrier cable board is failing.

**018 (continued)**

**Does the primary fuse blow?**

Yes   No

**019**

Go to Step 021.

**020**

The printer option board is failing.

**021**

(From step 019)

- Turn the machine off.
- Connect the option power supply cable to the diskette control board.
- Turn the machine on.

**Does the primary fuse blow?**

Yes   No

**022**

Go to "MAP 0100: Start" on page 2-4.

**023**

The diskette control board or disk drive are failing.

**024**

(From step 017)

- Turn the machine off.
- Disconnect the printer option board from the function board.
- Connect the options power supply cable to the printer option board.
- Turn the machine on.

**Does the primary fuse blow?**

Yes   No

**025**

Go to "MAP 0100: Start" on page 2-4.

**026**

The printer option board is failing.

**027**

(From step 016)

**Is the diskette option installed?**

Yes   No

**028**

Go to "MAP 0100: Start" on page 2-4.

## MAP 0450: Primary Fuse, Wheelwriter 50, 70

**001**

- Turn the machine off.
- Unplug the machine.
- Replace the primary fuse.
- Disconnect J5 from the motor control board.
- Plug the machine in.
- Turn the machine on.

**Does the primary fuse blow?**

Yes   No

**002**

- Turn the machine off.
- Set your meter to the RX1K scale.
- Measure the resistance between J5-7 (GND) and J5-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-7 and the black meter lead (COM) connected to J5-8.

**Is the resistance less than 15 ohms?**

Yes   No

**003**

Go to Step 032 on page 2-179.

**004**

The motor control board is failing.

**005**

- Turn the machine off.
- Unplug the machine.
- Replace the primary fuse.
- Disconnect the options power supply cable from the power supply.
- Plug the machine in.
- Turn the machine on.

**Does the primary fuse blow?**

Yes   No

**006**

Go to Step 008.

**007**

The power supply assembly is failing.

**008**

(From step 006)

- Turn the machine off.
- Disconnect the options power supply cable from the CRT control board and any options boards if installed.

(Step 008 continues)

**019 (continued)**

- Measure the resistance between J5-2 (+5V) and J5-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-8 and the black meter lead (COM) connected to J5-2.

Is the resistance less than 500 ohms?

Yes    No

**020**

- Check each of the following, in the order shown, for pin-to-housing shorts (check between the pins in the motor connector and the motor or solenoid housing):

- transport motor
- ribbon lift/feed motor
- paperfeed motor
- selection motor
- print hammer solenoid.

**Do any of the motors have a pin-to-housing short?**

Yes    No

**021**

The motor control board is failing.

**022**

The motor and the motor control board are failing.

**023**

The motor control board is failing.

## MAP 0440: Primary Fuse, Wheelwriter 30

001

- Turn the machine off.
- Replace the primary fuse.
- Disconnect J5 from the motor control board.
- Turn the machine on.

Does the primary fuse blow again?

Yes   No

002

- Turn the machine off.
- Set your meter to the RX1K scale.
- Measure the resistance between J5-7 (GND) and J5-8 (+32V) on the motor control board.

Note: The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-7 and the black meter lead (COM) connected to J5-8.

Is the resistance less than 15 ohms?

Yes   No

003

Go to Step 019 on page 2-173.

004

The motor control board is failing.

005

Is the option power supply cable installed on J2 on the power supply?

Yes   No

006

The power supply assembly is failing.

007

- Disconnect the options power supply cable from the power supply.
- Replace the primary fuse.
- Turn the machine on.

Does the primary fuse blow again?

Yes   No

008

Go to Step 010.

009

The power supply assembly is failing.

010

(From step 008)  
(Step 010 continues)

## **MAP 0430: Primary Fuse, Wheelwriter 10, 15**

**Note:** This MAP is for the Wheelwriter 10 and 15. If your machine is a Wheelwriter 30, go to "MAP 0440: Primary Fuse, Wheelwriter 30" on page 2-172. If your machine is a Wheelwriter 50 or 70, go to "MAP 0450: Primary Fuse, Wheelwriter 50, 70" on page 2-176.

**001**

- Turn the machine off.
- Be certain the machine is unplugged.
- Replace the primary fuse.
- Plug in the machine.

### **Single board machines:**

#### **WHEELWRITER 10 typewriter: Level 1**

- Disconnect power connector J9 from the system board.
- Turn the machine on.

#### **WHEELWRITER 10 typewriter: Level 2**

- Disconnect power connector J15 from the system board.
- Turn the machine on.

#### **WHEELWRITER 15 typewriter:**

- Disconnect J15 from the system board.
- Turn the machine on.

### **Two-board machines:**

- Disconnect J5 from the motor control board.
- Turn the machine on.

### **Does the primary fuse blow again?**

Yes   No

**002**

- Turn the machine off.
- Set your meter to the RX1 scale.

### **Single board machines:**

#### **WHEELWRITER 10 typewriter: Level 1**

- Measure the resistance between J9-7 (GND) and J9-8 (+32V) on the system board.

#### **WHEELWRITER 10 typewriter: Level 2**

- Measure the resistance between J15-7 (GND) and J15-8 (+32V) on the system board.

#### **WHEELWRITER 15 typewriter:**

- Measure the resistance between J15-7 (GND) and J15-8 (+32V) on the system board.

### **Two-board machines:**

- Measure the resistance between J5-7 (GND) and J5-8 (+32V) on the motor control board.

**Note:** For all machines: The meter polarity switch must be set to + and the red meter lead (VOM) connected to Pin7 and the black meter lead (COM) connected to Pin8.

### **Is the resistance less than 15 ohms?**

Yes   No

**003**

Go to Step 006 on page 2-171.

**004**

**Single board machines:** The function board is failing.

**Two-board machines:** The motor control board is failing.

020 (continued)

Is the voltage correct?

Yes No

021

Inform the customer there is a problem with the outlet.

022

(From step 017)

- Plug the line cord back into the electrical outlet.
- Measure the voltage at the typewriter end of the line cord.

Is the voltage correct?

Yes No

023

The line cord is failing.

024

- Check the continuity of the on/off switch.

Is there continuity?

Yes No

025

The on/off switch is failing.

026

The power supply assembly is failing.

## MAP 0420: Power Supply

**001**

— Check connector J2 on the power supply for bent or shorted pins.

Is the connector good?

Yes   No

**002**

Repair as necessary.

**003**

**Note:** There are three levels of power supplies.

1. Level one - the primary fuse is located in an external removable fuse holder. Fuse F1 (+5V) is mounted on the regulator board.
2. Level two - the primary fuse is located inside the switch tower. There is no fuse F1 (+5V).
3. Level three - there are no replaceable fuses. If the power supply has no fuses go to Step 020 on page 2-167

Have you checked the continuity of the primary and F1 fuses?

Yes   No

**004**

Go to Step 012 on page 2-167.

**005**

Is the primary fuse good?

Yes   No

**006**

WW 10, 15 - go to "MAP 0430: Primary Fuse, Wheelwriter 10, 15" on page 2-170.

WW30 - go to "MAP 0440: Primary Fuse, Wheelwriter 30" on page 2-172.

WW 50, 70 - go to "MAP 0450: Primary Fuse, Wheelwriter 50, 70" on page 2-176.

**007**

Is fuse F1 (+5V) installed on your power supply?

Yes   No

**008**

Go to Step 020 on page 2-167.

**009**

Is fuse F1 (+5V) good?

Yes   No

**010**

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

**016**

(From step 012)

**Does the form feeder actuate the switch?**

Yes No

**017**

— Check the form feeder switch to be sure it is operating correctly.

**Is the switch operating correctly?**

Yes No

**018**

Correct the problem.

**019**

The form feeder is failing.

**020**

(From step 007)

**Does the form feeder correctly feed paper?**

Yes No

**021**

— Press the paper up/down buttons on the typewriter.

**Does the platen turn?**

Yes No

**022**

Go to "MAP 0100: Start" on page 2-4.

**023**

Go to Step 025.

**024**

Go to Step 035 on page 2-165.

**025**

(From step 023)

**Does the form feeder turn?**

Yes No

**026**

(Step 026 continues)

## MAP 0410: Pinwheel Form Feeder

001

Is the deflector-to-frame ground strap installed correctly?

Is the platen ground clip installed correctly? The clip must contact the metal shaft of the platen.

Yes   No

002

Correct as necessary.

003

(From step 015)

- Activate the switch and sensor test.

WW10, 15, 1500, 3000 - Does the Line space 3 LED come on?

WW30, 35, 50, 70, 3500, 5000, 7000 -

- Does the SUSPND indicator come on (pinfeed connected to the function board)?
- Does the TADJ indicator come on (pinfeed connected to the printer option board)?

Yes   No

004

Are the platen and form feeder correctly installed?

Yes   No

005

Install the platen and form feeder correctly.

006

Go to Step 008.

007

Go to Step 020 on page 2-164.

008

(From step 006)

- Remove the form feeder assembly.
- Ensure the switch and sensor test is activated.
- Manually actuate the left form feeder switch (large actuator). Press the actuator down until you hear a click.

WW10, 15, 1500, 3000 - Does the Line space 3 LED come on?

WW30, 35, 50, 70, 3500, 5000, 7000 -

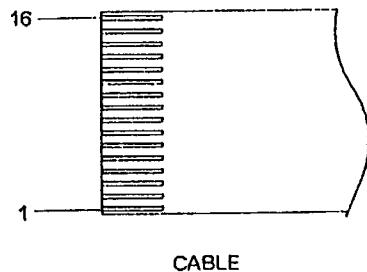
- Does the SUSPND indicator come on (pinfeed connected to the function board)?
- Does the TADJ indicator come on (pinfeed connected to the printer option board)?

Yes   No

**014 (continued)**

**Two board machines:**

- Turn the machine off.
- Disconnect the 16-pin cable at J3 on the motor control board.
- Turn the machine on.
- Measure the voltage on pin 15 of the cable.



**Is the voltage between 4.5 V dc and 5.5 V dc?**

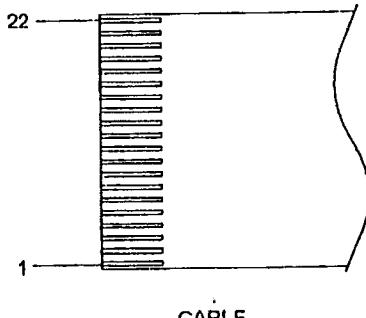
**Yes      No**

**015**

Go to Step 022 on page 2-161.

**016**

- Turn the machine off.
- Disconnect the 22-pin cable at J1 on the motor control board.
- Turn the machine on.
- Measure the voltage on pins 20 and 22 of the cable.



**Is the voltage between 4.5 V dc and 5.5 V dc?**

**Yes      No**

**017**

Go to Step 022 on page 2-161.

**018**

The motor control board is failing.

**019**

(From steps 011 and 014)

(Step 019 continues)

## MAP 0400: Paperfeed Electrical

001

**Single board machines:** Go to Step 003.

**Two board machines:**

- Check the 16- and 22-pin cables connecting the motor control board and the function board for alignment, correct fit, rolled edges and damaged corners. The cables may shift out of adjustment when you remove the board cover.

**Are the cables good?**

Yes No

002

Correct the problem and go to "MAP 0100: Start" on page 2-4.

003

(From step 001)

- Turn the machine on.
- Set the line space on 3.
- Mark the platen.
- Operate the carrier return 9 times.

**Does the platen make a complete revolution?**

Yes No

004

Go to Step 010.

005

- Operate the carrier return 9 times.

**Does the platen make a complete revolution without excessive noise?**

Yes No

006

- Check for binds, loose, broken, or worn parts.

**Are the parts good?**

Yes No

007

Repair or replace parts as required and go to "MAP 0100: Start" on page 2-4.

008

Go to Step 010.

009

Go to Step 010.

010

(From steps 004, 008, and 009)

(Step 010 continues)

## MAP 0390: Paperfeed

001

This chart lists the FRUs in the most probable order of failure.

Symptom	1	2	3	4	5	6
Paperfeed and/or other keybuttons fail	G					
No paperfeed	F	E				
Too little paperfeed, skewing, bent or wrinkled paper	E	D	C	B	F	A
Noisy paperfeed	F	D				
Too much paperfeed	H					

	FRU	Action
A	Cardholder	See "Cardholder Adjustment" on page 3-2
B	Paper Release	Cams: Worn, cracked, broken, or loose on shaft
C	Paper Bail	Check: <ul style="list-style-type: none"><li>• Rubber. Is it dirty, worn, or cracked?</li><li>• Springs.</li><li>• Paper Bail arms. Are they worn?</li><li>• Bail Rollers. Do they bind?</li></ul>
D	Feed Rollers and Deflector	Check the rubber. Is it dirty, worn, or cracked? See "Deflector Adjustment" on page 3-3.
E	Platen	Check: <ul style="list-style-type: none"><li>• Rubber. Is it dirty, worn, or cracked?</li><li>• Latches.</li><li>• Gear. Is it worn?</li></ul>
F	Paperfeed Motor	If the motor is noisy or does not run, Go to "MAP 0400: Paperfeed Electrical" on page 2-158.  Check the gear. Is it loose, broken, or worn?
G	Keyboard	Go to "MAP 0260: Keyboard" on page 2-96.
H	Motor Control Board or System Board	The motor control board or the function board is failing.

## 016 (continued)

The 16-Pin Cable between the function board and the motor control board is failing.

— or —

The function board is failing.

— or —

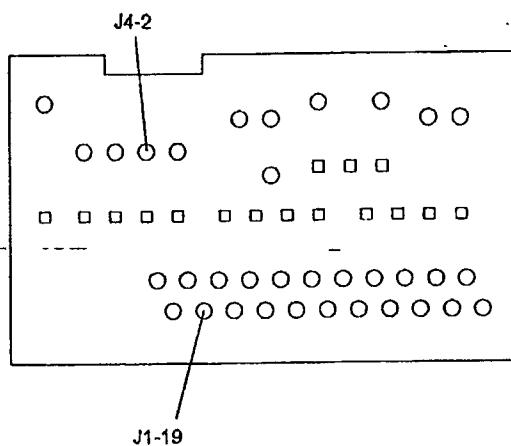
The motor control board is failing.

017

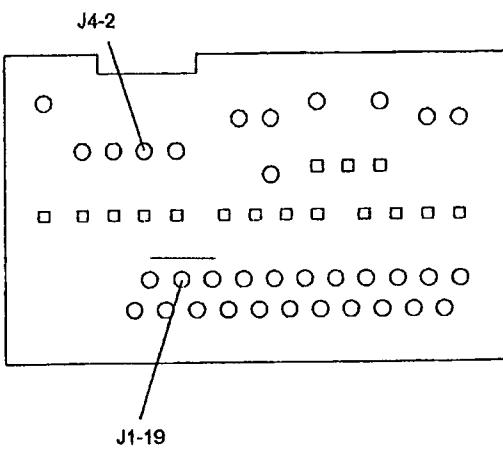
(From step 015)

— Turn the machine off

— **Single board machines:** Check the continuity between the PAPSEN test point on the function board and J4-2 on the carrier cable board.



Level 1



Level 2

— **Two-board machines:** Check the continuity between J10-7 on the function board and J4-2 on the carrier cable board.

**Is there continuity?**

Yes   No

018

- Disconnect the carrier cable from the motor control board or the function board.
- Check the continuity of line 19 from the end of the carrier cable to J4-2 on the carrier cable board.

**Is there continuity?**

Yes   No

019

Go to Step 022 on page 2-155.

020

**Single board machines:** The function board is failing.

**Two-board machines:**

The 16-pin cable between the function board and the motor control board is failing.

— or —

The motor control board is failing.

021

## MAP 0380: Out-of-Paper Sensor Electrical — Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000

001

- Check the out-of-paper sensor for paper dust, ribbon particles or obstruction.

Is the paper sensor clean?

Yes No

002

Clean the sensor and go to "MAP 0100: Start" on page 2-4.

003

- Turn the machine off.
- Remove any paper from the machine.
- Turn the machine on.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

Is the CONT indicator off?

Yes No

004

Go to Step 014 on page 2-153.

005

- Make sure the switch and sensor test is still activated.
- Slowly pass a piece of paper between the out-of-paper sensor and the platen.

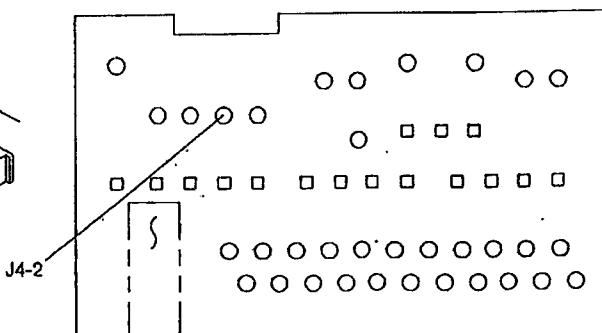
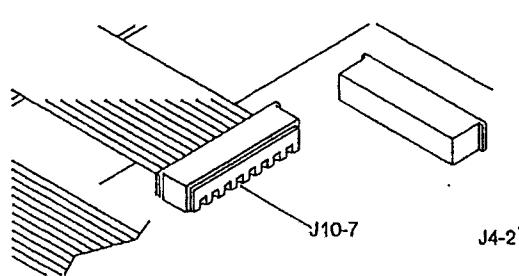
Does CONT turn on and off?

Yes No

006

**Single board machines:** With the paper between the sensor and the platen, measure the voltage at the PAPSEN test point on the function board.

**Two-board machines:** With the paper between the sensor and the platen, measure the voltage at J10-7 on the function board.



Is it approximately 0 V dc?

Yes No

007

(Step 007 continues)

**031 (continued)**

- Disconnect J4 at the carrier cable board.
- Turn the machine on.
- Measure the voltage at J4-2 on the carrier cable board.

**Is it approximately 0 V dc?**

Yes      No

**032**

The sensor assembly is failing.

**033**

Go to Step 023 on page 2-148.

017

Go to Step 023.

018

(From step 016)

- Measure the voltage between J4-4 (gnd) and J4-1 (+5 V dc) on the carrier cable board.  
Is the voltage between +4.5 V dc and +5.5 V dc?

Yes   No

019

Remove the carrier cable. Check the continuity of lines 6, 7, and 19.

Is there continuity?

Yes   No

The carrier cable is failing.

021

**Single board machines:** The function board is failing.**Two-board machines:** The motor control board is failing.

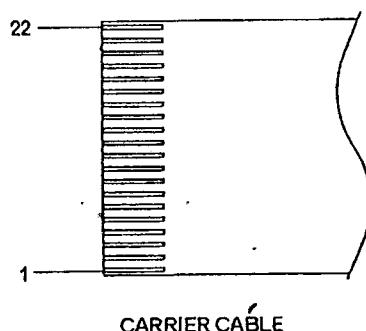
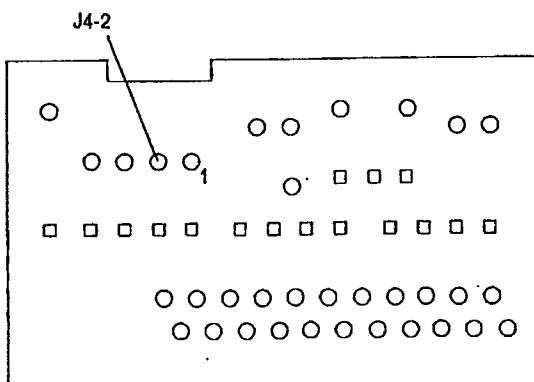
022

The out-of-paper sensor assembly is failing.

023

(From step 017)

- Disconnect the carrier cable from the system board or motor control board.
- Check the continuity from line 19 on the end of the carrier cable to J4-2 on the carrier cable board.



Is there continuity?

Yes   No

024

(Step 024 continues)

## MAP 0370: Out-of-Paper Sensor Electrical, Wheelwriter 10, 15, 1500, 3000

001

- Check the out-of-paper sensor for paper dust, ribbon particles or obstruction.

Is the paper sensor clean?

Yes No

002

Clean the sensor and go to "MAP 0100: Start" on page 2-4.

003

- Turn the machine off.
- Turn the machine on.
- Remove any paper from the machine.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

Is the CONT LED off?

Yes No

004

Go to Step 012 on page 2-147.

005

- Make sure the switch and sensor test is still activated.
- Slowly pass a piece of paper between the out-of-paper sensor and the platen.

Does the CONT LED go on and off?

Yes No

006

Go to Step 012 on page 2-147.

007

- Try the machine several times.

Does the machine still have the same symptom?

Yes No

008

Go to "MAP 0100: Start" on page 2-4.

009

Is the sensor switch assembly installed correctly?

Yes No

010

Correct the problem and go to "MAP 0100: Start" on page 2-4.

011

Go to "MAP 0100: Start" on page 2-4.

**021 (continued)**

- Make sure the switch and sensor test is still activated.

- SUSPND appears on the display when the sensor switch cable is connected to printer option board.
- TADJ appears on the display when the sensor switch cable is connected to function board.

**Does SUSPND or TADJ appear on the display?**

Yes   No

**022**

**Is the form feeder assembly firmly latched down?**

Yes   No

**023**

Correctly install the form feeder.

**024**

**Is the sensor switch cable correctly connected?**

Yes   No

**025**

Connect the cable correctly.

**026**

Go to "MAP 0410: Pinwheel Form Feeder" on page 2-162.

— or —

Go to "MAP 0540: Sheetfeed" on page 2-204.

**027**

Go to "MAP 0100: Start" on page 2-4.

**028**

(From step 020)

- Make sure the switch and sensor test is still activated.

- CENTER appears on the display when the sensor switch cable is connected to printer option board.
- PLAY appears on the display when the sensor switch cable is connected to function board.

**Does CENTER or PLAY appear on the display?**

Yes   No

**029**

**Is the sheetfeed assembly properly latched down?**

Yes   No

**030**

Correctly install the form feeder.

**031**

(Step 031 continues)

## MAP 0360: Out-of-Paper Sensor—Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000

001

Is a pinwheel form feeder or sheetfeed installed on your machine?

Yes No

002

Inform the customer the out-of-paper sensor is intended to work only with one of these options installed.

003

- Remove the ribbon cartridge from the machine.
- Remove any paper from the machine.
- Turn the machine on.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

Is the CONT indicator off?

Yes No

004

Go to Step 009.

005

- Slowly pass a piece of paper between the out-of-paper sensor and the platen.

Does CONT turn on and off?

Yes No

006

Go to "MAP 0380: Out-of-Paper Sensor Electrical — Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-152.

007

Is the sensor switch assembly installed correctly?

Yes No

008

Correct the problem and go to "MAP 0100: Start" on page 2-4.

009

(From step 004)

- Check the platen for paper dust and excessive ink.

Is the platen clean?

Yes No

010

Clean the platen.

011

(Step 011 continues)

**021**

**Is a pinwheel forms feeder installed on your machine?**

Yes   No

**022**

Go to Step 029.

**023**

— Make sure the switch and sensor test is still activated.

**Is the line space 3 LED on?**

Yes   No

**024**

**Is the form feeder assembly firmly latched down?**

Yes   No

**025**

Correctly install the form feeder.

**026**

**Is the sensor switch cable correctly connected to the printer option board?**

Yes   No

**027**

Correctly connect the cable to the printer option board.

**028**

Go to "MAP 0410: Pinwheel Form Feeder" on page 2-162.

**029**

(From step 022)

— Make sure the switch and sensor test is still activated.

**Is the line space 2 LED on?**

Yes   No

**030**

**Is the sheetfeed assembly firmly latched down?**

Yes   No

**031**

Correctly install the sheetfeed.

**032**

Go to "MAP 0540: Sheetfeed" on page 2-204.

## **MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000**

**Note:** This MAP is for the Wheelwriter 10, 15, 1500, and 3000 only. If your machine is a Wheelwriter 30, 35, 50, 70, 3500, 5000, or 7000 go to "MAP 0360: Out-of-Paper Sensor—Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-142.

**001**

Is a printer option board installed on your machine?

Yes No

**002**

Inform the customer the out-of-paper sensor is intended to work only with this option.

**003**

Is a form feeder or sheetfeed installed on your machine?

Yes No

**004**

Inform the customer the out-of-paper sensor is intended to work only with either one of these options installed.

**005**

- Remove the ribbon cartridge from the machine.
- Remove any paper from the machine.
- Turn the machine on.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

Is the CONT LED off?

Yes No

**006**

Go to Step 011 on page 2-139.

**007**

- Insert a piece of paper into the machine and move the platen up and down so the edge of the paper passes between the sensor and the platen.

Does the CONT LED go on and off?

Yes No

**008**

Go to "MAP 0370: Out-of-Paper Sensor Electrical, Wheelwriter 10, 15, 1500, 3000" on page 2-146.

**009**

- Check the sensor assembly adjustments.

Are the adjustments correct?

Yes No

**010**

Make the adjustments and go to "MAP 0100: Start" on page 2-4.

**024 (continued)**

**Is a diskette option installed?**

**Yes    No**

**025**

Go to "MAP 0100: Start" on page 2-4.

**026**

**Does the diskette option operate correctly?**

**Yes    No**

**027**

Go to "MAP 0130: Diskette Option" on page 2-24.

**028**

Go to "MAP 0100: Start" on page 2-4.

---

## MAP 0340: Options Inoperative

**001**

Did you come here from "MAP 0170: Error Codes" on page 2-48?

Yes No

**002**

Go to Step 006.

**003**

- Turn the machine off.
- Turn the machine on.

WW10, 15, 1500, 3000 - Does the machine display error code of flashing line space LEDs 1 and 1.5?

WW30, 35, 50, 70, 5000, 7000 - Does the machine display error code 102?

Yes No

**004**

Go to Step 006.

**005**

There is a mismatch between the microcode on the printer option board and the code on the function board.

Verify what level code you should be using:

**006**

(From steps 002 and 004)

Is the printer option installed on your machine?

Yes No

**007**

Go to Step 010.

**008**

Does the printer option operate correctly?

Yes No

**009**

Go to "MAP 0480: Printer Option" on page 2-186.

**010**

(From step 007)

Is the pinwheel form feeder option installed on your machine?

Yes No

**011**

Go to Step 024 on page 2-135.

## MAP 0330: Memory Expansion, Wheelwriter 30

Note: If you disconnect the batteries from the function board, all data stored in the machine will be lost. If you need to remove the memory expansion module from the function board, you must disconnect the batteries. Discuss the problem with the customer before you disconnect the batteries.

**001**

Does the 30k base machine memory operate correctly?

Yes No

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

- Turn the machine off.
- Check the 32k Memory Module (U302), to make sure it is correctly installed in its socket.

Are any pins bent, out of the socket, or misaligned?

Yes No

**004**

Is the module installed in the right direction?

Yes No

**005**

Go to Step 007.

**006**

The 32k memory expansion module is failing.

— or —

The function board is failing.

**007**

(From step 005)

- Inform the customer you must disconnect the batteries which will destroy all stored memory.
- Turn the machine off.
- Observe all ESD precautions.
- Disconnect the batteries.
- Correctly install the module.
- Turn the machine on.
- Connect the batteries.
- Put a piece of paper in the machine.
- Select MENU
- Select LIST
- Press crtn

Does the number that prints on the paper indicate the available memory is greater than 32000 but less than 64000?

Yes No

**008**

(Step 008 continues)

**034 (continued)**

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

Yes   No

**035**

The printer option is failing.

**036**

- Turn the machine off.
- Connect the options power supply cable to the diskette control board.
- Disconnect the diskette control board from the printer control board.
- Turn the machine on.
- Measure the voltage on the power supply plug between Pin1 (gnd) and Pin2 (+5 V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

Yes   No

**037**

The diskette control board is failing.

— or —

The disk drive assembly is failing.

**038**

No trouble found. Go to "MAP 0100: Start" on page 2-4.

**017 (continued)**

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes    No**

**018**

The power supply is failing.

**019**

**Single board machines:** Go to Step 025.

**Two-board machines:** Go to Step 023.

**020**

- Turn the machine off.
- Connect the power supply plug .
- Disconnect the End of Ribbon/Out of paper assembly from the carrier cable board.
- Turn the machine on.
- Measure the voltage on the power supply plug between Pin1 (gnd) and Pin2 (+5 V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes    No**

**021**

Go to Step 025.

**022**

The sensor assembly is failing.

**023**

(From step 019)

- Turn the machine off.
- Disconnect the 16-pin and 22-pin cables between the function board and the motor control board.
- Connect the power supply to J5 on the motor control board.
- Turn the machine on.
- Measure the voltage on the power supply plug between J5-1 and J5-2.

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

**Yes    No**

**024**

The Motor control board is failing

**025**

(From steps 019 and 021)

- Turn the machine off.
- Disconnect the options power supply cable from the CRT control board and any option boards installed.
- Check for continuity between Pin 1 and Pin 3 on the cable.

(Step 025 continues)

## MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000

001

- Turn the machine off.
- Turn the machine on.

Is the machine totally inoperative (CRT dark, no motor movement, no beep, and no print hammer solenoid operation)?

Yes No

002

Go to "MAP 0100: Start" on page 2-4.

003

**Newer machines with fuseless power supply:** Go to Step 007

- Turn off the machine.
- Unplug the machine.
- Remove the primary fuse from the switch tower.
- Check the continuity of the fuse.

Is there continuity?

Yes No

004

Go to "MAP 0450: Primary Fuse, Wheelwriter 50, 70" on page 2-176.

005

- Install the primary fuse.
- If there is no fuse on the power supply board, go to Step 007.
- Remove the +5V fuse from the power supply board.
- Check the continuity of the fuse.

Is there continuity?

Yes No

006

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

007

- Put the fuse back in the power supply if any were removed.
- Disconnect the line cord from the electrical outlet.
- Measure the voltage at the outlet.

Is the voltage correct?

Yes No

008

- Inform the customer there is a problem with the outlet.

009

- Plug the line cord back into the electrical outlet.
- Measure the voltage at the typewriter end of the line cord.

(Step 009 continues)

**037 (continued)**

- Connect the Diskette control board to the function board or printer option board (if installed).
- Disconnect the disk drive cable from the diskette control board.

**Do you still have the same symptom?**

Yes   No

**038**

The disk drive or cable is failing.

**039**

The diskette control board is failing.

018 (continued)

Go to Step 030 on page 2-123.

**019**

Go to Step 021.

**020**

**WW30:** Go to Step 027.

— or —

**WW35, 3500:** The system board is failing.

**021**

(From step 019)

- Turn the machine off.
- Disconnect the power supply connector (J6) from the printer option board.
- Turn the machine on.
- Measure the voltage on the power supply connector at the motor control or system board. Measure between Pin1 (GND) and Pin2 (+5V dc).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

Yes      No

**022**

Go to Step 024.

**023**

The printer option board is failing.

**024**

(From step 022)

- Disconnect the printer option cable from J2 on the power supply.
- Check the continuity on the cable plug between J6-1 and J6-3.

**Is there continuity?**

Yes      No

**025**

Go to "MAP 0420: Power Supply" on page 2-166.

**026**

The cable is failing.

**027**

(From step 020)

- Turn the machine off.
- Disconnect the 16-pin and 22-pin cables between the function board and the motor control board.
- Connect the power supply to J5 on the motor control board.
- Turn the machine on.

(Step 027 continues)

## MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500

**001**

- Turn the machine off.
- Turn the machine on.

Is the machine totally inoperative (display off, no motor movement, no beep, and no print hammer solenoid operation)?

Yes No

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

*Wheelwriter 30, 35, and 3500 with fuseless power supply:* Go to Step 007

- Turn off the machine.
- Unplug the machine.
- Remove the primary fuse from the switch tower.
- Check the continuity of the fuse.

Is there continuity?

Yes No

**004**

Go to "MAP 0440: Primary Fuse, Wheelwriter 30" on page 2-172.

**005**

- Install the primary fuse.
- If there is no fuse on the power supply board, go to Step 007.
- Remove the +5V fuse from the power supply board.
- Check the continuity of the fuse.

Is there continuity?

Yes No

**006**

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

**007**

- Put the fuse back in the power supply if any were removed.
- Disconnect the line cord from the electrical outlet.
- Measure the voltage at the outlet.

Is the voltage correct?

Yes No

**008**

- Inform the customer there is a problem with the outlet.

**009**

- Plug the line cord back into the electrical outlet.
  - Measure the voltage at the typewriter end of the line cord.
- (Step 009 continues)

**016 (continued)**

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

Yes   No

**017**

**Is there a printer option board installed in the machine?**

Yes   No

**018**

Go to "MAP 0420: Power Supply" on page 2-166.

**019**

Go to Step 021.

**020**

**Single board machines:**

The system board is failing.

**Two-board machines:**

Go to Step 027 on page 2-119.

**021**

(From step 019)

- Turn the machine off.
- Disconnect the power supply connector (J6) from the printer option board.
- Turn the machine on.
- Measure the voltage on the power supply connector at the system board or motor control board.  
Measure between pin 1 (GND) and pin 2 (+5V).

**Does the voltage measure between 4.75 V dc and 5.25 V dc?**

Yes   No

**022**

Go to Step 024.

**023**

The printer option board is failing.

**024**

(From step 022)

- Disconnect the printer option cable from J2 on the power supply.
- Check the continuity on the plug between J6-1 and J6-3.

**Is there continuity?**

Yes   No

**025**

Go to "MAP 0420: Power Supply" on page 2-166.

**026**

(Step 026 continues)

## **MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000**

**Note:** This MAP is for the Wheelwriter 10, 15, 1500 and 3000. If your machine is a Wheelwriter 30, 35, or 3500, go to "MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120. If your machine is a Wheelwriter 50, 70, 5000, or 7000, go to "MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126.

**001**

- Turn the machine off.
- Turn the machine on.

**Is the machine totally inoperative (no LEDs light, no motor movement, no beep, and no solenoid operation)?**

Yes    No

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

- Newer machines with fuseless power supply: go to Step 007.
- Turn off the machine.
- Unplug the machine.
- Remove the primary fuse from the switch tower.
- Check the continuity of the fuse.

**Is there continuity?**

Yes    No

**004**

Go to "MAP 0430: Primary Fuse, Wheelwriter 10, 15" on page 2-170.

**005**

- Install the primary fuse.

**WHEELWRITER 10 typewriter Level 2 and WHEELWRITER 15, 1500, 3000 typewriter:**

- Go to Step 007.

**WHEELWRITER 10 typewriter Level 1:**

- Remove the +5V fuse from the power supply board.
- Check the continuity of the fuse.

**Is there continuity?**

Yes    No

**006**

Go to "MAP 0180: Fuse F1 (+5V)" on page 2-54.

**007**

**WHEELWRITER 10 typewriter Level 1:**

- Put the fuse back in the power supply.

**All machines:**

- Disconnect the line cord from the electrical outlet.
- Measure the voltage at the outlet.

(Step 007 continues)

**030**

- Measure the voltage at the +5V dc test point on the function board.

**Is the voltage between +4.75 V dc and +5.25 V dc?**

Yes   No

**031**

The 16-pin cable is failing.

— or —

The function board is failing.

**032**

The 16-pin cable is failing.

— or —

The function board is failing.

— or —

The motor control board is failing.

— or —

The power supply is failing.

**033**

(From step 005)

- Check the following chart for your identical symptom:

Symptom	Action
POR Incomplete (with printer option installed): <ul style="list-style-type: none"> <li>• Long pause, then the machine attempts to POR again. This will continue until you turn the machine off.</li> </ul>	Replace these FRUs in the following order: <ol style="list-style-type: none"> <li>1. 22-pin cables between the CRT board and function board</li> <li>2. Printer option board</li> <li>3. Function board.</li> </ol>
POR Incomplete (with diskette option installed): <ul style="list-style-type: none"> <li>• WW70, 7000 only. Carrier moves to the left frame, Logo screen remains on.</li> <li>• Six long beeps, machine is inoperative except for beeps.</li> </ul>	Replace these FRUs in the following order: <ol style="list-style-type: none"> <li>1. 22-pin cables between the CRT board and function board</li> <li>2. Diskette control board</li> <li>3. Function board.</li> <li>4. Printer option board (if installed)</li> </ol>

**Did you find your identical symptom?**

Yes   No

**034**

Go to Step 036 on page 2-115.

**035**

(Step 035 continues)

Symptom	Action
<b>POR Incomplete:</b> <ul style="list-style-type: none"> <li>• WW70, 7000 – Screen message is "Insert wheel and press CRTN key." The machine goes system busy when the key is pressed.</li> <li>• Screen mostly dark with snow running through it.</li> <li>• The screen has vertical bars rolling horizontally.</li> <li>• WW70, 7000 - IBM logo screen is distorted with a line running thru it.</li> <li>• Screen is dark, beeper beeps continuously.</li> </ul>	Replace these FRUs in the following order: <ol style="list-style-type: none"> <li>1. 22-pin cables between the CRT board and function board.</li> <li>2. Function board</li> <li>3. CRT control board.</li> </ol>

**Did you find your exact symptom?**

Yes   No

**014**

Go to Step 016.

**015**

**Perform the action required**

**016**

(From steps 007, 011, 014, and 038)

**Single board machines:** Go to Step 024 on page 2-113.

**Two-board machines:**

- Turn the machine off.
- Remove the 16-pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

**Is the cable good?**

Yes   No

**017**

Replace the cable.

**018**

- Install the cable.
- Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

Yes   No

**019**

Replace the 16-pin cable and go to "MAP 0100: Start" on page 2-4.

**020**

- Remove the 22-pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

(Step 020 continues)

## MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000

Note: Newer machines have a single function board rather than a separate motor control board and function board. On two-board machines, the cables between the motor control board and the function board and the cables between the CRT control board and function board must be installed correctly. Ensure the lines of the cables align correctly with the pins in the board connectors. The cables must also be fully seated. Ensure the carrier cable is also installed correctly. If any options are installed, be sure to also check their cables.

**001**

- Turn the machine off.
- Wait 30 seconds.
- Turn the machine on.

Is the machine totally inoperative (CRT remains dark, no motor movement, no beep, no solenoid operation, and no printwheel movement)?

Yes   No

**002**

Does the machine complete POR?

Yes   No

**003**

Are any options installed?

Yes   No

**004**

Go to Step 013 on page 2-111.

**005**

Go to Step 033 on page 2-114.

**006**

Go to Step 010 on page 2-111.

**007**

If you have measured the power supply output voltage in a previous MAP, go to Step 016 on page 2-112. If you have not yet checked the power supply:

**Single board machines:** Measure the voltage on the power supply plug at the function board between J15-1 (gnd) and J15-2 (+5 V dc).

**Two-board machines:** Measure the voltage on the power supply plug at the motor control board between J5-1 (gnd) and J5-2 (+5 V dc).

Is the voltage between 4.75 V dc and 5.25 V dc

Yes   No

**008**

Go to "MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126.

**009**

(Step 009 continues)

**035 (continued)**

**Do you still have the same symptom?**

**Yes    No**

**036**

The Spell Check module(s) are failing.

**037**

Go to Step 015 on page 2-105.

017 (continued)

**Does the machine still have the same symptom?**

Yes   No

**018**

Replace the 16-pin cable and go to "MAP 0100: Start" on page 2-4.

**019**

- Remove the 22-pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

**Is the cable good?**

Yes   No

**020**

Replace the cable.

**021**

- Install the cable.
- Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

Yes   No

**022**

Replace the 22-pin cable and go to "MAP 0100: Start" on page 2-4.

**023**

- Turn the machine off.
- Disconnect the carrier cable from the motor control or system board and check for cracks, wear, broken or damaged outer edges.
- Carefully install the cable.
- Be sure to check for proper alignment and fit.
- Turn the machine on.

**Does the machine still have the same symptom?**

Yes   No

**024**

Go to "MAP 0100: Start" on page 2-4.

**025**

- Turn the machine off.
- Carefully disconnect and connect the carrier cable to the motor control or system board two or three times.
- Turn the machine on.

**Does the machine have the same symptom?**

Yes   No

**026**

Replace the carrier cable and go to "MAP 0100: Start" on page 2-4.

## MAP 0280: Machine Electronics, Wheelwriter 30, 35, 3500

### CAUTION:

On two-board machines, the cables between the motor control board and the function board must be installed correctly. Ensure the lines of the cables align correctly with the pins in the board connectors. The cables must also be fully seated. Ensure the carrier cable is also installed correctly.

**001**

- Turn the machine off.
- Wait 30 seconds.
- Turn the machine on.

Is the machine totally inoperative (Display off, no motor movement, no beep, no solenoid operation, and no printwheel movement)?

Yes    No

**002**

Does the machine complete POR?

Yes    No

**003**

Go to Step 008.

**004**

Go to Step 032 on page 2-107.

**005**

If you have measured the power supply output voltage in a previous MAP, go to Step 015 on page 2-105. If you have not yet checked the power supply:

**Single board machines:** Measure the voltage on the power supply plug at the function board between J15-1 (gnd) and J15-2 (+5 V dc).

**Two-board machines:** Measure the voltage on the power supply plug at the motor control board between J5-1 (gnd) and J5-2 (+5 V dc).

Is the voltage between 4.75 V dc and 5.25 V dc

Yes    No

**006**

Go to "MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120.

**007**

Go to Step 015 on page 2-105.

**008**

(From step 003)

- Turn the machine off.
- Turn the machine on.

(Step 008 continues)

**034**

- Turn the machine off.
- Disconnect the power supply connector from the motor control board or system board.
- Turn the machine on.
- Measure the following voltages on the power supply connector.

Between	Reading
Pin 1(GND) and Pin 2	+5VDC
Pin 3(GND) and Pin 4	+5VDC
Pin 5(GND) and Pin 6	+32VDC
Pin 7(GND) and Pin 8	+32VDC

**Are the voltages present?**

Yes   No

**035**

The power supply is failing.

**036**

**Single board machines:**

The function board is failing.

**Two-board machines:**

- Check the continuity of the 16-Pin cable between the motor control board and the function board.

**Is there continuity?**

Yes   No

**037**

The 16-Pin cable is failing.

**038**

- Replace the function board.

**Does the machine still have the same symptom?**

Yes   No

**039**

Go to "MAP 0100: Start" on page 2-4.

**040**

- Reinstall the original function board.

The motor control board is failing.

**041**

(From step 004)

(Step 041 continues)

**018**

(From steps 005 and 015)

- Turn the machine off.
- Remove the 16-Pin cable between the function board and motor control board and check for cracks, wear, and broken or damaged outer edges.

**Is the cable good?**

Yes   No

**019**

Replace the cable.

**020**

- Install the cable.
- Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

Yes   No

**021**

Replace the 16-Pin Cable and go to "MAP 0400: Start" on page 2-4.

**022**

- Remove the 22-Pin cable between the function board and motor control board and check for cracks, wear, broken or damaged outer edges.

**Is the cable good?**

Yes   No

**023**

Replace the cable.

**024**

- Install the cable.
- Be sure to check for proper alignment and fit.

**Does the machine still have the same symptom?**

Yes   No

**025**

Replace the 22-Pin Cable and go to "MAP 0100: Start" on page 2-4.

**026**

(From steps 005 and 015)

- Turn the machine off.

**Single board machines:**

- Disconnect the carrier cable from the system board and check for cracks, wear, broken or damaged outer edges.
- Carefully install the cable.
- Be sure to check for proper alignment and fit.
- Turn the machine on.

(Step 026 continues)

## MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000

### CAUTION:

**Two-board machines:** The cables between the motor control board and the function board must be installed correctly. Ensure the lines of the cables align correctly with the pins in the board connectors. The cables must also be fully seated. Ensure the carrier cable is also installed correctly.

**001**

- Turn the machine off.
- Wait 30 seconds.
- Turn the machine on.

Is the machine totally inoperative (no LEDs on, no motor movement, no beep, no solenoid operation, and no printwheel movement)?

Yes   No

**002**

Does the machine complete POR?

Yes   No

**003**

Go to Step 006.

**004**

Go to Step 041 on page 2-102.

**005**

### **Single board machines:**

Go to Step 026 on page 2-100.

### **Two-board machines:**

Go to Step 018 on page 2-100.

**006**

(From step 003)

- Turn the machine off.
- Turn the machine on.

Does the machine lock up with all LEDs on solid?

Yes   No

**007**

- Check for a spell check option installed in the machine.

### **WHEELWRITER 10 typewriter:**

- There will be a module in the U102 socket on the function board or system board and it can be removed.

### **WHEELWRITER 15, 1500, 3000 typewriter:**

- There will be a module in the U3 socket on the system board.

(Step 007 continues)

## MAP 0260: Keyboard

**001**

- Turn the machine off.
- Disconnect the keyboard mylar tabs from the function board.
- Check the nylon tabs for damage (silver paint scraped off, bent or broken tabs,

Are the tabs damaged?

Yes   No

**002**

Were you sent here from "MAP 0170: Error Codes" on page 2-48?

Yes   No

**003**

Go to Step 011 on page 2-97.

**004**

- Ensure the keyboard, (part number and machine type), is correct for your machine. See "Keyboard Identification Hole Charts" on page 2-228.

Is the correct keyboard installed?

Yes   No

**005**

Inform the customer an incorrect keyboard is installed.

**006**

Go to Step 008.

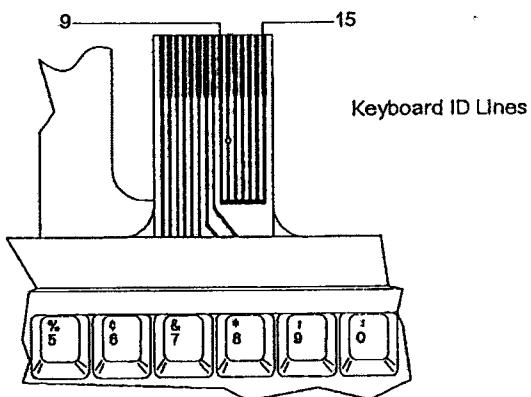
**007**

The keyboard is failing.

**008**

(From step 006)

- Check the keyboard cable ID lines for continuity between line 15 and lines 10 to 14. If a hole is punched in an ID line on the tab, the meter should indicate infinity for that line. If the ID lines have been cut away and replaced by the language modification comb, refer to the "Keyboard Identification Hole Charts" on page 2-228 to verify that the correct teeth of the comb have been removed.



## MAP 0250: Intermittent Failure

**Note:** Play-in-loop may help you locate an intermittent failure. Intermittent dead machine can be caused by a loose line cord or loose cables. Try to duplicate the failure by moving the cables. Check for loose, shorted or corroded pins, connector, line cord, and cables before you replace any parts. Also check the carrier cable and the short cables connecting the electronic boards for damage.

### CAUTION:

The cables between the motor control board and the function board must be installed correctly. The cables must be fully seated and the lines of the cables must align correctly with the pins in the board connectors. Ensure the carrier cable is also installed correctly.

001

Is this the first call for this symptom?

Yes   No

002

Go to Step 004.

003

Try to recreate the failure.

004

(From step 002)

- Locate the symptom in the following chart.
- See the diagnostic listed.
- If you have already replaced a FRU, replace the next most probable FRU until the machine is fixed.

This chart lists the FRUs in the most probable order of failure.

SYMPTOM	1	2	3	4	SEE THESE DIAGNOSTICS
Dead Machine	P	K	C	D	"MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116 "MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120 "MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126
Fuses Blown	B	D	C		"MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116 "MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120 "MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126
Homing Sensor Failure	F	D	A		"MAP 0190: Homing Sensor, Carrier" on page 2-56
Incomplete POR	F	B	D	C	"MAP 0230: Incomplete Power On Reset (POR) Wheelwriter 10, 15, 1500, 3000" on page 2-78
Indicator Panel Failure	D	L			"MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76
Display Failure	D	R			"MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32

**064 (continued)**

Go to "MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000" on page 2-110.

**065**

- If your machine is a WW50 or 5000 go to Step 069.
- If your machine is a WW70 or 7000, continue with this step.

**Does the machine beep one time?**

Yes   No

**066**

**Does the machine complete POR except for beeping one time?**

Yes   No

**067**

Go to "MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000" on page 2-110.

**068**

The 16-pin Cable is failing.

— or —

The function board is failing.

— or —

The motor control board is failing.

**069**

(From step 065)

**WW70, 7000 — Does the machine beep 3 times and display a blinking Battery Indicator?**

**WW50, 5000 — Does the machine beep 3 times and display a LOW BAT indicator?**

Yes   No

**070**

Go to Step 072.

**071**

Go to "MAP 0110: Battery Backup" on page 2-16.

**072**

(From step 070)

**Is the diskette option installed?**

Yes   No

**073**

Go to Step 076 on page 2-93.

**074**

(Step 074 continues)

**MAP 0240 (continued)**

044 (continued)

Does the machine complete POR except for beeping one time?

Yes   No

**045**

Go to Step 047.

**046**

The 16-pin cable is failing.

— or —

The function board is failing.

— or —

The motor control board is failing.

**047**

(From step 045)

Is spell check installed?

Yes   No

**048**

Go to Step 054.

**049**

The machine may beep two times.(The sound will depend on how the operator has set code + 4.

Does the machine beep two times?

Yes   No

**050**

Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.

**051**

Does the machine beep 3 times?

Yes   No

**052**

Go to Step 054.

**053**

Go to "MAP 0110: Battery Backup" on page 2-16.

**054**

(From steps 048 and 052)

(Step 054 continues)

**MAP 0240 (continued)**

**023**

(From step 019)

**Does the carrier move to the right?**

Yes No

**024**

- Turn the machine off.
- Push the carrier to the center of the machine.
- Turn the machine on.

**Does the carrier move to the right?**

Yes No

**025**

Go to "MAP 0580: Transport" on page 2-222.

**026**

Go to Step 027.

**027**

(From step 026)

**Does the carrier continue to drive into the right frame?**

Yes No

**028**

The carrier may or may not move.

**Does the transport motor hum, buzz or make other noises?**

Yes No

**029**

Go to Step 032.

**030**

Go to "MAP 0580: Transport" on page 2-222.

**031**

Go to "MAP 0520: Selection" on page 2-198.

**032**

(From step 029)

**Does the printwheel home?**

Yes No

**033**

**Single board machines:**

(Step 033 continues)

## **MAP 0240: Incomplete Power On Reset (POR) Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000**

**001**

- Turn the machine off.
- Turn the machine on.
- Carefully observe the POR sequence. You may have to turn the machine off and on several times to verify a specific step. Wait at least 30 seconds between each POR.

**Does the machine complete the POR?**

Yes No

**002**

**Is there an error indication on the display?**

Yes No

**003**

Go to Step 006.

**004**

Go to "MAP 0170: Error Codes" on page 2-48.

**005**

Go to "MAP 0100: Start" on page 2-4.

**006**

(From step 003)

WW70, 7000 — The CRT screen should be dark when the power is first turned on and then the IBM Logo screen should appear.

WW50, 5000 — The CRT screen should be dark with a blinking cursor when the power is first turned on.

WW30, 35, 3500 - Is the display blank (No PELS on)?

WW50, 5000 - Does the blinking cursor display?

WW70, 7000 - Does the IBM Logo screen display?

Yes No

**007**

WW30, 35, 3500 - Go to "MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32.

WW50, 70, 5000, 7000 - Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20.

**008**

**Does the printwheel rotate slightly?**

Yes No

**009**

Go to "MAP 0520: Selection" on page 2-198.

**010**

(Step 010 continues)

**067 (continued)**

**Does the print hammer operate one time?**

**Yes**   **No**

**068**

Go to Step 072.

**069**

**Does the print hammer hit too hard or remain energized?**

**Yes**   **No**

**070**

Go to Step 074.

**071**

The Function Board is failing.

**072**

(From step 068)

**Does the print hammer energize?**

**Yes**   **No**

**073**

Go to "MAP 0470: Print Quality" on page 2-184.

**074**

(From step 070)

**Are all the line space LEDs off except one?**

**Yes**   **No**

**075**

Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

**076**

- Press the line space keybutton 3 or 4 times.

**Do the line space LEDs change each time you press the keybutton?**

**Yes**   **No**

**077**

Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

**078**

- Put a sheet of paper in the machine. If the SAPI does not work, pull the paper release lever forward and slide the paper in.
- Press each character keybutton from a to z. Look for a change in the LEDs, motor movement, solenoid operation, or beeps as an indication that the function board or system board senses the keybutton is being pressed.

(Step 078 continues)

**045 (continued)**

**Does the printwheel rotate slightly?**

**Yes**   **No**

**046**

**Does the machine complete POR except for the printwheel turning?**

**Yes**   **No**

**047**

Go to Step 049.

**048**

Go to "MAP 0520: Selection" on page 2-198.

**049**

(From step 047)

**Does the printwheel make approximately 3 revolutions?**

**Yes**   **No**

**050**

Go to "MAP 0520: Selection" on page 2-198.

**051**

**Does the ribbon plate move up, then down?**

**Yes**   **No**

**052**

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

**053**

**Does the ribbon feed one time?**

**Yes**   **No**

**054**

Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.

**055**

- Turn the machine off.
  - Move the carrier to the right side frame.
  - Turn the machine on.
- Does the carrier move to the left frame then to the right?**

**Yes**   **No**

**056**

(Step 056 continues)

## MAP 0230: Incomplete Power On Reset (POR) Wheelwriter 10, 15, 1500, 3000

**001**

- Turn the machine off.
- Turn the machine on.
- Carefully observe the POR sequence. You may have to turn the machine off and on several times to verify a specific step. Wait at least 30 seconds between each POR.

**Does the machine complete the POR?**

Yes No

**002**

Are any or all indicator panel LEDs flashing?

Yes No

**003**

Go to Step 006.

**004**

Go to "MAP 0170: Error Codes" on page 2-48.

**005**

Go to "MAP 0100: Start" on page 2-4.

**006**

(From step 003)

Do all the LEDs turn on?

Yes No

**007**

Go to Step 009.

**008**

Go to Step 012 on page 2-79.

**009**

(From step 007)

Do any indicator panel LEDs turn on?

Yes No

**010**

Go to Step 012 on page 2-79.

**011**

Go to Step 015 on page 2-79.

## MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000

001

- Turn the machine off.
- Turn the machine on.

Do all the indicator panel LEDs turn on during POR?

Yes No

002

Do any indicator panel LEDs turn on during POR?

Yes No

003  
Go to Step 008.

004

**System board machines:**

- Turn the machine off.
- Disconnect J4 from the system board.
- Turn the machine on.
- Measure the voltage on the J4 plug between J4-1 (+5 V dc) and J4-2 (gnd).

**Two-Board machines:**

- Turn the machine off.
- Disconnect J5 from the function board.
- Turn the machine on.
- Measure the voltage on the J5 plug between J5-1 (+5 V dc) and J5-9 (gnd).

Is the voltage between 4.5 V dc and 5.5 V dc?

Yes No

005  
The function board is failing.

006

The indicator panel is failing.

007

Do all the LEDs turn off during POR?

Yes No

008

**System board machines:**

- Turn the machine off.
- Disconnect J4 from the system board.
- Turn the machine on.
- Measure the voltage on the J4 plug between J4-1 (+5 V dc) and J4-9 (gnd) as you press the keybutton that turns on the failing LED.

**Two-board machines:**

- Turn the machine off.
- (Step 008 continues)

**053 (continued)**

- Check from the carrier cable board connector, pins 6, 7, and 20 to the homing sensor connector.

**Is there continuity?**

**Yes**   **No**

**054**

The carrier cable board is failing.

**055**

- Reconnect the homing sensor cable.
- Be sure the carrier cable is properly connected to the carrier cable board.
- Install the carrier.
- Turn the machine on.

**Do you still have the original symptom?**

**Yes**   **No**

**056**

Go to "MAP 0100: Start" on page 2-4.

**057**

The function board is failing.

— or —

The selection plate assembly is failing.

— or —

The LED assembly is failing.

— or —

The motor control board is failing.

040 (continued)

Do you still have the same symptom?

Yes   No

**041**

Go to "MAP 0100: Start" on page 2-4.

**042**

(From step 033)

- Measure the resistance as indicated in the following chart.

Meter Lead	Motor Control Board End of Carrier Cable	Reading
VOM COM	Pin-20 Pin-7	Greater than 500K Ohms
VOM COM	Pin-20 Pin-6	Greater than 500K Ohms
VOM COM	Pin-7 Pin-20	Greater than 500K Ohms
VOM COM	Pin-6 Pin-20	30K to 50K Ohms
VOM COM	Pin-7 Pin-6	Greater than 500K Ohms
VOM COM	Pin-6 Pin-7	30K to 50K Ohms

Are the measurements correct?

Yes   No

**043**

Go to Step 051 on page 2-73.

**044**

- Remove the carrier.
- Check the homing sensor and LED assembly for ribbon particles, paper dust, and obstructions.

Are the homing sensor and LED assembly clean?

Yes   No

**045**

- Clean as necessary.
- Install the carrier.

Go to "MAP 0100: Start" on page 2-4.

**046**

- Check the position of the sensor.

(Step 046 continues)

**028**

- Turn the machine off.
- Turn the machine on.

**Do you still have the same symptom?**

Yes   No

**029**

Go to "MAP 0100: Start" on page 2-4.

**030**

The 22-pin cable is failing.

— or —

The 16-pin cable is failing.

— or —

The function board is failing.

— or —

The motor control board is failing.

**031**

(From step 027)

- Turn the machine off.
- Set the meter to the RX1K scale.
- Set the polarity switch to +.
- Measure the resistance as indicated below.

Meter Lead	Motor Control Board End of Carrier Cable	Reading
COM VOM	Pin-6 Pin-22	10K to 80K Ohms
COM VOM	Pin-22 Pin-6	500K Ohms or more

**Are the measurements correct?**

Yes   No

**032**

Go to Step 034.

**033**

Go to Step 042 on page 2-72.

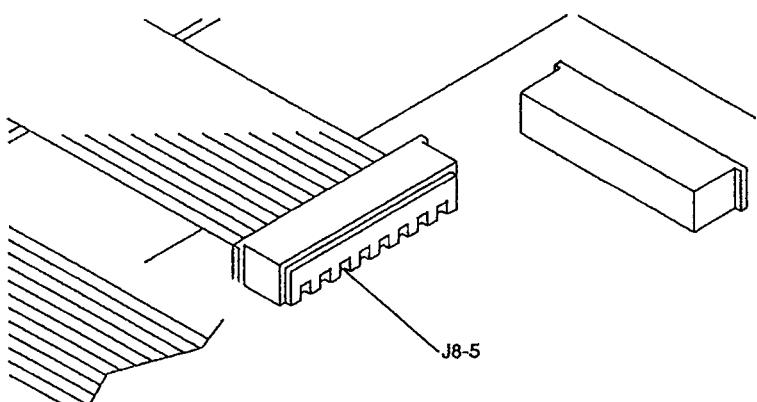
**034**

(From step 032)

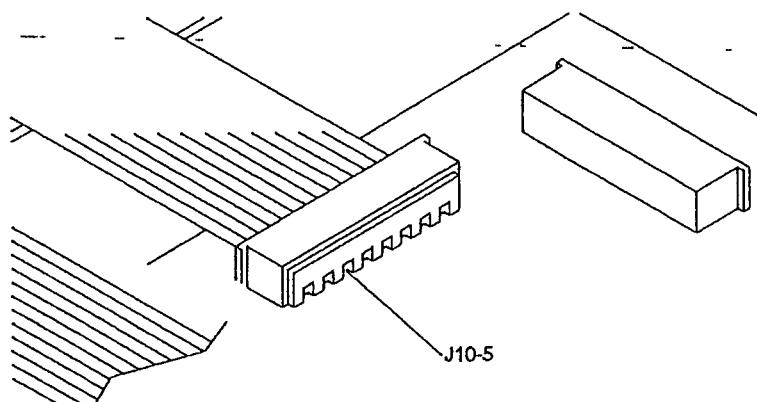
- Disconnect the homing LED from the carrier cable board.
- Measure the resistance between the red and black leads on the homing LED connector.

019

- WW10 - Measure the voltage at J8-5 on the function board as you slowly push the homing sensor flag in and out.



- WW30, 50, 70 - Measure the voltage at J10-5 on the function board as you slowly push the homing sensor flag in and out.



Does the voltage change?

Yes   No

020

- Turn the machine off.

**WW10:**

- Disconnect the 16-pin cable from J8 on the function board.
- Turn the machine on.
- Measure the voltage at J8-5.

**WW30, 50, 70:**

- Disconnect the 16-pin cable from J10 on the function board.
- Turn the machine on.
- Measure the voltage at J10-5.

Is the voltage between 4.5 V dc and 5.5 V dc?

Yes   No

021

The function board is failing.

## MAP 0210: Homing Sensor, Printwheel – Two Board Machines

Note: Wheelwriter 50 will not operate without a printwheel installed.

Wheelwriter 70 only: If the printwheel has been removed from the machine, the message INSERT PRINTWHEEL will appear on the CRT. If you want to operate the machine without the printwheel, hold down the Code + Shift keybuttons and press Crtn.

**001**

Is a known good printwheel available?

Yes   No

**002**

Go to Step 006.

**003**

– Try a known good printwheel in the machine.

Does the machine operate correctly now?

Yes   No

**004**

Go to Step 006.

**005**

The original printwheel is failing.

**006**

(From steps 002 and 004)

- Check the printwheel.
- Ensure the homing, pitch, and impression holes open, and the printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)

Is the printwheel good?

Yes   No

**007**

The printwheel is failing.

**008**

- Turn the machine off.
- Carefully check the 16- and 22-pin cables between the motor control board and the function board for cracks, breaks, wear, and damaged edges.

Is either cable damaged?

Yes   No

**009**

Go to Step 015 on page 2-67.

**010**

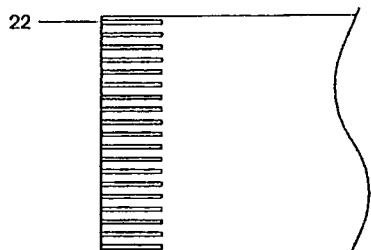
(Step 010 continues)

## MAP 0200 (continued)

046 (continued)

(From step 036)

- Check the continuity of lines 6, 7, and 20 in the carrier cable.



CARRIER CABLE

Is there continuity?

Yes   No

047

The carrier cable is failing.

048

- Remove the carrier from the machine.
- Check the continuity of the carrier cable board from the carrier cable board connector, pins 6, 7, and 20 to the homing sensor connector.

Is there continuity?

Yes   No

049

The carrier cable board is failing.

050

- Reconnect the homing sensor cable.
- Be sure the carrier cable is properly connected to the carrier cable board and the system board.
- Install the carrier.
- Turn the machine on.

Does the machine still have the original symptom?

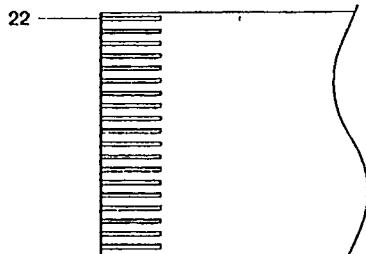
Yes   No

051

Go to "MAP 0100: Start" on page 2-4.

052

The selection plate assembly is failing.



CARRIER CABLE

Is there continuity?

Yes   No

032

The carrier cable is failing.

033

- Reinstall the carrier cable on the carrier cable board and on the system board.
- Reinstall the homing LED cable.
- Turn the machine on.

Does the machine still have the same symptom?

Yes   No

034

Go to "MAP 0100: Start" on page 2-4.

035

(From step 026)

- Turn the machine off.
- If the carrier cable is disconnected from the system board, reinstall it.
- Measure the resistance between the following points on the carrier cable board.

Meter Lead	Carrier Cable Connector	Reading
VOM COM	Pin-20 Pin-7	4K to 12K Ohms
VOM COM	Pin-20 Pin-6	4K to 12K Ohms
VOM COM	Pin-7 Pin-20	4K to 12K Ohms
VOM COM	Pin-6 Pin-20	4K to 12K Ohms
VOM COM	Pin-7 Pin-6	0.5K to 1.0K Ohms
VOM COM	Pin-6 Pin-7	0.5K to 1.0K Ohms

(Step 035 continues)

**MAP 0200 (continued)**

017 (continued)

- Turn the machine on.
- Measure the voltage at lines 20 and 6 of the carrier cable board end of the carrier cable.  
**Is the voltage between 4.5 V dc and 5.5 V dc?**

Yes   No

**018**

- Remove the carrier cable.
- Check the continuity of lines 6 and 20 in the carrier cable.

**019**

**Is there continuity?**

Yes   No

**020**

The carrier cable is failing.

**021**

The system board is failing.

**022**

Go to Step 024.

**023**

Go to "MAP 0520: Selection" on page 2-198.

**024**

(From step 022)

- Turn the machine off.
- If it has been disconnected reinstall the carrier cable to the carrier cable board.
- Disconnect the carrier cable from the system board.
- Set the meter to the RX1K scale.
- Set the polarity switch to +.
- Measure the resistance as indicated below.

Meter Lead	System Board End of Carrier Cable	Reading
COM VOM	Pin-6 Pin-22	10K to 80K Ohms
COM VOM	Pin-22 Pin-6	500K Ohms or more

(Step 024 continues)

## MAP 0200: Homing Sensor, Printwheel — Single Board Machines

Note: Wheelwriter 50 and 5000 will not operate without a printwheel installed.

Wheelwriter 70 and 7000: If the printwheel has been removed from the machine, the message INSERT PRINTWHEEL will appear on the CRT. If you want to operate the machine without the printwheel, hold down the Code + Shift keybuttons and press Crtn.

**001**

Is a known good printwheel available?

Yes No

**002**

Go to Step 006.

**003**

— Try a known good printwheel in the machine.

Does the machine operate correctly now?

Yes No

**004**

Go to Step 006.

**005**

The original printwheel is failing.

---

**006**

(From steps 002 and 004)

- Check the printwheel.
- Ensure the homing, pitch, and impression holes are open, and the printwheel is free of binds. (To check for binds, push the printwheel toward the rear of the cartridge and rotate it.)

Is the printwheel good?

Yes No

**007**

The printwheel is failing.

**008**

- Turn the machine off.
- Carefully check the carrier cable for cracks, wear, and damaged edges.

Is the cable damaged?

Yes No

**009**

Go to Step 011 on page 2-59.

**010**

The carrier cable is failing.

---

## MAP 0190: Homing Sensor, Carrier

Note: Wheelwriter 50 and 5000 will not operate without a printwheel installed.

Wheelwriter 70 and 7000: If the printwheel has been removed from the machine, the message INSERT PRINTWHEEL will appear on the CRT. If you want to operate the machine without the printwheel, hold down the Code + Shift keybuttons and press Crtn.

**001**

- Turn the machine off.
- Turn the machine on.

WW10, 15, 1500, 3000 - Does the machine display an error code of 6 beeps and LEDs 1, 2, 3 blinking?

WW30, 35, 50, 70, 3500, 5000, 7000 - Does the machine display a 215 error code?

Yes    No

**002**

Go to "MAP 0100: Start" on page 2-4.

**003**

Is the homing sensor flag broken?

Yes    No

**004**

Go to Step 006.

**005**

Replace the homing sensor flag.

**006**

(From step 004)

- Turn the machine off.
- Push the carrier to the left side frame.

Does the homing sensor flag contact the left side frame?

Yes    No

**007**

Go to "MAP 0580: Transport" on page 2-222.

**008**

- Turn the machine off.
- Observe the POR sequence as you turn the machine on.

Does the carrier move at all?

Yes    No

**009**

Go to "MAP 0580: Transport" on page 2-222.

**010**

(Step 010 continues)

## MAP 0180: Fuse F1 (+5V)

001

Are you here because fuse F1 is blowing?

Yes No

002

Go to "MAP 0100: Start" on page 2-4.

003

- Turn the machine off.

*WW10 with Single board:*

- Disconnect J9 from the system board.
- Replace fuse F1.
- Turn the machine on.

*WW15:*

- Disconnect J15 from the function board.
- Replace fuse F1.
- Turn the machine on.

*Two board machines*

- Disconnect J5 from the motor control board.
- Replace fuse F1.
- Turn the machine on.

Does fuse F1 blow again?

Yes No

004

- Turn the machine off.
- Set your meter to the RX100 scale.

*WW10 with Single board:*

- Measure the resistance between J9-2 (+5V) and J9-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J9-2 and the black meter lead (COM) connected to J9-8.

*WW15 with Single board:*

- Measure the resistance between J15-2 (+5V) and J15-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J15-2 and the black meter lead (COM) connected to J15-8.

*Two board machines*

- Measure the resistance between J5-2 (+5V) and J5-8 (+32V) on the motor control board.

**Note:** The meter polarity switch must be set to + and the red meter lead (VOM) connected to J5-2 and the black meter lead (COM) connected to J5-8.

Is the resistance less than 500 ohms?

Yes No

005

Go to Step 008 on page 2-55.

006

(Step 006 continues)

**Diskette Errors**

<b>Beeps</b>	<b>Error Indication</b>	<b>Fault</b>	<b>Action</b>
6	160	RAM/Diskette Control Failure	Go to "MAP 0130: Diskette Option" on page 2-24.
6	161	Diskette Drive Operator Check Failure	Go to "MAP 0130: Diskette Option" on page 2-24.
6	162	Code Mismatch	Go to "MAP 0130: Diskette Option" on page 2-24.

Beeps	Error Indicator	Fault	Action
6	141	Spelling Invalid or Missing Spelling Dictionary	Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.

**Printer Option Errors.**

Beeps	Error Indication	Fault	Action
6	101 80	Printer Option Not Found	Printer option board is failing. or Function board is failing. or Cables are failing.
6	131	Printer Option Error	Printer option board is failing.
3	Out Of Paper	Out-of-Paper	If not out of paper, go to "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138.
3	End Of Ribbon	End-of-Ribbon	If not at end of ribbon, go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36.
3	Change Wheel	Printwheel Change	Install correct printwheel.
3	Missing Wheel	Missing Printwheel	Install printwheel.
6	102	Feature Disable Error	Go to "MAP 0340: Options Inoperative" on page 2-134.

**Diskette Errors**

Beeps	Error Indication	Fault	Action
6	101 90	Diskette Not Found	Diskette control board is failing. or Function board is failing. or Cables are failing.
6	160	RAM/Diskette Control Failure	Go to "MAP 0130: Diskette Option" on page 2-24.
3	161	Diskette Drive Operator Check Failure	Go to "MAP 0130: Diskette Option" on page 2-24.
3	162	Code Mismatch	Go to "MAP 0130: Diskette Option" on page 2-24.

## MAP 0170: Error Codes

### Wheelwriter 10, 15, 1500, 3000 Error Codes

B = LEDs blink at same time

S = LEDs blink sequentially

#### Base Machine Error Codes

Beeps	LED 1	LED 1.5	LED 2	LED 3	Fault	Action
6	B			B	Function board failure System board failure	The function board is failing. The system board is failing.
6	B		B	B	Selection homing failure	Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.
6	B	B		B	ROM scan error	Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.
6	B		B		Invalid keyboard	Go to "MAP 0260: Keyboard" on page 2-96.
6	B	B	B		Spelling RAM	Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.
3	B	B	B	B	Dead Batteries	Go to "MAP 0110: Battery Backup" on page 2-16.
3	S	S	S	S	Low Batteries	Go to "MAP 0110: Battery Backup" on page 2-16.
6	B	B			Feature Disable Error	Go to "MAP 0340: Options Inoperative" on page 2-134.
6	B	B	B		Spelling RAM/Correction Buffer failure	The function board is failing. The system board is failing.
3	B		B	B	Transport Failure	Go to "MAP 0580: Transport" on page 2-222.
3	B	B	B	B	Not an Error See Note	Power the printer Off then On

**Note:** (WW15, WW1500, and WW3000) LED 1 and 3 will alternate blinking with LED 1.5 and 2. This LED code indicates the batteries are "Good." and the machine has performed a reset of the format and forms storage areas. This code is displayed upon initial battery installation or battery replacement with the power off.

038 (continued)

Is the voltage less than 4.0 V dc?

Yes   No

**039**

The sensor assembly is failing.

**040**

- Turn the machine off.
- Disconnect the carrier cable from the carrier cable board.
- Turn the machine on.
- Measure the voltage at line 21 of the carrier cable at the carrier end of the cable.

Is the voltage less than 4.0 V dc?

Yes   No

**041**

The carrier cable board is failing.

**042**

- Turn the machine off.
- Check the continuity of line 6 and line 21 of the carrier cable.

Is there continuity?

Yes   No

**043**

The carrier cable is failing.

**044**

**Single board machines:**

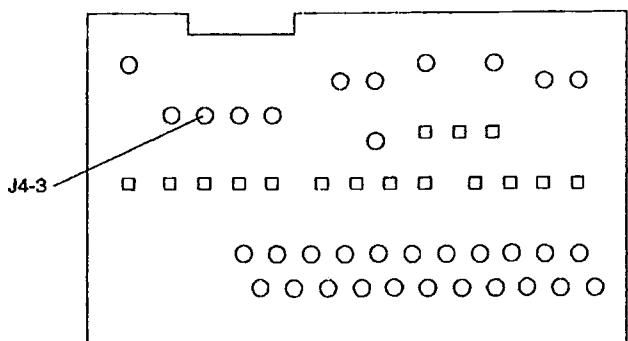
The function board is failing.

**Two-board machines:**

The motor control board is failing.

**026**

- Monitor the voltage at J4-3 on the carrier cable board as you pass a piece of paper through the sensor.



**Does the voltage change approximately 0 to 5 V dc?**

Yes   No

**027**

- Turn the machine off.
- Measure the continuity between the following points on the wiring side of the carrier cable board:

Table 2-1.	
J4 Pin	Carrier Cable Connector Pin
1	7
2	19
3	21
4	6

**Is there continuity?**

Yes   No

**028**

The carrier cable board is failing.

**029**

The end-of-ribbon sensor is failing.

**030**

- Check the continuity of line 21 in the carrier cable between the end of the carrier cable and J4-3 on the carrier cable board.

**Is there continuity?**

Yes   No

**031**

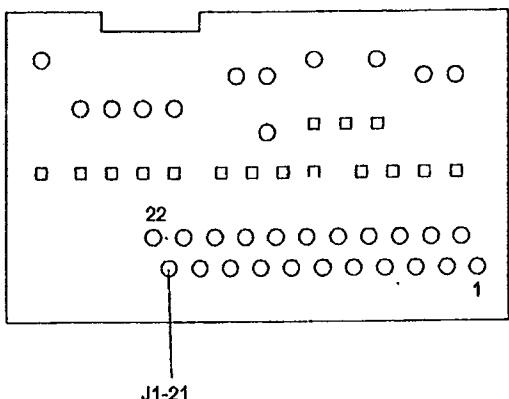
(Step 031 continues)

016

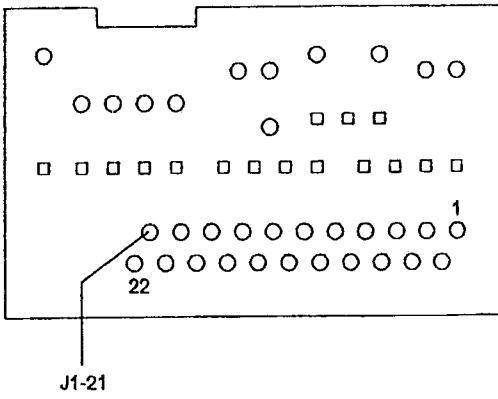
(From step 014)

**WW10 with system board:**

- Monitor the voltage at the J1-21 on the carrier cable board as you pass a piece of paper through the opening in the ribbon sensor.



Level 1



Level 2

**Does the voltage change?**

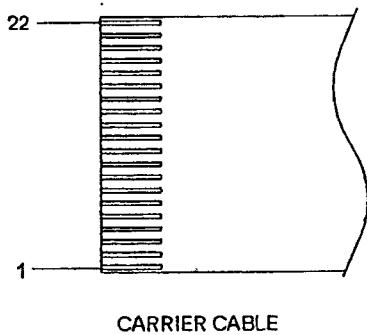
Yes   No

017

Go to Step 024 on page 2-43.

018

- Check the continuity of line 21 and of line 6 in the carrier cable.



CARRIER CABLE

**Is there continuity?**

Yes   No

019

The carrier cable is failing.

020

**Single board machines:**

The function board is failing.

**Two board machines:**

(Step 020 continues)

## MAP 0160: End-of-Ribbon Sensor Electrical

001

### *Single board machines:*

- Go to Step 003.

### *Two board machines:*

- Check the 16-pin and 22-pin cables between the function board and the motor control board for cracks, breaks, damaged contacts or damaged outer edges.

### Are the cables good?

Yes No

002

Replace the failing cable.

003

(From step 001).

### *Single board machines:*

- Check the carrier cable at the system board end for breaks, damaged contacts, or damaged outer edges.

### *Two board machines:*

- Check the carrier cable at the motor control board end for breaks, damaged contacts, or damaged outer edges.

### Is the cable good?

Yes No

004

The carrier cable is failing.

005

- Check the end of the ribbon sensor and LED for paper dust, ribbon particles or obstructions.

### Are the sensor and LED clean?

Yes No

006

Clean and go to "MAP 0100: Start" on page 2-4.

007

(From step 012)

- Turn the machine on.
- Tab to the right side frame.
- Remove the ribbon cartridge.
- Activate the sensor and switch test (CODE + SHIFT + TSet).

### Does the BOLD indicator come on solid?

Yes No

008

- Press any keybutton to exit the sensor and switch test.
- Press CODE + BOLD.

(Step 008 continues)

## MAP 0150 (continued)

### 022 (continued)

- Check the ribbon lift adjustment. See page 3-5.

**Is the adjustment correct?**

Yes   No

023

Correct the adjustment and go to "MAP 0100: Start" on page 2-4.

024

Ask the customer to save the ribbon if the problem happens again and end the call.

025

(From step 011)

- Check the ribbon for scratches, voids, or other damage.

**Is the ribbon damaged?**

Yes   No

026

Go to Step 028.

027

Try a new ribbon.

028

(From step 026)

**Is the end-of-ribbon sensor free of obstruction, and positioned correctly?**

Yes   No

029

Correct the sensor problem and go to "MAP 0100: Start" on page 2-4.

030

- Check the ribbon lift adjustment. See page 3-5.

**Is the adjustment correct?**

Yes   No

031

Correct the adjustment and go to "MAP 0100: Start" on page 2-4.

032

- Check for a bright light shining directly on the typewriter such as sunlight, overhead light, or desk light.

**Is there a bright light shining on the typewriter?**

Yes   No

033

(Step 033 continues)

## MAP 0150: End-of-Ribbon Sensor

001

- Remove the ribbon cartridge from the machine.
- Activate the switch and sensor test (CODE + SHIFT + TSet).

WW10, 15, 1500, 3000 -Does the BOLD LED on the indicator panel come on solid?

WW30, 35, 50, 70, 3500, 5000, 7000 -Does the BOLD indicator come on?

Yes      No

002

Go to "MAP 0160: End-of-Ribbon Sensor Electrical" on page 2-40.

003

- Slowly pass a piece of paper between the LED and ribbon sensor in the end of ribbon housing.

WW10, 15, 1500, 3000 - Does the BOLD LED go off and on?

WW30, 35, 50, 70, 3500, 5000, 7000 -Does the BOLD indicator go off and on?

Yes      No

004

Go to "MAP 0160: End-of-Ribbon Sensor Electrical" on page 2-40.

005

- Examine the ribbon sensor and LED for paper dust, ribbon particles or obstructions.  
Is the sensor and LED clean?

Yes      No

006

Clean the sensor and LED and go to "MAP 0100: Start" on page 2-4.

007

Does the machine detect the end of the ribbon?

Yes      No

008

**Note:** When typing from the keyboard, rely on the color trailer at the end of the ribbon to signal the end of the ribbon.

Go to Step 012 on page 2-37.

009

Does the machine display an end-of-ribbon error code before the ribbon has reached the trailer?

Yes      No

010

Go to "MAP 0100: Start" on page 2-4.

**021**

The display is failing.

— or —

The function board is failing.

---

## MAP 0140: Display, Wheelwriter 30, 35, 3500

**001**

- Turn the machine off.
- Turn the machine on.
- Adjust the contrast control to the center of its range.

Is the display black (all PELs on)?

Yes   No

**002**

Go to Step 004.

**003**

The function board is failing.

— or —

The display is failing.

— or —

The display cable is failing (WW30 only).

**004**

(From step 002)

Is the display blank (no PELs on)?

Yes   No

**005**

Go to Step 013 on page 2-33.

**006**

- Adjust the contrast control fully clockwise.

Is the display still blank?

Yes   No

**007**

- Adjust the contrast control over its entire range.

Does the display operate properly?

Yes   No

**008**

The display is failing.

— or —

The function board is failing.

**009**

Go to "MAP 0100: Start" on page 2-4.

**010**

(Step 010 continues)

**043**

(From step 032)

Error code 004XY or 010 XY displayed during test.

— Try a new diskette. Be sure to FORMAT or PREPARE the diskette before using it.

Does the machine display the same error code during test?

Yes    No

**044**

The original diskette is failing.

**045**

Replace these FRUs in the following order:

1. Interface board
2. Disk drive assembly
3. Diskette control board
4. Function board.

**046**

(From step 032)

Error code 020 XY, 040 XY, 060 XY, or 080 XY displayed during TEST.

Replace the FRUs in the following order:

1. Interface board
2. Diskette drive
3. Diskette control board
4. Function board and cables.

Error Code	Failure	Action
010 XY	Bad CRC	WW30, 35, 3500 - Go to Step 036 on page 2-28. WW50, 70, 5000, 7000 - Go to Step 043 on page 2-30.
020 XY	Defective Controller	WW30, 35, 3500 - Go to Step 036 on page 2-28. WW50, 70, 5000, 7000 - Go to Step 046 on page 2-30.
040 XY	Bad Seek	WW30, 35, 3500 - Go to Step 036 on page 2-28. WW50, 70, 5000, 7000 - Go to Step 046 on page 2-30.
060 XY	Bad Controller Seek	WW30, 35, 3500 - Go to Step 036 on page 2-28. WW50, 70, 5000, 7000 - Go to Step 046 on page 2-30.
080 XY	Time Out	WW30, 35, 3500 - Go to Step 036 on page 2-28. WW50, 70, 5000, 7000 - Go to Step 046 on page 2-30.

**Note:** The X in the error code = side, and the Y = operation. Locate the error code numbers in the following chart to determine the problem.

Side	Operation
X = 0 - side 0	Y = 0 - reset
X = 1 - side 1	Y = 1 - reserved Y = 2 - read Y = 3 - write Y = 4 - verify Y = 5 - format

Do you have any of the error codes listed above?

Yes      No

**033**

Go to Step 038 on page 2-29.

**034**

Perform the required action.

**035**

(From step 032)

Error code 002 XY displayed during TEST.

Replace the FRUS in the following order:

1. Diskette drive
2. Diskette control board
3. Diskette drive to control board cable.
4. Function board and 22-pin cables

**036**

(From step 032)

(Step 036 continues)

**017 (continued)**

**Do you still have the same symptom?**

**Yes**   **No**

**018**

Go to "MAP 0100: Start" on page 2-4.

**019**

**Replace the FRUS in the following order:**

1. Diskette drive interface board
2. Diskette drive to diskette control board cable.
3. Diskette control board
4. Function board

**020**

(From steps 010 and 012)

The following tests require the use of a scratch diskette.

You must run the prepare function on the diskette before you run the test. This will destroy all data on the diskette. *Be sure to use a diskette that does not contain useful data.*

- Run the prepare function.
- Activate the Diskette Service diagnostics by holding down Code and Shift while pressing the = key.
- Select TEST from the Diskette service menu.

**Does the test perform successfully?**

**Yes**   **No**

**021**

- Check the continuity of the diskette drive cable.

**Is the continuity good?**

**Yes**   **No**

**022**

The diskette drive-to-diskette control board cable is failing.

**023**

Go to Step 032 on page 2-27.

**024**

Go to Step 038 on page 2-29.

**025**

(From steps 010 and 012)

The following tests require the use of a scratch diskette.

You must format the diskette before you run the test. This will destroy all data on the diskette. *Be sure to use a diskette that does not contain useful data.*

- WW70, WW7000 — Select FORMAT A DISKETTE from the word processor menu and format a diskette.
- WW50, WW5000 — Select PREPARE from the menu and prepare (format) a diskette.

(Step 025 continues)

## MAP 0130: Diskette Option

**001**

- Check diskette control board for proper installation.
- If the printer option board is installed make sure it is installed correctly.

**Is the diskette control board properly installed?**

Yes   No

**002**

Correct it and go to "MAP 0100: Start" on page 2-4.

**003**

- Check the white 22-pin cables on the options for proper alignment, and fit. Also check for damage.

**Are all cables good?**

Yes   No

**004**

Repair and go to "MAP 0100: Start" on page 2-4.

**005**

- Check the diskette drive cable for proper installation.

Error code 161 will be displayed if the drive cable is not connected.

**Is the cable properly attached to the diskette control board?**

Yes   No

**006**

Repair and go to "MAP 0100: Start" on page 2-4.

**007**

**Did you come here from the Error Code MAP?**

Yes   No

**008**

**Does the disk drive initialize?**

Yes   No

**009**

Replace these FRUs in the following order:

1. Diskette control board and cables
2. Function board and cables
3. Interface board
4. Disk drive
5. Printer option board (if installed).

**010**

If your machine is a Wheelwriter 30, 35, or 3500, go to Step 020 on page 2-26.  
(Step 010 continues)

**MAP 0120 (continued)**

**016 (continued)**

- Turn the machine off.
- Disconnect the cables from J13 and J14 on the function board.
- Turn the machine on.

**Do you still have the same symptom?**

Yes   No

**017**

The 22-pin cables are failing.

— or —

The diskette control board is failing.

— or —

The function board is failing.

**018**

(From step 015)

The 22-pin cables from the CRT control board to the function board are failing.

— or —

The CRT control board is failing.

— or —

The function board is failing.

— or —

The CRT assembly is failing.

## MAP 0120: CRT Display WW 50, 70, 5000, 7000

Note: Be sure the CRT display is plugged into a properly functioning AC outlet and connected to the CRT control board.

001

- Check the following chart for your *identical* symptom.

Symptom	Action
<ul style="list-style-type: none"><li>Image on screen rolls up or rolls down (Loss of vertical sync.)</li><li>Image on screen rolls sideways (Loss of horizontal sync).</li><li>Loss of both horizontal and vertical sync.</li></ul>	The CRT control board is failing. or The CRT display assembly is failing.
<ul style="list-style-type: none"><li>Image on screen all white. Controls on CRT have no effect.</li></ul>	The CRT control board is failing. or The function board is failing. or The CRT display assembly is failing.

Did you find the exact symptom from the chart above?

Yes   No

002

Go to Step 004.

003

Perform the required action.

004

(From step 002)

- Turn the CRT display power on.
- Adjust the brightness and contrast controls to 3/4 clockwise.
- Turn the machine on.

Does the CRT remain dark during or after POR?

Yes   No

005

The 22-pin cables from the CRT control board to the function board are failing.

— or —

The function board is failing.

— or —

The CRT control board is failing.

— or —

The CRT display assembly is failing.

006

- Turn the CRT display power off.

(Step 006 continues)

**MAP 0110 (continued)**

017 (continued)

Is there continuity?

Yes No

018

Replace the cable.

019

- Install the cable.
- Check the cable for correct alignment and fit.
- Turn the machine on.

Do you still have the same symptom?

Yes No

020

Go to "MAP 0100: Start" on page 2-4.

021

The motor control board is failing.

— or —

The function board is failing.

022

The cable is failing.

## MAP 0110: Battery Backup

### CAUTION:

*Memory will be lost if you disconnect the batteries from the function board/system board while the machine is turned off.*

001

#### All Single board machines and two-board WW10:

- Are the batteries installed correctly in the battery holder and the cable correctly connected to J-7 on the function board/system board?

#### Other Two board machines:

- Are the batteries installed correctly in the battery holder and the cable correctly connected to J-4 on the function board?

Yes    No

002

Correct the problem and go to "MAP 0100: Start" on page 2-4.

003

— Turn the machine on.

#### All Single board machines and two-board WW10:

- Measure the voltage between J7-1 (red) and J7-3 (black) on the plug.

#### Other Two board machines:

- Measure the voltage between J4-1 (red) and J4-3 (black) on the plug.

#### Two battery machines:

TWO BATTERY MACHINES: Does the voltage measure 2.3 to 3.2 V dc?

THREE BATTERY MACHINES: Does the voltage measure 3 to 5 V dc?

Yes    No

004

*Do not disconnect the battery cable from the unless the machine is turned on.*

#### All single board machines and two-board WW10:

- Disconnect J-7 from the function board/system board.
- Measure the voltage between J7-1 (red) and J7-2 (black) on the plug.

#### Other two-board machines:

- Disconnect J-4 from the function board.
- Measure the voltage between J4-1 (red) and J4-2 (black) on the plug.

TWO BATTERY MACHINES: Does the voltage measure 2.3 to 3.2 V dc?

THREE BATTERY MACHINES: Does the voltage measure 3 to 5 V dc?

Yes    No

005

Go to Step 008 on page 2-17.

006

The function board is failing.

007

(Step 007 continues)

**063 (continued)**

**Does the print hammer push the printwheel petal against the paper?**

Yes   No

**064**

Go to "MAP 0460: Print Hammer Solenoid" on page 2-180.

**065**

— Type several characters.

**Do characters print (ink transfers to the paper)?**

Yes   No

**066**

Go to "MAP 0470: Print Quality" on page 2-184.

**067**

**Does the correct character print when you press a keybutton?**

Yes   No

**068**

Go to "MAP 0520: Selection" on page 2-198.

**069**

**Is the print quality good?**

Yes   No

**070**

Go to "MAP 0470: Print Quality" on page 2-184.

**071**

**Is the correction quality good?**

Yes   No

**072**

Go to "MAP 0470: Print Quality" on page 2-184.

**073**

**Are any options installed on the machine?**

Yes   No

**074**

No trouble found. Try to recreate the problem.

**075**

Go to "MAP 0340: Options Inoperative" on page 2-134.

045 (continued)

Can you type 3 lines of characters without a system busy?

Yes No

**046**

WW10, WW15, WW1500, WW3000: to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.

— or —

WW30, WW35, WW3500: to "MAP 0280: Machine Electronics, Wheelwriter 30, 35, 3500" on page 2-104.

— or —

WW50, WW70, WW5000, WW7000: to "MAP 0290: Machine Electronics, Wheelwriters 50, 70, 5000, 7000" on page 2-110.

**047**

- Turn the machine off.
- Move the carrier to the right frame.
- Turn the machine on.

Does the carrier move smoothly and quietly to the left side frame?

Yes No

**048**

Go to "MAP 0580: Transport" on page 2-222.

**049**

- Use SAPI to load paper.

Does the paper load correctly without skewing, excessive noise, and without marks?

Yes No

**050**

Go to "MAP 0510: Semi-Automatic Paper Insertion" on page 2-196.

**051**

- Press the paper up and paper down keybuttons.

Does the platen move up and down?

Yes No

**052**

- Press each keybutton.

Does the electronics sense any keybutton?

Yes No

**053**

Go to "MAP 0260: Keyboard" on page 2-96.

**054**

Go to "MAP 0390: Paperfeed" on page 2-156.

Symptom	Go To
The ribbon plate does not move up and down.	"MAP 0490: Ribbon and Correcting Tape" on page 2-190.
The carrier will not move smoothly and quietly to the left side frame.	"MAP 0580: Transport" on page 2-222
The carrier will not move to the left limit.	"MAP 0190: Homing Sensor, Carrier" on page 2-56.
The machine does not beep one time. The machine functions normally except for the beep.	The function board is failing.
The display is blank (no PELS on) at end of POR. The machine functions normally.	"MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32.
The Display is blank (no PELS on) at end of POR. The machine does not function normally.	"MAP 0240: Incomplete Power On Reset (POR) Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-86.
Diskette will not initialize.	"MAP 0130: Diskette Option" on page 2-24.
The Display is black (all PELS on) at end of POR.	"MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32.
Error code displayed	"MAP 0170: Error Codes" on page 2-48

Do you have any of the identical symptoms listed above?

Yes      No

**038**

Go to "MAP 0240: Incomplete Power On Reset (POR) Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-86.

**039**

Perform the required action.

**040**

(From step 034)

**WW50, WW70, WW5000, WW7000** –

– Check the following chart for your *identical* symptom:

Symptom	Go To
<ul style="list-style-type: none"> <li>The CRT remains black (no raster) during or after POR. Six beeps may sound.</li> <li>Loss of vertical or horizontal sync.</li> <li>The CRT remains all white (raster on all the time).</li> </ul>	"MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20.
Printwheel does not move.	"MAP 0520: Selection" on page 2-198.
The Printwheel moves but does not home	"MAP 0190: Homing Sensor, Carrier" on page 2-56.
The Carrier does not move	"MAP 0580: Transport" on page 2-222.

032 (continued)

Does the machine perform any steps of the POR?

Yes   No

**033**

**WW10, WW15, WW1500, WW3000:** Go to "MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116.

— or —

**WW30, WW35, WW3500:** Go to "MAP 0310: Machine Inoperative, Wheelwriter 30, 35, 3500" on page 2-120.

— or —

**WW50, WW70, WW5000, WW7000:** Go to "MAP 0320: Machine Inoperative, Wheelwriter 50, 70, 5000, 7000" on page 2-126.

**034**

**WW50, WW70, WW5000, WW7000** — Go to Step 040 on page 2-10.

**WW30, WW35, WW3500** — Go to Step 037 on page 2-9.

**WW10, WW15, WW1500, WW3000** — Continue with this step.

— Check the following chart for your *identical* symptom:

Symptom	Action
Incomplete POR. Machine is dead. LEDs do not turn on.	Go to "MAP 0300: Machine Inoperative, Wheelwriter 10, 15, 1500, 3000" on page 2-116.
No motion in printwheel, carrier, index or ribbon when you turn the machine on.	
Incomplete POR. All LEDs stay on solid.	Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.
Incomplete POR. All LEDs stay off.	Replace the function board/system board.
Incomplete POR. Carrier moves, printwheel moves but doesn't home.	Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.
POR complete. The machine goes system busy with all LEDs on solid or all LEDs off.	Go to "MAP 0270: Machine Electronics, Wheelwriter 10, 15, 1500, 3000" on page 2-98.
One inoperative key on keyboard.	Replace the Keyboard.
No SAPI operation. Paper Up/Down keybuttons work correctly.	Go to "MAP 0510: Semi-Automatic Paper Insertion" on page 2-196.
Error Code indication.	Go to "MAP 0170: Error Codes" on page 2-48.
POR complete. Ribbon will not feed.	Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.
POR complete. Ribbon will not lift.	Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.
POR complete. Correct character does not print when any keybutton or code + keybutton is pressed.	Go to "MAP 0520: Selection" on page 2-198.
One LED stays on or stays off all the time.	Go to "MAP 0220: Indicator Panel, Wheelwriter 10, 15, 1500, 3000" on page 2-76.

## MAP 0100 (continued)

016 (continued)

Does the typewriter operate correctly?

Yes      No

017

Go to Step 020.

018

Go to "MAP 0540: Sheetfeed" on page 2-204.

019

Go to "MAP 0540: Sheetfeed" on page 2-204.

020

(From steps 014 and 017)

Are any of the following options installed:

- Printer Option
- Diskette Option
- Pinwheel Forms Feeder
- 32k Memory Expansion
- Spell Check
- Spell Check II

Yes      No

021

Go to Step 025 on page 2-7.

022

Does the machine operate correctly except for an option(s)?

Yes      No

023

Go to Step 025 on page 2-7.

024

— Select the option that appears to be failing from the chart below and perform the required action.

Option	Go To
Printer Option	"MAP 0480: Printer Option" on page 2-186.
Diskette Option	"MAP 0130: Diskette Option" on page 2-24.
Printer and Diskette Option	"MAP 0340: Options Inoperative" on page 2-134.
32k Memory Expansion	"MAP 0330: Memory Expansion, Wheelwriter 30" on page 2-132.
Spell Check or Spell Check II	"MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.

## MAP 0100: Start

Use the MAPs in this chapter to diagnose failures in the Wheelwriter® 10, 15, 30, 35, 50, 70, 1500, 3000, 3500, 5000, and 7000 typewriters.

**Note:** Later level machines have a single function board rather than a separate motor control board and the function board. Some steps in the MAPs require that you identify which machine you have. You will be asked specific questions to identify your machine or the step will be divided into two parts; one part identified by **Single Board Machine** the other part identified by **Two board Machines** Perform the appropriate action for the machine you have. In some cases there will be a separate MAP for each machine.

**Note:** The POR sequence is different in the Wheelwriter 10, 15, 30, 35, 1500, 3000, 3500 when the Spell Check option is installed. The machine will beep twice (depending where the operator has set Code + 4), pause, then will beep one more time.

If an error code condition exists on your machine, go to "MAP 0170: Error Codes" on page 2-48. If the machine beeps and an error code appears while you are performing any diagnostic procedure, go to "MAP 0170: Error Codes" on page 2-48.

**001**

Is the sheetfeed option installed on your machine?

Yes   No

**002**

Go to Step 004.

**003**

Go to Step 015 on page 2-5.

**004**

(From step 002)

- Turn the machine off.
- Check the cables for damage, proper alignment and fit.

Are the cables good?

Yes   No

**005**

Repair as necessary.

**006**

- If your machine is a Wheelwriter 50, 70, 5000, or 7000, be sure the CRT is plugged into a properly operating a.c. outlet and connected to the CRT control board. Adjust the brightness and contrast controls on the CRT to the center of their range.
- Turn the machine on.

Does the machine still fail?

Yes   No

**007**

- POR the machine several times.

(Step 007 continues)

MAP 0590: Transport Electrical	2-224
Diagnostic Aids	2-227
Printwheel Hole Code Chart	2-227
Keyboard Identification Hole Charts	2-228
Keyboard Country ID Modification	2-232
Power On Reset (POR) Sequence, Wheelwriter 10, 15, 1500, 3000	2-235
Power On Reset (POR) Sequence, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000	2-236
Play-In-Loop Test, Wheelwriter 10, 15, 1500, 3000	2-237
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Sensor and Switch Test, Wheelwriter 30, 35, 3500	2-239
Sensor and Switch Test, Wheelwriter 50, 70, 5000, 7000	2-240
Diskette Diagnostic Tests	2-241



diagnostic will help you locate mechanical failures. In some cases you will be sent from the matrix to an electrical diagnostic if there is no mechanical failure. The left side of the matrix lists the symptoms. The right side of the matrix, lists the FRUs in the order you should check them. The FRU most probably causing the indicated symptom is placed first in the sequence. The letters in the matrix send you to the part or assembly you need to check. These parts and assemblies are listed in the FRU CHECK procedure directly below the matrix.

SYMPTOM	1	2
Printwheel does not rotate, is noisy, or its speed changes as it rotates.	B	A
Typewriter miselects, splits characters, or makes print hammer marks.	B	A
Carrier drives against right side frame.	A	B
Print Hammer does not energize	A	B

	FRU	CHECK FOR
A	Selection Plate Assembly	Motor: Binds, loose-screws, and loose connector Hub: Bent, broken, or loose Hammer: Binding or excessive end play If the hammer solenoid does not energize, Go to "MAP 0240: Print Hammer Electrical" on page 2-70. For electrical failures, Go to "MAP 0290: Selection Electrical" on page 2-96.
B	Printwheel	Binds, brokeh or missing bias spring, broken' cartridge, bent printwheel petals For electrical failures, Go to "MAP 0290: Selection Electrical" on page 2-96.

Figure 2, Matrix Diagnostic.

- **DIAGNOSTIC AIDS:** This section contains information outside the diagnostic procedures to help you diagnose a failure of a specific part. Some diagnostic aids are resident in the machine. This section also contains the Power on Sequence (POR) of the machine. The machine performs the POR each time it is turned on. You will use this information throughout the diagnostic procedures. You should become familiar with the POR and be able to determine if the machine performed all the steps.

### Chapter 3. Repair Information:

This chapter contains:

- Adjustments
- Removals and Replacements
- Packaging/Handling Procedures

### Chapter 4. Parts/Test Point Locations:

This chapter is useful when you are asked to measure voltages. Use this information to help you locate parts such as electronic boards, connectors, pin numbers and test points.

### Chapter 5. Preventive Maintenance:

This chapter contains the Lubrication Guide for this machine.

### Chapter 6. Safety Inspection Guide:

Use this information to inspect a machine for safety problems before putting the machine under a Maintenance Agreement.



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