

Firmware Update Procedure

The following instructions explain how to download updated printer firmware.

- Step 1. Power up the printer normally and print out a Configuration Report. This will give you a hard copy of the printer setup. You will need this to restore any parameters that you have set in the printer. Power the printer down.
- Step 2. Connect the printer to your computer using the parallel interface.
- Step 3. Power up the printer while holding down the following three keys on the control panel: **FF**, the up arrow, and **Config**. Hold them down until the following message scrolls on the control panel display: "Tally Flash Loader." The display then stops scrolling and says: "Flash Dnld Ready."
- Step 4. Change the directory to the floppy drive. From the DOS Command Prompt enter:

<filename> -P

This will cause the compressed file to expand directly to the PRN device.

The time required to update the firmware depends upon the speed of the computer you are using. Typically the times will vary from 3–10 minutes.

- Step 5. After the download is complete, check the hard copy of the configuration and set up the appropriate parameters.



The firmware download is now complete.

You may or may not get an NVRAM fault at the end of the download. If you do, it does not indicate a problem with the printer. Simply depress the CLEAR Key on the printer control panel and the message will clear.

Before using the printer again, you should do the following calibrations:

- Print
- Paper Motion Sensor
- Paper Out
- Platen

These calibration procedures are explained in Chapter 2.

Introduction

The Test menu contains procedures for calibrating sensors, turning motors on and off, changing hammer lead time, running various printer tests, etc. These procedures are located in the Config and Test menus and can be accessed through the Control Panel.

Technical Access Mode

Technical (Tech) Access Mode is provided for the repair technician. It allows you to access tests, calibration, and diagnostic procedures, unavailable in normal menu operations, for use in troubleshooting. Once Tech Access is enabled, these menu items appear on the Control Panel Selections Printout (the Help menu printout).

How To Enter Tech Access Mode

Place the printer Offline. Press Line Feed and Enter simultaneously and hold for 3 seconds. Release the keys when the alarm sounds and "Tech Access On" displays. At this point, the printer defaults to the Powerup configuration.

How to Exit Tech Access Mode

There are two methods for leaving Tech Access Mode.

1. Place the printer Offline. Press Line Feed and Enter simultaneously. Release the keys when the alarm sounds.

OR

2. Cycle power.

Upon leaving Tech Access mode, the printer defaults to the Powerup configuration.

Testing, Troubleshooting and Calibration

The printer is equipped with the following types of Printer Tests, Hex Dumps, and Printer Information Printouts.

Printer Tests

Printer tests appear in both normal menu operations and in Tech Access Mode. These tests consist of the following patterns and types:

- ASCII print patterns
- Plot Mode patterns
- Calibration routines
- Electronic hardware tests

Detailed explanations of the print tests follow in the Test Menu section of this chapter.

Hex Dumps

Use Hex Dumps to check printer functions and data processing operations. They may also be helpful in resolving printer performance. These dumps are located in the Configuration menu, Printer category, under the Dump Mode parameter in normal menu operations. There are three styles of Dump Modes on the printer:

Style 1 Text, spaces, and control codes print out in hexadecimal format.



Make sure that wide paper (136 columns — 13+ inches of printable width) is loaded on the printer before running a Style 1 Hex Dump.

Style 2 Control codes print out in hexadecimal format while text and spaces print out in their original form.

Style 3 Control codes and spaces print in hexadecimal format, while text prints out in its original form.

Printer Information Printouts and Displays

There are fifteen printouts and displays accessible through the printer control panel. The first printout is the Help menu and the rest are Printer Reports (Current Config, All Configs, Configs 1-10, Calibrations, Last Fault, and Version). These reports can be accessed via the Configuration menu, Printer category, under the Report parameter.

Help Menu

The Help menu is a printout that lists selections that are available for each parameter in the multilevel menus on the printer and indicates with an asterisk (*) which ones are currently active.



Before printing out the Help menu, make sure that there is at least 13 inches of printable width on the installed paper.

Printing a HELP Menu In Tech Access Mode

- STEP 1. Place the printer Offline.
- STEP 2. Press the Line Feed and Enter keys simultaneously until the printer alarm sounds, then release them to place the printer in Tech Access Mode.
- STEP 3. Press the Menu/Back Key to enter the multilevel menu system, then scroll (▲ Keys) to the Help menu.
- STEP 4. Press Enter to begin printing the Help menu.

This printout will end when the entire Help menu is printed out.

Report

This parameter has fifteen selections. The selections Current Config, All Configs, Configs 1-10 and Calibrations generate printouts. The second pair of reports (LastFault and Version) are displays. The Report Parameter is located in the Config Menu, under the Printer Category.

Report selections

Configs	Prints a report showing the setups of the configurations.
Calibrations	Prints a report showing the current values of the Paper Out and Paper Motion sensors and the hammer lead time and shuttle amplitude.
Last Fault	The Control Panel Display shows the Last Fault that occurred.
Version	The Control Panel Display shows the version number of the currently installed firmware.

To clear the displays, depress any key on the printer control panel.

Selecting a Printer Report

- Step 1. Take the printer Offline.
- Step 2. Depress the Menu/Back key to enter the multilevel menu system, then scroll (▲ Key) to the Config menu. Press Enter
- Step 3. Scroll (▲ Key) until the Printer Category displays. Press Enter.
- Step 4. Scroll (▲ Key) until the Report Parameter is displayed. Press Enter.
- Step 5. Scroll (▲ Key) to the desired selection.
- Step 6. Press Enter to begin the report printout or display.

TEST Menu

The Test menu contains the parameters for testing printer operation, adjusting print quality, and controlling fault reporting. There are three categories in this menu: Pattern, Diagnostics, and Fault Override.

The table that follows presents the categories, parameters, and parameter selections that will appear in the Test menu while the printer is in Tech Access Mode.

Table 2-1 Test Menu



Use the **▲** Key to scroll to the desired selection.



Use the **ENTER** Key to select a value or option.

	Categories	Parameters	Selections
	Pattern	Print	Upper All Characters 63/69 ECMA Columns
		Print2	Paper Save Thermal Cycle Lower 1 Line All H's All E's All #'s All +'s Parens Rubout Ribbon
		Plot	Grid Cross Gray Black Block
	Fault Override	Paper Motion	OFF ON
		Ribbon Motion	OFF ON
		Paper Out	OFF ON
		Shuttle	OFF ON
		Temp	OFF ON
		Platen	OFF ON

	Categories	Parameters	Selections
		Control	OFF ON
		Link	OFF ON
		Sync	OFF ON
	Diag	Calibrations	Hammer Paper Out Platen Gap Cal
		Meter	Paper Out Paper Motion Ribbon Weld Hammer Bus Temp Sensor Power Platen Keypad
		Motors	Ribbon Shuttle Ribbon Pump Blower
		Shuttle Speed	37-80
		Ribbon Speed	1-250
		Paper Out Thold	0-255
		Energy Star	On Off
		Clear	Calibrations Counts NVRAM
		Shuttle Off	10 Sec 20 Sec 30 Sec 60 Sec
		Shuttle Change	1-30
		Ribbon Ink, Dots/Pump	500-2000
		Serial Dump	Disabled Enabled

Pattern Category

The Pattern Category contains several predefined print patterns used to test basic printer functionality. There are three parameters in this category: **Print**, **Print2**, and **Plot**.

Print

This parameter is also available in normal menu operations. It has five selections:

Print selections

- Upper** Prints a rolling pattern of 63 UPPERCASE ASCII characters.
- All Chrs** Prints all Character Sets available on your printer.
- 63/69** Prints rolling ASCII with spaces.
- ECMA** Prints a pattern designed to produce a specific audible noise pattern specified by European Computer Manufacturers Association used for acoustics testing.
- Columns** This test labels each column in the current print line. The line length used is based on the current margin settings.

To stop any of the above tests, press Enter or Clear.

Print2

This parameter is available in Tech Access only. It has 11 print test selections.

Print2 selections

Except for the **1 Line** test all of the tests below run continuously. They will continue to run until you depress either the **Enter** key or the **Clear** key.

Paper Save This option provides a means of completing long-term testing of the printer without wasting large amounts of paper. It prints a pattern of all uppercase characters that is advanced by one character on each line. Each pass is four lines long. The printer then backs up three lines and prints another four line pass. The printer then continues printing in this fashion until it makes 30 passes. On the 30th pass the printer does not back up.

Thermal Cycle This option prints the **PaperSv** pattern for 15 minutes, stops printing for five minutes, then starts the cycle over. It is used to test the temperature cycling abilities of the printer.

Lower This option prints a rolling pattern of all 95 lowercase ASCII characters.

1 Line This option prints one line only of upper- and lowercase characters.

All H's This option prints lines composed of the uppercase letter H.

All E's	This option prints lines composed of the uppercase letter E.
All #'s	This option prints lines composed of the # symbol.
All +'s	This option prints lines composed of the + sign.
Parens	This option prints lines composed of the left paren followed by a vertical bar followed by the right paren.
Rubout	This option prints lines composed of the currently selected fill character.
Ribbon	This option prints lines composed of rolling ASCII uppercase characters.

Plot

This parameter is available in Tech Access only and it contains selections of plot patterns used to test such things as hammer ball alignment and dot placement. There are five selections for this parameter.

Plot selections

After you have started one of the tests below, it will run continuously until you depress either the **ENTER** Key or the **CLEAR** Key.

Grid	This option prints a grid pattern that can be used to check hammer ball alignment. Proper alignment of the hammer bank components is indicated by clean lines and uniform patterns.
Cross	This option prints a crosshatch pattern of diagonal lines that can be used to check linearity of dot placement. Clean lines and uniform pattern are used to indicate linear shuttle action.
Gray	This option prints a grayscale pattern at 60 x 72 DPI. This test fires all hammers (printing every other dot vertically and horizontally), which should lay down an even gray tone across the page. Any change in the gray tone indicates a variation in the gap between the hammer module and the platen, most commonly indicating either a worn hammer module or a replacement module in need of alignment.
Black	<p>This option prints a solid black page at 60 x 72 DPI matrix. The Black Page Print Mode is the most dense print test that can be run for verifying the proper operation of the printer's power supply. This test places the greatest electrical current load on the power supply as well as increasing the thermal load on the electronics.</p> <p>When performing this test, it is considered normal for the print rate to slow as the current and thermal limits are reached. If the power supply shuts down, rather than simply slowing down, the power supply may need replacement.</p>
Block	This option prints alternating bars at 60 x 72 DPI matrix. Each bar is offset from the previous bar in order to check on dot placement. This pattern is used to test the printer at its maximum sustainable graphics rate without exceeding the boundaries of thermal change or electrical current overload. This test is useful in examining the capabilities of the print mechanism, for checking proper hammer alignment/spacing, and print quality. The output in the printed areas should have uniform

shading. If not, parameters such as individual hammer module heights and alignments should be checked.

Selecting And Running a Print Test

- Step 1. Take the printer Offline and place it in Tech Access Mode.
- Step 2. Access the **Test menu** with the Menu/Back key, then scroll until it displays.
- Step 3. Scroll (**▲** Key) until the **Pattern** Category is displayed. Press Enter.
- Step 4. Scroll (**▲** Key) until the desired Print Test parameter (**Print**, **Print2**, or **Plot**) is displayed. Press Enter
- Step 5. Scroll (**▲** Key) to the desired test pattern.
- Step 6. Press Enter to begin the Print Test.

With the exception of the **1 Line** print test, the print tests are continuous and will continue to print until you depress the Clear key or the Enter key.

Fault Override Category

This category provides you a means of controlling fault reporting from the Engine Manager to the Control Processor. Each of the following parameters has two selections: OFF and ON.

When these parameters are set to OFF, faults are reported as they happen (Fault Override is disabled). When these parameters are set to ON, faults are not reported on the display (Fault Override is Enabled).

Paper Motion

This parameter provides fault override for Paper Motion Faults.

Paper Out

This parameter provides fault override for Paper Out Faults.

Ribbon Motion

This parameter provides fault override for Ribbon Motion Faults.

Shuttle

This parameter provides fault override for Shuttle Fault reporting.

Temp

The Temp Parameter provides fault override for Temperature Threshold fault reporting.

Platen

This parameter provides fault override for the Platen Open Sensor.

Control

This parameter provides fault override for the control processor fault reporting status.

Link

This parameter provides fault override for control processor to main processor communications.

Sync

This parameter provides fault override for the "Lost Sync (28)" error in Twinax Interface Mode. Check printer cable connection.

Diagnostic Category

This category contains parameters for testing various printer components, for setting operational thresholds, and for calibrating certain sensors. You are guided through these diagnostic procedures by instructions on the Control Panel Display. There are 12 diagnostic parameters.

Calibrations

This parameter provides a means to calibrate the hammer timing pulses to obtain the best print quality, and to calibrate the Paper Out sensor. There are three selections for Calibrations: **Hammer**, **Paper Out**, and **Platen Gap Cal**.

After an initial calibration (the standard "hammer" calibration), if print quality is acceptable, no further calibration is needed. The additional procedures need only be performed if certain types of quality defects persist. As with "Hammer" calibration procedure, this option must be invoked separately for single-part and multi-part form platen gap settings.

Selecting And Running a Hammer Calibration Routine

This procedure generates a test pattern consisting of an assortment of characters and character shapes while stepping through a range of lead times during this hammer timing calibration. The lead times are measured in clock cycles and are printed along the left side of the paper (see Figure 2–1). The tests are run at one shuttle frequency and then repeated for other frequencies.

- Step 1. Take the printer Offline and place it in Tech Access Mode.
- Step 2. Access the **Test** menu.
- Step 3. Scroll (▲ Key) until the **Diag** Category is displayed. Press Enter.
- Step 4. Scroll (▲ Key) until the **Calibration** Parameter is displayed. Press Enter.
- Step 5. Scroll (▲ Key) until the **Hammer** selection is displayed.
- Step 6. Depress the **Enter** key to begin the **Hammer Calibration Routine**.
The printer generates coarse test patterns using hammer lead times from several shuttle frequencies.
- Step 7. Examine each line of the printed output for each lead time and select the one that has the best dot placement, then scroll to that setting on the Control Panel and depress the **Enter** key to select it.

After you make the last selection (for 45Hz) the printer prints out the settings for the various lead times and the calibration routine is over.



Repeat the Print calibration routine with "Heavy Forms" turned on and with heavy forms installed on the printer.

```
136 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
140 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
144 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
148 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
152 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
156 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
160 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
164 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
168 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
172 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
176 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
180 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
184 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
188 OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL) (OH TAXI! #+JL)
```

Figure 2–1. Hammer Leadtime Calibration Printout Sample (partial)

Selecting And Running a Platen Gap Calibration Routine

- Step 1. Take the printer offline and place it in Tech Access Mode.
- Step 2. Access the **TEST** Menu.
- Step 3. Scroll (▲ Key) until the **Diag** Category is displayed. Press Enter.
- Step 4. Scroll (▲ Key) until the **Calibrations** Parameter is displayed. Press Enter.
- Step 5. Scroll (▲ Key) until **Platen Gap Cal** is displayed.
- Step 6. Depress the **ENTER** key to begin the first part of the Platen Gap **Calibration routine**.
- Step 7. The message "Set Platen to E and press Enter" displays. Turn the Platen Gap wheel to the letter E and then press Enter.
- Step 8. The message "Set platen to C and press Enter" displays. Turn the Platen Gap wheel to the letter C and press Enter.

Meter

The Meter Parameter provides real-time dynamic measurements of various sensor readings within the printer. They can be used to adjust the sensor for optimum performance or to test sensors to ensure that they are operating properly. These test measurements are displayed directly on the Control Panel Display. There are seven selections for Meter: **Paper Out, Paper Motion, Ribbon Weld, Temp Sensor,** and **Keypad.** **Power** and **Platen** will not be discussed in this manual because they are used on the printer production line only.

Accessing the Meter Measurement Tests:

- Step 1. Take the printer offline and place it in Tech Access Mode.
- Step 2. With the printer display reading **OFFLINE**, depress the **Menu/Back** key and use the **▲/▼** keys to scroll to **Test**
- Step 3. Press Enter and scroll (**▲** Key) to **Diag.**
- Step 4. Press Enter and scroll (**▲** Key) to **Meter.**
- Step 5. Press Enter and scroll (**▲** Key) to one of the following measurement tests at Level 3. Each Meter Test is initiated by pressing the Enter key when the desired selection displays.

Paper Out Sensor

The **Paper Out** Sensor should read less than .2 volts with paper removed and greater than 4 volts with paper installed. No other operator actions are required during this test.

Paper Motion Sensor

The **Paper Motion** Sensor only needs to have a differential of greater than 2 volts between the high and low reading to function properly. No other operator actions are required during this test.

Ribbon Weld

The **Ribbon Weld** Sensor is read by sliding a piece of white paper between the ribbon and the sensor. The readings should be greater than 4 volts uncovered and less than .2 volts covered.

Temp Sensor

The printer has a sensor on the Engine Controller Board for monitoring the air temperature in the area of the engine controller CBA. When **Temp Sensor** is selected, the display shows the temperature in milli-volts.

Keypad

This test verifies that the logic board can receive a signal from each key on the control panel. Once you have entered the Keypad Test, depressing each key should make its label appear on the Control Panel Display (i.e., **Mode, View, Line Feed,** etc.). Exit the Keypad Test by depressing the **Clear** key three times.

Motors

This parameter provides a means for testing individual motor circuits by turning them on or off. They can be tested at the current selection (Default) or you can select a variety of speeds at which to test them. (See **Shuttle Speed** parameter and **Ribbon Weld** parameter.)

Accessing the Motor Tests:

- Step 1. Take the printer offline and place it in Tech Access Mode.
- Step 2. With the printer display reading **OFFLINE**, depress the **Menu/Back** Key and use the **▲/▼** keys to scroll to **TEST**.
- Step 3. Press Enter and scroll (**▲** Key) to **Diag**.
- Step 4. Press Enter and scroll (**▲** Key) to **Motor**.
- Step 5. Press Enter and scroll (**▲** Key) to either Ribbon or Shuttle. Each Motor Test is initiated by depressing the **Enter** key when the desired selection is displayed.

Motor selections

- Ribbon
- Shuttle
- Ribbon Pump (Remove ribbon before performing this test.)
- Blower



Remove the ribbon before performing the Ribbon Pump test!

The selected test is initiated by depressing the **ENTER** Key. After the motor reaches its assigned speed the test can be stopped by depressing the **ENTER** Key again. This sequence may be repeated until you are satisfied with the operation of the motor. (The Paper Feed Motor may be tested using the LF (line feed) or FF (form feed) functions.).

Shuttle Speed

This option provides a means to vary the Shuttle Motor speed for a Shuttle Motor Test.

Shuttle Speed selections:

20-99 Hz.

Ribbon Speed

Provides a means to vary the Ribbon Motor speed for a Ribbon Motor Test.

Speed selections:

1-250
Default

Ribbon Threshld

This parameter allows you to set the Ribbon Sensor Threshold value for the Ribbon Motion Sensor.

Threshold selections:

1–255

Paper Out Thold

This parameter allows you to set the Paper Out Threshold value for the Paper Out Sensor. By using this, you can compensate for the reflectivity of different types of paper. Selections are 1-255.

Energy Star

This parameter allows you to control Energy Star Operation. Selections are OFF and ON.

Clear

This parameter provides you with a means of clearing part or all of NVRAM.

Clear selections

Calibrations Clears the calibration data from NVRAM. When CalData is selected you must perform a Hammer Calibration Routine before using the printer.

Counts Clears the count information from NVRAM.

NVRAM Clears ALL NVRAM.

Shuttle Off

This parameter allows you to set the amount of time the shuttle remains at speed after the last printed data. Options are 10 Sec, 20 Sec, 30 Sec, and 60 Sec.

Shuttle Change

The printer checks for incoming data that uses a different shuttle speed. This parameter allows you to determine how much of that data is required before an actual shuttle speed change occurs. Options are 1-30.

Ribbon Ink, Dots per Pump

This parameter allows you to adjust the number of dots printed before the next pump of the ink is added to the ribbon. Options are 500-2000.

Serial Dump

When this parameter is enabled, the data the printer receives from the parallel port of PSIO cards is replicated and sent out from the serial port. This allows you to connect a serial cable from the printer to a computer and capture the data using a serial capture utility.

Control Panel Key Operations For Controlling Fault Reporting

In addition to being able to use the above parameters to set up individual fault overrides, you may also use three different key sequences to set up fault overrides. You may set up all fault overrides, four specific overrides, or just Paper Out Fault override.



To use these, the printer must be in Tech Access Mode.

ALL Fault Reporting

To turn **ALL** fault reporting OFF, place the printer Offline and depress the **FORM FEED** Key and **ENTER** Key simultaneously until the printer alarm sounds. To turn ALL fault reporting back ON, hold down the same two keys when the printer is Offline until the printer alarm sounds.

Four Faults Only

To turn fault reporting OFF for **Paper Motion**, **Paper Out**, **Ribbon Fault**, and **Platen Open** sensors, hold down the **ENTER** Key and **TOF** Key simultaneously until the printer alarm sounds. To toggle them back ON, hold down the same two keys until the printer alarm sounds.

Paper Out Only

To turn OFF fault reporting for the **Paper Out** sensor, depress the **Up Arrow** Key and **ENTER** Key simultaneously until the printer alarm sounds. To turn it back ON, depress the same keys until the printer alarm sounds.



The displays that appear when you are enabling the options above can be somewhat confusing. Just remember, when you turn on fault overrides you are losing fault protection.