

Typewriter

2-48
Lites

**Service
Manual**

IBM Wheelwriters

typewriter

Wheelwriter

Wheelwriter 5000

LEXMARK

Safety Information

- The maintenance information for this product has been prepared for use by a professional service person and is not intended to be used by others.
- There may be an increased risk of electric shock and personal injury during disassembly and servicing of this product. Professional service personnel should understand this and take necessary precautions.
- The safety features of some parts may not always be obvious. Therefore, replacement parts must have the identical or equivalent characteristics as the original parts.
- When you replace a lithium battery, exercise
CAUTION: Danger of explosion if lithium battery is incorrectly replaced. Replace only with the same or equivalent type lithium battery. Do not recharge, disassemble, or incinerate a lithium battery. Discard used batteries according to the manufacturer's instructions and local regulations.

Sicherheitshinweise

- Die Wartungsinformationen für dieses Produkt wurden zur Verwendung durch einen Wartungsfachmann entwickelt und sollten nicht von anderen benutzt werden.
- ~~Zusätzliches Risiko eines elektrischen Schlags und körperlicher Verletzung existiert während des Auseinandernehmens und der Wartung des Geräts.~~ Fachpersonal sollte im vollen Verständnis der Lage entsprechende Vorsichtsmaßnahmen ergreifen.
- Ersatzteile müssen gleiche oder gleichwertige Merkmale wie die Originalteile aufweisen, da Sicherheitsvorkehrungen nicht immer offensichtlich sind.
- Wenden Sie beim Austauschen einer Lithiumbatterie besondere
VORSICHT an: Explosionsgefahr, wenn die Lithiumbatterie nicht ordnungsgemäß ausgetauscht wird. Ersetzen Sie die Batterie nur durch eine Lithiumbatterie gleichen oder gleichwertigen Typs. Laden Sie die Lithiumbatterie unter keinen Umständen neu auf, nehmen Sie sie nicht auseinander und verbrennen Sie sie nicht. Vernichten Sie verbrauchte Batterien laut Anweisungen des Herstellers und in Einklang mit gültigen Vorschriften des Landes.

Consignes de Sécurité

- Les consignes d'entretien et de réparation de ce produit s'adressent uniquement à un personnel de maintenance qualifié.
- Le démontage et l'entretien de ce produit pouvant présenter certains risques électriques, le personnel d'entretien qualifié devra prendre toutes les précautions nécessaires.
- Les normes de sécurité de certaines pièces n'étant pas toujours explicites, les pièces de rechange doivent être identiques ou conformes aux caractéristiques des pièces d'origine.
- Remplacement de la pile de lithium :
ATTENTION : Danger d'explosion si la pile utilisée pour remplacer la pile de lithium n'est pas du même type. Ne pas recharger, démonter ni brûler une pile de lithium. Veuillez suivre les recommandations du fabricant et la législation en vigueur concernant les piles usées.

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General Information

This chapter contains general information about the contents of this maintenance information. The text that follows describes each chapter and, in some cases, explains how to use the information in the chapter.

You will find a list of the tools and test equipment you will need to service this machine at the end of the chapter.

Chapter 2. Diagnostic Information

The diagnostic information contains the procedures you will use to diagnose and isolate product failures. Diagnostic information consists of:

Start
Maintenance Analysis Procedures (MAPs)
Diagnostic Aids

- **START MAP:** This MAP is the starting point for any diagnostic action. Based on high level symptoms, the information in this MAP will direct you to more detailed procedures or actions. The detailed procedures will help you resolve the machine failure.
- **MAINTENANCE ANALYSIS PROCEDURES:** When Start sends you to a MAP, go to that page and perform the steps as instructed. If there are any notes or instructions at the top of the page you must read them before you start the procedure.

Carefully read each step of the MAP and perform the appropriate action as instructed. If you do not remember the location of a specific part or test point, or if you do not remember an adjustment or removal procedure, see the chapter that has that information. Always return to the MAP after you do this. In some cases you will be sent to other MAPs to find the failure.

Failing Parts or Assemblies - The MAPs will generally help you diagnose a problem to one part or assembly. The last step of the specific MAP you are using will indicate a part or assembly is failing. You should inspect the part or assembly before you decide to replace it. It may only be loose or dirty or need only a small repair. The MAPs may lead you to 2 or even 3 possible failing parts or assemblies (Figure 1). The parts that may be failing are listed in order of the most probable failure. In the example shown below, the printer board is most probably the cause of the problem.

The Printer Board is failing.
— or —
The Function Board is failing.

Figure 1, Failing Parts or Assemblies

Measuring Voltages - Many of the diagnostic procedures instruct you to measure voltages on cable plugs and electronic board connectors. If you are asked to measure voltage at several places on a plug or connector, a chart next to or near the question will indicate the number of the plug or connector, the pin numbers you should measure, the signal name, and the correct voltage for the condition you are measuring. Measure the voltage only at the pins listed in the chart. A ground point may be specified. If the ground point is not specified, use the frame ground strap on the left or right side of the frame.

Remember to set your meter on the correct scale and put the meter leads in the correct position for the voltage you are asked to measure.

Matrix Diagnostic - When there could be multiple symptoms for a failure, or multiple failures that could cause the same symptom, you will be sent to a matrix diagnostic (Figure 2). In general, the matrix

Tools And Test Equipment

Meter readings in this manual were taken with an IBM® meter, P/N 9900167.

The following tools should be used to service this machine.

Tool	Part Number
6" Metal Scale	0450158
Push-Pull Scale	0460870
3/16" x 6" Flat Blade Screwdriver	1650853
5/16" x 6" Flat Blade Screwdriver	1650856
3" Small Screwdriver	9900070
7mm Open End Wrench	1749242
#1 SUPADRIV ¹ Screwdriver	4760541
#2 SUPADRIV Screwdriver	4760542
#1 SUPADRIV Screwdriver, insulated	4056724
#2 SUPADRIV Screwdriver, insulated	4056726
5/16" x 1/4" Open End Wrench	9900005
Large Springhook	9900059
Medium Screw Starter	9900060
Large Screw Starter	9900328
T-Bender	9900094
Analog or Digital VOM (Triplet ² 310C or equivalent)	9900167
3/8" x 7/16" Box End Wrench	9900182
Large Screw Starter	9900328
Feeler Gauges	1749245
	or
	9900468
ESD Handling Kit	6428316
ESD Wrist Band, Small	6428167
ESD Wrist Band, Large	6428169
IC Module Extracting Tool	9900764

¹ SUPADRIV is a registered trademark of GNK and Fasteners Limited.

² Triplet is a trademark of the Triplet Corporation.

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This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

007 (continued)

Does the machine fail?

Yes No

008

End the call.

009

Go to Step 010.

010

(From step 009)

— Inspect the machine for obvious failures such as:

- Loose line cord
- Paper clips, staples, or other foreign material in the machine.
- Dirt or contamination on the carrier or the platen
- Broken springs or levers
- Damaged covers
- Any machine or option cables disconnected.

Do you have any of the above failures?

Yes No

011

Go to Step 013.

012

Repair as necessary.

013

(From step 011)

Is the sheetfeed option installed?

Yes No

014

Go to Step 020 on page 2-6.

015

(From step 003)

Does the typewriter operate correctly except for the sheetfeed?

Yes No

016

- Turn the typewriter off.
- Disconnect the sheetfeed power/signal cable from the typewriter.
- Remove the sheetfeed from the typewriter.
- Turn the typewriter on.

(Step 016 continues)

Option	Go To
Pinwheel Forms Feeder	"MAP 0410: Pinwheel Form Feeder" on page 2-162.
End-Of-Ribbon Sensor	"MAP 0150: End-of-Ribbon Sensor" on page 2-36.
Out-Of-Paper Sensor	"MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138.

025

(From steps 021 and 023)

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

Does the machine perform all steps of the POR?

Yes No

026

Does the machine display an error code?

Yes No

027

Go to Step 032.

028

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

029

Wheelwriter 10, 15, 30, 35, 1500, 3000, 3500: Go to Step 043 on page 2-11.

Wheelwriter 50, 70, 5000, 7000:

Does the machine appear to operate correctly except for the CRT display?

Yes No

030

Go to Step 043 on page 2-11.

031

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

032

(From step 027)

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

(Step 032 continues)

Symptom	Action
Poor print quality (voids, character alignment, light characters).	Go to "MAP 0470: Print Quality" on page 2-184.
Poor correction quality.	Go to "MAP 0490: Ribbon and Correcting Tape" on page 2-190.
Loss of memory after machine is turned off then on.	Go to "MAP 0110: Battery Backup" on page 2-16.
Form feeder out of paper. No error code.	Go to "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138.
Machine at end of ribbon; no error code (for machines equipped with ribbon sensor).	Go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36.
Form feeder will not feed paper. Machine works.	Go to "MAP 0410: Pinwheel Form Feeder" on page 2-162.

Do you see your *identical* symptom listed above?

Yes No

035

Go to "MAP 0230: Incomplete Power On Reset (POR) Wheelwriter 10, 15, 1500, 3000" on page 2-78.

036

Perform the required action.

037

(From step 034)

WW30, WW35, WW3500 —

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

Symptom	Go To
All of display black, no beeps	"MAP 0140: Display, Wheelwriter 30, 35, 3500" on page 2-32.
Top half of Display black, 6 beeps	"MAP 0170: Error Codes" on page 2-48.
Bottom Half of Display black, 6 beeps	"MAP 0170: Error Codes" on page 2-48.
All of display black, 6 beeps	"MAP 0170: Error Codes" on page 2-48.
The 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.
The Platen does not move up or down	"MAP 0390: Paperfeed" on page 2-156.
The Print hammer does not move or energize	"MAP 0470: Print Quality" on page 2-184.
The carrier does not move to the right	"MAP 0580: Transport" on page 2-222.

Symptom	Go To
The Platen does not move up or down	"MAP 0390: Paperfeed" on page 2-156.
The Print hammer does not move or energize	"MAP 0470: Print Quality" on page 2-184.
The carrier does not move to the right	"MAP 0580: Transport" on page 2-222.
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 Wheelwriter 50, 5000 will sound spelling beeps before sounding the POR beep.	The function board is failing.
WW70, WW7000 — The typewriter screen does not appear on the CRT. WW50, WW5000 — The margin scale does not appear on the CRT.	"MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20.
Diskette will not initialize.	"MAP 0130: Diskette Option" on page 2-24.
Error code displayed	"MAP 0170: Error Codes" on page 2-48

Do you have any of the identical symptoms listed above?

Yes No

041

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

042

Perform the required action.

043

(From steps 029 and 030)

- Put a piece of paper into the machine. If SAPI doesn't work, pull the paper release lever forward and slide the paper into the machine.
- Press each character keybutton from A to Z.

Does the electronics sense any keybuttons?

Yes No

044

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

045

(Step 045 continues)

055

- If the printer option is installed make sure its not active.
- Press each character keybutton.

Does the electronics sense each character keybutton?

Yes No

056

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

057

- Perform each coded keybutton function.

Do the functions perform correctly?

Yes No

058

Wheelwriter 10, 15, 1500, 3000: Go to "MAP 0260: Keyboard" on page 2-96.

Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000:

~~Some coded functions have messages that appear on the display or CRT.~~

Do the coded functions work correctly but the messages not appear on the display or CRT? If in doubt refer to the operators manual for those that should appear.

Yes No

059

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

060

Wheelwriter 30, 35, 3500:

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

Wheelwriter 50, 70, 5000, 7000:

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

061

Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000: Go to Step 063.

Wheelwriter 10, 15, 1500, 3000:

- Turn all the LEDs on and off one at a time.

Do all the LED Indicators turn on and off?

Yes No

062

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

063

(From step 061)

- Type several characters.

(Step 063 continues)

Notes

007 (continued)
Go to Step 011.

008

(From step 005)

- Remove the batteries from the battery holder.
- Check the battery cable for continuity.
- Check the battery holder for damage or corrosion.

Are the battery holder and cable good?

Yes No

009

The battery pack is failing.

010

The batteries are failing.

011

(From step 007)

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

Do you still have an error indication?

Yes No

012

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

013

Does the machine have two boards?

Yes No

014

The function board is failing.

015

Go to Step 016.

016

(From step 015)

- Turn the machine off.
- Remove the 22-pin cable between the motor control board and the function board.

Does the cable have any cracks, breaks, or damaged edges?

Yes No

017

— Check the cable for continuity.
(Step 017 continues)

Notes

006 (continued)

- Turn the machine off.
- Disconnect the CRT display from the CRT control card.
- Turn the CRT display power on.

Does a raster appear (screen lights up) on the CRT? You may have to adjust the brightness.

Yes No

007

The CRT display is failing.

008

- Turn the machine on.
- Measure the voltage between the +5v test point and GND on the CRT control board.

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

Yes No

009

- Turn the machine off.
- Disconnect the options power supply cable from the CRT board.
- Turn the machine on.
- Measure the voltage between J3-5(+5 VDC) and J3-6(GND) on the plug.

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

Yes No

010

- Check the continuity of the options power supply cable.

Is there continuity?

Yes No

011

The options power supply cable is failing.

012

The power supply assembly is failing.

013

The CRT control board is failing.

014

Is the diskette option installed?

Yes No

015

Go to Step 018 on page 2-22.

016

(Step 016 continues)

Notes

010 (continued)

If your machine is a Wheelwriter 50, 70, 5000 or 7000, go to Step 025 on page 2-26.

011

— Locate the error code you had in the following chart.

Error Code	Failure	Go To
160	RAM check failure Diskette controller check failure.	Step 014.
161	Diskette drive operation check failure	Step 017.
162	Code version level check	Verify the diskette code matches the base code.

Do you see your identical error code listed above?

Yes No

012

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

If your machine is a Wheelwriter 50, 70, 5000, or 7000, go to Step 025 on page 2-26.

013

Perform the required action.

014

(From step 011)

With error code 160 displayed.

- Turn the machine off.
- Replace the diskette control board.
- Turn the machine on.

Do you still have the same symptom?

Yes No

015

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

016

Replace the function board and 22-pin cables.

017

(From step 011)

With error code 161 displayed.

- Turn the machine off.
- Replace the diskette drive.
- Turn the machine on.

(Step 017 continues)

025 (continued)

Are you able to **FORMAT** or **PREPARE** a diskette?

Yes No

026

— Try another diskette.

Does the diskette **FORMAT** or **PREPARE** correctly?

Yes No

027

Replace these FRUs in the following order:

1. Diskette control board
2. Disk drive assembly
3. Function board
4. Diskette control board-to-disk drive cable
5. Printer option board (if installed).

028

Go to Step 029.

029

(From step 028)

- 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

030

Go to Step 032.

031

Go to Step 038 on page 2-29.

032

(From steps 023 and 030)

- Look in the following chart for the diskette test error code on the display.

Error Code	Failure	Action
001 XY	Bad Command	Replace the control board or the 22-pin cables.
002 XY	Bad Address Mark	Go to Step 035 on page 2-28.
004 XY	Record Not Found	WW30, 35, 3500 - Go to Step 036 on page 2-28. WW50, 70, 5000, 7000 - Go to Step 043 on page 2-30.
006	Defective RAM	Replace the control board or the 22-pin cables.
007	Motor Speed Incorrect	Go to Step 037 on page 2-29.

036 (continued)

Error code 004 XY, 010 XY, 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
-

037

(From step 032)

Error code 007 displayed.

Replace the FRUS in the following order.

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

038

(From steps 024, 031, and 033)

- Make sure the write-protect window is open on the scratch diskette.
- Select Write-Protect from the service diagnostics menu.
- Run the test.

Is error code 003 displayed?

Yes No

039

No trouble found.

Try to recreate the failure.

040

- Check to make sure the diskette Write-Protect window is open.
- Try a new diskette (be sure to prepare the diskette prior to use)
- Select Write-Protect and run the test again.

Is Error 003 still displayed?

Yes No

041

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

042

Replace the FRUS in the following order:

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

Notes

010 (continued)

- WW35, 3500: Go to Step 012
- WW30: Check the continuity of the display cable.

Is there continuity?

Yes No

011

The display cable is failing.

012

(From step 010)

The function board is failing.

— or —

The display is failing.

013

(From step 005)

Does the display have missing, partial, or extra characters.

Yes No

014

Go to Step 016.

015

The display is failing.

— or —

The function board is failing.

016

(From step 014)

Are any PELs missing, or do any stay on all the time?

Yes No

017

Go to Step 019.

018

The display is failing.

019

(From step 017)

Is the display too light or too dark?

Yes No

020

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

Notes

011

Go to Step 025 on page 2-38.

012

(From step 008)

Is the ribbon that was on the machine when the problem occurred still available?

Yes No

013

— Examine the ribbon that is on the machine.

Is the trailer showing?

Yes No

014

Go to Step 020.

015

Go to Step 018.

016

Is the trailer showing?

Yes No

017

Go to Step 020.

018

(From step 015)

— Examine the trailer for a piece of silver tape between the end of the inked portion of the ribbon and the beginning of the trailer.

Is the silver tape in place?

Yes No

019

The ribbon is failing.

020

(From steps 014 and 017)

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

Yes No

021

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

022

(Step 022 continues)

033 (continued)
End the call.

034

- Turn the light off, block the light from shining on the machine, or move the machine so the light does not shine on the paper sensor.

Does the machine still malfunction?

Yes No

035

Inform the customer that the bright light is causing the machine to malfunction.

036

Do the following:

- Try a new ribbon.
- Check all sensor adjustments.
- Replace the sensor assembly.

008 (continued)

Does the BOLD indicator come on?

Yes No

009

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

010

— Enter the sensor and switch test again.

Does the BOLD indicator come on solid?

Yes No

011

Go to Step 024 on page 2-43.

012

Go to Step 007 on page 2-40.

013

— Slowly pass a piece of paper between the opening in the ribbon sensor. Ensure the paper is between the LED and the sensor.

Does the BOLD indicator go on and off?

Yes No

014

Go to Step 016 on page 2-42.

015

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

020 (continued)

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

Is there continuity?

Yes No

021

The 16-pin cable is failing.

- Replace the motor control board.
- Slowly pass a piece of paper through the opening in the ribbon sensor.

Does the BOLD indicator go on and off?

Yes No

022

The function board is failing. Reinstall the original motor control board prior to replacing the function board.

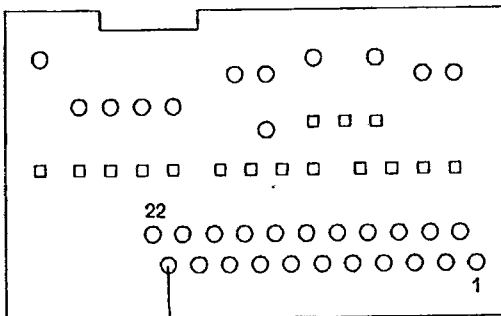
023

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

024

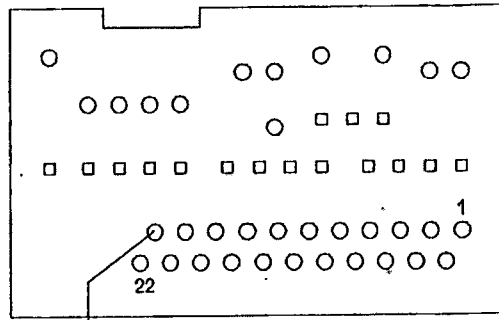
(From steps 011 and 017)

- Measure the voltage at J1-21 in the carrier cable board.



J1-21

Level 1



J1-21

Level 2

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

Yes No

025

Go to Step 036 on page 2-45.

031 (continued)
Go to Step 033.

032

Single board machines:

The function board is failing.

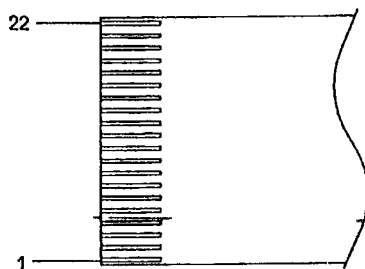
Two-board machines:

The motor control board is failing.

033

(From step 031)

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



CARRIER CABLE

Is there continuity?

Yes No

034

The carrier cable is failing.

035

The carrier cable board is failing.

036

(From step 025)

- Turn the machine off.
- Turn the machine on.
- Measure the voltage at J1-21 on the carrier cable board.

Is the voltage less than 4.0 V dc?

Yes No

037

The function board is failing.

038

- Turn the machine off.
- Disconnect the sensor assembly cable from J4 on the carrier cable board.
- Turn the machine on.
- Measure the voltage at J1-21 on the carrier cable board.

(Step 038 continues)

1

Printer Option Errors

Beeps	LED 1	LED 1.5	LED 2	LED 3	Fault	Action
6	S	S			Printer Option Error	Printer option board is failing.
3	B				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		B			End-of-Ribbon	If not at end of ribbon, go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36.
3				B	Printwheel Change	Install correct printwheel.
3				B	Missing Printwheel	Install printwheel.

Wheelwriter 30, 35, 3500 Error Codes

Base Machine Error Codes

Beeps	Error Indicator	Fault	Action
6	114 08	Function board failure	The function board is failing.
6	114 10	Memory Expansion Failure	The 32K memory module is failing or the function board is failing.
6	215	Selection homing failure	Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.
6	101	ROM scan error	Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.
6	121	Invalid keyboard	Go to "MAP 0260: Keyboard" on page 2-96.
6	Bottom half of display is black.	Base Memory	The function board is failing.
6	Top half of display is black.	LCD Memory	The function board is failing.
6	Display is all black.		The function board is failing.
3	Low Battery	Dead Batteries	Go to "MAP 0110: Battery Backup" on page 2-16.
3	Low Battery	Low Batteries, Storage Cleared	Go to "MAP 0110: Battery Backup" on page 2-16.
6	102	Feature Disable Error	Go to "MAP 0340: Options Inoperative" on page 2-134.
6	140	Spelling RAM/Correction Buffer Failure	Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.

Wheelwriter 50, 70, 5000, 7000 Error Codes

Base Machine Error Codes

Beeps	Error Indicator	Fault	Action
6	101 20	Spelling dictionary not found	Go to "MAP 0560: Spell Check, Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000" on page 2-216.
6	101 40 101 48 101 55	ROM Scan Error	The function board is failing.
6	101 80 101 88	Printer Option not found (if installed)	Go to "MAP 0480: Printer Option" on page 2-186.
6	101 90 101 98	Diskette Option not found (if installed)	Go to "MAP 0130: Diskette Option" on page 2-24.
6	101 C0 101 EF 101 F5	Check Sum Error	The function board is failing.
6	114 08 114 10 114 18 114 19	RAM Failure	The function board is failing.
6	121	Invalid keyboard	Go to "MAP 0260: Keyboard" on page 2-96.
6	215	Homing Sensor failure	Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.
6	Display Blank	CRT display board not found.	Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20.
6	140	Spelling RAM not found	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	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.

Notes

006 (continued)

Single board machines: The function board is failing.

Two board machines: The motor control board is failing.

007

The power supply assembly is failing.

008

(From step 005)

WW10 with Single board:

- Connect J9 to the system board.
- Turn the machine on.

WW15:

- Connect J15 to the function board.
- Turn the machine on.

Two board machines:

- Connect J5 to the motor control board.
- Turn the machine on.

Does fuse F1 blow again?

Yes No

009

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

010

Single board machines: The function board is failing.

Two board machines: The motor control board is failing.

— or —

The function board is failing.

010 (continued)

Does the printwheel move at all?

Yes No

011

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

012

- Turn the machine off.
- Move the printwheel 5 to 10 petals away from the home position.
- Turn the machine on.

Does the printwheel home?

Yes No

013

Single board machines: Go to "MAP 0200: Homing Sensor, Printwheel — Single Board Machines" on page 2-58.

Two-board machines: Go to "MAP 0210: Homing Sensor, Printwheel — Two Board Machines" on page 2-66.

014

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

Does the carrier move to the left side frame and then to the home position?

Yes No

015

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

016

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

011

(From step 009)

- Carefully install the cable.
- Check the cable for proper alignment and fit.
- Turn the machine on.

Does the machine have the same symptom?

Yes No

012

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

013

- Check the homing LED cable at the carrier cable board to make sure it is not loose and fits properly.

Does the cable fit properly?

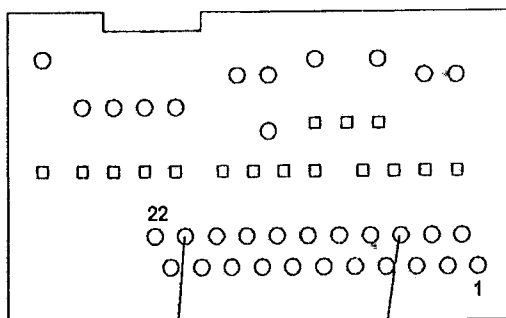
Yes No

014

Repair as necessary.

015

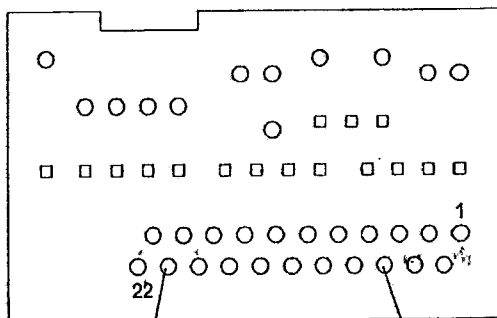
- Remove the printwheel.
- Measure the voltage between J1-20 and J1-6 (GND) on the carrier cable board as you slowly push the homing sensor flag in and out.



J1-20

J1-6

Level 1



J1-20

J1-6

Level 2

Does the voltage change?

Yes No

016

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

Yes No

017

- Turn the machine off.
 - Disconnect the carrier cable from the carrier cable board.
- (Step 017 continues)

024 (continued)

Are the measurements correct?

Yes No

025

Go to Step 027.

026

Go to Step 035 on page 2-62.

027

(From step 025)

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

Meter Lead	Homing LED Cable	Reading
COM	Pin-1 (red)	10K to 80K Ohms
VOM	Pin-2 (black)	
COM	Pin-2 (black)	500K Ohms or more
VOM	Pin-1 (red)	

Are the measurements correct?

Yes No

028

The LED is failing.

029

- Disconnect the carrier cable at the carrier cable board.
- Measure continuity between the following points on the carrier cable board:
 - J6 Pin 1 and carrier cable connector Pin 22.
 - J6 Pin 2 and carrier cable connector Pin 6.

Is there continuity?

Yes No

030

The carrier cable board is failing.

031

- Check the continuity of lines 6 and 22 in the carrier cable.

035 (continued)

Are the measurements correct?

Yes No

036

Go to Step 046 on page 2-64.

037

- 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

038

- Clean as necessary.
 - Install the carrier.
- Go to "MAP 0100: Start" on page 2-4.

039

- Check the position of the sensor.

Is the sensor assembly firmly mounted to the selection plate?

Yes No

040

Repair as necessary.

041

- Install the carrier.
- Turn the machine on.

Does the machine still have the original symptom?

Yes No

042

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

043

- Check the selection motor.

Are the selection motor mounting screws tight and is the selection motor bias spring in place?

Yes No

044

Repair as necessary.

045

The homing sensor is failing.

046

(Step 046 continues)

Notes

010 (continued)

- Replace the damaged cable.
- Turn the machine on.

Does the machine have the same symptom?

Yes No

011

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

012

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

Is the cable damaged?

Yes No

013

Go to Step 015.

014

Replace the carrier cable.

015

(From steps 009 and 013)

- Carefully install the cables.
- Check the cables for proper alignment and fit.
- Turn the machine on.

Does the machine have the same symptom?

Yes No

016

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

017

- Check the homing LED cable at the carrier cable board to make sure it is not loose and fits properly.

Does the cable fit properly?

Yes No

018

Repair as necessary.

022

Go to Step 024.

023

WW10 - Go to "MAP 0520: Selection" on page 2-198.

WW30, 50, 70:

The 22-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.

024

(From step 022)

— Turn the machine off.

— Disconnect the carrier cable from the motor control board.

— Turn the machine on

— Measure the voltage at J2-20 on the motor control board.

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

Yes No

025

The motor control board is failing.

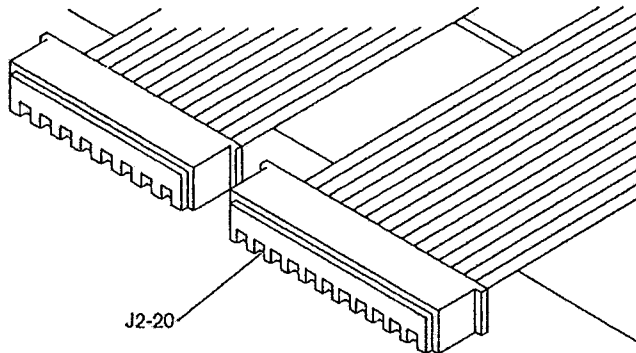
026

— Turn the machine off.

— Connect the carrier cable.

— Turn the machine on.

— Measure the voltage at J2-20 on the function board as you slowly push the homing sensor flag in and out.



Does the voltage change?

Yes No

027

Go to Step 031 on page 2-70.

Meter Lead	Homing LED Cable	Reading
COM VOM	Pin-1 (red) Pin-2 (black)	10K to 80K Ohms
COM VOM	Pin-2 (black) Pin-1 (red)	500K Ohms or more

Are the measurements correct?

Yes No

035

The LED is failing.

036

— Check the continuity of the carrier cable board.

Is there continuity?

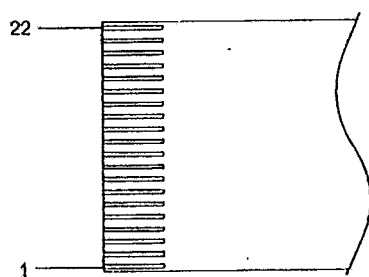
Yes No

037

The carrier cable board is failing.

038

— Check the continuity of lines 6 and 22 in the carrier cable.



CARRIER CABLE

Is there continuity?

Yes No

039

The carrier cable is failing.

040

- Reinstall the carrier cable on the carrier cable board and the motor control board.
 - Reinstall the homing LED cable.
 - Turn the machine on.
- (Step 040 continues)

046 (continued)

Is the sensor assembly firmly mounted to the selection plate?

Yes No

047

Repair as necessary.

048

- Install the carrier.
- Turn the machine on.

Do you still have the original symptom?

Yes No

049

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

050

The function board is failing.

— or —

The selection plate assembly is failing.

— or —

The LED assembly is failing.

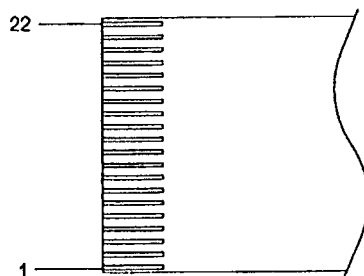
— or —

The motor control board is failing.

051

(From step 043)

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



CARRIER CABLE

Is there continuity?

Yes No

052

The carrier cable is failing.

053

- Remove the carrier from the machine.
- Check the continuity from the carrier cable board.

(Step 053 continues)

Blank lined paper with horizontal ruling lines.

008 (continued)

- 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) as you press the keybutton that turns on the failing LED.

Does the voltage go from 4.5 V dc to 5.5 V dc?

Yes No

009

The function board or system board is failing.

010

The indicator panel is failing.

011

Does one of the line space indicators come on after POR?

The indicator that comes on depends on which one was on the last time the machine was turned on.

Yes No

012

System Board machines: The system board is failing.

Two-Board machines: The function board is failing.

013

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

012

(From steps 008 and 010)

Does the machine complete the POR except for the LEDs turning on?

Yes No

013

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

014

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

015

(From step 011)

Do all the LEDs turn on and remain on?

Yes No

016

Do all the LEDs turn off and remain off?

Yes No

017

Go to Step 020.

018

Go to Step 025 on page 2-80.

019

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

020

(From step 017)

— Try to turn on the line space 1 LED by pressing the line space keybutton.

Does any LED other than the line space 1 remain on?

Yes No

021

Does any LED stay off during POR?

Yes No

022

Go to Step 030 on page 2-80.

023

Go to Step 036 on page 2-81.

056 (continued)

Does the carrier continue to drive into the left frame?

Yes No

057

Go to Step 060.

058

Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.

059

Go to Step 065.

060

(From step 057)

Does the carrier continue to drive into the right frame?

Yes No

061

The carrier may or may not move.

Is the transport motor noisy?

Yes No

062

Go to Step 065.

063

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

064

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

065

(From steps 059 and 062)

Does the platen move slightly down, then up?

Yes No

066

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

067

(Step 067 continues)

078 (continued)

Does the function board or system board sense any keybutton?

Yes No

079

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

080

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

010 (continued)

Does the printwheel move approximately 3 revolutions?

Yes No

011

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

012

Does the carrier move?

Yes No

013

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

014

Does the platen move slightly down then up?

Yes No

015

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

016

Does the print hammer operate one time? (May be difficult to see)

Yes No

017

Go to Step 021.

018

Does the print hammer hit too hard or remain energized?

Yes No

019

Go to Step 023 on page 2-88.

020

The function board is failing.

021

(From step 017)

Does the print hammer energize?

Yes No

022

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

033 (continued)

Go to "MAP 0200: Homing Sensor, Printwheel — Single Board Machines" on page 2-58.

Two-board machines:

Go to "MAP 0210: Homing Sensor, Printwheel — Two Board Machines" on page 2-66.

034

Does the ribbon move up and down then home?

Yes No

035

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

036

Does the ribbon move one time?

Yes No

037

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

038

Does the carrier move to the left and continue to drive into the left frame?

Yes No

039

Does the carrier home?

Yes No

040

Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.

041

WW30, 35, 3500 - Go to Step 043.

WW50, 70, 5000, 7000 - Go to Step 063 on page 2-91.

042

Go to "MAP 0190: Homing Sensor, Carrier" on page 2-56.

043

(From step 041)

Does the machine beep one time?

Yes No

044

(Step 044 continues)

054 (continued)

Is the diskette option installed?

Yes No

055

Go to Step 058.

056

Does the diskette initialize?

Yes No

057

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

058

(From step 055)

Does either of the following appear on the display:

- The cursor, linespace symbol and linespace number (Warm start)
- Storage cleared, linespace symbol and linespace number (Cold start)?

Note: Some coded functions may also appear on the display if they have been previously stored.

Yes No

059

Does an error code appear on the display?

Yes No

060

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

061

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

062

POR is complete, if you still have a problem, go to "MAP 0100: Start" on page 2-4.

063

(From step 041)

Do the screens change?

- WW 70, 7000 – Logo screen goes off and Copyright screen comes on.
- WW 50, 5000 – Blinking cursor goes off and left margin indicator appears in lower left corner.

Yes No

064

(Step 064 continues)

074 (continued)

Does the diskette initialize?

Yes No

075

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

076

(From step 073)

WW70, 7000 — Does the typewriter screen appear on the display?

WW50, 5000 — Does the margin scale screen appear on the display?

Yes No

077

Does an error code appear on the display?

Yes No

078

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

079

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

080

POR is complete, if you still have a problem, go to "MAP 0100: Start" on page 2-4.

SYMPTOM	1	2	3	4	SEE THESE DIAGNOSTICS
CRT Failure	D	S			"MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20
Keyboard Failure	M	D			"MAP 0260: Keyboard" on page 2-96
Memory Failures	O	D	C		"MAP 0110: Battery Backup" on page 2-16
Paperfeed Failure	B	E	Q		"MAP 0390: Paperfeed" on page 2-156
Print Hammer Failure	F	B	D	G	"MAP 0460: Print Hammer Solenoid" on page 2-180
Ribbon Failure	H	B	D		"MAP 0490: Ribbon and Correcting Tape" on page 2-190
Selection Failure	F	I	B	G	"MAP 0520: Selection" on page 2-198
Transport Failure	J	B	D	C	"MAP 0580: Transport" on page 2-222

A Homing LED	D Function Board	G Carrier Cable	J Transport Asm
B Motor Control Board or System Board	E Paperfeed Motor	H Lift Motor or Ribbon Plate	K Line Cord or On/Off Switch
C Power Supply	F Selection Plate	I Printwheel	L Indicator Panel
M Keyboard	N Carrier Cable Board	O Batteries	P Primary Fuse
Q Paperfeed Motor Cable	R Display	S CRT	

Is there continuity, or were the correct comb teeth removed?

Yes No

009

Refer to "Keyboard Country ID Modification" on page 2-232 and install a correct keyboard language modification comb.

010

The function board is failing.

011

(From step 003)

Is only one keybutton failing?

Yes No

012

The keyboard is failing.

— or —

The function board is failing.

013

Does the code keybutton work correctly?

Yes No

014

The keyboard is failing.

— or —

The function board is failing.

015

Does the shift keybutton work correctly?

Yes No

016

The keyboard is failing.

— or —

The function board is failing.

017

The keyboard is failing.

007 (continued)

Is the Spell Check option installed in the machine?

Yes No

008

Go to Step 013.

009

Go to Step 044 on page 2-103.

010

Single board machines:

The system 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

011

The 16-Pin cable is failing.

012

The function board is failing.

013

(From step 008)

Does the machine lock up with all LEDs off?

Yes No

014

Does the machine lock up with random LEDs on?

Yes No

015

Single board machines:

Go to Step 026 on page 2-100.

Two-board machines:

Go to Step 018 on page 2-100.

016

The function board or system board is failing.

017

The function board or system board is failing.

026 (continued)

Two-board machines:

- Disconnect the carrier cable from the motor control 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

027

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

028

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

Does the machine have the same symptom?

Yes No

029

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

030

Single board machines:

WHEELWRITER 10 typewriter:

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

WHEELWRITER 15, 1500, 3000 typewriter:

- Measure the voltage at connector J15 between Pin 1 (GND) and Pin 2 (+5 V dc) at the system board.

Two-board machines:

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

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

Yes No

031

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

032

Single board machines:

Go to Step 034 on page 2-102.

Two-board machines:

- 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

033

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

041 (continued)

Does the machine lock up when you type several lines?

Yes No

042

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

043

The function board is failing.

044

(From step 009)

- Turn the machine off.
- Remove the Spell Check module from the function board or system board. Be sure to observe all ESD precautions.
- Turn the machine on.

Does the machine still have the same symptom?

Yes No

045

The Spell Check module is failing.

046

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

047

The 16-Pin cable is failing.

048

- Replace the function board.

Does the machine still have the same symptom?

Yes No

049

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

050

- Reinstall the original function board.

The motor control board is failing.

008 (continued)

Does the machine go system busy with all PELs in the display turned on?

Yes No

009

Is Spell Check an option on your machine?

Answer yes only if modules U700 and U801 or module U200 (two board machines) or module U3 or U800 (single board machines) are socketed to the function board and can be removed.

Yes No

010

Go to Step 015.

011

Go to Step 035 on page 2-107.

012

Single board machines: The system board is failing.

Two-board machines: Remove the 16-pin cable between the function board and the motor control board and check the continuity of the cable.

Is there continuity?

Yes No

013

The 16-pin cable is failing.

014

The function board is failing.

015

(From steps 005 and 010)

Single board machines: Go to Step 023 on page 2-106.

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

016

Replace the cable.

017

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

(Step 017 continues)

027

Single board machines: The system board is failing.

Two-board machines:

— Measure the voltage at the +5V dc test point on the motor control board.

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

Yes No

028

The motor control board is failing.

029

— 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

030

The 16-pin cable is failing.

— or —

The function board is failing.

031

The 16-pin cable is failing.

— or —

The function board is failing.

— or —

The motor control board is failing.

032

(From step 004)

Does the machine go system busy when you type several lines?

Yes No

033

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

034

The function board is failing.

035

(From step 011)

— Turn the machine off.

— Remove the Spell Check module from the function board. Be sure to observe all ESD precautions.

— Turn the machine on.

(Step 035 continues)

1

009 (continued)
Go to Step 016 on page 2-112.

010

(From step 006)

Symptom	Action
POR complete: <ul style="list-style-type: none">• Random characters appear on screen.• Random failures occur.	The function board is failing. or The CRT control board is failing.
Screen goes dark after POR.	Go to "MAP 0120: CRT Display WW 50, 70, 5000, 7000" on page 2-20
POR complete: <ul style="list-style-type: none">• Machine goes system busy, screen shows what was last displayed.• The beeper beeps continuously for 4-5 seconds after CRTN is pressed.• The machine goes system busy after a few characters or lines are typed.• The machine goes system busy after pressing the type/screen keybutton.• The screen goes all white after the type/screen keybutton, is pressed. The machine goes system busy.	The function board is failing.

Did you find your identical symptom?

Yes No

011

Go to Step 016 on page 2-112.

012

Perform the action required

013

(From step 004)

— Check the following chart for your identical symptom(s):

Symptom	Action
POR Incomplete: <ul style="list-style-type: none">• WW70, 7000 - Part of IBM logo is on the screen.• WW70, 7000 - The copyright screen turns all white and the machine completes the rest of POR. If the type/screen keybutton is pressed, the screen will go all white.	The function board is failing.

020 (continued)

Is the cable good?

Yes No

021

Replace the cable.

022

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

Does the machine still have the same symptom?

Yes No

023

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

024

- Turn the machine off.
- Disconnect the carrier cable from the motor control board or the function 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

025

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

026

- Turn the machine off.
- Carefully disconnect and connect the carrier cable to the motor control board or the function board.
- Turn the machine on.

Does the machine have the same symptom?

Yes No

027

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

028

Single board machines: The system board is failing or the power supply is failing.

Two-board machines:

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

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

Yes No

029

The motor control board is failing.

035 (continued)
Perform the action required

036

(From step 034)

- 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

037

Go to Step 039.

038

Go to Step 016 on page 2-112.

039

(From step 037)

Are both the diskette and printer option installed?

Yes No

040

Is the diskette option installed?

Yes No

041

The printer option board is failing.

042

The diskette option board is failing.

043

- Turn the machine off.
- Connect the cables to J13 and J14.
- Disconnect the diskette control board from the printer option board.
- Turn the machine on.

Do you still have the same symptom?

Yes No

044

The diskette control board is failing.

045

The printer option board is failing.

007 (continued)

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.

Is the voltage correct?

Yes No

010

The line cord is failing.

011

- Check the continuity of the On/Off switch.

Is there continuity?

Yes No

012

The On/Off switch is failing.

013

- Install the power cord.
- Turn the machine on.
- Measure the voltage on the power supply plug at the system board or motor control board between pin 1 (GND) and pin 2 (+5V dc).

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

Yes No

014

Go to Step 016.

015

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

016

(From step 014)

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

(Step 016 continues)

026 (continued)

The printer option 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.
- Measure the voltage on the power supply plug J5 between J5-1 and J5-2.

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

Yes No

028

The motor control board is failing.

029

The function board is failing.

009 (continued)

Is the voltage correct?

Yes No

010

The line cord is failing.

011

— Check the continuity of the On/Off switch.

Is there continuity?

Yes No

012

The On/Off switch is failing.

013

- Install the power cord.
- Turn the machine on.

WW30:

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

WW35, 3500:

- Measure the voltage on the power supply plug at the function board between J15-1 (GND) and J15-2 (+5V dc).

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

Yes No

014

Go to Step 016.

015

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

016

(From step 014)

- Turn the machine off.
- Disconnect the power supply plug from the motor control or function board.
- Turn the machine on.
- Measure the voltage on the power supply plug. Measure between Pin1 (GND) and Pin2 (+5V dc).

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

(Step 018 continues)

027 (continued)

- Measure the voltage on the power supply plug J5 between J5-1 and J5-2.

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

Yes No

028

The motor control board is failing.

029

The function board is failing.

030

(From step 018)

Is a diskette option installed?

Yes No

031

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

032

- Turn the machine off.
- Disconnect the power supply cable from the diskette control board.
- Disconnect the diskette control board from the function board or printer option board if one is installed.
- Turn the machine on.

Do you still have the same symptom?

Yes No

033

Go to Step 037

034

- Disconnect the power supply cable at J2 on the power supply.
- Check the continuity on the plug between J2-1 and J2-3.

Is there continuity?

Yes No

035

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

036

The cable is failing.

037

(From step 033)

- Turn the machine off.
- Connect the power supply cable to J2 on the power supply and to the diskette control board.

(Step 037 continues)

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

009 (continued)

Is the voltage correct?

Yes No

010

The line cord is failing.

011

— Check the continuity of the On/Off switch.

Is there continuity?

Yes No

012

The On/Off switch is failing.

013

— Install the power cord.

— Turn the machine on.

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

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

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

Yes No

014

Go to Step 016.

015

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

016

(From step 014)

— Turn the machine off.

— Disconnect the power supply plug from the motor control or function board.

— Turn the machine on.

— Measure the voltage on the power supply plug. Measure between Pin1 (GND) and Pin2 (+5 VDC).

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

Yes No

017

— Turn the machine off.

— Disconnect the options power supply cable from the power supply

— Turn the machine on.

(Step 017 continues)

025 (continued)
Is there continuity?

Yes No

026

Go to Step 028.

027

The cable is failing.

028

(From step 026)

- Connect the options power supply cable to the power supply.
- Connect the options power supply cable to the CRT control board
- Disconnect the CRT control board from the function 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

029

The CRT control board is failing.

030

Are both the printer and diskette options installed?

Yes No

031

Is the printer option installed?

Yes No

032

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

033

Go to Step 034.

034

(From step 033)

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

(Step 034 continues)

Notes

008 (continued)

The 32k memory expansion module is failing

— or —

The function board is failing

009

No trouble found.

012

Does the out-of-paper sensor operate correctly?

Yes No

013

Go to "MAP 0350: Out-of-Paper Sensor, Wheelwriter 10, 15, 1500, 3000" on page 2-138.

014

Does the end-of-ribbon sensor operate correctly?

Yes No

015

Go to "MAP 0150: End-of-Ribbon Sensor" on page 2-36.

016

Does the pinwheel form feeder option operate correctly?

Yes No

017

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

018

Does the sheetfeed option operate correctly?

Yes No

019

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

020

Does your machine have a spell check option?

Yes No

021

Go to Step 024.

022

Does the spell check option operate correctly?

Yes No

023

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

024

(From steps 011 and 021)

(Step 024 continues)

Notes

011

(From step 006)

- Check the platen for paper dust and excessive ink.

Is the platen clean?

Yes No

012

Clean the platen.

013

- Move the carrier to the right side frame.
- Activate the switch and sensor test.

Is the CONT LED off?

Yes No

014

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

015

- Clean the platen.
- Move the carrier to the center of the machine.
- Activate the switch and sensor test.

Is the CONT LED off?

Yes No

016

- 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

017

The sensor assembly is failing.

018

Block the light from shining on the end-of-paper sensor.

Is the CONT LED off?

Yes No

019

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

020

Inform the customer that the bright light is causing the machine to malfunction.

033

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

011 (continued)

- Move the carrier to the right side frame.
- Activate the switch and sensor test.

Is CONT off?

Yes No

012

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

013

- Clean the platen.
- Move the carrier to the center of the machine.
- Activate the switch and sensor test.

Is the CONT indicator off?

Yes No

014

- 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

015

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

016

Block the light from shining on the end-of-paper sensor.

Does CONT turn off?

Yes No

017

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

018

Inform the customer that the bright light is causing the machine to malfunction.

019

Is a pinwheel forms feeder installed on your machine?

Yes No

020

Go to Step 028 on page 2-144.

021

(Step 021 continues)

031 (continued)

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

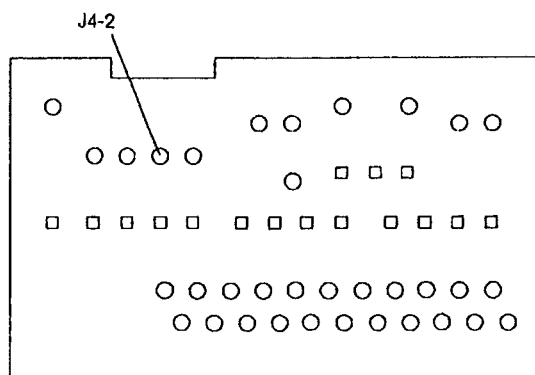
032

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

012

(From steps 004 and 006)

- With the paper between the sensor and the platen, measure the voltage at J4-2 on the carrier cable board.



Is it approximately 0 V dc?

Yes No

013

Go to Step 015.

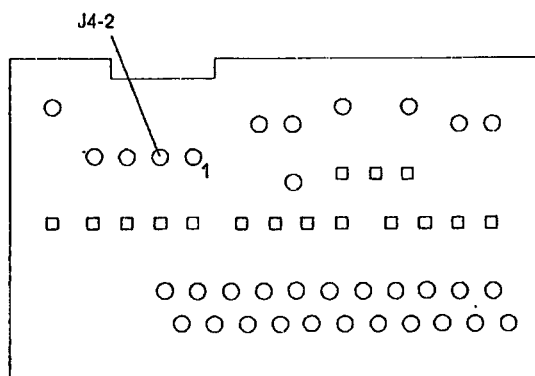
014

Go to Step 031 on page 2-149.

015

(From step 013)

- Monitor the voltage at J4-2 on the carrier cable board as you slowly pass a piece of paper between the out-of-paper sensor and the platen.



Does the voltage change?

Yes No

016

Go to Step 018 on page 2-148.

024 (continued)
Go to Step 028.

025

Single board machines: The function board is failing.

Two-board machines:

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

Is there continuity?

Yes No

026

The 16-Pin cable is failing.

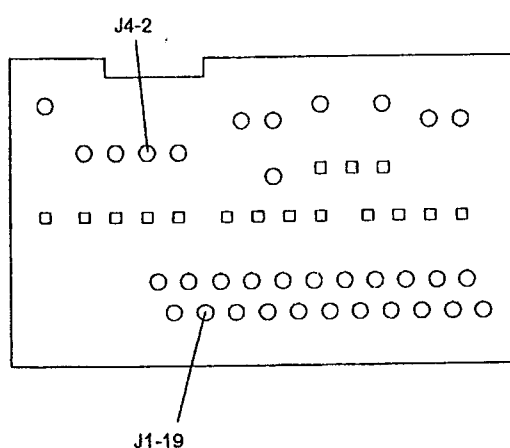
027

The motor control board is failing.

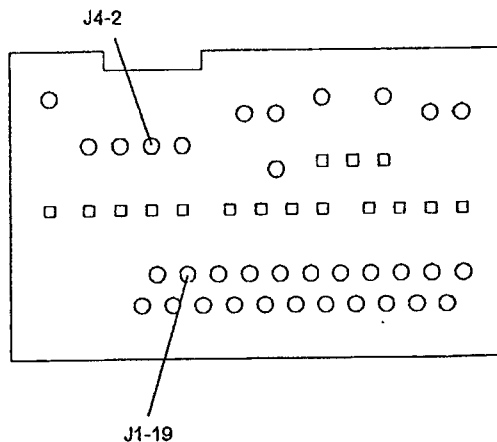
028

(From step 024)

- Check the continuity of the carrier cable board between J1-19 and J4-2.



Level 1



Level 2

Is there continuity?

Yes No

029

The carrier cable board is failing.

030

The carrier cable is failing.

031

(From step 014)

- Turn the machine off.

(Step 031 continues)

Notes

007 (continued)
Go to Step 014.

008

Go to Step 025 on page 2-155.

009

— Try the machine several times.

Does the machine still have the same symptom?

Yes No

010

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

011

Is the sensor switch assembly installed correctly?

Yes No

012

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

013

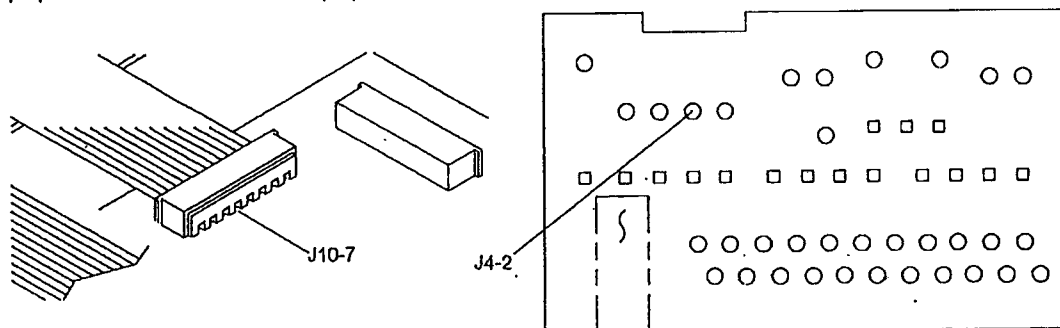
Go to "MAP 0100: Start" on page 2-4.

014

(From steps 004 and 007)

Single board machines: Monitor the voltage on the PAPSEN test point on the function board as you slowly pass a piece of paper between the out-of-paper sensor and the platen.

Two-board machines: Monitor the voltage at J10-7 on the function board as you slowly pass a piece of paper between the out-of-paper sensor and the platen.



Does the voltage change?

Yes No

015

Go to Step 017 on page 2-154.

016

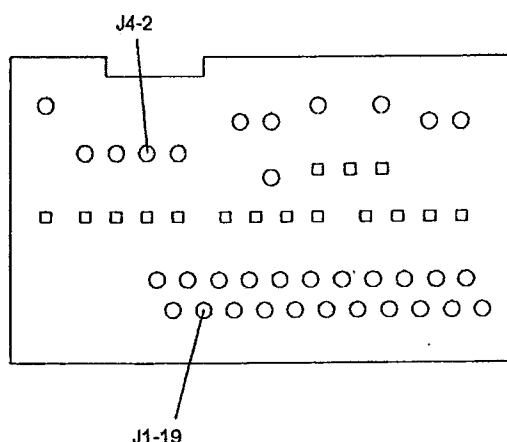
(Step 016 continues)

The sensor assembly is failing.

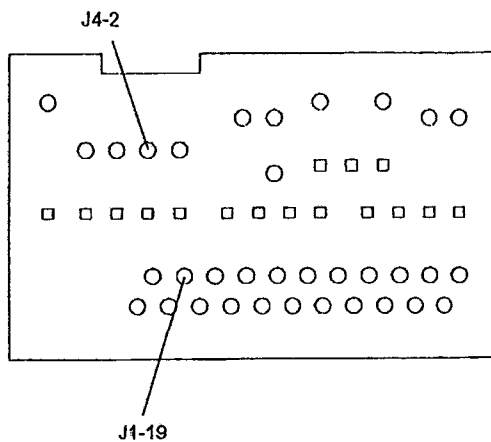
022

(From step 019)

- Check the continuity of the carrier cable board between J1-19 and J4-2.



Level 1



Level 2

Is there continuity?

Yes No

023

The carrier cable board is failing.

024

The carrier cable is failing.

025

(From step 008)

- Turn the machine off.
- Disconnect J4 at the carrier cable board.
- Turn the machine on.
- **Single board machines:** Measure the voltage at the PAPSEN test point on the function board.
- **Two-board machines:** Measure the voltage at J10-7 on the function board.

Is it approximately 0 V dc?

Yes No

026

The sensor assembly is failing.

027

The function board is failing.

— or —

The motor control board is failing.

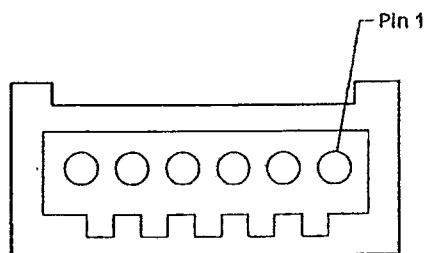
Notes

Lined area for notes.

010 (continued)

- Turn the machine off.
- Disconnect the paperfeed motor cable from the paperfeed motor.
- Set your meter on **X1**
- Carefully zero the meter.
- Measure the resistance of the paperfeed motor on the motor connector as indicated in the chart below.
To ensure accurate measurements, the motor should be at room temperature. The resistance may be higher if the motor is hot.

Meter Connections	Reading
Pin 1 to Pin 3	6 - 8 ohms
Pin 2 to Pin 4	6 - 8 ohms
Pin 1 to Pin 5	13 - 18 ohms
Pin 2 to Pin 6	13 - 18 ohms
Pin 1 to Pin 2, 4, 6	Infinity
Pin 2 to Pin 1, 3, 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
Pin 5 to Motor Housing	Infinity
Pin 6 to Motor Housing	Infinity



MOTOR CONNECTOR

Are the measurements correct?

Yes No

011

Go to Step 019 on page 2-160.

012

- Check the continuity of the paperfeed motor cable.

Is there continuity?

Yes No

013

The paperfeed motor cable is failing.

014

Single board machines: Go to Step 019 on page 2-160.
(Step 014 continues)

019 (continued)

Are any motor pins shorted to the motor housing?

Yes No

020

The paperfeed motor is failing.

021

Single board machines: The system board and the paperfeed motor are failing.

Two board machines: The motor control board and the paperfeed motor are failing.

022

(From steps 015 and 017)

— Check the cable for continuity.

Is there continuity?

Yes No

023

The cable is failing.

024

The function board is failing.

009

- Disconnect the form feeder switch cable from the printer option board or the function board.
- Check for continuity between pins 1 and 2 on the plug as you activate the switch.

Is there continuity?

Yes No

010

The form feeder switch assembly is failing.

011

Go to Step 013.

012

Go to Step 016 on page 2-164.

013

(From step 014)-

- Ensure the switch and sensor test is activated.
- WW10, 15, 1500, 3000 with pinfeed connected to the printer option board: Short together J5-1 and J5-2 on the printer option board.
- WW10, 15, 1500, 3000 with pinfeed connected to the function board: Short together J17-1 and J17-2 on the printer option board.
- WW30 and two-board WW50: Short together J7-1 and J7-2 on the function board.
- Two-board WW70: Short together J6-1 and J6-2 on the function board.
- WW35, 3500 single board WW50, 5000 and single board WW70, 7000: Short together J17-1 and J17-2 on the function board.

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

Wheelwriter 10, 15, 1500, 3000:

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

The printer option board is failing.

- or -

The function board is failing.

Wheelwriter 30, 35, 50, 70, 3500, 5000, 7000

- or -

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

- or -

The function board is failing.

015

Go to Step 003 on page 2-162.

026 (continued)

Does the gear on the platen mesh with the gear on the form feeder?

Yes No

027

Repair as necessary.

028

Go to Step 032.

029

Are there any obstructions in the form feeder?

Yes No

030

The form feeder is failing.

031

Remove the obstruction.

032

(From step 028)

Is either the gear on the platen or the gear on the form feeder loose?

Yes No

033

The form feeder is failing.

034

Tighten the appropriate gear.

035

(From step 024)

Does the typewriter correctly feed a single sheet of paper?

Yes No

036

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

037

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

011

Go to Step 020.

012

(From step 004)

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

Yes No

013

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

014

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

Is there continuity?

Yes No

015

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.

016

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

Yes No

017

Go to Step 022 on page 2-168.

018

- Install the primary fuse.
- Remove fuse F1 from the power supply board.
- Check the continuity of the fuse.

Is there continuity?

Yes No

019

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

020

(From steps 008 and 011)

- Put the fuse back into the power supply.
- Disconnect the line cord from the electrical outlet.
- Measure the voltage at the outlet.

(Step 020 continues)

Notes

Lined area for notes.

005

The power supply assembly is failing.

006

(From step 003)

— Set your meter to the **RX100** scale.

Single board machines

WHEELWRITER 10 typewriter, Level 1

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

WHEELWRITER 10 typewriter, Level 2

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

WHEELWRITER 15 typewriter:

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

Two-board machines:

— Measure the resistance between J5-2 (+5V) 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 Pin8 and the black meter lead (COM) connected to Pin2.

Is the resistance less than 500 ohms?

Yes No

007

— 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

008

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

009

Single board machines:

The motor and the system board are failing.

Two-board machines:

The motor and the motor control board are failing.

010

Single board machines:

The system board is failing.

Two-board machines:

The motor control board is failing.

010 (continued)

Are the printer option and diskette options installed?

Yes No

011

Is the printer option installed?

Yes No

012

Go to Step 016.

013

Go to Step 014.

014

(From step 013)

- Disconnect the printer option board from the diskette board
- Connect the option power supply cable to the printer option board. (Be sure the cable is installed correctly)
- Turn the machine on.

Does the primary fuse blow again?

Yes No

015

The Printer option board is failing.

016

(From step 012)

- Turn the machine off.
- Connect the option power supply cable to the diskette control board.
- (Be sure the cable is installed correctly)
- Turn the machine on.

Does the primary fuse blow again?

Yes No

017

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

018

The diskette control board is failing.

- or -

The diskette drive is failing.

019

(From step 003)

- Turn the machine off.
- Set your meter to the RX10K scale.

(Step 019 continues)

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

008 (continued)

- Check the options power supply cable for continuity between adjacent pins.

Is there continuity?

Yes No

009

Go to Step 011.

010

The options power supply cable is failing.

011

(From step 009)

- Connect the options power supply cable to the power supply and to the CRT control board.
- Turn the machine on.

Does the primary fuse blow?

Yes No

012

Go to Step 014.

013

The CRT control board is failing.

014

(From step 012)

Are both the printer and diskette options installed?

Yes No

015

Is the printer option installed?

Yes No

016

Go to Step 027 on page 2-178.

017

Go to Step 024 on page 2-178.

018

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

(Step 018 continues)

029

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

Does the primary fuse blow?

Yes No

030

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

031

The diskette control board is failing.

— or —

The disk drive assembly is failing.

032

(From step 003)

- Turn the machine off.
- Set your meter to the **RX10K** scale.
- Measure the resistance between J5-2 (+5V) and J5-8 (+32V) on the motor control board.

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

033

- 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

034

The motor control board is failing.

035

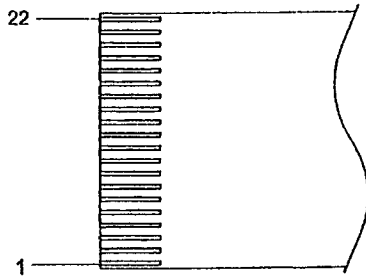
The motor and the motor control board are failing.

036

The motor control board is failing.

005

- Check the continuity of lines 1, 2, 3, and 4 in the carrier cable.



CARRIER CABLE

Is there continuity?

Yes No

006

The carrier cable is failing.

007

Were you sent to this diagnostic from the Error Code MAP?

Yes No

008

Single board machines:

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

— or —

The system board is failing.

Two-board machines:

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

— or —

The motor control board is failing.

— or —

The function board is failing.

009

Single board machines: The system board is failing.

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

010

(From step 002)

Are any solenoid pins shorted to the solenoid housing?

Yes No

011

The selection plate assembly is failing.

012

(Step 012 continues)

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	FRU	Action
G	Selection Plate	<p>See "Even Top and Bottom Printing Adjustment" on page 3-3. Check:</p> <ul style="list-style-type: none"> • Motor. Does it bind? Are the mounting screws loose? Is the connector loose? • Hub. Is it bent, broken, or loose? • Hammer: Does it bind? Does it have a loose head, a worn stop, or too much end play? <p>For electrical failures, Go to "MAP 0460: Print Hammer Solenoid" on page 2-180.</p> <p>Note: The hammer solenoid does not energize when the printwheel is removed or the machine is in the centering or decimal tab modes.</p>
H	Ribbon Plate or Lift Asm	<p>Check:</p> <ul style="list-style-type: none"> • Gears. Do they bind? Are they loose, or broken? • Motor. Does it bind? Does it have loose mounting screws or a loose connector? • Tape feed clutch, pin, link, and slot. Are they worn? • Lift cam and roller. Are they worn? • Lift stud. Is it loose? <p>See "Ribbon Lift Adjustment" on page 3-5.</p> <p>For electrical failures, Go to "MAP 0500: Ribbon Electrical" on page 2-192.</p>
I		Go to "MAP 0520: Selection" on page 2-198.

007 (continued)

WW10, 15, 1500, 3000 - Does the 1.5 LED go off and the 2 and 3 LEDs stay on solid?

WW30, 35, 3500 - Does the NOT READY message appear on the display?

WW50, 70, 5000, 7000 - Does the NOT READY message appear on the CRT?

Yes No

008

Single board machines:

The printer option board is failing.

— or —

The system board is failing.

Two-board machines:

The printer option board is failing.

— or —

The function board is failing.

009

— Press Code + 7.

Does the platen turn?

Yes No

010

— Turn the machine off.

— Disconnect the printer option board from the function board.

— Turn the machine on.

Does the machine operate correctly?

Yes No

011

The function board is failing.

012

— Check the continuity of the cables between the function board and the printer option board.

Is there continuity?

Yes No

013

One or both of the cables are failing.

014

The printer option board is failing.

015

— Turn the machine off.

— Install a printer option board.

— Turn the machine on.

(Step 015 continues)

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