NCR 7193 Thermal Receipt Printer

Service Guide

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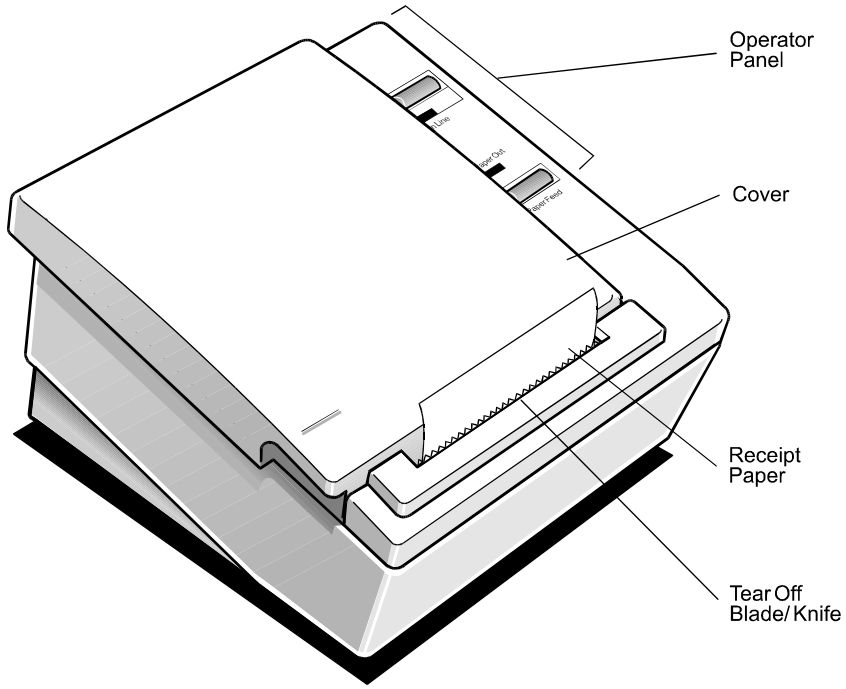
Address correspondence to:

Retail Systems Group–Atlanta
NCR Corporation
2651 Satellite Blvd.
Duluth, GA 30136

Contents

Chapter 1: About the 7193 Printer

The 7193 thermal receipt printer is fast, quiet, and very reliable. With thermal printing technology, there is no ribbon cassette to change, and paper loading is extremely simple. The printer is small enough to fit almost anywhere and is easy to use with the receipt exiting from the top. There is no journal as it is kept electronically by the host system.



Models

There are several models of the 7193 depending on the communication interface and the combination of options selected.

Communication Interfaces

- RS-232C
- Parallel
- LCSIO (RS-485)

See “Appendix D: Connectors” later in this book or the Owner's Guide for more information.

Features

All models come with the following features:

- Drop-in paper loading which does not require using a spindle or threading the paper through a paper path
- Host-selectable 44 or 56 columns of print on 80 mm wide “fax grade” thermal paper
- Two resident selectable character sets:
  - PC Code Page 437 (US)
  - PC Code Page 850 (Multilingual)
- 16K RAM available for downloadable character sets and bit-mapped graphics
- 4K buffer (RS-232C and Parallel)
- History EEROM
- Speaker
- Resident bar codes
  - Code 39
  - UPC-A
  - UPC-E
  - JAN8 (EAN)
  - JAN13 (EAN)
  - Interleaved 2 of 5
  - Codabar
  - Code 128

Options

The following options are available:

- Remote power supply with wall-mount kit
  - Standard with RS-232C and Parallel interface models
  - Optional with LCSIO (RS-485) models: these models may be powered through the remote power supply or through the host system
- Paper cutter
- Cash drawer drivers: will open a separately purchased cash drawer under software command (RS-232C and Parallel only)
- Wall-mount kit for hanging the printer on a wall

Thermal Printhead

The 7193 uses a thermal printhead which is extremely fast and quiet. Because it uses heat to print directly on paper, there is no cassette or ribbon to change, eliminating soiled fingers and paper dust.

The printhead is designed for a very long life, but it may be replaced if needed. See “Troubleshooting” later in this book for information on when to replace the printhead. See “Removing the Printhead” in “Disassembling and Reassembling the Printer” later in this

book for instructions on replacing the printhead. See “Cleaning the Printer” later in this chapter for cleaning instructions for the printhead.

Cleaning the Printer

Cleaning the Cabinet

Clean the cabinet as needed to remove dust and finger marks. Use any household cleaner made for plastics, but test it first on a small unseen area. If the receipt paper bucket is dirty, wipe it with a clean, damp cloth. The cabinet materials and finish are durable and are resistant to the following items:

- Cleaning solutions
- Lubricants
- Fuels
- Cooking oils
- Ultraviolet light

Cleaning the Thermal Printhead

If the printhead appears dirty, clean it with cotton swabs and rubbing alcohol.

Caution: Do not spray the thermal printhead with household cleaner as this may damage it and the electronics.

If spotty or light printing problems persist after cleaning the thermal printhead, contact your NCR authorized service representative.

Note: The thermal printhead does not normally require cleaning if the recommended paper grades are used. If non-recommended paper has been used for an extended period of time, cleaning the printhead with the alcohol pen will not be of much benefit.

If this is the case, the printhead will need to be changed. See “Removing the Printhead” in “Disassembling and Reassembling the Printer” later in this book for instructions on replacing the printhead.

Chapter 2: Installing the Printer

What Is in the Box?

The following items are packed in the shipping box (printers shipped in bulk may not include all of these items):

- Printer enclosed in a plastic bag and foam pack
  - Thermal paper roll (inside printer)
  - Test printout protecting the printhead (inside printer)
- Power supply with attached cable to printer (only if ordered with the printer)
  - Power cord—from power supply to outlet (only if ordered with the printer)
  - Wall-mount holder for the power supply with screws and wall anchors (only if ordered with the power supply)
  - Tie-wrap for cable
- Installation report card (please complete this form and return to NCR)
- *7193 Thermal Receipt Printer: Setup and User's Guide*

These items may be ordered as options from NCR and will be shipped separately:

- Wall-mount kit for the printer
- Communication cable (from host computer to printer)
- Cash drawer with cables

Removing the Printer

1. Remove the printer from the foam pack and open the receipt cover by pulling up on the front left corner.
2. Remove the paper roll and test printout from inside the printer.
3. Save all packing materials for future storing, moving, or shipping the printer.
4. Complete the Installation report card and send it to NCR.

Repacking the Printer

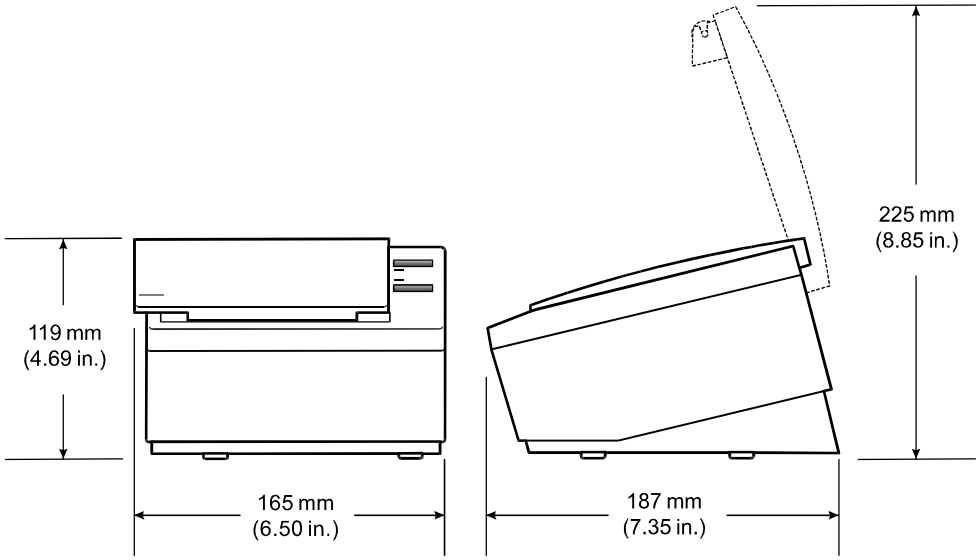
1. Protect the printhead by placing a piece of receipt paper between the receipt cover and the printhead.
2. Place the printer in the plastic bag and foam pack.
3. Place the packed printer in the box and secure the box with packing tape.
4. If you are sending the printer directly to NCR for repair, call your NCR-authorized service representative for instructions on where to send the printer.

   Be prepared to answer questions concerning shipping and billing.

Choosing a Location

The 7193 is compact and requires little counter space. It may even be mounted on a wall if space is at a premium. See “Mounting the Printer on a Wall” later in this chapter. The power supply, if used, may also be mounted on a wall or under a table. See “Mounting the Power Supply on a Wall” later in this chapter. Be sure to plan for the length of the communication and power cables when choosing a location.

Make sure there is enough room to open the receipt cover and change the paper. The following illustration shows the actual dimensions of the printer, but leave several inches around the printer for connecting and accessing the cables.



Setting Switches

The DIP switches control communication between the printer and host computer and are located on the bottom of the printer. The switches are used for the following purposes:

- To set variables for several printer functions (see the sections for the various printer functions in “Level 1 Diagnostics” in the “Diagnostics” chapter)
- To perform diagnostic tests (see the sections for the various diagnostic tests in “Level 1 Diagnostics” in the “Diagnostics” chapter)
- To set communication parameters for the RS-232C communication interface (see “RS-232C Switch Settings” later in this chapter)
- To set the data buffer for the Parallel communication interface (see “Parallel Switch Settings” later in this chapter)
- To set the address bits for the LCSIO (RS-485) communication interface (see “LCSIO—RS-485 Switch Settings” later in this chapter)

Caution: The DIP switches are set at the factory to predetermined settings and should generally not be changed. If you must change the settings do so carefully to avoid changing other functions.

Before changing any of the switches, first run the print test to print out the current switch settings on the receipt. See “Testing the Printer” later in this chapter for instructions on running the print test and for a sample printout.

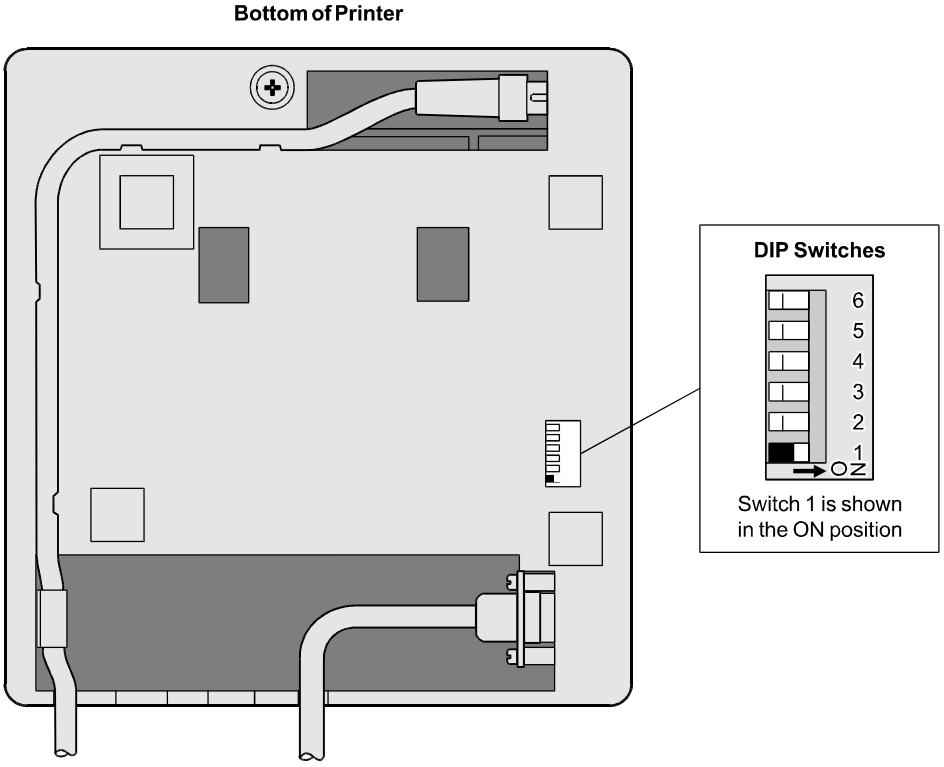
Note: Switch #1 is used to toggle between regular communication with the host computer and Level 1 Diagnostics (used for the printer functions and level 1 diagnostic tests):

- Switch #1 set to OFF: printer is ready to communicate with the host computer and receive data (online mode)
- Switch #1 set to ON: printer is in Level 1 Diagnostics (setup mode)

If you want the printer to communicate with the host computer, be sure switch 1 is OFF. Use a paper clip or other pointed object to set the switch.

For additional information on the setup mode (Level 1 Diagnostics), see the "Diagnostics" chapter.

Note: Some 7193 models may appear slightly different than what is shown in the illustration. The procedures are the same for all models unless otherwise noted.



RS-232C Switch Settings

Use the DIP switches to set the RS-232C parameters and the Data Error and Data Buffer options as shown. The parameters must match the host computer. See "Level 1 Diagnostics" in the "Diagnostics" chapter for more information.

Caution: The switches can also be used for setting other functions and tests. Be careful when setting the switches for the RS-232C settings that you do not accidentally change the settings for the other functions and tests.

DIP Switch Settings for RS-232C Parameters

Switch	Settings		Description
1	OFF		RS-232C Communication: On-line Mode (Default)
	ON		Level 1 Diagnostics: Setup Mode
2	OFF		DTR / DSR Protocol (Default)
	ON		XON / XOFF Protocol
3	OFF		Parity Disabled (Default)
	ON		Parity Enabled
4*	OFF		Odd Parity
	ON		Even Parity
5, 6	5	6	
	OFF	OFF	19,200 Baud
	ON	OFF	9600 Baud (Default)
	OFF	ON	4800 Baud
	ON	ON	1200 Baud

*Switch 4 is not used if the parity is disabled (switch 3 set to OFF).

Note: The following options are set with the printer in the setup mode. See "Level 1 Diagnostics" in the "Diagnostics" chapter for more information.

DIP Switch Settings for Data Error and Data Buffer Options (Choose one from each option)

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Option
On	Off	On	Off	Off	Off	"?" for Data Errors*
On	Off	On	Off	Off	On	Ignore Data Errors
On	Off	On	Off	On	Off	4K Byte Data Buffer*
On	Off	On	Off	On	On	One Line Data Buffer

*Default

Parallel Switch Settings

When switch 1 is set to Off, the printer is on-line and ready to communicate with the host computer. For systems using non-standard ACK handshaking, this option is on Switch 2. DO NOT select the ACK handshaking option without fully understanding your system requirements.

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Option
Off	On	Off	Off	Off	Off	ACK Handshaking (On-line)
Off	Off	Off	Off	Off	Off	Standard Busy Handshaking (On-line)

Caution: The switches can also be used for setting other functions and tests. Be careful when setting the switches for the Data Buffer settings that you do not accidentally change the settings for the other functions and tests.

Note: The Data Buffer option is set with the printer in the setup mode. See the table below, and see “Level 1 Diagnostics” in the “Diagnostics” chapter for more information.

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Option
On	Off	On	Off	On	Off	4K Byte Data Buffer (Default)
On	Off	On	Off	On	On	One Line Data Buffer

LCSIO (RS-485) Switch Settings

For printers using the LCSIO (RS-485) interface, the DIP switches are used to set the LCSIO (RS-485) address bits as shown in the following table.

DIP Switch 1 (Set to Off when setting address bits)
Off = LCSIO (RS-485) Communication, On-line Mode (Default)
On = Level 1 Diagnostics: Setup Mode

DIP Switch 2 is always Off

Address w/Parity	Address w/o Parity	Switch 3	Switch 4	Switch 5	Switch 6
3C	BC	Off	Off	Off	Off
3D	3D	Off	Off	Off	On
3E	3E	Off	Off	On	Off
3F	BF	Off	Off	On	On
40	40	Off	On	Off	Off
41	C1	Off	On	Off	On
42	C2	Off	On	On	Off
43	43	Off	On	On	On
44	C4	On	Off	Off	Off
45	45	On	Off	Off	On
46	46	On	Off	On	Off
47	C7	On	Off	On	On
48	C8	On	On	Off	Off
49	49	On	On	Off	On
4A	4A	On	On	On	Off
4B	CB	On	On	On	On

Connecting Cash Drawer Cables

The cash drawer option is available with RS-232C interface and Parallel interface models. This option allows up to two cash drawers to be connected to the printer in a system with a PC that has no connectors for the cash drawer cables. The cash drawer cables usually come with the cash drawer.

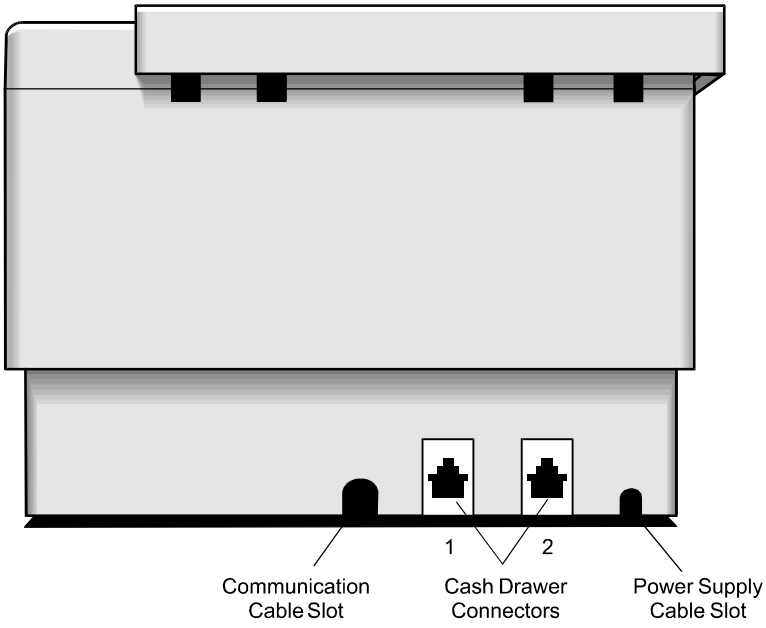
The cash drawers are operated by software command from the host computer through the printer. For additional information on the printer commands used by the host computer to activate the cash drawers, see "Appendix E: Commands."

1. Plug the cash drawer cables into the connectors on the printer.

   The connectors are standard phone connectors.

2. If only one cash drawer is used, plug the cable into the connector labeled 1.

Note: Some 7193 models may appear slightly different than what is shown in the illustration. The procedures are the same for all models unless otherwise noted.



Back View of Printer

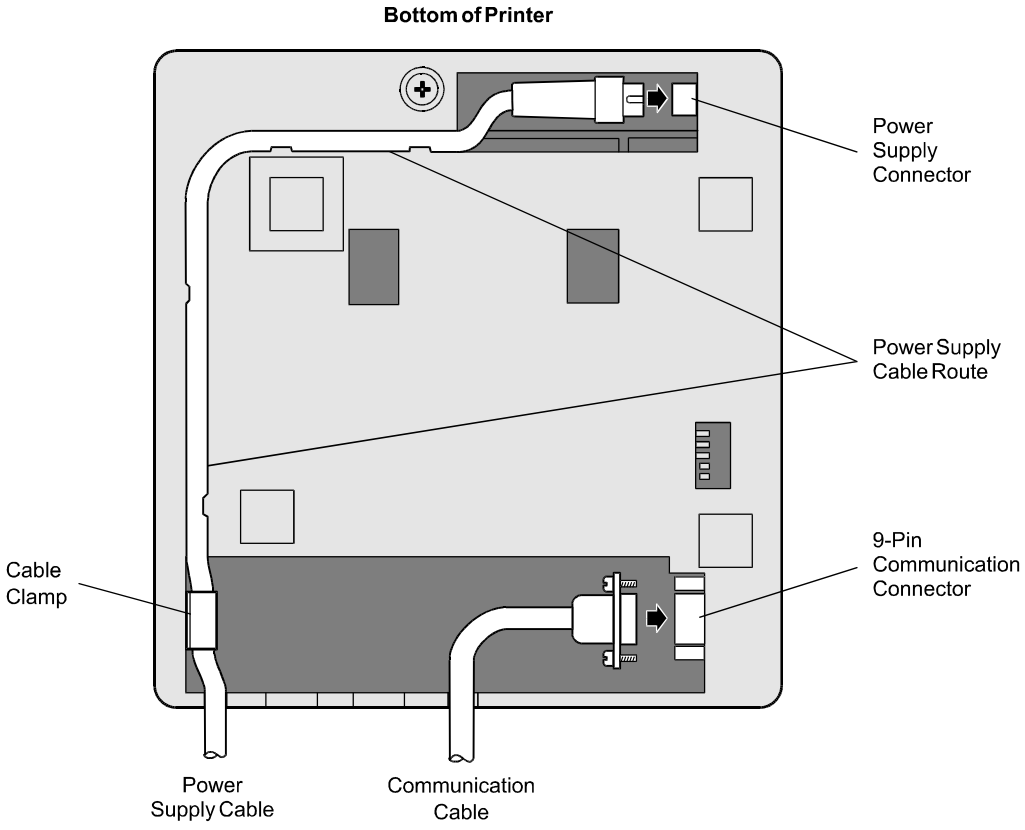
Connecting Communication and Power Cables

Models receiving power from the host computer (integrated), use one cable for communication and power. Models receiving power from a power supply (remote), use one cable for communication and a separate cable for power.

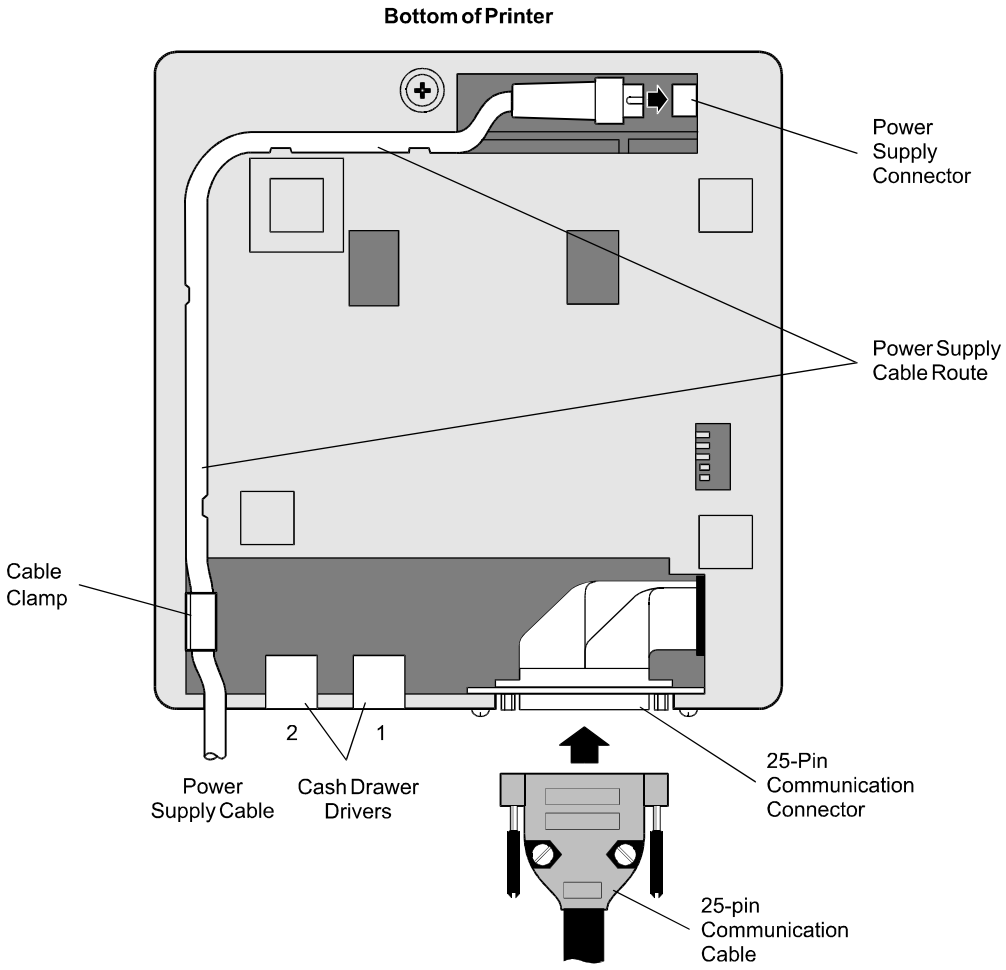
Caution: Be sure that all power is disconnected before connecting the cables.

1. Turn off the host computer or unplug the power supply if it is plugged in.
2. If the power supply is used, plug the power supply cable into the printer first, then plug the power cord into the power supply, then into an outlet.
3. Connect the communication cable to the printer, then to the host computer.

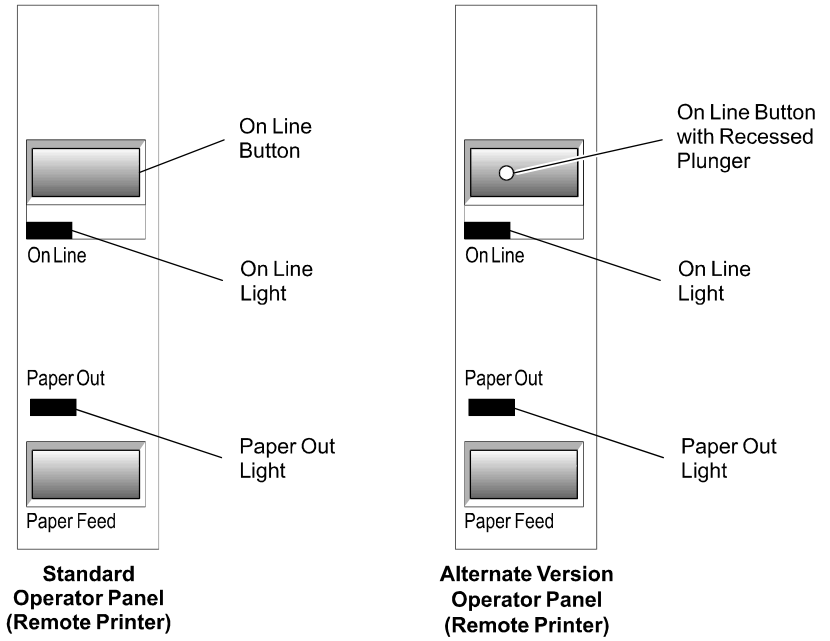
RS-232C and LCSIO (RS-485) Models



Parallel Models



Turning On the Printer



Note: On models receiving power from a power supply, the printer receives power when the power supply is on even if the printer is off-line. To remove power from the printer, press the On Line button to take the printer off-line (On Line is off), then unplug the power supply power cord from the outlet.

1. Press the On Line button on the operator panel to put the printer on-line.

   The printer goes through a self-test routine to ensure everything is working, then "beeps." The On Line light (green) comes on indicating the printer is on-line. If the On Line light does not come on, or either the On Line light or Paper Out light flashes, see "Troubleshooting" later in this book.

2. Press the On Line button again to take the printer off-line.

Note: On models receiving power from the host computer (integrated), the printer receives power when the communication cable has been connected and the host turned on. The printer then goes through a self-test routine to ensure everything is working, then "beeps." There is no On Line button or light.

When the printer has completed its "startup" cycle it is ready to receive data. If the Paper Out light flashes, see "Troubleshooting" later in this book.

Testing the Printer

Run this test to check the printer. The test prints the settings for several functions, prints all variations of the character sets, and partially cuts the paper between each variation. See the "Diagnostics" chapter for a description of the functions.

A sample printout (RS-232C) is shown later in this section. The printouts for other models are similar. The test ends with a partial cut, then begins again. Several feet of paper can be used to print one pass of the test.

Running the test is slightly different for printers receiving power from the host computer and printers receiving power from a power supply.

Additional diagnostic tests may be performed. For more information, see "Diagnostics" later in this book.

Models Receiving Power from the Power Supply (Remote)

1. Press the On Line button on the operator panel to take the printer off-line.

   The On Line light turns off indicating the printer is off-line.

2. Press and hold the Paper Feed button while pressing the On Line button.
3. Let go of the Paper Feed button once the printing begins.

   The printer begins printing the data and character sets. This can be given to a service representative if it appears there is a problem.

4. To stop the test, press the On Line button.

   The On Line light turns off indicating the printer is off-line.

5. To return to the on-line mode, press the On Line button again.

   The printer is ready to receive and print data from the host computer.

Models Receiving Power from the Host (Integrated)

1. Open the receipt cover by pulling up on the front left corner.

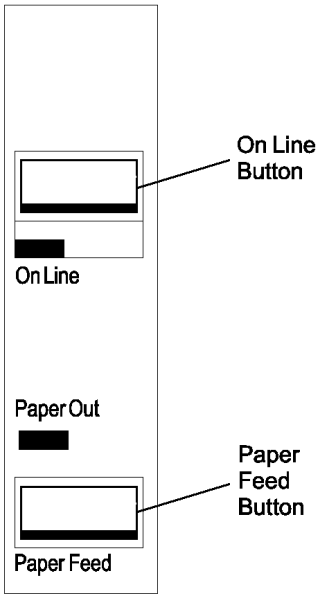
   The Paper Out light (red) comes on indicating that the receipt cover is open and that the printer cannot receive or print data (not that the paper is out).

2. Press and hold down the Paper Feed button while closing the receipt cover.
3. Let go of the Paper Feed button once the printing begins.

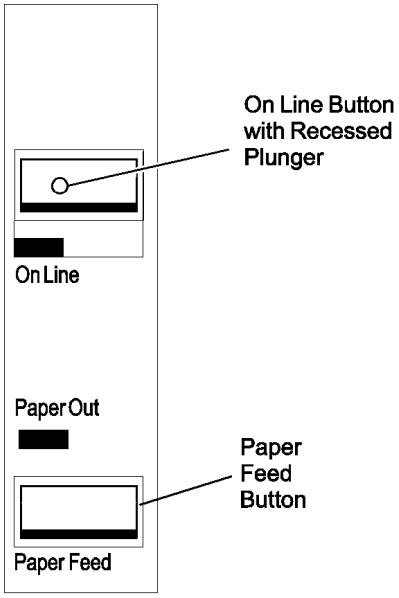
   The printer begins printing the data and character sets. This can be given to a service representative if it appears there is a problem.

4. To stop the test, press the Paper Feed button.

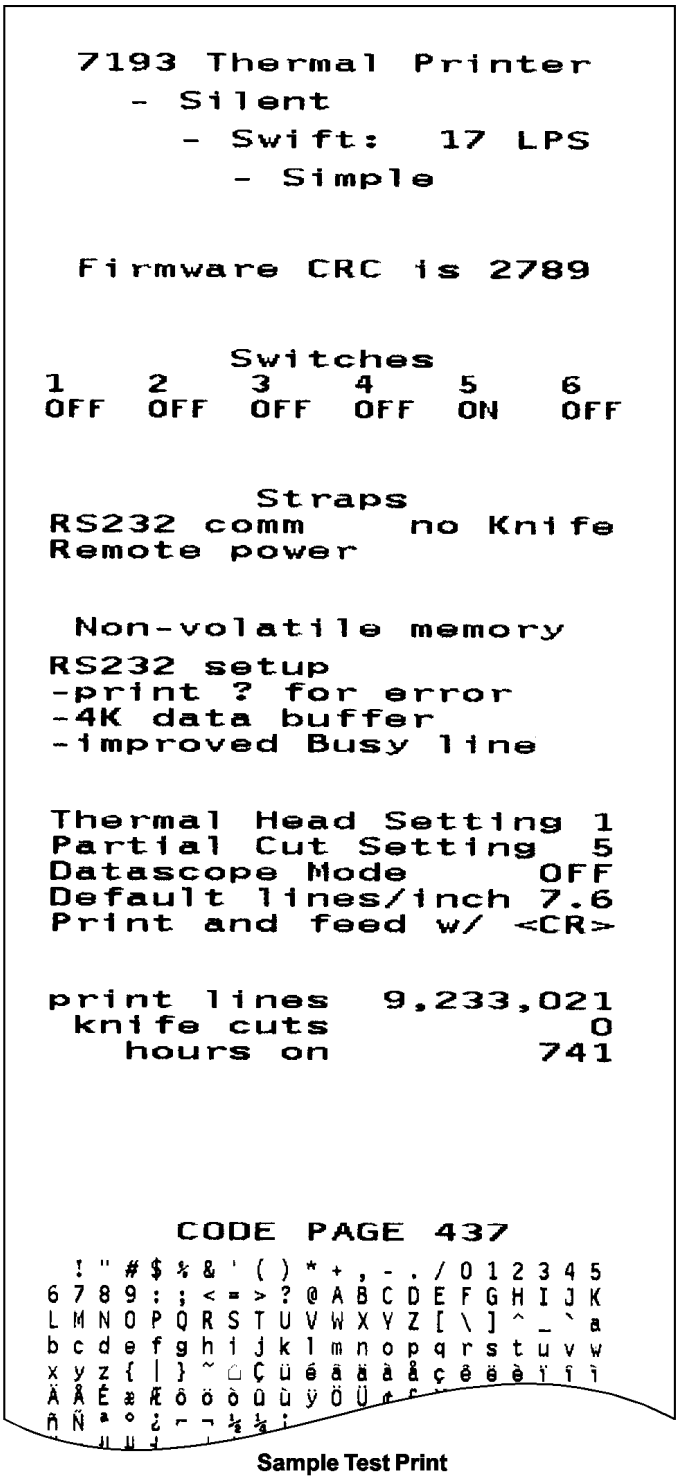
   The printer returns to the on-line mode and is ready to receive and print data from the host computer.



Standard Operator Panel (Remote Printer)



Alternate Version Operator Panel (Remote Printer)



Sample Test Print

Mounting the Printer on a Wall

Use the wall-mount kit to mount the printer vertically on a wall. See “Appendix B: Ordering Paper and Supplies” for information on ordering the printer wall-mount kit.

The kit contains a mounting bracket, screws with plastic anchors, and a label. Once the printer is mounted on the wall, the operator panel will be upside down. The label corrects this so the panel can be easily read.

Select a wall that is accessible, but away from main traffic to keep the printer from being bumped or knocked off. Be sure there are no hidden wires or other obstructions in the wall where you mount the printer. Keep in mind the length of the cables when mounting the printer on the wall.

Be sure that the rubber pads have been attached to the bottom of the printer. The rubber pads help the printer to fit snugly against the mounting bracket.

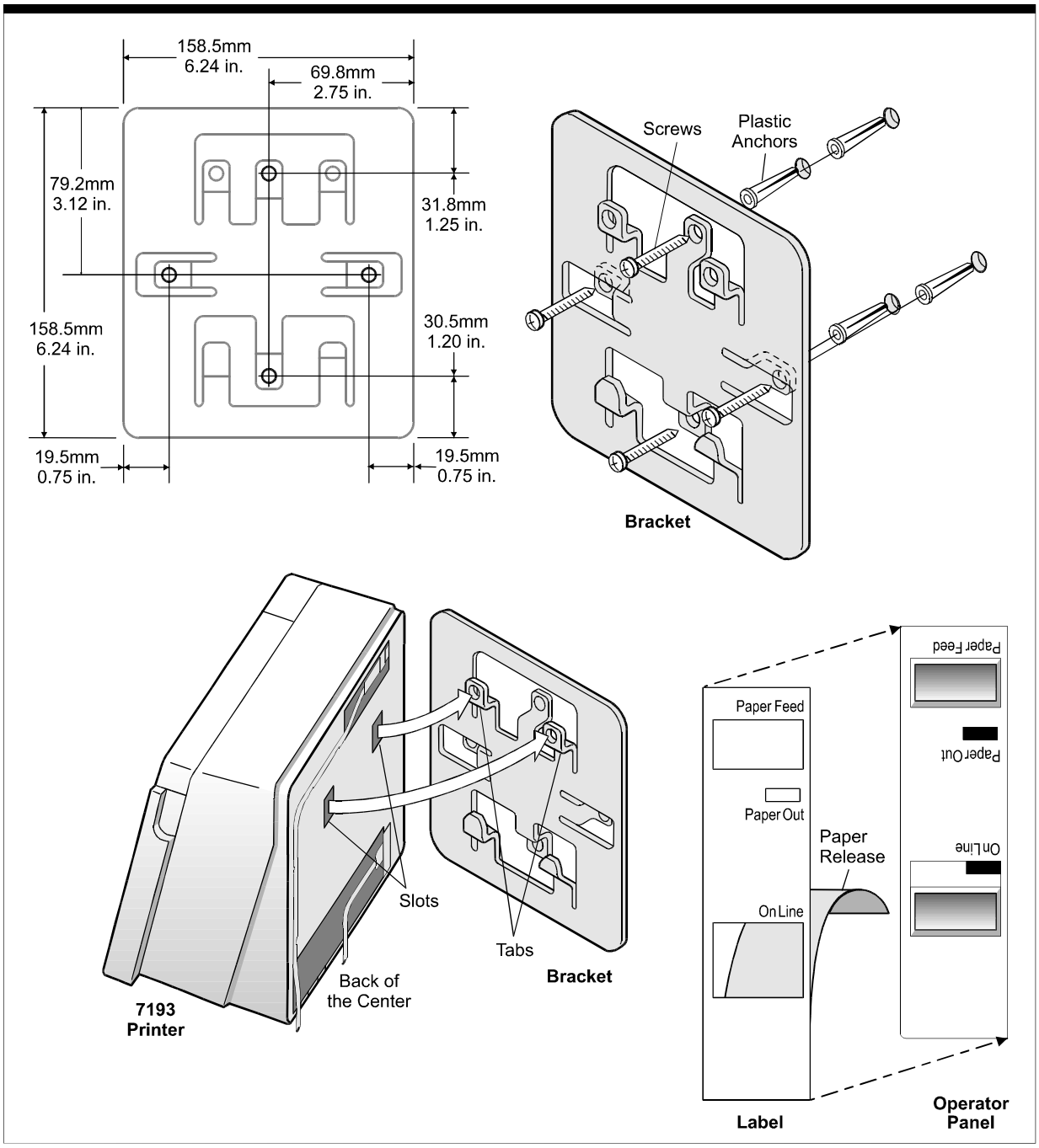
You will need a 1/4 inch drill bit and either a Phillips or standard screwdriver (screws are combination Phillips and pan-slotted).

1. Using the bracket as a template, mark and drill a hole for each plastic anchor 1.25 inches deep.
2. Insert the anchors into the holes so they are flush with the wall surface and screw the bracket against the wall, tightening the screws so that the plastic anchors expand and hold firmly in the wall.

   Do not overtighten the screws.

Note: Because the power cable and communication cable connect to the bottom of the printer, they must be connected before the printer can be attached to the bracket. If you haven't connected the cables to the printer, do so now. See “Connecting Communication and Power Cables” earlier in this chapter.

3. Line up the tabs of the bracket with the slots on the back of the printer and attach the printer to the bracket.
4. Place the label on the cover.


158.5mm
6.24 in.
69.8mm
2.75 in.
79.2mm
3.12 in.
31.8mm
1.25 in.
158.5mm
6.24 in.
30.5mm
1.20 in.
19.5mm
0.75 in.
19.5mm
0.75 in.
Screws
Plastic
Anchors
Bracket
Slots
Tabs
Back of
the Center
7193
Printer
Bracket
Paper Feed
Paper Out
On Line
Paper
Release
Paper Feed
Paper Out
On Line
Label
Operator
Panel

Mounting the Power Supply on a Wall

The power supply comes with a wall-mount kit to mount the power supply on the wall or under a table. See “Appendix B: Ordering Paper and Supplies” for information on ordering the power supply and wall-mount kit.

The kit contains a holder and screws with plastic anchors. Be sure there are no hidden wires or other obstructions in the wall where you mount the power supply.

You will need a 1/4 inch drill bit and either a Phillips or standard screwdriver (screws are combination Phillips and pan-slotted).

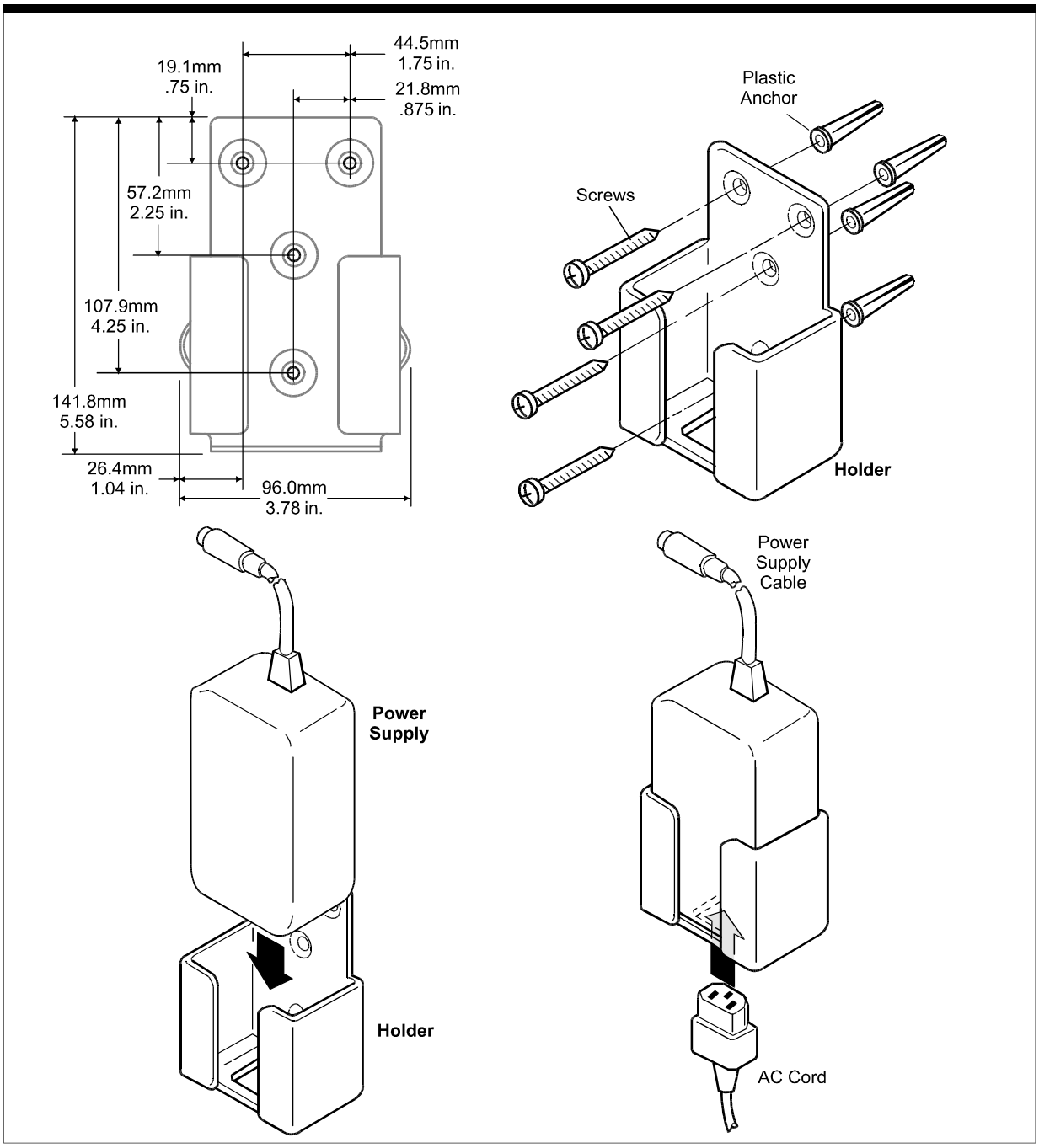
1. Using the bracket as a template, mark and drill a hole for each plastic anchor 1.25 inches deep.
2. Insert the anchors into the holes so they are flush with the wall surface and screw the holder against the wall, tightening the screws so that the plastic anchors expand and hold firmly in the wall.

   Do not overtighten the screws.

Note: You must unplug the power cord in order to place the power supply in the holder. First, take the printer off-line by pressing the On Line button on the operator panel (the On Line light goes off indicating the printer is off-line), unplug the power cord from the outlet, then unplug the power cord from the power supply.

3. Place the power supply in the holder.
4. Plug the power cord into the power supply.
5. Plug the power cord into an outlet.

Note: You can use the tie-wrap to wrap the power supply cable to keep it out of the way.


44.5mm
1.75 in.
19.1mm
.75 in.
21.8mm
.875 in.
57.2mm
2.25 in.
107.9mm
4.25 in.
141.8mm
5.58 in.
26.4mm
1.04 in.
96.0mm
3.78 in.
Plastic
Anchor
Screws
Holder
Power
Supply
Cable
Power
Supply
Holder
AC Cord

Chapter 3: Diagnostics

The following diagnostic tests are available for the 7193:

- Level 0 Diagnostics
  Performed during the startup cycle
- Level 1 Diagnostics (setup mode)
  Available in a dedicated environment and accessed through the DIP Switches
- Level 2 Diagnostics
  Performed during normal printer operation

Level 0 Diagnostics

The printer performs level 0 diagnostics during the startup cycle when power is supplied to the printer. Models that receive power from a power supply (remote) also run Level 0 Diagnostics when the printer is brought on-line (On Line button is pressed). Level 0 diagnostics comprise the following actions:

- Motors are turned off
- Microprocessor timing is checked, CRC check of the firmware ROM is performed, external RAM is read (failure causes level 0 diagnostics to stop; the printer beeps once when the test is successfully completed)
- Checks if paper is present
- Homes knife (failure causes a fault condition)
- Checks if receipt cover is closed (failure does not interrupt the startup cycle)

When the last step is complete, the Paper Feed button is enabled and the printer is ready for normal operation. Information about the test is available to the communication interface through the commands.

If the printer has not been turned on before, or a new EEROM has been installed, the default values for the printer settings (set in Level 1 Diagnostics) will be loaded into the EEROM. The printer beeps twice when this occurs. See the tables in “Level 1 Diagnostics” for the printer settings. If the printer beeps twice at any other time, it indicates that the EEROM has failed.

Level 1 Diagnostics

Level 1 Diagnostics (setup mode) allow you to change the settings for various printer functions (described on the following pages) and to run certain tests using the DIP switches.

Keep the following information in mind when changing the settings:

- Turn the power off (not required, but recommended).
  - Remote models: press the On Line button (although the printer still receives power, this is sufficient for changing the DIP switches)
  - Integrated models: turn the host computer off.
- The settings can only be changed when the printer is in level 1 diagnostics (setup mode): switch 1 must be set to On.
- Turn the power back on. The printer beeps, and the On Line light (green) blinks (remote models only).
- Once the settings have been changed and stored in the EEROM, the DIP switches must be set back to the on-line settings for the printer to operate.
- The stored settings for the functions are printed with a dump of all resident characters during a print test. See “Testing the Printer” in “Chapter 2: Installing the Printer.”
- The default settings are set at the factory and are stored in the history EEROM.

Caution: If you change the switch settings, be sure they are the correct settings for that particular function or test to avoid accidentally changing the settings for another function or test. If the settings are accidentally changed, use the switch settings shown in the tables throughout this section to change those settings.

The functions and tests are described in the following order in this section:

- Setting Data Error (RS-232C) and Data Buffer (RS-232C and Parallel) options
- Setting printhead resistance
- Setting default lines per inch
- Setting partial cut distance
- Setting the 7150 response mode
- Ignoring / using the carriage return
- Running the data scope mode

Setting Data Error and Data Buffer options

This function allows you to select the handling of data reception errors (RS-232C only) and to select the size of the data buffer (RS-232C and Parallel only).

Caution: The DIP switches are pre-set at the factory and should generally not be changed. If you must change them, do so carefully to avoid changing other functions. Run the print test to see the current settings for this function. See "Testing The Printer" in chapter 2.

1. Turn the power off.
2. Turn the printer over and note what the current DIP switch settings are.
3. Set the switches to the settings in the table you want for data reception errors and the data buffer.

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Option
On	Off	On	Off	Off	Off	"?" for Data Errors[1, 2]
On	Off	On	Off	Off	On	Ignore Data Errors[2]
On	Off	On	Off	On	Off	4K Byte Data Buffer[1, 3]
On	Off	On	Off	On	On	One Line Data Buffer[3]

[1]Default

[2]RS-232C only

[3]RS-232C and Parallel only

Choose one of the Data Errors options and one of the Data Buffer options.

4. Turn the power back on to enter the settings into the EEROM.

   On remote models, the On Line light (green) blinks.
5. Turn the power off.
6. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the RS-232C .

Setting Printhead Resistance

This function allows you to change the setting for the printhead resistance. The setting (A-H) must match the letter stamped on the heatsink in back of the printhead. This is visible only by removing the L cover (operator panel) of the printer. See “Removing the L Cover” in the chapter, “Disassembling and Reassembling the Printer,” later in this book.

Caution: The DIP switches are pre-set at the factory and should generally not be changed. If you must change them, do so carefully to avoid changing other functions. Run the print test to see the current settings for this function. See “Testing The Printer” in chapter 2.

1. Turn the power off.
2. Turn the printer over and note what the current DIP switch settings are.
3. Set the switches to the settings in the table that match the letter stamped on the heatsink in back of the printhead.

						Printhead Setting	
Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Early 7193 Models*	Later 7193 Models*
On	On	On	Off	Off	Off	A	A
On	On	On	Off	Off	On	B	B
On	On	On	Off	On	Off	C	C
On	On	On	Off	On	On	D	D
On	On	On	On	Off	Off	E	3
On	On	On	On	Off	On	F	2
On	On	On	On	On	Off	G	1
On	On	On	On	On	On	H	0

*Be sure that the settings are correct for the version of the printer. A-D are the same for all printers. E-H is used for early models only, while 3, 2, 1, 0 are used for later models.

4. Turn the power back on to enter the settings into the EEROM.

   On remote models, the On Line light (green) blinks.
5. Turn the power off.
6. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the on-line mode.

Setting Default Lines per Inch

This function allows you to set the default for lines per inch to either 7.6 or 6.

Caution: The DIP switches are pre-set at the factory and should generally not be changed. If you must change them, do so carefully to avoid changing other functions. Run the print test to see the current settings for this function. See "Testing The Printer" in chapter 2.

1. Turn the power off.
2. Turn the printer over and note what the current DIP switch settings are.
3. Set the switches to the settings in the table that match the lines per inch setting you want as the default setting (when the printer is powered up).

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Default LInes per Inch
On	Off	On	On	On	Off	7.6 (Factory Setting)
On	Off	On	On	On	On	6.0

4. Turn the power back on to enter the settings into the EEROM.

   On remote models, the On Line light (green) blinks.
5. Turn the power off.
6. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the on-line mode.

Setting Partial Cut Distance

This function allows you to change the length of the partial knife cut. The higher the number, the longer the cut.

Caution: The DIP switches are pre-set at the factory and should generally not be changed. If you must change them, do so carefully to avoid changing other functions. Run the print test to see the current settings for this function. See "Testing The Printer" in chapter 2.

1. Turn the power off.
2. Turn the printer over and note what the current DIP switch settings are.
3. Set the switches to the settings in the table that match the cut distance value you want (the higher the number, the longer the cut).

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Cut Distance Value
On	On	Off	Off	Off	Off	0
On	On	Off	Off	Off	On	1
On	On	Off	Off	On	Off	2
On	On	Off	Off	On	On	3
On	On	Off	On	Off	Off	4
On	On	Off	On	Off	On	5 (Default)
On	On	Off	On	On	Off	6
On	On	Off	On	On	On	7

4. Turn the power back on to enter the settings into the EEROM.

   On remote models, the On Line light (green) blinks.
5. Turn the power off.
6. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the on-line mode.

Setting the 7150 Response Mode

This function allows you to set the 7193 to respond as an NCR 7150™ printer for the Configuration Message at the link level and the Request Status command at the command level. This "7150 response mode" allows the 7193 to communicate with those LCSIO (RS-485) host computers whose drivers recognize the NCR 7150™ but not the 7193.

Caution: The DIP switches are pre-set at the factory and should generally not be changed. If you must change them, do so carefully to avoid changing other functions. Run the print test to see the current settings for this function. See "Testing The Printer" in chapter 2.

1. Turn the power off.
2. Turn the printer over and note what the current DIP switch settings are.
3. Set the switches to the settings in the table that match selection you want for the 7150 Response Mode (on or off).

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	7150 Response Mode
On	Off	On	Off	Off	Off	Off (Default)
On	Off	On	Off	Off	On	On

4. Turn the power back on to enter the settings into the EEROM.

   On remote models, the On Line light (green) blinks.
5. Turn the power off.
6. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the on-line mode.

Ignoring/Using the Carriage Return

This function allows the printer to ignore or use the Carriage Return (Hex 0D) command depending on the application. Some applications expect the command to be ignored while others use the command as a print command.

Caution: The DIP switches are pre-set at the factory and should generally not be changed. If you must change them, do so carefully to avoid changing other functions.

1. Turn the power off.
2. Turn the printer over and note what the current DIP switch settings are.
3. Set the switches to the settings in the table that match you want for ignoring or using the Carriage Return command.

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Option
On	Off	On	On	Off	On	Ignore CR (Hex 0D)
On	Off	On	On	Off	Off	Use CR (Hex 0D) as Print Command (Default)*

*Emulates the NCR 7150™ printer.

4. Turn the power back on to enter the settings into the EEROM.

   On remote models, the On Line light (green) blinks.
5. Turn the power off.
6. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the on-line mode.

Running the Data Scope Mode

This test prints a Hex dump of all data sent to the printer: “1” prints as Hex 31, “A” as Hex 41 and so on. This helps troubleshoot communication problems, and runs during a normal host application (after being enabled in level 1 diagnostics).

Enter the Data Scope Mode

Caution: The DIP switches are pre-set at the factory and should generally not be changed. If you must change them, do so carefully to avoid changing other functions. Run the print test to see if the Data Scope Mode is on or off. See “Testing The Printer” in chapter 2.

1. Turn the power off.
2. Turn the printer over and note what the current DIP switch settings are.
3. Set the switches to the settings in the table.

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6
On	Off	Off	On	Off	On

4. Turn the power back on to enter the settings into the EEROM and enable the Data Scope Mode.

   On remote models, the On Line light (green) blinks.

5. Turn the power off.
6. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the on-line mode.

7. Turn the power back on.

   The printer is on-line and can communicate with the host computer.

8. Run a transaction from the host computer.

   All commands and data sent from the host computer will be printed as Hex characters as shown in the following illustration.

```
1BH
61H 00H 1BH 64H 06H 1BH 6DH 16H 0CH 1BH 21H
30H 20H 37H 31H 35H 36H 20H 54H 68H 65H 72H
6DH 61H 6CH 2FH 49H 6DH 70H 61H 63H 74H 0AH
1BH 21H 20H 54H 54H 77H 6FH 20H 48H 65H 61H
```

Datascope Mode Print Test

Exit the Data Scope Mode

1. Turn the power off.
2. Set the switches to the settings in the table.

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6
On	Off	Off	On	Off	Off

3. Turn the power back on to enter the settings into the EEROM and disable the Data Scope Mode.

   On remote models, the On Line light (green) blinks.

4. Turn the power off.
5. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the on-line mode.

6. Turn the power back on.

   The printer is on-line and can communicate normally with the host computer.

Testing Receipt Printing

This function allows you to select various print tests. You can also test the printing by following the procedures in "Testing the Printer" in chapter 2 without having to change the DIP switches. A sample test printout is in chapter 2.

Caution: The DIP switches are pre-set at the factory and should generally not be changed. If you must change them, do so carefully to avoid changing other functions.

1. Turn the power off.
2. Turn the printer over and note what the current DIP switch settings are.
3. Set the switches to the settings in the table that match the test you want.

Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6	Option
On	Off	Off	Off	Off	Off	Sample Receipt[1]
On	Off	Off	Off	Off	On	Continuous Sample Receipt
On	Off	Off	Off	On	Off	Character Sets[1]
On	Off	Off	Off	On	On	Continuous Character Sets[2]

[1]The Paper Feed button is used to begin the test.

[2]Default

4. Turn the power back on to enter the settings into the EEROM.

   On remote models, the On Line light (green) blinks. If either the continuous sample receipt or the continuous character sets is selected, the printer will automatically begin printing.
5. Press the Paper Feed button to print the sample receipt or the character sets (whichever was selected).
6. Press the Paper Feed button or turn the printer off to stop the test.
7. Turn the power off.
8. Set the DIP switches to the former settings.

   DIP switch 1 must be Off to return the printer to the on-line mode.

Level 2 Diagnostics

Level 2 diagnostics run during normal printer operation. When the following conditions occur, the printer automatically turns off the appropriate motors and disables printing to prevent damage:

- Paper out, cover off, or knife unable to home
- Printhead too hot or voltages out of range

The lights on the operator panel will signal when these conditions occur as well as indicate what state or mode the printer is in. See “Troubleshooting” later in this book for more information.

Level 3 Diagnostics

Level 3 diagnostics keep track of the following tallies and prints them on the receipt during the print test. See the sample test printout in “Testing the Printer” in Chapter 2.

- Number of lines printed
- Number of knife cuts
- Number of hours the printer has been on

Chapter 4: Troubleshooting

The 7193 printer is a simple, generally trouble-free printer, but from time to time minor problems may occur. For example, the power supply may be interrupted or the printhead may overheat for some reason.

Lights on the operator panel will signal that something may not be operating properly: one green light (labeled On Line—remote models only) and one red light (labeled Paper Feed—all models) may either flash or glow continuously. See “Level 2 Diagnostics” in the “Diagnostics” chapter for definitions of the operator panel lights.

Operator Panel Lights

The following chart describes the operator panel lights. See “Correcting Problems” on the next page for more information about each of these conditions.

Light	Condition	Meaning	Action Required
Green*	On	Printer is on-line.	None.
Green*	Off	Printer is unplugged or off-line.	Connect printer to host or power supply and turn on.
Green*	Flashing	Printer is in diagnostics mode.	Set DIP switch #1 to Off (see “Setting Switches” in chapter 2).
Red**	Off	No fault conditions.	None.
Red**	On	Paper out, cover open, or knife won't home.	Reload paper, close cover, or clear paper jam.
Red**	Flashing	Printhead too hot or voltages out of range.	Wait for printhead to cool down.

*Light labeled On Line (remote models only—powered from power supply).

**Light labeled Paper Out (on all models).

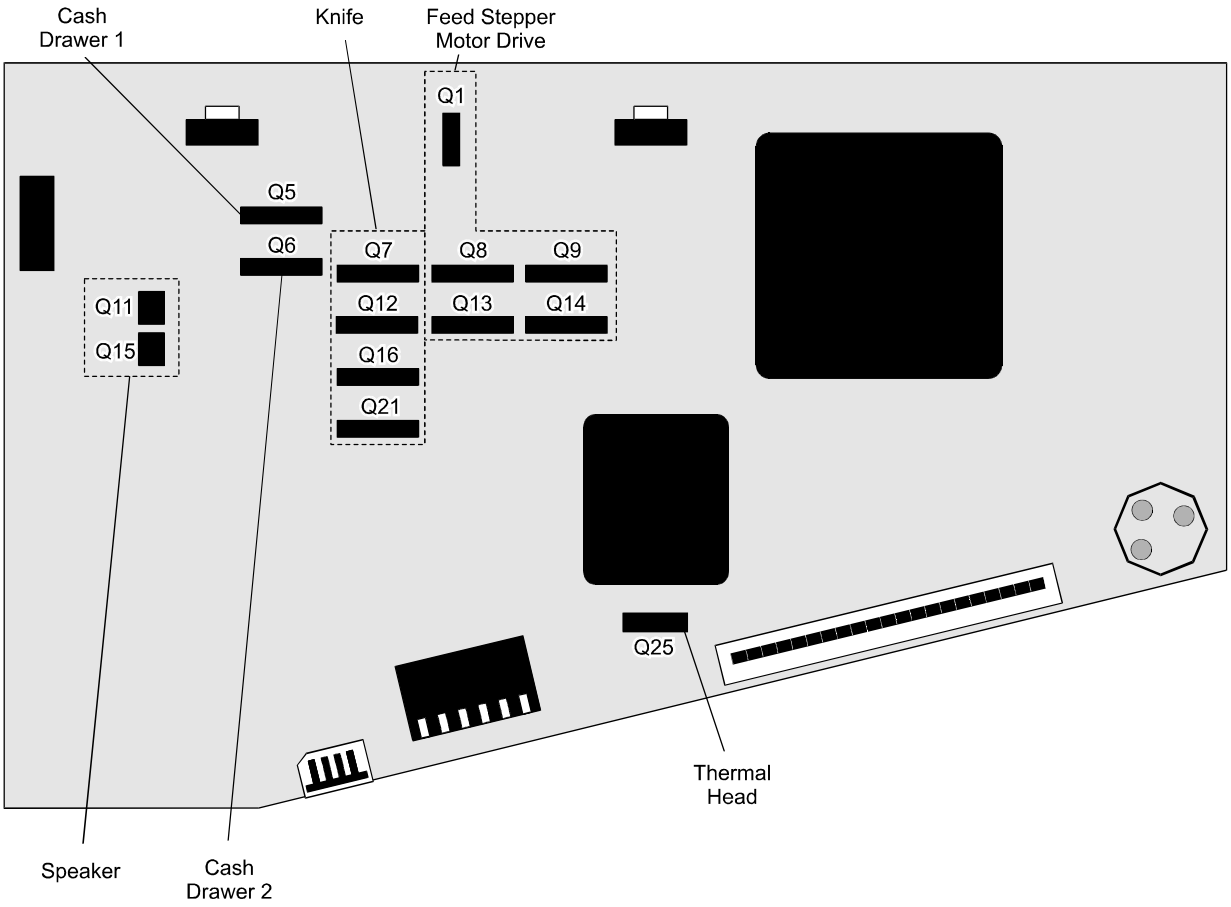
Field Effect Transistors (FETs))

Field Effect Transistors (FETs) are located on the PC board and can be used to diagnose motor and printhead problems. There are a maximum of 14 FETs located on the PC Board assigned to the following items:

- Feed Stepper Motor Drive: five FETs (Q1, Q8 Q9, Q13, Q14)
- Knife: four FETs (Q7, Q12, Q16, Q21)
- Thermal printhead: one FET (Q25)
- Cash Drawer 1: one FET (Q5)
- Cash Drawer 2: one FET (Q6)
- Speaker: two FETs (Q11, Q15)

Caution: Electro Static Discharge may damage the PC board. Wear a grounded wrist strap and use a static mat or other ESD protected work surface whenever you work with the PC board.

If the resistance across any two pins is less than 1k ohm, the FET needs to be replaced. Refer to the following illustration for the locations and descriptions of the FETs.



Operating Problems

The tables in this section aid in determining the cause of printer malfunctions and provide a list of steps to follow to correct each problem. The steps in the "What to do" column progress from correcting the most likely cause to correcting the least likely cause of the problem. The tables are grouped according to the following types of problems:

- Operating
- Printing
- Electronic
- Messages

Problem	Possible Causes	What To Do
Printer Does Not Function When Turned On	Printer not plugged in.	Check that printer cables are properly connected on both ends. Make sure the ground wire is properly connected. Check that the host or power supply is getting power.
	Receipt cover not fully closed.	Close and latch the receipt cover.
	Cables within the printer are improperly connected to the PC board.	Make sure the cables in the printer are properly connected to the PC board.
	ROM improperly positioned.	Check that the ROM is properly positioned.
	DIP switches not set correctly.	Check the switch settings.
	Improper power ground or voltage supply.	Check that the ground strap connecting the L Cover and PC board is properly connected.
	Failed PC Board.	Replace the PC Board.

Problem	Possible Causes	What To Do
Printer Cycles But Does Not Print	Cable connecting the printhead to the PC board is not properly connected.	Check the cable connection to the printhead and to the PC board.

Problem	Possible Causes	What To Do
Knife Does Not Operate	Paper jam.	Open the receipt cover, inspect the knife, and clear any jammed paper.
	Bad knife home sensor.	Check knife sensor with an ohm meter at its harness and test point. Replace the knife home sensor.
	Printer not configured for knife.	Check the switch settings.
	Knife motor sensor not plugged in.	Check connections to the PC Board.
	Failure of the knife motor or sensor.	Check knife motor by testing Hex FETs on PC board. Replace the knife motor sensor. Replace the knife motor.
	Note: When the knife test fails, the printer continues to operate, but does not cut paper.	

Problem	Possible Causes	What To Do
Thermal Printhead Over/Under Temperature	Operating printer in a room where temperature is above recommended temperature.	Adjust the room temperature. Move the printer to a cooler location.
	Continuous printing of graphics (regardless of room temperature).	Reduce the demand on the printer.
	Operating printer in a room where temperature is below recommended temperature.	Adjust the room temperature. Move the printer to a warmer location.
	Note: The printer will shut off when it is over or under temperature. See "Appendix A: Specifications" for the recommended temperature range.	

Electronic Problems

Problem	Possible Causes	What To Do
Power Voltage too Low/High	Improper connections in printer.	Check that all cable connections are correct and that the power supply (if present) is plugged in and the printer is on-line.
	AC supply voltage is out of range.	Measure the voltage with an AC volt meter and check it against the power supply label. The voltage range should be 24V +/- 5%.

Problem	Possible Causes	What To Do
Printer Beeps Twice at Power On	If printer beeps twice during level 0 diagnostics, it indicates that default values have been loaded into the EEROM.	Take no action. See “Level 0 Diagnostics” in the “Diagnostics” chapter for more information.
	If the printer beeps twice at every power on, the EEROM has failed.	Replace the PC board.
LED Does Not Come On	Failed LED sensor.	Use the HEX-FET test to see if the sensor is bad. If so, replace the LED sensor.

Printing Problems

Problem	Possible Causes	What To Do
Thermal Print is Light or Spotty	Printhead resistance not properly set.	Adjust the printhead resistance. See the “Diagnostics” chapter.
	Paper roll loaded incorrectly.	Check that the paper is loaded properly. See the Owner's Guide.
	Wrong paper used.	Use recommended thermal receipt paper. See “Appendix B: Ordering Paper and Supplies.”[1]
	Thermal printhead is dirty.	Clean thermal printhead with cotton swabs and rubbing alcohol.[2]
	Improper cable connections.	Check thermal printhead cable connections.
	Printhead is defective.	Replace the printhead.

[1]Do not spray the thermal printhead with household cleaner as this may damage it and the electronics.

[2]The thermal printhead does not normally require cleaning if the recommended paper grades are used. If non-recommended paper has been used for an extended period of

time, cleaning the printhead with cotton swabs and rubbing alcohol will not be of much benefit. See "Appendix B: Ordering Paper and Supplies" for the recommended paper grades.

Chapter 5: Disassembling and Reassembling the Printer

This chapter explains how to completely disassemble and reassemble the 7193 printer. The 7193 is a relatively simple printer with a straightforward design and is easy to service. This information may be used as an aid for training service personnel as well as a reference guide for servicing the printer in the field.

Note: Some 7193 models may appear slightly different than what is shown in the illustrations. The procedures are the same for all models unless otherwise noted.

Getting Started

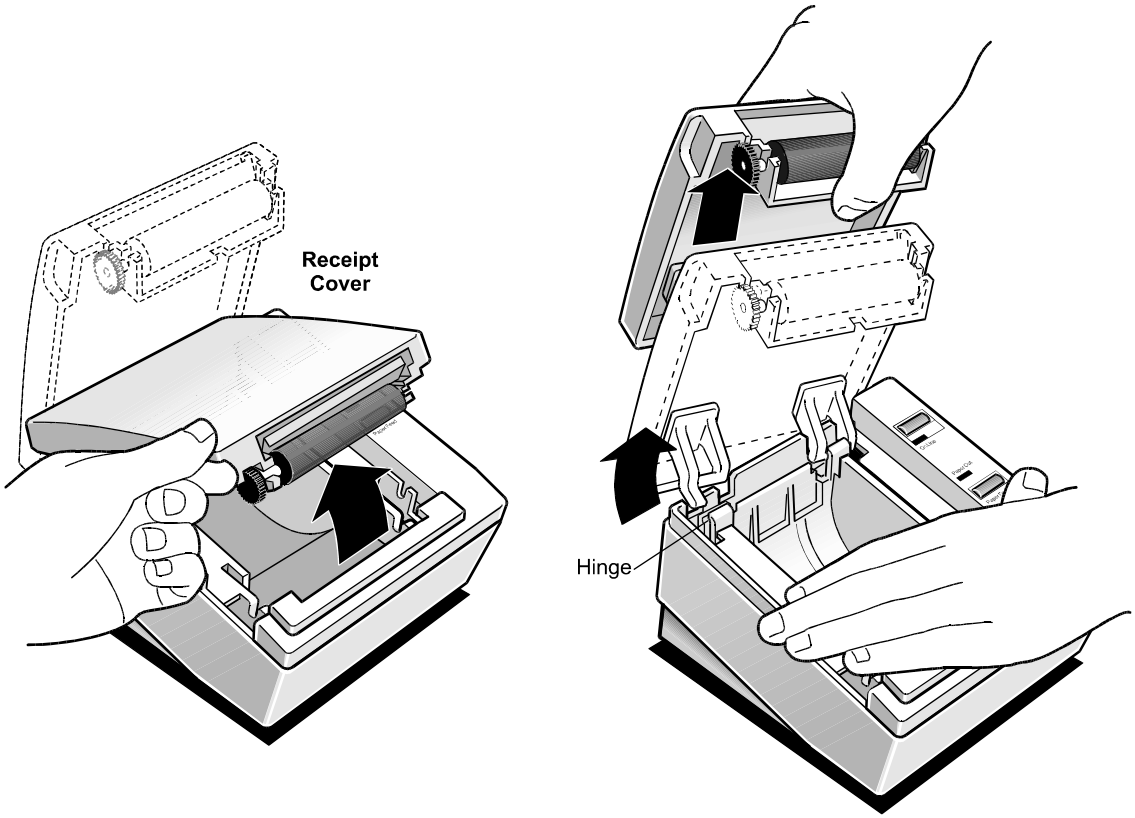
Tools

You will need the following tools to disassemble the printer:

- Torx® drivers
- #1 and #2 Posi drivers
- 1½ mm hex driver (for disassembly of optional knife)
- Small flathead screwdriver

Caution: Before working on the printer be sure that it has been turned off and unplugged from both the host system and the power supply (if the power supply is used). Wear a grounded wrist strap and use a static mat or other ESD protected work surface whenever you work with the PC board.

Removing the Receipt Cover



1. Turn off the host system or unplug the power supply (if used).
2. Disconnect the communication and power cables.

   Models receiving power from the host system (integrated) use one cable for communication and power. Models receiving power from a power supply (remote) use one cable for communication and a separate cable for power.
3. With the printer facing you, lift the receipt cover, pull it upward and slightly to the right to detach it from the printer at its hinges.

   While removing the cover, hold down on the printer with your other hand.

Removing the Platen (Non-Knife Units Only)

The platen can be replaced on non-knife units only. In some cases, it may be better to replace the entire receipt cover.

Caution: Be careful when removing the paper guide. It may break. If it does break, you need to replace the entire receipt cover. The paper guide is not stocked as a separate item.

1. Remove the paper guide by pulling out from the center.

   The sides should bow slightly releasing the paper guide arms from the tabs.
2. Remove the platen by prying on one side of the platen shaft with a screwdriver from behind until it pops out.

   The other side will slide easily out.

Note: The platen cannot be replaced on knife units. The receipt cover comes complete as a kit and cannot be disassembled.

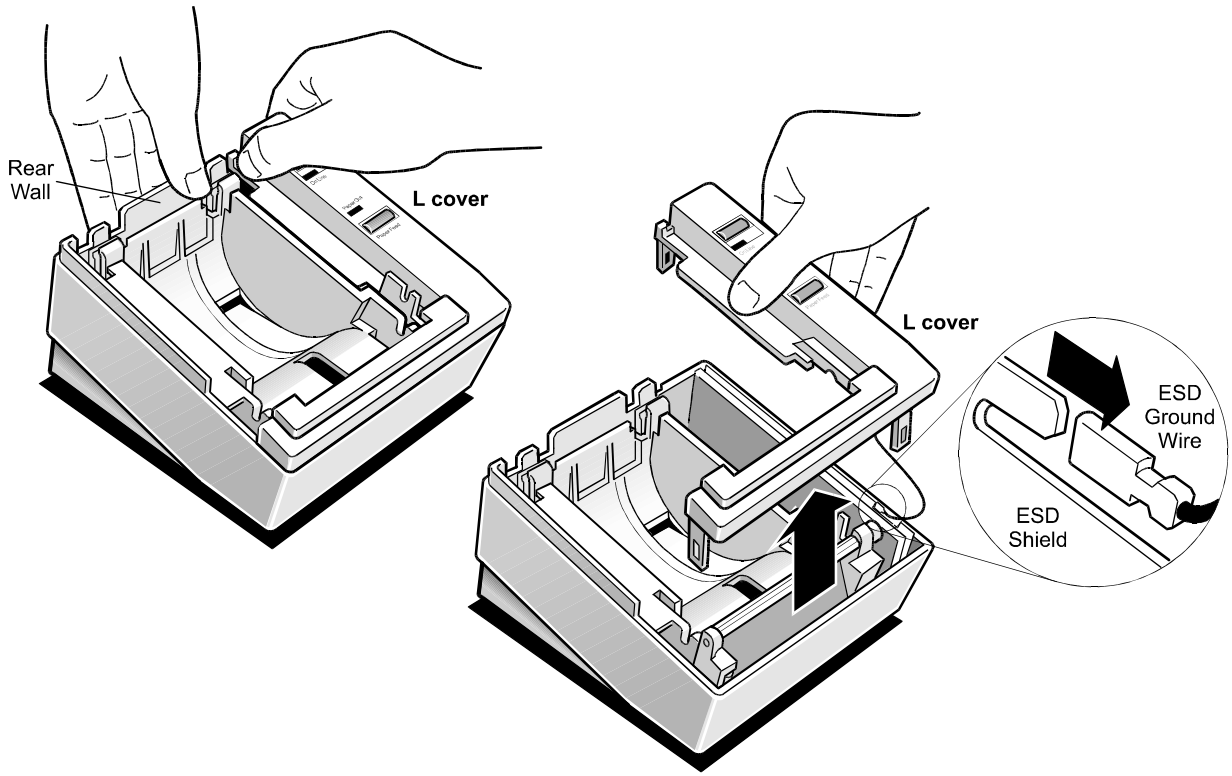
Replacing the Platen

1. Slide one end of the platen shaft into the slot on the receipt cover and press the other side until it snaps in place in the other slot.
2. Bow the paper guide slightly so the paper guide arms are bent in slightly and insert the paper guide into the receipt cover.

   Once you let go, the tabs should lock the paper guide into place.

Note: Whenever either the rotating knife blade (on the print mechanism) or the stationary knife blade (in the receipt cover) need to be replaced on knife units, both knife blades must be replaced. Order the knife blade kit, which includes the receipt cover. See "Appendix C: Kits."

Removing the L Cover



The L cover is held in place by three molded latches at its three corners.

1. To release the rear latch, push back on the rear wall of the cabinet (with the printer facing you) with one hand while pulling gently forward on the rear of the L cover with your other hand.
2. When the rear latch is released, pull the L cover up gently and the two front latches will release freeing the cover.

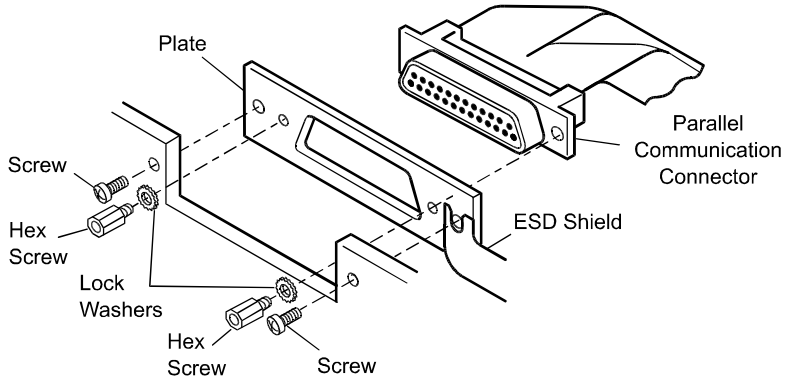
Caution: Be aware of the ground strap connecting the L cover and the PC board. Do not jerk the cover away or the strap may be damaged.

3. Disconnect the ground strap from the PC board (not from the L cover).

Removing the Print Mechanism and PC Board Assembly

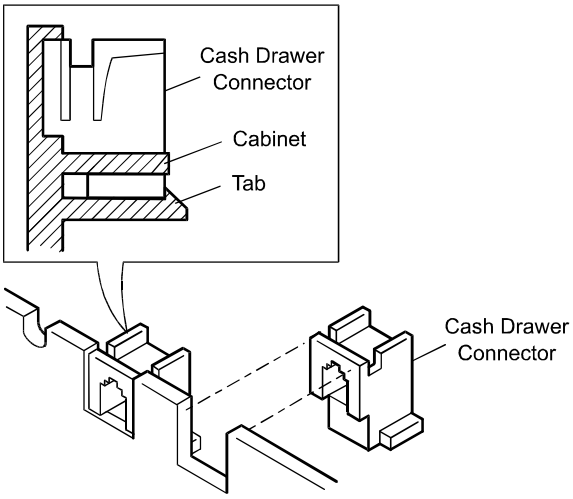
Caution: Electrostatic Discharge may damage the PC board. Wear a grounded wrist strap and use a static mat or other ESD protected work surface whenever you work with the PC board.

The print mechanism and board assembly come out of the cabinet together. The first three steps apply to parallel models only.

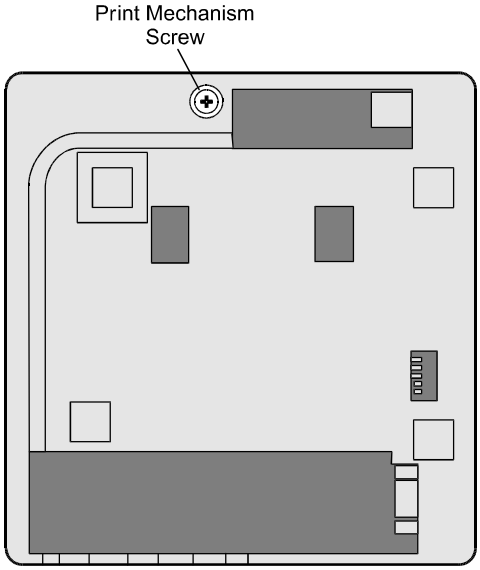


Note: The view in the illustration shows the printer from the bottom.

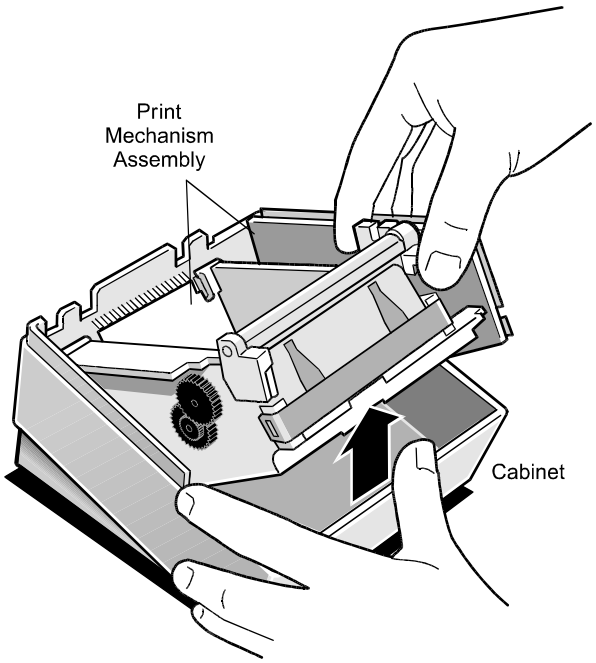
1. On Parallel models only, remove the parallel communication connector from the plate at the rear of the base by removing the two Hex screws.
2. Remove the screw at the rear of the base to release the ESD shield.



3. Remove the cash drawer connectors from the base by pushing down on the tab and sliding the connector straight back.



Bottom of Printer



4. Turn the printer on its rear wall and loosen and remove the #8 thread-cutting screw on the bottom of the printer.

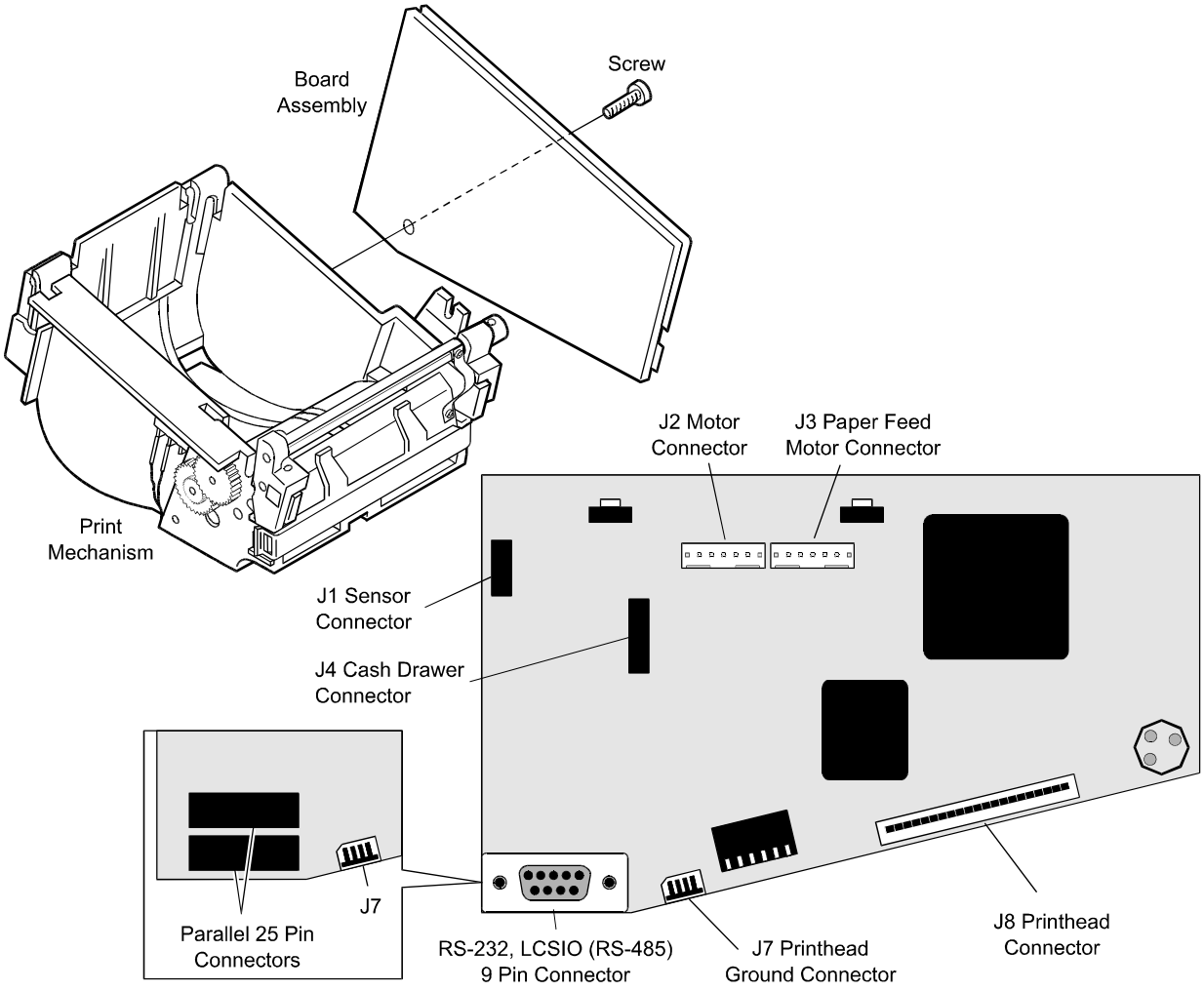
   Go slowly to preserve the screw hole.

5. Turn the printer back over so it is right side up.

Caution: Keep your hands away from the thermal printhead. Touching the printhead will smudge it causing the print to degrade.

6. Lift the front end of the assembly out of the cabinet by pushing on and lifting out the front of the print mechanism.

Separating the Print Mechanism and PC Board Assembly



1. Remove the PC board assembly from the print mechanism by unscrewing the large #8 thread-cutting screw on the bottom of the board using a P2 Posidrive screwdriver.
2. Go slowly so as to preserve the screw hole.

Disconnecting Cables

See the illustration on the facing page for the locations of the connectors on the PC board.

1. Remove the following cables by gently tugging on the connector.

- J1, sensor connector
- J2, motor connector for knife motor (on knife unit)
- J3, paper feed motor connector
- J4, cash drawer connector
- J7, 4-pin connector for printhead ground

2. Remove the 30-pin ZIF connector (J8) for the printhead.
   a. Carefully pry up the outer shell of the ZIF connector with a screwdriver.
   b. Remove the flat flex cable from the connector, leaving the inner white connector attached to the PC board.

Disassembling the Print Mechanism

The following subassemblies and parts may be removed from the print mechanism for service or replacement:

- Printhead
- Knife assembly and motor (on knife unit)
- Paper feed motor
- Switches for sensors (paper out, knife home, and cover open).

Removing the Knife Assembly

1. Using a 1½ mm hex driver, remove the set screw from the top of the knife drive arm.

   See the illustration.

2. Carefully pry off the slotted drive arm, separating it from the rotating blade.

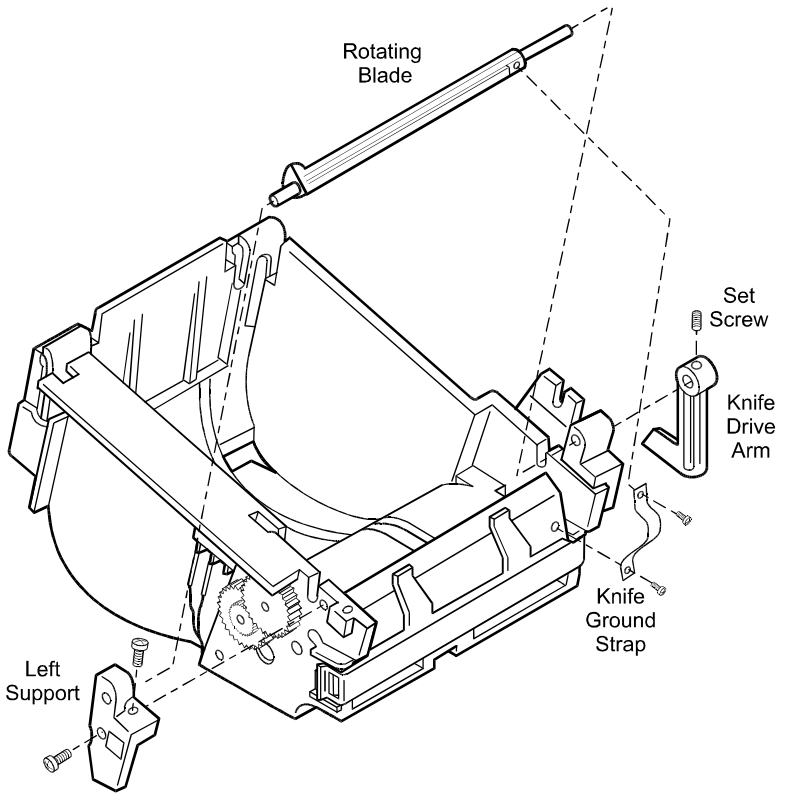
   Take care not to loosen or remove the gears.

3. Unscrew the ground strap and remove it from the right-hand side of the rotating blade.

4. Unscrew both screws on the left side knife support using a #1 Posidriver and remove the left side knife support.

5. Slide the rotating blade out of the right knife support.

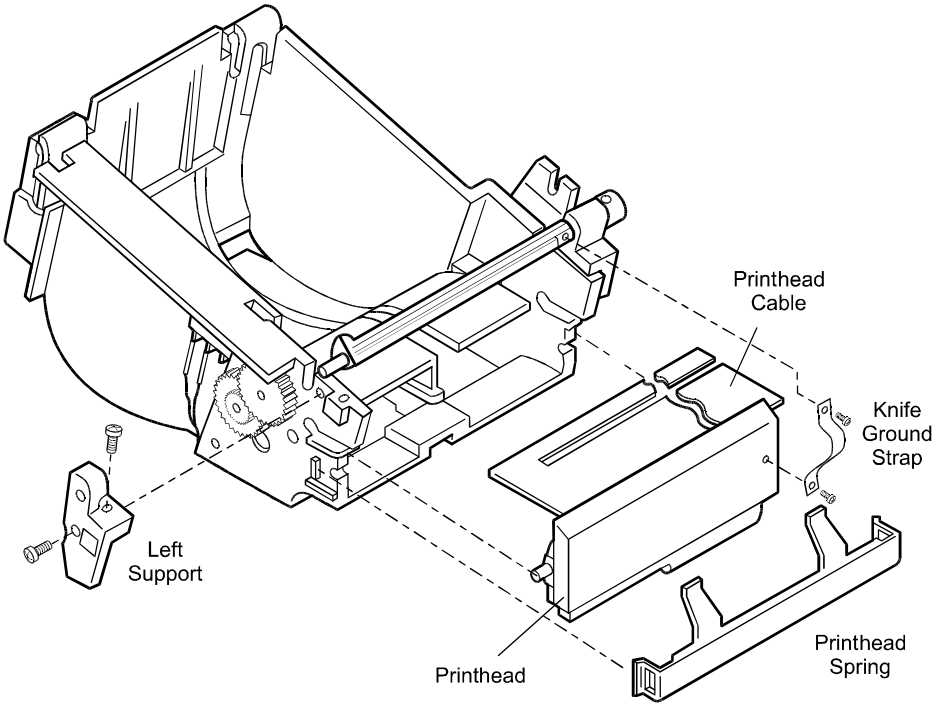
Note: Whenever either the rotating knife blade (on the print mechanism) or the stationary knife blade (in the receipt cover) need to be replaced on knife units, both knife blades must be replaced. Order the knife blade kit, which includes the receipt cover. See "Appendix C: Kits."



Replacing the Knife Assembly

1. Place the left knife support over the left side of the knife blade.
2. Slide the rotating blade into the right-hand knife support.
3. Replace the two screws in the left-hand knife support, securing it to the frame.
4. Place the slotted drive arm on the right end of the rotating blade.
5. Replace the set screw in the top of the slotted drive arm by using a 1½ mm hex driver.
6. Reattach the ground strap from the printhead to the right side of the rotating blade.

Removing the Printhead



Caution: Eectrostatic Discharge may damage the PC board. Wear a grounded wrist strap and use a static mat or other ESD protected work surface whenever you work with the PC board.

1. Unscrew the knife ground strap (on knife unit) from the printhead.
2. Remove the flat printhead spring by pushing or prying with a flathead screwdriver under the plastic tab on one side.

   Take care to preserve the plastic tabs.

Caution: Keep your hands away from the thermal printhead. Touching the printhead will smudge it causing the print to degrade.

3. Remove the left support by unscrewing the two screws.

Note: You may find it easier to remove the knife motor before removing the printhead assembly. See “Removing the Knife Motor” later in this chapter.

4. Remove the printhead assembly (printhead, heat sink, and cable) by sliding the flat flex cable through the front slot of the mechanism.

   Roll the cable over, without crimping it, to slide it through. Be careful not to tear the cable.

5. Push out on the right back corner of the printhead to remove it.

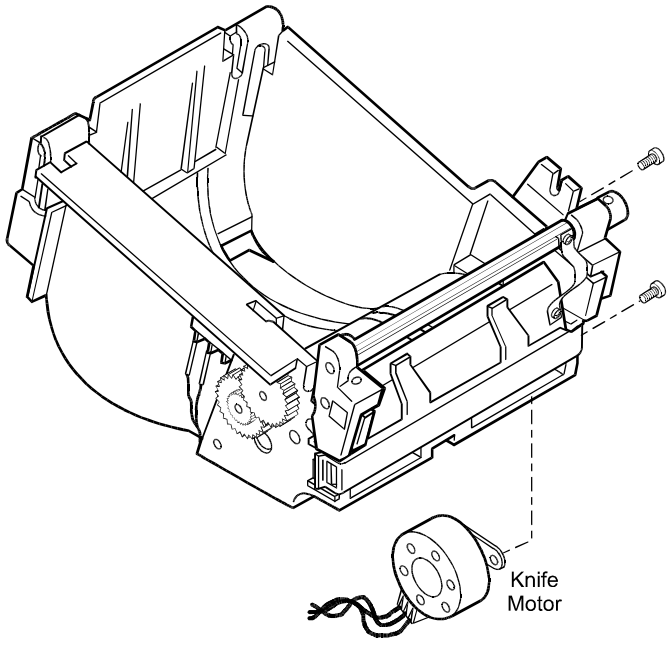
Replacing the Printhead

The mechanism should be facing you with the printhead area toward you.

Note: Take note of the letter (A-H for early models; A-D, 3-0 for later models) printed on the heat sink (the part of the printhead which faces the front of the printer). This letter indicates the printhead resistance and should match the letter printed on the print test. If these letters do not match, changes in the EEROM need to be made. See "Setting Printhead Resistance" in the "Diagnostics" chapter for the procedure to change the printhead resistance.

1. Carefully roll the flat flex cable so that it can be slid into place without tearing.
2. Slide the cable back down through the slot in the right bottom of the mechanism.
3. Place the pin on the left side of the heat sink into its slot in the left side of the frame.
4. Slide the right-hand pin down into its slot.
5. Replace the left support by screwing in the two screws.
6. Snap the printhead into place and check to make sure it is fully seated.
7. Push the flat printhead spring back into position, realigning the snaps on either side.
8. Check that the assembly is free to pivot and that it is centered in position.
9. Replace the knife motor it you removed it earlier.

Removing the Knife Motor



1. Remove the two screws holding the knife motor.
2. Pull the knife motor off of the print mechanism.

Note: The knife motor needs to be removed from the print mechanism to remove the paper out switch.

Replacing the Knife Motor

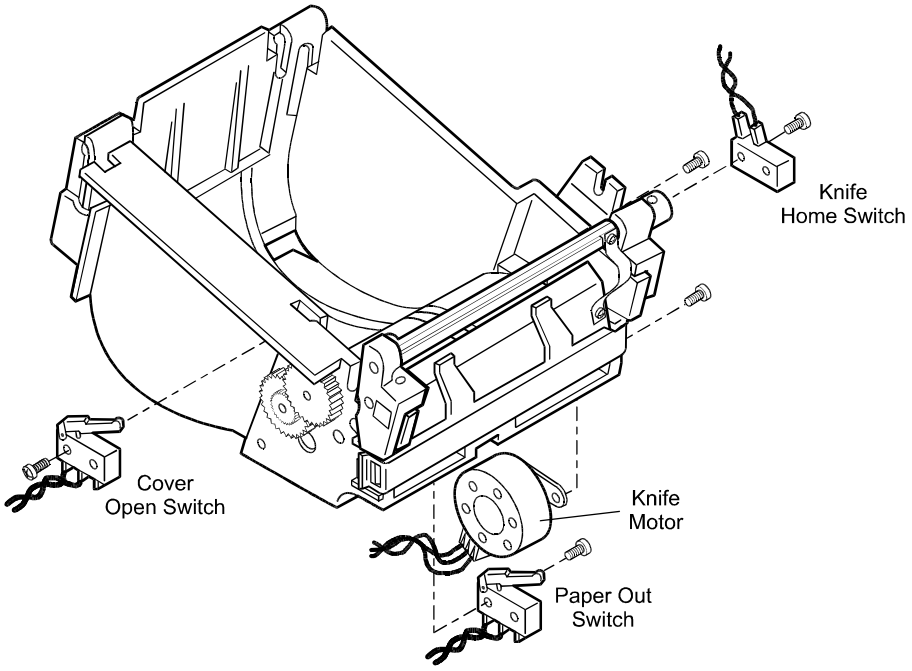
1. Replace the knife motor by placing its gear through the mounting hole in the right side of the printer mechanism.

   The gear should mesh with the gears on the outer edge.

2. Replace the two mounting screws.

Removing the Switches

Note: The knife motor must be removed before the paper out swictch can be removed.

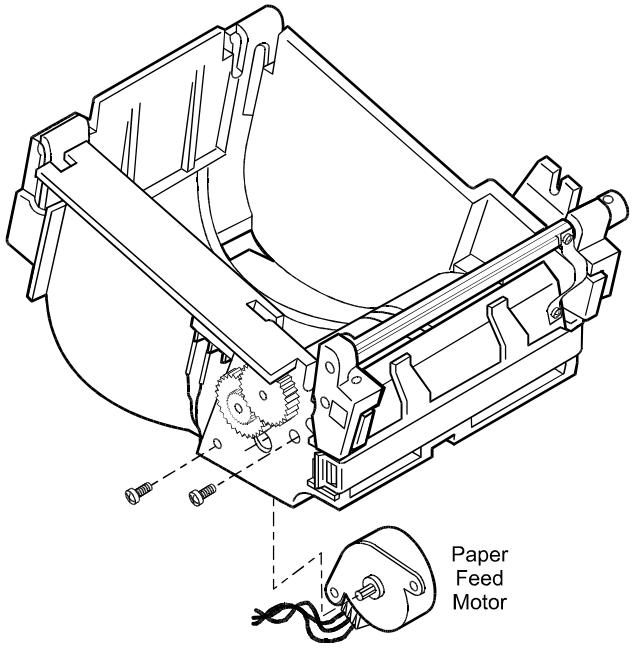


1. Insert a screwdriver in the motor mounting hole and remove the screw holding the switch and then pull the switch from the print mechanism.
2. Remove the cover open switch by removing the screw holding the switch and then pulling the switch off the print mechanism.
3. Remove the knife home switch by removing the screw holding the switch and then pulling the switch off the print mechanism.
4. After each switch has been removed from the print mechanism, remove each switch from its switch harness by detaching its faston terminals.

Replacing the Switches

1. For each switch, reattach the faston terminals on the harness to the rearmost spade on the switch.
2. Replace the paper out switch in its proper position under the paper path area and insert the screwdriver through the knife motor mounting hole and replace the mounting screw.
3. Replace the cover open switch under the left top edge of the mechanism (printhead area facing you) and replace the mounting screw.
4. With the printhead area of the mechanism facing you, place the knife home switch in position on the right-hand side of the knife near the gears (it fits on a molded mounting bracket in this area), and replace the two screws holding it in position.

Removing the Paper Feed Motor



1. Remove the two screws holding the paper feed motor.
2. Remove the paper feed motor from the print mechanism.

Replacing the Paper Feed Motor

1. Replace the paper feed motor by placing its gear through the mounting hole in the left side of the printer mechanism.

   It should mesh with the gears on the outer edge.
2. Replace the two mounting screws.

Disassembling the PC Board Assembly

Disassembling the PC board assembly consists of separating the ESD/EMC shield from the PC board. This is not required as the PC board assembly is an orderable item. Neither the PC board nor the ESD/EMC shield are separately orderable. These instructions are here only for your convenience.

Removing the ESD/EMC Shield

Caution: Electrostatic Discharge may damage the PC board. Wear a grounded wrist strap and use a static mat or other ESD protected work surface whenever you work with the PC board.

1. Remove the ESD/EMC shield from the PC board by taking out the self-tapping screw from the front side of the board.
2. Remove the two screws under the communication cable connector.

   The shield then unfolds from the board and can be removed.

   This step does not apply to models with the Parallel interface PC board.

Replacing the ESD/EMC Shield

Caution: Electrostatic Discharge may damage the PC board. Wear a grounded wrist strap and use a static mat or other ESD protected work surface whenever you work with the PC board.

1. Fold the ESD/EMC shield together with the PC board and replace the retaining screw on the front side of the board.
2. Replace the two screws under the communication cable connector.

   This step does not apply to models with the Parallel interface PC board.

Replacing the Print Mechanism

Replacing the PC Board Assembly on the Print Mechanism

See “Separating the Print Mechanism and PC Board Assembly” for more information.

1. Place the PC board next to the right side of the print mechanism in a vertical position, so that J2 and J3 connectors are up.

   The printhead area of the mechanism should be facing you with the board next to it and to your right. The ZIF printhead connector (J8) should be to the left side of the board (closest to you).

2. Align the PC board and the mechanism in the following areas:

- The rear communication connector with the rear cutout area
- The power connector with the channel

3. Reconnect the cables and harnesses.
4. Make sure nothing is pinching and that the printhead cable is not creased.
5. Line up the screw hole in the PC board with the screw slot.
6. Replace the screw and tighten slowly with a screwdriver.

   Do not over tighten.

Reconnecting the Cables and Harnesses

Reconnect the Printhead Cables

See “Separating the Print Mechanism and PC Board Assembly” for more information.

The solder side of the PC board should be up when it is reconnected.

1. Insert the 4-pin frame ground (J7) into position in its connector.
2. Lift up the locking outer shell of the larger ZIF connector, insert the cable to the bottom, and push down on the shell.

   Make sure the cables are placed so they are straight.

Reconnect the Knife and Paper Feed Motor Cables

See “Separating the Print Mechanism and PC Board Assembly” for more information.

1. Hook up the knife harness to connector J2 and the paper feed harness to J3.

   The number labels on each harness should be facing out to the edge of the board.

2. Push gently until they are in position.

Reconnect the Sensor Harness

The sensor harness is for the knife home, paper out, and cover open switchesSee “Separating the Print Mechanism and PC Board Assembly” for more information.

1. Plug the sensor harness into connector J1.
2. Make sure that its keyed area fits properly.

Replacing the Print Mechanism

See “Removing the Print Mechanism and PC Board Assembly” for more information.

1. Lift the entire mechanism / board assembly and place it in the cabinet.

   The mounting shelf (in the rear of the mechanism) should fit under the row of ribs along the back inside of the cabinet. The front of the mechanism assembly should now drop into place.

2. If necessary, gently push the front corner of the PC board closest to you.

   The assembly is correctly positioned when:

   - The PC board is in its guide slot at the cabinet bottom
   - The printer mounting hole is lined up with the screw hole on the bottom
   - The printhead cable is inside the cabinet and is not protruding through the bottom

3. Hold on to the entire cabinet assembly and turn it over.
4. Replace the bottom screw and tighten gently.

   Do not overtighten.

Finishing Up

Replacing the L-Cover

See “Removing the L Cover” for more information.

1. Attach the ground strap to the PC board.
2. Position the cover, taking care to align the buttons with the switches underneath.
3. Push on the left corner until that latch snaps.
4. Carefully push out on the inside back of the cabinet with your left hand, while pushing down on the L cover with your right hand.

   This will snap the L cover into position.

Replacing the Receipt Cover

See “Removing the Receipt Cover” for more information.

1. Hold the top cover vertically over the hinge brackets in the printer cabinet.
2. Align the hinges.
3. Push down gently until the cover snaps into place.
4. Place a roll of paper in the paper bin area so that the loose edge feeds up from the bottom of the bin toward the printhead area.
5. Close the receipt cover by pushing it down until it latches firmly into place.

Checking out the Printer

1. Turn on the printer.
2. Run the print test.

   See “Testing the Printer” in “Chapter 2: Installing the Printer.”

Appendix A: Specifications

Features

Interfaces	RS-232C, Parallel, LCSIO Version of RS-485
Memory/Firmware	16K RAM (available for downloadable character sets and bit-mapped graphics) History EEROM 4K Buffer (RS-232C and Parallel)
Resident character sets	PC Code Page 437 (US) PC Code Page 850 (Multilingual)
Integrated bar codes	Code 39, UPC-A, UPC-E, JAN8 (EAN), JAN13 (EAN), Interleaved 2 of 5, Codabar, Code 128
Options	Knife Power Supply (separate in-line power supply for models not receiving power from host) Wall-Mount Kit Cash Drawer Drivers

Reliability

Thermal mechanism	36 Million Lines
Electronics	240,000 Hours of Ontime
Knife	1 Million Cuts

Environmental Conditions

Operating Temperature	5°C to 35°C (40°F to 95°F), models with no knife 5°C to 28°C (41°F to 82°F), models with knife
Operating Humidity	5% to 90%
Condensation	Condensation may occur when the printer is moved from cold to warm areas after shipment. The printer's design permits operation after drying out and stabilizing at room temperature.

The printer can operate at higher temperatures if the humidity is lower (5°C to 45°C with humidity of 5% to 35%).

Power Requirements

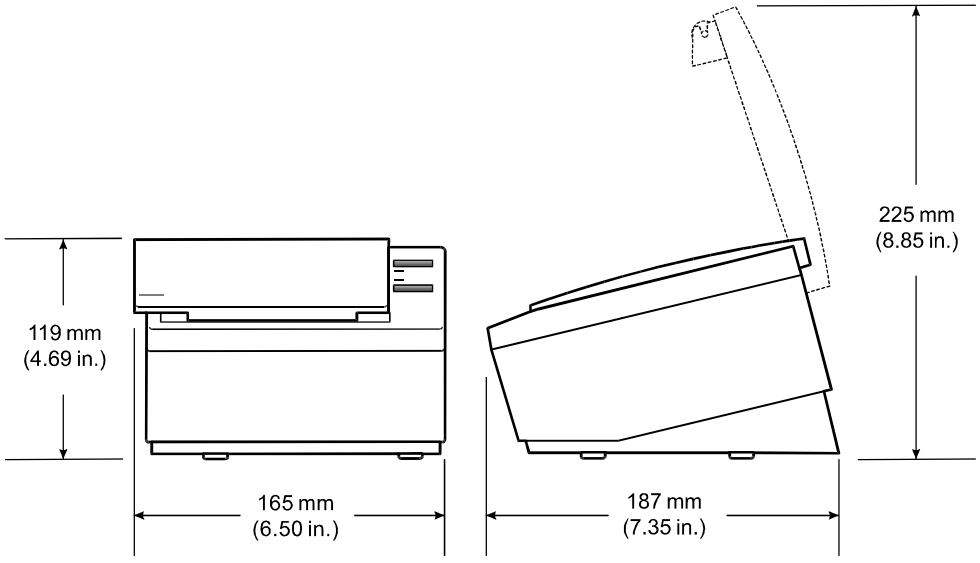
The 7193 printer receives power either from the host system (integrated) or from a separate in-line power supply (remote) which can be purchased separately.

Power from Host (Integrated)	
Voltage	21.4-30.8 Vac +5 Volts for Logic Circuits
Amps	2 Amps Maximum Current Draw

Power from Power Supply (Remote)	
Voltage	24 Vdc +5 Volt Supply for the Logic Circuits

Dimensions and Weight

Height	119 mm (4.7 in.)
Height with cover open	216 mm (8.5 in.)
Width	165 mm (6.5 in.)
Depth	187 mm (7.35 in.)
Weight	1.3 kg (2.9 lbs.)



Printing Specifications

Speed	1020 Lines per Minute
Noise Level	50 dBA (ISO 7779)
Printhead	Direct Thermal, Fixed Head
Print Area	Host Selectable 44 (Standard) or 56 (Compressed) Columns
Character Pitch	15.2 Characters per Inch (Standard) 19.0 Characters per Inch (Compressed)
Dot Density	152 Dots per Inch
Line Spacing	7.6 Lines per Inch
Character Cell	10 x 18 Dots (Standard) 8 x 18 Dots (Compressed)
Print Modes	Standard, Compressed, Double High, Double Wide, Upside Down, Rotated
Paper Diameter	83 mm Maximum (3.27 inches)
Paper Length	83 Meters (273 ft.)
Paper Width	80 mm ± .2 mm (3.15 Inches ± .02 Inches)

Density of Receipt Print Lines

When the 7193 prints high density print lines (text or graphics), it automatically slows down to a rate slower than 600 lines per minute. High density print lines are defined as lines with over 57% of the dots printing on the line (there are 448 total dot columns on the print station).

Duty Cycle Restrictions (Printing Solid Blocks)

There are restrictions on the duty cycle because of the heat generated by the receipt thermal printhead when printing solid blocks (regardless of the length of the block in relation to the print line). The restrictions are ambient temperature, the percentage of time (measured against one minute) of continuous solid printing, and the amount of coverage.

Caution: When the duty cycle approches the limits shown in the table, the receipt printhead will heat up and shut down. This may damage the printhead.

To avoid this problem, do one or a combination of the following:

1. Reduce the amount of coverage.
2. Reduce the time of continuous solid printing.
3. Reduce the ambient temperature.

	Ambient Temperature		
Amount of Solid Coverage	25°C	35° C	50° C
20%	100% of 1 min. continuous printing	50% of 1 min. continuous printing	20% of 1 min. continuous printing
40%	50% of 1 min. continuous printing	25% of 1 min. continuous printing	10% of 1 min. continuous printing
100%	20% of 1 min. continuous printing	10% of 1 min. continuous printing	3% of 1 min. continuous printing

Appendix B: Ordering Paper and Supplies

Ordering Thermal Paper

The 7193 requires qualified thermal thermal paper with the following dimensions:

Diameter	Length	Width
83 mm max. (3.27 in.)	83 meters (273 ft.)	80 mm ± .2 mm (3.15 ± .02 in.)

The paper must not be attached at the core. Use paper with a colored stripe at the end to indicate that the paper is running low.

To order thermal receipt paper, contact your sales representative or order from NCR at the following address or toll free number:

NCR
Media Products Division
9995 Washington Church Road
Miamisburg, OH 45342
Voice: 1(800)543-8130 (toll free), or local listing of Media Products sales office

Ordering Other Supplies

Contact your sales representative to order the supplies listed in the table.

Item	Type	Number
Power supply with attached cable to printer and U.S. power supply cord		7193-K330
Power supply, attached cable		7193-K301
Power supply cord (to outlet)	United States International (no plug) United Kingdom S.E.V. Australia International (with plug)	7193-K320 7193-K321 7193-K322 7193-K323 7193-K324 7193-K326
Communication cables RS-232C 25-pin (host) to 9-pin RS-232C 9-pin to 9-pin Parallel 25-pin to 25-pin	 (3 meters—9.8 ft.) (3 meters—9.8 ft.) (3 meters—9.8 ft.)	 1420-C001-0030 1416-C057-0030 1420-C003-0030
Printer wall-mount kit		7193-K260
Cash Drawers		7052-K657

Appendix C: Kits

The available service kits are listed in this section. See the Parts Identification Manual for more information.

Knife Blade Kit

189-9940817	Paper Guide (Knife) Rotating Blade Drive Arm Knife Cover w/o platen Ground Strap Screws Platen Bearing Platen with Gear Left and Right Knife Supports Grip Rings

Cabinet Base Kit

189-9940606	Cabinet Base Self-Adhering Foot Hook Fastener Loop Fastener

Paper Feed Motor Kit (Speed)

189-9940830 (models 7143-4xxx, 5xxx only)	Stepper Motor Screw
189-9940607 (all other models)	Stepper Motor Screw

Knife Motor Kit

189-9940608	Stepper Motor Screw

Cover Open Switch Kit

189-9940743	Micro Switch Screw Switch Retaining Arm

Paper Out Switch Kit

189-9940746	Microswitch Screw

Knife Switch Kit	
189-9940610	Micro Switch Screw

Printhead Kit (Speed)	
189-9940850	Printhead Screw

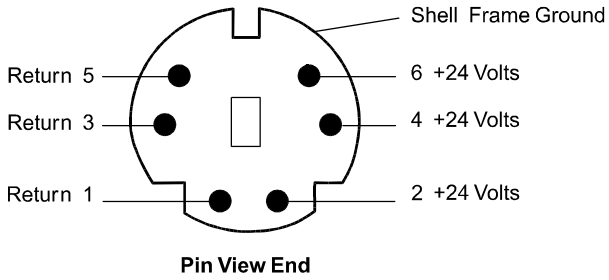
Small Parts Kit	
189-9940618	Left Knife Support Right Knife Support Knife Drive Arm Intermediate Gears Drive Gear (Knife) Grip Ring Ground Strap Screws

Hardware Kit	
189-9940619	Jack Cover Ground Strap Screws

Appendix D: Connectors

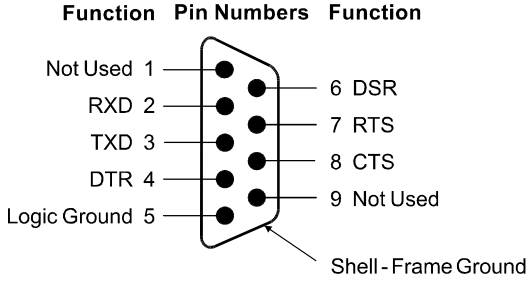
Power Connector

The following illustration shows the power cable connector and pin assignments. The power cable connector is a 6-pin mini DIN plug and is located in the small cavity under the printer at the front. It is not used with LCSIO (RS-485) models that receive power from the host system.



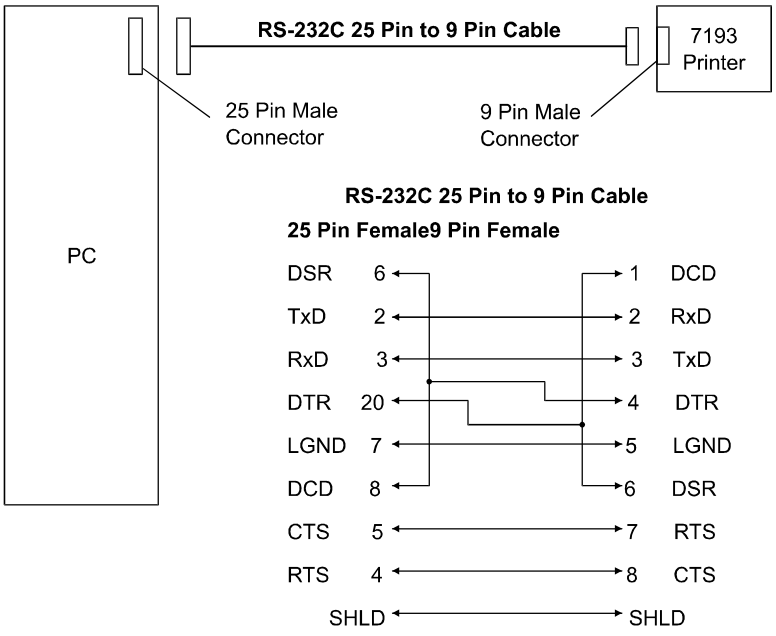
RS-232C Connector

The following illustration shows the RS-232C communication connector and pin assignments. The cable is communication only. It is not a power cable. The connector is a 9-pin male D-shell connector and is located in the hollow cavity under the printer at the rear.



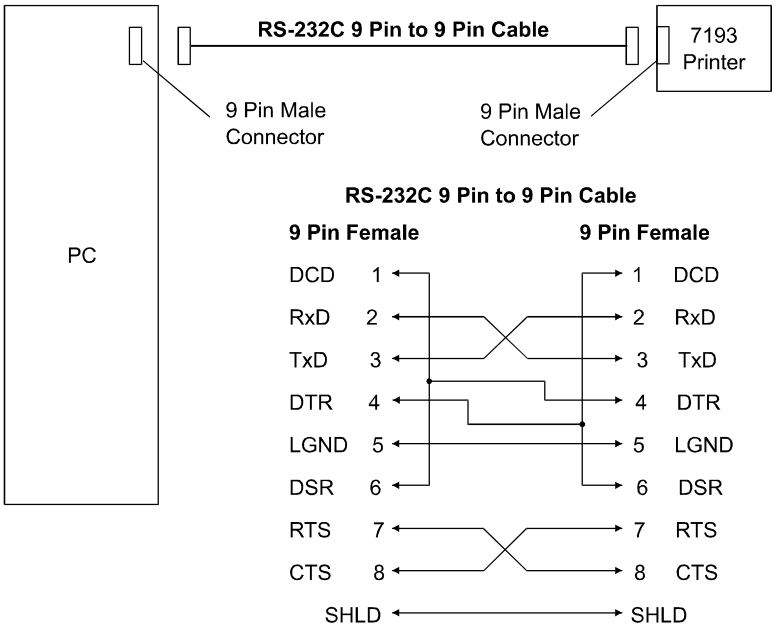
RS-232C 25-Pin to 9-Pin Cable Diagram

Note: This information is provided for testing and troubleshooting only.



RS-232C 9-Pin to 9-Pin Cable Diagram

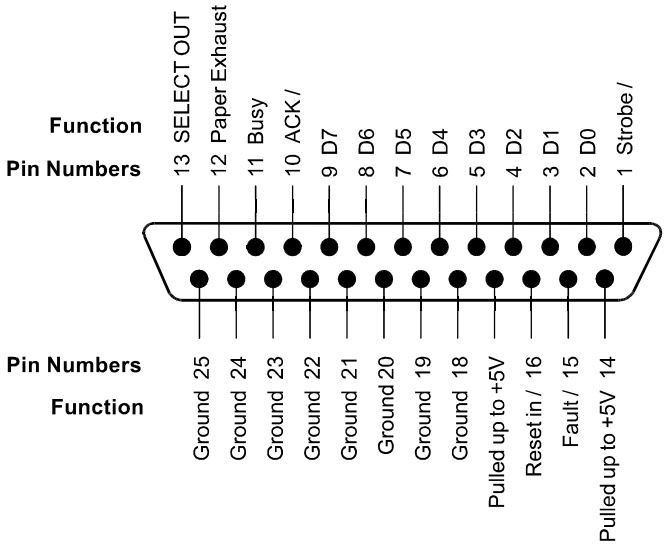
Note: This information is provided for testing and troubleshooting only.



Parallel Connector

The following illustration shows the Parallel communication connector and pin assignments. The connector is at the rear of the printer. With Parallel, the 7193 is always remotely powered. See “Power Connector” earlier in this appendix for an illustration of the power connector and pin assignments.

Note: The cable used for the parallel interface is a 25-pin wired straight-through cable. The pin assignments are the same on either end of the cable. This information is provided for testing and troubleshooting only.



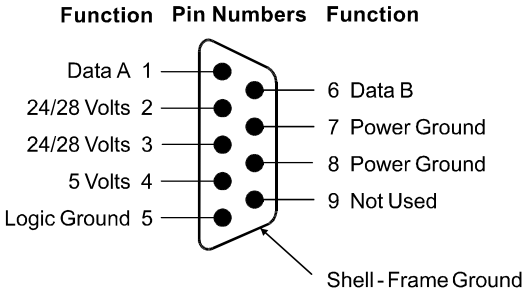
LCSIO (RS-485) Connectors

The following illustrations show the LCSIO (RS-485) communication connectors and pin assignments for printers powered from a host system and from a power supply. The connector is in the hollow cavity underneath the printer at the rear.

See the host system documentation for cable troubleshooting information

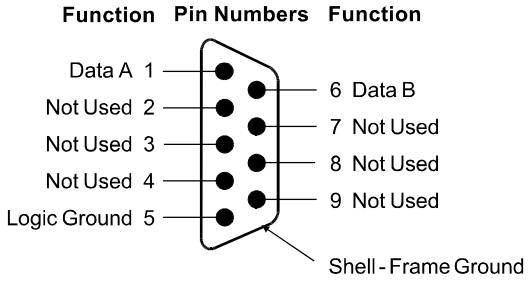
Powered from Host

The cable serves as both power and communication cable.



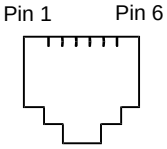
Powered from Power Supply

The cable serves only as a communication cable.



Cash Drawer Connectors

The following illustration shows the pinouts for the cash drawer connector.



The following two tables show the pinouts for cash drawers 1 and 2. The cash drawer connectors are located at the rear of the printer. There are no cash drawer connectors used with LCSIO (RS-485) printers.

Parallel Printers

Pin Number	Cash Drawer 1 Connector	Cash Drawer 2 Connector
1	Frame Ground	Frame Ground
2	Drawer 1 Solenoid	Drawer 2 Solenoid (Remove jumper JPR4 to disable)
3	Drawer 1 Status Switch	Drawer 2 Status Switch
4	+24 Volts (to Solenoid +)	+24 Volts (to Solenoid +)
5	Drawer 2 Solenoid (Remove jumper JPR3 to disable)	Drawer 1 Solenoid
6	Ground (Status Switch Return)	Ground (Status Switch Return)

RS-232C Printers

Pin Number	Cash Drawer 1 Connector	Cash Drawer 2 Connector
1	Frame Ground	Frame Ground
2	Drawer 1 Solenoid	Drawer 2 Solenoid
3	Drawer 1 Status Switch	Drawer 2 Status Switch
4	+24 Volts (to Solenoid +)	+24 Volts (to Solenoid +)
5	Drawer 2 Solenoid	Drawer 1 Solenoid
6	Ground (Status Switch Return)	Ground (Status Switch Return)

Appendix E: Commands

The commands control all operations and functions of the 7193 printer, from selecting the size and placement of characters and graphics on the receipt to feeding and cutting the paper.

Note: All versions of the 7193 use the same commands as listed in this section unless otherwise noted. For example, the Parallel interface does require unique commands for controlling the cash drawer.

The 7193 commands emulate two printers: the NCR 7150™ Multifunction printer and the Epson TM-T80™ Thermal printer. Any of the commands from either set may be used in any combination to program a host system to communicate with the 7193 (unless otherwise noted).

Some commands listed here are not implemented in the 7193 (they are identified as not implemented). If received, they are ignored and not sent to the print buffer as data. Non-legal commands are sent to the print buffer as data.

Command List

This section groups the commands according to the following categories:

- Printer Function Commands
- Print Characteristics Commands
- Graphics Commands
- Printer Status Commands
- Real Time Commands
- Bar Code Commands

Within each group, the commands are listed in numerical order of their Hex codes.

Printer Function Commands

These commands control the following basic printer functions and are listed in numerical order of their Hex codes:

- Printing
- Feeding the paper
- Resetting the printer
- Cutting the paper
- Opening the cash drawers
- Defining the print area

Printer Function Commands

Hex Code	Command
09	Horizontal Tab
0A	Line Feed
0D	Carriage Return
10	Clear Printer
14 *n*	Feed *n* Print Lines
15 *n*	Feed *n* Dot Rows
16 *n*	Add *n* Extra Dot Rows
17	Print
19 1B 69	Full Knife Cut
1A 1B 6D	Partial Knife Cut
1B 07	Generate Tone
1B 14 *n*	Set Column
1B 20 *n*	Set Character Right Side Spacing (Not Implemented)
1B 24 etc.	Set Absolute Starting Position
1B 32	Set Line Spacing to 1/6 Inch
1B 33 *n*	Set Line Spacing to *n* Minimum Units
1B 3D *n*	Select Peripheral Device
1B 40	Initialize Printer
1B 44 etc.	Set Horizontal Tab Positions
1B 4A *n*	Print and Feed *n* Minimum Units
1B 5C etc.	Set Relative Starting Position

Printer Function Commands

Hex Code	Command
1B 61 *n*	Align Character Positions
1B 63 34 *n*	Select Sensors to Stop Printing (Not Implemented)
1B 63 35 *n*	Enable or Disable Panel Switch
1B 64 *n*	Print and Feed *n* Lines
1B 6A *k*	Read from Non-Volatile Memory
1B 70 *n* etc.	Generate Pulse to Open Cash Drawer
1B 73 *n* etc.	Write to Non-Volatile Memory
1D 4C *n n*	Set Left Margin
1D 50 *x y*	Set Horizontal and Vertical Minimum Motion Units
1D 56 *m* 1D 56 *m n*	Select Cut Mode and Cut Paper
1D 57 *nL nH*	Set Printing Area Width

Print Characteristics Commands

These commands control what the printed information looks like and are listed in numerical order of their Hex codes.

Print Characteristics Commands

Hex Code	Command
12	Select Double-Wide Characters
13	Select Single-Wide Characters
1B 12	Rotate Characters Counter-Clockwise
1B 16 *n*	Select Pitch (Column Width)
1B 21 *m*	Set Print Mode
1B 25 *n*	Select Character Set
1B 26 etc.	Define User-Defined Character Set
1B 3A 0 0 0	Copy Character Set From ROM to RAM
1B 3F *n*	Cancel User-Defined Character
1B 52 *n* 1B 74 *n*	Select Character Code Table
1B 56 *n*	Set or Cancel Rotated Characters Clockwise
1B 7B *n*	Set or Cancel Upside-Down Characters

Graphics Commands

These commands print graphics data and are listed in numerical order of their Hex codes.

Graphics Commands

Hex Code	Command
1B 24 etc.	Set Absolute Starting Position[1]
1B 2A *m* etc.	Set Bit Image Mode
1B 4B etc.	Single-Density Graphics
1B 4C etc. 1B 59 etc.	Double-Density Graphics
1D 2A etc.	Define Downloaded Bit Image
1D 2F *m*	Print Downloaded Bit Image

[1]This printer function command is also used in graphics to emulate an Epson LQ-950™ printer to handle graphics output from word processing programs.

Printer Status Commands

These commands send printer status information to the host system and are listed in numerical order of their Hex codes.

Printer Status Commands

Hex Code	Command
1B 75 0	Transmit Cash Drawer Status (RS-232C Only)
1B 75 *n*	Request Alternate Status (Parallel Only)
1B 76	Transmit Printer Status (Not Implemented for Parallel)
1D 49 *n*	Transmit Printer ID
1D 61 *n*	Enable / Disable Automatic Status Back
1D 72 *n*	Transmit Status

Real Time Commands

These commands provide an application interface to the printer even when the printer is not handling other commands (RS-232C communication interface only) and are listed in numerical order of their Hex codes.

Real Time Commands

Hex Code	Command
10 04 *n*	Real Time Status Transmission, DLE Sequence
10 05 *n*	Real Time Request to Printer, DLE Sequence

Real Time Commands

Hex Code	Command
1D 03 *n*	Real Time Request to Printer, GS Sequence
1D 04 *n*	Real Time Status Transmission, GS Sequence
1D 05	Real Time Printer Status Transmission

Bar Code Commands

These commands print bar codes. HRI means Human Readable Interface. The commands are listed in numerical order of their Hex codes.

Bar Code Commands

Hex Code	Command
1D 48 *n*	Select Printing Position of HRI Characters
1D 66 *n*	Select Pitch for HRI Characters (Not Implemented)
1D 68 *n*	Select Height of Bar Code
1D 6B *n* etc.	Print Bar Code
1D 77 *n*	Select Width of Bar Code

Index

—E—

—F—

—H—

—I—

—K—

—L—

—M—

—O—

—P—

—R—

—S—

—T—

—V—

—W—

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