

SP2200

Ticket Printer

Software Version 1.3

Installation Manual



DISCONTINUED

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About this Manual

This manual is intended for use by service technicians responsible for installing SP2200 ticket printers. The manual is organized based on the procedures you will likely follow when setting up and using your printer. This manual applies to printers using Version 1.3 of the SP2200 software.



Warning

Some procedures described in this manual require removal of the printer covers. **These procedures are to be performed by qualified service personnel only.**



Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at www.ricelake.com.

1.0 Introduction

The SP2200 Ticket Printer is a bidirectional dot matrix printer designed for use in electronic weighing, point-of-sale, and industrial applications. The SP2200 is available in 115 VAC, and 230 VAC models.

1.1 Operating Modes

The SP2200 uses two principal operating modes, weight extraction mode and standard input mode, to process and print the data sent by the host device. These modes are selected using a DIP switch on the back of the SP2200. A third mode, called monitor mode, is a diagnostic mode associated with the printer self-test function.

1.1.1 Weight Extraction Mode

Weight extraction mode is used to extract weight information from the serial outputs of weighing devices. Used in weight extraction mode, the SP2200 extracts weight, units, and status information from the scale output and sends the data to the printer buffer in the format shown below. **Note: The format of the printed output depends on the SP2200 configuration.**

WWWWWWW UU HH:MM xM MM/DD/YY CCCCCCCC

where:

- **WWWWWWW** is the weight
- **UU** is the units (lb or kg)
- **HH:MM xM** is the time (If US format is used, **xM** is the am/pm indicator. If international format is used, time is shown as **HH:MM** using a 24-hour clock.)
- **MM/DD/YY** is the date (If US format is used. If international format is used, the date is shown in the format **DD/MM/YY**.)
- **CCCCCCCC** is the ID code

The SP2200 must be configured for weight extraction mode when connected to devices sending data as continuous output.

1.1.2 Standard Input Mode

Standard input mode is used to print data exactly as received from the sending device. In standard input mode, the host device controls the content and formatting of the information printed.

1.1.3 Self-Test and Monitor Mode

The self-test function and monitor mode are used to test the SP2200 and installed options. The self-test function provides a dot firing test, an ASCII character dump routine, and a list of installed options and DIP switch settings. Monitor mode is a test state entered once the self-test is complete. In monitor mode, the SP2200 prints characters and control codes sent to it without interpreting the data.

See Section 2.3 for more information about using the SP2200 self-test and monitor mode.

1.2 Optional Equipment

The following sections describe optional equipment available for the SP2200 ticket printer. If you ordered your printer with one or more of the options listed below, the option was installed at the factory. For information about installing the options, see Section 2.4, *Installing Optional Equipment*.

1.2.1 20mA Current Loop Interface

The 20mA current loop interface is a current-based serial interface, capable of data rates of 300 to 19200 bits per second over a cable length of up to 1000 feet (300 meters). The 20mA interface is used to connect the SP2200 printer to host devices using that interface rather than the standard RS-232C interface.

1.2.2 RS-422A Interface

The RS-422A interface is a differential voltage-based serial interface capable of transmitting data over distances of up to 4000 feet (1200 meters) at data rates of up to 10 Mbps. RS-422 can be configured for multi-drop communications with as many as ten receivers.

1.2.3 Parallel Interface

The parallel interface option is used to connect the SP2200 printer to host devices with parallel data ports. Many personal computers and ASCII terminals use parallel ports for printer connection.

1.2.4 Switch Module

The switch module option provides the SP2200 printer with a number of capabilities that may be required for some applications. The switch module option lets you:

- Enter ID codes to be printed with weight information
- Set time and date without an attached serial sending device (requires time and date module)
- Request printing using the **PRINT** button on the SP2200 switch module

1.2.5 Time and Date

The time and date option provides time and date stamping for tickets printed by the SP2200. The time and date module can be programmed using the optional switch module or a serial sending device.

1.3 Front Panel Indicators

The three LEDs on the front panel of the SP2200 are used as follows:

POWER (green LED)	Indicates that the printer is connected to a power source and the rear panel power switch is on.
FORM OUT (red LED)	Indicates that there is no ticket in the printer. This indicator is active only if the paper sensor is set on. See Section 4.3.7 for more information.
FAULT (amber LED)	Indicates that the time and date or ID code information being entered is either incomplete or invalid. The FAULT LED is normally lit when using the switch module to enter this information. When the entry is complete, the LED turns off.

2.0 Installation and Setup

The following section provides detailed information on unpacking, inspection and setup of the SP2200, the self-test procedure, and installation of optional equipment.

2.1 Unpacking and Inspecting

Immediately after unpacking, perform a visual inspection of the SP2200. Notify the shipper and Rice Lake Weighing Systems immediately if any damage occurred during transportation.

Replace all packing materials, including the plastic bag and the cardboard insert, in the shipping carton. Store the carton in a safe place so that it will be available if the printer is relocated or returned for service.

Factory installation of some printer options, such as the switch module and the parallel interface, can be verified by visual inspection. For other options, such as the time and date module and the 20mA current loop interface, use the self-test procedure described in Section 2.3 to verify installation.

2.2 Setup

Initial setup of the SP2200 consists of installing the print ribbon, setting the head gap, and running the printer self-test. See Section 2.4 for information about installing optional equipment.

Before connecting the printer to a power source, check the operating voltage shown on the back panel of the printer. Verify that the source voltage is within the operating range of the printer.

2.2.1 Installing the Print Ribbon

Use the following procedure to install print ribbon cartridges:

1. Turn off the printer. Open the print mechanism cover.
2. Use a pencil to pull a few extra inches of ribbon out of the ribbon cartridge (see Figure 2-1).

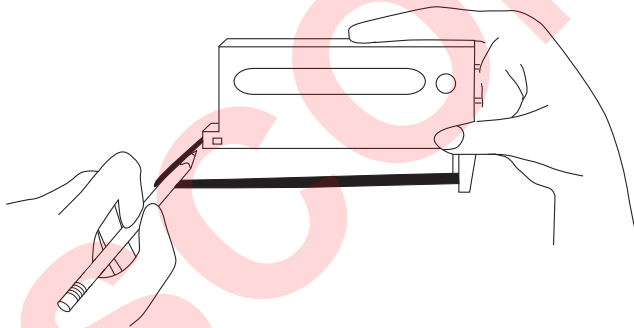


Figure 2-1. Use a pencil to pull extra ribbon from the cartridge before installing

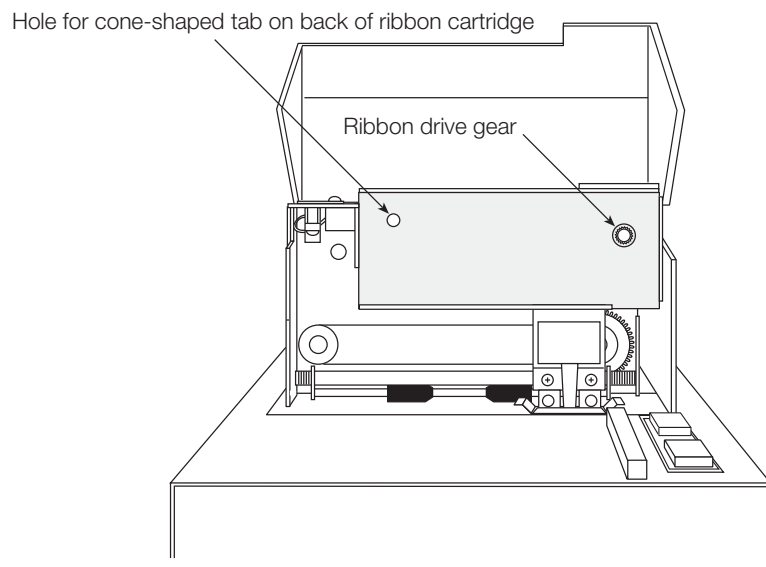


Figure 2-2. SP2200 print mechanism, showing ribbon drive gear

3. Snap the cartridge into place, fitting the hole in the ribbon take-up knob over the ribbon drive gear. If necessary, adjust the ribbon take-up knob to align the cartridge gear with the ribbon drive gear.
4. Use a pencil to loop the ribbon over the left ribbon guide (see Figure 2-3).
5. Thread the ribbon between the ribbon deflector and the printhead.
6. Loop the ribbon over the right ribbon guide.

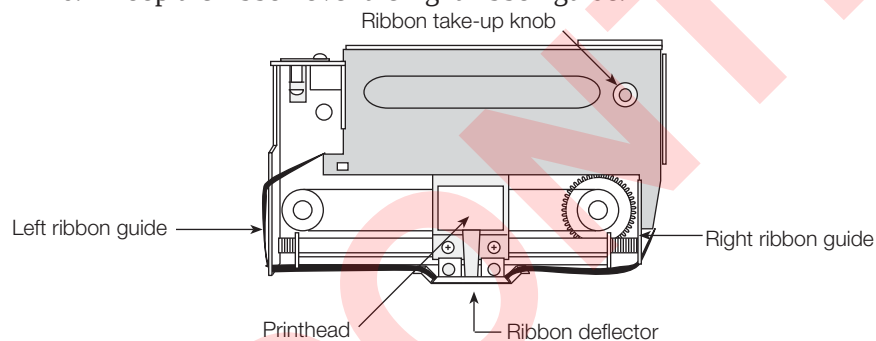


Figure 2-3. Installed ribbon cartridge, showing ribbon path

7. Turn the cartridge knob to take up slack in the ribbon.
8. Slide the printhead back and forth several times to ensure that the ribbon is being fed as the printhead moves.
9. Switch printer power on.

2.2.2 Setting the Head Gap

The SP2200 is designed to accept forms up to a thickness of .024 inches (0.609 mm). The head gap adjustment lever (Figure 2-4) can be set to print up to 5-part forms. The six detents allow a head gap range of .004 to .024 inches in .004-inch increments. Move the adjustment lever toward the back of the printer to increase the head gap.

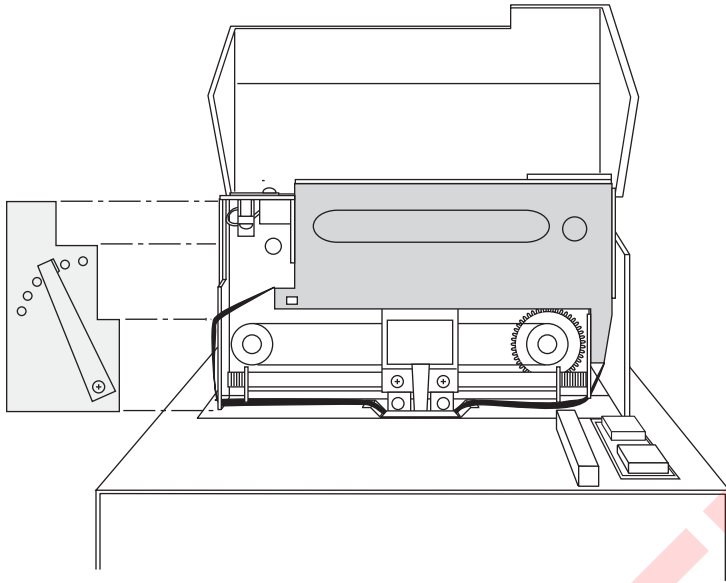


Figure 2-4. Head gap adjustment lever, located on left side of the print mechanism

2.3 Printer Self-Test

The SP2200 self-test function is used to verify the operation of the printer. The self test should be run before using the printer when first installed and after installing any optional equipment. The SP2200 self-test provides the following information:

- Software revision number
- Dot firing test
- Printout of ASCII character set
- Configured baud rate
- List of installed options
- DIP switch settings

Figure 2-5 shows an example of a ticket printed using the SP2200 self-test function.

2.3.1 Self-Test Procedure

SELF TEST ** CHIP REVISION # W01-061096

!"#\$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~

SERIAL INTERFACE BAUD RATE IS 1200

TIME AND DATE MODULE IS INSTALLED
SWITCH MODULE IS INSTALLED
SERIAL BAUD RATE CHECKS GOOD

SWITCH OPTION SETTING

SW1 - OFF 1 34567 SW2 - OFF 12345678
ON 2 8 ON

SW3 - OFF 123456 8
ON 7

Figure 2-5. Printer self-test ticket

To run the SP2200 self-test, do the following:

1. Turn off the printer.
2. Set DIP switch 3-7 on. This switch puts the printer in self-test/monitor mode.
3. Insert a form into the printer.
4. Turn on the printer to print the self-test information.

To test the serial port, you must use a test plug for the loop-back test. Running the self-test with a test plug connected to the serial port checks the configured baud rate and verifies that serial communications is operational. When the serial port is configured correctly, the self-test ticket includes the statement **SERIAL BAUD RATE CHECKS GOOD** (see Figure 2-5); if the port is incorrectly configured, the ticket reads **SERIAL BAUD RATE IS HUNG**.

A test plug can be easily fabricated using a male DB-25 connector. Figures 2-6a, 2-6b, and 2-6c show test plugs for RS-232, 20mA current loop, and RS-422A interfaces.

Notes:

1. You must use a separate test plug for each of the interfaces used by the SP2200. A test plug wired for both RS-232 and 20mA current loop will not verify operation of the 20mA circuit.
2. RS-232 communications is disabled if either of the other serial communications options is installed. See Section 2.4 for instructions on installing or removing communications options.

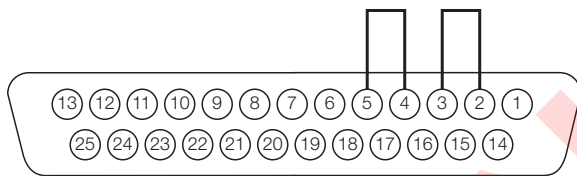


Figure 2-6a. Test plug for RS-232C interface

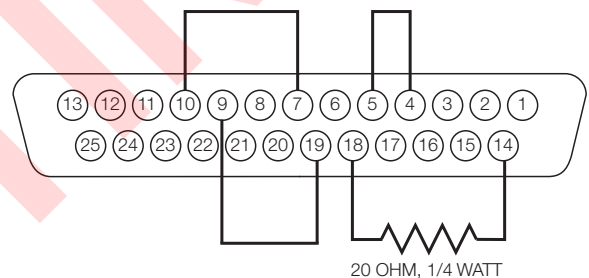


Figure 2-6b. Test plug for 20mA current loop interface

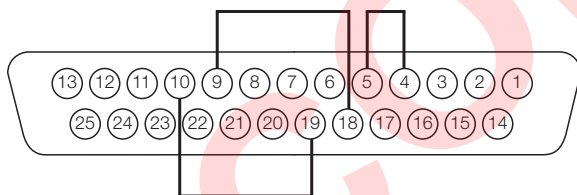


Figure 2-6c. Test plug for RS-422A interface

2.3.2 Using Monitor Mode

Once the printer self-test has run, the SP2200 goes into a diagnostic state called monitor mode. In monitor mode, the SP2200 prints any data sent to it without interpreting the data. The SP2200 remains in monitor mode until DIP switch 3-7 is turned off and the printer is turned off and on again.

You can use monitor mode to determine exactly what information is being sent to the SP2200 by the indicator or other host device. The full ASCII character set, including the SP2200 control codes (ASCII values 0–31 decimal, 0–1F hexadecimal), are printed without formatting.

Control codes are shown with a caret (`^`) symbol followed by a second ASCII character that indicates the specific control code. For example, a carriage return (ASCII value CR, 13 decimal, 0D hex) is shown as `^M`; a line feed (ASCII value LF, 10 decimal, 0A hex) is shown as `^J`. See Sections 5.0 and 5.1 for more information and a complete list of SP2200 control codes.

2.4 Installing Optional Equipment

To install the 20mA current loop, RS-422A, and parallel interface options you must remove the print mechanism cover and the electronics cover (see Figure 2-7). To install the switch module or the time and date module, you must also remove the print mechanism. This section provides procedures for installing or removing the SP2200 options.



Caution
Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the SP2200 enclosure.

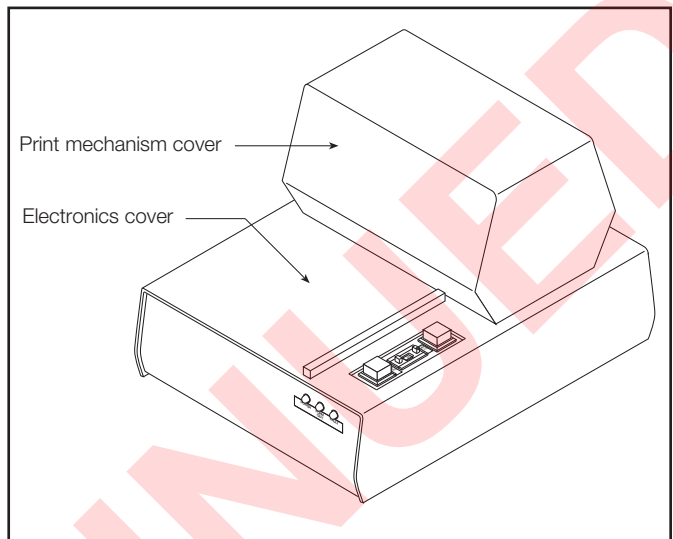


Figure 2-7. Electronics and print mechanism covers

2.4.1 Removing Covers and Print Mechanism



Warning
Disconnect power before removing printer covers.

Follow the steps listed below to remove the covers and print mechanism. See the procedure for the particular option you are installing to determine whether the print mechanism must be removed.

1. Turn off printer and unplug from wall outlet.
2. Remove three screws from back of print mechanism cover (see Figure 2-8). Lift and remove cover.

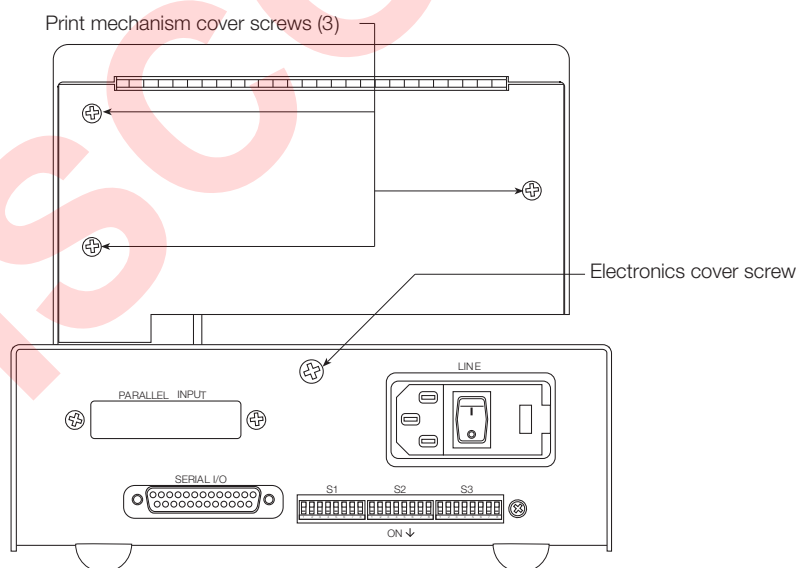


Figure 2-8. Back of SP2200, showing screws for removing electronics and print mechanism covers

3. Remove screw from the back of the base enclosure (see Figure 2-8). Slide the printhead to the far left (home position) then remove the electronics cover by lifting at back, tipping forward, and lifting over print mechanism.
4. If the print mechanism must be removed, turn the printer on its side and remove the 4 screws that hold the print mechanism to the bottom of the base enclosure (see Figure 2-9).

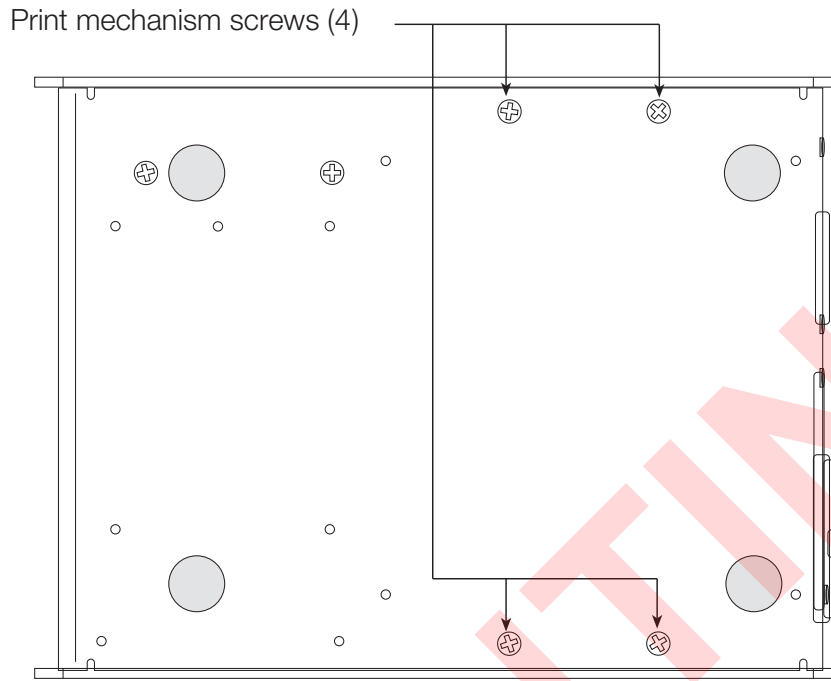
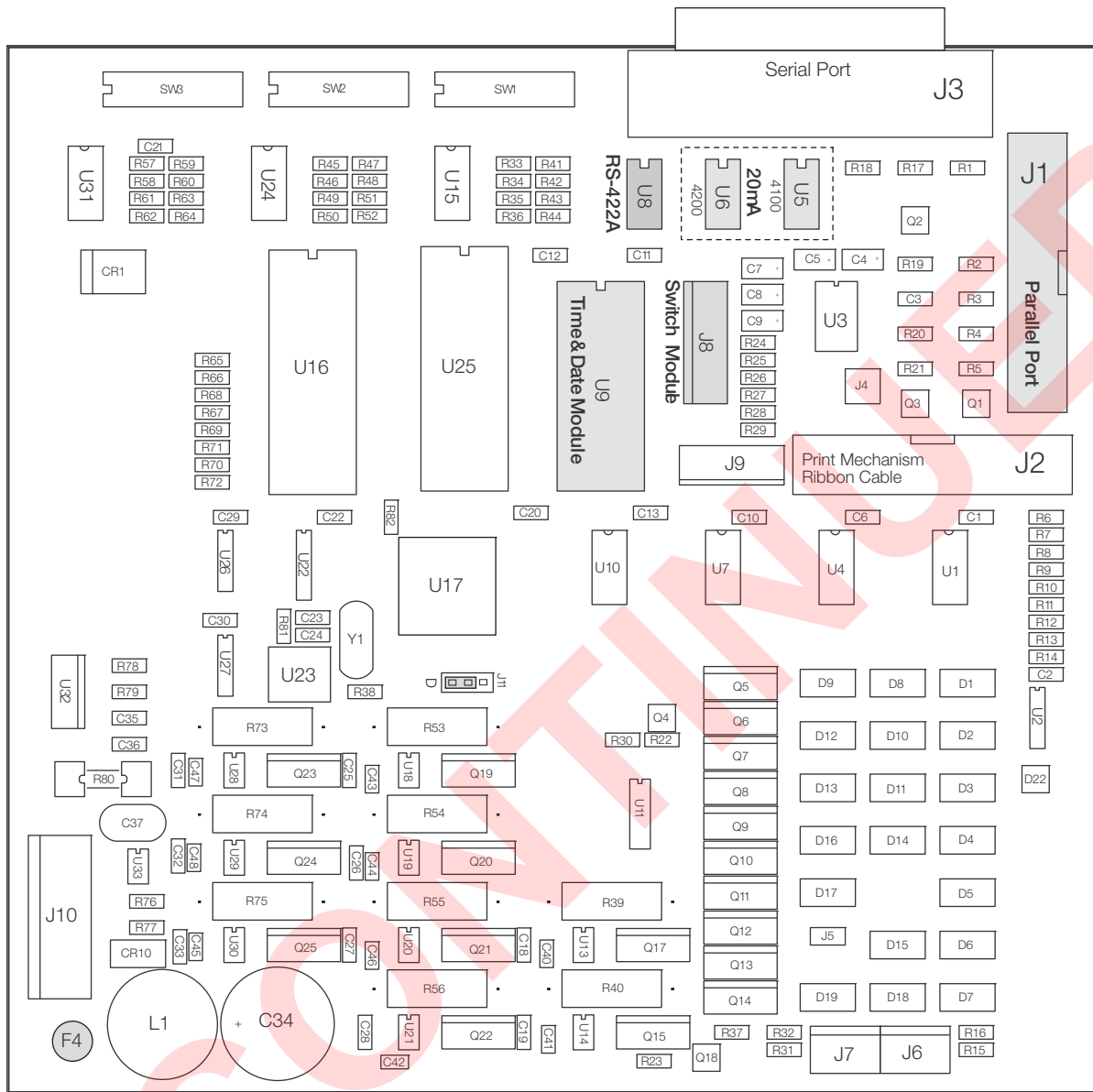


Figure 2-9. Bottom view of SP2200, showing screws for removing print mechanism

5. Set the printer upright, then remove the print mechanism. Do not disconnect cables between the print mechanism and the SP2200 circuit board. **Replugging cables into the wrong connectors will result in circuit damage.**

Once the print mechanism has been removed from the base enclosure, all of the circuit board sockets, jumpers, and connectors can be easily accessed. Figure 2-10 shows the locations of these components on the circuit board. Continue with the procedure for the particular option you want to install.



FRONT

Figure 2-10. SP2200 circuit board, showing locations of optional components and connectors

2.4.2 20mA Current Loop Interface

To install the 20mA current loop interface, disconnect power to the printer and follow the procedure for removing the covers as described in Section 2.4.1. Once the covers are removed, continue with the following steps:

1. If you are replacing the 20mA current loop chips, carefully remove chips from sockets U5 and U6 with a chip removal tool.
2. Install the new 20mA current loop chips. The 4100 chip goes in socket U5; the 4200 chip goes in socket U6 (see Figure 2-10). The notch on the top of each chip must face the back of the printer when installed.
3. Replace covers using the procedure described in Section 2.4.7.

2.4.3 RS-422A Interface

To install the RS-422A interface, disconnect power to the printer and follow the procedure for removing the covers as described in Section 2.4.1. Once the covers are removed, continue with the following steps:

1. If you are replacing the RS-422A chip, carefully remove chip from socket U8 with a chip removal tool.
2. Install the new RS-422A chip in socket U8 (see Figure 2-10). The notch on the top of the chip must face the back of the printer when installed.
3. Replace covers using the procedure described in Section 2.4.7.

2.4.4 Parallel Interface

To install the parallel interface, disconnect power to the printer and follow the procedure for removing the covers as described in Section 2.4.1. Once the covers are removed, continue with the following steps:

1. Remove the cover plate from the parallel input port.
2. Plug the parallel interface ribbon cable into socket J1 (see Figure 2-10).
3. Attach the connector to the parallel input port using the screws, lock washers, and nuts provided.
4. Set DIP switch 2-8 on for parallel communications.
5. Replace covers using the procedure described in Section 2.4.7.

2.4.5 Switch Module

To install the switch module, disconnect power to the printer and follow the procedure for removing the covers and print mechanism as described in Section 2.4.1. Once the print mechanism is removed, continue with the following steps:

1. Turn the printer on its side and remove the two screws shown in Figure 2-11. (These screws are used, in the same locations, to attach the switch module.) Remove the blank plate assembly from the base enclosure.
2. Install the switch module assembly in the same location, aligning the holes in the assembly with those in the base enclosure. Reinstall screws removed in Step 1.
3. Plug the switch module cable onto connector J8 (see Figure 2-10).
4. Replace print mechanism and covers using the procedure described in Section 2.4.7.
5. Use the printer self-test procedure described in Section 2.3 to verify installation of the option.

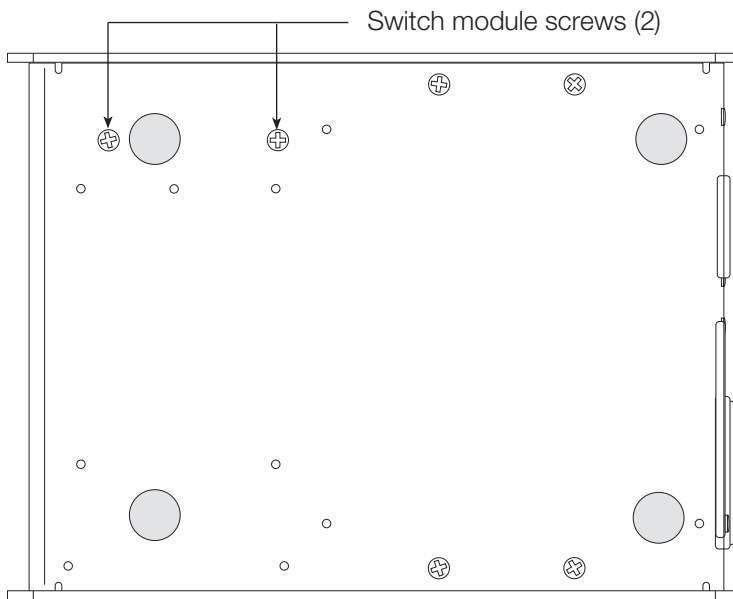


Figure 2-11. Bottom of SP2200, showing screws for attaching switch module

2.4.6 Time and Date Module

To install the time and date module, disconnect power to the printer and follow the procedure for removing the covers and print mechanism as described in Section 2.4.1. Once the print mechanism is removed, continue with the following steps:

1. If you are replacing the time and date module, carefully remove chip from socket U9 with a chip removal tool or small screwdriver.
2. Install the time and date module in socket U9 (see Figure 2-10). The notch on the top of the chip must face the back of the printer when installed.
3. Replace print mechanism and covers using the procedure described in Section 2.4.7.
4. Use the printer self-test procedure described in Section 2.3 to verify installation of the option.
5. To set the time and date, see Section 4.5.

2.4.7 Reassembling Print Mechanism and Covers

Once the optional hardware has been installed, use the following procedure to reassemble the print mechanism and covers before testing or configuring the option.

If any internal cables were unplugged during disassembly, ensure that they are replugged in the correct sockets before continuing. **Incorrect cable connections can cause serious damage to the printer.**

1. If the print mechanism has been removed, place the print mechanism in the base enclosure, then turn the printer on its side and replace the 4 screws that hold the print mechanism to the bottom of the base enclosure. Do not overtighten the screws.
2. Ensure that the print mechanism ribbon cable is plugged securely into connector J2 on the circuit board (see Figure 2-10).
3. Replace electronics cover and secure with screw in back of base enclosure. The printhead must be in the home position before replacing the cover.
4. Replace print mechanism cover and fasten with 3 screws.

3.0 Connecting to Host Devices

The SP2200 printer supports serial communications using RS-232C, 20mA current loop, and RS-422A communications interfaces. A parallel communications interface is also available for use with host devices with parallel printer ports.

Only ASCII-encoded data is supported by the SP2200. The SP2200 can be connected to host devices using other data formats, but a protocol converter must be used to convert the data to ASCII encoding before the SP2200 can process the data.

3.1 SP2200 Communications

RS-232C is the standard communications interface for the SP2200 printer. RS-232 is a voltage-based serial interface, capable of data rates of 300 to 19200 bits per second over a cable length of up to 50 feet (15 meters). The optional 20mA current loop and RS-422A interfaces provide alternative serial communications methods. The optional Centronics parallel interface allows connection to PCs and ASCII terminals equipped with parallel printer ports.

Only one serial communications interface can be used at a time. Installation of either of the serial communications options (20mA or RS-422) disables the RS-232 capability of the SP2200.

The active port is selected on power-up based on the setting of DIP switch 2-8 (see Section 4.2.3).

Note:

To meet regulatory requirements for EMI/RFI suppression, you must install the included clamp-on EMI filter, PN 38694, on the serial communications cable. To install, position the open filter on the serial cable, as close as possible to the printer connection, then squeeze the filter halves together.

3.2 Serial Port Pin Connections

The following table lists the pin connections for the SP2200 serial data input port.

Pin	Signal
1	Chassis ground
2	TXD (RS-232)
3	RXD (RS-232)
4	+5V (4.7K Ω resistor)
5	CTS/Clear to Send
6	Not used
7	Ground
8	Not used
9	+IN (20mA/RS-422A)
10	-IN (20mA/RS-422A)
11	Print (Active low)
12	Not used
13	Ground
14	+5V
15	Not used
16	Not used
17	Not used
18	+OUT (20mA/RS-422A)
19	-OUT (20mA/RS-422A)
20	DTR/Data Terminal Ready
21	Not used
22	Not used
23	Cash drawer OUT
24	+9V OUT (330 Ω resistor)
25	+9V OUT

3.3 Parallel Port Pin Connections

The following table lists the pin connections for the SP2200 parallel data input port.

Pin	Signal
1	STROBE
2	D0
3	D1
4	D2
5	D3
6	D4
7	D5
8	D6
9	D7
10	ACK
11	BUSY
12	Ground
13	+5V
14-18	Not used
19-29	Ground
30-36	Not used

3.4 IQ plus 350/355 Indicators

The SP2200 can be connected to the IQ plus 350/355 indicators at baud rates of 300 to 9600 bps. Communications cable connections are made to the terminal blocks in the IQ plus 350/355 as shown in the following tables.

Note: For connections *not* using hardware handshaking (CTS/DTR), install a jumper between pins 4 and 5 on the printer end of the serial cable.

3.4.1 RS-232 Connections

IQ Plus 350/355 Indicator		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J4-5	TxD (RS-232)	3	RxD (RS-232)
J4-2	GND (Signal Ground)	7	GND (Signal Ground)

3.4.2 20mA Current Loop Connections

IQ Plus 350/355 Indicator		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J4-4	+20mA OUT	9	+20mA IN)
J4-2	-20mA OUT	10	-20mA IN

3.5 IQ plus 390/590 Indicators

The SP2200 can be connected to the IQ plus 390/590 indicators at baud rates of 300 to 19200 bps. Communications cable connections are made to the terminal blocks in the IQ plus 390/590 as shown in the following tables.

3.5.1 RS-232 Connections

IQ Plus 390/590 Indicator		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J2-1	TxD (RS-232)	3	RxD (RS-232)
J2-2	GND (Signal Ground)	7	GND (Signal Ground)

3.6 UMC222 Indicators

The SP2200 can be connected to the UMC222 indicator at baud rates of 300 to 19200 bps. Communications cable connections are made to the terminal blocks in the UMC222 as shown in the following tables.

3.6.1 RS-232 Connections

UMC222 Indicator - Port 1		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB2-2	TxD (RS-232)	3	RxD (RS-232)
TB2-4	GND (Signal Ground)	7	GND (Signal Ground)

UMC222 Indicator - Port 2		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB2-1	TxD (RS-232)	3	RxD (RS-232)
TB2-4	GND (Signal Ground)	7	GND (Signal Ground)

3.7 IQ plus 510/710 Indicators

The SP2200 can be connected to the IQ plus 510 and 710 indicators at baud rates of 300 to 19200 bps. Communications cable connections are made to the J4 and J5 terminal blocks in the indicators as shown in the following tables.

Note: For connections *not* using hardware handshaking (CTS/DTR), install a jumper between pins 4 and 5 on the printer end of the serial cable.

3.7.1 RS-232 Connections

IQ Plus 510/710 Indicator			SP2200 Ticket Printer	
Pin	Port	Description	Serial Port Pin	Description
J4-2	1/2	GND (Signal Ground)	7	GND (Signal Ground)
J4-5	1	RxD (RS-232)	2	TxD (RS-232)
J4-4	1	TxD (RS-232)	3	RxD (RS-232)

3.7.2 20mA Current Loop Connections

IQ Plus 510/710 Indicator			SP2200 Ticket Printer	
Pin	Port	Description	Serial Port Pin	Description
J4-7	1	+20mA TxD	9	+20mA IN)
J4-6	1	-20mA TxD	10	-20mA IN

3.8 820i Indicators

The SP2200 can be connected to the 820i indicator at baud rates of 300 to 115200 bps. Communications cable connections are made to the terminal blocks in the 820 as shown in the following tables.

Note: For connections *not* using hardware handshaking (CTS/DTR), install a jumper between pins 4 and 5 on the printer end of the serial cable.

3.8.1 RS-232 Connections

820 Indicator		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J11-8	GND (Signal Ground)	7	GND (Signal Ground)
J11-9	RxD (RS-232)	2	TxD (RS-232)
J11-10	TxD (RS-232)	3	RxD (RS-232)

3.8.2 20mA Current Loop Connections

820 Indicator		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J11-7	-20mA OUT	10	-20mA IN)
J11-6	+20mA OUT	9	+20mA IN

3.9 IQ700/UMC600 Indicators

The SP2200 can be connected to the IQ700/UMC600 indicators at baud rates of 300 to 9600 bps. Communications cable connections are made to the terminal blocks in the IQ700/UMC600 as shown in the following tables.

Note: For connections *not* using hardware handshaking (CTS/DTR), install a jumper between pins 4 and 5 on the printer end of the serial cable.

3.9.1 IQ700/UMC600 Indicators

IQ700/UMC600 Indicator - Port 1		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB2-2	TxD (RS-232)	3	RxD (RS-232)
TB2-3	Rx1 (RS-232)	2	TxD (RS-232)
TB2-5	GND (Signal Ground)	7	GND (Signal Ground)

IQ700/UMC600 Indicator - Port 2		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB2-1	Tx2 (RS-232)	3	RxD (RS-232)
TB2-5	GND (Signal Ground)	7	GND (Signal Ground)

3.9.2 20mA Current Loop Connections

IQ700/UMC600 Indicator - Port 1		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB2-4	+20mA OUT	9	+20mA IN)
TB2-6	-20mA OUT	10	-20mA IN
TB2-3	+20mA IN	18	+20mA OUT
TB2-5	-20mA IN	19	-20mA OUT

IQ700/UMC600 Indicator - Port 2		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB4-1	+20mA OUT	9	+20mA IN
TB4-2	-20mA OUT	10	-20mA IN
TB5-3	+20mA IN	18	+20mA OUT
TB5-4	-20mA IN	19	-20mA OUT

3.10 UMC444/555 Indicators

The SP2200 can be connected to the UMC444/555 indicators at baud rates of 300 to 9600 bps. Communications cable connections are made to the terminal blocks in the UMC444/555 as shown in the following tables.

Note: For connections *not* using hardware handshaking (CTS/DTR), install a jumper between pins 4 and 5 on the printer end of the serial cable.

3.10.1 RS-232 Connections

UMC444/555 Indicator - Port 1		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB3-1	GND (Signal Ground)	7	GND (Signal Ground)
TB2-3	RxD1 (RS-232)	2	TxD (RS-232)
TB2-5	TxD1 (RS-232)	3	RxD (RS-232)

UMC444/555 Indicator - Port 2		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB3-1	GND (Signal Ground)	7	GND (Signal Ground)
TB2-6	TxD2 (RS-232)	3	RxD (RS-232)

3.10.2 20mA Current Loop Connections

UMC444/555 Indicator - Port 1		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB2-1	+20mA OUT	9	+20mA IN)
TB2-2	-20mA OUT	10	-20mA IN
TB2-4	+20mA IN	18	+20mA OUT
TB3-1	-20mA IN	19	-20mA OUT

UMC444/555 Indicator - Port 2		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
TB3-2	+20mA OUT	9	+20mA IN
TB3-3	-20mA OUT	10	-20mA IN

3.11 520/920i Indicators

The SP2200 can be connected to the 520/920i indicators at baud rates of 300 to 19200 bps. Communications cable connections are made to the terminal blocks in the 520/920i as shown in the following tables.

Note: For connections *not* using hardware handshaking (CTS/DTR), install a jumper between pins 4 and 5 on the printer end of the serial cable.

3.11.1 RS-232 Connections

520 Indicator - Port 1		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J5-2	GND (Signal Ground)	7	GND (Signal Ground)
J5-3	EDP RxD	2	TxD (RS-232)
J5-1	EDP TxD	3	RxD (RS-232)

920i Indicator - Port 3		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J9-1	GND (Signal Ground)	7	GND (Signal Ground)
J9-3	TxD (RS-232)	3	RxD (RS-232)
J9-2	RxD (RS-232)	2	TxD (RS-232)

3.11.2 20mA Current Loop Connections

520 Indicator - Printer Port		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J5-6	+20mA TxD	10	+20mA IN)
J5-7	-20mA TxD	9	-20mA IN

920i Indicator - Port 3		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J9-1	+20mA OUT	10	-20mA IN
J9-4	-20mA OUT	9	+20mA IN

3.12 120 Plus Indicator

The SP2200 can be connected to the 120 indicator at baud rates of 300 to 19200 bps. Communications cable connections are made to the terminal blocks in the 120 as shown in the following tables.

Note: For connections *not* using hardware handshaking (CTS/DTR), install a jumper between pins 4 and 5 on the printer end of the serial cable.

3.12.1 RS-232 Connections

120 Indicator - Port 1 - EDP		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
1	TxD	3	RxD
5	GND (Signal Ground)	7	GND (Signal Ground)

3.12.2 RS-232 Connections

120 Indicator - Printer Port		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
5	-20mA OUT	9	-20mA IN
9	+20mA OUT	10	+20mA IN

3.13 420 Plus Indicator

The SP2200 can be connected to the 420 Plus indicator at baud rates of 300 to 19200 bps. Communications cable connections are made to the terminal blocks in the 420 Plus as shown in the following tables.

Note: For connections *not* using hardware handshaking (CTS/DTR), install a jumper between pins 4 and 5 on the printer end of the serial cable.

3.13.1 RS-232 Connections

420 Indicator - Port 1 - EDP		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J4-1	TxD	3	RxD
J4-3	GND (Signal Ground)	7	GND (Signal Ground)

3.13.2 RS-232 Connections

420 Indicator - Printer Port		SP2200 Ticket Printer	
Pin	Description	Serial Port Pin	Description
J4-5	-20mA OUT	9	-20mA IN
J4-4	+20mA OUT	10	+20mA IN

4.0 Configuring the SP2200

The SP2200 is configured using three banks of DIP switches, labeled S1, S2, and S3, on the back of the unit. Each bank contains 8 switches, numbered 1 through 8. Switches are referred to by bank and switch number; for example, *DIP switch 3-7* refers to switch number 7 in bank 3 (S3).

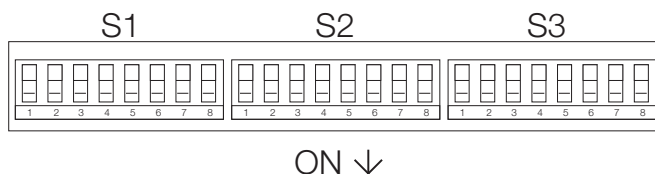


Figure 4-1. SP2200 DIP switch banks

With the exception of switch 3-8, *DIP switch values are read only when the printer is powered on*. If you change any of the switches while the printer is powered on, you must turn the printer off and on again for the change to take effect. Switch 3-8 is used to enable and disable the switch module and is read continuously.

4.1 Printer Mode Switches

Figure 4-2 shows the DIP switches used to set the printer mode.

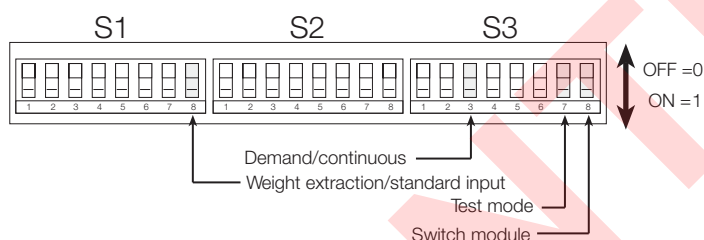


Figure 4-2. DIP switches used to set printer mode

4.1.1 Weight Extraction/Standard Input Mode

Switch 1-8 selects whether the printer operates in weight extraction mode (0) or standard input mode (1). See Section 1.1 for information about SP2200 operating modes and the data format used for weight extraction mode.

Note: This may require a parameter change in indicator. Some indicators require EOL (End of Line) delay change.k

4.1.2 Demand/Continuous Mode

Switch 3-3 selects whether data sent to the printer is sent in demand (0) or continuous mode (1). This switch is used only if the printer is configured for weight extraction mode (switch 1-8 is off).

The following table shows how the demand and continuous modes for the SP2200 relate to the mode selections configured for several indicators.

Indicator	SP2200 in Demand Mode	SP2200 in Continuous Mode
IQ plus 350/355	SERIAL → STREAM → OFF	SERIAL → STREAM → PRN
IQ plus 510/710	SERIAL → PRINT → STREAM → OFF	SERIAL → PRINT → STREAM → ON
IQ plus 800/810*	SERIAL → STREAM → OFF	SERIAL → STREAM → PRN

* IQ plus 800/810 PRNDEST (demand) or STREAM (continuous) parameter must be set to use either EDP or PRN port.

Table 4-1. Indicator configuration for demand/continuous mode

4.1.3 Test Mode

Switch 3-7 places the printer in self-test mode when the printer is powered on. The printer self-test and monitor mode functions are described in Section 2.3. For normal printer operations this switch must be off.

4.1.4 Switch Module

Switch 3-8 enables the **SET** button on the switch module. This switch must be set on to program time and date or ID code information using the switch module. Once the time and date or ID code has been set, switch 3-8 should be set off to prevent accidental changes to the programmed information. This switch has no effect on the use of the **PRINT** button.

4.2 Communications Configuration Switches

Figure 4-3 shows the DIP switches used to configure communications for the SP2200. These switches are described in the following sections.

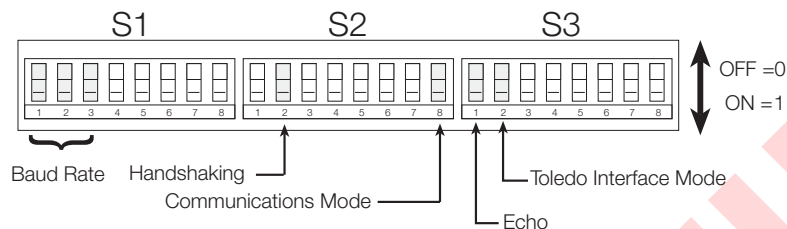


Figure 4-3. DIP switches used to set communications configuration

4.2.1 Baud Rate

Switches 1-1, 1-2, and 1-3 are used to set the baud rate used for serial communications between the printer and the indicator or other host device. **The value set at the printer must match the value configured for the host device.** Use Table 4-2 to determine the switch settings needed for the baud rate you are using.

1-1	1-2	1-3	Baud Rate
0	0	0	300 bps
0	0	1	600 bps
0	1	0	1200 bps
0	1	1	2400 bps
1	0	0	4800 bps
1	0	1	9600 bps
1	1	1	19.2 Kbps

Table 4-2. Baud rate selection switches

4.2.2 Handshaking

Switch 2-2 enables software handshaking between the printer and host device. This switch should be set on only for duplex RS-232 connections using the Clear to Send (CTS) and Data Terminal Ready (DTR) pins.

4.2.3 Communications Mode

Switch 2-8 sets the communications mode to serial (0) or parallel (1). Set this switch on only if you are using the parallel communications port.

4.2.4 Echo

Switch 3-1 determines whether information sent to the printer is echoed back to the host device. This function can be used to provide error checking at the host device or to relay transmitted data to a second printer or remote display. This switch is used for serial communications only. **Note: To enable echo in passive devices when using 20 mA current loop please add jumper from 4 to 5 and jumper 18 to 24 then pin 19 is +CL out and pin 13 is -CL out to passive device. Dip switch 3-1 on for echo on.**

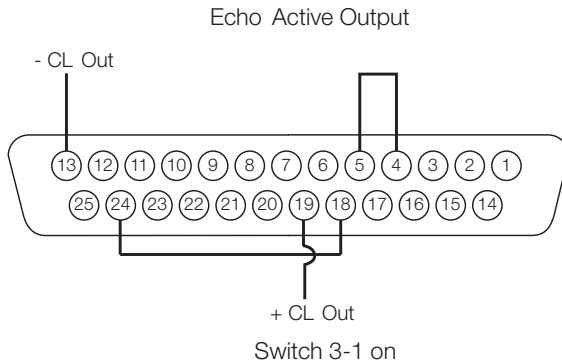


Figure 4-4. Echo Active Output Pin Connection

4.2.5 Toledo Interface Mode

Switch 3-2, when set on, enables the Toledo interface mode when connecting the SP2200 to Toledo indicators. This mode allows the SP2200 to communicate with Toledo indicators and to format weight information in both standard and weight extraction modes. Shift-in/shift-out (SO/SI) characters are also supported. **Note: The checksum must be disabled in the Toledo indicator. Placement of text may not be identical to the Toledo position of print.**

4.2.6 Active 20mA Mode

Active 20mA requires the device to supply current while the other device is passive. To have an active output, jumper pins 9 and 14.

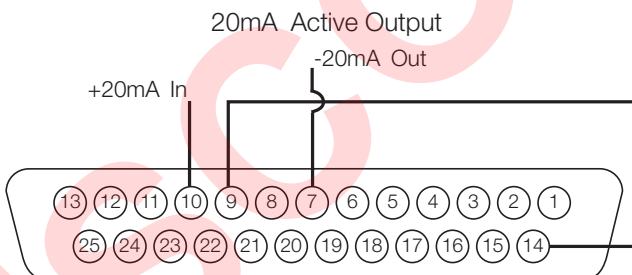


Figure 4-5 Active 20mA Mode Pin Connection

4.3 Printing Characteristics Switches

Figure 4-6 which is shown on page 23, shows the DIP switches used to set the printing characteristics of the SP2200.

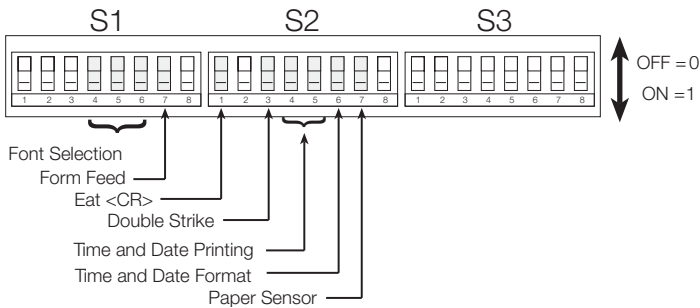


Figure 4-6. DIP switches used to set printer mode

4.3.1 Font Selection

Switches 1-4, 1-5, and 1-6 are used to select the size and orientation of the characters printed by the SP2200. Characters can be printed at the normal size (5x9 matrix), double height, double width, or double height and width. Characters can also be inverted (printed upside down) for use with applications using reverse form feed. Table 4-3 shows the switch settings used to select the various printer fonts.

1-4	1-5	1-6	Fonts
0	0	0	Normal
0	0	1	Inverted (I)
0	1	0	2xWidth (2W)
0	1	1	2xHeight (2H)
1	0	0	2H & I
1	0	1	2W & I
1	1	0	2H & 2W
1	1	1	2H & 2W & I

Table 4-3. Font selection switches

4.3.2 Form Feed

Switch 1-7 controls form feed direction. When set on, this switch causes the SP2200 to reverse the feed direction, pulling forms from the rear of the printer toward the front.

4.3.3 Eat <LF> after <CR>

Switch 2-1 is used in standard input mode to convert double-spaced data to a single-spaced format. If the host device sends an ASCII carriage return (CR, hex 0D, decimal 13) followed by a line feed (LF, hex 0A, decimal 10), setting this switch on causes the printer to ignore the line feed control code.

4.3.4 Double Strike

Switch 2-3, when set on, causes the printer to double-strike the printed characters. Use this function to specify darker print on multicopy forms and forms with weak carbon layers.

4.3.5 Time and Date Printing

Switches 2-4 and 2-5 are used to specify where the time and date information is printed on the ticket. These switches are used only if the time and date option is installed. Table 4-4 shows the switch combinations used to select where the time and date information is positioned on the ticket.

2-4	2-5	Time & Date Printing
0	0	Off
0	1	Print first
1	0	Print last
1	1	Print after units

Table 4-4. Time and date printing switches

4.3.6 Time and Date Format

Switch 2-6 selects whether the time and date are printed in international (0) or US (1) format. See Section 4.5 for more information about time and date formats.

4.3.7 Paper Sensor

Switch 2-7 turns the paper sensor off (0) and on (1). If the paper sensor is turned on and there is no form in the printer, the red FORM OUT LED will light and the printer will not attempt to print information sent to it.

4.4 DIP Switch Configuration Summary

The following table summarizes the function of the SP2200 DIP switch banks. See Sections 4-1 through 4-3 for detailed information.

Switch	Function	Values	
1-1	Baud Rate	000=300	100=4800
1-2		001=600	101=9600
1-3		010=1200	111=19200
		011=2400	
1-4	Font	000=Normal	100=2H & Inv
1-5		001=Inverted (Inv)	101=2W & Inv
1-6		010=2xWidth (2W)	110=2H & 2W
		011=2xHeight (2H)	111=2H & 2W & Inv
1-7	Form Feed	0=Forward	1=Reverse
1-8	Mode	0=Weight extraction	1=Standard input
2-1	Eat <LF> after <CR>	0=Off	1=On
2-2	Handshaking	0=Off	1=On
2-3	Double Strike	0=Off	1=On
2-4	Time & Date Printing	00=Off	01=Print First
2-5		10=Print Last	11=Print after Units
2-6	Time & Date Format	0=International	1=US
2-7	Paper Sensor	0=Off	1=On
2-8	Communications Mode	0=Serial	1=Parallel
3-1	Echo	0=Off	1=On
3-2	Toledo Interface Mode*	0=Off	1=On
3-3	Demand/Continuous Mode	0=Demand	1=Continuous
3-4	Not Used		
3-5			
3-6			
3-7	Test Mode	0=Off	1=On
3-8	Switch Module	0=Off	1=On

* Switch 3-2: To use the Toledo interface mode, the checksum must be disabled in the Toledo indicator for the printer to correctly format weight data. SO/SI characters are also supported.

4.5 Setting the Time and Date

If the time and date module is installed in the SP2200, you can set the time and date using either the switch module (if installed) or a serial input device such as a PC or ASCII terminal.

The following table shows the US and international time and date formats. The examples show how each format would print at 6:19 pm (1819 hrs) on 11 June 1999.

Format	Time and Date Format		Example	
US	hh:mm xM	MM/DD/YY	06:19 PM	11/15/06
International	hh:mm	DD/MM/YY	18:19	11/15/06

4.5.1 Setting the Time and Date Using the Switch Module

To set time and date using the switch module, DIP switch 3-8 must be set on to enable the switch module. The format you use to enter the date and time must match the format set by DIP switch 2-6 (0=International, 1=US format).

The following table shows the sequence of characters that are entered to set the time and date for US and international formats. Characters are entered one at a time: Use the + and – buttons on the switch module to select the character to be entered, then press **SET** to enter the character.

NOTE: When you begin entering time and date information, the **FAULT** lamp on the printer front panel will light. Once you have entered the last character required for the selected format (US or International), the **FAULT** lamp will go off.

The first character entered, **F**, indicates that the switch module is being used to set the time and date. The **x** character in the US format sequence represents the am/pm indicator: enter **0** for am, **8** for pm.

US	F	h	h	m	m	x	M	M	D	D	Y	Y
International	F	h	h	m	m	D	D	M	M	Y	Y	

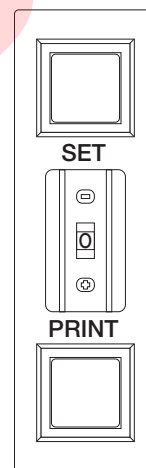
Example: To set the time and date for 6:19 pm (1819 hrs) on 11 June 1999, you would enter the following characters, pressing the **SET** button after each character.

US	F	0	6	1	9	8	0	6	1	1	9	9
International	F	1	8	1	9	1	1	0	6	9	9	

When you have finished entering the time and date information, set DIP switch 3-8 off to disable the switch module and prevent accidental changes.

4.5.2 Disabling Time and Date Printing

The simplest way to disable time and date printing is to set DIP switches 2-4 and 2-5 off. You can also clear the time and date information using the switch module or a serial command string.



To clear time and date information using the switch module, DIP switch 3-8 must be set on to enable the switch module. Use the + and – buttons on the switch module to select **F** (set time and date), then press **SET**. Select **C**, then press **SET** 12 times (or until the FAULT lamp goes off) to clear the time and date.

F C C C C C C C C C C C C

The time and date information is overwritten by the **C** (space) characters. When you have cleared the time and date information, set DIP switch 3-8 off to disable the switch module and prevent accidental changes.

To clear time and date information using a serial command string, enter the following (with no spaces between characters):

<SUB> sp sp sp sp sp sp sp sp sp sp sp sp sp sp <ESC> A

where **sp** is a space character (decimal 32, hex 40).

4.6 Setting ID Codes

If the switch module is installed in the SP2200, you can enter ID codes to be printed with weight data when the printer is in weight extraction mode. ID codes must be 8 digits in length and use only the digits 0 through 9 and the following characters: colon, period, and space. An ID code can be either a constant value, such as a part number or location code, or an incremented value. Incremented ID codes serve as counters, with the value increased by one for each printing request.

ID codes are entered one character at a time: Use the + and – buttons on the switch module to select the character to be entered, then press **SET** to enter the character. To enter the colon, period, or space characters in an ID code, use the A, B, and C characters on the switch module:

To Enter	Select
colon	A
period	B
space	C

4.6.1 Setting a Constant ID Code

To set a constant ID code using the switch module, set DIP switch 3-8 on to enable the switch module.

The following table shows the sequence of characters that are entered to set a constant ID code. The first character entered, **E**, indicates that the switch module is being used to set an ID code. The remaining eight characters represent the ID code itself. Characters are entered one at a time: Use the + and – buttons on the switch module to select the character to be entered, then press **SET** to enter the character.

E n n n n n n n

Note: When you begin entering the ID code information, the FAULT lamp on the printer front panel will light. Once you have entered the eight characters required for the code, the FAULT lamp will go off.

Example: To enter a constant ID code of 487561, you would enter the following characters, pressing the **SET** button after each character. The ID code entered must be eight characters in length. Use leading zeroes or spaces for codes of less than eight characters. In the example below, the **C** characters are used to insert two spaces before the ID code.

E C C 4 8 7 5 6 1

When you have entered the ID code information, set DIP switch 3-8 off to disable the switch module and prevent accidental changes.

4.6.2 Clearing an ID Code

To clear an ID code, set DIP switch 3-8 on to enable the switch module. Use the + and – buttons on the switch module to select **E** (to enter an ID code), then press **SET**. Select **C**, then press **SET** eight times to clear the ID code:

E C C C C C C C C

The ID code is overwritten by the **C** (space) characters.

When you have cleared the ID code information, set DIP switch 3-8 off to disable the switch module and prevent accidental changes.

4.6.3 Setting an Incrementing ID Code

To set an incrementing ID code, set DIP switch 3-8 on to enable the switch module. Before entering the code incrementing information, you must set the starting ID code using the **E** switch module command described in Section 4.6.1. See the examples below for more information.

The following table shows the sequence of characters that are entered to set an incrementing ID code. The number of digits used for the incrementing ID code and the number of line feeds between print requests are specified at the same time, using the same switch module command.

D x x y

The first character entered, **D**, is used to set code incrementing and to set the number of line feeds between prints. The first two characters following the **D** character (**xx**) are used to set the number of line feeds between each print request. (See Section 4.7 for more information about setting line feeds.) The remaining character, **y**, is the number of digits, 0 through 8, that are to be incremented. Use the + and – buttons on the switch module to select the character to be entered, then press **SET** to enter the character.

Note: When you begin entering the information, the **FAULT** lamp on the printer front panel will light. Once you have entered the two-digit line feed number and the number of digits used to increment the ID code, the **FAULT** lamp will go off.

Example 1: To set an ID code that increments from 1 to 9999, do the following, pressing the **SET** button after each character:

- 1) Enter the starting value as a constant ID code:

E 0 0 0 0 0 0 0 0

Because the starting value is also incremented, you must enter a value of one less than the first value to be printed.

- 2) Enter the incrementing ID code and line feed information. To increment the code through the value 9999, specify four digits of code incrementing:

D 0 1 4

where 4 is the number of digits through which the code will be incremented (0001-9999). The first two digits following the **D** character (**01**) set a single line feed between print requests. The ID code will now start at 0 and increment with each print request to 9999.

When you have entered the line feed and ID code information, set DIP switch 3-8 off to disable the switch module and prevent accidental changes.

Example 2: You can set an ID code to increment from any value entered as a constant ID code. For example, to set the SP2200 to increment through values of 100 to 99999, do the following:

- 1) Enter the starting value as a constant ID code:

E 0 0 0 0 0 0 9 9

Because the starting value is also incremented, you must enter a value of one less than the first value to be printed.

- 2) Enter the incrementing ID code and line feed information. To increment the code through the value 99999, specify five digits of code incrementing:

D 0 1 5

The ID code will now start at the value 100 and increment with each print request to 99999.

4.6.4 Stopping ID Code Incrementing

To stop an ID code from being incremented, follow the same procedure used for setting an incrementing ID code, but set the number of incrementing digits to zero.

D x x 0

4.7 Setting the Number of Line Feeds between Print Requests

You can use the switch module to set the number of line feeds between each print request handled by the SP2200. This function can be used to control spacing and align printing on labels or continuous forms.

To set the number of line feeds between prints, set DIP switch 3-8 on to enable the switch module.

The following table shows the sequence of characters that are entered to set the number of line feeds between print requests.

D x x y

The first character entered, **D**, is used to set both code incrementing and the number of line feeds. The **xx** characters are the number of line feeds, 00 through 99, that occur between each print request. *You must enter two digits for the number of line feeds.* A value of 00 provides single-spaced output.

The last character, **y**, sets the number of digits used for an incrementing ID code (see Section 4.6.2). Use the **+** and **-** buttons on the switch module to select the character to be entered, then press **SET** to enter the character.

Example: To set the printer to perform nine line feeds between print requests (with no code incrementing), you would enter the following characters, pressing the **SET** button after each character:

D 0 9 0

When you have entered the number of line feeds, set DIP switch 3-8 off to disable the switch module and prevent accidental changes.

4.8 Switch Module Command Summary

The following table provides a summary of switch module command formats used to set the time and date, ID codes and the number of line feeds between print requests. See Sections 4-4 through 4-6 for detailed descriptions of switch module commands.

Command	Function	Format
F	Set Time and Date	FhhmmxMMDDYY or FhhmmDDMMYY Enter using US or International format as configured by DIP switch 2-6 (0 =International, 1 =US format). For US format, x =am/pm indicator, where 0 =am, 8 =pm.
	Clear Time and Date	FCCCCCCCCCCCC
E	Set ID Code	Ennnnnnnnn
	Clear ID Code	ECCCCCCCC
D	Set Incrementing ID/Line Feeds	Dxxy xx =line feeds; y =number of digits incremented

5.0 SP2200 Control Codes and Escape Sequences

Control codes described in this manual are shown in the format **<CC>**, where the **< >** symbols indicate that the enclosed characters are a control code. For example, **<SUB>** represents a control code that clears the buffers in the SP2200.

The actual keys used to enter the control codes depend on the type of device used. For IBM-compatible devices, control codes are entered by holding the Control (Ctrl) key and pressing the key whose hexadecimal value equals the hexadecimal value of the control code plus 40.

For example, to find the key for control code **<SUB>**, find the hexadecimal equivalent for the SUB control code in the table in Section 6.1. Take that value (1A), and add 40:

$$1A + 40 = 5A$$

5A is the ASCII representation for the character **Z**. To enter the control code **<SUB>**, use the key combination Ctrl-Z.

Escape sequences are used to enter an alternate command. The alternate command is identified by entering the **<ESC>** command code followed by the alternate command. For IBM-compatible devices, the escape sequence consists of the key combination for the **<ESC>** command code (Ctrl-I) followed by a one-character alternate command.

The following table lists the alternate command used by the SP2200:

Command	Command Description
A	Set Time and Date

5.1 SP2200 Control Codes

The following table shows the key combinations used by IBM-compatible devices to enter control codes for the SP2200. The table lists the decimal and hexadecimal values of the control codes, ASCII character designation, and the command issued to the SP2200 by the control code.

Decimal	Hex	Code	Key Combination	Command
00	00	NUL	Ctrl-@	
01	01	SOH	Ctrl-A	
02	02	STX	Ctrl-B	
03	03	ETX	Ctrl-C	
04	04	EOT	Ctrl-D	
05	05	ENQ	Ctrl-E	Transmit on request (weight extraction mode only)
06	06	ACK	Ctrl-F	
07	07	BEL	Ctrl-G	
08	08	BS	Ctrl-H	
09	09	HT	Ctrl-I	
10	0A	LF	Ctrl-J	Line feed
11	0B	VT	Ctrl-K	Print and return (automatic line feed)
12	0C	FF	Ctrl-L	
13	0D	CR	Ctrl-M	Carriage return (end of field data; print buffer contents)
14	0E	SO	Ctrl-N	
15	0F	SI	Ctrl-O	Place time and date in field
16	10	DLE	Ctrl-P	Place date in field
17	11	DC1	Ctrl-Q	XON
18	12	DC2	Ctrl-R	Cash drawer OUT (0.5-second pulse at 12V)
19	13	DC3	Ctrl-S	XOFF
20	14	DC4	Ctrl-T	Place time in field
21	15	NAK	Ctrl-U	Place ID code in field
22	16	SYN	Ctrl-V	Request time and date
23	17	ETB	Ctrl-W	Wide print toggle
24	18	CAN	Ctrl-X	
25	19	EM	Ctrl-Y	
26	1A	SUB	Ctrl-Z	Clear buffers
27	1B	ESC	Ctrl-[	Use alternate command
28	1C	FS	Ctrl-\	
29	1D	GS	Ctrl-]	
30	1E	RS	Ctrl-^	
31	1F	US	Ctrl-_	

5.2 ASCII Character Set

Decimal	Hex	ASCII	Decimal	Hex	ASCII	Decimal	Hex	ASCII	Decimal	Hex	ASCII
00	00	NUL	32	20	SP	64	40	@	96	60	`
01	01	SOH	33	21	!	65	41	A	97	61	a
02	02	STX	34	22	"	66	42	B	98	62	b
03	03	ETX	35	23	#	67	43	C	99	63	c
04	04	EOT	36	24	\$	68	44	D	100	64	d
05	05	ENQ	37	25	%	69	45	E	101	65	e
06	06	ACK	38	26	&	70	46	F	102	66	f
07	07	BEL	39	27	'	71	47	G	103	67	g
08	08	BS	40	28	(	72	48	H	104	68	h
09	09	HT	41	29	)	73	49	I	105	69	i
10	0A	LF	42	2A	*	74	4A	J	106	6A	j
11	0B	VT	43	2B	+	75	4B	K	107	6B	k
12	0C	FF	44	2C	,	76	4C	L	108	6C	l
13	0D	CR	45	2D	-	77	4D	M	109	6D	m
14	0E	SO	46	2E	.	78	4E	N	110	6E	n
15	0F	SI	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	48	30	0	80	50	P	112	70	p
17	11	DC1	49	31	1	81	51	Q	113	71	q
18	12	DC2	50	32	2	82	52	R	114	72	r
19	13	DC3	51	33	3	83	53	S	115	73	s
20	14	DC4	52	34	4	84	54	T	116	74	t
21	15	NAK	53	35	5	85	55	U	117	75	u
22	16	SYN	54	36	6	86	56	V	118	76	v
23	17	ETB	55	37	7	87	57	W	119	77	w
24	18	CAN	56	38	8	88	58	X	120	78	x
25	19	EM	57	39	9	89	59	Y	121	79	y
26	1A	SUB	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	60	3C	<	92	5C	\	124	7C	
29	1D	GS	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	62	3E	>	94	5E	^	126	7E	~
31	1F	US	63	3F	?	95	5F	_	127	7F	DEL

6.0 Printer Maintenance

The following section covers routine maintenance, printhead service, fuse replacement, and replacement parts for the SP2200.

6.1 Routine Maintenance

To ensure trouble-free performance from the SP2200, keep dust and dirt out of the electronics enclosure and away from the print mechanism. A protective dust cover (part number 21210) is available to keep the printer clean when not in use.

The only routine maintenance required for the SP2200 printer is regular cleaning and lubrication of the printhead carriage shaft. Depending on the environment and amount of use, the carriage shaft should be cleaned and lubricated every one to six months using LUBRI-PLATE, IBM #23, or a similar product.

See Section 2.2.1 for information about installing ribbon cartridges.

6.2 Printhead Service

Printhead problems can arise when one or more of the printhead pins does not fire. **Before replacing the printhead, perform the printhead and drive transistor tests described in the *SP2200 Ticket Printer Service Manual*. If the printhead malfunction is caused by a bad drive transistor and the transistor is not replaced, a new printhead will be ruined.**

6.3 Fuse Replacement

If the SP2200 will not power on, use the following procedures to check the line fuses, power supply fuse, then the 5 volt supply fuse on the CPU board.

6.3.1 Line Fuses

To replace line fuses in the SP2200, do the following:

1. Turn off the printer and disconnect the power cord.
2. Use a small, flat-head screwdriver to lift the cover of the fuse compartment (see Figure 6-2).
3. Use the screwdriver to lift the fuseholder out of the compartment.
4. Replace either or both of the fuses, as required. See Section 7.1 for information about fuse ratings.
5. Slide the fuseholder back into the fuse compartment. Press down until the fuseholder snaps in place.
6. Close the fuse compartment cover and reconnect the power cord.

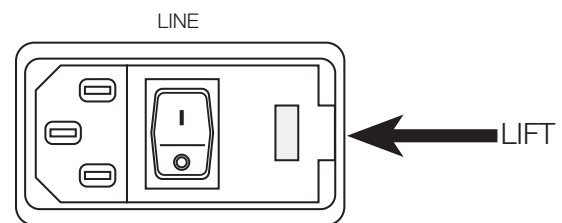


Figure 6-2. Cover of SP2200 Fuse Compartment

6.3.2 AC Power Supply Current Limiting Fuse

The SP2200 uses a 5A fuse to limit current output of the power supply. If the line fuses are good but the SP2200 does not power up when connected to the power source, use the following procedure to check the power supply fuse:

1. Turn off the printer and disconnect the power cord.
2. Remove the printer covers using the procedure described in Section 2.4.1.
3. Locate the fuse, PSF1, at the left rear corner of the power supply board.
4. If the fuse canister is transparent, the fuse is intact. If the fuse is discolored, remove the fuse from the socket and replace with a new 125V/5A fast-acting microfuse.
5. Replace covers using the procedure described in Section 2.4.7.
6. Reconnect the power cord.

6.3.3 Onboard 5 Volt Supply Fuse

The SP2200 uses a 2.0A fuse to protect board circuitry. Short circuits of serial or parallel communications cables or shorts on the board itself can blow the 5V supply fuse. If the line and power supply fuses are good but the SP2200 does not power up when connected to the power source, use the following procedure to check the 5V supply fuse:

1. Turn off the printer and disconnect the power cord.
2. Remove the printer covers using the procedure described in Section 2.4.1.
3. Locate the fuse, F4, at the left front corner of the main SP2200 circuit board (see Figure 2-10).
4. If the fuse canister is transparent, the fuse is intact. If the fuse is discolored, remove the fuse from the socket and replace with a new 2.0A fast-acting microfuse. See Section 7.1 for fuse rating.
5. Replace covers using the procedure described in Section 2.4.7.
6. Reconnect the power cord.

6.4 Selected Replacement Parts

Tables 6-1 and 6-2 list selected replacement parts for the SP2200 ticket printer. For a complete parts list, see the *Electronic Components and Replacement Parts Catalog*.

Description		Part Number
Top cover	Gray	33944
	Black	35341
	Blue	40870
Enclosure cover	Gray	33945
	Black	35340
	Blue	40869
Base enclosure	Gray	35339
	Gray	35286
Foot, small rubber		16109
Power supply board		35362
Fuse, Slo-Blo 1.25A 3AG	115V	16462
Fuse, Slo-Blo .75A 3AG	230V	16451
Fuse, fast-acting 1.5A subminiature (F4)		36014
Fuse, fast-acting 5A subminiature (PSF1)		38851
Line filter, RFI 6A		34192
Power cord		15438

Table 6-1. Selected SP2200 Replacement Parts, Enclosure and Power Supply

Description	Part Number
EMI filter for serial cable	38694
Parallel port cable assembly	35698
20mA current loop option	20302
RS-422A option	23169
Time and date module	16210
Programmed SP2200 EPROM	23171
CPU board assembly	35361
Switch module assembly	35231
Switch module lens (white)	15939
Switch module push button switch	15938
Switch module pushwheel switch	15940
Print mechanism assembly	34170
Print platen	33116
Printhead	35347
Printhead cable assembly	35346
Printhead cable, 2x6 flexible	33850
Printhead board assembly	35364
Sensor board assembly	23168
Head adjustment lever	20282
Paper drive motor assembly	34168
Paper drive gear	20286
Paper idler gear	20287
Timing belt	20298
Head drive motor assembly	34169
Clutch gear assembly	34175
Ribbon drive gear	33503
Ribbon idler gear	33808
Paper guide	16096
Ribbon cartridge (black)	20308

Table 6-2. Selected SP2200 Replacement Parts, Electronics and Print Mechanism

7.0 SP2200 Specifications

7.1 Electrical Specifications

Voltage:	115 or 230 VAC (–10% / +15%)
Frequency:	50 or 60 Hz
Fusing:	Two 1.25A Slo-Blo (UL/CSA) 3AG @ 115 VAC operation, or Two 0.75A Slo-Blo (UL/CSA) 3AG @ 230 VAC operation (line filter) One 125V/5.0A fast-acting, socketed (UL/CSA) microfuse (power supply) One 2.0A fast-acting, socketed (UL/CSA) microfuse (CPU board)

7.2 Printing Specifications

Printer type:	Bidirectional dot matrix
Print speed:	180 characters per second (cps), single strike, 50% duty cycle 3.5 lines per second (lps)
Line feed rate:	34 lines per second (lps)
Characters per line:	40 characters @ 12 characters per inch (cpi)
Print width:	3.33 inches
Standard matrix:	5x9 (0.012 inch diameter dots on 0.0139 inch centers)
Character height:	0.124 inches
Character set:	Upper and lower case ASCII
Line spacing:	6 lines per inch
Paper feed motor rate:	73.34 steps per inch
Printhead motor feed rate:	73.34 steps per inch
Form thickness:	Adjustable from 0.004 to 0.024 inches in increments of 0.004 inches

7.3 Communications Specifications

Serial communications	
Interfaces:	25-pin serial port supports RS-232C (standard), RS-422A, 20mA current loop
Data rates:	300, 600, 1200, 2400, 4800, 9600, 19.2 Kbps
ASCII encoding:	1 start bit, 7 data bits (parity bit ignored), 2 stop bits
Parallel communications	
Interface:	36-pin parallel port
Data rate:	Set by sending device

7.4 Environmental Specifications

Temperature:	–10° to +40° C (14° to 104° F)
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SP2200 Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for one (1) year.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

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- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, "Protecting Your Components From Static Damage in Shipment," available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the non-conformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

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PN 34171 10/11